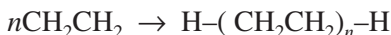


POLYMERIZATION

Polymerization is a process in which similar molecules (usually olefins) are linked to form a high-molecular-weight product; such as the formation of polyethylene from ethylene

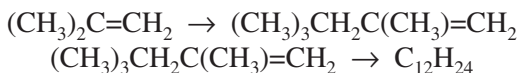


The molecular weight of the polyethylene can range from a few thousand to several hundred thousand.

Polymerization of the monomer in bulk may be carried out in the liquid or vapor state. The monomers and activator are mixed in a reactor and heated or cooled as needed. As most polymerization reactions are exothermic, provision must be made to remove the excess heat. In some cases, the polymers are soluble in their liquid monomers, causing the viscosity of the solution to increase greatly. In other cases, the polymer is not soluble in the monomer and it precipitates out after a small amount of polymerization occurs.

In the petroleum industry, the term *polymerization* takes on a different meaning since the polymerization processes convert by-product hydrocarbon gases produced in cracking into liquid hydrocarbons suitable (of limited or specific molecular weight) for use as high-octane motor and aviation fuels and for petrochemicals.

To combine olefinic gases by polymerization to form heavier fractions, the combining fractions must be unsaturated. Hydrocarbon gases, particularly olefins, from cracking reactors are the major feedstock of polymerization.



Vapor-phase cracking produces considerable quantities of unsaturated gases suitable as feedstocks for polymerization units.

Catalytic polymerization is practical on both large and small scales and is adaptable to combination with reforming to increase the quality of the

gasoline. Gasoline produced by polymerization contains a smog-producing olefinic bond. Polymer oligomers are widely used to make detergents.