

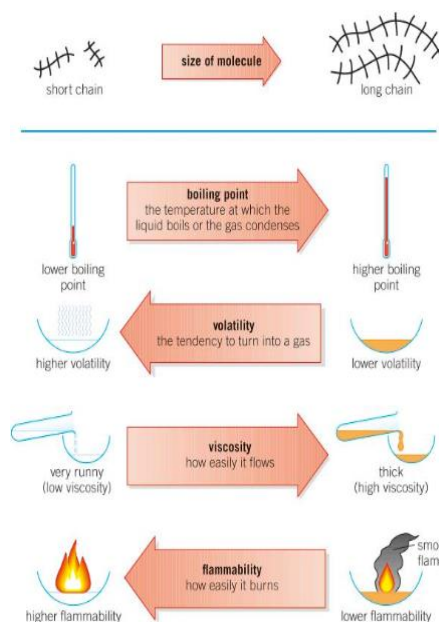
4.7 Organic chemistry

Organic Chemistry	Compounds are living / once-living materials from plants and animals. Used as feedstock for fuels, polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents.
Crude Oil	A finite resource found in rocks. Remains of an ancient biomass consisting mainly of plankton that was buried in mud. Mixture of a very large number of hydrocarbons.
Hydrocarbons	Compounds made of hydrogen and carbon atoms only.
Alkanes	Saturated hydrocarbons (single bonds) C_nH_{2n+2}
Fractional Distillation	Crude oil is separated into fractions. Crude oil is heated and vapourised. Vapour rises up the column and condense at their boiling points into fractions.
Fraction	Mixture of hydrocarbons with similar chain lengths and similar boiling points.
Combustion	(Hydrocarbon) Fuel + Oxygen \rightarrow Carbon Dioxide + Water and releases energy. Both the carbon and hydrogen are oxidised.
Complete Combustion	All carbon converted to $CO_2(g)$.
Incomplete Combustion	Insufficient oxygen. $CO(g)$ and $C(s)$ produced.
Alkenes	Unsaturated hydrocarbons. C_nH_{2n} . More reactive than alkanes. Used to make polymers.
Cracking	Hydrocarbons (long chain alkanes) are broken down into smaller, more useful molecules (short chain alkanes & alkenes).
Catalytic Cracking	Vapourised and passed over a hot (ceramic) catalyst.
Steam Cracking	Mixed with steam and heated to high temperatures.
Testing for unsaturation	Add bromine water. Orange to colourless.

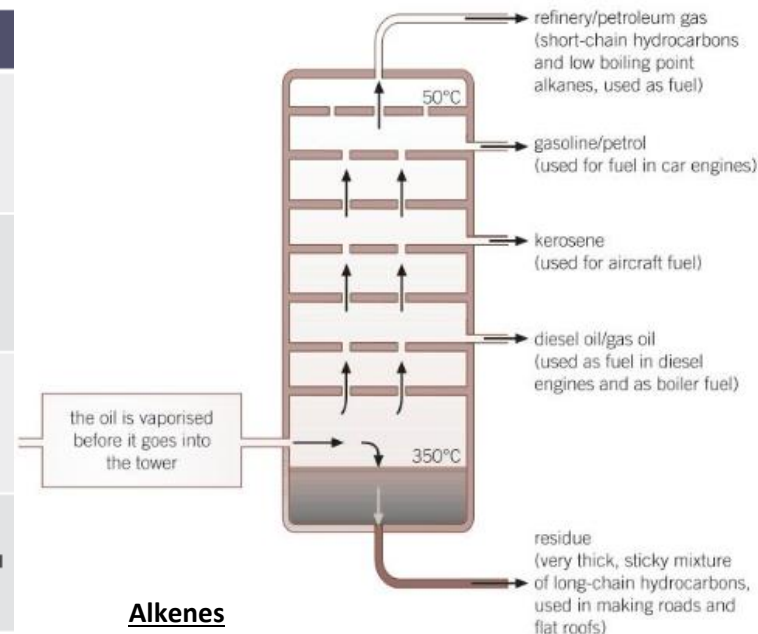
Alkanes

Name	Molecular formula	Full structural formula
Methane	CH_4	<pre> H H - C - H H </pre>
Ethane	C_2H_6	<pre> H H H - C - C - H H H </pre>
Propane	C_3H_8	<pre> H H H H - C - C - C - H H H H </pre>
Butane	C_4H_{10}	<pre> H H H H H - C - C - C - C - H H H H H </pre>

Properties of hydrocarbons are affected by chain length.



Fractional distillation column

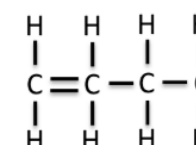
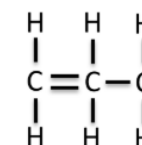
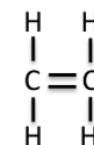


Alkenes

ethene
 C_2H_4

propene
 C_3H_6

butene
 C_4H_8



Catalytic Cracking

