Mechanism of Organic Reaction

(IMPORTANT)

1) Kolbe's Electrolysis

$$2CH_3COONa \xrightarrow[2H_2O]{\text{Electrolysis}} CH_3-CH_3 + 2CO_2 + H_2 + 2NaOH$$

Mechanism

$$2CH_3COO^-Na^+ \rightleftharpoons 2CH_3-\overset{\overset{O}{\|}}{C}-O^- + Na^+$$

At Anode

$$2\,CH_3-\overset{\overset{O}{\|}}{C}-O^- \xrightarrow[-2e^-]{} 2CH_3-\overset{\overset{O}{\|}}{C}-\dot{O}:$$

$$2\,CH_3-\overset{\overset{O}{\|}}{C}-\dot{O}: \longrightarrow 2\,\dot{C}H_3 + 2\overset{\overset{O}{\|}}{C}=O$$

$$\dot{C}H_3 + \dot{C}H_3 \longrightarrow CH_3-CH_3$$

At cathode

$$H_2O + e^- \longrightarrow {}^-OH + \dot{H}$$

$$\dot{H} + \dot{H} \longrightarrow H_2$$

$$Na^+ + OH^- \longrightarrow NaOH$$

2) Halogenation of Alkane :

$$CH_4 + Cl_2 \xrightarrow{h\nu} CH_3Cl + HCl$$

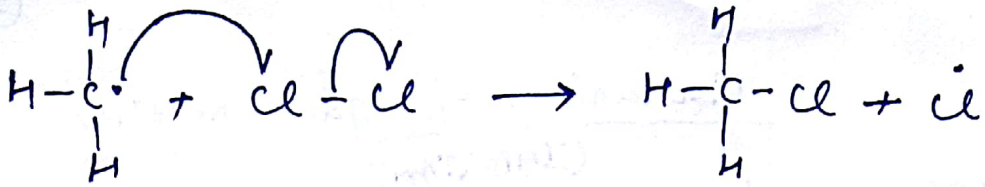
Mechanism

step-1 chain initiation step :

$$Cl-Cl \xrightarrow{h\nu} \dot{Cl} + \dot{Cl}$$

step-2 chain Propagation step

$$H-\underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}}-H + :Cl \longrightarrow H-\underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}}\cdot + HCl$$



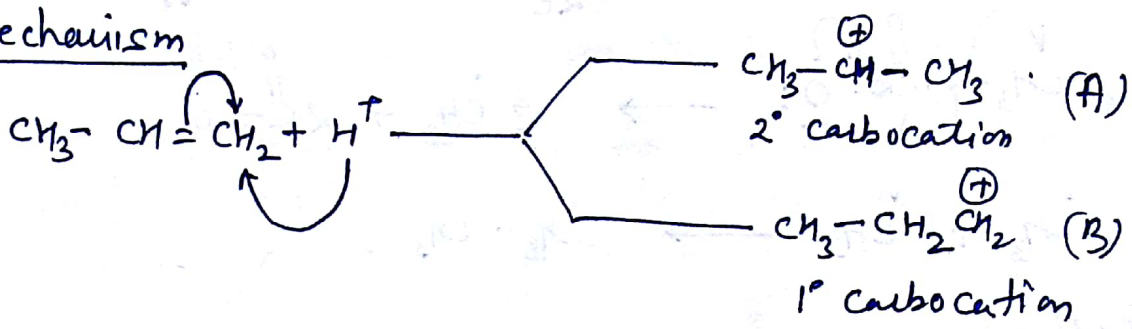
Step-3
Chain termination

$$Cl^{\cdot} + Cl^{\cdot} \longrightarrow Cl_2$$

3) Markownikoff's rule

$$CH_3-CH=CH_2 + HBr \longrightarrow CH_3-\underset{Br}{CH}-CH_3$$

Mechanism



Secondary (2°) carbocation is more stable than Primary (1°) carbocation therefore the attack of H^+ ion on propene results in the formation of more stable carbocation (A).

$$CH_3-\overset{\oplus}{C}H-CH_3 + Br^- \longrightarrow CH_3-\underset{Br}{CH}-CH_3$$

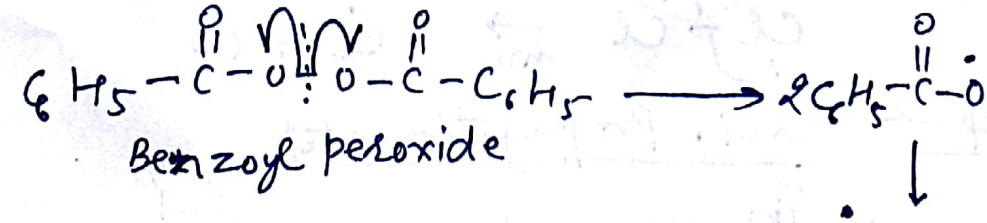
(A)

4) Anti Markownikoff's Rule / Peroxide effect / kharsch effect

$$CH_3-CH=CH_2 + HBr \xrightarrow{\text{Peroxide}} CH_3CH_2CH_2Br$$

Mechanism

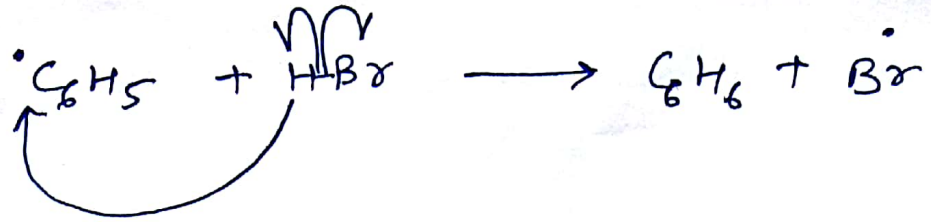
Step-1



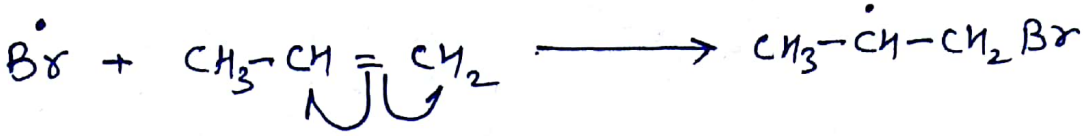
Benzoyl peroxide

$$2\dot{C}_6H_5 + 2CO_2$$

Step-2



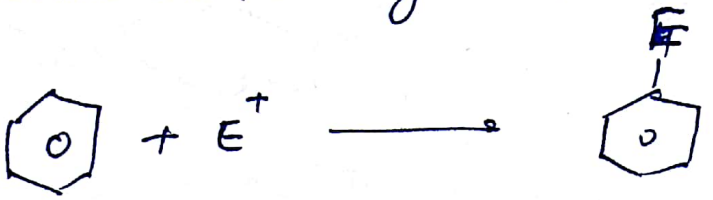
Step-3



Step-4

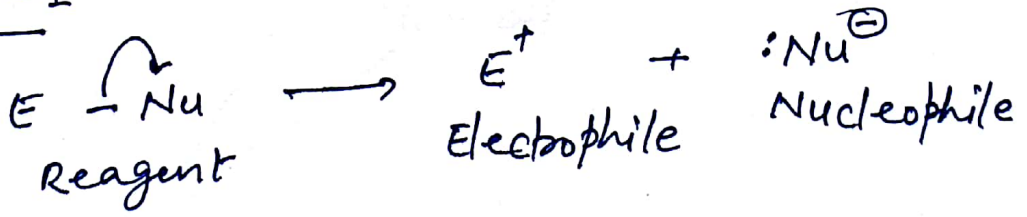
5) Electrophilic substitution of Benzene

Same mechanism for halogenation, Nitration, sulphonation, friedel craft alkylation and friedel craft acylation.

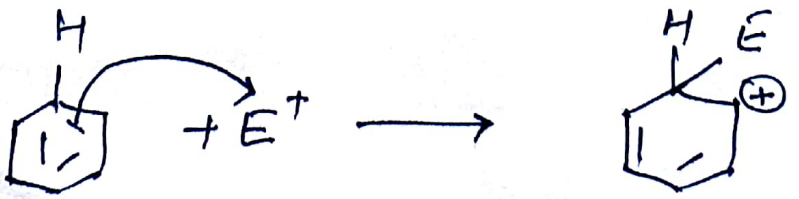


Mechanism

Step-1



Step-2



Step-3