

REACTIVE INTERMEDIATES

Homolytic and heterolytic bond fission result in the formation of short-lived fragments called reaction intermediates.

Existence of these intermediates can be detected by different spectroscopic methods.

Important intermediates are carbocations, carbanions and free radicals.

Carbocations (Carbonium ion)

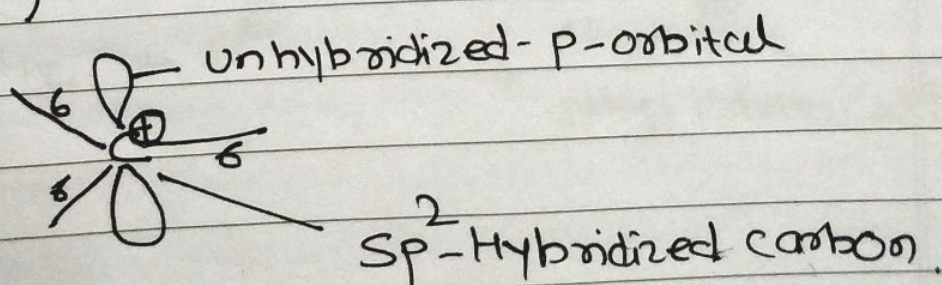
An organic species which has a carbon atom with only six electrons in its outermost shell and bearing positive charge is called as carbonium ion or carbocation.

In carbocation central carbon is sp^2 hybridized. The three sp^2 hybrids form σ -bonds with three other atoms.

The vacant p-orbital lies perpendicular to the plane of σ -bonds.

Thus the carbocation is planar ion.

The vacant p-orbital is used for the overlapping with electron pair orbital of donor atom (nucleophile)

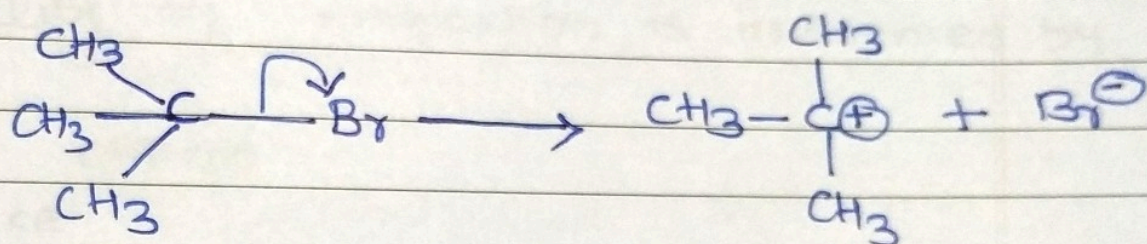


carbocations are classified as primary, secondary and tertiary on the basis of carbon atom bearing positive charge.

Methods of Generation:-

carbocations can be generated by following methods

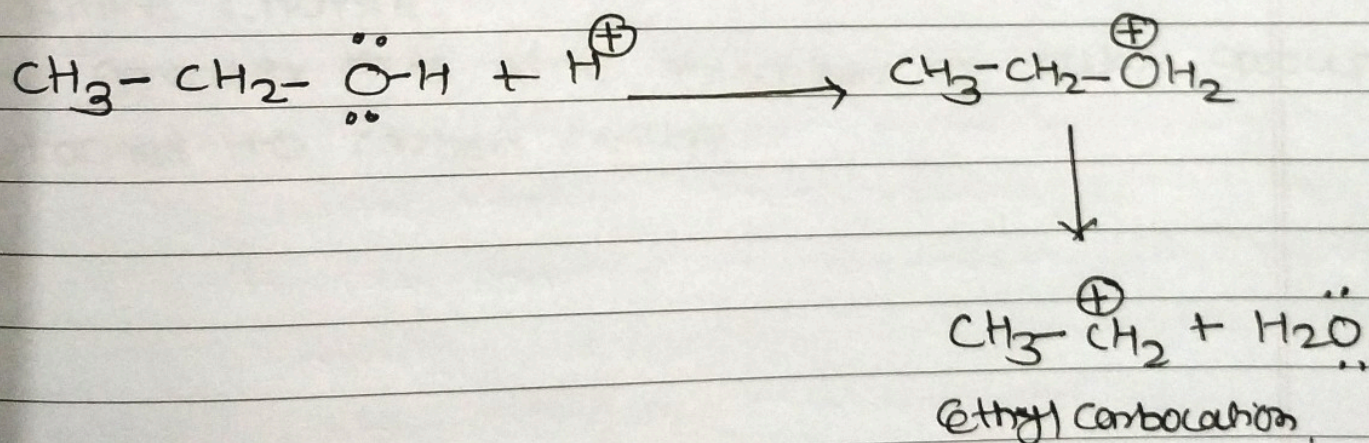
1) Heterolysis of alkyl halides:-



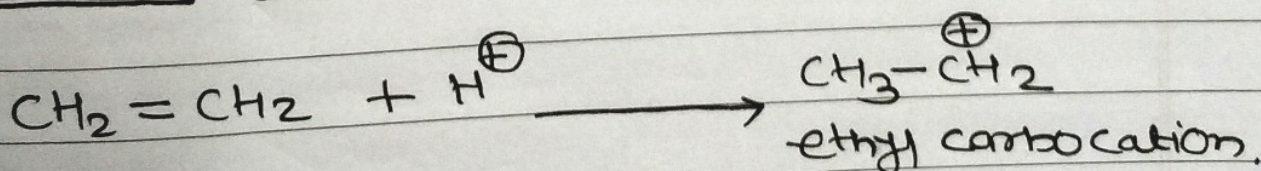
tert. butyl bromide.

t-butyl carbocation.

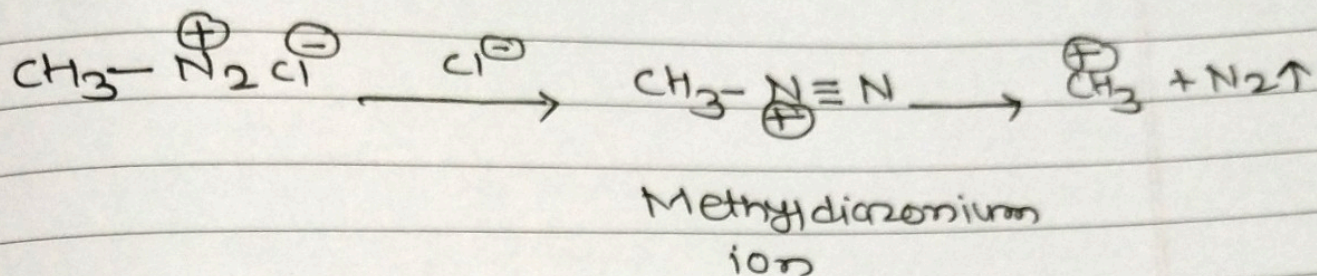
2) Dehydration of alcohols:-



3) Protonation of Alkenes :-



4] Decomposition of Diazo salt \Rightarrow



Stability of Carbocation:-

Stability of carbocation is influenced by

- 1) Inductive effect
- 2) Resonance
- 3) Hyperconjugation.

Electron releasing (+I effect) alkyl group stabilize the carbocation by dispersing the positive charge.
The greater is the number of alkyl groups attached to carbon centre