Stephanie Louise Kwolek Biography

Stephanie Louise Kwolek

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Biography

Stephanie Louise Kwolek is best known for her discovery of liquid crystalline solutions of synthetic aromatic polyamides and their fibers. These fibers became the first of a new generation of high performance fibers, and the basis for the commercialization of Du Pont's Kevlar brand fibers.

Kwolek graduated with a degree in chemistry from the Carnegie Institute of Technology in 1946, and joined Du Pont in the same year. She moved to Du Pont's Pioneering Research Laboratory at the Experimental Station when it opened four years later. There she was encouraged and supported by Hale Charch, director of the laboratory at that time, as she struggled to gain intellectual acceptance in a male-dominated research community.

Kwolek began her career scouting for new polymers. In 1964, Kwolek began experimenting with poly-p-Phenylene-terephthalate (PPD-T) and polybenzamide (PBA). She became the first person to prepare pure monomers that could be used to synthesize PBA.

The intermediates needed in this process proved extremely sensitive to moisture and heat, so were readily susceptible to hydrolysis and premature self-polymerization. Kwolek discovered a suitable solvent and identified the low-temperature polymerization conditions required to produce an unusual polymer solution that was fluid and cloudy, rather than clear and viscous. Upon spinning this solution, she found that tough fibers with startling properties had formed. These fibers were much stronger and stiffer than any previously made synthetic fiber. The discovery ushered in a stimulating period of research at Du Pont. The search for a candidate for commercialization finally came up with Kevlar.

Kwolek has been honored on many occasions for her pioneering studies. In 1980 she received an award for Creative Invention from the American Chemical Society. In 1995, she was inducted into the National Inventors Hall of Fame.