

11.8 Polymers

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS polymer 聚合物 • polyamides 聚酰胺 • polyesters 聚酯 • monomers 单体
• repeat unit 重复单元

Objective

Build the skills to answer exam questions on **polymers** 聚合物 — **addition** 加聚 and **condensation** 缩聚 polymerisation, the **repeat unit** 重复单元, and plastics in the environment.

You must be able to:

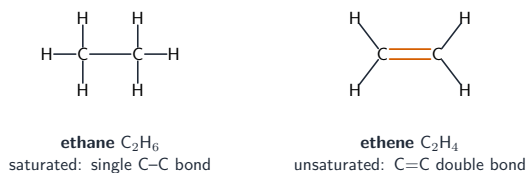
- describe addition polymerisation and draw a repeat unit
- compare addition with condensation polymerisation (polyamides, polyesters)
- discuss the disposal problems of plastics

1 Worked examples

■ Addition polymerisation



In addition polymerisation the C=C bonds open and monomers join — no other product



Addition polymers form from unsaturated monomers

- monomer:** small unit; **polymer:** the long chain; **repeat unit:** the part that repeats.
- condensation:** monomers join and a small molecule (water) is lost — polyamides (nylon), polyesters (PET).

2 Practice

2.1 Define a polymer. [1]

2.2 Name the monomer used to make poly(ethene). [1]

3 Exam-style questions

3.1 In addition polymerisation, the number of products formed is: [1]

- A one (the polymer only)
- B two
- C three
- D none

3.2 Poly(ethene) is made from ethene.

(a) State what happens to the C=C double bonds during polymerisation. [1]

(b) Draw the repeat unit of poly(ethene). [2]

3.3 Many plastics are not biodegradable. State two problems this causes for the environment. [2]

Solutions

2.1 a very large molecule made from many small molecules (monomers) joined together.

2.2 ethene.

3.1 A. Addition polymerisation makes only the polymer (no other product).

3.2 (a) the double bonds open up so the monomers can join together.

(b) $-(\text{CH}_2 - \text{CH}_2)-$ shown in brackets with the continuation bonds.

3.3 any two of: they build up in landfill; they collect in oceans and harm sea life; burning them releases toxic gases.