Arenes

Benzene ⬡ C_6H_6

aromatic compounds

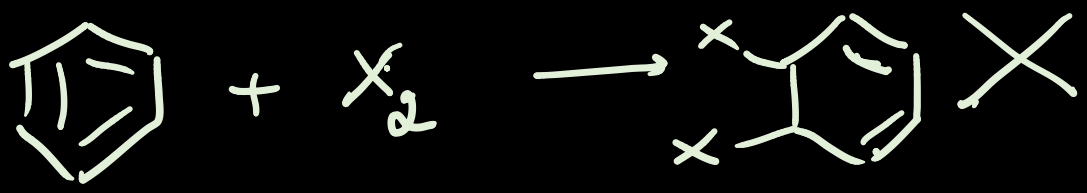
→ Hydrocarbon

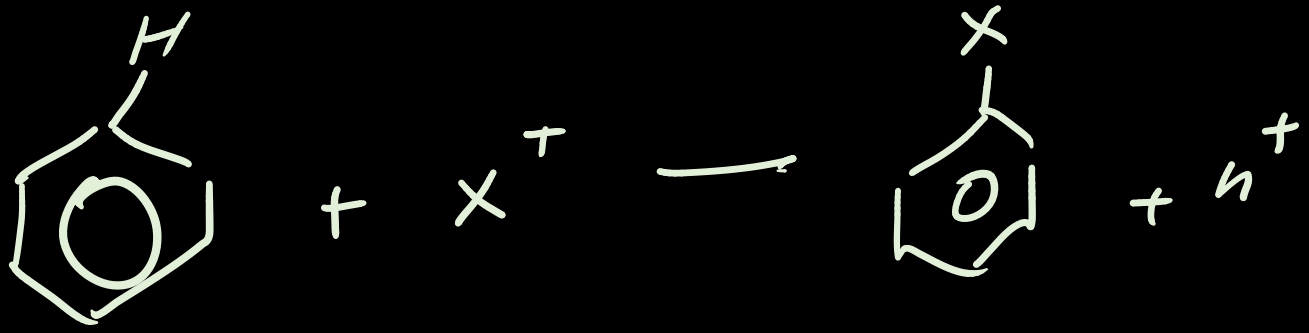
→ high B.P, high M.P due to strong Vander wal forces

Benzene show electrophilic substitution reactions —:

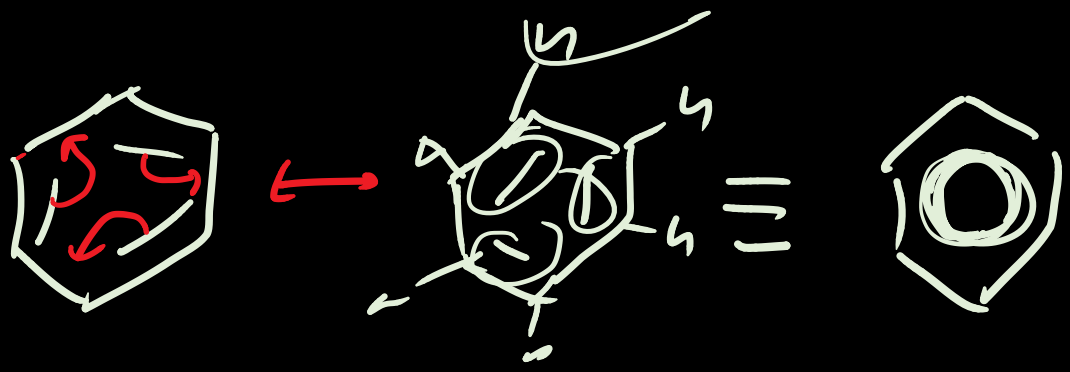
(1) Benzene is e^- rich molecule. aromatic ring is an area of high e^- density as the delocalisation of e^- occurs So it attracts electrophile.

(2) It show substitution . not addition

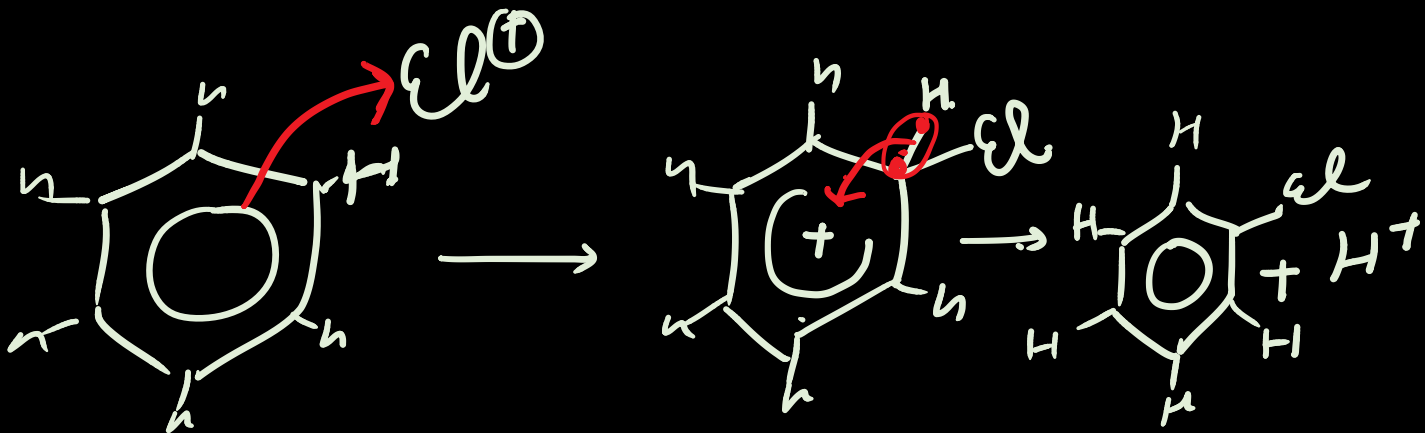


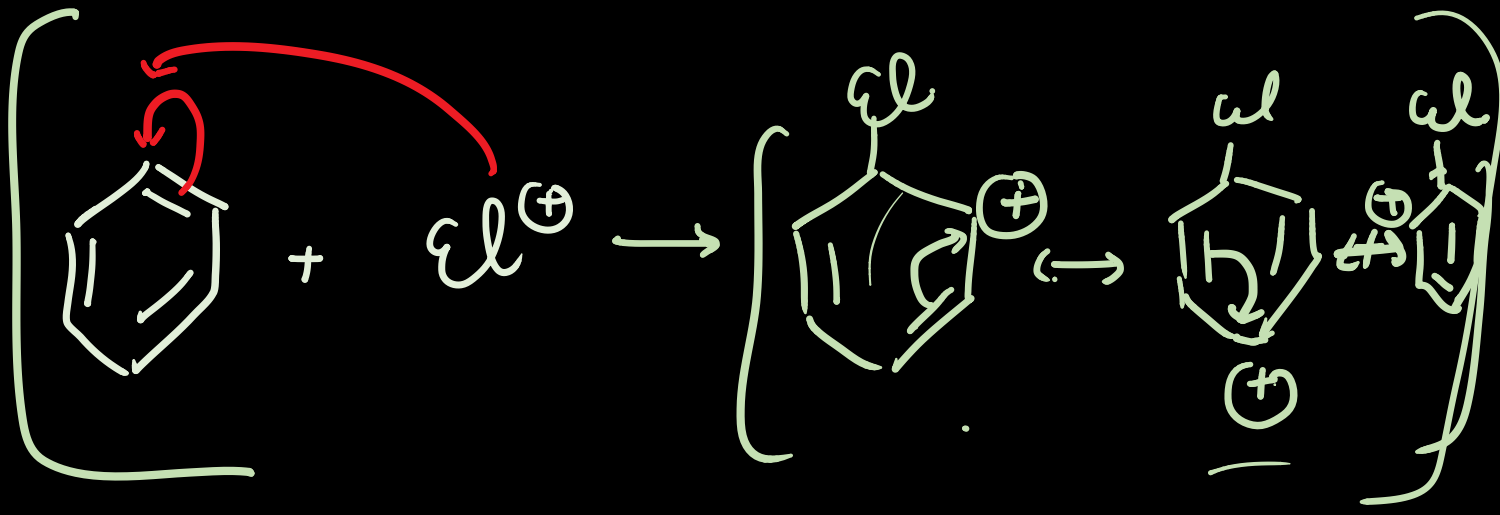


Aromatic ring is highly stable. It remain intact in all reaction of benzene.

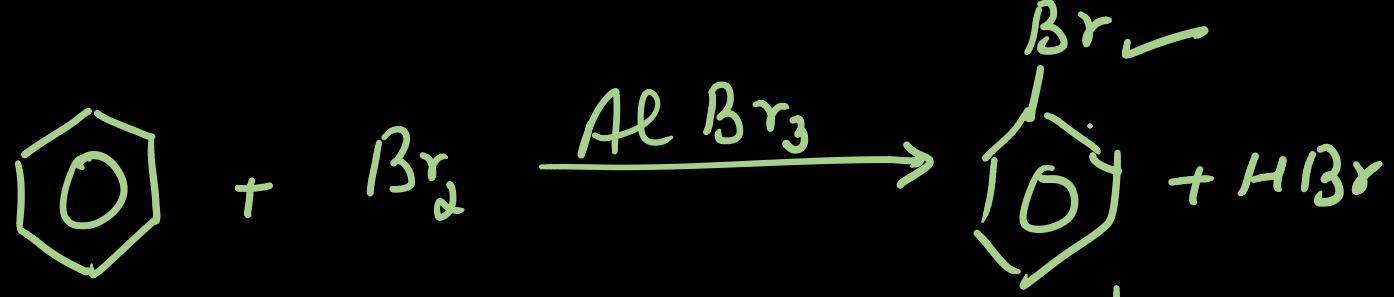


Mechanism



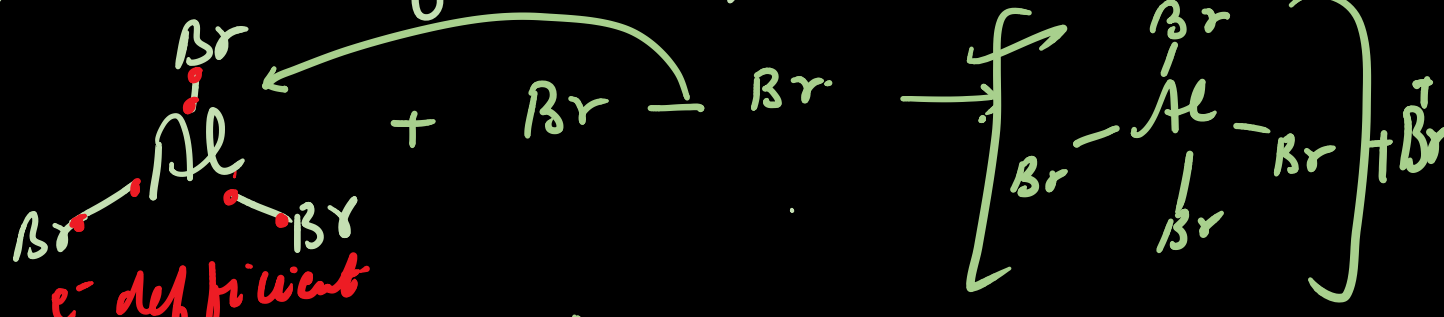


Halogenation :- Rxn with Halogens.

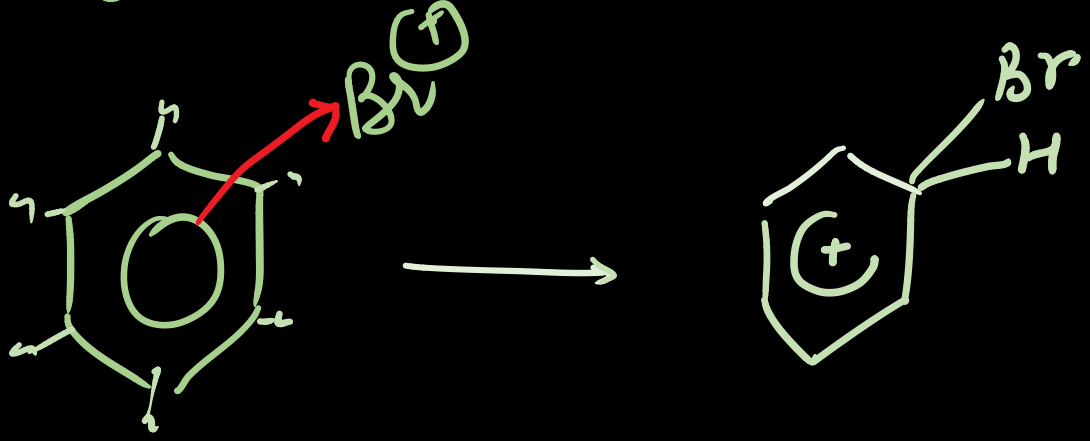


Mechanism.

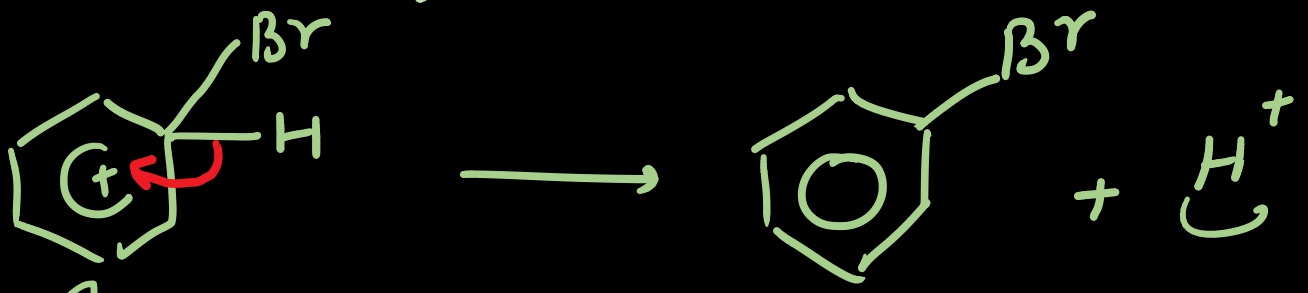
① Formation of electrophile. $[El^+]$



② Attack of electrophile on benzene ring :-



③ Removal of proton (H^+)



④ Regeneration of catalyst

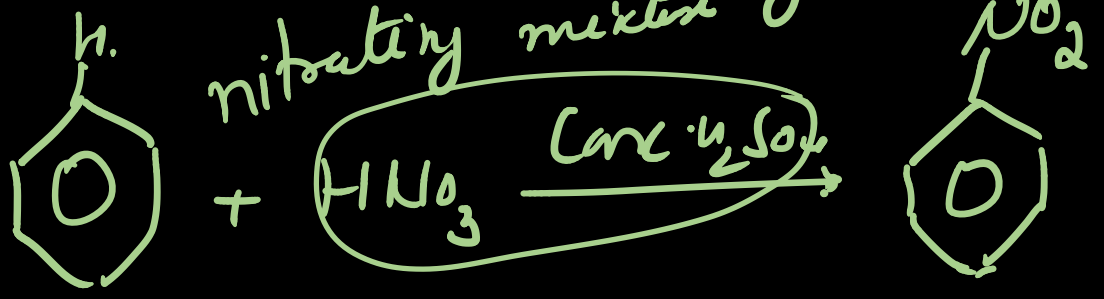
$AlBr_4^- + H^+ \longrightarrow AlBr_3 + HBr$

catalyst regenerated

Nitration

Substitution by NO_2 gp with hydrogen atom on benzene ring.

nitrating mixture



Nitrobenzene.

Mechanism

① Formation of Electrophile

(catalyst)

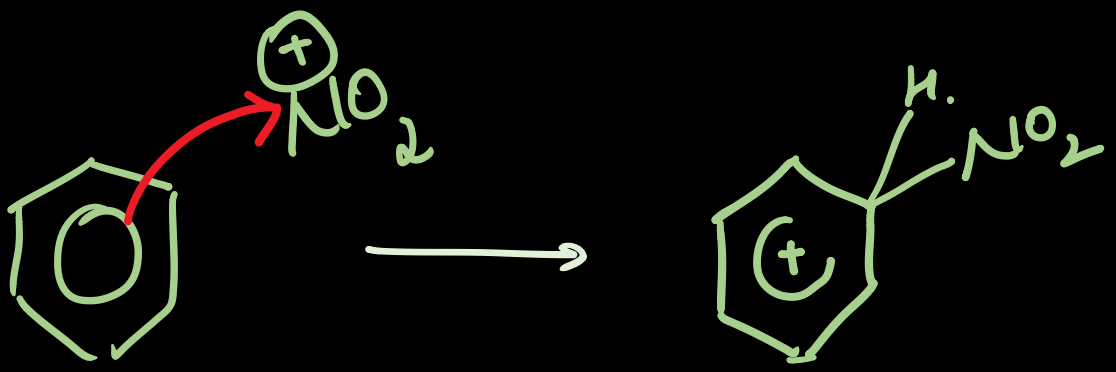
$H_2SO_4 + HNO_3 \longrightarrow HSO_4^- + H_2NO_3^+$

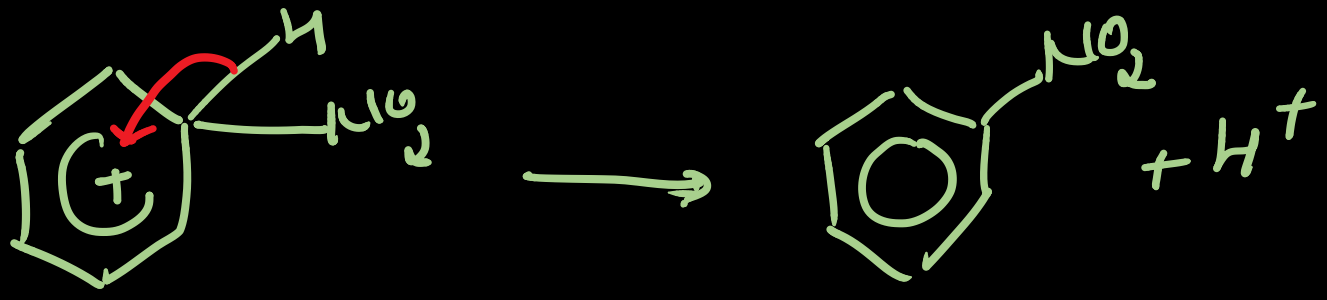
Proton donor

Proton acceptor

$H_2NO_3^+ \longrightarrow \overset{+}{N}O_2 + H_2O$

Nitronium ion (nitryl cation)





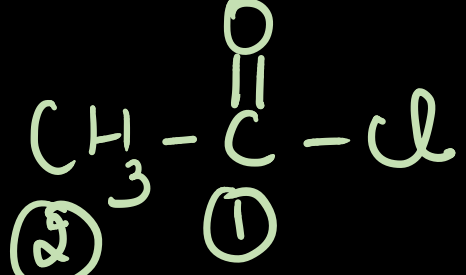
Regeneration of Catalyst

$$HSO_4^- + H^+ \longrightarrow H_2SO_4$$

Catalyst

Friedel craft acylation

Benzene + acid chloride ⟶ acyl chloride.



Ethanoyl chloride