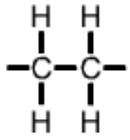
Monomers - repeating units in a polymer

Hydrocarbons obtained from fossil fuels are broken down into simpler molecules in the "cracking process". The cracking process involves heating a hydrocarbon in the presence of a catalyst which causes it to break down into simpler molecules such as ethylene (ethene) C_2H_4, propylene (propene) C_3H_6, and butene C_4H_8.

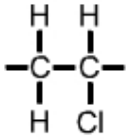
A single unit of a molecule like ethene is called a monomer.

Polymers are created by linking lots of units of a monomer in a long chain in a process called polymerisation.

Single units (monomers) of the more common polymers are shown below.

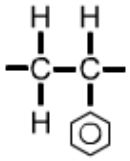


Polyethylene (PE)

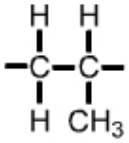


Polyvinyl Chloride (PVC)

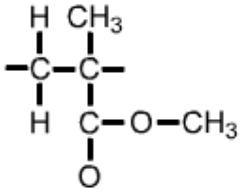
Polytetrafluoroethylene (PTFE)



Polystyrene (PS)
(see note below)

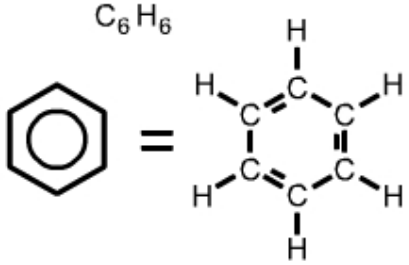


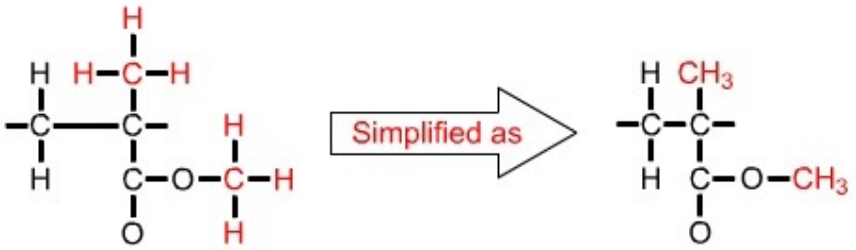
Polypropylene (PP)
(see note below)



Polymethyl methacrylate (PMMA)
(see note below)

The formula for polystyrene includes a hexagon with a circle inside. This symbol represents the compound benzene, C_6H_6.

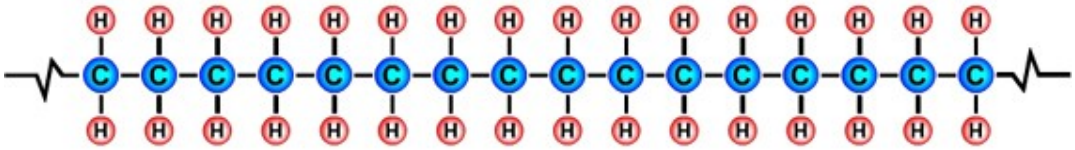




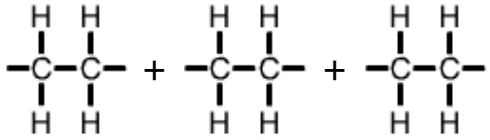
The formula for a single unit of polymethyl methacrylate (PMMA) is $C_5O_2H_8$. This can be shown as in the diagram above left, or simplified as in the diagram above right.

Two examples of polymers are given below:

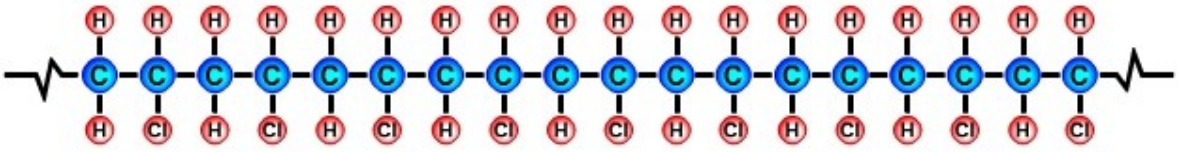
Polyethylene (PE) polymer



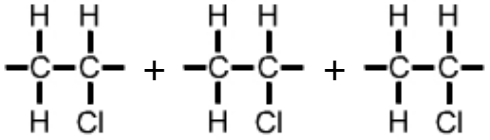
The polyethylene polymer is made up of lots of units of the polyethylene monomer linked together:



Polyvinyl chloride (PVC) polymer



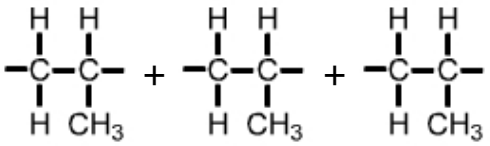
The polyvinyl chloride polymer is made up of lots of units of the polyvinyl chloride monomer linked together:



The PVC polymer formula is similar to the PE polymer formula but you will notice that one hydrogen atom is replaced by a chlorine atom in each PVC monomer.

Other polymers are made in the same way, i.e. monomers are linked together in long chains, e.g. the polytetrafluoroethylene (PTFE) polymer and the polypropylene (PP) polymer shown below.

polytetrafluoroethylene (PTFE) polymer



polypropylene (PP) polymer