



— University of Mosul —
College of Petroleum & Mining Engineering



Petroleum Chemistry

Lecture 2

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6- Chemical composition of crude oil:

The hydrocarbons in crude oil are mostly paraffin , naphthene, olefin and various aromatic hydrocarbons while the other organic compounds contain nitrogen, oxygen and sulfur, and trace amounts of metals such as iron, nickel, copper and vanadium as follows:

The hydrocarbon and non-hydrocarbon constituents of crude oil

A- Hydrocarbons components:

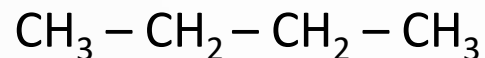
All the petroleum contains the same hydrocarbons groups such as normal, branch, cyclic paraffins, olefins and aromatic. They generally have from 1 to 60 carbon atoms per molecule.

I- Paraffins:

The paraffins, also known as alkanes, are saturated hydrocarbons with straight, branched or cyclic chains which contain only carbon and hydrogen. It is found in different formula as follows:

i- Normal /or series paraffins:

The hydrocarbon chain is straight , the general formula C_nH_{2n+2} , example n butane mean $n=4=$ carbon atoms (C_4H_{10}). The properties of normal paraffins are:



n- butane

High molecular weight.

High boiling point.

Low octane number.

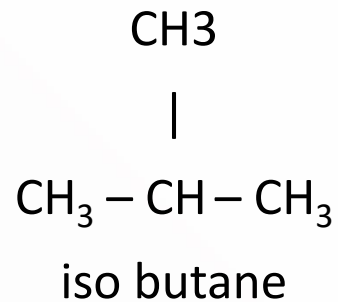
ii- Branch /or iso paraffins:

The hydrocarbon chain is branched, the general formula C_nH_{2n+2} , example iso butane mean $n=4=$ carbon atoms (C_4H_{10}). The properties of branch paraffins are:

Low boiling point.

High octane number therefore is favorite in cars fuel.

The common in crude oil is one branch and less tow branches.

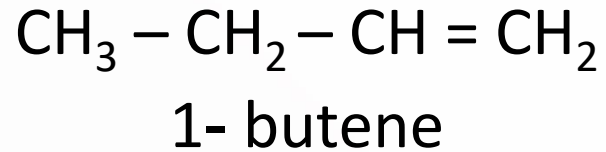


iii- Cycloparaffins (Naphthenes):

The cycloalkanes, also known as naphthenes; are saturated hydrocarbons which have one or more carbon rings to which hydrogen atoms are attached according to the formula C_nH_{2n} . Cycloalkanes have similar properties to alkanes but have higher boiling points.

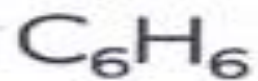
II- Olefins:

The olefins, also known as alkenes, are unsaturated hydrocarbons with general formula (C_nH_{2n}). The low boiling olefins are probably not present in crude petroleum, but they are found in cracked products.



III- Aromatics:

The aromatic hydrocarbons are unsaturated hydrocarbons which have one or more planar six-carbon rings called benzene rings, to which hydrogen atoms are attached with the formula (C_nH_n) and many have a sweet aroma and a carcinogenic.



Benzene
Molecular formula

