# पुना International School

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**Class – XI** **Subject: Chemistry (Practical) Term-2** **Experiment (2021_22)**

| Exp. No | Aim |
|---|---|
| | **QUALITATIVE ANALYSIS(Term-2)** |
| 1 | To Identify the given inorganic salt[$Ba(NO_3)_2$] |
| 2 | To Identify the given inorganic salt [$ZnCo_3$] |
| 3 | To Identify the given inorganic salt [$Pb(NO_3)_2$] |
| 4 | To Identify the given inorganic salt $PbCl_2$ |
| 5 | To Identify the given inorganic salt $MgSO_4$ |
| 6 | To Identify the given inorganic salt [$BaSO_4$] |
| 7 | To Identify the given inorganic salt [$Sr(NO_3)_2$] |
| | **Content based Experiment** |
| 1 | Purification of the impure samples like copper sulphate, by the process of crystallization. |

## EXPERIMENT-1

***Aim: To analyze the given salt for acidic and basic radicals.***

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| 1. **Physical examination :** | | |
| (a) Noted the color of the given salt. | White | $Cu^{2+}$, $Fe^{2+}$, $Fe^{3+}$, $Ni^{2+}$, $Mn^{2+}$, $Co^{2+}$ absent. |
| (b) Noted the smell of the salt. | No specific odour | $NH_4^+$, $S^{2-}$ and $CH_3COO^-$ may be absent. |
| 2. **Dry heating test** | | |
| Heated a pinch of the salt in a dry test tube and noted the following observations : | | |
| *(a) Gas evolved* | A reddish brown gas evolved which turned freshly prepared $FeSO_4$ solution black. | $NO_3^-$ may be present. |
| *(b) Sublimation* | No sublimate formed. | Ammonium halides, aluminium chloride, iodide may be absent. |
| *(c) Decrepitation* | No crackling sound observed. | Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent. |
| *(d) Fusion* | Salt does not fuse. White | Alkali (sodium, potassium) salts may be absent. |
| *(e) Colour of the residue* | | $Zn^{2+}$, $Pb^{2+}$ may be absent. |

| | | |
|---|---|---|
| **5. Flame test**<br>Prepared a paste of the salt in conc. HCl and performed flame test. | Persistent grassy green flame on prolonged heating. | $Ba^{2+}$ present. |
| **6. Borax bead test**<br>Did not perform this test since the given salt was white. | — | $Cu^{2+}$, $Ni^{2+}$, $Fe^{3+}$, $Mn^{2+}$, $Co^{2+}$ may be absent. |
| **7. Dil. sulphuric acid test**<br>Treated a pinch of the salt with dil. $H_2SO_4$ and warmed. | No gas evolved. | $CO_3^{2-}$, $S^{2-}$, $NO_2^-$, $SO_3^{2-}$ may be absent. |
| **8. $KMnO_4$ test**<br>To a pinch of the salt added dil. $H_2SO_4$ warm and then a drop of $KMnO_4$ solution. | Pink colour of $KMnO_4$ was not discharged. | $Cl^-$, $Br^-$, $I^-$, $C_2O_4^{2-}$, $Fe^{2+}$ may be absent. |
| **9. Conc. sulphuric acid test**<br>Heated a pinch of the salt with conc. sulphuric acid and added to it a paper pellet. | A reddish brown gas evolved which turned $FeSO_4$ solution black. | $NO_3^-$ may be present. |
| **10. Confirmatory test for nitrate**<br>(a) *Copper chips test*. Heated a pinch of the salt with conc. sulphuric acid and a few copper chips. | Reddish brown gas evolved. | $NO_3^-$ confirmed. |
| (b) *Ring test*. To 2–3 ml of the salt solution, added freshly prepared $FeSO_4$ solution. Now added conc. sulphuric acid along the sides of the test tube. | A dark brown ring formed at the junction of the two liquids. | $NO_3^-$ confirmed. |
| **11. Heated a pinch of salt with conc. NaOH solution** | No ammonia gas evolved. | $NH_4^+$ absent. |
| **12. Preparation of Original Solution (O.S.)**<br>Shook a pinch of the salt with water. | Solution obtained | Labelled it as Original Solu tion (O.S.) |
| **13.** To a part of the O.S. added 1–2 mls of dilute hydrochloric acid. | No ppt. formed. | Group I absent. ($Pb^{2+}$ absent) |
| **14.** Through a part of the above solution, passed $H_2S$ gas. | No ppt. formed. | Group II absent<br>($Pb^{2+}$, $Cu^{2+}$, $As^{3+}$, absent) |
| **15.** To the remaining solution, added a pinch of solid ammonium chloride. Boiled the solution, cooled it and added excess of ammonium hydroxide solution. | No ppt. formed. | Group III absent.<br>($Fe^{3+}$, $Al^{3+}$ absent) |

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| 16. Through a part of this solution, passed $H_2S$ gas. | No ppt. formed. | Group IV absent. ($Zn^{2+}$, $Mn^{2+}$, $Ni^{2+}$, $Co^{2+}$, absent) |
| 17. To the remaining ammonical solution added ammonium carbonate solution. | White ppt. formed. | Group V present. ($Ca^{2+}$, $Ba^{2+}$, $Sr^{2+}$ may be present) |
| 18. **Confirmatory test for Barium** | | |
| Filtered the above white ppt. Dissolved the ppt. in hot dilute acetic acid. | Yellow ppt. | $Ba^{2+}$ confirmed. |
| (*a*) *Pot. chromate test*. To one part of the above solution, added a few drops of pot. chromate solution. | Persistent grassy green flame on prolonged heating. | $Ba^{2+}$ confirmed. |
| (*b*) *Flame test*. Performed flame test with the salt. | | |

**Result.** *Acid radical*: $NO_3^-$

*Basic radical*: $Ba^{2+}$.

# Experiment- 2

***To analyse the given salt for acidic and basic radicals.***

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| **1. Physical examination** | | |
| *(a)* Noted the colour of the given salt. | White | $Cu^{2+}$, $Fe^{3+}$, $Ni^{2+}$, $Mn^{2+}$, $Co^{2+}$ absent. |
| *(b)* Noted the smell of the salt. | No specific odour | $NH_4^+$, $S^{2-}$ and $CH_3COO^-$ may be absent. |
| **2. Dry heating test** | | |
| Heated a pinch of the salt in a dry test tube and noted the following : | | |
| *(a) Gas evolved* | A colourless, odourless gas evolved which turned lime water milky. | $CO_3^{2-}$ may be present. |
| *(b) Sublimation* | No sublimate formed. | Ammonium halides, iodide may be absent. |
| *(c) Decrepitation* | No crackling sound observed. | Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent. |
| *(d) Colour of the residue* | Yellow when hot and white when cold. | $Zn^{2+}$ may be present. |
| **3. Flame test** | | |
| Prepared a paste of the salt in conc. HCl and performed flame test. | Green flashes seen with naked eye. | $Zn^{2+}$ may be present. |
| **4. Borax bead test** | | |
| Did not perform this test since the given salt was white. | — | $Cu^{2+}$, $Ni^{2+}$, $Fe^{2+}$, $Fe^{3+}$, $Mn^{2+}$, $Co^{2+}$ may be absent. |
| **5. Dil. Sulphuric acid test** | | |
| Treated a pinch of the salt with dil. $H_2SO_4$ and warmed. | Colourless, odourless gas evolved with brisk effervescence, turned lime water milky. | $CO_3^{2-}$ present |
| Shook a pinch of salt with water taken in test tube. | Salt did not dissolve. | Insoluble $CO_3^{2-}$ indicated. $Cl^-$, $Br^-$, $I^-$, $Fe^{2+}$, $CO_3^{2-}$ are absent. |
| **6. $KMnO_4$ test** | | |
| To a pinch of the salt added dilute $H_2SO_4$ warm and then a drop of $KMnO_4$ solution. | Pink colour of $KMnO_4$ was not discharged. | |
| **7. Conc. Sulphuric acid test** | | |
| Did not perform this test because the salt reacted with dil. $H_2SO_4$. | — | $Cl^-$, $Br^-$, $I^-$, $NO_3^-$, $CH_3COO^-$, $C_2O_4^{2-}$ are absent. |
| **8. Confirmatory tests forcarbonate** | | |
| (a) Shook a pinch of the saltwith water. | Salt did not dissolve. | |
| (b) To the salt added dil. HCl. | Brisk effervescence with evolution of colourless, odourless gas which turned lime water milky. | Insoluble carbonate indicated. Insoluble carbonate con- firmed. |

| | | |
|---|---|---|
| **11. Heated a pinch of saltwith conc. NaOH solution** | No ammonia gas evolved. | $NH_4^+$ absent. |

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| **12. Preparation of Original solution (O.S.)** | | |
| (*a*) Shook a pinch of the salt with water. | Insoluble | Labelled it as O.S. |
| (*b*) Shook a pinch of the salt in dil. HCl. | Clear solution obtained. | |
| 13. As the O.S. is prepared in dil. HCl. | | Group I absent. ($Pb^{2+}$ absent) |
| 14. Through a part of O.S. passed $H_2S$ gas. | No ppt. formed. | Group II absent ($Pb^{2+}$, $Hg^{2+}$, $Cu^{2+}$, $As^{3+}$ absent). |
| 15. To the remaining solution, added a pinch of solid ammonium chloride. Boiled the solution, cooled it and added excess of ammonium hydroxide solution. | No ppt. formed | Group III absent. ($Fe^{3+}$, $Al^{3+}$ absent). |
| 16. Through a part of this solution, passed $H_2S$ gas. | Dull white ppt. formed. | Group IV present. ($Zn^{2+}$ present) |
| **17. Confirmatory tests for $Zn^{2+}$ ion** | | |
| Dissolved the above dull white ppt. in dil HCl. Boiled off $H_2S$. | | |
| Divided the solution into two parts. | | |
| (*a*) To one part added NaOH solution dropwise. | White ppt. soluble in excess of NaOH. | $Zn^{2+}$ confirmed. |
| (*b*) To another part, added potassium ferrocyanide solution. | Bluish white ppt. | $Zn^{2+}$ confirmed. |

**Result.** *Acid Radical* : $CO_3^{2-}$

*Basic Radical* : $Zn^{2+}$.

## EXPERIMENT-3

***Aim:To analyse the given salt for acidic and basic radicals.***

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| 1. **Physical examination :** | | |
| (c) Noted the colour of the given salt. | White | $Cu^{2+}$, $Fe^{2+}$, $Fe^{3+}$, $Ni^{2+}$, $Mn^{2+}$, $Co^{2+}$ absent. |
| (d) Noted the smell of the salt. | No specific odour | $NH_4^+$, $S^{2-}$ and $CH_3COO^-$ may be absent. |
| 2. **Dry heating test** | | |
| Heated a pinch of the salt in a dry test tube and noted the following observations : | | |
| *(f) Gas evolved* | A reddish brown gas evolved which turned freshly prepared $FeSO_4$ solution black. | $NO_3^-$ may be present. |
| *(g) Sublimation* | No sublimate formed. | Ammonium halides, aluminium chloride, iodide may be absent. |
| *(h) Decrepitation* | No crackling sound observed. | Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent. |
| *(i) Fusion* | Salt does not fuse. White | Alkali (sodium, potassium) salts may be absent. |
| *(j) Colour of the residue* | | $Zn^{2+}$, $Pb^{2+}$ may be absent. |

| Experiment | Observations | Inference |
|---|---|---|
| **11. Flame test**<br>Prepared a paste of the salt in conc. HCl and performed flame test. | Persistent grassy green flame on prolonged heating. | $Ba^{2+}$ present. |
| **12. Borax bead test**<br>Did not perform this test since the given salt was white. | — | $Cu^{2+}$, $Ni^{2+}$, $Fe^{3+}$, $Mn^{2+}$, $Co^{2+}$ may be absent. |
| **13. Dil. sulphuric acid test**<br>Treated a pinch of the salt with dil. $H_2SO_4$ and warmed. | No gas evolved. | $CO_3^{2-}$, $S^{2-}$, $NO_2^-$, $SO_3^{2-}$ may be absent. |
| **14. $KMnO_4$ test**<br>To a pinch of the salt added dil. $H_2SO_4$ warm and then a drop of $KMnO_4$ solution. | Pink colour of $KMnO_4$ was not discharged. | $Cl^-$, $Br^-$, $I^-$, $C_2O_4^{2-}$, $Fe^{2+}$ may be absent. |
| **15. Conc. sulphuric acid test**<br>Heated a pinch of the salt with conc. sulphuric acid and added to it a paper pellet. | A reddish brown gas evolved which turned $FeSO_4$ solution black. | $NO_3^-$ may be present. |
| **16. Confirmatory test for nitrate**<br>(c) *Copper chips test*. Heated a pinch of the salt with conc. sulphuric acid and a few copper chips. | Reddish brown gas evolved. | $NO_3^-$ confirmed. |
| (d) *Ring test*. To 2–3 ml of the salt solution, added freshly prepared $FeSO_4$ solution. Now added conc. sulphuric acid along the sides of the test tube. | A dark brown ring formed at the junction of the two liquids. | $NO_3^-$ confirmed. |
| **16. Heated a pinch of salt with conc. NaOH solution** | No ammonia gas evolved. | $NH_4^+$ absent. |
| **17. Preparation of Original Solution (O.S.)**<br>Shook a pinch of the salt with water. | Solution obtained | Labelled it as Original Solution (O.S.) |
| **18. Confirmatory test for Barium**<br>Add KI in original Solution | ppt. formed.<br>Yellow ppt formed | Group I absent. ($Pb^{2+}$ present)<br>$Pb^{2+}$ conformed |

**Result.** *Acid radical*: $NO_3^-$

*Basic radical*: $Pb^{2+}$.

# Experiment- 4

***To analyse the given salt for acidic and basic radicals.***

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| **3. Physical examination** | | |
| *(a)* Noted the colour of the given salt. | White | $Cu^{2+}$, $Fe^{3+}$, $Ni^{2+}$, $Mn^{2+}$, $Co^{2+}$ absent. |
| *(b)* Noted the smell of the salt. | No specific odour | $NH_4^+$, $S^{2-}$ and $CH_3COO^-$ may be absent. |
| **4. Dry heating test** | | |
| Heated a pinch of the salt in a dry test tube and noted the following : | | |
| *(a) Gas evolved* | A colourless, odourless gas evolved | $Cl^-$ may be present. |
| *(b) Sublimation* | No sublimate formed. | Ammonium halides, iodide may be absent. |
| *(c) Decrepitation* | No crackling sound observed. | Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent. |
| *(d) Colour of the residue* | Yellow when hot and white when cold. | $Zn^{2+}$ may be present. |
| **9. Flame test** | | |
| Prepared a paste of the salt in conc. HCl and performed flame test. | White Flame observed with nakedeye. | $Pb^{2+}$ may be present. |
| **10. Borax bead test** | | |
| Did not perform this test since the given salt was white. | — | $Cu^{2+}$, $Ni^{2+}$, $Fe^{2+}$, $Fe^{3+}$, $Mn^{2+}$, $Co^{2+}$ may be absent. |
| **11. Dil. Sulphuric acid test** | | |
| Treated a pinch of the salt with dil. $H_2SO_4$ and warmed. | Colourless, odourless gas evolved | $Cl^-$ present |
| **12. Conc. Sulphuric acid test** | | |
| Did not perform this test because the salt reacted with dil. $H_2SO_4$. | — | $Cl^-$, $Br^-$, $I^-$, $NO_3^-$, $CH_3COO^-$, $C_2O_4^{2-}$ are absent. |
| **13. Confirmatory tests forcarbonate** | | |
| **1. Silver nitrate test** | | |
| Acidify a portion of aqueous solution (or sodium carbonate extract) with dil. $HNO_3$. Boil for some time, cool and add silver nitrate solution. | A **white ppt.** is formed which is soluble in ammonium hydroxide. | $Cl^-$ is Conformed |

| | | |
|---|---|---|
| **2. Manganese dioxide test**<br>Heat a pinch of the salt with a small quantity of manganese dioxide and conc. $H_2SO_4$. | Evolution of **greenish yellow gas** having a pungent irritating smell. It turns moist starch-iodide paper blue. | $Cl^-$ is Conformed |
| 11. **Heated a pinch of saltwith conc. NaOH solution** | No ammonia gas evolved. | $NH_4^+$ absent |

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| 12. **Preparation of Original solution (O.S.)** | | |
| (*a*) Shook a pinch of the salt with water. | Insoluble | Labelled it as O.S. |
| (*b*) Shook a pinch of the salt in dil. HCl. | Clear solution obtained. | |
| 13. As the O.S. is prepared in dil. HCl. | ppt. formed. | Group I present.($Pb^{2+}$ present) |
| 17. **Confirmatory tests for $Pb^{2+}$ ion** | | |
| Add KI in original Solution | Yellow ppt formed | $Pb^{2+}$ conformed |

**Result.** *Acid Radical* : $Cl^-$

*Basic Radical* : $Pb^{2+}$.

# Experiment- 5

***Aim*** ***To analyses the given salt for one anion and one cation present in it.***

- Boiling tubes, test tubes, test tube holder, test tube stand, delivery tube, corks, filter papers, reagents

***Material required***

| Sl. No. | Experiment | Observation | Inference |
|---|---|---|---|
| 1. | Noted the colour of the salt given. | White | $Cu^{2+}$, $Fe^{2+}$, $Ni^{2+}$, $Co^{2+}$, $Mn^{2+}$ are absent. |
| 2. | Noted the smell of the salt. | No specific smell. | $S^{2-}$, $SO_3^{2-}$, $CH_3COO^-$ may be absent. |
| 3. | Heated 0.5 g of the salt in a dry test tube and noted the colour of the gas evolved and change in the colour of the residue on heating and cooling. | (i) No gas was evolved.<br>(ii) No particular change in colour of the residue is observed when heated and when cooled. | (i) $CO_3^{2-}$ may be present, $NO_3^-$, $NO_2^-$, $Br^-$ may be absent.<br>(ii) $Zn^{2+}$ may be absent. |
| 4. | Prepared a paste of the salt with conc. HCl and performedthe flame test. | No distinct colour of theflame seen. | $Ca^{2+}$, $Sr^{2+}$, $Ba^{2+}$ $Cu^{2+}$ may be absent. |
| 5. | Borax bead test was not performed as the salt was white in colour. | — | — |
| 6. | Treated 0.1 g of salt with 1 mLdil.$H_2SO_4$ and warmed. | No effervescence and evolution of vapours. | $CO_3^{2-}$, $SO_3^{2-}$, $S^{2-}$, $NO_2^-$, $CH_3COO^-$ absent. |
| 7. | Heated 0.1 g of salt with 1 mLconc. $H_2SO_4$. | No gas evolved. | $Cl^-$, $Br^-$, $I^-$, $NO_3^-$, $C_2O_4^{2-}$ are absent. |
| 8. | Acidified 1mL of aqueous salt solution with conc. $HNO_3$. Warmed the contents and then added 4-5 drops of ammonium molybdate solution. | No yellow precipitate | $PO_4^{3-}$ absent. |

| | | | |
|---|---|---|---|
| 9. | Acidified water extract of the salt with dil. HCl and then added 2mL of $BaCl_2$ solution. | A white ppt. is obtainedwhich is insoluble in conc. $HNO_3$and conc. HCl. | $SO_4^{2-}$ present. |
| 10. | Heated 0.1 g of salt with 2 mLNaOH solution. | Ammonia gas is not evolved. | $NH_4^+$ absent. |
| 11. | Attempted to prepare original solution of the salt by dissolving 1g of it in 20 mLwater. | Clear solution formed | Water soluble salt is present. |
| 12. | To a small part of the above salt solution added 2 mL of dil. HCl. | No white precipitate formed. | Group–I absent. |
| 13. | Passed $H_2S$ gas through oneportion of thesolution of step 12. | No precipitate formed. | Group–II absent. |
| 14. | Since salt is white, heating with conc. $HNO_3$ is not required. Added about 0.2 g of solid ammonium chloride and then added excess of ammonium hydroxide to the solution of step 12. | No precipitate formed. | Group–III absent. |
| 15. | Passed $H_2S$ gas through the above solution. | No precipitate formed. | Group–IV absent. |
| 16. | Added excess of ammonium hydroxide solution to the original solution and then added 0.5 g of ammonium carbonate. | No precipitate formed. | Group–V absent. |
| 17. | To the original solution of salt added ammonium hydroxide solution, followed by disodium hydrogen phosphate solution. Heated and scratched the sides of the test tu. | White precipitate. | $Mg^{2+}$ confirmed. |

## Result

The given salt contains:

**Result.** *Acid Radical* : $SO_4^{2-}$

*Basic Radical* : $Mg^{2+}$.

# Experiment- 6

***Aim*** ***To analyses the given salt for one anion and one cation present in it.***

- Boiling tubes, test tubes, test tube holder, test tube stand, delivery tube, corks, filter papers, reagents

***Material required***

| Sl. No. | Experiment | Observation | Inference |
|---|---|---|---|
| 1. | Noted the colour of the salt given. | White | $Cu^{2+}$, $Fe^{2+}$, $Ni^{2+}$, $Co^{2+}$, $Mn^{2+}$ are absent. |
| 2. | Noted the smell of the salt. | No specific smell. | $S^{2-}$, $SO_3^{2-}$, $CH_3COO^-$ may be absent. |
| 3. | Heated 0.5 g of the salt in a dry test tube and noted the colour of the gas evolved and change in the colour of the residue on heating and cooling. | (i) No gas was evolved.<br>(ii) No particular change in colour of the residue is observed when heated and when cooled. | (iii) $CO_3^{2-}$ may be present, $NO_3^-$, $NO_2^-$, $Br^-$ may be absent.<br>(iv) $Zn^{2+}$ may be absent. |
| 4. | Prepared a paste of the salt with conc. HCl and performedthe flame test. | Green colour of the flame seen. | $Ba^{2+}$may be present. |
| 5. | Borax bead test was not performed as the salt was white in colour. | — | — |
| 6. | Treated 0.1 g of salt with 1 mLdil.$H_2SO_4$ and warmed. | No effervescence and evolution of vapours. | $CO_3^{2-}$, $SO_3^{2-}$, $S^{2-}$, $NO_2^-$, $CH_3COO^-$ absent. |
| 7. | Heated 0.1 g of salt with 1 mLconc. $H_2SO_4$. | No gas evolved. | $Cl^-$, $Br^-$, $I^-$, $NO_3^-$, $C_2O_4^{2-}$ are absent. |
| 8. | Acidified 1mL of aqueous salt solution with conc. $HNO_3$. Warmed the contents and then added 4-5 drops of ammonium molybdate solution. | No yellow precipitate | $PO_4^{3-}$ absent. |

| | | | |
|---|---|---|---|
| 9. | Acidified water extract of the salt with dil. HCl and then added 2mL of $BaCl_2$ solution. | A white ppt. is obtained which is insoluble in conc. $HNO_3$ and conc. HCl. | $SO_4^{2-}$ present. |
| 10. | Heated 0.1 g of salt with 2 mL NaOH solution. | Ammonia gas is not evolved. | $NH_4^+$ absent. |
| 11. | Attempted to prepare original solution of the salt by dissolving 1g of it in 20 mL water. | Clear solution formed | Water soluble salt is present. |
| 12. | To a small part of the above salt solution added 2 mL of dil. HCl. | No white precipitate formed. | Group–I absent. |
| 13. | Passed $H_2S$ gas through one portion of the solution of step 12. | No precipitate formed. | Group–II absent. |
| 14. | Since salt is white, heating with conc. $HNO_3$ is not required. Added about 0.2 g of solid ammonium chloride and then added excess of ammonium hydroxide to the solution of step 12. | No precipitate formed. | Group–III absent. |
| 15. | Passed $H_2S$ gas through the above solution. | No precipitate formed. | Group–IV absent. |
| 16. | Added excess of ammonium hydroxide solution to the original solution and then added 0.5 g of ammonium carbonate. | No precipitate formed. | Group–V present. |
| 17. | **Confirmatory test for Barium** | | |
| | (*a*) *Pot. chromate test*. To one part of the above solution, added a few drops of pot. chromate solution. | Yellow ppt. | $Ba^{2+}$ conformed |
| | (*b*) *Flame test*. Performed flame test with the salt. | Persistent grassy green flame on prolonged heating. | $Ba^{2+}$ conformed |
| | | | |

## Result

The given salt contains:

*Acid Radical* : $SO_4^{2-}$

*Basic Radical* : $Ba^{2+}$.

# EXPERIMENT-7

***Aim:To analyse the given salt for acidic and basic radicals.***

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| 1. **Physical examination :** | | |
| (e) Noted the colour of the given salt. | White | $Cu^{2+}$, $Fe^{2+}$, $Fe^{3+}$, $Ni^{2+}$, $Mn^{2+}$, $Co^{2+}$ absent. |
| (f) Noted the smell of the salt. | No specific odour | $NH_4^+$, $S^{2-}$ and $CH_3COO^-$ may be absent. |
| 2. **Dry heating test** | | |
| Heated a pinch of the salt in a dry test tube and noted the following observations : | | |
| *(k) Gas evolved* | A reddish brown gas evolved which turned freshly prepared $FeSO_4$ solution black. | $NO_3^-$ may be present. |
| *(l) Sublimation* | No sublimate formed. | Ammonium halides, aluminium chloride, iodide may be absent. |
| *(m) Decrepitation* | No crackling sound observed. | Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent. |
| *(n) Fusion* | Salt does not fuse. White | Alkali (sodium, potassium) salts may be absent. |
| *(o) Colour of the residue* | | $Zn^{2+}$, $Pb^{2+}$ may be absent. |

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| **17. Flame test**<br>Prepared a paste of the salt in conc. HCl and performed flame test. | Red flame on prolonged heating. | $Sr^{2+}$ present. |
| **18. Borax bead test**<br>Did not perform this test since the given salt was white. | — | $Cu^{2+}$, $Ni^{2+}$, $Fe^{3+}$, $Mn^{2+}$, $Co^{2+}$ may be absent. |
| **19. Dil. sulphuric acid test**<br>Treated a pinch of the salt with dil. $H_2SO_4$ and warmed. | No gas evolved. | $CO_3^{2-}$, $S^{2-}$, $NO_2^-$, $SO_3^{2-}$ may be absent. |
| **20. $KMnO_4$ test**<br>To a pinch of the salt added dil. $H_2SO_4$ warm and then a drop of $KMnO_4$ solution. | Pink colour of $KMnO_4$ was not discharged. | $Cl^-$, $Br^-$, $I^-$, $C_2O_4^{2-}$, $Fe^{2+}$ may be absent. |
| **21. Conc. sulphuric acid test**<br>Heated a pinch of the salt with conc. sulphuric acid and added to it a paper pellet. | A reddish brown gas evolved which turned $FeSO_4$ solution black. | $NO_3^-$ may be present. |
| **22. Confirmatory test for nitrate**<br>(e) *Copper chips test*. Heated a pinch of the salt with conc. sulphuric acid and a few copper chips. | Reddish brown gas evolved. | $NO_3^-$ confirmed. |
| (f) *Ring test*. To 2–3 ml of the salt solution, added freshly prepared $FeSO_4$ solution. Now added conc. sulphuric acid along the sides of the test tube. | A dark brown ring formed at the junction of the two liquids. | $NO_3^-$ confirmed. |
| **18. Heated a pinch of salt with conc. NaOH solution** | No ammonia gas evolved. | $NH_4^+$ absent. |
| **19. Preparation of Original Solution (O.S.)**<br>Shook a pinch of the salt with water. | Solution obtained | Labelled it as Original Solution (O.S.) |
| **20.** To a part of the O.S. added 1–2 mls of dilute hydrochloric acid. | No ppt. formed. | Group I absent. ($Pb^{2+}$ absent) |
| **21.** Through a part of the above solution, passed $H_2S$ gas. | No ppt. formed. | Group II absent ($Pb^{2+}$, $Cu^{2+}$, $As^{3+}$, absent) |
| **22.** To the remaining solution, added a pinch of solid ammonium chloride. Boiled the solution, cooled it and added excess of ammonium hydroxide solution. | No ppt. formed. | Group III absent. ($Fe^{3+}$, $Al^{3+}$ absent) |

| *Experiment* | *Observations* | *Inference* |
|---|---|---|
| 16. Through a part of this solution, passed $H_2S$ gas. | No ppt. formed. | Group IV absent. ($Zn^{2+}$, $Mn^{2+}$, $Ni^{2+}$, $Co^{2+}$, absent) |
| 17. To the remaining ammonical solution added ammonium carbonate solution. | White ppt. formed. | Group V present. ($Ca^{2+}$, $Ba^{2+}$, $Sr^{2+}$ may be present) |
| 18. **Confirmatory test for** | | |
| **1. Amm. sulphate test** To the second part of the solution, add 1 ml of amm. sulphate solution and warm. | **White ppt.** | $Sr^{2+}$ confirmed. |
| **2. Flame test** Perform the flame test with the original salt. | **Crimson red flame.** | $Sr^{2+}$ confirmed. |

**Result.** *Acid radical*: $NO_3^-$

*Basic radical*: $Sr^{2+}$

## Experiment-8
## Content Based Experiment

**Aim**: Purification of the impure samples like copper sulphate, Alum, Benzoic Acid and Iron Sulphate by the process of crystallization

**Materials Required:**
50 mL capacity Beaker, filtration unit, watch glass, kerosene burner and CuSO4 .5H20

**The procedure of crystallization of copper sulphate:**

1. Prepare a clear solution of copper sulphate.
2. Dissolve 0.8g of CuSO4.5H20 in about 8 mL of water and add 1-2 drops about 6 mL H2SO4 to it.
3. Heat the solution for a while and filter it using a filtration unit.
4. Transfer the solution from filtration unit to another beaker and allow it to cool to room temperature.
5. The crystals will appear.
6. Filter, wash these crystals and let it dry
7. Weigh the crystals and report the yield.