AQA GCSE Chemistry

Topic 7: Organic chemistry

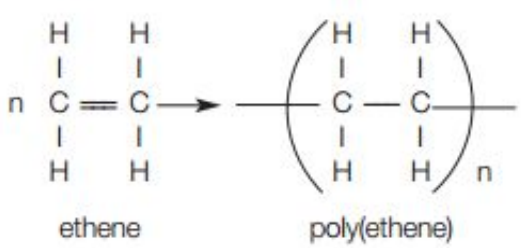
Synthetic and naturally occurring polymers (chemistry only)

Notes

(Content in bold is for Higher Tier only)

Addition polymerisation

- Alkenes can be used to make polymers such as poly(ethene) and poly(propene) by addition polymerisation. In this reaction, many small molecules (monomers) join together to create very large molecules (polymers). For example:

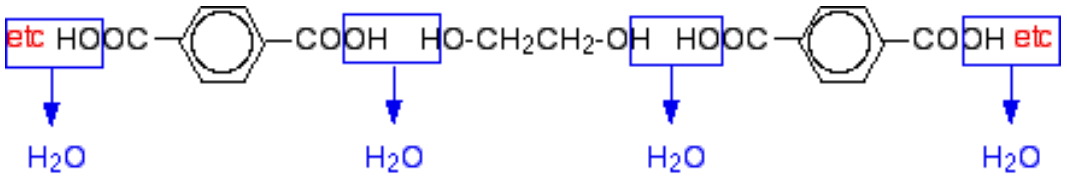


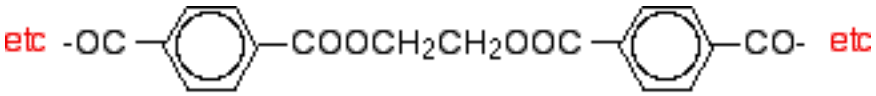
- The repeat unit has the same atoms as the monomer because no other molecule is formed in the reaction
- when you draw out a polymer make sure than you remember to draw the bonds coming off the C's out the brackets and the little 'n' (means there are large numbers of these molecules joined together)

Condensation polymerisation

- **Involves monomers with two functional groups**
  - **When they react, they join together, usually losing small molecules such as water, and so the reactions are called condensation reactions**
  - **Simplest polymers are produced from two different monomers with two of the same functional groups on each monomer**

E.g. this polyester has 1 monomer with 2 carboxylic acid functional groups and 1 monomer with 2 alcohol functional groups:





Amino acids

- **They have two different functional groups in a molecule (an amine group and a carboxylic acid group)**
- **They react by condensation polymerisation to produce polypeptides (works the same as the polyester above just has different functional groups)**
- **Different amino acids can be combined in the same chain to produce proteins**

DNA (deoxyribonucleic acid) and other naturally occurring polymers

- DNA is a large molecule essential for life- it encodes genetic instructions for the development and functioning of living organisms and viruses
- Most molecules are two polymer chains, made from four different monomers called nucleotides, in the form of a double helix
- Other naturally occurring polymers important for life…
    - *o* Proteins (monomer= amino acid), starch (monomer= glucose) and cellulose (monomer= glucose)