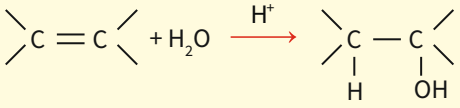
METHODS OF PREPARATION OF ALCOHOLS

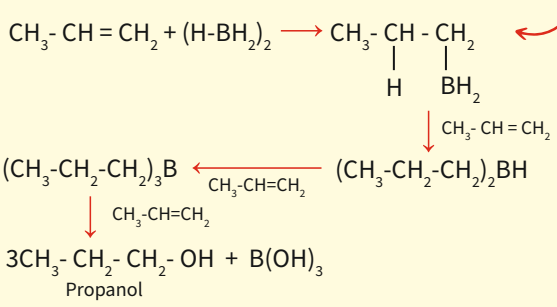
✦ From alkenes

From alkenes, by acid Catalysed Hydration:

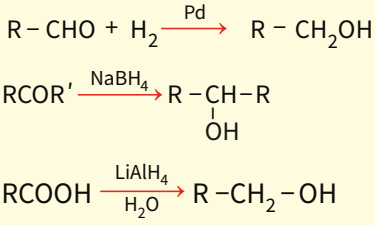


Eg. $CH_3-CH=CH_2 + H_2O \longrightarrow CH_3-\underset{\underset{OH}{|}}{CH}-CH_3$

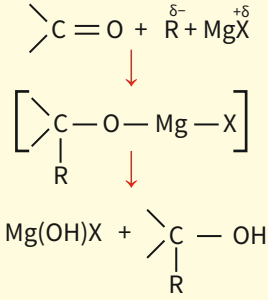
✦ From Hydroboration Oxidation



✦ Reduction of Aldehyde, Ketone and Carboxylic Acid



✦ From Grignard reagent



8. ALCOHOLS, PHENOLS AND ETHERS

ALCOHOLS

R - OH

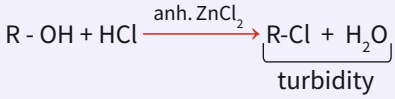
where R = alkyl group

PHYSICAL PROPERTIES

- ✦ Soluble in water due to H-bonding.
- ✦ M.P. and B.P. ∝ Molecular mass.
- ✦ Colorless with characteristic smell.

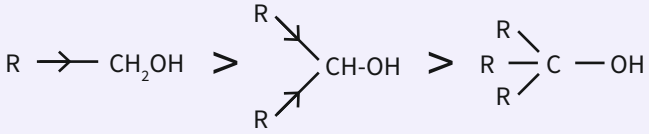
CHEMICAL PROPERTIES

✦ Reaction involving cleavage of -OH bond.



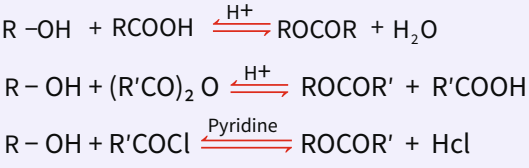
rate: 3° alcohol > 2° alcohol > 1° alcohol

✦ Acidity: Due to the presence of polar-OH group.

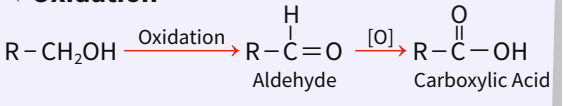


1° alcohol 2° alcohol 3° alcohol

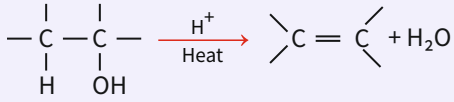
✦ Esterification



✦ Oxidation

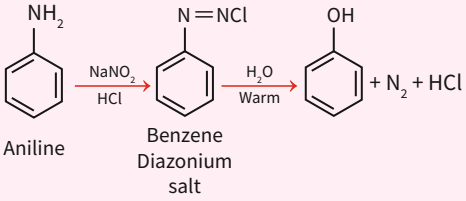


✦ Dehydration Reaction



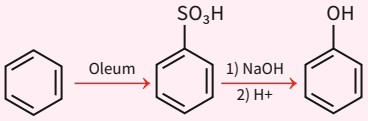
METHODS OF PREPARATION OF PHENOL

✦ From Diazonium Salts



Aniline — Benzene Diazonium salt

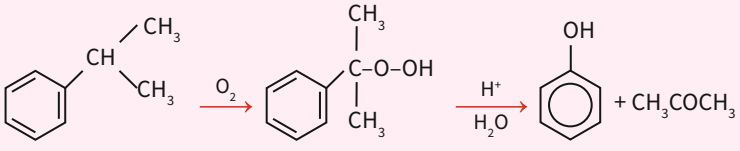
✦ From Benzene Suplhonic Acid



✦ Dow's Process

Chlorobenzene + NaOH $\xrightarrow[2)\ HCl]{1)\ 623K,\ 300atm}$ Phenol

✦ From Cumene



Cumene — Cumene Hydroperoxide — Phenol

PREPARATION OF ETHER

✦ Williamson Synthesis

$R{-}X + R{-}\ddot{O}{-}Na \longrightarrow R{-}\ddot{O}{-}R + NaX$

✦ By Dehydration of Alcohols

$2CH_3{-}CH_2{-}OH \xrightarrow[413K]{H_2SO_4} C_2H_5{-}O{-}C_2H_5$

ETHER

R-O-R′

where R and R′ can be same or different alkyl group.

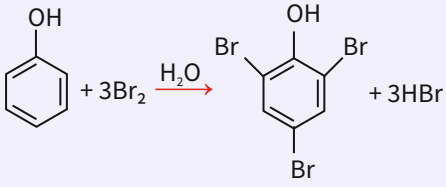
PHYSICAL PROPERTIES

- ✦ Colourless crystalline solid or Liquid
- ✦ Higher boiling point due to Hydrogen Bonding

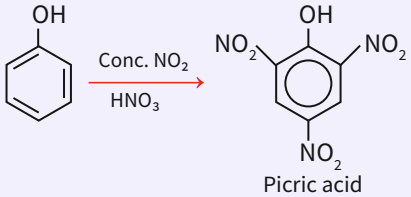
PHENOL

CHEMICAL PROPERTIES

✦ Electrophilic Aromatic Substitution

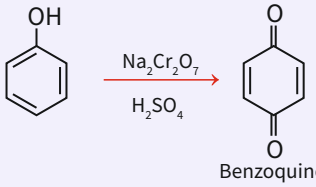


✦ Nitration



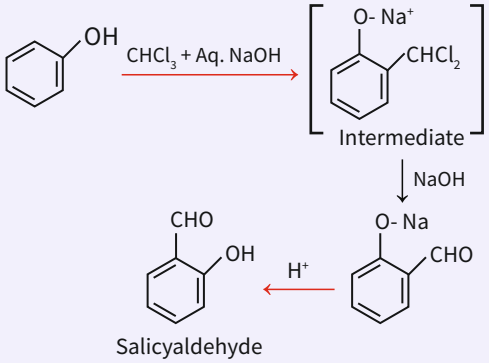
Picric acid

✦ Oxidation of Phenol



Benzoquinone

✦ Reimer-Tiemann reaction:



Salicyaldehyde

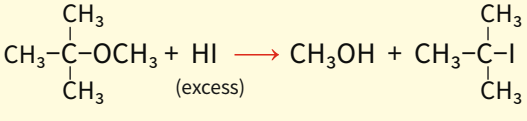
CHEMICAL PROPERTIES

✦ Cleavage of C-O Bond

$R{-}O{-}R + HX \longrightarrow R{-}X + ROH$

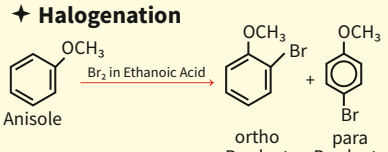
$R{-}O{-}R' + HX \longrightarrow R'{-}X + ROH$

For Tertiary Group:In Case of excess HI



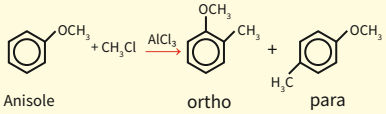
✦ Electrophilic Substitution

✦ Halogenation



Anisole — ortho Product — para Product

✦ Friedel-craft Reaction



Anisole — ortho Product — para Product