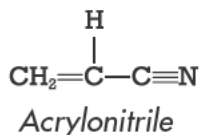


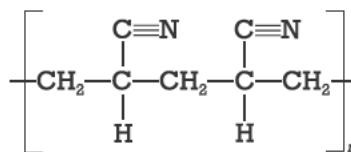
be stretched up to 600 percent and recover their original shape. They are always blended with other fibers and are used in articles of clothing where stretch is wanted, such as athletic apparel, bathing suits, and underwear.



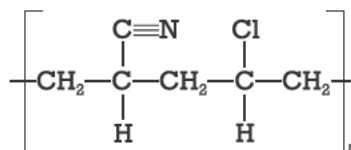
Teacher Demonstration

Now is a good time to perform Teacher Demonstration 6.1, found on the Teacher Resources on Flourish.

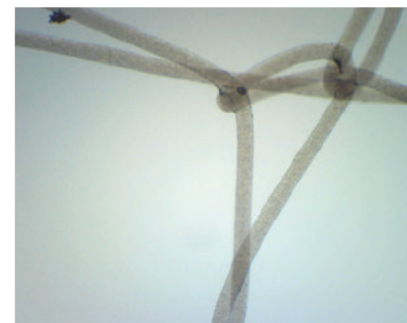
The olefins are one last class of fibers you may come across in your investigation, as they are commonly used in manufacturing carpet and upholstery. These fibers are generally made from ethylene or propylene. Because there are no weak functional groups, such as amide or ester, this type of polymer is very resistant to weathering and chemicals. Polypropylene (pp) is used more in textiles than is polyethylene (pe) and is found in automotive interior fabrics, and rope.



Structure of Orlon



Structure of Dynel



Filaments of nylon

Fiber Analysis

As with most forensic evidence, the characteristics of a material are used as a basis for comparison. The following sections describe properties of fibers that are useful in forensic examinations.

You can still perform some other tests that could further determine fiber type; these include tests for density, refractive index, and fluorescence. All are valuable because they can be used on single fibers and are not destructive.

LABORATORY ACTIVITY 6.5:

Burn Tests

How a fiber burns, its odor, and the appearance of the ash or residue can help an investigator identify it.

Materials

For each group:

- fabric samples and unknowns
- forceps
- Bunsen burner or alcohol burner
- burn test table handout

LAB ACTIVITY 6.5: Burn Tests continued



SAFETY ALERT! CHEMICALS USED

Always wear goggles and an apron when working in the laboratory



SAFETY NOTE Also wear disposable lab gloves. Avoid inhalation, ingestion, and skin contact with chemicals.

Look closely at your blue jeans. The blue yarn makes up the warp (vertical rows in the fabric), and the white yarn makes up the woof (horizontal filling). Denim is a three-on-one twill weave, where the warp passes over three strands of filling, then under one, over three, under one, and so on. So every fourth strand is white. The back side of the fabric, consequently, is one-fourth blue and three-fourths white. Take a look.

Procedure Notes

Table B6.1, Burn Test Results, provided on Blackline Master 6.2 on the Teacher Resources on Flourish, may be used as a handout. It is provided and filled out in Blackline Master 6.3 for the teacher's benefit. The unknown can be selected from any one of the fabrics under study. Your students should perform microscopic observation first because burning is obviously a destructive test.

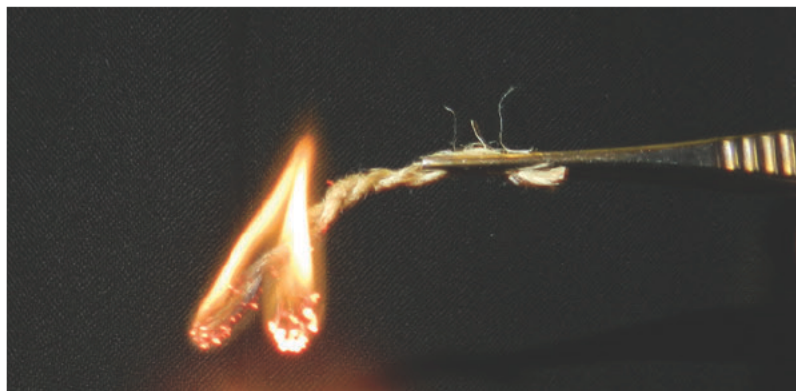
Procedure

Do not write in your textbook. Take notes in your science notebook.

1. Pull a bundle of fibers from each of your labeled fabric samples.
2. Hold the fibers with tweezers or forceps and bring them *slowly* into the open flame of a Bunsen burner or alcohol lamp.
3. Note any odor, whether the fabric continues to burn when you *slowly* remove it from the flame, the color of the flame, the type of ash or residue, and the color of the smoke.
4. Make a table in your notebook like that shown to describe your observations, or use the one given out in class. Fill in your table using words such as *scorches, smolders, fuses, melts, glows, shrinks, sizzles, flickers, flares, sputters, burns fast or slow, smoky, sooty*, and the like. The ash or residue can be light gray, black, dark gray, shiny, clumpy, beady, sticky, feathery, and so on.
5. If you think you are dealing with a blended fabric, that is, one where the warp threads are a different generic material from the woof threads, unravel and separate the crosswise threads from the lengthwise ones. Twist each group into a bundle and check its burning characteristics.

Analysis

1. Based on your microscopic observations and the results of the burn tests, what is the unknown fabric?



Burn test of a jute fiber