8th – Synthetic Fibres and Plastics II

Plastics: Material which can be easily moulded into any desired shape on heating is called a 'plastic'. Plastics are synthetic (man – made) polymers. Plastics form an important class of synthetic materials. In plastics, the arrangement of the individual units may be linear or cross-linked.

Raw material for plastics

Petroleum product such as ethane, propane, benzene, toluene etc. are the raw materials for the plastics. These materials are either directly polymerized or first converted into suitable monomers chemically and then polymerized to form plastics.

Kinds of Plastics

1. Thermosetting plastics
2. Thermoplastics

Cross- linked polymers have side chains or cross-links, which connect different polymer chains. These can be of two types: thermoplastics and thermosetting plastics.

Thermoplastics	Thermosetting plastics
Thermoplastics are long chain polymers with no cross linking. Heating also does not produce any cross linking between the chains.	Thermosetting plastics are the polymers in which chains get highly cross lined on heating.
Thermoplastics can be melted by heating and thereafter moulded into desired Shapes. This is a reversible process.	Unlike thermoplastics, thermosetting plastics cannot be remoulded after reheating.
PVC (Polyvinyl chloride) and LDPE (low-density polyethylene) are examples of thermoplastics.	Melamine and Bakelite are example of thermosetting plastics.

Uses of different types of Plastics

Plastic	Uses
PET(Polyethylene terephthalate)	Making containers for microwave cooking, bottles of carbonated beverages, and other food containers.
HDPE(High-density polyethylene)	Making containers for strong and corrosive household and industrial chemicals like bleaches and acids.
LDPE(Low-density polyethylene)	Making poly bags, grocery bags, and packaging of foods and bread.
PVC(polyvinyl chloride)	Making pipes for sanitary fittings like water pipes
PP(polypropylene)	Making ketchup bottles, yogurt containers, medicine bottles, and automobile battery casings.
PS(polystyrene)	Thermocol, a form of PS, is used for making disposable cups and packaging material for fragile items like computers and televisions.
Bakelite	It is harder than other plastics used for making buttons, plugs, switches and other electrical things.

Properties of Plastics

Although different types of plastics differ in some physical and chemical properties, the following properties are common to most of them.

1. **Thermal conductivity:** 'Thermal' means 'relating to or associated with heat'. Plastics are poor conductors of heat, which make them suitable for

1) Making handles of cooking vessels.
2) Use in refrigerators as foam core
3) Making containers used in microwave ovens.

2. **Electrical conductivity:** Plastics are poor conductors of electricity. They are used as covering materials in electrical appliances, cords, electrical outlets, and wiring.
3. **Solubility in water:** Plastics are insoluble in water and it is used for making bottles, buckets, and other containers used for storing water.
4. **Effect of flame:** Most plastics are inflammable, they catch fire easily.
5. **Chemical Reactivity:** Plastics are not affected by acids and alkalies. They do not corrode or rust. It is used in homes and laboratories for storing chemicals like acids and bleaches.
6. **Toughness of Tensile Strength:** Plastics have much less toughness as compared to metals & Alloys like steel
7. **Light Weight**: Plastics are much lighter in weight as compared to wood, metals etc.
8. **Appearance**: Plastics can e coloured in any colour and given any shape, therefore they are used for making large variety of household products.

Plastics and the Environment:

Plastics can cause various health hazards. This is because plastics are non-biodegradable. That is they cannot be decomposed by microorganisms.

Reducing the usage of plastics and recycling plastic object are two ways of countering the harmful effects associated with plastic disposal.

To aid recycling of plastic garbage, two types of bins are made available by municipality:

a. Green bin: that accommodates biodegradable wastes.
b. Blue bin: that accommodates waste like plastic and glass.

Few things that can be done to limit the harmful effects associated with plastics:

1. Do not accept plastic bags when you go for shopping.
2. Keep plastic bag clean and dry for recycling.
3. Do not throw plastic waste at roadside or in water bodies.
4. Use separate garbage bins at your home for biodegradable and non-biodegradable wastes.
5. Reproduce percolation of water into the soil.

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