

Week 29

A-Level Chemistry

Homework bundle for this week

本周作业合集

exercises.lol

Contents 目录

Exercise sheet 20.1	2
Past-paper questions 20.1	6

A-LEVEL CHEMISTRY • EXERCISE SHEET

20.1 Addition polymerisation

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS repeat unit 重复单元 • monomer 单体 • addition polymerisation 加成聚合
• polymer 聚合物 • poly(ethene) 聚乙烯

Objective

Build the skills to answer exam questions on **addition polymerisation** 加成聚合 — drawing **repeat units** 重复单元, finding **monomers** 单体, and the problems of disposal.

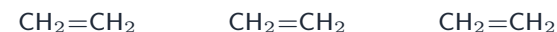
You must be able to:

- describe addition polymerisation (poly(ethene), PVC)
- deduce the repeat unit from a monomer, and the monomer from a polymer
- explain the difficulty of disposing of poly(alkene)s

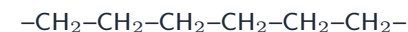
1 Worked examples

■ Addition polymerisation

many monomers (each has a C=C)



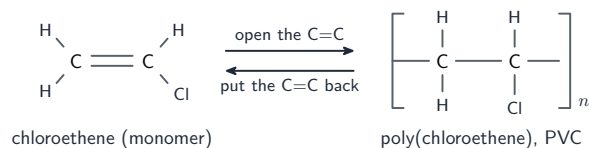
double bonds open and join



one long polymer chain (single bonds)

Many unsaturated monomers join into one long chain, with no other product

■ Repeat unit and monomer

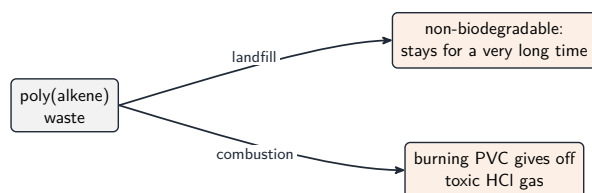


Repeat unit: change the monomer's C=C to a single bond and draw bonds out at each end



To find the **monomer** from a polymer: take one repeat unit and put the C=C back.

■ Disposal



*Poly(alkene)s are **non-biodegradable** and their combustion can release harmful gases (e.g. PVC gives toxic HCl)*

2 Practice

2.1 State what is meant by the **repeat unit** of a polymer. [1]

2.2 State **two** problems of disposing of poly(alkene)s. [2]

3 Exam-style questions

3.1 Which feature must a monomer have to undergo addition polymerisation? [1]

- **A** an –OH group
- **B** a C=C double bond
- **C** a benzene ring
- **D** an ionic bond

3.2 Burning PVC is a particular problem because it releases: [1]

- **A** carbon dioxide only
- **B** toxic hydrogen chloride
- **C** water vapour
- **D** nitrogen

3.3 Propene is $\text{CH}_3\text{CH}=\text{CH}_2$.

(a) Draw the repeat unit of poly(propene). [2]

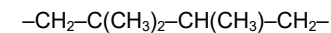
(b) A section of a polymer is $-(\text{CH}_2\text{CHCl})_n-$. Draw the monomer it was made from. [1]

3.4 Explain why addition polymers are described as non-biodegradable. [2]

Solutions

- 2.1** the small part that is repeated again and again along the polymer chain.
- 2.2** non-biodegradable (microbes cannot break them down); combustion releases harmful/toxic gases.
- 3.1 B.** The monomer needs a C=C double bond.
- 3.2 B.** Burning PVC releases toxic hydrogen chloride.
- 3.3** (a) $-(\text{CH}_2\text{CH}(\text{CH}_3))_n-$ drawn with bonds out at each end.
(b) chloroethene, $\text{CH}_2=\text{CHCl}$.
- 3.4** the C–C backbone is strong and unreactive, so microbes/enzymes cannot break it down, and it persists in the environment.

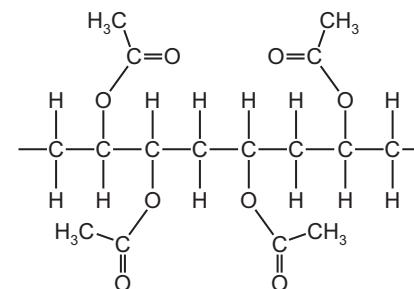
- 32** A small section of a polymer produced from two monomers is shown.



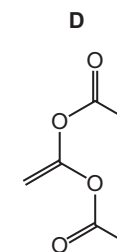
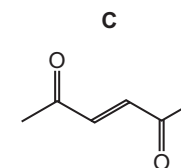
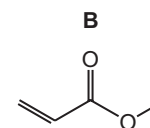
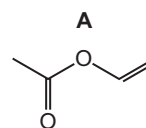
What are the two monomers?

- A** but-1-ene and propene
B but-2-ene and propene
C ethene and pent-2-ene
D methylpropene and propene

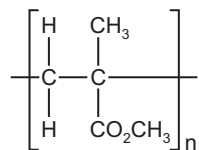
- 39** A section of an addition polymer is shown.



Which monomer is used to make this polymer?

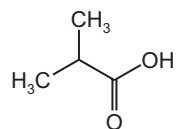


39 PMMA is a rigid polymer. The repeat unit of PMMA is shown.

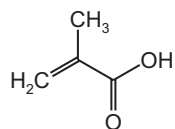


Which monomer is used to make PMMA?

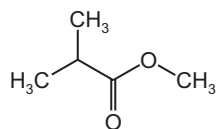
A



B



C



D

