

20.1 Addition polymerisation

Name: _____ Class: _____ Date: _____

Total: 10 marks

Objective

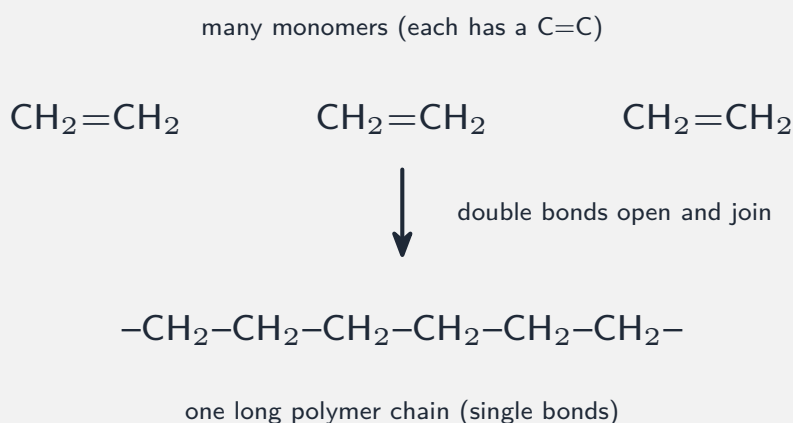
Build the skills to answer exam questions on **addition polymerisation** 加成聚合—drawing **repeat units** 重复单元, finding **monomers** 单体, and the problems of disposal.

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

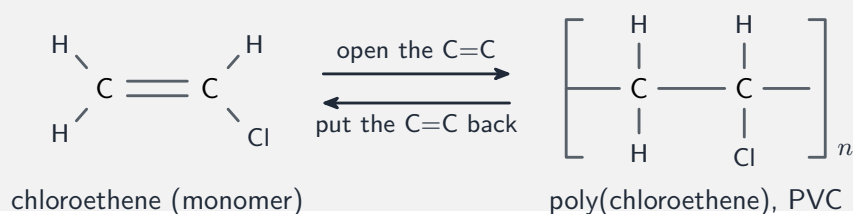
1 Worked examples

■ Addition polymerisation



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

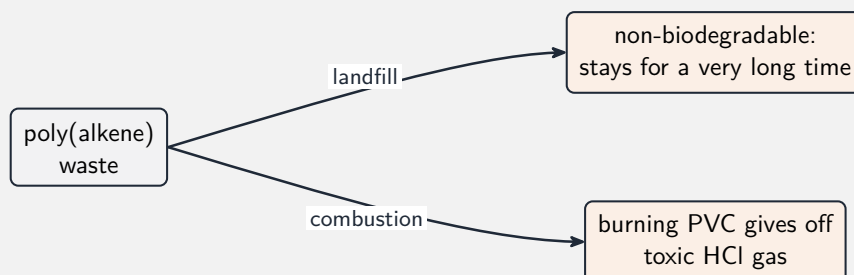
■ Repeat unit and monomer





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
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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]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **20.1 Addition polymerisation** past-paper sheet in the Library, or try these in **Practice mode**:

- 9701/11 N25 —Q32 (polymers)
- 9701/12 N25 —Q39 (repeat units)
- 9701/14 N25 —Q39 (polymerisation)

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.