

FlexiPrep

Rayon Fabric and Nylon, Discovery of Usable Fiber, Production of Man-Made Rayon (For CBSE, ICSE, IAS, NET, NRA 2022)

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Discovery of Usable Fiber

- In 1885, Hilaire de Chardonnet discovered the method of deriving usable fibre from cellulose by chemically treating rags and wood pulp. It was first developed and marketed by DuPont. After the introduction of DuPont in the market, there was a tremendous transformation in the textile industry. DuPont industries started making man-made fibres like nylon.
- Chardonnet is often considered as the father of rayon. Rayon became one of the most important fibres in the carpet and home fabric industries.

Production of Man-Made Rayon

- Even though rayon fibre is made from a natural substance called cellulose, it is considered as a man-made fibre because the fibre is altered chemically according to the requirements and demands of the final product.
- DuPont was the first company to produce man-made rayon. At that time, silk was considered to be royal fabric and in Yang dynasty, only the royal family had the privilege to use it. After some time, nylon and rayon became a major fabric for making clothes.

Discovery of Nylon

- Mary Quant, the British designer, designed a mini skirt which led to the popularity of opaque tights and the nylon fabric. In 1951, an article from Time magazine mentioned that nylon and rayon had stiff competition. Wallace Carothers was a great organic chemist who worked for DuPont on the crystalline molecule.
- In April 1930, Wallace and his assistant while working on esters found that there are molecules that have repeated chemical structures. But he ignored this observation and started working on amides derived from ammonia. While working on amides, he discovered a strong polymer called nylon.

Fibre 66

- Carothers referred to this polymer as 'fibre 66'. A batch production was made and then it was sent to a mill for further processing. Researchers wanted to see the quality of the cloth. After a quality check, full-scale production started in Delaware.

- So, the commercial production began in 1939 and the first nylon product, a toothbrush came in the market. The bristles of the brush were made from nylon fibre and the brush was named as Dr West's miracle toothbrush. Nylon is an important man-made fibre which has a lot of twists and turns in its discovery.

What is Rayon?

- Rayon is a regenerated cellulose fiber. It is considered as a semi-synthetic (neither natural nor synthetic) fiber that is made from wood pulp; a natural raw material based on semi-cellulose. Although rayon is a manufactured fiber, it shares many similarities with natural fabrics such as cotton and linen.
- Rayon is soft, breathable, comfortable and moisture absorbent. This moisture absorbance and softness of the fabric make it ideal for summer wear. This fabric also drapes well. However, rayon fiber is also prone to wrinkles, creases and tears just like natural fibers. This fabric is also blended with other materials to achieve different properties. Rising prices in cotton have increased the demand for rayon since rayon is being used as a substitute for cotton.
- It is also important to note that various characteristics and properties of rayon depend on its many factors such as processing and additives. There are four major types of rayon fabrics known as regular rayon, high wet modulus rayon, high tenacity modulus rayon and Cuprammonium rayon.



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What is Nylon?

- Nylon is not a natural fiber; it is a synthetic fiber that is made from chemical by-products of petroleum, coal, and agricultural products. Nylon is often referred to as a polymer and the material used to produce nylon is known as polyamides. It was first produced by Wallace Carothers at the DuPont Experimental Station. Nylon became popular during the Second World War due to the shortage of natural fabrics such as silk. It was used to manufacture parachutes, tires, tents, ponchos, ropes, and other military supplies.
- Nylon fabrics have a low absorbency rate, making them ideal for the manufacture of stockings, swimwear, and athletic wear. Nylon is a very popular fabric today due to its low cost, durability, and low maintenance. It is also resistant to heat and tears. This fabric also resists stains and maintain its shape after being washed.



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Questions

What is Rayon and Nylon?

Answer:

Rayon is a semi synthetic fibre which is woven with some natural fibres. Nylon, on the other hand, is a synthetic fiber completely. Rayon is more susceptible to wrinkles and tears whereas nylon has great resistance for it.

What is the Advantage of Nylon over Rayon?

Answer:

Nylon fibres are stronger than rayon, producing a smooth fabric that's strong, elastic and abrasion-resistant. It's difficult to permanently mar the man-made fabric because it's resistant to oil and chemical stains, and easy to wash.

What Are the Disadvantages of Nylon?

Answer:

There are very few disadvantages to nylon as it is such a success but here are some:

- High shrinkage in moulded sections.
- Pollution problems.
- Lack of stability.
- Does not absorb water well.

What Are the Disadvantages of Rayon?

Answer:

The disadvantage is not acid, resilience and fatigue resistance poor, wet low mechanical strength. Can be pure spin, it can also be blended with polyester and other chemical fibers. rayon or viscose or viscose fibre, one kind of man-made cotton, it feels like cotton, cheaper than cotton.

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