



Al-Mustaqbal University College

Department of Medical Physics

First Class

Organic Chemistry

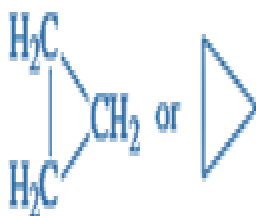
Lec 3 Alkanes (part 2)

MSc .Doaa Nassr

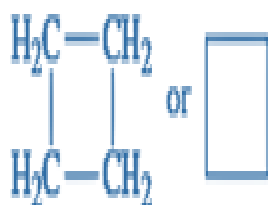
MSc .Issa Farahan

Cyclo Alkanes

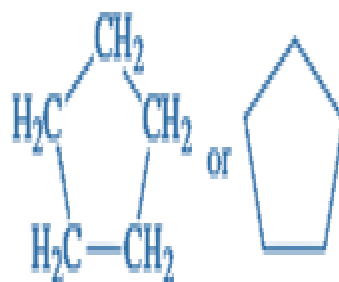
A hydrocarbon that contains carbon atoms joined to form a ring is called a cyclic hydrocarbon. When all carbons of the ring are saturated, the hydrocarbon is called a cycloalkane



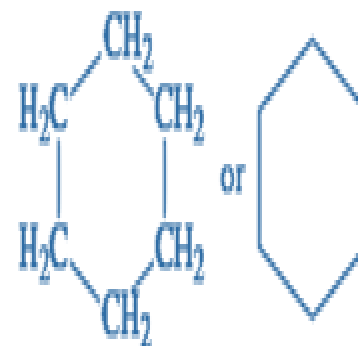
Cyclopropane



Cyclobutane



Cyclopentane



Cyclohexane

Physical Properties of Alkanes

The first four n-alkanes are gases, but, as a result of the rise in boiling point and melting point with increasing chain length, the next 13 (C₅-C₁₇) are liquids, and those- containing 18 carbons or more are solids

physical constants for a number of the n-alkanes., the boiling points and melting points rise as the number of carbons increases.

The processes of boiling and melting require overcoming the intermolecular forces of a liquid and a solid; the boiling points and melting points rise because these intermolecular forces increase as the molecules get larger.

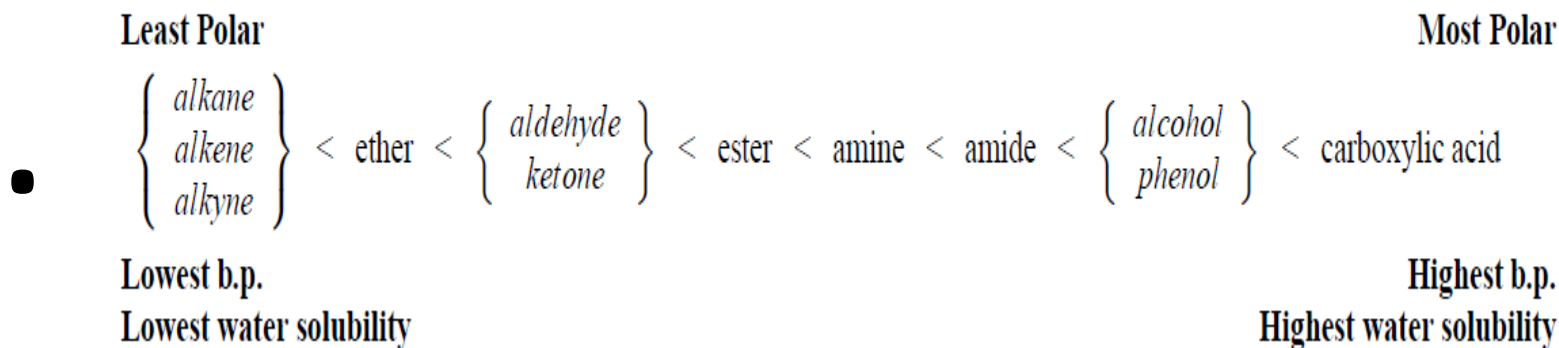
There are somewhat smaller differences among the boiling points of alkanes that have the same carbon number but different structures. The boiling points of the isomeric butanes, pentanes, and hexanes are given

We see that in every case a branched-chain isomer has a lower boiling point than a straight-chain isomer, and further, that the more numerous the branches, the lower the boiling point.

That branching should lower the boiling point is reasonable: with branching the shape of the molecule tends to approach that of a sphere; and as this happens the surface area decreases, with the result that the intermolecular forces become weaker and are overcome at a lower temperature.

The increase in melting point is not quite so regular, since the intermolecular forces in a crystal depend not only upon the size of the molecules but also upon how well they fit into a crystal lattice.

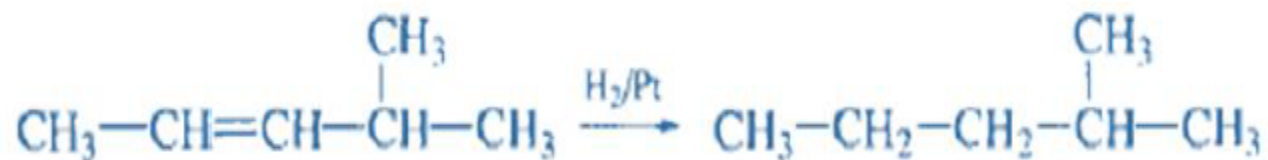
Properties



The density increases with size of the alkanes, but tends to level off at about 0.8; thus all alkanes are less dense than water. It is not surprising that nearly all organic compounds are less dense than water since, like the alkanes, they consist chiefly of carbon and hydrogen. In general, to be denser than water a compound must contain a heavy atom like bromine or iodine, or several atoms like chlorine.

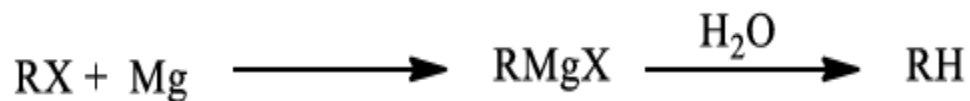
Preparation of Alkane

1) Hydrogenation of Alkene



2) Reduction with Alkyl Halide

A) Hydrolysis with Grignard reagent.



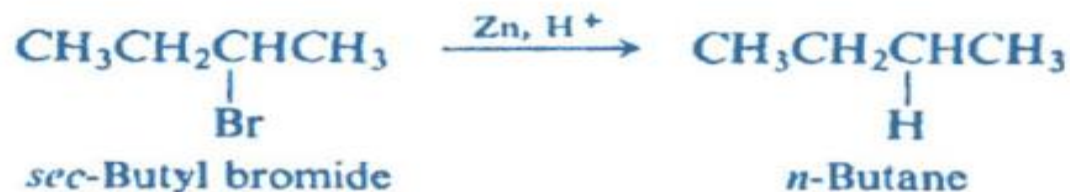
Example:



b) Reduction with Metal and Acid



Example:



*Thank
you*

