



19CH103 ENGINEERING CHEMISTRY

UNIT-4 HIGH POLYMERS

What is Thermosetting Plastics?

Thermosetting plastics are made up from long chains of molecules that are cross-linked. They have a very rigid structure.

Once heated, thermosetting plastics can be moulded, shaped and pressed into shapes. Once set they cannot be reheated since they are permanently set.

When you are studying polymers in chemistry you will generally come across a typical question like *“distinguish between or write the differences between thermoplastic and thermosetting plastic.”* While thermoset plastics and thermoplastics sound very similar, they are totally different compounds and have different properties as well as applications.

Basically, thermosetting and thermoplastics are two different types of polymers and they are mostly separated based on their molecular bond and reaction to heat.

Difference Between Thermoplastic and Thermosetting Plastic

Thermoplastic	Thermosetting Plastic
Thermoplastic can be synthesized by the process called addition polymerization.	Thermosetting plastics are synthesized by condensation polymerization.
Thermoplastic is processed by injection moulding, extrusion process, blow moulding, thermoforming process, and rotational moulding.	Thermosetting Plastic is processed by compression moulding, reaction injection moulding.



Thermoplastics have secondary bonds between molecular chains.	Thermosetting plastics have primary bonds between molecular chains and held together by strong cross-links.
Thermoplastics have low melting points and low tensile strength.	Thermosetting plastics have high melting points and tensile strength.
Thermoplastic is lower in molecular weight, compared to thermosetting plastic.	Thermosetting Plastic is high in molecular weight.

Talking about the differences between thermoplastic and thermosetting plastic, well the main distinguishing factor between the two is that, thermoplastic materials typically have low melting points due to which it can further be remoulded or recycled easily.

On the other hand, thermosetting plastic is quite the opposite. They can withstand high temperatures and once hardened these cannot be reformed or recycled even with the application of heat. In any case, let's have a look at some of the important differences between these two compounds below.

These are some of the differences between thermoplastic and thermosetting plastic.

Some *examples of thermoplastics* are listed below.

- Polystyrene
- Teflon
- Acrylic
- Nylon

Examples of thermosetting polymers include:

- Vulcanized rubber



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- Bakelite
 - Polyurethane
 - Epoxy resin
 - Vinyl ester resin