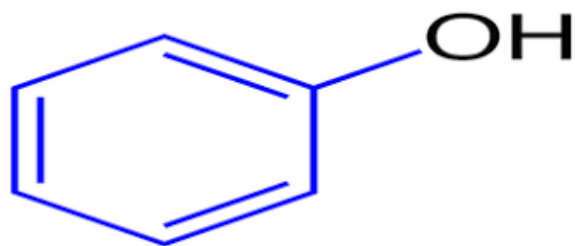


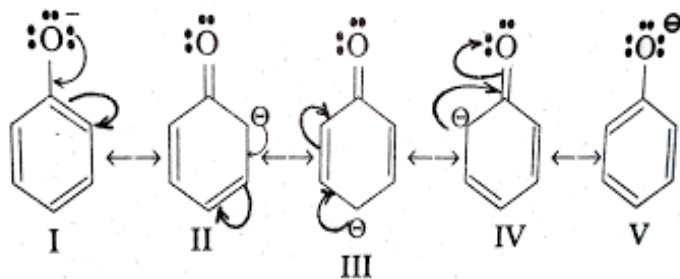
PHENOL

DEFINATION OF PHENOL:-

Phenol any of a family of organic compounds characterized by a hydroxyl ($-OH$) group attached to a carbon atom that is part of an aromatic ring



1] ACIDITY OF PHENOL



- than alcohol ($PK_a = 16-20$)
- phenol are less acidic than carboxylic acid ($PK_a = 5$)
- compression of acidity of phenols and alcohols.

2] EFFECT OF SUBSTITUTION ON ACIDITY –

ELECTRON ATTRACTING [WITHDRAWNG] SUBSTITUENTS

- Shows negative inductive effect
- Tend to disperse negative charge of the phenoxide ion thus stability the ion
- And increase the acidity of phenol
- Order of increase in acidity – $p > o > m$ phenol (least acidic)

ELECTRON RELEASING (DONATING) SUBSTITUENT

- positive Shows inductive effect
 - Tend to intensify the charge ,destabilize the ion, diminish the resonance
- And decrease the acidity

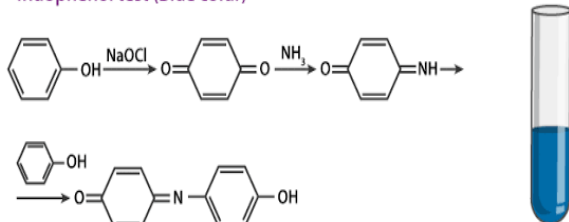
3. Order of decreasing acidity: phenol > m > p > o (least acidity)

3] QUALITATIVE TESTS

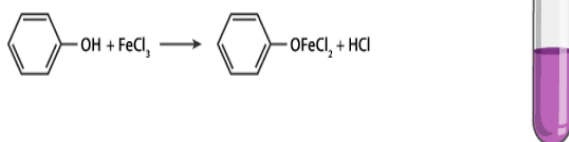
Ferric Chloride Test :

Compounds with a phenol group will form a blue, violet, purple, green, or red-brown color upon addition of aqueous ferric chloride due to the formation of ferric phenoxide. This reaction can be used as an identification test for phenol groups.

Indophenol test (Blue color)



Ferric chloride test (Violet color)

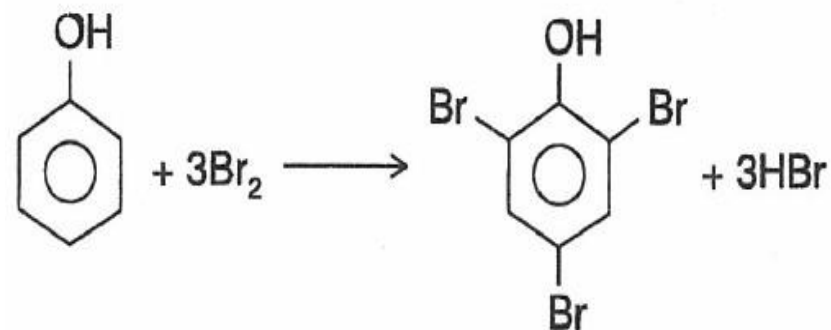


Procedure:

A more sensitive test for phenols consists of dissolving or suspending 15 mg of the unknown in 0.5 mL of methylene chloride and adding 3-5 drops of a 1% solution ferric chloride in methylene chloride. Add a drop of pyridine and stir. Observation: Addition of pyridine and stirring will produce a color if phenols or enols are present.

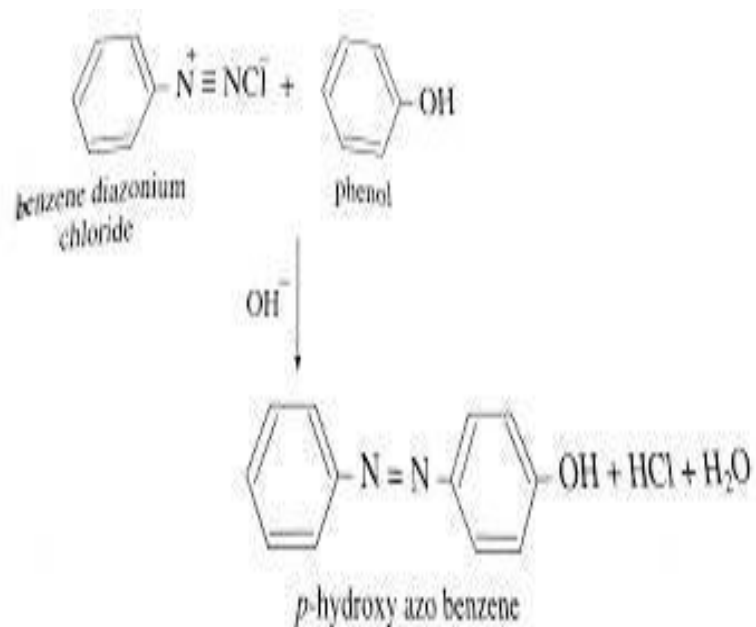
Bromination:

Phenol forms polyhalogen derivatives with chlorine or bromine water. For example; with bromine water, it forms 2,4,6-tribromophenol which is precipitated as white precipitate.



COUPLING REACTION:

In weakly alkaline medium, phenol reacts with benzenediazonium chloride to form colored substances which are called as azo dyes. The reaction takes place at 273-278 K temperature and also known as coupling reaction.



STRUCTURE AND USES OF PHENOL:--

Naphthol	Cresol	Phenol	Resorcinol
Uses	Uses	Uses	Uses
<ol style="list-style-type: none"> 1. Manufacturing of plastic. 2. fumigant insecticide. 3. pesticides. 	<ol style="list-style-type: none"> 1. Disinfectants properties. 2. Wood preservation. 	<ol style="list-style-type: none"> 1. antiseptic. 2. disinfectant. 3. Cosmetic industries. 	<ol style="list-style-type: none"> 1. Treat acne 2. Skin disorder 2. manufacturing reagents and dyes.

REFERENCE :

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2. Varun arora , pragi arora , sapna k.shah, Arvind r.umarkar , pharmaceutical organic chemistry 2, PV publication [page no. 1 to 29]
3. Morgan and boyd, organic chemistry, 6 th edition [page no. 493]

Prepared by: 1} Dhanashree Dama (13)

2} Pritam garbade (19)

3} Divyata Ghagas(20)

4} Dive Chitra (15)

5} Fatak Ankita (22)

GUIDED BY:

Mrs. Chiwadshetti N.S { Asst Professor Spcop, Otur}

DEPARTMENT :

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