

POLYMERS

Polymers. They are high molecular mass compounds made up of a large number of simple repeating units known as monomers.

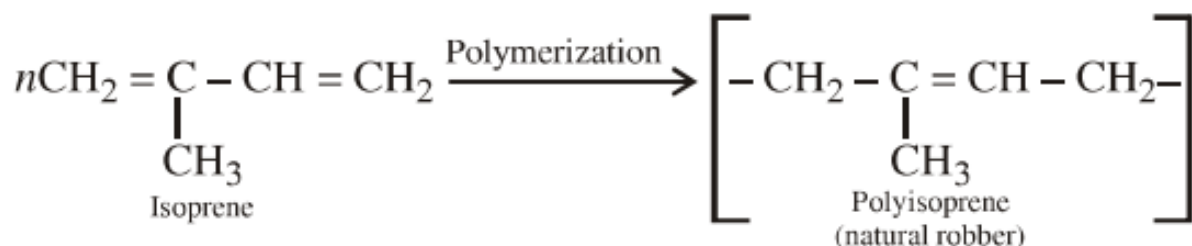
Polymers synthesized from one type of monomers are known as **homopolymers** such as polythene, which has one type of monomer ethylene.

Polymers synthesized from two or more types of monomers are known as **co-polymers** such as terylene, which has two types of monomers, ethylene glycol and terephthalic acid.

Classification of Polymers Based on Source

- (a) **Natural polymers:** The polymers that are found in nature are known as natural polymers. Starch is a polymers of glucose,

protein is a polymer of α -amino acids and natural rubber is a polymer of 2-methyl-1,3-butadiene (isoprene).



(b) Synthetic polymers: The polymers prepared in the laboratories are known as synthetic polymers. Such as polyethylene, polystyrene, bakelite, nylon etc.

Some Important Facts

- I. All polymers are macromolecules but all macromolecules are not polymers.
- II. The addition polymers have the same empirical formula as their monomers.
- III. Carbohydrates and proteins are biopolymers.
- IV. Metaphosphoric acid $(\text{HPO}_3)_n$, silicates and silicones are some inorganic polymers.
- V. Natural rubber is obtained from white milky juice called latex of rubber trees.
- VI. Thiokol rubber is made by polymerization of ethylene dichloride and sodium polysulphide.

Some important polymers and their monomers

Polymers	Monomers	Structural formula
Addition polymers		
I. Polyethylene or Polythene	Ethene	$(-\text{CH}_2-\text{CH}_2-)_n$
II. Polystyrene	Styrene	$\left[\begin{array}{c} -\text{CH}-\text{CH}_2- \\ \\ \text{C}_6\text{H}_5 \end{array} \right]_n$
III. Polypropylene or polypropene	Propylene	$(-\text{CH}-\text{CH}_2-)_n$ $\quad \quad \quad $ $\quad \quad \quad \text{CH}_3$
IV. Buna-S	1, 3- butadiene and styrene	$(-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}-\text{CH}_2-)_n$ $\quad \quad \quad \quad \quad \quad $ $\quad \quad \quad \quad \quad \quad \text{C}_6\text{H}_5$
V. Neoprene	Chloroprene	$(-\text{CH}_2-\text{C}=\text{CH}-\text{CH}_2-)_n$ $\quad \quad \quad $ $\quad \quad \quad \text{Cl}$
VI. Polyacrylonitrile (PAN) or Orlon	Vinyl cyanide	$(-\text{CH}_2-\text{CH}-)_n$ $\quad \quad \quad $ $\quad \quad \quad \text{CN}$