→ Cross linked polymers are insoluble and infusible depending on nature and frequency of cross-links, such polymers may show different orders of swelling in solvent.

Eg: PF Resin, epoxy resins, vulcanised rubber etc.

Q→ Why branch polymer is soluble but linear polymer is not soluble.

Ans ⇒ Branched polymers are readily soluble & fusible than linear polymers of comparable chain length or m.wt

(5) ON THE BASIS OF APPLICATION and physical properties.

① Rubber ⇒ These polymers are characterized by long-chain elasticity. They are rather weak, dimensionally unstable and undergo high elongation even on application of low stress. They exhibit tensile strengths in the range 300-3000 Psi.

Exa: Natural Rubber, and synthetic rubbers.

→ They are also known as elastomers. The cross linking of rubber is commonly known as vulcanization.

② Plastics: These are polymers which can be shaped into hard and tough utility articles by the application of heat & pressure.

These are usually much stronger than rubber. ~~Some of them are hard, horny rigid, stiff~~ Plastics exhibits tensile strength ranging b/w 4,000 - 15,000 psi.

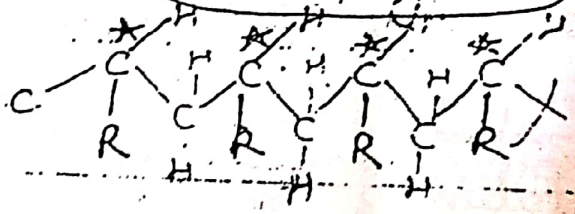
Exa: Polyethylene, polypropylene, polystyrene, PVC, PF & UF resins, polycarbonates.

(3) Fibre: They are strongest of the three diff. types of polymers.

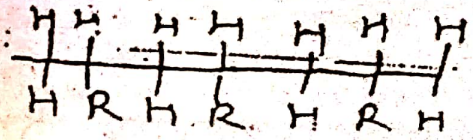
Exa: Rayon, Polyester, silk.

(6) ON THE BASIS OF TACTICITY ⇒

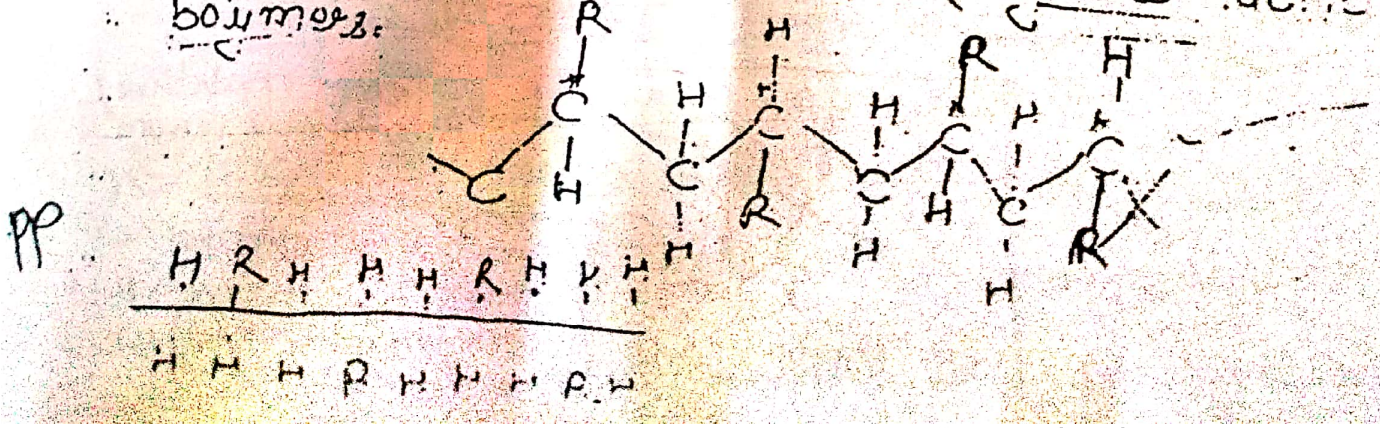
(i) Iso-tactic: Polymers where in all adjacent asymmetric carbon atoms over the chain length of the polymer chain have the same space configuration are known as Isotactic polymers.



Iso-tactic

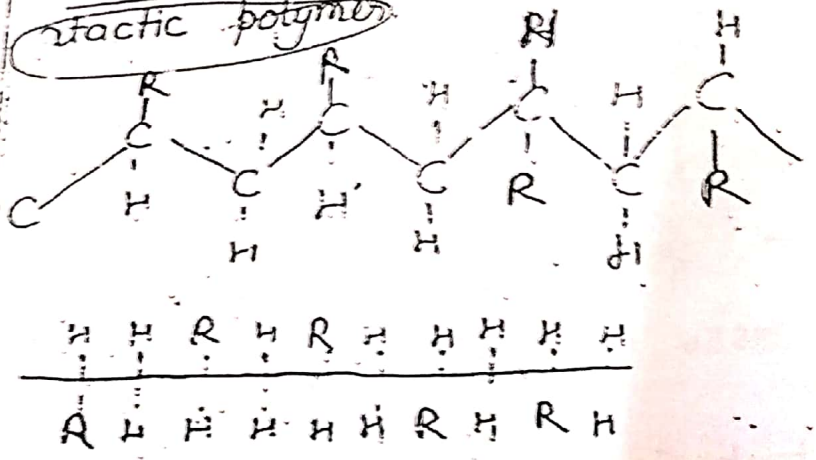


(ii) Syndio-tactic ⇒ Polymers in which chain is made up of units having opposite space configuration of each symmetric carbon atom are known as (Syndio-tactic polymers.



~~(ii) Syndiotactic~~ ⇒

(iii) Atactic polymer ⇒ Polymer in which gps are arranged randomly in space over the chain are known as atactic polymer



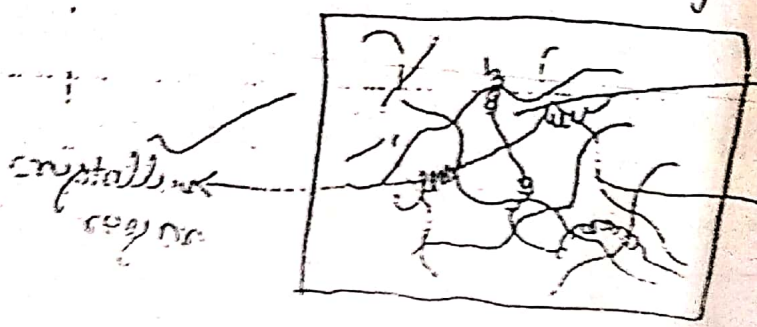
(7) ON THE BASIS OF CRYSTALLINITY ⇒

When polymers cooled from molten state they exhibit diff. tendency to crystallize at different rates depending on many factors.

(1) Crystalline ⇒ Polymer showing a high extent of crystallinity more than 60% are commonly known crystalline polymers

(2) Semi crystalline ⇒ those showing a significant but relatively lower degree of crystallinity are termed as (semicrystalline polymers.)

(3) Non crystalline ⇒ No crystal formation



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PAGE NO:
DATE:

2078 (2½) - Chemical

(8) ON THE BASIS OF composition ⇒ On this basis the polymers can be classified as-

(i) Homo-polymer ⇒ When a polymer is obtained from a single monomer unit it is called homopolymer e.g. polystyrene which is formed from monomer styrene.

→ Some other examples of homopolymers are polyethylene, polypropylene.

With some exceptions, polymers made in chain reactions often certain only carbon atoms in main chain (homo chain-polymers).

(ii) Co-polymers ⇒ When a polymer contains two and more monomer units in the chain then it is known as a copolymers

It is possible to designate copolymers as

(a) Random copolymers ⇒ when monomer units are arranged in an irregular manner, the co-polymer molecule is called Random co-polymer Exa: -A-B-B-A-B-A-B-A-A-B

(b) Alternate co-polymers ⇒ When monomer units in a copolymer molecule are arranged in the chain in regular manner, the molecule is called alternate - copolymer.

Exa: -A-B-A-B-A-B-A-B-A-

(c) Block-Copolymer ⇒ Linear copolymes in which the like monomeric units occur in relatively long sequences are called block co-polymers.

Eg: -A-A-A-A-B-B-B-B-A-A-A-A-B-B-B-B-

Block copolymers

Block copolymers may be produced by the following four tech.

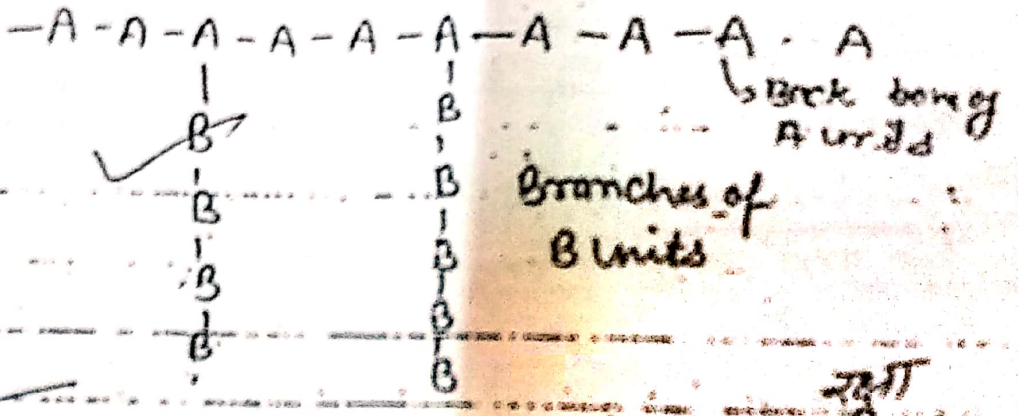
(a) Utilise reactive end groups

(b) Activate end gps

(c) fragment a chain to produce active end gps

(d) Transport reactive end gps into a diff. media

(e) Graft copolymers ⇒ These are branched copolymers in which the branches have diff. chemical st. to that of main chain.



graft

The importance of the block and graft co-polymers is that the resultant material tends to exhibit the properties of each homopolymer

They also have same unique property arising from the chemical linkage b/w the homopolymer sequence.

Eg: Pure polystyrene is quite brittle, whereas polymerisation of about 5% of Rubber produced material which is strong and tough

→ 90 part of vinyl chloride & 10 part of vinyl acetate, the random co-polymerisation