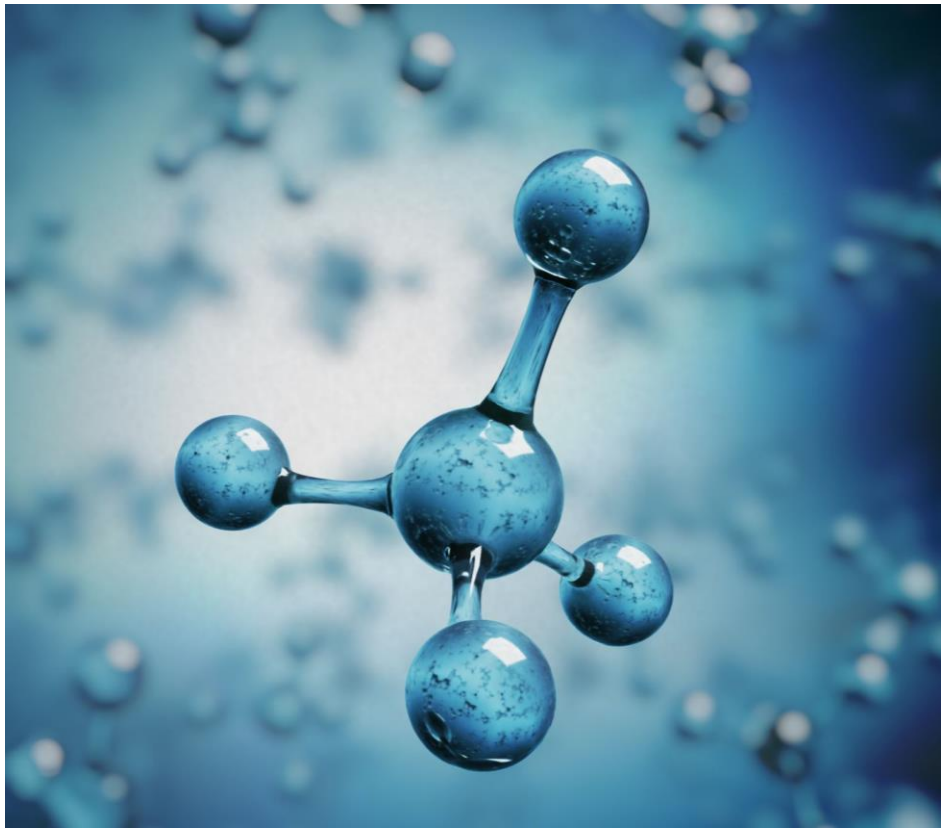
ORIGIN OF HYDROCARBONS

- The word petroleum is derived from the Latin words for rock (petra) and oleum (oil). It is found in the form of gas and/or liquid phases in porous rock structures.
- These are available in the sub-surface of Earth in the porous rocks known as sedimentary basins.
- In the majority of the basins, gas, oil, and water coexist under pressure with methane gas at the cap and oil is sandwiched between the gas and water.



Many hypotheses about the origin of the formation of crude oil

To date, it is generally agreed that crude petroleum oil was formed from decaying plants and vegetables and dead animals and converted to oil by the action of high pressure and high temperature under the earth's surface, and by the action of the biological activities of micro-organisms.

Organic materials of plant or animal origin accumulate in the lowest places, usually in the crevices, low-lying land, sea bed, coral reefs, etc., and are gradually buried under the surface of Earth.

Huge amounts of organic matter are trapped layer after layer in the earth's crust and rock. Rocks that bear these organic layers are called sedimentary rocks. Several kilometres below the earth's surface, organic sediments are decayed biologically to a mass, known as kerogen, which has a very high mass of organic-to-inorganic ratio favourable for conversion to hydrocarbon

Formation of Crude Oil Continued ….

The temperature of Earth increases with depth (geothermal gradient) at the rate of approximately 30°C per kilometre. Thus, at a depth of 4–5 km, called kitchen by geologists, temperatures of 120°C–150°C exist where kerogen is converted to hydrocarbon oil under very high pressure of rocks and soil.

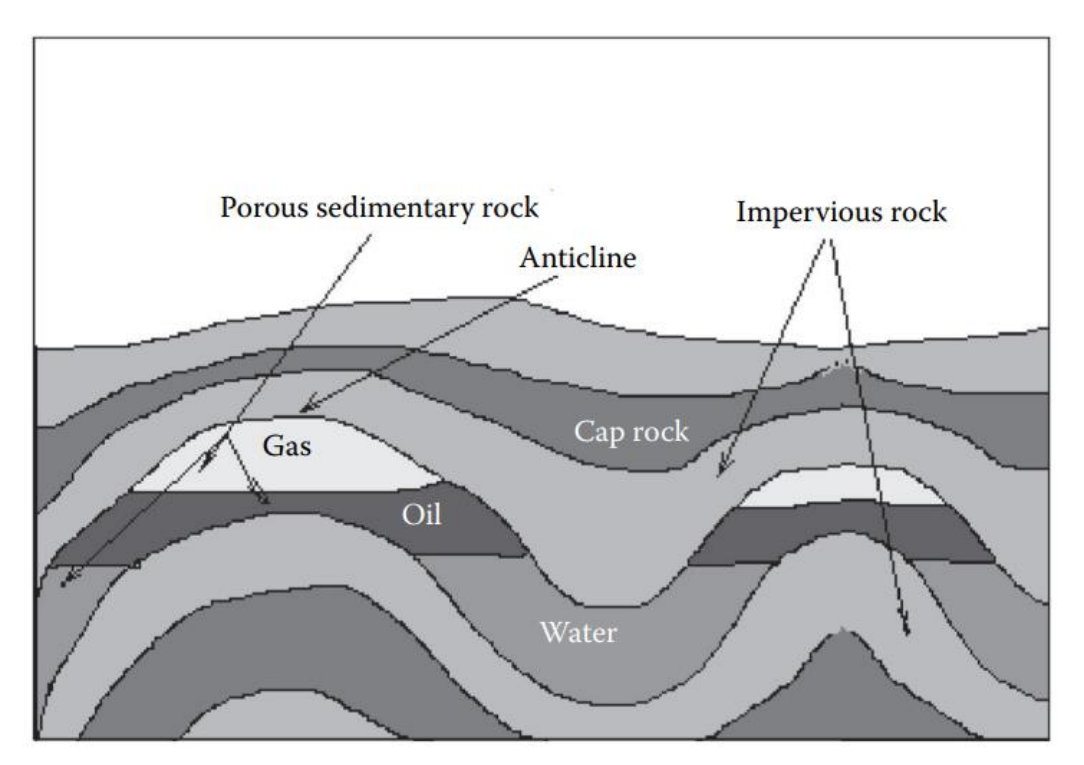
But this conversion takes millions of years (geological time period) to complete.

Methane is also formed thermogenically (i.e., thermal conversion of kerogen) along with biogenic methane already present before the formation of crude oil.

Migration of oil with gas occurs within the rock layers by the pressure gradient from high to low pressure zones.

The formation of crude (or crude deposit) oil has been found in the sedimentary porous rock layers trapped under the hard and impervious igneous rock layers.

Layers of Formation



- Crude oil and gas accumulate in the pores of the sedimentary rocky layer as shown in Figure beside. This formation may be found from a few kilometers (as deep as 2 km and as deep as 7 km) below the earth's surface.
- The first oil deposit is known as the Drake Well, discovered in the United States (near Titusville) in 1859.