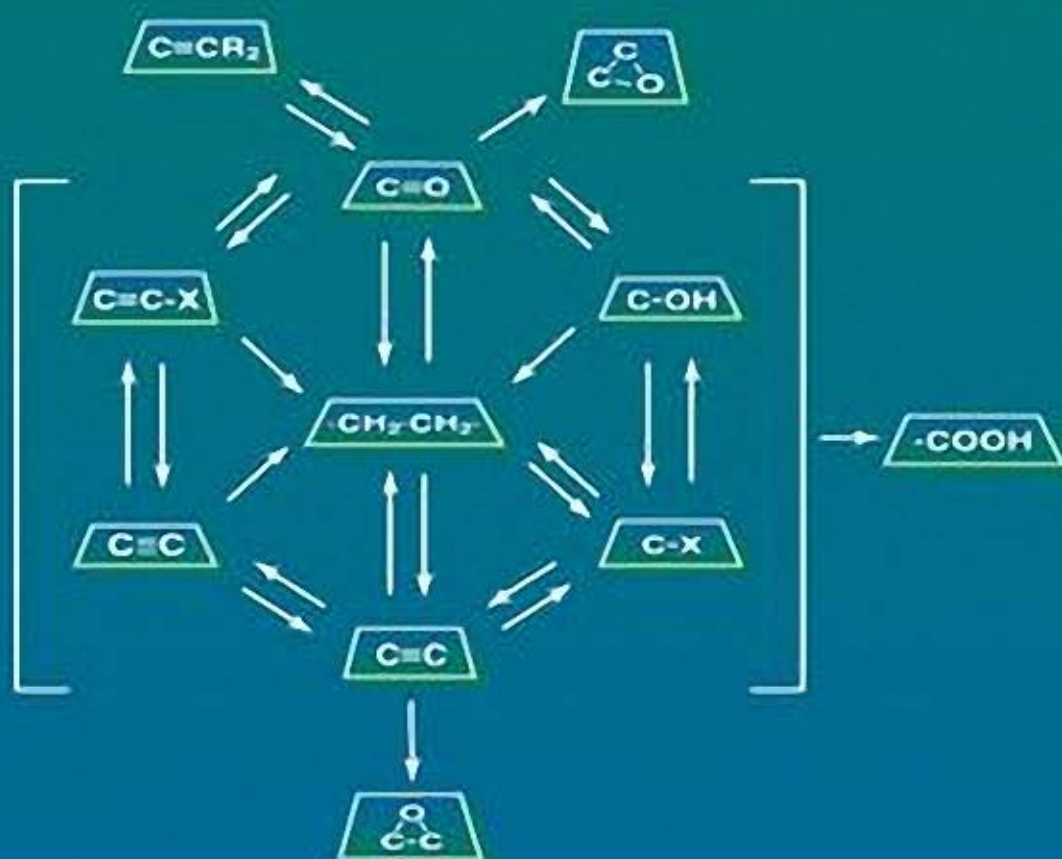


# Compendium of Organic Synthetic Methods

Volume 11



Michael B. Smith

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Volume 11

MICHAEL B. SMITH

DEPARTMENT OF CHEMISTRY  
THE UNIVERSITY OF CONNECTICUT  
STORRS, CONNECTICUT



**WILEY-INTERSCIENCE**

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# PREFACE

Since the original volume in this series by Ian and Shuyen Harrison, the goal of the *Compendium of Organic Synthetic Methods* was to facilitate the search for functional group transformations in the original literature of Organic Chemistry. In Volume 2, difunctional compounds were added and this compilation was continued by Louis Hegedus and Leroy Wade for Volume 3 of the series. Wade became the author for Volume 4 and continued with Volume 5. I began editing the series with Volume 6, where I introduced an author index for the first time and added a new chapter (Chapter 15, Oxides). Volume 7 introduced Sections 378 (Oxides - Alkynes) through Section 390 (Oxides - Oxides). This volume introduces Section 74G (Cyclobutanations). The *Compendium* is a handy desktop reference that will remain a valuable tool to the working Organic chemist, allowing a "quick check" of the literature. It also allows one to "browse" for new reactions and transformations that may be of interest. The number of articles that comprise Organic literature is very large, and the *Compendium* is a focused and highly representative review of the literature and is offered in that context.

*Compendium of Organic Synthetic Methods, Volume 11* contains both functional group transformations and carbon-carbon bond forming reactions from the literature appearing in the years 1999, 2000 and 2001. The classification schemes used for Volumes 6–10 have been continued, but one new section was added. Section 74G (Cyclobutanations) describes methods that produce cyclobutane rings. As in the past, difunctional compounds appear in Chapter 16. The experienced user of the *Compendium* will require no special instructions for the use of Volume 11. Author citations and the Author Index have been continued as in Volumes 6–10.

Every effort has been made to keep the manuscript error free. Where there are errors, I take full responsibility. If there are questions or comments, the reader is encouraged to contact me directly at the address, phone, fax, or Email addresses given below.

As I have throughout my writing career, I thank my wife Sarah and my son Steven, who have shown unfailing patience and devotion during this work. Steven Smith also prepared many of the drawings used in this volume, and I thank him for that contribution. I also thank Dr. Darla Henderson and Amy Romano, the editors for this volume.

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Storrs, Connecticut

April, 2003

# ABBREVIATIONS

Ac  
acac  
AIBN  
aq.

Acetyl  
Acetylacetonate  
*azo-bis-isobutyronitrile*  
Aqueous



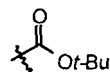
9-Borabicyclo[3.3.1]nonylboryl

9-BBN  
BER  
BINAP  
Bmim  
Bn  
Bz

9-Borabicyclo[3.3.1]nonane  
Borohydride exchange resin  
2*R*,3*S*-2,2'-*bis*-(diphenylphosphino)-1,1'-binaphthyl  
1-butyl-3-methylimidazolium  
benzyl  
benzoyl

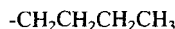
BOC

*t*-Butoxycarbonyl



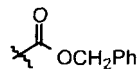
bpy (Bipy)  
Bu  
CAM  
CAN  
*c*-  
cat.

2,2'-Bipyridyl  
*n*-Butyl  
Carboxamidomethyl  
Ceric ammonium nitrate  
cyclo-  
Catalytic



Cbz

Carbobenzyloxy



Chirald  
COD  
COT  
Cp  
CSA  
CTAB

2*S*,3*R*-(+)-4-dimethylamino-1,2-diphenyl-3-methylbutan-2-ol  
1,5-Cyclooctadienyl  
1,3,5-cyclooctatrienyl  
Cyclopentadienyl  
Camphorsulfonic acid  
cetyltrimethylammonium bromide



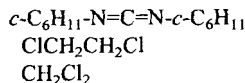
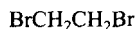
Cy (*c*-C<sub>6</sub>H<sub>11</sub>)

Cyclohexyl







°C  
DABCO  
dba  
DBE  
DBN  
DBU  
DCC  
DCE  
DCM  
DDQ

Temperature in Degrees Centigrade  
1,4-Diazabicyclo[2.2.2]octane  
dibenzylidene acetone  
1,2-Dibromoethane  
1,8-Diazabicyclo[5.4.0]undec-7-ene  
1,5-Diazabicyclo[4.3.0]non-5-ene  
1,3-Dicyclohexylcarbodiimide  
1,2-Dichloroethane  
dichloromethane  
2,3-Dichloro-5,6-dicyano-1,4-benzoquinone





% de	% Diastereomeric excess	
DEA	Diethylamine	$\text{HN}(\text{CH}_2\text{CH}_3)_2$
DEAD	Diethylazodicarboxylate	$\text{EtO}_2\text{C}-\text{N}=\text{NCO}_2\text{Et}$
Dibal-H	Diisobutylaluminum hydride	$(\text{Me}_2\text{CHCH}_2)_2\text{AlH}$
Diphos (dppe)	1,2- <i>bis</i> -(Diphenylphosphino)ethane	$\text{Ph}_2\text{PCH}_2\text{CH}_2\text{PPh}_2$
Diphos-4 (dppb)	1,4- <i>bis</i> -(Diphenylphosphino)butane	$\text{Ph}_2\text{P}(\text{CH}_2)_4\text{PPh}_2$
DMAP	4-Dimethylaminopyridine	
DMA	Dimethylacetamide	
DME	Dimethoxyethane	$\text{MeOCH}_2\text{CH}_2\text{OMe}$
DMF	<i>N,N'</i> -Dimethylformamide	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{N}(\text{CH}_3)_2 \end{array}$
dmp	<i>bis</i> -[1,3-Di( <i>p</i> -methoxyphenyl)-1,3-propanedionato]	
dpm	dipivaloylmethanato	
dppb	1,4- <i>bis</i> -(Diphenylphosphino)butane	$\text{Ph}_2\text{P}(\text{CH}_2)_4\text{PPh}_2$
dppe	1,2- <i>bis</i> -(Diphenylphosphino)ethane	$\text{Ph}_2\text{PCH}_2\text{CH}_2\text{PPh}_2$
dppf	<i>bis</i> -(Diphenylphosphino)ferrocene	
dppp	1,3- <i>bis</i> -(Diphenylphosphino)propane	$\text{Ph}_2\text{P}(\text{CH}_2)_3\text{PPh}_2$
dvb	Divinylbenzene	
e <sup>-</sup>	Electrolysis	
% ee	% Enantiomeric excess	
EE	1-Ethoxyethoxy	$\text{EtO}(\text{Me})\text{CHO}-$
Et	Ethyl	$-\text{CH}_2\text{CH}_3$
EDA	Ethylenediamine	$\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2$
EDTA	Ethylenediaminetetraacetic acid	
Emim	1-ethyl-3-methylimidazolium	
FMN	Flavin mononucleotide	
fod	<i>tris</i> -(6,6,7,7,8,8,8)-Heptafluoro-2,2-dimethyl-3,5-octanedionate	
Fp	Cyclopentadienyl- <i>bis</i> -carbonyl iron	
FVP	Flash Vacuum Pyrolysis	
Grubbs' catalyst	$\text{Cl}_2(\text{PCy}_3)_2\text{Ru}=\text{CHPh}$	
Grubbs' catalyst II	$\begin{array}{c} \text{Mes}-\text{N} \quad \text{N}-\text{Mes} \\ \diagdown \quad \diagup \\ \text{C} \\ \diagup \quad \diagdown \\ \text{Cl} \quad \text{Ru}=\text{CHPh} \\ \diagdown \\ \text{PCy}_3 \end{array}$	
h	hour (hours)	
hν	Irradiation with light	
1,5-HD	1,5-Hexadienyl	
HPMA	Hexamethylphosphoramide	$(\text{Me}_2\text{N})_3\text{P}=\text{O}$
HMPT	Hexamethylphosphorus triamide	$(\text{Me}_2\text{N})_3\text{P}$
iPr	Isopropyl	$-\text{CH}(\text{CH}_3)_2$
LICA (LIPCA)	Lithium cyclohexylisopropylamide	
LDA	Lithium diisopropylamide	$\text{LiN}(\text{iPr})_2$
LHMDS	Lithium hexamethyl disilazide	$\text{LiN}(\text{SiMe}_3)_2$
LTMP	Lithium 2,2,6,6-tetramethylpiperidine	
MABR	Methylaluminum <i>bis</i> -(4-bromo-2,6-di- <i>tert</i> -butylphenoxide)	

MAD	<i>bis</i> -(2,6-di- <i>t</i> -butyl-4-methylphenoxy)methyl aluminum	
mCPBA	<i>meta</i> -Chloroperoxybenzoic acid	
Me	Methyl	-CH <sub>3</sub>
MEM	β-Methoxyethoxymethyl	MeOCH <sub>2</sub> CH <sub>2</sub> OCH <sub>2</sub> -
Mes	Mesityl	2,4,6-tri-Me-C <sub>6</sub> H <sub>2</sub>
MOM	Methoxymethyl	MeOCH <sub>2</sub> -
Ms	Methanesulfonyl	CH <sub>3</sub> SO <sub>2</sub> -
MS	Molecular Sieves (3 Å or 4 Å)	
MTM	Methylthiomethyl	CH <sub>3</sub> SCH <sub>2</sub> -
NAD	Nicotinamide adenine dinucleotide	
NADP	Sodium triphosphopyridine nucleotide	
Naph	Naphthyl (C <sub>10</sub> H <sub>8</sub> )	
NBD	Norbornadiene	
NBS	<i>N</i> -Bromosuccinimide	
NCS	<i>N</i> -Chlorosuccinimide	
NIS	<i>N</i> -Iodosuccinimide	
Ni(R)	Raney nickel	
NMP	<i>N</i> -Methyl-2-pyrrolidinone	
Oxone	2 KHSO <sub>5</sub> ·KHSO <sub>4</sub> ·K <sub>2</sub> SO <sub>4</sub>	
	Polymeric backbone	
PCC	Pyridinium chlorochromate	
PDC	Pyridinium dichromate	
PEG	Polyethylene glycol	
Ph	Phenyl	
PhH	Benzene	
PhMe	Toluene	
Phth	Phthaloyl	
pic	2-Pyridinecarboxylate	
Pip	Piperidino	
PMP	4-methoxyphenyl	
Pr	<i>n</i> -Propyl	-CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>
Py	Pyridine	
quant.	Quantitative yield	
Red-Al	[(MeOCH <sub>2</sub> CH <sub>2</sub> O) <sub>2</sub> AlH <sub>2</sub> ] <sub>2</sub> Na	
sBu	<i>sec</i> -Butyl	CH <sub>3</sub> CH <sub>2</sub> CH(CH <sub>3</sub> )
sBuLi	<i>sec</i> -Butyllithium	CH <sub>3</sub> CH <sub>2</sub> CH(Li)CH <sub>3</sub>
Siamyl	Diisoamyl	(CH <sub>3</sub> ) <sub>2</sub> CHCH(CH <sub>3</sub> )-
TADDOL	α,α,α',α'-tetraaryl-4,5-dimethoxy-1,3-dioxolane	
TASF	<i>tris</i> -(Diethylamino)sulfonium difluorotrimethyl silicate	
TBAB	Tetrabutylammonium bromide	<i>n</i> -Bu <sub>4</sub> N <sup>+</sup> Br <sup>-</sup>
TBAF	Tetrabutylammonium fluoride	<i>n</i> -Bu <sub>4</sub> N <sup>+</sup> F <sup>-</sup>
TBAI	Tetrabutylammonium iodide	<i>n</i> -Bu <sub>4</sub> N <sup>+</sup> I <sup>-</sup>
TBDMS	<i>t</i> -Butyldimethylsilyl	<i>t</i> -BuMe <sub>2</sub> Si
TBHP ( <i>t</i> -BuOOH)	<i>t</i> -Butylhydroperoxide	Me <sub>3</sub> COOH

<i>t</i> -Bu	<i>tert</i> -Butyl	-C(CH <sub>3</sub> ) <sub>3</sub>
TEBA	Triethylbenzylammonium	PhCH <sub>2</sub> (Et) <sub>3</sub> N <sup>+</sup>
TEMPO	Tetramethylpiperdinyloxy free radical	
TFA	Trifluoroacetic acid	CF <sub>3</sub> COOH
TFAA	Trifluoroacetic anhydride	(CF <sub>3</sub> CO) <sub>2</sub> O
Tf (OTf)	Triflate	-SO <sub>2</sub> CF <sub>3</sub> (-OSO <sub>2</sub> CF <sub>3</sub> )
THF	Tetrahydrofuran	
THP	Tetrahydropyran	
TMEDA	Tetramethylethylenediamine	Me <sub>2</sub> NCH <sub>2</sub> CH <sub>2</sub> NMe <sub>2</sub>
TMG	1,1,3,3-Tetramethylguanidine	
TMS	Trimethylsilyl	-Si(CH <sub>3</sub> ) <sub>3</sub>
TMP	2,2,6,6-Tetramethylpiperidine	
TPAP	tetra- <i>n</i> -Propylammonium perruthenate	
Tol	Tolyl	4-CH <sub>3</sub> -C <sub>6</sub> H <sub>4</sub>
Tr	Trityl	-CPh <sub>3</sub>
TRIS	Triisopropylphenylsulfonyl	
Ts(Tos)	Tosyl = <i>p</i> -Toluenesulfonyl	4-MeC <sub>6</sub> H <sub>4</sub> SO <sub>2</sub>
X <sub>c</sub>	Chiral auxiliary	

# INDEX, MONOFUNCTIONAL COMPOUNDS

Sections—Heavy type  
Pages—light type

PREPARATION OF

FROM

Alkynes	Carboxylic acid derivatives	Alcohols, phenols	Aldehydes	Alkyls, methylenes, aryls	Amines	Esters	Ethers, epoxides	Halides, sulfonates	Nitriles	Alkenes	Oxides
1 9	16 46	46 90	61 90	76 115	91 264	106 310	121 335	166 386	196 425	211 470	
	17 9	32 18	47 90	62 120	77 226	107 310	137 366	152 377	167 387	212 470	
	18 10	33 19	48 91	63 120	78 230	108 265	123 335	138 367	153 378	198 439	213 471
	4 10	19 34	49 98	64 121	79 239	109 265	124 339	139 368	169 395	184 417	199 471
	20 11	35 42	50 98	65 122	110 319	140 369	155 378	185 419	200 443	215 472	
	21 12	51 98	81 232	96 268	111 320	126 343	171 395	186 419	216 472		
	37 42	52 99	67 125	82 246	97 271	127 343	157 378	172 395	187 420	202 444	217 473
	23 12	36 43	68 125	83 251	98 288	113 321	128 344	143 369	158 379	173 397	203 444
	24 13	39 45	54 99	69 131	84 253	114 325	129 345	144 370	159 380	174 398	204 445
	10 5	25 49	55 102	70 132	85 254	100 289	115 327	130 347	145 370	175 381	190 421
	11 7	26 41	56 103	71 153	86 255	101 294	116 328	146 370	176 401	221 477	
	12 7	27 42	57 103	72 155	87 255	102 295	117 330	132 348	162 383	177 405	207 450
	13 7			73 156	88 257	103 297			178 409	193 422	208 451
	29 15	44 70	59 103	74 156	89 258	104 298	119 332	134 349	149 375	179 409	194 423
	30 8	45 73	60 105	75 221	90 259	105 298	120 333	135 363	150 376	165 385	180 423
	15 8	30 16	45 73	60 105	75 221	90 259	105 298	120 333	135 363	150 376	165 385
	15 8	30 16	45 73	60 105	75 221	90 259	105 298	120 333	135 363	150 376	165 385

PROTECTION

Sect. Pg.  
Carboxylic acids 30A 17  
Alcohols, phenols 45A 73  
Aldehydes 60A 107  
Amides 90A 263  
Amines 105A 307  
Ketones 180A 415

Blanks in the table correspond to sections for which no additional examples were found in the literature

Sections—heavy type  
Pages—light type

Sections—heavy type		Pages—light type		Alkyne		Carboxylic acid		Alcohol, Phenol		Aldehyde		Amine		Ester		Ether, Epoxide		Halide		Ketone		Nitrile		Alkyne		Oxide																																																																																																																																																																																																																																																																																																																																																																																																																																			
300	423	301	312	302	313	323	303	324	304	315	325	334	342	305	316	326	335	343	350	306	317	327	336	344	351	357	307	328	337	345	351	358	363	308	329	338	346	353	359	364	368	309	320	330	339	347	354	360	365	369	372	310	331	340	348	355	361	366	373	375	311	322	332	341	349	356	362	367	371	374	376	377	312	323	333	342	350	357	363	368	372	375	378	313	324	334	343	351	358	364	370	373	376	379	314	325	335	344	352	359	365	371	374	377	380	315	326	336	345	353	360	366	372	375	378	381	316	327	337	346	354	361	367	373	376	379	382	317	328	338	347	355	362	368	374	377	380	383	318	329	339	348	356	363	369	375	378	381	384	319	330	340	349	357	364	370	373	376	379	382	320	331	341	350	358	365	371	374	377	380	383	321	332	342	351	359	366	372	375	378	381	384	322	333	343	352	360	367	373	376	379	382	323	334	344	353	361	368	374	377	380	383	386	324	335	345	354	362	369	375	378	381	384	387	325	336	346	355	363	370	373	376	379	382	385	326	337	347	356	364	371	374	377	380	383	386	327	338	348	357	365	372	375	378	381	384	387	328	339	349	358	366	373	376	379	382	385	388	329	340	350	359	367	374	377	380	383	386	389	330	341	351	360	368	375	378	381	384	387	390	331	342	352	361	369	376	379	382	385	388	391	332	343	353	362	370	377	380	383	386	389	392	333	344	354	363	371	374	377	380	383	386	389	392	334	345	355	364	372	375	378	381	384	387	390	335	346	356	365	373	376	379	382	385	388	391	336	347	357	366	374	377	380	383	386	389	392	337	348	358	367	375	378	381	384	387	390	338	349	359	368	376	379	382	385	388	391	339	350	360	369	377	380	383	386	389	392	340	351	361	370	378	381	384	387	390	341	352	362	371	379	382	385	388	391	342	353	363	372	380	383	386	389	392	343	354	364	373	381	384	387	390	344	355	365	374	382	385	388	391	345	356	366	375	383	386	389	392	346	357	367	376	384	387	390	347	358	368	377	385	388	391	348	359	36

Blanks in the table correspond to sections for which no additional examples were found in the literature.

# INTRODUCTION

**Relationship between Volume 11 and Previous Volumes.** *Compendium of Organic Synthetic Methods, Volume 11* presents 2781 examples of published reactions for the preparation of monofunctional compounds, updating the 13,050 in Volumes 1–10. Volume 11 contains 1212 examples of reactions that prepare difunctional compounds with various functional groups. Reviews have long been a feature of this series, and Volume 11 adds 41 pertinent reviews in the various sections.

Chapters 1–14 continue as in Volumes 1–10, as does Chapter 15, introduced in Volume 6. Difunctional compounds appear in Chapter 16, as in Volumes 6–10. The sections on oxides as part of difunctional compounds, introduced in Volume 7, continues in Chapter 16 of Volumes 8–11 with Sections 378 (Oxides-Alkynes) through Section 390 (Oxides-Oxides).

Following Chapter 16 is a complete alphabetical listing of all authors (last name, initials). The authors for each citation appear below the reaction. The principal author is indicated by underlining (i.e., Kwon, T.W.; Smith, M.B.), as done previously in Volumes 7–10.

**Classification and Organization of Reactions Forming Monofunctional Compounds.** Chemical transformations are classified according to the reacting functional group of the starting material and the functional group formed. Those reactions that give products with the same functional group form a chapter. The reactions in each chapter are further classified into sections on the basis of the functional group of the starting material. Within each section, reactions are loosely arranged in descending order of year cited (2001–1999), although an effort has been made to put similar reactions together when possible. Review articles are collected at the end of each appropriate section.

The classification is unaffected by allylic, vinylic, or acetylenic unsaturation appearing in both starting material and product, or by increases or decreases in the length of carbon chains; for example, the reactions  $t\text{-BuOH} \rightarrow t\text{-BuCOOH}$ ,  $\text{PhCH}_2\text{OH} \rightarrow \text{PhCOOH}$ , and  $\text{PhCH=CHCH}_2\text{OH} \rightarrow \text{PhCH=CHCOOH}$  would all be considered as preparations of carboxylic acids from alcohols. Conjugate reduction and alkylation of unsaturated ketones, aldehydes, esters, acids, and nitriles have been placed in Sections 74D and 74E (Alkyls from Alkenes), respectively.

The terms hydrides, alkyls, and aryls classify compounds containing reacting hydrogens, alkyl groups, and aryl groups, respectively; for example,  $\text{RCH}_2\text{-H} \rightarrow \text{RCH}_2\text{COOH}$  (carboxylic acids from hydrides),  $\text{RMe} \rightarrow \text{RCOOH}$  (carboxylic acids from alkyls),  $\text{RPh} \rightarrow \text{RCOOH}$  (carboxylic acids from aryls). Note the distinction between  $\text{R}_2\text{CO} \rightarrow \text{R}_2\text{CH}_2$  (methylenes from ketones) and  $\text{RCOR}' \rightarrow \text{RH}$  (hydrides from ketones). Alkylations involving additions across double bonds are found in Section 74 (alkyls, methylenes, and aryls from alkenes).

The following examples illustrate the classification of some potentially confusing cases:

$\text{RCH=CHCOOH} \rightarrow$	$\text{RCH=CH}_2$	Hydrides from carboxylic acids
$\text{RCH=CH}_2 \rightarrow$	$\text{RCH=CHCOOH}$	Carboxylic acids from hydrides
$\text{ArH} \rightarrow$	$\text{ArCOOH}$	Carboxylic acids from hydrides
$\text{ArH} \rightarrow$	$\text{ArOAc}$	Esters from hydrides
$\text{RCHO} \rightarrow$	$\text{RH}$	Hydrides from aldehydes
$\text{RCH=CHCHO} \rightarrow$	$\text{RCH=CH}_2$	Hydrides from aldehydes
$\text{RCHO} \rightarrow$	$\text{RCH}_3$	Alkyls from aldehydes
$\text{R}_2\text{CH}_2 \rightarrow$	$\text{R}_2\text{CO}$	Ketones from methylenes
$\text{RCH}_2\text{COR} \rightarrow$	$\text{R}_2\text{CHCOR}$	Ketones from ketones
$\text{RCH=CH}_2 \rightarrow$	$\text{RCH}_2\text{CH}_3$	Alkyls from alkenes (Hydrogenation of Alkenes)
$\text{RBr} + \text{HC}\equiv\text{CH} \rightarrow$	$\text{RC}\equiv\text{CR}$	Acetylenes from halides; also acetylenes from acetylenes
$\text{ROH} + \text{RCOOH} \rightarrow$	$\text{RCOOR}$	Esters from alcohols; also esters from carboxylic acids
$\text{RCH=CHCHO} \rightarrow$	$\text{RCH}_2\text{CH}_2\text{CHO}$	Alkyls from alkenes (Conjugate Reduction)
$\text{RCH=CHCN} \rightarrow$	$\text{RCH}_2\text{CH}_2\text{CN}$	Alkyls from alkenes (Conjugate Reduction)

**How to Use the Book to Locate Examples of the Preparation of Protection of Monofunctional Compounds.** Examples of the preparation of one functional group from another are found in the monofunctional index on p xiii, which lists the corresponding section and page. Sections that contain examples of the reactions of a functional group are found in the horizontal rows of this index. Section 1 gives examples of the reactions of acetylenes that form new acetylenes; Section 16 gives reactions of acetylenes that form carboxylic acids; and Section 31 gives reactions of acetylenes that form alcohols.

Examples of alkylation, dealkylation, homologation, isomerization, and transposition are found in Sections 1, 17, 33, and so on, lying close to a diagonal of the index. These sections correspond to such topics as the preparation of acetylenes from acetylenes; carboxylic acids from carboxylic acids; and alcohols, thiols, and phenols from alcohols, thiols, and phenols. Alkylations that involve conjugate additions across a double bond are found in Section 74E (Alkyls, Methylenes, and Aryls from Alkenes).

Examples of name reactions can be found by first considering the nature of the starting material and product. The Wittig reaction, for instance, is in Section 199 (Alkenes from Aldehydes) and Section 207 (Alkenes from Ketones). The aldol condensation can be found in the chapters on difunctional compounds in Section 324 (Alcohol, Thiol-Aldehyde) and in Section 330

(Alcohol, Thiol-Ketone). Examples of the synthetically important alkene metathesis reaction are mostly found in Section 209 (Alkenes from Alkenes).

Examples of the protection of acetylenes, carboxylic acids, alcohols, phenols, aldehydes, amides, amines, esters, ketones, and alkenes are also presented. Sections (designated with an A: 15A, 30A, etc.) are labeled "protecting group: reactions" and are located at the end of pertinent chapters.

Some pairs of functional groups such as alcohol, ester; carboxylic acid, ester; amine, amide; and carboxylic acid, amide can be interconverted by simple reactions. When a member of these groups is the desired product or starting material, the other member should also be consulted in the text.

The original literature must be used to determine the generality of reactions, although this is occasionally stated in the citation. This is only done in cases where such generality is stated clearly in the original citation. A reaction given in this book for a primary aliphatic substrate may also be applicable to tertiary or aromatic compounds. This book provides very limited experimental conditions or precautions and the reader is referred to the original literature before attempting a reaction. **In no instance should a citation in this book be taken as a complete experimental procedure. Failure to refer to the original literature prior to beginning laboratory work could be hazardous.** The original papers usually yield a further set of references to previous work. Papers that appear after those publications can usually be found by consulting *Chemical Abstracts* and the *Science Citation Index*.

**Classification and Organization of Reactions Forming Difunctional Compounds.** This chapter considers all possible difunctional compounds formed from the groups acetylene, carboxylic acid, alcohol, thiol, aldehyde, amide, amine, ester, ether, epoxide, thioether, halide, ketone, nitrile, and alkene. Reactions that form difunctional compounds are classified into sections on the basis of two functional groups in the product that are pertinent to the reaction. The relative positions of the groups do not affect the classification. Thus preparations of 1,2-amino-alcohols, 1,3-amino-alcohols, and 1,4-amino-alcohols are included in a single section (Section 326, Alcohol-Amine). Difunctional compounds that have an oxide as the second group are found in the appropriate section (Sections 278–290). The nitroketone product of oxidation of a nitroalcohol is found in Section 386 (Ketone-Oxide). Conversion of an oxide (such as nitro or a sulfone moiety) to another functional group is generally found in the "Miscellaneous" section of the sections concerning monofunctional compounds. Conversion of a nitroalkane to an amine, for example, is found in Section 105 (Amines from Miscellaneous Compounds). The following examples illustrate applications of this classification system:



<i>Difunctional Product</i>	<i>Section Title</i>
$RC\equiv C-C\equiv CR$	Acetylene-Acetylene
$RCH(OH)COOH$	Carboxylic acid-Alcohol
$RCH=CHOMe$	Ether-Alkene
$RCHF_2$	Halide-Halide
$RCH(Br)CH_2F$	Halide-Halide
$RCH(OAc)CH_2OH$	Alcohol-Ester
$RCH(OH)CO_2Me$	Alcohol-Ester
$RCH=CHCH_2CO_2Me$	Ester-Alkene
$RCH=CHOAc$	Ester-Alkene
$RCH(OMe)CH_2SO_2CH_2CH_2OH$	Alcohol-Ether
$RSO_2CH_2CH_2OH$	Alcohol-Oxide

**How to Use the Book to Locate Examples of the Preparation of Difunctional Compounds.** The difunctional index on p xiv gives the section and page corresponding to each difunctional product. Thus Section 327 (Alcohol, Thiol-Ester) contains examples of the preparation of hydroxyesters; Section 323 (Alcohol, Thiol-Alcohol, Thiol) contains examples of the preparation of diols.

Some preparations of alkene and acetylenic compounds from alkene and acetylenic starting materials can, in principle, be classified in either the monofunctional or difunctional sections; for example, the transformation  $RCH=CHBr \rightarrow RCH=CHCOOH$  could be considered as preparing carboxylic acids from halides (Section 25, monofunctional compounds) or preparing a carboxylic acid-alkene (Section 322, difunctional compounds). The choice usually depends on the focus of the particular paper where this reaction was found. In such cases both sections should be consulted.

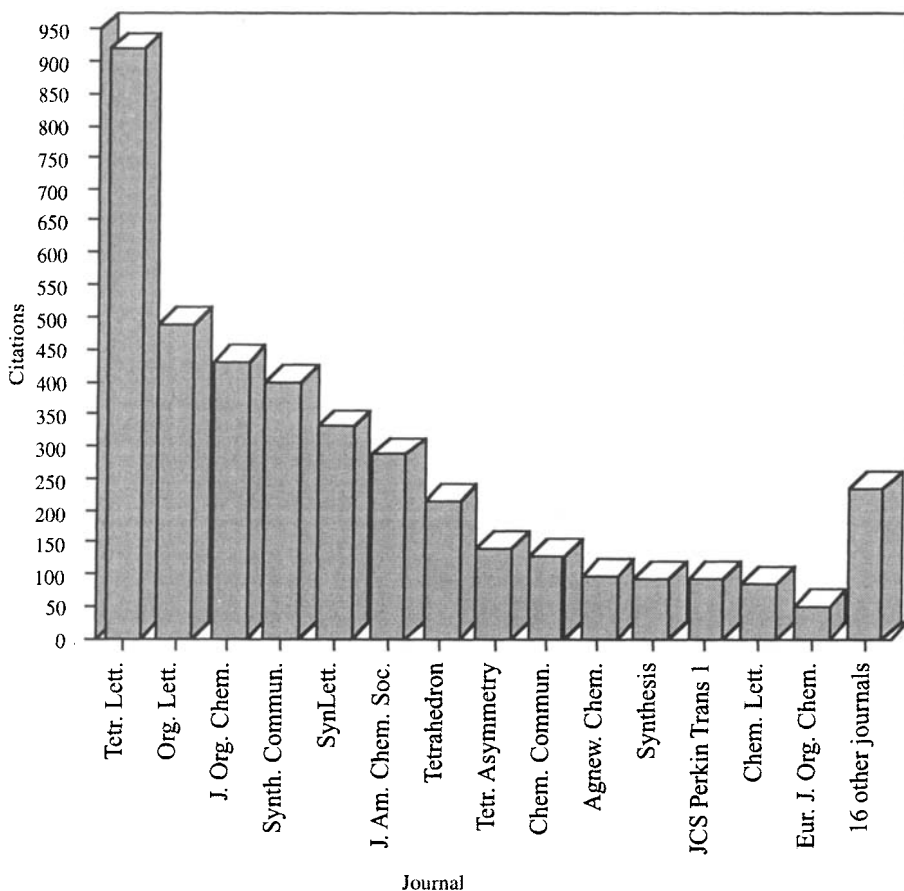
Reactions applicable to both aldehyde and ketone starting materials are in many cases illustrated by an example that uses only one of them. Likewise, many citations for reactions found in the Aldehyde-X sections, will include examples that could be placed in the Ketone-X section. Again, the choice is dictated by the paper where the reaction was found.

Many literature preparations of difunctional compounds are extensions of the methods applicable to monofunctional compounds. As an example, the reaction  $RCI \rightarrow ROH$  might be used for the preparation of diols from an appropriate dichloro compound. Such methods are difficult to categorize and may be found in either the monofunctional or difunctional sections, depending on the focus of the original paper.

The user should bear in mind that the pairs of functional groups alcohol, ester; carboxylic acids, ester; amine, amide; and carboxylic acid, amide can be interconverted by simple reactions. Compounds of the type  $RCH(OAc)CH_2OAc$  (ester-ester) would thus be of interest to anyone preparing the diol  $RCH(OH)CH_2OH$  (alcohol-alcohol).

**Sources of Literature Citations.** I thought it would be useful for a reader of this *Compendium* to see those journals that contain the most new synthetic methodology. The accompanying graph shows that *Tetrahedron Letters*, *Organic Letters*, and *Journal of Organic Chemistry* account for roughly 46% of all the citations in Volume 11. In past volumes, *Tetrahedron Letters* and *Journal of Organic Chemistry* have accounted for 50–60% of all citations. The advent of the new journal *Organic Letters*, the consolidation of several European journals into the *European Journal of Organic Chemistry*, and the apparent expansion of synthetic methodology relative to the last two volumes probably accounts for the new relationship of the three cited journals. This book was not edited to favor one journal, section or type of

Citation Sources, Volume 11



article over another. Undoubtedly, my own personal preferences are part of the selection, but I believe that this compilation is an accurate representation of new synthetic methods that appear in the literature for this period. Therefore, I believe the accompanying graph reflects those journals where new synthetic methodology is located. I should point out that the category "16 other journals" includes: *Helvetica Chimica Acta*, *Journal of Heterocyclic Chemistry*, *Pure and Applied Chemistry*, *Journal of Chemical Research (S)*, *Monatshefte für Chemie*, *Russian Journal of Organic Chemistry*, *Acta Chemica Scandinavica*, *Israel Journal of Chemistry*, *Chemistry, A European Journal*, *Canadian Journal of Chemistry*, *Chemistry Letters*, *Chemical Reviews*, *Bulletin of the Chemical Society of Japan*, *Organic Preparations and Procedures International*, *Accounts of Chemical Research*, *Heterocycles*, and the *Australian Journal of Chemistry*. In addition, 6 more journals were examined but no references were recorded.

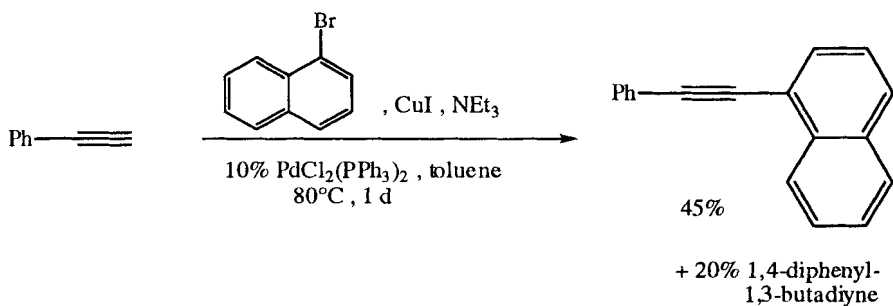
# Compendium of Organic Synthetic Methods

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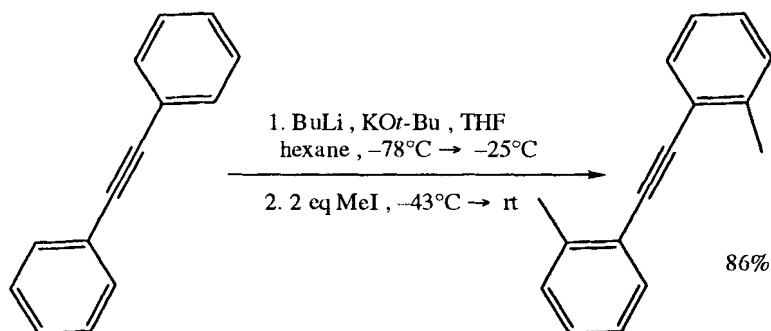
# CHAPTER 1

## PREPARATION OF ALKYNES

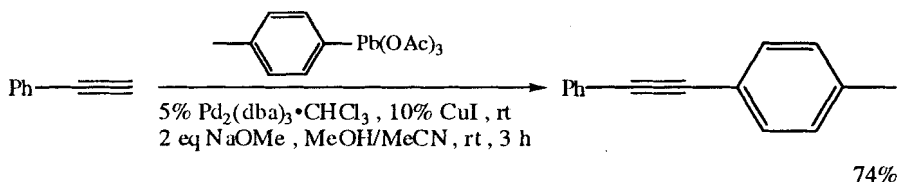
### SECTION 1: ALKYNES FROM ALKYNES



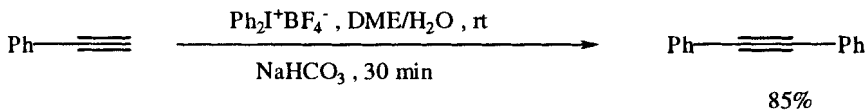
Chow, H.-F.; Wan, C.-W.; Low, K.-H.; Yeung, Y.-Y. *J. Org. Chem.*, 2001, 66, 1910.



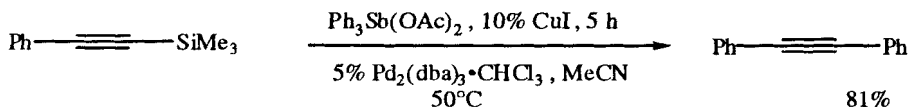
Kowalik, J.; Tolbert, L.M. *J. Org. Chem.*, 2001, 66, 3229.



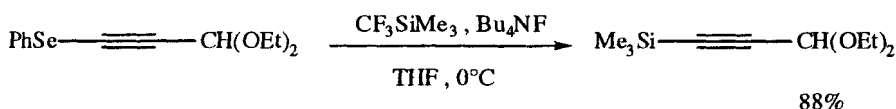
Kang, S.-K.; Ryu, H.-C.; Lee, S.-H. *Synth. Commun.*, 2001, 31, 1059.



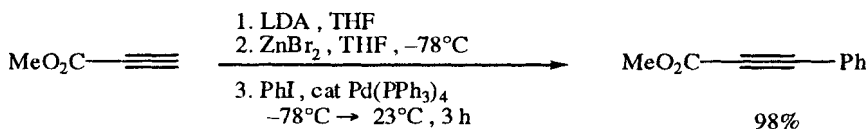
Kang, S.-K.; Yoon, S.-K.; Kim, Y.-M. *Org. Lett.*, **2001**, 3, 2697.



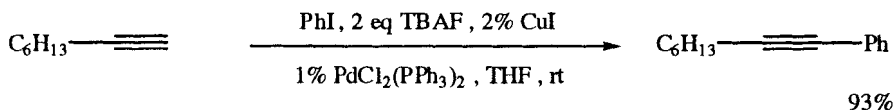
Kang, S.-K.; Ryu, H.-C.; Hong, Y.-T. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 736.



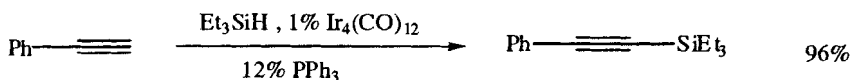
Yoshimatsu, M.; Kuribayashi, M. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 1256.



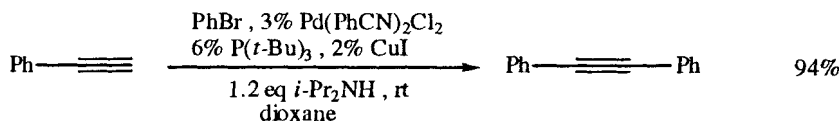
Anastasia, L.; Negishi, E.-i. *Org. Lett.*, **2001**, 3, 3111.



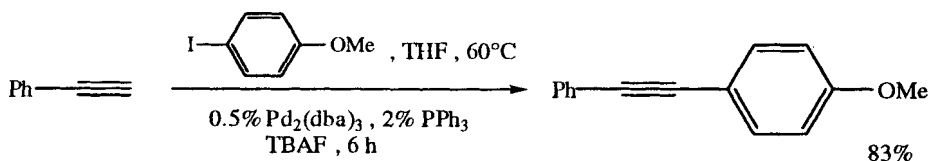
Mori, A.; Shimada, T.; Kondo, T.; Sekiguchi, A. *Synlett*, **2001**, 649.



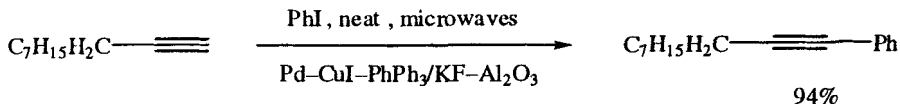
Shimizu, R.; Fuchikami, T. *Tetrahedron Lett.*, **2000**, 41, 907.



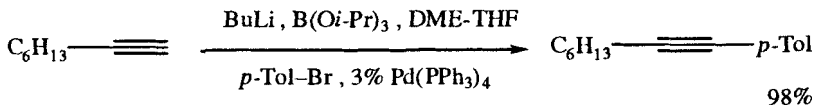
Hundertmark, T.; Littke, A.F.; Buchwald, S.L.; Fu, G.C. *Org. Lett.*, **2000**, 2, 1729.



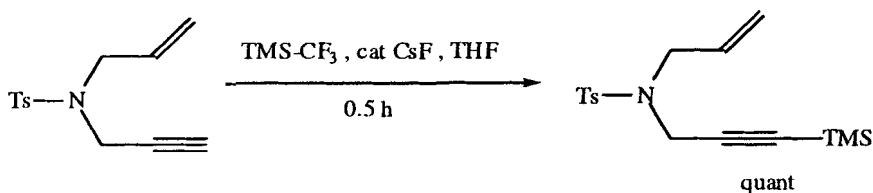
Mori, A.; Kawashima, J.; Shimada, T.; Suguro, M.; Hirabayashi, K.; Nishihara, Y. *Org. Lett.*, **2000**, 2, 2935.



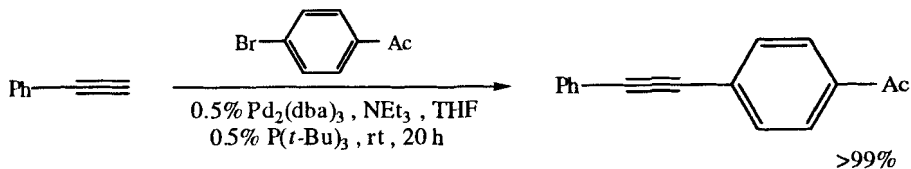
Kabalka, G.W.; Wang, L.; Namboodiri, V.; Pagni, R.M. *Tetrahedron Lett.*, **2000**, *41*, 5151.



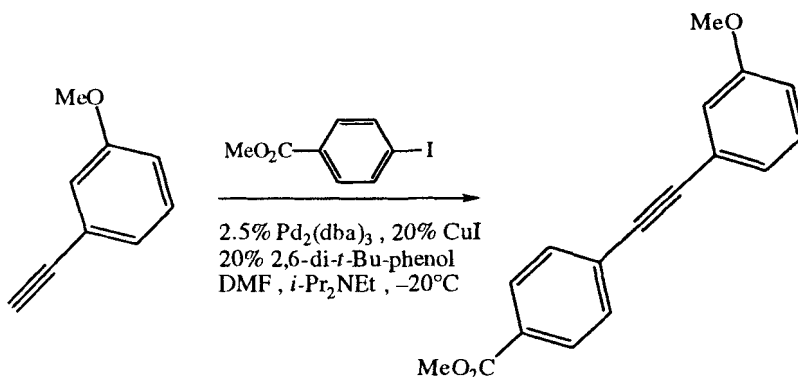
Kang, S.; Jang, T.-S.; Keum, G.; Kang, S.B.; Han, S.-Y.; Kim, Y. *Org. Lett.*, **2000**, *2*, 3615.



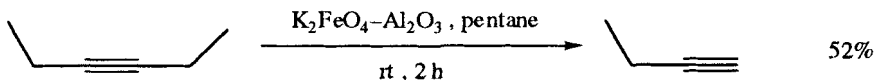
Ishizaki, M.; Hoshino, O. *Tetrahedron*, **2000**, *56*, 8657, 8661.



Böhm, V.P.W.; Herrmann, W.A. *Eur. J. Org. Chem.*, **2000**, 3679.

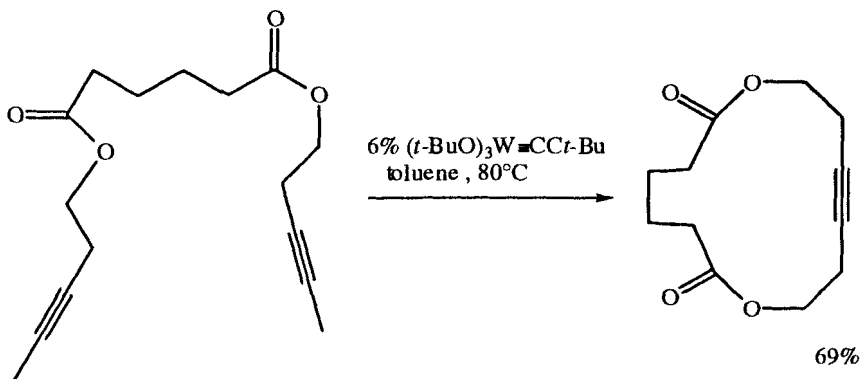


Nakamura, K.; Okubo, H.; Yamaguchi, M. *Synlett*, **1999**, 549.



Caddick, S.; Murtaugh, L.; Weacing, R. *Tetrahedron Lett.*, **1999**, *40*, 3655





Fürstner, A.; Guth, O.; Rumbo, A.; Seidel, G. *J. Am. Chem. Soc.*, **1999**, *121*, 11108.

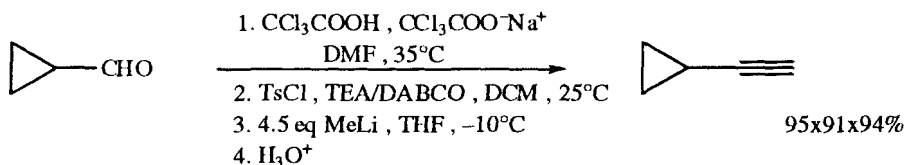
## SECTION 2: ALKYNES FROM ACID DERIVATIVES

NO ADDITIONAL EXAMPLES

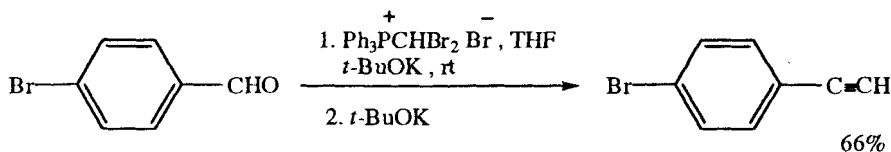
## SECTION 3: ALKYNES FROM ALCOHOLS AND THIOLS

NO ADDITIONAL EXAMPLES

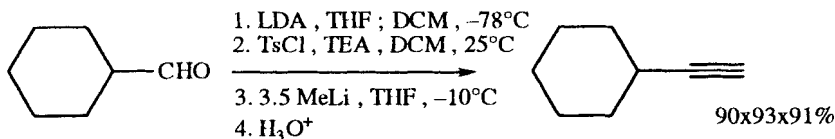
## SECTION 4: ALKYNES FROM ALDEHYDES



Wang, Z.; Campagna, S.; Yang, K.; Xu, G.; Pierce, M.E.; Fortunak, J.M.; Confalone, P.N. *J. Org. Chem.*, **2000**, *65*, 1889.



Michel, P.; Gennet, D.; Rassat, A. *Tetrahedron Lett.*, **1999**, *40*, 8575.



Wang, Z.; Yin, J.; Campagna, S.; Pesti, J.A.; Fortunak, J.M. *J. Org. Chem.*, **1999**, *64*, 6918.

## SECTION 5: ALKYNES FROM ALKYL, METHYLENES AND ARYL

NO ADDITIONAL EXAMPLES

## SECTION 6: ALKYNES FROM AMIDES

NO ADDITIONAL EXAMPLES

## SECTION 7: ALKYNES FROM AMINES

NO ADDITIONAL EXAMPLES

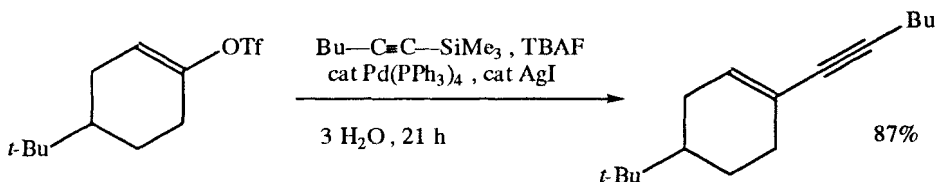
## SECTION 8: ALKYNES FROM ESTERS

NO ADDITIONAL EXAMPLES

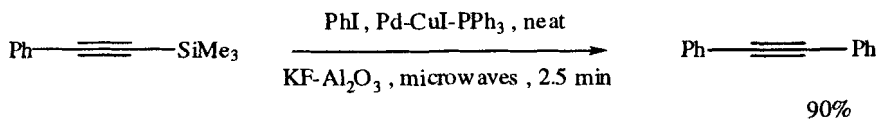
## SECTION 9: ALKYNES FROM ETHERS, EPOXIDES AND THIOETHERS

NO ADDITIONAL EXAMPLES

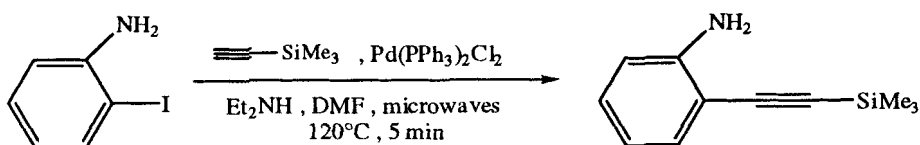
## SECTION 10: ALKYNES FROM HALIDES AND SULFONATES



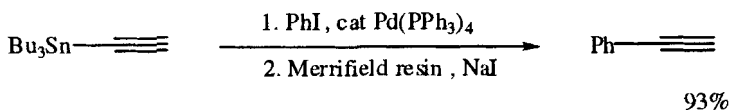
Halbes, U.; Bertus, P.; Pale, P. *Tetrahedron Lett.*, **2001**, *42*, 8641.



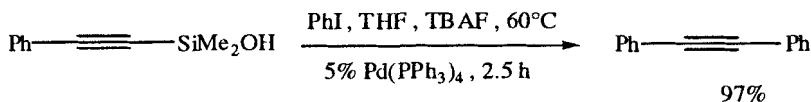
Kabalka, G.W.; Wang, L.; Pagni, R.M. *Tetrahedron*, **2001**, 57, 8017.



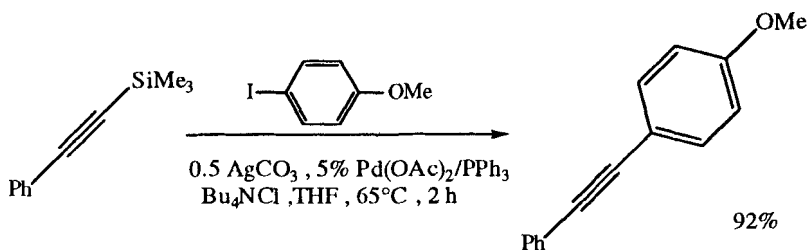
Erdélyi, M.; Gogoll, A. *J. Org. Chem.*, **2001**, 66, 4165.



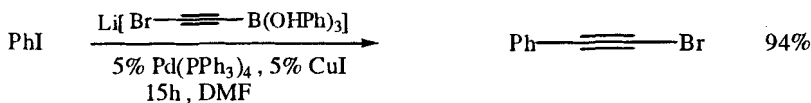
Lipshutz, B.H.; Blomgren, P.A. *Org. Lett.*, **2001**, 3, 1869.



Chang, S.; Yang, S.H.; Lee, P.H. *Tetrahedron Lett.*, **2001**, 42, 4833.



Koseki, Y.; Omino, K.; Anzai, S.; Nagasaka, T. *Tetrahedron Lett.*, **2000**, 41, 2377.



Oh, C.H.; Jung, S.H. *Tetrahedron Lett.*, **2000**, 41, 8513.

## REVIEW:

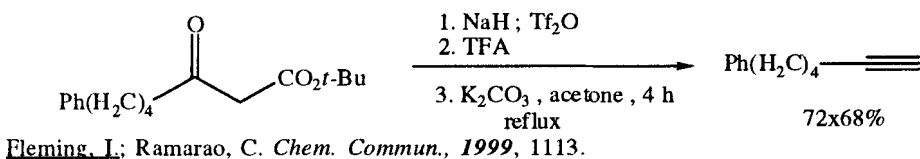
"Formation of Acetylenes by Ring-Opening of 1,1,2-Trihalocyclopropanes,"  
Sydnos, L.K. *Eur. J. Org. Chem.*, **2000**, 3511.

## SECTION 11: ALKYNES FROM HYDRIDES

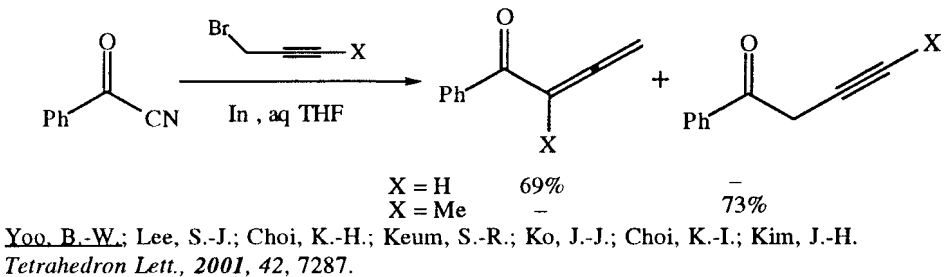
For examples of the reaction  $RC\equiv CH \rightarrow RC\equiv C-C\equiv CR^1$ , see section 300 (Alkyne-Alkyne).

NO ADDITIONAL EXAMPLES

## SECTION 12: ALKYNES FROM KETONES



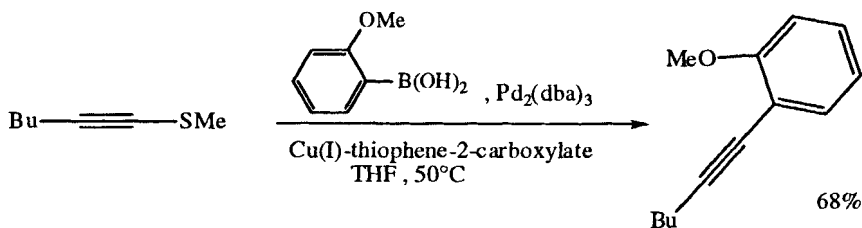
## SECTION 13: ALKYNES FROM NITRILES



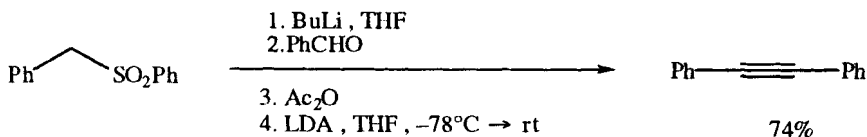
## SECTION 14: ALKYNES FROM ALKENES

NO ADDITIONAL EXAMPLES

## SECTION 15: ALKYNES FROM MISCELLANEOUS COMPOUNDS



Grasa, G.A.; Nolan, S.P. *Org. Lett.*, 2001, 3, 119.



Orita, A.; Yoshioka, N.; Struwe, P.; Braier, A.; Beckmann, A.; Otera, J. *Chem. Eur. J.*, 1999, 5, 1355.

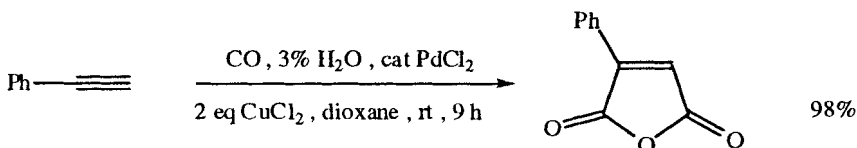
## SECTION 15A: PROTECTION OF ALKYNES

NO ADDITIONAL EXAMPLES

## CHAPTER 2

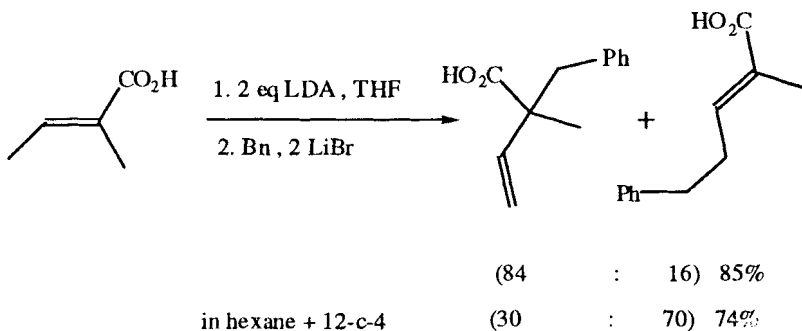
## PREPARATION OF ACID DERIVATIVES

### SECTION 16: ACID DERIVATIVES FROM ALKYNES

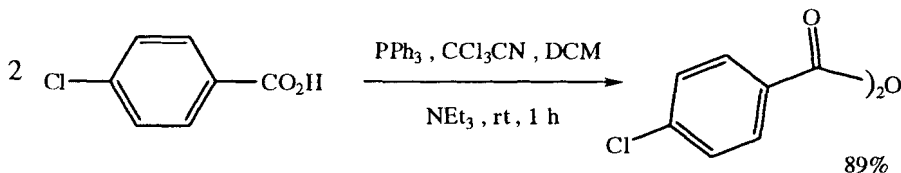


Li, J.; Li, G.; Jiang, H.; Chen, M. *Tetrahedron Lett.*, **2001**, 42, 6923.

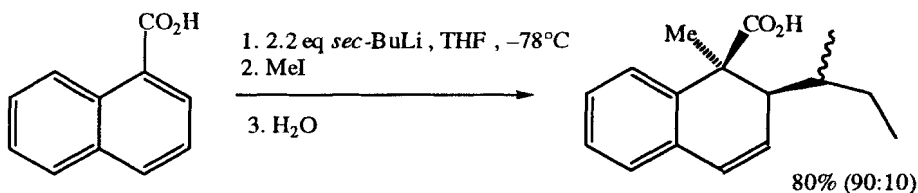
### SECTION 17: ACID DERIVATIVES FROM ACID DERIVATIVES



Brun, E.M.; Gil, S.; Parra, M. *Synlett.*, **2001**, 156.

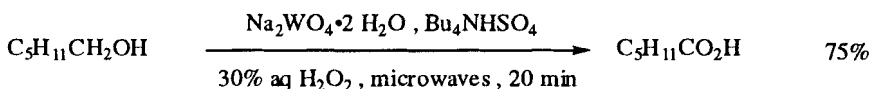


Kim, J.; Jang, D.O. *Synth. Commun.*, **2001**, 31, 395.

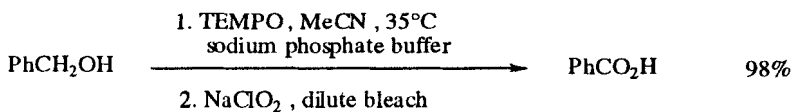


Mortier, J.; Vaultier, M.; Plunian, B.; Sinbandhit, S. *Can. J. Chem.* **1999**, *77*, 98.

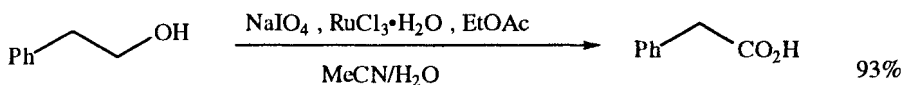
## SECTION 18: ACID DERIVATIVES FROM ALCOHOLS AND THIOLS



Bogdal, D.; Łukasiewicz, M. *Synlett*, **2000**, 143.

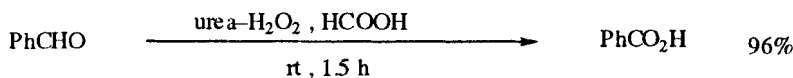


Zhao, M.; Li, J.; Mano, E.; Song, Z.; Tschäen, D.M.; Grabowski, E.J.J.; Reider, P.J. *J. Org. Chem.*, **1999**, *64*, 2564.

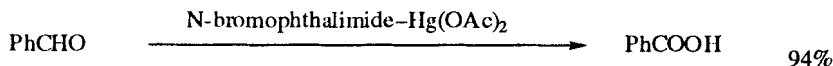


Prashad, M.; Lu, Y.; Kim, H.-Y.; Hu, B.; Repic, O.; Blacklock, T.J. *Synth. Commun.*, **1999**, *29*, 2937.

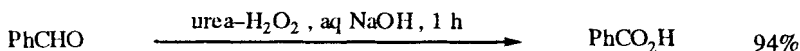
## SECTION 19: ACID DERIVATIVES FROM ALDEHYDES



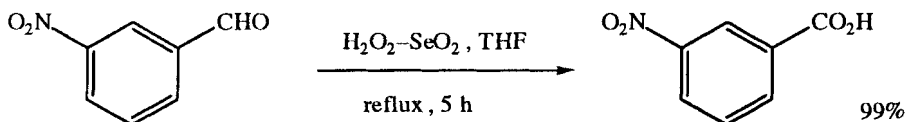
Balicki, R. *Synth. Commun.*, **2001**, *31*, 2195.



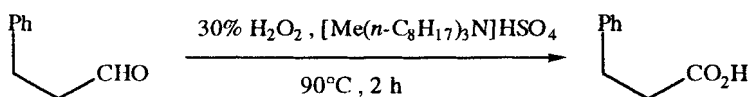
Anjum, A.; Srinivas, P. *Chem. Lett.*, **2001**, 900.



Heaney, H.; Newbold, A.J. *Tetrahedron Lett.*, **2001**, *42*, 6607.

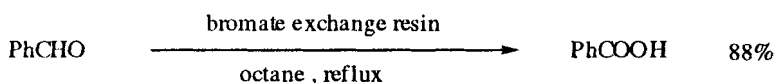


Wójtowicz, H.; Brzłaszcz, M.; Kloc, K.; Młochowski, J. *Tetrahedron*, **2001**, 57, 9743.

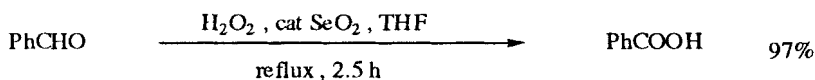


73%

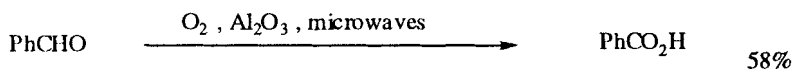
Sato, K.; Hyodo, M.; Takagi, J.; Aoki, M.; Noyori, R. *Tetrahedron Lett.*, **2000**, 41, 1439.



Chetri, A.B.; Kalita, B.; Das, P.J. *Synth. Commun.*, **2000**, 30, 3317.

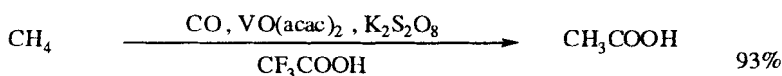


Młochowski, J. *Synth. Commun.*, **2000**, 30, 4425.

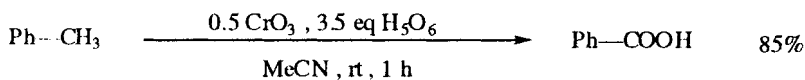


Reddy, D.S.; Reddy, P.P.; Reddy, P.S.N. *Synth. Commun.*, **1999**, 29, 2949.

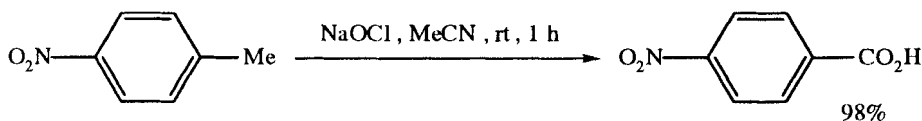
## SECTION 20: ACID DERIVATIVES FROM ALKYL, METHYLENES AND ARYLS



Taniguchi, Y.; Hayashida, T.; Shibasaki, H.; Piao, D.; Kitamura, T.; Yamaji, T.; Fujiwara, Y. *Org. Lett.*, **1999**, 1, 557.



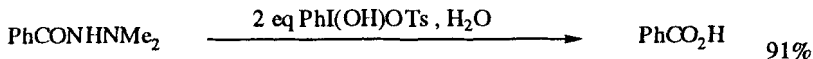
Yamazaki, S. *Org. Lett.*, **1999**, 1, 2129.



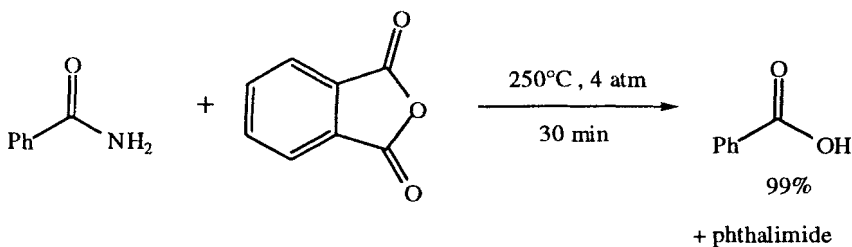
Yamazaki, S. *Synth. Commun.*, **1999**, 29, 2211.



## SECTION 21: ACID DERIVATIVES FROM AMIDES



Wuts, P.G.M.; Goble, M.P. *Org. Lett.*, **2000**, 2, 2139.

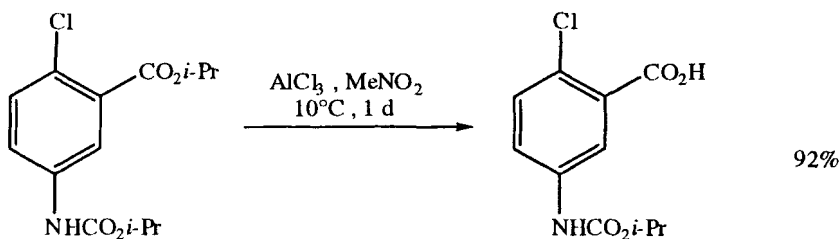


Chemat, E. *Tetrahedron Lett.*, **2000**, 41, 3855.

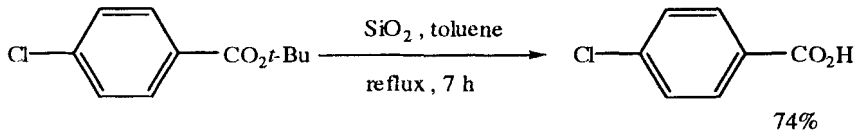
## SECTION 22: ACID DERIVATIVES FROM AMINES

NO ADDITIONAL EXAMPLES

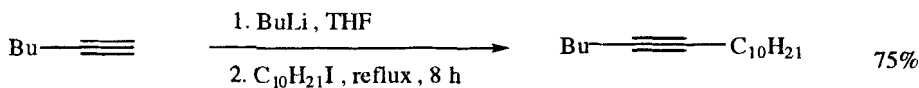
## SECTION 23: ACID DERIVATIVES FROM ESTERS



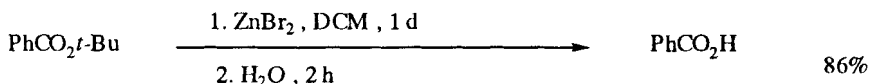
Chee, G.-L. *Synlett*, **2001**, 1593.



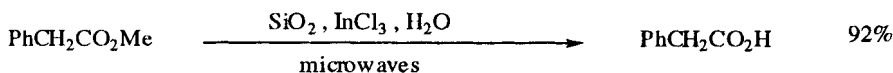
Jackson, R.W. *Tetrahedron Lett.*, **2001**, 42, 5163.



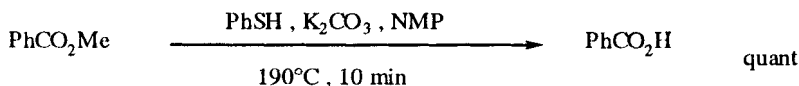
Buck, M.; Chong, J.M. *Tetrahedron Lett.*, **2001**, 42, 5825.



Wu, Y.-q.; Limburg, D.C.; Wilkinson, D.E.; Vaal, M.J.; Hamilton, G.S. *Tetrahedron Lett.*, **2000**, *41*, 2847.



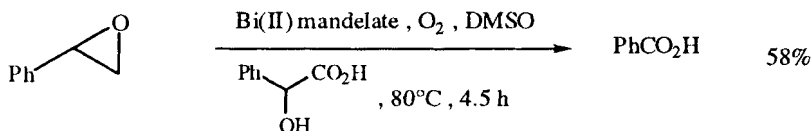
Ranu, B.C.; Dutta, P.; Sarkar, A. *Synth. Commun.*, **2000**, *30*, 4167.



Sharma, L.; Nayak, M.K.; Chakraborti, A.K. *Tetrahedron*, **1999**, *55*, 9595.

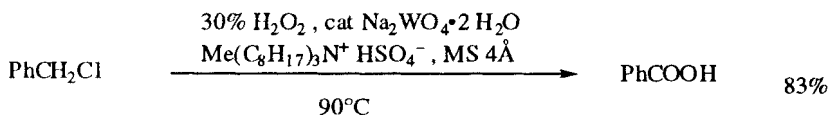
Other reactions useful for the hydrolysis of esters may be found in Section 30A (Protection of Carboxylic Acids).

## SECTION 24: ACID DERIVATIVES FROM ETHERS, EPOXIDES AND THIOETHERS

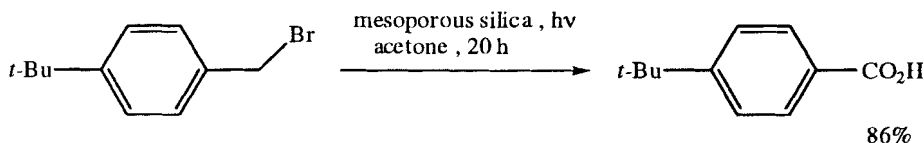


Coin, C.; Le Boisselier, V.; Favier, I.; Postsel, M.; Duñach, E. *Eur. J. Org. Chem.*, **2001**, 735.

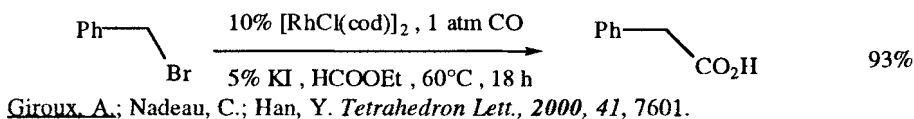
## SECTION 25: ACID DERIVATIVES FROM HALIDES AND SULFONATES



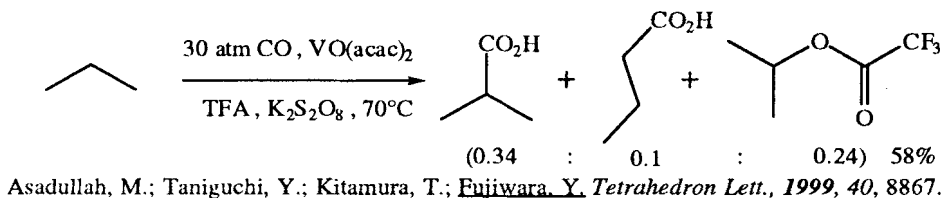
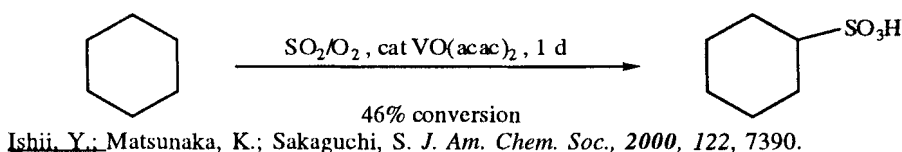
Shi, M.; Feng, Y.-S. *J. Org. Chem.*, **2001**, *66*, 3235.



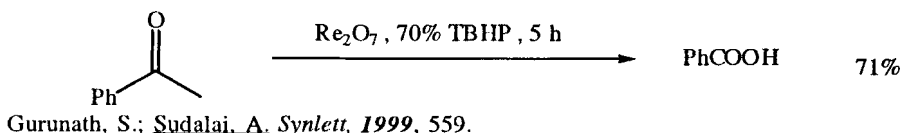
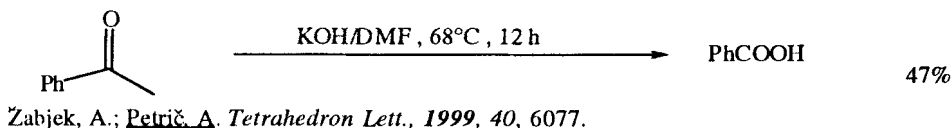
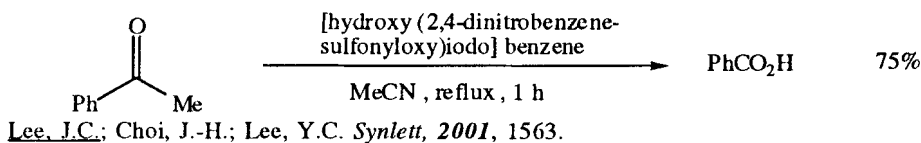
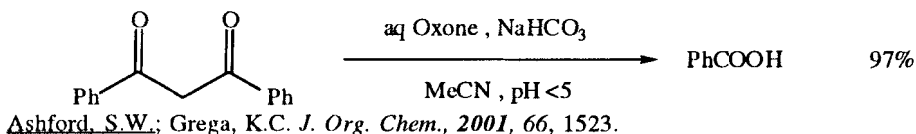
Itoh, A.; Kodama, T.; Inagaki, S.; Masaki, Y. *Org. Lett.*, **2000**, *2*, 2455.

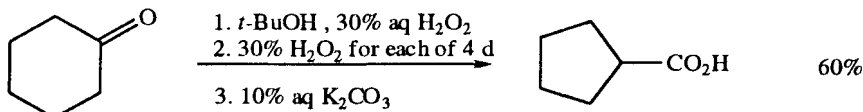


## SECTION 26: ACID DERIVATIVES FROM HYDRIDES

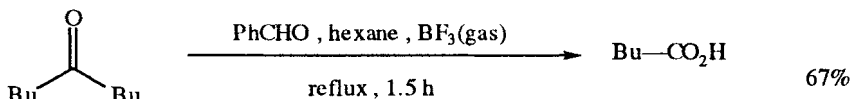


## SECTION 27: ACID DERIVATIVES FROM KETONES





Giurg, M.; Mlochowski, J. *Synth. Commun.*, **1999**, *29*, 2281.

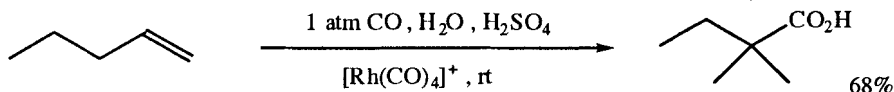


Kabalka, G.W.; Li, N.-S.; Tejedor, D.; Malladi, R.R.; Gao, X.; Trotman, S. *Synth. Commun.*, **1999**, *29*, 2783.

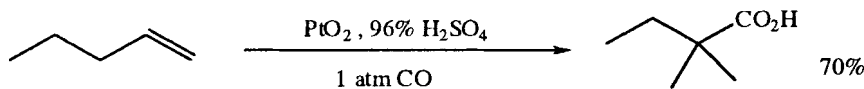
## SECTION 28: ACID DERIVATIVES FROM NITRILES

NO ADDITIONAL EXAMPLES

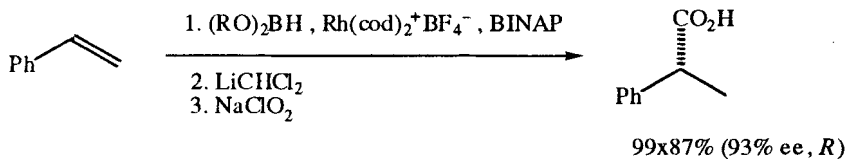
## SECTION 29: ACID DERIVATIVES FROM ALKENES



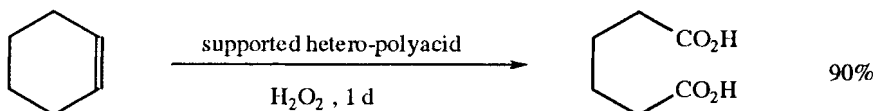
Xu, Q.; Nakatani, H.; Souma, Y. *J. Org. Chem.*, **2000**, *65*, 1540.



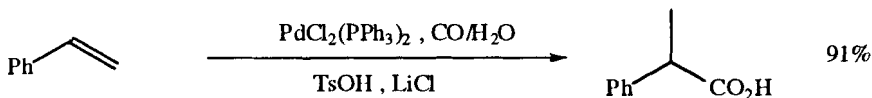
Xu, Q.; Fujiwara, M.; Tanaka, M.; Souma, Y. *J. Org. Chem.*, **2000**, *65*, 8105.



Chen, A.; Ren, L.; Crudden, C.M. *J. Org. Chem.*, **1999**, *64*, 9704.



Brooks, C.D.; Huang, L.-c.; McCarron, M.; Johnstone, R.A.W. *Chem. Commun.*, **1999**, 37.

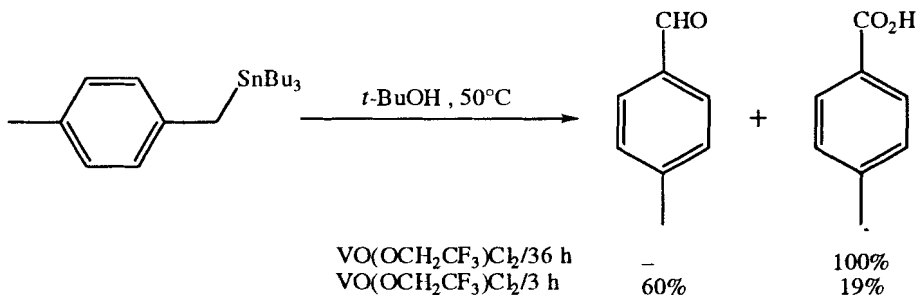


Seayad, A.; Jayasree, S.; Chaudhari, R.V. *Org. Lett.*, **1999**, *1*, 459.

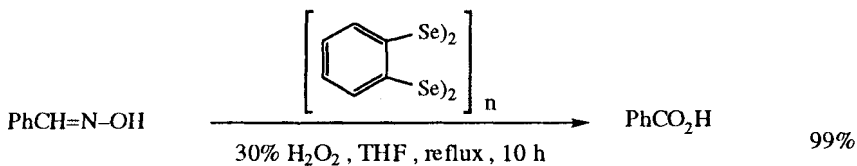
#### REVIEWS:

"Palladium-Catalysed Reppe Carbonylation," Kiss, G. *Chem. Rev.*, **2001**, *101*, 3435.

### SECTION 30: ACID DERIVATIVES FROM MISCELLANEOUS COMPOUNDS



Hirao, T.; Morimoto, C.; Takada, T.; Sakurai, H. *Tetrahedron Lett.*, **2001**, *42*, 1961.

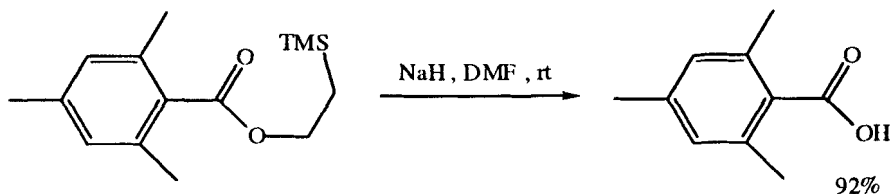


Giurg, M.; Said, S.B.; Syper, L.; Mlochowski, J. *Synth. Commun.*, **2001**, *31*, 3151.

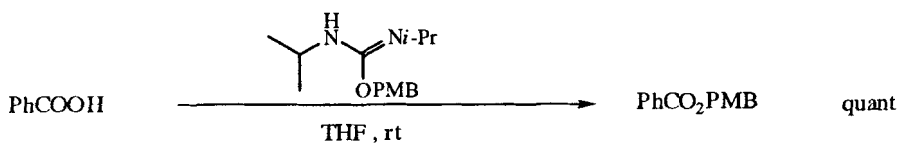
#### REVIEWS:

"Carboxylic Acids and Esters," Franklin, A.S. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 3537

# SECTION 30A: PROTECTION OF CARBOXYLIC ACID DERIVATIVES



Serrano-Wu, M.H.; Regueiro-Ren, A.; St. Laurent, D.R.; Carroll, T.M.; Balasubramanian, B.N. *Tetrahedron Lett.*, **2001**, 42, 8593.



Wang, M.F.; Golding, B.T.; Potter, G.A. *Synth. Commun.*, **2000**, 30, 4197.

Other reactions useful for the protection of carboxylic acids are included in Section 107 (Esters from Carboxylic Acids and Acid Halides) and Section 23 (Carboxylic Acids from Esters).

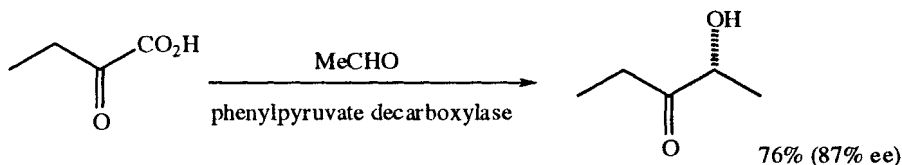
## CHAPTER 3

## PREPARATION OF ALCOHOLS

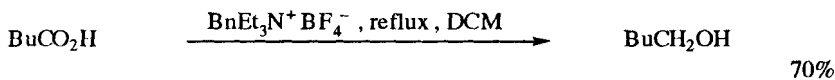
### SECTION 31: ALCOHOLS AND THIOLS FROM ALKYNES

NO ADDITIONAL EXAMPLES

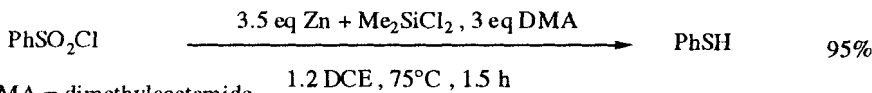
### SECTION 32: ALCOHOLS AND THIOLS FROM ACID DERIVATIVES



Guo, Z.; Goswami, A.; Nandur, V.B.; Patel, R.N. *Tetrahedron Asymm.*, **2001**, 12, 571.

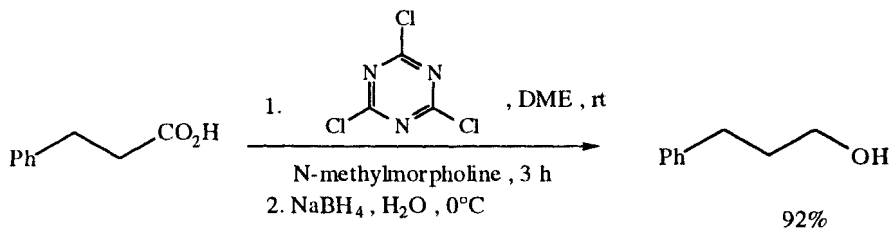


Narasimhan, S.; Swarnalakshmi, S.; Balakumar, R. *Synth. Commun.*, **2000**, 30, 941.



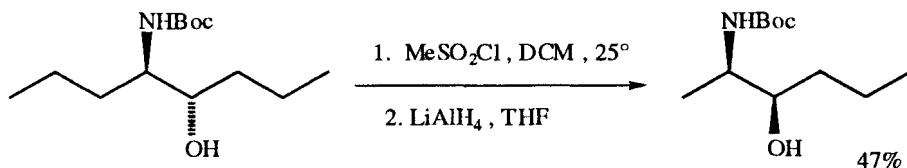
DMA = dimethylacetamide

Uchiro, H.; Kobayashi, S. *Tetrahedron Lett.*, **1999**, 40, 3179.

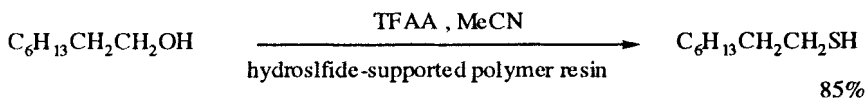


Falorni, M.; Porcheddu, A.; Taddei, M. *Tetrahedron Lett.*, **1999**, 40, 4395.

### SECTION 33: ALCOHOLS AND THIOLS FROM ALCOHOL AND THIOLS



Benedetti, F.; Norbedo, S. *Tetrahedron Lett.*, **2000**, *41*, 10071.



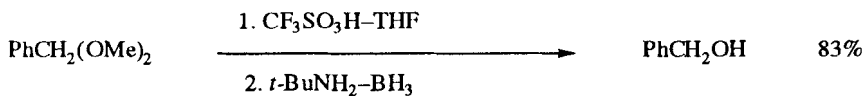
Bandgar, B.P.; Sadavarte, V.S.; Uppalla, L.S. *Chem. Lett.*, **2000**, 1304.

### SECTION 34: ALCOHOLS AND THIOLS FROM ALDEHYDES

The following reaction types are included in this section:

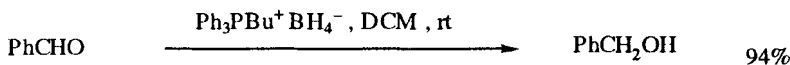
- A. Reductions of Aldehydes to Alcohols
- B. Alkylation of Aldehydes, forming Alcohols.

Coupling of Aldehydes to form Diols is found in Section 323 (Alcohol-Alcohol).

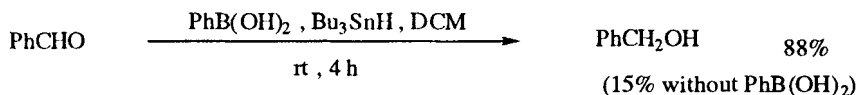


Lukin, K.A.; Yang, C.X.; Bellettini, J.R.; Narayanan, B.A.; Leanna, M.R.; Rasmussen, M. *Synlett*, **1999**, 59.

### SECTION 34A: REDUCTIONS OF ALDEHYDES TO ALCOHOLS

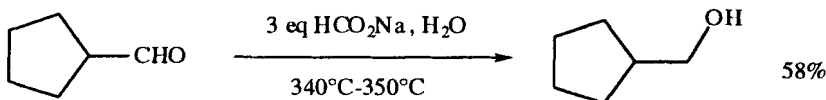


Hajipour, A.R.; Mallakpour, S.E. *Synth. Commun.*, **2001**, *31*, 1177.

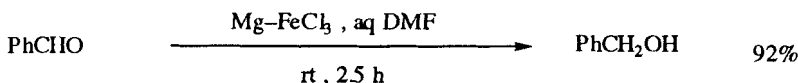


Yu, H.; Wang, B. *Synth. Commun.* **2001**, *31*, 2719.

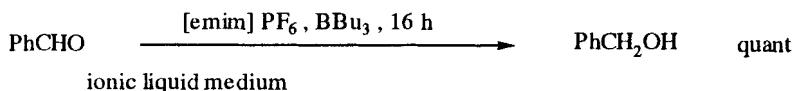




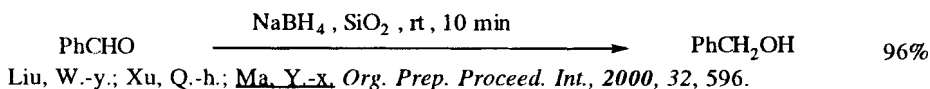
Bryson, T.A.; Jennings, J.M.; Gibson, J.M. *Tetrahedron Lett.*, **2000**, *41*, 3523.



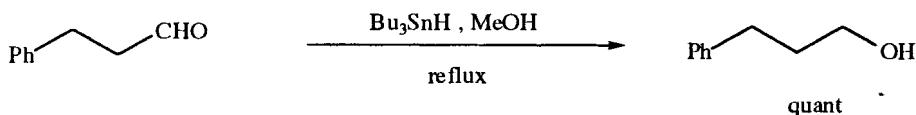
Swami, S.S.; Desai, D.G.; Bhosale, D.G. *Synth. Commun.*, **2000**, *30*, 3097.



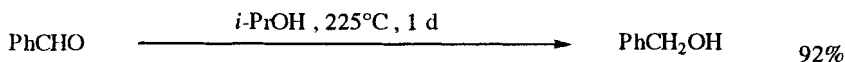
Kabalka, G.W.; Malladi, R.R. *Chem. Commun.*, **2000**, 2191.



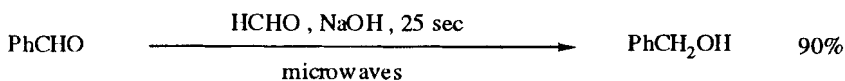
Liu, W.-y.; Xu, Q.-h.; Ma, Y.-x. *Org. Prep. Proceed. Int.*, **2000**, *32*, 596.



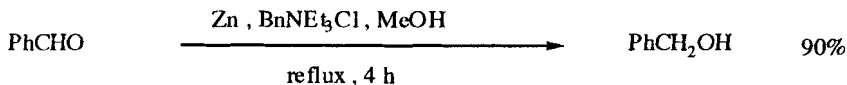
Kamiura, K.; Wada, M. *Tetrahedron Lett.*, **1999**, *40*, 9059.



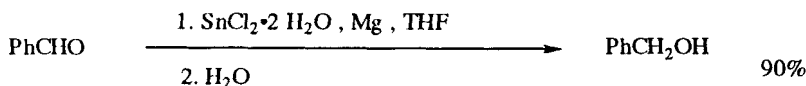
Bagnell, L.; Strauss, C.R. *Chem. Commun.*, **1999**, 287.



Thakuria, J.A.; Baruah, M.; Sandhu, J.S. *Chem. Lett.*, **1999**, 995.



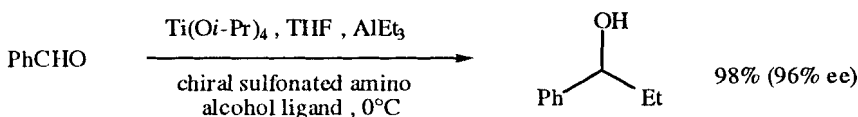
Kardile, G.B.; Desai, D.G.; Swami, S.S. *Synth. Commun.*, **1999**, *29*, 2129.



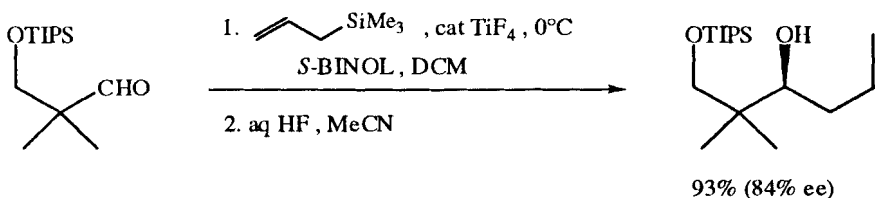
Bordoloi, M.; Sharma, R.P.; Chakraborty, V. *Synth. Commun.*, **1999**, *29*, 2501.

## SECTION 34B: ALKYLATION OF ALDEHYDES, FORMING ALCOHOLS

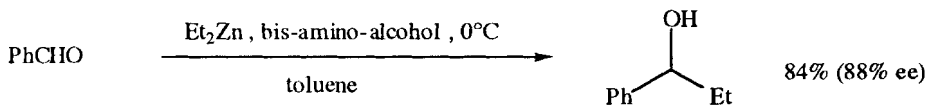
### ASYMMETRIC ALKYLATIONS



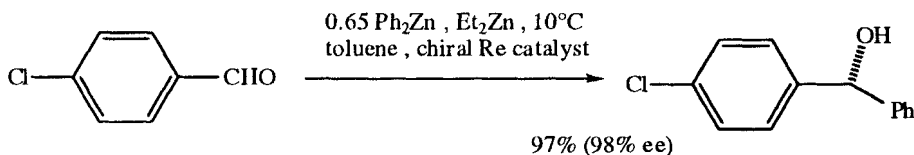
You, J.-S.; Hsieh, S.-H.; Gau, H.-M. *Chem. Commun.*, **2001**, 1546.



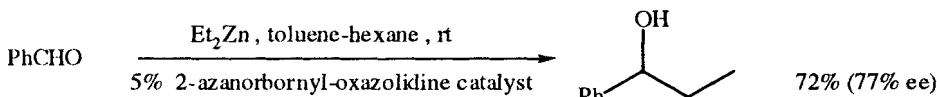
Bode, J.W.; Gauthier Jr., D.R.; Carreira, E.M. *Chem. Commun.*, **2001**, 2560.



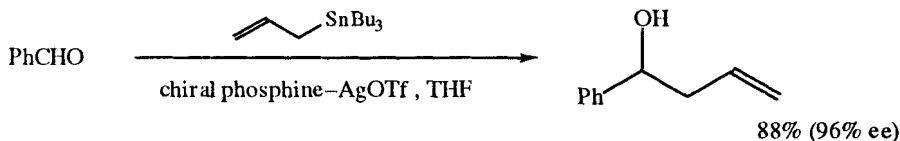
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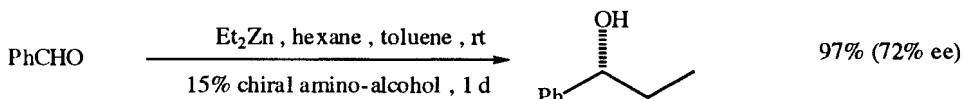
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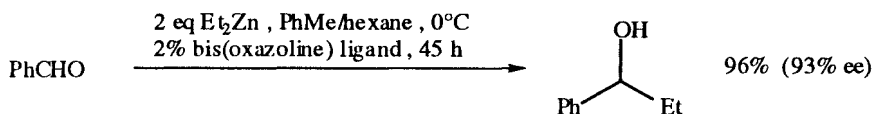
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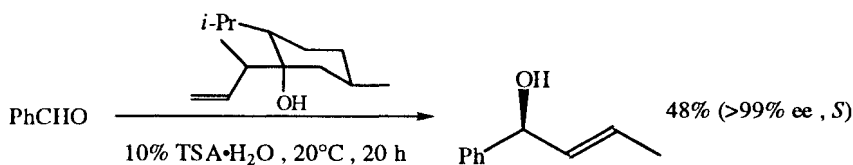
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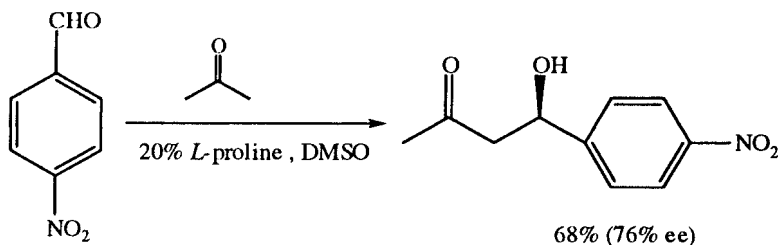
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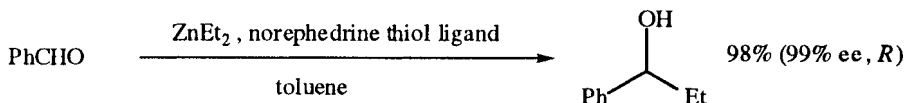
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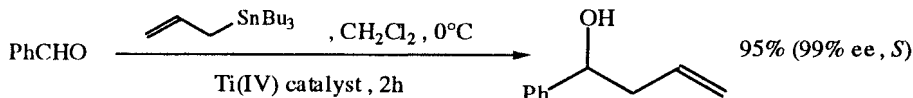
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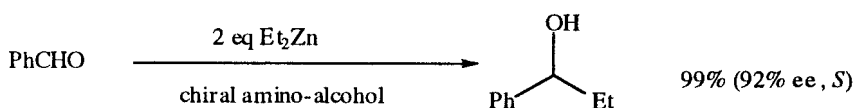
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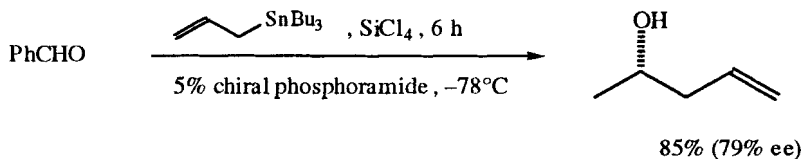
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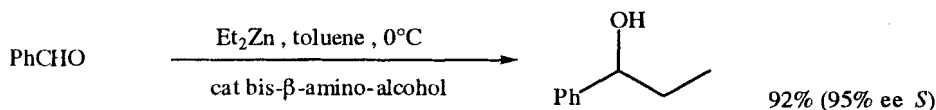
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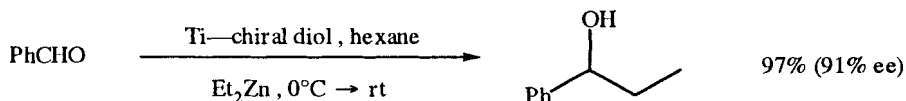
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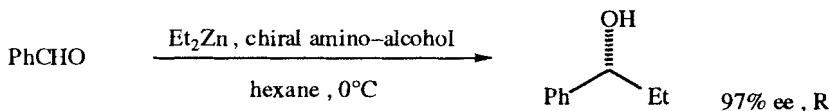
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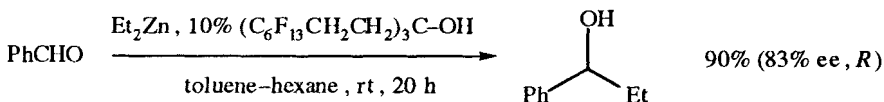
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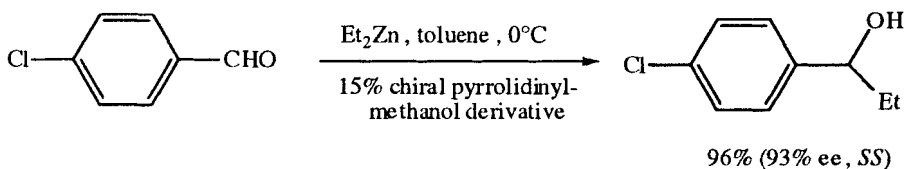
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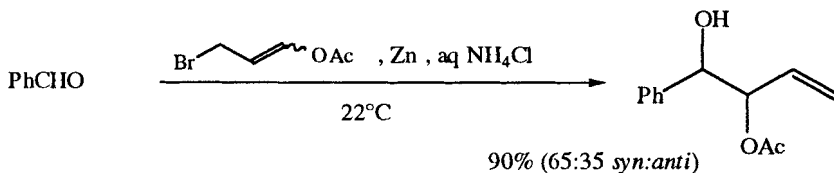
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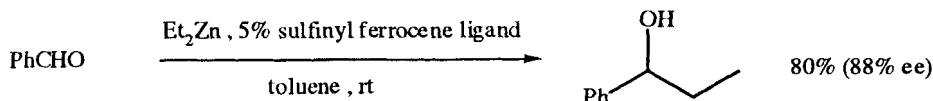
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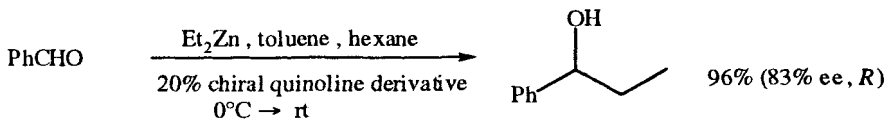
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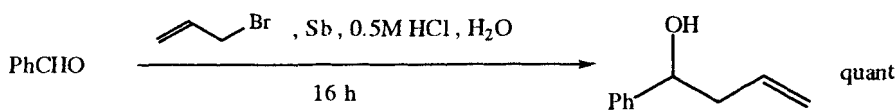
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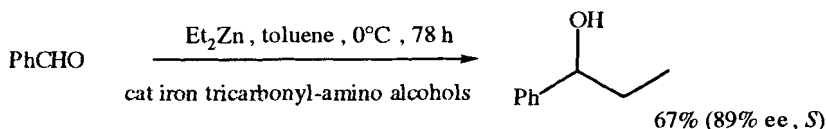
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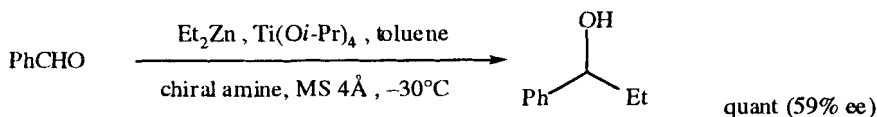
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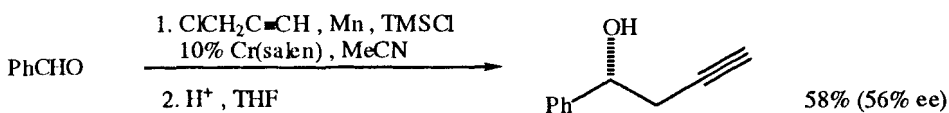
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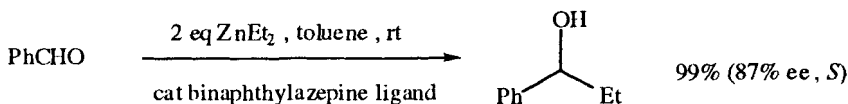
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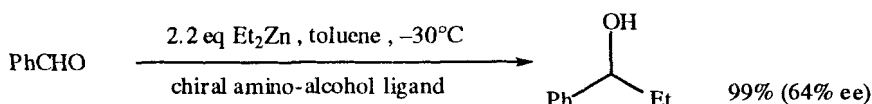
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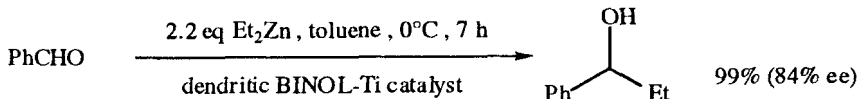
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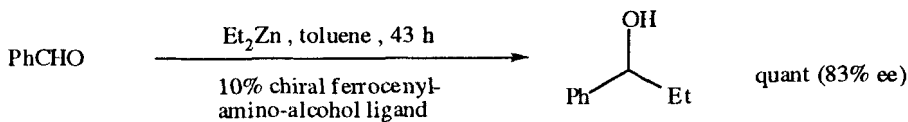
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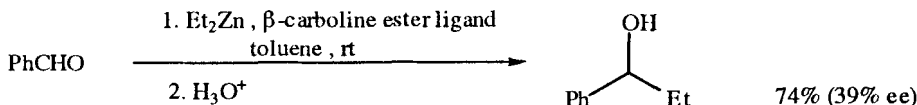
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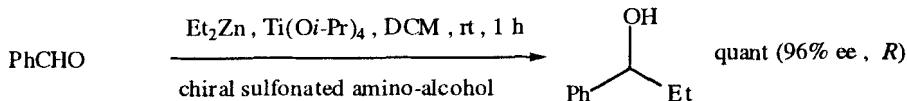
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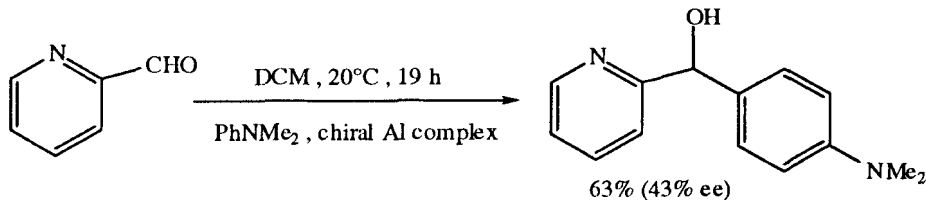
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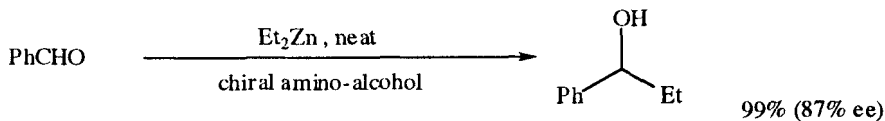
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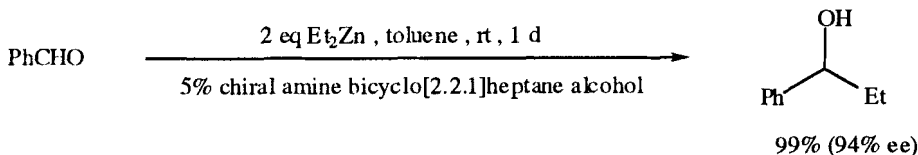
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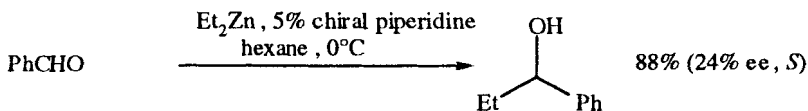
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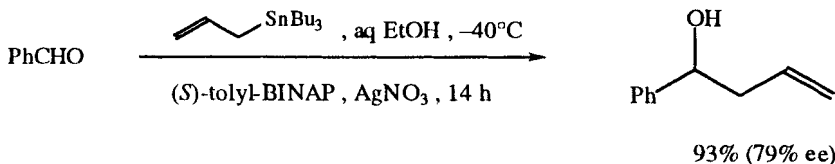
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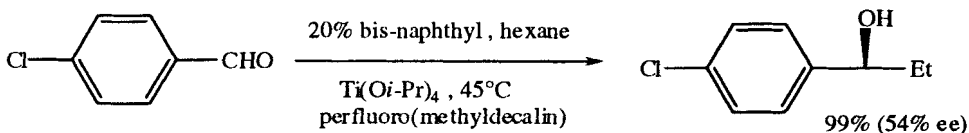
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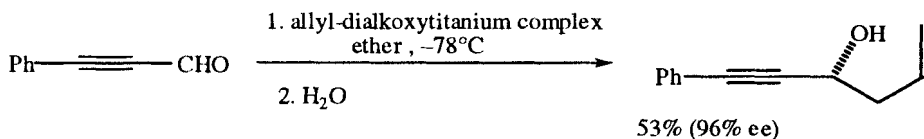
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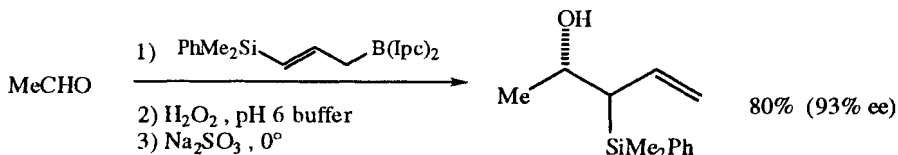
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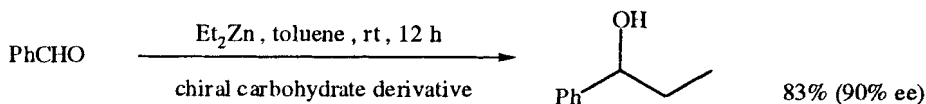
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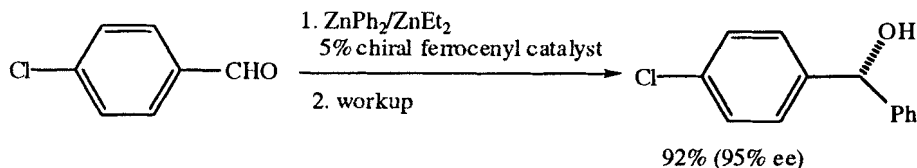
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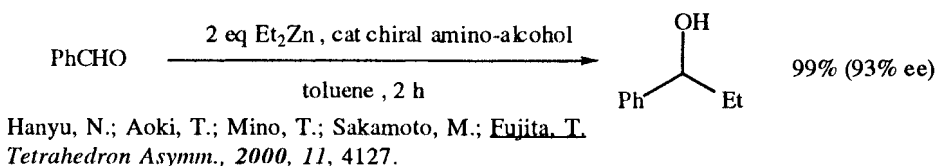
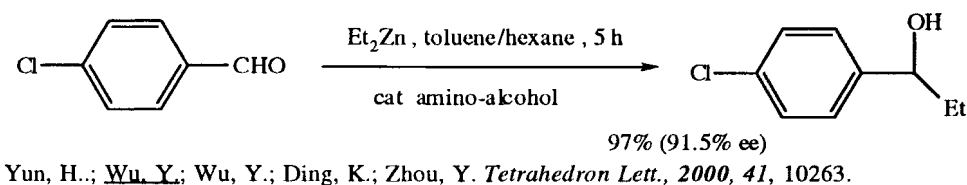
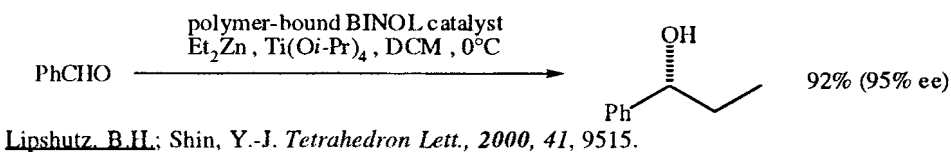
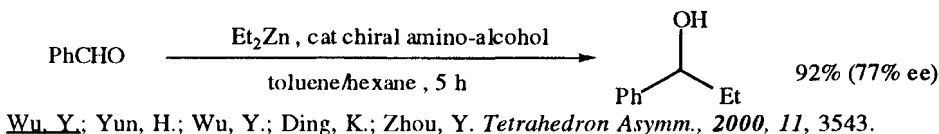
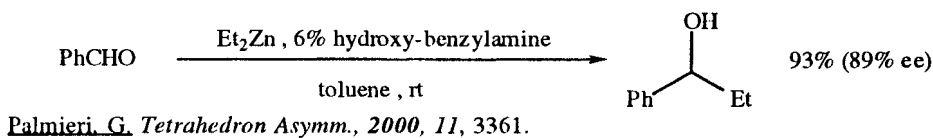
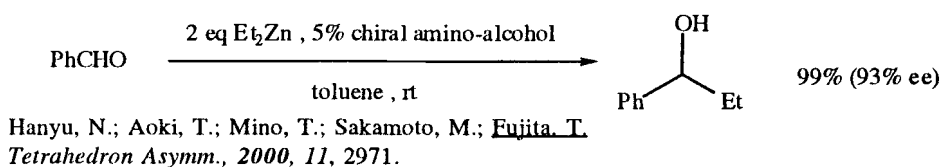
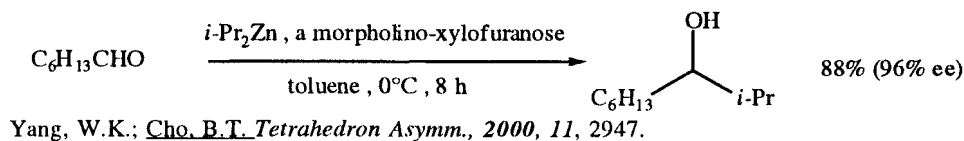
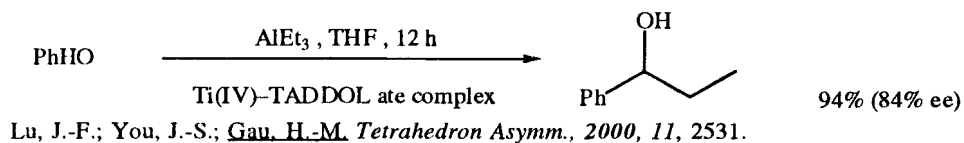
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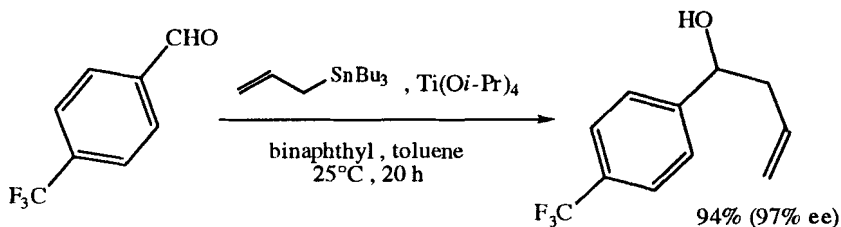
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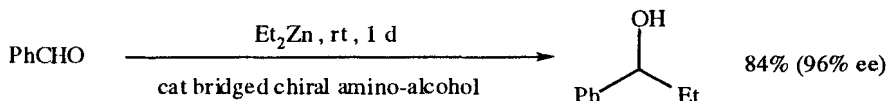
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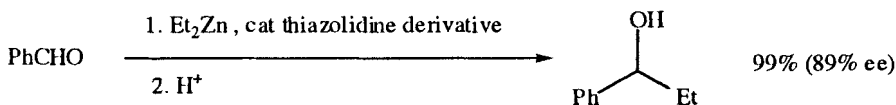




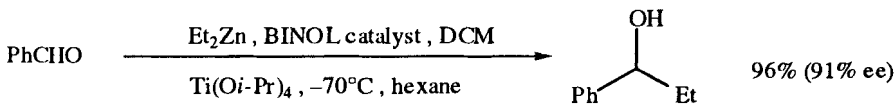
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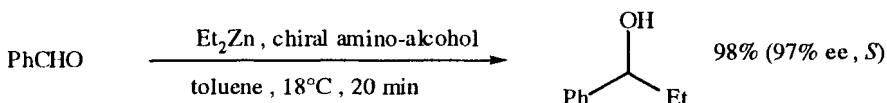
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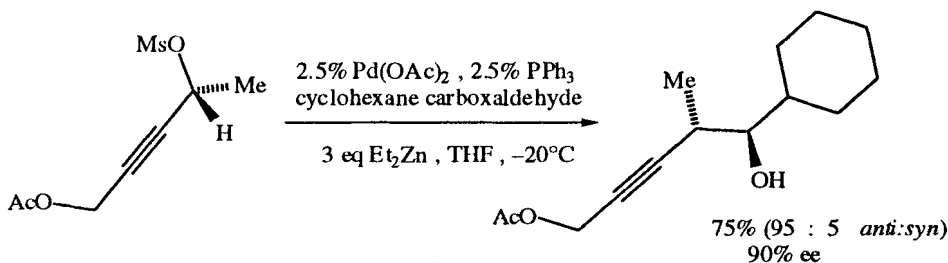
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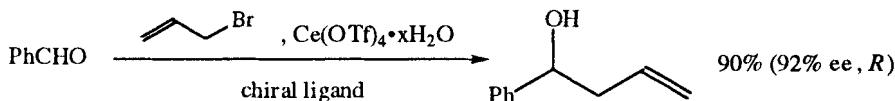
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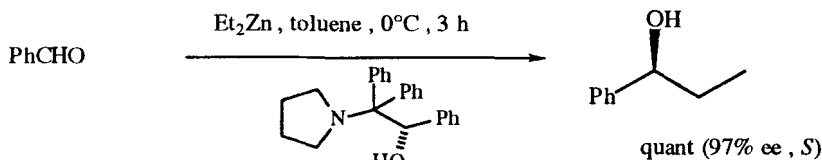
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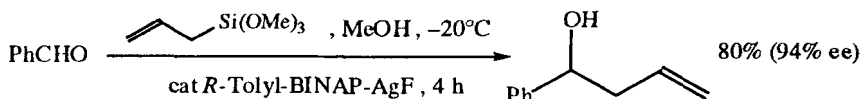
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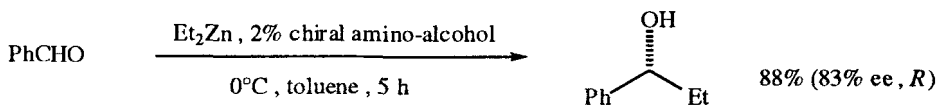
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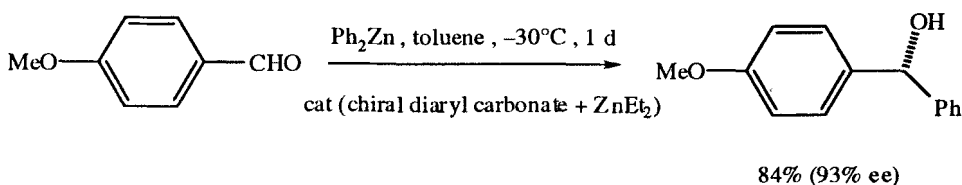
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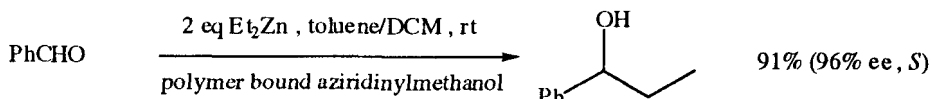
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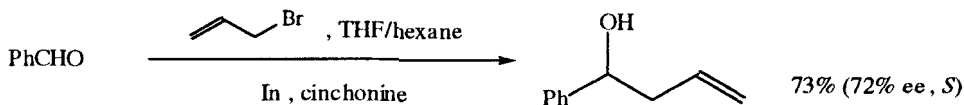
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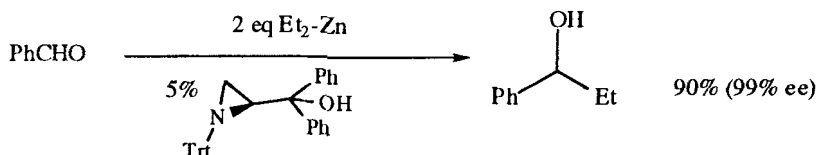
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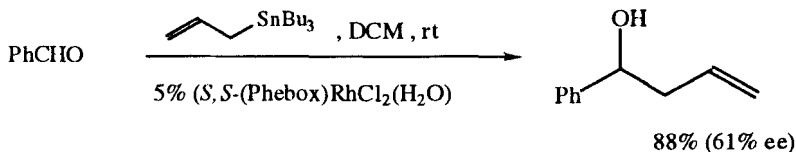
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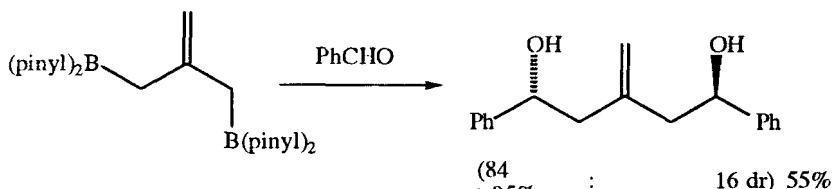
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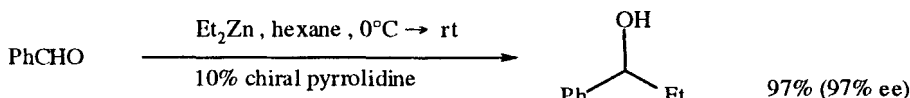
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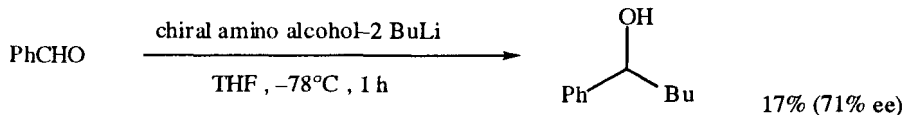
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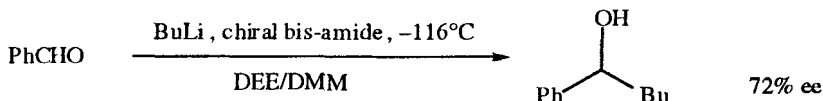
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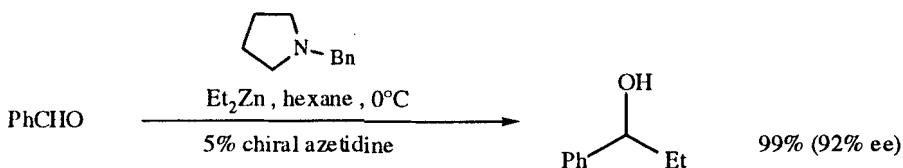
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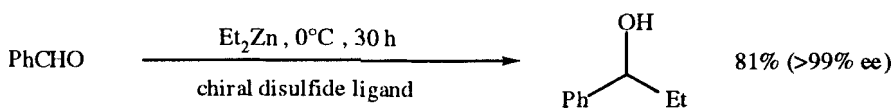
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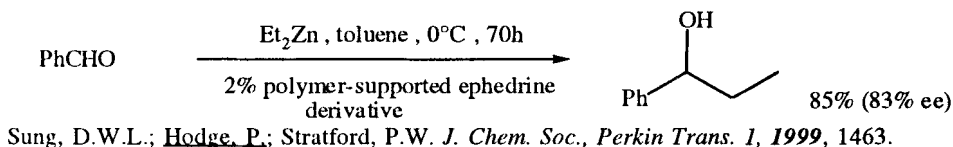
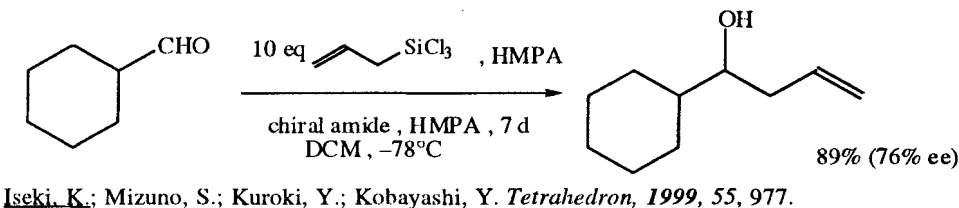
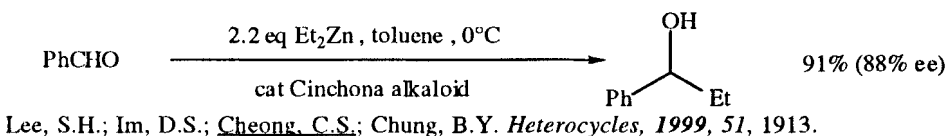
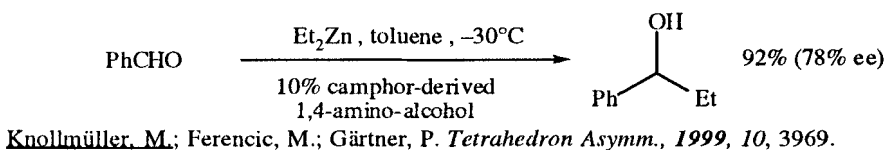
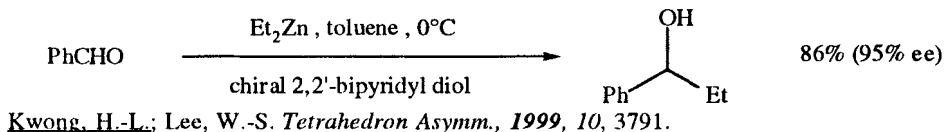
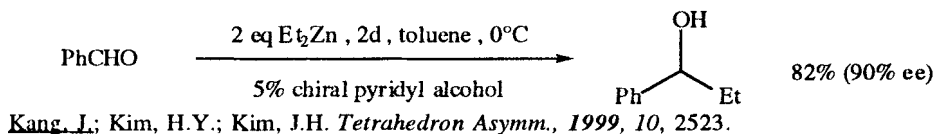
Arvidsson, P.I.; Davidsson, Ö; Hilmersson, G. *Tetrahedron Asymm.*, **1999**, 10, 527.



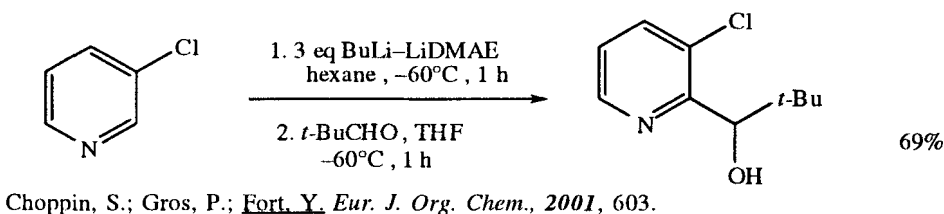
Shi, M.; Jiang, J.-K. *Tetrahedron Asymm.*, **1999**, 10, 1673.

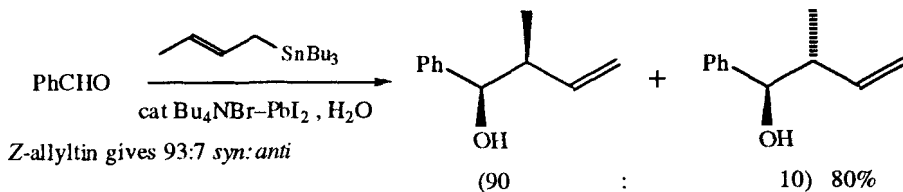


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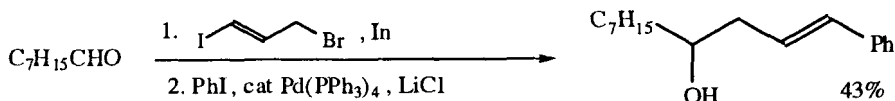


## NON-ASYMMETRIC ALKYLATIONS

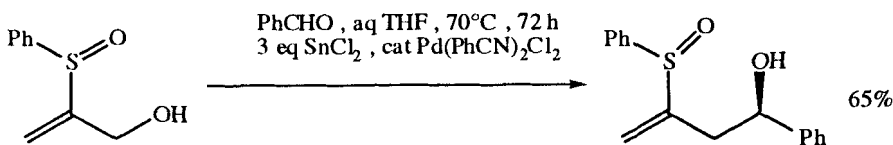




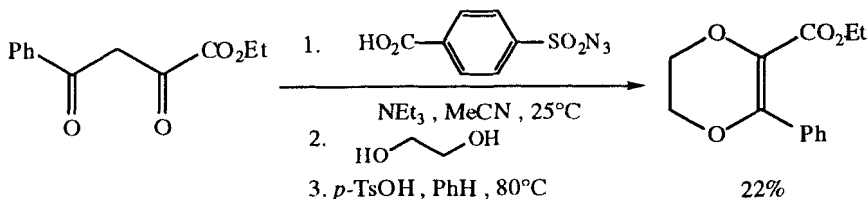
Shibata, I.; Yoshimura, N.; Yabu, M.; Baba, A. *Eur. J. Org. Chem.*, **2001**, 3207.



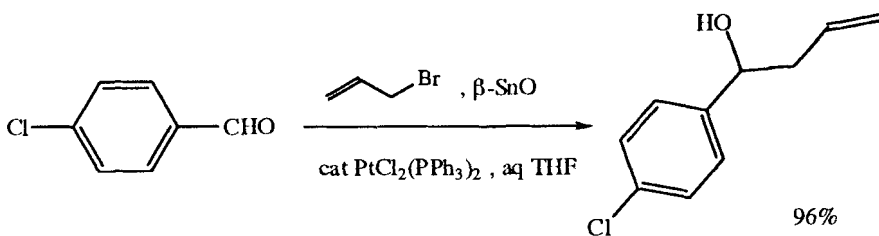
Hirashita, T.; Yamamura, H.; Kawai, M.; Araki, S. *Chem. Commun.*, **2001**, 387.



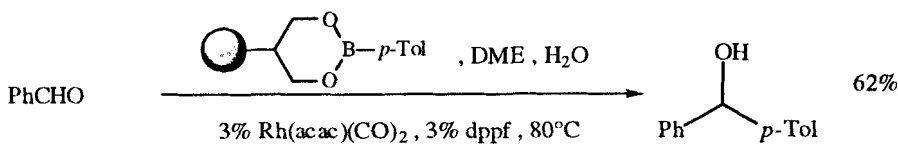
Márquez, F.; Llebaria, A.; Delgado, A. *Tetrahedron Asymm.* **2001**, 12, 1625.



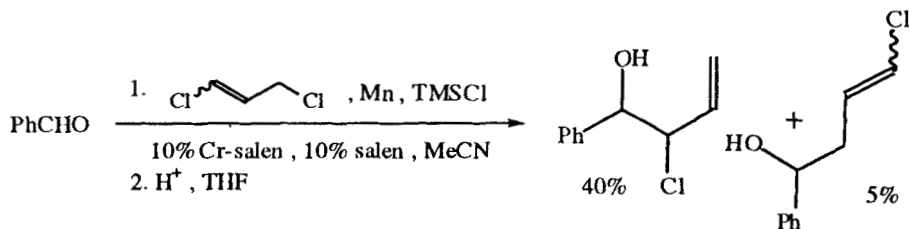
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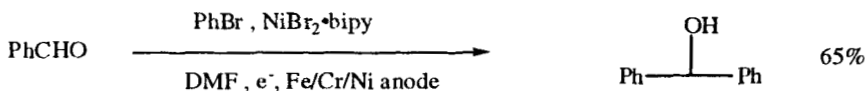
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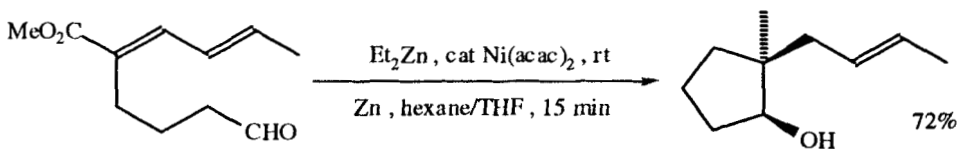
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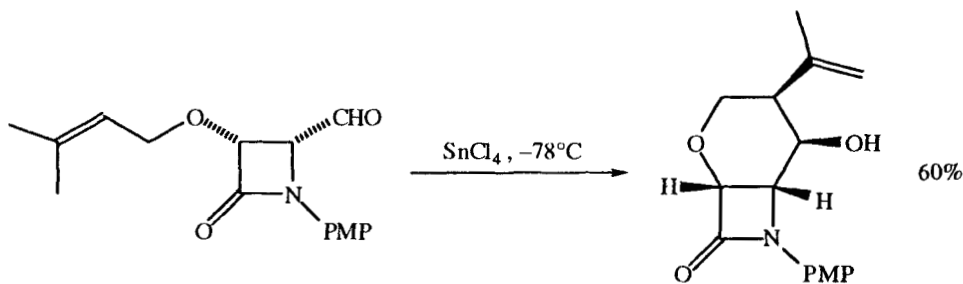
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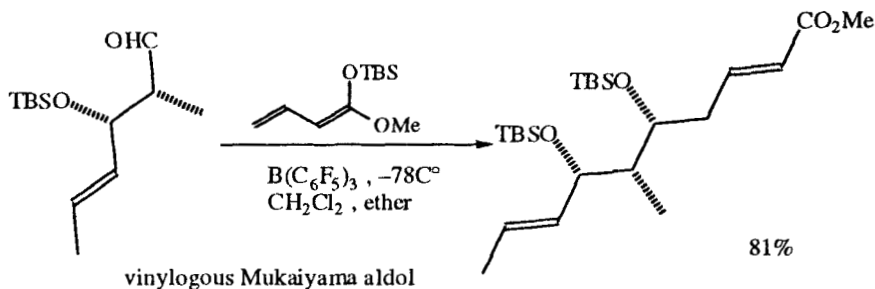
Durandetti, M.; Nédélec, J.-Y.; Périchon, J. *Org. Lett.*, **2001**, 3, 2073.



Shibata, K.; Kimura, M.; Shimizu, M.; Tamaru, Y. *Org. Lett.*, **2001**, 3, 2181.

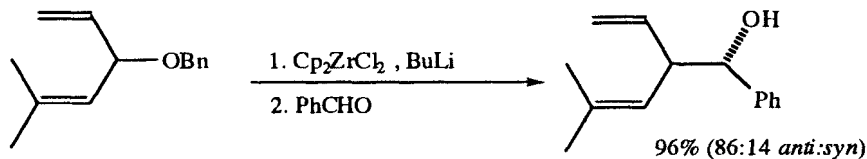


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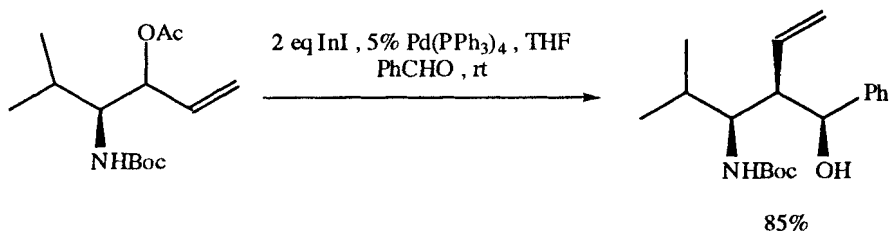


Chirstmann, M.; Kalesse, M. *Tetrahedron Lett.*, **2001**, 42, 1269.

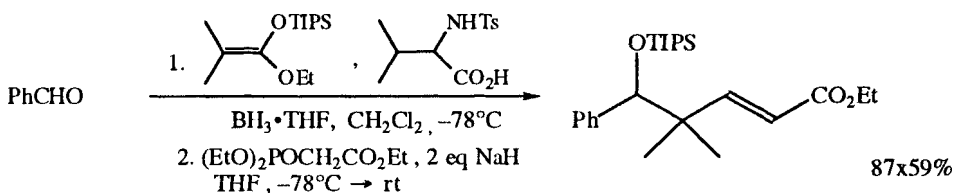




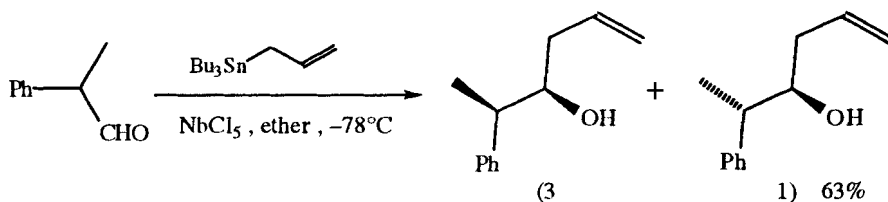
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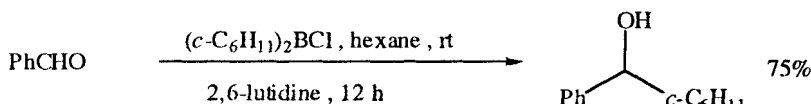
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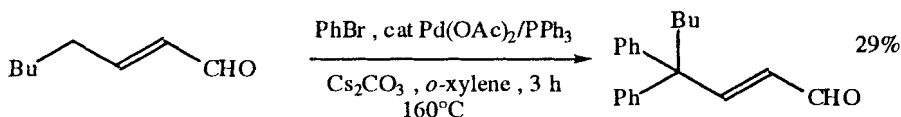
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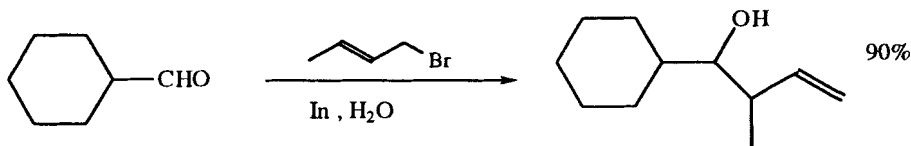


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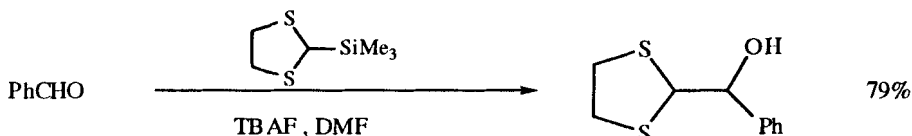


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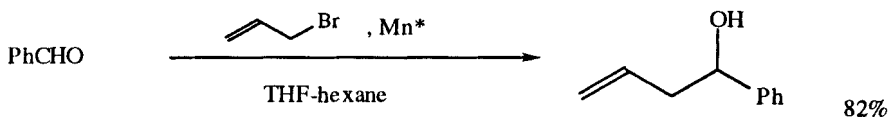




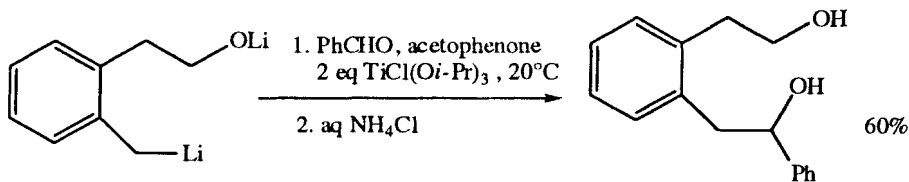
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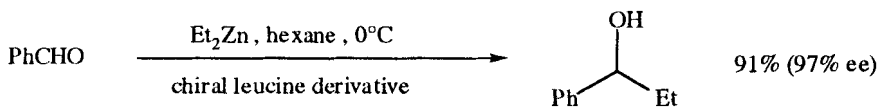
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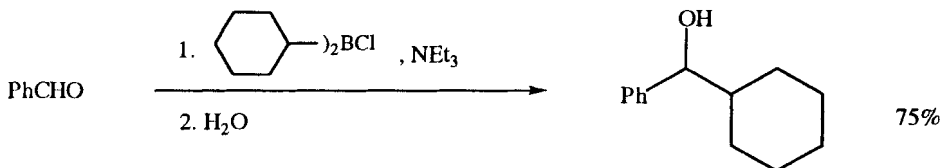
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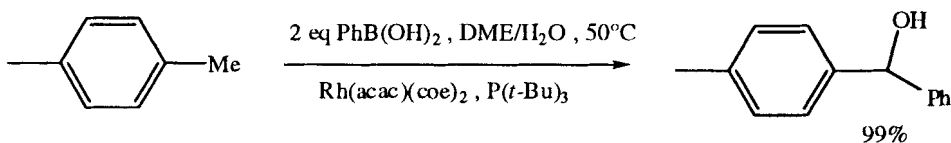
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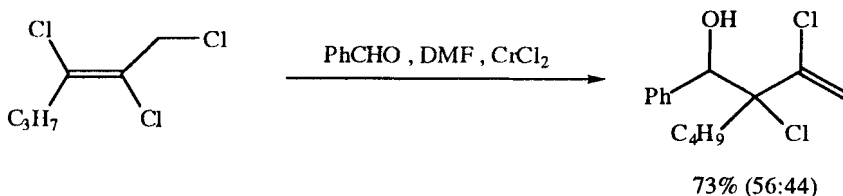
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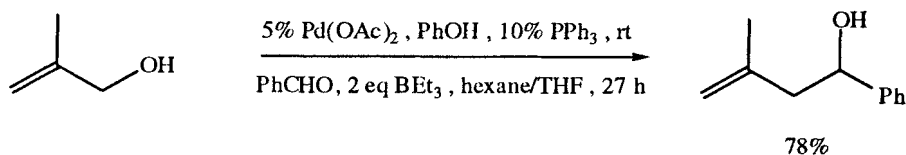
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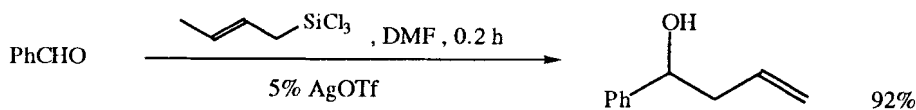
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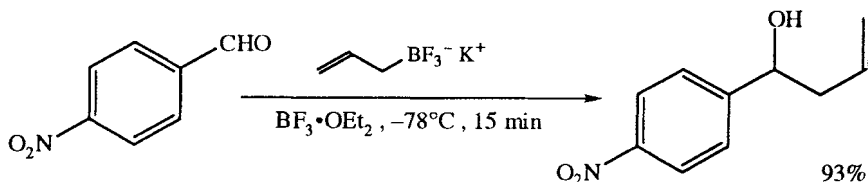
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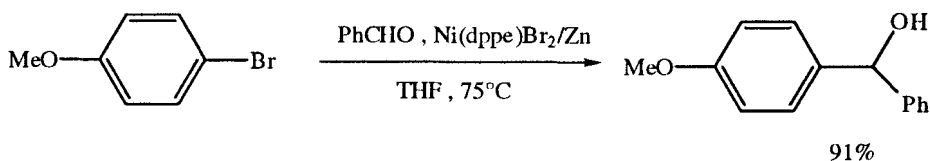
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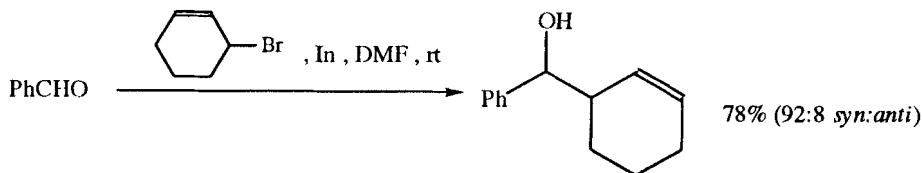
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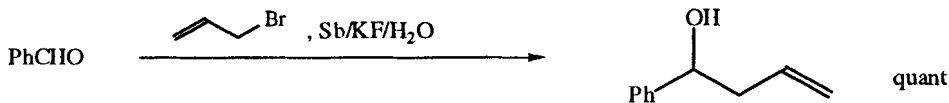
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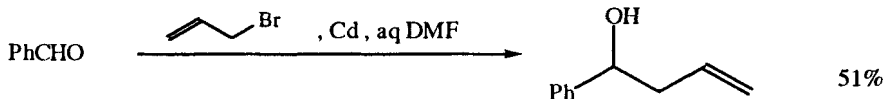
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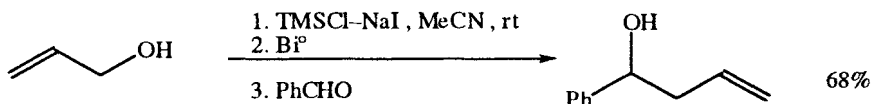
Khan, F.A.; Prabhudas, B. *Tetrahedron*, **2000**, *56*, 7595.



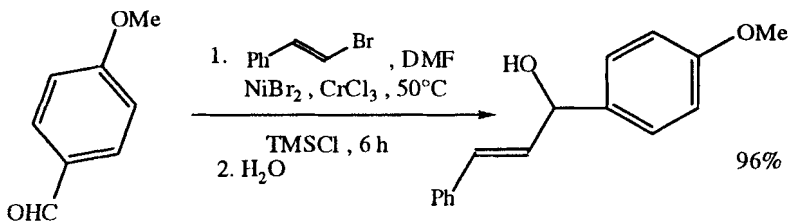
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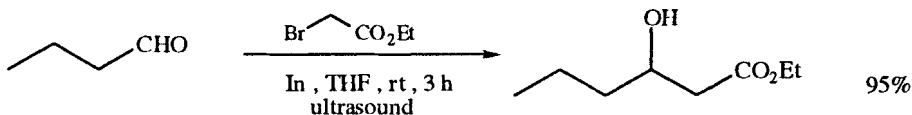
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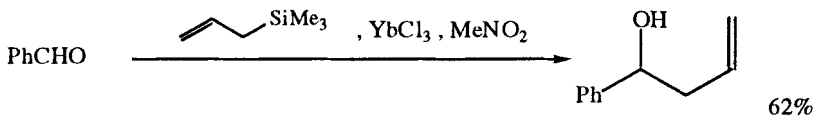
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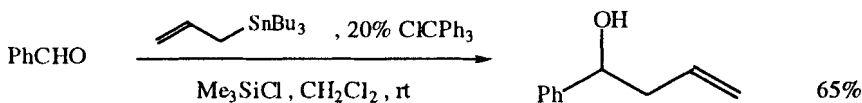
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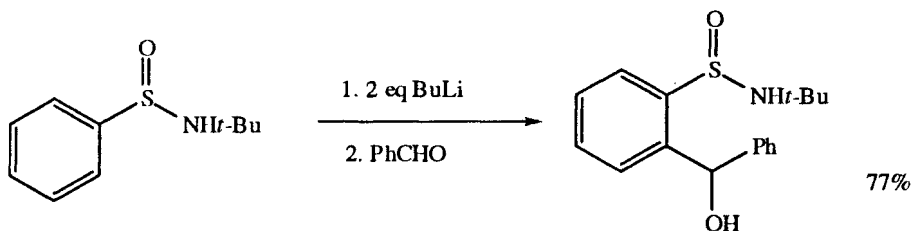
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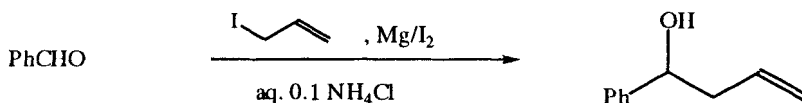
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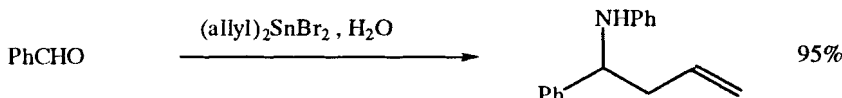
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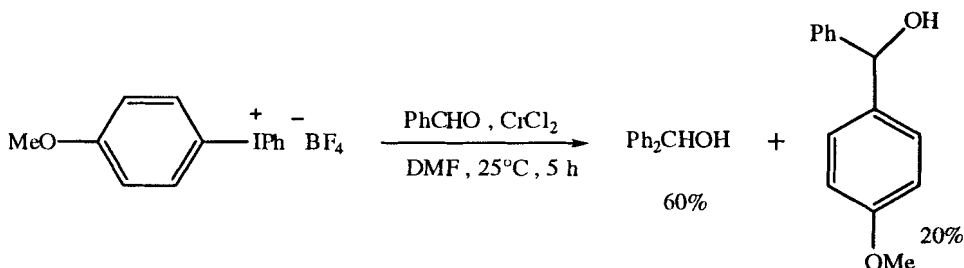
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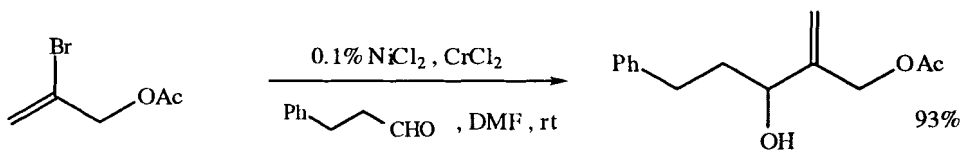
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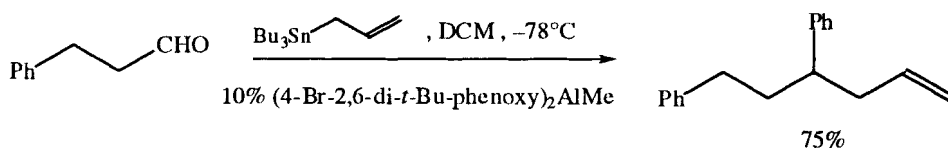
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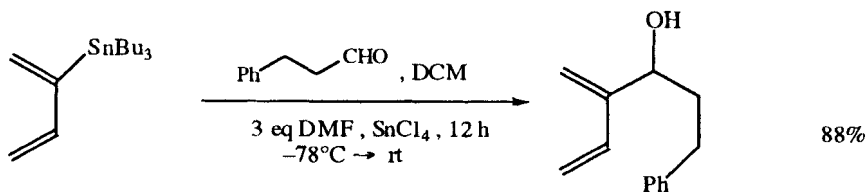
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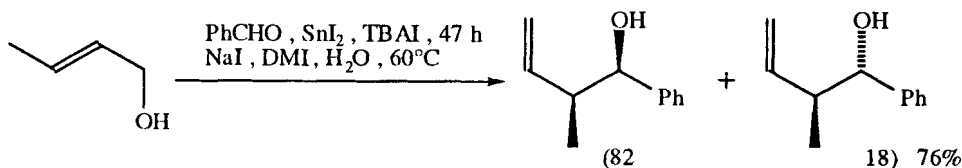
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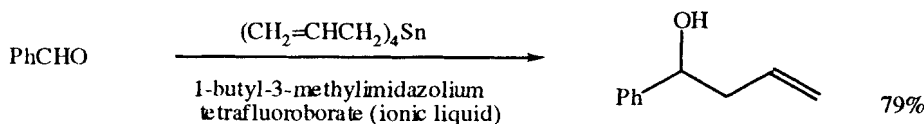
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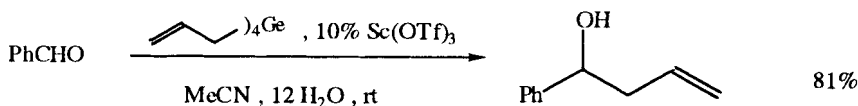
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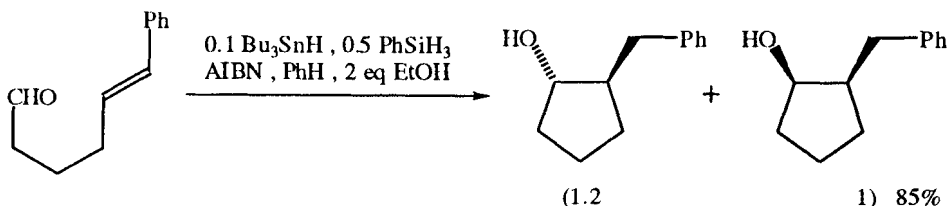
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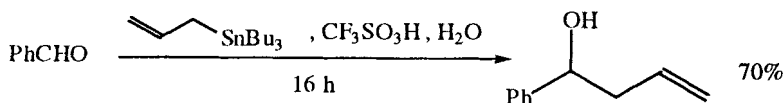
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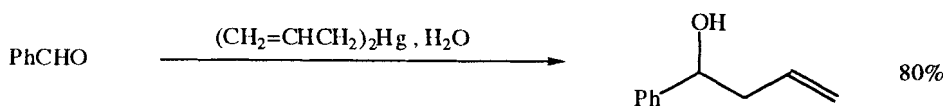
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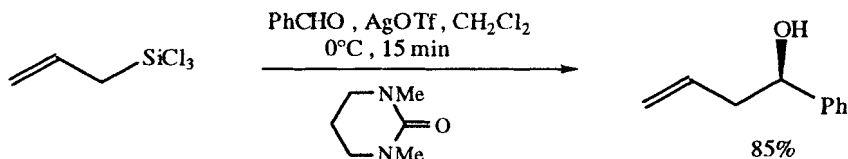
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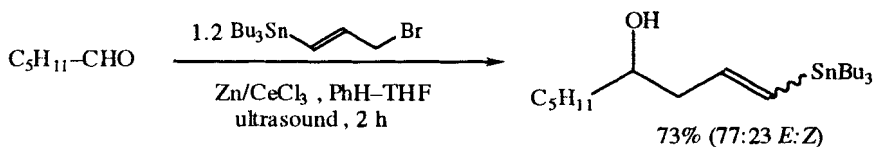
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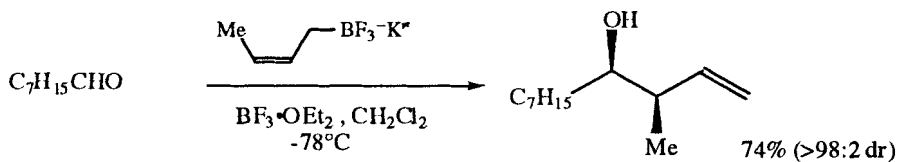
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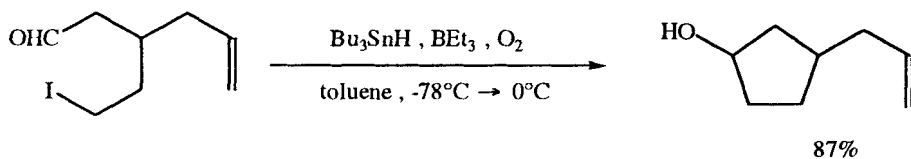
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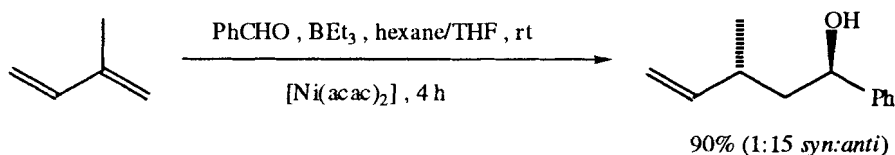
Lee, A.S.-Y.; Wu, C.-W. *Tetrahedron*, **1999**, *55*, 12531.



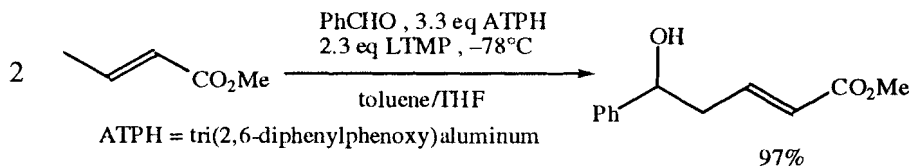
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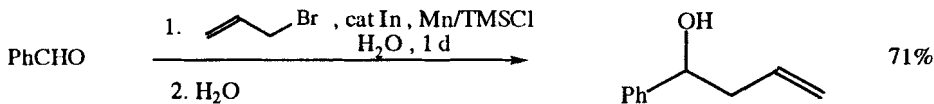
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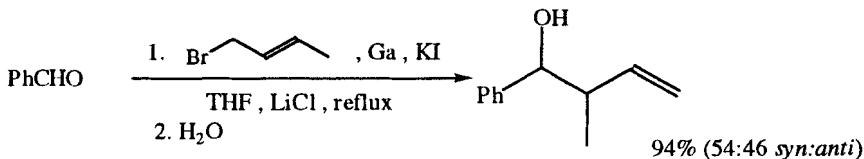
Kimura, M.; Fujimatsu, H.; Ezoe, A.; Shibata, K.; Shimizu, M.; Matsumoto, S.; Tamaru, Y.  
*Angew. Chem., Int. Ed.*, **1999**, 38, 397.



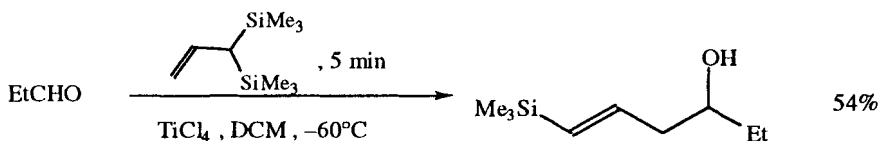
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"Catalytic Asymmetric Organic Zinc Addition to Carbonyl Compounds", Pu, L.; Yu, H.-B. *Chem. Rev.*, **2001**, 101, 757.

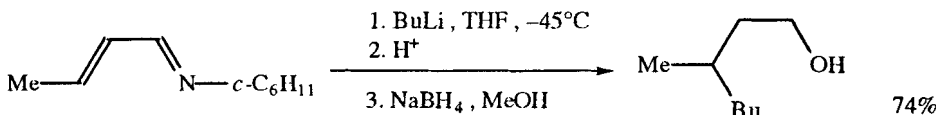
## SECTION 35: ALCOHOLS AND THIOLS FROM ALKYL, METHYLENES AND ARYL

No examples of the reaction  $\text{RR}^1 \rightarrow \text{ROH}$  ( $\text{R}^1 = \text{alkyl, aryl, etc.}$ ) occur in the literature. For reactions of the type  $\text{RH} \rightarrow \text{ROH}$  ( $\text{R} = \text{alkyl or aryl}$ ) see Section 41 (Alcohols and Phenols from Hydrides).

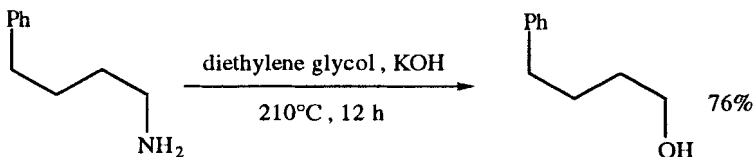
## SECTION 36: ALCOHOLS AND THIOLS FROM AMIDES

NO ADDITIONAL EXAMPLES

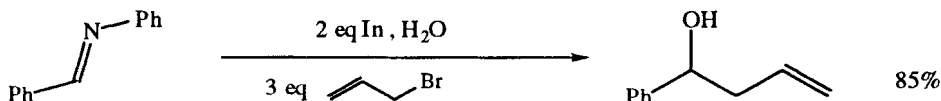
## SECTION 37: ALCOHOLS AND THIOLS FROM AMINES



Tomioka, K.; Shieoya, Y.; Nagaoka, Y.; Yamada, K.-i. *J. Org. Chem.*, **2001**, 66, 7051.

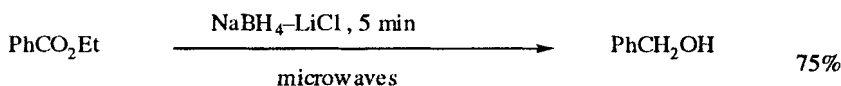


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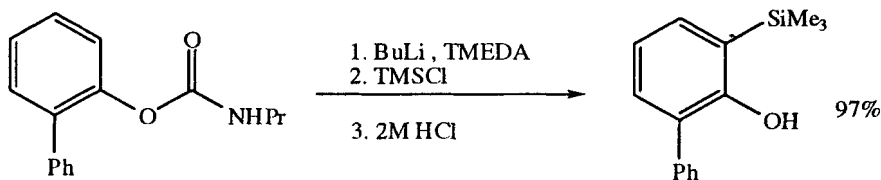


Vilaivan, T.; Winotapan, C.; Shinada, T.; Ohfuné, Y. *Tetrahedron Lett.*, **2001**, 42, 9073.

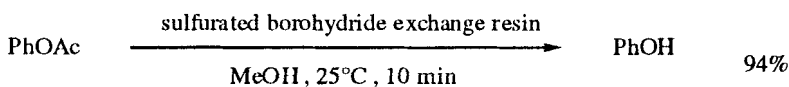
## SECTION 38: ALCOHOLS AND THIOLS FROM ESTERS



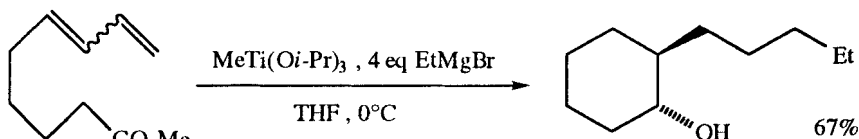
Feng, J.-C.; Liu, B.; Dai, L.; Yang, X.-L.; Tu, S.-J. *Synth. Commun.*, **2001**, 31, 1875.



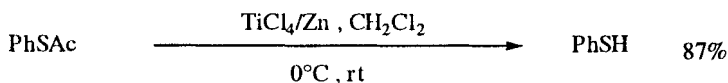
Kauch, M.; Hoppe, D. *Can. J. Chem.*, **2001**, 79, 1736.



Bandgar, B.P.; Kamble, V.T. *J. Chem. Res. (S)*, **2001**, 54.

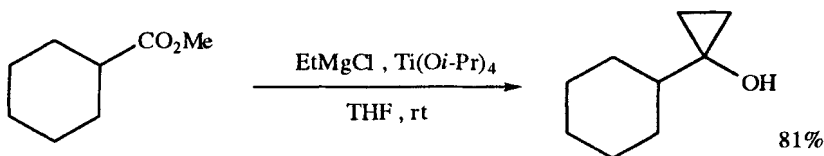


Quan, L.G.; Cha, J.K. *Org. Lett.*, **2001**, 3, 2745.

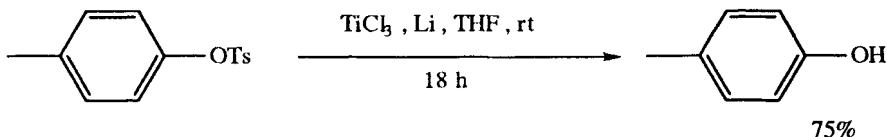


Jin, C.K.; Jeong, H.J.; Kim, M.K.; Kim, J.Y.; Yoon, Y.-J.; Lee, S.-G. *Synlett*, **2001**, 1956.

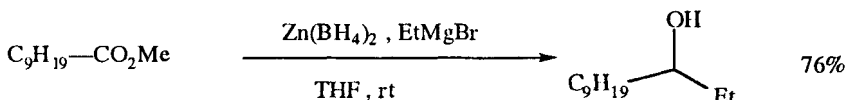




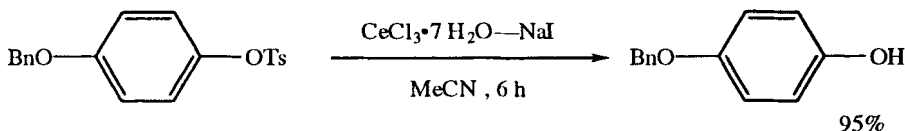
Lee, J.C.; Sung, M.J.; Cha, I.K. *Tetrahedron Lett.*, **2001**, *42*, 2059.



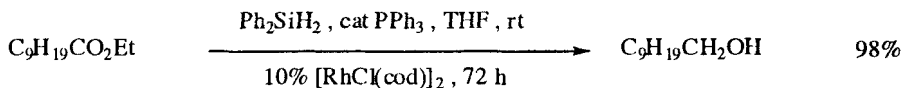
Nayak, S.K. *Synthesis*, **2000**, 1575.



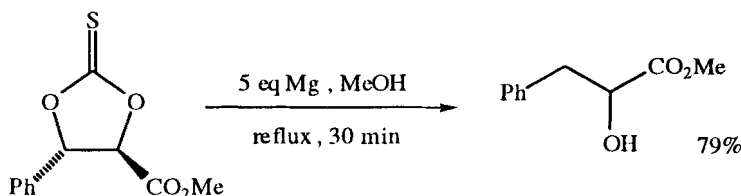
Balasubramanian, S.; Nair, M.G. *Synth. Commun.*, **2000**, *30*, 313.



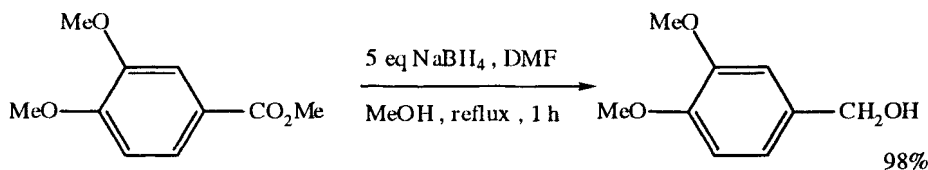
Reddy, G.S.; Mohan, G.H.; Iyengar, D.S. *Synth. Commun.*, **2000**, *30*, 3829.



Ohta, T.; Kamiya, M.; Kusui, K.; Michibata, T.; Nobutomo, M.; Furukawa, I. *Tetrahedron Lett.*, **1999**, *40*, 6963.

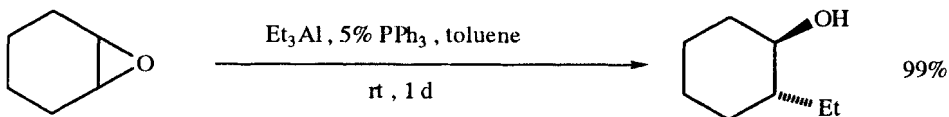


Rho, H.-S.; Ko, B.-S. *Synth. Commun.*, **1999**, *29*, 2875.

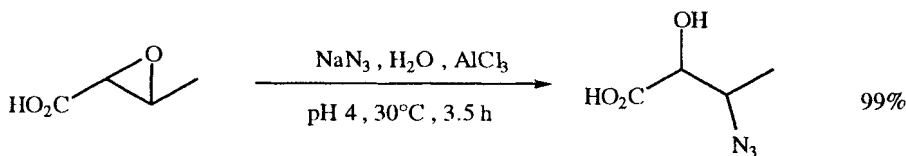


Zanka, A.; Ohmori, H.; Okamoto, T. *Synlett*, **1999**, 1636.

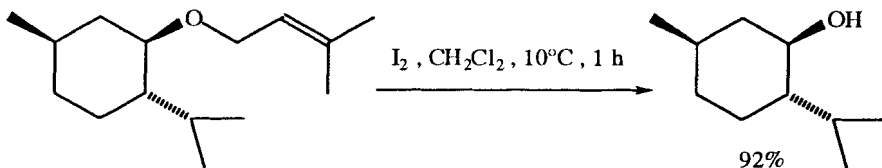
# SECTION 39: ALCOHOLS AND THIOLS FROM ETHERS, EPOXIDES AND THIOETHERS



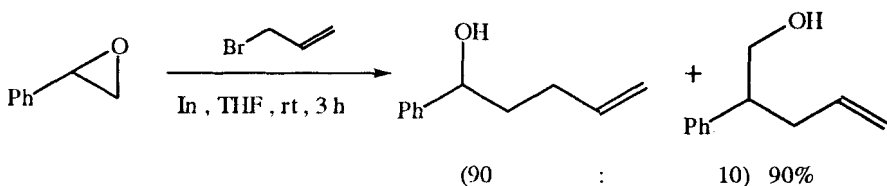
Schneider, C.; Brauner, J. *Eur. J. Org. Chem.*, **2001**, 4445.



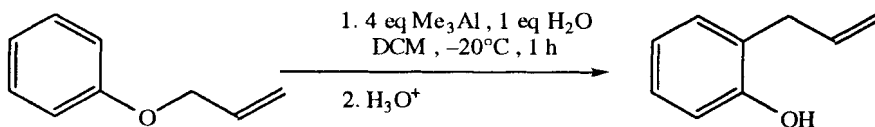
Fringuelli, F.; Pizzo, F.; Vaccaro, L. *Tetrahedron Lett.*, **2001**, 42, 1131.



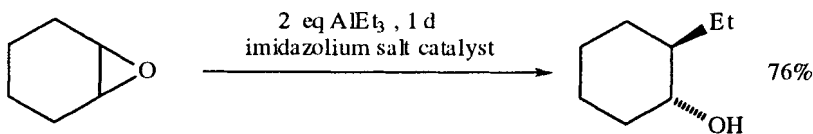
Vatèle, J.-M. *Synlett*, **2001**, 1989.



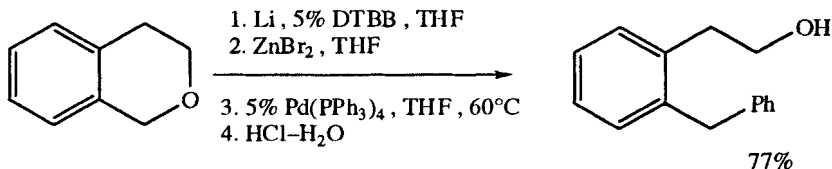
Yadav, J.S.; Anjaneyulu, S.; Ahmed, Md.M.; Subba Reddy, B.V. *Tetrahedron Lett.*, **2001**, 42, 2557.



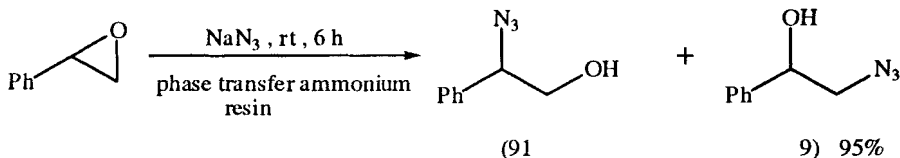
Wipf, P.; Ribe, S. *Org. Lett.*, **2001**, 3, 1503.



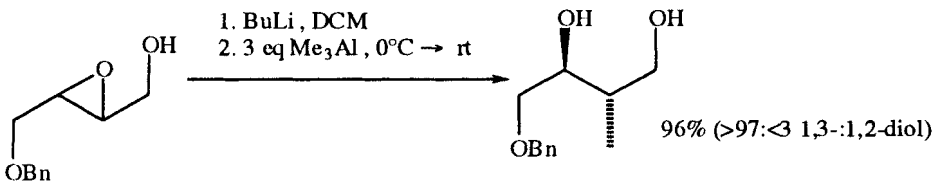
Zhou, H.; Campbell, E.J.; Nguyen, S.T. *Org. Lett.*, **2001**, 3, 2229.



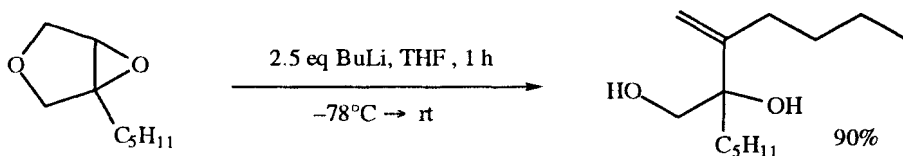
Yus, M.; Gomis, J. *Tetrahedron Lett.*, **2001**, 42, 5721.



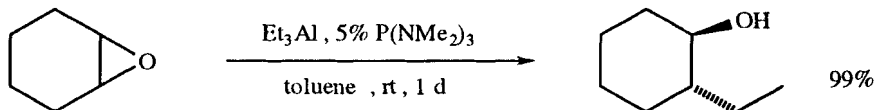
Tamami, B.; Mahdavi, H. *Tetrahedron Lett.*, **2001**, 42, 8721.



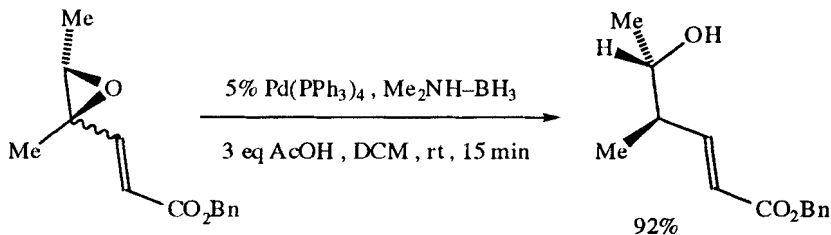
Sasaki, M.; Tanino, K.; Miyashita, M. *Org. Lett.*, **2001**, 3, 1765.



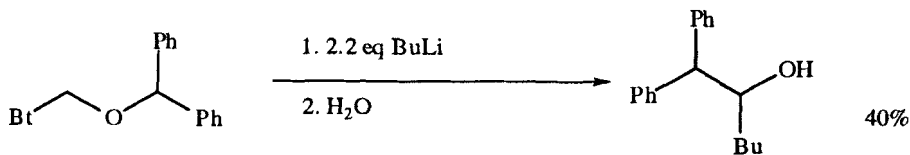
Hodgson, D.M.; Stent, M.A.H.; Wilson, F.X. *Org. Lett.*, **2001**, 3, 3401.



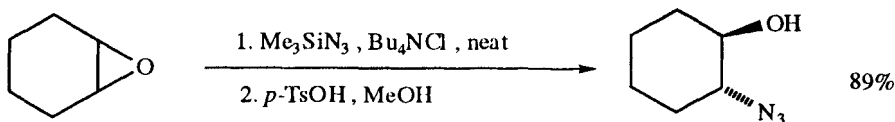
Schneider, C.; Brauner, J. *Tetrahedron Lett.*, **2000**, 41, 3043.



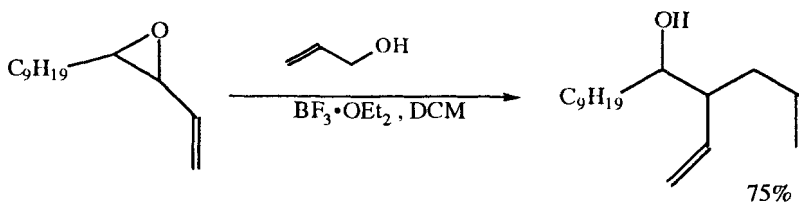
David, H.; Dupuis, L.; Guillerez, M.-G.; Guibe, F. *Tetrahedron Lett.*, **2000**, 41, 3335.



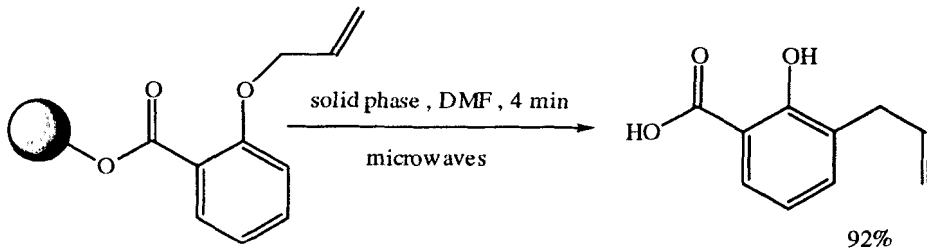
Katritzky, A.R.; Fang, Y. *Heterocycles*, **2000**, *53*, 1783.



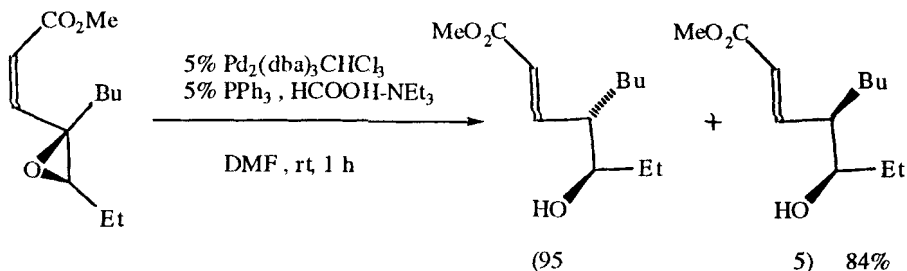
Schneider, C. *Synlett*, **2000**, 1840.



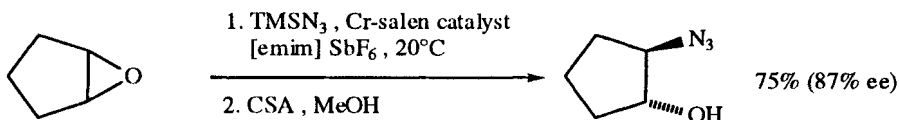
Prestat, G.; Baylon, C.; Heck, M.-P.; Mioskowski, C. *Tetrahedron Lett.*, **2000**, *41*, 3829.



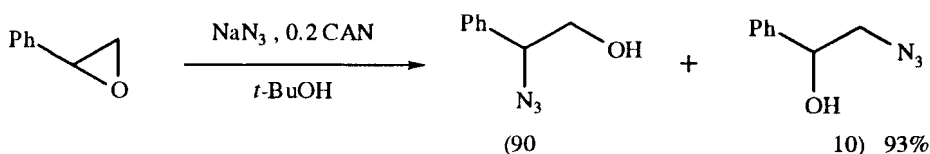
Kumar, H.M.S.; Anjaneyulu, S.; Reddy, B.V.S.; Yadav, J.C. *Synlett*, **2000**, 1129.



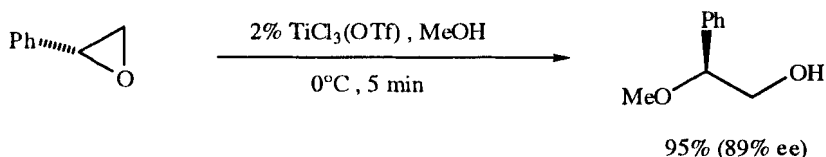
Noguchi, Y.; Yamada, T.; Uchiro, H.; Kobayashi, S. *Tetrahedron Lett.*, **2000**, *41*, 7493, 7499.



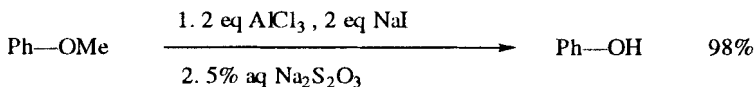
Song, C.E.; Oh, C.R.; Roh, E.J.; Choo, D.J. *Chem. Commun.*, **2000**, 1743.



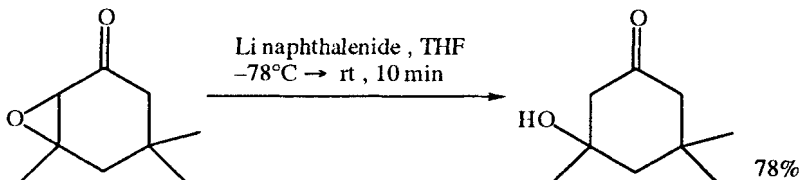
Iranpoor, N.; Kazemi, F. *Synth. Commun.*, **1999**, 29, 561.



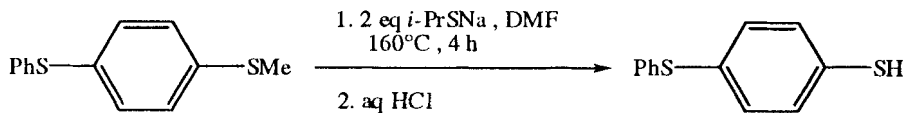
Iranpoor, N.; Zeynizadeh, B. *Synth. Commun.*, **1999**, 29, 1017.



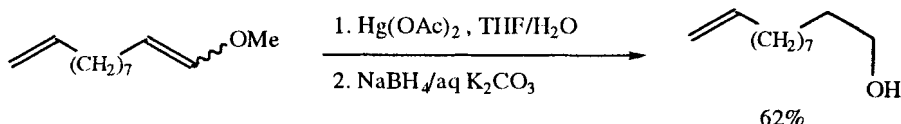
Ghiaci, M.; Asghari, J. *Synth. Commun.*, **1999**, 29, 973.



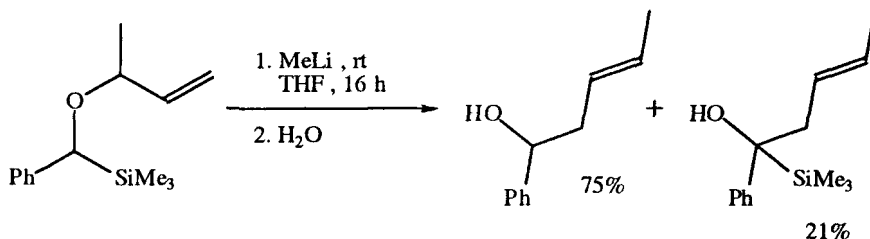
Jankowska, R.; Mhehe, G.-L.; Liu, H.-L. *Chem. Commun.*, **1999**, 1581.



Pinchart, A.; Dallaire, C.; Van Bierbeek, A.; Gingras, M. *Tetrahedron Lett.*, **1999**, 40, 5479.



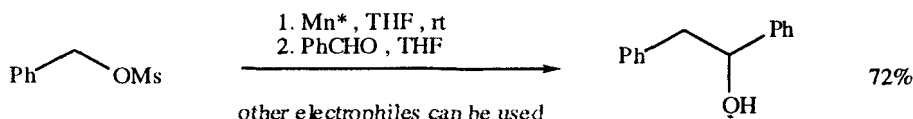
Crouch, E.D.; Mehlmann, J.F.; Herb, B.R.; Mitten, J.V.; Dai, G. *Synthesis*, **1999**, 559.



Maleczka Jr., R.E.; Geng, F. *Org. Lett.*, **1999**, *1*, 1115.

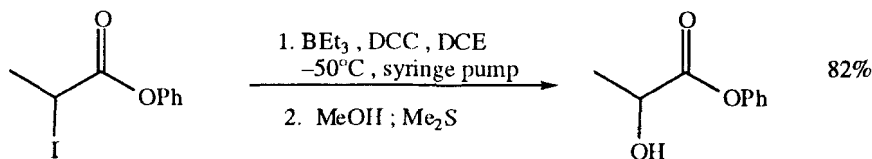
Additional examples of ether cleavages may be found in Section 45A (Protection of Alcohols and Thiols).

## SECTION 40: ALCOHOLS AND THIOLS FROM HALIDES AND SULFONATES

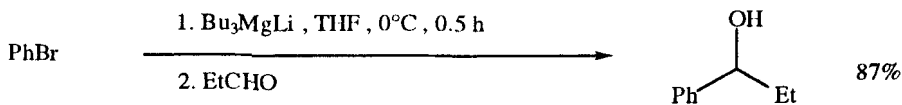


other electrophiles can be used

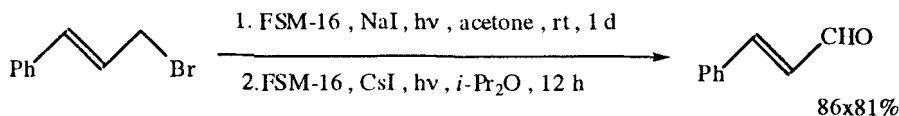
Kim, S.-H.; Rieke, R.D. *Tetrahedron Lett.*, **1999**, *40*, 4931.



Kihara, N.; Ollivier, C.; Renaud, P. *Org. Lett.*, **1999**, *1*, 1419.

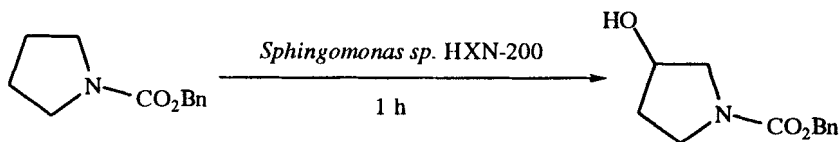


Inoue, A.; Kitagawa, K.; Shinokubo, H.; Oshima, K. *J. Org. Chem.*, **2001**, *66*, 4333.



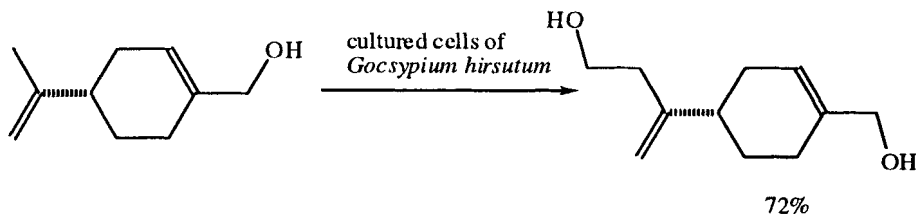
Itoh, A.; Kodama, T.; Inagaki, S.; Masaki, Y. *Org. Lett.*, **2001**, *3*, 2653.

## SECTION 41: ALCOHOLS AND THIOLS FROM HYDRIDES

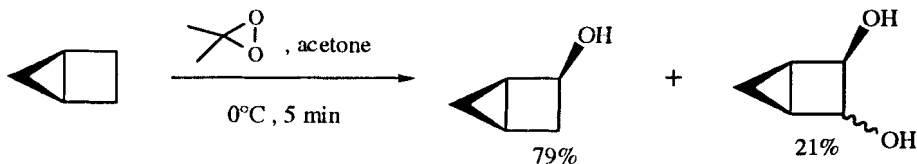


90% conversion

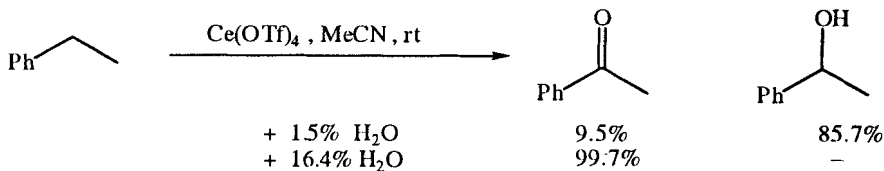
Li, Z.; Feiten, H.-J.; Chang, D.; Duetz, W.A.; van Beilen, J.B.; Witholt, B.  
*J. Org. Chem.*, **2001**, *66*, 8424.



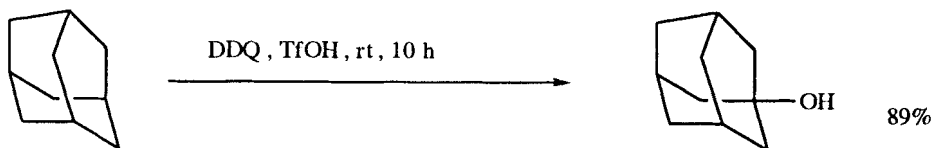
Hamada, H.; Tanaka, T.; Furuya, T.; Takahata, H.; Nemoto, H.  
*Tetrahedron Lett.*, **2001**, *42*, 909.



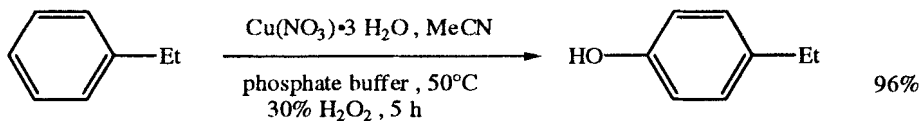
Curci, R.; D'Accolti, L.; Fusco, C. *Tetrahedron Lett.*, **2001**, *42*, 7087.



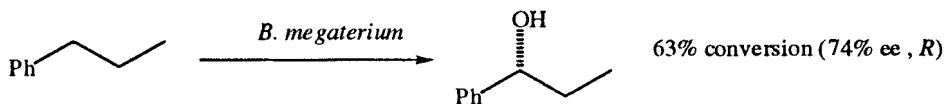
Laali, K.K.; Herbert, M.; Cushnyr, B.; Bhatt, A.; Terrano, D.  
*J. Chem. Soc., Perkin Trans. 1*, **2001**, 578.



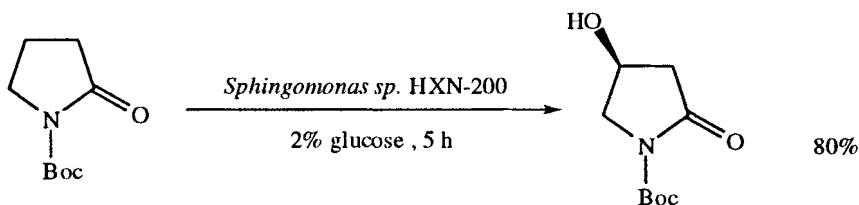
Tanemura, K.; Suzuki, T.; Nishida, Y.; Satsumabayashi, K.; Horaguchi, T.  
*J. Chem. Soc., Perkin Trans. 1*, **2001**, 3230.



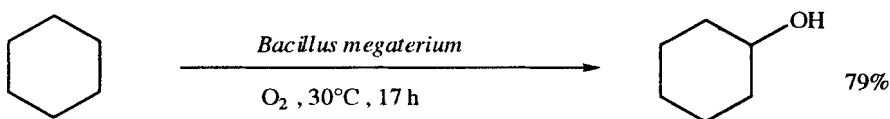
Nasreen, A.; Adapa, S.R. *Org. Prep. Proceed. Int.*, **2000**, 32, 287.



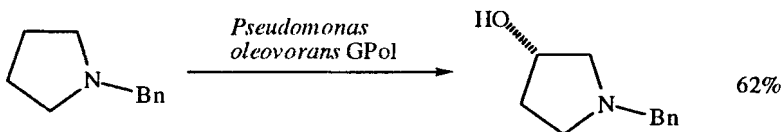
Adam, W.; Lukacs, Z.; Harmsen, D.; Saha-Möller, C.R.; Schreier, P. *J. Org. Chem.*, **2000**, 65, 878.



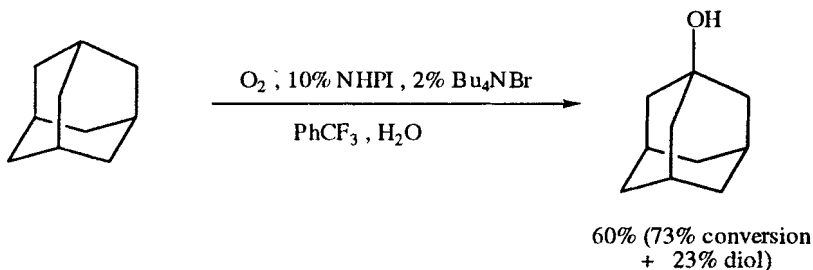
Chang, D.; Witholt, B.; Li, Z. *Org. Lett.*, **2000**, 2, 3949.



Adam, W.; Lukacs, Z.; Saha-Möller, C.R.; Weckerle, B.; Schreier, P. *Eur. J. Org. Chem.*, **2000**, 2923.

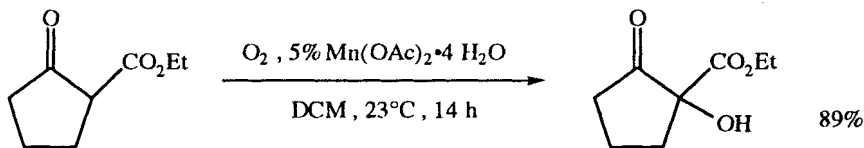


Li, Z.; Feiten, H.-J.; van Beilen, J.B.; Duetz, W.; Witholt, B. *Tetrahedron Asymm.*, **1999**, 10, 1323.

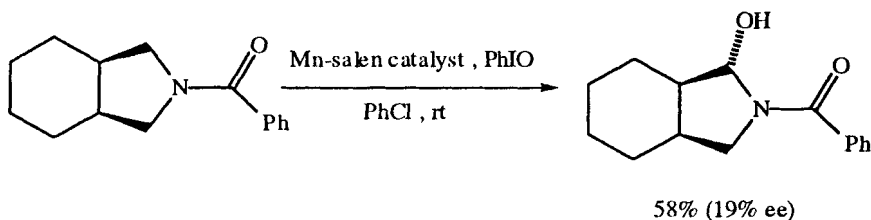


Matsunaka, K.; Iwahama, T.; Sakaguchi, S.; Ishii, Y. *Tetrahedron Lett.*, **1999**, 40, 2165.

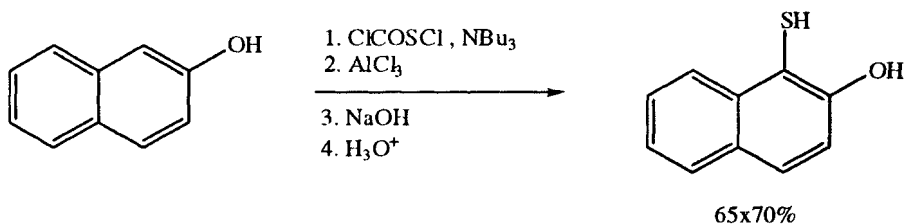




Christoffers, L. *J. Org. Chem.*, **1999**, 64, 7668.



Punniyamurthy, T.; Katsuki, T. *Tetrahedron*, **1999**, 55, 9439.

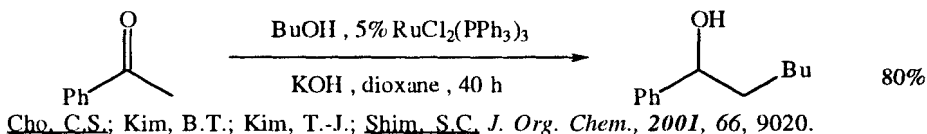


Yoshida, Y.; Ogura, M.; Tanabe, Y. *Heterocycles*, **1999**, 50, 681.

## SECTION 42: ALCOHOLS AND THIOLS FROM KETONES

The following reaction types are included in this section:

- A. Reductions of Ketones to Alcohols
- B. Alkylations of Ketones, forming Alcohols

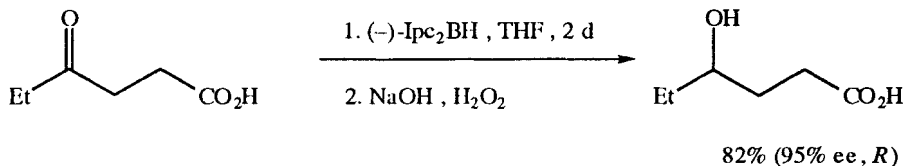


Cho, C.S.; Kim, B.T.; Kim, T.-J.; Shim, S.C. *J. Org. Chem.*, **2001**, 66, 9020.

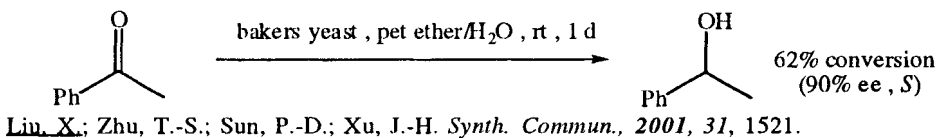
Coupling of ketones to give diols is found in Section 323 (Alcohol  $\rightarrow$  Alcohol).

## SECTION 42A: REDUCTION OF KETONES TO ALCOHOLS

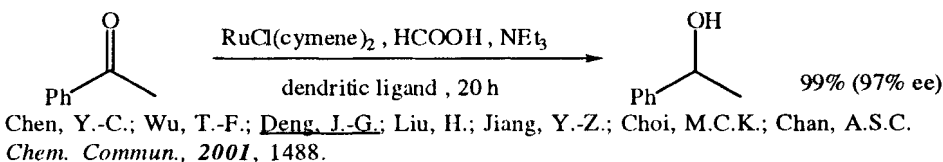
## ASYMMETRIC REDUCTION



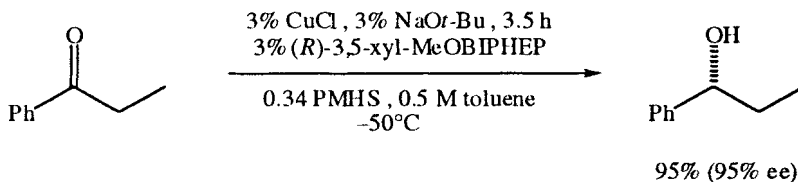
Ramachandran, P.V.; Brown, H.C.; Pitre, S. *Org. Lett.*, **2001**, *3*, 17.



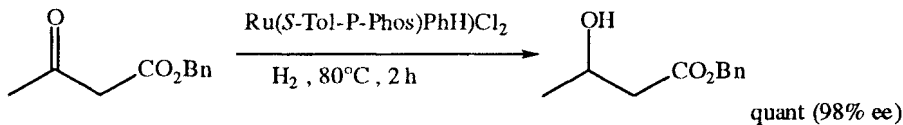
Liu, X.; Zhu, T.-S.; Sun, P.-D.; Xu, J.-H. *Synth. Commun.*, **2001**, *31*, 1521.



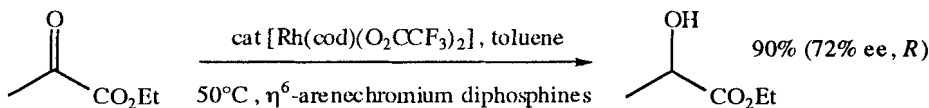
Chen, Y.-C.; Wu, T.-F.; Deng, J.-G.; Liu, H.; Jiang, Y.-Z.; Choi, M.C.K.; Chan, A.S.C. *Chem. Commun.*, **2001**, 1488.



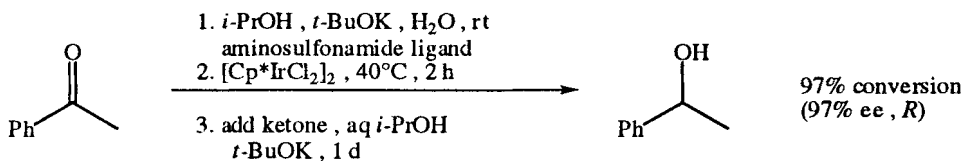
Lipshutz, B.H.; Noson, K.; Chrisman, W. *J. Am. Chem. Soc.*, **2001**, *123*, 12917.



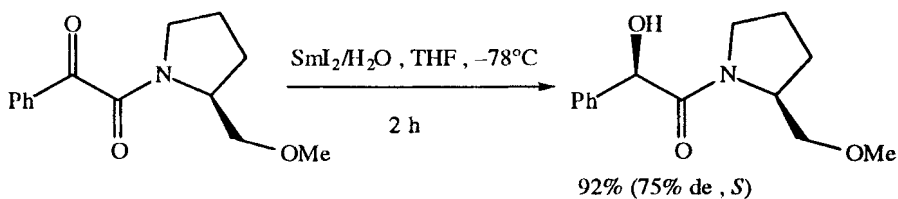
Wu, J.; Chen, H.; Zhou, Z.-Y.; Yueng, C.H.; Chan, A.S.C. *Synlett*, **2001**, 1050.



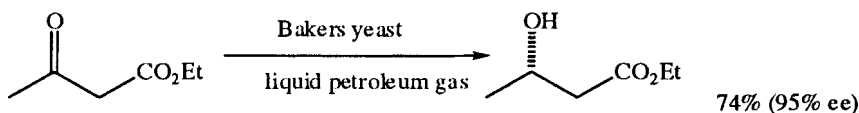
Pasquier, C.; Pélineski, L.; Brocard, J.; Mortreux, A.; Aghossou-Niedercorn, F. *Tetrahedron Lett.*, **2001**, *42*, 2809.



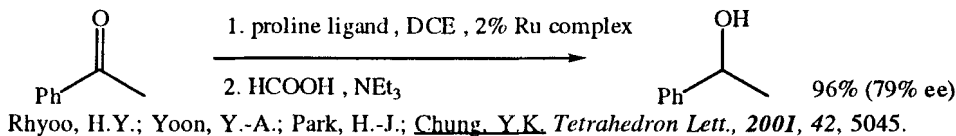
Thorpe, T.; Blacker, J.; Brown, S.M.; Bubert, C.; Crosby, J.; Fitzjohn, S.; Muxworthy, J.P.; Williams, J.M.J. *Tetrahedron Lett.*, **2001**, *42*, 4041.



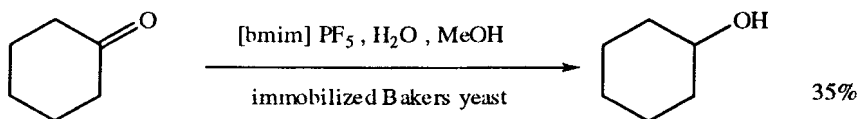
Fukuzawa, S.-i.; Miura, M.; Matsuzawa, H. *Tetrahedron Lett.*, **2001**, *42*, 4167.



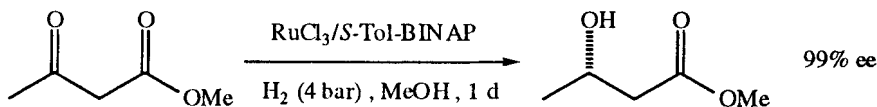
Johns, M.K.; Smallridge, A.L.; Trehwella, M.A. *Tetrahedron Lett.*, **2001**, *42*, 4261.



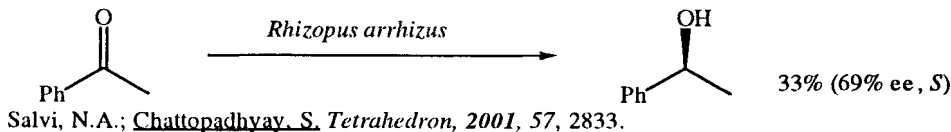
Rhyoo, H.Y.; Yoon, Y.-A.; Park, H.-J.; Chung, Y.K. *Tetrahedron Lett.*, **2001**, *42*, 5045.



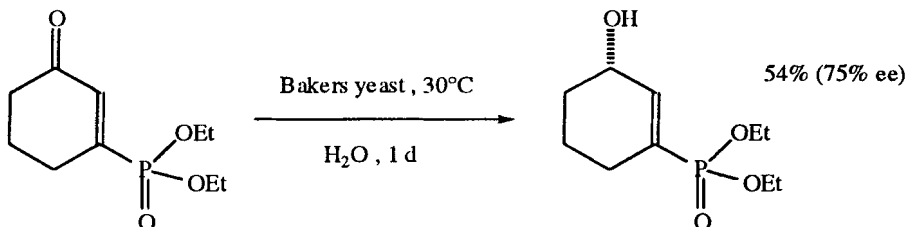
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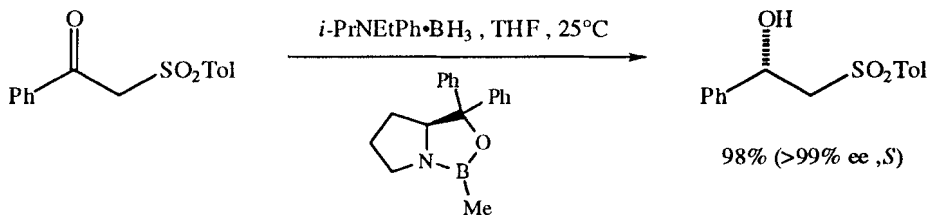
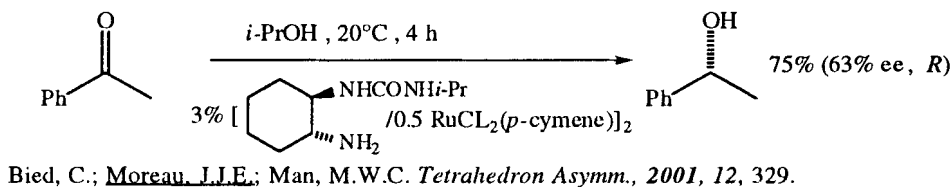
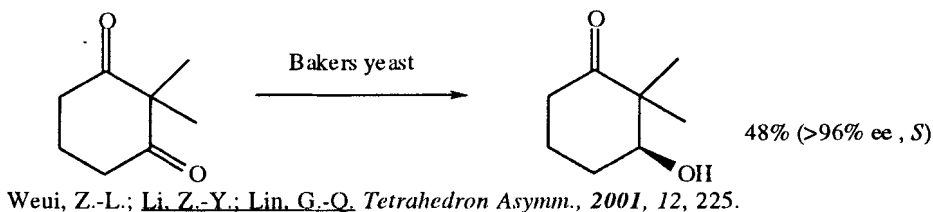
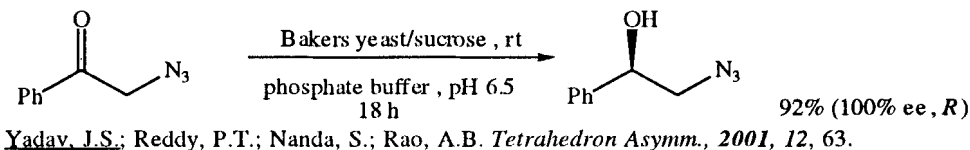
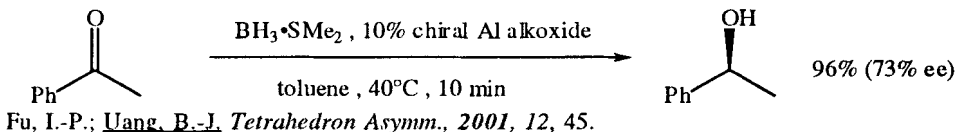
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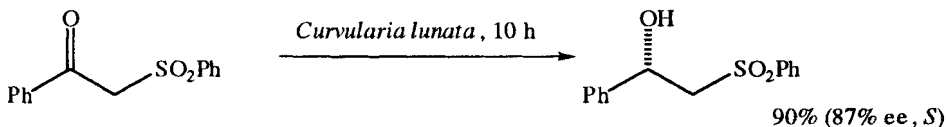


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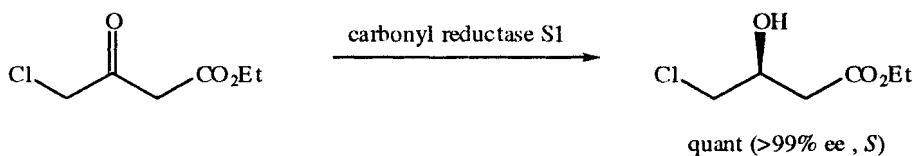


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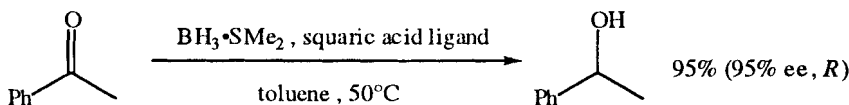




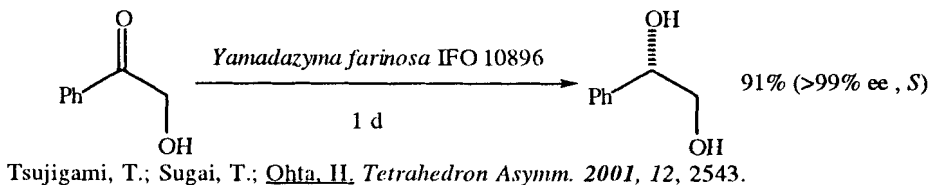
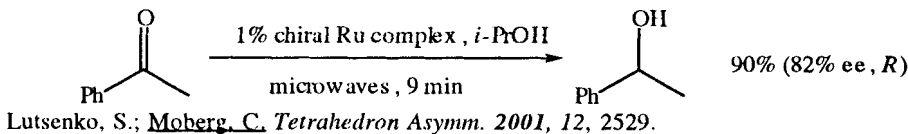
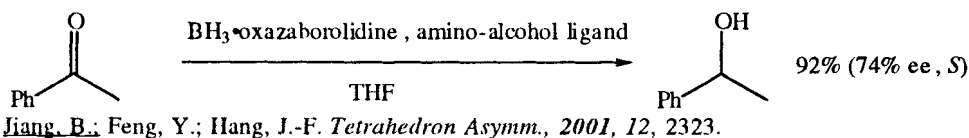
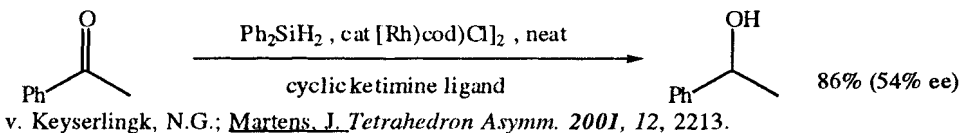
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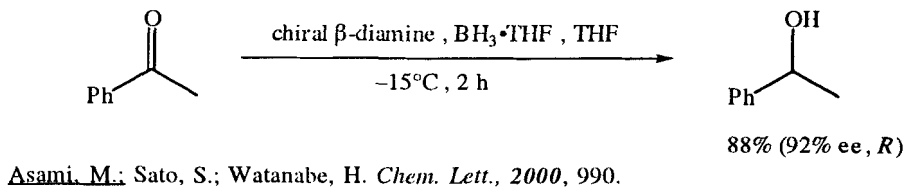
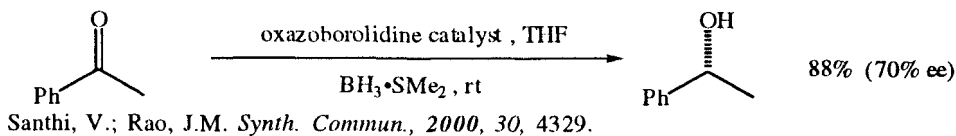
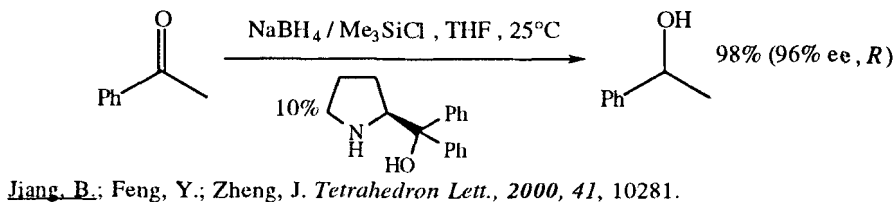
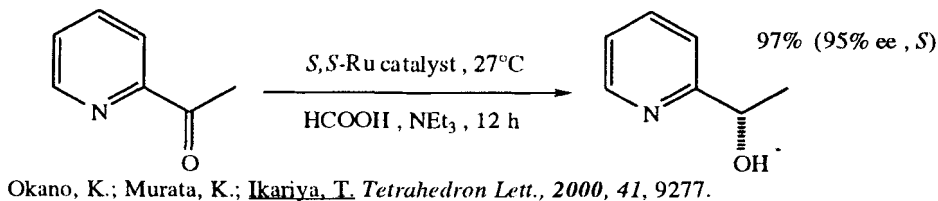
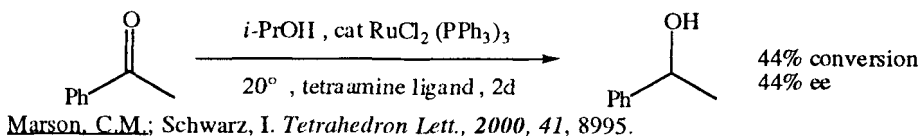
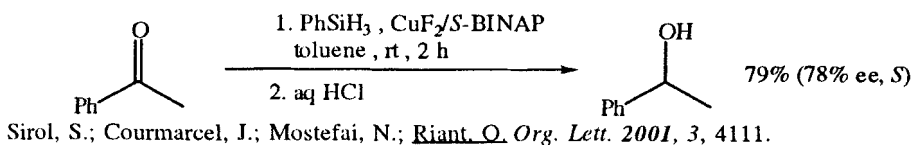
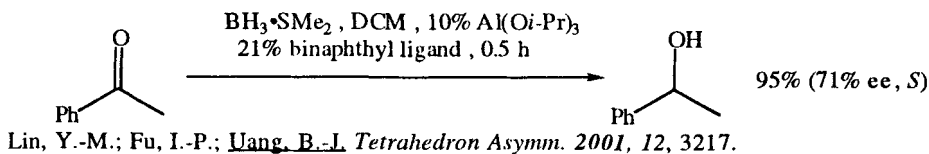


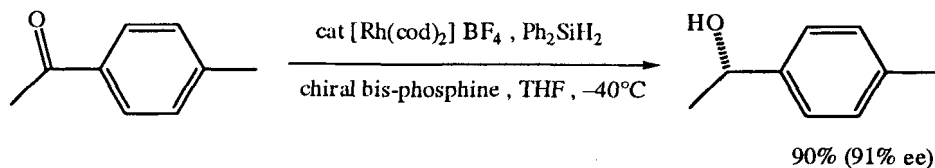
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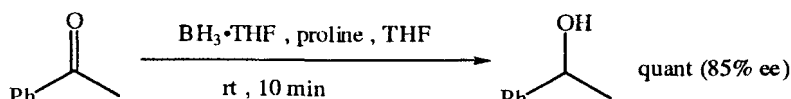
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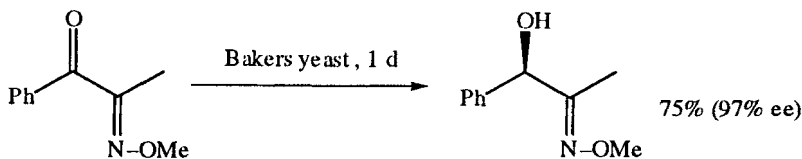




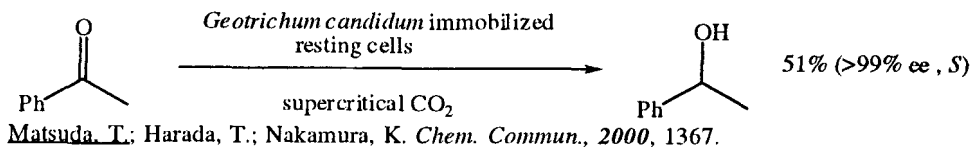
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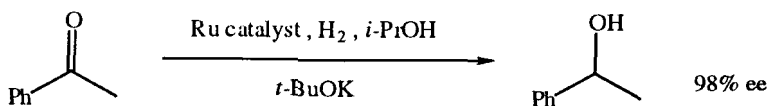
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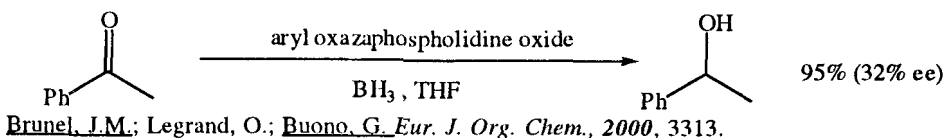
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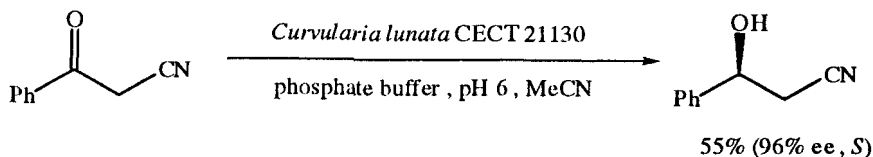
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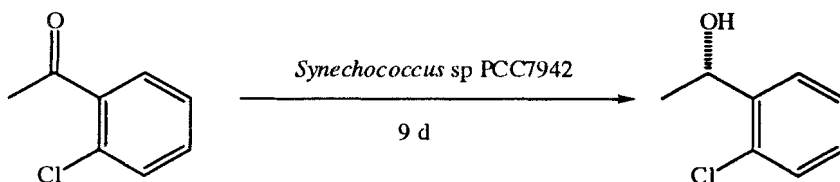
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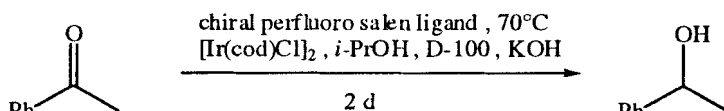


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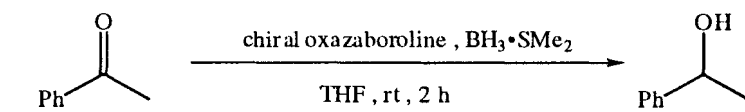
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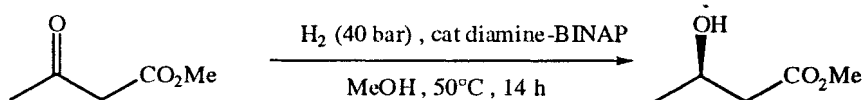
91% (56% ee)

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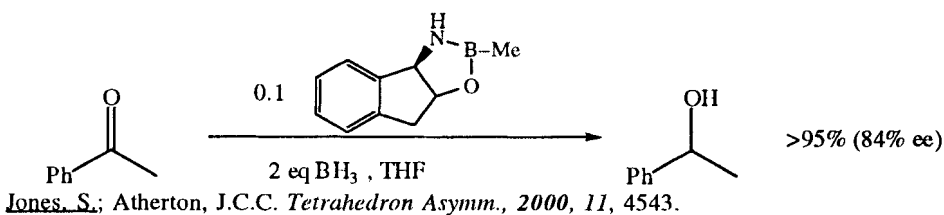
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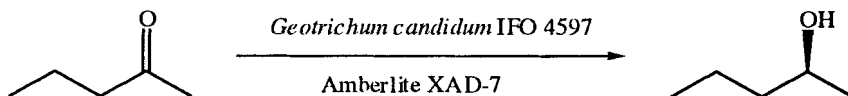
quant (99% ee)

ter Halle, R.; Colasson, B.; Schulz, E.; Spagnol, M.; Lemaire, M. *Tetrahedron Lett.*, **2000**, *41*, 643.



&gt;95% (84% ee)

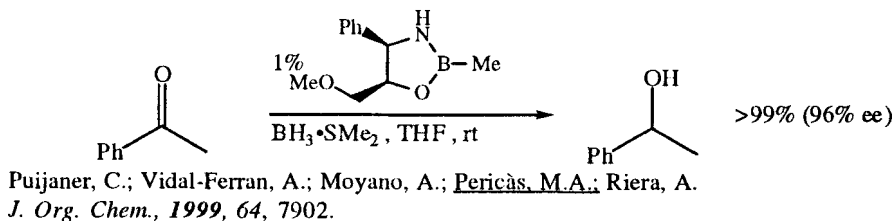
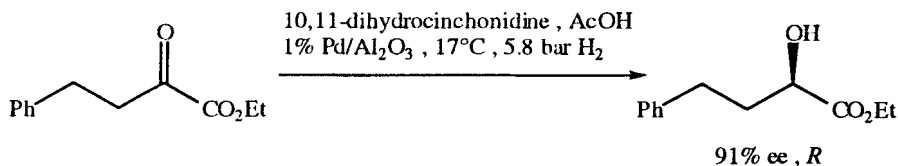
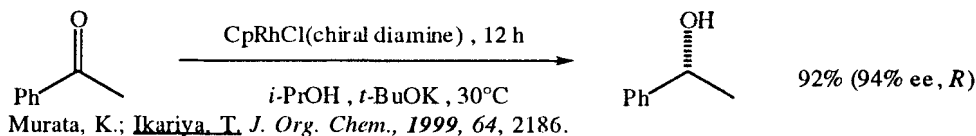
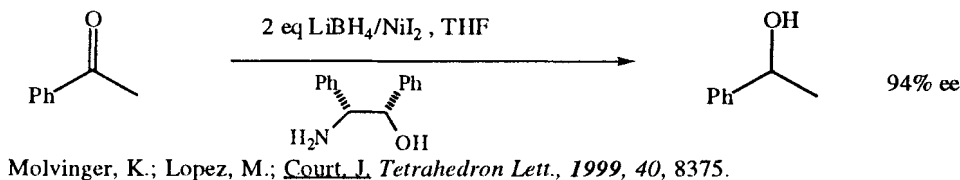
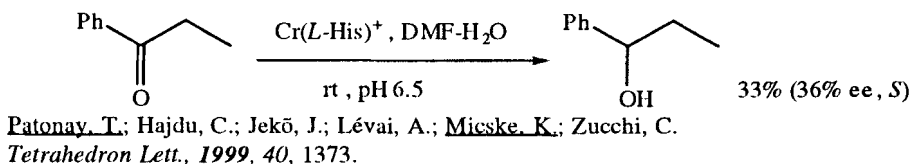
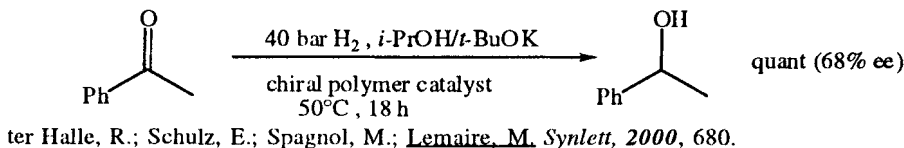
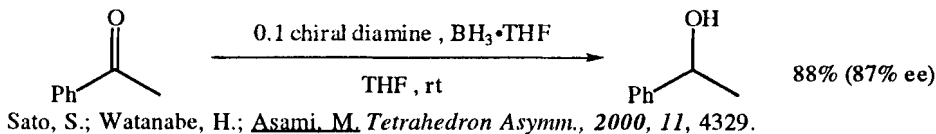
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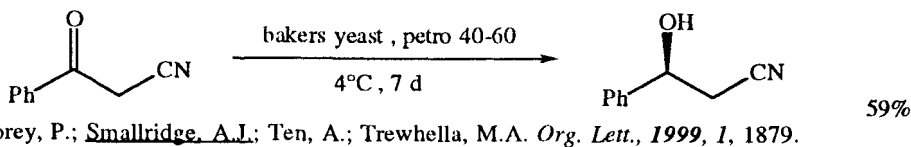


83% (94% ee, S)

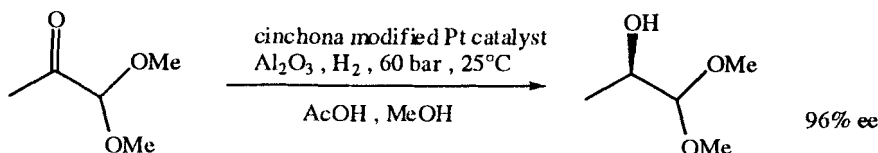
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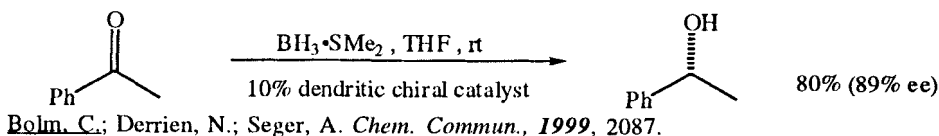




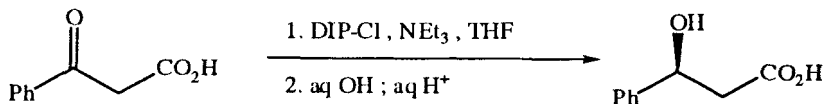
Florey, P.; Smallridge, A.L.; Ten, A.; Trehwella, M.A. *Org. Lett.*, **1999**, *1*, 1879.



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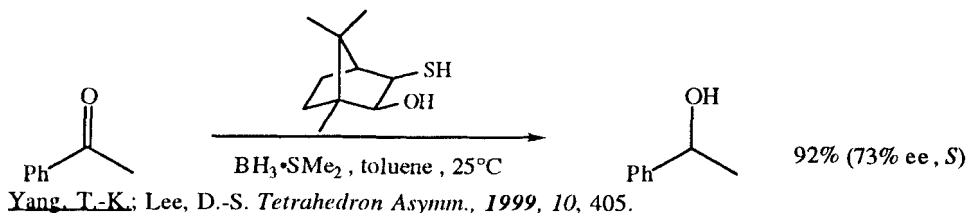


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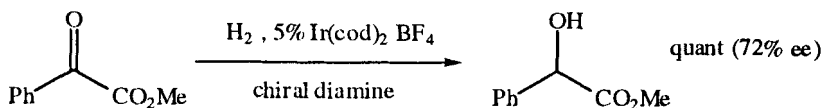


DIP-Cl = B-chloro diisopinocampheylborane 87% (98% ee)

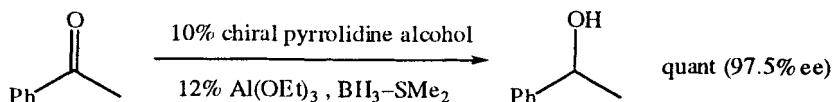
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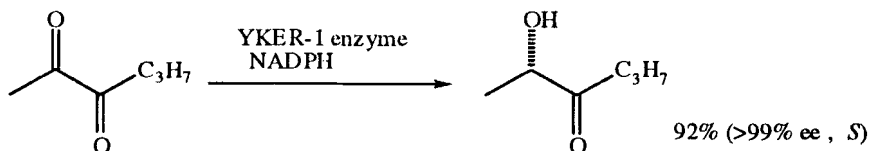
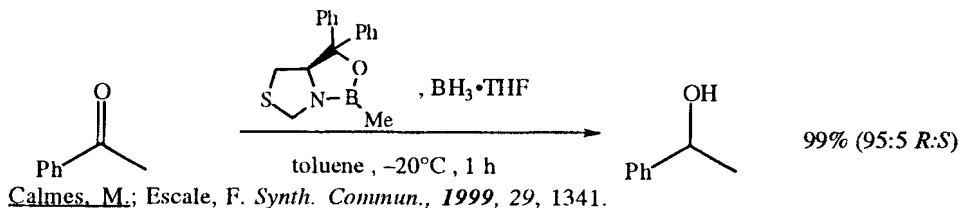
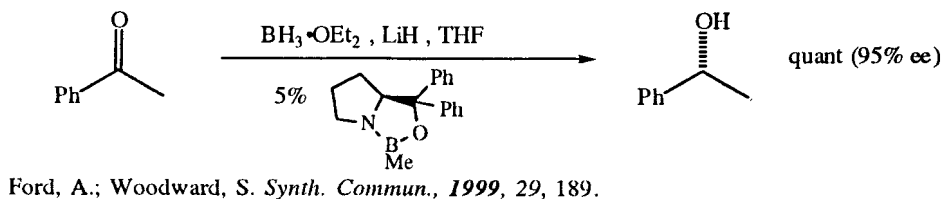
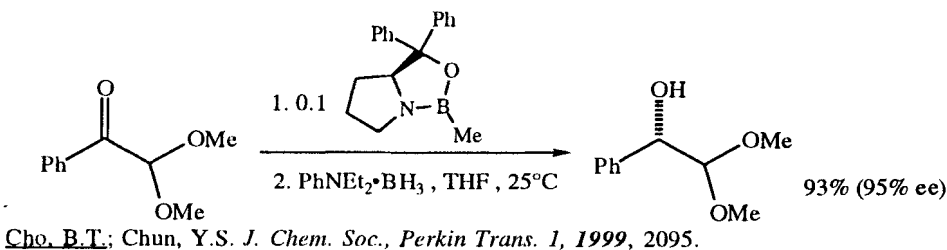
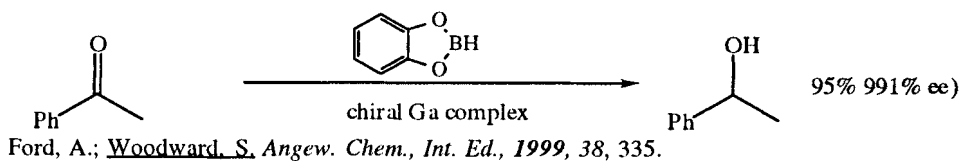
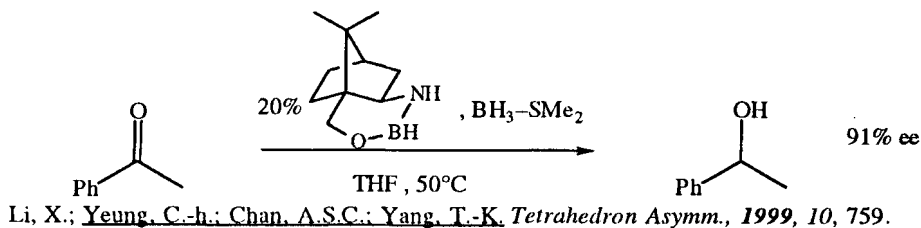
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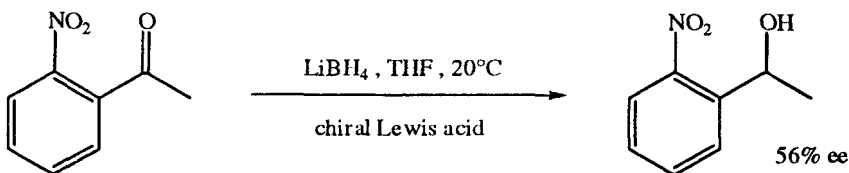
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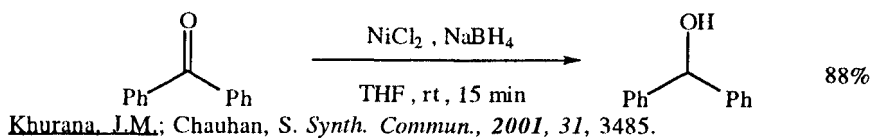


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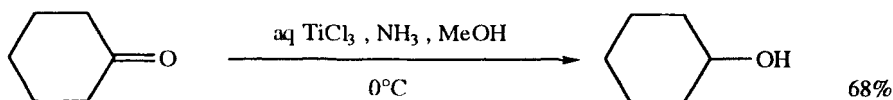


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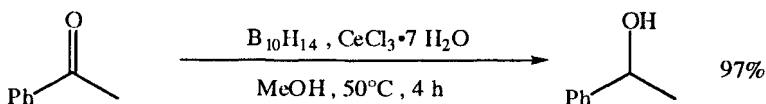
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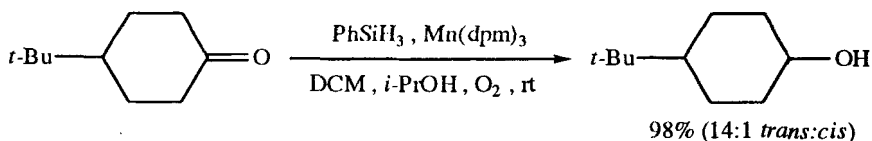
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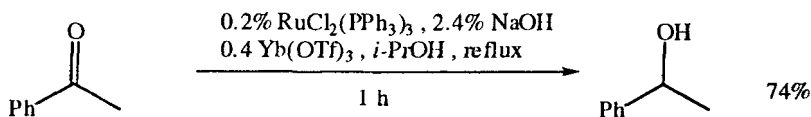
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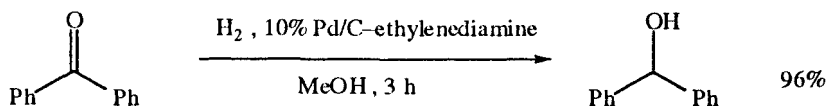
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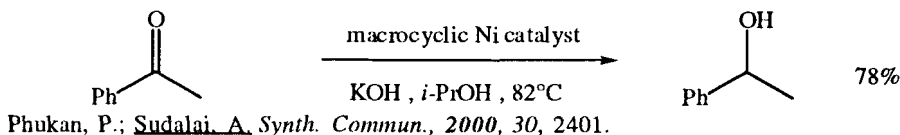
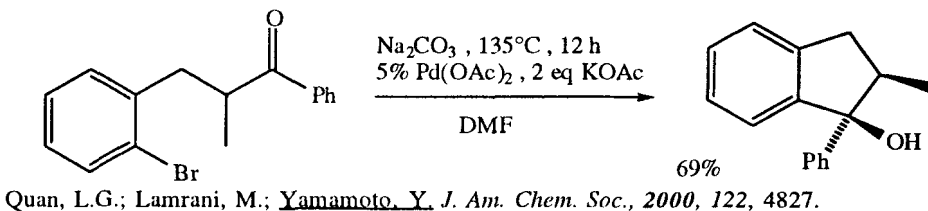
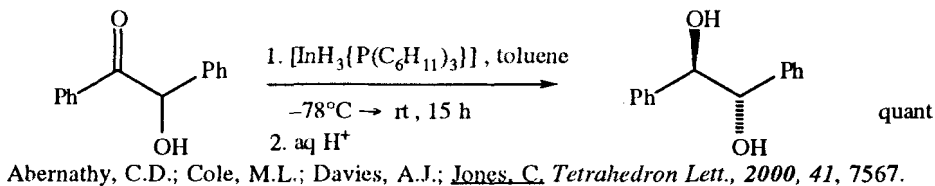
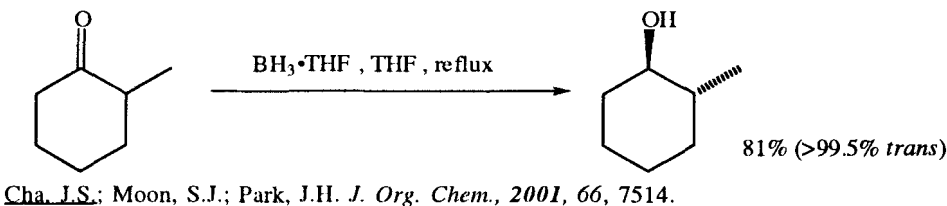
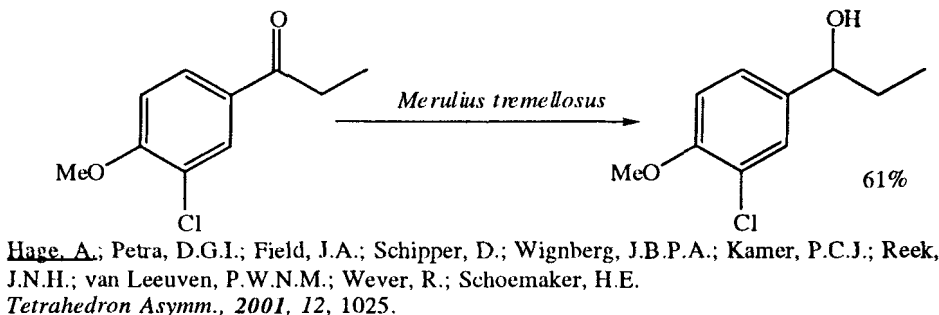
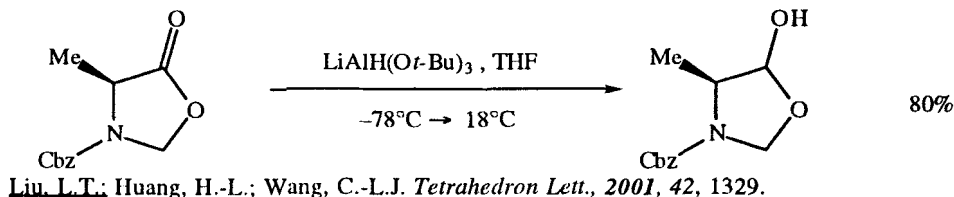
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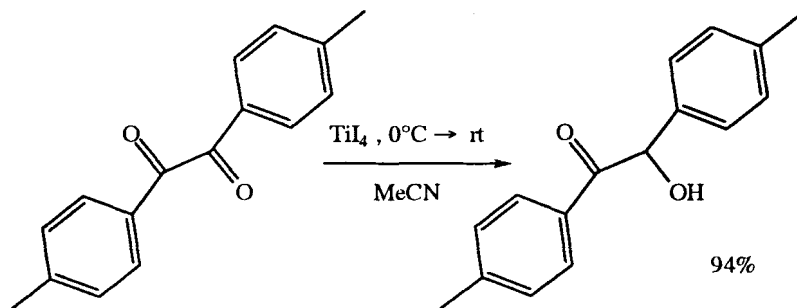


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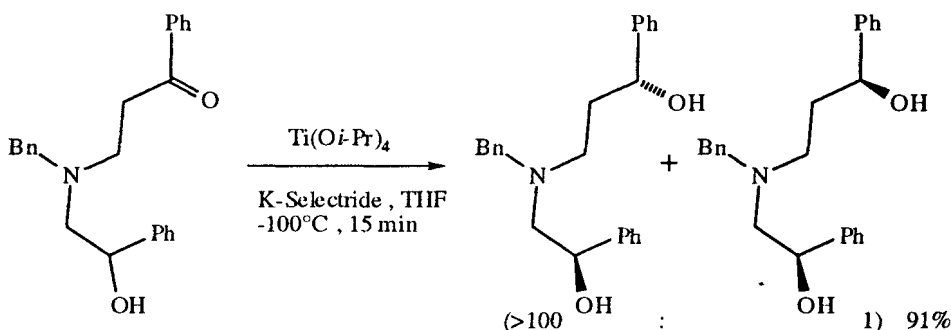


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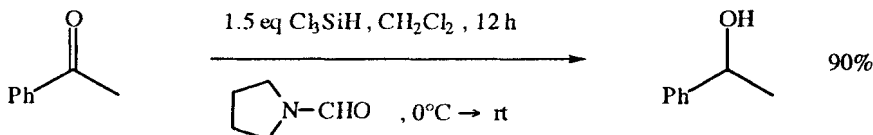




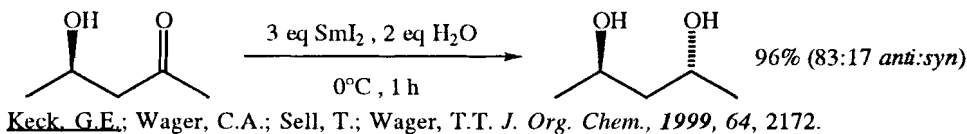
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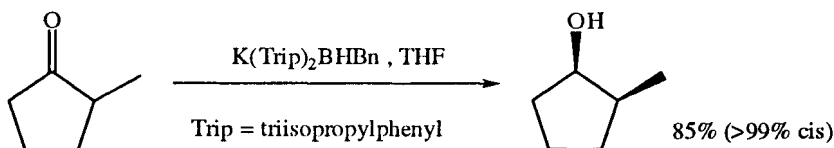
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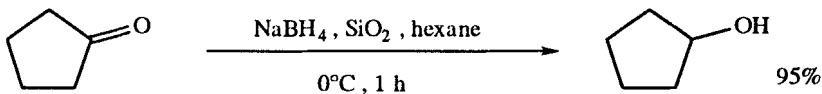
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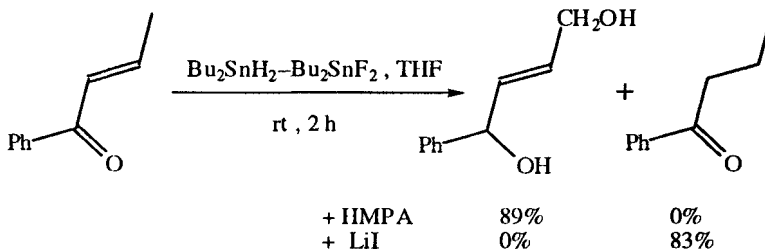
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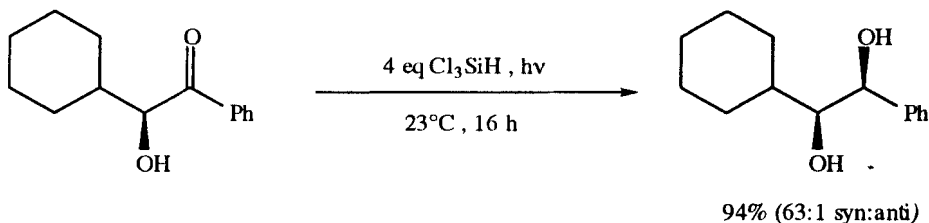
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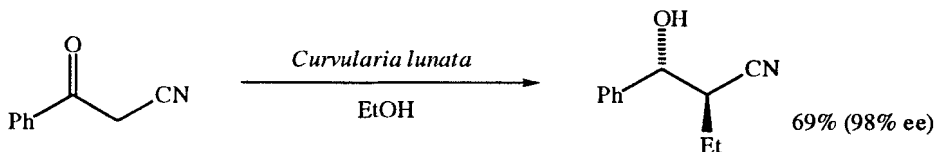
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"Enantioselective Reductions by Chirally Modified Alumino- and Borohydrides", Daverio, P.;  
Zanda, M. *Tetrahedron Asymm.* **2001**, 12, 2225.

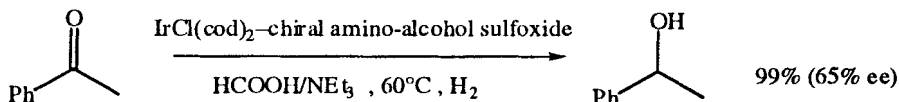
## SECTION 42B: ALKYLATION OF KETONES, FORMING ALCOHOLS

Aldol reactions are listed in Section 330 (Ketone-Alcohol)

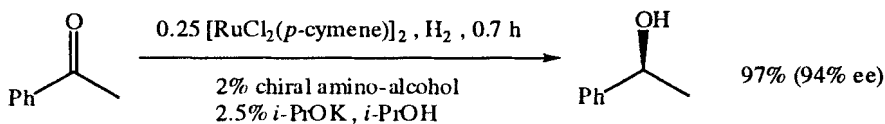
### ASYMMETRIC ALKYLATION



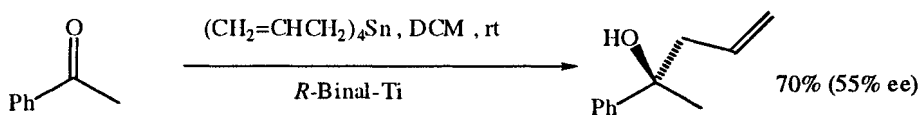
Dehli, J.R.; Gotor, V. *Tetrahedron Asymm.* **2001**, 12, 1485.



Petra, D.G.I.; Kamer, P.C.J.; Spek, A.L.; Shoemaker, H.E.; van Leeuwen, P.W.N.M.  
*J. Org. Chem.*, **2000**, *65*, 3010.

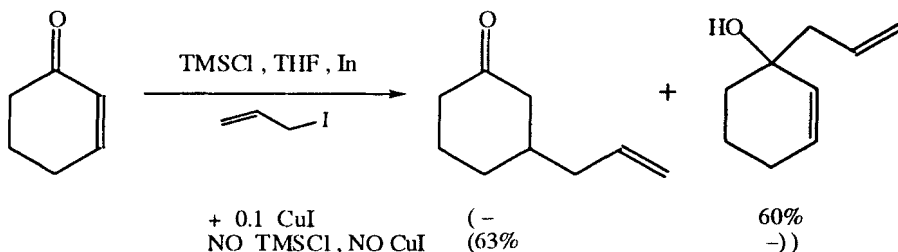


Alonso, D.A.; Nordin, S.J.M.; Roth, P.; Tamai, T.; Andersson, P.G.  
*J. Org. Chem.*, **2000**, *65*, 3116.

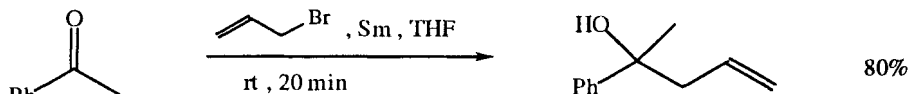


Casolari, S.; D'Addario, D.; Tagliavini, E. *Org. Lett.*, **1999**, *1*, 1061.

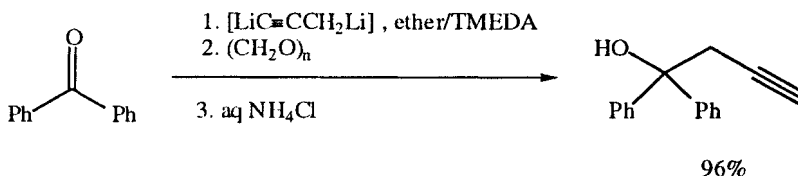
### NON-ASYMMETRIC ALKYLATION



Lee, P.H.; Ahn, H.; Lee, K.; Sung, S.-y.; Kim, S. *Tetrahedron Lett.*, **2001**, *42*, 37.

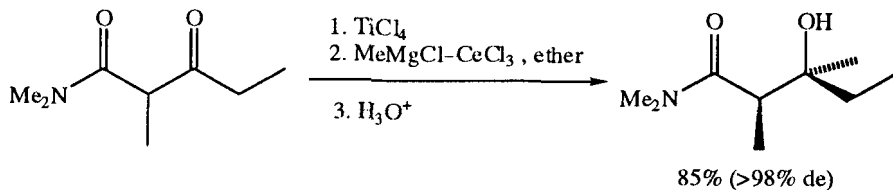
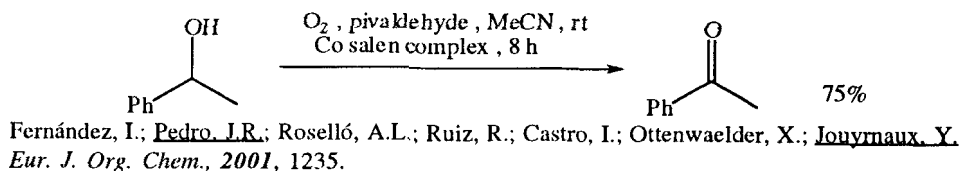
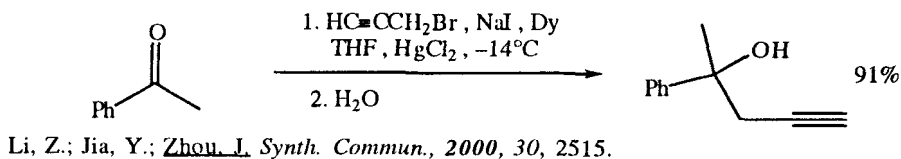
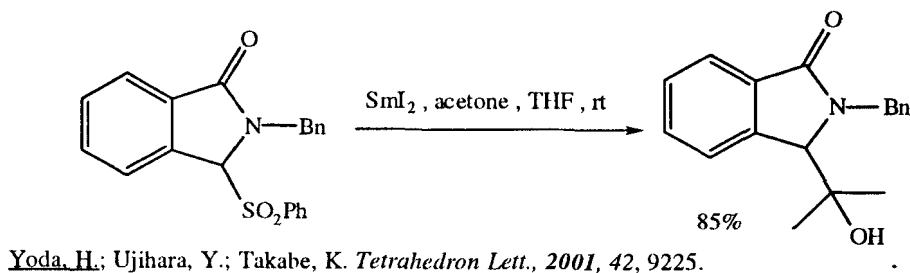
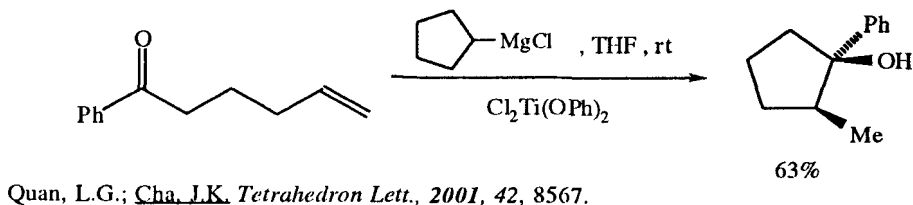
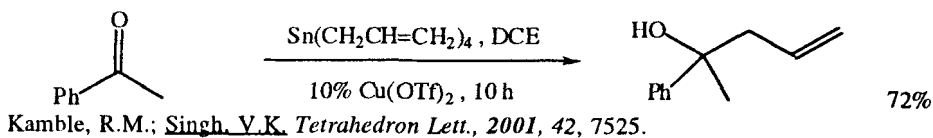


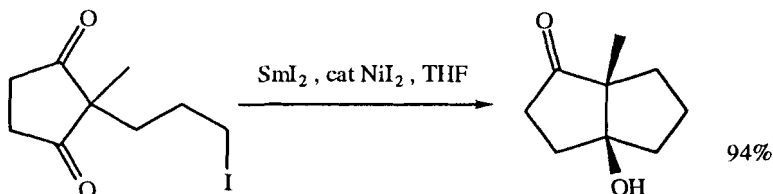
Basu, M.K.; Banik, B.K. *Tetrahedron Lett.*, **2001**, *42*, 187.



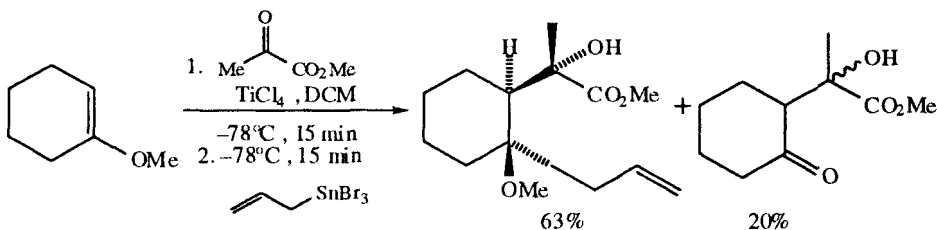
Cabezas, J.A.; Pereira, A.R.; Amey, A. *Tetrahedron Lett.*, **2001**, *42*, 6819.



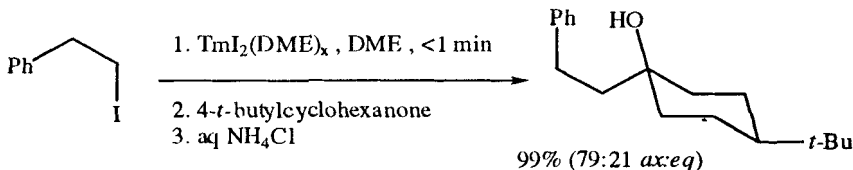




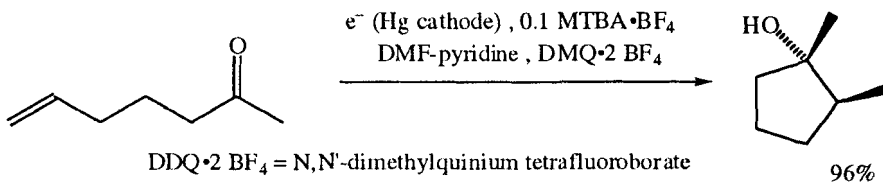
Molander, G.A.; Le Hu  rou, Y.; Brown, G.A. *J. Org. Chem.*, **2001**, *66*, 4511.



Ghosh, A.K.; Kawahama, R.; Wink, D. *Tetrahedron Lett.*, **2000**, *41*, 8425.

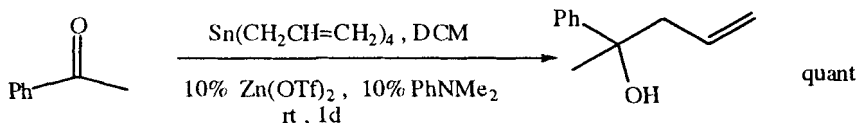


Wvans, W.J.; Allen, N.T. *J. Am. Chem. Soc.*, **2000**, *122*, 2118.

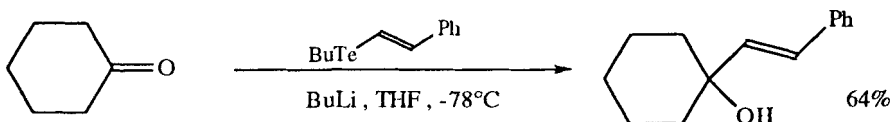


$\text{DDQ} \cdot 2 \text{BF}_4 = \text{N,N'-dimethylquinium tetrafluoroborate}$

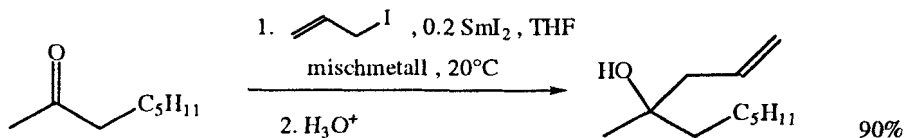
Yadav, A.K.; Singh, A. *Synlett*, **2000**, 1199.



Hamasaki, R.; Chounan, Y.; Horino, H.; Yamamoto, Y. *Tetrahedron Lett.*, **2000**, *41*, 9883.

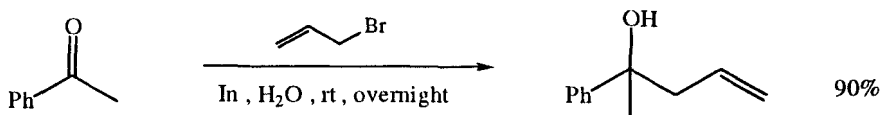


Dabdoub, M.L.; Jacob, R.G.; Ferreira, J.T.B.; Dabdoub, V.B.; Marques, F. de A. *Tetrahedron Lett.*, **1999**, *40*, 7159.



mischmetall = alloy of [La/Ce/Nd/Pr/Sm]

Hélión, F.; Namy, J.-L. *J. Org. Chem.*, **1999**, *64*, 2944.



Chan, T.H.; Yang, Y. *J. Am. Chem. Soc.*, **1999**, *121*, 3228.

## REVIEWS

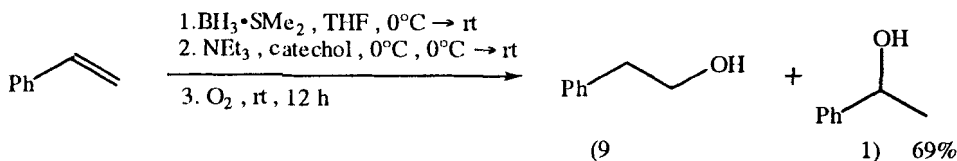
'Arylation with Organolead and Organobismuth Reagents,' Elliott, G.I.; Konopelski, J.P. *Tetrahedron*, **2001**, *57*, 5683.

'Catalytic Asymmetric Organic Zinc Addition to Carbonyl Compounds,' Pu, L.; Yu, H.-B. *Chem. Rev.*, **2001**, *101*, 757.

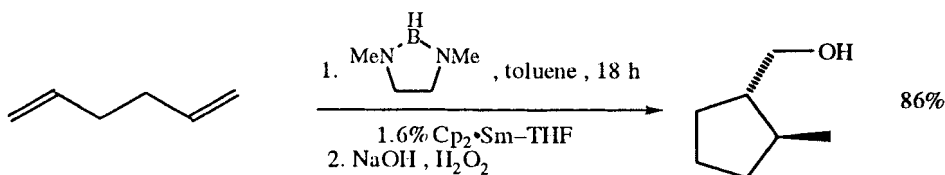
## SECTION 43: ALCOHOLS AND THIOLS FROM NITRILES

NO ADDITIONAL EXAMPLES

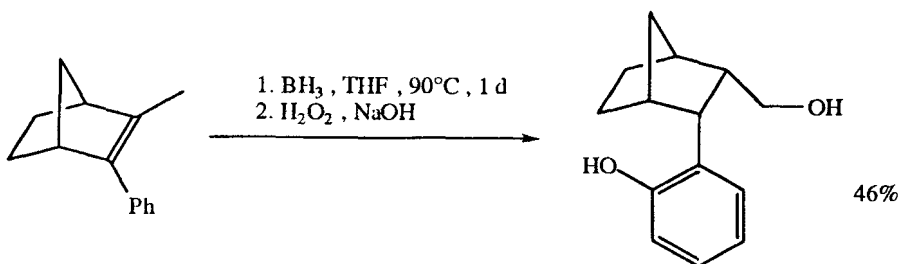
## SECTION 44: ALCOHOLS AND THIOLS FROM ALKENES



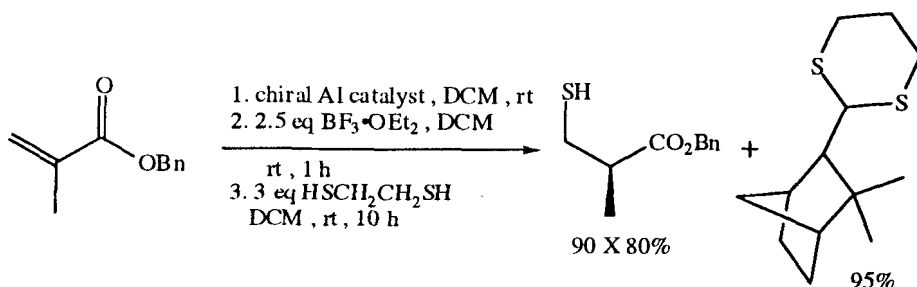
Cadot, C.; Dalko, P.I.; Cossy, J. *Tetrahedron Lett.*, **2001**, *42*, 1661.



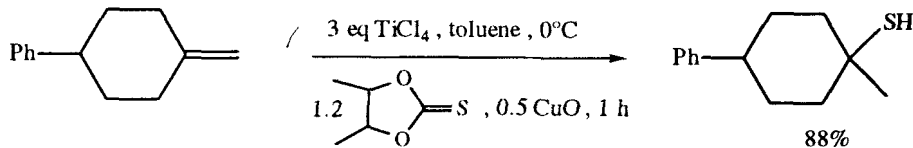
Molander, G.A.; Pfeiffer, D. *Org. Lett.*, **2001**, *3*, 361.



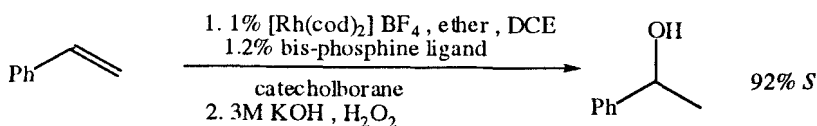
Varela, J.J.; Peña, D.; Goldfuss, B.; Polborn, K.; Knochel, P. *Org. Lett.*, **2001**, 3, 2395.



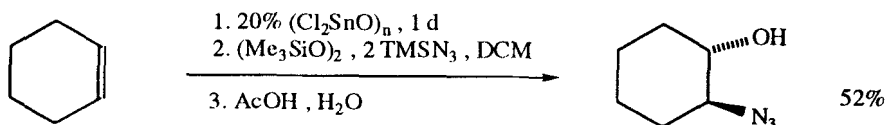
Nishide, K.; Ohsugi, S.-i.; Shiraki, H.; Tamakita, H.; Nozaki, M. *Org. Lett.*, **2001**, 3, 3121.



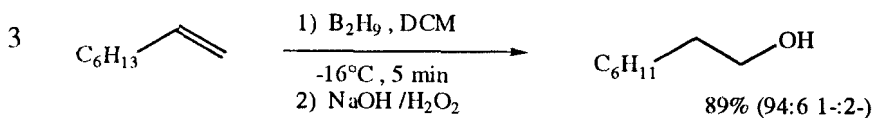
Mukaiyama, T.; Saitoh, T.; Jona, H. *Chem. Lett.*, **2001**, 638.



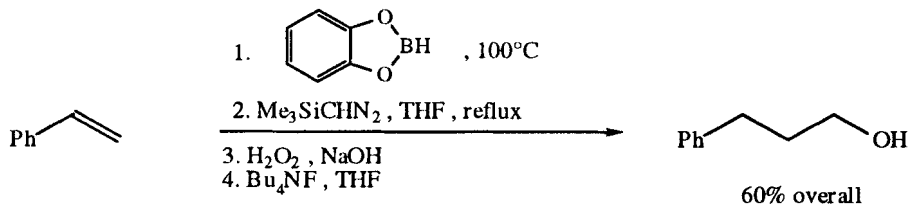
Demay, S.; Volant, F.; Knochel, P. *Angew. Chem. Int. Ed.*, **2001**, 40, 1235.



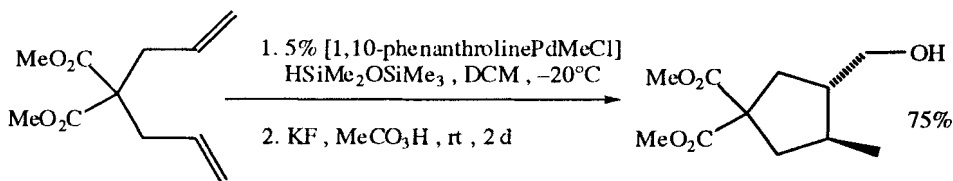
Sakurada, I.; Yamasaki, S.; Kanai, M.; Shibasaki, M. *Tetrahedron Lett.*, **2000**, 41, 2415.



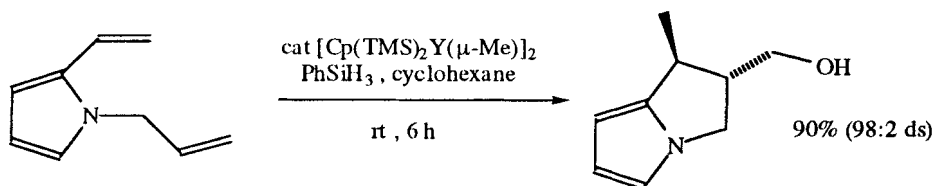
Kantha, J.V.B.; Brown, H.C. *Tetrahedron Lett.*, **2000**, 41, 9361.



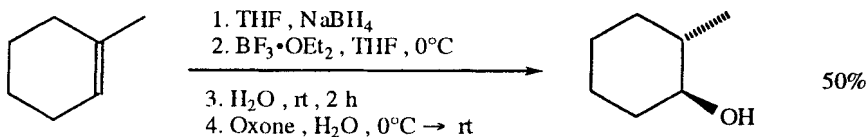
Goddard, J.-P.; LeGall, T.; Mioskowski, C. *Org. Lett.*, 2000, 2, 1455.



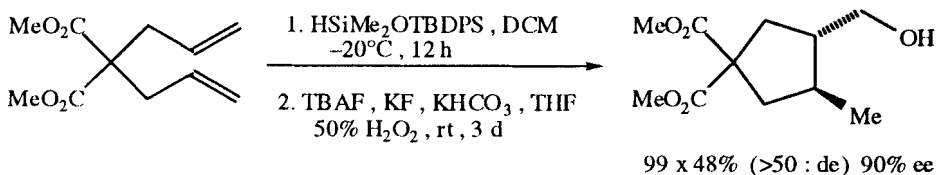
Pei, T.; Widenhoefer, R.A. *Org. Lett.*, 2000, 1, 1469.



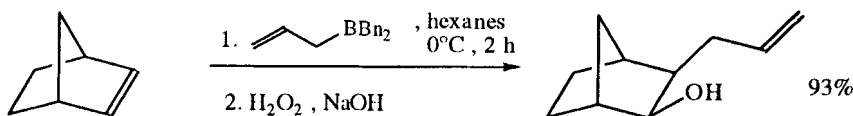
Molander, G.A.; Schmitt, M.H. *J. Org. Chem.*, 2000, 65, 3767.



Ripin, D.H.B.; Cai, W.; Brenek, S.J. *Tetrahedron Lett.*, 2000, 41, 5817.

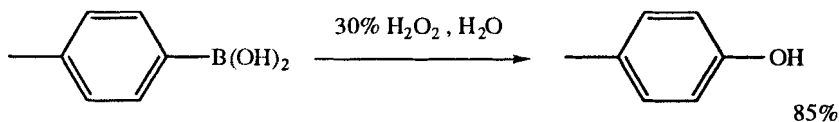


Pei, T.; Widenhoefer, R.A. *Tetrahedron Lett.*, 2000, 41, 7597.

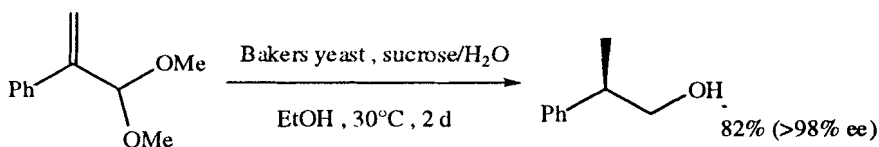
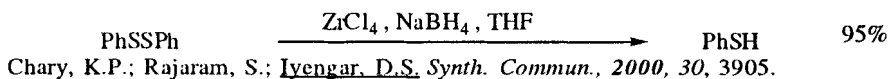
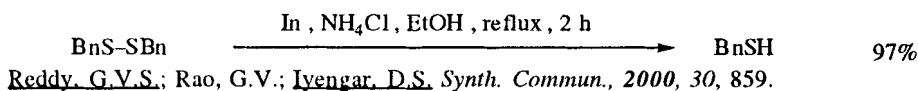


Frantz, D.E.; Singleton, D.A. *Org. Lett.*, 1999, 1, 485.

## SECTION 45: ALCOHOLS AND THIOLS FROM MISCELLANEOUS COMPOUNDS

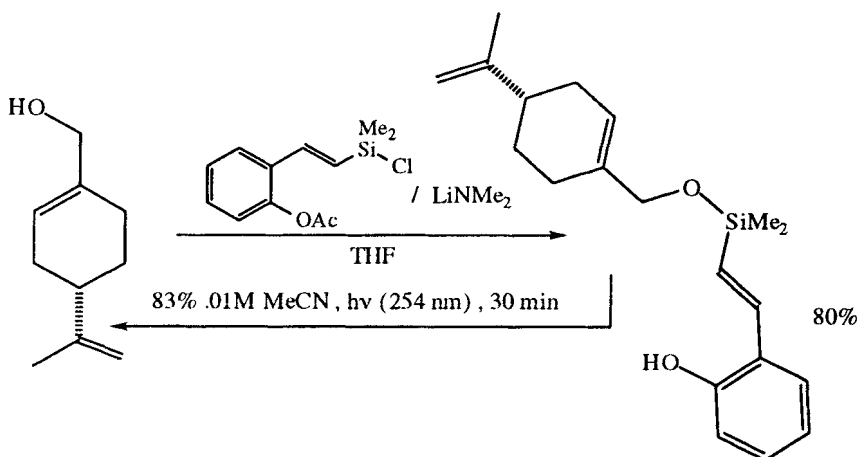


Simon, J.; Salzbrunn, S.; Prakash, G.K.S.; Petasis, N.A.; Olah, G.A.  
*J. Org. Chem.*, **2001**, *66*, 633.

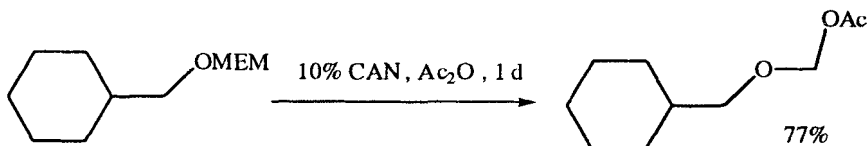


Ferraboschi, P.; Reza-Elahi, S.; Verza, E.; Santaniello, E.  
*Tetrahedron Asymm.*, **1999**, *10*, 2639.

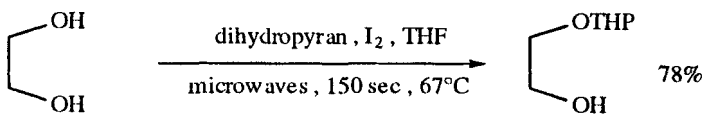
## SECTION 45A: PROTECTION OF ALCOHOLS AND THIOLS



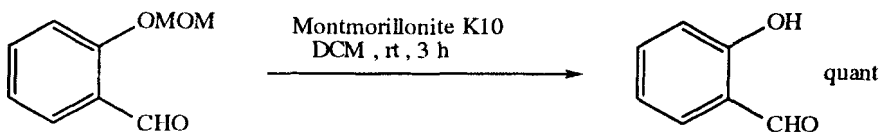
Pirrung, M.C.; Fallon, L.; Zhu, J.; Lee, Y.R. *J. Am. Chem. Soc.*, **2001**, *123*, 3638.



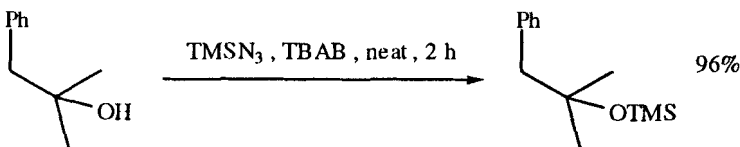
Tanemura, K.; Suzuki, T.; Nishida, Y.; Satsumabayashi, K.; Horaguchi, T.  
*Chem. Lett.*, **2001**, 1012.



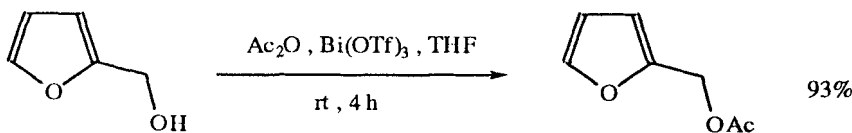
Deka, N.; Sarma, J.C. *J. Org. Chem.*, **2001**, 61, 1947.



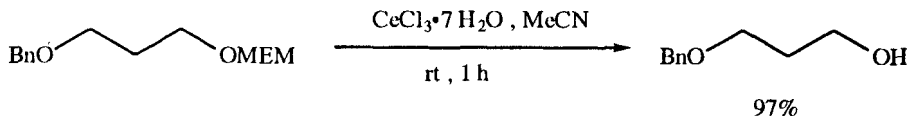
Deville, J.P.; Behar, V. *J. Org. Chem.*, **2001**, 66, 4097.



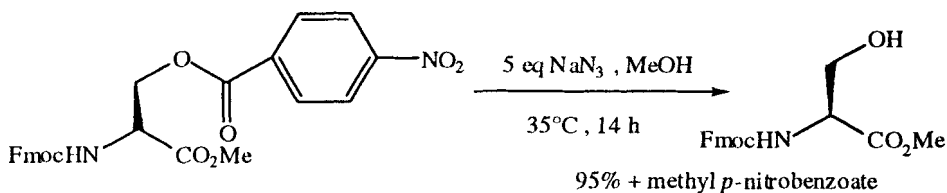
Amantini, D.; Fringuelli, F.; Pizzo, E.; Vaccaro, L. *J. Org. Chem.*, **2001**, 66, 6734.



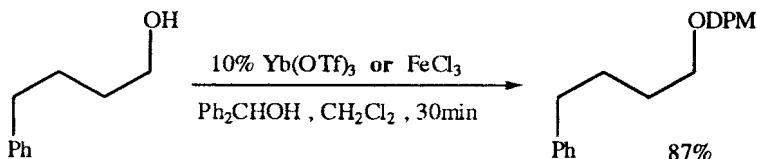
Orita, A.; Tanahashi, C.; Kakuda, A.; Otera, J. *J. Org. Chem.*, **2001**, 66, 8926.



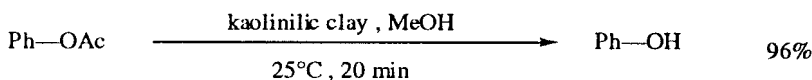
Sabitha, G.; Babu, R.S.; Rajkumar, M.; Srividya, R.; Yadav, J.S. *Org. Lett.*, **2001**, 3, 1149.



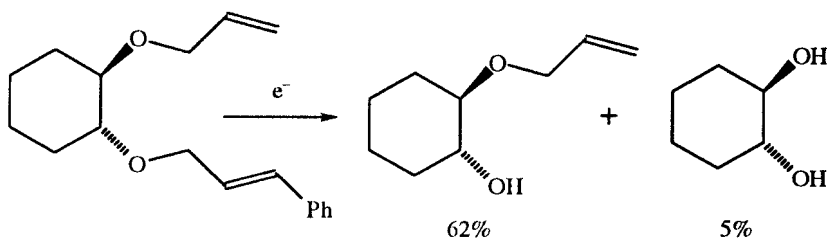
Gómez-Vidal, J.A.; Forrester, M.T.; Silverman, R.B. *Org. Lett.*, **2001**, 3, 2477.



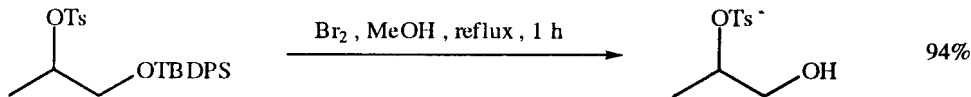
Sharma, G.V.M.; Prasad, T.R.; Mahalingam, A.K. *Tetrahedron Lett.*, **2001**, 42, 759.



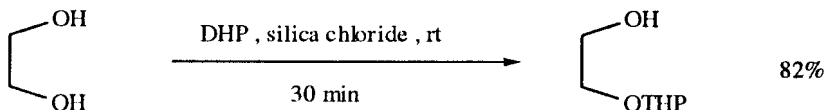
Bandgar, B.P.; Uppalla, L.S.; Sagar, A.D.; Sadavarte, V.S. *Tetrahedron Lett.*, **2001**, 42, 1163.



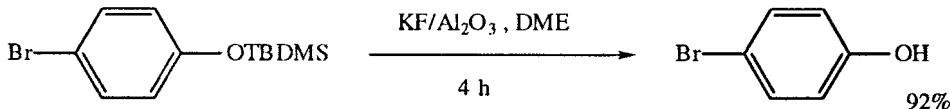
Solis-oba, A.; Hudlicky, T.; Koroniak, L.; Frey, D. *Tetrahedron Lett.*, **2001**, 42, 1241.



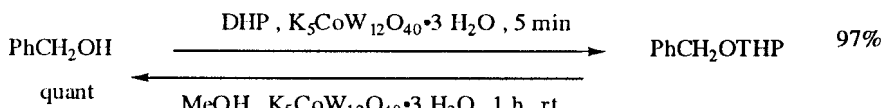
Barros, M.T.; Maycock, C.D.; Thomassigny, C. *Synlett*, **2001**, 1146.



Ravindranath, N.; Ramesh, C.; Das, B. *Synlett*, **2001**, 1777.

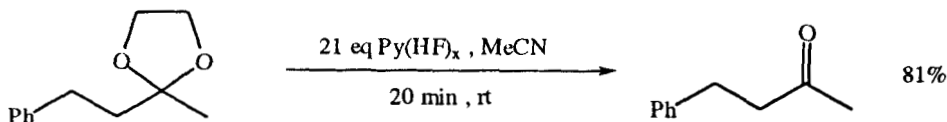


Blass, B.E.; Harris, C.L.; Portlock, D.E. *Tetrahedron Lett.*, **2001**, 42, 1611.

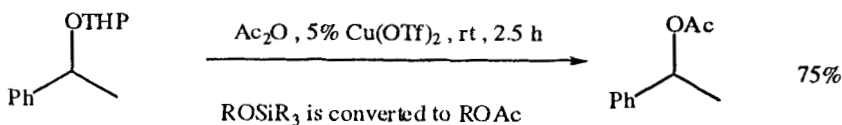


Habibi, M.H.; Tangestaninejad, S.; Mohammadpoor-Baltork, I.; Mirkhani, V.; Yadollahi, B. *Tetrahedron Lett.*, **2001**, 42, 2851.

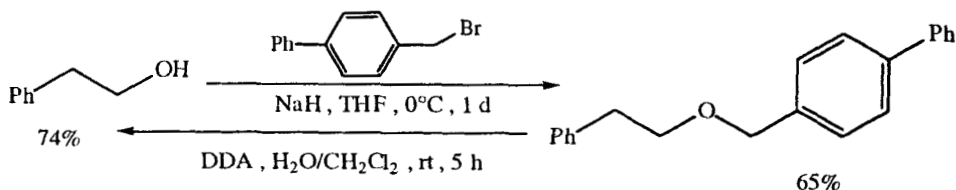




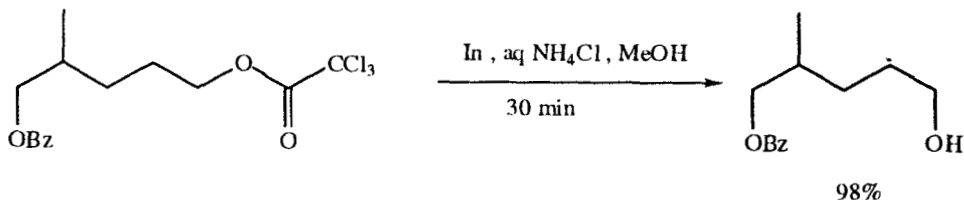
Watanabe, Y.; Kiyosawa, Y.; Tatsukawa, A.; Hayashi, M. *Tetrahedron Lett.*, **2001**, 42, 4641.



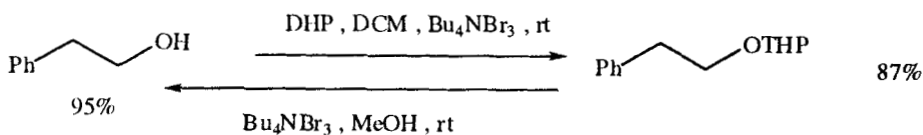
Chandra, K.L.; Saravanan, P.; Singh, V.K. *Tetrahedron Lett.*, **2001**, 42, 5309.



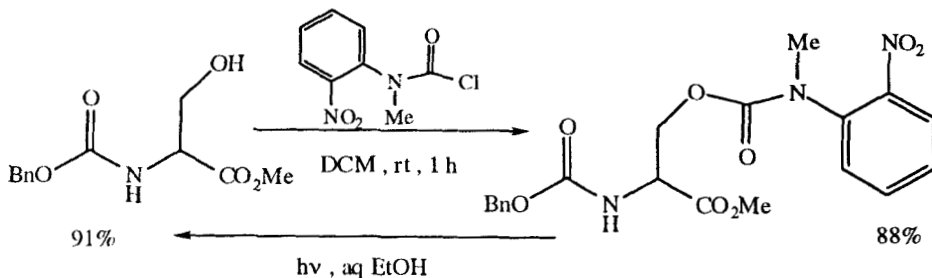
Sharma, G.V.M.; Rakesh *Tetrahedron Lett.*, **2001**, 42, 5571.



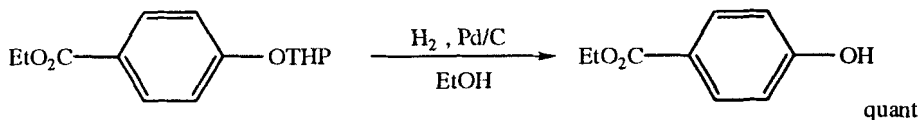
Valluri, M.; Mineno, T.; Hindupur, R.M.; Avery, M.A. *Tetrahedron Lett.*, **2001**, 42, 7153.



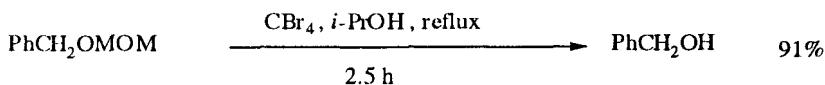
Naik, S.; Gopinath, R.; Patel, B.K. *Tetrahedron Lett.*, **2001**, 42, 7679.



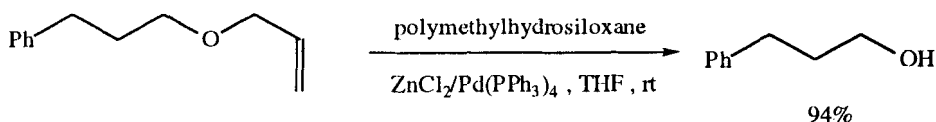
Loudwig, S.; Goeldner, M. *Tetrahedron Lett.*, **2001**, 42, 7957.



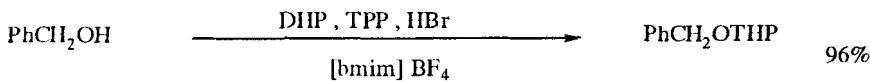
Kaisalo, L.H.; Hase, T.A. *Tetrahedron Lett.*, **2001**, 42, 7699.



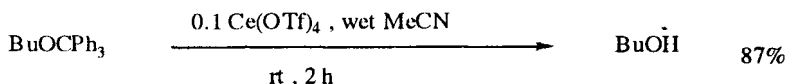
Lee, A.S.-Y.; Hum, Y.-J.; Chu, S.-F. *Tetrahedron*, **2001**, 57, 2121.



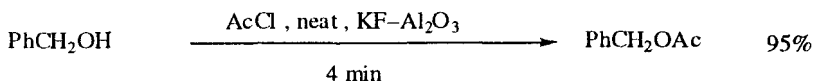
Chandrasekhar, S.; Reddy, Ch.R.; Rao, R.J. *Tetrahedron*, **2001**, 57, 3435.



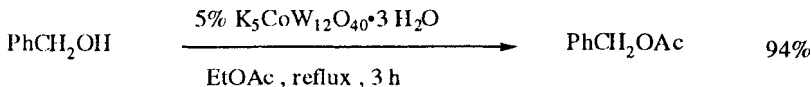
Branco, L.C.; Afonso, C.A.M. *Tetrahedron*, **2001**, 57, 4405.



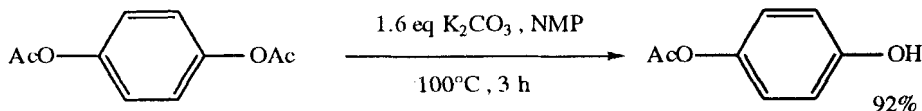
Khalafi-Nezhad, A.; Alamdari, R.F. *Tetrahedron*, **2001**, 57, 6805.



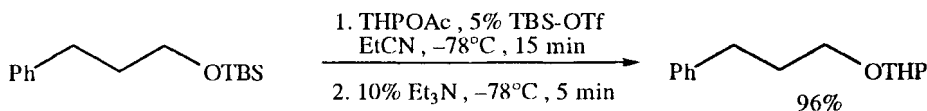
Yadav, V.K.; Babu, K.G.; Mittal, M. *Tetrahedron*, **2001**, 57, 7047.



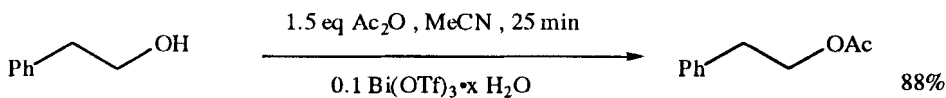
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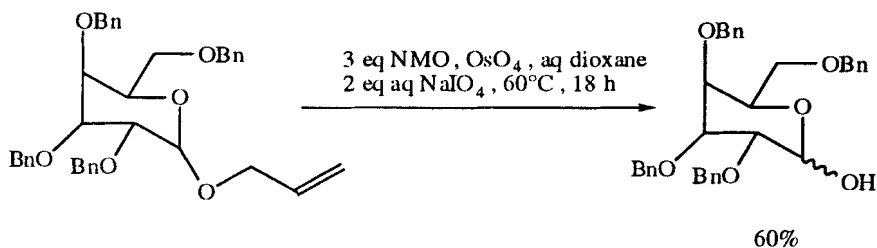
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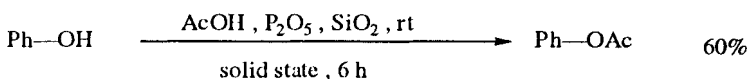
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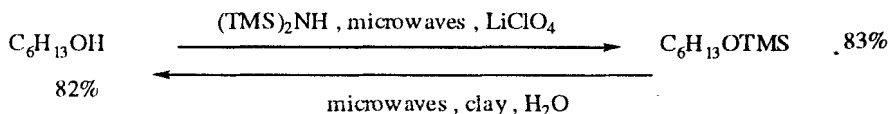
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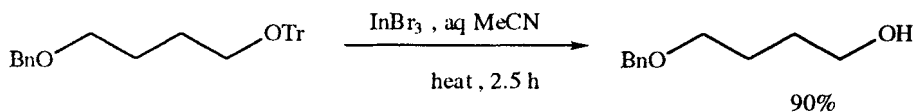
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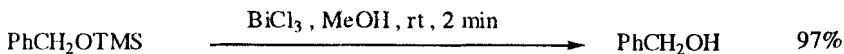
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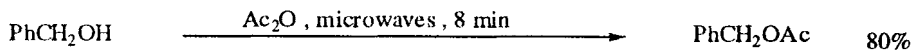
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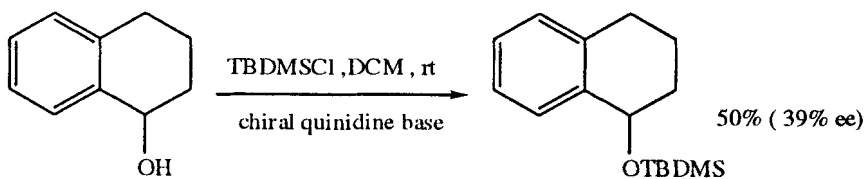
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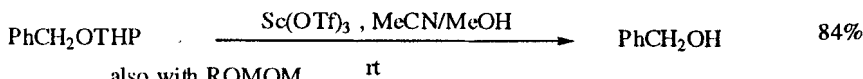
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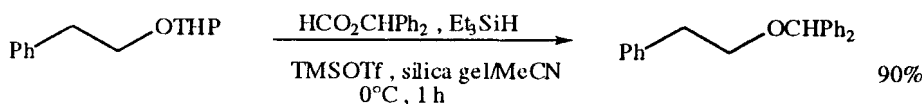
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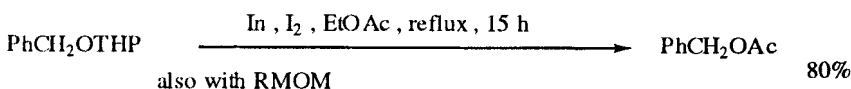
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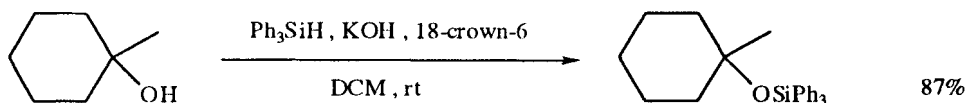


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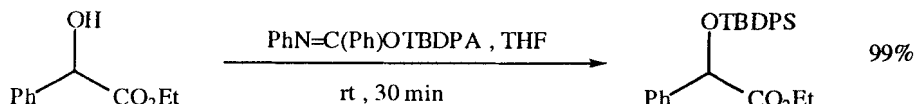


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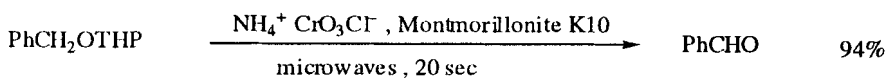
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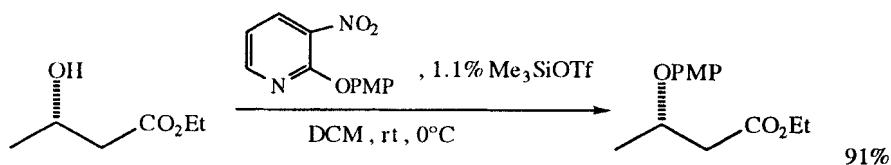
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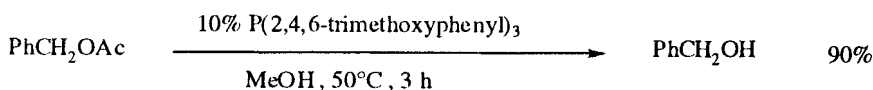
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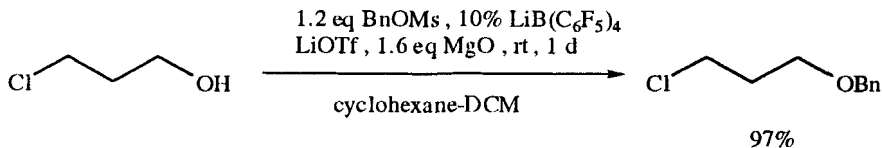
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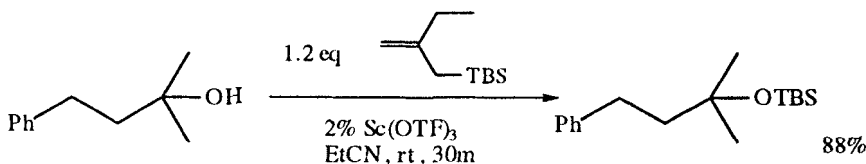
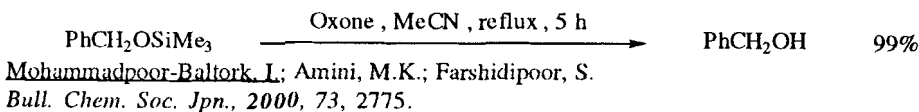
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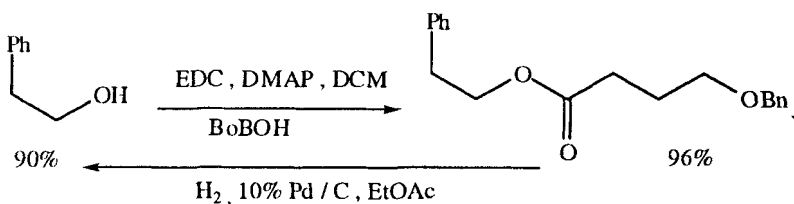
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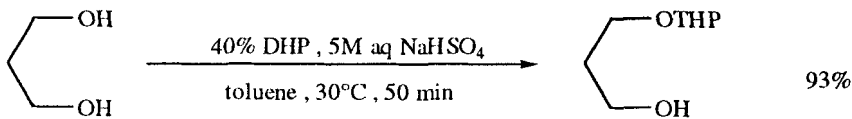
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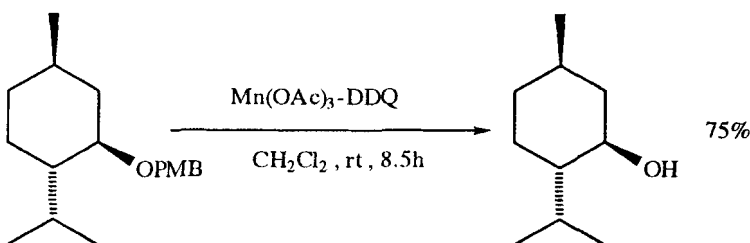
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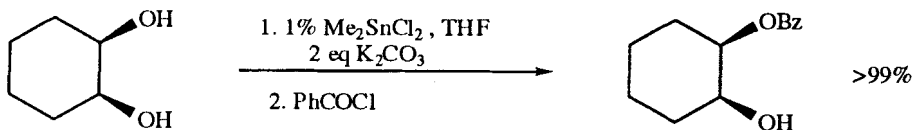
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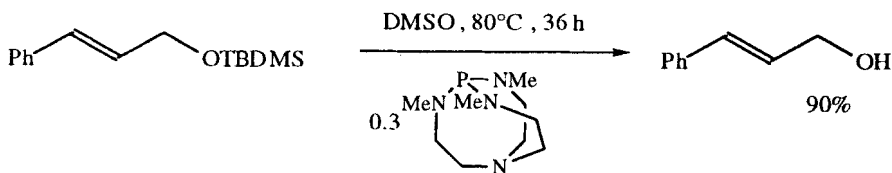
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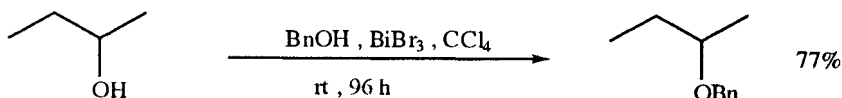
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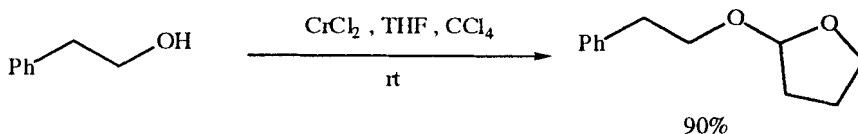
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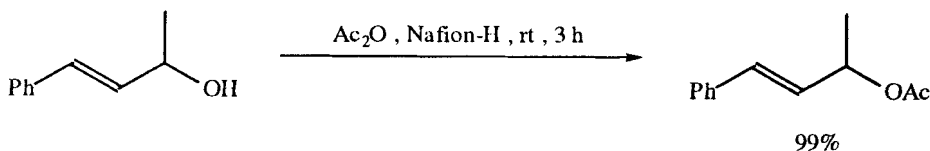
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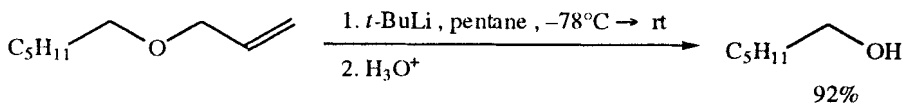
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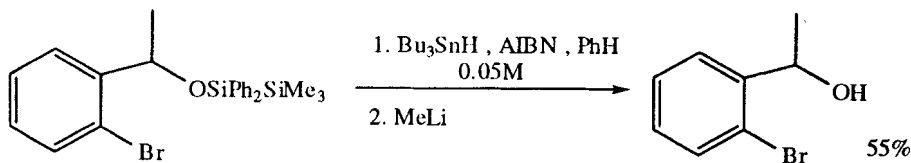
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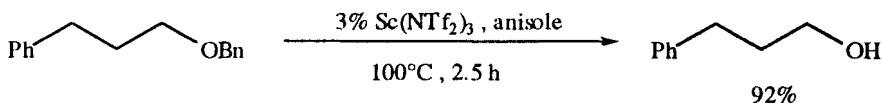
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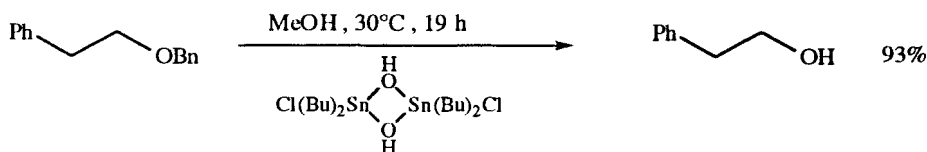
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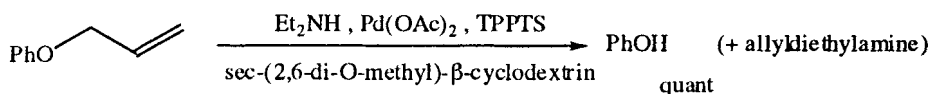
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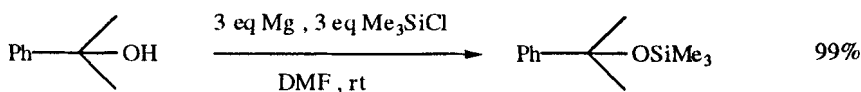
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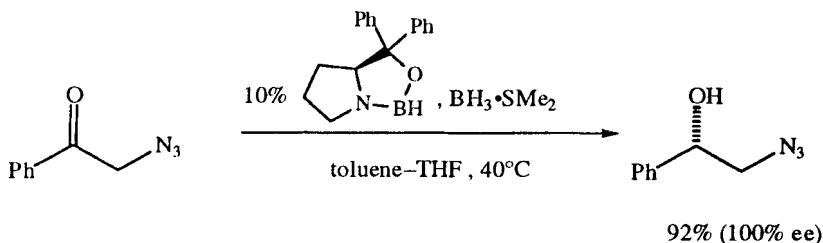
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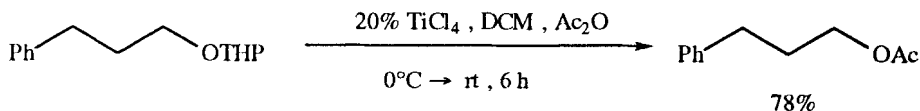
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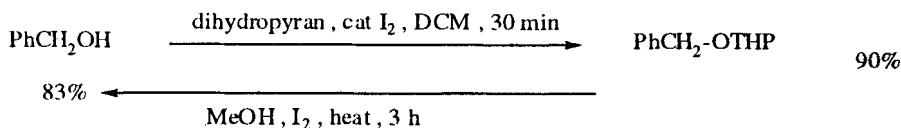
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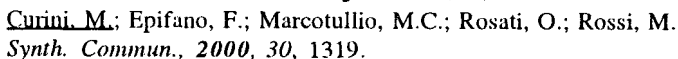
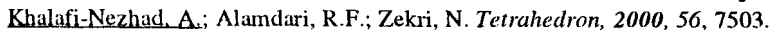
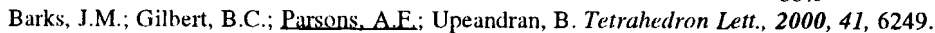
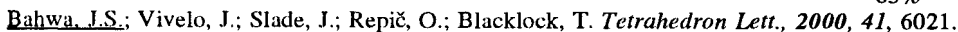
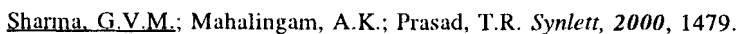
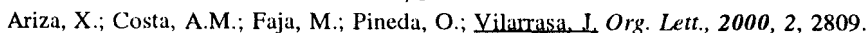
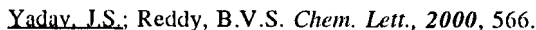
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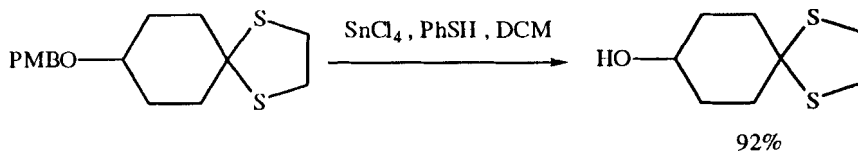
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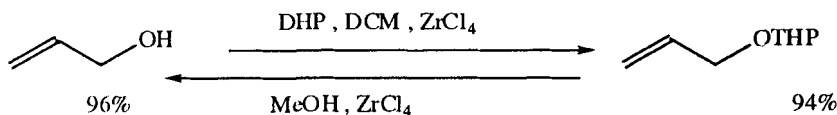
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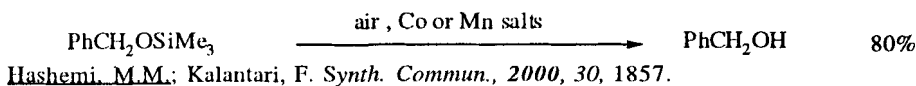




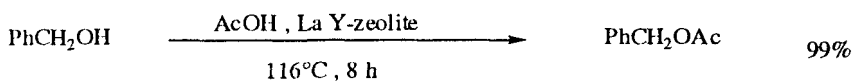
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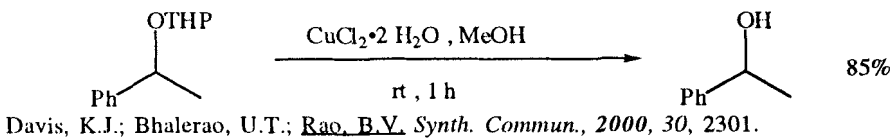
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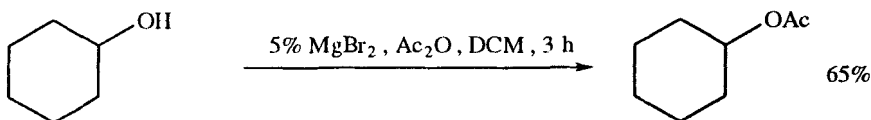
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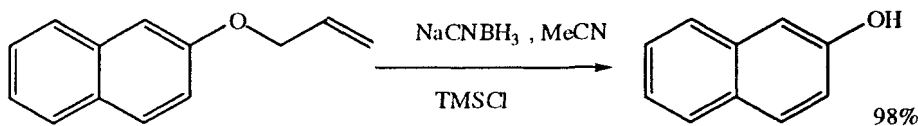
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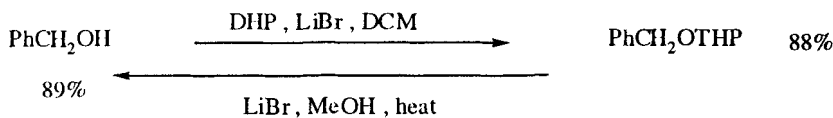
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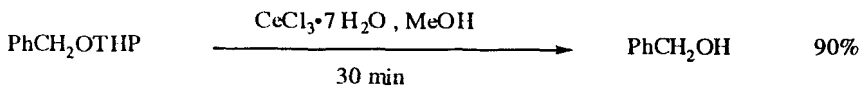
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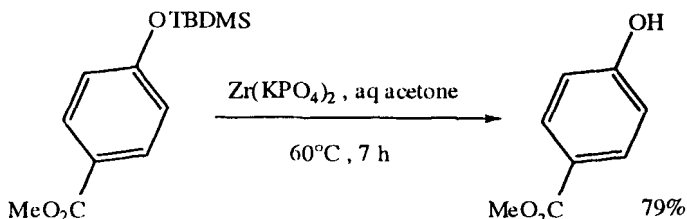
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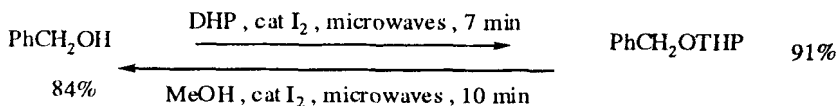
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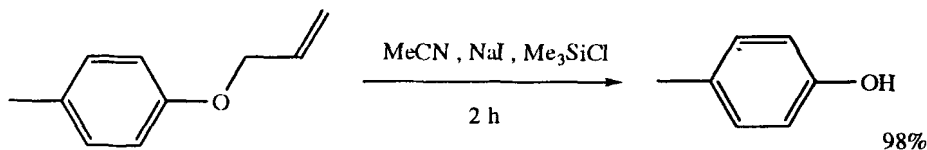
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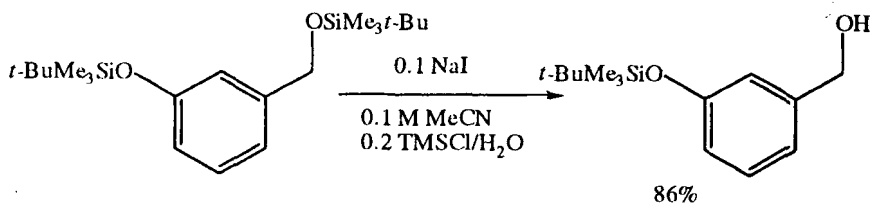
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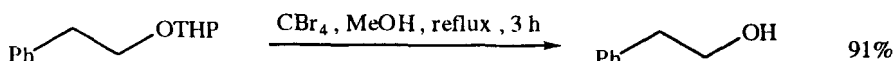
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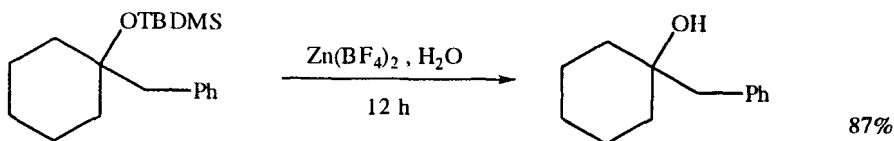
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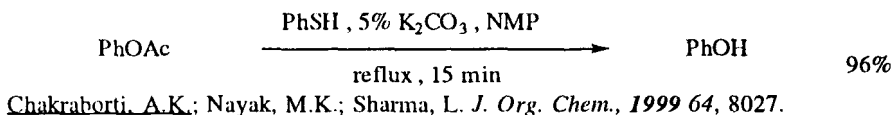
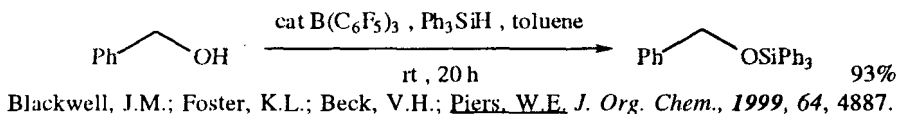
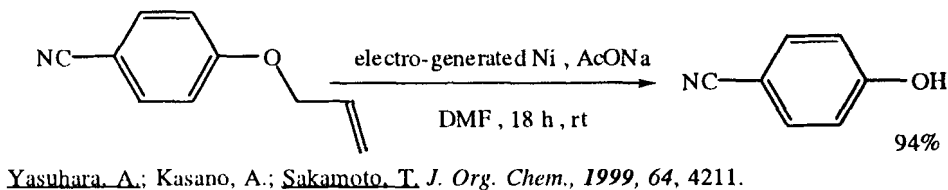
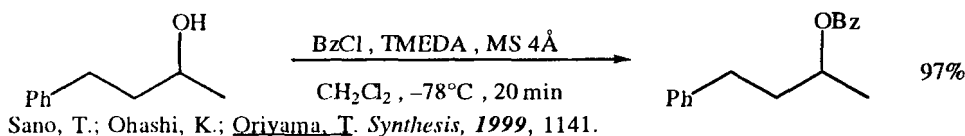
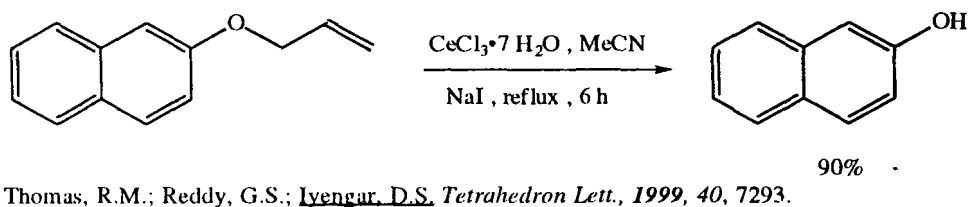
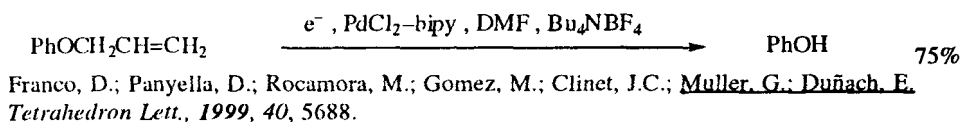
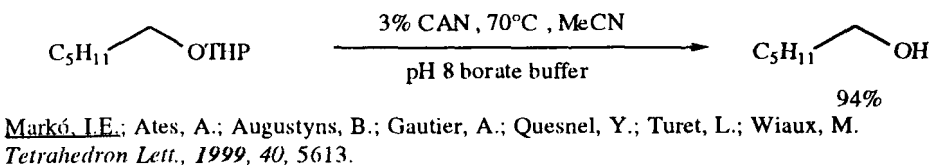
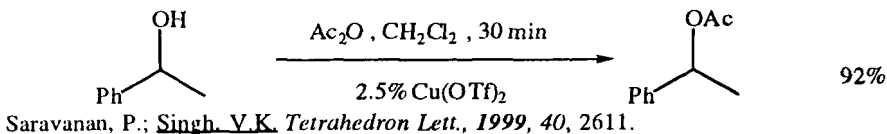
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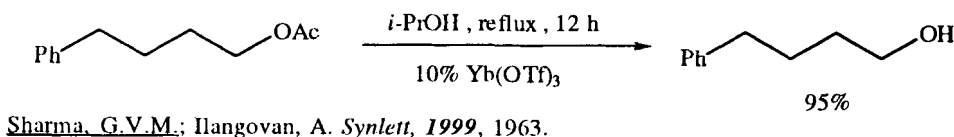
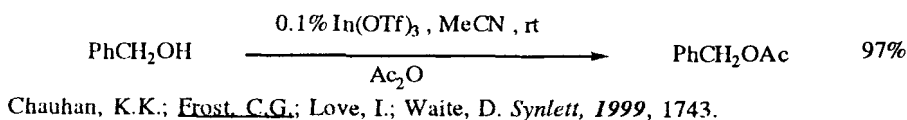
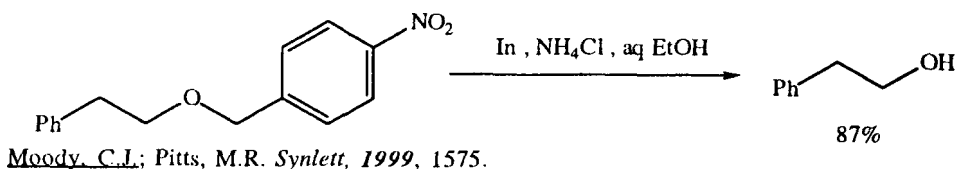
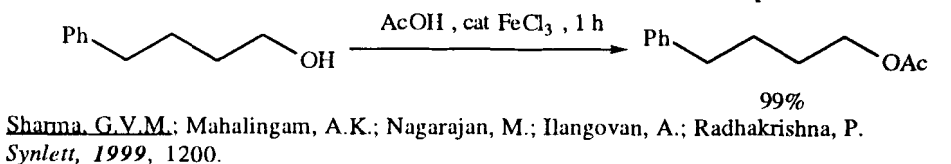
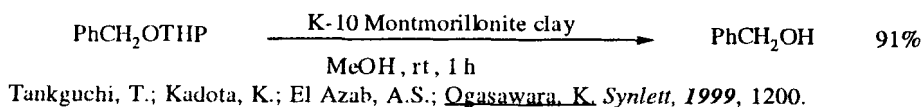
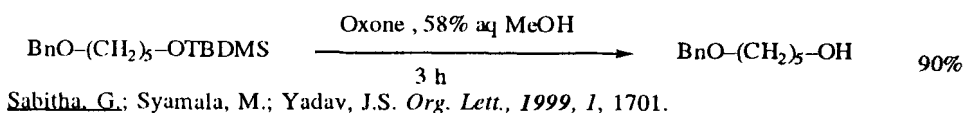
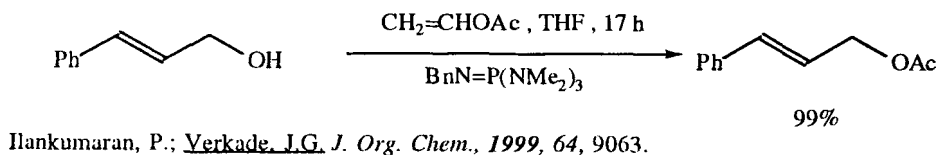
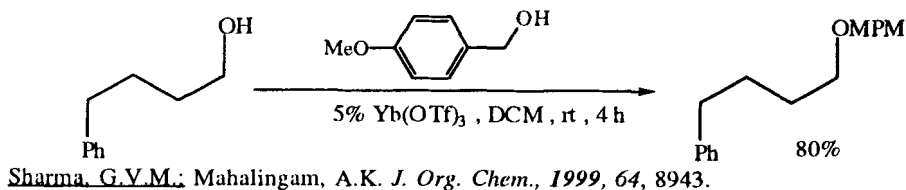


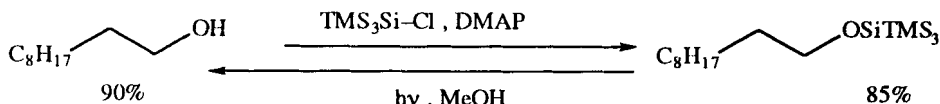
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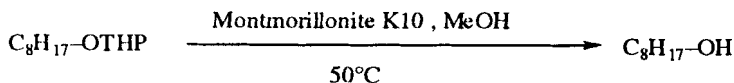
Ranu, B.C.; Jana, U.; Majee, A. *Tetrahedron Lett.*, **1999**, *40*, 1985.



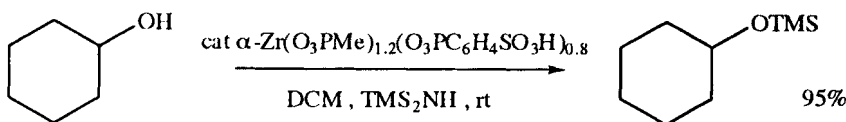




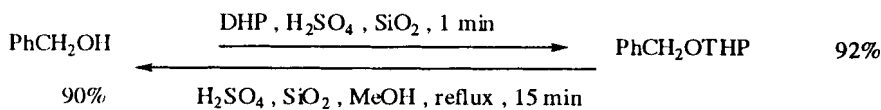
Brook, M.A.; Balduzzi, S.; Mohamed, M.; Gottardo, C. *Tetrahedron*, **1999**, *55*, 10027.



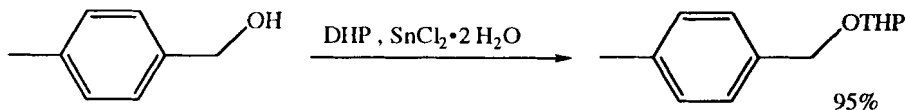
Li, T.-S.; Zhang, Z.-H.; Jin, T.-S. *Synth. Commun.* **1999**, *29*, 181.



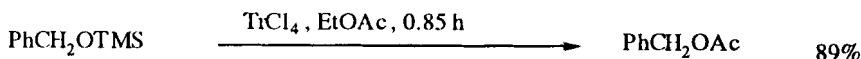
Curini, M.; Epifano, F.; Marcotullio, M.C.; Rosati, O.; Costantino, U. *Synth. Commun.*, **1999**, *29*, 541.



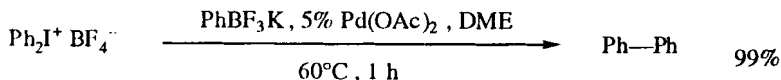
Heravi, M.M.; Ajami, D.; Ghassemzadeh, M. *Synth. Commun.*, **1999**, *29*, 1013.



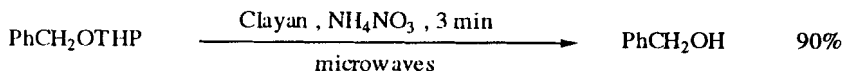
Davis, K.J.; Bhalerao, U.T.; Rao, B.V. *Synth. Commun.* **1999**, *29*, 1679.



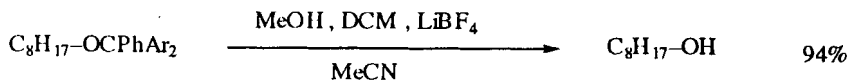
Iranpoor, N.; Zeynizadeh, B. *Synth. Commun.*, **1999**, *29*, 2123.



Sabitha, G.; Reddy, B.V.S.; Srividya, R.; Yadav, J.S. *Synth. Commun.*, **1999**, *29*, 2311.

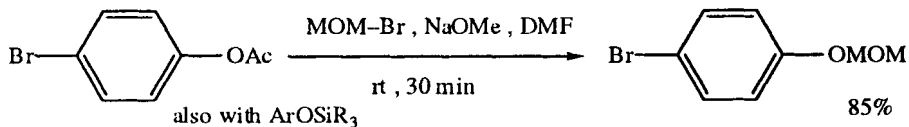


Meshram, H.M.; Sumitra, G.; Raddy, G.S.; Ganesh, Y.S.S.; Yadav, J.S. *Synth. Commun.*, **1999**, *29*, 2807.

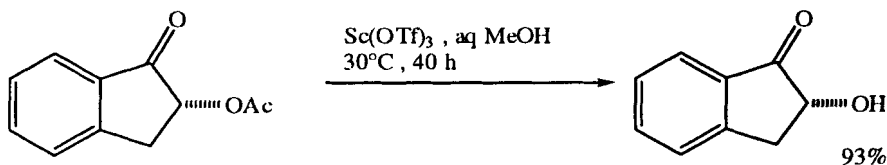


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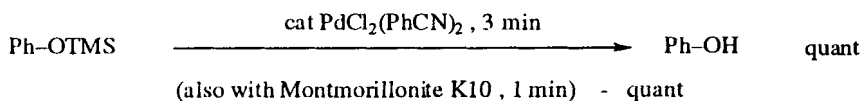
Chen, A.; Zheng, Y.; Zhou, X. *Synth. Commun.*, **1999**, *29*, 3421.



Oriyama, T.; Noda, K.; Sugawara, S. *Synth. Commun.*, **1999**, 29, 2217.



Kajiro, H.; Mitamura, S.; Mori, A.; Hiyama, T. *Bull. Chem. Soc. Jpn.*, **1999**, 72, 1553.

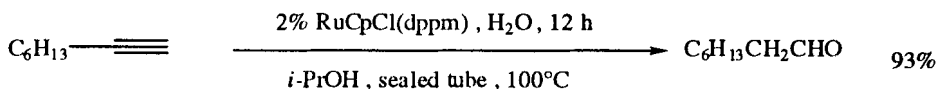


Mojtahedi, M.M.; Saidi, M.R.; Heravi, M.M.; Bolourtchian, M. *Monat. Chem.*, **1999**, 130, 1175.

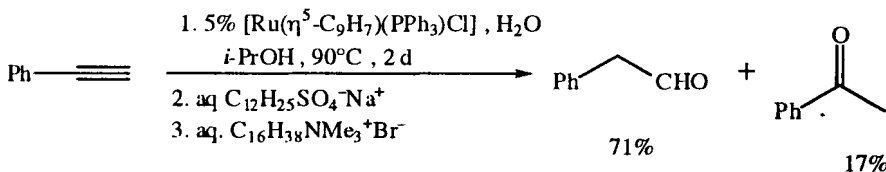
# CHAPTER 4

## PREPARATION OF ALDEHYDES

### SECTION 46: ALDEHYDES FROM ALKYNES

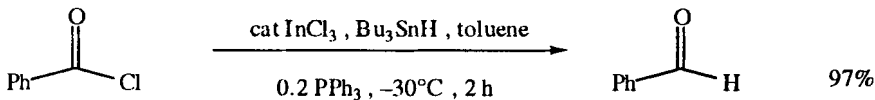


Suzuki, T.; Tokunaga, M.; Watatsuki, Y. *Org. Lett.*, **2001**, 3, 735.

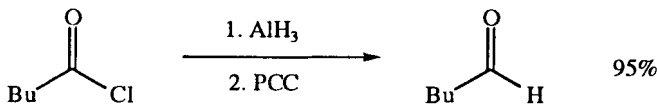


Alvarez, P.; Bassetti, M.; Gimeno, J.; Mancini, G. *Tetrahedron Lett.*, **2001**, 42, 8467.

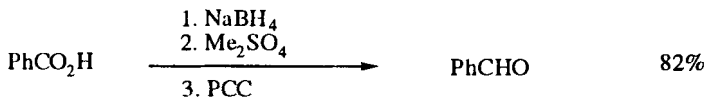
### SECTION 47: ALDEHYDES FROM ACID DERIVATIVES



Inoue, K.; Yasuda, M.; Shibata, I.; Baba, A. *Tetrahedron Lett.*, **2000**, 41, 113.

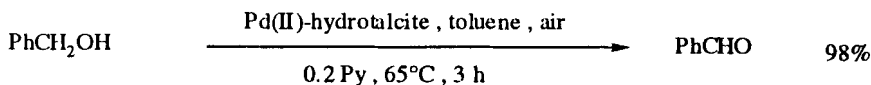


Cha, J.S.; Kim, J.M.; Chun, J.H.; Kwon, O.O.; Kwon, S.Y.; Han, S.W. *Org. Prep. Proceed. Int.*, **1999**, 31, 204.

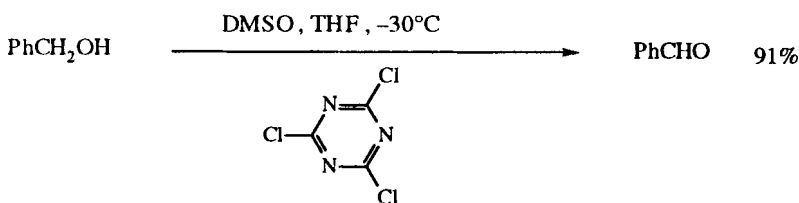


Cha, J.S.; Lee, D.Y.; Kim, J.M. *Org. Prep. Proceed. Int.*, **1999**, 31, 694.

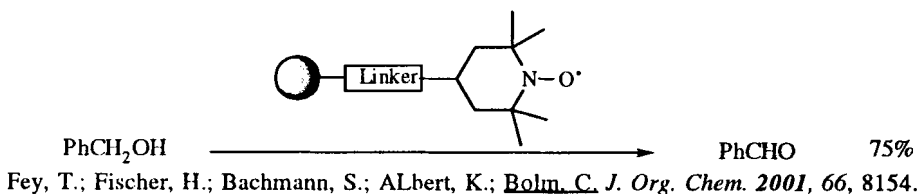
## SECTION 48: ALDEHYDES FROM ALCOHOLS AND THIOLS



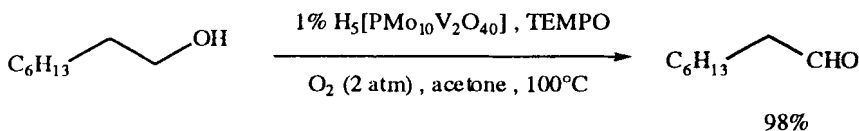
Kakiuchi, N.; Maeda, Y.; Nishimura, T.; Uemura, S. *J. Org. Chem.*, **2001**, 66, 6620.



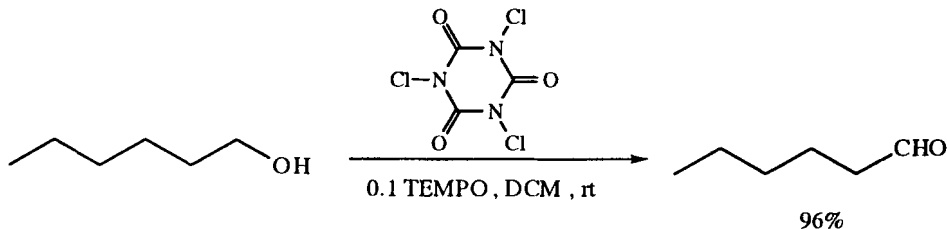
De Luca, L.; Giacomelli, G.; Porcheddu, A. *J. Org. Chem.* **2001**, 66, 7907.



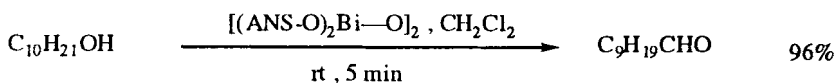
Fey, T.; Fischer, H.; Bachmann, S.; ALbert, K.; Bolm, C. *J. Org. Chem.* **2001**, 66, 8154.



Ben-Daniel, R.; Alsters, P.; Neumann, R. *J. Org. Chem.*, **2001**, 66, 8650.

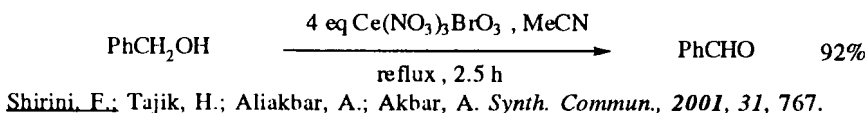
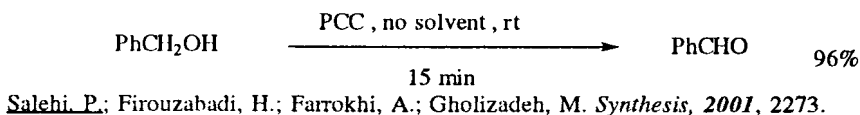
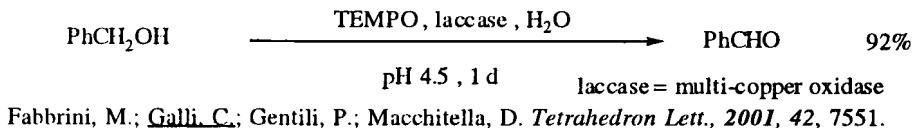
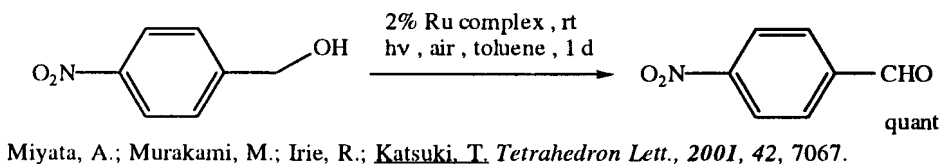
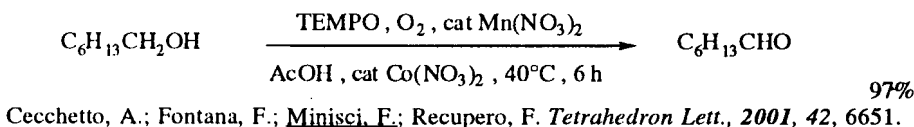
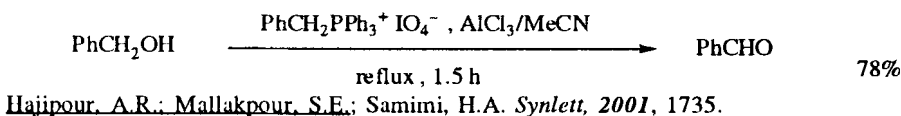
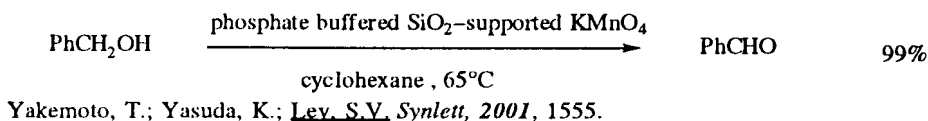
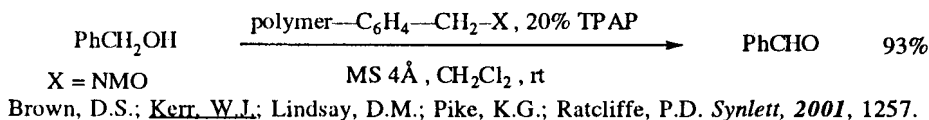
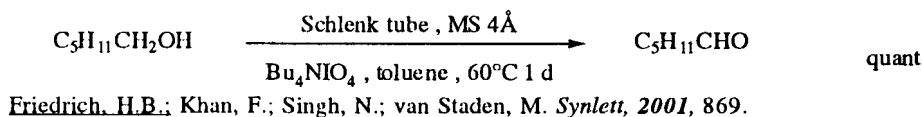


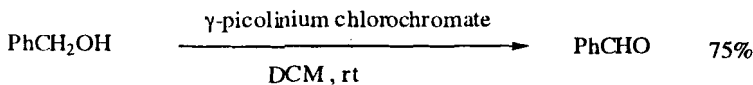
De Luca, L.; Giacomelli, G.; Porcheddu, A. *Org. Lett.*, **2001**, 3, 3041.



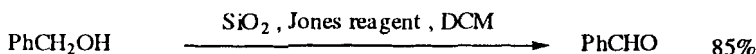
Matano, Y.; Nomura, H. *J. Am. Chem. Soc.*, **2001**, 123, 6443.



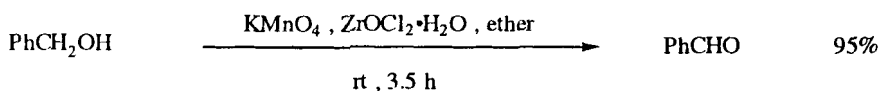




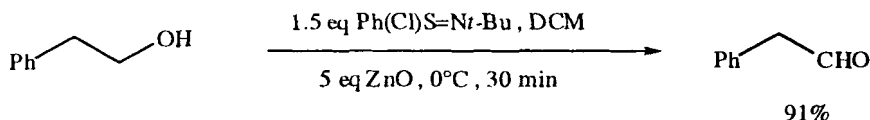
Khodaei, M.M.; Salehi, P.; Goudarzi, M. *Synth. Commun.*, **2001**, *31*, 1253.



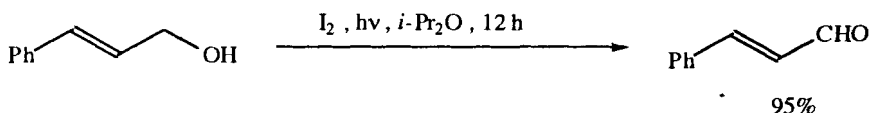
Ali, M.H.; Wiggin, C.J. *Synth. Commun.*, **2001**, *31*, 1389.



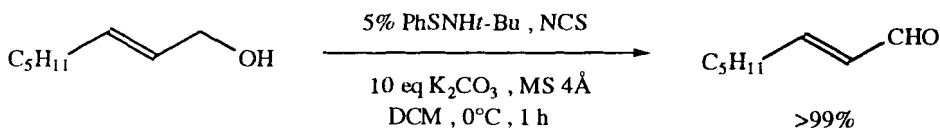
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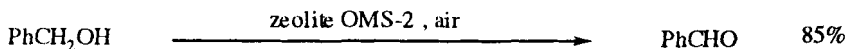
Matsuo, J.-i.; Kitagawa, H.; Iida, D.; Mukaiyama, T. *Chem. Lett.*, **2001**, 150.



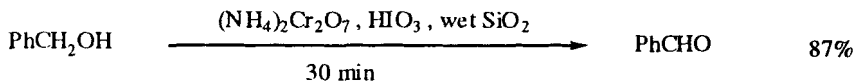
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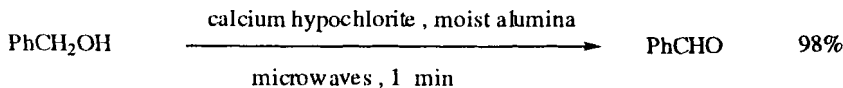
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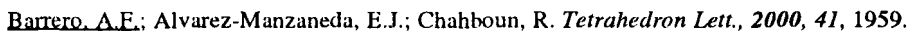
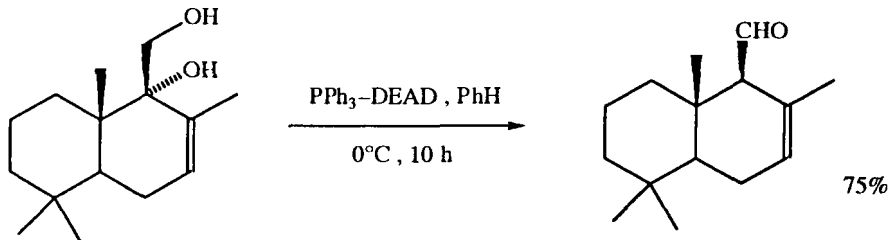
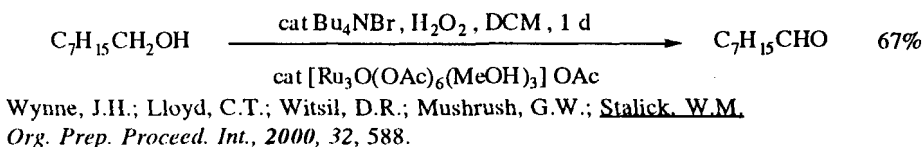
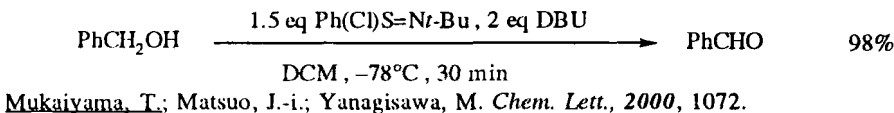
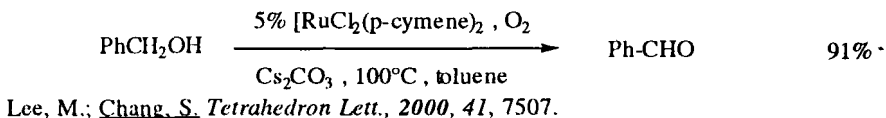
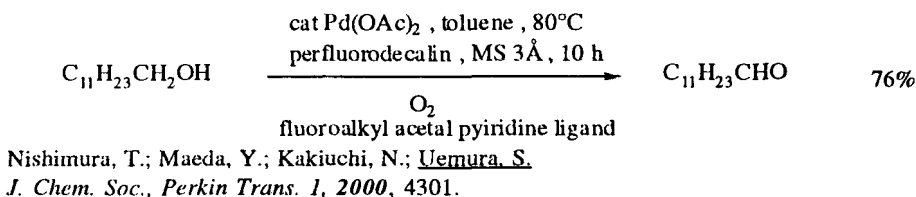
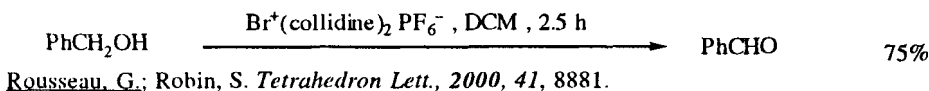
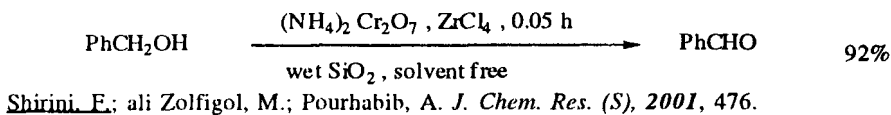
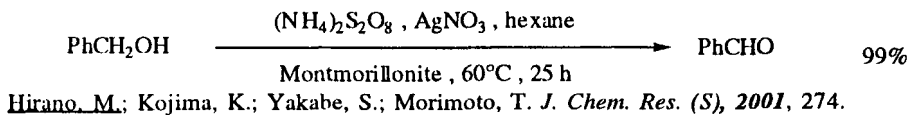
Son, Y.-C.; Makwana, V.D.; Howell, A.R.; Suib, S.L. *Angew. Chem. Int. Ed.*, **2001**, *40*, 4280.

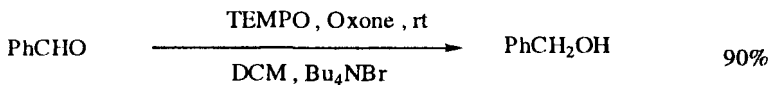


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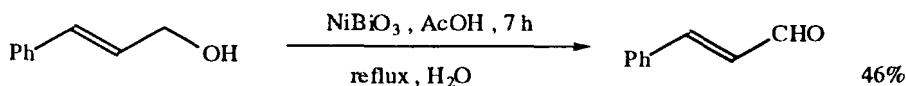


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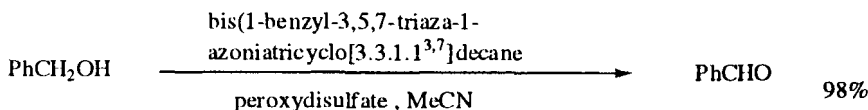




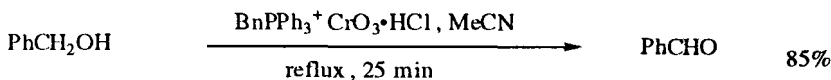
Bolm, C.; Magnus, A.S.; Hildebrand, J. *Org. Lett.*, **2000**, 2, 1173.



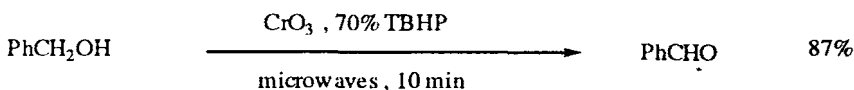
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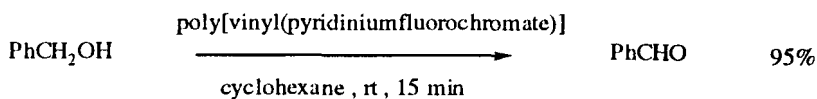
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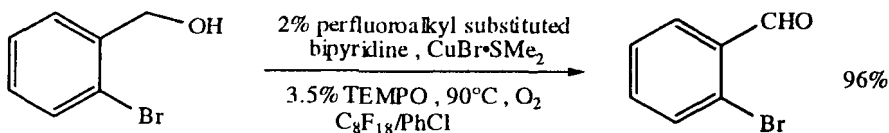
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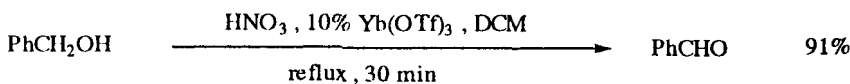
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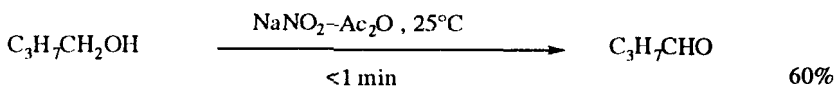
Srinivasan, R.; Balasubramanian, K. *Synth. Commun.*, **2000**, 30, 4397.



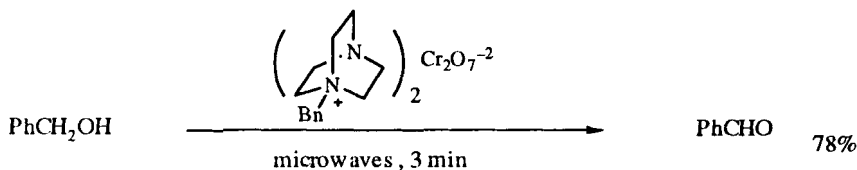
Betzemeier, B.; Cavazzini, M.; Quici, S.; Knochel, P. *Tetrahedron Lett.*, **2000**, 41, 4343.



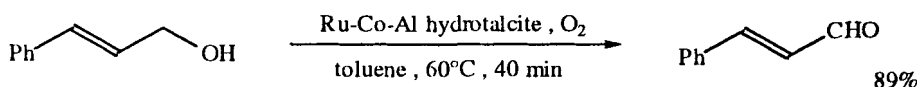
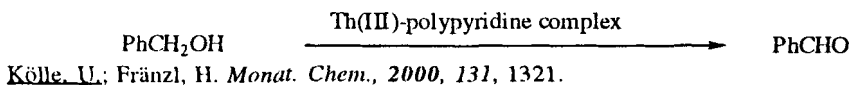
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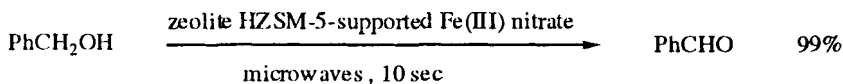
Bandgar, B.P.; Sadavarte, V.S.; Uppalla, L.S. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 3559.



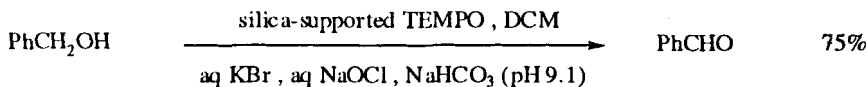
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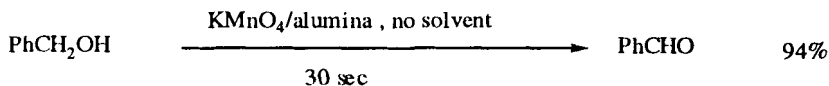
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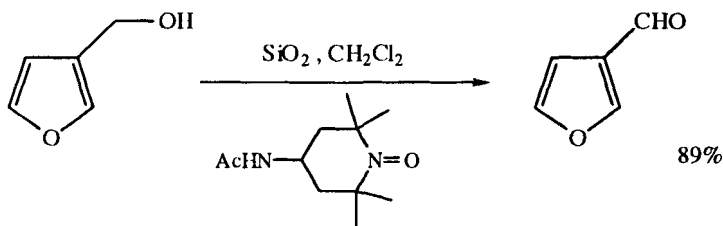
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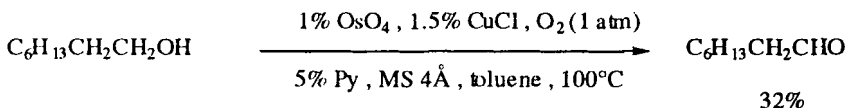
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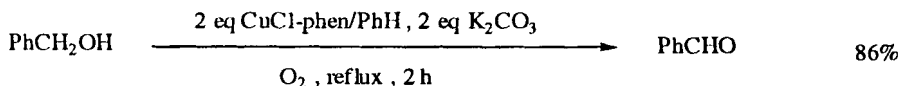


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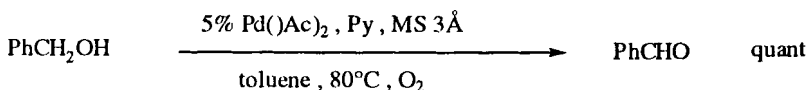


better yields with benzylic alcohols

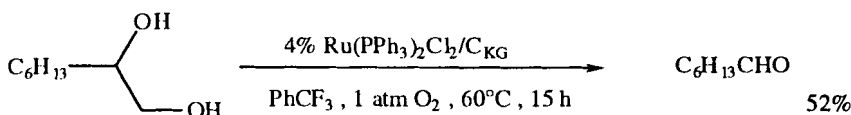
Coleman, K.; Coppe, M.; Thomas, C.; Osborn, J.A. *Tetrahedron Lett.*, **1999**, 40, 3723.



Markó, I.E.; Giles, P.R.; Tsukazaki, M.; Chellé-Regnaut, I.; Gautier, A.; Brown, S.M.; Urch, C.J. *J. Org. Chem.*, **1999**, *64*, 2433.

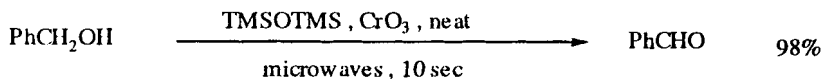


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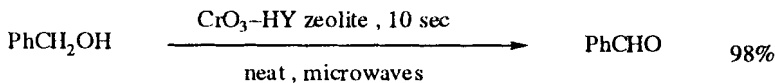


C<sub>KG</sub> = Kurane coal GLC

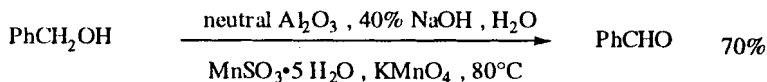
Takezawa, E.; Sakaguchi, S.; Ishii, Y. *Org. Lett.*, **1999**, *1*, 713.



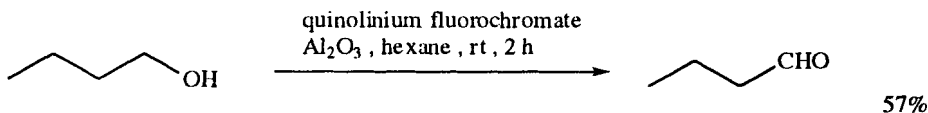
Heravi, M.M.; Ajami, D.; Tabar-Heydar, K. *Synth. Commun.*, **1999**, *29*, 163.



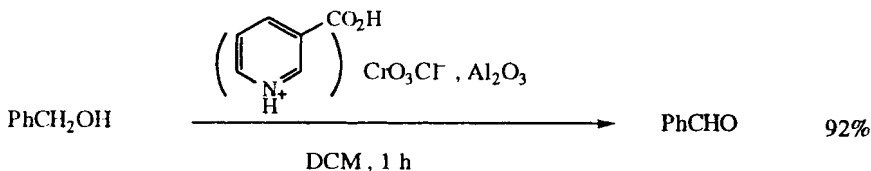
Mirza-Aghayan, M.; Heravi, M.M. *Synth. Commun.*, **1999**, *29*, 785.



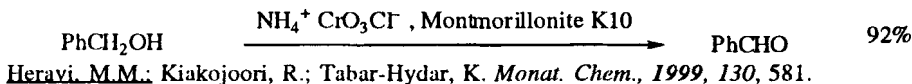
Stavrescu, R.; Kimura, T.; Fujita, M.; Vinatoru, M.; Ando, T. *Synth. Commun.*, **1999**, *29*, 1719.



Rajkumar, G.A.; Arabindoo, B.; Murugesan, V. *Synth. Commun.*, **1999**, *29*, 2105.

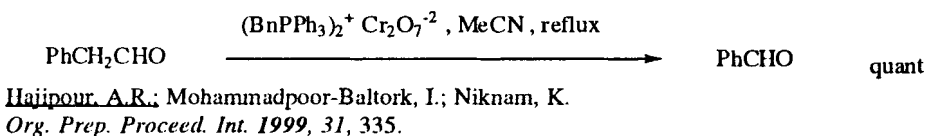


Heravi, M.M.; Kiakoojori, R.; Mirza-Aghayan, M.; Tabar-Hydar, K.; Bolourtchian, M. *Monat. Chem.*, **1999**, *130*, 481.



## SECTION 49: ALDEHYDES FROM ALDEHYDES

Conjugate reductions and Michael Alkylations of conjugated aldehydes are listed in Section 74 (Alkyls from Alkenes).



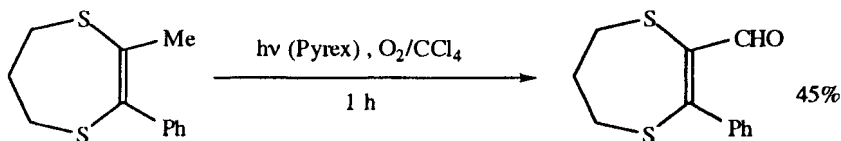
Related Methods:

Aldehydes from Ketones (Section 57)

Ketones from Ketones (Section 177)

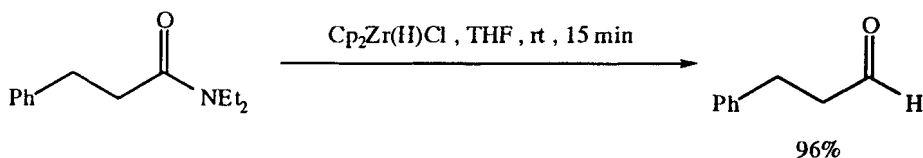
Also via: Alkenyl aldehydes (Section 341)

## SECTION 50: ALDEHYDES FROM ALKYL, METHYLENES AND ARYL



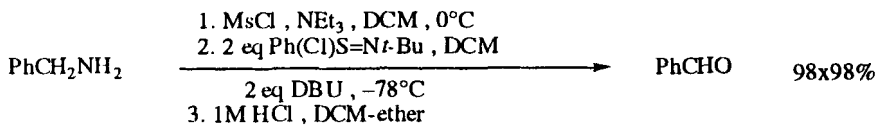
Wan, Y.; Barnhurst, L.A.; Kutateladze, A.G. *Org. Lett.*, **1999**, *1*, 937.

## SECTION 51: ALDEHYDES FROM AMIDES

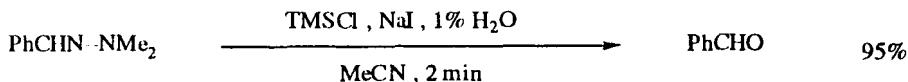


White, J.M.; Tunoori, A.R.; Georg, G.I. *J. Am. Chem. Soc.*, **2000**, *122*, 11995.

## SECTION 52: ALDEHYDES FROM AMINES



Matsuo, J.-i.; Kawana, A.; Fukuda, Y.; Mukaiyama, T. *Chem. Lett.*, **2001**, 712.



Kamal, A.; Ramana, K.V.; Arifuddin, M. *Chem. Lett.*, **2000**, 827.

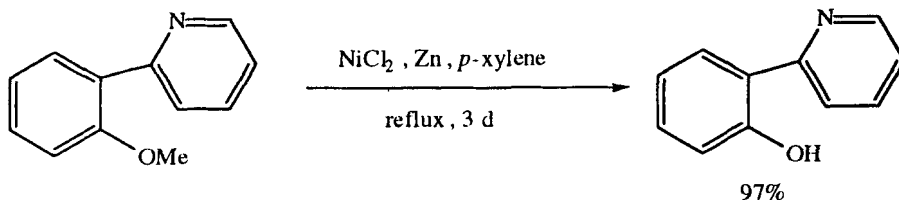
Related Methods:

Ketones from Amines (Section 172)

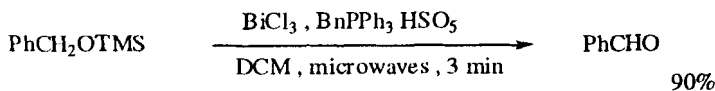
## SECTION 53: ALDEHYDES FROM ESTERS

NO ADDITIONAL EXAMPLES

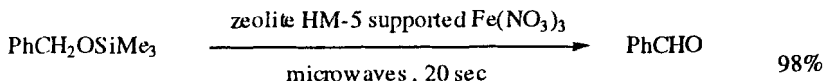
## SECTION 54: ALDEHYDES FROM ETHERS, EPOXIDES AND THIOETHERS



Maeyama, K.; Kobayashi, M.; Yonezawa, N. *Synth. Commun.*, **2001**, 31, 869.

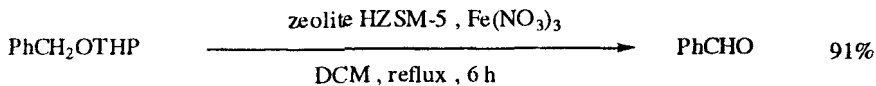


Hajipour, A.R.; Mallakpour, S.E.; Balork, I.M.; Adibi, H. *Synth. Commun.* **2001**, 31, 1625.

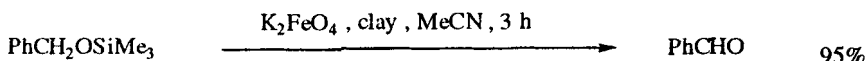


Heravi, M.M.; Ajami, D.; Ghassemzadeh, M.; Tabar-Hydar, K. *Synth. Commun.*, **2001**, 31, 2097.

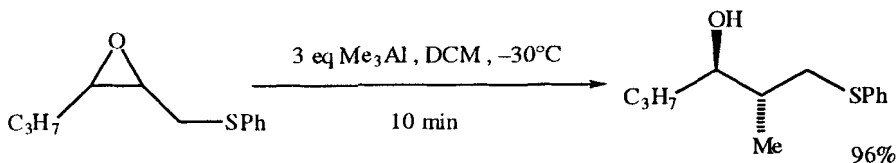




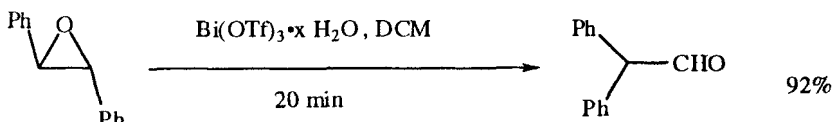
Mohajerani, B.; Heravi, M.M.; Ajami, D. *Monat. Chem.*, **2001**, 132, 871.



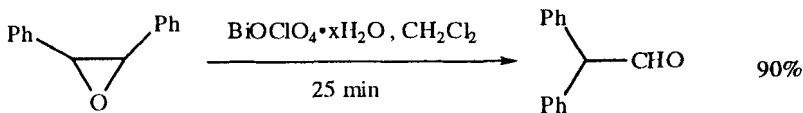
Tajbakhsh, M.; Heravi, M.M.; Habibzadeh, S.; Ghassemzadeh, M. *J. Chem.Res. (S)*, **2001**, 39.



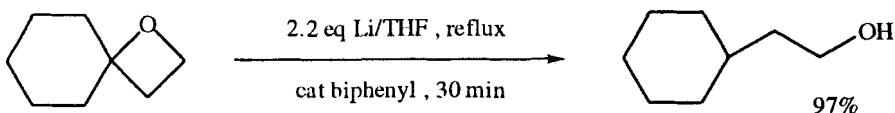
Sasaki, M.; Tanino, K.; Miyashita, M. *J. Org. Chem.*, **2001**, 66, 5388.



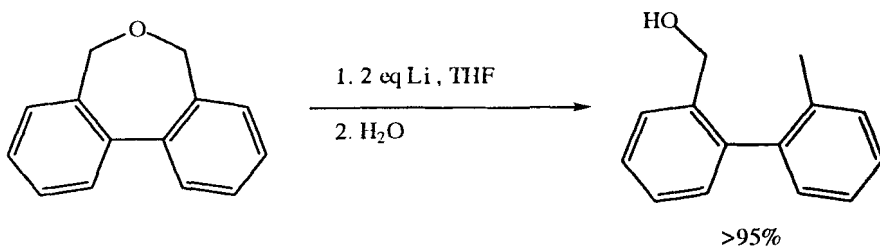
Bhatia, K.A.; Eash, K.J.; Loenard, N.M.; Oswald, M.C.; Mohan, R.S. *Tetrahedron Lett.*, **2001**, 42, 8129.



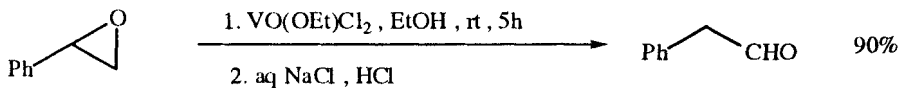
Anderson, A.M.; Blazek, J.M.; Garg, P.; Payne, B.J.; Mohan, R.S. *Tetrahedron Lett.*, **2000**, 41, 1527.



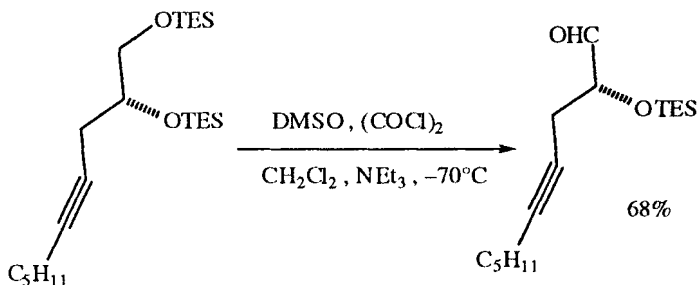
Rama, K.; Pasha, M.A. *Tetrahedron Lett.*, **2000**, 41, 1073.



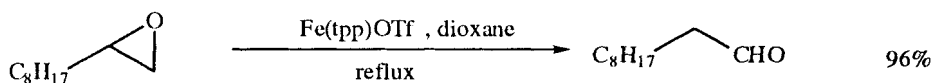
Azzena, U.; Demartis, S.; Pilo, L.; Pivas, E. *Tetrahedron*, **2000**, 56, 8375.



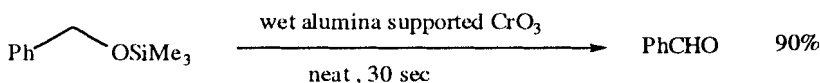
Martínez, F.; del Campo, C.; Llama, E.F. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 1749.



Rodríguez, A.; Nomen, M.; Spur, B.W.; Godfroid, J.J. *Tetrahedron Lett.*, **1999**, *40*, 5161.

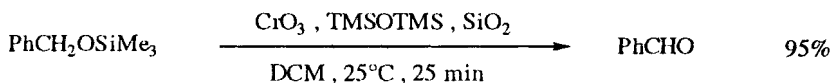


Suda, K.; Baba, K.; Nakajima, S.-i.; Takanami, T. *Tetrahedron Lett.*, **1999**, *40*, 7243.

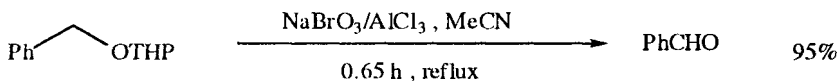


Heravi, M.M.; Ajami, D.; Ghassemzadeh, M. *Synthesis*, **1999**, 393.

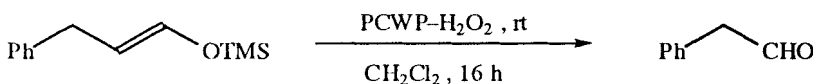
Heravi, M.M.; Ajami, D.; Ghassemzadeh, M. *Synth. Commun.*, **1999**, *29*, 781.



Heravi, M.M.; Ajami, D.; Tabar-Heydar, K. *Synth. Commun.*, **1999**, *29*, 1009.

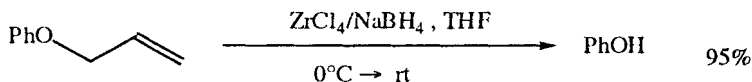


Mohammadpoor-Baltork, I.; Nourozi, A.R. *Synthesis*, **1999**, 487.

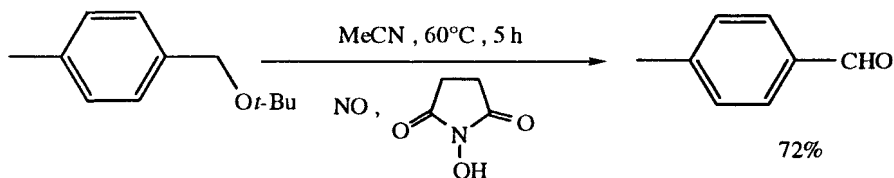


PCWP = peroxotungstophosphate

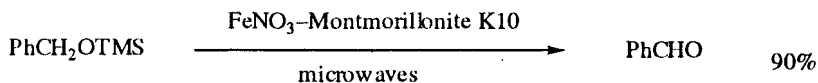
Sakaguchi, S.; Yamamoto, Y.; Sugimoto, T.; Yamamoto, H.; Ishii, Y. *J. Org. Chem.*, **1999**, *64*, 5954.



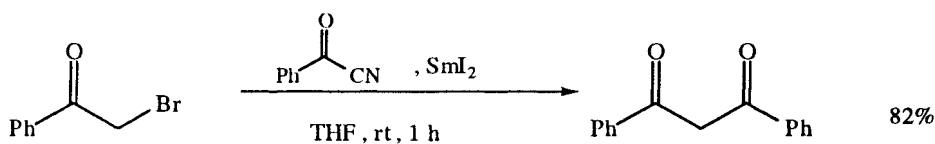
Chary, K.P.; Mohan, G.H.; Iyengar, D.S. *Chem. Lett.*, **1999**, 1223.



Eikawa, M.; Sakaguchi, S.; Ishii, Y. *J. Org. Chem.*, **1999**, *64*, 4676.



Mojtahedi, M.M.; Saidi, M.R.; Bolourtchian, M.; Heravi, M.M. *Synth. Commun.*, **1999**, *29*, 3283.

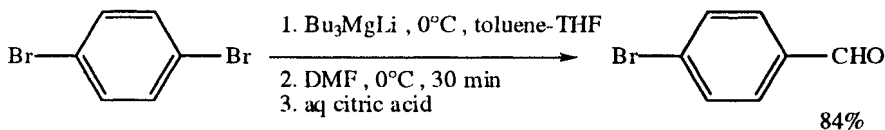


Firouzabadi, H.; Etemadi, S.; Karimi, B.; Jarrahpour, A.A. *Synth. Commun.*, **1999**, *29*, 4333.

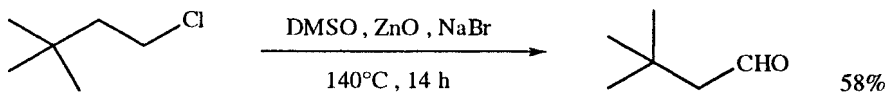
Related Methods:

Ketones from Ethers and Epoxides (Section 174)

## SECTION 55: ALDEHYDES FROM HALIDES AND SULFONATES

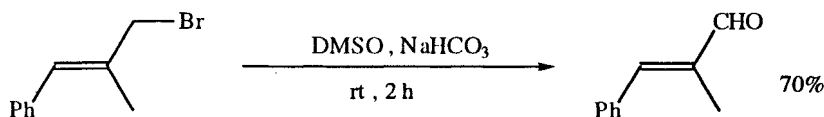


Iida, T.; Wada, T.; Tomimoto, K.; Mase, T. *Tetrahedron Lett.*, **2001**, *42*, 4841.



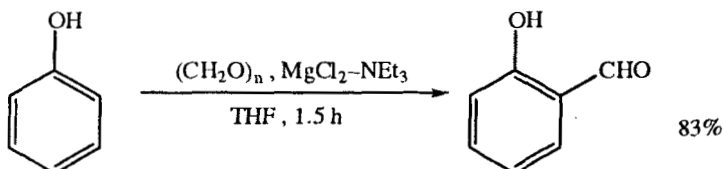
Guo, Z.; Sawyer, R.; Prakash, I. *Synth. Commun.*, **2001**, *31*, 667.

Guo, Z.; Sawyer, R.; Prakash, I. *Synth. Commun.*, **2001**, *31*, 3395.



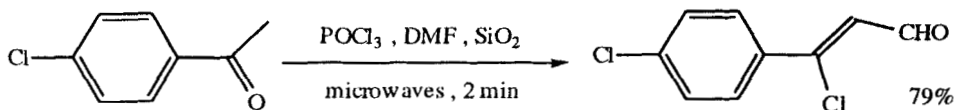
Ravichandran, S. *Synth. Commun.*, **2001**, *31*, 2185.

## SECTION 56: ALDEHYDES FROM HYDRIDES



Hofsløkkse, N.U.; Skattebøl, L. *Acta Chem. Scand.* **1999**, *53*, 258.

## SECTION 57: ALDEHYDES FROM KETONES

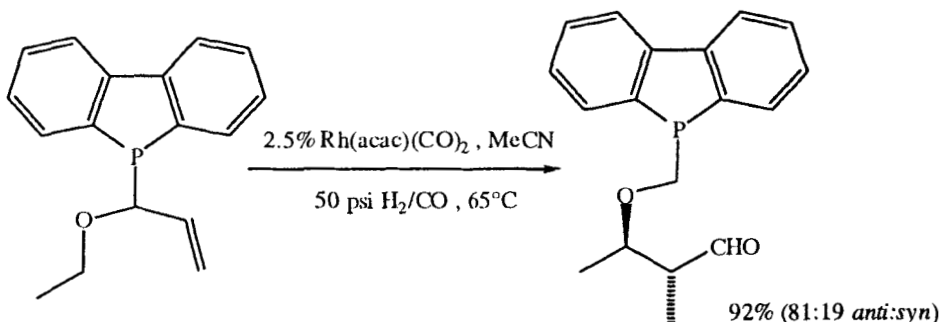


Paul, S.; Gupta, M.; Gupta, R. *Synlett*, **2000**, 1115.

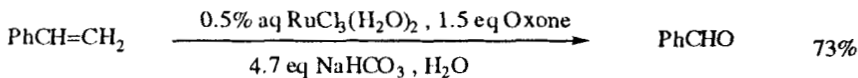
## SECTION 58: ALDEHYDES FROM NITRILES

NO ADDITIONAL EXAMPLES

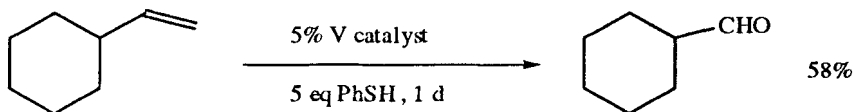
## SECTION 59: ALDEHYDES FROM ALKENES



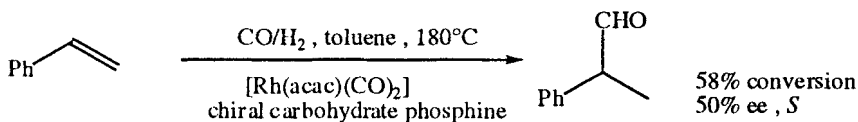
Krauss, I.J.; Wang, C.C.-Y.; Leighton, J.L. *J. Am. Chem. Soc.*, **2001**, *123*, 11514.



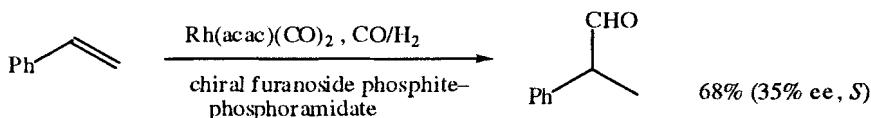
Yang, D.; Zhang, C. *J. Org. Chem.*, **2001**, *66*, 4814.



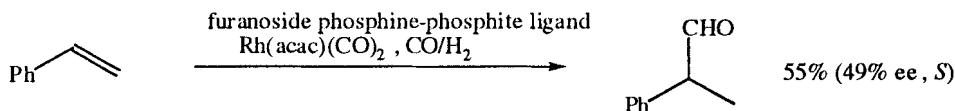
Bauchere, X.; Uziel, J.; Jugé, S. *J. Org. Chem.* **2001**, *66*, 4504.



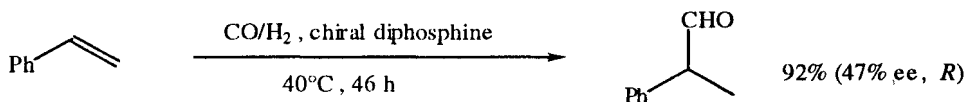
Diéguez, M.; Pàmies, O.; Net, G.; Ruiz, A.; Claver, C. *Tetrahedron Asymm.* **2001**, *12*, 651.



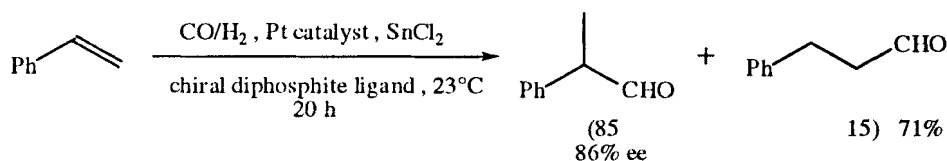
Diéguez, M.; Ruiz, A.; Claver, C. *Tetrahedron Asymm.* **2001**, *12*, 2827.



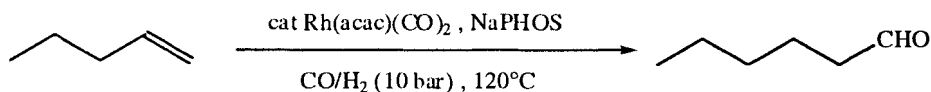
Pàmies, O.; Net, G.; Ruiz, A.; Claver, C. *Tetrahedron Asymm.* **2001**, *12*, 3441.



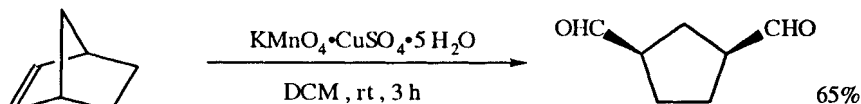
Hegedüs, C.; Madrász, J.; Gulyás, H.; Szöllösy, Á.; Bakos, J. *Tetrahedron Asymm.* **2001**, *12*, 2867.



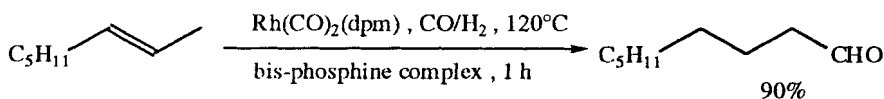
Bakos, J.; Cserépi-Szlöcs, S.; Gömöry, Á.; Hegedüs, C.; Markó, L.; Szöllösy, Á. *Can. J. Chem.* **2001**, *79*, 725.



Klein, H.; Hackstell, R.; Wiese, K.-D.; Borgmann, C.; Beller, M. *Angew. Chem. Int. Ed.* **2001**, *40*, 3408.



Göksu, S.; Altundag, R. *Synth. Commun.*, **2000**, *30*, 1615.



van der Veen, L.A.; Kamer, P.C.J.; van Leeuwen, P.W.N.M. *Angew. Chem. Int. Ed.*, **1999**, *38*, 336.

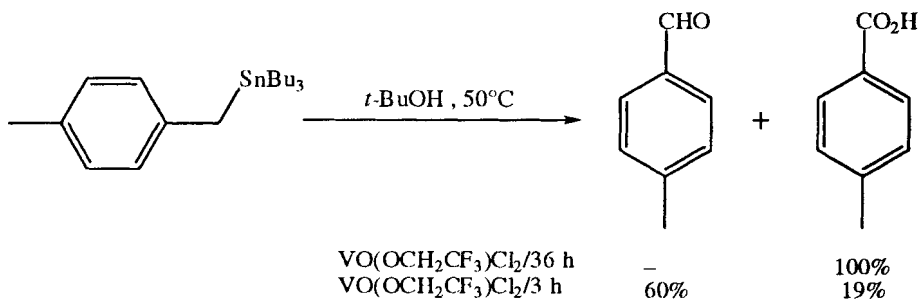
## REVIEWS:

"Recent Advances on Chemo-, Regio- and Stereoselective Hydroformylation," Breit, B.; Seiche, W. *Synthesis*, **2001**, 1.

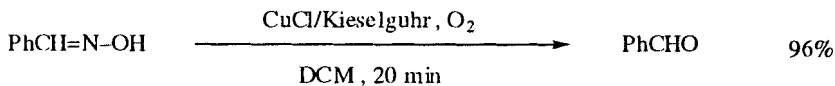
Related Methods:

Ketones from Alkenes (Section 179)

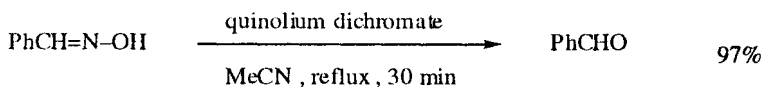
## SECTION 60: ALDEHYDES FROM MISCELLANEOUS COMPOUNDS



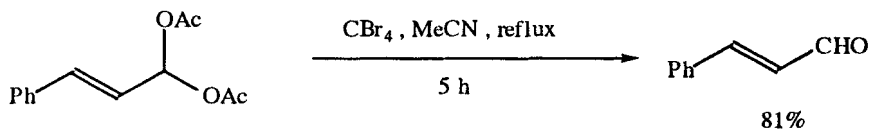
Hirao, T.; Morimoto, C.; Takada, T.; Sakurai, H. *Tetrahedron Lett.*, **2001**, *42*, 1961.



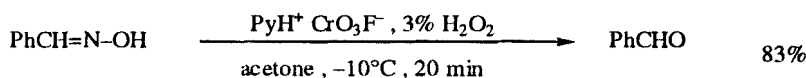
Hashemi, M.M.; Beni, Y.A. *Synth. Commun.*, **2001**, *31*, 295.



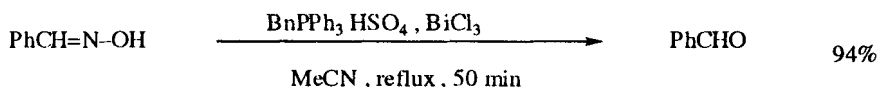
Sadeghi, M.M.; Mohammadpoor-Baltork, I.; Azarn, M.; Mazidi, M.R. *Synth. Commun.*, **2001**, *31*, 435.



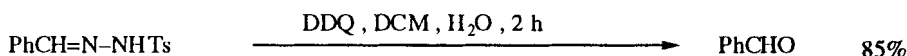
Ramalingam, T.; Srinivas, R.; Reddy, B.V.S.; Yadav, J.S. *Synth. Commun.*, **2001**, *31*, 1091.



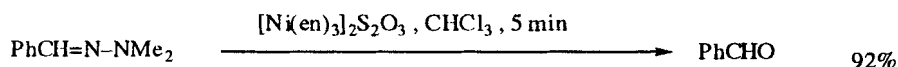
Ganguly, N.C.; Sukai, A.K.; De, S.; De, P. *Synth. Commun.* **2001**, *31*, 1607.



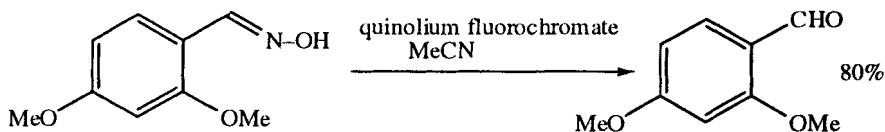
Hajipour, A.R.; Mallakpour, S.E.; Baltork, I.M.; Adibi, H. *Synth. Commun.*, **2001**, *31*, 3401.



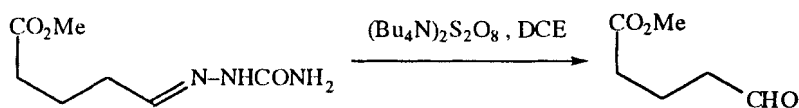
Chandrasekhar, S.; Reddy, Ch.R.; Reddy, M.V. *Chem. Lett.*, **2000**, 430.



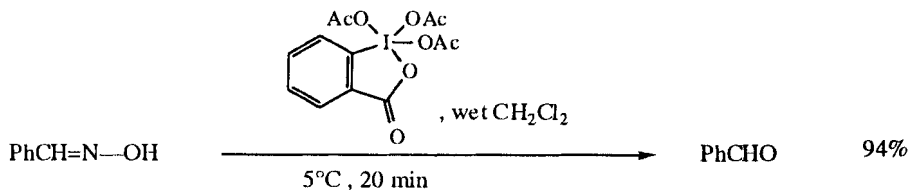
Kamal, A.; Arifuddin, M.; Rao, M.V. *Synlett*, **2000**, 1482.



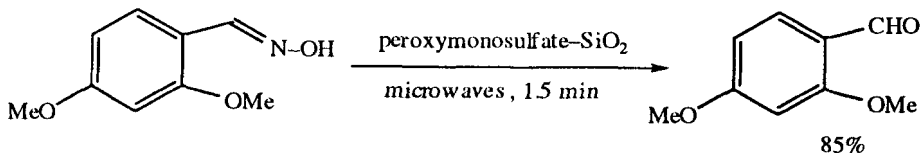
Bose, D.S.; Narasaiah, A.V. *Synth. Commun.*, **2000**, *30*, 1153.



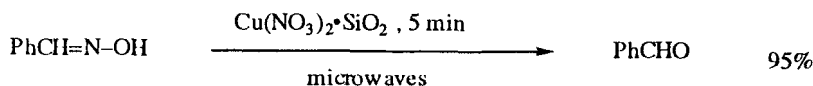
Chen, F.-E.; Liu, J.-P.; Fu, H.; Peng, Z.-Z.; Shao, L.-Y. *Synth. Commun.*, **2000**, *30*, 2295.



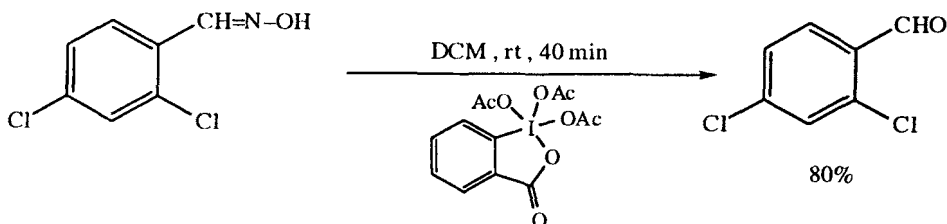
Chaudhari, S.S.; Akamanchi, K.G. *Synthesis*, **1999**, 760.



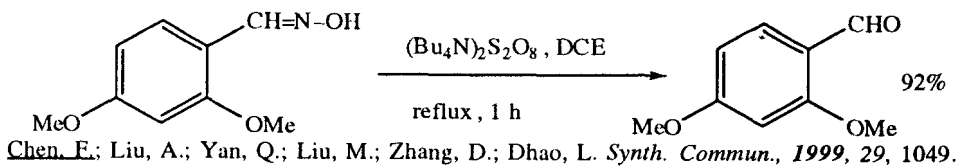
Bose, D.S.; Narsaiah, A.V.; Lakshminarayana, V. *Synth. Commun.*, **2000**, 30, 3121.



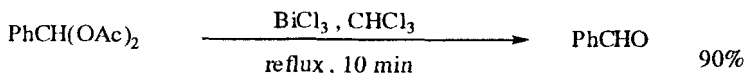
Ghiaci, M.; Asghari, J. *Synth. Commun.*, **2000**, 30, 3865.



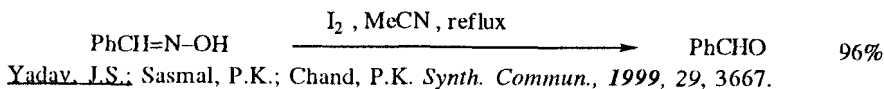
Bose, D.S.; Narsaiah, A.V. *Synth. Commun.*, **1999**, 29, 937.



Chen, E.; Liu, A.; Yan, Q.; Liu, M.; Zhang, D.; Dhao, L. *Synth. Commun.*, **1999**, 29, 1049.

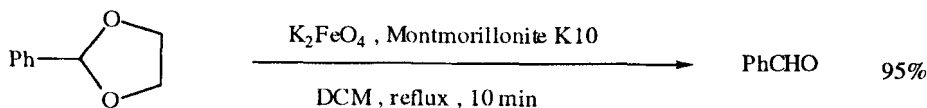


Mohammadpoor-Baltork, L.; Aliyan, H. *Synth. Commun.*, **1999**, 29, 2731.



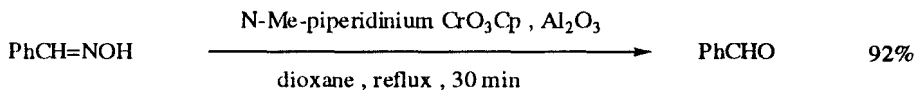
Yadav, J.S.; Sasmal, P.K.; Chand, P.K. *Synth. Commun.*, **1999**, 29, 3667.

## SECTION 60A: PROTECTION OF ALDEHYDES

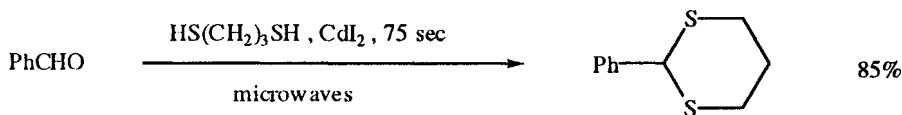


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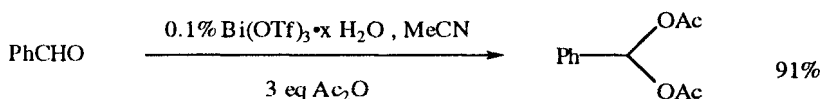




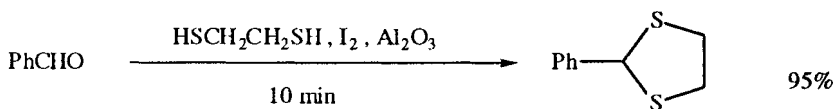
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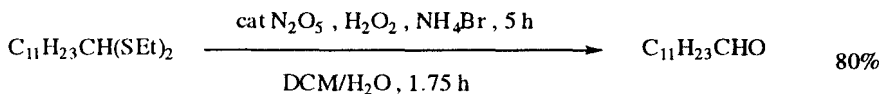
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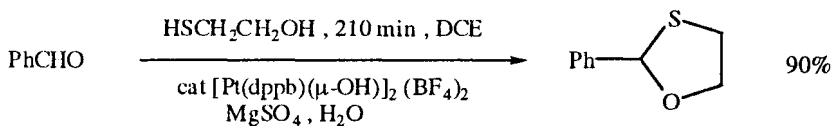
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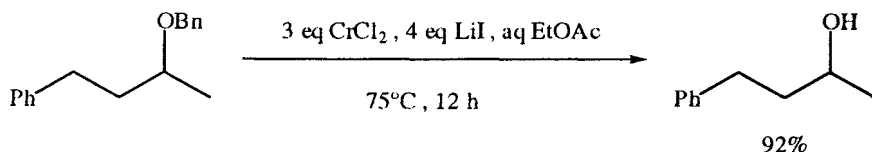
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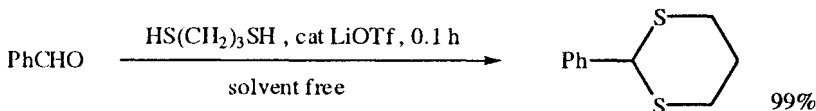
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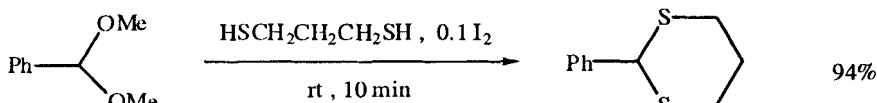
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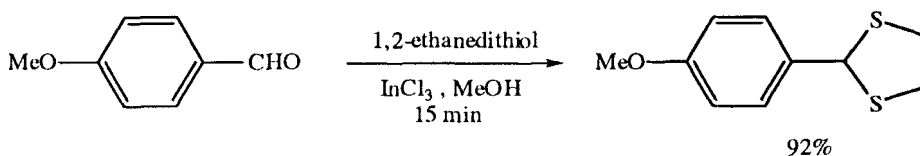
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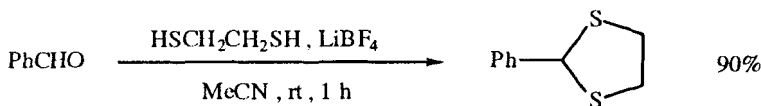
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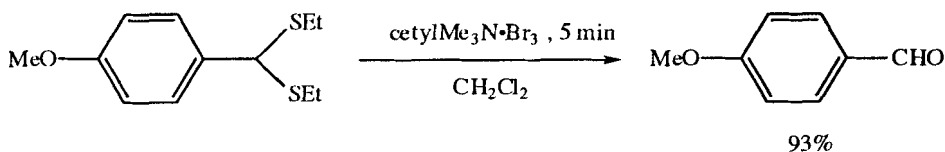
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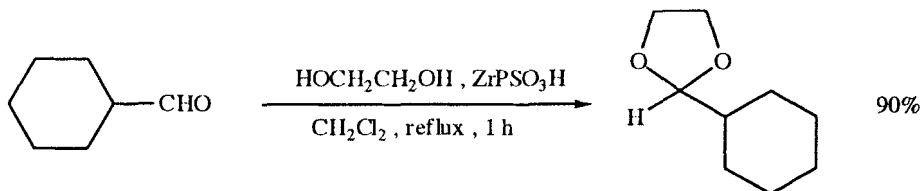
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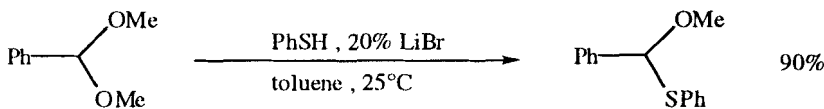
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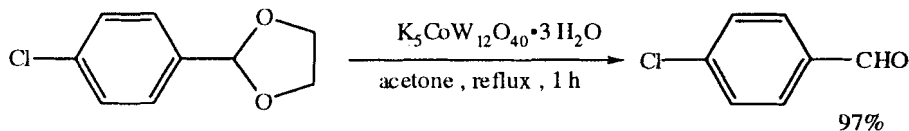
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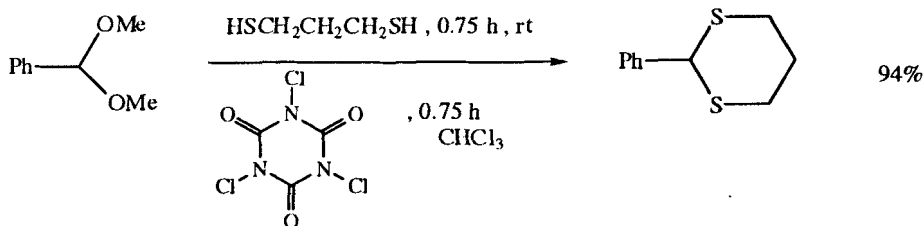
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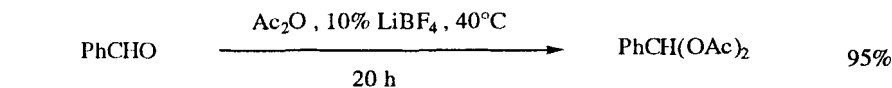
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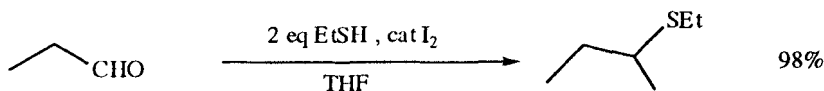
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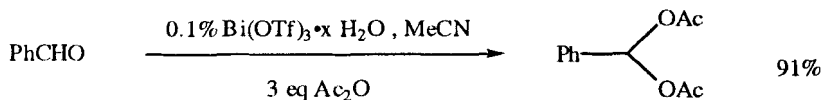
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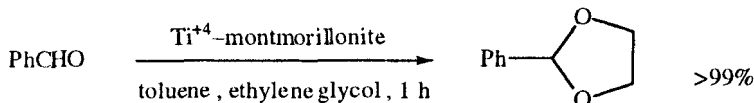
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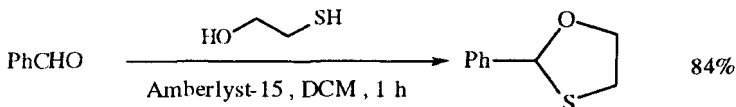
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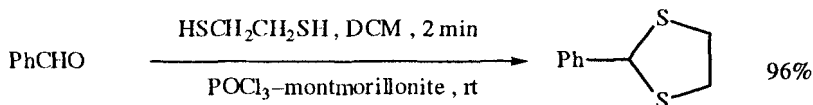
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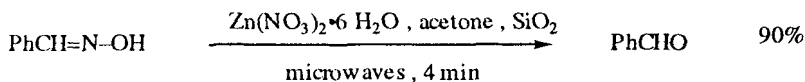
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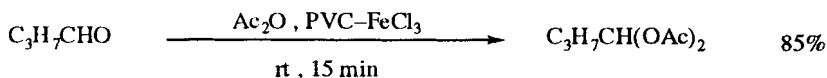
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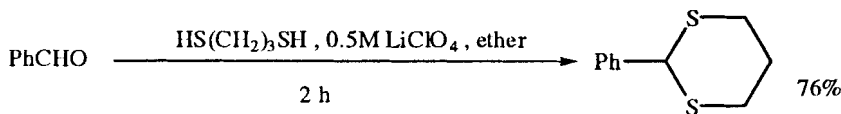
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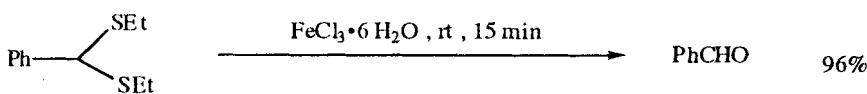
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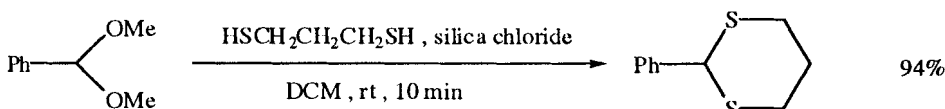
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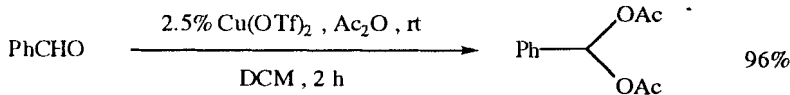
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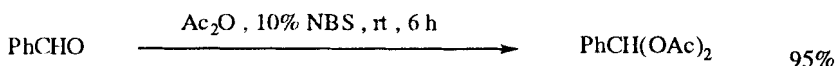
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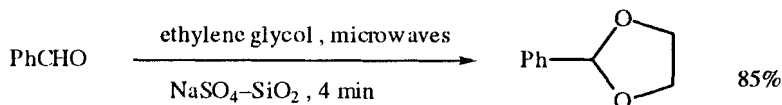
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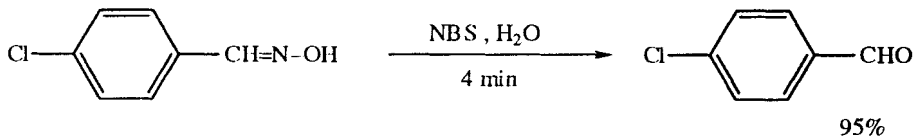
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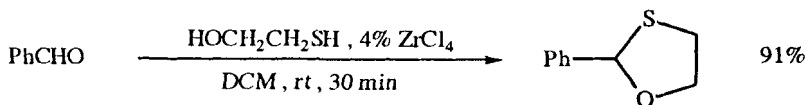
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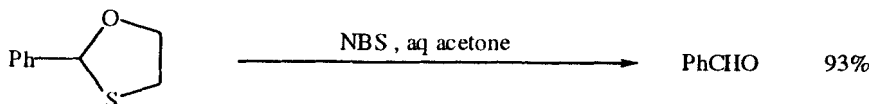
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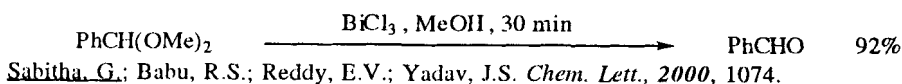
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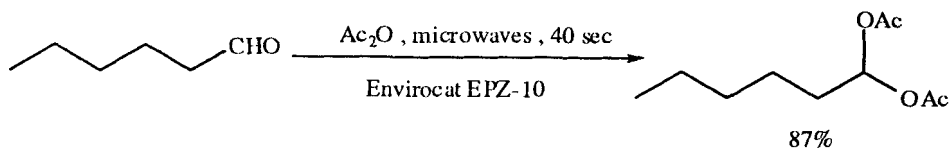
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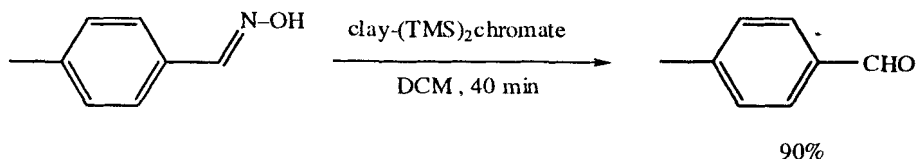
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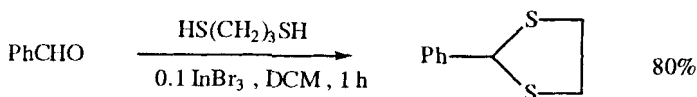
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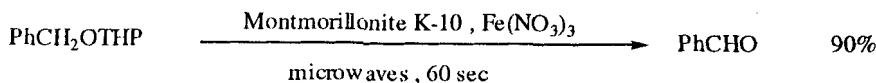
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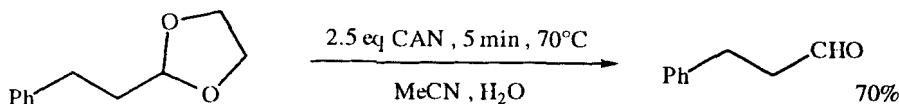
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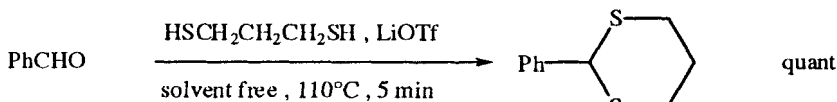
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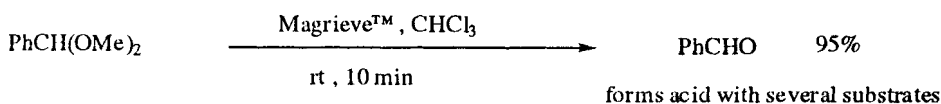
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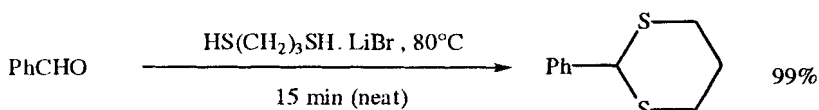


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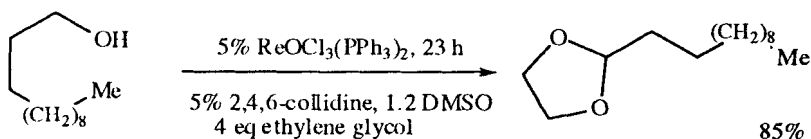


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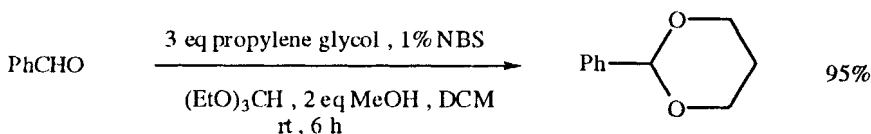
forms acid with several substrates



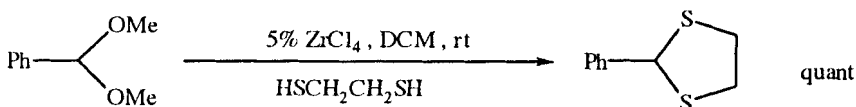
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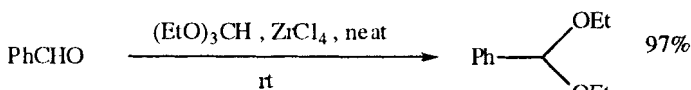
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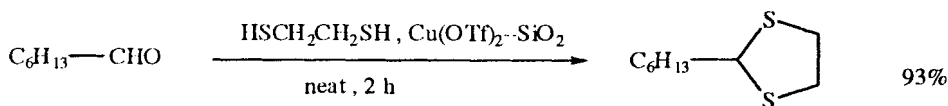
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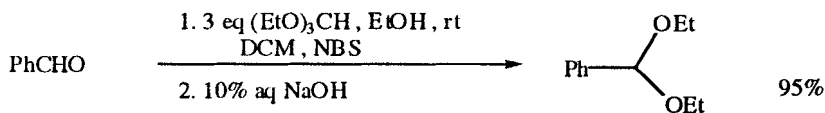
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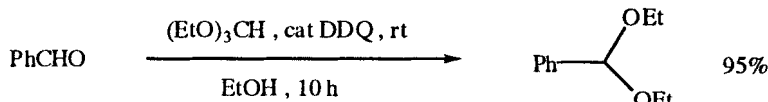
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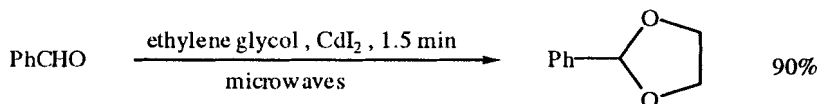
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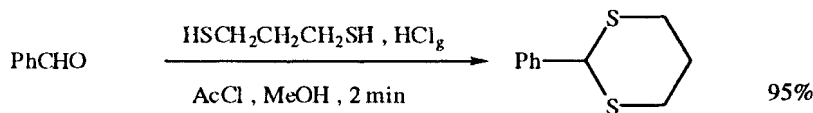
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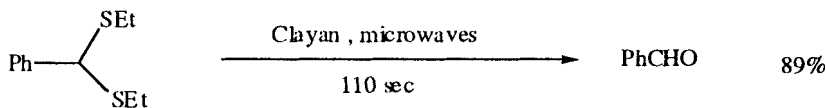
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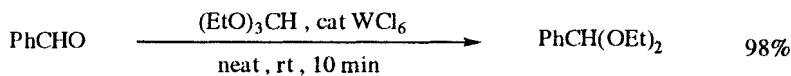
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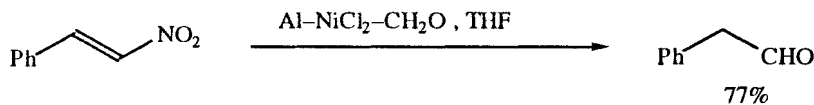
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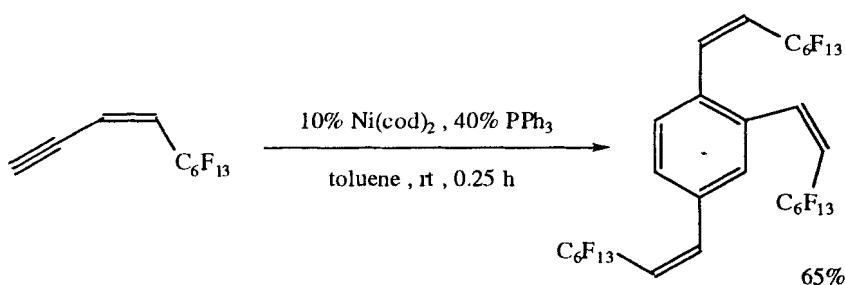
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## CHAPTER 5

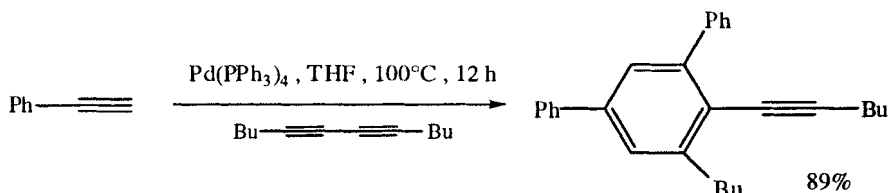
# PREPARATION OF ALKYL, METHYLENES AND ARYL

This chapter lists the conversion of functional groups into methyl, ethyl, propyl, etc. as well as methylene (CH<sub>2</sub>), phenyl, etc.

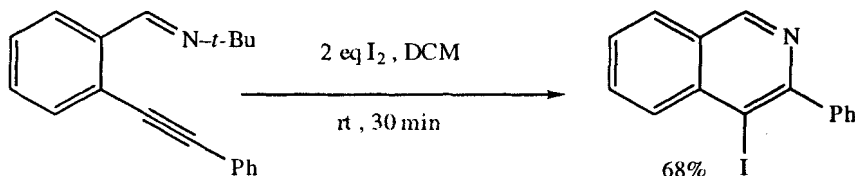
### SECTION 61: ALKYL, METHYLENES AND ARYL FROM ALKYNES



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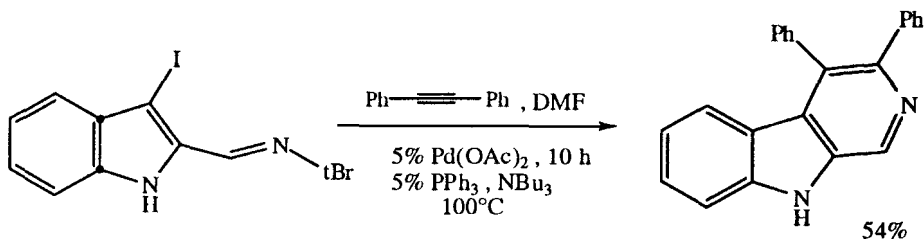


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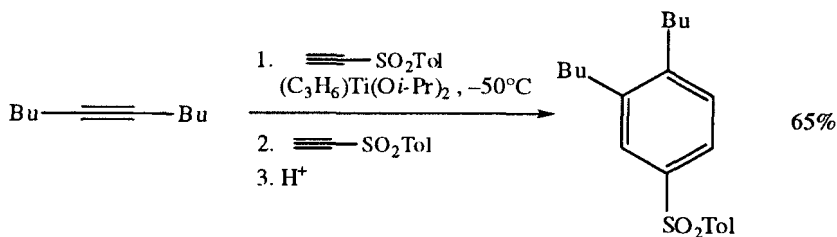


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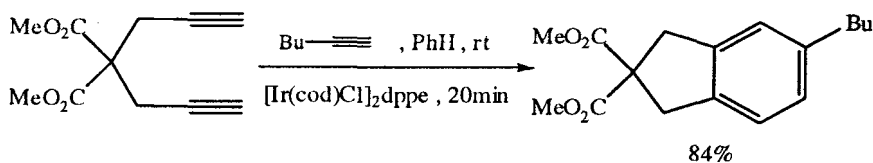




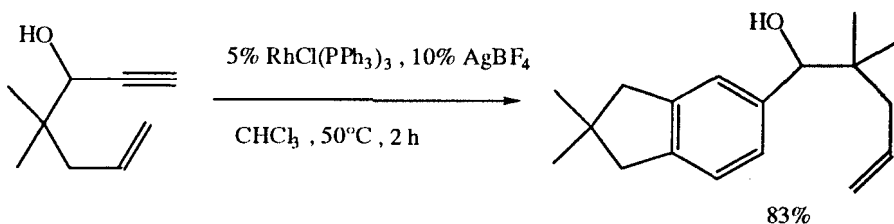
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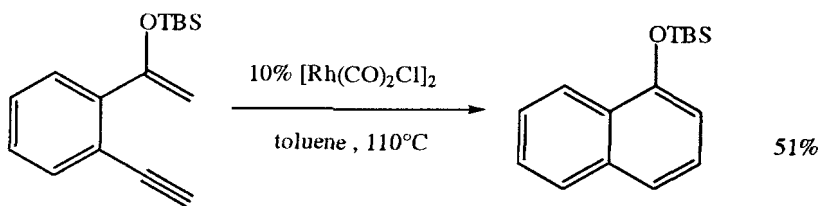
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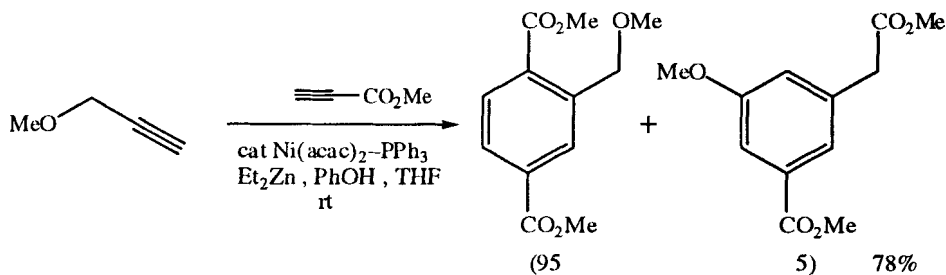
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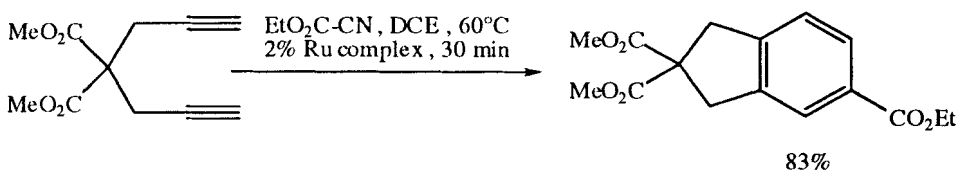
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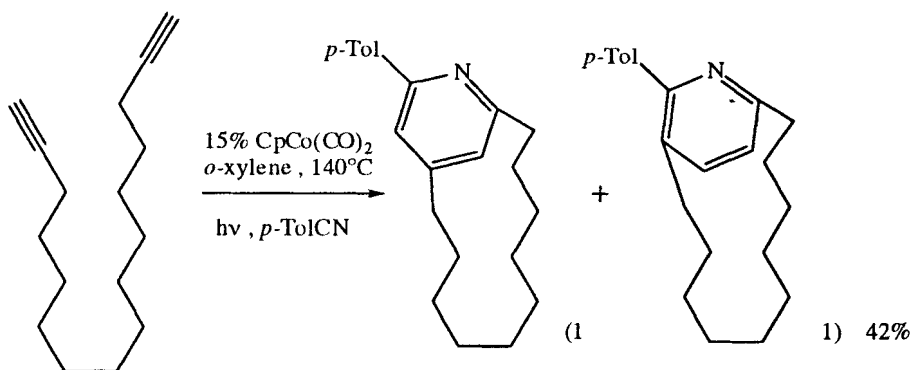
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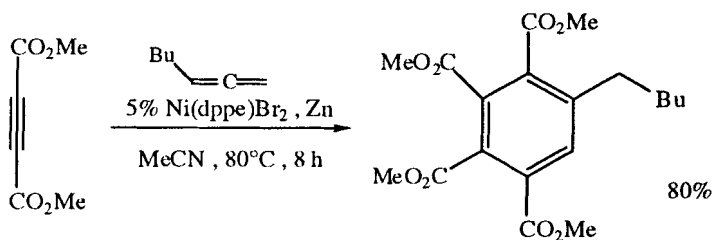
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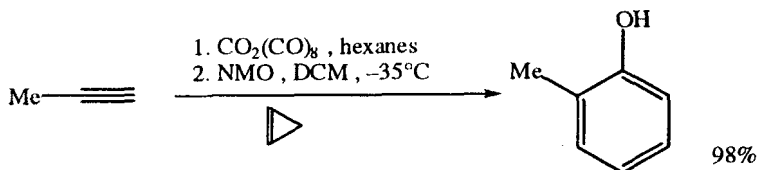
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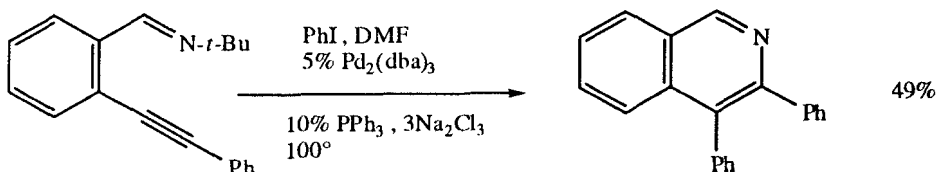
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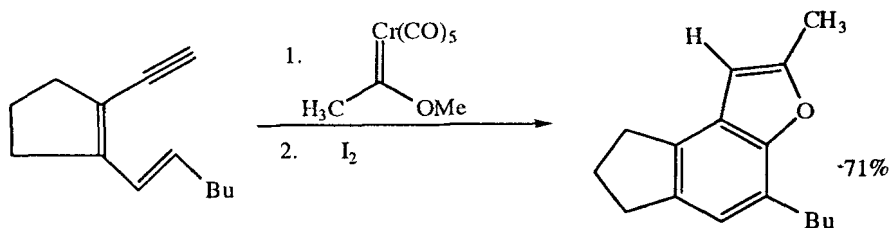
Shanmugasundaram, M.; Wu, M.-S.; Cheng, C.-H. *Org. Lett.*, **2001**, 3, 4233.



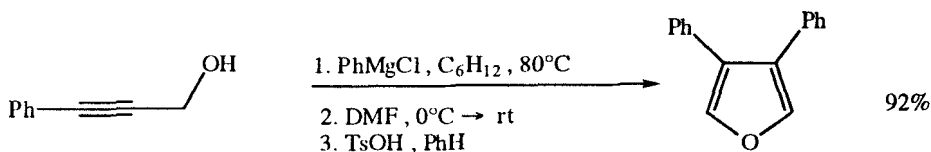
Marchueta, I.; Olivella, S.; Solá, L.; Moyano, A.; Pericàs, M.A.; Riera, A. *Org. Lett.*, **2001**, 3, 3197.



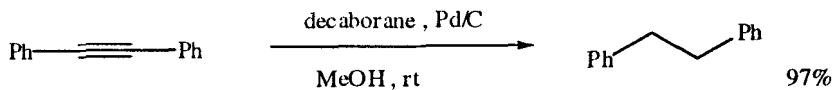
Daum G.; Larock, R.C. *Org. Lett.*, **2001**, 3, 4035.



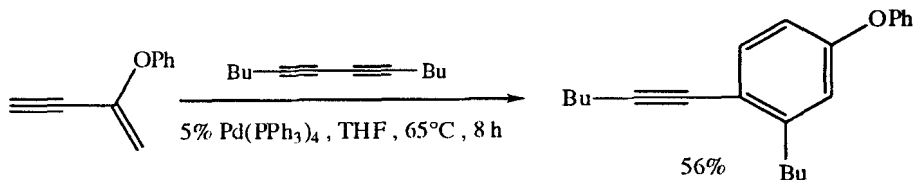
Herndon, J.W.; Zhang, Y.; Wang, H.; Wang, K. *Tetrahedron Lett.*, **2000**, 41, 8687.



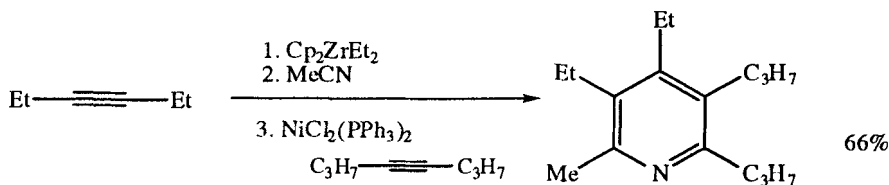
Forgione, P.; Wilson, P.D.; Fallis, A.G. *Tetrahedron Lett.*, **2000**, 41, 17.



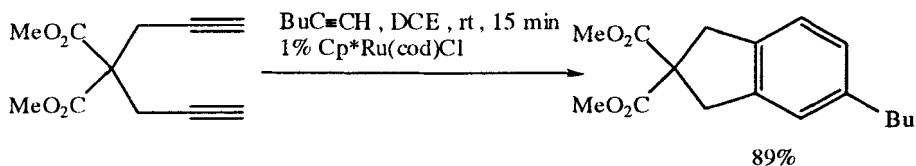
Lee, S.H.; Park, Y.T.; Yoon, C.M. *Tetrahedron Lett.*, **2000**, 41, 887.



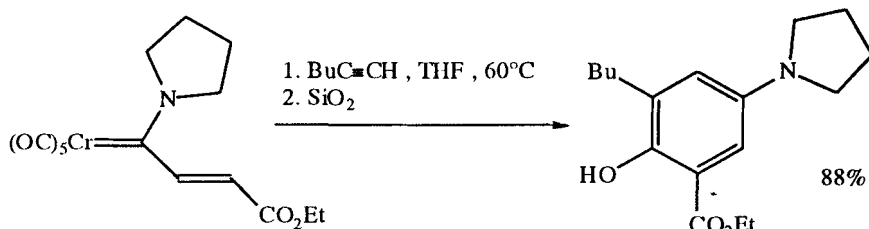
Gevorgyan, V.; Quan, L.G.; Yamamoto, Y. *J. Org. Chem.*, **2000**, 65, 568.



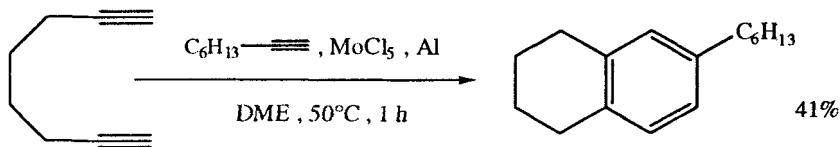
Takahashi, T.; Tsai, F.Y.; Kitora, M. *J. Am. Chem. Soc.*, **2000**, *122*, 4994.



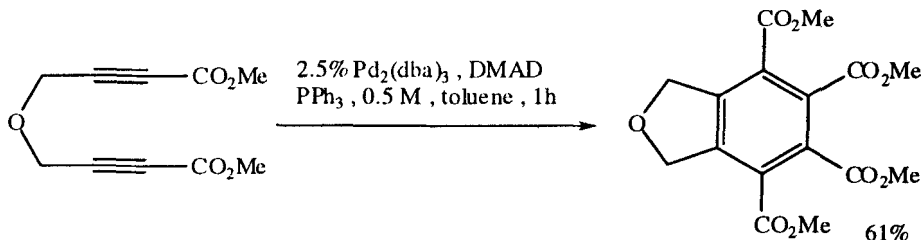
Yamamoto, Y.; Ogawa, R.; Itoh, K. *Chem. Commun.*, **2000**, 549.



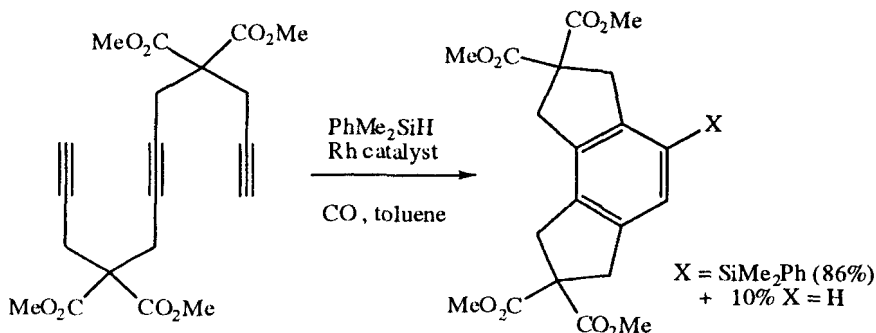
Barluenga, J.; López, L.A.; Martínez, S.; Tomás, M. *Tetrahedron*, **2000**, *56*, 4967.



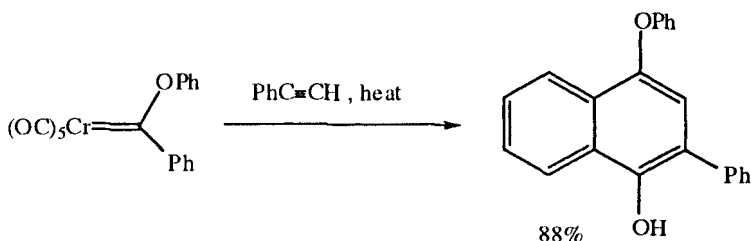
Hara, R.; Guo, Q.; Takahashi, T. *Chem. Lett.*, **2000**, 140.



Yamamoto, Y.; Nagata, A.; Itoh, K. *Tetrahedron Lett.*, **1999**, *40*, 5035.

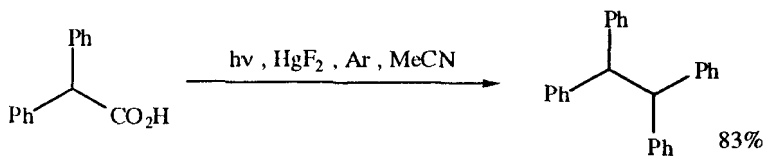


Ojima, I.; Vu, A.T.; McCullagh, J.V.; Kinoshita, A. *J. Am. Chem. Soc.*, **1999**, *121*, 3230.



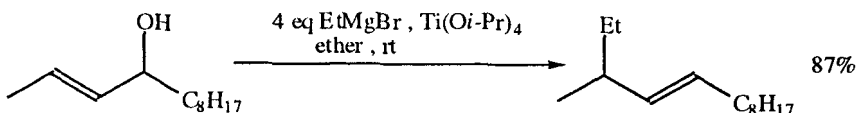
Pulley, S.R.; Sen, S.; Vorogushin, A.; Swanson, E. *Org. Lett.*, **1999**, *1*, 1721.

## SECTION 62: ALKYL, METHYLENES AND ARYLS FROM ACID DERIVATIVES

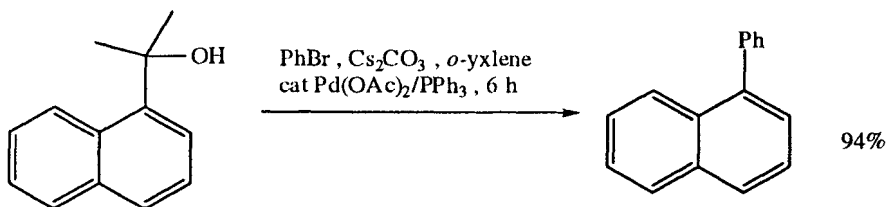


Habibi, M.H.; Farhadi, S. *Tetrahedron Lett.*, **1999**, *40*, 2821.

## SECTION 63: ALKYL, METHYLENES AND ARYLS FROM ALCOHOLS AND THIOLS

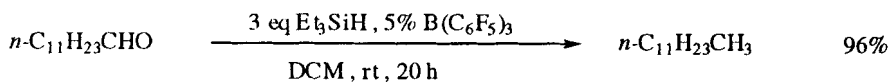


Kulinkovich, O.G.; Epstein, O.L.; Isakov, V.E.; Khmel'nitskaya, E.A. *Synlett*, **2001**, 49.

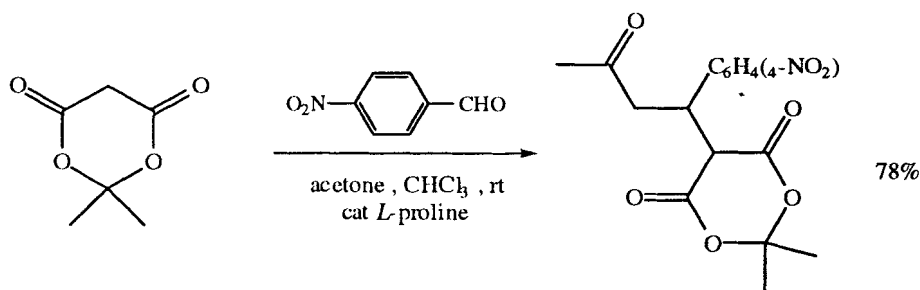


Terao, Y.; Wakui, H.; Satoh, T.; Miura, M.; Nomura, M.  
*J. Am. Chem. Soc.*, **2001**, *123*, 10407.

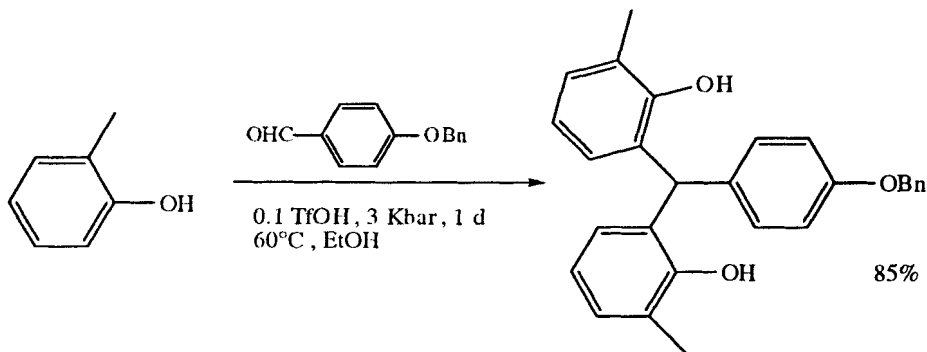
## SECTION 64: ALKYLs, METHYLENES AND ARYLs FROM ALDEHYDES



Gevorgyan, V.; Rubin, M.; Liu, J.-X.; Yamamoto, Y. *J. Org. Chem.*, **2001**, *66*, 1672.



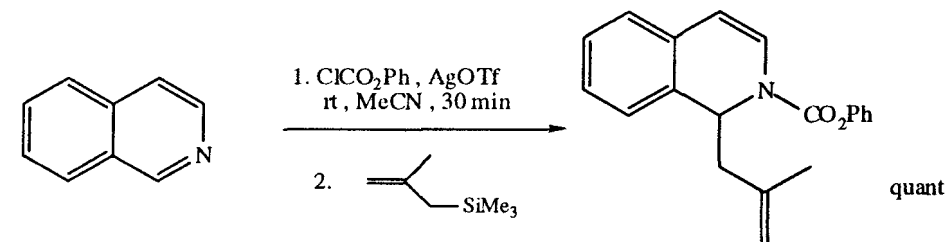
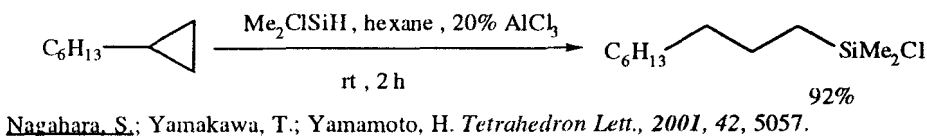
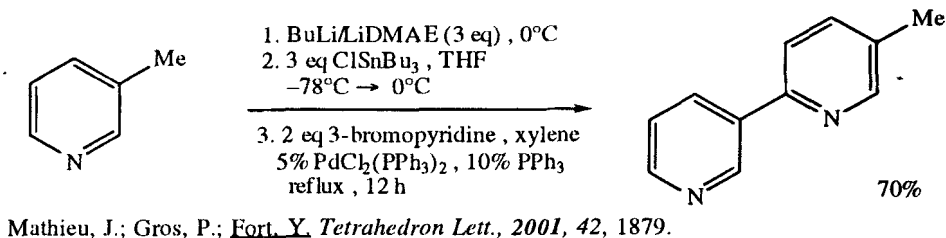
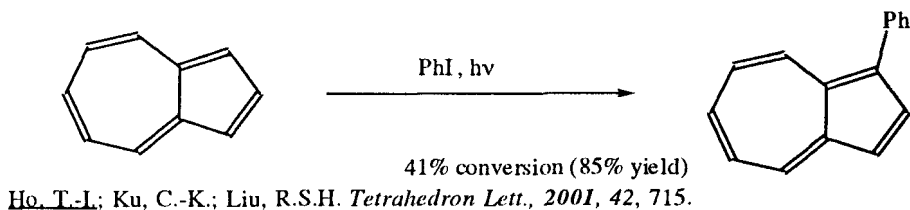
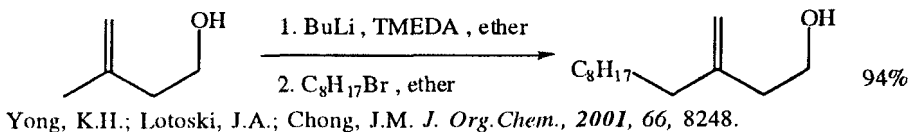
List, B.; Castello, C. *Synlett*, **2001**, 1687.

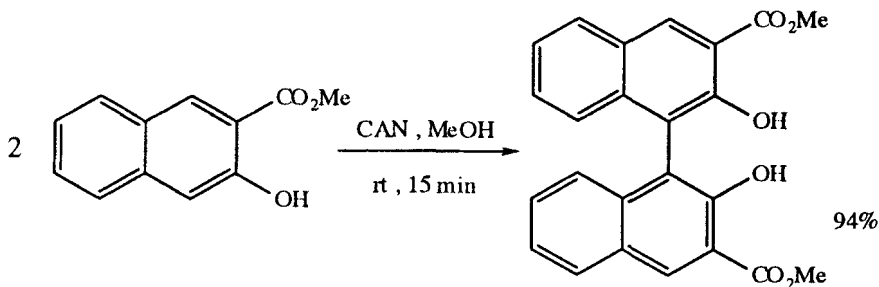


Ohishi, T.; Kojima, T.; Matsuoka, T.; Shiro, M.; Kotsuki, H.  
*Tetrahedron Lett.*, **2001**, *42*, 2493.

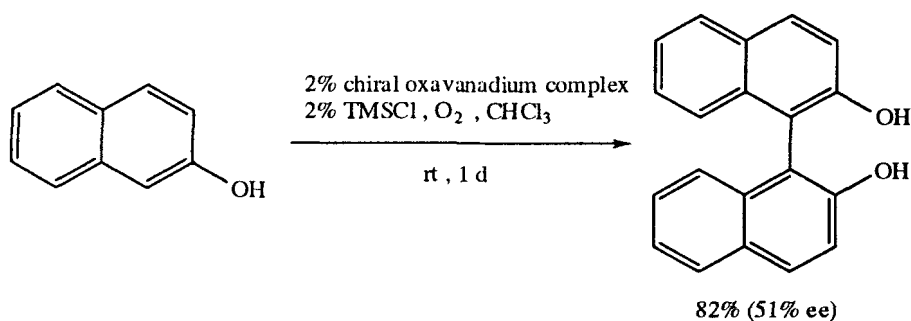
Related Methods: Alkyls, Methylenes and Aryls from Ketones (Section 72)

## SECTION 65: ALKYLs, METHYLENES AND ARYLs FROM ALKYLs, METHYLENES AND ARYLs

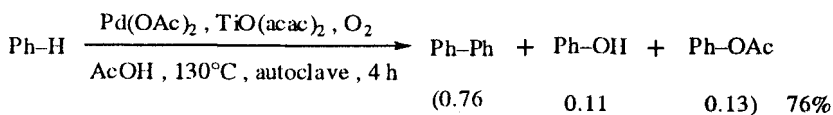




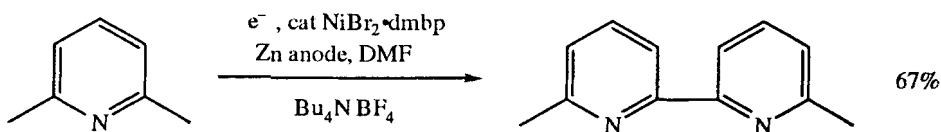
Jiang, P.; Lu, S. *Synth. Commun.*, **2001**, *31*, 131.



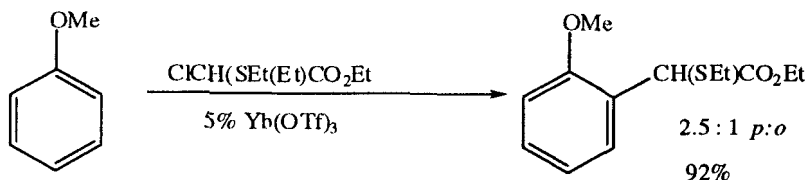
Chu, C.-Y.; Huang, D.-R.; Wang, S.-K.; Uang, B.-I. *Chem. Commun.*, **2001**, 980.



Okamoto, M.; Yamaji, T. *Chem. Lett.*, **2001**, 212.

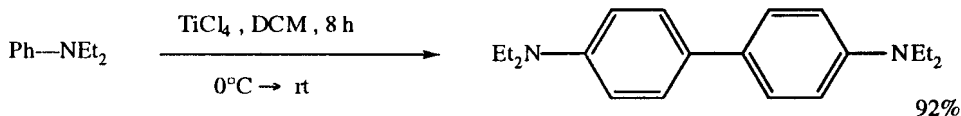


Cassol, T.M.; Demnitz, F.W.J.; Navarro, M.; de. Neves, E.A. *Tetrahedron Lett.*, **2000**, *41*, 8203.

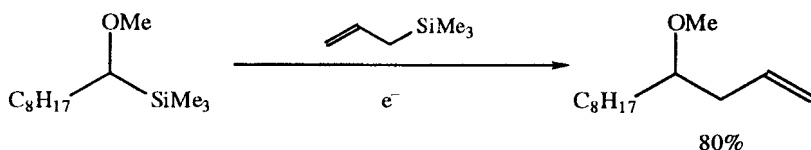


Sinha, S.; Mandal, B.; Chandrasekaran, S. *Tetrahedron Lett.*, **2000**, *41*, 9109.

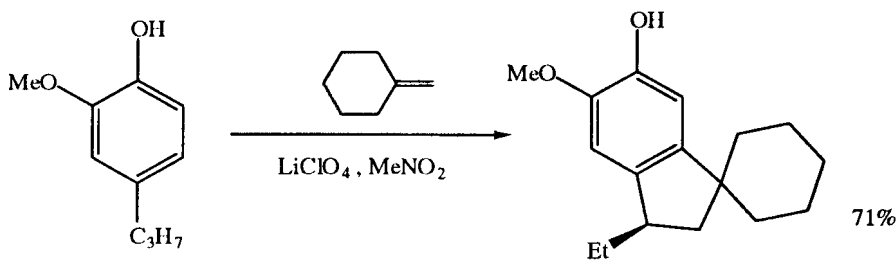




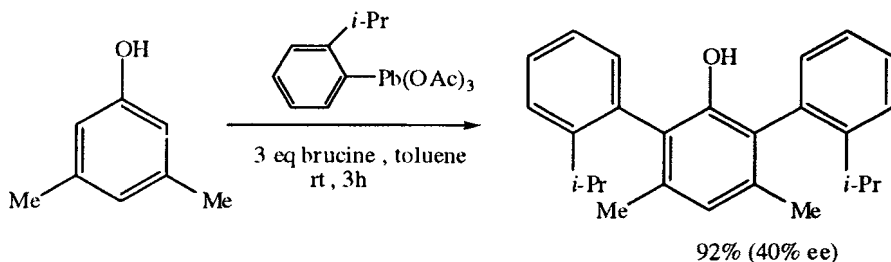
Periasamy, M.; Jayakumar, K.N.; Bharathi, P. *J. Org. Chem.*, **2000**, *65*, 3548.



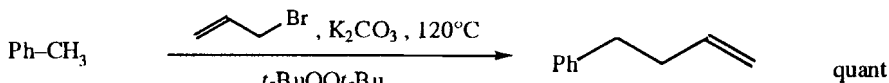
Suga, S.; Suzuki, S.; Yamamoto, A.; Yoshida, J.-i. *J. Am. Chem. Soc.*, **2000**, *122*, 10244.



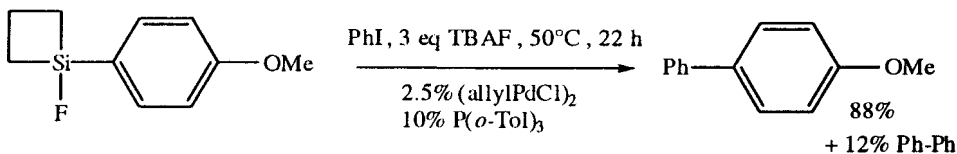
Kim, S.; Kitano, Y.; Tada, M.; Chiba, K. *Tetrahedron Lett.*, **2000**, *41*, 7079.



Sato, S.; Kano, T.; Muto, H.; Nakadai, M.; Yamamoto, H. *J. Am. Chem. Soc.*, **1999**, *121*, 8943.



Tanko, J.M.; Sadeghipour, M. *Angew. Chem. Int. Ed.*, **1999**, *38*, 159.



Denmark, S.E.; Wu, Z. *Org. Lett.* **1999**, *1*, 1495.

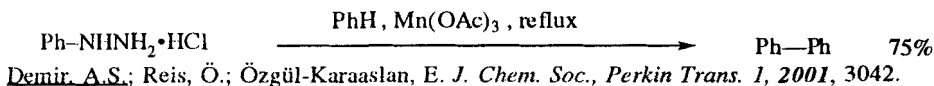
## REVIEWS:

"*cine*- and *tele*-Substitution Reactions," Suwiński, L.; Świerczek, K. *Tetrahedron*, **2001**, *57*, 1639.

## SECTION 66: ALKYLs, METHYLENES AND ARYLs FROM AMIDES

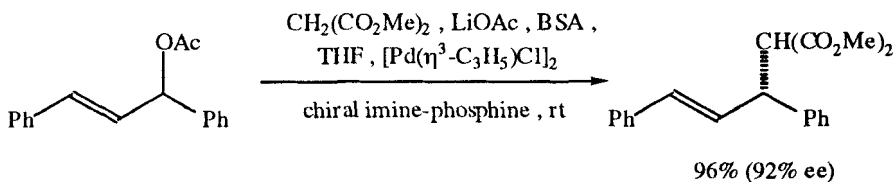
NO ADDITIONAL EXAMPLES

## SECTION 67: ALKYLs, METHYLENES AND ARYLs FROM AMINES

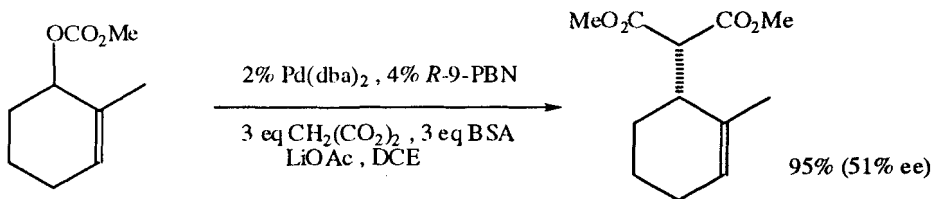


## SECTION 68: ALKYLs, METHYLENES AND ARYLs FROM ESTERS

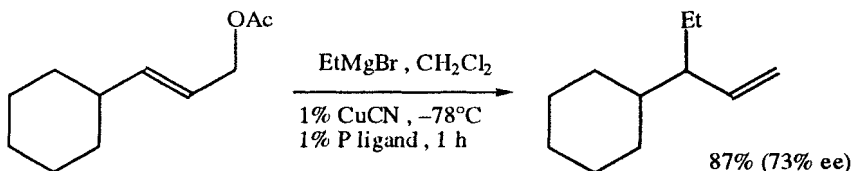
## ASYMMETRIC CONVERSIONS



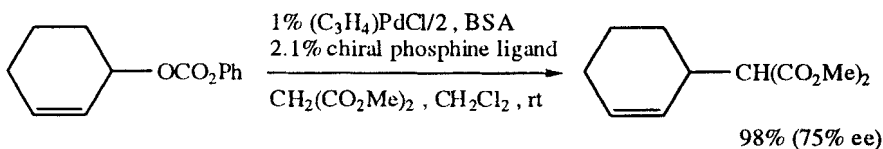
Mino, T.; Shiotsuki, M.; Yamamoto, N.; Suenag, T.; Sakamoto, M.; Fujita, T.; Yamashita, M. *J. Org. Chem.*, **2001**, *66*, 1795.



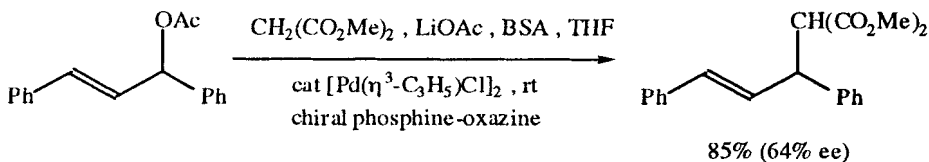
Hamada, Y.; Sakaguchi, K.-e.; Hatano, K.; Hara, O. *Tetrahedron Lett.*, **2001**, *42*, 1297.



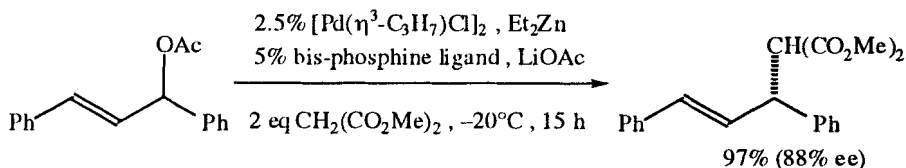
Alexakis, A.; Malan, C.; Lea, L.; Benhaim, C.; Fournioux, X. *Synlett*, **2001**, 927.



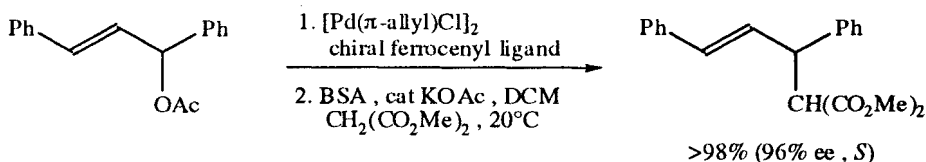
Ito, K.; Kashiwagi, R.; Hayashi, S.; Uchida, T.; Katsuki, T. *Synlett*, **2001**, 284.



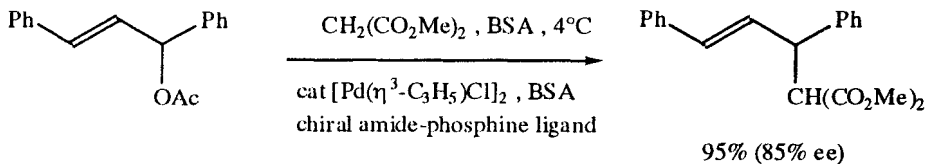
Mino, T.; Hata, S.; Ohtaka, K.; Sakamoto, M.; Fujita, T. *Tetrahedron Lett.*, **2001**, 42, 4837.



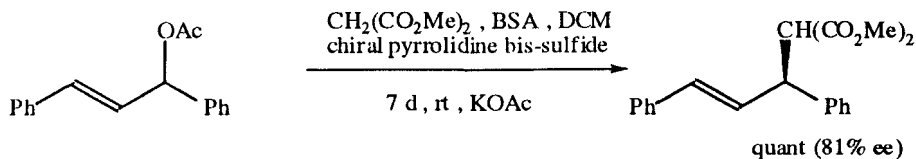
Naik, S.; Gopinath, R.; Patel, B.K. *Tetrahedron Lett.*, **2001**, 42, 7679.



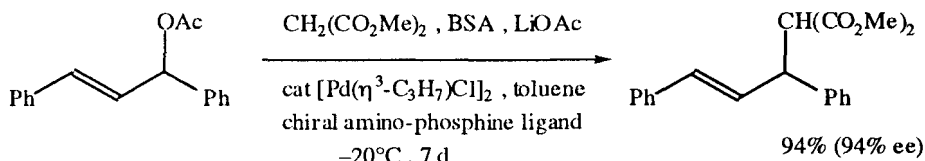
Kang, J.; Lee, J.H.; Choi, J.S. *Tetrahedron Asymm.*, **2001**, 12, 33.



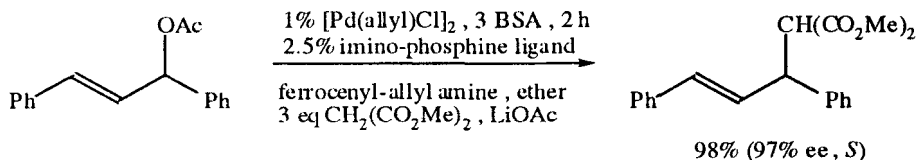
Mino, T.; Kashiwara, K.; Yamashita, M. *Tetrahedron Asymm.*, **2001**, 12, 287.



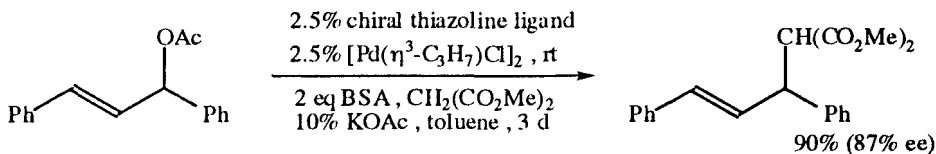
Jansat, S.; Gómez, M.; Muller, G.; Diéguez, M.; Aghmiz, A.; Claver, C.; Masdeu-Bultó, A.M.; Flores-Santos, L.; Martín, E.; Maestro, M.A.; Mahía, J. *Tetrahedron Asymm.*, **2001**, *12*, 1469.



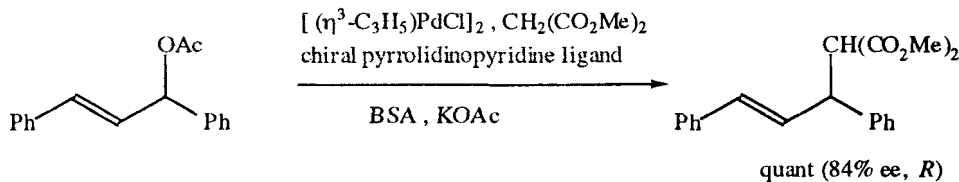
Mino, T.; Tanaka, Y.; Sakamoto, M.; Fujita, T. *Tetrahedron Asymm.*, **2001**, *12*, 2435.



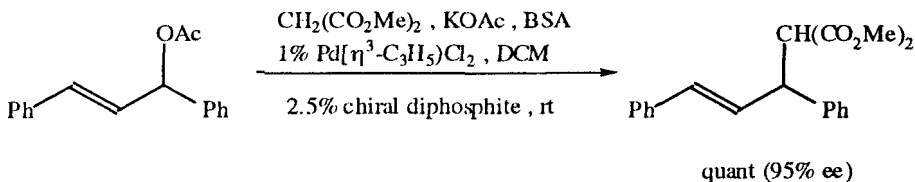
Fukuda, T.; Takehara, A.; Iwao, M. *Tetrahedron Asymm.*, **2001**, *12*, 2793.



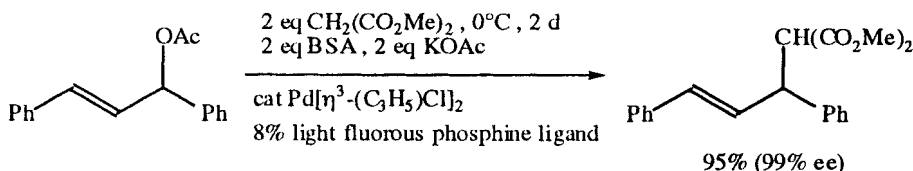
Abrunhosa, I.; Gulea, M.; Levillain, J.; Masson, S. *Tetrahedron Asymm.*, **2001**, *12*, 2851.



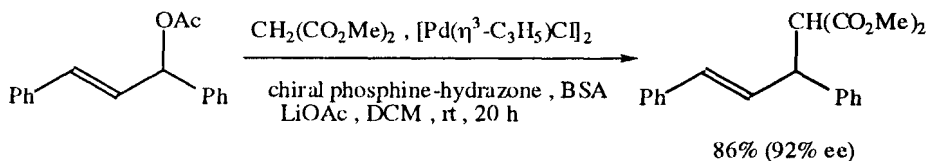
Stranne, R.; Moberg, C. *Eur. J. Org. Chem.*, **2001**, 2191.



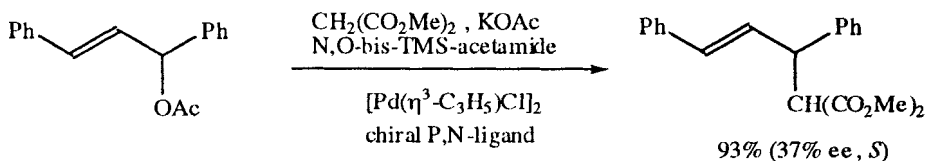
Diéguez, M.; Jansat, S.; Gómez, M.; Ruiz, A.; Muller, G.; Claver, C. *Chem. Commun.*, **2001**, 1132.



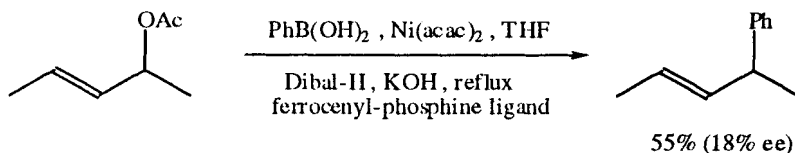
Cavazzini, M.; Pozzi, G.; Quici, S.; Maillard, D.; Sinou, D. *Chem. Commun.*, **2001**, 1220.



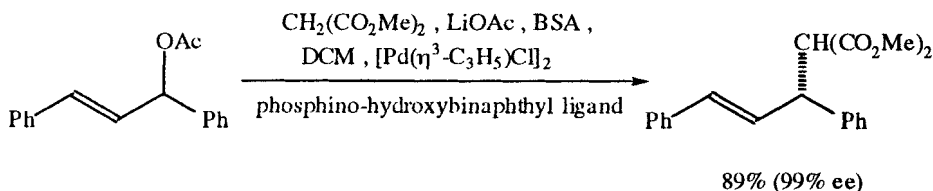
Mino, T.; Ogawa, T.; Yamashita, M. *Heterocycles*, **2001**, *55*, 453.



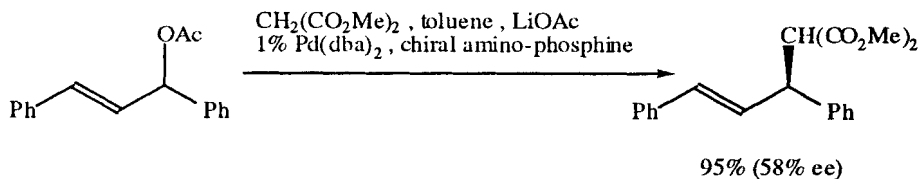
Arena, C.G.; Drommi, D.; Faraone, F. *Tetrahedron Asymm.*, **2000**, *11*, 4753.



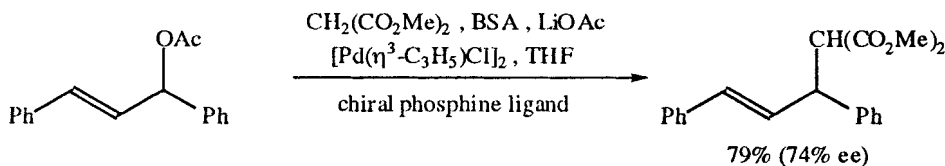
Chung, K.-G.; Miyake, Y.; Yemura, S. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 15.



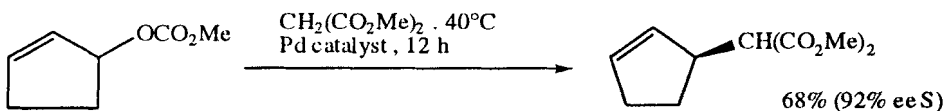
Kodama, H.; Taiji, T.; Ohta, T.; Furukawa, I. *Tetrahedron Asymm.*, **2000**, *11*, 4009.



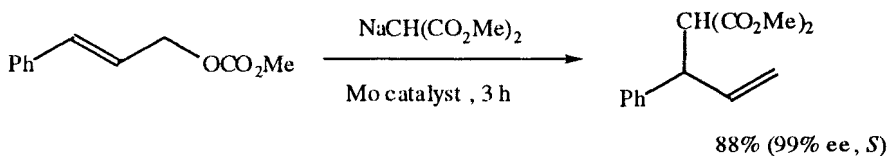
Gong, L.; Chen, G.; Mi, A.; Jiang, Y.; Fu, F.; Cui, X.; Char, A.S.C. *Tetrahedron Asymm.*, **2000**, *11*, 4297.



Mino, T.; Tanaka, Y.; Sakamoto, M.; Fujita, T. *Heterocycles*, **2000**, *53*, 1485.

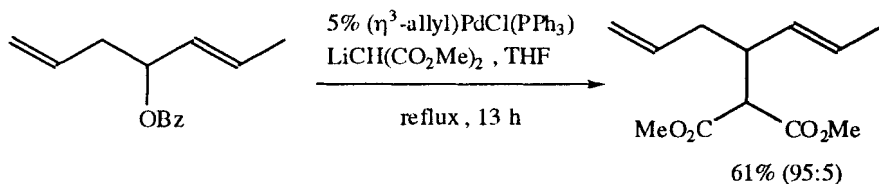


Uozumi, Y.; Shibatomi, K. *J. Am. Chem. Soc.*, **2001**, *123*, 2919.

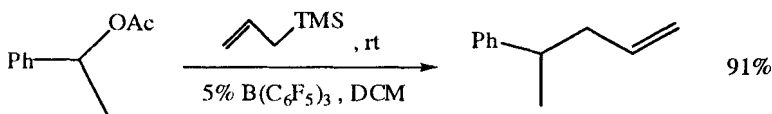


Malkov, A.V.; Spoor, P.; Vinader, V.; Kočvský, P. *Tetrahedron Lett.*, **2001**, *42*, 509.

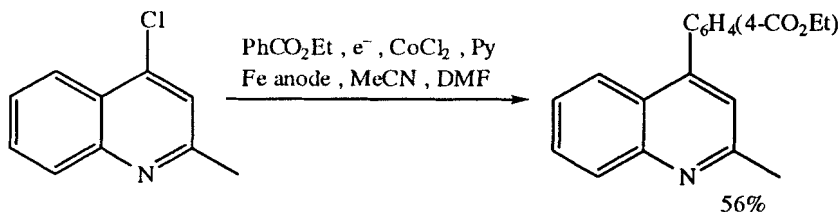
### NON-ASYMMETRIC CONVERSIONS



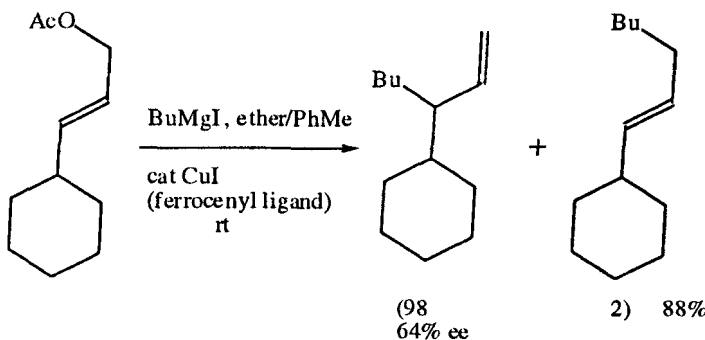
Krafft, M.E.; Sugiura, M.; Abboud, K.A. *J. Am. Chem. Soc.*, **2001**, *123*, 9174.



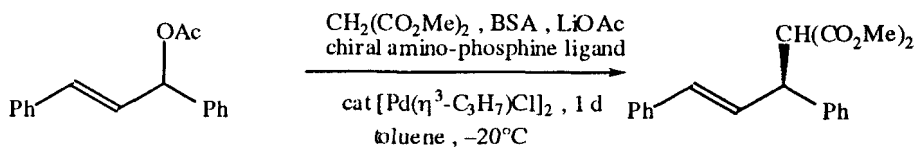
Rubin, M.; Gevorgyan, V. *Org. Lett.* **2001**, *3*, 2705.



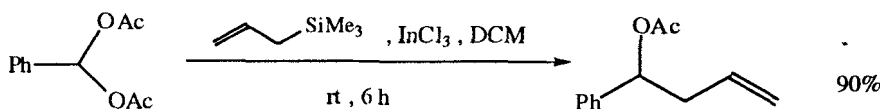
Le Gall, E.; Gosmini, C.; Nédélec, J.-Y.; Périchon, J. *Tetrahedron Lett.*, **2001**, *42*, 267.



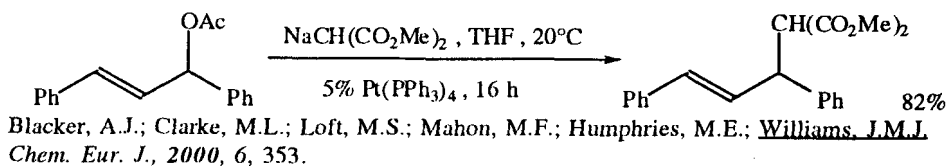
Karlström, A.S.E.; Huerta, F.F.; Muezelaar, G.J.; Bäckvall, J.-E. *Synlett*, **2001**, 923.



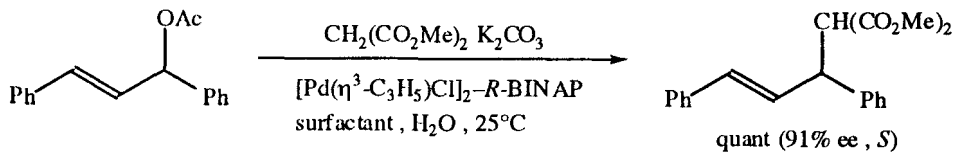
Mino, T.; Tanaka, Y.-i.; Akita, K.; Anada, K.; Sakamoto, M.; Fujita, T. *Tetrahedron Asymm.*, **2001**, 12, 1677.



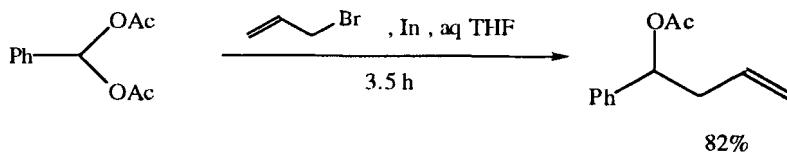
Yadav, J.S.; Reddy, B.V.S.; Madhur, Ch.; Sabitha, G. *Chem. Lett.*, **2001**, 18.



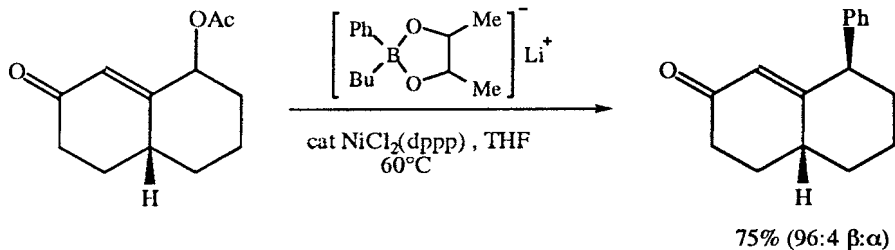
Blacker, A.J.; Clarke, M.L.; Loft, M.S.; Mahon, M.F.; Humphries, M.E.; Williams, J.M.J. *Chem. Eur. J.*, **2000**, 6, 353.



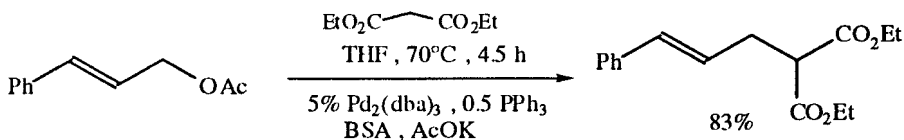
Rabeyrin, C.; Nguefack, C.; Sinou, D. *Tetrahedron Lett.*, **2000**, 41, 7461.



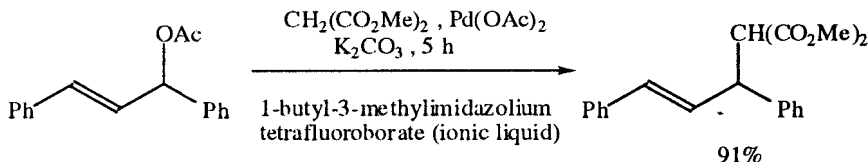
Yadav, J.S.; Reddy, B.V.S.; Reddy, G.S.K.K. *Tetrahedron Lett.*, **2000**, 41, 2695.



Kobayashi, Y.; Ito, M. *Eur. J. Org. Chem.*, **2000**, 3393.



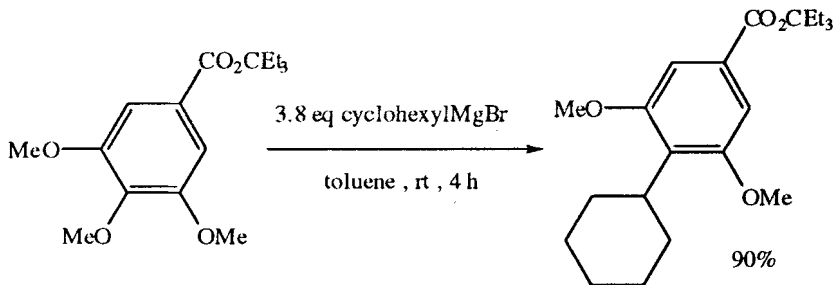
Poli, G.; Giambastiani, G.; Mordini, A. *J. Org. Chem.*, **1999**, 64, 2962.



Chen, W.; Xu, L.; Chatterton, C.; Xiao, J. *Chem. Commun.*, **1999**, 1247.

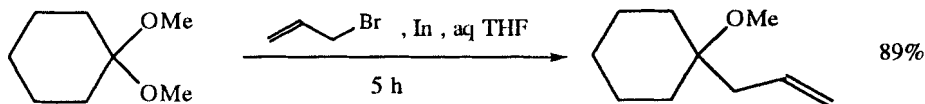
## SECTION 69: ALKYL, METHYLENES AND ARYL FROM ETHERS, EPOXIDES AND THIOETHERS

The conversion  $\text{ROR} \rightarrow \text{RR}'$  ( $\text{R}' = \text{alkyl, aryl}$ ) is included in this section.

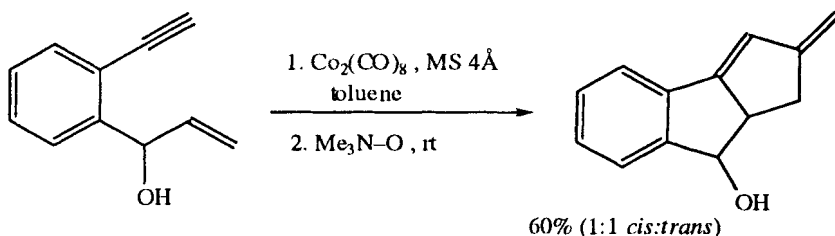


Kojima, T.; Ohishi, T.; Yamamoto, I.; Matsuoka, T.; Kotsuki, H.  
*Tetrahedron Lett.*, **2001**, 42, 1709.

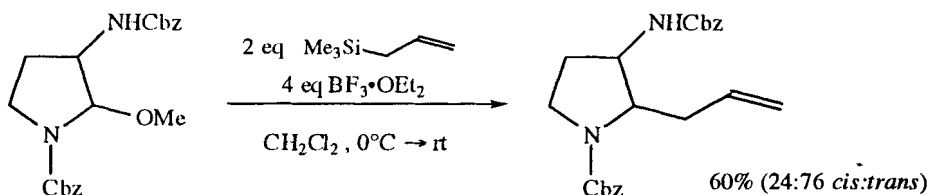




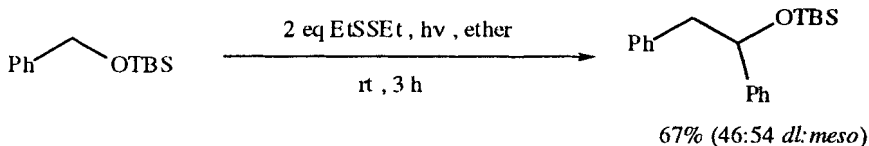
Kwon, J.S.; Pae, A.N.; Choi, K.I.; Koh, H.Y.; Kim, Y.; Cho, Y.S. *Tetrahedron Lett.*, **2001**, *42*, 1957.



Kajikawa, S.; Nishino, H.; Kurosawa, K. *Tetrahedron Lett.*, **2001**, *42*, 3351.



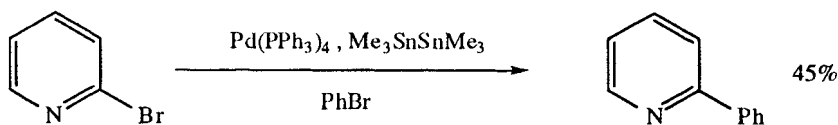
Matos, M.R.P.N.; Afonso, C.A.M.; Batey, R.A. *Tetrahedron Lett.*, **2001**, *42*, 7007.



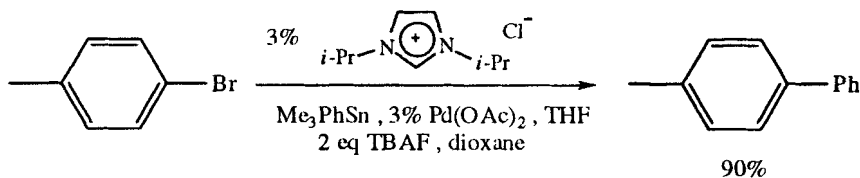
Fujisawa, H.; Hayakawa, Y.; Sasaki, Y.; Mukaiyama, T. *Chem. Lett.*, **2001**, 632.

## SECTION 70: ALKYL, METHYLENES AND ARYL FROM HALIDES AND SULFONATES

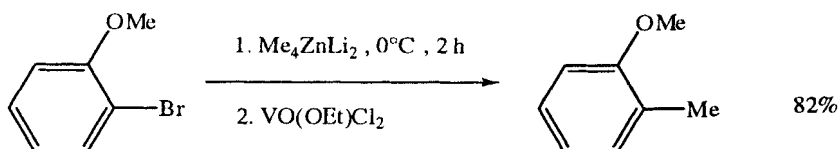
The replacement of halogen by alkyl or aryl groups is included in this section. For the conversion of  $\text{RX} \rightarrow \text{RH}$  ( $\text{X} = \text{halogen}$ ) see Section 160 (Hydrides from Halides and Sulfonates).



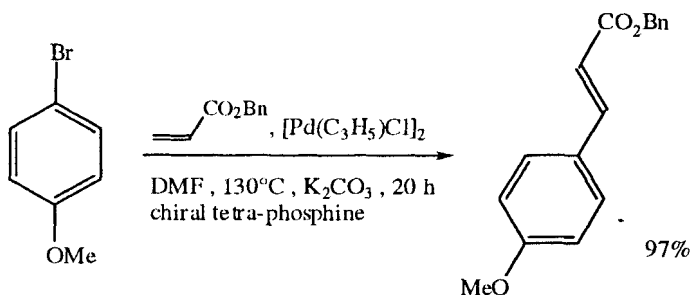
Zhang, N.; Thomas, L.; Wu, B. *J. Org. Chem.*, **2001**, *66*, 1500.



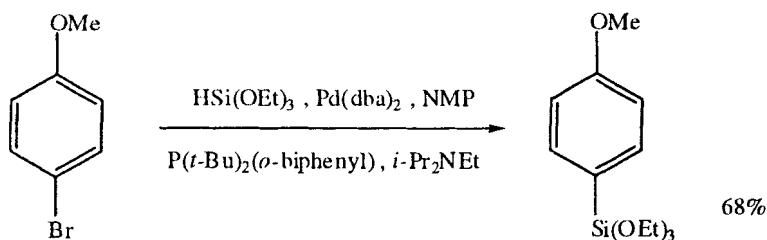
Grasa, G.A.; Nolan, S.P. *Org. Lett.*, **2001**, 3, 119.



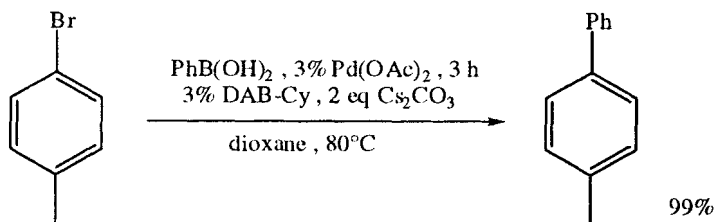
Takada, T.; Sakurai, H.; Hirao, T. *J. Org. Chem.*, **2001**, 66, 300.



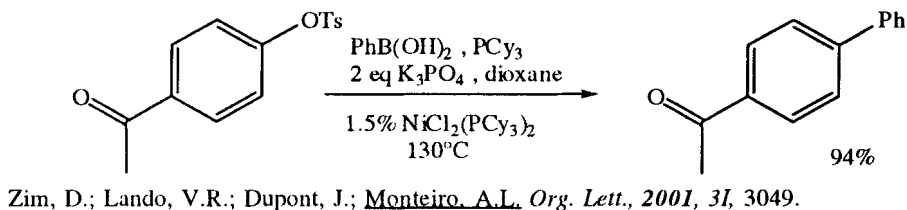
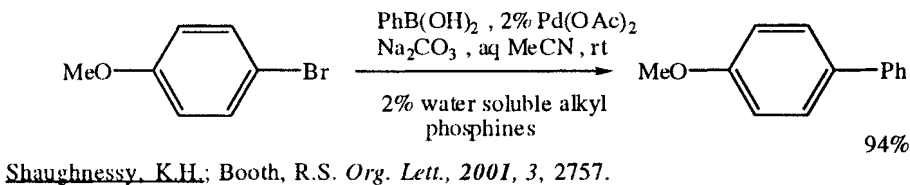
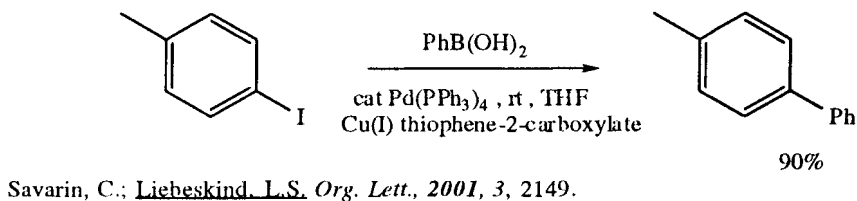
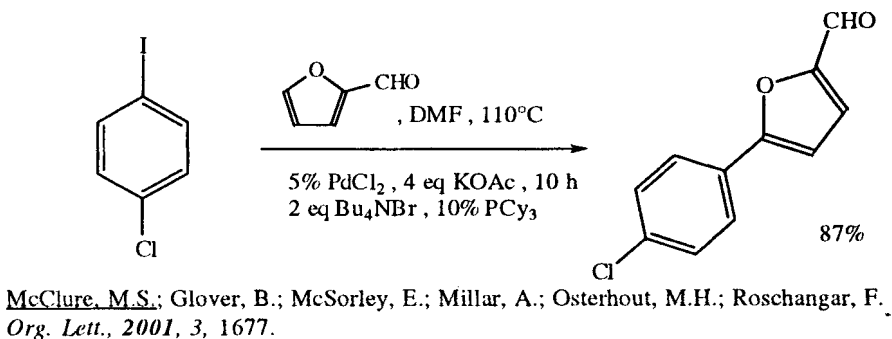
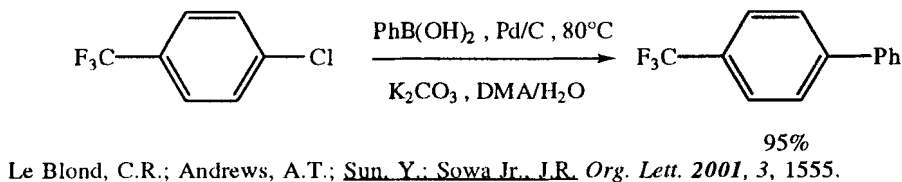
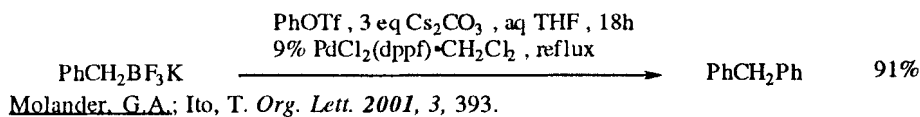
Feuerstein, M.; Doucet, H.; Santelli, M. *J. Org. Chem.*, **2001**, 66, 5923.

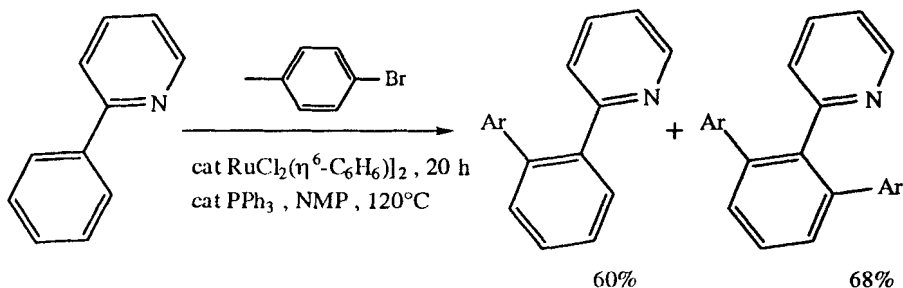


Manoso, A.S.; DeShong, P. *J. Org. Chem.*, **2001**, 66, 7449.

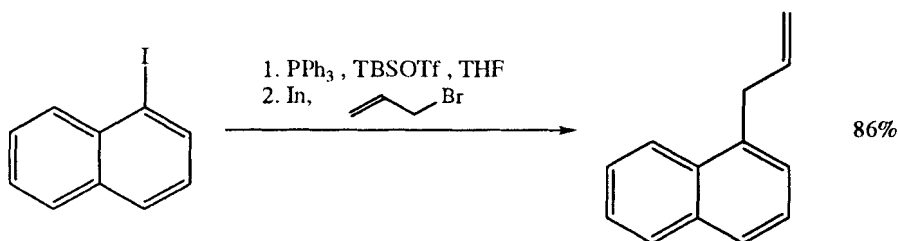


Grasa, G.A.; Hillier, A.C.; Nolan, S.P. *Org. Lett.* **2001**, 2, 1077.

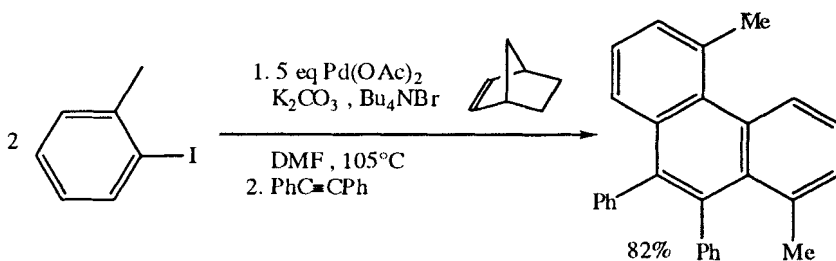




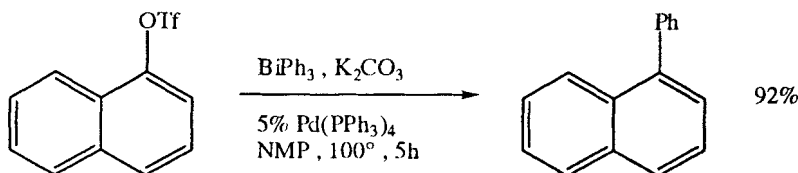
Qi, S.; Fukita, S.; Hirata, N.; Watanuki, N.; Miyano, S.; Inoue, Y. *Org. Lett.*, **2001**, 3, 2579.



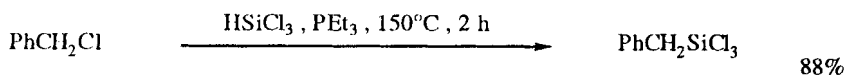
Lee, P.H.; Sung, S.-y.; Lee, K. *Org. Lett.*, **2001**, 3, 3201.



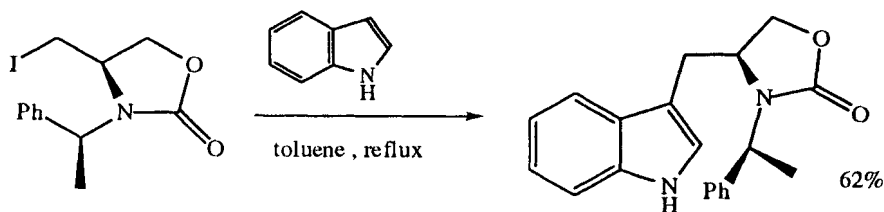
Catellani, M.; Motti, E.; Baratta, S. *Org. Lett.*, **2001**, 3, 3611.



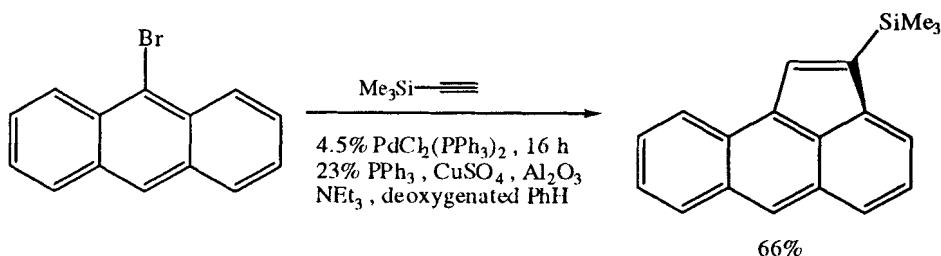
Rao, M.L.N.; Tamazaki, I.; Shimada, S.; Tanaka, T.; Suzuki, Y.; Tanaka, M. *Org. Lett.*, **2001**, 3, 4103.



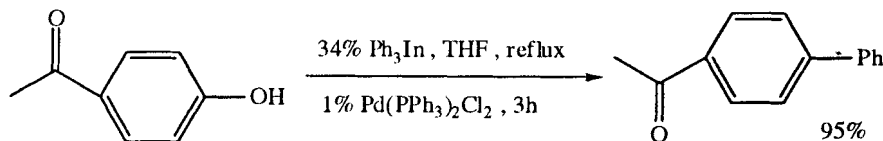
Cho, Y.S.; Kang, S.-H.; Han, J.-S.; Yoo, B.R.; Jung, I.N. *J. Am. Chem. Soc.*, **2001**, 123, 5584.



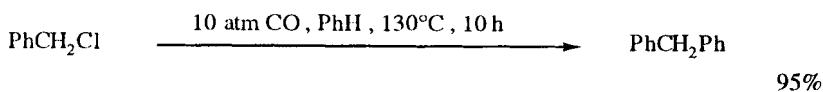
Pyun, D.K.; Lee, C.H.; Ha, H.-J.; Park, C.S.; Chang, J.-W.; Lee, W.K.  
*Org. Lett.*, **2001**, 3, 4205.



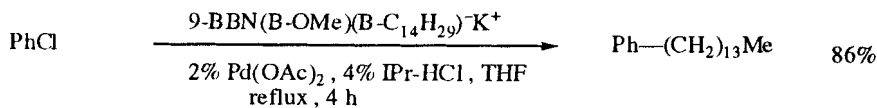
Dang, H.; Garcia-Garibay, M.A. *J. Am. Chem. Soc.*, **2001**, 123, 355.



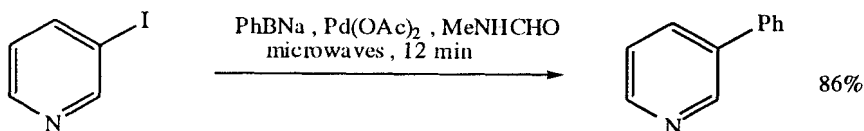
Pérez, I.; Sestelo, J.P.; Sarandeses, L.A. *J. Am. Chem. Soc.*, **2001**, 123, 4155.



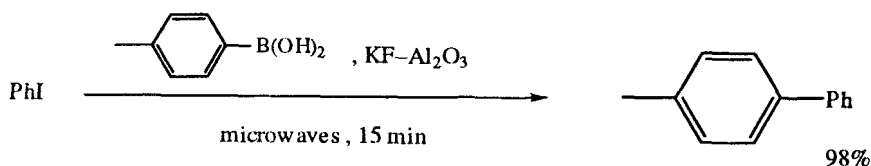
Ogoshi, S.; Nakashima, H.; Shimonaka, K.; Kurosawa, H.  
*J. Am. Chem. Soc.*, **2001**, 123, 8626.



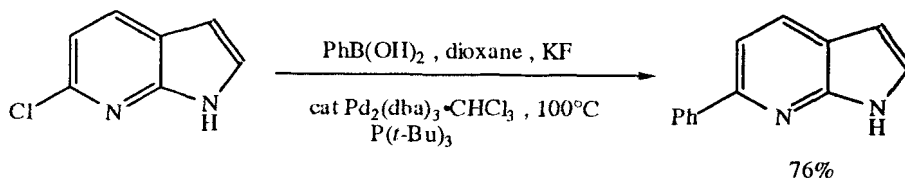
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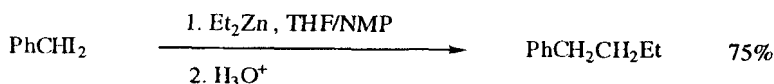
Villemin, D.; Gómez-Escalonilla, M.J.; Saint-Clair, J.-F. *Tetrahedron Lett.*, **2001**, 42, 635.



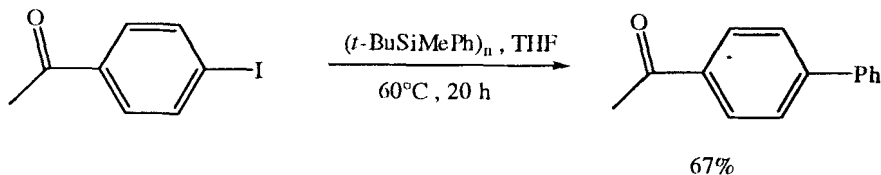
Villemin, D.; Caillot, F. *Tetrahedron Lett.*, **2001**, 42, 639.



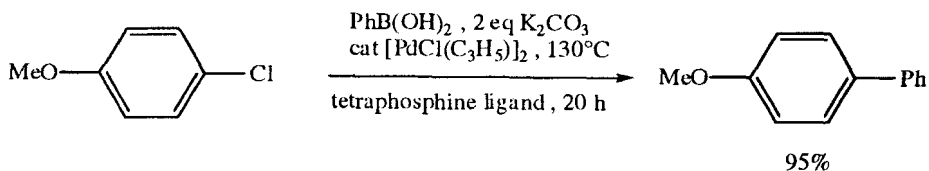
Allegretti, M.; Arcadi, A.; Marinelli, F.; Nicolini, L. *Synlett*, **2001**, 609.



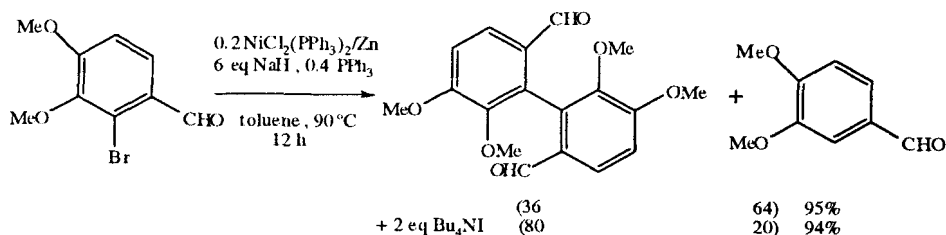
Shibli, A.; Varghese, J.P.; Knochel, P.; Marek, I. *Synlett*, **2001**, 818.



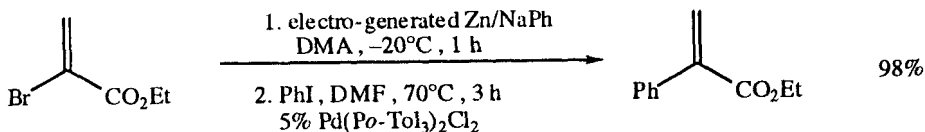
Mori, A.; Suguro, M. *Synlett*, **2001**, 845.



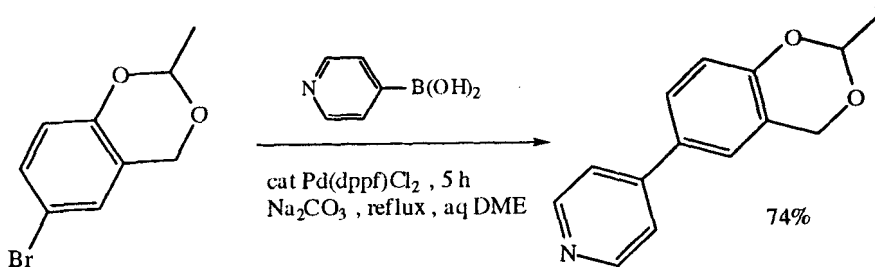
Feuerstein, M.; Doucet, H.; Santelli, M. *Synlett*, **2001**, 1458.



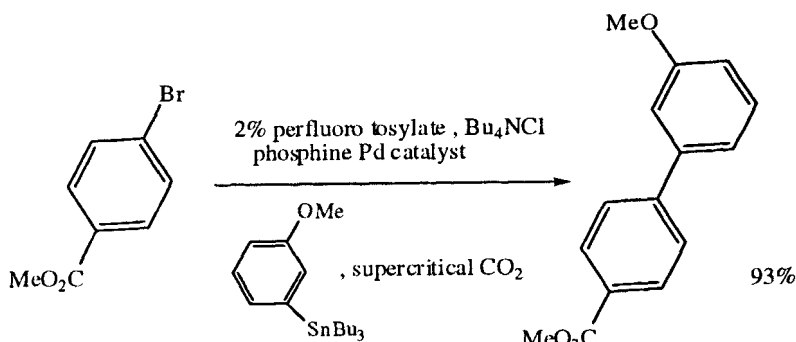
Hong, R.; Hoen, R.; Zhang, J.; Lin, G.-q. *Synlett*, **2001**, 1527.



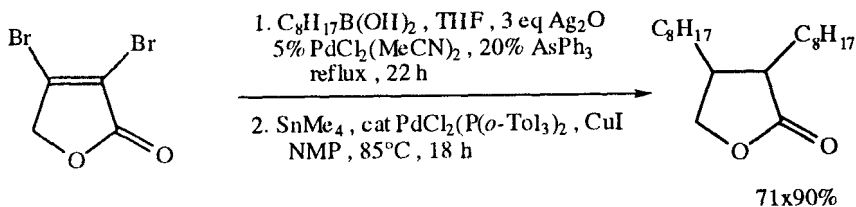
Jalil, A.A.; Kurono, N.; Tokuda, M. *Synlett*, 2001, 1944.



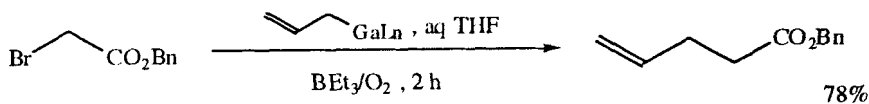
Morris, G.A.; Nguyen, S.T. *Tetrahedron Lett.*, 2001, 42, 2093.



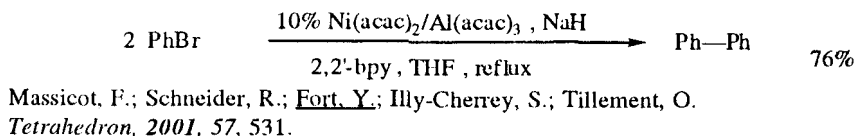
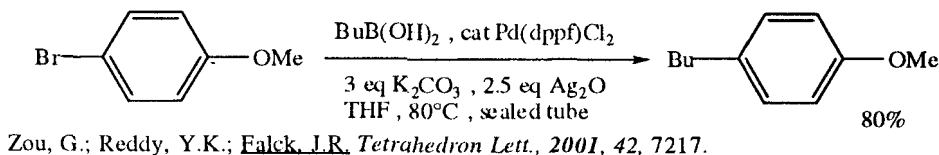
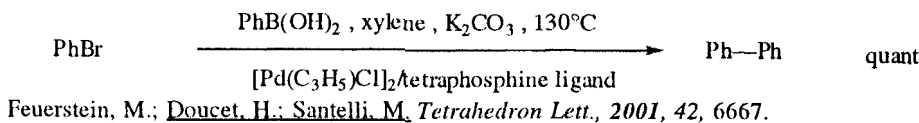
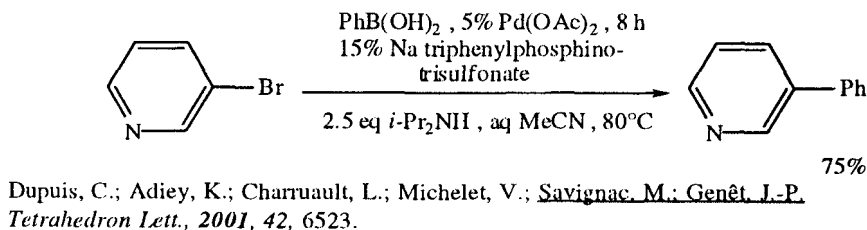
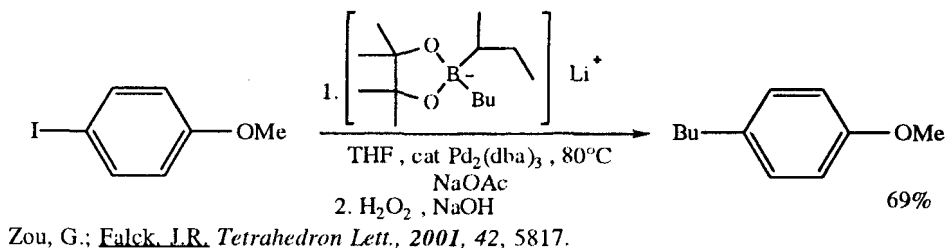
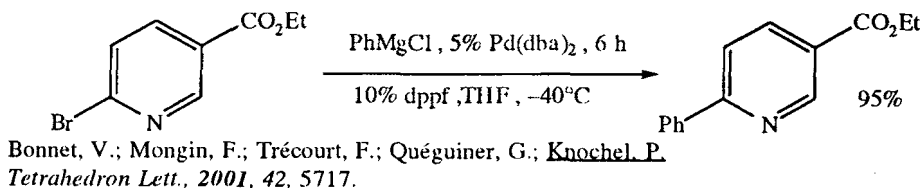
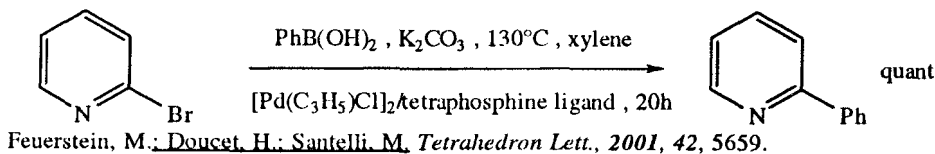
Osswald, T.; Schneider, S.; Wang, S.; Bannwarth, W. *Tetrahedron Lett.*, 2001, 42, 2965.



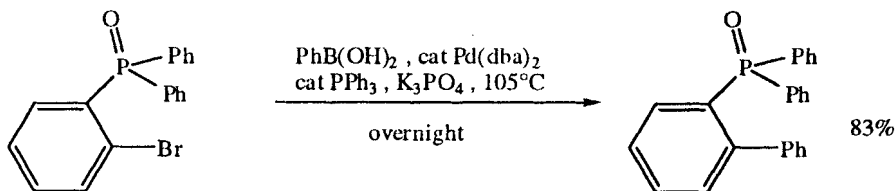
Bellina, F.; Anselmi, C.; Rossi, R. *Tetrahedron Lett.*, 2001, 42, 3851.



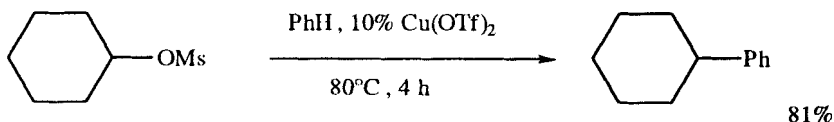
Usugi, S.-i.; Yoromitsu, H.; Oshima, K. *Tetrahedron Lett.*, 2001, 42, 4535.



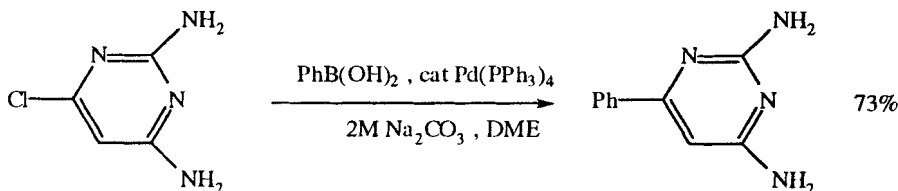




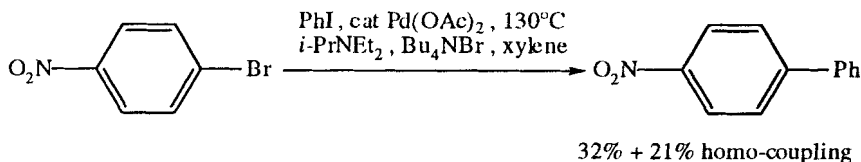
Baillie, C.; Chen, W.; Xiao, J. *Tetrahedron Lett.*, **2001**, 42, 9085.



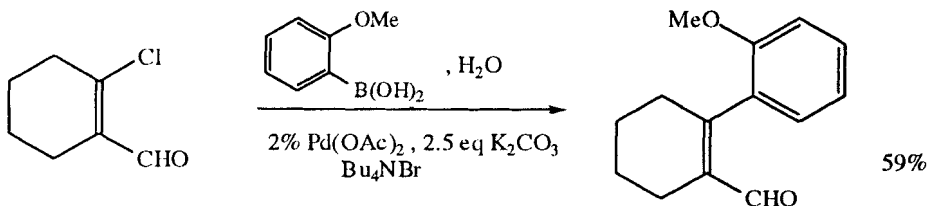
Singh, R.P.; Kamble, R.M.; Chandra, K.L.; Saravanan, P.; Singh, V.K. *Tetrahedron*, **2001**, 57, 241.



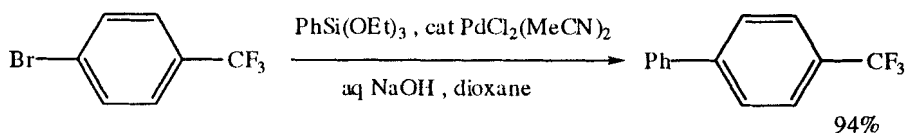
Cooke, G.; de Cremiers, H.A.; Rotello, V.M.; Tarbit, B.; Vanderstraeten, P.E. *Tetrahedron*, **2001**, 57, 2787.



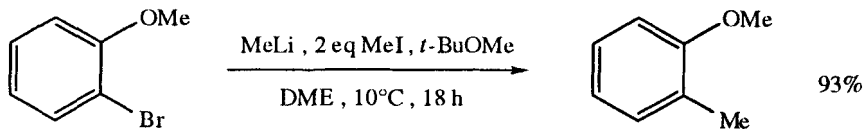
Hassan, J.; Hathroubi, C.; Gozzi, C.; Lemaire, M. *Tetrahedron*, **2001**, 57, 7845.



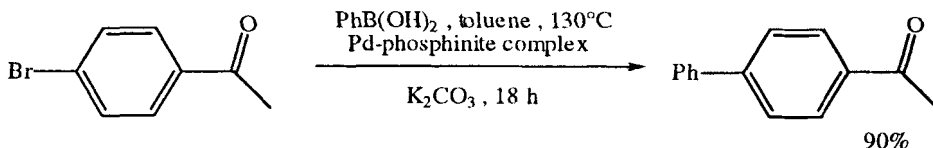
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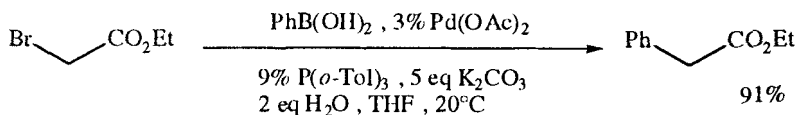
Murata, M.; Shimazaki, R.; Watanabe, S.; Masuda, Y. *Synthesis*, **2001**, 2231.



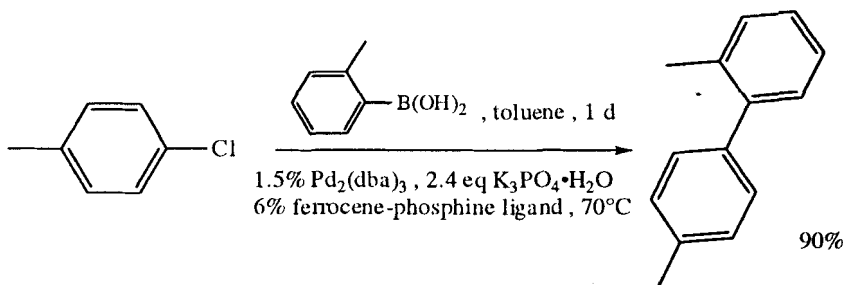
Andrews, I.P.; Kitteringham, J.; Vogle, M. *Synth. Commun.*, **2001**, *31*, 2323.



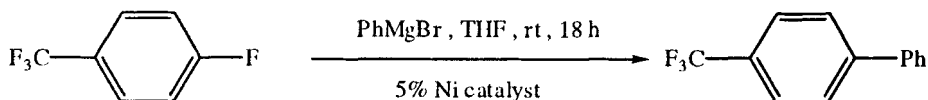
Bedford, R.B.; Welch, S.L. *Chem. Commun.*, **2001**, 129.



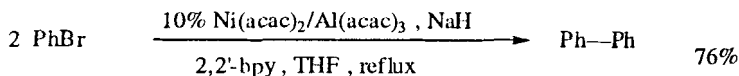
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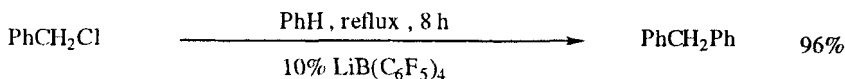
Liu, S.-Y.; Choi, M.J.; Fu, G.C. *Chem. Commun.*, **2001**, 2408.



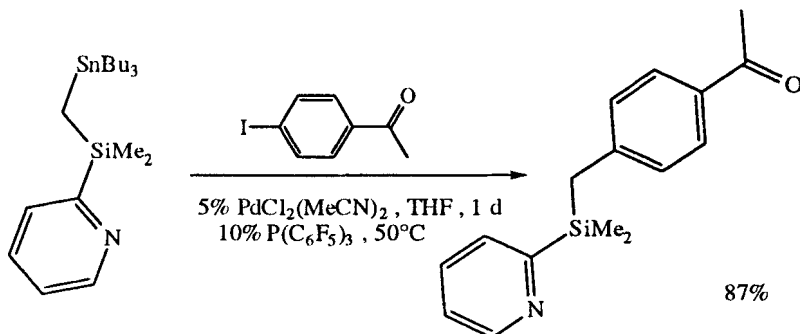
Böhm, V.P.W.; Gstöttmayr, C.W.K.; Weskamp, T.; Hermann, W.A. *Angew. Chem. Int. Ed.*, **2001**, *40*, 3387.



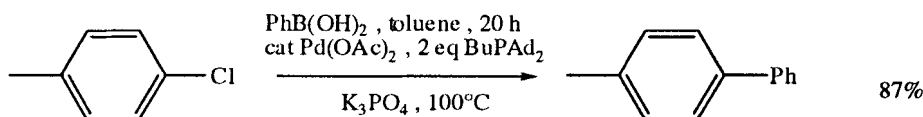
Massicot, F.; Schneider, R.; Fort, Y.; Illy-Cherrey, S.; Tillement, O. *Tetrahedron*, **2001**, *57*, 531.



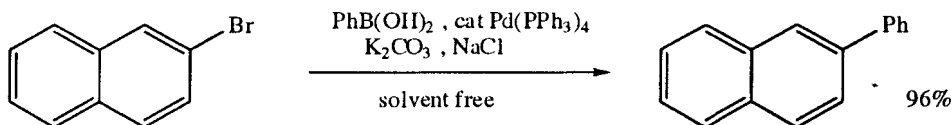
Mukaiyama, T.; Nakano, M.; Kikuchi, W.; Matsuo, J.-i. *Chem. Lett.*, **2000**, 1010.



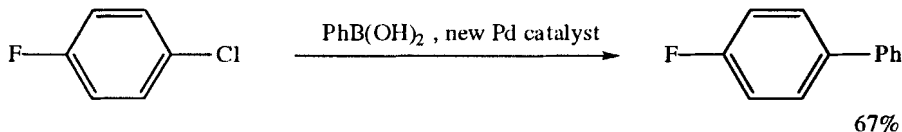
Itami, K.; Kamei, T.; Yoshida, J.-i. *J. Am. Chem. Soc.*, **2001**, *123*, 8773.



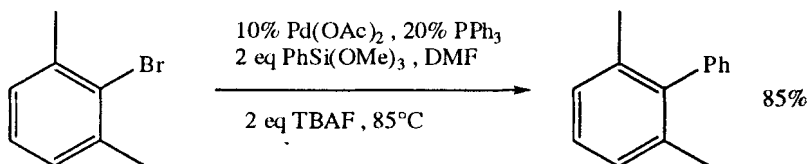
Zapf, A.; Ehrentraut, A.; Beller, M. *Angew. Chem. Int. Ed.*, **2000**, *39*, 4153.



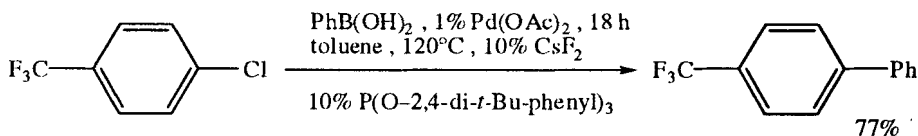
Nielsen, S.F.; Peters, D.; Axelsson, O. *Synth. Commun.*, **2000**, *30*, 3501.



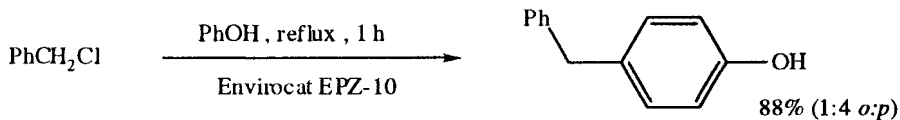
Andreu, M.G.; Zapf, A.; Beller, M. *Chem. Commun.*, **2000**, 2475.



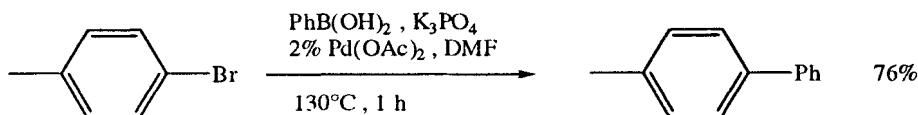
DeShong, P.; Handy, C.J.; Mowery, M.E. *Pure Appl. Chem.*, **2000**, *72*, 1655.



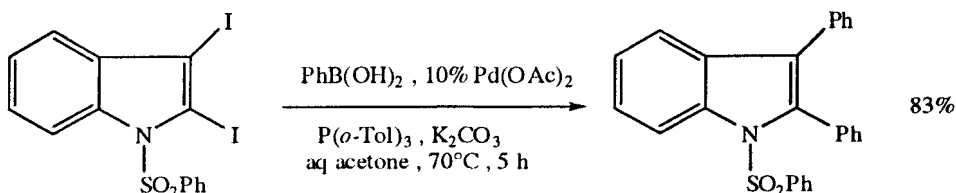
Zapf, A.; Beller, M. *Chem. Eur. J.*, **2000**, *6*, 1830.



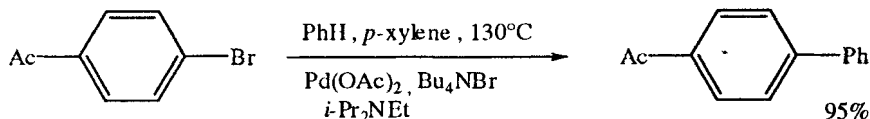
Bandgar, B.P.; Kasture, S.P. *Monat. Chem.*, **2000**, *131*, 913.



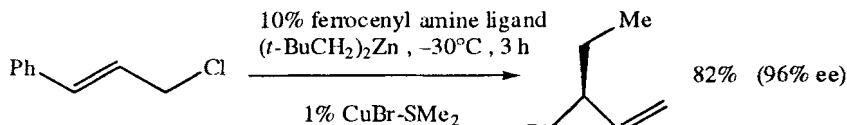
Zim, D.; Monteiro, A.L.; Dupont, J. *Tetrahedron Lett.*, **2000**, *41*, 8199.



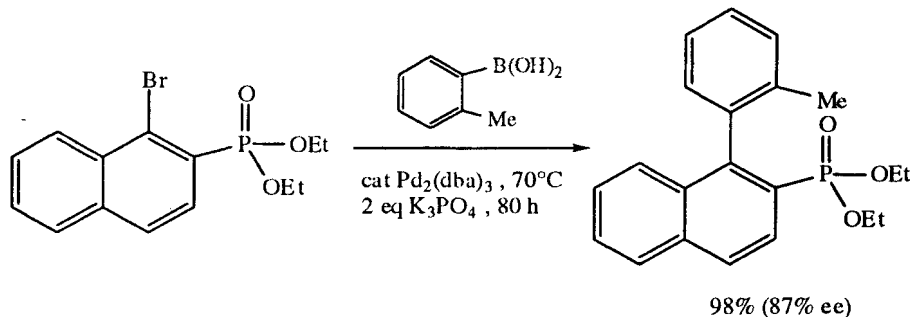
Liu, Y.; Gribble, G.W. *Tetrahedron Lett.*, **2000**, *41*, 8717.



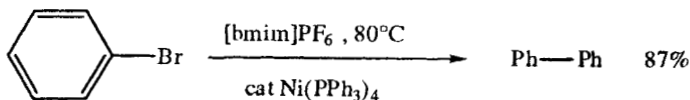
Hassan, J.; Hathroubi, C.; Gozzi, C.; Lemaire, M. *Tetrahedron Lett.*, **2000**, *41*, 8791.



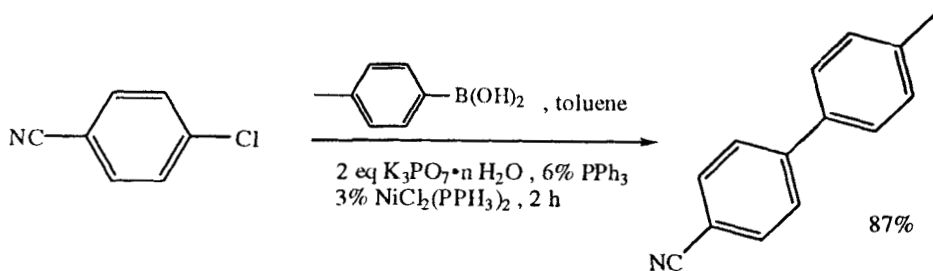
Okano, K.; Murata, K.; Ikariya, T. *Tetrahedron Lett.*, **2000**, *41*, 9277.



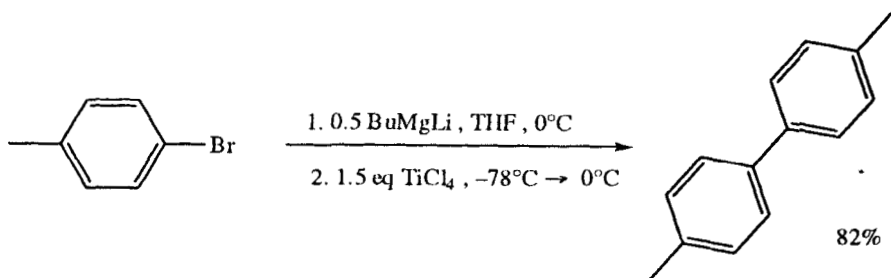
Yin, J.; Buchwald, S.L. *J. Am. Chem. Soc.*, **2000**, *122*, 12051.



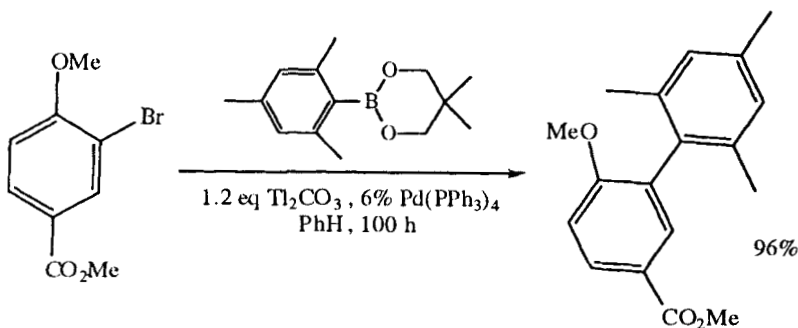
Howarth, J.; James, P.; Dai, J. *Tetrahedron Lett.*, 2000, 41, 10319.



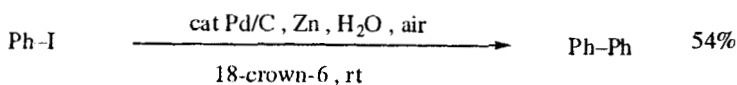
Inada, K.; Miyaura, N. *Tetrahedron*, 2000, 56, 8657, 8661.



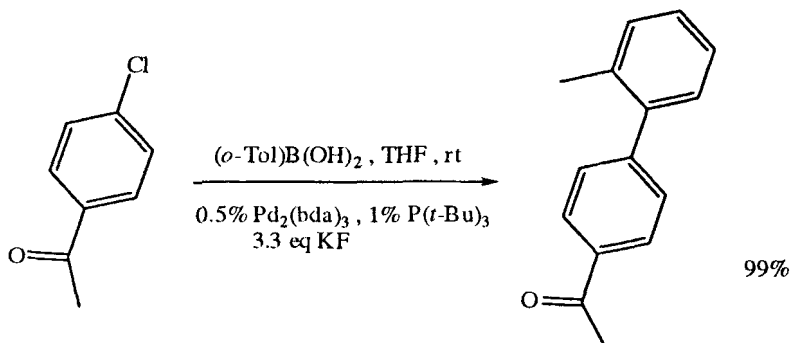
Inoue, A.; Kitagawa, K.; Shinokubo, H.; Oshima, K. *Tetrahedron*, 2000, 56, 9601.



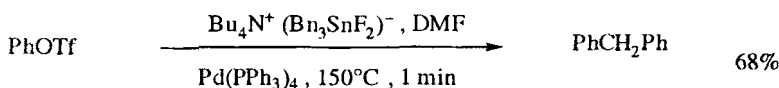
Chaumeil, H.; Signorella, S.; Le Drian, C. *Tetrahedron*, 2000, 56, 9655.



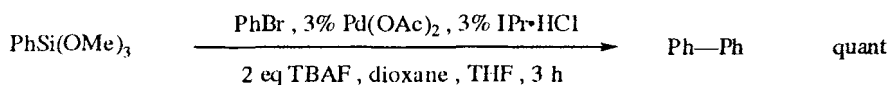
Venkatraman, S.; Li, C.-J. *Tetrahedron Lett.*, 2000, 41, 4831.



Littke, A.F.; Dai, C.; Fu, G.C. *J. Am. Chem. Soc.*, **2000**, *122*, 4020.

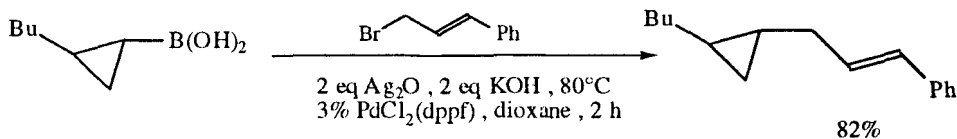


Martínez, A.G.; Barcinia, J.O.; Heras, Md.R.C.; Cerezo, A.d.F. *Org. Lett.*, **2000**, *2*, 1377.

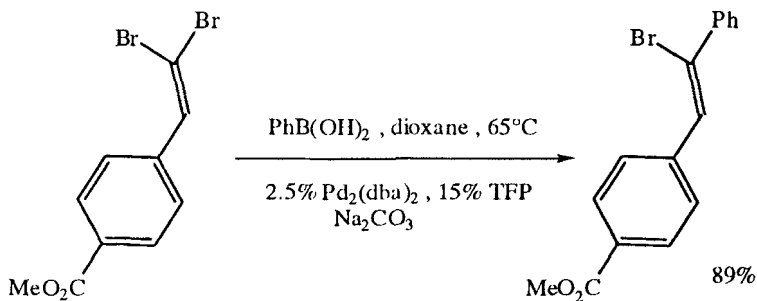


IPr = 1,3-bis(2,6-diisopropylphenyl)imidazolyl-2-ylidene

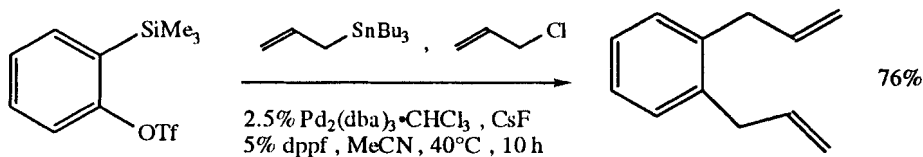
Lee, H.M.; Nolan, S.P. *Org. Lett.*, **2000**, *2*, 2053.



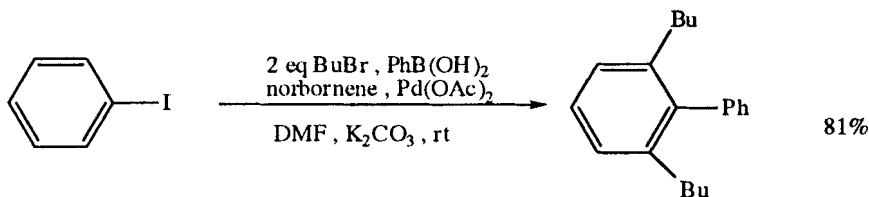
Chen, H.; Deng, M.-Z. *J. Org. Chem.*, **2000**, *65*, 4444.



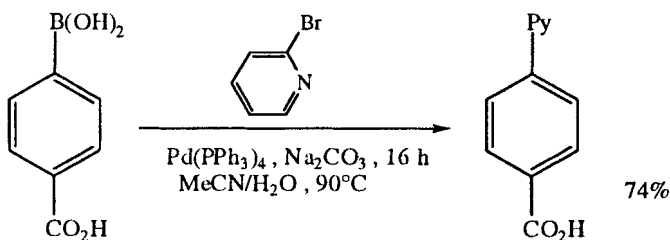
Shen, W. *Synlett*, **2000**, 737.



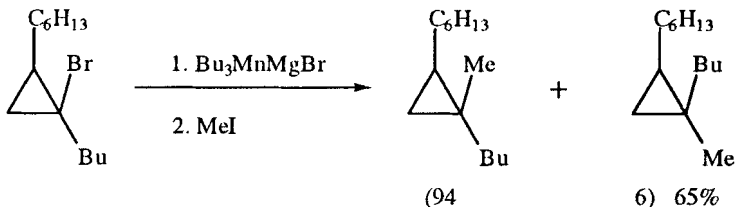
Yoshikawa, E.; Radhakrishnan, K.V.; Yamamoto, Y. *Tetrahedron Lett.*, **2000**, *41*, 729.



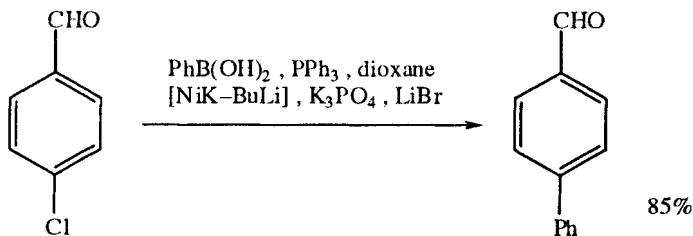
Catellani, M.; Motti, E.; Minari, M. *Chem. Commun.*, **2000**, 157.



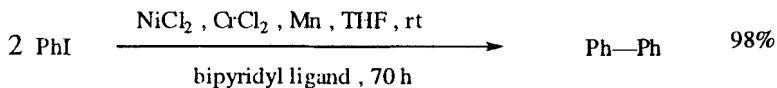
Gong, Y.; Pauls, H.W. *Synlett*, **2000**, 829.



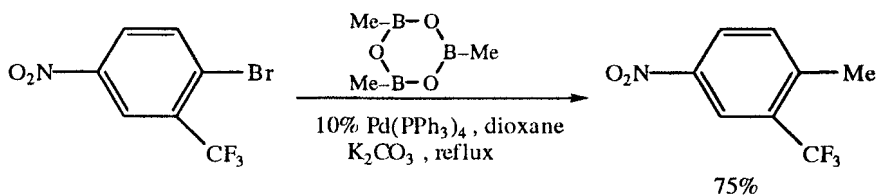
Kakiya, H.; Inoue, R.; Shinokubo, H.; Oshima, K. *Tetrahedron*, **2000**, *56*, 2131.



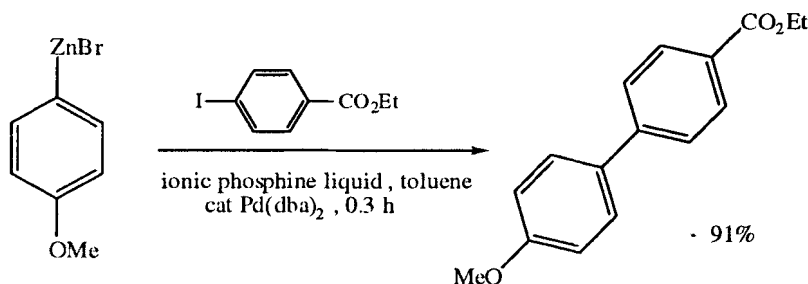
Lipshutz, B.H.; Sclafani, J.A.; Blomgren, P.A. *Tetrahedron*, **2000**, *56*, 2139.



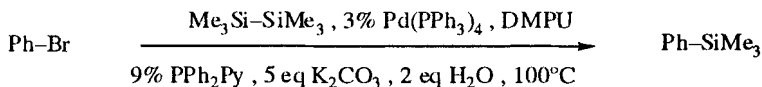
Chen, C. *Synlett*, 2000, 1491.



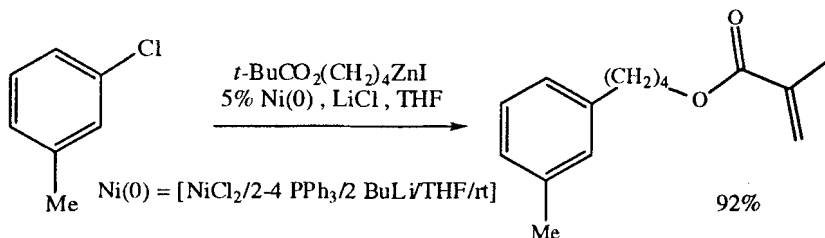
Gray, M.; Andrews, I.P.; Hook, D.F.; Kitteringham, J.; Vogle, M. *Tetrahedron Lett.*, 2000, 41, 6237.



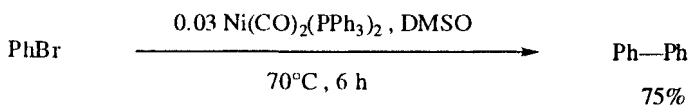
Sirieix, J.; Oßberger, M.; Betzemeier, B.; Knochel, P. *Synlett*, 2000, 1613.



Gooßen, L.J.; Ferwanah, A.-R.S. *Synlett*, 2000, 1801.

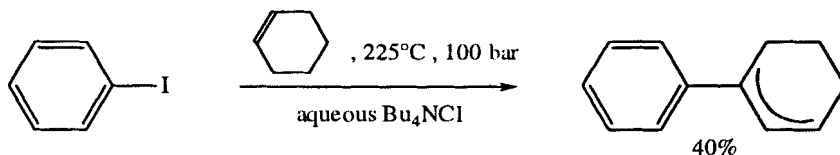


Lipshutz, B.H.; Blomgren, P.A.; Kim, S.-K. *Tetrahedron Lett.*, 1999, 40, 197.



Leadbeater, N.E.; Resouly, S.M. *Tetrahedron Lett.*, 1999, 40, 4243.

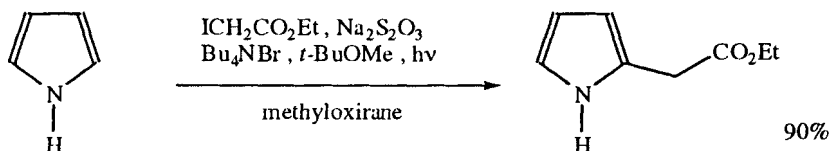




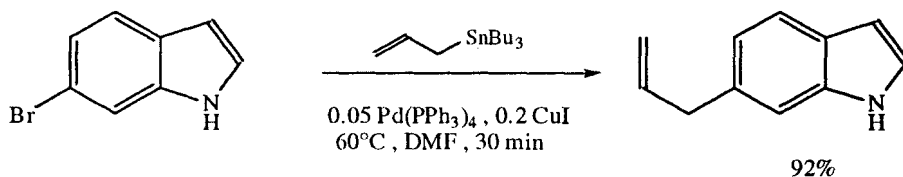
Heck reaction – in aqueous media

67:13:20 1-Ph:2-Ph:3-Ph-cyclohexene

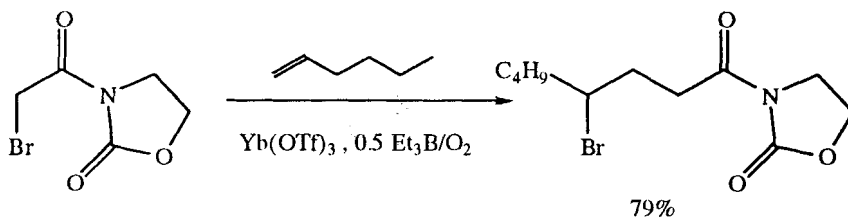
Cron, L.U.; Tinsley, A.S. *Tetrahedron Lett.*, **1999**, 40, 227.



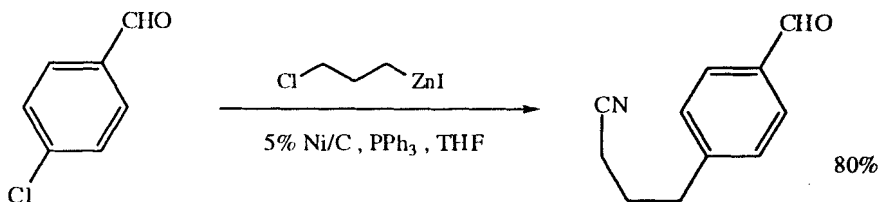
Byers, J.H.; Campbell, J.E.; Knapp, F.H.; Thissell, J.G. *Tetrahedron Lett.*, **1999**, 40, 2677.



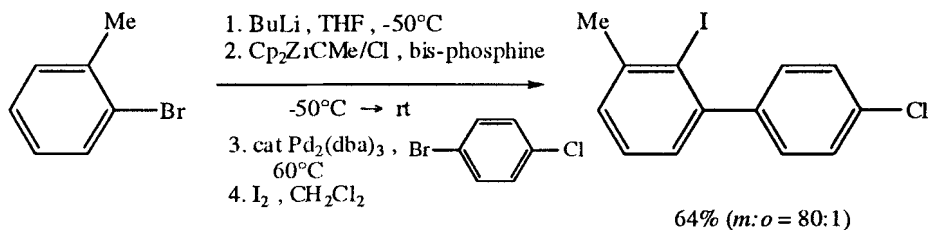
Benhida, R.; Lecubin, F.; Fourrey, J.-L.; Castellanos, L.R.; Quintero, L. *Tetrahedron Lett.*, **1999**, 40, 5701.



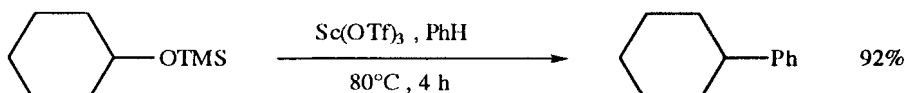
Mero, C.L.; Porter, N.A. *J. Am. Chem. Soc.*, **1999**, 121, 5155.



Lipshutz, B.H.; Blomgren, P.A. *J. Am. Chem. Soc.*, **1999**, 121, 5819.

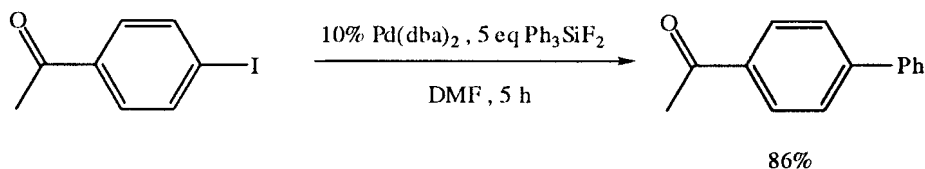


Frid, M.; Pérez, D.; Peat, A.J.; Buchwald, S.L. *J. Am. Chem. Soc.*, **1999**, *121*, 9469.

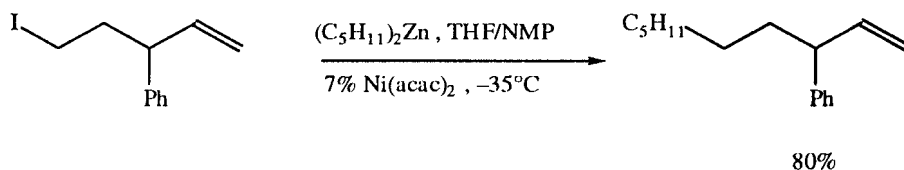


several other catalysts used as well

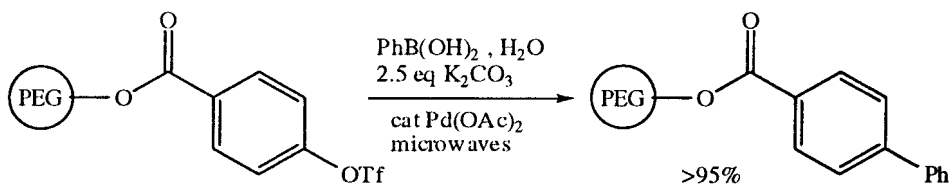
Kotsuki, H.; Ohishi, T.; Inoue, M.; Kojima, T. *Synthesis*, **1999**, 603.



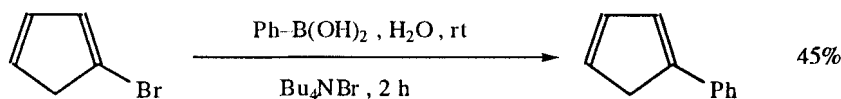
Mowery, M.E.; DeShong, P. *J. Org. Chem.*, **1999**, *64*, 3266.



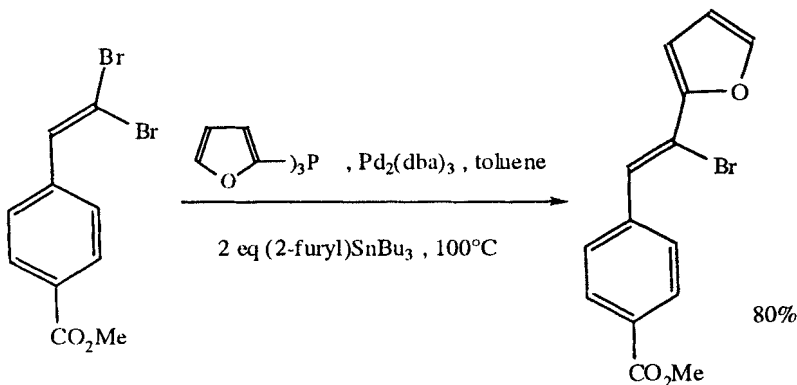
Giovannini, R.; Stüdemann, T.; Devasagayaram, A.; Dussin, G.; Knochel, P. *J. Org. Chem.*, **1999**, *64*, 3544.



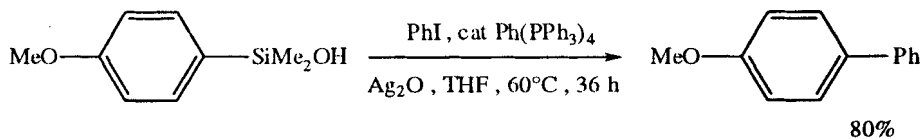
Lettner, C.G.; König, W.A.; Stenzel, W.; Schotten, T. *J. Org. Chem.*, **1999**, *64*, 3885.



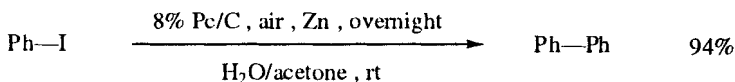
Bussolari, J.C.; Rehborn, D.C. *Org. Lett.*, **1999**, *1*, 965.



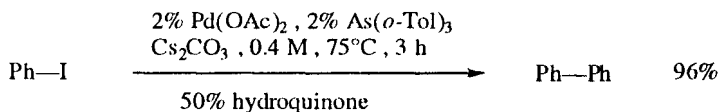
Shen, W.; Wang, L. *J. Org. Chem.*, **1999**, *64*, 8873.



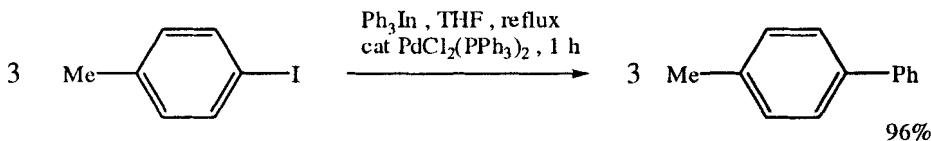
Hirabayashi, K.; Kawashima, J.; Nishihara, Y.; Mori, A.; Hiyama, T. *Org. Lett.*, **1999**, *1*, 299.



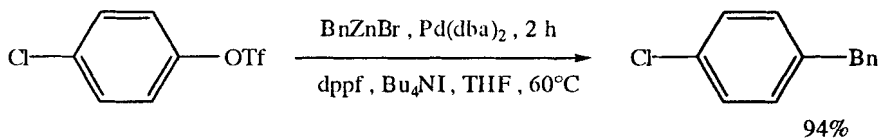
Venkatraman, S.; Li, C.-J. *Org. Lett.*, **1999**, *1*, 1133.



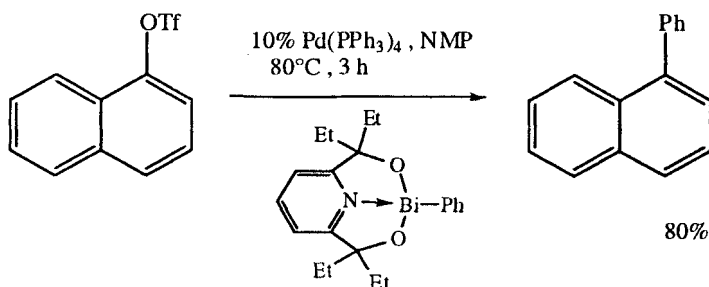
Hennings, D.D.; Iwama, T.; Rawal, V.H. *Org. Lett.*, **1999**, *1*, 1205.



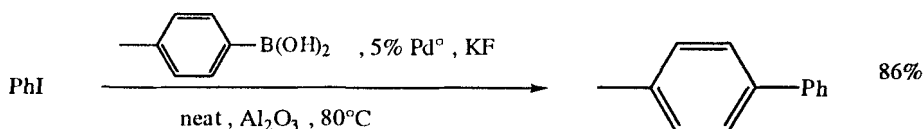
Pérez, I.; Sestelo, J.P.; Sarandeses, L.A. *Org. Lett.*, **1999**, *1*, 1267.



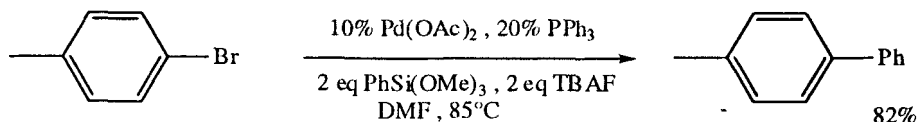
Fiber, M.; Jensen, A.E.; Rottländer, M.; Knochel, P. *Org. Lett.*, **1999**, *1*, 13223.



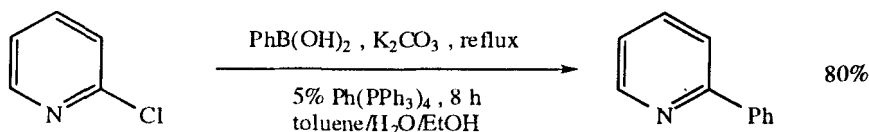
Rao, M.L.N.; Shimada, S.; Tanaka, M. *Org. Lett.* **1999**, *1*, 1271.



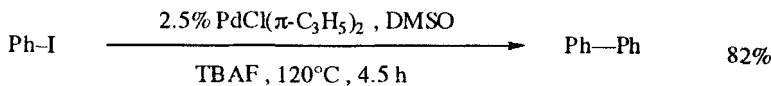
Kabalka, G.W.; Pagni, R.M.; Hair, C.M. *Org. Lett.*, **1999**, *1*, 1423.



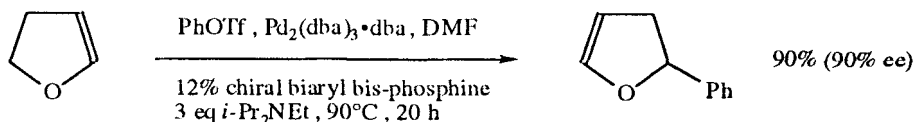
Mowery, M.E.; DeShong, P. *Org. Lett.*, **1999**, *1*, 2137.



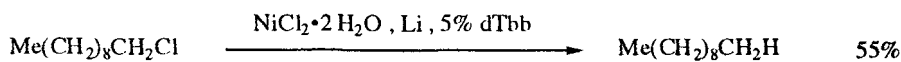
Lohse, O.; Thevenin, P.; Waldvogel, E. *Synlett*, **1999**, 45.



Albanese, D.; Landini, D.; Penso, M.; Petricci, S. *Synlett*, **1999**, 199.

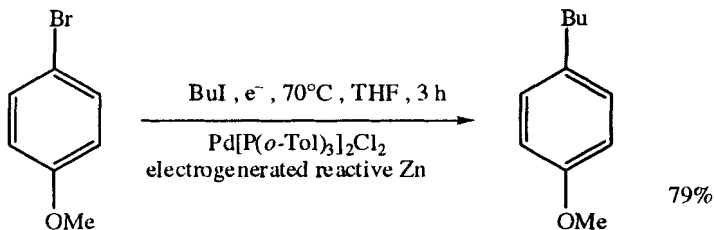


Tietze, L.F.; Thede, K.; Sannicolò, F. *Chem. Commun.*, **1999**, 1811.

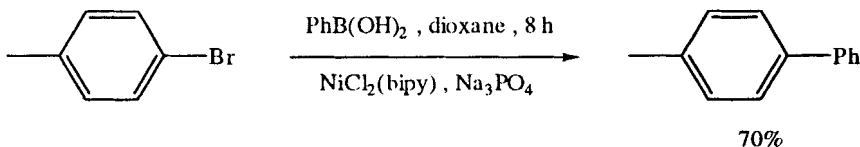


dTbb = d,4'-di-*t*-butylbiphenyl

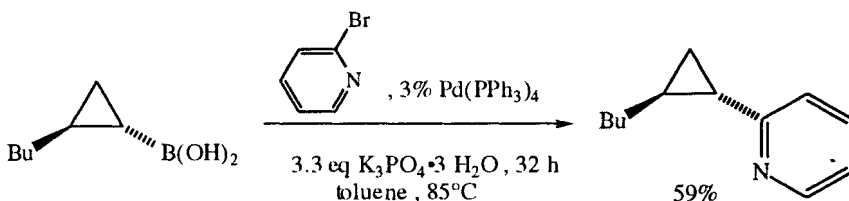
Alonso, F.; Radivoy, G.; Yus, M. *Tetrahedron*, **1999**, *55*, 4441.



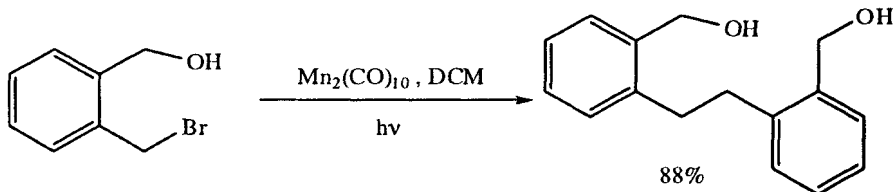
Jurono, N.; Sugita, K.; Takasugi, S.; Tokuda, M. *Tetrahedron*, **1999**, *55*, 6097.



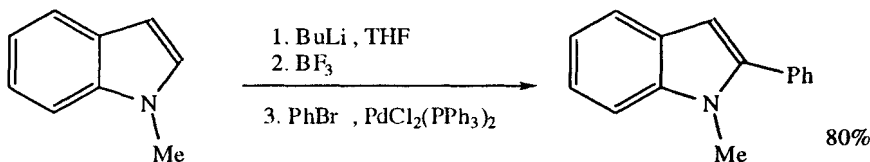
Leadbeater, N.E.; Resouly, S.M. *Tetrahedron*, **1999**, *55*, 11889.



Ma, H.-r.; Wang, X.-h.; Deng, M.-z. *Synth. Commun.*, **1999**, *29*, 2477.



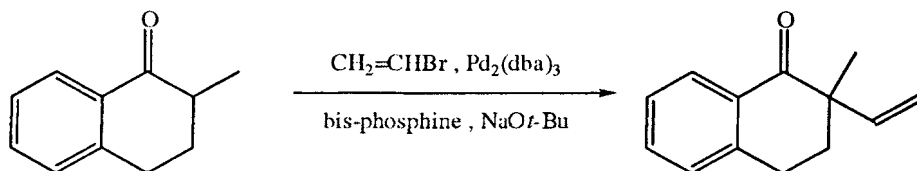
Gilbert, B.C.; Lindsay, C.I.; McGrail, P.T.; Parsons, A.F.; Whittaker, D.T.E. *Synth. Commun.*, **1999**, *29*, 2711.



Ishikura, M.; Agata, I.; Katagiri, N. *J. Heterocyclic Chem.*, **1999**, *36*, 873.

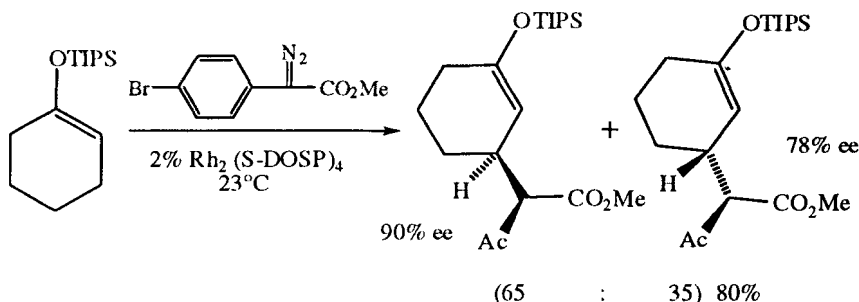
## SECTION 71: ALKYLs, METHYLENES AND ARYLs FROM HYDRIDES

This section lists examples of the reaction of  $RH \rightarrow RR'$  ( $R, R' = \text{alkyl or aryl}$ ). For the reaction  $C=CH \rightarrow C=C-R$  ( $R = \text{alkyl or aryl}$ ), see Section 209 (Alkenes from Alkenes). For alkylations of ketones and esters, see Section 177 (Ketones from Ketones) and Section 113 (Esters from Esters).

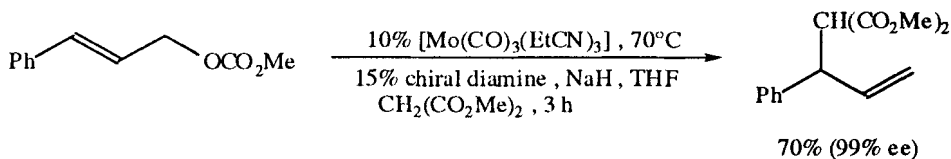


96% (80% ee)

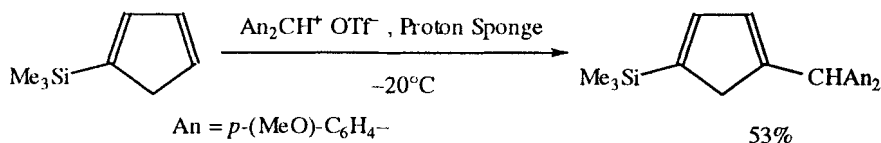
Chieffi, A.; Kamikawa, K.; Åhman, J.; Fox, J.M.; Buchwald, S.L. *Org. Lett.* **2001**, 3, 1897.



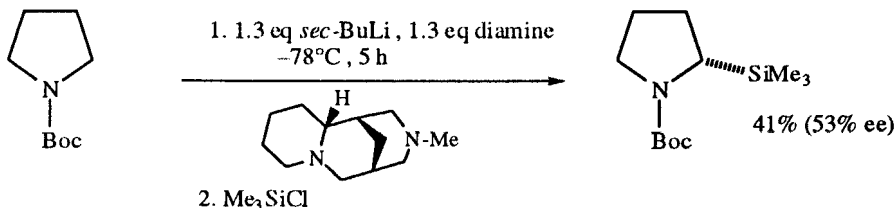
Davies, H.M.L.; Ren, P. *J. Am. Chem. Soc.*, **2001**, 123, 2070.



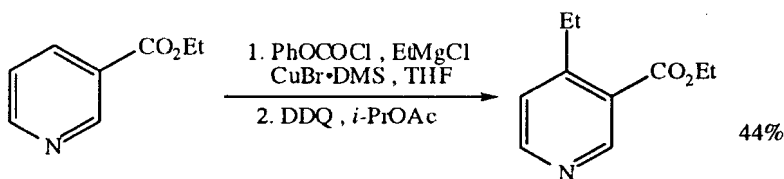
Glorius, F.; Neuburger, M.; Pfaltz, A. *Helv. Chim. Acta*, **2001**, 84, 3178.



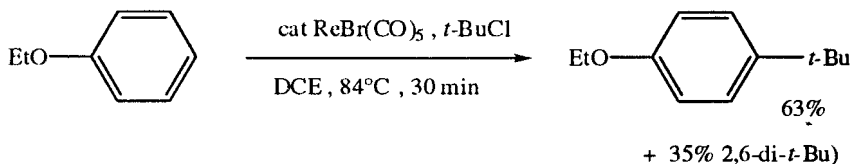
Herrlich, M.; Hampel, N.; Mayr, H. *Org. Lett.*, **2001**, 3, 1629.



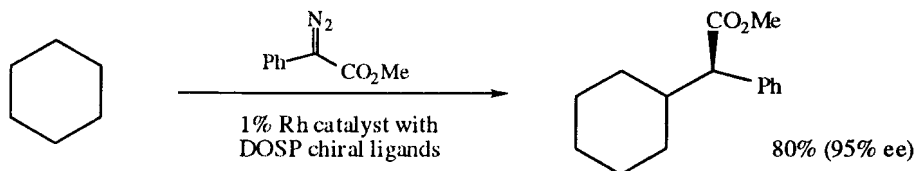
Harrison, J.R.; O'Brien, P.; Porter, D.W.; Smith, N.M. *Chem. Commun.*, **2001**, 1202.



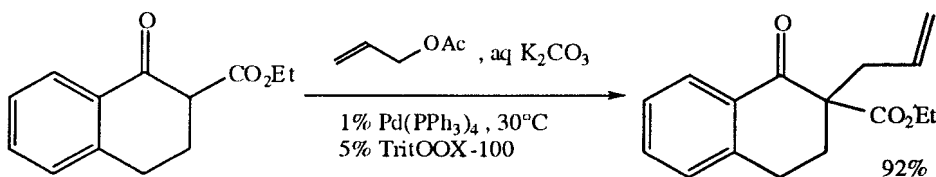
Wallace, D.J.; Gibb, A.D.; Cottrell, I.F.; Kennedy, D.J.; Brands, K.M.; Dolling, U.H. *Synthesis*, **2001**, 1784.



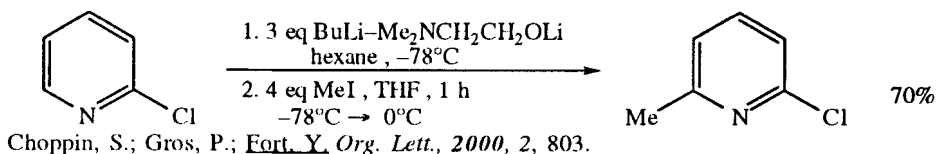
Nishiyama, Y.; Kakushou, F.; Sonoda, N. *Bull. Chem. Soc. Jpn.*, **2000**, 73, 2779.



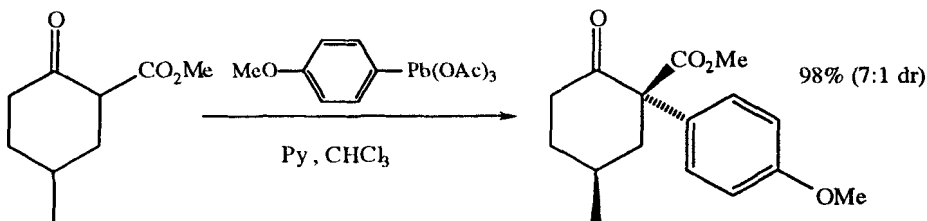
Davies, H.M.L.; Hansen, T.; Churchill, M.R. *J. Am. Chem. Soc.*, **2000**, 122, 3063.



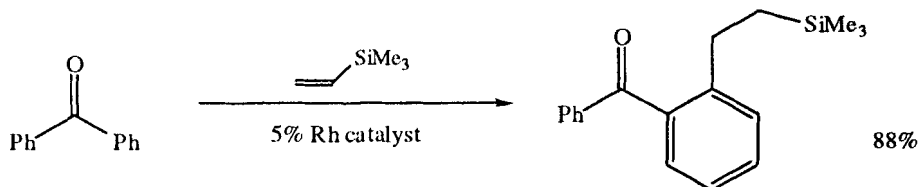
Kobayashi, S.; Lam, W.W.-L.; Manabe, K. *Tetrahedron Lett.*, **2000**, 41, 6115.



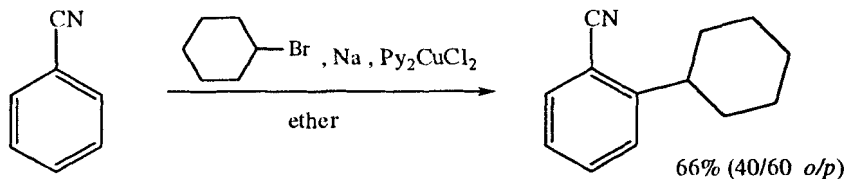
Choppin, S.; Gros, P.; Fort, Y. *Org. Lett.*, **2000**, 2, 803.



Elliott, G.I.; Konopelski, J.P.; Olmstead, M.M. *Org. Lett.*, **1999**, 1, 1867.



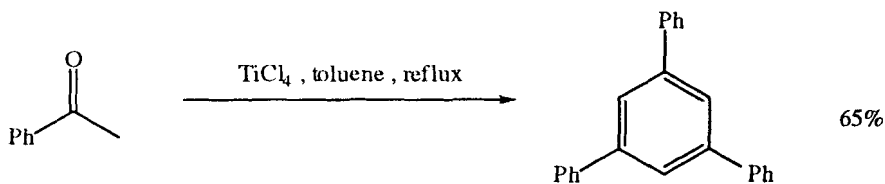
Lenges, C.P.; Brookhart, M. *J. Am. Chem. Soc.*, **1999**, 121, 6616.



Tan, C.-Q.; Zheng, X.; Ma, Z.; Gu, Y. *Synth. Commun.*, **1999**, 29, 123.

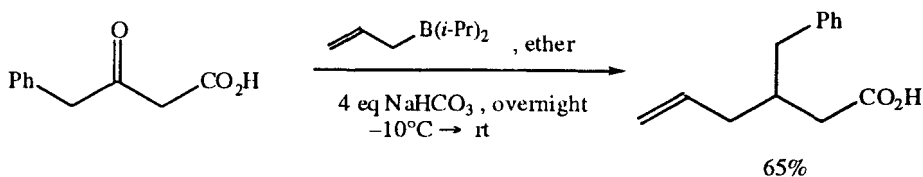
## SECTION 72: ALKYLs, METHYLENES AND ARYLs FROM KETONES

The conversions  $\text{R}_2\text{C=O} \rightarrow \text{R-R}$ ,  $\text{R}_2\text{CH}_2$ ,  $\text{R}_2\text{CHR}'$ , etc. are listed in this section.

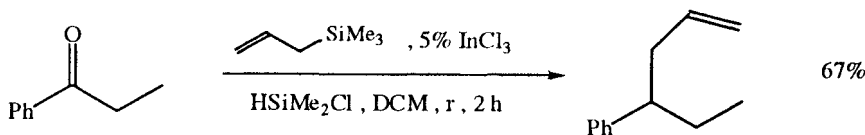


Li, Z.; Sun, W.-H.; Jin, C.; Shao, C. *Synlett*, **2001**, 1947.



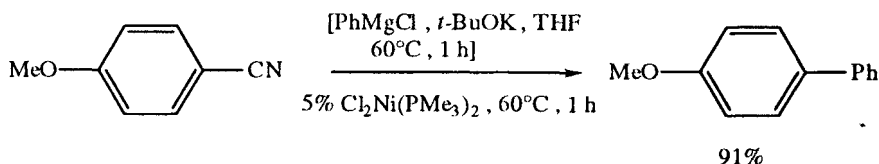


Kabalka, G.W.; Yang, K.; Wang, Z. *Synth. Commun.*, **2001**, *31*, 511.

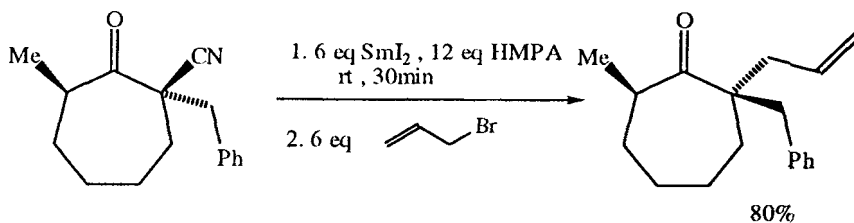


Yasuda, M.; Ohishi, Y.; Ito, T.; Baba, A. *Tetrahedron Lett.*, **2000**, *41*, 2425.

## SECTION 73 ALKYL, METHYLENES AND ARYL FROM NITRILES



Miller, J.A. *Tetrahedron Lett.*, **2001**, *42*, 6991.



Zhu, J.-L.; Shia, K.-S.; Liu, H.-J. *Tetrahedron Lett.*, **1999**, *40*, 7055.

## SECTION 74: ALKYL, METHYLENES AND ARYL FROM ALKENES

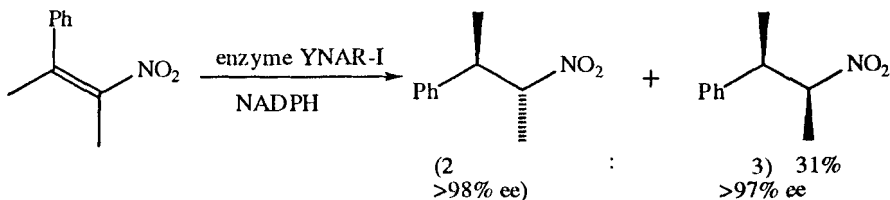
The following reaction types are included in this section:

- A. Hydrogenation of Alkenes (and Aryls)
- B. Formation of Aryls
- C. Alkylations and Arylations of Alkenes
- D. Conjugate Reduction of Conjugated Aldehydes, Ketones, Acids, Esters and Nitriles
- E. Conjugate Alkylations
- F. Cyclopropanations, including halocyclopropanations

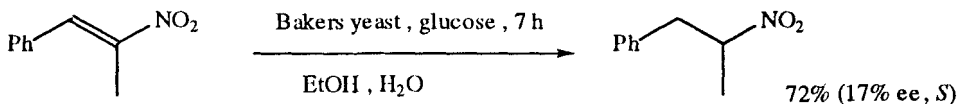
## SECTION 74A: HYDROGENATION OF ALKENES (AND ARYLS)

Reduction of aryls to dienes are listed in Section 377 (Alkene-Alkene).

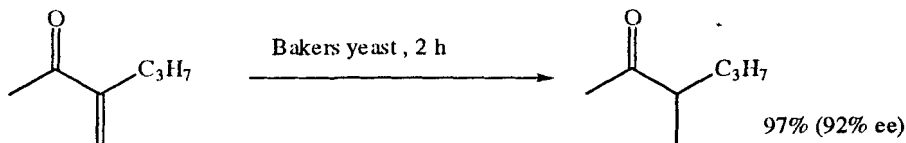
## ASYMMETRIC HYDROGENATIONS



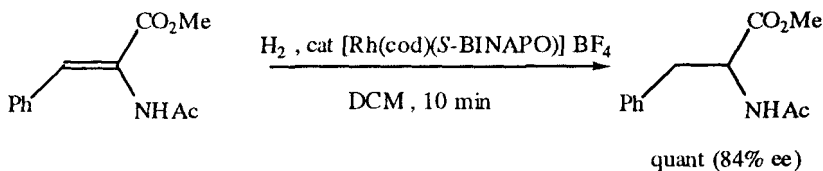
Kawai, Y.; Inaba, Y.; Hayashi, M.; Tokitoh, N. *Tetrahedron Lett.*, **2001**, 42, 3367.



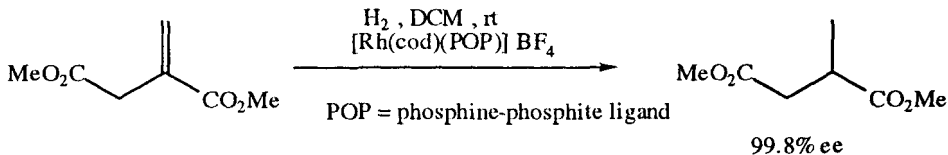
Kawai, Y.; Inaba, Y.; Tokitoh, N. *Tetrahedron Asymm.*, **2001**, 12, 309.



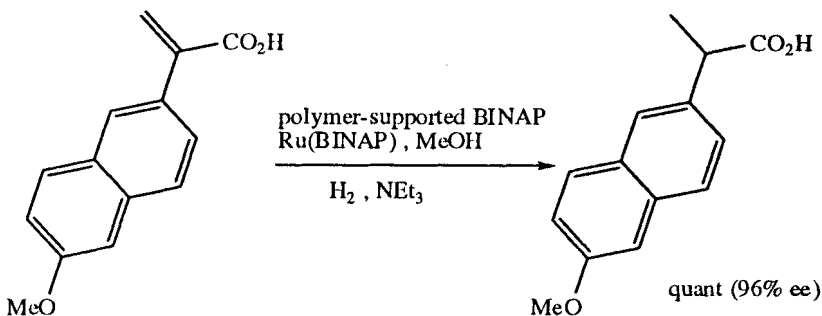
Filho, E.P.S.; Rodrigues, J.A.R.; Movam, P.L.S. *Tetrahedron Asymm.*, **2001**, 12, 847.



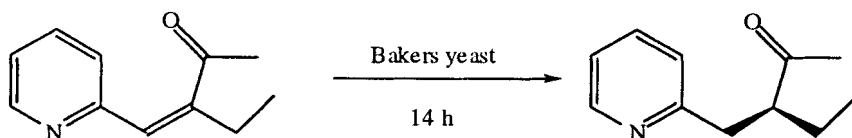
Zhang, F.-Y.; Kwok, W.H.; Chan, A.S.C. *Tetrahedron Asymm.*, **2001**, 12, 2337.



Suárez, A.; Pizzano, A. *Tetrahedron Asymm.*, **2001**, 12, 2501.

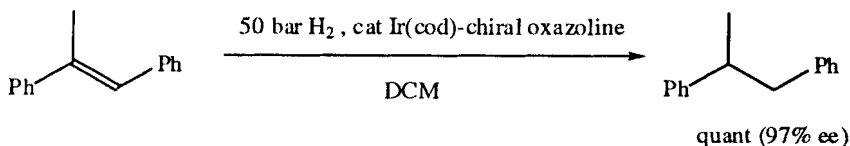


Fan, Q.H.; Deng, G.-J.; Lin, C.-C.; Chan, A.S.C. *Tetrahedron Asymm.*, **2001**, *12*, 1241.

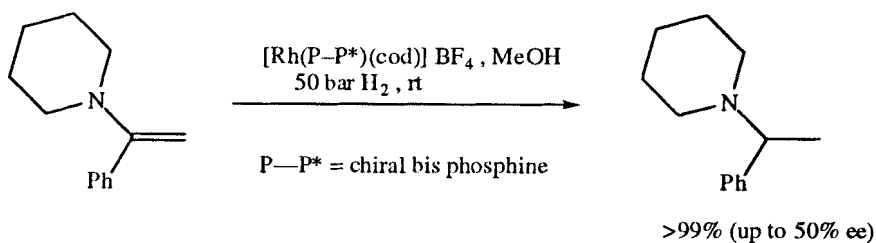


72% (>99% ee, S)

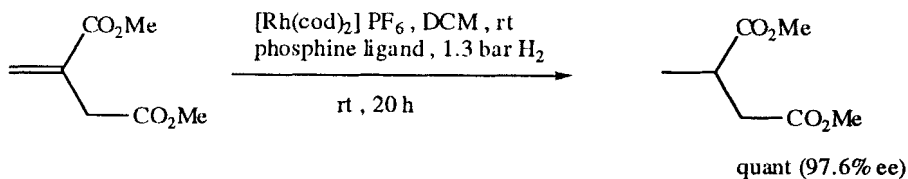
Kawai, Y.; Hayashi, M.; Tokitoh, N. *Tetrahedron Asymm.*, **2001**, *12*, 3007.



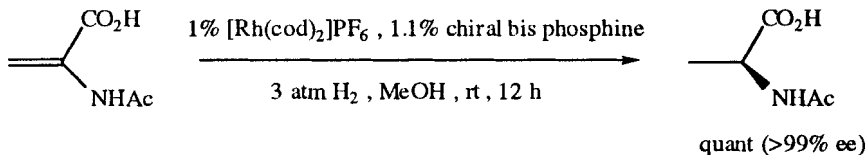
Blankenstein, J.; Pfaltz, A. *Angew. Chem. Int. Ed.*, **2001**, *40*, 4445.



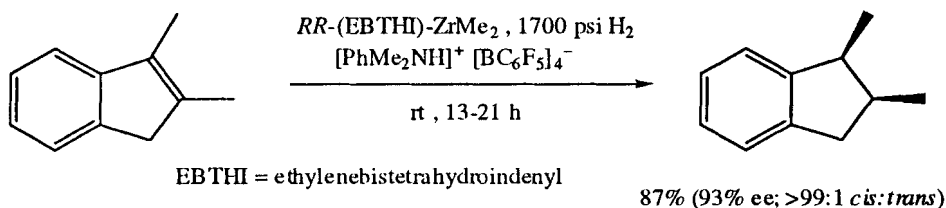
Tararov, V.I.; Kadyrov, R.; Riermeier, T.H.; Holz, J.; Börner, A. *Tetrahedron Lett.*, **2000**, *41*, 2351.



Reetz, M.T.; Mehler, G. *Angew. Chem. Int. Ed.*, **2000**, *39*, 3889.

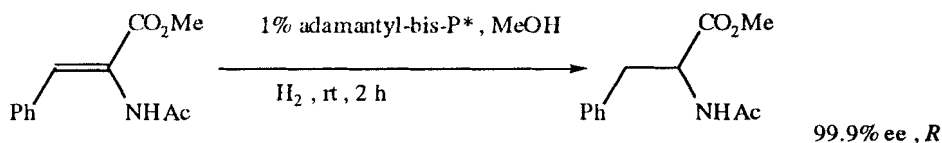


Li, W.; Zhang, Z.; Xiao, D.; Zhang, X. *Tetrahedron Lett.*, **1999**, *40*, 6701.



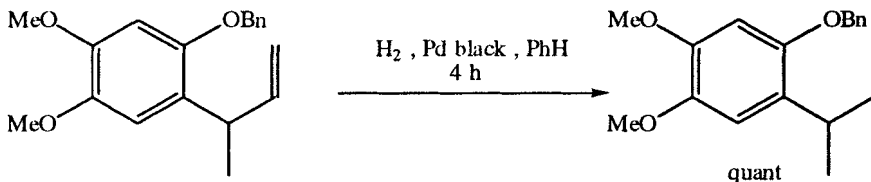
EBTHI = ethylenebistetrahydroindenyl

Troutman, M.V.; Appella, D.H.; Buchwald, S.L. *J. Am. Chem. Soc.*, **1999**, *1221*, 4916.

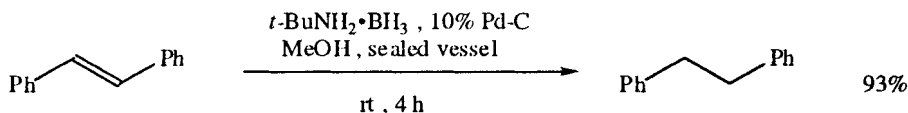


Ohashi, A.; Imamoto, T. *Org. Lett.*, **2001**, *3*, 373.

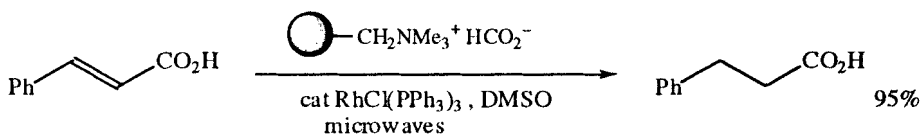
## NON-ASYMMETRIC HYDROGENATIONS



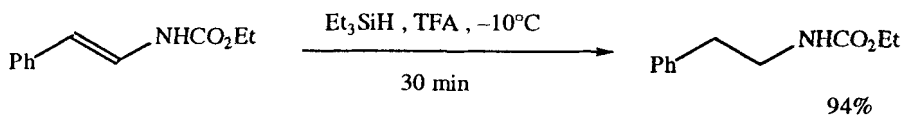
Maki, S.; Okawa, M.; Matsui, R.; Hirano, T.; Niwa, H. *Synlett*, **2001**, 1590.



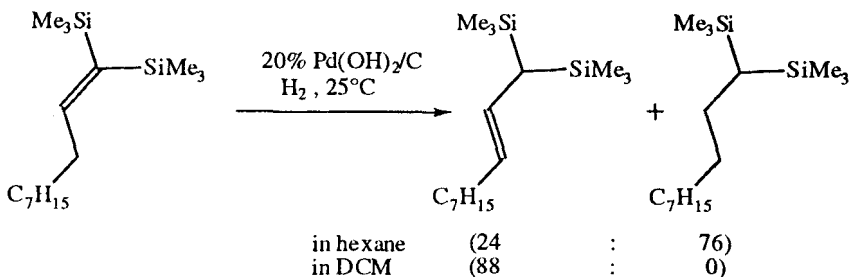
Couturier, M.; Andresen, B.M.; Tucker, J.L.; Dubé, P.; Brenck, S.J.; Negri, J.T. *Tetrahedron Lett.*, **2001**, *42*, 2763.



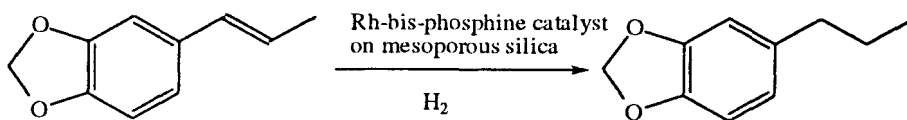
Desai, B.; Danks, T.N. *Tetrahedron Lett.*, **2001**, *42*, 5963.



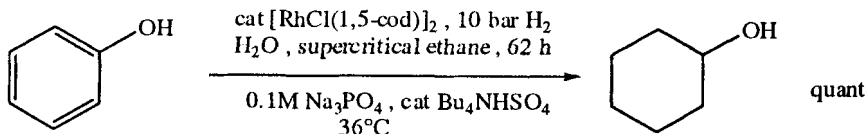
Masuno, M.N.; Molinski, T.F. *Tetrahedron Lett.*, **2001**, 42, 8263.



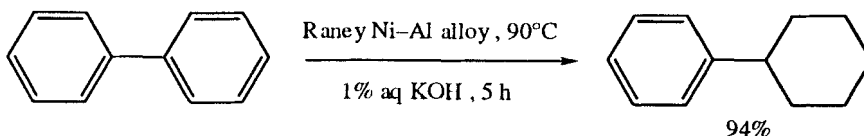
Hodgson, D.M.; Barker, S.F.; Mace, L.H.; Moran, J.R. *Chem. Commun.*, **2001**, 153.



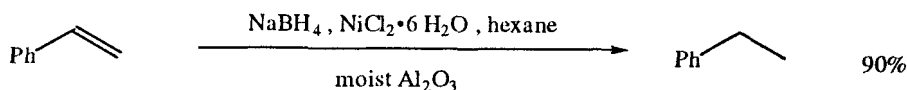
Crudden, C.M.; Allen, D.; Mikoluk, M.D.; Sun, J. *Chem. Commun.*, **2001**, 1154.



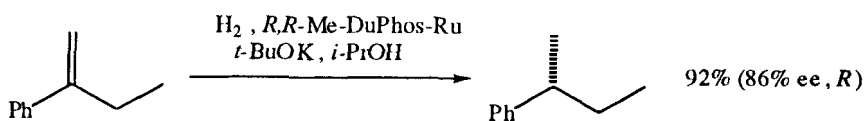
Bonilla, R.J.; James, B.R.; Jessop, P.G. *Chem. Commun.*, **2000**, 941.



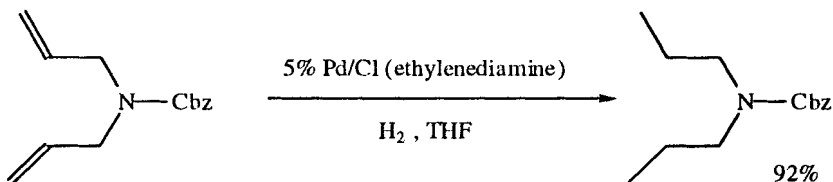
Tsukinoki, T.; Kanda, T.; Liiu, G.-B.; Ysuzuki, H.; Tashiro, M. *Tetrahedron Lett.*, **2000**, 41, 5865.



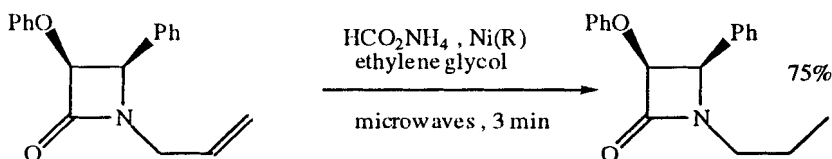
Yakabe, S.; Hirano, M.; Morimoto, T. *Tetrahedron Lett.*, **2000**, 41, 6795.



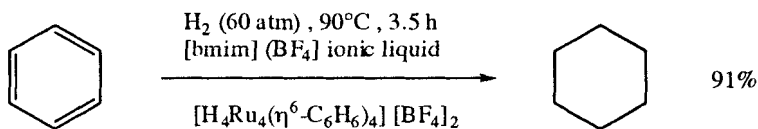
Forman, G.S.; Ohkuma, T.; Hems, W.P.; Noyori, R. *Tetrahedron Lett.*, **2000**, 41, 9471.



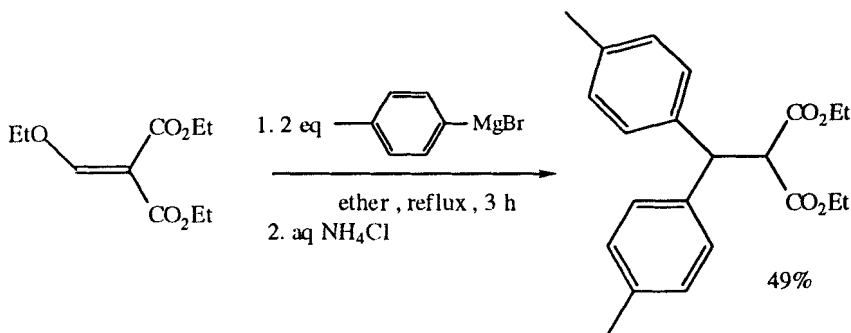
Hattori, K.; Sajiki, H.; Hirota, K. *Tetrahedron*, **2000**, *56*, 8433.



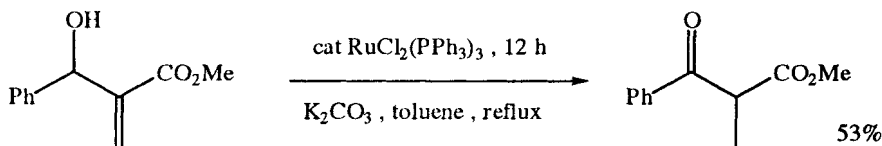
Banik, B.K.; Barakat, K.J.; Wagle, D.R.; Manhas, M.S.; Bose, A.K. *J. Org. Chem.*, **1999**, *64*, 5746.



Dyson, P.J.; Ellis, D.J.; Parker, D.G.; Welton, T. *Chem. Commun.*, **1999**, 25.

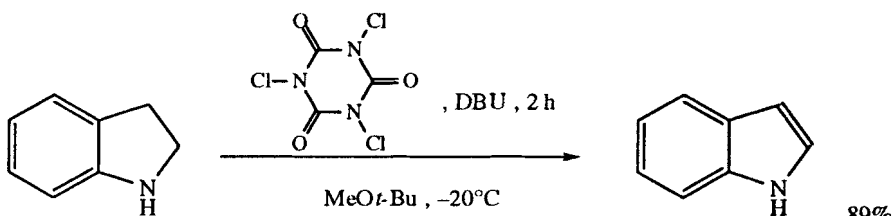


Kim, Y.M.; Kwon, T.W.; Chung, S.K.; Smith, M.B. *Synth. Commun.*, **1999**, *29*, 343.

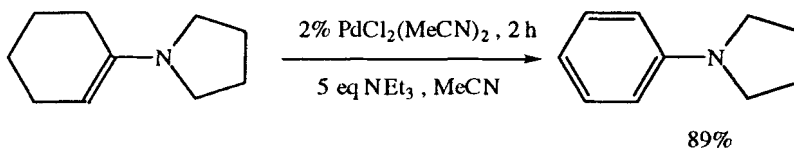


Basavaiah, D.; Muthukumaran, K. *Synth. Commun.*, **1999**, *29*, 713.

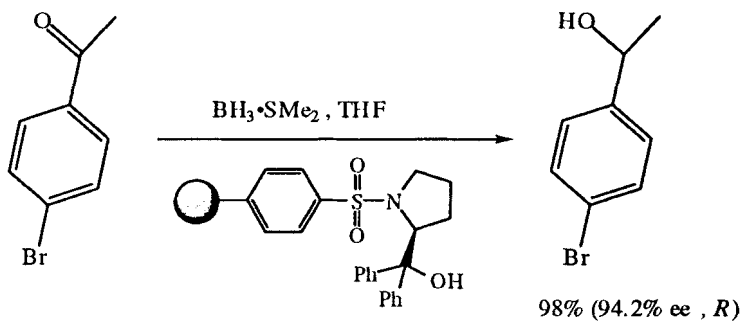
## SECTION 74B: FORMATION OF ARYLS AND HETEROARYLS



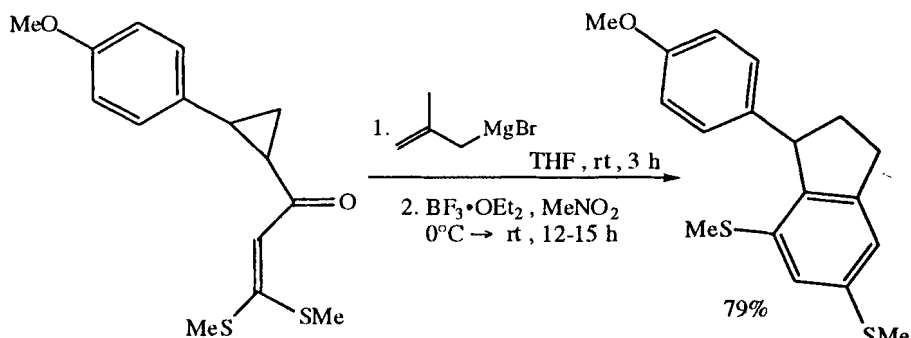
Tilstam, U.; Harre, M.; Heckrodt, T.; Weinmann, H. *Tetrahedron Lett.*, **2001**, 42, 5385.



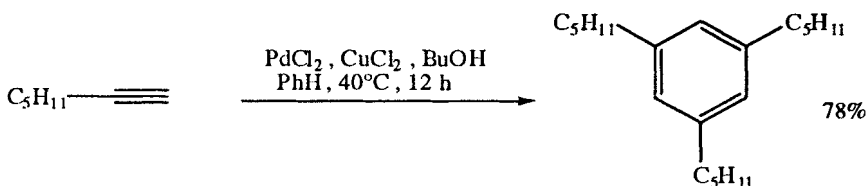
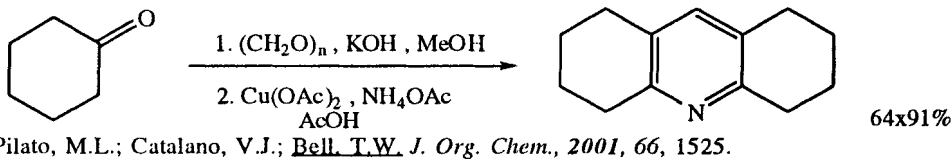
Ishikawa, T.; Uedo, E.; Tan, R.; Saito, S. *J. Org. Chem.*, **2001**, 66, 186.



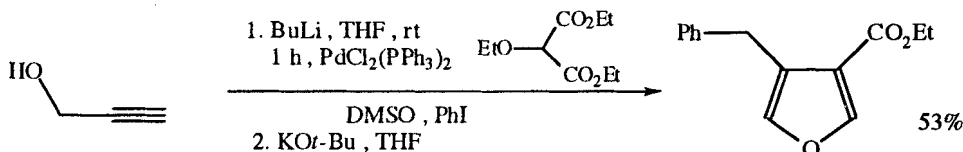
Hu, J.-b.; Zhao, G.; Yang, G.-s.; Ding, Z.-d. *J. Org. Chem.*, **2001**, 66, 303.



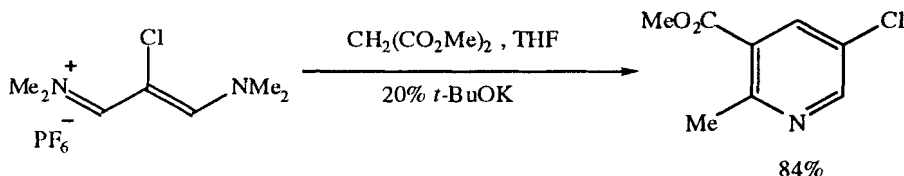
Mohanta, P.K.; Peruncheralathan, S.; Ila, H.; Junjappa, H. *J. Org. Chem.*, **2001**, 66, 1503.



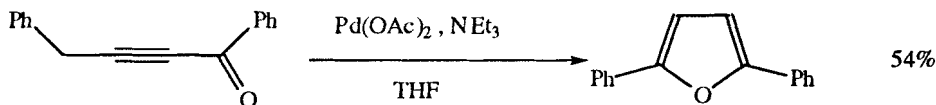
Li, J.; Jiang, H.; Chen, M. *J. Org. Chem.*, **2001**, *66*, 3627.



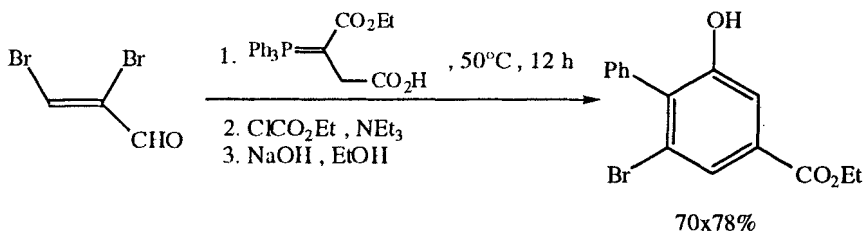
Garçon, S.; Vassiliou, S.; Cavicchioli, M.; Hartmann, B.; Monteiro, N.; Blame, G. *J. Org. Chem.*, **2001**, *66*, 4069.



Marcoux, J.-E.; Marcotte, F.-A.; Wu, J.; Dormer, P.G.; Davies, I.W.; Hughes, D.; Reider, P.J. *J. Org. Chem.*, **2001**, *66*, 4194.

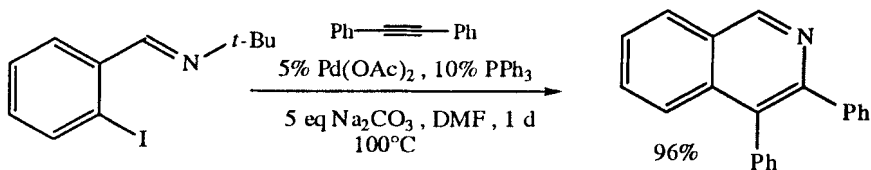


Jeevanandam, A.; Narkunan, K.; Ling, Y.-C. *J. Org. Chem.*, **2001**, *66*, 6014.

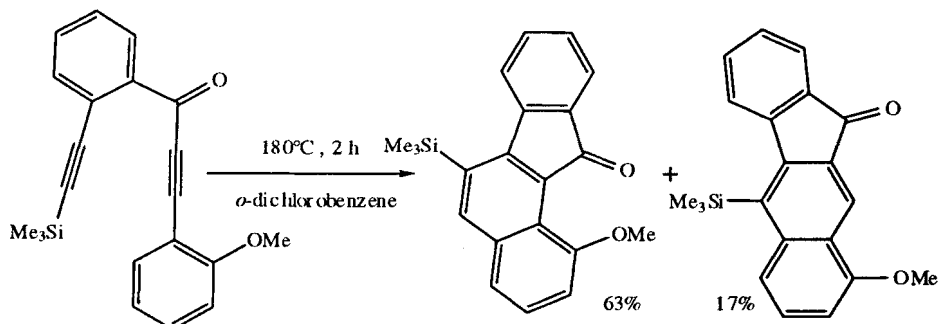


Serra, S.; Fuganti, C.; More, A. *J. Org. Chem.*, **2001**, *66*, 7883.

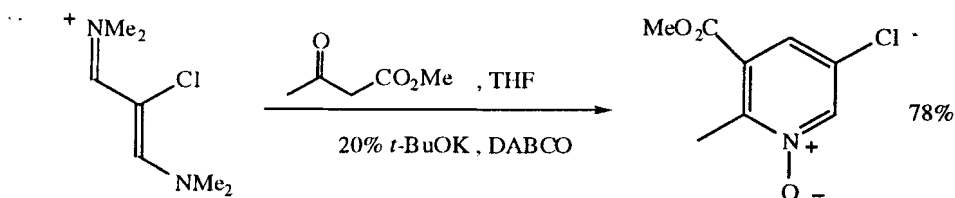




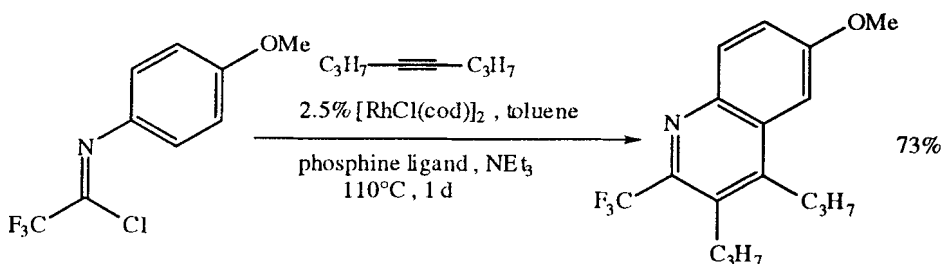
Roesch, K.R.; Zhang, H.; Larock, R.C. *J. Org. Chem.*, **2001**, *66*, 8042.



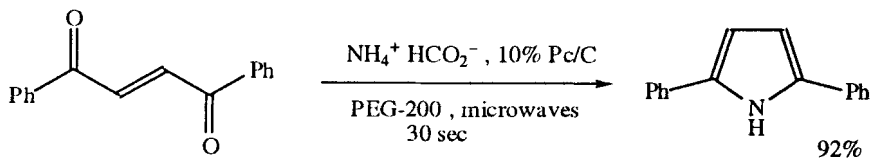
Atienza, C.; Mateo, C.; de Frutos, Ó.; Schavarren, A.M. *Org. Lett.*, **2001**, *3*, 153.



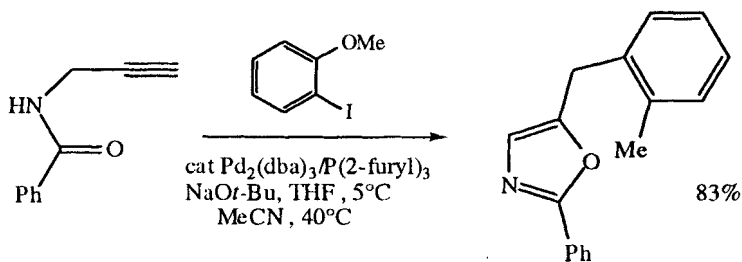
Davies, I.W.; Marcoux, J.-F.; Reider, P.J. *Org. Lett.*, **2001**, *3*, 209.



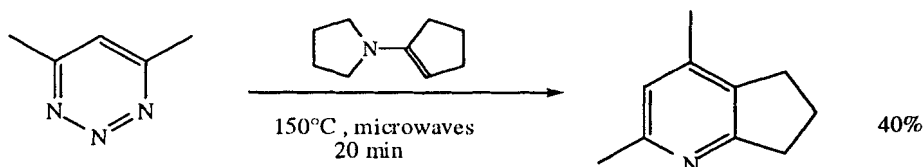
Amii, H.; Kishikawa, Y.; Uneyama, K. *Org. Lett.*, **2001**, *3*, 1109.



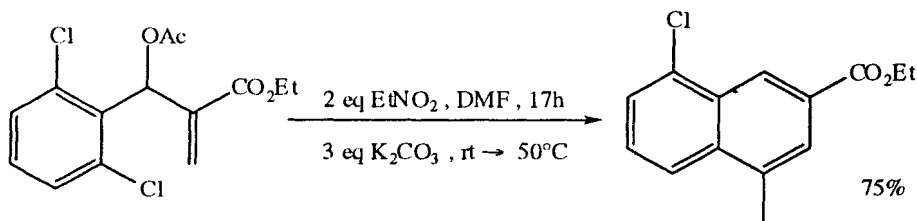
Rao, H.S.P.; Jothilingam, S. *Tetrahedron Lett.*, **2001**, *42*, 6595.



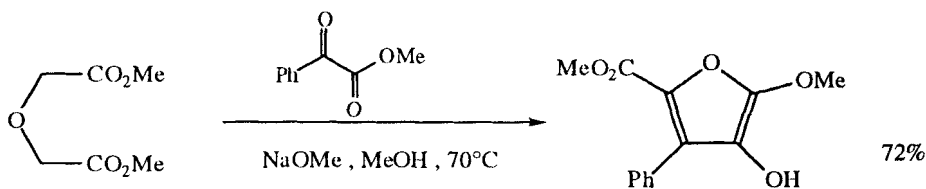
Arcadi, A.; Cacchi, S.; Cascia, L.; Labrizi, G.; Marinelli, F. *Org. Lett.*, **2001**, 3, 2501.



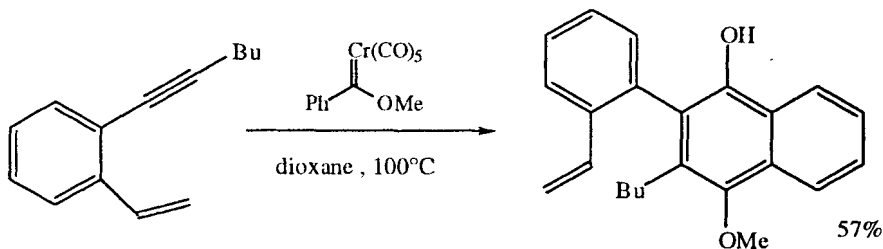
Díaz-Ortiz, A.; de la Hoz, A.; Prieto, P.; Carrillo, J.R.; Moreno, A.; Neunhoeffter, H. *Synlett*, **2001**, 236.



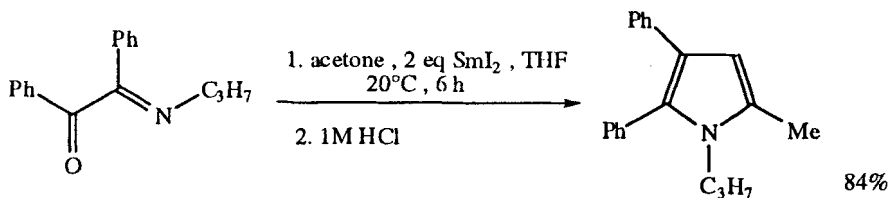
Kim, J.N.; Im, Y.J.; Gong, J.H.; Lee, K.Y. *Tetrahedron Lett.*, **2001**, 42, 4195.



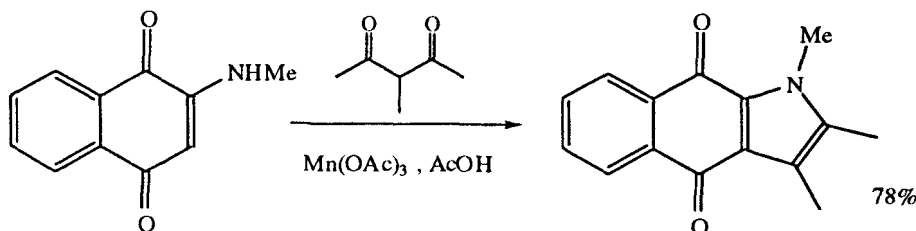
Tse, B.; Jones, A.B. *Tetrahedron Lett.*, **2001**, 42, 6429.



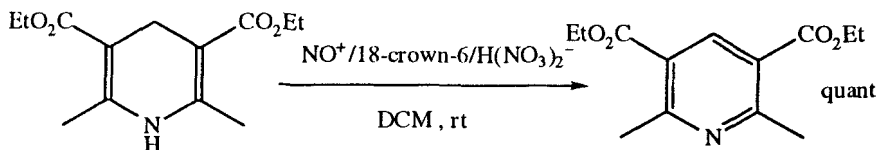
Jackson, T.J.; Herndon, J.W. *Tetrahedron*, **2001**, 57, 3859.



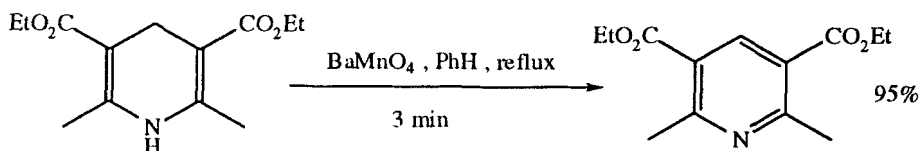
Farcas, S.; Many, J.-L. *Tetrahedron*, **2001**, *57*, 4881.



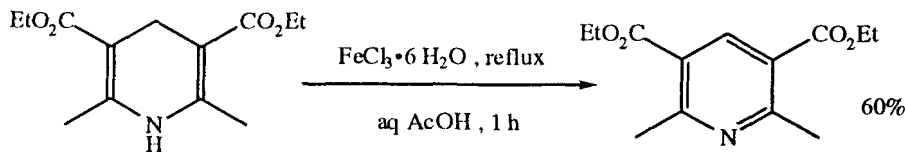
Wu, Y.-L.; Chuang, C.-P.; Lin, P.-Y. *Tetrahedron*, **2001**, *57*, 5543.



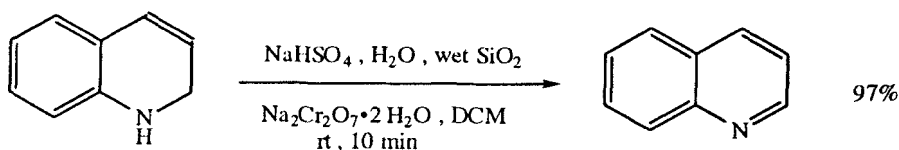
Zolfigol, M.A.; Zebbarjadian, M.H.; Sadeghi, M.M.; Mohammadpoor-Baltork, I.; Memarian, H.R.; Shamsipur, M. *Synth. Commun.*, **2001**, *31*, 929.



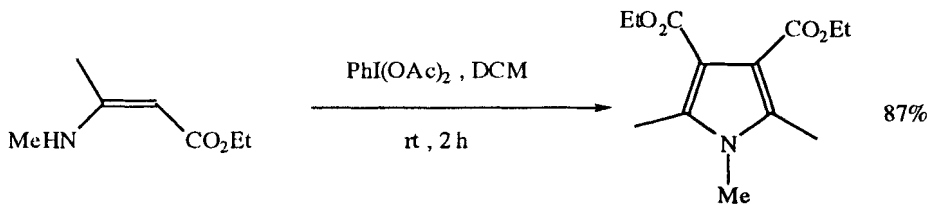
Memarian, H.R.; Sadeghi, M.M.; Momeni, A.R. *Synth. Commun.*, **2001**, *31*, 2241.



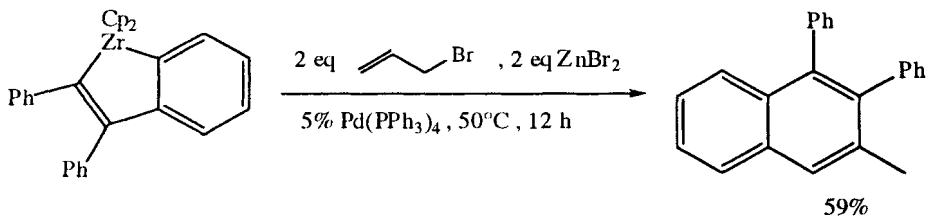
Lu, J.; Bai, Y.; Wang, Z.; Yang, B.Q.; Li, W. *Synth. Commun.*, **2001**, *31*, 2625.



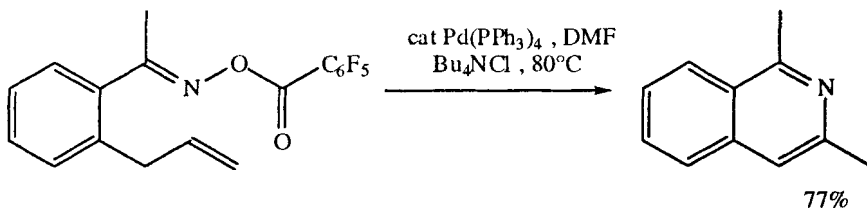
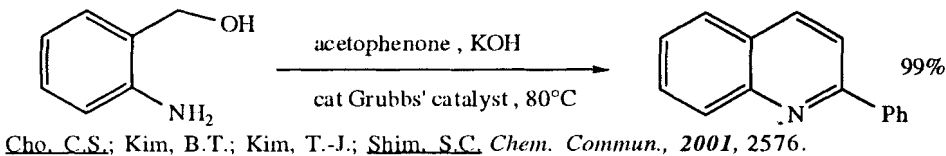
Damavandi, J.A.; Zolfigol, M.A.; Karami, B. *Synth. Commun.*, **2001**, *31*, 3183.



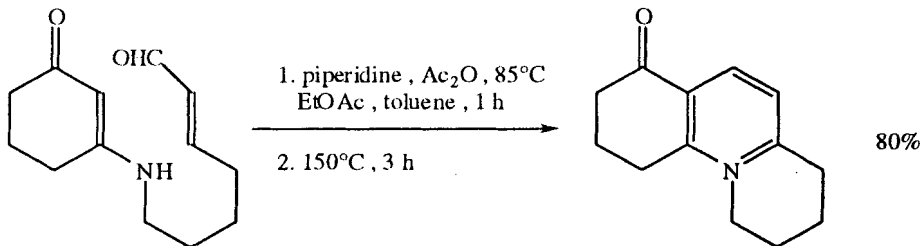
Zhang, P.-F.; Chen, Z.-C. *Synth. Commun.*, **2001**, *31*, 1619.



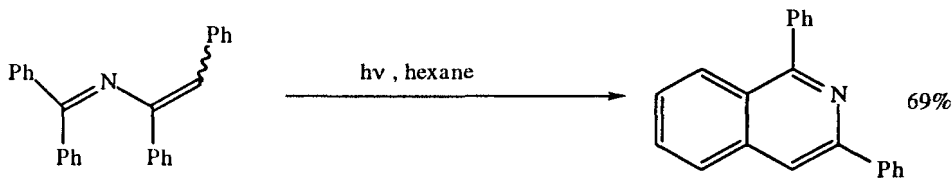
Duan, Z.; Nakajima, K.; Takahashi, T. *Chem. Commun.*, **2001**, 1672.



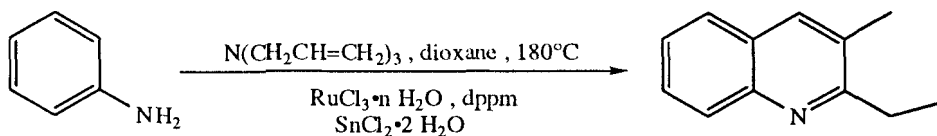
Tsutsui, H.; Narasaka, K. *Chem. Lett.*, **2001**, 526.



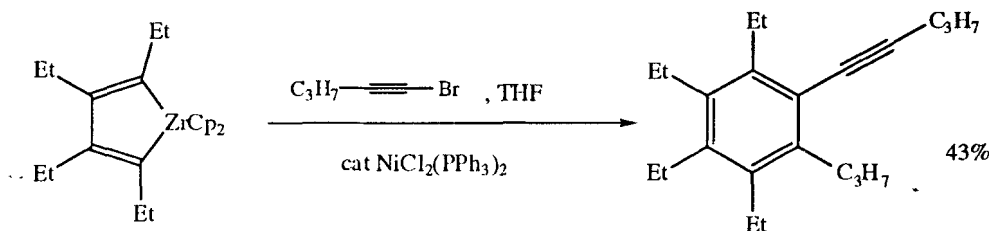
Wei, L.-L.; Hsung, R.P.; Sklenicka, H.M.; Gerasyuto, A.I. *Angew. Chem. Int. Ed.*, **2001**, *40*, 1516.



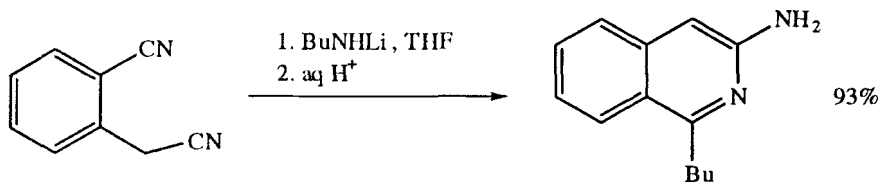
Campos, P.L.; Caro, M.; Rodríguez, M.A. *Tetrahedron Lett.*, **2001**, 42, 3575.



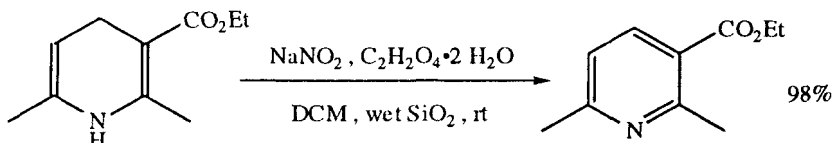
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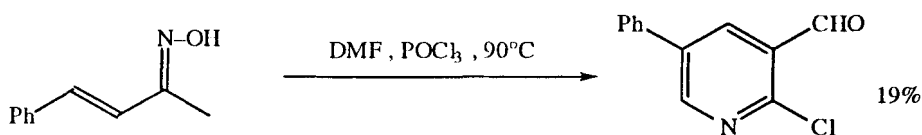
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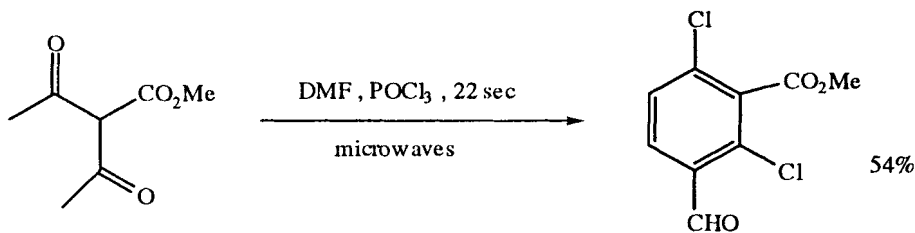
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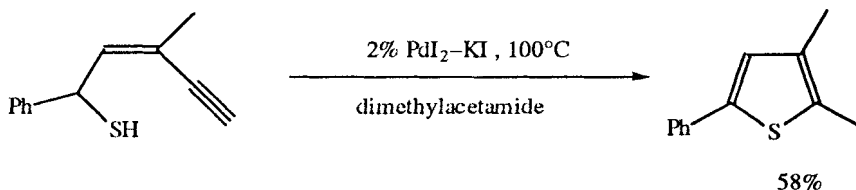
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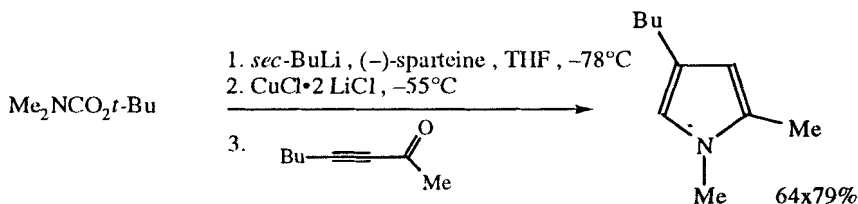
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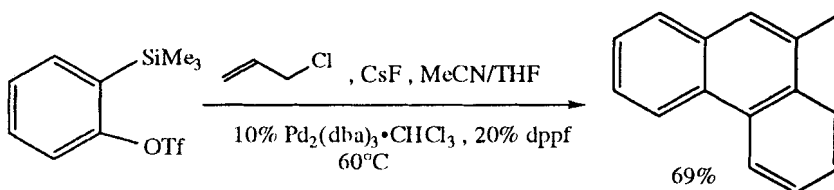
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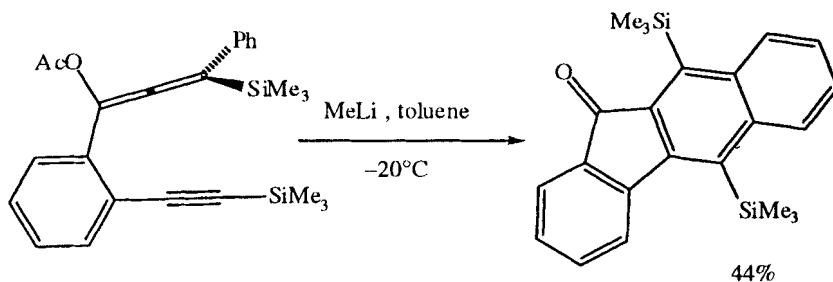
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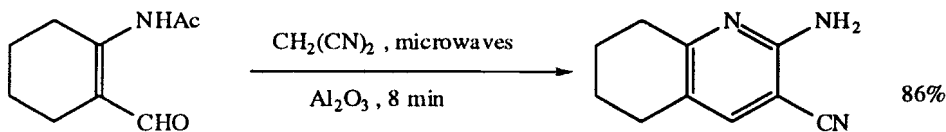
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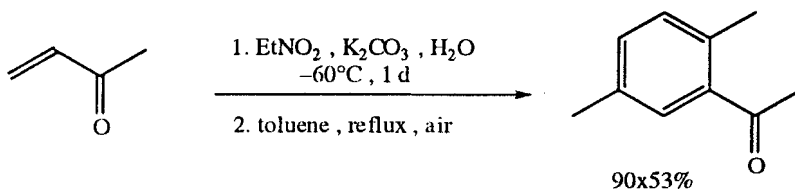
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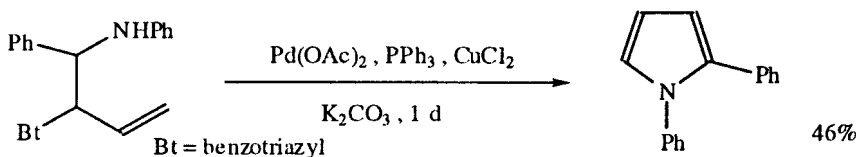
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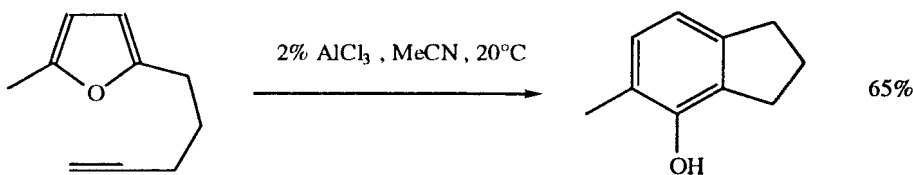
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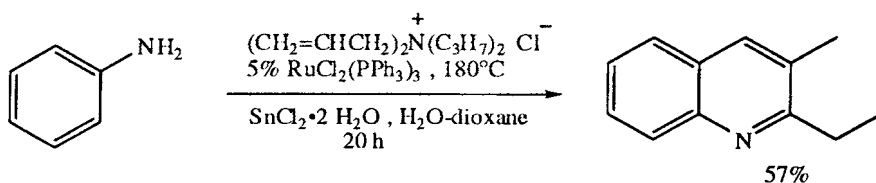
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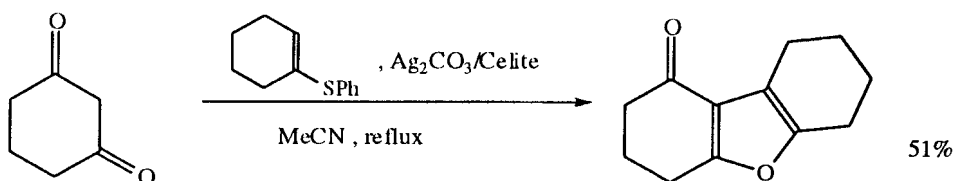
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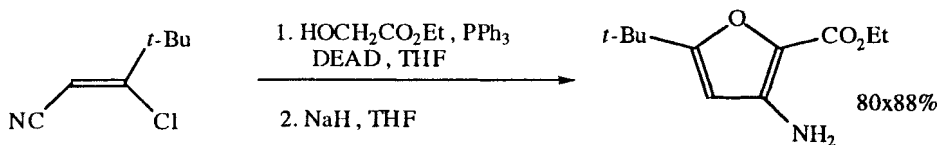
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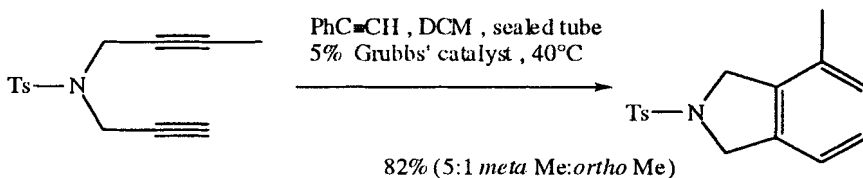
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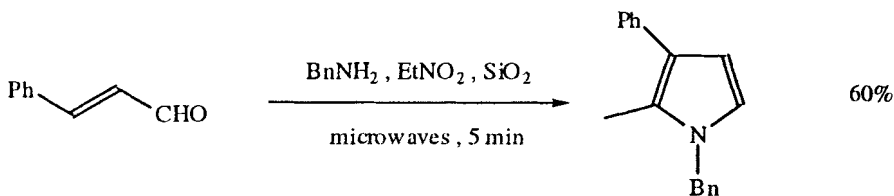
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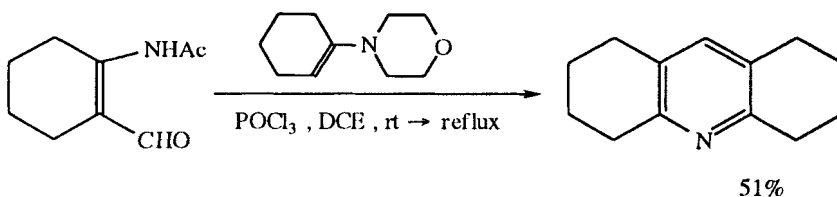
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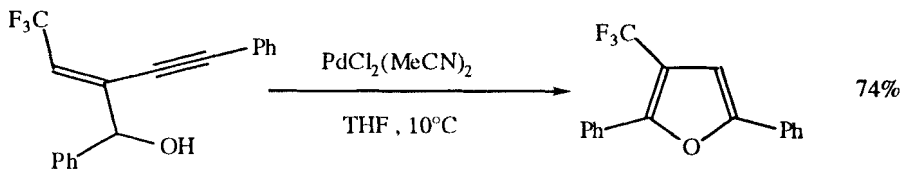
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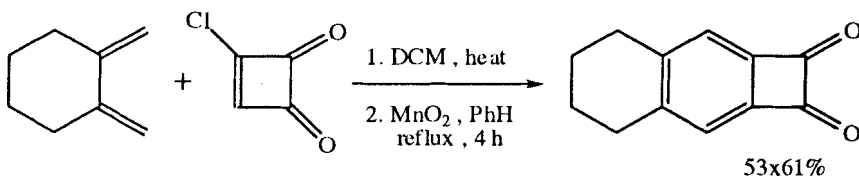
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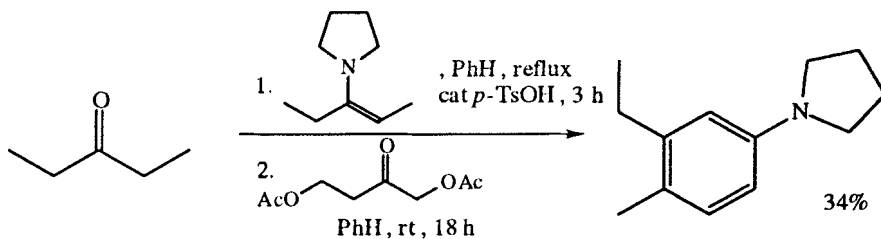


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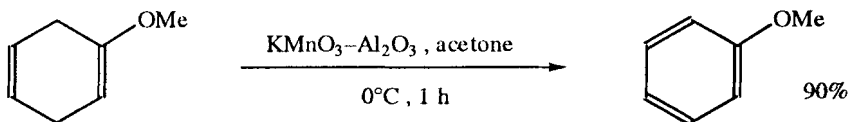


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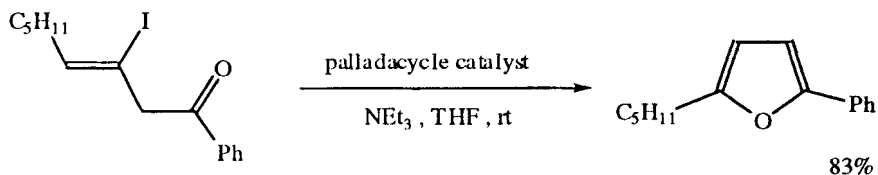




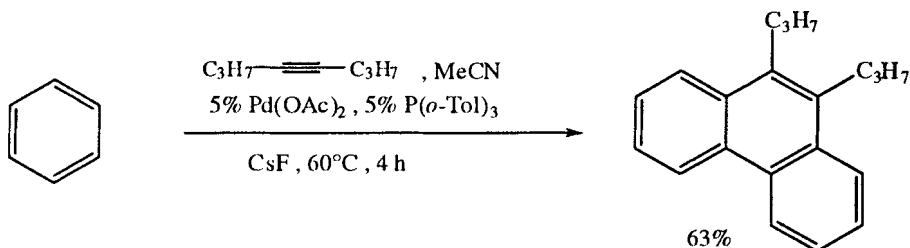
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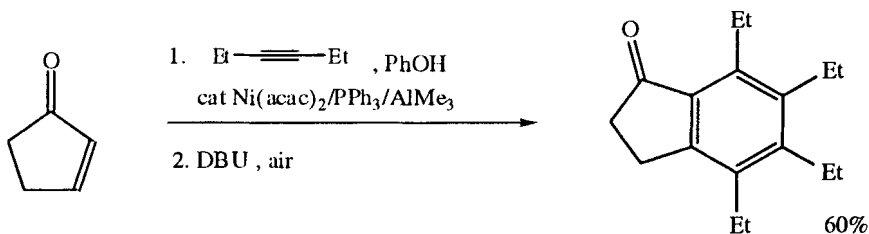
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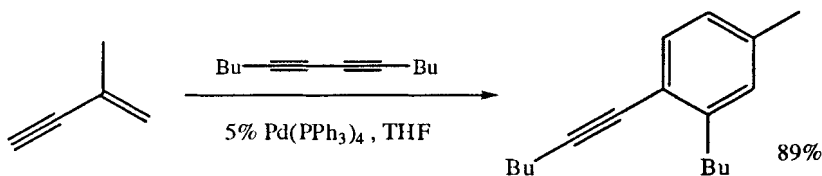
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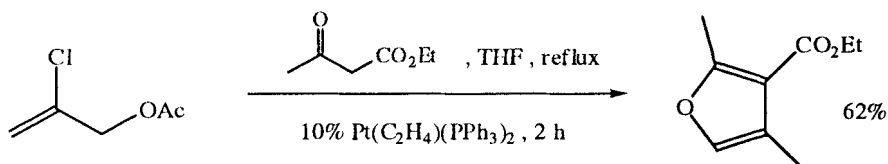
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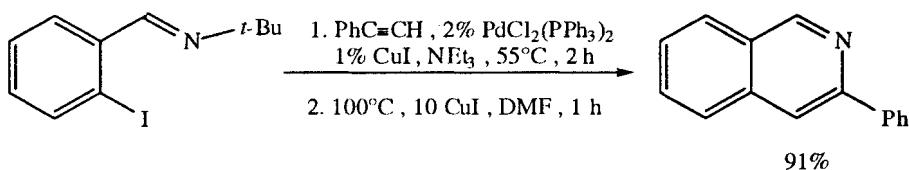
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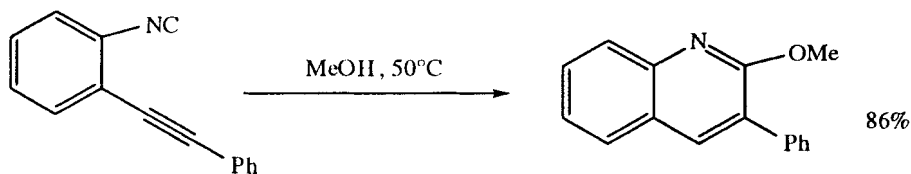
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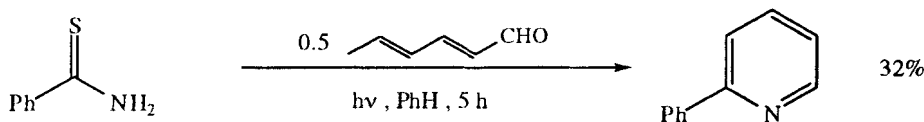
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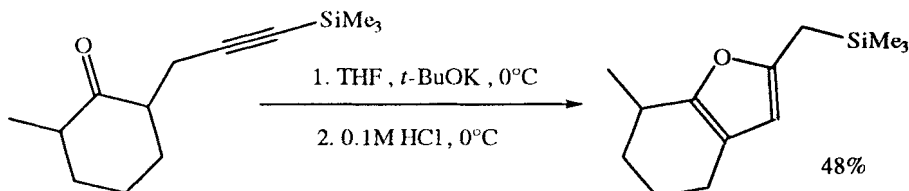
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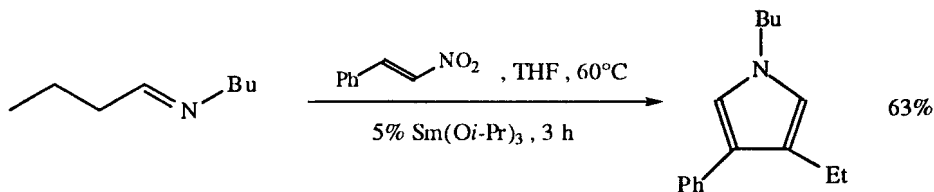
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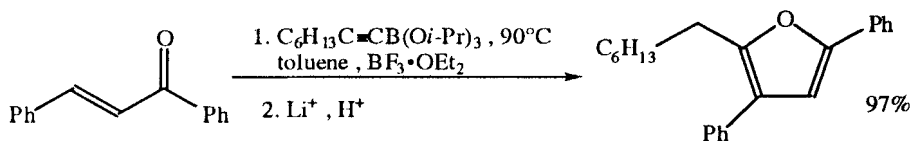
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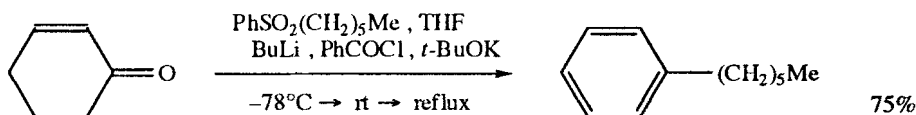
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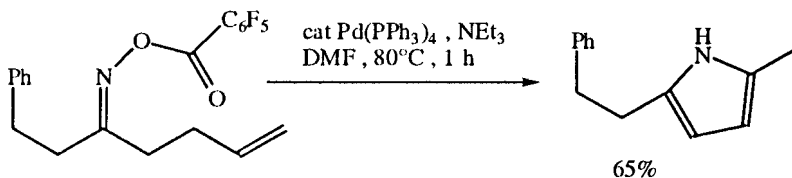
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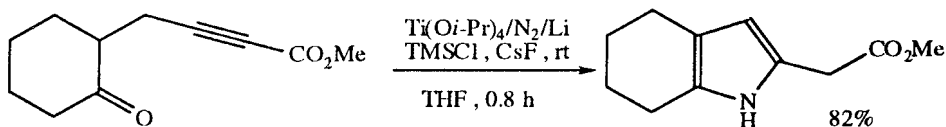
Brown, C.D.; Chong, J.M.; Shen, L. *Tetrahedron*, **1999**, *55*, 14235.



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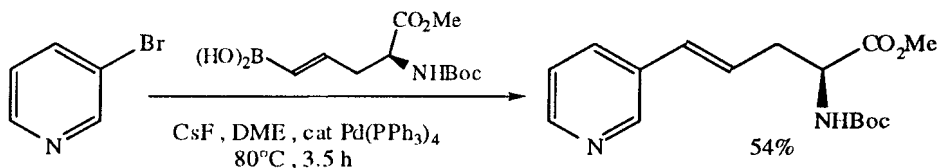


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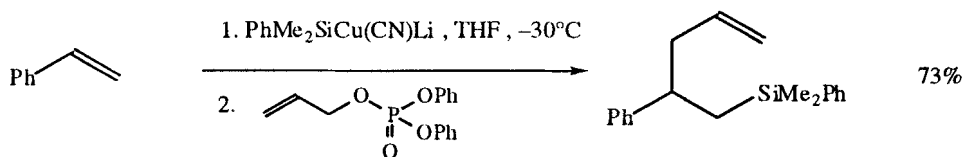


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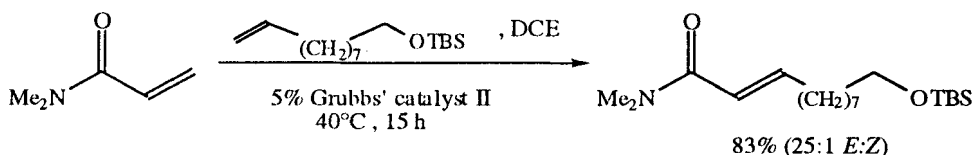
## SECTION 74C: ALKYLATIONS AND ARYLATIONS OF ALKENES



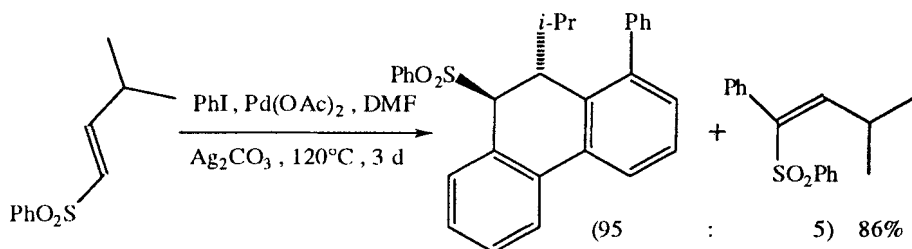
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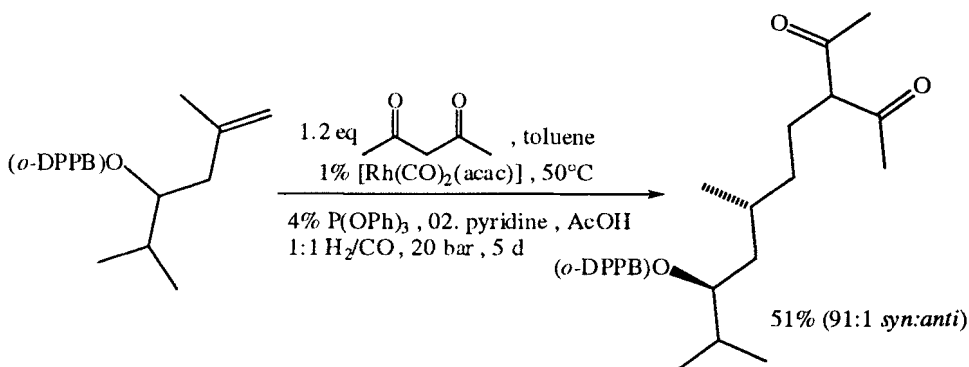
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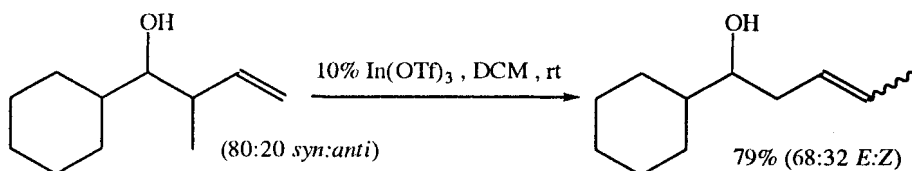
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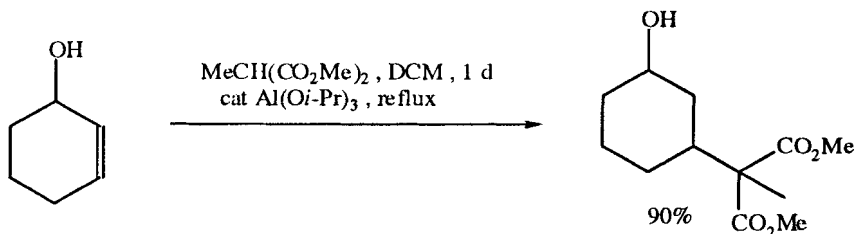
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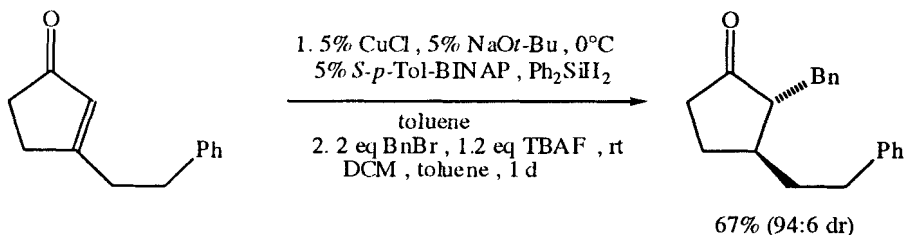
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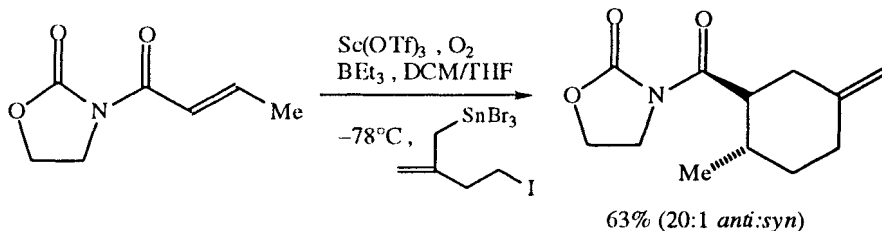
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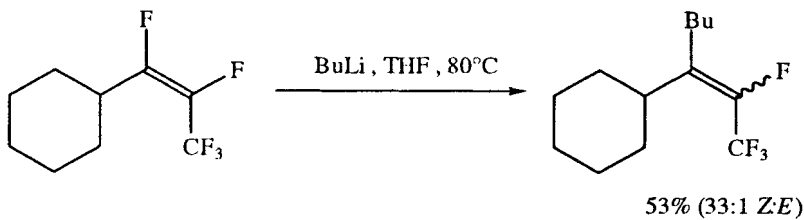
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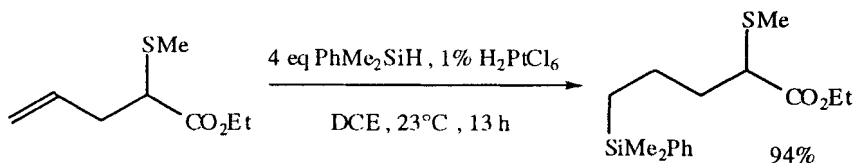
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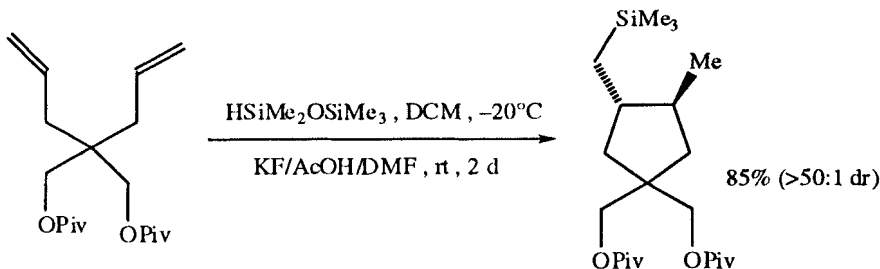
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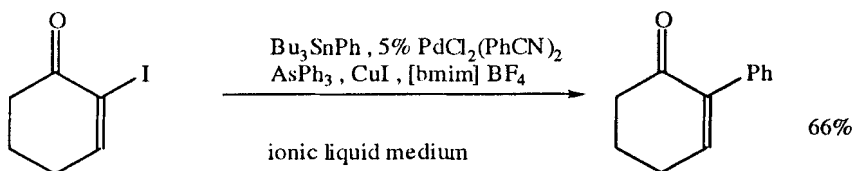
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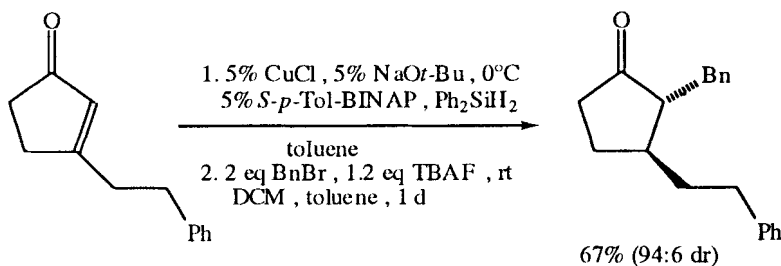
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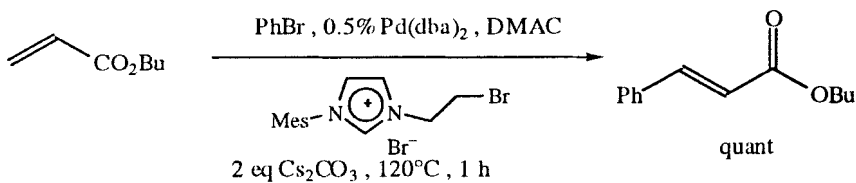
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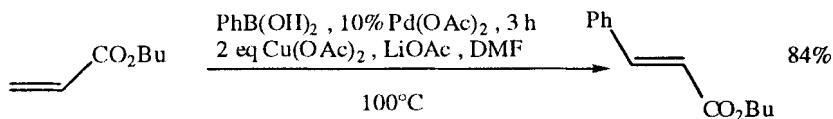
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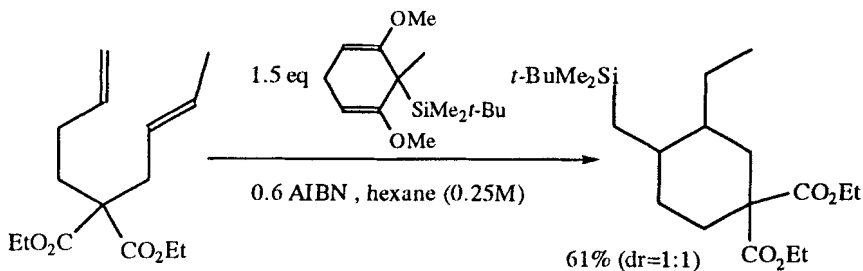
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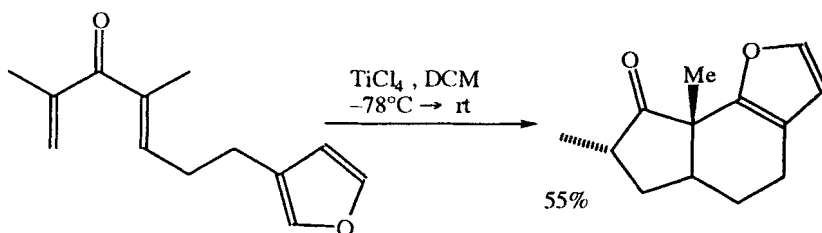
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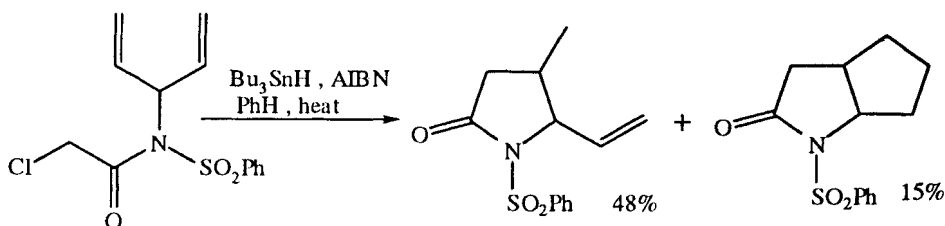
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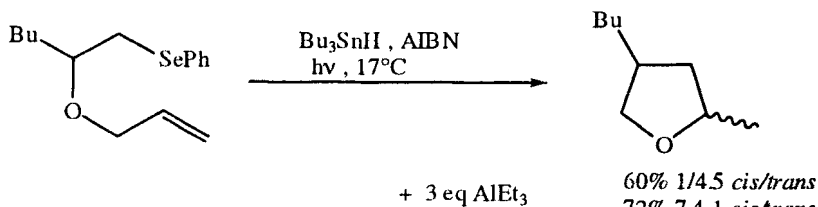
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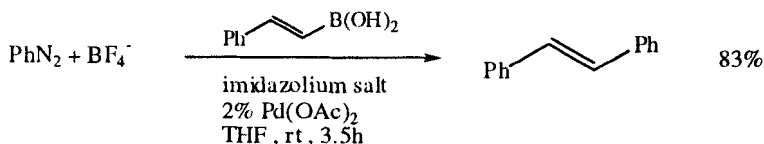
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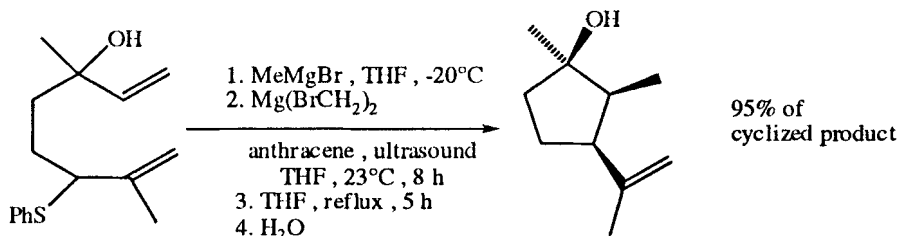
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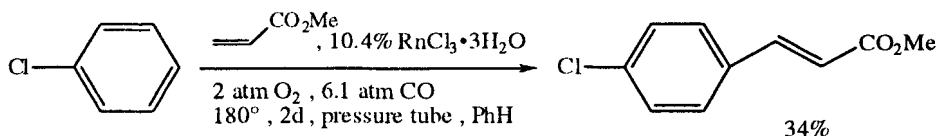
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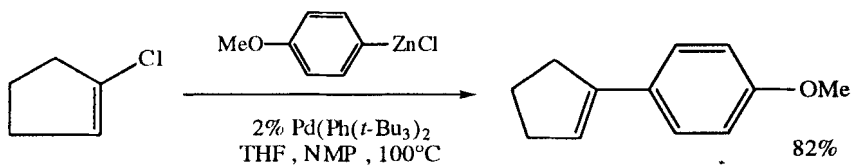
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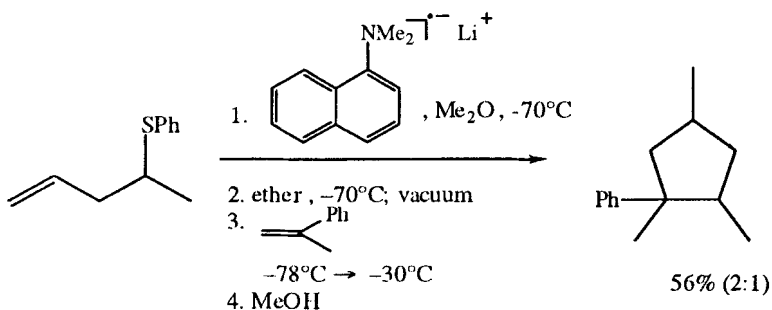
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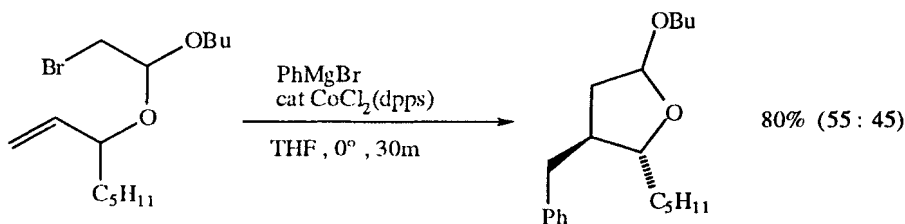
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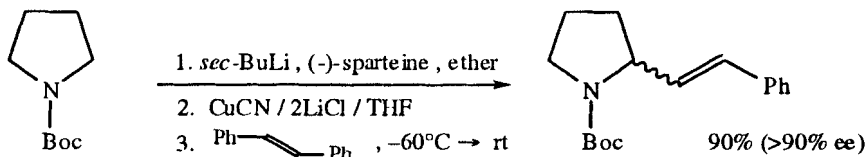


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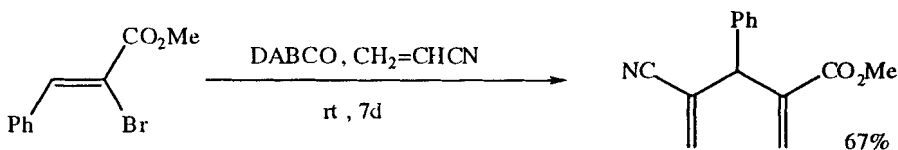


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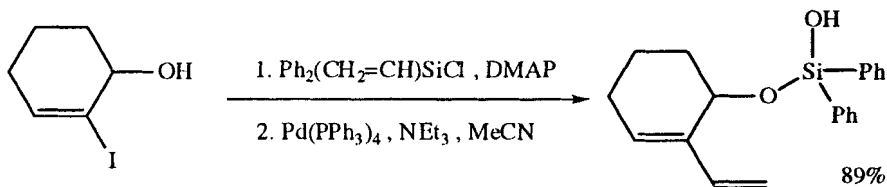




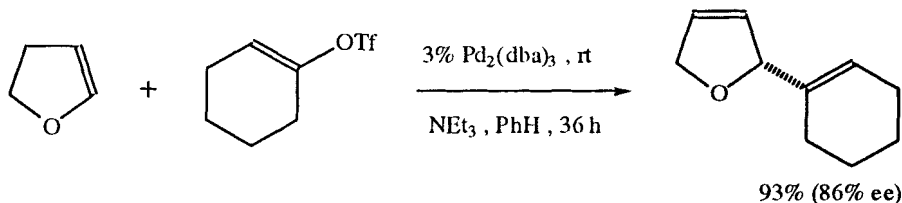
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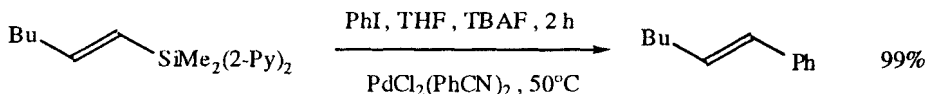
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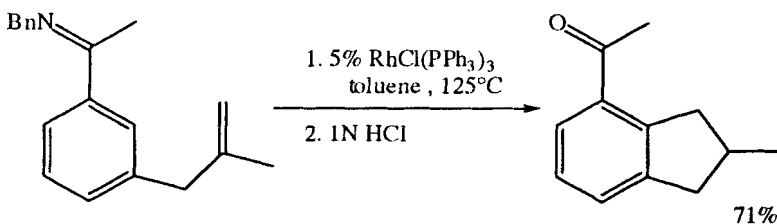
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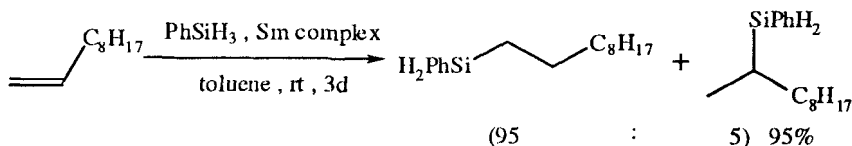
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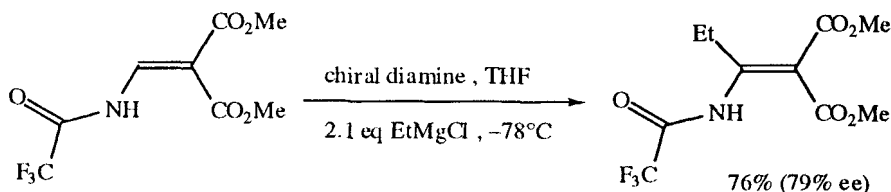
Itami, K.; Nokami, T.; Yoshida, J.-i. *J. Am. Chem. Soc.*, **2001**, *123*, 5600.



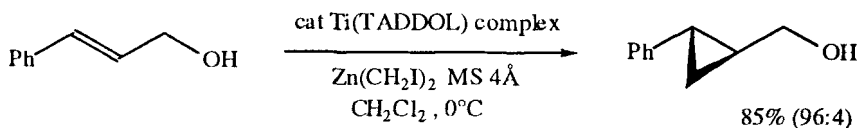
Thalji, R.K.; Ahrendt, K.A.; Bergman, R.G.; Ellman, J.A. *J. Am. Chem. Soc.*, **2001**, *123*, 9692.



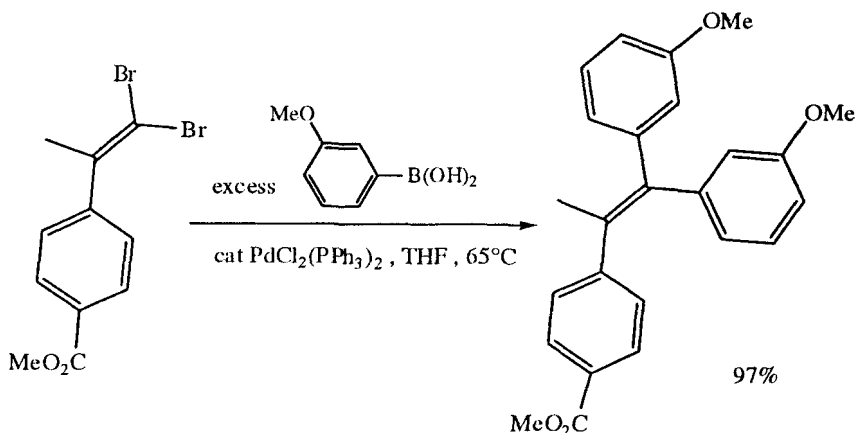
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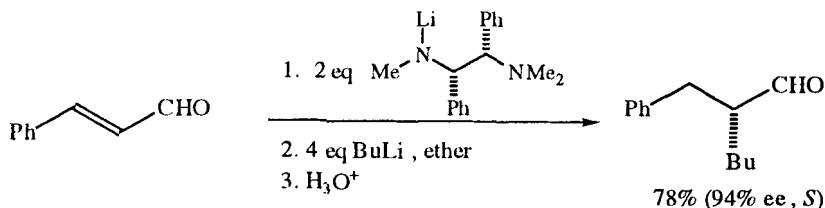
Sibi, M.P.; Asano, Y. *J. Am. Chem. Soc.*, **2001**, *123*, 9708.



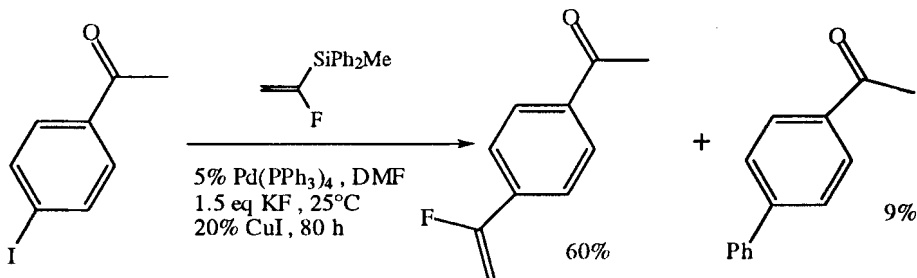
Charette, A.B.; Molinaro, C.; Brochu, C. *J. Am. Chem. Soc.*, **2001**, *123*, 12168.



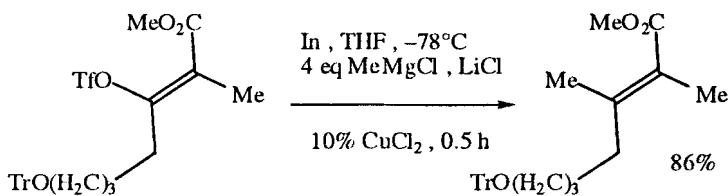
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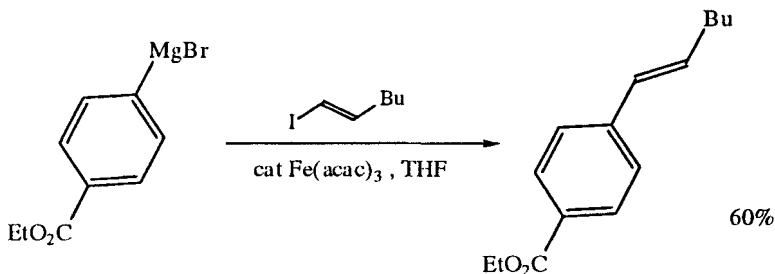
Brémond, N.; Mangeney, P.; Normant, J.F. *Tetrahedron Lett.*, **2001**, *42*, 1883.



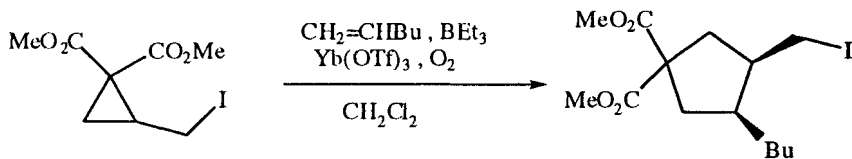
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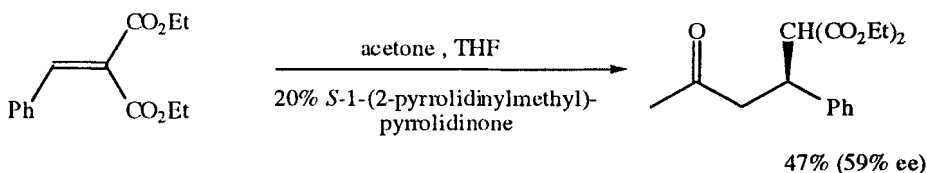
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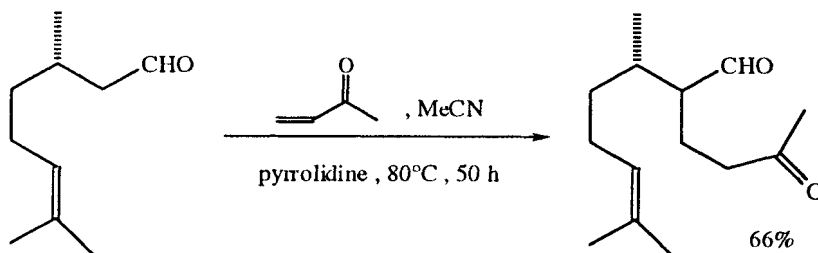
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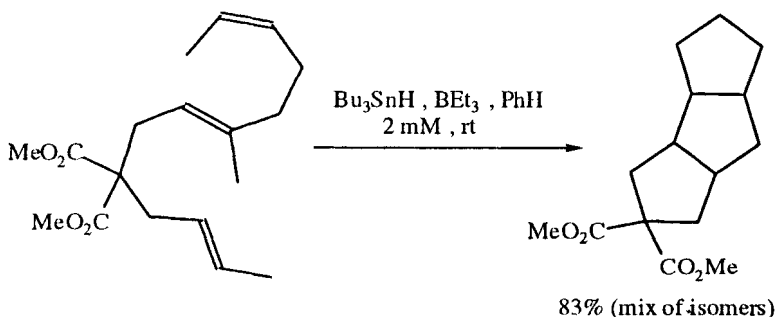
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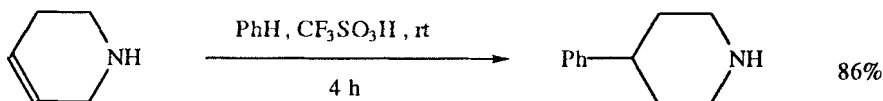
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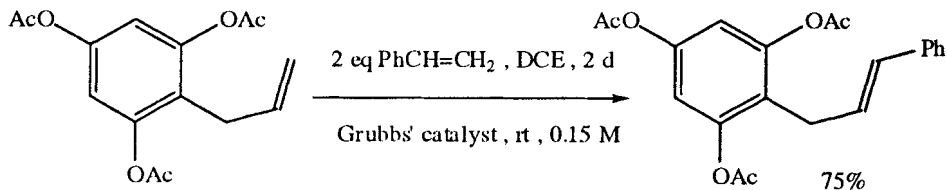
Hagiwara, H.; Okabe, T.; Hakoda, K.; Hoshi, T.; Ono, H.; Kamat, V.P.; Suzuki, T.; Ando, M. *Tetrahedron Lett.*, **2001**, 42, 2705.



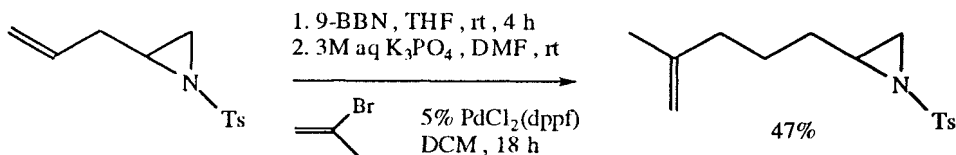
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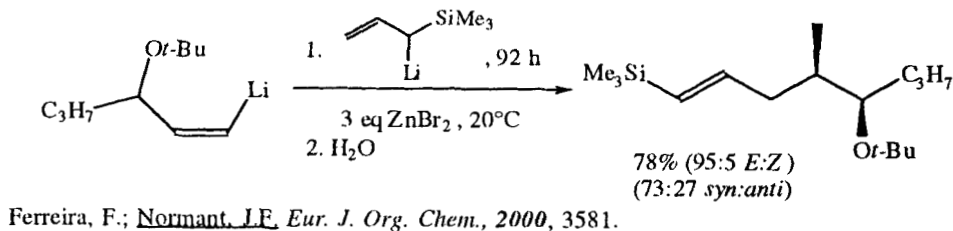
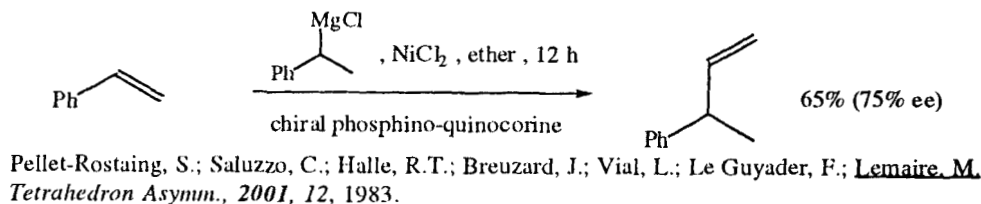
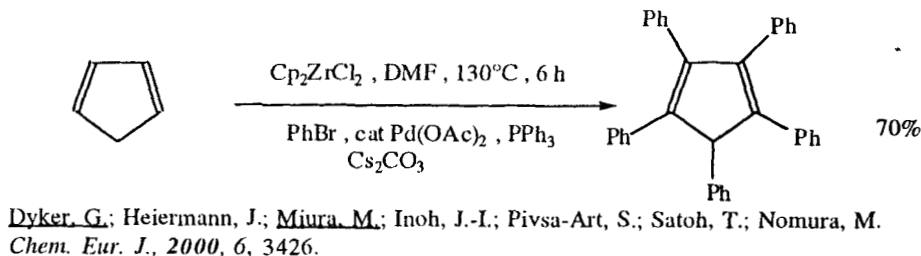
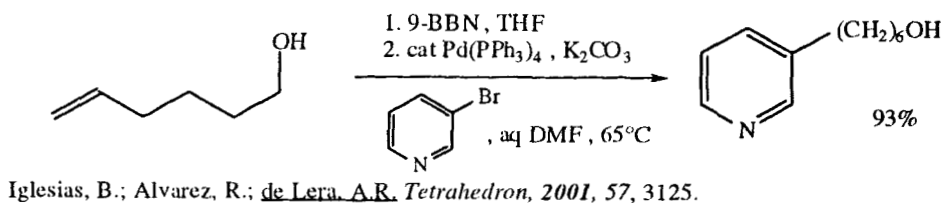
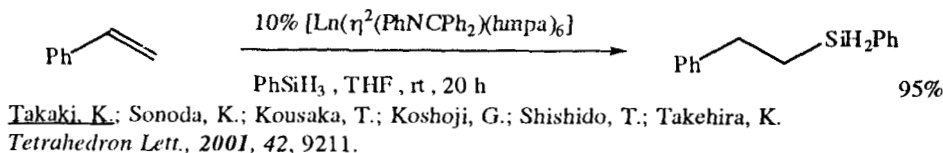
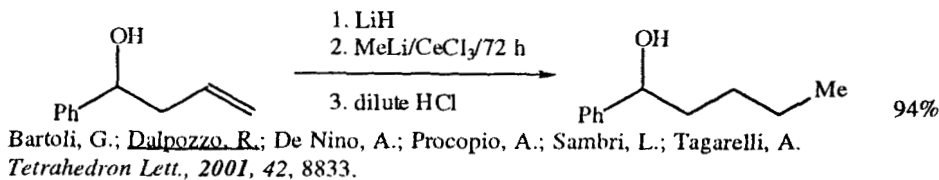
Klumpp, D.A.; Beauchamp, P.S.; Sanchez Jr., G.V.; Aguirre, S.; de Leon, S. *Tetrahedron Lett.*, **2001**, 42, 5821.

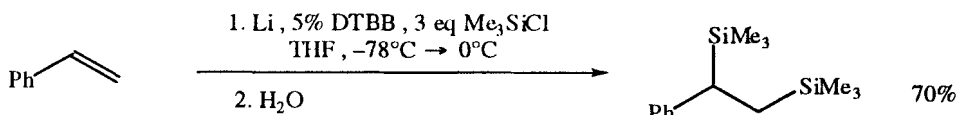


Forget-Champagne, D.; Mondon, M.; Fonteneau, N.; Gesson, J.-P. *Tetrahedron Lett.*, **2001**, 42, 7229.

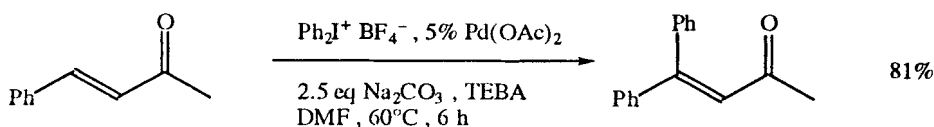


Lapinsky, D.J.; Bergmeier, S.C. *Tetrahedron Lett.*, **2001**, 42, 8583.

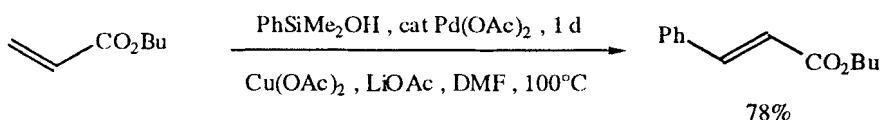




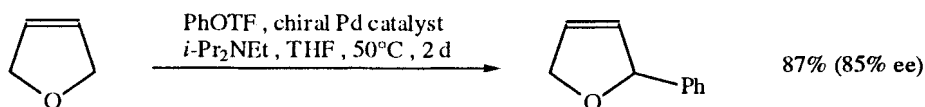
Yus, M.; Martínez, P.; Guijarro, D. *Tetrahedron*, 2001, 57, 10119.



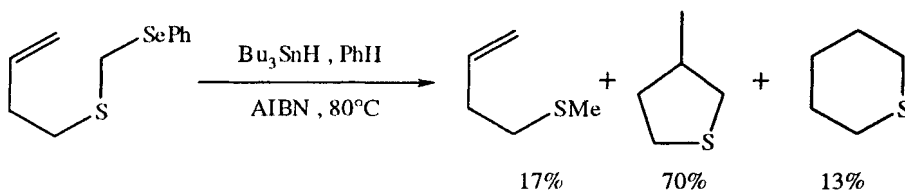
Xia, M.; Chen, Z.C. *Synth. Commun.*, 2000, 30, 1281.



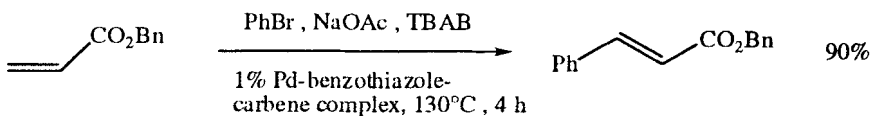
Hirabayashi, K.; Ando, J.-i.; Kawashima, J.; Nishihara, Y.; Mori, A.; Hiyama, T. *Bull. Chem. Soc. Jpn.*, 2000, 73, 1409.



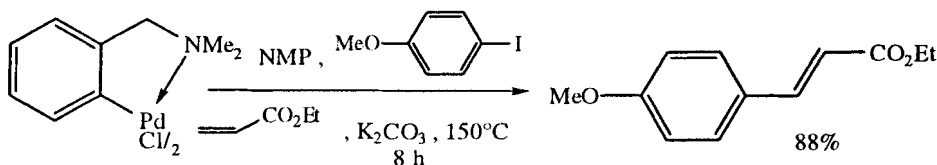
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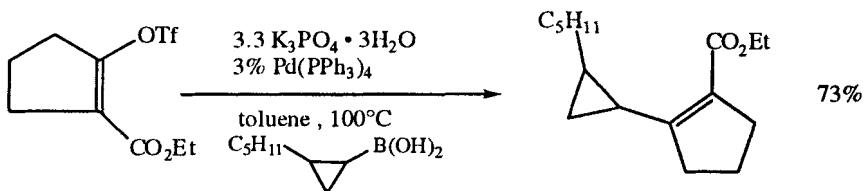
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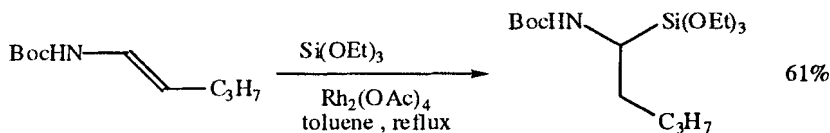
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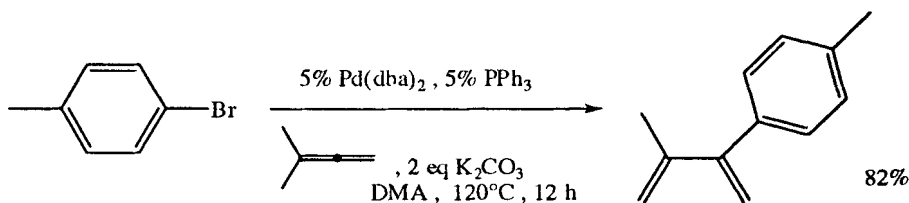
Iyer, S.; Ramesh, C. *Tetrahedron Lett.*, 2000, 41, 8981.



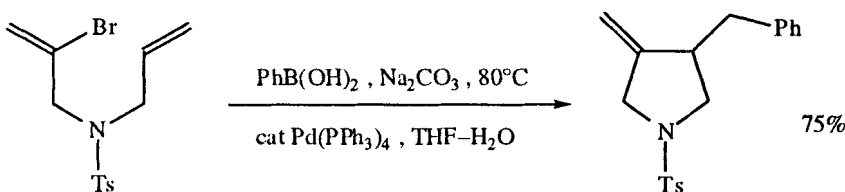
Yao, M.-L.; Deng, M.-Z. *Tetrahedron Lett.*, **2000**, *41*, 9083.



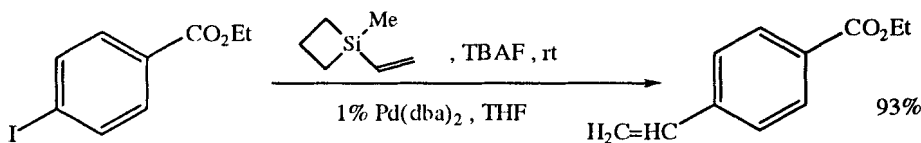
Hewitt, G.W.; Somers, J.J.; Sieburth, S.Mc.N. *Tetrahedron Lett.*, **2000**, *41*, 10175.



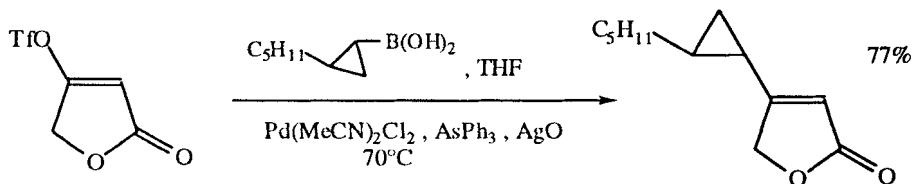
Chang, H.-M.; Cheng, C.-H. *J. Org. Chem.*, **2000**, *65*, 1767.



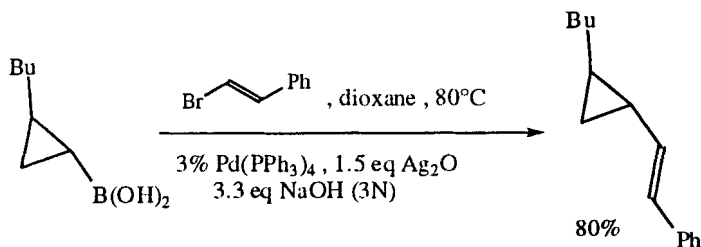
Lee, C.-W.; Oh, K.S.; Kim, K.S.; Ahn, K.H. *Org. Lett.*, **2000**, *2*, 1213.



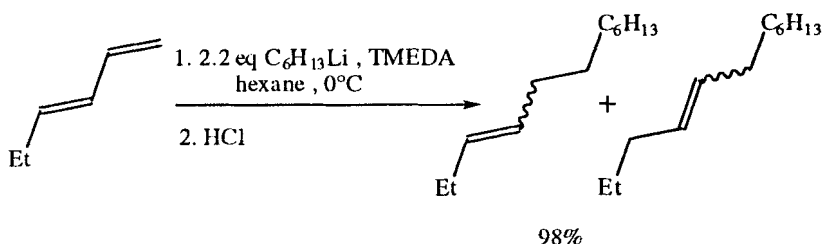
Denmark, S.E.; Wang, Z. *Synthesis*, **2000**, 999.



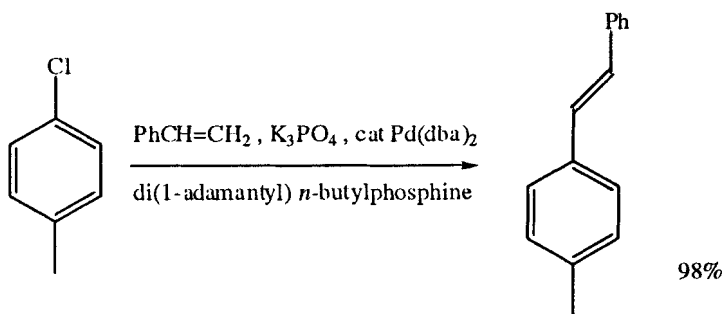
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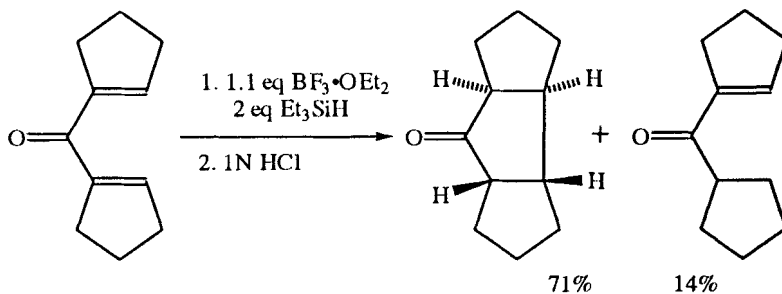
Zhou, S.-m.; Deng, M.-z. *Tetrahedron Lett.*, **2000**, *41*, 3951.



Norsikian, S.; Baudry, M.; Normant, J.F. *Tetrahedron Lett.*, **2000**, *41*, 6575.

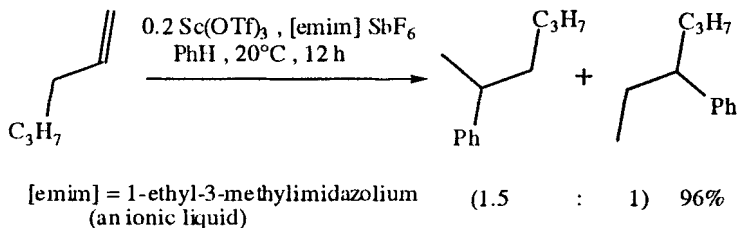


Ehrentraut, A.; Zapf, A.; Beller, M. *Synlett*, **2000**, 1577.

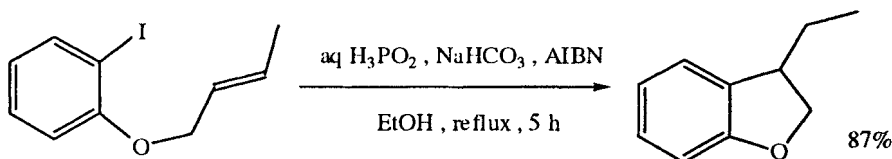


Giese, S.; West, F.G. *Tetrahedron*, **2000**, *56*, 10221.

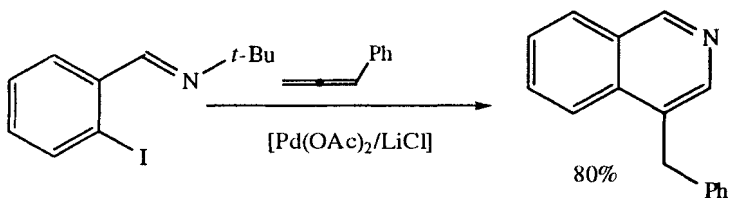




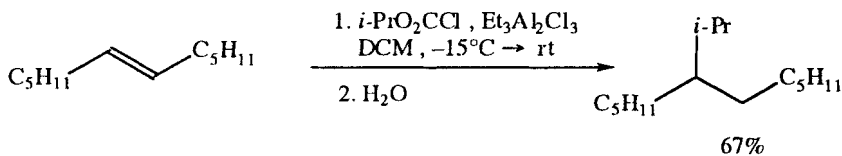
Song, C.E.; Shim, W.H.; Roh, E.J.; Choi, J.H. *Chem. Commun.*, **2000**, 1695.



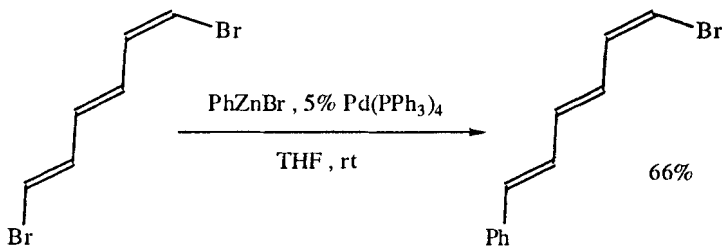
Yorimitsu, H.; Shinokubo, H.; Oshima, K. *Chem. Lett.*, **2000**, 104.



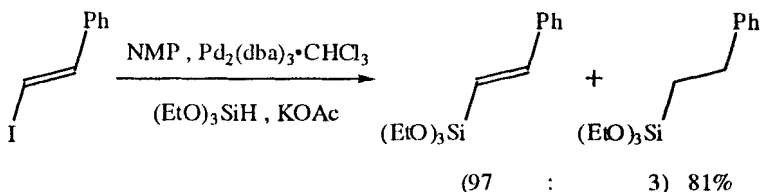
Diederer, J.J.H.; Sinkeldam, R.W.; Frühauf, H.-W.; Hiemstra, H.; Vrieze, K. *Tetrahedron Lett.*, **1999**, *40*, 4255.



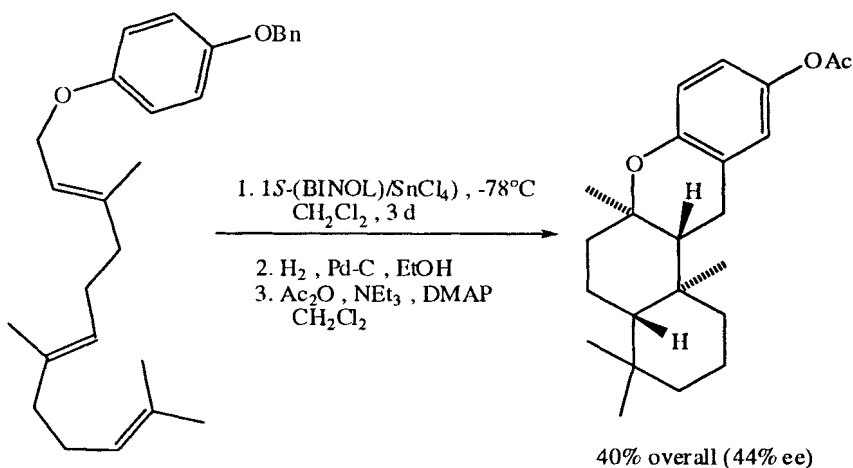
Biermann, U.; Metzger, J.O. *Angew. Chem. Int. Ed.*, **1999**, *38*, 3675.



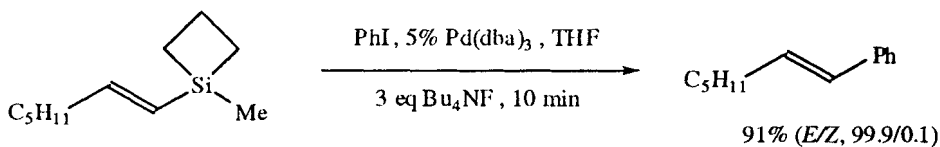
Villiers, P.; Vicart, N.; Ramondenc, Y.; Plé, G. *Tetrahedron Lett.*, **1999**, *40*, 8781.



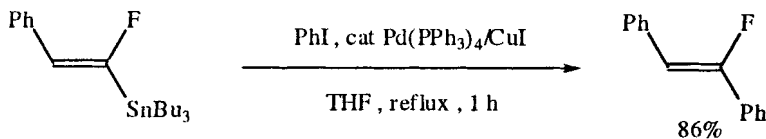
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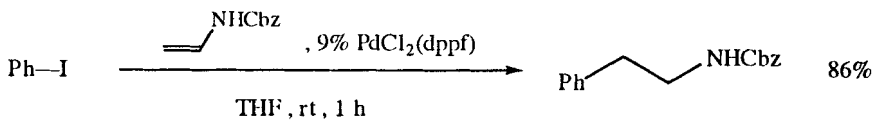
Ishihara, K.; Nakamura, S.; Yamamoto, H. *J. Am. Chem. Soc.*, **1999**, *121*, 4906.



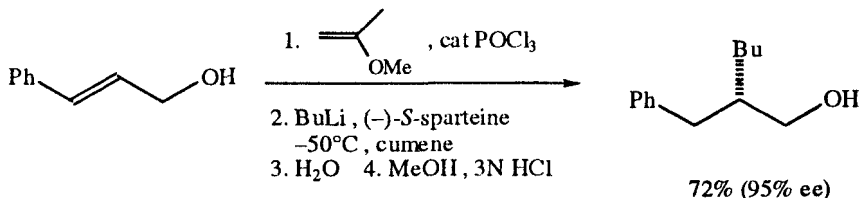
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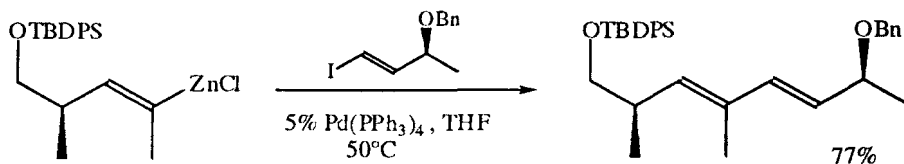
Chen, C.; Wilcoxon, K.; Zhu, Y.-F.; Kim, K.-i.; McCarthy, J.R. *J. Org. Chem.*, **1999**, *64*, 3476.



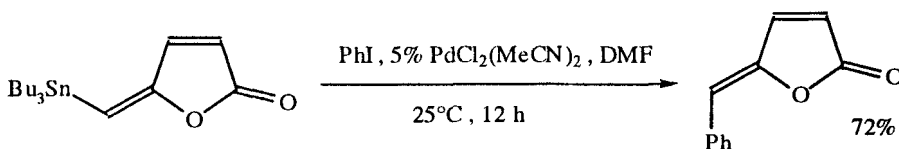
Kamatani, A.; Overman, L.E. *J. Org. Chem.*, **1999**, *64*, 8743.



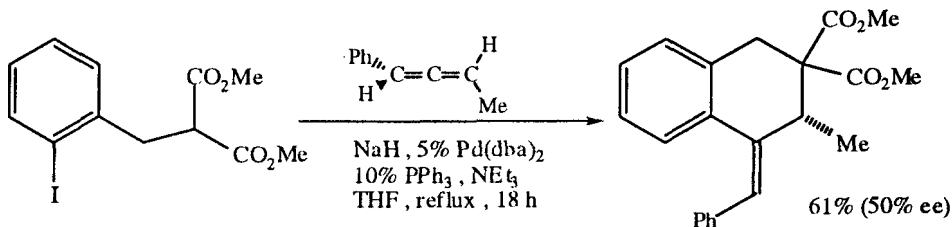
Norsikian, S.; Marek, I.; Poisson, J.-F.; Normant, J.F. *J. Org. Chem.*, **1999**, *64*, 4898.



Panek, L.S.; Hu, T. *J. Org. Chem.*, **1999**, *64*, 4912.



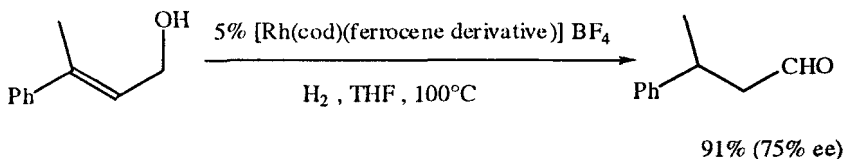
Rousset, S.; Abarbri, M.; Thibonnet, J.; Duchêne, A.; Parrain, J.-L. *Org. Lett.*, **1999**, *1*, 701.



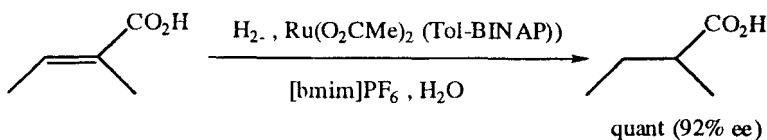
Kato, F.; Hiratsuka, Y.; Mitsui, T.; Watanabe, T.; Hiroi, K. *Heterocycles*, **1999**, *50*, 83.

## SECTION 74D: CONJUGATE REDUCTION OF $\alpha,\beta$ -UNSATURATED CARBONYL COMPOUNDS AND NITRILES

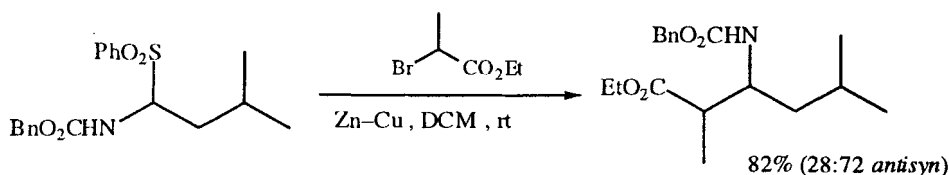
### ASYMMETRIC REDUCTIONS



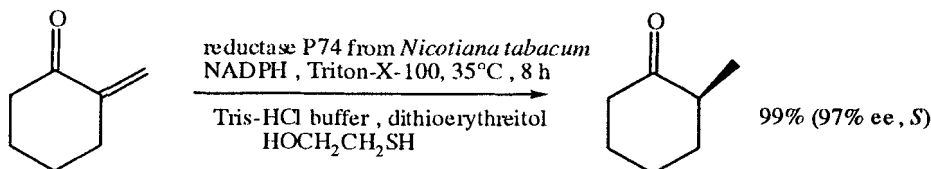
Tanaka, K.; Fu, G.C. *J. Org. Chem.*, **2001**, *66*, 8177.



Brown, R.A.; Pollet, P.; McKoon, E.; Eckert, C.A.; Liotta, C.L.; Jessop, P.G.  
*J. Am. Chem. Soc.*, **2001**, *123*, 1254.

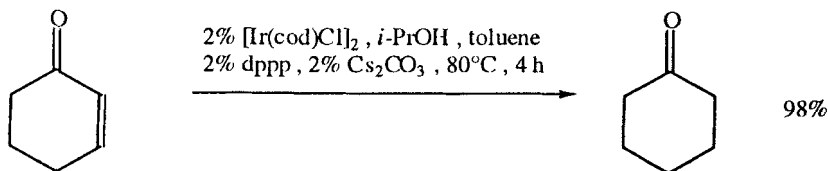


Li, W.; Zhang, Z.; Xiao, D.; Zhang, C. *J. Org. Chem.*, **2000**, *65*, 3489.

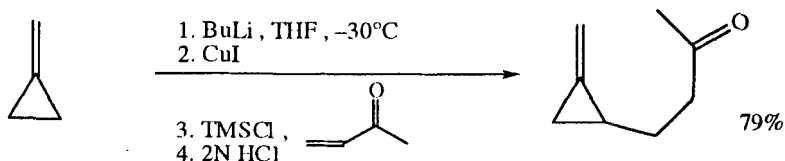


Hirata, T.; Shimoda, K.; Gondai, T. *Chem. Lett.*, **2000**, 850.

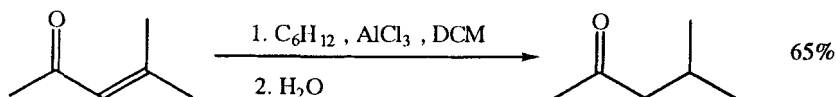
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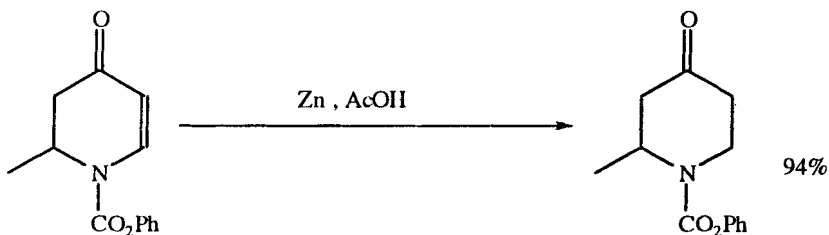
Sakaguchi, S.; Yamaga, T.; Ishii, Y. *J. Org. Chem.*, **2001**, *66*, 4710.



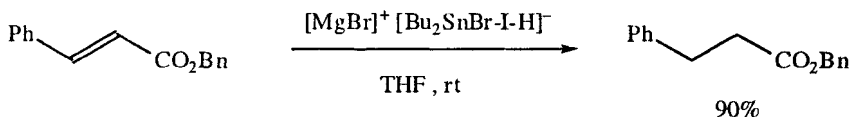
Peron, G.; Norton, D.; Kitteringham, J.; Kilburn, J.D. *Tetrahedron Lett.*, **2001**, *42*, 347.



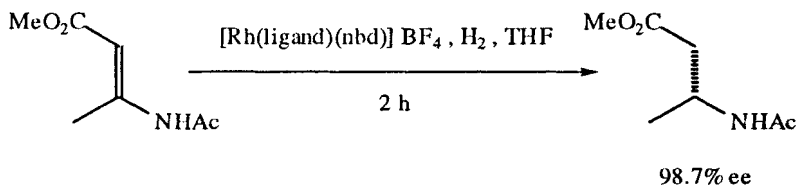
Shirini, F.; Zolfigol, M.A.; Azadbar, M.R. *Russ. J. Org. Chem.*, **2001**, *37*, 1600.



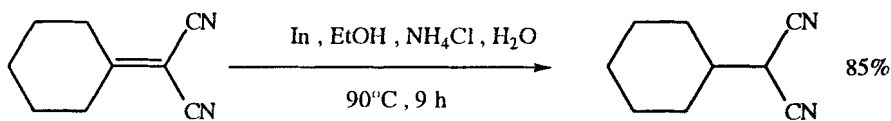
Comins, D.L.; Brooks, C.A.; Ingalls, C.L. *J. Org. Chem.*, **2001**, 66, 2181.



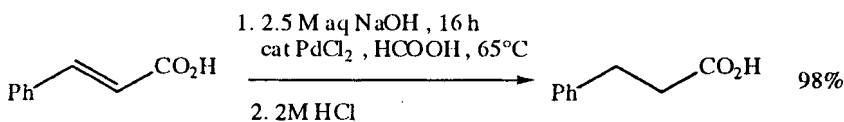
Shibata, I.; Suwa, T.; Ryu, K.; Baba, A. *J. Org. Chem.*, **2001**, 66, 8690.



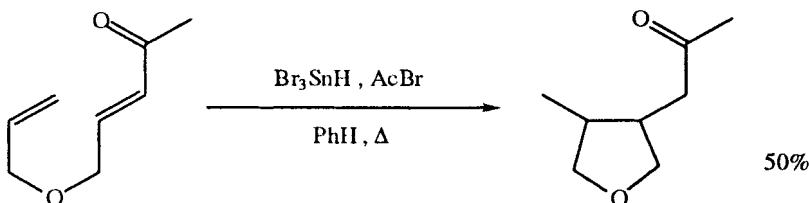
Yasutake, M.; Gridnev, I.D.; Higashi, N.; Imamoto, T. *Org. Lett.*, **2001**, 3, 1701.



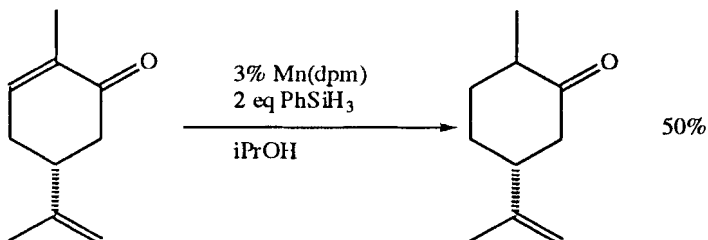
Ranu, B.C.; Dutta, J.; Guchhait, S.K. *Org. Lett.*, **2001**, 3, 2603.



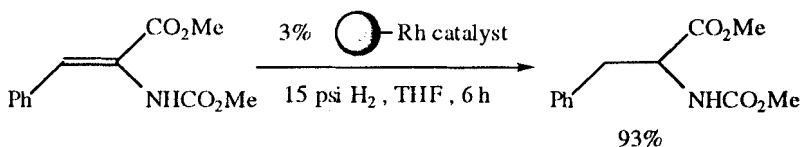
Arterburn, J.B.; Pannala, M.; Gonzalez, A.M.; Chamberlin, R.M. *Tetrahedron Lett.*, **2000**, 41, 7847.



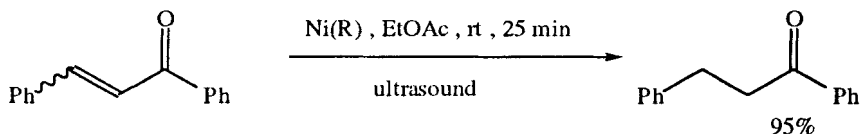
Bebbington, D.; Bentley, J.; Nilsson, P.A.; Parsons, A.E. *Tetrahedron Lett.*, **2000**, 41, 8941.



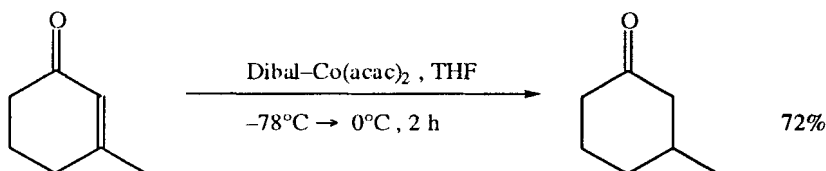
Magnus, P.; Waring, M.J.; Scott, D.A. *Tetrahedron Lett.*, **2000**, *41*, 9731.



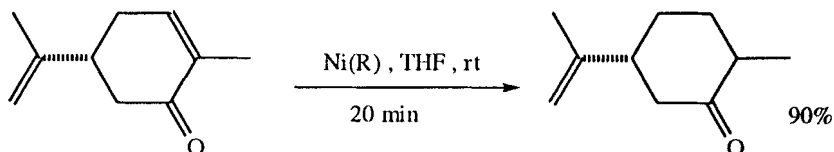
Taylor, R.A.; Santora, B.P.; Gagné, M.R. *Org. Lett.*, **2000**, *2*, 1781.



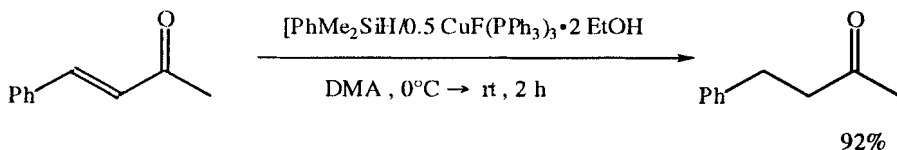
Wang, H.; Lian, H.; Chen, J.; Pan, Y.; Shi, Y. *Synth. Commun.*, **1999**, *29*, 129.



Ikeno, T.; Kimura, T.; Ohtsuka, Y.; Yamada, T. *Synlett*, **1999**, 96.



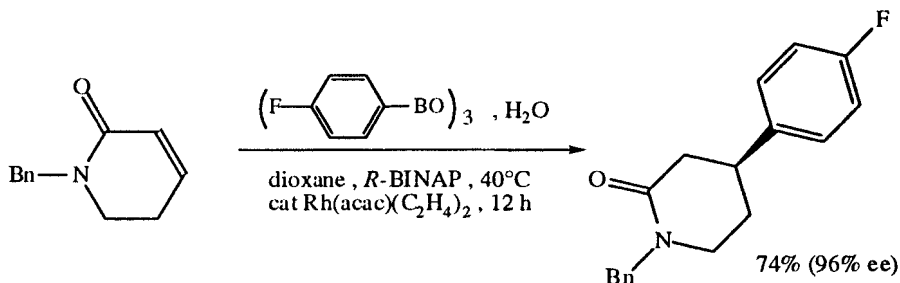
Barrero, A.F.; Alvarez-Manzaneda, E.J.; Chahboun, R.; Meneses, R. *Synlett*, **1999**, 1663.



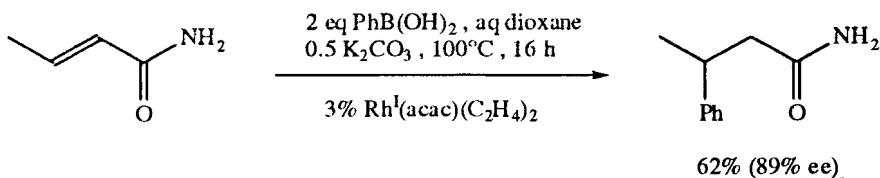
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## SECTION 74E: CONJUGATE ALKYLATIONS

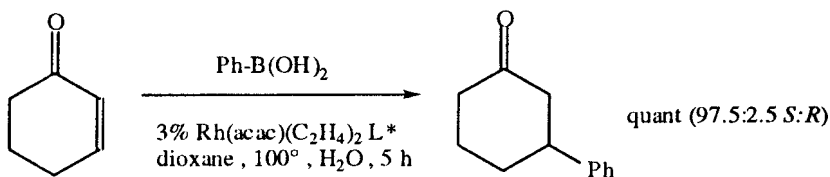
## ASYMMETRIC ALKYLATIONS



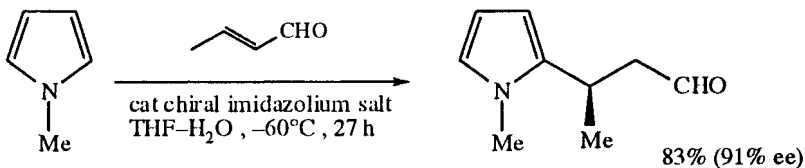
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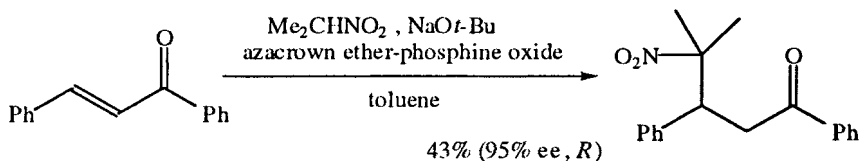
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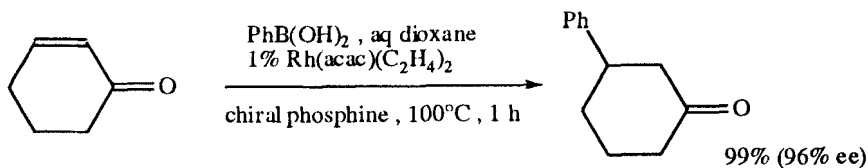
Reetz, M.T.; Moulin, D.; Gosberg, A. *Org. Lett.*, **2001**, *3*, 4083.



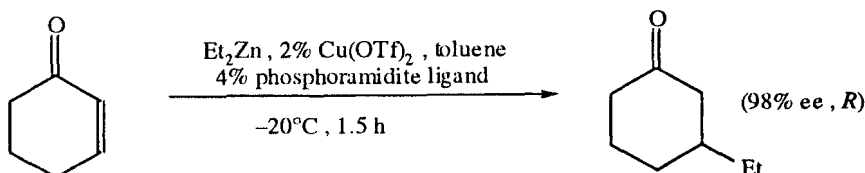
Paras, N.A.; MacMillan, D.W.C. *J. Am. Chem. Soc.*, **2001**, *123*, 4370.



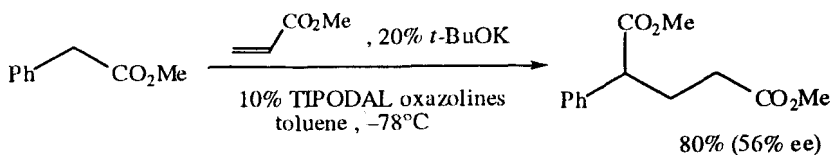
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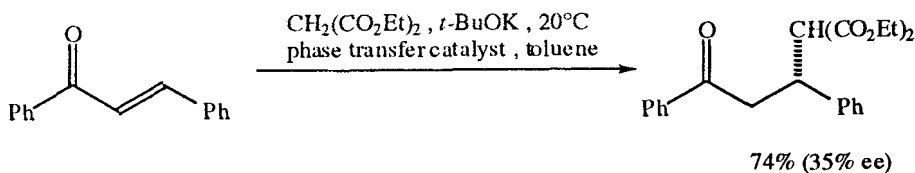
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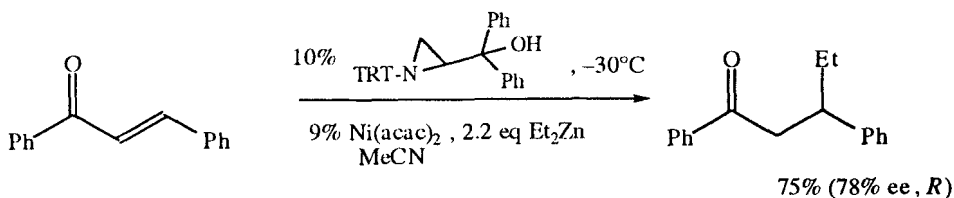
Alexakis, A.; Rosset, S.; Allamand, J.; March, S.; Guillen, F.; Benhaim, C. *Synlett*, **2001**, 1375.



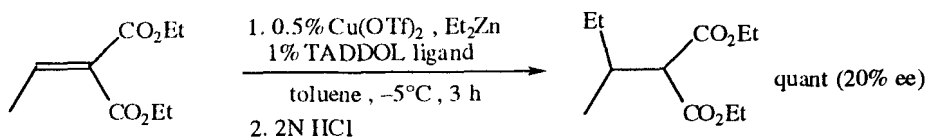
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Kim, D.Y.; Huh, S.C.; Kim, S.M. *Tetrahedron Lett.*, **2001**, 42, 6299.

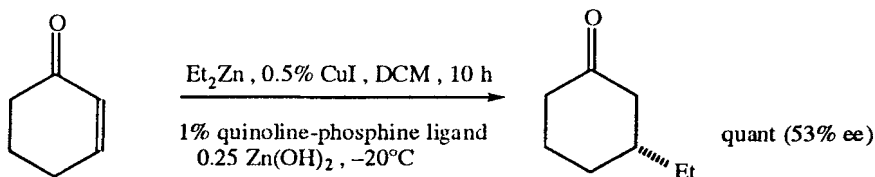


Shadakshari, U.; Nayak, S.K. *Tetrahedron*, **2001**, 57, 8185.

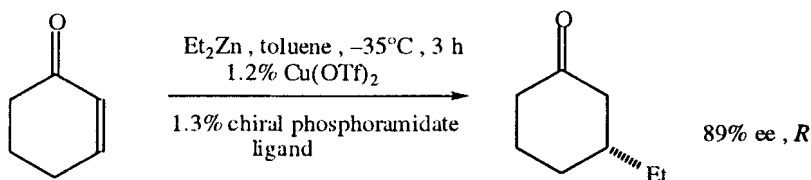


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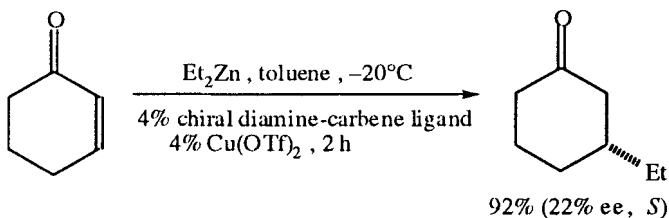




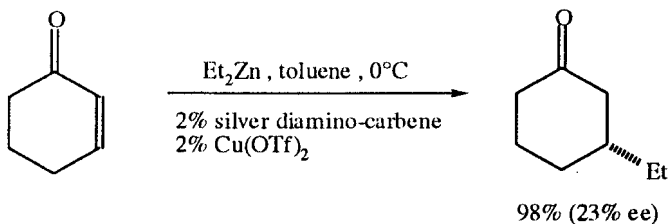
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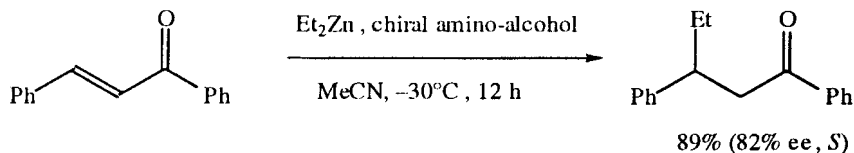
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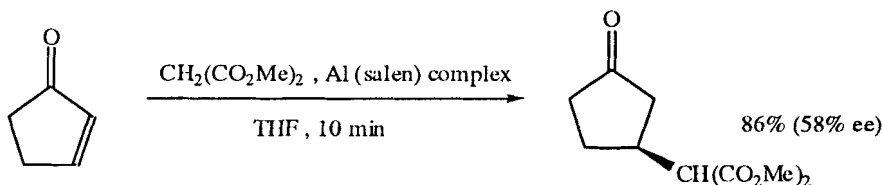
Guillen, F.; Winn, C.L.; Alexakis, A. *Tetrahedron Asymm.*, **2001**, *12*, 2083.



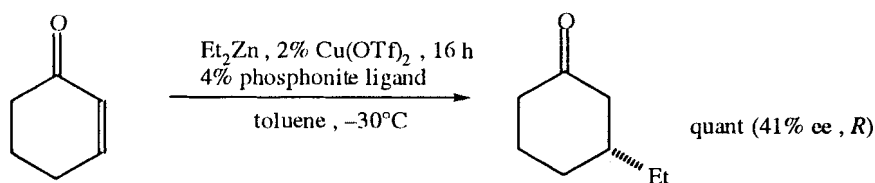
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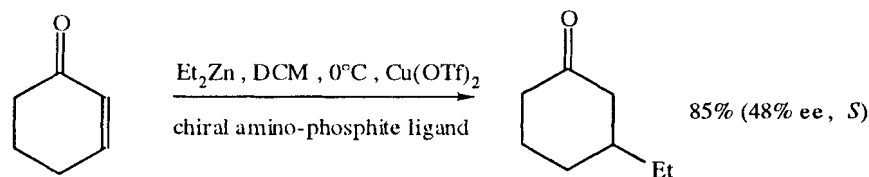
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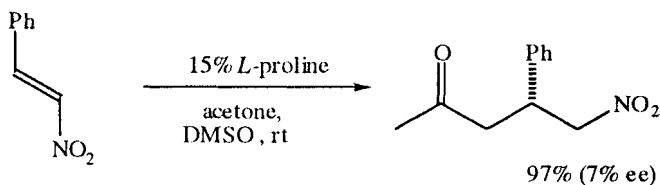
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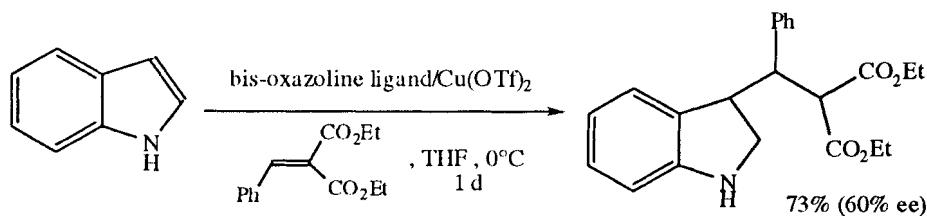
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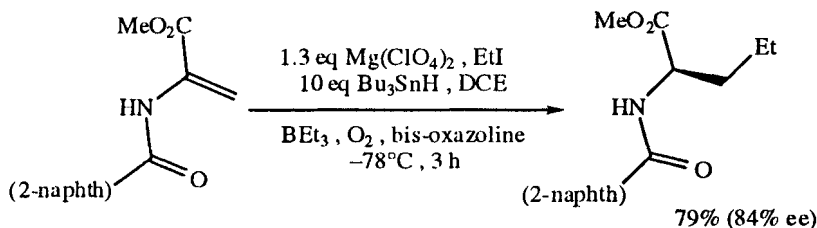
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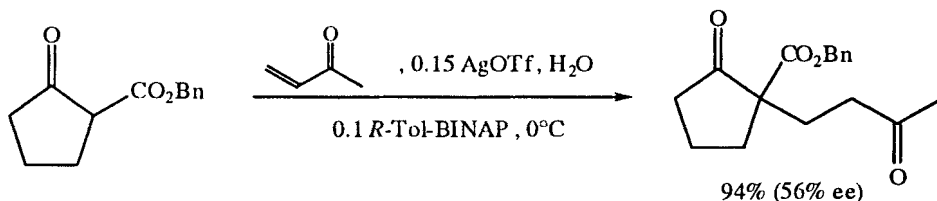
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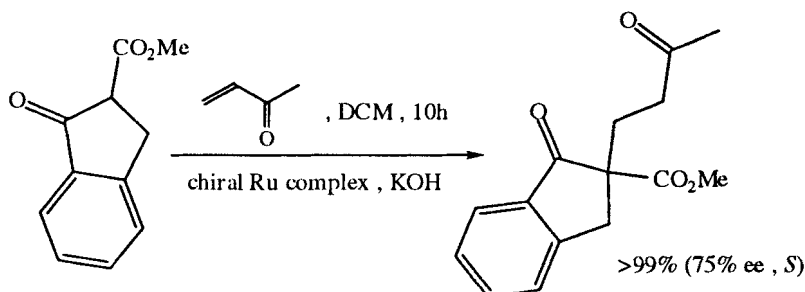
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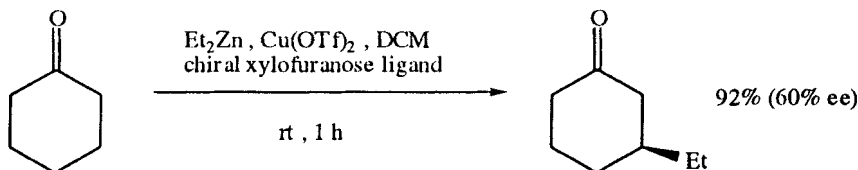
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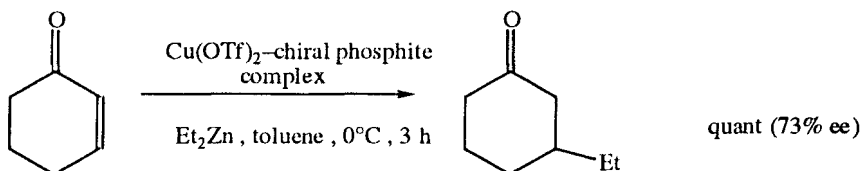
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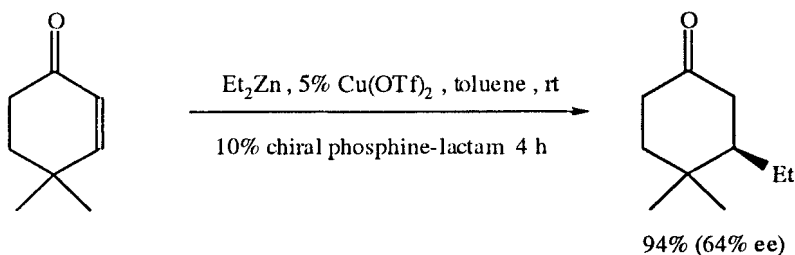
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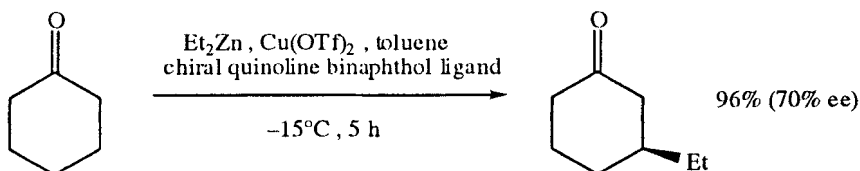
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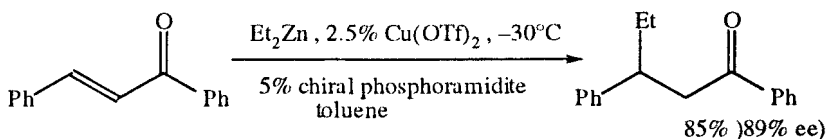
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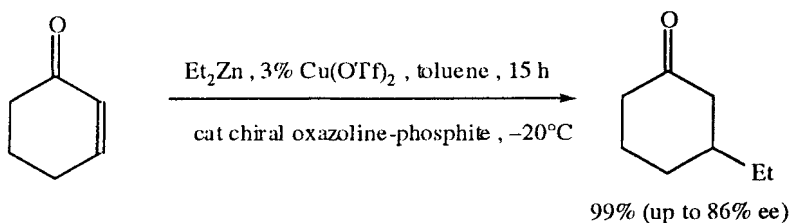
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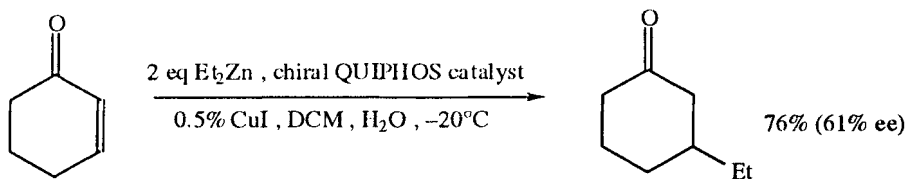
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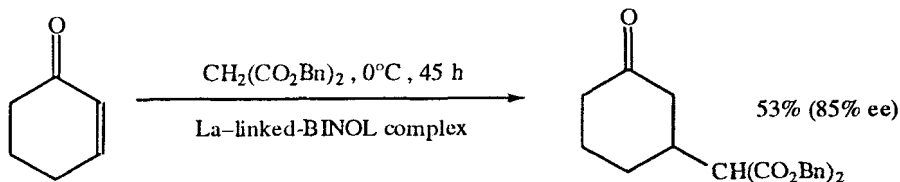
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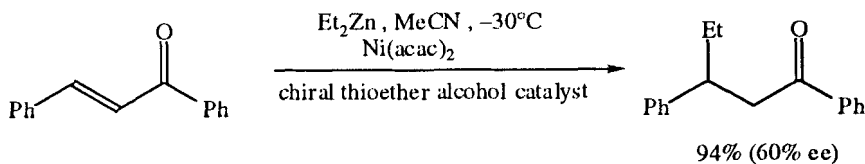
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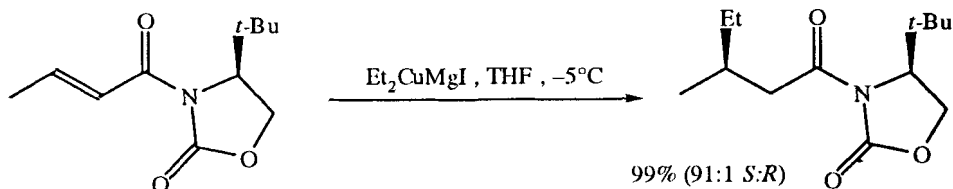
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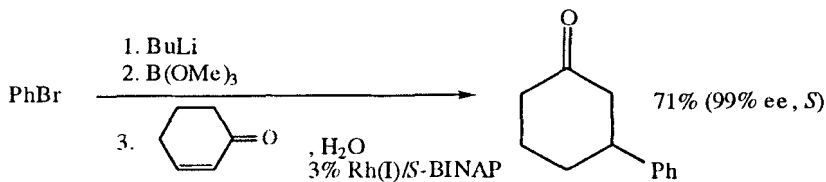
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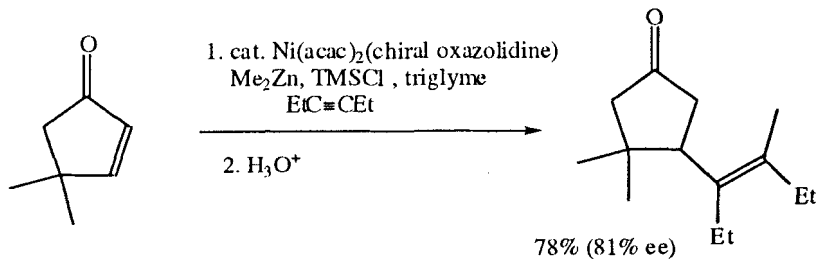
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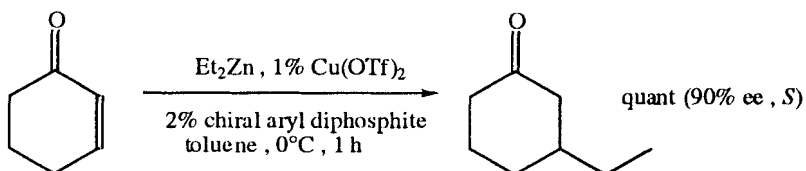
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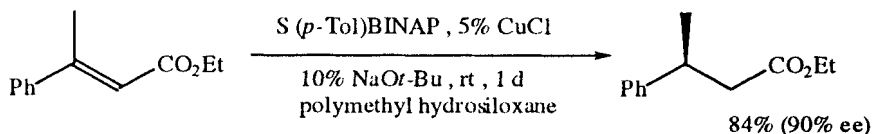
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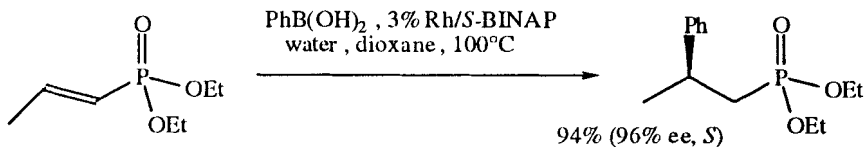
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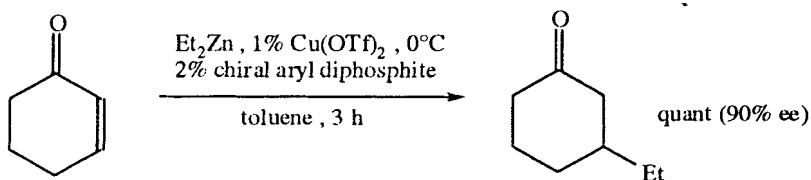
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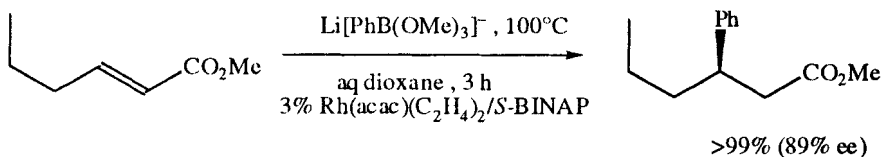
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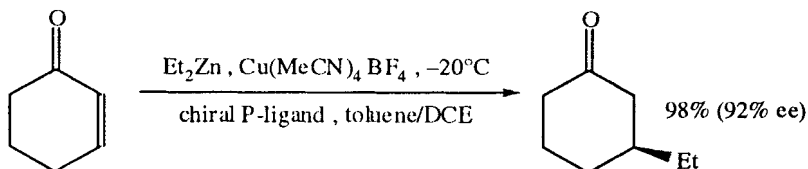
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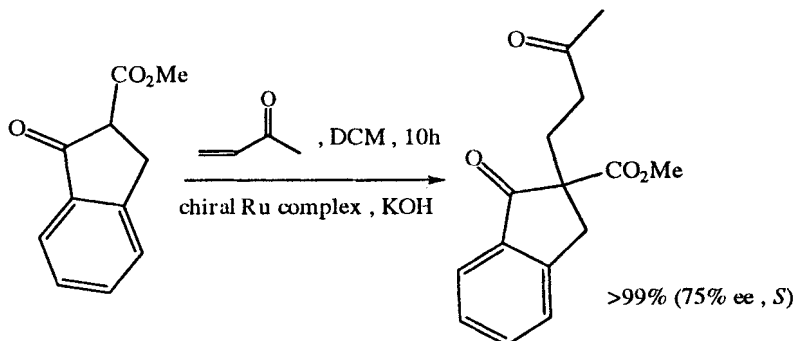
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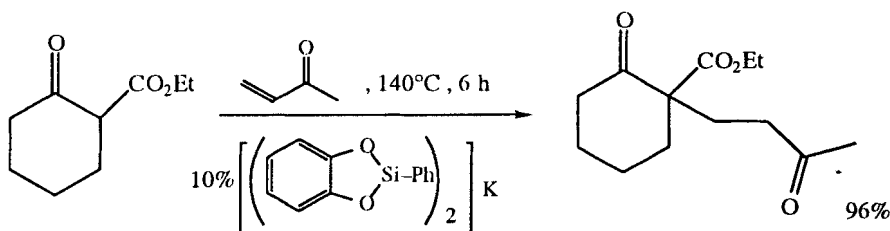


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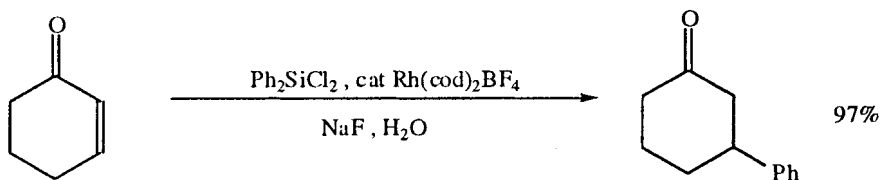


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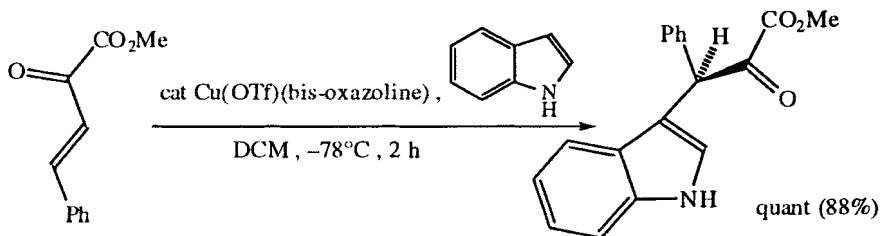
### NON-ASYMMETRIC ALKYLATIONS



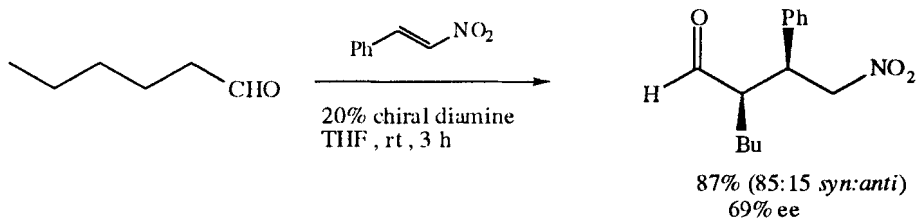
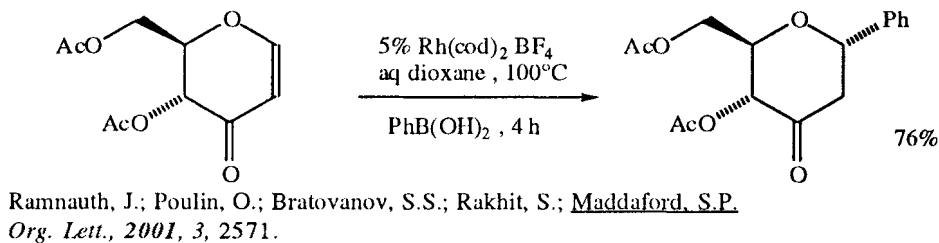
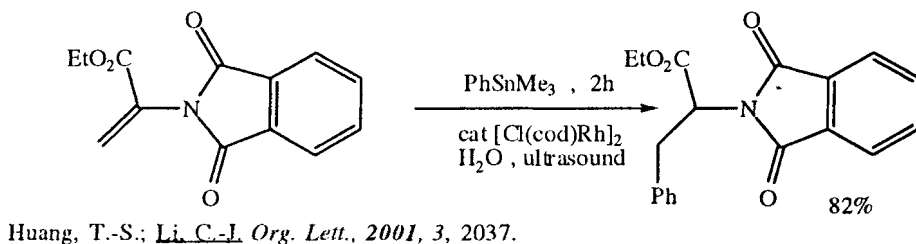
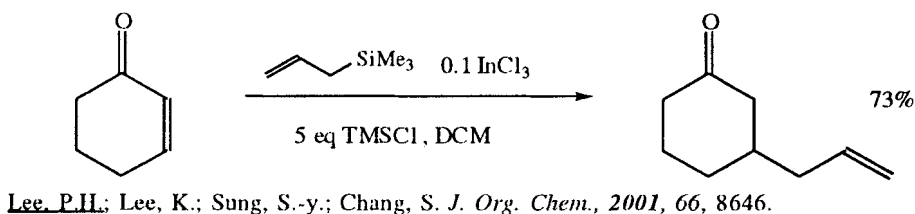
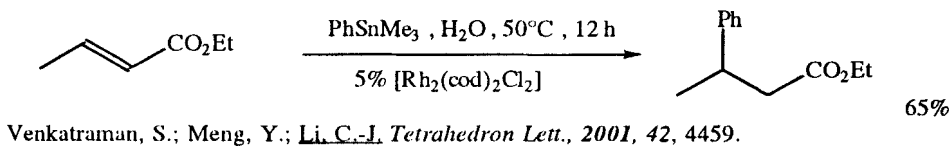
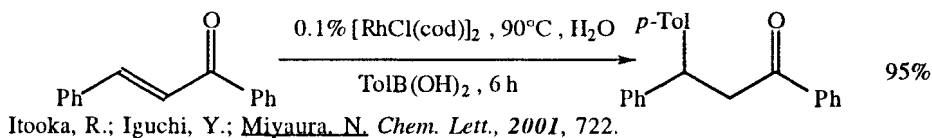
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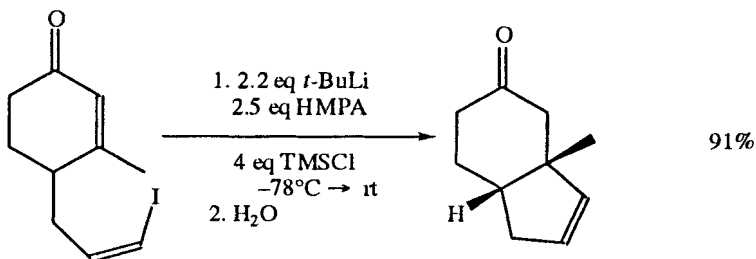


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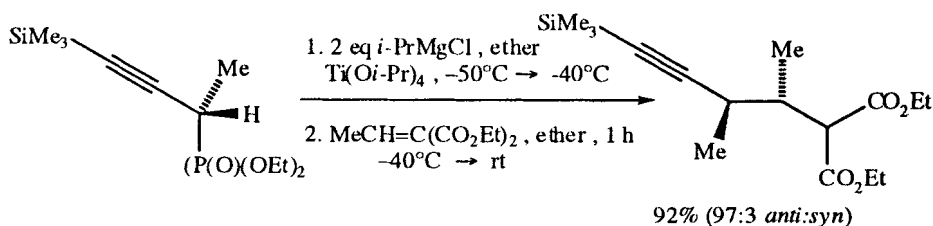


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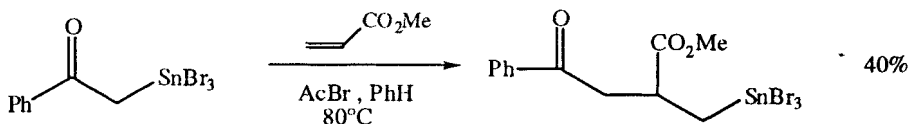




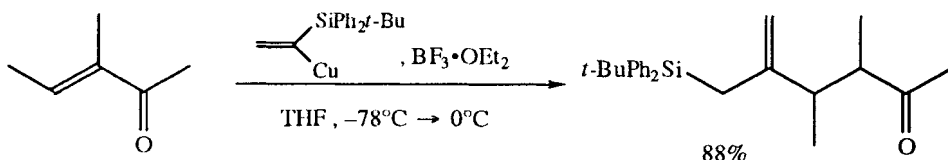
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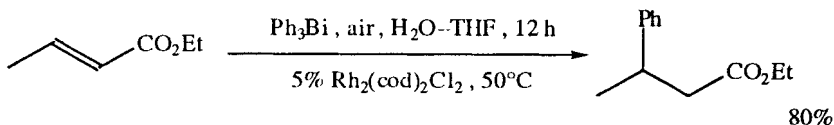
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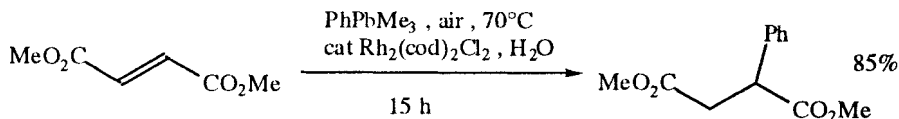
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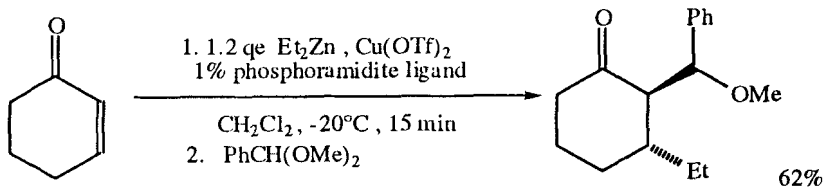
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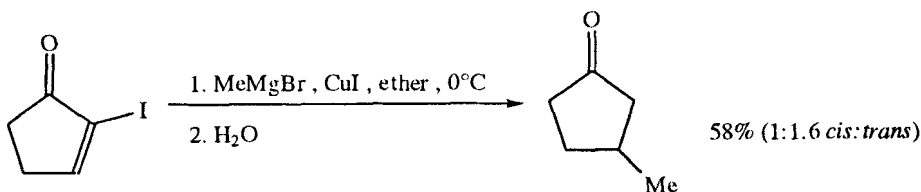
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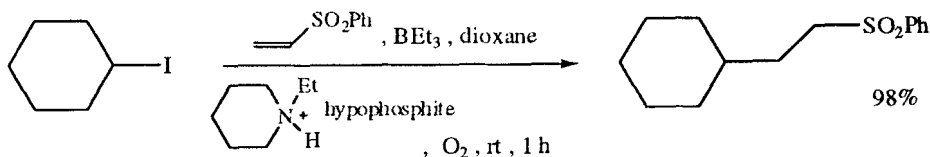
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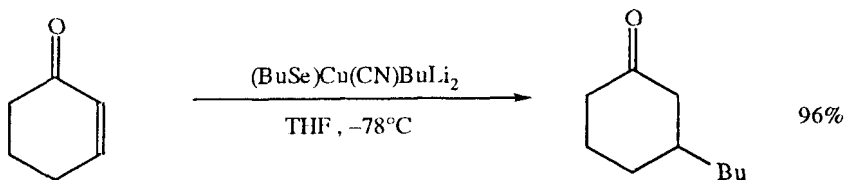
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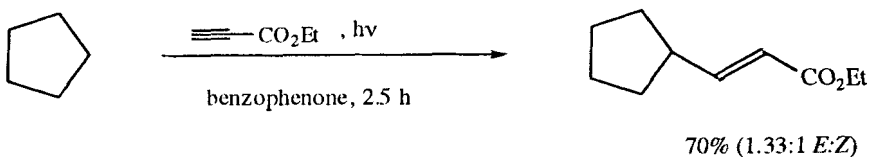
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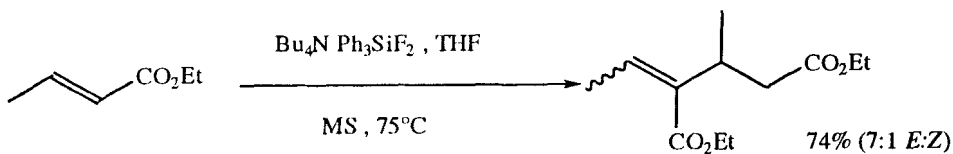
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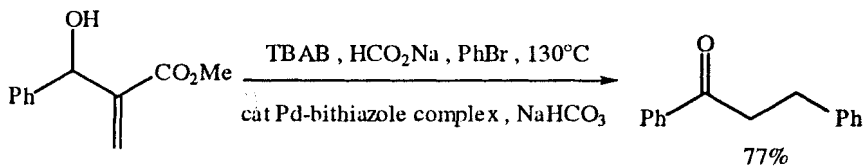
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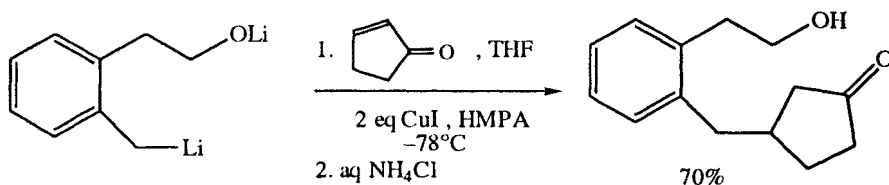
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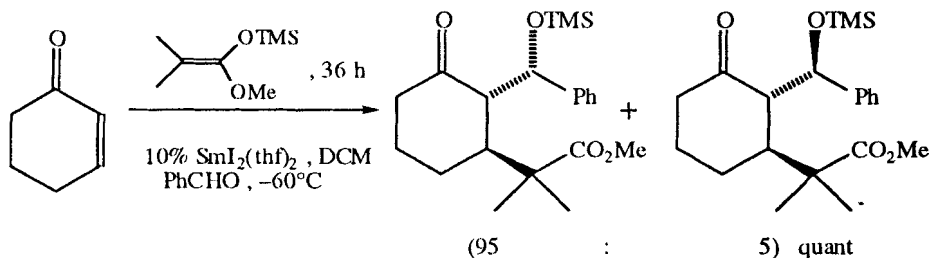
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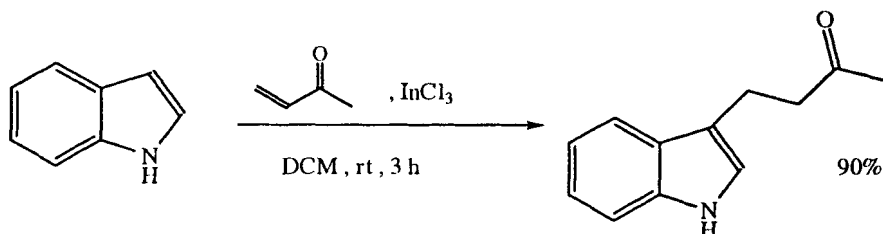
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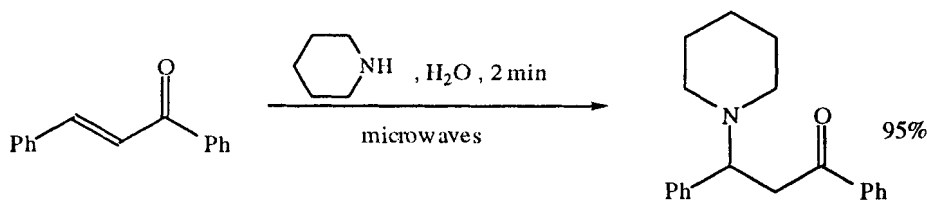
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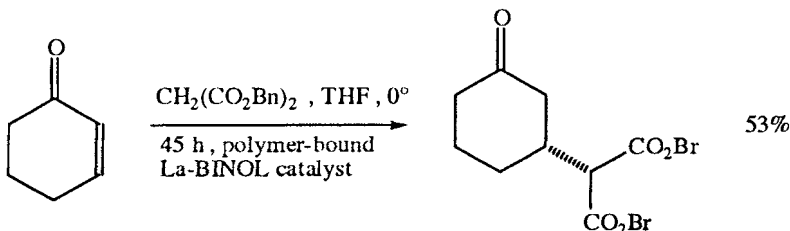
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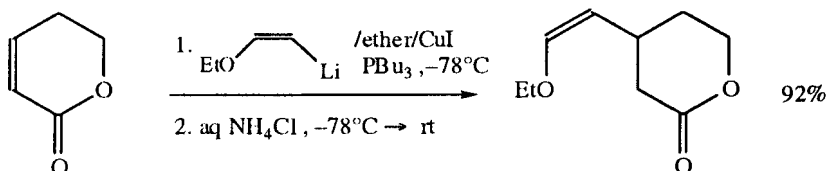
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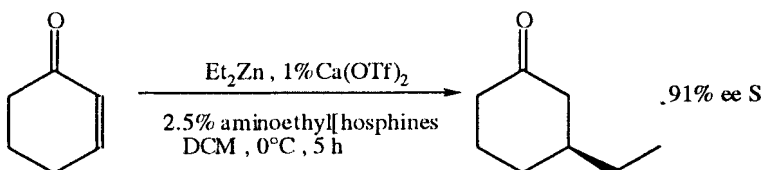
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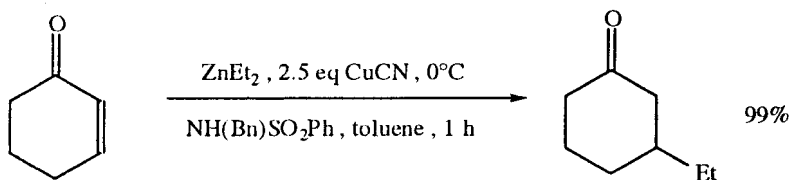
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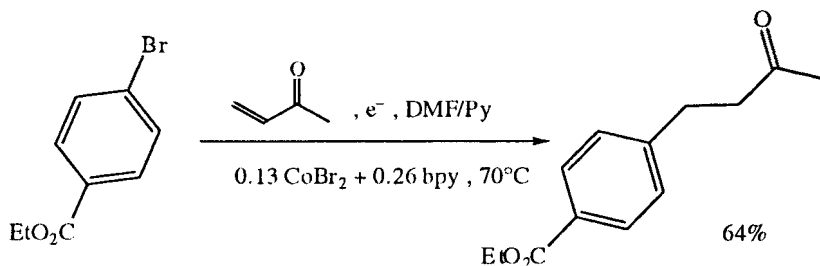
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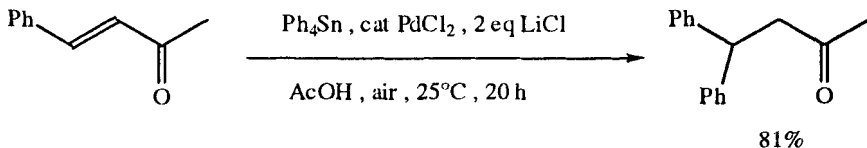
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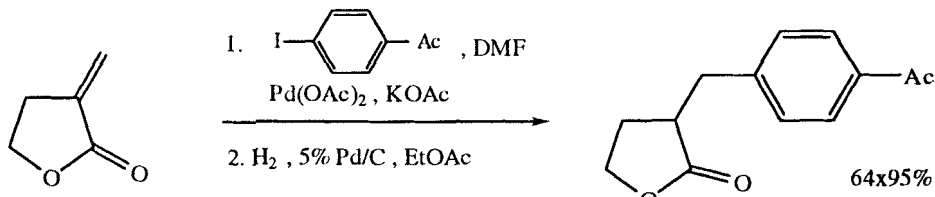
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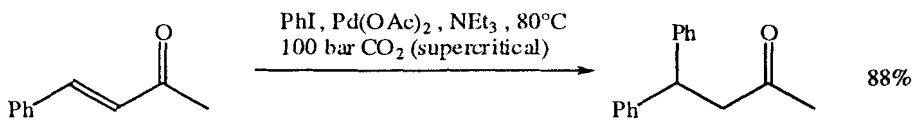
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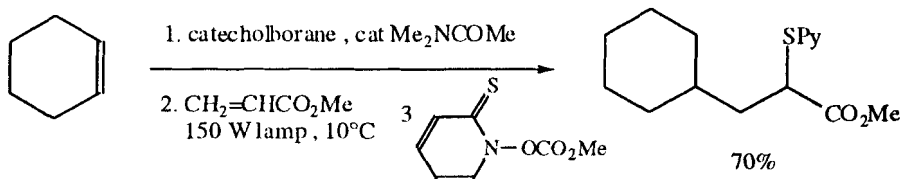
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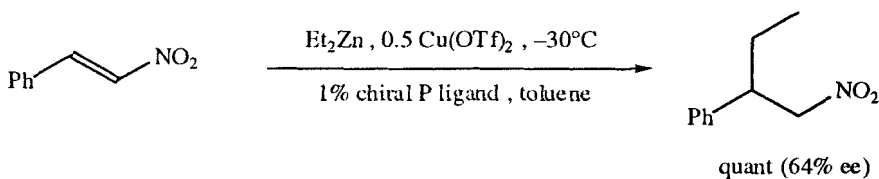
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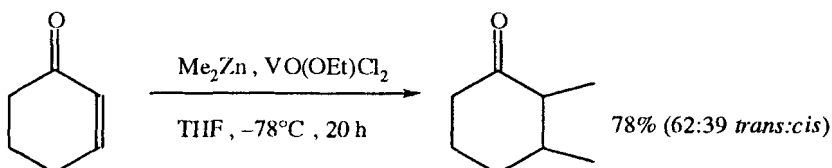
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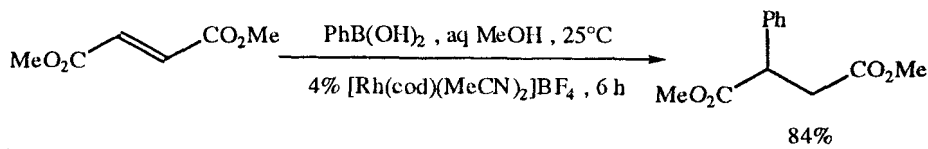
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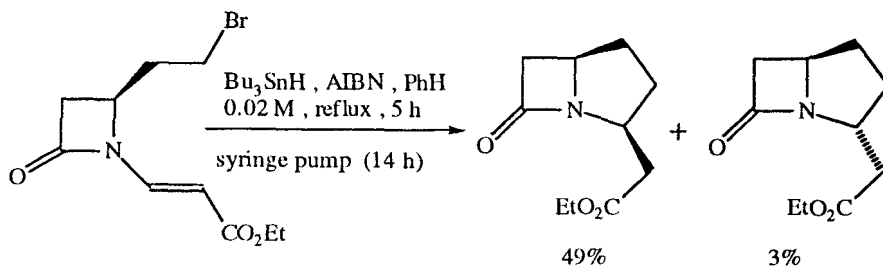
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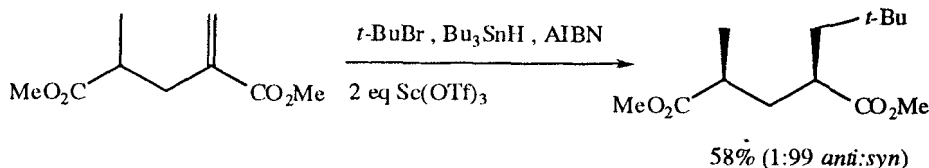
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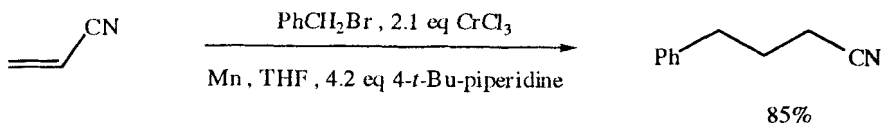
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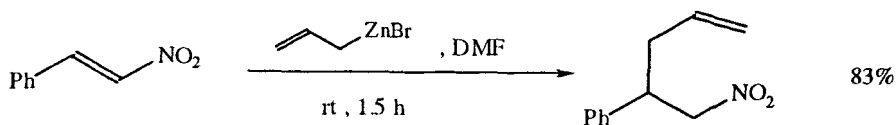
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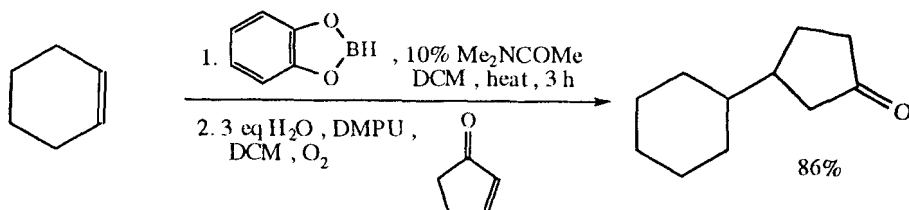
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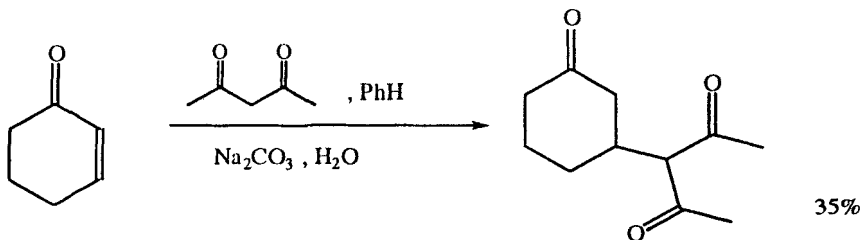
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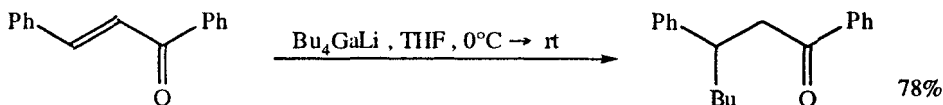
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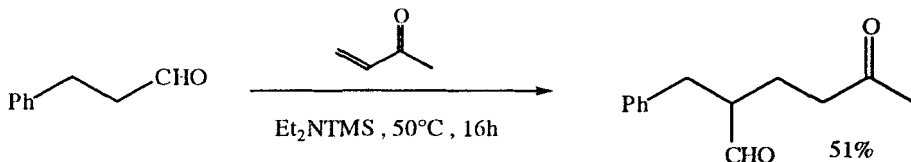
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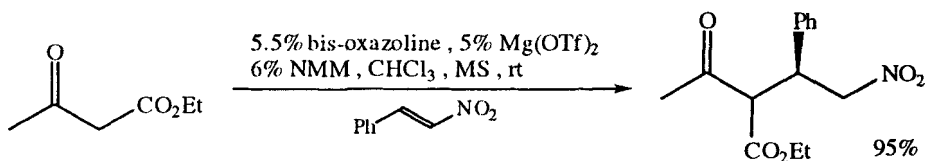
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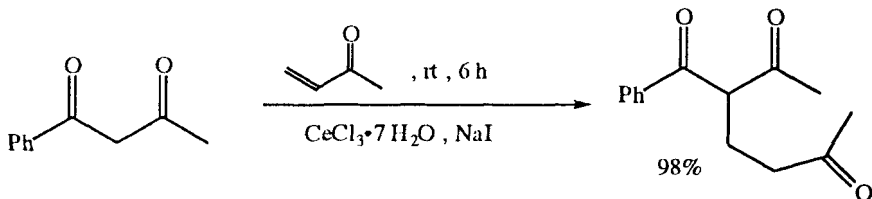
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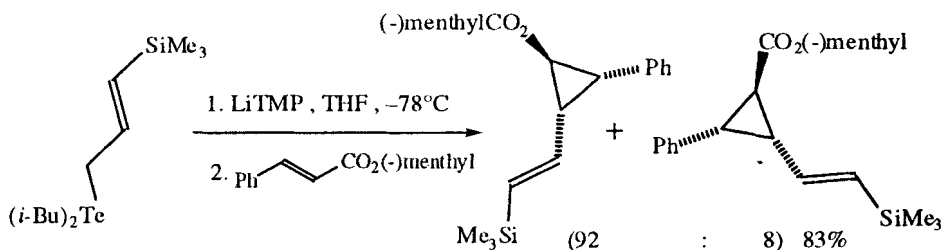
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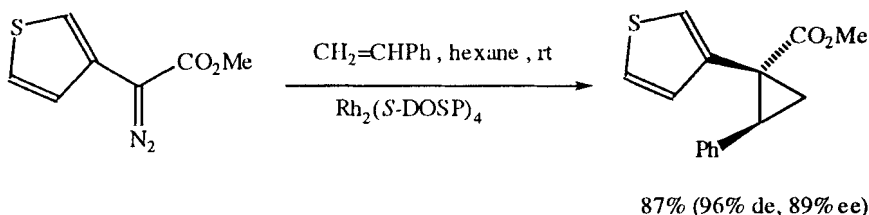
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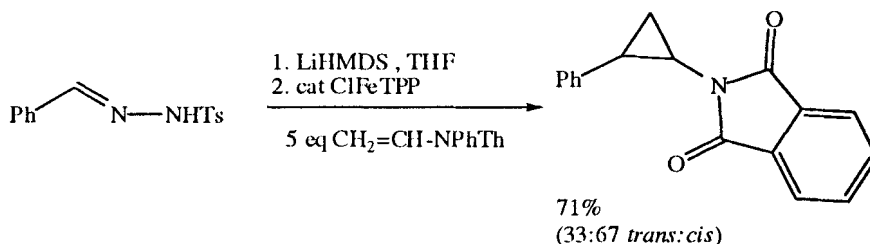
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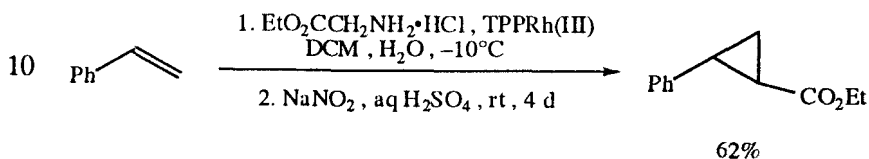


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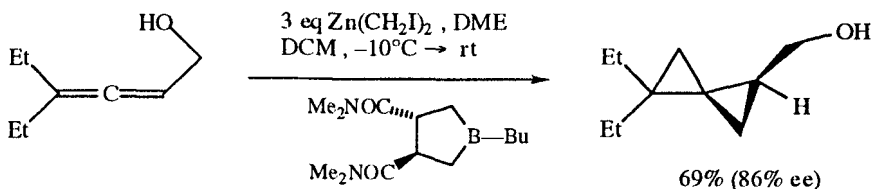


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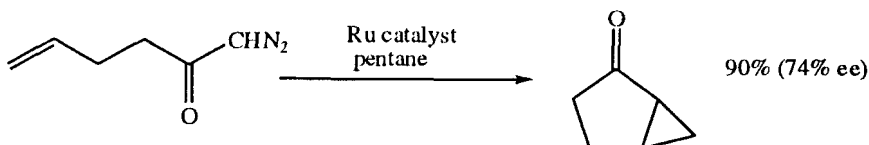




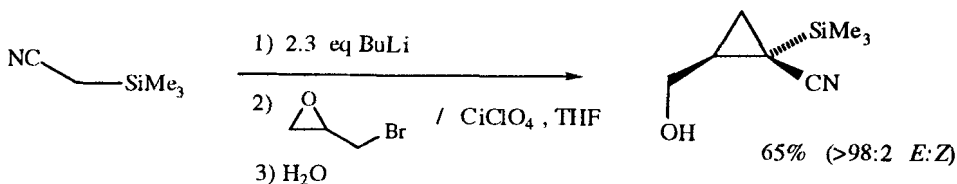
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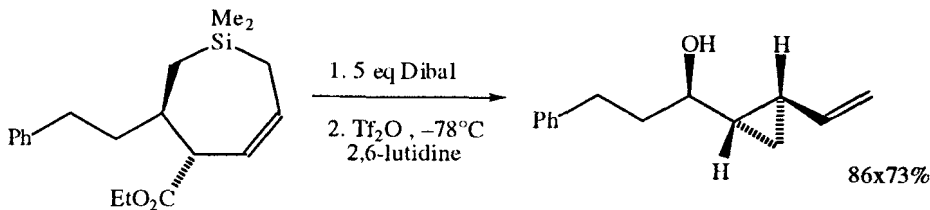
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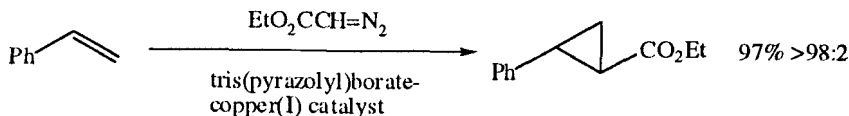
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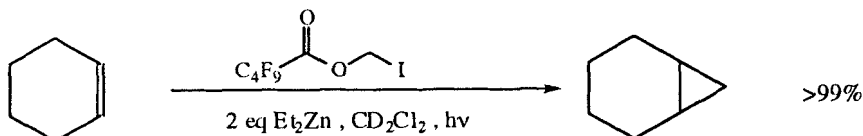
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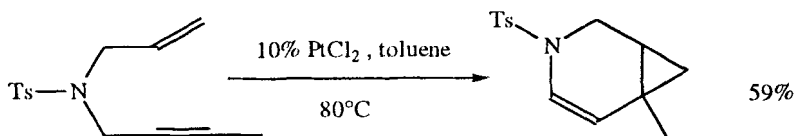
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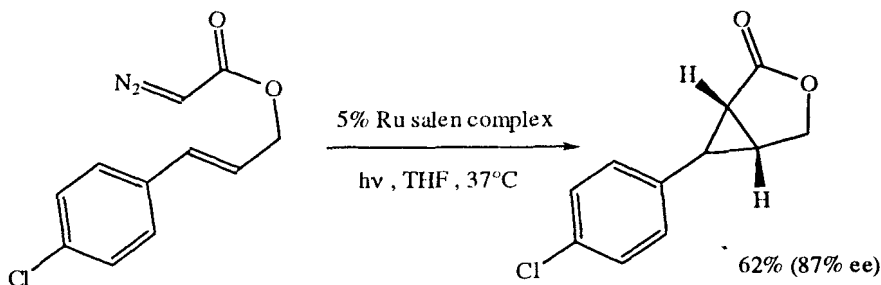
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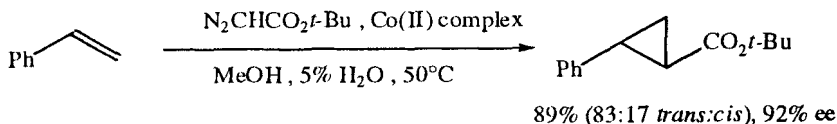
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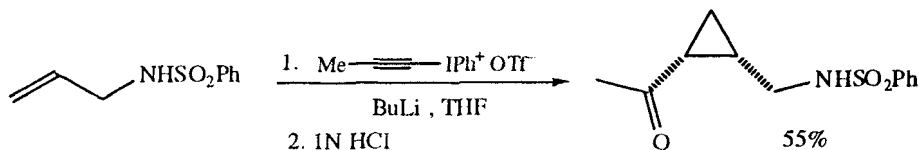
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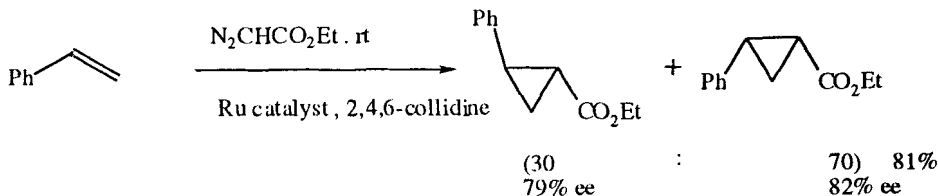
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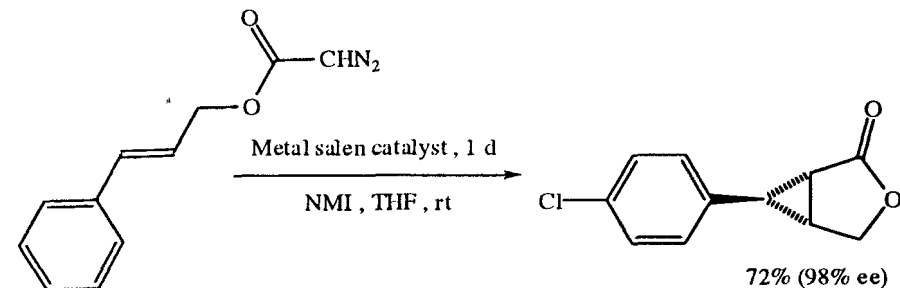
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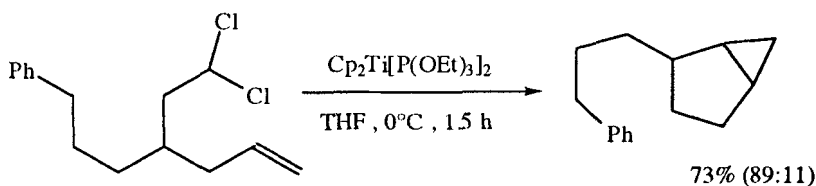
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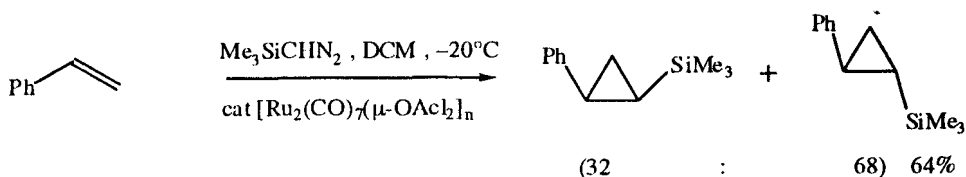
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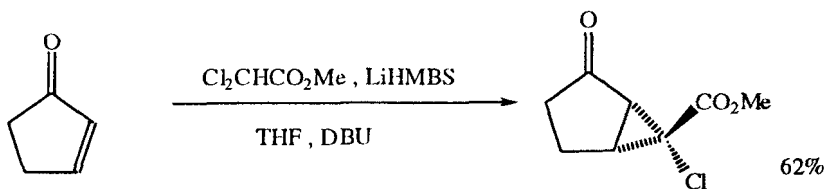
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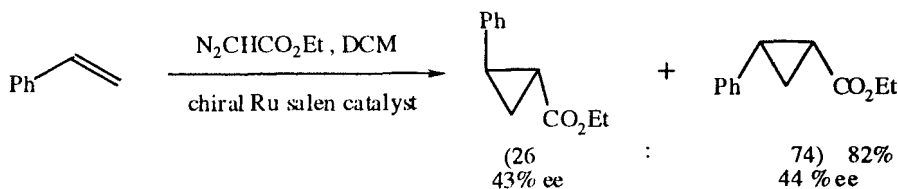
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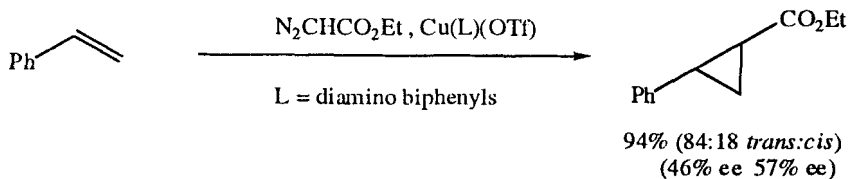
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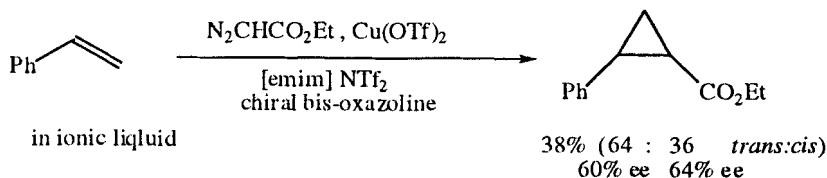
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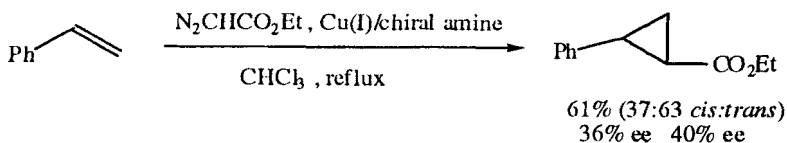
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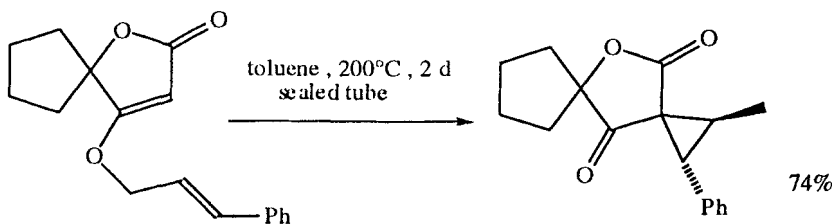
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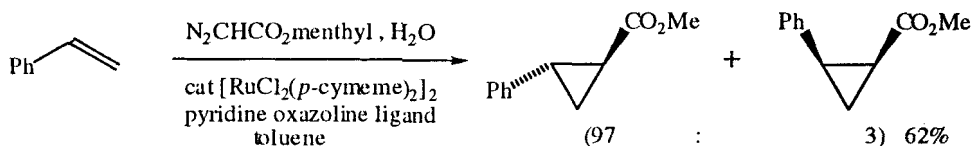
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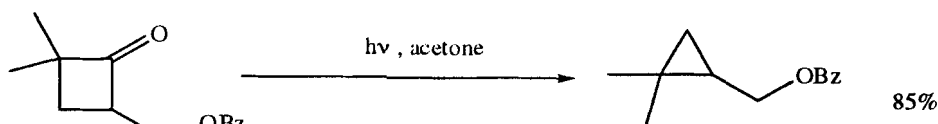
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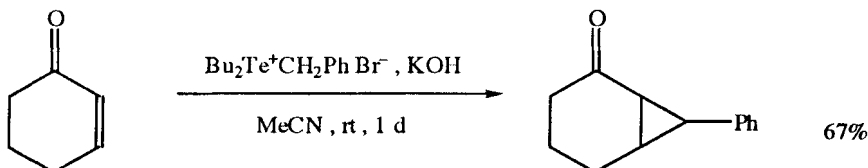
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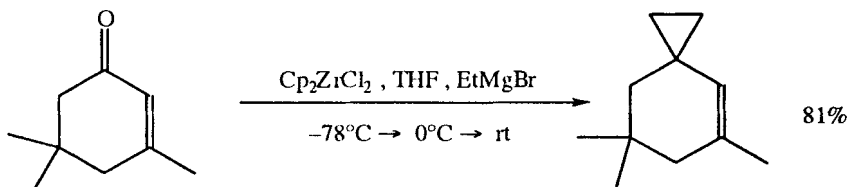
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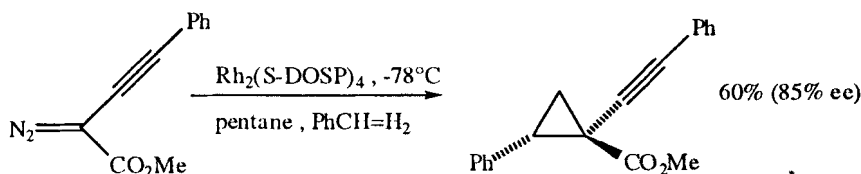
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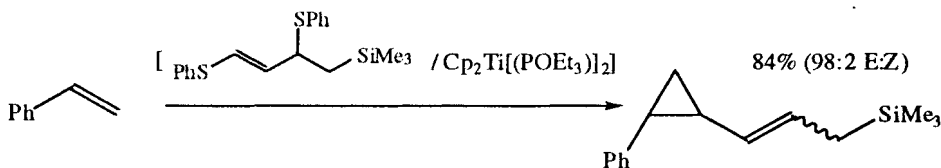
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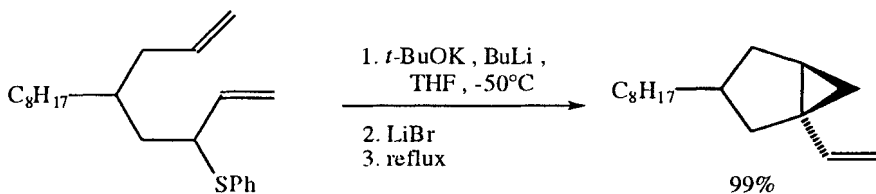
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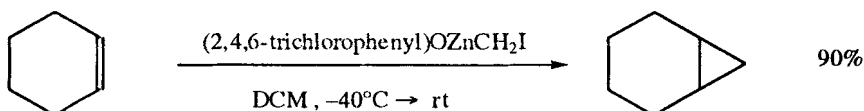
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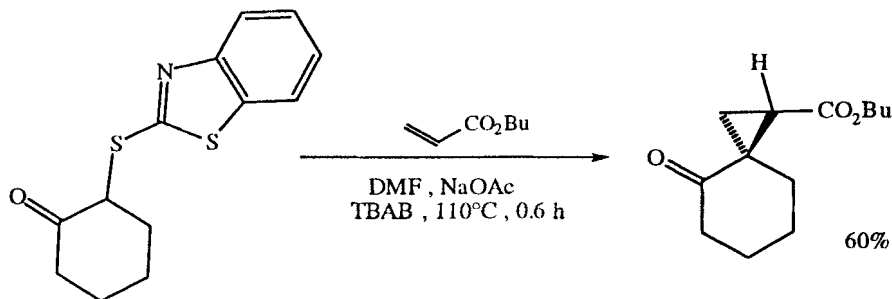
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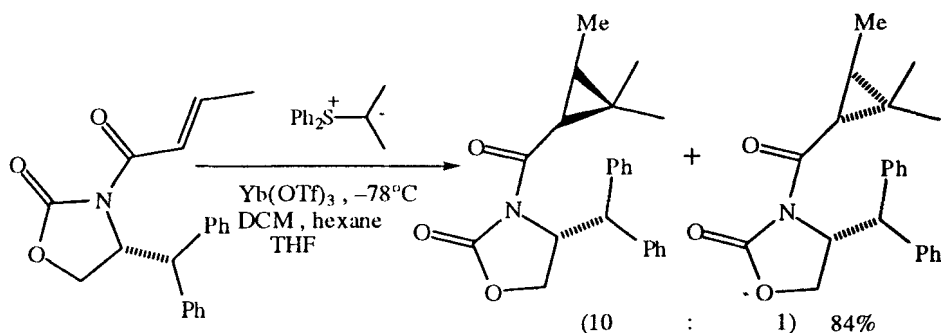
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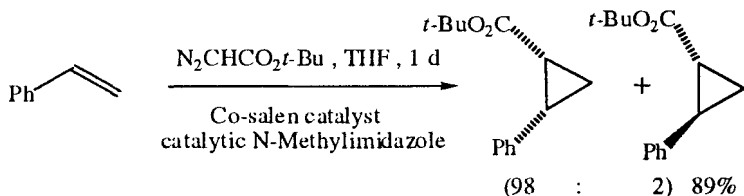
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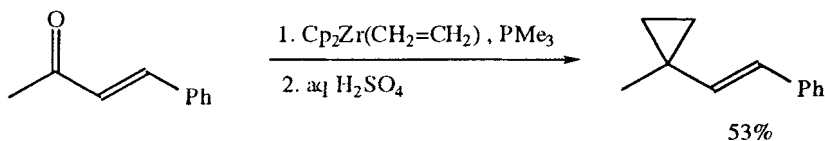
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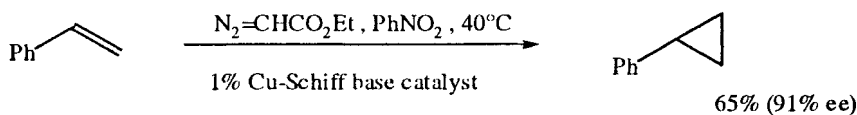
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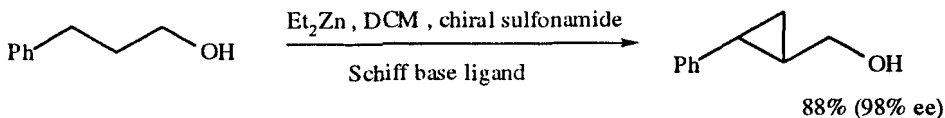
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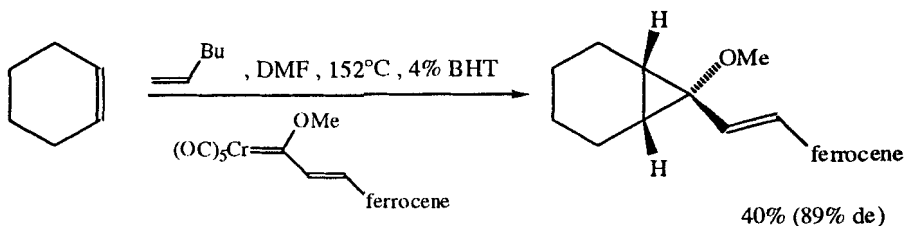
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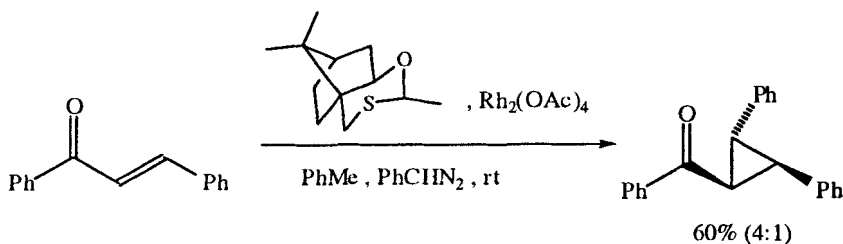
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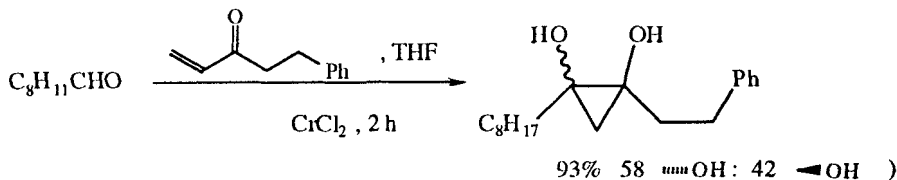
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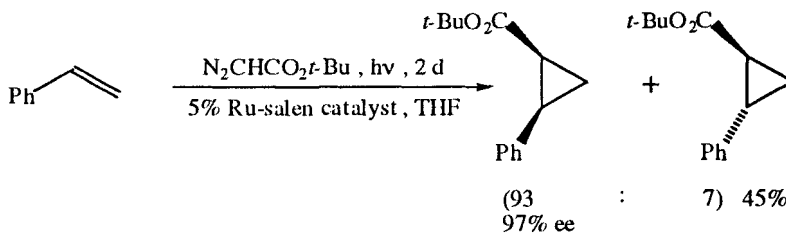
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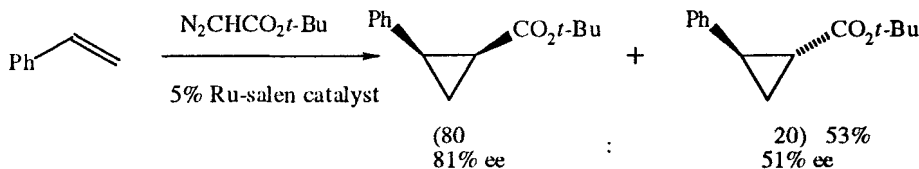
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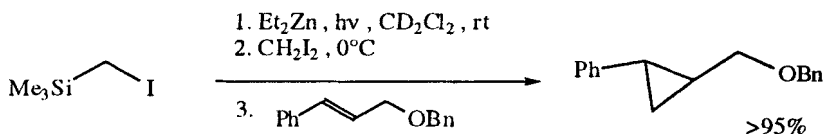
Toratsu, C.; Fujii, T.; Suzuki, T.; Takai, K. *Angew. Chem. Int. Ed.*, **2000**, *39*, 2725.



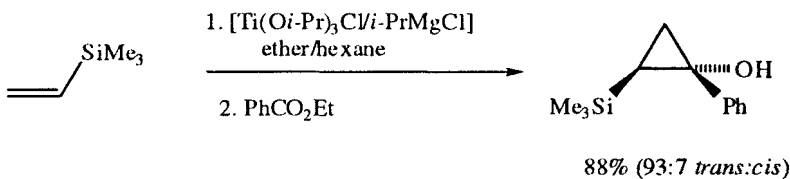
Uchida, T.; Irie, R.; Katsuki, T. *Synlett*, **1999**, 1793.



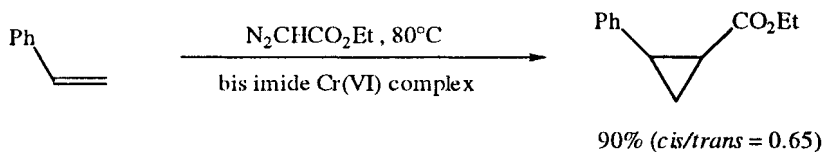
Uchida, T.; Irie, R.; Katsuki, T. *Synlett*, **1999**, 1163.



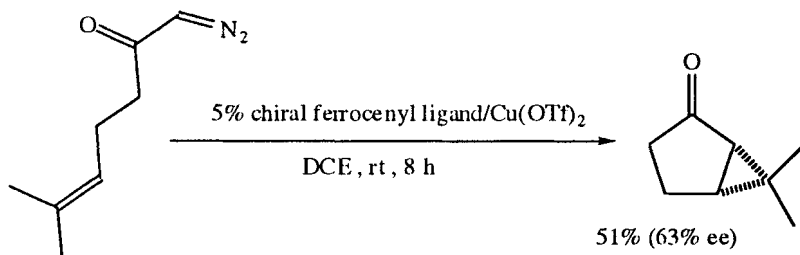
Charette, A.B.; Beauchemin, A.; Marcoux, J.-F. *Tetrahedron Lett.*, **1999**, 40, 33.



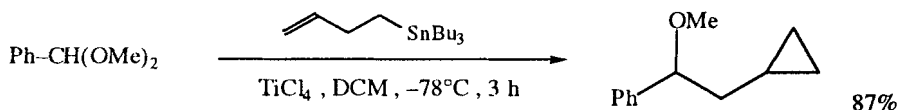
Matsuda, I.; Takeuchi, K.; Itoh, K. *Tetrahedron Lett.*, **1999**, 40, 2553.



Jan, D.; Simal, F.; Demonceau, A.; Noels, A.F.; Rufanov, K.A.; Ustynyuk, N.A.; Gourevitch, D.N. *Tetrahedron Lett.*, **1999**, 40, 5695.

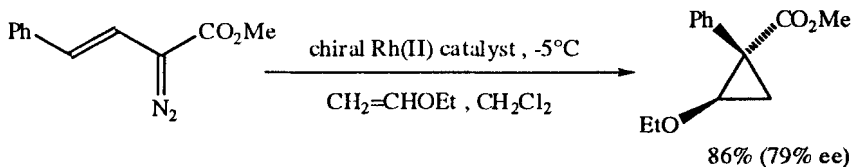


Kim, S.-G.; Cho, C.-W.; Ahn, K.H. *Tetrahedron*, **1999**, 55, 10029.

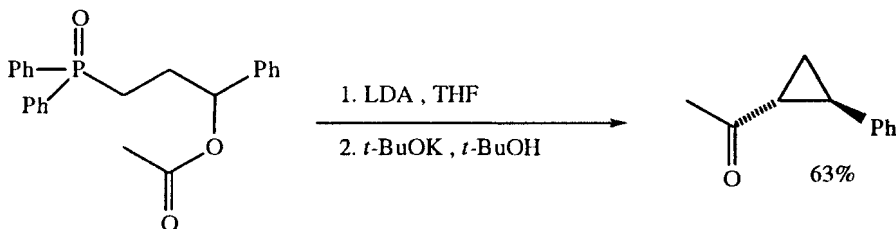


Sugawara, M.; Yoshida, J.-i. *Chem. Commun.*, **1999**, 505.

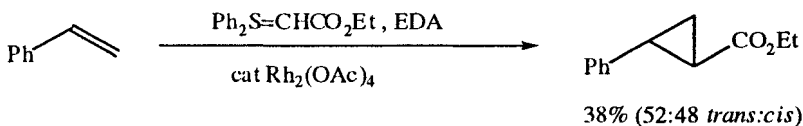




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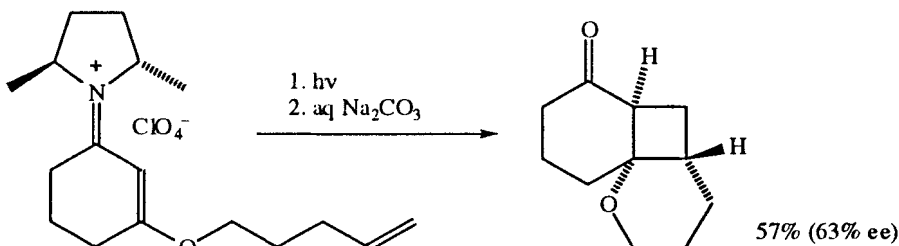


Nelson, A.; Warren, S. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 3425.

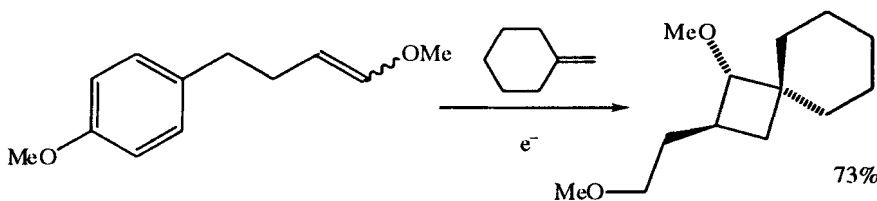


Müller, P.; Fernandez, D.; Nury, P.; Rossier, J.-C. *Helv. Chim. Acta*, **1999**, *82*, 935.

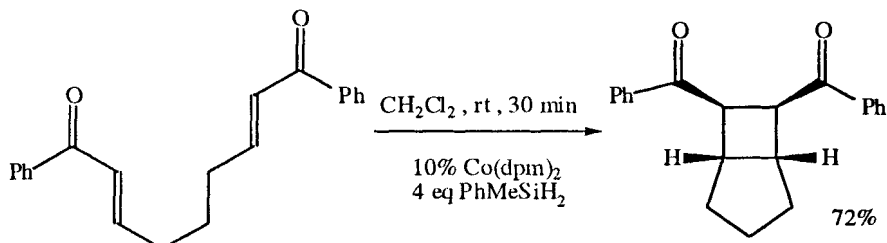
## SECTION 74G: CYCLOBUTANATIONS, INCLUDING HALOCYCLOBUTANATIONS



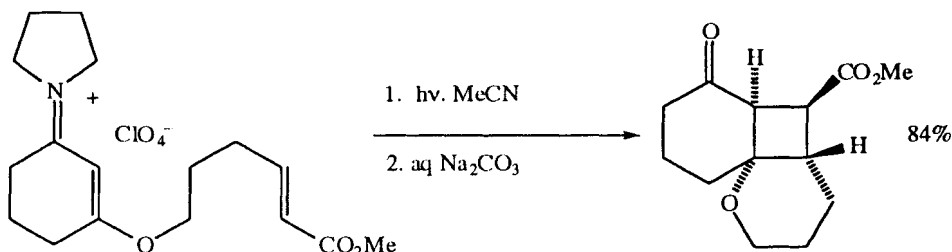
Chen, C.; Chang, V.; Cai, X.; Duesler, E.; Mariano, P.S. *J. Am. Chem. Soc.*, **2001**, *123*, 6433.



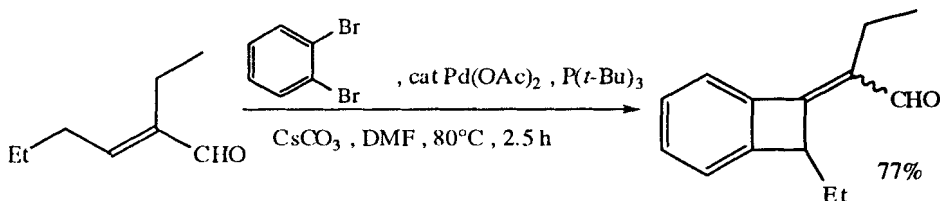
Chiba, K.; Miura, T.; Kim, S.; Kitano, Y.; Tada, M. *J. Am. Chem. Soc.*, **2001**, *123*, 11314.



Baik, T.-G.; Luis, A.L.; Wang, L.-C.; Krische, M.J. *J. Am. Chem. Soc.*, **2001**, *123*, 6716.



Cai, X.; Chang, V.; Chen, C.; Kim, H.-J.; Mariano, P.S. *Tetrahedron Lett.*, **2000**, *41*, 9445.

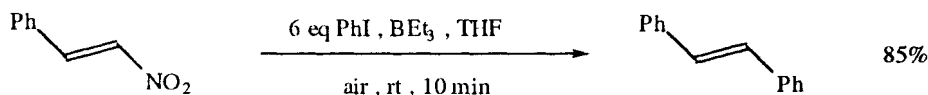


Terao, Y.; Satoh, T.; Miura, M.; Nomura, M. *Bull. Chem. Soc. Jpn*, **1999**, *72*, 2345.

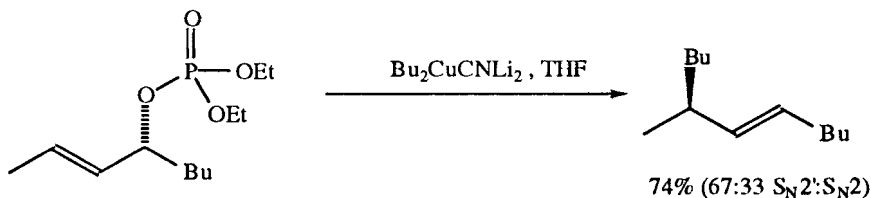
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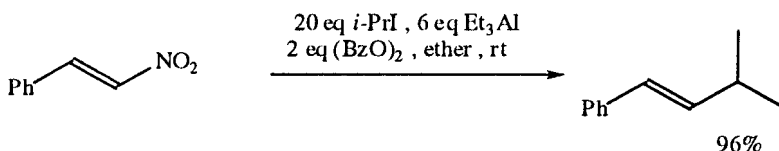
## SECTION 75: ALKYLs, METHYLENES AND ARYLs FROM MISCELLANEOUS COMPOUNDS



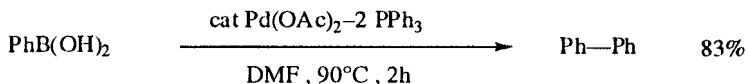
Liu, J.-T.; Jang, Y.-J.; Shih, Y.-K.; Hu, S.-R.; Chu, C.-M.; Yao, C.-F. *J. Org. Chem.*, **2001**, *66*, 6021.



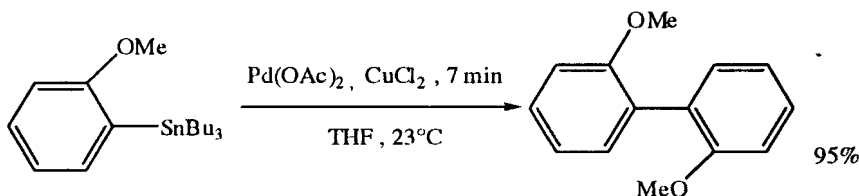
Belelie, J.L.; Chong, J.M. *J. Org. Chem.*, **2001**, *66*, 5552.



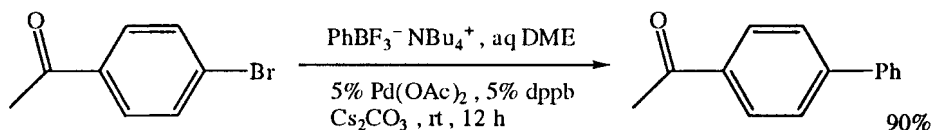
Liu, J.-Y.; Liu, J.-T.; Yao, C.-F. *Tetrahedron Lett.*, **2001**, *42*, 3613.



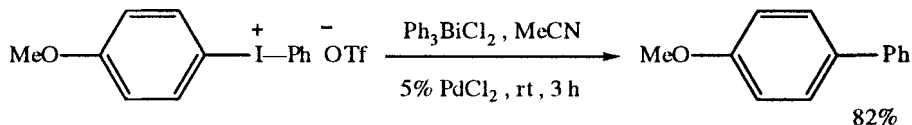
Wong, M.S.; Zhang, X.L. *Tetrahedron Lett.*, **2001**, *42*, 4087.



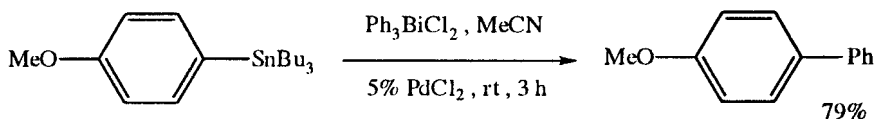
Parrish, J.P.; Flanders, V.L.; Floyd, R.J.; Jung, K.W. *Tetrahedron Lett.*, **2001**, *42*, 7729.



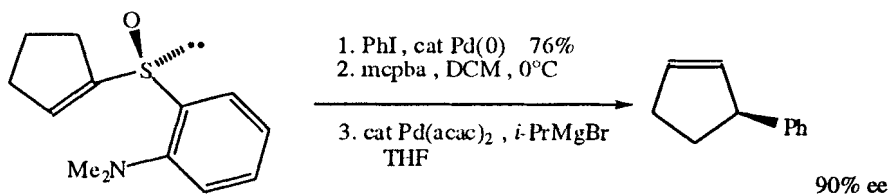
Batey, R.A.; Quach, T.D. *Tetrahedron Lett.*, **2001**, *42*, 9099.



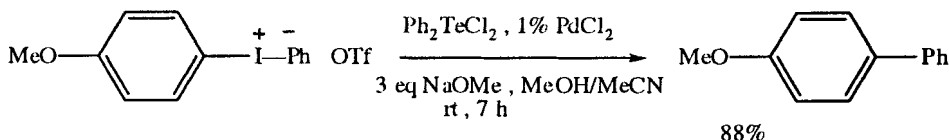
Kang, S.-K.; Ryu, H.-C.; Kim, J.-W. *Synth. Commun.*, **2001**, *31*, 1021.



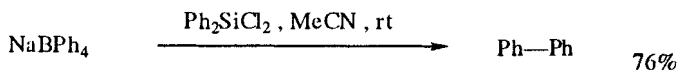
Kang, S.-K.; Ryu, H.-C.; Lee, S.-W. *Synth. Commun.*, **2001**, *31*, 1027.



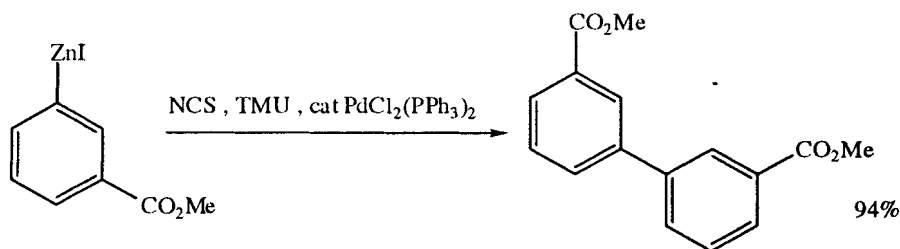
de la Rosa, J.C.; Díaz, N.; Carretero, J.C. *Tetrahedron Lett.*, **2000**, *41*, 4107.



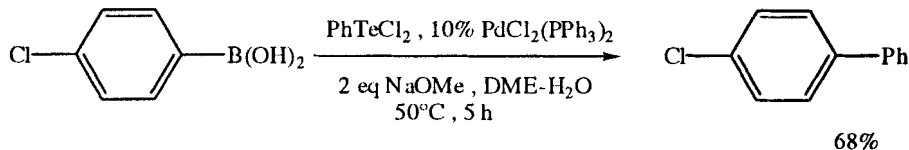
Kang, S.-K.; Lee, S.-W.; Kim, M.-S.; Kwon, H.-S. *Synth. Commun.*, **2001**, *31*, 1721.



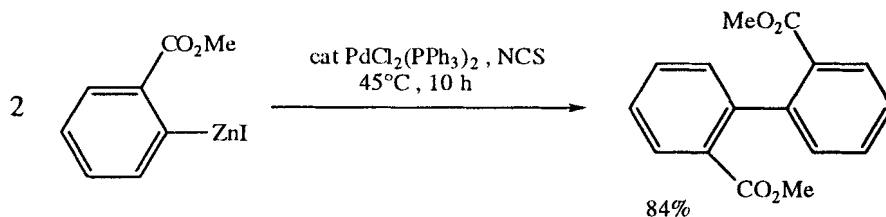
Sakurai, H.; Morimoto, C.; Hirao, T. *Chem. Lett.*, **2001**, 1084.



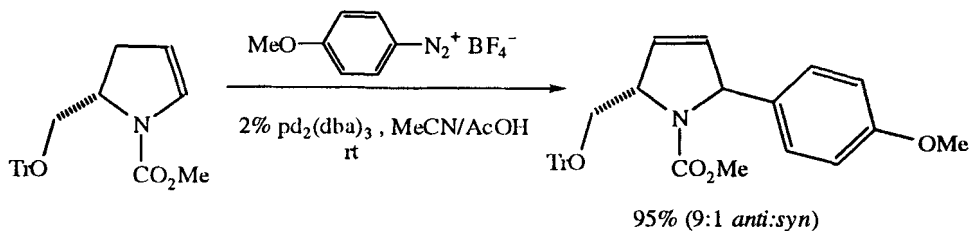
Hossain, K.M.; Kameyama, T.; Shibata, T.; Takagi, K. *Bull. Chem. Soc. Jpn.*, **2001**, *74*, 2415.



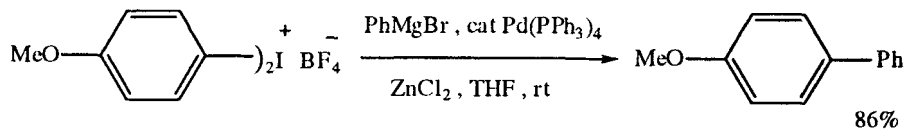
Kang, S.-K.; Hong, Y.-T.; Kim, D.-H.; Lee, S.-H. *J. Chem. Res. (S)*, **2001**, 283.



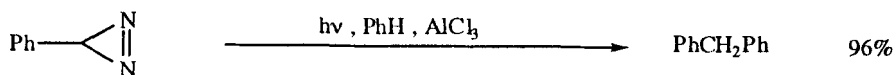
Hossain, K.M.; Shibata, T.; Takagi, K. *Synlett*, **2000**, 1137.



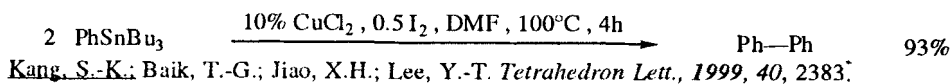
Servino, E.A.; Correia, C.R.D. *Org. Lett.*, **2000**, *2*, 3039.



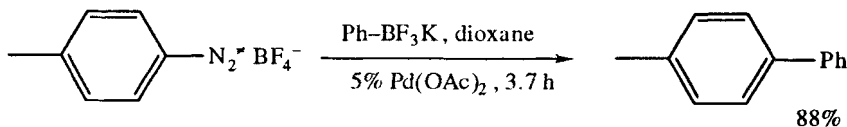
Wang, L.; Chen, Z.-C. *Synth. Commun.*, **2000**, *30*, 3607.



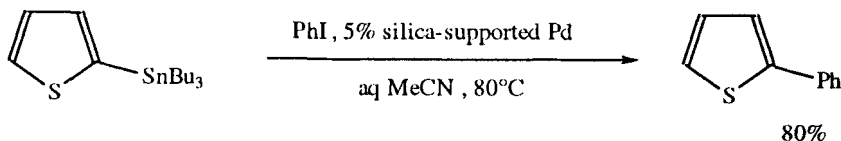
Moss, R.A.; Fedé, J.-M.; Yan, S. *J. Am. Chem. Soc.*, **2000**, *122*, 9878.



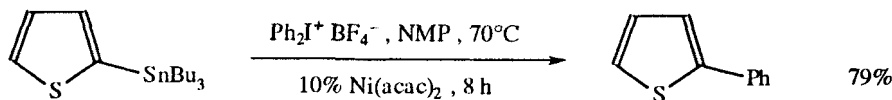
Kang, S.-K.; Baik, T.-G.; Jiao, X.H.; Lee, Y.-T. *Tetrahedron Lett.*, **1999**, *40*, 2383.



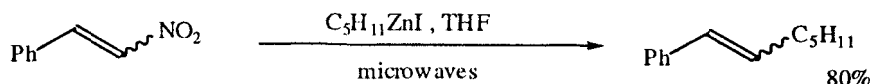
Darses, S.; Michaud, G.; Genêt, J.-P. *Eur. J. Org. Chem.*, **1999**, 1875.



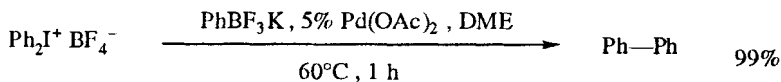
Kang, S.-K.; Baik, T.-G.; Song, S.-Y. *Synlett*, **1999**, 327.



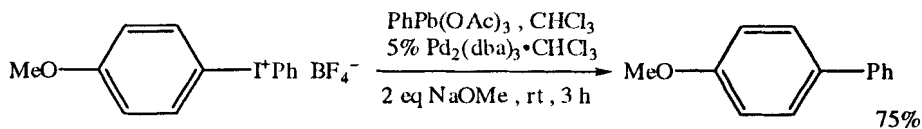
Kang, S.-K.; Ryu, H.-C.; Lee, S.-W. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 2661.



Hu, Y.; Yu, J.; Yang, S.; Wang, J.-X.; Yin, Y. *Synth. Commun.*, **1999**, *29*, 1157.



Xia, M.; Chen, Z.-C. *Synth. Commun.*, **1999**, 29, 2457.



Kang, S.-K.; Choi, S.-C.; Baik, T.-G. *Synth. Commun.*, **1999**, 29, 2493.

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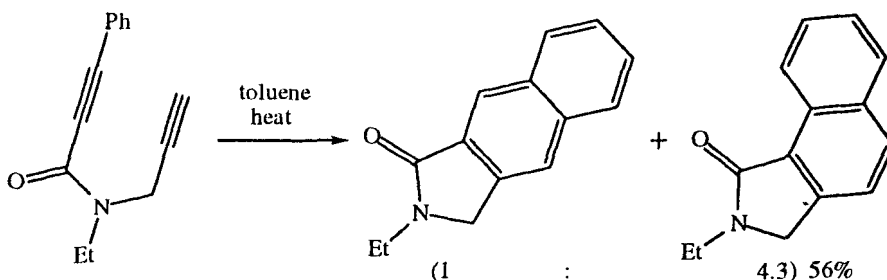
"Recent Advances In The Transition Metal Catalyzed Regioselective Approaches To Polysubstituted Benzene Derivatives," Saito, S.; Yamamoto, Y. *Chem. Rev.*, **2000**, 100, 294.

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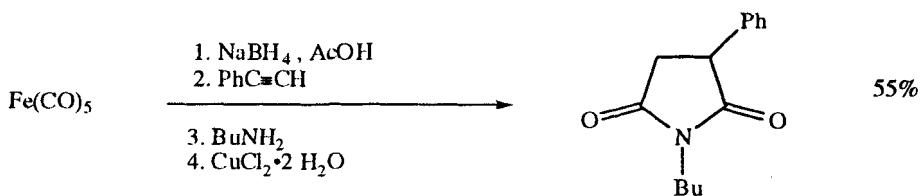
# CHAPTER 6

## PREPARATION OF AMIDES

### SECTION 76: AMIDES FROM ALKYNES

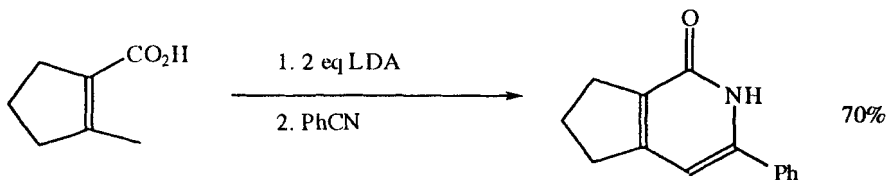


Rodríguez, D.; Navarro-Vázquez, A.; Castedo, L.; Domínguez, D.; Saá, C. *J. Am. Chem. Soc.*, **2001**, 123, 9168.

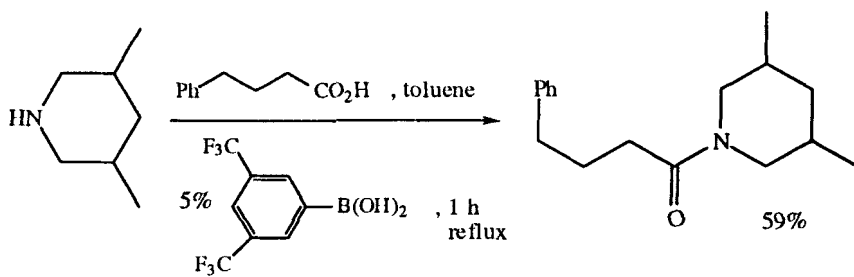


Remeshkumar, C.; Periasamy, M. *Synlett*, **2000**, 1619.

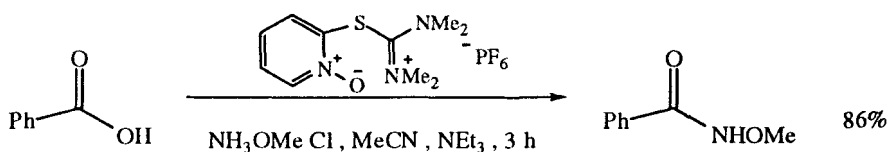
### SECTION 77: AMIDES FROM ACID DERIVATIVES



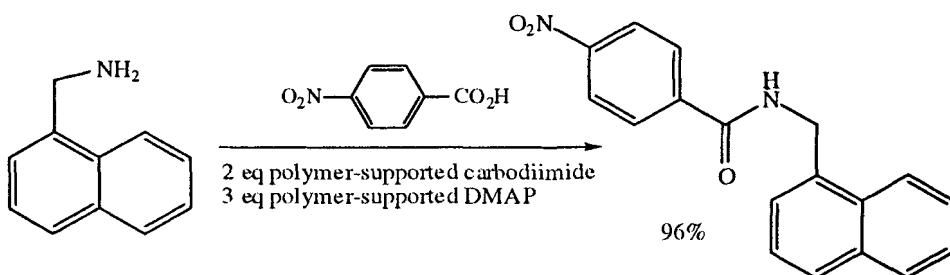
Chen, Y.; Li, T.; Sieburth, S. Mc.N. *J. Org. Chem.*, **2001**, 66, 6826.



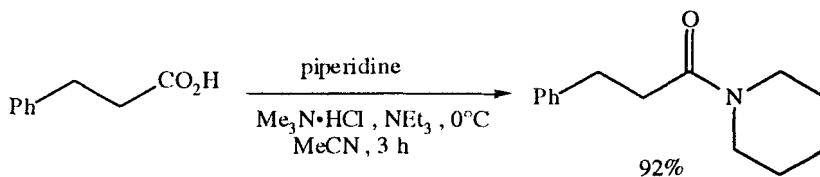
Ishihara, K.; Kondo, S.; Yamamoto, H. *Synlett*, **2001**, 1371.



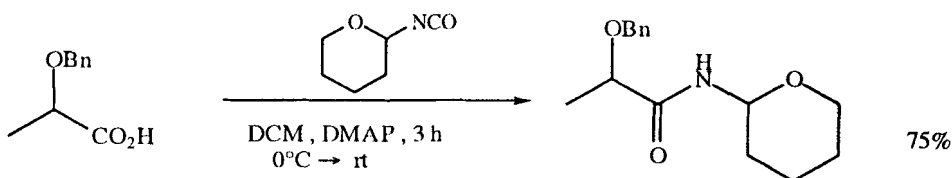
Bailén, M.A.; Chinchilla, R.; Dodsworth, D.J.; Nájera, C. *Tetrahedron Lett.*, **2001**, *42*, 5013.



Lannuzel, M.; Lamothe, M.; Perez, M. *Tetrahedron Lett.*, **2001**, *42*, 6703.

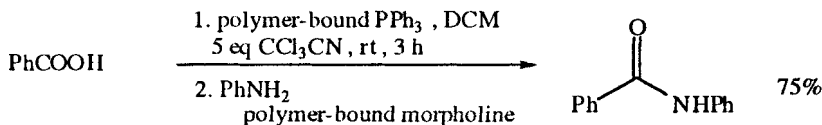


Wakasugi, K.; Nakamura, A.; Tanabe, Y. *Tetrahedron Lett.*, **2001**, *42*, 7427.

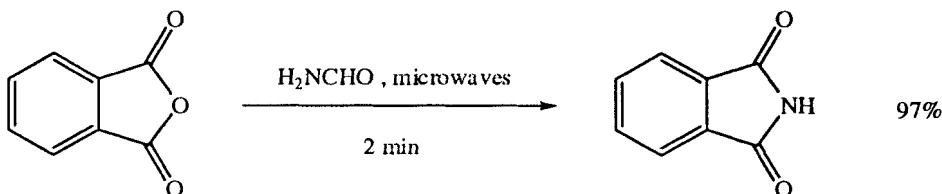


Schuemacher, A.C.; Hoffmann, R.W. *Synthesis*, **2001**, 243.

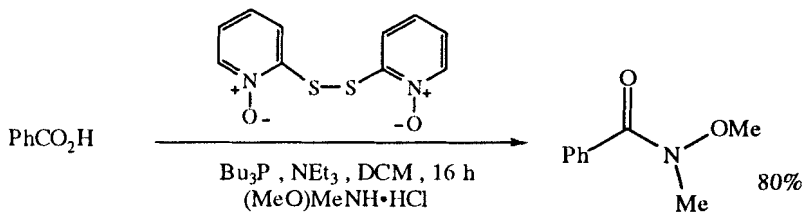




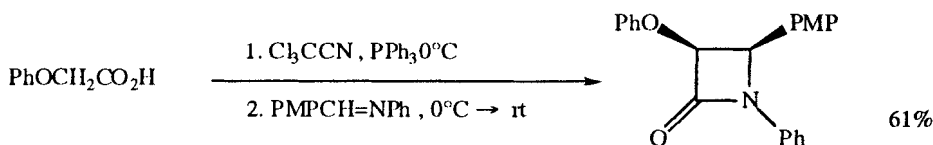
Buchstaller, H.P.; Ebert, H.M.; Anlauf, U. *Synth. Commun.*, **2001**, *31*, 1001.



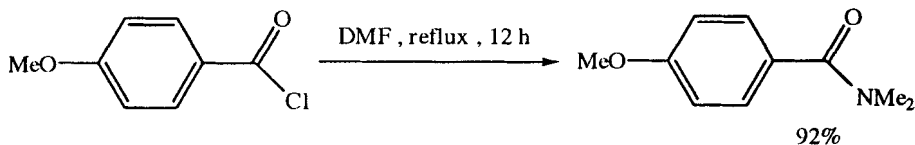
Peng, Y.; Song, G.; Qian, X. *Synth. Commun.*, **2001**, *31*, 1927.



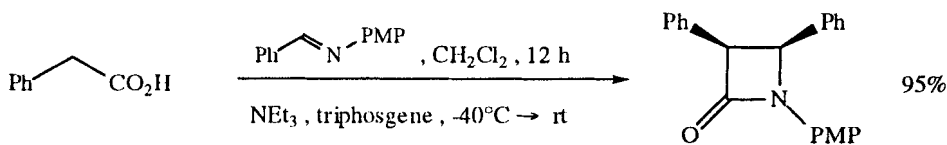
Banwell, M.; Smith, J. *Synth. Commun.*, **2001**, *31*, 2011.



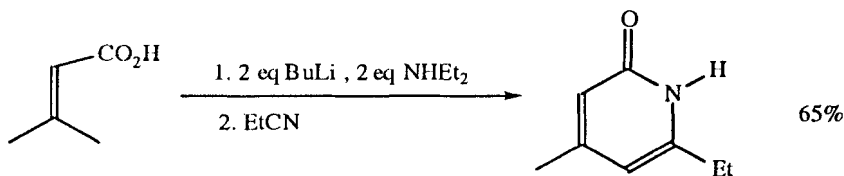
Govande, V.V.; Arun, M.; Deshmukh, A.R.A.S.; Bhawal, B.M. *Synth. Commun.*, **2000**, *30*, 4177.



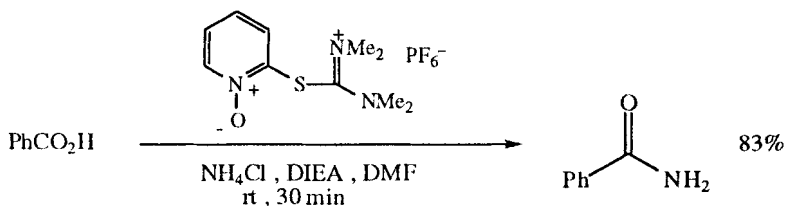
Lee, W.S.; Park, K.H.; Yoon, Y.-J. *Synth. Commun.*, **2000**, *30*, 4241.



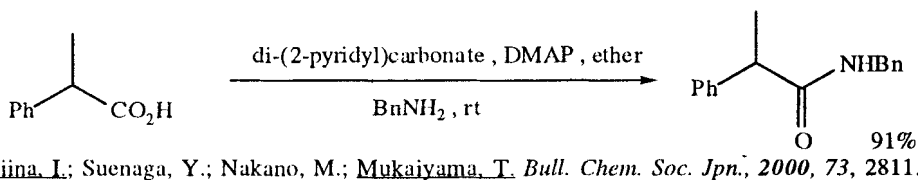
Krishnaswamy, D.; Bhawal, B.M.; Desmukh, A.R.A.S. *Tetrahedron Lett.*, **2000**, *41*, 417.



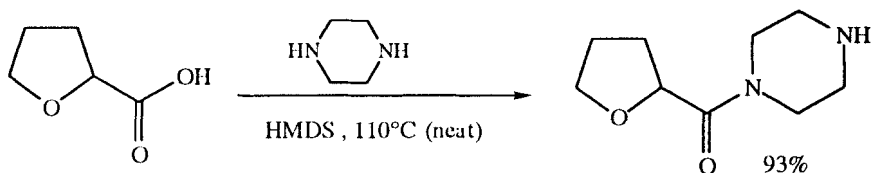
Brun, E.M.; Gil, S.; Mestres, R.; Parva, M. *Synthesis*, **2000**, 273.



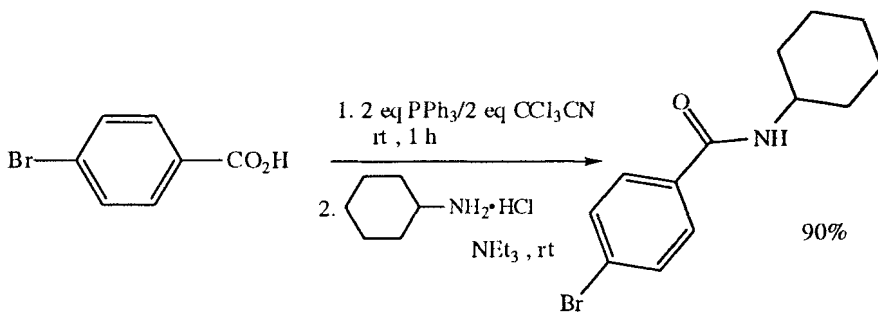
Bailen, M.A.; Chinchilla, R.; Dodsworth, D.J.; Najera, C. *Tetrahedron Lett.*, **2000**, *41*, 9809.



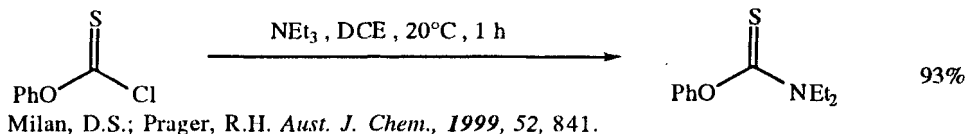
Shiina, I.; Suenaga, Y.; Nakano, M.; Mukaiyama, T. *Bull. Chem. Soc. Jpn.*, **2000**, *73*, 2811.



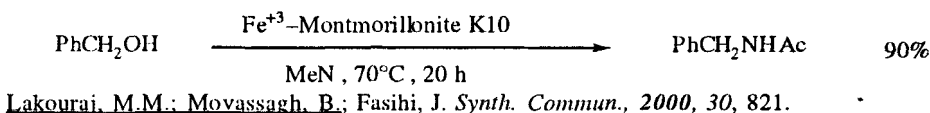
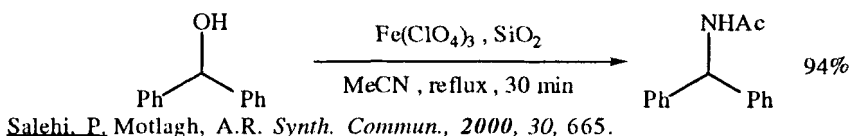
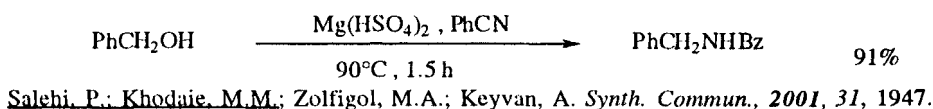
Chou, W.-C.; Chou, M.-C.; Lu, Y.-Y.; Chen, S.-F. *Tetrahedron Lett.*, **1999**, *40*, 3419.



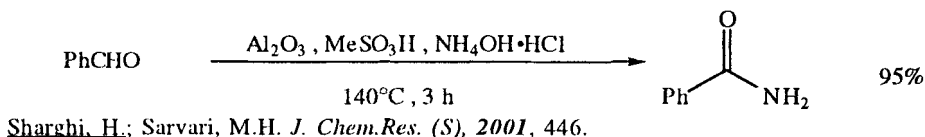
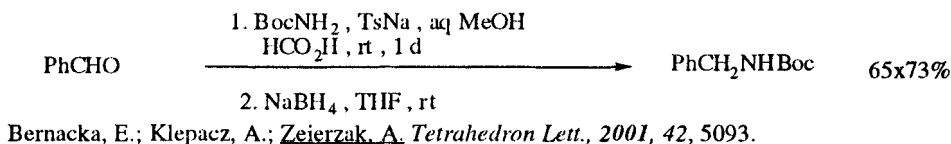
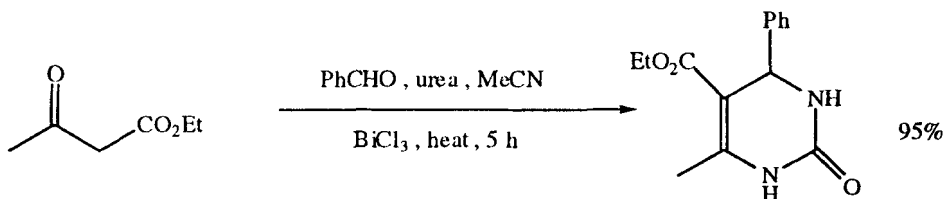
Jang, D.O.; Park, D.J.; Kim, J. *Tetrahedron Lett.*, **1999**, *40*, 5323.

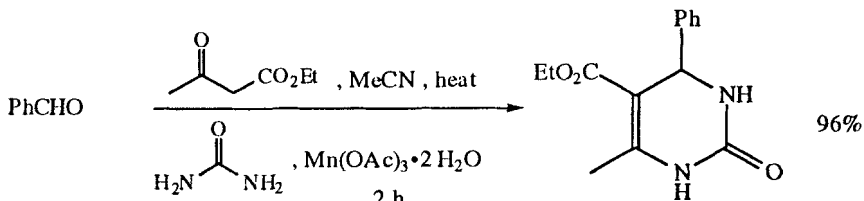


## SECTION 78: AMIDES FROM ALCOHOLS AND THIOLS

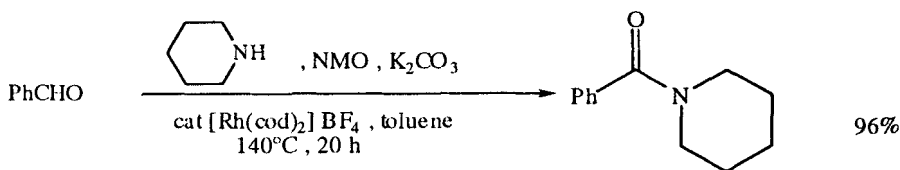


## SECTION 79: AMIDES FROM ALDEHYDES

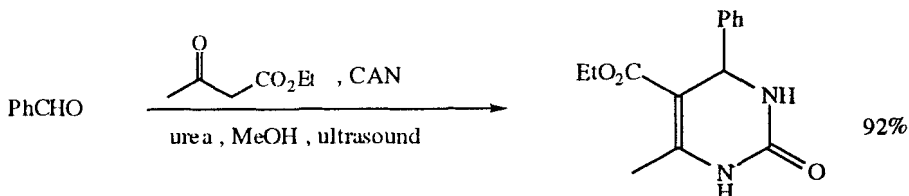




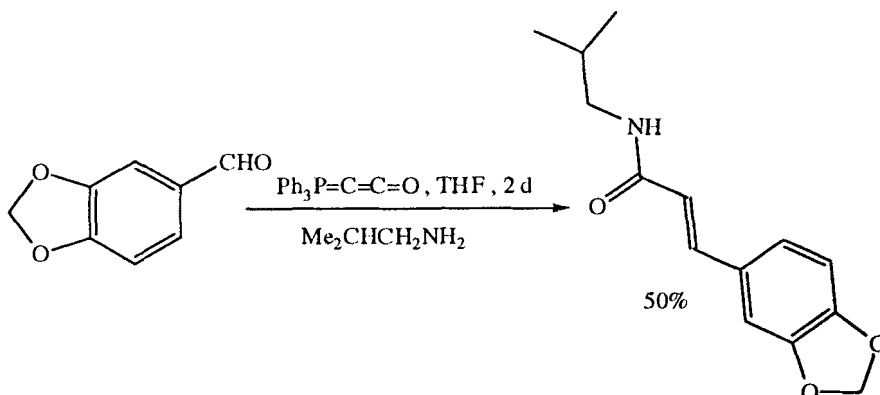
Kumar, K.A.; Kasthuraiah, M.; Reddy, C.S.; Reddy, C.D. *Tetrahedron Lett.*, **2001**, *42*, 7873.



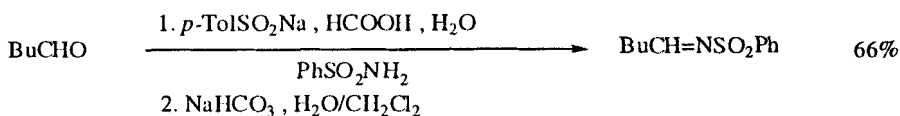
Tillack, A.; Rudloff, I.; Beller, M. *Eur. J. Org. Chem.*, **2001**, 523.



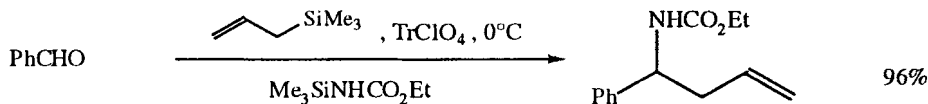
Yadav, J.S.; Reddy, B.V.S.; Reddy, K.B.; Raj, K.S.; Prasad, A.R. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 1939.



Schobert, R.; Siegfried, S.; Gordon, G.J. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 2393.



Chemla, E.; Hebbe, V.; Normant, J.-F. *Synthesis*, **2000**, 75.



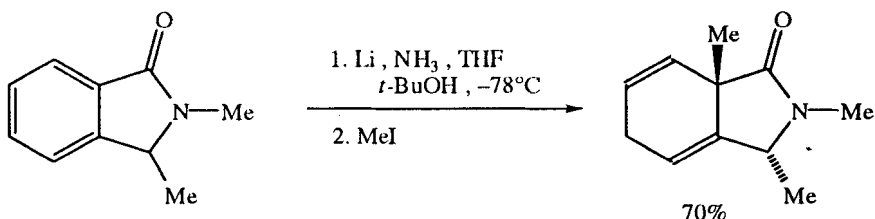
Niimi, L.; Serita, K.-i.; Hiraoka, S.; Yokozawa, T. *Tetrahedron Lett.*, **2000**, *41*, 7075.

## SECTION 80: AMIDES FROM ALKYLs, METHYLENES AND ARYLs

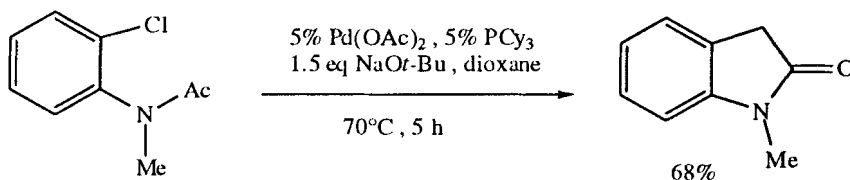
NO ADDITIONAL EXAMPLES

## SECTION 81: AMIDES FROM AMIDES

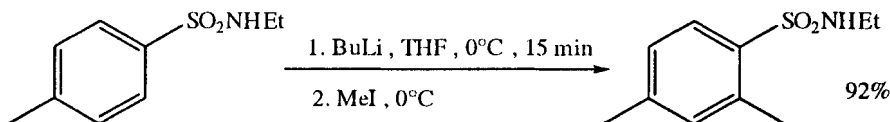
Conjugate reductions of unsaturated amides are listed in Section 74D (Alkyls from Alkenes).



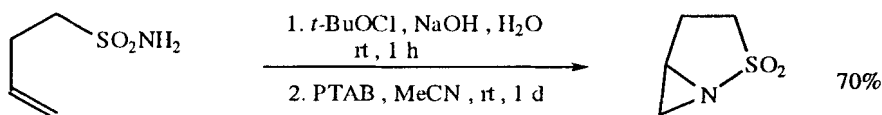
Guo, Z.; Schultz, A.G. *J. Org. Chem.*, **2001**, *66*, 2154.



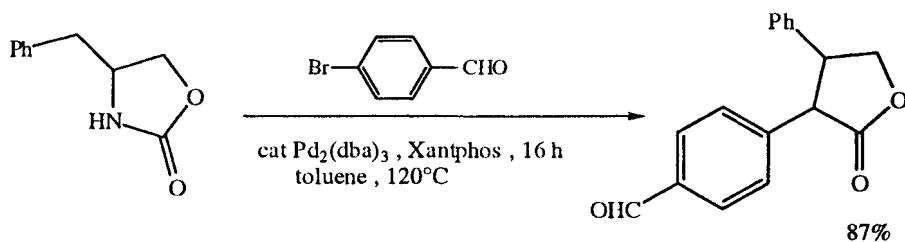
Lee, S.; Hartwig, J.F. *J. Org. Chem.*, **2001**, *66*, 3402.



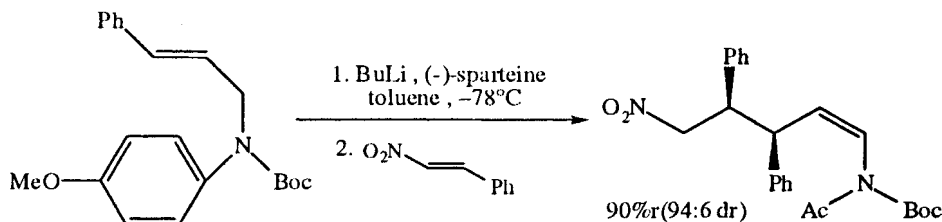
MacNeil, S.L.; Familoni, OB.; Snieckus, V. *J. Org. Chem.*, **2001**, *66*, 3662.



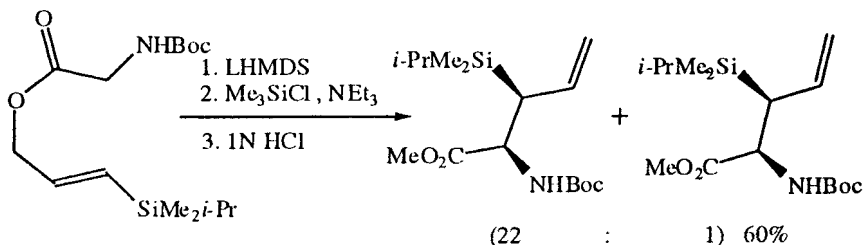
Dauban, P.; Dodd, R.H. *Tetrahedron Lett.*, **2001**, *42*, 1037.



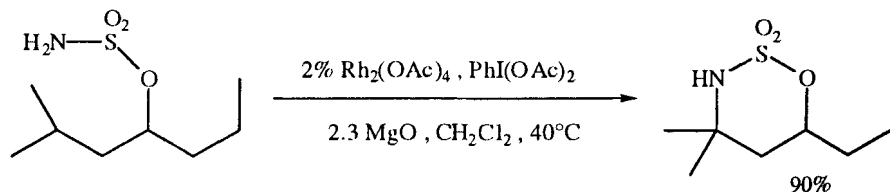
Cacchi, S.; Fabrizi, G.; Goggiamani, A.; Zappia, G. *Org. Lett.*, **2001**, 3, 2539.



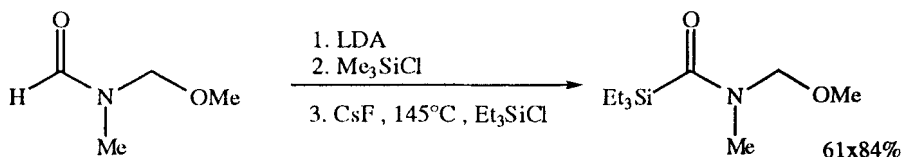
Johnson, T.A.; Curtis, M.D.; Beak, P. *J. Am. Chem. Soc.*, **2001**, 123, 1230.



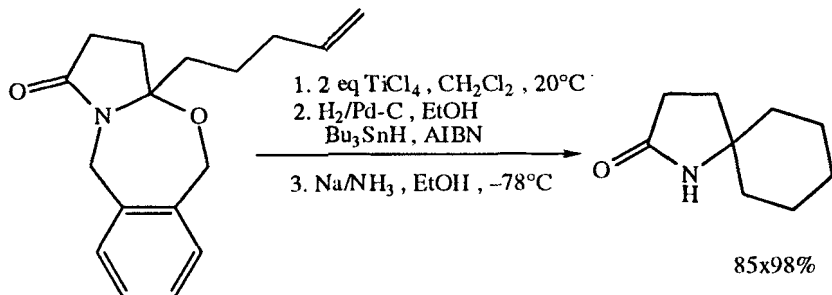
Mohamed, M.; Brook, M.A. *Tetrahedron Lett.*, **2001**, 42, 191.



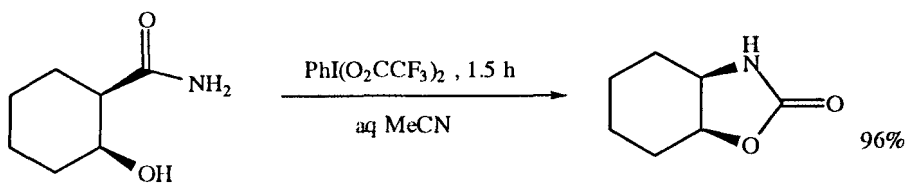
Espino, C.G.; Wehn, P.M.; Chow, J.; DuBois, J. *J. Am. Chem. Soc.*, **2001**, 123, 6935.



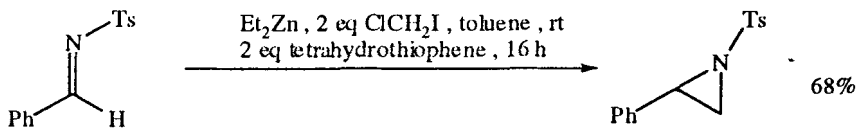
Cunico, R.F. *Tetrahedron Lett.*, **2001**, 42, 1423.



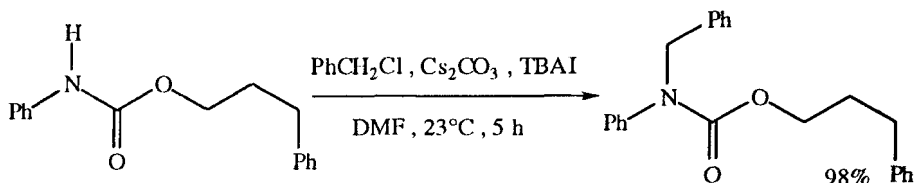
Ito, T.; Yamazaki, N.; Kibayashi, C. *Synlett*, **2001**, 1506.



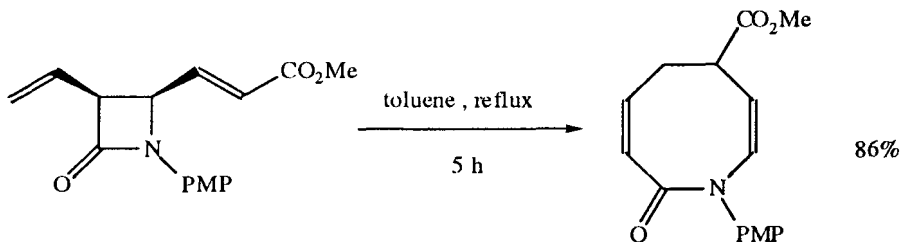
Yu, C.; Jiang, Y.; Liu, B.; Hu, L. *Tetrahedron Lett.*, **2001**, 42, 1449.



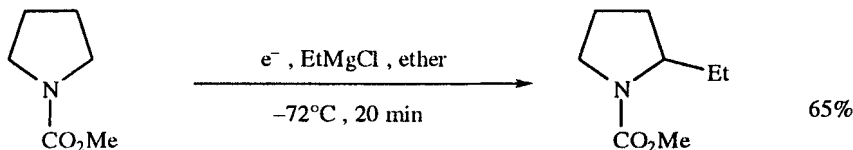
Aggarwal, V.K.; Stenson, R.A.; Jones, R.V.H.; Fieldhouse, R.; Blacker, J. *Tetrahedron Lett.*, **2001**, 42, 1587.



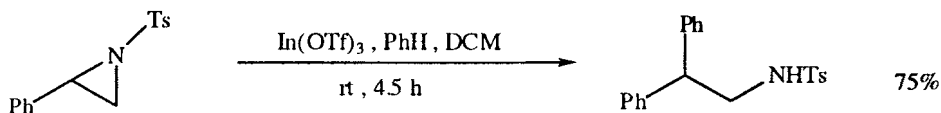
Salvatore, R.N.; Shin, S.I.; Flanders, V.L.; Jung, K.W. *Tetrahedron Lett.*, **2001**, 42, 1799.



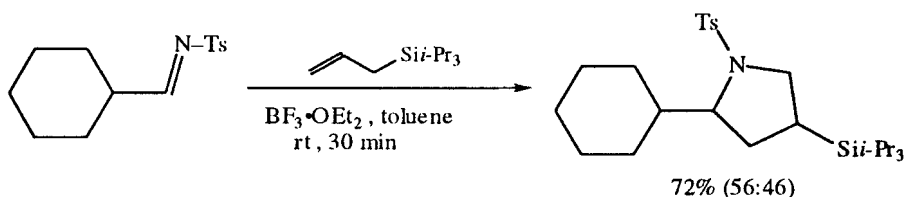
Alcaide, B.; Rodríguez-Ranera, C.; Rodríguez-Vicente, A. *Tetrahedron Lett.*, **2001**, 42, 3081.



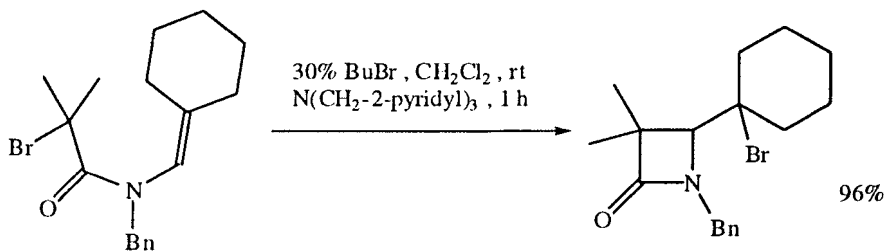
Suga, S.; Okajima, M.; Yoshida, I.-i. *Tetrahedron Lett.*, **2001**, 42, 2173.



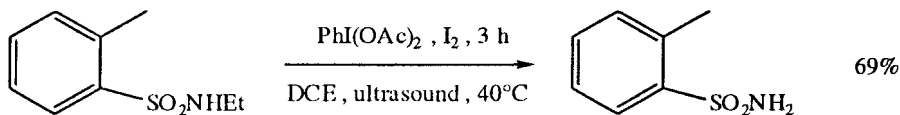
Yadav, J.S.; Reddy, B.V.S.; Rao, R.S.; Veerendhar, G.; Nagaiah, K. *Tetrahedron Lett.*, **2001**, 42, 8067.



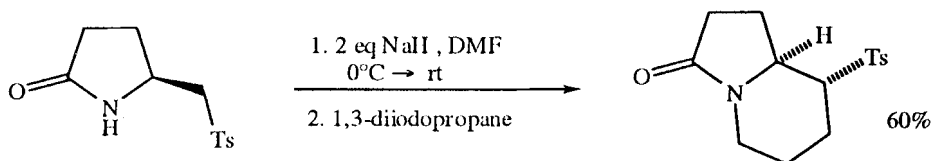
Akiyama, T.; Sugano, M.; Kagoshima, H. *Tetrahedron Lett.*, **2001**, 42, 3889.



Clark, A.J.; Battle, G.M.; Bridge, A. *Tetrahedron Lett.*, **2001**, 42, 4409.

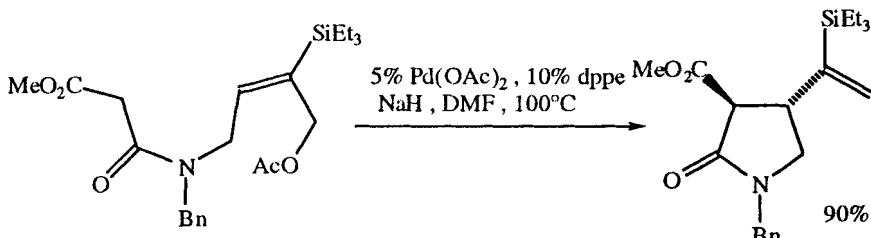


Katohgi, M.; Togo, H. *Tetrahedron*, **2001**, 57, 7481.

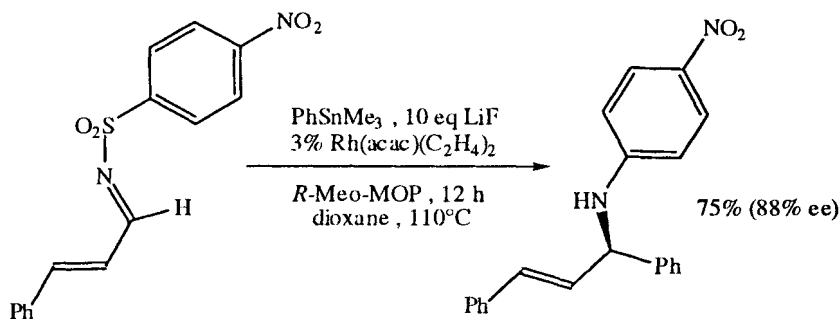


Costa, A.; Najera, C.; Sansano, J.M. *Tetrahedron Asymm.*, **2001**, 12, 2205.

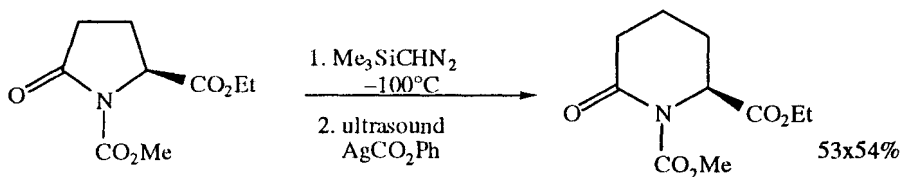




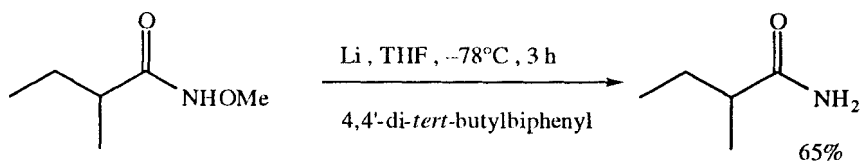
Poli, G.; Giambastiani, G.; Malacria, M.; Thorimbert, S. *Tetrahedron Lett.*, **2001**, 42, 6287.



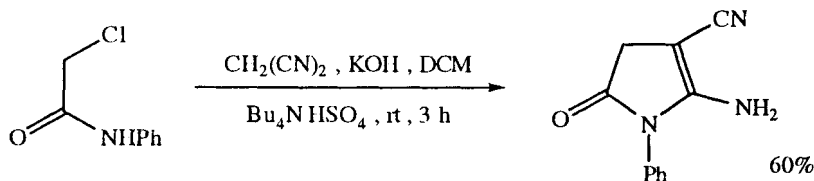
Hayashi, T.; Ishigedani, M. *Tetrahedron*, **2001**, 57, 2589.



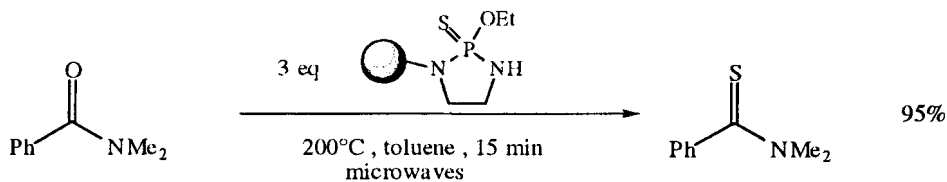
Coutts, I.G.C.; Saint, R.E.; Saint, S.L.; Chambers-Asman, D.M. *Synthesis*, **2001**, 247.



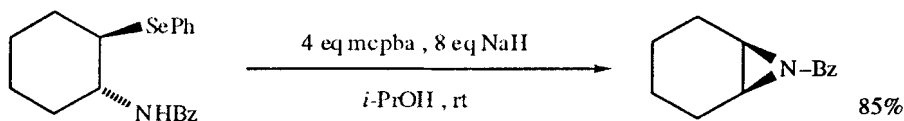
Yus, M.; Radivoy, G.; Alonso, F. *Synthesis*, **2001**, 914.



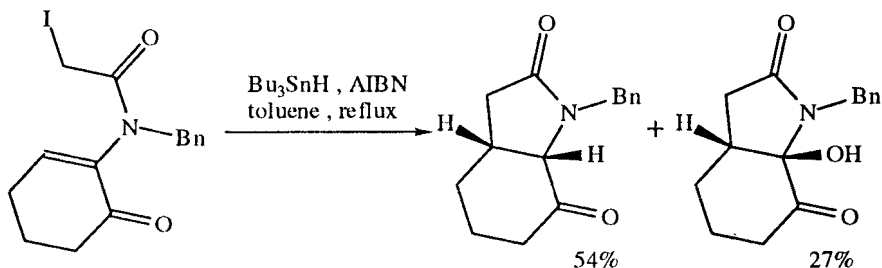
Dave, C.G.; Parikh, V.A. *Synth. Commun.*, **2001**, 31, 1301.



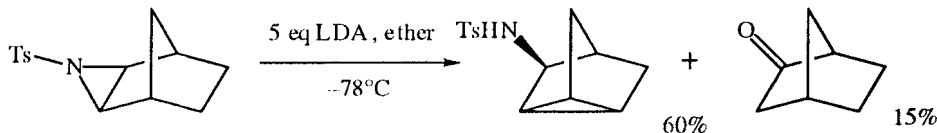
Ley, S.V.; Leach, A.G.; Storer, R.I. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 358.



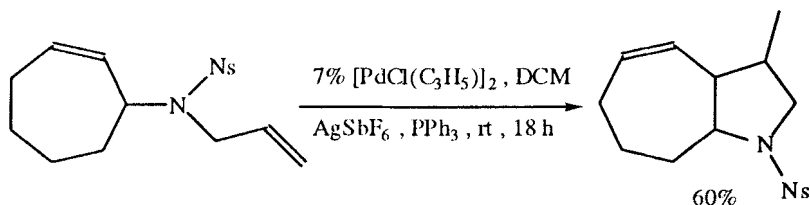
Ward, V.R.; Cooper, M.A.; Ward, A.D. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 944.



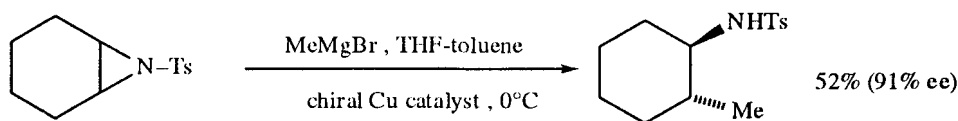
El Bialy, S.A.A.; Ohtan, S.; Sato, T.; Ikeda, M. *Heterocycles*, **2001**, 54, 1021.



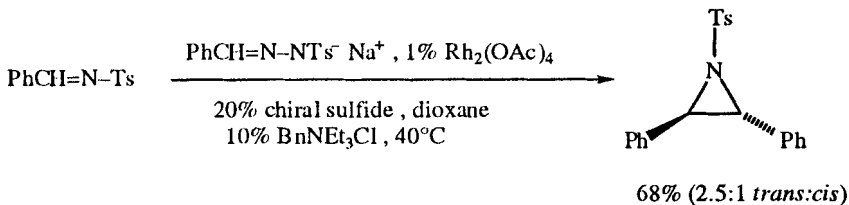
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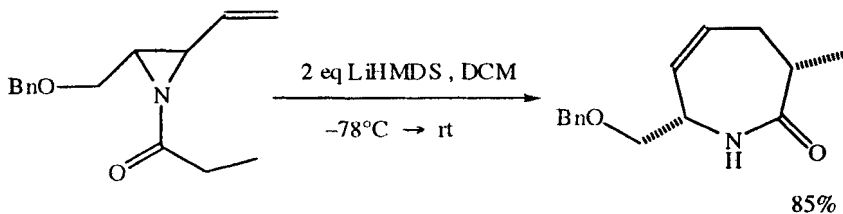
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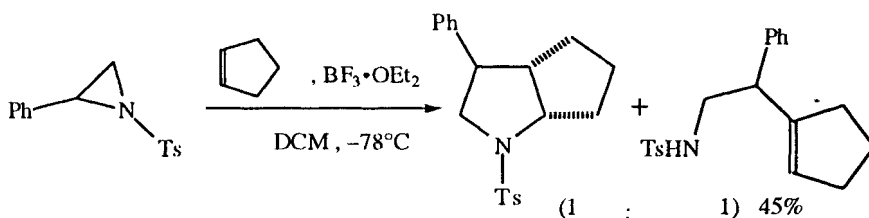
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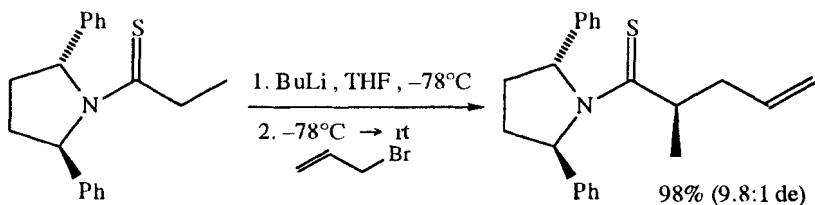
Aggarwal, V.K.; Alonso, E.; Fang, G.; Ferrara, M.; Hynd, G.; Procelloni, M.  
*Angew. Chem. Int. Ed.*, **2001**, *40*, 1433.



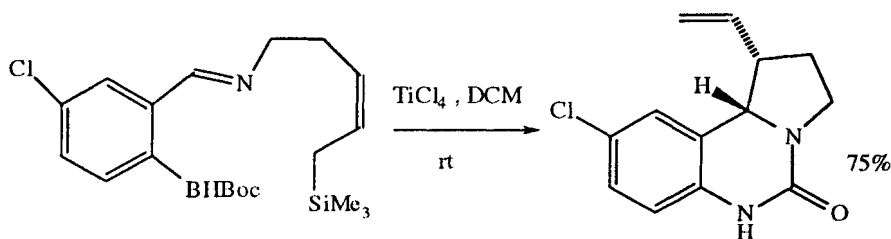
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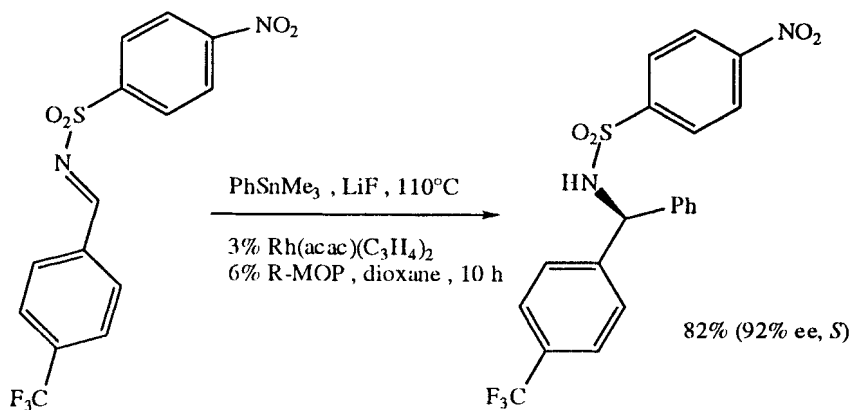
Ungureanu, I.; Klotz, P.; Mann, A. *Angew. Chem. Int. Ed.*, **2000**, *39*, 4615.



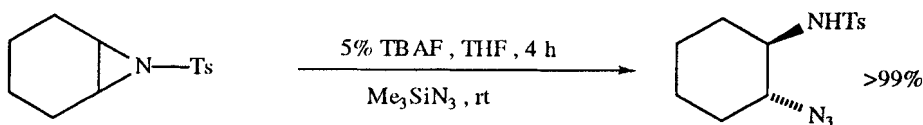
He, S.; Kozmin, S.A.; Rawal, V.H. *J. Am. Chem. Soc.*, **2000**, *122*, 190.



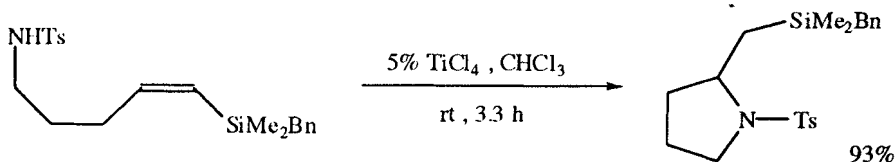
Frank, K.E.; Aubé, J. *J. Org. Chem.*, **2000**, *65*, 655.



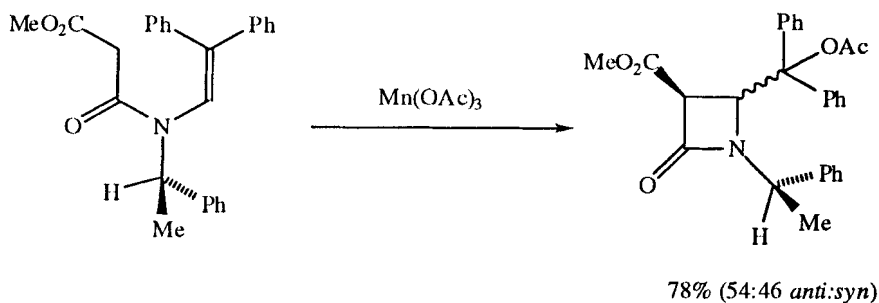
Hayashi, T.; Ishigedani, M. *J. Am. Chem. Soc.*, **2000**, *122*, 976.



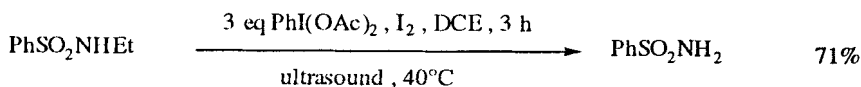
Wu, J.; Hou, X.-L.; Dai, L.-X. *J. Org. Chem.*, **2000**, *65*, 1344.



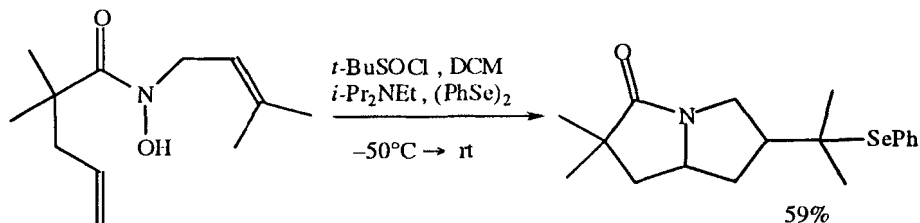
Miura, K.; Hondo, T.; Nakagawa, T.; Takahashi, T.; Hosomi, A. *Org. Lett.*, **2000**, *2*, 385.



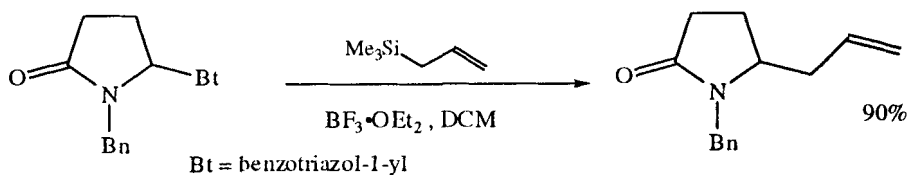
D'Annibale, A.; Nanni, D.; Trogolo, C.; Umami, F. *Org. Lett.*, **2000**, *2*, 401.



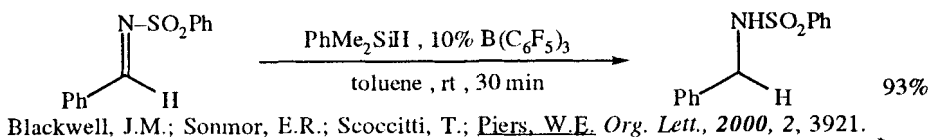
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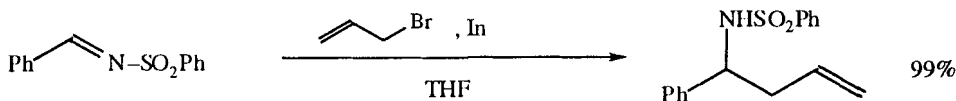
Lin, X.; Stein, D.; Weinreb, S.M. *Tetrahedron Lett.*, **2000**, *41*, 2333.



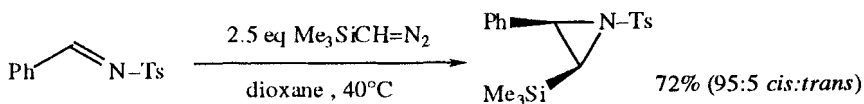
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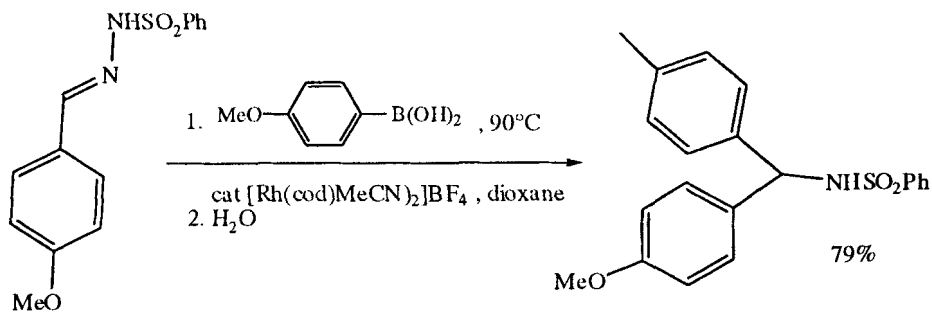
Blackwell, J.M.; Sonmor, E.R.; Scoccitti, T.; Piers, W.E. *Org. Lett.*, **2000**, *2*, 3921.



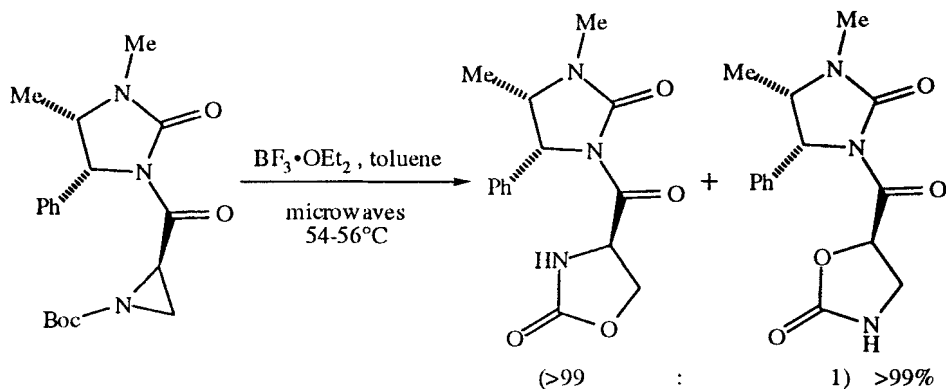
Lu, W.; Chan, T.H. *J. Org. Chem.*, **2000**, *65*, 8589.



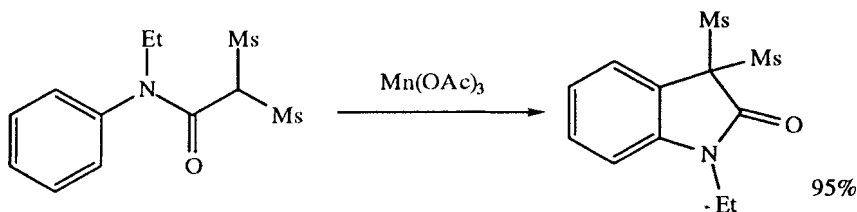
Aggarwal, V.K.; Ferrara, M. *Org. Lett.*, **2000**, *2*, 4107.



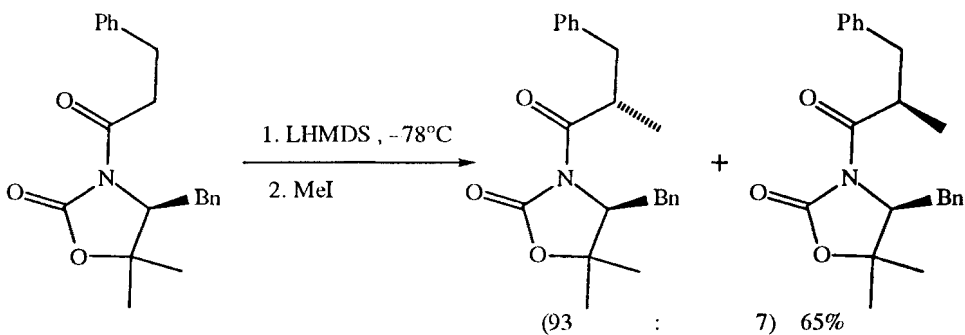
Ueda, M.; Saito, A.; Miyayra, N. *Synlett*, **2000**, 1637.



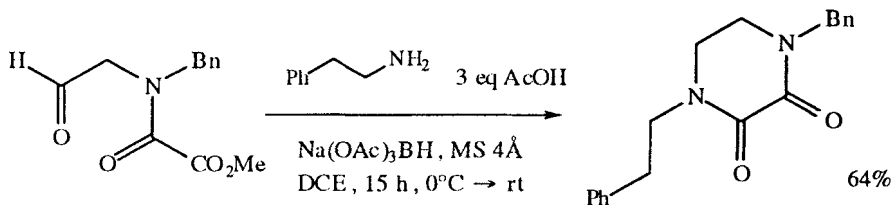
Cardillo, G.; Gentilucci, L.; Gianotti, M.; Tolomelli, A. *Synlett*, **2000**, 1309.



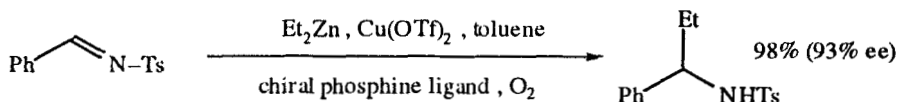
Wu, Y.-L.; Chuang, C.-P.; Lin, P.-Y. *Tetrahedron*, **2000**, 56, 6209.



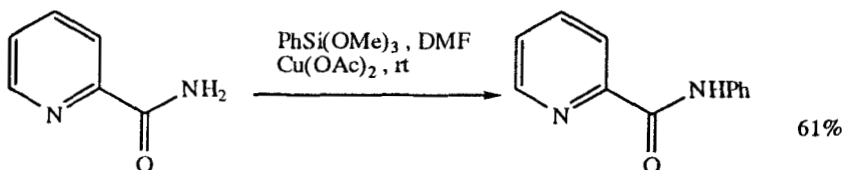
Bull, S.D.; Davies, S.G.; Nicholson, R.L.; Sanganeer, H.J.; Smith, A.D. *Tetrahedron Asym.*, **2000**, 11, 3475.



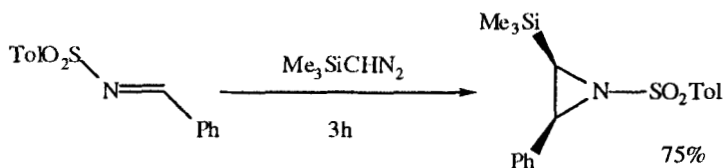
Beshore, D.C.; Dinsmore, C.J. *Tetrahedron Lett.*, **2000**, 41, 8735.



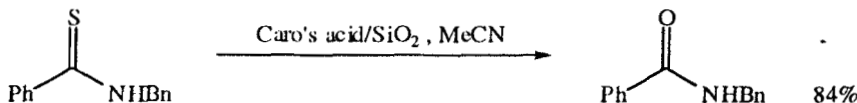
Fujihara, H.; Nagai, K.; Tomioka, K. *J. Am. Chem. Soc.*, **2000**, *122*, 12055.



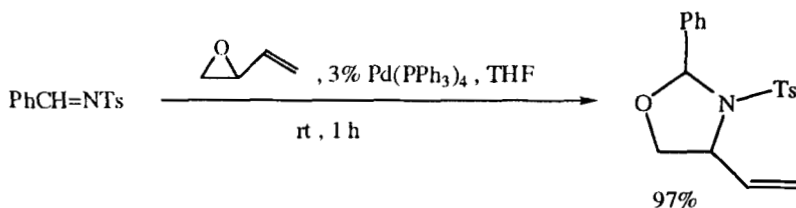
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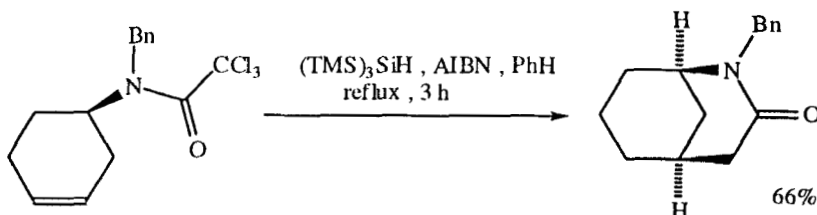
Hori, R.; Aoyama, T.; Shioiri, T. *Tetrahedron Lett.*, **2000**, *41*, 9455.



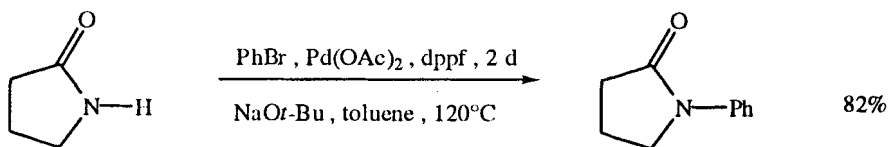
Movassagh, B.; Lakouraj, M.M.; Ghodrati, K. *Synth. Commun.*, **2000**, *30*, 2353.



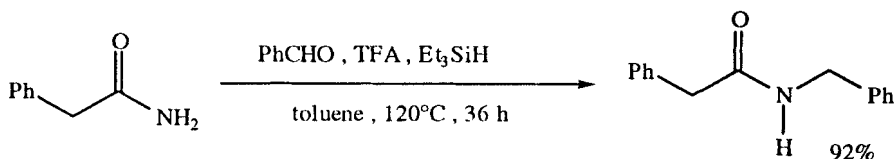
Shim, J.-G.; Yamamoto, Y. *Heterocycles*, **2000**, *52*, 885.



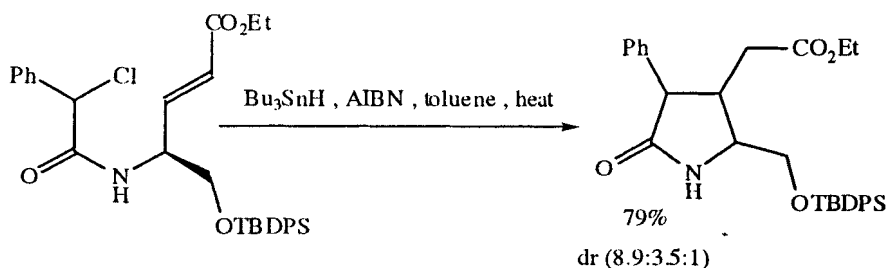
Quirante, J.; Escolano, C.; Diaba, F.; Bonjoch, J. *Heterocycles*, **1999**, *50*, 731.



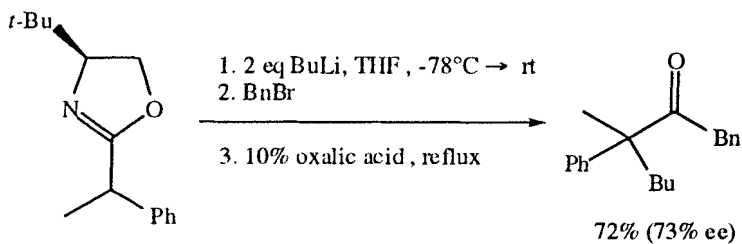
Shakespeare, W.C. *Tetrahedron Lett.*, **1999**, *40*, 2035.



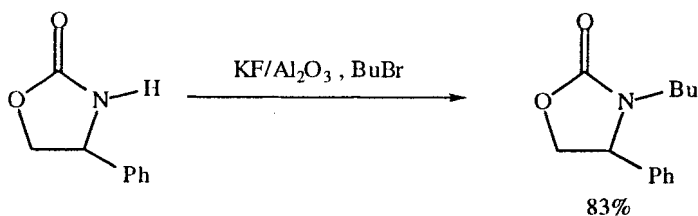
Dubé, D.; Scholte, A.A. *Tetrahedron Lett.*, **1999**, *40*, 2295.



Bryans, J.S.; Large, J.M.; Parsons, A.F. *Tetrahedron Lett.*, **1999**, *40*, 3487.

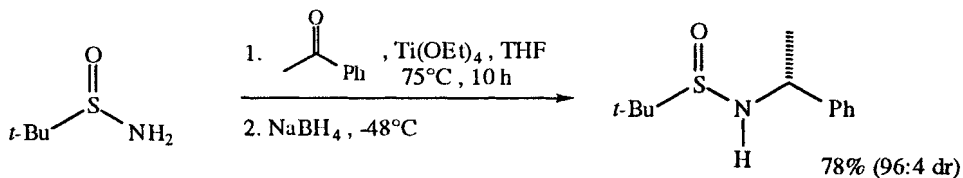


Hanson, P.R.; Probst, D.A.; Robinson, R.E.; Yau, M. *Tetrahedron Lett.*, **1999**, *40*, 4761.

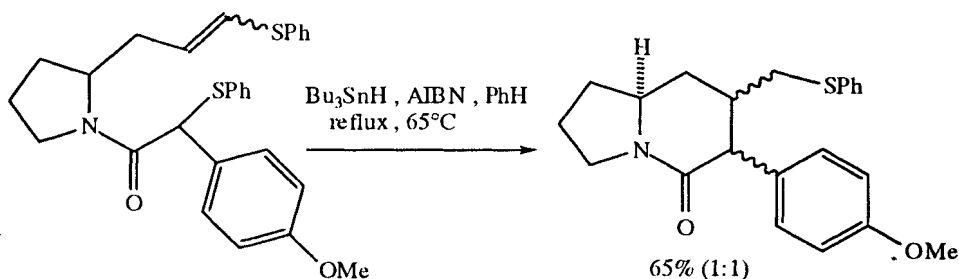
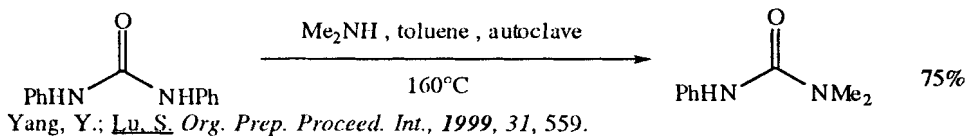


Blass, B.; Drowns, M.; Harris, C.L.; Liu, S.; Portlock, D.E. *Tetrahedron Lett.*, **1999**, *40*, 6545.

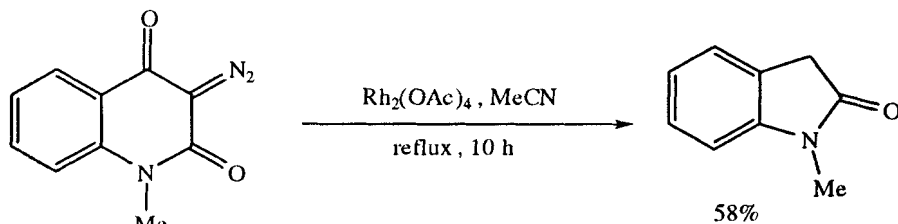




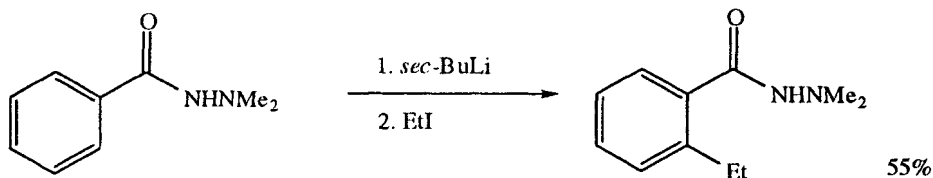
Borg, G.; Cogan, D.A.; Ellman, J.A. *Tetrahedron Lett.*, **1999**, *40*, 6709.



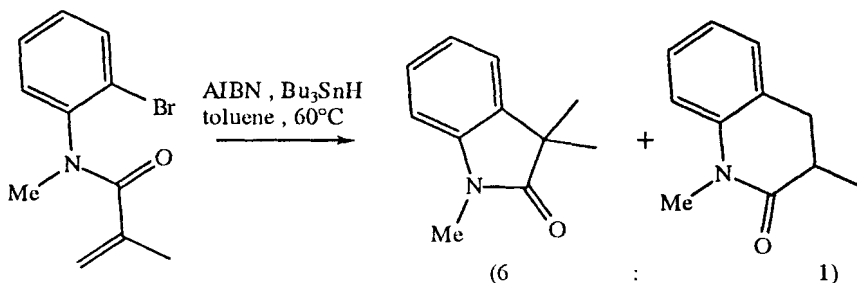
Ikeda, M.; Shikaura, J.; Maekawa, N.; Daibuzono, K.; Teranishi, H.; Teraoka, Y.; Oda, N.; Ishibashi, H. *Heterocycles*, **1999**, *50*, 31.



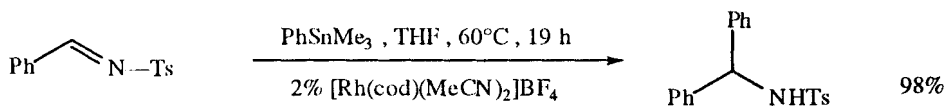
Lee, Y.R.; Suk, J.Y.; Kim, B.S. *Tetrahedron Lett.*, **1999**, *40*, 8219.



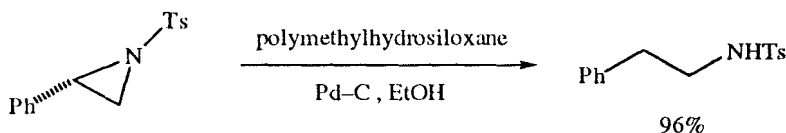
McCombie, S.W.; Lin, S.-I.; Vice, S.F. *Tetrahedron Lett.*, **1999**, *40*, 8767.



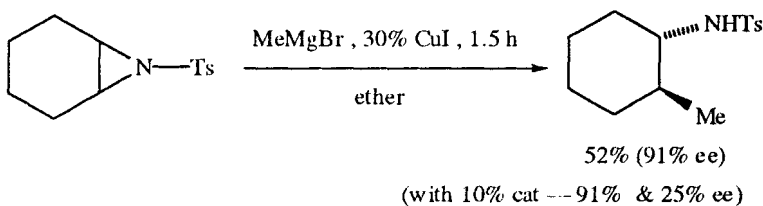
Jones, K.; Brunton, S.A.; Gosain, R. *Tetrahedron Lett.*, **1999**, 40, 8935.



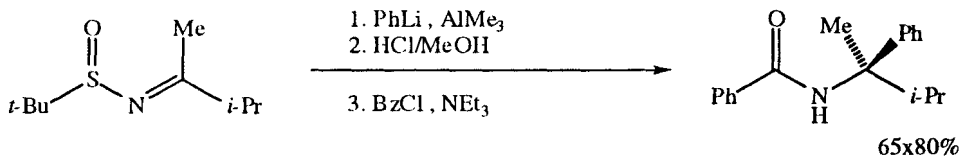
Oi, S.; Moro, M.; Fukuhara, H.; Kawanishi, T.; Inoue, Y. *Tetrahedron Lett.*, **1999**, 40, 9259.



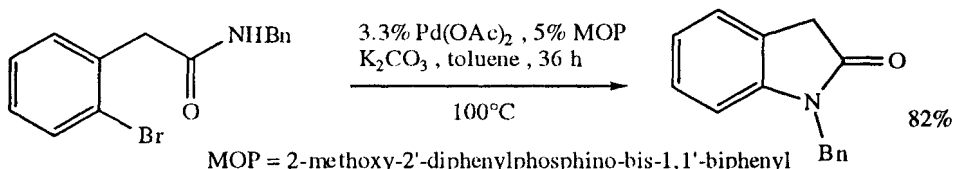
Chandrasekhar, S.; Ahmed, M. *Tetrahedron Lett.*, **1999**, 40, 9325.



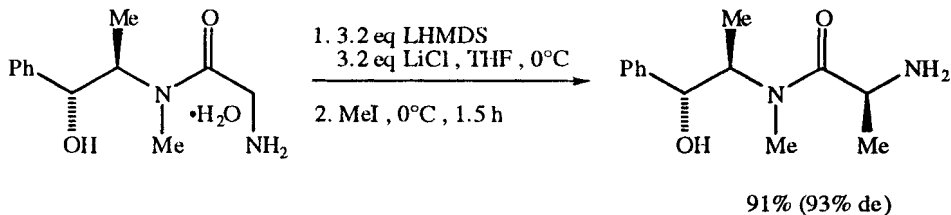
Muller, P.; Nury, P. *Org. Lett.*, **1999**, 1, 439.



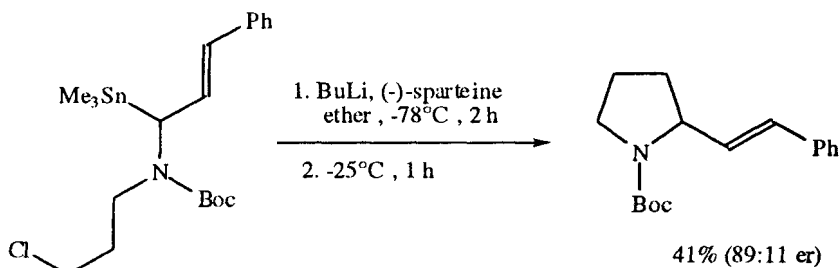
Cogan, D.A.; Ellman, J.A. *J. Am. Chem. Soc.*, **1999**, 121, 268.



Yang, B.H.; Buchwald, S.L. *Org. Lett.*, **1999**, 1, 35.



Myers, A.G.; Schnider, P.; Kwon, S.; Kung, D.W. *J. Org. Chem.*, **1999**, *64*, 3322.

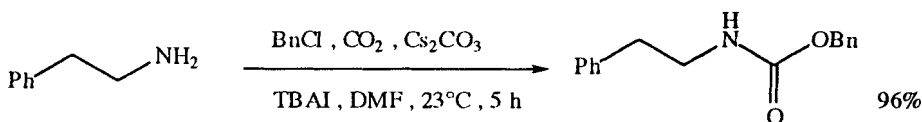


Serino, C.; Stehle, N.; Park, Y.S.; Florio, S.; Beak, P. *J. Org. Chem.*, **1999**, *64*, 1160.

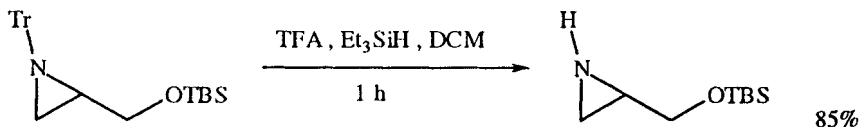
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*Accts. Chem. Res.*, **2000**, *33*, 849.

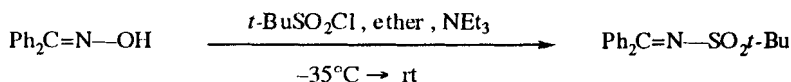
## SECTION 82: AMIDES FROM AMINES



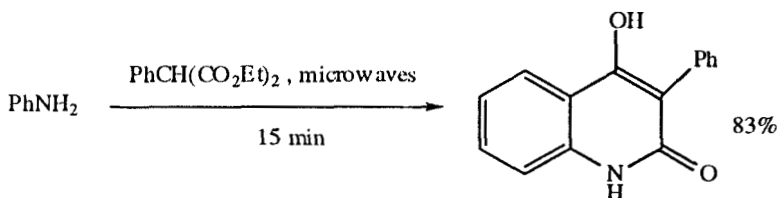
Salvatore, R.N.; Shin, S.I.; Nagle, A.S.; Jung, K.W. *J. Org. Chem.*, **2001**, *66*, 1035.



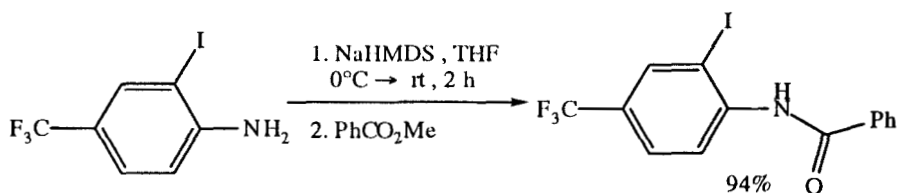
Vedejs, E.; Klapars, A.; Warner, D.L.; Weiss, A.H. *J. Org. Chem.*, **2001**, *66*, 7542.



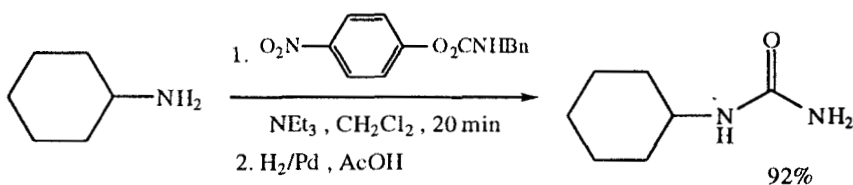
Artmann III, G.D.; Bartolozzi, A.; Franck, R.W.; Weinreb, S.M. *Synlett*, **2001**, 232.



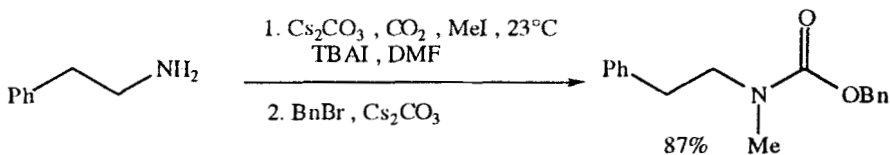
Lange, J.H.M.; Verveer, P.C.; Osnabrug, S.J.M.; Visser, G.M.  
*Tetrahedron Lett.*, 2001, 42, 1367.



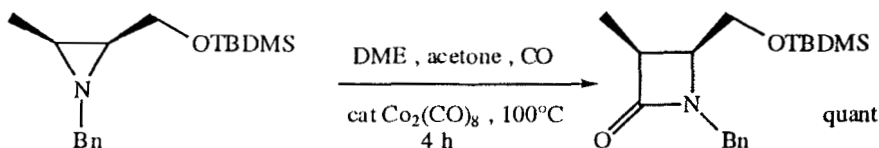
Wang, J.; Rosingana, M.; Discordia, R.P.; Soundararajan, N.; Polniaszek, R. *Synlett.*, 2001, 1485.



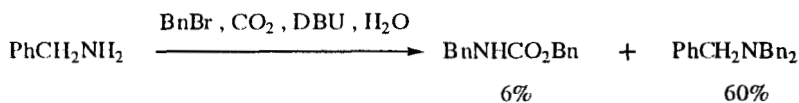
Liu, Q.; Luedtke, N.W.; Tor, Y. *Tetrahedron Lett.*, **2001**, 42, 1445.



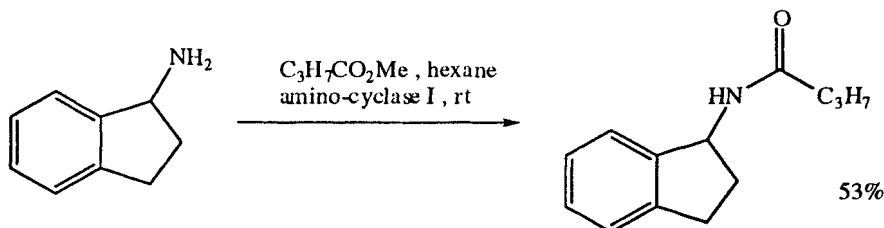
Salvatore, R.N.; Ledger, J.A.; Jung, K.W. *Tetrahedron Lett.*, **2001**, *42*, 6023.



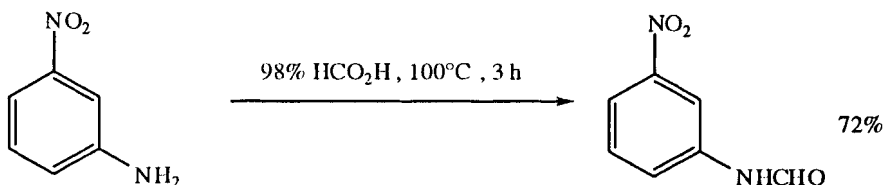
Davoli, P.; Forni, A.; Moretti, I.; Prati, E.; Torre, G. *Tetrahedron*, **2001**, *57*, 1801.



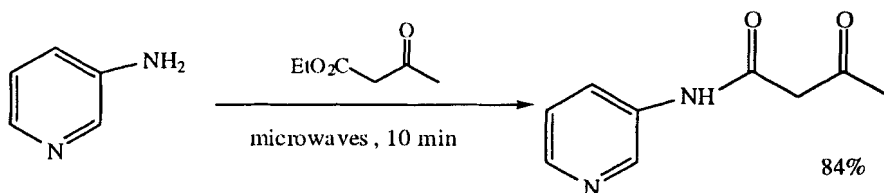
Shi, M.; Shen, Y.-M. *Helv. Chim. Acta*, 2001, 84, 3357.



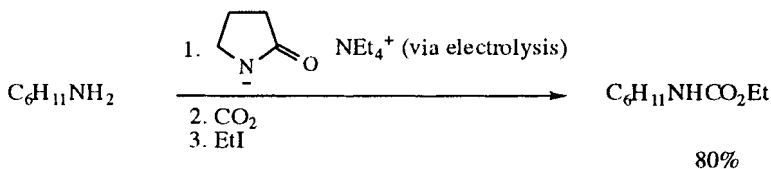
Youshko, M.I.; van Rantwijk, F.; Sheldon, R.A. *Tetrahedron Asymm.*, **2001**, *12*, 3267.



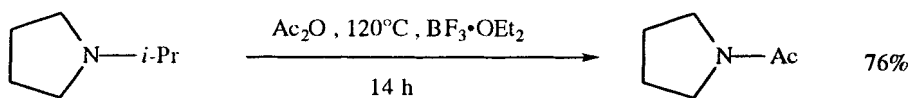
Chakrabarty, M.; Khasnobis, S.; Harigaya, Y.; Konda, Y. *Synth. Commun.*, **2000**, *30*, 187.



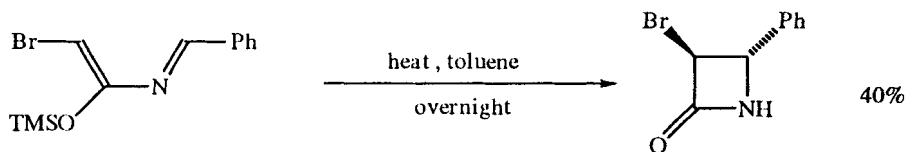
Suri, O.P.; Satti, N.K.; Suri, K.A. *Synth. Commun.*, **2000**, *30*, 3709.



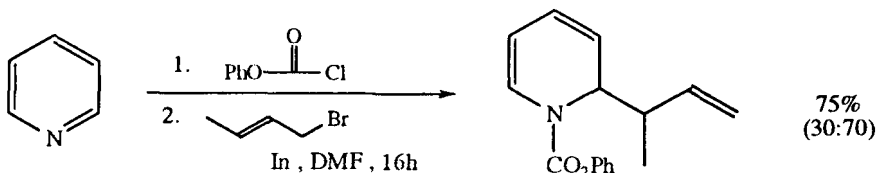
Feroci, M.; Inesi, A.; Rossi, L. *Tetrahedron Lett.*, **2000**, *41*, 963.



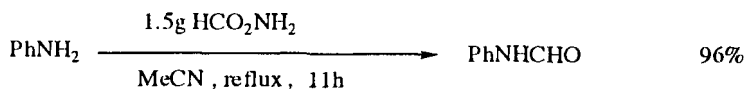
Dave, P.R.; Kumar, K.A.; Duddu, R.; Axenrod, T.; Dai, R.; Das, K.K.; Guan, X.-P.; Sun, J.; Trivedi, N.L.; Gilardi, R.D. *J. Org. Chem.*, **2000**, *65*, 1207.



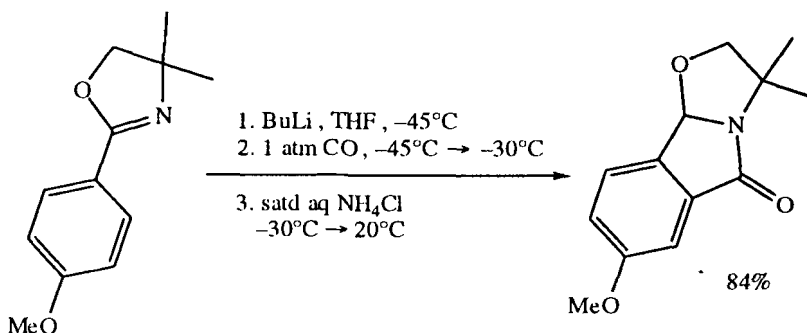
Bandini, E.; Favi, G.; Martelli, G.; Panunzio, M.; Piersanti, G. *Org. Lett.*, **2000**, *2*, 1077.



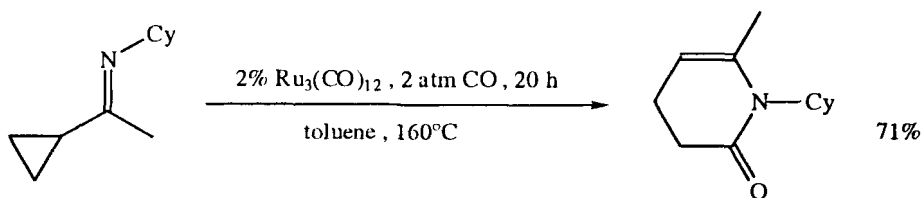
Loh, T.-P.; Lye, P.-L.; Wang, R.-B.; Sim, K.-Y. *Tetrahedron Lett.*, 2000, 41, 7779.



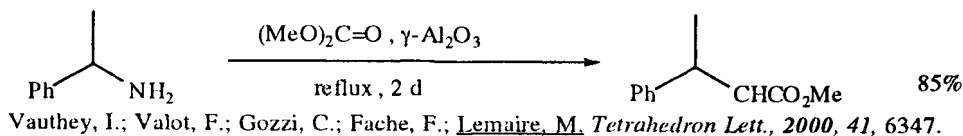
Reddy, P.G.; Kumar, G.D.K.; Baskaran, S. *Tetrahedron Lett.*, 2000, 41, 9149.



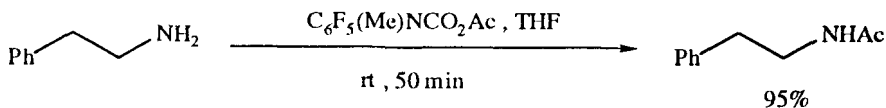
Iwamoto, K.; Chatani, N.; Murai, S. *J. Org. Chem.*, 2000, 65, 7944.



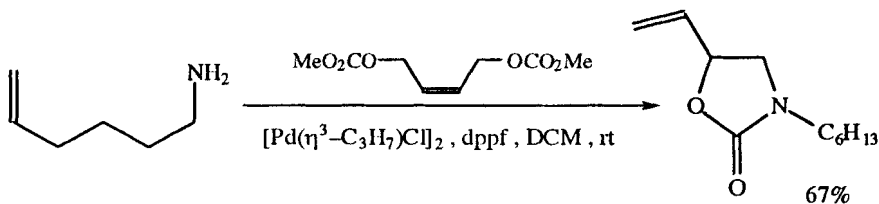
Kamitani, A.; Chatani, N.; Morimoto, T.; Murai, S. *J. Org. Chem.*, 2000, 65, 930.



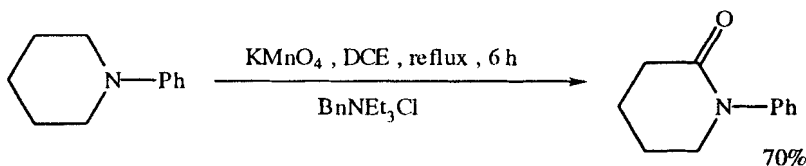
Vauthey, I.; Valot, F.; Gozzi, C.; Fache, F.; Lemaire, M. *Tetrahedron Lett.*, 2000, 41, 6347.



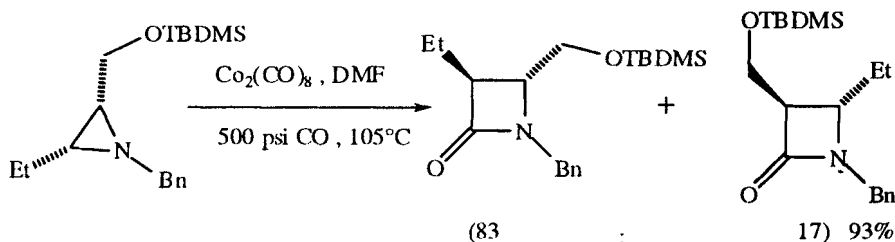
Kondo, K.; Sekimoto, E.; Nakao, J.; Murakami, Y. *Tetrahedron*, 2000, 56, 5843.



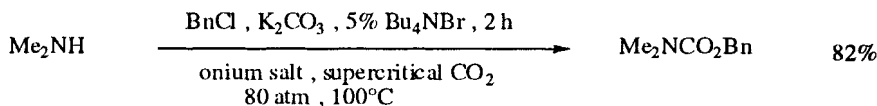
Tanimori, S.; Kiriata, M. *Tetrahedron Lett.*, **2000**, *41*, 6785.



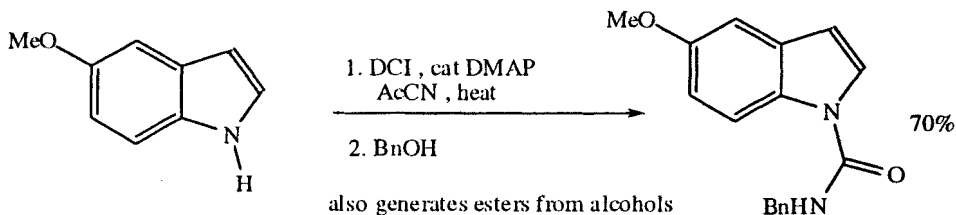
Markgraf, J.H.; Stickney, C.A. *J. Heterocyclic Chem.*, **2000**, *37*, 109.



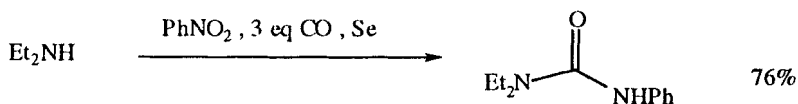
Davoli, P.; Prati, F. *Heterocycles*, **2000**, *53*, 2379.



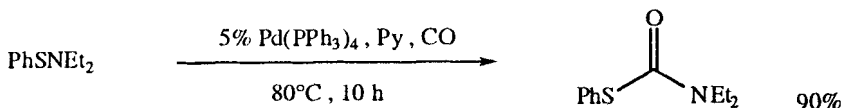
Yoshida, M.; Hara, N.; Okuyama, S. *Chem. Commun.*, **2000**, 151.



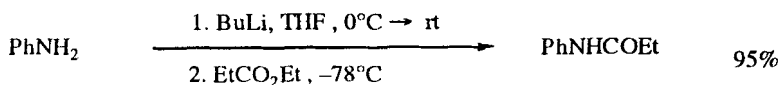
Macor, J.E.; Cuff, A.; Cornelius, L. *Tetrahedron Lett.*, **1999**, *40*, 2733.



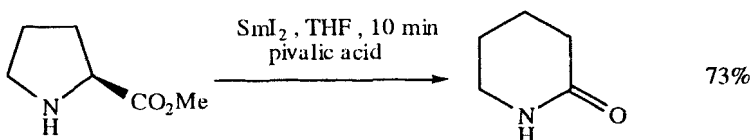
Yang, Y.; Lu, S. *Tetrahedron Lett.*, **1999**, *40*, 4845.



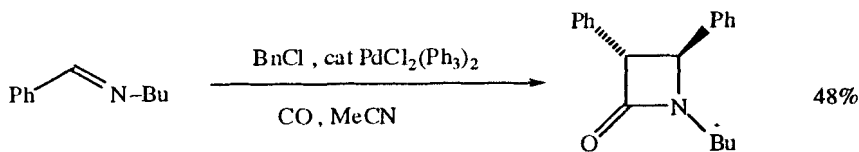
Kuniyasu, H.; Hiraike, H.; Morita, M.; Tanaka, A.; Sugoh, K.; Kurosawa, H. *J. Org. Chem.*, **1999**, *64*, 7305.



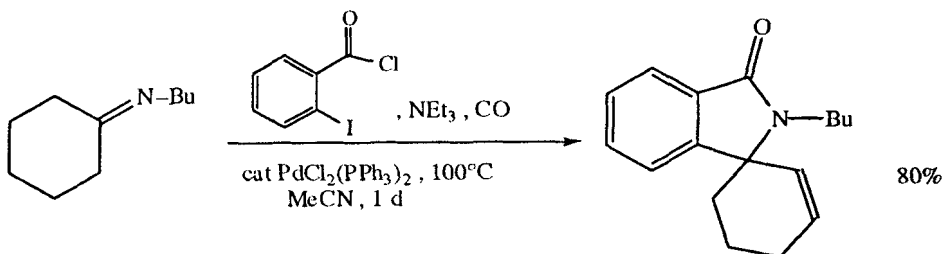
Ooi, T.; Tayama, E.; Yamada, M.; Maruoka, K. *Synlett*, **1999**, 729.



Honda, T.; Ishikawa, F. *Chem. Commun.*, **1999**, 1065.

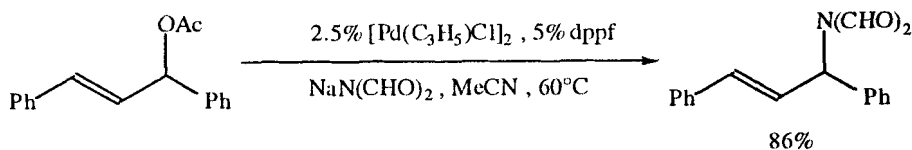


Cho, C.S.; Jiang, L.H.; Shim, S.C. *Synth. Commun.*, **1999**, *29*, 2695.



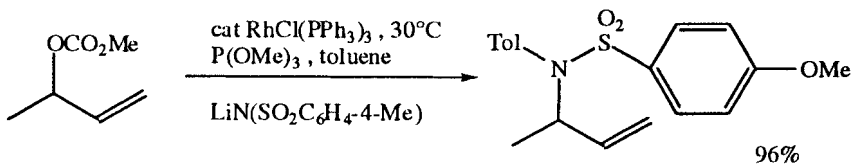
Cho, C.S.; Wu, X.; Jiang, L.H.; Shim, S.C.; Kim, H.R. *J. Heterocyclic Chem.*, **1999**, *36*, 297.

## SECTION 83: AMIDES FROM ESTERS

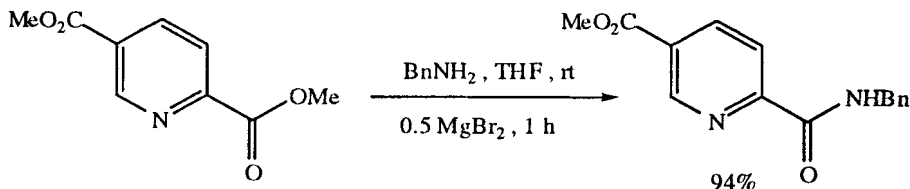


Wang, Y.; Dink, K. *J. Org. Chem.*, **2001**, *66*, 3238.

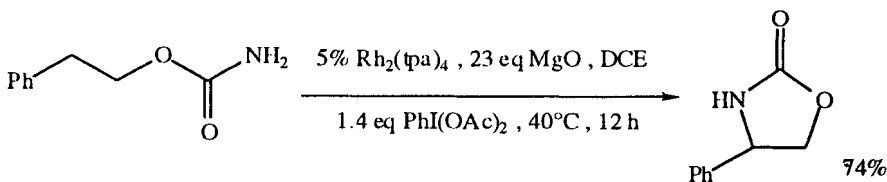




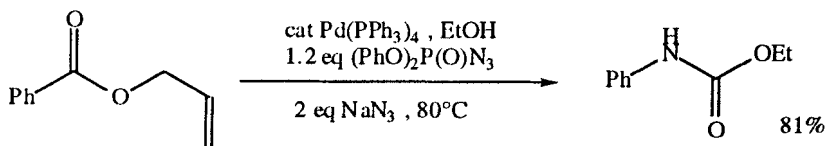
Evans, P.A.; Robinson, J.E.; Moffett, K.K. *Org. Lett.*, 2001, 3, 3269.



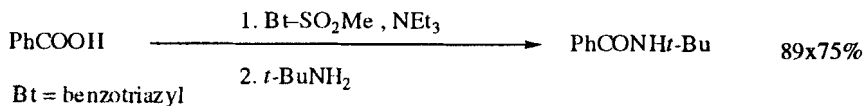
Guo, Z.; Dowdy, E.D.; Li, W.-S.; Polniaszek, R.; Delaney, E. *Tetrahedron Lett.*, 2001, 42, 1843.



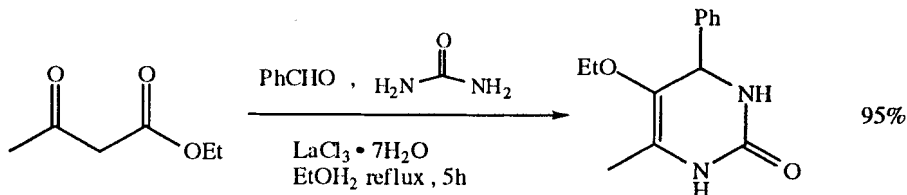
Espino, C.G.; DuBois, J. *Angew. Chem. Int. Ed.*, 2001, 40, 598.



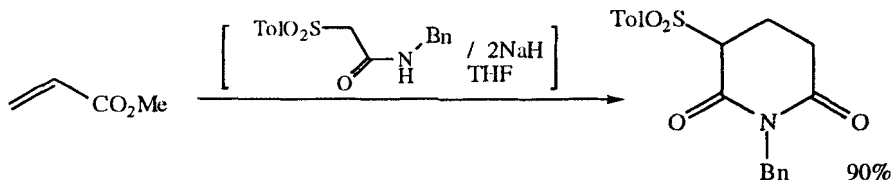
Okumoto, H.; Nishihara, S.; Yamamoto, S.; Hino, H.; Nozawa, A.; Suzuki, A. *Synlett*, 2000, 991.



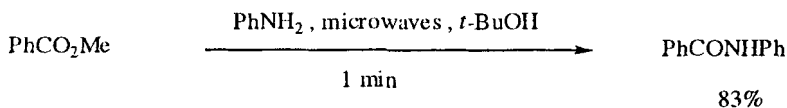
Katritzky, A.R.; He, H.-Y.; Suzuki, K. *J. Org. Chem.*, 2000, 65, 8210.



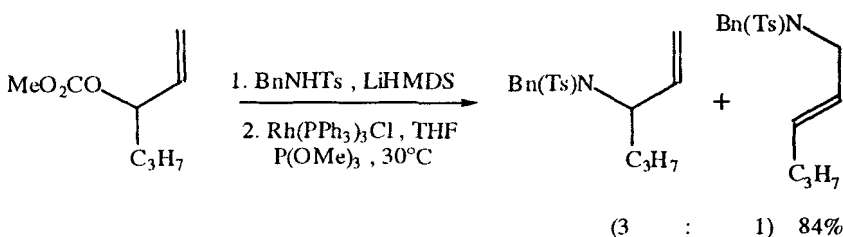
Lu, J.; Bai, Y.; Wang, Z.; Yang, B.; Ma, H. *Tetrahedron Lett.*, 2000, 41, 9075.



Chang, M.-Y.; Chang, B.-R.; Tai, H.-M.; Chang, N.-C. *Tetrahedron Lett.*, **2000**, *41*, 10273.

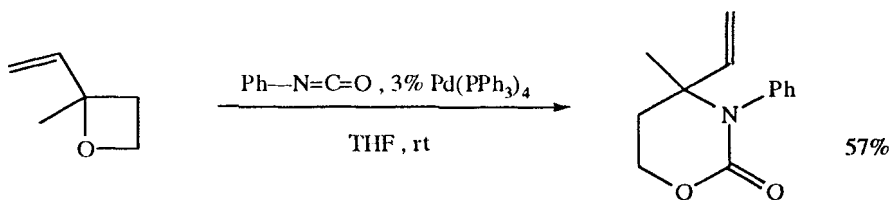


Varma, R.S.; Naicker, K.P. *Tetrahedron Lett.*, **1999**, *40*, 6177.

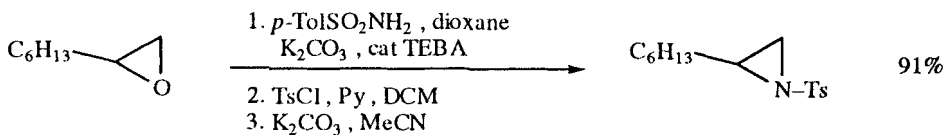


Evans, P.A.; Robinson, J.E.; Nelson, J.D. *J. Am. Chem. Soc.*, **1999**, *121*, 6761.

## SECTION 84: AMIDES FROM ETHERS, EPOXIDES AND THIOETHERS

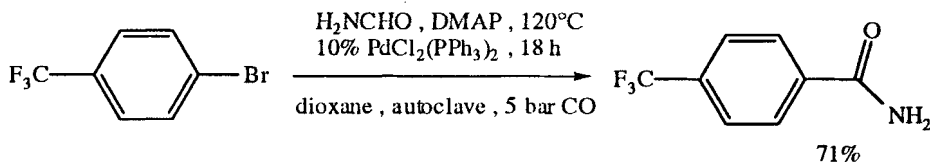


Larksarp, C.; Alper, H. *J. Org. Chem.*, **1999**, *64*, 4152.

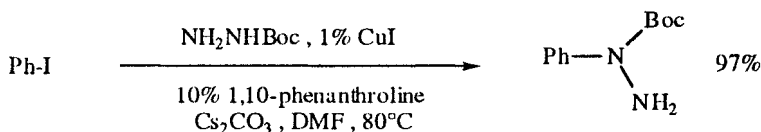


Albanese, D.; Landini, D.; Penso, M.; Petricci, S. *Tetrahedron*, **1999**, *55*, 6387.

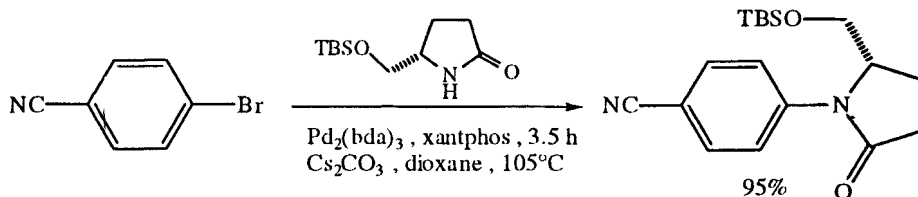
## SECTION 85: AMIDES FROM HALIDES AND SULFONATES



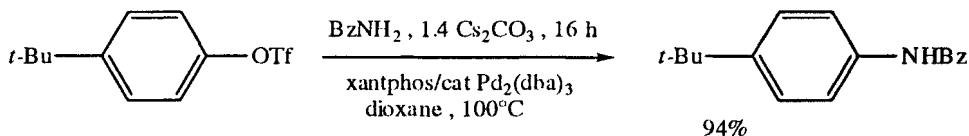
Schnyder, A.; Beller, M.; Mehlretter, G.; Nsenda, T.; Studer, M.; Indolese, A.F.  
*J. Org. Chem.*, **2001**, *66*, 4311.



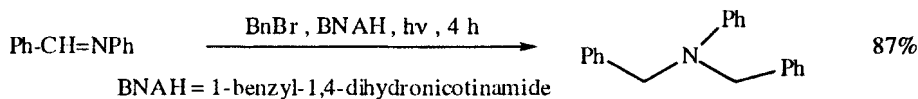
Wolter, M.; Klapars, A.; Buchwald, S.L. *Org. Lett.*, **2001**, *3*, 3803.



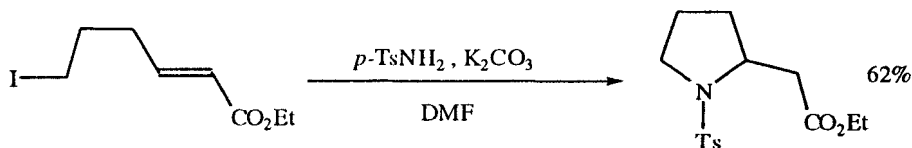
Browning, R.G.; Mahmud, H.; Badarinarayana, V.; Lovely, C.L.  
*Tetrahedron Lett.*, **2001**, *42*, 7155.



Yin, J.; Buchwald, S.L. *Org. Lett.*, **2000**, *2*, 1101.

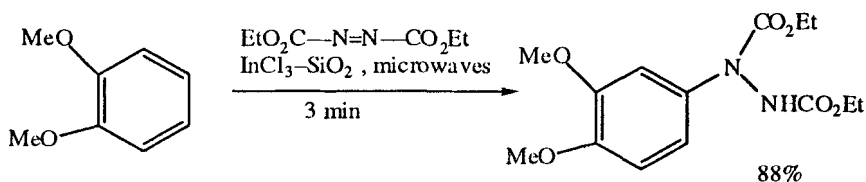


Jin, M.; Zhang, D.; Yang, L.; Lium, Y.; Liu, Z. *Tetrahedron Lett.*, **2000**, *41*, 7357.

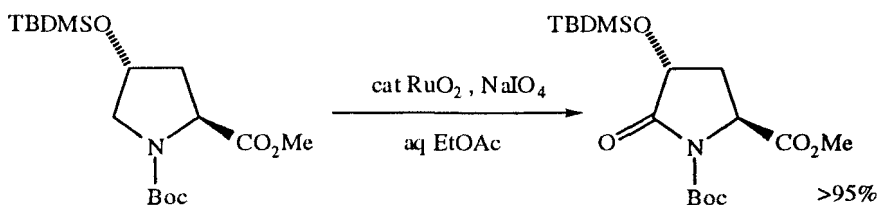


Bunce, R.A.; Allison, J.C. *Synth. Commun.*, **1999**, *29*, 2175.

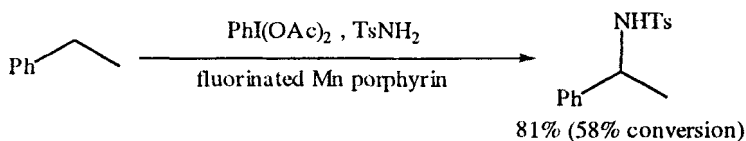
## SECTION 86: AMIDES FROM HYDRIDES



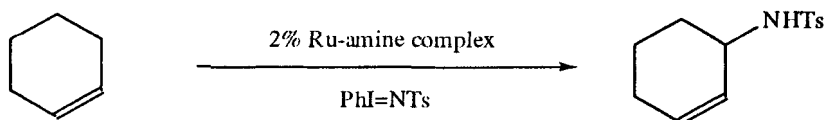
Yadav, J.S.; Subba Reddy, B.V.; Kumar, G.M.; Madan, C. *Synlett*, **2001**, 1781.



Zhang, X.; Schmitt, A.C.; Jiang, W. *Tetrahedron Lett.*, **2001**, 42, 5335.

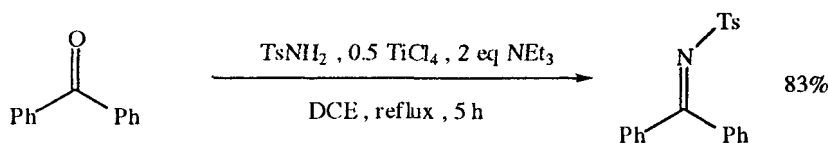


Yu, X.-Q.; Huang, J.-S.; Zhou, X.-G.; Che, C.-M. *Org. Lett.*, **2000**, 2, 2233.

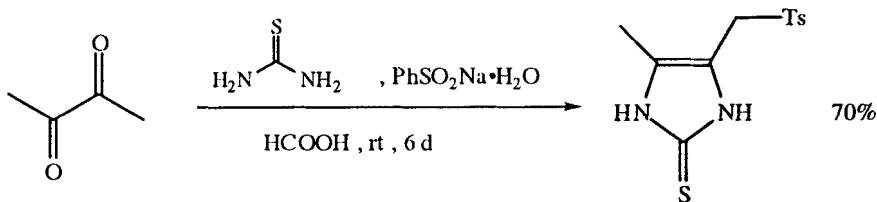


Au, S.-M.; Huang, J.-S.; Che, C.-M.; Yu, W.-Y. *J. Org. Chem.*, **2000**, 65, 7858.

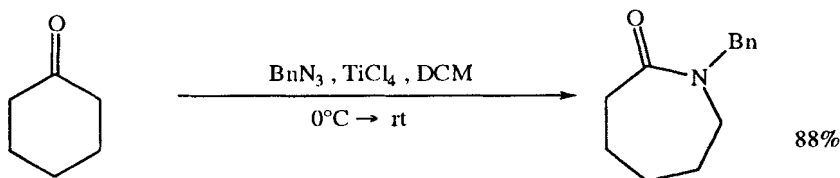
## SECTION 87: AMIDES FROM KETONES



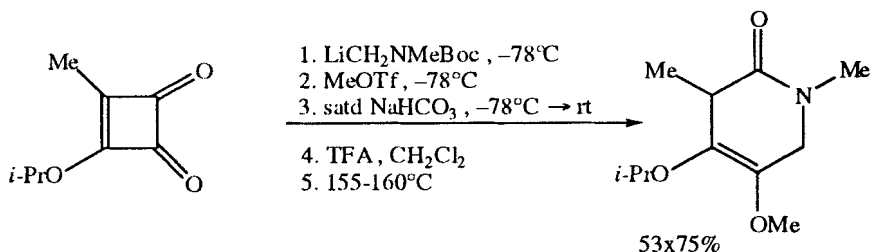
Ram, R.N.; Khan, A.A. *Synth. Commun.*, **2001**, 31, 841.



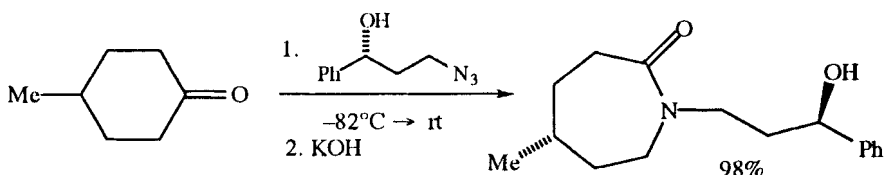
Liepa, A.J.; Wright, D.M.J. *Aust. J. Chem.*, **2000**, *53*, 73.



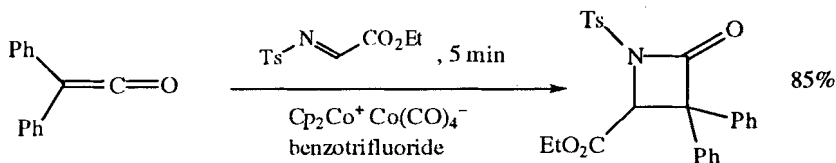
Desai, P.; Schildknecht, K.; Agrios, K.A.; Mossman, C.; Milligan, G.L.; Aubé, J. *J. Am. Chem. Soc.*, **2000**, *122*, 7226.



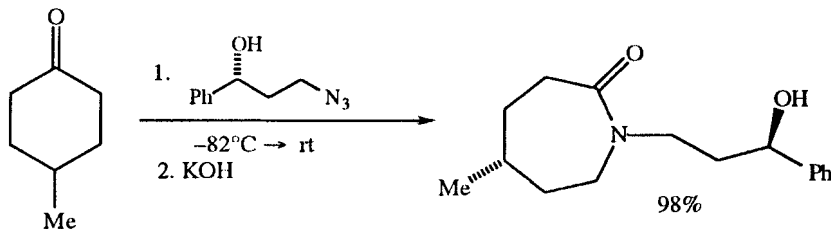
Zhang, S.; Liebeskind, L.S. *J. Org. Chem.*, **1999**, *64*, 4042.



Furness, K.; Aubé, J. *Org. Lett.*, **1999**, *1*, 495.

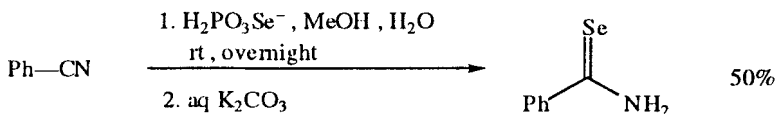


Wack, H.; Drury III, W.J.; Taggi, A.E.; Ferraris, D.; Lectka, T. *Org. Lett.*, **1999**, *1*, 1985.

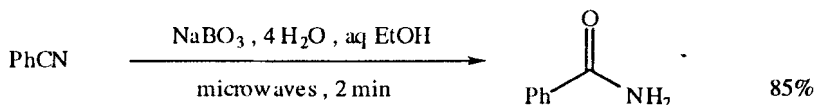


Furness, K.; Aubé, J. *Org. Lett.*, **1999**, *1*, 495.

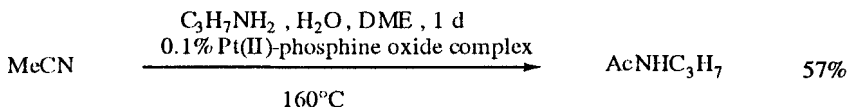
## SECTION 88: AMIDES FROM NITRILES



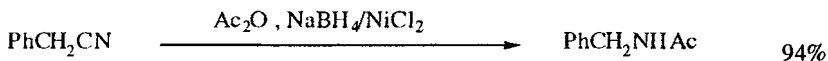
Kamiński, R.; Glass, R.S.; Skowrońska, A. *Synthesis*, **2001**, 1308.



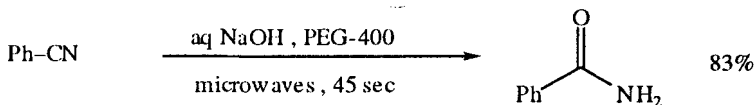
Sharifi, A.; Mohsenzadeh, F.; Mojtahedi, M.M.; Saidi, M.R.; Balalaie, S. *Synth. Commun.*, **2001**, *31*, 431.



Cobley, C.J.; van den Heuvel, M.; Abbadj, A.; de Vries, J.G. *Tetrahedron Lett.*, **2000**, *41*, 2467.

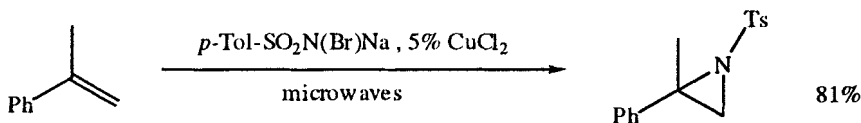


Caddick, S.; deK. Haynes, A.K.; Judd, D.B.; Williams, M.R.V. *Tetrahedron Lett.*, **2000**, *41*, 3513.

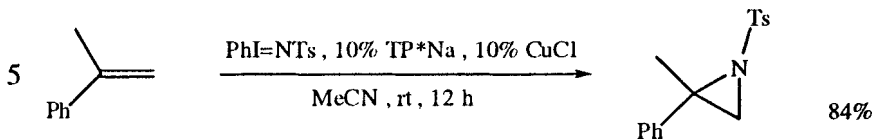


Bendale, P.M.; Khadilkar, B.M. *Synth. Commun.*, **2000**, *30*, 1713.

## SECTION 89: AMIDES FROM ALKENES

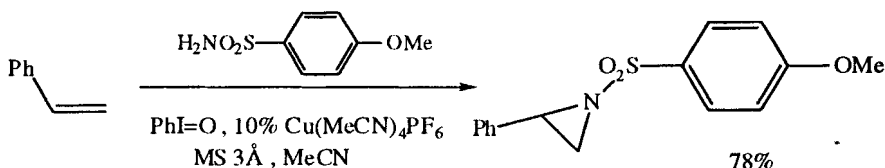


Chanda, B.M.; Vyas, R.; Bedekar, A.V. *J. Org. Chem.*, **2001**, 66, 30.

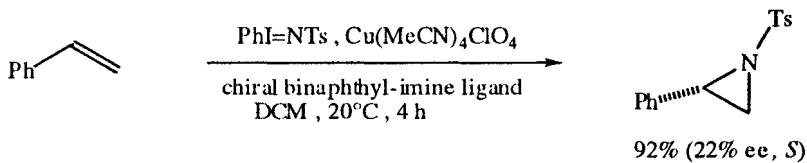


TP = tris-(3,5-dimethylpyrazolyl)borate

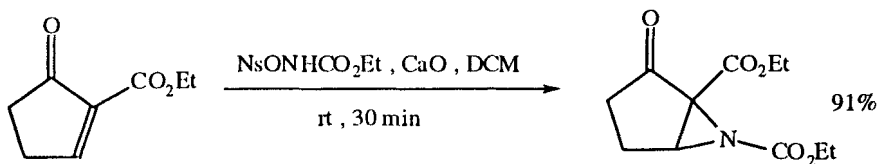
Handy, S.T.; Czopp, M. *Org. Lett.*, **2001**, 3, 1423.



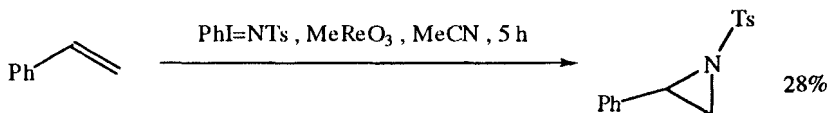
Dauben, P.; Sanière, L.; Tarrade, A.; Dodd, R.H. *J. Am. Chem. Soc.*, **2001**, 123, 7707.



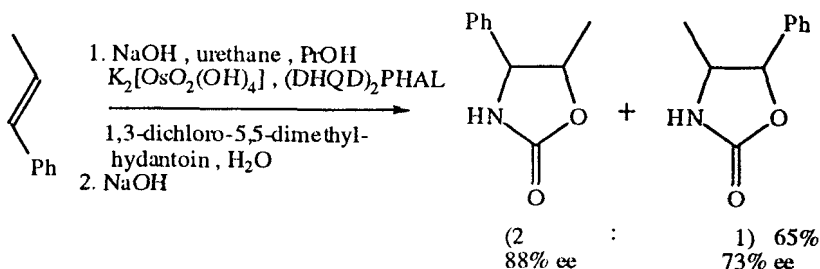
Shi, M.; Wang, C.-J.; Chan, A.S.C. *Tetrahedron Asym.*, **2001**, 12, 3105.



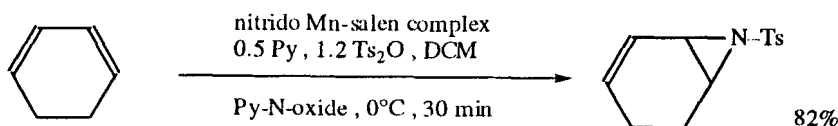
Fioravanti, S.; Morreale, A.; Pellacani, L.; Tardella, P.A. *Synthesis*, **2001**, 1975.



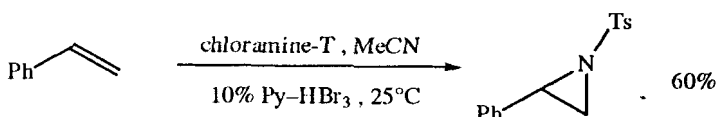
Jeon, H.-J.; Nguyen, S.B.T. *Chem. Commun.*, **2001**, 235.



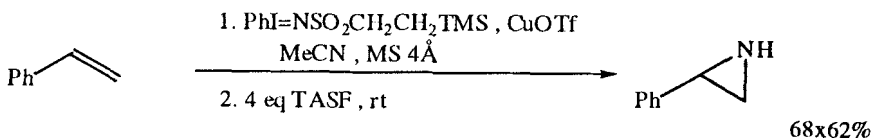
Barta, N.S.; Sidler, D.R.; Somerville, K.B.; Weissman, S.A.; Larsen, R.D.; Reider, P.J.  
*Org. Lett.*, 2000, 2, 2821.



Nishimura, M.; Minakata, S.; Thongchant, S.; Ryu, I.; Komatsu, M.  
*Tetrahedron Lett.*, 2000, 41, 7089.

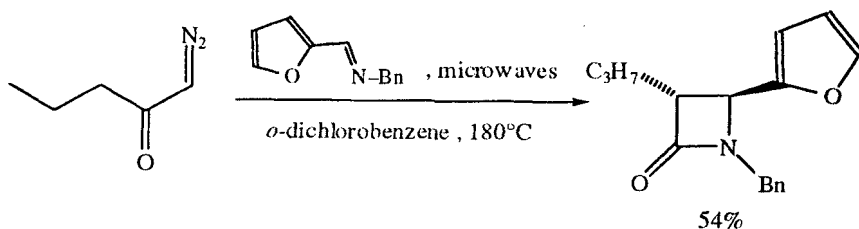


Ali, S.I.; Nikalje, M.D.; Sudalai, A. *Org. Lett.*, 1999, 1, 705.



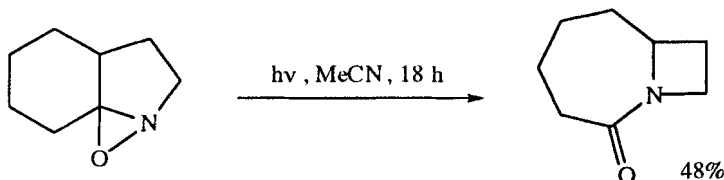
Dauben, P.; Dodd, R.H. *J. Org. Chem.*, 1999, 64, 5304.

## SECTION 90: AMIDES FROM MISCELLANEOUS COMPOUNDS

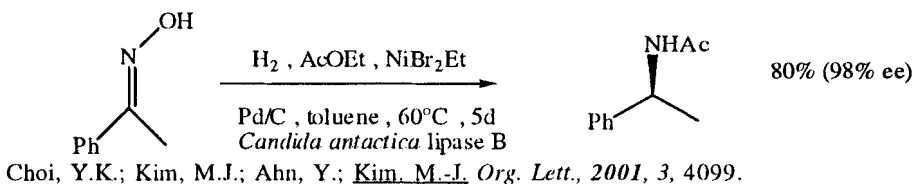


Linder, M.R.; Podlech, J. *Org. Lett.*, 2001, 3, 1849.

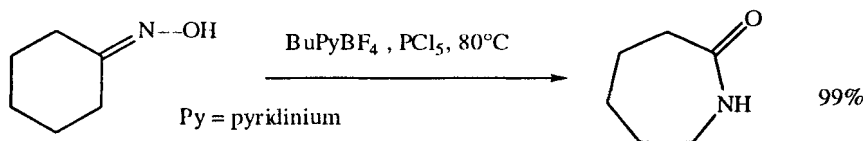




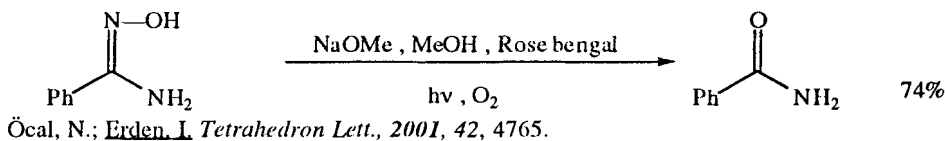
Bourguet, E.; Baneres, J.-L.; Girard, J.-P.; Parello, J.; Vidal, J.-P.; Lusinchi, X.; Declercq, J.-P. *Org. Lett.*, **2001**, 3, 3067.



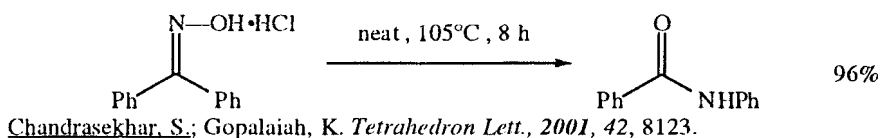
Choi, Y.K.; Kim, M.J.; Ahn, Y.; Kim, M.-J. *Org. Lett.*, **2001**, 3, 4099.



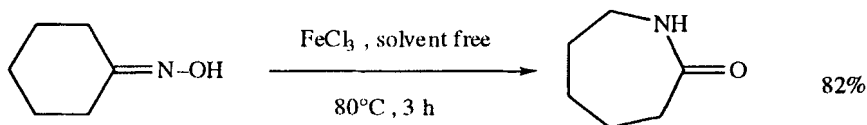
Peng, J.; Deng, Y. *Tetrahedron Lett.*, **2001**, 42, 403.



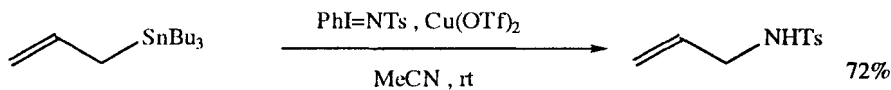
Öcal, N.; Erden, I. *Tetrahedron Lett.*, **2001**, 42, 4765.



Chandrasekhar, S.; Gopalaiah, K. *Tetrahedron Lett.*, **2001**, 42, 8123.



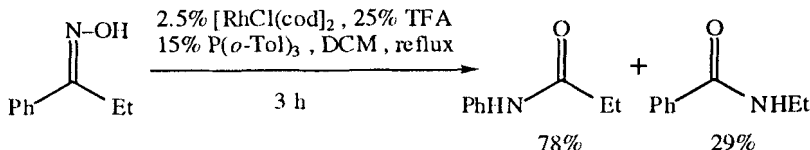
Khodaei, M.M.; Meybodi, F.A.; Rezai, N.; Salehi, P. *Synth. Commun.*, **2001**, 31, 2047.



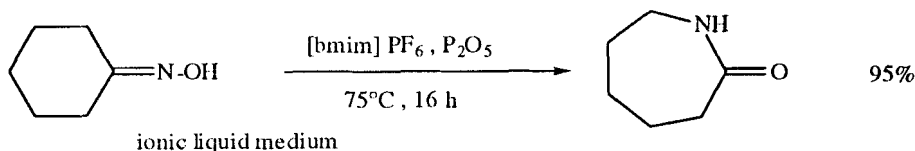
Kim, D.Y.; Kim, H.S.; Choi, Y.J.; Mang, J.Y.; Lee, K. *Synth. Commun.*, **2001**, 31, 2463.



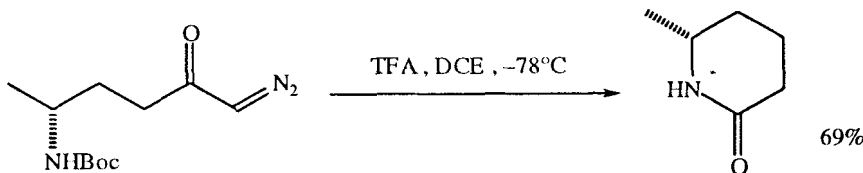
Kim, B.H.; Cheong, J.W.; Han, R.; Jun, Y.M.; Baik, W.; Lee, B.M.  
*Synth. Commun.*, **2001**, *31*, 3577.



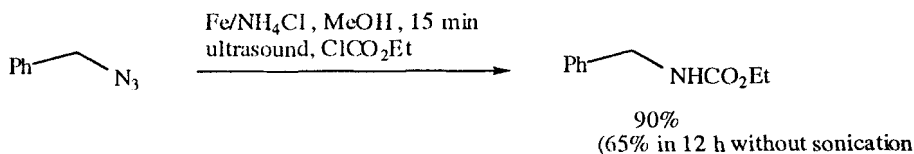
Arisawa, M.; Yamaguchi, M. *Org. Lett.*, **2001**, *3*, 311.



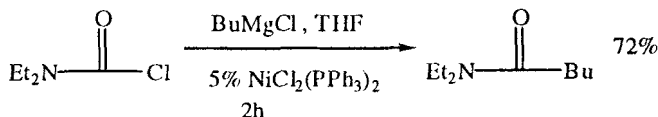
Ren, R.X.; Zueva, L.D.; Ou, X. *Tetrahedron Lett.*, **2001**, *42*, 8441.



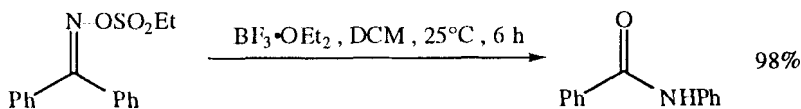
Yang, H.; Jurkauskas, V.; Mackintosh, N.; Mogrenn, T.; Stephenson, C.R.J.; Foster, K.; Brown, W.; Roberts, E. *Can. J. Chem.*, **2000**, *78*, 800.



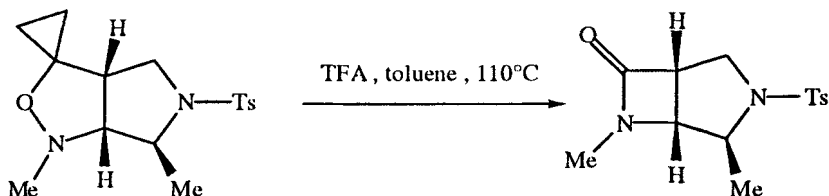
Chandrasekhar, S.; Narsihmulu, Ch. *Tetrahedron Lett.*, **2000**, *41*, 7969.



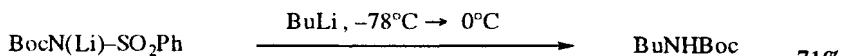
Lemoucheux, L.; Rouden, J.; Lasne, M.-C. *Tetrahedron Lett.*, **2000**, *41*, 9997.



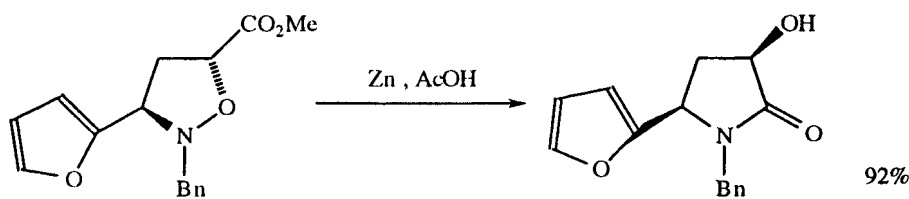
Anilkumar, R.; Chandrasekhar, S. *Tetrahedron Lett.*, **2000**, *41*, 5427.



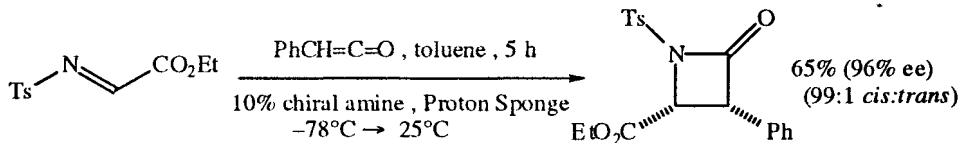
Cordero, F.M.; Pisaneschi, F.; Goti, A.; Ollivier, J.; Salaün, J.; Brandi, A.  
*J. Am. Chem. Soc.*, **2000**, *122*, 8077.



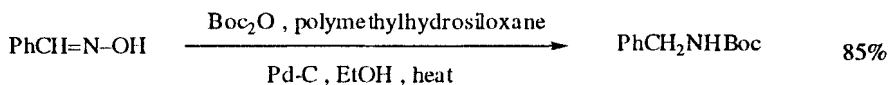
Dembech, P.; Seconi, G.; Ricci, A. *Chem. Eur. J.*, **2000**, *6*, 1281.



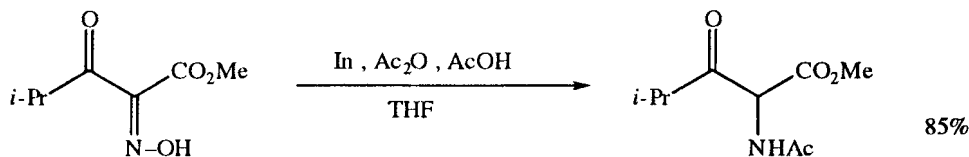
Merino, P.; Anoro, S.; Merchan, F.; Téjero, T. *Heterocycles*, **2000**, *53*, 861.



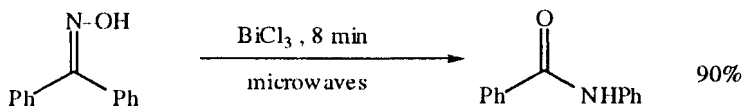
Taggi, A.E.; Hafez, A.M.; Wack, H.; Young, B.; Drury III, W.J.; Lectka, T.  
*J. Am. Chem. Soc.*, **2000**, *122*, 7831.



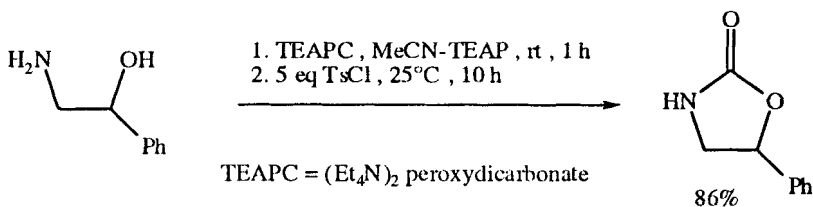
Chandrasekhar, S.; Reddy, M.V.; Chandraiah, L. *Synlett*, **2000**, 1351.



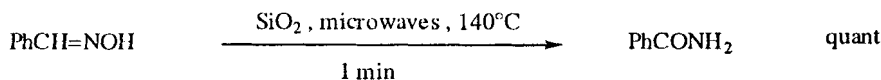
Harrison, J.R.; Moody, C.J.; Pitts, M.R. *Synlett*, **2000**, 1601.



Thakur, A.J.; Boruah, A.; Prajapati, D.; Sandhu, J.S. *Synth. Commun.*, **2000**, *30*, 2105.



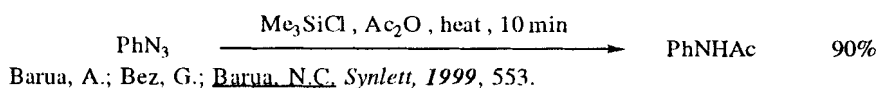
Feroci, M.; Inesi, A.; Mucciante, V.; Rossi, L. *Tetrahedron Lett.*, **1999**, 40, 6059.



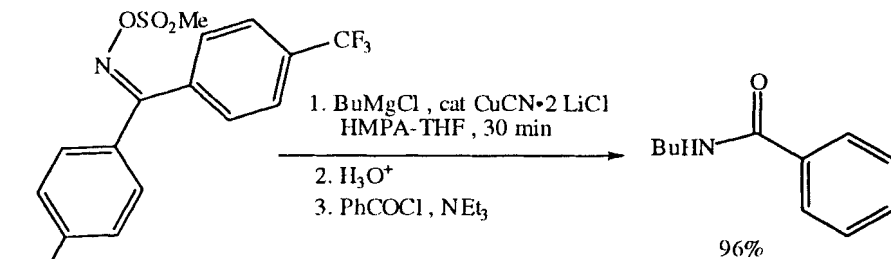
Loupy, A.; Régnier, S. *Tetrahedron Lett.*, **1999**, 40, 6221.



Ariza, X.; Urpí, F.; Vilarrasa, J. *Tetrahedron Lett.*, **1999**, 40, 7515.

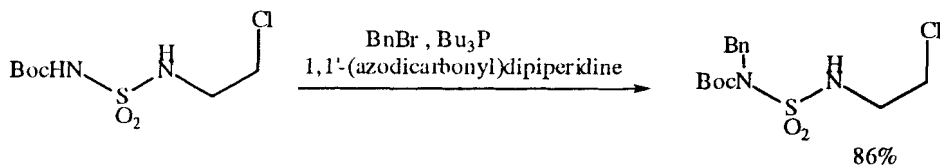


Barua, A.; Bez, G.; Barua, N.C. *Synlett*, **1999**, 553.



Tsutsui, H.; Ichikawa, T.; Narasaka, K. *Bull. Chem. Soc. Jpn.*, **1999**, 72, 1869.

## SECTION 90A: PROTECTION OF AMIDES

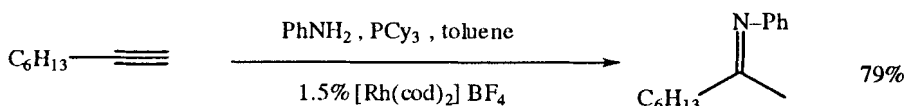


Winum, J.-Y.; Barragan, V.; Montero, J.-L. *Tetrahedron Lett.*, **2001**, 42, 601.

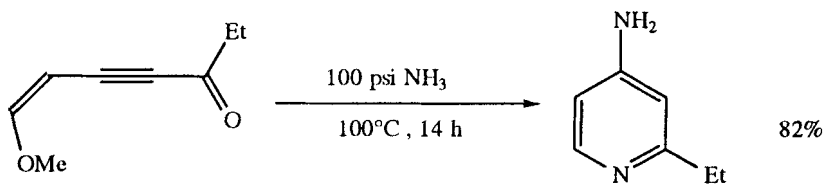
# CHAPTER 7

## PREPARATION OF AMINES

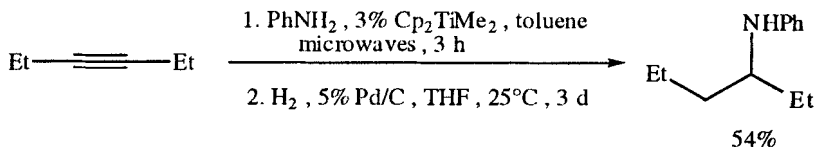
### SECTION 91: AMINES FROM ALKYNES



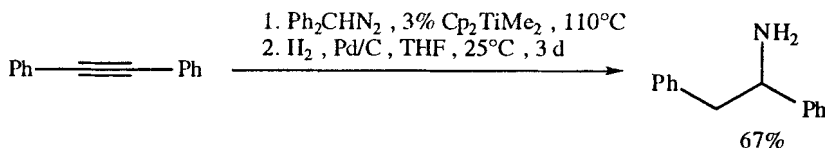
Hartung, C.G.; Tillack, A.; Trauthwein, H.; Beller, M. *J. Org. Chem.*, **2001**, *66*, 6339.



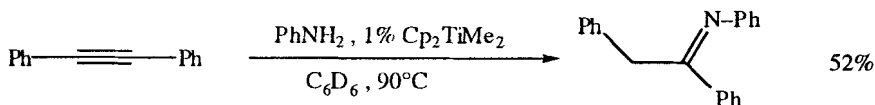
Hegde, V.B.; Renga, J.M.; Owen, J.M. *Tetrahedron Lett.*, **2001**, *42*, 1847.



Bytschkov, I.; Doye, S. *Eur. J. Org. Chem.*, **2001**, 4411.



Haak, E.; Siebeneicher, H.; Doye, S. *Org. Lett.*, **2000**, *2*, 1935.

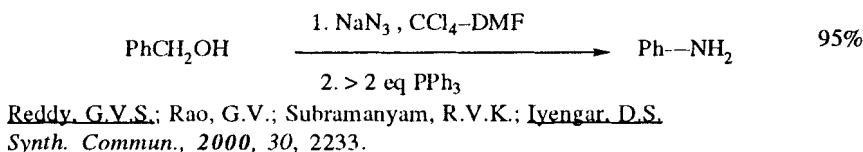
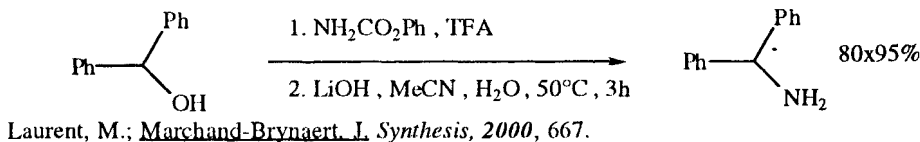
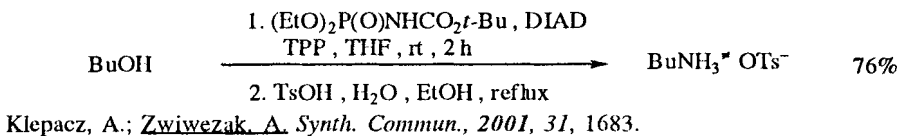
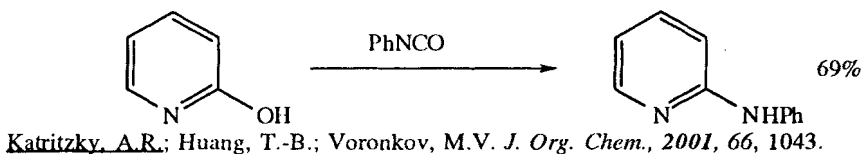


Haak, E.; Bytschkov, I.; Doye, S. *Angew. Chem. Int. Ed.*, **1999**, *38*, 3389.

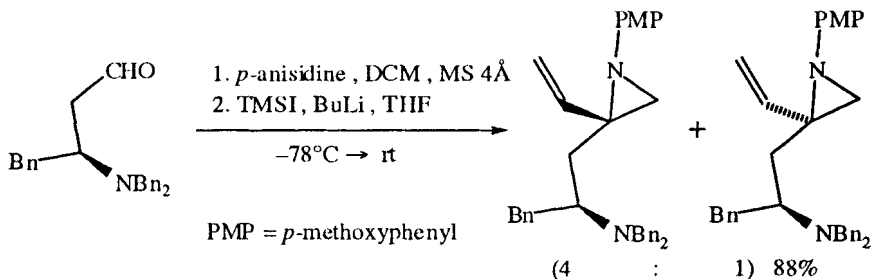
## SECTION 92: AMINES FROM ACID DERIVATIVES

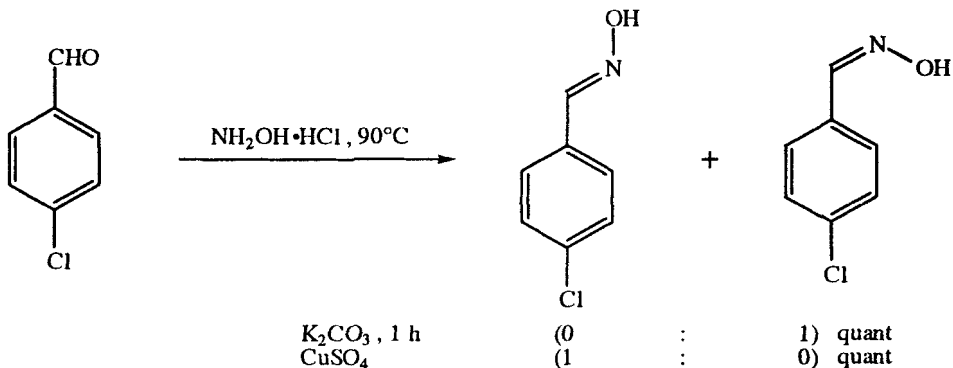
NO ADDITIONAL EXAMPLES

## SECTION 93: AMINES FROM ALCOHOLS AND THIOLS

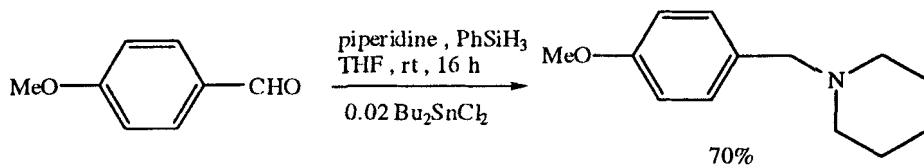


## SECTION 94: AMINES FROM ALDEHYDES

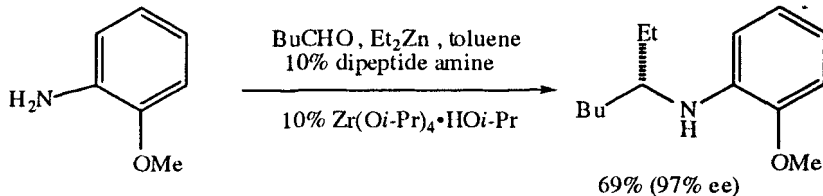
Reetz, M.T.; Lee, W.K. *Org. Lett.*, 2001, 3, 3119.



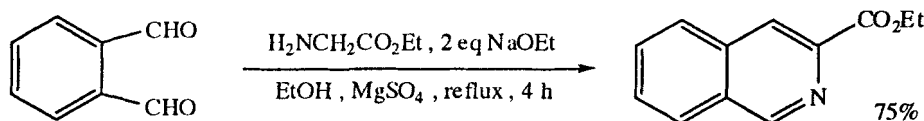
Sharghi, H.; Sarvari, M.H. *Synlett*, **2001**, 99.



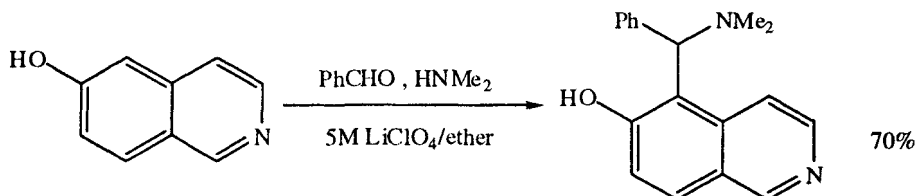
Apodaca, R.; Xiao, W. *Org. Lett.*, **2001**, 3, 1745.



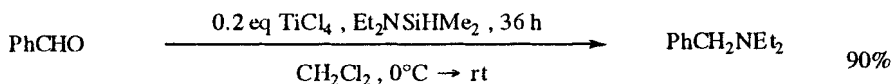
Porter, J.R.; Traverse, J.F.; Hoveyda, A.H.; Snapper, M.L.  
*J. Am. Chem. Soc.*, **2001**, 123, 10409.



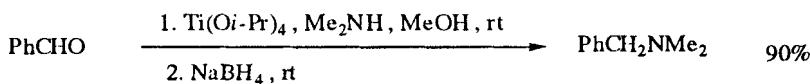
Meziane, M.A.A.; Royer, S.; Bazureau, J.P. *Tetrahedron Lett.*, **2001**, 42, 1017.



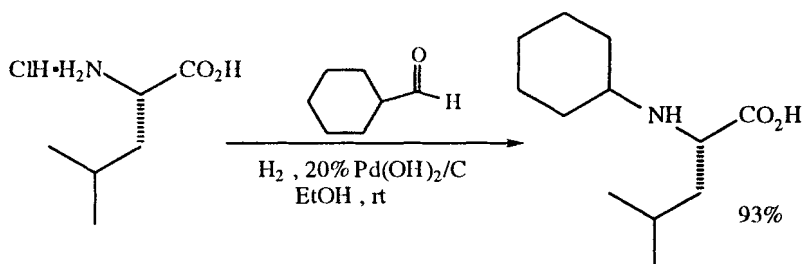
Saidi, M.R.; Azizi, N.; Naimi-Jamal, M.R. *Tetrahedron Lett.*, **2001**, 42, 8111.



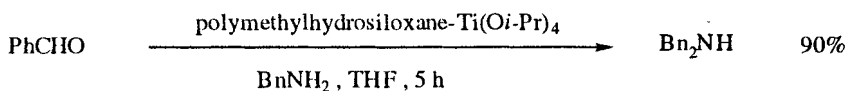
Miura, K.; Ootsuka, K.; Suda, S.; Nishikori, H.; Hosomi, A. *Synlett*, 2001, 1617.



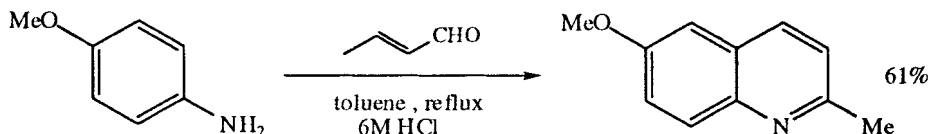
Bhattacharyya, S. *Synth. Commun.*, 2000, 30, 2001.



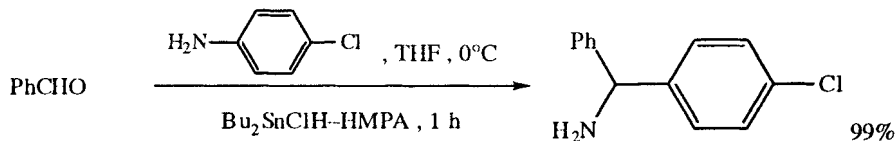
Song, Y.; Serce, A.D.; Johnson, D.R.; Colbry, N.L.; Sun, K.-L.; Roth, B.D. *Tetrahedron Lett.*, 2000, 41, 8225.



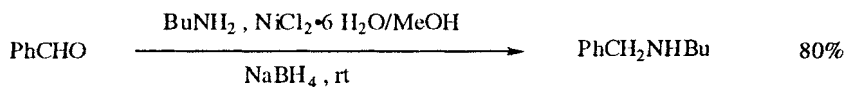
Chandrasekhar, S.; Reddy, Ch.R.; Ahmed, M. *Synlett*, 2000, 1655.



Matsugi, M.; Tabussa, F.; Minamikawa, J.-i. *Tetrahedron Lett.*, 2000, 41, 8523.

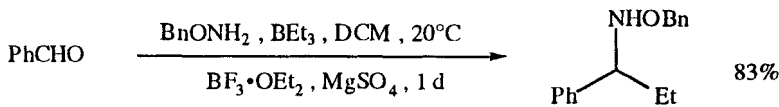


Suwa, T.; Sugiyama, E.; Shibata, I.; Baba, A. *Synthesis*, 2000, 789.

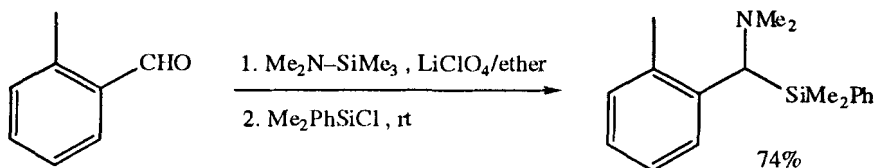


Saxena, I.; Borah, R.; Sarma, J.C. *J. Chem. Soc., Perkin Trans. 1*, 2000, 503.





Miyabe, H.; Yamakawa, K.; Yoshioka, N.; Naito, T. *Tetrahedron*, **1999**, *55*, 11209.



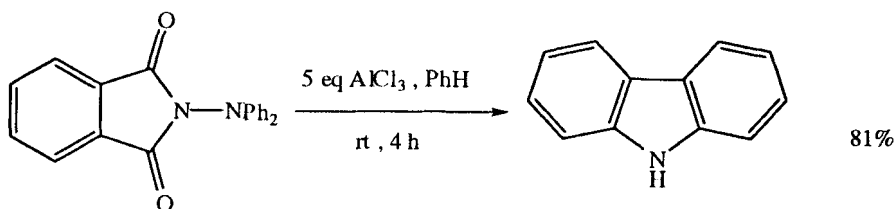
Naimi-Jamal, M.R.; Mojtahedi, M.M.; Ipaktschi, J.; Saidi, M.R.  
*J. Chem. Soc., Perkin Trans. 1*, **1999**, 3709.

Related Methods: Section 102 (Amines from Ketones)

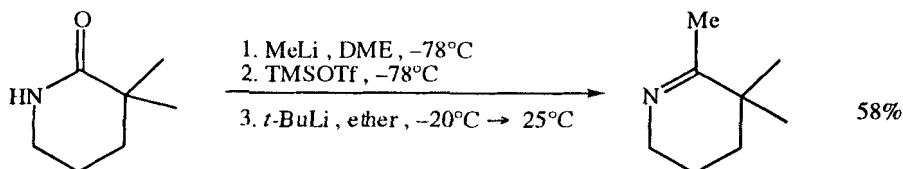
## SECTION 95: AMINES FROM ALKYL, METHYLENES AND ARYLS

NO ADDITIONAL EXAMPLES

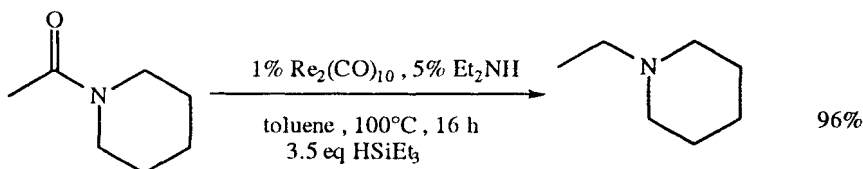
## SECTION 96: AMINES FROM AMIDES



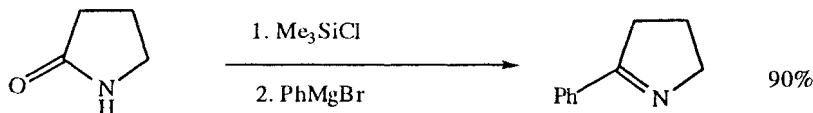
Kikugawa, Y.; Aoki, Y.; Sakamoto, T. *J. Org. Chem.*, **2001**, *66*, 8612.



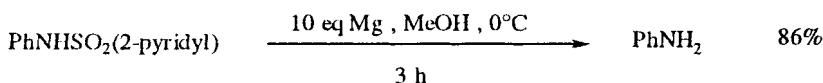
Ahn, Y.; Cardenas, G.I.; Yang, J.; Romo, D. *Org. Lett.*, **2001**, *3*, 7511.



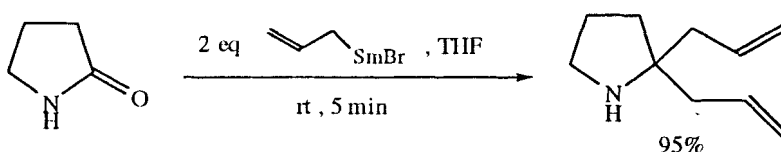
Igarashi, M.; Fuchikami, T. *Tetrahedron Lett.*, **2001**, 42, 1945.



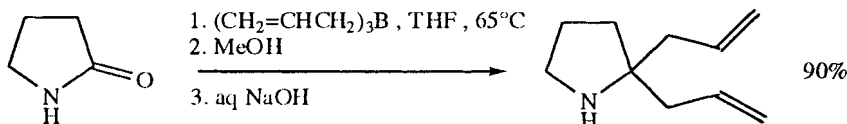
Coindet, C.; Comel, A.; Kirsch, G. *Tetrahedron Lett.*, **2001**, 42, 6101.



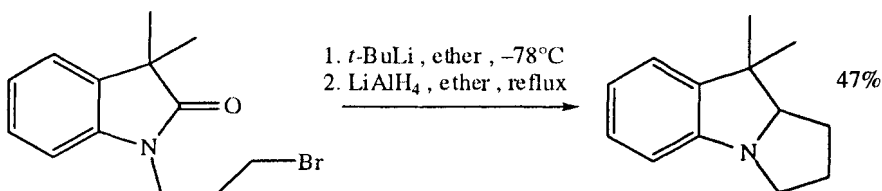
Pak, C.S.; Lim, D.S. *Synth. Commun.*, **2001**, 31, 2209.



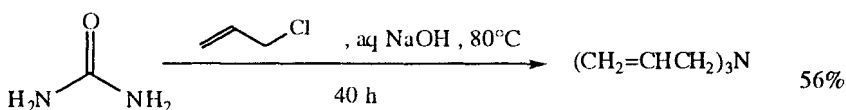
Li, Z.; Zhang, Y. *Tetrahedron Lett.*, **2001**, 42, 8507.



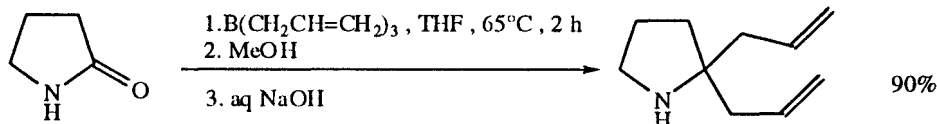
Bubnov, Y.N.; Pastukhov, F.V.; Yampolsky, I.V.; Ignatenko, A.V. *Eur. J. Org. Chem.*, **2000**, 1503.



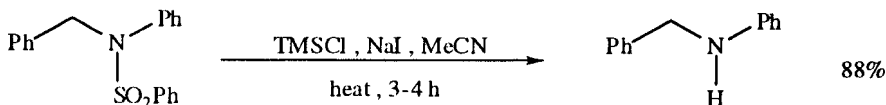
Jones, K.; Storey, J.M.D. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 769.



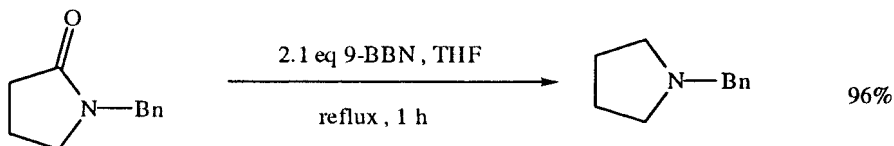
Sachinvala, N.; Winsor, D.L.; Maskos, K.; Grimm, C.; Hamed, O.; Vigo, T.L.; Bertoniere, N.R. *J. Org. Chem.*, **2000**, 65, 9234.



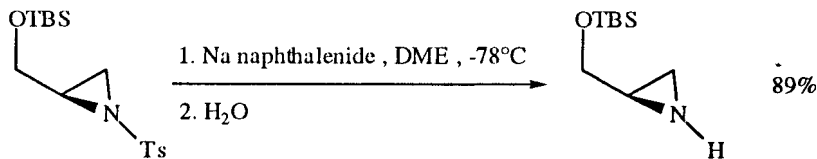
Rubnov, Yu.N.; Klimkina, E.V.; Zhun, I.V.; Pastukhov, F.V.; Yampolsky, I.V.  
*Pure Appl. Chem.*, **2000**, 72, 1641.



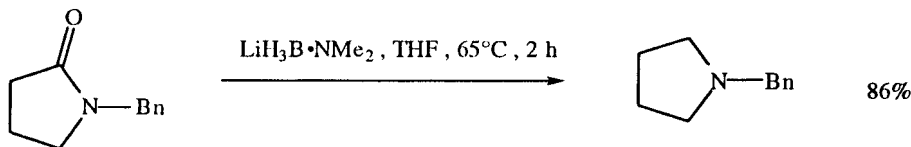
Sabitha, G.; Reddy, B.V.S.; Abraham, S.; Yadav, J.S. *Tetrahedron Lett.*, **1999**, 40, 1569.



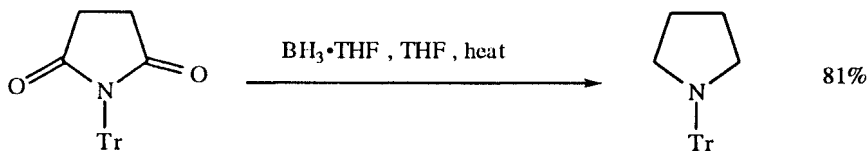
Collins, C.J.; Lanz, M.; Singaram, B. *Tetrahedron Lett.*, **1999**, 40, 3673.



Bergmeier, S.C.; Seth, P.P. *Tetrahedron Lett.*, **1999**, 40, 6181.



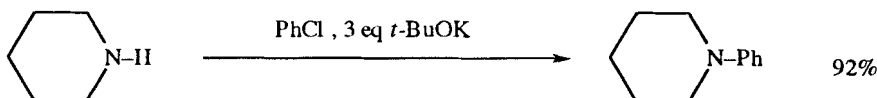
Flaniken, J.M.; Collins, C.J.; Lanz, M.M.; Singaram, B. *Org. Lett.*, **1999**, 1, 799.



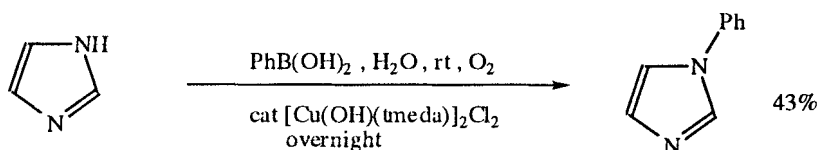
Akula, M.R.; Kabalka, G.W. *Org. Prep. Proceed. Int.*, **1999**, 31, 214.

Related Methods: Section 105A (Protection of Amines)

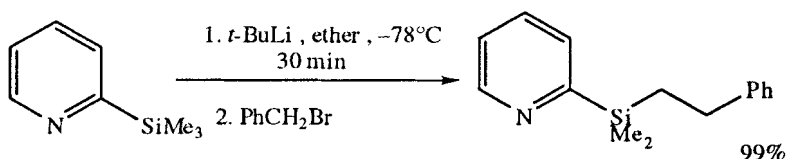
## SECTION 97: AMINES FROM AMINES



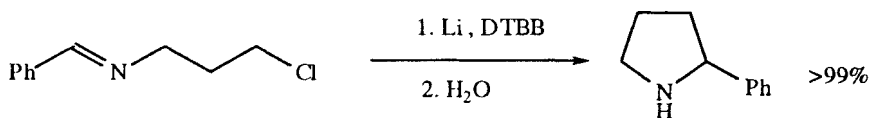
Beller, M.; Breindl, C.; Riermeier, T.H.; Tillack, A. *J. Org. Chem.*, **2001**, *66*, 1403.



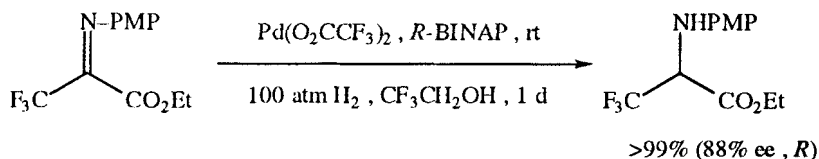
Collman, J.P.; Zhong, M.; Zeng, L.; Costanzo, S. *J. Org. Chem.*, **2001**, *66*, 528.



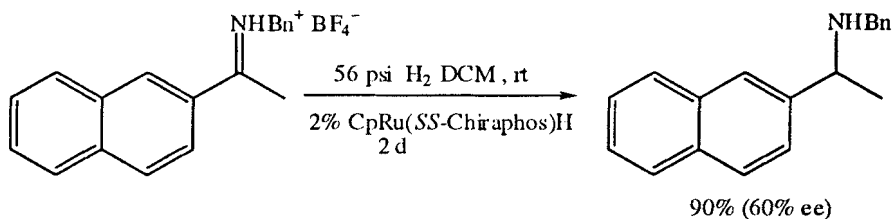
Itami, K.; Kame, T.; Mitsudo, K.; Nokami, T.; Yoshida, J.-i. *J. Org. Chem.*, **2001**, *66*, 3970.



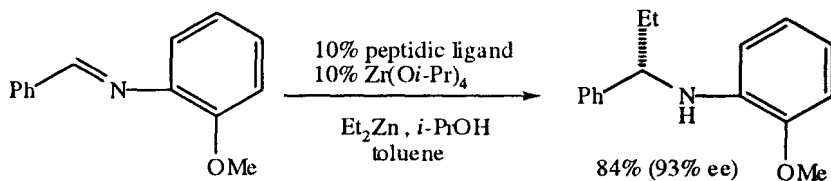
Yus, M.; Soler, T.; Foubelo, F. *J. Org. Chem.*, **2001**, *66*, 6207.



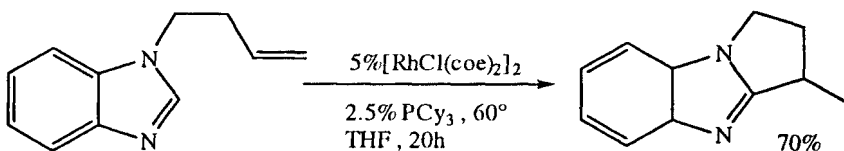
Abe, H.; Amii, H.; Uneyama, K. *Org. Lett.*, **2001**, *3*, 313.



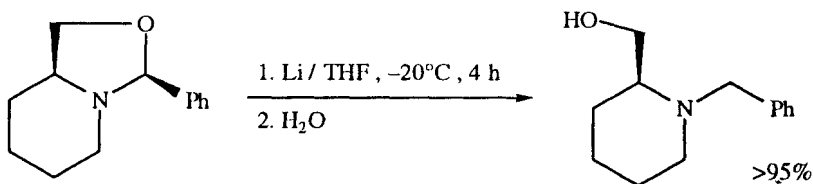
Magee, M.P.; Norton, J.R. *J. Am. Chem. Soc.*, **2001**, *123*, 1778.



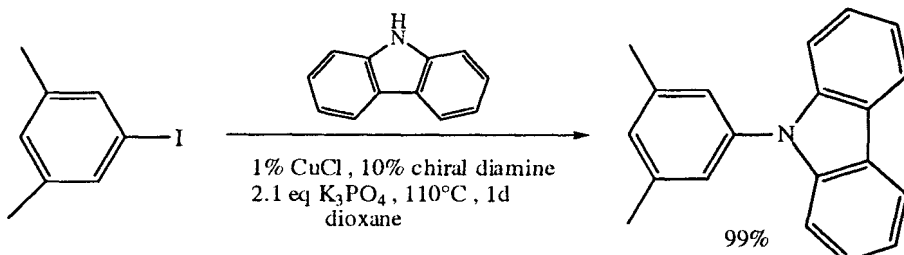
Porter, J.R.; Traverse, J.F.; Hoveyda, A.H.; Snapper, M.L.  
*J. Am. Chem. Soc.*, **2001**, *123*, 984.



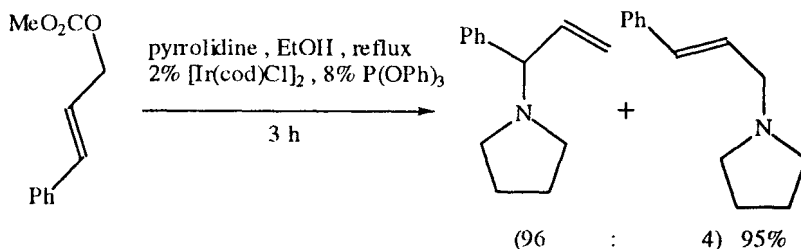
Tan, K.L.; Bergman, R.G.; Ellman, J.A. *J. Am. Chem. Soc.* **2001**, *123*, 2685.



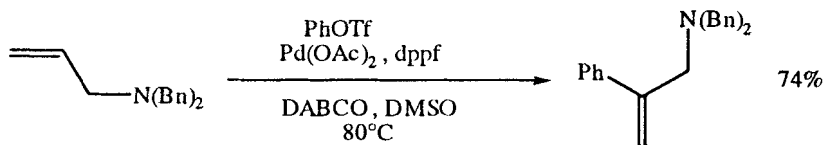
Azzena, U.; Pilo, L.; Piras, E. *Tetrahedron Lett.*, **2001**, *42*, 129.



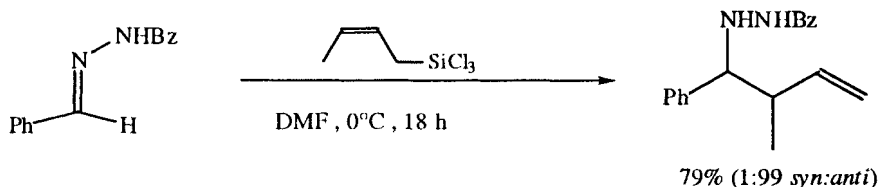
Klapars, A.; Antilla, J.C.; Huang, X.; Buchwald, S.L. *J. Am. Chem. Soc.*, **2001**, *123*, 7727.



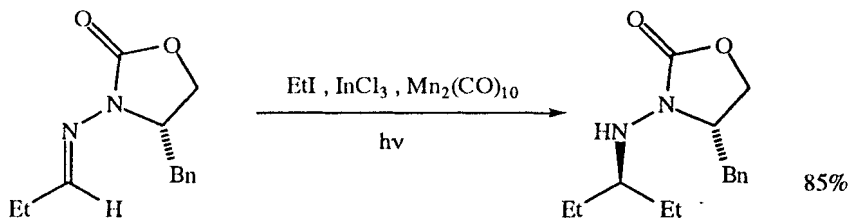
Takeuchi, R.; Ue, N.; Tanabe, K.; Yamashita, K.; Shiga, N.  
*J. Am. Chem. Soc.*, **2001**, *123*, 9525.



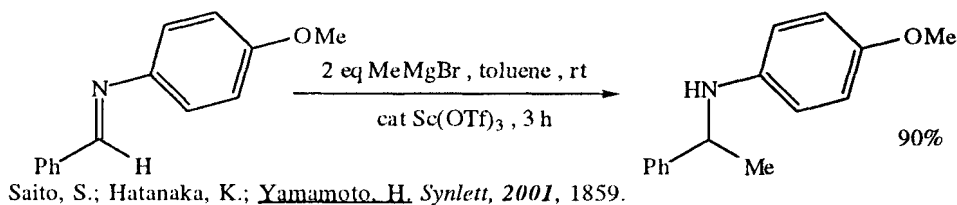
Wu, J.; Marcoux, J.-F.; Davies, I.W.; Reider, P.J. *Tetrahedron Lett.*, **2001**, 42, 159.



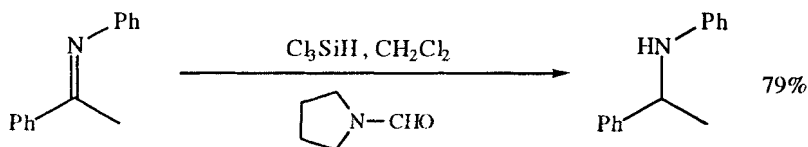
Hirabayashi, R.; Ogawa, C.; Sugiura, M.; Kobayashi, S. *J. Am. Chem. Soc.*, **2001**, 123, 9493.



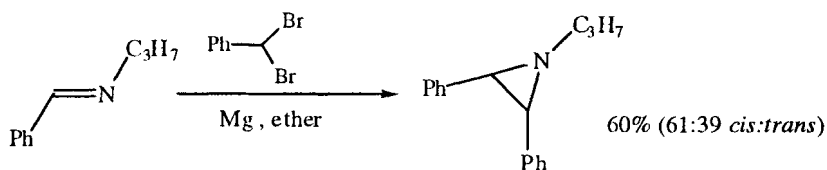
Friestad, G.K.; Qin, J. *J. Am. Chem. Soc.*, **2001**, 123, 9922.



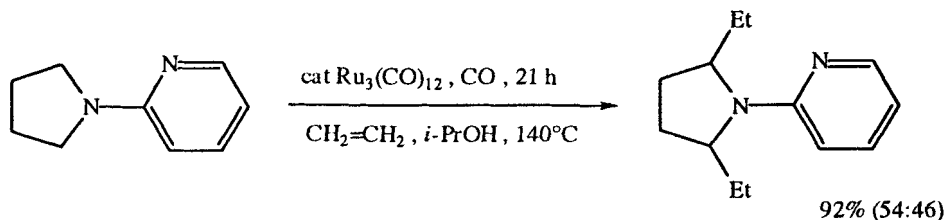
Saito, S.; Hatanaka, K.; Yamamoto, H. *Synlett*, **2001**, 1859.



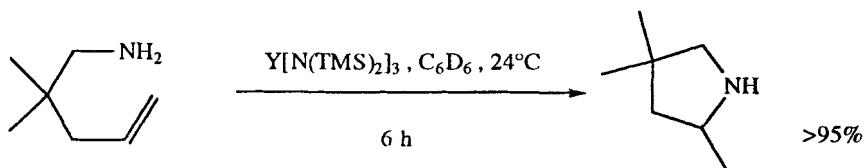
Iwasaki, F.; Onomura, O.; Mishima, K.; Kanematsu, T.; Maki, T.; Matsumura, Y. *Tetrahedron Lett.*, **2001**, 42, 2525.



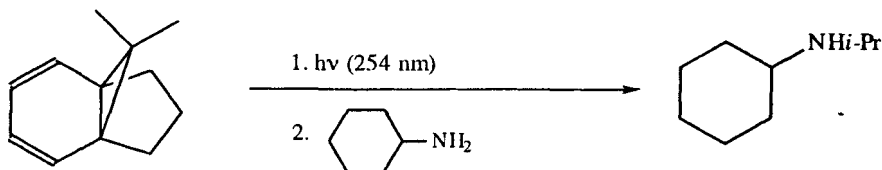
Biscoe, M.R.; Fry, A.J. *Tetrahedron Lett.*, **2001**, 42, 2759.



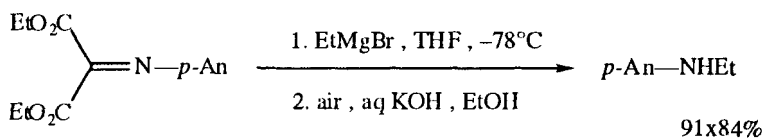
Chatani, N.; Asaumi, T.; Yorimitsu, S.; Ikeda, T.; Kakiuchi, F.; Murai, S.  
*J. Am. Chem. Soc.*, **2001**, *123*, 10935.



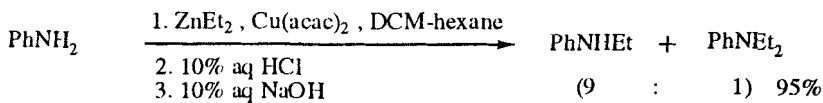
Kim, Y.K.; Livinghouse, T.; Bercaw, J.W. *Tetrahedron Lett.*, **2001**, *42*, 2933.



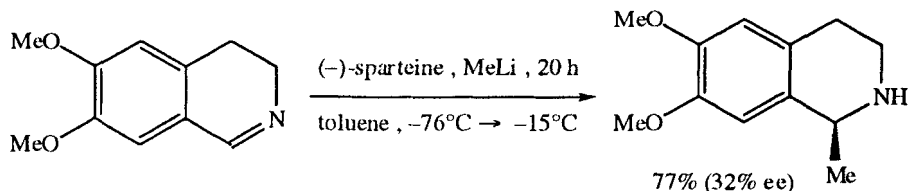
Likhotvorik, I.T.; Tippmann, E.; Platz, M.S. *Tetrahedron Lett.*, **2001**, *42*, 3049.



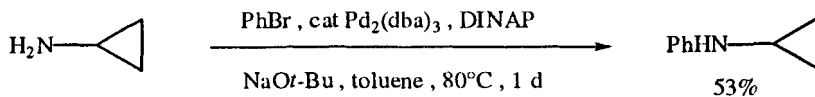
Niwa, Y.; Takayama, K.; Shimizu, M. *Tetrahedron Lett.*, **2001**, *42*, 5473.



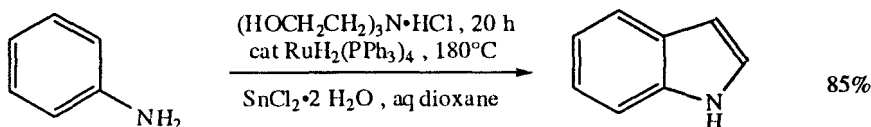
Brielles, C.; Harnett, J.J.; Doris, E. *Tetrahedron Lett.*, **2001**, *42*, 8301.



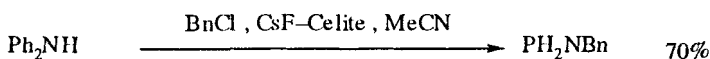
Chrzanowska, M.; Sokołowska, J. *Tetrahedron Asymm.*, **2001**, *12*, 1435.



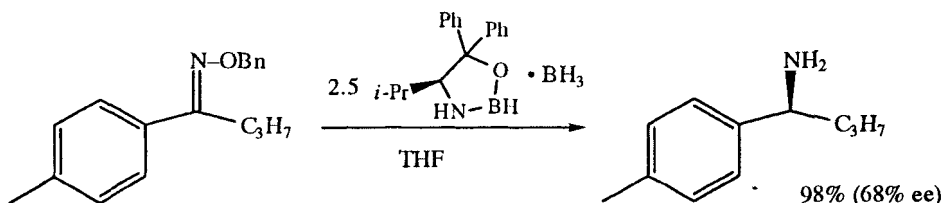
Cai, W.; Loeppky, R.N. *Tetrahedron*, **2001**, *57*, 2953.



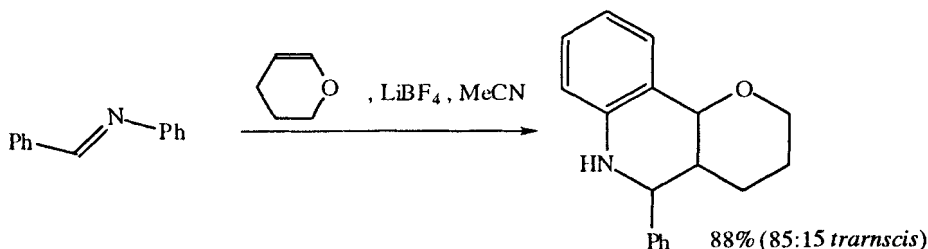
Cho, C.S.; Kim, J.H.; Kim, T.-J.; Shim, S.C. *Tetrahedron*, **2001**, *57*, 3321.



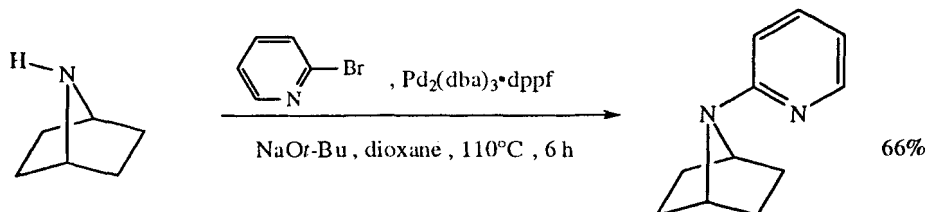
Hayat, S.; Rahman, A.-u.; Choudhary, M.I.; Khan, K.M.; Schumann, W.; Bayer, E. *Tetrahedron*, **2001**, *57*, 9951.



Fontaine, E.; Namane, C.; Meneyrol, J.; Geslin, M.; Serva, L.; Roussey, E.; Tissandier, S.; Maftouh, M.; Roger, P. *Tetrahedron Asymm.*, **2001**, *12*, 2185.

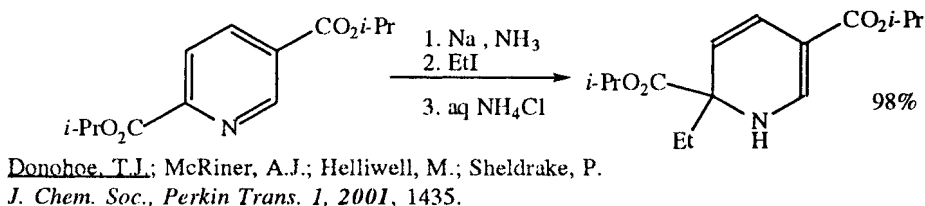
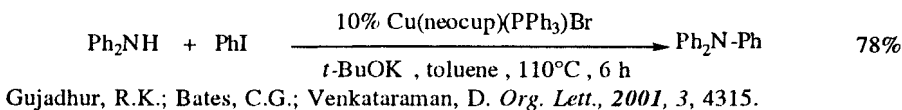
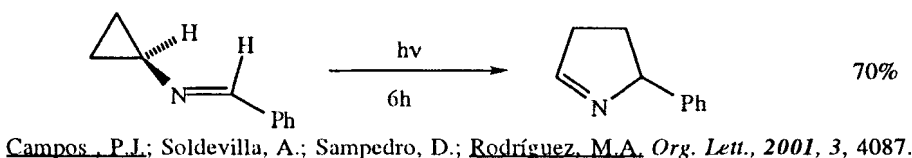
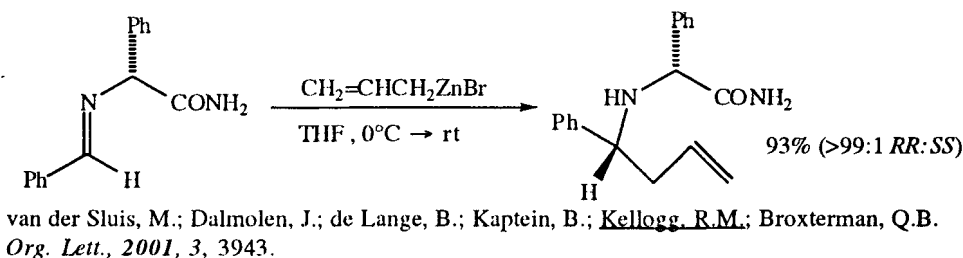
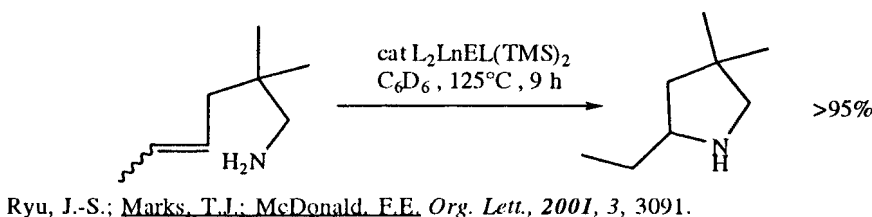
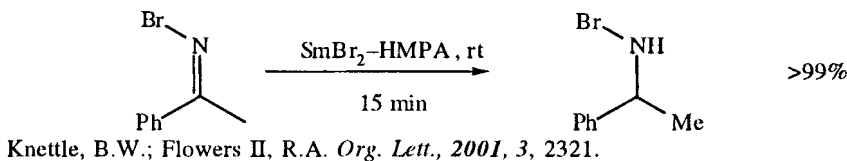
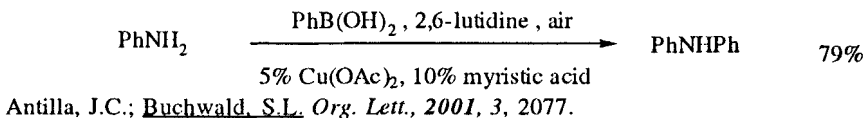


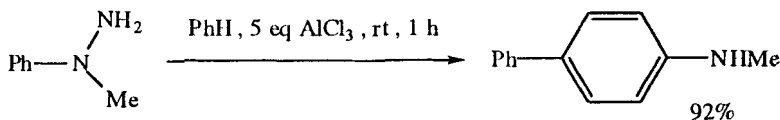
Yadav, J.S.; Reddy, B.V.S.; Madhuri, C.R.; Sabitha, G. *Synthesis*, **2001**, 1065.



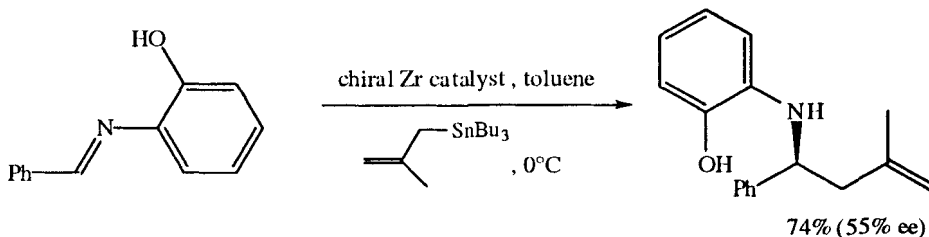
Cheng, J.; Trudell, M.L. *Org. Lett.*, **2001**, *3*, 1371.



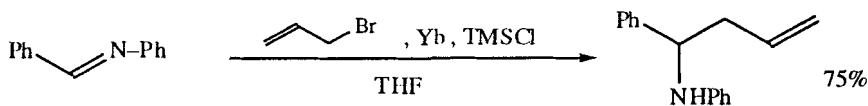




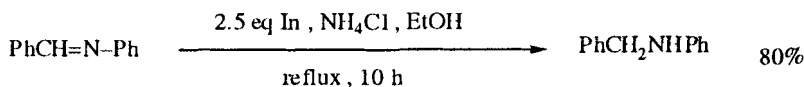
Ohwada, A.; Nara, S.; Sakamoto, T.; Kikugawa, Y.  
*J. Chem. Soc., Perkin Trans. 1*, **2001**, 3064.



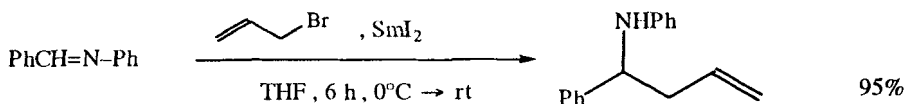
Gastner, T.; Ishitani, H.; Akiyama, R.; Kobayashi, S. *Angew. Chem. Int. Ed.*, **2001**, *40*, 1896.



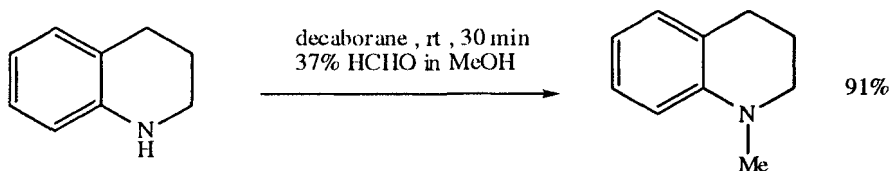
Su, W.; Li, J.; Zhang, Y. *Synth. Commun.*, **2001**, *31*, 273.



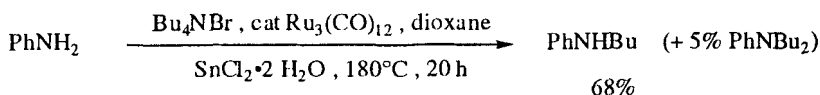
Banik, B.K.; Hackfeld, L.; Becker, F.F. *Synth. Commun.*, **2001**, *31*, 1581.



Kim, B.H.; Han, R.; Park, R.J.; Bai, K.H.; Jun, Y.M.; Baik, W.  
*Synth. Commun.*, **2001**, *31*, 2297.

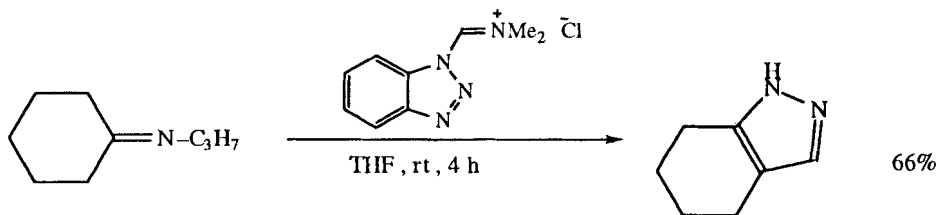


Jung, Y.J.; Bae, J.W.; Yoon, C.-O.M.; Yoo, B.W.; Yoon, C.M.  
*Synth. Commun.*, **2001**, *31*, 3417.

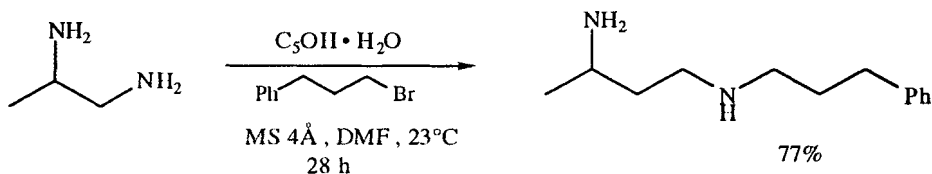
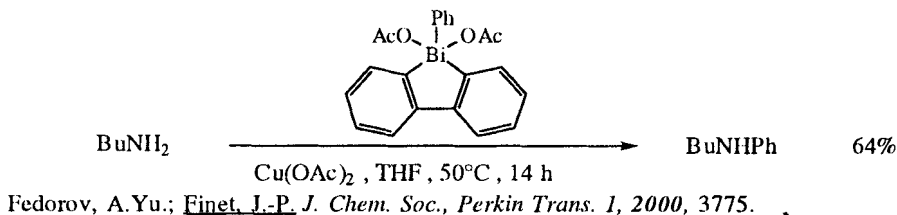
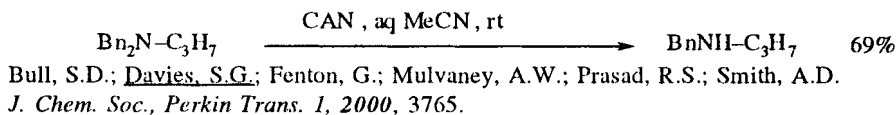


Cho, C.S.; Kim, J.S.; Kim, H.S.; Kim, T.-J.; Shim, S.C. *Synth. Commun.*, **2001**, *31*, 3791.

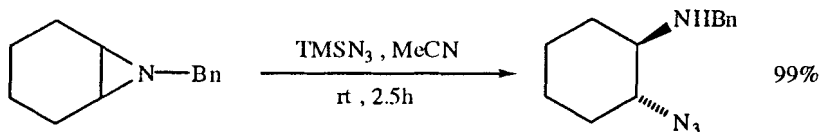




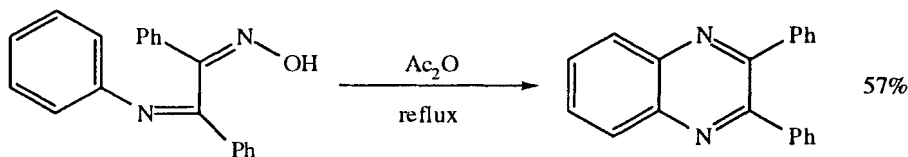
Katritzky, A.R.; Denisenko, A.; Denisenko, S.N.; Arend, M.  
*J. Heterocyclic Chem.*, 2000, 37, 1309.



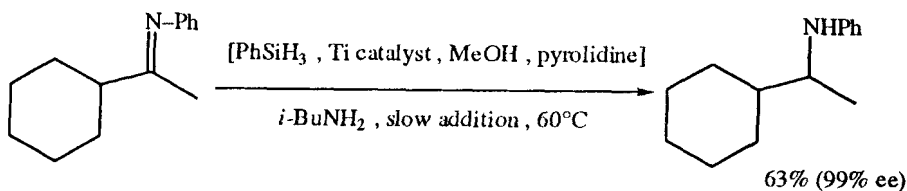
Salvatore, R.N.; Schmidt, S.E.; Shin, S.I.; Nagle, A.S.; Worrell, J.H.; Jung, K.W.  
*Tetrahedron Lett.*, 2000, 41, 9705.



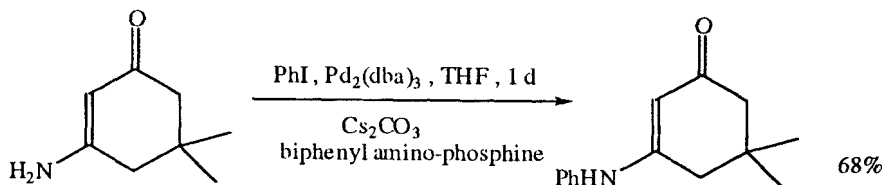
Chandrasekhar, M.; Sekar, G.; Singh, V.K. *Tetrahedron Lett.*, 2000, 41, 10079.



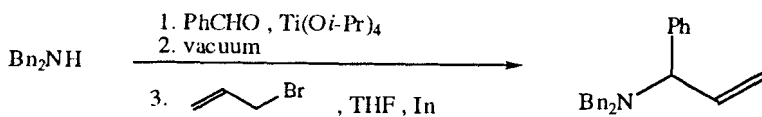
Xekou Koulotakis, N.P.; Hadjiantoniou-Maroulis, C.P.; Maroulis, A.J.  
*Tetrahedron Lett.*, 2000, 41, 10299.



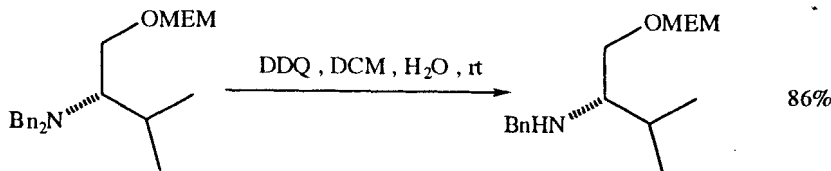
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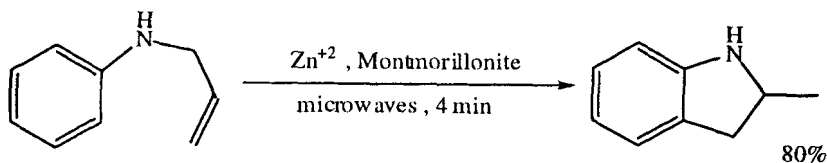
Edmondson, S.D.; Mastracchio, A.; Parmee, E.R. *Org. Lett.*, 2000, 2, 1109.



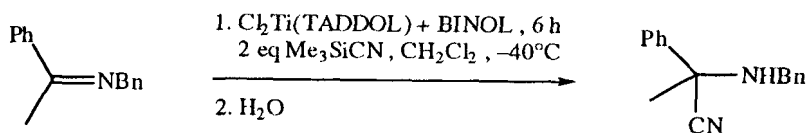
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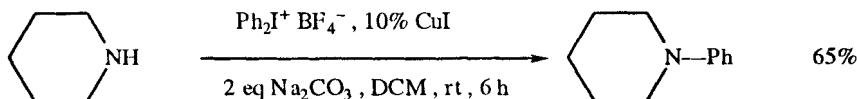


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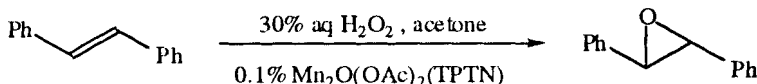


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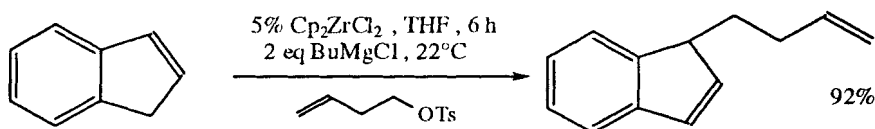
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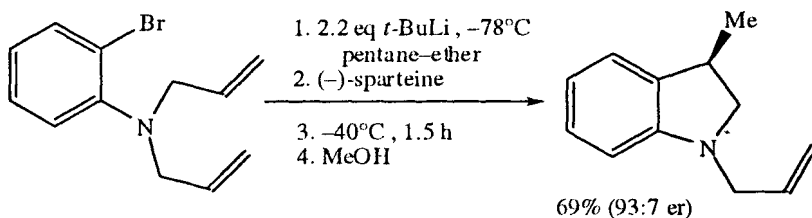
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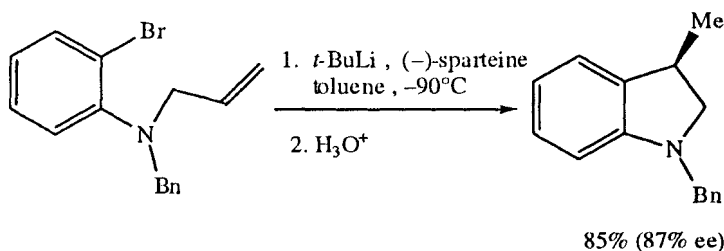
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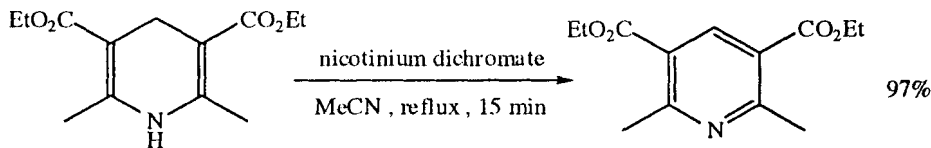
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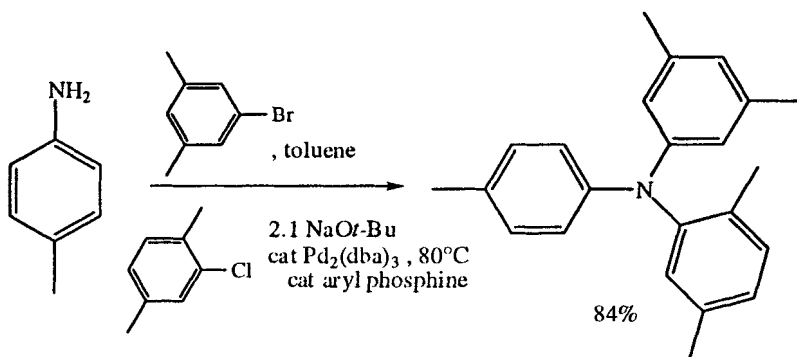
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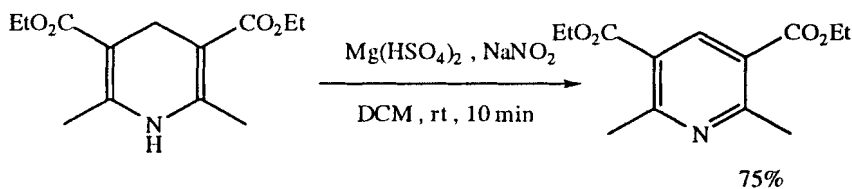
Gil, G.S.; Groth, U.M. *J. Am. Chem. Soc.*, 2000, 122, 6789.



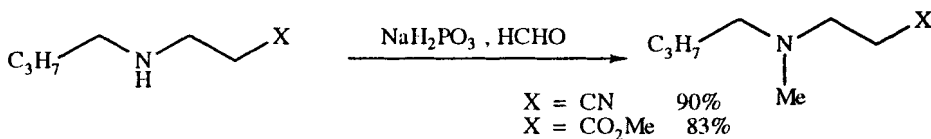
Sadeghi, M.M.; Mohammadpoor-Baltork, I.; Memarian, H.R.; Subhani, S. *Synth. Commun.*, 2000, 30, 1661.



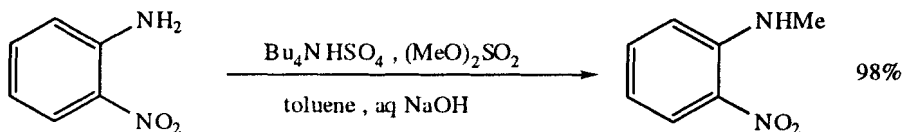
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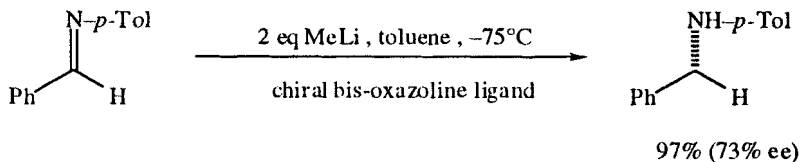
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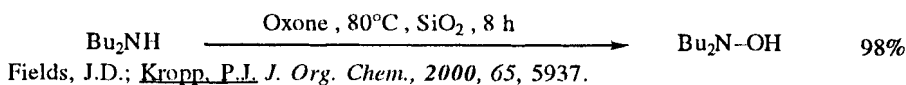
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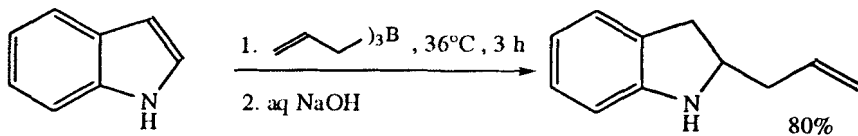
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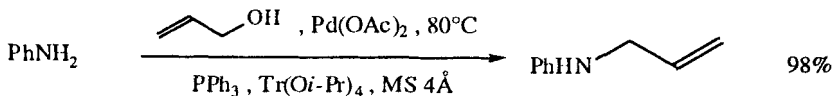
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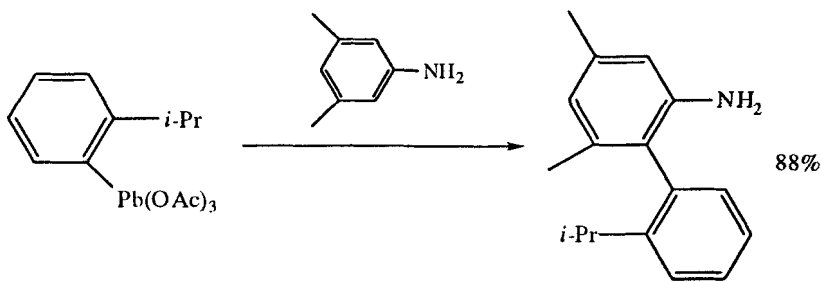
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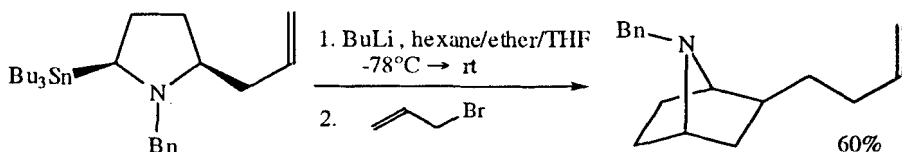
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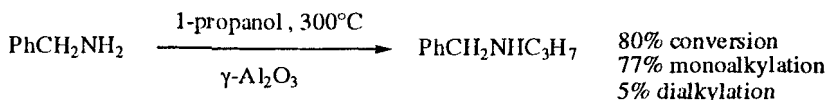
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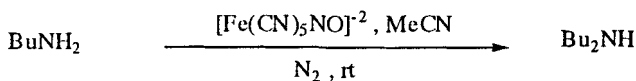
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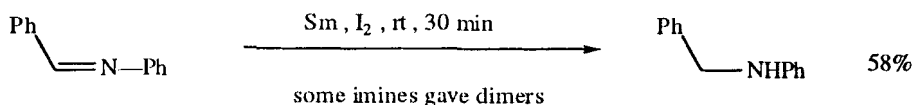
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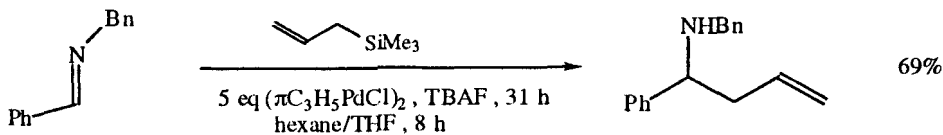


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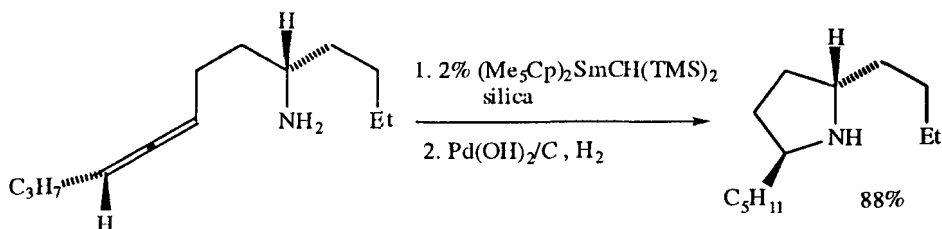


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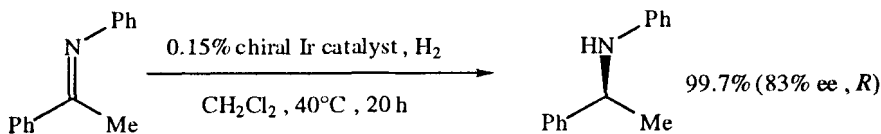




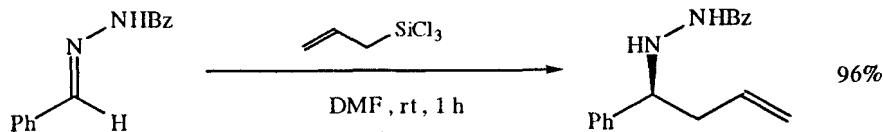
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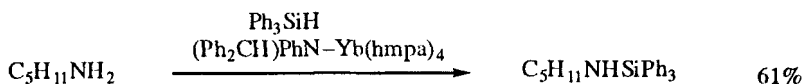
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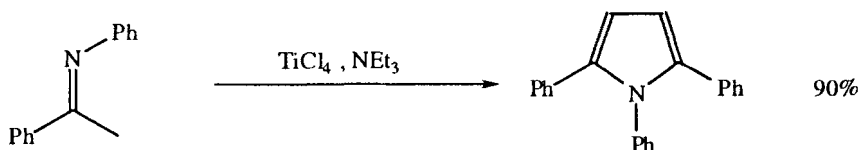
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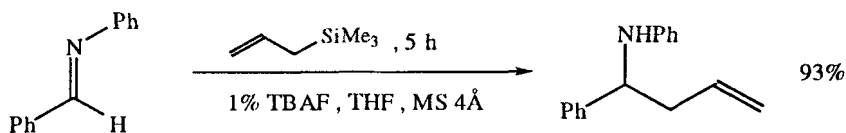
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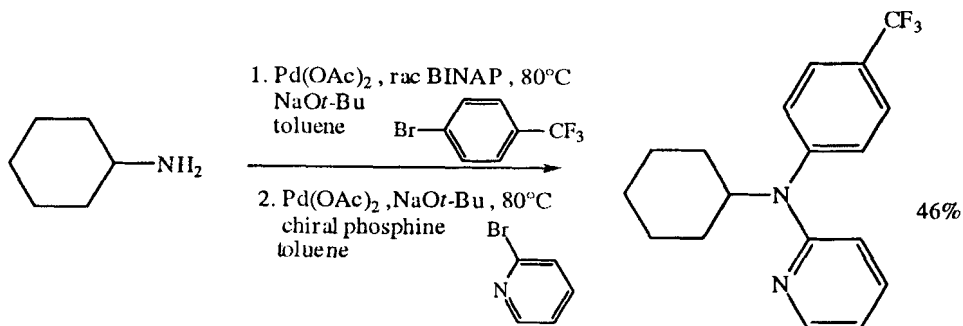
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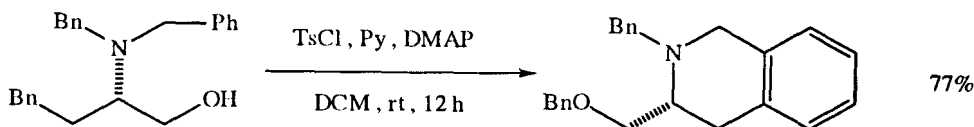
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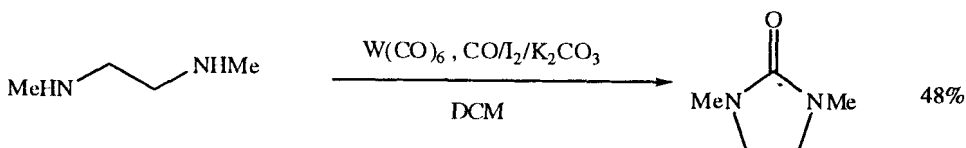
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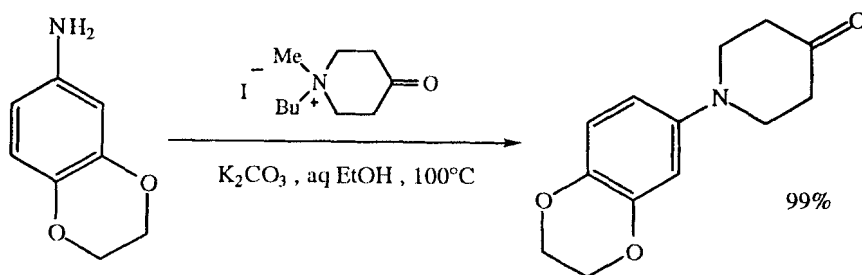
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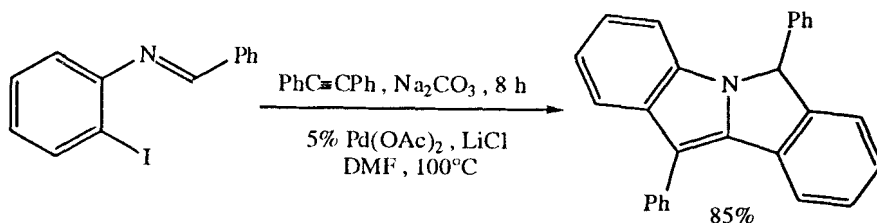
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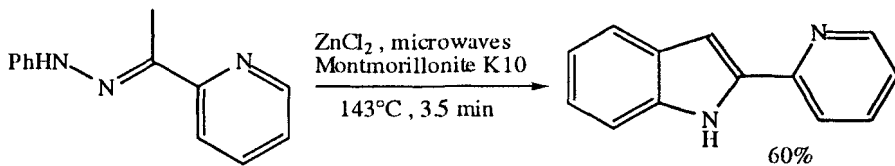


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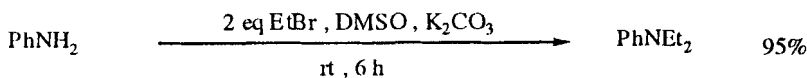


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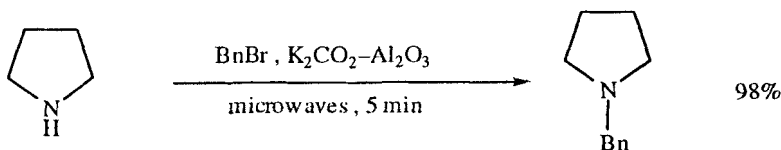




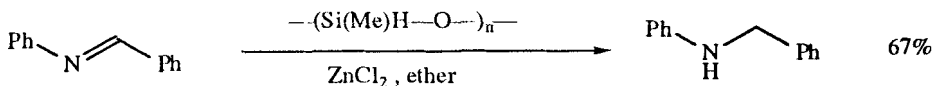
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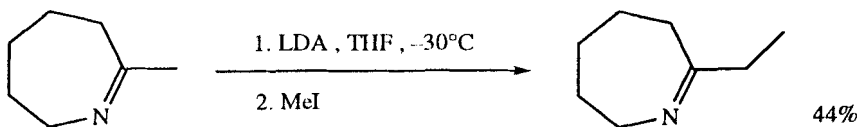
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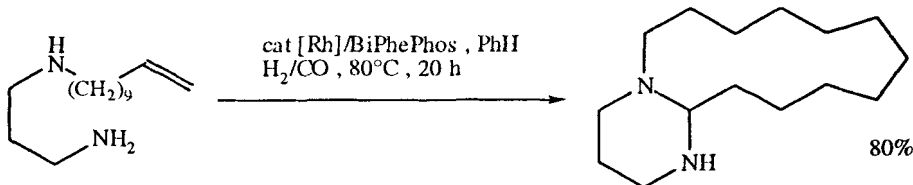
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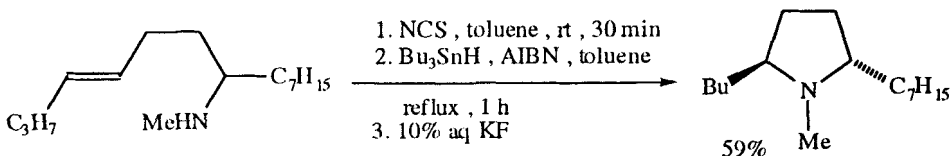
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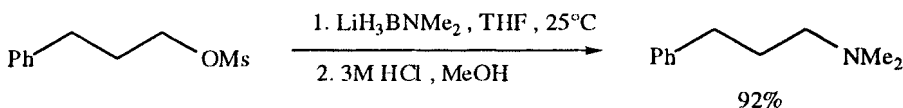
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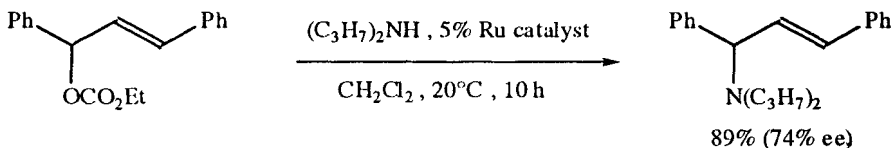
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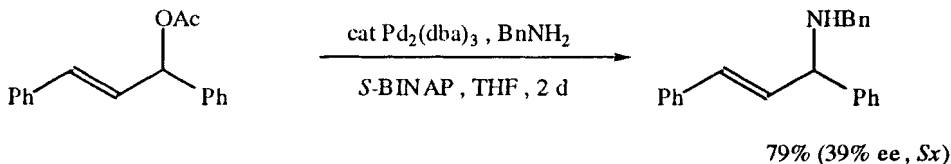
## SECTION 98: AMINES FROM ESTERS



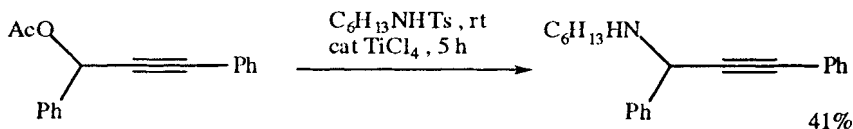
Thomas, S.; Huynh, T.; Enriquez-Rios, V.; Singaram, B. *Org. Lett.*, **2001**, *3*, 3915.



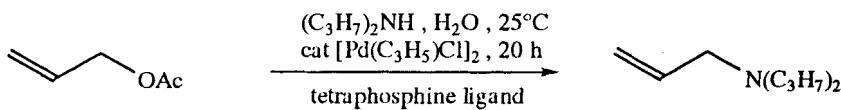
Matsushima, Y.; Onitsuka, K.; Kondo, T.; Mitsudo, T.-a.; Takahashi, S. *J. Am. Chem. Soc.*, **2001**, *12*, 10405.



Kodama, H.; Taiji, T.; Ohta, T.; Furukawa, I. *Synlett*, **2001**, 385.



Mahrwald, R.; Quint, S. *Tetrahedron Lett.*, **2001**, *42*, 1655.

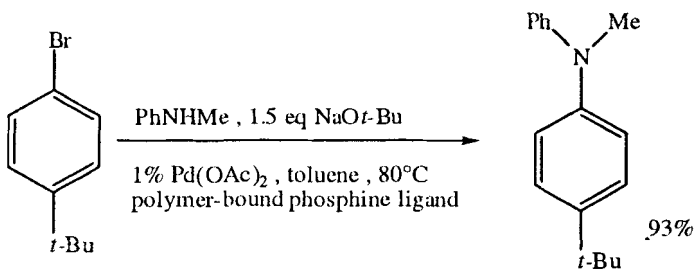
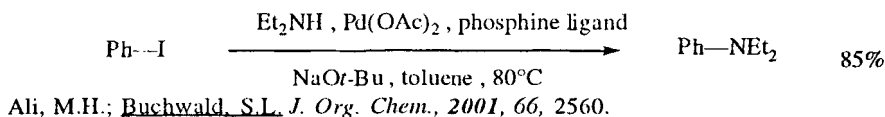


Feuerstein, M.; Laurenti, D.; Doucet, H.; Santelli, M. *Tetrahedron Lett.*, **2001**, *42*, 2313.

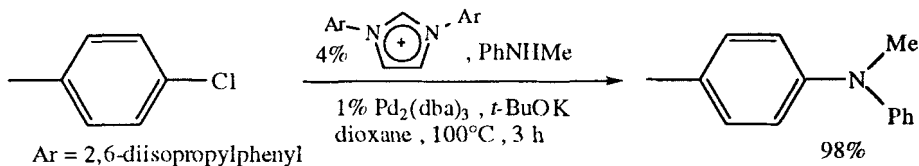
# SECTION 99: AMINES FROM ETHERS, EPOXIDES AND THIOETHERS

NO ADDITIONAL EXAMPLES

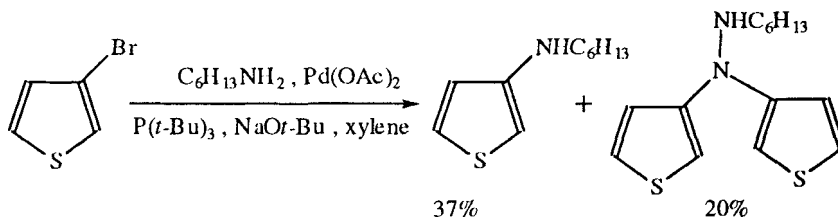
## SECTION 100: AMINES FROM HALIDES AND SULFONATES



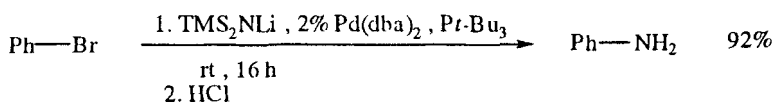
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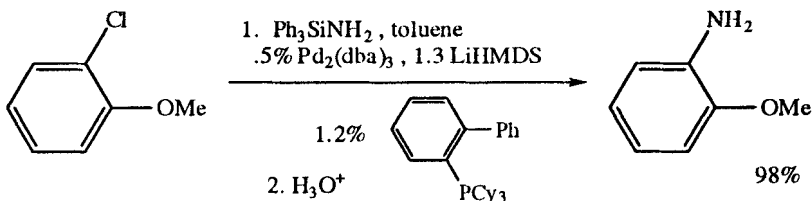
Grasa, G.A.; Viciu, M.S.; Huang, J.; Nolan, S.P. *J. Org. Chem.*, **2001**, 66, 7729.



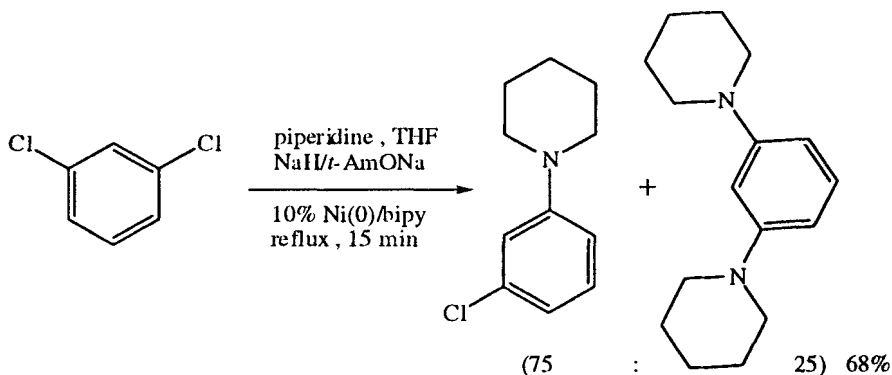
Ogawa, L.; Radke, K.R.; Rothstein, S.D.; Rasmussen, S.C. *J. Org. Chem.*, **2001**, 66, 9067.



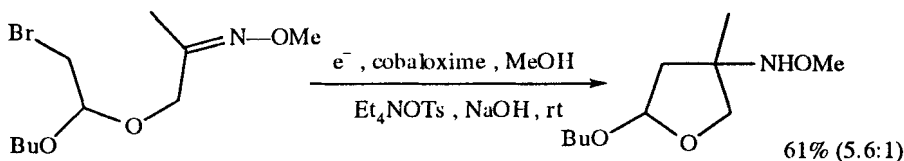
Lee, S.; Jørgensen, M.; Hartwig, J.F. *Org. Lett.*, **2001**, 3, 2729.



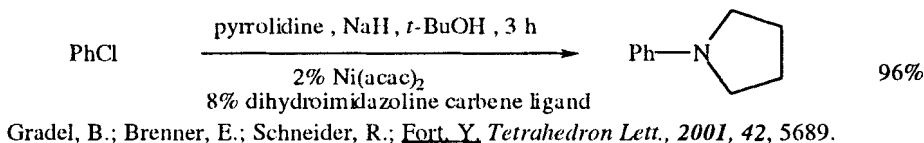
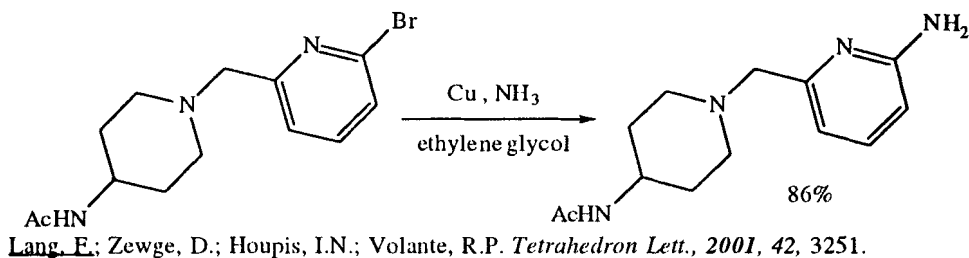
Huang, X.; Buchwald, S.L. *Org. Lett.*, **2001**, 3, 3417.

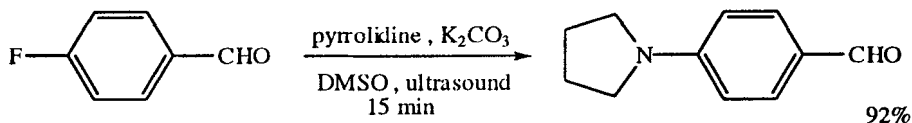


Desmarets, C.; Schneider, R.; Fort, Y. *Tetrahedron Lett.*, **2001**, 42, 247.

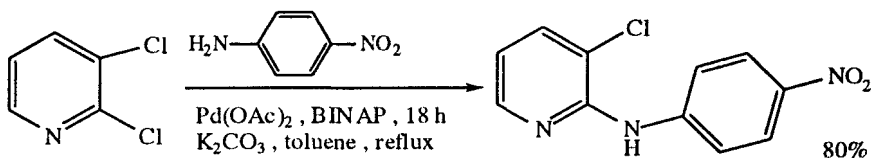


Inokuchi, T.; Kawafuchi, H. *Synlett*, **2001**, 421.

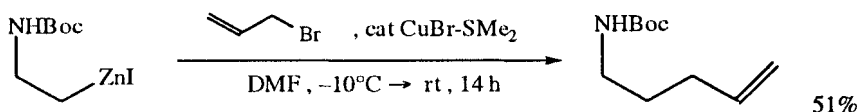




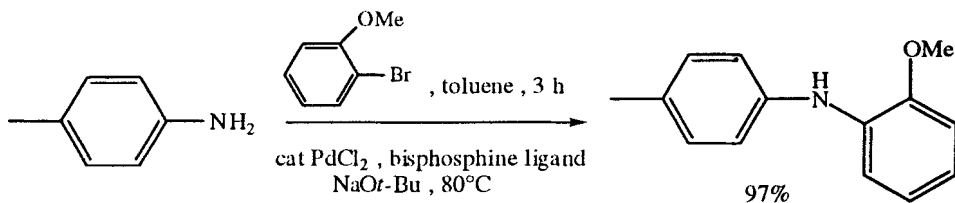
Magdolen, P.; Mečiarová, M.; Toma, Š. *Tetrahedron*, **2001**, 57, 4781.



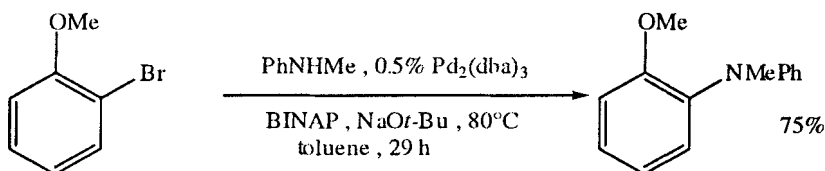
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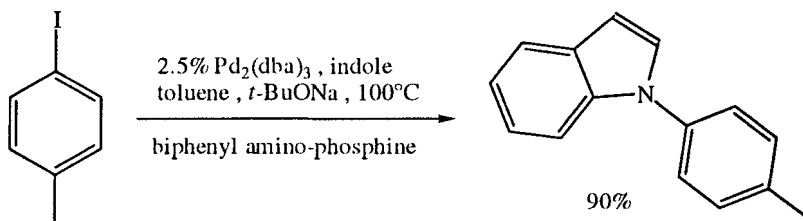
Hunter, C.; Jackson, R.F.W.; Rami, H.K. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 1349.



Zhang, X.-X.; Harris, M.C.; Sadighi, K.J.P.; Buchwald, S.L. *Can. J. Chem.*, **2001**, 79, 1799.

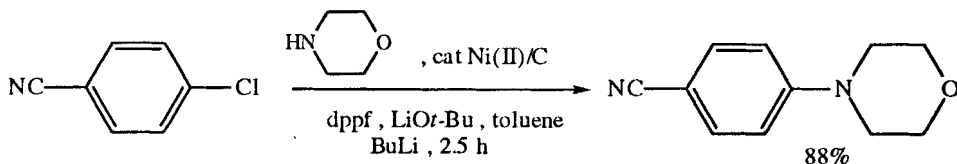


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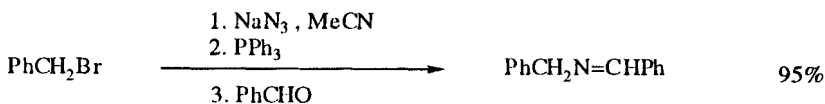


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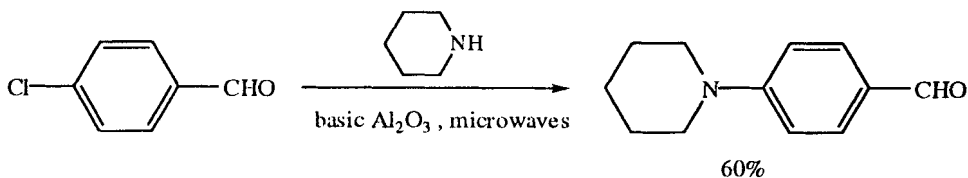




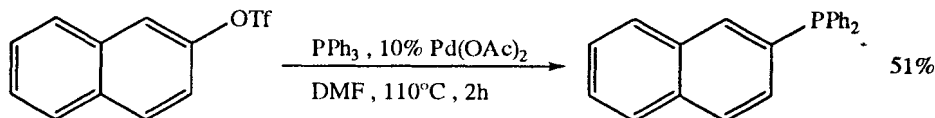
Lipshutz, B.H.; Ueda, H. *Angew. Chem. Int. Ed.*, **2000**, *39*, 4492.



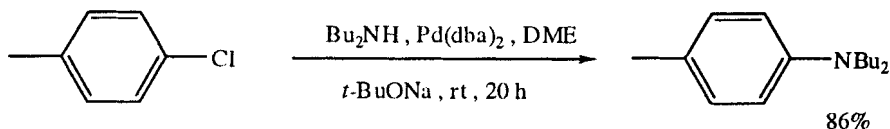
Vaněk, P.; Klán, P. *Synth. Commun.*, **2000**, *30*, 1503.



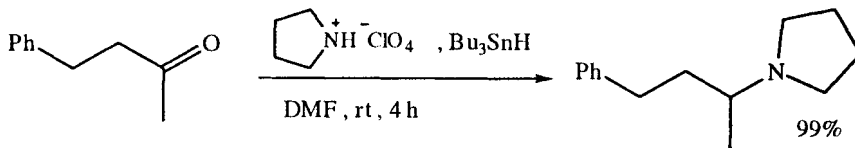
Kidwai, M.; Sapra, P.; Dave, B. *Synth. Commun.*, **2000**, *30*, 4479.



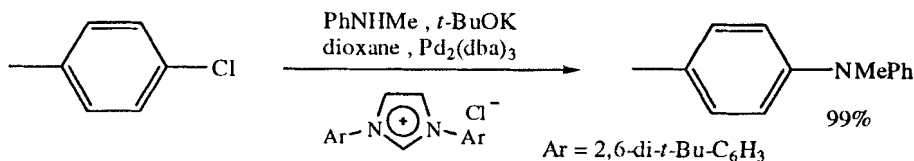
Kwong, F.Y.; Lai, C.W.; Tian, Y.; Chan, K.S. *Tetrahedron Lett.*, **2000**, *41*, 10285.



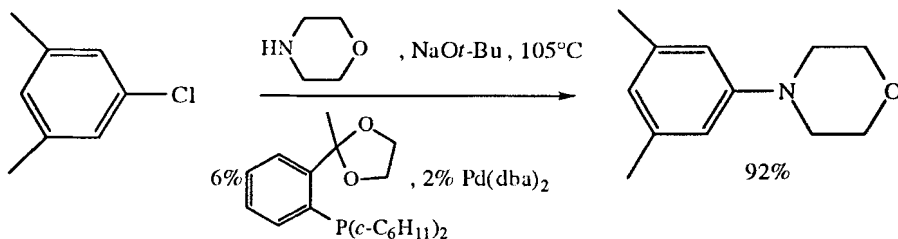
Stauffer, S.R.; Lee, S.; Stambuli, J.P.; Hauck, S.I.; Hartwig, J.F. *Org. Lett.*, **2000**, *2*, 1423.



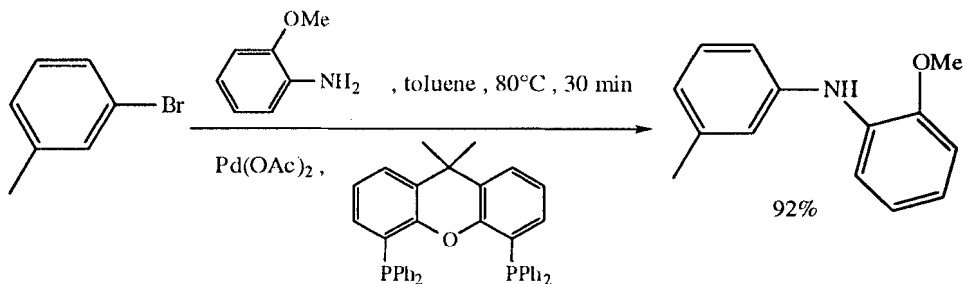
Suwa, T.; Sugiyama, E.; Shibata, I.; Baba, A. *Synlett*, **2000**, 556.



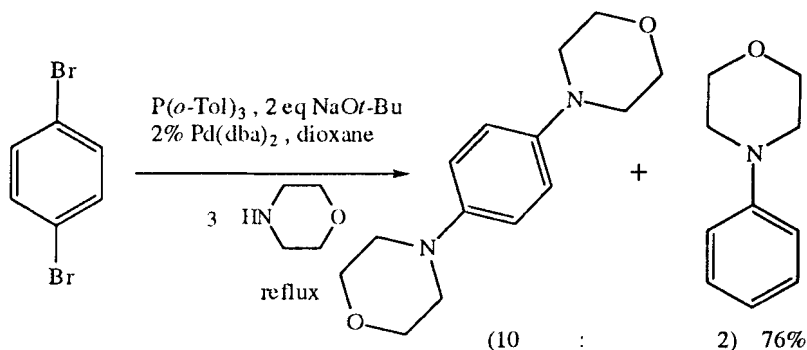
Huang, J.; Grasa, G.; Nolan, S.P. *Org. Lett.*, **1999**, *1*, 1307.



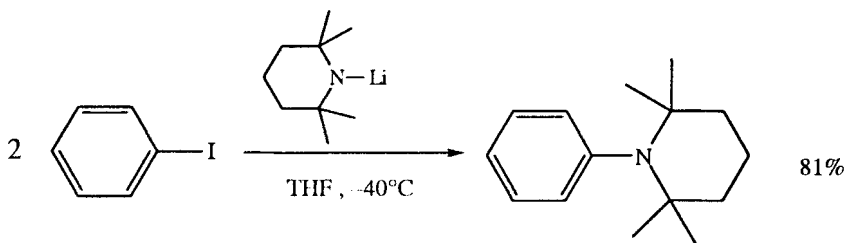
Bei, X.; Guram, A.S.; Turner, H.W.; Weinberg, W.H. *Tetrahedron Lett.*, **1999**, 40, 1237.



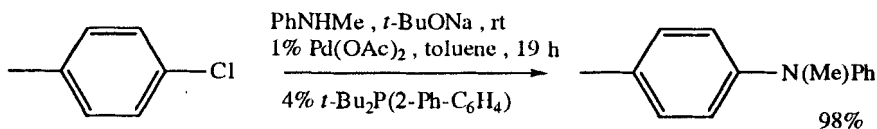
Guari, Y.; van Es, D.S.; Reek, J.N.H.; Kamer, P.C.J.; van Leeuwen, P.W.N.M. *Tetrahedron Lett.*, **1999**, 40, 3789.



Beletskaya, I.P.; Bessmertnykh, A.G.; Guillard, R. *Tetrahedron Lett.*, **1999**, 40, 6393.

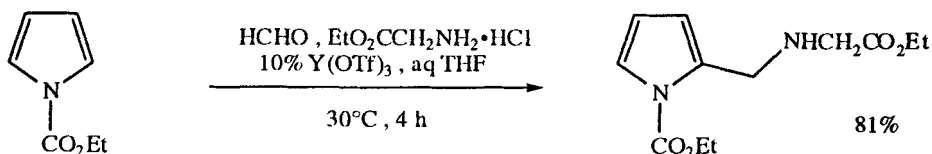


Tripathy, S.; Le Blanc, R.; Durst, T. *Org. Lett.*, **1999**, 1, 1973.

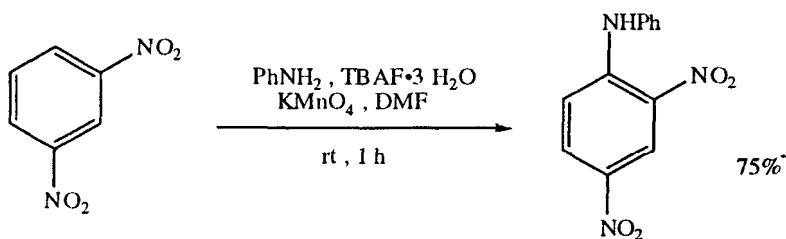


Wolfe, J.P.; Buchwald, S.L. *Angew. Chem. Int. Ed.*, **1999**, *38*, 2413.

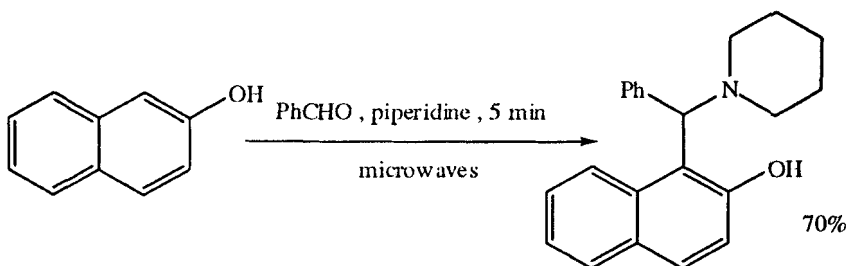
## SECTION 101: AMINES FROM HYDRIDES



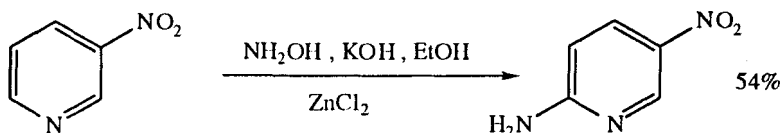
Zhang, C.; Dong, J.; Cheng, T.; Li, R. *Tetrahedron Lett.*, **2001**, *42*, 461.



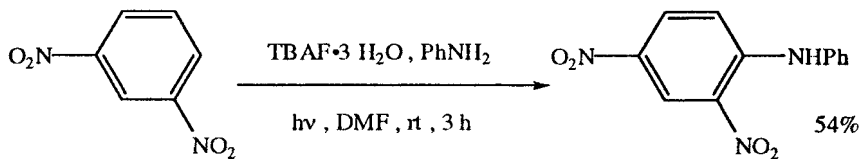
Huertas, I.; Gallardo, I.; Marguet, J. *Tetrahedron Lett.*, **2001**, *42*, 3439.



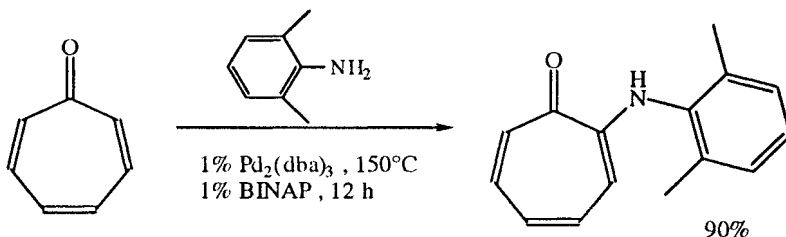
Sharifi, A.; Mirzaei, M.; Najmi-Jamal, M. *Monat. Chem.*, **2001**, *132*, 875.



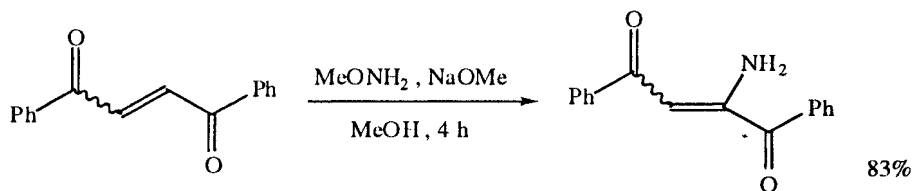
Bakke, J.M.; Svensen, H.; Trevisan, R. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 376.



Juertas, I.; Gallardo, I.; Marquet, J. *Tetrahedron Lett.*, 2000, 41, 279.

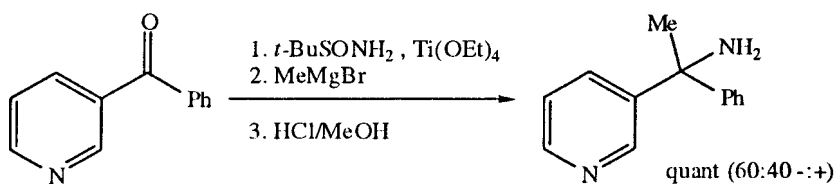


Hicks, F.A.; Brookhart, M. *Org. Lett.*, 2000, 2, 219.

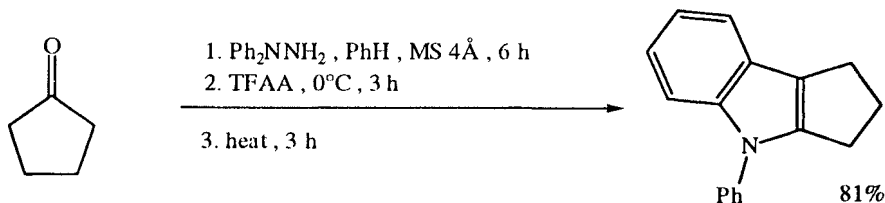


Seko, S.; Miyake, K. *Synth. Commun.*, 1999, 29, 2487.

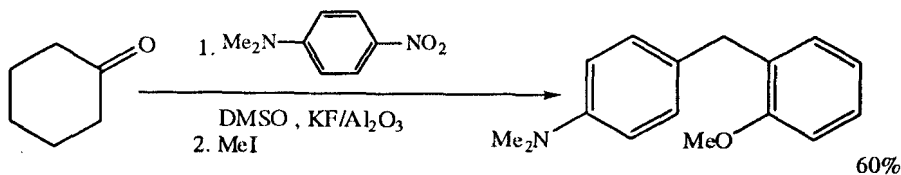
## SECTION 102: AMINES FROM KETONES



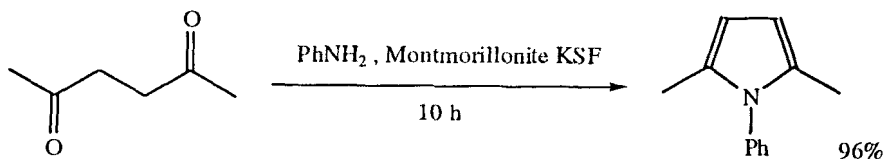
Shaw, A.W.; de Solms, S.J. *Tetrahedron Lett.*, 2001, 42, 7173.



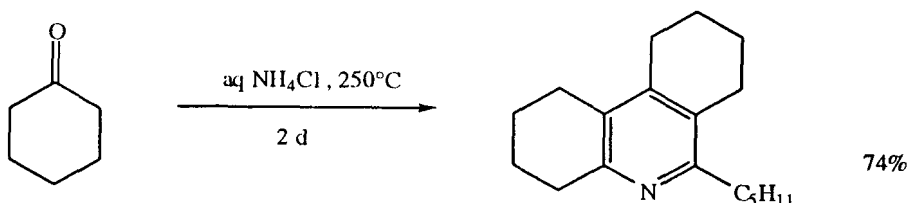
Miyata, O.; Kimura, Y.; Naito, T. *Synthesis*, 2001, 1635.



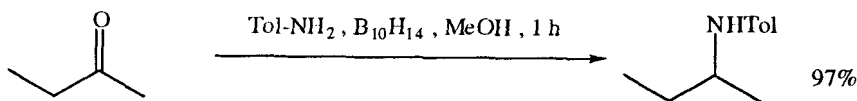
Moskalev, N.; Makosza, M. *Chem. Commun.*, **2001**, 1248.



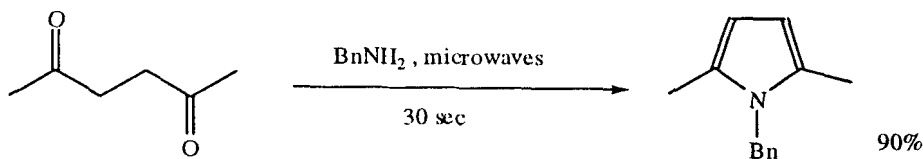
Samajdar, S.; Becker, F.F.; Banik, B.K. *Heterocycles*, **2001**, 55, 1019.



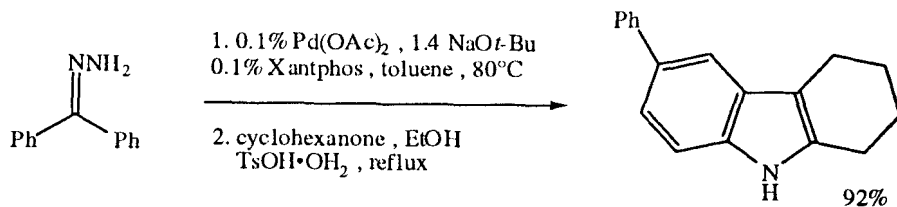
Kotsuki, H.; Mehta, B.K.; Yanigisawa, K. *Synlett*, **2001**, 1323.



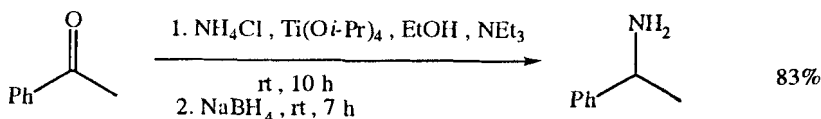
Bae, J.W.; Lee, S.H.; Cho, Y.J.; Yoon, C.M. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 145.



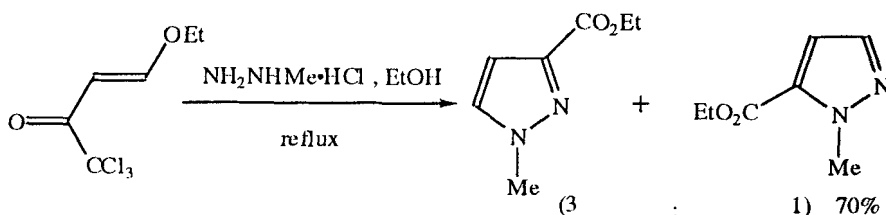
Danks, T.N. *Tetrahedron Lett.*, **1999**, 40, 3957.



Wagaw, S.; Yang, B.H.; Buchwald, S.L. *J. Am. Chem. Soc.*, **1999**, 121, 10251.



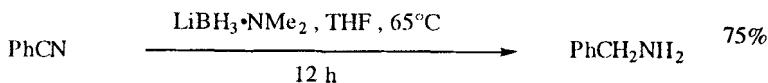
Bhattacharyya, S.; Neidigh, K.A.; Avery, M.A.; Williamson, J.S. *Synlett*, **1999**, 1781.



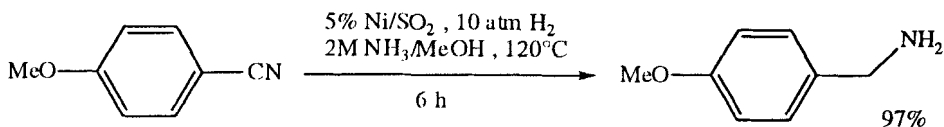
Martins, M.A.P.; Freitag, R.A.; da Rosa, A.; Flores, A.F.C.; Zanatta, N.; Benacorse, H.G. *J. Heterocyclic Chem.*, **1999**, *36*, 217.

Related Methods: Section 94 (Amines from Aldehydes)

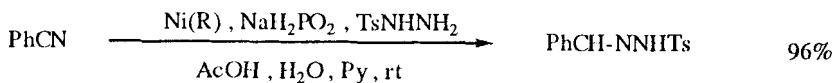
## SECTION 103: AMINES FROM NITRILES



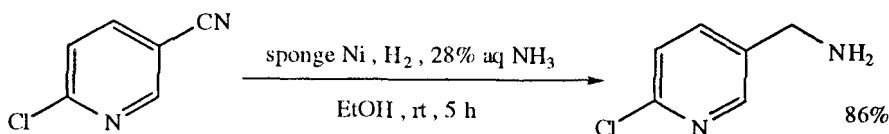
Thomas, S.; Collins, C.J.; Cuzens, J.R.; Spiciarich, D.; Goralski, C.T.; Singaram, B. *J. Org. Chem.*, **2001**, *66*, 1999.



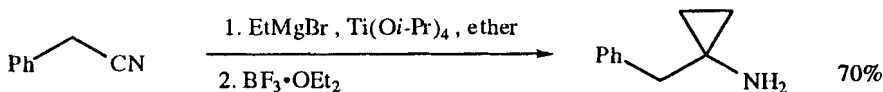
Takamizawa, S.; Wakasa, N.; Fuchikami, T. *Synlett*, **2001**, 1623.



Tóth, M.; Sumsák, L. *Tetrahedron Lett.*, **2001**, *42*, 2723.

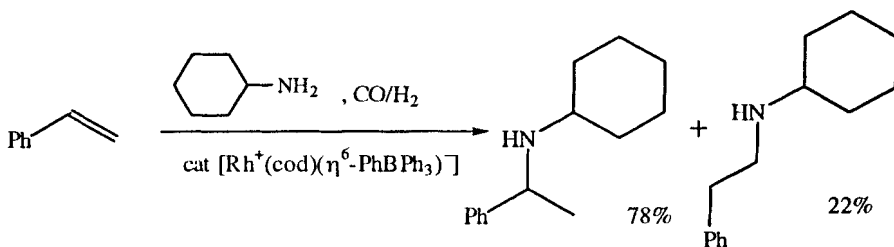


Tanaka, K.; Nagasawa, M.; Kasuga, Y.; Sakamura, H.; Takuma, Y.; Iwatani, K. *Tetrahedron Lett.*, **1999**, *40*, 5885.

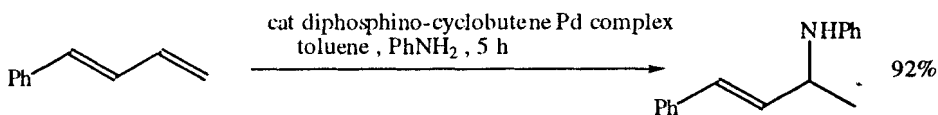


Bertus, P.; Szymoniak, J. *Chem. Commun.*, **2001**, 1792.

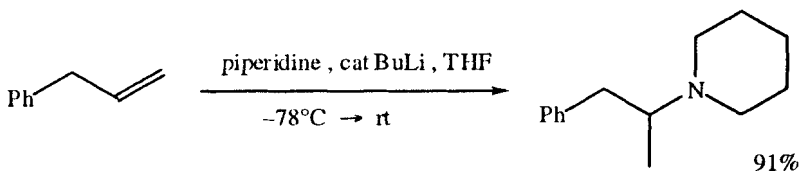
## SECTION 104: AMINES FROM ALKENES



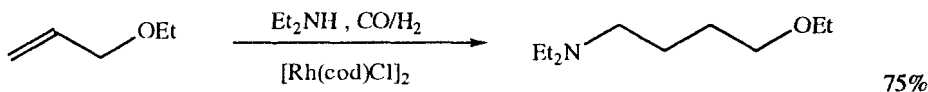
Lin, Y.-S.; El Ali, B.; Alper, H. *Tetrahedron Lett.*, **2001**, 42, 2423.



Minami, T.; Okamoto, H.; Ikeda, S.; Tanaka, R.; Ozawa, E.; Yoshifuji, M. *Angew. Chem. Int. Ed.*, **2001**, 40, 4501.

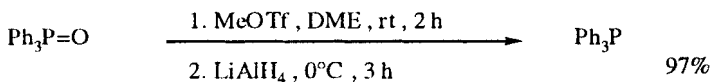


Hartung, C.G.; Breindl, C.; Tillack, A.; Beller, M. *Tetrahedron*, **2000**, 56, 5157.

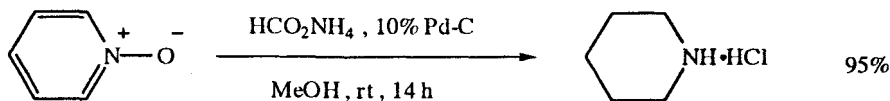


Rische, T.; Bärfacker, L.; Eilbracht, P. *Eur. J. Org. Chem.*, **1999**, 653.

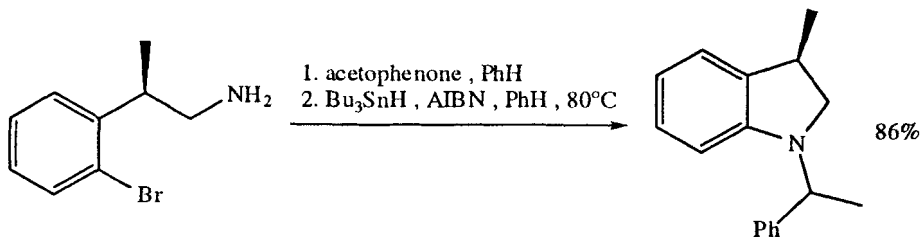
## SECTION 105: AMINES FROM MISCELLANEOUS COMPOUNDS



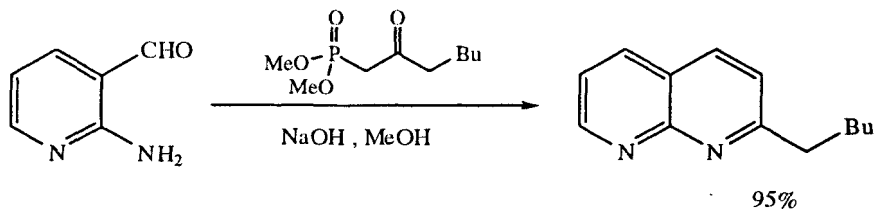
Imamoto, T.; Kikuchi, S.-i.; Miura, T.; Wada, Y. *Org. Lett.*, **2001**, 3, 87.



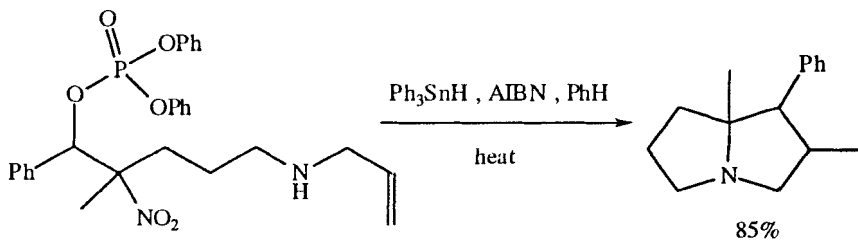
Zacharie, B.; Moreau, N.; Dockendorff, C. *J. Org. Chem.*, **2001**, 66, 5264.



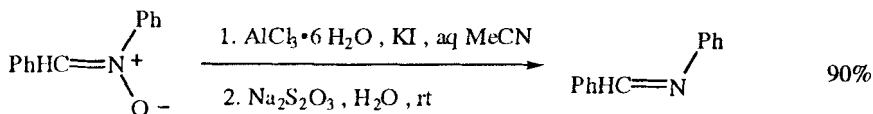
Johnston, J.N.; Plotkin, M.A.; Viswanathan, R.; Prabhakaran, E.N. *Org. Lett.*, **2001**, 3, 1009.



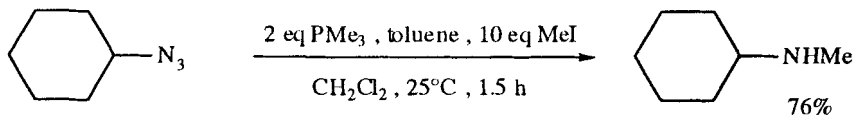
Hsiao, Y.; Rivera, R.; Yasuda, N.; Hughes, D.L.; Reider, P.J. *Org. Lett.*, **2001**, 3, 1101.



Crich, D.; Ranganathan, K.; Huang, X. *Org. Lett.*, **2001**, 3, 1917.

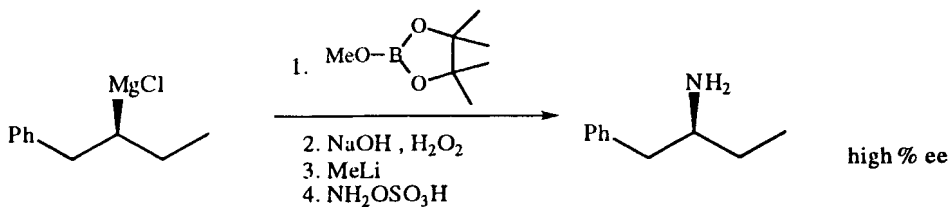


Boruah, M.; Konwar, D. *Synlett*, **2001**, 795.

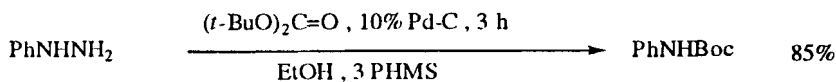


Kato, H.; Ohmori, K.; Suzuki, K. *Synlett*, **2001**, 1003.

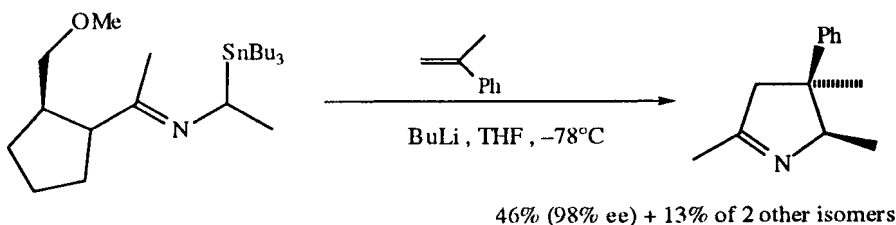




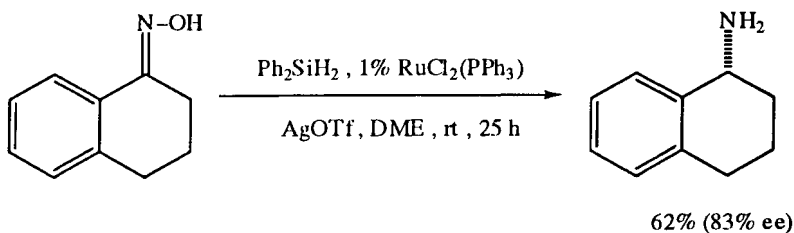
Hoffmann, R.W.; Hölzer, B.; Knopff, O. *Org. Lett.*, **2001**, *3*, 1945.



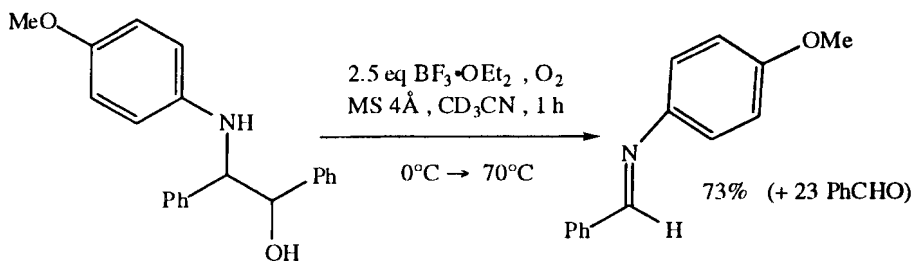
Chandrasekhar, S.; Reddy, Ch.R.; Rao, R.J. *Synlett*, **2001**, 1561.



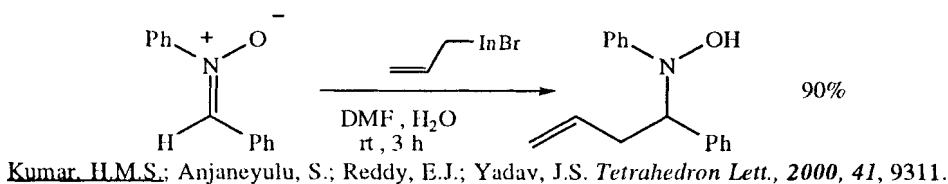
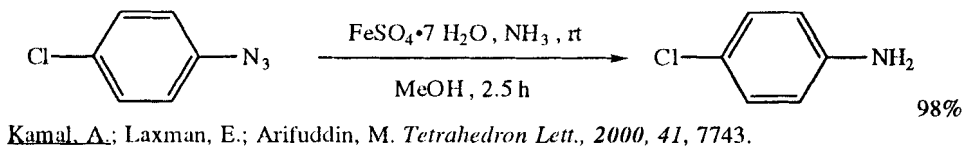
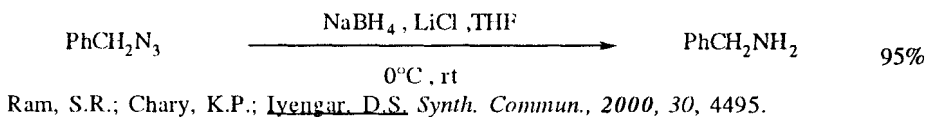
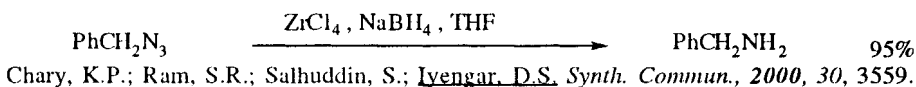
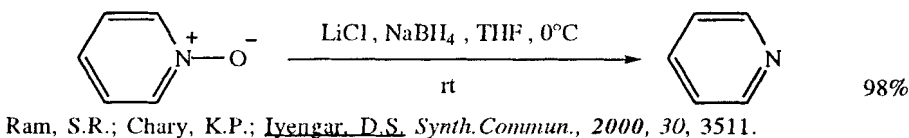
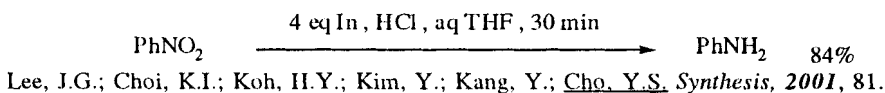
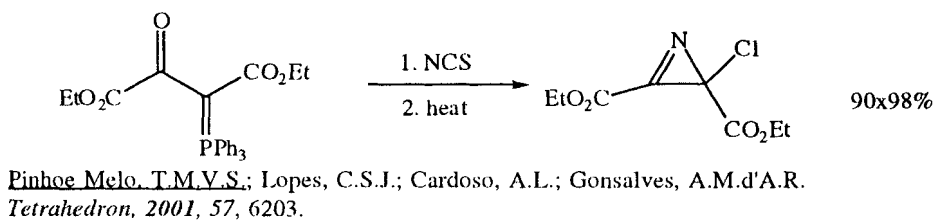
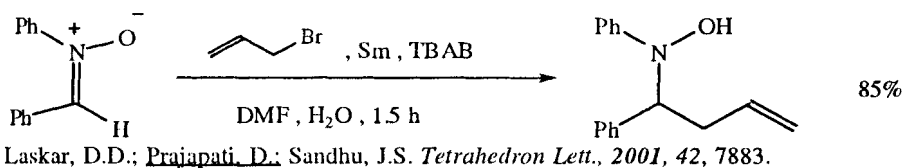
Pearson, W.H.; Stevens, E.P.; Aponick, A. *Tetrahedron Lett.*, **2001**, *42*, 7361.

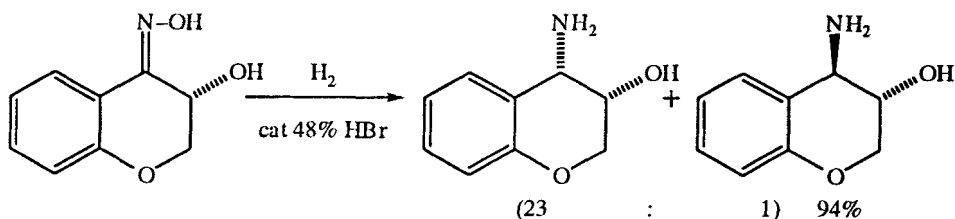


Takei, I.; Nishibayashi, Y.; Ishii, Y.; Mizobe, Y.; Uemura, S.; Hidai, M.  
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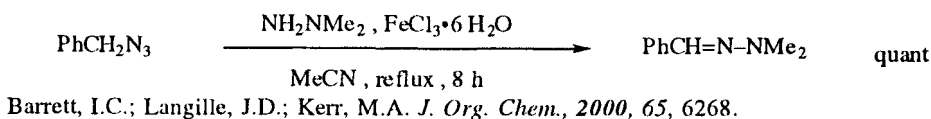
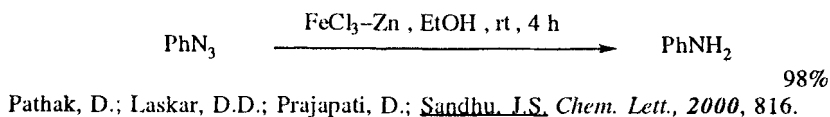
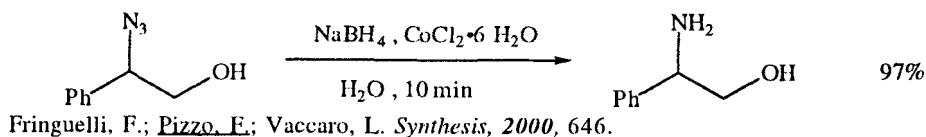
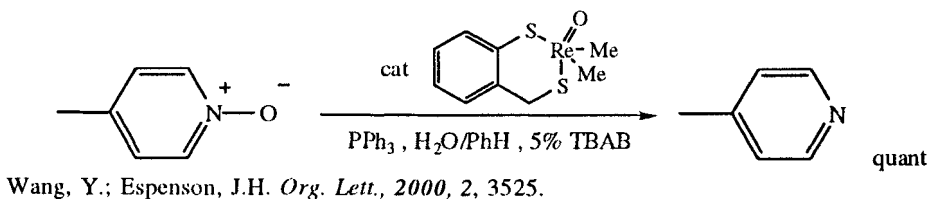
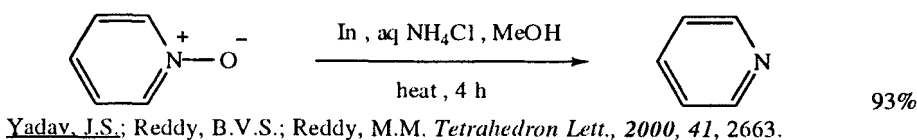
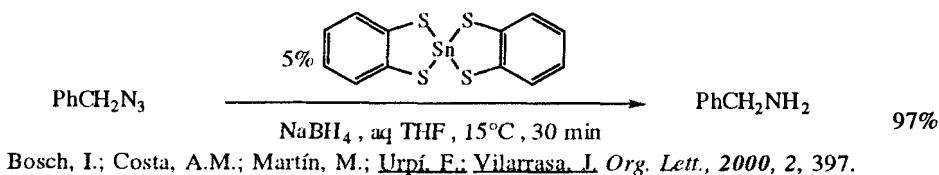


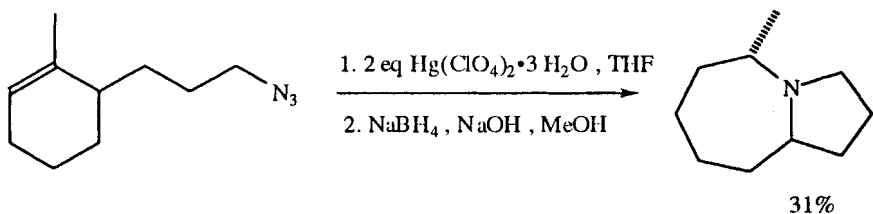
Shimizu, M.; Makino, H. *Tetrahedron Lett.*, **2001**, *42*, 8865.



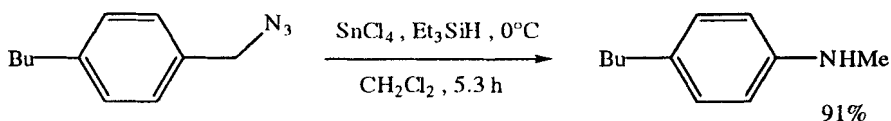


Davies, I.W.; Taylor, M.; Marcoux, J.-F.; Matty, L.; Wu, J.; Hughes, D.; Reider, P.J. *Tetrahedron Lett.*, **2000**, *41*, 8021.

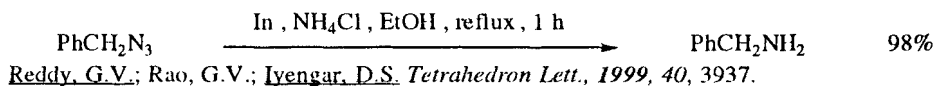




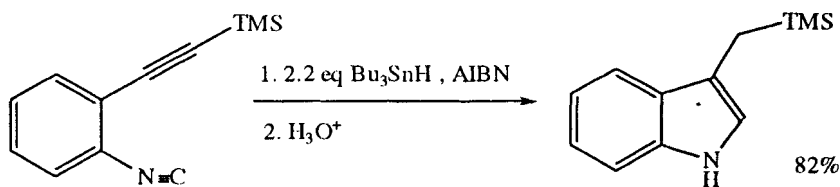
Pearson, W.H.; Hutta, D.A.; Fang, W.-K. *J. Org. Chem.*, **2000**, *65*, 8326.



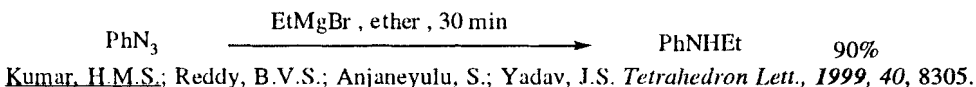
Lopez, F.J.; Nitzan, D. *Tetrahedron Lett.*, **1999**, *40*, 2071.



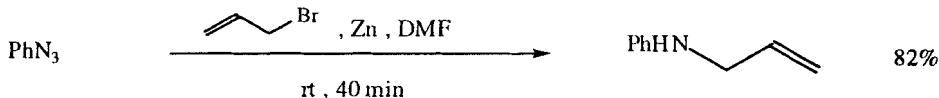
Reddy, G.V.; Rao, G.V.; Iyengar, D.S. *Tetrahedron Lett.*, **1999**, *40*, 3937.



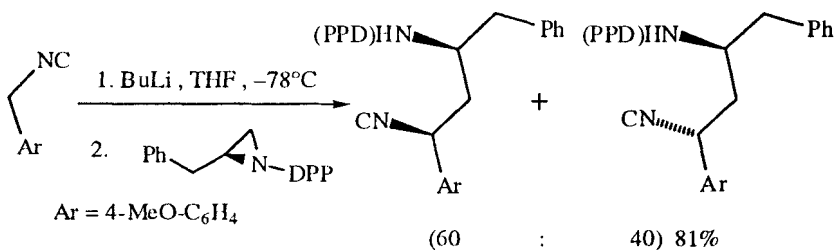
Rainer, J.D.; Kennedy, A.R.; Chase, E. *Tetrahedron Lett.*, **1999**, *40*, 6325.



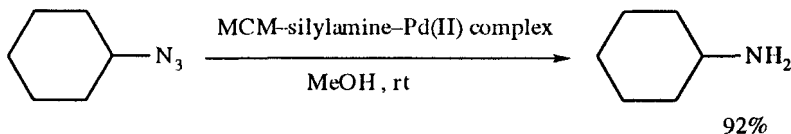
Kumar, H.M.S.; Reddy, B.V.S.; Anjaneyulu, S.; Yadav, J.S. *Tetrahedron Lett.*, **1999**, *40*, 8305.



Kumar, H.M.S.; Anjaneyulu, S.; Reddy, B.V.S.; Yadav, J.S. *Synlett*, **1999**, 551.

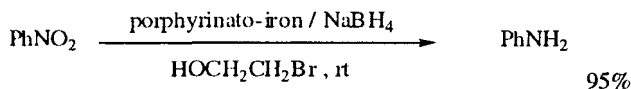


Kaiser, A.; Balbi, M. *Tetrahedron Asymm.*, **1999**, *10*, 1001.

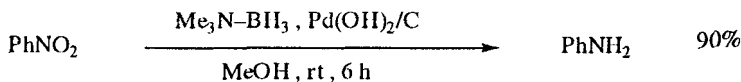


Kantam, M.L.; Chowdari, N.S.; Rahman, S.; Choudary, B.M. *Synlett*, **1999**, 1413.

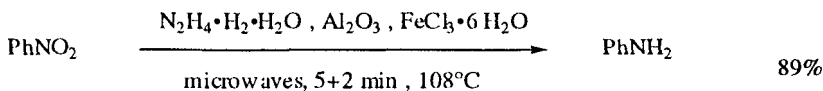
## AMINES FROM NITRO COMPOUNDS



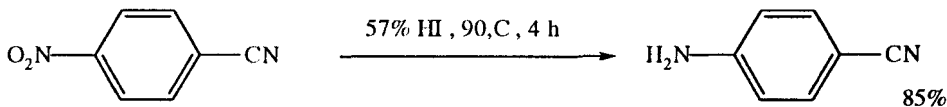
Wilkinson, H.S.; Tanoury, G.J.; Wald, S.A.; Senanayake, C.H.  
*Tetrahedron Lett.*, **2001**, 42, 167.



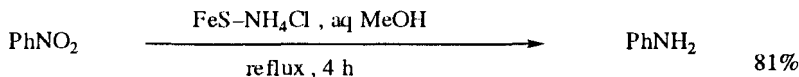
Conturier, M.; Tucker, J.L.; Andresen, B.M.; Dubé, P.; Brenek, S.J.; Negri, J.T.  
*Tetrahedron Lett.*, **2001**, 42, 2285.



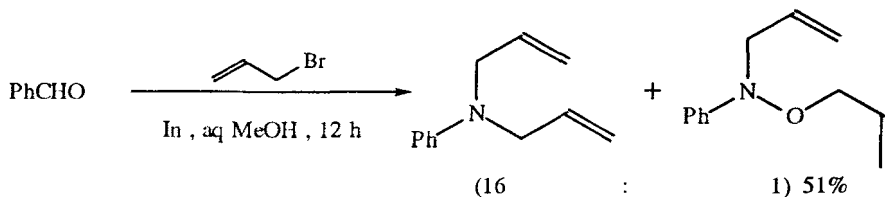
Vass, A.; Dudás, J.; Tóth, J.; Vanna, R.S. *Tetrahedron Lett.*, **2001**, 42, 5347.



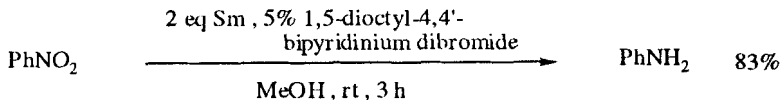
Kumar, J.S.D.; Ho, M.M.; Toyokuni, T. *Tetrahedron Lett.*, **2001**, 42, 5601.



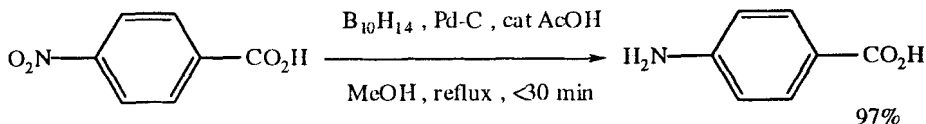
Desai, D.G.; Swami, S.S.; Dabhade, S.K.; Ghagare, M.G. *Synth. Commun.*, **2001**, 31, 1249.



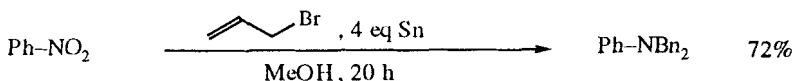
Kang, K.H.; Choi, K.I.; Koh, H.Y.; Kim, Y.; Chung, B.Y.; Choi, Y.S.  
*Synth. Commun.*, **2001**, 31, 2277.



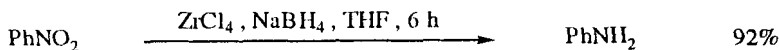
Yu, C.; Liu, B.; Hu, L. *J. Org. Chem.*, **2001**, *66*, 919.



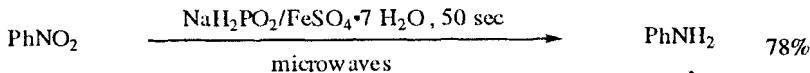
Bae, J.W.; Cho, Y.J.; Lee, S.H.; Yoon, C.M. *Tetrahedron Lett.*, **2000**, *41*, 175.



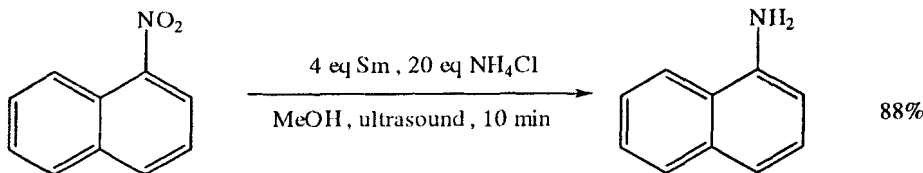
Bieber, L.W.; da Costa, R.C.; da Silva, M.F. *Tetrahedron Lett.*, **2000**, *41*, 4827.



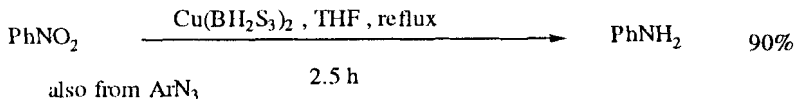
Chary, K.P.; Ram, S.R.; Iyengar, D.S. *Synlett*, **2000**, 683.



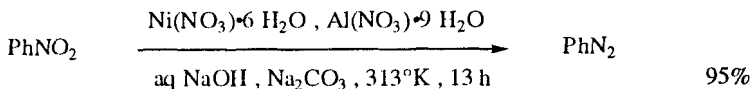
Meshram, H.M.; Ganesh, Y.S.S.; Sekhar, K.C.; Yadav, J.S. *Synlett*, **2000**, 993.



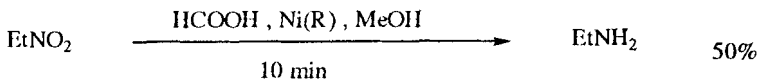
Basu, M.K.; Becker, F.F.; Banik, B.K. *Tetrahedron Lett.*, **2000**, *41*, 5603.



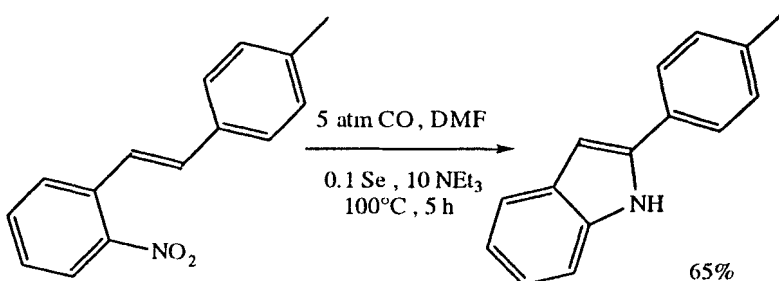
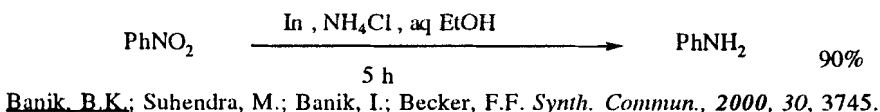
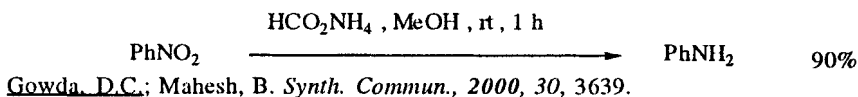
Firouzabadi, H.; Tamami, B.; Kiasat, A.R. *Synth. Commun.*, **2000**, *30*, 587.



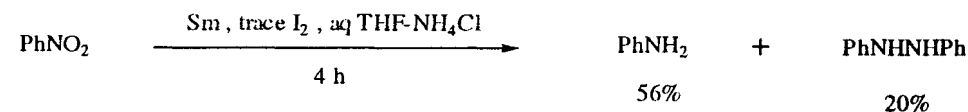
Iyothi, T.M.; Raja, T.; Talawar, M.B.; Sreekumar, K.; Sugunan, S.; Rao, B.S. *Synth. Commun.*, **2000**, *30*, 1573.



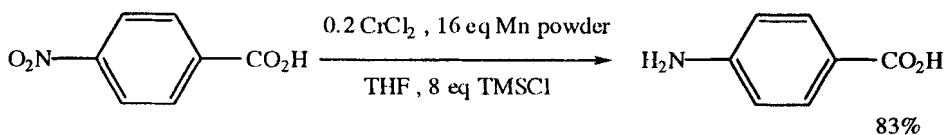
Gowda, D.C.; Gowda, A.S.P.; Baba, A.R.; Gowda, S. *Synth. Commun.*, **2000**, *30*, 2889.



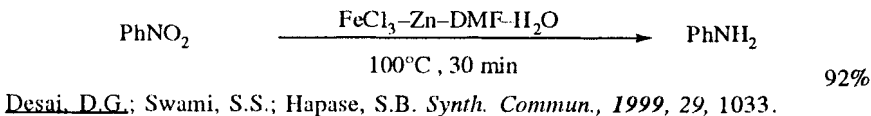
Nishiyama, Y.; Maema, R.; Ohno, K.; Hirose, M.; Sonoda, N. *Tetrahedron Lett.*, **1999**, 40, 5717.



Wang, L.; Zhou, L.; Zhang, Y. *Synlett*, **1999**, 1065.



Hari, A.; Miller, B.L. *Angew. Chem. Int. Ed.*, **1999**, 38, 2777.



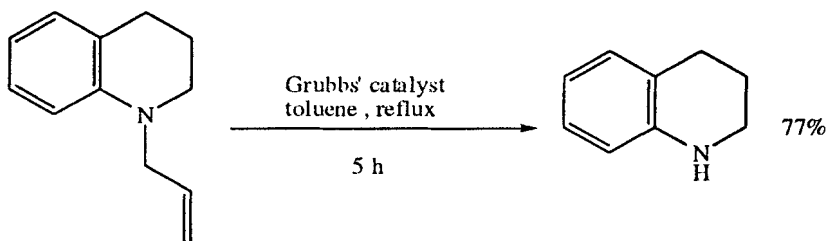
## REVIEWS:

"[3+2] Synthesis of Pyrrolizidine and Indolizidine Alkaloids," Broggini, G.; Zecchi, G. *Synthesis*, **1999**, 905.

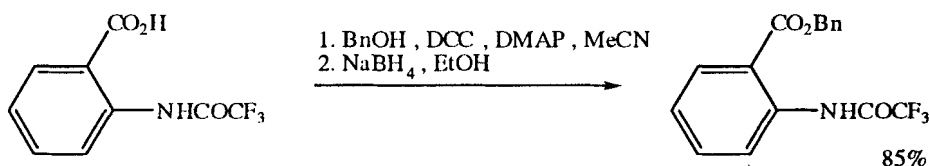
"Synthesis of Secondary Amines," Salvatore, R.N.; Yoon, C.H.; Jung, K.W. *Tetrahedron*, **2001**, 57, 7785.

"A Comparison of Imine-Forming Methodologies," Love, B.E.; Boston, T.S.; Nguyen, B.T.; Rorer, J.R. *Org. Prep. Proceed. Int.*, **1999**, *31*, 399.

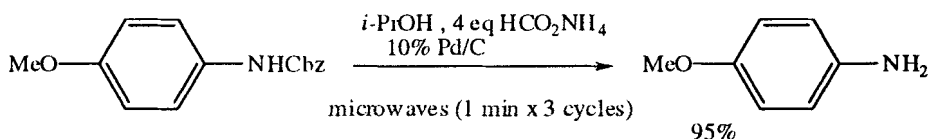
## SECTION 105A: PROTECTION OF AMINES



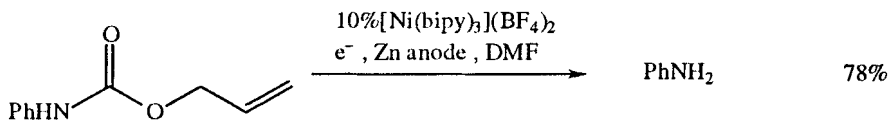
Alcaide, B.; Almendros, P.; Alonso, J.M.; Aly, M.F. *Org. Lett.*, **2001**, *3*, 3781.



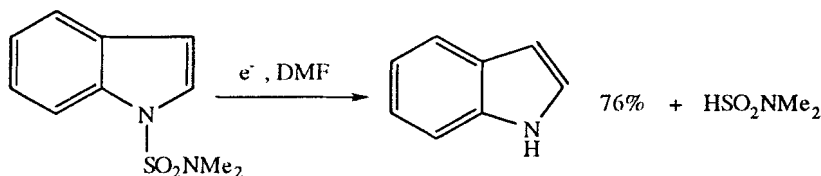
Barker, D.; McLeod, M.D.; Brimble, M.A.; Savage, G.P. *Tetrahedron Lett.*, **2001**, *42*, 1785.



Daga, M.C.; Taddei, M.; Varchi, G. *Tetrahedron Lett.*, **2001**, *42*, 5191.

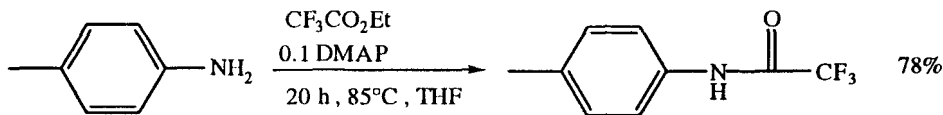


Franco, D.; Duñach, E. *Tetrahedron Lett.*, **2000**, *41*, 7333.

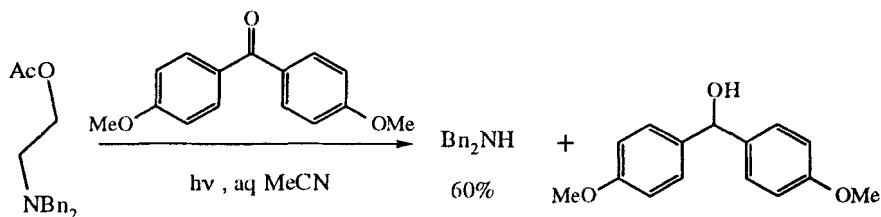


Largerion, M.; Farrell, B.; Rousseau, J.-F.; Fleury, M.-B.; Potier, P.; Dodd, R.H. *Tetrahedron Lett.*, **2000**, *41*, 9403.

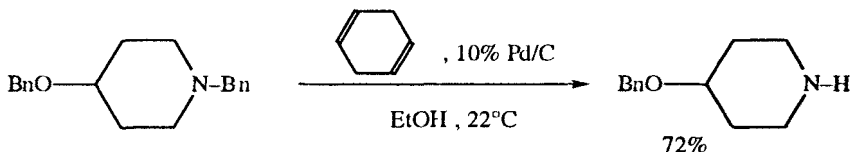




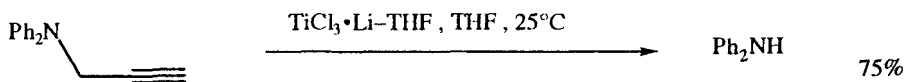
Prashad, M.; Hu, B.; Har, D.; Repič, O.; Blacklock, T.J. *Tetrahedron Lett.*, **2000**, *41*, 9957.



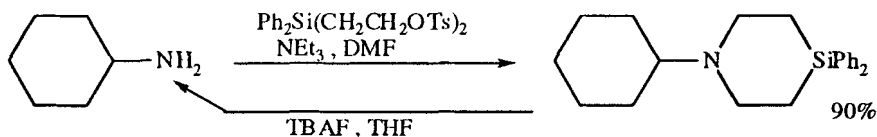
Cossy, L.; Rakotoarisoa, H. *Tetrahedron Lett.*, **2000**, *41*, 2097.



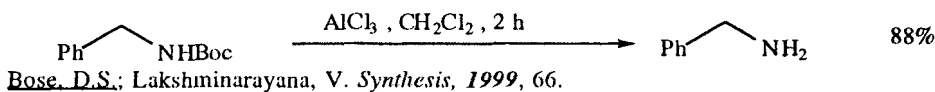
Bajwa, J.S.; Slade, J.; Repič, O.; Blacklock, T. *Tetrahedron Lett.*, **2000**, *41*, 6021.



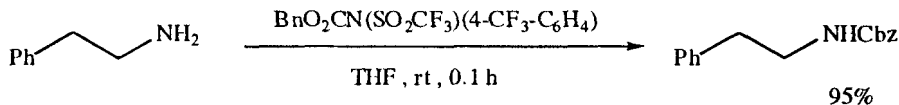
Rele, S.; Talukdar, S.; Banerji, A. *Tetrahedron Lett.*, **1999**, *40*, 767.



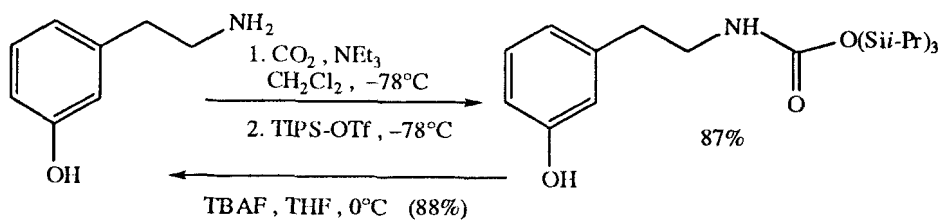
Kim, B.M.; Cho, J.H. *Tetrahedron Lett.*, **1999**, *40*, 5333.



Bose, D.S.; Lakshminarayana, V. *Synthesis*, **1999**, 66.



Yasuhara, T.; Nagaoka, Y.; Tomioka, K. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 2233.

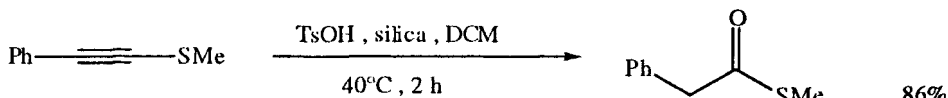


Lipshutz, B.H.; Papa, P.; Keith, J.M. *J. Org. Chem.*, **1999**, *64*, 3792.

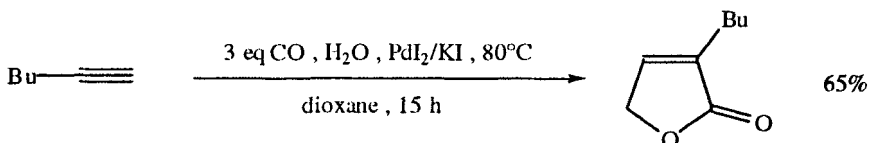
# CHAPTER 8

## PREPARATION OF ESTERS

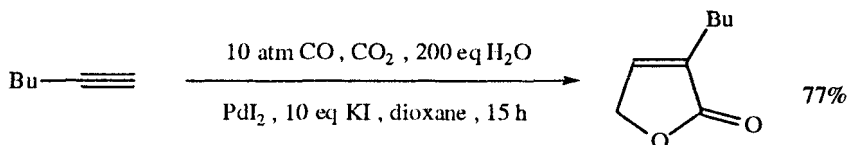
### SECTION 106: ESTERS FROM ALKYNES



Braga, A.L.; Martins, T.L.C.; Silveira, C.C.; Rodrigues, O.E.D. *Tetrahedron*, **2001**, *57*, 3297.



Gabriele, B.; Salerno, G.; Costa, M.; Chiusoli, G.P. *Tetrahedron Lett.*, **1999**, *40*, 989.

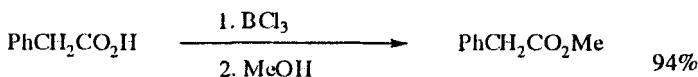


Gabriele, B.; Salerno, G.; Costa, M.; Chiusoli, G.P. *Chem. Commun.*, **1999**, 1381.

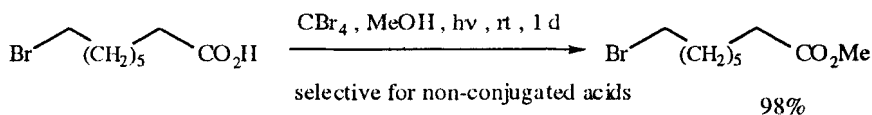
### SECTION 107: ESTERS FROM ACID DERIVATIVES

The following types of reactions are found in this section:

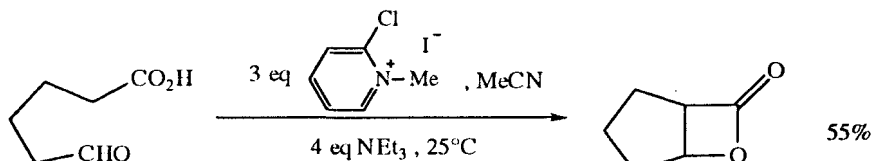
1. Esters from the reaction of alcohols with carboxylic acids, acid halides and anhydrides.
2. Lactones from hydroxy acids
3. Esters from carboxylic acids and halides, sulfoxides and miscellaneous compounds



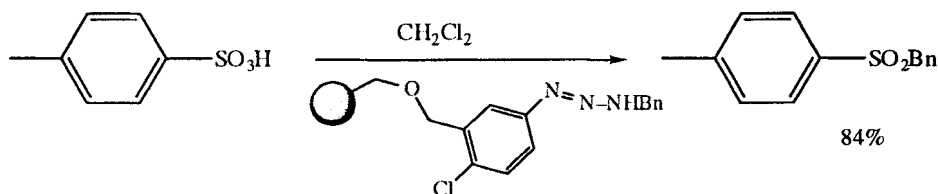
Dyke, C.A.; Bryson, T.A. *Tetrahedron Lett.*, **2001**, *42*, 3959.



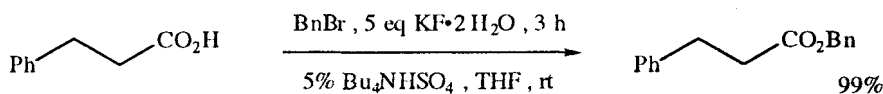
Lee, A.S.-Y.; Yang, H.-C.; Su, F.-Y. *Tetrahedron Lett.*, **2001**, 42, 301.



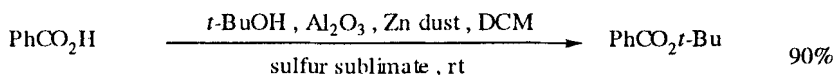
Coretz, G.S.; Tennyson, R.L.; Romo, D. *J. Am. Chem. Soc.*, **2001**, 123, 7945.



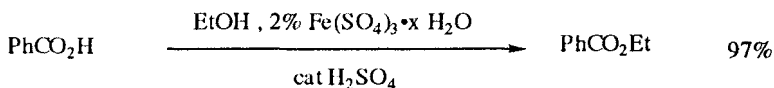
Vignola, N.; Dahmen, S.; Enders, D.; Bräse, S. *Tetrahedron Lett.*, **2001**, 42, 7833.



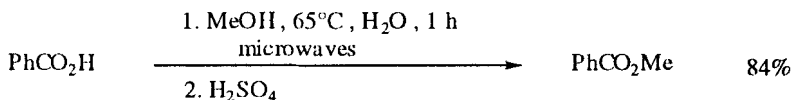
Ooi, T.; Sugimoto, H.; Doda, K.; Maruoka, K. *Tetrahedron Lett.*, **2001**, 42, 9245.



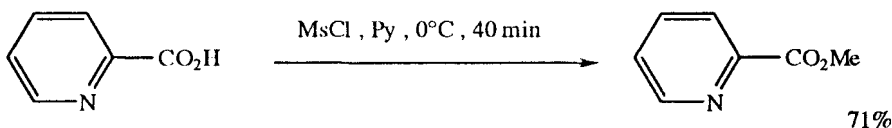
Karmakar, D.; Das, P.J. *Synth. Commun.*, **2001**, 31, 535.



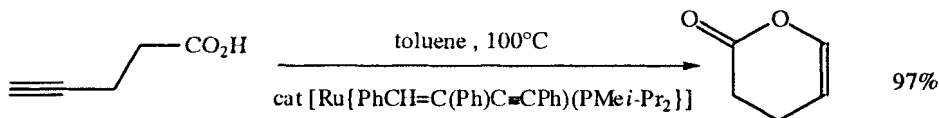
Xu, Q.-h.; Liu, W.-y.; Chen, B.-h.; Ma, Y.-x. *Synth. Commun.*, **2001**, 31, 2113.



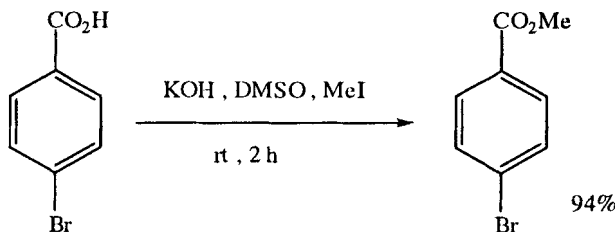
Zhang, Z.; Zhou, L.; Zhang, M.; Wu, H.; Chen, Z. *Synth. Commun.*, **2001**, 31, 2435.



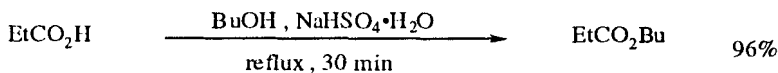
Siddiqui, B.S.; Begum, F.; Begum, S. *Tetrahedron Lett.*, **2001**, 42, 9059.



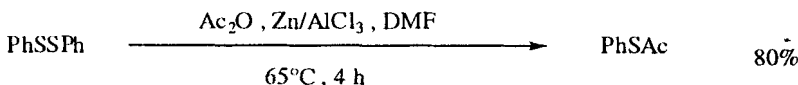
Jiménez-Tenorio, M.; Puerta, M.C.; Valerga, P.; Moreno-Dorado, F.J.; Guerra, F.M.; Massanet, G.M. *Chem. Commun.*, **2001**, 2324.



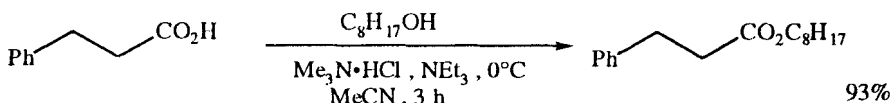
Avila-Zárraga, J.G.; Mariñez, R. *Synth. Commun.*, **2001**, 31, 2177.



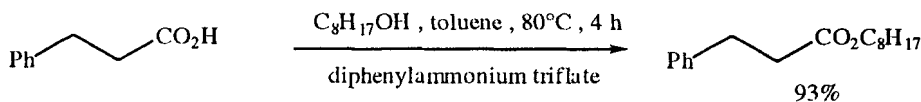
Li, Y.-Q. *Synth. Commun.*, **1999**, 29, 3901.



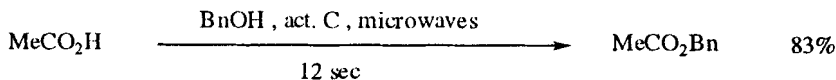
Movassagh, B.; La Kouraj, M.M.; Fadaei, Z. *J. Chem. Res. (S)*, **2001**, 22.



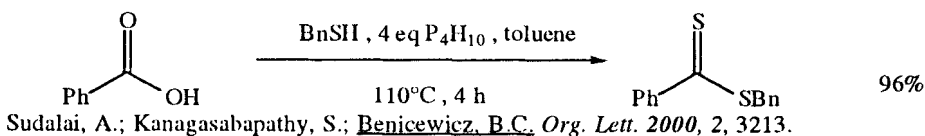
Wakasugi, K.; Nakamura, A.; Tanabe, Y. *Tetrahedron Lett.*, **2001**, 42, 7427.



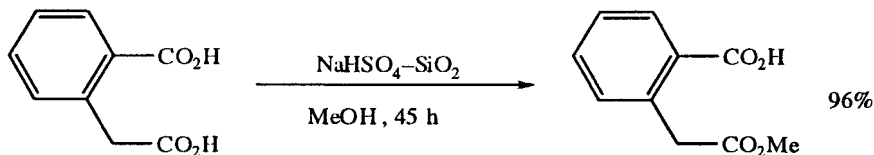
Wakasugi, K.; Misaki, T.; Yamada, K.; Tanabe, Y. *Tetrahedron Lett.* **2000**, 41, 5249.



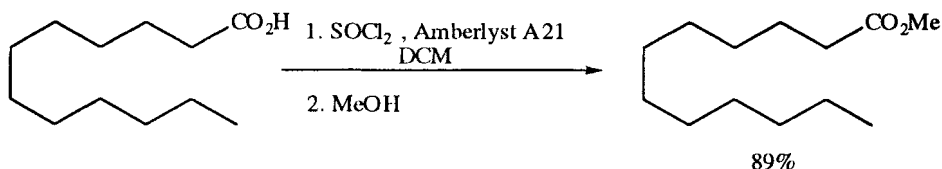
Sagar, A.D.; Shinde, N.A.; Bandgar, B.P. *Org. Prep. Proceed. Int.*, **2000**, 32, 287.



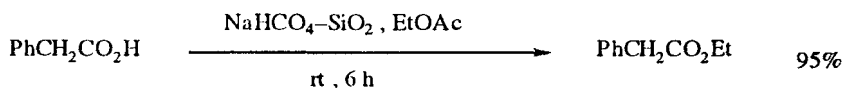
Sudalai, A.; Kanagasabapathy, S.; Benicewicz, B.C. *Org. Lett.* **2000**, 2, 3213.



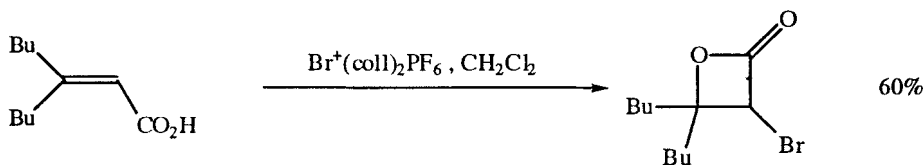
Das, B.; Venkataiah, B.; Madhusudhan, P. *Synlett*, **2000**, 59.



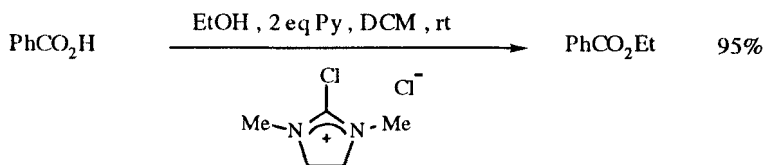
Girard, C.; Tranchant, I.; Nioré, P.-A.; Herscovici, J. *Synlett*, **2000**, 1577.



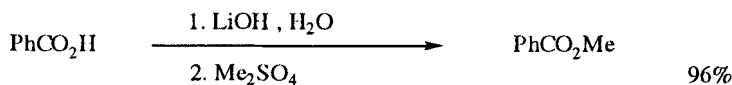
Das, B.; Venkataiah, B. *Synthesis*, **2000**, 1671.



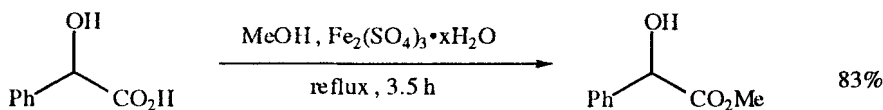
Homsí, F.; Rousseau, G. *J. Org. Chem.*, **1999**, *64*, 81.



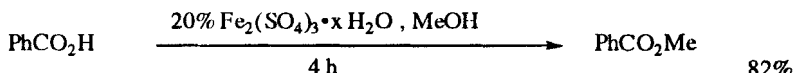
Isobe, T.; Ishikawa, T. *J. Org. Chem.*, **1999**, *64*, 6984.



Chakraborti, A.K.; Basak, A.; Grover, V. *J. Org. Chem.*, **1999**, *64*, 8014.



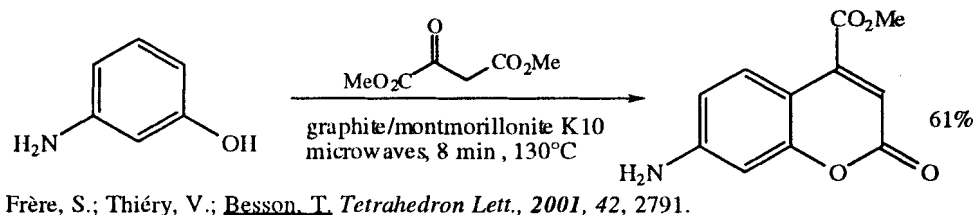
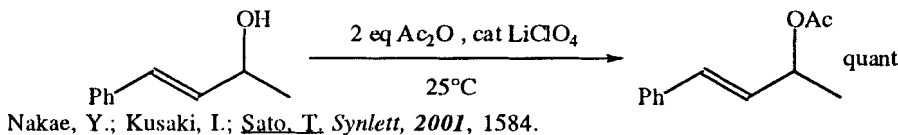
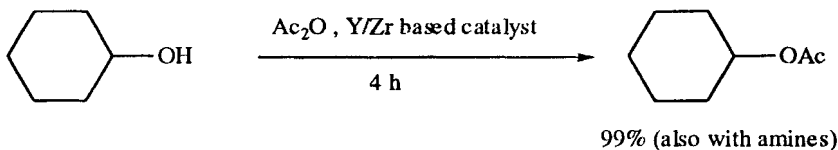
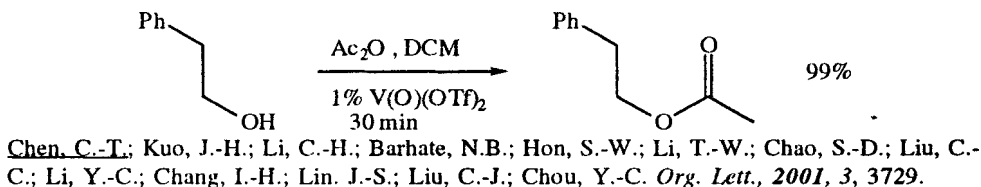
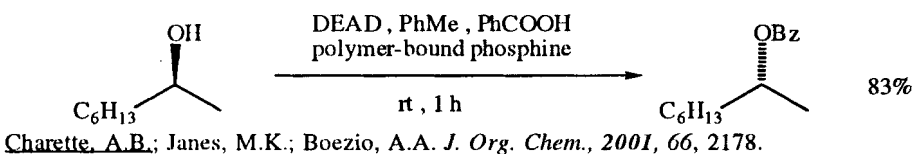
Zhang, G.-S.; Gong, H. *Synth. Commun.*, **1999**, *29*, 1547.

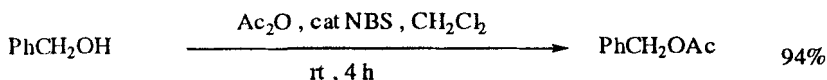


Zhang, G.-S. *Synth. Commun.*, **1999**, 29, 607.

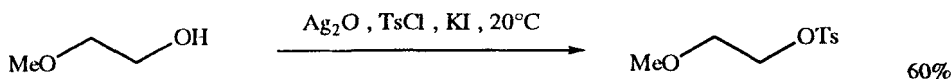
Further examples of the reaction  $\text{RCO}_2\text{H} + \text{R}'\text{OH} \rightarrow \text{RCO}_2\text{R}'$  are included in Section 108 (Esters from Alcohols and Phenols) and in Section 30A (Protection of Carboxylic Acids).

## SECTION 108: ESTERS FROM ALCOHOLS AND THIOLS

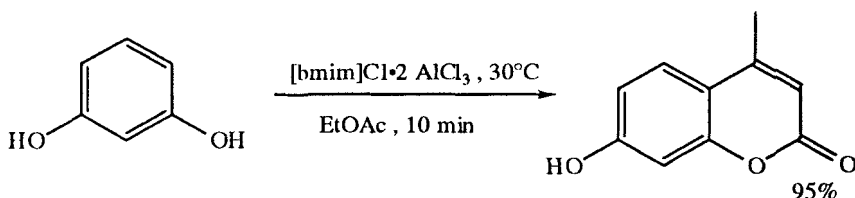




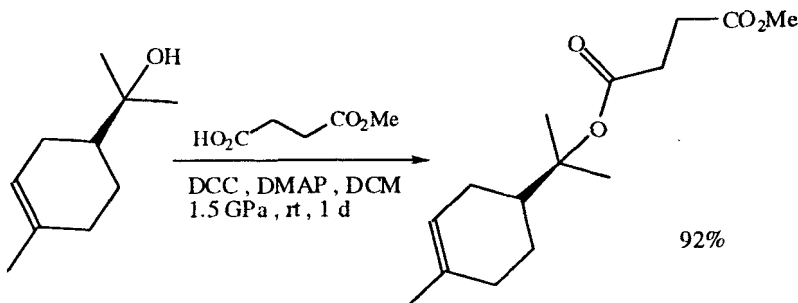
Karimi, B.; Seradj, H. *Synlett*, **2001**, 519.



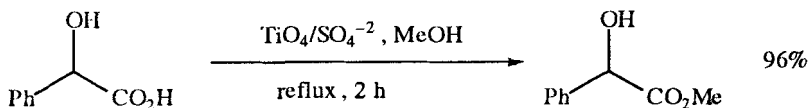
Bouzide, A.; Le Berre, N.; Sauv , G. *Tetrahedron Lett.*, **2001**, 42, 8781.



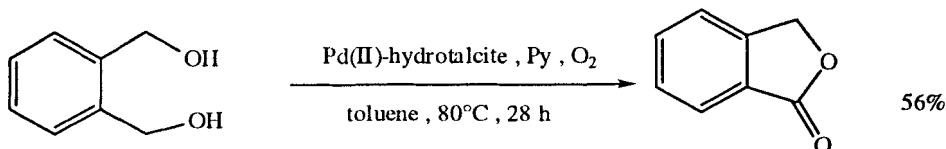
Potdar, M.K.; Mohile, S.S.; Salunkhe, M.M. *Tetrahedron Lett.*, **2001**, 42, 9285.



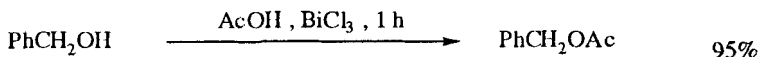
Shimizu, T.; Hiramoto, K.; Nakata, T. *Synthesis*, **2001**, 1027.



Jin, T.-S.; Ma, Y.-R.; Li, Y.; Sun, X.; Li, T.-S. *Synth. Commun.*, **2001**, 31, 2051.

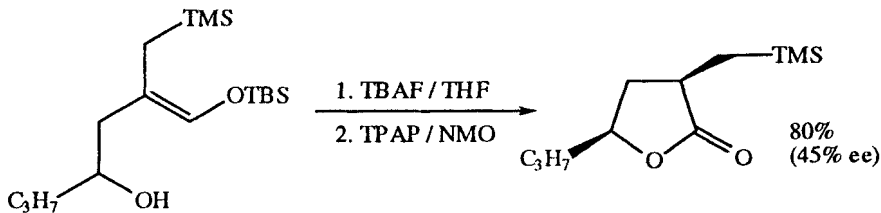


Kakiuchi, N.; Nishimura, T.; Inoue, M.; Uemura, S. *Bull. Chem. Soc. Jpn.*, **2001**, 74, 165.

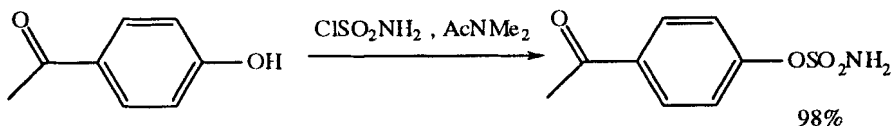


Mohammadpoor-Baltork, I.; Khosropour, A.R.; Aliyan, H. *J. Chem. Res. (S)*, **2001**, 280.

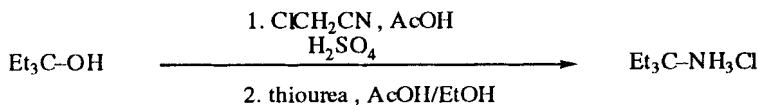




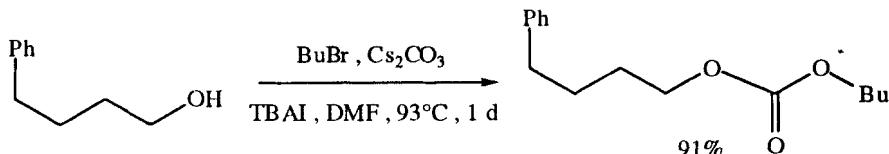
Leroy, B.; Dumeunier, R.; Markó, I.E. *Tetrahedron Lett.*, 2000, 41, 10215.



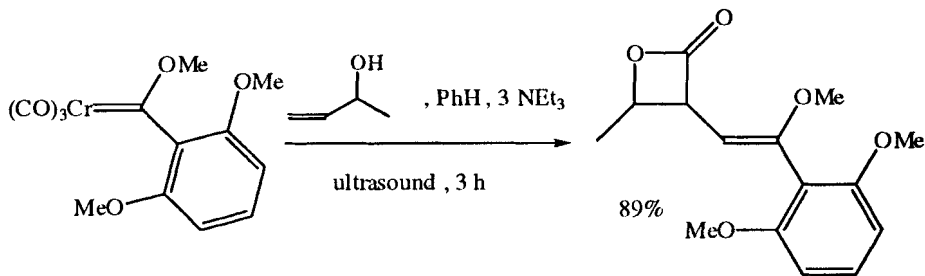
Okada, M.; Iwashita, S.; Koizumi, N. *Tetrahedron Lett.*, 2000, 41, 7047.



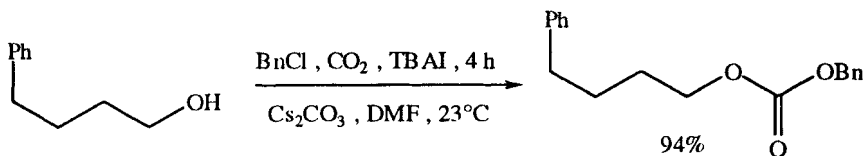
Jirgensons, A.; Kauss, V.; Kalvinsh, I.; Gold, M.R. *Synthesis*, 2000, 1709.



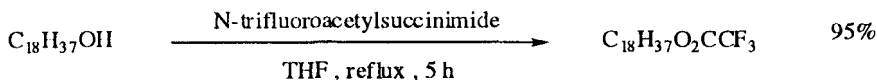
Chu, F.; Dueno, E.E.; Jung, K.W. *Tetrahedron Lett.*, 1999, 40, 1847.



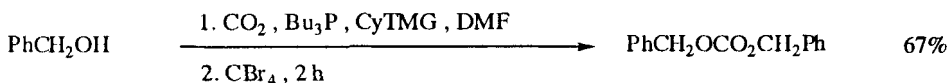
Caldwell, J.J.; Harrity, J.P.A.; Heron, N.M.; Kerr, W.J.; McKendry, S.; Middlemiss, D. *Tetrahedron Lett.*, 1999, 40, 3481.



Kim, S.-I.; Chu, F.; Dueno, E.E.; Jung, K.W. *J. Org. Chem.*, 1999, 64, 4578.



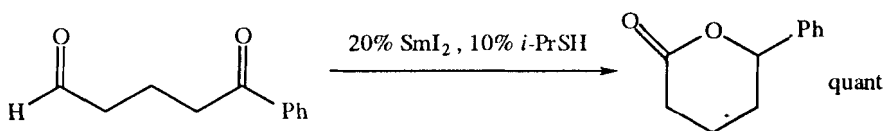
Katritzky, A.R.; Yang, B.; Qiu, G.; Zhang, Z. *Synthesis*, **1999**, 55.



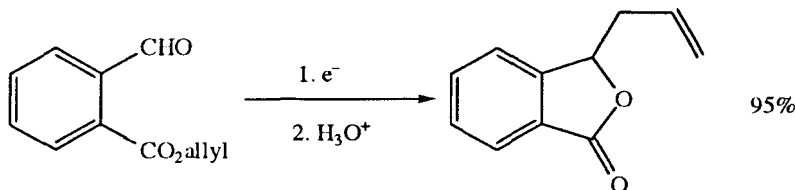
Kadokawa, L.-i.; Habu, H.; Fukumachi, S.; Karasu, M.; Tagaya, H.; Chiba, K. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 2205.

Further examples of the reaction  $\text{ROH} \rightarrow \text{RCO}_2\text{R}'$  are included in Section 107 (Esters from Acid Derivatives) and in Section 45A (Protection of Alcohols and Phenols).

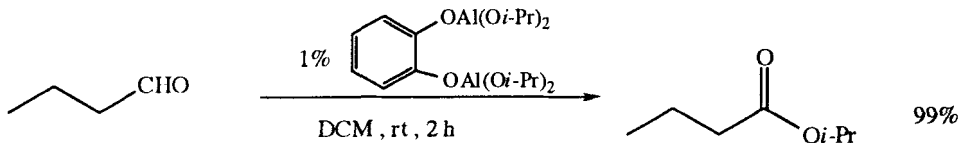
## SECTION 109: ESTERS FROM ALDEHYDES



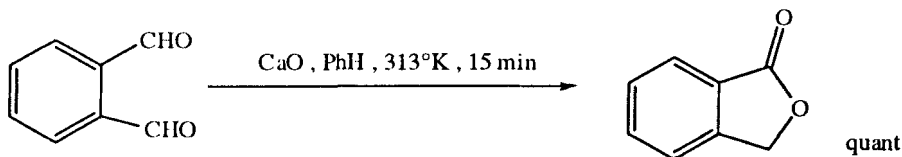
Hsu J.-L.; Fang, J.-M. *J. Org. Chem.*, **2001**, 66, 8673.



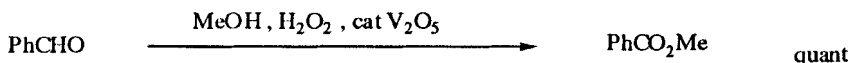
Franco, D.; Duñach, E. *Synlett*, **2001**, 806.



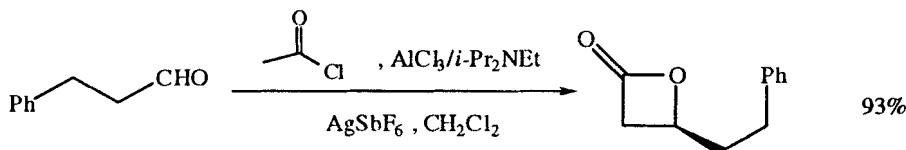
Simpura, I.; Nevalainen, V. *Tetrahedron*, **2001**, 57, 9867.



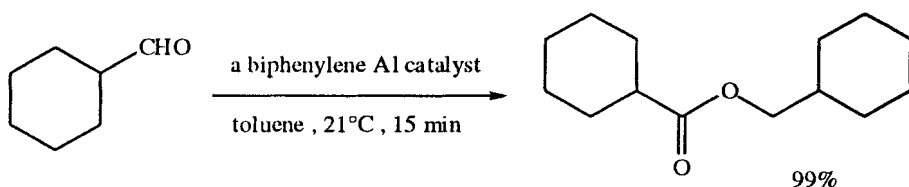
Seki, T.; Hattori, H. *Chem. Commun.* **2001**, 2510.



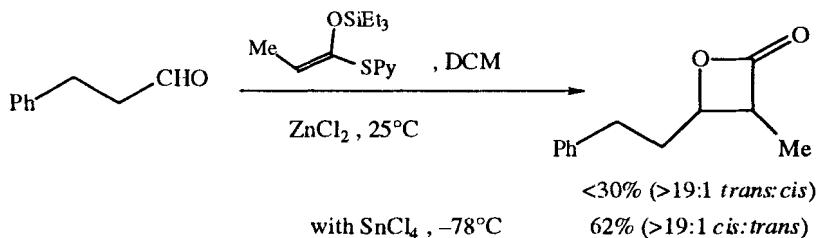
Gopinath, R.; Patel, B.K. *Org. Lett.*, **2000**, *2*, 577.



Nelson, S.G.; Wan, Z.; Peelen, T.J.; Spencer, K.L. *Tetrahedron Lett.*, **1999**, *40*, 6535.

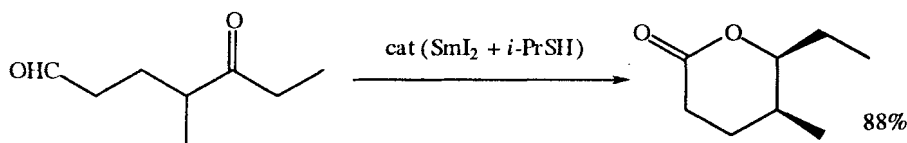


Ooi, T.; Miura, T.; Takaya, K.; Maruoka, K. *Tetrahedron Lett.*, **1999**, *40*, 7695.

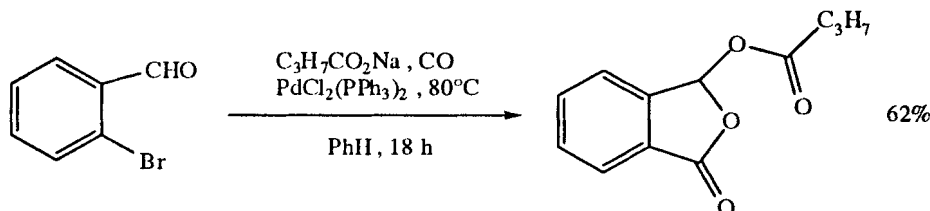


with  $\text{SnCl}_4$ ,  $-78^\circ\text{C}$

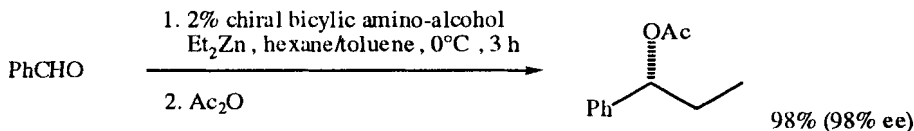
Wang, Y.; Zhao, C.; Romo, D. *Org. Lett.*, **1999**, *1*, 1197.



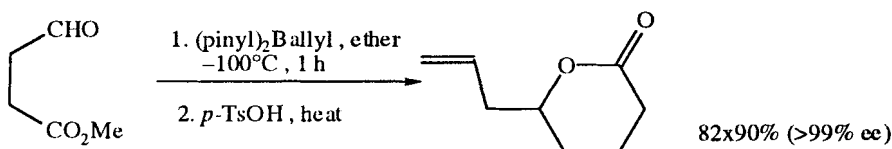
Hsu, J.-L.; Chen, C.-T.; Fang, J.-M. *Org. Lett.*, **1999**, *1*, 1989.



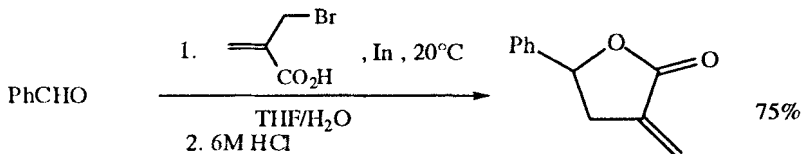
Cho, C.S.; Bark, D.Y.; Shim, S.C. *J. Heterocyclic Chem.*, **1999**, *36*, 289.



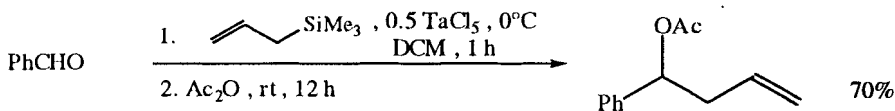
Nugent, W.A. *Chem. Commun.*, **1999**, 1369.



Ramachandran, P.V.; Krzeminski, M.P.; Reddy, M.V.R.; Brown, H.C. *Tetrahedron Asymm.*, **1999**, 10, 11.



Choudhury, P.K.; Foubelo, F.; Yus, M. *Tetrahedron*, **1999**, 55, 10779.

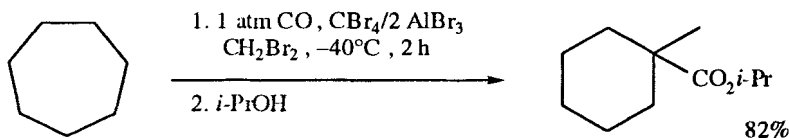


Chandrasekhar, S.; Mohanty, P.K.; Raza, A. *Synth. Commun.*, **1999**, 29, 257.

Related Methods: Section 117 (Esters from Ketones)

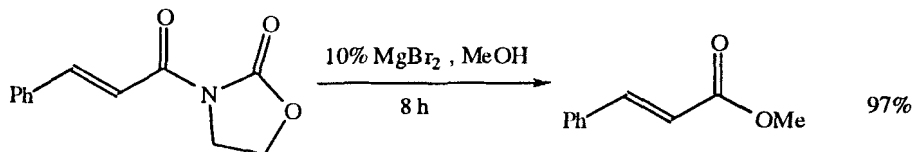
## SECTION 110: ESTERS FROM ALKYLs, METHYLENES AND ARYLs

No examples of the reaction  $\text{R-R} \rightarrow \text{RCO}_2\text{R}'$  or  $\text{R}'\text{CO}_2\text{R}$  ( $\text{R}, \text{R}' = \text{alkyl, aryl, etc.}$ ) occur in the literature. For the reaction  $\text{R-H} \rightarrow \text{RCO}_2\text{R}'$  or  $\text{R}'\text{CO}_2\text{R}$ , see Section 116 (Esters from Hydrides).

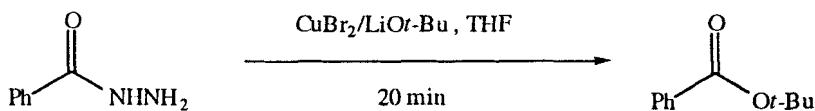


Akhrem, L.; Afanas'eva, L.; Petrovskii, P.; Vitt, S.; Orlinkov, A. *Tetrahedron Lett.*, **2000**, 41, 9903.

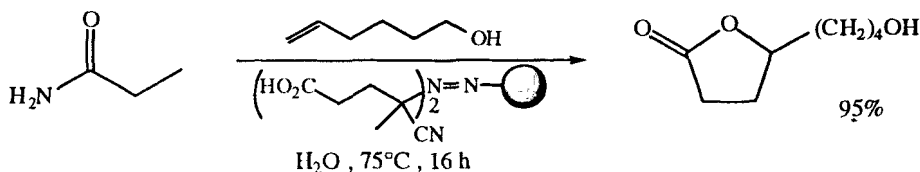
## SECTION 111: ESTERS FROM AMIDES



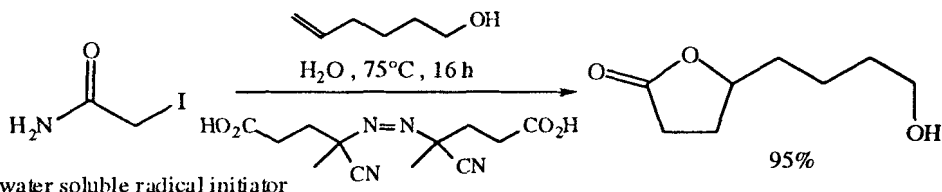
Orita, A.; Nagano, Y.; Hirano, I.; Otera, J. *Synlett*, **2001**, 637.



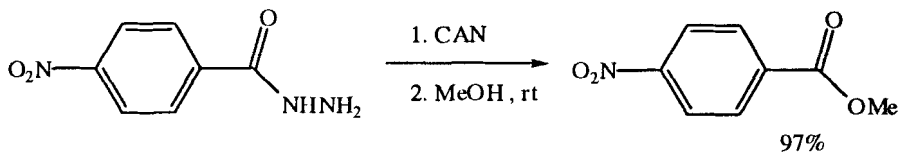
Yamaguchi, J.-i.; Aoyagi, T.; Fujikura, R.; Suyama, T. *Chem. Lett.*, **2001**, 466.



Yorimitsu, H.; Wakabayashi, K.; Shinokubo, H.; Oshima, K. *Bull. Chem. Soc. Jpn.*, **2001**, 74, 1963.



water soluble radical initiator  
Yorimitsu, H.; Wakabayashi, K.; Shinokubo, H.; Oshima, K. *Tetrahedron Lett.*, **1999**, 40, 519.



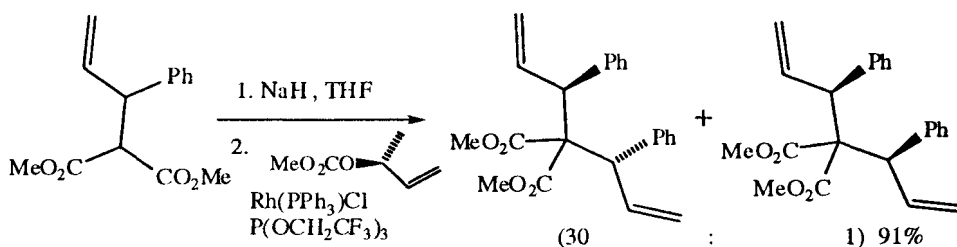
Stefane, B.; Kočevár, M.; Polanc, S. *Tetrahedron Lett.*, **1999**, 40, 4429.

## SECTION 112: ESTERS FROM AMINES

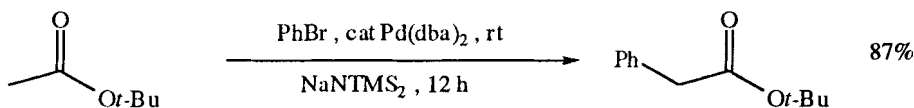
NO ADDITIONAL EXAMPLES

## SECTION 113: ESTERS FROM ESTERS

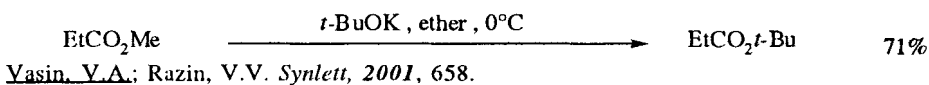
Conjugate reductions and conjugate alkylations of unsaturated esters are found in Section 74 (Alkyls from Alkenes).



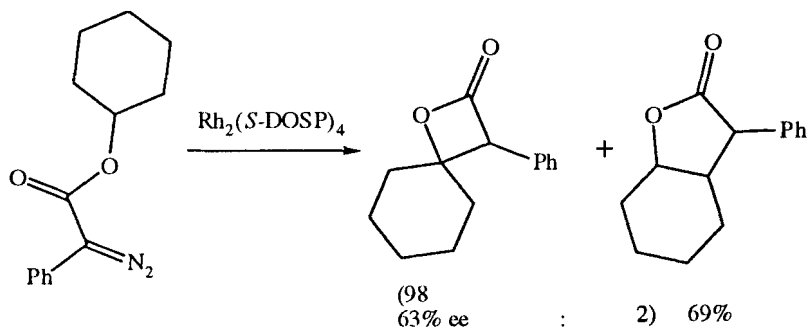
Evans, P.A.; Kennedy, L.J. *J. Am. Chem. Soc.*, **2001**, 123, 1234.



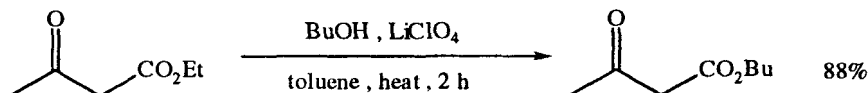
Lee, S.; Beare, N.A.; Hartwig, J.F. *J. Am. Chem. Soc.*, **2001**, 123, 8410.



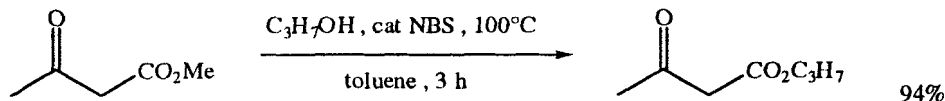
Vasin, V.A.; Razin, V.V. *Synlett*, **2001**, 658.



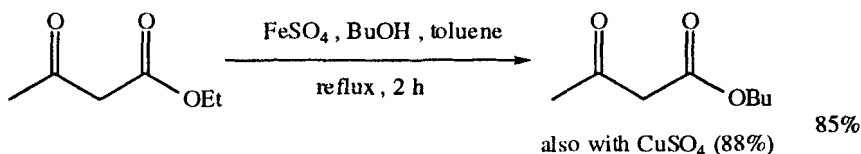
Doyle, M.P.; May, E.J. *Synlett*, **2001**, 967.



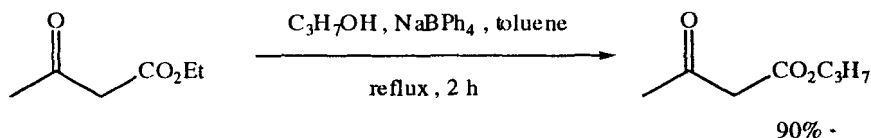
Bandgar, B.P.; Sadavarte, V.S.; Uppalla, L.S. *Synlett*, **2001**, 1338.



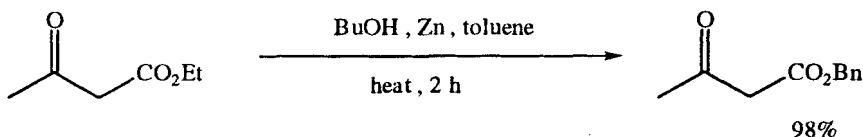
Bandgar, B.P.; Uppalla, L.S.; Sadavarte, V.S. *Synlett*, **2001**, 1715.



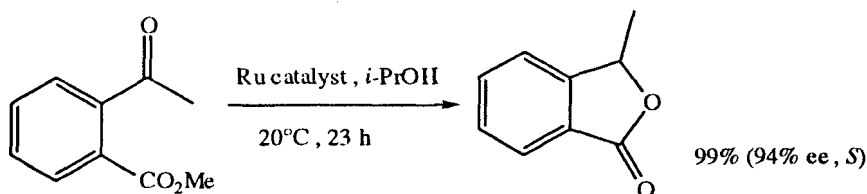
Bandgar, B.P.; Sadavarte, V.S.; Uppalla, L.S. *Synth. Commun.*, **2001**, 31, 2063.



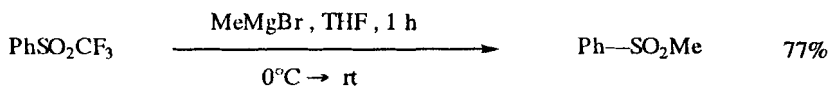
Bandgar, B.P.; Sadavarte, V.S.; Uppalla, L.S. *Chem. Lett.*, **2001**, 894.



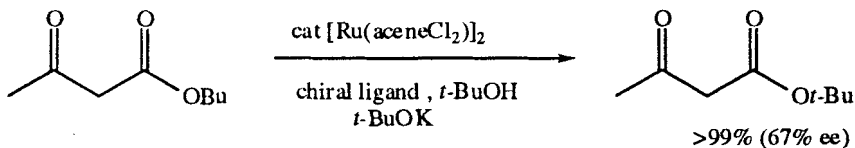
Bandgar, B.P.; Sadavarte, V.S.; Uppalla, L.S. *J. Chem. Res. (S)*, **2001**, 16.



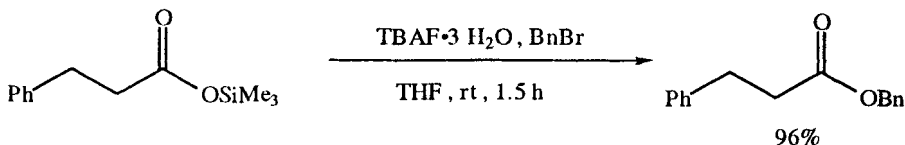
Evaraere, K.; Scheffler, J.-L.; Mortreux, A.; Carpentier, J.-F. *Tetrahedron Lett.*, **2001**, 42, 1899.



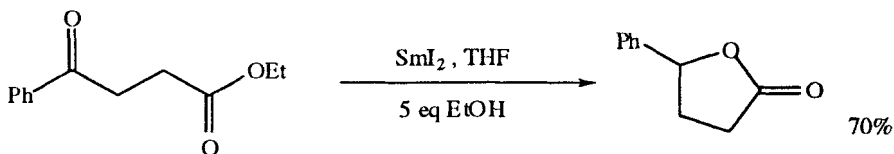
Steensma, R.W.; Galabi, S.; Tagat, J.R.; McCombie, S.W. *Tetrahedron Lett.*, **2001**, 42, 2281.



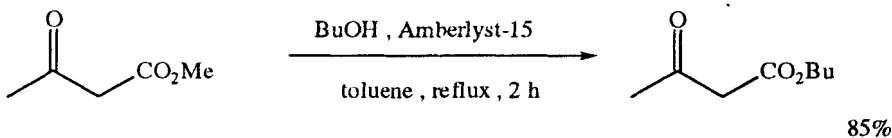
Everaere, K.; Mortreux, A.; Bulliard, M.; Brusse, J.; van der Gen, A.; Nowogrocki, G.; Carpentier, J.-F. *Eur. J. Org. Chem.*, **2001**, 275.



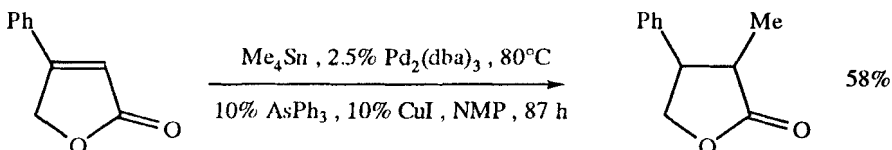
Ooi, T.; Sugimoto, H.; Maruoka, K. *Heterocycles*, **2001**, 51, 593.



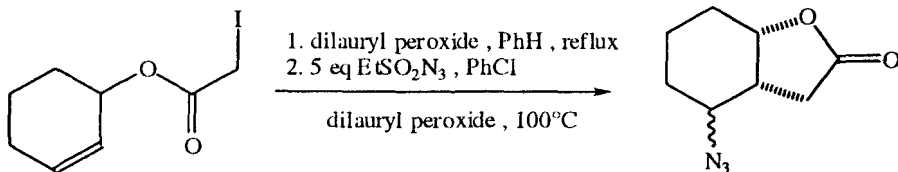
Williams, D.B.G.; Blann, K.; Holzapfel, C.W. *Synth. Commun.*, **2001**, 31, 203.



Chavan, S.P.; Subbarao, Y.T.; Dantale, S.W.; Sivappa, R. *Synth. Commun.*, **2001**, 31, 289.

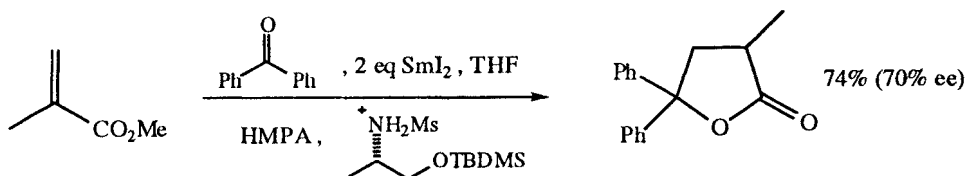


Rossi, R.; Bellina, F.; Rauegi, E. *Synlett*, **2000**, 1749.

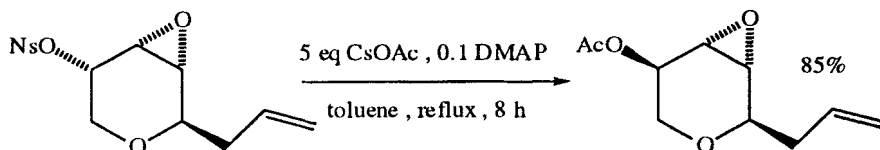


Ollivier, C.; Renaud, P. *J. Am. Chem. Soc.*, **2000**, 122, 6496.



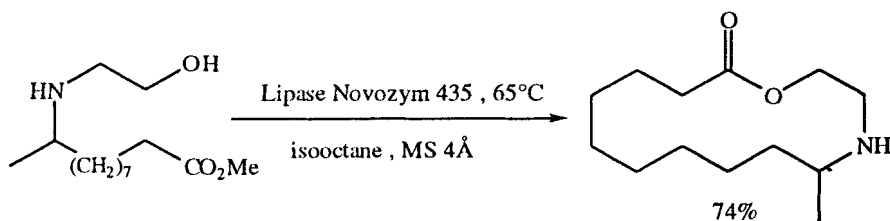


Wang, W.; Xu, M.-H.; Lei, X.-S.; Lin, G.-Q. *Org. Lett.*, **2000**, 2, 3773.

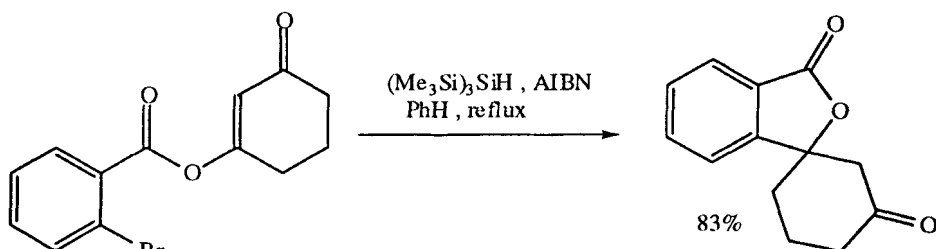


Ns = nitrobenzenesulfonyl

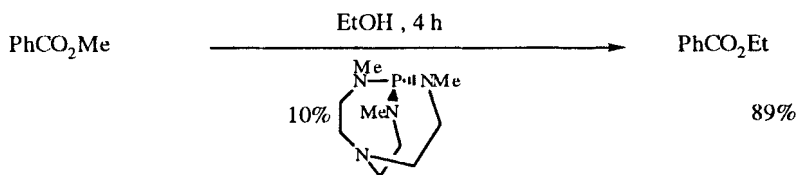
Hawryluk, N.A.; Snider, B.B. *J. Org. Chem.*, **2000**, 65, 8379.



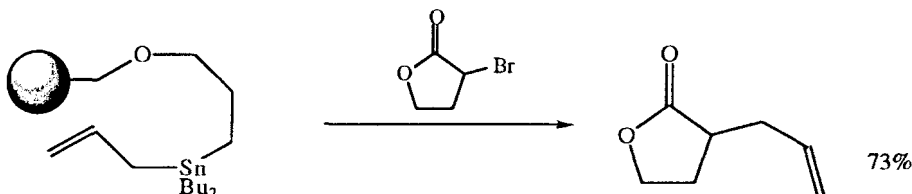
Lu, W.; Sih, C.J. *Tetrahedron Lett.*, **1999**, 40, 4965.



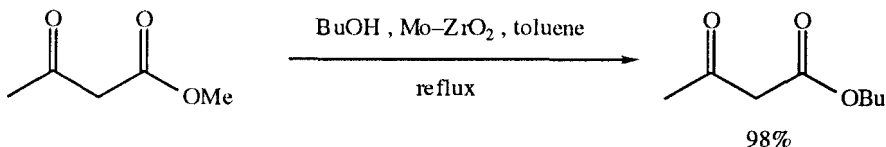
Zhang, W.; Pugh, G. *Tetrahedron Lett.*, **1999**, 40, 7595.



Hankumaran, P.; Verkade, J.G. *J. Org. Chem.*, **1999**, 64, 3086.



Enholm, E.L.; Gallagher, M.E.; Moran, K.M.; Lombardi, J.S.; Schulte II, J.P.  
*Org. Lett.* **1999**, *1*, 689.

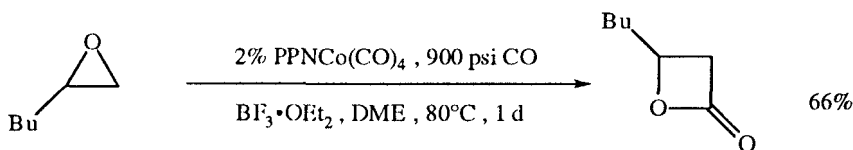


Reddy, B.M.; Reddy, V.R.; Manohar, B. *Synth. Commun.*, **1999**, *29*, 1235.

## REVIEWS:

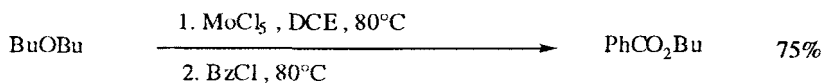
"Stereochemistry of the Alkylation of Lactones," Ibrahim-Ouali, M.; Parrain, J.-L.; Santelli, M.  
*Org. Prep. Proceed. Int.*, **1999**, *31*, 467.

## SECTION 114: ESTERS FROM ETHERS, EPOXIDES AND THIOETHERS

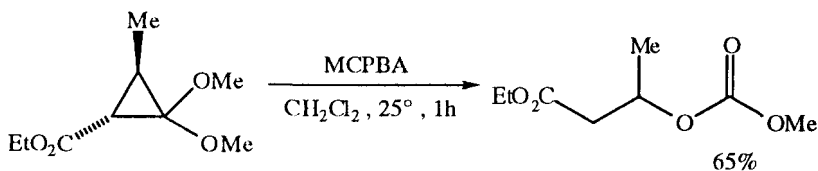


PPN = bis(triphenylphosphine) iminium

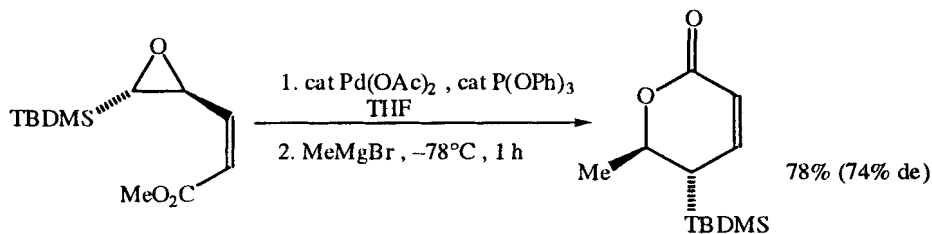
Lee, J.T.; Thomas, P.J.; Alper, H. *J. Org. Chem.*, **2001**, *66*, 5424.



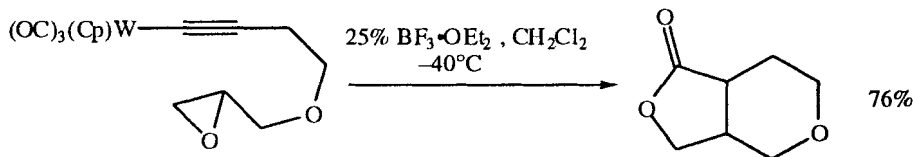
Guo, Q.; Miyaji, T.; Gao, G.; Hara, R.; Takahashi, T. *Chem. Commun.*, **2001**, 1018.



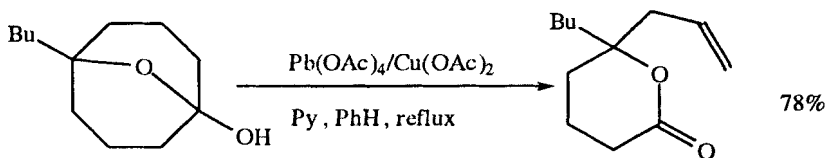
Piccialli, V.; Graziano, M.L. *Tetrahedron Lett.*, **2001**, *42*, 93.



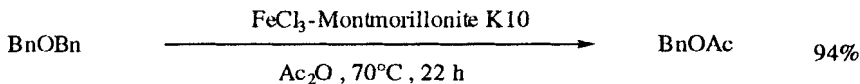
Marion, F.; Le Fol, R.; Courillon, C.; Malacria, M. *Synlett*, **2001**, 138.



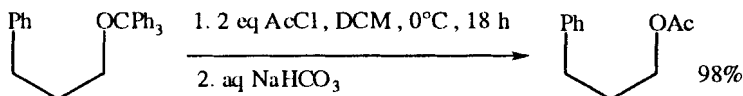
Madhushaw, R.J.; Li, C.-L.; Shen, K.-H.; Hu, C.-C.; Liu, R.-S.  
*J. Am. Chem. Soc.*, **2001**, 123, 7427.



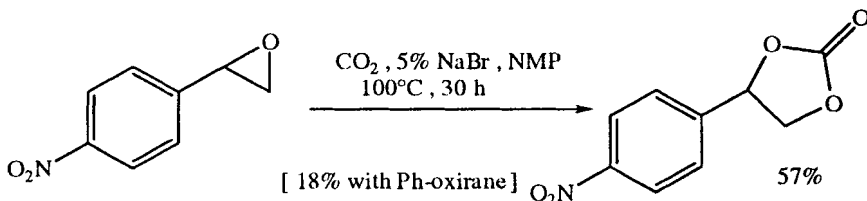
Rigby, J.L.; Payen, A.; Warshakoon, N. *Tetrahedron Lett.*, **2001**, 42, 2047.



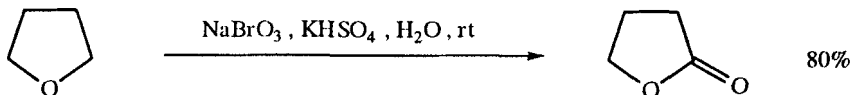
Lakouraj, M.M.; Movassagh, B.; Fasihi, J. *J. Chem. Soc. (S)*, **2001**, 378.



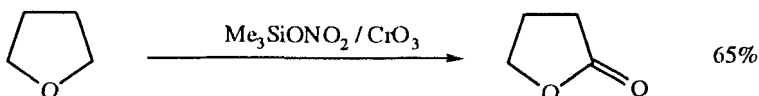
Bergmeier, S.C.; Arason, K.M. *Tetrahedron Lett.*, **2000**, 41, 5799.



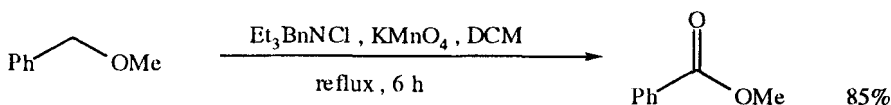
Iwasaki, T.; Kihara, N.; Endo, T. *Bull. Chem. Soc. Jpn.*, **2000**, 73, 713.



Metsger, L.; Bittner, S. *Tetrahedron*, **2000**, 56, 1905.

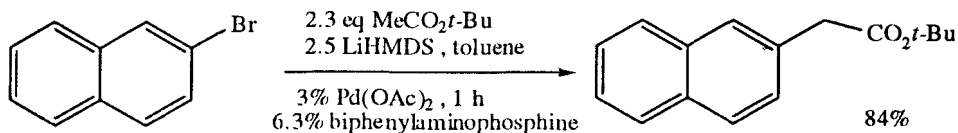


Shahi, S.P.; Gupta, A.; Pitre, S.V.; Reddy, M.V.R.; Kumareswaran, R.; Vankar, Y.D. *J. Org. Chem.* **1999**, 64, 4509.

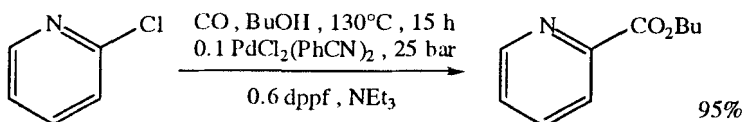


Markgraf, J.H.; Choi, B.Y. *Synth. Commun.*, **1999**, 29, 2405.

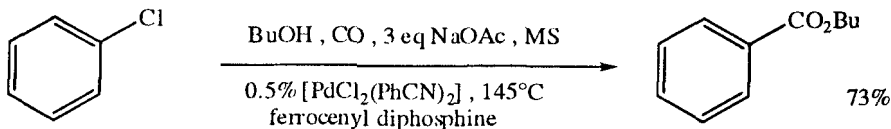
## SECTION 115: ESTERS FROM HALIDES AND SULFONATES



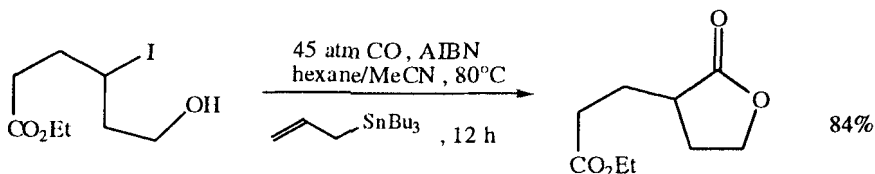
Moradi, W.A.; Buchwald, S.L. *J. Am. Chem. Soc.*, **2001**, 123, 7996.



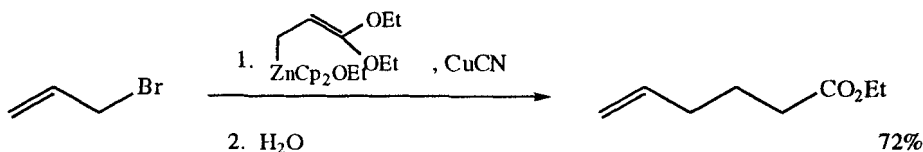
Beller, M.; Mägerlein, W.; Indolese, A.F.; Fischer, C. *Synthesis*, **2001**, 1098.



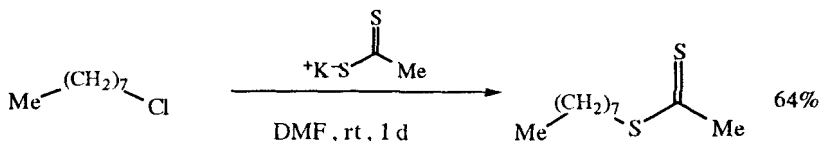
Mägerlein, W.; Indolese, A.F.; Beller, M. *Angew. Chem. Int. Ed.*, **2001**, 40, 2856.



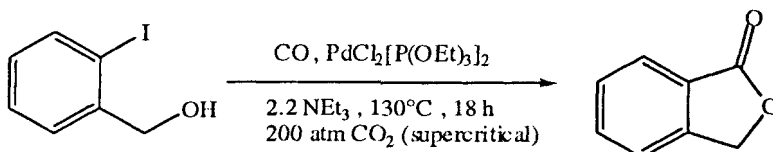
Kreimerman, S.; Ryu, I.; Minakata, S.; Komatsu, M. *Org. Lett.*, **2000**, 2, 389.



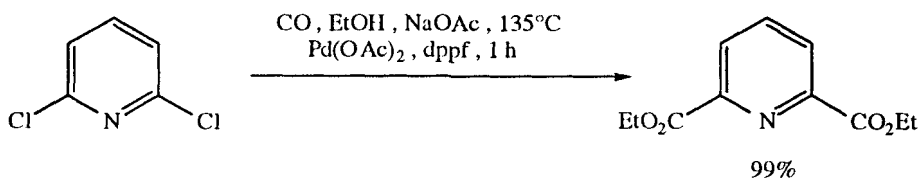
Sato, A.; Ito, H.; Yamaguchi, Y.; Taguchi, T. *Tetrahedron Lett.*, **2000**, *41*, 10239.



Zheng, T.-C.; Burkart, M.; Richardson, D.E. *Tetrahedron Lett.*, **1999**, *40*, 603.



Kayaki, Y.; Noguchi, Y.; Iwasa, S.; Ikariya, T.; Noyori, R. *Chem. Commun.*, **1999**, 1235.

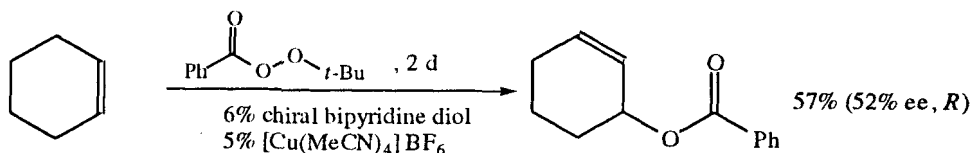


Bessard, Y.; Crettaz, R. *Heterocycles*, **1999**, *51*, 2589.

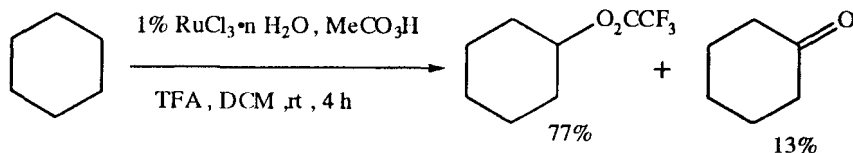
Related Methods: Section 25 (Acid Derivatives from Halides).

## SECTION 116: ESTERS FROM HYDRIDES

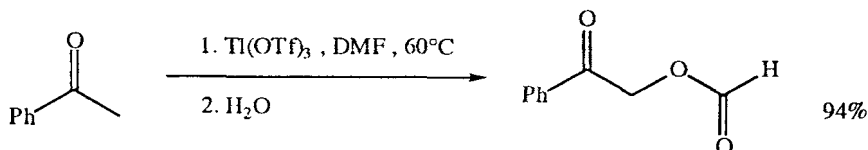
This section contains examples of the reaction  $\text{R}-\text{H} \rightarrow \text{RCO}_2\text{R}'$  or  $\text{R}'\text{CO}_2\text{R}$  ( $\text{R}$  = alkyl, aryl, etc.).



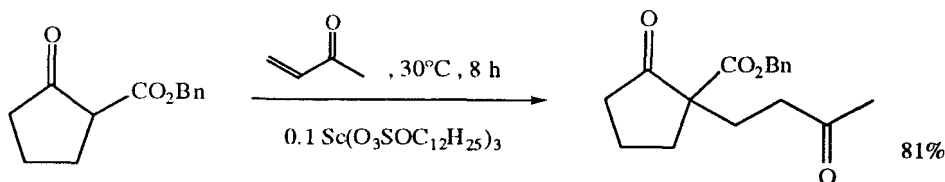
Lee, W.-S.; Kwong, H.-L.; Chan, H.-L.; Choi, W.-W.; Ng, L.-Y. *Tetrahedron Asym.*, **2001**, *12*, 1007.



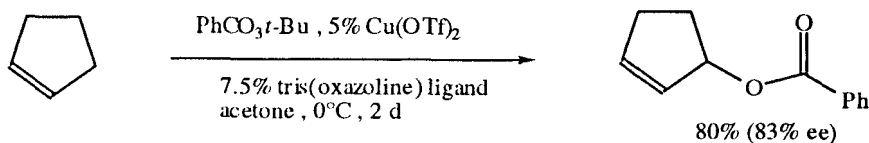
Komiya, N.; Noji, S.; Murahashi, S.-I. *Chem. Commun.*, **2001**, 65.



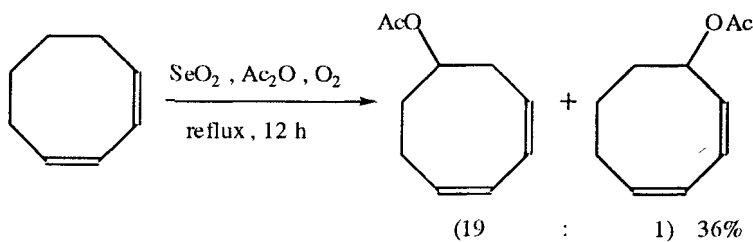
Lee, J.C.; Jin, Y.S.; Choi, J.-H. *Chem. Commun.*, **2001**, 956.



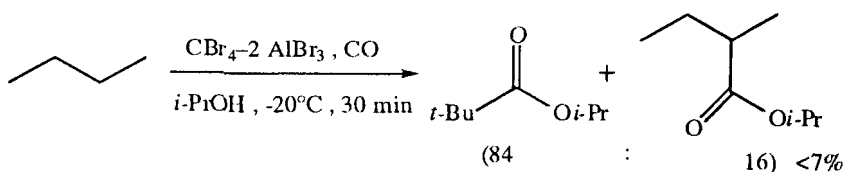
Mori, Y.; Kakumoto, K.; Manabe, K.; Kobayashi, S. *Tetrahedron Lett.*, **2000**, *41*, 3107.



Kohmura, Y.; Katsuki, T. *Tetrahedron Lett.*, **2000**, *41*, 3941.



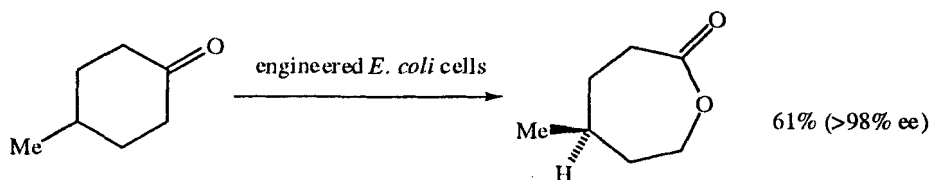
Koltun, E.S.; Kass, S.R. *Synthesis*, **2000**, 1366.



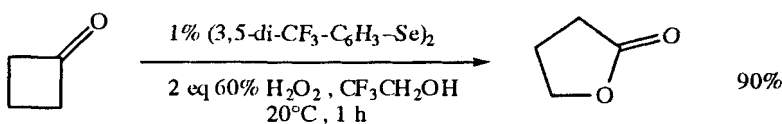
Akhrem, I.; Orlinkov, A.; Afanas'eva, L.; Petrovskii, P.; Vitt, S. *Tetrahedron Lett.*, **1999**, *40*, 5897.

Also via: Section 26 (Acid Derivatives) and Section 41 (Alcohols).

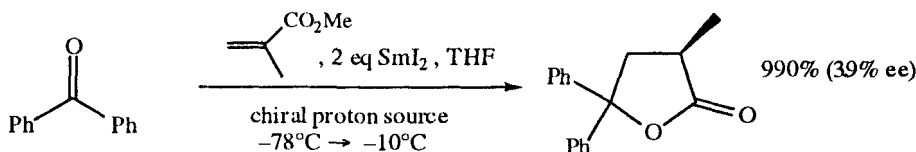
## SECTION 117: ESTERS FROM KETONES



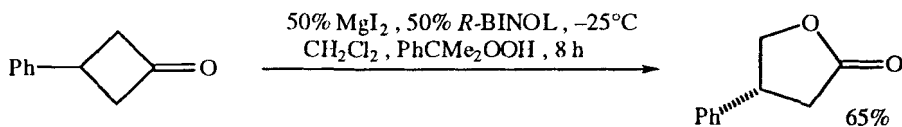
Mihovilovic, M.D.; Chen, G.; Wang, S.; Kyte, B.; Rochon, F.; Kayser, M.M.; Stewart, J.D. *J. Org. Chem.*, **2001**, *66*, 733.



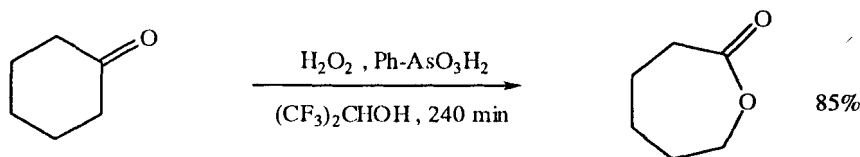
ten Brink, G.-J.; Vis, J.-M.; Arends, I.W.C.E.; Sheldon, R.A. *J. Org. Chem.*, **2001**, *66*, 2429.



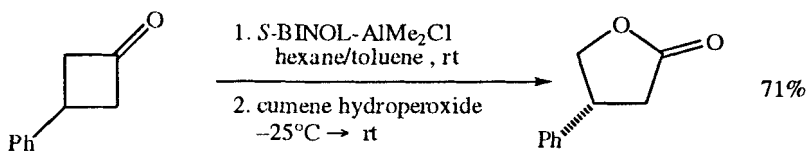
Xu, M.-H.; Wang, W.; Xia, L.-J.; Lin, G.-Q. *J. Org. Chem.*, **2001**, *66*, 3953.



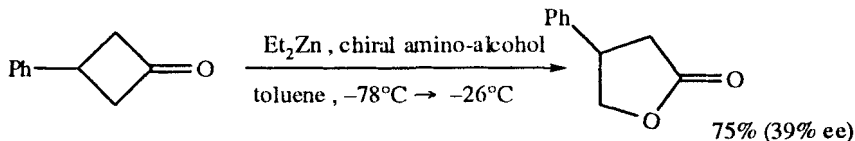
Bolm, C.; Beckmann, O.; Cosp, A.; Palazzi, C. *Synlett*, **2001**, 1461.



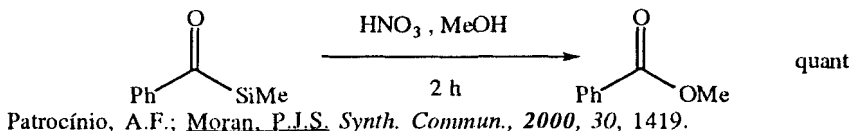
Berkessel, A.; Andreae, M.R.M. *Tetrahedron Lett.*, **2001**, *42*, 2293.



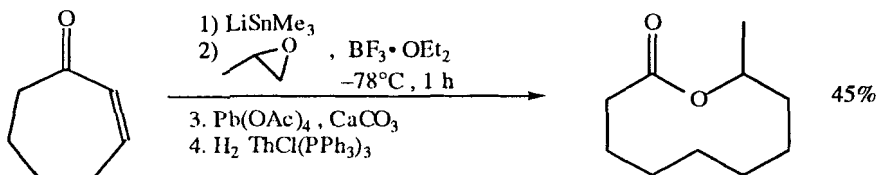
Bolm, C.; Beckmann, O.; Palazzi, C. *Can. J. Chem.*, **2001**, *79*, 1593.



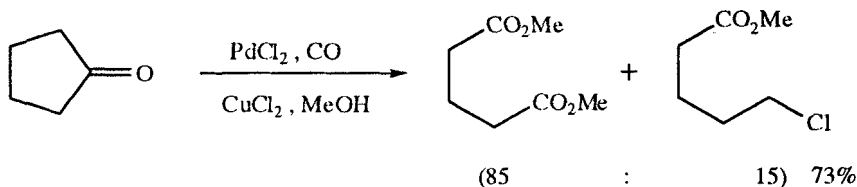
Shinohara, T.; Fujioka, S.; Kotsuki, H. *Heterocycles*, **2001**, *55*, 237.



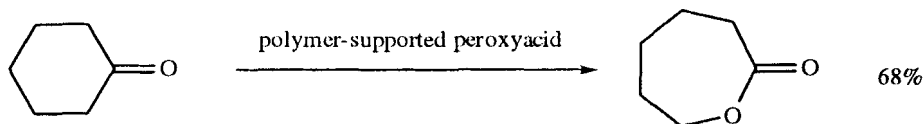
Patrocínio, A.F.; Moran, P.J.S. *Synth. Commun.*, **2000**, *30*, 1419.



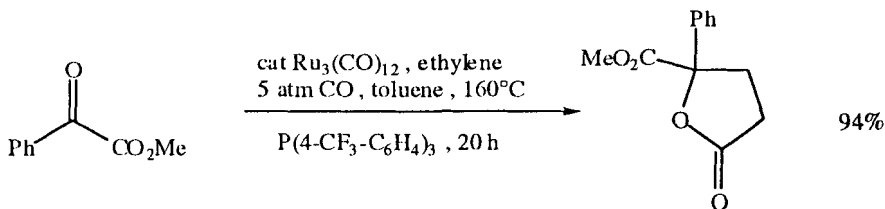
Posner, G.H.; Wang, Q.; Halford, B.A.; Elias, J.S.; Maxwell, J.P. *Tetrahedron Lett.*, **2000**, *41*, 9655.



Hamed, O.; El-Qisairi, A.; Henry, P.M. *Tetrahedron Lett.*, **2000**, *41*, 3021.

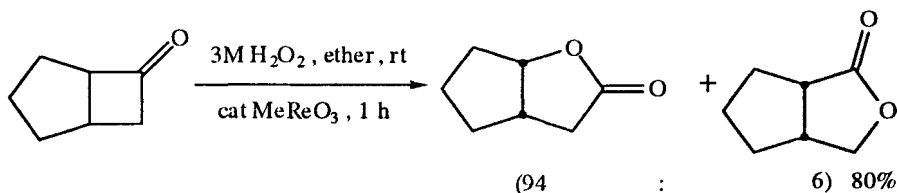


Lambert, A.; Elings, J.A.; Macquarrie, D.J.; Carr, G.; Clark, J.H. *Synlett*, **2000**, 1052.

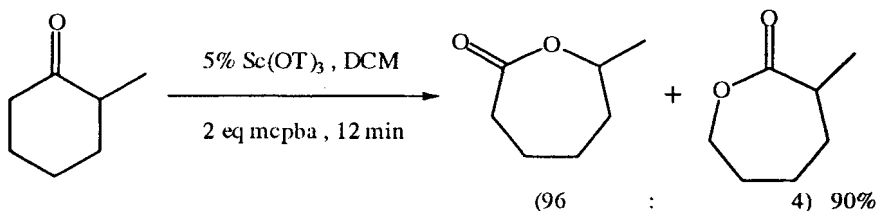


Chatani, N.; Tobisu, M.; Asaumi, T.; Fukumoto, Y.; Murai, S. *J. Am. Chem. Soc.*, **1999**, *121*, 7160.





Phillips, A.M.F.; Romão, C. *Eur. J. Org. Chem.*, **1999**, 1767.



Kotsuki, H.; Arimura, K.; Araki, T.; Shinohara, T. *Synlett*, **1999**, 462.

## REVIEWS:

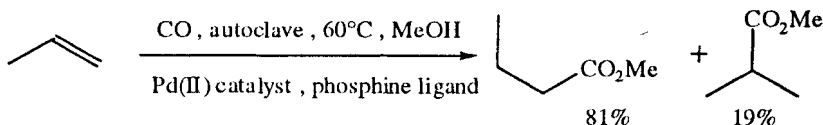
"100 Years of Baeyer-Villiger Oxidations," Renz, M.; Meunier, B. *Eur. J. Org. Chem.*, **1999**, 737.

Also via: Section 27 (Acid Derivatives).

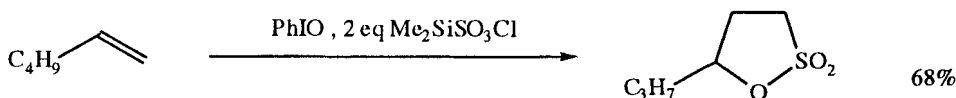
## SECTION 118: ESTERS FROM NITRILES

NO ADDITIONAL EXAMPLES

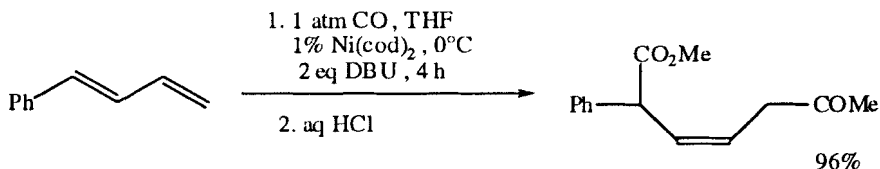
## SECTION 119: ESTERS FROM ALKENES



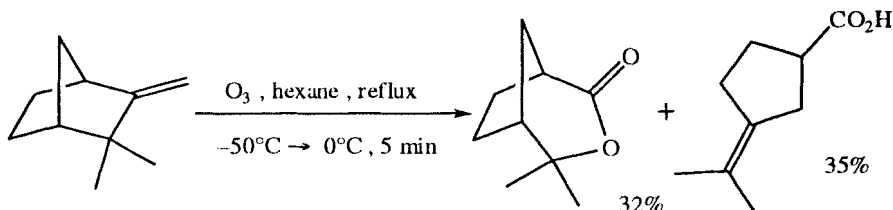
Pugh, R.I.; Drent, E.; Pringle, P.G. *Chem. Commun.*, **2001**, 1476.



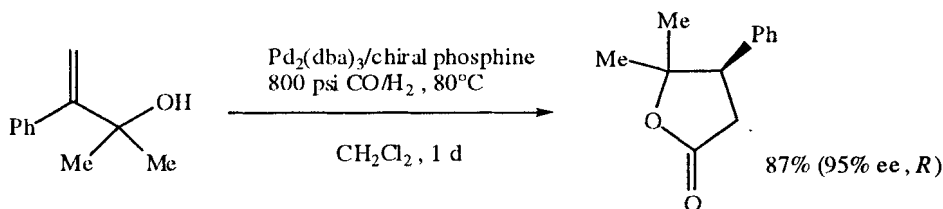
Bassindale, A.R.; Katampe, I.; Maesano, M.G.; Patel, P.; Taylor, P.G. *Tetrahedron Lett.*, **1999**, 40, 7417.



Takimoto, M.; Mori, M. *J. Am. Chem. Soc.*, **2001**, *123*, 2895.



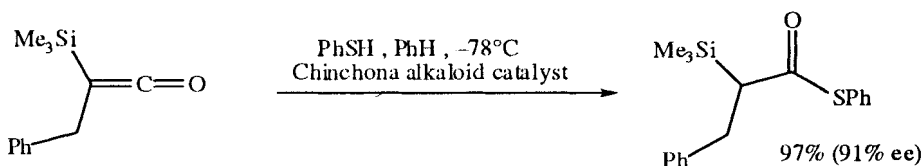
Barrero, A.F.; Alvarez-Manzaneda, E.J.; Chahboun, R.; Cuerva, J.M.; Segovia, A. *Synlett*, **2000**, 1269.



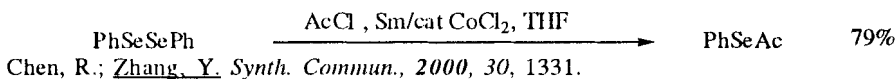
Cao, P.; Zhang, X. *J. Am. Chem. Soc.*, **1999**, *121*, 7708.

Also via: Section 44 (Alcohols).

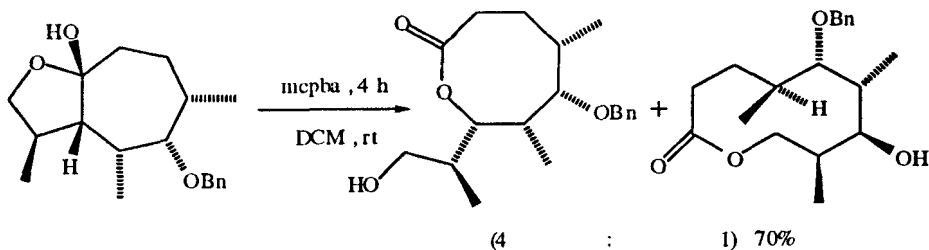
## SECTION 120: ESTERS FROM MISCELLANEOUS COMPOUNDS



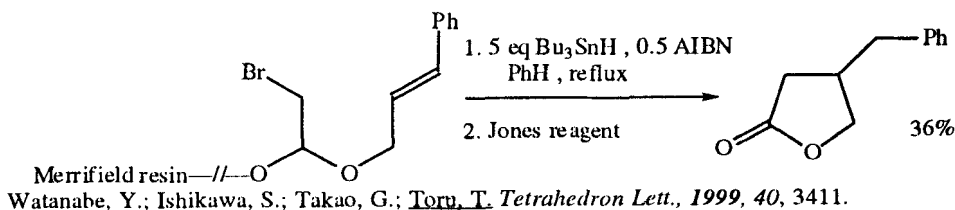
Blake, A.J.; Friend, C.L.; Outram, R.J.; Simpkins, N.S.; Whitehead, A.J. *Tetrahedron Lett.*, **2001**, *42*, 2877.



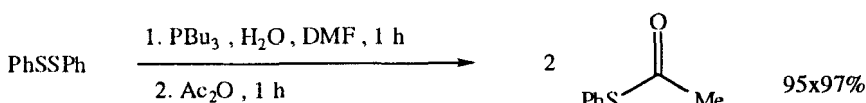
Chen, R.; Zhang, Y. *Synth. Commun.*, **2000**, *30*, 1331.



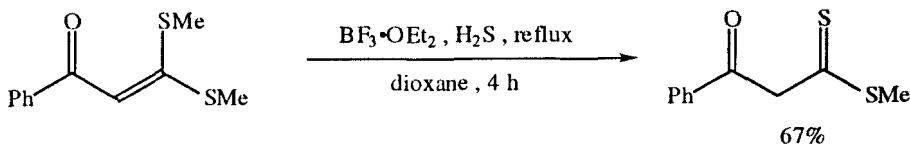
Hunt, K.W.; Grieco, P.A. *Org. Lett.*, 2000, 2, 1717.



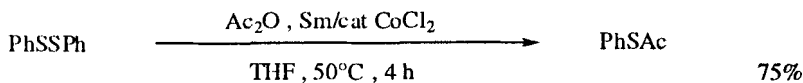
Watanabe, Y.; Ishikawa, S.; Takao, G.; Toru, T. *Tetrahedron Lett.*, 1999, 40, 3411.



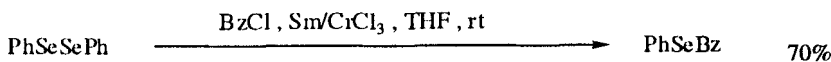
Ayers, J.T.; Anderson, S.R. *Synth. Commun.*, 1999, 29, 351.



Nair, S.K.; Askokan, C.V. *Synth. Commun.*, 1999, 29, 791.



Chen, R.; Zhang, Y. *Synth. Commun.*, 1999, 29, 3699.



Liu, Y.; Zhang, Y. *Synth. Commun.*, 1999, 29, 4043.

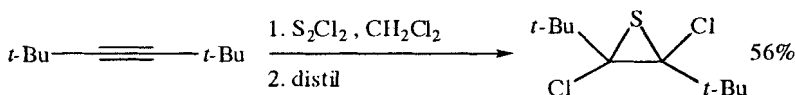
## REVIEWS:

"Carboxylic Acids and Esters," Franklin, A.S. *J. Chem. Soc., Perkin Trans. 1*, 1999, 3537

## CHAPTER 9

# PREPARATION OF ETHERS, EPOXIDES AND THIOETHERS

### SECTION 121: ETHERS, EPOXIDES AND THIOETHERS FROM ALKYNES

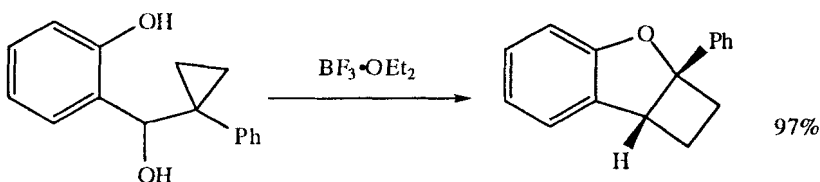


Nakayama, J.; Takahashi, K.; Watanabe, T.; Sugihara, Y.; Ishii, A.  
*Tetrahedron Lett.*, 2000, 41, 8349.

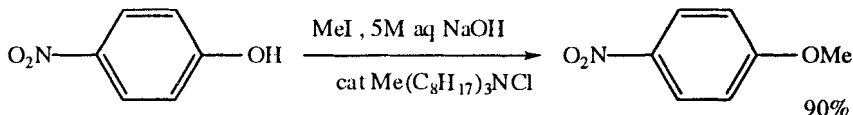
### SECTION 122: ETHERS, EPOXIDES AND THIOETHERS FROM ACID DERIVATIVES

NO ADDITIONAL EXAMPLES

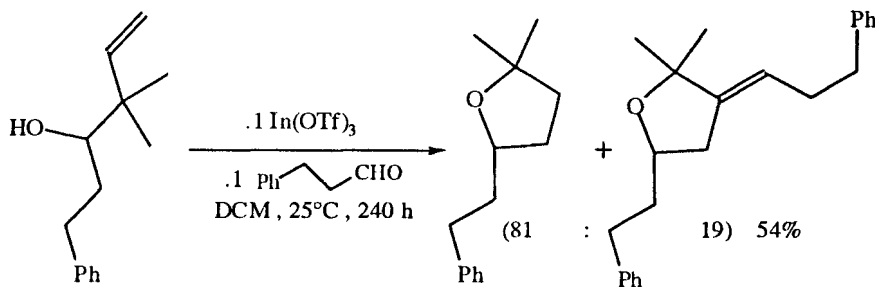
### SECTION 123: ETHERS, EPOXIDES AND THIOETHERS FROM ALCOHOLS AND THIOLS



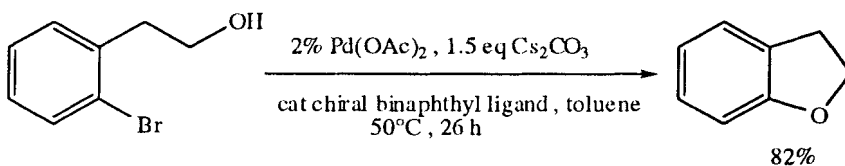
Hardouin, C.; Taran, F.; Doris, E. *J. Org. Chem.*, 2001, 66, 4450.



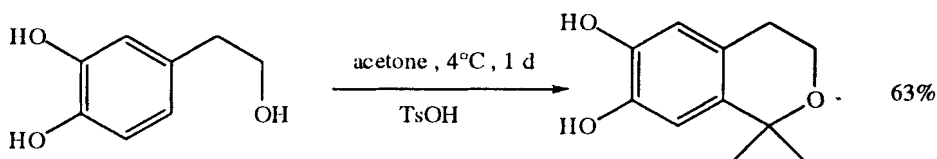
Eynde, J.L.V.; Mailleux, I. *Synth. Commun.*, 2001, 31, 1.



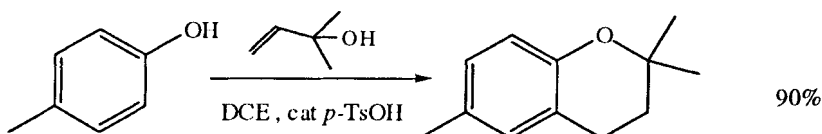
Loh, T.-P.; Hu, Q.-Y.; Ma, L.-T. *J. Am. Chem. Soc.*, **2001**, *123*, 2450.



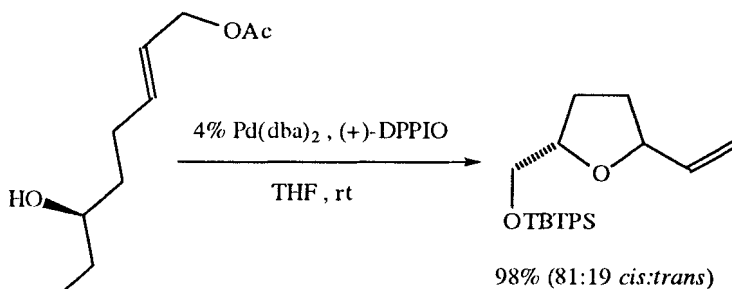
Kuwabe, S.-i.; Torracca, K.E.; Buchwald, S.L. *J. Am. Chem. Soc.*, **2001**, *123*, 12202.



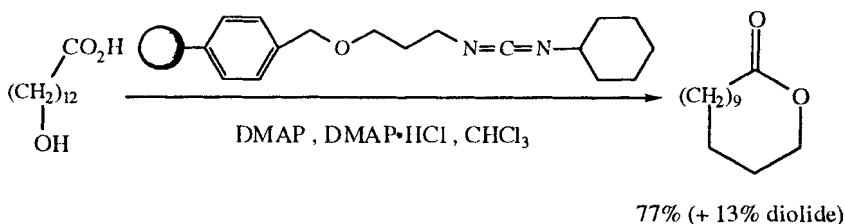
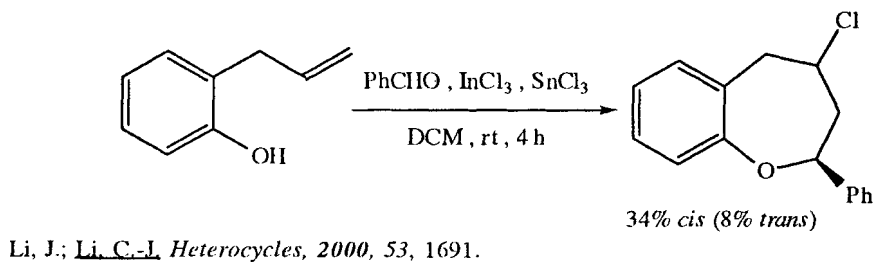
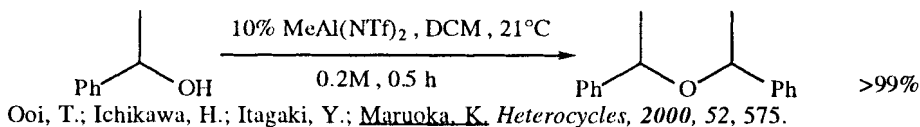
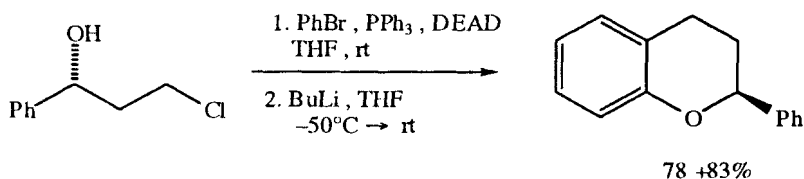
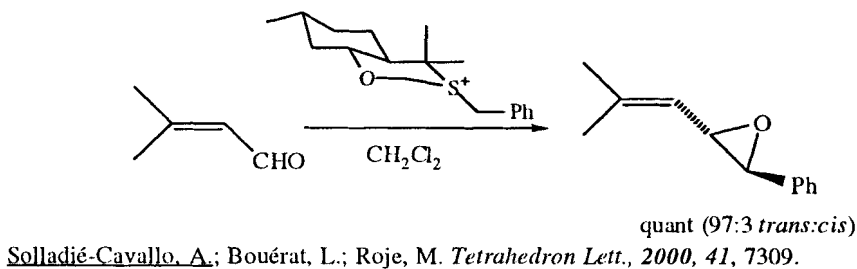
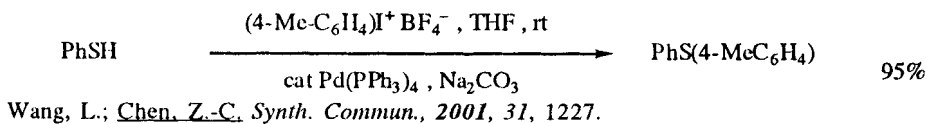
Guiso, M.; Marra, C.; Cavarischia, C. *Tetrahedron Lett.*, **2001**, *42*, 6531.

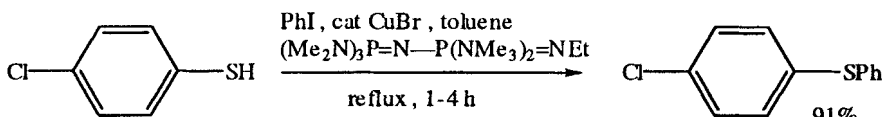


Ishino, Y.; Mihara, M.; Hayakawa, N.; Miyata, T.; Kaneko, Y.; Miyata, T. *Synth. Commun.*, **2001**, *31*, 439.

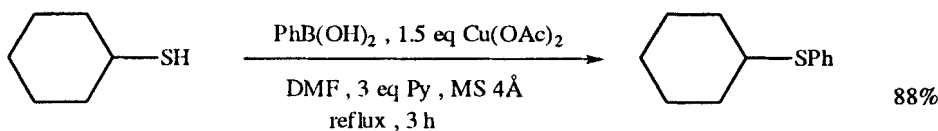


Hara, O.; Fujii, K.; Hamada, Y.; Sakagami, Y. *Heterocycles*, **2001**, *54*, 419.

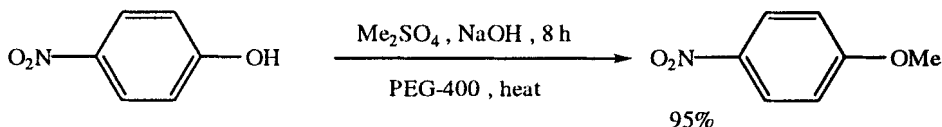




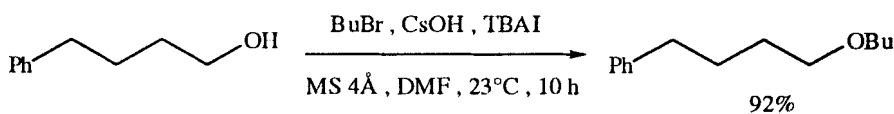
Palomo, C.; Oiarbide, M.; López, R.; Gómez-Bengoa, E. *Tetrahedron Lett.*, **2000**, *41*, 1283.



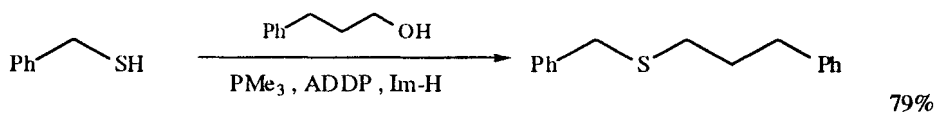
Herradura, P.S.; Pendola, K.A.; Guy, R.K. *Org. Lett.*, **2000**, *2*, 2019.



Cao, Y.-Q.; Pei, B.-G. *Synth. Commun.*, **2000**, *30*, 1759.

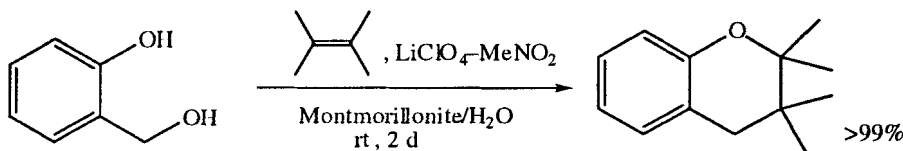


Dueno, E.E.; Chu, F.; Kim, S.-I.; Jung, K.W. *Tetrahedron Lett.*, **1999**, *40*, 1843.

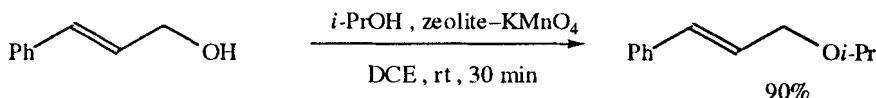


ADDP = 1,1'(azodicarbonyl)dipiperidine

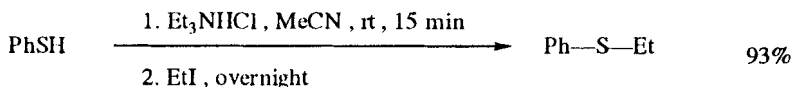
Falck, J.R.; Lai, J.-Y.; Cho, S.-D.; Yu, J. *Tetrahedron Lett.*, **1999**, *40*, 2903.



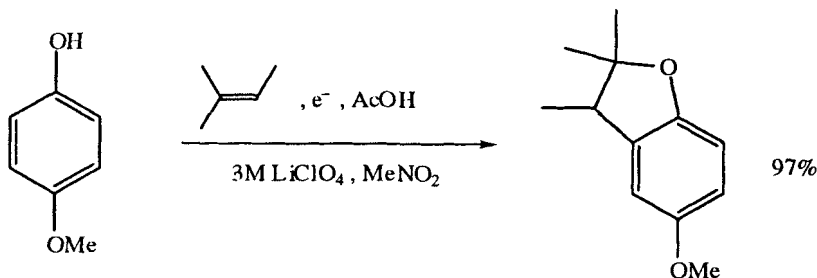
Chiba, K.; Hirano, T.; Kitano, Y.; Tada, M. *Chem. Commun.*, **1999**, 691.



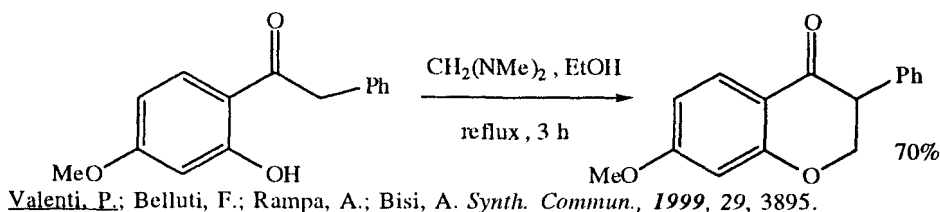
Gadhwail, S.; Boruah, A.; Prajapati, D.; Sandhu, J.S. *Synth. Commun.*, **1999**, *29*, 1921.



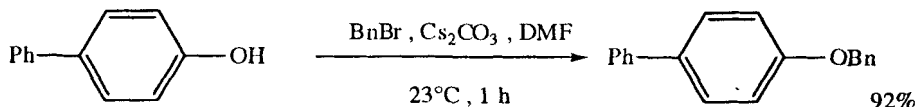
Feroci, M.; Inesi, A.; Rossi, L. *Synth. Commun.*, **1999**, *29*, 2611.



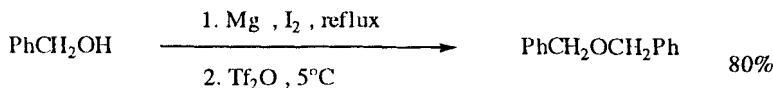
Chiba, K.; Fukuda, M.; Kim, S.; Kitano, Y.; Tada, M. *J. Org. Chem.*, **1999**, *64*, 7654.



Valenti, P.; Belluti, F.; Rampa, A.; Bisi, A. *Synth. Commun.*, **1999**, *29*, 3895.

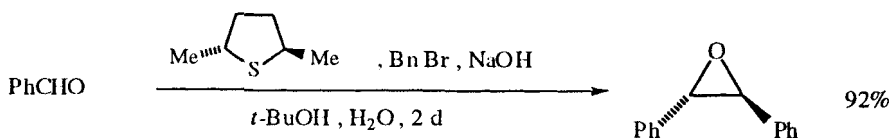


Parrilsh, J.P.; Sudaresan, B.; Jung, K.W. *Synth. Commun.*, **1999**, *29*, 4423.

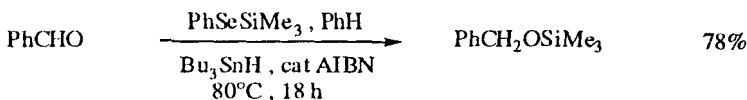


Nishiyama, T.; Kameyama, H.; Maekawa, H.; Watanuki, K. *Can. J. Chem.*, **1999**, *77*, 258.

## SECTION 124: ETHERS, EPOXIDES AND THIOETHERS FROM ALDEHYDES

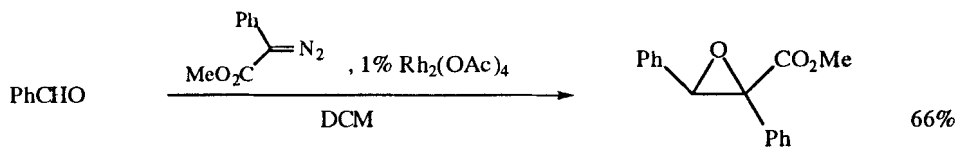


Zanardi, J.; Leriverend, C.; Aubert, D.; Julienne, K.; Metzner, P. *J. Org. Chem.*, **2001**, *66*, 5620.

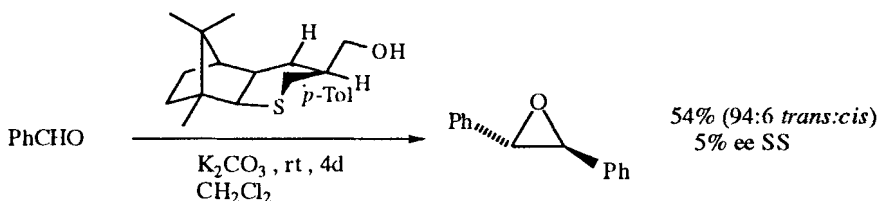


Nishiyama, Y.; Kajimoto, H.; Kotani, K.; Sonoda, N. *Org. Lett.*, **2001**, *3*, 3087.

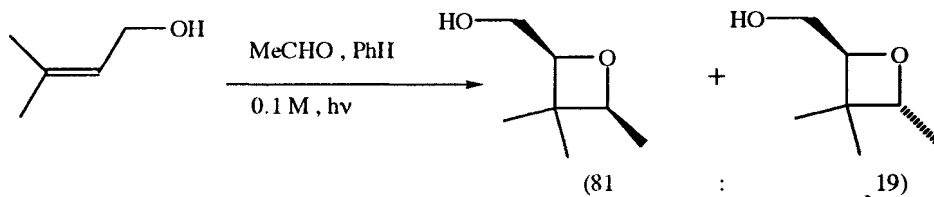




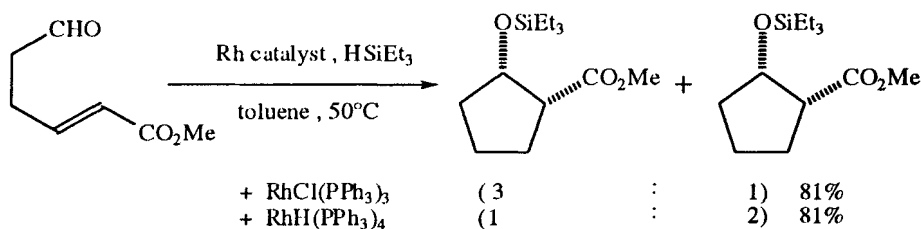
Doyle, M.P.; Hu, W.; Timmons, D.J. *Org. Lett.*, **2001**, 3, 933.



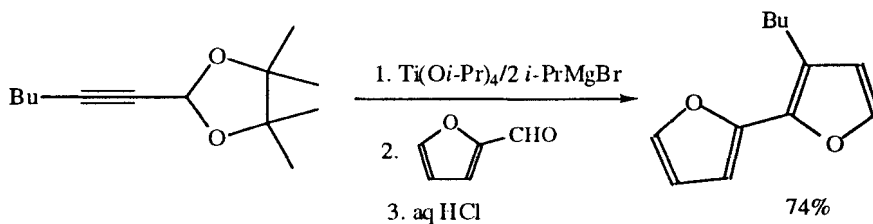
Saito, T.; Akiba, D.; Sakairi, M.; Kanazawa, S. *Tetrahedron Lett.*, **2001**, 42, 57.



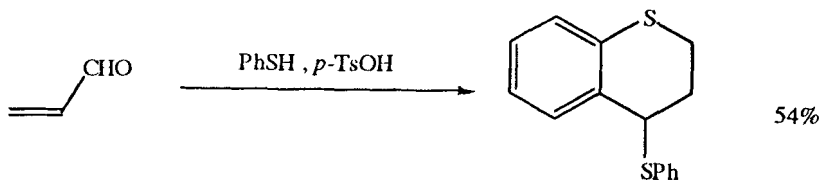
Griesbeck, A.G.; Bondock, S. *J. Am. Chem. Soc.*, **2001**, 123, 6191.



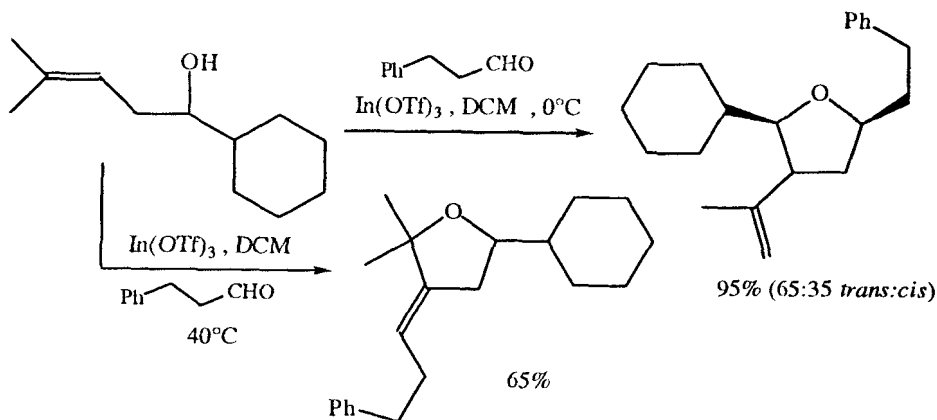
Emiabata-Smith, D.; McKillop, A.; Mills, C.; Motherwell, W.B.; Whitehead, A.J. *Synlett*, **2001**, 1302.



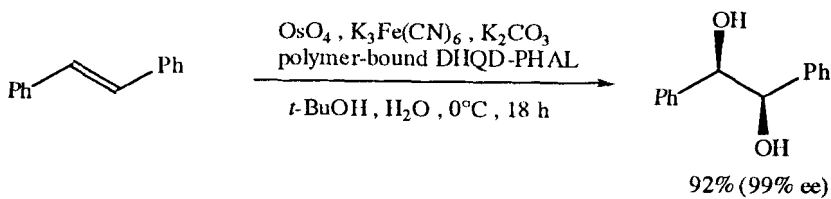
Teng, X.; Wada, T.; Okamoto, S.; Sato, F. *Tetrahedron Lett.*, **2001**, 42, 5501.



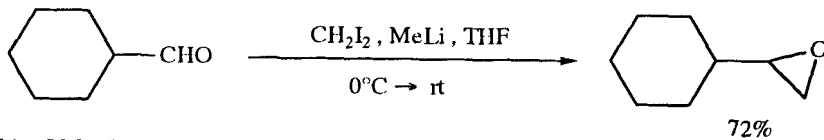
Ishino, Y.; Mihara, M.; Kawai, H. *Synlett*, **2001**, 1317.



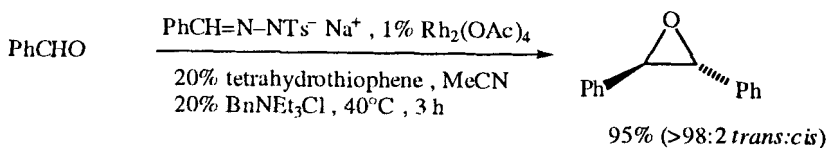
Loh, T.-P.; Hu, Q.Y.; Tan, K.-T.; Cheng, H.-S. *Org. Lett.*, **2001**, 3, 2669.



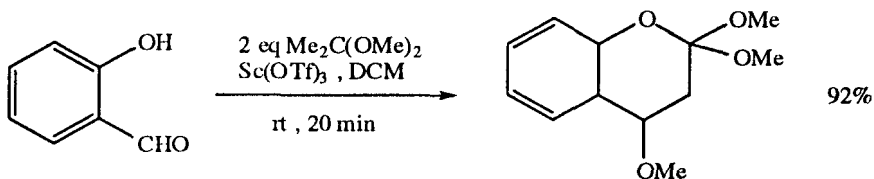
Federov, A.Yu.; Carrara, F.; Finet, J.-P. *Tetrahedron Lett.*, **2001**, 42, 5875.



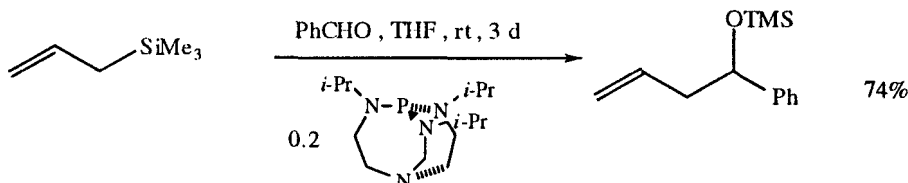
Concellón, J.M.; Cuervo, II.; Fernández-Fano, R. *Tetrahedron*, **2001**, 57, 8983.



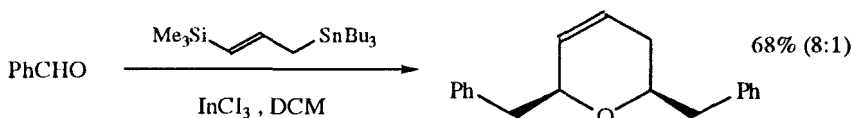
Aggarwal, V.K.; Alonso, E.; Hyund, G.; Lydon, K.M.; Palmer, M.J.; Porcelloni, M.; Studley, J.R. *Angew. Chem. Int. Ed.*, **2001**, 40, 1430.



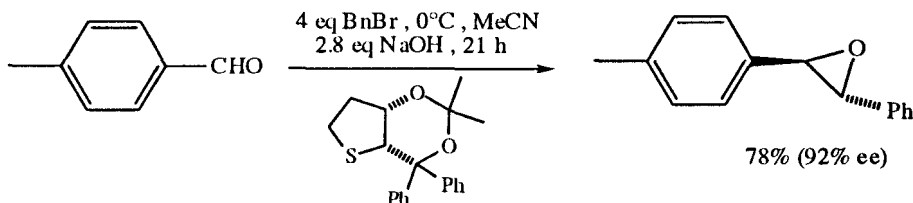
Yadav, J.S.; Reddy, B.V.S.; Rao, T.P. *Tetrahedron Lett.*, 2000, 41, 7943.



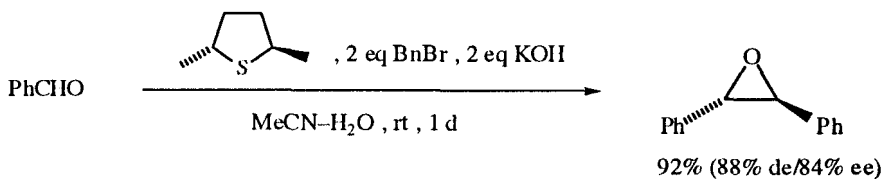
Wang, Z.; Kisanga, P.; Verkade, J.G. *J. Org. Chem.*, 1999, 64, 6459.



Viswanathan, G.S.; Yang, J.; Li, C.-J. *Org. Lett.*, 1999, 1, 993.



Hayakawa, R.; Shimizu, M. *Synlett*, 1999, 1388.

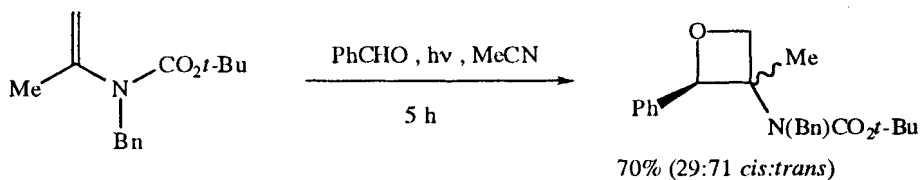


Julienne, K.; Metzner, P.; Henryon, V. *J. Chem. Soc., Perkin Trans. 1*, 1999, 731.

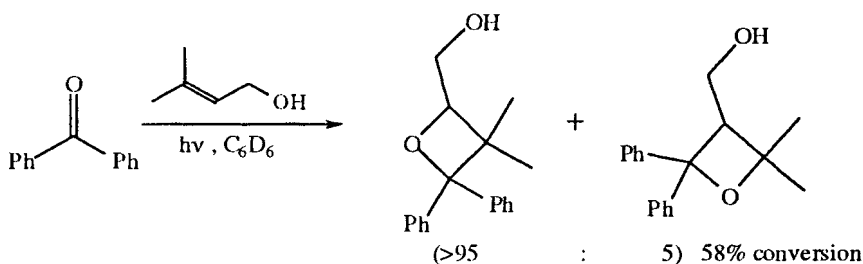
## SECTION 125: ETHERS, EPOXIDES AND THIOETHERS FROM ALKYL, METHYLENES AND ARYLS

NO ADDITIONAL EXAMPLES

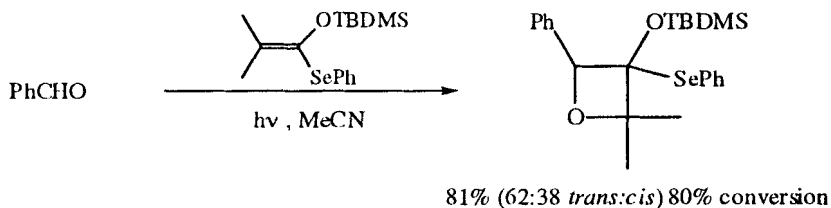
## SECTION 126: ETHERS, EPOXIDES AND THIOETHERS FROM AMIDES



Bach, T.; Schröder, J. *Synthesis*, 2001, 1117.

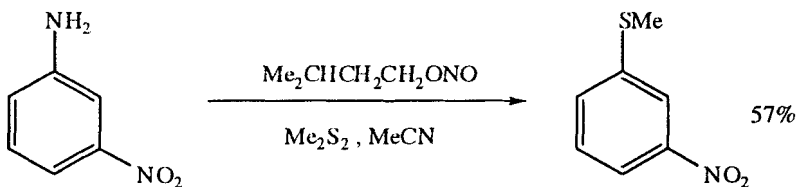


Adam, W.; Stegmann, V.R. *Synthesis*, 2001, 1203.

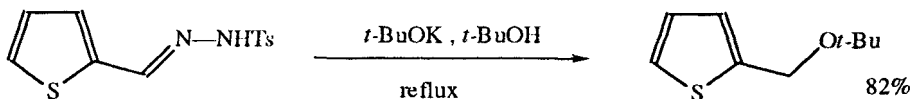


Abe, M.; Tachibana, K.; Fujimoto, K.; Nojima, M. *Synthesis*, 2001, 1243.

## SECTION 127: ETHERS, EPOXIDES AND THIOETHERS FROM AMINES

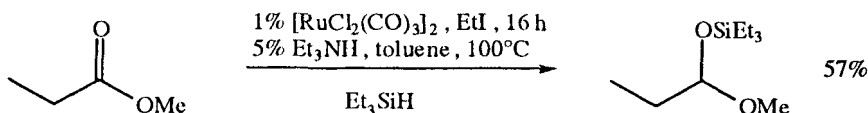


Allaire, F.S.; Lyga, J.W. *Synth. Commun.*, 2001, 31, 1857.

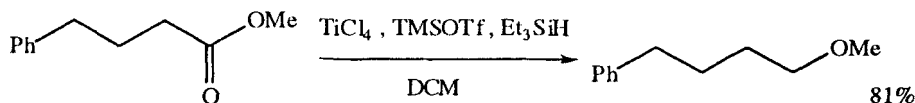


Chandrasekhar, S.; Rajaiah, G.; Chandraiah, L.; Swamy, D.N. *Synlett*, **2001**, 1779.

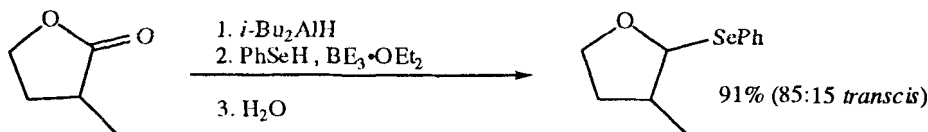
## SECTION 128: ETHERS, EPOXIDES AND THIOETHERS FROM ESTERS



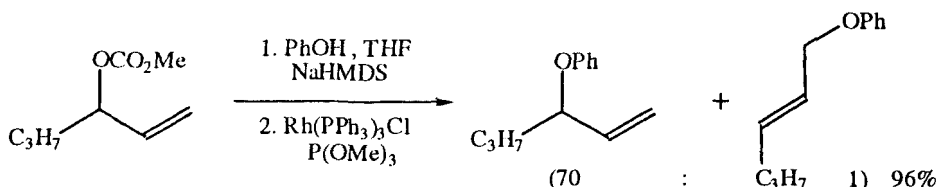
Igarashi, M.; Mizuno, R.; Fuchikami, T. *Tetrahedron Lett.*, **2001**, 42, 2149.



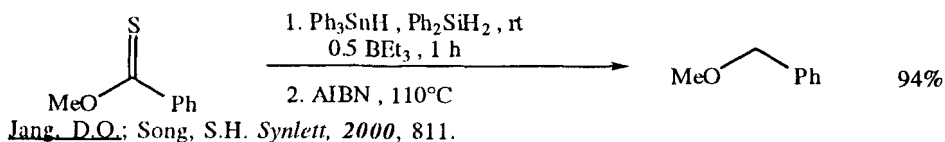
Yato, M.; Homma, K.; Ishida, A. *Tetrahedron*, **2001**, 57, 5353.



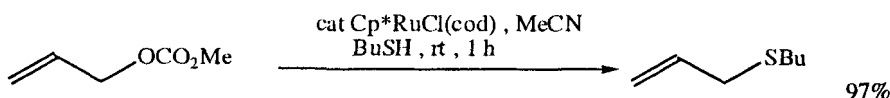
Schmitt, A.; Reissig, H.-U. *Synthesis*, **2001**, 867.



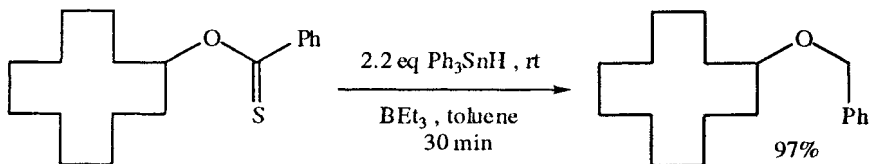
Evans, P.A.; Leahy, D.K. *J. Am. Chem. Soc.*, **2000**, 122, 5012.



Jang, D.O.; Song, S.H. *Synlett*, **2000**, 811.

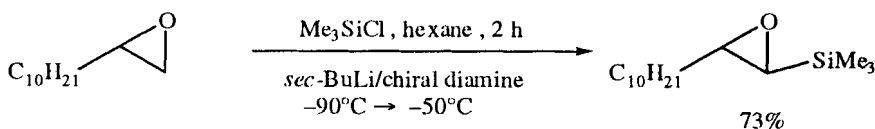


Kondo, T.; Morisaki, Y.; Uenoyama, S.-y.; Wada, K.; Mitsudo, T.-a. *J. Am. Chem. Soc.*, **1999**, 121, 8657.

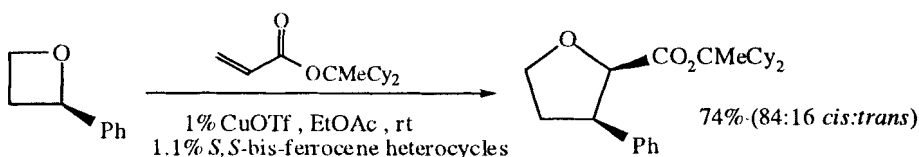


MaGee, D.I.; Leach, J.D.; Setiadji, S. *Tetrahedron*, **1999**, *55*, 2847.

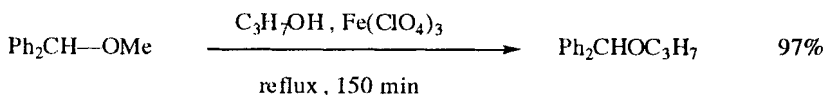
## SECTION 129: ETHERS, EPOXIDES AND THIOETHERS FROM ETHERS, EPOXIDES AND THIOETHERS



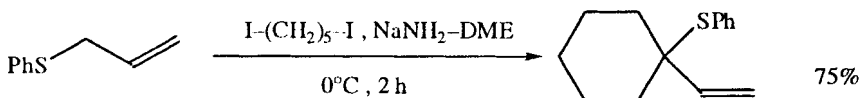
Hodgson, D.M.; Norsikian, S.L.M. *Org. Lett.*, **2001**, *3*, 461.



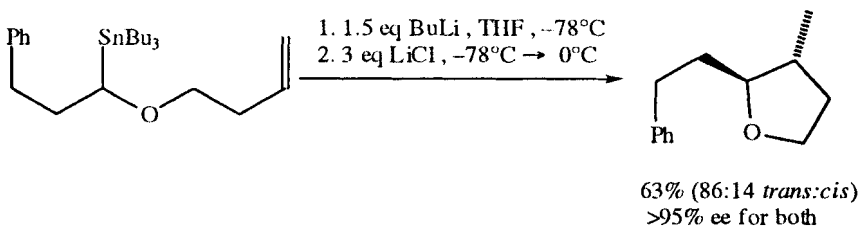
Lo, M.M.-C.; Fu, G.C. *Tetrahedron*, **2001**, *57*, 2621.



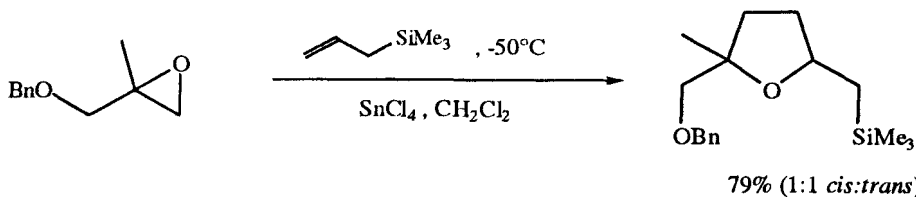
Salehi, P.; Irandoost, M.; Seddighi, B.; Behbahani, F.K.; Tahmasebi, D.P. *Synth. Commun.*, **2000**, *30*, 1743.



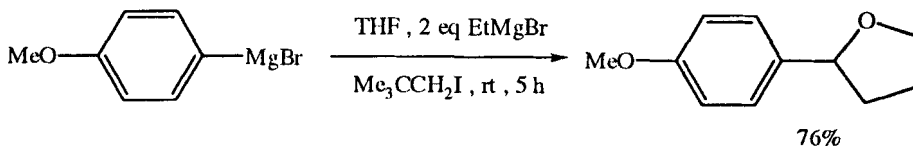
Choppin, S.; Gros, P.; Fort, Y. *Synth. Commun.*, **2000**, *30*, 795.



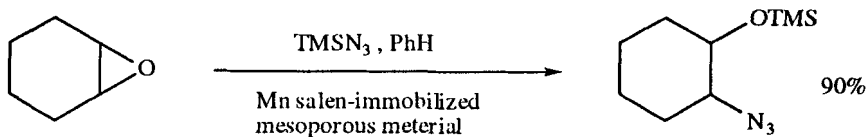
Komine, N.; Tomooka, K.; Nakai, T. *Heterocycles*, **2000**, *52*, 1071.



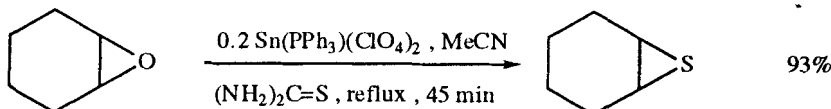
Sugita, Y.; Kimura, Y.; Yokie, I. *Tetrahedron Lett.*, **1999**, 40, 5877.



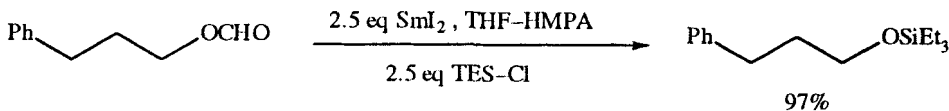
Inoue, A.; Shinokubo, H.; Oshima, K. *Synlett*, **1999**, 1582.



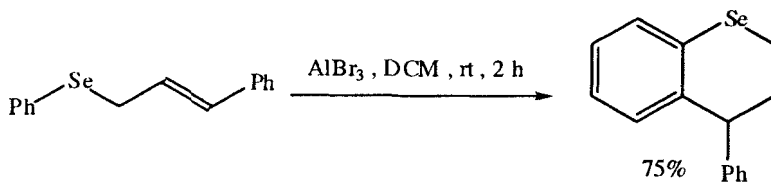
Kantam, M.L.; Choudary, B.M.; Barathi, B. *Synth. Commun.*, **1999**, 29, 1121.



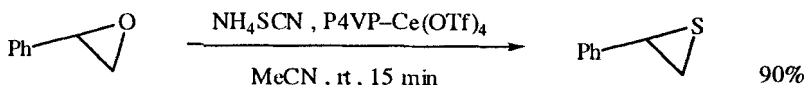
Tangestaninejad, S.; Mirkhani, V. *Synth. Commun.*, **1999**, 29, 2079.



Honda, T.; Ishikawa, F. *Synth. Commun.*, **1999**, 29, 3323.



Abe, H.; Koshiha, N.; Yamasaki, A.; Harayama, T. *Heterocycles*, **1999**, 51, 2301.

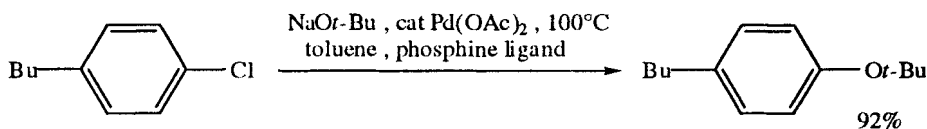


Iranpoor, N.; Tamami, B.; Shekarri, M. *Synth. Commun.*, **1999**, 29, 3313.

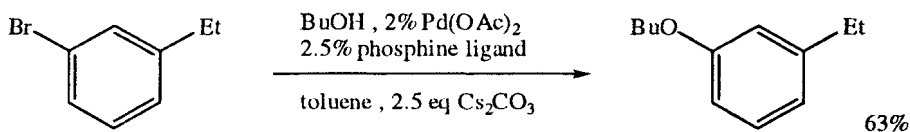
## REVIEWS:

"The Brook Rearrangement In Tandem Bond Formation Strategies," Moser, W.H. *Tetrahedron*, **2001**, 57, 2065.

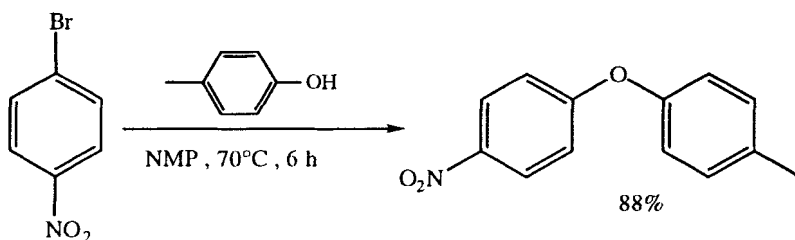
## SECTION 130: ETHERS, EPOXIDES AND THIOETHERS FROM HALIDES AND SULFONATES



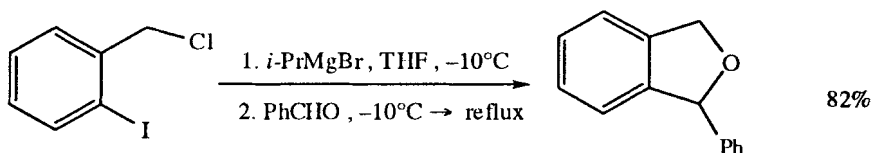
Parrish, C.A.; Buchwald, S.L. *J. Org. Chem.*, **2001**, 66, 2498.



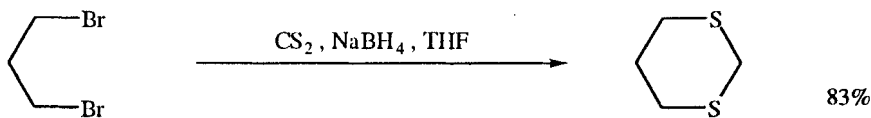
Torraca, K.E.; Huang, X.; Parrish, C.A.; Buchwald, S.L. *J. Am. Chem. Soc.*, **2001**, 123, 10770.



Gujadhur, R.; Venkataraman, D. *Synth. Commun.*, **2001**, 31, 2865.

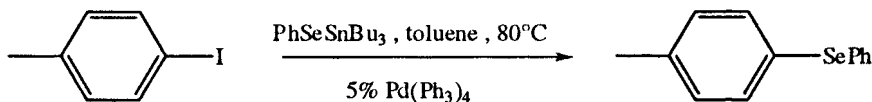


Delacroix, T.; Bérillon, L.; Cahiez, G.; Knochel, P. *J. Org. Chem.*, **2000**, 65, 8108.



Wan, Y.; Kurchan, A.N.; Barnhurst, L.A.; Kutateladze, A.G. *Org. Lett.*, **2000**, 2, 1133.





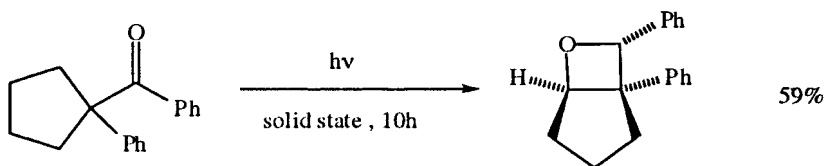
Nishiyama, Y.; Tokunaga, K.; Sonoda, N. *Org. Lett.*, 1999, 1, 1725.

Related Methods: Section 123 (Ethers from Alcohols).

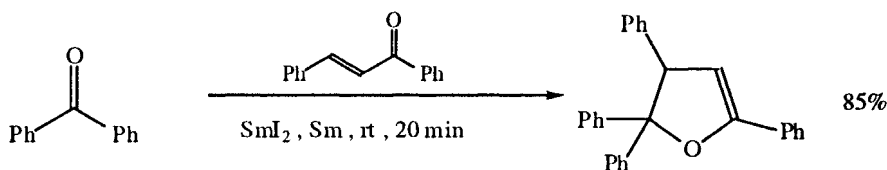
## SECTION 131: ETHERS, EPOXIDES AND THIOETHERS FROM HYDRIDES

NO ADDITIONAL EXAMPLES

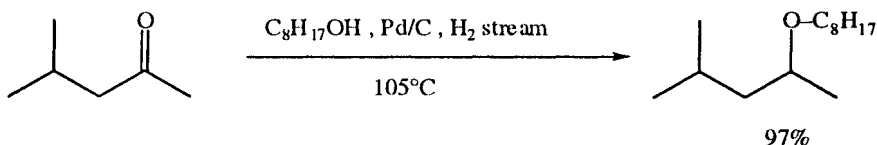
## SECTION 132: ETHERS, EPOXIDES AND THIOETHERS FROM KETONES



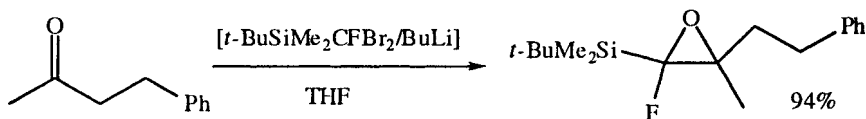
Kang, T.; Scheffer, J.R. *Org. Lett.*, 2001, 3, 3361.



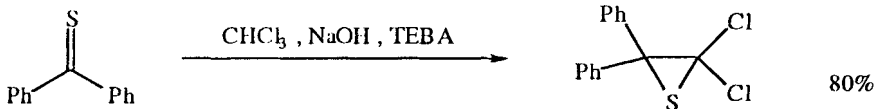
Ma, Y.; Zhang, Y.; Chen, J. *Synthesis*, 2001, 1004.



Fujii, Y.; Furugaki, H.; Yano, S.; Kita, K. *Chem. Lett.*, 2000, 926.



Shimizu, M.; Hata, T.; Hiyama, T. *Heterocycles*, 2000, 52, 707.



Mlossteni, G.; Romański, J.; Swiatek, A.; Hemgartner, H. *Helv. Chim. Acta*, **1999**, 82, 946.

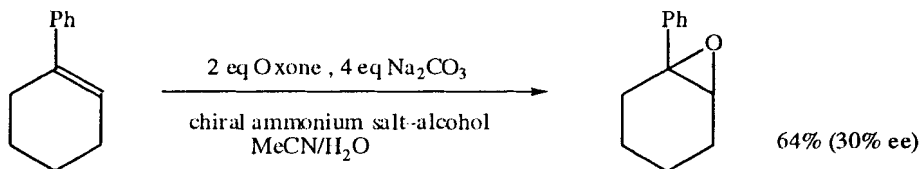
Related Methods: Section 124 (Epoxides from Aldehydes).

### SECTION 133: ETHERS, EPOXIDES AND THIOETHERS FROM NITRILES

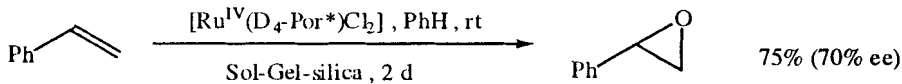
NO ADDITIONAL EXAMPLES

### SECTION 134: ETHERS, EPOXIDES AND THIOETHERS FROM ALKENES

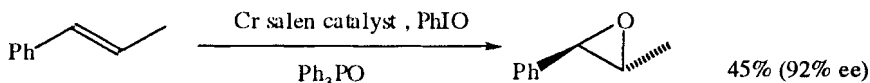
#### ASYMMETRIC COMPOUNDS



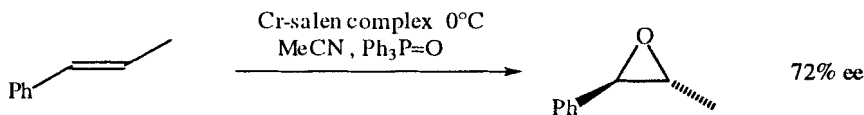
Page, P.C.B.; Rassias, G.A.; Barros, D.; Ardakani, A.; Buckley, B.; Bethell, D.; Smith, T.A.D.; Slawin, A.M.Z. *J. Org. Chem.*, **2001**, 66, 6926.



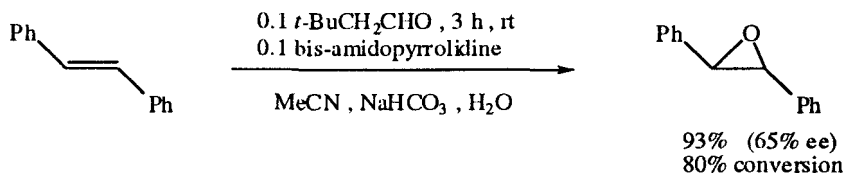
Zhang, R.; Yu, W.-Y.; Wong, K.-y.; Che, C.-M. *J. Org. Chem.*, **2001**, 66, 8145.



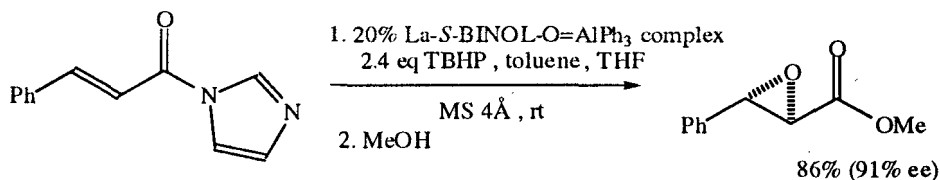
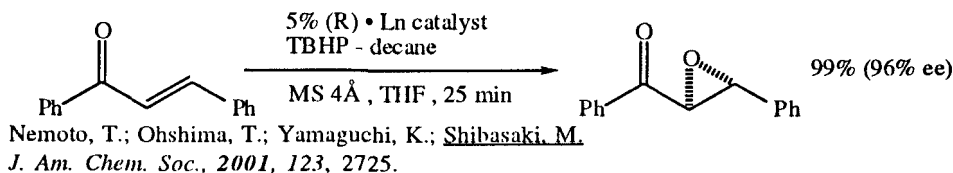
Daly, A.M.; Renehan, M.F.; Gilheany, D.G. *Org. Lett.*, **2001**, 3, 663.



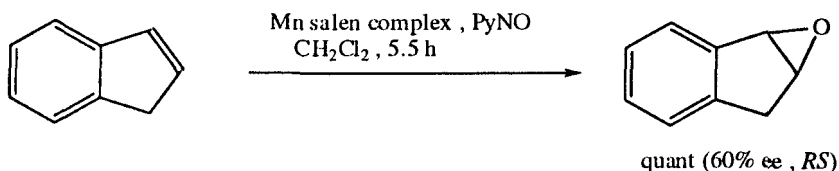
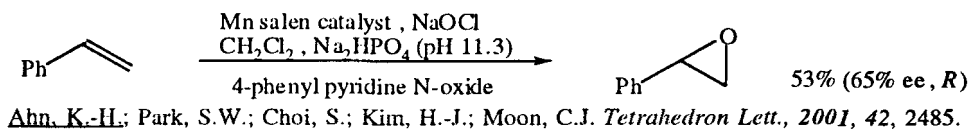
O'Mahony, C.P.; McGarrigle, E.M.; Renehan, M.F.; Ryan, K.M.; Kerrigan, N.J.; Bousquet, C.; Gilheany, D.G. *Org. Lett.*, **2001**, 3, 3435.



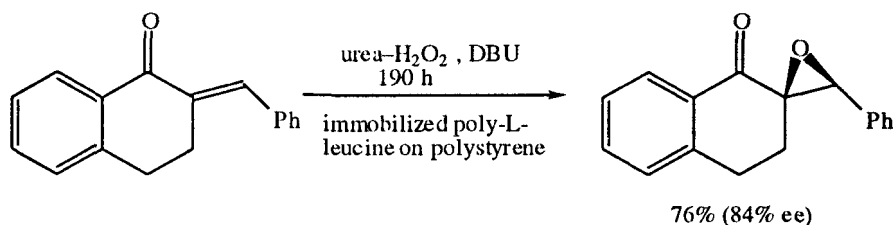
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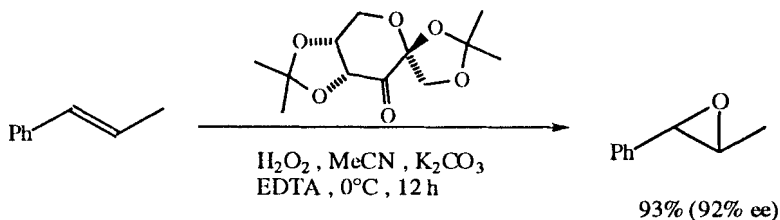
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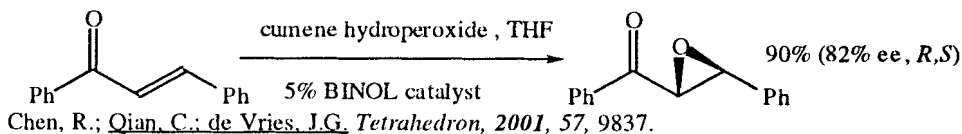
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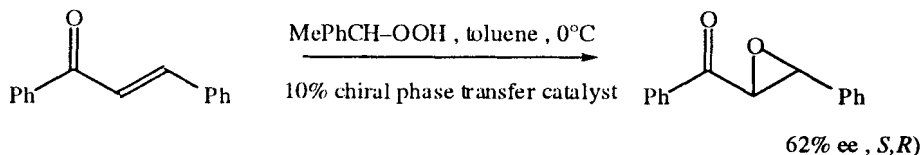
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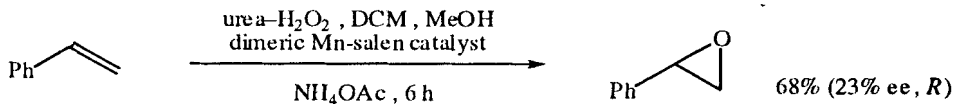
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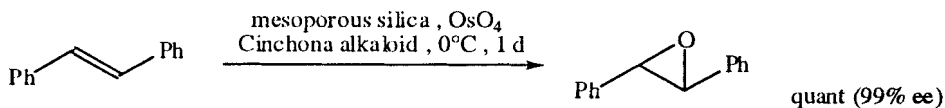
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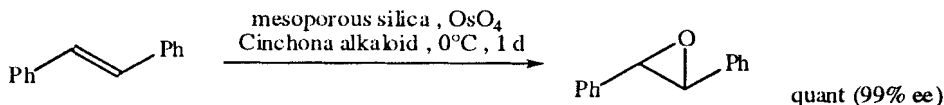
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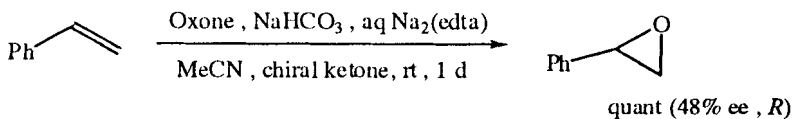
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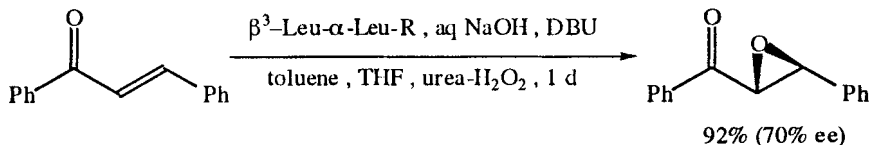
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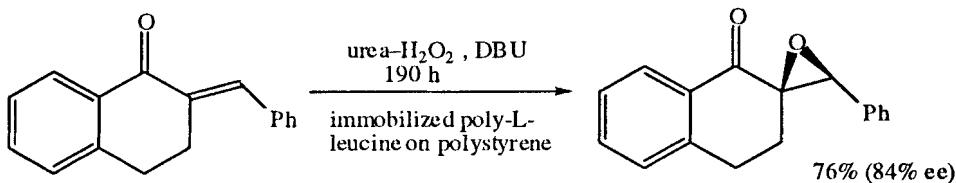
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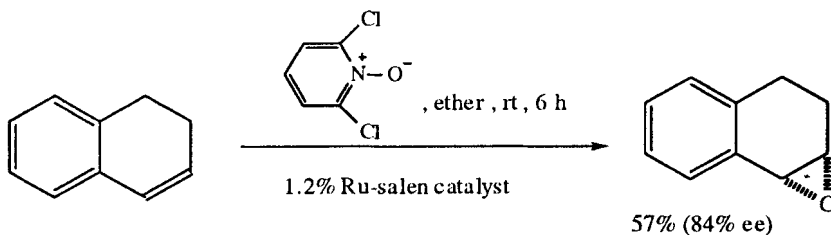
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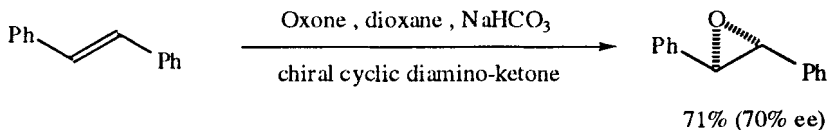
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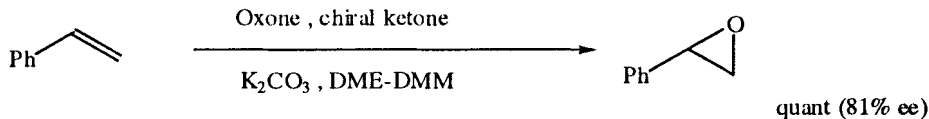
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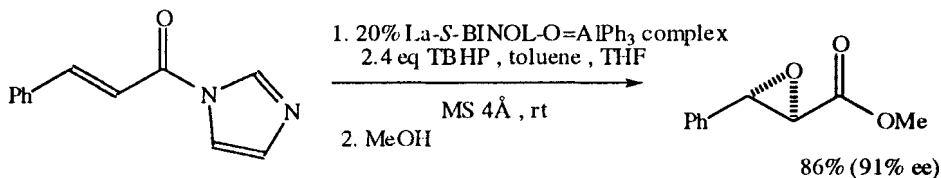
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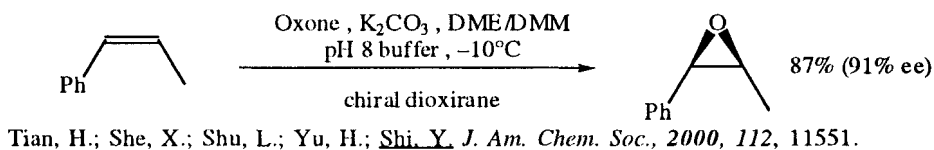
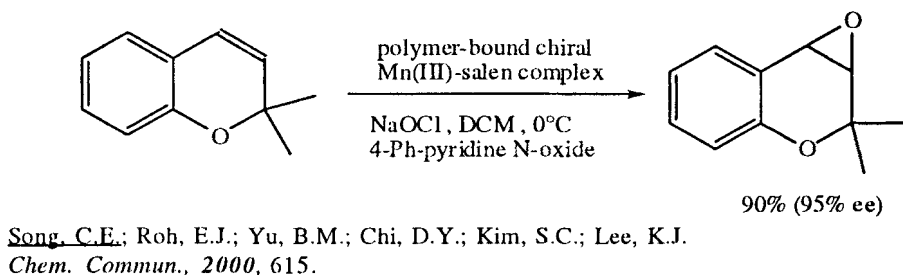
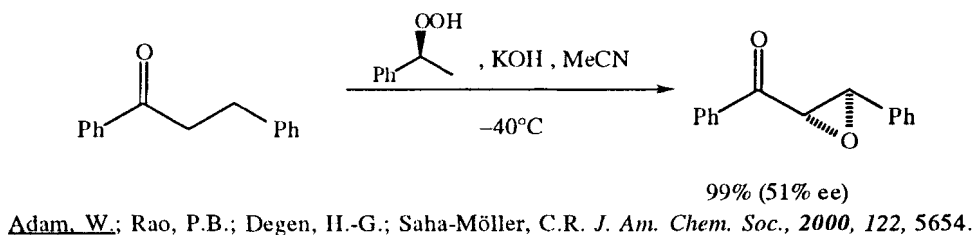
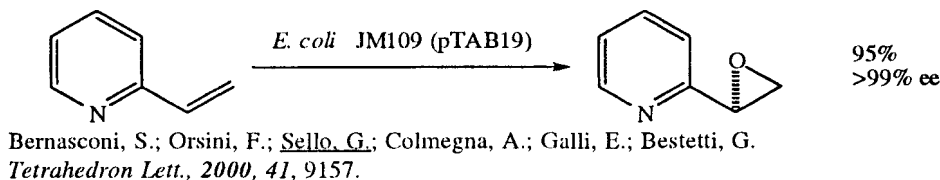
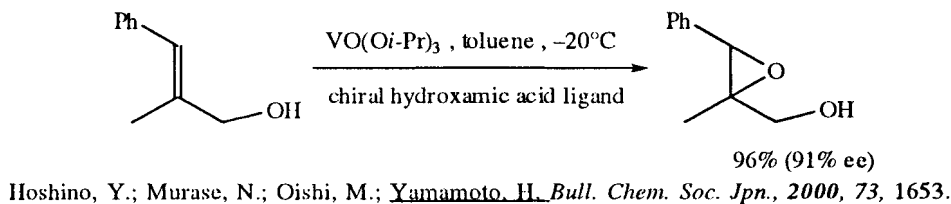
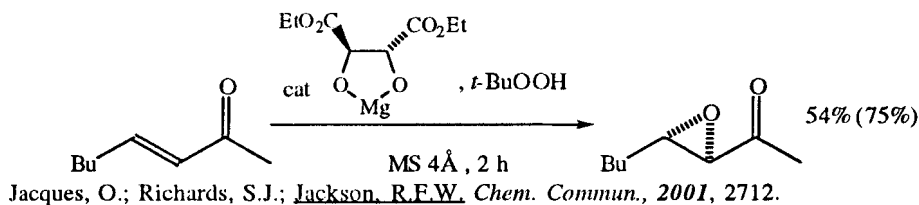
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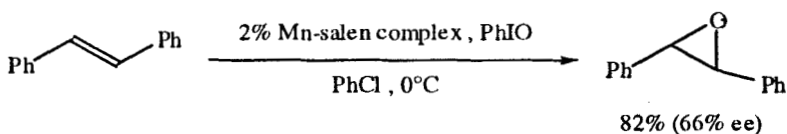


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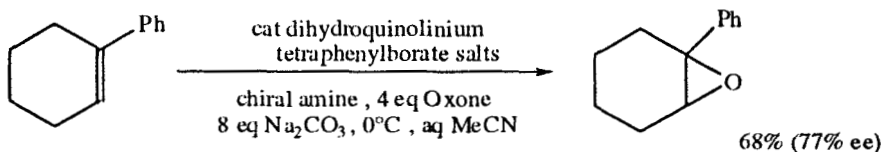


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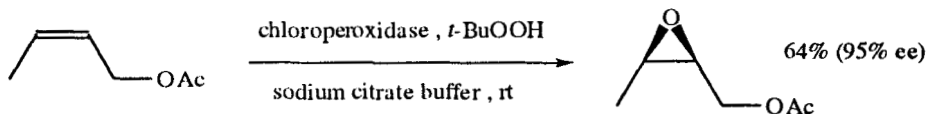




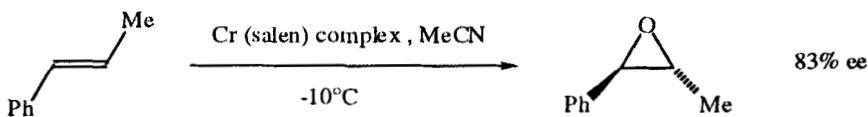
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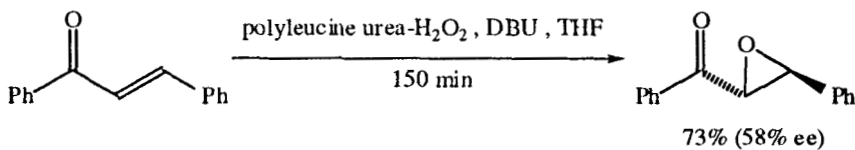
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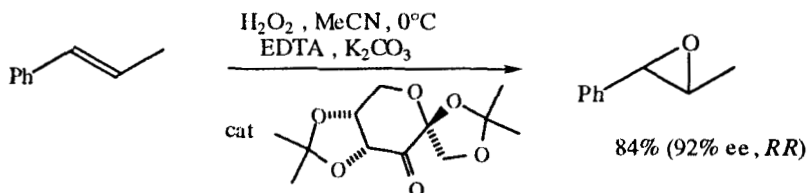
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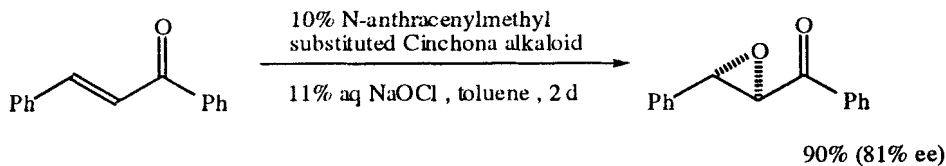
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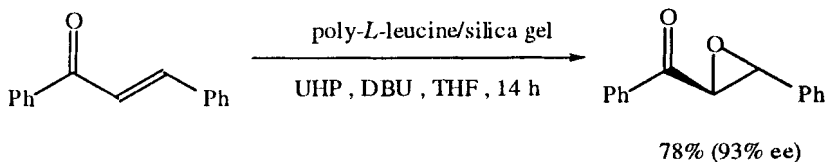
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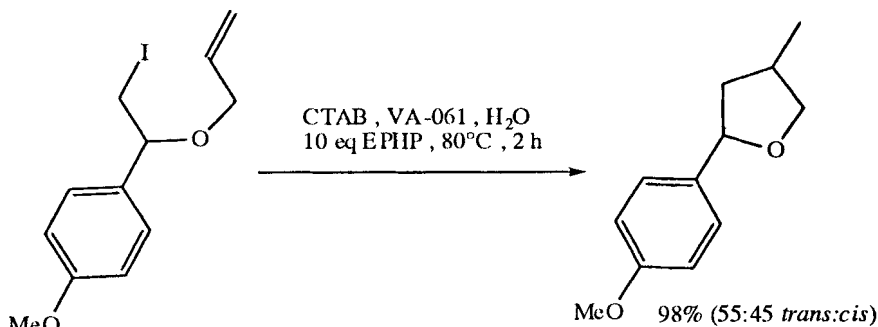


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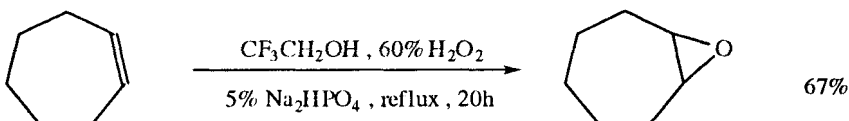


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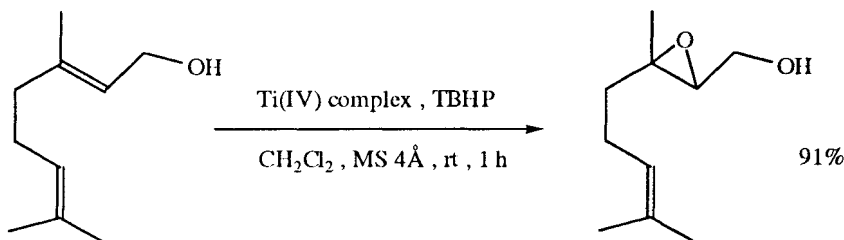
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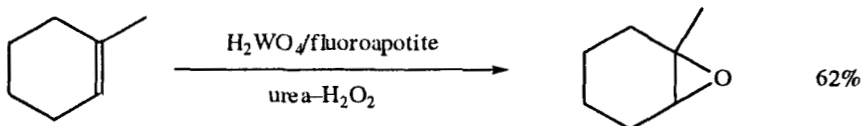


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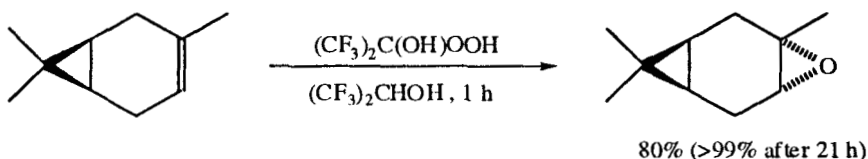


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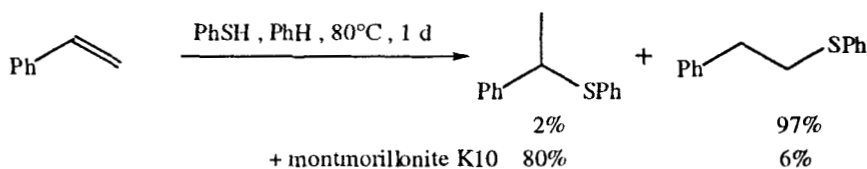




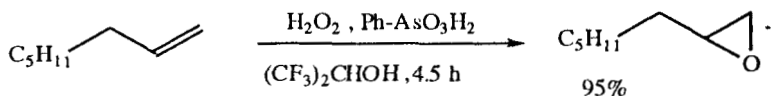
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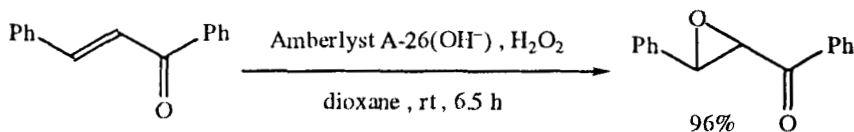
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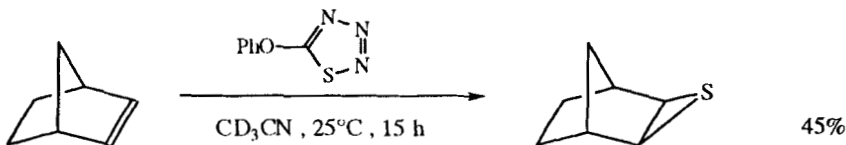
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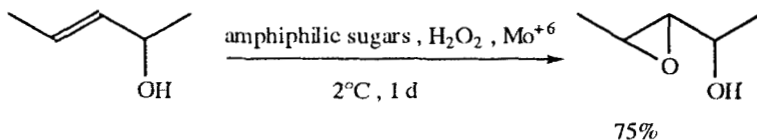
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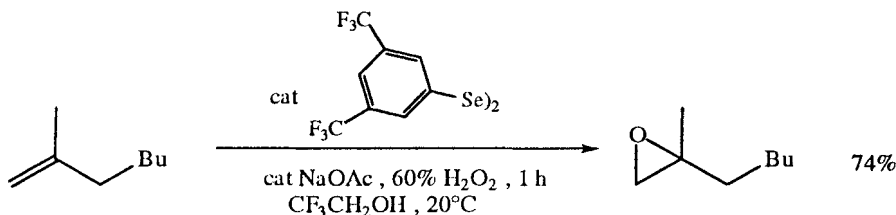
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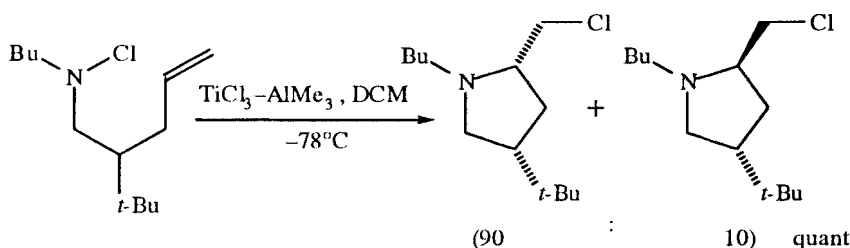
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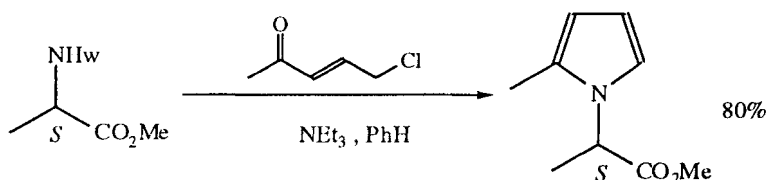
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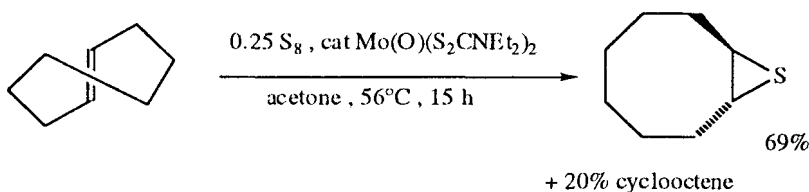
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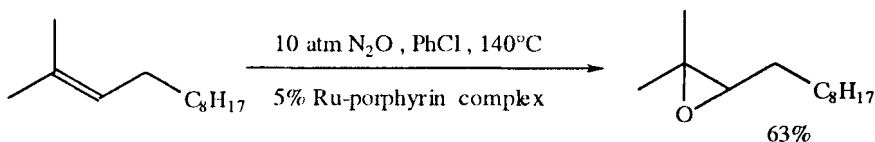
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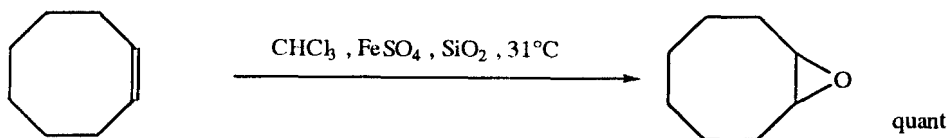
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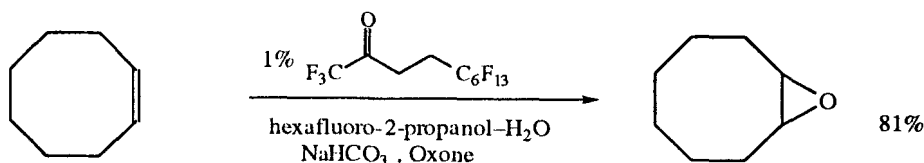
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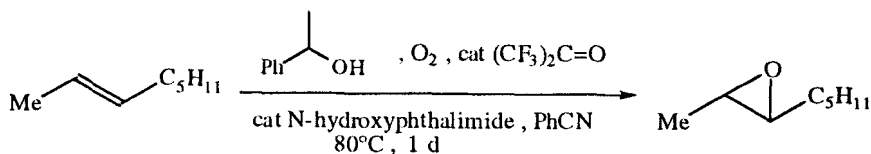
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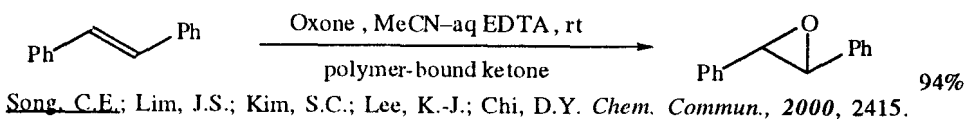
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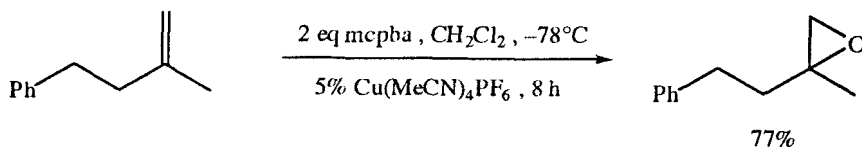
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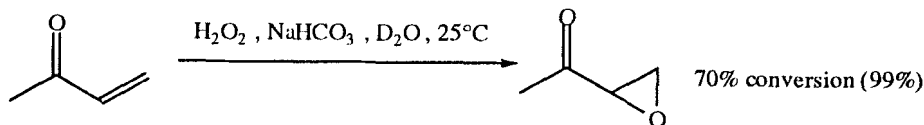
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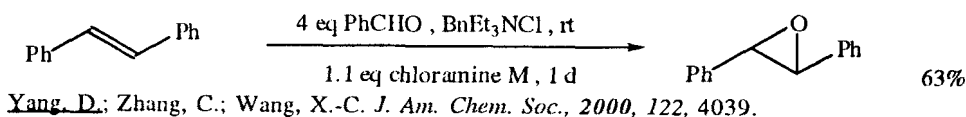
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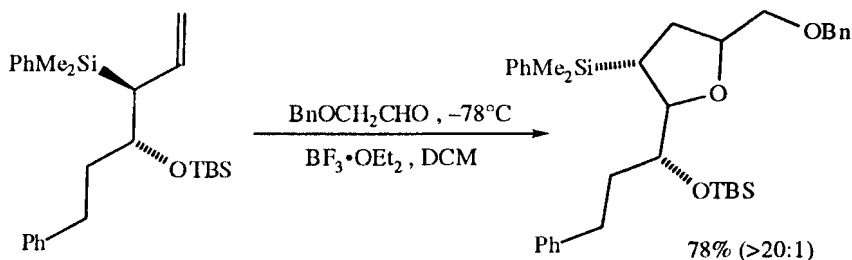
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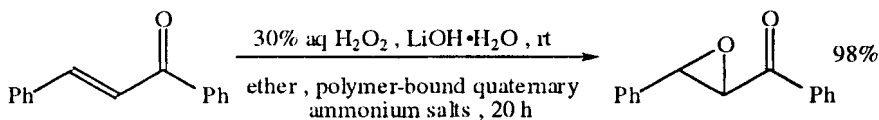
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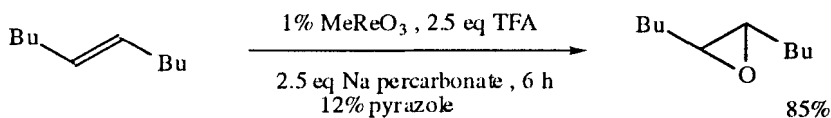
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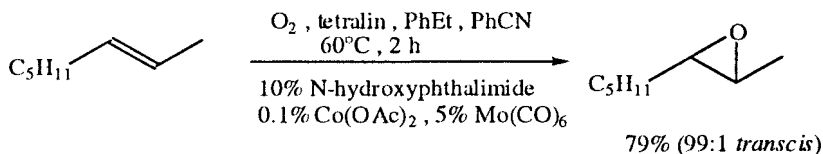
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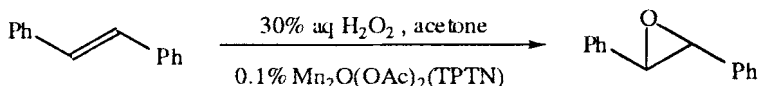
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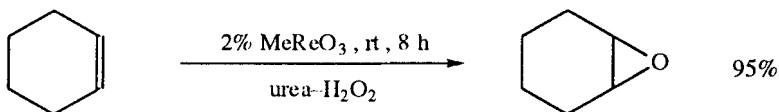
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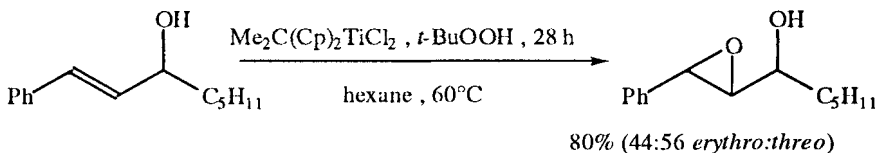
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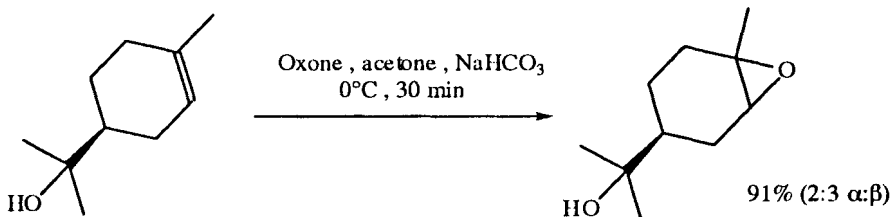
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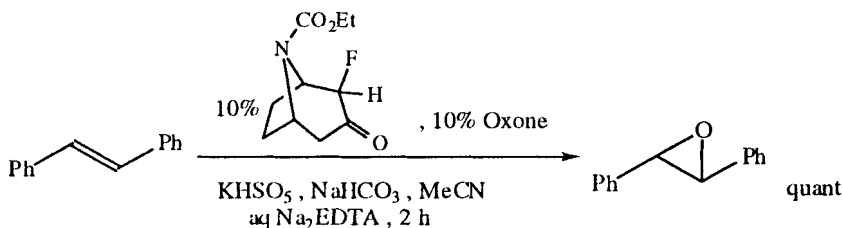
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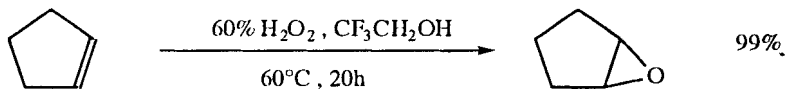
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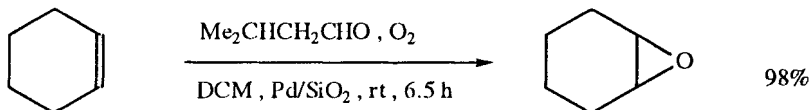
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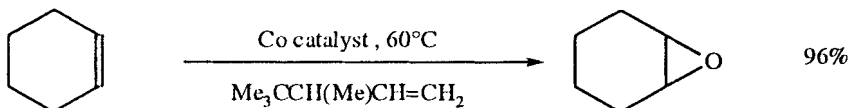
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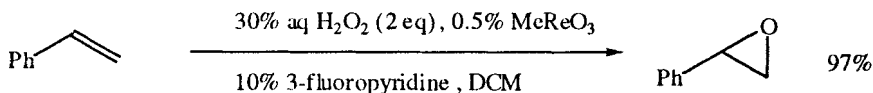
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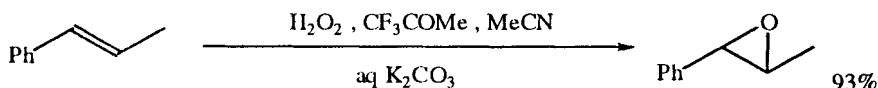
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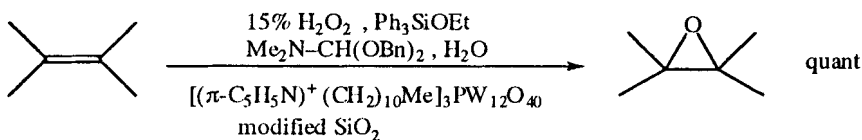
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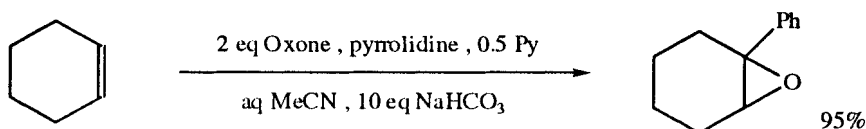
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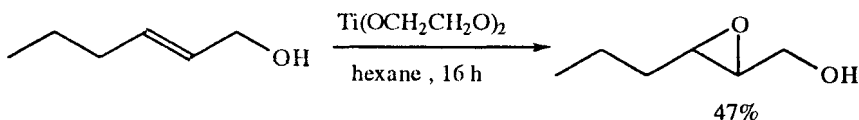
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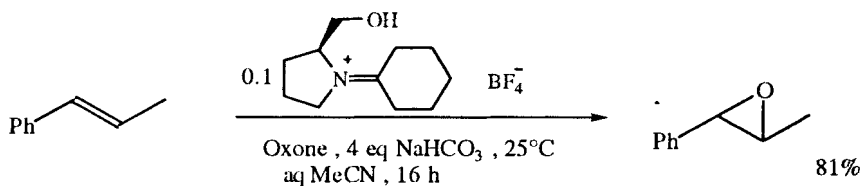
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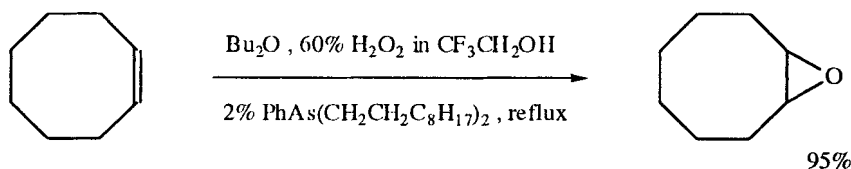
Adamo, M.F.A.; Aggarwal, V.K.; Sage, M.A. *J. Am. Chem. Soc.*, **2000**, *122*, 8317.



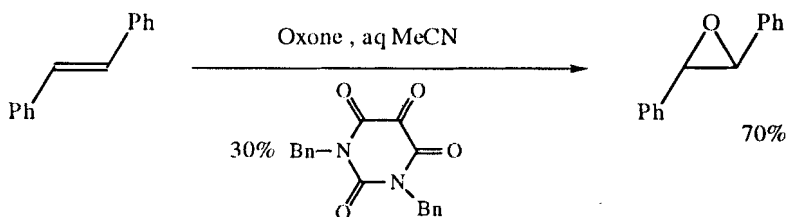
Massa, A.; Scerrettri, A. *Synlett*, **2000**, 1348.



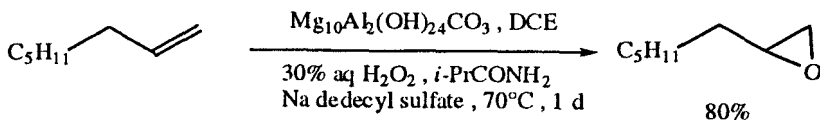
Minakata, S.; Takemiya, A.; Nakamura, K.; Ryu, I.; Komatsu, M. *Synlett*, **2000**, 1810.



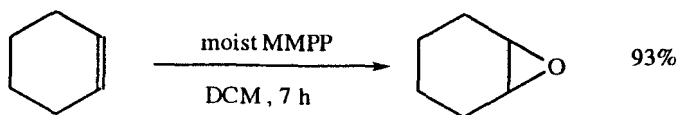
van Vliet, M.C.A.; Arends, I.W.C.E.; Sheldon, R.A. *Tetrahedron Lett.*, **1999**, *40*, 5239.



Carnell, A.J.; Johnstone, R.A.W.; Parsy, C.C.; Sanderson, W.R. *Tetrahedron Lett.*, **1999**, *40*, 8029.

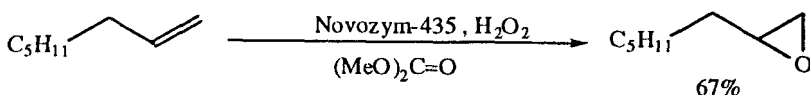


Yamaguchi, K.; Ebitani, K.; Kaneda, K. *J. Org. Chem.*, **1999**, *64*, 2966.

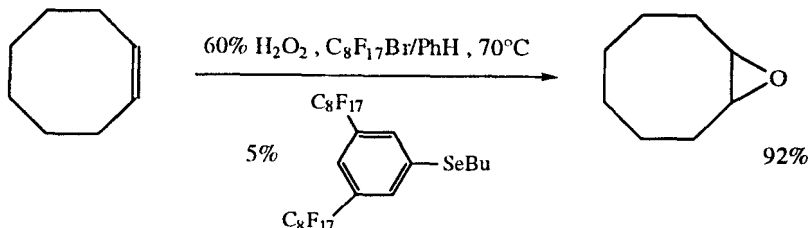


MMPP = monoperoxyphthalic acid

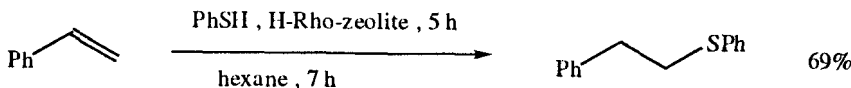
Foti, C.J.; Fields, J.D.; Kropp, P.L. *Org. Lett.*, **1999**, *1*, 903.



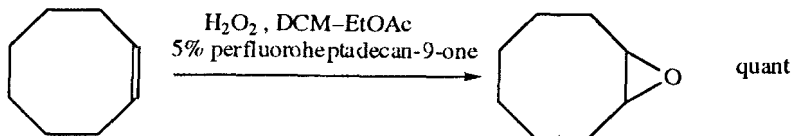
Klaas, M.R.g.; Warwel, S. *Org. Lett.*, **1999**, *1*, 1025.



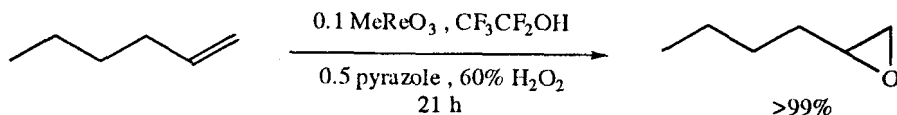
Betzemeier, B.; Lhermitte, F.; Knochel, P. *Synlett*, **1999**, 489.



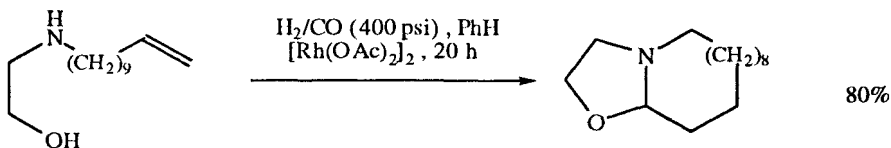
Kumar, P.; Pandey, R.K.; Hegde, V.R. *Synlett*, **1999**, 1921.



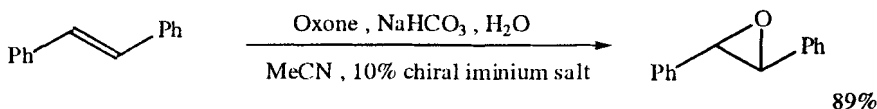
van Vliet, M.C.A.; Arends, I.W.C.E.; Sheldon, R.A. *Chem. Commun.*, **1999**, 263.



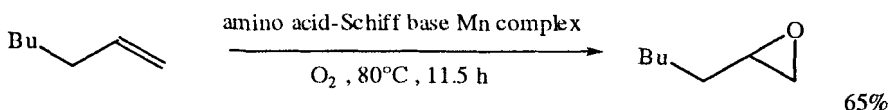
van Vliet, M.C.A.; Arends, I.W.C.E.; Sheldon, R.A. *Chem. Commun.*, **1999**, 821.



Bergmann, D.J.; Campi, E.M.; Jackson, W.R.; Patti, A.F. *Chem. Commun.*, **1999**, 1279.

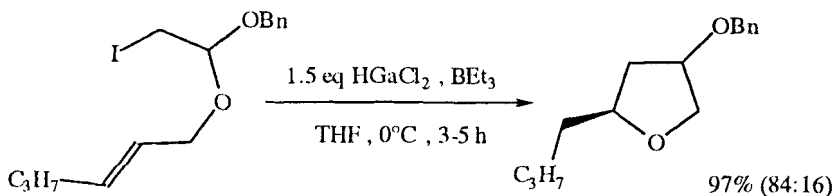


Armstrong, A.; Ahmed, G.; Garnett, I.; Goacoleu, K.; Wailes, J.S. *Tetrahedron*, **1999**, *55*, 2341.

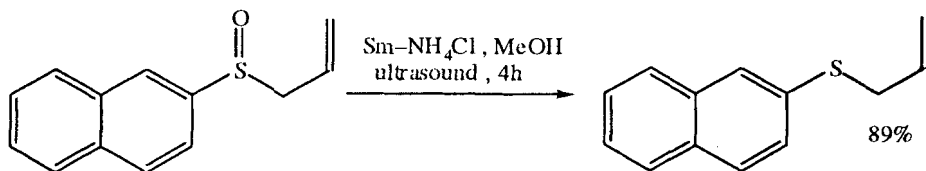


Wang, R.-M.; Hao, C.-J.; Wang, Y.-P. *Synth. Commun.*, **1999**, *29*, 1409.

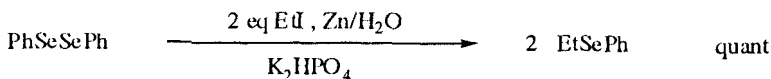
## SECTION 135: ETHERS, EPOXIDES AND THIOETHERS FROM MISCELLANEOUS COMPOUNDS



Mikami, S.; Fujita, K.; Nakamura, T.; Yorimitsu, H.; Shinokubo, H.; Matsubara, S.; Oshima, K. *Org. Lett.*, **2001**, *3*, 1853.

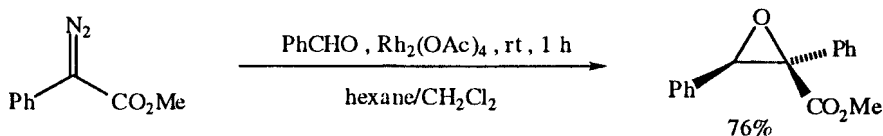


Yadav, J.S.; Subba Reddy, B.V.; Srinivas, C.; Srihari, P. *Synlett*, **2001**, 854.

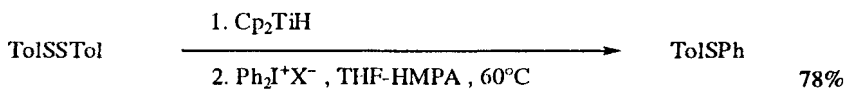


Bieber, L.W.; de Sá, A.C.P.F.; Menezes, P.H.; Gonçalves, S.M.C. *Tetrahedron Lett.*, **2001**, *42*, 4597.

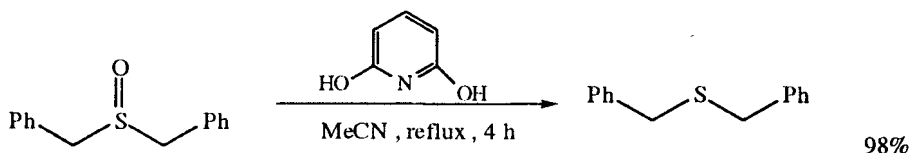




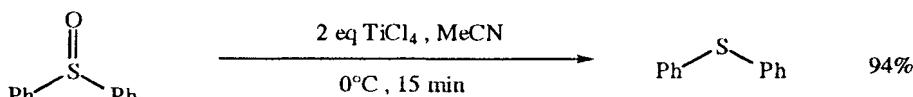
Davies, H.M.L.; De Meese, J. *Tetrahedron Lett.*, **2001**, 42, 6803.



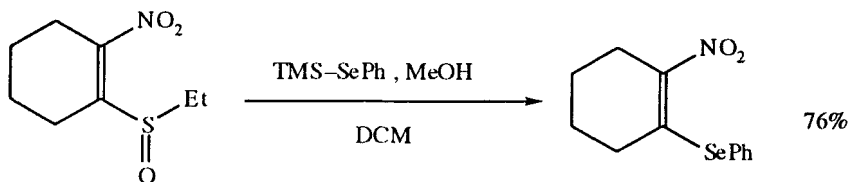
Huang, X.; Wu, L.-L.; Xu, X.-H. *Synth. Commun.*, **2001**, 31, 1871.



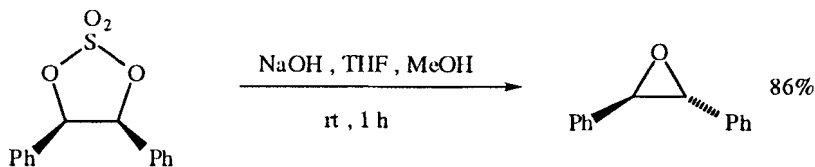
Miller, S.J.; Collier, T.R.; Wu, W. *Tetrahedron Lett.*, **2000**, 41, 3781.



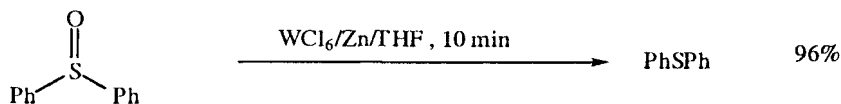
Shimizu, M.; Shibuya, K.; Hayakawa, R. *Synlett*, **2000**, 1437.



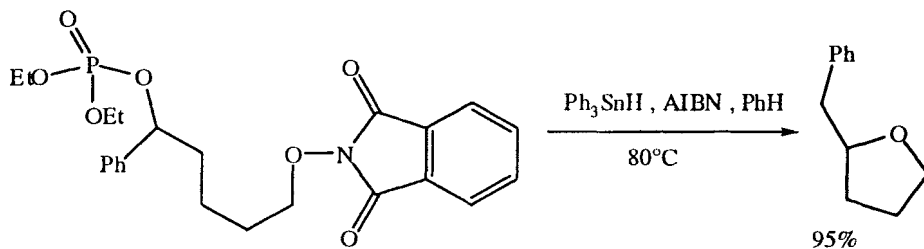
Abe, H.; Fujii, H.; Yamasaki, A.; Kinome, Y.; Takeuchi, Y.; Harayama, T. *Synth. Commun.*, **2000**, 30, 543.



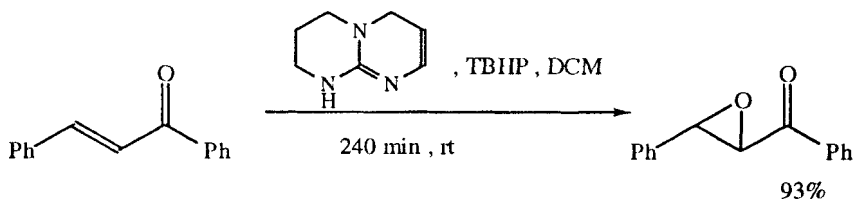
Jang, D.O.; Joo, Y.H.; Cho, D.H. *Synth. Commun.*, **2000**, 30, 4489.



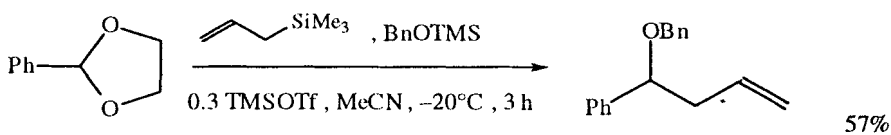
Eirouzabadi, H.; Karimi, B. *Synthesis*, **1999**, 500.



Crich, D.X.; Huang, X.; Newcomb, M. *Org. Lett.*, **1999**, 1, 225.



Genski, T.; Macdonald, G.; Wei, X.; Lewis, N.; Taylor, R.J.K. *Synlett*, **1999**, 795.



Suzuki, T.; Oriyama, T. *Synth. Commun.*, **1999**, 29, 1263.

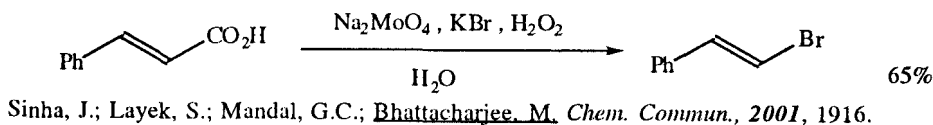
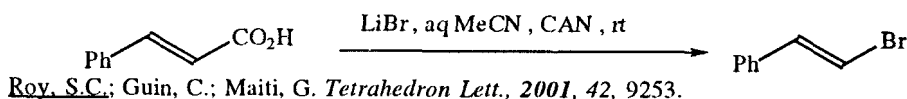
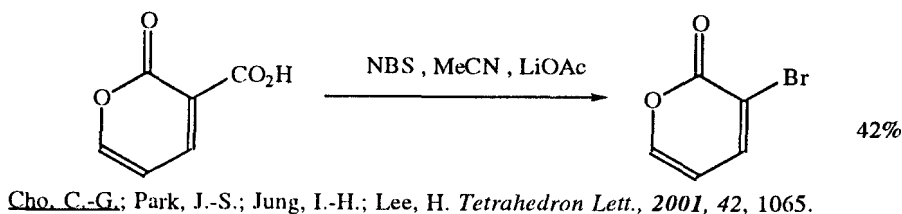
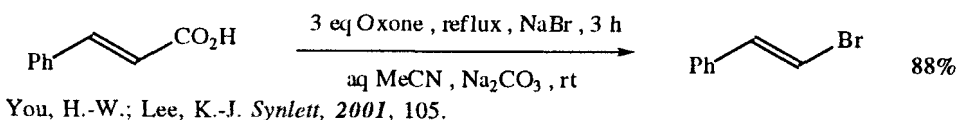
## CHAPTER 10

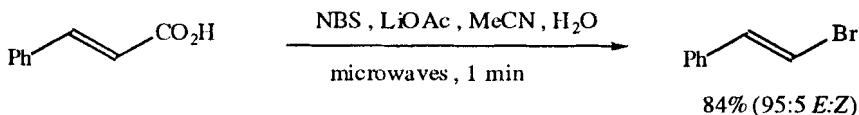
# PREPARATION OF HALIDES AND SULFONATES

### SECTION 136: HALIDES AND SULFONATES FROM ALKYNES

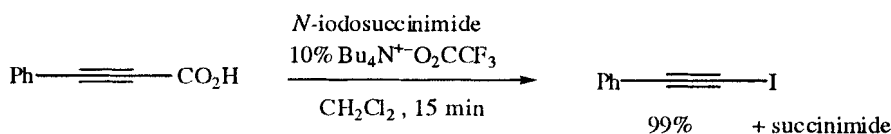
NO ADDITIONAL EXAMPLES

### SECTION 137: HALIDES AND SULFONATES FROM ACID DERIVATIVES



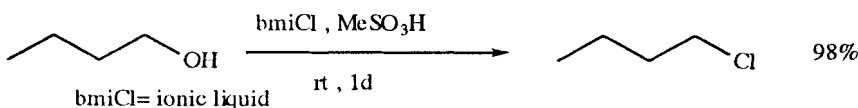


Kuang, C.; Senboku, H.; Tokuda, M. *Synlett*, **2000**, 1439.



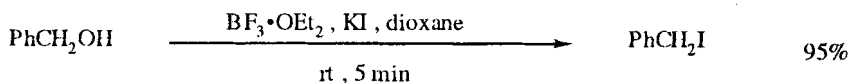
Naskar, D.; Roy, S. *J. Org. Chem.*, **1999**, *64*, 6896.

### SECTION 138: HALIDES AND SULFONATES FROM ALCOHOLS AND THIOLS

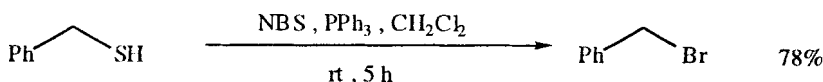


bmiCl = ionic liquid

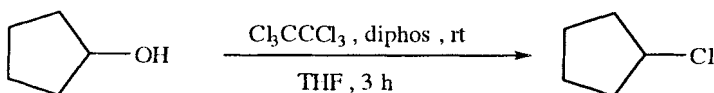
Ren, R.X.; Wu, J.X. *Org. Lett.*, **2001**, *3*, 3727.



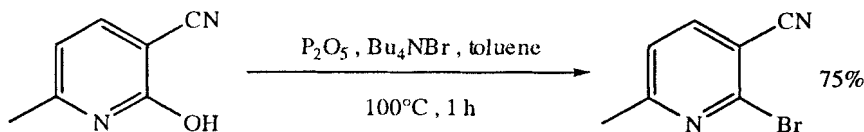
Bandgar, B.P.; Sadavarte, V.S.; Uppalla, L.S. *Tetrahedron Lett.*, **2001**, *42*, 951.



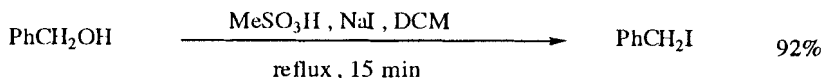
Iranpoor, N.; Firouzabadi, H.; Aghapour, G. *Synlett*, **2001**, 1176.



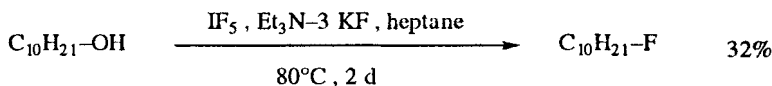
Pollastri, M.P.; Sagal, J.F.; Chang, G. *Tetrahedron Lett.*, **2001**, *42*, 2459.



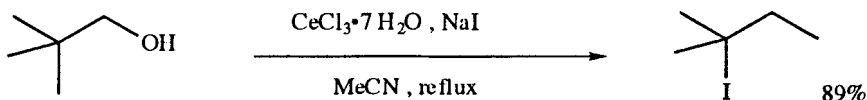
Kato, Y.; Okada, S.; Tomimoto, K.; Mase, T. *Tetrahedron Lett.*, **2001**, *42*, 4849.



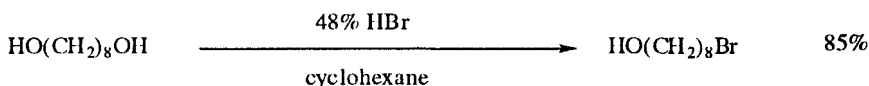
Ram, A.; Ramesh, G.; Laxman, N. *Synth. Commun.*, **2001**, *31*, 827.



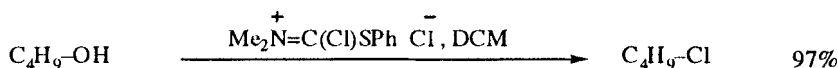
Yoneda, N.; Fukuhara, T. *Chem. Lett.*, **2001**, 222.



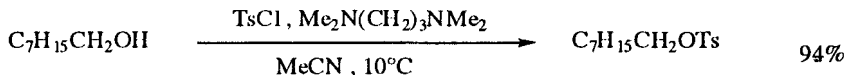
Di Deo, M.; Marcantoni, D.; Torregiani, E.; Bartoli, G.; Bellucci, M.C.; Bosco, M.; Sambri, L. *J. Org. Chem.*, **2000**, *65*, 2830.



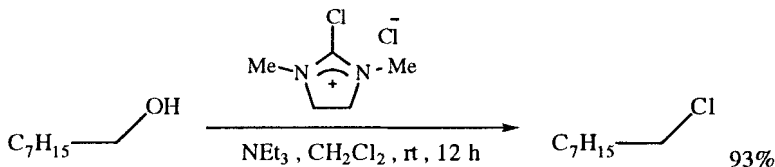
Chong, J.M.; Heuft, M.A.; Rabbat, P. *J. Org. Chem.*, **2000**, *65*, 5837.



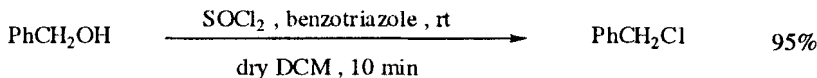
Gomez, L.; Gellibert, F.; Wagner, A.; Mioskowski, C. *Tetrahedron Lett.*, **2000**, *41*, 6049.



Yoshida, Y.; Shimonishi, K.; Sakakura, Y.; Koda, S.; Aso, N.; Tanabe, Y. *Synthesis*, **1999**, 1633.

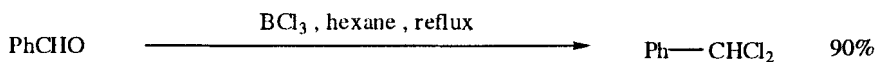


Isobe, T.; Ishikawa, T. *J. Org. Chem.*, **1999**, *64*, 5832.

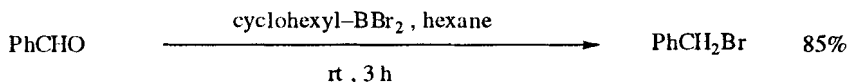


Chaudhari, S.S.; Akamanchi, K.G. *Synlett*, **1999**, 1763.

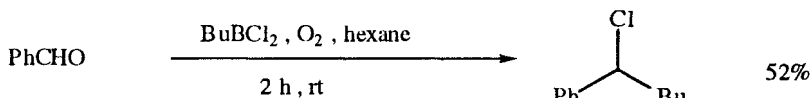
## SECTION 139: HALIDES AND SULFONATES FROM ALDEHYDES



Kabalka, G.W.; Wu, Z. *Tetrahedron Lett.*, **2000**, *41*, 579.



Kabalka, G.W.; Wu, Z.; Ju, Y. *Tetrahedron Lett.*, **2000**, 41, 5161.



Kabalka, G.W.; Wu, Z.; Ju, Y. *Tetrahedron Lett.*, **2001**, 42, 6239.

## SECTION 140: HALIDES AND SULFONATES FROM ALKYL, METHYLENES AND ARYLS

For the conversion  $\text{R-H} \rightarrow \text{R-Halogen}$ , see Section 146 (Halides from Hydrides).

NO ADDITIONAL EXAMPLES

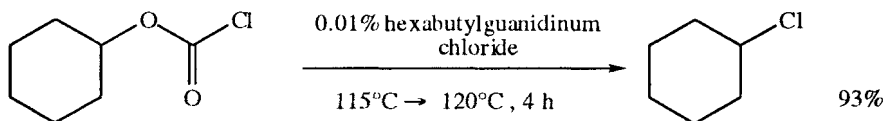
## SECTION 141: HALIDES AND SULFONATES FROM AMIDES

NO ADDITIONAL EXAMPLES

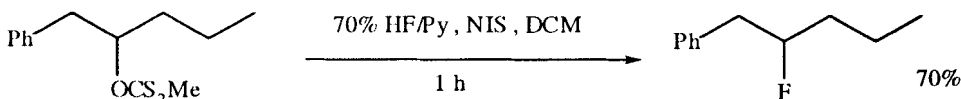
## SECTION 142: HALIDES AND SULFONATES FROM AMINES

NO ADDITIONAL EXAMPLES

## SECTION 143: HALIDES AND SULFONATES FROM ESTERS

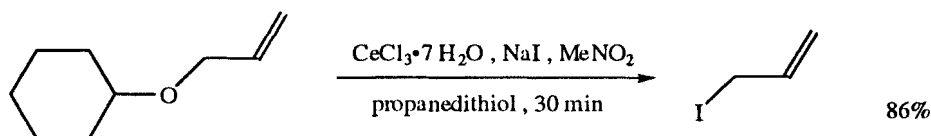


Violleau, F.; Thiébaud, S.; Borredon, E.; Le Gars, P. *Synth. Commun.*, **2001**, 31, 367.



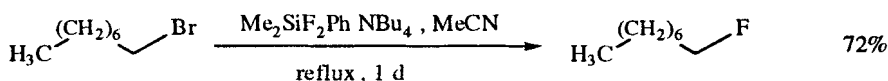
Kanie, K.; Tanaka, Y.; Suzuki, K.; Kuroboshi, M.; Hiyama, T. *Bull. Chem. Soc. Jpn.*, **2000**, 73, 471.

## SECTION 144: HALIDES AND SULFONATES FROM ETHERS, EPOXIDES AND THIOETHERS

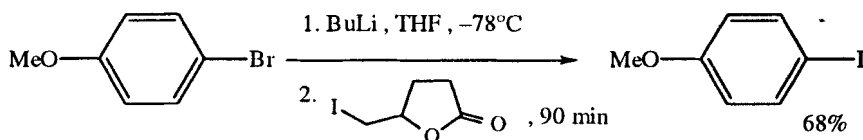


Bartoli, G.; Cupone, G.; Dalpozzo, R.; De Nino, A.; Maiuolo, L.; Marcantoni, E.; Procopio, A. *Synlett*, **2001**, 1897.

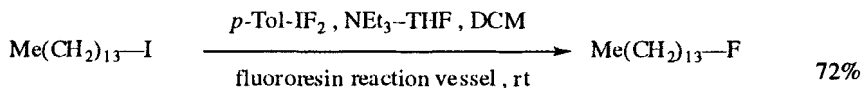
## SECTION 145: HALIDES AND SULFONATES FROM HALIDES AND SULFONATES



Kvíčala, J.; Mysík, P.; Paleta, O. *Synlett*, **2001**, 547.



Harrowven, D.C.; Nunn, M.I.T.; Fenwick, D.R. *Tetrahedron Lett.*, **2001**, 42, 7501.



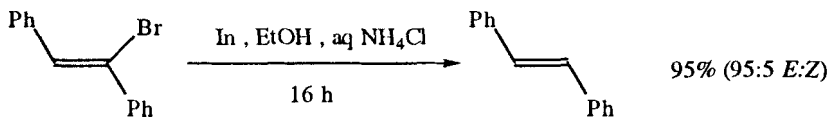
Sawaguchi, M.; Hara, S.; Nakamura, Y.; Ayuba, S.; Fukuhara, T.; Yoneda, N. *Tetrahedron*, **2001**, 57, 3315.



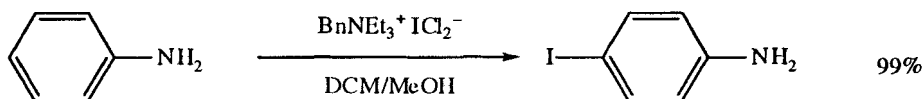
Sawaguchi, M.; Ayuba, S.; Nakamura, Y.; Fukuhara, T.; Hara, S.; Yoneda, N. *Synlett*, **2000**, 999.

## SECTION 146: HALIDES AND SULFONATES FROM HYDRIDES

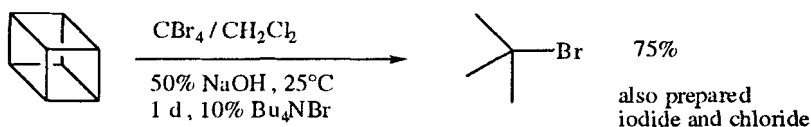
$\alpha$ -Halogenations of aldehydes, ketones and acids are found in Sections 338 (Halide-Aldehyde), 369 (Halide-Ketone), 359 (Halide-Esters) and 319 (Halide-Acids).



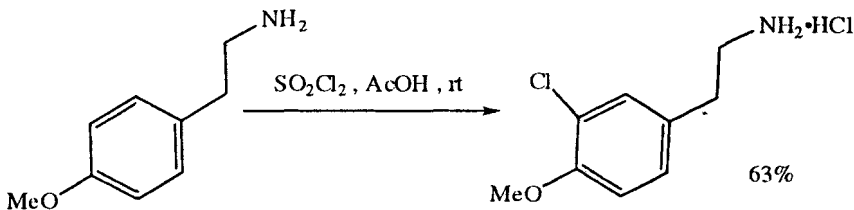
Ranu, B.C.; Samanta, S.; Guchhait, S.K. *J. Org. Chem.*, **2001**, 66, 4102.



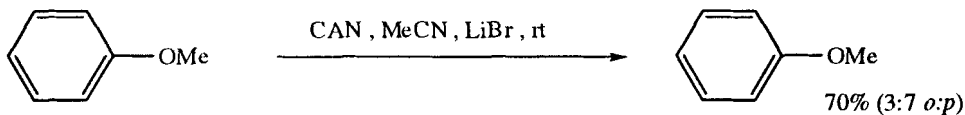
Kesynkin, D.V.; Tour, J.M. *Org. Lett.*, **2001**, 3, 991.



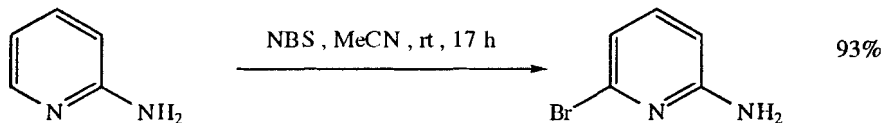
Fokin, A.A.; Lauenstein, O.; Gunchenko, P.A.; Schreiner, P.R. *J. Am. Chem. Soc.*, **2001**, 123, 1842.



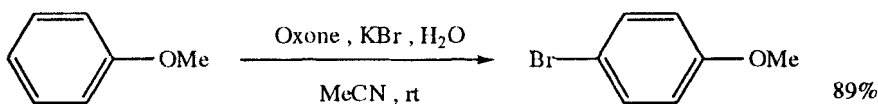
Yu, G.; Mason, H.J.; Wu, X.; Endo, M.; Douglas, J.; Macor, J.E. *Tetrahedron Lett.*, **2001**, 42, 3247.



Roy, S.C.; Guin, C.; Rana, K.K.; Maiti, G. *Tetrahedron Lett.*, **2001**, 42, 6941.

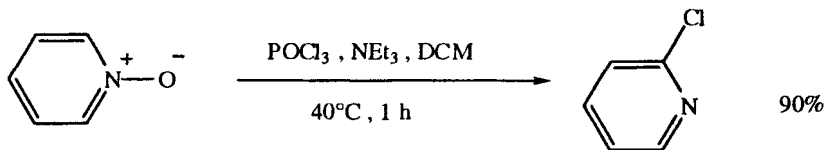


Cañibano, V.; Rodríguez, J.F.; Santos, M.; Sanz-Tejedor, A.; Carreño, M.C.; González, G.; García-Ruano, J.L. *Synthesis*, **2001**, 2175.

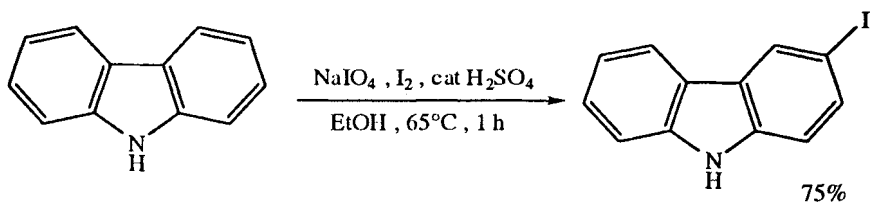


Tamhankar, B.V.; Desai, U.V.; Mane, R.B.; Wadgaonkar, P.P.; Bedekar, A.V. *Synth. Commun.*, **2001**, 31, 2021.

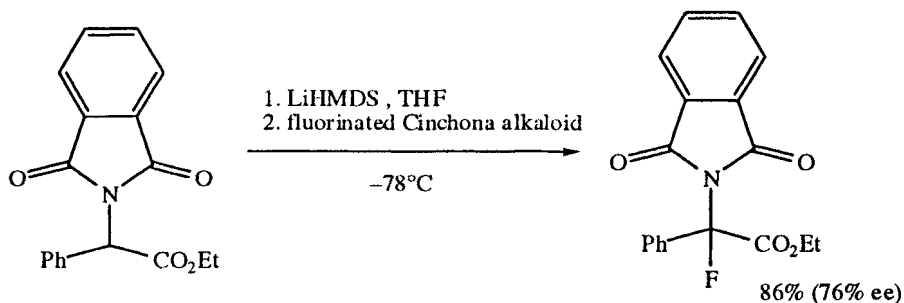




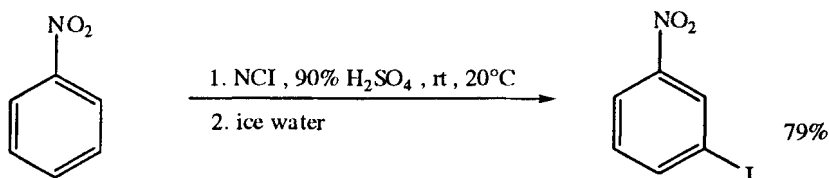
Jung, J.-C.; Jung, Y.-J.; Park, O.-S. *Synth. Commun.*, **2001**, *31*, 2507.



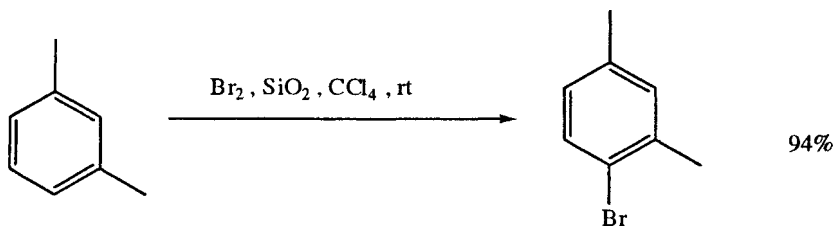
Bonesi, S.M.; Erra-Balsells, R. *J. Heterocyclic Chem.*, **2001**, *38*, 77.



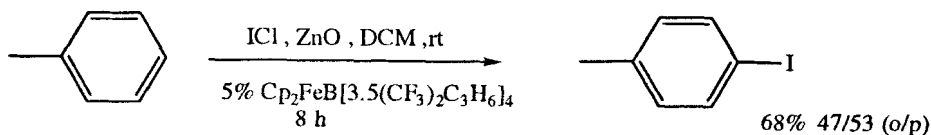
Mohar, B.; Baudoux, J.; Plaquevent, J.-C.; Cahard, D. *Angew. Chem. Int. Ed.*, **2001**, *40*, 4214.



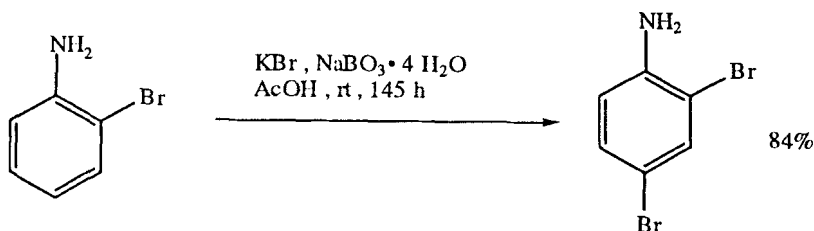
Chaikovskii, V.K.; Shorokhodov, V.I.; Filimonov, V.D. *Russ. J. Org. Chem.*, **2001**, *37*, 1503.



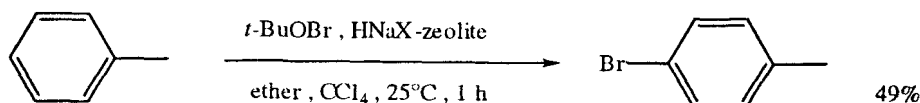
Ghiaci, M.; Asghari, J. *Bull. Chem. Soc. Jpn.*, **2001**, *74*, 1151.



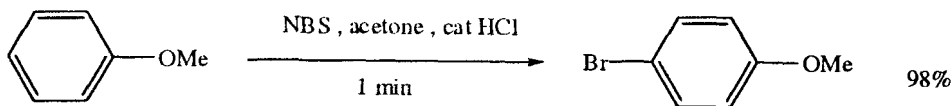
Mukaiyama, T.; Kitagawa, H.; Matsuo, J.-i. *Tetrahedron Lett.*, **2000**, *41*, 9383.



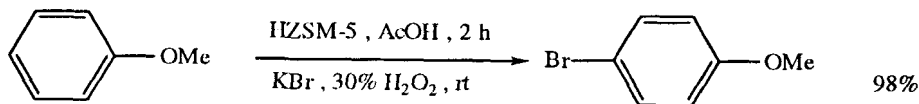
Roche, D.; Prasad, K.; Repic, O.; Blacklock, T.J. *Tetrahedron Lett.*, **2000**, *41*, 2083.



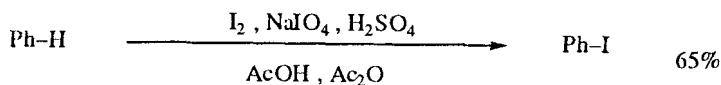
Smith, K.; El-Hiti, G.A.; Hammond, M.E.W.; Bahzad, D.; Li, Z.; Siquet, C. *J. Chem. Soc., Perkin Trans. I*, **2000**, 2745.



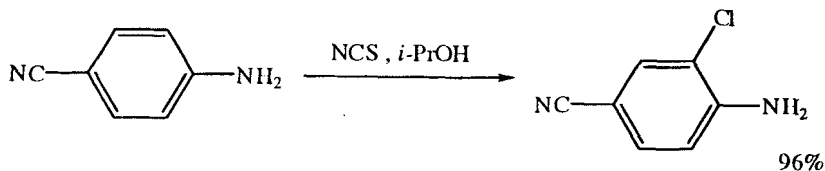
Andersh, B.; Murphy, D.L.; Olson, R.J. *Synth. Commun.*, **2000**, *30*, 2091.



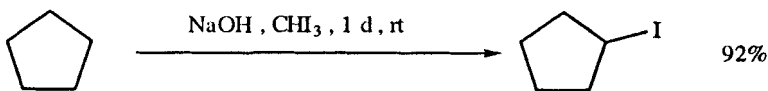
Narender, N.; Srinivasu, P.; Kulkarni, S.L.; Raghavan, K.V. *Synth. Commun.*, **2000**, *30*, 3669.



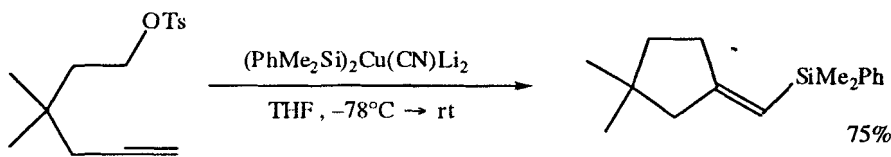
Luliński, P.; Skulski, J. *Bull. Chem. Soc. Jpn.*, **2000**, *73*, 951.



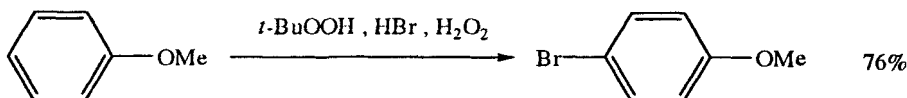
Zanka, A.; Kubota, A. *Synlett*, **1999**, 1984.



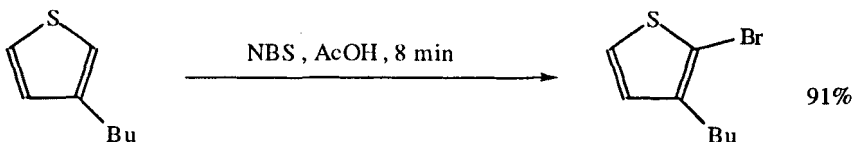
Schreiner, P.R.; Lauenstein, O.; Butova, E.D.; Fokin, A.A.  
*Angew. Chem. Int. Ed.*, **1999**, *38*, 2786.



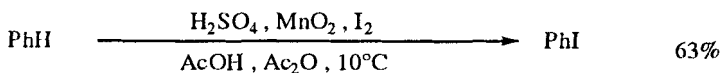
Chambers, R.D.; Parsons, M.; Sandford, G.; Skinner, C.J.; Atherton, M.J.; Moilliet, J.S.  
*J. Chem. Soc., Perkin Trans. 1*, **1999**, 803.



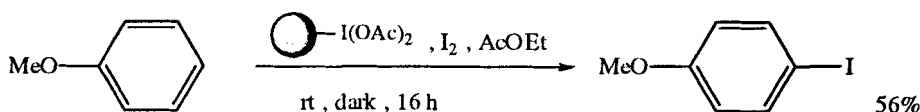
Barhate, N.B.; Gajare, A.S.; Wakharkar, R.D.; Bedekar, A.V. *Tetrahedron*, **1999**, *55*, 11127.



Hoffmann, K.J.; Carlsen, P.H.L. *Synth. Commun.*, **1999**, *29*, 1607.



Luliński, P.; Skulski, L. *Bull. Chem. Soc. Jpn.*, **1999**, *72*, 115.



Togo, H.; Abe, S.; Nogami, G.; Yokoyama, M. *Bull. Chem. Soc. Jpn.*, **1999**, *72*, 2351.

## SECTION 147: HALIDES AND SULFONATES FROM KETONES

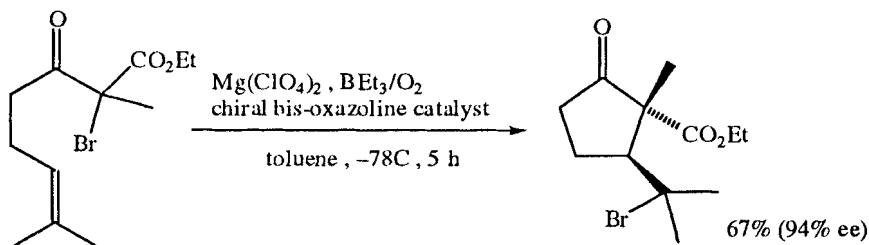
NO ADDITIONAL EXAMPLES

## SECTION 148: HALIDES AND SULFONATES FROM NITRILES

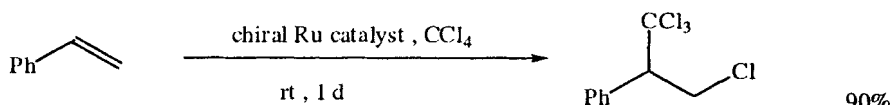
NO ADDITIONAL EXAMPLES

## SECTION 149: HALIDES AND SULFONATES FROM ALKENES

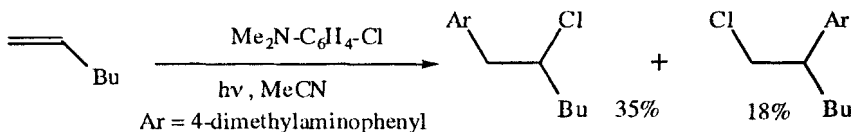
For halocyclopropanations, see Section 74E (Alkyls from Alkenes).



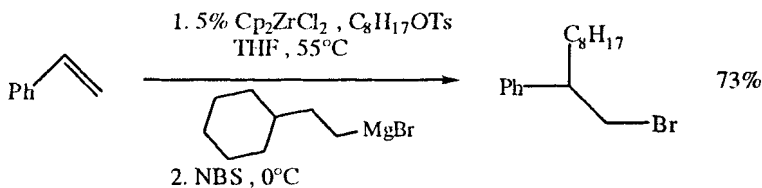
Yang, D.; Gu, S.; Yan, Y.-L.; Zhu, N.-Y.; Cheung, K.-K.  
*J. Am. Chem. Soc.*, **2001**, *123*, 8612.



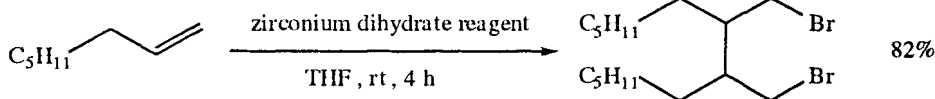
Simal, E.; Włodarczak, L.; Demonceau, A.; Noels, A.F. *Eur. J. Org. Chem.*, **2001**, 2689.



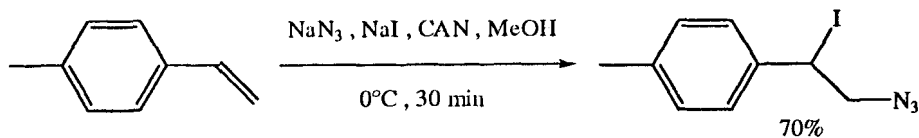
Mella, M.; Coppo, P.; Guizzardo, B.; Fagnoni, M.; Freccero, M.; Albini, A.  
*J. Org. Chem.*, **2001**, *66*, 6344.



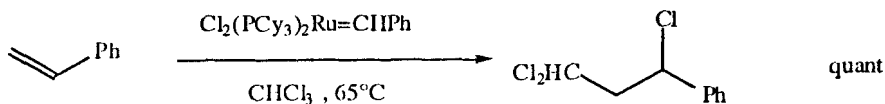
de Armas, J.; Hoveyda, A.H. *Org. Lett.*, **2001**, *3*, 2097.



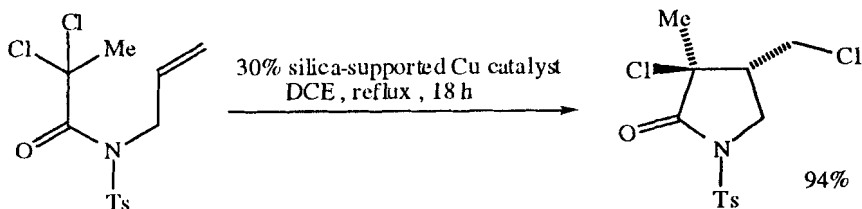
Wipf, P.; Wang, X. *Tetrahedron Lett.*, **2000**, *41*, 8237.



Nair, V.; George, T.G.; Sheeba, V.; Augustine, A.; Balagopal, L.; Nair, L.G. *Synlett*, 2000, 1597.



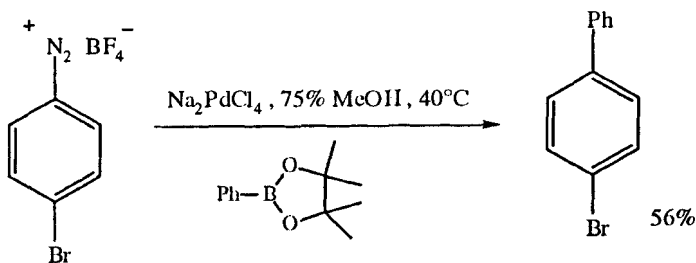
Tallarico, J.A.; Malnick, L.M.; Snapper, M.L. *J. Org. Chem.*, 1999, 64, 344.



Clark, A.L.; Filik, R.P.; Haddleton, D.M.; Radigue, A.; Sanders, C.J.; Thomas, G.H.; Smith, M.E. *J. Org. Chem.*, 1999, 64, 8954.

## SECTION 150:

## HALIDES AND SULFONATES FROM MISCELLANEOUS COMPOUNDS



Willis, D.M.; Strongin, R.M. *Tetrahedron Lett.*, 2000, 41, 6271.

# CHAPTER 11

## PREPARATION OF HYDRIDES

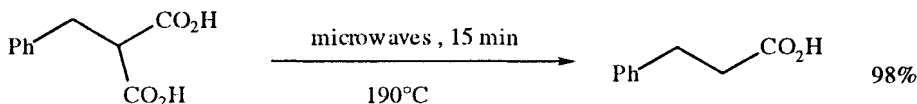
This chapter lists hydrogenolysis and related reactions by which functional groups are replaced by hydrogen: e.g.  $\text{RCH}_2\text{X} \rightarrow \text{RCH}_2\text{-H}$  or  $\text{R-H}$ .

### SECTION 151: HYDRIDES FROM ALKYNES

NO ADDITIONAL EXAMPLES

### SECTION 152: HYDRIDES FROM ACID DERIVATIVES

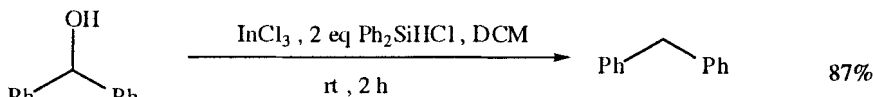
This section lists examples of decarboxylations ( $\text{RCO}_2\text{H} \rightarrow \text{R-H}$ ) and related reactions.



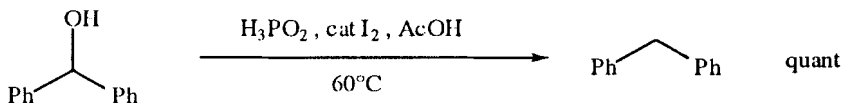
Zara, C.L.; Jin, T.; Giguere, R.I. *Synth. Commun.*, **2000**, *30*, 2099.

### SECTION 153: HYDRIDES FROM ALCOHOLS AND THIOLS

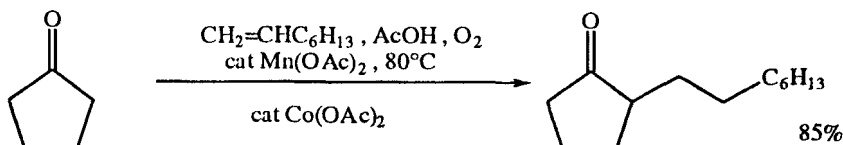
This section lists examples of the hydrogenolysis of alcohols and phenols ( $\text{ROH} \rightarrow \text{R-H}$ ).



Yasuda, M.; Onishi, Y.; Ueba, M.; Miyai, T.; Baba, A. *J. Org. Chem.*, **2001**, *66*, 7741.



Gordon, P.E.; Fry, A.J. *Tetrahedron Lett.*, **2001**, *42*, 831.



Crudden, C.M.; Allen, D.; Mikeluk, M.D.; Sun, J. *Chem. Commun.*, **2001**, 1154.

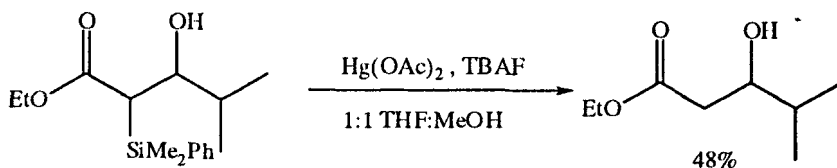
Also via: Section 160 (Halides and Sulfonates).

## SECTION 154: HYDRIDES FROM ALDEHYDES

For the conversion  $\text{RCHO} \rightarrow \text{R-Me}$ , etc., see Section 64 (Alkyls from Aldehydes).

NO ADDITIONAL EXAMPLES

## SECTION 155: HYDRIDES FROM ALKYLs, METHYLENES AND ARYLs



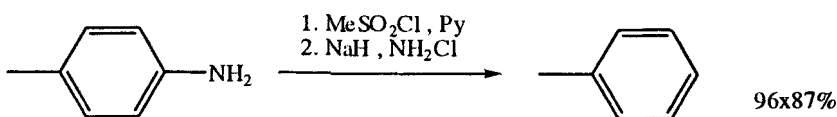
Poliskie, G.M.; Mader, M.M.; van Well, R. *Tetrahedron Lett.*, **1999**, *40*, 589.

## SECTION 156: HYDRIDES FROM AMIDES

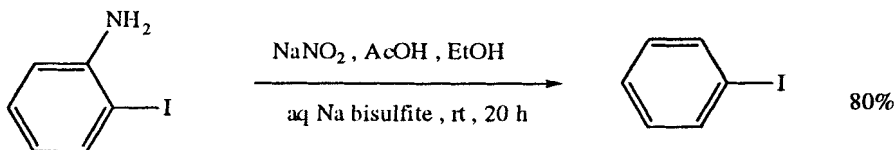
NO ADDITIONAL EXAMPLES

## SECTION 157: HYDRIDES FROM AMINES

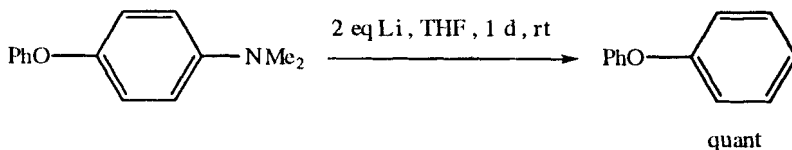
This section lists examples of the conversion  $\text{RNH}_2$  (or  $\text{R}_2\text{NH}$ )  $\rightarrow$  R-H.



Wang, Y.; Guzjee Jr., F.S. *J. Org. Chem.*, **2001**, *66*, 8293.



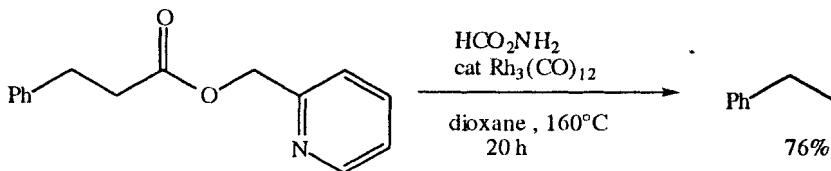
Geoffroy, O.J.; Morinelli, T.A.; Meier, G.B. *Tetrahedron Lett.*, **2001**, *42*, 5367.



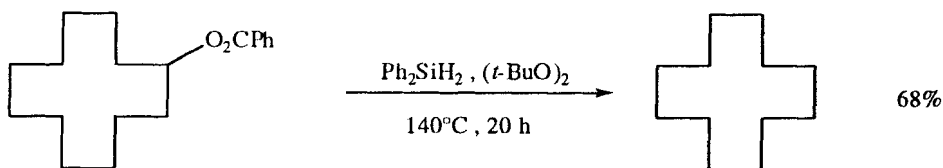
Azzena, U.; Dessanti, F.; Melloni, G.; Pisano, L. *Tetrahedron Lett.*, **1999**, *40*, 8291.

## SECTION 158: HYDRIDES FROM ESTERS

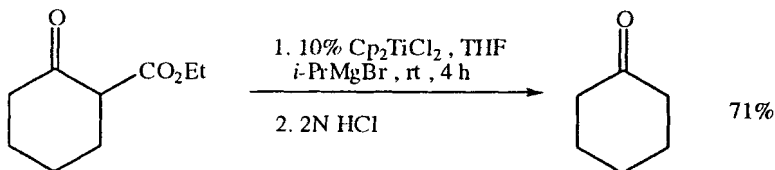
This section lists examples of the reactions  $\text{RCO}_2\text{R}' \rightarrow \text{R-H}$  and  $\text{RCO}_2\text{R}' \rightarrow \text{R'H}$ .



Chatani, N.; Tatamidani, H.; Ie, Y.; Kakiuchi, F.; Murai, S. *J. Am. Chem. Soc.*, **2001**, *123*, 4849.



Tang, D.Q.; Kim, J.; Cho, D.H.; Chung, C.-M. *Tetrahedron Lett.*, **2001**, *42*, 1073.

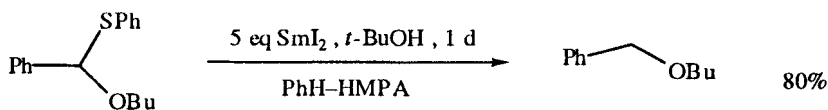


Yu, Y.; Zhang, Y. *Synth. Commun.*, **1999**, *29*, 243.

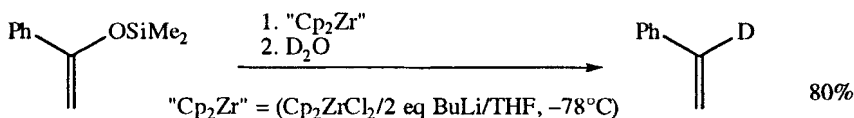


## SECTION 159: HYDRIDES FROM ETHERS, EPOXIDES AND THIOETHERS

This section lists examples of the reaction  $R-O-R' \rightarrow R-H$ .



Nakata, D.; Kusaka, C.; Tani, S.; Kunishima, M. *Tetrahedron Lett.*, **2001**, *42*, 415.

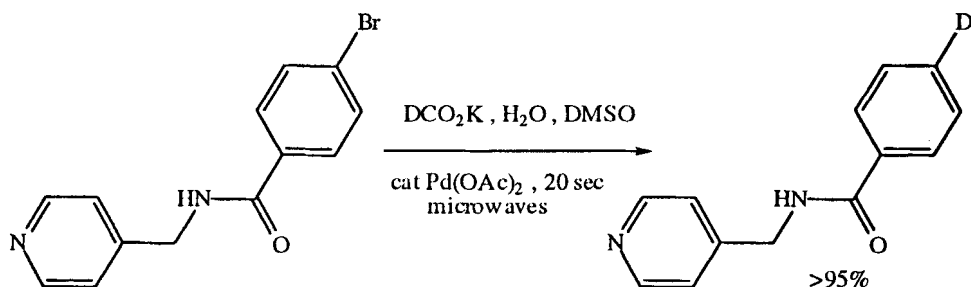


"Cp<sub>2</sub>Zr" = (Cp<sub>2</sub>ZrCl<sub>2</sub>/2 eq BuLi/THF, -78°C)

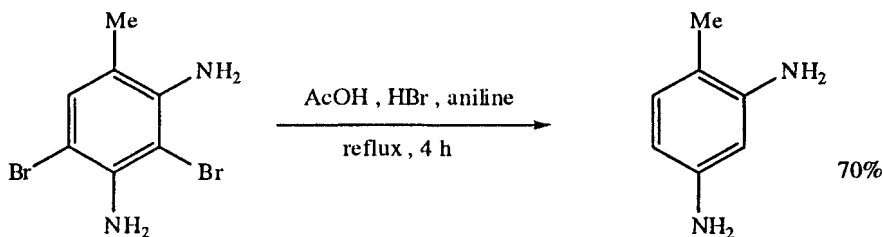
Ganchegui, B.; Bertus, P.; Szymoniak, J. *Synlett*, **2001**, 123.

## SECTION 160: HYDRIDES FROM HALIDES AND SULFONATES

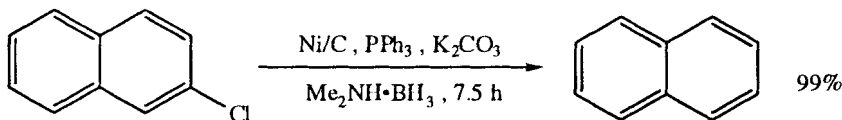
This section lists the reductions of halides and sulfonates,  $R-X \rightarrow R-H$ .



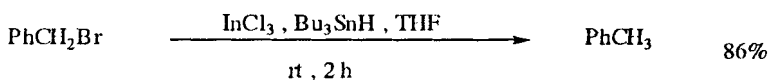
Jones, J.R.; Lockley, W.J.S.; Lu, S.-Y.; Thompson, S.P. *Tetrahedron Lett.*, **2001**, *42*, 331.



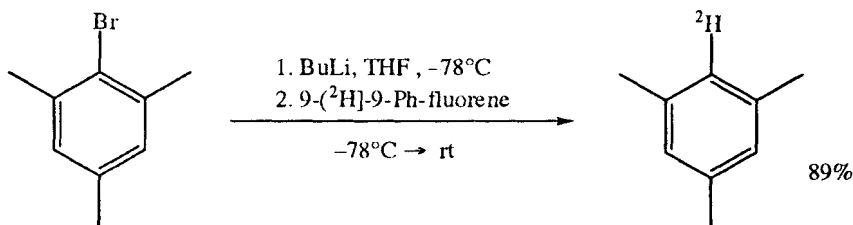
Choi, H.; Chi, D.Y. *J. Am. Chem. Soc.*, **2001**, *123*, 9202.



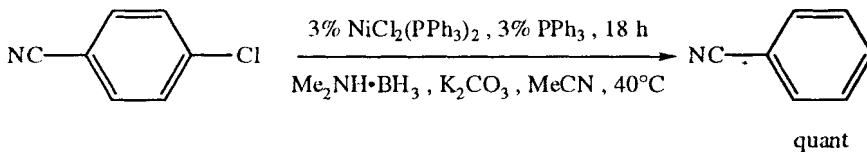
Lipshutz, B.H.; Tomioka, T.; Sato, K. *Synlett*, **2001**, 970.



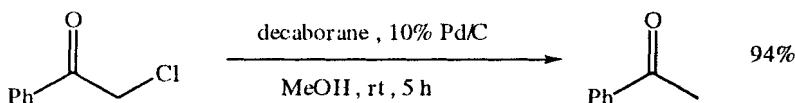
Inoue, K.; Sawada, A.; Shibata, I.; Baba, A. *Tetrahedron Lett.*, **2001**, 42, 4661.



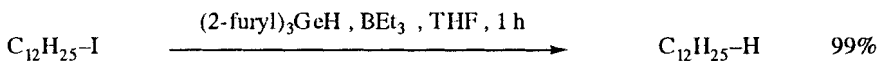
Cintrat, J.-C.; Pillon, F.; Rousseau, B. *Tetrahedron Lett.*, **2001**, 42, 5001.



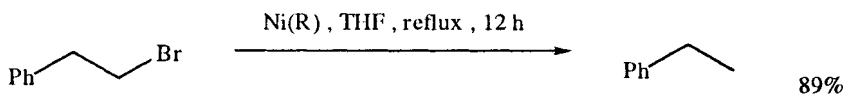
Lipshutz, B.H.; Tomioka, T.; Pfeiffer, S.S. *Tetrahedron Lett.*, **2001**, 42, 7737.



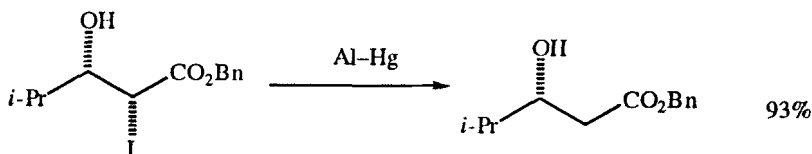
Lee, S.H.; Jung, Y.J.; Cho, Y.J.; Yoon, C.-O.M.; Hwang, H.-J.; Yoon, C.M. *Synth. Commun.*, **2001**, 31, 2251.



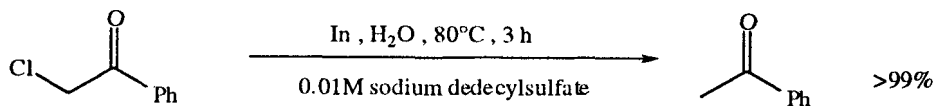
Nakamura, T.; Yorimitsu, H.; Shinokubo, H.; Oshima, K. *Bull. Chem. Soc. Jpn.*, **2001**, 74, 747.



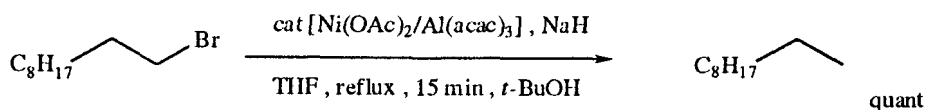
Barrero, A.E.; Alvarez-Manzaneda, E.J.; Chahboun, R.; Meneses, R.; Romera, J.L. *Synlett*, **2001**, 485.



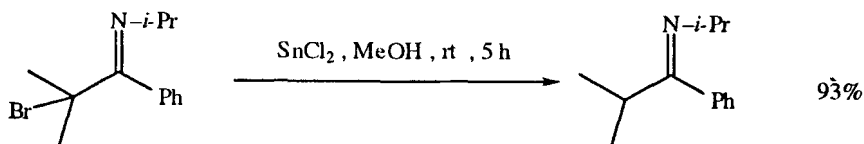
Wang, Y.-C.; Yan, T.-H. *Chem. Commun.*, **2000**, 545.



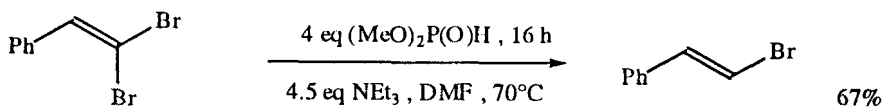
Park, L.; Keum, G.; Kang, S.B.; Kim, K.S.; Kim, Y. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 4462.



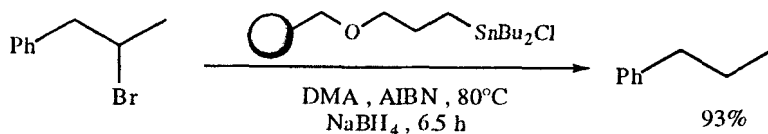
Massicot, F.; Schneider, R.; Fort, Y.; Illy-Cherrey, S.; Tillement, O. *Tetrahedron*, **2000**, 56, 4765.



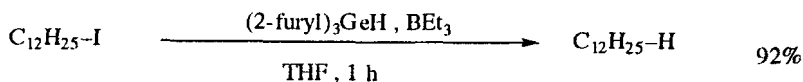
Aelterman, W.; Eeckhaut, A.; De Kimpe, N. *Synlett*, **2000**, 1283.



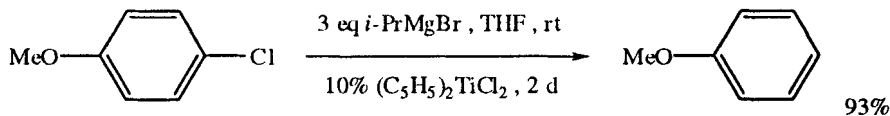
Abbas, S.; Hayes, C.J.; Worden, S. *Tetrahedron Lett.*, **2000**, 41, 3215.



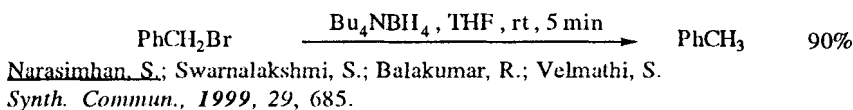
Enholm, E.J.; Schulte II, J.P. *Org. Lett.*, **1999**, 1, 1275.



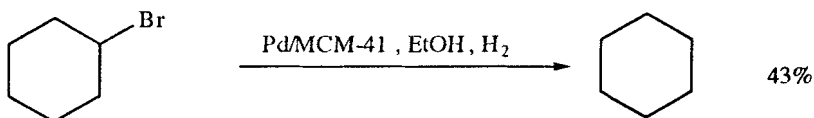
Nakamura, T.; Yorimitsu, H.; Shinokubo, H.; Oshima, K. *Synlett*, **1999**, 1415.



Hara, R.; Sato, K.; Sun, W.-H.; Takahashi, T. *Chem. Commun.*, **1999**, 845.



Narasimhan, S.; Swarnalakshmi, S.; Balakumar, R.; Velmathi, S. *Synth. Commun.*, **1999**, 29, 685.



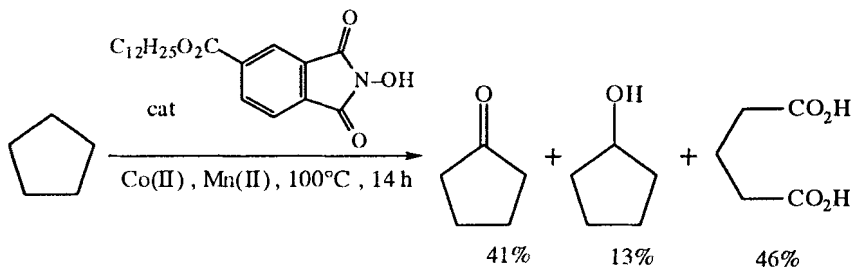
Kantam, M.L.; Rahman, A.; Bandyopadhyay, T.; Haritha, Y. *Synth. Commun.*, **1999**, 29, 691.

## SECTION 161: HYDRIDES FROM HYDRIDES

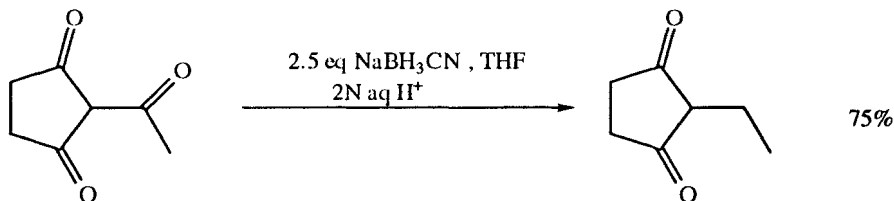
NO ADDITIONAL EXAMPLES

## SECTION 162: HYDRIDES FROM KETONES

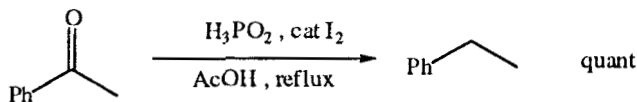
This section lists examples of the reaction  $R_2C-(C=O)R \rightarrow R_2C-H(R)$ .



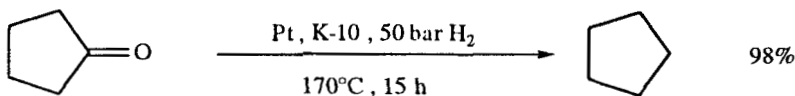
Sawatari, N.; Yokota, T.; Sakaguchi, S.; Ishii, Y. *J. Org. Chem.*, **2001**, 66, 7889.



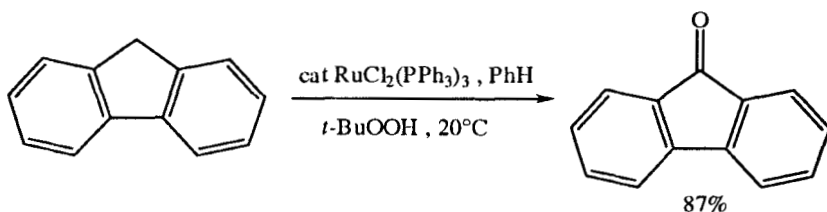
Pashkovsky, F.S.; Lokot, I.P.; Lakhvich, F.A. *Synlett*, **2001**, 1391.



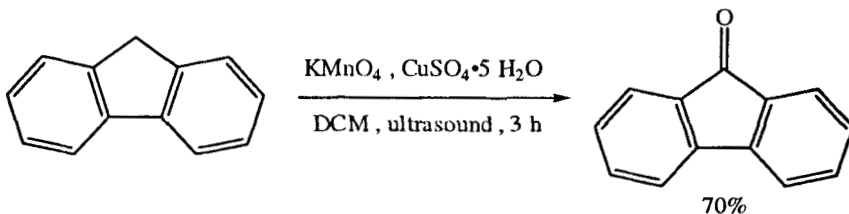
Hicks, L.D.; Han, J.K.; Fry, A.J. *Tetrahedron Lett.*, **2000**, *41*, 7817.



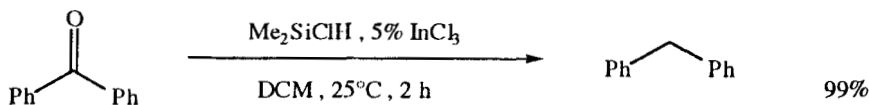
Török, B.; London, G.; Bartók, M. *Synlett*, **2000**, 631.



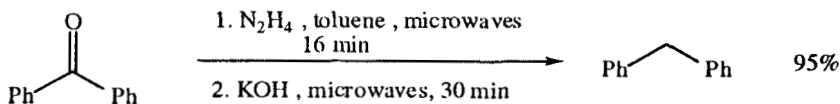
Murahashi, S.-I.; Komiya, N.; Oda, Y.; Kuwabara, T.; Naota, T. *J. Org. Chem.*, **2000**, *65*, 9186.



Mečiarová, M.; Toma, S.; Heribanová, A. *Tetrahedron*, **2000**, *56*, 8561.



Miyai, T.; Ueba, M.; Baba, A. *Synlett*, **1999**, 182.



Gadhwai, S.; Baruah, M.; Sandhu, J.S. *Synlett*, **1999**, 1573.

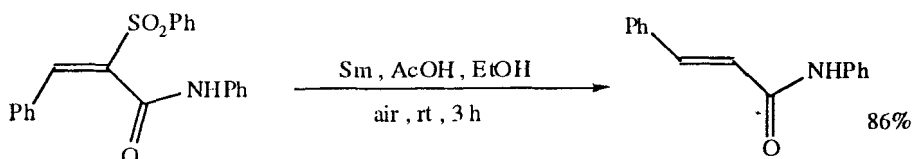
**SECTION 163: HYDRIDES FROM NITRILES**

This section lists examples of the reaction,  $R-C\equiv N \rightarrow R-H$  (includes reactions of isonitriles ( $R-N\equiv C$ )).

NO ADDITIONAL EXAMPLES

**SECTION 164: HYDRIDES FROM ALKENES**

NO ADDITIONAL EXAMPLES

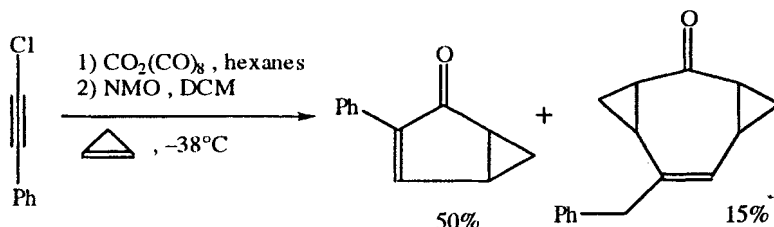
**SECTION 165: HYDRIDES FROM MISCELLANEOUS COMPOUNDS**

Liu, Y.; Zhang, Y. *Org. Prep. Proceed. Int.*, **2001**, 33, 376.

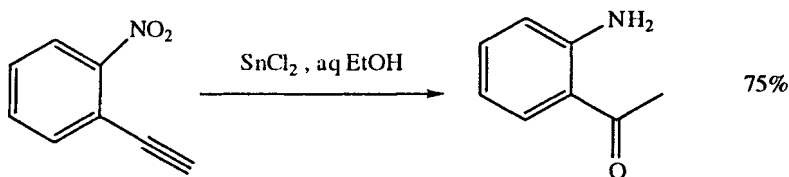
# CHAPTER 12

## PREPARATION OF KETONES

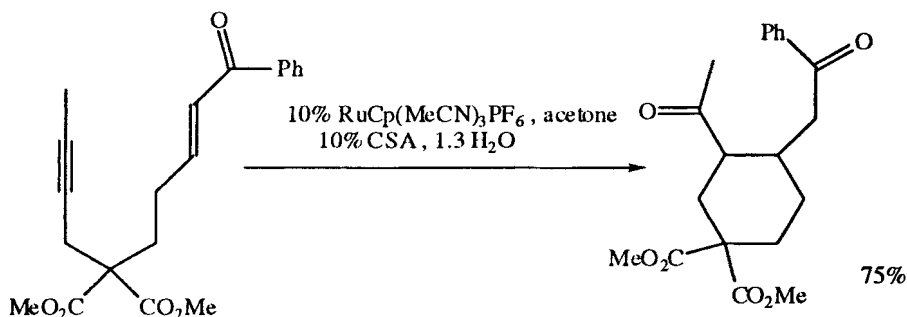
### SECTION 166: KETONES FROM ALKYNES



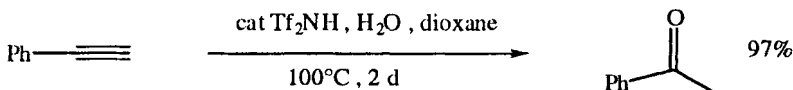
Marchueta, I.; Verdaguer, X.; Moyano, A.; Pericàs, M.A.; Riera, A. *Org. Lett.*, **2001**, 3, 3193.



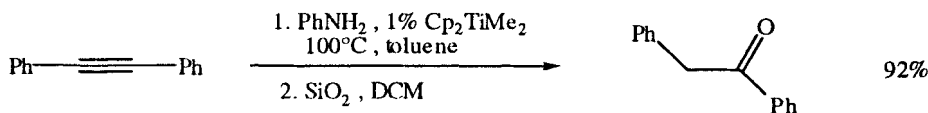
Bosch, E.; Jefferies, L. *Tetrahedron Lett.*, **2001**, 42, 8141.



Trost, B.M.; Brown, R.E.; Toste, F.D. *J. Am. Chem. Soc.*, **2000**, 122, 5877.

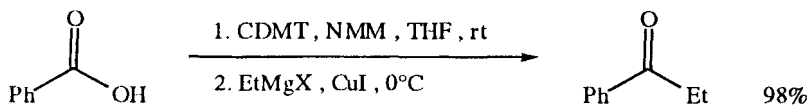


Tsuchimoto, T.; Joya, T.; Shirakawa, E.; Kawakami, Y. *Synlett*, **2000**, 1777.



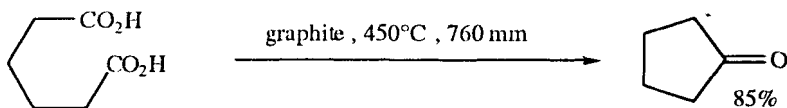
Haak, E.; Bytschkov, I.; Doye, S. *Angew. Chem. Int. Ed.*, **1999**, 38, 3389.

## SECTION 167: KETONES FROM ACID DERIVATIVES



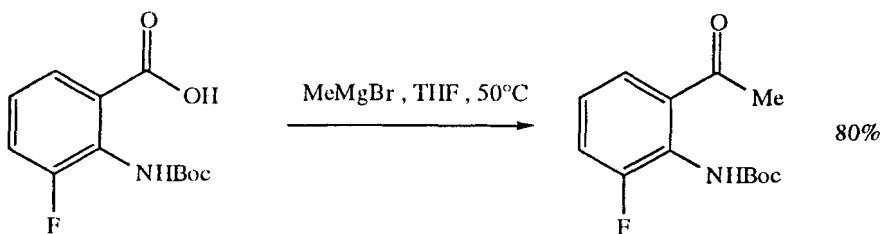
CDMT = 2-chloro-4,6-dimethoxy-[1,3,5]-triazine

De Luca, L.; Giacomelli, G.; Porcheddu, A. *Org. Lett.*, **2001**, 3, 1519.



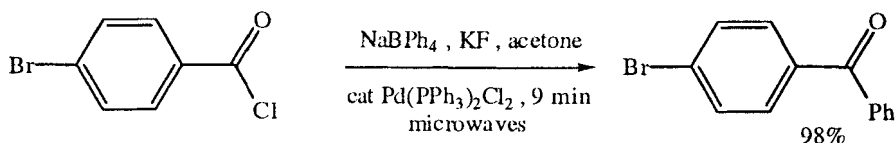
microwaves (2x2 min)x6,  $450^\circ\text{C}$  90%

Barrero, A.E.; Alvarez-Manzaneda, E.J.; Chahboun, R.; Meneses, R.; Romera, J.L. *Synlett*, **2001**, 485.



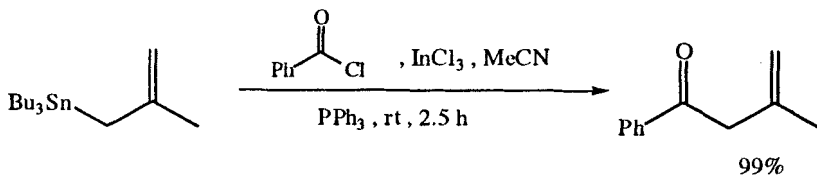
<5% when F is replaced with H

Zhang, P.; Terefenko, E.A.; Slavin, J. *Tetrahedron Lett.*, **2001**, 42, 2097.

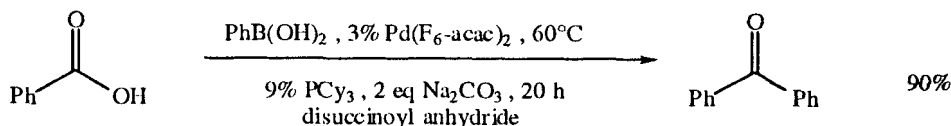


Wang, J.-X.; Wei, B.; Hu, Y.; Liu, Z.; Yang, Y. *Synth. Commun.*, **2001**, 31, 3885.

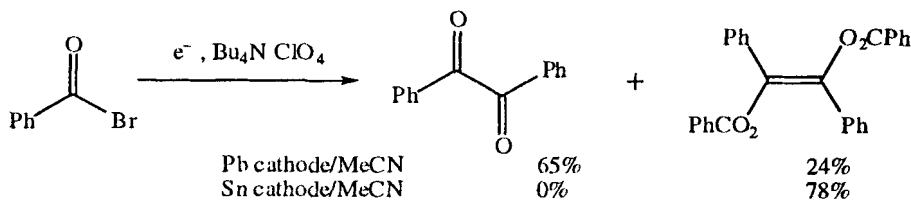




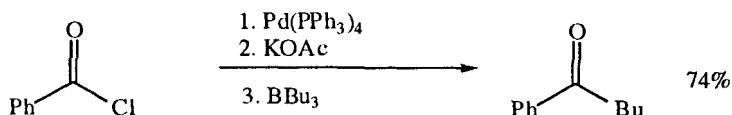
Inoue, K.; Shimizu, Y.; Shibata, I.; Baba, A. *Synlett*, **2001**, 1659.



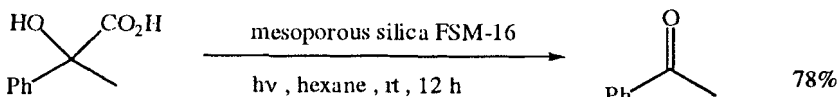
Gooßen, L.L.; Ghosh, K. *Chem. Commun.*, **2001**, 2084.



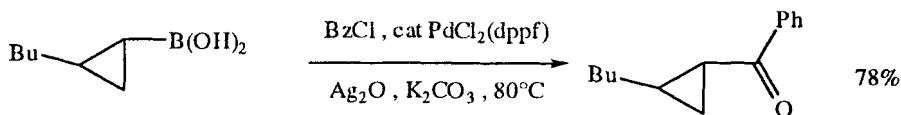
Kise, N.; Ueda, N. *Bull. Chem. Soc. Jpn.*, **2001**, 74, 755.



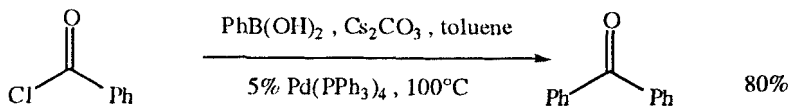
Kabalka, G.W.; Malladi, R.R.; Tejedor, D.; Kelley, S. *Tetrahedron Lett.*, **2000**, 41, 999.



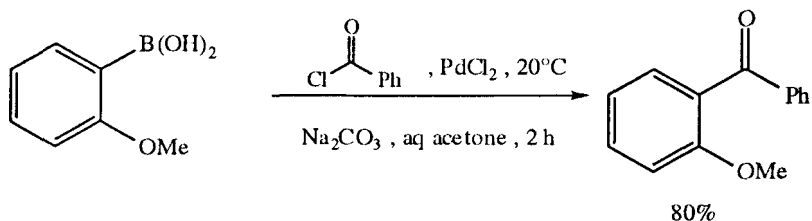
Itoh, A.; Kodama, T.; Inagaki, S.; Masaki, Y. *Org. Lett.*, **2000**, 2, 331.



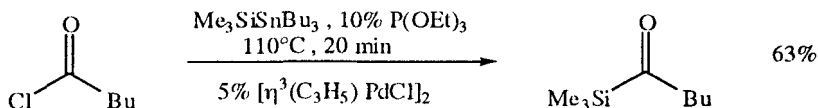
Chen, H.; Deng, M.-Z. *Org. Lett.*, **2000**, 2, 1649.



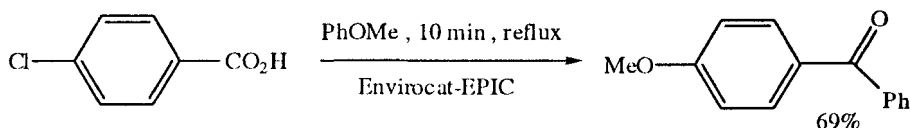
Haddach, M.; McCarthy, J.R. *Tetrahedron Lett.*, **1999**, 40, 3109.



Bumagin, N.A.; Korolev, D.N. *Tetrahedron Lett.*, **1999**, 40, 3057.

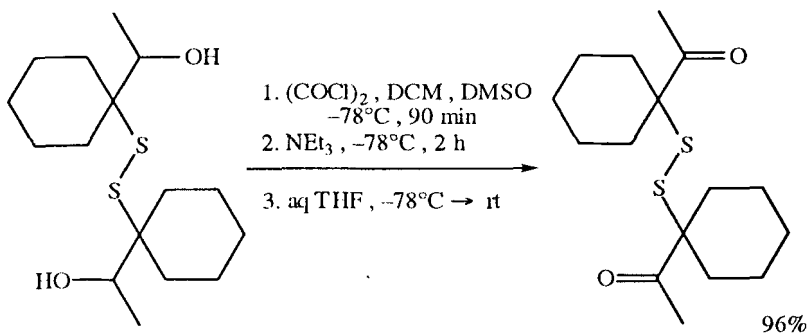


Geng, F.; Maleczka Jr., R.E. *Tetrahedron Lett.*, **1999**, 40, 3113.

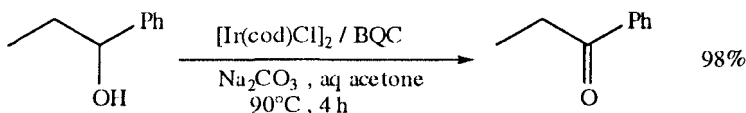


Bandgar, B.P.; Sadvarte, V.S. *Synth. Commun.*, **1999**, 29, 2587.

## SECTION 168: KETONES FROM ALCOHOLS AND THIOLS

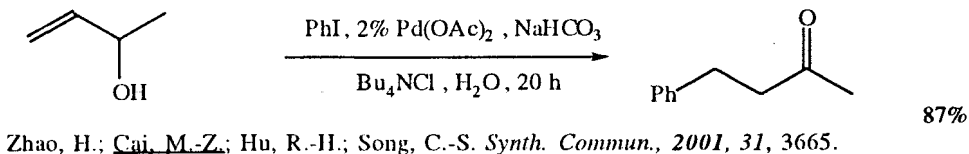
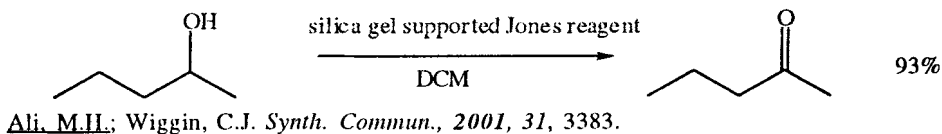
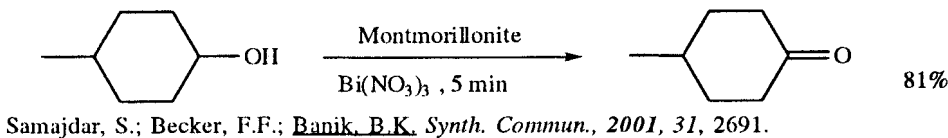
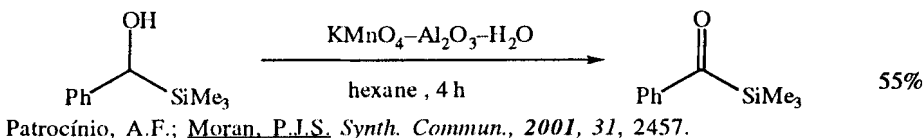
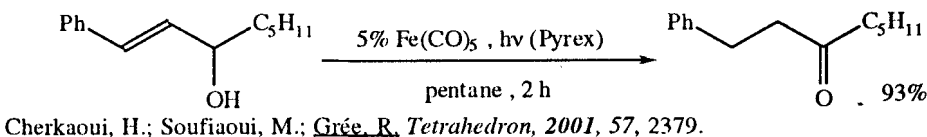
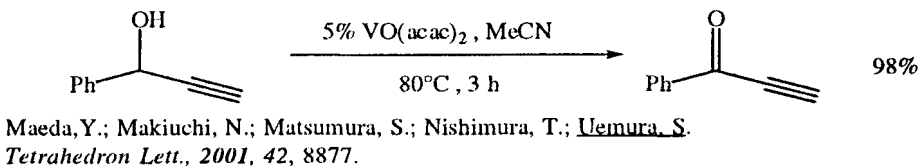
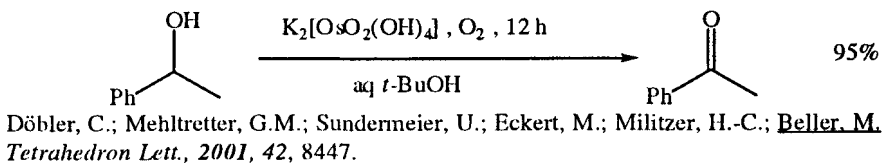
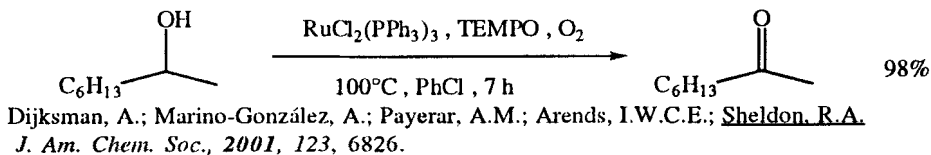


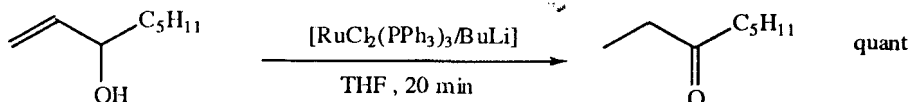
Fang, X.; Bandarage, U.K.; Wang, T.; Schroeder, J.D.; Garvey, D.S. *J. Org. Chem.*, **2001**, 66, 4019.



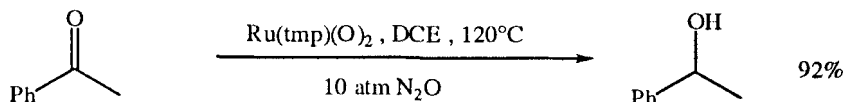
BQC = 2,2'-biquinoline

Ajjou, A.N. *Tetrahedron Lett.*, **2001**, 42, 13.

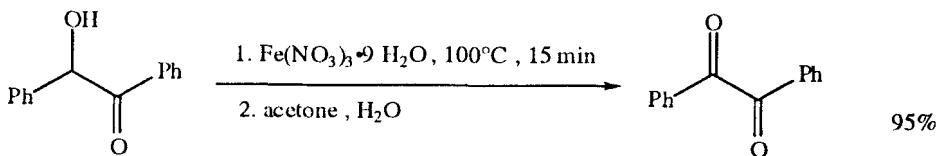




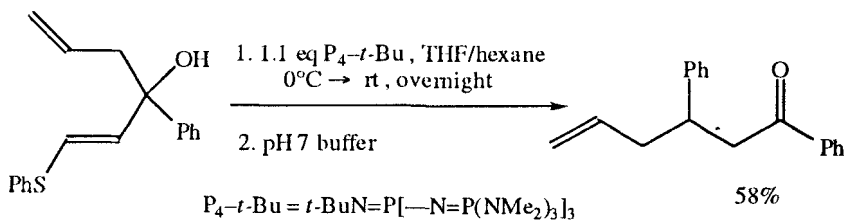
Uma, R.; Davies, M.K.; Crévisy, C.; Grée, R. *Eur. J. Org. Chem.*, **2001**, 3141.



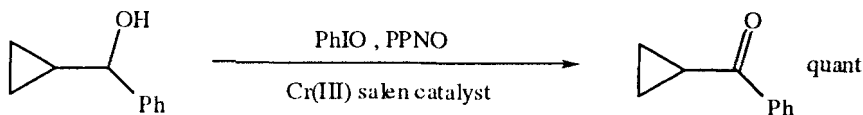
Hashimoto, K.; Kitaichi, Y.; Tanaka, H.; Ikeno, T.; Yamada, T. *Chem. Lett.*, **2001**, 922.



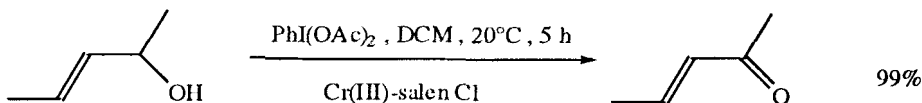
Zhao, Y.-W.; Wang, Y.-L. *J. Chem. Res. (S)*, **2001**, 70.



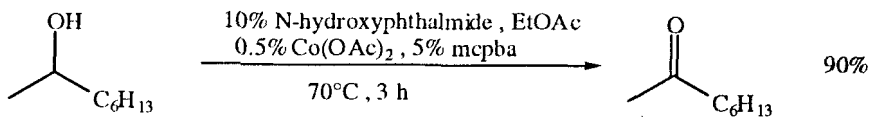
Mamdani, H.T.; Hartley, R.C. *Tetrahedron Lett.*, **2000**, 41, 747.



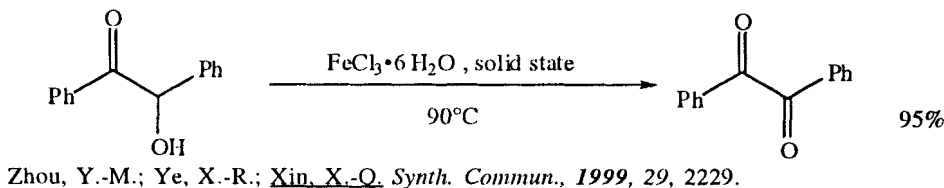
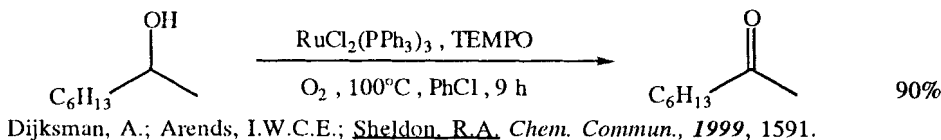
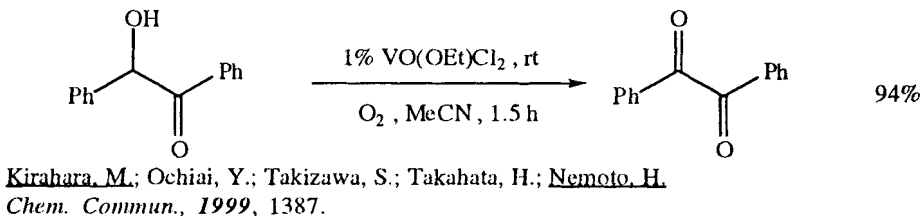
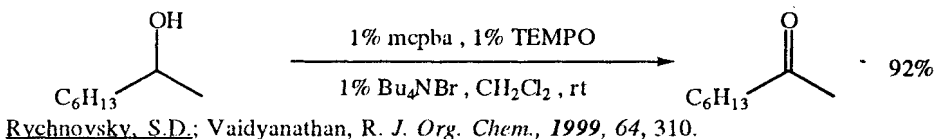
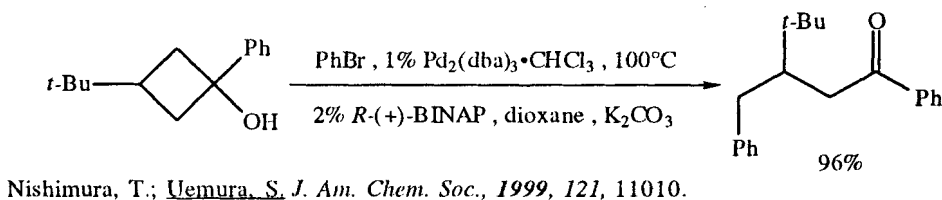
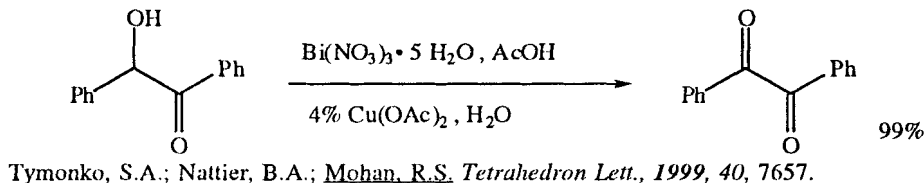
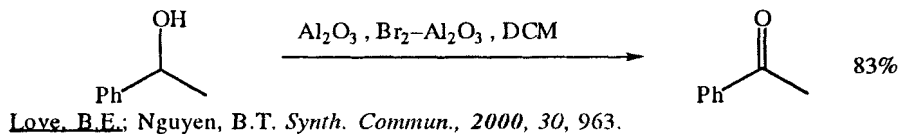
Adam, W.; Gelalcha, F.G.; Saha-Möller, C.R.; Stegmann, V.R. *J. Org. Chem.*, **2000**, 65, 1915.

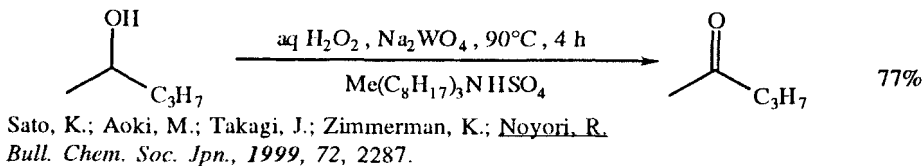
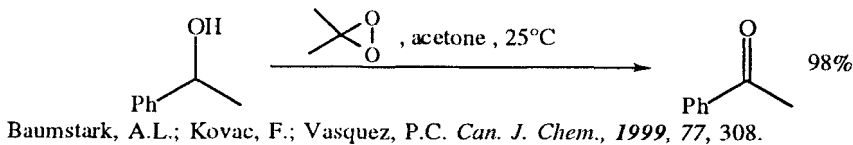


Adam, W.; Hajra, S.; Herderich, M.; Saha-Möller, C.R. *Org. Lett.*, **2000**, 2, 2773.



Iwahama, T.; Yoshino, Y.; Keitoku, T.; Sakaguchi, S.; Ishii, Y. *J. Org. Chem.*, **2000**, 65, 6502.



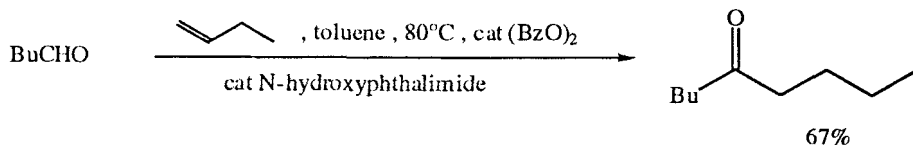
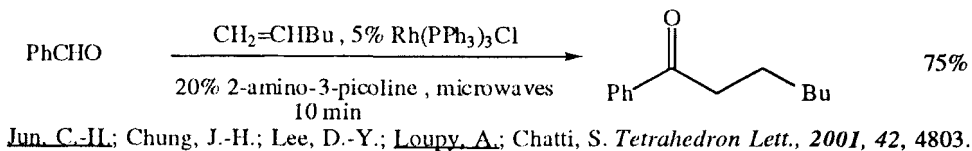
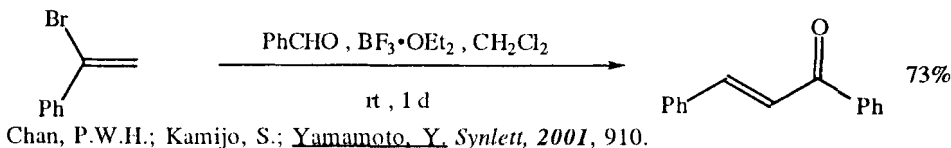
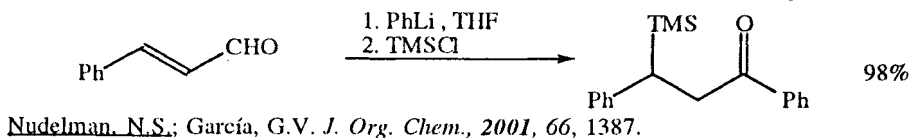


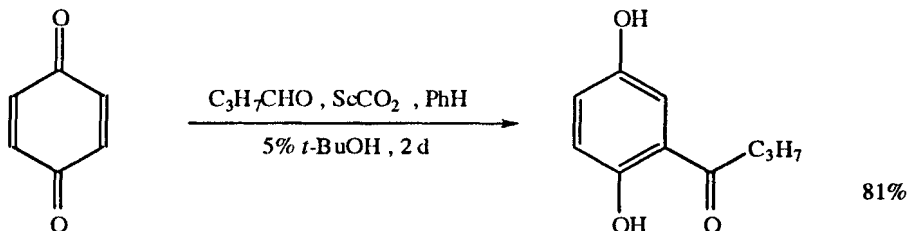
## REVIEWS:

"Selective Oxidation of Secondary Alcohols," Arterburn, J.B. *Tetrahedron*, **2001**, *57*, 9765.

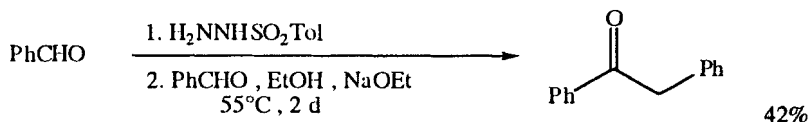
Related Methods: Section 48 (Aldehydes from Alcohols and Phenols).

## SECTION 169: KETONES FROM ALDEHYDES

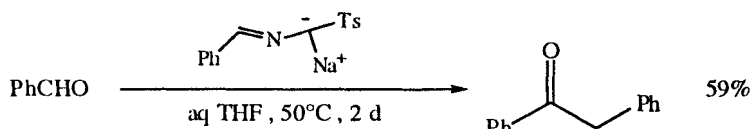




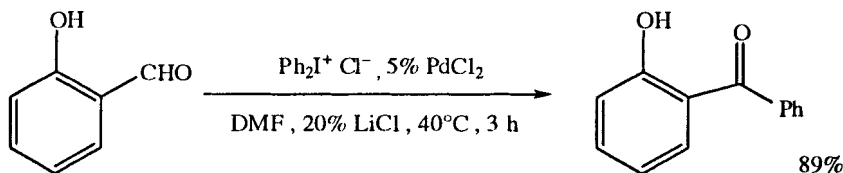
Pacut, R.; Grimm, M.L.; Kraus, G.A.; Tanko, J.M. *Tetrahedron Lett.*, **2001**, 42, 1415.



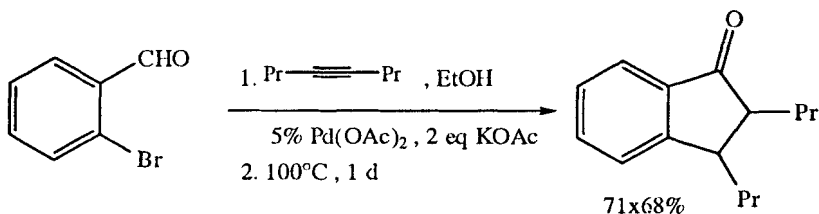
Angle, S.R.; Neitzel, M.L. *J. Org. Chem.*, **2000**, 65, 6458.



Aggarwal, V.K.; de Vincente, J.; Pelotier, B.; Holmes, I.P.; Bonnert, R.V. *Tetrahedron Lett.*, **2000**, 41, 10327.



Xia, M.; Chen, Z.C. *Synth. Commun.*, **2000**, 30, 531.



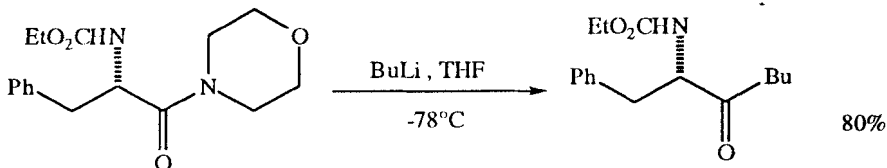
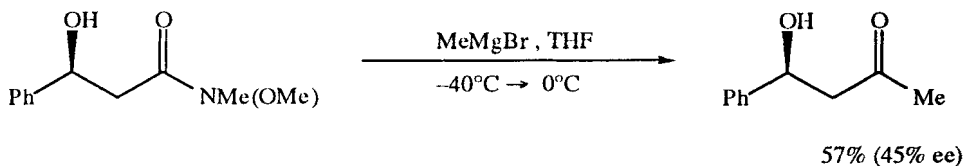
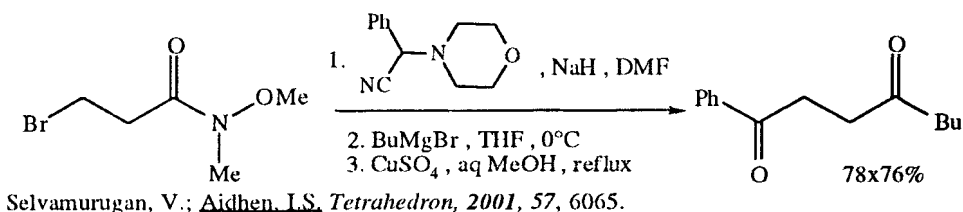
Gevorgyan, V.; Quan, L.G.; Yamamoto, Y. *Tetrahedron Lett.*, **1999**, 40, 4089.

## SECTION 170: KETONES FROM ALKYL, METHYLENES AND ARYLS

This section lists examples of the reaction,  $\text{R}-\text{CH}_2-\text{R}' \rightarrow \text{R}(\text{C}=\text{O})-\text{R}'$ .

## NO ADDITIONAL EXAMPLES

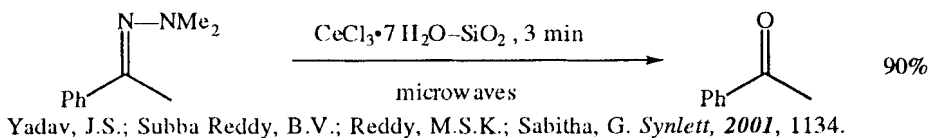
## SECTION 171: KETONES FROM AMIDES



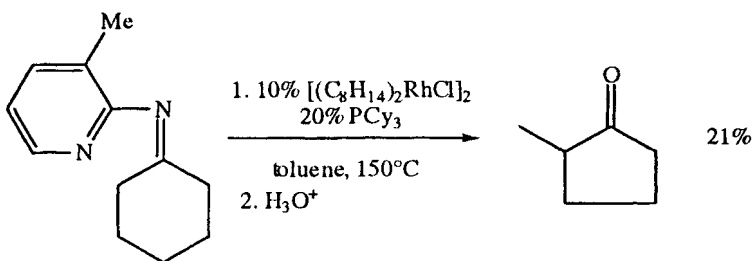
## REVIEWS:

"Base Catalysis in the Willgerodt-Kindler Reaction," Renard, M.; Lambert, D.; Isa, M. *Org. Prep. Proceed. Int.*, **2001**, *33*, 335.

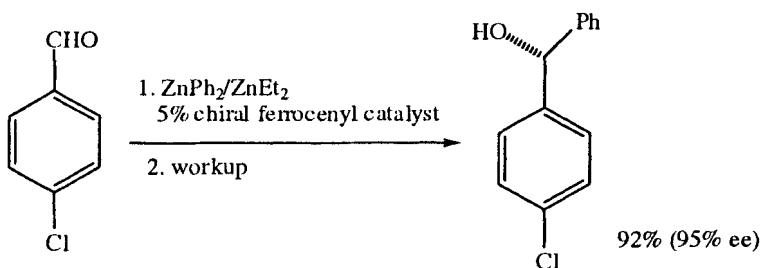
## SECTION 172: KETONES FROM AMINES



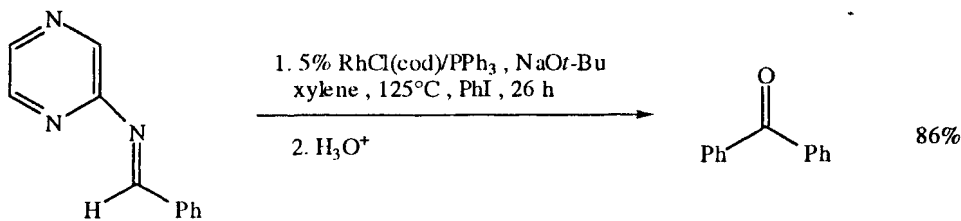




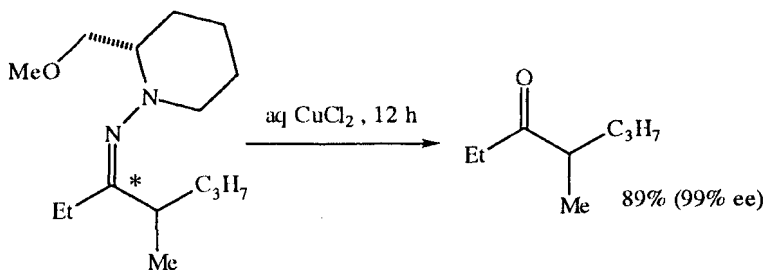
Jun, C.-H.; Lee, H.; Lim, S.-G. *J. Am. Chem. Soc.*, **2001**, 123, 751.



Jun, C.-H.; Hong, J.-B.; Kim, Y.-H.; Chung, K.-Y. *Angew. Chem. Int. Ed.*, **2000**, 39, 3440.

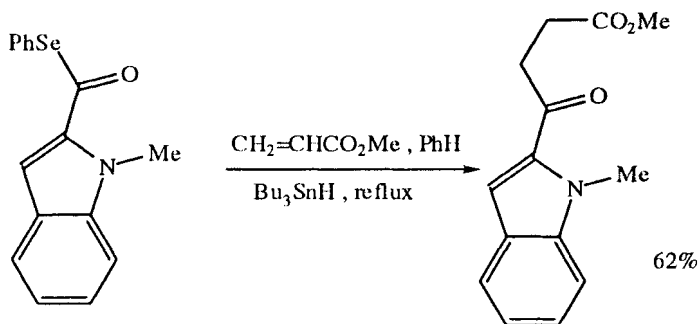


Ishiyamama, T.; Hartung, J. *J. Am. Chem. Soc.*, **2000**, 122, 12043.

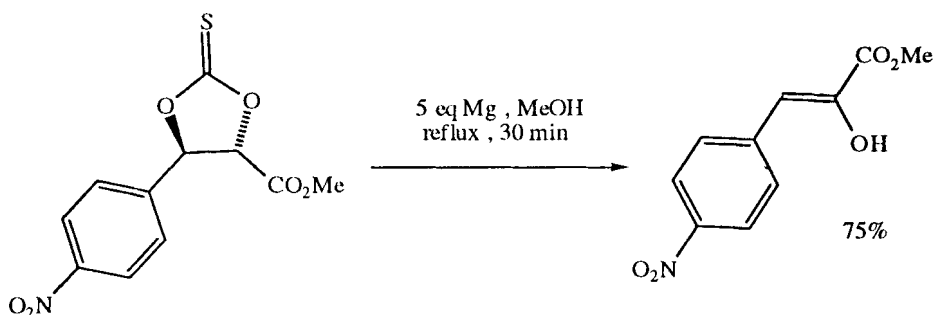


Enders, D.; Hundertmark, T.; Lazny, R. *Synth. Commun.*, **1999**, 29, 27.

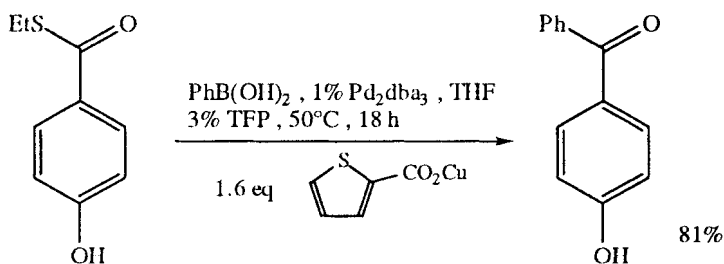
## SECTION 173: KETONES FROM ESTERS



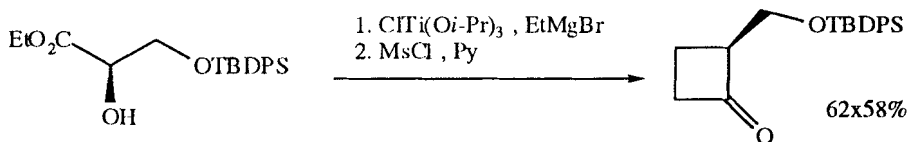
Bennasar, M.-L.; Roca, T.; Grier, R.; Bosch, J. *Org. Lett.*, **2001**, 3, 1697.



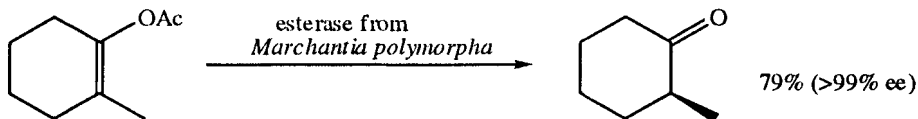
Rho, H.S.; Ko, B.-S. *Synth. Commun.*, **2001**, 31, 283.



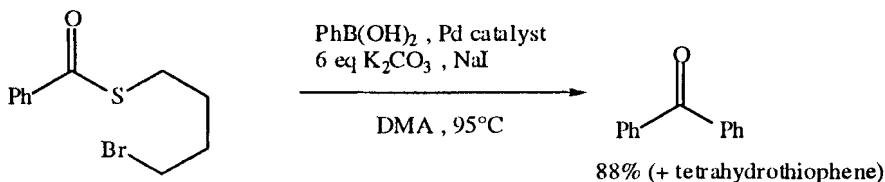
Liebeskind, L.S.; Srogl, L. *J. Am. Chem. Soc.*, **2000**, 122, 11260.



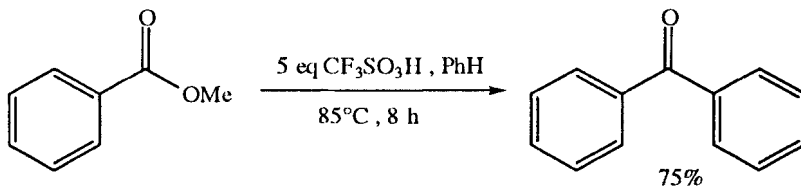
Cho, S.Y.; Cha, J.-K. *Org. Lett.* **2000**, 2, 1337.



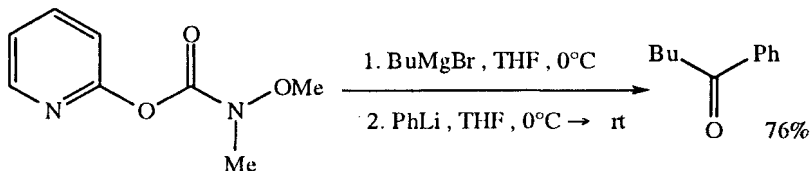
Hirata, T.; Shimoda, K.; Kawano, T. *Tetrahedron Asym.* **2000**, *11*, 1063.



Savarin, C.; Srogl, J.; Liebeskind, L.S. *Org. Lett.*, **2000**, *2*, 3229.

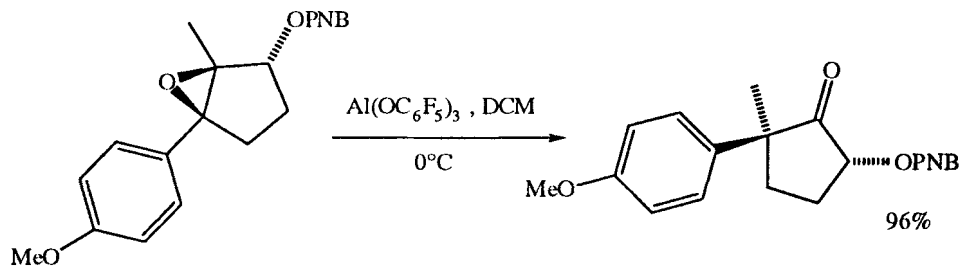


Hwang, J.P.; Prakash, G.K.S.; Olah, G.A. *Tetrahedron*, **2000**, *56*, 7199.

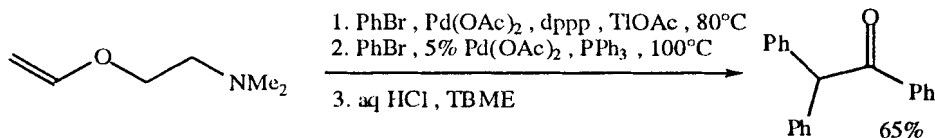


Lee, N.R.; Lee, K.I. *Synth. Commun.*, **1999**, *29*, 1249.

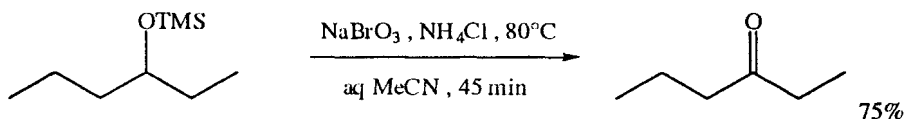
## SECTION 174: KETONES FROM ETHERS, EPOXIDES AND THIOETHERS



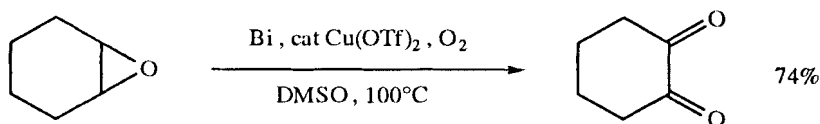
Kita, Y.; Furukawa, A.; Futamura, J.; Ueda, K.; Sawama, Y.; Hamamoto, H.; Fujioka, H. *J. Org. Chem.*, **2001**, *66*, 8779.



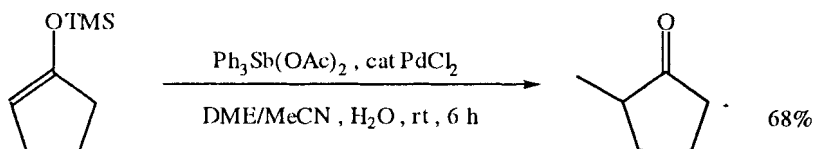
Nilsson, P.; Larhed, M.; Hallberg, A. *J. Am. Chem. Soc.*, **2001**, *123*, 8217.



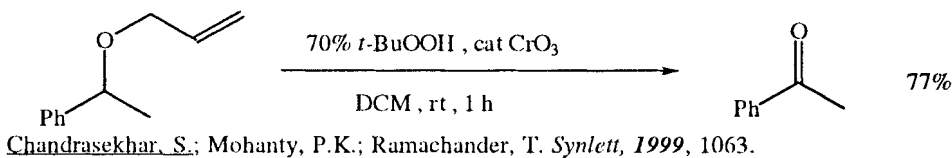
Shaabani, A.; Karimi, A.-R. *Synth. Commun.*, **2001**, *31*, 759.



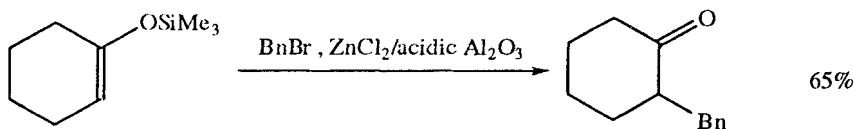
Antoniotti, S.; Duñach, E. *Chem. Commun.*, **2001**, 2566.



Kang, S.-K.; Ryu, H.-C.; Hong, Y.-T. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 3350.

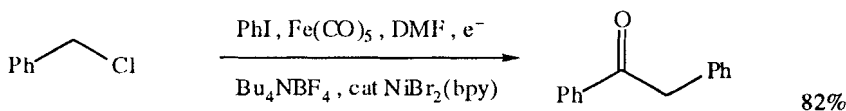


Chandrasekhar, S.; Mohanty, P.K.; Ramachander, T. *Synlett*, **1999**, 1063.

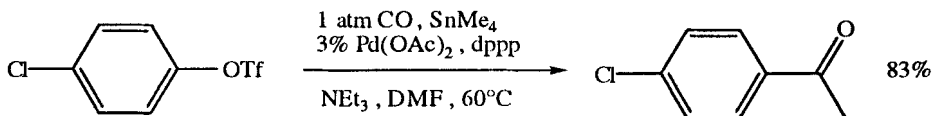


Kad, G.L.; Singh, V.; Khurana, A.; Chaudhary, S.; Singh, J. *Synth. Commun.*, **1999**, *29*, 3439.

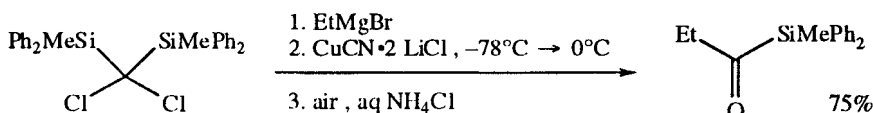
## SECTION 175: KETONES FROM HALIDES AND SULFONATES



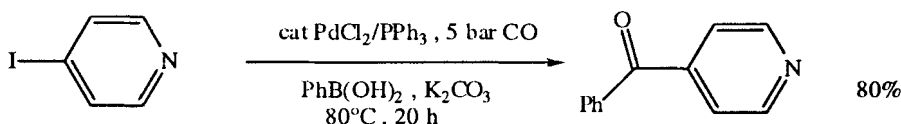
Dolhem, E.; Barhdadi, R.; Folest, J.C.; Nédélec, J.Y.; Troupel, M. *Tetrahedron*, **2001**, *57*, 525.



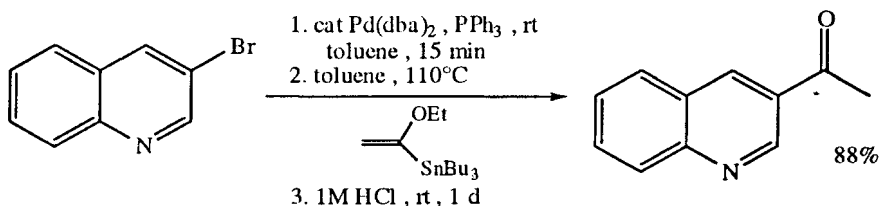
Garrido, F.; Raeppe, S.; Mann, A.; Lautens, M. *Tetrahedron Lett.*, **2001**, 42, 265.



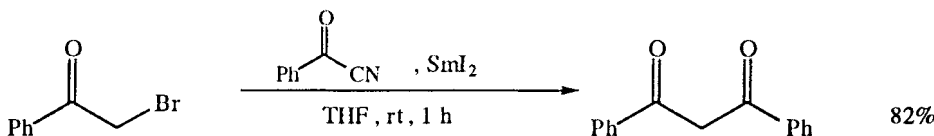
Inoue, A.; Kondo, J.; Shinokubo, H.; Oshima, K. *J. Am. Chem. Soc.*, **2001**, 123, 11109.



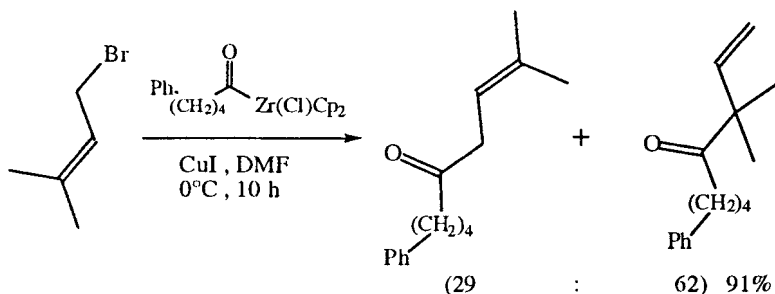
Couve-Bonnaire, S.; Carpentier, J.-E.; Mortreux, A.; Castanet, Y. *Tetrahedron Lett.*, **2001**, 42, 3689.



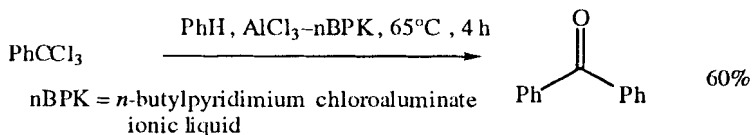
Legros, J.-Y.; Primault, G.; Fiaud, J.-C. *Tetrahedron*, **2001**, 57, 2507.



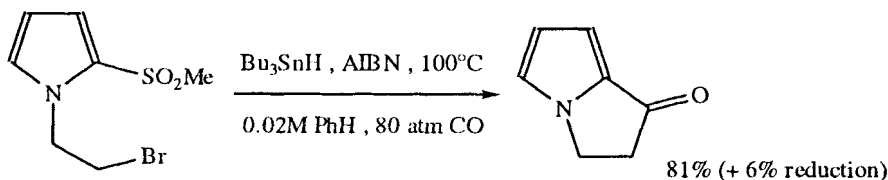
Back, H.S.; Yoo, B.W.; Keum, S.R.; Yoon, C.M.; Kim, S.H.; Kim, J.H. *Synth. Commun.*, **2000**, 30, 31.



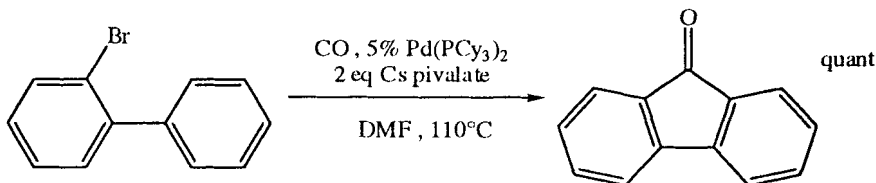
Hanzawa, Y.; Narita, K.; Taguchi, T. *Tetrahedron Lett.*, **2000**, 41, 109.



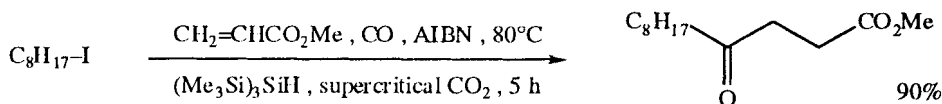
Rebeiro, G.L.; Khadilkar, B.M. *Synth. Commun.*, **2000**, *30*, 1605.



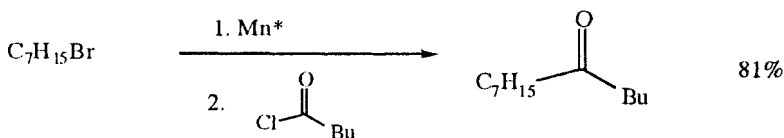
Miranda, L.D.; Cruz-Almanza, R.; Alvarez-García, A.; Muchowski, J.M. *Tetrahedron Lett.*, **2000**, *41*, 3035.



Campo, M.A.; Larock, R.C. *Org. Lett.*, **2000**, *2*, 3675.



Kishimoto, Y.; Ikariya, T. *J. Org. Chem.*, **2000**, *65*, 7656.



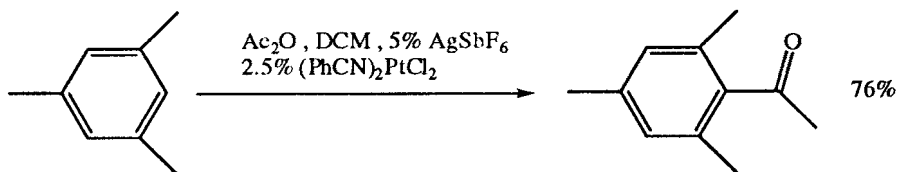
Cahiez, G.; Martin, A.; Delacroix, T. *Tetrahedron Lett.*, **1999**, *40*, 6407.

Related Methods:

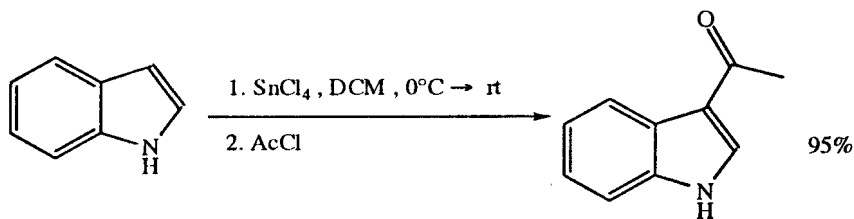
Section 177 (Ketones from Ketones).  
Section 55 (Aldehydes from Halides).

## SECTION 176: KETONES FROM HYDRIDES

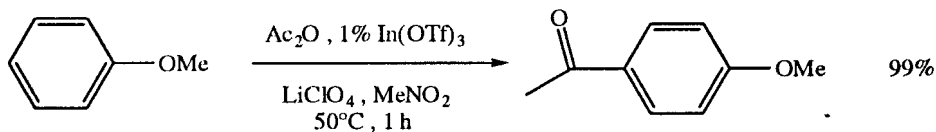
This section lists examples of the replacement of hydrogen by ketonic groups,  $\text{R-H} \rightarrow \text{R(C=O)-R'}$ . For the oxidation of methylenes,  $\text{R}_2\text{CH}_2 \rightarrow \text{R}_2\text{C=O}$ , see section 170 (Ketones from Alkyls).



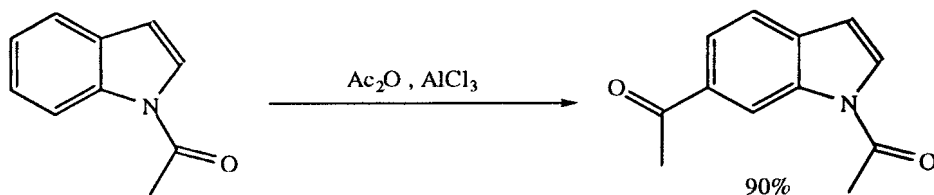
Fürstner, A.; Voigtländer, D.; Schrader, W.; Giebel, D.; Reetz, M.T. *Org. Lett.*, **2001**, 3, 417.



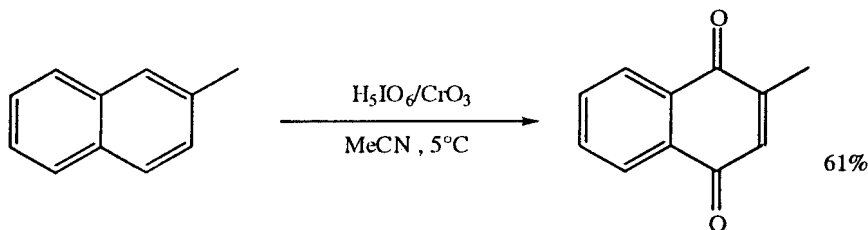
Ottoni, O.; de V.F. Neder, A.; Dias, A.K.B.; Cruz, R.P.A.; Aquino, L.B. *Org. Lett.*, **2001**, 3, 1005.



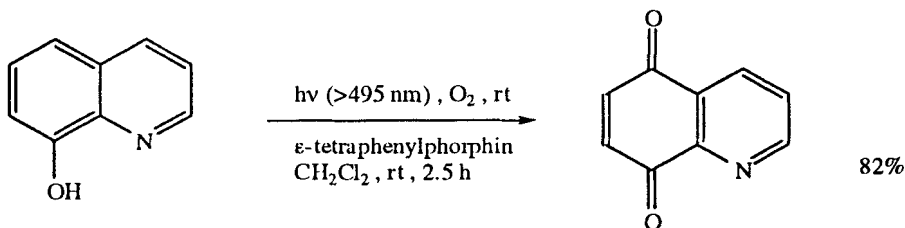
Chapman, C.J.; Frost, C.G.; Hartley, J.P.; Whittle, A.J. *Tetrahedron Lett.*, **2001**, 42, 773.



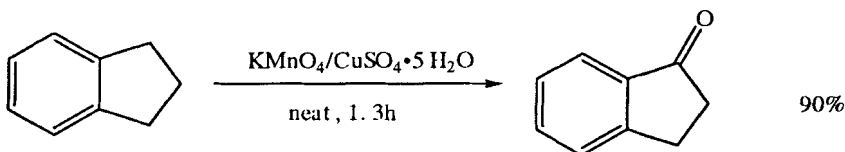
Cruz, R.P.A.; Ottoni, O.; Abella, C.A.M.; Aquino, L.B. *Tetrahedron Lett.*, **2001**, 42, 1467.



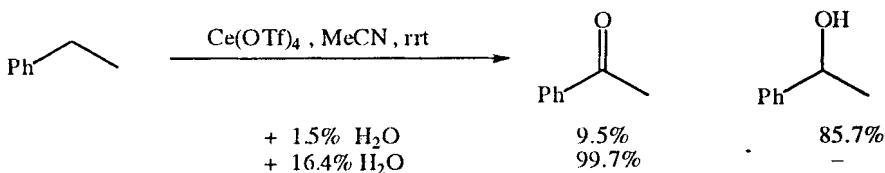
Yamazaki, S. *Tetrahedron Lett.*, **2001**, 42, 3355.



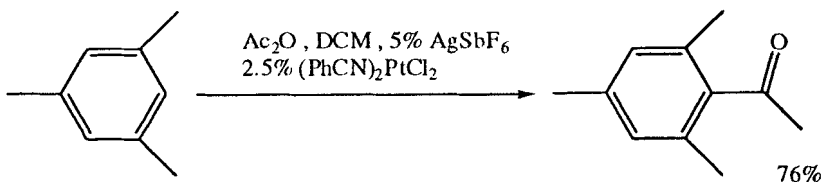
Cosy, J.; Belotti, D. *Tetrahedron Lett.*, **2001**, *42*, 4329.



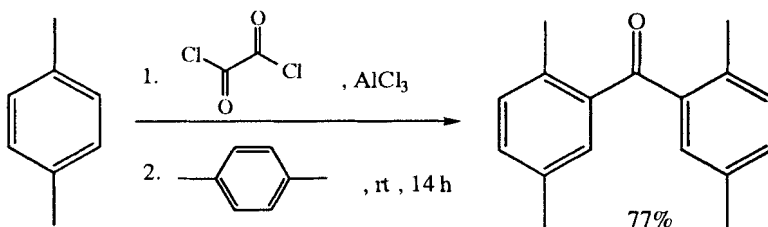
Shaabani, A.; Lee, D.G. *Tetrahedron Lett.*, **2001**, *42*, 5833.



Laali, K.K.; Herbert, M.; Cushnir, B.; Bhatt, A.; Terrano, D.  
*J. Chem. Soc., Perkin Trans. 1*, **2001**, 578.

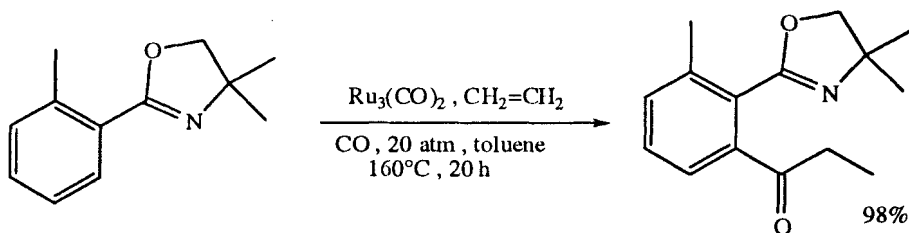


Fürstner, A.; Voigtländer, D.; Schrader, W.; Giebel, D.; Reetz, M.T. *Org. Lett.*, **2001**, *3*, 417.

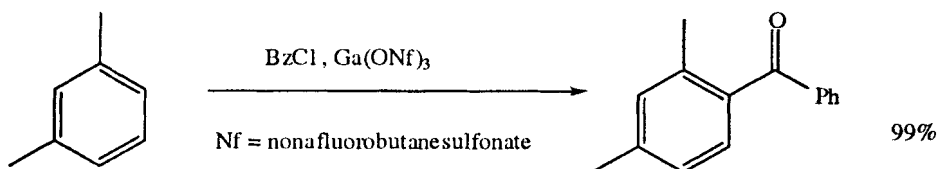


Taber, D.F.; Sethuraman, M.R. *J. Org. Chem.*, **2000**, *65*, 254.

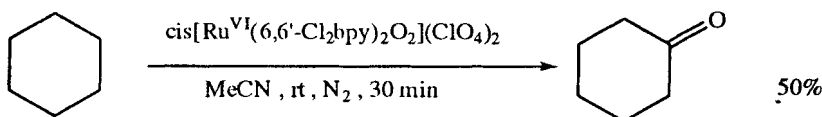




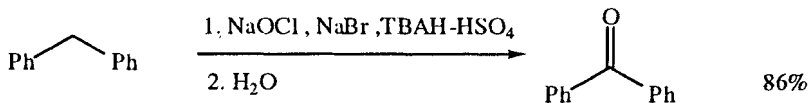
Ie, Y.; Chatani, N.; Ogo, T.; Marshall, D.R.; Fukuyama, T.; Kakiuchi, F.; Murai, S.  
*J. Org. Chem.*, **2000**, *65*, 1475.



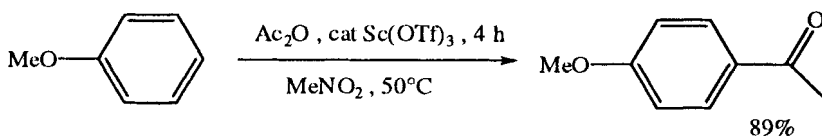
Matsuo, J.-i.; Odashima, K.; Kobayashi, S. *Synlett*, **2000**, 403.



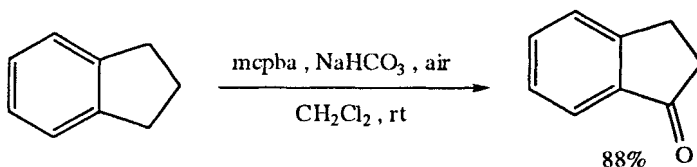
Che, C.-M.; Cheng, K.-W.; Chan, M.C.W.; Lau, T.-C.; Mak, C.-K.  
*J. Org. Chem.*, **2000**, *65*, 7996.



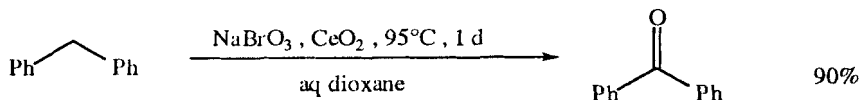
Clark, J.H.; Grigoropoulou, G.; Scott, K. *Synth. Commun.*, **2000**, *30*, 3731.



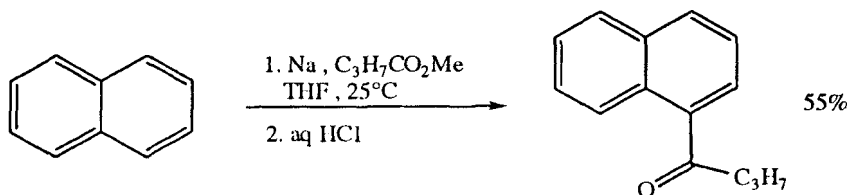
Kawada, A.; Mitamura, S.; Matsuo, J.-i.; Tsuchiya, T.; Kobayashi, S.  
*Bull. Chem. Soc. Jpn.*, **2000**, *73*, 2325.



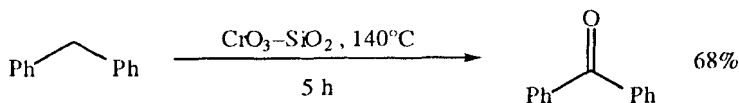
Ma, D.; Xia, C.; Tian, H. *Tetrahedron Lett.*, **1999**, *40*, 8915.



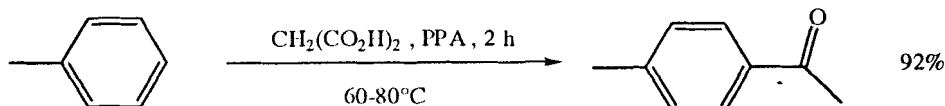
Shi, Q.-Z.; Wang, J.-G.; Cai, K. *Synth. Commun.*, **1999**, 29, 1177.



Periasamy, M.; Reddy, M.R.; Bharathi, P. *Synth. Commun.*, **1999**, 29, 677.



Bose, D.S.; Sunder, K.S. *Synth. Commun.*, **1999**, 29, 4295.

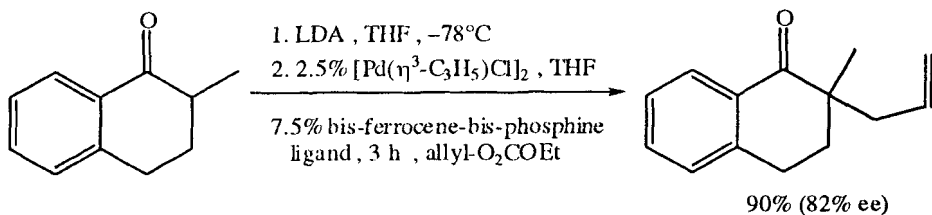


Renault, O.; Dallemagne, P.; Rault, S. *Org. Prep. Proceed. Int.*, **1999**, 31, 324.

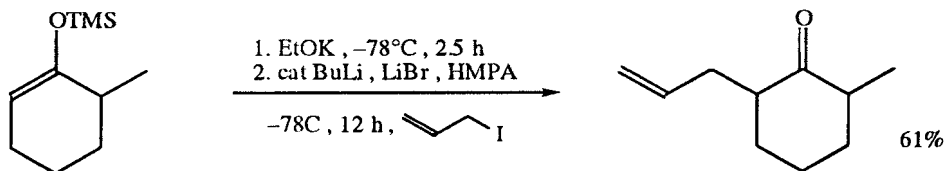
## SECTION 177: KETONES FROM KETONES

This section contains alkylations of ketones and protected ketones, ketone transpositions and annulations, ring expansions and ring openings and dimerizations. Conjugate reductions and Michael alkylations of enone are listed in Section 74 (Alkyls from Alkenes).

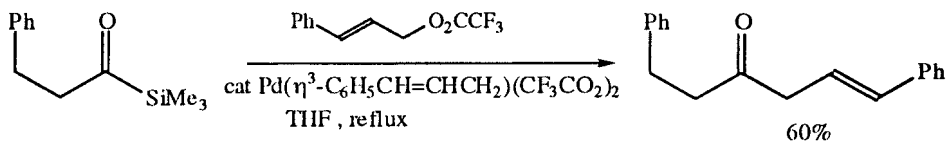
For the preparation of enamines or imines from ketones, see Section 356 (Amine-Alkene).



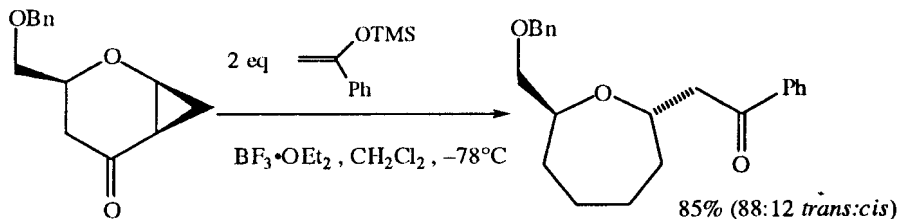
You, S.-L.; Hou, X.-L.; Dai, L.-X.; Zhu, X.-Z. *Org. Lett.*, **2001**, 3, 3149.



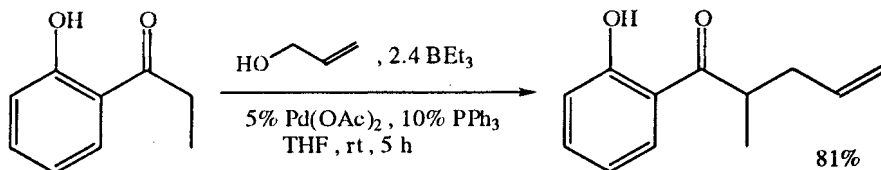
Yu, W.; Jin, Z. *Tetrahedron Lett.*, **2001**, *42*, 369.



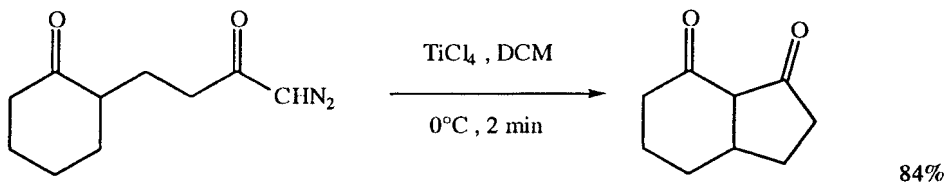
Obora, Y.; Ogawa, Y.; Imai, Y.; Kawamura, T.; Tsuji, Y.  
*J. Am. Chem. Soc.*, **2001**, *123*, 10489.



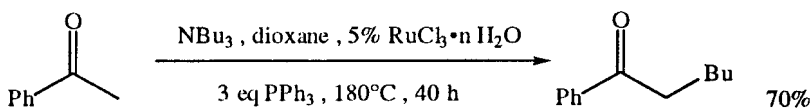
Sugita, Y.; Kimura, C.; Hosoya, H.; Yamadoi, S.; Yokoe, I. *Tetrahedron Lett.*, **2001**, *42*, 1095.



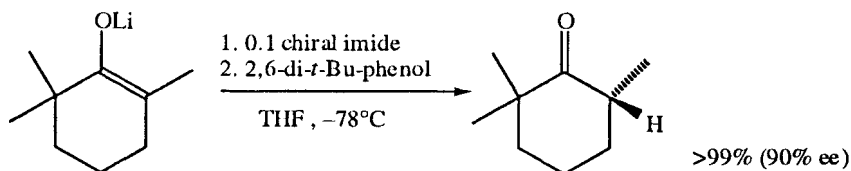
Horino, Y.; Naito, M.; Kimura, M.; Tanaka, S.; Tamaru, Y. *Tetrahedron Lett.*, **2001**, *42*, 3113.



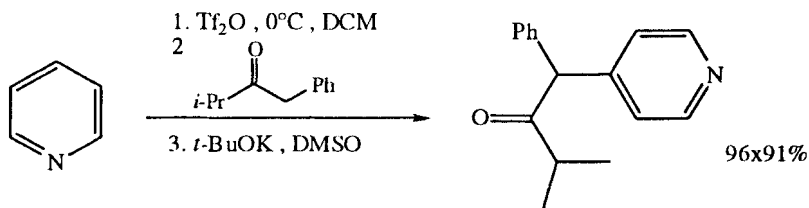
Muthusamy, S.; Babu, S.A.; Gunanathan, C. *Synth. Commun.*, **2001**, *31*, 1205.



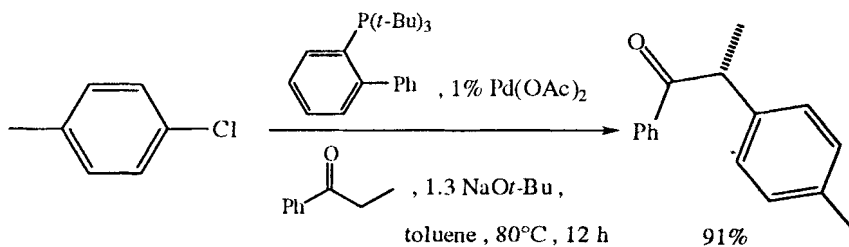
Cho, C.S.; Kim, B.T.; Lee, M.J.; Kim, T.-J.; Shim, S.C.  
*Angew. Chem. Int. Ed.*, **2001**, *40*, 958.



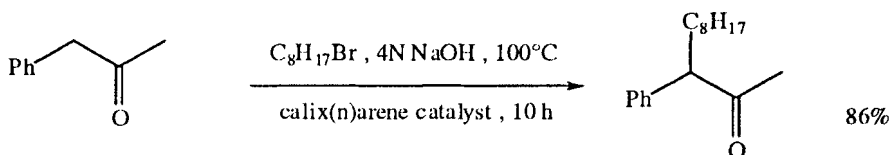
Yanagisawa, A.; Watanabe, T.; Kikuchi, T.; Yamamoto, H. *J. Org. Chem.*, **2000**, *65*, 2979.



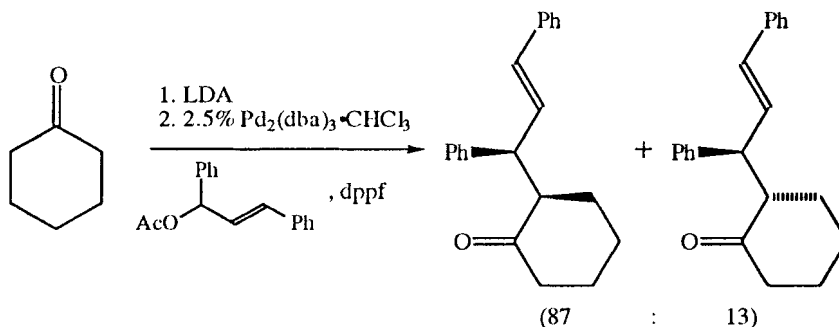
Katritzky, A.R.; Zhang, S.; Kurz, T.; Wang, M. *Org. Lett.*, **2001**, *3*, 2807.



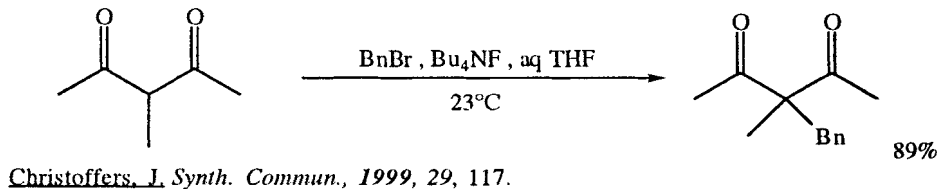
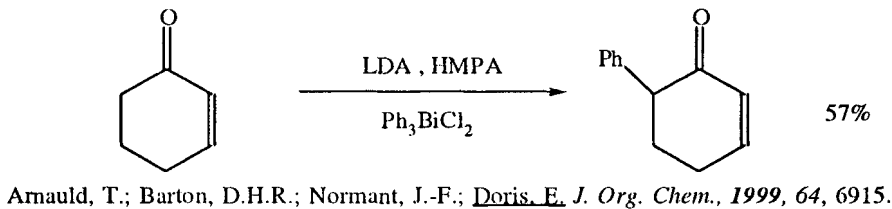
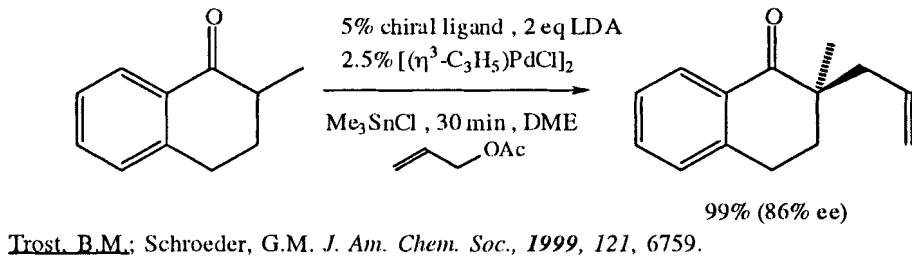
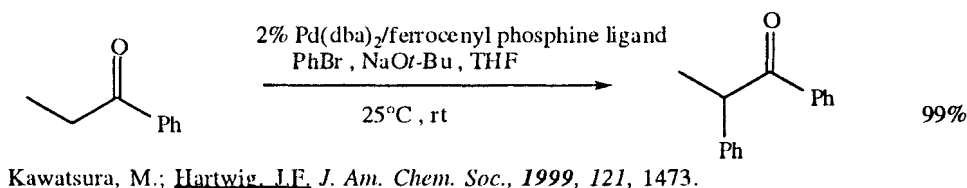
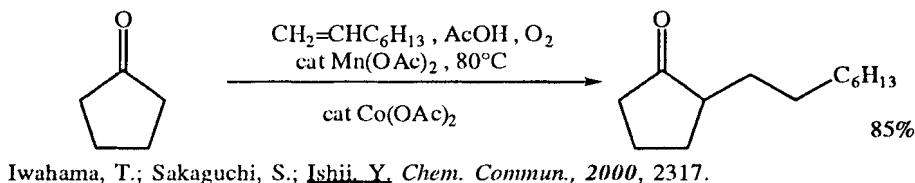
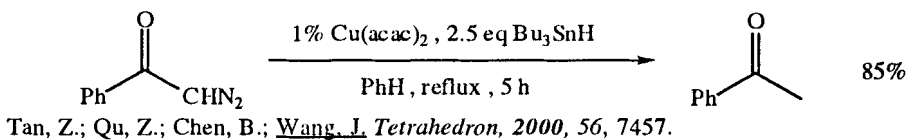
Fox, J.M.; Huang, X.; Chieffi, A.; Buchwald, S.L. *J. Am. Chem. Soc.*, **2000**, *122*, 1360.

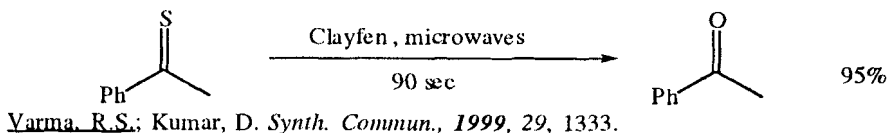


Shimizu, S.; Suzuki, T.; Sasaki, Y.; Hirai, C. *Synlett*, **2000**, 1664.



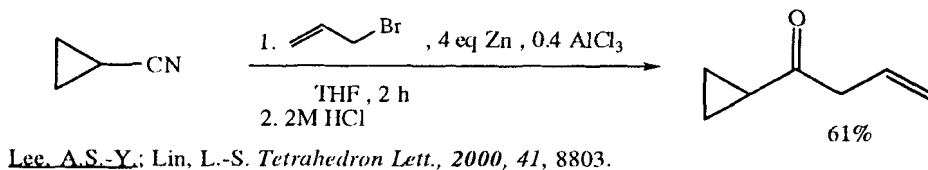
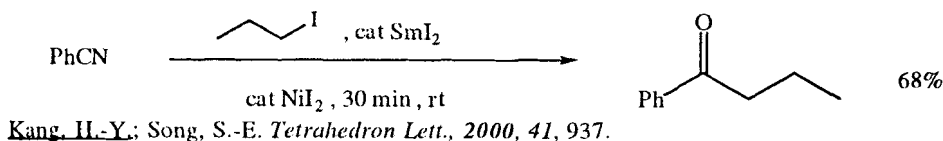
Braun, M.; Laicher, F.; Meier, T. *Angew. Chem. Int. Ed.*, **2000**, *39*, 3494.



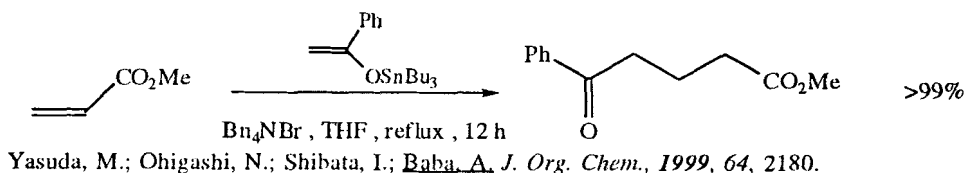
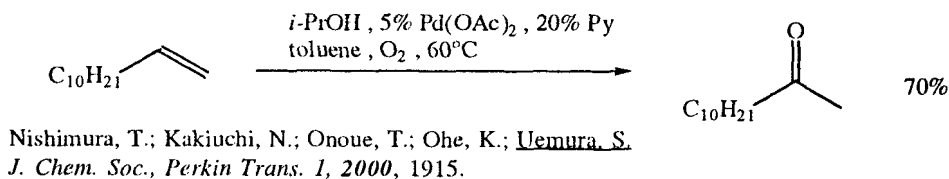
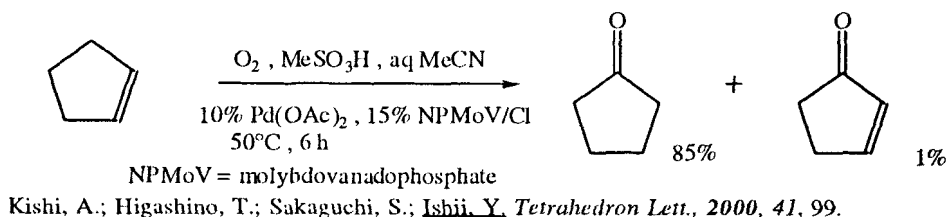


Related Methods: Section 49 (Aldehydes from Aldehydes).

## SECTION 178: KETONES FROM NITRILES



## SECTION 179: KETONES FROM ALKENES



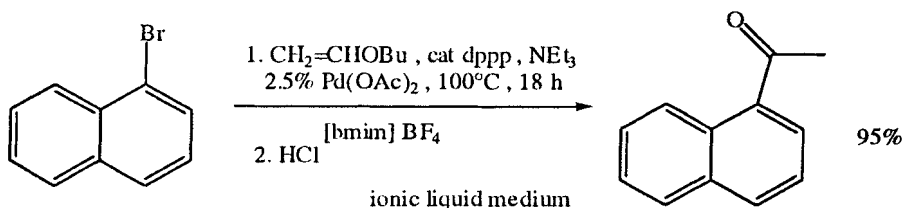
See also:

Section 134 (Ethers from Alkenes).

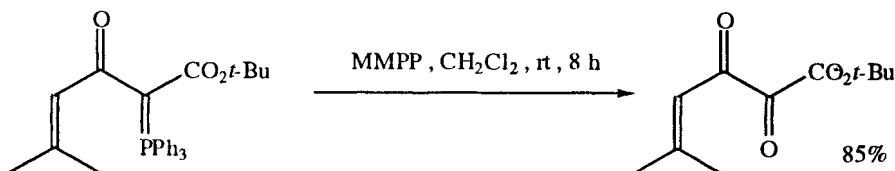
Section 174 (Ketones from Ethers).

## SECTION 180: KETONES FROM MISCELLANEOUS COMPOUNDS

Conjugate reductions and reductive alkylations of enones are listed in Section 74 (Alkyls from Alkenes).

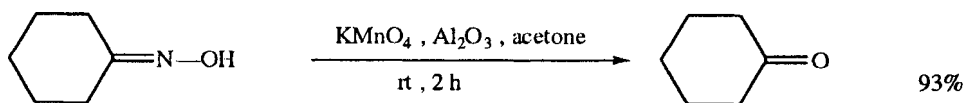


Xu, L.; Chen, W.; Ross, J.; Xiao, J. *Org. Lett.*, **2001**, 3, 295.

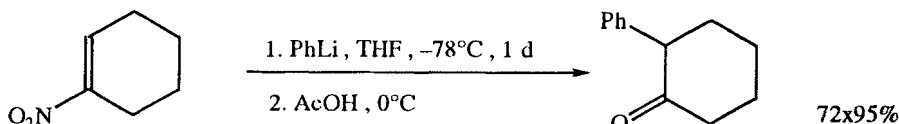


MMPP = magnesium monoperoxy phthalate

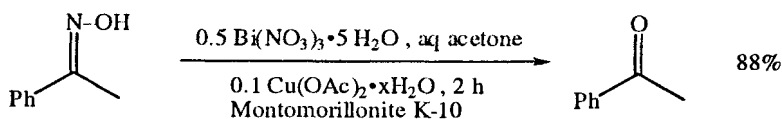
Lee, K.; Im, J.-M. *Tetrahedron Lett.*, **2001**, 42, 1539.



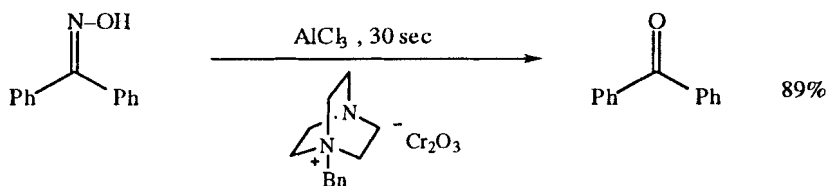
Chrisman, W.; Blankinship, M.J.; Taylor, B.; Harris, C.E. *Tetrahedron Lett.*, **2001**, 42, 4775.



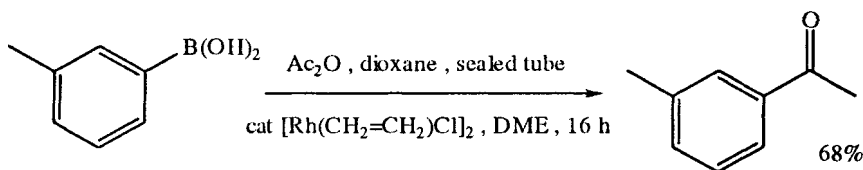
Santos, R.P.; Lopes, R.S.C.; Lopes, C.C. *Synthesis*, **2001**, 845.



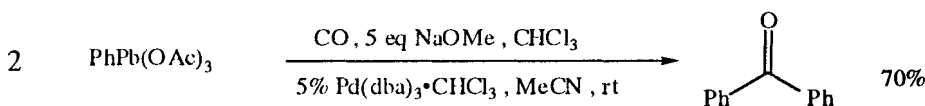
Nattier, B.A.; Eash, K.J.; Mohan, R.S. *Synthesis*, **2001**, 1010.



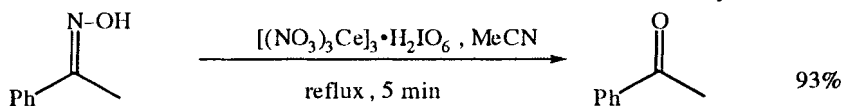
Hakipour, A.R.; Mallakpour, S.E.; Mohammadpoor-Baltork, I.; Khoee, S. *Synth. Commun.*, **2001**, *31*, 1187.



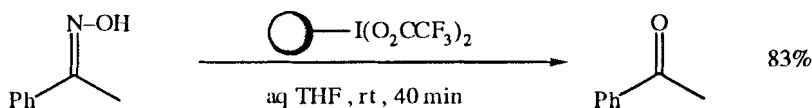
Frost, C.G.; Wadsworth, K.J. *Chem. Commun.*, **2001**, 2316.



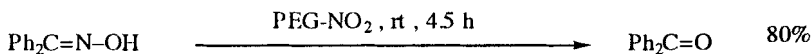
Kang, S.-K.; Ryu, H.-C.; Choi, S.-C. *Synth. Commun.*, **2001**, *31*, 1035.



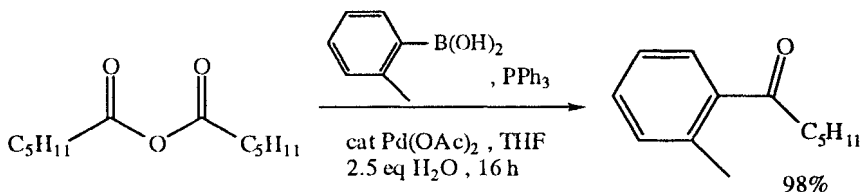
Shirini, E.; Azadbar, M.R. *Synth. Commun.*, **2001**, *31*, 3775.



Chen, D.-J.; Cheng, D.-P.; Chen, Z.-C. *Synth. Commun.*, **2001**, *31*, 3847.

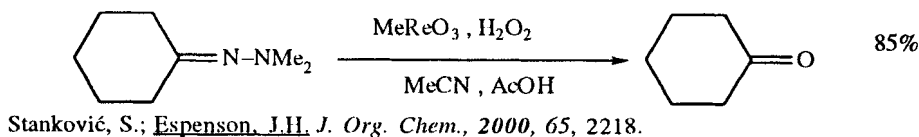
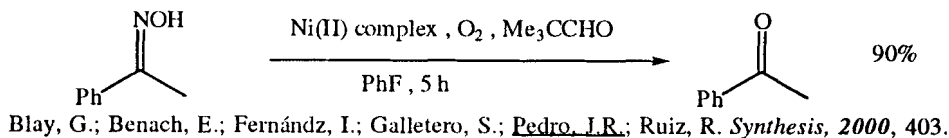
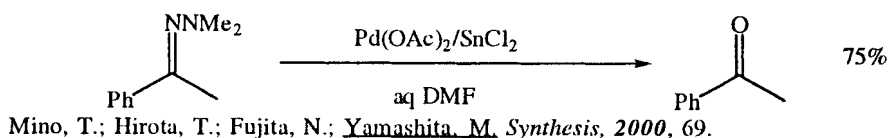
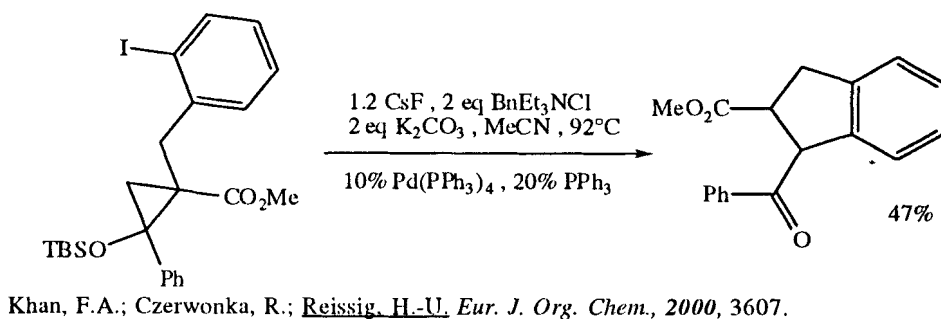
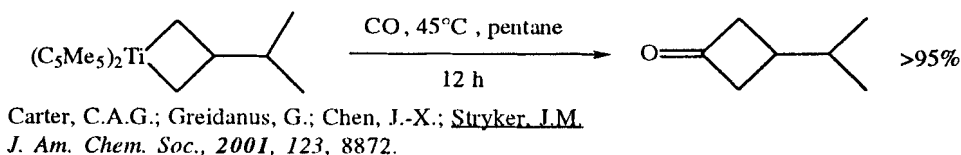
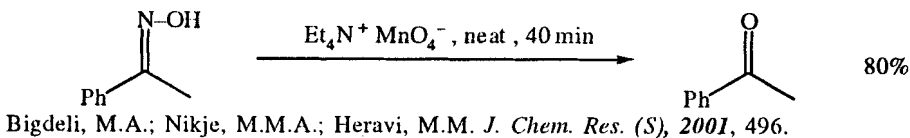
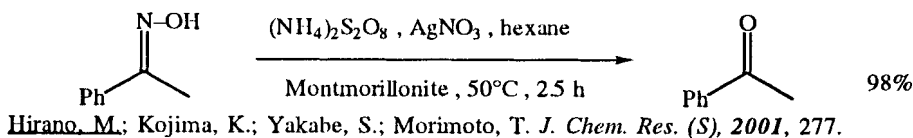


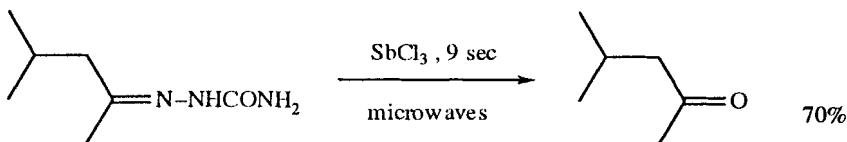
Liu, X.; Zhang, Q.; Zhang, S.; Zhang, J. *J. Org. Prep. Proceed. Int.*, **2001**, *33*, 87.



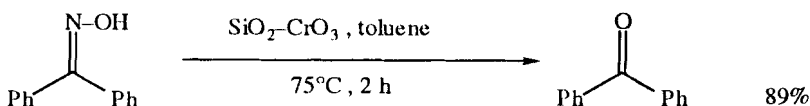
Gooßen, L.J.; Ghosh, K. *Angew. Chem. Int. Ed.*, **2001**, *40*.



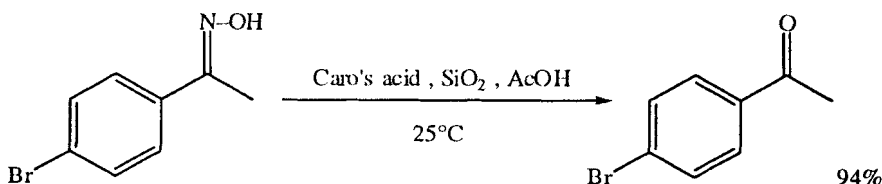




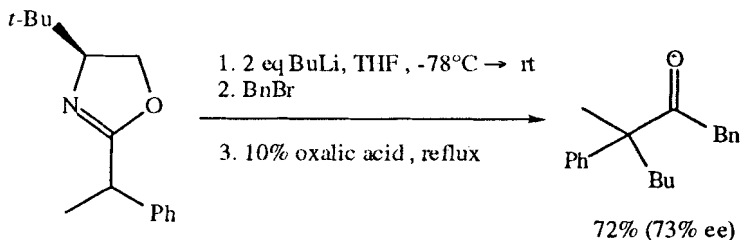
Mitra, A.K.; De, A.; Karchaudhuri, N. *Synth. Commun.*, 2000, 30, 1651.



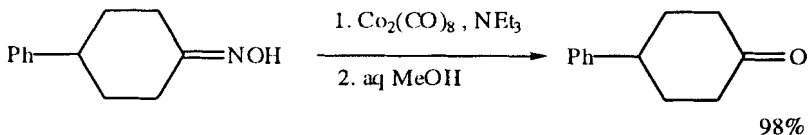
Bendale, P.M.; Khaditkar, B.M. *Synth. Commun.*, 2000, 30, 665.



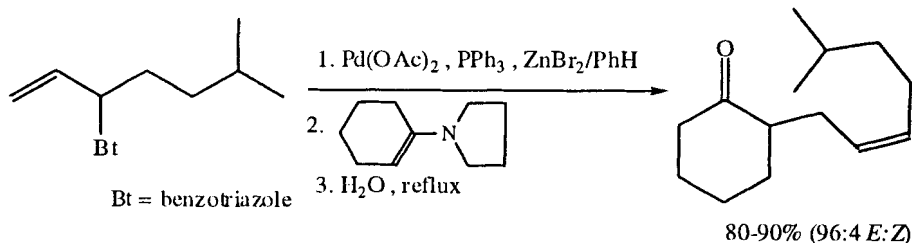
Movassagh, B.; Lakouraj, M.M.; Ghodrati, K. *Synth. Commun.*, 2000, 30, 4501.



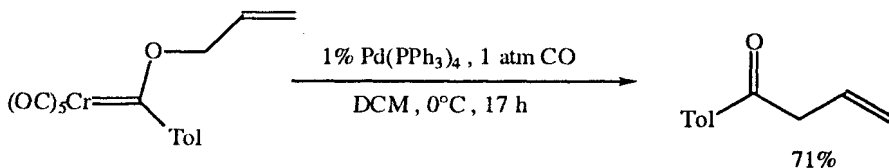
Dwyer, M.P.; Price, D.A.; Lamar, J.E.; Meyers, A.J. *Tetrahedron Lett.*, 1999, 40, 4765.



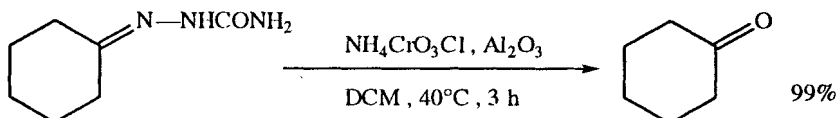
Mukai, C.; Nomura, I.; Kataoka, O.; Hanaoka, M. *Synthesis*, 1999, 1872.



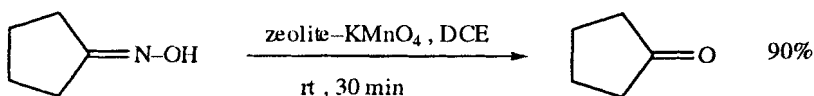
Katritzky, A.R.; Huang, Z.; Fang, Y. *J. Org. Chem.*, 1999, 64, 7625.



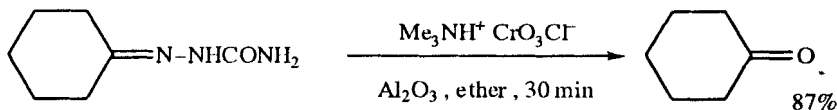
Sakurai, H.; Tanabe, K.; Narasaka, K. *Chem. Lett.*, **1999**, 75.



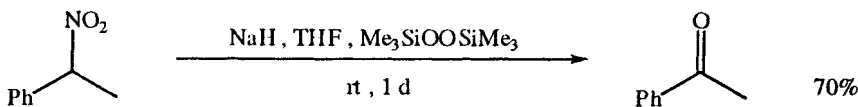
Zhang, G.-S.; Gong, H.; Yang, D.-H.; Chen, M.-F. *Synth. Commun.*, **1999**, 29, 1165.



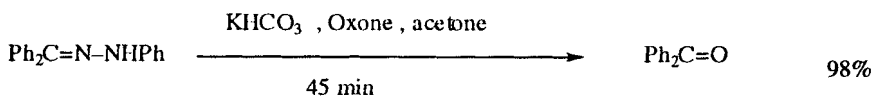
Jadhav, V.K.; Wadgaonkar, P.P.; Joshi, P.L.; Salunkhe, M.M. *Synth. Commun.*, **1999**, 29, 1989.



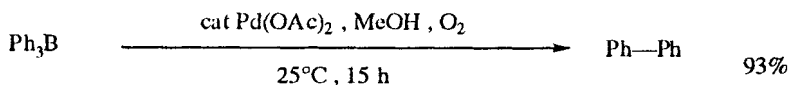
Gong, H.; Zhang, G.-S. *Synth. Commun.*, **1999**, 29, 2591.



Shahi, S.P.; Yankar, Y.D. *Synth. Commun.*, **1999**, 29, 4321.



Hajipour, A.R.; Mahboubghah, N. *Org. Prep. Proceed. Int.* **1999**, 31, 112.



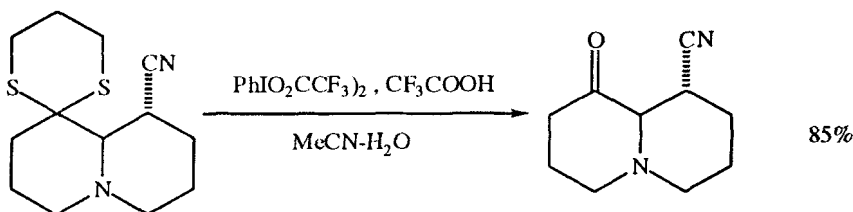
Ohe, T.; Tanaka, T.; Kuroda, M.; Cho, C.S.; Ohe, K.; Uemura, S. *Bull. Chem. Soc. Jpn.*, **1999**, 72, 1851.

## REVIEWS:

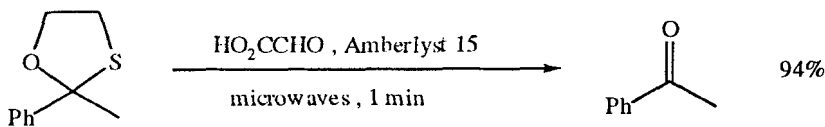
"Recent Advances Into The Enantioselective Protonation Of Prostereogenic Enol Derivatives," Eames, J.; Weerasooriya, N. *Tetrahedron Asymm.*, **2001**, 12, 1.

"Regeneration Of Carbonyl Compounds From The Corresponding Oximes," Corsaro, A.; Chiacchio, U.; Pistarà, V. *Synthesis*, **2001**, 1903.

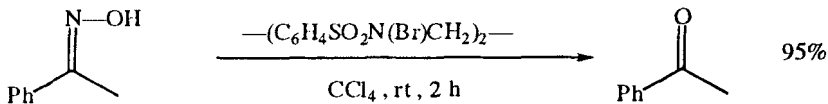
## SECTION 180A: PROTECTION OF KETONES



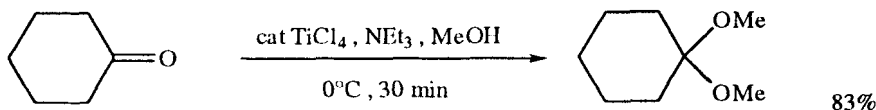
Fleming, F.E.; Funk, L.; Altundas, R.; Tu, Y. *J. Org. Chem.*, **2001**, 66, 6502.



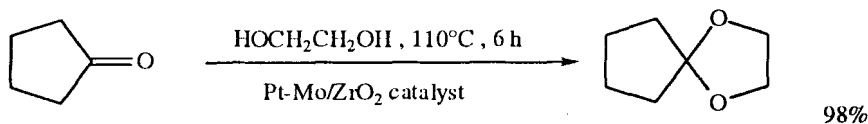
Chavan, S.P.; Soni, P.; Kamat, S.K. *Synlett*, **2001**, 1251.



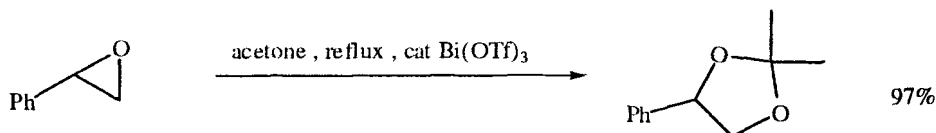
Khazaei, A.; Vaghei, R.G.; Tajbakhsh, M. *Tetrahedron Lett.*, **2001**, 42, 5099.



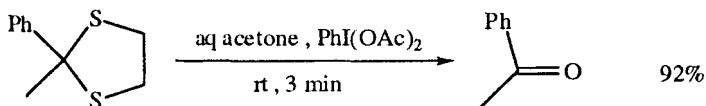
Clerici, A.; Pastori, N.; Porta, O. *Tetrahedron*, **2001**, 57, 217.



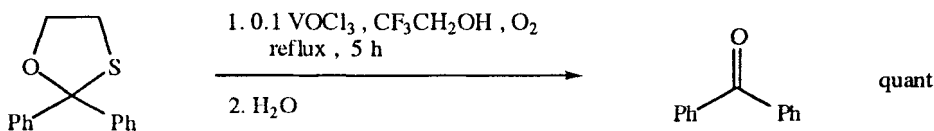
Reddy, B.M.; Reddy, V.R.; Giridhar, D. *Synth. Commun.*, **2001**, 31, 1819.



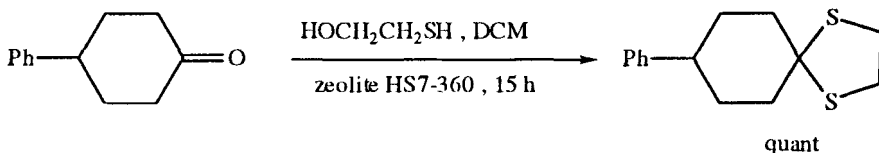
Mohammadpoor-Baltork, L.; Khosropour, A.R.; Aliyan, H. *Synth. Commun.*, **2001**, 31, 3411.



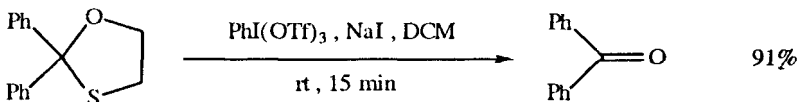
Shi, X.-X.; Wu, Q.-Q. *Synth. Commun.*, **2000**, *30*, 4081.



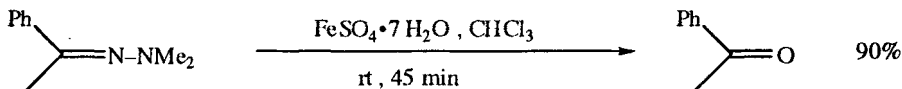
Kirahara, M.; Ochiai, Y.; Arai, N.; Takizawa, S.; Momose, T.; Nemoto, H.  
*Tetrahedron Lett.*, **1999**, *40*, 9055.



Ballini, R.; Barboni, L.; Maggi, R.; Sartori, G. *Synth. Commun.*, **1999**, *29*, 713.



Chen, L.-C.; Wang, H.-M. *Org. Prep. Proceed. Int.*, **1999**, *31*, 562.



Nasreen, A.; Adapa, S.R. *Org. Prep. Proceed. Int.*, **1999**, *31*, 573.

See Section 362 (Ester-Alkene) for the formation of enol esters and Section 367 (Ether-Alkenes) for the formation of enol ethers. Many of the methods in Section 60A (Protection of Aldehydes) are also applicable to ketones.

# CHAPTER 13

## PREPARATION OF NITRILES

### SECTION 181: NITRILES FROM ALKYNES

NO ADDITIONAL EXAMPLES

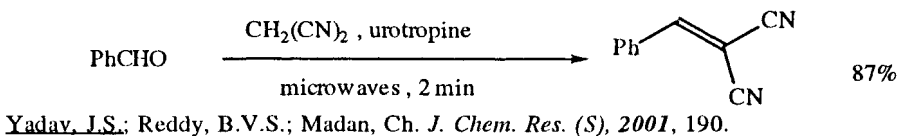
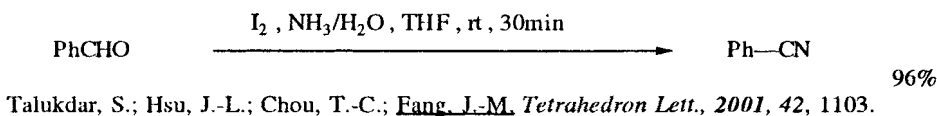
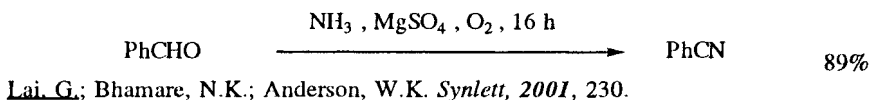
### SECTION 182: NITRILES FROM ACID DERIVATIVES

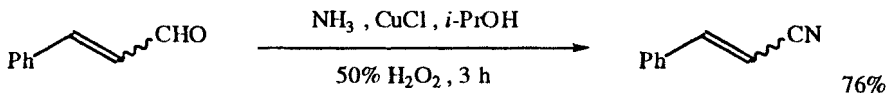
NO ADDITIONAL EXAMPLES

### SECTION 183: NITRILES FROM ALCOHOLS AND THIOLS

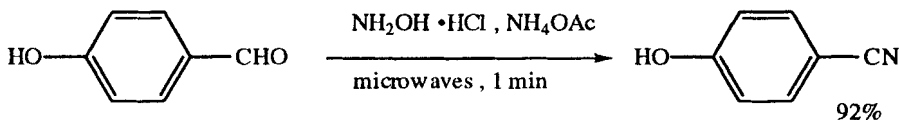
NO ADDITIONAL EXAMPLES

### SECTION 184: NITRILES FROM ALDEHYDES

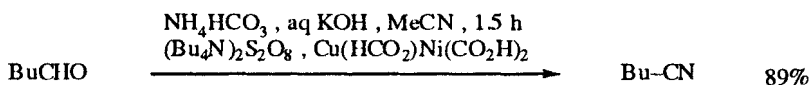




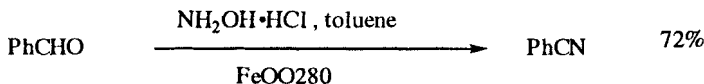
Erman, M.B.; Snow, J.W.; Williams, M.J. *Tetrahedron Lett.*, **2000**, *41*, 6749.



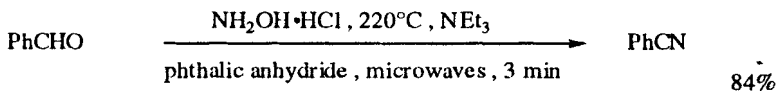
Das, B.; Ramesh, C.; Madhusudhan, P. *Synlett*, **2000**, 1599.



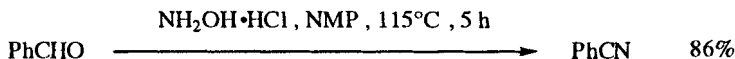
Chen, F.-E.; Fu, H.; Meng, G.; Cheng, Y.; Lü, Y.-X. *Synthesis*, **2000**, 1519.



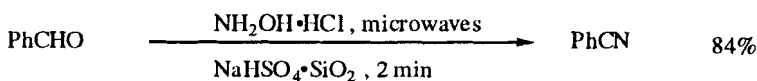
Bajpai, A.R.; Deshpande, A.B.; Samant, S.D. *Synth. Commun.*, **2000**, *30*, 2785.



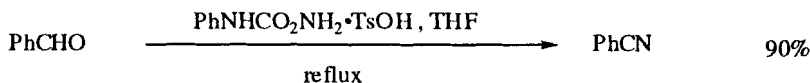
Veverková, E.; Toma, Š. *Synth. Commun.*, **2000**, *30*, 3109.



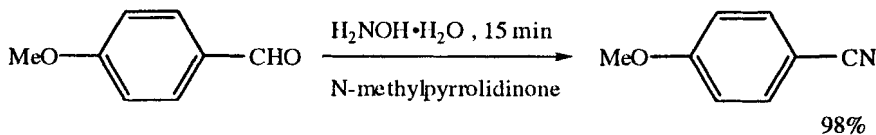
Kumar, H.M.S.; Reddy, B.V.S.; Reddy, P.T.; Yadav, J.S. *Synthesis*, **1999**, 586.



Das, B.; Madhusudhan, P.; Venkataiah, B. *Synlett*, **1999**, 1569.

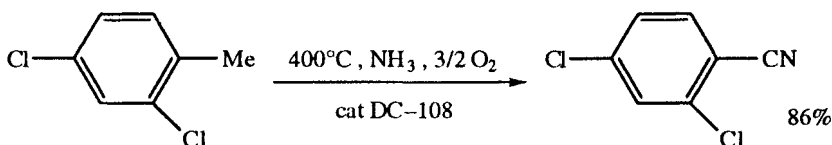


Coşkun, N.; Arikian, N. *Tetrahedron*, **1999**, *55*, 11943.



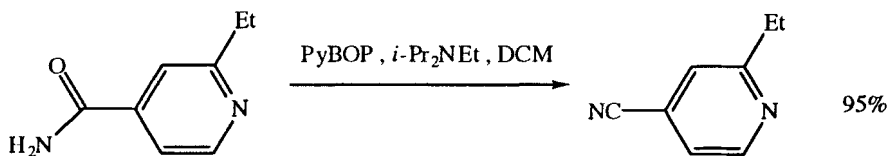
Chakraborti, A.K.; Kaur, G. *Tetrahedron*, **1999**, *55*, 13265.

## SECTION 185: NITRILES FROM ALKYL, METHYLENES AND ARYLS



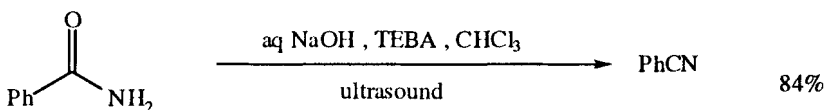
Qiong, Z.; Chi, H.; Guangyong, X.; Chongwen, X.; Yuanyin, C.  
*Synth. Commun.*, **1999**, 29, 2349.

## SECTION 186: NITRILES FROM AMIDES

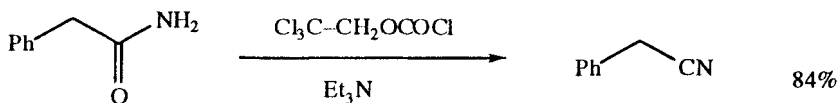


PyBOP = benzotriazol-1-yloxytris(pyrrolidino)phosphonium hexafluorophosphate

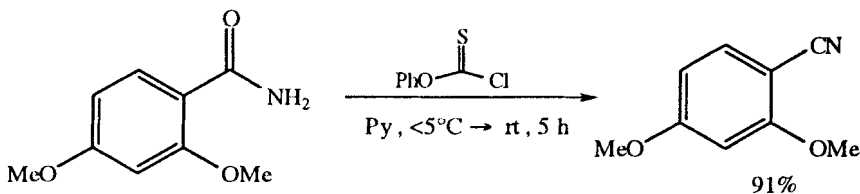
Bose, D.S.; Narsaiah, A.V. *Synthesis*, **2001**, 373.



Sivakumar, M.; Senthilkumar, P.; Pandit, A.B. *Synth. Commun.*, **2001**, 31, 2583.

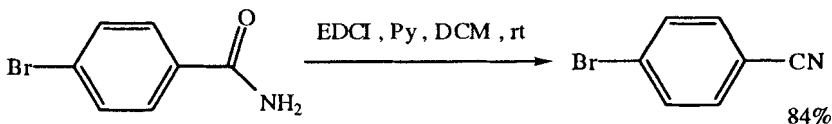
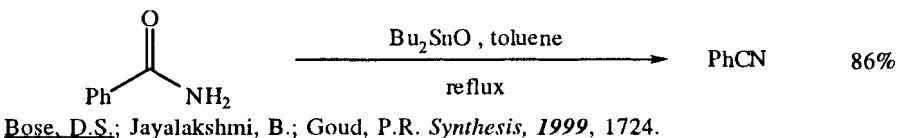
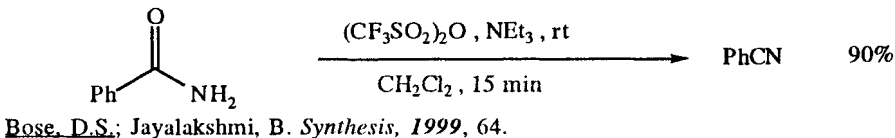
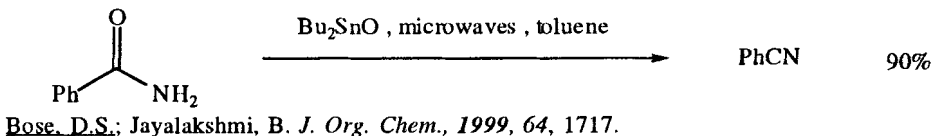


Bose, D.S.; Kumar, K.K. *Synth. Commun.*, **2000**, 30, 3047.



Bose, D.S.; Goud, P.R. *Tetrahedron Lett.*, **1999**, 40, 747.

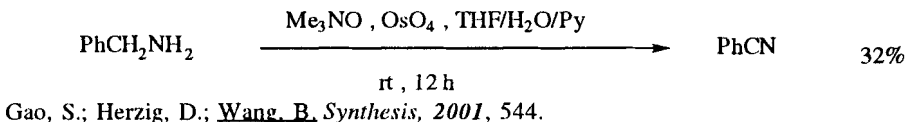




EDCI = 1-(3-dimethylaminopropyl)-3-ethyl-B-carbodiimide hydrochloride

Bose, D.S.; Sunder, K.S. *Synth. Commun.*, **1999**, 29, 4235.

## SECTION 187: NITRILES FROM AMINES



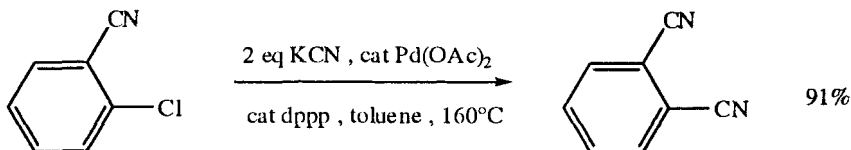
## SECTION 188: NITRILES FROM ESTERS

NO ADDITIONAL EXAMPLES

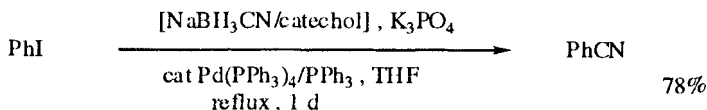
## SECTION 189: NITRILES FROM ETHERS, EPOXIDES AND THIOETHERS

NO ADDITIONAL EXAMPLES

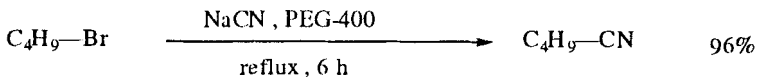
## SECTION 190: NITRILES FROM HALIDES AND SULFONATES



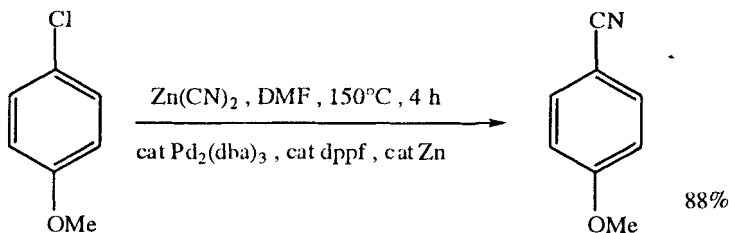
Sundermeier, M.; Zapf, A.; Beller, M.; Sans, J. *Tetrahedron Lett.*, **2001**, 42, 6707.



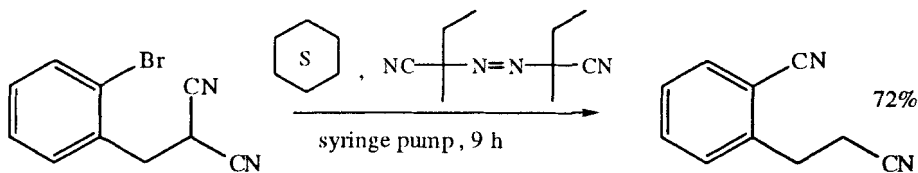
Jiang, B.; Kan, Y.; Zhang, A. *Tetrahedron*, **2001**, 57, 1581.



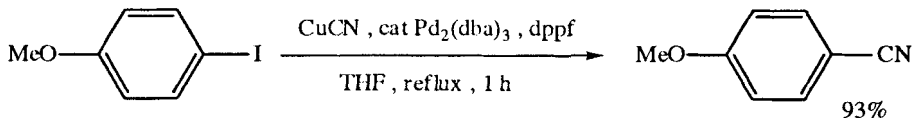
Cao, Y.-Q.; Chen, B.-H.; Pei, B.-G. *Synth. Commun.*, **2001**, 31, 2203.



Jin, F.; Confalone, P.N. *Tetrahedron Lett.*, **2000**, 41, 3271.



Bowman, W.R.; Bridge, C.F.; Brookes, P. *Tetrahedron Lett.*, **2000**, 41, 8989.



Sakamoto, T.; Ohsawa, K. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 2323.

## SECTION 191: NITRILES FROM HYDRIDES

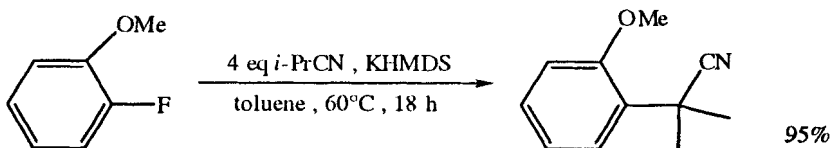
NO ADDITIONAL EXAMPLES

## SECTION 192: NITRILES FROM KETONES

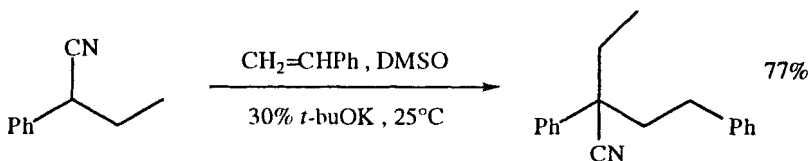
NO ADDITIONAL EXAMPLES

## SECTION 193: NITRILES FROM NITRILES

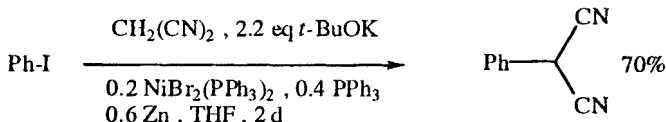
Conjugate reductions and Michael alkylations of alkene nitriles are found in Section 74D (Alkyls from Alkenes).



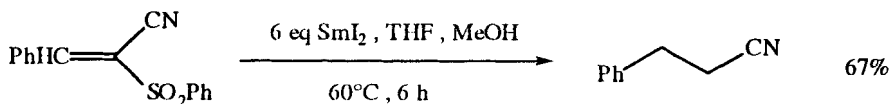
Caron, S.; Vazquez, E.; Wojcik, J.M. *J. Am. Chem. Soc.*, **2000**, *122*, 712.



Rodriguez, A.L.; Bunlaksananusorn, T.; Knochel, P. *Org. Lett.*, **2000**, *2*, 3285.

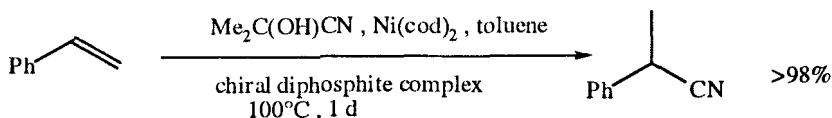


Cristau, H.L.; Vogel, R.; Taillefer, M.; Gadras, A. *Tetrahedron Lett.*, **2000**, *41*, 8457.



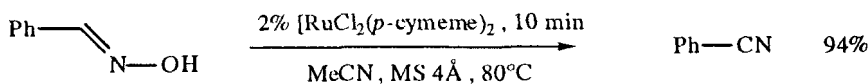
Guo, H.; Zhang, Y. *Synth. Commun.*, **2000**, *30*, 1879.

## SECTION 194: NITRILES FROM ALKENES

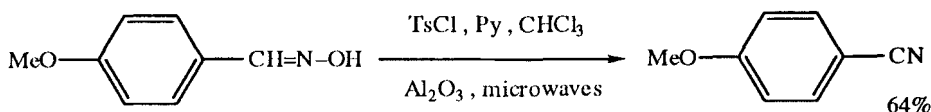


Yan, M.; Xu, Q.-Y.; Chan, A.S.C. *Tetrahedron Asym.*, **2000**, *11*, 845.

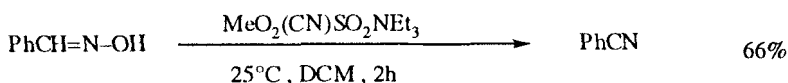
## SECTION 195: NITRILES FROM MISCELLANEOUS COMPOUNDS



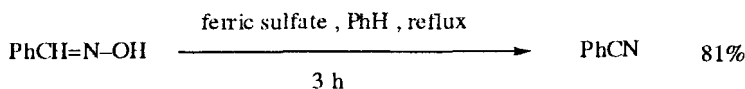
Yang, S.H.; Chang, S. *Org. Lett.*, **2001**, *3*, 4209.



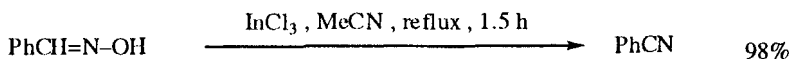
Ghiaci, M.; Bakhtiari, K. *Synth. Commun.*, **2001**, *31*, 1803.



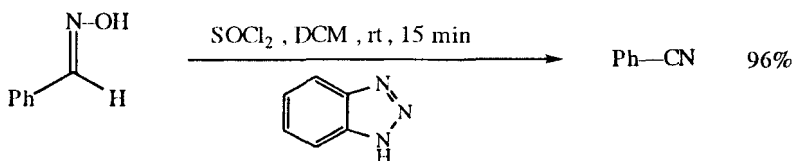
Jose, B.; Saulatha, M.S.; Pillai, P.M.; Prathapan, S. *Synth. Commun.*, **2000**, *30*, 1509.



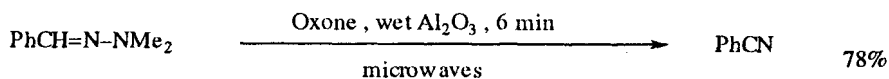
Desai, D.G.; Swami, S.S.; Mahale, G.D. *Synth. Commun.*, **2000**, *30*, 1623.



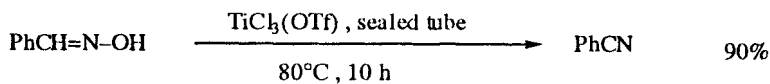
Barman, D.C.; Thakur, A.J.; Prajapati, D.; Sandhu, J.S. *Chem. Lett.*, **2000**, 1196.



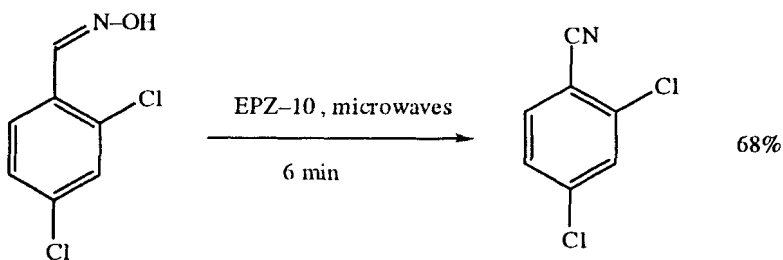
Chaudhari, S.S.; Akamanchi, K.G. *Synth. Commun.*, **1999**, *29*, 1741.



Ramalingam, T.; Reddy, B.V.S.; Srinivas, R.; Yadav, J.S. *Synth. Commun.*, **2000**, *30*, 4507.



Iranpoor, N.; Zeynizadeh, B. *Synth. Commun.*, **1999**, *29*, 2747.

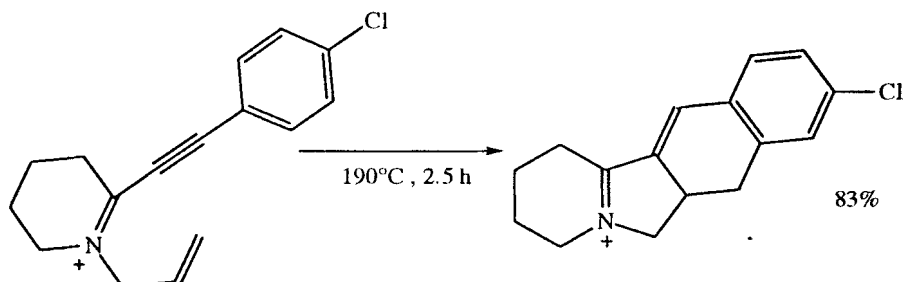


Bandgar, B.P.; Sadavarte, V.S.; Sabu, K.R. *Synth. Commun.*, **1999**, *29*, 3409.

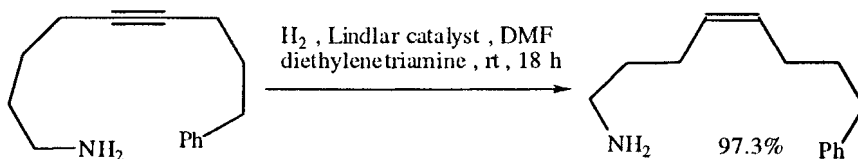
# CHAPTER 14

## PREPARATION OF ALKENES

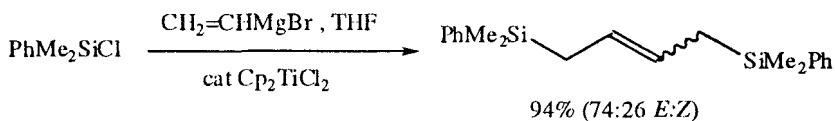
### SECTION 196: ALKENES FROM ALKYNES



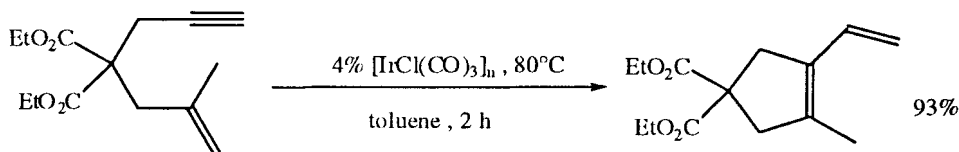
Herz, H.-G.; Schatz, J.; Maas, G. *J. Org. Chem.*, **2001**, 66, 3176.



Campos, K.R.; Cai, D.; Journet, M.; Kowal, J.J.; Larsen, R.D.; Reider, P.J. *J. Org. Chem.* **2001**, 66, 3634.

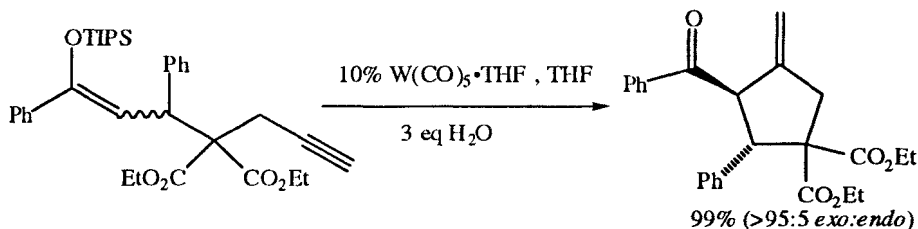


Watanabe, H.; Terao, J.; Kambe, N. *Org. Lett.*, **2001**, 3, 1733.

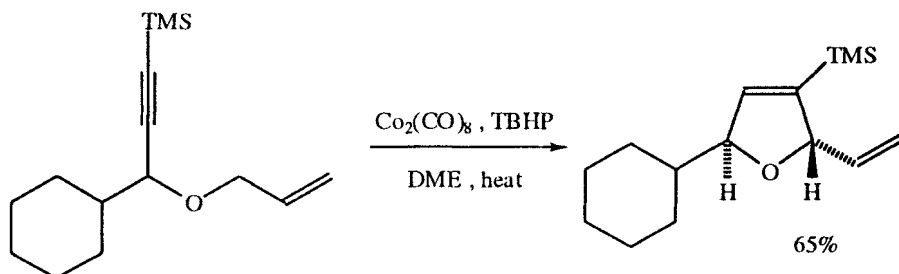


Chatani, N.; Inoue, H.; Morimoto, T.; Muto, T.; Murai, S. *J. Org. Chem.*, **2001**, 66, 4433.

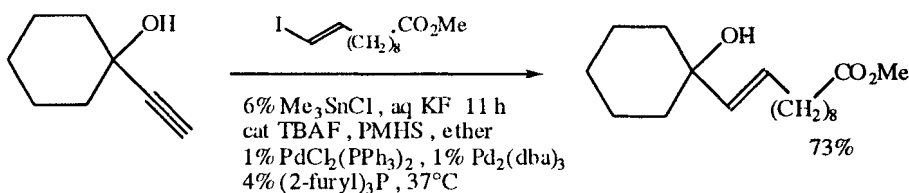




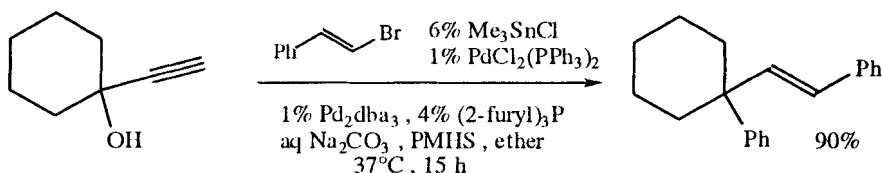
Iwasawa, N.; Maeyama, K.; Kusama, H. *Org. Lett.*, 2001, 3, 3871.



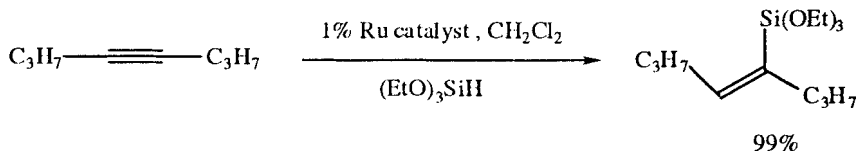
Ajamian, A.; Gleason, J.L. *Org. Lett.*, 2001, 3, 4161.



Maleczka Jr., R.E.; Gallagher, W.P. *Org. Lett.*, 2001, 3, 4173.

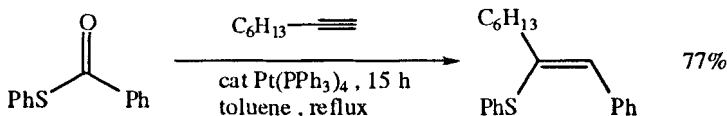


Gallagher, W.P.; Terstiege, I.; Maleczka Jr., R.E. *J. Am. Chem. Soc.*, 2001, 123, 3194.

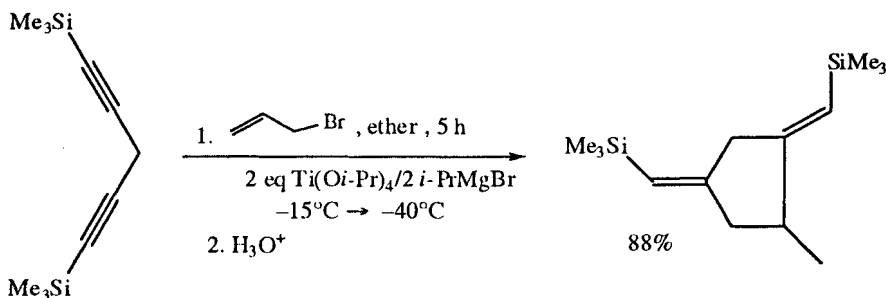


Trost, B.M.; Ball, Z.T. *J. Am. Chem. Soc.*, 2001, 123, 12726.

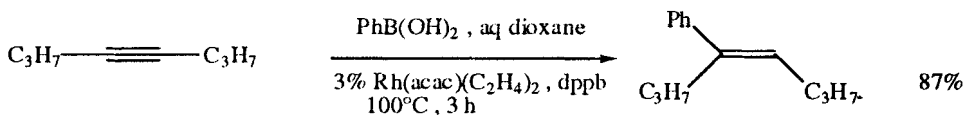




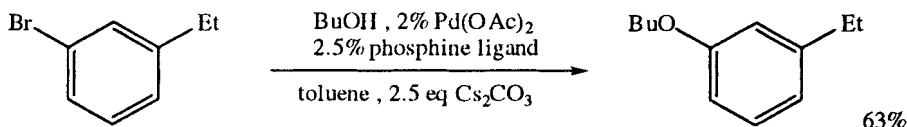
Sugoh, K.; Kuniyasu, H.; Sugae, T.; Ohtaka, A.; Takai, Y.; Tanaka, A.; Machino, C.; Kambe, N.; Hurosawa, H. *J. Am. Chem. Soc.*, **2001**, *123*, 5108.



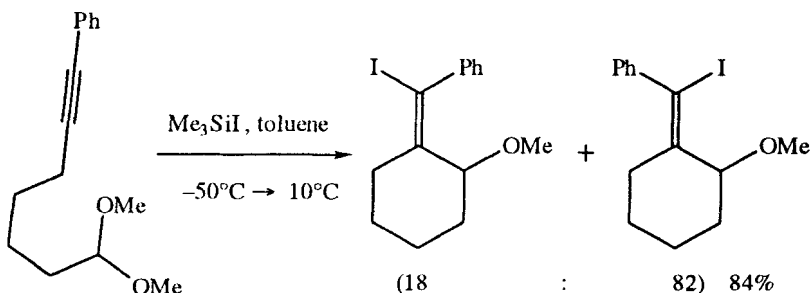
Okamoto, S.; Subbaraj, K.; Sato, F. *J. Am. Chem. Soc.*, **2001**, *123*, 4857.



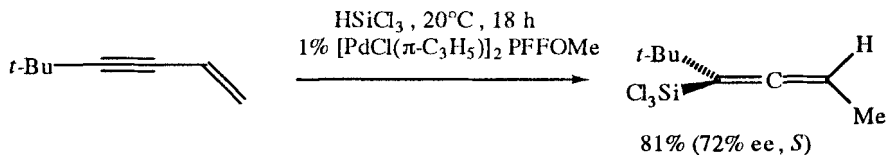
Hayashi, T.; Inoue, K.; Tankguchi, N.; Ogasawara, M. *J. Am. Chem. Soc.*, **2001**, *123*, 9918.



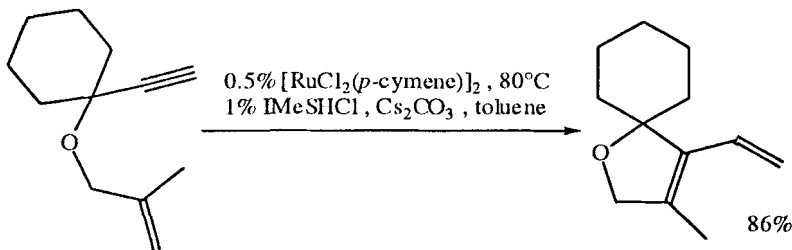
Asao, N.; Shimada, T.; Shimada, T.; Yamamoto, Y. *J. Am. Chem. Soc.*, **2001**, *12*, 10899.



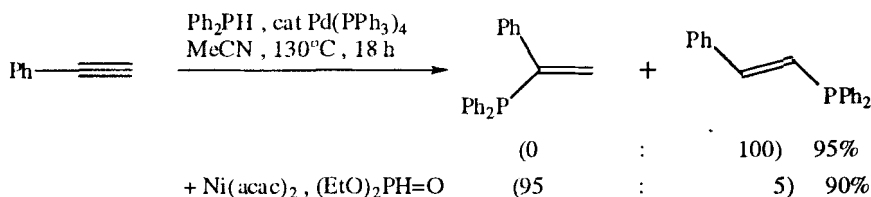
Takami, K.; Yorimitsu, H.; Shinokubo, H.; Matsubara, S.; Oshima, K. *Synlett*, **2001**, 293.



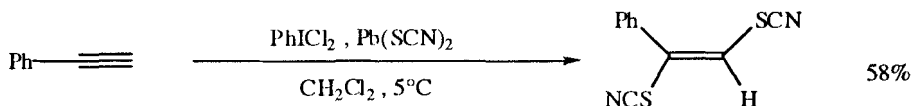
Vo-Tranh, G.; Boucard, V.; Sauriat-Dorizon, H.; Guibé, F. *Synlett*, **2001**, 37.



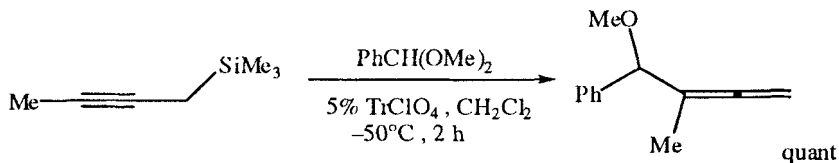
Ackermann, L.; Bruneau, S.; Dixneuf, P.H. *Synlett*, **2001**, 397.



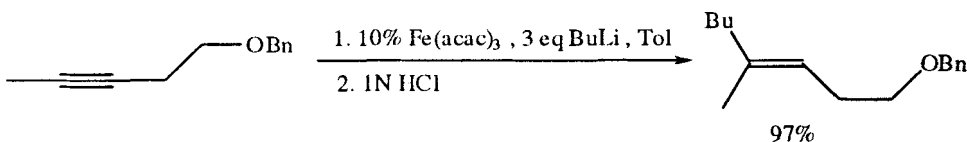
Kazankova, M.A.; Efimova, I.V.; Kochetkov, A.N.; Afanas'ev, V.V.; Beletskaya, I.P.; Dixneuf, P.H. *Synlett*, **2001**, 497.



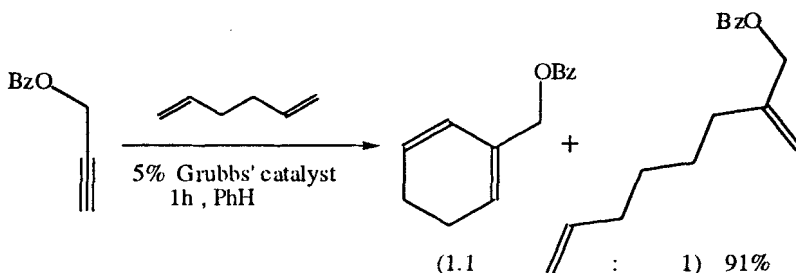
Prakash, O.; Sharma, V.; Batra, H.; Moriarty, R.M. *Tetrahedron Lett.*, **2001**, 42, 553.



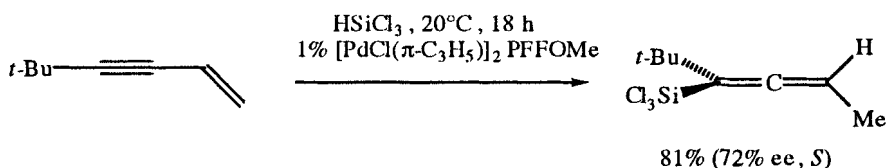
Niimi, L.; Shiino, K.; Hiraoka, S.; Yokozawa, T. *Tetrahedron Lett.*, **2001**, 42, 1721.



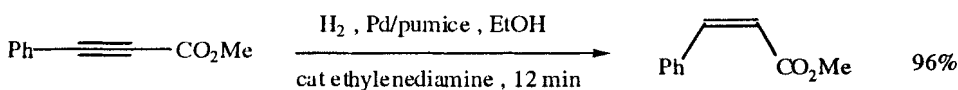
Hojo, M.; Murakami, Y.; Aihara, H.; Sakuragi, R.; Baba, Y.; Hosomi, A. *Angew. Chem. Int. Ed.*, **2001**, 40, 621.



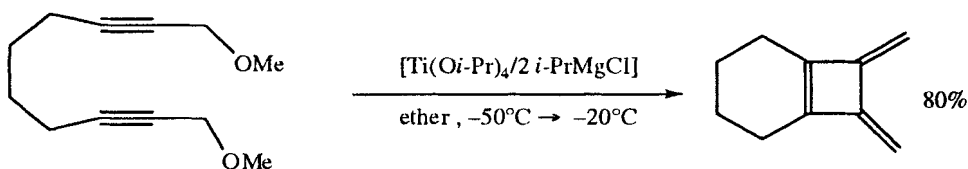
Smulik, J.A.; Diver, S.T. *Tetrahedron Lett.*, **2001**, 42, 171.



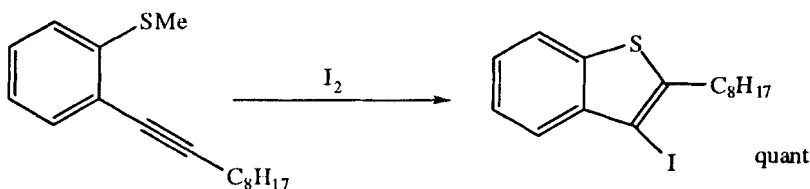
Han, J.W.; Tokunaga, N.; Hayashi, T. *J. Am. Chem. Soc.*, **2001**, 123, 12915.



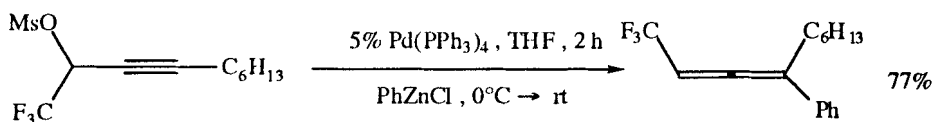
Gruttadauria, M.; Liotta, L.F.; Noto, R.; Deganello, G. *Tetrahedron Lett.*, **2001**, 42, 2015.



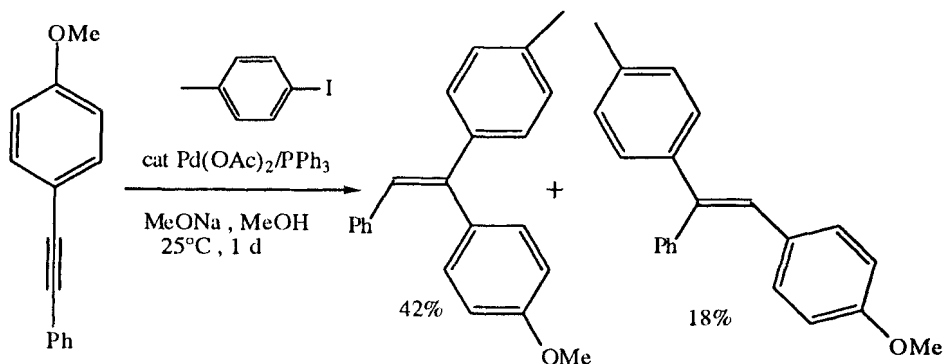
Delas, C.; Urabe, H.; Sato, E. *Tetrahedron Lett.*, **2001**, 42, 4147.



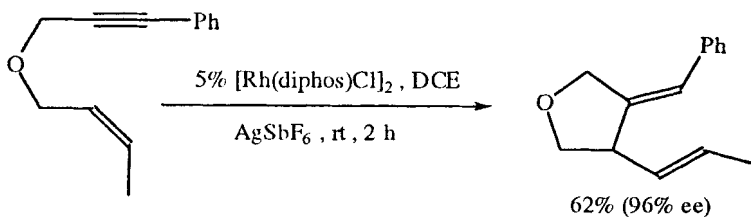
Larock, R.C.; Yue, D. *Tetrahedron Lett.*, **2001**, 42, 6011.



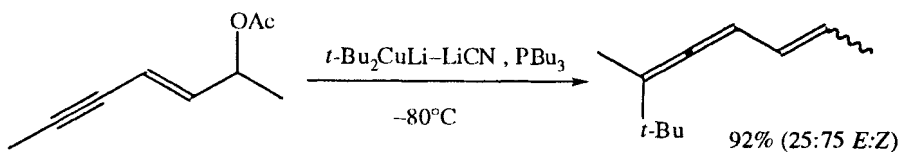
Konno, T.; Tanikawa, M.; Ishihara, T.; Yamanaka, H. *Chem. Lett.*, **2000**, 1360.



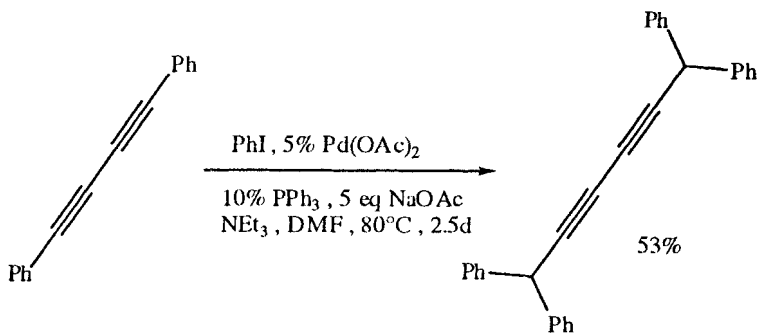
Wu, M.-L.; Wei, L.-M.; Lin, C.-F.; Leou, S.-P.; Wei, L.-L. *Tetrahedron*, **2001**, *57*, 7839.



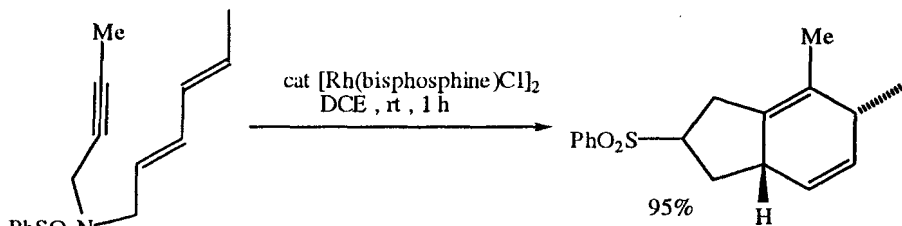
Cao, P.; Zhang, X. *Angew. Chem. Int. Ed.*, **2000**, *39*, 4104.



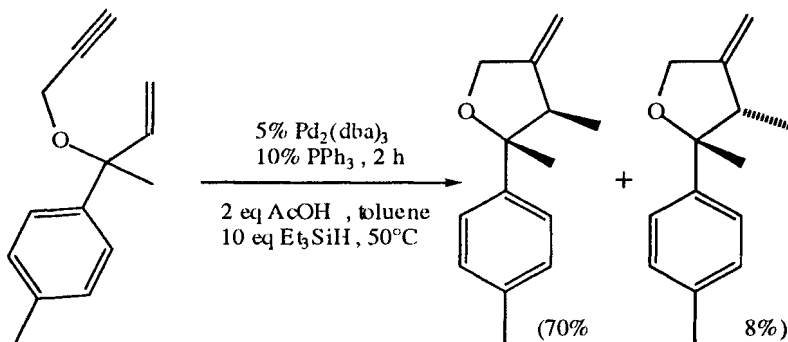
Krause, N.; Purpura, M. *Angew. Chem. Int. Ed.*, **2000**, *39*, 4355.



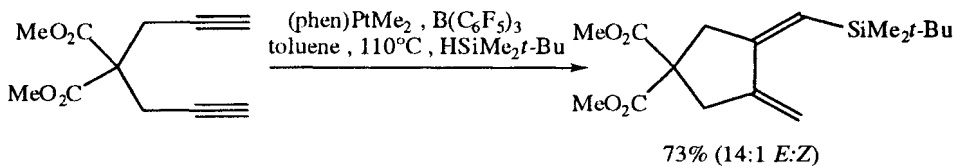
Dyker, G.; Borowski, S.; Henkel, G.; Kellner, A.; Dix, I.; Jones, P.G. *Tetrahedron Lett.*, **2000**, *41*, 8259.



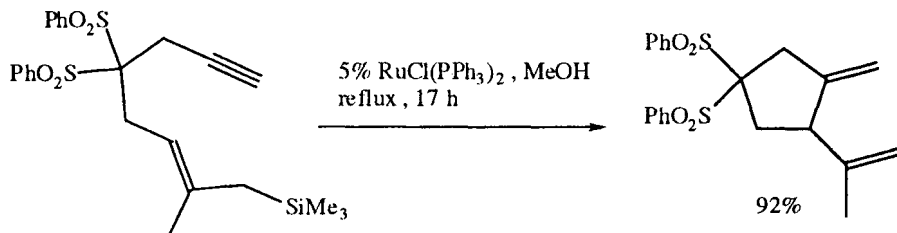
Wang, B.; Cao, P.; Zhang, X. *Tetrahedron Lett.*, 2000, 41, 8041.



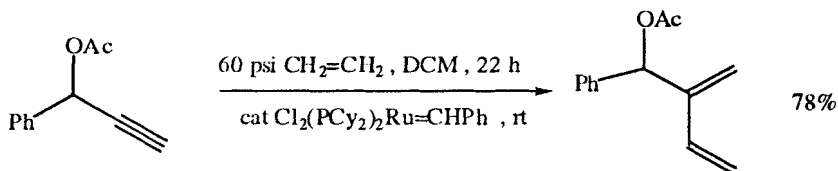
Oh, C.H.; Han, J.W.; Kim, J.S.; Um, S.Y.; Jung, H.H.; Jang, W.H.; Won, H.S. *Tetrahedron Lett.*, 2000, 41, 8365.



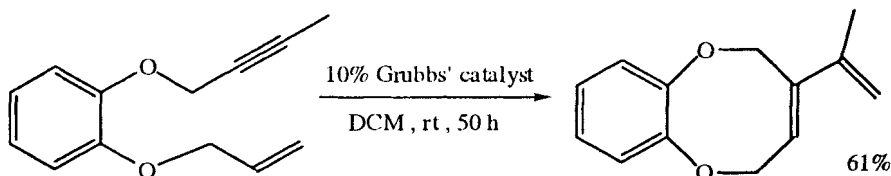
Madine, J.W.; Wang, X.; Widenhoefer, R.A. *Org. Lett.*, 2001, 3, 385.



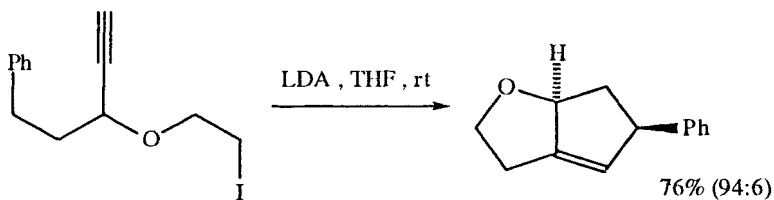
Fernández-Rivas, C.; Méndez, M.; Echavarren, A.M. *J. Am. Chem. Soc.*, 2000, 122, 1221.



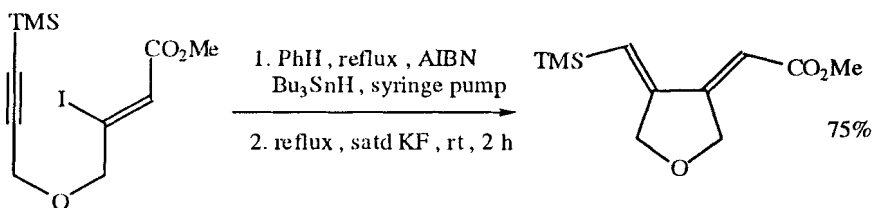
Smulik, J.A.; Diver, S.T. *J. Org. Chem.*, **2000**, *65*, 1788.



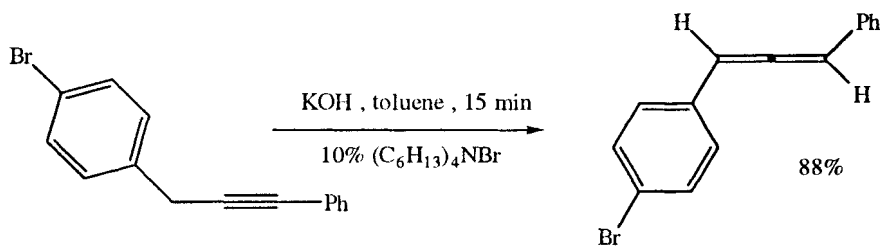
Mori, M.; Kitamura, T.; Sakaibara, N.; Sato, Y. *Org. Lett.*, **2000**, *2*, 543.



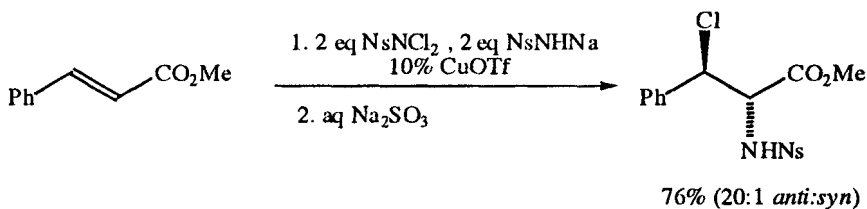
Harada, T.; Fujiwara, T.; Iwazaki, K.; Oku, A. *Org. Lett.*, **2000**, *2*, 1855.



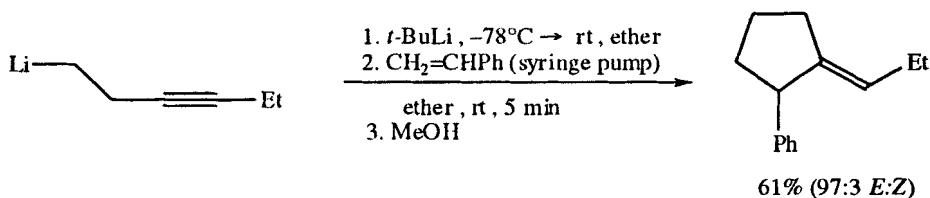
Sha, C.-K.; Zhan, Z.-P.; Wang, F.-S. *Org. Lett.*, **2000**, *2*, 2011.



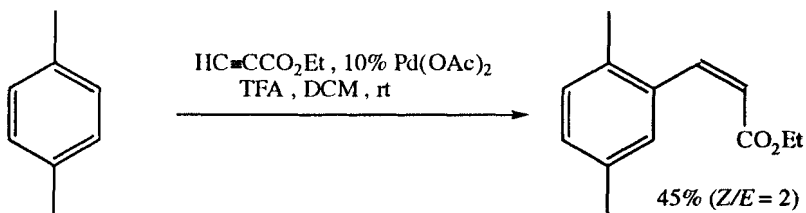
Oku, M.; Arai, S.; Katayama, K.; Shioiri, T. *Synlett*, **2000**, 493.



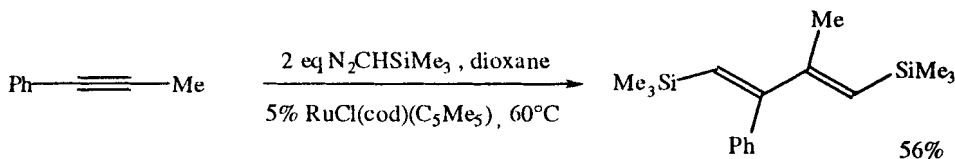
Li, G.; Wei, H.-X.; Kim, S.H. *Org. Lett.*, **2000**, *2*, 2249.



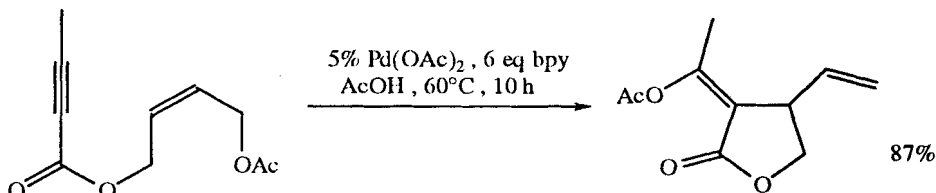
Wei, X.; Taylor, R.J.K. *Angew. Chem. Int. Ed.*, **2000**, *39*, 409.



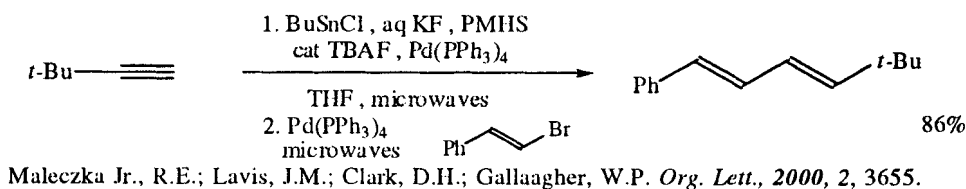
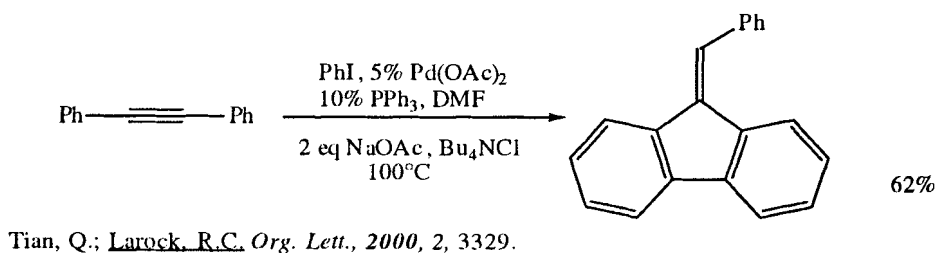
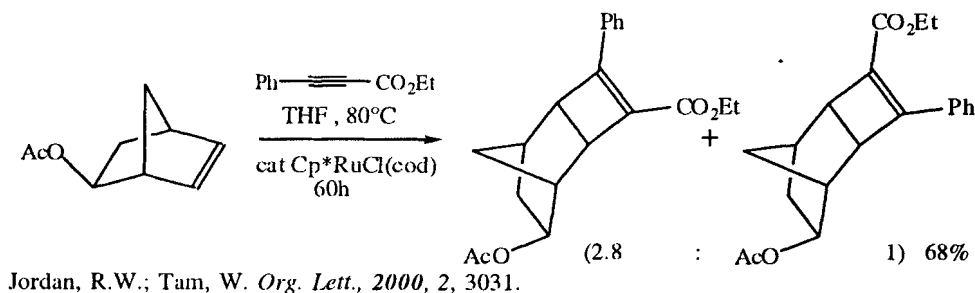
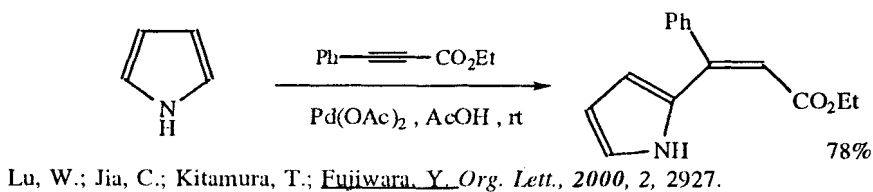
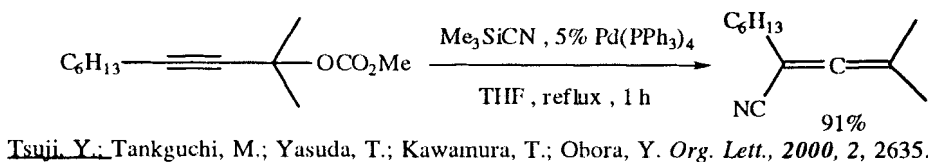
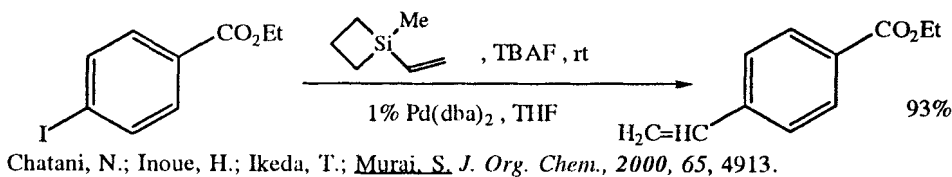
Jia, C.; Lu, W.; Oyamada, J.; Kitamura, T.; Matsuda, K.; Irie, M.; Fujiwara, Y.  
*J. Am. Chem. Soc.*, **2000**, *122*, 7252.



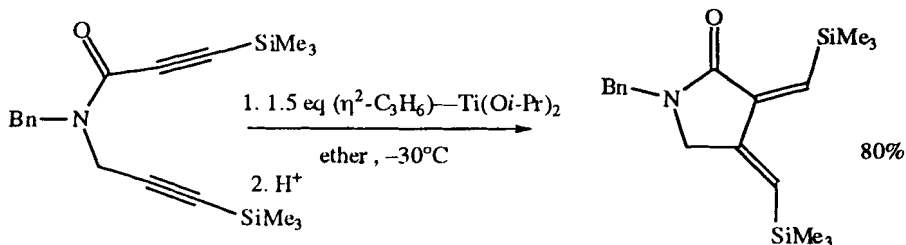
Le Paih, J.; Dérien, S.; Özdemir, I.; Dixneuf, P.H. *J. Am. Chem. Soc.*, **2000**, *122*, 7400.



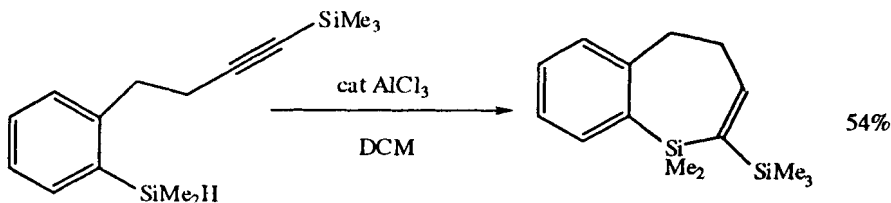
Zhang, Q.; Lu, X. *J. Am. Chem. Soc.*, **2000**, *122*, 7604.



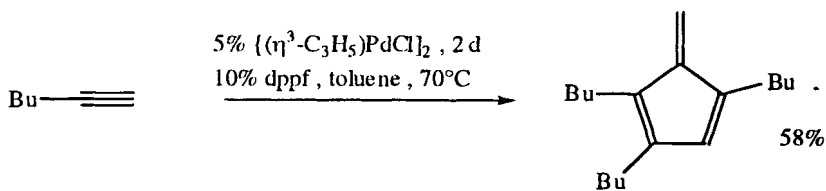




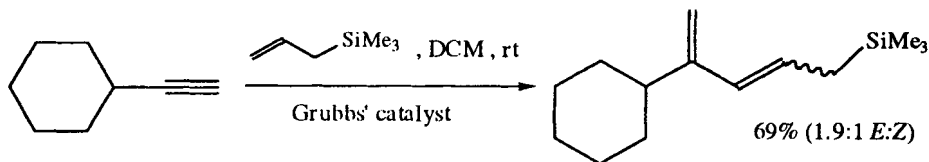
Urabe, H.; Nakajima, R.; Sato, F. *Org. Lett.*, 2000, 2, 3481.



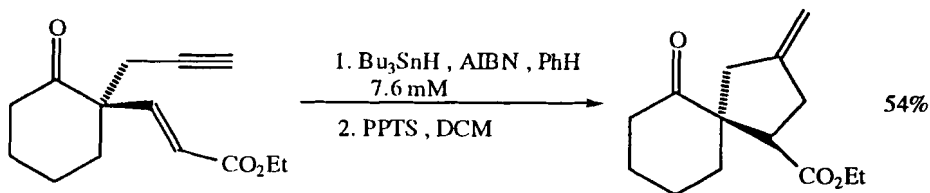
Sudo, T.; Asao, N.; Yamamoto, Y. *J. Org. Chem.*, 2000, 65, 8919.



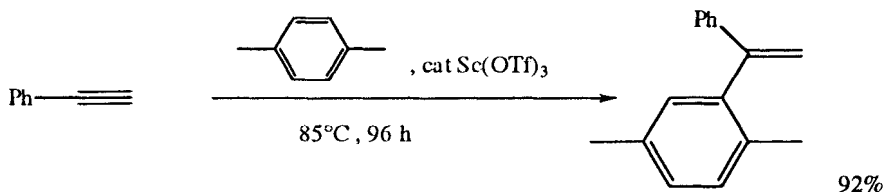
Radhakrishnan, U.; Gevorgyan, V.; Yamamoto, Y. *Tetrahedron Lett.*, 2000, 41, 1971.



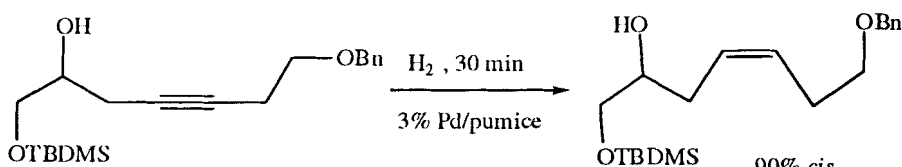
Stragies, R.; Voigtmann, U.; Blechert, S. *Tetrahedron Lett.*, 2000, 41, 5465.



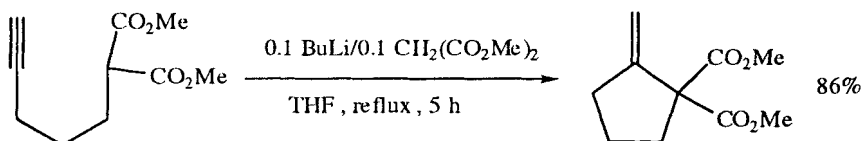
Robertson, J.; Lam, H.W.; Abazi, S.; Roseblade, S.; Lusch, R.K. *Tetrahedron*, 2000, 56, 8959.



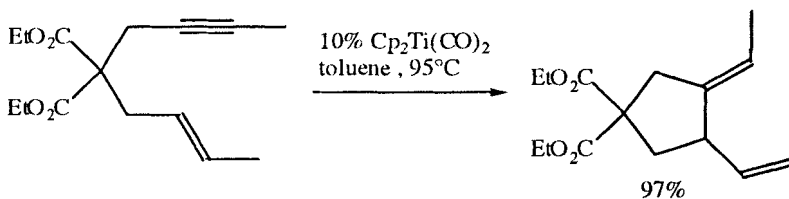
Tsuchimoto, T.; Maeda, T.; Shirakawa, E.; Kawakami, Y. *Chem. Commun.*, **2000**, 1573.



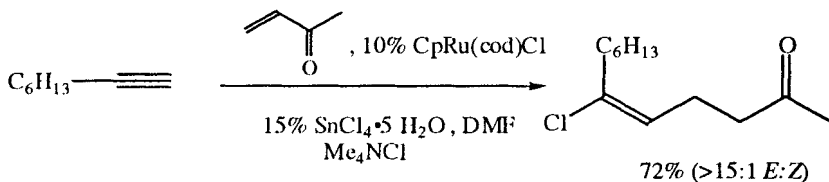
Gruttadauria, M.; Noto, R.; Deganello, G.; Liotta, L.F. *Tetrahedron Lett.*, **1999**, *40*, 2857.



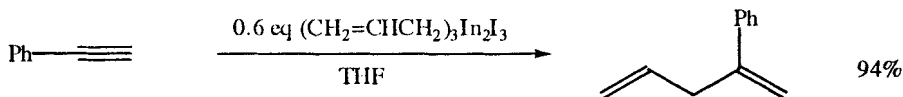
Kitagawa, O.; Suzuki, T.; Fujiwara, H.; Fujita, M.; Taguchi, T. *Tetrahedron Lett.*, **1999**, *40*, 4585.



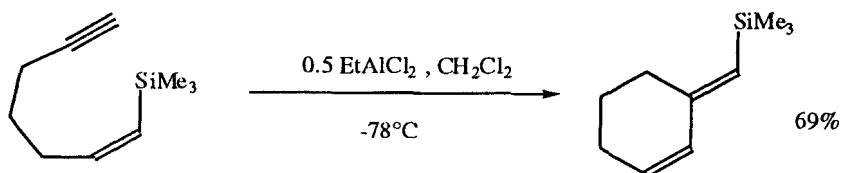
Sturla, S.J.; Kablaoui, N.M.; Buchwald, S.L. *J. Am. Chem. Soc.*, **1999**, *121*, 1976.



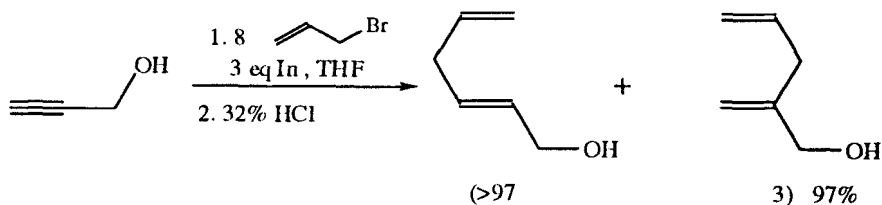
Trost, B.M.; Pinkerton, A.B. *J. Am. Chem. Soc.*, **1999**, *121*, 1988.



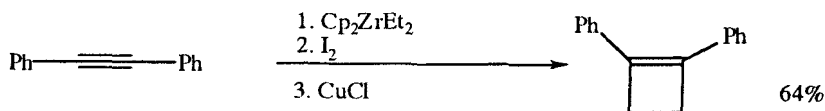
Fujiwara, N.; Yamamoto, Y. *J. Org. Chem.*, **1999**, *64*, 4095.



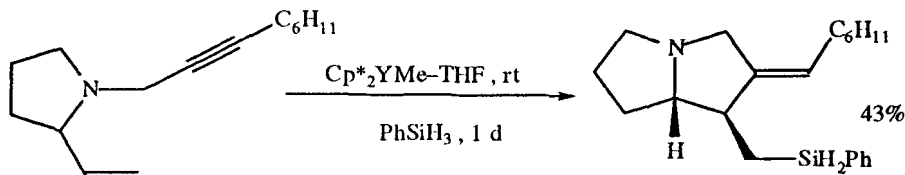
Asao, N.; Shimada, T.; Yamamoto, Y. *J. Am. Chem. Soc.*, **1999**, *121*, 3797.



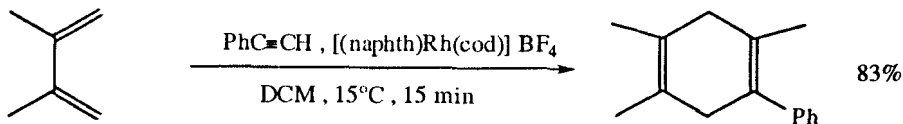
Klaps, E.; Schmid, W. *J. Org. Chem.*, **1999**, *64*, 7537.



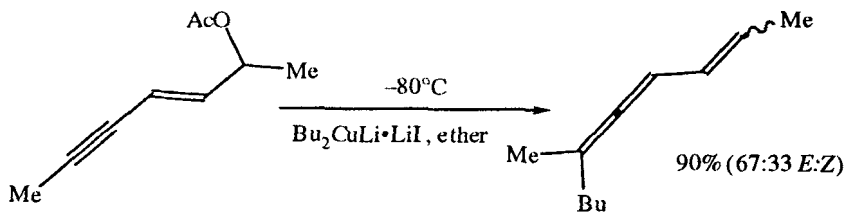
Takahashi, T.; Shen, B.; Nakajima, K.; Xi, Z. *J. Org. Chem.*, **1999**, *64*, 8706.



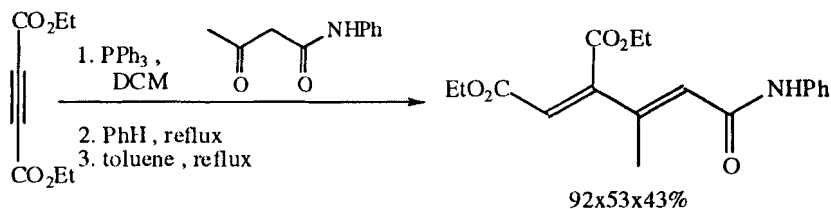
Molander, G.A.; Corrette, C.P. *J. Org. Chem.*, **1999**, *64*, 9697.



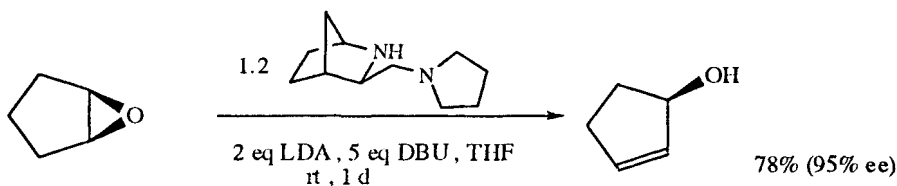
Paik, S.-J.; Son, S.U.; Chung, Y.K. *Org. Lett.*, **1999**, *1*, 2045.



Purpura, M.; Krause, N. *Eur. J. Org. Chem.*, **1999**, 267.



Yavari, I.; Asghari, S. *Tetrahedron*, **1999**, *55*, 11853.



Fleming, I.; de Marigorta, E.M. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 889.

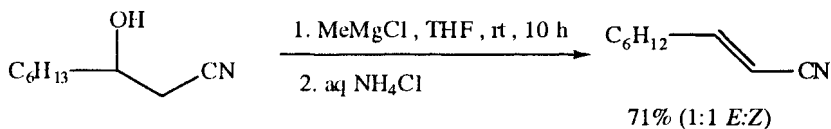
## REVIEWS:

"Metal-Mediated Carbometallation Of Alkynes And Alkenes Containing Adjacent Heteroatoms,"  
Fallis, A.G.; Forgione, P. *Tetrahedron*, **2001**, *57*, 5899.

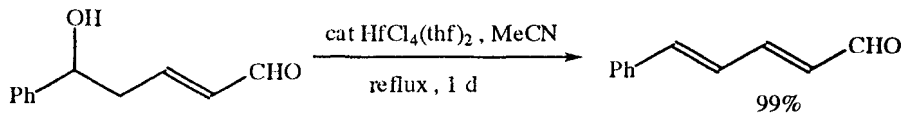
## SECTION 197: ALKENES FROM ACID DERIVATIVES

NO ADDITIONAL EXAMPLES

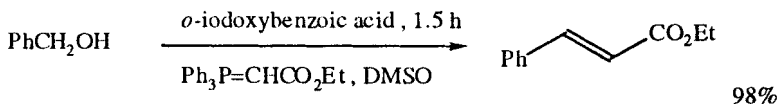
## SECTION 198: ALKENES FROM ALCOHOLS AND THIOLS



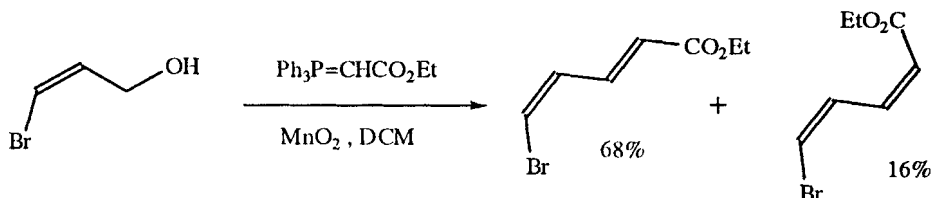
Fleming, F.F.; Shook, B.C. *Tetrahedron Lett.*, **2000**, *41*, 8847.



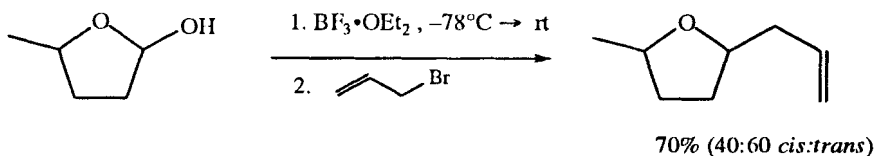
Saito, S.; Nagahara, T.; Yamamoto, H. *Synlett*, **2001**, 1690.



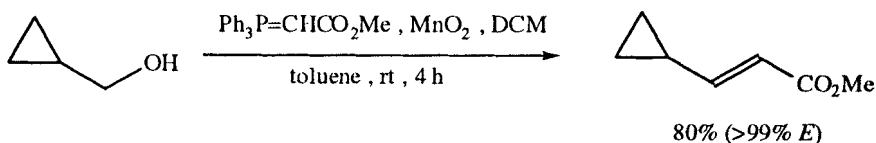
Maiti, A.; Yadav, J.S. *Synth. Commun.*, **2001**, 31, 1499.



Wei, X.; Taylor, R.J.K. *J. Org. Chem.*, **2000**, 65, 616.

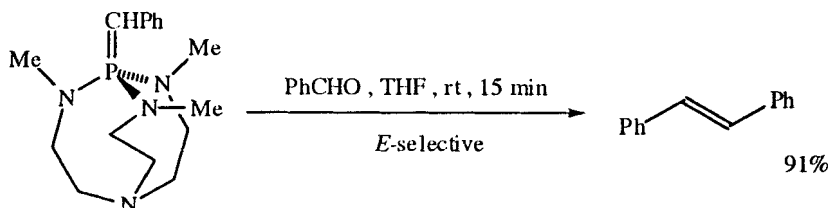


Schmitt, A.; Reißig, H.-U. *Eur. J. Org. Chem.*, **2000**, 3893.

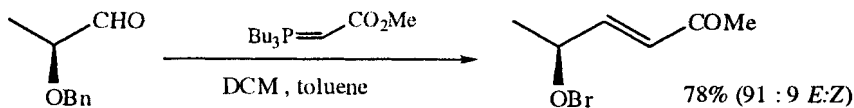


Blackburn, L.; Wei, X.; Taylor, R.J.K. *Chem. Commun.*, **1999**, 1337.

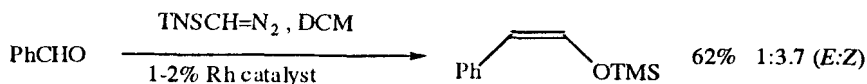
## SECTION 199: ALKENES FROM ALDEHYDES



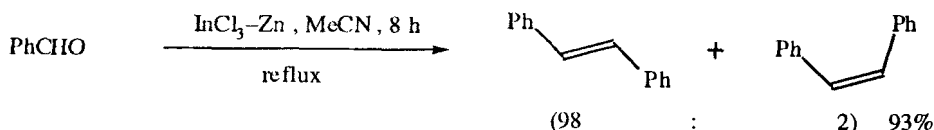
Wang, Z.; Zhang, G.; Guzei, I.; Verkade, J.G. *J. Org. Chem.*, **2001**, 66, 3521.



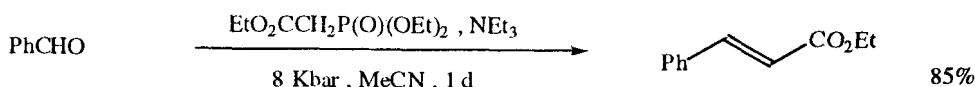
Harcken, C.; Martin, S.F. *Org. Lett.*, **2001**, 3, 3591.



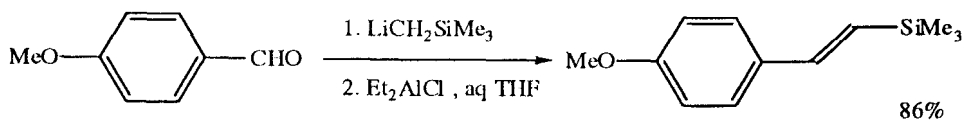
Dias, E.L.; Brookhart, M.; White, P.S. *J. Am. Chem. Soc.*, **2001**, *123*, 2442.



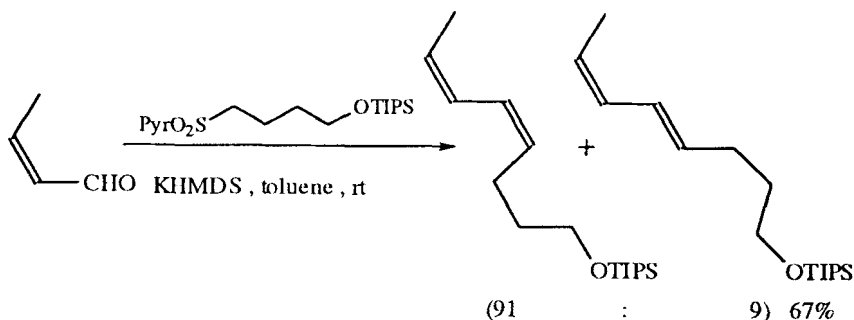
Barman, D.C.; Thakur, A.J.; Prajapati, D.; Sandhu, J.S. *Synlett*, **2001**, 515.



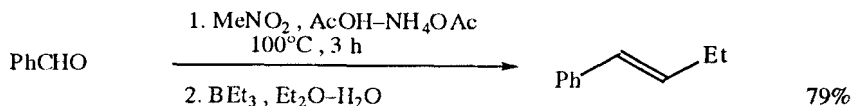
Has-Becker, S.; Bodmann, K.; Kreuder, R.; Santoni, G.; Rein, T.; Reiser, O. *Synlett*, **2001**, 1395.



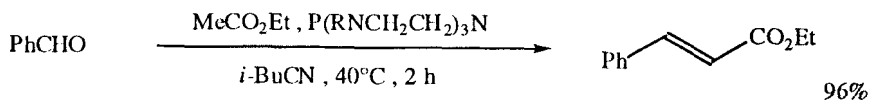
Kwan, M.L.; Yeung, C.W.; Breno, K.L.; Doxsee, K.M. *Tetrahedron Lett.*, **2001**, *42*, 1411.



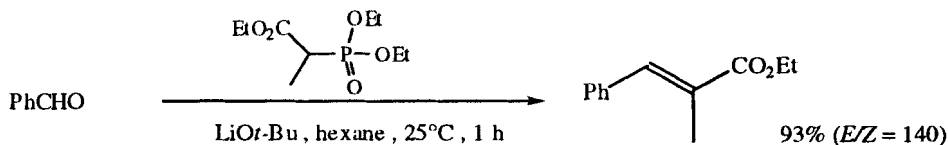
Charette, A.B.; Berthelette, C.; St.-Martin, D. *Tetrahedron Lett.*, **2001**, *42*, 5149.



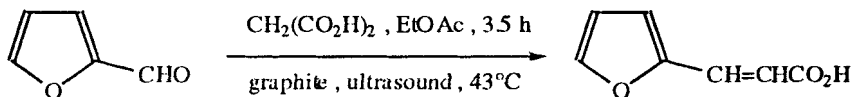
Liu, J.-T.; Yao, C.-F. *Tetrahedron Lett.*, **2001**, *42*, 6147.



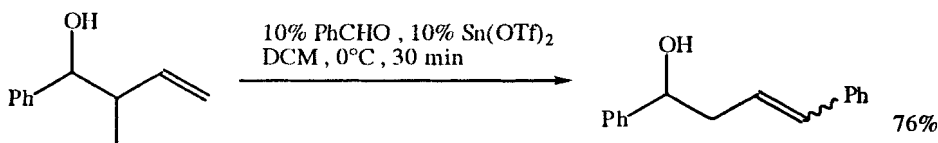
Kisanga, P.; D'Sa, B.; Verkade, J. *Tetrahedron*, **2001**, *57*, 8047.



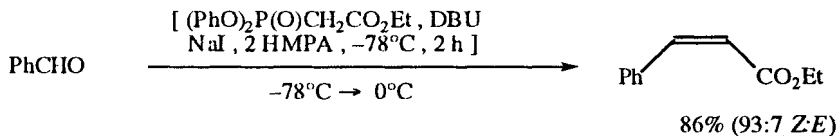
Petroski, R.J.; Weisleder, D. *Synth. Commun.*, **2001**, *31*, 89.



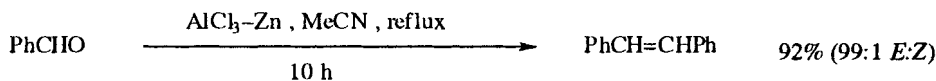
Li, J.-T.; Zang, H.-J.; Fang, J.-Y.; Li, L.-J.; Li, T.-S. *Synth. Commun.*, **2001**, *31*, 653.



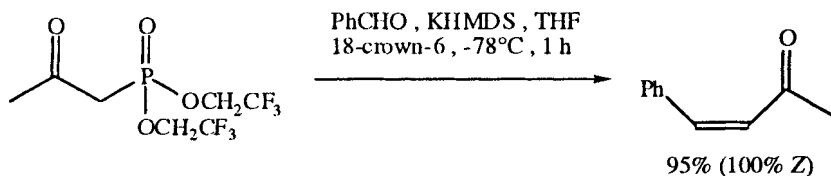
Nokami, J.; Anthony, L.; Sumida, S.-i. *Chem. Eur. J.*, **2000**, *6*, 2909.



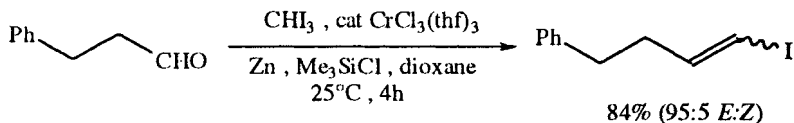
Ando, K.; Oishi, T.; Hiramata, M.; Ohno, H.; Ibuka, T. *J. Org. Chem.*, **2000**, *65*, 4745.



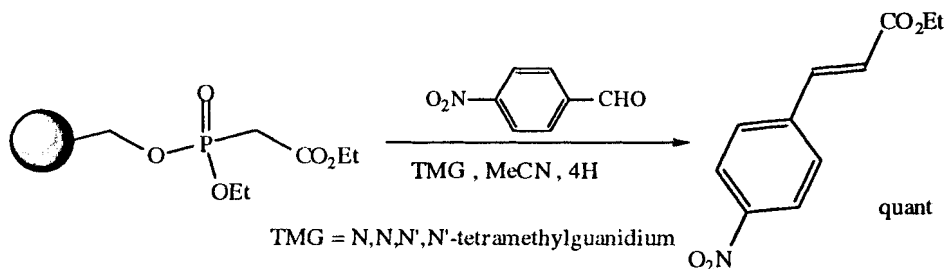
Dutta, D.K.; Konwar, D. *Tetrahedron Lett.*, **2000**, *41*, 6227.



Yu, W.; Su, M.; Jin, Z. *Tetrahedron Lett.*, **1999**, *40*, 6725.



Takai, K.; Ichiguchi, T.; Hikasa, S. *Synlett*, **1999**, 1268.

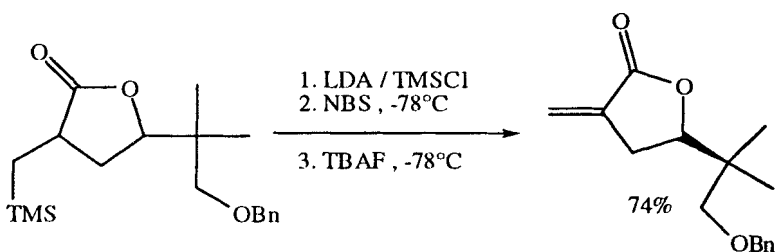


Barrett, A.G.M.; Cramp, S.M.; Roberts, R.S.; Zecri, F.J. *Org. Lett.*, **1999**, *1*, 579.

Related Methods: Section 207 (Alkenes from Ketones).

## SECTION 200: ALKENES FROM ALKYL, METHYLENES AND ARYLS

This section contains dehydrogenations to form alkenes and unsaturated ketones, esters and amides. It also includes the conversion of aromatic rings to alkenes. Reduction of aryls to dienes is found in Section 377 (Alkene-Alkene). Hydrogenation of aryls to alkanes and dehydrogenations to form aryls are included in Section 74 (Alkyls from Alkenes).



Dumeunier, R.; Markó, I.E. *Tetrahedron Lett.*, **2000**, *41*, 10219.

## SECTION 201: ALKENES FROM AMIDES

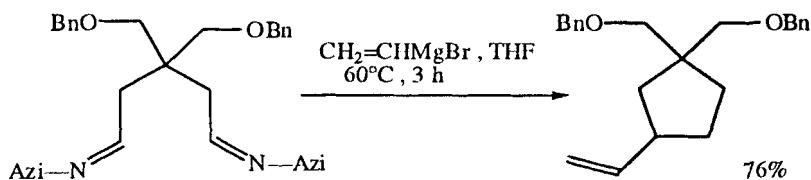
Related Methods:

Section 65 (Alkyls from Alkyls).  
Section 74 (Alkyls from Alkenes).

NO ADDITIONAL EXAMPLES

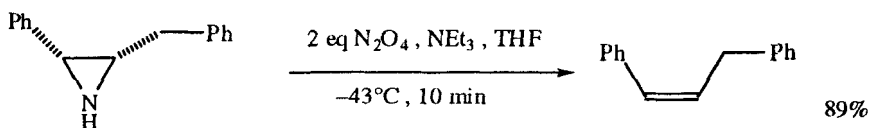


## SECTION 202: ALKENES FROM AMINES



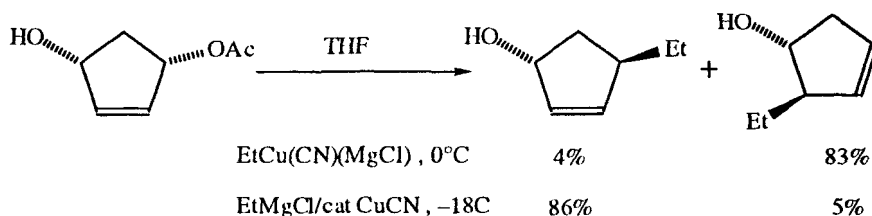
Azi = 2-phenyl *N*-aziridinyl group

Kim, S.; Ohi, D.H.; Yoon, J.-Y.; Cheong, J.H. *J. Am. Chem. Soc.*, **1999**, 121, 5330.

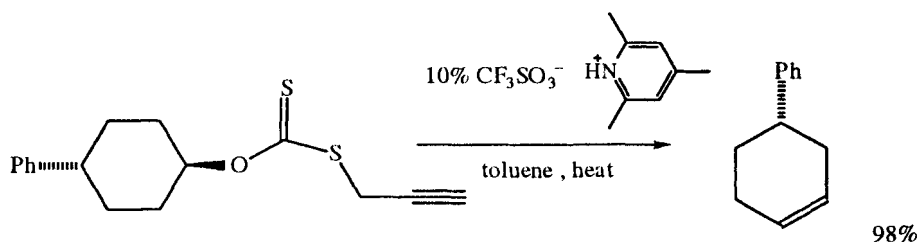


Lee, K.; Kim, Y.H. *Synth. Commun.*, **1999**, 29, 1241.

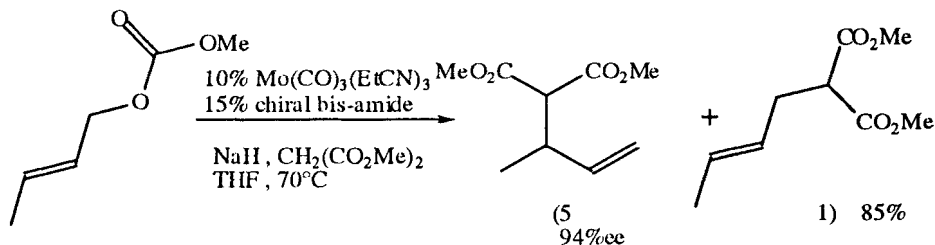
## SECTION 203: ALKENES FROM ESTERS



Ito, M.; Muruges, M.G.; Kobayashi, Y. *Tetrahedron Lett.*, **2001**, 42, 423.

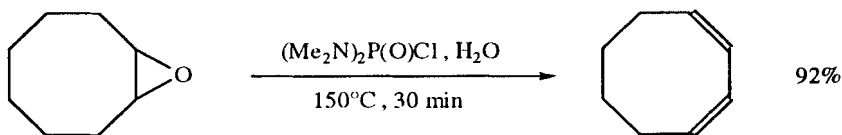


Fauré-Tromeur, M.; Zard, S.Z. *Tetrahedron Lett.*, **1999**, 40, 1305.

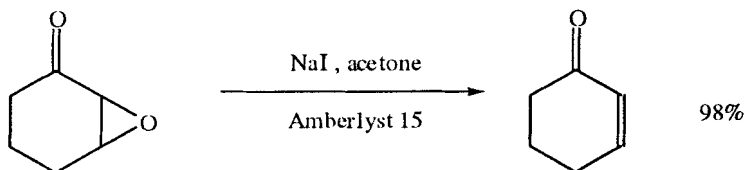


Glorius, F.; Pfaltz, A. *Org. Lett.*, **1999**, *1*, 141.

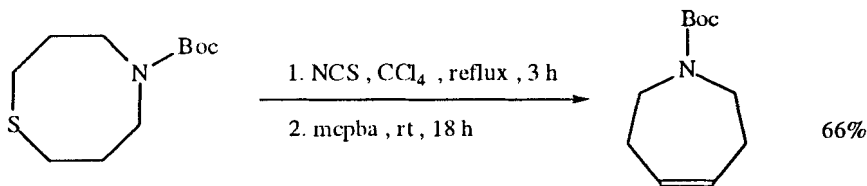
## SECTION 204: ALKENES FROM ETHERS, EPOXIDES AND THIOETHERS



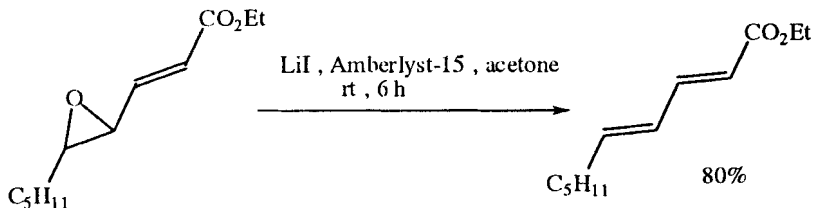
Demir, A.S. *Tetrahedron*, **2001**, *57*, 227.



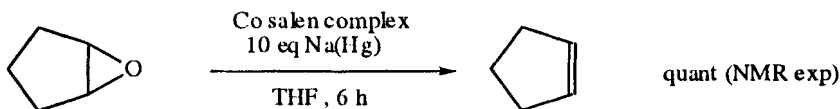
Righi, G.; Bovicelli, P.; Sperandio, A. *Tetrahedron*, **2000**, *56*, 1733.



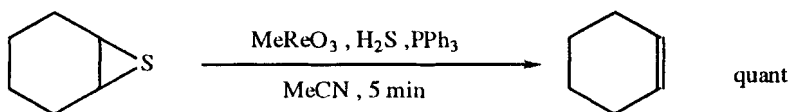
MacGee, D.L.; Beck, E.J. *J. Org. Chem.*, **2000**, *65*, 8367.



Antoniolletti, R.; Bovicelli, P.; Fazzolari, E.; Righi, G. *Tetrahedron Lett.*, **2000**, *41*, 9315.

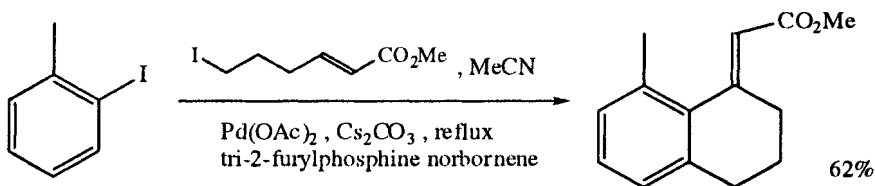


Isobe, H.; Branchaud, B.P. *Tetrahedron Lett.*, **1999**, 40, 8747.

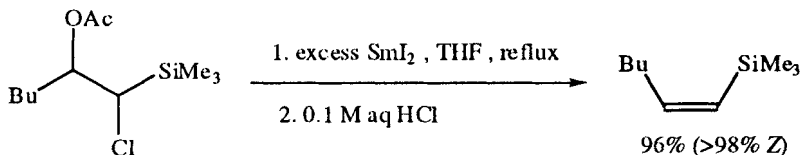


Jacob, J.; Espenson, J.H. *Chem. Commun.*, **1999**, 1003.

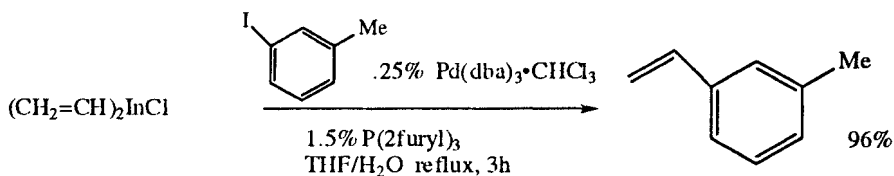
## SECTION 205: ALKENES FROM HALIDES AND SULFONATES



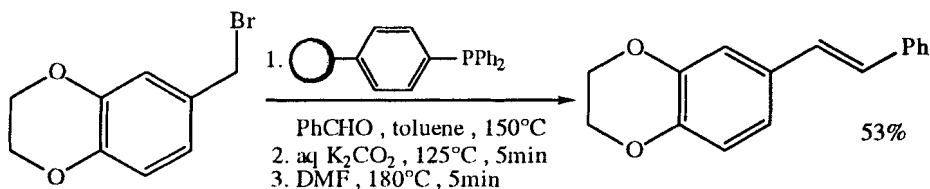
Lautens, M.; Paquin, J.-F.; Piguel, S.; Dahlmann, M. *J. Org. Chem.*, **2001**, 66, 8127.



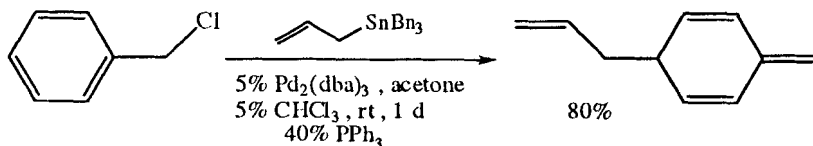
Concellón, J.M.; Bernad, P.L.; Bardales, E. *Org. Lett.*, **2001**, 3, 937.



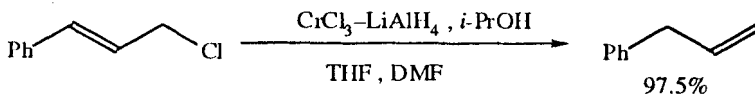
Takami, K.; Yorimitsu, H.; Shinobu, H.; Matsubara, S.; Oshima, K. *Org. Lett.*, **2001**, 3, 1997.



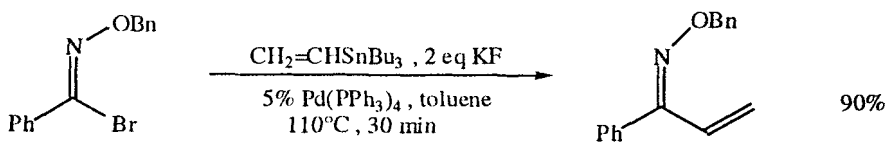
Westman, J. *Org. Lett.*, **2001**, 3, 3745.



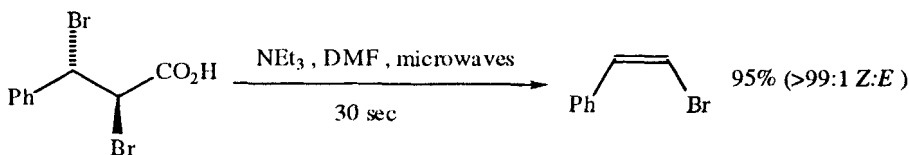
Bao, M.; Nakamura, H.; Yamamoto, Y. *J. Am. Chem. Soc.*, **2001**, *123*, 759.



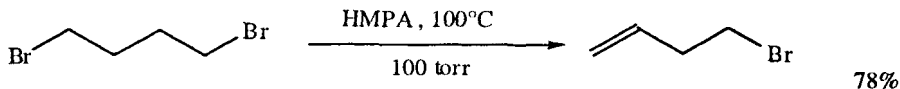
Omoto, M.; Kato, N.; Sogon, T.; Mori, A. *Tetrahedron Lett.*, **2001**, *42*, 939.



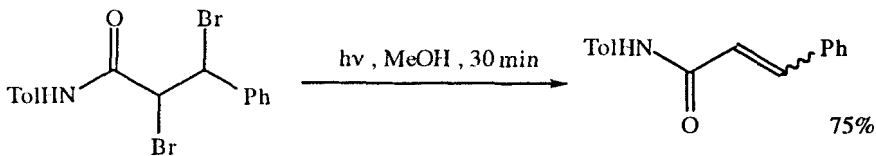
Chang, S.; Lee, M.; Kim, S. *Synlett*, **2001**, 1557.



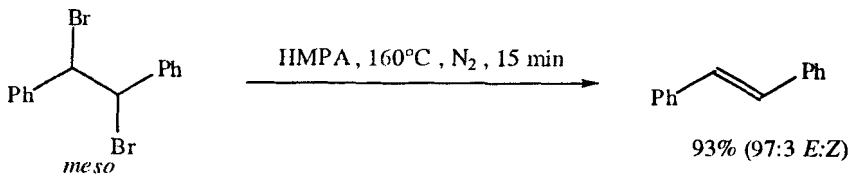
Kuang, C.; Senboku, H.; Tokuda, M. *Tetrahedron Lett.*, **2001**, *42*, 3893.



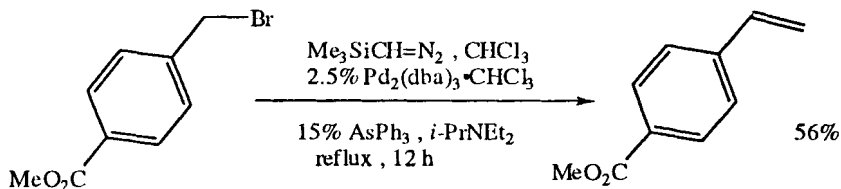
Hoye, T.R.; Van Veldhuizen, J.J.; Vos, T.J.; Zhao, P. *Synth. Commun.*, **2001**, *31*, 1367.



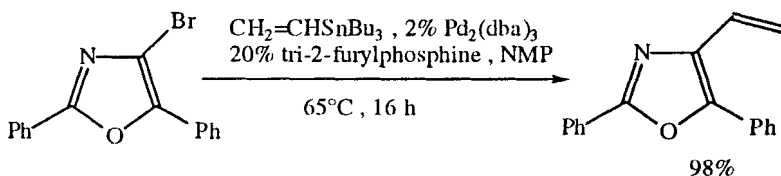
Aruna, S.; Kalyanakumar, R.; Ramakrishnan, V.T. *Synth. Commun.*, **2001**, *31*, 3125.



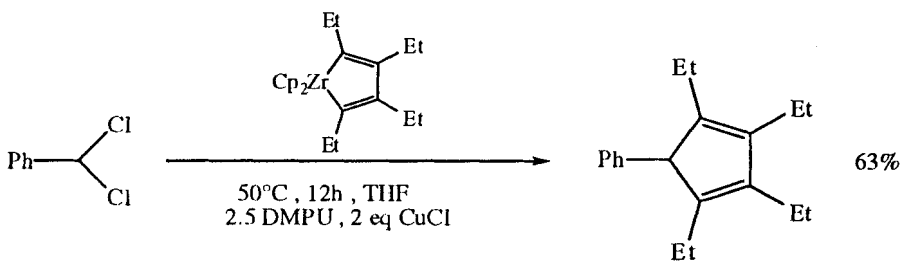
Khurana, J.M.; Bansal, G.; Chauhan, S. *Bull. Chem. Soc. Jpn.*, **2001**, *74*, 1089.



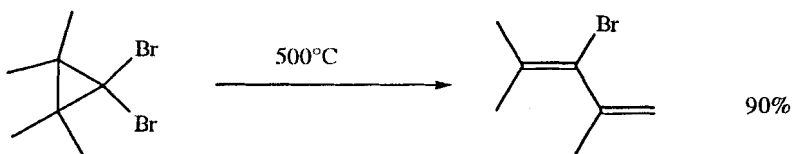
Greenman, K.L.; Carter, D.S.; Van Vranken, D.L. *Tetrahedron*, **2001**, *57*, 5219.



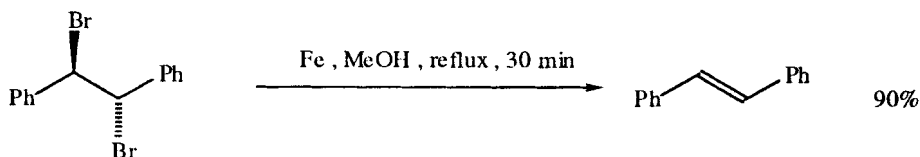
Clapham, B.; Sutherland, A.J. *J. Org. Chem.*, **2001**, *66*, 9033.



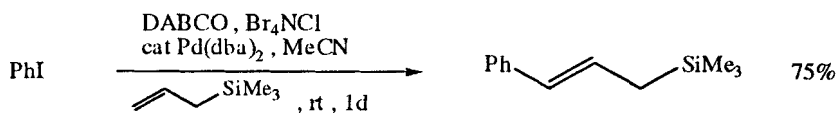
Duan, Z.; Sun, W.-H.; Liiu, Y.; Takahashi, T. *Tetrahedron Lett.*, **2000**, *41*, 7471.



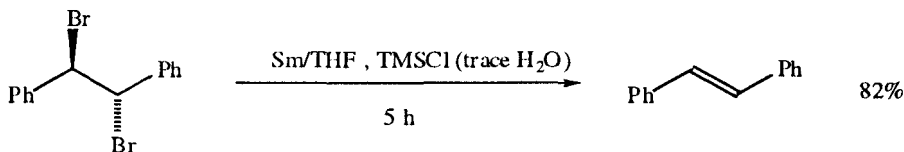
Werstiuk, N.H.; Roy, C.D. *Tetrahedron Lett.*, **2001**, *42*, 3255.



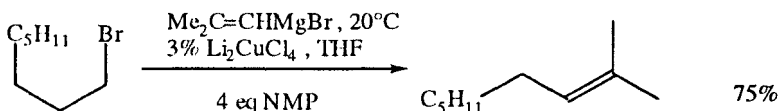
Thakur, A.J.; Boruah, A.; Baruah, B.; Sandhu, J.S. *Synth. Commun.*, **2000**, *30*, 157.



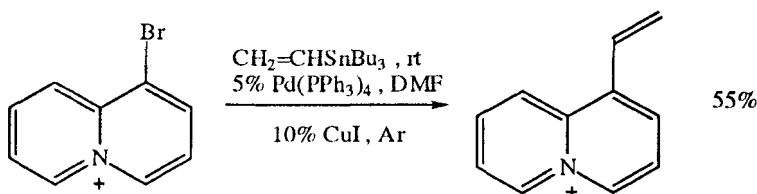
Jeffery, T. *Tetrahedron Lett.*, **2000**, *41*, 8445.



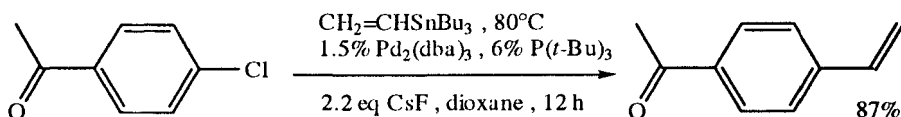
Xu, X.; Lu, P.; Zhang, Y. *Synth. Commun.*, **2000**, *30*, 1917.



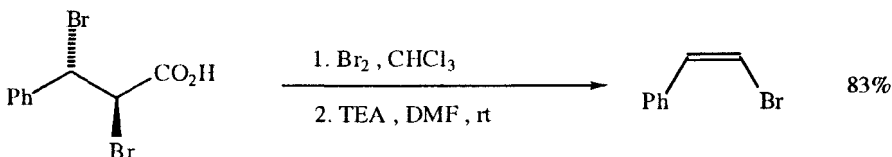
Cabiez, G.; Chaboche, C.; Jézéquel, M. *Tetrahedron*, **2000**, *56*, 2733.



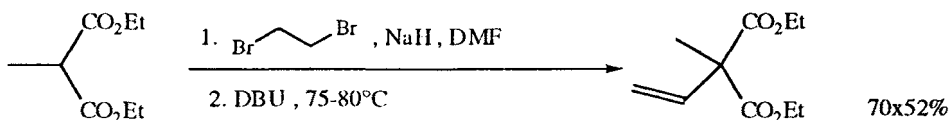
Barchín, B.M.; Valenciano, J.; Cuadro, A.M.; Alvarez-Builla, J.; Vaquero, J.J. *Org. Lett.*, **1999**, *1*, 545.



Littke, A.F.; Fu, G.C. *Angew. Chem. Int. Ed.*, **1999**, *38*, 2411.



Kim, S.H.; Wei, H.-X.; Willis, S.; Li, G. *Synth. Commun.*, **1999**, *29*, 4179.



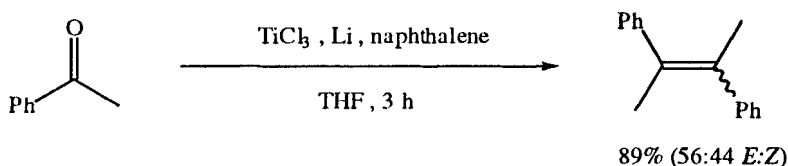
Bunce, R.A.; Burns, S.E. *Org. Prep. Proceed. Int.*, **1999**, *31*, 99.

## SECTION 206: ALKENES FROM HYDRIDES

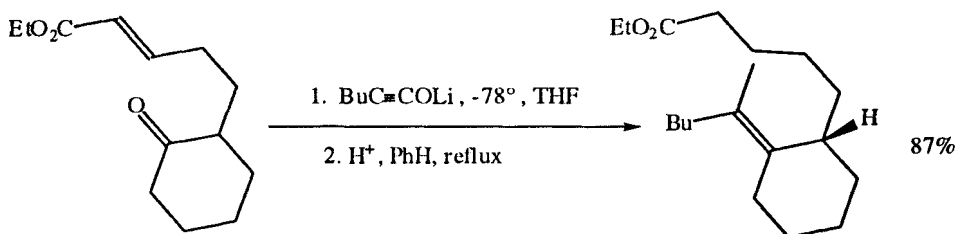
For conversions of methylenes to alkenes ( $\text{RCH}_2\text{R}' \rightarrow \text{RR}'\text{C=CH}_2$ ), see Section 200 (Alkenes from Alkyls).

## NO ADDITIONAL EXAMPLES

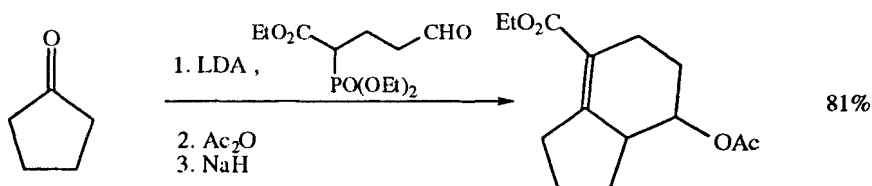
## SECTION 207: ALKENES FROM KETONES



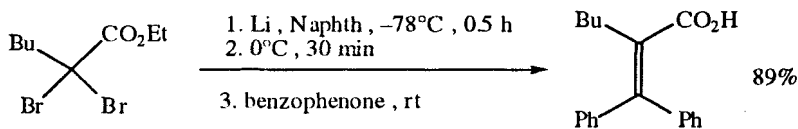
Rele, S.; Talukdar, S.; Banerji, A.; Chattopadhyay, S. *J. Org. Chem.*, **2001**, *66*, 2990.



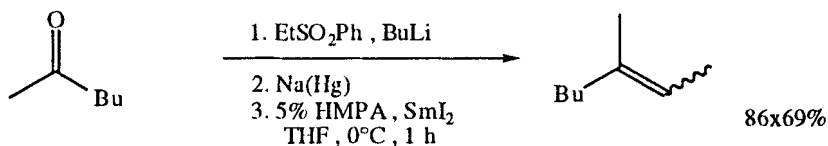
Shindo, M.; Matsumoto, K.; Sato, Y.; Shishido, K. *Org. Lett.*, **2001**, *3*, 2029.



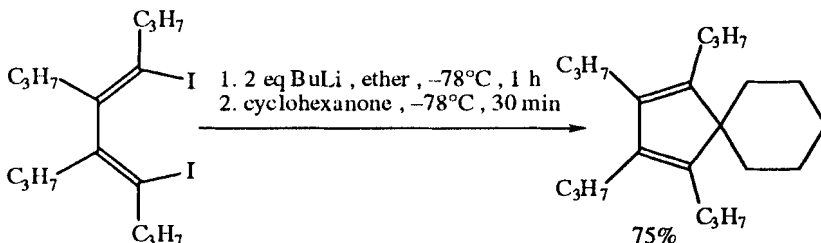
Kraus, G.A.; Jones, C. *Synlett*, **2001**, 793.



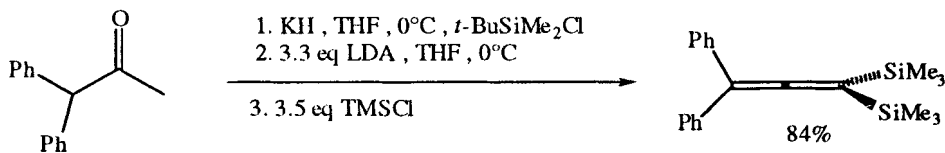
Shindo, M.; Koretsune, R.; Yokota, W.; Itoh, K.; Shishido, K. *Tetrahedron Lett.*, **2001**, *42*, 8357.



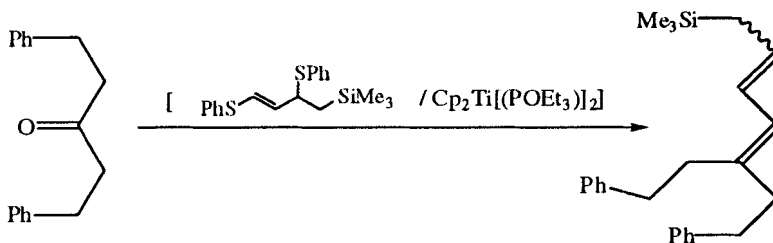
Markó, J.E.; Murphy, F.; Kumps, L.; Ales, A.; Touillaux, R.; Craig, D.; Carballares, S.; Dolan, S. *Tetrahedron*, **2001**, *57*, 2609.



Xi, Z.; Song, Q.; Chen, J.; Guan, H.; Li, P. *Angew. Chem. Int. Ed.*, **2001**, *40*, 1913.



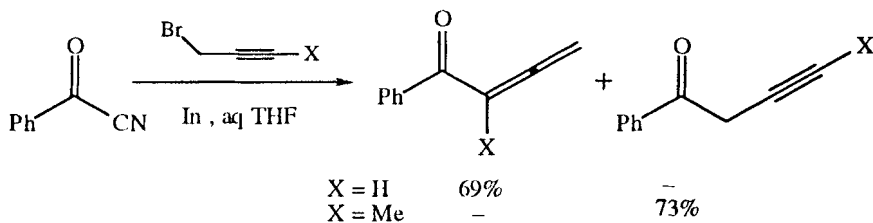
Langer, P.; Döring, M.; Seyferth, D.; Görls, H. *Chem. Eur. J.*, **2001**, *8*, 573.



Takeda, T.; Takagi, Y.; Saeki, N.; Fujiwara, T. *Tetrahedron Lett.*, **2000**, *41*, 8377.

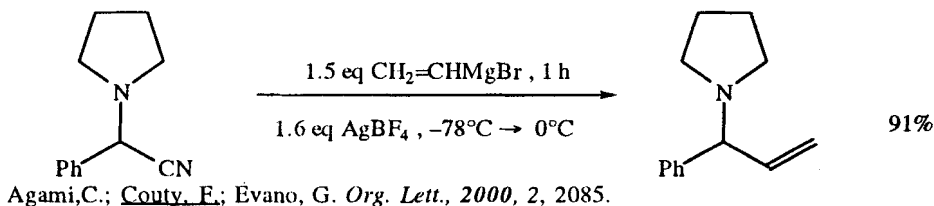
Related Methods: Section 199 (Alkenes from Aldehydes).

## SECTION 208: ALKENES FROM NITRILES

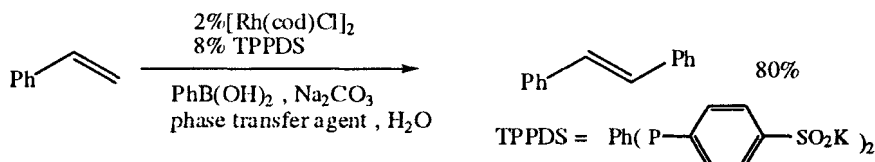


Yoo, B.-W.; Lee, S.-J.; Choi, K.-H.; Keum, S.-R.; Ko, J.-J.; Choi, K.-I.; Kim, J.-H. *Tetrahedron Lett.*, **2001**, *42*, 7287.

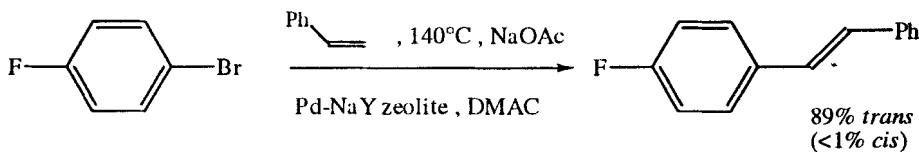




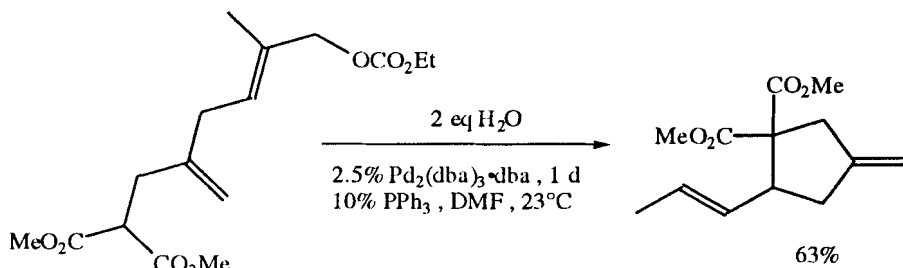
## SECTION 209: ALKENES FROM ALKENES



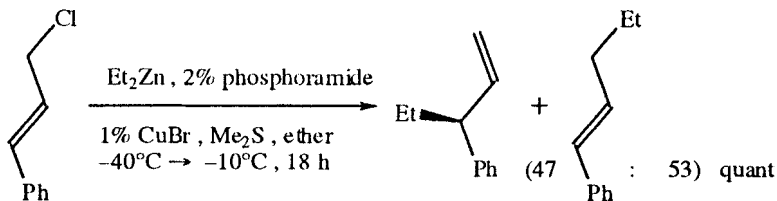
Lautens, M.; Roy, A.; Fukuoka, K.; Fagnou, K.; Martín-Matute, B.  
*J. Am. Chem. Soc.*, **2001**, 123, 5358.



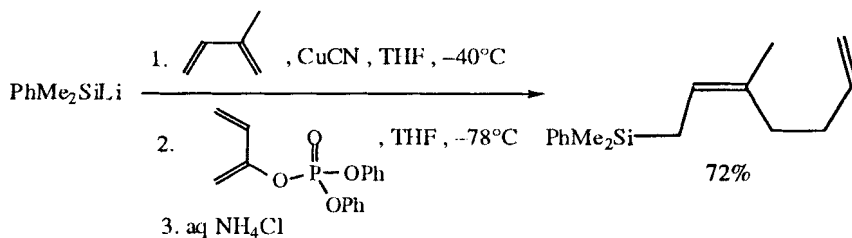
Djakovitch, L.; Koehler, K. *J. Am. Chem. Soc.*, **2001**, 123, 5990.



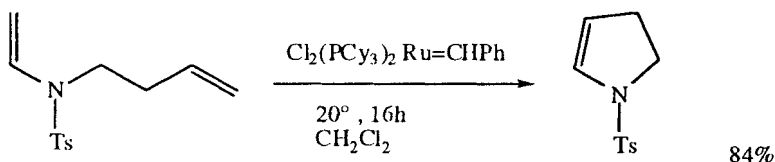
Castaño, A.M.; Méndez, M.; Ruano, M.; Eschavarren, A.M. *J. Org. Chem.*, **2001**, 66, 589.



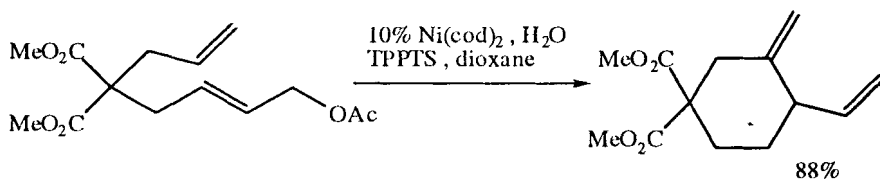
Malda, H.; van Zijl, A.W.; Arnold, L.A.; Feringa, B.L. *Org. Lett.*, **2001**, 3, 1169.



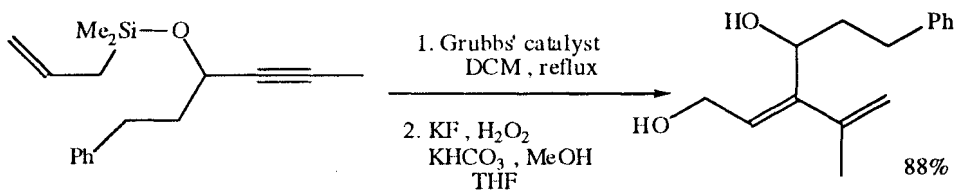
Liepins, V.; Bäckvall, J.-E. *Org. Lett.*, **2001**, 3, 1861.



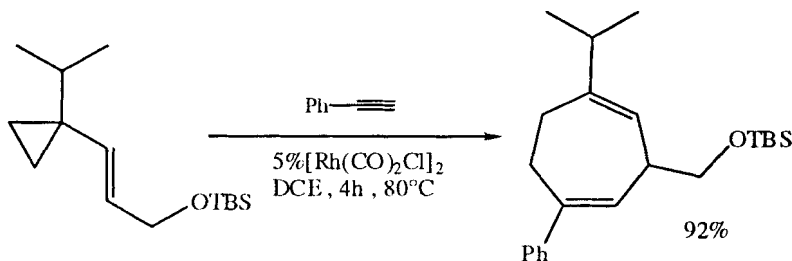
Kinderman, S.S.; van Maarseveen, J.H.; Schoemaker, H.E.; Hiemstra, H.; Rutjes, F.P.J.T. *Org. Lett.*, **2001**, 3, 2045.



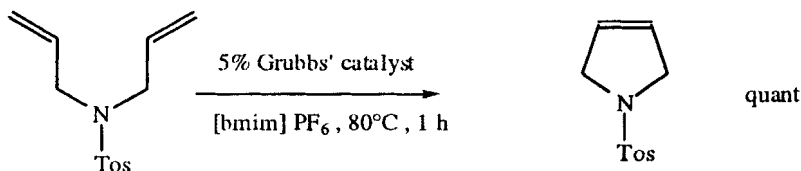
Michelet, V.; Galland, J.-C.; Charruault, L.; Savignac, M.; Genêt, J.-P. *Org. Lett.* **2001**, 3, 2065.



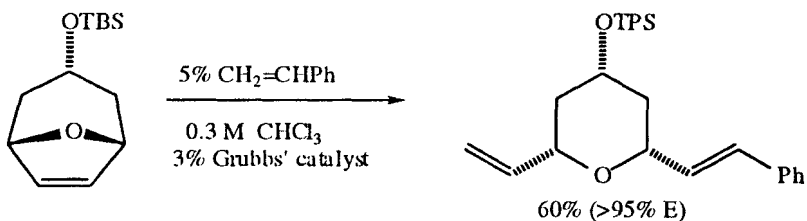
Yao, Q. *Org. Lett.*, **2001**, 3, 2069.



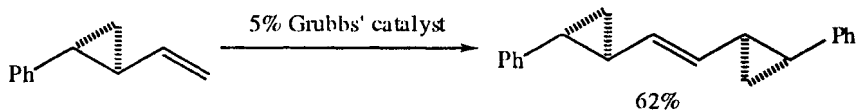
Wender, P.A.; Barzilay, C.M.; Dyckman, A.J. *J. Am. Chem. Soc.*, **2001**, 123, 179.



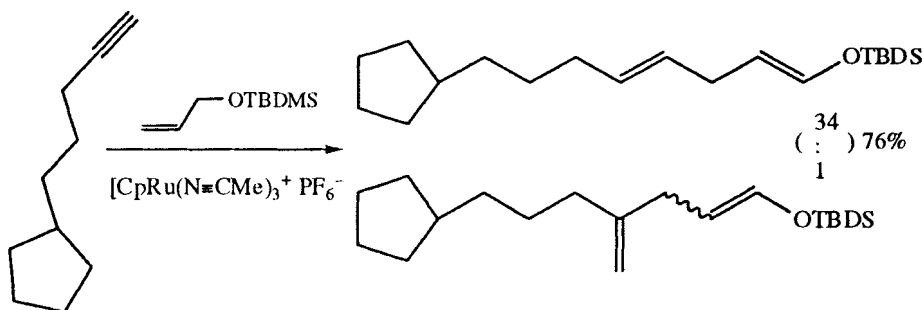
Buijsman, R.C.; van Vuuren, E.; Sterrenburg, J.G. *Org. Lett.*, **2001**, *3*, 3785.



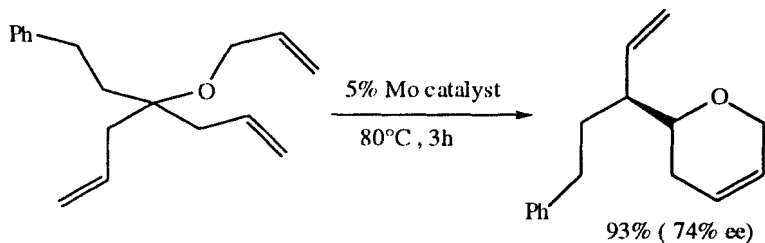
Wright, D.L.; Usher, L.C.; Estrella-Jimenez, M. *Org. Lett.*, **2001**, *3*, 4275.



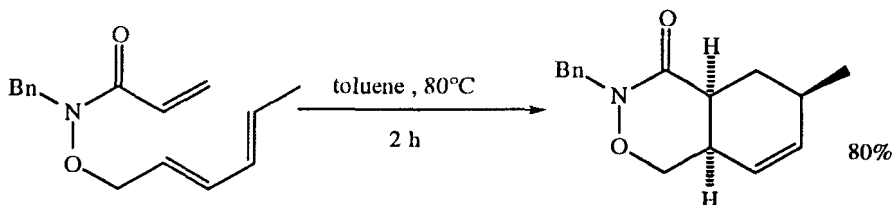
Verbicky, C.A.; Zercher, C.K. *Tetrahedron Lett.*, **2000**, *41*, 8723.



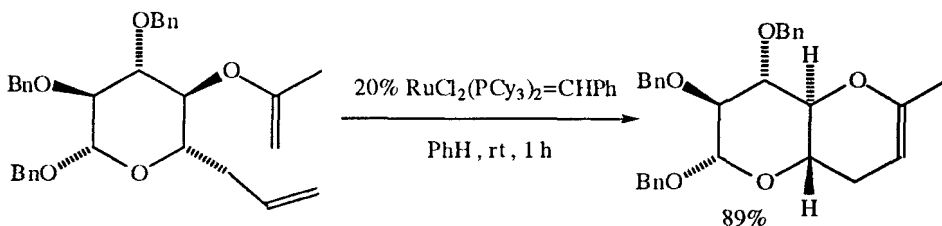
Trost, B.M.; Surivet, J.-P.; Toste, F.D. *J. Am. Chem. Soc.*, **2001**, *123*, 2897.



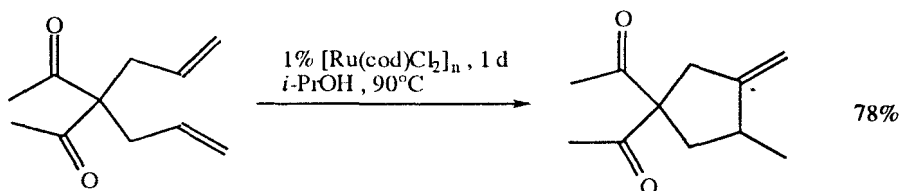
Cefalo, D.R.; Kiely, A.F.; Wuchrer, M.; Jamieson, J.Y.; Schrock, R.R.; Hoveyda, A.H. *J. Am. Chem. Soc.*, **2001**, *123*, 3139.



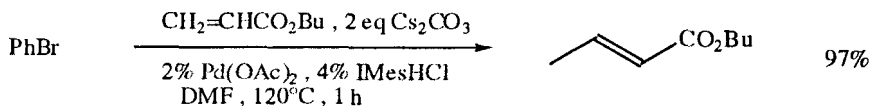
Ishikawa, T.; Senzaki, M.; Kadoya, R.; Morimoto, T.; Miyake, N.; Iawa, M.; Saito, S. *J. Am. Chem. Soc.*, **2001**, *123*, 4607.



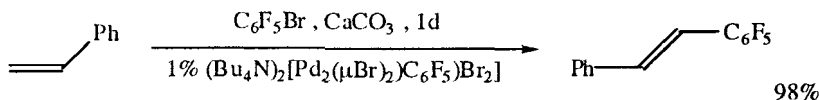
Rainer, J.D.; Cox, J.M.; Allwein, S.P. *Tetrahedron Lett.*, **2001**, *42*, 179.



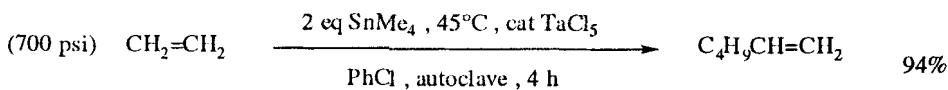
Yamamoto, Y.; Nakagai, Y.-i.; Ohkoshi, N.; Itoh, K. *J. Am. Chem. Soc.*, **2001**, *123*, 6372.



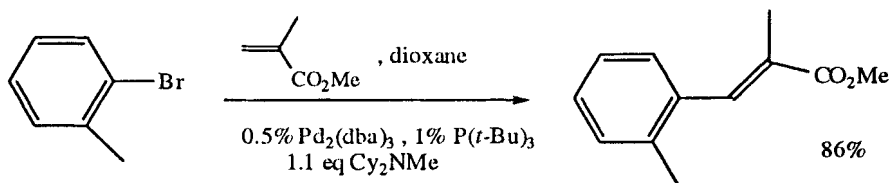
Yang, C.; Nolan, S.P. *Synlett*, **2001**, 1539.



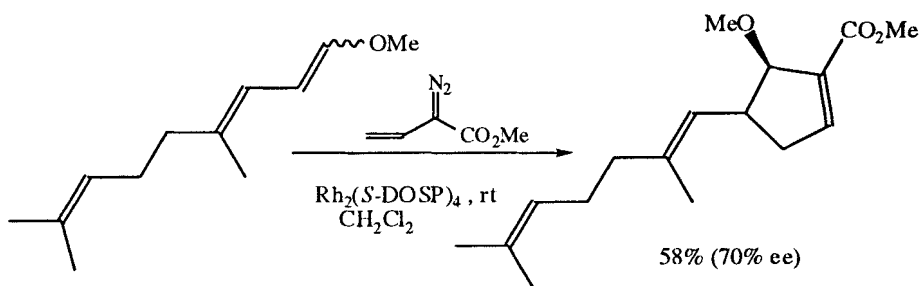
Albéniz, A.C.; Espinet, P.; Martín-Ruiz, B.; Milstein, D. *J. Am. Chem. Soc.*, **2001**, *123*, 11504.



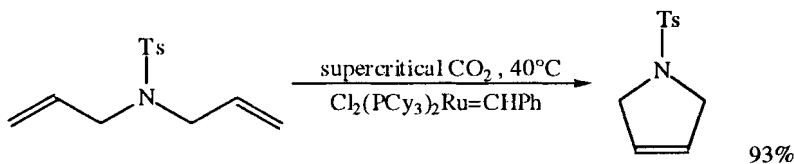
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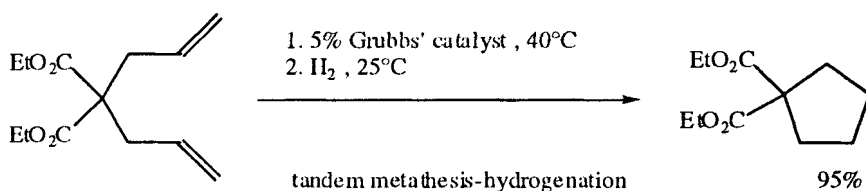
Littke, A.F.; Fu, G.C. *J. Am. Chem. Soc.*, **2001**, *123*, 6989.



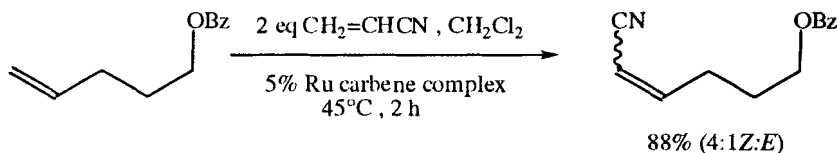
Davies, H.M.L.; Xiang, B.; Kong, N.; Stafford, D.G. *J. Am. Chem. Soc.*, **2001**, *123*, 7461.



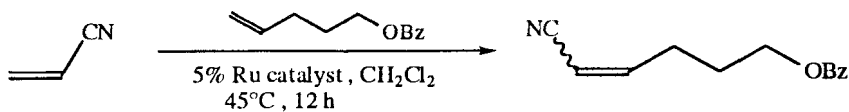
Fürstner, A.; Ackermann, L.; Beck, K.; Hori, H.; Koch, D.; Langemann, K.; Liebl, M.; Six, C.; Leitner, W. *J. Am. Chem. Soc.*, **2001**, *123*, 9000.



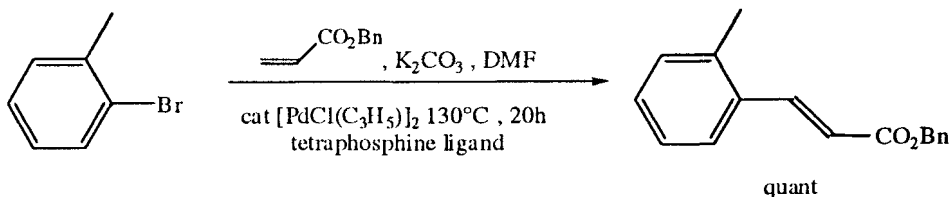
Louie, J.; Bielawski, C.W.; Grubbs, R.H. *J. Am. Chem. Soc.*, **2001**, *123*, 11312.



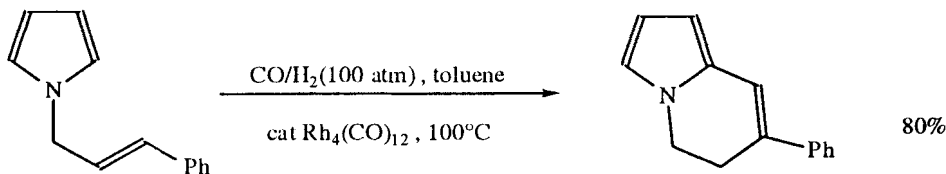
Randl, S.; Gessler, S.; Wakamaatsu, H.; Blechert, S. *Synlett*, **2001**, 430.



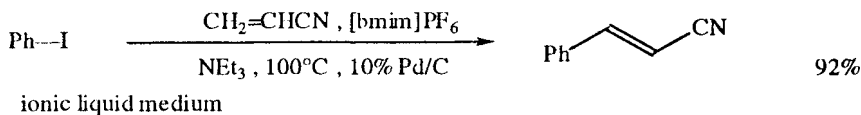
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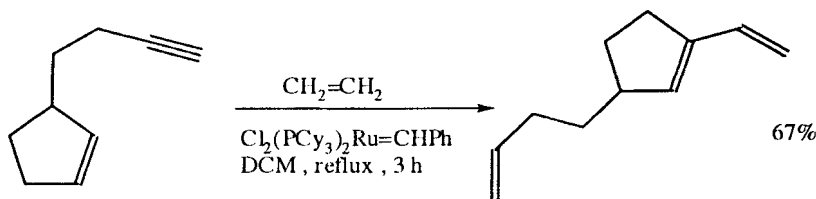
Feuerstein, M.; Doucet, H.; Santelli, M. *Synlett*, **2001**, 1980.



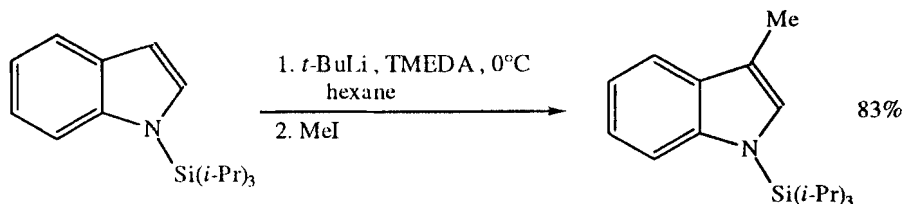
Settambolo, R.; Caizzo, A.; Lazzaroni, R. *Tetrahedron Lett.*, **2001**, 42, 4045.



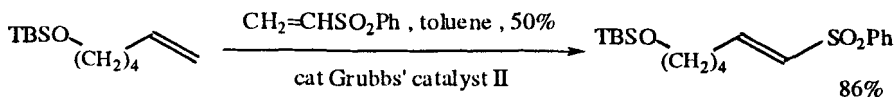
Hagiwara, H.; Shimizu, Y.; Hoshi, T.; Suzuki, T.; Ando, M.; Ohkubo, K.; Yokoyama, C. *Tetrahedron Lett.*, **2001**, 42, 4349.



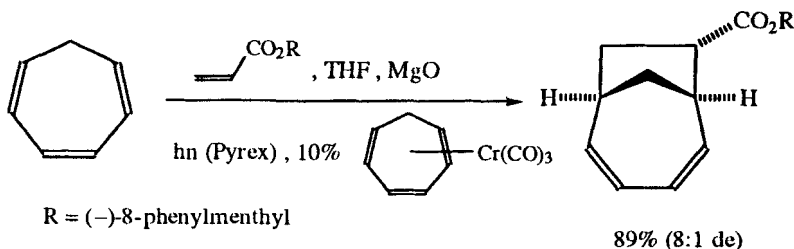
Chandra, K.L.; Saravanan, P.; Singh, V.K. *Tetrahedron Lett.*, **2001**, 42, 5309.



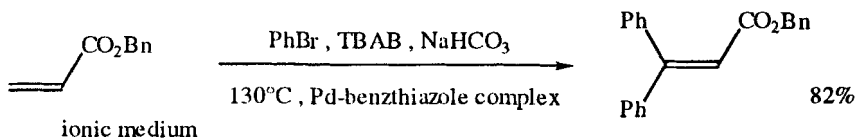
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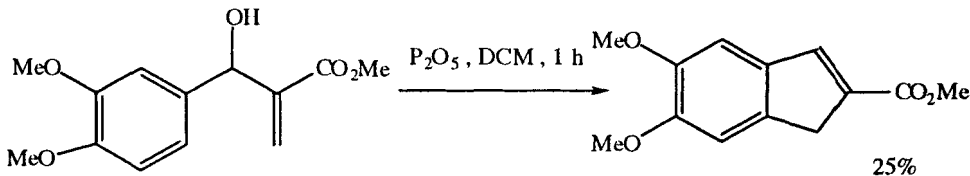
Grela, K.; Bieniek, M. *Tetrahedron Lett.*, **2001**, 42, 6425.



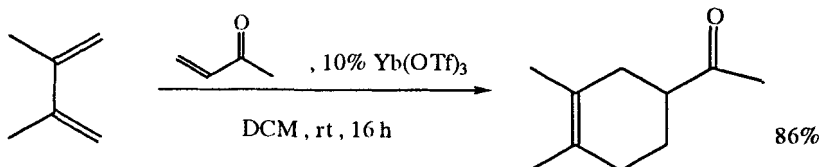
Rigby, J.H.; Mann, L.W.; Myers, B.J. *Tetrahedron Lett.*, **2001**, 42, 8773.



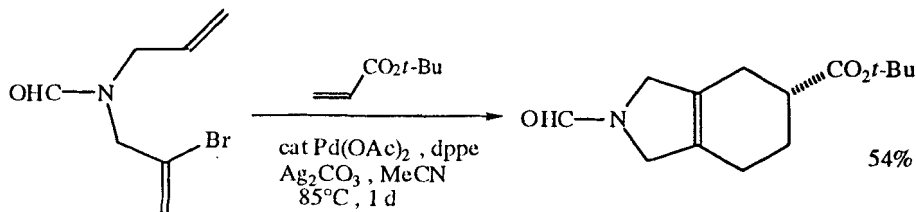
Calò, V.; Nacci, A.; Monopoli, A.; Lopez, L.; di Cosmo, A. *Tetrahedron*, **2001**, 57, 6071.



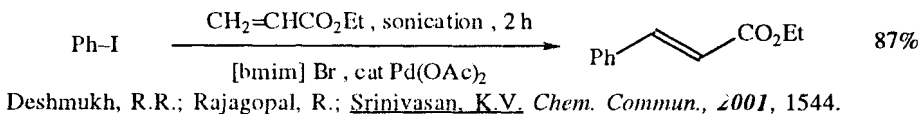
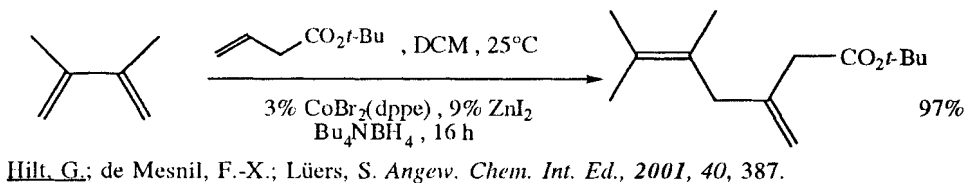
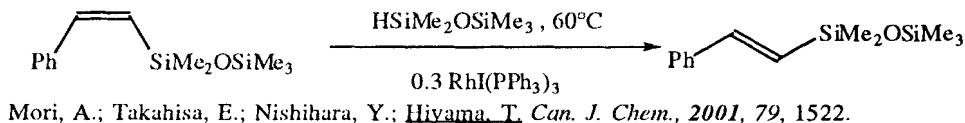
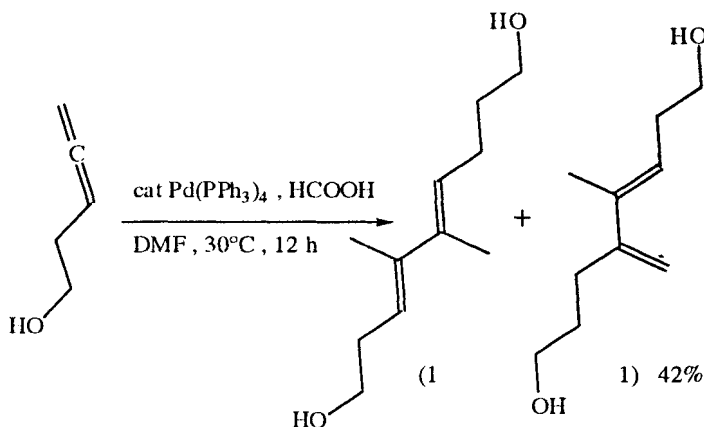
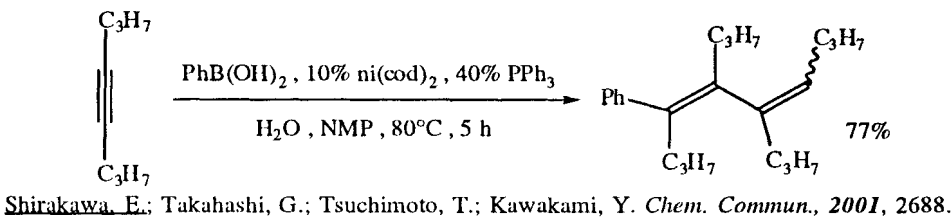
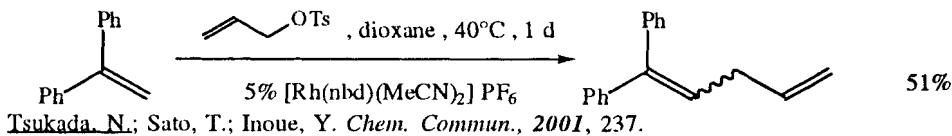
Basavaiah, D.; Bakthadoss, M.; Reddy, G.J. *Synthesis*, **2001**, 919.



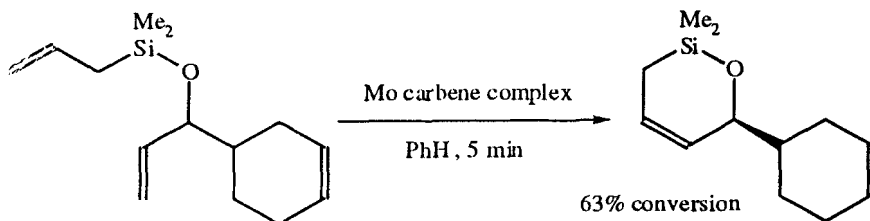
Fang, X.; Warner, B.P.; Watkin, J.G. *Synth. Commun.*, **2000**, 30, 2669.



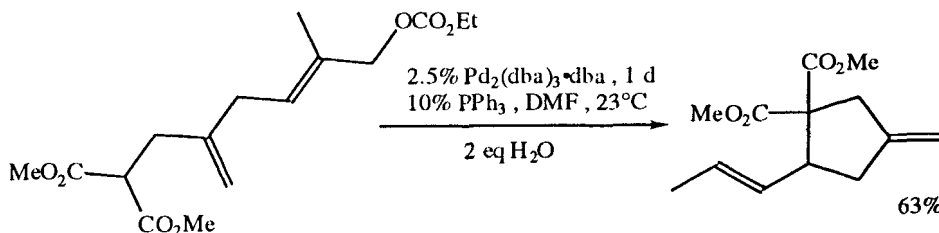
Bhat, L.; Steinig, A.G.; Appelbe, R.; de Meijere, A. *Eur. J. Org. Chem.*, **2001**, 1673.



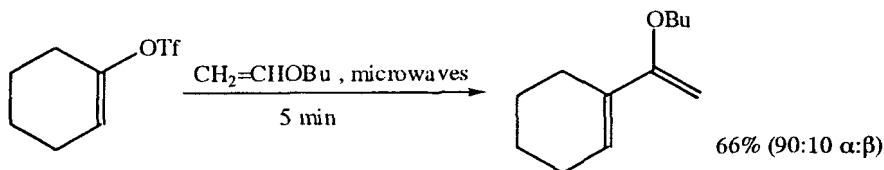




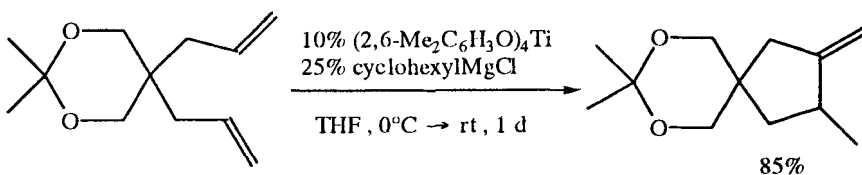
Aeilts, S.L.; Cefalo, D.R.; Bonditatus Jr., P.J.; Houser, J.H.; Hoveyda, A.H.; Schrock, R.R. *Angew. Chem. Int. Ed.*, **2001**, *40*, 1452.



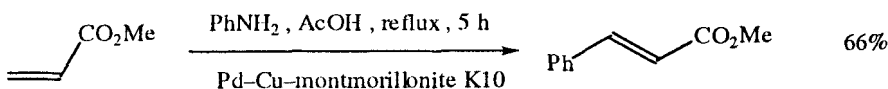
Castaño, A.M.; Méndez, M.; Ruano, M.; Echavarren, A.M. *J. Org. Chem.*, **2001**, *66*, 585.



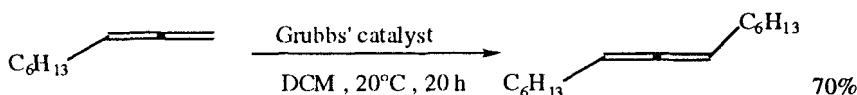
Vallin, K.S.A.; Larhed, M.; Johansson, K.; Hallberg, A. *J. Org. Chem.*, **2000**, *65*, 4537.



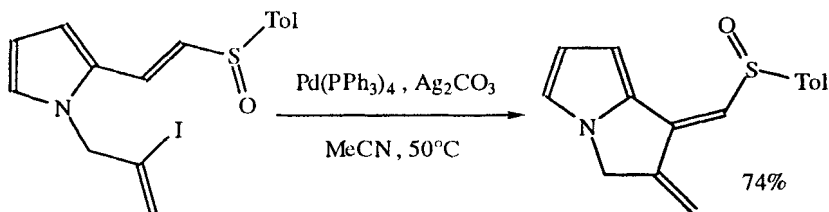
Okamoto, S.; Livinghouse, T. *J. Am. Chem. Soc.*, **2000**, *122*, 1223.



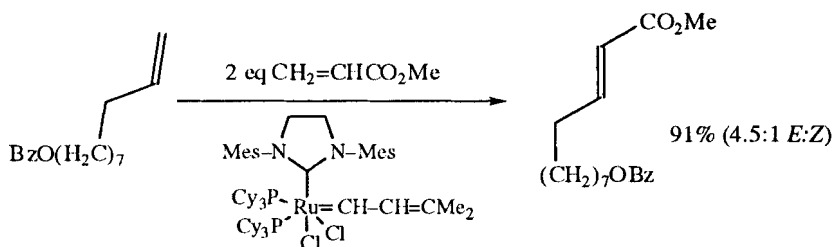
Waterlot, C.; Couturier, D.; Rigo, B. *Tetrahedron Lett.*, **2000**, *41*, 317.



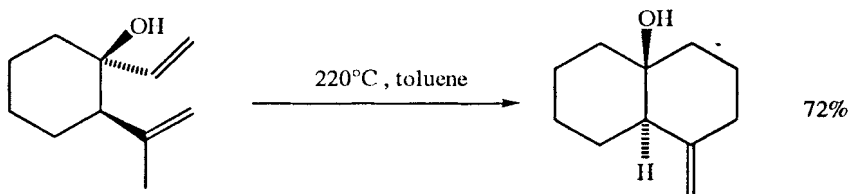
Ahmed, M.; Arnould, T.; Barrett, A.G.M.; Braddock, D.C.; Flack, K.; Procopiou, P.A. *Org. Lett.*, **2000**, *2*, 551.



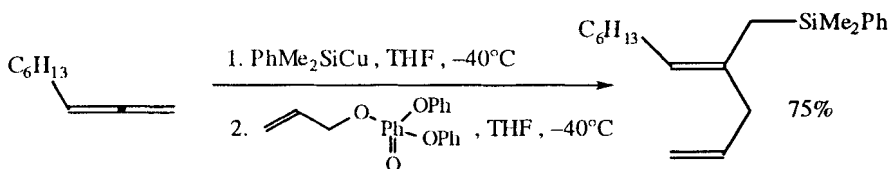
Segorbe, M.M.; Adrio, J.; Carretero, J.C. *Tetrahedron Lett.*, **2000**, *41*, 1983.



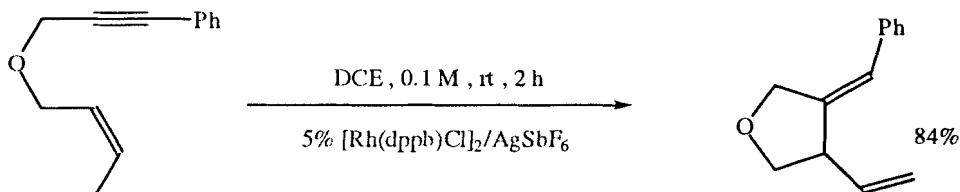
Chatterjee, A.K.; Morgan, J.P.; Scholl, M.; Grubbs, R.H. *J. Am. Chem. Soc.*, **2000**, *122*, 3783.



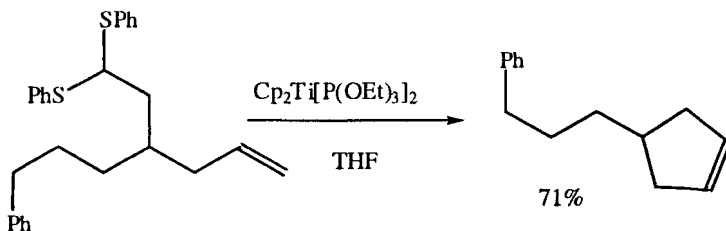
Warrington, J.M.; Yap, G.P.A.; Barriault, L. *Org. Lett.*, **2000**, *2*, 663.



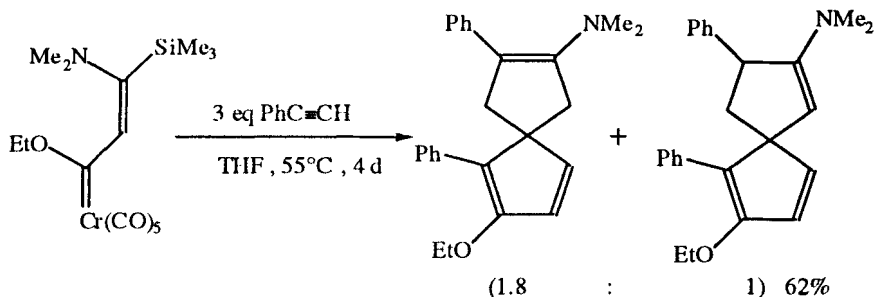
Liepins, V.; Karlström, A.S.E.; Bückvall, J.-E. *Org. Lett.*, **2000**, *2*, 1237.



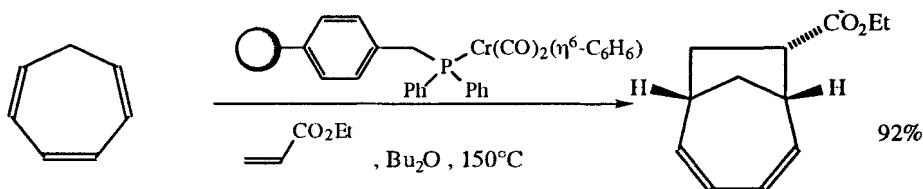
Cao, P.; Wang, B.; Zhang, X. *J. Am. Chem. Soc.*, **2000**, *122*, 6490.



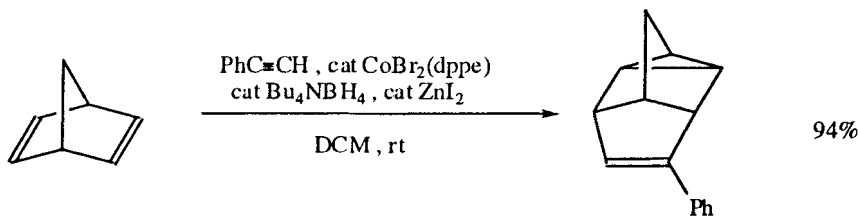
Fujiwara, T.; Kato, Y.; Takeda, T. *Tetrahedron*, 2000, 56, 4859.



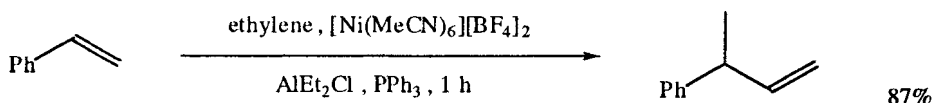
Schirmer, H.; Flynn, B.L.; de Meijere, A. *Tetrahedron*, 2000, 56, 4977.



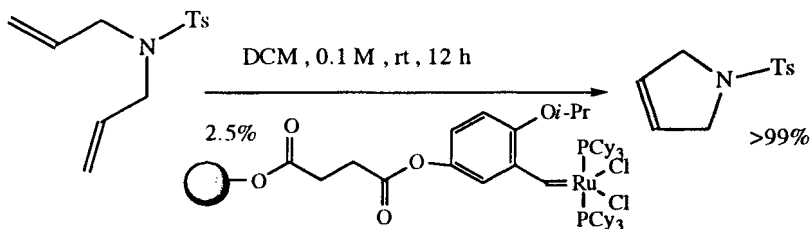
Rigby, J.H.; Kondratenko, M.A.; Fiedler, C. *Org. Lett.*, 2000, 2, 3917.



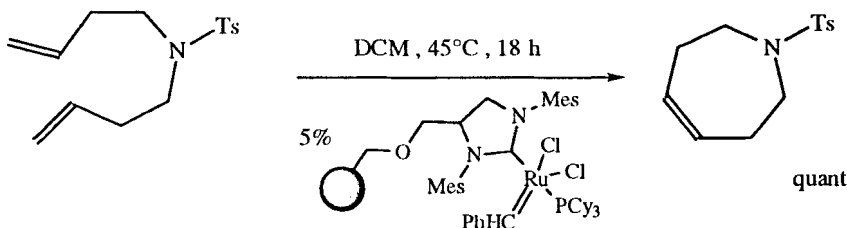
Hilt, G.; du Mesnil, F.-X. *Tetrahedron Lett.*, 2000, 41, 6757.



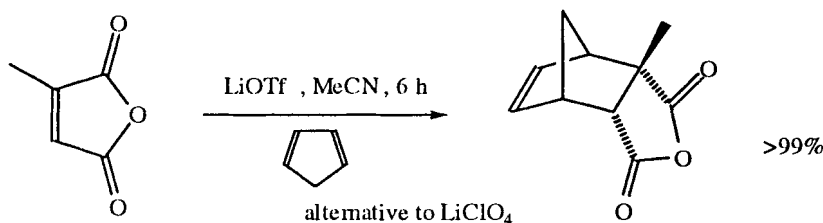
Fassina, V.; Ramminger, C.; Seferin, M.; Monteiro, A.L. *Tetrahedron*, 2000, 56, 7403.



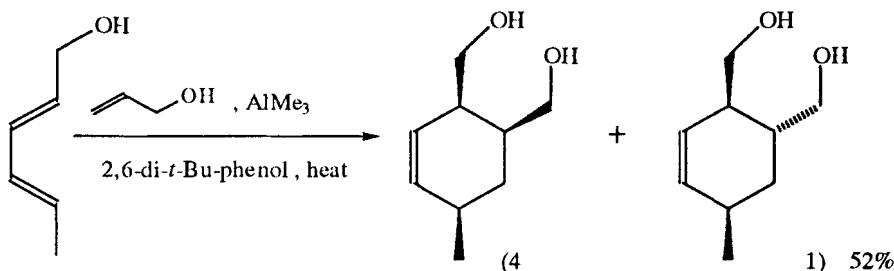
Yao, Q. *Angew. Chem. Int. Ed.*, **2000**, *39*, 3896.



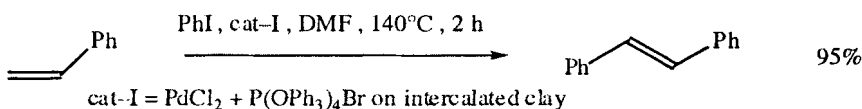
Schürer, S.C.; Gessler, S.; Buschmann, N.; Bleichert, S.  
*Angew. Chem. Int. Ed.*, **2000**, *39*, 3898.



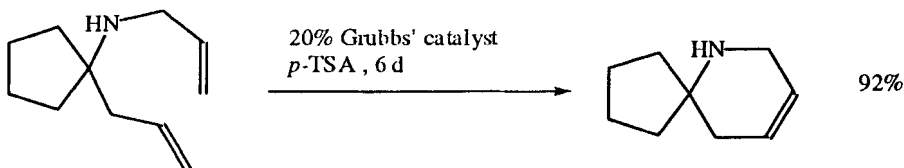
Augé, J.; Gil, R.; Kalsey, S.; Lubin-Germain, N. *Synlett*, **2000**, 877.



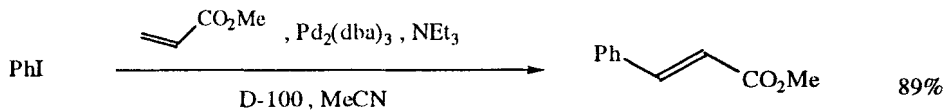
Bertozzi, F.; Olsson, R.; Frejd, T. *Org. Lett.*, **2000**, *2*, 1283.



Varma, R.S.; Naicker, K.P.; Liesen, P.J. *Tetrahedron Lett.*, **1999**, *40*, 2075.

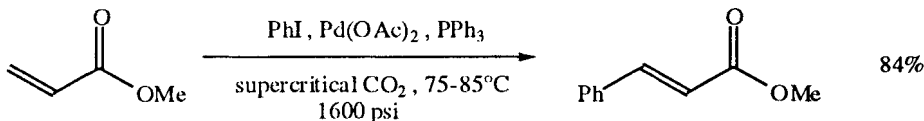


Wright, D.L.; Schulte II, J.P.; Page, M.A. *Org. Lett.*, **2000**, 2, 1847.

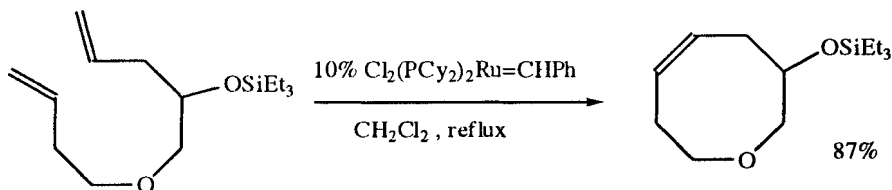


D-100 = perfluorinated solvent - mainly *n*-perfluorooctane

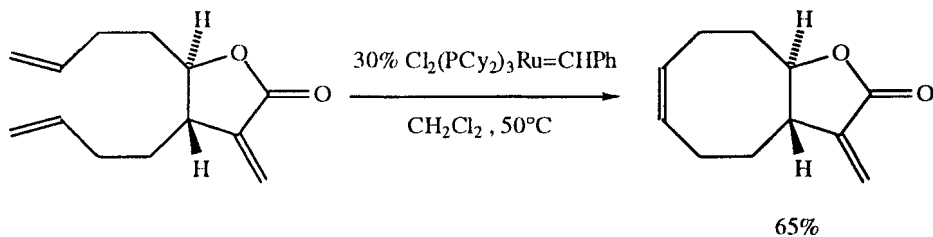
Moineau, J.; Pozzi, G.; Quici, S.; Sinou, D. *Tetrahedron Lett.*, **1999**, 40, 7683.



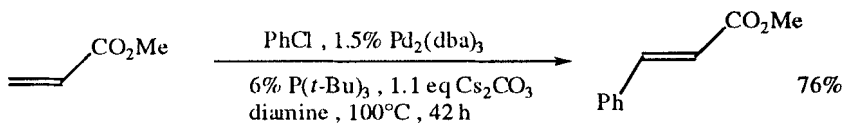
Shezad, N.; Oakes, R.S.; Clifford, A.A.; Rayner, C.M. *Tetrahedron Lett.*, **1999**, 40, 2221.



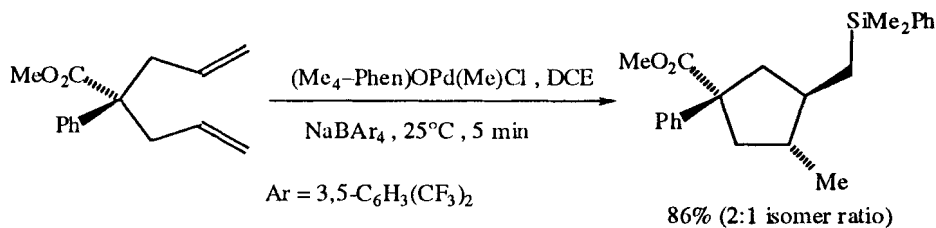
Edwards, S.D.; Lewis, T.; Taylor, R.J.K. *Tetrahedron Lett.*, **1999**, 40, 4267.



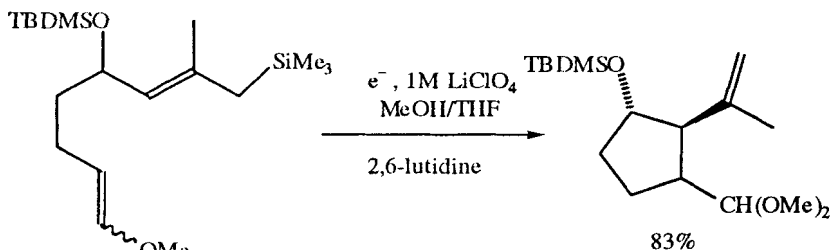
Paquette, L.A.; Méndez-Andino, J. *Tetrahedron Lett.*, **1999**, 40, 4301.



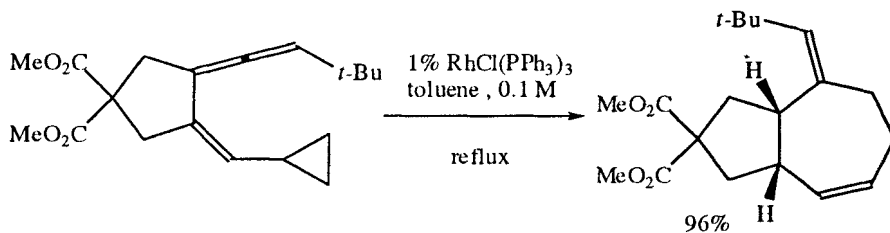
Litke, A.F.; Fu, G.C. *J. Org. Chem.*, **1999**, 64, 10.



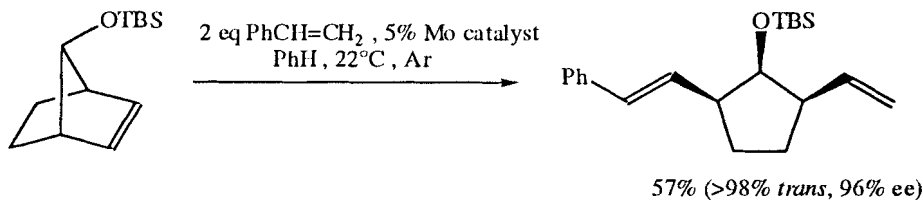
Widenhoefer, R.A.; Vadehra, A. *Tetrahedron Lett.*, **1999**, 40, 8499.



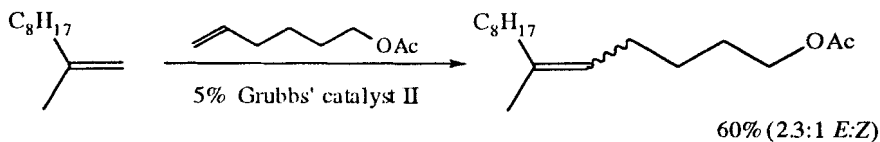
Frey, D.A.; Reddy, S.H.K.; Moeller, K.D. *J. Org. Chem.*, **1999**, 64, 2805.



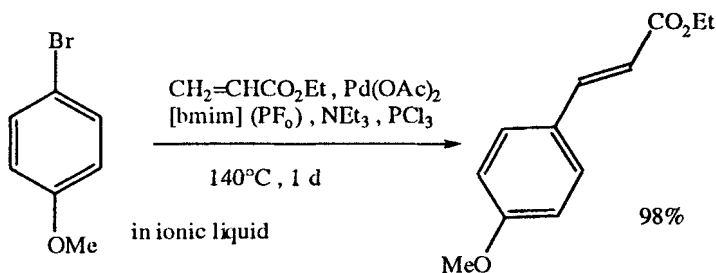
Wender, P.A.; Glorius, F.; Husfeld, C.O.; Langkopf, E.; Love, J.A. *J. Am. Chem. Soc.*, **1999**, 121, 5348.



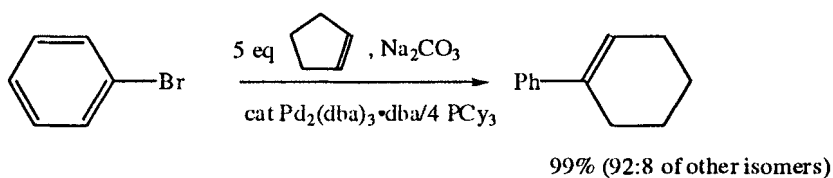
La, D.S.; Ford, J.G.; Satately, E.S.; Bonitatebus, P.J.; Schrock, R.R.; Hoveyda, A.H. *J. Am. Chem. Soc.*, **1999**, 121, 11603.



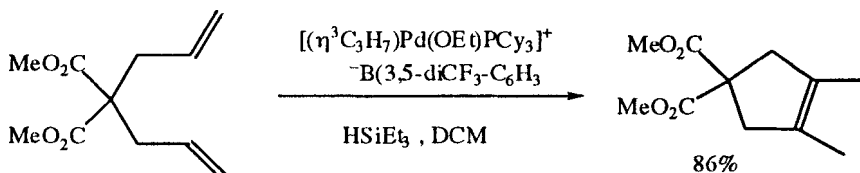
Chatterjee, A.K.; Grubbs, R.H. *Org. Lett.*, **1999**, 1, 1751.



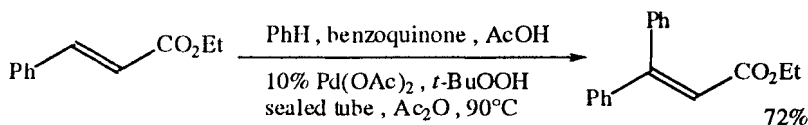
Carmichael, A.J.; Earle, M.J.; Holbrey, J.D.; McCormac, P.B.; Seddon, K.R. *Org. Lett.*, **1999**, *1*, 997.



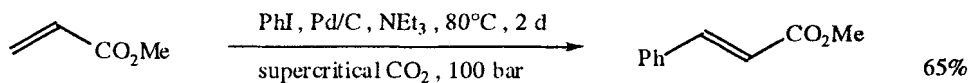
Hartung, C.G.; Köhler, K.; Beller, M. *Org. Lett.*, **1999**, *1*, 709.



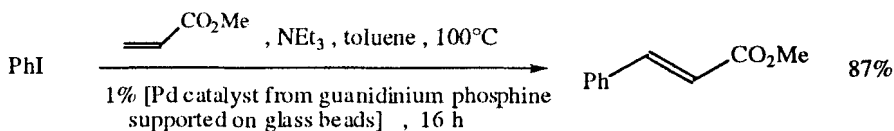
Widenhoefer, R.A.; Perch, N.S. *Org. Lett.*, **1999**, *1*, 1103.



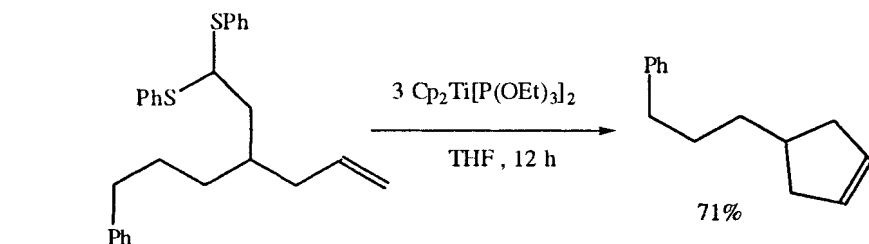
Jia, C.; Lu, W.; Kitamura, T.; Fujiwara, Y. *Org. Lett.*, **1999**, *1*, 2097.



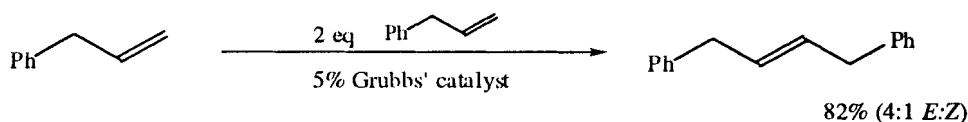
Cacchi, S.; Fabrizi, G.; Gasparri, F.; Villani, C. *Synlett*, **1999**, 345.



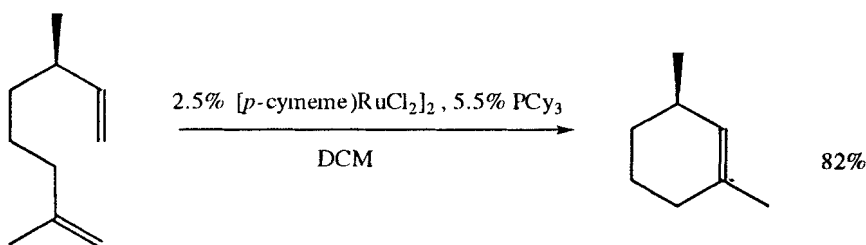
Leese, M.P.; Williams, J.M.J. *Synlett*, **1999**, 1645.



Fujiwara, T.; Takeda, T. *Synlett*, **1999**, 354.



Blanco, O.M.; Castedo, L. *Synlett*, **1999**, 557.



Fürstner, A.; Ackermann, L. *Chem. Commun.*, **1999**, 95.

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"The Transannular Diels-Alder Strategy: Application To Total Synthesis," Marsault, D.; Toró, A.; Nowak, P.; Deslongchamps, P. *Tetrahedron*, **2001**, 57, 4243.

"The Preparation Of Mono-, 1, 1-Di, *Trans*-1, 2-Di- And Trisubstituted Ethylenes By Benzotriazole Methodology," Katritzky, A.R.; Toader, D. *Synlett*, **2001**, 458.

"Diels-Alder Reaction On Solid Supports," Yli-Kauhaluoma, J. *Tetrahedron*, **2001**, 57, 7053.

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"Cycloadditions Under Microwave Irradiation Conditions; Methods And Applications," De La Hoz, A.; Díaz-Ortiz, A.; Moreno, A.; Lang, F. *Eur. J. Org. Chem.*, **2000**, 3659.

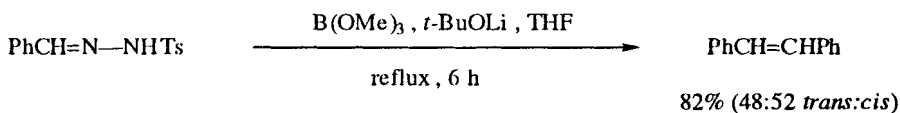
"Recent Advances In Lewis Acid-Catalyzed Diels-Alder Reactions In Aqueous Media," Fringuelli, E.; Piermatti, O.; Pizzo, F.; Vaccaro, L. *Eur. J. Org. Chem.*, **2001**, 439.



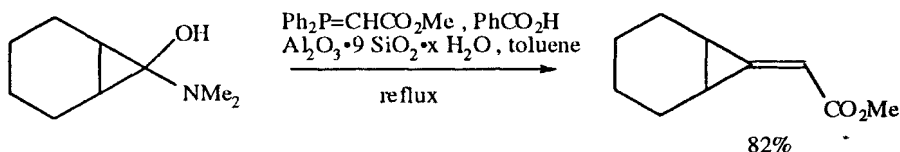
"Formation Of Cumulenes, Triple-Bonded, And Related Compounds By Flash Vacuum Pyrolysis Of Five-Membered Heterocycles," Yranzo, G.I.; Elguero, J.; Flammang, R.; Wentrup, C. *Eur. J. Org. Chem.*, **2001**, 2209.

"Synthesis Of Heterocycles Using The Intramolecular Heck Reaction Involving A 'formal' Anti-Elimination Process," Ikeda, M.; El Bialy, S.A.A.; Yakura, T. *Heterocycles*, **1999**, 51, 1957.

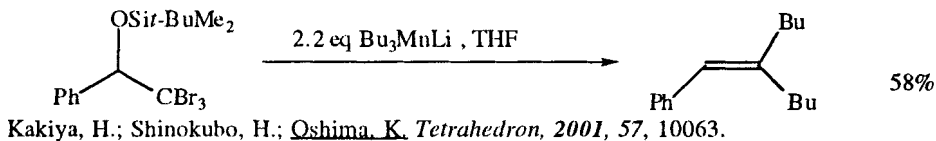
## SECTION 210: ALKENES FROM MISCELLANEOUS COMPOUNDS



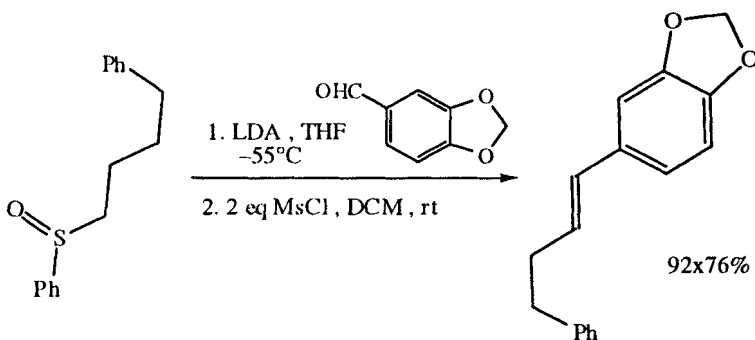
Kabalka, G.W.; Wu, Z.; Ju, Y. *Tetrahedron Lett.*, **2001**, 42, 4759.



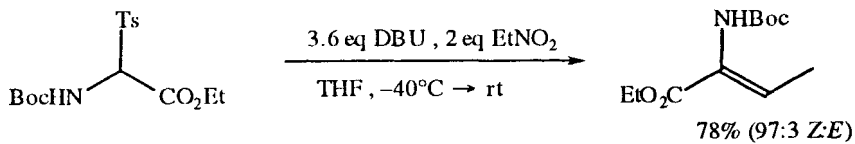
Chowdhury, M.A.; Senboku, H.; Tokudda, M.; Masuda, Y.; Chiba, T. *Tetrahedron Lett.*, **2001**, 42, 7075.



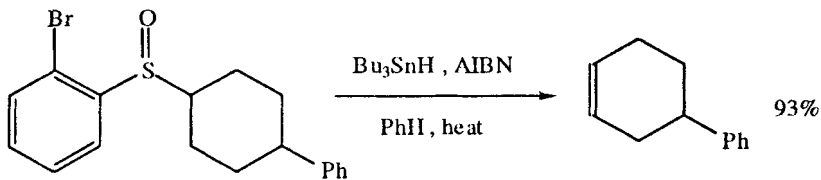
Kakiya, H.; Shinokubo, H.; Oshima, K. *Tetrahedron*, **2001**, 57, 10063.



Satoh, T.; Hanaki, N.; Yamada, N.; Asano, T. *Tetrahedron*, **2000**, 56, 6223.



Nagano, T.; Kinoshita, H. *Bull. Chem. Soc. Jpn.*, **2000**, *73*, 1605.



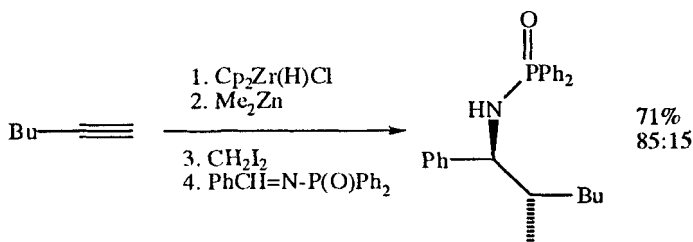
Imboden, C.; Villar, F.; Renaud, P. *Org. Lett.*, **1999**, *1*, 873.

## CHAPTER 15

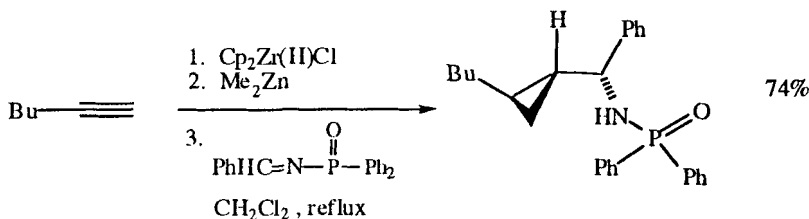
### PREPARATION OF OXIDES

This chapter contains reactions that prepare the oxides of nitrogen, sulfur and selenium. Included are *N*-oxides, nitroso and nitro compounds, nitrile oxides, sulfoxides, selenoxides and sulfones. Oximes are considered to be amines and appear in those sections. Preparation of sulfonic acid derivatives are found in Chapter Two and the preparation of sulfonate esters in Chapter Ten.

#### SECTION 211: OXIDES FROM ALKYNES

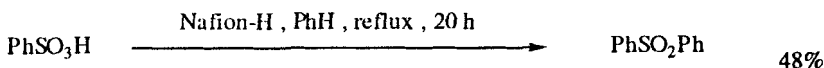


Wipf, P.; Kendall, C. *Org. Lett.*, 2001, 3, 2773.

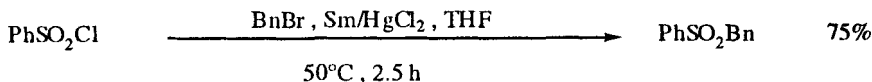


Wipf, P.; Kendall, C.; Stephenson, C.R.J. *J. Am. Chem. Soc.*, 2001, 123, 5122.

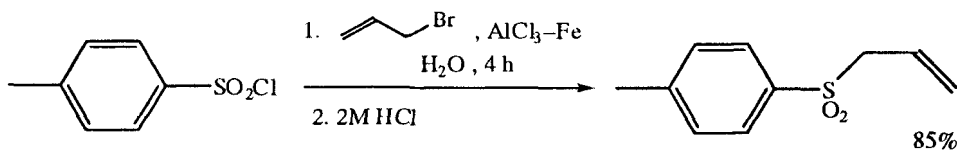
#### SECTION 212: OXIDES FROM ACID DERIVATIVES



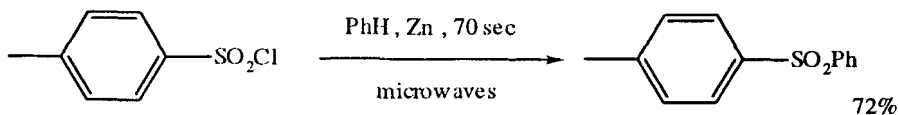
Olah, G.A.; Mathew, T.; Prakash, G.K.S. *Chem. Commun.*, 2001, 1696.



Zhang, J.; Zhang, Y. *J. Chem. Res. (S)*, 2001, 516.

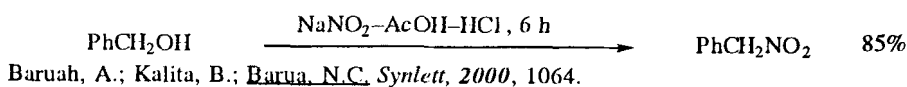


Saikia, P.; Laskar, D.D.; Prajapati, D.; Sandhu, J.S. *Chem. Lett.*, **2001**, 512.

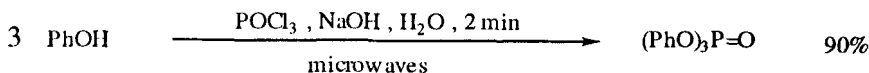


Bandgar, B.P.; Kasture, S.P. *Synth. Commun.*, **2000**, 31, 1065.

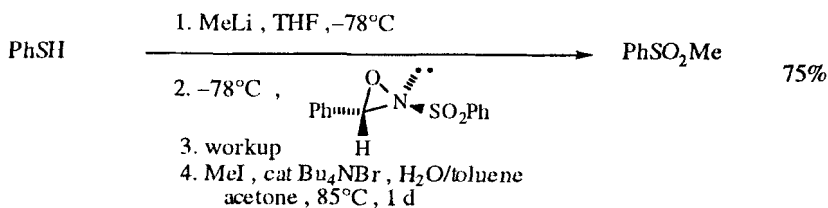
## SECTION 213: OXIDES FROM ALCOHOLS AND THIOLS



Baruah, A.; Kalita, B.; Barua, N.C. *Synlett*, **2000**, 1064.

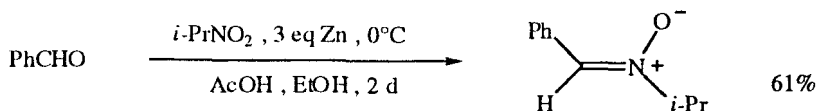


Sagar, A.D.; Shinde, N.A.; Bandgar, B.P. *Org. Prep. Proceed. Int.*, **2000**, 32, 269.



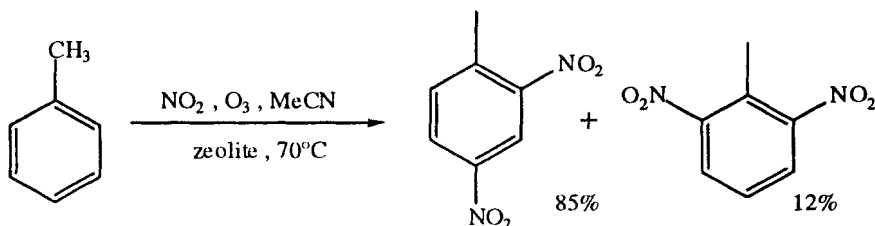
Sandrinelli, F.; Perrio, S.; Beslin, P. *Org. Lett.* **1999**, 1, 1177.

## SECTION 214: OXIDES FROM ALDEHYDES

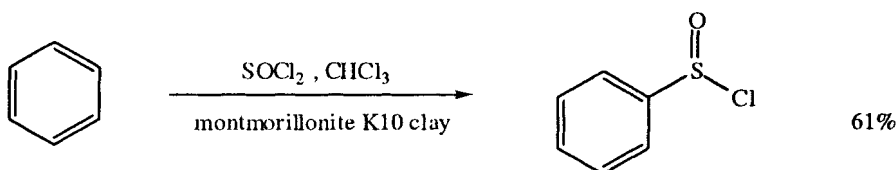


Gautheron-Chapoulaud, V.; Pandya, S.U.; Cividino, P.; Masson, G.; Py, S.; Vallée, Y. *Synlett*, **2001**, 1281.

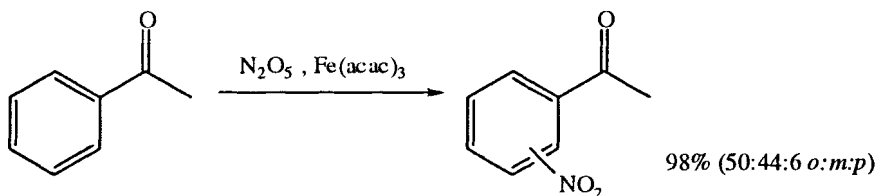
# SECTION 215: OXIDES FROM ALKYL, METHYLENES AND ARYLS



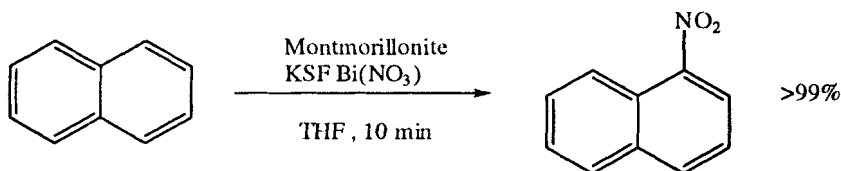
Peng, X.; Suzuki, H. *Org. Lett.* **2001**, 3, 34331.



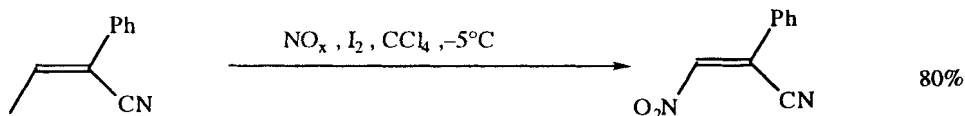
Karade, N.N.; Kate, S.S.; Adude, R.N. *Synlett*, **2001**, 1573.



Bak, R.R.; Smallridge, A.J. *Tetrahedron Lett.*, **2001**, 42, 6767.

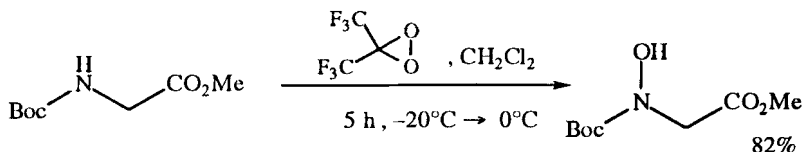


Samajdar, S.; Becker, F.F.; Banik, B.K. *Tetrahedron Lett.*, **2000**, 41, 8017.



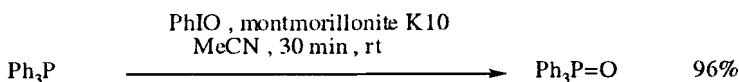
Navaarro-Ocaño, A.; Barzana, E.; López-González, D.; Jiménez-Estrada, M. *Org. Prep. Proceed. Int.*, **1999**, 31, 117.

## SECTION 216: OXIDES FROM AMIDES

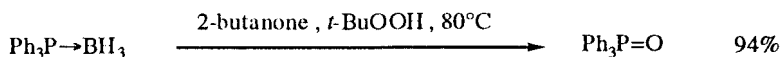


Detomaso, A.; Cursi, R. *Tetrahedron Lett.*, **2001**, 42, 755.

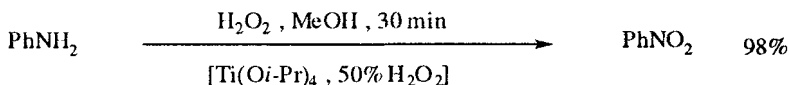
## SECTION 217: OXIDES FROM AMINES



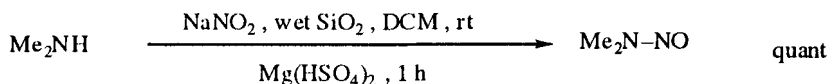
Mielniczak, G.; Łopusiński, A. *Synlett*, **2001**, 505.



Uziel, J.; Darcel, C.; Moulin, D.; Bauduin, C.; Jugé, S. *Tetrahedron Asymm.*, **2001**, 12, 1441.

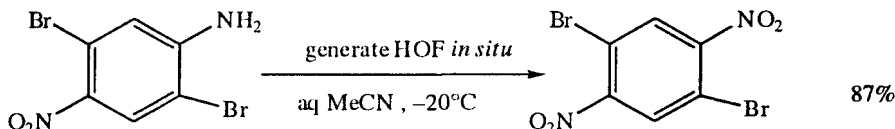


Dewkar, G.K.; Mikalje, M.D.; Ali, I.S.; Paraskar, A.S.; Jagtap, H.; Sudalai, A. *Angew. Chem. Int. Ed.*, **2001**, 40, 405.

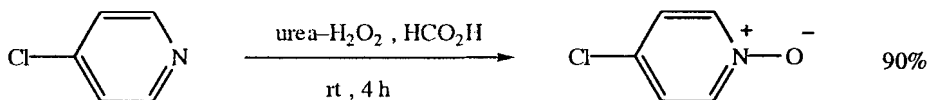


Zolfigol, M.A.; Ghaemi, E.; Madrakian, E.; Kiany-Borazjani, M. *Synth. Commun.*, **2000**, 30, 2057.

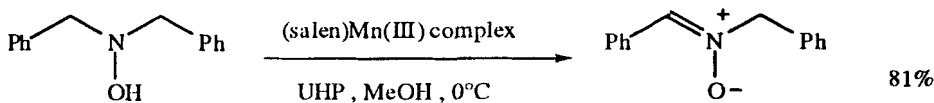
With KHSO<sub>5</sub> on wet silica gel. Zolfigol, M.A.; Bagherzadeh, M.; Chaghmarani, A.G.; Keypour, H.; Salehzadeh, S. *Synth. Commun.*, **2001**, 31, 1161.



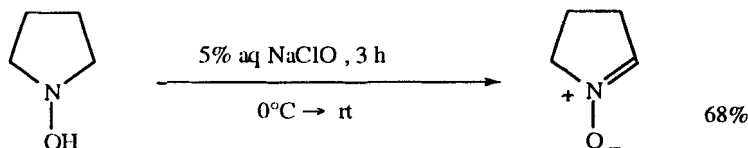
Dirk, S.M.; Mickelson, E.T.; Henderson, J.C.; Tour, J.M. *Org. Lett.*, **2000**, 2, 3405.



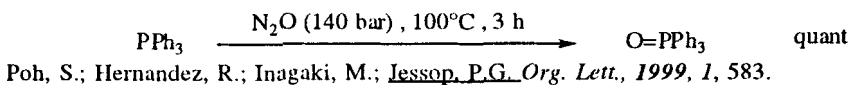
Balicki, R.; Goliński, J. *Synth. Commun.*, **2000**, 30, 1529.



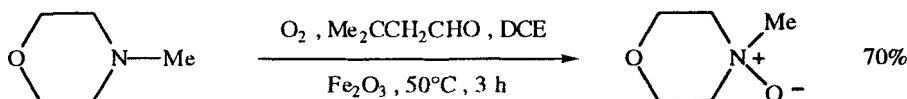
Cicchi, S.; Cardona, F.; Brandi, A.; Corsi, M.; Goti, A. *Tetrahedron Lett.*, **1999**, 40, 1989.



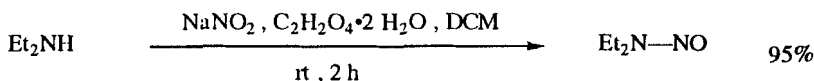
Cicchi, S.; Corsi, M.; Goti, A. *J. Org. Chem.*, **1999**, 64, 7243.



Poh, S.; Hernandez, R.; Inagaki, M.; Jessop, P.G. *Org. Lett.*, **1999**, 1, 583.



Wang, E.; Zhang, H.; Song, G.; Lu, X. *Synth. Commun.*, **1999**, 29, 11.

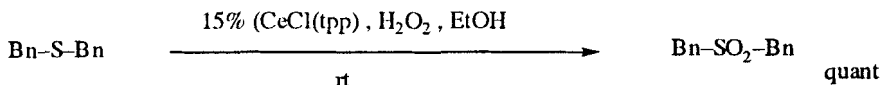


Zolfigol, M.A. *Synth. Commun.*, **1999**, 29, 905.

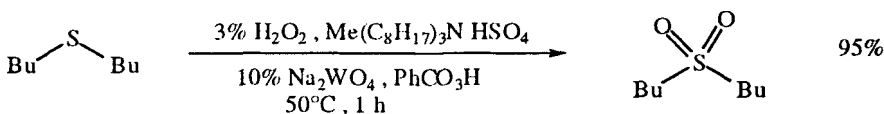
## SECTION 218: OXIDES FROM ESTERS

NO ADDITIONAL EXAMPLES

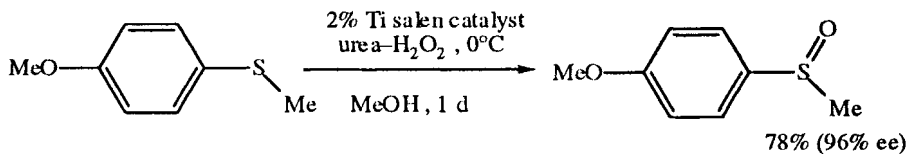
## SECTION 219: OXIDES FROM ETHERS, EPOXIDES AND THIOETHERS



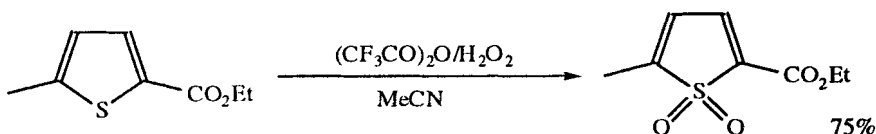
Marques, A.; Marin, M.; Ruasse, M.-E. *J. Org. Chem.*, **2001**, 66, 7588.



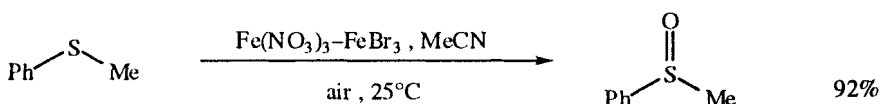
Sato, K.; Hyodo, M.; Aoki, M.; Zheng, X.-Q.; Noyori, R. *Tetrahedron*, **2001**, 57, 2469.



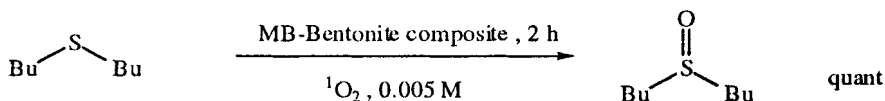
Saito, B.; Katsuki, T. *Tetrahedron Lett.*, **2001**, 42, 3873.



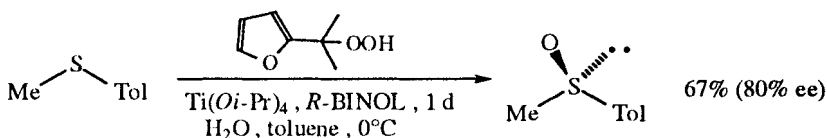
Nenajdenko, V.G.; Gavryushin, A.E.; Balenkova, E.S. *Tetrahedron Lett.*, **2001**, 42, 4397.



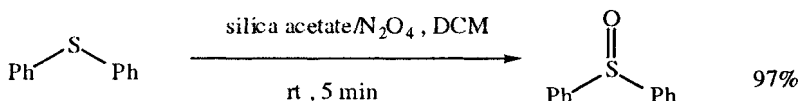
Martín, S.E.; Rossi, L.I. *Tetrahedron Lett.*, **2001**, 42, 7147.



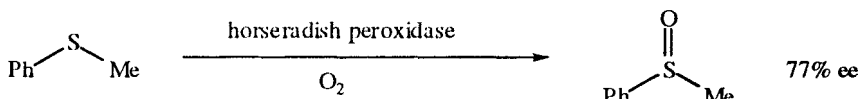
Habibi, M.H.; Tangestaninejad, S.; Mirkhani, V.; Yadollahi, B. *Tetrahedron*, **2001**, 57, 8333.



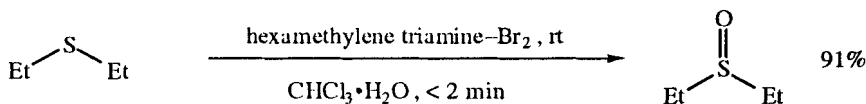
Massa, A.; Lattanzi, A.; Siniscalchi, F.R.; Scretti, A. *Tetrahedron Asym.*, **2001**, 12, 2775.



Firouzbadi, H.; Iranpoor, N.; Heydari, R. *Synth. Commun.*, **2001**, 31, 2037.

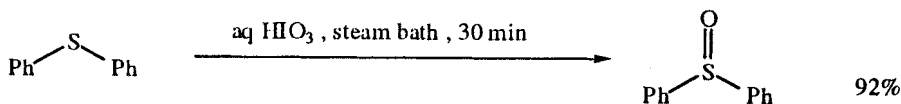


Ozaki, S.-i.; Watanabe, S.; Hayasaka, S.; Konuma, M. *Chem. Commun.*, **2001**, 1654.

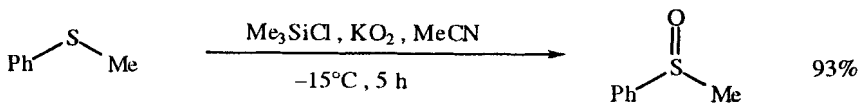


Shaabani, A.; Teimouri, M.B.; Safaei, H.R. *Synth. Commun.*, **2000**, 30, 265.

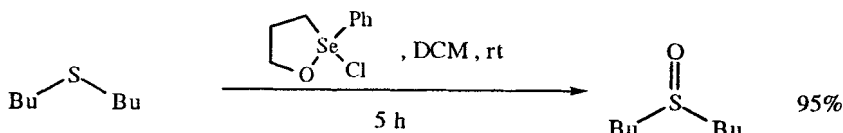




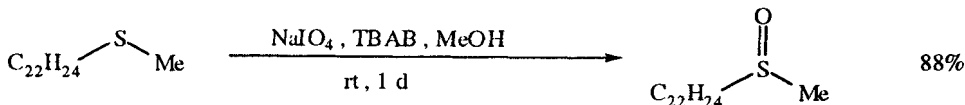
Shirini, F.; Zolfigol, M.A.; Lakouraj, M.M.; Azadbar, M.R.  
*Russ. J. Org. Chem.*, **2001**, *37*, 1340.



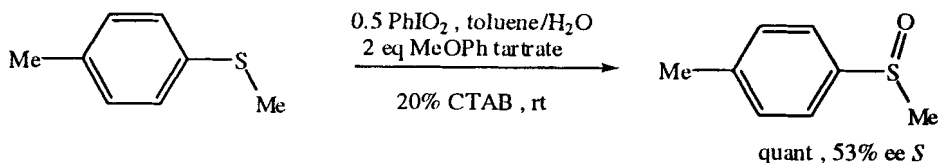
Chen, Y.-L.; Huang, Y.-P. *Tetrahedron Lett.*, **2000**, *41*, 5233.



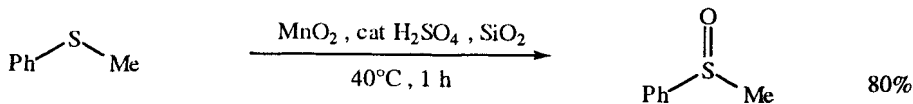
Zhang, J.; Koizumi, T. *Synth. Commun.*, **2000**, *30*, 979.



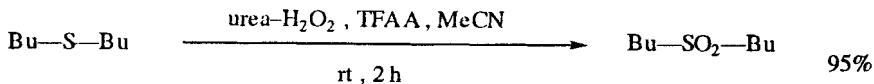
Yamamoto, T.; Hayakawa, T.; Yoshino, M.; Hata, Si.; Hirayama, Y.  
*Org. Prep. Proceed. Int.*, **2000**, *32*, 192.



Tohma, H.; Takizawa, S.; Watanabe, H.; Fukuoka, Y.; Maegawa, T.; Kita, Y.  
*J. Org. Chem.*, **1999**, *64*, 3519.

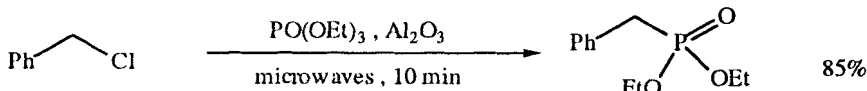


Firouzabadi, H.; Abbasi, M. *Synth. Commun.*, **1999**, *129*, 1485.

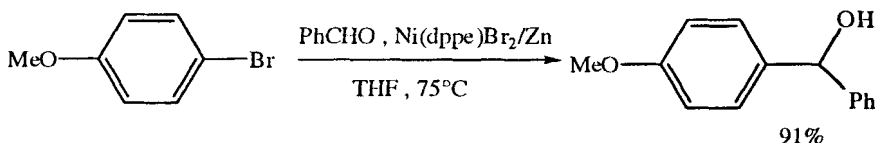


Balicki, R. *Synth. Commun.*, **1999**, *29*, 2235.

## SECTION 220: OXIDES FROM HALIDES AND SULFONATES

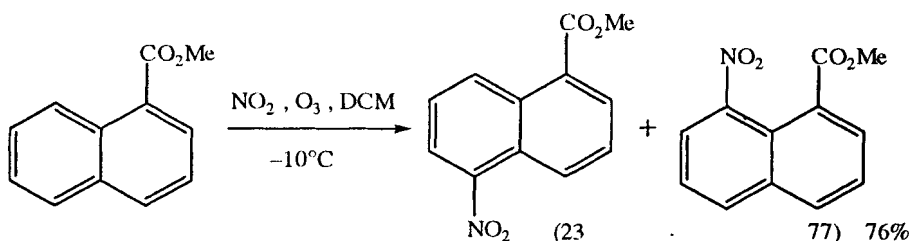


Kaboudin, B.; Balakrishna, M.S. *Synth. Commun.*, **2001**, *31*, 2773.

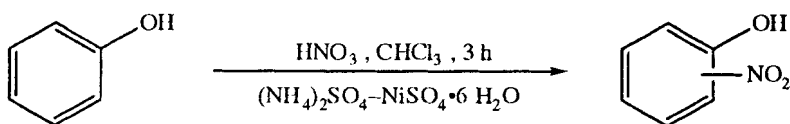


Kim, S.; Yoon, J.-Y.; Lim, C.J. *Synlett*, **2000**, 1151.

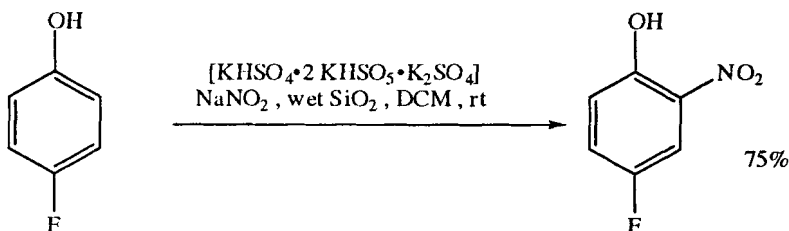
## SECTION 221: OXIDES FROM HYDRIDES



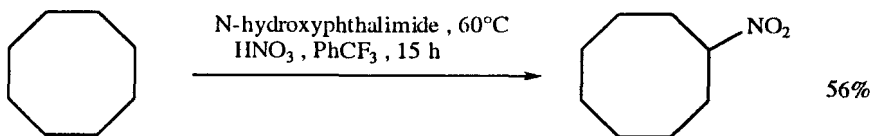
Nose, M.; Suzuki, H.; Suzuki, H. *J. Org. Chem.*, **2001**, *66*, 4356.



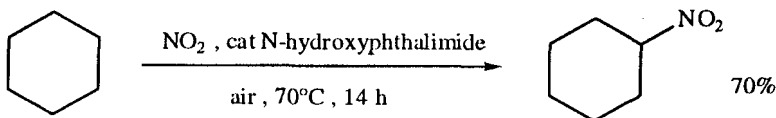
Tasneem, Ali M.M.; Rajanna, K.C.; Saiparakash, P.K. *Synth. Commun.*, **2001**, *31*, 1123.



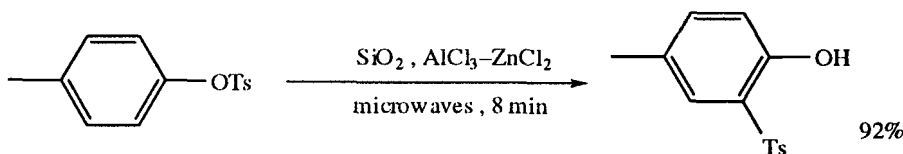
Zolfigol, M.A.; Bagherzadeh, M.; Madrakian, E.; Ghaemi, E.; Taqian-Nasab, A. *J. Chem. Res. (S)*, **2001**, 140.



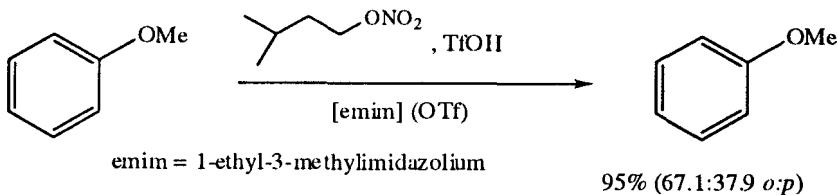
Isozaki, S.; Nishiwaki, Y.; Sakaguchi, S.; Ishii, Y. *Chem. Commun.*, **2001**, 1352.



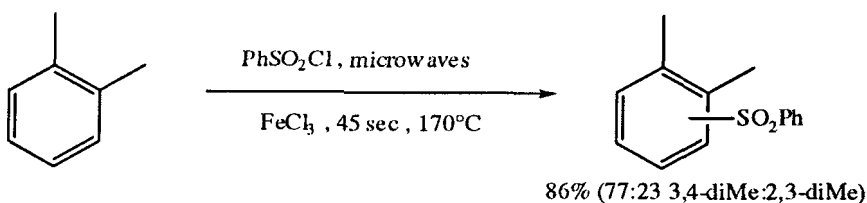
Sakaguchi, S.; Nishiwaki, Y.; Kitamura, T.; Ishii, Y. *Angew. Chem. Int. Ed.*, **2001**, 40, 222.



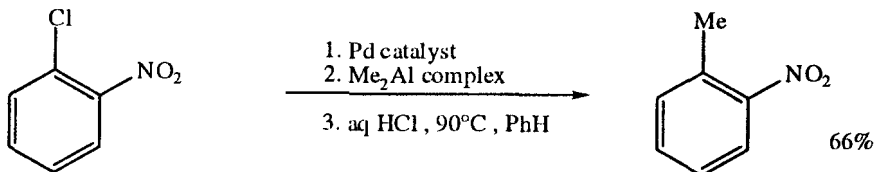
Moghaddam, F.M.; Dakamin, M.G. *Tetrahedron Lett.*, **2000**, 41, 3479.



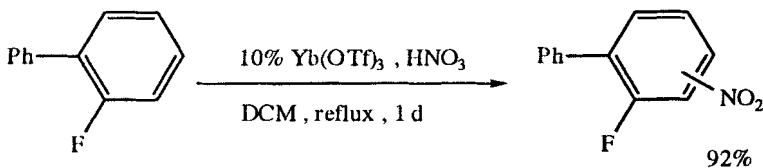
Laali, K.K.; Gettewert, V.J. *J. Org. Chem.*, **2001**, 66, 35.



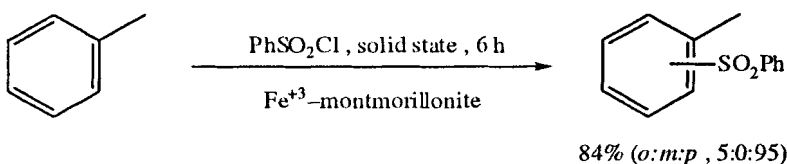
Marquié, J.; Laporterie, A.; Dubac, J.; Roques, N.; Desmurs, J.-R. *J. Org. Chem.*, **2001**, 66, 421.



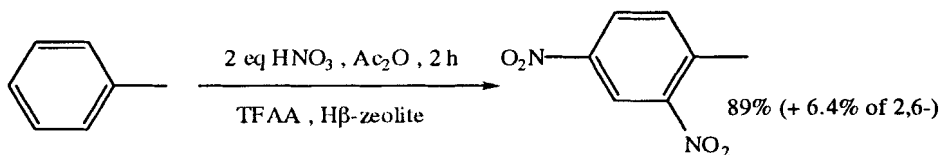
Blum, J.; Berlin, O.; Milstein, D.; Ben-David, Y.; Wassermann, B.C.; Schutte, S.; Schumann, H. *Synthesis*, **2000**, 571.



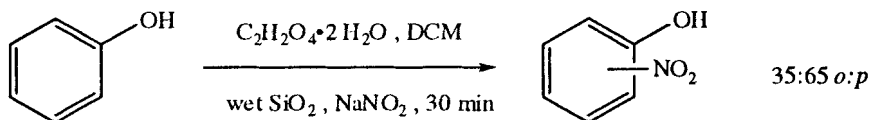
Barrett, A.G.M.; Braddock, D.C.; Ducray, R.; McKinnell, R.M.; Waller, F.J. *Synlett*, **2000**, 57.



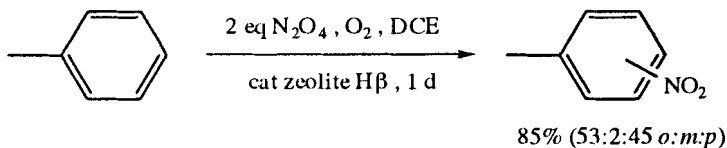
Choudary, B.M.; Chowdari, N.S.; Kantam, M.L. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 2689



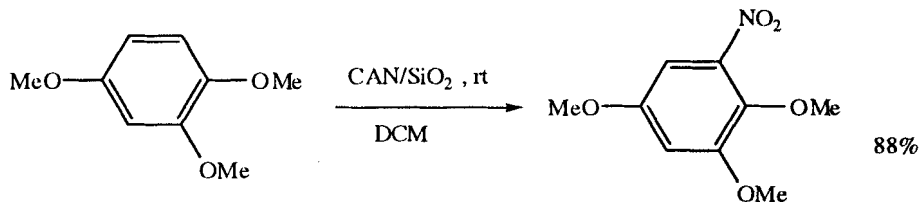
Smith, K.; Gibbins, T.; Millar, R.W.; Clardige, R.P. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 2753.



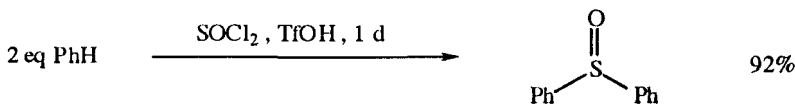
Zolfigol, M.A.; Ghaemi, E.; Madrakian, E. *Synth. Commun.*, **2000**, 30, 1689.



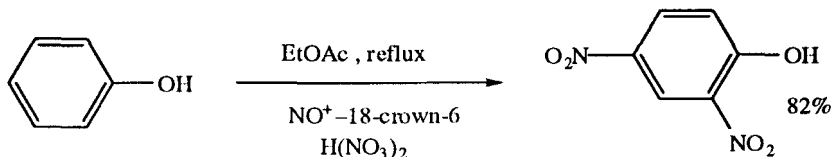
Smith, K.; Almeer, S.; Black, S.J. *Chem. Commun.*, **2000**, 1571.



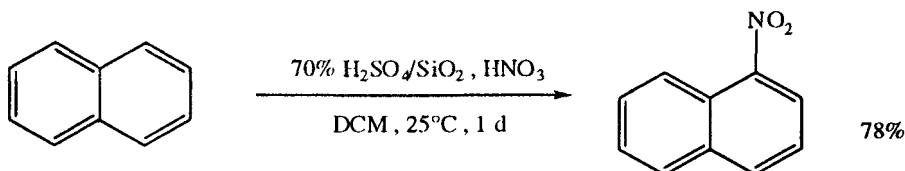
Grenier, J.-L.; Catteau, J.-P.; Cotelle, P. *Synth. Commun.*, **1999**, 29, 1201.



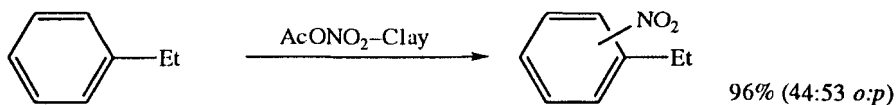
Olah, G.A.; Marinez, E.R.; Prakash, G.K.S. *Synlett*, **1999**, 1397.



Iranpoor, N.; Firouzabadi, H.; Heydari, R. *Synth. Commun.*, **1999**, 29, 3295.



Smith, A.C.; Narvaez, L.D.; Akins, B.G.; Langford, M.M.; Gary, T.; Geisleer, V.J.; Khan, F.A. *Synth. Commun.*, **1999**, 29, 4187.



Rodrigues, J.A.R.; Filho, A.P.O.; Moran, P.J.S. *Synth. Commun.*, **1999**, 29, 2169.

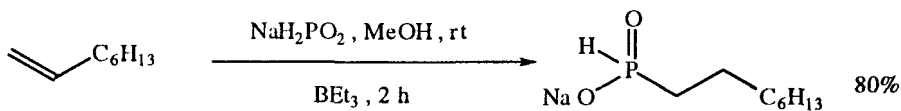
## SECTION 222: OXIDES FROM KETONES

NO ADDITIONAL EXAMPLES

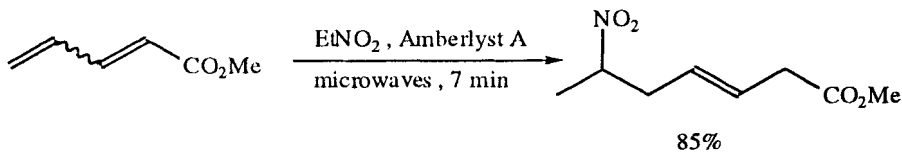
## SECTION 223: OXIDES FROM NITRILES

NO ADDITIONAL EXAMPLES

## SECTION 224: OXIDES FROM ALKENES

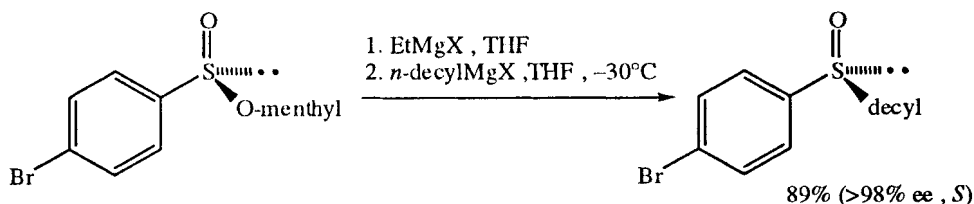


Deprère, S.; Montchamp, J.-L. *J. Org. Chem.*, **2001**, 66, 6745.

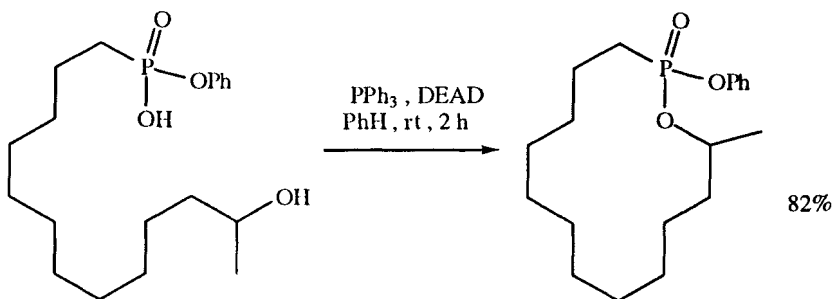


Ballini, R.; Bosica, G.; Fiorini, D. *Tetrahedron Lett.*, **2001**, 42, 8471.

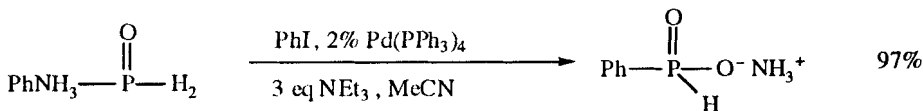
## SECTION 225: OXIDES FROM MISCELLANEOUS COMPOUNDS



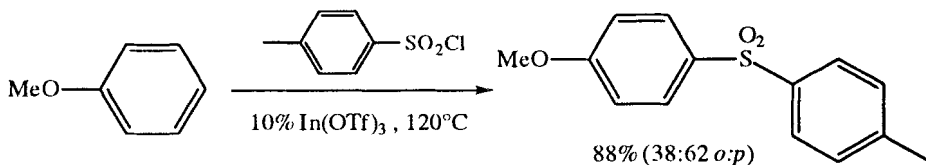
Capozzi, M.A.M.; Cardellicchio, C.; Naso, E.; Spina, G.; Tortorella, P. *J. Org. Chem.*, **2001**, 66, 5933.



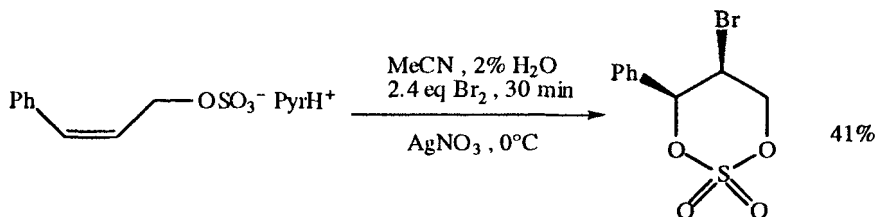
Pungente, M.D.; Weiler, L. *Org. Lett.*, **2001**, 3, 643.



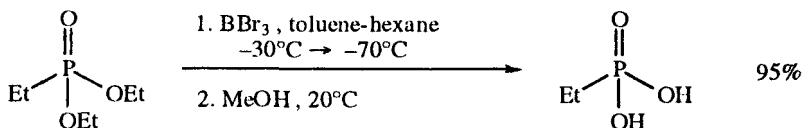
Montchamp, J.-L.; Dumond, Y.R. *J. Am. Chem. Soc.*, **2001**, 123, 510.



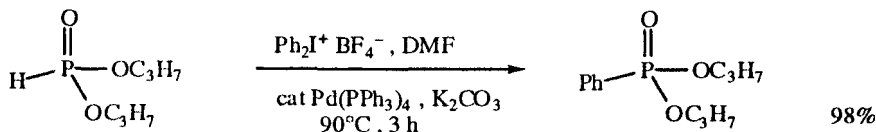
Frost, C.G.; Hartley, J.P.; Whittle, A.J. *Synlett*, **2001**, 830.



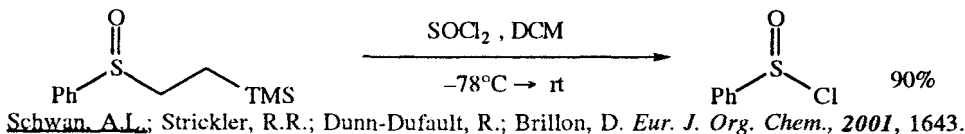
Steinmann, J.E.; Phillips, J.H.; Sanders, W.J.; Kiessling, L.L. *Org. Lett.*, **2001**, 3, 3557.



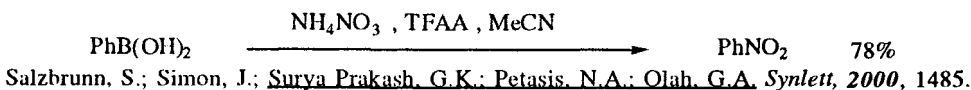
Gauvry, N.; Mortier, J. *Synthesis*, **2001**, 553.



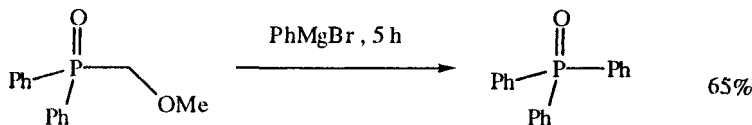
Zhou, T.; Chen, Z.-C. *Synth. Commun.*, **2001**, 31, 3289.



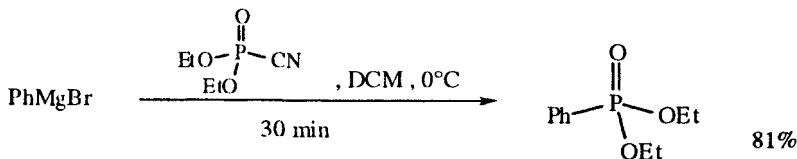
Schwan, A.L.; Strickler, R.R.; Dunn-Dufault, R.; Brillon, D. *Eur. J. Org. Chem.*, **2001**, 1643.



Salzbrunn, S.; Simon, J.; Surya Prakash, G.K.; Petasis, N.A.; Olah, G.A. *Synlett*, **2000**, 1485.



Cardellicchio, C.; Fracchiolla, G.; Naso, F.; Tortorella, P.; Holody, W.; Pietrusiewicz, K.M. *Tetrahedron Lett.*, **1999**, 40, 5773.

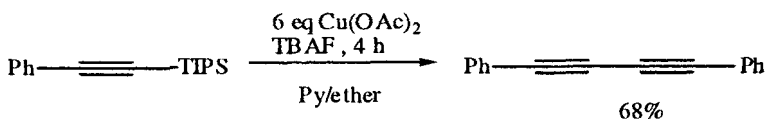


Guzman, A.; Alfaro, R.; Díaz, E. *Synth. Commun.*, **1999**, 29, 2967.

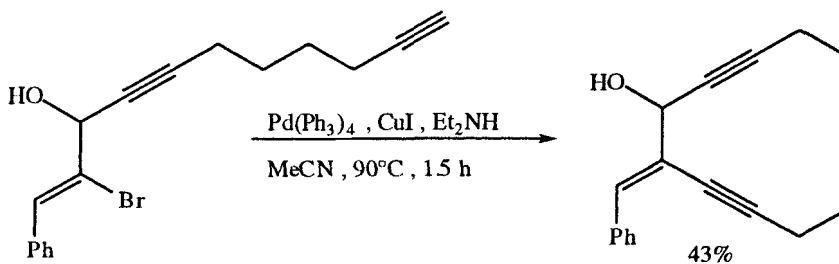
## CHAPTER 16

# PREPARATION OF DIFUNCTIONAL COMPOUNDS

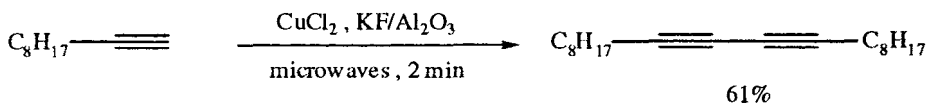
### SECTION 300: ALKYNE - ALKYNE



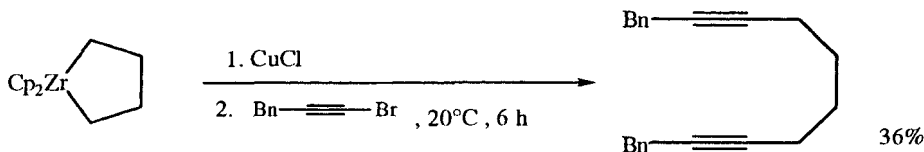
Hueft, M.A.; Collins, S.K.; Yap, G.P.A.; Fallis, A.G. *Org. Lett.*, **2001**, *3*, 2883.



Dai, W.-M.; Wu, A. *Tetrahedron Lett.*, **2001**, *42*, 81.

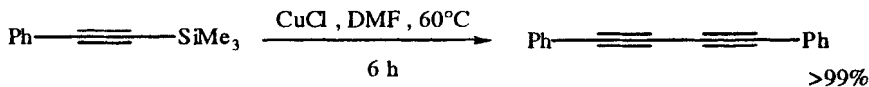


Kabalka, G.W.; Wang, L.; Pagni, R.M. *Synlett*, **2001**, 108.

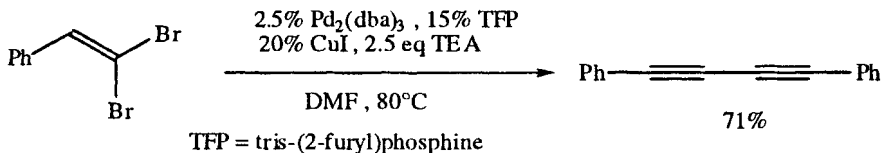


Liu, Y.; Xi, C.; Hara, R.; Nakajima, K.; Yamazaki, A.; Kotora, M.; Takahashi, T. *J. Org. Chem.*, **2000**, *65*, 6951.

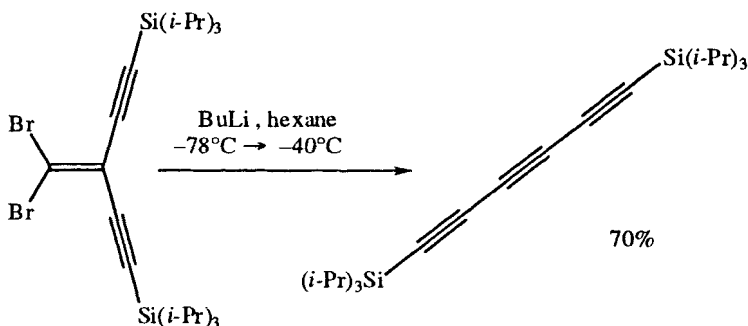




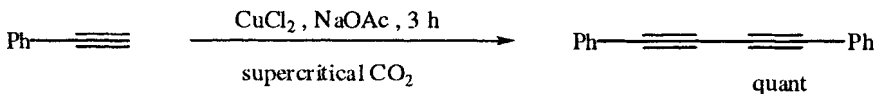
Nishihara, Y.; Ikegashira, K.; Hirabayashi, K.; Ando, J.-i.; Mori, A.; Hiyama, T.  
*J. Org. Chem.*, **2000**, *65*, 1780.



Shen, W.; Thomas, S.A. *Org. Lett.*, **2000**, *2*, 2857.



Eisler, S.; Tykwinski, R.R. *J. Am. Chem. Soc.*, **2000**, *122*, 10736.

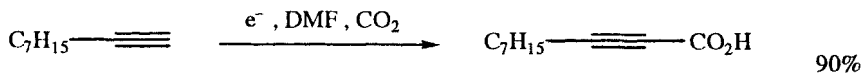


Li, J.; Jiang, H. *Chem. Commun.*, **1999**, 2369.

## REVIEWS:

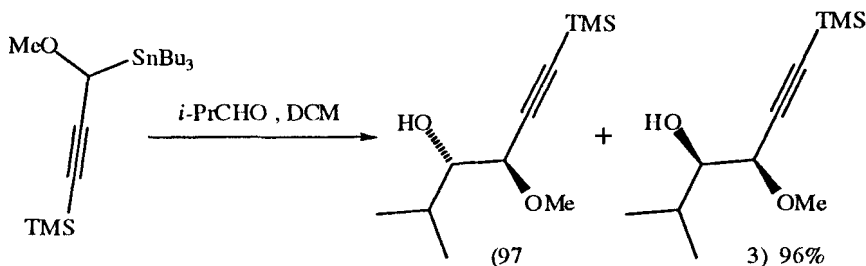
"Acetylenic Coupling: A Powerful Tool In Molecular Construction," Siemsen, P.; Livingston, R.C.; Diederich, F. *Angew. Chem. Int. Ed.*, **2000**, *39*, 2632.

## SECTION 301: ALKYNE - ACID DERIVATIVES

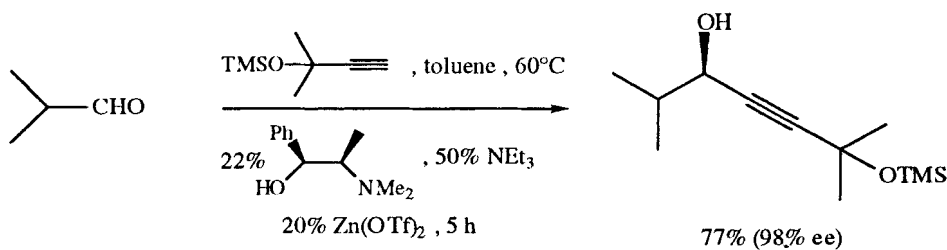


Köster, F.; Dinhus, E.; Duñach, E. *Eur. J. Org. Chem.*, **2001**, 2507.

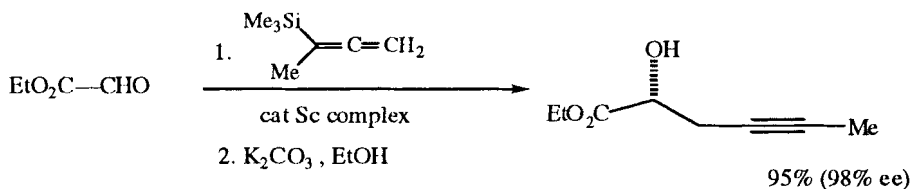
## SECTION 302: ALKYNE - ALCOHOL, THIOL



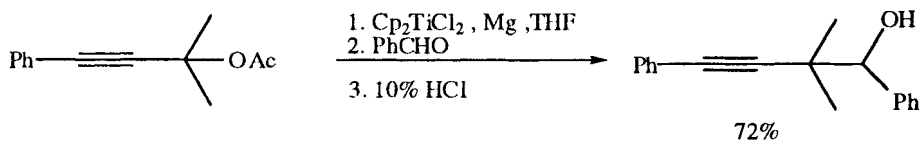
Savall, B.M.; Powell, N.A.; Roush, W.R. *Org. Lett.*, **2001**, 3, 3057.



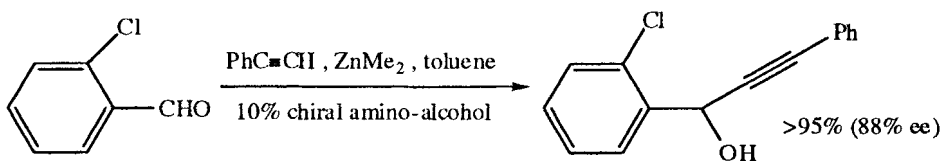
Anand, N.K.; Carreira, E.M. *J. Am. Chem. Soc.*, **2001**, 123, 9687.



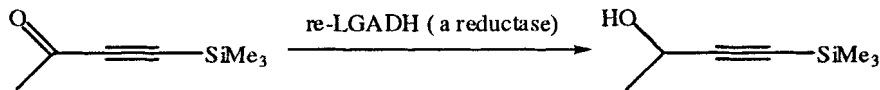
Evans, D.A.; Sweeney, Z.K.; Rovis, T.; Tedron, J.S. *J. Am. Chem. Soc.*, **2001**, 123, 12095.



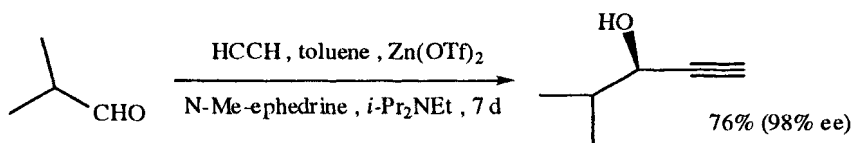
Yang, F.; Zhao, G.; Ding, Y. *Tetrahedron Lett.*, **2001**, 42, 2839.



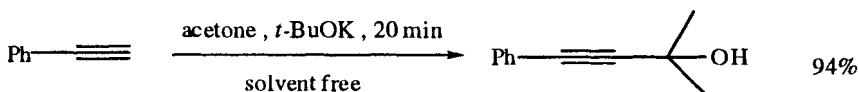
Lu, G.; Li, X.; Zhou, Z.; Chan, W.L.; Chan, A.S.C. *Tetrahedron Asymm.*, **2001**, 12, 2147.



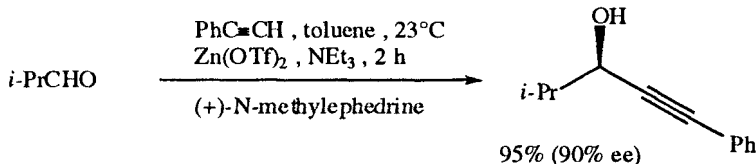
92% ee

Schubert, T.; Hummel, W.; Kula, M.-R.; Müller, M. *Eur. J. Org. Chem.*, **2001**, 4181.

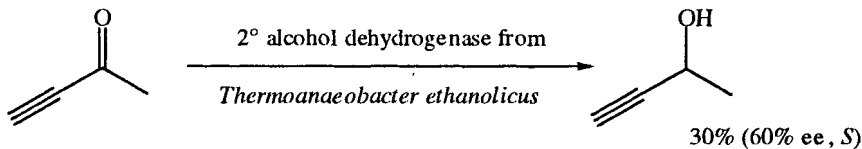
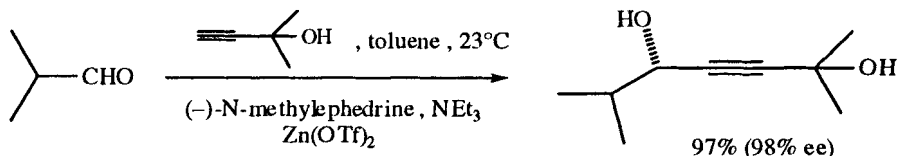
76% (98% ee)

Sasaki, H.; Boyall, D.; Carreira, E.M. *Helv. Chim. Acta*, **2001**, 84, 964.

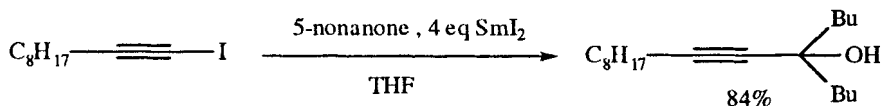
94%

Miyamoto, H.; Yasaka, S.; Tanaka, K. *Bull. Chem. Soc. Jpn.*, **2001**, 74, 185.

95% (90% ee)

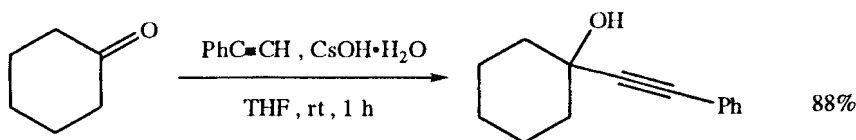
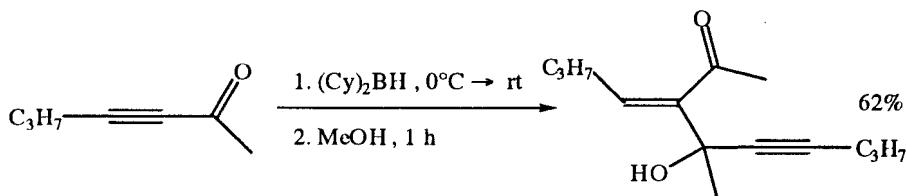
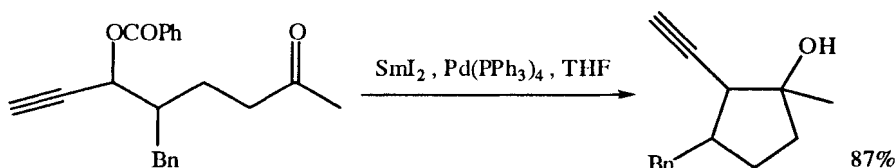
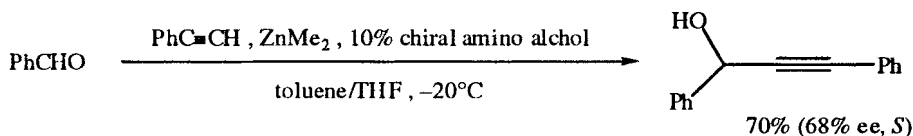
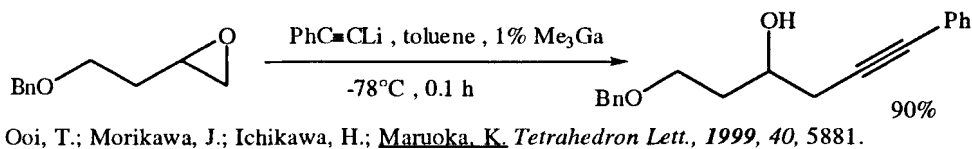
Frantz, D.E.; Fässler, R.; Carreira, E.M. *J. Am. Chem. Soc.*, **2000**, 122, 1806.30% (60% ee, *S*)Heiss, C.; Phillips, R.S. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 2821.

97% (98% ee)

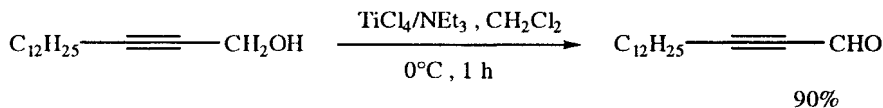
Boyall, D.; López, F.; Sasaki, H.; Frantz, D.; Carreira, E.M. *Org. Lett.*, **2000**, 2, 4233.

84%

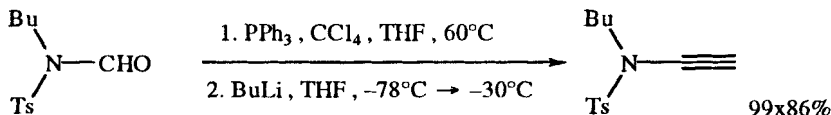
Kunishima, M.; Nakata, D.; Tanaka, S.; Hioki, K.; Tani, S. *Tetrahedron*, **2000**, 56, 9927.



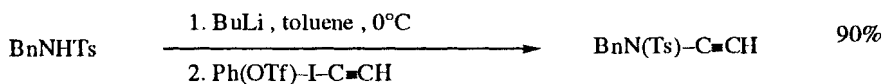
## SECTION 303: ALKYNE - ALDEHYDE



## SECTION 304: ALKYNE - AMIDE



99x86%

Brückner, D., *Synlett*, **2000**, 1402.

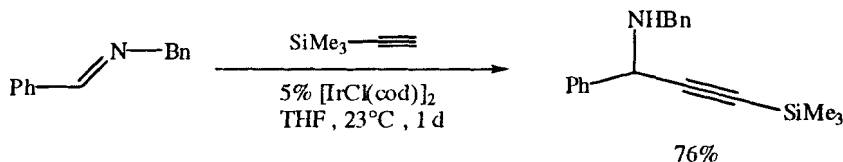
90%

Witulski, B.; Gößmann, M. *Synlett*, **2000**, 1793.

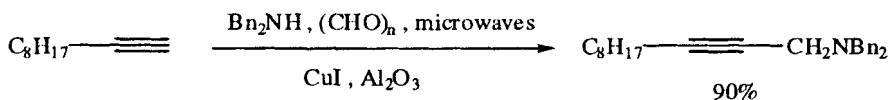
## REVIEWS:

"Recent Advances in the Chemistry of Ynamines and Ynamides," Zificsak, C.A.; Mulder, J.A.; Hsung, R.P.; Rameshkumar, C.; Wei, L.-L. *Tetrahedron*, **2001**, 57, 7575.

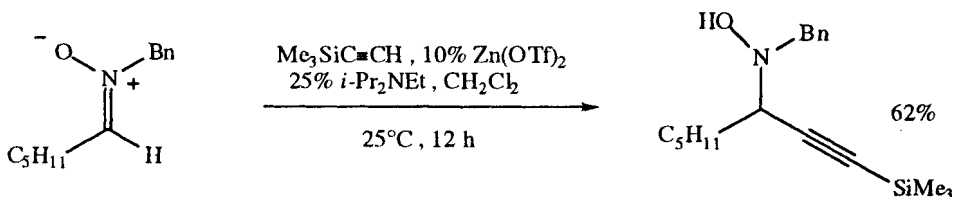
## SECTION 305: ALKYNE - AMINE



76%

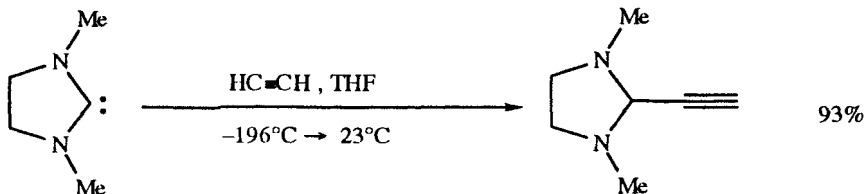
Fischer, C.; Carreira, E.M. *Org. Lett.*, **2001**, 3, 4319.

90%

Kabalka, G.W.; Wang, L.; Pagni, R.M. *Synlett*, **2001**, 676.

62%

Frantz, D.E.; Fässler, R.; Carreira, E.M. *J. Am. Chem. Soc.*, **1999**, 121, 11245.

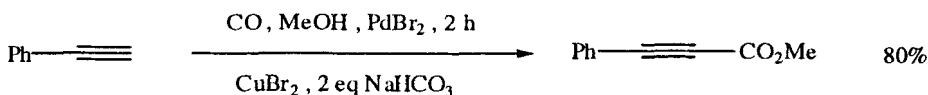


Arduengo III, A.L.; Calabrese, J.C.; Davidson, F.; Diasa, H.V.R.; Goerlich, J.R.; Krafczyk, R.; Marshall, W.J.; Tamm, M.; Schmutzler, R. *Helv. Chim. Acta*, **1999**, 82, 2348.

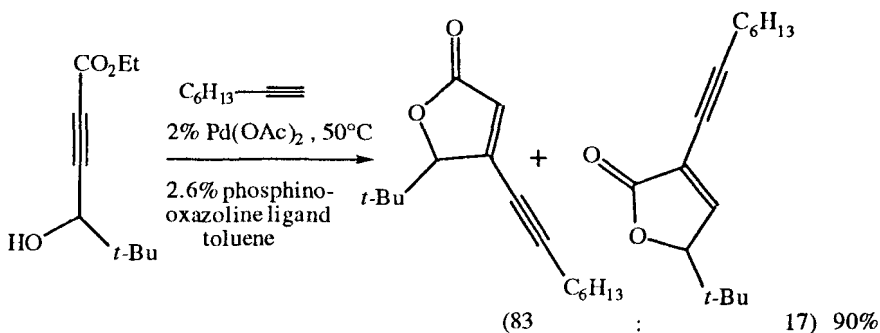
## REVIEWS:

"Recent Advances in the Chemistry of Ynamines and Ynamides," Zifcisk, C.A.; Mulder, J.A.; Hsung, R.P.; Rameshkumar, C.; Wei, L.-L. *Tetrahedron*, **2001**, 57, 7575.

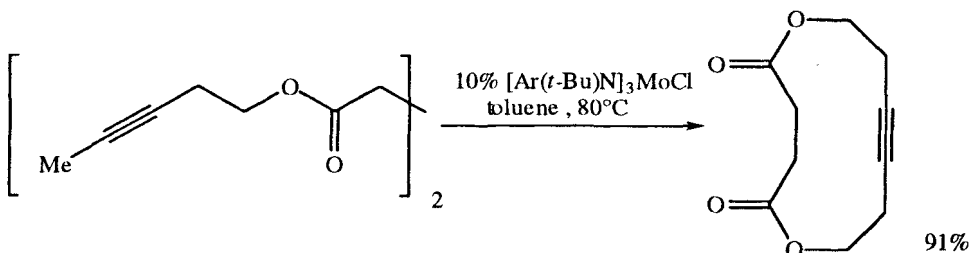
## SECTION 306: ALKYNE - ESTER



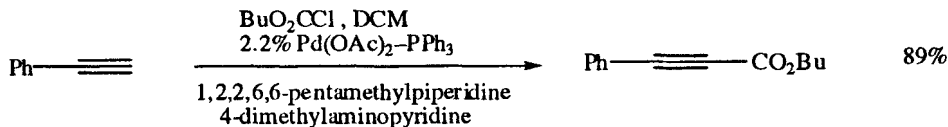
Li, J.; Jiang, H.; Chen, M. *Synth. Commun.*, **2001**, 31, 199.



Lücking, U.; Pfaltz, A. *Synlett*, **2000**, 1261.

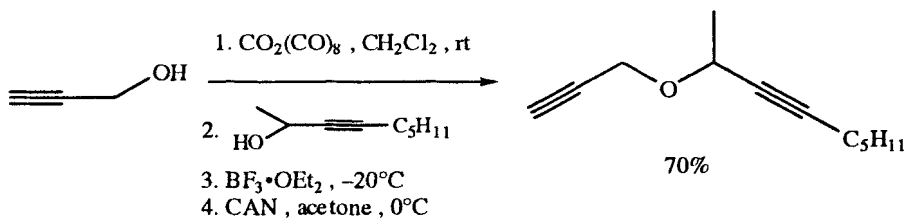
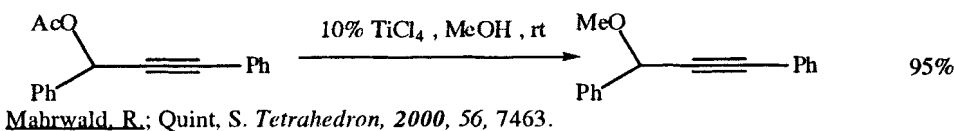


Fürstner, A.; Mathes, C.; Lehmann, C.W. *J. Am. Chem. Soc.*, **1999**, 121, 9453.

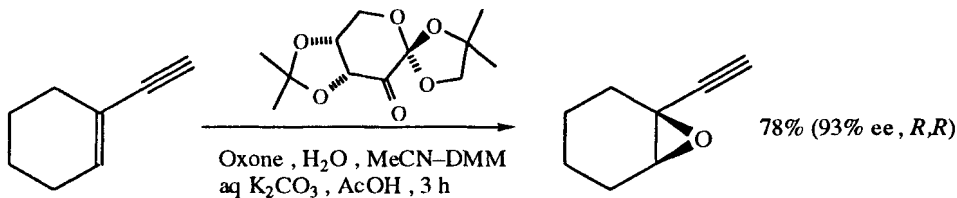


Böttcher, A.; Becker, H.; Brunner, M.; Preiss, T.; Henkelmann, J.; De Bakker, C.; Gleiter, R. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 3555.

## SECTION 307: ALKYNE - ETHER, EPOXIDE, THIOETHER

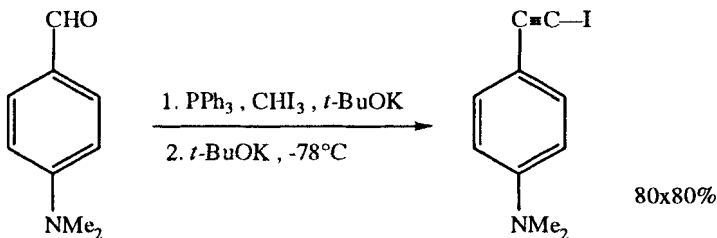


Diaz, D.D.; Martin, V.S. *Tetrahedron Lett.*, **2000**, 41, 9993.

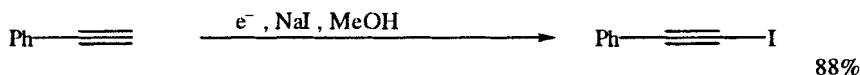


Wang, Z.-X.; Cao, G.-A.; Shi, Y. *J. Org. Chem.*, **1999**, 64, 7646.

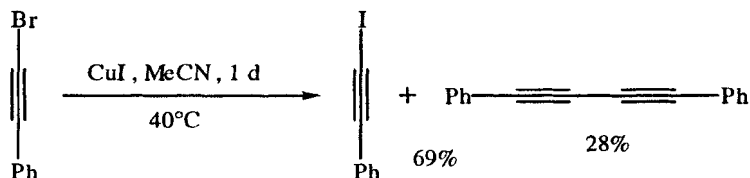
## SECTION 308: ALKYNE - HALIDE



Michel, P.; Rassat, A. *Tetrahedron Lett.*, **1999**, 40, 8579.

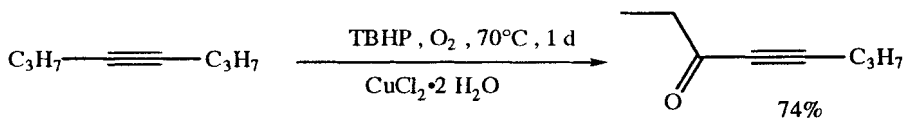


Nishiguchi, I.; Kanabe, O.; Itoh, K.; Maekawa, H. *Synlett*, 2000, 89.

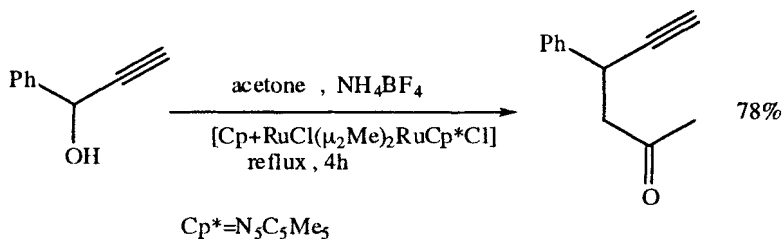


Abe, H.; Suzuki, H. *Bull. Chem. Soc. Jpn.*, 1999, 72, 787.

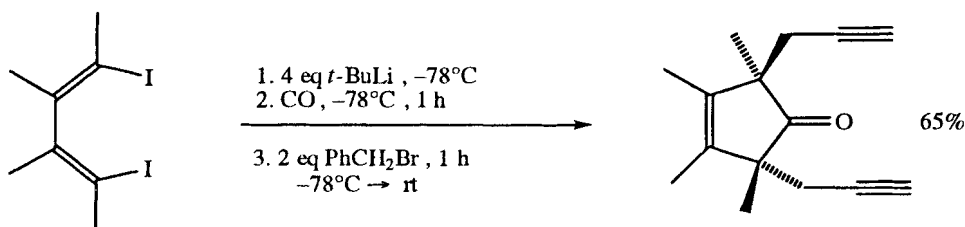
## SECTION 309: ALKYNE - KETONE



Li, P.; Fong, W.M.; Chao, L.C.F.; Fung, S.H.C.; Williams, I.D. *J. Org. Chem.*, 2001, 66, 4087.

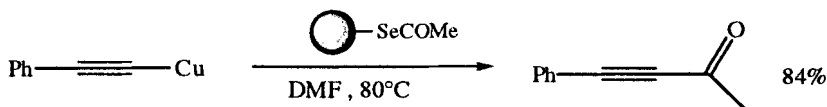


Nishibayashi, Y.; Wakiji, I.; Ishii, Y.; Uemura, S.; Hidai, M. *J. Am. Chem. Soc.*, 2001, 123, 3393.

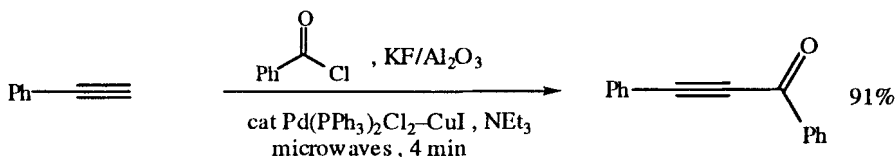


Song, Q.; Hen, J.; Jin, X.; Xi, Z. *J. Am. Chem. Soc.*, 2001, 123, 10419.

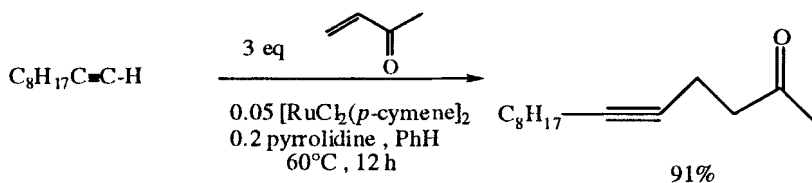




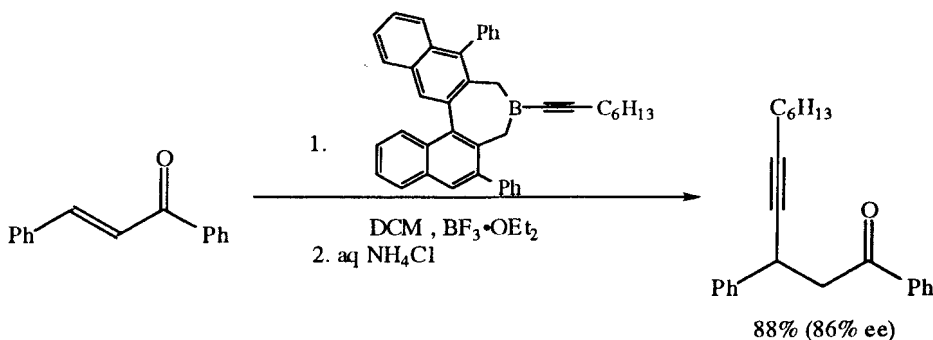
Qian, H.; Shao, L.-X.; Huang, X. *Synlett*, **2001**, 1571.



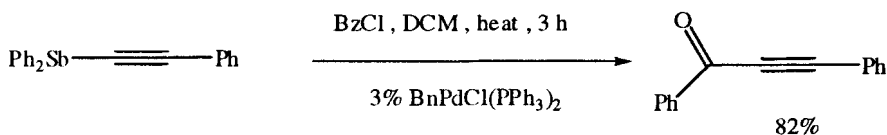
Wang, J.-X.; Wei, B.; Huang, D.; Hu, Y.; Bai, L. *Synth. Commun.*, **2001**, *31*, 3337.  
with CuI/NEt<sub>3</sub>, microwaves. See Wang, J.-X.; Wei, B.; Hu, Y.; Liu, Z.; Fu, Y. *Synth. Commun.*, **2001**, *31*, 3527; Wang, J.-X.; Wei, B.; Hu, Y.; Liu, Z.; Kang, L. *J. Chem. Res. (S)*, **2001**, 146.



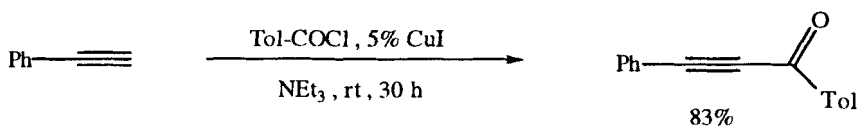
Chang, S.; Na, Y.; Choi, E.; Kim, S. *Org. Lett.*, **2001**, *3*, 2089.



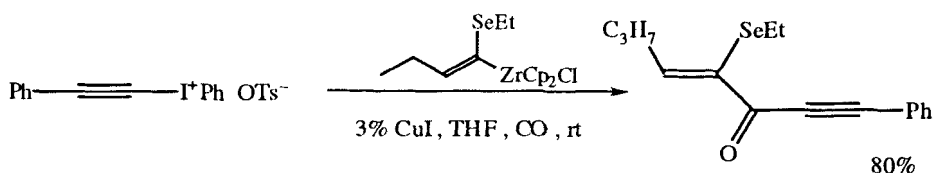
Chong, J.M.; Shen, L.; Taylor, N.J. *J. Am. Chem. Soc.*, **2000**, *122*, 1822.



Kakusawa, N.; Yamaguchi, K.; Kurita, J.; Tsuchiya, T. *Tetrahedron Lett.*, **2000**, *41*, 4143.



Chowdhury, C.; Kundu, N.G. *Tetrahedron*, **1999**, *55*, 7011.

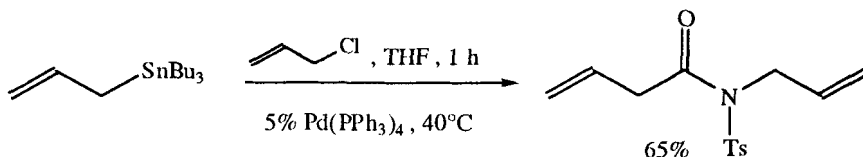


Sun, A.-M.; Huang, X. *Tetrahedron*, **1999**, *55*, 13201.

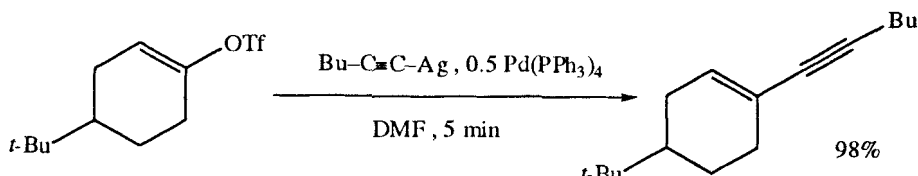
## SECTION 310: ALKYNE - NITRILE

NO ADDITIONAL EXAMPLES

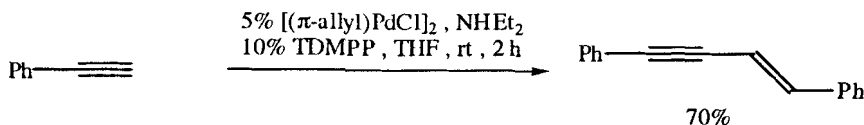
## SECTION 311: ALKYNE - ALKENE



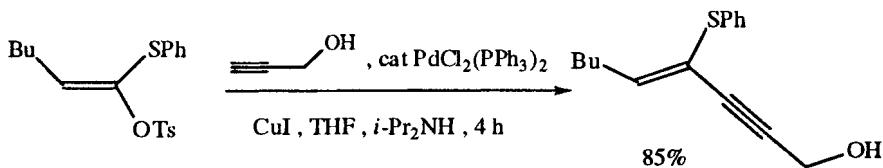
Radhakrishnan, U.; Stang, P.J. *Org. Lett.*, **2001**, *3*, 859.



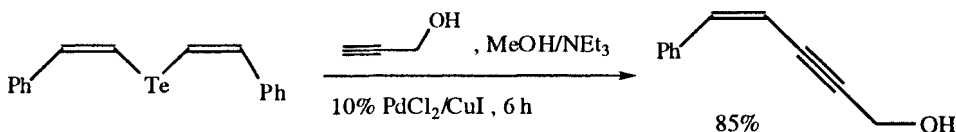
Dillinger, S.; Bertus, P.; Pale, P. *Org. Lett.*, **2001**, *3*, 1661.



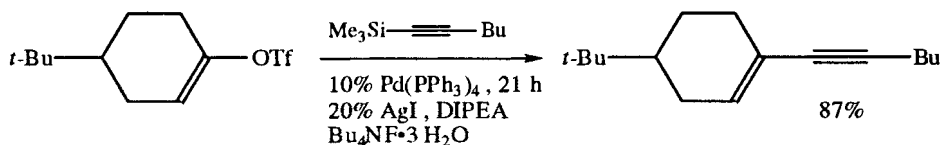
Rubina, M.; Gevorgyan, V. *J. Am. Chem. Soc.*, **2001**, *123*, 11107.



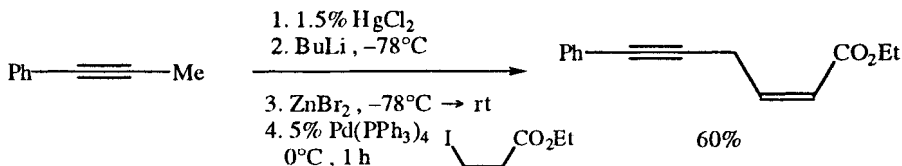
**Braga, A.L.**; Emmerich, D.J.; Silveira, C.C.; Martins, T.L.C.; Rodrigues, O.E.D. *Synlett*, **2001**, 369.



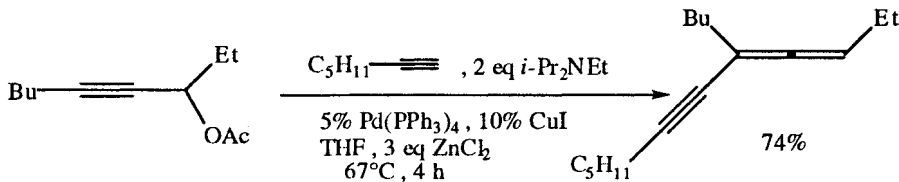
**Zeni, G.**; Menezes, P.H.; Moro, A.V.; Braga, A.L.; Silveira, C.C.; Stefani, H.A. *Synlett*, **2001**, 1473.



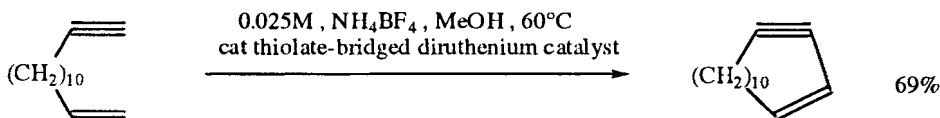
Bertus, P.; Halbes, U.; **Pale, P.** *Eur. J. Org. Chem.*, **2001**, 4391.



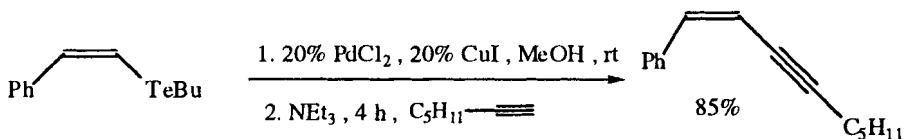
**Ma, S.**; Zhang, A.; Yu, Y.; Xia, W. *J. Org. Chem.*, **2000**, 65, 2287.



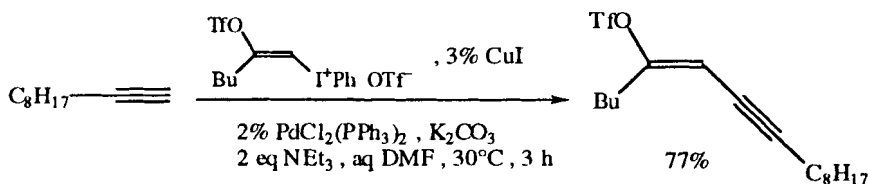
**Condon-Gueugnot, S.**; Linstumelle, G. *Tetrahedron*, **2000**, 56, 1851.



Nishibayashi, Y.; Yamanashi, M.; Wakiji, I.; **Hidai, M.** *Angew. Chem. Int. Ed.*, **2000**, 39, 2905.



Zeni, G.; Comasseto, J.V. *Tetrahedron Lett.*, **1999**, 40, 4619.

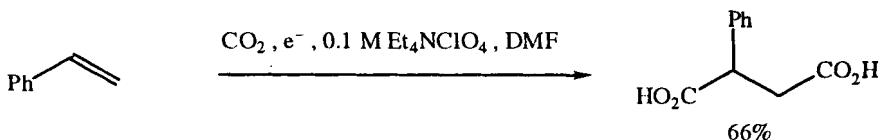


Pirguliyev, N.Sh.; Brel, V.K.; Zefirov, N.S.; Stang, P.J. *Tetrahedron*, **1999**, 55, 12377.

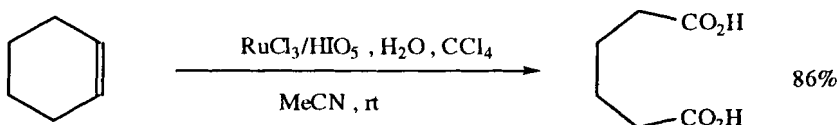
## REVIEWS:

"Cycloaromatization of Open and Masked 1,3-Hexadiene-5-ynes – Mechanistic and Synthetic Aspects," Zimmerman, G. *Eur. J. Org. Chem.*, **2001**, 457.

## SECTION 312: CARBOXYLIC ACID - CARBOXYLIC ACID

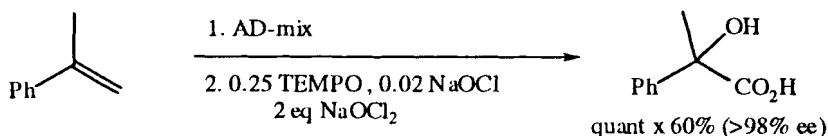


Senboku, H.; Komatsu, H.; Fujimura, Y.; Tokuda, M. *Synlett*, **2001**, 418.

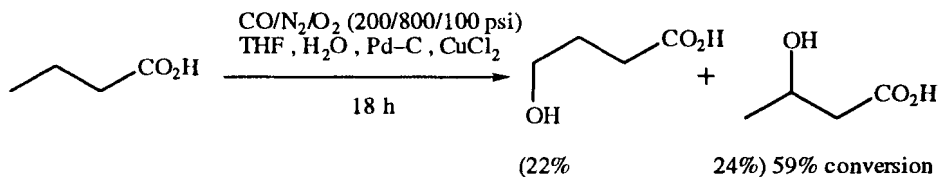


Griffith, W.P.; Shoair, A.G.; Suriaatmaja, M. *Synth. Commun.*, **2000**, 30, 3091.

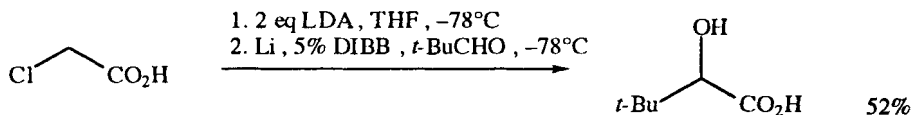
## SECTION 313: CARBOXYLIC ACID - ALCOHOL, THIOL



Aladro, F.J.; Guerra, F.M.; Moreno-Dorado, F.J.; Bustamante, J.M.; Jorge, Z.D.; Massanet, G.M. *Tetrahedron Lett.*, **2000**, 41, 3209.



Shen, C.; Garcia-Zayas, E.A.; Sen, A. *J. Am. Chem. Soc.*, **2000**, *122*, 4029.

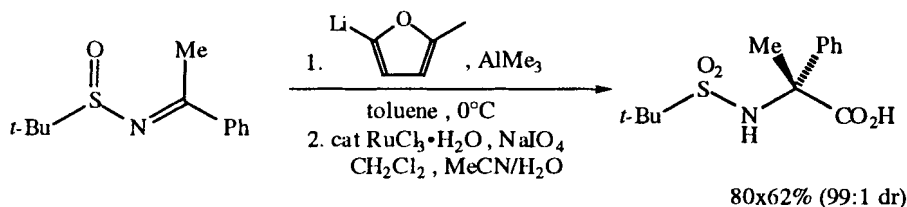


Pastro, I.M.; Yus, M. *Tetrahedron Lett.*, **2000**, *41*, 5335.

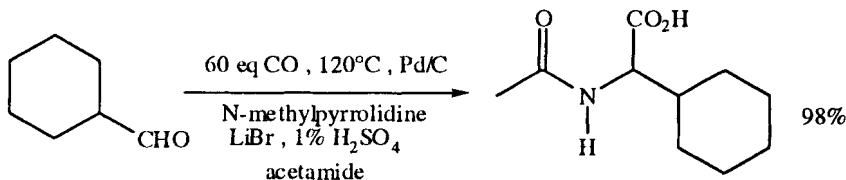
## SECTION 314: CARBOXYLIC ACID - ALDEHYDE

NO ADDITIONAL EXAMPLES

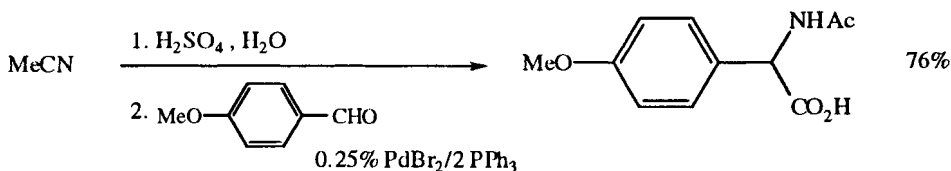
## SECTION 315: CARBOXYLIC ACID - AMIDE



Borg, G.; Chino, M.; Ellman, J.A. *Tetrahedron Lett.*, **2001**, *42*, 1433.

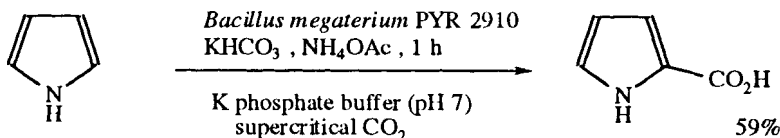


Beller, M.; Moradi, W.A.; Eckert, M.; Neumann, H. *Tetrahedron Lett.*, **1999**, *40*, 4523.



Beller, M.; Eckert, M.; Moradi, W.A. *Synlett*, **1999**, 108.

## SECTION 316: CARBOXYLIC ACID - AMINE



Matsuda, T.; Ohaishi, Y.; Harada, T.; Yanagihara, R.; Nagasawa, T.; Nakamura, K. *Chem. Commun.*, **2001**, 2194.

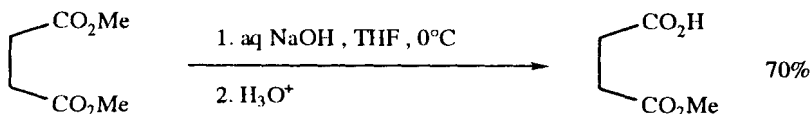
## REVIEWS:

"Recent Developments in Catalytic Asymmetric Strecker-Type Reactions," Yvet, L. *Angew. Chem. Int. Ed.*, **2001**, 40, 875.

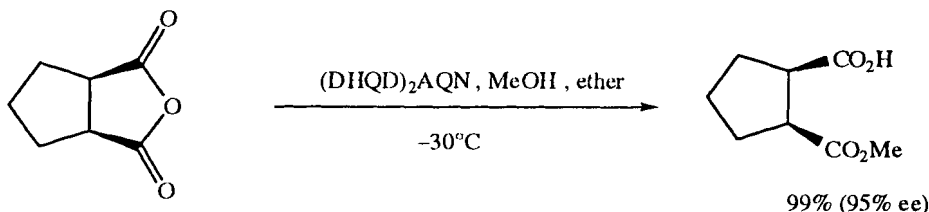
Related Methods:

Section 315 (Carboxylic Acid - Amide).  
 Section 344 (Amide - Ester).  
 Section 351 (Amine - Ester).

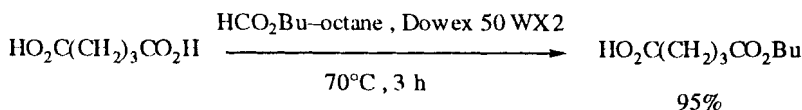
## SECTION 317: CARBOXYLIC ACID - ESTER



Niwayama, S. *J. Org. Chem.*, **2000**, 65, 5834.



Chen, Y.; Tian, S.-K.; Deng, L. *J. Am. Chem. Soc.*, **2000**, 122, 9542.



Nishiguchi, T.; Ishii, Y.; Fujisaki, S. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 3023.

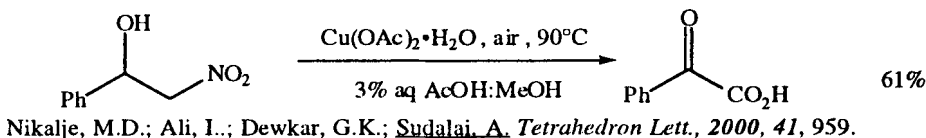
# SECTION 318: CARBOXYLIC ACID - ETHER, EPOXIDE, THIOETHER

NO ADDITIONAL EXAMPLES

# SECTION 319: CARBOXYLIC ACID - HALIDE, SULFONATE

NO ADDITIONAL EXAMPLES

# SECTION 320: CARBOXYLIC ACID - KETONE



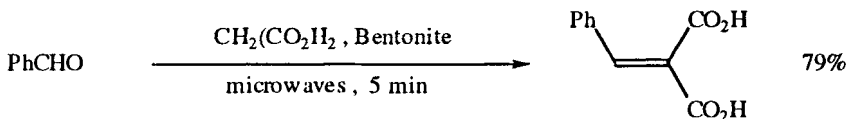
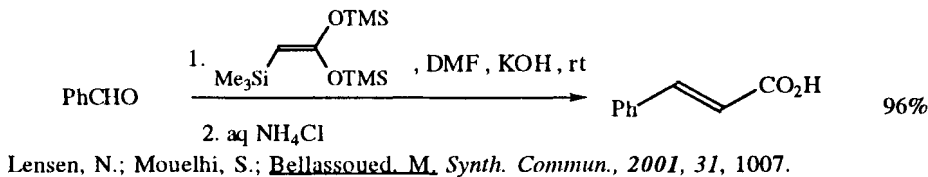
Also via: Section 360 (Ketone - Ester).

# SECTION 321: CARBOXYLIC ACID - NITRILE

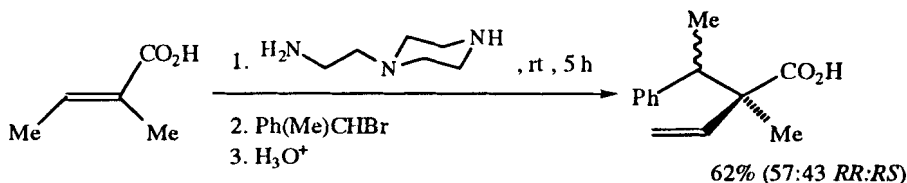
NO ADDITIONAL EXAMPLES

Also via: Section 361 (Nitrile - Ester).

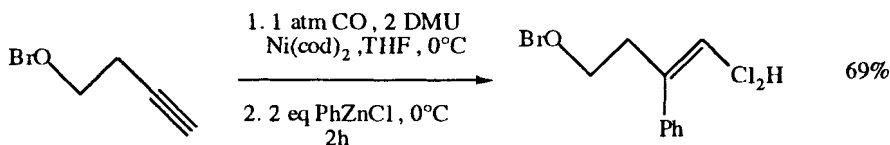
# SECTION 322: CARBOXYLIC ACID - ALKENE



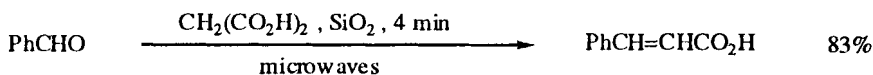
Loupy, A.; Song, S.-J.; Sohn, S.-M.; Lee, Y.-M.; Kwon, T.W.  
*J. Chem. Soc., Perkin Trans. 1*, **2001**, 1220.



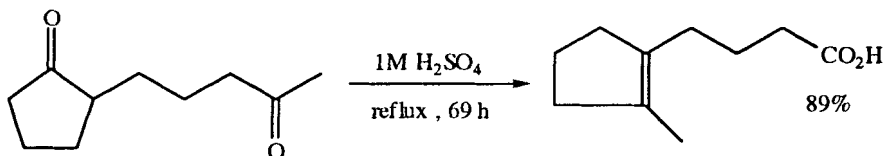
Brun, E.M.; Gil, S.; Parra, M. *Tetrahedron Asymm.*, 2001, 12, 915.



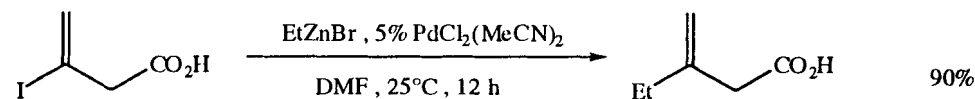
Takimoto, M.; Shimizu, K.; Mori, M. *Org. Lett.*, 2001, 3, 3345.



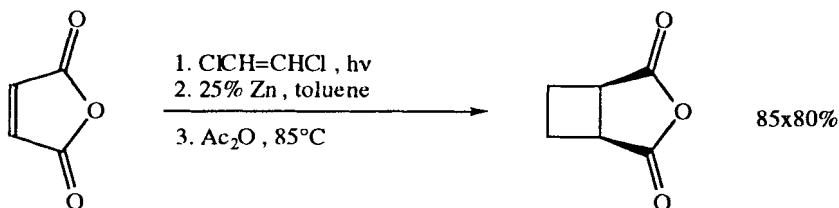
Kumar, H.M.S.; Reddy, B.V.S.; Reddy, P.T.; Srinivas, D.; Yadav, J.S. *Org. Prep. Proceed. Int.* 2000, 32, 81.



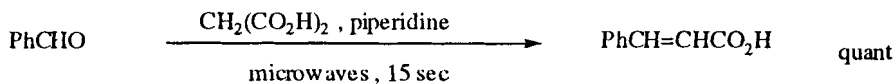
Zhu, S.; Pardi, S.; Cohen, T. *Tetrahedron Lett.*, 2000, 41, 9589.



Abarbri, M.; Parvain, J.-L.; Kitamura, M.; Noyori, R.; Duchêne, A. *J. Org. Chem.*, 2000, 65, 7475.

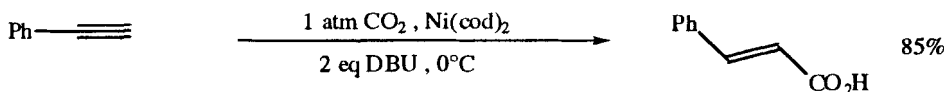


Gauvry, N.; Comoy, C.; Lescop, C.; Huet, E. *Synthesis*, 1999, 574.

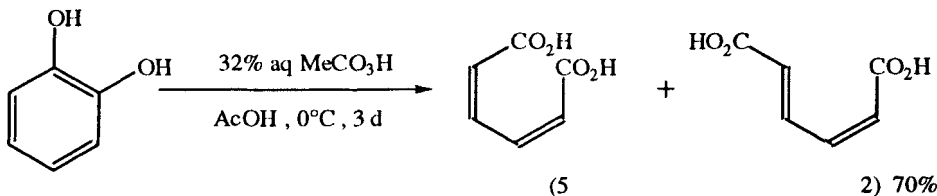


Pellón, R.F.; Mamposo, T.; González, E.; Calderón, O. *Synth. Commun.*, 2000, 30, 3769.

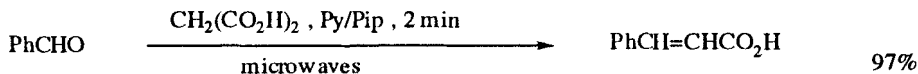




Saito, S.; Nakagawa, S.; Koizumi, T.; Hirayama, K.; Yamamoto, Y.  
*J. Org. Chem.*, **1999**, *64*, 3975.



McKague, A.B. *Synth. Commun.*, **1999**, *29*, 1463.

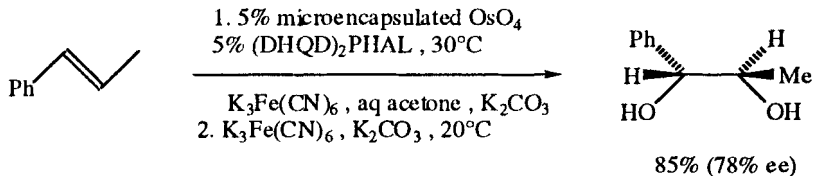


Mitra, A.K.; De, A.; Karchaudhuri, N. *Synth. Commun.*, **1999**, *29*, 573.

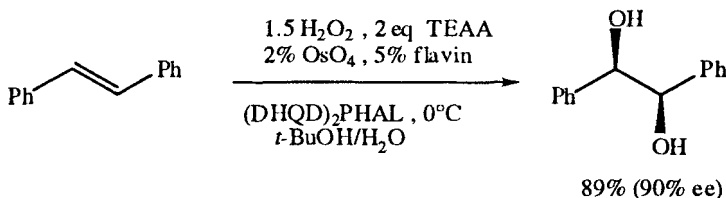
Also via:      Section 313 (Alcohol - Carboxylic Acids).  
                  Section 349 (Amide - Alkene).  
                  Section 362 (Ester - Alkene).  
                  Section 376 (Nitrile - Alkene).

## SECTION 323: ALCOHOL, THIOL - ALCOHOL, THIOL

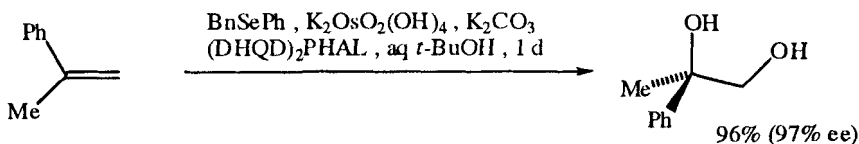
### ASYMMETRIC DIOLS



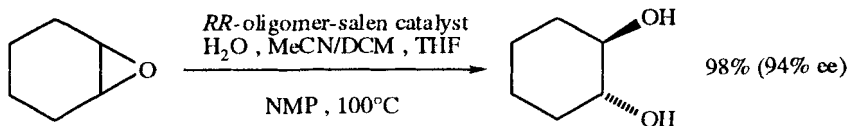
Kobayashi, S.; Ishida, T.; Akiyama, R. *Org. Lett.*, **2001**, *3*, 2649.



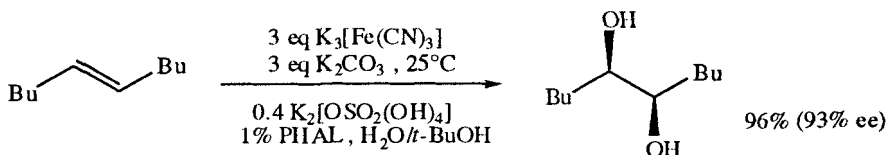
Jonsson, S.Y.; Adolfsson, H.; Bäckvall, J.-E. *Org. Lett.*, **2001**, *3*, 3463.



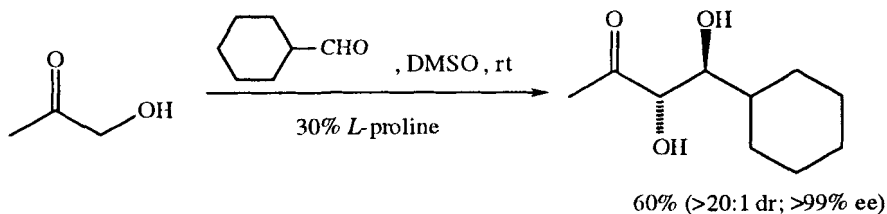
Krief, A.; Castillo-Colaux, C. *Synlett*, **2001**, 501.



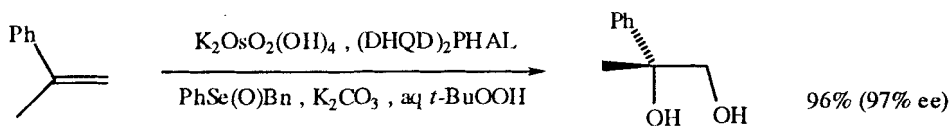
Ready, J.M.; Jacobsen, E.N. *J. Am. Chem. Soc.*, **2001**, *123*, 2719.



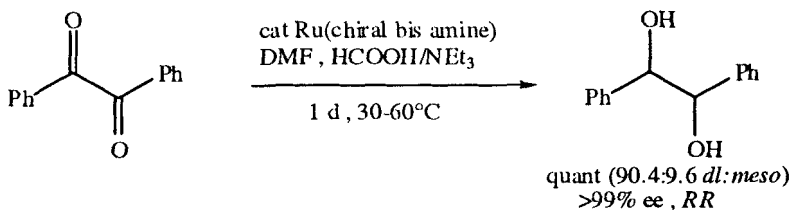
Mehlretter, G.M.; Döbler, C.; Sundermeier, U.; Beller, M. *Tetrahedron Lett.*, **2000**, *41*, 8083.



Notz, W.; List, B. *J. Am. Chem. Soc.*, **2000**, *122*, 7386.

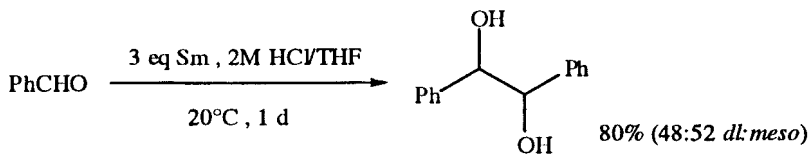


Krief, A.; Colaux-Castillo, C. *Tetrahedron Lett.*, **1999**, *40*, 4189.

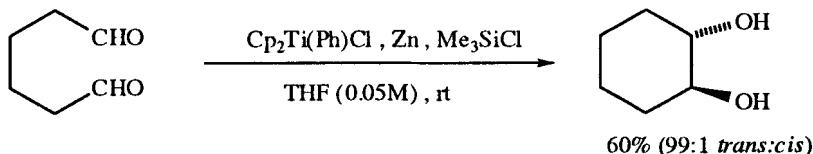


Murata, K.; Okano, K.; Miyagi, M.; Iwane, H.; Noyori, R.; Ikariya, T.  
*Org. Lett.*, **1999**, *1*, 1119.

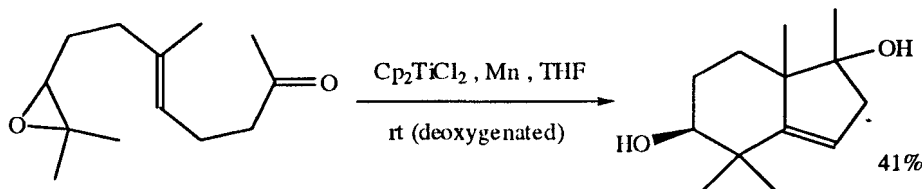
## NON-ASYMMETRIC DIOLS



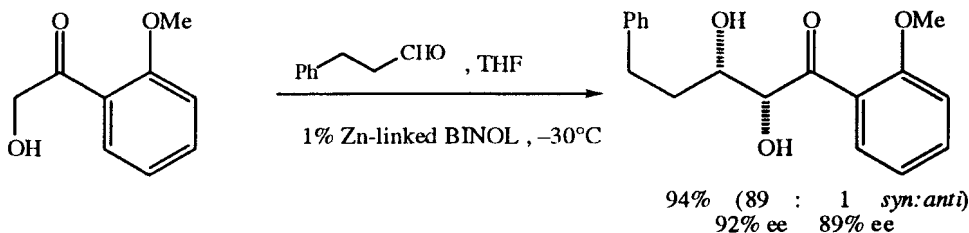
Talukdar, S.; Fang, J.-M. *J. Org. Chem.*, **2001**, *66*, 330.



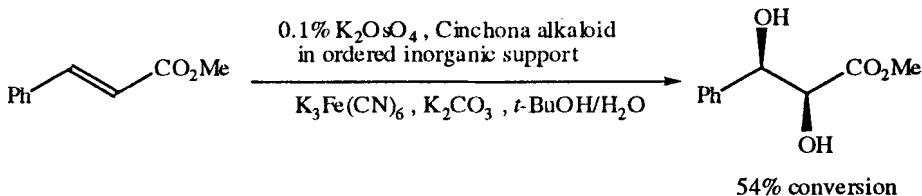
Yamamoto, Y.; Hattori, R.; Miwa, T.; Nakagai, Y.-i.; Kubota, T.; Yamamoto, C.; Okamoto, Y.; Itoh, K. *J. Org. Chem.*, **2001**, *66*, 3865.



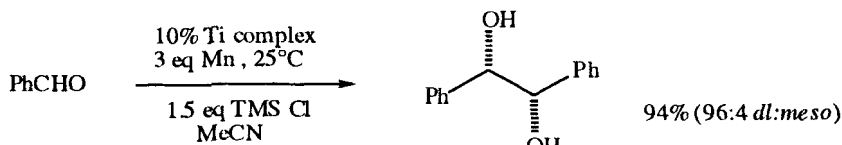
Barrero, A.E.; Cuerva, J.M.; Herrador, M.M.; Valdivia, M.V. *J. Org. Chem.*, **2001**, *66*, 4074.



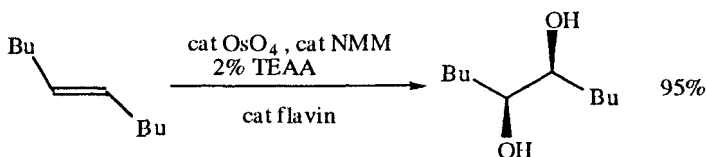
Kumagai, N.; Matsunaga, S.; Yoshikawa, N.; Ohshima, T.; Shibasaki, M. *Org. Lett.*, **2001**, *3*, 1539.



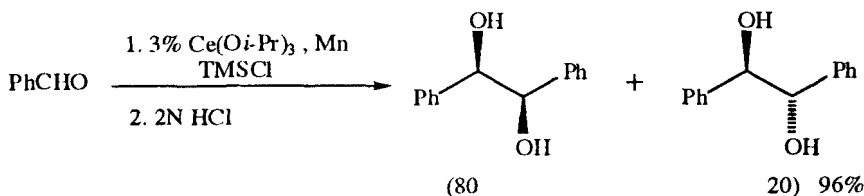
Motorina, I.; Crudden, C.M. *Org. Lett.*, **2001**, *3*, 2325.



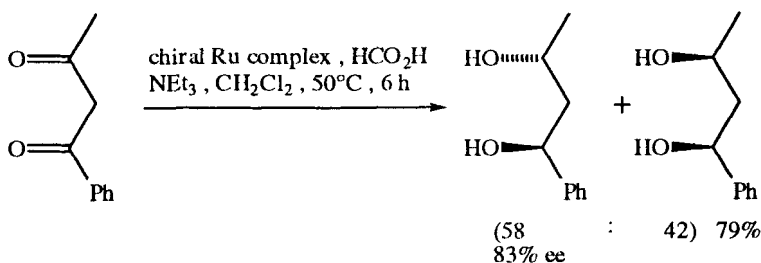
Bensari, A.; Renaud, J.-L.; Riant, O. *Org. Lett.*, 2001, 3, 3863.



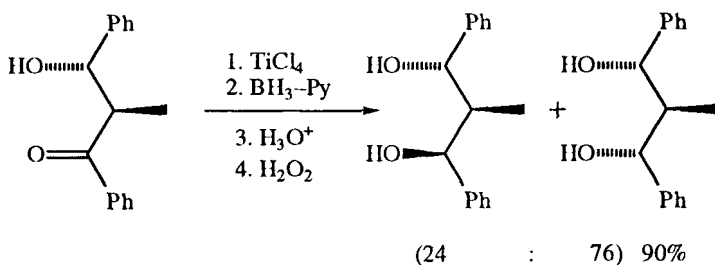
Jonsson, S.Y.; Färnegårdh, K.; Bäckvall, J.-E. *J. Am. Chem. Soc.*, 2001, 123, 1365.



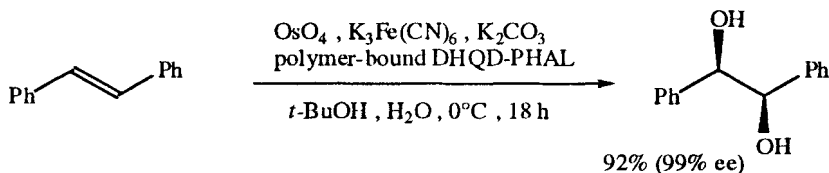
Groth, U.; Jeske, M. *Synlett*, 2001, 129.



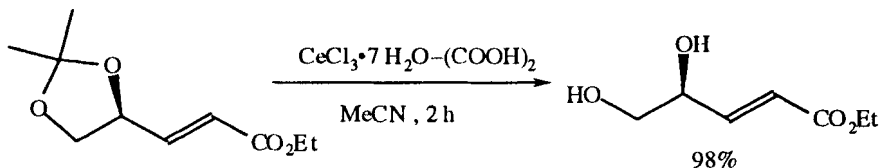
Cossy, J.; Eustache, F.; Dalko, P.I. *Tetrahedron Lett.*, 2001, 42, 5005.



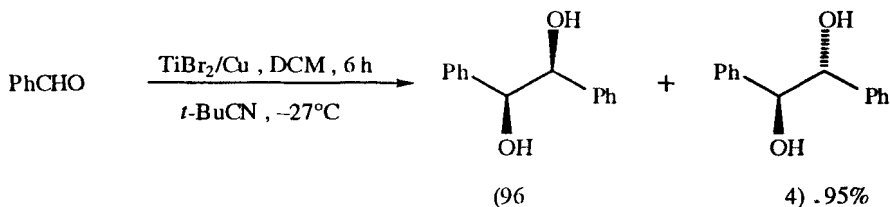
Bartoli, G.; Bosco, M.; Marcantoni, E.; Massaccesi, M.; Rinaldi, S.; Sambri, L. *Eur. J. Org. Chem.*, 2001, 4679.



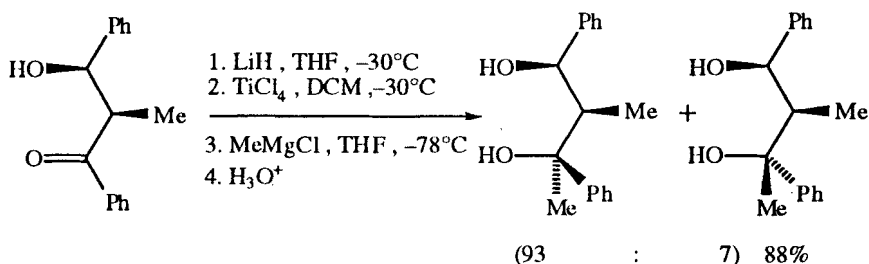
Kuang, Q.-Q.; Zhang, S.-Y.; Wei, L.-L. *Tetrahedron Lett.*, 2001, 42, 5925.



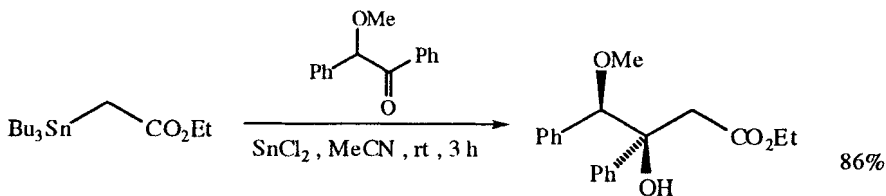
Xiao, X.; Bai, D. *Synlett*, 2001, 535.



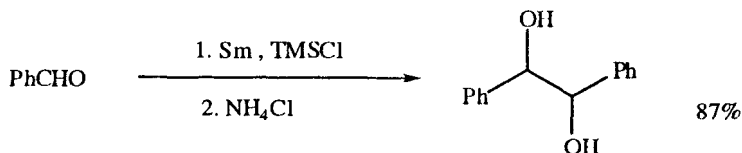
Mukaiyama, T.; Yoshimura, N.; Igarashi, K.; Kagayama, A. *Tetrahedron*, 2001, 57, 2495.



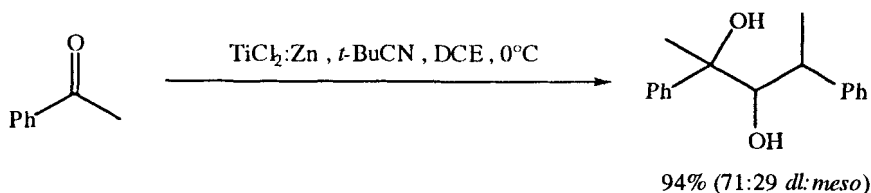
Bartoli, G.; Bosco, M.; Di Maartino, E.; Marcantoni, E.; Sambri, L. *Eur. J. Org. Chem.*, 2001, 2901.



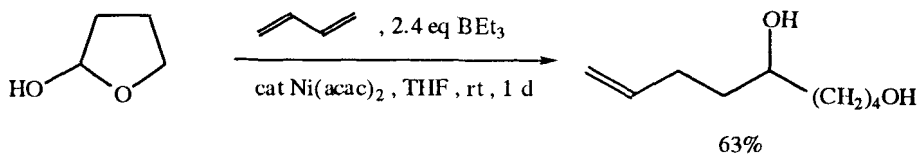
Yasuda, M.; Okamoto, K.; Sako, T.; Baba, A. *Chem. Commun.*, 2001, 157.



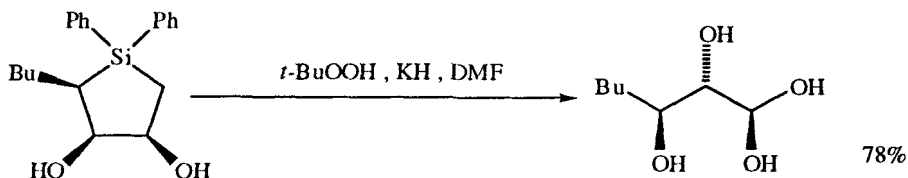
Yu, M.; Zhang, Y. *Org. Prep. Proceed. Int.*, **2001**, 33, 187.



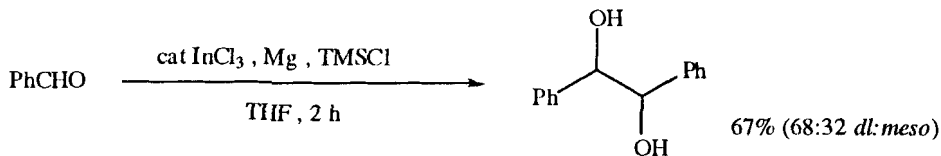
Kagayama, A.; Igarashi, K.; Mukaiyama, T. *Can. J. Chem.*, **2000**, 78, 657.



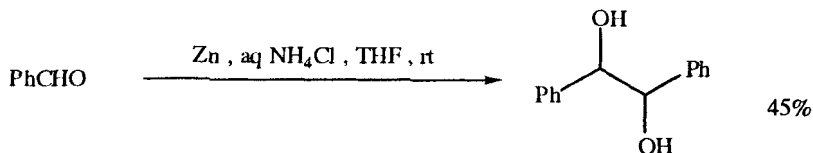
Kimura, M.; Ezoe, A.; Tanaka, S.; Tamaru, Y. *Angew. Chem. Int. Ed.*, **2001**, 40, 3600.



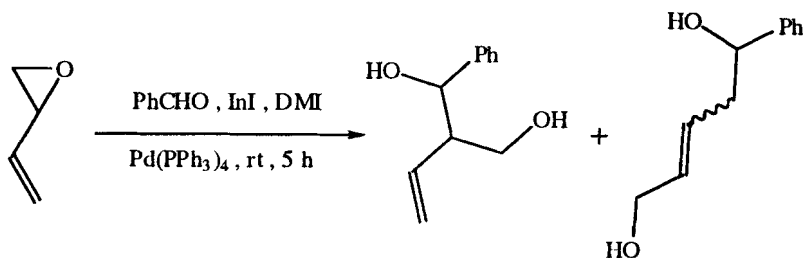
Liu, D.; Kozmin, S.A. *Angew. Chem. Int. Ed.*, **2001**, 40, 4757.



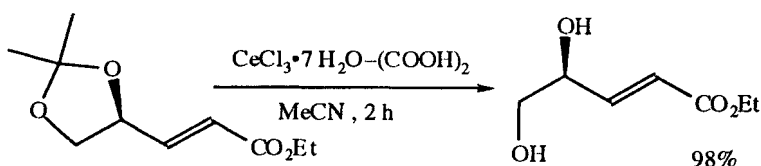
Mori, K.; Ohtaka, S.; Uemura, S. *Bull. Chem. Soc. Jpn.*, **2001**, 74, 1497.



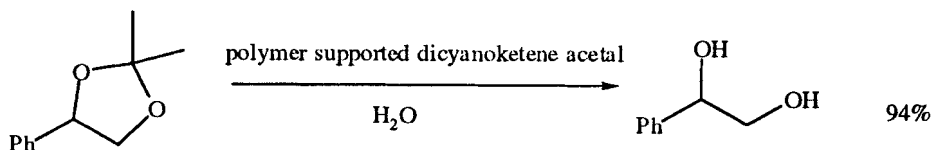
Hekmatshoar, R.; Yavari, I.; Beheshtiha, Y.S.; Heravi, M.M. *Monat. Chem.*, **2001**, 132, 689.

62% (22:78 *syn:anti*)33% (29:71 *E:Z*)

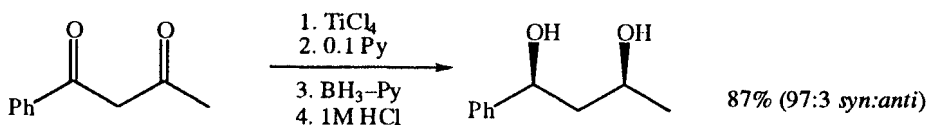
Araki, S.; Kameda, K.; Tanaka, J.; Hirashita, T.; Yamamura, H.; Kawai, M.  
*J. Org. Chem.*, **2001**, *66*, 7919.



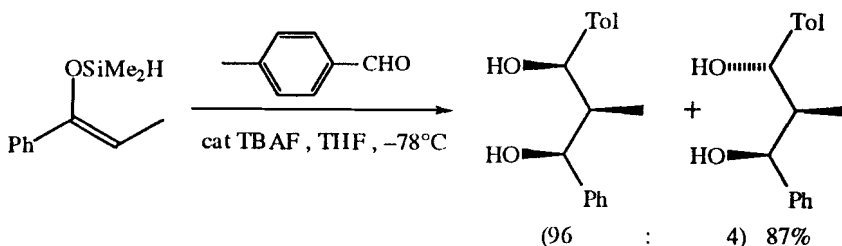
Xiao, X.; Bai, D. *Synlett*, **2001**, 535.



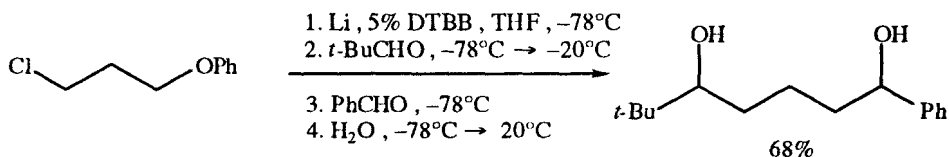
Masaki, Y.; Yamada, T.; Tanaka, N. *Synlett*, **2001**, 1311.



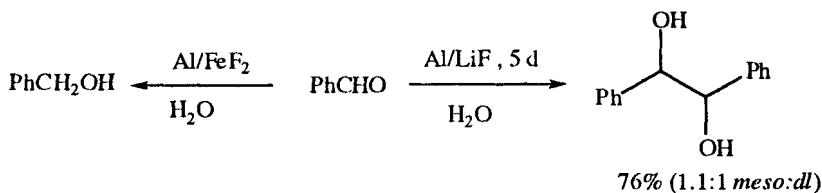
Bartoli, G.; Bosco, M.; Bellucci, M.C.; Dalpozzo, R.; Marcantoni, E.; Sambri, L.  
*Org. Lett.*, **2000**, *2*, 45.



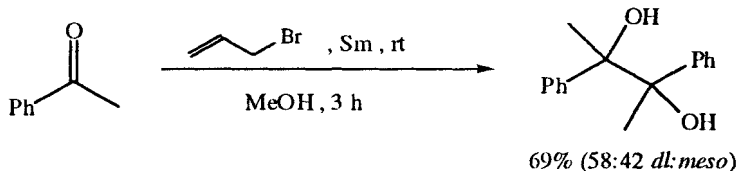
Miura, K.; Nakagawa, T.; Suda, S.; Hosomi, A. *Chem. Lett.*, **2000**, 150.



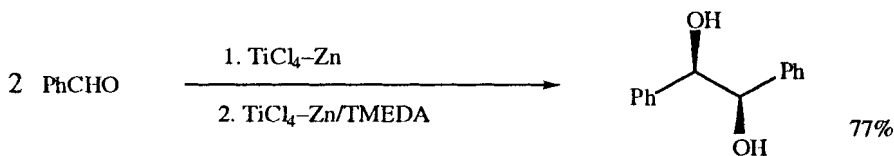
Foubelo, E.; Saleh, S.A.; Yus, M. *J. Org. Chem.*, 2000, 65, 3478.



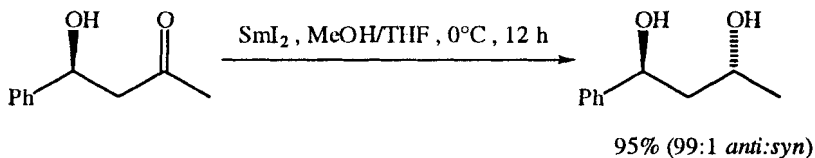
Li, L.-H.; Chan, T.H. *Org. Lett.*, 2000, 2, 1129.



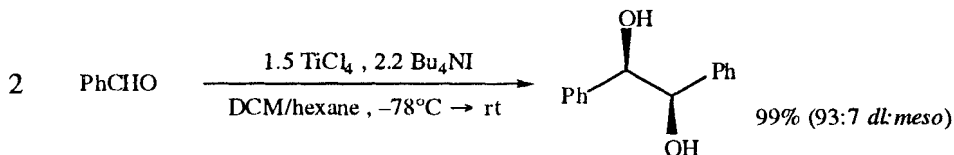
Ghatak, A.; Becker, F.F.; Banik, B.K. *Tetrahedron Lett.*, 2000, 41, 3793.



Li, T.; Cui, W.; Liu, J.; Zhao, J.; Wang, Z. *Chem. Commun.*, 2000, 139.

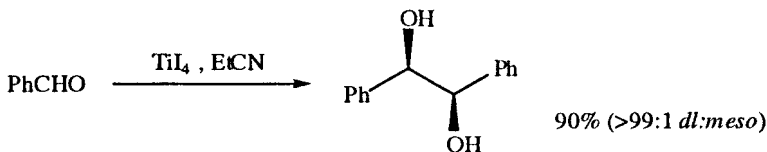


Keck, G.E.; Wager, C.A. *Org. Lett.*, 2000, 2, 2307.

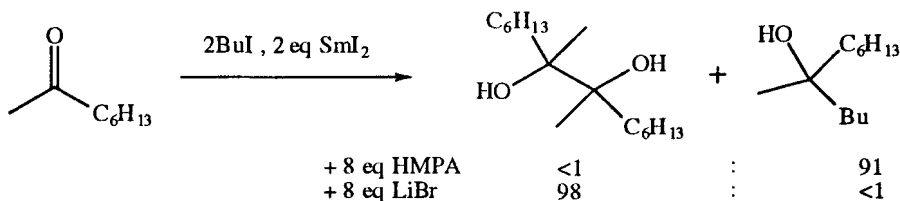


Tsuritani, T.; Ito, S.; Shinokubo, H.; Oshima, K. *J. Org. Chem.*, 2000, 65, 5066.

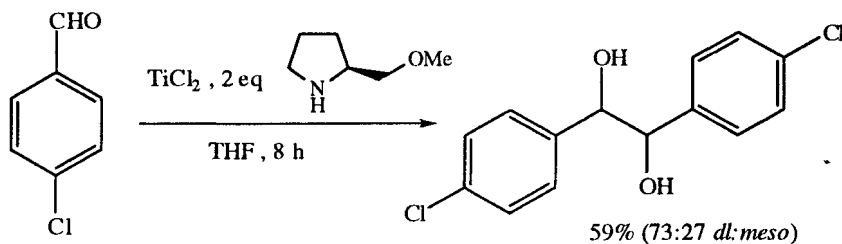




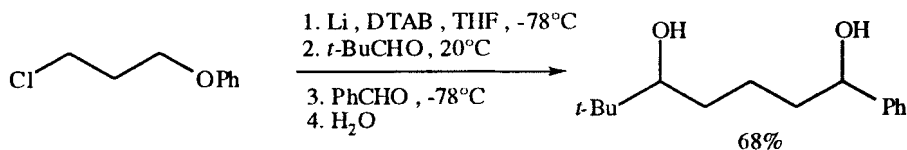
Hayakawa, R.; Shimizu, M. *Chem. Lett.*, 2000, 724.



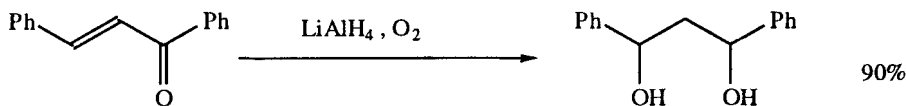
Miller, R.S.; Sealy, J.M.; Shabangi, M.; Kuhlman, M.L.; Fuchs, J.R.; Flowers II, R.A. *J. Am. Chem. Soc.*, 2000, 122, 7718.



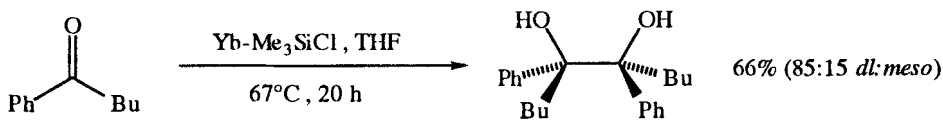
Enders, D.; Ullrich, E.C. *Tetrahedron Asymm.*, 2000, 11, 3861.



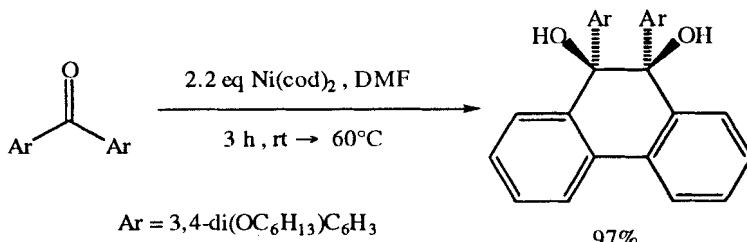
Foubelo, F.; Yus, M. *Tetrahedron Lett.*, 1999, 40, 743.



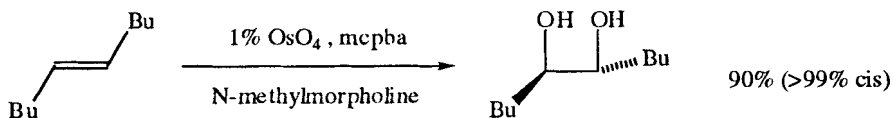
Csáky, A.G.; Máximo, N.; Plumet, J.; Rámila, A. *Tetrahedron Lett.*, 1999, 40, 6427.



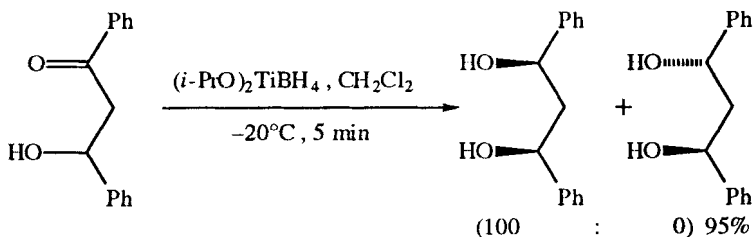
Ogawa, A.; Takeuchi, H.; Hirao, T. *Tetrahedron Lett.*, 1999, 40, 7113.



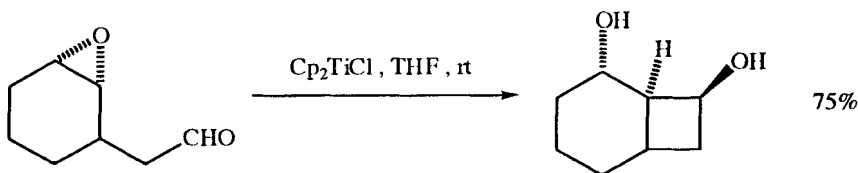
Reisch, H.A.; Enkelmann, V.; Scherf, U. *J. Org. Chem.*, **1999**, *64*, 655.



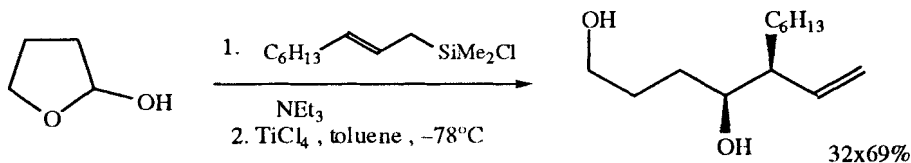
Bergstad, K.; Piet, J.J.N.; Bäckvall, J.-E. *J. Org. Chem.*, **1999**, *64*, 2545.



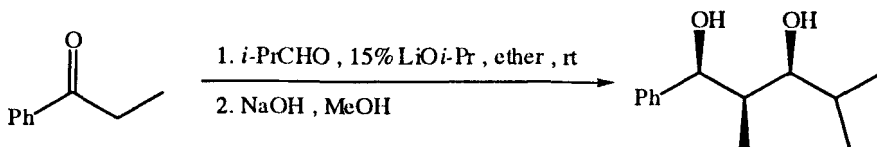
Ravikumar, K.S.; Sinha, S.; Chandrasekaran, S. *J. Org. Chem.*, **1999**, *64*, 5841.



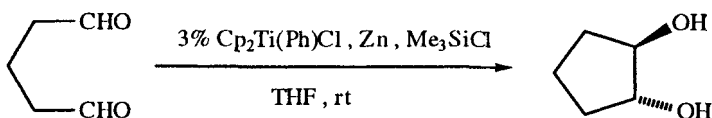
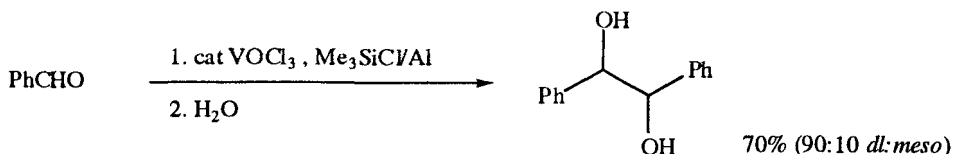
Fernández-Mateos, A.; de la Nava, E.M.; Coca, G.P.; Silvo, A.R.; González, R.R. *Org. Lett.*, **1999**, *1*, 607.



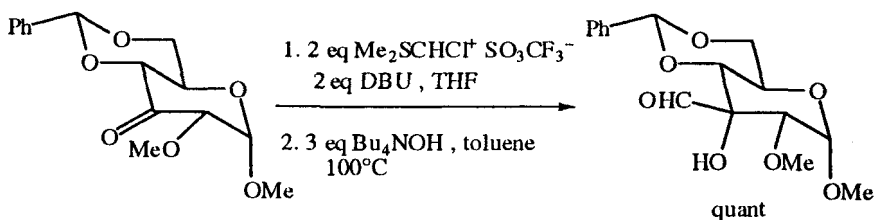
Fujita, K.; Inoue, A.; Shinokubo, H.; Oshima, K. *Org. Lett.*, **1999**, *1*, 917.

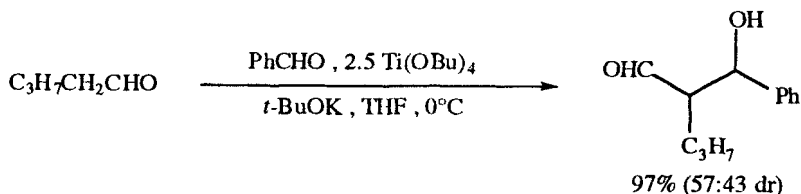


74% (96:4 dr)

Mascarenhas, C.M.; Duffey, M.O.; Liu, S.-Y.; Morken, J.P. *Org. Lett.*, **1999**, *1*, 1427.40% (99:1 *trans:cis*)Yamamoto, Y.; Hattori, R.; Itoh, K. *Chem. Commun.*, **1999**, 825.70% (90:10 *dl:meso*)Hirao, T.; Hatano, B.; Imamoto, Y.; Ogawa, A. *J. Org. Chem.*, **1999**, *64*, 7665.**REVIEWS:**"Synthesis and Chemistry of Dithiols," Elgemeie, G.H.; Sayed, S.H. *Synthesis*, **2001**, 1747.

Also via: Section 327 (Alcohol - Ester). Section 357 (Ester - Ester).

**SECTION 324: ALCOHOL, THIOL - ALDEHYDE**Sato, K.-i.; Sekiguchi, T.; Akai, S. *Tetrahedron Lett.*, **2001**, *42*, 3625.

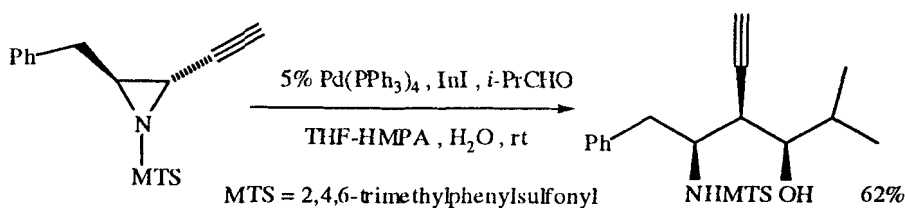


Han, Z.; Yorimitsu, H.; Shinokubo, H.; Oshima, K. *Tetrahedron Lett.*, **2000**, *41*, 4415.

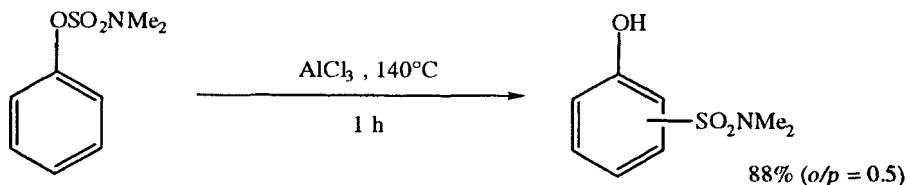
Related Methods:

Section 330 (Alcohol - Ketone).

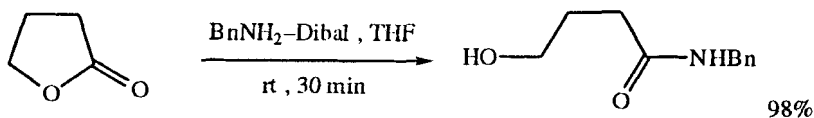
## SECTION 325: ALCOHOL, THIOL - AMIDE



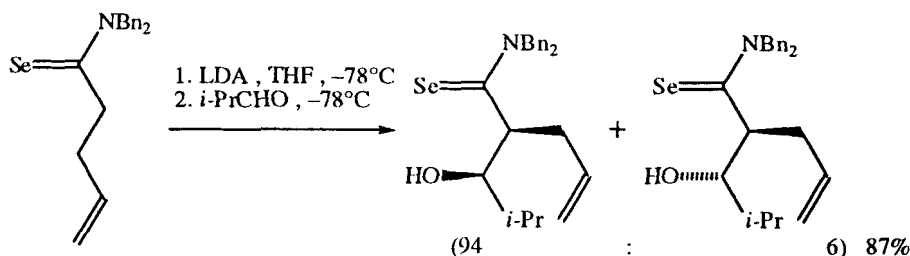
Ohno, H.; Hamaguchi, H.; Tanaka, T. *J. Org. Chem.*, **2001**, *66*, 1867.



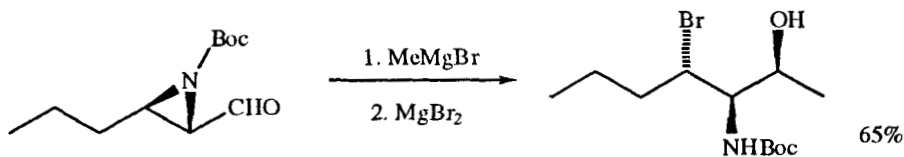
Benson, G.A.; Maughan, P.L.; Shelly, D.P.; Spillane, W.J. *Tetrahedron Lett.*, **2001**, *42*, 8729.



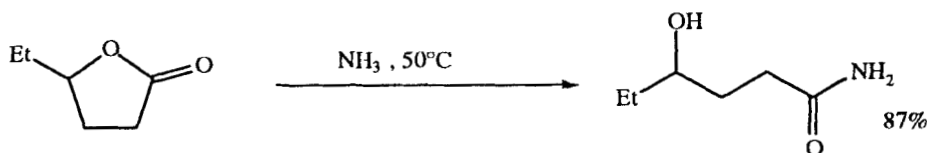
Huang, P.-Q.; Zheng, X.; Deng, X.-M. *Tetrahedron Lett.*, **2001**, *42*, 9039.



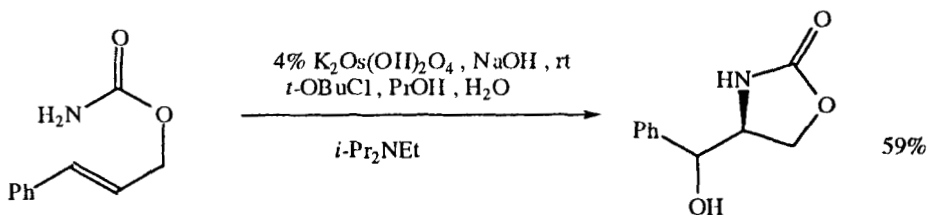
Murai, T.; Suzuki, A.; Kato, S. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 2711.



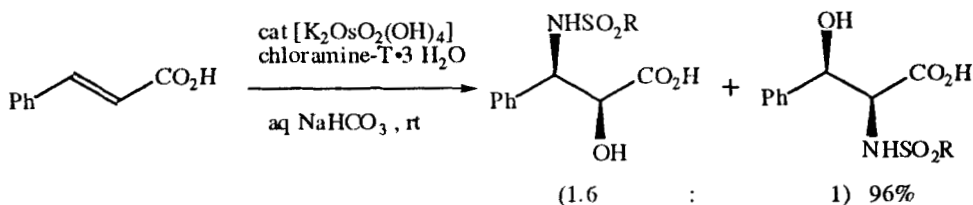
Righi, G.; Pietrantonio, S.; Bonini, C. *Tetrahedron*, **2001**, 57, 10039.



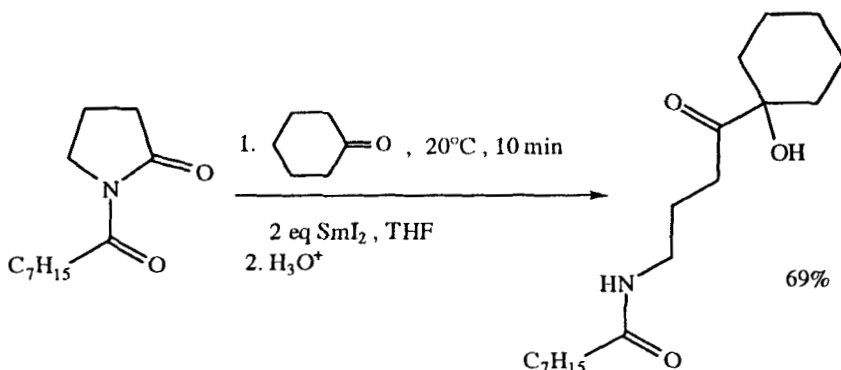
Taylor, S.K.; Ide, N.D.; Silver, M.E.; Stephan, M.L. *Synth. Commun.*, **2001**, 31, 2391.



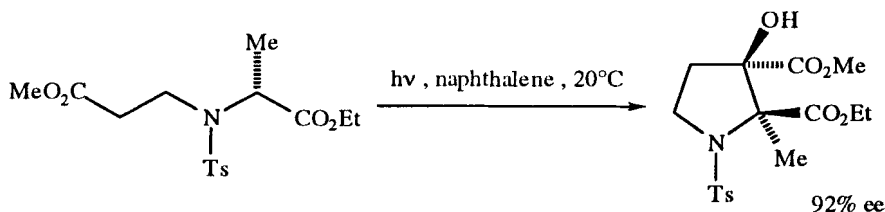
Donohoe, T.J.; Johnson, P.D.; Helliwell, M.; Keenan, M. *Chem. Commun.*, **2001**, 2078.



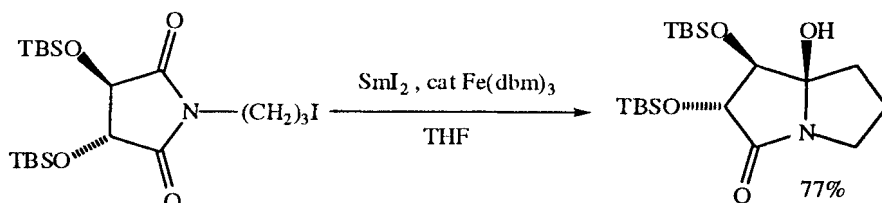
Fokin, V.V.; Sharpless, K.B. *Angew. Chem. Int. Ed.*, **2001**, 40, 3455.



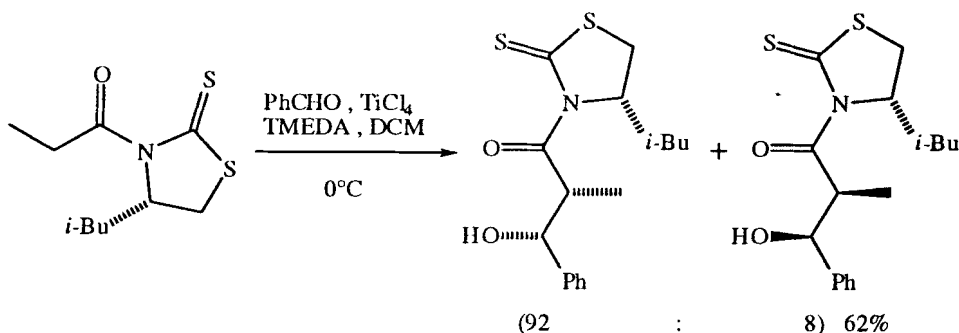
Farcas, S.; Namy, J.-L. *Tetrahedron Lett.*, **2000**, 41, 7299.



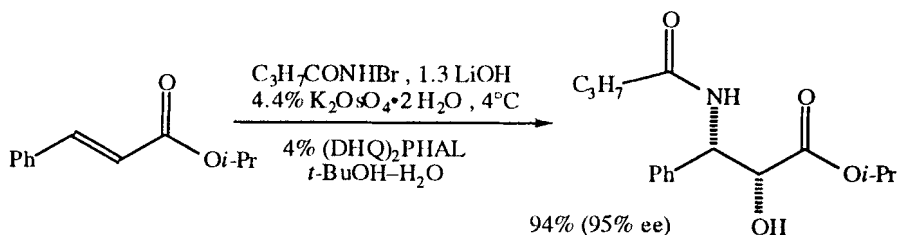
Giese, B.; Barbosa, F.; Stähelin, C.; Sauer, S.; Wettstein, P.; Wyss, C. *Pure Appl. Chem.*, **2000**, *72*, 1623.



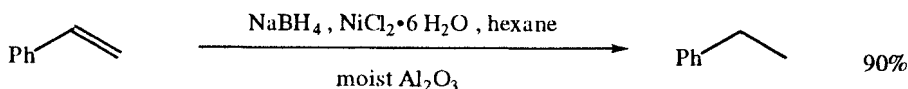
Ha, D.-C.; Yun, C.-S.; Lee, Y. *J. Org. Chem.*, **2000**, *65*, 621.



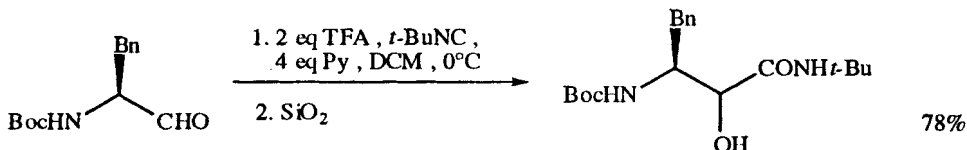
Crimmins, M.T.; Chaudhary, K. *Org. Lett.*, **2000**, *2*, 775.



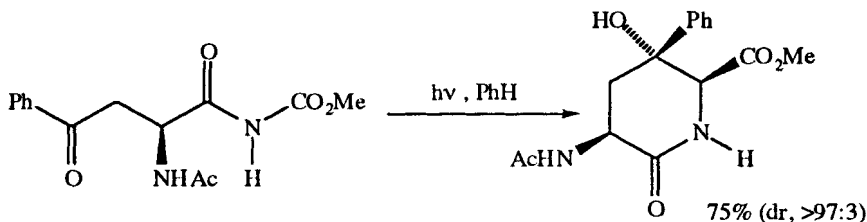
Demko, Z.P.; Bartosch, M.; Sharpless, K.B. *Org. Lett.*, **2000**, *2*, 2221.



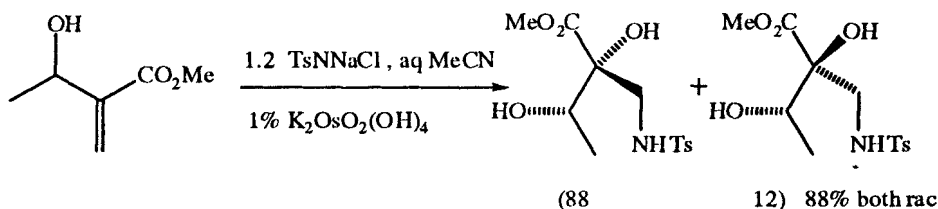
Kim, S.H.; Han, E.-H. *Tetrahedron Lett.*, **2000**, *41*, 6479.



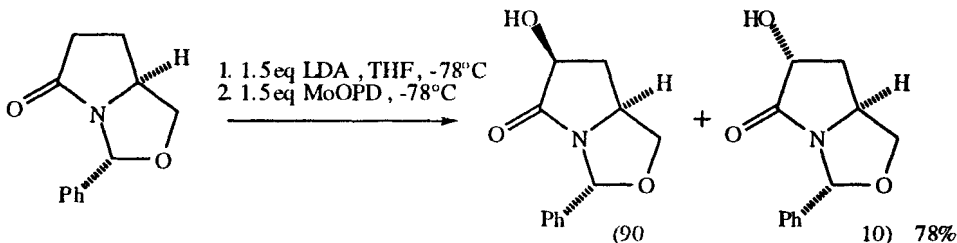
Sample, J.E.; Owens, T.D.; Nguyen, K.; Levy, O.E. *Org. Lett.*, 2000, 2, 2769.



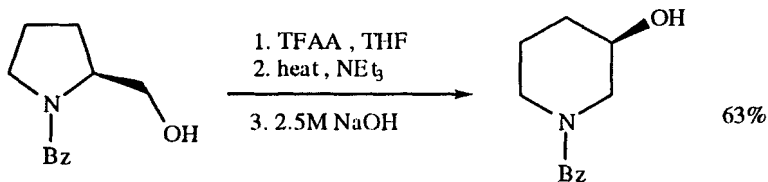
Griesbeck, A.G.; Heckroth, H.; Schmickler, H. *Tetrahedron Lett.*, 1999, 40, 3137.



Pringle, W.; Sharpless, K.B. *Tetrahedron Lett.*, 1999, 40, 5151.

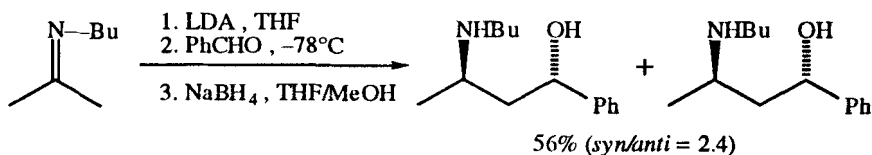


Hara, O.; Takizwa, J.-i.; Yamatake, T.; Makino, K.; Hamada, Y. *Tetrahedron Lett.*, 1999, 40, 7787.

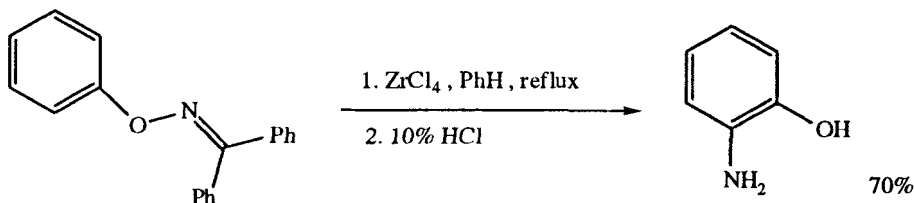


Cossy, J.; Dumas, C.; Pardo, D.G. *Eur. J. Org. Chem.*, 1999, 1693.

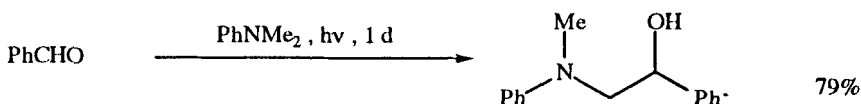
## SECTION 326: ALCOHOL, THIOL - AMINE



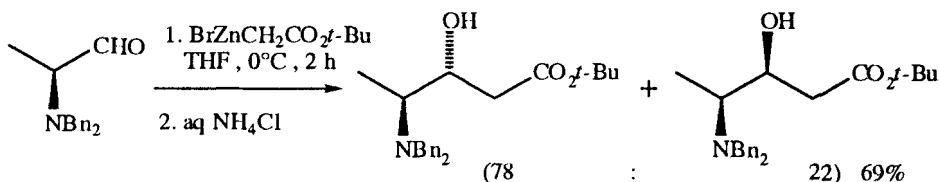
Veenstra, S.J.; Kinderman, S.S. *Synlett*, **2001**, 1109.



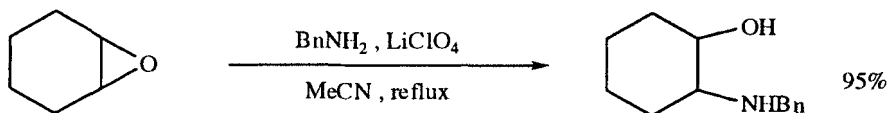
Kikugawa, Y.; Tsuji, C.; Miyazawa, E.; Sakamoto, T. *Tetrahedron Lett.*, **2001**, 42, 2337.



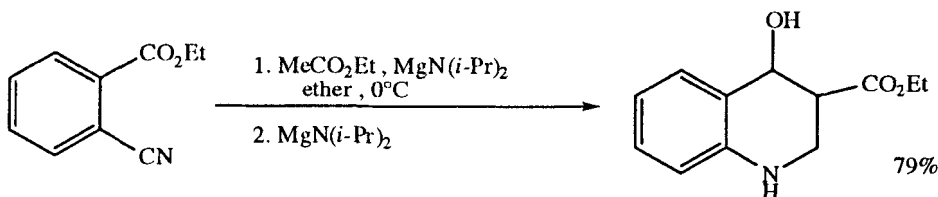
Kim, S.S.; Mah, Y.J.; Kim, A.R. *Tetrahedron Lett.*, **2001**, 42, 8315.



Andrés, J.M.; Pedrosa, R.; Pérez, A.; Pérez-Encabo, A. *Tetrahedron*, **2001**, 57, 8521.

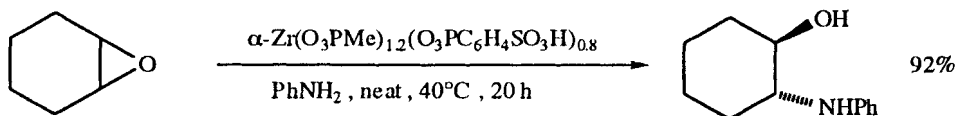


de Parrodi, C.A.; Vázquez, V.; Quintero, L.; Juaristi, E. *Synth. Commun.*, **2001**, 31, 3295.

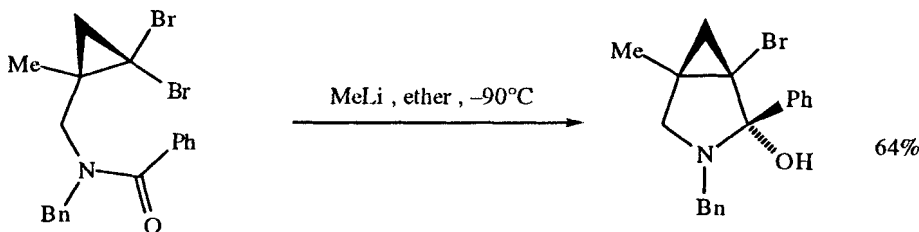


Kobayashi, K.; Nakalshima, T.; Mano, M.; Morikawa, O.; Konishi, H. *Chem. Lett.*, **2001**, 602.

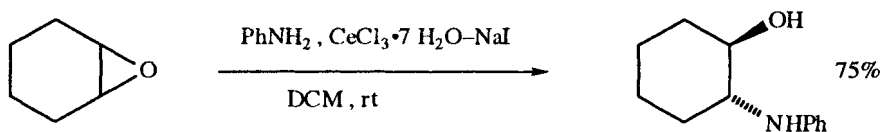




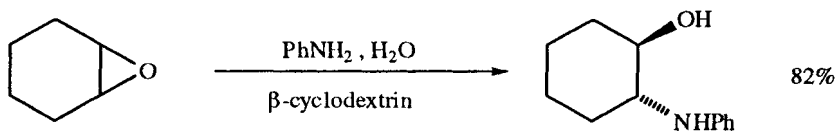
Curini, M.; Epifano, F.; Marcotullio, M.C.; Rosati, O. *Eur. J. Org. Chem.*, **2001**, 4149.



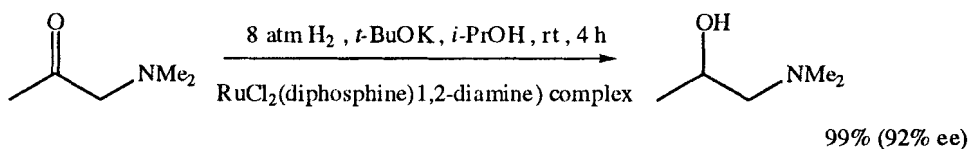
Barid, M.S.; Huber, F.A.M.; Tverezovsky, V.V.; Bolesov, I.G. *Tetrahedron*, **2001**, 57, 1593.



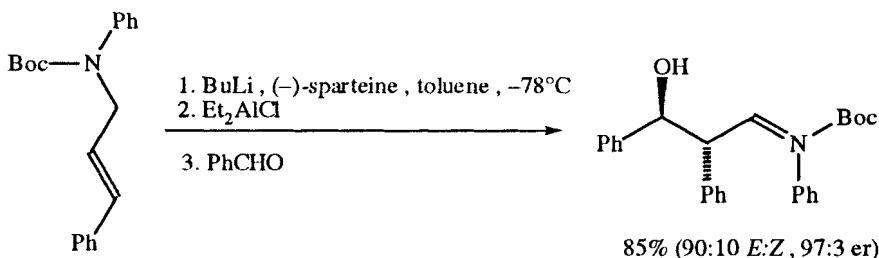
Reddy, L.R.; Reddy, M.A.; Bhanumathi, N.; Rao, K.R. *Synthesis*, **2001**, 831.



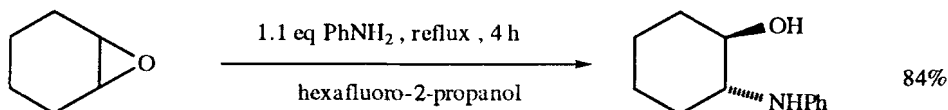
Reddy, L.R.; Reddy, M.A.; Bhanumathi, N.; Rao, K.R. *Synlett*, **2000**, 339.



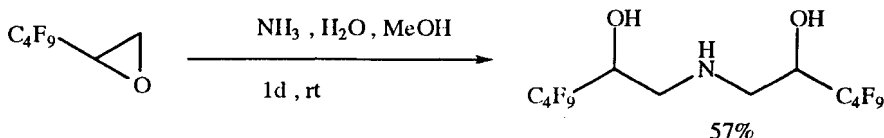
Ohkuma, T.; Ishii, D.; Takeno, H.; Noyori, R. *J. Am. Chem. Soc.*, **2000**, 122, 6510.



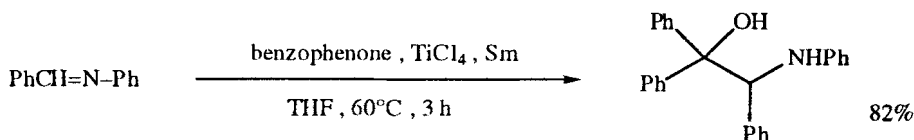
Whisler, M.C.; Vaillancourt, L.; Beak, P. *Org. Lett.*, **2000**, 2, 2655.



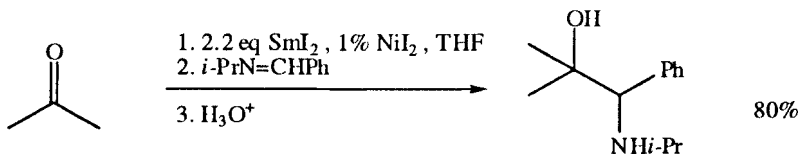
Das, U.; Crousse, B.; Kesavan, V.; Bonnet-Delpon, D.; Bégue, J.P.  
*J. Org. Chem.*, **2000**, *65*, 6749.



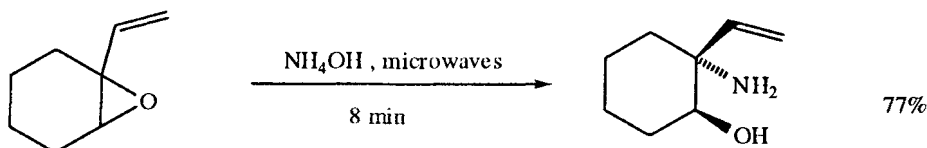
Charrada, B.; Hedhli, A.; Baklouti, A. *Tetrahedron Lett.*, **2000**, *41*, 7347.



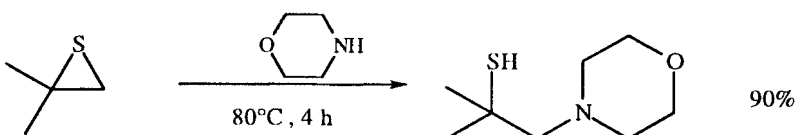
Ma, Y.; Zhang, Y. *Org. Prep. Proceed. Int.*, **2000**, *32*, 567.



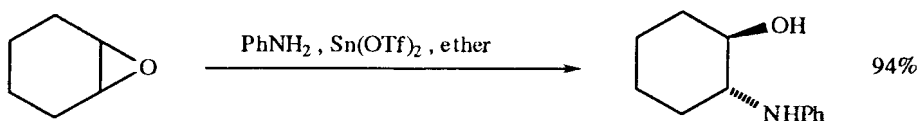
Machrouhi, F.; Namy, J.-L. *Tetrahedron Lett.*, **1999**, *40*, 1315.



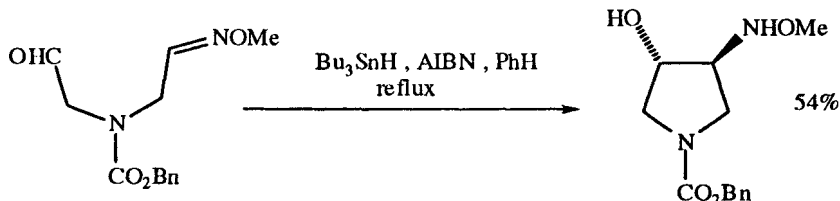
Lindström, U.M.; Olofsson, B.; Somfai, P. *Tetrahedron Lett.*, **1999**, *40*, 9273.



Dong, Q.; Fang, X.; Schroeder, J.D.; Garvey, D.S. *Synthesis*, **1999**, 1106.

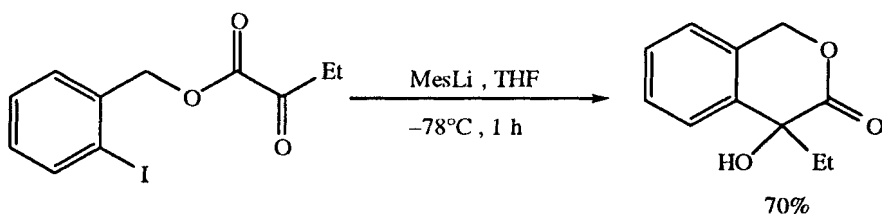


Sekar, G.; Singh, V.K. *J. Org. Chem.*, **1999**, *64*, 287.

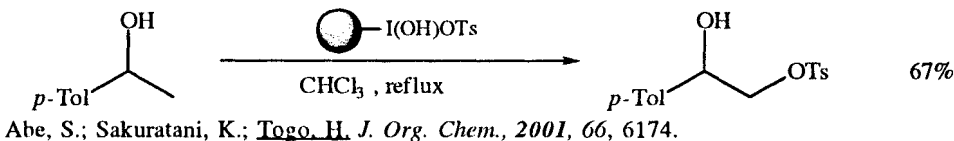


Naito, T.; Nakagawa, K.; Nakamura, T.; Kasei, A.; Ninomiya, I.; Kiguchi, T.  
*J. Org. Chem.*, **1999**, *64*, 2003.

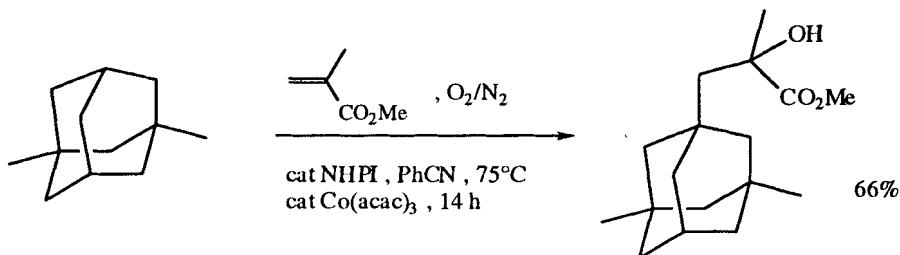
## SECTION 327: ALCOHOL, THIOL - ESTER



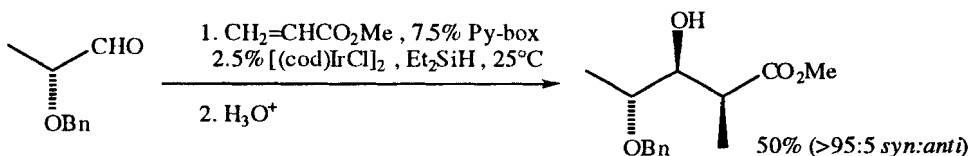
Kondo, Y.; Asai, M.; Miura, T.; Uchiyama, M.; Sakamoto, T. *Org. Lett.*, **2001**, *3*, 13.



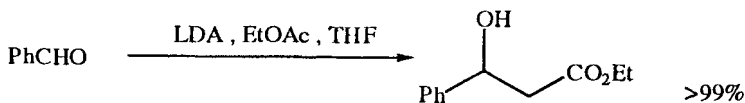
Abe, S.; Sakuratani, K.; Togo, H. *J. Org. Chem.*, **2001**, *66*, 6174.



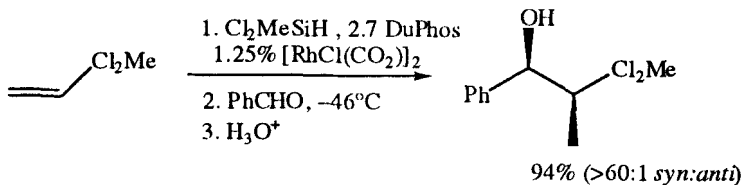
Hara, T.; Iwahama, T.; Sakaguchi, S.; Ishii, Y. *J. Org. Chem.*, **2001**, *66*, 6425.



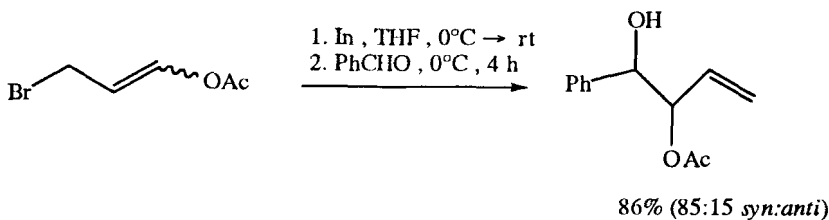
Zhao, C.-X.; Duffey, M.O.; Taylor, S.J.; Morken, J.P. *Org. Lett.*, **2001**, *3*, 1829.



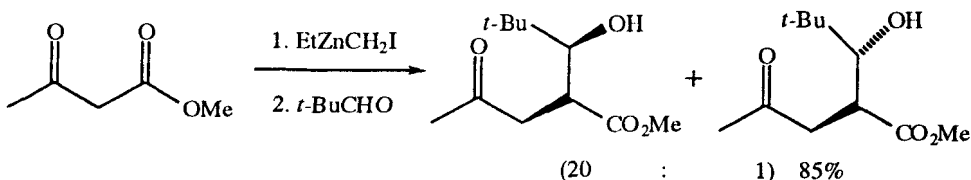
Huerta, F.F.; Bäckvall, J.-E. *Org. Lett.*, **2001**, *3*, 1209.



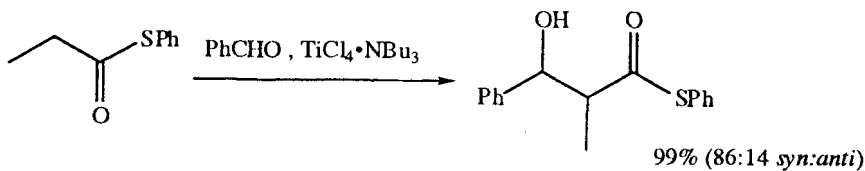
Zhao, C.-X.; Bass, J.; Morken, J.P. *Org. Lett.*, **2001**, *3*, 2839.



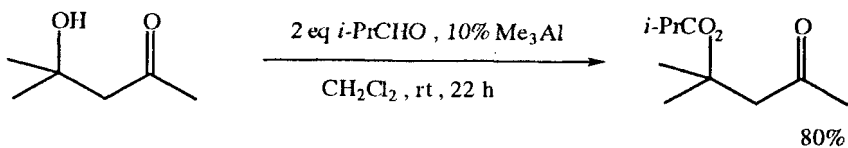
Lombardo, M.; Girotti, R.; Morganti, S.; Trombini, C. *Org. Lett.*, **2001**, *3*, 2981.



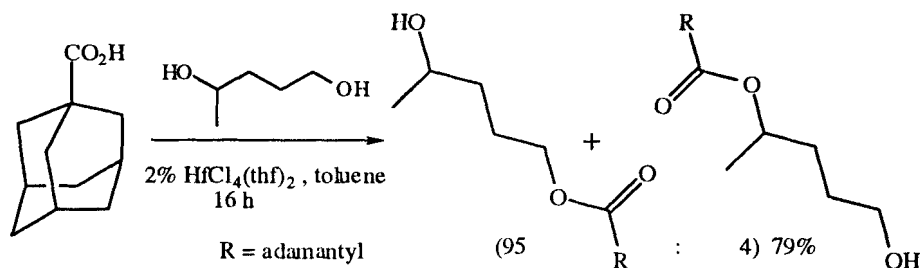
Lai, S.; Zercher, C.K.; Jasinski, J.P.; Reid, S.N.; Staples, R.J. *Org. Lett.*, **2001**, *3*, 4169.



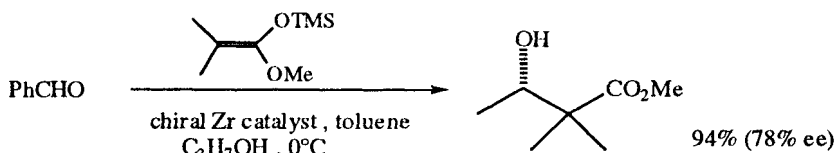
Tanabe, Y.; Matusmoto, N.; Funakoshi, S.; Manta, N. *Synlett*, **2001**, 1959.



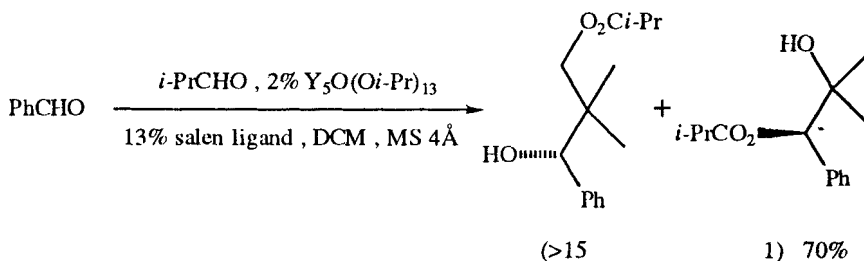
Simpura, I.; Nevalainen, V. *Tetrahedron Lett.*, **2001**, *42*, 3905.



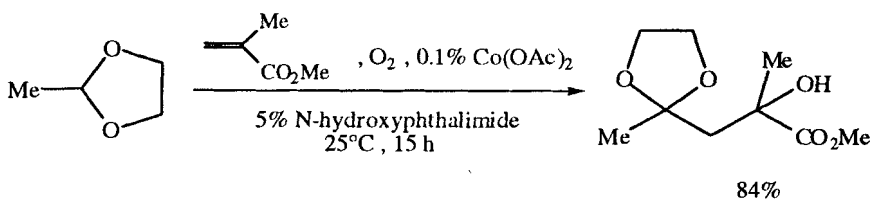
Ishihara, K.; Nakayama, M.; Ohara, S.; Yamamoto, H. *Synlett*, **2001**, 1117.



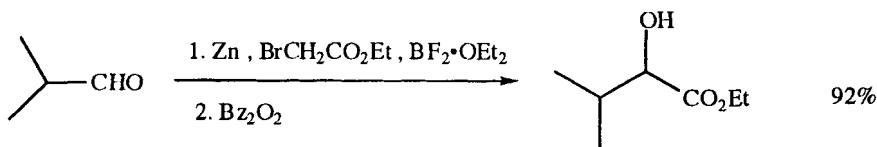
Kobayashi, S.; Ishitani, H.; Yamashita, Y.; Ueno, M.; Shimizu, H. *Tetrahedron*, **2001**, 57, 861.



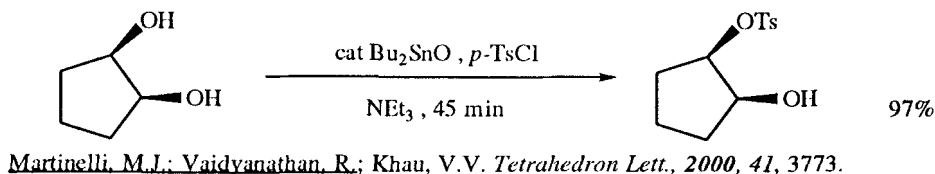
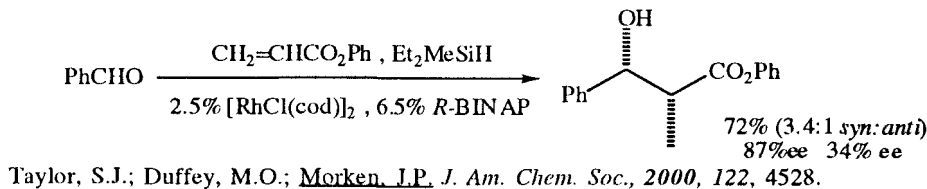
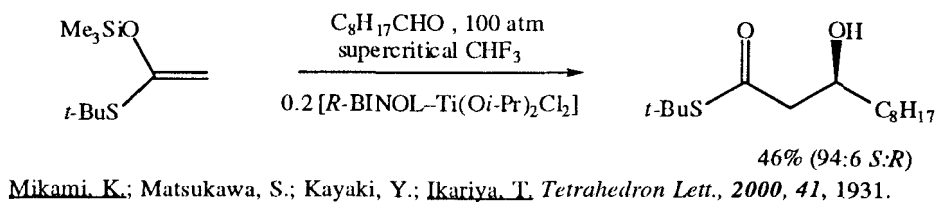
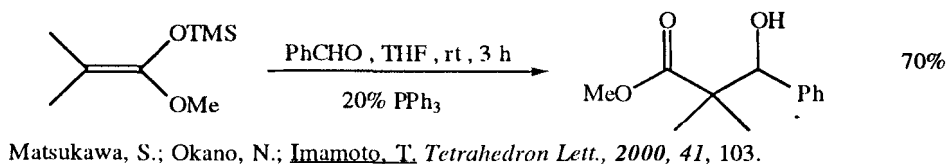
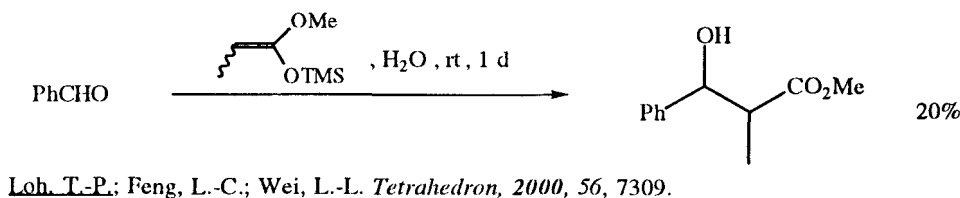
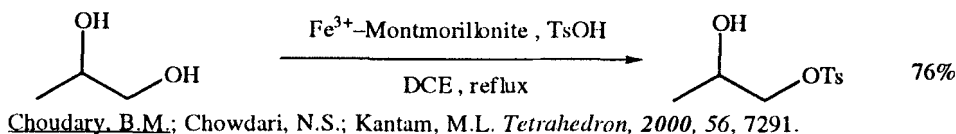
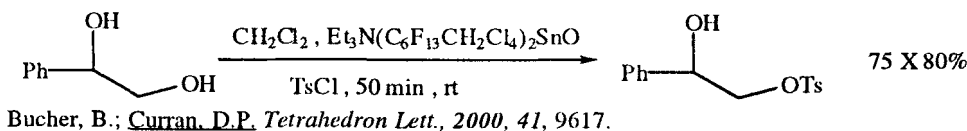
Mascarenhas, C.M.; Miller, S.P.; White, P.S.; Morken, J.P. *Angew. Chem. Int. Ed.*, **2001**, 40, 601.

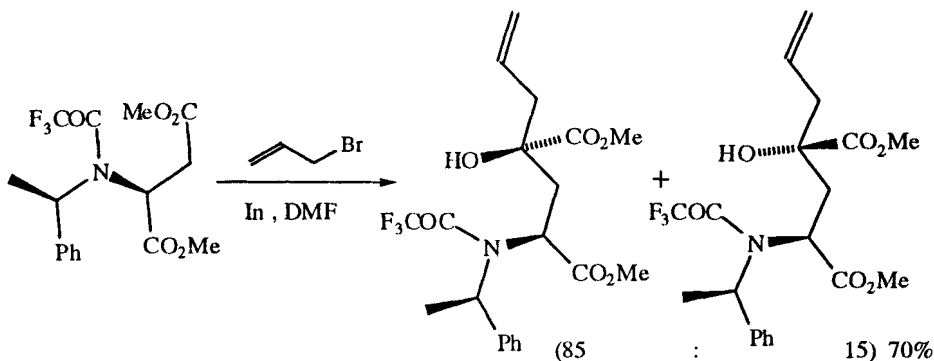
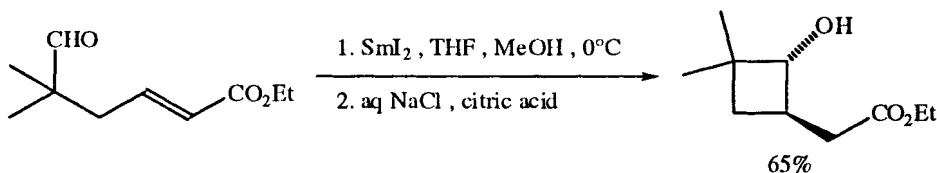
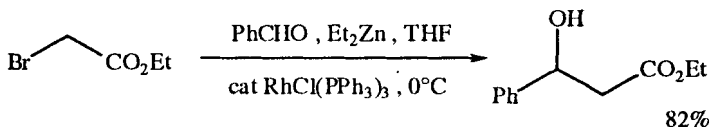
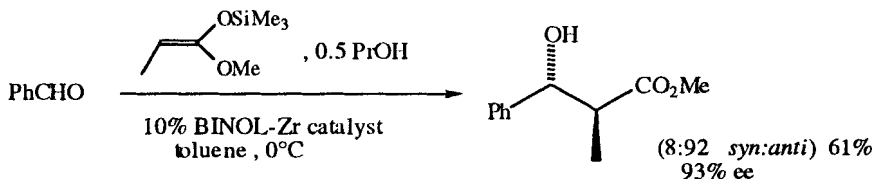
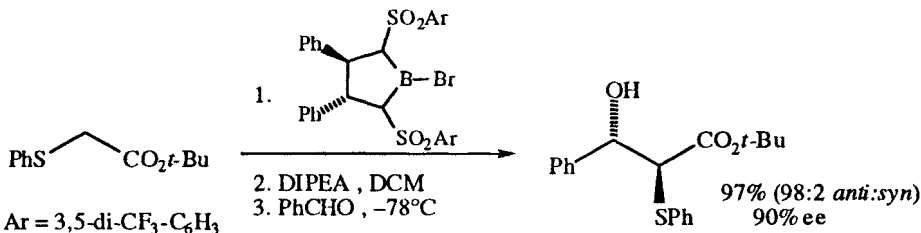


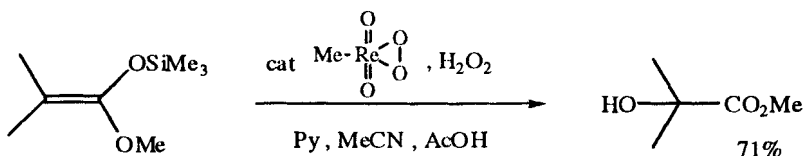
Hirano, K.; Iwahama, T.; Sakaguchi, S.; Ishii, Y. *Chem. Commun.*, **2000**, 2457.



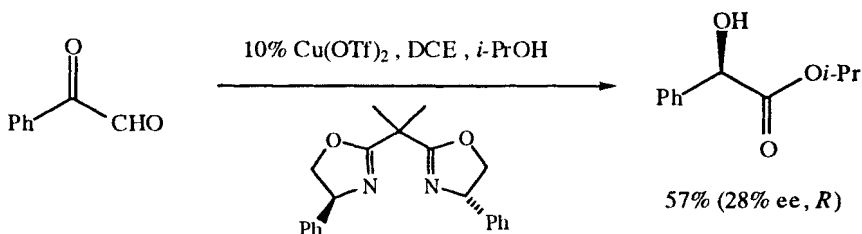
Chattopadhyay, A.; Salaskar, A. *Synthesis*, **2000**, 561.



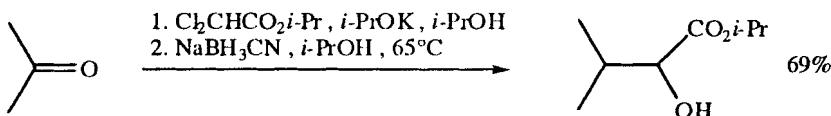




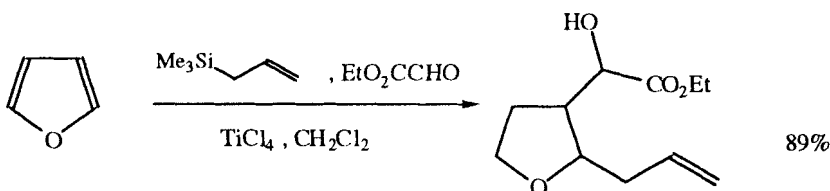
Stanković, S.; Espenson, J.H. *J. Org. Chem.*, **2000**, *65*, 5528.



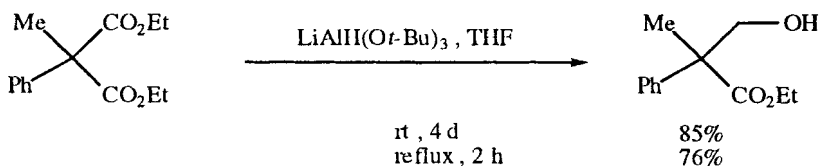
Russell, A.E.; Miller, S.P.; Morken, J.P. *J. Org. Chem.*, **2000**, *65*, 8381.



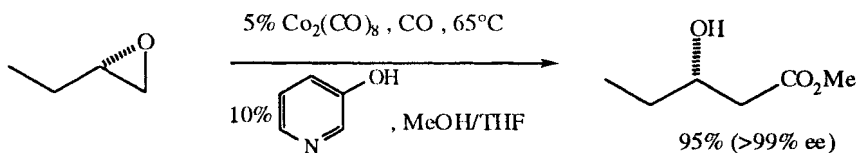
Grison, C.; Coutrot, F.; Comoy, C.; Lemilbeau, C.; Coutrot, P. *Tetrahedron Lett.*, **2000**, *41*, 6571.



Ghosh, A.K.; Kawahama, R. *Tetrahedron Lett.*, **1999**, *40*, 1083.

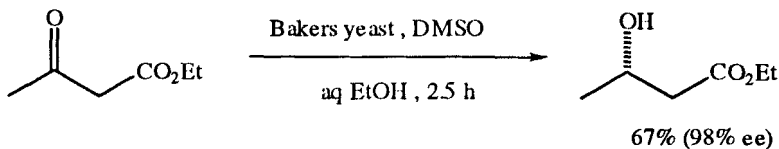


Ayers, T.A. *Tetrahedron Lett.*, **1999**, *40*, 5467.

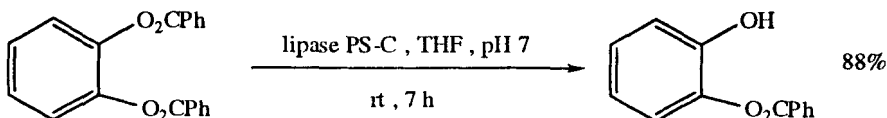


Hinterding, K.; Jacobsen, E.N. *J. Org. Chem.*, **1999**, *64*, 2164.





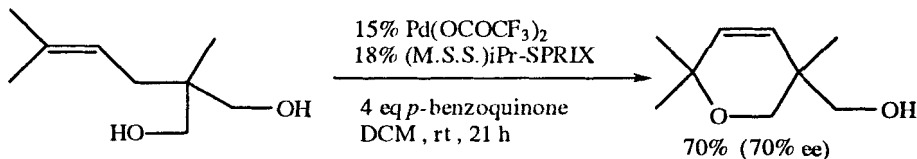
Hayakawa, R.; Nozawa, K.; Kimura, K.; Shimizu, M. *Tetrahedron*, **1999**, *55*, 7519.



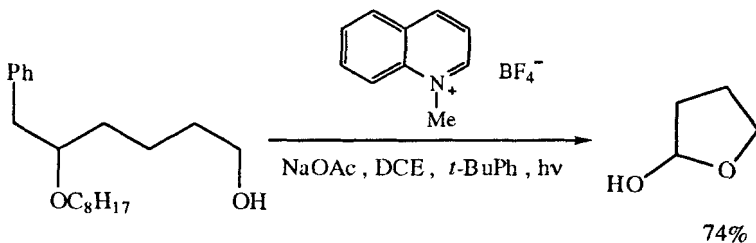
Nair, R.V.; Shukla, M.R.; Patil, P.N.; Salunkhe, M.M. *Synlett*, **1999**, *29*, 1671.

Also via: Section 313 (Alcohol - Carboxylic Acid).

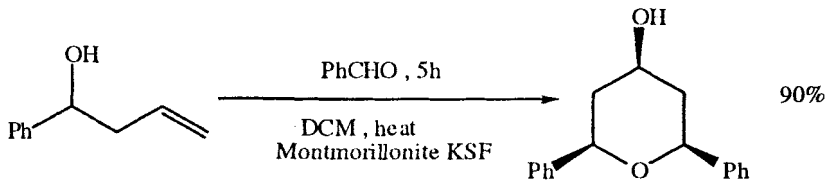
## SECTION 328: ALCOHOL, THIOL - ETHER, EPOXIDE, THIOETHER



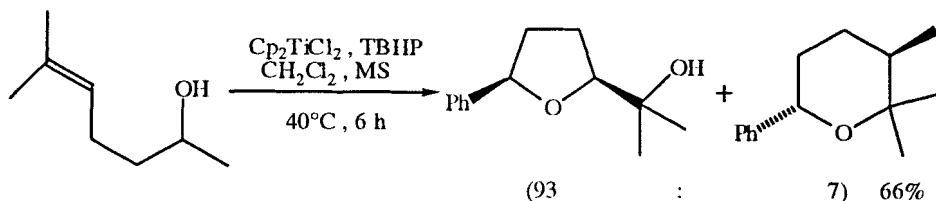
Arai, M.A.; Kuraishi, M.; Arai, T.; Sasai, H. *J. Am. Chem. Soc.*, **2001**, *123*, 2907.



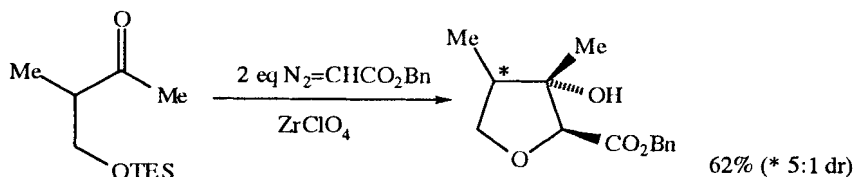
Kumar, V.S.; Floreancig, P.E. *J. Am. Chem. Soc.*, **2001**, *123*, 3842.



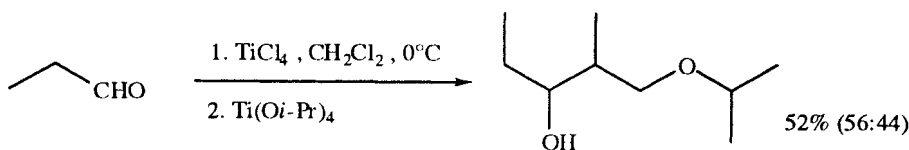
Yadav, J.S.; Reddy, B.V.S.; Kumar, G.M.; Murthy, Ch.V.S.R. *Tetrahedron Lett.*, **2001**, *42*, 89.



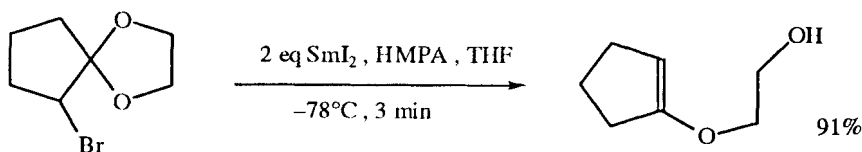
Lattanzi, A.; Sala, G.D.; Russo, M.; Screttri, A. *Synlett*, **2001**, 1479.



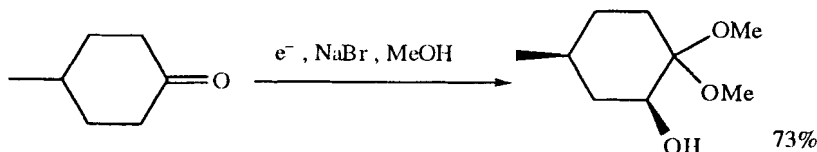
Angle, S.R.; Chann, K. *J. Org. Chem.*, **2001**, *42*, 1819.



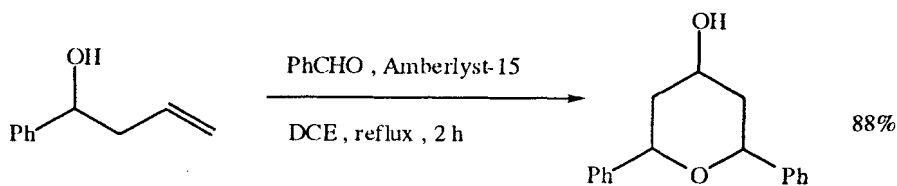
Aremo, N.; Hase, T. *Tetrahedron Lett.*, **2001**, *42*, 3637.



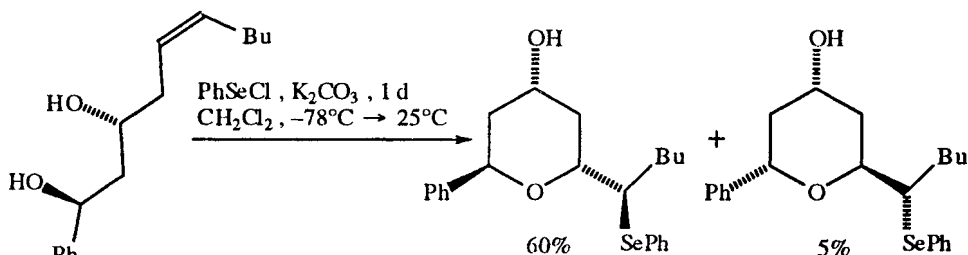
Park, H.S.; Kim, S.H.; Park, M.Y.; Kim, Y.H. *Tetrahedron Lett.*, **2001**, *42*, 3729.



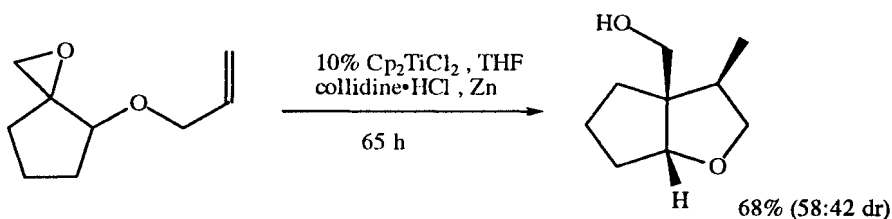
Elinson, M.N.; Feducovich, S.K.; Dmitriev, D.E.; Dorofeev, A.S.; Vereshchagin, A.N.; Nikishin, G.I. *Tetrahedron Lett.*, **2001**, *42*, 5557.



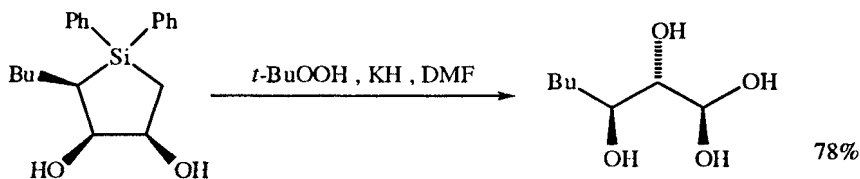
Yadav, J.S.; Reddy, B.V.S.; Sekhar, K.C.; Gunasekar, D. *Synthesis*, **2001**, 885.



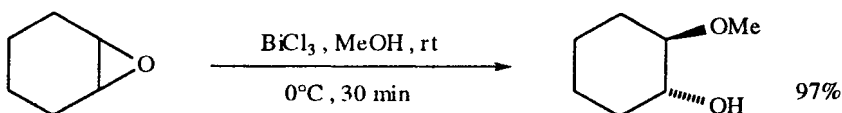
Grutlauria, M.; Aprile, C.; RIELA, S.; Noto, R. *Tetrahedron Lett.*, 2001, 42, 2213.



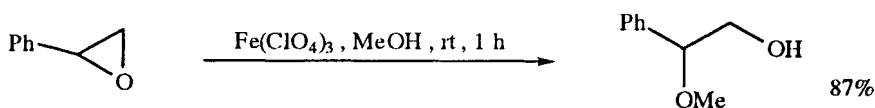
Gansäuer, A.; Pierobon, M.; Bluhm, H. *Synthesis*, 2001, 2500.



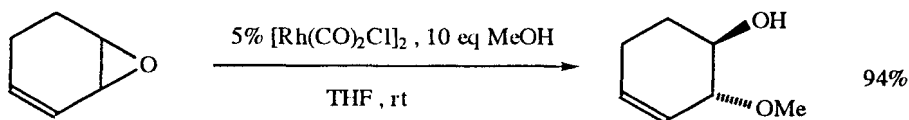
Denmark, S.E.; Ghosh, S.K. *Angew. Chem. Int. Ed.*, 2001, 40, 4759.



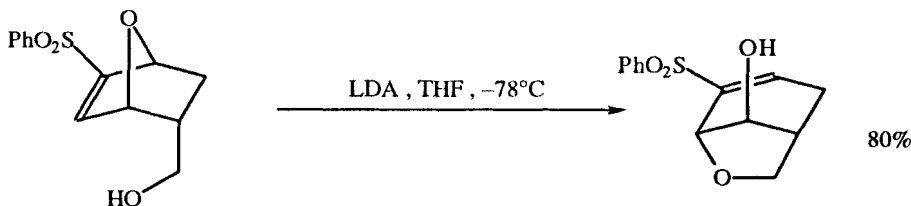
Mohammadpoor-Baltork, I.; Tangestaninejad, S.; Aliyan, H.; Mirkhani, V. *Synth. Commun.*, 2000, 30, 2365.



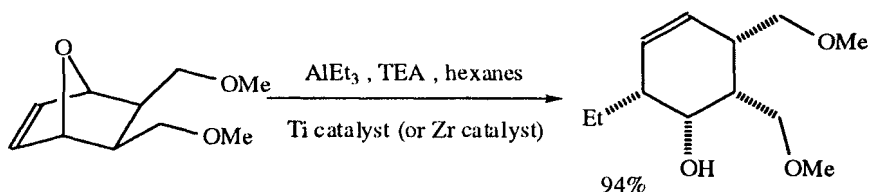
Salehi, P.; Seddighi, B.; Irandoost, M.; Behbahani, I.K. *Synth. Commun.*, 2000, 30, 2967.



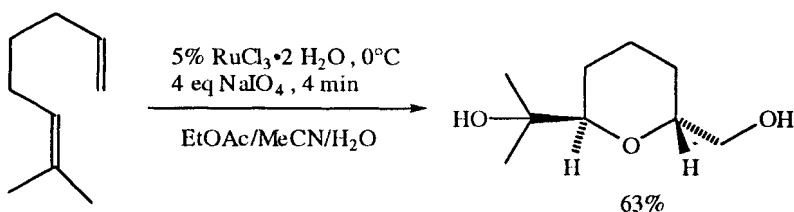
Fagnou, K.; Lautens, M. *Org. Lett.*, 2000, 2, 2319.



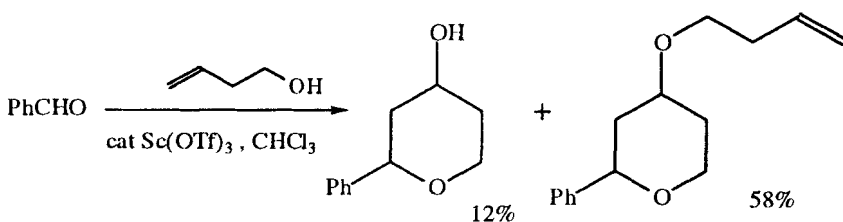
Aceña, J.L.; Arjona, O.; Mañas, R.; Plumet, J. *Tetrahedron Lett.*, 2000, 41, 2549.



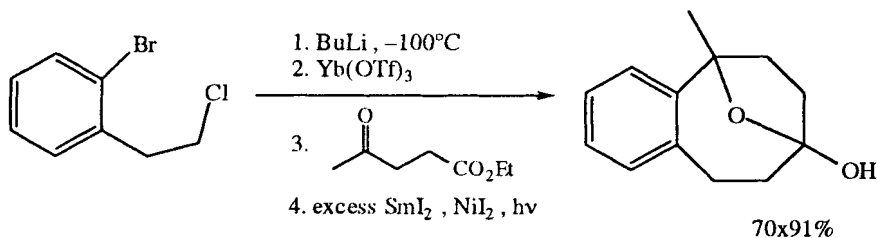
Millward, D.B.; Sammis, G.; Waymouth, R.M. *J. Org. Chem.*, 2000, 65, 3902.



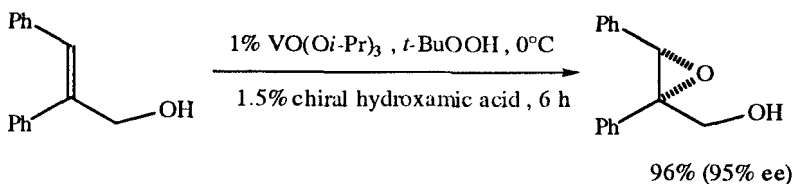
Niimi, T.; Uchida, T.; Irie, R.; Katsuki, T. *Tetrahedron Lett.*, 2000, 41, 3647.



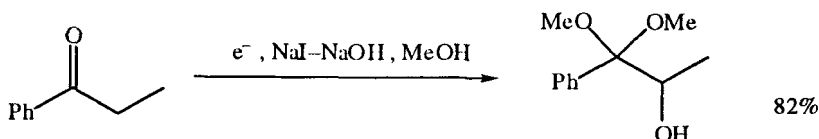
Zhang, W.-C.; Li, C.-J. *Tetrahedron*, 2000, 56, 2403.



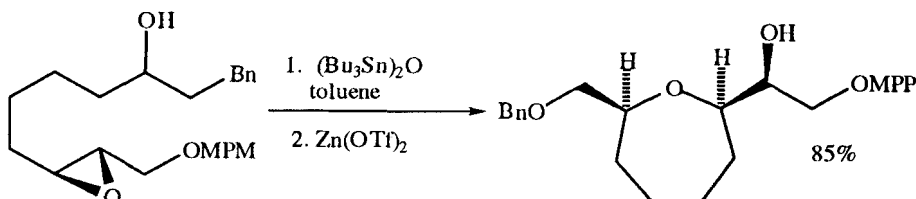
Molander, G.A.; Köllner, C. *J. Org. Chem.*, 2000, 65, 8333.



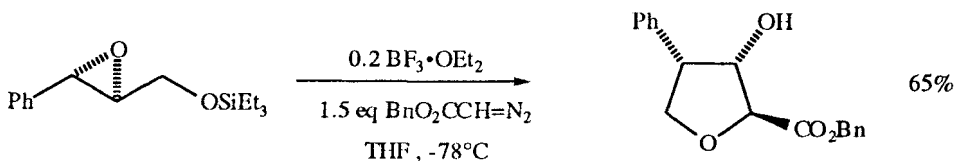
Hoshino, Y.; Yamamoto, H. *J. Am. Chem. Soc.*, **2000**, *12*, 10452.



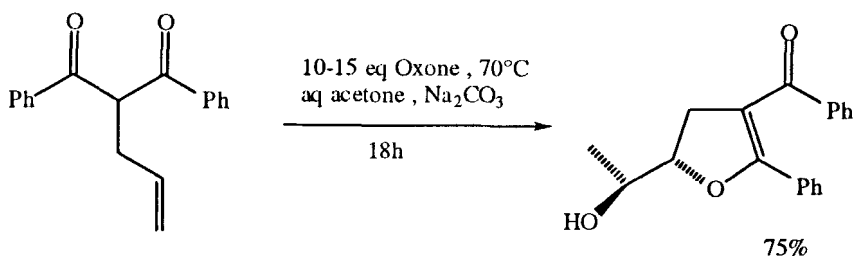
Elinson, M.N.; Feducovich, S.K.; Dorofeev, A.S.; Vereshchagin, A.N.; Nikishin, G.I. *Tetrahedron*, **2000**, *56*, 9999.



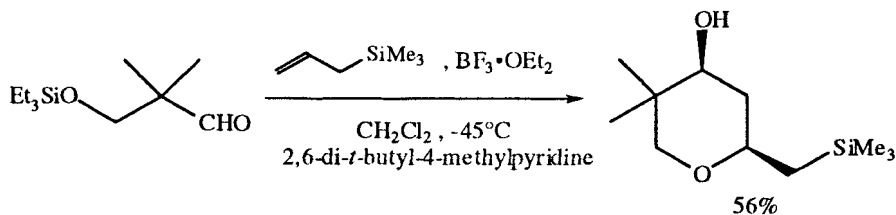
Matsumura, R.; Suzuki, T.; Sato, K.; Inotsume, T.; Hagiwara, H.; Hoshi, T.; Kamat, V.P.; Ando, M. *Tetrahedron Lett.*, **2000**, *41*, 7697. Also see Matsumura, R.; Suzuki, T.; Sato, K.; Oku, K.-i.; Hagiwara, H.; Hoshi, T.; Ando, M.; Kamat, V.P. *Tetrahedron Lett.*, **2000**, *41*, 770.



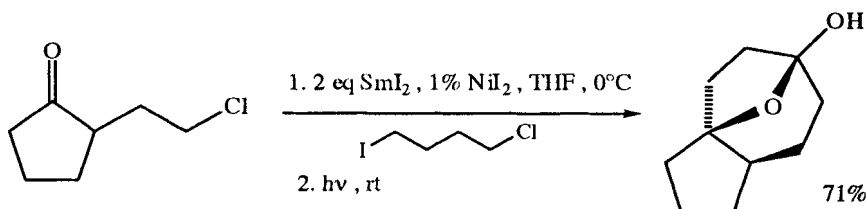
Liu, Q.; Burton, D.L. *Tetrahedron Lett.*, **2000**, *41*, 8045.



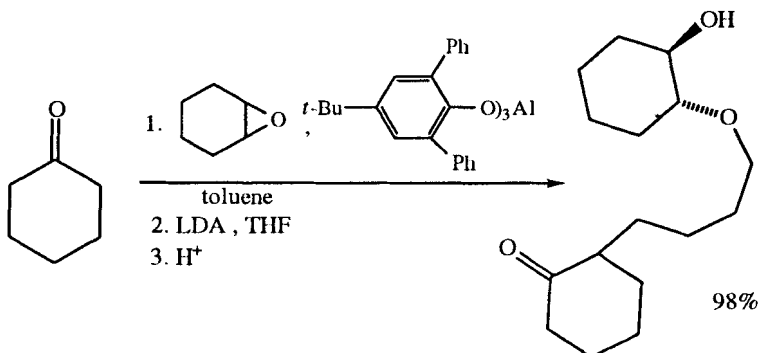
Antonioletti, R.; Righi, G.; Oliveri, L.; Bovicelli, P. *Tetrahedron Lett.*, **2000**, *41*, 10127.



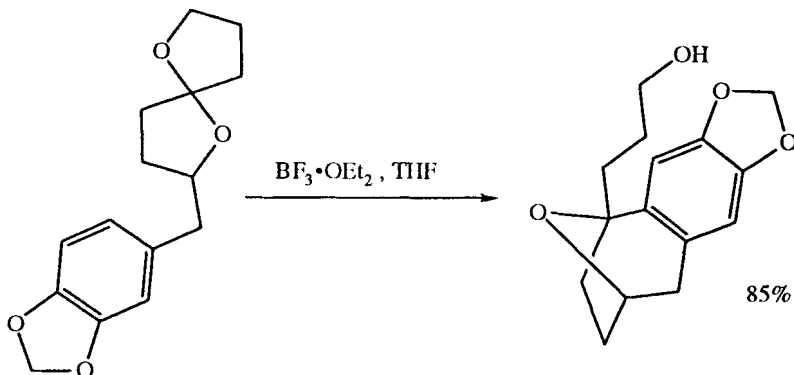
Angle, S.R.; El-Said, N.A. *J. Am. Chem. Soc.*, **1999**, *121*, 10211.



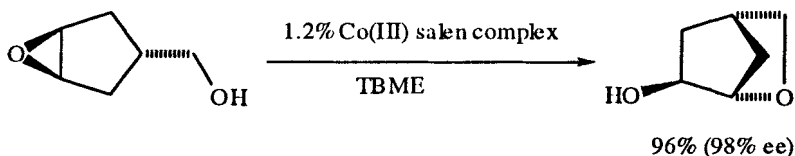
Molander, G.A.; Machrouchi, F. *J. Org. Chem.*, **1999**, *64*, 4119.



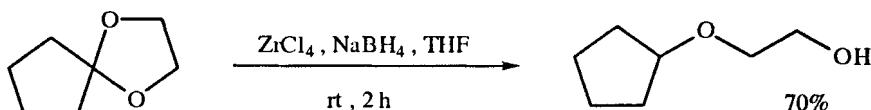
Saito, S.; Yamazaki, S.; Shiozawa, M.; Yamamoto, H. *Synlett*, **1999**, 581.



Fan, J.-F.; Wu, Y.; Wu, Y.-L. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 1189.



Wu, M.H.; Hansen, K.B.; Jacobsen, E.N. *Angew. Chem. Int. Ed.*, **1999**, *38*, 1202.

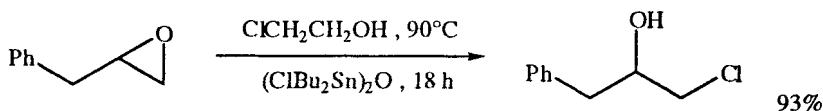


Chary, K.P.; Laxmi, Y.R.S.; Iyengar, D.S. *Synth. Commun.*, **1999**, *29*, 1257.

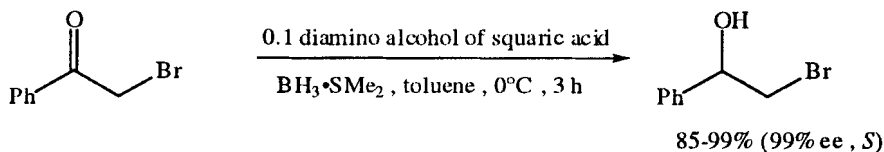
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"Free Radical Chemistry of Three-Membered Heterocycles," Li, J.L. *Tetrahedron*, **2001**, *57*, 1.

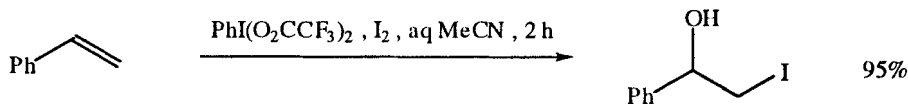
## SECTION 329: ALCOHOL, THIOL - HALIDE, SULFONATE



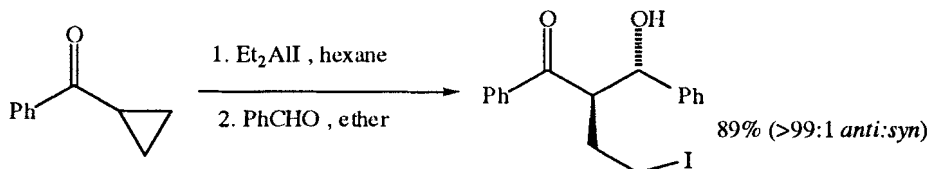
Salomon, C.J. *Synlett*, **2001**, 65.



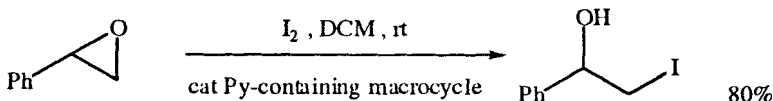
Zhou, H.; Lü, S.; Xie, R.; Chan, A.S.C.; Yang, T.-K. *Tetrahedron Lett.*, **2001**, *42*, 1107.



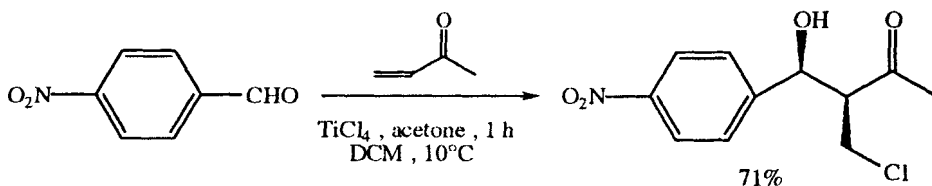
DeCorso, A.R.; Panunzi, B.; Tingoli, M. *Tetrahedron Lett.*, **2001**, *42*, 7245.



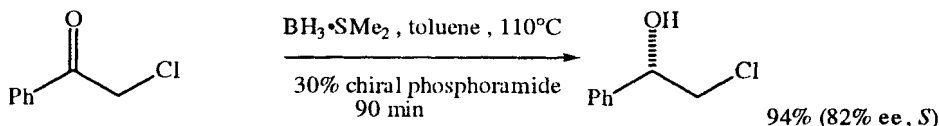
Han, Z.; Uehira, S.; Tsuritani, T.; Shinokubo, H.; Oshima, K. *Tetrahedron*, **2001**, *57*, 987.



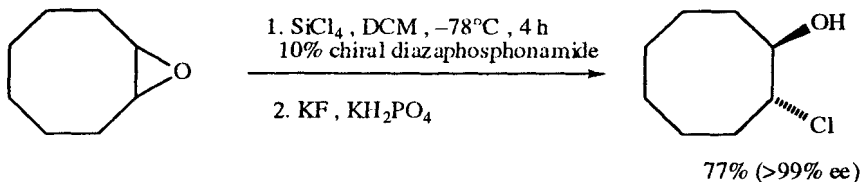
Sharghi, H.; Niknam, K.; Pooyan, M. *Tetrahedron*, **2001**, 57, 6057.



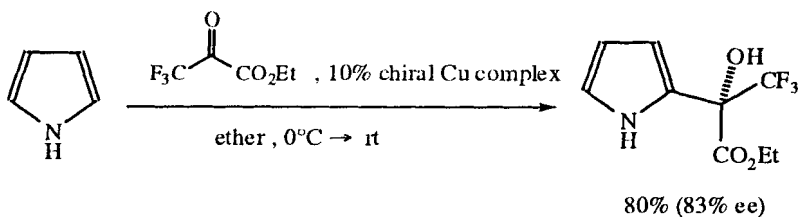
Shi, M.; Jiang, J.-K.; Chui, S.-C. *Tetrahedron*, **2001**, 57, 7343.



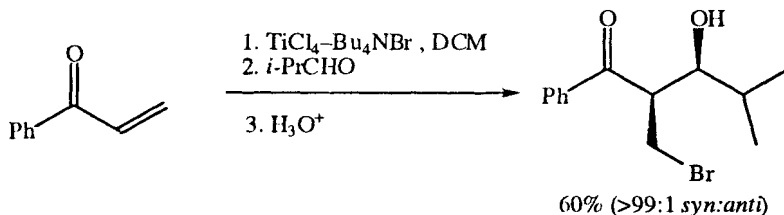
Basavaiah, D.; Reddy, G.J.; Chandrashekar, V. *Tetrahedron Asymm.*, **2001**, 12, 685.



Reymond, S.; Legrand, O.; Brunel, J.M.; Buono, G. *Eur. J. Org. Chem.*, **2001**, 2819.

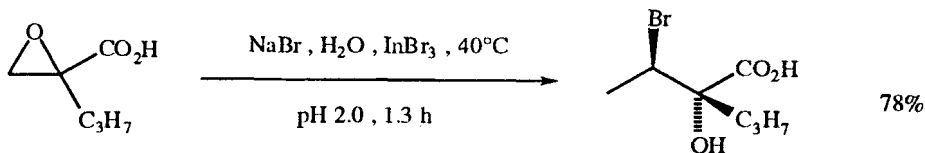


Zhuang, W.; Gathergood, N.; Hazell, R.G.; Jørgensen, K.A. *J. Org. Chem.*, **2001**, 66, 1009.

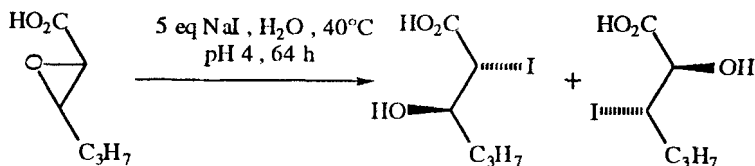


Han, Z.; Uehira, S.; Shinokubo, H.; Oshima, K. *J. Org. Chem.*, **2001**, 66, 7854.



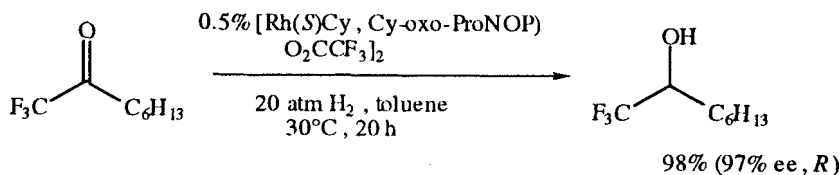


Amantini, D.; Fringuelli, F.; Pizzo, F.; Vaccaro, L. *J. Org. Chem.*, **2001**, *66*, 4463.

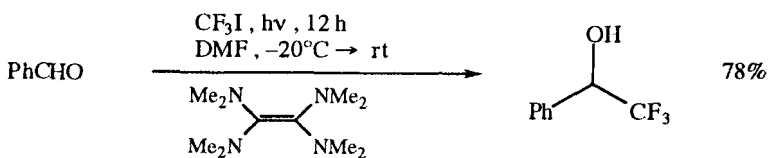


no catalyst (99 : 1) 99%  
+  $\text{InCl}_3$ , pH 1.5 (2 : 98) >99%  
30 min

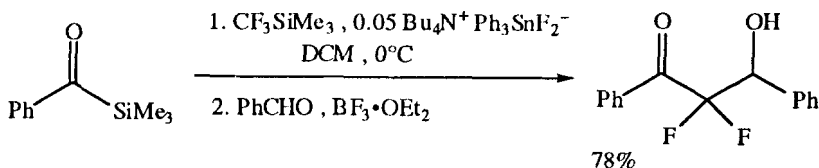
Fringuelli, F.; Pizzo, F.; Vaccaro, L. *J. Org. Chem.*, **2001**, *66*, 4719.



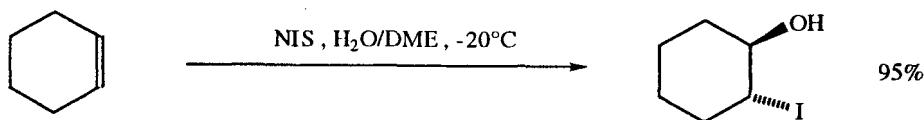
Iuroki, Y.; Sakamaki, Y.; Iseki, K. *Org. Lett.*, **2001**, *3*, 457.



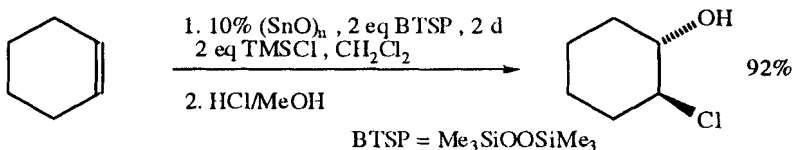
Wright, D.L.; Usher, L.C.; Estrella-Jimenez, M. *Org. Lett.*, **2001**, *3*, 4275.



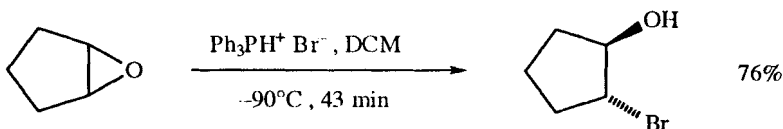
Lefebvre, O.; Brigaud, T.; Portella, C. *J. Org. Chem.*, **2001**, *66*, 1941.



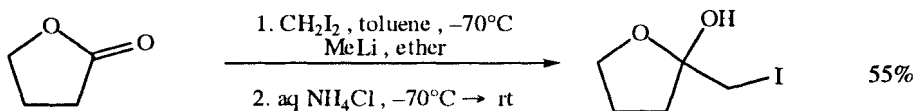
Smietana, M.; Gouverneur, V.; Mioskowski, C. *Tetrahedron Lett.*, **2000**, *41*, 193.



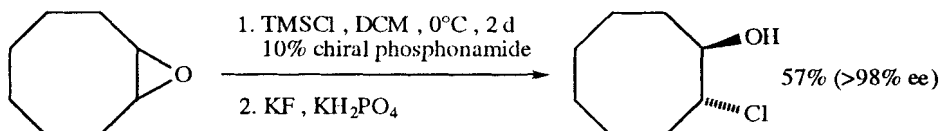
Sakurada, I.; Yamasaki, S.; Göttlich, R.; Iida, T.; Kanai, M.; Shibasaki, M.  
*J. Am. Chem. Soc.*, **2000**, *122*, 1245.



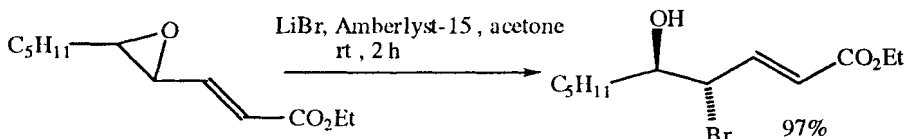
Afonso, C.A.M.; Vieira, N.M.L.; Motherwell, W.B. *Synlett*, **2000**, 382.



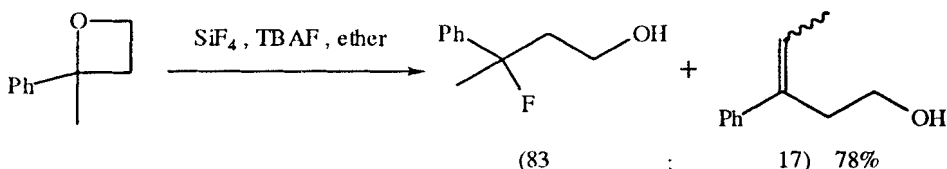
Bessieres, B.; Morin, C. *Synlett*, **2000**, 1691.



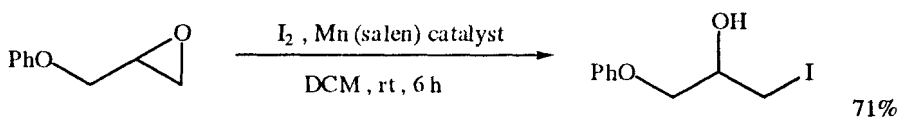
Reymond, S.; Brunel, J.M.; Buono, G. *Tetrahedron Asym.*, **2000**, *11*, 4441.



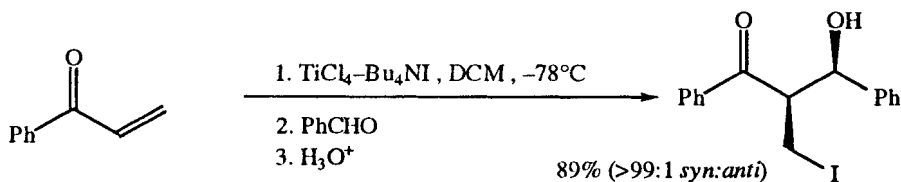
Antonioletti, R.; Bovicelli, P.; Fazzolari, E.; Righi, G. *Tetrahedron Lett.*, **2000**, *41*, 9315.



Shimizu, M.; Kanemoto, S.; Nakahara, Y. *Heterocycles*, **2000**, *52*, 117.

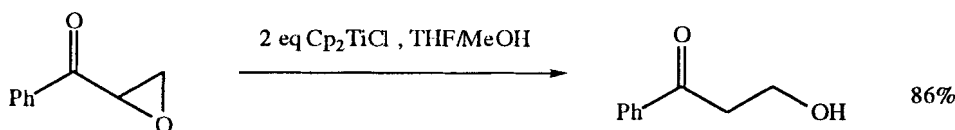


Sharghi, H.; Naeimi, H. *Bull. Chem. Soc. Jpn.*, **1999**, *72*, 1525.

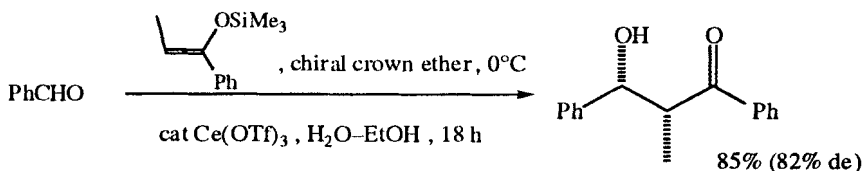


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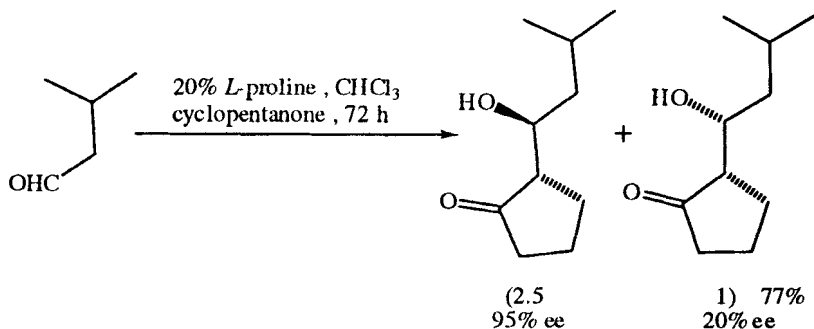
## SECTION 330: ALCOHOL, THIOL - KETONE



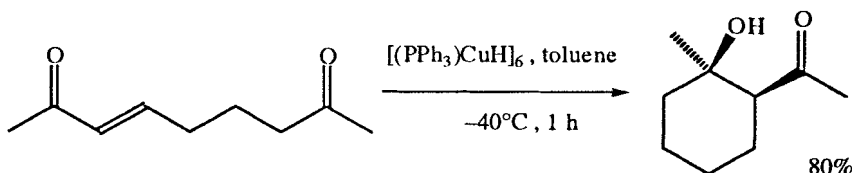
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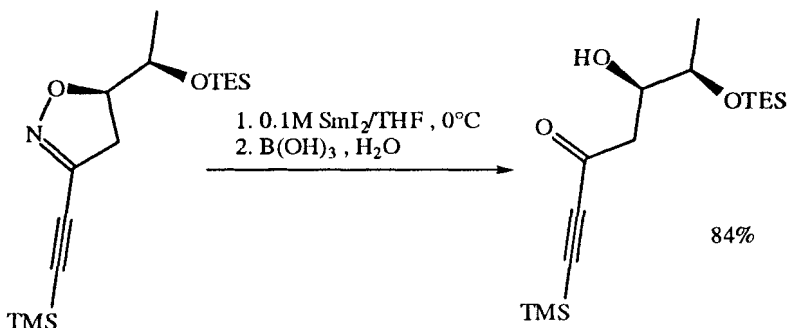
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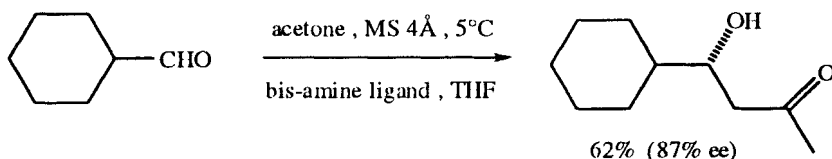
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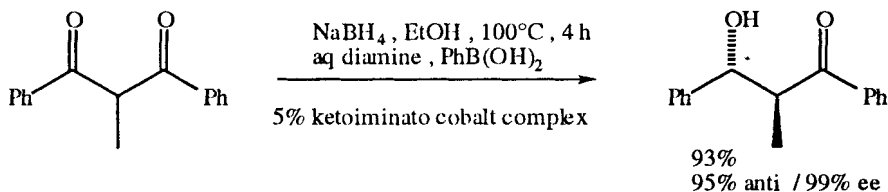
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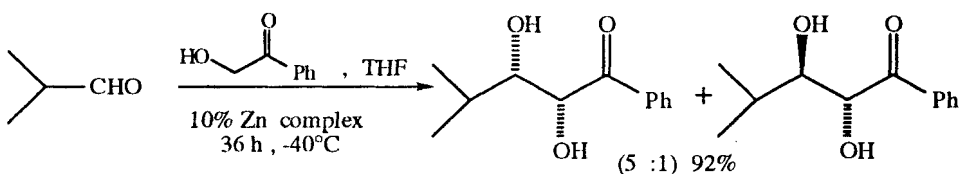
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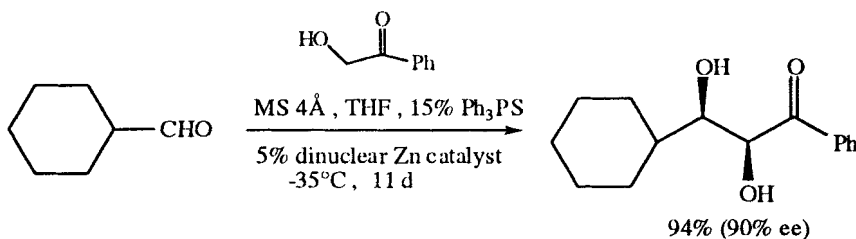
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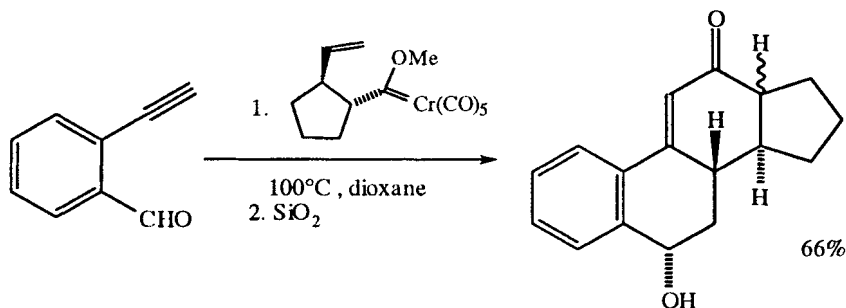
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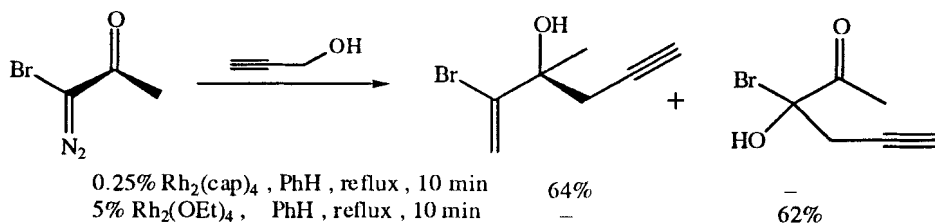
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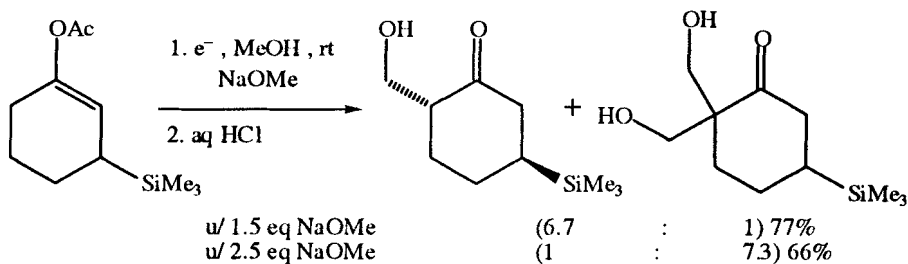
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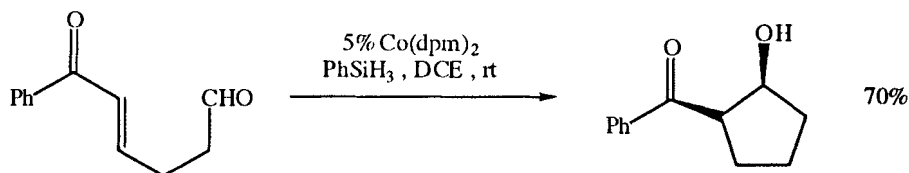
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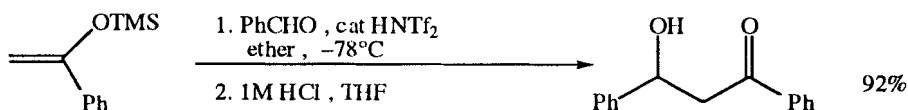
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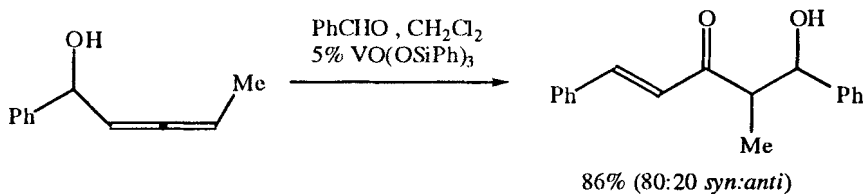
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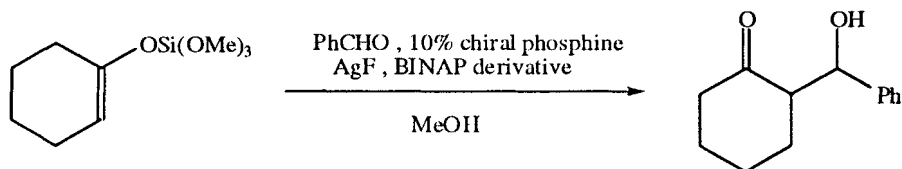
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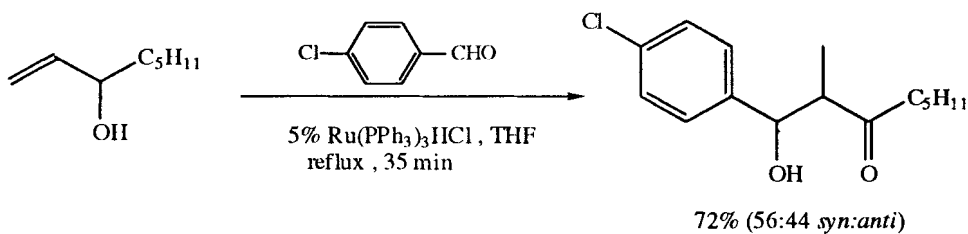
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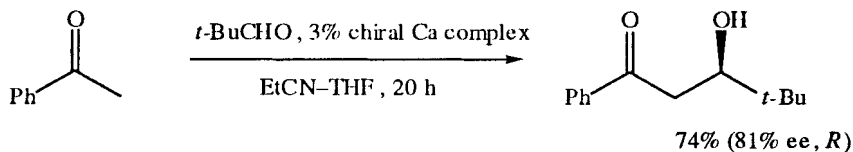
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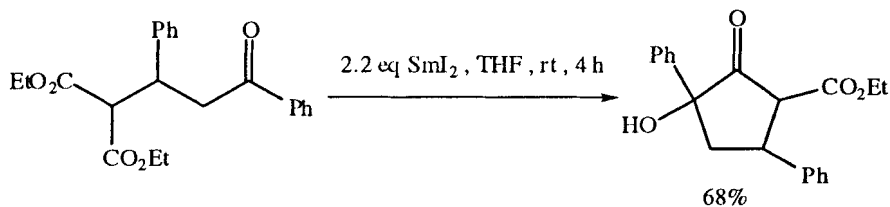
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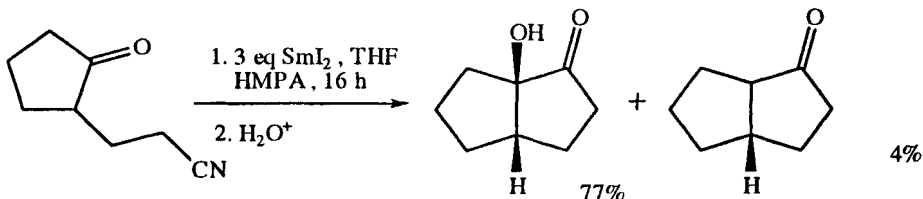
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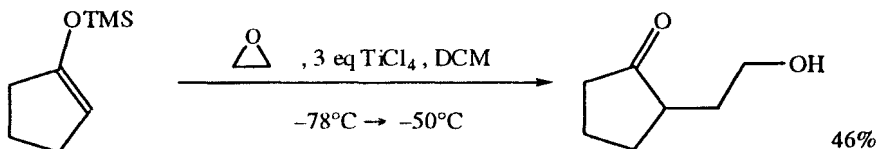
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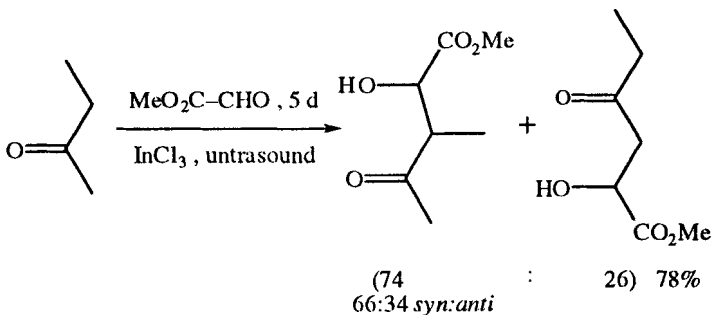
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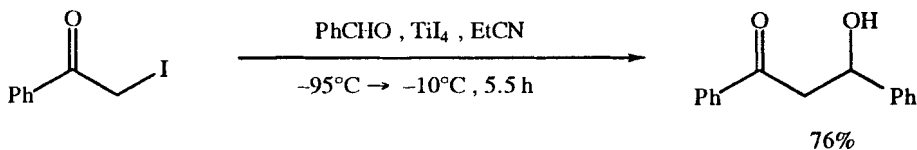
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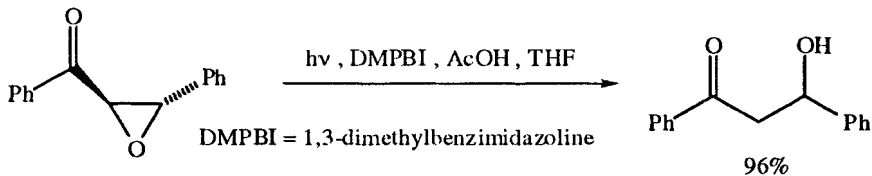
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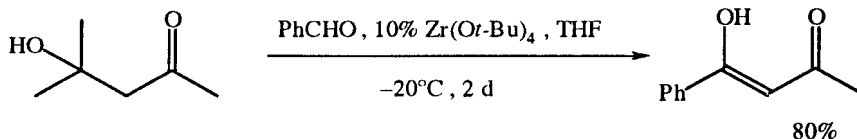
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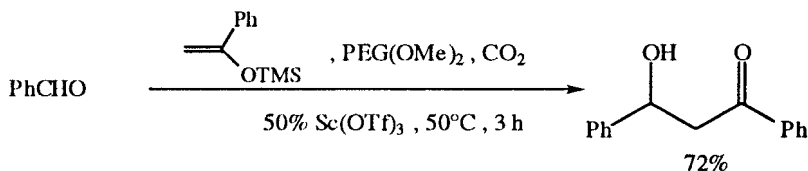
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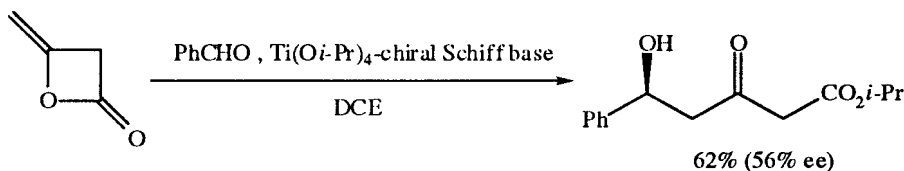
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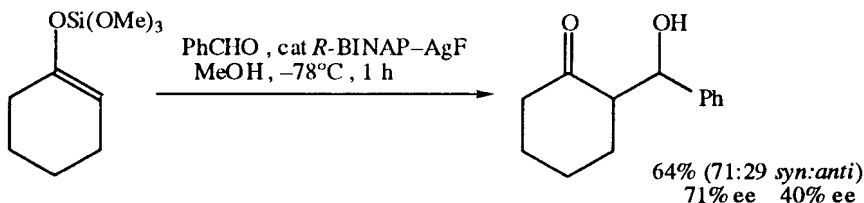
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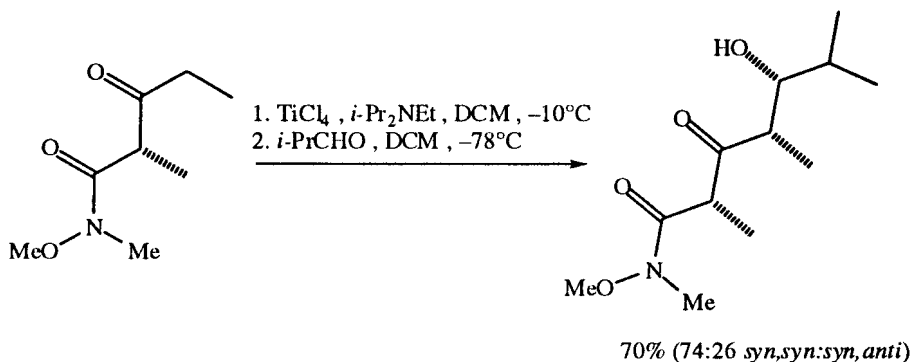
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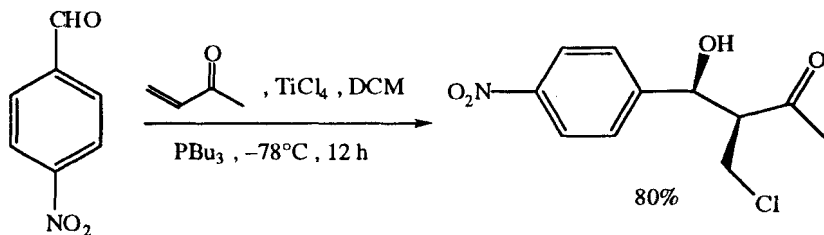


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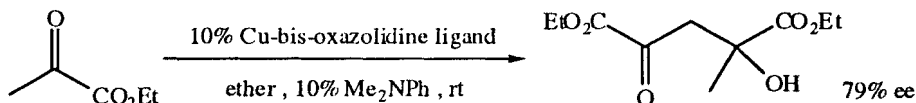


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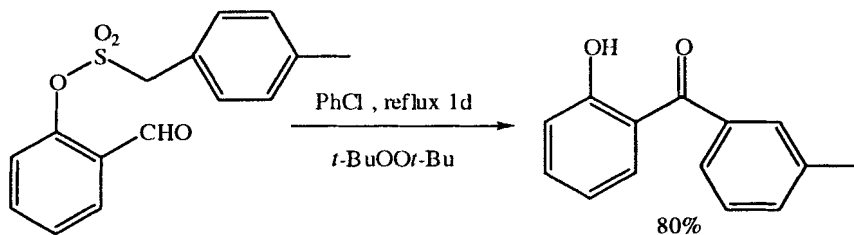




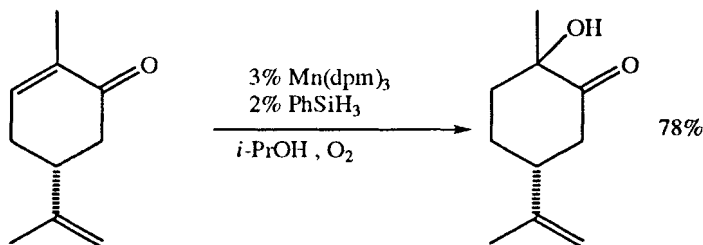
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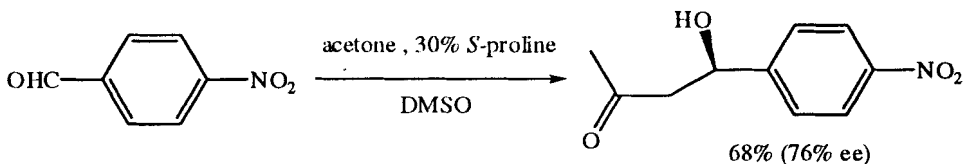
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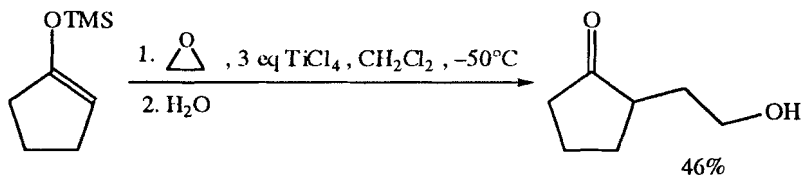
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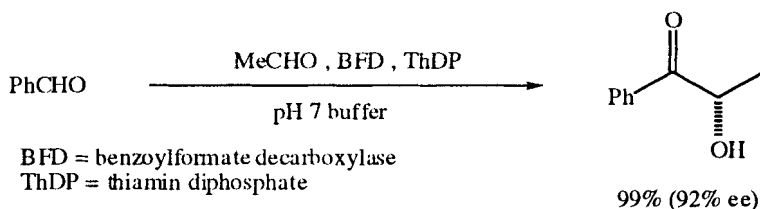
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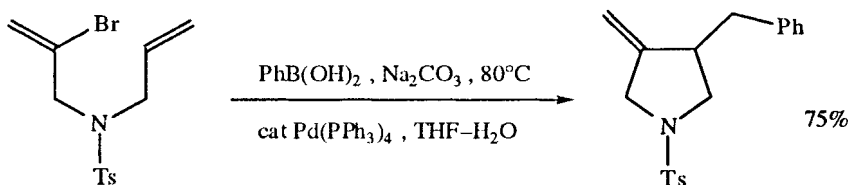
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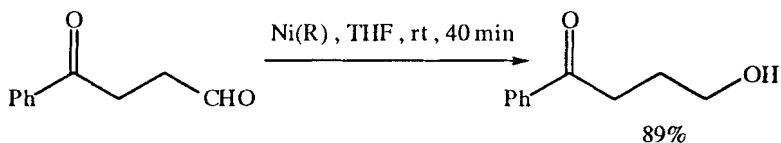
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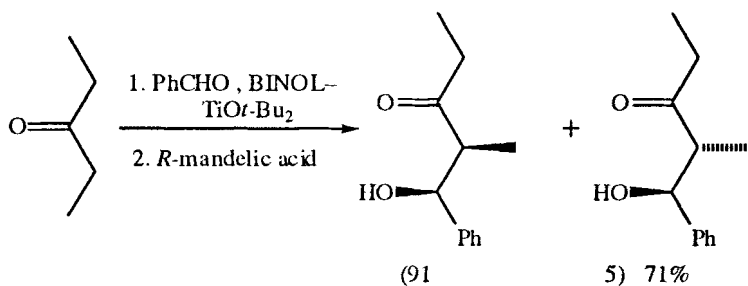
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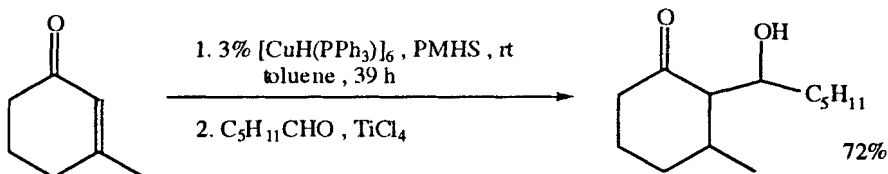
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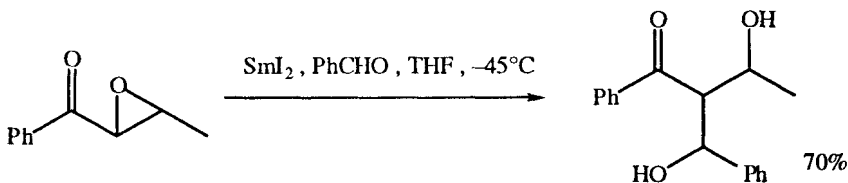
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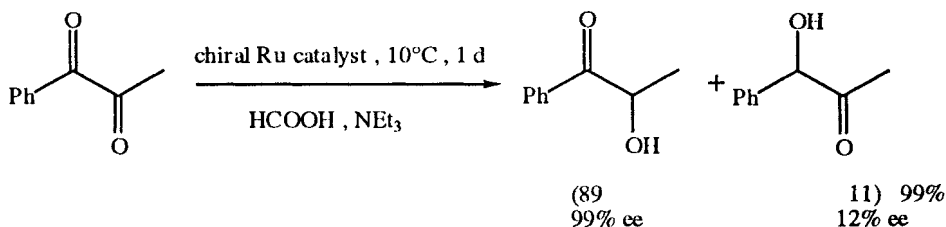
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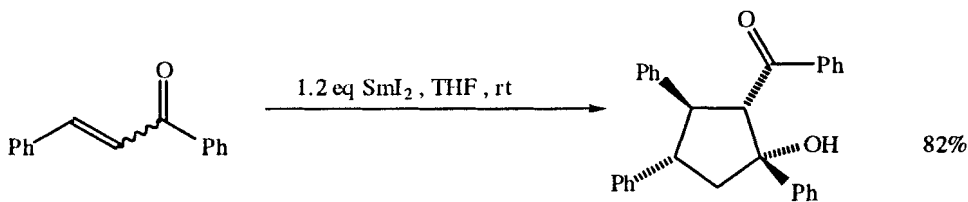
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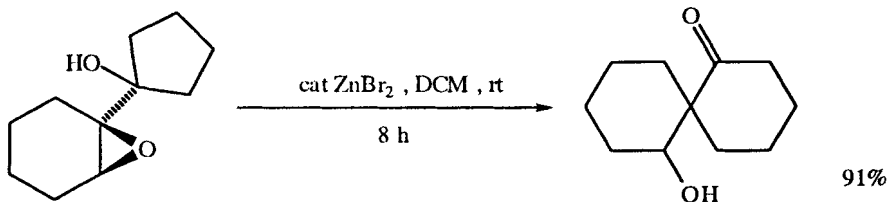
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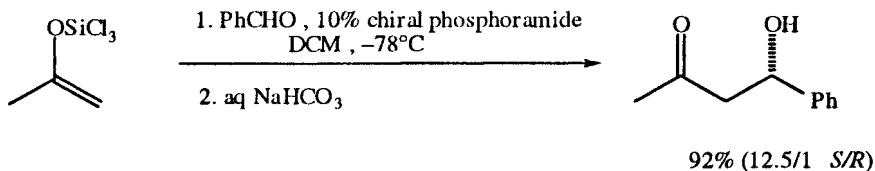
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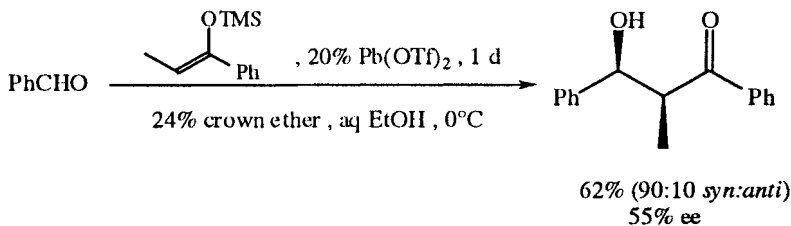
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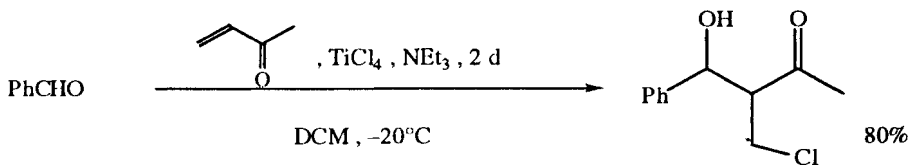
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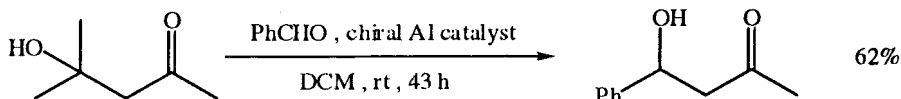
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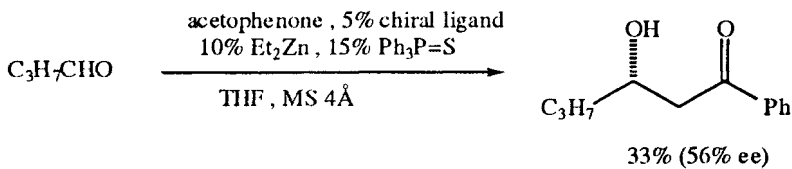
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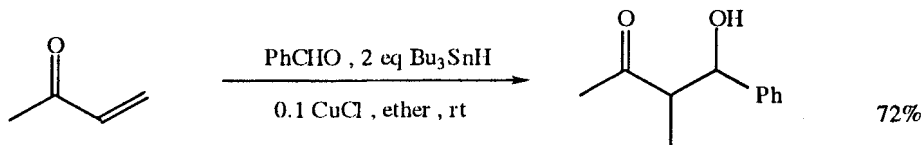
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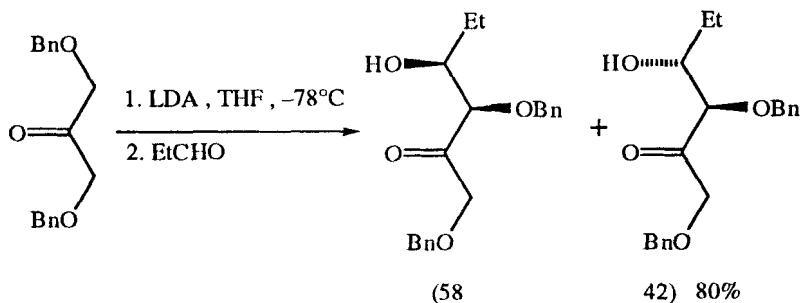
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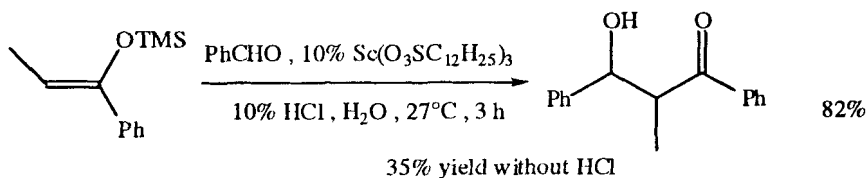
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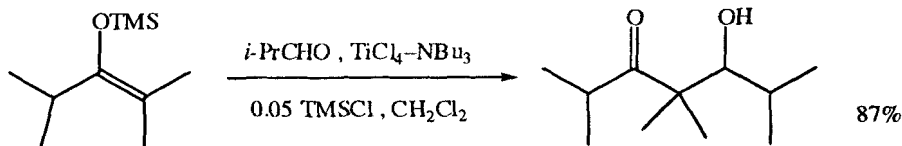
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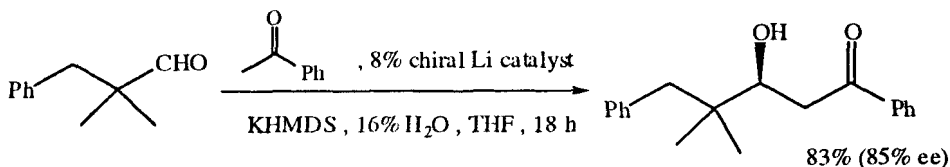
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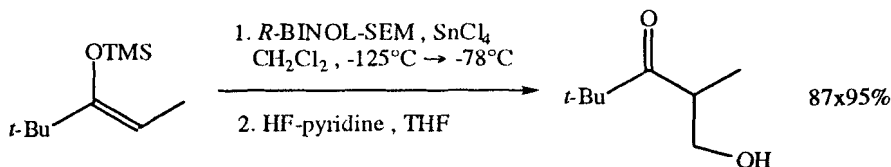
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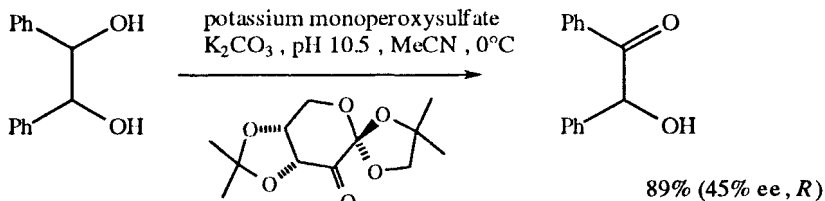
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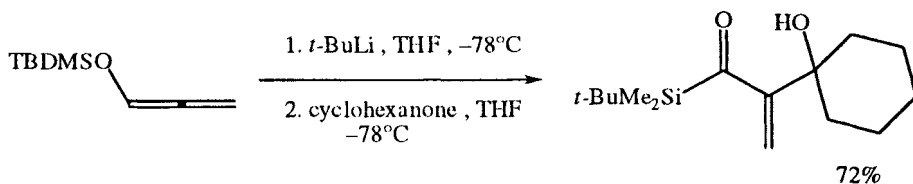
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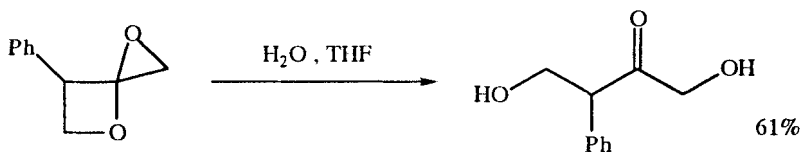
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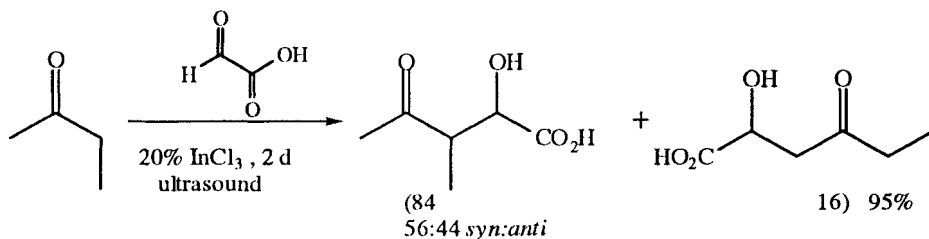
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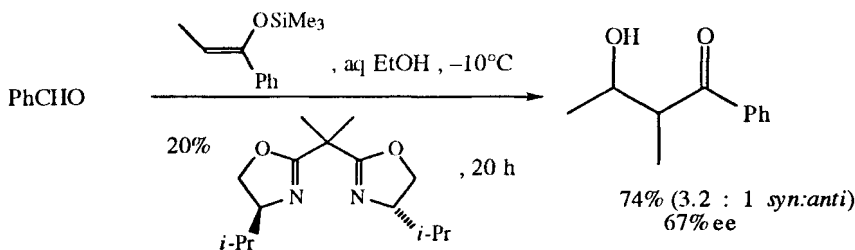
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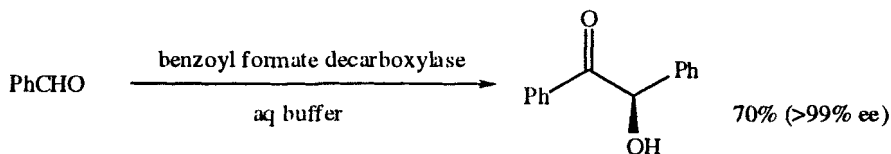
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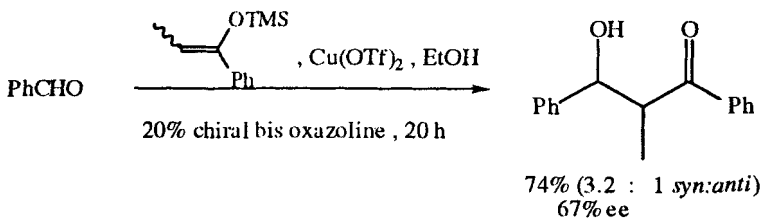
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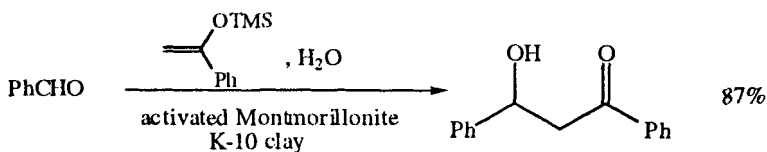
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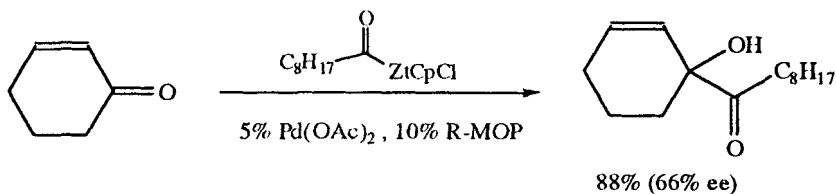
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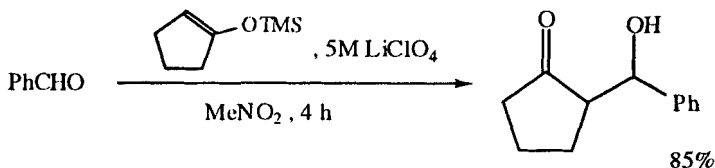
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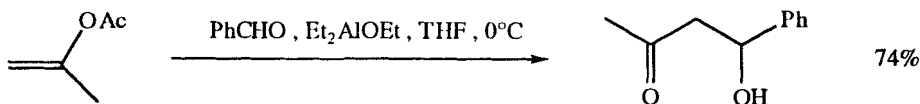
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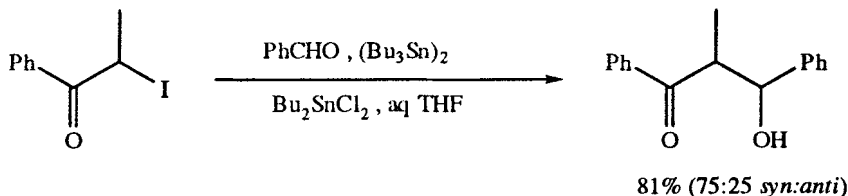
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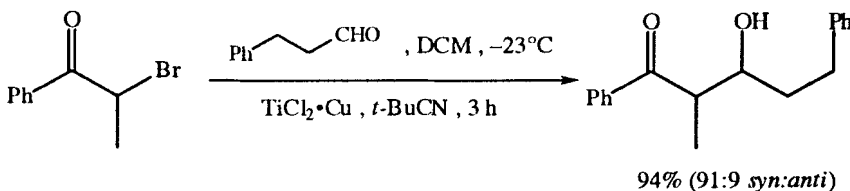
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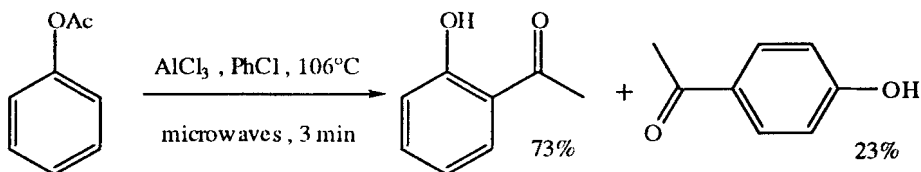
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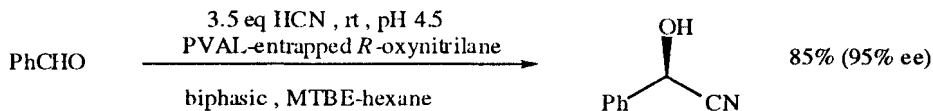
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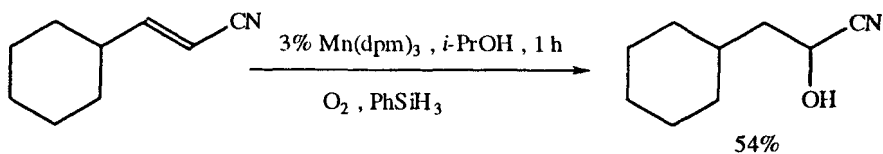
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## SECTION 331: ALCOHOL, THIOL - NITRILE

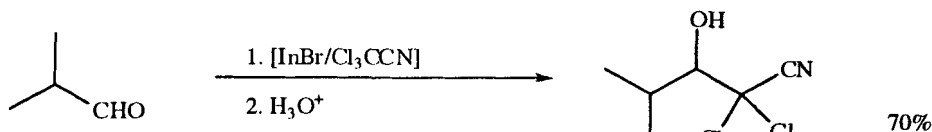


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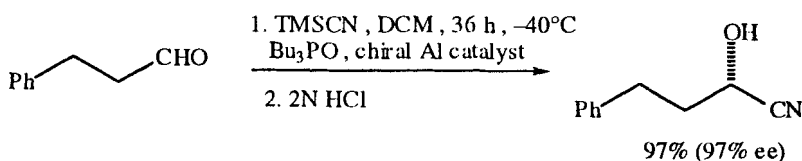




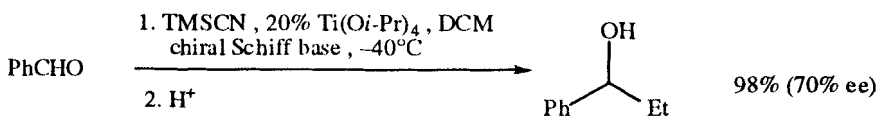
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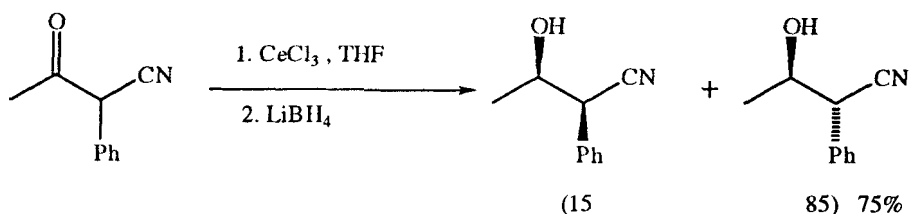
Nóbrega, J.A.; Gonçalves, S.M.C.; Peppe, C. *Tetrahedron Lett.*, 2001, 42, 4745.



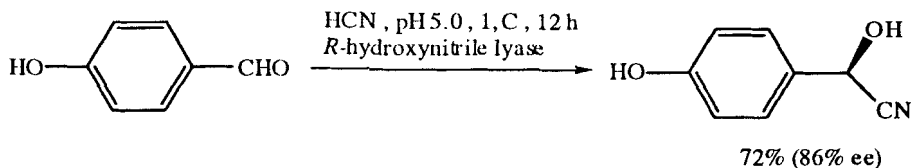
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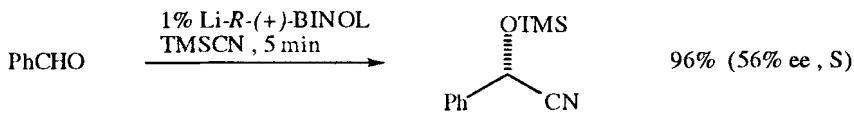
Yang, Z.-H.; Wang, L.-X.; Zhou, Z.-H.; Zhou, Q.-L.; Tang, C.-C. *Tetrahedron Asymm.*, 2001, 12, 1579.



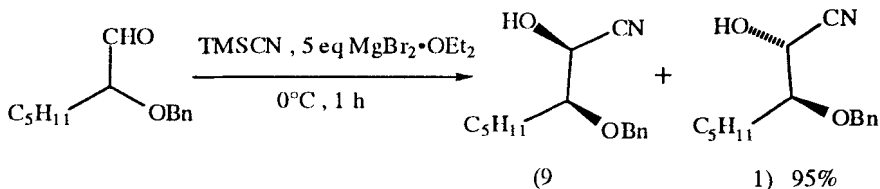
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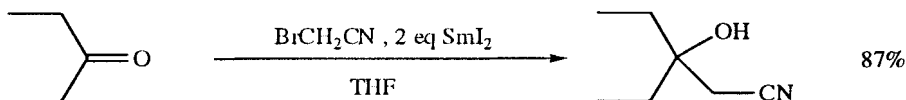
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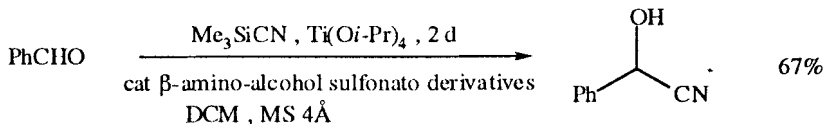
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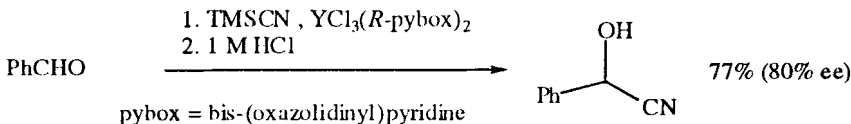
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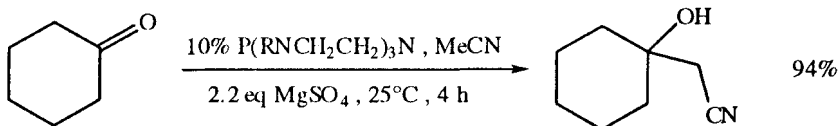
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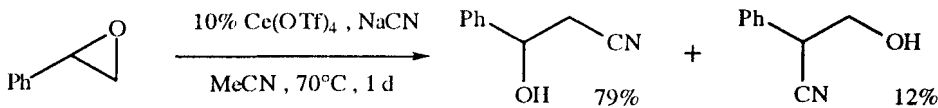
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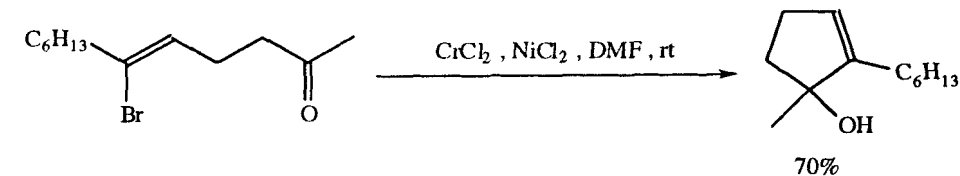
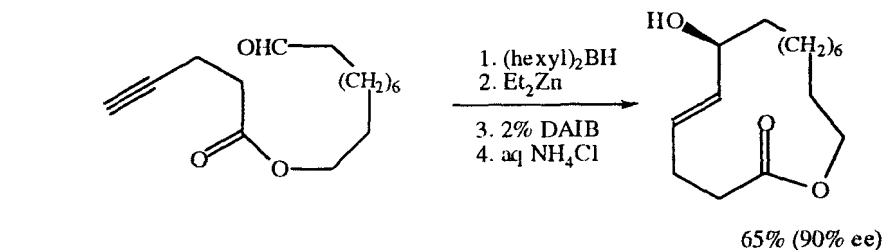
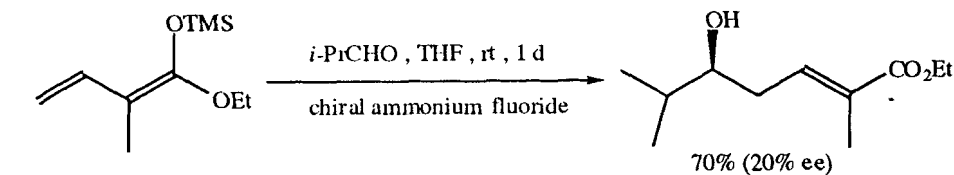
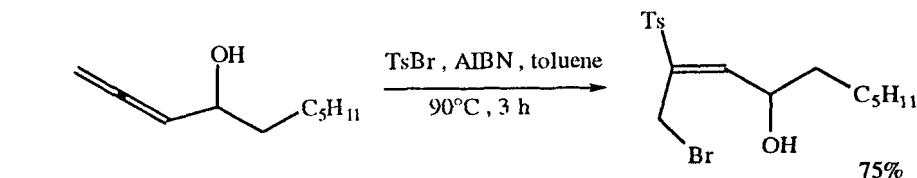
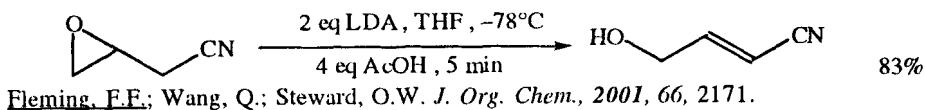
Kisanga, P.; McLeod, D.; D'Sa, B.; Verkade, J. *J. Org. Chem.*, 1999, 64, 3090.

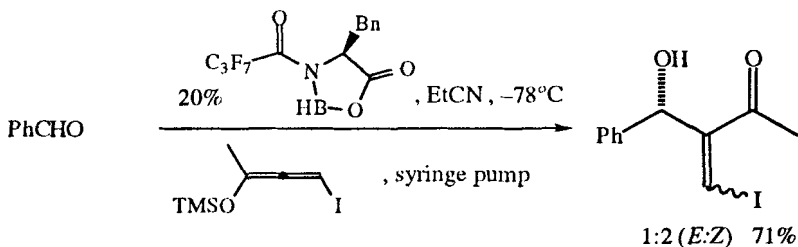


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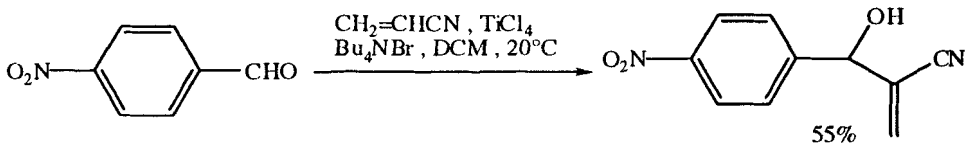
## SECTION 332: ALCOHOL, THIOL - ALKENE

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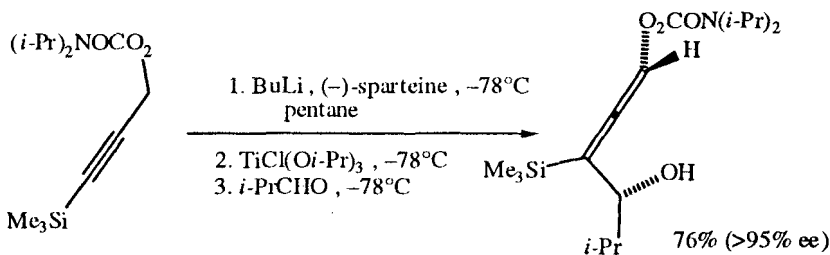




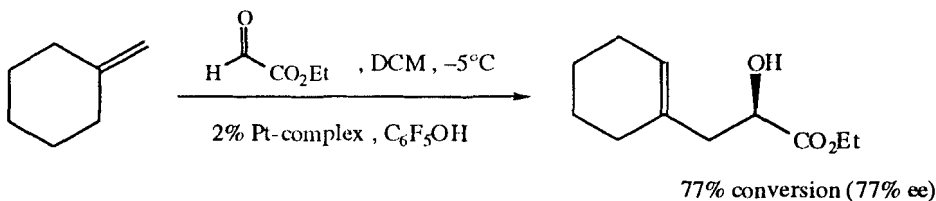
Li, G.; Wei, H.-X.; Phelps, B.S.; Purkiss, D.W.; Kim, S.H. *Org. Lett.*, **2001**, 3, 823.



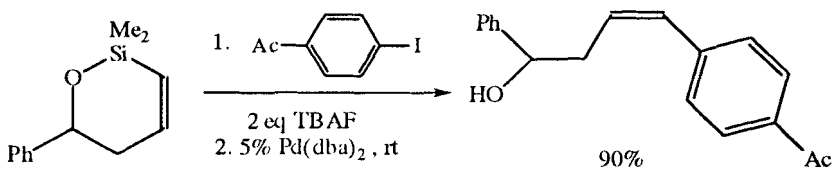
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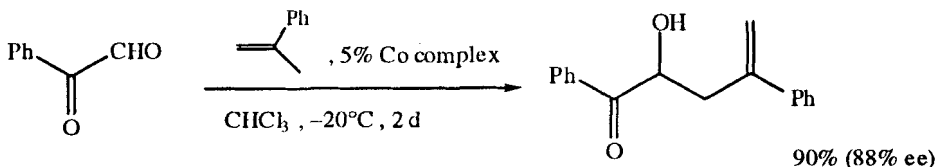
Schultz-Fademrecht, C.; Wibbeling, B.; Frölich, R.; Hoppe, D. *Org. Lett.*, **2001**, 3, 1221.



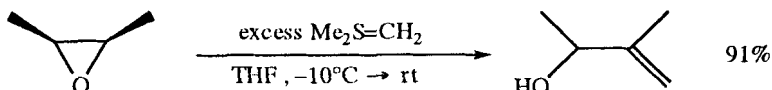
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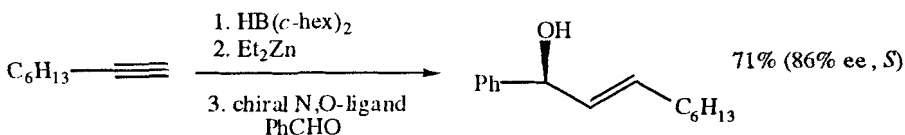
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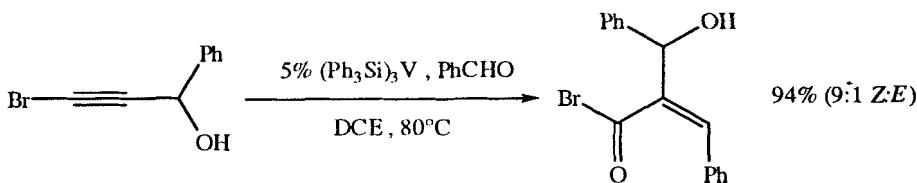
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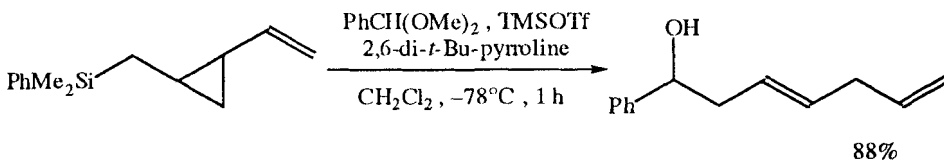
Alcaraz, L.; Cridland, A.; Kinchin, E. *Org. Lett.*, **2001**, 3, 4051.



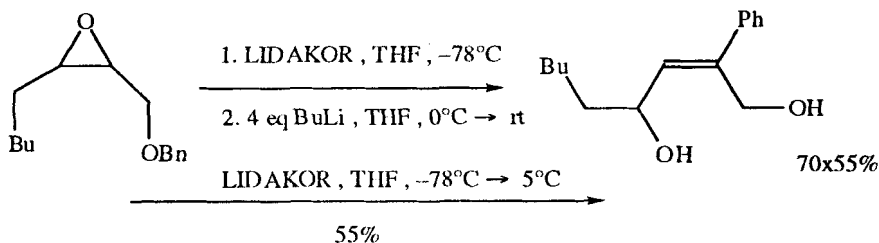
Dahmen, S.; Bräse, S. *Org. Lett.*, **2001**, 3, 4119.



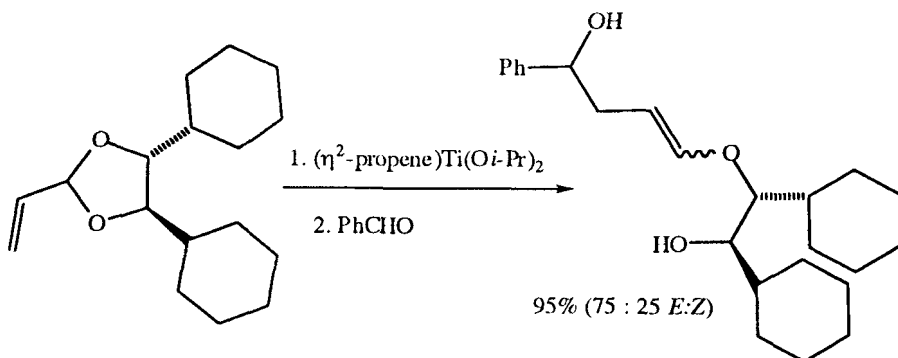
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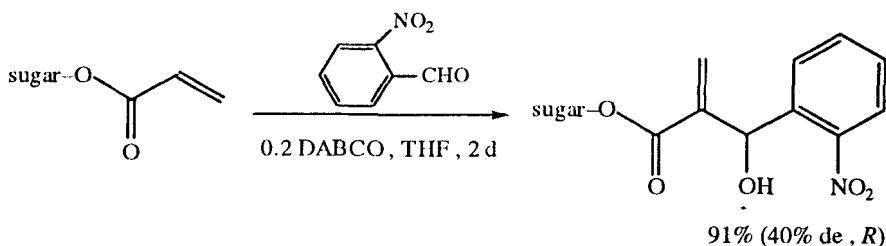
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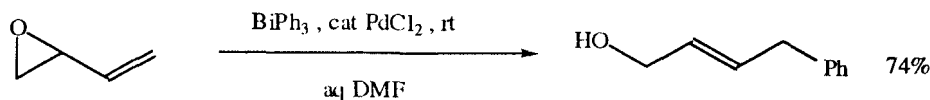
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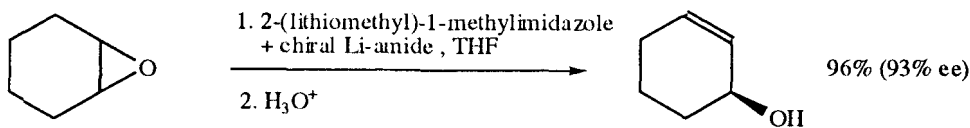
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*J. Am. Chem. Soc.*, **2001**, *123*, 3462.



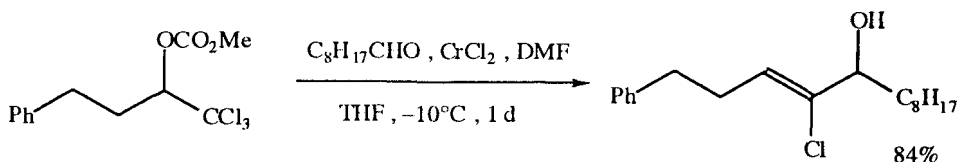
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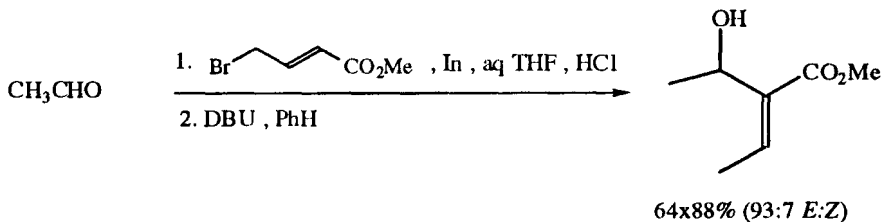
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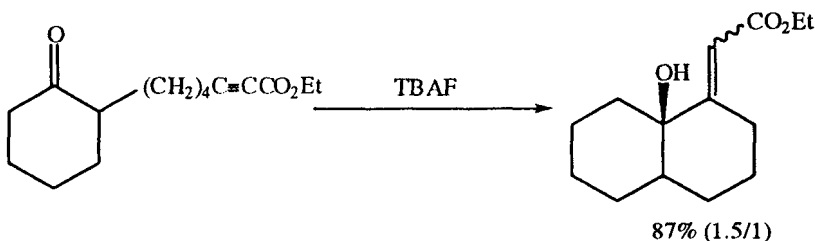
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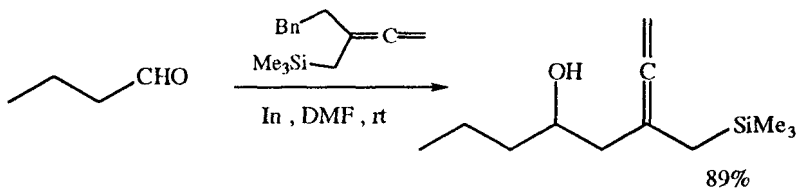
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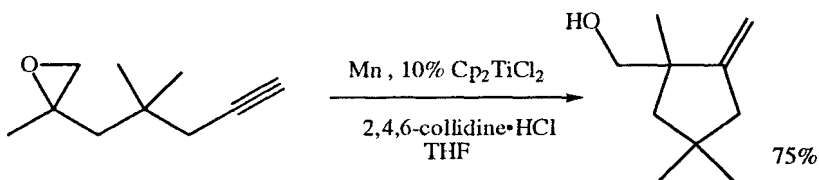
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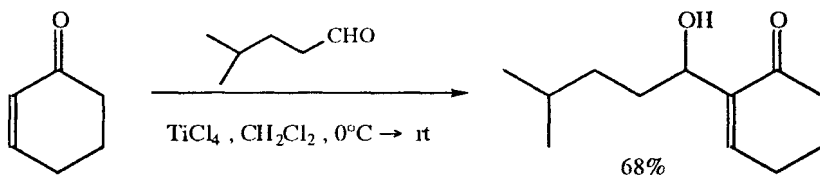
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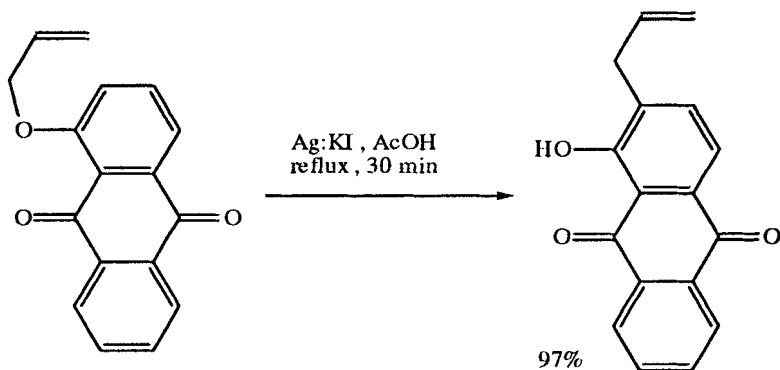
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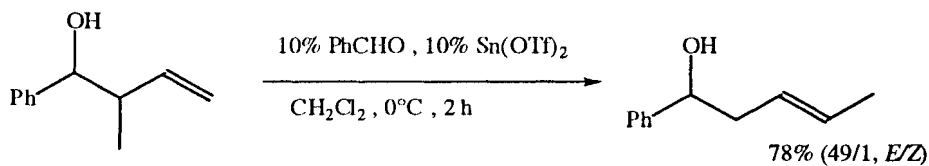
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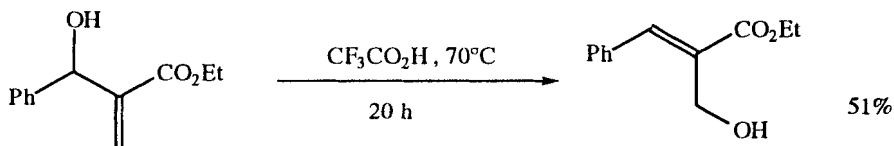
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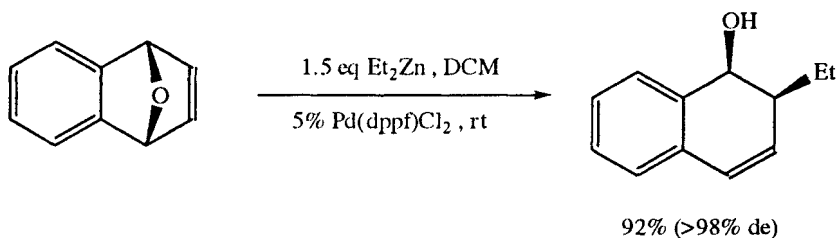
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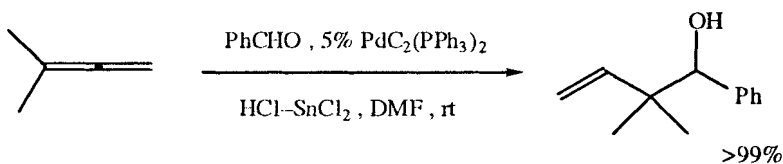
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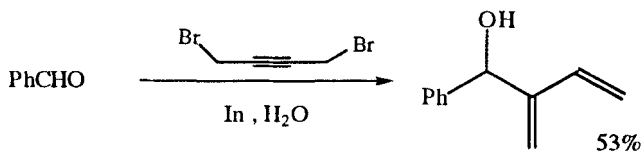


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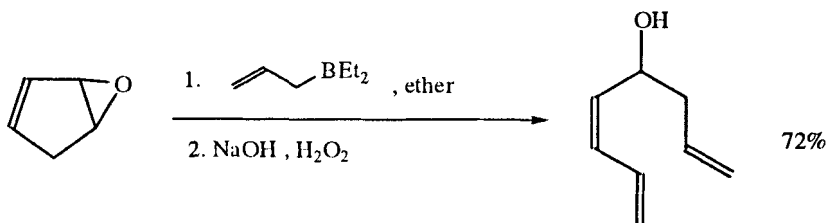


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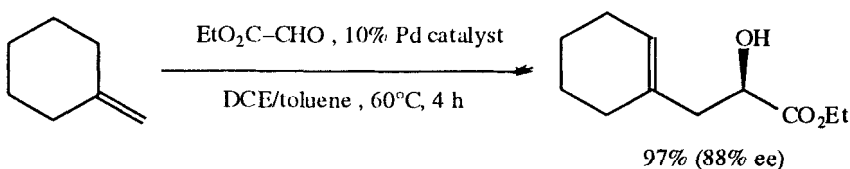




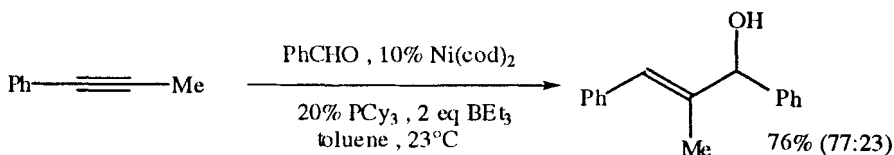
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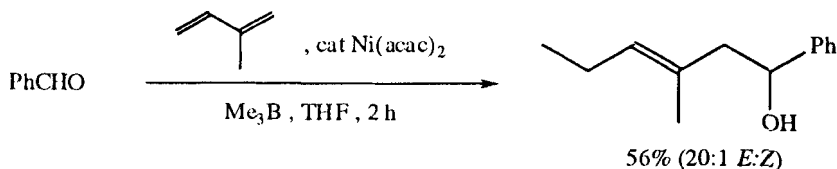
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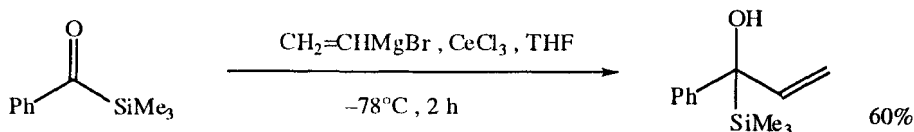
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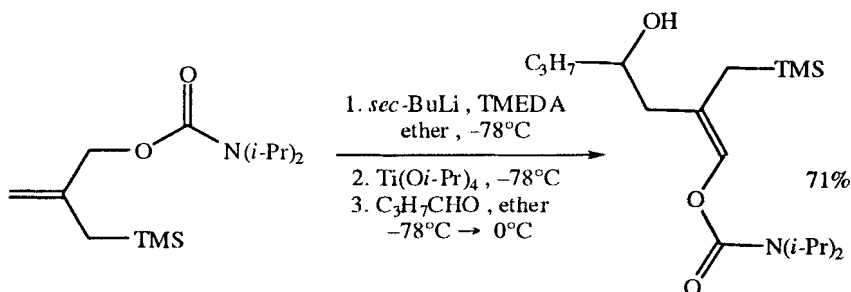
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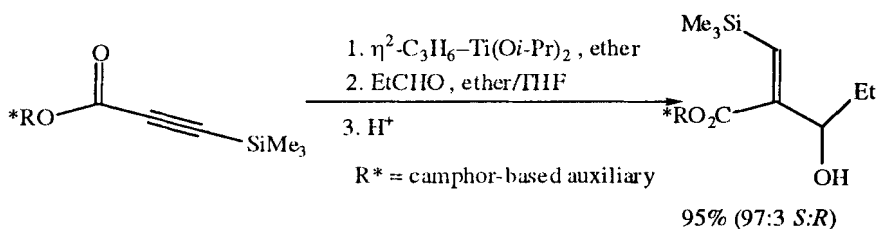
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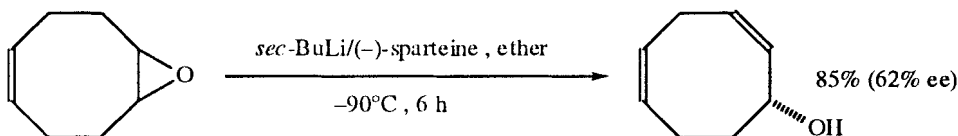
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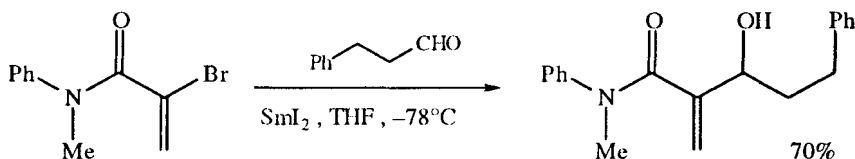
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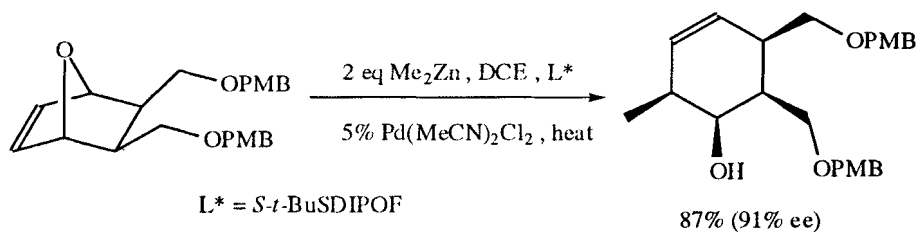
Suzuki, D.; Urabe, H.; Sato, F. *Angew. Chem. Int. Ed.*, 2000, 39, 3290.



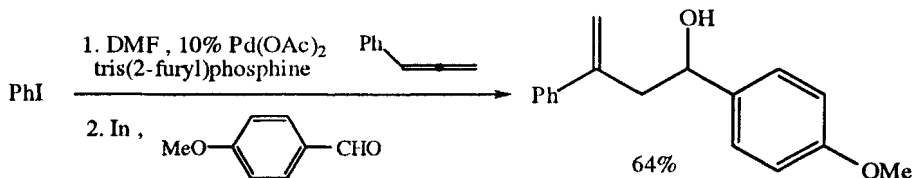
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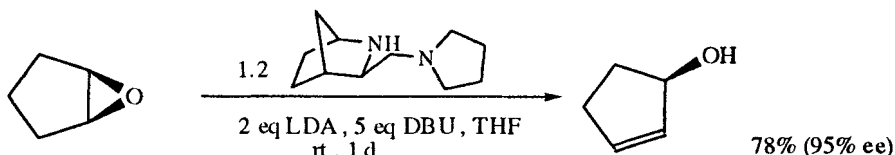
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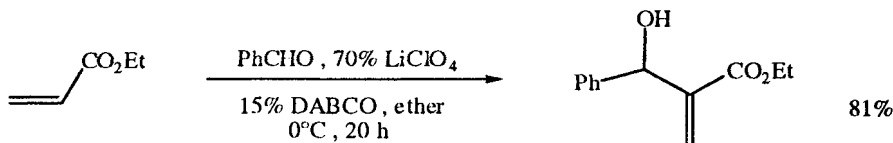
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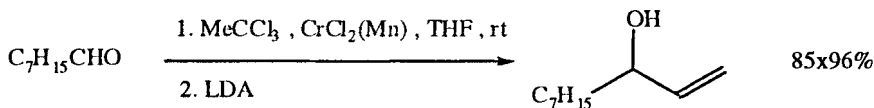
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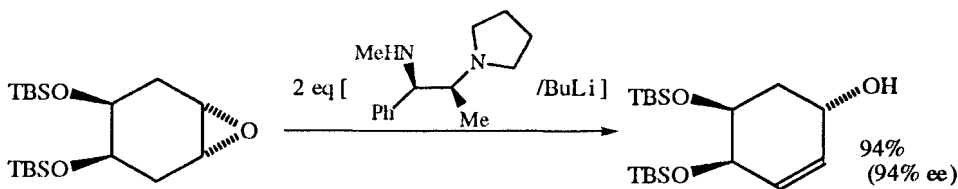
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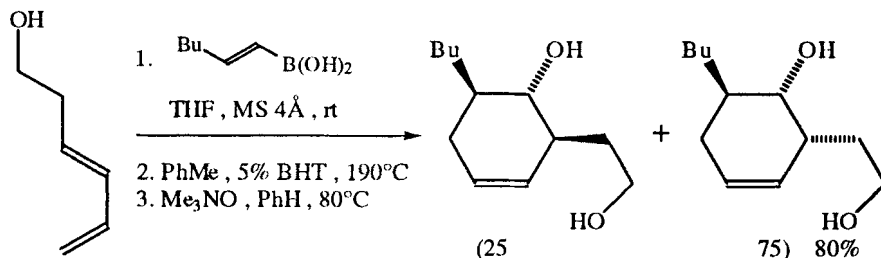
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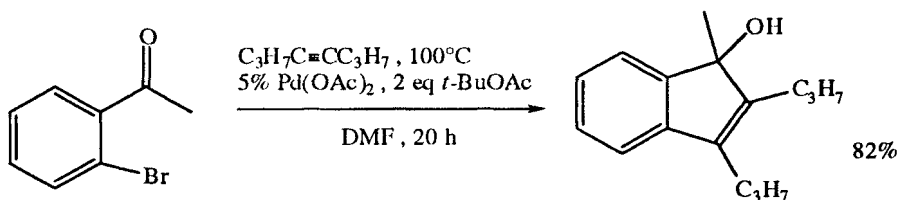
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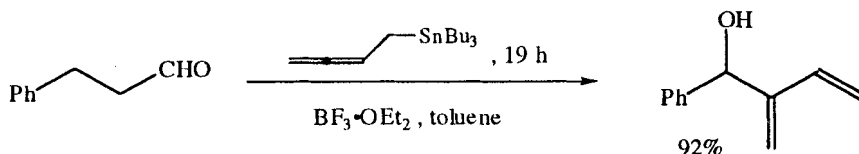
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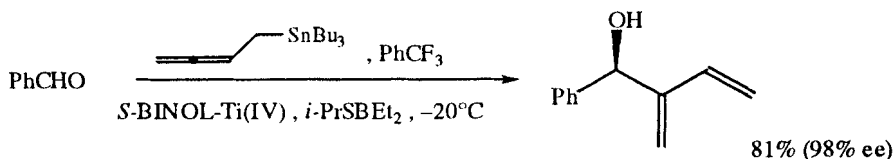
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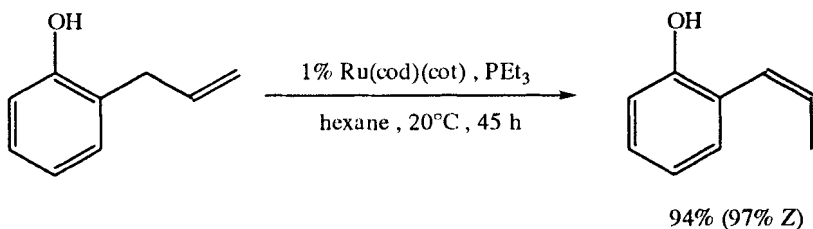
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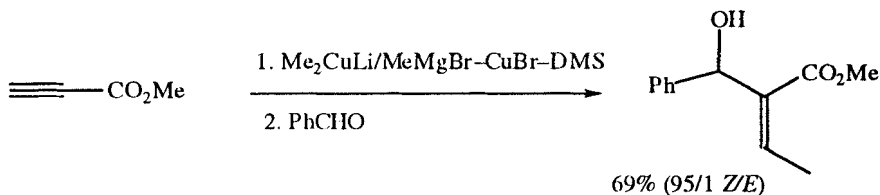
Luo, M.; Iwabuchi, Y.; Hatakeyama, S. *Chem. Commun.*, **1999**, 267.



Yu, C.-M.; Lee, S.-J.; Jeon, M. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 3557.



Sato, T.; Komine, N.; Hirano, M.; Komiya, S. *Chem. Lett.*, **1999**, 441.



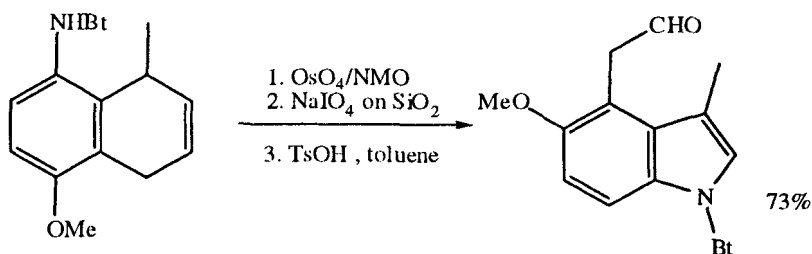
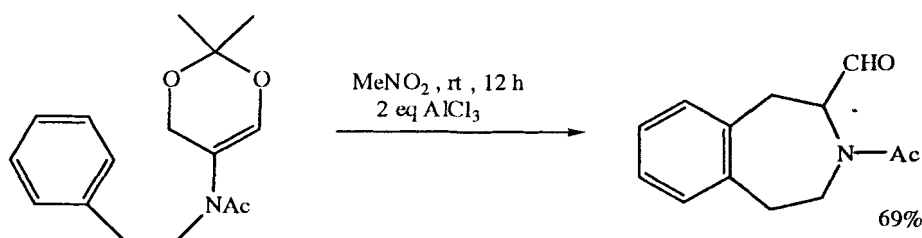
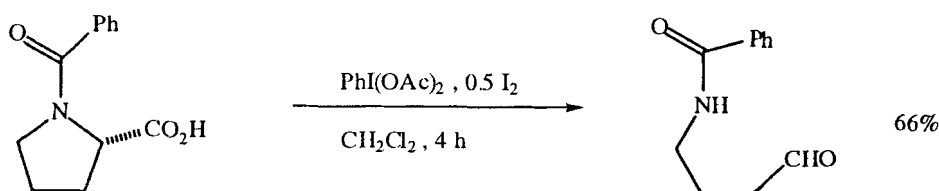
Wei, H.-X.; Willis, S.; Li, G. *Synth. Commun.*, **1999**, *29*, 2959.

Also via: Section 302 (Alkyne - Alcohol).

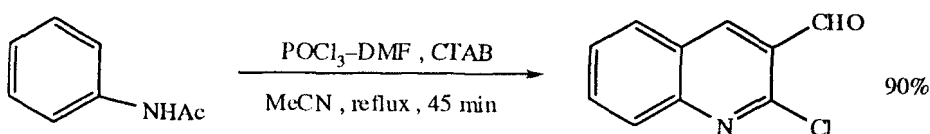
## SECTION 333: ALDEHYDE - ALDEHYDE

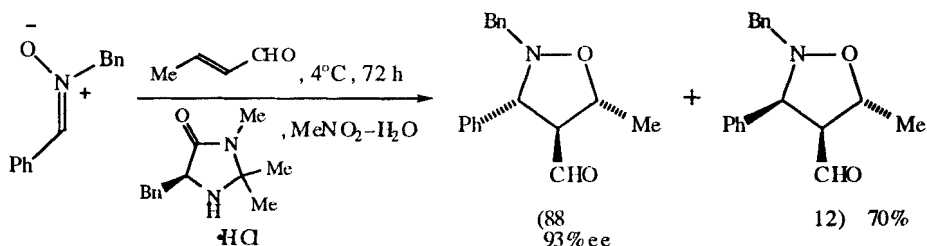
NO ADDITIONAL EXAMPLES

## SECTION 334: ALDEHYDE - AMIDE

Banfield, S.C.; England, D.B.; Kerr, M.A. *Org. Lett.*, **2001**, 3, 3325.Fuchs, J.R.; Funk, R.L. *Org. Lett.*, **2001**, 3, 3361.Boto, A.; Hernández, R.; Suárez, E. *Tetrahedron Lett.*, **1999**, 40, 5945.

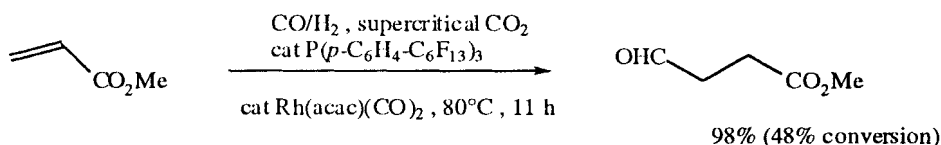
## SECTION 335: ALDEHYDE - AMINE

Ali, M.M.; Tasneem; Rajanna, K.C.; Prakash, P.K.S. *Synlett*, **2001**, 251.



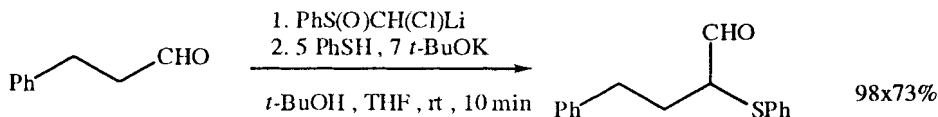
Jen, W.S.; Wiener, J.J.M.; MacMillan, D.W.C. *J. Am. Chem. Soc.*, **2000**, *122*, 9874.

### SECTION 336: ALDEHYDE - ESTER



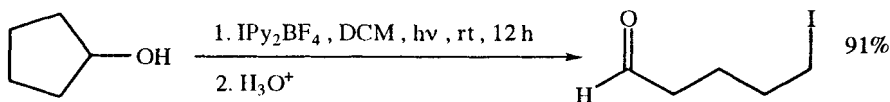
Hu, Y.; Chen, W.; Osuna, A.M.B.; Stuart, A.M.; Hope, E.G.; Xiao, J. *Chem. Commun.*, **2001**, 725.

### SECTION 337: ALDEHYDE - ETHER, EPOXIDE, THIOETHER

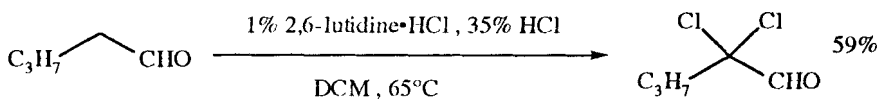


Sato, T.; Kubota, K.-i. *Tetrahedron Lett.*, **2000**, *41*, 2121.

### SECTION 338: ALDEHYDE - HALIDE, SULFONATE

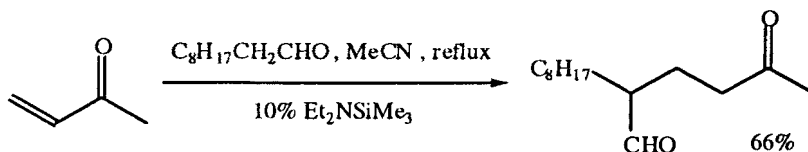


Barluenga, J.; González-Bobes, F.; Anathouju, S.R.; García-Martin, M.A.; González, J.M. *Angew. Chem. Int. Ed.*, **2001**, *40*, 3389.

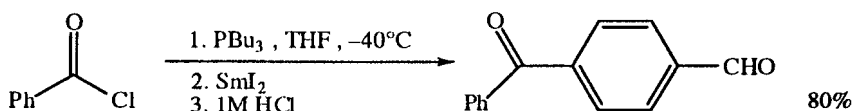


Bellesia, F.; De Buyck, L.; Ghelfi, F.; Libertini, E.; Pagnoni, U.M.; Roncaglia, F. *Tetrahedron*, **2000**, *56*, 7507.

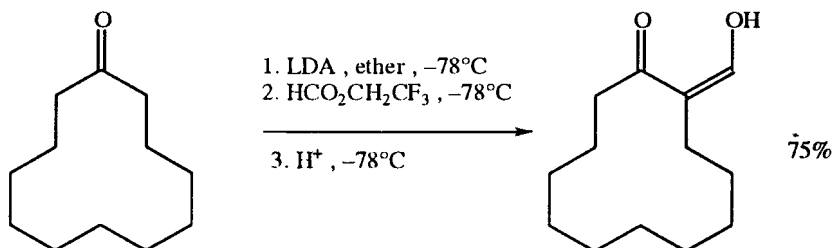
## SECTION 339: ALDEHYDE - KETONE



Hagiwara, H.; Komatsubara, N.; Ono, H.; Okabe, T.; Hoshi, T.; Suzuki, T.; Ando, M.; Kato, M. *J. Chem. Soc., Perkin Trans. 1*, 2001, 316.



Maeda, H.; Huang, Y.; Hino, N.; Yamauchi, Y.; Ohmori, H. *Chem. Commun.*, 2000, 2307.



Zayla, G.H. *Org. Lett.*, 1999, 1, 989.

## SECTION 340: ALDEHYDE - NITRILE

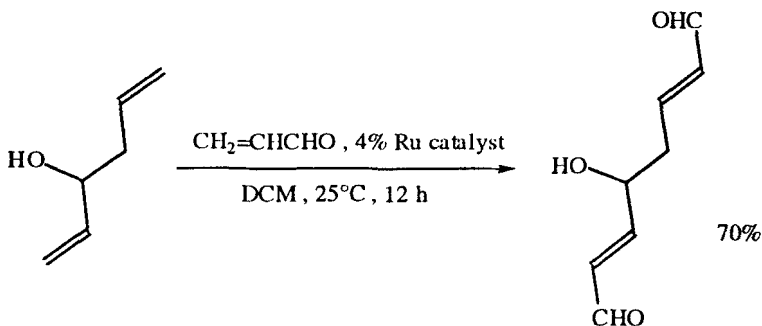
NO ADDITIONAL EXAMPLES

## REVIEWS:

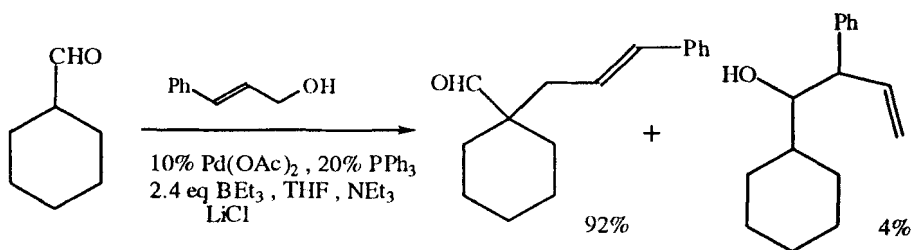
"Cyanohydrins in Nature and the Laboratory: Biology, Preparations and Synthetic Applications," Gregory, R.J.H. *Chem. Rev.*, 1999, 99, 3649.

## SECTION 341: ALDEHYDE - ALKENE

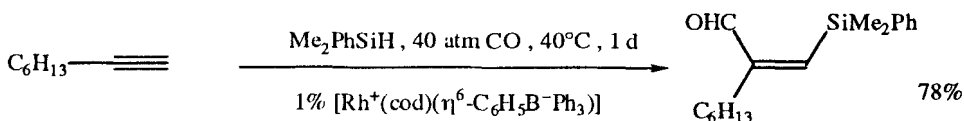
For the oxidation of allylic alcohols to alkene aldehydes, also see Section 48 (Aldehydes from Alcohols).



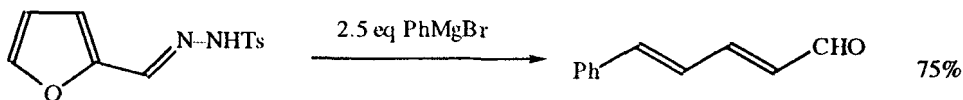
Bouzbouz, S.; Cossy, J. *Org. Lett.*, **2001**, 3, 1451.



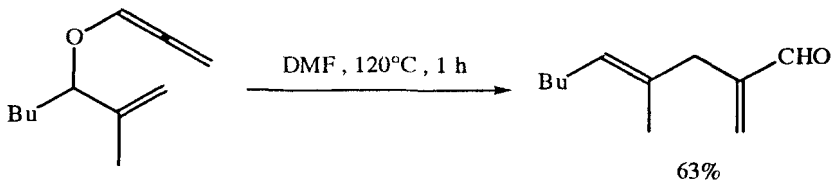
Kimura, M.; Horino, Y.; Mukai, R.; Tanaka, S.; Tamaru, Y.  
*J. Am. Chem. Soc.*, **2001**, 123, 10401.



Okazaki, H.; Kawanami, Y.; Yamamoto, K. *Chem. Lett.*, **2001**, 650.

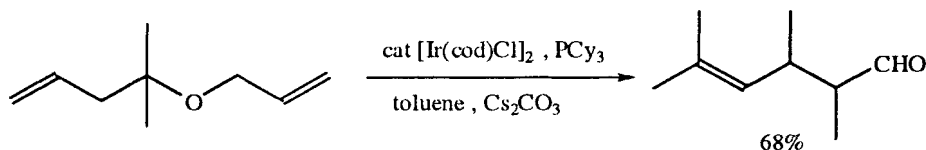


Chandrasekhar, S.; Reddy, M.V.; Reddy, K.S.; Ramarao, C. *Tetrahedron Lett.*, **2000**, 41, 2667.

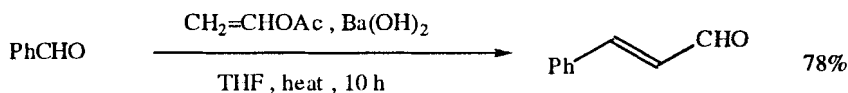


Parsons, P.J.; Thomson, P.; Taylor, A.; Sparks, T. *Org. Lett.*, **2000**, 2, 571.

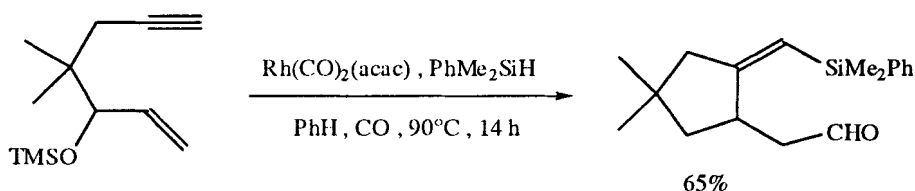




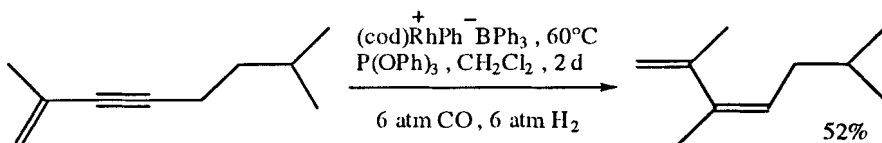
Higashino, T.; Sakaguchi, S.; Ishii, Y. *Org. Lett.*, **2000**, *2*, 4193.



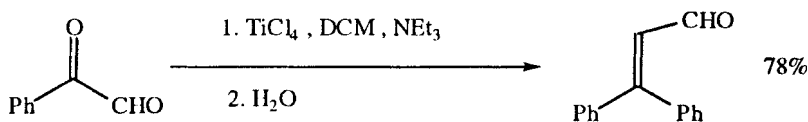
Mahata, P.K.; Barun, O.; Ila, H.; Junjappa, H. *Synlett*, **2000**, 1345.



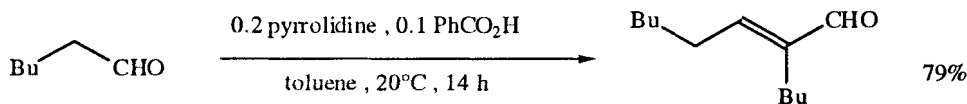
Fukuta, Y.; Matsuda, I.; Itoh, K. *Tetrahedron Lett.*, **1999**, *40*, 4703.



van den Hoven, B.G.; Alper, H. *J. Org. Chem.*, **1999**, *64*, 3961.



Bharathi, P.; Periasamy, M. *Org. Lett.*, **1999**, *1*, 857.



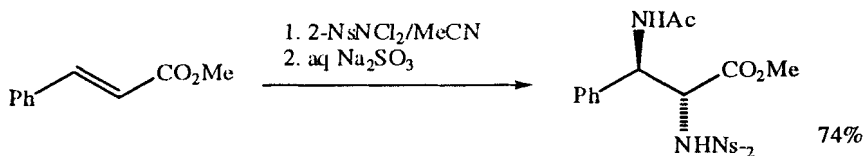
Ishikawa, T.; Uedo, E.; Okada, S.; Saito, S. *Synlett*, **1999**, 450.

## REVIEWS:

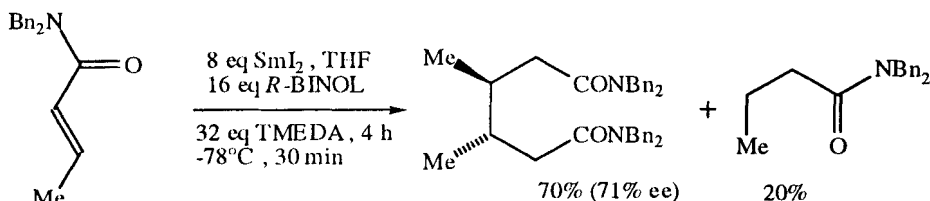
"The Silyloxy-Cope Rearrangement of Syn-Aldol Products: Evolution of a Powerful Synthetic Strategy," Schneider, C. *Synlett*, **2001**, 1079.

Also via  $\beta$ -Hydroxy aldehydes: Section 324 (Alcohols - Aldehyde).

## SECTION 342: AMIDE - AMIDE



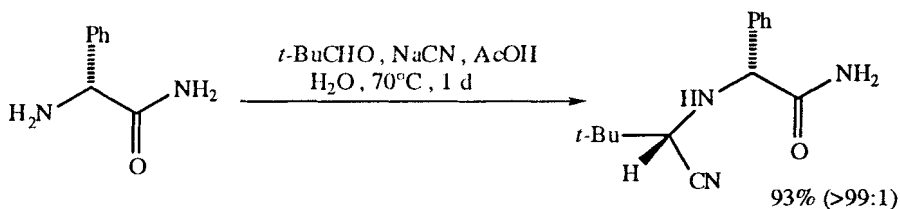
Li, G.; Kim, S.H.; Wei, H.-X. *Tetrahedron Lett.*, **2000**, *41*, 8699.



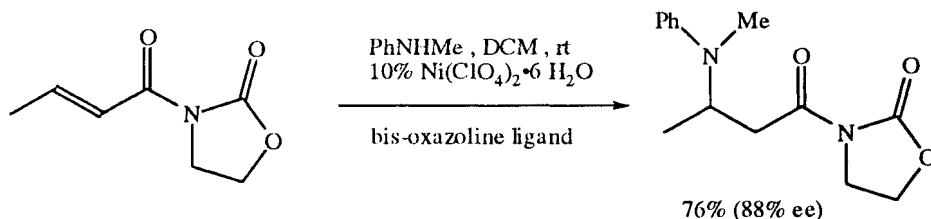
Kikukawa, T.; Hanamoto, T.; Inanaga, J. *Tetrahedron Lett.*, **1999**, *40*, 7497.

Also via Dicarboxylic Acids:      Section 312 (Carboxylic Acid - Carboxylic Acid)  
Diamines      Section 350 (Amines - Amines)

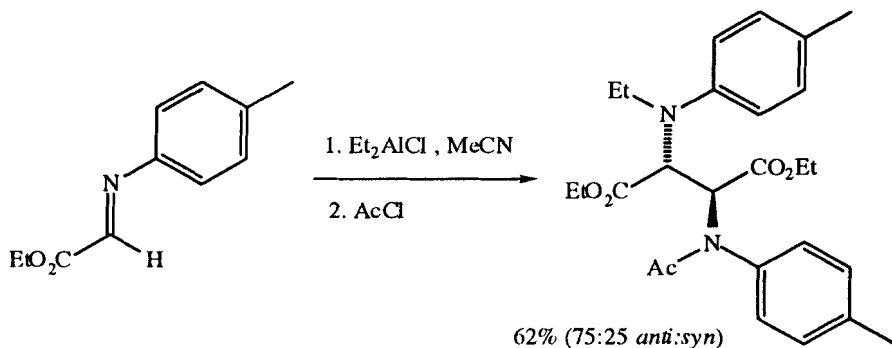
## SECTION 343: AMIDE - AMINE



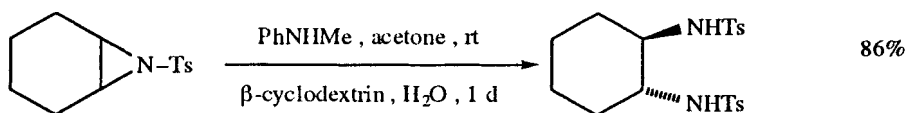
Boesten, W.H.J.; Seerden, J.-P.G.; de Lange, B.; Dielemans, H.J.A.; Elsenberg, H.L.M.; Kaptein, B.; Moudy, H.M.; Kellogg, R.M.; Broxterman, Q.B. *Org. Lett.*, **2001**, *3*, 1121.



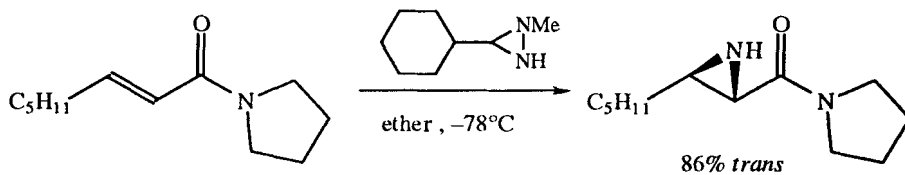
Zhuang, W.; Hazell, R.G.; Jørgensen, K.A. *Chem. Commun.*, **2001**, 1240.



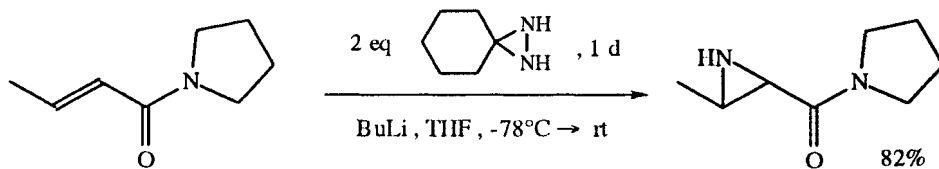
Shimizu, M.; Niwa, Y. *Tetrahedron Lett.*, **2001**, 42, 2829.



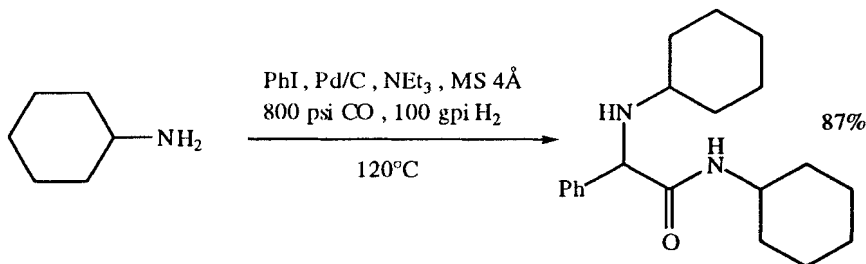
Reddy, M.A.; Reddy, L.R.; Bhanumathi, N.; Rao, K.R. *Chem. Lett.*, **2001**, 246.



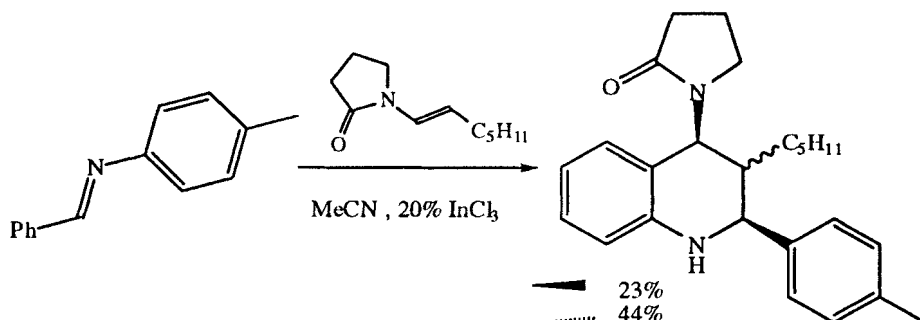
Ishihara, H.; Ito, Y.N.; Katsuki, T. *Chem. Lett.*, **2001**, 980.



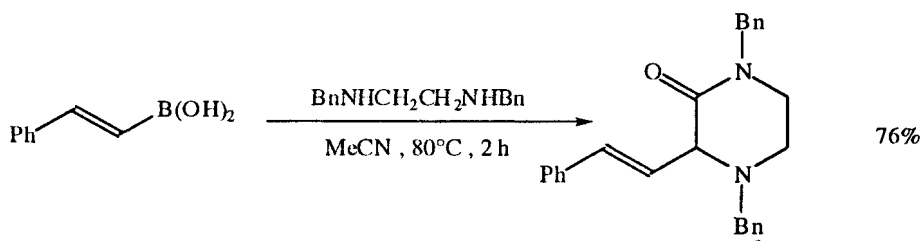
Hori, K.; Sugihara, H.; Ito, Y.N.; Katsuki, T. *Tetrahedron Lett.*, **1999**, 40, 5207.



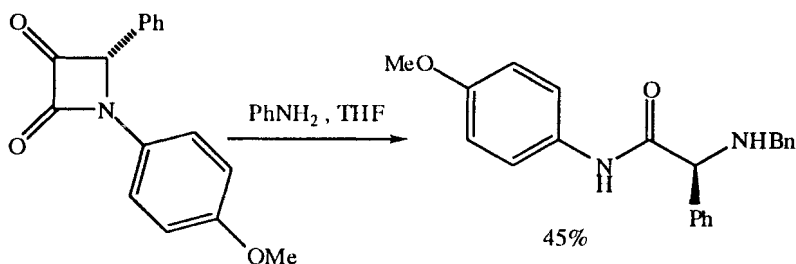
Lin, Y.-S.; Alper, H. *Angew. Chem. Int. Ed.*, **2001**, 40, 779.



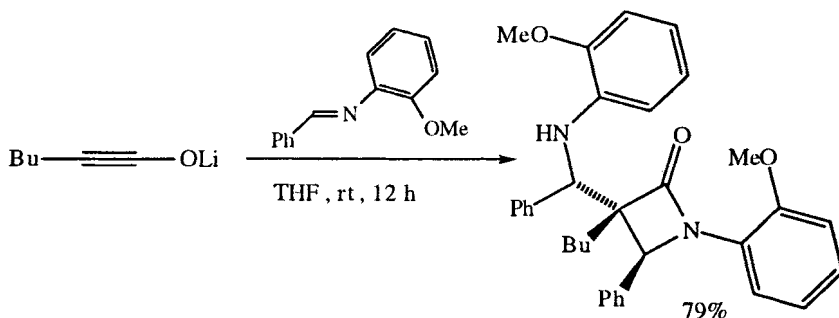
Hadden, M.; Nieuwenhuyzen, M.; Potts, D.; Stevenson, P.I.; Thompson, N. *Tetrahedron*, **2001**, *57*, 5615.



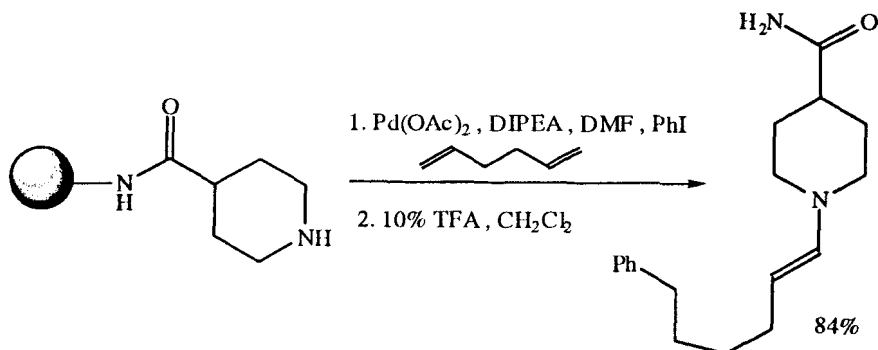
Petasis, N.A.; Patel, Z.D. *Tetrahedron Lett.*, **2000**, *41*, 9607.



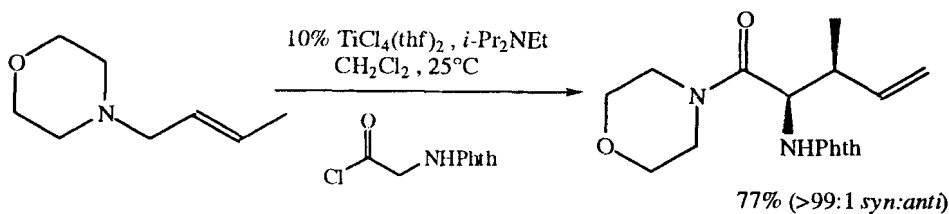
Alcaide, B.; Almendros, P.; Aragoncillo, C. *Chem. Commun.*, **2000**, 757.



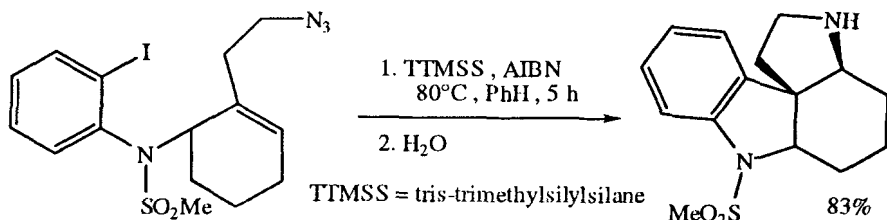
Shindo, M.; Oya, S.; Murakami, R.; Sato, Y.; Shishido, K. *Tetrahedron Lett.*, **2000**, *41*, 5943.



Wang, Y.; Huang, T.-N. *Tetrahedron Lett.*, **1999**, 40, 5837.

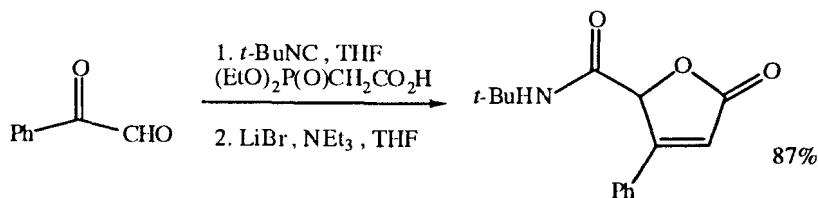


Yoon, T.P.; Dong, Vy.M.; MacMillan, D.W.C. *J. Am. Chem. Soc.*, **1999**, 121, 9726.

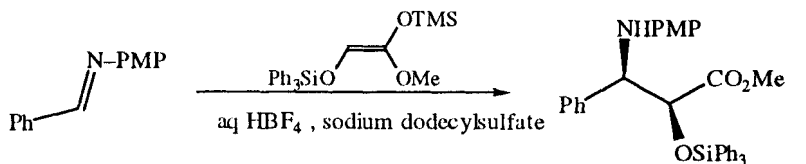
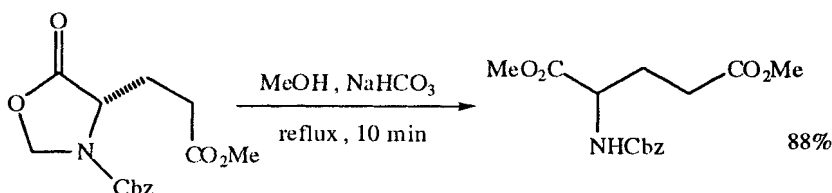


Kizil, M.; Patro, B.; Callaghan, O.; Murphy, J.A.; Hursthouse, M.B.; Hibbs, D. *J. Org. Chem.*, **1999**, 64, 7856.

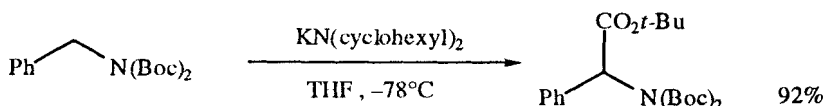
## SECTION 344: AMIDE - ESTER



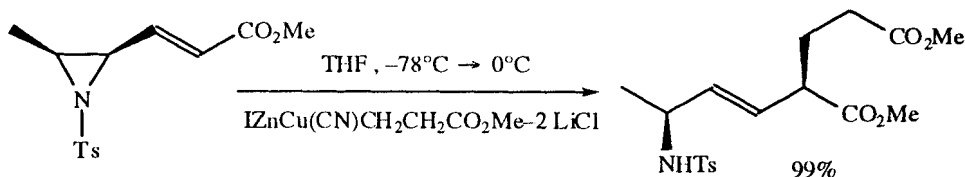
Beck, B.; Magnin-Lachaux, M.; Herdtweck, E.; Dömling, A. *Org. Lett.*, **2001**, 3, 2875.

90% (90:10 *syn:anti*)Akiyama, T.; Takaya, J.; Kagoshima, H. *Tetrahedron Lett.*, **2001**, *42*, 4025.

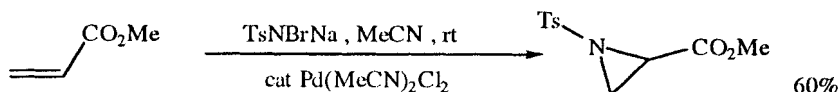
88%

Allevi, P.; Cighetti, G.; Anatasia, M. *Tetrahedron Lett.*, **2001**, *42*, 5319.

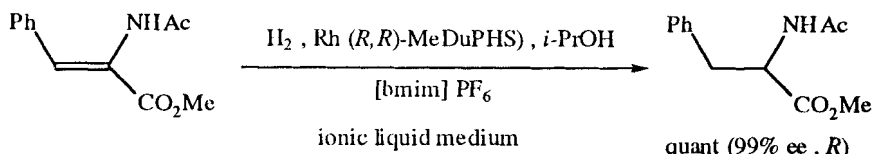
92%

Kise, N.; Ozaki, H.; Terui, H.; Ohya, K.; Ueda, N. *Tetrahedron Lett.*, **2001**, *42*, 7637.

99%

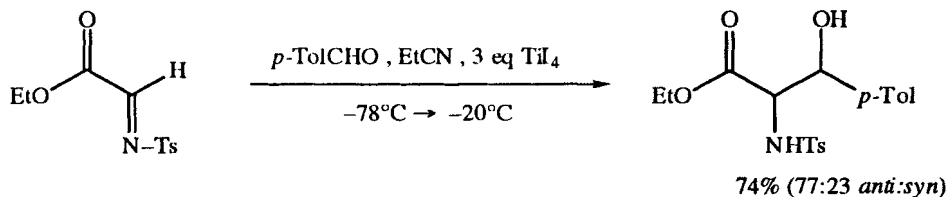
Oishi, S.; Tamamura, H.; Yamashita, M.; Odagaki, Y.; Hamanaka, N.; Otaka, A.; Fujii, N. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 2445.

60%

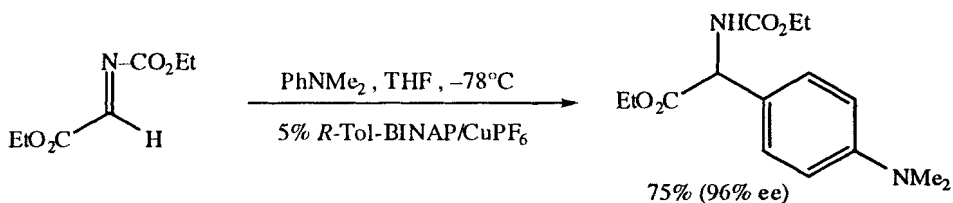
Antunes, A.M.M.; Marto, S.J.L.; Branco, P.S.; Prabhakar, S.; Lobo, A.M. *Chem. Commun.*, **2001**, 405.

ionic liquid medium

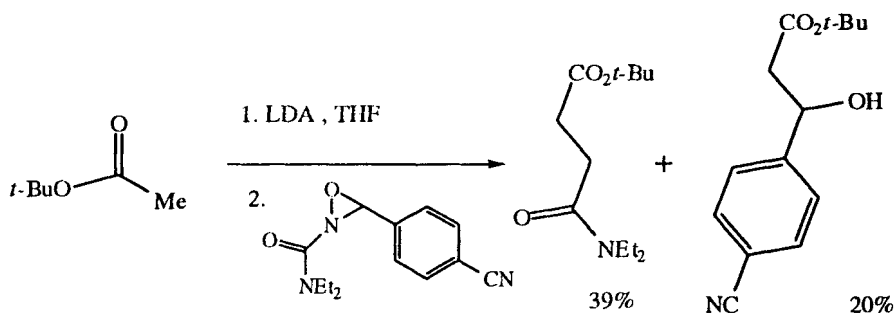
quant (99% ee, *R*)Guernik, S.; Wolfson, A.; Hrshowitz, M.; Greenspoon, N.; Geresh, S. *Chem. Commun.*, **2001**, 2314.



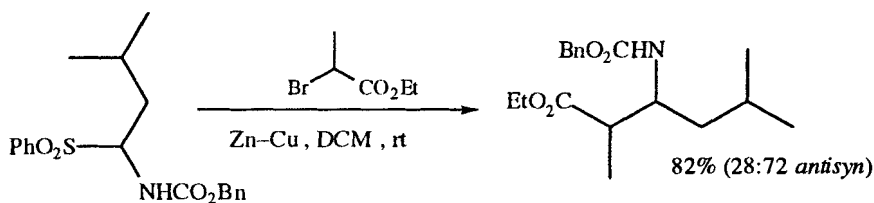
Shimizu, M.; Takeuchi, Y.; Sahara, T. *Chem. Lett.*, 2001, 1196.



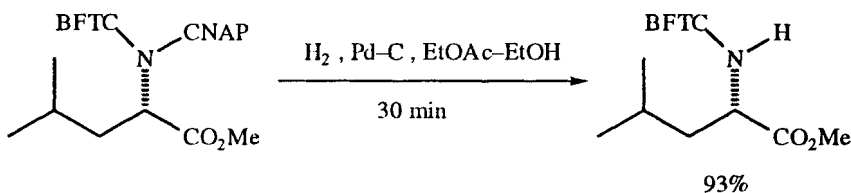
Saaby, S.; Fang, X.; Gathergood, N.; Jørgensen, K.A. *Angew. Chem. Int. Ed.*, 2000, 39, 4114.



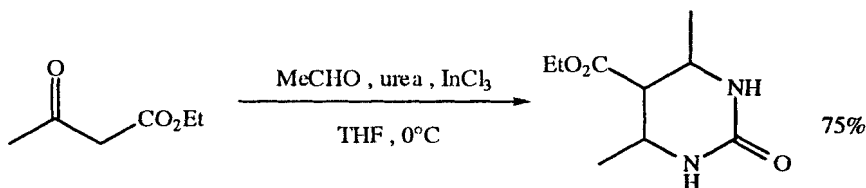
Armstrong, A.; Atkin, M.A.; Swallow, S. *Tetrahedron Lett.*, 2000, 41, 2247.



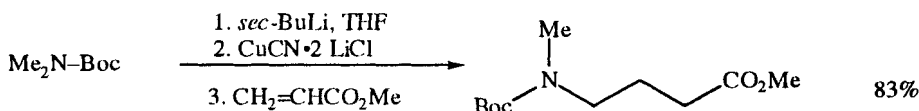
Mecozzi, T.; Petrini, M. *Tetrahedron Lett.*, 2000, 41, 2709.



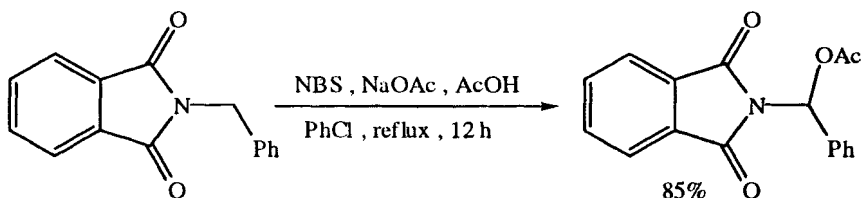
Papageorgiou, E.A.; Gaunt, M.J.; Yu, J.-q.; Spencer, J.B. *Org. Lett.*, 2000, 2, 1049.



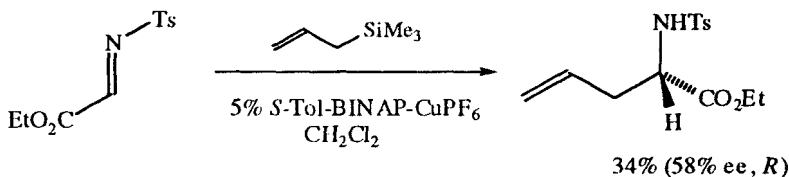
Ranu, B.C.; Hajra, A.; Jana, U. *J. Org. Chem.*, 2000, 65, 6270.



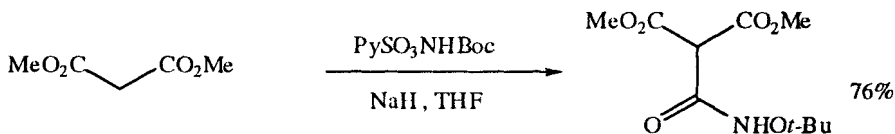
Dieter, R.K.; Lu, K.; Velu, S.E. *J. Org. Chem.*, 2000, 65, 8715.



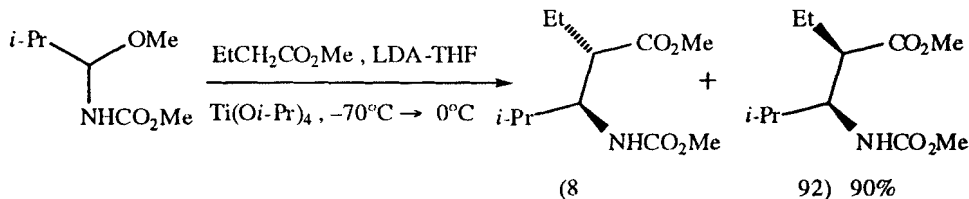
Cho, S.-D.; Kim, H.-J.; Ahn, C.; Falck, J.R.; Shin, D.-S. *Tetrahedron Lett.*, 1999, 40, 8215.



Fang, X.; Johannsen, M.; Hao, S.; Gathergood, N.; Hazell, R.G.; Jørgensen, K.A. *J. Org. Chem.*, 1999, 64, 4844.

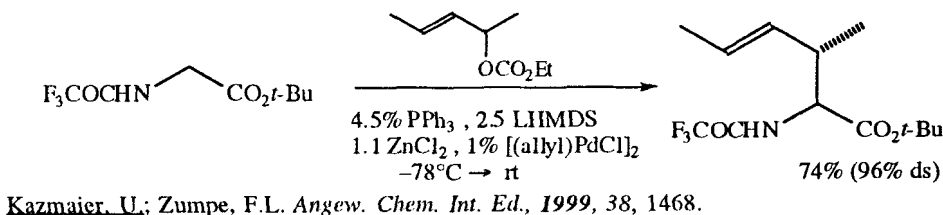
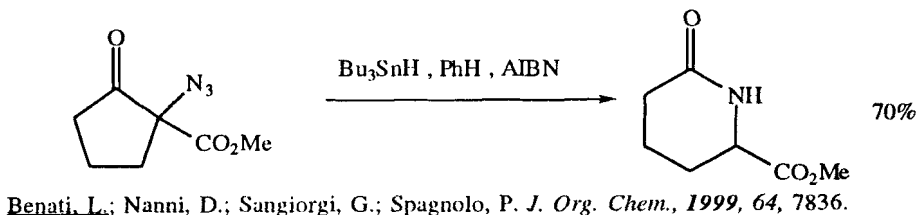
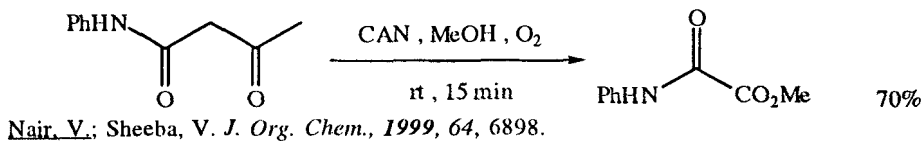


Hanessian, S.; Johnstone, S. *J. Org. Chem.*, 1999, 64, 5896.



Kise, N.; Ueda, N. *J. Org. Chem.*, 1999, 64, 7511.

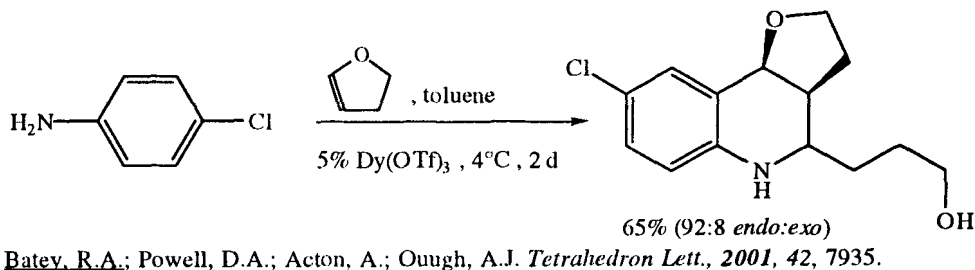
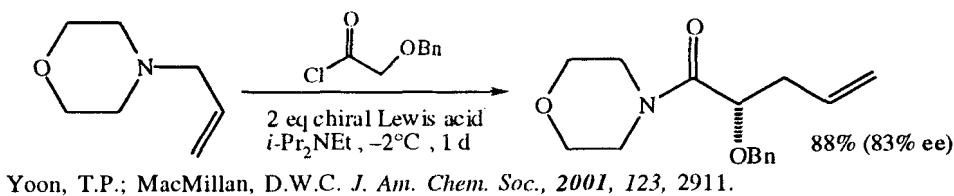


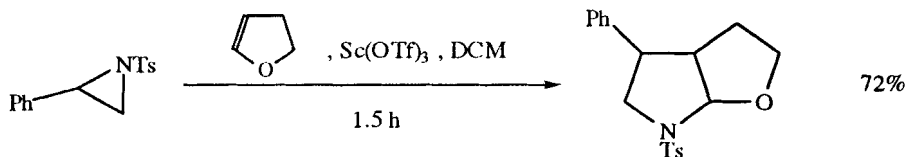


Related Methods:

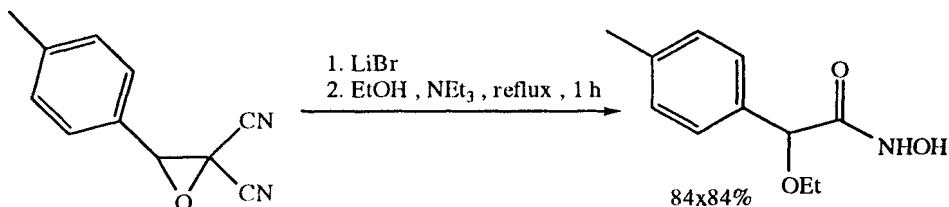
Section 315 (Carboxylic Acid - Amide)  
 Section 316 (Carboxylic Acid - Amine)  
 Section 351 (Amine - Ester)

## SECTION 345: AMIDE - ETHER, EPOXIDE, THIOETHER

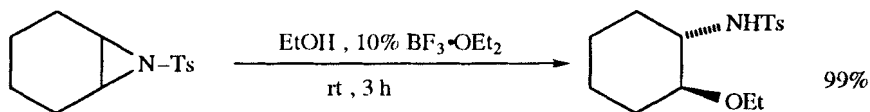




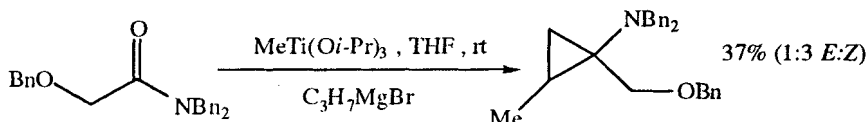
Yadav, J.S.; Reddy, B.V.S.; Pandey, S.K.; Srihari, P.; Prathap, I. *Tetrahedron Lett.*, **2001**, *42*, 9085.



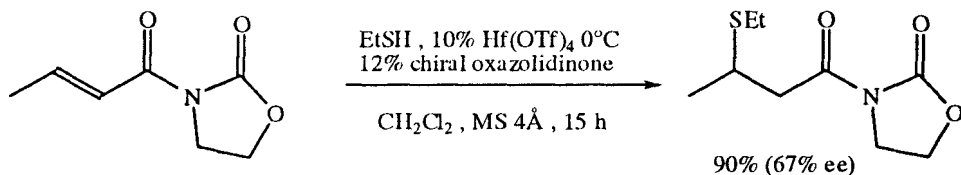
Boukhris, S.; Souizi, A. *Tetrahedron Lett.*, **2000**, *41*, 2559.



Prasad, B.A.B.; Sera, G.; Singh, V.K. *Tetrahedron Lett.*, **2000**, *41*, 4677.

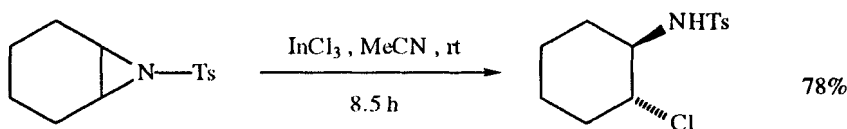


Kordes, M.; Winsel, H.; De Meijere, A. *Eur. J. Org. Chem.*, **2000**, 3235.

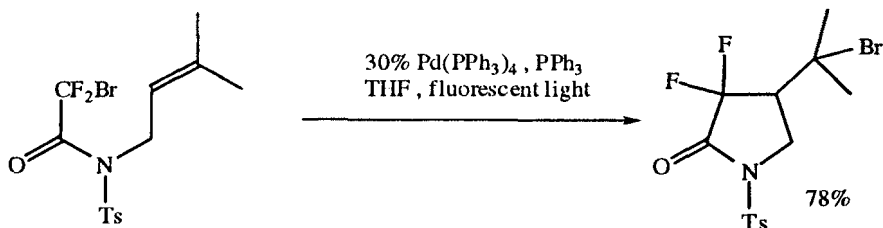


Kobayashi, S.; Ogawa, C.; Kawamura, M.; Sugiura, M. *Synlett*, **2000**, 983.

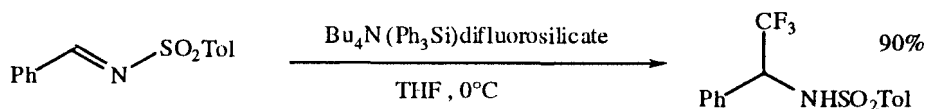
## SECTION 346: AMIDE - HALIDE, SULFONATE



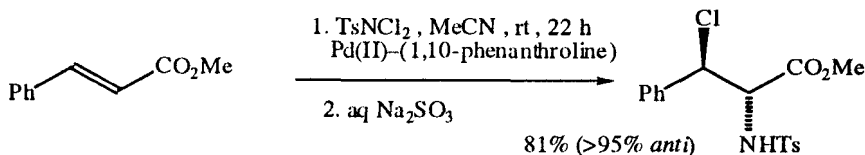
Yadav, J.S.; Subba Reddy, B.V.; Kumar, G.M. *Synlett*, **2001**, 1417.



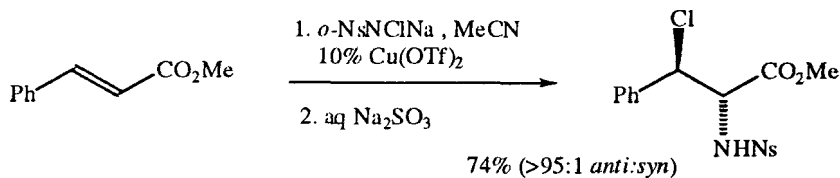
Nagashima, H.; Isono, Y.; Iwamatsu, S.-i. *J. Org. Chem.*, **2001**, *66*, 315.



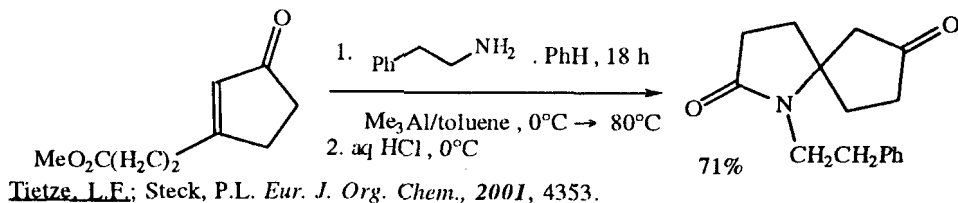
Prakash, G.K.S.; Mandal, M.; Olah, G.A. *Synlett*, **2001**, 77.



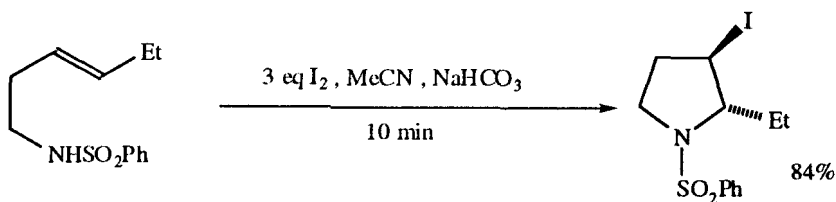
Wei, H.-X.; Kim, S.H.; Li, G. *Tetrahedron*, **2001**, *57*, 3869.



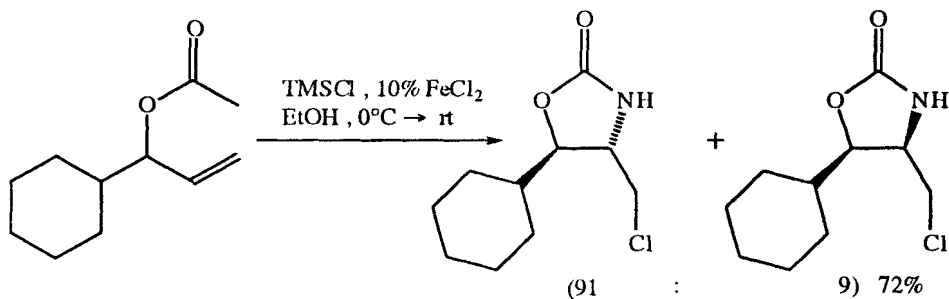
Li, G.; Wei, H.-X.; Kim, S.H. *Tetrahedron*, **2001**, *57*, 8407.



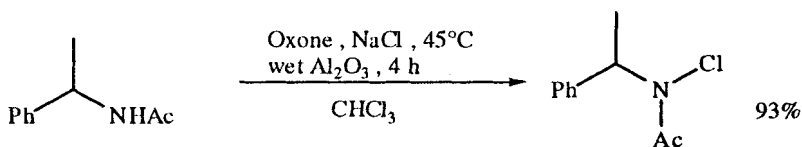
Tietze, L.F.; Steck, P.L. *Eur. J. Org. Chem.*, **2001**, 4353.



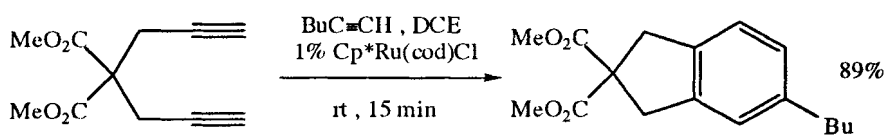
Jones, A.D.; Knight, D.W.; Hibbs, D.E. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 1182.



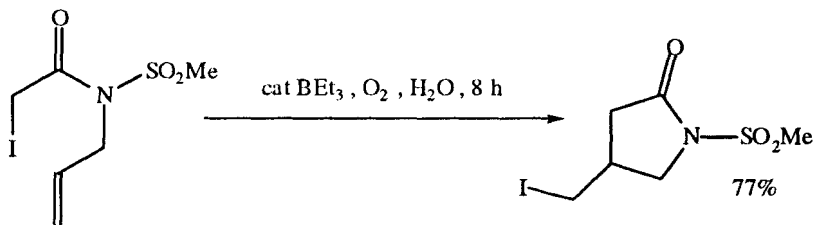
Bach, T.; Schlummer, B.; Harms, K. *Chem. Eur. J.*, **2001**, *7*, 2581.



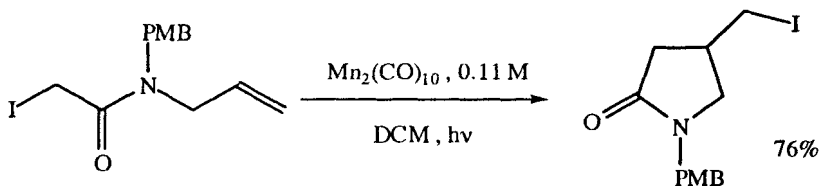
Curini, M.; Epifano, F.; Marcotullio, M.C.; Rosati, O.; Tsadjout, A. *Synlett*, **2000**, 813.



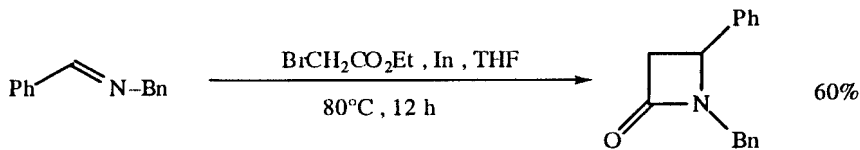
Li, G.; Wei, H.-X.; Kim, S.H. *Org. Lett.*, **2000**, *2*, 2249.



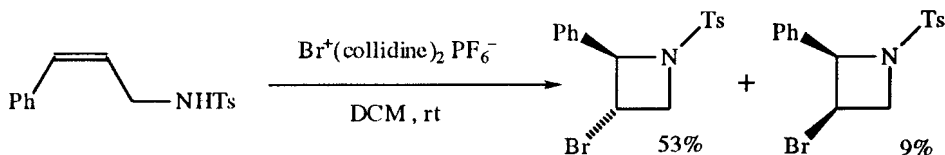
Wakabayashi, K.; Yorimitsu, H.; Shinokubo, H.; Oshima, K. *Bull. Chem. Soc. Jpn.*, **2000**, *73*, 2377.



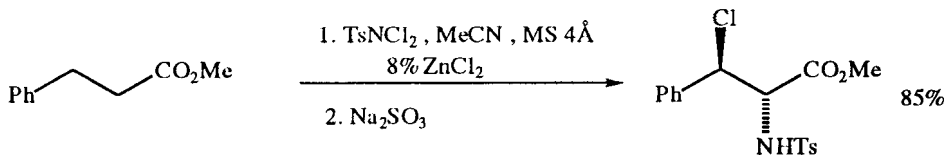
Gilbert, B.C.; Kalz, W.; Lindsay, C.I.; McGrail, P.T.; Parsons, A.E.; Whittaker, D.T.E. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 1187.



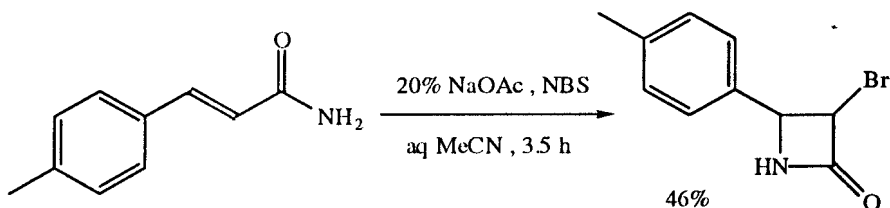
Banik, B.K.; Ghatak, A.; Becker, F.F. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 2179.



Robin, S.; Rousseau, G. *Eur. J. Org. Chem.*, **2000**, 3007.

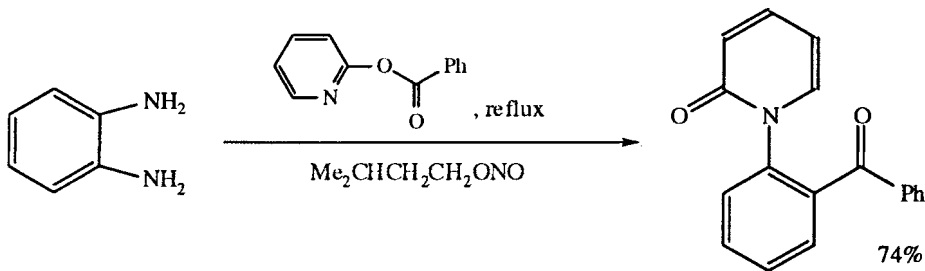


Li, G.; Wei, H.-X.; Kim, S.H.; Neighbors, M. *Org. Lett.*, **1999**, 1, 395.

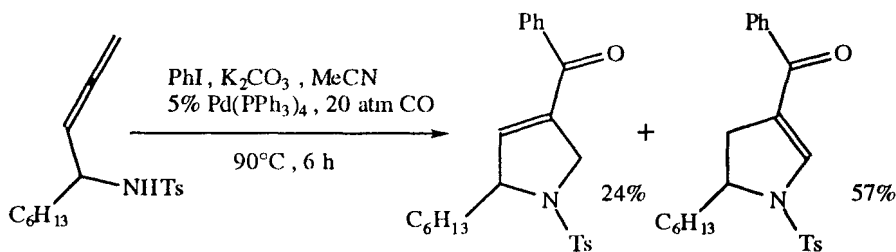


Naskar, D.; Roy, S. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 2435.

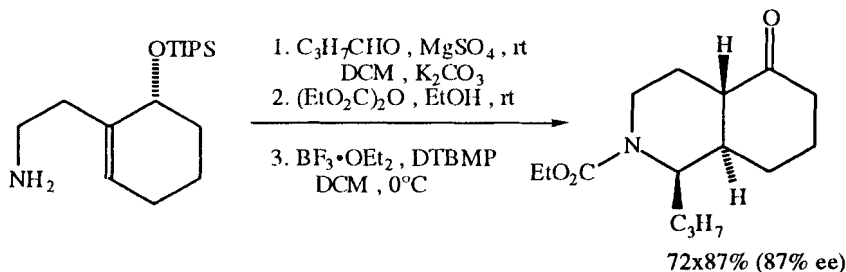
## SECTION 347: AMIDE - KETONE



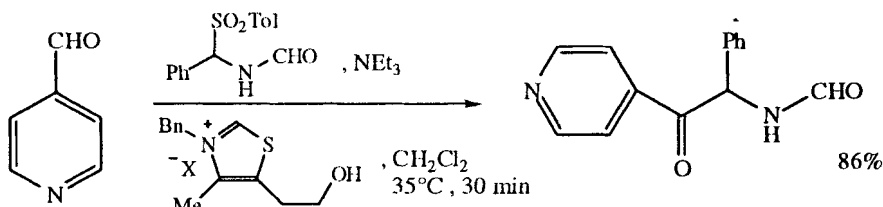
Rayabharapu, D.K.; Majumdar, K.K.; Sambaiiah, T.; Cheng, C.-H. *J. Org. Chem.*, **2001**, 66, 3646.



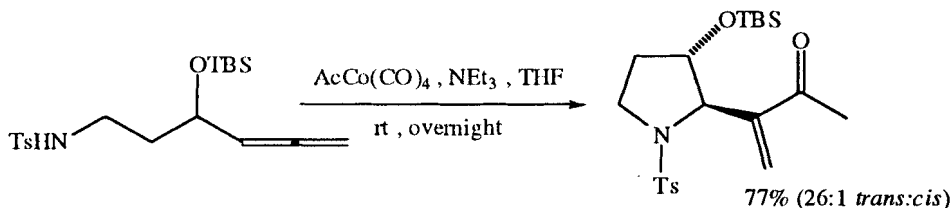
Kang, S.-K.; Kim, K.I. *Org. Lett.*, **2001**, 3, 511.



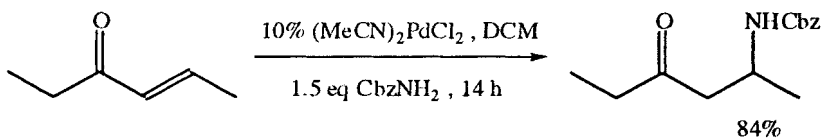
Kametani, A.; Overman, L.E. *Org. Lett.*, **2001**, 3, 1229.



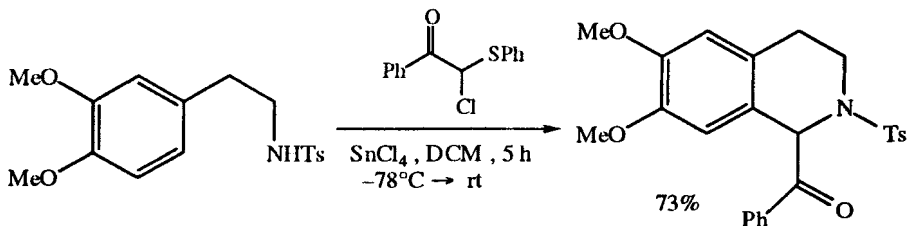
Murry, J.A.; Frantz, D.E.; Soheili, A.; Tillyer, R.; Grabowski, E.J.J.; Reider, P.J. *J. Am. Chem. Soc.*, **2001**, 123, 9696.



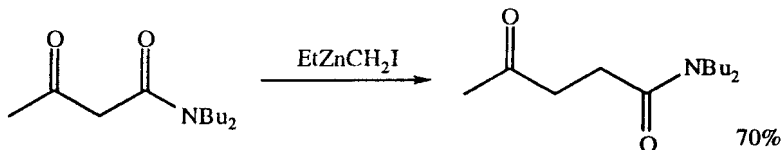
Bates, R.W.; Satcharoen, V. *Synlett*, **2001**, 532.



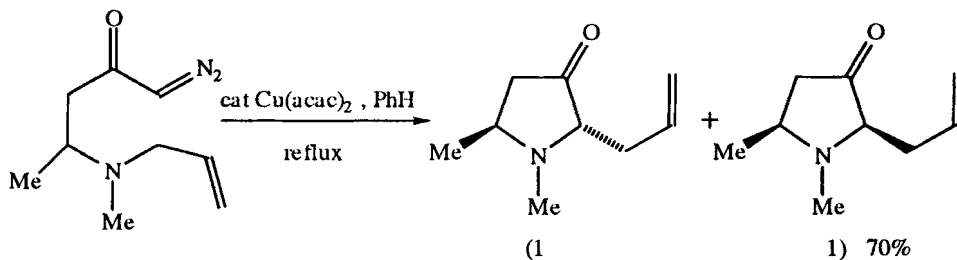
Gaunt, M.J.; Spencer, J.B. *Org. Lett.*, **2001**, 3, 25.



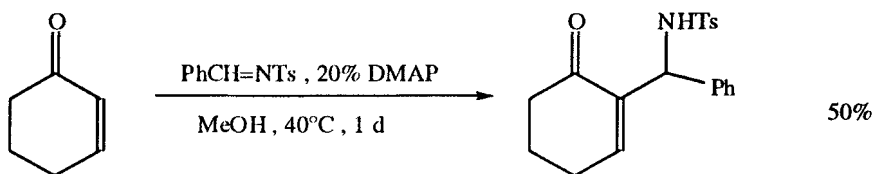
Silveira, C.C.; Bernardi, C.R.; Braga, A.L.; Kaufman, T.S. *Tetrahedron Lett.*, **2001**, 42, 8947.



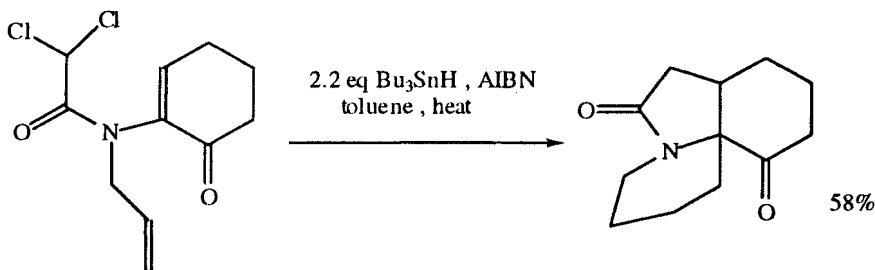
Hilgenkamp, R.; Zercher, C.K. *Tetrahedron*, **2001**, 57, 8793.



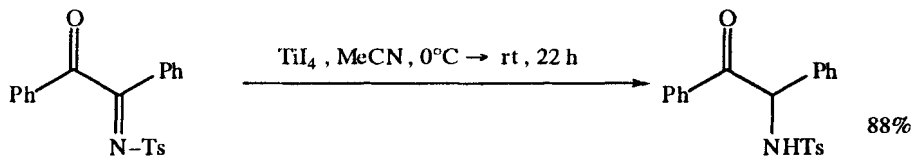
Clark, J.S.; Hodgson, P.B.; Goldsmith, M.D.; Street, L.J. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 3312.



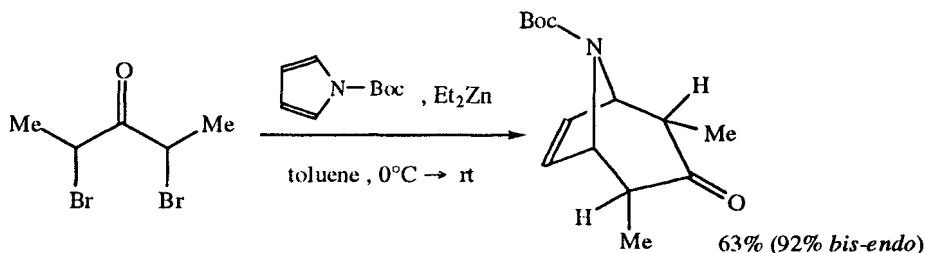
Shi, M.; Xu, Y.-M. *Chem. Commun.*, **2001**, 1876.



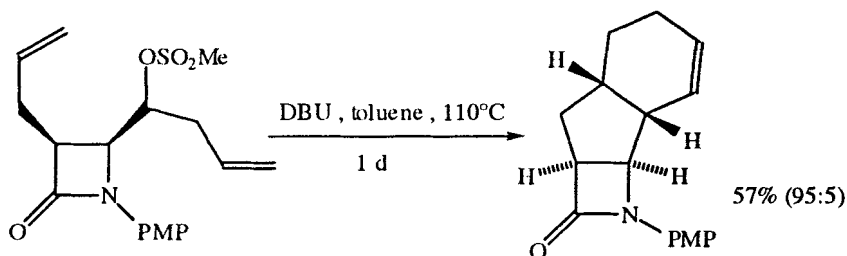
Parsons, A.F.; Williams, D.A.J. *Tetrahedron*, **2000**, 56, 7217.



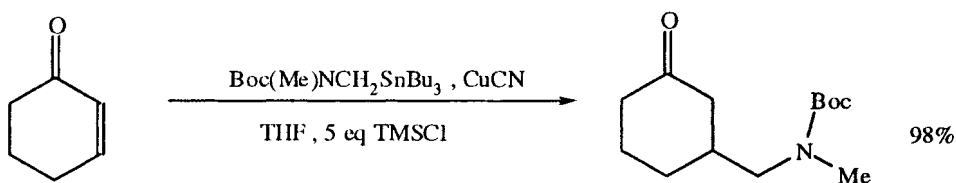
Shimizu, M.; Sahara, T.; Hayakawa, R. *Chem. Lett.*, 2001, 792.



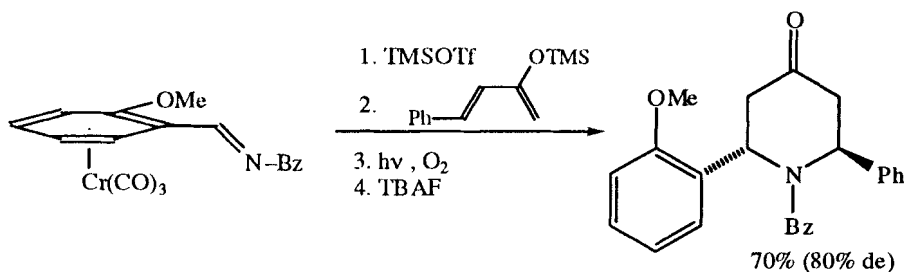
Paparin, J.-L.; Crévisy, C.; Grée, R. *Tetrahedron Lett.*, 2000, 41, 2343.



Alcaide, B.; Almendros, P.; Salgado, N.R. *J. Org. Chem.*, 2000, 65, 3310.

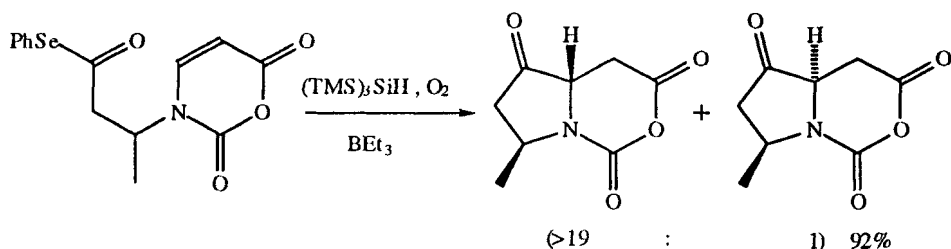


Dieter, R.K.; Alexander, C.W.; Nice, L.E. *Tetrahedron*, 2000, 56, 2767.

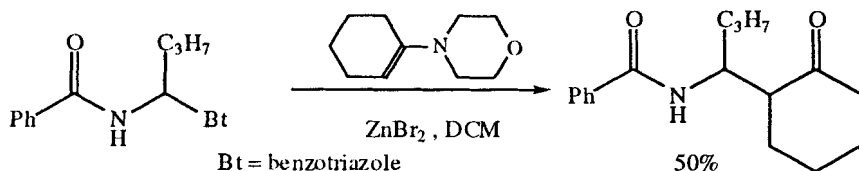


Ishimaru, K.; Kojima, T. *J. Chem. Soc., Perkin Trans. 1*, 2000, 2105.

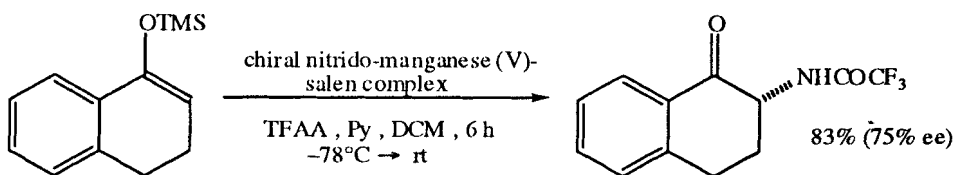




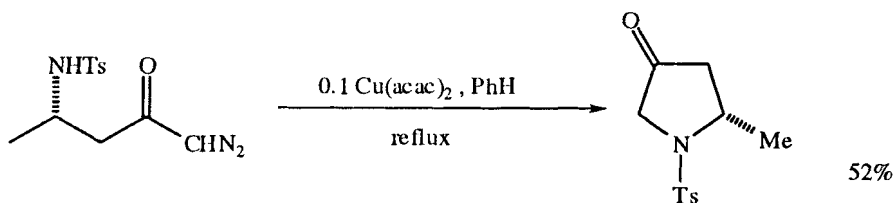
Evans, P.A.; Managan, T.; Rheingold, A.L. *J. Am. Chem. Soc.*, **2000**, *122*, 11009.



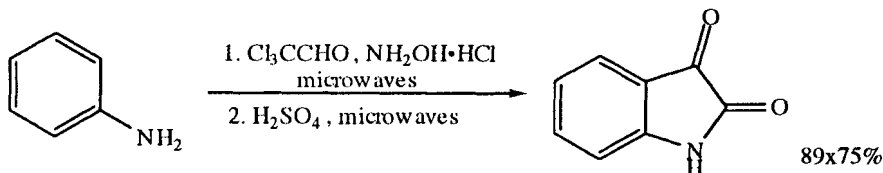
Katritzky, A.R.; Fang, Y.; Silina, A. *J. Org. Chem.*, **1999**, *64*, 7622.



Svenstrup, N.; Bøgevig, A.; Hazell, R.G.; Jørgensen, K.A.  
*J. Chem. Soc., Perkin Trans. 1*, **1999**, 1559.



Wang, J.; Hou, Y.; Wu, P. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 2277.

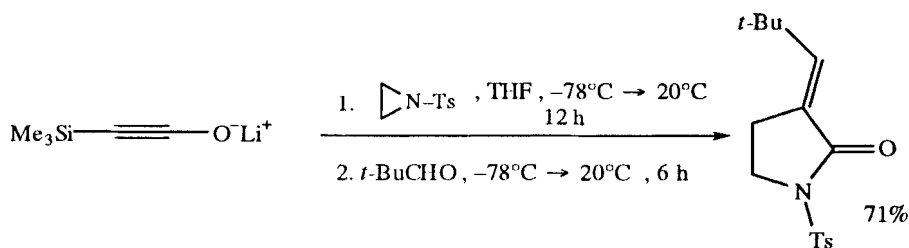
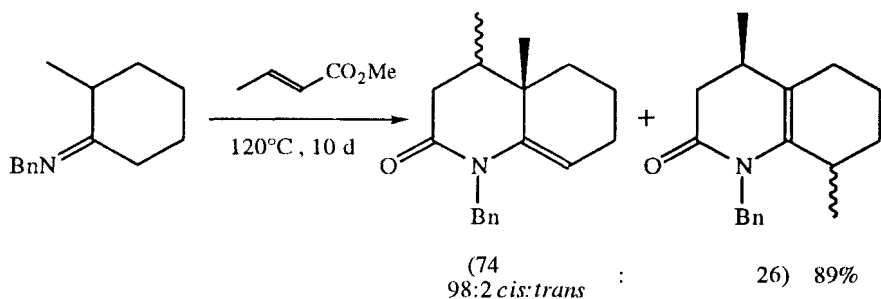
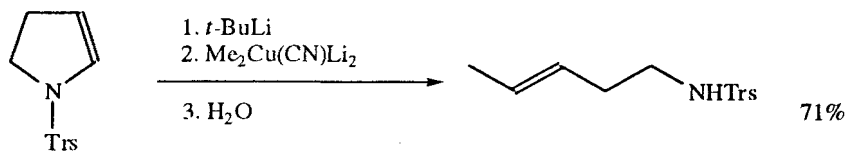
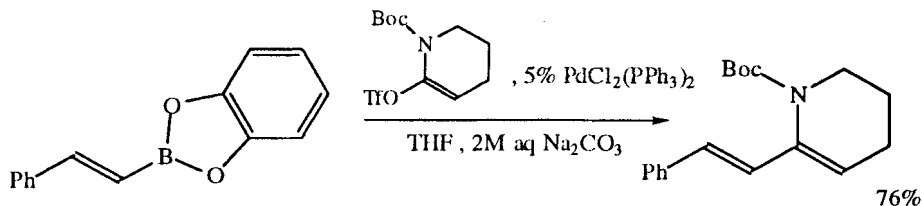


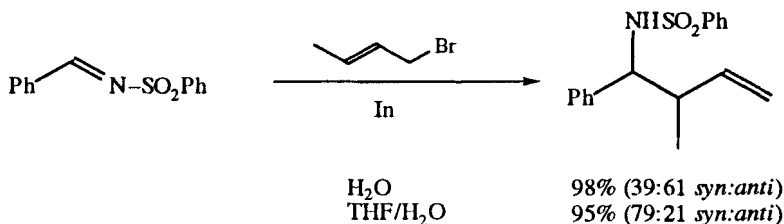
Janeshwara, G.K.; Bedekar, A.V.; Deshpande, V.H. *Synth. Commun.*, **1999**, *29*, 3627.

## SECTION 348: AMIDE - NITRILE

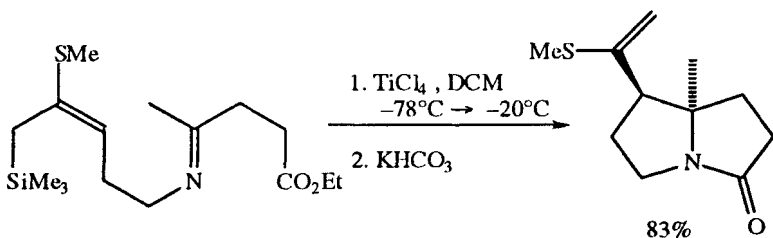
NO ADDITIONAL EXAMPLES

## SECTION 349: AMIDE - ALKENE

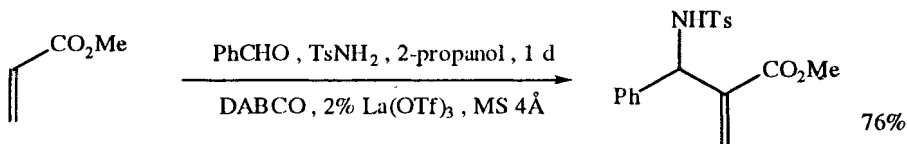
Iwamoto, K.; Kojima, M.; Chatani, N.; Murai, S. *J. Org. Chem.*, **2001**, 66, 169.Jabin, L.; Revial, G.; Monnier-Benoit, N.; Netchitaïlo, P. *J. Org. Chem.*, **2001**, 66, 256.Neipp, C.E.; Humphrey, J.M.; Martin, S.E. *J. Org. Chem.*, **2001**, 66, 531.Occhiato, E.G.; Trabocchi, A.; Guarna, A. *J. Org. Chem.*, **2001**, 66, 2459.



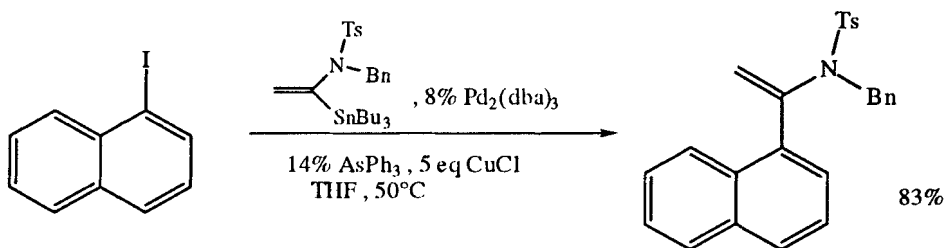
Lu, W.; Chan, T.H. *J. Org. Chem.*, **2001**, *66*, 3467.



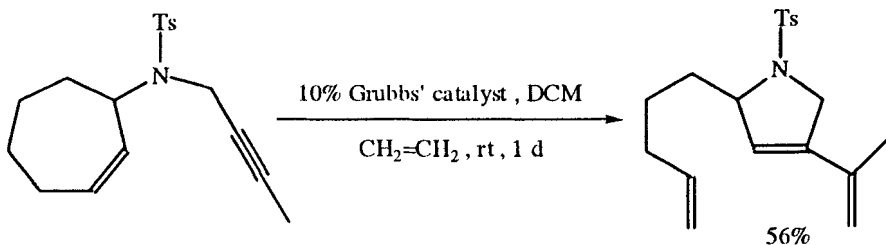
Duncan, D.; Livinghouse, T. *J. Org. Chem.*, **2001**, *66*, 5237.



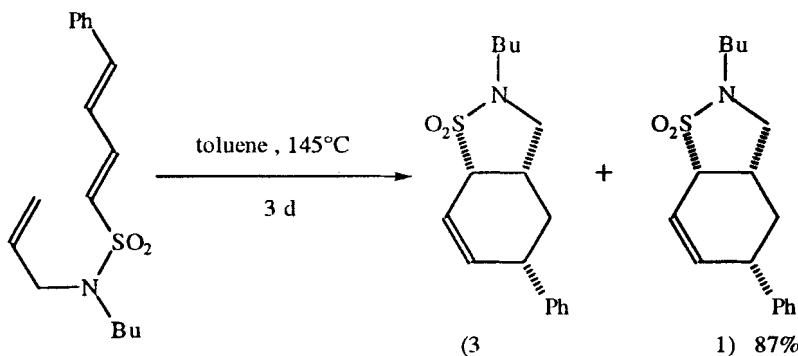
Balan, D.; Adolfsson, H. *J. Org. Chem.*, **2001**, *66*, 6498.



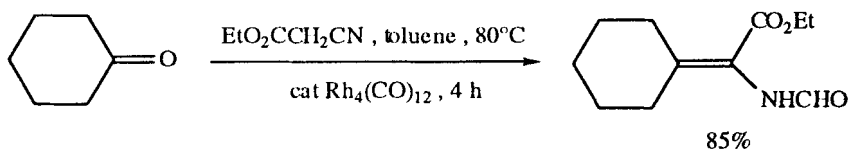
Minière, S.; Cintrat, J.-C. *J. Org. Chem.*, **2001**, *66*, 7385.



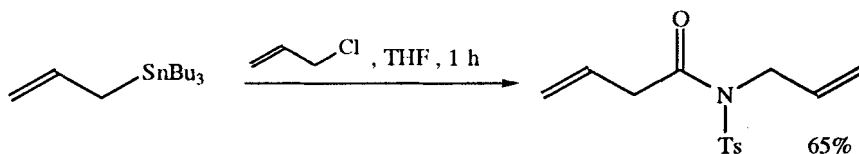
Kitamura, T.; Mori, M. *Org. Lett.*, **2001**, *3*, 1161.



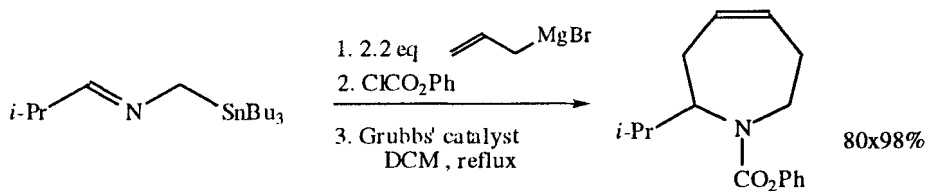
Greig, I.R.; Tozer, M.J.; Wright, P.T. *Org. Lett.*, **2001**, 3, 369.



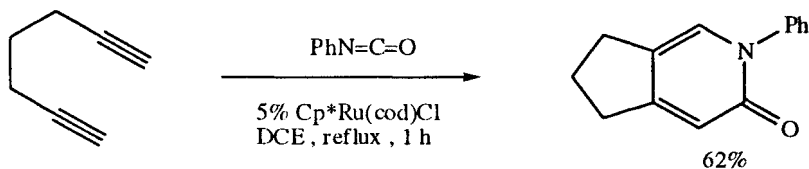
Takaya, H.; Kojima, S.; Murahashi, S.-i. *Org. Lett.*, **2001**, 3, 421.



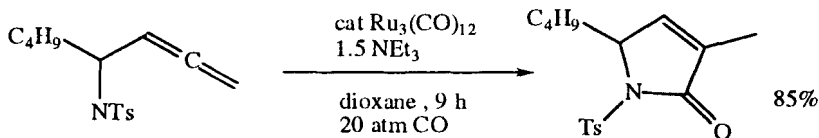
Solin, N.; Narayan, S.; Szabó, K.J. *Org. Lett.*, **2001**, 3, 909.



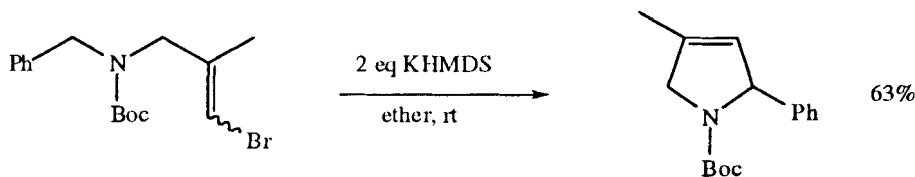
Pearson, W.H.; Aponick, A. *Org. Lett.*, **2001**, 3, 1327.



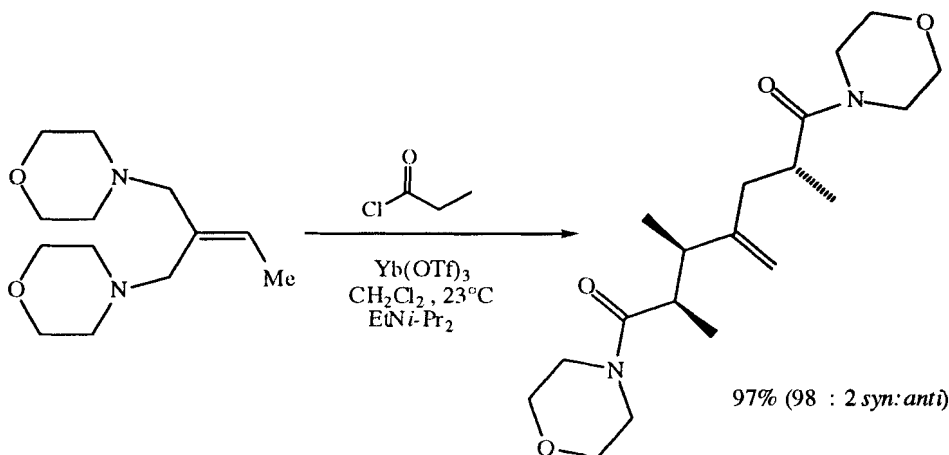
Yamamoto, Y.; Takagishi, H.; Itoh, K. *Org. Lett.*, **2001**, 3, 2117.



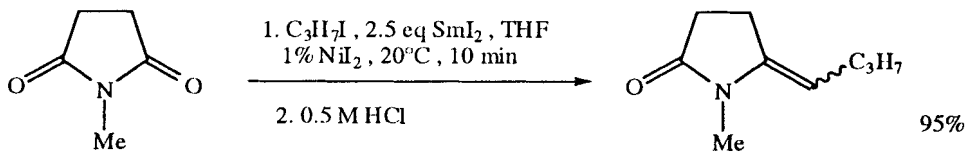
Kang, S.-K.; Kim, K.-J.; Yu, C.-M.; Hwang, J.-W.; Do, Y.-K. *Org. Lett.*, **2001**, 3, 2851.



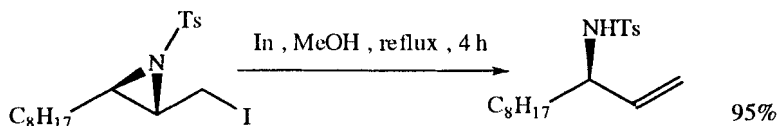
Green, M.P.; Prodger, J.; Sherlock, A.E.; Hayes, C.J. *Org. Lett.*, **2001**, 3, 3377.



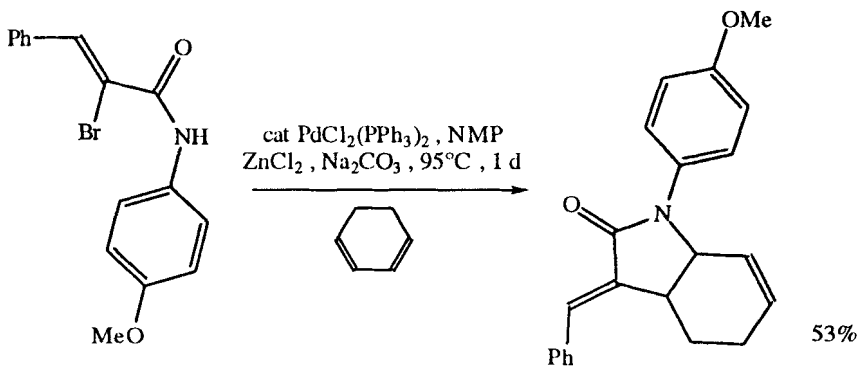
Dong, V.M.; MacMillan, D.W.C. *J. Am. Chem. Soc.*, **2001**, 123, 2448.



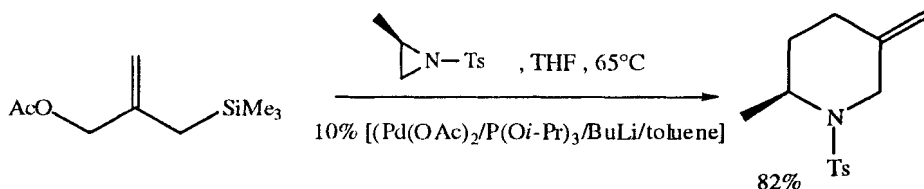
Farcas, S.; Namy, J.-L. *Tetrahedron Lett.*, **2001**, 42, 879.



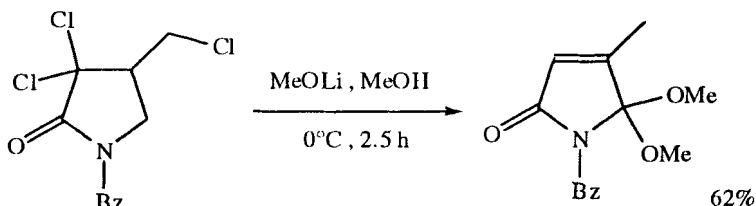
Yadav, J.S.; Bandyopadhyay, A.; Reddy, B.V.S. *Synlett*, **2001**, 1608.



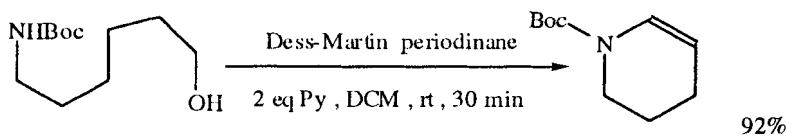
Iyer, S.; Ramesh, C.; Kulkarni, G.M. *Synlett*, **2001**, 1241.



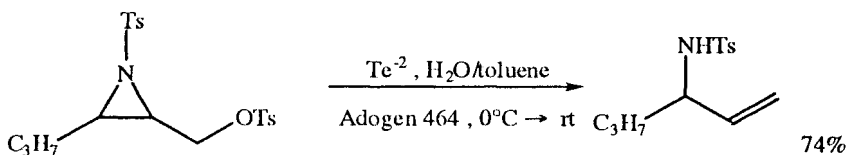
Hedley, S.J.; Moran, W.J.; Prenzel, A.H.G.P.; Price, D.A.; Harrity, J.P.A. *Synlett*, **2001**, 1596.



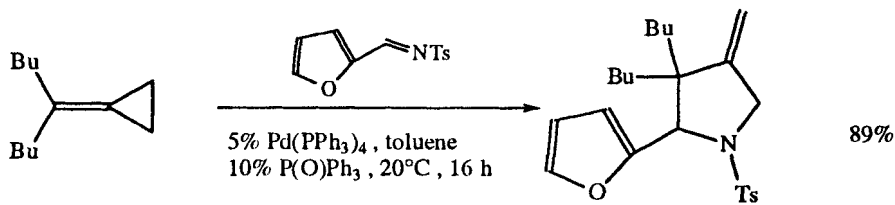
Bellesia, F.; De Buyck, L.; Colucci, M.V.; Ghelfi, E.; Laureyn, I.; Libertini, E.; Mucci, A.; Pagnoni, U.M.; Pinetti, A.; Rogge, T.M.; Stevens, C.V. *Tetrahedron Lett.*, **2001**, 42, 4573.



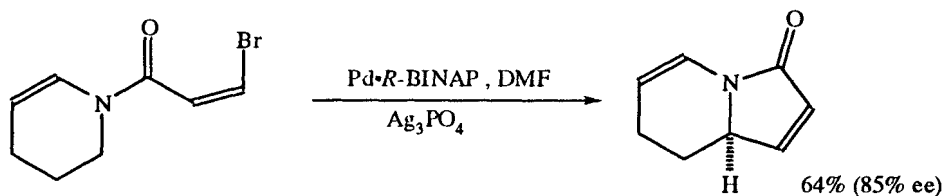
Yu, C.; Hu, L. *Tetrahedron Lett.*, **2001**, 42, 5167.



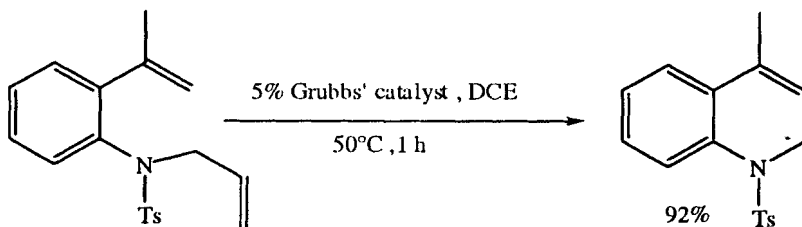
Chao, B.; Dittmer, D.C. *Tetrahedron Lett.*, **2001**, 42, 5789.



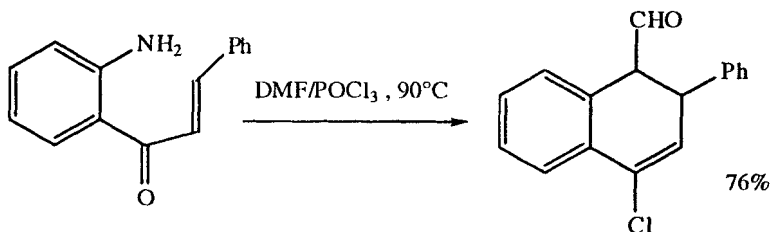
Oh, B.H.; Nakamura, I.; Saito, S.; Yamamoto, Y. *Tetrahedron Lett.*, **2001**, 42, 6203.



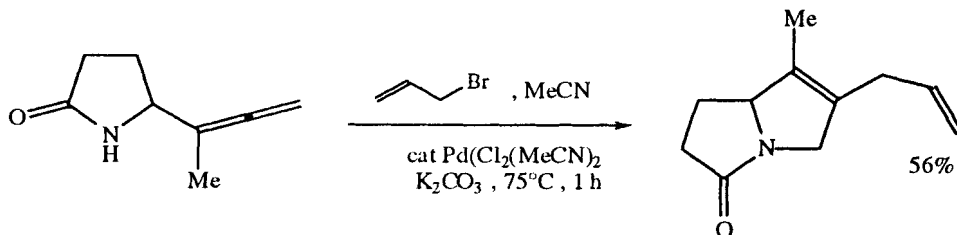
Kiewel, K.; Tallant, M.; Sulikowski, G.A. *Tetrahedron Lett.*, **2001**, 42, 6621.



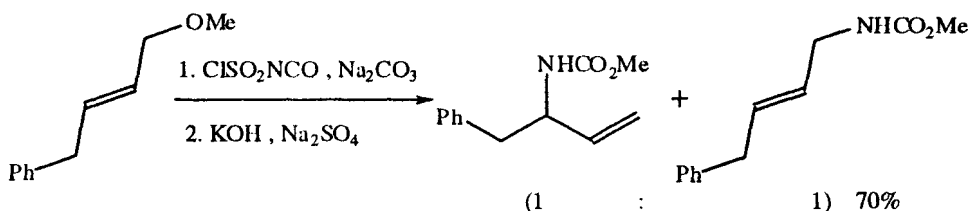
Arisawa, M.; Theeraladanon, C.; Nishida, A.; Nakagawa, M. *Tetrahedron Lett.*, **2001**, 42, 8029.



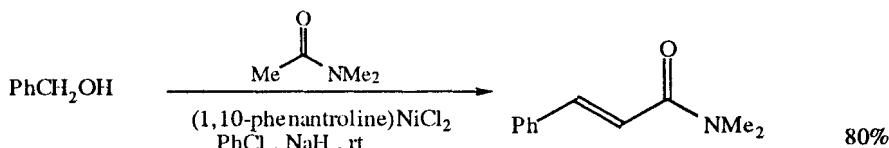
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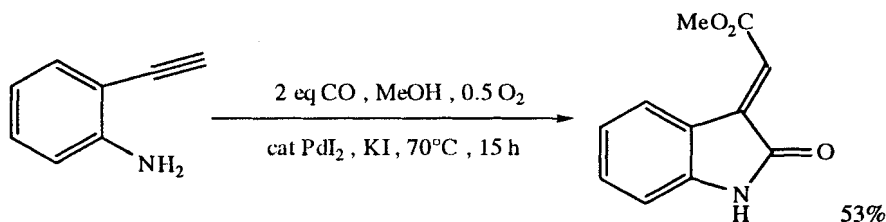
Karstens, W.F.J.; Klomp, D.; Rutjes, F.P.J.T.; Hiemstra, H. *Tetrahedron*, **2001**, 57, 5123.



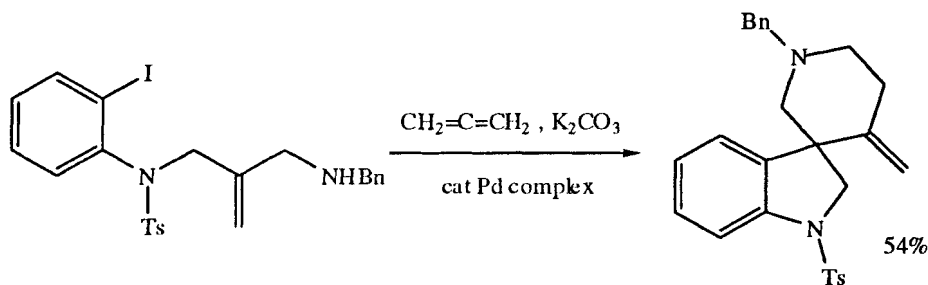
Kim, J.D.; Lee, M.H.; Han, G.; Park, H.; Zee, O.P.; Jung, Y.H. *Tetrahedron*, **2001**, *57*, 8257.



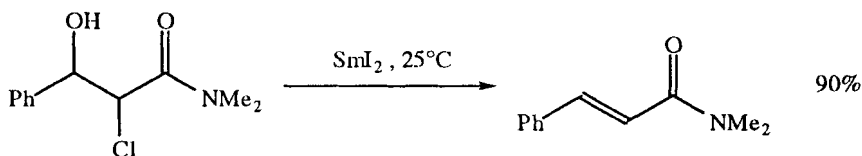
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Gabriele, B.; Salerno, G.; Veltri, L.; Costa, M.; Massera, C. *Eur. J. Org. Chem.*, **2001**, 4607.

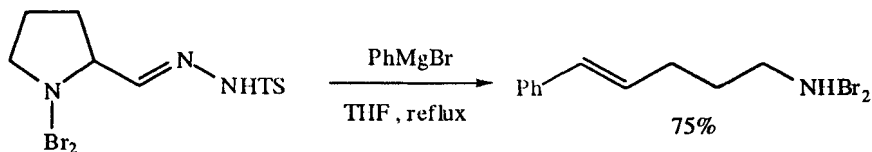


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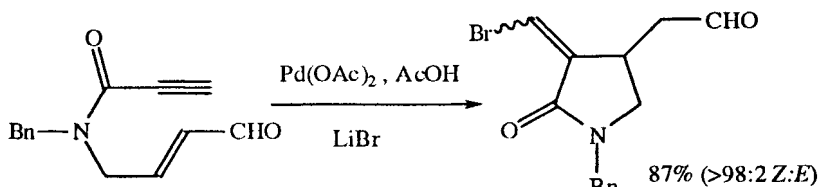


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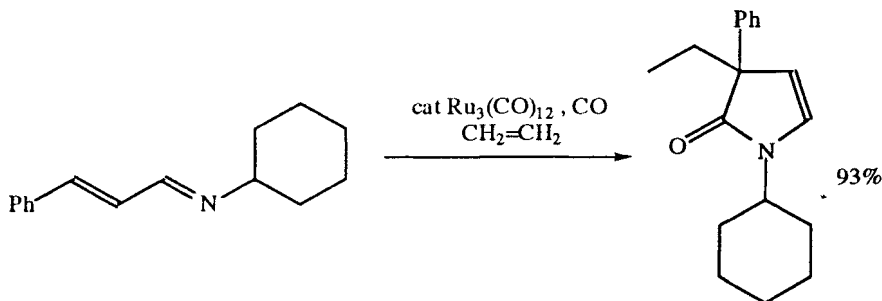




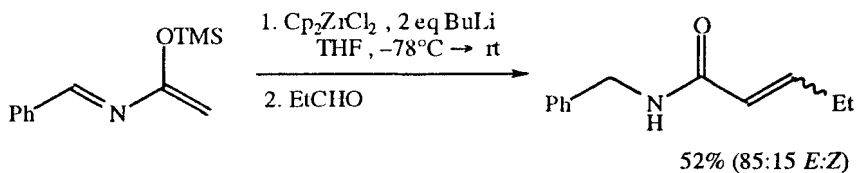
Chandrasekhar, S.; Reddy, M.V.; Rajaiah, G. *Tetrahedron Lett.*, **2000**, *41*, 10131.



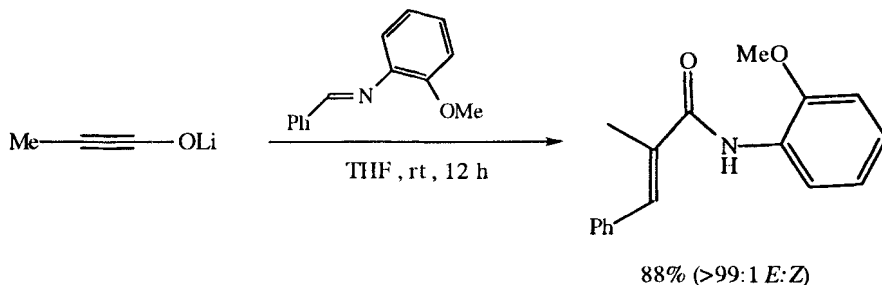
Xie, X.; Lu, X. *Synlett*, **2000**, 707.



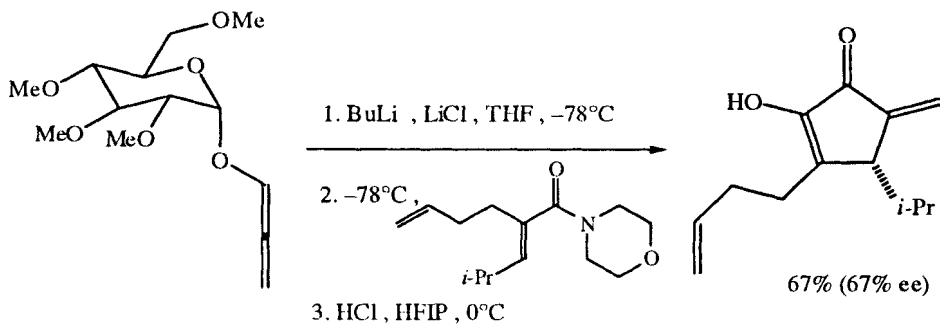
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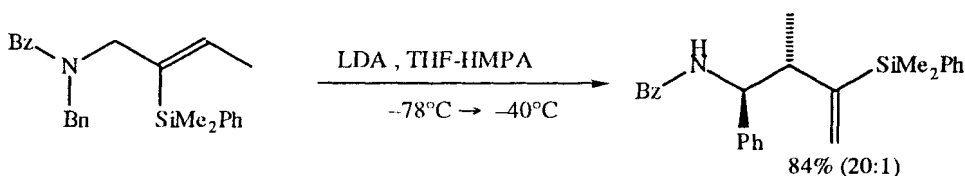
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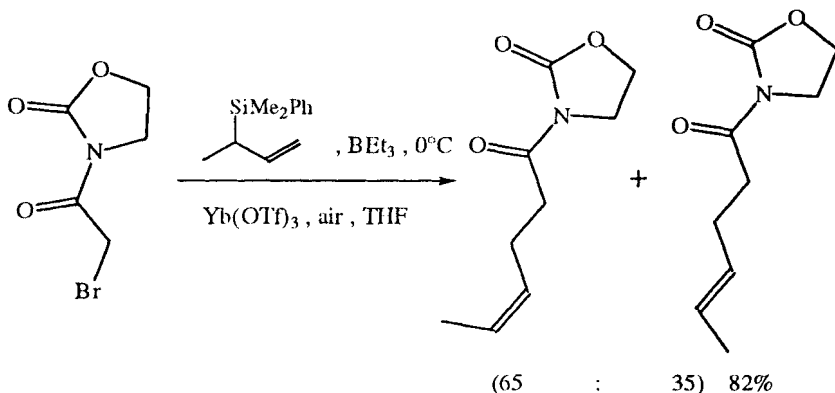
Shindo, U.; Oya, S.; Murakami, R.; Satoo, Y.; Shishido, K. *Tetrahedron Lett.*, **2000**, *41*, 5947.



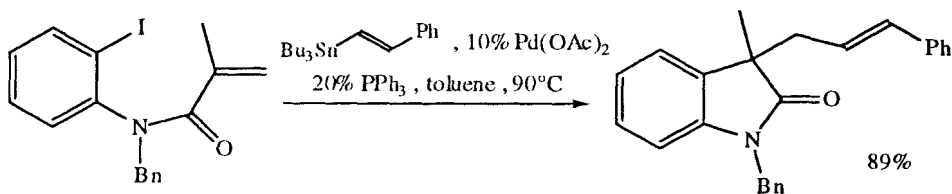
Harrington, P.E.; Tius, M.A. *Org. Lett.*, 2000, 2, 2447.



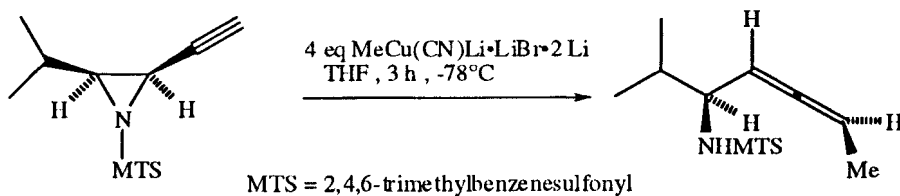
Anderson, J.C.; Flaherty, A.; Swarbrick, M.E. *J. Org. Chem.*, 2000, 65, 9152.



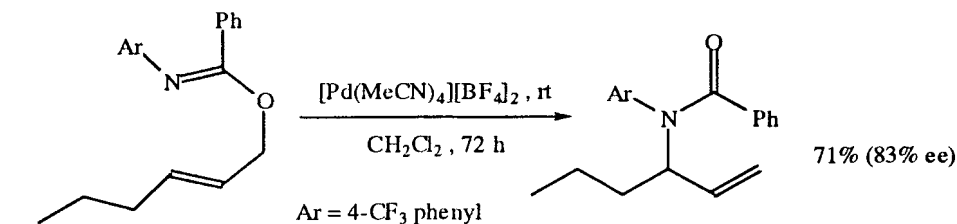
Porter, N.A.; Zhang, G.; Reed, A.D. *Tetrahedron Lett.*, 2000, 41, 5773.



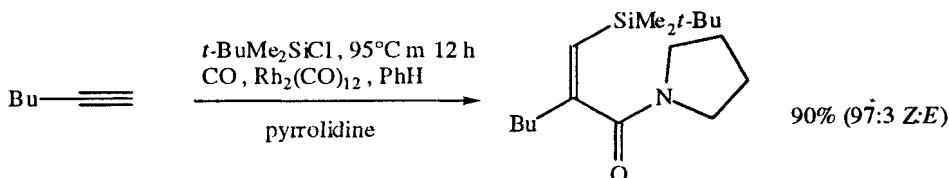
Fretwell, P.; Grigg, R.; Sansano, J.M.; Sridharan, V.; Sukirthalingm, S.; Wilson, D.; Redpath, J. *Tetrahedron*, 2000, 56, 7525.



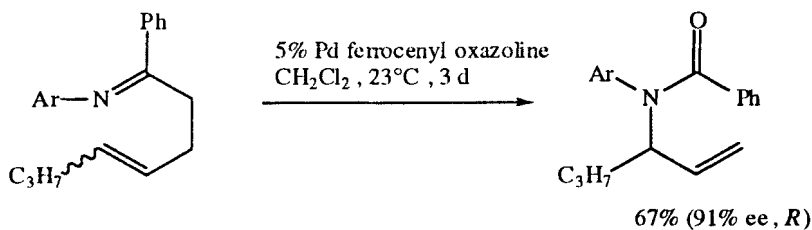
Ohno, H.; Toda, A.; Miwa, Y.; Taga, T.; Fujii, N.; Ibuka, T. *Tetrahedron Lett.*, **1999**, *40*, 349.



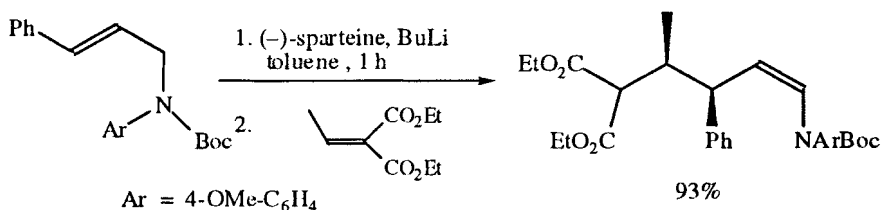
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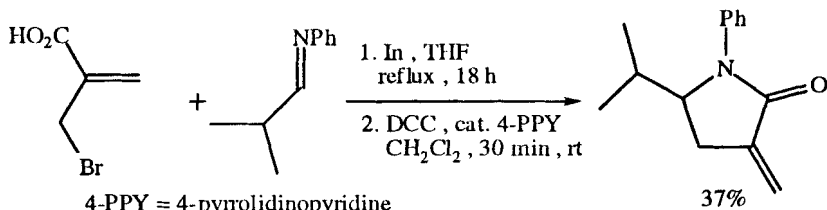
Matsuda, I.; Takeuchi, K.; Itoh, K. *Tetrahedron Lett.*, **1999**, *40*, 2553.



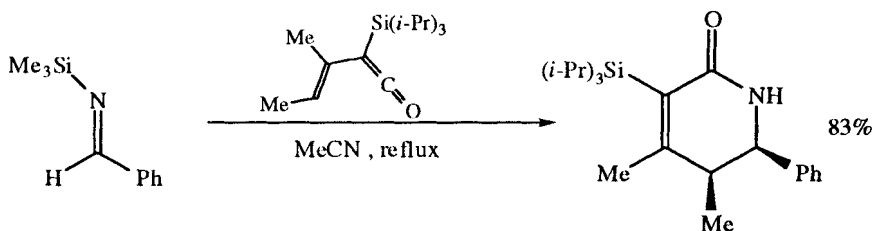
Donde, Y.; Overman, L.E. *J. Am. Chem. Soc.*, **1999**, *121*, 2933.



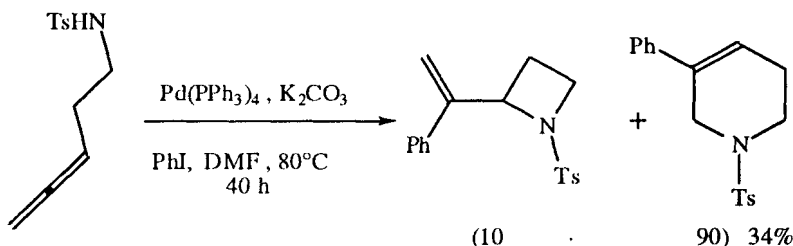
Curtis, M.D.; Beak, P. *J. Org. Chem.*, **1999**, *64*, 2996.



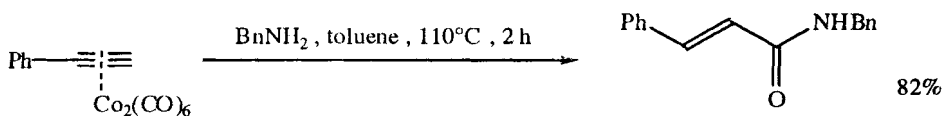
Choudhury, P.K.; Foubelo, F.; Yus, M. *J. Org. Chem.*, **1999**, *64*, 3376.



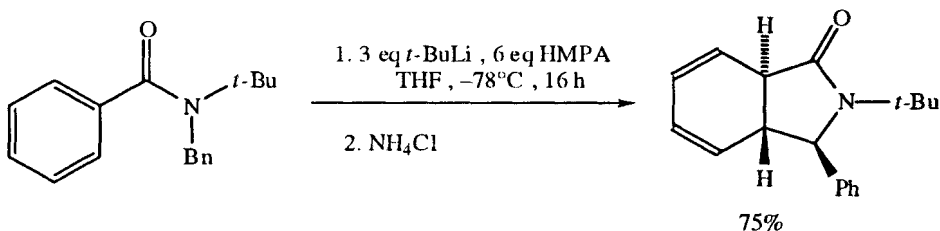
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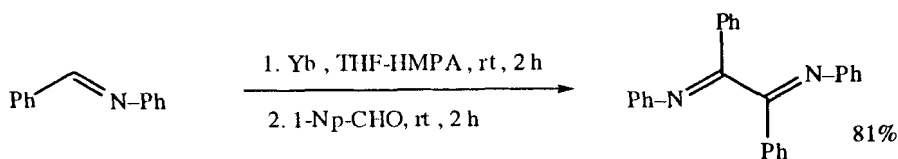
Ahmed, A.; Clayden, J.; Yasin, S.A. *Chem. Commun.*, **1999**, 231.

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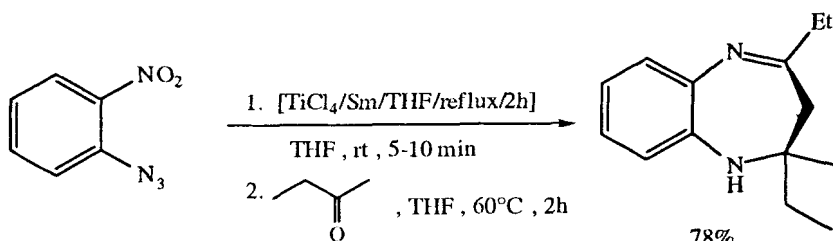
"1,3-Dipolar Cycloadditions of Five- and Six-Membered Cyclic Nitrones to  $\alpha,\beta$ -Unsaturated Acid Derivatives," de March, P.; Figueredo, M.; Font, J. *Heterocycles*, **1999**, *59*, 1213.

Also via Alkenyl Acids: Section 322 (Carboxylic Acid -Alkene)

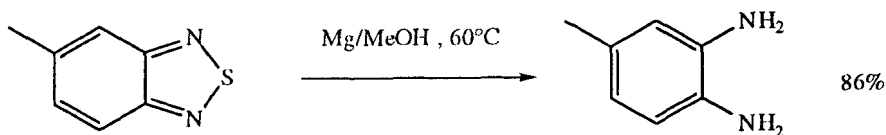
## SECTION 350: AMINE - AMINE



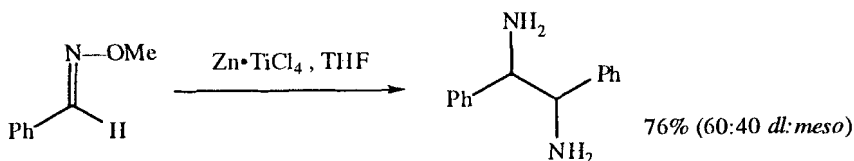
Jin, W.; Makioka, Y.; Kitamua, T.; Fujiwara, Y. *J. Org. Chem.*, **2001**, *66*, 514.



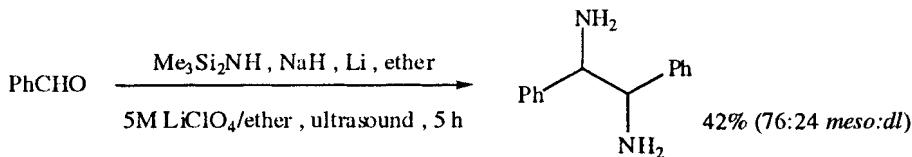
Zhang, W.; Zhang, Y.; Chen, X. *Tetrahedron Lett.*, **2001**, *42*, 73.



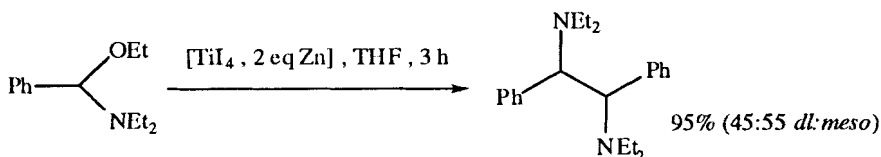
Prashad, M.; Liu, Y.; Repič, O. *Tetrahedron Lett.*, **2001**, *42*, 2277.



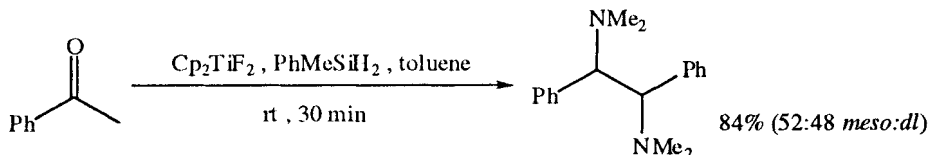
Kise, N.; Ueda, N. *Tetrahedron Lett.*, **2001**, *42*, 2365.



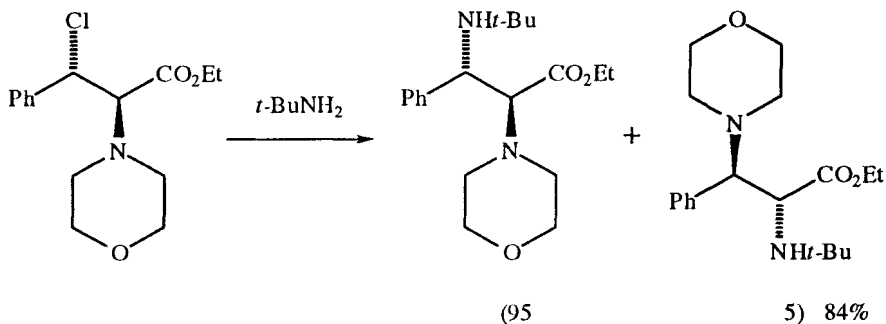
Mojtahedi, M.M.; Saidi, M.R.; Shirzi, J.S.; Bolourtchian, M.  
*Synth. Commun.*, **2001**, *31*, 3587.



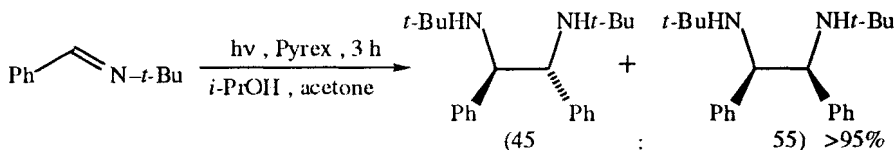
Yoshimura, N.; Mukaiyama, T. *Chem. Lett.*, **2001**, 1334.



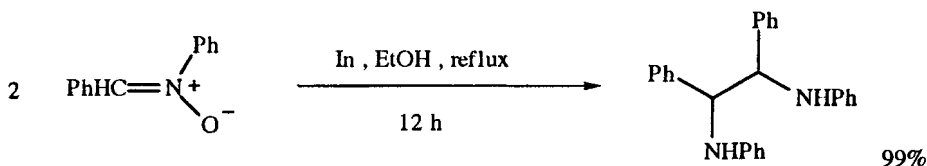
Selvakumar, K.; Harrod, J.E. *Angew. Chem. Int. Ed.*, **2001**, *40*, 2129.



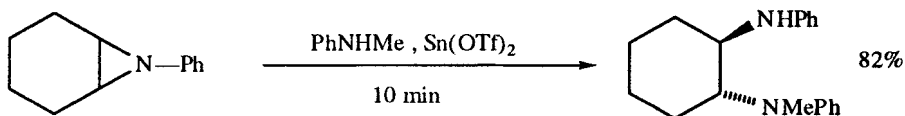
Chung, T.-H.; Sharpless, K.B. *Org. Lett.*, **2000**, *2*, 3555.



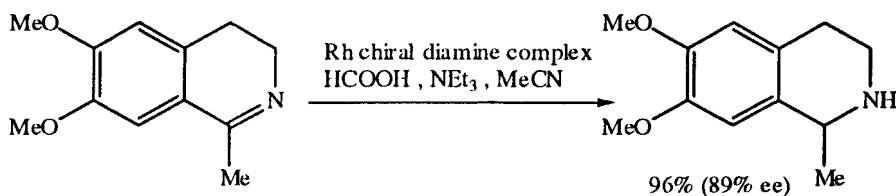
Campos, P.J.; Arranz, J.; Rodríguez, M.A. *Tetrahedron*, **2000**, *56*, 7285.



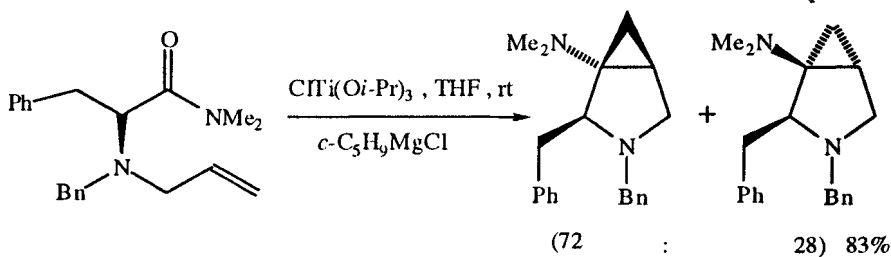
Jeevanandam, A.; Cartwright, C.; Ling, Y.-C. *Synth. Commun.*, **2000**, *30*, 3153.



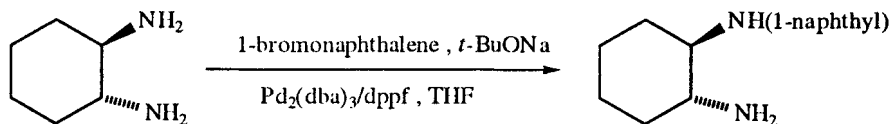
Sekar, G.; Singh, V.K. *J. Org. Chem.*, **1999**, *64*, 2537.



Mao, J.; Baker, D.C. *Org. Lett.*, **1999**, *1*, 841.

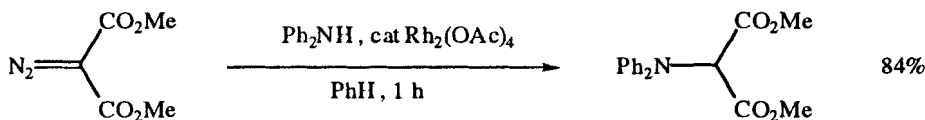


Cao, B.; Xiao, D.; Joullié, M.M. *Org. Lett.*, **1999**, *1*, 1799.

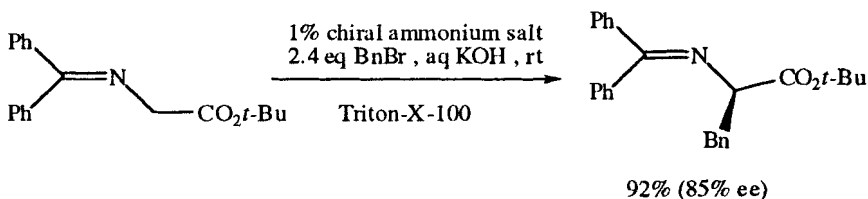


Frost, C.G.; Mendonça, P. *Tetrahedron Asymm.*, **1999**, *10*, 1831.

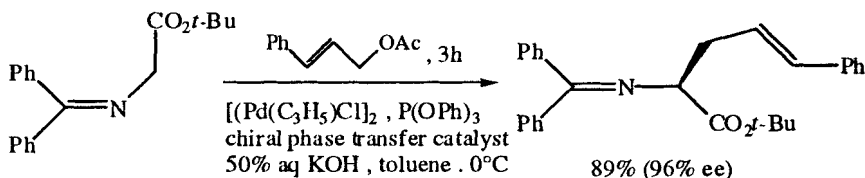
## SECTION 351: AMINE - ESTER



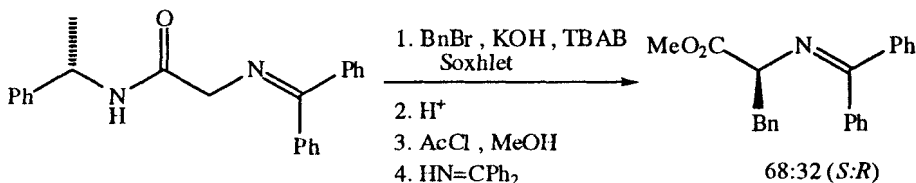
Yang, M.; Wang, X.; Li, H.; Livant, P. *J. Org. Chem.*, **2001**, 66, 6729.



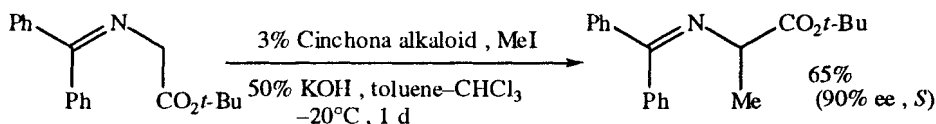
Okino, T.; Takemoto, Y. *Org. Lett.*, **2001**, 3, 1515.



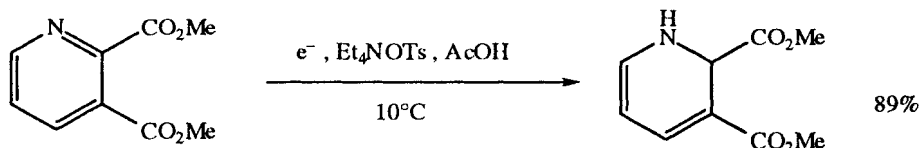
Nakoji, M.; Kanayama, T.; Okino, T.; Takemoto, Y. *Org. Lett.*, **2001**, 3, 3329.



Kim, H.J.; Lee, S.-k.; Park, Y.S. *Synlett*, **2001**, 613.

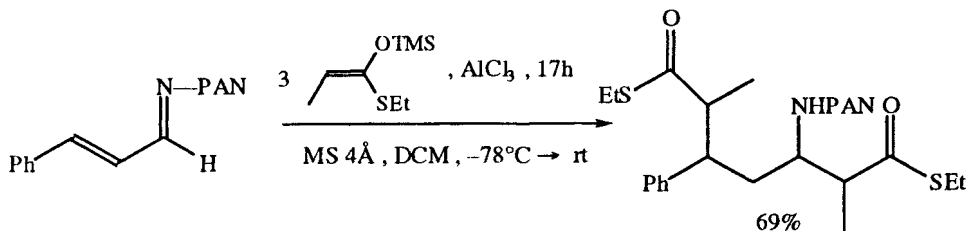


Park, H.-g.; Jeong, B.-s.; Yoo, M.-s.; Park, M.-k.; Huh, H.; Jew, S.-s. *Tetrahedron Lett.*, **2001**, 42, 4645.

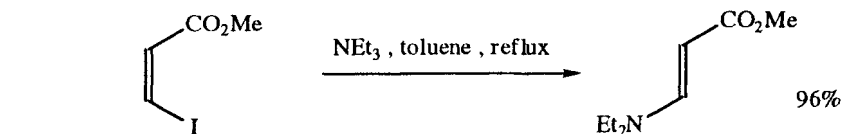


Kita, Y.; Maekawa, H.; Yamasaki, Y.; Nishiguchi, I. *Tetrahedron*, **2001**, 57, 2095.

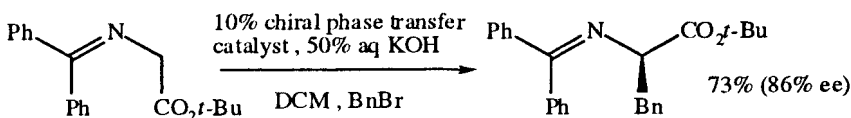




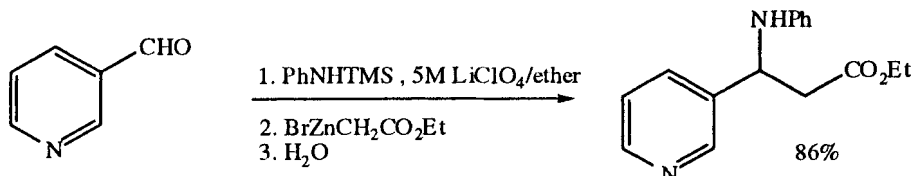
Shimizu, M.; Ogawa, T.; Nishi, T. *Tetrahedron Lett.*, **2001**, 42, 5463.



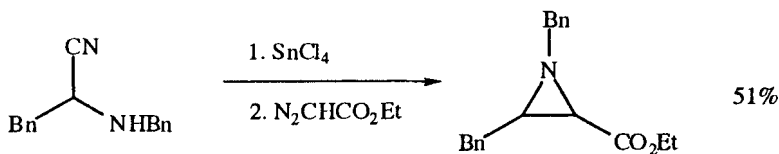
Maw, G.; Thirsk, C.; Whiting, A. *Tetrahedron Lett.*, **2001**, 42, 8387.



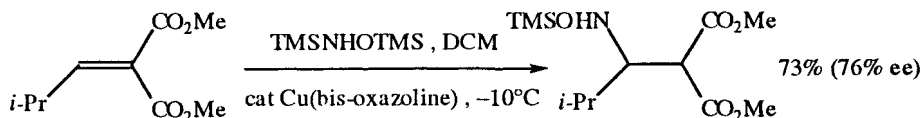
Lygo, B.; Crosby, J.; Lowden, T.R.; Peterson, J.A.; Wainwright, P.G. *Tetrahedron*, **2001**, 57, 2403.



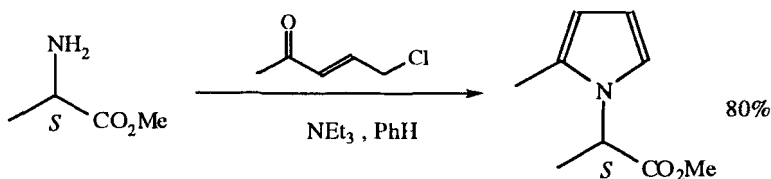
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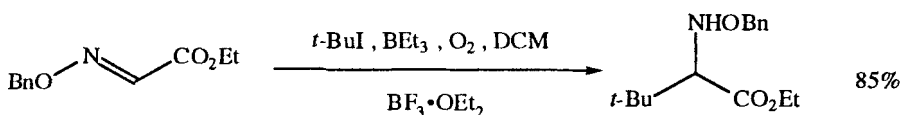
Lee, K.-D.; Suh, J.-M.; Park, J.-H.; Ha, H.-J.; Choi, H.G.; Park, C.S.; Chang, J.W.; Lee, W.K.; Dong, Y.; Yun, H. *Tetrahedron*, **2001**, 57, 8267.



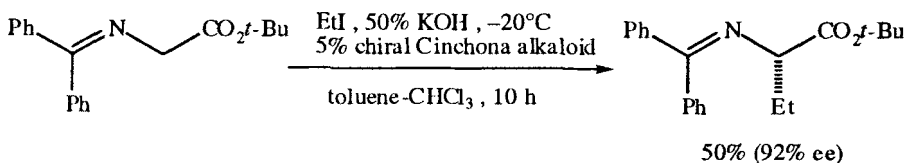
Cardillo, G.; Gentilucci, L.; Gianotti, M.; Kim, H.; Perciaccante, R.; Tolomelli, A. *Tetrahedron Asym.*, **2001**, 12, 2395.



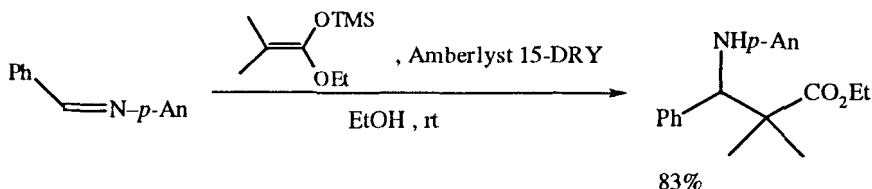
Demir, A.S.; Akhmedov, İ.M.; Şwşenoğlu, Ö.; Alptürk, O.; Apaydun, S.; Gerçek, Z.; İbrahimzade, N. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 1162.



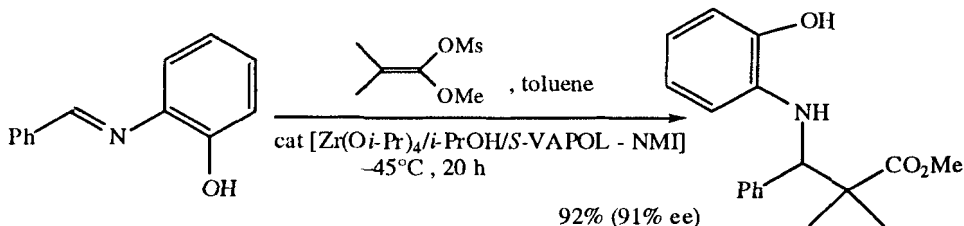
Halland, N.; Jørgensen, K.A. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 1290.



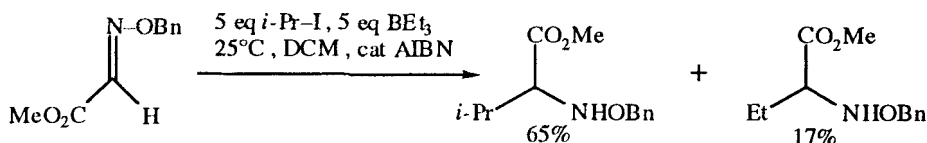
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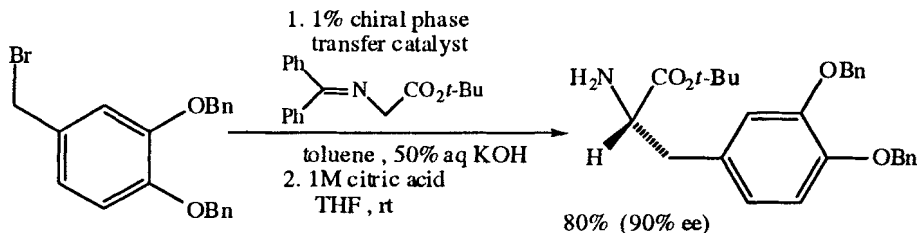
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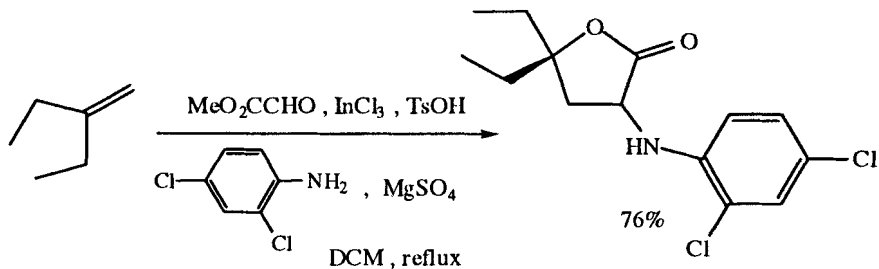
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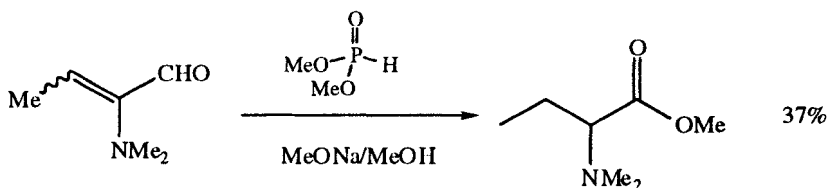
Miyabe, H.; Ueda, M.; Yoshioka, N.; Yamakawa, K.; Naito, T. *Tetrahedron*, **2000**, 56, 241.



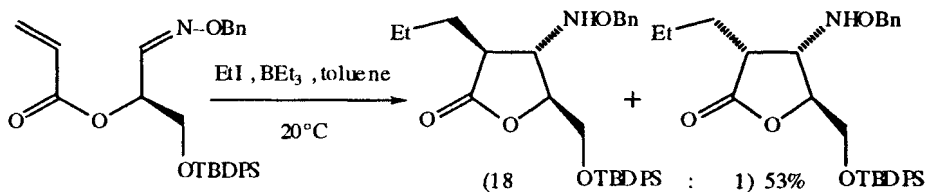
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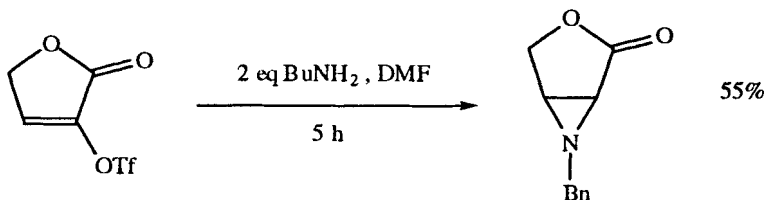
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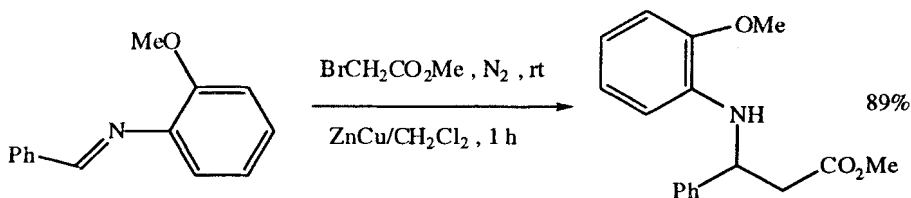
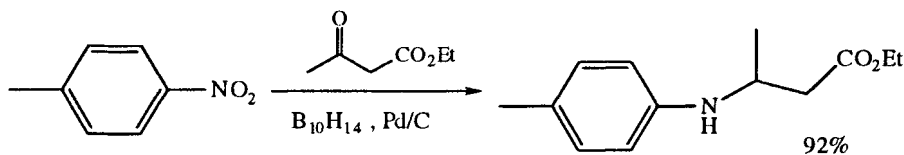
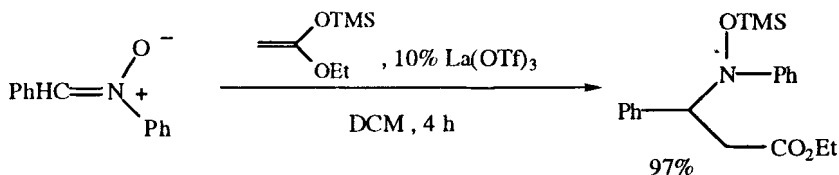
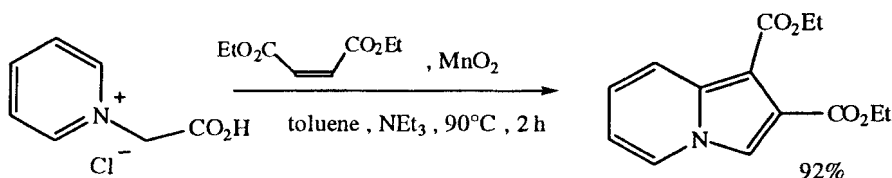
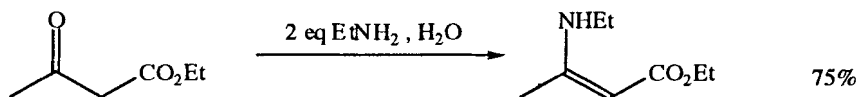
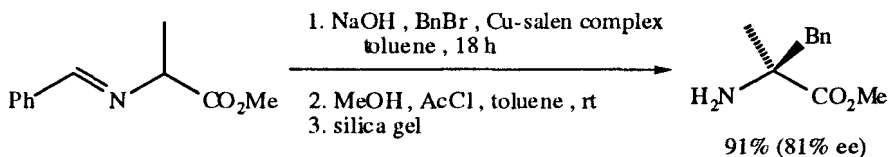
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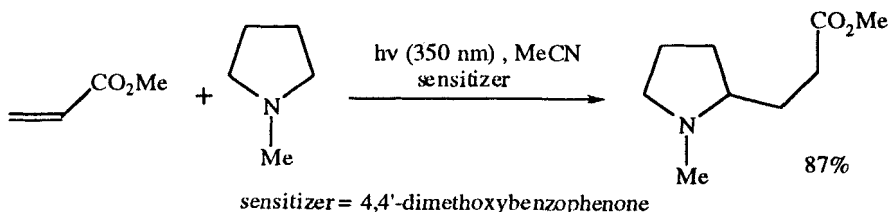


Miyabe, H.; Fujii, K.; Goto, T.; Naito, T. *Org. Lett.*, **2000**, *2*, 4071.

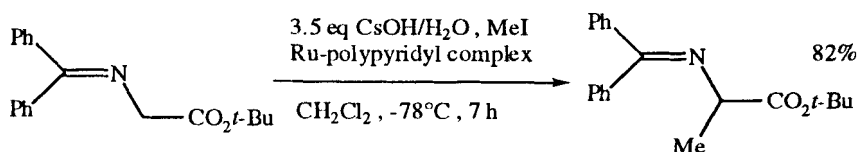


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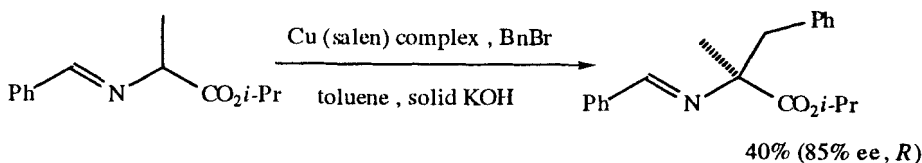




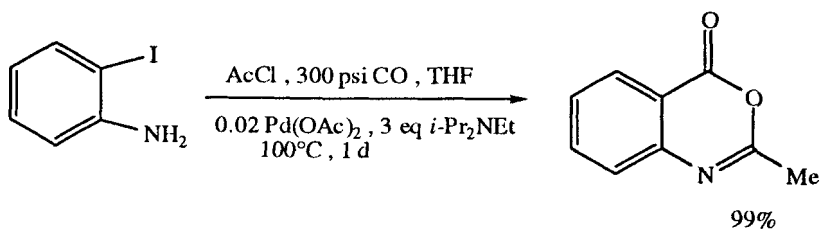
Bertand, S.; Glapski, C.; Hoffmann, N.; Pete, J.-P. *Tetrahedron Lett.*, **1999**, *40*, 3169.



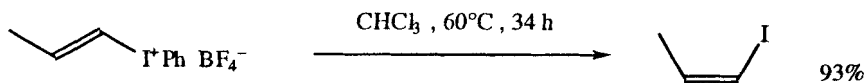
Tzalis, D.; Knochel, P. *Tetrahedron Lett.*, **1999**, *40*, 3685.



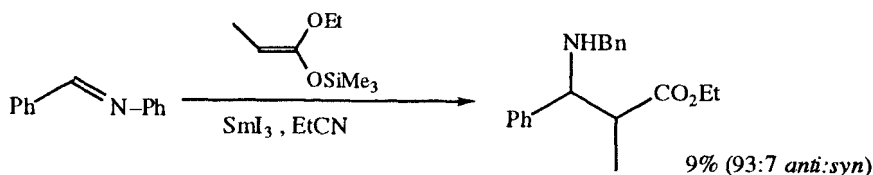
Belokon, Y.N.; North, M.; Kublitski, V.S.; Ikonnikov, N.S.; Kraskik, P.E.; Maleev, V.I. *Tetrahedron Lett.*, **1999**, *40*, 6105.



Larksarp., C.; Alper, H. *Org. Lett.*, **1999**, *1*, 1619.



Juhl, K.; Hazell, R.G.; Jørgensen, K.A. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 2293.



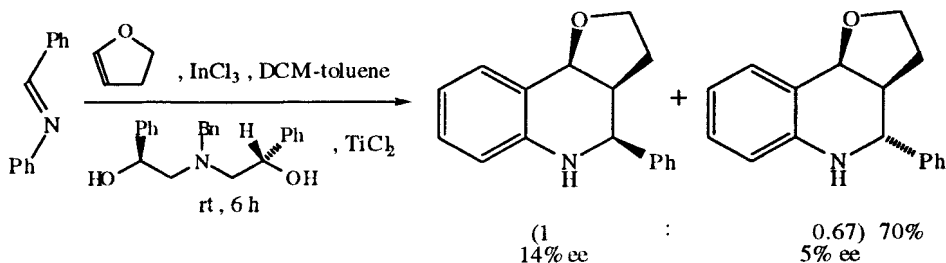
Hayakawa, R.; Shimizu, M. *Chem. Lett.*, **1999**, 591.

Related Methods:

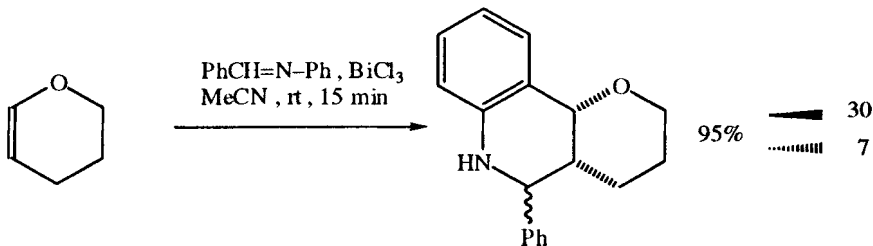
Section 315 (Carboxylic Acid - Amide)

Section 316 (Carboxylic Acid - Amine)

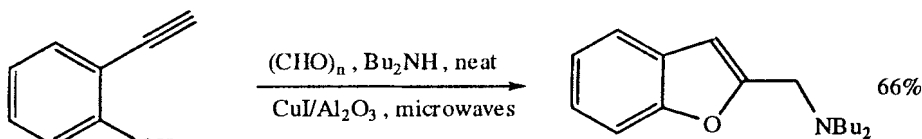
Section 344 (Amide - Ester)

**SECTION 352: AMINE - ETHER, EPOXIDE, THIOETHER**

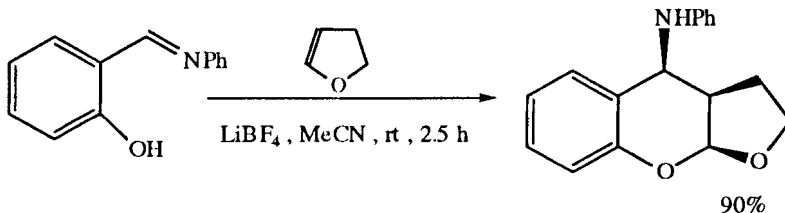
Sundararajan, G.; Prabakaran, N.; Varghese, B. *Org. Lett.*, **2001**, *3*, 1973.



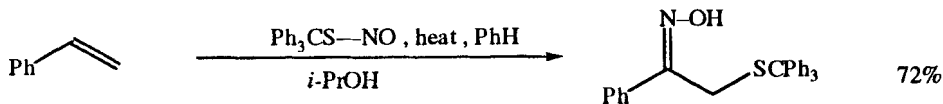
Reddy, B.V.S.; Srinivas, R.; Yadav, J.S.; Ramalingam, T. *Synth. Commun.*, **2001**, *31*, 1075.



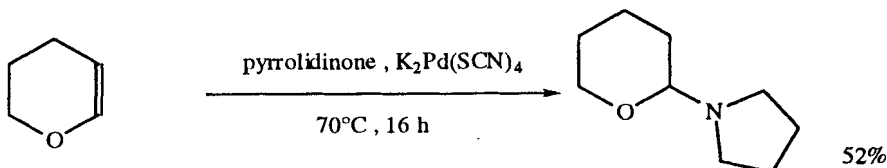
Kabalka, G.W.; Wang, L.; Pagni, R.M. *Tetrahedron Lett.*, **2001**, *42*, 6049.



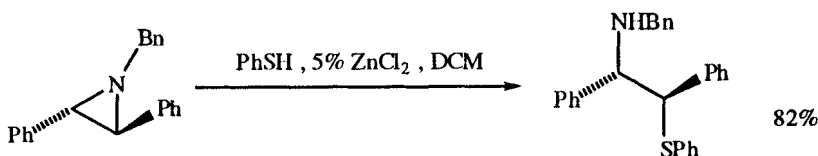
Yadav, J.S.; Reddy, B.V.S.; Madhuri, Ch.; Sabitha, G.; Jagannadh, B.; Kumar, S.K.; Kunwar, A.C. *Tetrahedron Lett.*, **2001**, *42*, 6381.



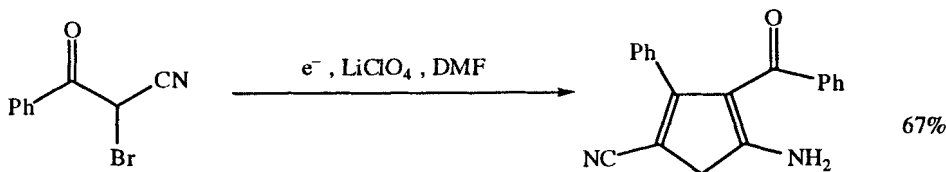
Cavero, M.; Motherwell, W.B.; Potier, P. *Tetrahedron Lett.*, **2001**, 42, 4377.



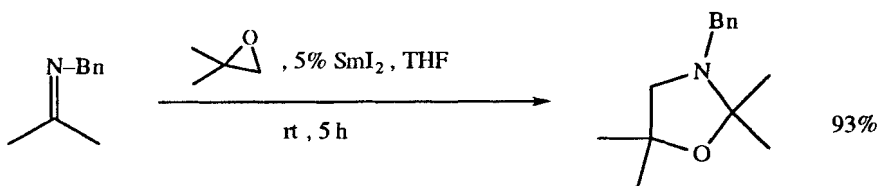
Cheng, X.; Hii, K.K. *Tetrahedron*, **2001**, 57, 5445.



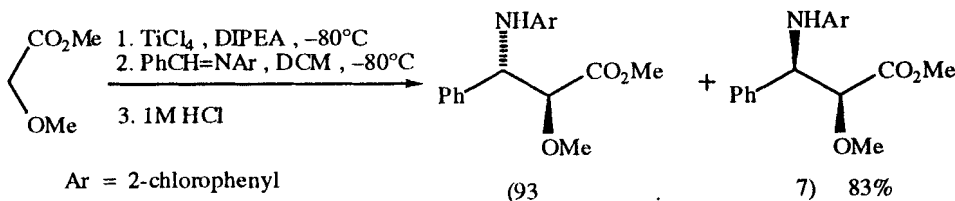
Wu, J.; Hou, X.-L.; Dai, L.-X. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 1314.



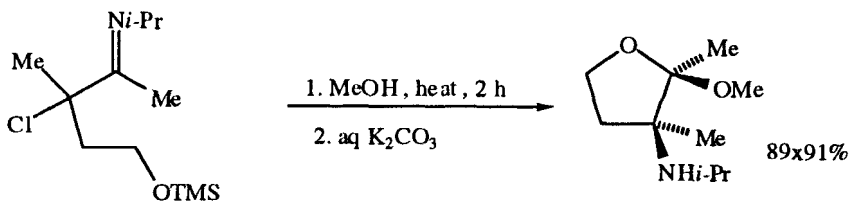
Batanero, B.; Vago, M.; Barba, F. *Heterocycles*, **2000**, 53, 1337.



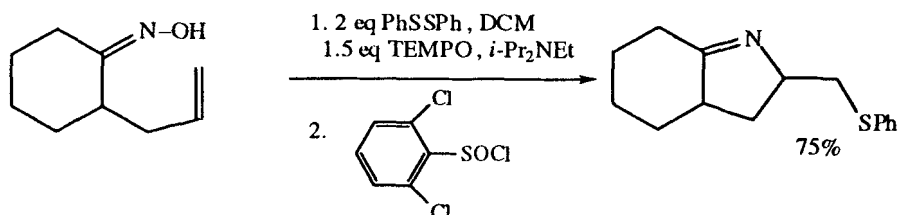
Nishitani, T.; Shiraishi, H.; Sakaguchi, S.; Ishii, Y. *Tetrahedron Lett.*, **2000**, 41, 3389.



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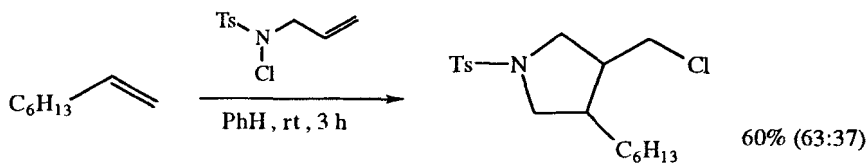


Lin, X.; Stien, D.; Weinreb, S.M. *Org. Lett.*, **1999**, *1*, 637.

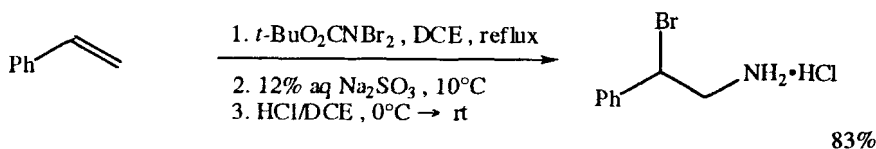
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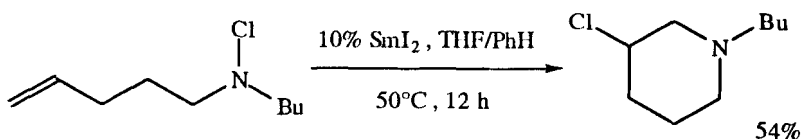
## SECTION 353: AMINE - HALIDE, SULFONATE



Tsuritani, T.; Shinokubo, H.; Oshima, K. *Org. Lett.*, **2001**, *3*, 2709.

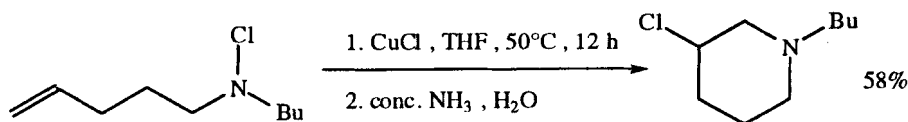


Klepacz, A.; Zwierzak, A. *Tetrahedron Lett.*, **2001**, *42*, 4539.

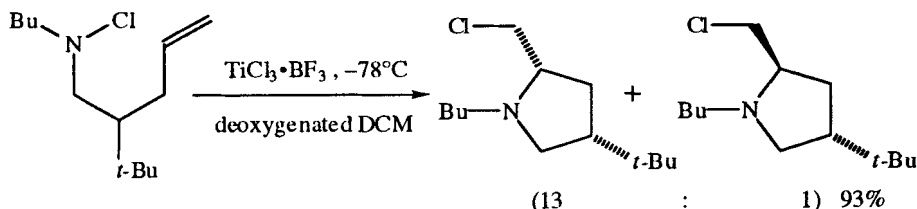


Göttlich, R.; Noack, M. *Tetrahedron Lett.*, **2001**, *42*, 7771.



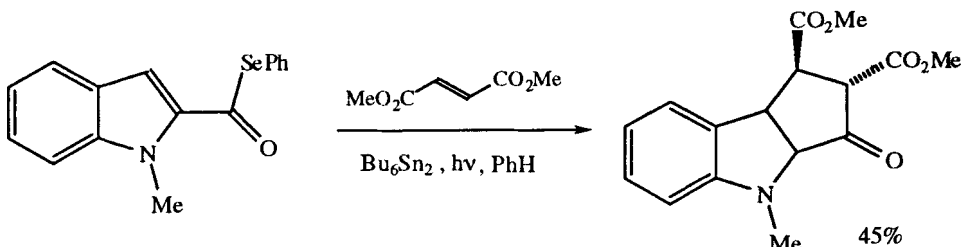


Göttlich, R. *Synthesis*, 2000, 1526.

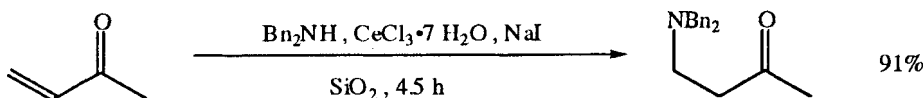


Hemmerling, M.; Sjöholm, Å.; Sonfai, P. *Tetrahedron Asymm.*, 1999, 10, 4091.

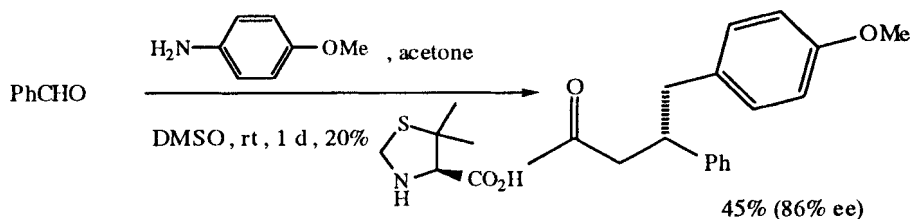
## SECTION 354: AMINE - KETONE



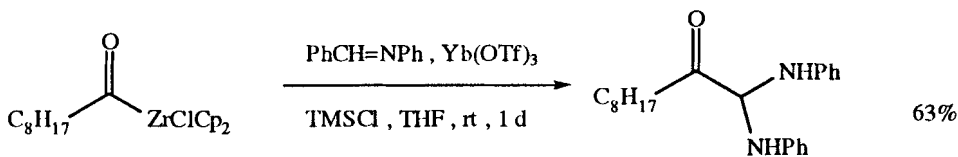
Bennasar, M.-L.; Roca, T.; Griera, R.; Bosch, J. *J. Org. Chem.*, 2001, 66, 7547.



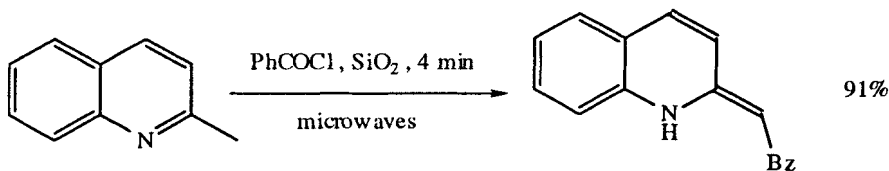
Bartoli, G.; Bosco, M.; Marcantoni, E.; Petrini, M.; Sambri, L.; Torregiani, E. *J. Org. Chem.*, 2001, 66, 9052.



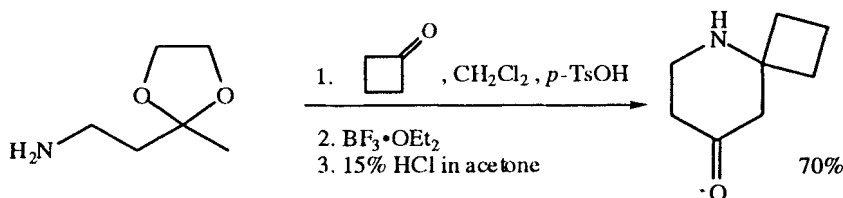
Notz, W.; Sakthivel, K.; Bui, T.; Zhong, G.; Barbas III, C.F. *Tetrahedron Lett.*, 2001, 42, 199.



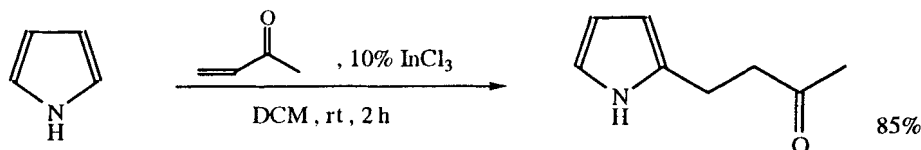
Kakuuchi, A.; Taguchi, T.; Hanzawa, Y. *Tetrahedron Lett.*, **2001**, 42, 1547.



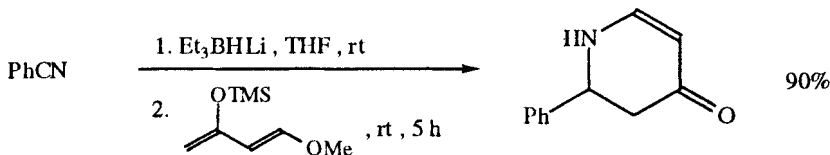
Loghmani-Khouzani, H.; Sadeghi, M.M.; Safari, J.; Minaeifar, A. *Tetrahedron Lett.*, **2001**, 42, 4363.



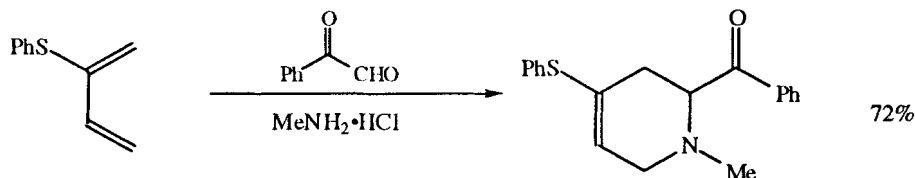
Ciblat, S.; Canet, J.-L.; Troin, Y. *Tetrahedron Lett.*, **2001**, 42, 4815.



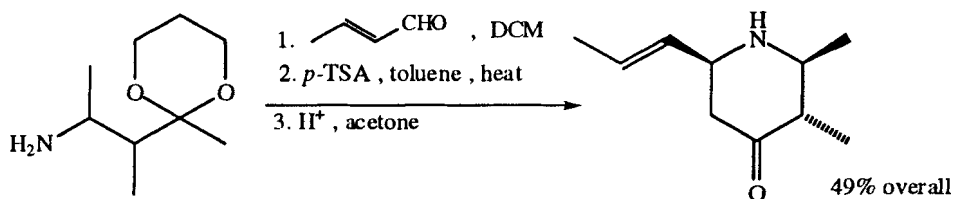
Yadav, J.S.; Abraham, S.; Reddy, B.V.S.; Sabitha, G. *Tetrahedron Lett.*, **2001**, 42, 8063.



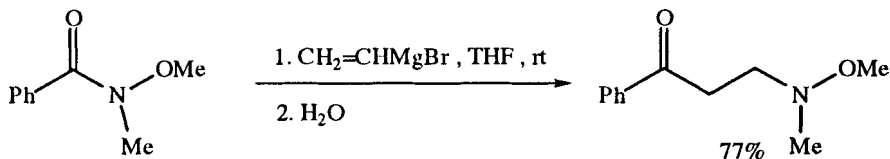
Kawecki, R. *Synthesis*, **2001**, 828.



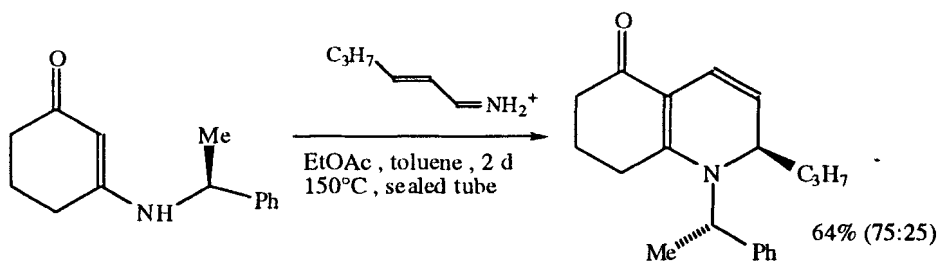
Chou, S.-S.P.; Hung, C.C. *Synth. Commun.*, **2001**, 31, 1097.



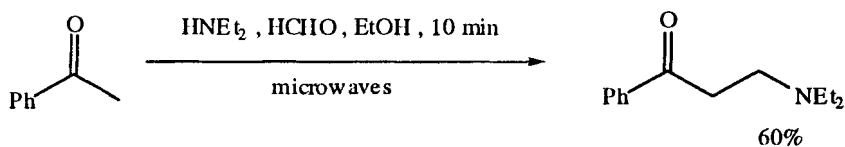
Glasson, S.R.; Canet, J.-L.; Troin, Y. *Tetrahedron Lett.*, **2000**, *41*, 9797.



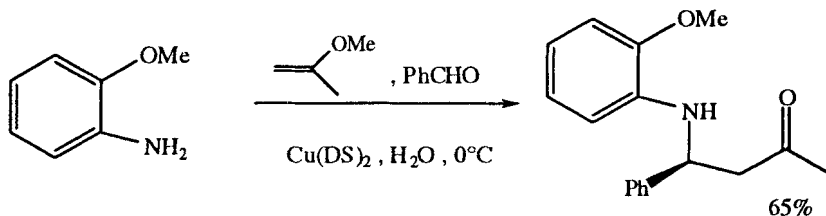
Gomtsyan, A. *Org. Lett.*, **2000**, *2*, 11.



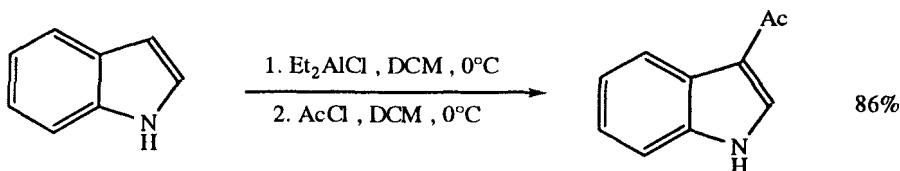
Sklenicka, H.M.; Hsung, R.P.; Wei, L.-L.; McLaughlin, M.J.; Gerasyuto, A.I.; Degin, S.J. *Org. Lett.*, **2000**, *2*, 1161.



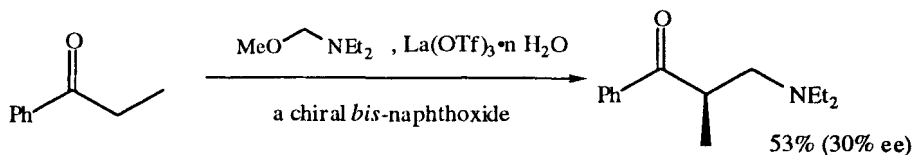
Gadhwal, S.; Baruah, M.; Prajapati, D.; Sandhu, J.S. *Synlett*, **2000**, 341.



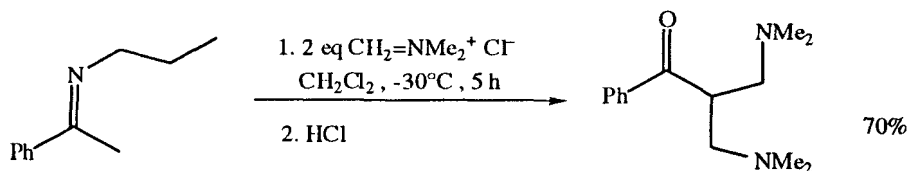
Kobayashi, S.; Ueno, M.; Suzuki, R.; Ishitani, H.; Kim, H.-S.; Wataya, Y. *J. Org. Chem.*, **1999**, *64*, 6833.



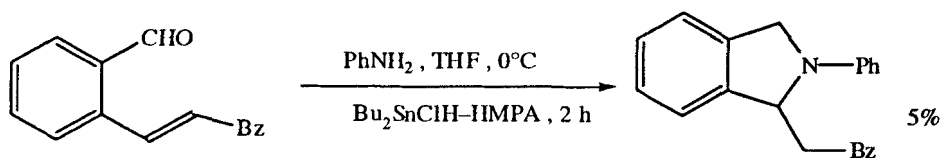
Okauchi, T.; Itonaga, M.; Minami, T.; Owa, T.; Kitoh, K.; Yoshino, H.  
*Org. Lett.*, **2000**, 2, 1485.



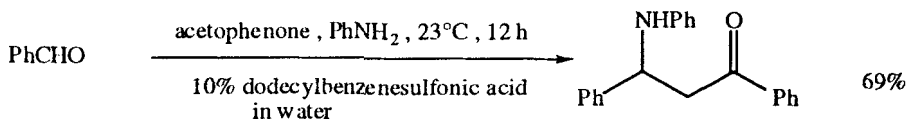
Yamasaki, S.; Iida, T.; Shibasaki, M. *Tetrahedron Lett.*, **1999**, 40, 307.



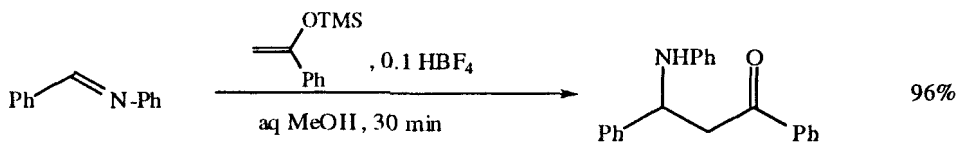
Arend, M.; Risch, N. *Tetrahedron Lett.*, **1999**, 40, 6205.



Suwa, T.; Shibata, I.; Nishino, K.; Baba, A. *Org. Lett.*, **1999**, 1, 1579.

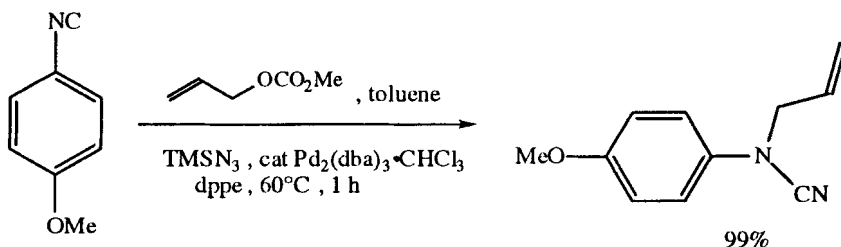


Manabe, K.; Kobayashi, S. *Org. Lett.*, **1999**, 1, 1965.

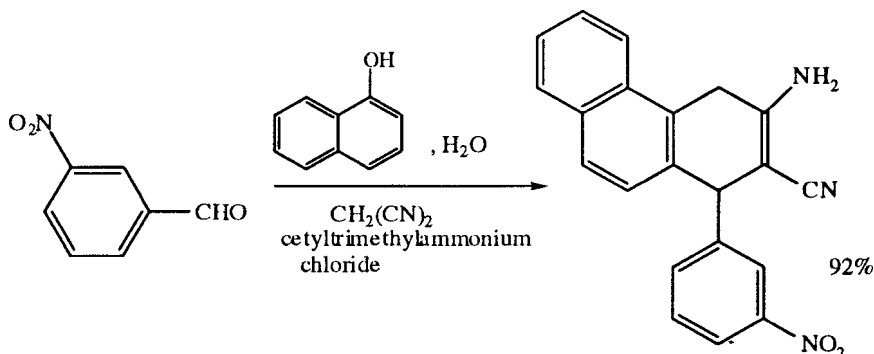


Akiyama, T.; Takaya, J.; Kagishima, H. *Synlett*, **1999**, 1045.

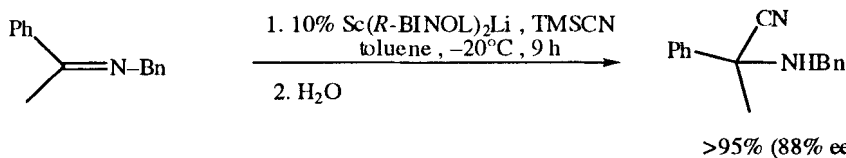




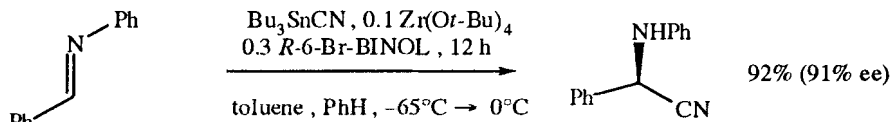
Kamijo, S.; Jin, T.; Yamamoto, Y. *J. Am. Chem. Soc.*, **2001**, *123*, 9453.



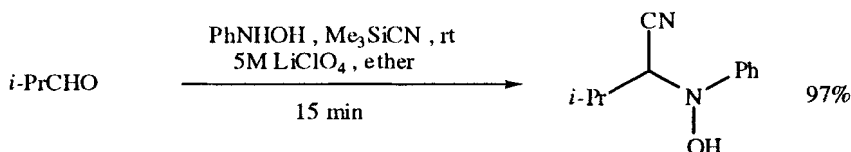
Ballini, R.; Bosica, G.; Conforti, M.L.; Maggi, R.; Mazzacani, A.; Righi, P.; Sartori, G. *Tetrahedron*, **2001**, *57*, 1395.



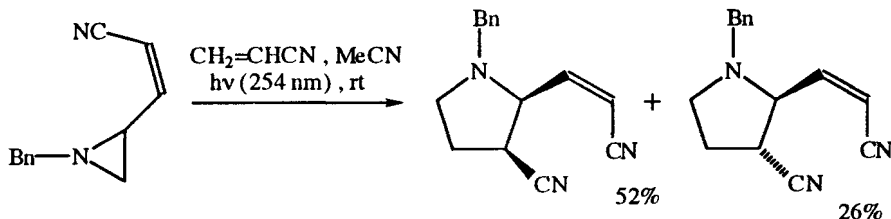
Chavarot, M.; Byrne, J.J.; Chavant, P.Y.; Vallée, Y. *Tetrahedron Asym.*, **2001**, *12*, 1147.



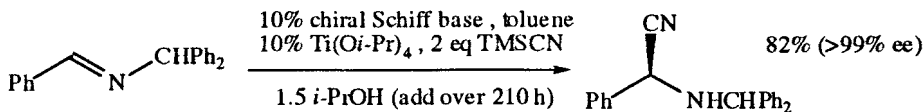
Ishitani, H.; Komiyama, S.; Hasegawa, Y.; Kobayashi, S. *J. Am. Chem. Soc.*, **2000**, *122*, 762.



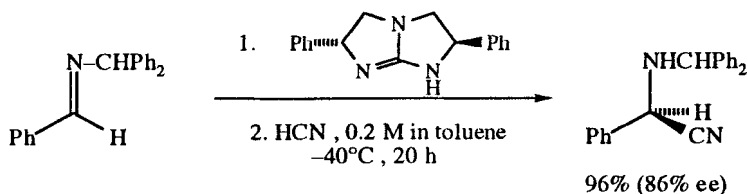
Heydari, A.; Lavijani, H.; Emami, J.; Karami, B. *Tetrahedron Lett.*, **2000**, *41*, 2471.



Ishii, K.; Shimada, Y.; Sugiyama, S.; Noji, M. *J. Chem. Soc., Perkin Trans. 1*, 2000, 3022.

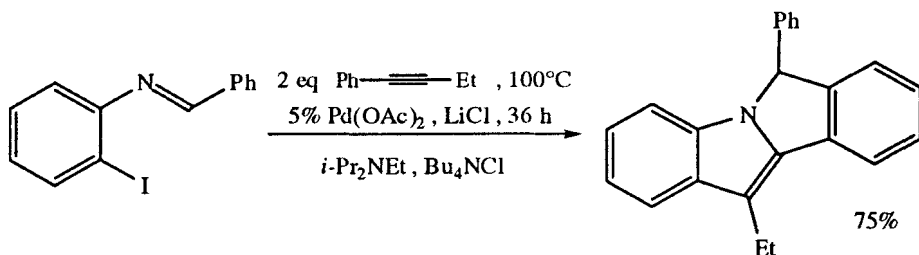


Krueger, C.A.; Kuntz, K.W.; Dzierba, C.D.; Wirschun, W.G.; Gleason, J.D.; Snapper, M.L.; Hoveyda, A.H. *J. Am. Chem. Soc.*, 1999, 121, 4284.

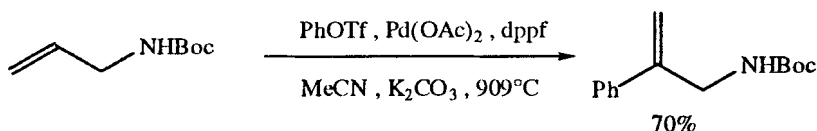


Corey, E.J.; Grogan, M.J. *Org. Lett.*, 1999, 1, 157.

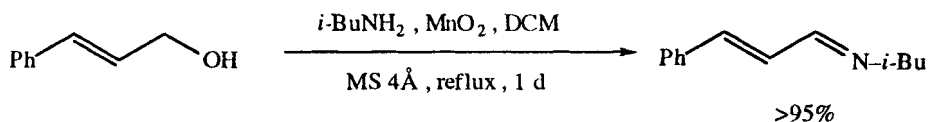
## SECTION 356: AMINE - ALKENE



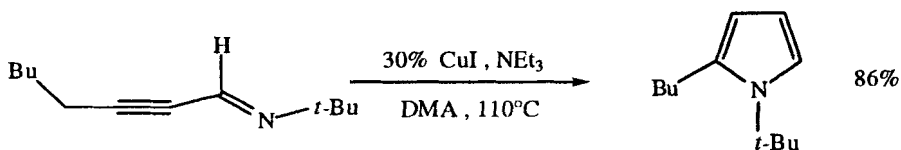
Roesch, K.R.; Larock, R.C. *J. Org. Chem.*, 2001, 66, 412.



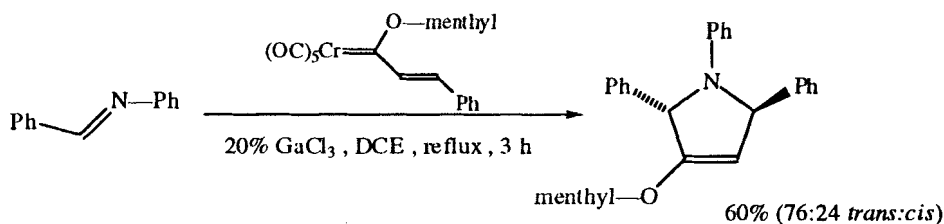
Olofsson, K.; Sahlin, H.; Larhed, M.; Hallberg, A. *J. Org. Chem.*, 2001, 66, 544.



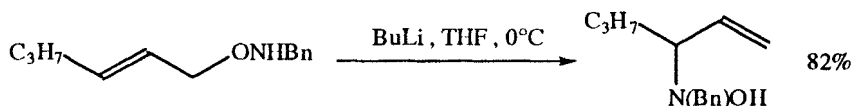
Blackburn, L.; Taylor, R.J.K. *Org. Lett.*, **2001**, 3, 1637.



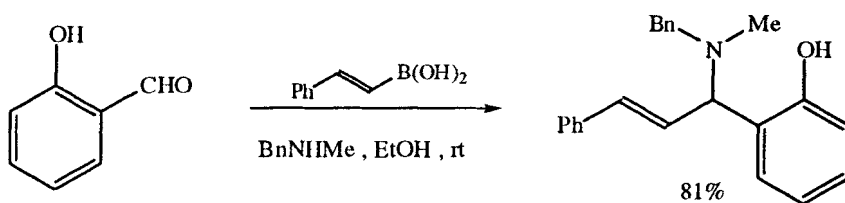
Kel'in, A.; Sromek, A.W.; Gevorgyan, V. *J. Am. Chem. Soc.*, **2001**, 123, 2074.



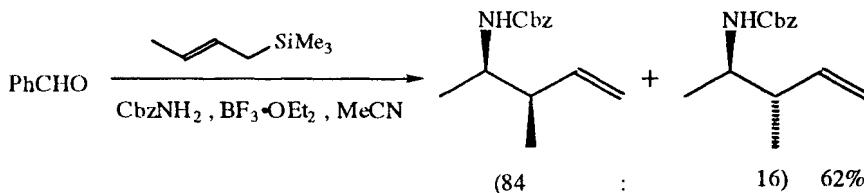
Kagoshima, H.; Okamura, T.; Akiyama, T. *J. Am. Chem. Soc.*, **2001**, 123, 7182.



Ishikawa, T.; Kawakami, M.; Fukui, M.; Yamashita, A.; Urano, J.; Saito, S. *J. Am. Chem. Soc.*, **2001**, 123, 7734.



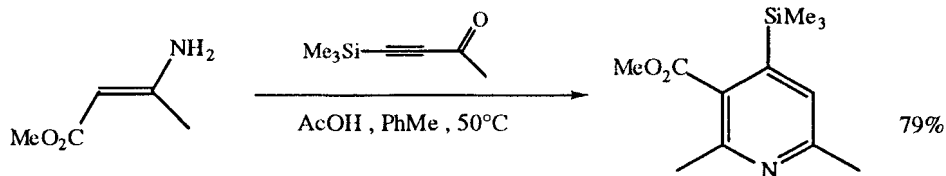
Petasis, N.A.; Boral, S. *Tetrahedron Lett.*, **2001**, 42, 539.



Billet, M.; Klotz, P.; Mann, A. *Tetrahedron Lett.*, **2001**, 42, 631.

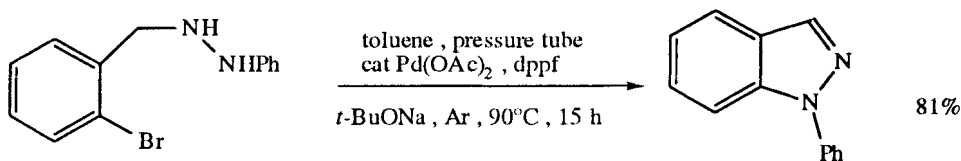




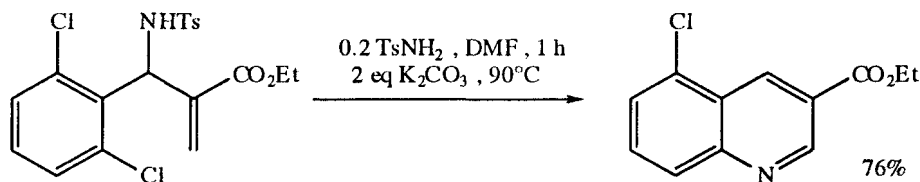


Bagley, M.C.; Dale, J.W.; Bower, J. *Synlett*, **2001**, 1149.

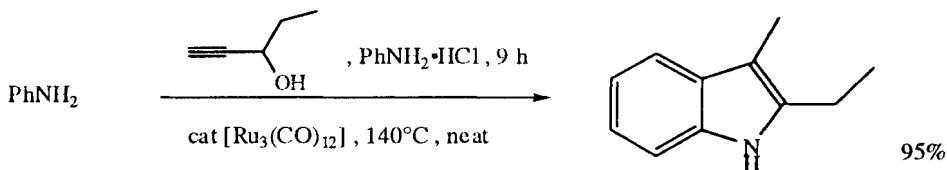
In toluene, ethyl ester, catalyzed by 15% ZnBr<sub>2</sub> (90%). Bagley, M.C.; Dale, J.W.; Hughes, D.D.; Ohnesorge, M.; Phillips, N.G.; Bower, J. *Synlett*, **2001**, 1523.



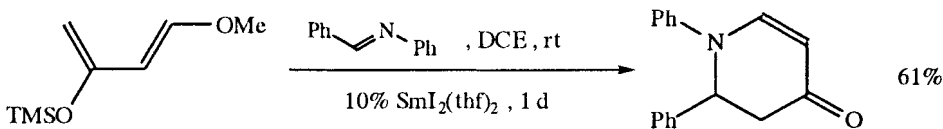
Sung, J.L.; Yee, N.K. *Tetrahedron Lett.*, **2001**, 42, 2937.



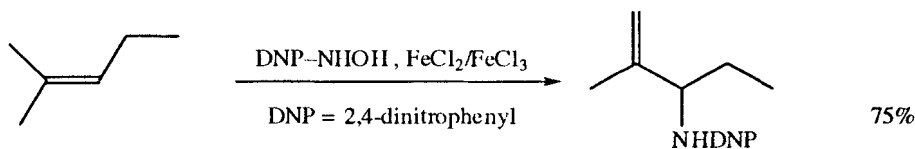
Kim, J.N.; Lee, H.F.; Lee, K.Y.; Kim, H.S. *Tetrahedron Lett.*, **2001**, 42, 3737.



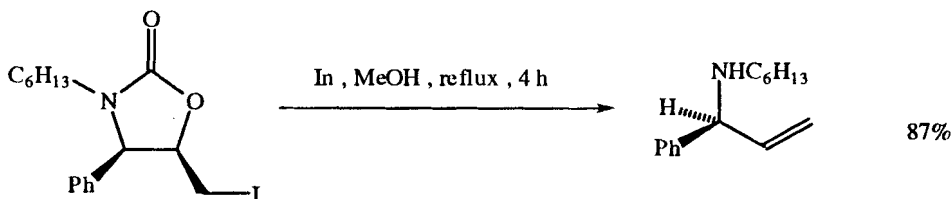
Tokunaga, M.; Ota, M.; Haga, M.-a.; Wakatsuki, Y. *Tetrahedron Lett.*, **2001**, 42, 3865.



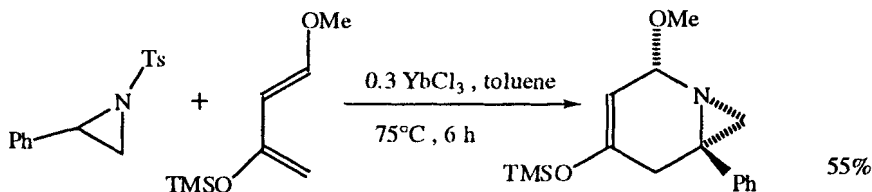
Collin, J.; Jaber, N.; Lannon, M.I. *Tetrahedron Lett.*, **2001**, 42, 7405.



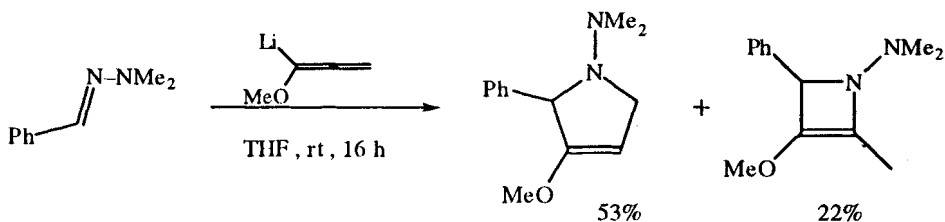
Singh, S.; Nicholas, K.M. *Synth. Commun.*, **2001**, 31, 3087.



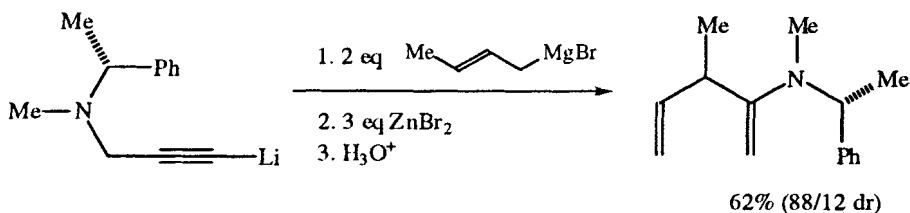
Yadav, J.S.; Bandyopadhyay, A.; Reddy, B.V.S. *Tetrahedron Lett.*, **2001**, 42, 6385.



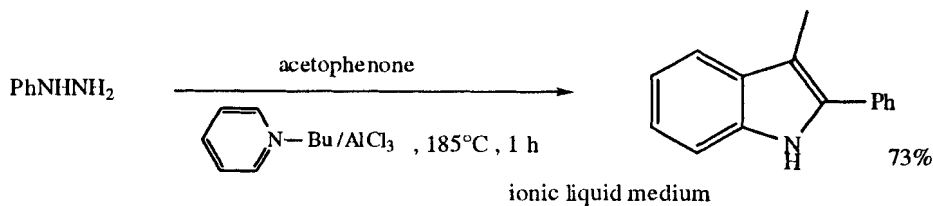
Ray, C.A.; Risberg, E.; Somfai, P. *Tetrahedron Lett.*, **2001**, 42, 9289.



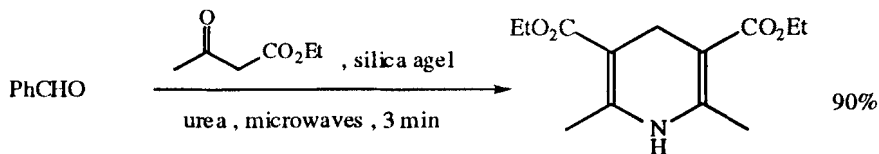
Breuil-Desvergnès, V.; Goré, J. *Tetrahedron*, **2001**, 57, 1951.



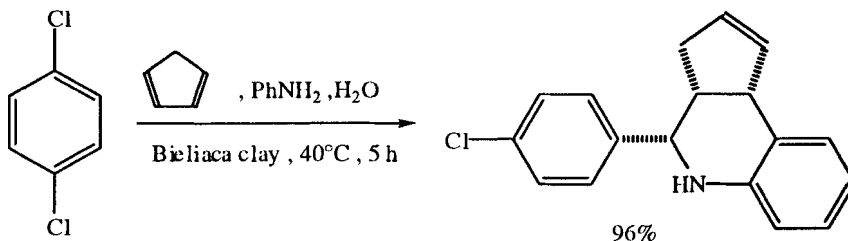
Rezaei, H.; Marek, I.; Normant, J.F. *Tetrahedron*, **2001**, 57, 2477.



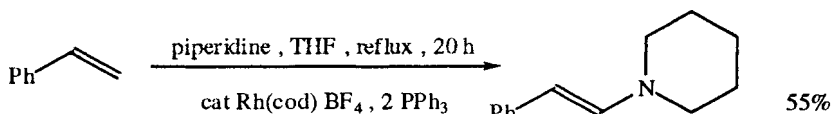
Rebeiro, G.L.; Khadilkar, B.M. *Synthesis*, **2001**, 370.



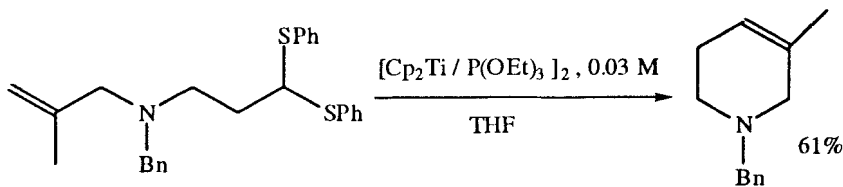
Yadav, J.S.; Redy, B.V.S.; Reddy, P.T. *Synth. Commun.*, **2001**, *31*, 425.



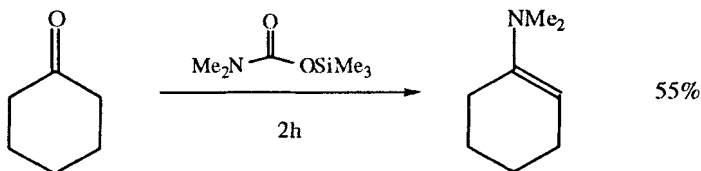
Sartori, G.; Bigi, F.; Maggi, R.; Mazzacani, A.; Oppici, G. *Eur. J. Org. Chem.*, **2001**, *2513*.



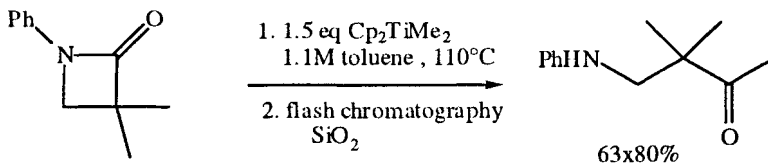
Tillack, A.; Trauthwein, H.; Hartung, C.G.; Eichberger, M.; Pitter, S.; Jansen, A.; Beller, M. *Monat. Chem.*, **2000**, *141*, 1327.



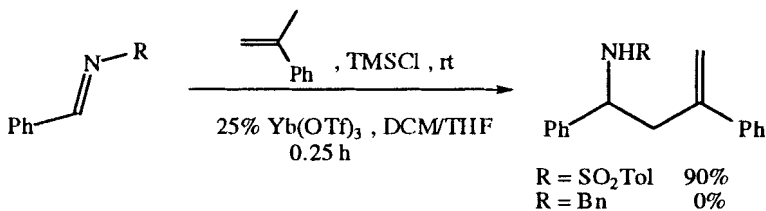
Fujiwara, T.; Kato, Y.; Takeda, T. *Heterocycles*, **2000**, *52*, 147.



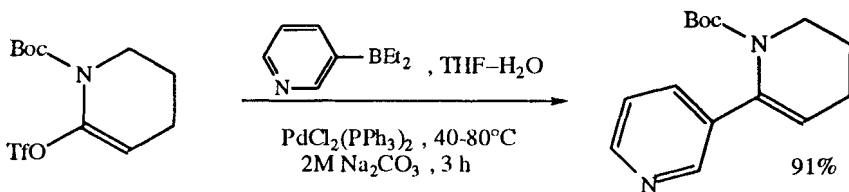
Kardon, F.; Mörtl, M.; Knausz, D. *Tetrahedron Lett.*, **2000**, *41*, 8937.



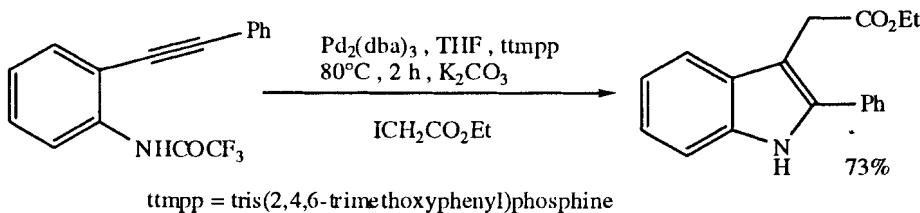
Tehrani, K.A.; De Kimpe, N. *Tetrahedron Lett.*, **2000**, *41*, 1975.



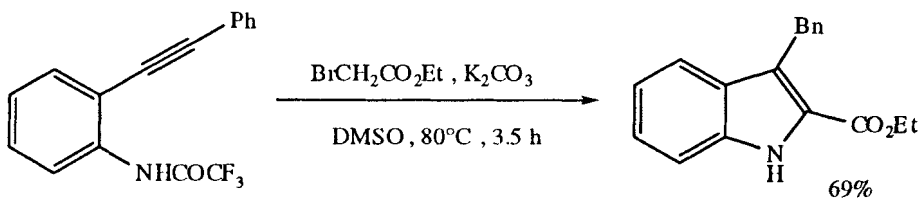
Yamanaka, M.; Nishida, A.; Nakagawa, M. *Org. Lett.*, **2000**, 2, 159.



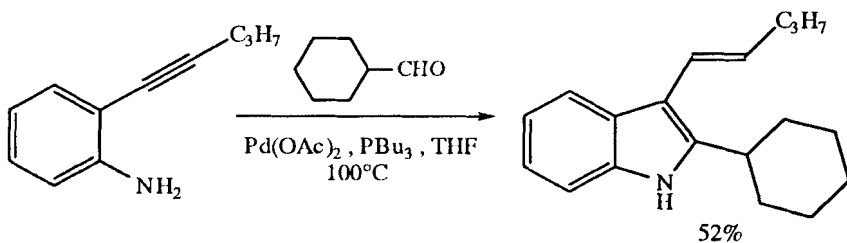
Occchiato, E.G.; Trabocchi, A.; Guarna, A. *Org. Lett.*, **2000**, 2, 1241.



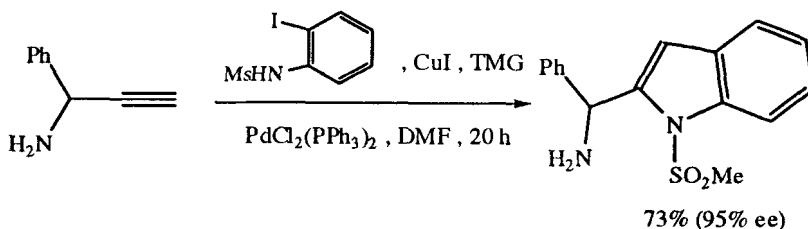
Arcadi, A.; Cacchi, S.; Fabrizi, G.; Marinelli, F. *Synlett*, **2000**, 394.



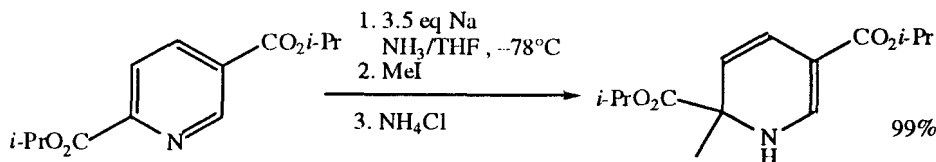
Arcadi, A.; Cacchi, S.; Fabrizi, G.; Marinelli, F. *Synlett*, **2000**, 647.



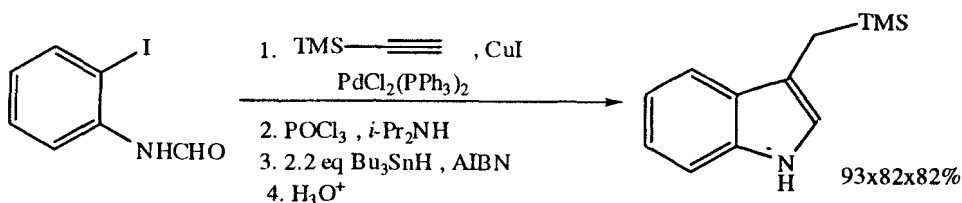
Takeda, A.; Kamijo, S.; Yamamoto, Y. *J. Am. Chem. Soc.*, **2000**, 122, 5662.



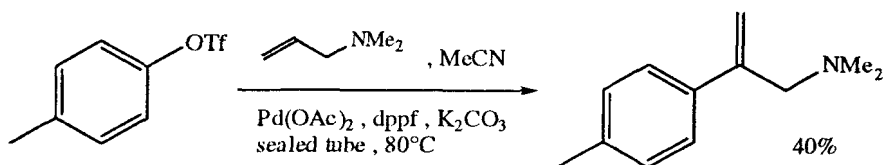
Messina, F.; Botta, M.; Corelli, E.; Villani, C. *Tetrahedron Asymm.*, **2000**, *11*, 1681.



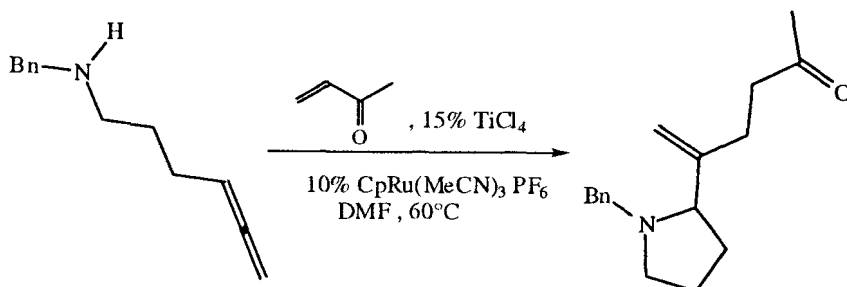
Donohoe, T.J.; McRiner, A.J.; Sheldrake, P. *Org. Lett.*, **2000**, *2*, 3861.



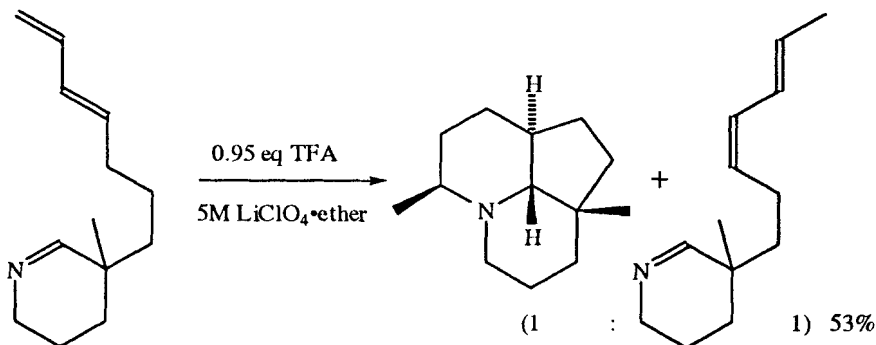
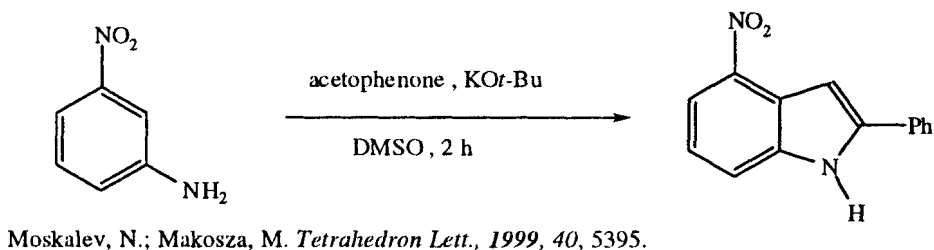
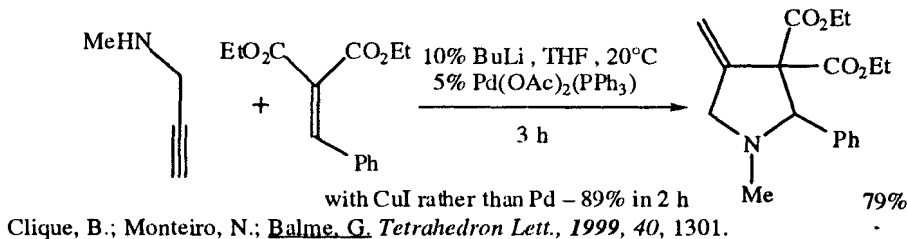
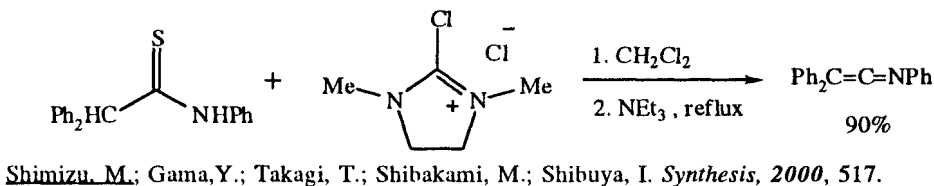
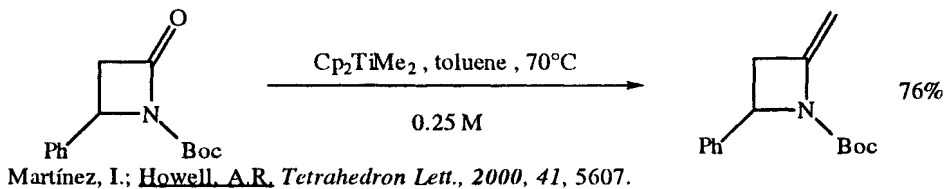
Ranier, J.D.; Kennedy, A.R. *J. Org. Chem.*, **2000**, *65*, 6213.



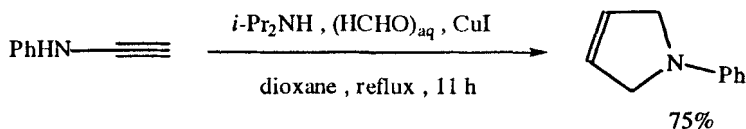
Olofsson, K.; Larhed, M.; Hallberg, A. *J. Org. Chem.*, **2000**, *65*, 7235.



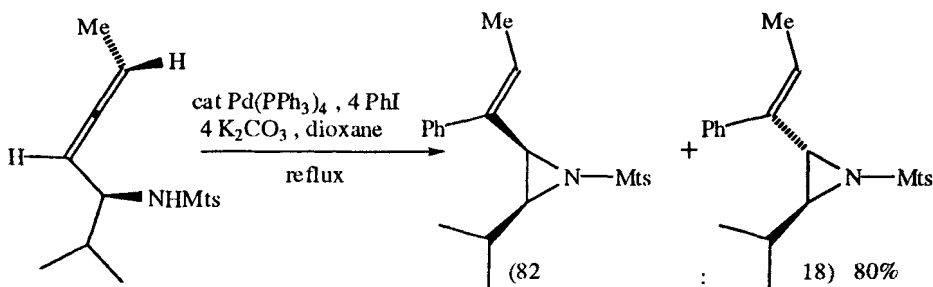
Trost, B.M.; Pinkerton, A.B.; Kremzow, D. *J. Am. Chem. Soc.*, **2000**, *122*, 12007.



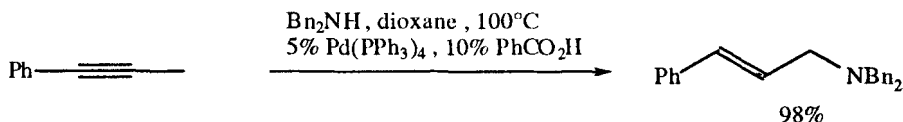
Grieco, P.A.; Kaufman, M.D. *J. Org. Chem.*, **1999**, *64*, 6041.



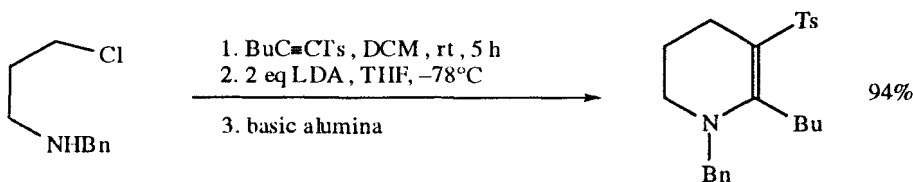
Jayaprakash, K.; Venkatachalam, C.S.; Balasubramanian, K.K.  
*Tetrahedron Lett.*, **1999**, 40, 6493.



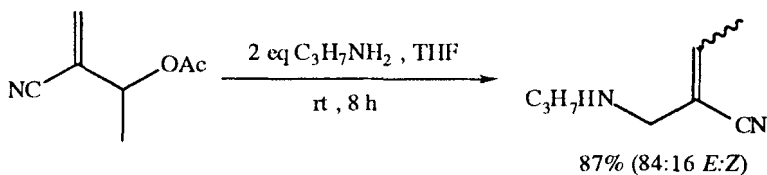
Ohno, H.; Toda, A.; Miwa, Y.; Taga, T.; Osawa, E.; Tamaoka, Y.; Fujii, N.; Ihuka, T.  
*J. Org. Chem.*, **1999**, 64, 2992.



Kadota, I.; Shibuya, A.; Lutete, L.M.; Yamamoto, Y. *J. Org. Chem.*, **1999**, 64, 4570.



Back, T.G.; Nakajima, K. *Org. Lett.*, **1999**, 1, 261.



Hbaïeb, S.; Latiri, Z.; Amri, H. *Synth. Commun.*, **1999**, 29, 981.

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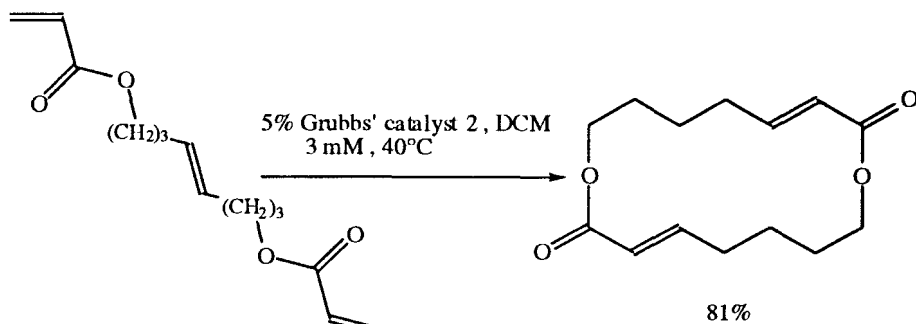
"Addition of Carbon-Centered Radicals to Imines and Related Compounds," Friestad, G.K.  
*Tetrahedron*, **2001**, 57, 5461.



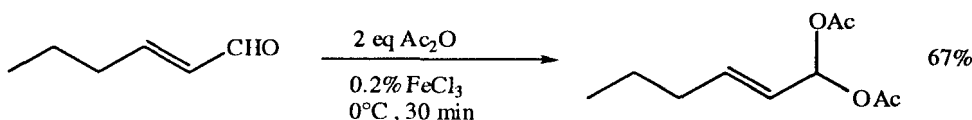
"Recent Developments in Imino-Diels-Alder Reactions," Buonora, P.; Olsen, J.-C.; Oh, T. *Tetrahedron*, **2001**, *57*, 6099.

"Generation and Reactivity of  $\alpha$ -Metalated Vinyl Ethers," Friesen, R.W. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 1969.

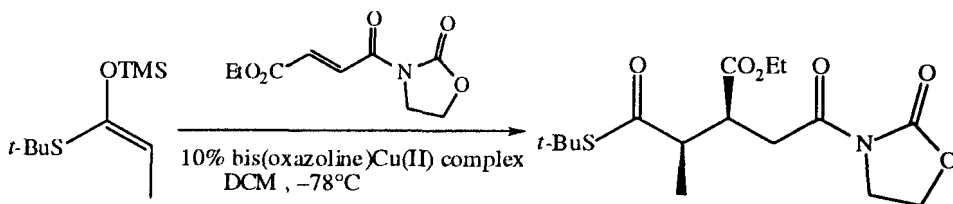
## SECTION 357: ESTER - ESTER



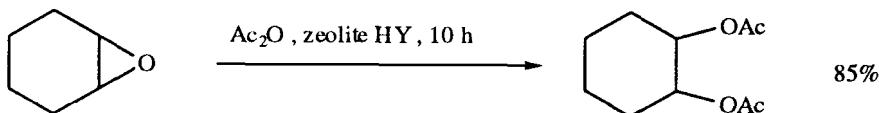
Lee, C.W.; Grubbs, R.H. *J. Org. Chem.*, **2001**, *66*, 7155.



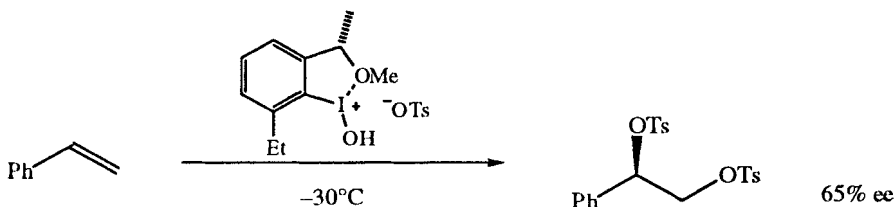
Trost, B.M.; Lee, C.B. *J. Am. Chem. Soc.*, **2001**, *123*, 3671.



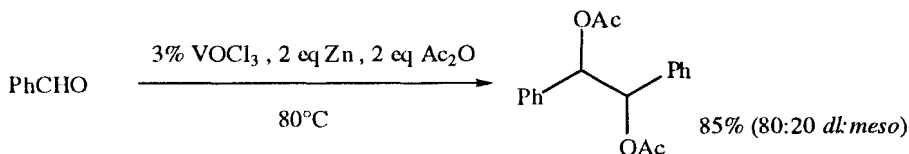
Evans, D.A.; Scheidt, K.A.; Johnson, J.N.; Willis, M.C. *J. Am. Chem. Soc.*, **2001**, *123*, 4480.



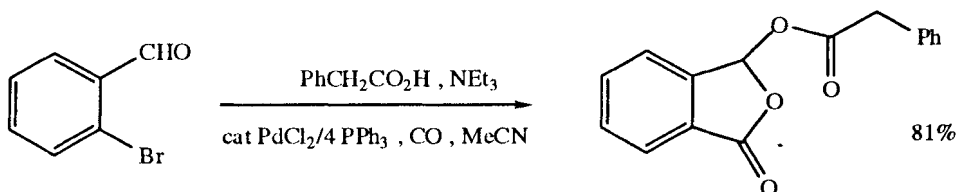
Ramesh, P.; Reddy, V.L.N.; Venugopal, D.; Subrahmanyam, M.; Venkateswarlu, Y. *Synth. Commun.*, **2001**, *31*, 2599.



Hirt, U.H.; Schuster, M.F.H.; French, A.N.; Wiest, O.G.; Wirth, T.  
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Hirao, T.; Takeuchi, H.; Ogawa, A.; Sakurai, H. *Synlett*, **2000**, 1658.



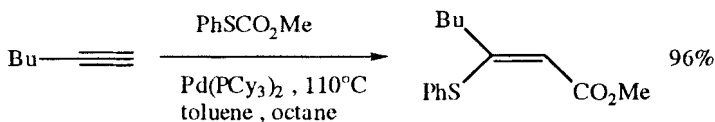
Cho, C.S.; Back, D.Y.; Kim, H.-Y.; Shim, S.C.; Oh, D.H. *Synth. Commun.*, **2000**, 39, 1139.

## REVIEWS:

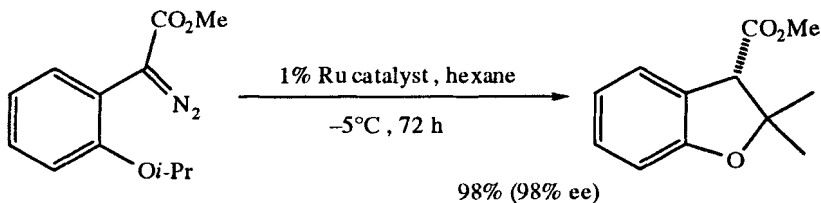
"1, 2-Diacetals: A New Opportunity for Organic Synthesis," Ley, S.V.; Baeschlin, D.K.; Dixon, D.J.; Foster, A.C.; Ince, S.J.; Priepke, H.W.M.; Reynolds, D.J. *Chem. Rev.*, **2001**, 101, 53.

Also via Dicarboxylic Acids:      Section 312 (Carboxylic Acids - Carboxylic Acids)  
 Hydroxy-esters                      Section 327 (Alcohol - Ester)  
 Diols                                      Section 323 (Alcohol - Alcohol)

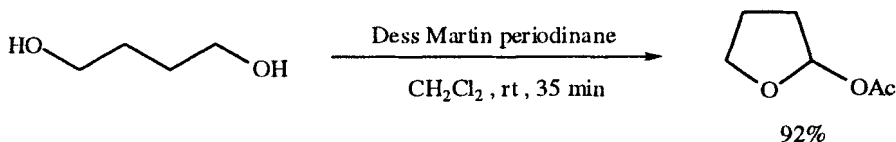
## SECTION 358: ESTER - ETHER, EPOXIDE, THIOETHER



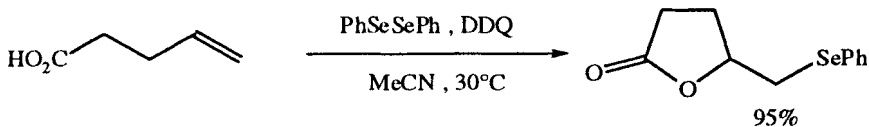
Hua, R.; Takeda, H.; Onozawa, S.-y.; Abe, Y.; Tanaka, M.  
*J. Am. Chem. Soc.*, **2001**, 123, 2899.



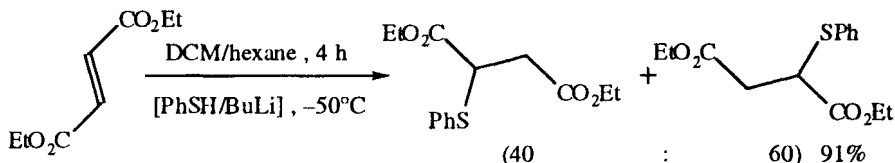
Davies, H.M.L.; Grazini, M.V.A.; Aouad, E. *Org. Lett.*, **2001**, *3*, 1475.



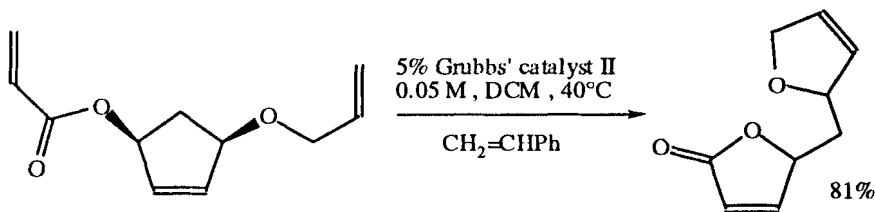
Roels, J.; Metz, P. *Synlett*, **2001**, 789.



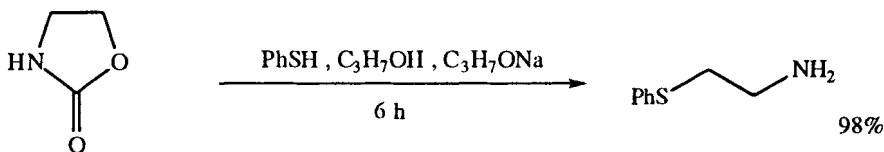
Tiecco, M.; Testaferri, L.; Temnperini, A.; Bagnoli, L.; Marini, F.; Santi, C. *Synlett*, **2001**, 1767.



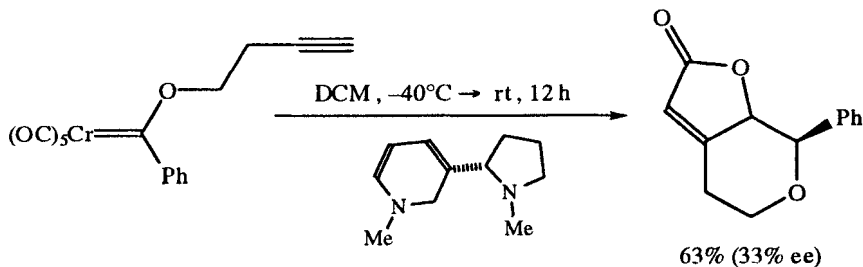
Kamimura, A.; Kawahara, F.; Omata, Y.; Murakami, N.; Morita, R.; Otake, H.; Mitsudera, H.; Shirai, M.; Kakehi, A. *Tetrahedron Lett.*, **2001**, *42*, 8497.



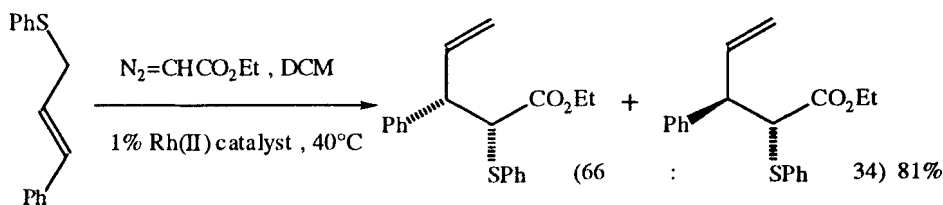
Choi, T.-L.; Grubbs, R.H. *Chem. Commun.*, **2001**, 2648.



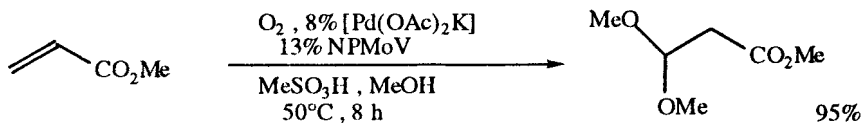
Ishibashi, H.; Uegaki, M.; Sakai, M.; Takeda, Y. *Tetrahedron*, **2001**, *57*, 2115.



**Rudler, J.L.**; Parlier, A.; Certal, V.; Frison, J.-C. *Tetrahedron Lett.*, **2001**, *42*, 5235.

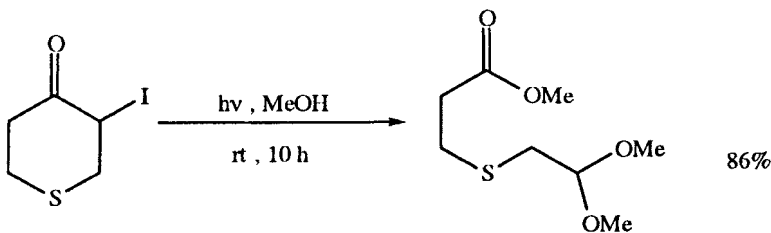


Kitagaki, S.; Yanamoto, Y.; Okubo, H.; Nakajima, M.; **Hashimoto, S.**  
*Heterocycles*, **2001**, *54*, 623.

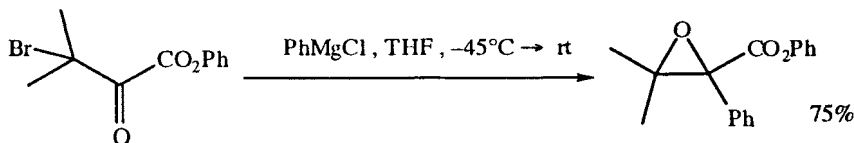


NPMoV = molybdovanadophosphate

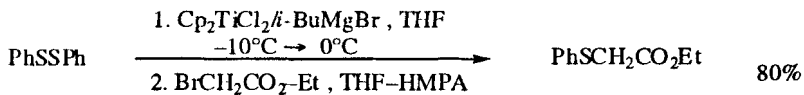
Kishi, A.; Sakaguchi, S.; **Ishii, Y.** *Org. Lett.*, **2000**, *2*, 523.



Ji, S.-J.; **Horiuchi, C.A.** *Bull. Chem. Soc. Jpn.*, **2000**, *73*, 1645.

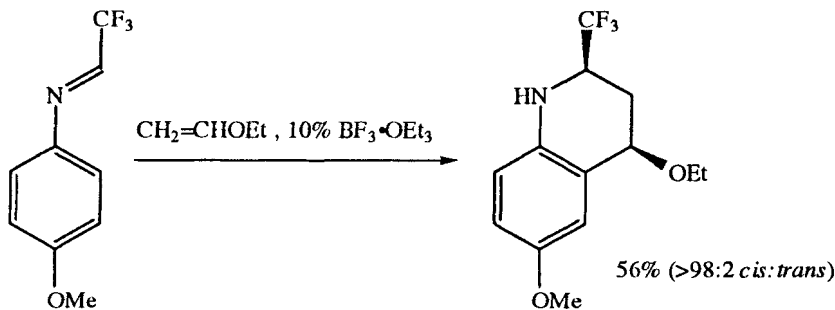


Jung, M.E.; Mengel, W.; Newton, T.W. *Synth. Commun.*, **1999**, *29*, 3659.



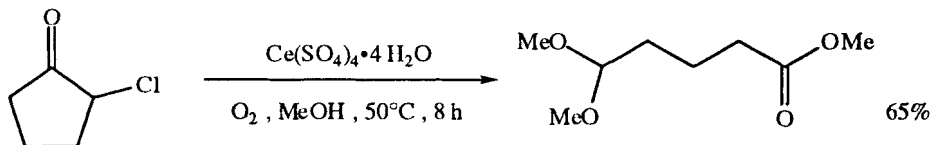
80%

Huang, X.; Zheng, W.-X. *Synth. Commun.*, **1999**, 29, 1297.



56% (&gt;98:2 cis:trans)

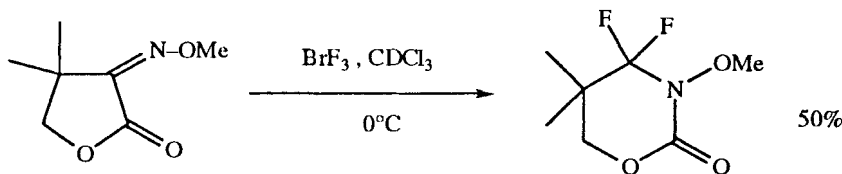
Crousse, B.; Bégué, J.-P.; Bonnet-Delpon, D. *J. Org. Chem.*, **2000**, 65, 5009.



65%

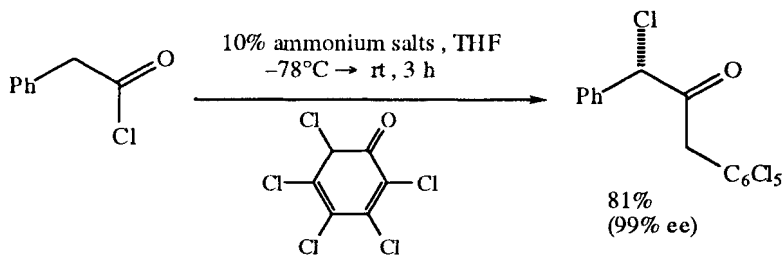
He, L.; Horiuchi, C.A. *Bull. Chem. Soc., Jpn.*, **1999**, 72, 2515.

## SECTION 359: ESTER - HALIDE, SULFONATE

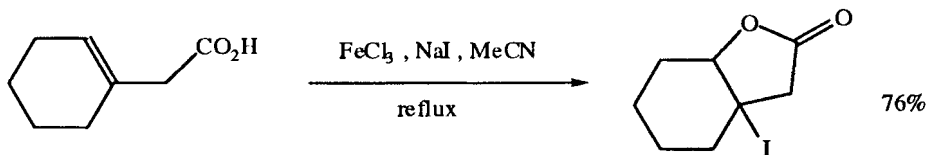


50%

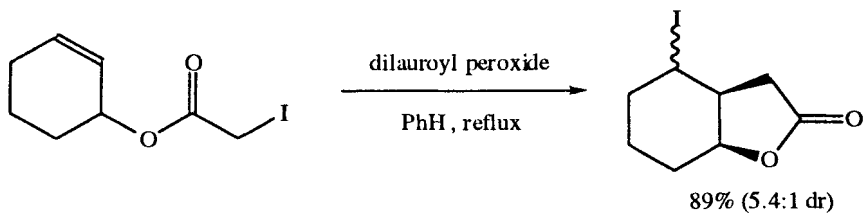
Rozen, S.; Ben-David, I. *J. Org. Chem.*, **2001**, 66, 496.

81%  
(99% ee)

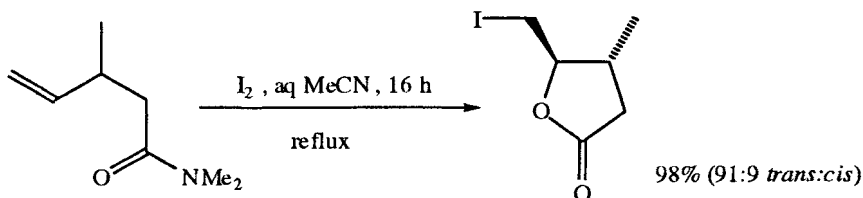
Wack, H.; Taggi, A.E.; Hafez, A.M.; Drury III, W.J.; Lectka, T. *J. Am. Chem. Soc.*, **2001**, 123, 1531.



Chavan, S.P.; Sharma, A.K. *Tetrahedron Lett.*, 2001, 42, 4923.

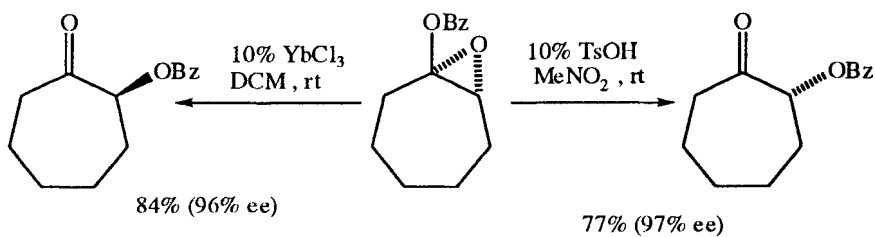


Ollivier, C.; Bark, T.; Renaud, P. *Synthesis*, 2000, 1598.

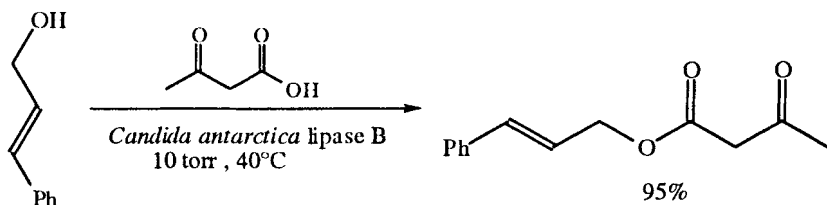


Ha, H.-I.; Lee, S.-Y.; Park, Y.-S. *Synth. Commun.*, 2000, 30, 3645.

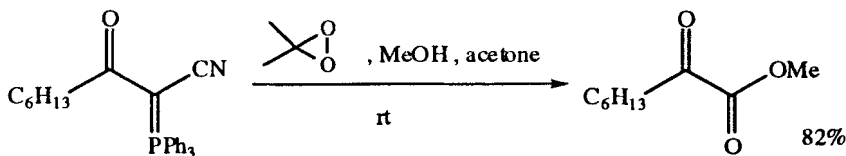
## SECTION 360: ESTER - KETONE



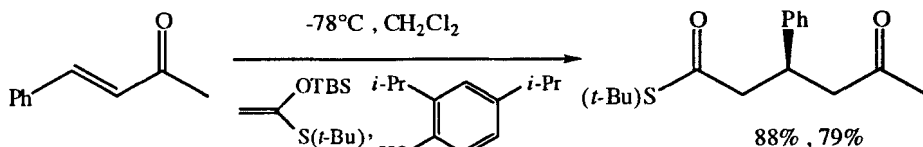
Zhu, Y.; Shu, L.; Tu, Y.; Shi, Y. *J. Org. Chem.*, 2001, 66, 1818.



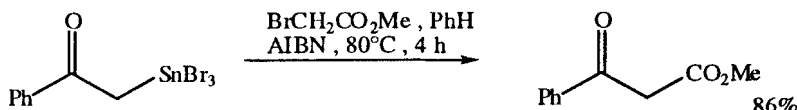
Córdova, A.; Janda, K.D. *J. Org. Chem.*, 2001, 66, 1906.



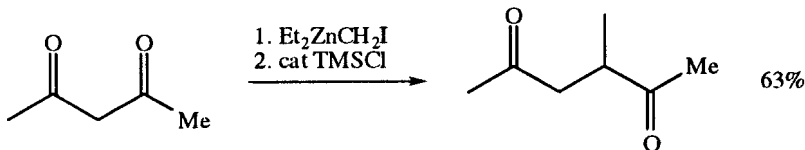
Wong, M.-K.; Yu, C.-W.; Yuen, W.-H.; Yang, D. *J. Org. Chem.*, **2001**, *66*, 3606.



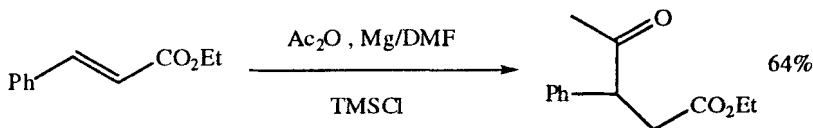
Harada, T.; Iwai, H.; Yakatsuki, H.; Fujita, K.; Kubo, M.; Oku, A. *Org. Lett.*, **2001**, *3*, 2101.



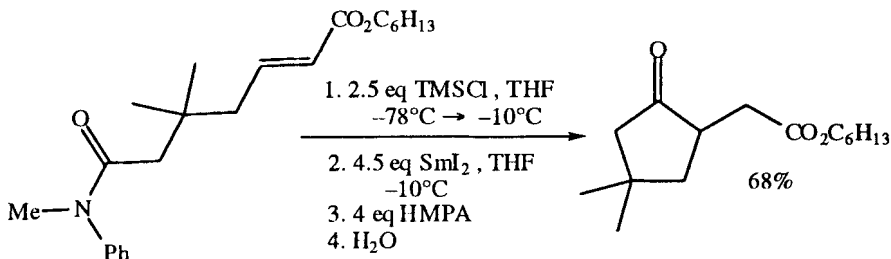
Miura, K.; Fukisawa, N.; Saito, H.; Wang, D.; Hosomi, A. *Org. Lett.*, **2001**, *3*, 2591.



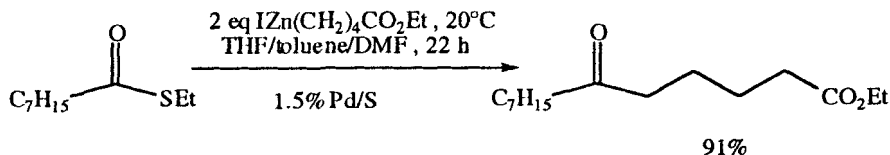
Hilgenkamp, R.; Zercher, C.K. *Org. Lett.*, **2001**, *3*, 3037.



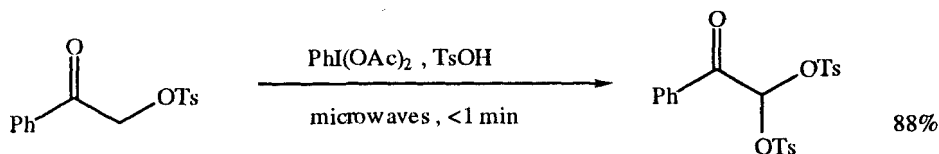
Ohno, T.; Sakai, M.; Ishino, Y.; Shibata, T.; Maekawa, H.; Nishiguchi, I. *Org. Lett.*, **2001**, *3*, 3439.



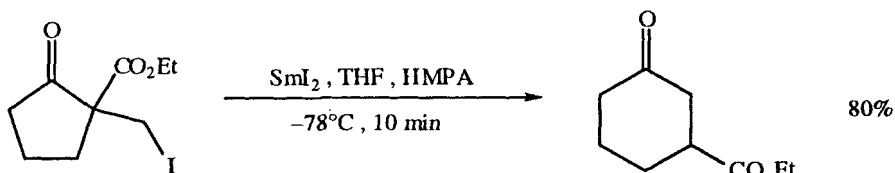
McDonald, C.E.; Galka, A.M.; Green, A.I.; Keane, J.M.; Kowalchick, J.E.; Micklitsch, C.M.; Wisnoski, D.D. *Tetrahedron Lett.*, **2001**, *42*, 163.



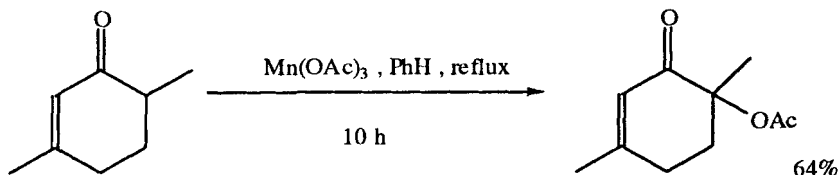
Shimizu, T.; Seki, M. *Tetrahedron Lett.*, **2001**, 42, 429.



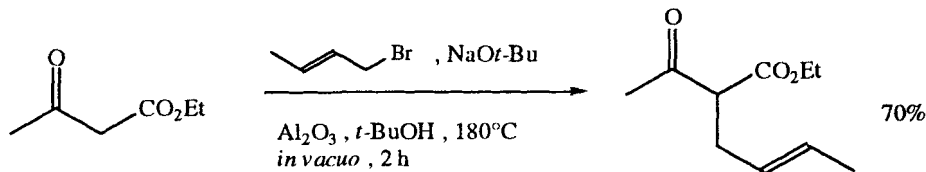
Lee, J.C.; Choi, J.-H. *Synlett*, **2001**, 234.



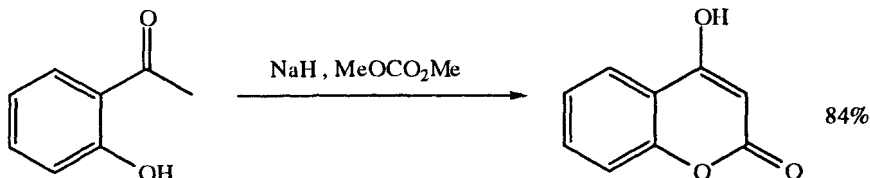
Chung, S.H.; Cho, M.S.; Choi, J.Y.; Kwon, D.W.; Kim, Y.H. *Synlett*, **2001**, 1266.



Tanyeli, C.; Sezen, B.; Iyigün, Ç.; Elmali, O. *Tetrahedron Lett.*, **2001**, 42, 6397.

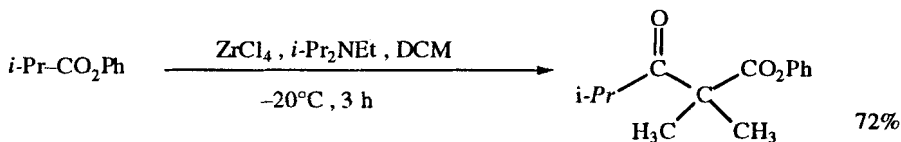


Bhar, S.; Chaudhuri, S.K.; Sahu, S.G.; Panja, C. *Tetrahedron*, **2001**, 57, 9011.

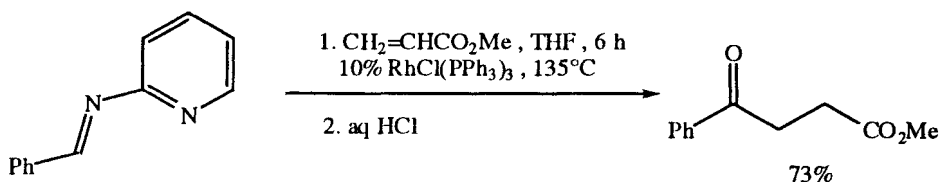


Jung, J.-C.; Jung, Y.-J.; Park, O.-S. *Synth. Commun.*, **2001**, 31, 1195.

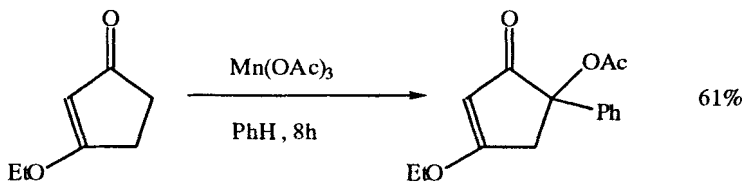




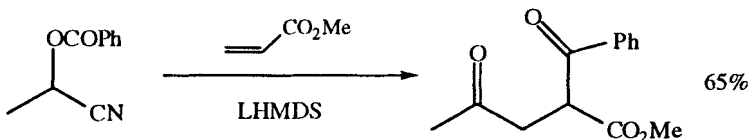
Tanabe, Y.; Hamasaki, R.; Funakoshi, S. *Chem. Commun.*, 2001, 1674.



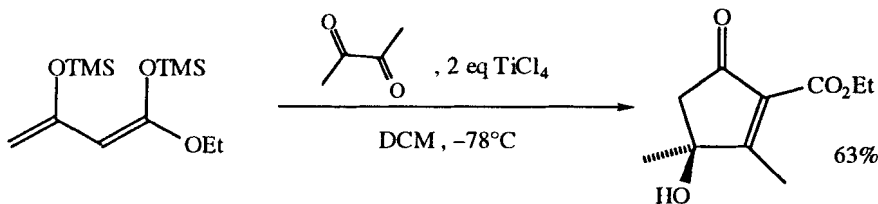
Willis, M.C.; Sapmaz, S. *Chem. Commun.*, 2001, 2558.



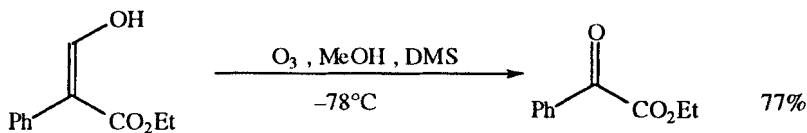
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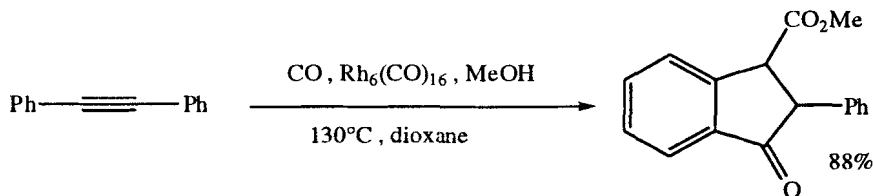
Kraus, G.A.; Dneprovskaja, E. *Tetrahedron Lett.*, 2000, 41, 21.



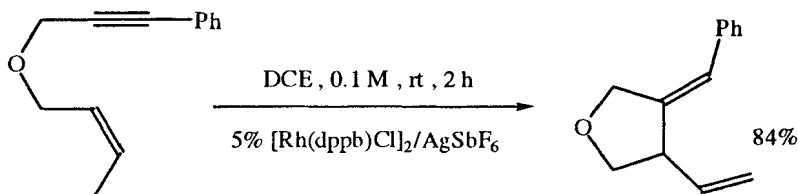
Langer, P.; Köhler, V. *Org. Lett.*, 2000, 2, 1597.



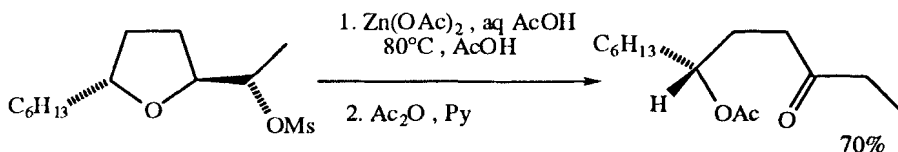
Mahmood, S.J.; McLaughlin, M.; Hossain, M.M. *Synth. Commun.*, 1999, 29, 2967.



Yoneda, E.; Kaneko, T.; Zhang, S.-W.; Onitsuka, K.; Takahashi, S.  
*Tetrahedron Lett.*, **1999**, *40*, 7811.



Ley, S.V.; Thomas, A.W.; Finch, H. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 669.

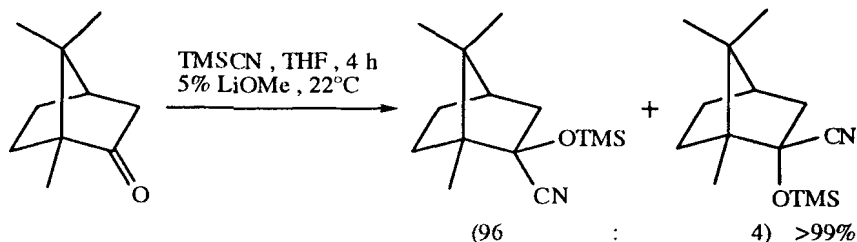


Nagasawa, K.; Hori, N.; Koshino, H.; Nakata, T. *Heterocycles*, **1999**, *50*, 919.

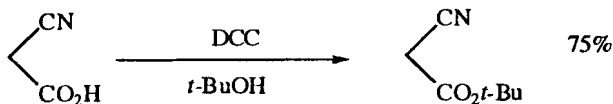
Also via Ketoacids  
 Hydroxyketones

Section 320 (Carboxylic Acid - Ketone)  
 Section 330 (Alcohol - Ketone)

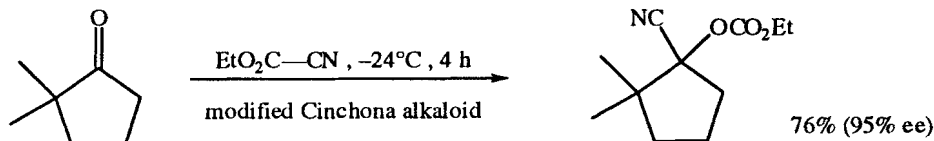
## SECTION 361: ESTER - NITRILE



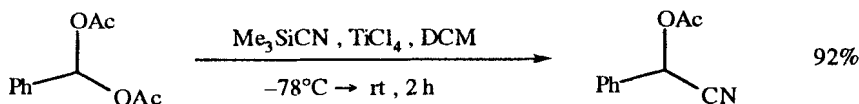
Wilkinson, H.S.; Grover, P.T.; Vanddenbossche, C.P.; Bakale, R.P.; Bhongle, N.N.; Wald, S.A.;  
Senanayake, C.H. *Org. Lett.*, **2001**, *3*, 553.



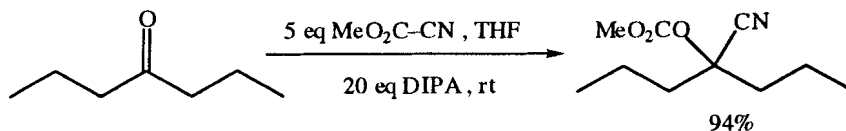
Nahmany, M.; Melman, A. *Org. Lett.*, **2001**, 3, 3733.



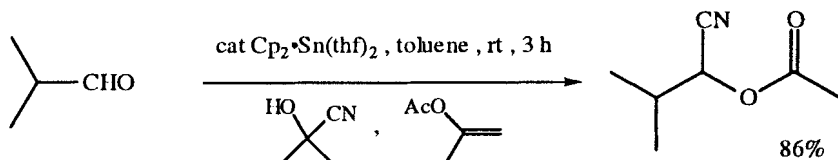
Tian, S.-K.; Deng, L. *J. Am. Chem. Soc.*, **2001**, 123, 6195.



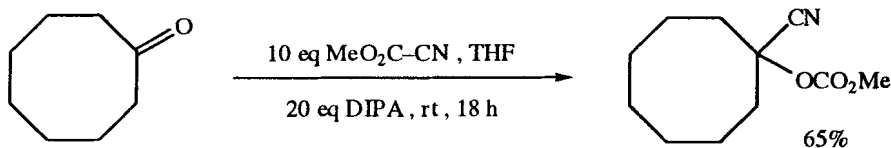
Sandberg, M.; Sydnnes, L.K. *Org. Lett.*, **2000**, 2, 687.



Berthiaume, D.; Poirier, D. *Tetrahedron*, **2000**, 56, 5995.



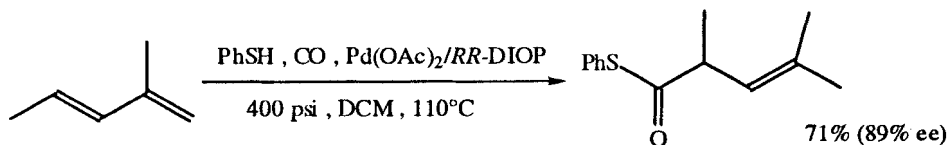
Kawasaki, Y.; Fujii, A.; Nakano, Y.; Sakaguchi, S.; Ishii, Y. *J. Org. Chem.*, **1999**, 64, 4214.



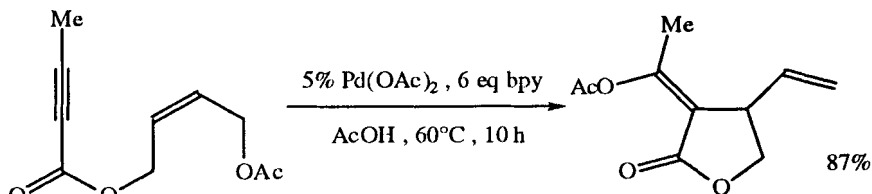
Poirier, D.; Berthiaume, D.; Boivin, R.P. *Synlett*, **1999**, 1423.

## SECTION 362: ESTER - ALKENE

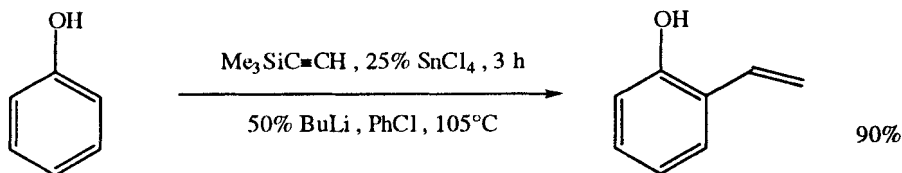
This section contains syntheses of enol esters and esters of unsaturated acids as well as ester molecules bearing a remote alkenyl unit.



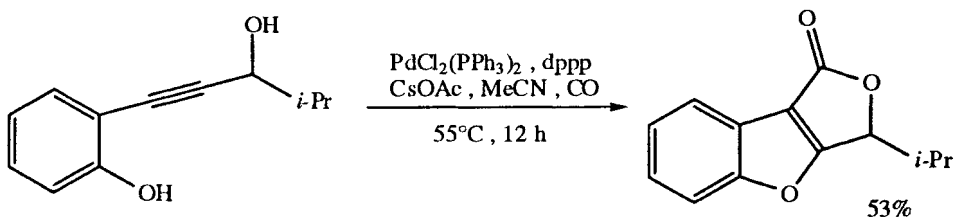
Xiao, W.-J.; Alper, H. *J. Org. Chem.*, **2001**, 66, 6229.



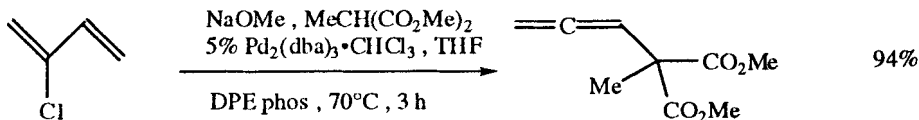
Zhang, Q.; Lu, X.; Han, X. *J. Org. Chem.*, **2001**, 66, 7676.



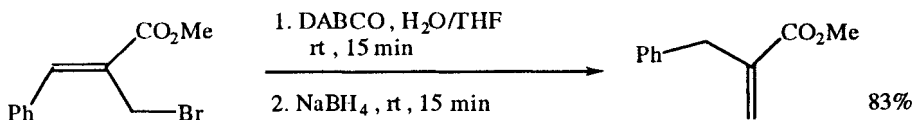
Kobayashi, K.; Yamaguchi, M. *Org. Lett.*, **2001**, 3, 241.



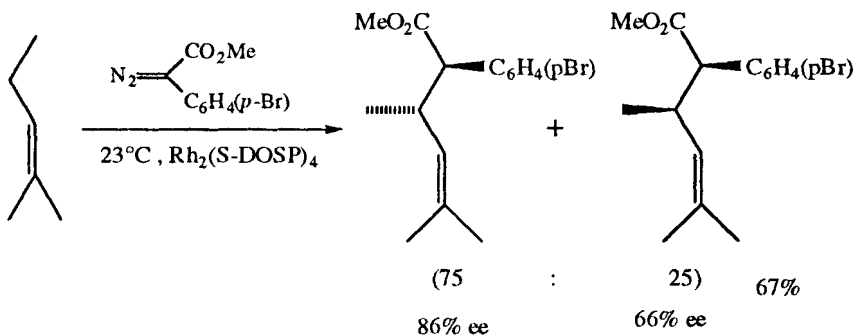
Hu, Y.; Yang, Z. *Org. Lett.*, **2001**, 3, 1387.



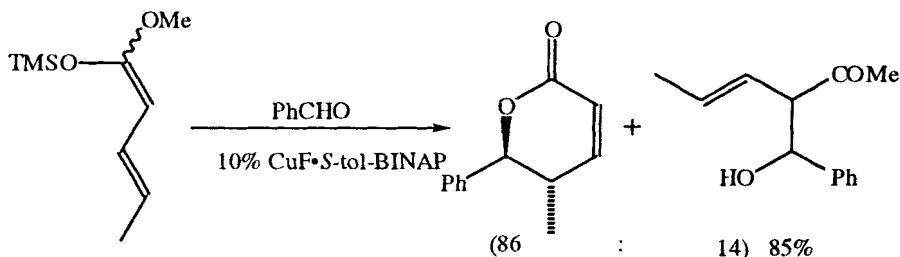
Ogasawara, M.; Ikeda, H.; Nagano, T.; Hayashi, T. *Org. Lett.*, **2001**, 3, 2615.



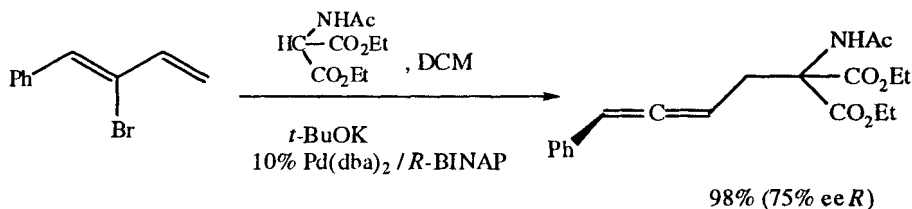
Basavaiah, D.; Kumaragurubaran, N. *Tetrahedron Lett.*, **2001**, 42, 477.



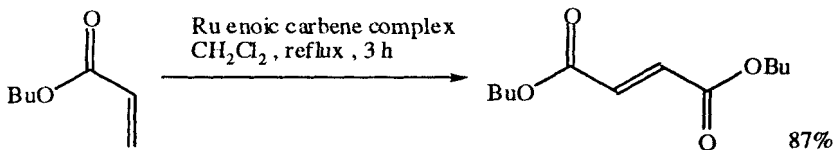
Davies, H.M.L.; Ren, P.; Jin, Q. *Org. Lett.*, **2001**, 3, 3587.



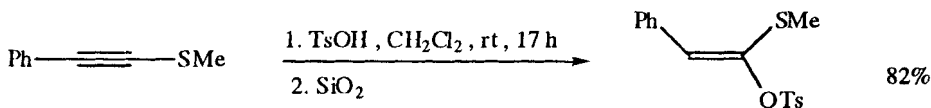
Bluet, G.; Bazán-Tejeda, B.; Campagne, J.-M. *Org. Lett.*, **2001**, 3, 3807.



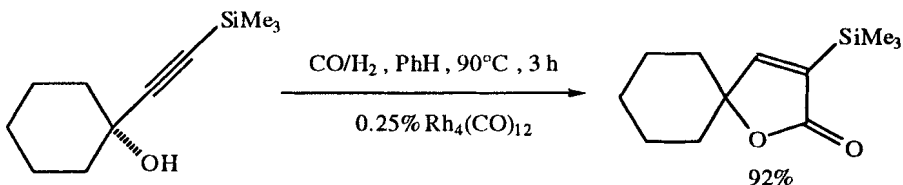
Ogasawara, M.; Ikeda, H.; Nagano, T.; Hayashi, T. *J. Am. Chem. Soc.*, **2001**, 123, 2089.



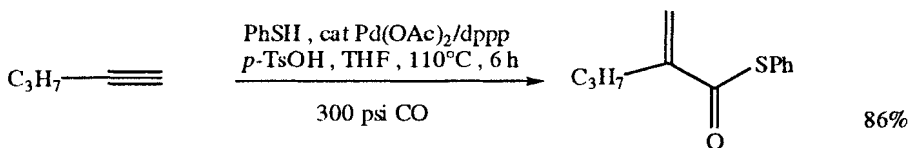
Choi, T.-L.; Lee, C.W.; Chatterjee, A.K.; Grubbs, R.H. *J. Am. Chem. Soc.*, **2001**, 123, 10417.



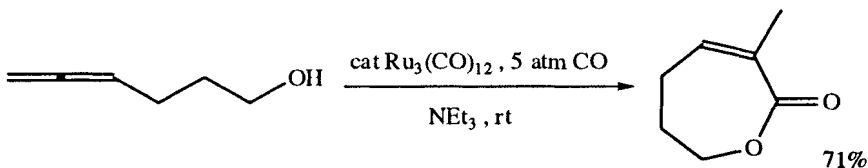
Braga, A.L.; Emmerich, D.J.; Silveira, C.C.; Martins, T.L.C.; Rodrigues, O.E.D. *Synlett*, **2001**, 371.



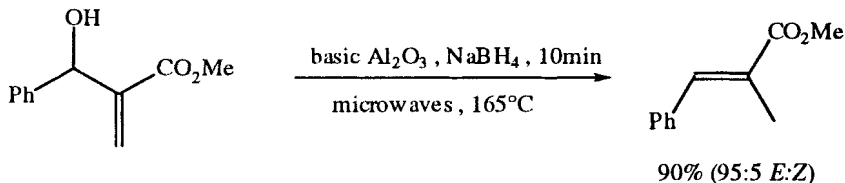
Fukuta, Y.; Matsuda, I.; Itoh, K. *Tetrahedron Lett.*, **2001**, 42, 1301.



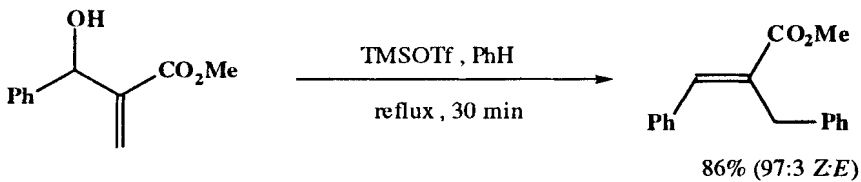
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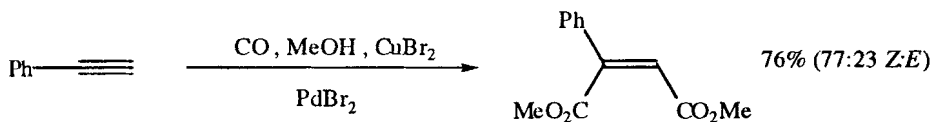
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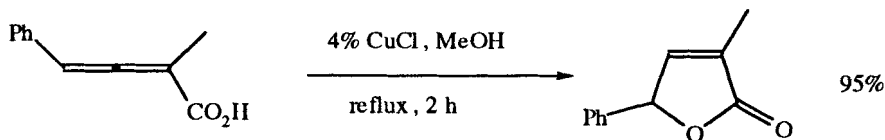
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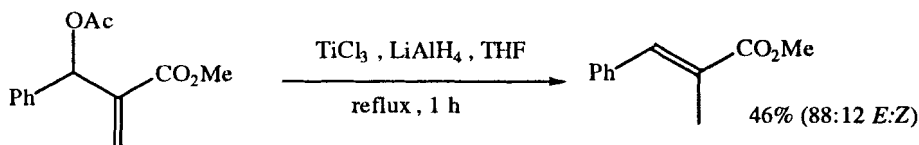
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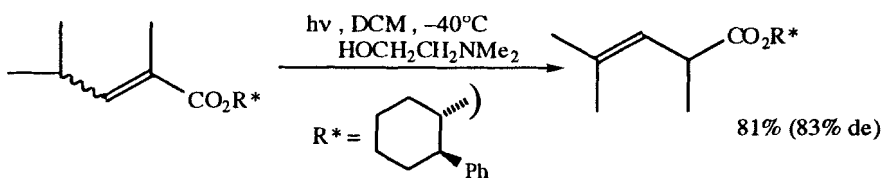
Li, J.; Jiang, H.; Chen, M. *Synth. Commun.*, **2001**, 31, 3131.



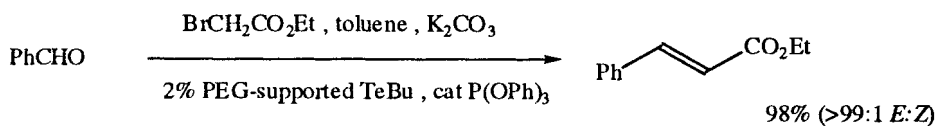
Ma, S.; Yu, Z.; Wu, S. *Tetrahedron*, **2001**, *57*, 1585.



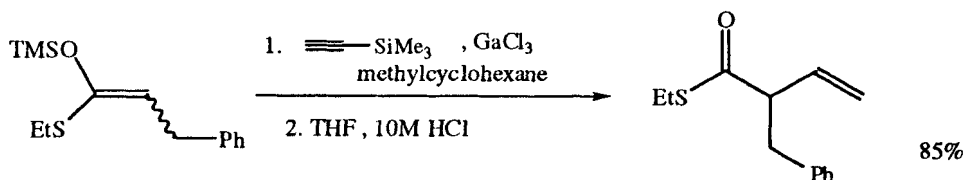
Shadakshari, U.; Nayak, S.K. *Tetrahedron*, **2001**, *57*, 4599.



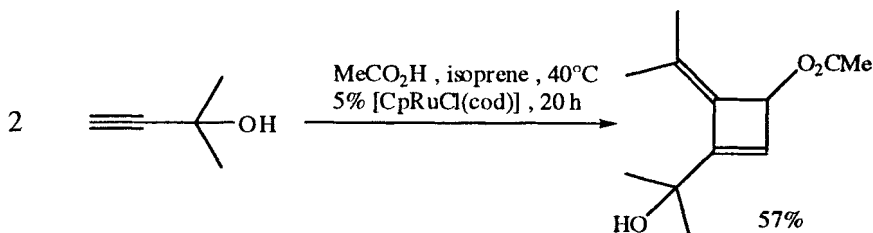
Bargiggia, F.; Piva, O. *Tetrahedron Asym.*, **2001**, *12*, 1389.



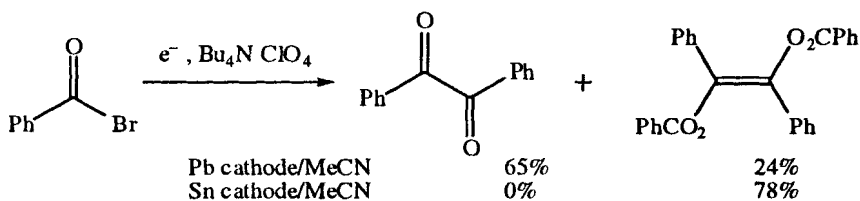
Huang, Z.-Z.; Ye, S.; Xia, W.; Tang, Y. *Chem. Commun.*, **2001**, 1384.



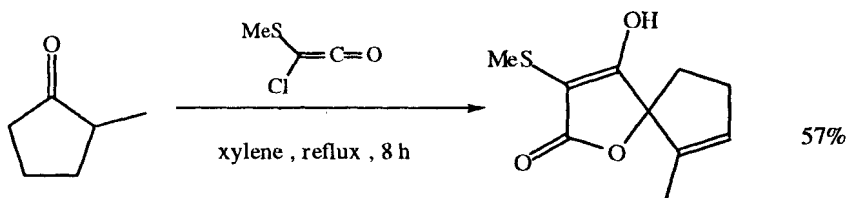
Arisawa, M.; Miyagawa, C.; Yoshimura, S.; Kido, Y.; Yanaguchi, M. *Chem. Lett.*, **2001**, 1080.



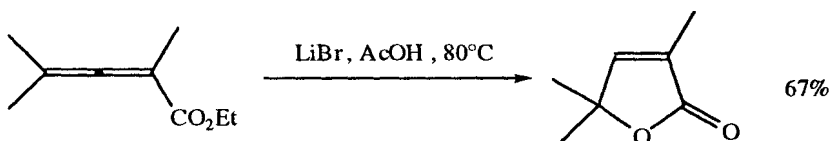
La Paih, J.; Dérien, S.; Bruneau, C.; Demerseman, B.; Toupet, L.; Dixneuf, P.H. *Angew. Chem. Int. Ed.*, **2001**, *40*, 2912.



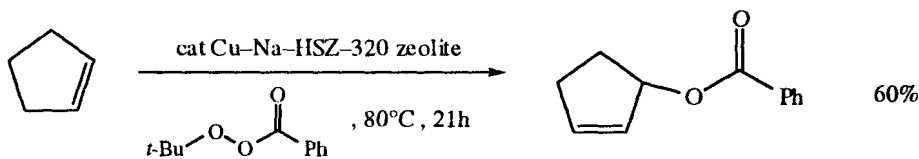
Kise, N.; Ueda, N. *Bull. Chem. Soc. Jpn.*, **2001**, *74*, 755.



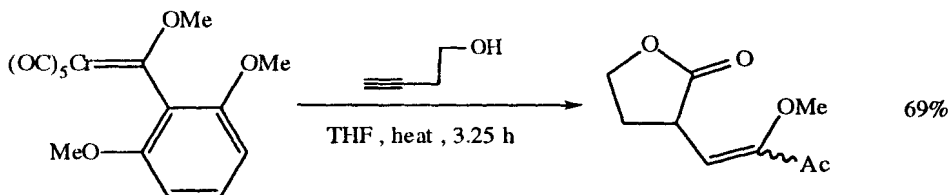
Lieb, E.; Benet-Buchholz, J.; Fäcke, T.; Fischer, R.; Graff, A.; Lefebvre, I.M.; Stetter, J. *Tetrahedron*, **2001**, *57*, 4133.



Ma, S.; Li, L.; Wei, Q.; Xie, H.; Wang, G.; Shi, Z.; Zhang, J. *Pure. Appl. Chem.*, **2000**, *72*, 1739.

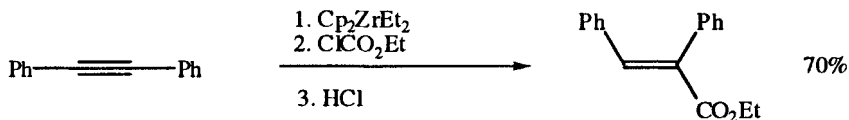


Carlioni, S.; Frullanti, B.; Maggi, R.; Mazzacani, A.; Bigi, F.; Sartori, G. *Tetrahedron Lett.*, **2000**, *41*, 8947.

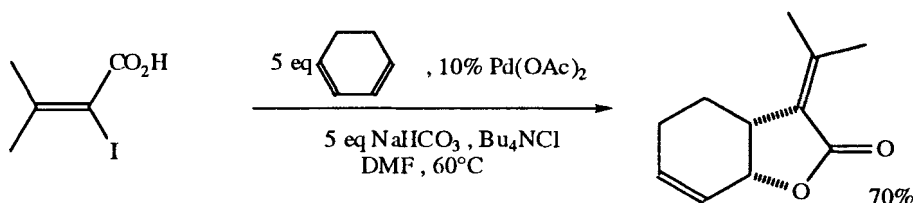


Good, G.M.; Kemp, M.I.; Kerr, W.J. *Tetrahedron Lett.*, **2000**, *41*, 9323.

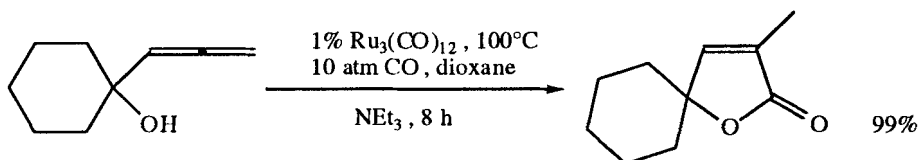




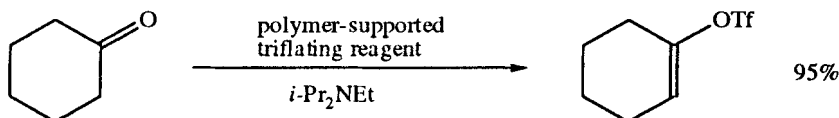
Takahashi, T.; Xi, C.; Ura, Y.; Nakajima, K. *J. Am. Chem. Soc.*, **2000**, *122*, 3228.



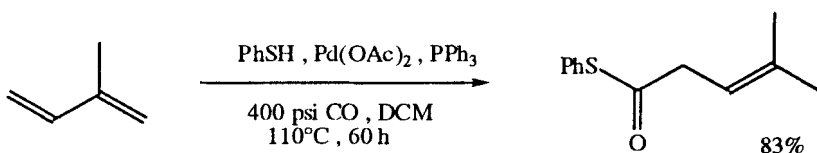
Gagnier, S.V.; Larock, R.C. *J. Org. Chem.*, **2000**, *65*, 1525.



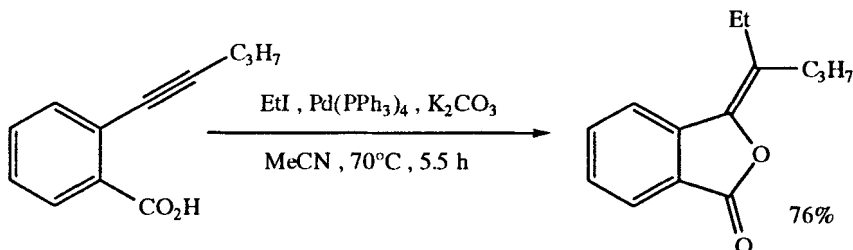
Yoneda, E.; Kaneko, T.; Zhang, S.-W.; Onitsuka, K.; Takahashi, S. *Org. Lett.*, **2000**, *2*, 441.



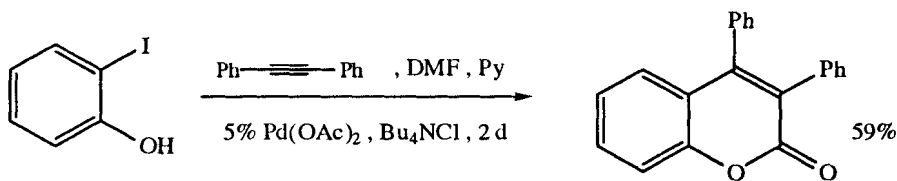
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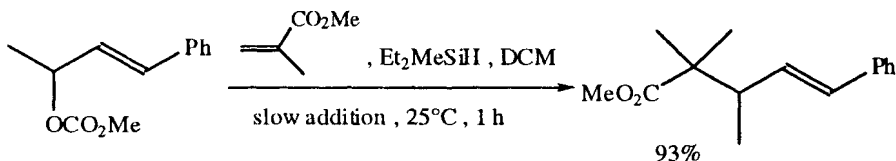
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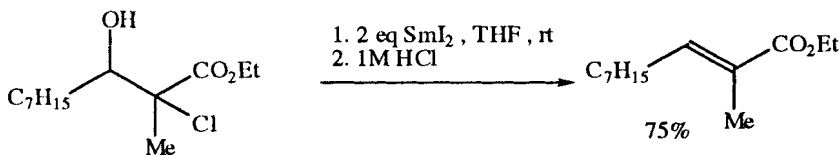
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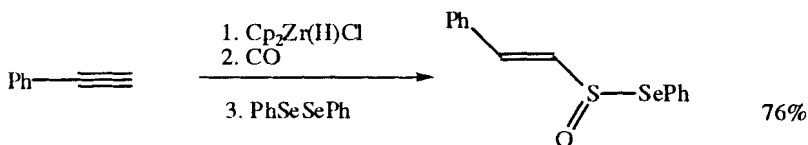
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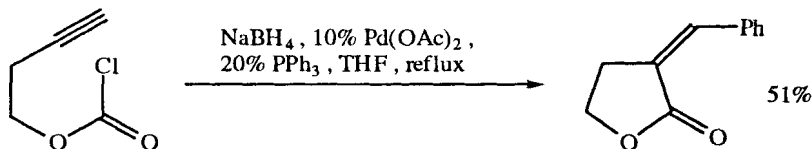
Muraoka, T.; Matsuda, I.; Itoh, K. *J. Am. Chem. Soc.*, 2000, 122, 9552.



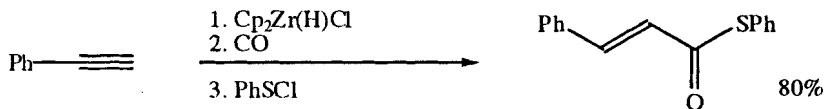
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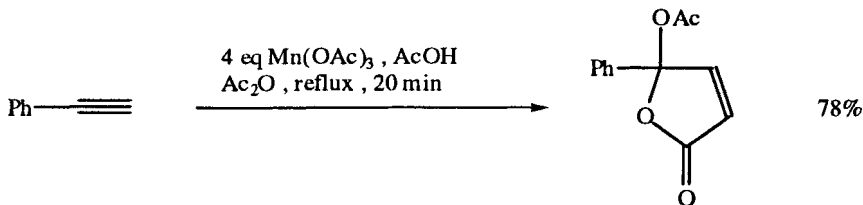
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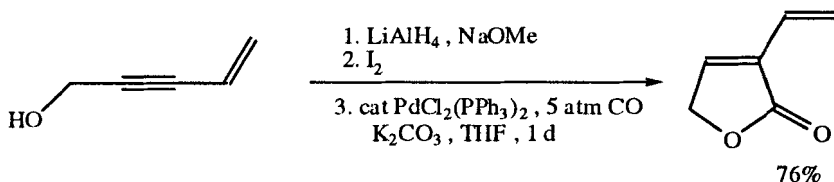
Grigg, R.; Savic, V. *Chem. Commun.*, 2000, 2381.



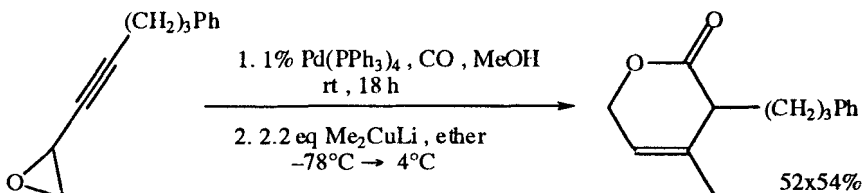
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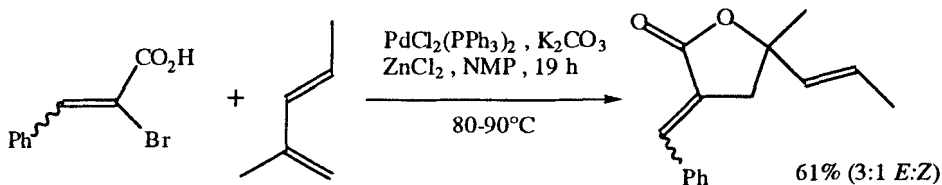
Montevecchi, P.C.; Navacchia, M.L. *Tetrahedron*, **2000**, *56*, 9339.



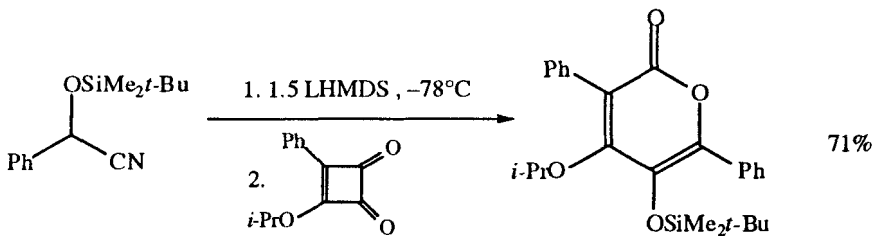
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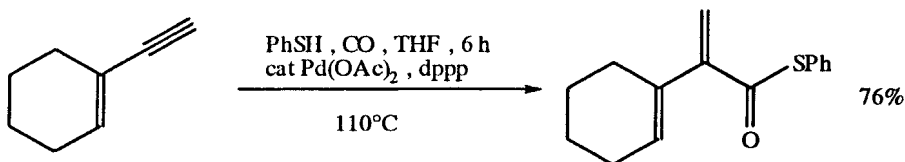
Knight, J.G.; Ainge, S.W.; Baxter, C.A.; Eastman, T.P.; Harwood, S.J. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 3188.



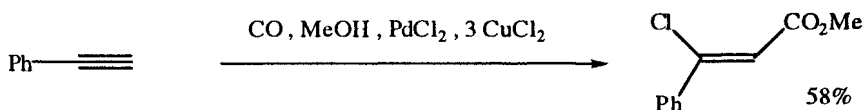
Iyer, S.; Ramesh, C. *Tetrahedron Lett.*, **1999**, *40*, 4719.



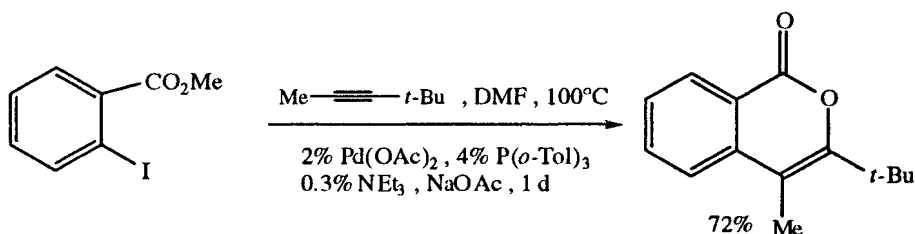
Mingo, P.; Zhang, S.; Liebeskind, L.S. *J. Org. Chem.*, **1999**, *64*, 2145.



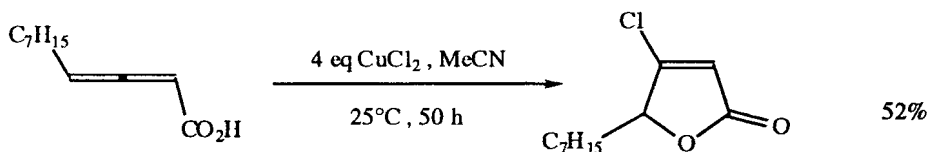
Xiao, W.-J.; Vasapollo, G.; Alper, H. *J. Org. Chem.*, **1999**, *64*, 2080.



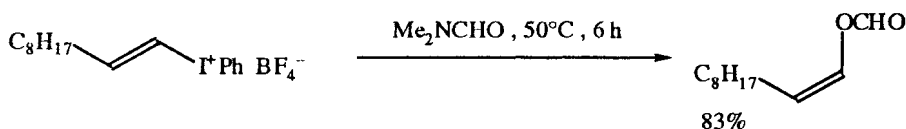
Li, J.; Jiang, H.; Feng, A.; Jia, L. *J. Org. Chem.*, **1999**, *64*, 5984.



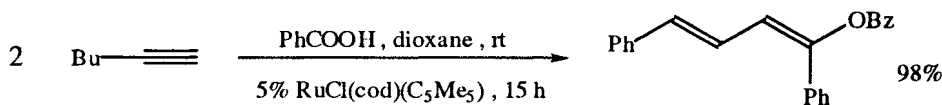
Larock, R.C.; Doty, M.J.; Han, X. *J. Org. Chem.*, **1999**, *64*, 8770.



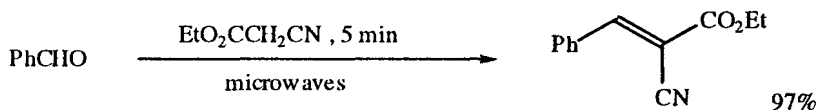
Ma, S.; Wu, S. *J. Org. Chem.*, **1999**, *64*, 9314.



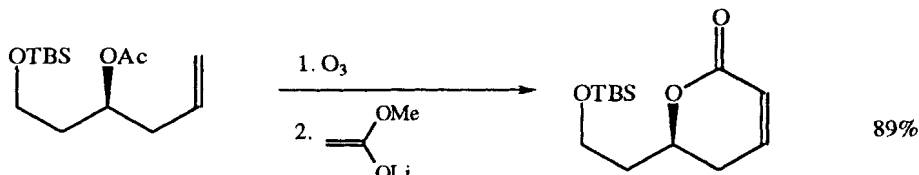
Ochiai, M.; Yamamoto, S.; Sato, K. *Chem. Commun.*, **1999**, 1363.



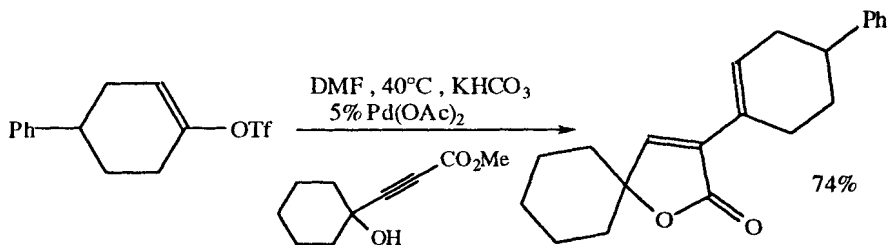
Le Paih, J.; Dérien, S.; Dixneuf, P.H. *Chem. Commun.*, **1999**, 1437.



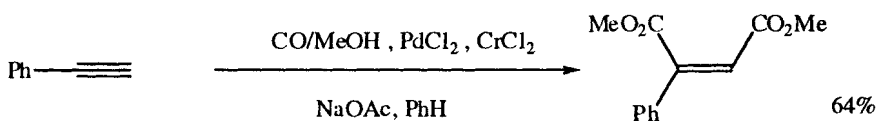
Mitra, A.K.; De, A.; Karchaudhuri, N. *Synth. Commun.*, **1999**, *29*, 2731.



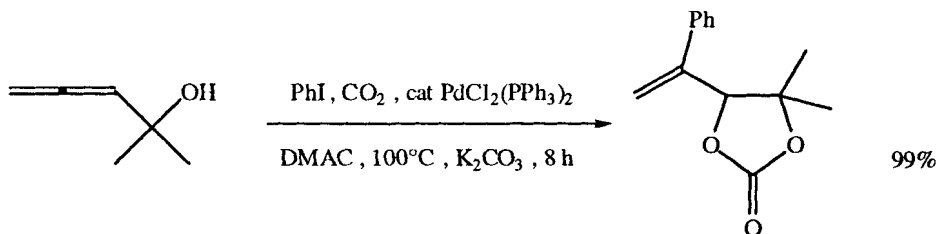
Keck, G.E.; Li, X.-Y.; Knutson, C.E. *Org. Lett.*, **1999**, *1*, 411.



Arcadi, A.; Cacchi, S.; Fabrizi, G.; Marinelli, F.; Pace, P. *Eur. J. Org. Chem.*, **1999**, 3305.



Li, J.; Jiang, H.; Jia, L. *Synth. Commun.*, **1999**, *29*, 3733.



Uemura, K.; Shiraishi, D.; Noziri, M.; Inoue, Y. *Bull. Chem. Soc. Jpn.*, **1999**, *72*, 1063.

Related Methods:

Section 60A (Protection of Aldehydes).

Section 180A (Protection of Ketones).

Also via Acetylenic Esters:

Section 306 (Alkyne - Ester).

Alkenyl Acids:

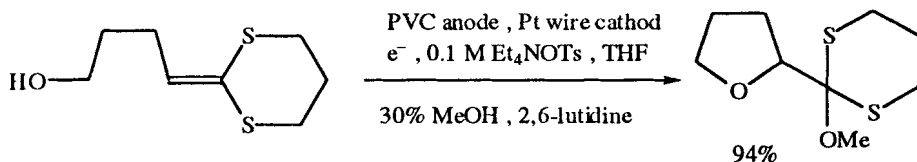
Section 322 (Carboxylic Acid - Alkene).

$\beta$ -Hydroxy-esters:

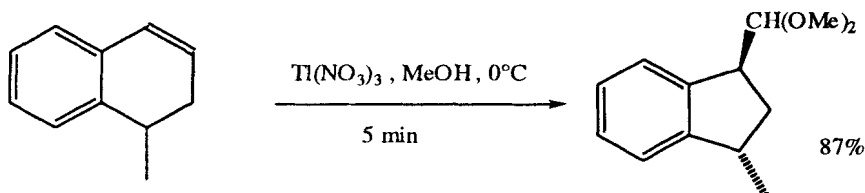
Section 327 (Alcohol - Ester).

## SECTION 363: ETHER, EPOXIDE, THIOETHER - ETHER, EPOXIDE, THIOETHER

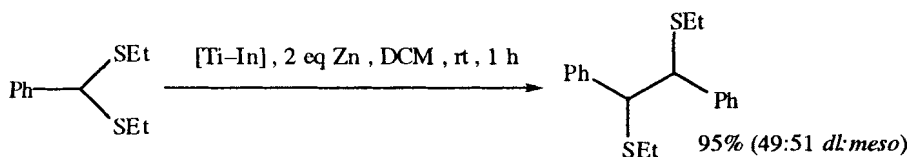
See Section 60A (Protection of Aldehydes) and Section 180A (Protection of Ketones) for reactions involving formation of Acetals and Ketals.



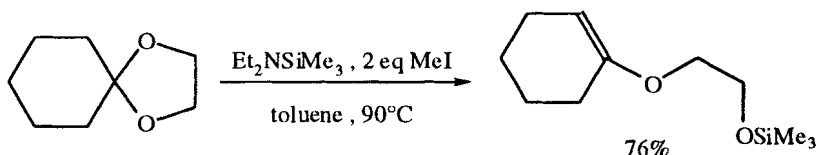
Sun, Y.; Liu, B.; Kao, J.; Andre d'Avignon, D.; Moeller, K.D. *Org. Lett.*, **2001**, 3, 1729.



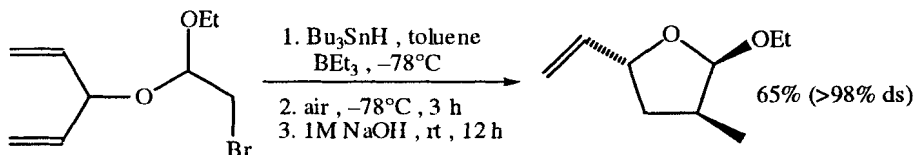
Ferraz, H.M.C.; Silva Jr., L.; Vieira, T.O. *Tetrahedron*, **2001**, 57, 1709.



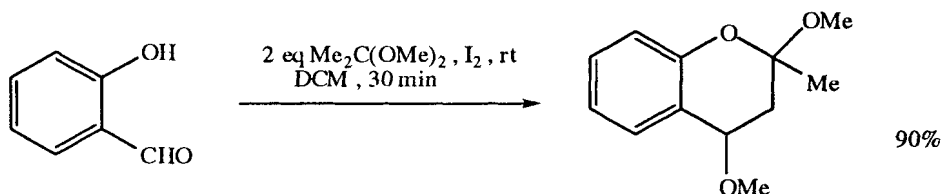
Yoshimura, N.; Igarashi, K.; Funasaka, S.; Mukaiyama, T. *Chem. Lett.*, **2001**, 640.



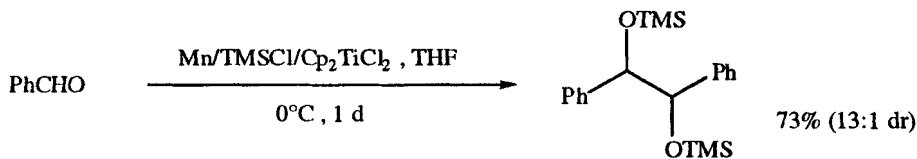
Ohshita, J.; Iwata, A.; Tang, H.; Yamamoto, Y.; Matsui, C.; Kunai, A. *Chem. Lett.*, **2001**, 740.



Villar, F.; Equey, O.; Renaud, P. *Org. Lett.*, **2000**, 2, 1061.

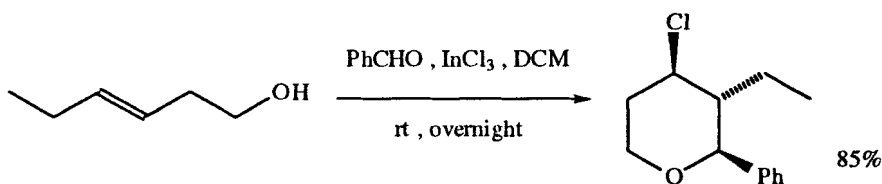


Yadav, J.S.; Reddy, B.V.S.; Hashim, S.R. *J. Chem. Soc., Perkin Trans. 1*, **2000**, 3082.

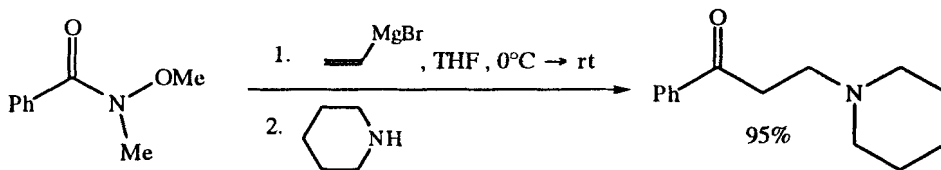


Dunlap, M.S.; Nicholas, K.M. *Synth. Commun.*, **1999**, 29, 1097.

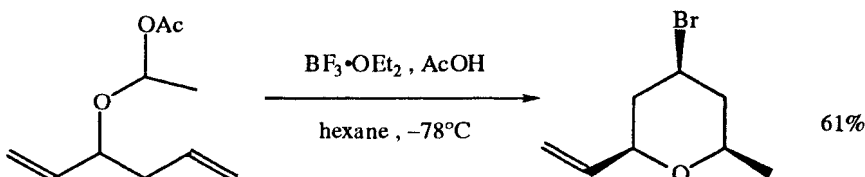
## SECTION 364: ETHER, EPOXIDE, THIOETHER - HALIDE, SULFONATE



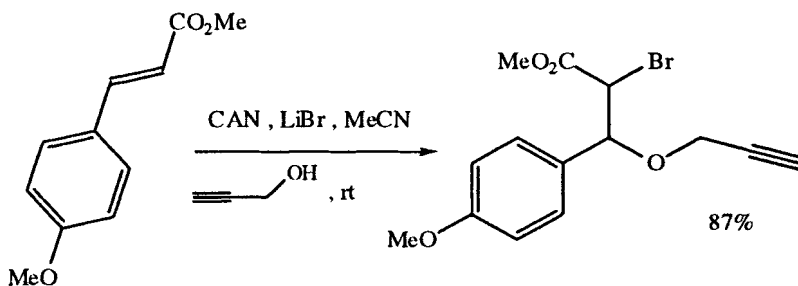
Yang, X.-F.; Mague, J.T.; Li, C.-J. *J. Org. Chem.*, **2001**, 66, 739.



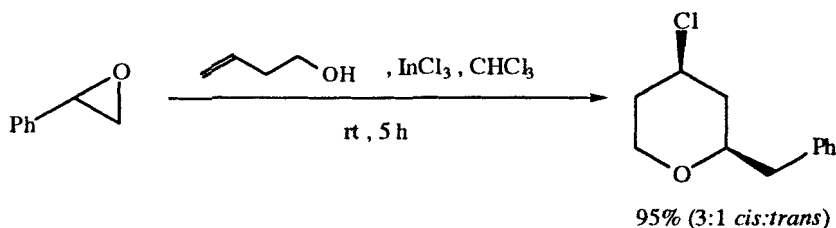
Gomtsyan, A.; Koenig, R.J.; Lee, C.-H. *J. Org. Chem.*, **2001**, 66, 3613.



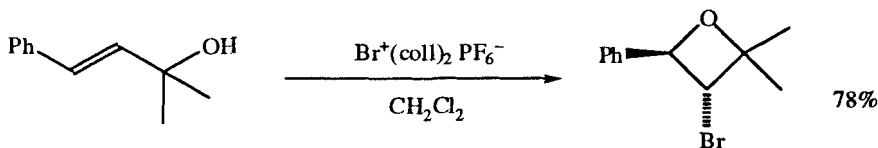
Jaber, J.J.; Mitsui, K.; Rychnovsky, S.D. *J. Org. Chem.*, **2001**, 66, 4679.



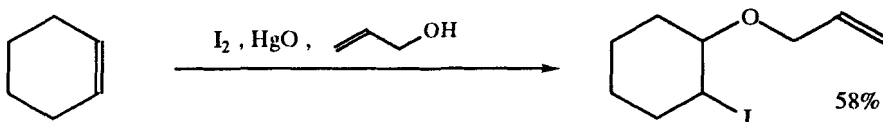
Roy, S.C.; Guin, C.; Rana, K.K.; Maiti, G. *Synlett*, **2001**, 226.



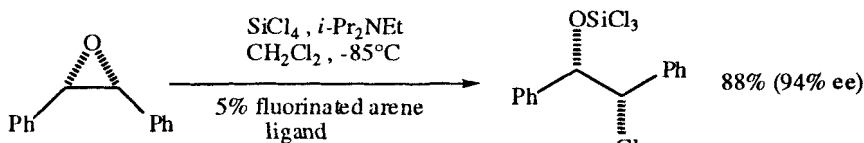
Li, J.; Li, C.-J. *Tetrahedron Lett.*, **2001**, 42, 793.



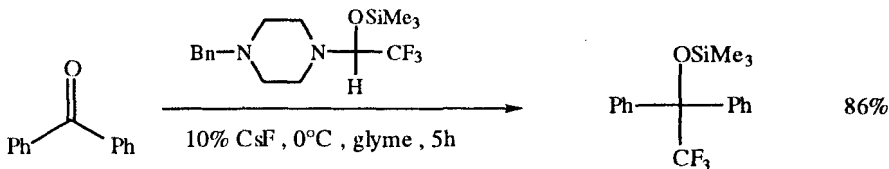
Albert, S.; Robin, S.; Rousseau, G. *Tetrahedron Lett.*, **2001**, 42, 2477.



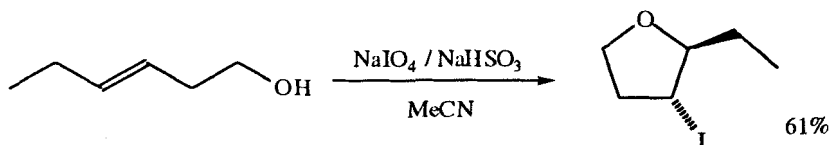
Talybov, G.M.; Mekhtieva, V.Z.; Karaev, S.F. *Russ. J. Org. Chem.*, **2001**, 37, 600.



Tao, B.; Lo, M.M.-C.; Fu, G.C. *J. Am. Chem. Soc.*, **2001**, 123, 353.

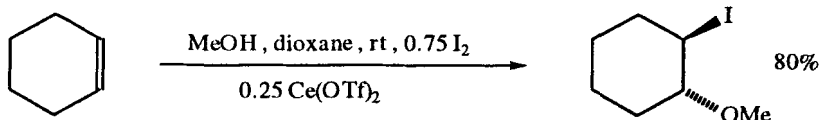


Billard, T.; Langlois, B.R.; Blond, G. *Tetrahedron Lett.*, **2000**, 41, 8777.

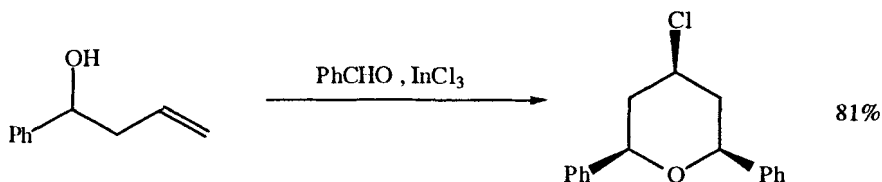


Okimoto, Y.; Kikuchi, D.; Sakaguchi, S.; Ishiji, Y. *Tetrahedron Lett.*, **2000**, 41, 10223.

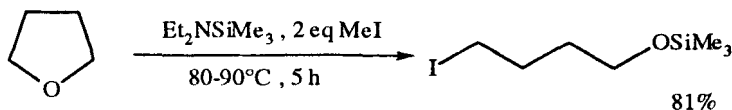




Iranpoor, N.; Shekarriz, M. *Tetrahedron Lett.*, 2000, 56, 5209.

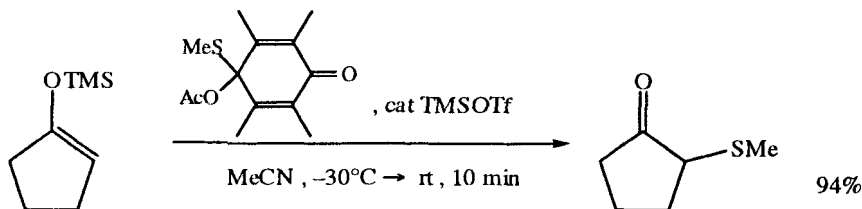


Yang, J.; Viswanathan, G.S.; Li, C.-J. *Tetrahedron Lett.*, 1999, 40, 1627.

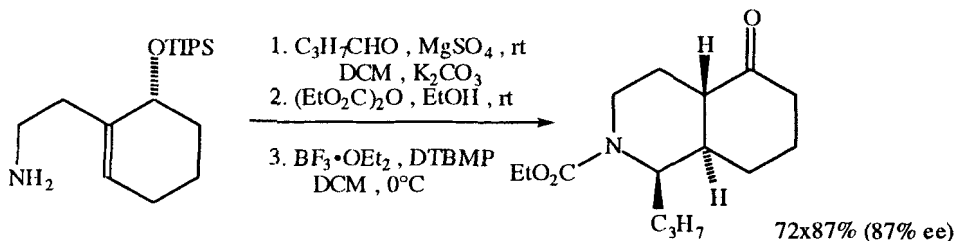


Ohshita, J.; Iwata, A.; Kanetani, F.; Kunai, A.; Yamamoto, Y.; Matui, C. *J. Org. Chem.*, 1999, 64, 8024.

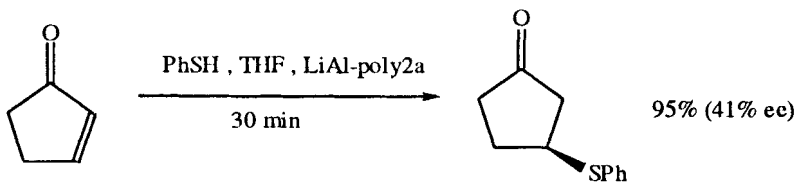
## SECTION 365: ETHER, EPOXIDE, THIOETHER - KETONE



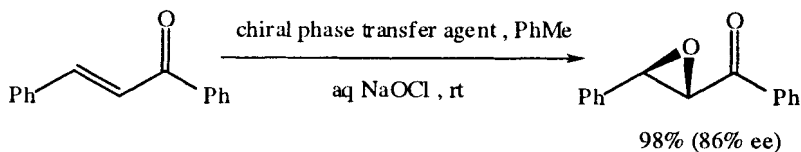
Matsugi, M.; Murata, K.; Gotanda, K.; Nambu, H.; Anilkumar, G.; Matsumoto, K.; Kita, Y. *J. Org. Chem.*, 2001, 66, 2434.



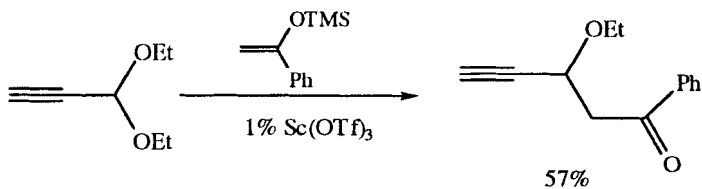
Cohen, F.; MacMillan, D.W.C.; Overman, L.E.; Romero, D. *Org. Lett.*, 2001, 3, 1225.



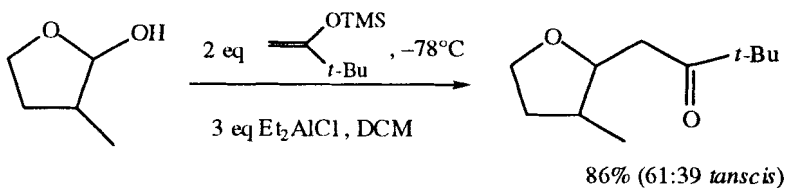
Sundararajan, G.; Prabakaran, N. *Org. Lett.*, **2001**, 3, 389.



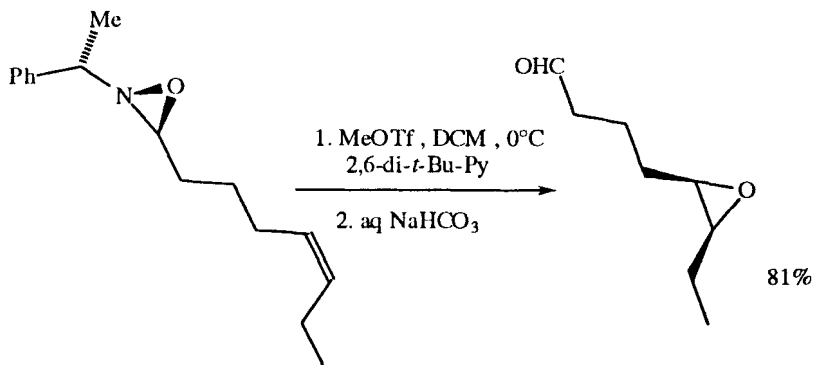
Lygo, B.; To, D.C.M. *Tetrahedron Lett.*, **2001**, 42, 1343.



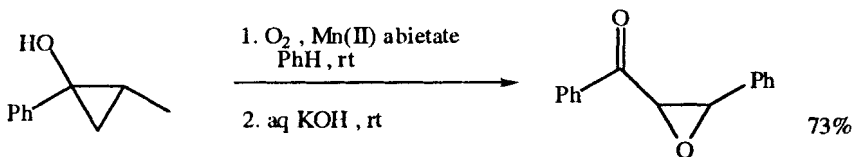
Yoshimatsu, M.; Kuribayashi, M.; Koike, T. *Synlett*, **2001**, 1799.



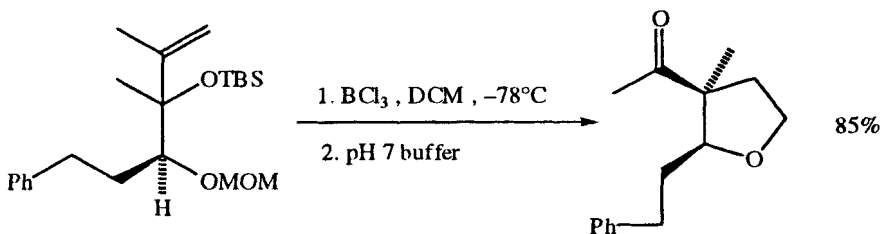
Schmitt, A.; Reibig, H.-U. *Eur. J. Org. Chem.*, **2001**, 1169.



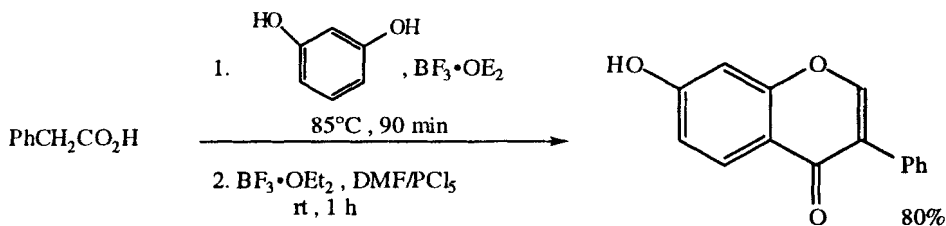
Armstrong, A.; Draffen, A.G. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 2861.



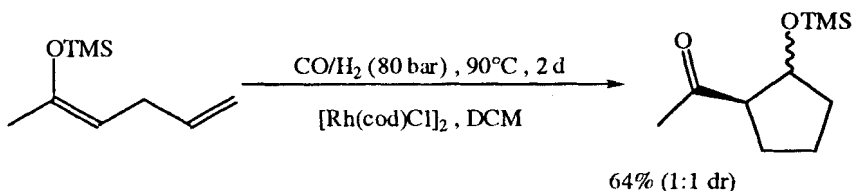
Kulinkovich, O.G.; Astashko, D.A.; Tyvorskii, V.I.; Ilyina, N.A. *Synthesis*, **2001**, 1453.



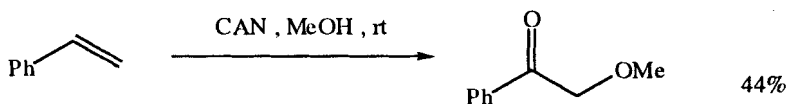
Gasparski, C.M.; Herrinton, P.M.; Overman, L.E.; Wolfe, J.P. *Tetrahedron Lett.*, **2000**, *41*, 9431.



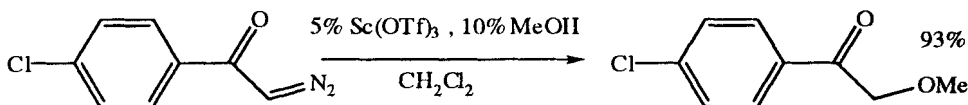
Balasubramanian, S.; Nair, M.G. *Synth. Commun.*, **2000**, *30*, 469.



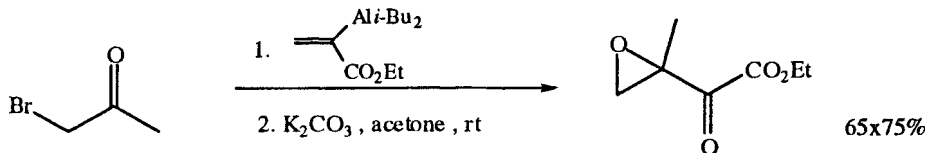
Hollmann, C.; Eilbracht, P. *Tetrahedron*, **2000**, *56*, 1685.



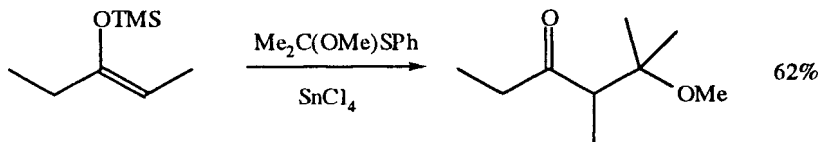
Nair, V.; Nair, L.G.; Panicker, S.B.; Sheeba, V.; Augustine, A. *Chem. Lett.*, **2000**, 584.



Pansare, S.V.; Jain, R.P.; Bhattacharyya, A. *Tetrahedron Lett.*, **1999**, *40*, 5255.

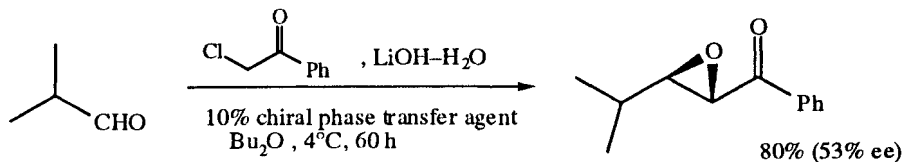


Ramachandran, P.V.; Krzeminski, M.P. *Tetrahedron Lett.*, **1999**, 40, 7879.



with  $\text{TiCl}_4$ , RSPH is obtained in 86%

Braga, A.L.; Dronelles, L.; Silveira, C.C.; Wessjohann, L.A. *Synthesis*, **1999**, 562.

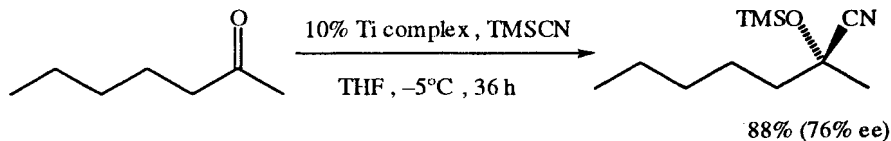


Arai, S.; Shirai, Y.; Ishida, T.; Shioiri, T. *Tetrahedron*, **1999**, 55, 6375.

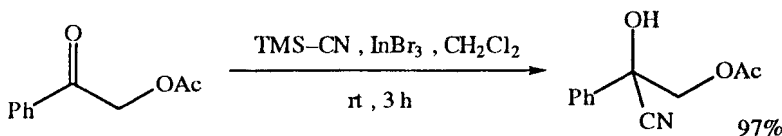
## REVIEWS:

"Epoxy Ketones as Versatile Building Blocks in Organic Synthesis," Lauret, C. *Tetrahedron Asymm.*, **2001**, 12, 2359.

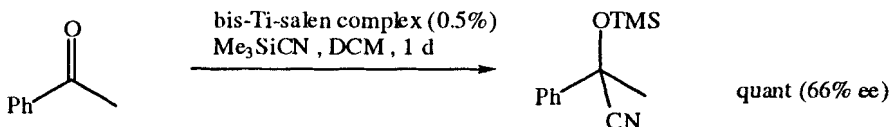
## SECTION 366: ETHER, EPOXIDE, THIOETHER - NITRILE



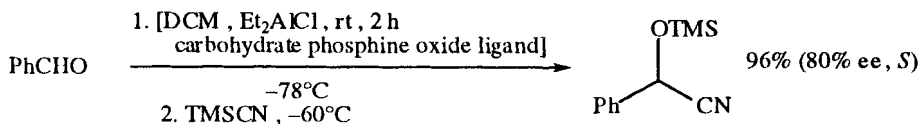
Hamashima, Y.; Kanai, M.; Shibasaki, M. *Tetrahedron Lett.*, **2001**, 42, 691.



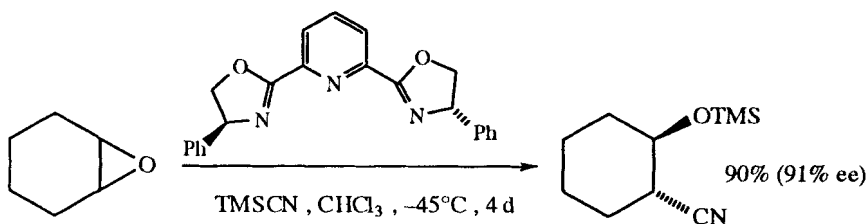
Bandini, M.; Cozzi, P.G.; Melchiorre, P.; Umami-Ronchi, A. *Tetrahedron Lett.*, **2001**, 42, 2041.



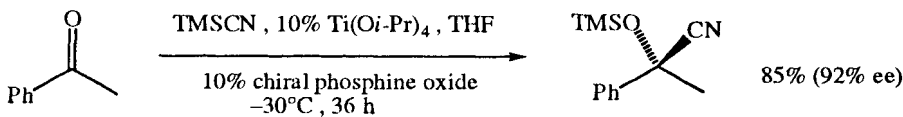
Belokon, Y.N.; Green, B.; Ikonnikov, N.S.; North, M.; Persons, T.; Tararov, V.I. *Tetrahedron*, **2001**, *57*, 771.



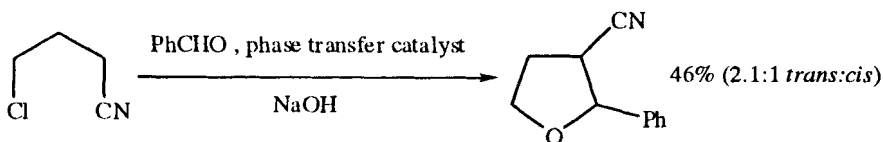
Kanai, M.; Hamashima, Y.; Shibasaki, M. *Tetrahedron Lett.*, **2000**, *41*, 2405.



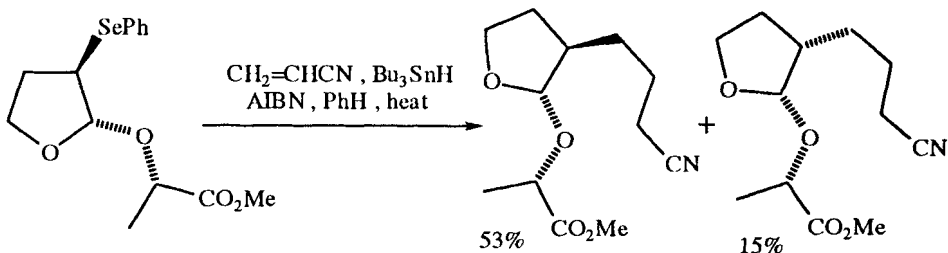
Schaus, S.E.; Jacobsen, E.N. *Org. Lett.*, **2000**, *2*, 1001.



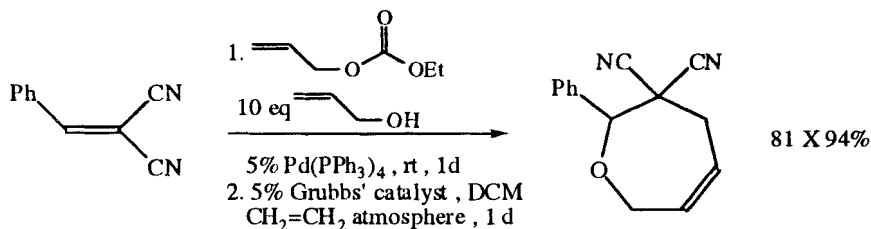
Hamashima, Y.; Kanai, M.; Shibasaki, M. *J. Am. Chem. Soc.*, **2000**, *122*, 7412.



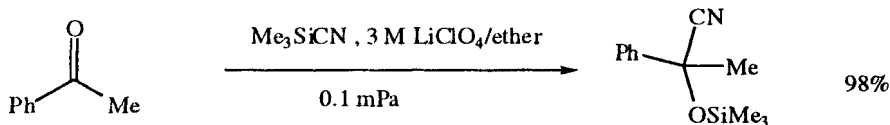
Makosza, M.; Przyborowski, J.; Klajn, R.; Kwast, A. *Synlett*, **2000**, 1773.



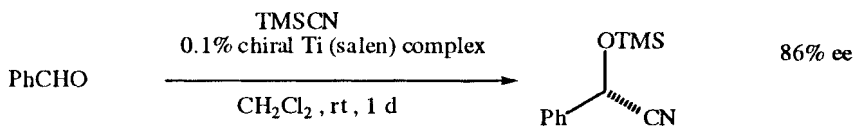
Nimkar, K.S.; Mash, E.A. *Tetrahedron*, **2000**, *56*, 5793.



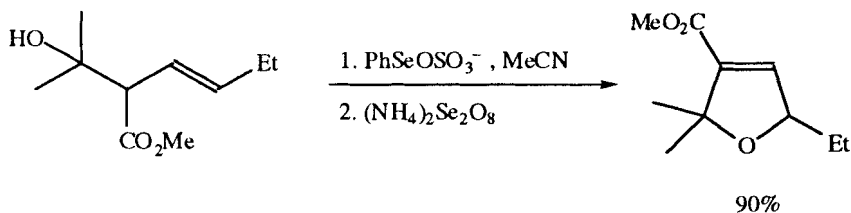
Xie, R.L.; Hauske, J.R. *Tetrahedron Lett.*, **2000**, *41*, 10167.



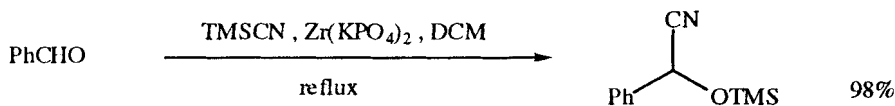
Jenner, G. *Tetrahedron Lett.*, **1999**, *40*, 491.



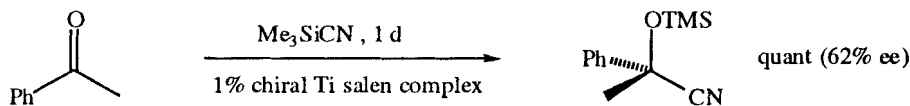
Belokon', Y.N.; Caveda-Cepas, S.; Green, B.; Ikonnikov, N.S.; Khrustalev, V.N.; Larichev, V.S.; Moscalenko, M.A.; North, M.; Orizu, C.; Tararov, V.I.; Tasinazzo, M.; Timofeeva, G.I.; Yashkina, L.V. *J. Am. Chem. Soc.*, **1999**, *121*, 3968.



Tiecco, M.; Testaferri, L.; Santi, C. *Eur. J. Org. Chem.*, **1999**, 797.



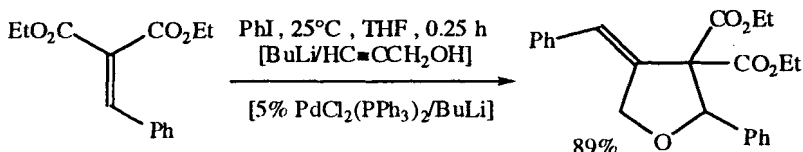
Curini, M.; Epifano, F.; Marcotullio, M.C.; Rosati, O.; Rossi, M. *Synlett*, **1999**, 315.



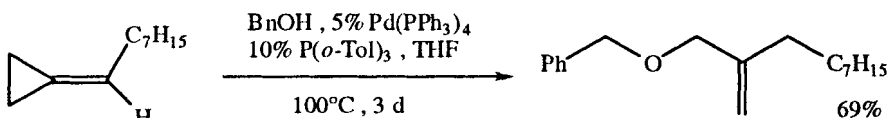
Belokon, Y.N.; Green, B.; Ikonnikov, N.S.; North, M.; Tararov, V.I. *Tetrahedron Lett.*, **1999**, *40*, 8147.

## SECTION 367: ETHER, EPOXIDE, THIOETHER - ALKENE

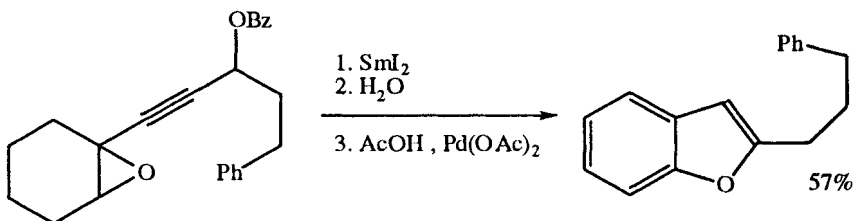
Enol ethers are found in this section as well as alkenyl ethers.



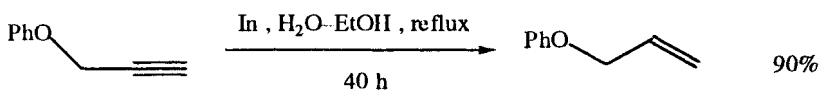
Bottex, M.; Cavicchioli, M.; Hartmann, B.; Monteiro, N.; Balme, G.  
*J. Org. Chem.*, **2001**, *66*, 175.



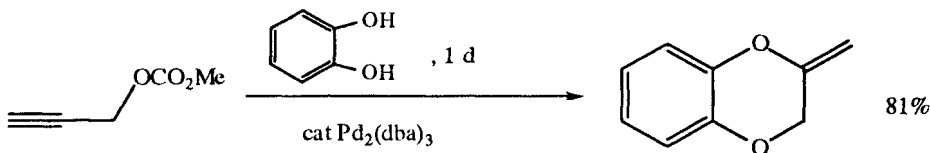
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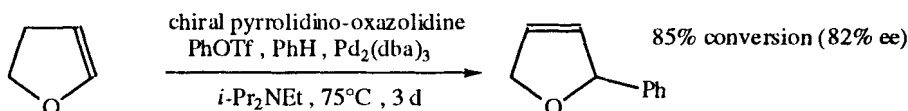
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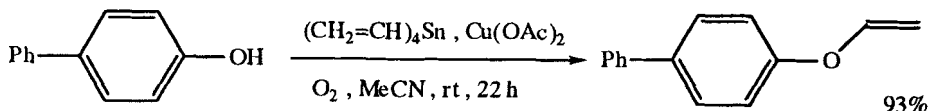
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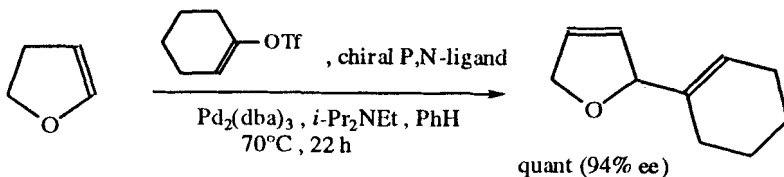
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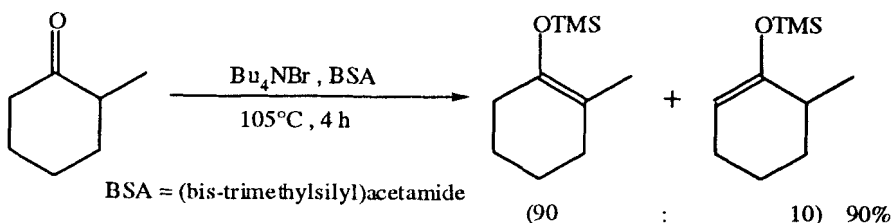
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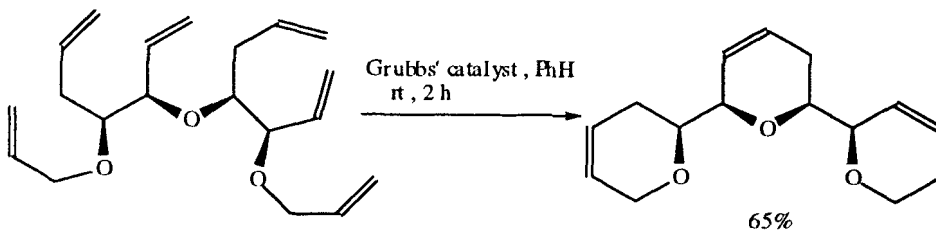
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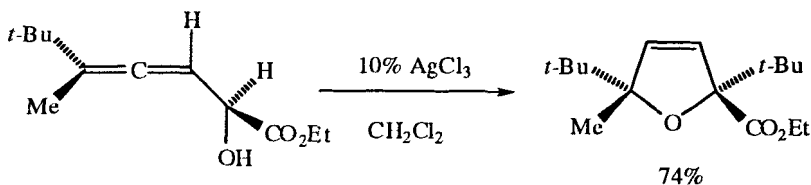
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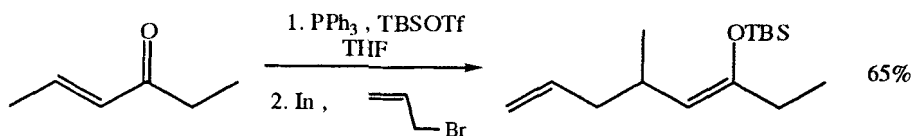
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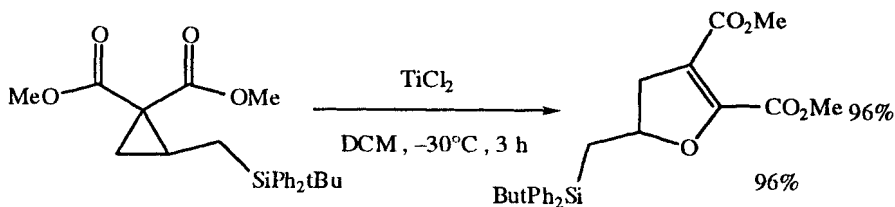


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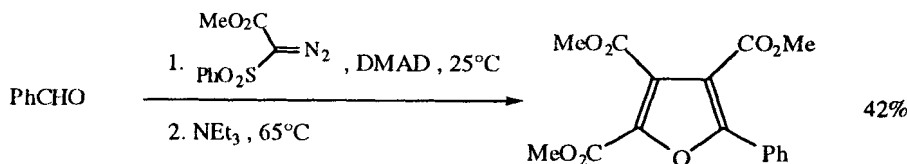


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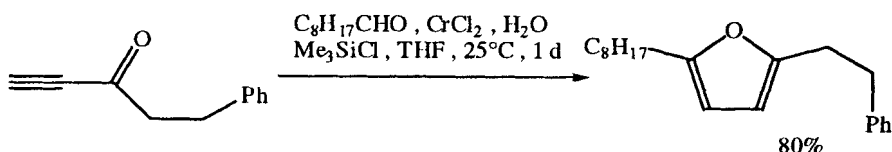




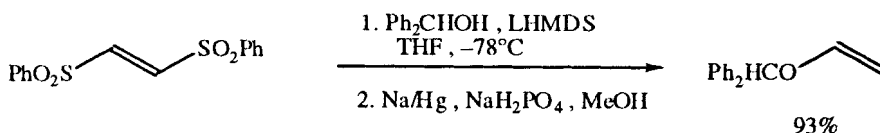
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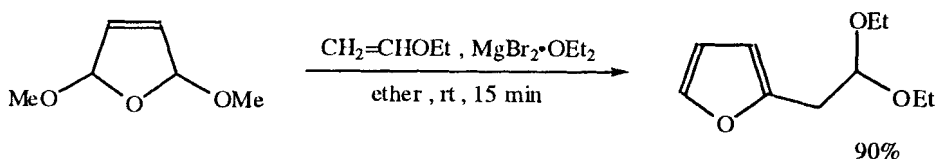
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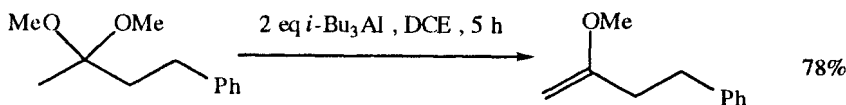
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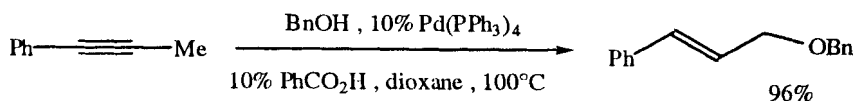
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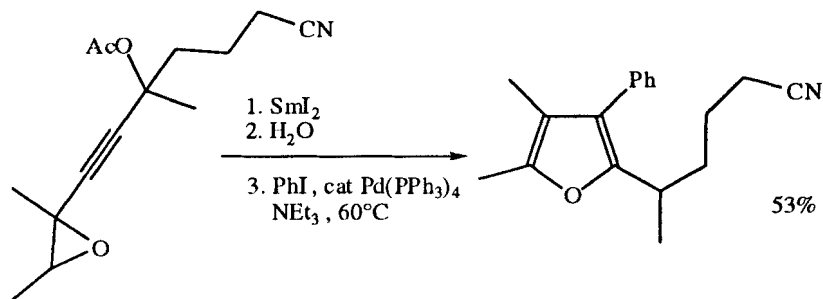
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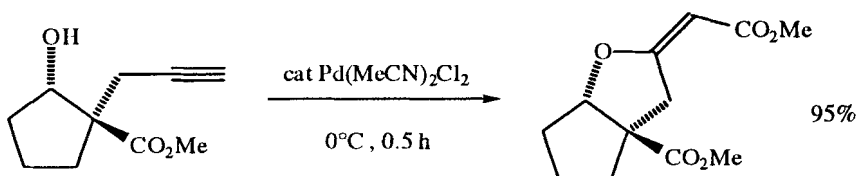
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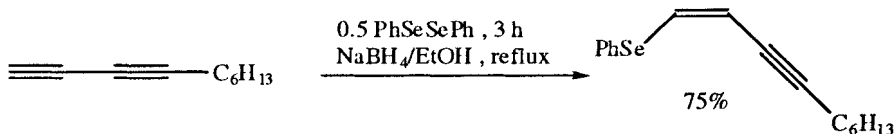
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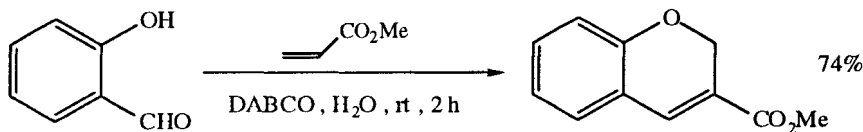
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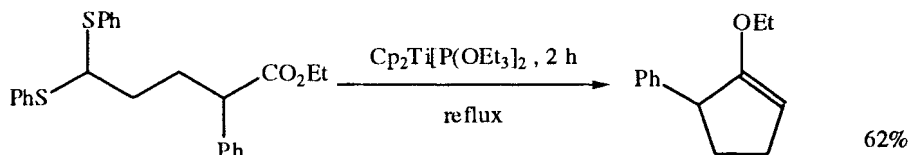
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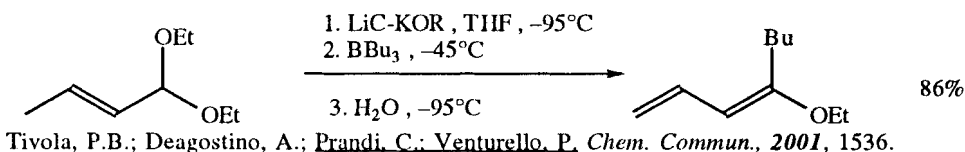
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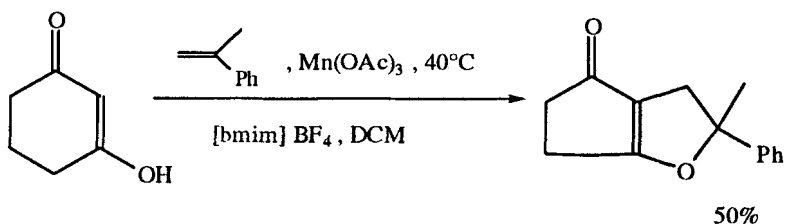
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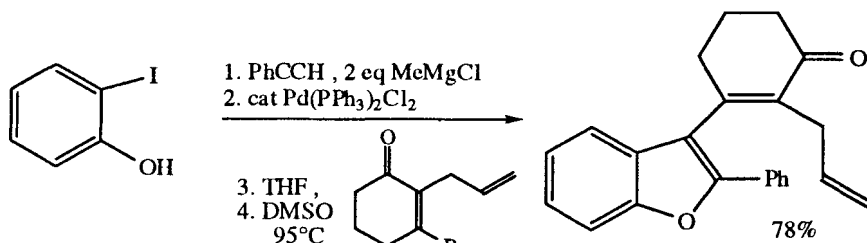
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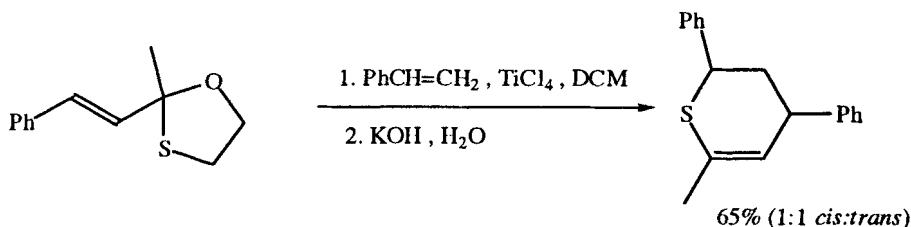
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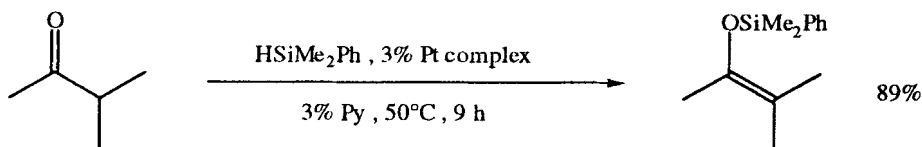
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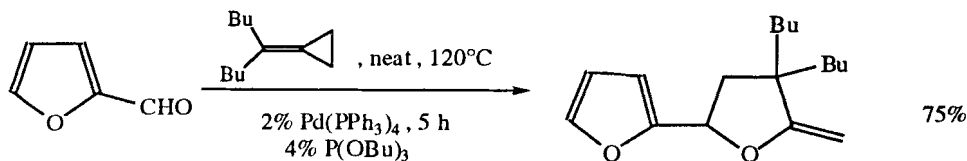
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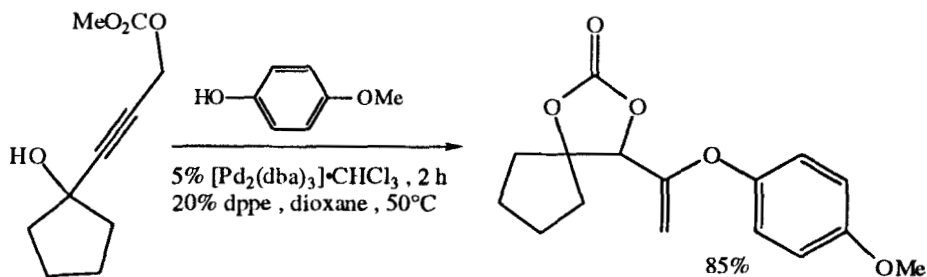
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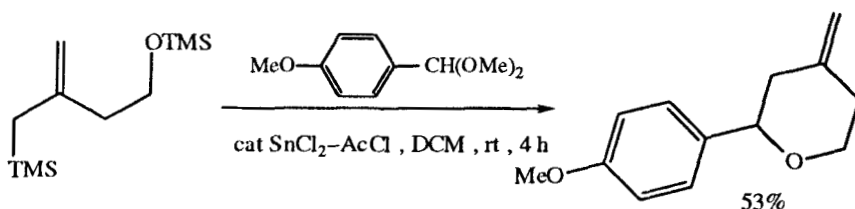
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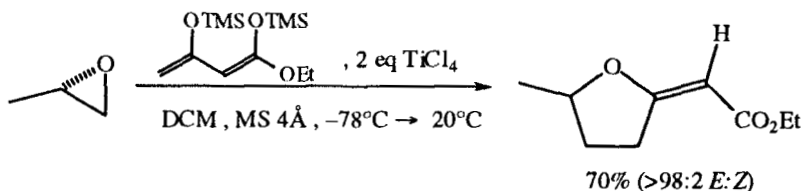
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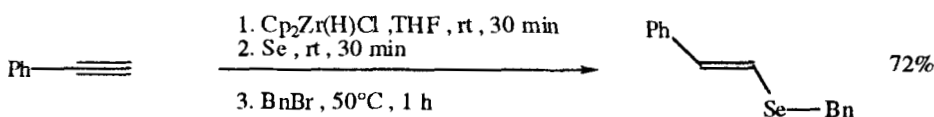
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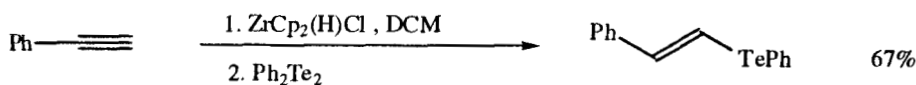
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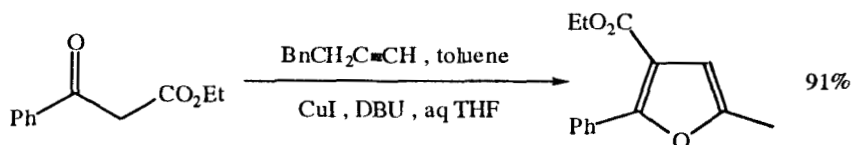
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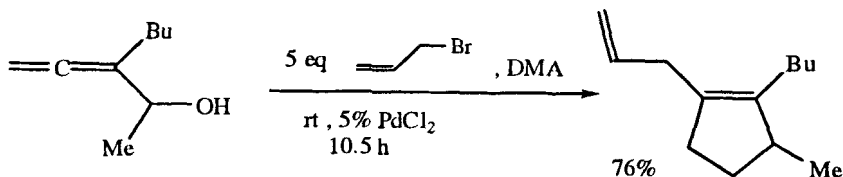
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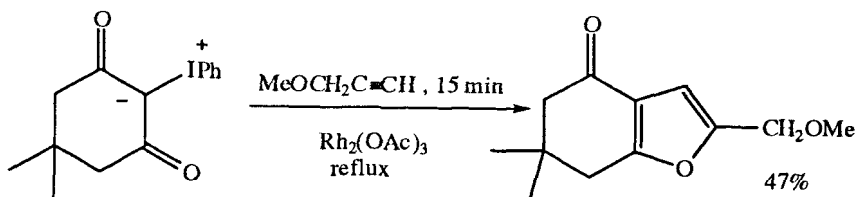
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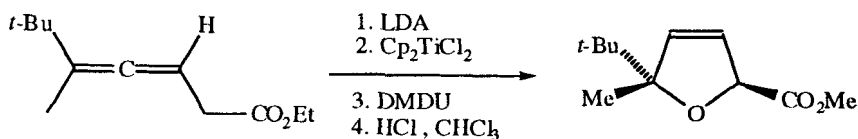
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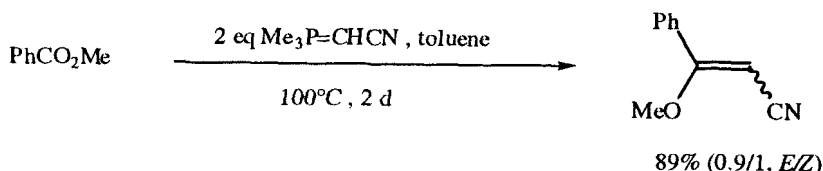
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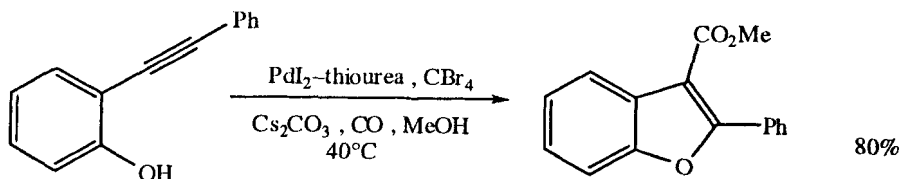
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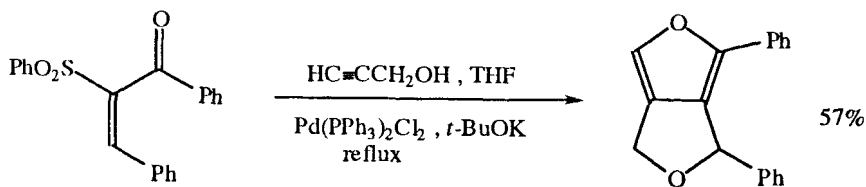
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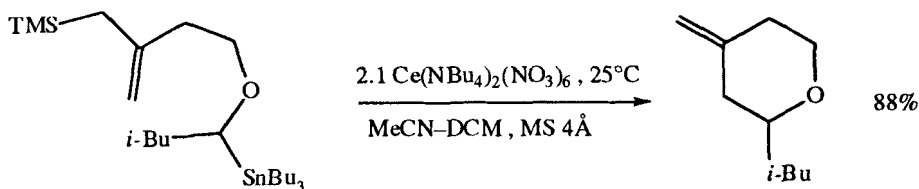
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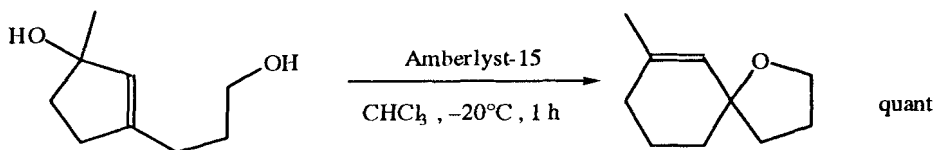
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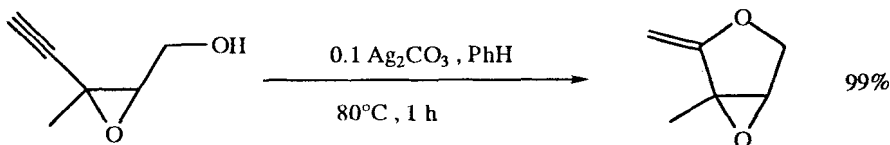
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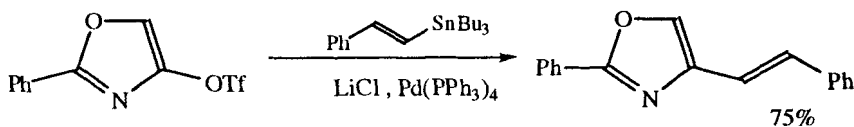
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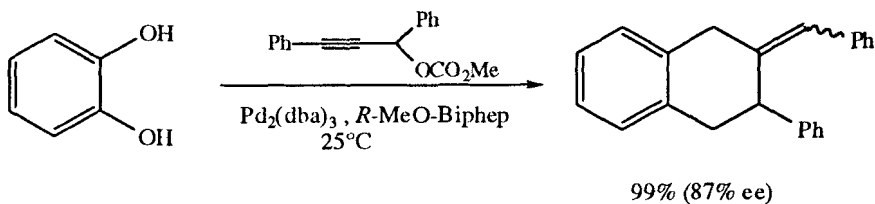
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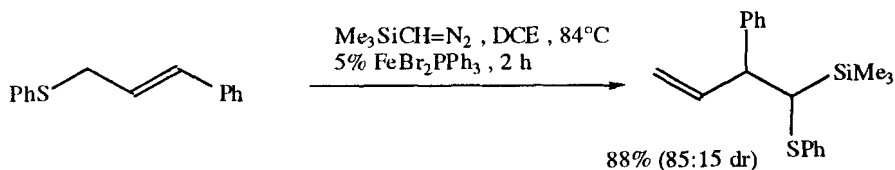
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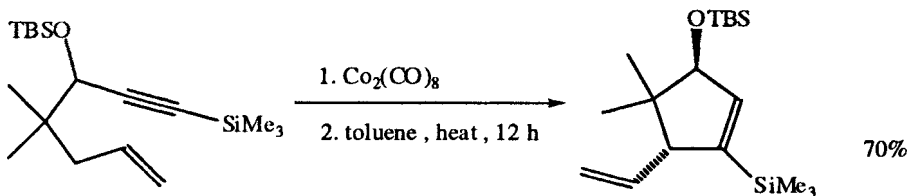
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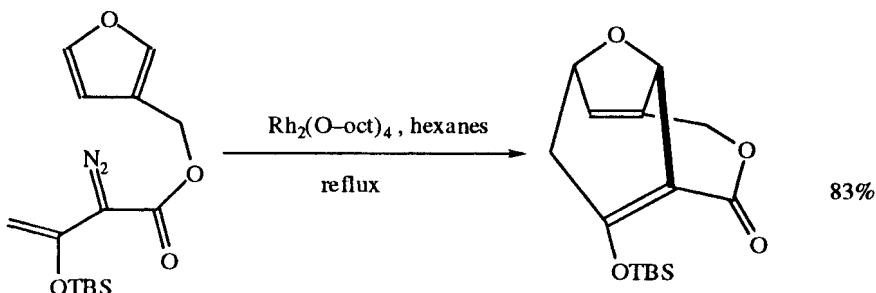
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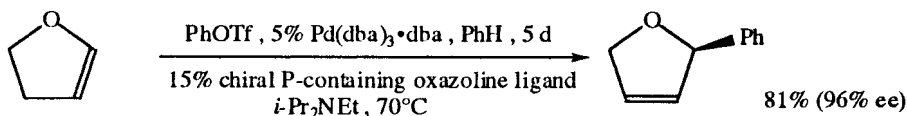
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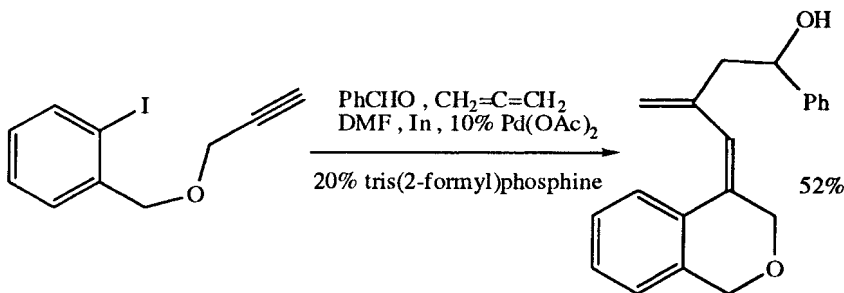
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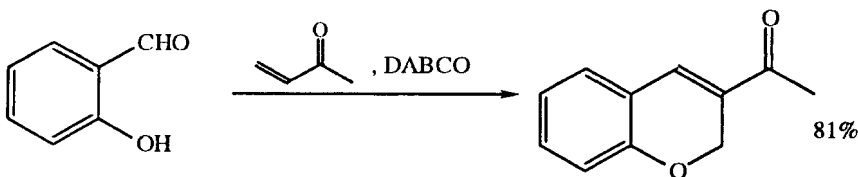
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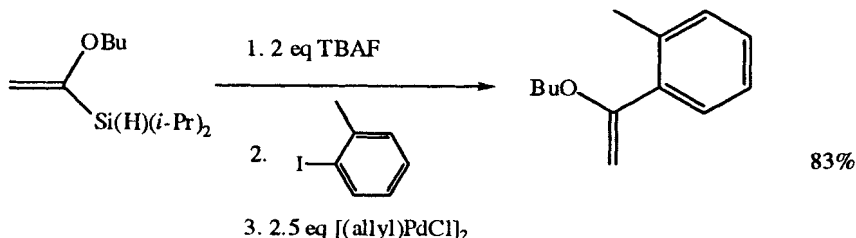
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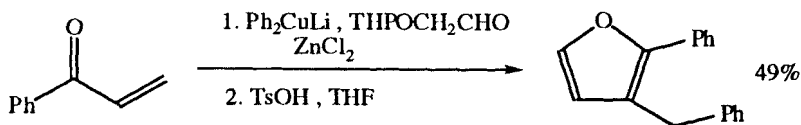
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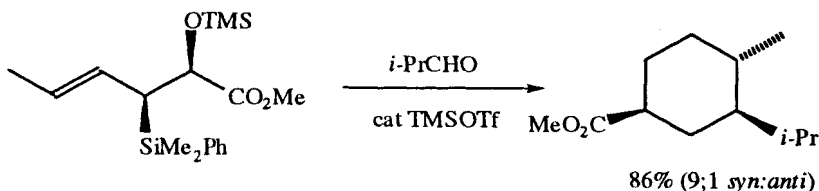
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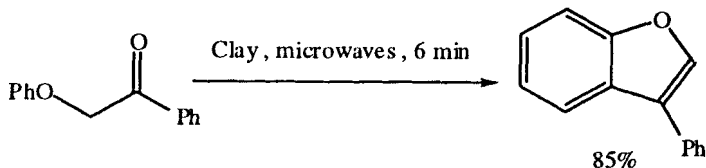
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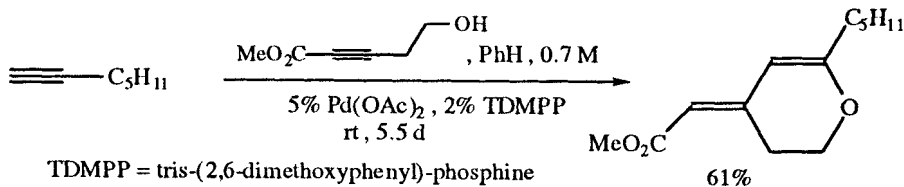
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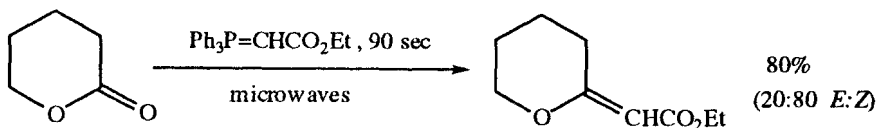


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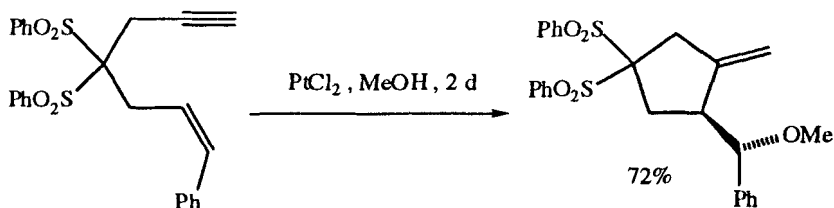
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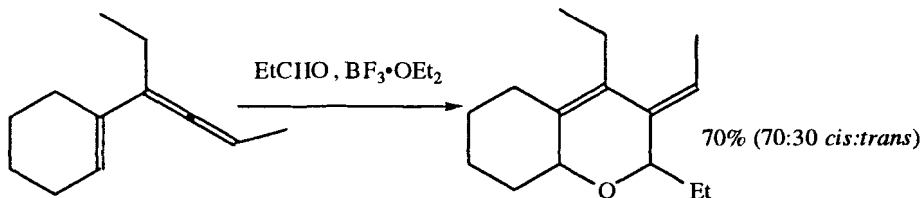


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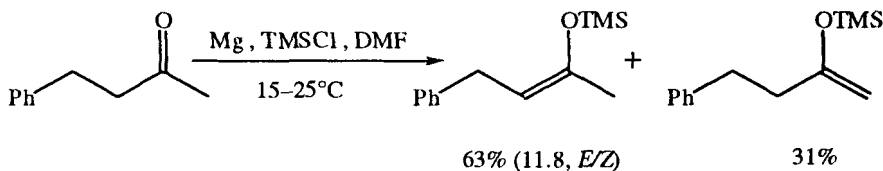




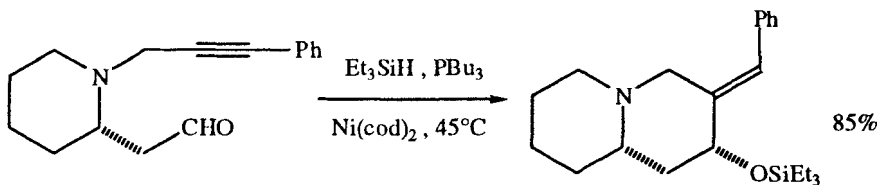
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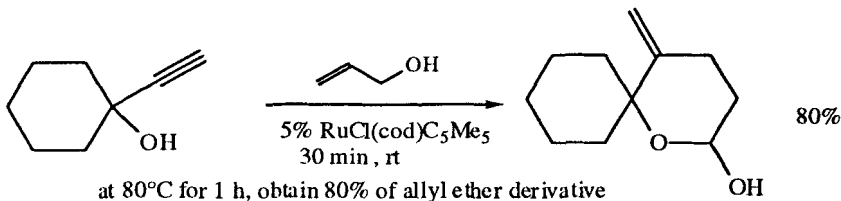
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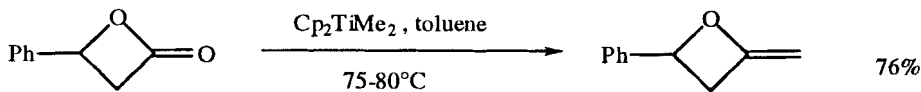
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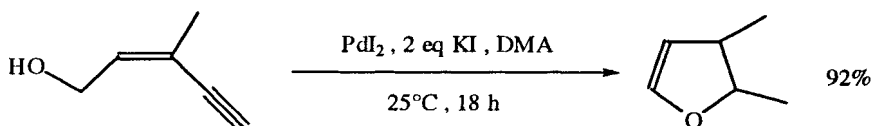
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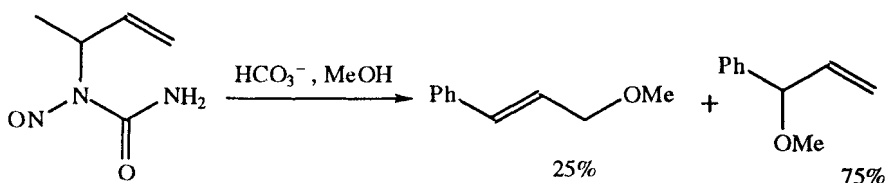
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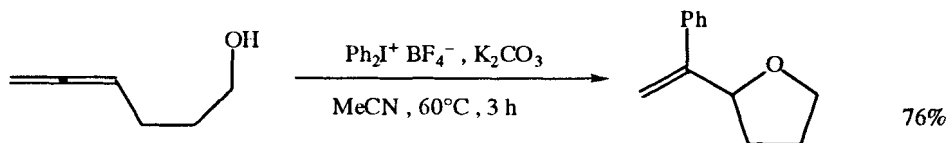
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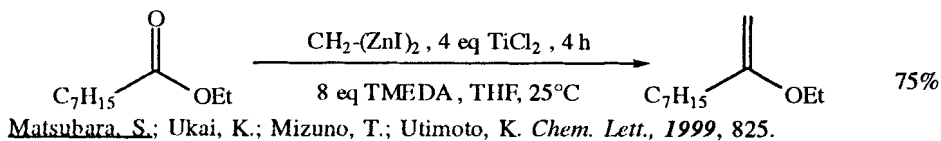
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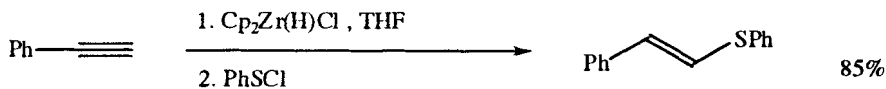
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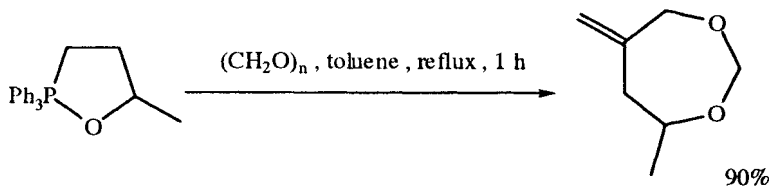
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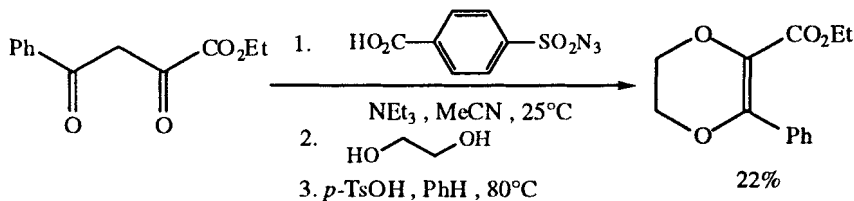
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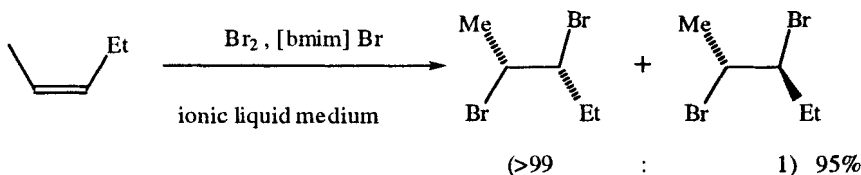
Hilagenkamp, R.; Brogan, J.B.; Zercher, C.K. *Heterocycles*, **1999**, *51*, 1073.

Related Methods:

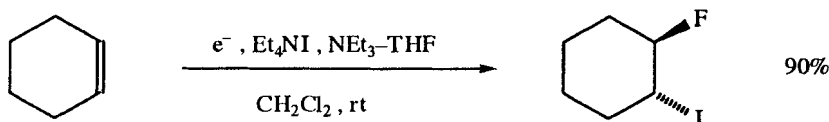
Section 180A (Protection of Ketones)

## SECTION 368: HALIDE, SULFONATE - HALIDE, SULFONATE

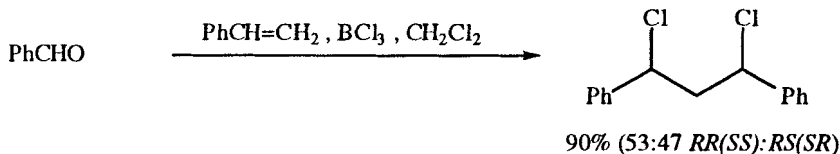
Halocyclopropanations are found in Section 74F (Alkyls from Alkenes).



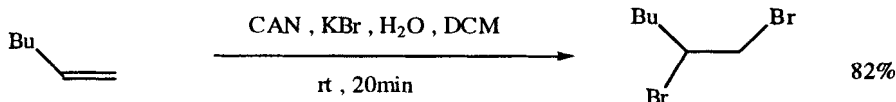
Chiappe, C.; Capraro, D.; Conte, V.; Pieraccini, D. *Org. Lett.*, **2001**, *3*, 1061.



Kobayashi, S.; Sawaguchi, M.; Ayuba, S.; Fukuhara, T.; Hara, S. *Synlett*, **2001**, 1938.

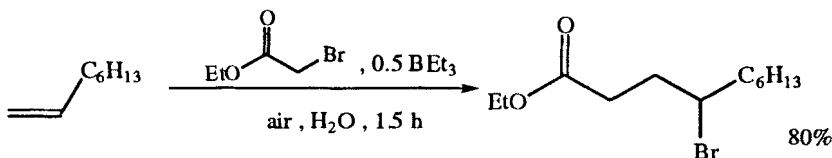


Kabalka, G.W.; Wu, Z.; Hu, Y. *Tetrahedron Lett.*, **2001**, *42*, 5793.

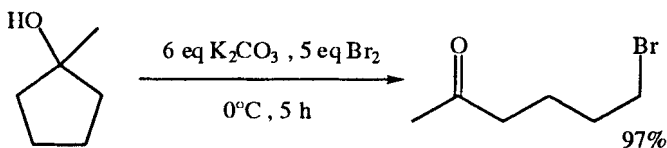


Nair, V.; Panicker, S.B.; Augustine, A.; George, T.G.; Thomas, S.; Vairamani, M. *Tetrahedron*, **2001**, *57*, 7417.

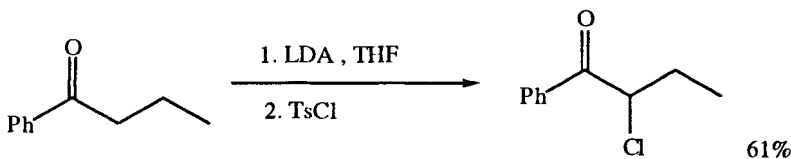
## SECTION 369: HALIDE, SULFONATE - KETONE



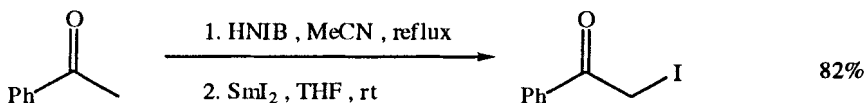
Yorimitsu, H.; Shinokubo, H.; Matsubara, S.; Oshima, K.; Omoto, K.; Fujimoto, H. *J. Org. Chem.*, **2001**, 66, 7776.



Zhang, W.-C.; Li, C.-J. *J. Org. Chem.*, **2000**, 65, 5831.



Brummond, K.M.; Gesenberg, K.D. *Tetrahedron Lett.*, **1999**, 40, 2231.



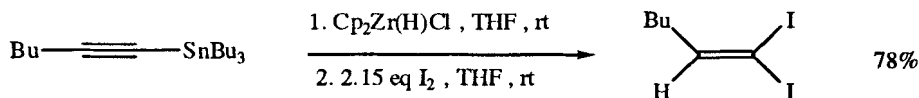
HNIB = (hydroxy-*p*-nitrobenzenesulfonyloxy)benzene

Lee, J.C.; Jin, Y.S. *Synth. Commun.*, **1999**, 29, 2769.

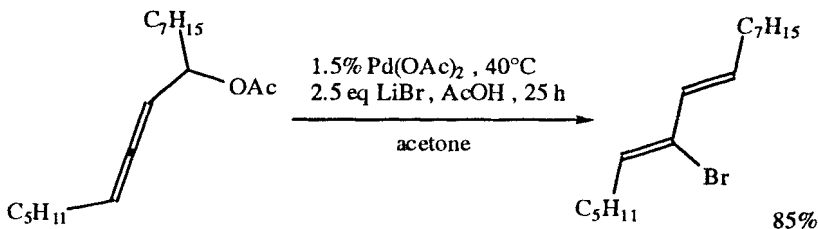
## SECTION 370: HALIDE, SULFONATE - NITRILE

NO ADDITIONAL EXAMPLES

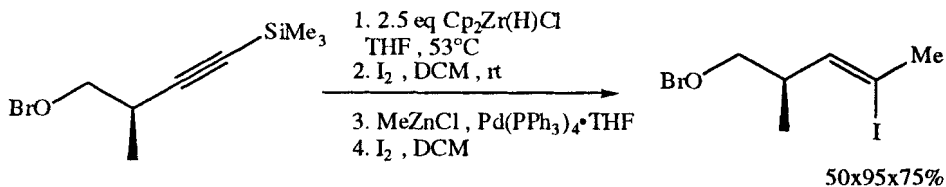
## SECTION 371: HALIDE, SULFONATE - ALKENE



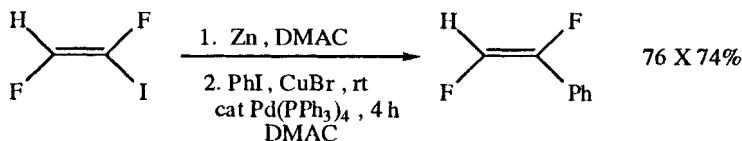
Dabdoub, M.J.; Dabdoub, V.B.; Baroni, A.C.M. *J. Am. Chem. Soc.*, **2001**, 123, 9694.



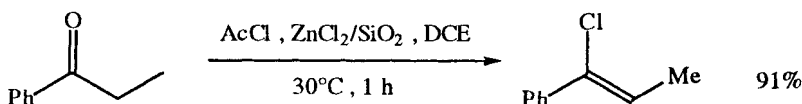
Horváth, A.; Bäckvall, J.-E. *J. Org. Chem.*, **2001**, 66, 8120.



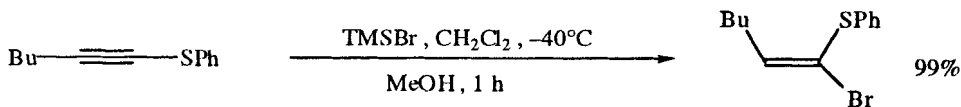
Arefolov, A.; Langille, N.F.; Panek, J.S. *Org. Lett.*, **2001**, 3, 3281.



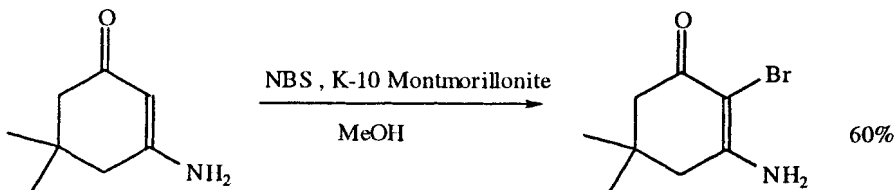
Liu, Q.; Burton, D.J. *Tetrahedron Lett.*, **2000**, 41, 8045.



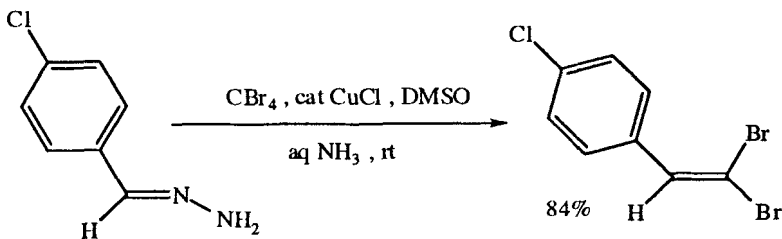
Kodomari, M.; Nagaoka, T.; Furusawa, Y. *Tetrahedron Lett.*, **2001**, 42, 3105.



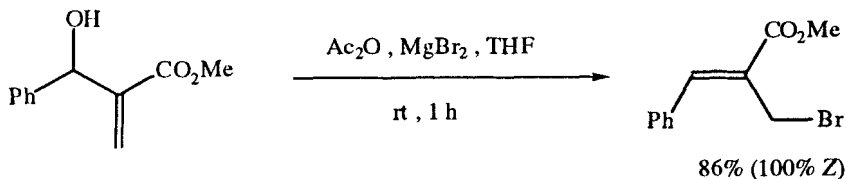
Su, M.; Yu, W.; Jin, Z. *Tetrahedron Lett.*, **2001**, 42, 3771.



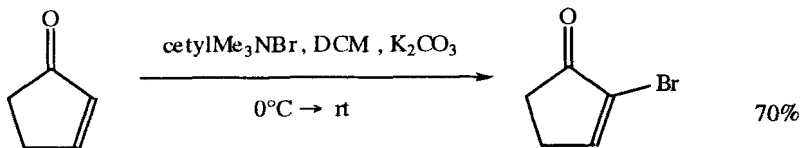
Braibante, M.E.F.; Braibante, H.T.S.; Rosso, G.b.; da Roza, J.K. *Synthesis*, **2001**, 1935.



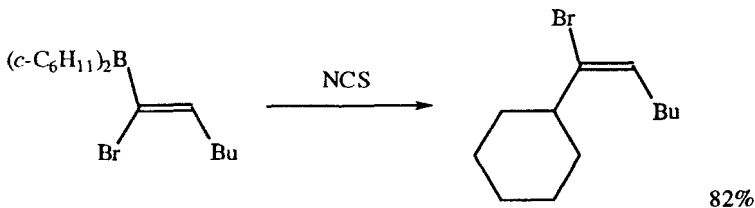
Shastin, A.V.; Korotchenko, N.; Nenajdenko, V.G.; Balenkova, E.S. *Synthesis*, **2001**, 2081.



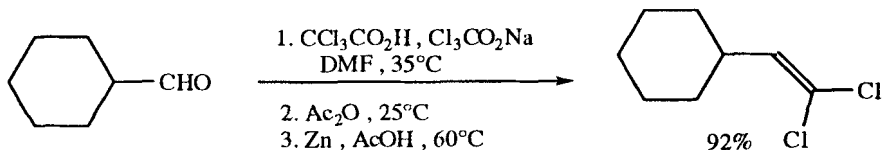
Ravichandran, S.; *Synth. Commun.*, **2001**, 31, 2059.



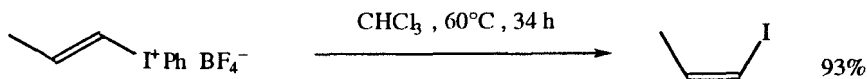
Bose, G.; Barua, P.M.B.; Chaudhuri, M.K.; Kalita, D.; Khan, A.T. *Chem. Lett.*, **2001**, 290.



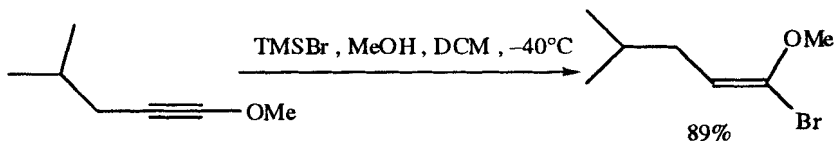
Hoshi, M.; Shirakawa, K. *Tetrahedron Lett.*, **2000**, 41, 2595.



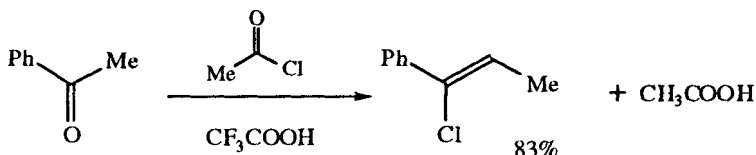
Wang, Z.; Campagna, S.; Xu, G.; Pierce, M.E.; Fortunak, J.M.; Confalone, P.N. *Tetrahedron Lett.*, **2000**, 41, 4007.



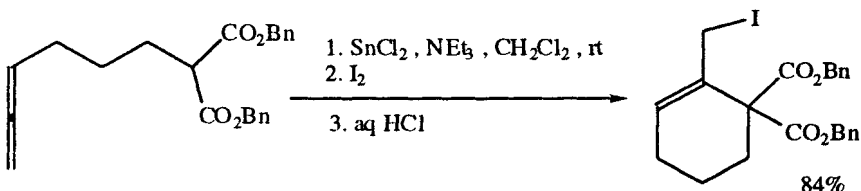
Okuyama, T.; Fujita, M.; Gronheid, R.; Lodder, G. *Tetrahedron Lett.*, **2000**, 41, 5125.



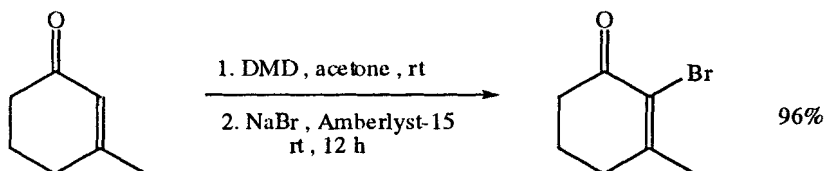
Yu, W.; Jin, Z. *J. Am. Chem. Soc.*, **2000**, *122*, 9840.



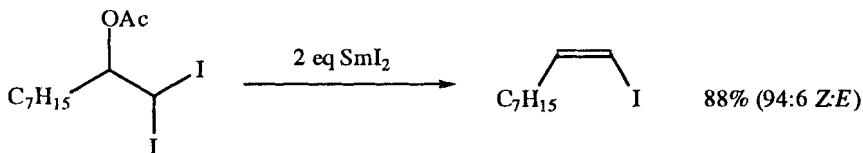
Moughamir, K.; Mezgueldi, B.; Atmani, A.; Mestdagh, H.; Rolando, C. *Tetrahedron Lett.*, **1999**, *40*, 59.



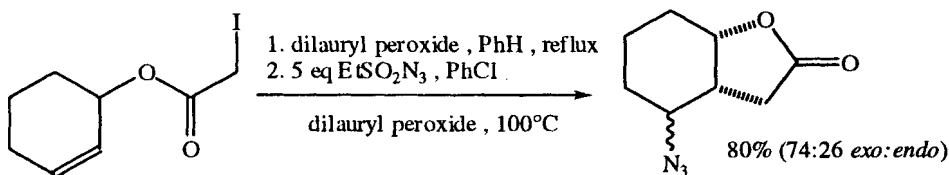
Kitagawa, O.; Suzuki, T.; Fujiwara, H.; Taguchi, T. *Tetrahedron Lett.*, **1999**, *40*, 2549.



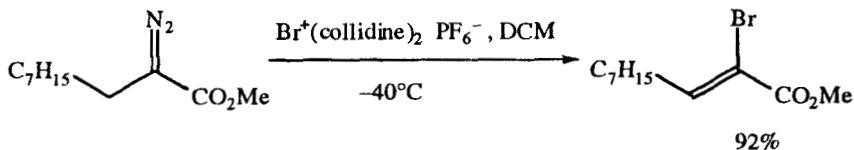
Righi, G.; Bovicelli, P.; Sperandio, A. *Tetrahedron Lett.*, **1999**, *40*, 5889.



Concellón, J.M.; Bernad, P.L.; Pérez-Andrés, J.A. *Angew. Chem. Int. Ed.*, **1999**, *38*, 2384.



Huang, X.; Wang, J.-H.; Yang, D.-Y. *J. Chem. Soc., Perkin Trans. 1*, **1999**, 673.

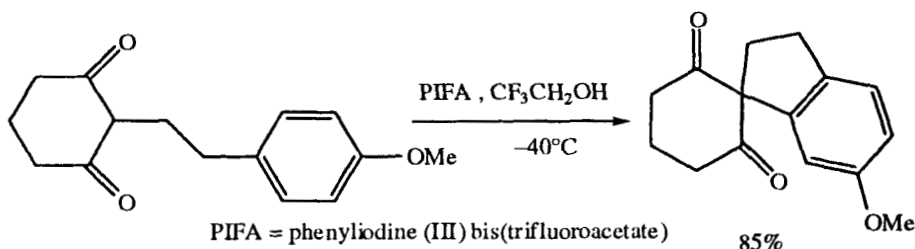


Rousseau, G.; Marie, J.-X. *Synth. Commun.*, **1999**, 29, 3705.

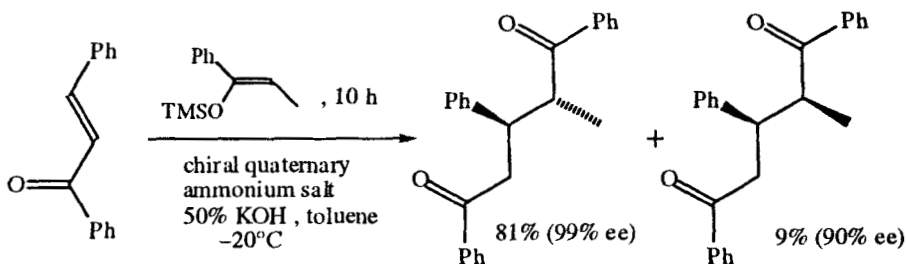
## REVIEWS:

"An Efficient New Methodology For The Synthesis Of 1-Functionalized-2-Halo-2-Alkenes Via Hydrohalogenation Reaction Of Electron-Deficient Allenes," Ma, S.; Li, L. *Synlett*, **2001**, 1206.

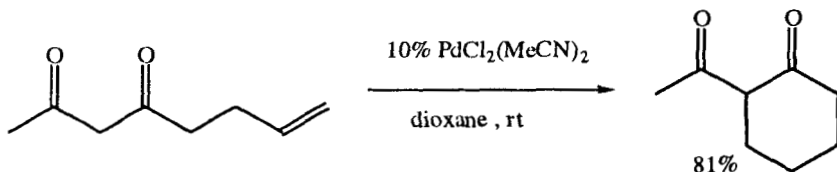
## SECTION 372: KETONE - KETONE



Arisawa, M.; Ramesh, N.G.; Nakajima, M.; Tohma, H.; Kita, Y. *J. Org. Chem.*, **2001**, 66, 59.

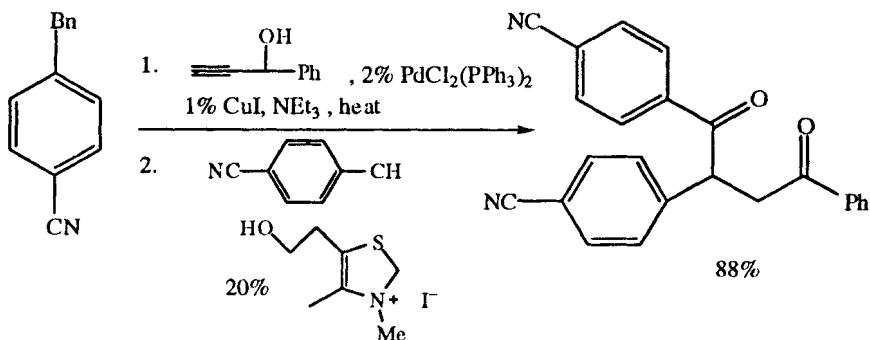


Zhang, F.-Y.; Corey, E.J. *Org. Lett.*, **2001**, 3, 639.

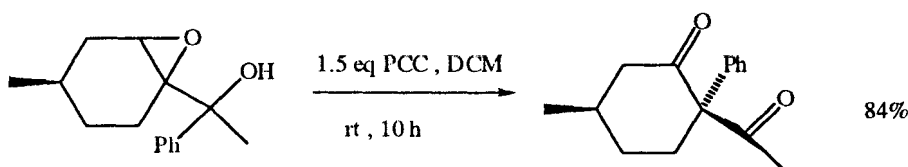


Pei, T.; Widenhoefer, R.A. *J. Am. Chem. Soc.*, **2001**, 123, 11290.

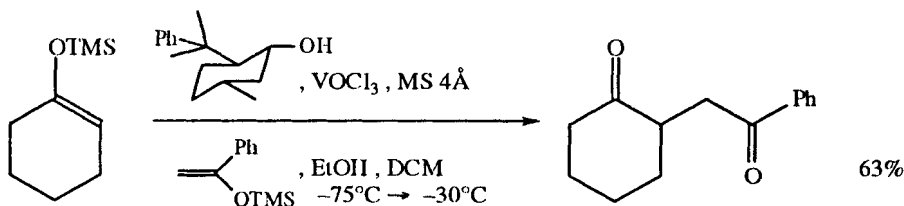




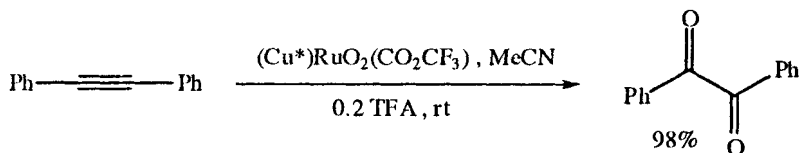
Braun, R.U.; Zeitler, K.; Müller, T.J.T. *Org. Lett.*, **2001**, 3, 3297.



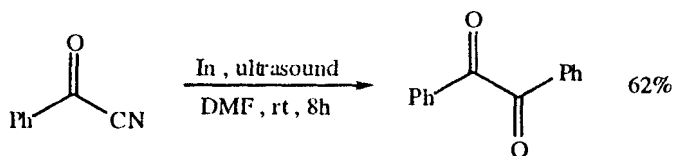
Ren, S.-K.; Wang, F.; Dou, H.-N.; Fan, C.-A.; He, L.; Song, Z.-L.; Xia, W.-J.; Li, D.-R.; Jia, Y.-X.; Li, X.; Tu, Y.Q. *Synthesis*, **2001**, 2384.



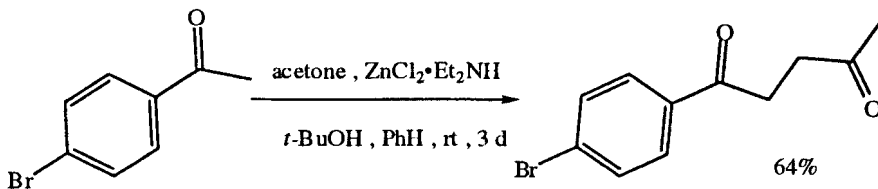
Kurihara, M.; Hayashi, T.; Miyata, N. *Chem. Lett.*, **2001**, 1324.



Che, C.-M.; Yu, W.-Y.; Chan, P.-M.; Cheng, W.-C.; Peng, S.-M.; Lau, K.-C.; Li, W.-K. *J. Am. Chem. Soc.*, **2000**, 122, 11380.



Back, H.; Lee, S.J.; Yoo, B.W.; Ko, J.J.; Kim, S.I.; Kim, J.H. *Tetrahedron Lett.*, **2000**, 41, 8097.

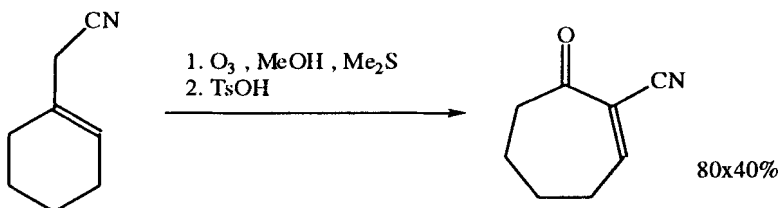


Nevar, N.M.; Kel'in, A.V.; Kulinkovich, O.G. *Synthesis*, **2000**, 1259.

## REVIEWS:

"Chemistry of 2-Acylcycloalkane-1,3-diones," Rubinov, D.B.; Rubinova, I.L.; Akhrem, A.A. *Chem. Rev.*, **1999**, 99, 1047.

## SECTION 373: KETONE - NITRILE



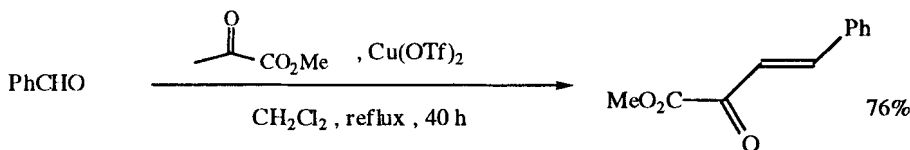
Fleming, F.E.; Huang, A.; Sharief, V.A.; Pu, Y. *J. Org. Chem.*, **1999**, 64, 2830.

## SECTION 374: KETONE - ALKENE

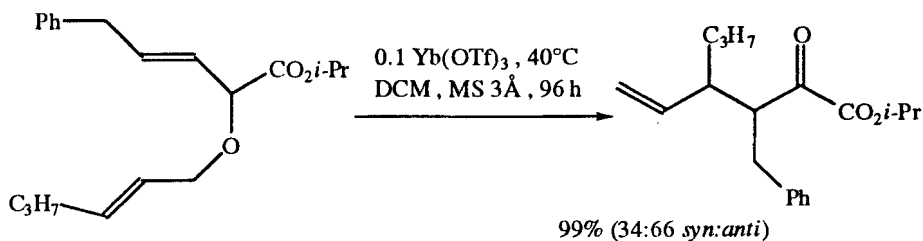
For the oxidation of allylic alcohols to alkene ketones, see Section 168 (Ketones from Alcohols and Phenols)

For the oxidation of allylic methylene groups ( $\text{C}=\text{C}-\text{CH}_2 \rightarrow \text{C}=\text{C}-\text{C}=\text{O}$ ), see Section 170 (Ketones from Alkyls and Methylenes).

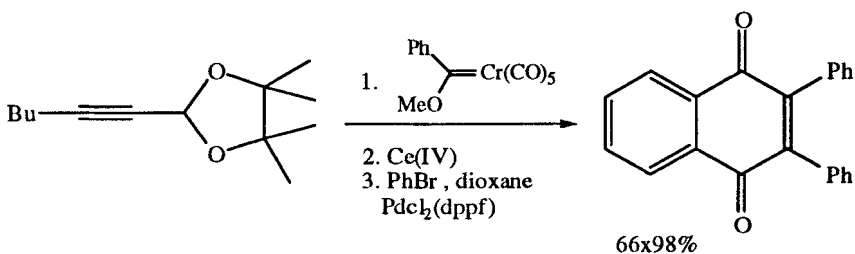
For the alkylation of alkene ketones, also see Section 177 (Ketones from Ketones) and for conjugate alkylations see Section 74E (Alkyls form Alkenes).



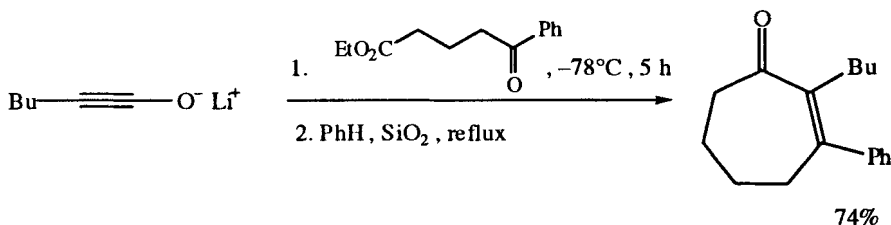
Dujardin, G.; Leconte, S.; Bénard, A.; Brown, E. *Synlett*, **2001**, 147.



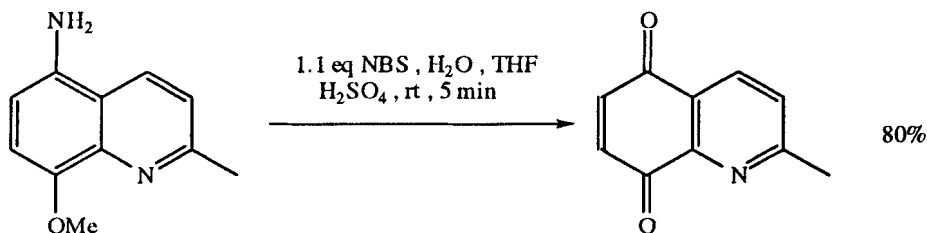
Hiersemann, M.; Abraham, L. *Org. Lett.*, **2001**, 3, 49.



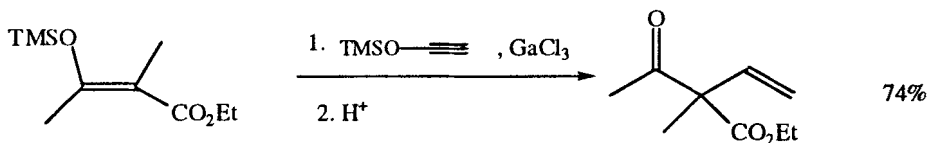
Davies, M.W.; Johnson, C.N.; Hartrity, J.P.A. *J. Org. Chem.*, **2001**, 66, 3525.



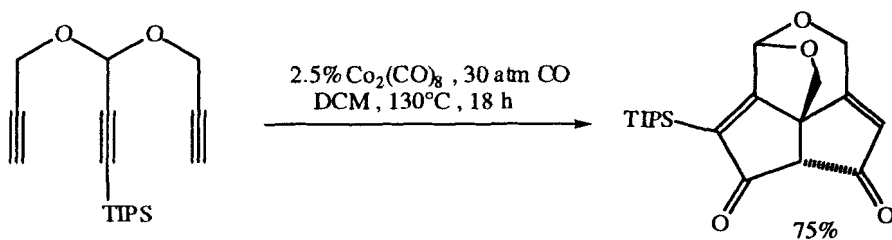
Shindo, M.; Sato, Y.; Shishido, K. *J. Org. Chem.*, **2001**, 66, 7818.



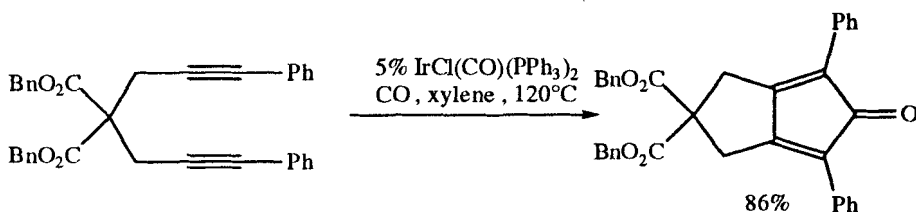
Kim, D.W.; Choi, H.Y.; Lee, K.-J.; Chi, D.Y. *Org. Lett.*, **2001**, 3, 445.



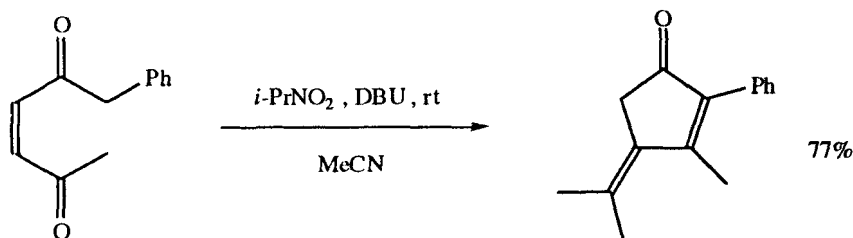
Arisawa, M.; Akamatsu, K.; Yamaguchi, M. *Org. Lett.*, **2001**, 3, 789.



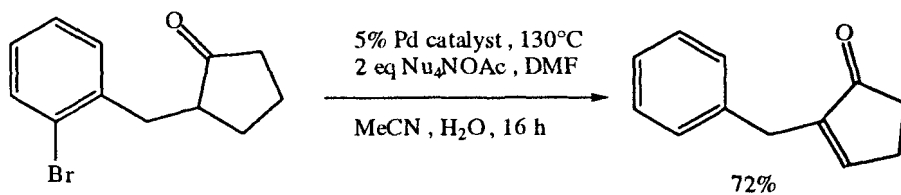
Son, S.U.; Yoon, Y.A.; Choi, D.S.; Park, J.K.; Kim, B.M.; Chung, Y.K. *Org. Lett.*, **2001**, 3, 1065.



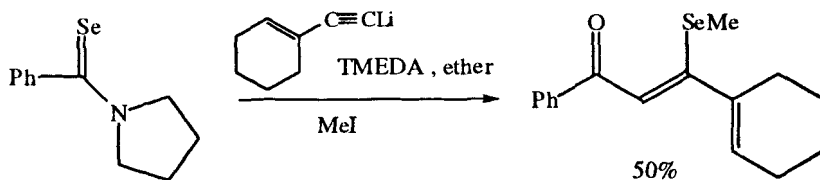
Shibata, T.; Yamashita, K.; Ishida, H.; Takagi, K. *Org. Lett.*, **2001**, 3, 1217.



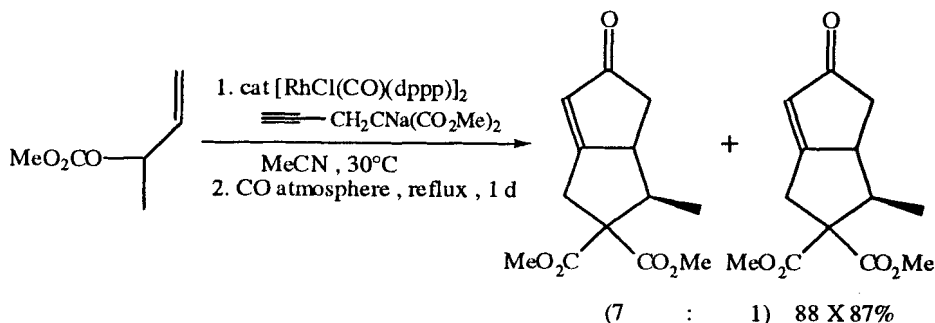
Ballini, R.; Bosica, G.; Fiorini, D.; Gil, M.V.; Petrini, M. *Org. Lett.*, **2001**, 3, 1265.



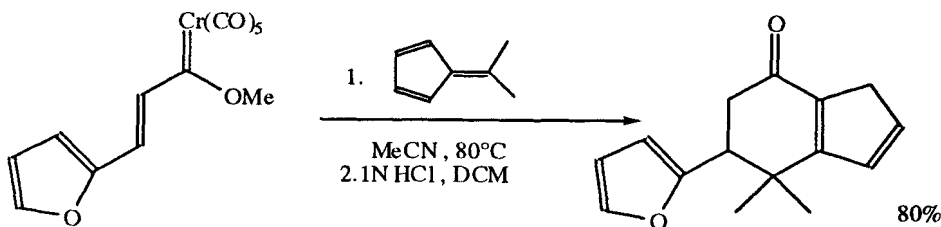
Högenauer, K.; Mulzer, J. *Org. Lett.*, **2001**, 3, 1495.



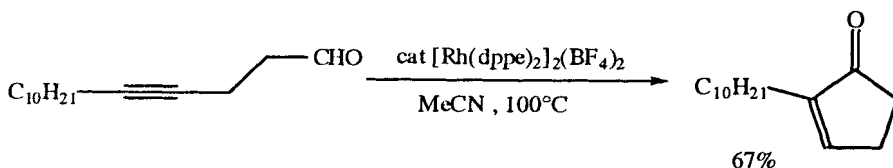
Murai, T.; Mutoh, Y.; Kato, S. *Org. Lett.*, **2001**, 3, 1993.



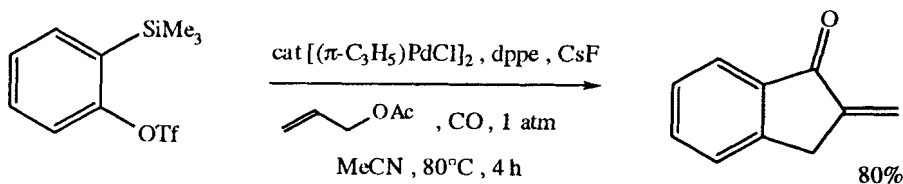
Evans, P.A.; Robinson, J.E. *J. Am. Chem. Soc.*, **2001**, *123*, 4609.



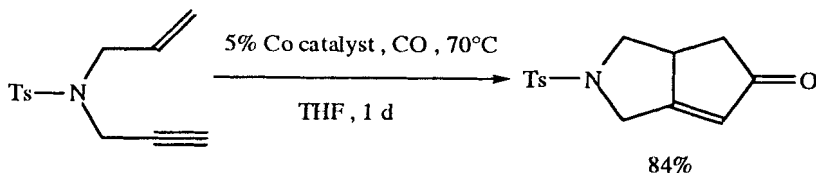
Barluenga, J.; Martínez, S.; Suárez-Sobrino, A.L.; Tomás, M. *J. Am. Chem. Soc.*, **2001**, *123*, 11113.



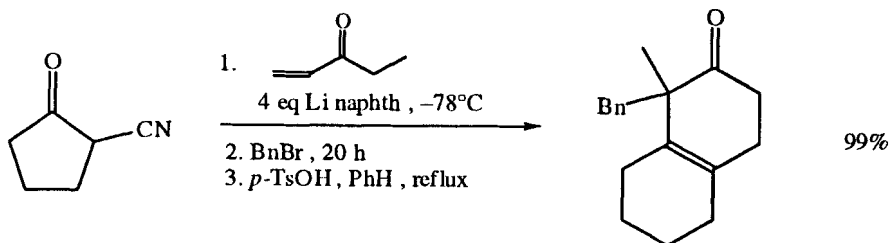
Tanaka, K.; Fu, G.C. *J. Am. Chem. Soc.*, **2001**, *123*, 11492.



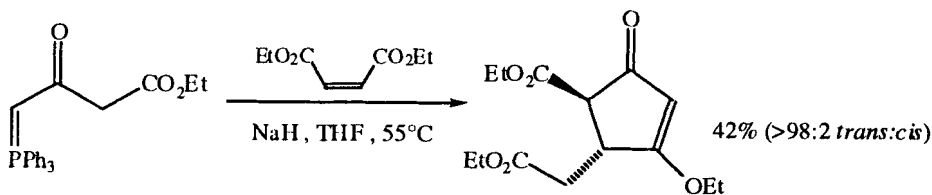
Chatani, N.; Kamitani, A.; Oshita, M.; Fukumoto, Y.; Murai, S. *J. Am. Chem. Soc.*, **2001**, *123*, 12686.



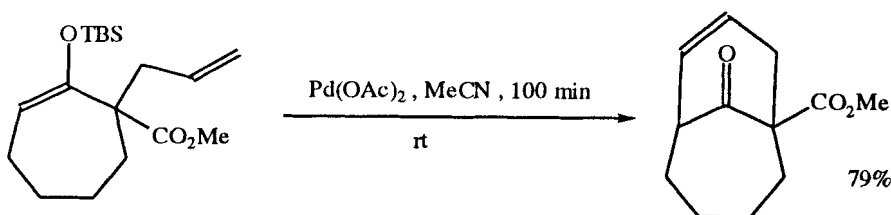
Comely, A.C.; Gibson, S.E.; Stevenazzi, A.; Hales, N.J. *Tetrahedron Lett.*, **2001**, *42*, 1183.



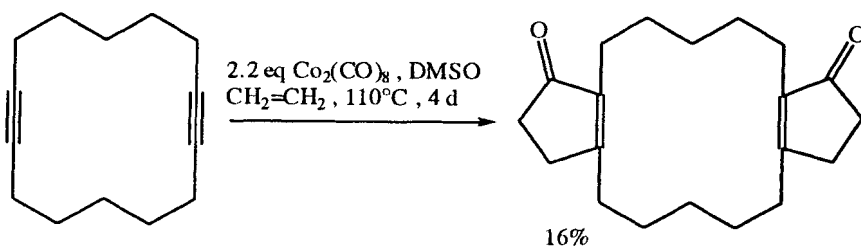
Tai, C.-L.; Ly, T.W.; Wu, J.-D.; Shia, K.-S.; Liu, H.-J. *Synlett*, **2001**, 214.



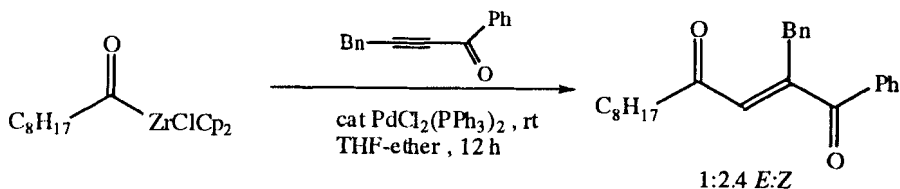
Langer, P.; Kracke, B. *Synlett*, **2001**, 1790.



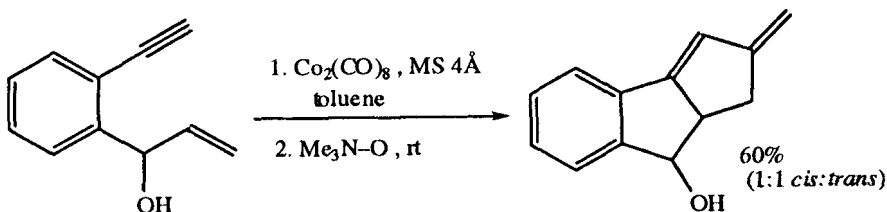
Toyota, M.; Majo, V.J.; Ihara, M. *Tetrahedron Lett.*, **2001**, 42, 1555.



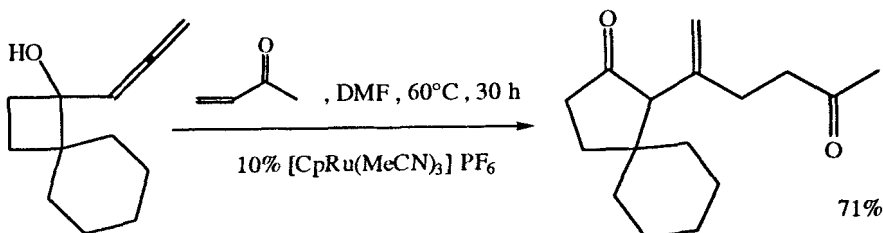
Rausch, B.J.; Gleiter, R. *Tetrahedron Lett.*, **2001**, 42, 1651.



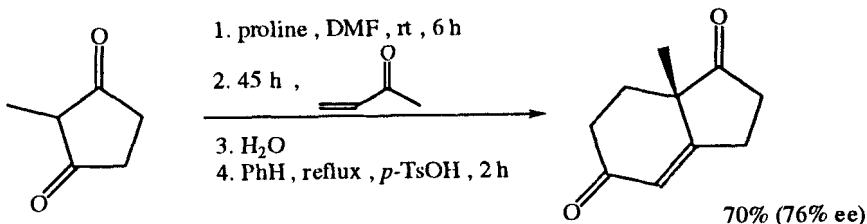
Hanzawa, Y.; Kakuuchi, A.; Yabe, M.; Narita, K.; Tabuchi, N.; Taguchi, T. *Tetrahedron Lett.*, **2001**, 42, 1737.



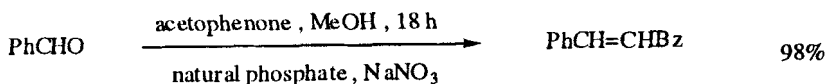
Blanco-Urgeiti, J.; Casarrubios, L.; Domínguez, G.; Pérez-Castells, J. *Tetrahedron Lett.*, 2001, 42, 3315.



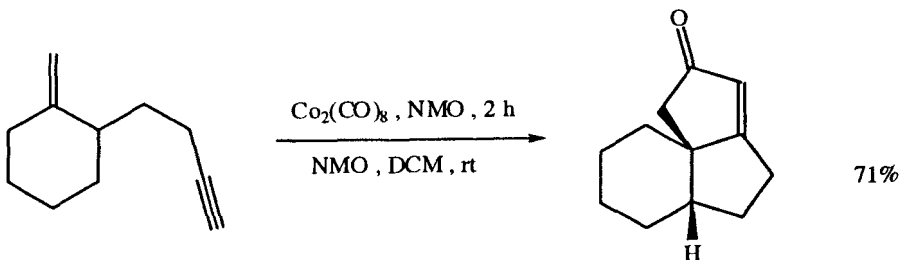
Yoshida, M.; Sugimoto, K.; Ihara, M. *Tetrahedron Lett.*, 2001, 42, 3877.



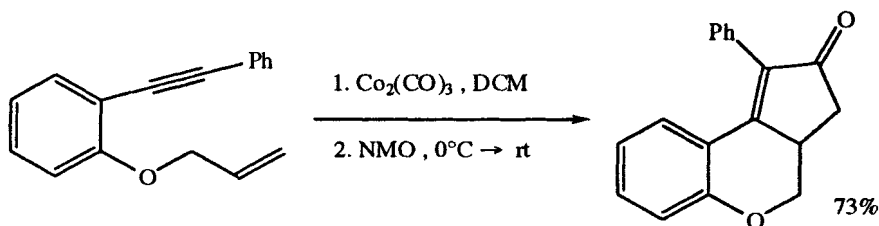
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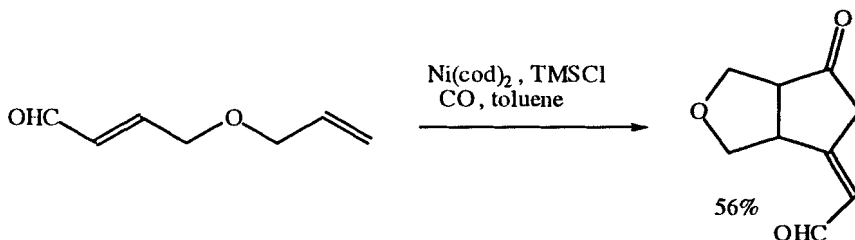
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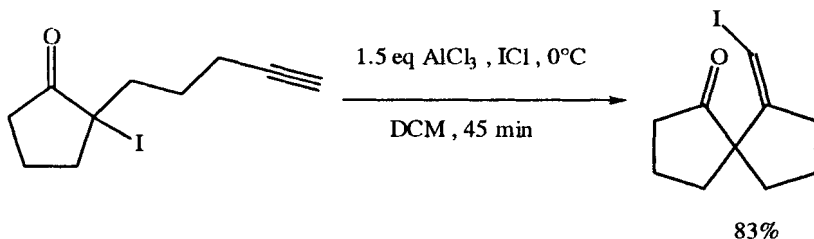
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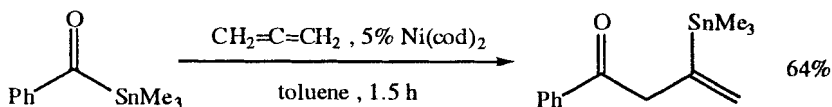
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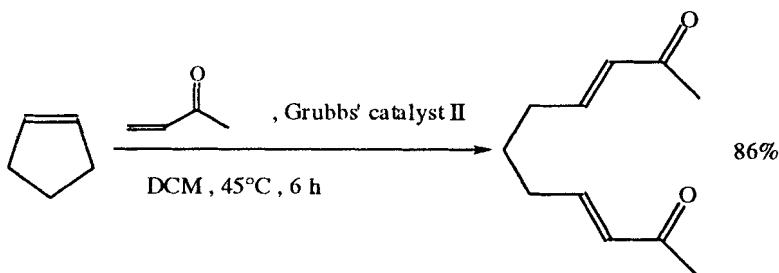
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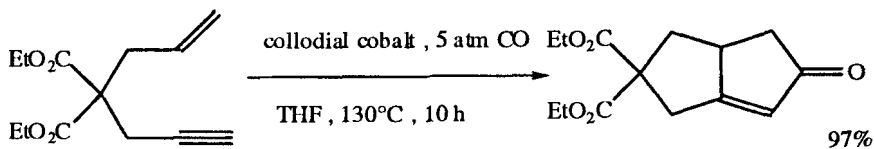


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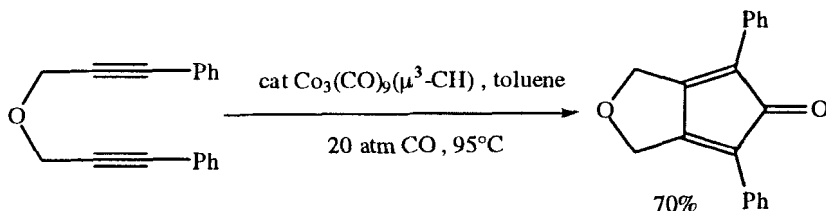


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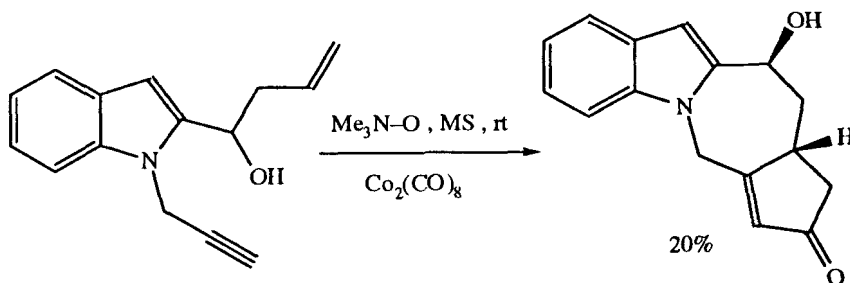




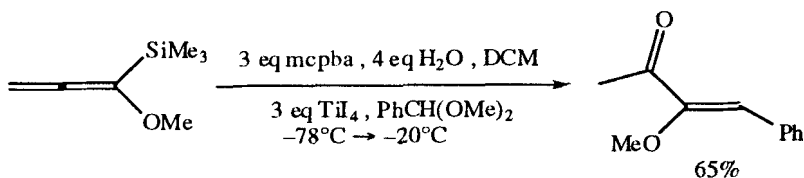
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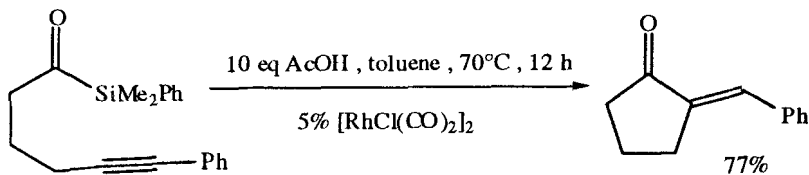
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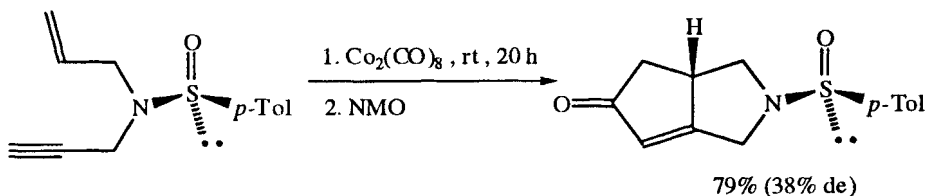
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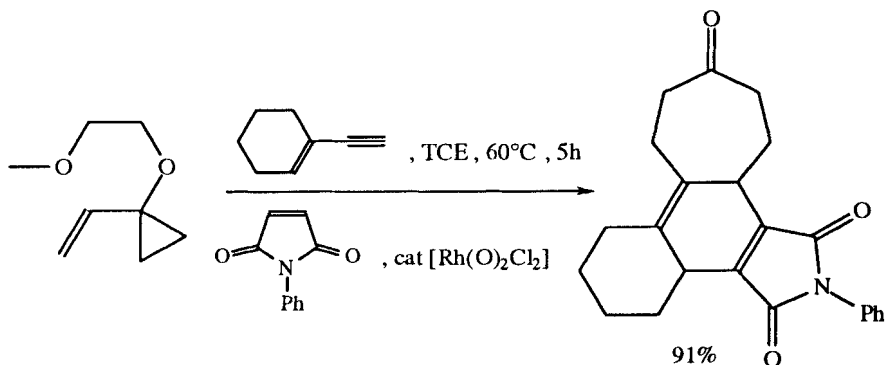
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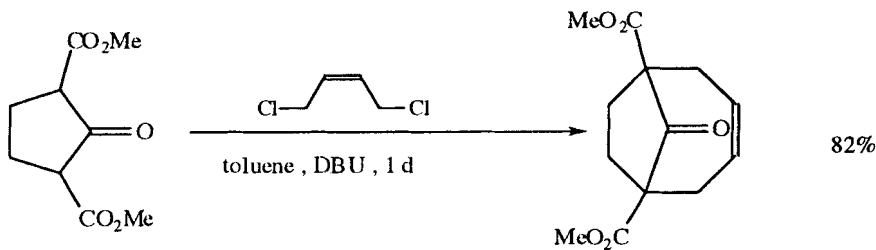
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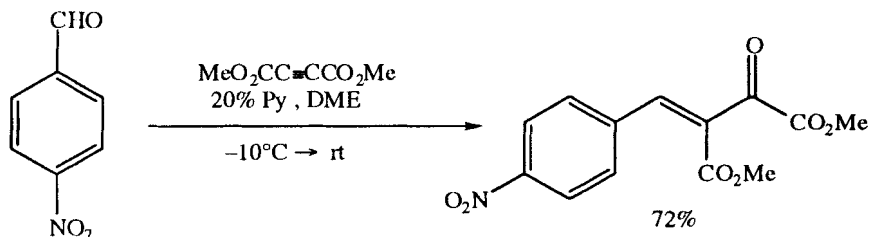
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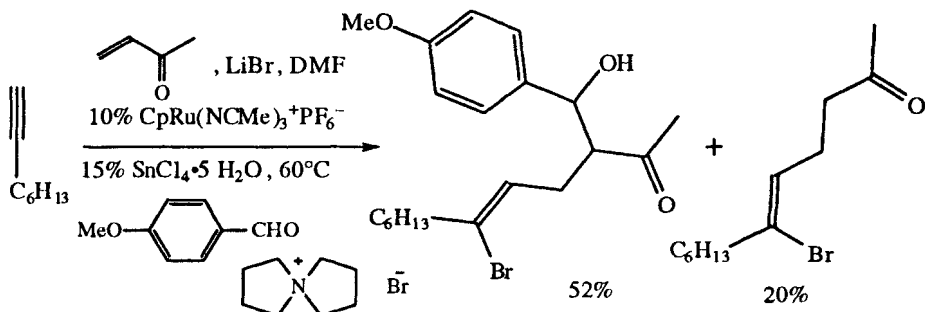
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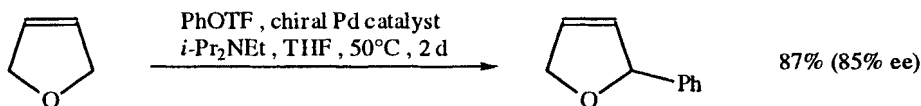
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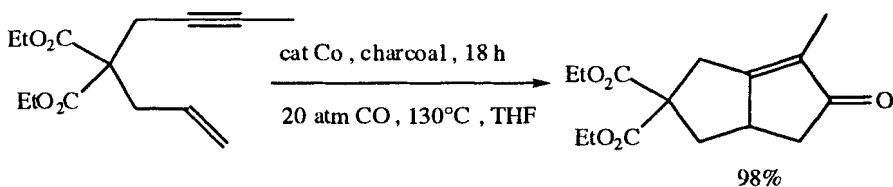
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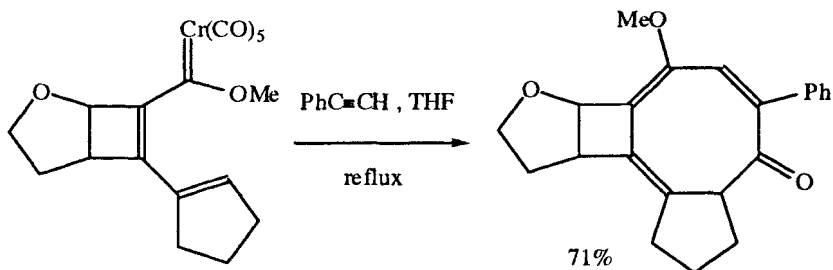
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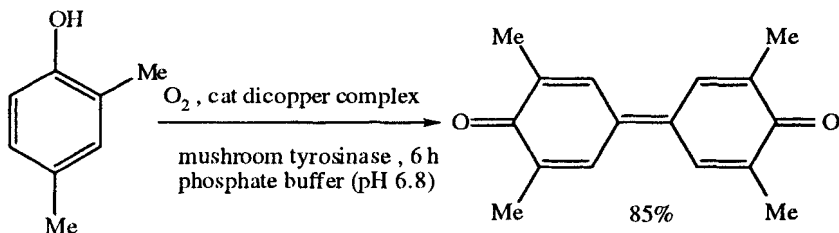
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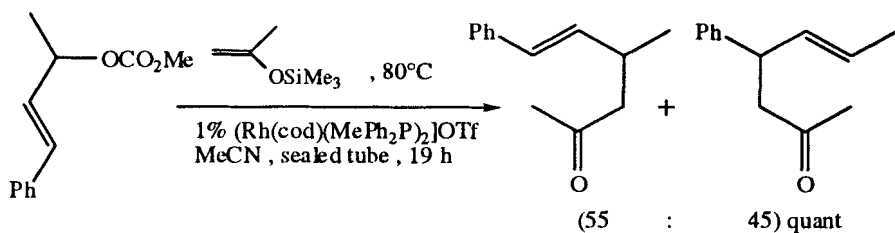
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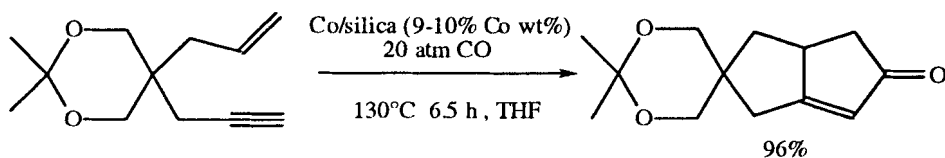
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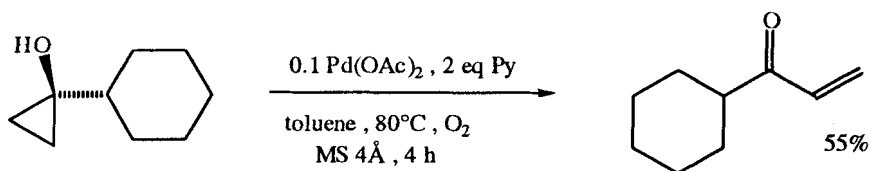
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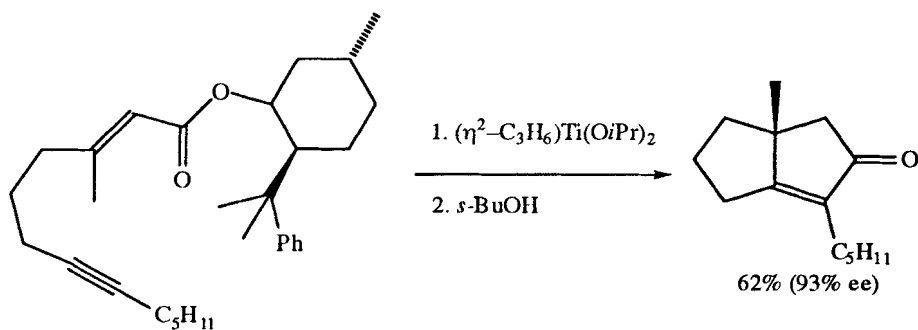
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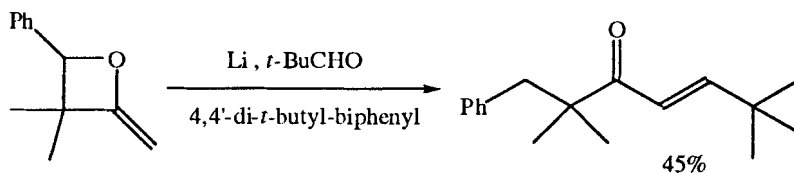
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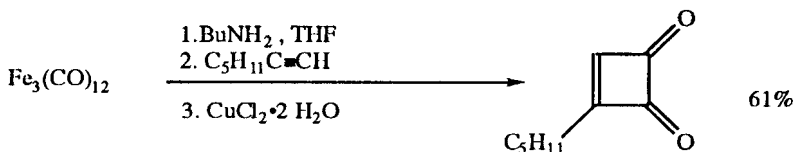
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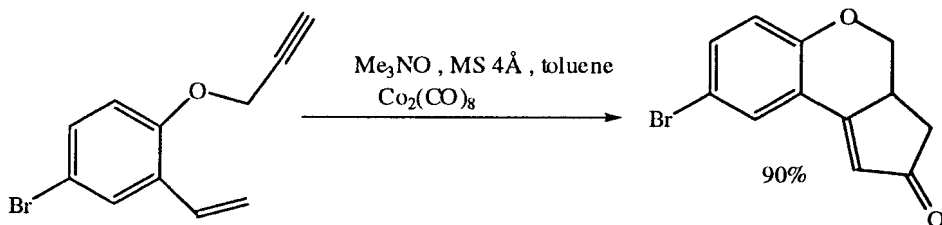
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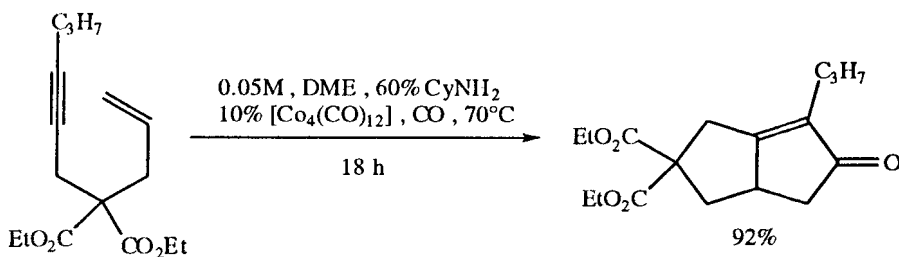
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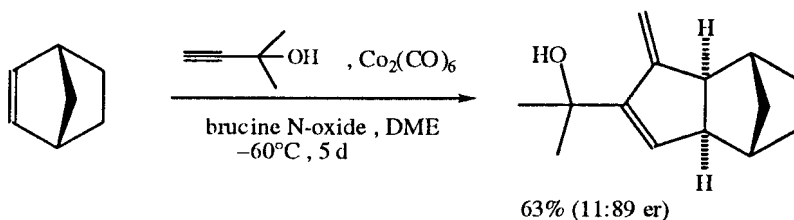
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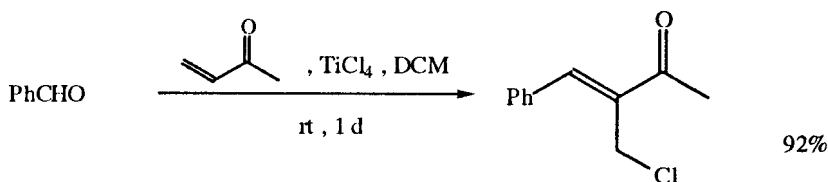
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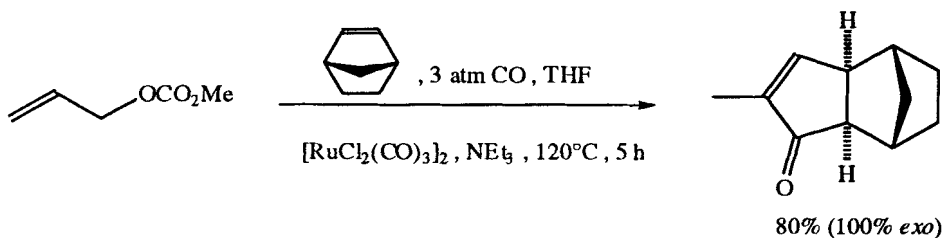
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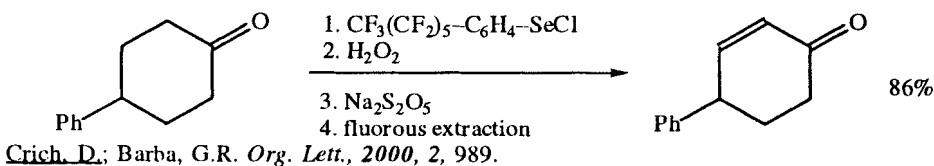
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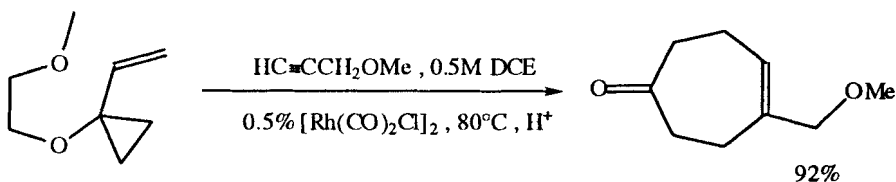
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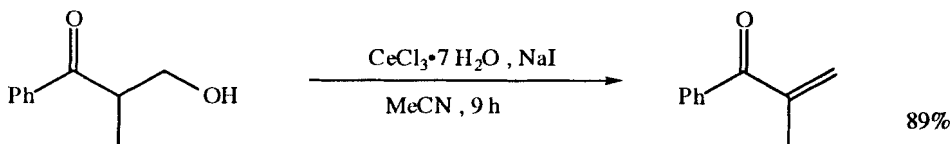
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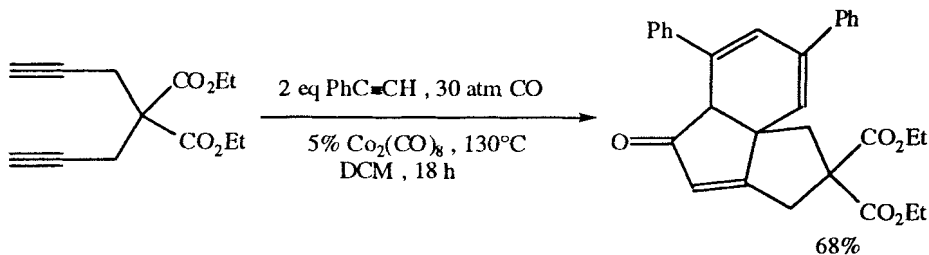
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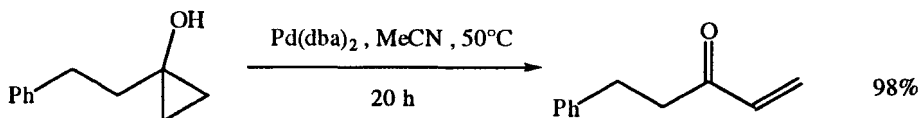
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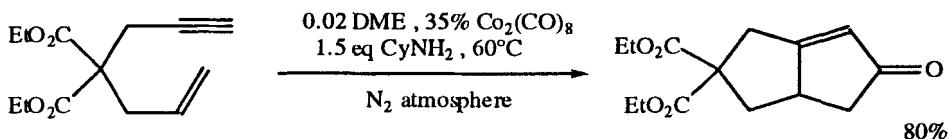
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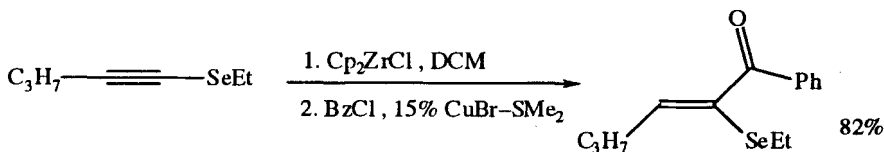
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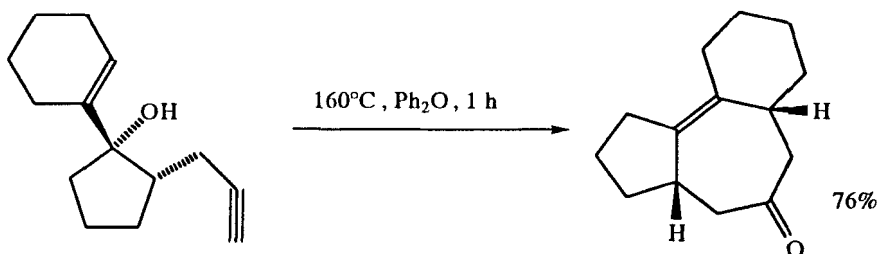
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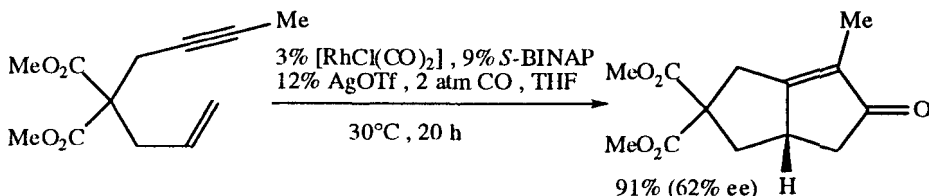
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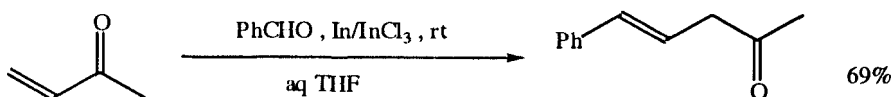
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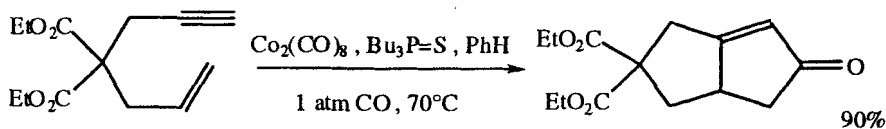
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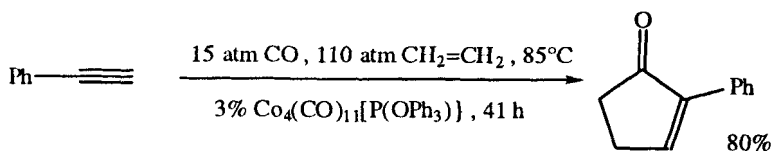
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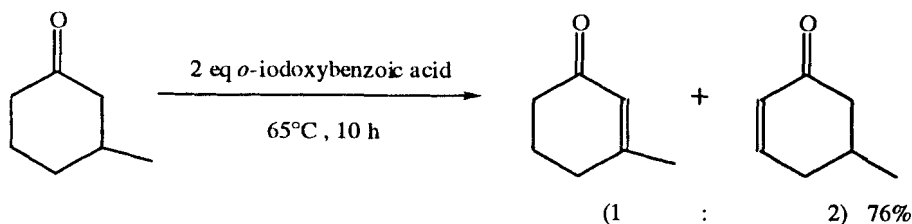
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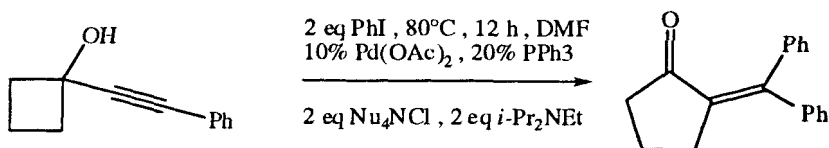
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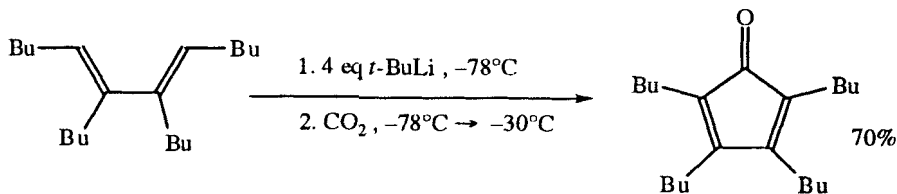
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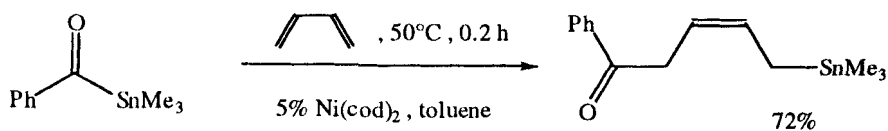
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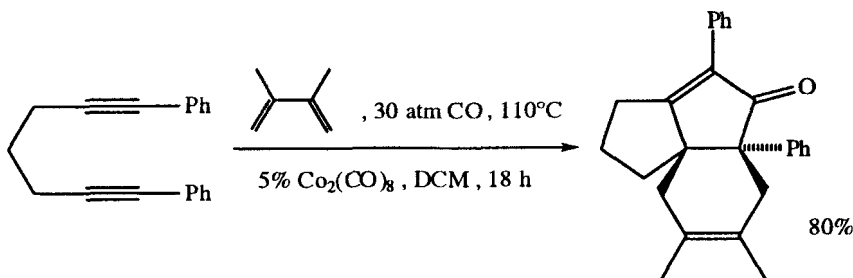


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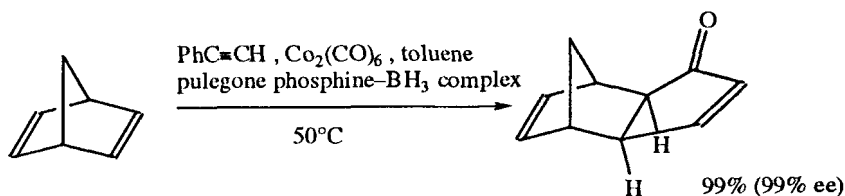


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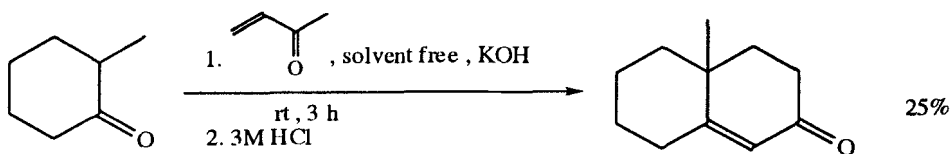




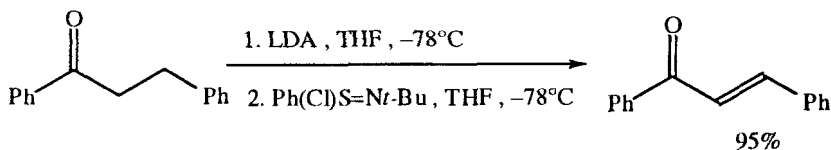
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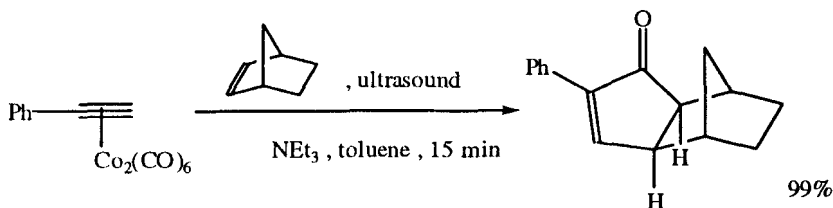
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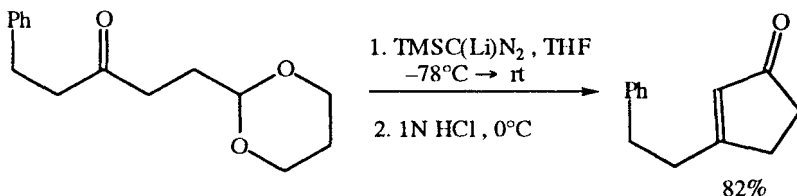
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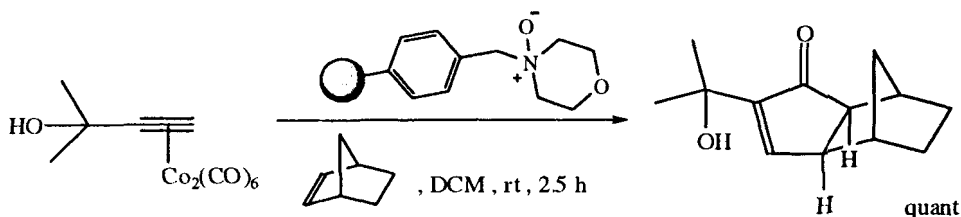
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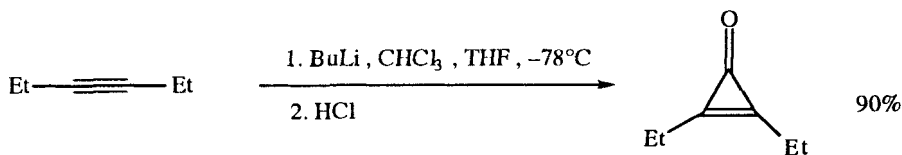
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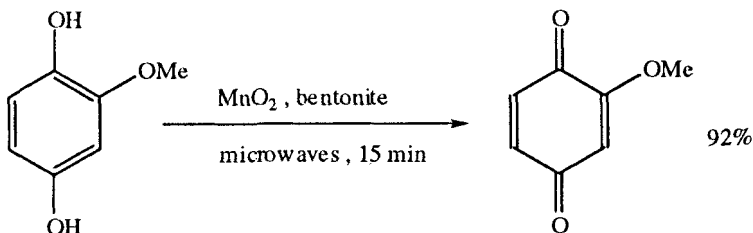
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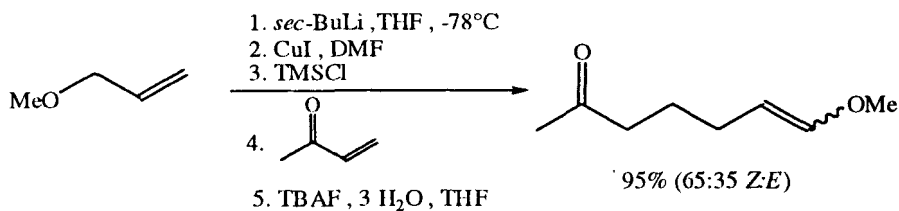
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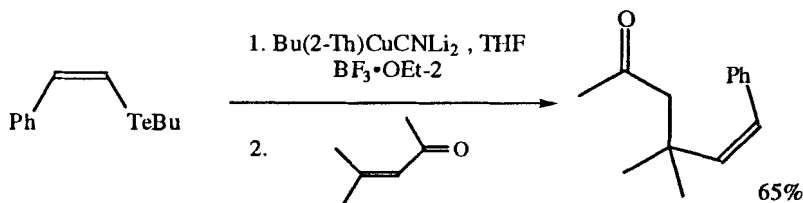
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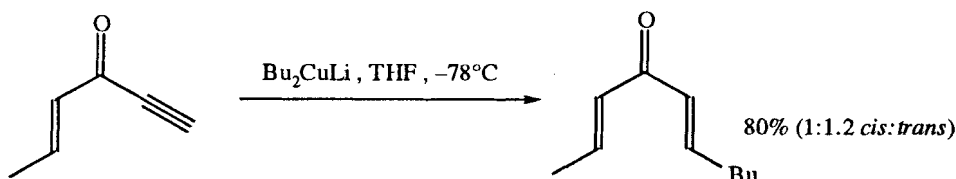
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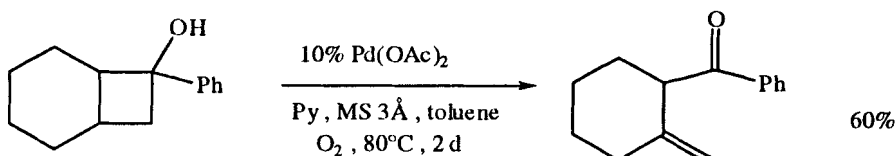
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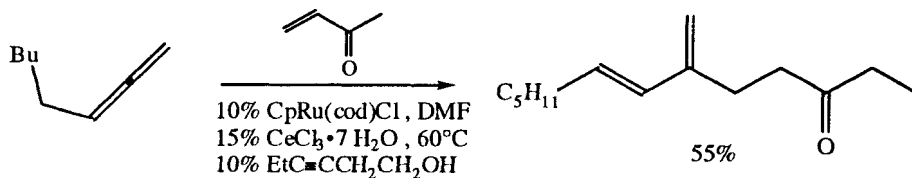
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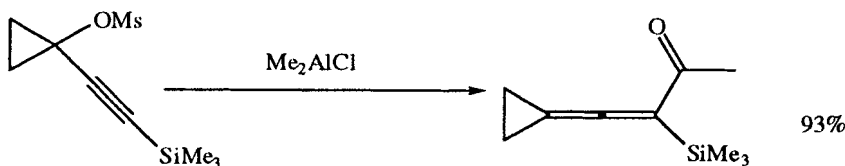
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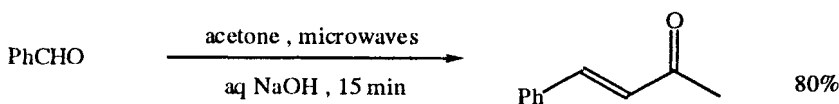
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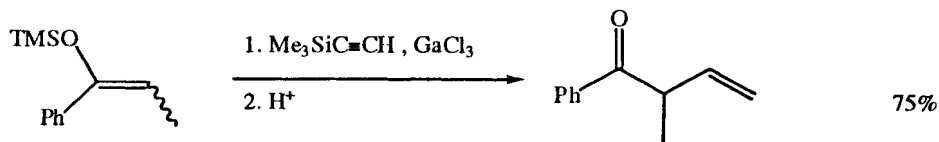
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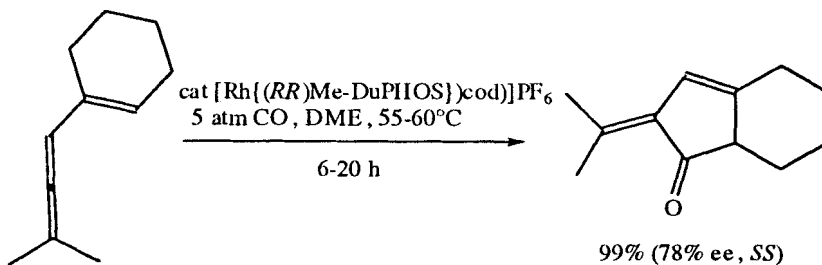
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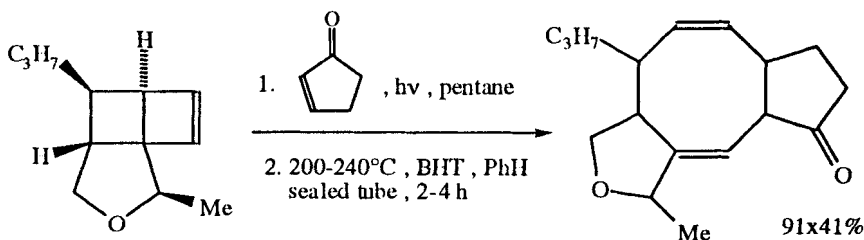
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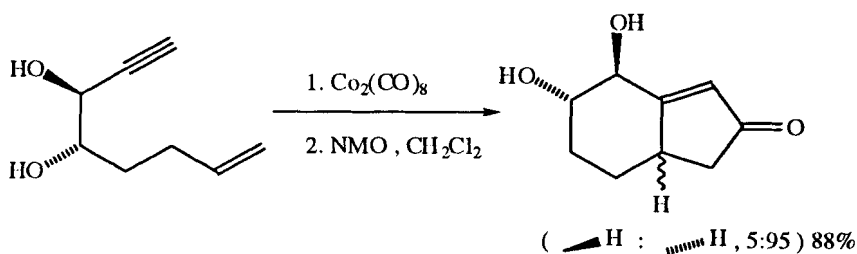
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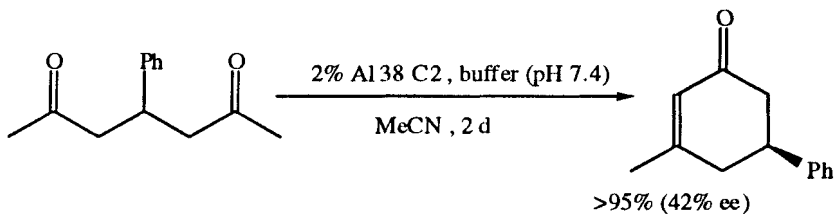
Murakami, M.; Itami, K.; Ito, Y. *J. Am. Chem. Soc.*, **1999**, *121*, 4130.



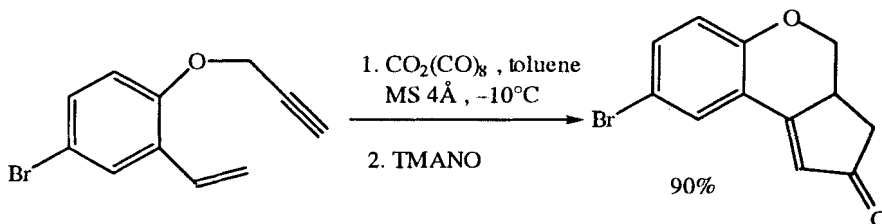
Randall, M.L.; Lo, P.C.-K.; Bonitatebus Jr., P.J.; Snapper, M.L.  
*J. Am. Chem. Soc.*, **1999**, *121*, 4534.



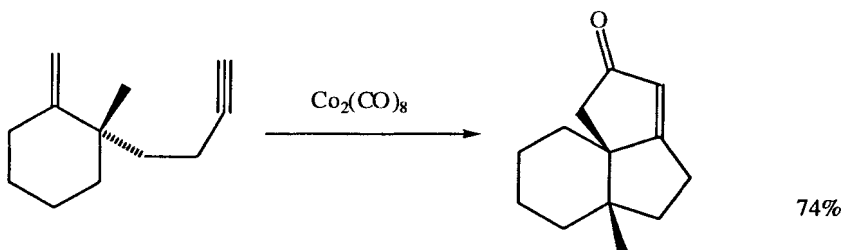
Mukai, C.; Kim, J.S.; Sonobe, H.; Hanaoka, M. *J. Org. Chem.*, **1999**, *64*, 6822.



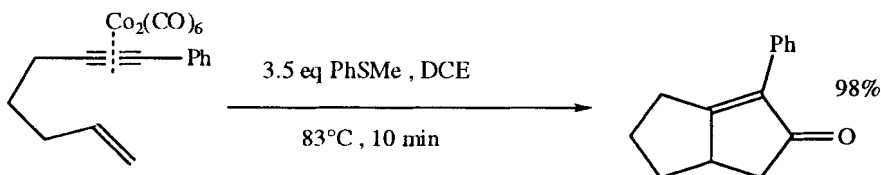
List, B.; Lerner, R.A.; Barbas III, C.F. *Org. Lett.*, **1999**, *1*, 59.



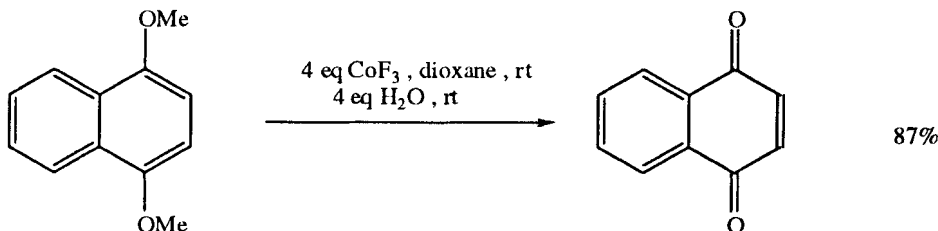
Pérez-Serrano, L.; Casarrubios, L.; Domínguez, G.; Pérez-Castells, J. *Org. Lett.*, **1999**, *1*, 1187.



Ishizaki, M.; Iwahara, K.; Kyoumura, K.; Hoshino, O. *Synlett*, **1999**, 587.

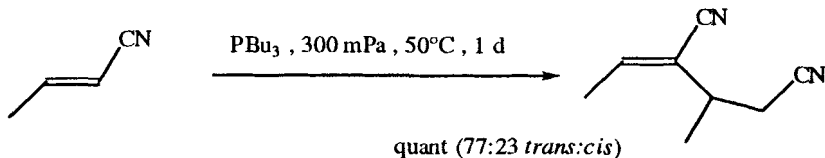


Sugihara, T.; Yamada, M.; Yamaguchi, M.; Nishizawa, M. *Synlett*, **1999**, 771.



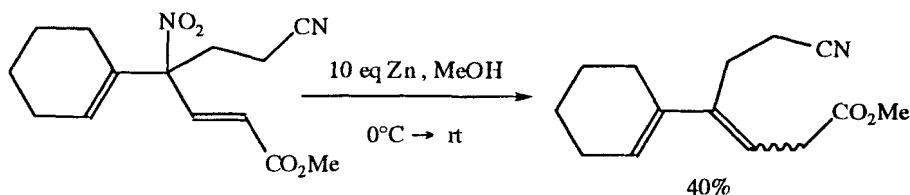
Tomatsu, A.; Takemura, S.; Hashimoto, K.; Nakata, M. *Synlett*, **1999**, 1474.

## SECTION 375: NITRILE - NITRILE

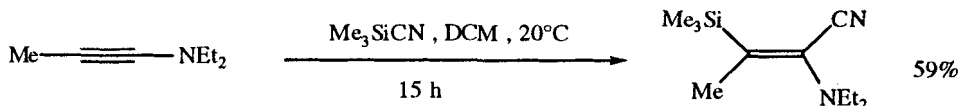


Jenner, G. *Tetrahedron Lett.*, **2000**, *41*, 3091.

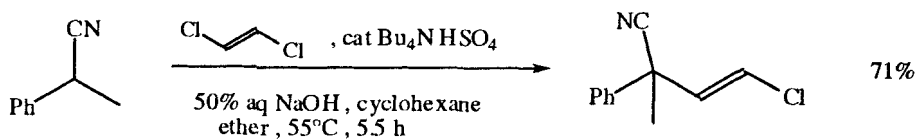
## SECTION 376: NITRILE - ALKENE



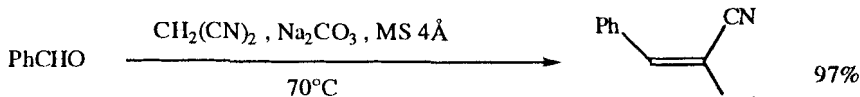
Chavan, S.P.; Shirma, A.K.; Ethiraj, K.S. *Synlett*, **2001**, 857.



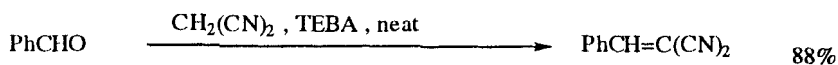
Lukashev, N.V.; Kazantsev, A.V.; Borisenko, A.A.; Beletskaya, I.P. *Tetrahedron*, **2001**, *57*, 10309.



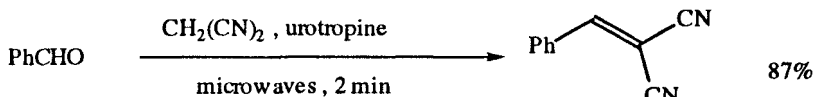
Jończyk, A.; Gierczak, A.H. *Synthesis*, **2001**, 93.



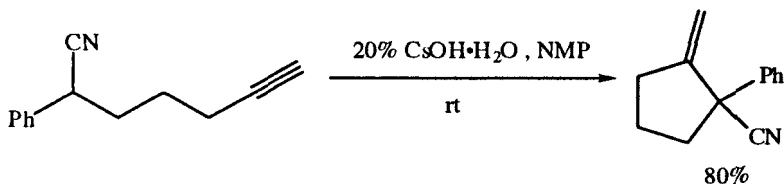
Siebenhaar, B.; Casagrande, B.; Studer, M.; Blaser, H.-U. *Can. J. Chem.*, **2001**, *79*, 566.



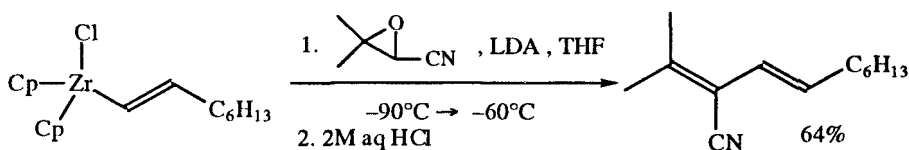
Bose, D.S.; Narsaiah, A.V. *J. Chem. Res. (S)*, **2001**, 36.



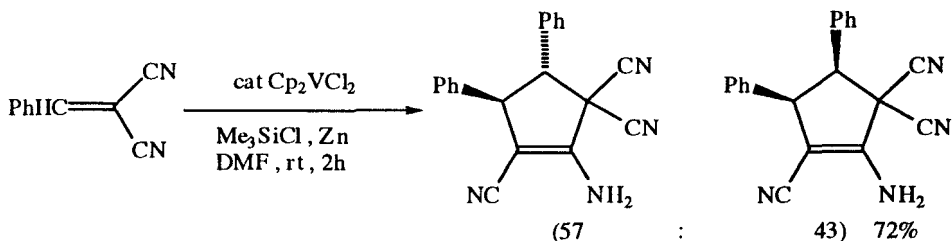
Wang, J.-X.; Wei, B.; Hu, Y.; Liu, Z.; Kang, L. *J. Chem. Res. (S)*, **2001**, 146



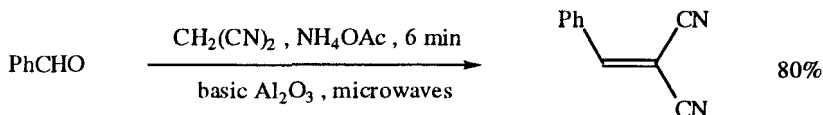
Koradin, C.; Rodríguez, A.; Knochel, P. *Synlett*, **2000**, 1452.



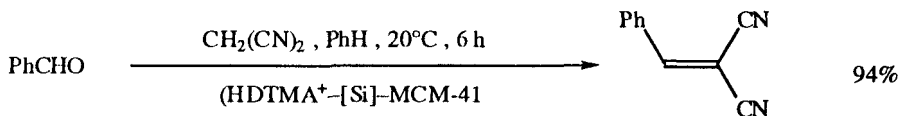
Kasatkin, A.N.; Whitby, R.J. *Tetrahedron Lett.*, **2000**, 41, 6201.



Zhou, L.; Hirao, T. *Tetrahedron Lett.*, **2000**, 41, 8517.

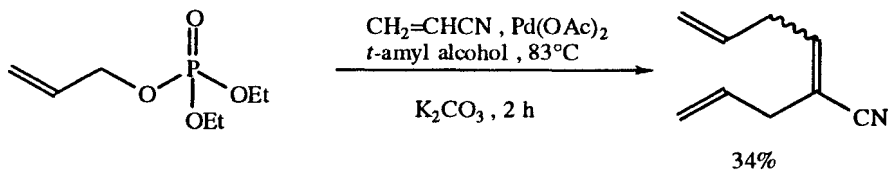


Balalaie, S.; Namati, N. *Synth. Commun.*, **2000**, 30, 869.

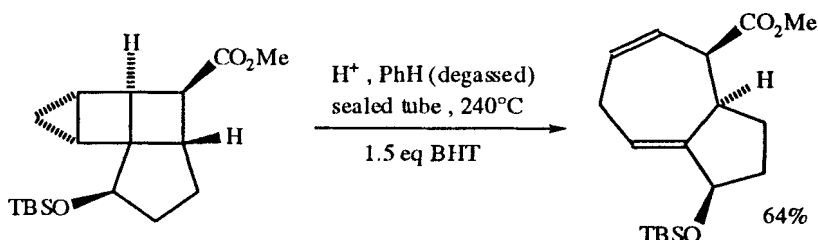


Kubota, Y.; Nishizaki, Y.; Sugi, Y. *Chem. Lett.*, **2000**, 998.

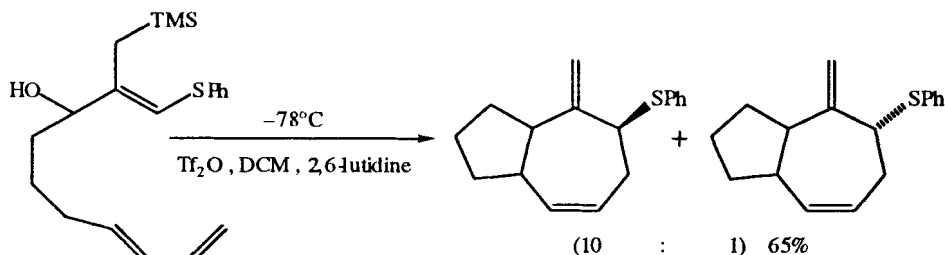
## SECTION 377: ALKENE - ALKENE



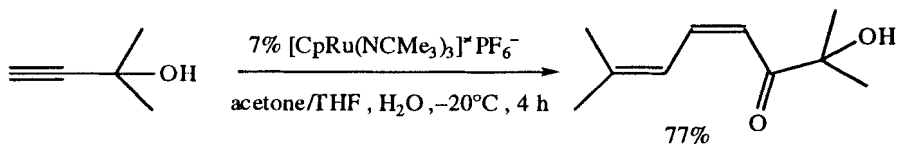
Shvo, Y.; Arisha, A.H.I. *J. Org. Chem.*, **2001**, 66, 4921.



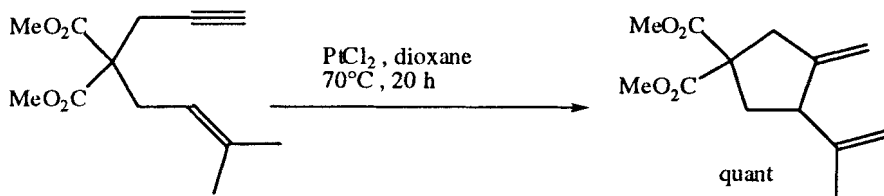
Deak, H.L.; Stokes, S.S.; Snapper, M.L. *J. Am. Chem. Soc.*, **2001**, 123, 5152.



Harmata, M.; Bohnert, G.; Barnes, C.L. *Tetrahedron Lett.*, **2001**, 42, 149.

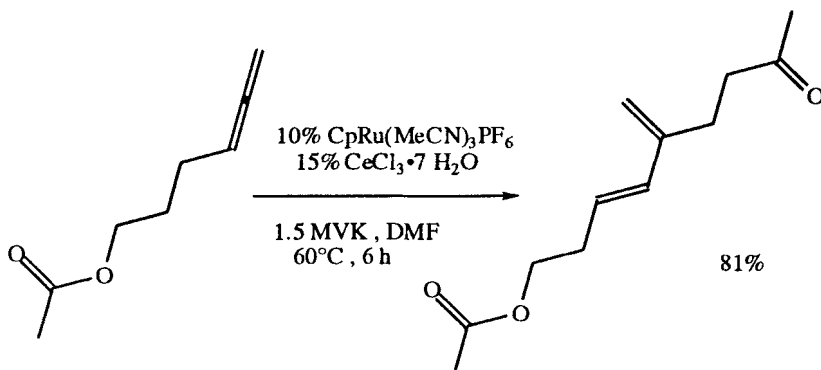


Trost, B.M.; Rudd, M.T. *J. Am. Chem. Soc.*, **2001**, 123, 8862.

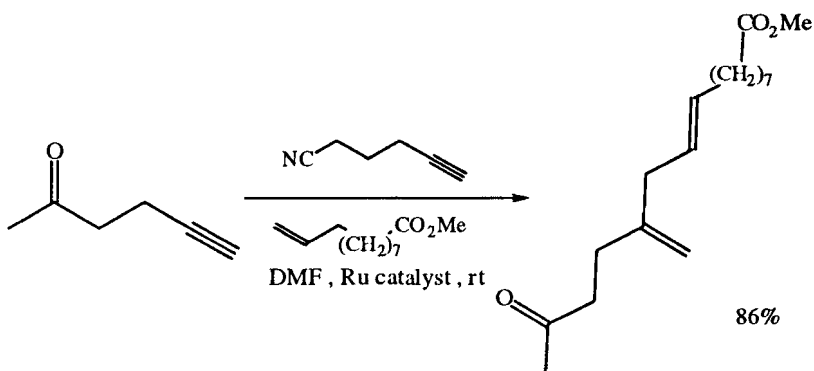


Méndez, M.; Muñoz, M.P.; Nevado, C.; Cárdenas, D.J.; Echavarren, A.M. *J. Am. Chem. Soc.*, **2001**, 123, 10511.

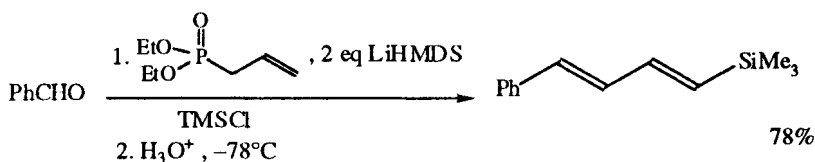




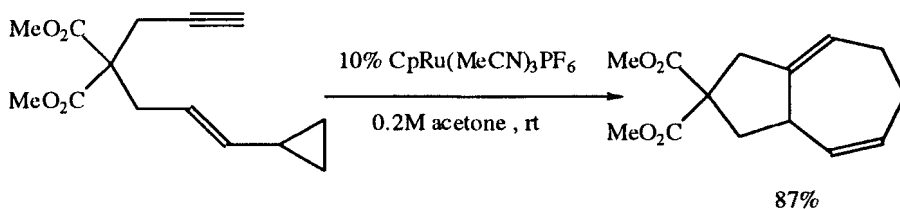
Trost, B.M.; Pinkerton, A.B.; Seidel, M. *J. Am. Chem. Soc.*, **2001**, *123*, 12466



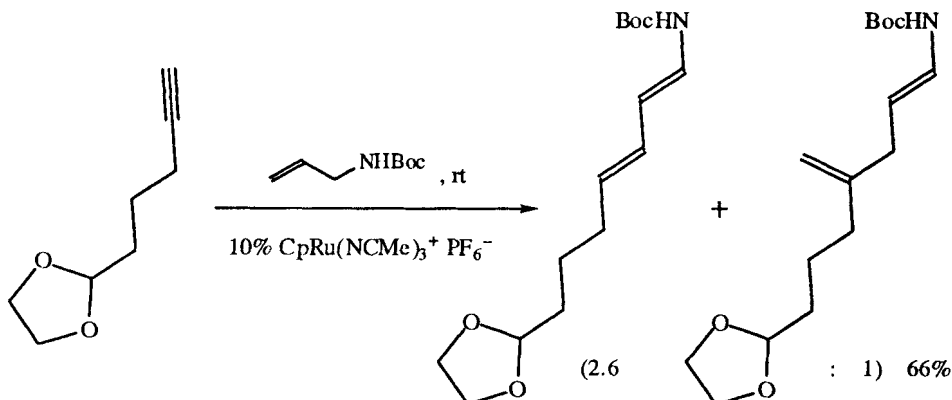
Trost, B.M.; Pinkerton, A.B.; Toste, F.D.; Sperrle, M. *J. Am. Chem. Soc.* **2001**, *123*, 12504.



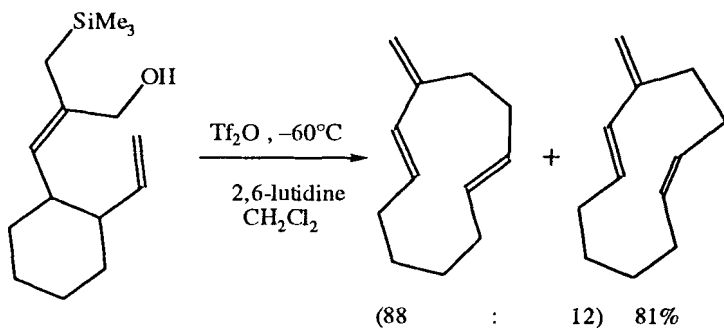
Lee, B.S.; Gil, J.M.; Oh, D.Y. *Tetrahedron Lett.*, **2001**, *42*, 2345.



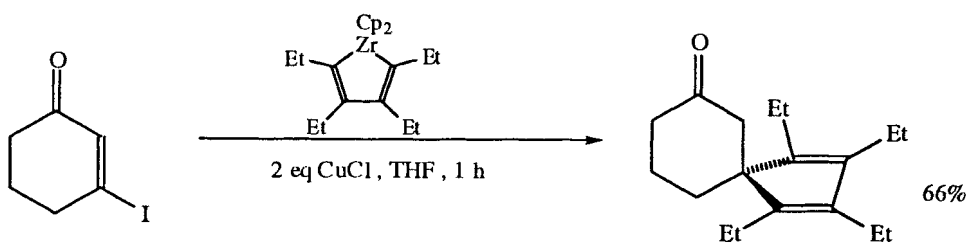
Trost, B.M.; Toste, F.D.; Shen, H. *J. Am. Chem. Soc.*, **2000**, *122*, 2379.



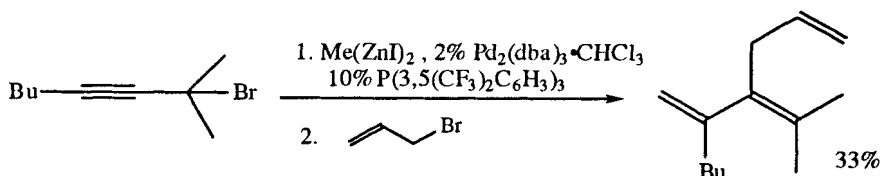
Trost, B.M.; Surivet, J.-P. *Angew. Chem. Int. Ed.*, **2001**, *40*, 1468.



Suzuki, H.; Monda, A.; Kuroda, C. *Tetrahedron Lett.*, **2001**, *42*, 1915.

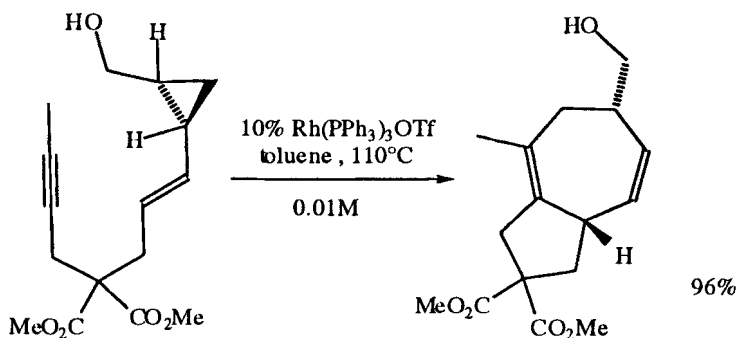


Xi, C.; Kitora, M.; Nakajima, K.; Takahashi, T. *J. Org. Chem.*, **2000**, *65*, 945.



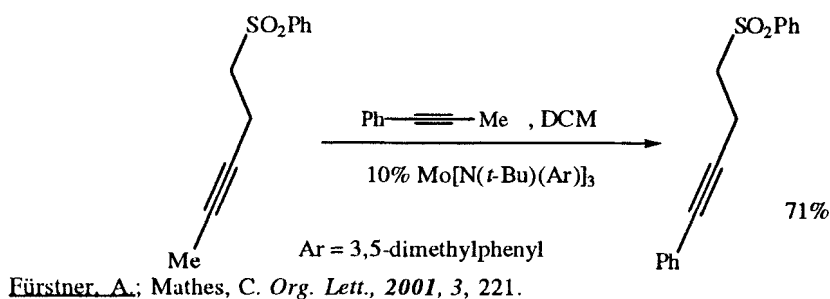
Matsubara, S.; Ukai, K.; Toda, N.; Utimoto, K.; Oshima, K. *Synlett*, **2000**, 995.



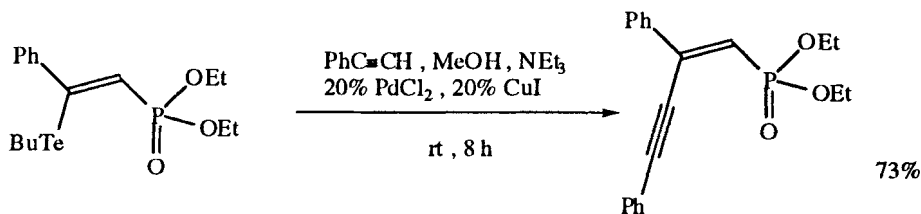


Wender, P.A.; Dyckman, A.J. *Org. Lett.*, **1999**, 1, 2089.

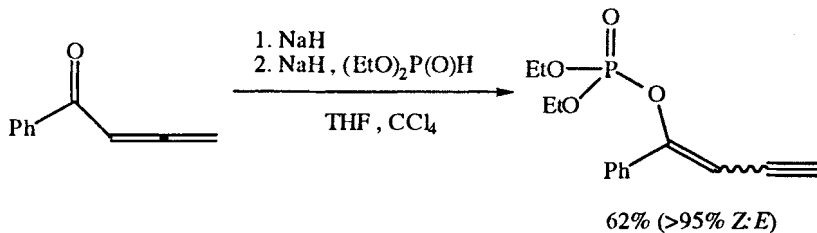
## SECTION 378: OXIDES - ALKYNES



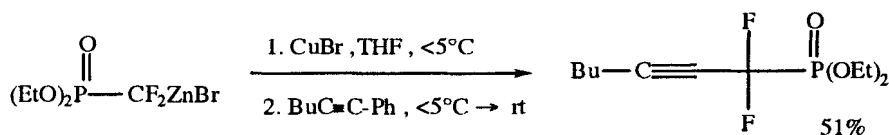
Fürstner, A.; Mathes, C. *Org. Lett.*, **2001**, 3, 221.



Braga, A.L.; de Andrade, L.H.; Silveira, C.C.; Moro, A.V.; Zeni, G. *Tetrahedron Lett.*, **2001**, 42, 8563.



Kabalka, G.W.; Yang, K.; Wang, Z. *Synth. Commun.*, **2001**, 31, 511.



Zhang, X.; Burton, D.J. *Tetrahedron Lett.*, **2000**, *41*, 7791.

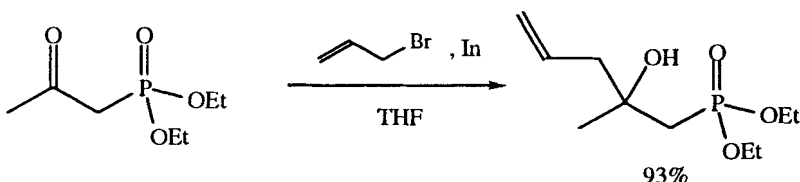
## REVIEWS:

"The Chemistry of Acetylenes and Allenic Sulfones," Back, T.G. *Tetrahedron*, **2001**, *57*, 5263.

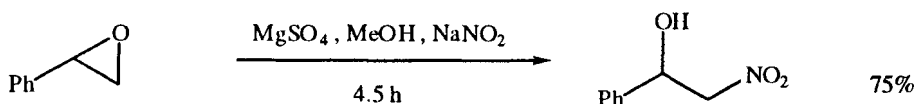
## SECTION 379: OXIDES - ACID DERIVATIVES

NO ADDITIONAL EXAMPLES

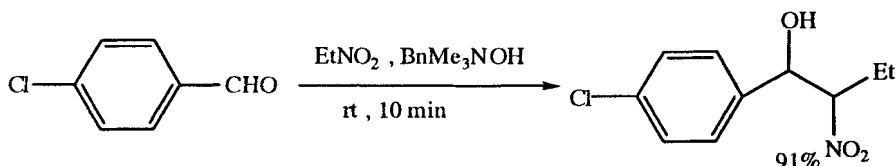
## SECTION 380: OXIDES - ALCOHOLS, THIOLS



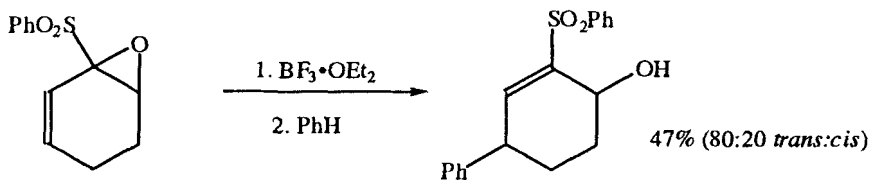
Ranu, B.C.; Samanta, S.; Hajra, A. *J. Org. Chem.*, **2001**, *66*, 7519.



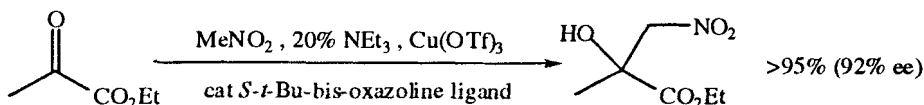
Kalita, B.; Barua, N.C.; Bezbarua, M.; Bez, G. *Synlett*, **2001**, 1411.



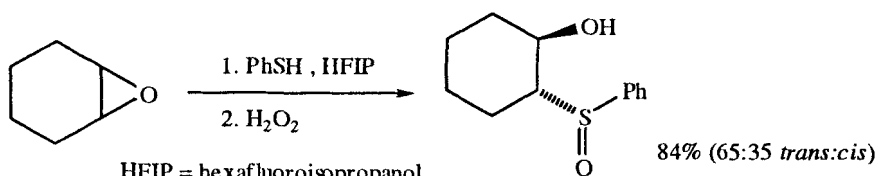
Bulbule, V.J.; Jnaneshwara, G.K.; Deshmukh, R.R.; Borate, H.B.; Seshpande, V.H. *Synth. Commun.*, **2001**, *3*, 3623.



Brandänge, S.; Bäckvall, J.-E.; Leijonmarck, H. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 2051.

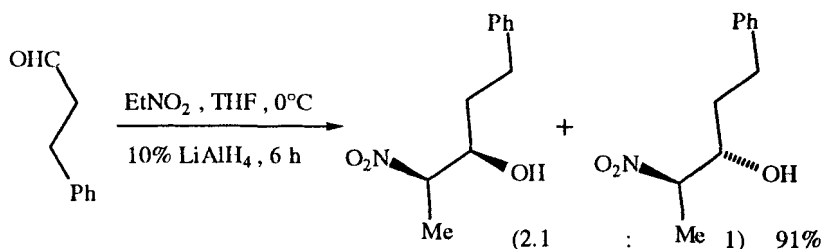


Christensen, C.; Juhl, K.; Jørgensen, K.A. *Chem. Commun.*, **2001**, 2222.

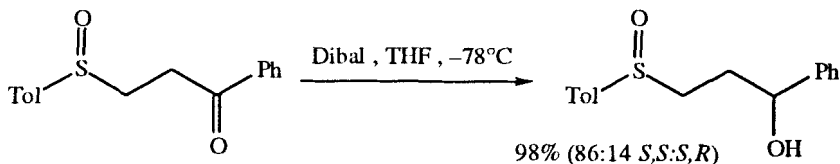


HFIP = hexafluoroisopropanol

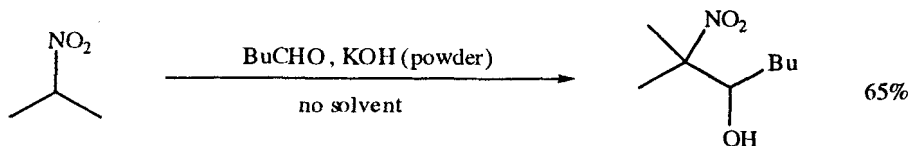
Kesavan, V.; Bonnet-Delpon, D.; Bégué, J.-P. *Tetrahedron Lett.*, **2000**, *41*, 2895.



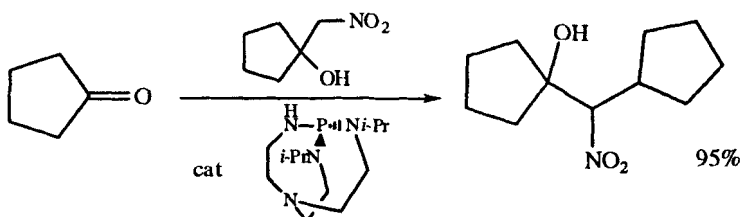
Youn, W.; Kim, Y.H. *Synlett*, **2000**, 880.



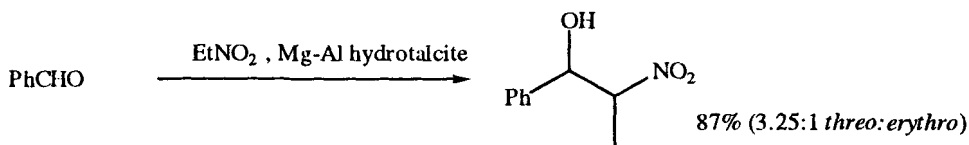
Nakamura, S.; Kuroyanagi, M.; Watanabe, Y.; Toru, T.  
*J. Chem. Soc., Perkin Trans. 1*, **2000**, 3143.



Ballini, R.; Bosica, G.; Parrini, M. *Chem. Lett.*, **1999**, 1105.



Kisanga, P.B.; Verkade, J.G. *J. Org. Chem.*, **1999**, *64*, 4298.



Bulbule, V.J.; Deshpande, V.H.; Velu, S.; Sudalai, A.; Sivasankar, S.; Sathe, V.T. *Tetrahedron*, **1999**, *55*, 9325.

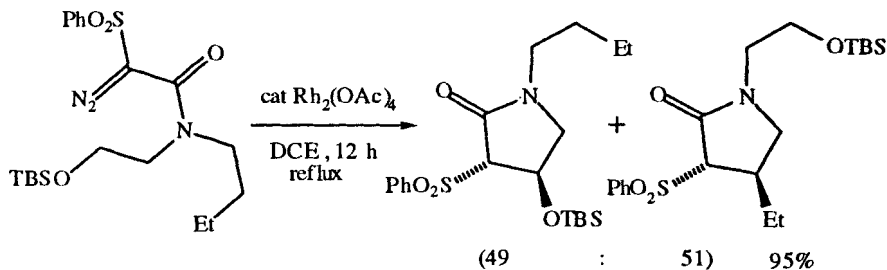
## REVIEWS:

"The Henry Reaction; Recent examples," Luzzio, F.A. *Tetrahedron*, **2001**, *57*, 915.

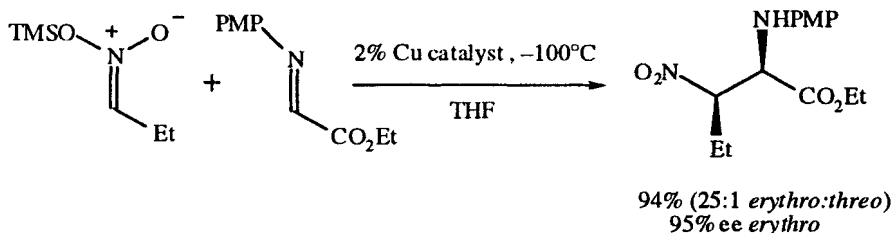
## SECTION 381 OXIDES - ALDEHYDES

NO ADDITIONAL EXAMPLES

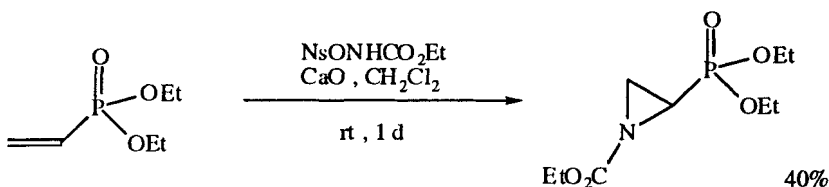
## SECTION 382: OXIDES - AMIDES



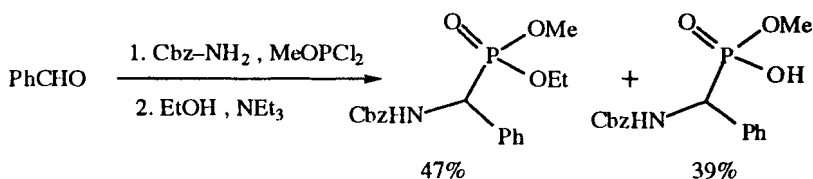
Yoon, C.H.; Zaworotko, M.J.; Moulton, B.; Jung, K.W. *Org. Lett.*, **2001**, *3*, 3539.



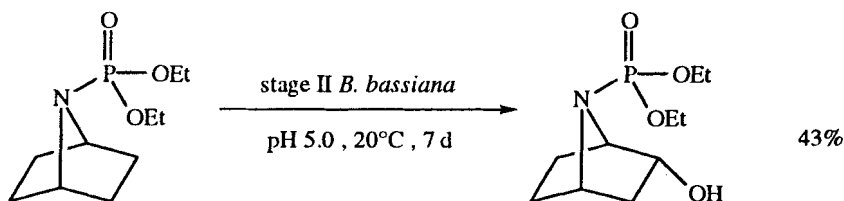
Knudsen, K.R.; Risgaard, T.; Nishiwaki, N.; Gothelf, K.V.; Jørgensen, K.A.  
*J. Am. Chem. Soc.*, **2001**, *123*, 5843.



Fazio, A.; Loreto, M.A.; Tardella, P.A. *Tetrahedron Lett.*, **2001**, *42*, 2185.

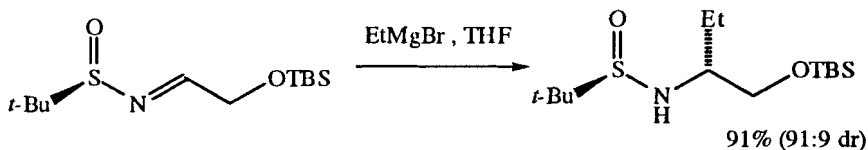


Xu, L.; Fun, N. *J. Chem. Soc., Perkin Trans. 1*, **2001**, 1223.



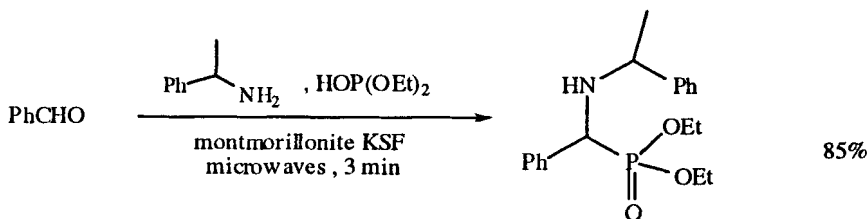
Hemenway, M.S.; Olivo, H.F. *J. Org. Chem.*, **1999**, *64*, 6312.

## SECTION 383: OXIDES - AMINES

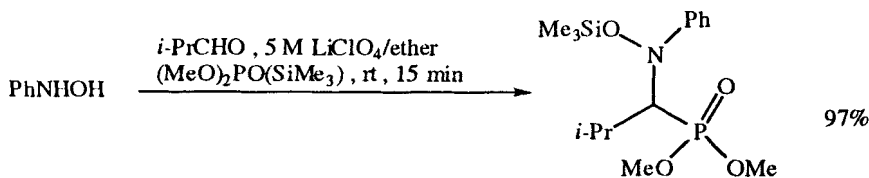


Tang, T.P.; Volkman, S.K.; Ellman, J.A. *J. Org. Chem.*, **2001**, *66*, 8772.

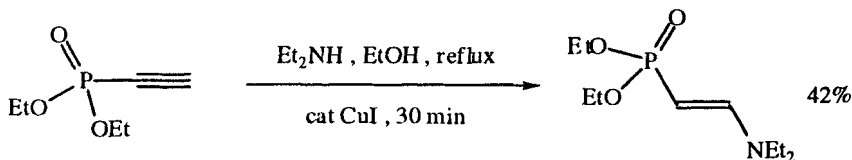




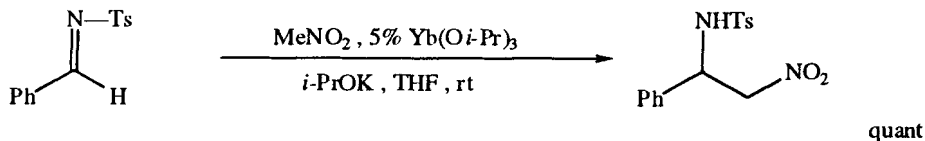
Yadav, J.S.; Subba Reddy, B.V.; Madan, Ch. *Synlett*, **2001**, 1131.



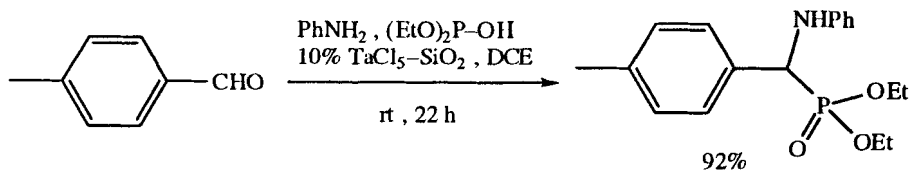
Heydari, A.; Zarei, M.; Alijanianzadeh, R.; Tavakol, H. *Tetrahedron Lett.*, **2001**, 42, 3629.



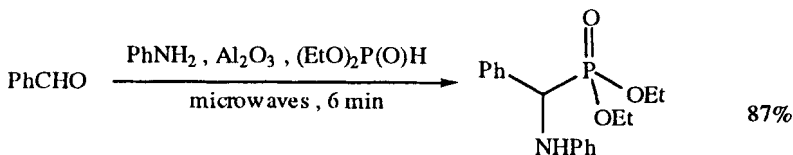
Panarina, A.E.; Dugadina, A.V.; Zakharov, V.I.; Ionin, B.I. *Tetrahedron Lett.*, **2001**, 42, 4365.



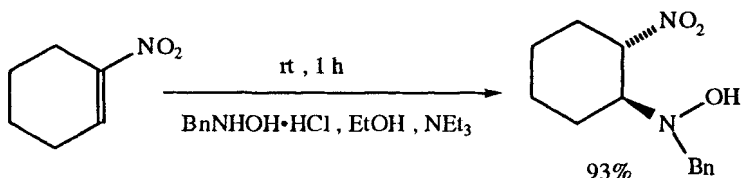
Qian, C.; Gao, F.; Chen, R. *Tetrahedron Lett.*, **2001**, 42, 4673.



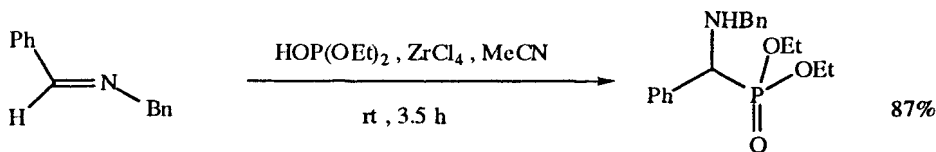
Chandrasekhar, S.; Prakash, S.J.; Jagadeshwar, V.; Narsihmulu, Ch. *Tetrahedron Lett.*, **2001**, 42, 5561.



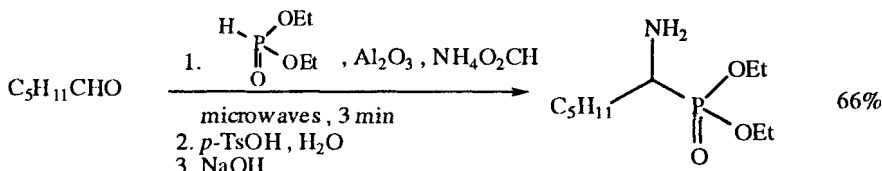
Kaboudin, B.; Nazari, R. *Tetrahedron Lett.*, **2001**, 42, 8211.



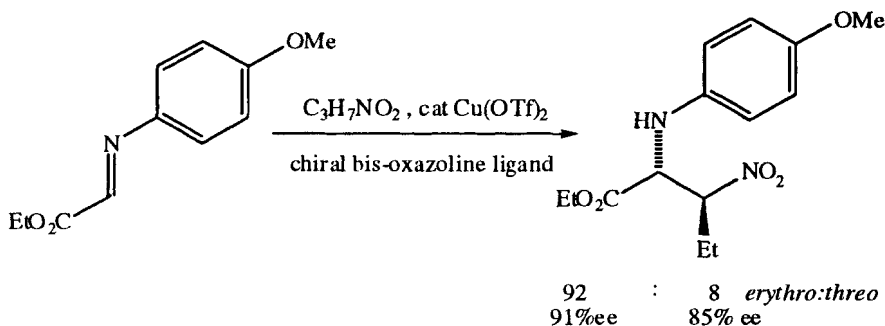
O'Neil, J.A.; Clator, E.; Southern, J.M.; Bickley, J.F.; Tapolczay, D.J.  
*Tetrahedron Lett.*, **2001**, 42, 8251.



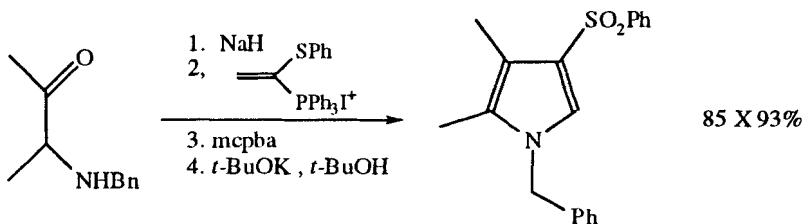
Yadav, J.S.; Reddy, B.V.S.; Raj, K.S.; Reddy, B.; Prasad, A.R. *Synthesis*, **2001**, 2277.



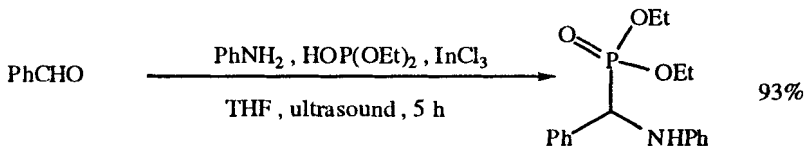
Kaboudin, B. *Chem. Lett.*, **2001**, 880.



Nishiwaki, N.; Knudsen, K.R.; Gothelf, K.V.; Jørgensen, K.A.  
*Angew. Chem. Int. Ed.*, **2001**, 40, 2992.

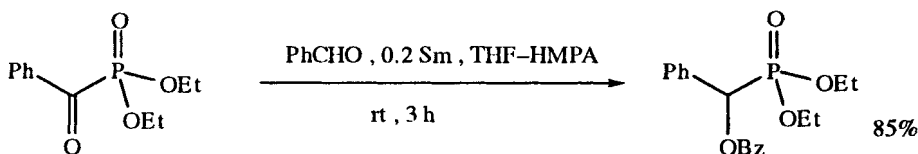


Burley, I.; Bilic, B.; Hewson, A.T.; Newton, J.R.A. *Tetrahedron Lett.*, **2000**, 41, 8969.

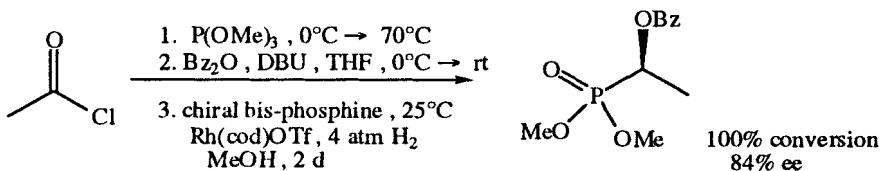


Ranu, B.C.; Hajra, A.; Jana, U. *Org. Lett.*, **1999**, *1*, 1141.

## SECTION 384: OXIDES - ESTERS

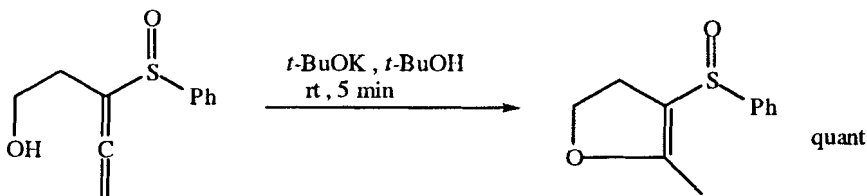


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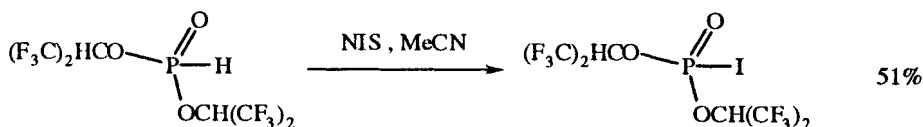
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## SECTION 385: OXIDES - ETHERS, EPOXIDES, THIOETHERS

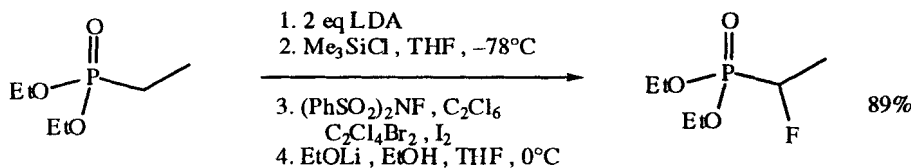


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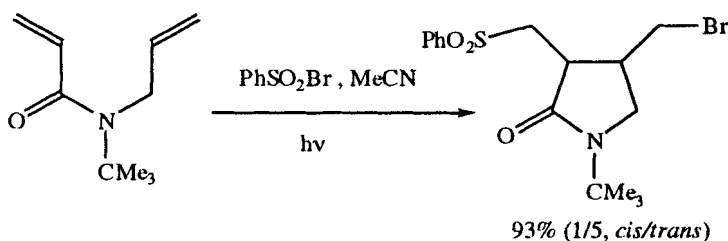
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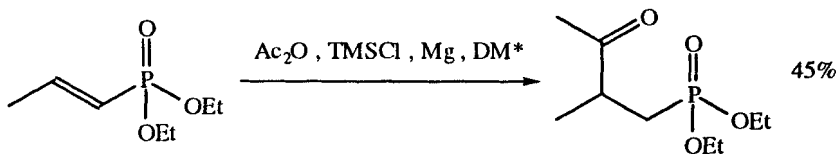


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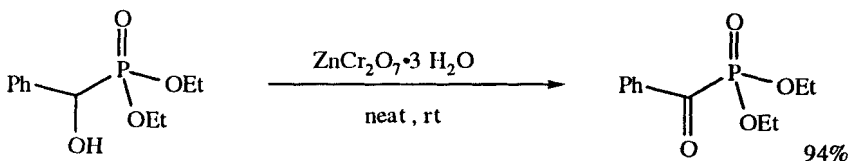


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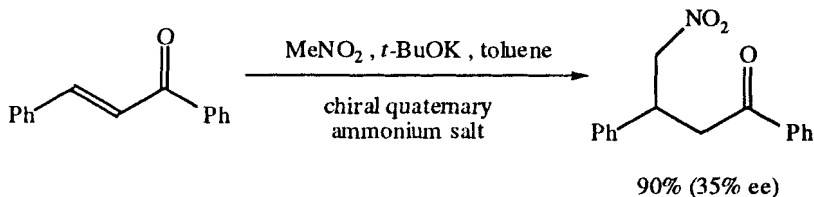
## SECTION 387: OXIDES - KETONES



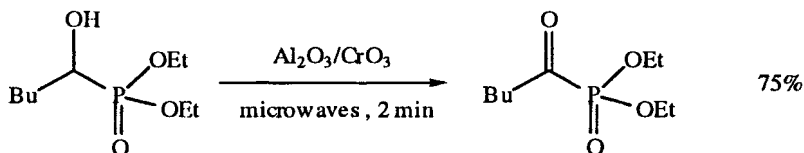
Kyoda, M.; Yokoyama, T.; Maekawa, H.; Ohno, T.; Nishiguchi, I. *Synlett*, **2001**, 1535.



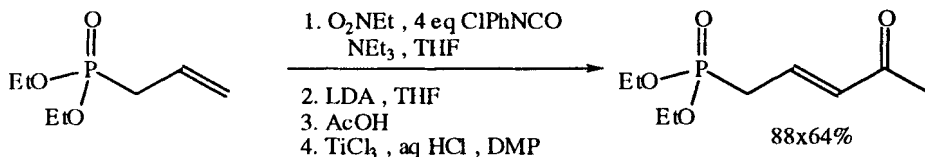
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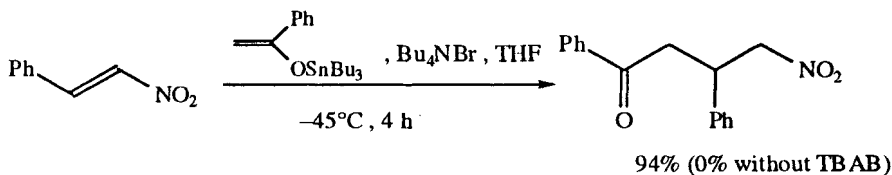
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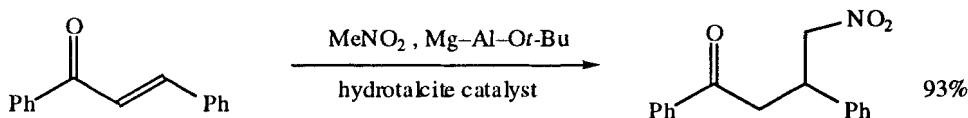
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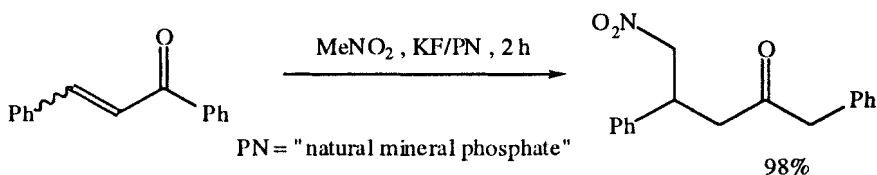
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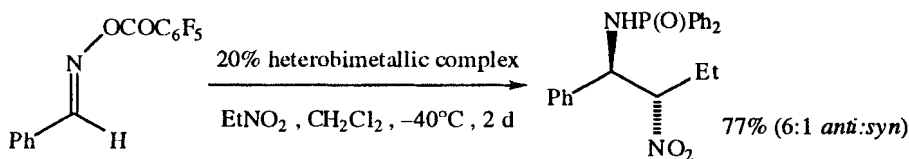


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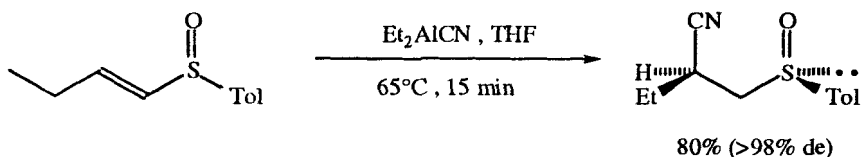


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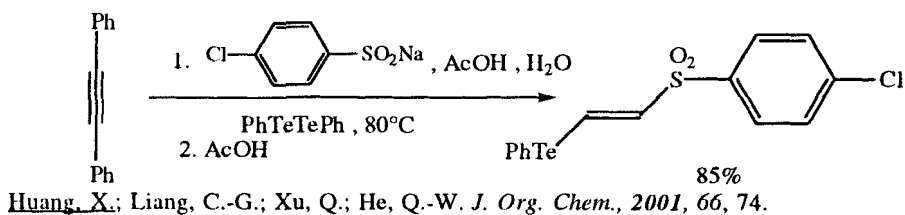


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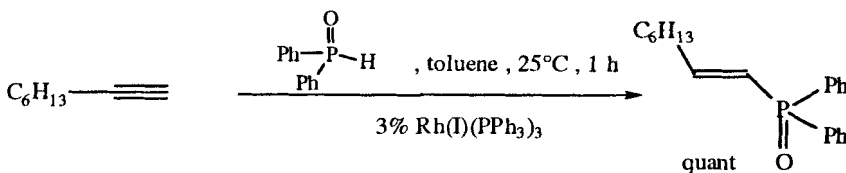


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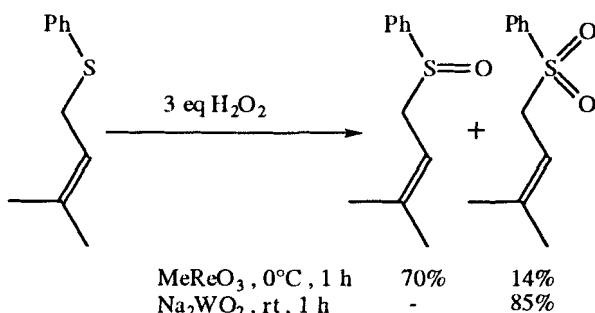
## SECTION 389: OXIDES - ALKENES



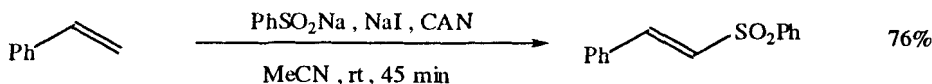
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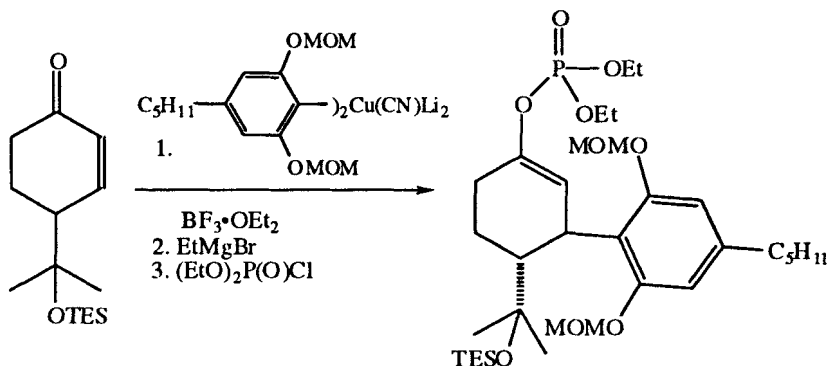
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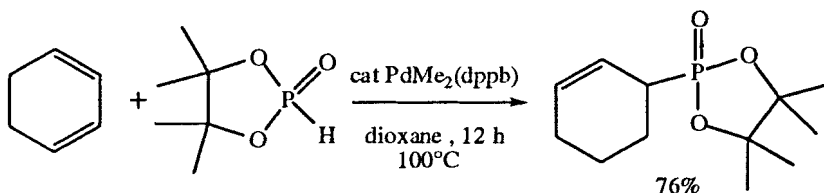
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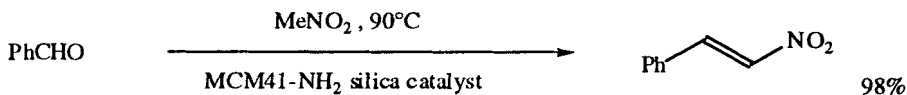
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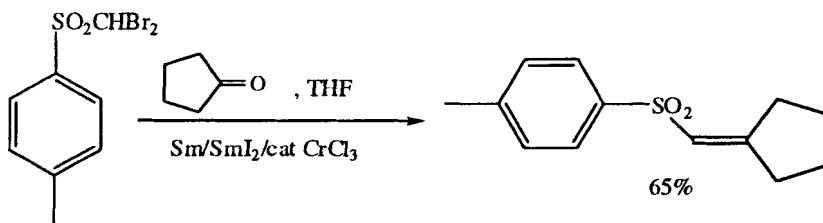
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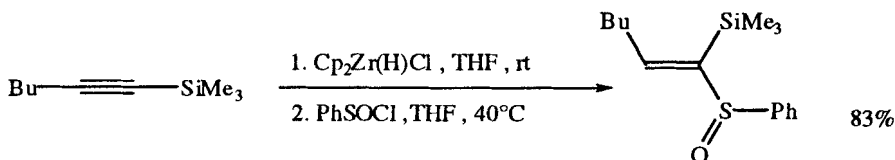
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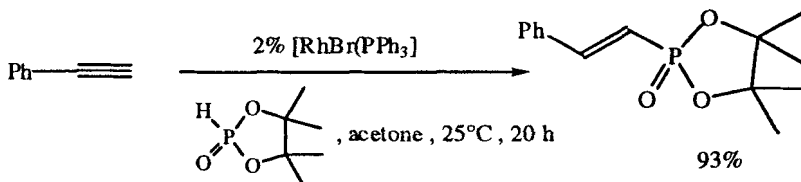
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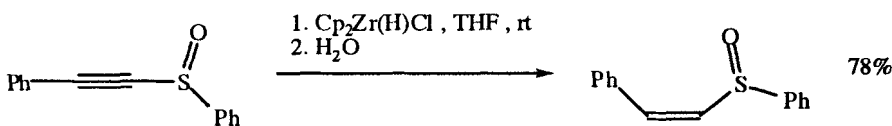
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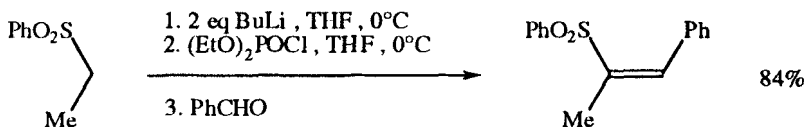
Zhong, P.; Guo, M.-P.; Huang, X. *Synth. Commun.*, **2001**, 31, 615.



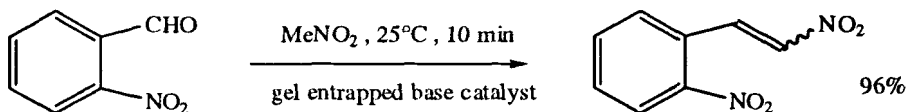
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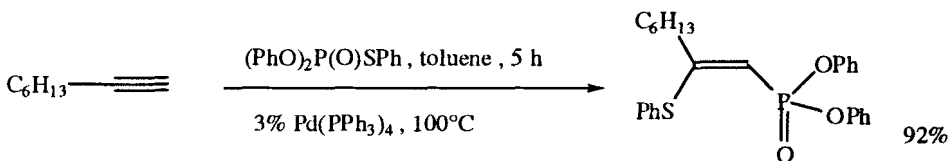
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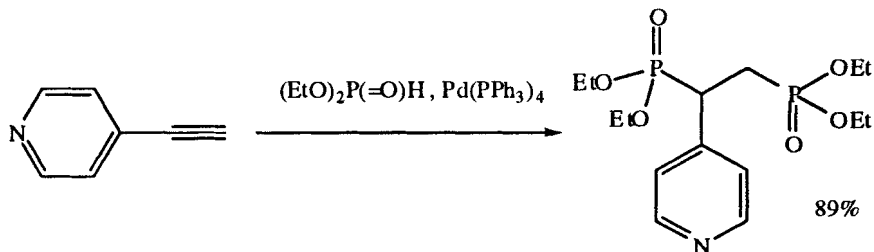
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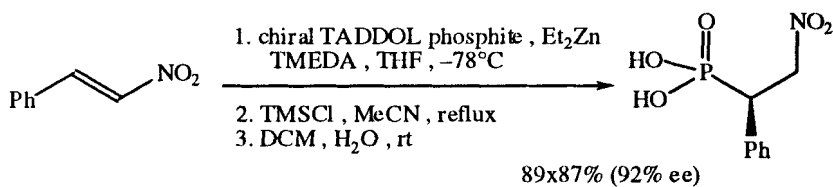
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| Aquino, L.B.              | 402            | Asano, T.                  | 468            |
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