

SYNTHETIC FIBRES



CONTENTS

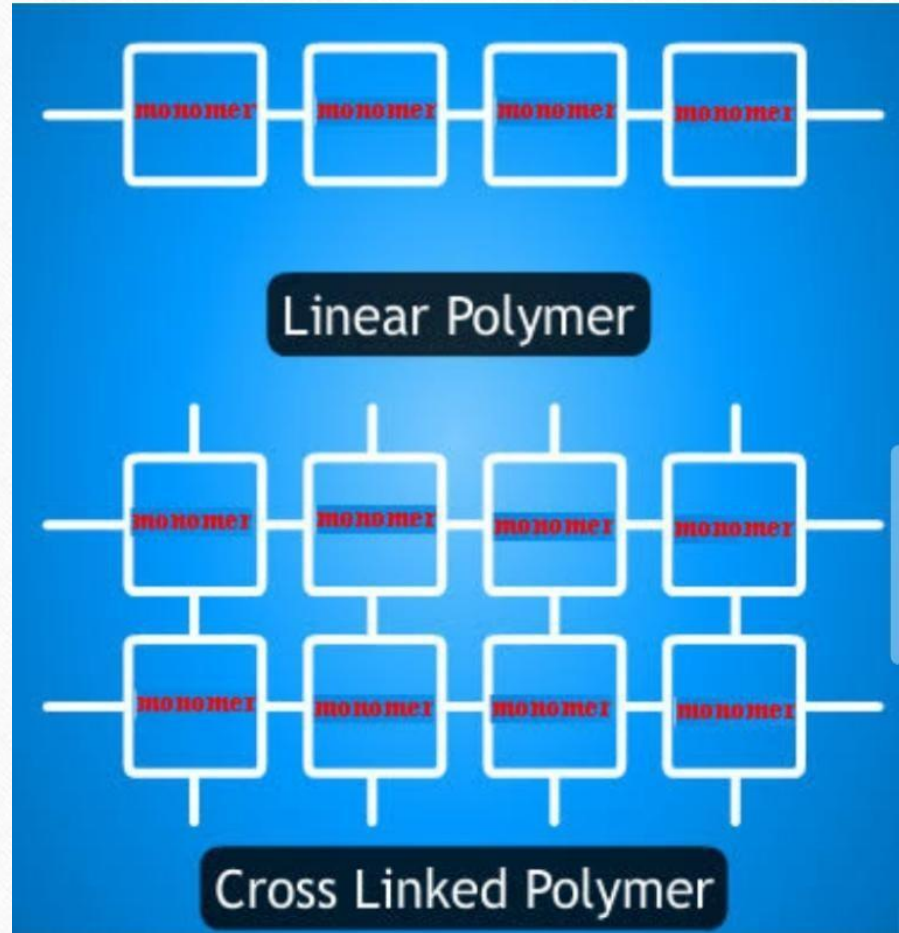
- **Fibres**
- **Polymers**
- **Natural Fibres**
- **Synthetic Fibres**
- **Types of Synthetic Fibres**
- **Advantages and Disadvantages of Synthetic Fibres**

FIBRES

- Long strands of molecules interwoven to form a linear, string-like structure are known as fibres.
- Fibres can be natural as well as synthetic depending on the source of the raw material.
- Fibres are made up of molecules called polymers.

POLYMERS

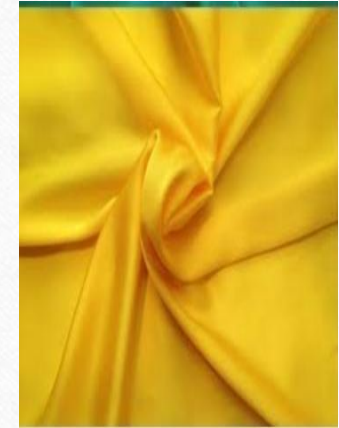
- **Polymers are huge molecules- usually consisting of long chains made from thousands of similar molecules called monomer.**
- **The structure of a monomer can be compared to that of a beaded necklace- with the beads being the monomers.**
- **The process by which monomer units are linked together to form polymers is called polymerization.**
- **Polymers can be linear or cross-linked in structure.**



NATURAL FIBRES

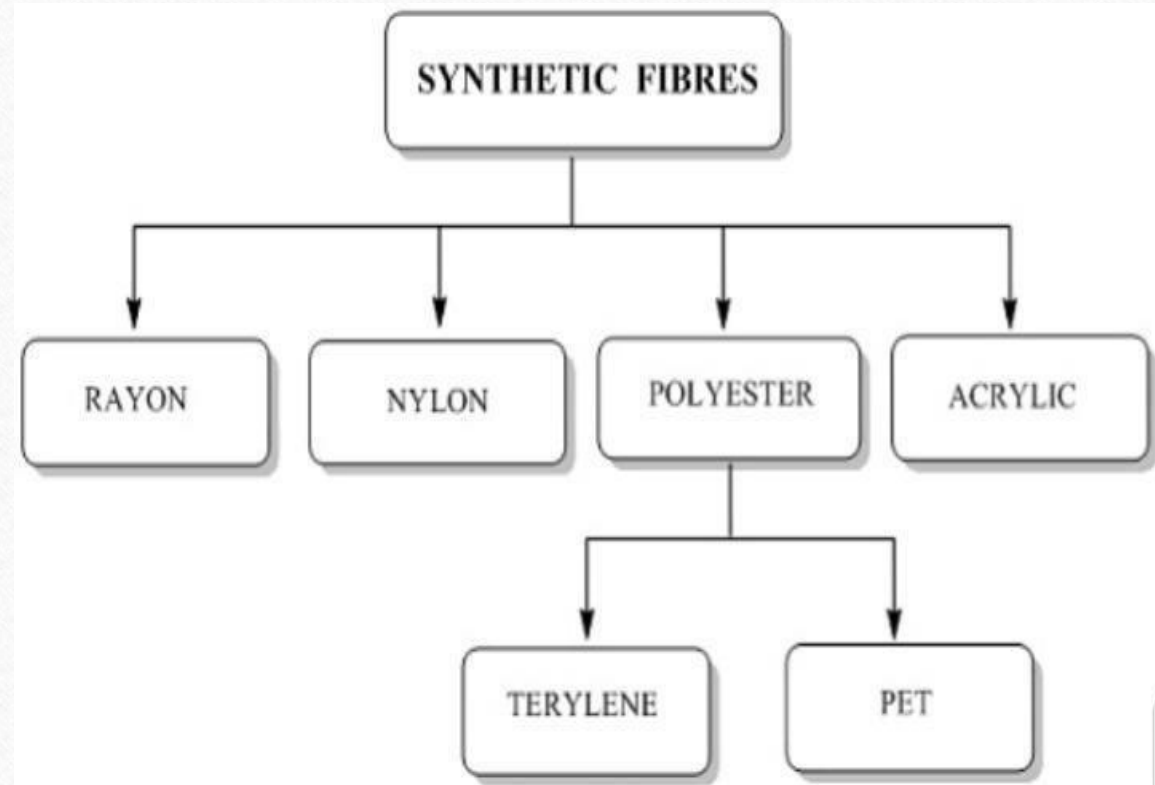


- These are natural polymers obtained from plants and animals.
- Wool is obtained from sheep.
- Cotton is obtained from cotton plant.
- Silk is obtained from silkworm.



SYNTHETIC FIBRES

- These are artificial or man-made polymers obtained from petroleum.
- Synthetic fibres when mixed with natural fibres are called blended or mixed fibres. For example- Terywool (mixture of terylene and wool)



RAYON (ARTIFICIAL SILK)

Introduction

- It is made from cellulose.
- It is called as regenerated fibre because cellulose is first broken down and then reformed.
- It is known as artificial silk because of its beautiful silk like texture.

Properties

- Strong
- Easy to dye in variety of colours
- Absorbs sweat and so rayon clothes are comfortable to wear in summers.

Uses

- It is used to make apparel such as suits, ties, blouses, jackets etc.
- Home furnishings such as bedspreads, bedsheets, blankets, carpets etc.



NYLON

Introduction

- It is the first synthetic fibre to be made entirely of chemicals.
- Its name is derived from the cities of **New York** and **London**, where it was first marketed.

Properties

- Very strong (stronger than steel wire)
- Elastic and Light
- Wrinkle and Wear resistant
- Easy to wash
- Absorbs very little water
- Lustrous in appearance

USES

- It is used to make garments such as sarees and shirts.
- Being very strong, nylon fibre is used to make ropes, tents, parachutes, etc.
- It has good elasticity and so is used to make socks and stockings.
- It is also used to make zip fasteners, toothbrushes etc.



Polyester

Introduction

- It is made by repeating units of a chemical called an ester.
- It is often mixed with natural fibres to make clothes.
- With cotton it makes Polycot and with wool it makes Polywool.

Properties

- Very strong
- Elastic
- Light
- Crease-resistant
- Water-resistant

Uses

- It is used to make clothes such as trousers, shirts, suits and home furnishings.
- Being water resistant it is used to make jackets and garments used in wet or damp environments.
- PET is a form of polyester used to make bottles, films, utensils, wires, etc.



ACRYLIC

Introduction

- It is a type of synthetic fibre that resembles wool in its properties.
- Clothes made from acrylic are cheaper than wool.

Properties

- Lightweight
- Soft and Warm
- Wrinkle-resistant
- Resists shrinkage
- Can be dyed in various colours

Uses

It is used to make sweaters, tracksuits etc. as it is soft and warm like wool.



ADVANTAGES AND DISADVANTAGES OF SYNTHETIC FIBRES

Advantages

- Strong
- Crease-resistant
- Elastic
- Moth proof
- Easy to wash
- Last for along time

Disadvantages

- Do not absorb sweat
- Stick to the body in hot and humid weather
- Get's charged easily and hence cause irritation to skin.
- Catches fire very rapidly
- Melt on heating and stick to the body and can cause severe burn injuries

Plastics

- Plastics are also synthetic polymers. The monomers in plastics are either linked in straight chains or are cross-linked to form the polymer. The starting materials for plastics are obtained from petroleum products called 'petrochemicals'. Some of the examples of plastics are : Polythene, Poly-Vinyl Chloride (PVC), Bakelite, Melamine and Teflon.

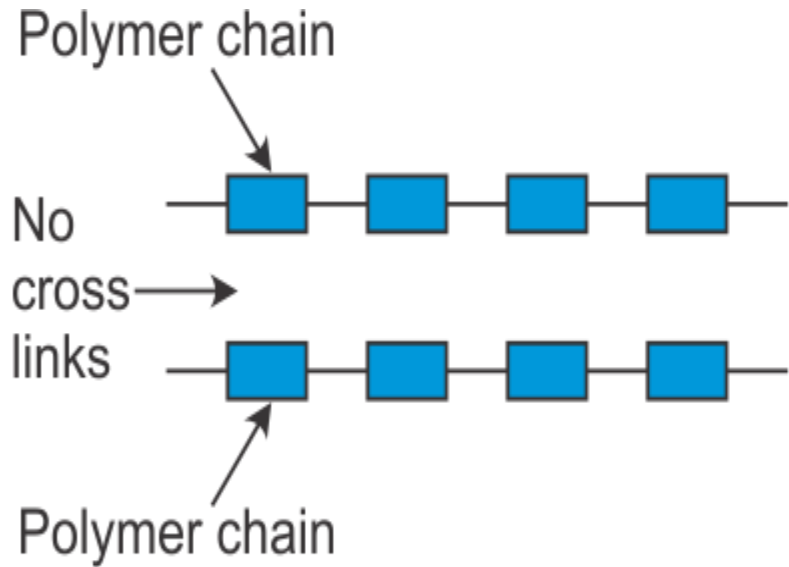
Types:- There are two types of plastics:

Thermoplastics

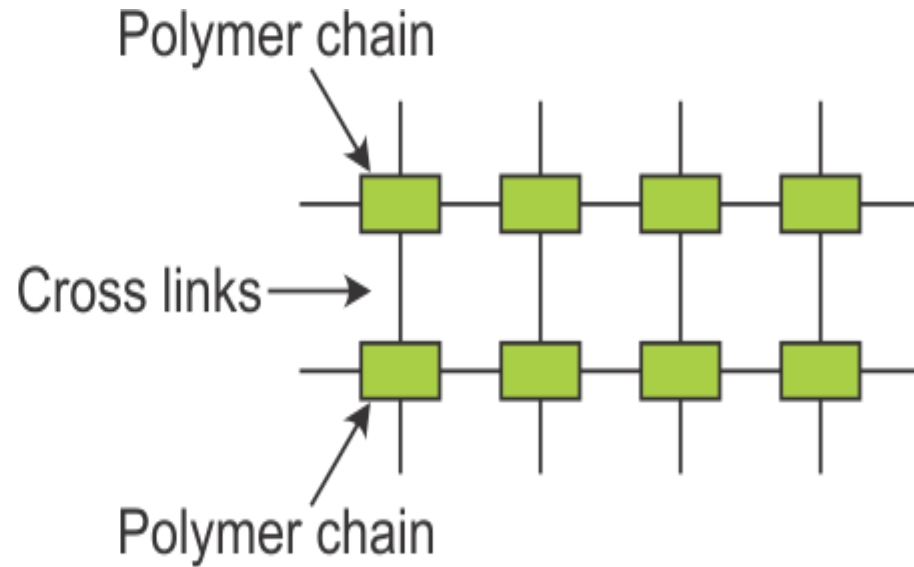


Thermosetting plastics.





(a) Polymer chains in thermoplastics (like polythene) are linear, having no cross-links



(b) Polymer chains in thermosetting plastics (like bakelite) have cross-links

Thermoplastics

□Plastics which gets deformed easily on heating and can be bent easily are known as thermoplastics.

Examples: PVC and polythene etc.

Uses

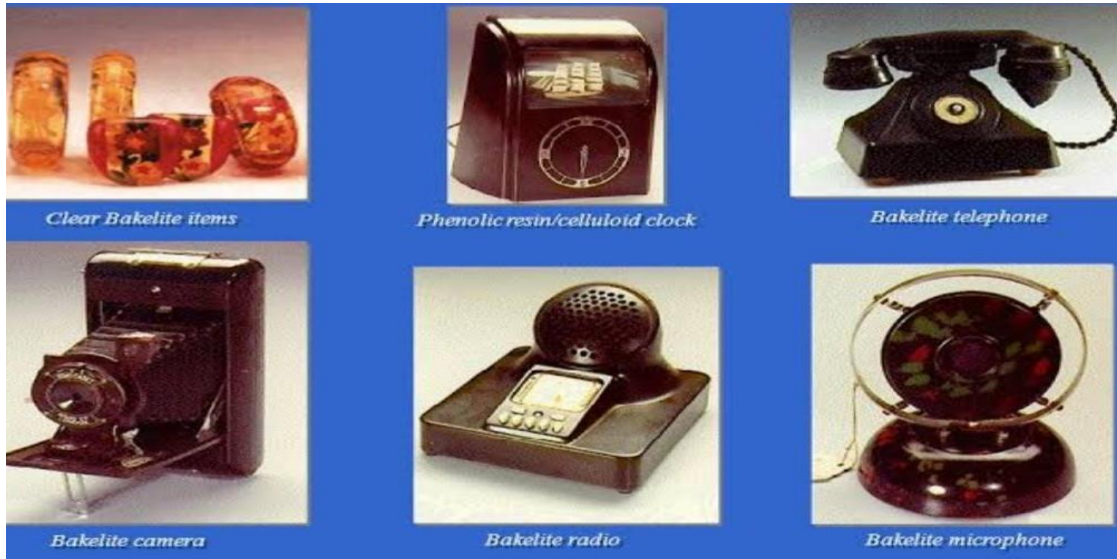


Thermosetting plastics

- Plastics which when moulded once, cannot be softened by re-heating are called thermosetting plastics.

Examples:-Bakelite and melamine.

Uses:-



Melamine dinner ware

Characteristic properties of plastics



Plastics show the following General Characteristics :-

1. Toughness or Tensile strength :

Plastics vary in their tensile strength from material to material. Plastics have much less toughness as compared to metals and alloys like steel.

2. Light Weight and strong :

Plastics are much lighter in weight as compared to woods, metals etc.

3. Chemically Unreactive:

Plastics are not affected by acids and alkalis. Natural polymers such as cotton, wool, etc are damaged by acids.

4. Plastic can be moulded into different shapes.

5. Plastics are quite cheap and easily made.

6. Appearance :

Transparent plastics material can be made look like glass. Plastic can be coloured in any colour and given any shape and are used for making large variety of household products.

7. Thermal Conductivity :

Plastics are the bad conductors of heat. For this reason, the handles of the cooking utensils are made of plastic material.

8. Electrical Conductivity :

Plastics do not conduct electricity . This property of plastic is used for making electrical appliances like switches, irons, touches, bulb- holders etc.

9. Solubility in water :

There is no effect of water on plastics. They are insoluble in water.

10. Effect of Flame :

The plastics melt on bringing closer to flame.

Plastics and the environment

- ❑ Plastics cannot be broken down or decomposed by bacteria or other organisms. Such substances are called **non-biodegradable** substances. They accumulate as junk.
- ❑ It causes environmental pollution.
- ❑ They cannot be disposed off by burning as they give out poisonous gases.

Plastic pollution



Adopt 4 Rs-Reduce, Reuse, Recycle and Recover.

- Do not throw plastic bags in the water bodies or on the road.
- Take a cotton carry bag or a jute bag while going for shopping.
- Try to minimize the use of plastic materials.

