

Revision Notes on Synthetic Fibres and Plastics

- Fabrics are made by weaving fibres (or threads) obtained from natural or artificial sources. They can be of two types

Natural fibres



- Natural fibres are produced by plants or animals.
- Examples: Cotton, Wool, Silk, etc.

Synthetic fibres



- Synthetic fibres or man-made fibres are textile fibres made by human beings using natural materials or petrochemicals.
- Examples: Rayon, Nylon, Polyester, etc.

What are Synthetic Fibres?

What is a synthetic fibre made up of?

A synthetic fibre, **as well as plastic**, is made up of a chain of small units (called **Monomers**) which combine to form polymers.

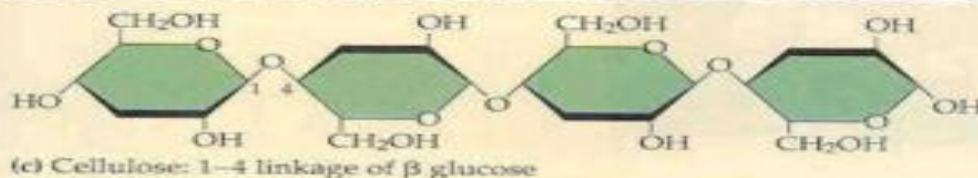
Monomers: A monomer is a single molecule that can bond with other identical molecules to form polymers through a process called **Polymerization**.

Polymers: Polymer is a Greek word in which 'poly' means 'many' and 'mer' means units. Hence, polymers are large molecule made up of several molecules (or monomers) linked together.

Example of Polymers:

- All synthetic fibres, such as Rayon and Nylon, are polymers.
- Polymers are also found in Nature. 'Cotton' is a polymer called '**Cellulose**'. 'Cellulose' is made up of a number of single units (or monomers) called '**Glucose**'.

Cotton fiber is mostly cellulose, and cellulose is made of chains of the sugar, glucose linked together a certain way.



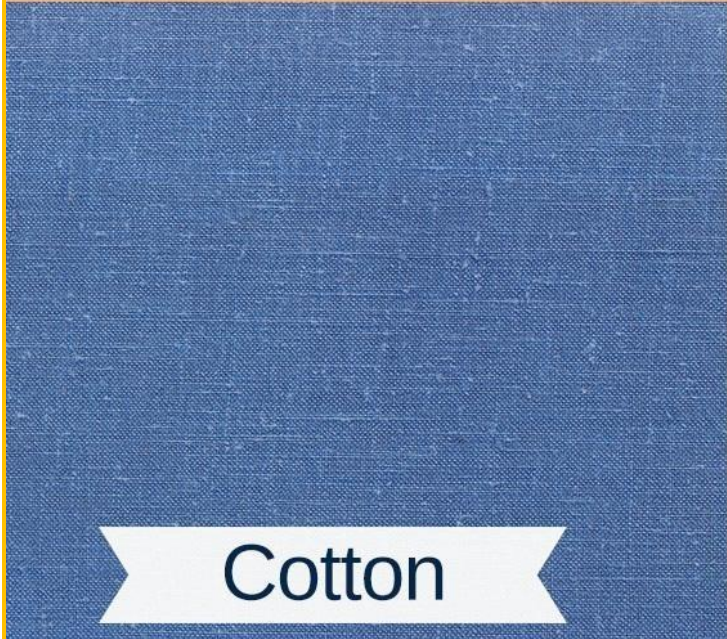
Polymerization Reaction: The process of linking small monomers together to form polymers is called **Polymerization**.

Types of Synthetic Fibres

Rayon	Nylon	Polyester	Acrylic
Also known as Artificial Silk	First synthetic made entirely from chemicals	Made from monomer called Ester	Lightweight, soft, and warm like wool
Made from Wood Pulp (Naturally-occurring Cellulose)	Made up of coal, petroleum oil, air and water	Manufactured from Petroleum	Wrinkle-resistant, does not shrink, cheaper than wool
Absorbs moisture and comfortable to wear	Strong, elastic, wrinkle-resistant, absorbs very little water, and easy to wash	Extremely strong, chemical-resistant, wrinkle-resistant, very durable, does not absorb water easily and quick to dry.	Can be dyed easily in a variety of colours

Rayon

Cotton is a **natural fabric**, whereas **Rayon** is a **semisynthetic** one.



Cotton



Rayon

Rayon is a versatile fibre and can imitate the feel and texture of silk, wool, cotton and linen with drape and slipperiness akin to nylon.

Why Rayon is called artificial silk?

Rayon resembles silk in appearance, texture and shine. Hence, it is also known as **Artificial Silk**.

Silk fibre was discovered in China and made from silkworms. It had a beautiful texture and was very costly. By the end of the 19th century, scientists managed to make an artificial silk-like fibre made by treating wood pulp chemically.

Uses of Rayon

This man-made fibre uses natural material (wood pulp) and can be woven like silk fibre. It is cheaper than silk and can be dyed in a variety of colours. It can be:

- Make apparels like suits, slacks, jackets etc.
- Make automobile tyre cords (because of its strength)
- Mixed with cotton to make bedsheets and bedspreads
- Mixed with wool to make carpets and blankets

- Used to make other home furnishings, such as curtains and tablecloths

Nylon

Nylon is the first synthetic fibre to be prepared without using any natural raw materials (materials produced by plants and animals).

Which properties make Nylon suitable for:

Making Ropes used for Rock Climbing: Strong fibre, Lightweight, Weather Resistant

Making Fishing Nets: Strong, Elastic, Water Resistant

Making Tents: Strong, Light, Does Not Absorb Much Water, Dries Quickly

Uses of Nylon

Developed in 1931, this thermoplastic silky material is strong, elastic, light, lustrous and easy to wash. A nylon thread is, in fact, stronger than a steel wire. Hence, it is used to:

- Make clothes (including socks)
- Make parachutes as well as ropes for rock climbing
- Make ropes, toothbrushes, and car seat belts etc.
- Make tents, curtains, and sleeping bags

❖ **Next part: Polyester**