TECHNICAL TUESDAYS

POLYESTER AND ITS BLENDS – PART I

REF: TT/ JULY 2020 / WK 1

An Introduction to Polyester

Polyesters are man-made long-chain polymers. These polymers are chemical compounds with molecules bonded together in long, repeating chains. Because of their structure, polymers have unique properties that can be of different uses.

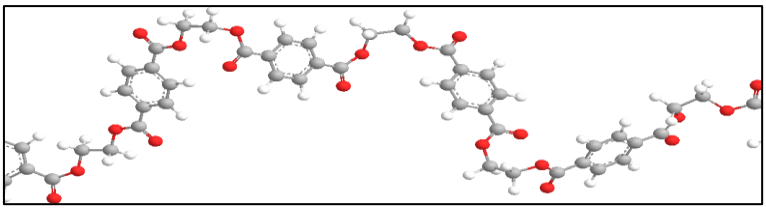

Fig 1.1 Long chain polymer of Polyester

Ref: pslc.ws

Polymers can be natural as well as man-made or synthetic. The most common natural polymer is cellulose, an organic compound found in the plants. This is used to produce textiles and papers.

Man-made or synthetic polymers include materials such as polyethylene, those are used to make wide range of items ranging from apparel to storage containers, and polystyrene, the material used to make packing peanuts and disposable cups. Some synthetic polymers are thermoplastics, while others are thermosets and some have rubber-like properties.

Like there are many types of polymers, polyesters are also of various types. The most popular one is polyethylene terephthalate or commonly referred as PET. Polyester fabrics are strong, resistant to stretching and shrinking, easy to clean, quick drying and resistant to wrinkles, mildew and abrasions.

These fibers have many uses, depending on the way they have been manufactured and the orientation of the polymer chains.

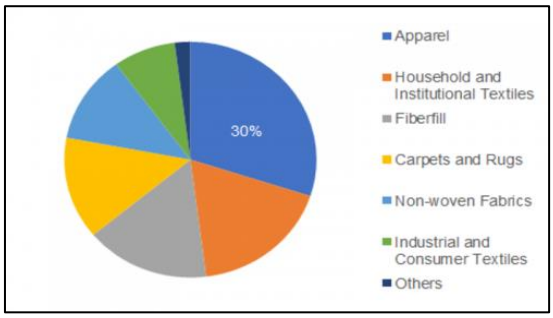

Fig 1.2 Polyester in different areas of textile

Ref: marketresearchfuture.com

The main application of polyester fibers is in the production of fabrics, which are used for the manufacturing of high fashion. However, because of its different properties, they are used
In other segments like home furnishing, technical fabrics also.

Chemistry of Polyester fibers

The long chain polymer of polyester fiber refers to the linkage of several monomers within the fiber. These monomers are esters, which are formed by the polymerization of ethylene glycol and terephthalic acid. Polyester fibers are chemically composed of at least 85 percent by weight of an ester formed by the reaction of Terephthalic acid (An acid) and Ethylyne glycol (An alcohol). It is made by a reaction involving an acid with two -COOH groups, and an alcohol with two -OH groups. Each acid group and each alcohol group reacts and loses a molecule of water resulting into the formation of an ester linkage.

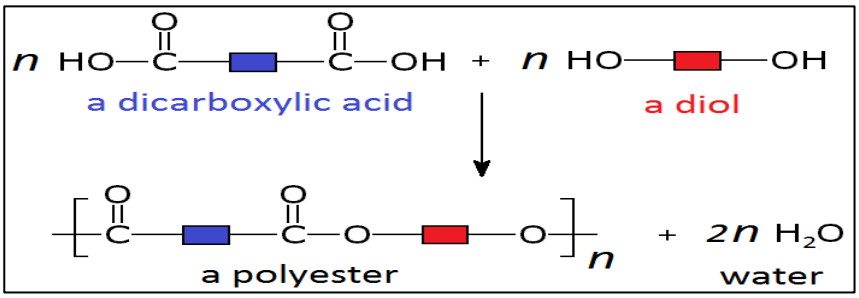

Fig 1.3 Chemical reaction to form polyester

Ref: TutorMyself Chemistry

Interesting Facts

- **W.H.Carothers while working in DuPont lab discovered that alcohols and carboxyl acids could be successfully mixed to create fibers. This later led to the discovery of Polyester fiber.**

- **Terylene, the first commercial polyester fiber was manufactured by ICI which is later taken by Dupont.**

By this reaction, PET is formed in the form of a molten, viscous mass that is spun into fibers or solidified to produce plastic. The presence of a large aromatic ring in the PET structure imparts stiffness and strength to the fiber. The stiffness of Polyester fibers makes them highly resistant to deformation and exhibits very good resistance to wrinkling in fabrics.

.....To be continued.....

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