Polyester Encyclopedia Article

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Polyesters are a class of linear, thermoplastic polymers, characterized by an ester group contained in their primary molecular backbone. They are the result of a reaction between a diacid (such as terephthalic acid) and a diol (such as ethylene glycol). First produced commercially in the late 1920s, polyesters have become important compounds used in a wide variety of industries. The most economically important types of polyesters include poly(ethylene terephthalate) (PET) and poly(butylene terephthalate) (PBT).

The chemical reactions for making polyesters were investigated in 1901 and resulted in the production of glyptal polyesters. These reactions involved the combination of a diacid with a diol. The reaction was called a **condensation reaction** because the two initial types of monomers combined to produce a longer chain polymer and **water** as a byproduct. Linear polyesters were not produced until the 1930s, when **W. H. Carothers** systematically investigated reactions of diols with diacids. Carothers was not successful in producing a polyester fiber and switched the focus of his research. In 1942, **John Whinfield** and W. Dickson made the first high **molecular weight** PET. After these fibers were produced other polyesters were discovered and have since become important compounds.

Polyesters have many characteristics that make them useful. They have high melting points and maintain good mechanical properties up to 175°C. They are generally resistant to **solvents** and other chemicals. When made into a fiber they demonstrate low moisture absorption and good resistance to abrasion. As a film they have a high tensile strength, are stiff, and have a high impact strength.

The versatility of polyesters can be demonstrated by the wide variety of products in which they are used. When spun into a fiber, polyesters are used to produce textiles, yarns, ropes and tire cord. When drawn out as a thin film, polyesters are used for making magnetic tape for audio and video recording, packaging materials and photographic film. Polyester can also be molded into many forms and used for making such things as bottles and containers that package consumer goods. They are also used to make parts for the automotive and electronics industries.