History of Manufactured Fibers

The following is a timeline of the history of manufactured fibers. References to apparel indicate the fiber’s original primary market. Interior design became the recipient of the research and development and benefited as the fiber’s secondary market.

1664  English naturalist Robert Hooke first suggested the possibility of producing a fiber that would be “if not fully as good, nay better” than silk.

1855  The first patent for “artificial silk” was granted in England in 1855 to a Swiss chemist named Audemars. He dissolved the fibrous inner bark of a mulberry tree, chemically modifying it to produce cellulose. He formed threads by dipping needles into this solution and drawing them out - but it never occurred to him to emulate the silkworm by extruding the cellulosic liquid through a small hole.

Early 1880's  Sir Joseph W. Swan, an English chemist and electrician, inspired by Thomas Edison's new incandescent electric lamp. He experimented with forcing a liquid similar to Audemars solution through fine holes into a coagulating bath. His fibers worked like carbon filament, and they found early use in Edison’s invention. In 1885 he exhibited in London some fabrics crocheted by his wife from his new fiber, but he focused on electric lamps and abandoned work on textiles.


1890  Count Hilarie deChardonnet built the first commercial rayon plant at Besancon, France, and secured his fame as the father of the rayon industry.

1893  Arthur D. Little of Boston, invented cellulosic acetate and developed it as a film.


By 1910  Camille and Henry Dreyfus were making acetate motion picture film and toilet articles in Basel, Switzerland. During World War I, they built a plant in England to produce cellulose acetate dope for airplane wings and other commercial products. Upon entering the War, the United States government invited the Dreyfus brothers to build a plant in Maryland to make the product for American warplanes.
1924  First commercial textile uses for acetate in fiber form were developed by the Celanese Company.

Mid-1920's  Textile manufacturers could purchase the rayon and acetate fibers for half the price of raw silk, and so began manufactured fibers' gradual conquest of the American fiber market. This modest start in the 1920's grew to nearly 70% of the national market for fiber by the last decade of the century.

1931  American chemist Wallace Carothers reported on research carried out in the laboratories of the DuPont Company on “giant” molecules called polymers. He focused his work on a fiber referred to simply as “66,” a number derived from its molecular structure. Nylon, the “miracle fiber,” was born. The Chemical Heritage Foundation is currently featuring an exhibit on the history of nylon.

1938  Paul Schlack of the I.G. Farben Company in Germany, polymerized caprolactam and created a different form of the polymer, identified simply as nylon “6.” Nylon’s advent created a revolution in the fiber industry. Rayon and acetate had been derived from plant cellulose, but nylon was synthesized completely from petrochemicals. It established the basis for the ensuing discovery of an entire new world of manufactured fibers.

1939  Vinyon was first produced in 1939 by American Viscose, now FMC Corporation.

1939  DuPont began commercial production of nylon. The first experimental testing used nylon as sewing thread, in parachute fabric, and in women's hosiery. Nylon stockings were shown in February 1939 at the San Francisco Exposition and the most exciting fashion innovation of the age was underway. American women had only a sampling of the beauty and durability of their first pairs of nylon hose when their romance with the new fabric was cut short when the United States entered World War II.

1941  The War Production Board allocated all production of nylon for military use. During the War, nylon replaced Asian silk in parachutes. It also found use in tires, tents, ropes, ponchos, and other military supplies, and even was used in the production of a high-grade paper for U.S. currency. At the outset of the War, cotton was king of fibers, accounting for more than 80% of all fibers used. Manufactured and wool fibers shared the remaining 20%.

August 1945  By the end of the war cotton stood at 75% of the fiber market. Manufactured fibers had risen to 15%. After the war, GI's came home,
families were reunited, industrial America gathered its peacetime forces, and economic growth surged. The conversion of nylon production to civilian uses started and when the first small quantities of postwar nylon stockings were advertised, thousands of frenzied women lined up at New York department stores to buy. In the immediate post-war period, most nylon production was used to satisfy this enormous pent up demand for hosiery.

Late 1940's  
Nylon was also being used in carpeting and automobile upholstery. At the same time, three new generic manufactured fibers started production. Dow Badische Company (today, BASF Corporation) introduced metalized fibers; Union Carbide Corporation developed modacrylic fiber; and Hercules, Inc. added olefin fiber.

By the 1950's  
The industry was supplying more than 20% of the fiber needs of textile mills. A new fiber, “acrylic,” was added to the list of generic names, as DuPont began production of this wool-like product. Meanwhile, polyester, first examined as part of the Wallace Carothers early research, was attracting new interest at the Calico Printers Association in Great Britain. There, J. T. Dickson and J. R. Whinfield produced a polyester fiber by condensation polymerization of ethylene glycol with terephthalic acid. DuPont subsequently acquired the patent rights for the United States and Imperial Chemical Industries for the rest of the world. A host of other producers soon joined in.

Summer 1952  
“Wash-and-wear” was coined to describe a new blend of cotton and acrylic. The term eventually was applied to a wide variety of manufactured fiber blends. Commercial production of polyester fiber transformed the wash-and-wear novelty into a revolution in textile product performance.

1953  
Polyester’s commercialization was accompanied by the introduction of triacetate. The majority of the 20th century’s basic manufactured fibers now had been discovered, and the industry’s engineers turned to refining their chemical and physical properties to extend their use across the American economy.

Early 1960's  
Manufactured fiber accounted for nearly 30% of American textile mill consumption.

By 1965  
The manufactured fiber industry was providing over 40% of the nation’s fiber needs.

1960's  
Manufactured fiber production accelerated as it was spurred on by continuous fiber innovation. The revolutionary new fibers were modified to offer greater comfort, provide flame resistance, reduce clinging,
release soil, achieve greater whiteness, special dullness or luster, easier
dyeability, and better blending qualities. New fiber shapes and
thicknesses were introduced to meet special needs. Spandex, a
stretchable fiber; aramid, a high-temperature-resistant polyamide; and
para-aramid, with outstanding strength-to-eight properties, were
introduced into the marketplace. Consumers bought more and more
clothing made with polyester. Clotheslines were replaced by electric
dryers, and the “wash and wear” garments they dried emerged wrinkle
free. Ironing began to shrink away on the daily list of household chores.
Fabrics became more durable and color more permanent. New dyeing
effects were being achieved and shape-retaining knits offered new
comfort and style.

Late 1960’s One dramatic new set of uses for manufactured fibers came with the
establishment of the U.S. space program. The industry provided special
fiber for uses ranging from clothing for the astronauts to spaceship nose
cones. When Neil Armstrong took “One small step for man, one giant
leap for mankind,” on the moon on July 20, 1969, his lunar space suit
included multi-layers of nylon and aramid fabrics. The flag he planted
was made of nylon. Today, the exhaust nozzles of the two large booster
rockets that lift the space shuttle into orbit contain 30,000 pounds of
carbonized rayon. Carbon fiber composites are used in as structural
components in the latest commercial aircraft, adding strength and
lowering weight and fuel costs.

Early 1970’s A wave of consumer protection demands emerged, most notably one for
a mandated Federal flammability standard for children’s sleepwear. The
manufactured fiber industry spent $20 million on flammability research
and development in 1972 and 1973, and manufactured fiber fabrics
became predominant in this market. Flammability standards were also
issued for carpet and other products. In the U.S. carpet market, 99% of
all surface fibers are now manufactured fibers.

Late 1973 When the U.S. was struck by a severe energy crisis, the manufactured
fiber industry reduced the energy required to produce a pound of fiber by
26%. By then, the industry was using but 1% of the Nation’s petroleum
supply to provide two-thirds of all fibers used by American textile mills.
Innovation is the hallmark of the manufactured fiber industry. Fibers
more numerous and diverse than any found in nature, are now routinely
created in the industry’s laboratories.

1990’s Nylon variants, polyester, and olefin are used to produce carpets that
easily can be rinsed clean even 24 hours after they’ve been stained.
Stretchable spandex and machine-washable, silk-like polyesters occupy
solid places in the U.S. apparel market. The finest microfibers are
remaking the world of fashion.
Late 1990’s  Increased environmental awareness further encourages manufacturers to become green manufacturers, reducing energy consumption, cleaning up or eliminating air and water pollution, and recycling production supplies and finding environmentally safe uses for fabric waste.

2001  Cargill Dow introduces the first completely renewable fiber made of plant dextrose from cornstarch, polylactide (PLA) and markets it as InGeo. It competes in durability with the petrochemicals and can be disposed of safely as completely biodegradable end use products. PLA has application in interior design materials and carpeting, apparel, packaging, and industry.

Today  Fiber research and improvement continues. As they always have, manufactured fibers continue to mean, “life made better.”

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**FIRST COMMERCIAL U.S. PRODUCTION**

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