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Term - 2.

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CHEMIS

ASSIGNMENT - 2

Q.1 Account shortly on Biodegradable Polymer.

→ Biodegradable polymer are those polymers that get degraded into simpler molecules like CO_2, N_2, O_2, H_2O, etc by the action of microorganisms or enzymes.

→ They decompose through enzymatic hydrolysis and oxidation processes.

→ These reactions include hydrolysis and oxidation processes (either enzymatic or non enzymatic) leading to non-toxic smaller molecules which can be metabolised or excreted by animals easily.

→ They are developed with polymeric materials like starch, lactic acid cellulose and polymers

→ There is also need to alternative biodegradable water soluble polymers for down the drain products like detergents or cosmetics which have gained immense importance

Eg. PHBV - Poly β hydroxy butyrate - co β hydroxy valerate.
PGA - Poly glycolic acid.

Q.2. What is glass transition temperature? What are the factors affecting it?

→ When plastic or rubber is cooled up to a certain temperature, it becomes so hard and brittle that it breaks into bits and pieces on application of stress.

→ The Temperature below which plastic or polymer becomes hard brittle and glassy and above which it is soft and flexible is known as glass transition Temperature.

→ It is the property of only amorphous portions of a semi crystalline solid. The crystalline portions remains the same.

→ Factors affecting glass transition Temperature

1. Chain stiffness
2. Inter molecular Forces
3. Pendent groups
4. Cross linking
5. Plasticizers.

Q.3 Explain Bulk Polymerization Technique.

→ In mass or bulk polymerization, the reaction mixture consists mainly of monomers and in case of free radical or ionic polymerization, of vinyl monomers and a soluble initiator.

→ So polymerization is carried out in undiluted monomers. This kind of polymerization is frequently used for step-growth polymerization

→ Mass polymerization has several advantages over other polymerization techniques, as there is no solvent or diluent present, it provides polymers of high quality and higher molecular weight. It is also a very environmentally friendly method.

→ No purification is required, final product is a 100 % solid resin.

→ Bulk polymerization can proceed either homogenous or inhomogenous depending on ~~quality~~ solubility of growing polymer chains in the monomer

Eg. Heterogeneous bulk polymerization is vinyl chloride
Homogeneous bulk polymerization is methyl Methacrylate and styrene.

Q.4. What is green chemistry? Give its goals.

→ Green chemistry is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances. Green chemistry applies across the life cycle of a chemical product, including its design manufacture, use and ultimate disposal. It is also known as sustainable chemistry.

Goals:

1. Prevent pollution at molecular level.
2. Apply innovative scientific solutions to real world environmental problems.
3. Reduce negative impact of chemicals on human health
4. Eliminate hazardous products from the Environment
5. Design chemical products to reduce intrinsic hazards.