



OCR B GCSE Chemistry

Topic 4: Material choices

What are the different types of polymers? (separate science only)

Notes





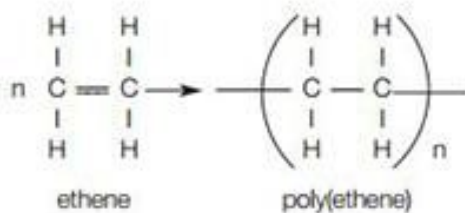
1. (separate science) Recall the basic principles of addition polymerisation by reference to the functional group in the monomer and the repeating units in the polymer

- Polymers are large molecules built up from small units (monomers)
- Addition polymerisation involves the removal of a C=C double bond from an alkene (monomer) to produce a polymer
 - o Repeat unit is just the monomer without the C=C double bond

2. (separate science) Deduce the structure of an addition polymer from a simple monomer with a double bond and vice versa

- Addition polymer from a simple alkene monomer: remove C=C to get repeat unit and then just repeat this a few times, then put brackets around the molecule with a small n outside the brackets on the bottom right
 - o Reverse this to find the monomer

e.g.



3. (separate science- HT only) explain the basic principles of condensation polymerisation by reference to the functional groups of the monomers, the minimum number of functional groups within a monomer, the number of repeating units in the polymer, and simultaneous formation of a small molecule (NB: learners are not expected to recall the formulae of dicarboxylic acid, diamine and diol monomers)

- Condensation polymerisation involves the reaction of two different functional groups to form one long molecule by the removal of a small molecule, such as water H₂O
- Functional groups that react to form condensation polymers include alcohol + carboxylic acid -> polyester // amine + carboxylic acid -> polyamide OR amino acid -> protein
- A monomer must have at least 2 functional groups, if the 2 functional groups are different only one type of monomer needs to be used. If the 2 functional groups are the same, then 2 monomers must be used, with the other monomer having a different 2 functional groups (e.g. one monomer with 2x carboxylic acid groups and one with 2x alcohol)
- How to find a repeat unit: look for a chunk that involves each functional group only once



4. (separate science) Recall that DNA is a polymer made from four different monomers called nucleotides and that other important naturally-occurring polymers are based on sugars and amino-acids

- 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...
 - Proteins (monomer= amino acid), starch (monomer= glucose) and cellulose (monomer= glucose)

