

HOW PLASTICS ARE MADE

Plastics encompass a large and varied group of materials consisting of different combinations or formulations of **carbon, oxygen, hydrogen, nitrogen** and other elements. Most plastics are a solid in finished form; however, at some stage of their existence, they are made to flow and may be formed into various shapes.

Plastics are **synthetic** because they are man-made. However, plastics are **organic** because they are made from natural compounds. The forming of plastics is done through the application of **heat and pressure**.

There are over 50 different families of plastics in commercial use today and each family may have dozens of variations. Even though there are 50 different families of plastics, you will be primarily interested in approximately 10 of those families.

Let's start with some basic terms.

MONOMER

“Mono” means “one” and “mer” means “part”. So, a Monomer is one specific type of complex



Monomers atom. It becomes the building block for Polymers. Monomers are then joined together to make long chains that result in a material with a useful blend of properties. The monomers are held together by a VERY strong attractive force. Polymer chains are held together by a much weaker attractive force. The polymer chains can be constructed in many ways. Examples of Monomers in the plastic world are ethylene, styrene, vinyl chloride, and propylene.

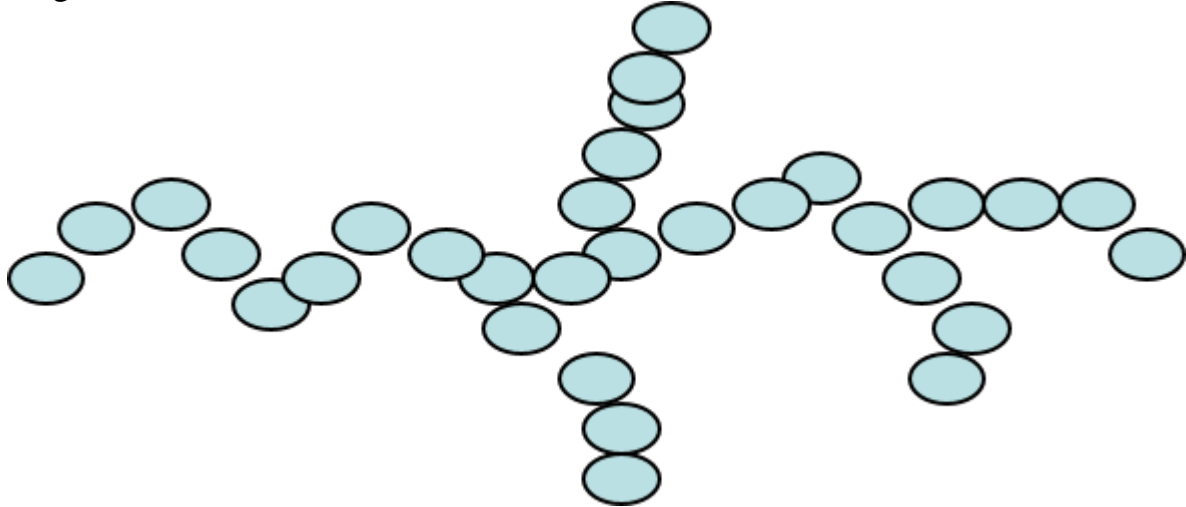
POLYMERIZATION

The word “mer” is a Greek word that means “part”. “Poly” means many. Poly-mer means many parts. The “part” is a unique combination of atoms, combining to form molecules which are called Monomers. POLYMERIZATION means getting these molecules to stick together.

HOMOPOLYMER

A-A-A-A-A-A-A

Homopolymers are Polymers constructed from joining Monomers. Compare it to a long ch



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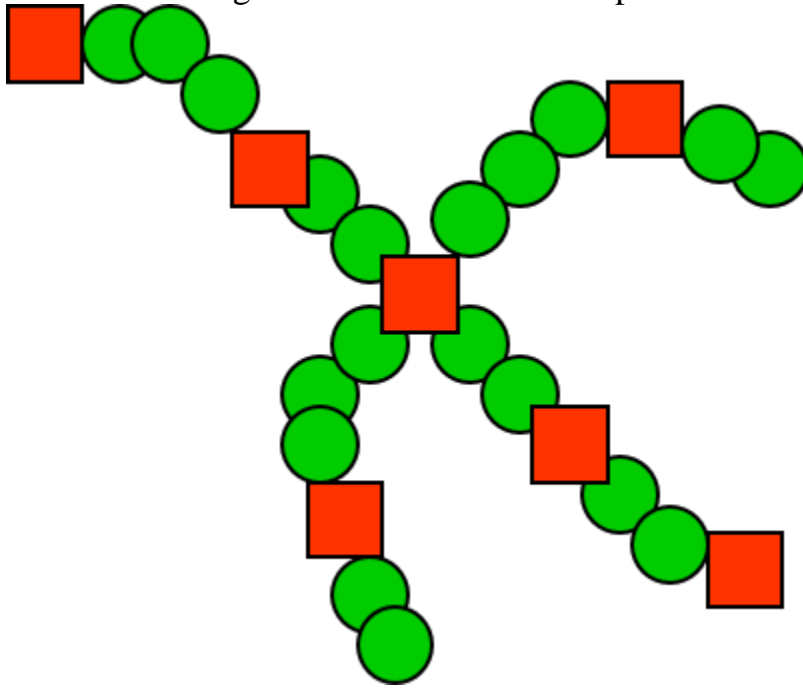
Even though the chain is a single tool, it is made up of many identical links. Polyethylene, polystyrene, polypropylene and polyvinyl chloride are examples of Homopolymers.

COPOLYMERS

A-A-A-B-A-A-A-B-A-A-A-B

Copolymers are Polymers made from two different Monomers. Copolymers in the plastic world are ethylene-acrylic and acetals. The two Monomers in a Copolymer are

combined during the chemical reaction of pol



ymerization.

Materials called “alloys” are manufactured by mixing two or more polymers resulting in a better material. There is no CHEMICAL REACTION in creating an alloy. Copolymers are combined forming a new product with new properties.