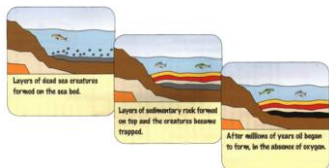


Hydrocarbons

Crude Oil is made from the remains of living **sea creatures** decayed in mud millions of years ago



It is a **FINITE** resource

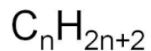
It is made of a mixture of Hydrocarbons.

Hydrocarbons are made of **Hydrogen and Carbon only**.

The main hydrocarbons in Crude Oil are **alkanes**

Alkane	Molecular formula	Structural formula
Methane	CH ₄	<pre> H H-C-H H </pre>
Ethane	C ₂ H ₆	<pre> H H H-C-C-H H H </pre>
Propane	C ₃ H ₈	<pre> H H H H-C-C-C-H H H H </pre>
Butane	C ₄ H ₁₀	<pre> H H H H H-C-C-C-C-H H H H H </pre>

The general formula for an alkane is -

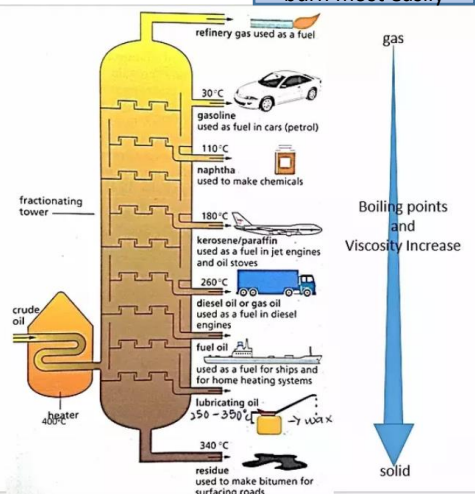


Fractional Distillation

How do we separate the mixture of hydrocarbons to use them?

Works by **evaporation** and then **condensation**.

Smaller molecules burn most easily



1. **Heat** the crude oil to **evaporate** it.
2. The gases **rise** up the column.
3. The different fractions **condense** at **different temperatures**.

C9 Crude Oil and Fuels

Combustion

Combustion (burning) is a reaction with **oxygen**

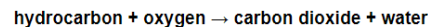
A reaction with oxygen is called '**oxidation**'

When hydrocarbons burn a lot of **energy** is released.

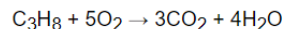
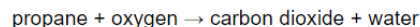
Complete combustion of hydrocarbons the only products are **carbon dioxide and water**

Complete combustion only happens if there is plenty of oxygen

General equation



Complete combustion of propane

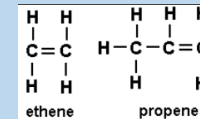


Cracking

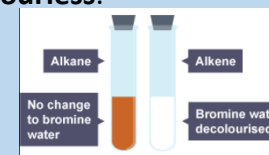
The larger molecules from fractional distillation are less useful. We can break them down into smaller, more useful molecules.

Cracking produces a mixture of **alkanes and alkenes**.

Alkenes have some **double bonds**.

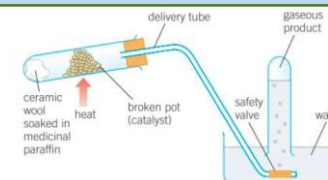


They turn **bromine water** **colourless**.



They are used to make **polymers**.

The apparatus for cracking



Catalytic cracking – catalyst and 500°C

Steam cracking – steam and 850°C