

Chapter- 3 Synthetic Fibres and Plastics

Synthetic fibres

Plastics

Characteristics of Plastics

Plastics and the Environment

Synthetic fibres

Synthesis means to make and synthetic means man-made, therefore man-made fibres are called synthetic fibres. A synthetic fibre is also a chain of small units joined together. Each small unit is actually a chemical substance. Many such small units combine to form a large single unit called a **polymer**.

Types of Synthetic Fibres

Rayon

- Rayon is an artificial or synthetic fibre having properties similar to that of silk. Such a fibre was obtained by chemical treatment of wood pulp.
- This fibre was called rayon or **artificial silk**. Although rayon is obtained from a natural source, wood pulp, yet it is a man-made fibre.
- It is cheaper than silk and can be woven like silk fibres. It can also be dyed in a wide variety of colours. Rayon is mixed with cotton to make bed sheets or mixed with wool to make carpets.



Rayon

Nylon

- **Nylon** is another man-made fibre made without using any natural raw material (from plant or animal).
- It was prepared from coal, water and air. It was the first fully synthetic fibre.
- Nylon fibre was strong, elastic and light. It was lustrous and easy to wash.
- We use many articles made from nylon, such as socks, ropes, tents, toothbrushes, car seat belts, sleeping bags, curtains etc.
- Nylon is also used for making parachutes and ropes for rock climbing. A nylon thread is actually stronger than a steel wire.



Nylon fibres used in ropes

Polyester and Acrylic

- Polyester is a synthetic fibre. The fabric made from this fibre does not get wrinkled easily. It remains crisp and is easy to wash.
- Terylene is popular polyester. It can be drawn into very fine fibres that can be woven like any other yarn.
- PET or polyethylene terephthalate is a very familiar form of polyester. It is used for making bottles, utensils, films, wires and many other useful products.
- We wear sweaters and use shawls or blankets in the winter. Many of these are actually not made from natural wool, though they appear to resemble wool.
- These are prepared from another type of synthetic fibre called acrylic.

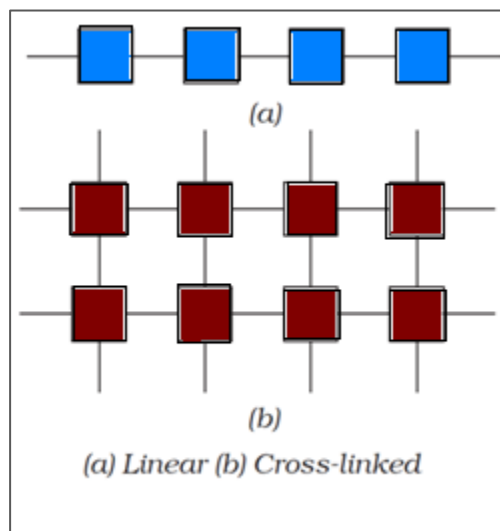


Acrylic fibre

- The wool obtained from natural sources is quite expensive, whereas clothes made from acrylic are relatively cheap.
- They are available in a variety of colours. Synthetic fibres are more durable and affordable which makes them more popular than natural fibres.

Characteristics of synthetic fibres

- They are non- reactive
- They dry up easily
- They are durable
- They are less expensive and readily available



Plastics

Plastic is also a polymer like the synthetic fibre. All plastics do not have the same type of arrangement of units. In some it is linear, whereas in others it is cross linked. Plastic articles are available in all possible shapes and sizes. The fact is that plastic is easily moldable i.e. can be shaped in any form. Plastic can be recycled, reused, coloured, melted, rolled into sheets or made into wires.

Polymer

Thermoplastics

Some plastic articles can bend easily while some break when forced to bend. When we add hot water to a plastic bottle, it gets deformed. Such plastic which gets deformed easily on heating and can be bent easily are known as **thermoplastics**. Polythene and PVC are some of the examples of thermoplastics. These are used for manufacturing toys, combs and various types of containers.



Thermosetting plastics



Thermosetting plastics

On the other hand, there are some plastics which when molded once, cannot be softened by heating. These are called **thermosetting** plastics. Two examples are bakelite and melamine. Bakelite is a poor conductor of heat and electricity. It is used for making electrical switches, handles of various utensils, etc. Melamine is a versatile material. It resists fire and can tolerate heat better than other plastics. It is used for making floor tiles, kitchenware and fabrics which resist fire.

Characteristics of Plastics

Plastic is non-reactive

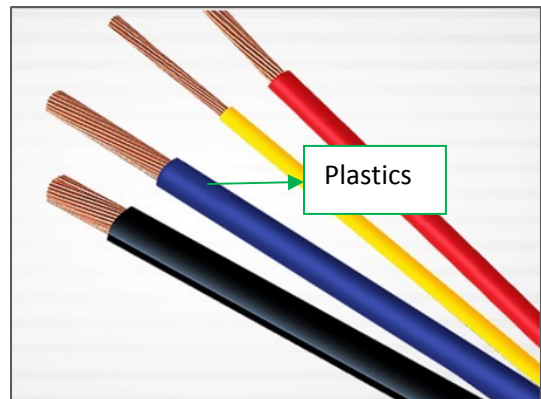
We know that metals like iron get rusted when left exposed to moisture and air. But plastics do not react with water and air. They are not corroded easily. That is why they are used to store various kinds of material, including many chemicals.

Plastic is light, strong and durable

Since plastic is very light, strong, and durable it can be molded into different shapes and sizes, it is used for various purposes. Plastics are generally cheaper than metals. They are widely used in industry and for household articles.

Plastics are poor conductors

Plastics are poor conductors of heat and electricity. That is why electrical wires have plastic covering, and handles of screw drivers are made of plastic.



Plastics and the Environment

- A material which gets decomposed through natural processes, such as action by bacteria, is called **biodegradable**. A material which is not easily decomposed by natural processes is termed as **non-biodegradable**.
- Since plastic takes several years to decompose, it is not environment friendly. It causes environmental pollution.
- Besides, the burning process in the synthetic material is quite slow and it does not get completely burnt easily. In the process it releases lots of poisonous fumes into the atmosphere causing air pollution. The 4 R principles should be followed that is **Reduce, Reuse, Recycle and Recover**.