

Polyethylene critical essay



**ASSIGN
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Polyethylene

Introduction : Polyethylene is a type of polymer that is thermoplastic, meaning that it can be melted to a liquid and remolded as it returns to a solid state. It is chemically synthesized from ethylene, a compound that's usually made from petroleum or natural gas. Other non-official names for this compound include polythene or polyethylyne; and it is also abbreviated as PE. It is used in making other plastic compounds much often than it's used in its pure form. Though it has a wide variety of uses, it can be harmful to humans and to the environment.

Members of the polyethylene group are heavily used in consumer products, and over 60 million tons of these materials are produced worldwide every year. For instance, high density polyethylene (HDPE) is used for products such as milk jugs, detergent bottles, margarine tubs, garbage containers, and water pipes. Ultra high molecular weight polyethylene (UHMWPE) is used in can- and bottle-handling machine parts, bearings, gears, joints, and butchers' chopping boards, and may even be found in bulletproof vests. Low density polyethylene (LDPE) is used for the production of rigid containers and plastic film.

Polyethylene

Description :

Physical properties

Polyethylene is a thermoplastic polymer consisting of long hydrocarbon chains. Depending on the crystallinity and molecular weight, a melting point and glass transition may or may not be observable. The temperature at

which these occur varies strongly with the type of polyethylene. For common commercial grades of medium- and high-density polyethylene the melting point is typically in the range 120 to 130 °C (248 to 266 °F). The melting point for average, commercial, low-density polyethylene is typically 105 to 115 °C (221 to 239 °F).

Chemical properties

Most LDPE, MDPE and HDPE grades have excellent chemical resistance, meaning that it is not attacked by strong acids or strong bases. It is also resistant to gentle oxidants and reducing agents. Polyethylene burns slowly with a blue flame having a yellow tip and gives off an odour of paraffin. The material continues burning on removal of the flame source and produces a drip. Crystalline samples do not dissolve at room temperature. Polyethylene (other than cross-linked polyethylene) usually can be dissolved at elevated temperatures in aromatic hydrocarbons such as toluene or xylene, or in chlorinated solvents such as trichloroethane or trichlorobenzene.

Process

Monomer

Ethylene (ethene).

The ingredient or monomer is ethylene (IUPAC name ethene), a gaseous hydrocarbon with the formula C_2H_4 , which can be viewed as a pair of methylene groups ($=CH_2$) connected to each other. Because the catalysts are highly reactive, the ethylene must be of high purity.