

Experiment: 1**SALT ANALYSIS****Anionic Analysis:****Dilute acid group:** CO_3^{2-} , NO_2^- , SO_3^{2-} , S^{2-} **Conc. acid group:** Cl^- , Br^- , I^- , NO_3^- , $\text{C}_2\text{O}_4^{2-}$, CH_3COO^- **Special group:** SO_4^{2-} , PO_4^{3-}

| S. No. | Experiment | Observation | Inference |
|--------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------|
| | Carbonate ion (CO_3^{2-}) | | |
| 1. | Salt + dilute H_2SO_4 | Colorless, odorless gas released with effervescence | CO_2 may be |
| 2. | Above gas passed through lime water solution | Lime water turns milky. | CO_2 may be |
| 3. | Above gas passed through lime water solution in excess | Milky solution turns colourless | CO_2 may be |
| 4. | Above gas passed through pink coloured KMnO_4 solution | The colour of the solution does not change. | CO_2 confirm. |
| 5. | Aqueous solution of the salt + MgSO_4 solution | White ppt | CO_3^{2-} confirm. |
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| | Sulphite ion (SO_3^{2-}) | | |
| 1. | Salt + dilute H_2SO_4 | Colorless gas with the smell of burning sulphur released | SO_2 may be |
| 2. | Above gas passed through lime water solution | Lime water turns milky. | SO_2 may be |
| 3. | Above gas passed through lime water solution in excess | Milky solution turns colourless | SO_2 may be |
| 4. | Above gas passed through pink coloured KMnO_4 solution | The colour of the solution changes from pink to colourless. | SO_2 confirm. |
| 5. | Above gas passed through orange coloured $\text{K}_2\text{Cr}_2\text{O}_7$ solution | The colour of the solution changes from orange to green. | SO_2 confirm. |
| 6. | Aqueous solution of the salt + BaCl_2 solution | White ppt | SO_3^{2-} may be |

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| 7. | Above ppt + dilute HCl | White ppt dissolved to form a colourless solution. | SO_3^{2-} confirm. |
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| | Sulphide ion (S^{2-}) | | |
| 1. | Salt + dilute H_2SO_4 | Colourless gas with a smell of rotten eggs released | H_2S may be |
| 2. | Brought a paper dipped in lead acetate $(\text{CH}_3\text{COO})_2\text{Pb}$ solution near the mouth of the test tube | The paper turned silvery black due to the formation of PbS . | H_2S confirm. |
| 3. | Aqueous solution of the salt + few drops of sodium nitroprusside solution $\text{Na}_2[\text{Fe}(\text{CN})_5\text{NO}]$ | Purple colouration due to the formation of $\text{Na}_4[\text{Fe}(\text{CN})_5\text{NOS}]$ | S^{2-} confirm. |
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| | Nitrite ion (NO_2^-) | | |
| 1. | Salt + dilute H_2SO_4 | Light brown coloured gas released which intensifies on heating | NO gas may be which on reaction with atmospheric oxygen turns NO_2 |
| 2. | Brought a paper dipped in ferrous sulphate solution near the mouth of the test tube | The paper turns black/ brown | NO gas confirm. |
| 3. | Salt solution + diphenylamine solution | A deep blue colour obtained. | NO_2^- confirm. |
| 4. | Salt solution + 1 ml of acetic acid + half a pinch of solid KI + 2-4 drops of freshly prepared starch solution | Blue black ppt | NO_2^- confirm. |
| | | | |
| | Nitrate ion (NO_3^-) | | |
| 1. | Salt + conc. $\text{H}_2\text{SO}_4 \rightarrow$ heat | Reddish brown gas released | NO_2 gas may be |

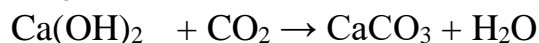
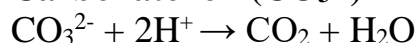
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| 2. | Added copper turnings or paper pellets to the above mixture | Brown colour of the gas intensified | NO ₂ confirm. |
| 3. | Salt solution + diphenylamine solution | A deep blue colour obtained. | NO ₃ ⁻ confirm. |
| 4. | Brown Ring test - Salt solution + freshly prepared ferrous sulphate solution + conc H ₂ SO ₄ by the sides of the test tube | Brown ring obtained at the junction of two liquids | NO ₃ ⁻ confirm. |
| | Acetate ion (CH₃COO⁻) | | |
| 1. | Salt + conc. H ₂ SO ₄ | Vinegar like smell | CH ₃ COO ⁻ may be |
| 2. | Salt + a pinch of oxalic acid + 2-3 drops of water → rub | Vinegar like smell | CH ₃ COO ⁻ may be |
| 3. | Salt solution + neutral FeCl ₃ solution | Red colouration | CH ₃ COO ⁻ confirm. |
| 4. | Above solution heated. | Reddish brown ppt | CH ₃ COO ⁻ confirm. |
| 5. | Salt solution + 1 ml ethanol + 1 ml conc. H ₂ SO ₄ → heat | Fruity odour | CH ₃ COO ⁻ confirm. |
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| | Chloride ion (Cl⁻) | | |
| 1. | Salt + conc. H ₂ SO ₄ → heat | Colourless gas with pungent smell | HCl gas may be. |
| 2. | Brought a rod dipped in NH ₄ OH near the mouth of the test tube | Dense white fumes obtained. | HCl gas confirm. |
| 3. | Salt solution + dilute HNO ₃ + AgNO ₃ solution | White ppt | Cl ⁻ may be. |
| 4. | Above ppt + NH ₄ OH in excess | Ppt dissolved to form a colourless solution | Cl ⁻ confirm. |
| 5. | Chromyl Chloride test – Salt + solid K ₂ Cr ₂ O ₇ + conc. H ₂ SO ₄ → heat | Red vapours obtained | Cl ⁻ may be. |
| 6. | Above red vapours passed through NaOH solution | NaOH solution turned yellow. | Cl ⁻ may be. |
| 7. | Yellow solution + CH ₃ COOH (CH ₃ COO) ₂ Pb solution | Yellow ppt | Cl ⁻ confirm. |
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| | Bromide ion (Br⁻) | | |

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| 1. | Salt + conc. $\text{H}_2\text{SO}_4 \rightarrow$ heat | Reddish brown gas with pungent smell | Br^- may be. |
| 2. | Brought a paper dipped in starch solution near the mouth of the test tube | Orange red stains | Br^- may be. |
| 2. | Salt solution + dilute HNO_3 + AgNO_3 solution | Light yellow ppt | Br^- may be. |
| 3. | Above ppt + NH_4OH in excess | Ppt is sparingly soluble. | Br^- confirm. |
| 4. | Layer test/ Chlorine water test- Salt solution + 1 ml of CS_2 / CCl_4 + 1 ml of chlorine water \rightarrow shake vigorously. | An orange colour obtained in the organic layer. | Br^- confirm. |
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| | Iodide ion (I^-) | | |
| 1. | Salt + conc. $\text{H}_2\text{SO}_4 \rightarrow$ heat | Violet coloured gas with pungent smell released. | I^- may be. |
| 2. | Brought a paper dipped in starch solution near the mouth of the test tube | Blue black stains | I^- may be. |
| 3. | Salt solution + dilute HNO_3 + AgNO_3 solution | yellow ppt | I^- may be. |
| 4. | Above ppt + NH_4OH in excess | Ppt is insoluble. | I^- confirm. |
| 5. | Layer test/ Chlorine water test- Salt solution + 1 ml of CS_2 / CCl_4 + 1 ml of chlorine water \rightarrow shake vigorously. | A violet colour obtained in the organic layer. | I^- confirm. |
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| | Oxalate ion ($\text{C}_2\text{O}_4^{2-}$) | | |
| 1. | Salt + conc. $\text{H}_2\text{SO}_4 \rightarrow$ heat | Colourless gas released with effervescence | CO_2 may be |
| 2. | Above gas passed through lime water solution | Lime water turns milky. | CO_2 may be |
| 3. | Above gas passed through lime water solution in excess | Milky solution turns colourless | CO_2 may be |

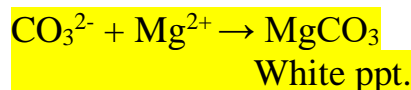
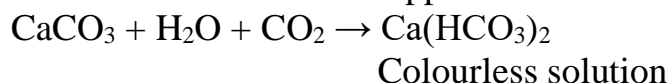
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| 4. | Salt solution + $\text{CH}_3\text{COOH} \rightarrow$ boil off CO_2 + CaCl_2 solution + dilute $\text{HNO}_3 \rightarrow$ boil | White ppt | $\text{C}_2\text{O}_4^{2-}$ may be. |
| 5. | Above solution + 3-4 drops of KMnO_4 solution | Pink colour turns colourless. | $\text{C}_2\text{O}_4^{2-}$ confirm. |
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| | Sulphate ion (SO_4^{2-}) | | |
| 1. | Salt solution + dilute HCl + BaCl_2 solution | Whit ppt | SO_4^{2-} may be |
| 2. | Above ppt + dilute HCl / dilute HNO_3 | Ppt remains insoluble. | SO_4^{2-} confirm. |
| 3. | Salt solution+ CH_3COOH + $(\text{CH}_3\text{COO})_2\text{Pb}$ solution | White ppt | SO_4^{2-} may be |
| 4. | Above ppt + hot $\text{CH}_3\text{COONH}_4$ in excess | Ppt dissolves to form a colourless solution | SO_4^{2-} confirm. |
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| | Phosphate ion (PO_4^{3-}) | | |
| 1. | Salt solution + conc. $\text{HNO}_3 \rightarrow$ boil + ammonium molybdate solution $(\text{NH}_4)_2\text{MoO}_4 \rightarrow$ boil | Canary yellow ppt | PO_4^{3-} confirm. |

Equations involved:

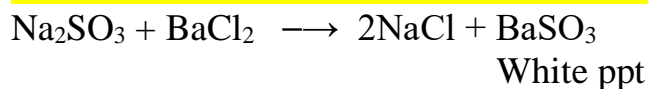
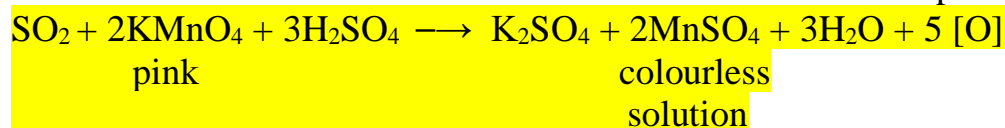
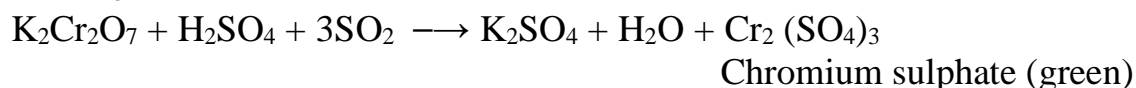
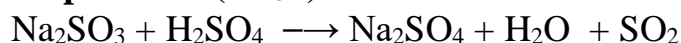
Carbonate ion (CO_3^{2-})

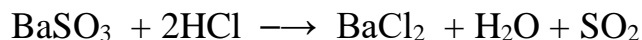


Lime water white ppt

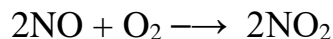
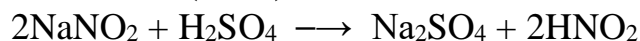


Sulphite ion (SO_3^{2-})

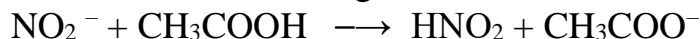




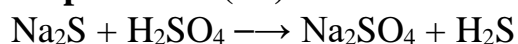
Nitrite ion (NO_2^-)



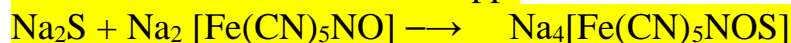
Brown gas



Sulphide ion (S^{2-})



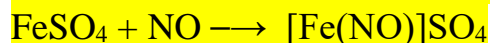
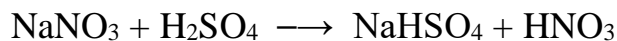
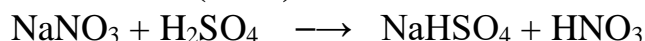
Black ppt



Sodium nitroprusside

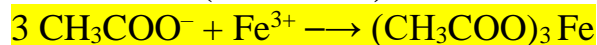
Complex of Purple colour

Nitrate ion (NO_3^-)

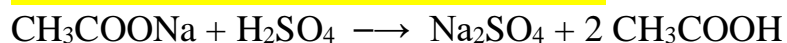


Nitrosoferrous sulphate (brown ring)

Acetate ion (CH_3COO^-)

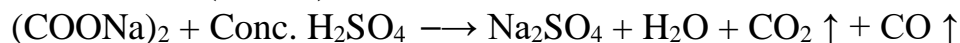


Red colouration

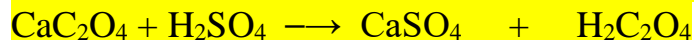


Ethylacetate (Fruity odour)

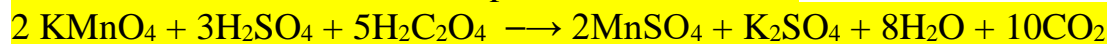
Oxalate ion ($\text{C}_2\text{O}_4^{2-}$)



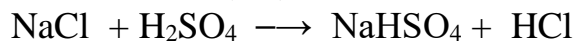
Calcium oxalate (White precipitate)

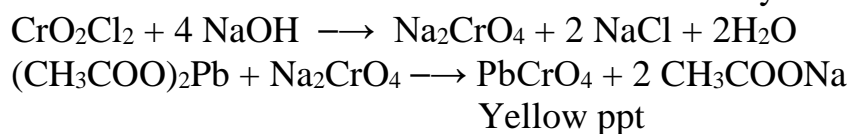
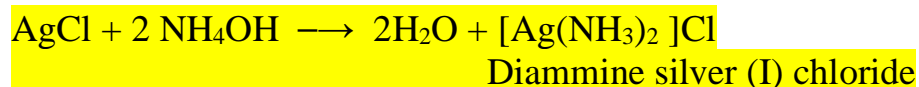


Calcium sulphate Oxalic acid

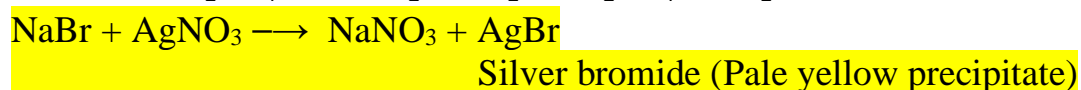


Chloride ion (Cl^-)

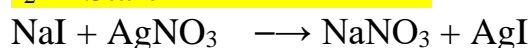
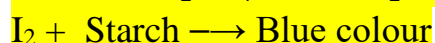
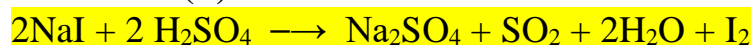




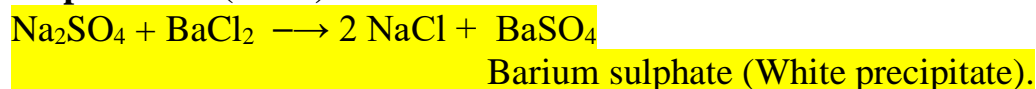
Bromide ion (Br^-)



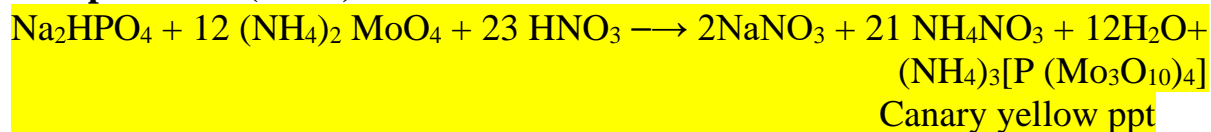
Iodide ion (I^-)



Sulphate ion (SO_4^{2-})



Phosphate ion (PO_4^{3-})



Cationic Analysis:

| Group | Group Reagent | Cations | Chemical form of the ppt |
|-------|------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------|
| 0 | - | NH_4^+ | |
| I | Dilute HCl | Pb^{2+} | PbCl_2 (white) |
| II | H_2S gas in an acidic medium or presence of dilute HCl | Pb^{2+} Cu^{2+} As^{3+} | PbS (black) CuS (black) As_2S_3 (yellow) |
| III | NH_4Cl solid + NH_4OH | Al^{3+} | $\text{Al}(\text{OH})_3$ (gel white) |

| | | | |
|----|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| | | Fe^{3+} | $\text{Fe}(\text{OH})_3$ (brown) |
| IV | H_2S gas in an alkaline medium or presence of $\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}$ | Zn^{2+} Co^{2+} Ni^{2+} Mn^{2+} | ZnS (dirty white) CoS (black) NiS (black) MnS (flesh/buff) |
| V | $(\text{NH}_4)_2\text{CO}_3$ in presence of $\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}$ | Ba^{2+} , Sr^{2+} Ca^{2+} | BaCO_3 (white) SrCO_3 (white) CaCO_3 (white) |
| VI | Na_2HPO_4 : Disodium hydrogen phosphate | Mg^{2+} | $\text{Mg}(\text{NH}_4)\text{PO}_4$ (white) |

| S.No. | Experiment | Observation | Inference |
|-------|----------------------------------------------------------------------------|----------------------------------------------|--------------------------|
| | Group 0 | | |
| 1. | Salt + $\text{NaOH} \rightarrow$ warm | Pungent smelling colourless gas released. | Group 0 present. |
| 2. | Brought a rod dipped in conc. HCl near the mouth of the test tube | Dense white fumes released. | NH_4^+ may be |
| 3. | OS + Nessler's reagent (K_2HgI_4) | Brown ppt | NH_4^+ confirm. |
| | Group I | | |
| 1. | Salt + $\text{NaOH} \rightarrow$ warm | No pungent smelling colourless gas released. | Group 0 absent. |
| 2. | OS + dilute HCl | White ppt | Group I present |
| 3. | Above ppt dissolved in hot water and divided the solution into two parts: | | |
| | Part I + KI solution | Yellow ppt | Pb^{2+} confirm |
| | Part II + K_2CrO_4 solution | Yellow ppt which is soluble in NaOH | Pb^{2+} confirm |
| | Group II | | |

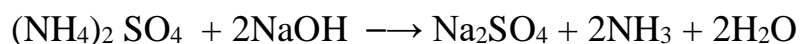
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| 1. | Salt + NaOH → warm | No pungent smelling colourless gas released. | Group 0 absent. |
| 2. | OS + dilute HCl | No white ppt | Group I absent |
| 3. | Above solution + H ₂ S gas | Ppt obtained Black ppt Yellow ppt | Group II present Cu ²⁺ may be As ³⁺ may be |
| | Cu²⁺ | | |
| 4. | Above ppt dissolved in dissolved in conc.HNO₃ and divide it into 3 parts: | | |
| | Part I + K₄[Fe (CN)₆] | Chocolate brown ppt | Cu²⁺ confirm. |
| | Part II + NH ₄ OH in excess | Deep blue colouration | Cu ²⁺ confirm |
| | Part III + KI solution | A white ppt obtained in brown solution | Cu ²⁺ confirm |
| 4. | As³⁺ | | |
| | Above ppt dissolved in dissolved in conc.HNO₃ and divide it into 2 parts: | | |
| | Part I + ammonium molybdate solution (NH ₄) ₂ MoO ₄ → boil | yellow ppt obtained | As ³⁺ confirm |
| | Part II + NH ₄ OH + magnesia mixture | white ppt obtained | As ³⁺ confirm |
| | Group III | | |
| 1. | Salt + NaOH → warm | No pungent smelling colourless gas released. | Group 0 absent. |
| 2. | OS + dilute HCl | No white ppt | Group I absent |
| 3. | Above solution + H ₂ S gas | No Ppt obtained | Group II absent |
| 4. | Above solution + solid NH ₄ Cl + NH ₄ OH | Ppt obtained Gel white ppt Brown ppt | Group III present Al ³⁺ may be Fe ³⁺ may be |

| | | | |
|----|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| | Al³⁺ | | |
| 5. | Gel white ppt dissolved in dilute HCl solution | | |
| | Part I + NaOH and warm. | A white gelatinous precipitate soluble in excess of sodium hydroxide | Al ³⁺ confirm |
| | Lake test: Part II + blue litmus solution and then ammonium hydroxide solution drop by drop along the sides of the test tube. | A blue floating mass in the colourless solution is obtained. | Al ³⁺ confirm |
| | Fe³⁺ | | |
| 5. | Brown ppt dissolved in dilute HCl and the solution is divided into two parts: | | |
| | Part I + KCNS solution: potassium thiocyanate soln | Blood red colouration | Fe ³⁺ confirm |
| | Part II + K ₄ [Fe (CN) ₆] solution | Prussian blue colouration | Fe ³⁺ confirm |
| | Group IV | | |
| 1. | Salt + NaOH → warm | No pungent smelling colourless gas released. | Group 0 absent. |
| 2. | OS + dilute HCl | No white ppt | Group I absent |
| 3. | Above solution + H ₂ S gas | No Ppt obtained | Group II absent |
| 4. | Above solution + solid NH ₄ Cl + NH ₄ OH | No Ppt obtained | Group III absent |
| 5. | Above solution + solid NH ₄ Cl + NH ₄ OH + H ₂ S gas | Ppt obtained Gel white ppt Buff ppt Black ppt | Group IV present Zn ²⁺ may be Mn ²⁺ may be Co ²⁺ or Ni ²⁺ may be |
| | Zn²⁺ | | |

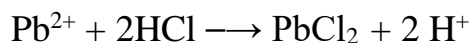
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| 6. | Above ppt dissolved in dilute HCl, boil off H ₂ S gas and divide the solution into two parts: | A white precipitate soluble in excess of sodium hydroxide | |
| | Part I + NaOH | | Zn ²⁺ confirm |
| | Part II + K ₄ [Fe (CN) ₆] solution | Bluish white ppt | Zn ²⁺ confirm |
| | Mn²⁺ | | |
| 6. | Above ppt dissolved in dilute HCl, boil off H ₂ S gas and add NaOH | White ppt which turns Brown on standing | Mn ²⁺ confirm |
| | Co²⁺ | | |
| 6. | Dissolve the ppt in aqua regia (3 parts conc HCl + conc HNO ₃) and add NH ₄ OH + CH ₃ COOH + KNO ₂ → heat | Yellow ppt | Co ²⁺ confirm |
| | Ni²⁺ | | |
| 6. | Dissolve the ppt in aqua regia (3 parts conc HCl + conc HNO ₃) and add NH ₄ OH + dimethyl glyoxime | Rose red ppt | Ni ²⁺ confirm |
| | Group V | | |
| 1. | Salt + NaOH → warm | No pungent smelling colourless gas released. | Group 0 absent. |
| 2. | OS + dilute HCl | No white ppt | Group I absent |
| 3. | Above solution + H ₂ S gas | No Ppt obtained | Group II absent |
| 4. | Above solution + solid NH ₄ Cl + NH ₄ OH | No Ppt obtained | Group III absent |
| 5. | Above solution + solid NH ₄ Cl + NH ₄ OH+ H ₂ S gas | No ppt obtained | Group IV absent |
| 6. | Above solution heated to boil off + H ₂ S gas and add solid NH ₄ Cl + NH ₄ OH+ (NH ₄) ₂ CO ₃ | white ppt obtained | Group V present Ba ²⁺ or Sr ²⁺ or Ca ²⁺ may be |

| | | | |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------|
| 7. | Above ppt dissolved in hot CH_3COOH and divide it into 3 parts: | | |
| | Part I + K_2CrO_4 solution | Yellow ppt | Ba^{2+} confirm. |
| | Part II + $(\text{NH}_4)_2 \text{SO}_4$ [ammonium sulphate solution] | White ppt | Sr^{2+} confirm. |
| | Part III + $(\text{NH}_4)_2 \text{C}_2\text{O}_4$ [ammonium oxalate solution] | White ppt | Ca^{2+} confirm. |
| | Group VI | | |
| 1. | Salt + $\text{NaOH} \rightarrow$ warm | No pungent smelling colourless gas released. | Group 0 absent. |
| 2. | OS + dilute HCl | No white ppt | Group I absent |
| 3. | Above solution + H_2S gas | No Ppt obtained | Group II absent |
| 4. | Above solution + solid NH_4Cl + NH_4OH | No Ppt obtained | Group III absent |
| 5. | Above solution + solid NH_4Cl + NH_4OH + H_2S gas | No ppt obtained | Group IV absent |
| 6. | Above solution heated to boil off + H_2S gas and add solid NH_4Cl + NH_4OH + $(\text{NH}_4)_2\text{CO}_3$ | no ppt obtained | Group V absent |
| 7. | Above solution + Na_2HPO_4 solution \rightarrow scratch the sides of the test tube | white ppt | Group VI present Mg^{2+} |
| | | | |

Equations involved:



Basic mercury (II) amido-iodine
(Brown precipitate)



White ppt



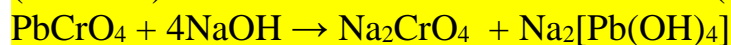
(Hot soln)

Yellow precipitate



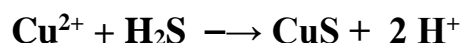
(Hot soln)

Lead chromate (Yellow precipitate)

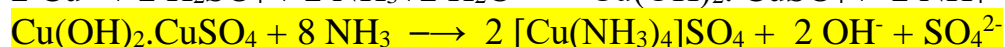
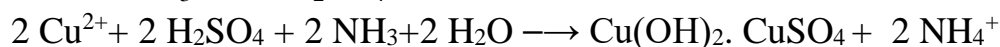
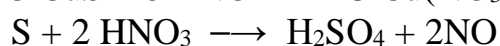


Sodium tetrahydroxoplumbate (II)

Cu²⁺



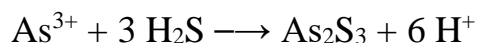
Black ppt



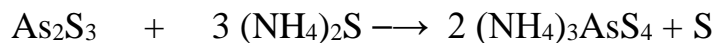
Tetraamminecopper (II) sulphate

(Deep blue colour)

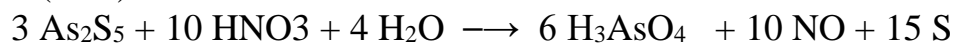
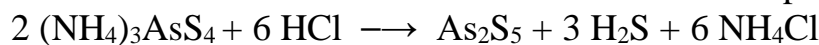
As³⁺



Yellow ppt



Yellow ammonium sulphide

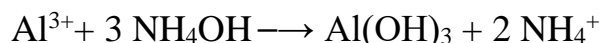


(NH₄)₃[As (Mo₃O₁₀)₄]

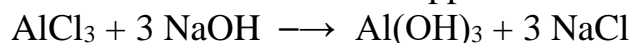
Ammonium arsinomolybdate

(yellow precipitate)

Al³⁺

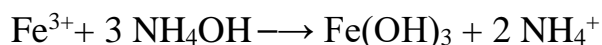


Gel white ppt

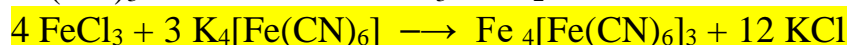
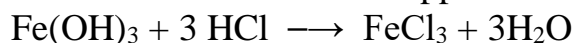


White gelatinous ppt (Sodium meta aluminate)

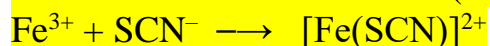
Fe³⁺



Brown ppt

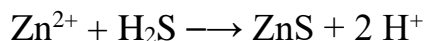


Potassium ferrocyanide
(Prussian blue colour)

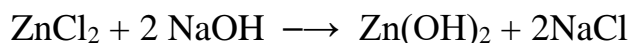
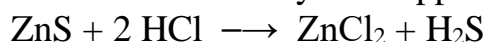


Blood red colour

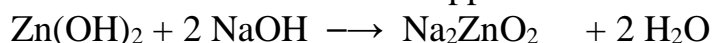
Zn²⁺



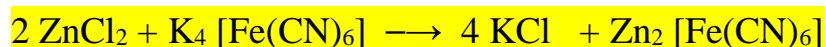
Dirty white ppt



White ppt

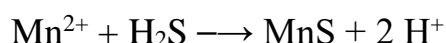


Colourless soln

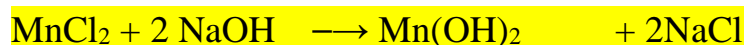
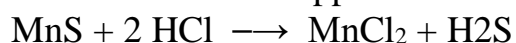


Zinc ferrocyanide (bluish white ppt)

Mn²⁺



Buff ppt

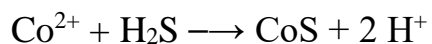


(White precipitate)

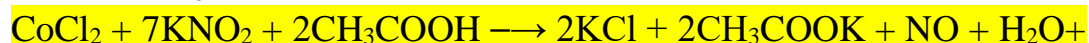


Hydrated manganese dioxide (Brown colour)

Co²⁺



Black ppt

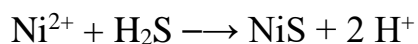


$\text{K}_3 [\text{Co}(\text{NO}_2)_6]$

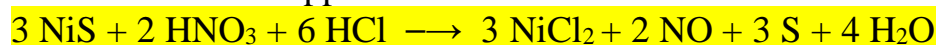
Potassium hexanitritocobaltate (III)

(Yellow precipitate)

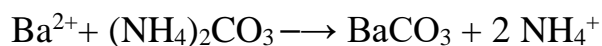
Ni²⁺



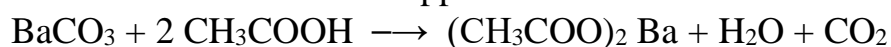
Black ppt

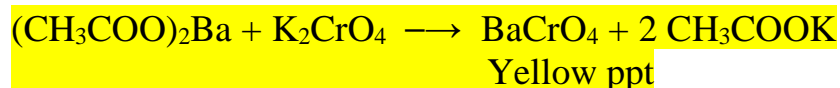


Ba²⁺

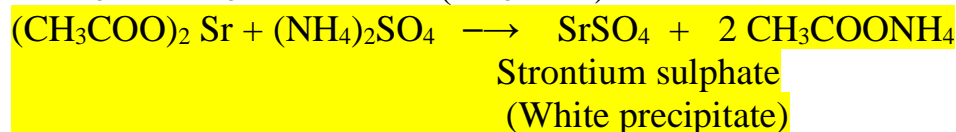
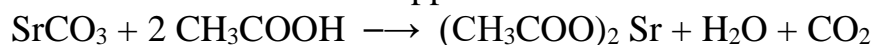
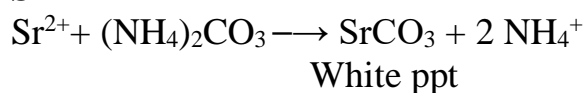


White ppt

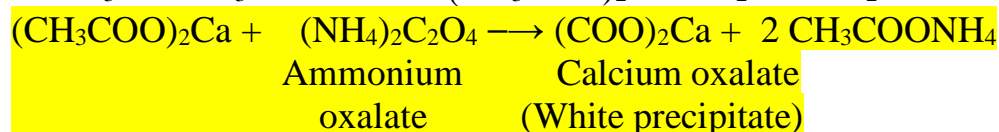
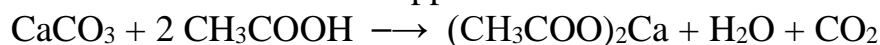
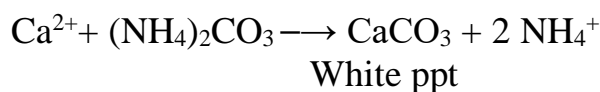




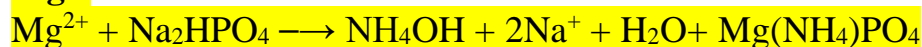
Sr²⁺



Ca²⁺



Mg²⁺



Magnesium ammonium phosphate
(white ppt)

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Experiment 2

Aim: To identify one cation and one anion in the given salt sample

| S.No. | Experiment | Observation | Inference |
|-------|---------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 1. | Noted the colour of the given salt. | 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. | Prepared a paste of the salt with conc. HCl and performed the flame test. | No distinct colour of the flame seen. | Ca^{2+} , Sr^{2+} , Ba^{2+} , Cu^{2+} may be absent. |

| | | | |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. | Treated 0.1 g of salt with 1 mL dil.H ₂ SO ₄ | No effervescence or gas evolved. | CO ₃ ²⁻ , SO ₃ ²⁻ , S ²⁻ , NO ₂ ⁻ absent. |
| 5. | Heated 0.1 g of salt with 1 mL conc. H ₂ SO ₄ . | No gas evolved | CH ₃ COO ⁻ , Cl ⁻ , Br ⁻ , I ⁻ , NO ₃ ⁻ , C ₂ O ₄ ²⁻ are absent. |
| 6. | 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. |
| 7. | Salt solution + dilute HCl + BaCl ₂ solution | Whit ppt | SO ₄ ²⁻ may be |
| 8. | Above ppt + dilute HCl/ dilute HNO ₃ | Ppt remains insoluble. | SO ₄ ²⁻ confirm. |
| 9. | Salt + NaOH → warm | No pungent smelling colourless gas released. | Group 0 absent. |
| 10. | OS + dilute HCl | No white ppt | Group I absent |
| 11. | Above solution + H ₂ S gas | No Ppt obtained | Group II absent |
| 12. | Above solution + solid NH ₄ Cl + NH ₄ OH | No Ppt obtained | Group III absent |
| 13. | Above solution + solid NH ₄ Cl + NH ₄ OH+ H ₂ S gas | No ppt obtained | Group IV absent |
| 14. | Above solution heated to boil off + H ₂ S gas and add solid NH ₄ Cl + NH ₄ OH+ (NH ₄) ₂ CO ₃ | no ppt obtained | Group V absent |
| 15. | Above solution + Na ₂ HPO ₄ solution → scratch the sides of the test tube | white ppt | Group VI present Mg ²⁺ |

Result: Cation - magnesium ion (Mg²⁺)
Anion – sulphate ion (SO₄²⁻)