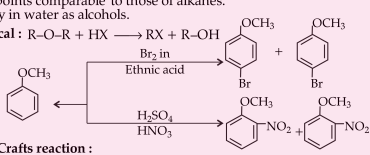
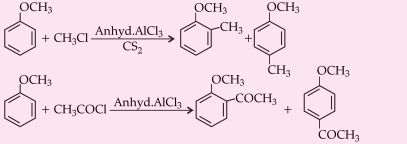
(i)Physical :
- C–O bonds are polar.
- Boiling points comparable to those of alkanes.
- Solubility in water as alcohols.

(ii)Chemical : R–O–R + HX ⟶ RX + R–OH



Friedel Crafts reaction :



Commercially important alcohols
- **Methanol (Wood spirit):** Used as solvent in paint, varnishes and making formaldehyde
- **Ethanol:** Used as solvent in paint industry and preparation of a number of carbon compounds.

Alcohols, Phenols And Ethers

Eather

Properties

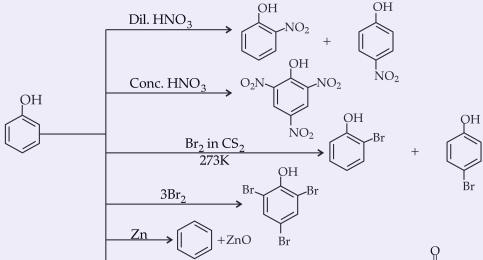
Alcohol

(i) Physical :
- Boiling point increases with increase in the number of C atoms.
- Solubility decreases with increase in size of alky/aryl groups.

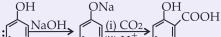
(ii) Chemical : 2–R–O–H + 2Na ⟶ 2R–O–Na + H_2; Acidity – primary > secondary > tertiary

Ar/RO – H + R′ –COOH ⇌ (H+) Ar/ROCOR′ + H_2O; ROH + HX ⟶ R–X + H_2O

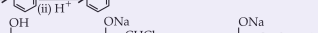
$C_2H_5OH \xrightarrow[443\ K]{H_2SO_4} CH_2 = CH_2 + H_2O$; $RCH_2OH \xrightarrow{Oxidations} R\text{-}\underset{H}{\overset{H}{C}}=O \longrightarrow R\text{-}C(=O)\text{-}OH$



Kolbe's reaction :



Reimer Tiemann reaction :



Class : 12th Chemistry
Chapter-11 : Alcohols, Phenols And Ethers (Part_2)

Alcohols, Phenols And Ethers

Ethers
Common name: alkyl/aryl groups in alphabetical order followed by ether.
IUPAC name: In alkyl /aryl group 'e' replaced by oxy followed by parent hydrocarbon.

Alcohols
Common name: Alkyl group + ol;
IUPAC name: substituting 'e' of alkane with suffix 'ol'

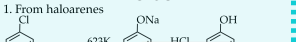
Phenols
Common name: Terms ortho, meta and para are used.
IUPAC name: Dihydroxy derivatives as 1,2–, 1,3–and 1,4–benzenediol

Structures of functional groups
- Oxygen of –OH group is attached to C by a σ bond formed by the overlap of sp^3orbital of C with a sp^3 orbital of oxygen.
- In ethers, tetrahedral arrangement for four electron pairs.

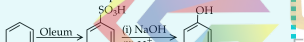
Nomenclature

Preparation

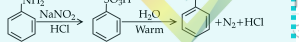
Phenols
1. From haloarenes



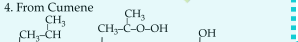
2. From benzene sulphonic acid



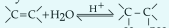
3. From diazonium salts



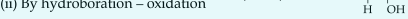
4. From Cumene

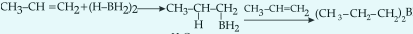


Alcohol
1. From alkenes :- (i) By acid catalysed hydration

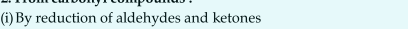


(ii) By hydroboration – oxidation

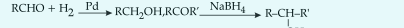




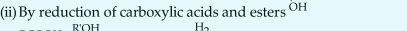
2. From carbonyl compounds :
(i) By reduction of aldehydes and ketones



(ii) By reduction of carboxylic acids and esters



3. From Grignard reagent

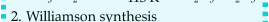


Classification

Mono, Di, Tri, or polyhydric
(i) Containing C_{sp3}–OH bond
CH_2OH (1°) > $CHOH$ (2°) > COH (3°)
(ii) Containing C_{sp2}–OH bond
Vinylic alcohol : $CH_2 = CH - OH$ Phenols:

Ethers
(i) Simple/symmetrical: Alkyl or aryl attached to $O_2$are same.
(ii) Mixed/Unsymmetrical: Two groups are different.

Ethers
1. By dehydration of alcohols



2. Williamson synthesis