

Difference Between Elastomer and Polymer

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Key Difference - Elastomer vs Polymer

Polymer chemistry involves the study of very large [molecules](#) which are made out of small repeating units. These repeating units are called [monomers](#) and are linked together to form the large molecule, polymer. Since these are large molecules, many varieties can be observed when studying polymers. Elastomer is a type of polymer. The key difference between elastomer and polymer is that **a polymer is any large molecule which is built with small units called monomers whereas elastomer is a special type of polymer which has [elastic](#) property.**

What is an Elastomer?

An elastomer is a type of polymer. It has the major characteristic feature of [elasticity](#). Elastomers are rubber-like material and are usually [amorphous polymers](#) (there is no ordered structure). The elastic property of elastomers arises due to sufficiently weak [Van Der Waal forces](#) between polymer chains or sufficiently irregular structure. If the forces between polymer chains are weak, it gives the polymer flexibility. Likewise, if the polymer has an unorganized structure, it allows the polymer to be more flexible. But in order for a polymer to be flexible, it should have some degree of cross-linking.

A good elastomer does not undergo plastic flow. In other words, the shape of an elastomer would momentarily change when a stress is applied, but it would obtain its original shape once the stress is relieved. Natural rubber vulcanization process is a good example for this. Natural rubber alone tends to undergo plastic flow. Vulcanization is the process where sulfur cross-links are introduced to natural rubber. This causes reduction of plastic flow and allows the polymer to return to its original shape when stretched and released.

Elastomers are found in two types as thermoplastic elastomers and thermoset elastomers.

- Thermoplastic elastomers – these elastomers melt when heated
- Thermoset elastomers – these do not melt when heated

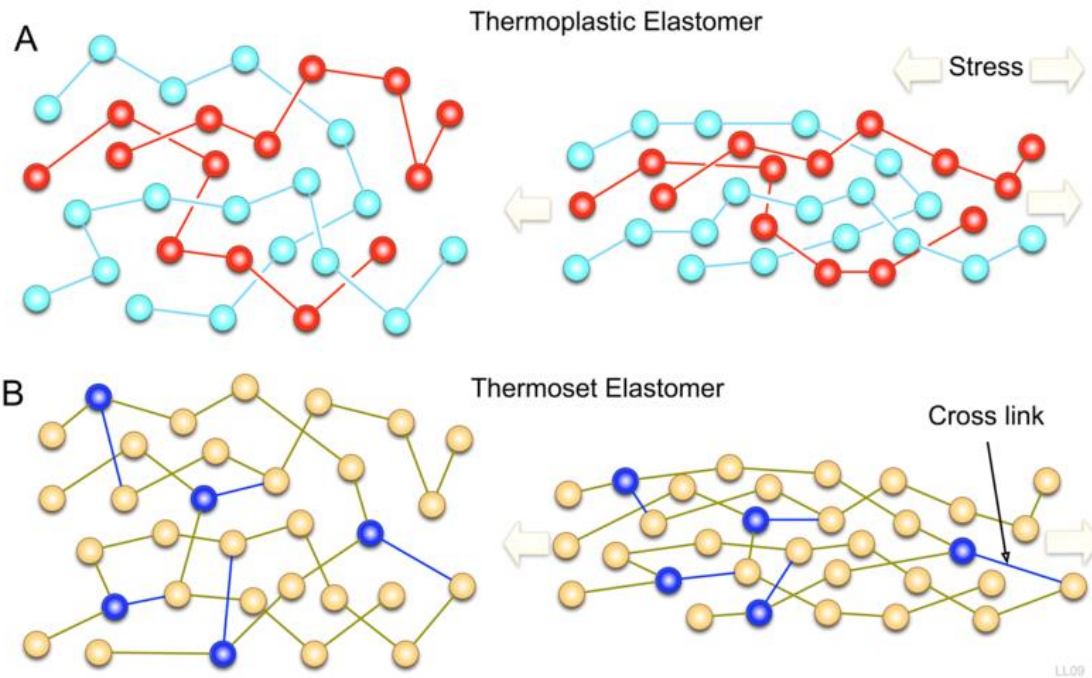


Figure 01: Response of Two Types of Elastomers to Stretching

What is a Polymer?

A polymer is a giant molecule which is built out of small units called monomers. These monomers are arranged repeatedly, thus they are called repeating units. Monomers are linked via [covalent bonds](#). A monomer should have two vacant points in its sides in order to bind with two other monomers. Those monomers also have a point where another monomer can bind with. Likewise, a number of monomers will bind with each other repeatedly. This results in a polymer chain. This process is called [polymerization](#). Polymer chains can hold [intermolecular forces](#) between polymer chains. This is called cross-linking. It will result in a number of different types of polymer molecules. These are macromolecules. Polymers are classified into several categories according to their structure, physical properties or their technological uses. According to the physical properties, polymers are divided as [thermosets](#), elastomers, and [thermoplastics](#). These polymers can be either amorphous or semi-crystalline.

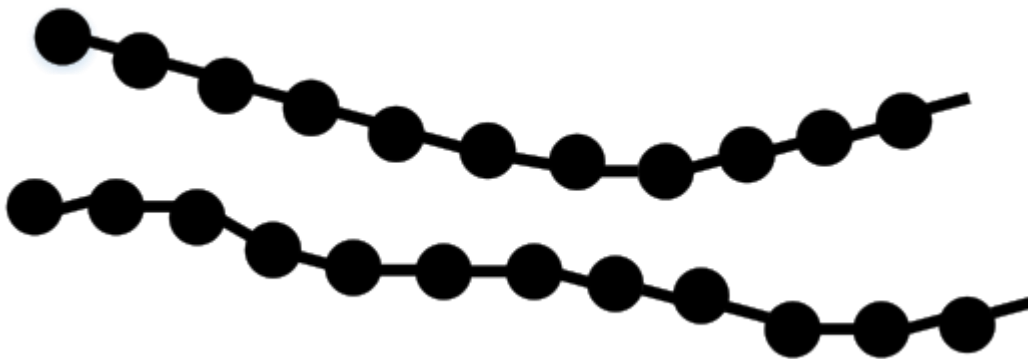


Figure 02: Polymer Chains Formed after Polymerization Process

What is the difference between Elastomer and Polymer?

Elastomer vs Polymer	
An elastomer is a type of polymer having special characteristics	Polymer is any giant molecule made out of repeating units.
Physical Properties	
An elastomer has a special property: elasticity	Polymers have different properties such as elasticity and plasticity.
Morphology	
An elastomer is an amorphous polymer.	Polymers can be either amorphous or semi-crystalline.
Elasticity	
Elastomers can withstand high elastic deformation.	Other polymers rupture.
Flexibility	
Elastomers are very flexible.	Other polymers are rigid.

Summary - Elastomer vs Polymer

Polymers are a broad collection of organic molecules, which are categorized into several groups according to the properties and their uses. Elastomer is a group that has been categorized according to its physical properties. The main difference between elastomer and polymer is that a polymer is any large molecule which is built with small units called monomers whereas elastomer is a special type of polymer which has elastic property.

Reference:

- 1."Thermosetting, thermoplastics and elastomers." LinkedIn SlideShare. N.p., 08 Dec. 2014. Web. [Available here](#). 05 June 2017.
2. "Types of Polymers." Chemical Education Division Groups. Purdue University, n.d. Web. [Available here](#). 05 June 2017.

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