Monomers and polymers

Edexcel GCSE Chemistry (1CH0) · Foundation and Higher

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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. Choose a polymer for insulation

Data from a standard test give these maximum use temperatures: poly(ethene), 65 °C. PVC, 105 °C. PTFE, 240 °C. Each passes the electrical insulation test.

A wire can reach 95 °C. Which polymers meet both requirements? PVC is cheaper to buy. Give one further test before choosing it.

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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 · Sort two polymer streams

Stream P contains fragments with repeat unit $[\text{-CH}_2\text{-CHCl-}]_n$. Stream Q contains fragments with repeat unit $[\text{-CF}_2\text{-CF}_2\text{-}]_n$.

Give the name and condensed formula of the monomer for each stream. Explain why a recycling plant might separate the two streams before making a new material, even if operating the sorting step costs money.

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