POLYMERS

Polymers are made from chemicals made from crude oil. Polymers form when small molecules, called monomers join together to make bigger ones. As monomers join together they produce a tangled web of very long chain molecules e.g. poly(ethene).

-Properties of polymers depend on:

- The monomers used to make it
- The conditions chosen to carry out the reaction

E.g There are two types of poly(ethene), both made from ethene monomers but formed under different conditions.

Low Density Poly(ethene) is an example of a thermosoftening polymer so it softens easily when heated. The conditions needed to make low density poly(ethene) are: high pressures and a trace of oxygen – ethene is heated to about 200 Celsius degrees. Low density poly(ethene) is used for bags and bottles because of its properties: its polymer chains are branched and can't pack closely together. There are weak intermolecular forces so there's a low melting point and a weak material overall.

The conditions to make high density poly(ethene) are: using a lower temperature, approximately 50 Celsius degrees and pressure as well as using a catalyst. High density poly(ethene) is made up of straighter poly(ethene) molecules which can pack more closely together than branched chains. High density poly(ethene) has a higher softening temperature and is stronger than low density poly(ethene).

Q) Describe and explain the properties of thermosetting and thermosoftening polymers.

- Thermosoftening polymers are easy to melt.
- When they cool, thermosoftening polymers harden into a new shape, so these plastics can be melted and remoulded.
- Polymers are made up of lots of molecules joined together in long chains. Thermosoftening polymers don't have cross-linking between chains.
- The weak intermolecular forces between the chains in thermosoftening polymers are really easy to overcome, so it's easy to melt the plastic.
- Thermosetting polymers are strong, hard and rigid.
- Thermosetting polymers don't soften when they're heated.
- Thermosetting polymers have crosslinks which hold the chains together in a solid structure.