

C7 Organic chemistry

Chemistry Paper 2 | AQA Combined Science Trilogy | Key ideas to remember

HYDROCARBONS

1 Crude oil and alkanes

Crude oil: a finite mixture, formed from ancient biomass, mainly plankton. Most compounds in it are hydrocarbons.

Hydrocarbon: hydrogen and carbon only.

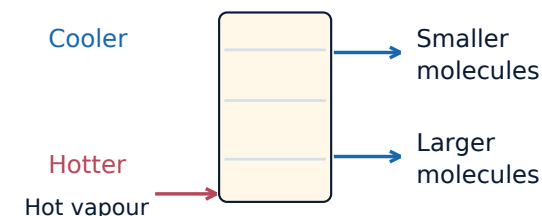
Alkanes: saturated; single C-C bonds.

Alkane	Formula
Methane	CH ₄
Ethane	C ₂ H ₆
Propane	C ₃ H ₈
Butane	C ₄ H ₁₀

C_nH_{2n+2}: n = number of carbon atoms.
Each next member has CH₂ more.

DISTILLATION

2 Fractional distillation



Heat crude oil so most **vaporises**. Vapours rise and cool in the column.

Different boiling points → **condensation at different heights**.

Higher-boiling molecules condense lower down; lower-boiling ones rise higher.

A fraction is still a **mixture** of similar-sized hydrocarbons. Molecules are unchanged.

COMBUSTION

3 Properties and uses

As hydrocarbon molecules get larger:

Property	Trend
Boiling point	Increases
Viscosity	Increases (harder to flow)
Flammability	Decreases (harder to ignite)

Larger alkane molecules have stronger **intermolecular attractions**. Boiling separates molecules; covalent bonds stay intact.

Fuels release energy on burning: petrol, diesel oil, kerosene.

Feedstock is raw material for making polymers, solvents, detergents and lubricants.

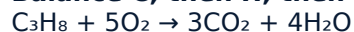
4 Complete combustion

Complete combustion produces **carbon dioxide and water** with enough oxygen. It is **exothermic**; carbon and hydrogen are oxidised.



Atoms	Left	Right
C	1	1
H	4	4
O	4	4

Balance C, then H, then O.



Change coefficients, never subscripts.

5 Cracking

Large molecules → smaller molecules

Products include alkanes and alkenes.



Carbon: 10 = 8 + 2

Hydrogen: 22 = 18 + 4

Catalytic: vaporise hydrocarbons; pass vapour over a hot catalyst.

Steam: mix vapour with steam; heat to a very high temperature.

Why? High demand for smaller fuel molecules. Alkenes make polymers and other chemicals. Cracking changes molecules; distillation only separates them.

CRACKING

6 Alkenes and bromine water

Alkenes: unsaturated hydrocarbons with a **C=C double bond**. More reactive than alkanes. Useful as chemical feedstock.

Alkane



Alkene



Under normal test conditions:

Alkene: orange → colourless.

Alkane: remains orange.

Colourless does not mean white.