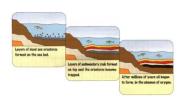
Hydrocarbons

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	H — C — H
Ethane	C ₂ H ₆	H H H H H H H H H H H H H
Propane	C ₃ H ₈	H H H H H H H H H H H H H H H H H H H
Butane	C ₄ H ₁₀	H-C-C-C-C-H

The general formula for an alkane is -

 C_nH_{2n+2}

Fractional Distillation

How do we separate the

mixture of hydrocarbons

to use them?

Works by evaporation

and then condensation.

refinery gas used as a fuel

1. Heat the crude oil to **evaporate** it.

2. The gases rise up the

3. The different fractions condense at different

column.

temperatures.

fractionating

Smaller molecules

burn most easily

Boiling points

Viscosity Increase

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

hydrocarbon + oxygen → carbon dioxide + water

Complete combustion of propane

propane + oxygen \rightarrow carbon dioxide + water

 $\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$

Cracking

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

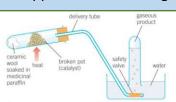
Cracking produces a mixture of alkanes and alkenes.

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