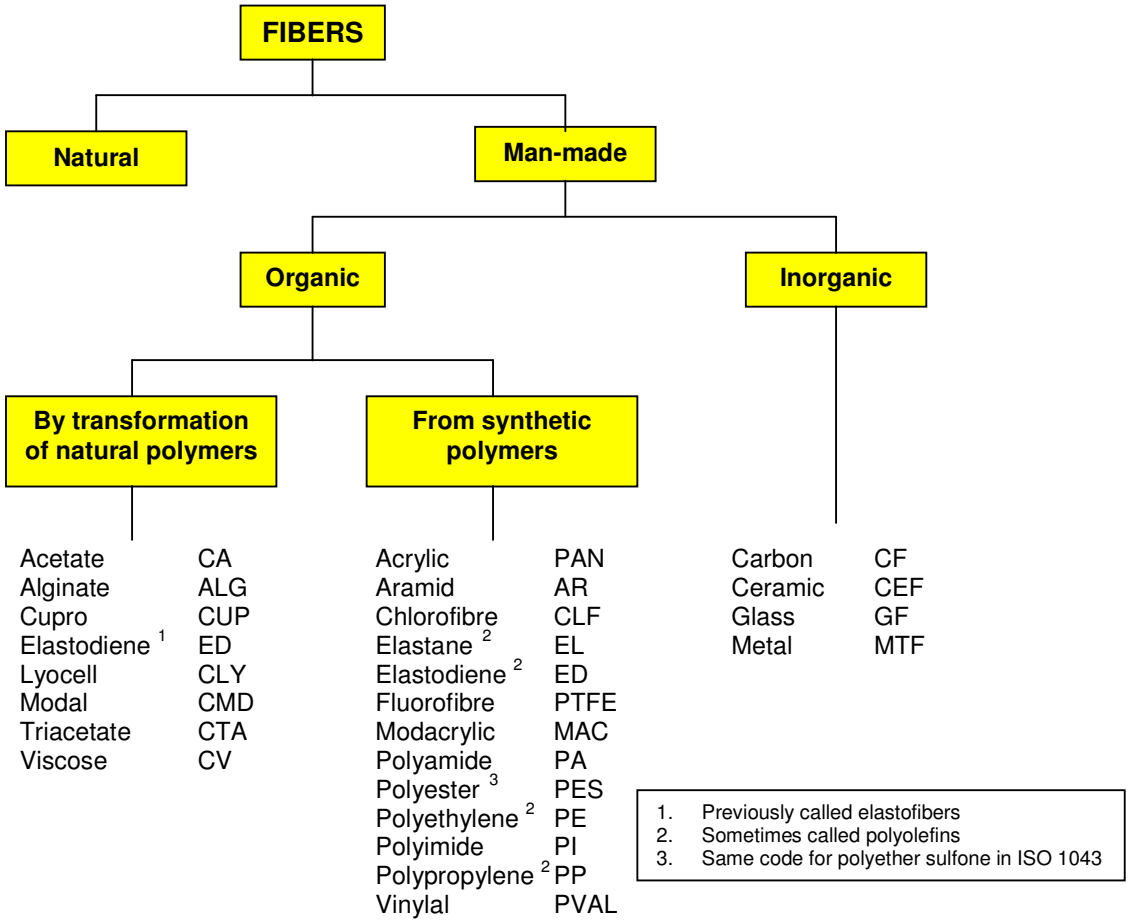
Classification of man-made fibers and their codes

The Classification of man-made fibers
Man-made fibers are classified into three classes, those made from natural polymers, those made from synthetic polymers and those made from inorganic materials.



Fibers from Natural Polymers
The most common natural polymer fiber is viscose, which is made from the polymer cellulose obtained mostly from farmed trees. Other cellulose-based fibers are cupro, acetate and triacetate, lyocell, and modal. Less common natural polymer fibers are made from rubber, alginic acid and regenerated protein.

Fibers from Syntetic Polymers
There are very many synthetic fibers i.e. organic fibers based on petrochemicals. The most common are polyester, polyamide (often called nylon), acrylic and modacrylic, polypropylene, the segmented polyurethanes which are elastic fibers known as elastanes (or spandex in the USA), and speciality fibers such as the high performance aramids.

Fibers from Inorganic Materials
The inorganic man-made fibers are fibers made from materials such as glass, metal, carbon or ceramic. These fibers are very often used to reinforce plastics to form composites.

Viscose

There are several fibres made from the naturally occuring polymer cellulose which is present in all plants. Mostly cellulose from wood is used to produce the fibers but sometimes cellulose from short cotton fibres, called linters, is the source. By far the most common cellulosic fibre is viscose.

Viscose is defined very simply by BISFA as being ”a cellulose fibre obtained by the viscose process”. It is known as rayon in the USA. Although several cellulosic fibres had been made experimentally during the 19th century, it was not until 1905 that what has become the most popular cellulosic fibre, viscose, was produced.

Production
Viscose fibres are made from cellulose from wood pulp. The cellulose is ground up and reacted with caustic soda. After a waiting period, the ripening process during which depolymerisation occurs, carbon disulphide is added. This forms a yellow crumb known as cellulose xanthate, which is easily dissolved in more caustic soda to give a viscous yellow solution. This solution is pumped through a spinneret, which may contain thousands of holes, into a dilute sulphuric acid bath where the cellulose is regenerated as fine filaments as the xanthate decomposes.

Properties and End-Uses
Viscose fibres, like cotton, have a hight moisture regain. It dyes easily, it does not shrink when heated, and it is biodegradable. It is used in most apparel end-uses, often blended with other fibres, and in hygienic disposables where its high absorbency gives advantages. In filament yarn form it is exellent for linings. It is used very little in home furnishing fabrics but in the industrial field, because of its thermal stability, a high modulus version is still the main product used in Europé to reinforce high speed tyres.

Rayon

Rayon, artificial textile material, composed of cellulose obtained from cotton linters or from the pulp of trees such as spruce. Since the introduction of rayon about 1900, it has been used in many textile fields. At first rayon was called silk because, in its filament form, it somewhat resembles silk; however, this comparision is misleading because the chemical composition of rayon is entirely different from that of silk.
Rayon can be made by either the viscose process or the cuprammonium process; both produce fibre classified by the U.S. Federal Trade Commission as rayon. In the viscose process purified cellulose is treated with sodium hydroxide, then with carbon disulfide, to form a viscous yellow liquid called viscose. In the cupammonium process purified cellulose is treated with cuprammoniun liquor, then with sodium hydroxide, to form viscose. The manufacture of rayon filaments – and all manufactured fibers – is done by means of an extrusion process called spinning. In this procedure the fiber-forming liquid is forced through tiny holes in a nozzle or spinneret into a liquid bath containing chemicals that produce filaments of pure cellolose, which can be spun into yarn. The filaments are drawn together to form both fibers and yarn in a single, continuous process.