

# Chapter 3: Synthetic Fibres and Plastics

## Introduction

We all use synthetic fibres and plastics in our daily lives, but what exactly are they? Unlike natural fibres (like cotton and wool), **synthetic fibres** are man-made fibres derived from chemicals. **Plastics** are synthetic materials made from polymers that can be molded into different shapes. This chapter explains the types of synthetic fibres and plastics, their properties, uses, and the environmental concerns associated with them.

## 1. Synthetic Fibres

Synthetic fibres are artificial fibres made from natural resources like petroleum, coal, and natural gas. They are commonly used in the textile industry to create fabrics for clothing, home furnishings, and other applications.

- **Types of Synthetic Fibres:**
  - **Nylon:** A strong, durable fibre used in making clothing, ropes, and fabrics.
  - **Polyester:** A versatile, wrinkle-resistant fibre commonly used in clothing and home furnishings.
  - **Acrylic:** A soft and wool-like fibre used in sweaters, carpets, and blankets.
  - **Rayon:** A semi-synthetic fibre made from cellulose (a plant material). It is used in clothing and home textiles.

**Real-life Example:** A common use of nylon is in the production of parachutes, while polyester is frequently used in school uniforms.

- **Properties of Synthetic Fibres:**
  - **Durability:** They are strong and can withstand wear and tear.
  - **Water Resistance:** Most synthetic fibres are resistant to water absorption.
  - **Wrinkle Resistance:** Synthetic fibres like polyester and nylon are wrinkle-resistant, making them ideal for clothing.
  - **Stretchability:** Some synthetic fibres like spandex are stretchy and used in activewear.

## 2. Plastics

Plastics are materials made from polymers, which are long chains of molecules. They can be molded into different shapes and are used for a wide variety of products.

- **Types of Plastics:**

- **Thermoplastics:** These plastics can be softened by heat and molded into different shapes. Examples include PVC, polythene, and polypropylene.
- **Thermosetting Plastics:** These plastics harden permanently after being shaped and cannot be re-molded. Examples include Bakelite and melamine.

**Real-life Example:** PVC is used to make pipes, while Bakelite is used for making electrical switches and kitchenware.

- **Properties of Plastics:**

- **Lightweight:** Plastics are generally light and easy to handle.
- **Durability:** Plastics are strong and resistant to breaking.
- **Water Resistance:** Plastics do not absorb water, which makes them suitable for various uses, such as in packaging and waterproof containers.
- **Versatility:** Plastics can be molded into any shape, making them ideal for a wide range of products, from bottles to toys to furniture.

## 3. Uses of Synthetic Fibres and Plastics

- **Synthetic Fibres:**

- **Clothing:** Many clothes, such as t-shirts, jackets, and pants, are made from synthetic fibres like polyester, nylon, and acrylic.
- **Carpets and Rugs:** Acrylic fibres are commonly used to make carpets and rugs.
- **Home Furnishings:** Curtains, bed sheets, and pillow covers are often made of synthetic fibres.

- **Plastics:**

- **Packaging:** Plastics are commonly used for packaging items like food, drinks, and medicine.
- **Construction:** Materials like PVC are used for plumbing pipes, insulation, and window frames.

- **Electronics:** Plastics are used in the manufacture of electrical and electronic goods like computers, phones, and televisions.
- **Toys and Furniture:** Plastic is widely used for making toys and lightweight furniture.

#### 4. Environmental Concerns

While synthetic fibres and plastics have many benefits, their widespread use also raises environmental concerns:

- **Non-biodegradable:** Most plastics and synthetic fibres are not biodegradable, meaning they do not decompose naturally and can remain in the environment for years.
- **Pollution:** Plastics and synthetic fibres can contribute to pollution when they are discarded improperly, especially in oceans and rivers.
- **Wildlife Harm:** Animals can mistake plastic waste for food, leading to ingestion and often causing harm or death.

**Real-life Example:** The accumulation of plastic waste in the oceans is a major environmental issue, with marine life being severely affected by plastic ingestion and entanglement.

#### 5. Recycling of Plastics

Recycling is one way to reduce the environmental impact of plastics. By reusing and recycling plastic materials, we can reduce waste and conserve natural resources.

- **Plastic Recycling Process:**
  - **Collection:** Plastics are collected from various sources, such as homes and industries.
  - **Sorting:** Plastics are sorted based on their type and color.
  - **Shredding:** The sorted plastics are shredded into small pieces.
  - **Melting and Molding:** The shredded plastics are melted and molded into new products.

**Real-life Example:** Recycled plastic bottles can be turned into new bottles, clothing, or even plastic lumber used for building.

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## **Important Points to Remember**

- Synthetic fibres are man-made fibres, including nylon, polyester, acrylic, and rayon.
  - Plastics are synthetic materials that can be molded into different shapes and are categorized into thermoplastics and thermosetting plastics.
  - Plastics and synthetic fibres are used in various industries like clothing, packaging, construction, and electronics.
  - The non-biodegradability of plastics is a major environmental concern.
  - Recycling plastics can help reduce pollution and conserve resources.
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## **Practice Questions**

1. **What are synthetic fibres? Name two types of synthetic fibres and their uses.**
2. **Differentiate between thermoplastics and thermosetting plastics.**
3. **Explain the advantages and disadvantages of using synthetic fibres.**
4. **What are the main properties of plastics that make them useful in everyday life?**
5. **Describe the process of recycling plastics.**
6. **Why are plastics considered harmful to the environment?**
7. **What are some common uses of nylon and polyester?**
8. **What is Bakelite, and where is it used?**
9. **How do synthetic fibres compare to natural fibres in terms of durability and cost?**
10. **What is the impact of plastic pollution on marine life?**
11. **What is the importance of recycling plastic, and how can it be done efficiently?**
12. **Give examples of products made from thermoplastics and thermosetting plastics.**
13. **Explain the role of synthetic fibres in clothing and fashion.**
14. **What are the environmental concerns associated with the use of synthetic fibres?**

**15. How does the use of plastics in packaging benefit both consumers and industries?**