

UNIT –IV-High Polymers

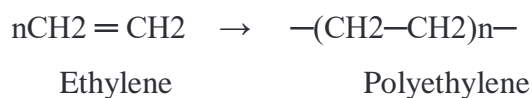
Polymers

- Polymers are materials of very high molecular weight that have many applications in the modern society.
- Polymers are obtained through the combination of small molecules called monomers (reactive functional groups or a double (or triple) bond

For example, polyethylene is formed from the monomer ethylene.

Degree of polymerisation

- The number of repeating units present in a polymer is called degree of polymerisation



High Polymers

Here n is the degree of polymerization. When the value of n is very large, that is, in the range of hundreds or thousands, the polymers are called High Polymers.

Classification of polymers:

1. Natural and synthetic polymers - Based on origin
2. Thermopolymers and thermosetting polymers - Based on behaviour of heating
3. Addition and Condensation polymers – Based on method of preparation.

Plastics are categorized on the basis of their use as commodity and engineering plastics.

Commodity plastics

- lower mechanical strength
- function under less severe environmental conditions

- a wide range of uses such as packaging, household products, magnetic tapes etc,

Engineering plastics

- Better mechanical, thermal and physical properties such as heat, impact and abrasion resistance.
- They are flame retardants and chemically inert.
- They are expensive and are used in applications as a replacement for traditional engineering materials such as metals and alloys

USES

- Automobile and aircraft parts
- gears, pulleys, electric iron, frying pans and shock absorbers
- pipes for underground installations
- telephone parts, switches, plugs, holders, spare parts in industries etc

Thermoplastic Vs Thermosetting Plastic

S.No	Thermoplastics	Thermosetting plastics
1	Thermoplastics are usually formed by the addition of polymerization.	Thermosetting plastics are often formed by condensation polymerization.
2	It contains long-chain linear polymers and is held together by weak Van der Waal forces.	it contains a 3D network structure constructed with strong covalent bonds.
3	Usually becomes soften on heating and stiffen on cooling.	It does not become soft on heating.
4	They are expensive.	They are cheap.
5	Thermoplastic is soluble in organic solvents.	Thermosetting plastics are insoluble in organic solvents.
6	They are usually soft, weak, and less brittle in nature.	They are usually hard, strong, and more brittle in nature.
7	Recyclable	Not Recyclable
8	Can be remolded.	They can't be remolded.
9	An example of thermoplastic is polythene.	An example of Thermosetting plastic is Bakelite.

