
PREFACE

Chemicals are part of our everyday lives. The hundreds of chemicals that are manufactured by industrial processes influence what we do and how we do it. This book offers descriptions and process details of the most popular of those chemicals. The manufacture of chemicals involves many facets of chemistry and engineering which are exhaustively treated in a whole series of encyclopedic works, but it is not always simple to rapidly grasp present status of knowledge from these sources. Thus, there is a growing demand for a text that contains concise descriptions of the most important chemical conversions and processes of industrial operations.

This text will, therefore, emphasize the broad principles of systems of chemicals manufacture rather than intimate and encyclopedic details that are often difficult to understand. As such, the book will allow the reader to appreciate the chemistry and engineering aspects of important precursors and intermediates as well as to follow the development of manufacturing processes to current state-of-the-art processing.

This book emphasizes *chemical conversions*, which may be defined as chemical reactions applied to industrial processing. The basic chemistry will be set forth along with easy-to-understand descriptions, since the nature of the *chemical reaction* will be emphasized in order to assist in the understanding of reactor type and design. An outline is presented of the production of a range of chemicals from starting materials into useful products. These chemical products are used both as consumer goods and as intermediates for further chemical and physical modification to yield consumer products.

Since the basis of chemical-conversion classification is a chemical one, emphasis is placed on the important industrial *chemical reactions* and *chemical processes* in Part 1 of this book. These chapters focus on the various chemical reactions and the type of equipment that might be used in such processes. The contents of this part are in alphabetical order by reaction name.

Part 2 presents the reactions and processes by which individual chemicals, or chemical types, are manufactured and is subdivided by alphabetical listing

of the various chemicals. Each item shows the chemical reaction by which that particular chemical can be manufactured. Equations are kept simple so that they can be understood by people in the many scientific and engineering disciplines involved in the chemical manufacturing industry. Indeed, it is hoped that the chemistry is sufficiently simple that nontechnical readers can understand the equations.

The design of equipment can often be simplified by the generalizations arising from a like chemical-conversion arrangement rather than by considering each reaction as unique.

Extensive use of *flowcharts* is made as a means of illustrating the various processes and to show the main reactors and the paths of the feedstocks and products. However, no effort is made to include all of the valves and ancillary equipment that might appear in a true industrial setting. Thus, the flowcharts used here have been reduced to maximum simplicity and are designed to show principles rather than details.

Although all chemical manufacturers should be familiar with the current selling prices of the principal chemicals with which they are concerned, providing price information is not a purpose of this book. Prices per unit weight or volume are subject to immediate changes and can be very misleading. For such information, the reader is urged to consult the many sources that deal with the prices of chemical raw materials and products.

In the preparation of this work, the following sources have been used to provide valuable information:

AIChE Journal (AIChE J.)

Canadian Journal of Chemistry

Canadian Journal of Chemical Engineering

Chemical and Engineering News (Chem. Eng. News)

ChemTech

Chemical Week (Chem. Week)

Chemical Engineering Progress (Chem. Eng. Prog.)

Chemical Processing Handbook, J. J. McKetta (ed.), Marcel Dekker, New York.

Encyclopedia of Chemical Technology, 4th ed., It. E. Kirk, and D. F. Othmer(eds.) Wiley-Interscience, New York

Chemical Engineers' Handbook, 7th ed., R. H. Perry and D. W. Green (eds.), McGraw-Hill, New York.

Chemical Processing

Handbook of Chemistry and Physics, Chemical Rubber Co.
Hydrocarbon Processing
Industrial and Engineering Chemistry (Ind. Eng. Chem.)
Industrial and Engineering Chemistry Fundamentals (Ind. Eng. Chem. Fundamentals)
Industrial and Engineering Chemistry Process Design and Development (Ind. Eng. Chem. Process Des. Dev.)
Industrial and Engineering Chemistry Product Research and Development (Ind. Eng. Chem. Prod. Res. Dev.)
International Chemical Engineering
Journal of Chemical and Engineering Data (J. Chem. Eng. Data)
Journal of the Chemical Society
Journal of the American Chemical Society
Lange's Handbook of Chemistry, 12th ed., J. A. Dean (ed.). McGraw-Hill, New York
Oil & Gas Journal
McGraw-Hill Encyclopedia of Science and Technology, 5th ed., McGraw-Hill, New York
Riegel's Industrial Chemistry, 7th ed., J. A. Kent (ed.), Reinhold, New York

Finally, I am indebted to my colleagues in many different countries who have continued to engage me in lively discussions and who have offered many thought-provoking comments about industrial processes. Such contacts were of great assistance in the writing of this book and have been helpful in formulating its contents.

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