Analyses of fibers

preliminary tests, burning tests, spaining tests, microscopic investigations, solubility tests.

1.Preliminary tests

A) Microscopic methods

i) Longitudinal appearence
ii) Cross section image
iii) Refractive index
iv) Double refractive index

B) Chemical methods

i) burning tests,
ii) Solubility tests
iii) spaining tests,
iv) Chemical interactions

C) Physical methods

i) Density
ii) Melting point
iii) Moisture absorption
iv) Spectroscopic techniques
v) Mechanical tests

1.Preliminary tests

These tests includes the investigations that are made by directly hand and eyes.
Any chemical or apparatus is not used during the investigaitons.

**the control of the fiber length: gives the information that the fiber is natural/ or synthetic. (remember the continous and staple fibers!!!)

** the control of fiber breaking strength by a facile stretching of a fiber with hand.

** the control of the fibers lusture




Cotton

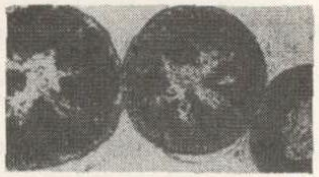
Flax

Wool

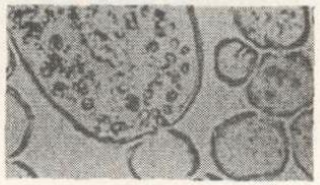
Linen

Silk

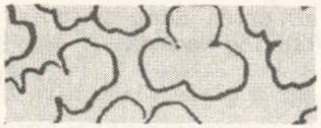
Horsehair



Camel



Acetate

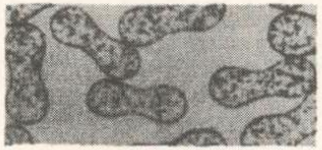


Acrilan Type 16

Creslan

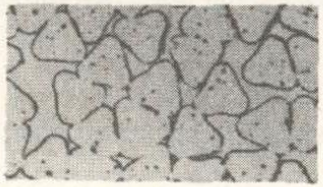
Orlon

Verel



Viscose rayon

Dacron Type 62



Physical methods

The determination of the fiber melting temperature (the polymer of the fiber). A strong but insufficient way to define a fiber

The moisture absorption analyze can give the information related to the possible fiber type.
Remember, natural fibers such as cotton and wool have high moist absorption ability compared to synthetic fibers

Mechanical test investigations gives the ideas about the possible type of the polymer but it is not a safe method

One of the most effective methods in the physical methods is the spectroscopic analysis with UV and IR. e.g IR spectrum of a fiber can be sufficient to reveal the bonds that are present the polymer structure.

Chemical methods

The burning tests are based on the behaviors of the polymers against the flame. The residues after burning and the smell suring burning can give hints about the fiber. The asbestos fibers do not melt and burn. Glass fibers can melt but do not burn. The proteinous fibers spread hair-burn smell during burning. The cellulose based fibers also spread paper-burn smell during burning.

https://media.rainpos.com/5968/burn_test_to_identify_textile_fibers.pdf

Cellulosic fibers (cotton, linen and rayon) burn rapidly with a yellow flame. When the flame is removed, there is an afterglow, then soft gray ash.

Cotton: Ignites on contact with flames; burns quickly and leaves a yellowish to orange afterglow when put out. Does not melt. It has the odor of burning paper, leaves, or wood. The residue is a fine, feathery, gray ash.

Rayon : Same as cotton, but burns slowly without flame with slight melting; leaves soft black ash. Silk: Burns slowly, but does not melt. It shrinks from the flame. It has the odor of charred meat (some say like burned hair). The residue is a black, hollow irregular bead that can be easily to a gritty, grayish-black ash powder. It is self-extinguishing, i.e., it burns itself out

Wool, and other Protein Fibers: Burns with an orange sputtery color, but does not melt. It shrinks from the flame. It has a strong odor of burning hair or feathers. The residue is a black, hollow irregular bead that can be easily crushed into a gritty black powder. It is self-extinguishing, i.e., it burns itself out.

Synthetic Fibers Most synthetic fibers both burn and melt, and also tend to shrink away from the flame. Synthetics burn with an acrid, chemical or vinegar-like odor and leave a plastic bead

Spun Diacetate
SEF (Modacrylic)
Filament Triacetate
Bleached Cotton
Creslan 61 (Acrylic)
Dacron 54 (Polyester)
Dacron 64 (Polyester)
Nylon 66 (Polyamide)
Orlon 75 (Acrylic)
Spun Silk
Polypropylene (Polyolefin)
Viscose (Rayon)
Wool (Worsted)

TESTFABRICS IDENTIFICATION STAIN No. 3A

Dyed or finished fabrics must be stripped completely. Dissolve 50 mg. of Fiber Indicator No. 3A in 100 cc. hot water. Bring to a boil. Add .5 cc. - 1 cc. of a 10% solution Acetic Acid 56%. Enter material, boil 5 minutes. Rinse at 120° F. Extract - Dry.

Testfabrics, Inc., P.O. Box 26, West Pittston, PA 18643
570-603-0432 www.testfabric.com

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Orlon 75 (Acrylic)
Spun Silk
Polypropylene (Polyolefin)
Viscose (Rayon)
Wool (Worsted)

T. I. S. IDENTIFICATION STAIN No. 1

PREPARATION:

Sample to be tested must be boiled off, or in case of a dyed or printed sample, stripped, and all finishes removed.

Prepare 1% solution. Immerse sample for 3-5 minutes at boiling temperature. Then rinse thoroughly in cold water and dry.

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? Homework: take little fiber samples from your sweaters and do not check their material info. Apply preliminary tests and burning test to determine thier type. Compare your findings with thier info.