Pioneering Women in Science

Edith Marie Flanigen

Introduction:

Edith is a well-known American chemist known for her work on emeralds and zeolites. Her legacy continues to shape materials science and her impact is still seen today.

Early Life and Education:

In Buffalo, New York, on January 28, 1929, Edith was born. Joan and Jane were two of her sisters. Their high school chemistry teacher had introduced them all to the subject, and they later studied chemistry together at D'Youville College. As both the class president and valedictorian, Edith graduated. She received an honorary doctorate from Syracuse in 2008. There, she completed an MS in inorganic chemistry.

Career:

In 1952, Edith started working for Union Carbide, at a time when women were rarely found working in highly complex scientific careers. Initially, she was responsible for identifying, extracting, and purifying various silicone polymers. She joined the molecular sieves group in 1956. In 1973, she became the first female employee at Union Carbide to hold the title of corporate research fellow and later on, senior corporate research fellow. In 1988, she relocated to UOP, where she held the position of senior research fellow. She then received a promotion to UOP Fellow in 1991. In the end, she left UOP in 1994 to retire. Over the course of her 42-year career, she has authored 36 publications, received 109 patent awards, and invented more than 200 distinct synthetic substances. She retired in 1994, after earning 108 U.S. patents in the fields of petroleum research and product development. She found that most of her male subordinates were supportive, but she quickly won over those who were more skeptical of being managed by a woman. She did so by continuing her brilliant work and encouraging theirs. “I gave them respect,” she said. “Once we worked together and we had successes, they were more excited about the work they were doing…rather than the relationship between the person and myself.”

Research:

Molecular sieves are crystal compounds with molecules-sized pores that can filter extremely complex substances. Edith began working on these compounds in 1956. Zeolite Y, a unique kind of molecular sieve, is the invention for which she is most famous. They can also catalyse or speed the rate of hydrocarbon reactions. Zeolite Y was a kind of molecular sieve used for petroleum refinement. As catalysts (a material that speeds up chemical reactions), Edith’s zeolites were employed. Edith's work made the production of Zeolite Y commercially viable. Fuel refinement is safer and more efficient when Zeolite Y, a catalyst, is used to increase the amount of gasoline fractioned from petroleum. She shared in the creation of a synthetic emerald as well. For a while, emeralds were also utilized in jewellery. Masers are the devices that came before lasers. Flanigen has said that one of her strengths throughout her career has been her ability to discover a new material and see it through to commercialization, from envisioning processes for manufacturing it on a large scale to developing it for industrial application. Her sieves are also used in water purification and environmental clean-up and can be used to make ethylene and propylene, which are elements necessary to the

By Mehr Fatima Salil 8C

manufacturing of some plastics. She also pioneered the use of mid-infrared spectroscopy for analyzing zeolite structures.

Achievements:

Edith was the first female to receive the Perkin Medal in 1992 and she was added into the National Inventors Hall of Fame in 2004. In 2014, the Edith Flanigen Award was created by the Collaborative Research Centre at Humboldt University of Berlin. The award is to be given annually to an outstanding female scientist at the early stage of her career. In 2012, she was named recipient of the National Medal of Technology and Innovation. On November 20, 2014, President Barack Obama presented she with the National Medal of Technology and Innovation for her contributions to science. Here is a list of more of her awards:

1991, Chemical Pioneer Award from the American Institute of Chemists

1993, Garvan Medal

2004, National Inventors Hall of Fame (“Good ideas are even better ideas when they can improve people’s lives and help the Earth,” she said in an interview with the National Inventors Hall of Fame)

2004, Lemelson–MIT Lifetime Achievement Award

2012, Edith M. Flanigen Honeywell invitational lecture in material science series, inaugurated October 2012

2012, National Medal of Technology and Innovation

Personal Life:

Although she was a chemist, she also enjoyed reading, gardening, music, art and cooking. When asked about her impactful career, Flanigen shared, “It’s been very satisfying because for all of my career, our task, our focus was to discover new materials. And when you’re discovering new materials that have never existed before, it is really a great delight.” She is a life-long Catholic and daily communicant, who is active in her parish as a Eucharistic minister and Lector.

By Mehr Fatima Salil 8C