MINISTRY OF EDUCATION

SECONDARY ENGAGEMENT PROGRAMME

GRADE 11

CHEMISTRY

WEEK 12 **LESSON 1**

Topic: Macromolecules

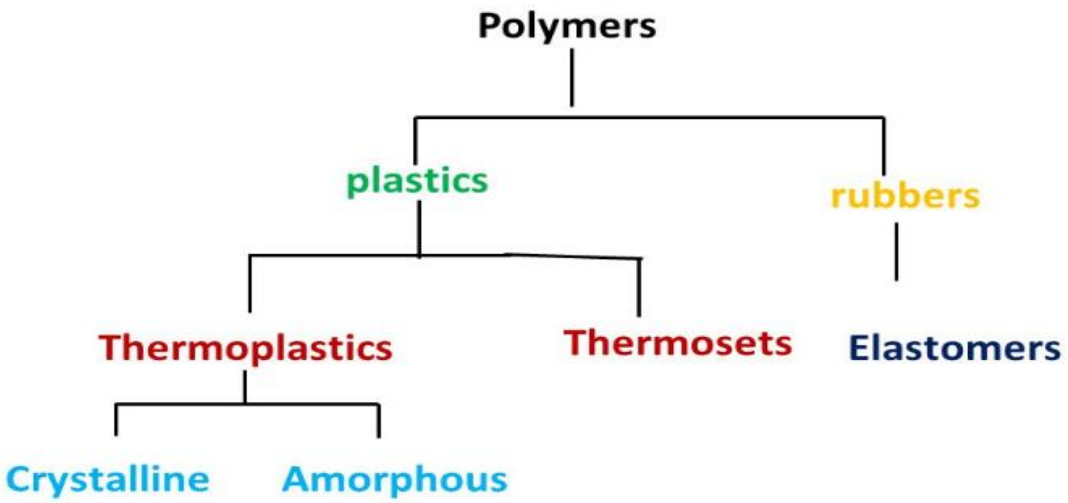
Sub-topic: Classification of Polymers

Objective: Given the information, students will at least 5 differences between thermoplastics and thermosetting plastics.

Content

Polymeric materials undergo many modifications such as the addition of stabilizers, fillers, pigments and dyes. These reduce the cost and enhance the appearance of the finished products. Plastics are classified as thermoplastics and thermosets, depending in their behavior when heated.

Classification of Polymers based on Molecular Forces



Note: You only need to know about thermoplastics and thermosets

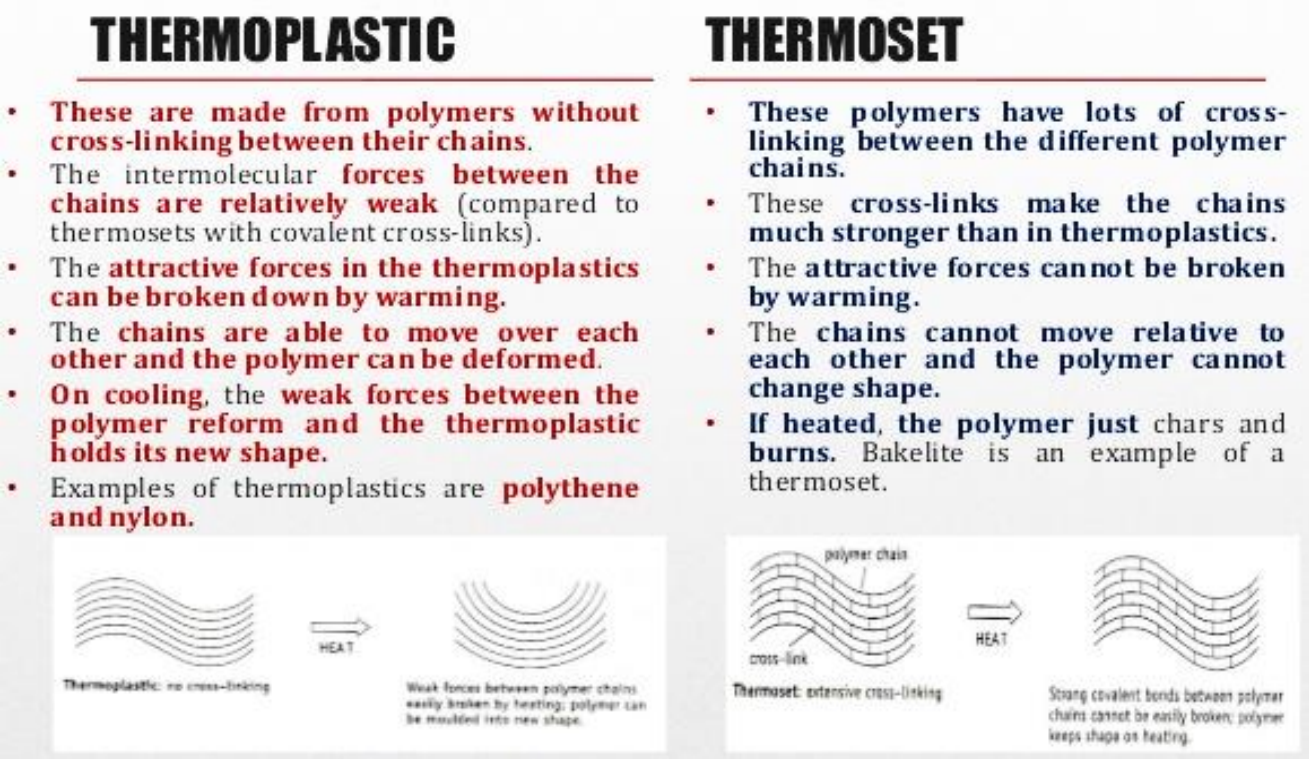
Thermoplastics

Thermoplastic polymers are long-chain polymers in which inter-molecules forces (Van der Waal's forces) hold the polymer chains together. These polymers when heated are softened (thick fluid-like) and hardened when they are allowed to cool down, forming a hard mass. They do not contain any cross bond and can easily be shaped by heating and using moulds. A common example is Polystyrene or PVC (which is used in making pipes).

iii) Thermosetting

Thermosetting plastics are polymers which are semi-fluid in nature with low molecular masses. When heated, they start cross-linking between polymer chains, hence becoming hard and infusible. They form a three-dimensional structure on the application of heat. This reaction is irreversible in nature. The most common example of a thermosetting polymer is that of Bakelite, which is used in making electrical insulation.

Differences between Thermosetting and Thermoplastics



Polymers and their uses.

Polyalkenes

1) Polyethene -which is made from the monomer ethane- used for packaging, manufacture of toys, kitchenware, food containers, buckets, plastic film and bags.
2) Polyvinyl chloride- insulation for electrical wires; as building material eg guttering.
3) Polypropene- manufacture of ropes, food containers, washing up bowls.
4) Polystyrene- packaging and insulation.

Polyamide- manufacture of fibres for clothing, ropes, fishing, fishing lines.

Protein- building body cells, hair and nails, making enzymes.

Polyester- manufacture of fibres for clothing, boat, boat sails, fishing lines

Polysaccharide- stored as food reserves in living organisms eg starch in plants, glycogen in animals.

References

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11. https://slideplayer.com/slide/6019693/
12. https://www.bbc.co.uk/bitesize/guides/z3v4xfr/revision/6