

(b) *Bulk Polymerization* : Bulk polymerization is the simplest method of polymerisation. Both addition and condensation polymerisations can be carried out in a bulk polymerization reactor. The monomer is taken in the liquid state and the initiator is dissolved in the monomer itself. Polymerisation is then carried out in pre-and post polymerisation stages for controlling the heat of polymerisation. Till about 10% conversion, reaction is quite slow subsequently it becomes fast. When it gets polymerised to 25-30%, the reaction mixture becomes viscous. In the second stage (post-polymerisation stage), the viscous mixture is transferred to the main reactor maintained at constant temperature. After a known period of time, the contents are poured into methanol when the polymer gets precipitated out.

*Monomers* which can be polymerised by this method are :  
styrene, vinyl chloride, methyl methacrylate etc.

*Pros* : Polymers obtained by this method have low impurity levels and they have good clarity and good electrical insulation characteristic.

*Cons* : Polymers have low thermal conductivity and the polymerisation reactions are exothermic so there is danger of overheating of the reactants. At later stages, Autoacceleration can lead to explosive reactions. Hence, thermal control is difficult.

(b) *Suspension polymerisation* : In this method, the monomer is dispersed as large droplets (0.1 – 1 mm in size) in water and kept in suspension by mechanical agitation. Stabilizers like gelatin and water soluble cellulose derivatives are used. The initiators are soluble in monomer and polymerization continues in each droplet till 100% conversion and the polymer is obtained as pearls or spherical beads.

*Monomers* which can be polymerised by this method are :

styrene, vinyl chloride, methyl methacrylate etc.

*Pros* : The purity of polymer is high compared to that synthesized by emulsion polymerisation. Viscosity is low throughout and temperature can be easily controlled.

*Cons* : Polymerisation reaction is highly sensitive to agitation and it is difficult to control size of the particles and their surface characteristics.