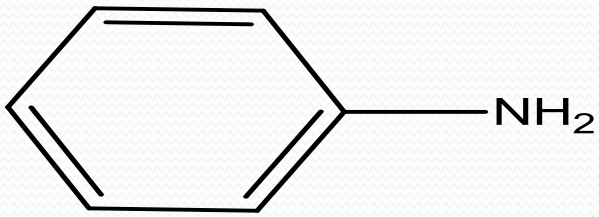
Preparation of aniline



aniline

*Aniline is the simplest aromatic amine

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Fourth Class

Physical properties

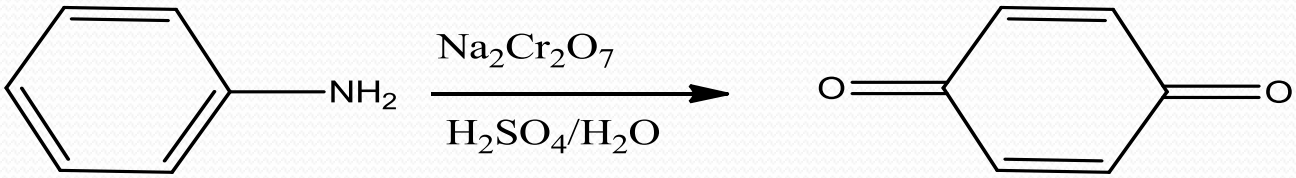
•Has B.P = 184c and it has bitter taste.

•Solubility:

•It is colorless liq. When freshly prepared but on exposure to air and light it develops a deep brown color .

•It is used for manufacture of dyes, drugs, perfumes.....

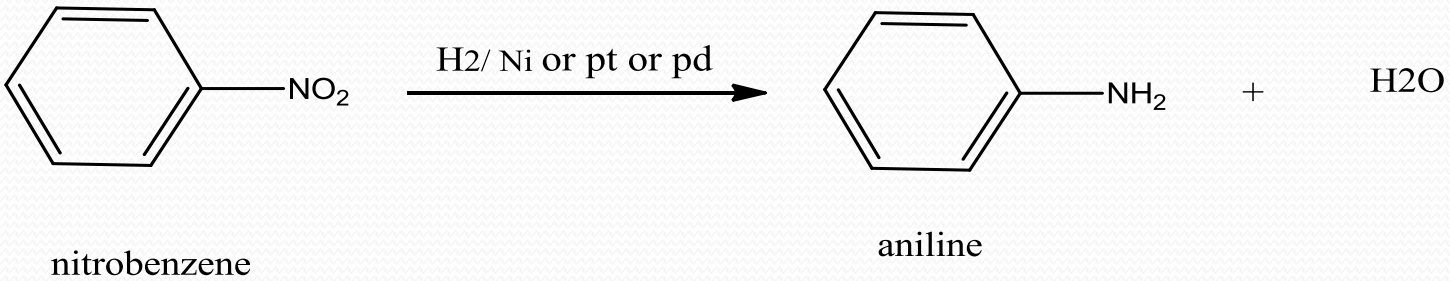
•When aniline react with dichromates ion, its oxidized and giving p-benzoquinone



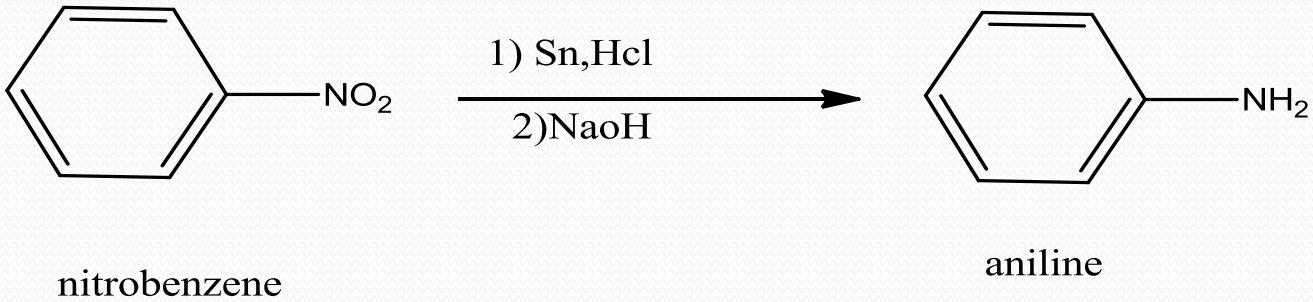
benzoquinone
yellow color

Preparation of aniline

1-catalytic hydrogenation over platinium, palladium or nickel is often used.



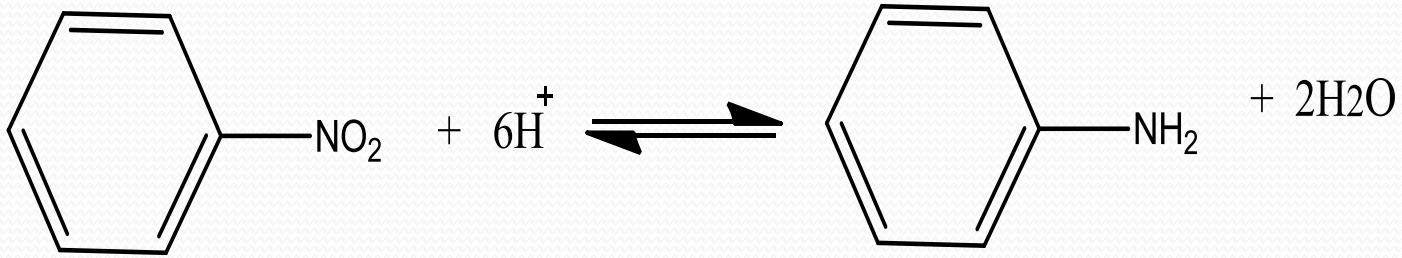
2-chemical reduction by using typical reducing agents including tin(sn),iron(Fe) or zinc (zn) in hydrochloric acid.



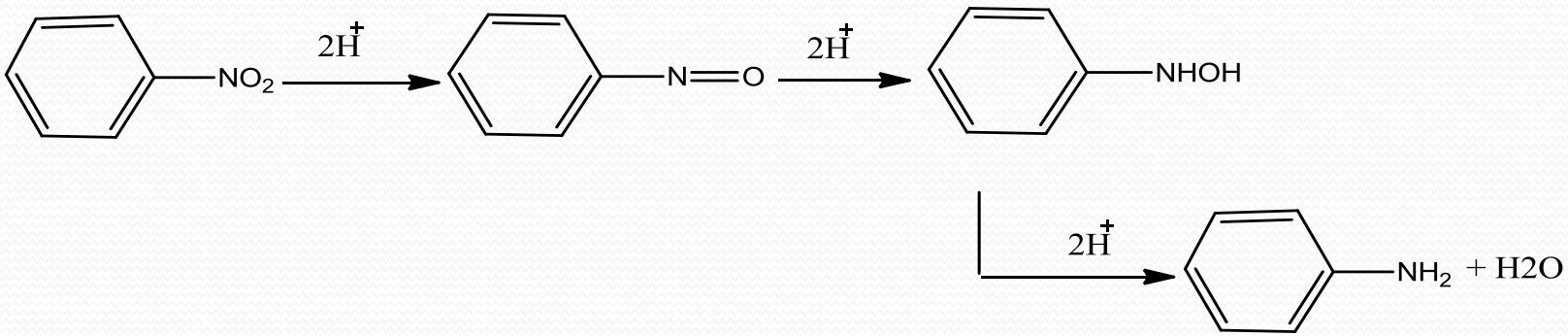
When a mixture of nitrobenzene and tin is treated with HCL :

1) $Sn + 2Hcl \rightleftharpoons Sncl_2 + 2H^+$

2) $Sncl_2 + 2Hcl \rightleftharpoons Sncl_4 + 2H^+$

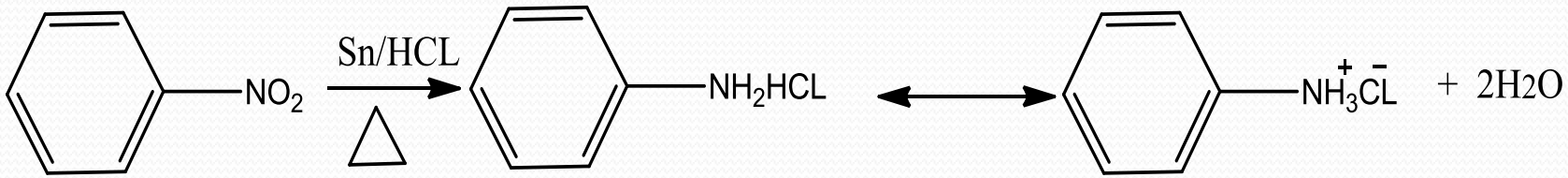
3) 

So each NO_2 group need 6H+ to be reduced to NH_2 group



The PH adjustment with sodium hydroxide in the last step :

$$(C_6H_5NH_2)_2\,H_2SnCL_6 + 8NaOH \rightleftharpoons 2C_6H_5NH_2 + Na_2SnO_3 + 6NaCL + 5H_2O$$



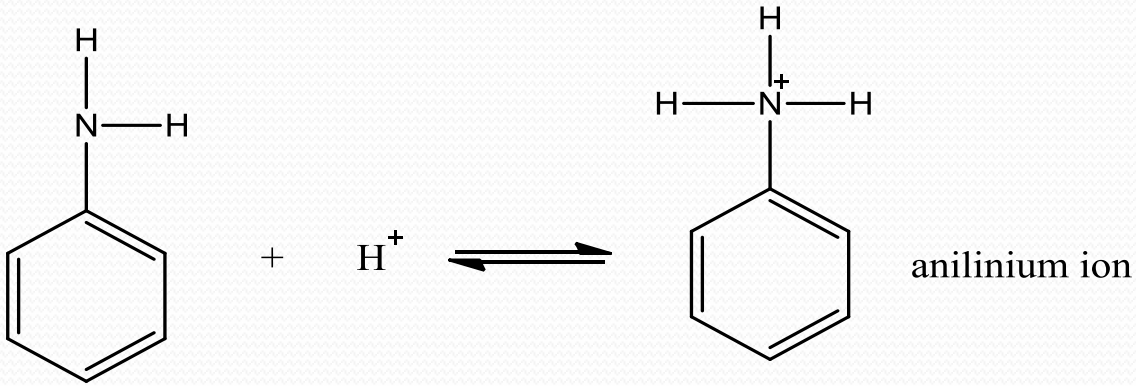
anilinium chloride salt
or anilinium hydrochloride salt

* Reduction of aniline is done in acidic medium not in alkaline because in alkaline medium the following reaction take place:

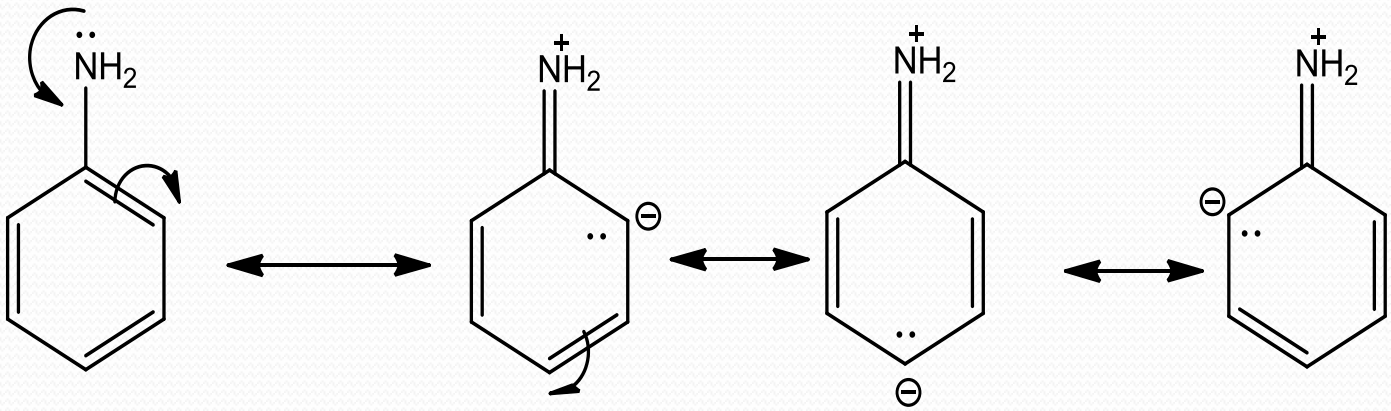
$$SnCL_2 + NaOH \longrightarrow Sn(OH)_2 \xrightarrow[NaOH]{excess} Na_2Sn(OH)_4 \xrightarrow{ArNH_2}$$

many side products
i.e $C_6H_5NO{=}NC_6H_5$
$C_6H_5N{=}NC_6H_5$
azo compounds

Basicity of aniline :



Resonance of aniline:

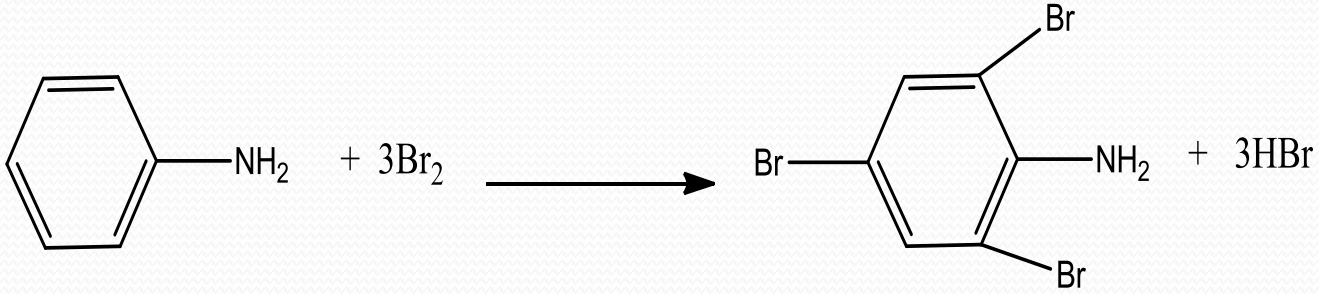


Notes:

• sulfonamides derived from primary amines have an acidic hydrogen and dissolve in alkali but precipitate out when the mixture is acidified.

Sulfonamides derived from secondary amines are insoluble in alkali and appear as precipitate which persist upon acidification of the mixture.

•When aniline is shaken with bromine water ,2,4,6-tribromo aniline is yield as a white ppt.



Steam distillation :

•It is used for purification and separation of liq. And solids (two immisible sub.s)

•For separation of slightly vol. water insoluble sub.s from non volatile material by means of steam.

•It is convenient for purification of high B.pt substances

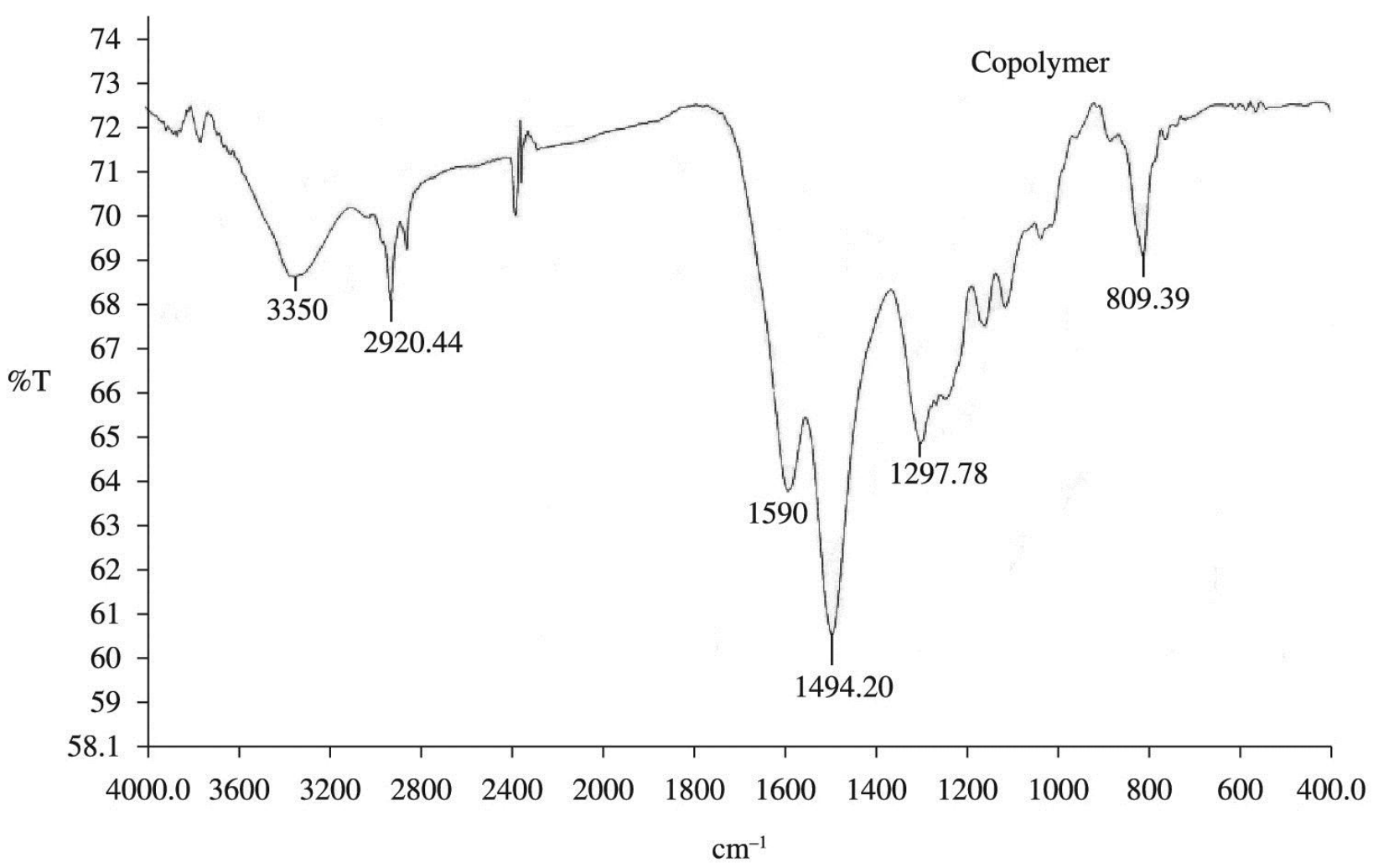
•Steam dist. Offers the advantage of selectivity ,

•It is useful for recovery of anon steam –volatile solid from its solution on high boiling solvent such as nitrobenzene (B..Pt. 210 c) all traces of the solvent can be eliminated and the temp. can be kept low.

•For the separation of such compounds from mix. Containing non volatile org. compounds from natural sources(plants) .

• for separation of such compounds from mixture containing non – volatile impurites .

Identification of Aniline



Identification of Aniline