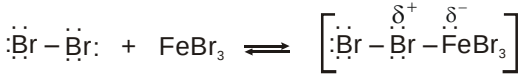
• Points to remember in Aromatic Compounds

Electrophilic aromatic substitution :

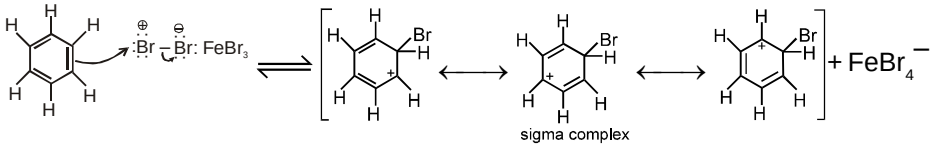
(a) Bromination of Benzene :

Bromination follows the general mechanism for electrophilic aromatic substitution. Bromine itself is not sufficiently electrophilic to react with benzene, but a strong Lewis acid such as $FeBr_3$ catalyzes the reaction.

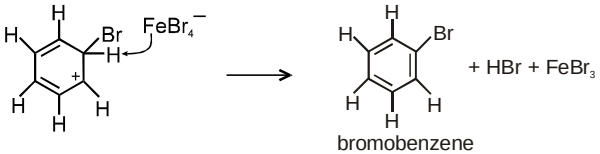
Step 1 : Formation of a stronger electrophile.

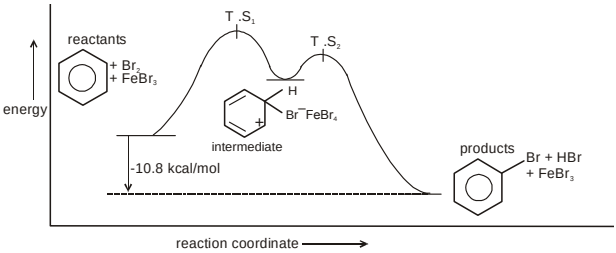


Step 2 : Electrophilic attack and formation of the sigma complex.

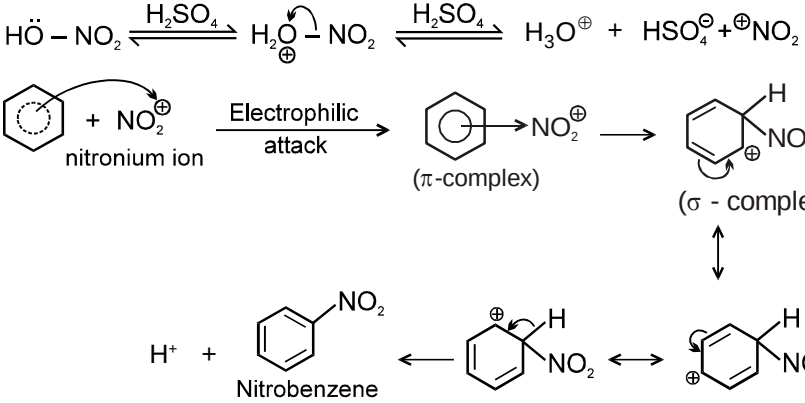


Step 3 : Loss of a proton gives the products.





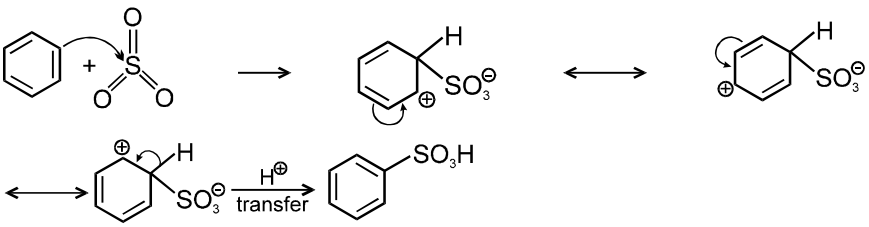
(b) Nitration :



(c) Sulphonation :

The electrophilic reagent, SO_3, attacks the benzene ring to form the intermediate carbocation.

$$2H_2SO_4 \rightleftharpoons SO_3 + H_3O^{\oplus} + HSO_4^{\ominus}$$

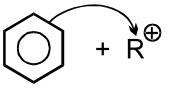


(d) Friedel Craft reaction :

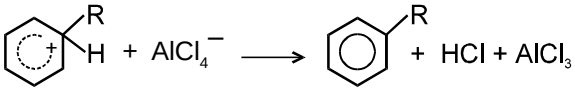
Alkylation mechanism :

(i) $R-\ddot{Cl}: + AlCl_3 \longrightarrow R \overset{\delta+}{-}Cl \overset{\delta-}{-} AlCl_3 \longrightarrow R^{\oplus} + AlCl_4^{\ominus}$

carbocation

(ii) 

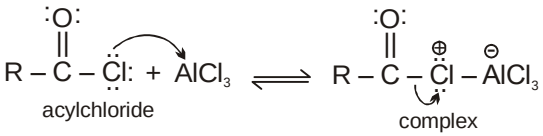
σ-complex

(iii) 

Acylation mechanism :

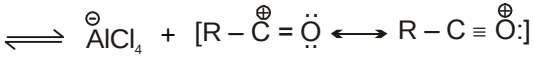
Acylation of benzene may be brought about with acid chlorides or anhydrides in presence of Lewis acids.

Step 1 : Formation of an acylium ion.



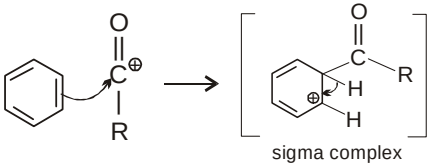
acylchloride

complex



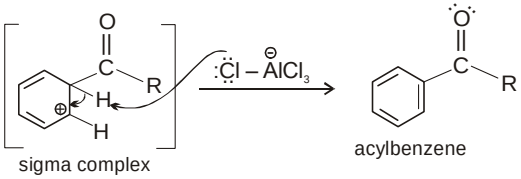
acylium ion

Step 2 : Electrophilic attack.



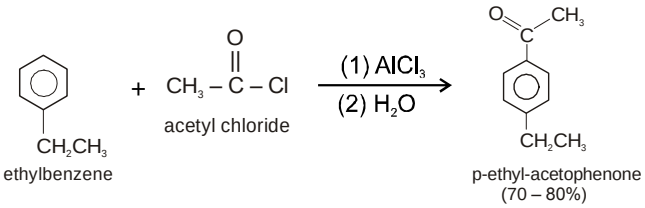
sigma complex

Step 3 : Loss of a proton. Complexation of the product.

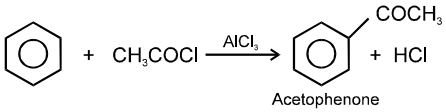


sigma complex

acylbenzene

e.g. 

Note : Friedal-Crafts acylations are generally free from rearrangements and multiple substitution. They do not go on strongly deactivated rings.

e.g. 

Chemical Reactions of Benzene :