

14 Alkenes – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	Write it 3 times (English)
Alkenes	_____
C=C double bond	_____
electrophilic addition	_____
bromine water	_____
addition polymerisation	_____
polymer	_____

Recall

From Part 1 you know alkanes are unreactive. **Alkenes** are different – they have a reactive **C=C double bond** (general formula C_nH_{2n}).

- The C=C double bond is the functional group.
- It makes alkenes react readily by **addition**.

New ideas

Read these first, then do the Practice.

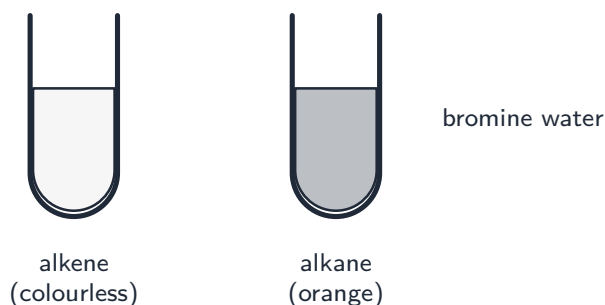
■ 1 Electrophilic addition

Most alkene reactions are **electrophilic addition** across the C=C bond:

Reagent	Product
H ₂ (Ni catalyst)	an alkane
steam (H ₂ O, H ₃ PO ₄ catalyst)	an alcohol
a hydrogen halide (HX)	a halogenoalkane
a halogen (Br ₂)	a di-substituted alkane

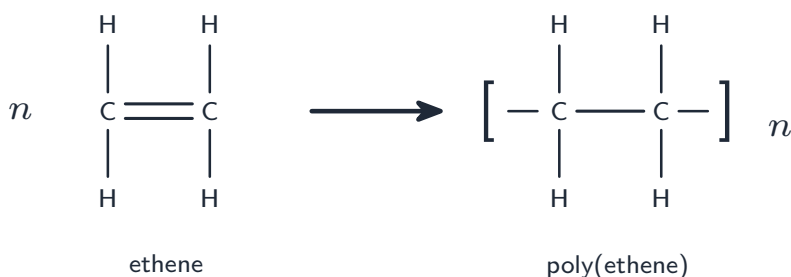
■ 2 The test for a C=C bond

Shake the compound with orange **bromine water**. An **alkene decolourises** it (turns it colourless); an alkane does not.



■ 3 Addition polymerisation

In **addition polymerisation**, many alkene molecules open their double bonds and join into one long chain – a **polymer** – with no other product. Ethene gives poly(ethene).



Watch out: alkenes react by *addition* – the C=C opens and groups add across it (unlike alkanes, which only substitute). In the bromine-water test the orange colour goes *colourless* with an alkene.

Practice

Try these in order.

14.1 Give the general formula of the alkenes, and name their functional group. [2]

14.2 Name the product when an alkene reacts with (a) hydrogen, (b) steam. [2]

14.3 Describe the bromine-water test and its result for an alkene. [2]

14.4 Why does an alkene decolourise bromine water but an alkane does not? [2]

14.5 What is *addition polymerisation*? [2]

14.6 Name the polymer made from ethene. [1]

14.7 Challenge. Predict the product when ethene ($\text{CH}_2=\text{CH}_2$) reacts with bromine (Br_2), and explain what happens to the double bond. [2]
