

REACTIONS KEY

- SUBSTITUTION
- OXIDATION
- REDUCTION
- HYDROLYSIS
- ACYLATION
- OTHER

Chemical Reactions Map:

BENZENE is the central starting point. Key reactions include:

- Phenylsulfonic Acid** (via H_2SO_4 , heat under reflux)
- Phenol** (via H_2SO_4 , heat)
- Chlorobenzene** (via Cl_2 & AlCl_3 cat., room temperature)
- Bromobenzene** (via Br_2 & FeBr_3 cat., room temperature)
- Iodobenzene** (via I_2 & conc. HNO_3 , reflux)
- Alkylbenzene** (via Chloroalkane, AlCl_3 cat., room temperature)
- Nitrobenzene** (via HNO_3 , H_2SO_4 cat., 55°C)
- Phenylamine** (via HCl , reflux, Sn , NaOH)
- Benzoic Acid** (via KMnO_4 , H_2SO_4 , heat)
- Benzaldehyde** (via CO , HCl & AlCl_3 cat., CuCl)
- Phenylketone** (via SOCl_2 , heat)
- Benzoyl Chloride** (via SOCl_2 , heat)
- Benzonitrile** (via KCN & copper powder)
- Benzene Diazonium** (via NaNO_2 (aq), dilute HCl , temp. $0-5^\circ\text{C}$)
- Azobenzene** (via Coupling reaction: $\text{C}_6\text{H}_5\text{R}$, NaOH , $<10^\circ\text{C}$)

Interconversions and Other Reactions:

- Phenol** to **Benzene**: Powdered Zn , heat
- Phenol** to **Chlorobenzene**: NaOH with Cu salt cat., 200 atm & 350°C , then HCl
- Chlorobenzene** to **Bromobenzene**: HBr , CuBr cat., room temperature
- Bromobenzene** to **Fluorobenzene**: HBF_4 - filter off solid, dry & heat
- Fluorobenzene** to **Benzene Diazonium**: HBF_4 - filter off solid, dry & heat
- Benzene Diazonium** to **Chlorobenzene**: HCl , CuCl cat., room temp.
- Benzene Diazonium** to **Benzonitrile**: KCN & copper powder
- Benzonitrile** to **Benzaldehyde**: SnCl_2 (ether), HCl , 20°C , then boil with H_2O
- Benzaldehyde** to **Phenylketone**: SOCl_2 , heat
- Phenylketone** to **Benzoic Acid**: H_2O
- Benzoic Acid** to **Phenylamine**: HCl , reflux, Sn , NaOH
- Alkylbenzene** to **Phenylamine**: HCl , reflux, Sn , NaOH
- Alkylbenzene** to **Nitrobenzene**: Na & Rl , dry ether
- Nitrobenzene** to **Phenylamine**: HCl , reflux, Sn , NaOH
- Phenylamine** to **Benzoic Acid**: KMnO_4 , H_2SO_4 , heat
- Benzoic Acid** to **Phenylamine**: HCl , reflux, Sn , NaOH
- Phenylamine** to **Phenylketone**: SOCl_2 , heat
- Phenylketone** to **Benzoic Acid**: H_2O
- Benzoic Acid** to **Phenylamine**: HCl , reflux, Sn , NaOH
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- Benzoic Acid** to **Phenylamine**: