

Stamps International

Just One Word: Plastics

That was the simple yet puzzling advice offered by a family friend to the character played by Dustin Hoffman in the 1967 American film *The Graduate*, for which the versatile actor received his first Oscar nomination. "There is a great future in plastics,"*

the friend added with confidence and unusual foresight. Only four years earlier, the Nobel Prize in Chemistry had been awarded jointly to Karl Ziegler (1898-1973) and Giulio Natta (1903-1979) "for their discoveries in the field of the chemistry and technology of high polymers." Although Bakelite, PVC, and polystyrene had been commercially available for several years, Ziegler and Natta's contributions in the 1950s, particularly for the catalytic

large-scale production of polyolefins, made polymers the truly ubiquitous materials they are today. Almost 300 million tonnes of plastics are now produced in the world each year, with polypropylene and various types of polyethylene, widely used in the packaging

and textile industries, accounting for more than half of the total output.

The Swedish stamp illustrated in this note was issued in 1988 and commemorates the 25th anniversary of the Nobel Prize in Chemistry that Ziegler and Natta received in 1963. It is part of a set of four stamps that honors Nobel laureates in chemistry and also features Willard Libby (radiocarbon dating, 1960), Ilya Prigogine (non-equilibrium thermodynamics, 1977) and Aaron Klug (electron microscopy, 1982). The design of the colorful stamp includes a spider's web, a substance known for its high-tensile strength and elasticity, and a molecular representation of what appears to be a linear chain of polyisoprene (i.e., natural rubber), even though the naturally occurring material contains primarily *cis*- rather than *trans*- double bonds.

Half a century after their pioneering work, Ziegler and Natta would be amazed today with the degree of sophistication attained by olefin polymerization catalysis (a driving force behind research in organometallic chemistry during the past few decades), not to mention the concerted effort in recent years to produce biodegradable and recyclable plastics.

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*<http://www.youtube.com/watch?v=DHGCvJjat1E>

