Chemistry

AMINES

ANILINE



Chemistry



(B) Reactions due to benzene ring:



Note:

- 1. In aniline, electron-rich sites are found at the 2, 4, 6, ortho, and para positions, making them susceptible to electrophilic attacks. In contrast, in aniline, the 3, 5, and meta positions are electron-deficient, making them prone to nucleophilic attacks.
- 2. The benzene ring of aniline can undergo halogenation, sulphuration, and nitration.
- 3. The NH2 group in aniline exhibits an ortho- and para-directing influence.

1. Halogenation:

Chlorine and bromine, upon interaction with aniline, give rise to trichloro aniline and tribromo aniline, respectively.





Note: Nevertheless, it's possible to produce the monobromide or chloro derivative of aniline when the -NH₂ group is initially shielded or protected with an acetyl group. In this scenario, the reactivity diminishes as a result of the -I (inductive) effect of the acetyl group.



2. Nitration:

a. Direct nitration:

Nitration of aniline using concentrated HNO_3 and concentrated H_2SO_4 directly results in the formation of meta-nitroaniline. The presence of a positively charged nitrogen atom makes the meta-position electron-rich when compared to the ortho and para positions.



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b. Indirect nitration:

In the process of indirect nitration, the amino group is safeguarded by acetylating it to yield acetanilide. This acetanilide, upon nitration and subsequent hydrolysis, yields ortho- and paranitroaniline.



- **Ex.** Azo dye test is given by
 - (A) All amines
 - (C) Only primary aliphatic amine
- (B) Only secondary amine(D) Only primary aromatic amine

Sol. (D)

3. Sulphonation:

Aniline, upon interaction with concentrated sulfuric acid (fuming H₂SO₄), results in the formation of sulfonic acid, specifically (p-amino-benzene sulfonic acid).



Note:

- 1. This procedure is referred to as baking.
- 2. Sulphonic acid holds significance as a crucial intermediate in the production of dyes and pharmaceuticals.
- 3. Compounds that contain both groups capable of donating protons and groups capable of accepting protons are categorized as ampholytes or dipolar ions.



4 Catalytic hydrogenations:

Aniline undergoes hydrogenation in presence of Ni at high temp. to form amino Cyclohexane.



5. Mercuration:

Aniline, when exposed to an alcoholic solution of mercuric acetate, goes through a process known as maceration.



Tests of aniline:

Carbylamines test:

Aniline gives carbylamine's test or Isocyanides test.



Dye test:

Firstly, aniline undergoes diazotization. Then, upon the addition of an alkaline solution of β -naphthol to the diazotized product, a scarlet red dye is produced. When this mixture is heated with bromine water, a precipitate is formed.