Addition Reaction :- Alkene show electrophilic addition reaction

1. Addition of Hydrogen :-

$$RCH=CH_2 \xrightarrow{H_2/Ni} RCH_2-CH_3$$

2. Addition of Halogens :-

$$CH_2=CH_2 + Br_2 \xrightarrow[\text{Solvent}]{CCl_4} \underset{\substack{| \\ Br}}{CH_2}-\underset{\substack{| \\ Br}}{CH_2}$$

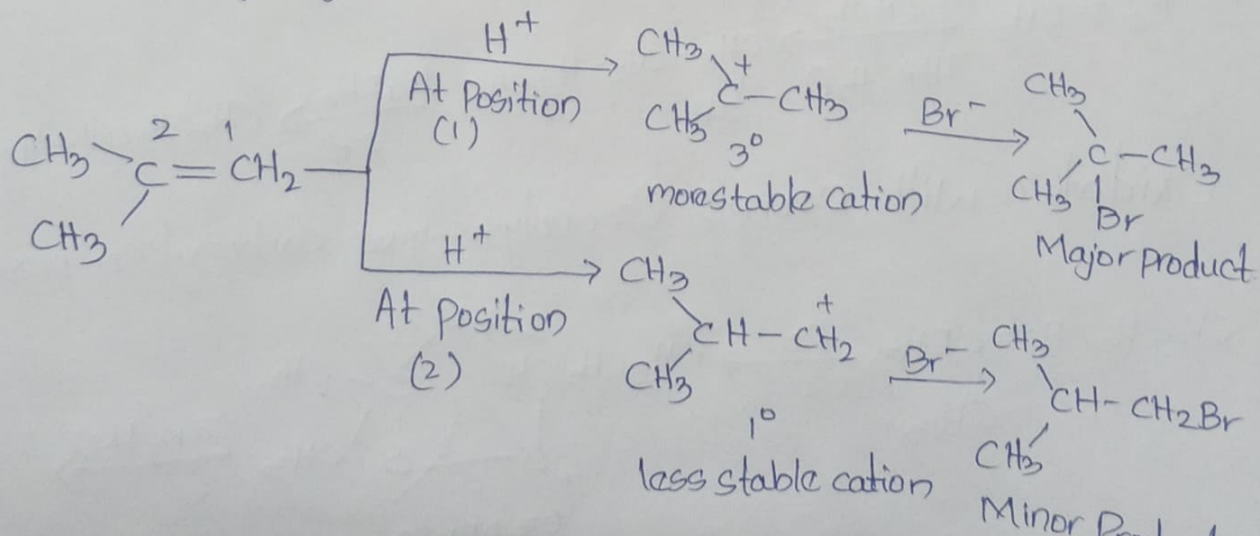
3. Addition of Hydrogen halides :-

Addition reaction of HBr to symmetrical alkenes.

$$CH_2=CH_2 + H-Br \longrightarrow CH_3-CH_2-Br$$

Addition reaction of HBr to unsymmetrical alkenes takes place according to Markovnikov Rule.

Markownikov Rule :- Negative part of addendum (adding molecule) gets attached to that carbon atom which possesses lesser number of hydrogen atoms.



Peroxide effect or Kharasch (Anti Markownikoff's addition) :-

In 1933 Kharasch and Mayo observed that when HBr is added to unsymmetrical double bond in the presence

of organic peroxide, the reaction take place opposite to Markovnikov rule.

Note: Peroxide Effect is applicable only to HBr and not to HF, HCl and HI.

4. Addition of Water :- Acid catalyzed addition of water.

$$CH_3-CH=CH_2 + H_2O \xrightarrow{65-70\%\ H_2SO_4} CH_3-\underset{OH}{CH}-CH_3$$

$$(CH_3)_2C=CH_2 \xrightarrow{H_2O/H^+} (CH_3)_2\underset{OH}{C}-CH_3$$

Oxidation :-

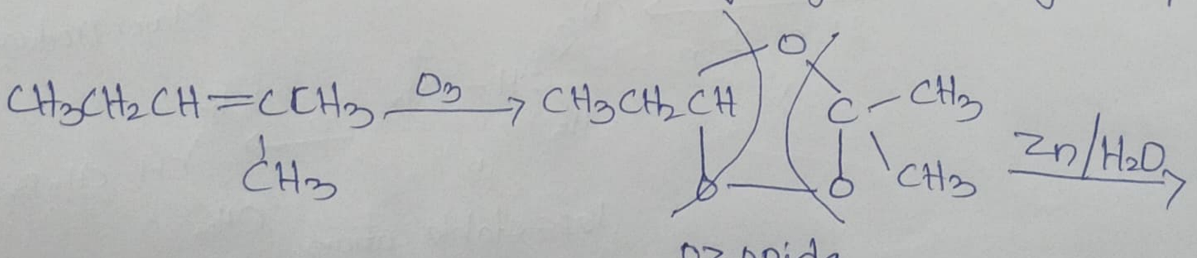
1. Hydroboration-oxidation :- Alkanes react with diborane to form trialkyl boranes with an oxidation with alkaline H_2O_2 give alcohols.

$$3CH_2=CH_2 \xrightarrow{BH_3} (CH_3CH_2)_3B \xrightarrow{H_2O_2/OH^-} 3CH_3CH_2OH$$

2. Oxymercuration - Demercuration:-

$$H_2C=CH_2 \xrightarrow[THF,\ H_2O]{Hg(OAc)_2} \underset{OH}{CH_2}-CH_2-HgOAc \xrightarrow[OH^-]{NaBH_4} CH_3CH_2OH + Hg$$

Oxidation with ozone :- Ozonolysis-give carbonyl compounds



$$CH_3CH_2-\overset{O}{\overset{\|}{C}}H + CH_3-\overset{O}{\overset{\|}{C}}-CH_3 + Zn(OH)_2$$