Class — U.G. sem - III

Paper — MIC — 3

Unit — 2

Topic — ALKENES

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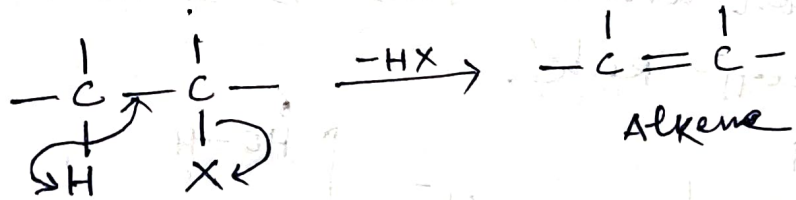
Preparation of Alkenes by Dehydrohalogenation of Alkyl Halides : Elimination Reaction

Alkyl halides can form alkenes by the loss of molecule of hydrogen halides under the influence of a base catalyst (alcoholic KOH). The reaction is known as dehydrohalogenation of alkyl halides. It involves the removal of the halogen atom together with the hydrogen atom from the adjacent carbon atom.

$$CH_3-CH_2X \xrightarrow{OH^-} H_2C=CH_2 + H_2O + X^-$$

Mechanism of reaction [E_2 i.e. Elimination bimolecular mechanism].



In some cases, this reaction yields a single product (alkene) and in other cases yields a mixture of alkenes.

For example —
out of 1-chlorobutane and 2-chlorobutane the former yields only but-1-ene while the latter gives but-1-ene and but-2-ene. Thus, the preferred product is the alkene that has the greater number of alkyl groups attached to the double bonded carbon atoms.

In other words, the ease of formation of alkene has the following order :-

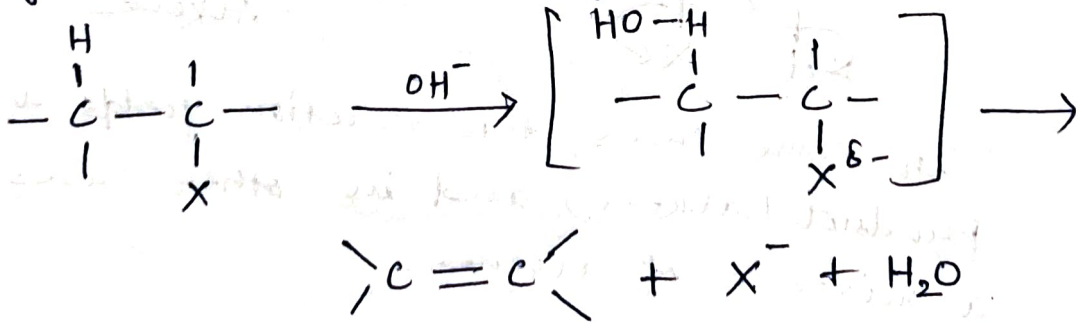
$$R_2C=CR_2 > R_2C=CHR > R_2C=CH_2 > RCH=CHR > RCH=CH_2 > CH_2=CH_2$$

this order is based on heat of hydrogenation values.

Hence in dehydrohalogenation, the more stable the alkene more easily it is formed.

Saytzeff's Rule :

In the dehydrohalogenation of alkyl halide to form alkene, the preferred product is the alkene which is more highly alkylated at the doubly bound carbon atoms. This is statement of 'saytzeff Rule'.



$3^\circ > 2^\circ > 1^\circ$

tertiary alkyl halide — secondary Alkyl halide — Preimary alkyl halide

} E_2 type of mechanism of dehydrohalogenation