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(Lecture-3)

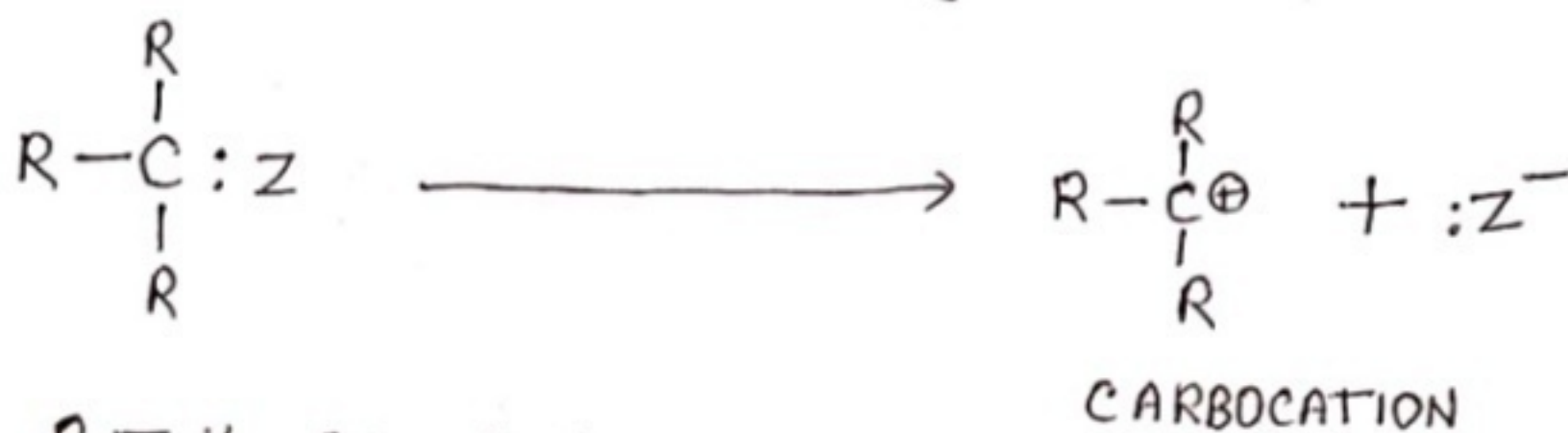
Degree-II (Sub.)
Chapter -5
Group - 'C'

Topic - Carbonation or, Carbonium Ion

Carbonium ions are positively charged species containing a carbon atom having only six electrons in three bonds.

The carbon atom lacks a pair of electrons in its valence shell.

They are formed by heterolytic cleavage of bonds.



R = H or alkyl or aryl group.

Z = more electronegative than carbon.

* The positively charged carbon atom in a carbonium ion use sp^2 hybrid orbitals to form three σ -bond. A vacant p-orbital extends above and below the plane of the σ -bond.

† Thus, a carbonium ion will combine with any substance which can donate a pair of electrons.

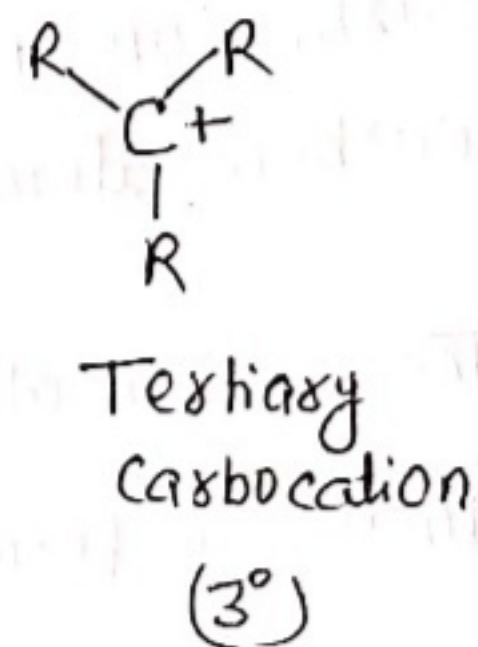
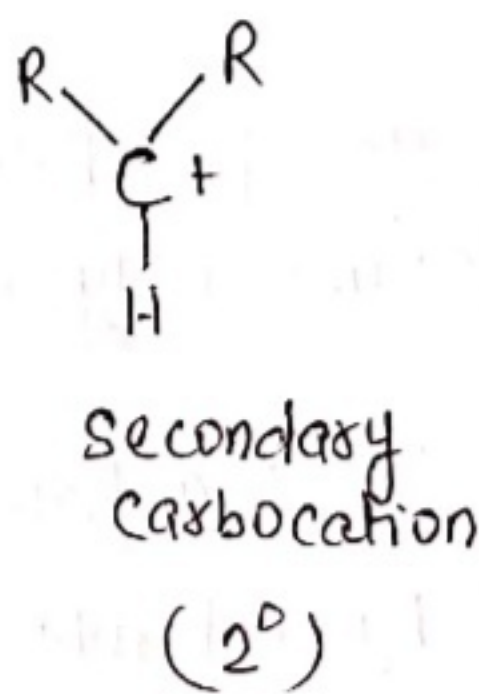
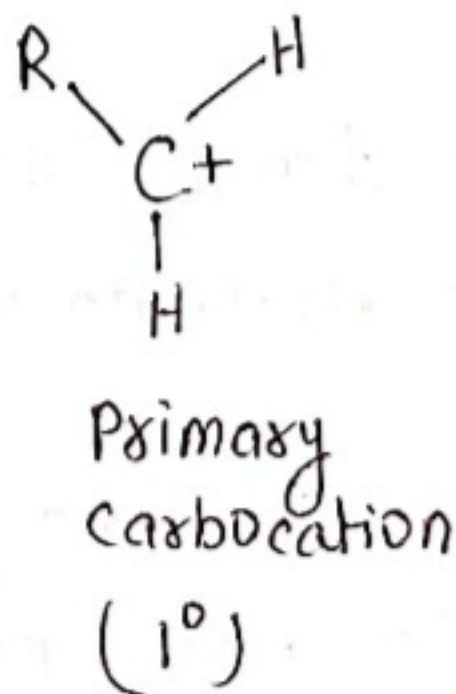
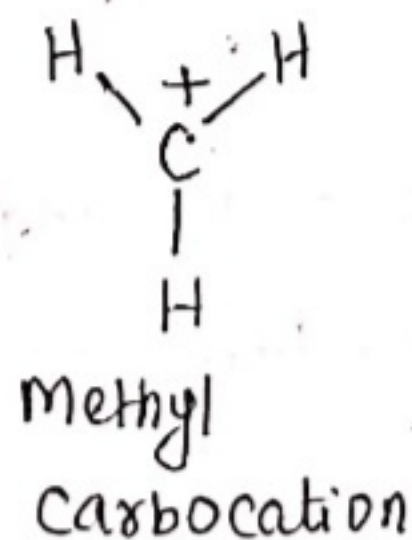


Hybridisation = sp^2

Geometry = Trigonal Planar.

Carbonium ions are classified as primary, secondary or tertiary depending upon the nature of the carbon atom bearing the positive charge.

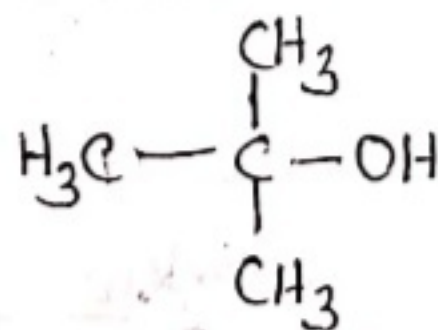
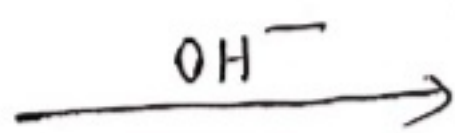
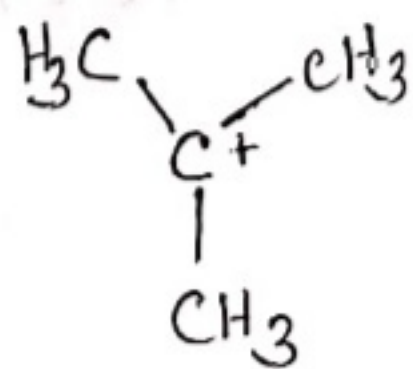
eg.



Most of the carbocation can not be isolated i.e.; they are only short lived and have a strong tendency to complete the octet of carbon.

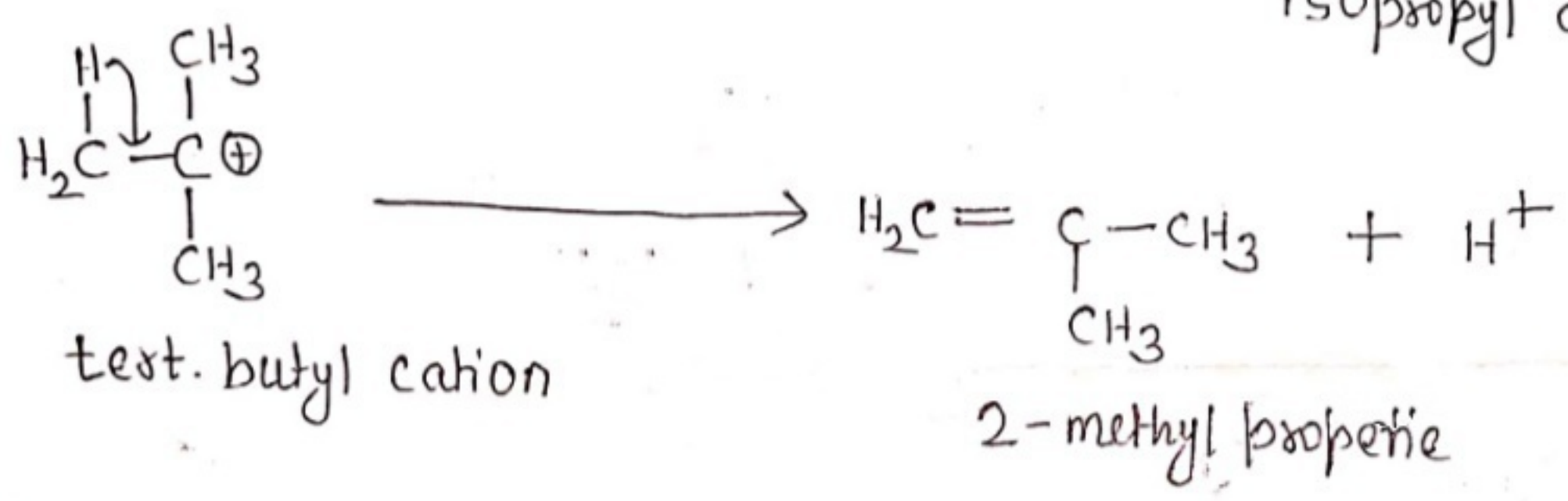
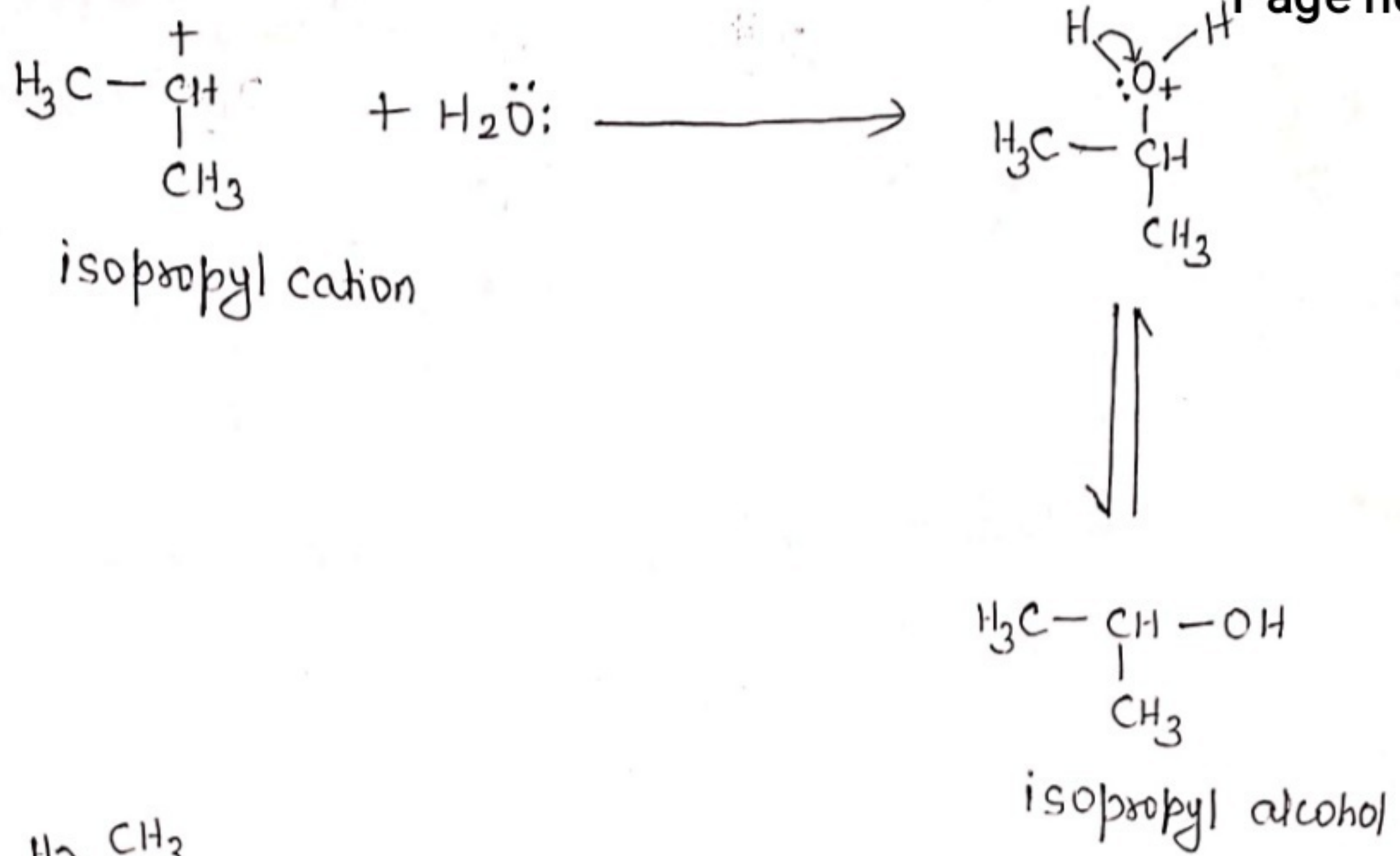
* The octet can be achieved by combining with: - - -

1. an available anionic species (eg. OH^- , CN^- etc.)
2. an electron rich species (eg; $\text{H}_2\text{O}:$, NH_3 , etc.)
3. by losing an atom or group (usually hydrogen) without its bonding electron, from the adjacent carbon atom.



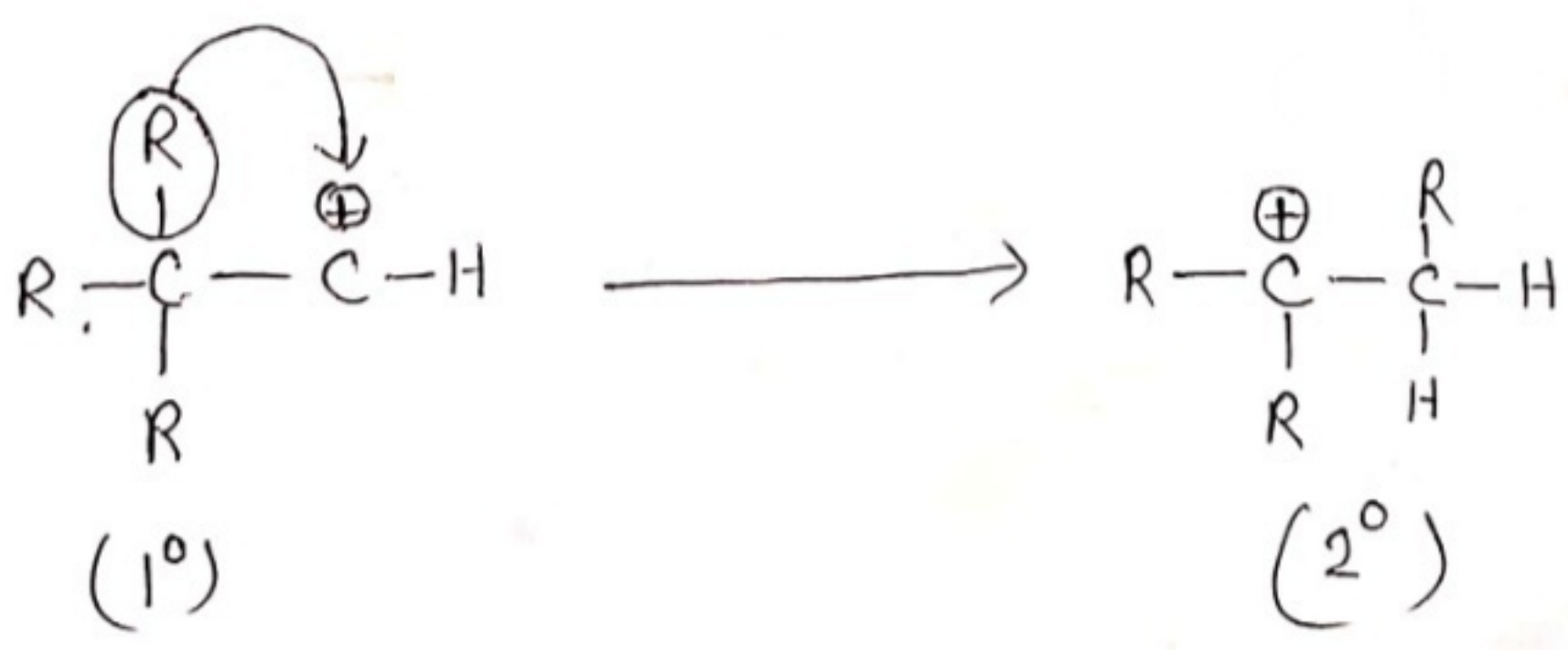
tert-butyl cation

tert-butyl alcohol



* Some of the carbocation are converted to more stable carbocation (rearrangement).

Thus, a 1° carbocation tends to rearrange to form a 2° or 3° carbocation.



To be continued in next lecture....