B.Sc. I

Paper II Organic Chemistry

ELIMINATION REACTIONS – E1, E2
REARRANGEMENT REACTION

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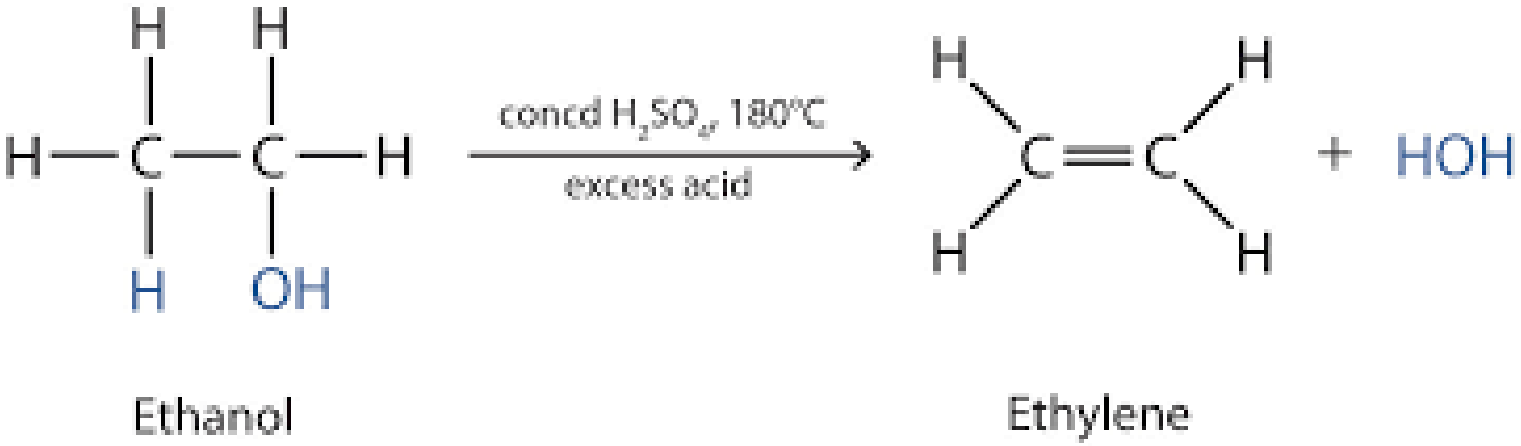
ELIMINATION REACTION

An elimination reaction is a type of organic reaction in which two substituents are removed from a molecule in either a one-step or two-step mechanism.
The one-step mechanism is known as the **E2 reaction**, and the two-step mechanism is known as the **E1 reaction.**
E2 is bimolecular (second-order) while E1 is unimolecular (first-order).

In most organic elimination reactions, at least one hydrogen atom (H^+) is lost, to form the double bond.
When the substrate is **asymmetric**, regioselectivity is determined by **Saytzeff's rule** or through Hofmann elimination.

1. Dehydration of Alcohols
2. Dehydrohalogenation of Alkyl halides

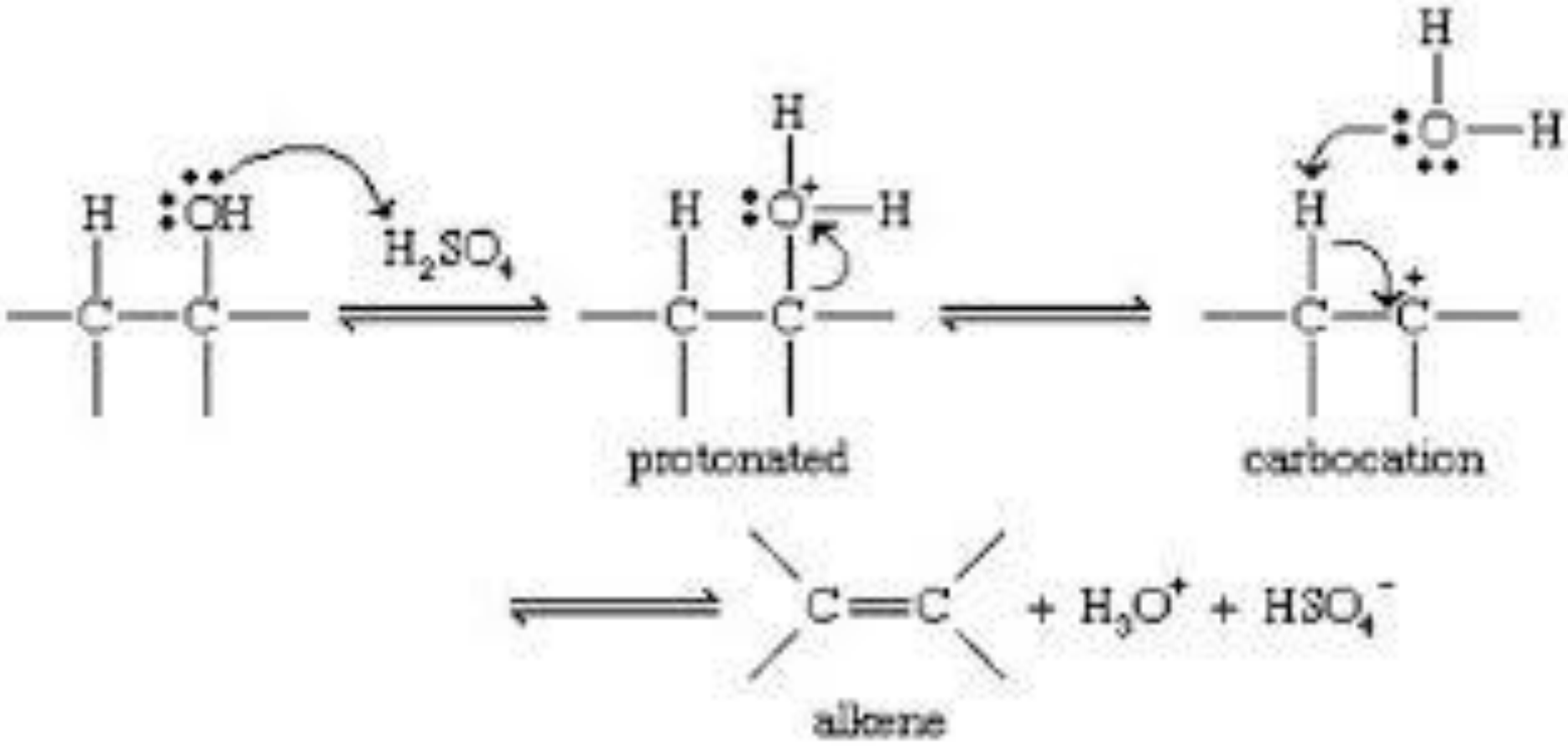
DEHYDRATION OF ALCOHOLS



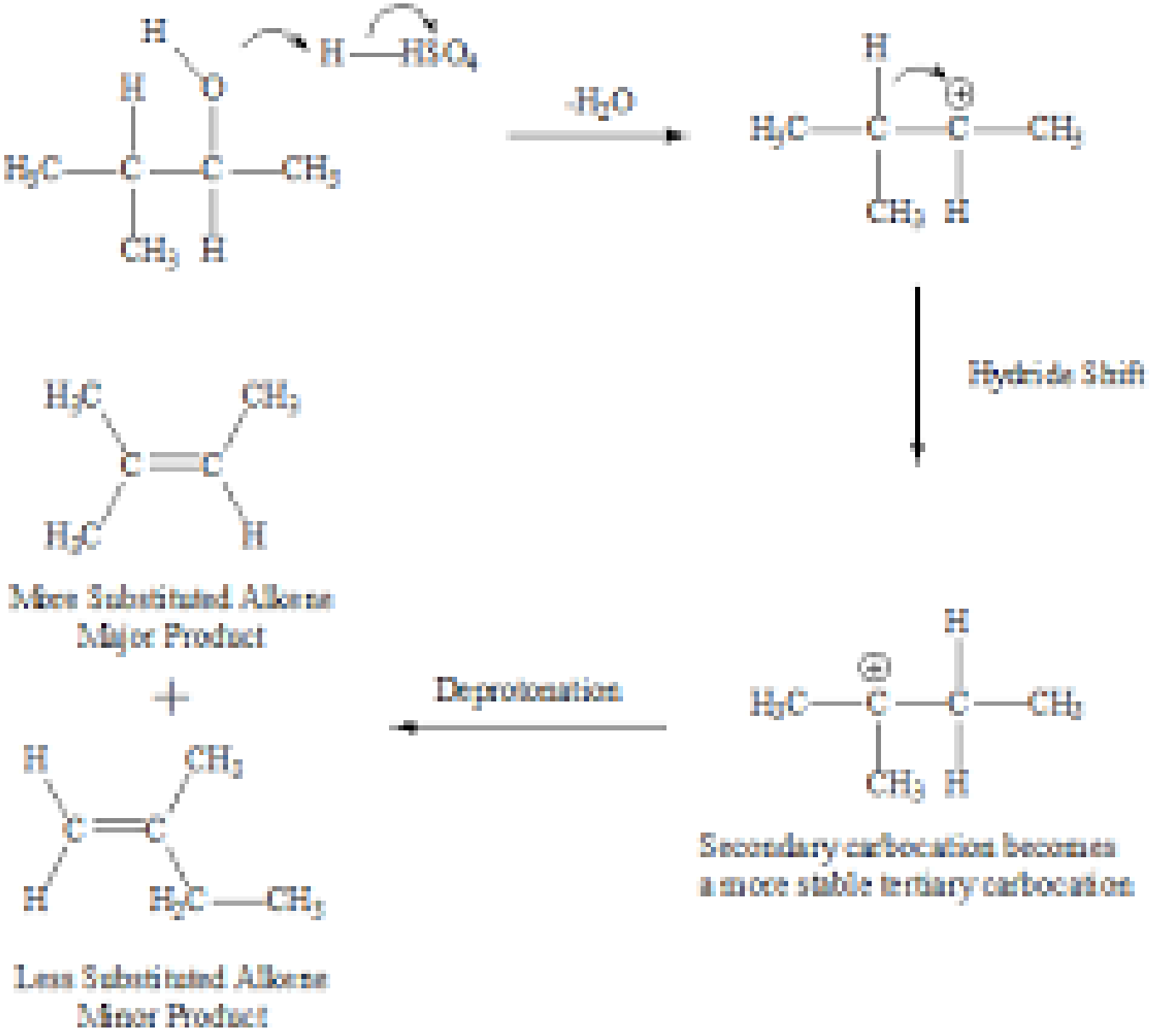
CONCENTRATED SULPHURIC ACID IS THE DEHYDRATING AGENT
DEHYDRATION IS CARRIED OUT IN PRESENCE OF CONCENTRATED H2SO4

H2SO4 ----------→ H+ + HSO4-

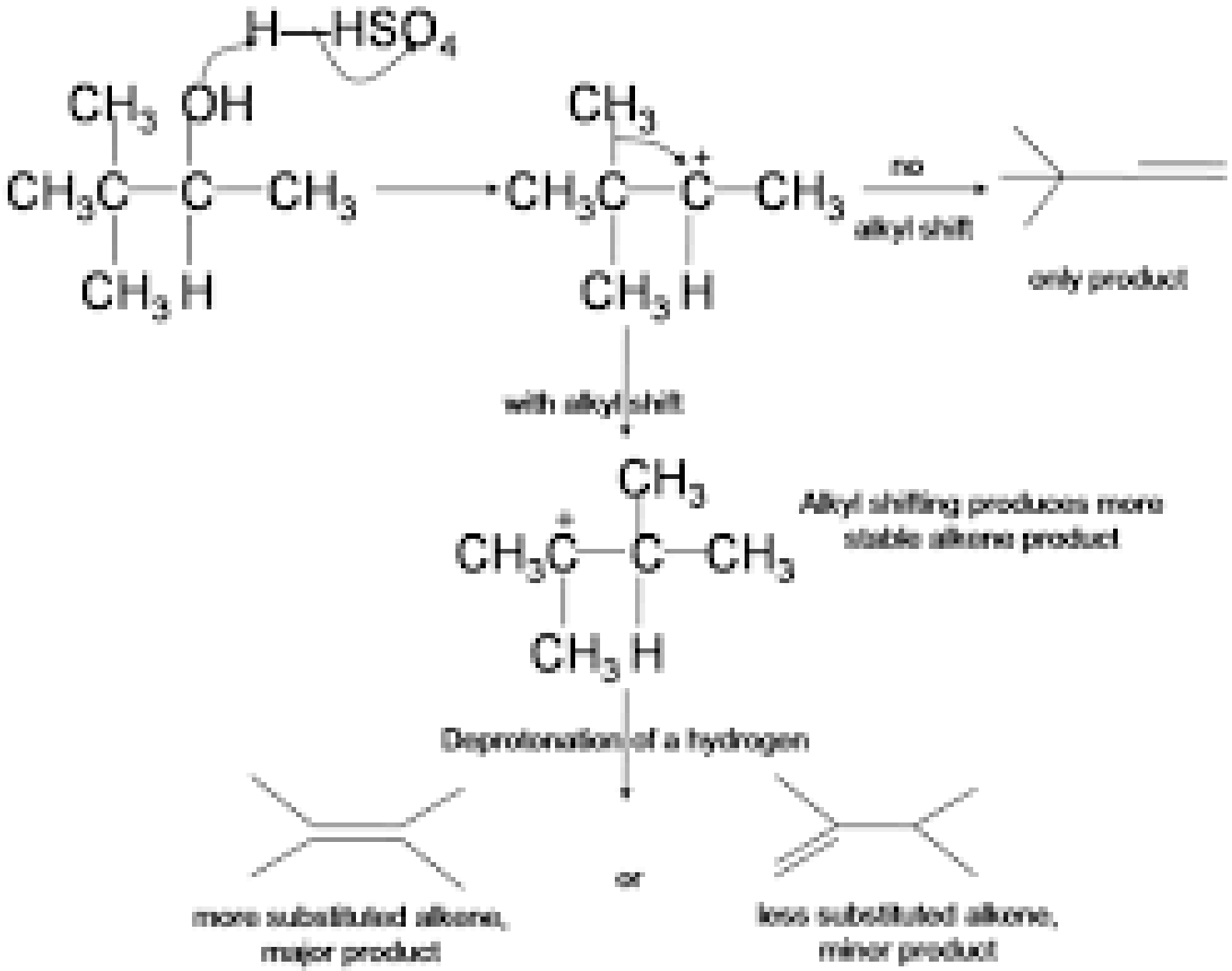
DEHYDRATION OF ALCOHOLS



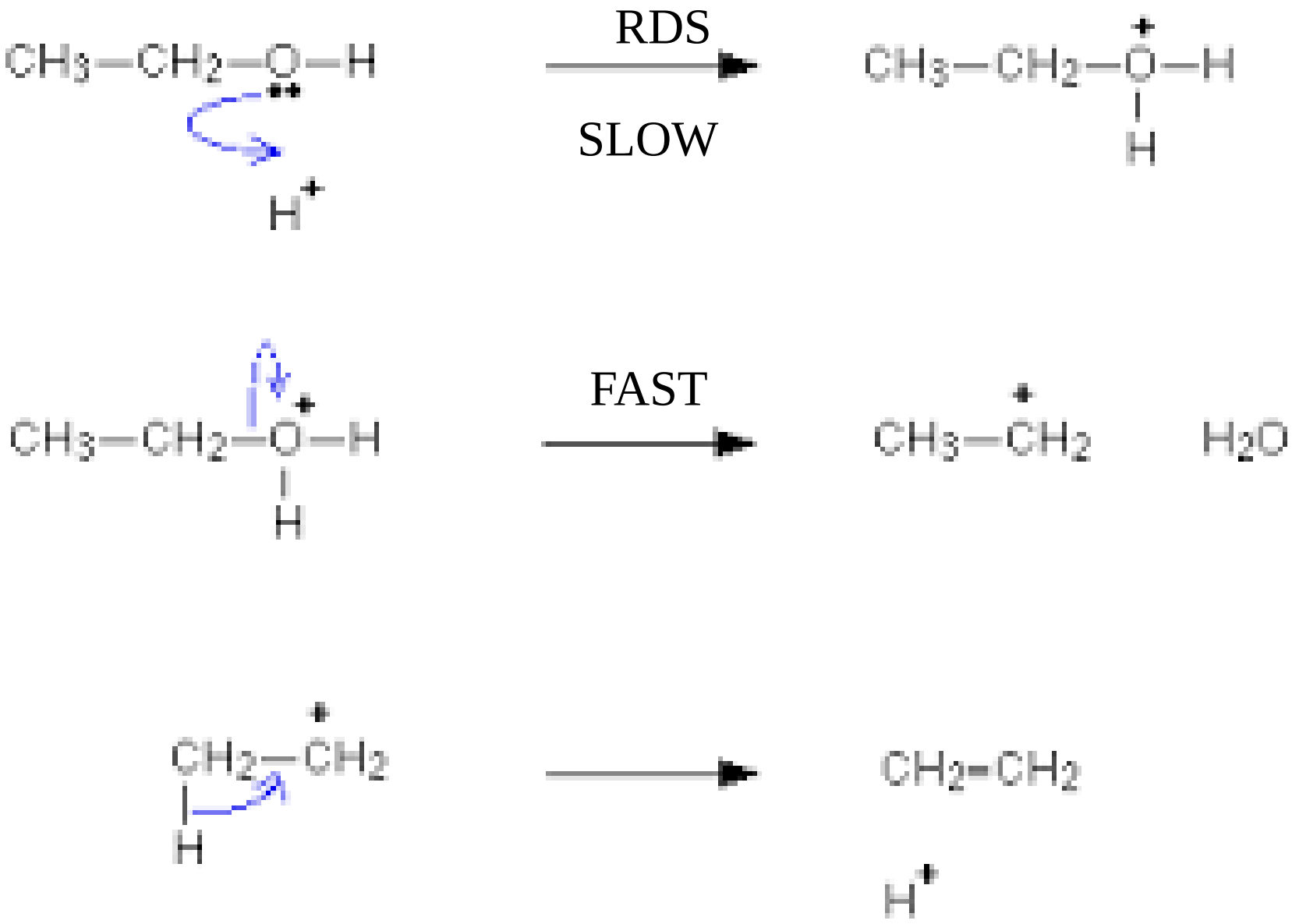
DEHYDRATION OF ALCOHOLS



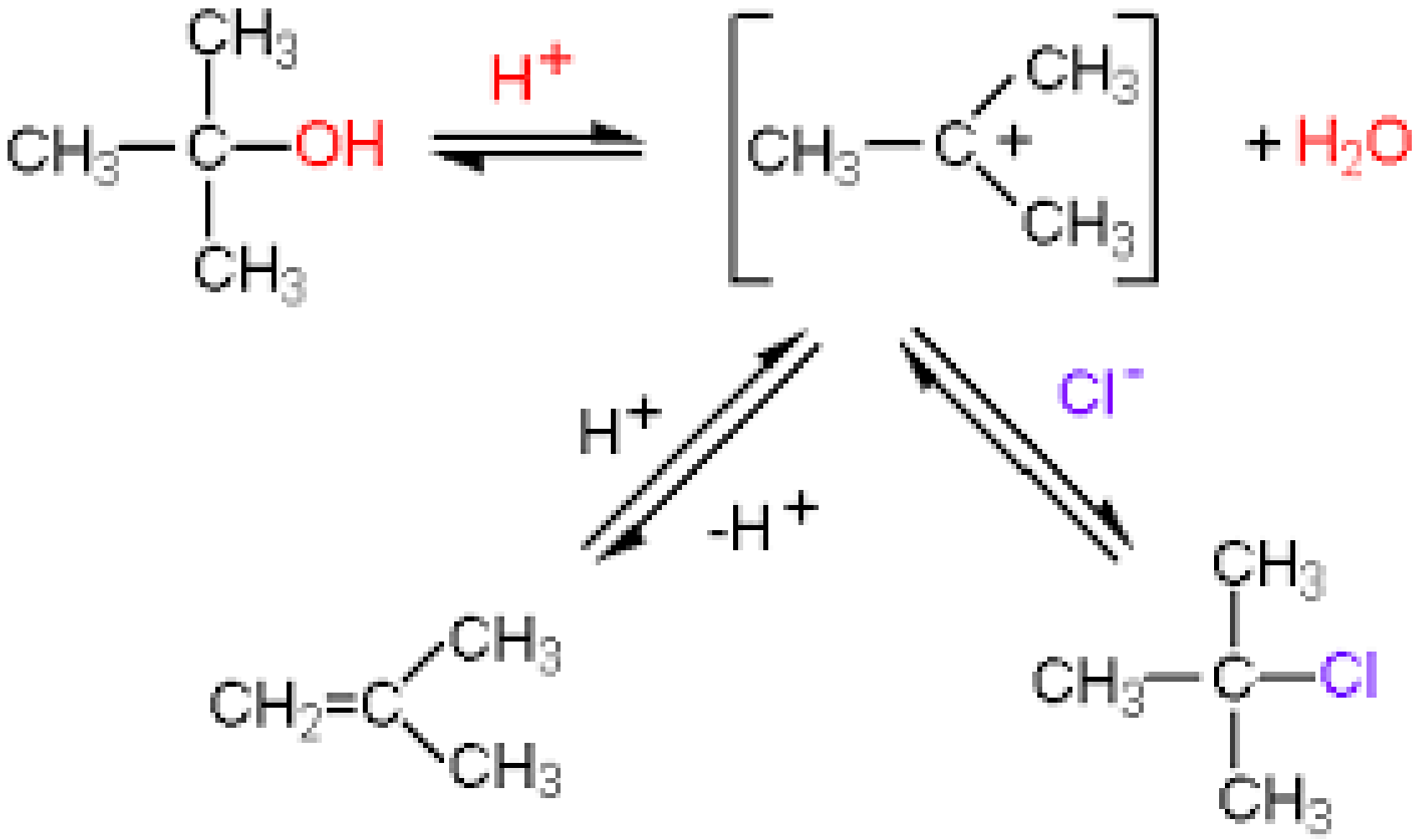
DEHYDRATION OF ALCOHOLS



E2 – BIMOLECULAR ELIMINATION



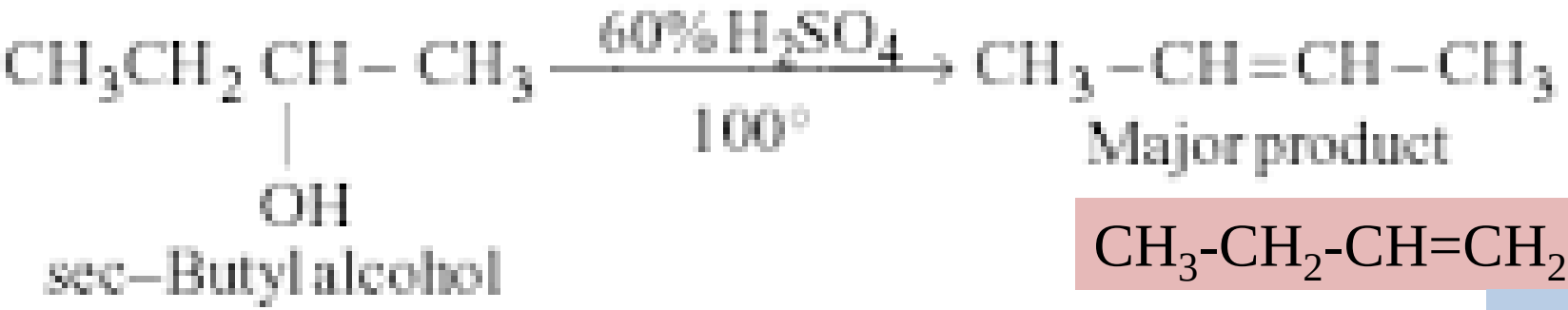
E1 – UNIMOLECULAR ELIMINATION



DEHYDRATION OF ALCOHOLS

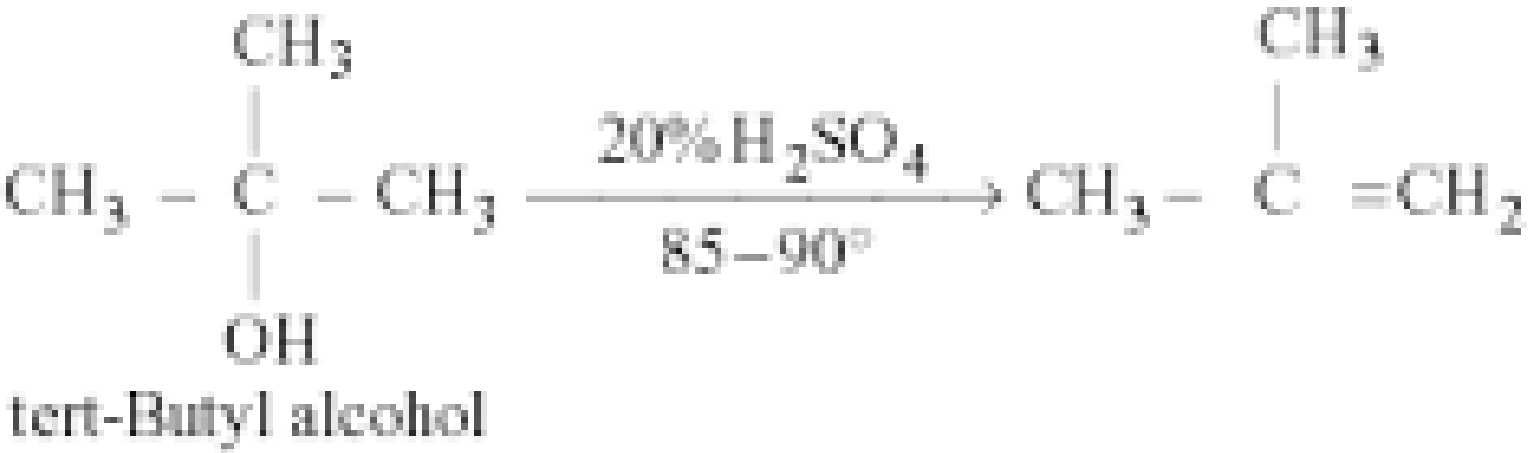
minor

CH_3-CH_2-CH=CH_2



CH_3-CH_2-CH=CH_2

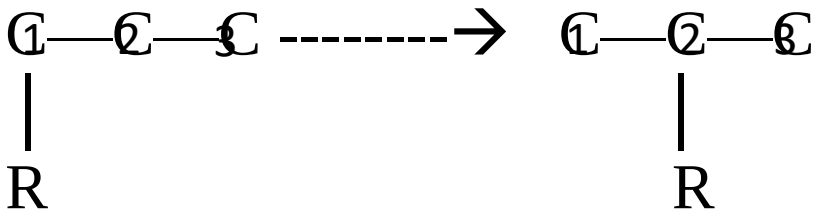
minor



REARRANGEMENT REACTION

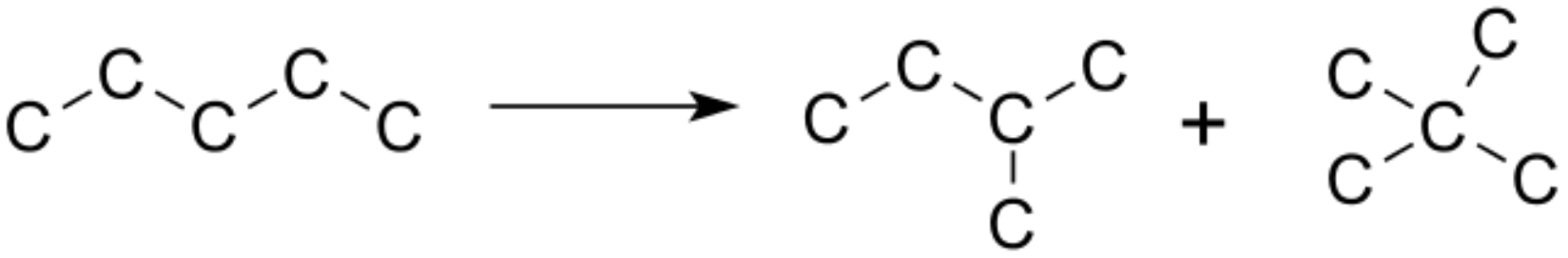
A rearrangement reaction is a broad class of organic reactions where the carbon skeleton of a molecule is rearranged to give a structural isomer of the original molecule. Often a substituent moves from one atom to another atom in the same molecule.

In the example below the substituent R moves from carbon atom 1 to carbon atom 2.



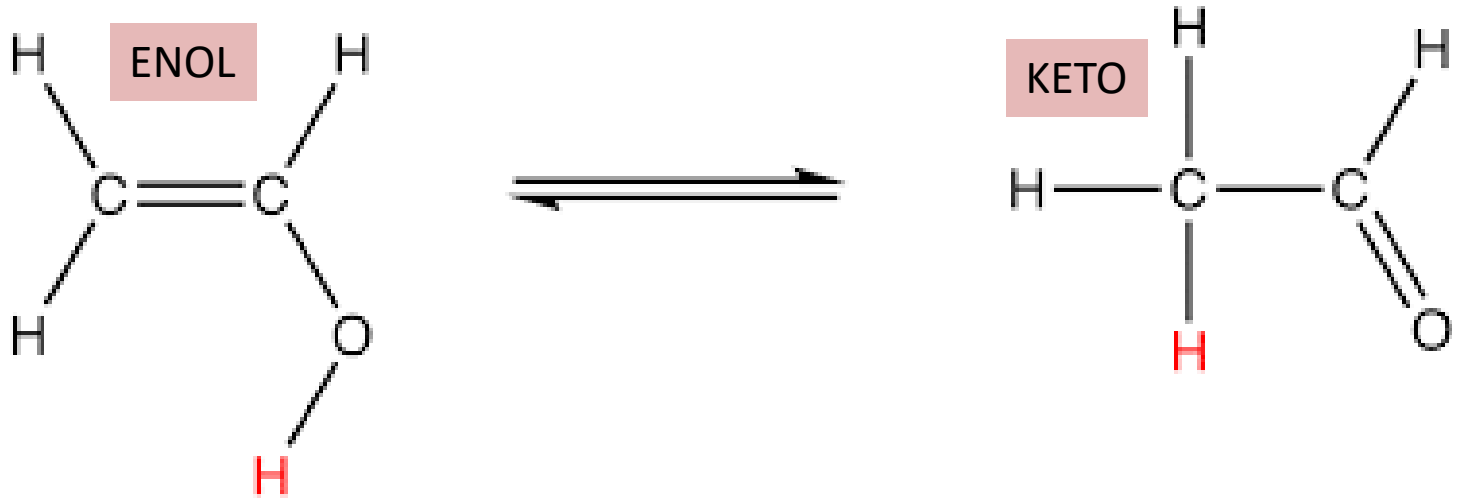
REARRANGEMENT REACTION

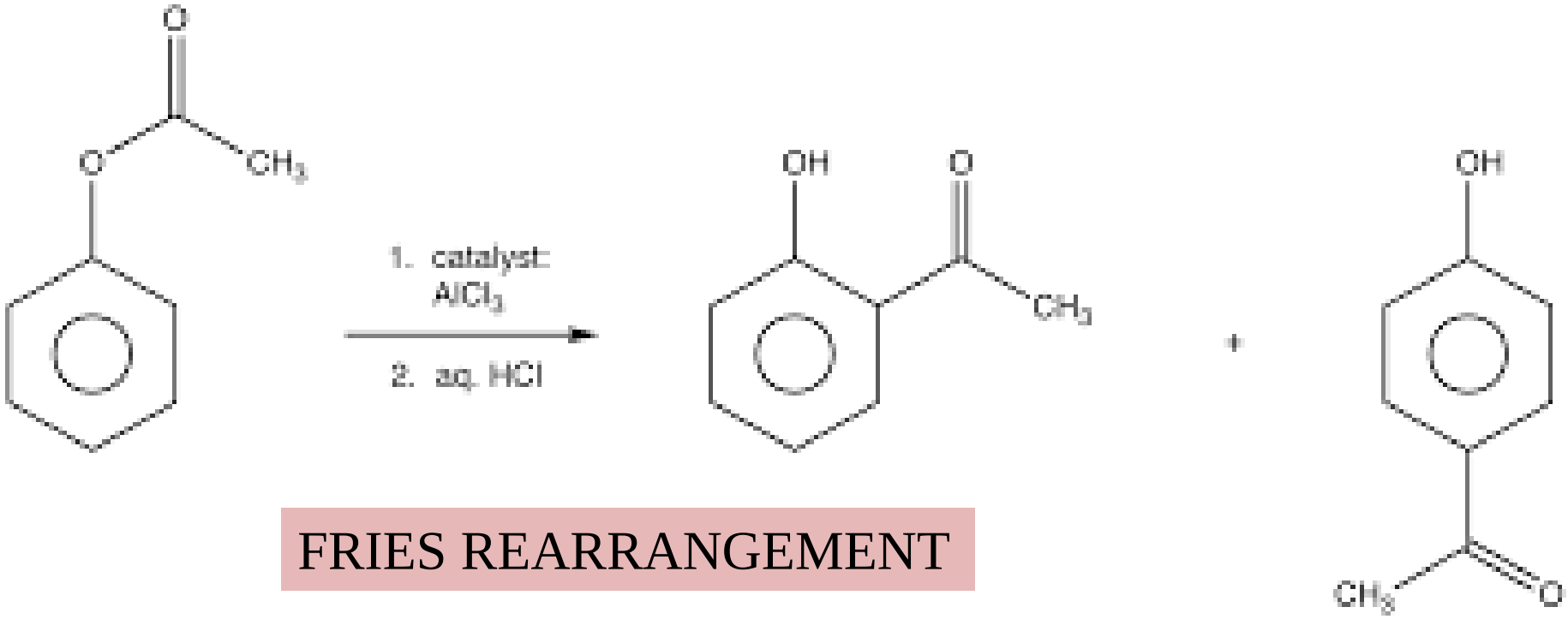
In general straight-chain alkanes, are converted to branched isomers by heating in the presence of a catalyst. Examples include isomerisation of n-butane to isobutane and pentane to isopentane.



pentane 2-methylbutane 2,2-dimethylpropane

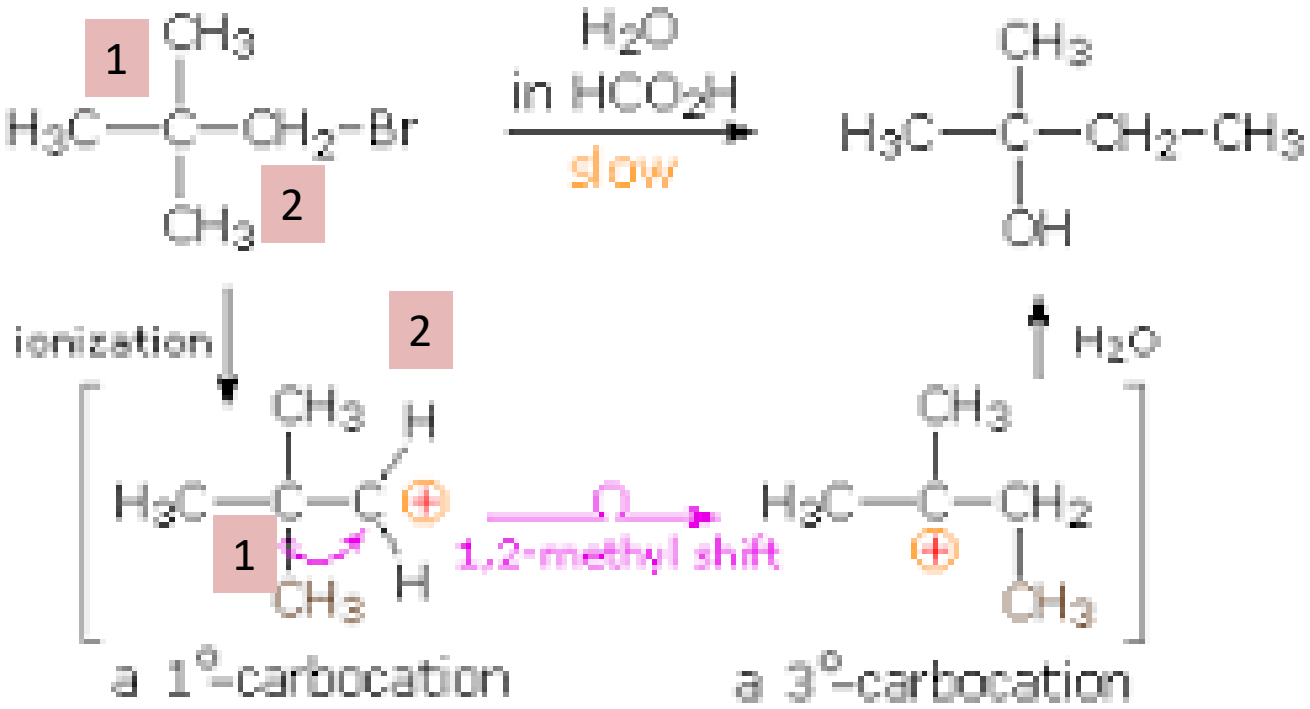
REARRANGEMENT REACTIONS





FRIES REARRANGEMENT

REARRANGEMENT REACTIONS



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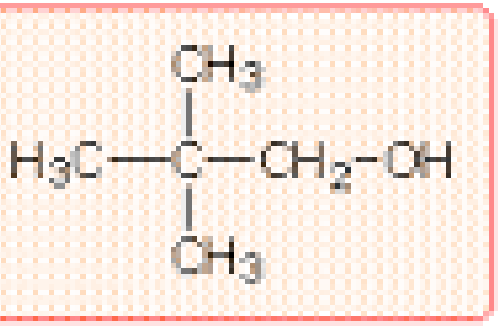

neopentyl alcohol

REARRANGEMENT REACTIONS