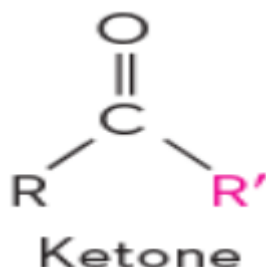


Lecture 5: Ketones

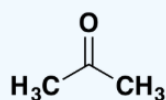
The ketone is characterized by the presence of the carbonyl group



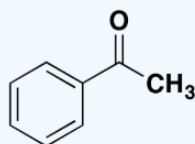
- The **carbonyl group** of ketone is polar because oxygen is more electronegative than carbon. This produces a dipole in which the oxygen carries a partial negative charge and the carbon carries a partial positive charge.
- Thus, the attractive forces between carbonyl-containing compounds include London dispersion forces between the hydrocarbon chains and dipole-dipole attractions between carbonyl groups.
- Because of the polar carbonyl cannot form hydrogen bonds with one another. As a result, they have higher boiling points than comparable hydrocarbons, but lower boiling points than comparable alcohols.

IUPAC Nomenclature and Common Names

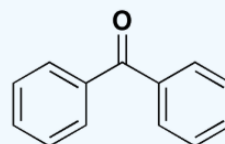
ketones are named by determining the parent compound and replacing the -one of the parent alkane with the -one suffix of the ketone family.



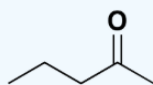
propanone
(acetone)



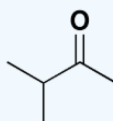
acetophenone
(methyl phenyl ketone)



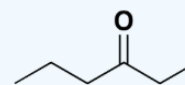
benzophenone
(diphenyl ketone)



2-pentanone
(methyl propyl ketone)



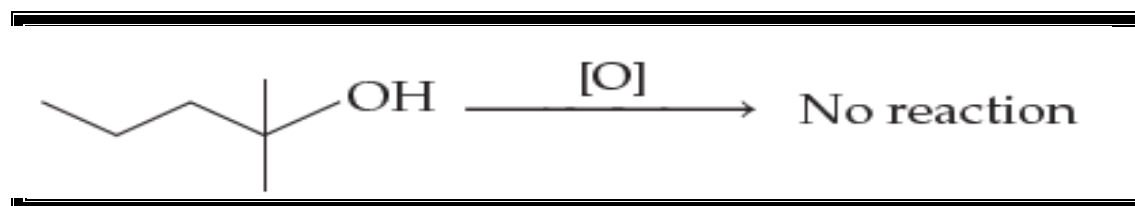
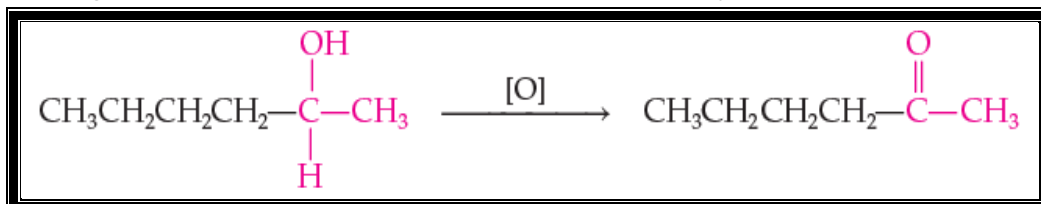
3-methyl-2-butanone
(methyl isopropyl ketone)



3-hexanone
(ethyl propyl ketone)

Preparation of Ketones

The oxidation of a secondary alcohol yields a ketone. Tertiary alcohols do not undergo oxidation under the conditions normally used.



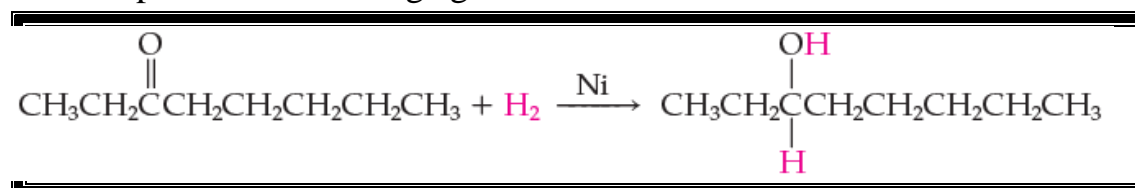
Reactions of ketone

1. Oxidation Reactions

Ketones do not generally undergo further oxidation. The reason is that a carbon-hydrogen bond not present in the ketone, is needed for the reaction to occur.

2. Reduction Reactions

Ketones are readily reduced to the corresponding alcohol by a variety of reducing agents. Throughout the text, the symbol [H] over the reaction arrow represents a reducing agent.



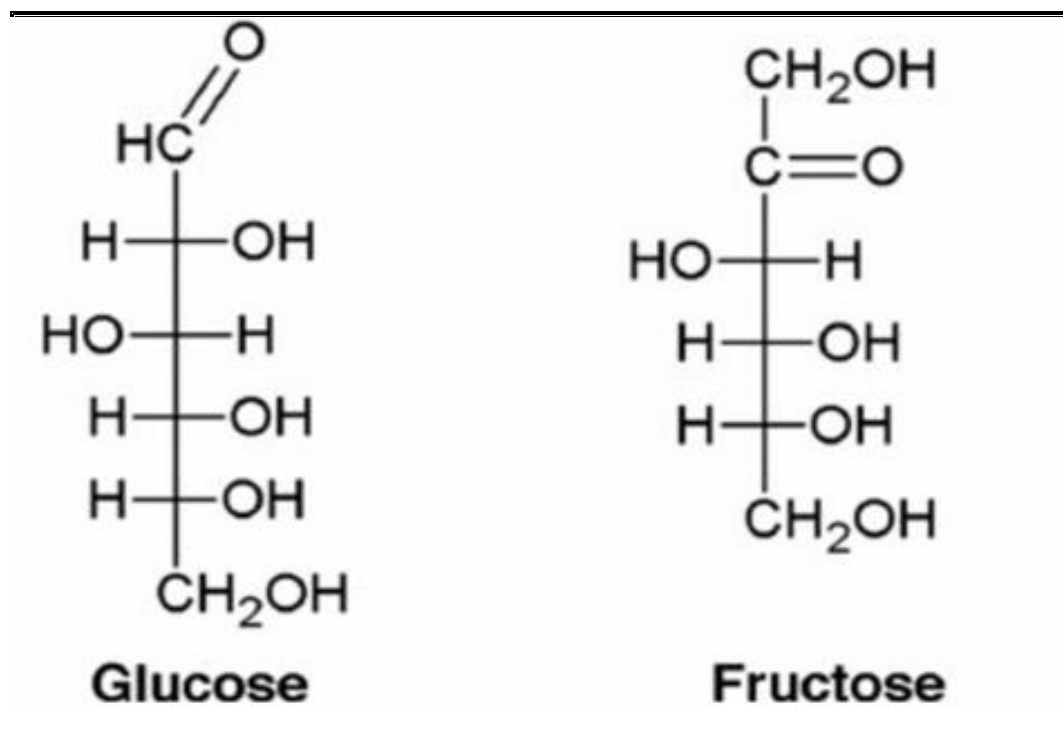
3. Addition reaction

Addition reaction is the reaction of ketones with alcohols in the presence of catalytic amounts of acid to yield ketal.

Important Ketones

Members of the ketone families are important as food and fragrance chemicals, and as medicinal and agricultural chemicals.

- Propanone (acetone) is a useful and versatile solvent for organic compounds. In human body An excess of acetone in the bloodstream is a common symptom of diabetes mellites (DM).
- Aldohexose is glucose, fructose is ketohexose respectively. Glucose is present in our blood, and gives rise to energy on oxidation. Aldopentose Ribose is constituent of nucleic acids monomer or nucleotides of DNA & RNA.



Structures of glucose and fructose

Ketones in Medical Perspective

