Monomers and polymers

AQA GCSE Chemistry (8462) · Foundation and Higher

Show your working where needed.

Name _____ Date _____

1. A polymer’s raw material

A factory has CH_3CH_3 and $CH_2{=}CH_2$. Which substance can act as a monomer in addition polymerisation? Explain how its structure lets it form a long chain.

2. The repeat unit from ethene

Ethene is $CH_2{=}CH_2$. Write the repeat unit of poly(ethene) with brackets and continuation bonds. State what happens to the double bond.

3. Working back to propene

A polymer repeat unit is $[\text{-}CH_2\text{-}CH(CH_3)\text{-}]_n$. Give the condensed structural formula and name of its monomer.

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4. A claim about a by-product

A pupil claims that making an addition polymer from $CF_2=CF_2$ gives off one water molecule for every monomer used. Use the monomer formula and the meaning of addition polymerisation to assess the claim.

5. Comparing natural polymers

A pupil says that DNA and proteins are built from the same type of monomer. Name the type of monomer in each and state one other naturally occurring polymer and its type of monomer.

6. Choosing a plastic for a seal

A seal must extend by at least 4 mm under a standard test force and must stay firm at 80 °C.

A extends by 5 mm and softens at 110 °C. B extends by 2 mm and softens at 140 °C. C extends by 6 mm and softens at 65 °C. Choose a material. Use the figures to rule out both alternatives.

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7. Sorting plastics for recycling

A recycling plant sorts a load containing several polymers before melting the plastics. Explain why the sorting step helps produce a reliable new product. State one benefit of recycling and one cost or limitation of this route.

8. Higher · making a polyester

A molecule with two -COOH groups reacts with a molecule with two -OH groups. Explain how these molecules can form a long chain. Identify the link formed and the small molecule released each time.

9. Extra challenge · Two chains from different starting units (Higher)

Monomer P has formula CH_2=CHCl. Monomer Q has formula H_2NCH_2COOH. A pupil says that both monomers form polymers by the same process.

Identify the polymerisation type for each monomer. Show a repeat unit for the polymer from P. For Q, explain how two monomers join and what happens to the other functional groups.

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