thermoplastic VS. thermoset plastic

Thermoplastic

- thermoplastic monomer, which has only two reactive ends for linear chain growth
- fully recyclable – can be re-shaped when heated. Polymer chain does not degrade when melted down.

Thermoset plastic

- monomer must have three or more reactive ends so that it's molecular chains crosslink in three dimensions.
- High melting point – high thermal stability (heat resistant)
- harder, stronger – giant molecule.

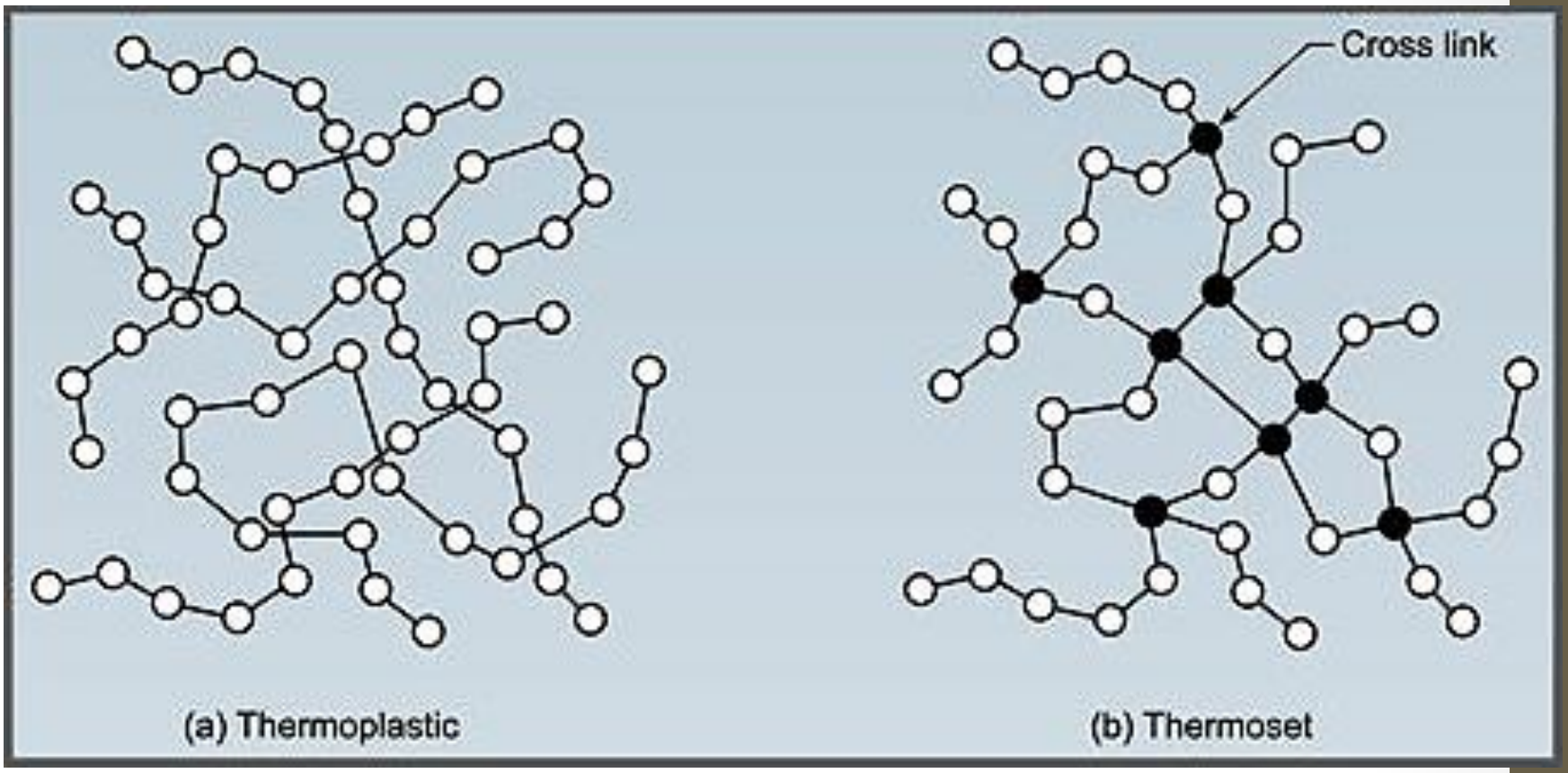
thermoplastic VS. thermoset plastic

Thermoplastic

- Long chains are held together by weak intermolecular forces (van-der-Waals forces).
- synthesized by addition reactions.
- light weight
- high strength

Thermoset plastic

- lack tensile strength - Brittle
- Not recyclable – burns when heated.
- Retain their strength and shape even when heated – suitable for production of large solid shapes and permanent components.


Cross link
(a) Thermoplastic
(b) Thermoset

Advantages

Thermoplastic

- Higher impact resistance.
- ability to reform – recyclable.
- light weight.
- low processing costs.

Thermoset plastic

- Excellent chemical and corrosion resistance
- Excellent thermal properties and low creep
- High stiffness
- Flame retardant
- High strength to weight ratios
- Excellent thermal insulation

disadvantages

Thermoplastic

- limited temperature spectrum for applications
- UV Decomposition
- more difficult to impregnate reinforcing fiber -thermoplastic resin is naturally in a solid state.
- Many has poor resistance to hydrocarbons, organic solvents, and highly polar solvents

Thermoset plastic

- Non recyclable.
- Brittle

- http://www.slideshare.net/VishnuMohan4/light-emitting-polymers-10118745#btnNext
- http://www.youtube.com/watch?v=SJ0oMMEyb40