

# Detection of Functional Groups (Part-I)

B.Sc Hons Chemistry Practical

3 rd Sem Paper C-7P

By

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# Test for primary amino group

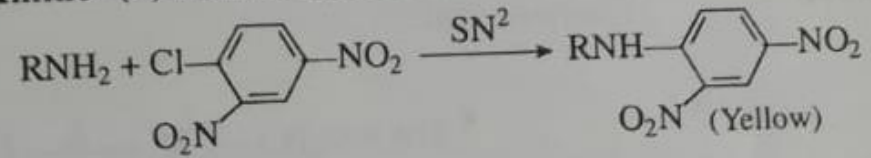
Experiment	Observation	Inference
<b>Test for Primary Amino Group :</b> 1. 2,4-Dinitrochlorobenzene Test : A drop of alcoholic solution of O.S. is placed on a piece of filter paper moistened with a saturated ethanolic solution of 2,4-dinitrochlorobenzene.	1. Yellow colour.	1. —NH <sub>2</sub> group present.

# Test for primary amino group

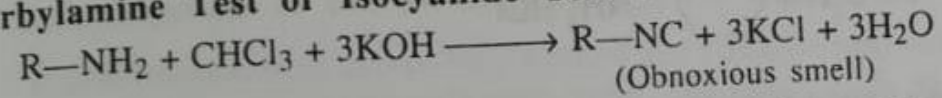
Experiment	Observation	Inference
<p>2. Carbylamine Test or Isocyanide Test :</p> <p>To 0.05 g of O.S. in dry test tube 2 drops of <math>\text{CHCl}_3</math> and 1 ml of alcoholic KOH is added and warmed gently.</p> <p>[N.B. : Some acyl derivatives of amines such as acetanilide gives positive test. Tests 1 and 2 are given by both aliphatic and aromatic amines.]</p> <p><b>Caution :</b> Isocyanides are highly poisonous and therefore should not be inhaled directly. It is better to close the mouth of the test tube by thumb and then to inhale the latter. The contents of the test tube should be decomposed by adding conc. HCl and then water and finally wash it out into basin under running water from the tap.</p>	<p>2. A characteristic obnoxious smell of carbylamine.</p>	<p>2. <math>-\text{NH}_2</math> group confirmed.</p>
<p>3. Bleaching Powder Test : 3-4 drops of bleaching powder solution is added to suspension of 0.05 g of O.S. in 5 ml water and shaken.</p>	<p>3. Transient purple colour which soon turns brown or light purple colour.</p>	<p>3. <math>\text{Ar}-\text{NH}_2</math> gr. present.</p>
<p>4. Dye Test : 0.1 g of O.S. is dissolved in 5 ml of dil. HCl and cooled at <math>0^\circ-5^\circ\text{C}</math> in an ice-bath. 1 ml of ice-cold solution of dil. <math>\text{NaNO}_2</math> is added and the mixture is added to ice-cold alkaline solution of <math>\beta</math>-naphthol.</p>	<p>4. Red or orange-red dye.</p> <p>[N.B. : Brown or reddish purple or violet dye indicates the presence of two amino groups, soluble dye indicates presence of <math>-\text{SO}_3\text{H}</math> or <math>\text{Ar}-\text{OH}</math> gr. along with <math>\text{AR}-\text{NH}_2</math> gr.]</p>	<p>4. <math>\text{Ar}-\text{NH}_2</math> group confirmed.</p>

# Reactions involved

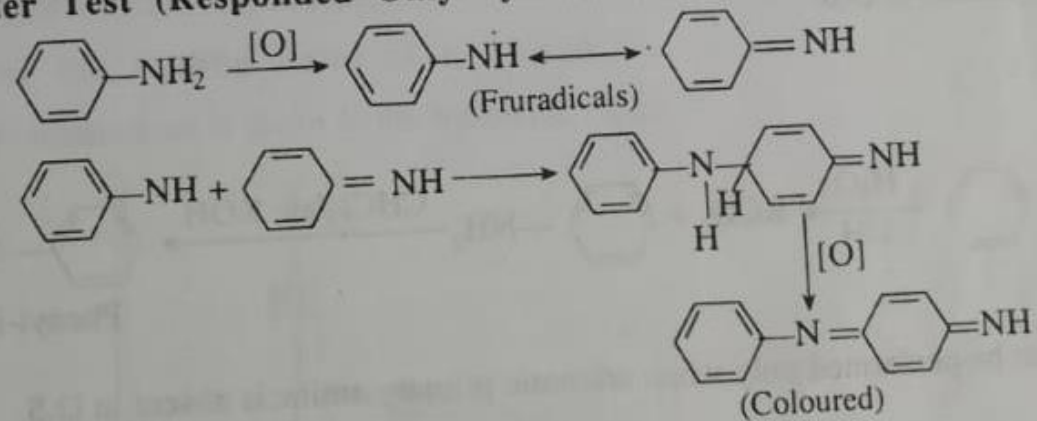
Reactions Related to Detection of Primary Amine (2,4-Dinitrochlorobenzene Test) :



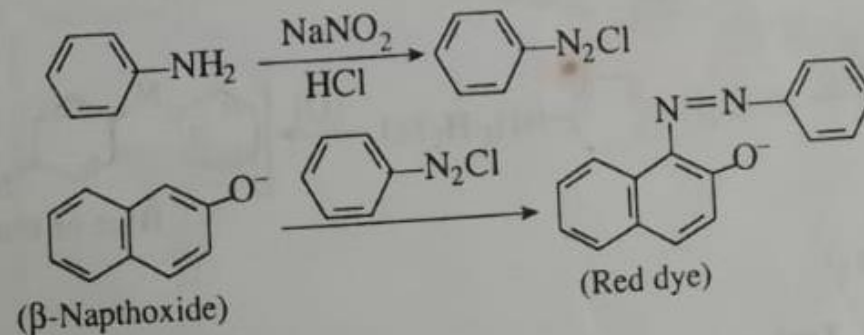
Carbylamine Test or Isocyanide Test :



Bleaching Powder Test (Responded Only by Aromatic Amine) :



Dye Test :



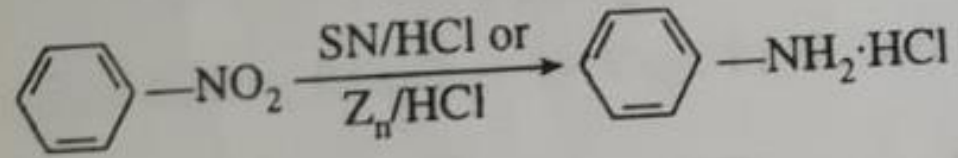
# Test for aromatic nitro group

<p>1. Reduction Test : A mixture of 0.1 g of O.S., few pieces of granulated tin or zinc and 3 ml of conc. HCl is warmed gently with occasional shaking till the reaction is complete. The mixture is cooled, filtered if required, diluted and diazo-coupling reaction is performed.</p> <p>[N.B. : This test must be omitted when Ar—NH<sub>2</sub> group or RCONHAr group is present.]</p> <p>2. Mulliken and Barker's Test : 0.1 g of O.S. is dissolved in 5 ml 50% alcohol, a little solid NH<sub>4</sub>Cl or 10% CaCl<sub>2</sub> solution and a pinch of Zn-dust is added to it. The mixture is boiled for a few minutes, cooled and allowed to stand for 5 minutes and then filtered. With the filtrate, the following three tests are performed:</p> <p>(a) A portion of the solution is added to Tollen's reagent and then warmed in a water-bath.</p>	<p>1. Brilliant red or scarlet dye.</p> <p>(a) A silver mirror or black or grey ppt.</p> <p>(b) A wine-red colour of</p>	<p>1. Ar—NO<sub>2</sub> gr. pr</p> <p>2. —NO<sub>2</sub> group confirmed.</p>
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# Reactions involved

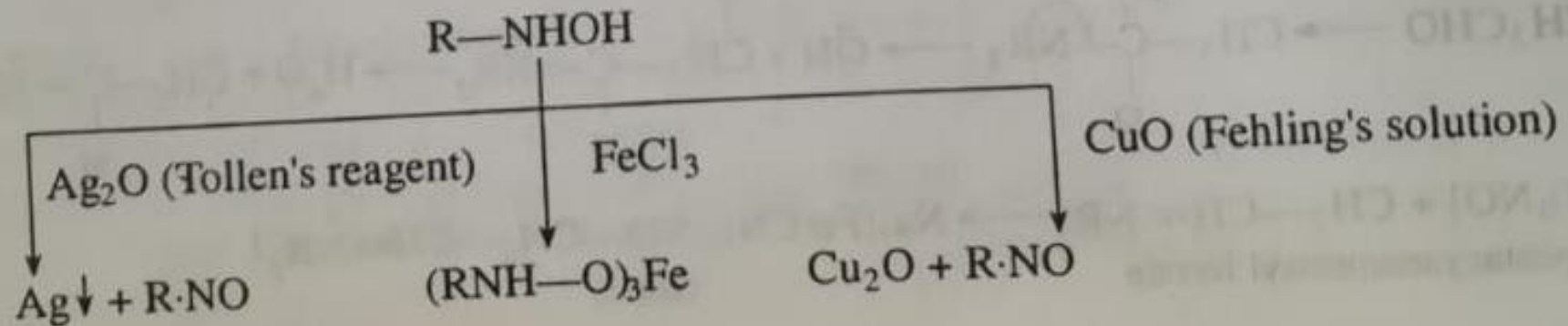
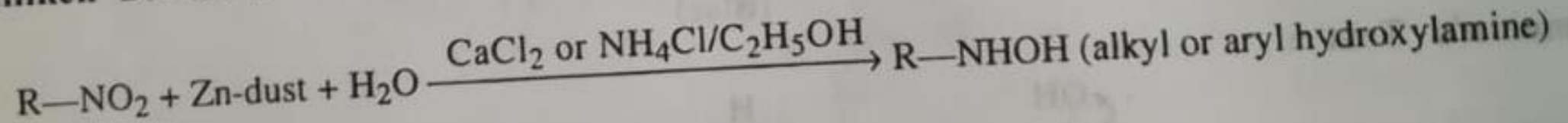
Tests for Nitro Group :

Metal Acid Reduction Test :



Then diazo-coupling reaction. This test can be performed only when aromatic primary amino group is absent in O.S.

Mulliken Barker's Test (Reduction in Neutral Medium) :



# You tube links

- 2 Test of Aromatic amino groups
  - a. <https://youtu.be/j5jgMUWri8U> ( Azo dye test)
  - b. [https://youtu.be/PiLUase\\_nzU](https://youtu.be/PiLUase_nzU) (Carbyl amine test)
- 3. Test for nitro group
  - a. <https://youtu.be/K6kh7p1TPBs> (Reduction test)
  - b. <https://youtu.be/MEgFQS2WsGw> ((Mulliken Barker test)