Polypropylene Encyclopedia Article

Polypropylene

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Polypropylene

Polypropylene is a linear **macromolecule**, or polymer, composed of repeating units of isopropane. It is a thermoplastic material which gets softer with heating and hardens when cooled. First produced in the late 1950s, polypropylene has become an important plastic used in a variety of industries.

The **chain reaction** polymerization process for producing polypropylene was first developed in 1954 by **Giulio Natta**. He used a catalyst discovered by **Karl Ziegler** to produce polypropylene from propylene. This reaction was important because it could be run at room **temperature** and low pressures. The first commercial production of polypropylene occurred in 1957 by Montecatini in Italy. It rapidly became a significant industrial compound because of its good physical and economic properties. For their work, Ziegler and Natta were awarded the Nobel Prize in **Chemistry** in 1963. Over the years, improvements have been made in the types of catalysts used for producing polypropylene. Improvements have also been found for controlling the structure of the resulting product. In 1993, worldwide production of polypropylene was greater than 14 million tons.

Polypropylene is a lightweight, low **density** material that has a high degree of crystallinity compared to other polymers. It also has high tensile strength, stiffness, and hardness. It has good gloss and a high softening temperature range which makes it suitable for sterilization. Additionally, it has good electrical properties, is resistant to moisture and is chemically inert. It also has excellent barrier properties making it resistant to permeation of **water** vapors and other **gases**.

Polypropylene is used for a variety of purposes. It can be spun into a filament that is useful for making rope, webbing and cordage. It is also used for making carpeting. It can be molded into different forms and used for parts in home appliances and automobiles. Additionally, polypropylene is used for household product packaging.