

Synthetic Fibers and Plastics

Introduction

- The clothes which we wear are made of fabrics.
- Fabrics are made of fibres obtained from natural or artificial sources.
- The fibres obtained from plants and animals are called natural fibres. Cotton, jute, wool and silk are natural fibres.
- The synthetic fibres are made by human beings. Rayon, nylon, polyester are synthetic fibres.

Synthetic Fibres

- A synthetic fibre is a long chain of small units joined together, and each small unit is actually a chemical substance.
- A **polymer** is a very big molecule formed by the combination of a large number of small molecules.
- The word polymer comes from two Greek words *poly* meaning many and *mer* meaning units.
- The small molecules which join to form a polymer are called **monomers**.

Types of Synthetic Fibres

Rayon

- Rayon is often regarded as artificial silk.
- It is a man-made fibre prepared from a natural raw material called cellulose by chemical treatment.
- The cellulose required for making rayon is obtained from wood pulp.
- So, rayon is obtained by the chemical treatment of wood pulp.
- Uses:
 - In the textile industry for making sarees and dresses
 - To make carpets
 - In the medical field for making bandages and surgical dressings
 - In making bedsheets, curtains and blankets

Nylon

- Nylon is the first fully synthetic fibre made by man without using any natural rawmaterials.
 - Properties:
 - It is very strong, elastic, lightweight and lustrous.
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- They absorb very little water, so clothes made of nylon are easy to wash and dry.
- It is wrinkle resistant.
- Uses:
 - In making socks, tents, toothbrushes, car seat belts and curtains
 - For making parachute
 - In making ropes for rock climbing

Polyester

- Polyester is a synthetic fibre.
- Polyester (poly + ester) is made of repeating units of a chemical called an ester.
- Terylene is a popular polyester fibre.
- Polyester fabric is strong and wrinkle resistant.
- It is easy to wash and dry.
- Natural fibres (like cotton and wool) are also mixed with polyester to make blended fabrics like polycot or polywool. As the name suggests, these fabrics are made by blending two types of fibres.
Example: Polycot is a mixture of polyester and cotton. Similarly, polywool is a mixture of polyester and wool.
- Uses:
 - In making fabrics for sarees, dress materials and curtains
 - For making PET bottles, utensils, films, wires and other useful PET products

Acrylic

- Because of its wool-like feel, acrylic fibre is often used as a substitute for wool.
- Properties:
 - It is lightweight, soft and warm with a wool-like feel.
 - It retains its shape and resists shrinkage and wrinkles.
 - It is strong and durable.
- Uses:
 - It is used for making sweaters, shawls, blankets, jackets, sportswear, socks, furnishing fabrics and carpets.

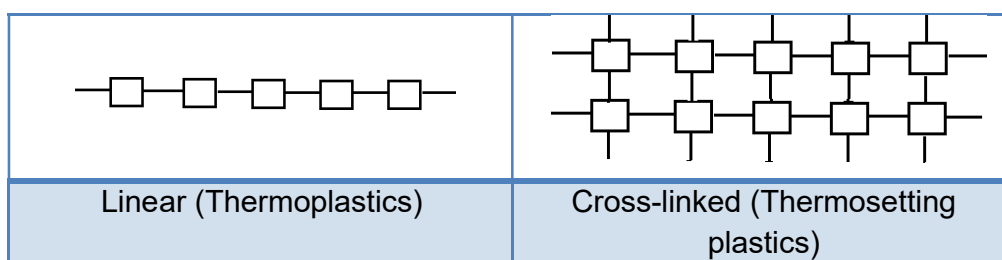
Characteristics of Synthetic Fibres

- Synthetic fibres are very strong and more durable.
 - They absorb very little water and dry up quickly.
 - They are wrinkle resistant and quite lightweight.
 - They are less expensive and readily available.
 - Clothes made of synthetic fibres are easy to maintain.
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Plastics

- Plastics are also polymers.
- It is a synthetic material which can be moulded into desired shape when soft and then hardened to produce a durable article.
- Plastics also consist of very long molecules made by joining many small molecules.
- Polythene (poly + ethene = polyethene) is an example of a plastic. It is obtained by polymerisation of a chemical compound known as ethene.
- Plastic does not have the same type of arrangement. Sometimes, it is linear, whereas in others, it is cross-linked.



- Plastics are of two types:
 - Thermoplastics**
 - A plastic which can be softened repeatedly by heating and can be moulded into different shapes again and again is called a thermoplastic.
 - Polythene and PVC are examples of thermoplastics.
 - Uses: In manufacturing toys, combs, various types of containers
 - Thermosetting plastics**
 - A plastic which when set does not become soft on heating again and cannot be moulded a second time is called a thermosetting plastic.
 - Bakelite and melamine are examples of thermosetting plastics.
 - Bakelite is a poor conductor of heat and electricity. So, it is used for making electrical switches and handles of various utensils.

Properties of Plastics

- Plastics are chemically unreactive. They do not react with air and water. As a result, plastics are resistant to corrosion.
- As they can be easily moulded, they are used to make a large variety of articles with different shapes and sizes.
- Plastics do not conduct heat and electricity. So, they are used as electrical insulators.



- Because they have low density, they are lighter than metals. They also have good strength and are durable. Being lighter than metals, plastics are also used in cars, aircraft and spacecraft.
- Plastics are generally cheaper and can be made more easily than metals. So, they are widely used for making many household and industrial articles.

Plastics and Environment

- Articles made of plastics are non-biodegradable. This causes a great problem in the disposal of plastic wastes.
- The burning of plastic wastes gives out harmful gases in the atmosphere, causing air pollution.

How to Save the Environment?

- Avoid the use of plastics as far as possible and use bags made of cotton or jute.
- Biodegradable and non-biodegradable wastes should be collected and disposed separately.
- Most of the thermoplastic wastes can be recycled.
- As a responsible citizen, remember the 4R principle—Reduce, Reuse, Recycle and Recover.

