

# Some more information on Lassaigne's Test

B.Sc Hons Chemistry  
3<sup>rd</sup> Sem Paper C 7P

By

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**B. Lassaigue's Test :**

A pea-sized sodium is taken in a fusion tube and it is just melted by warming. A small amount of O.S. is added to the sodium, so that no substance is adhered to the side of the fusion tube. The mixture is heated gently and then strongly to red hot. Then the fusion tube is quickly plunged into 20 ml of distilled water taken in a mortar. One or two more fusions may be performed and the fusion tubes are plunged into the same mortar. Then the mixture is ground thoroughly by a pestle and filtered. With the sodium-extract, the following tests are performed :

[N.B. : A dark-coloured filtrate may be obtained due to incomplete fusion of O.S. when it is taken in excess.]

| Experiment   | Observation   | Inference        |
|--|---|------------------|
| (i) <b>Prussian Blue Test</b> : A few drops of freshly prepared solution of $\text{FeSO}_4$ is added to 2 ml of the sodium-extract. The mixture is boiled, cooled under a tap, 2-3 drops of $\text{FeCl}_3$ solution is added and acidified with conc. $\text{HCl}$ (should be checked with blue litmus paper).<br>[N.B. : Dil. $\text{H}_2\text{SO}_4$ may be used instead of $\text{FeCl}_3$ and conc. $\text{HCl}$ .] | (i) Light green ppt. of $\text{Fe}(\text{OH})_2$ (Black ppt. indicates the presence of sulphur.)*<br>Prussian blue or green ppt. or colour. | (i) N-present.   |
| (ii) <b>Benzidine Copper Sulphate Test</b> : 2 ml of sodium-extract is acidified with 0.5 ml of acetic acid and added 2-3 drops of 1% solution of benzidine in 50% acetic acid. The mixture is shaken well and 1-2 drops of 1% $\text{CuSO}_4$ solution is added to it.  | (ii) Blue colour or ppt.<br>[N.B. : Greenish ppt. may be obtained in the presence of iodine.]   | (ii) N-present.  |
| (iii) <b>Lead Acetate Test</b> : 2 ml of sodium-extract is acidified with 2 ml of acetic acid and then 0.5 ml of lead acetate solution is added to it.   | (iii) Black ppt.  | (iii) S-present. |

\* The presence of sulphur may tend to obscure the test due to reduction of  $\text{Fe}^{+3}$  ion to  $\text{Fe}^{+2}$  ion. This test can be performed successfully by adding excess  $\text{FeSO}_4$  to precipitate black  $\text{FeS}$ . The mixture is then boiled, filtered and treated with  $\text{FeCl}_3$  solution and  $\text{HCl}$ .

| Experiment  | Observation                   | Inference                      |
|---|-------------------------------|--------------------------------|
| (iv) <b>Nitroprusside Test</b> : To 1 ml of sodium-extract 1 ml of dil. NaOH solution is added followed by 2-3 drops of sodium nitroprusside solution.  | (iv) Violet or purple colour. | (iv) S-present.                |
| (v) <b>Lauth's Violet Test</b> : 2 ml of sodium extract is acidified with 2 ml of conc. HCl, warmed, 2-3 drops of hydrochloric acid solution of phenylene diamine solution added, followed by 1 drop of FeCl <sub>3</sub> soln. | (v) Violet colour.            | (v) S-present.                 |
| (vi) <b>Cobalt Nitrate Test</b> : 2 ml of sodium-extract is acidified with dil. HCl, 2 ml of alcohol is added to it, followed by 0.5 ml of cobalt nitrate soln.   | (vi) Blue colour.             | (vi) N and S-present together. |
| (vii) <b>Liebig Test</b> : 2 ml of sodium extract is acidified with dil. HCl followed by 2-3 drops of FeCl <sub>3</sub> solution.   | (vii) Red colour.             | (vii) Both N and S-present.    |
| [N.B. : Test No. (vi) and (vii) are advised only when the presence of N and S have been confirmed individually from the earlier experiments.]   |                               | (viii) (a) Cl-present.         |

[N.B. : Test No. (vi) and (vii) are advised only when the presence of N and S have been confirmed individually from the earlier experiments.]

(viii) **Silver Nitrate Test** : Another 2 ml portion of sodium extract is boiled with 1 ml of conc.  $\text{HNO}_3$ , cooled and  $\text{AgNO}_3$  solution is added.

The yellow ppt. is treated with dil.  $\text{NH}_4\text{OH}$  and is then filtered. The filtrate is treated with dil.  $\text{HNO}_3$ .

(ix) **Chlorine Water Test** : If yellow ppt. is obtained in expt. (viii), 1 ml of sodium extract is acidified with 1 ml of dil.  $\text{H}_2\text{SO}_4$  or dil.  $\text{HCl}$  and 2 ml of  $\text{CCl}_4$  or  $\text{CS}_2$  is added. Then strong  $\text{Cl}_2$ -water is added drop by drop with shaking the mixture after each addition.

(viii) (a) White ppt. soluble in dil.  $\text{NH}_4\text{OH}$  but re-appears when acidified with  $\text{HNO}_3$ .

(b) Yellow ppt.

(c) (i) White ppt. (ii) No ppt.

(ix) The organic layer turns :

(a) Violet

(b) Brown or reddish-brown.

(viii) (a) Cl-present.

(b) Br or I or both (a white ppt. of  $\text{AgCl}$  may be admixed with yellow ppt.).

(c) (i) Cl-present with Br or I or both. (ii) Cl-absent.

(ix)

(a) I-present.

(b) Br-present.

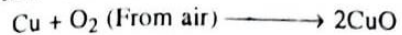
| Experiment   | Observation  | Inference   |
|--|--|---|
| If organic layer turns violet, addition of $\text{Cl}_2$ -water is continued with shaking.   | (a) Organic layer turns reddish-brown with the disappearance of violet colour.<br>(b) Organic layer turns colourless after disappearance of violet colour. | (a) Both I and Br present.<br>(b) I-present, no Br present. |
| (x) <b>Zirconium-Alizarin Test</b> : 1 ml of sodium extract is acidified with dil. HCl, boiled and cooled. One drop of the solution is added to zirconium-alizarin solution taken on a spot plate or placed on zirconium-alizarin reagent paper. | (x) The violet colour of the reagent turns yellow.   | (x) F-present.  |
| (xi) <b>Ammonium Molybdate Test</b> : 1 ml of sodium extract is added to 2 ml of conc. $\text{HNO}_3$ , boiled, 3 ml of ammonium molybdate solution added and finally the mixture is boiled and allowed to stand.                                | (xi) Canary yellow ppt.  | (xi) P-present.   |

C. Middleton's Test :

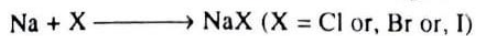
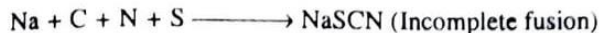
by a

## Reactions Related to Detection of Special Elements Present in an O.S. :

### Beilstein's Test :

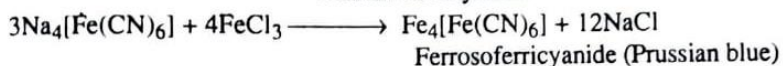
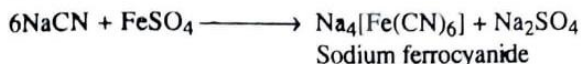


### Lassaigne's Test :



### Tests for Nitrogen :

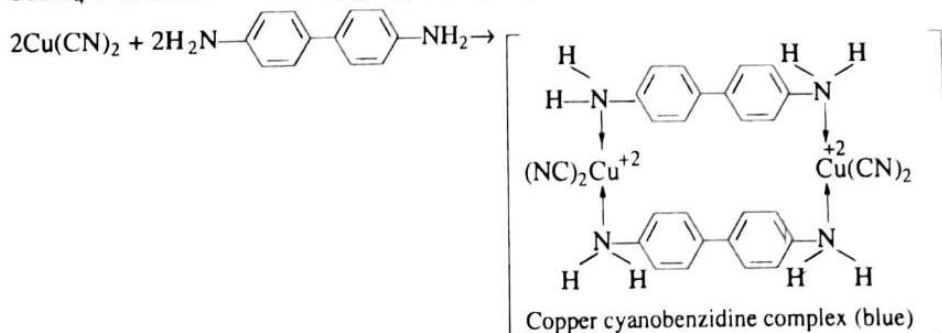
#### (i) Prussian Blue Test :



$\text{Fe}_2(\text{SO}_4)_3$  is produced from  $\text{FeSO}_4$  by aerial oxidation.

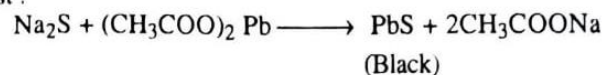


#### (ii) Benzidine-Copper Sulphate Test :

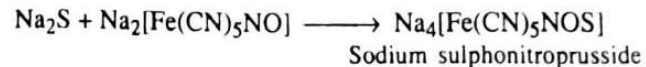


### Tests for Sulphur :

#### (i) Lead Acetate Test :



#### (ii) Nitroprusside Test :





Link to video

<https://youtu.be/FUo428guKt0>