

POLYMERISATION:

KEY POINTS / QUESTIONS:

DETAILS / ANSWERS:

MOLECULAR STRUCTURE:

1. **LINEAR + BRANCH CHAINS:**

The bonding between adjacent molecules is **secondary bonding or Van der Waal's Forces of Attraction**

2. **CROSS LINKS:**

Primary bonding occurs with the cross linking of adjacent molecules. This results in a rigid, non-reversible structure.

POLYMERISATION METHODS:

1. **ADDITION POLYMERISATION:**

Used to create thermoplastics // e.g. Polyethylene;

An ethylene mer (C₂H₄) consists of a strong and weak bond between its carbon atoms. A catalyst or free radical which has an unpaired electron on its outer shell is added. The free radical takes the weak bond leaving the other free. The attacked ethylene molecule now behaves like a radical and the process repeats continuously until terminated by the addition of an inhibitor. Addition polymerisation contains bonds held together with weak Van der Waal's forces which can be overcome with heat.

2. **CONDENSATION POLYMERISATION:**

Used to create thermosetting plastics // e.g. Phenol formaldehyde (C₆H₅OH);

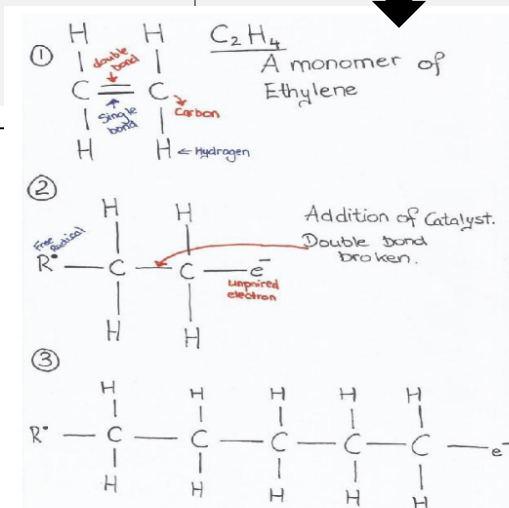
Forms strong primary bonds with cross links between chains. Two monomers react chemically to form a new molecule, with water eliminated as a by-product. The polymer cannot be re-softened and has a high melting point and tensile strength.

PROPERTIES:

THERMO // THERMOSET:

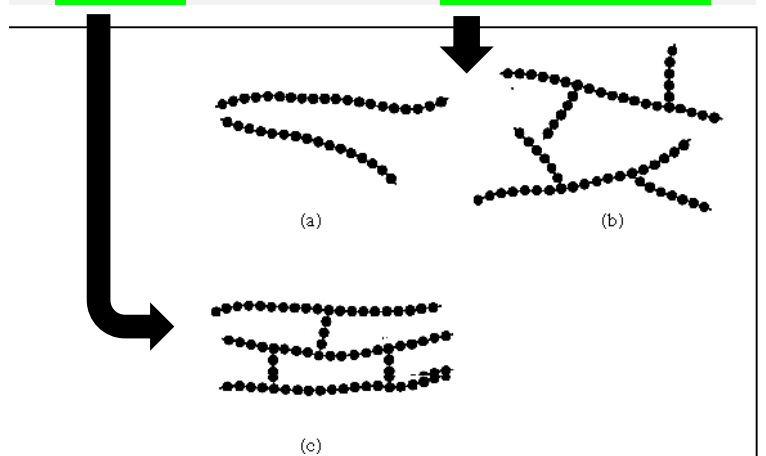
<i>Thermoplastics:</i>	<i>Thermosetting plastics:</i>
Can be heated and reshaped	Non reversible structure
Flexible	Rigid
Low melting point	High melting point
Low tensile strength	High tensile strength
Ideal for recycling	Not recyclable
Linear or Branch chain structure	Cross linked structure

Addition Polymerisation



Cross Links

Linear + Branch Chains



Summary: