

11.5 Alkenes

Name: _____ Class: _____ Date: _____

Total: 7 marks

Objective

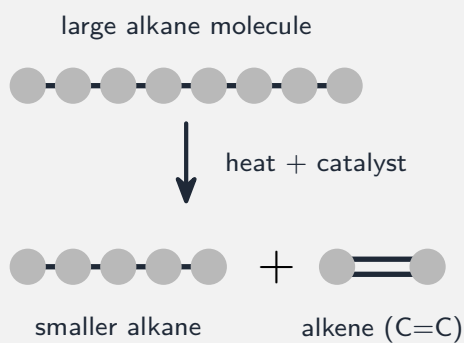
Build the skills to answer exam questions on **alkenes** 烯烃—unsaturated hydrocarbons, **cracking** 裂化, **addition reactions** 加成反应, and the **bromine water test** 溴水检验.

You must be able to:

- describe alkenes as unsaturated ($C=C$) and reactive
- describe cracking and its products
- describe addition reactions and the test for unsaturation

1 Worked examples

■ Cracking & the bromine water test



Cracking breaks large alkanes into smaller alkanes + alkenes (heat + catalyst)

shake with orange bromine water



Test for unsaturation: an alkene turns orange bromine water colourless; an alkane does not

- $-H$ (Ni) $\rightarrow$ alkane; + steam (acid catalyst) $\rightarrow$ alcohol.

2 Practice

2.1 State the functional group in an alkene. [1]

2.2 State what cracking does. [1]

3 Exam-style questions

3.1 When ethene is shaken with bromine water, the bromine water: [1]

- **A** stays orange
 - **B** turns colourless
 - **C** turns blue
 - **D** turns purple
-

3.2 Cracking breaks decane ($C_{10}H_{22}$) into octane (C_8H_{18}) and one other product.

(a) Name the type of compound formed as the other product. [1]

(b) Give the molecular formula of the other product. [1]

3.3 Describe how you could use bromine water to tell an alkene from an alkane. [2]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **11.5 Alkenes** past-paper sheet in the Library, or try these in **Practice mode**:

- 0620/21 N25 —Q36 (alkenes)
- 0620/22 N25 —Q32 (cracking / addition)

Solutions

2.1 the C=C carbon–carbon double bond.

2.2 it breaks large alkane molecules into smaller, more useful molecules (alkanes and alkenes).

3.1 B. The alkene decolourises the bromine water.

3.2 (a) an alkene.

(b) C₂H₄.

3.3 add bromine water to each and shake; the alkene turns it colourless while the alkane leaves it orange.