

Chemical Properties

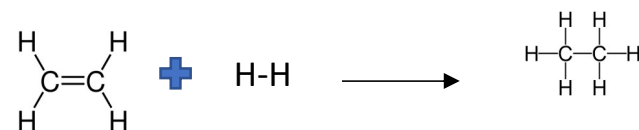
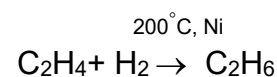
1. Combustion

- Complete combustion – sufficient oxygen
Products will be carbon dioxide and water.
E.g –
 $\text{C}_2\text{H}_4 + 3\text{O}_2 \rightarrow 2\text{CO}_2 + 2\text{H}_2\text{O}$
- Incomplete combustion – insufficient oxygen
Products will be carbon monoxide, soot (carbon) and water.

2. Addition - Only 1 product formed.

a. Addition of Hydrogen (Hydrogenation)

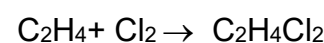
Condition: 200°C , Ni catalyst



Alkene undergoes hydrogenation to form alkanes.

b. Addition of Halogen (Halogenation)

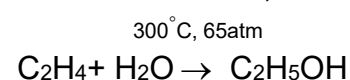
No Condition



Alkene undergoes hydrogenation with chlorine to form chloroalkanes.

c. Addition of Steam

Condition: 300°C , 65atm, H_3PO_4 catalyst



Alkene undergoes hydration to form alcohol.

d. Addition of similar alkene – covered in polymerisation

General Formula – C_nH_{2n} n is greater or equal to 2.

Functional Group – $\text{C}=\text{C}$ Carbon- carbon double bond
ene group

Nomenclature – end with ene

Name	Molecular Formula	Full Structural Formula
1 st member – Ethene	C_2H_4	
2 nd member – Propene	C_3H_6	
3 rd member – Butene	C_4H_8	

Uses–

Fuels, making of alcohol,
making of chloroalkanes

ALKENES

Test for alkene
(unsaturated compounds)

For gaseous alkene, bubble
the gas into aqueous
bromine.

Reddish brown bromine
decolourised.

For liquid alkene, add
bromine water to alkene.
Shake the test-tube.

Reddish brown bromine
decolourised.

Making of Alkenes

Catalytic cracking of long alkanes

Conditions – High temperature, SiO_2 and Al_2O_3 as
catalyst.

Cracking can produce

- alkanes and alkenes
E.g – $\text{C}_{10}\text{H}_{22} \rightarrow \text{C}_2\text{H}_4 + \text{C}_8\text{H}_{18}$
- alkene and hydrogen
E.g – $\text{C}_{10}\text{H}_{22} \rightarrow \text{C}_2\text{H}_4 + \text{C}_8\text{H}_{16} + \text{H}_2$

Physical Properties –

- Low mp and bp
- Generally gases and liquids at r
- Colourless
- Insoluble in water

Trends – As C chain increases,

- Mp and bp increases
- Viscosity increases.
- Flammability decreases.

