

## What is plastics ?

Synthetic organic materials are called Polymers. – (plastics, rubber, ceramics and glass)

Poly + mers - Polymers - Poly = many - mers = parts - Many parts means polymers. ----- If single (part) unit then it is called monomers

Polymers - made up of thousands and thousands of monomers arranged in a chain or network of repetition of molecules.

Plastics are a kind of polymers. Organic polymer moulded to needed shape by application of pressure or heat or BOTH

Resin - liquid of plastic having carbon as central element - This is raw material for making plastics.

Different process are used to make resin . It is known as polymerization process.

Catalyst, binders, dyes and lubricant are added to Resin to form plastic.

## **What is Polymerization?**

Linking of monomers of large number are known Polymerization Process

1. Addition Polymerisation
2. Condensation Polymerisation

### Addition polymerisation

Similar monomers of large number added by chemical reaction

Vander wall's force gives energy - in the form of pressure and heat - to form bonding of long chain of molecules - of monomers.

Co polymerisation is the addition of two or more different types of monomers.

### Condensation polymerisation

Two or more unlike monomers linked - and repetitive elimination of small molecules – to produce by-products ammonia and water.

Formation of by-product is known as condensation. - Condensation requires High pressure for more than hour or even days together.

## **What are the Types of Plastics ?**

Types of Plastic 1 . Thermo setting Plastics 2. Thermo plastics

Thermosetting - hardened by heat – it is non reversible chemical change called thermosetting.

Thermosetting Plastics - Plastic donot soften on reheating and cannot be reworked- made by condensation polymerisation. Thermosetting plastic – molecules have three dimensional network – strong binding force –

Raw material (RESIN)– liquid or solid - polymerized when moulded – takes more time to formation.

Raw materials - 1. Phenol formaldehyde 2. Polyester resin 3. Melamines 4. Phenol furfural 5. Epoxy resins 6. Silicones 7. Urea formaldehyde 8. Alkyds 9. Polyurethanes

Thermo plastics - Long and Large size molecules arranged side by side as chain – No cross link molecular structure in this formation. - Many have crystalline structure some will have amorphous structure in nature.

Thermo plastics Formed by addition polymerization process - when heated become very soft – rehardens on cooling. During heating linear bonding of molecules breaks up – separated – relinks on cooling and retains its hardness.