

Textiles & Fibers

1. Textiles

Term used to refer to fibers, yarns or fabrics



2. Fiber

The basic unit from which fabric is made.

(It can be natural or manufactured)



3. Natural Fiber

Fibers that come from natural sources, such as plants and animals.



4. Manufactured Fiber

Also called synthetic fibers.
Fibers that come from substances
such as wood pulp, petroleum,
natural gas, air and water.



Natural Fibers

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graph TD; A[Natural Fibers] --> B[Cotton]; A --> C[Ramie]; B --> D[Wool]; B --> E["Flax (Linen)"]; B --> F[Silk]; C --> G[Cashmere]
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Cotton

Ramie

Wool

Cashmere

Flax (Linen)

Silk



5.

“The Fabric of Our Lives”



- The world uses more cotton than any other fiber!
- In 1793, Eli Whitney invented the cotton-gin which revolutionized cotton production worldwide

• Properties of Cotton:

- Good Absorbency
- Good Conductor of Heat
- Strong and Durable
- Comfortable
- Cheap!

• Uses of Cotton:

- Pretty Much Anything!
(Apparel, Towels, Blankets, etc.)





6. Wool



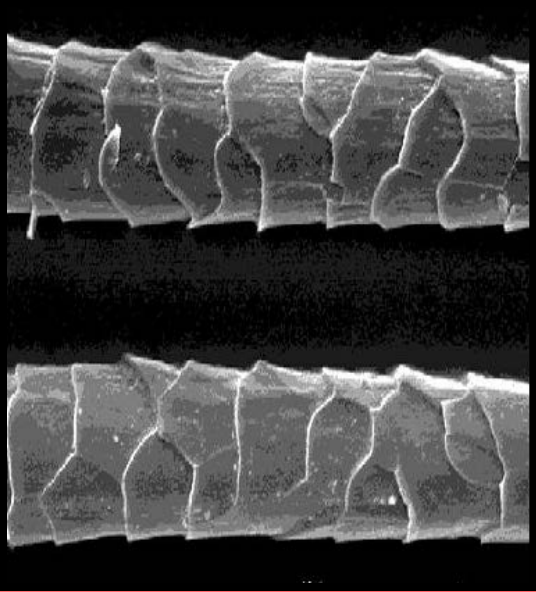
- Wool comes from sheep! 😊
- Wool fibers have scales on them which causes them to be itchy

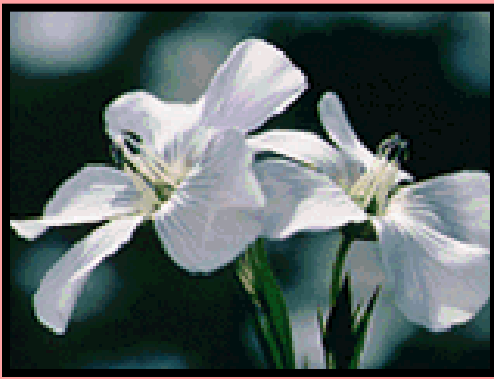
Properties of Wool:

- Very Strong!
- Keeps you VERY Warm!
- Durable
- Weaker When Wet
- Doesn't Wrinkle Easily

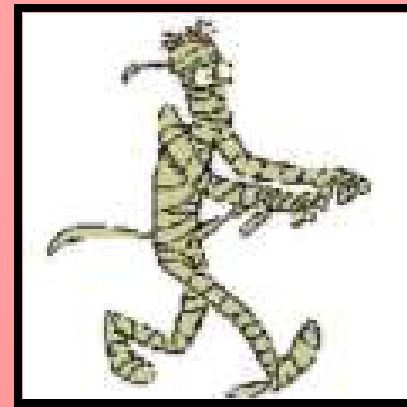
Uses of Wool:

- Apparel
- Blankets
- Coats
- Felt





7. Flax (Linen)



- Flax is one of the oldest textile fibers-the Ancient Egyptians were famous for it!
- Linen is the fabric made from the flax plant.

Properties of Flax/Linen:

- Very Strong!
- Can Be Soft or Hard
- Durable
- Comfortable
- Good Absorbency

Uses of Linen:

- Apparel
- Bedding
- Tablecloths
- Accessories (Purses, Luggage, Upholstery, etc.)



Flax (Linen) Production

Before Retting



After Breaking



After Scutching

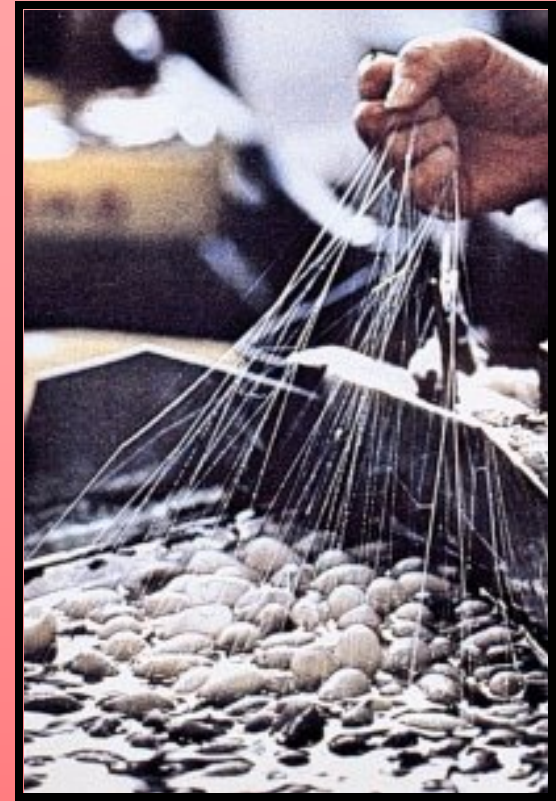


After Hackling





8. Silk



- Silk comes from the cocoons of silkworms
- China is famous for silk
- Real silk is very expensive!

• Properties of Silk:

- Strongest Natural Fiber
- Shiny, Smooth & Luxurious
- Durable
- Very Comfortable!
- Good Absorbency

• Uses of Silk:

- Apparel
- Sheets
- Tapestries
- Furnishings







9. Ramie



- It comes from the Ramie plant
- One of the strongest natural fibers, especially when wet!
- It has been around for at least 6,000 years!
- Properties of Ramie:
 - Resistant to shrinking
 - Blends well with other fibers
 - Lacks resiliency
 - Low in elasticity
- Uses of Ramie:
 - Packing materials
 - Fishing nets
 - Upholstery
 - Blended with wool in clothing



10. Cashmere



- Comes from the cashmere goat-sometimes called pashmina
- The hair is usually combed by hand during the molting season

• Properties of Cashmere:

- Very expensive!
- High quality apparel
- Great drapability
- Warm
- Sensitive to chemicals

• Uses of Cashmere:

- Apparel/Clothing
- Sweaters
- Coats
- Blankets

Manufactured Fibers

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graph TD; MF[Manufactured Fibers] --> Rayon; MF --> Polyester; MF --> Fiberglass; Rayon --> Acetate; Rayon --> Nylon; Nylon --> Olefin; Polyester --> Acrylic; Polyester --> Modacrylic; Modacrylic --> Spandex; Fiberglass --> PBI;
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Rayon

Polyester

Fiberglass

Acetate

Acrylic

PBI

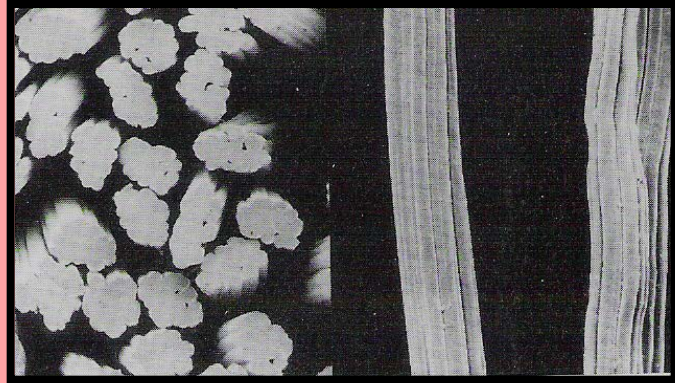
Nylon

Modacrylic

Olefin

Spandex

11. Rayon



- Was the first manufactured fiber
- First named "artificial silk" then name changed to rayon
- Produced by wet spinning

● Properties of Rayon:

- Weak when wet
- Highly absorbent
- Soft/comfortable
- Easy to dye

● Uses of Rayon:

- Apparel
- Upholstery
- Drapery
- Diapers

12. Acetate



- Started out as a varnish for airplane wings during WWI
- Produced by dry spinning
- Will dissolve in acetone (nail polish remover!)

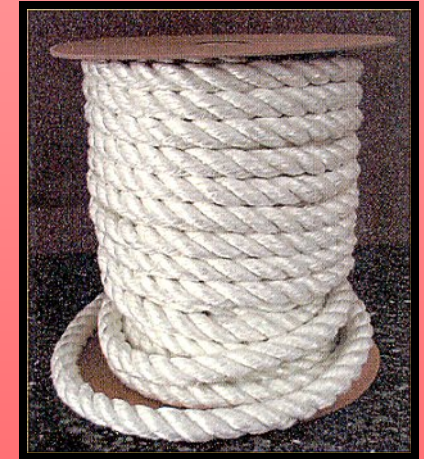
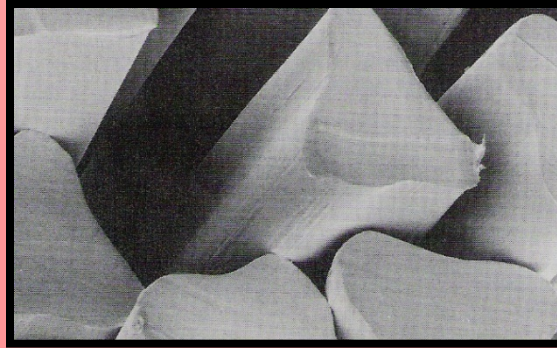
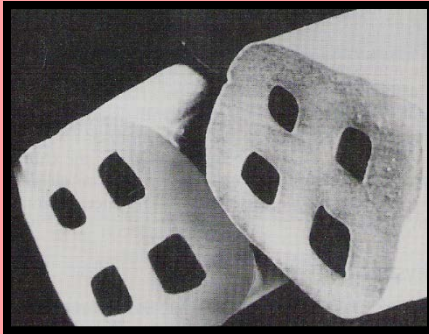
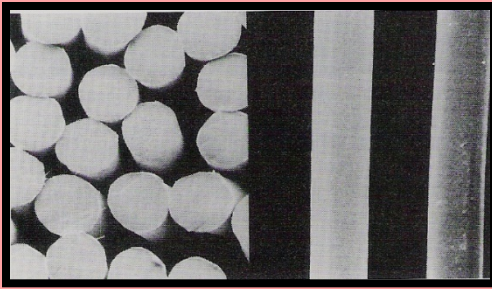
• Properties of Acetate:

- Wrinkles easily
- Low cost
- Low absorbency
- Low strength

• Uses of Acetate:

- Formal Wear
- Lining in clothing
- Furnishings
- Fiberfill

13. Nylon

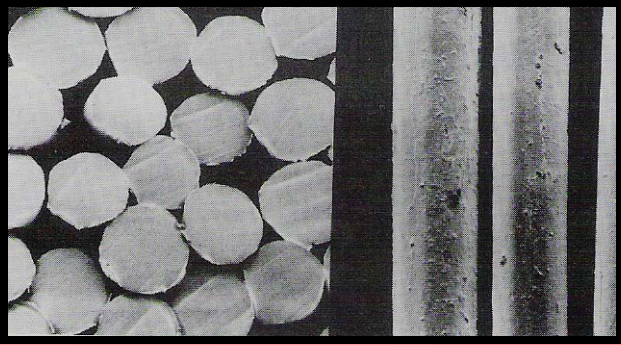


- First synthetic fiber in the U.S.
- Has several different structures (round, voided, trilobal, etc).
- Properties of Nylon:
- Uses of Nylon:

- Excellent stretchability
- Static build-up
- Durable/Resilient
- Not comfortable

- Hosiery/Nylons
- Carpet
- Windbreakers
- Rope

14. Olefin



- Produced by gel spinning
- Has very low moisture absorbency
- Very chemical resistant

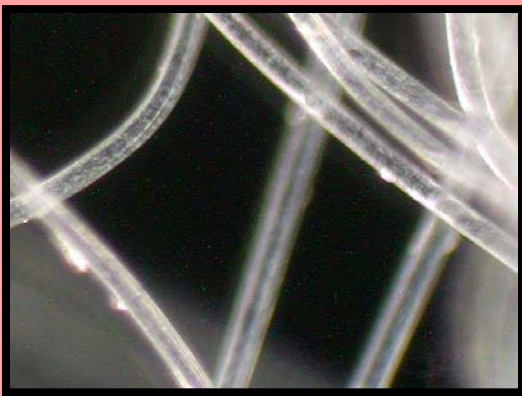
• Properties of Olefin:

- Smooth
- Good heat retention
- Strong and Durable

• Uses of Olefin:

- Furniture
- Socks
- Carpet





15. Polyester



- Polyester is the most widely used synthetic fiber
- Polyester became very popular in the 1970's-It was used to make the infamous "Leisure Suit" 😊
- Although it has many good qualities, it is not very comfortable

• Properties of Polyester:

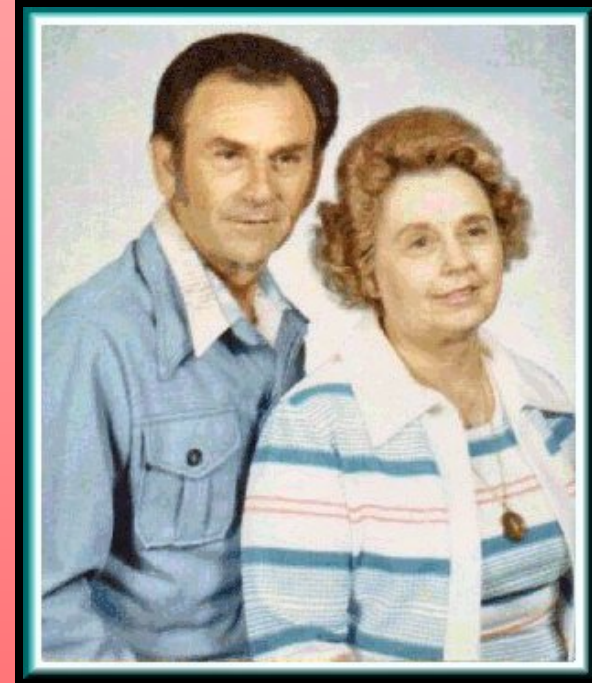
- Extremely Durable
- Doesn't Wrinkle Easily
- Very Strong
- Not Very Comfortable

• Uses of Polyester:

- Apparel
- Furnishings
- Fiberfill
- Tires



*"Heck Yes!
Polyester
Leisure Suits
are the Coolest!
GOSH!"*



16. Acrylic



- Produced either by dry or wet spinning
- It can be destroyed by chlorine bleach
- Be sure to follow care instructions

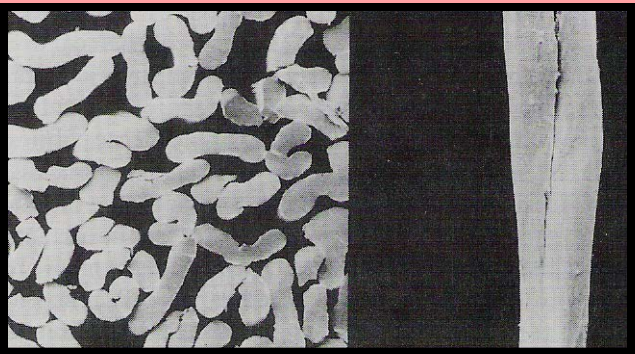


• Properties of Acrylic:

- Soft
- Warm
- Lightweight
- Resilient

• Uses of Acrylic:

- Apparel
- Blankets
- Craft Yarns



17. Modacrylic



- Produced by dry spinning
- Has properties similar to acrylic, but is flame and heat resistant
- Requires special care-follow care instructions

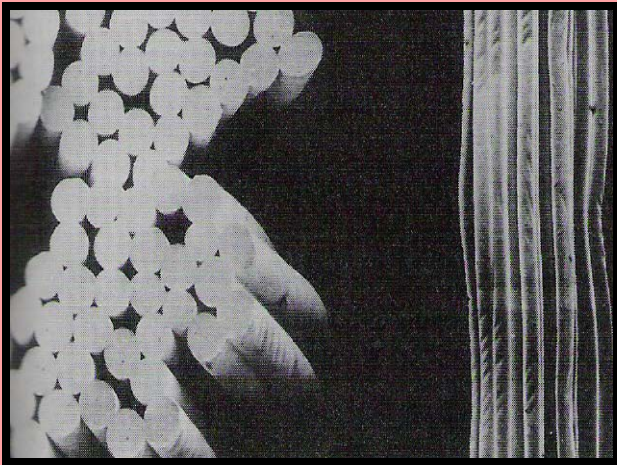
• Properties of Modacrylic:

- Does not wrinkle
- Soft
- Warm
- Tendency to pill

• Uses of Modacrylic:

- Fur-like fabrics
- Wigs/Hairpieces
- Pile-type fabrics

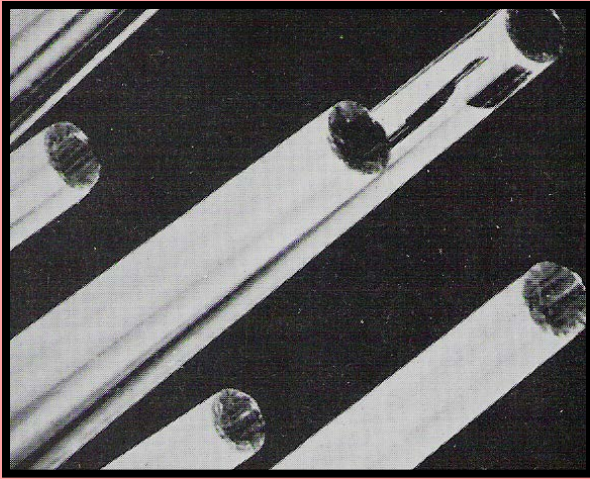




18. Spandex



- Extremely elastic fiber!
- Seldom used alone in fabrics-usually mixed with other fibers
- Properties of Spandex:
 - Durable
 - Resistant to body oils
 - Doesn't deteriorate easily
- Uses of Spandex:
 - Swimwear
 - Exercise clothing
 - Power-stretch apparel



19.

Fiberglass



- Materials for fiberglass include sand, silica and limestone-They are melted at 2400°F and formed into tiny round filaments

- Will not melt or burn

- Properties of Glass:

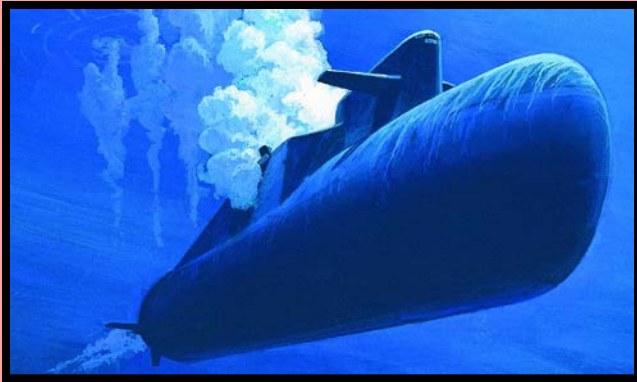
- Can only be hand-washed
- Severe skin irritation
- Strong
- Heat resistant



- Uses of Glass:

- Ironing board covers
- Molded plastic
- Draperies
- Mattress covers

20. PBI



- PBI stands for polybenzimidazole
- Synthetic fiber with high melting point
- Will not ignite under flame
- Properties of PBI:

- Extremely fire resistant
- Does not shrink
- Difficult to dye

- Uses of PBI:

- Firefighters uniforms
- Space suits
- Race car driver clothing
- Submarines