

Fiber Evidence



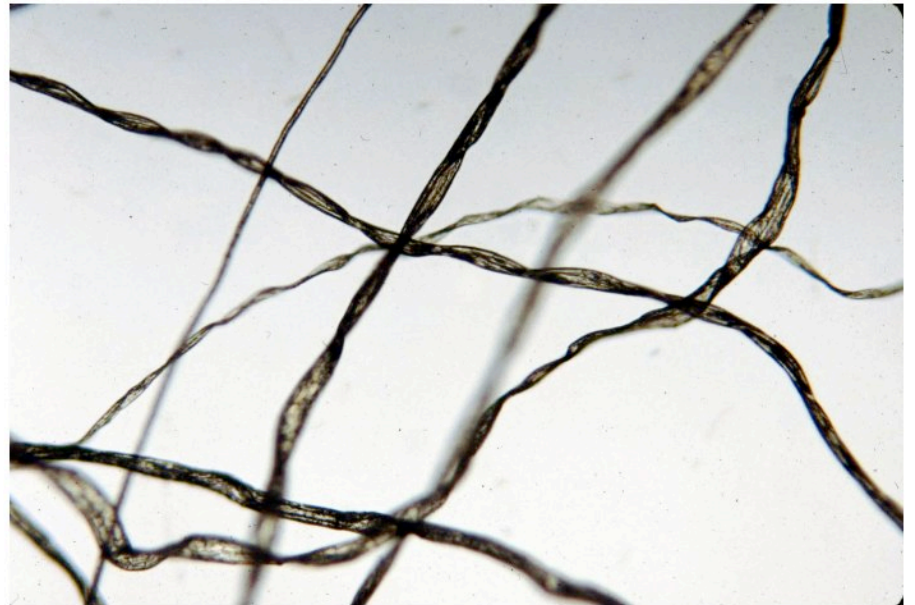
Natural Fibers

- Derived from plant or animals
- Animal fibers comprise a majority of natural fibers found at crime scenes
- Examples of Animal Fibers
 - Sheep (wool)
 - Goats (mohair, cashmere)
 - Camels, Llamas, Alpacas
 - Fur Fibers - Mink, Rabbit, Beaver, Muskrat



Plant Fibers

- Cotton is the most prevalent plant fiber
- White cotton fibers have no evidential value because it is so common

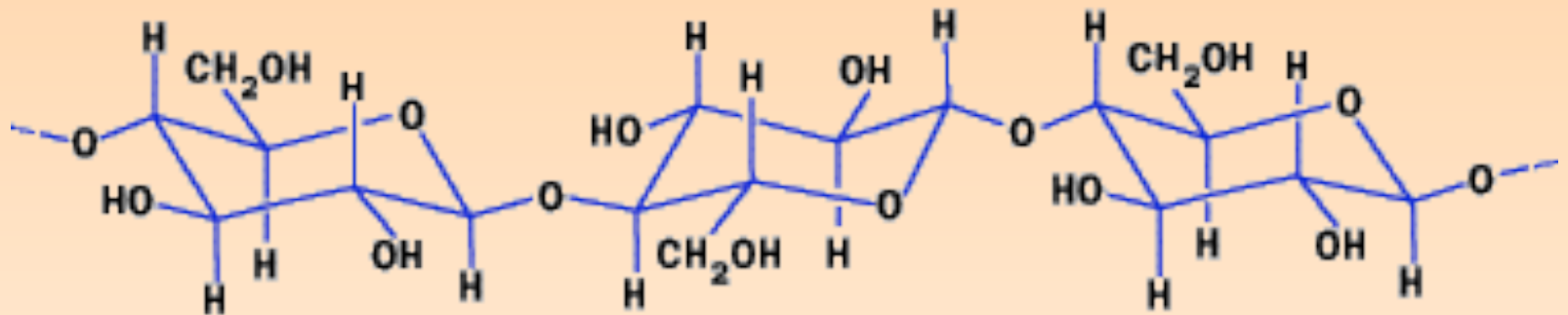


Man-made Fibers

- Rayon developed 1911
- Nylon developed 1939
- Today these fibers are prevalent and produced under a variety of names



Man-made Fibers - Polymers



Cellulose

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- Man-made fibers are made by pulling a synthetic material into thin strands
- The synthetic material is a polymer
- A polymer is a chain of repeating units (monomer)



Two Types of Man-made Fibers

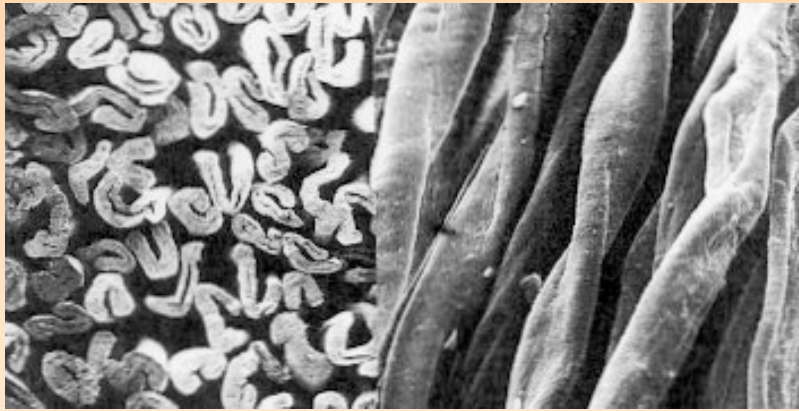
Regenerated Fibers

- Made from natural raw materials
- Examples:
 - Rayon
 - Acetate
 - Triacetate

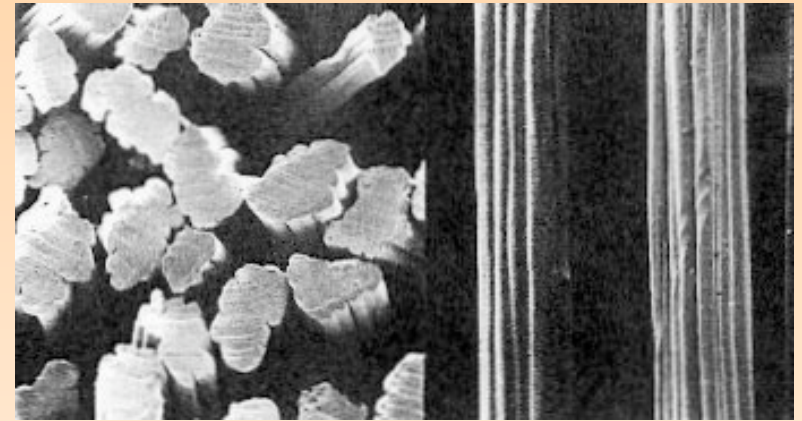
Synthetic Fibers

- Made solely from synthetic chemicals
- Examples:
 - Nylon
 - Polyester
 - Acrylics

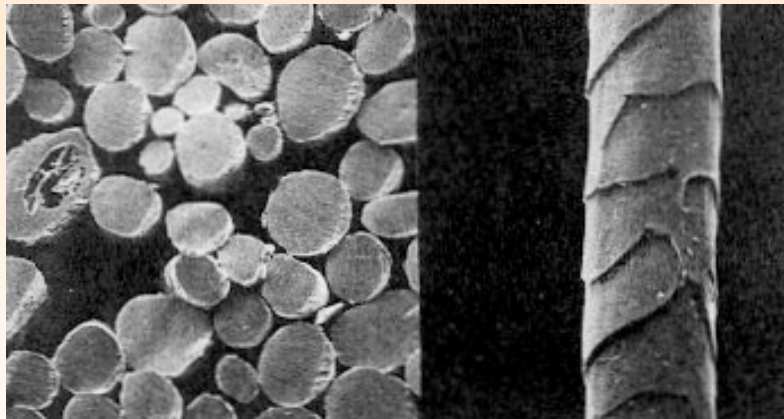
Examples of Fibers



Cotton



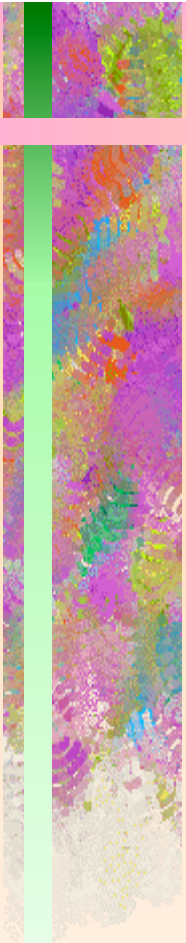
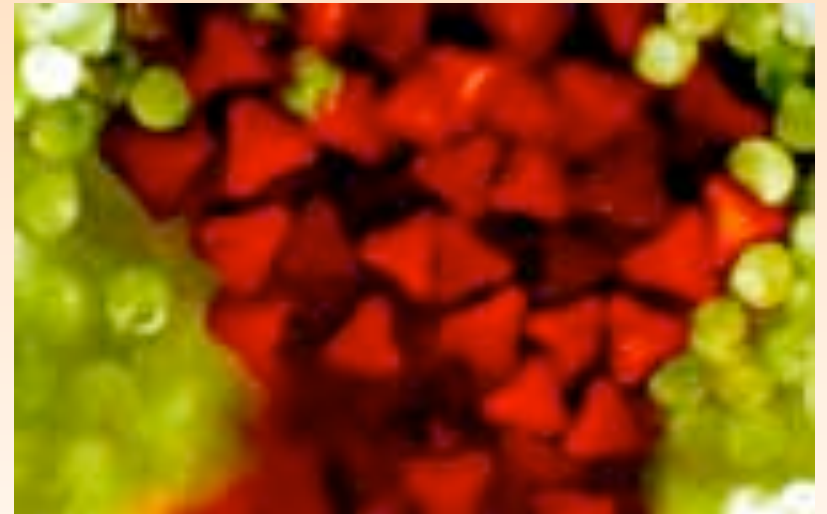
Triacetate



Wool

Identification and Comparison of Man-made Fibers

- Microscope comparison for color and diameter
- Compare striations on surface of fibers
- Compare pitting on surface
- Compare cross-sectional views
- Differences in the dyes can distinguish fibers

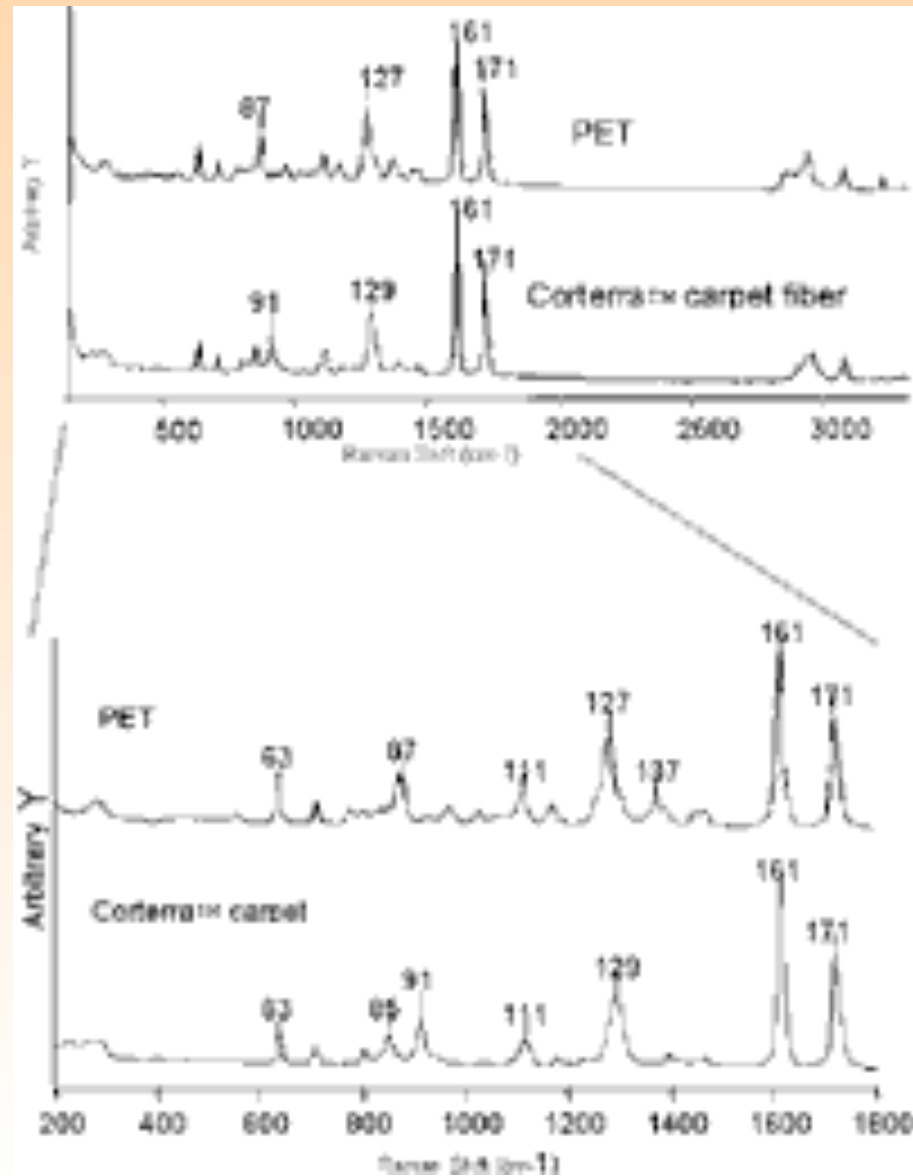




Infrared Light

- Compositional differences in the dyes can distinguish fibers
- Fibers will absorb infrared light in a characteristic pattern
- Infrared Spectrophotometry can identify generic classes and subclasses of fibers
- Does not destroy or damage the fiber

Spectrophotometry

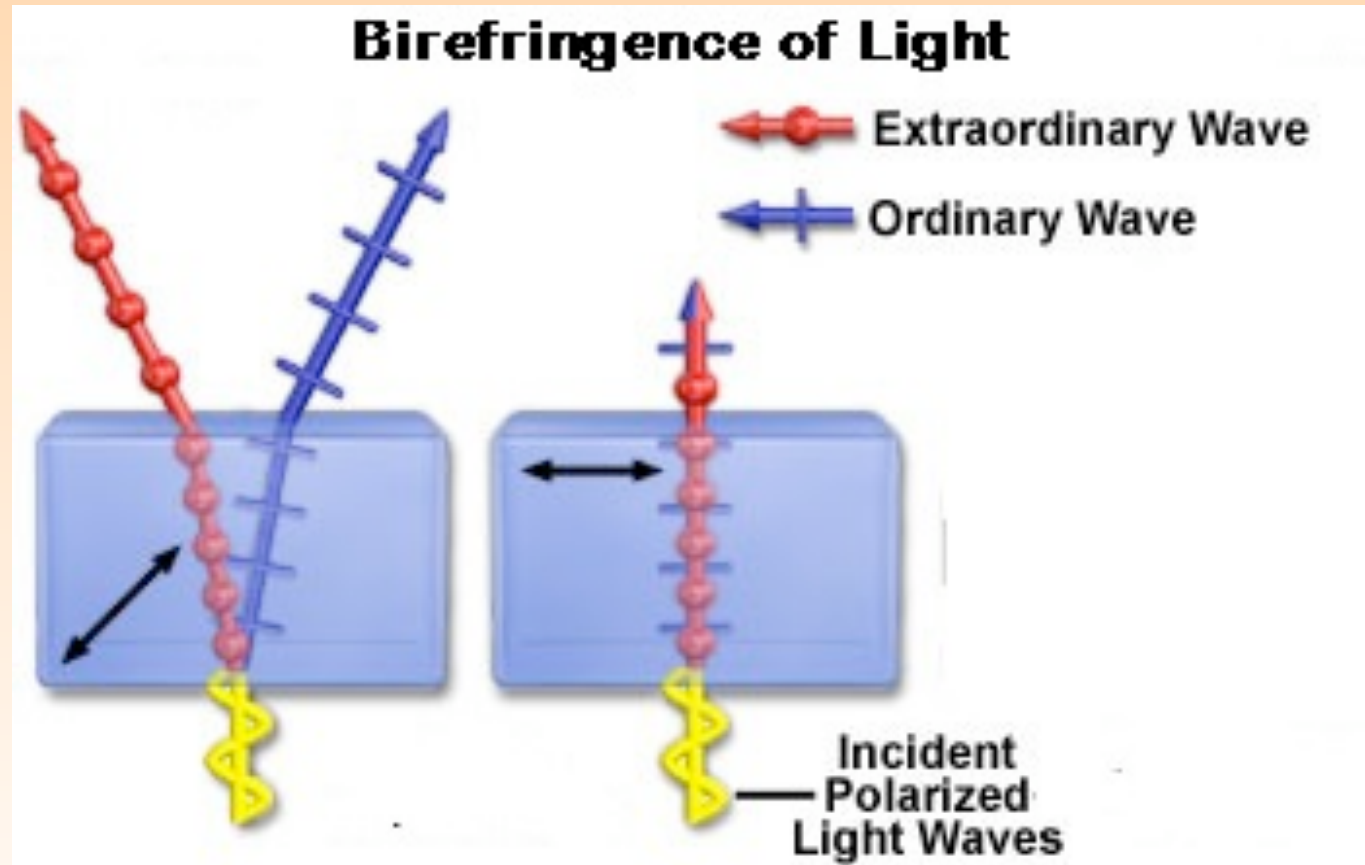




Double Refraction-Birefringence

- Optical Property
- Light passing through a synthetic fiber emerges with two distinct planes of light
- Each plane has a characteristic index of refraction
- Allows a fiber to be examined in a nondestructive manner

Birefringence of Light





Problems

- When collecting sample clothing, it is vital that no two articles come in contact with each other.