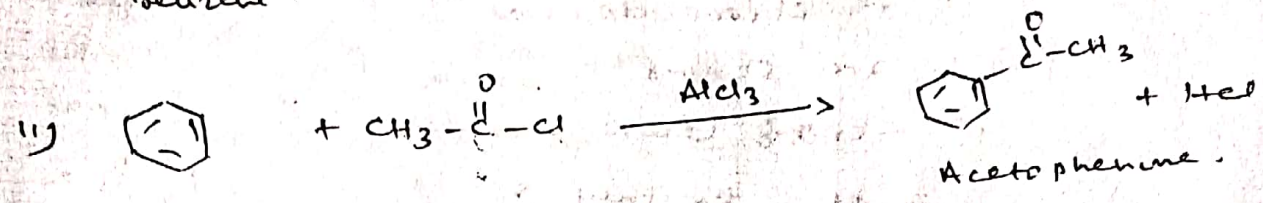
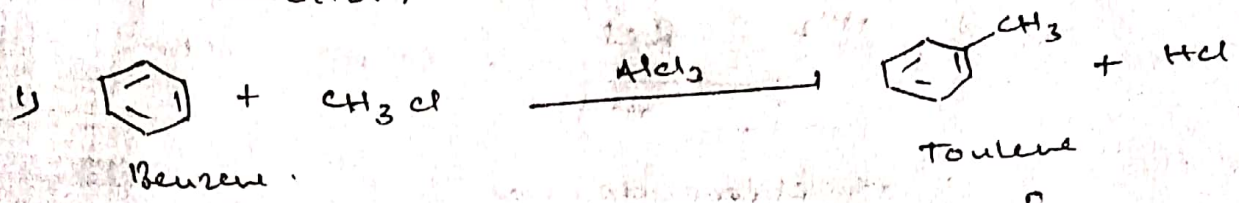


Friedel craft Reaction

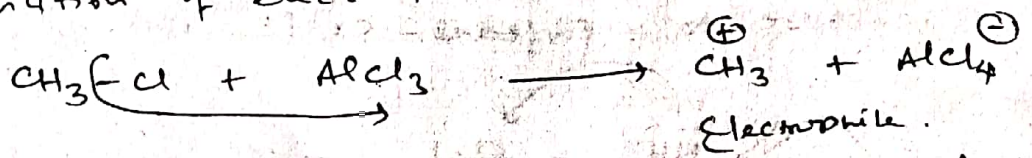
The reaction of an alkyl halide or acyl halide with benzene in presence of Lewis acid such as $AlCl_3$ is called Friedel-Crafts reaction.



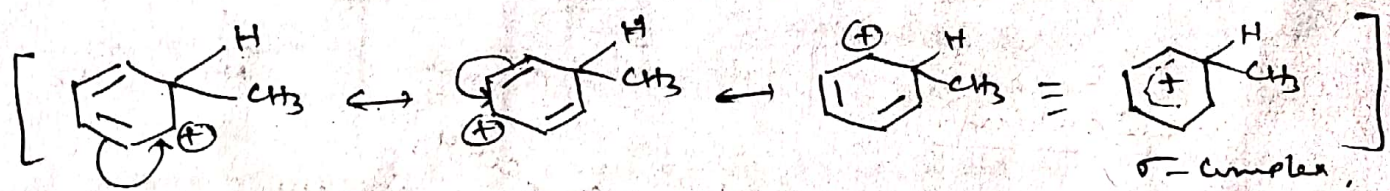
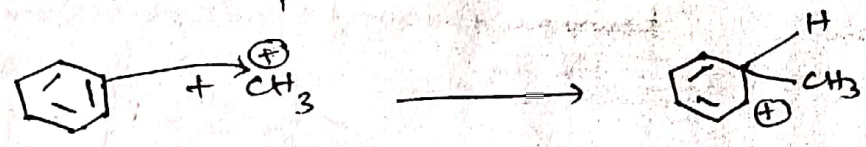
Mechanism:

Mechanism of this reaction leads into following steps -

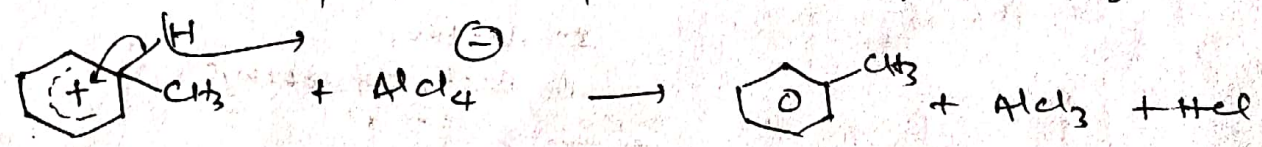
(i) Formation of electrophile



(ii) Attack of electrophile on benzene ring, to form σ -complex



(iii) Loss of proton from σ -complex to give toluene

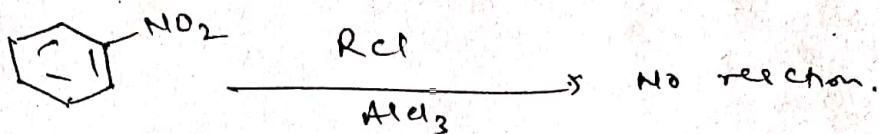


Limitation:

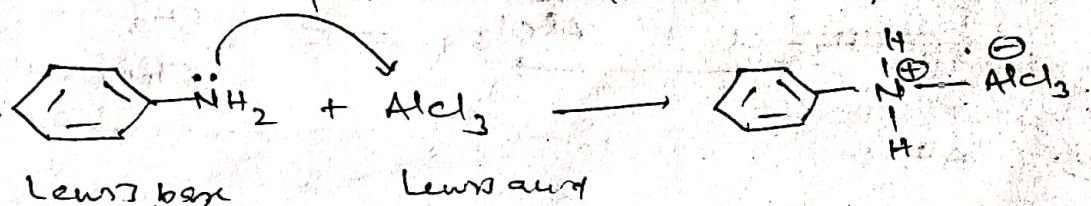
Friedel-Craft reactions are the most difficult electrophilic aromatic substitution reaction to carry out in laboratory. For example, they do not occur when benzene ring is substituted with $-NO_2$ (a strong deactivator) or with $-NH_2$, NHR_2 or NR_2 (strongly activating).

ters).

A benzene ring deactivated by a strong electron withdrawing group ($-\text{NO}_2$) is not electron rich to undergo Friedel-Craft reaction.



Friedel-Craft reactions do not occur with NH_2 groups which are strong activating group. $-\text{NH}_2$ groups are strong Lewis base due to lone pair of electrons of N, so they react with AlCl_3 , the resulting product contains a positive charge adjacent to the benzene ring, so, the ring is now strongly deactivated and therefore unreactive to Friedel-Craft reactions.



\downarrow RCl/AlCl_3
No reaction.

Application.

