Your notes

GCSE Chemistry: revision notes

Polymers

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Addition polymerisation

- Alkenes can join together to form very large molecules called **polymers**. This is **addition polymerisation**.
- The small molecules are **monomers**. The double bond opens and the **monomers** join in a long chain.
- Ethene makes poly(ethene); propene makes poly(propene).
- In the **repeating unit**, the atoms are the same as in the **monomer**, but the C=C becomes a single bond with bonds extending on either side.

Condensation polymerisation (Higher)

- **Condensation polymerisation** uses **monomers** with two functional groups each.
- When they react, they join together and lose small molecules, such as water.
- Example: a diol (two –OH groups) and a dicarboxylic acid (two –COOH groups) make a **polyester** and water.

Amino acids and proteins (Higher)

- **Amino acids** have two different functional groups: an amine group ($-NH_2$) and a carboxylic acid group (–COOH).
- **Amino acids** react by **condensation polymerisation** to form **polypeptides**; one molecule of water is lost for each bond formed.
- Different **amino acids** can be combined in the same chain to make proteins. Glycine is the simplest **amino acid**.

Natural polymers

- DNA is made of two **polymer** chains of nucleotides that form a double helix.
- Proteins are **polymers** of **amino acids**.

- Starch and cellulose are **polymers** of sugars (glucose).

Your notes

Key terms

Polymer	A very large molecule made by joining many small molecules (monomers).
Monomer	A small molecule that joins with others to make a polymer.
Addition polymerisation	Joining alkene monomers by opening their double bonds.
Repeating unit	The part of a polymer that repeats along the chain.
Condensation polymerisation	Joining monomers with two functional groups, with a small molecule such as water lost.
Polyester	A condensation polymer made from a diol and a dicarboxylic acid.
Amino acid	A molecule with an amine group and a carboxylic acid group; the monomer of proteins.
Polypeptide	A chain of amino acids.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What is a monomer?
2. Which monomer makes poly(propene)?
3. What happens to the double bond in addition polymerisation?
4. Is anything else produced in addition polymerisation?
5. What is lost when monomers join in condensation polymerisation? (Higher)
6. How many functional groups does each monomer need for condensation polymerisation? (Higher)
7. What two functional groups do amino acids have? (Higher)
8. What are proteins made from?

Answers

1. A small molecule that joins with others to form a polymer
2. Propene
3. It opens so the monomers can join
4. No, the polymer is the only product
5. A small molecule such as water
6. Two
7. An amine group and a carboxylic acid group
8. Amino acids

What to do next

Practise 10 questions on this topic

Try 7 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.

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