

16. Aromatic Compounds

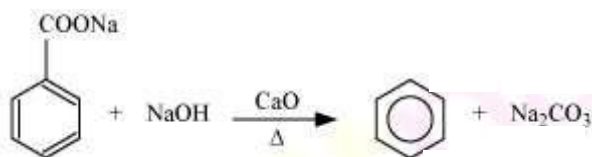
Aromatic hydrocarbon:

Aromaticity

1. Planarity
2. Complete delocalization of the electrons in the ring
3. Huckel rule $\rightarrow$ Presence of $(4n + 2)\pi$ electrons in the ring ($n = 0, 1, 2, \dots$)

• Preparation of benzene

1. Cyclic polymerization of ethyne
2. Decarboxylation of aromatic acids

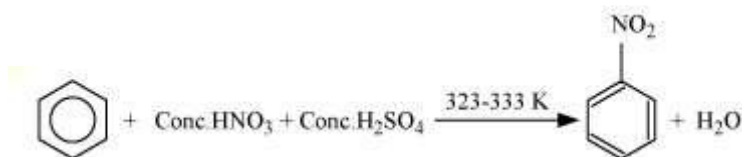


• Physical properties

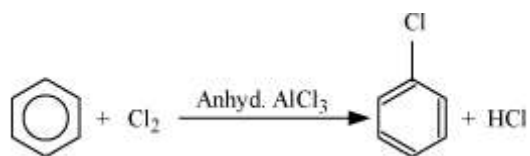
Immiscible with water but readily miscible with organic solvents

• Chemical properties

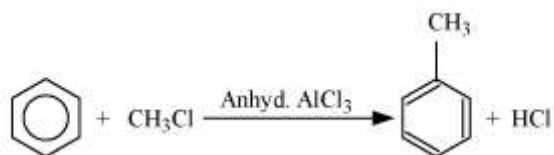
1. Electrophilic substitution
2. Nitration



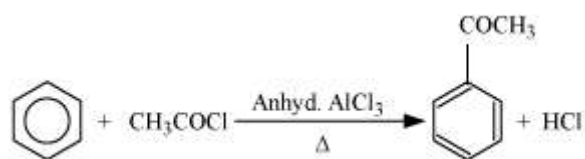
3. Halogenation



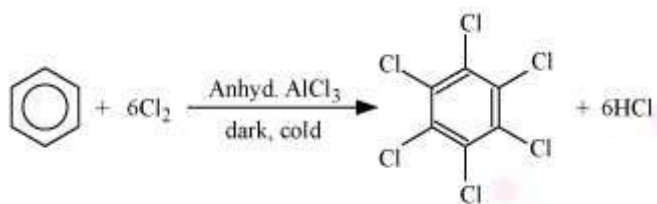
4. Friedel-Crafts alkylation



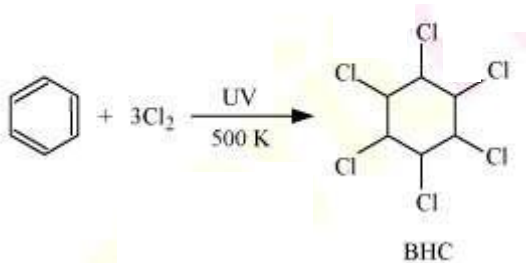
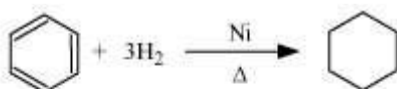
5. Friedel-Crafts acylation



6. On treatment with excess of chlorine



7. Addition reaction

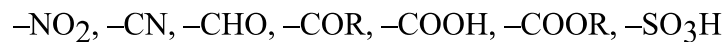


- Directive influence of functional group in benzene ring

1. Ortho and para directing groups:



2. Meta directing groups:



- **Carcinogenicity and toxicity**

Benzene and polynuclear hydrocarbons containing more than two benzene rings are toxic and can cause cancer

