| SYSTEMATIC ANALYSIS OF SIMPLE SALT- I [LEAD NITRATE] | | | |
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| S NO | Experiment | Observation | Inference |
| | Analysis of anions | | |
| 1 | **Colour:** Note the colour of the salt | Colourless | Absence of copper sulphate, iron salt |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | A reddish brown gas with afishy odour evolves | Presence of a nitratesalt |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic Colourflame Observed. | Absence of a copper, barium, calcium |
| 4. | **Action of dil. HCl:** Small amount of salt + 1mL of dil.HCl . Gently heat it | A reddish brown gas with thefishy odour turning a moist ferrous sulphate paper brownevolves | Presence of nitrate |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | Reddish brown gas turning acidified ferrous sulphate paper green evolves. | Presence of nitrate |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube +pinch of $MnO_2$ + Conc.$H_2SO_4$ and gently heat it | No Characteristic Change is Observed. | Absence of chloride, bromide |
| 7. | **Action of Conc. $H_2SO_4$ and copper turning:** small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | A reddish brown gas with fishyodour turning a moist ferrous sulphate paper brownevolves | Presence of nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. | No Red Orange is Observed. | Absence of chloride. |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | **Test for halides:** 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | No Characteristic ppt is Observed. | Absence of chloride, bromide, sulphide |
| 11 | **Test with barium chloride:** One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake | No white ppt is formed | Absence of sulphate |
| 12 | **Test with lead acetate:** 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it +1mlof lead acetate | No white ppt is formed | Absence of sulphate |
| 13 | **Brown ring test:** 1ml o f the sodium carbonate extract + dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | A brown ring is formed | Presence of nitrate confirmed. |
| 14 | **Ammonium molybdate test:** 1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of phosphate |
| 15 | **Test with sodium nitrobruside:** 1mlof the sodium carbonate extract + 1ml of dil .aommonia. + few drops of sodium nitrobruside. | No purple or violet colouration appears | Absence of sulphide. |

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| **Preparation of salt solution:**<br>**To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution".** | | | |
| **1** | **GROUP 0**<br>**1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH.** | **No chocolate brown ppt is obtained.** | **Absence of ammonium** |
| **2** | **GROUP I**<br>**Take about 1 ml of the salt solution in a test tube Add about 1mL of dil HCl, and shake it** | **A White ppt is formed.** | **Presence of 1st groupmetal ions ($Pb^{2+}$)** |
| **Analysis of the 1st group ppt:** | | | |
| | **To the ppt add about 1ml of waterandboil it** | **The ppt dissolves** | **Presence of Lead** |



| | | | |
|---|---|---|---|
| **1** | **Test for Lead:**<br>**To one portion of the hot solutionadd about 1ml of $K_2CrO_4$** | **A yellow ppt is obtained** | **Presence of Lead** |
| **2** | **To an another portion of the hot solution add about 1ml of KI. To the yellow ppt add about 1ml of water, boiland cool.** | **A yellow ppt is obtained.The yellow ppt dissolves on boiling , and on cooling golden spangles appear** | **Presence of lead is confirmed.** |

**Result:**
**The Anion Present : NITRATE**
**The cation Present : LEAD**
**The Given simple salt : LEAD NITRATE**

# SYSTEMATIC ANALYSIS OF SIMPLE SALT-II [COPPER SULPHATE]

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Blue | May be coppersulphate |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | Blue Changes into White dueto dehydration | May be coppersulphate |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | Bluish green flame. | Presence of a Coppersalt |
| 4. | **Action of dil. HCl:** Small amount of salt + 1mL of dil.HCl . Gently heat it | No Charactristic gas evolves | Absence of Carbonate,Nitrate, Sulphide |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | No Charactristic gas evolves | Absence of Chloride, Bromide, Nitrate |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube +pinch of $MnO_2$ + Conc. $H_2SO_4$ and gently heat it | No Characteristic Gas is evolved. | Absence of chloride, bromide |
| 7. | **Action of Conc. $H_2SO_4$ and copper turning:** small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | No reddish brown gas evolves | Absence of nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. | No Red Orange Vapour is Observed. | Absence of chloride. |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | **Test for halides:** 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | No Characteristic ppt is Observed. | Absence of chloride, bromide, sulphide |
| 11 | **Test with barium chloride:** One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of barium chloride solution and shake | A white ppt insoluble in dil $H_2SO_4$ is formed | Prsence of sulphate is Confirmed. |
| 12 | **Test with leadacetate:** 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | A whit ppt soluble in excessof ammonium acetate is formed | Presence of sulphate |
| 13 | **Brown ring test:** 1ml of the sodium carbonate extract + dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of Nitrate |
| 14 | **Ammonium molybdate test:** 1 ml of the extract + dil $HNO_3$ + about 1mL each of ammonium molybdate andConc. $HNO_3$ | No canary yellow ppt is formed. | Absence of Phosphate |

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| 15 | Test with sodium nitro bruside:<br>1ml of the sodium carbonate extract<br>+ 1ml of dil. aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |

**Preparation of salt solution:**

**To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution".**



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|---|---|---|---|
| 1 | **GROUP 0**<br>1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | **GROUP I**<br>Take about 1 ml of the salt solution inatest tube Add about 1ml of dil HCl, andshake it | No ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II**<br>To the above solution pass $H_2S$ gas. | A Black ppt is formed | Presence of 2nd groupmetal ions ($Cu^{2+}$) |
| **Analysis of the 2nd group ppt:** | | | |
| 1 | **Test for copper:**<br>i). To one portion of the solution add ammonium hydroxide | No ppt is obtained, but the solution is blue | Presence of Copper |
| 2 | ii) To the blue coloured solution addabout 1ml each of acetic acid and potassium ferro cyanide | A red brown ppt is obtained | Presence of Copper Confirmed |

Result:

The Anion Present The : SULPHATE

cation Present The : COPPER

Given simple salt : COPPER SULPHATE

| SYSTEMATIC ANALYSIS OF SIMPLE SALT-III [COPPER CARBONATE] | | | |
|---|---|---|---|
| **S NO** | **Experiment** | **Observation** | **Inference** |
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Green | May be Copper Carbonate |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | A colourless, odourless gasturning lime water milky evolves | Presence of carbonate |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | Bluish green flame. | Presence of a coppersalt |
| 4. | **Action of dil. HCl:** Small amount of salt + 1mL of dil.HCl . Gently heat it | A colourless, odourless gas evolves as a brisk Effervescenceand turns limewater milky | Presence of carbonateis Confirmed |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | No Charactristic gas evolves | Absence of Chloride, Bromide, Nitrate |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube +pinch of $MnO_2$ + Conc. $H_2SO_4$ and gently heat it | No Characteristic Gas is evolved. | Absence of chloride, bromide |
| 7. | **Action of Conc. $H_2SO_4$ and copper turning:** small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | No reddish brown gas evolves | Absence of nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. | No Red Orange Vapour is Observed. | Absence of chloride. |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | **Test for halides:** 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | No Characteristic ppt is Observed. | Absence of chloride, bromide, sulphide |
| 11 | **Test with barium chloride:** One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of barium chloride solution and shake | No white ppt is obtained | Absence of sulphate |
| 12 | **Test with leadacetate:** 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | No white ppt is obtained | Absence of sulphate |

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| 13 | **Brown ring test:**<br>1ml of the sodium carbonate extract + dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of nitrate |
| 14 | **Ammonium molybdate test:**<br>1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of phosphate |



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| 15 | **Test with sodium nitro bruside:**<br>1ml of the sodium carbonate extract + 1ml of dil. aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |
| **Preparation of salt solution:**<br>To a small amount of salt in a test tube add 2 to 3ml of dil. HCl, shake it and gently heat it. Thissolution is called "original solution". | | | |
| 1 | **GROUP 0**<br>1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | **GROUP I**<br>Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it | No ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II**<br>To the above solution pass $H_2S$ gas. | A Black ppt is formed | Presence of 2nd groupmetal ions ($Cu^{2+}$) |
| **Analysis of the 2nd group ppt:** | | | |
| 1 | **Test for copper:**<br>i). To one portion of the solution add ammonium hydroxide | No ppt is obtained, but the solution is blue | Presence of Copper |
| 2 | ii) To the blue coloured solution addabout 1ml each of acetic acid and potassium ferro cyanide | A red brown ppt is obtained | Presence of Copper Confirmed |

**Result:**

**The Anion Present : CARBONATE**

**The cation Present : COPPER**

**The Given simple salt : COPPER CARBONATE**

| SYSTEMATIC ANALYSIS OF SIMPLE SALT- IV [FERRIC CHLORIDE] | | | |
|---|---|---|---|
| **S NO** | **Experiment** | **Observation** | **Inference** |
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Brown | May be an iron salt |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | No Characteristic ChangeOccurs | Absence of Zinc, Ammonium, Nitrate |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic flame Colour is Observed. | Absence of Copper, Barium, Calcium |
| 4. | **Action of dil. HCl:** Small amount of salt + 1ml of dil. HCl . Gently heat it | No Charactristic gas evolves | Absence of Carbonate,Nitrate, Sulphide |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | A colourless gas evolves. Itgives a dense white fumes when a glass rod dipped inliquid ammonia is brought close to its mouth | Prsence of Chloride |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ andgently heat it | A greenish yellow gas turning starch iodide paper blue evolves | Prsence of Chloride |
| 7. | **Action of Conc. $H_2SO_4$ and copper turning:** small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | No reddish brown gas evolves | Absence of nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three dropsConc. H2SO4.Gently heat it. Pass the vapours into dilute sodiumhydroxide solution. If a yellow solution is obtained, add dil. Acetic acid and leadacetate | A yellow ppt is obtained | Presence of chloride. |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | **Test for halides:** 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | A curdy white ppt insoluble in dil. Ammonia isformed | Presence of chloride |

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|---|---|---|---|
| 11 | **Test with barium chloride:** One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake | No white ppt is obtained | Absence of sulphate |
| 12 | **Test with leadacetate:** 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | No white ppt is obtained | Absence of sulphate |
| 13 | **Brown ring test:** 1mL o f the sodium carbonate extract + dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of nitrate |

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| 14 | Ammonium molybdate test:<br>1 ml of the extract + dil HNO3 + about1mleach of ammonium molybdate and Conc.HNO3 | No canary yellow ppt is formed. | Absence of phosphate |
| 15 | Test with sodium nitrobruside:<br>1ml of the sodium carbonate extract + 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |
| Preparation of salt solution:<br>To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution". | | | |
| 1 | GROUP 0<br>1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | GROUP I<br>Take about 1 ml of the salt solution inatest tube Add about 1ml of dil HCl, andshake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | GROUP II<br>To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | GROUP III To about 1ml of the salt solution add about 1ml each of $NH_4Cl$,$NH_4OH$ and shake it well | A brown ppt is formed | presence of 3rd groupmetal ions ($Fe^{3+}$) |
| Analysis of the 3rd group ppt: | | | |
| 1 | To the ppt add a pinch of sodiumperoxide and boil it | A red or brown ppt is obtained | Presence of Iron |



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| 2 | i.) To one portion of the red ppt addabout1mL of dil HCl and boil it andthen add about 1ml of potassium ferocyanide | A blue ppt is obtained | Presence of Iron is Confirmed |
| 3 | ii.) To an another portion of the pptaddabout 1mL of dil. HNO3<br>boil it and then add about 1ml ofKCNS | A blood red colouration isseen | Presence of Iron is Confirmed |

**Result:**

**The Anion Present : CHLORIDE**

**The cation Present : FERRIC**

**The Given simple salt : FERRIC CHLORIDE**

SYSTEMATIC ANALYSIS OF SIMPLE SALT- V [ALUMINIUM SULPHATE]

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | Analysis of anions | | |
| 1 | Colour: Note the colour of the salt | Colourless | Absence of copper,Iron salts |
| 2. | Action of heat: A small amount of a salt is heated inatest tube | No Characteristic ChangeOccurs | Absence of Zinc, Ammonium, Nitrate |
| 3. | Flame test: Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic flame Colour is Observed. | Absence of Copper, Barium, Calcium |
| 4. | Action of dil. HCl: Small amount of salt + 1ml of dil. HCl . Gently heat it | No Charactristic gas evolves | Absence of Carbonate,Nitrate, Sulphide |
| 5 | Action of Conc.$H_2SO_4$: Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | No Charactristic gas evolves | Absence of Chloride, Bromide, Nitrate |
| 6 | Action of $MnO_2$ and Conc. $H_2SO_4$: Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ andgently heat it | No Characteristic Gas is evolved. | Absence of chloride, bromide |



| | | | |
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| 7. | Action of Conc. $H_2SO_4$ and copper turning: small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | No reddish brown gas evolves | Absence of nitrate. |
| 8. | Action of dil. NaOH solution: Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | Chromyl chloride test: Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. | No Red Orange Vapour is Observed. | Absence of chloride. |
| Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract<br>Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | Test for halides: 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | No Characteristic ppt is Obtained. | Absence of chloride, bromide, sulphide |
| 11 | Test with barium chloride: One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake | A white ppt insoluble in dil $H_2SO_4$ is formed | Prsence of sulphate is Confirmed. |
| 12 | Test with leadacetate: 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | A whit ppt soluble in excessof ammonium acetate is formed | Presence of sulphate |
| 13 | Brown ring test: 1ml o f the sodium carbonate extract + dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of nitrate |

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| 14 | Ammonium molybdate test:<br>1 ml of the extract + dil HNO3 + about1ml each of ammonium molybdate and Conc.HNO3 | No canary yellow ppt is formed. | Absence of phosphate |
| 15 | Test with sodium nitrobruside:<br>1ml of the sodium carbonate extract + 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |



**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution".

| | | | |
|---|---|---|---|
| 1 | GROUP 0<br>1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | GROUP I<br>Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | GROUP II<br>To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | GROUP III<br>To about 1ml of the salt solution add about 1ml each of NH4Cl and NH4OHandshake it well | A gelatinous white ppt is formed | Presence of 3rd groupmetal ion ($Al^{3+}$) |

**Analysis of the 3rd group ppt:**

| | | | |
|---|---|---|---|
| 1 | Test for Aluminium:<br>To the ppt add a pinch of sodiumperoxide and boil it | A colourless solution is obtained | Presence of Aluminium |
| 2 | To the colourless solution adddil.HCl and shake it | A gelatinous white ppt is obtained | Presence of Aluminiumis Confirmed |

**Result:**

The Anion Present : SULPHATE
The cation Present : ALUMINIUM
The Given simple salt : ALUMINIUM SULPHATE

SYSTEMATIC ANALYSIS OF SIMPLE SALT- VI [ALUMINIUM NITRATE]

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | Analysis of anions | | |
| 1 | Colour:<br>Note the colour of the salt | Colourless | Absence of copper,Iron salts |
| 2. | Action of heat:<br>A small amount of a salt is heated inatest tube | A reddish brown gas with afishy odour evolves | Presence of a nitratesalt |
| 3. | Flame test:<br>Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic flame Colour is Observed. | Absence of Copper, Barium, Calcium |



| | | | |
|---|---|---|---|
| 4. | Action of dil. HCl:<br>Small amount of salt + 1ml of dil. HCl . Gently heat it | A reddish brown gas with thefishy odour turning a moist ferrous sulphate paper brownevolves | Presence of nitrate |
| 5 | Action of Conc.$H_2SO_4$:<br>Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | Reddish brown gas turning acidified ferrous sulphate paper green evolves. | Presence of nitrate |
| 6 | Action of $MnO_2$ and Conc. $H_2SO_4$:<br>Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ andgently heat it | No Characteristic Gas is evolved. | Absence of chloride, bromide |
| 7. | Action of Conc. $H_2SO_4$ and copper turning:<br>small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | A reddish brown gas with fishyodour turning a moist ferrous sulphate paper brownevolves | Presence of nitrate |
| 8. | Action of dil. NaOH solution: Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | Chromyl chloride test:<br>Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. | No Red Orange Vapour is Observed. | Absence of chloride. |
| Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract<br>Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | Test for halides:<br>1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | No Characteristic ppt is Obtained. | Absence of chloride, bromide, sulphide |
| 11 | Test with barium chloride: One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake | No white ppt is obtained | Absence of sulphate |
| 12 | Test with leadacetate:<br>1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it +1mlof Lead Acetate | No white ppt is obtained | Absence of sulphate |



| | | | |
|---|---|---|---|
| 13 | Brown ring test:<br>1ml of the sodium carbonate extract + dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | A brown ring is formed | Presence of nitrate confirmed |

| | | | |
|---|---|---|---|
| 14 | **Ammonium molybdate test:**<br>1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of Phosphate |
| 15 | **Test with sodium nitrobruside:**<br>1ml of the sodium carbonate extract + 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |
| **Preparation of salt solution:**<br>To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution". | | | |
| 1 | **GROUP 0**<br>1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | **GROUP I**<br>Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II**<br>To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | **GROUP III** To about 1ml of the salt solution add about1ml each of $NH_4Cl$ and $NH_4OH$and shake it well | A gelatinous white ppt is formed | Presence of 3rd groupmetal ion ($Al^{3+}$) |
| **Analysis of the 3rd group ppt:** | | | |
| 1 | **Test for Aluminium:**<br>To the ppt add a pinch of sodiumperoxide and boil it | A colourless solution is obtained | Presence of Aluminium |
| 2 | To the colourless solution adddil.HCl and shake it | A gelatinous white ppt is obtained | Presence of Aluminiumis Confirmed |

**Result:**

The Anion Present : NITRATE The
cation Present : ALUMINIUM
The Given simple salt : ALUMINIUM NITRATE

## SYSTEMATIC ANALYSIS OF SIMPLE SALT- VII [ZINC SULPHATE]

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Colourless | Absence of copper,Iron salts |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | Salt is Yellow when hot,White when cold | May be a zinc salt |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic flame Colour is Observed. | Absence of Copper, Barium, Calcium |
| 4. | **Action of dil. HCl:** Small amount of salt + 1ml of dil. HCl . Gently heat it | No Charactristic gas evolves | Absence of Carbonate,Nitrate, Sulphide |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | No Charactristic gas evolves | Absence of Chloride, Bromide, Nitrate |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ andgently heat it | No Characteristic Gas is evolved. | Absence of chloride, bromide |
| 7. | **Action of Conc. $H_2SO_4$ and copper turning:** small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | No reddish brown gas evolves | Absence of nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. | No Red Orange Vapour is Observed. | Absence of chloride. |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | **Test for halides:** 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | No Characteristic ppt is Obtained. | Absence of chloride, bromide, sulphide |
| 11 | **Test with barium chloride:** One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake | A white ppt insoluble in dil $H_2SO_4$ is formed | Prsence of sulphate is Confirmed. |
| 12 | **Test with leadacetate:** 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | A whit ppt soluble in excessof ammonium acetate is formed | Presence of sulphate |

| | | | |
|---|---|---|---|
| 13 | **Brown ring test:**<br>1ml o f the sodium carbonate extract + dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of Nitrate |
| 14 | **Ammonium molybdate test:**<br>1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of Phosphate |
| 15 | **Test with sodium nitrobruside:**<br>1ml of the sodium carbonate extract + 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |
| **Preparation of salt solution:**<br>To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution". | | | |
| 1 | **GROUP 0**<br>1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | **GROUP I**<br>Take about 1 ml of the salt solution in a test tube Add about 1mL of dil HCl, and shake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II**<br>To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | **GROUP III** To about 1ml of the salt solution add about 1ml each of $NH_4Cl$and$NH_4OH$ and shake it well | No ppt is obtained | Absence of 3rd group metal ions ($Al^{3+}$ / $Fe^{3+}$) |



| | | | |
|---|---|---|---|
| | **GROUP IV** To the above solutionpass ($H_2S$) gas | A dirty white ppt is obtained | Presence of 4 th groupmetal ion ($Zn^{2+}$) |
| **Analysis of the 4th group ppt:** | | | |
| 1 | **Test for Zinc:**<br>To the ppt add dil HCl and boil it | The ppt dissolves | Presence of Zinc |
| 2 | To the 1 ml of Original solution adddil.NaOH in drops to excess | White Ppt Soluble in excessNaOH is Obtained | Presence of Zinc is Confirmed |
| 3 | To the 1 ml of Original solution add 2ml $K_4[Fe(CN)_6]$ solution | White Ppt Soluble in excessNaOH, insoluble in dilute acids, is Obtained | Presence of Zinc is Confirmed |

**Result:**

**The Anion Present : SULPHATE**
**The cation Present : ZINC**
**The Given simple salt : ZINC SULPHATE**

WISH U ALL SUCCESS IN XII STD COMMON PUBLIC EXAMINATION
BY C.A. RAJ
GHSS KALLUR PUDUKOTTAI DT CELL9442879936

**SYSTEMATIC ANALYSIS OF SIMPLE SALT- VIII [[ZINC SULPHIDE]**

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Colourless | Absence of copper,Iron salts |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | Salt is Yellow when hot,White when cold | May be a zinc salt |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic flameColour is Observed. | Absence of Copper, Barium, Calcium |
| 4. | **Action of dil. HCl:** Small amount of salt + 1ml of dil. HCl . Gently heat it | egg smell turning a paperdipped in lead acetate shining black evolves | Presence of sulphide is Confirmed |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | No Charactristic gas evolves | Absence of Chloride, Bromide, Nitrate |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ and gently heat it | No Characteristic Gas isevolved. | Absence of chloride, bromide |
| **7.** | **Action of Conc. $H_2SO_4$ and copper turning:** **small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it** | **No reddish brown gas evolves** | **Absence of nitrate.** |
| **8.** | **Action of dil. NaOH solution: Small amont of a salt + dil.NaOH solution andgently heat it.** | **No Characteristic gas is Observed.** | **Absence of ammoniumsalt** |
| **9** | **Chromyl chloride test: Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it.** | **No Red Orange Vapour is Observed.** | **Absence of chloride.** |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** **Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract.** | | | |
| **10.** | **Test for halides: 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it** | **A black ppt is formed** | **Presence of sulphide** |
| **11** | **Test with barium chloride: One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake** | **No white ppt is obtained** | **Absence of sulphate** |

| | | | |
|---|---|---|---|
| 12 | **Test with lead acetate:**<br>1ml of the sodium carbonate extract,<br>+ 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | No white ppt is obtained | Absence of sulphate |
| 13 | **Brown ring test:**<br>1ml o f the sodium carbonate extract<br>+ dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of nitrate |
| 14 | **Ammonium molybdate test:**<br>1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of phosphate |
| 15 | **Test with sodium nitrobruside:**<br>1ml of the sodium carbonate extract<br>+ 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | A purple or violet colouration appears | Prsence of sulphide. |



**Preparation of salt solution:**

To a small amount of salt in a test tube, add 3ml of dil.HCl + dil.$HNO_3$, shake it and gently heat it.This solution is called "original solution".

| | | | |
|---|---|---|---|
| 1 | **GROUP 0**<br>1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | **GROUP I**<br>Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II**<br>To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | **GROUP III** To about 1ml of the salt solution add about 1ml each of $NH_4Cl$and$NH_4OH$ and shake it well | No ppt is obtained | Absence of 3rd group metal ions ($Al^{3+}$ / $Fe^{3+}$) |
| | **GROUP IV** To the above solutionpass ($H_2S$) gas | A dirty white ppt is obtained | Presence of 4 th groupmetal ion ($Zn^{2+}$) |

**Analysis of the 4th group ppt:**

| | | | |
|---|---|---|---|
| 1 | **Test for Zinc:**<br>To the ppt add dil HCl and boil it | The ppt dissolves | Presence of Zinc |
| 2 | To the 1 ml of Original solution adddil.NaOH in drops to excess | White Ppt Soluble in excessNaOH is Obtained | Presence of Zinc is Confirmed |
| 3 | To the 1 ml of Original solution add 2ml $K_4[Fe(CN)_6]$ solution | White Ppt Soluble in excessNaOH, insoluble in dilute acids, is Obtained | Presence of Zinc is Confirmed |

**Result:**

The Anion Present : SULPHIDE
The cation Present : ZINC
The Given simple salt : ZINC SULPHIDE

SYSTEMATIC ANALYSIS OF SIMPLE SALT- IX[CALCIUM CARBONATE]

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | Analysis of anions | | |
| 1 | Colour:<br>Note the colour of the salt | Colourless | Absence of copper,Iron salts |
| 2. | Action of heat:<br>A small amount of a salt is heated inatest tube | A colourless, odourless gasturning lime water milky evolves | Presence of carbonate |
| 3. | Flame test:<br>Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | Brick red Colour is Observed. | Presence of a calciumsalt |
| 4. | Action of dil. HCl:<br>Small amount of salt + 1ml of dil. HCl<br>. Gently heat it | A colourless, odourless gas evolves as a brisk Effervescenceand turns limewater milky | Presence of carbonateis Confirmed |
| 5 | Action of Conc.$H_2SO_4$:<br>Small amount of a salt in a dry test tube<br>+ Conc. $H_2SO_4$ and gently heatit | No Charactristic gas evolves | Absence of Chloride, Bromide, Nitrate |
| 6 | Action of $MnO_2$ and Conc. $H_2SO_4$:<br>Small amount of salt in a dry test tube<br>+ pinch of $MnO_2$ + Conc.$H_2SO_4$ andgently heat it | No Characteristic Gas is evolved. | Absence of chloride, bromide |
| 7. | Action of Conc. $H_2SO_4$ and copper turning:<br>small amount of salt in a drytesttube + few copper turnings<br>+ Conc. $H_2SO_4$. Gently heat it | No reddish brown gas evolves | Absence of nitrate. |
| 8. | Action of dil. NaOH solution: Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | Chromyl chloride test:<br>Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. | No Red Orange Vapour is Observed. | Absence of chloride. |
| Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract<br>Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | Test for halides:<br>1 ml of sodium carbonate extract<br>+dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | No Characteristic ppt is Obtained. | Absence of chloride, bromide, sulphide |
| 11 | Test with barium chloride: One ml of the sodium carbonateextract<br>+ dil. Aceticacid + 1ml of bariumchloride solution and shake | No white ppt is obtained | Absence of sulphate |

| | | | |
|---|---|---|---|
| 12 | **Test with leadacetate:**<br>1ml of the sodium carbonate extract,<br>+ 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | No white ppt is obtained | Absence of sulphate |
| 13 | **Brown ring test:**<br>1ml of the sodium carbonate extract<br>+ dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of nitrate |
| 14 | **Ammonium molybdate test:**<br>1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of phosphate |
| 15 | **Test with sodium nitrobruside:**<br>1ml of the sodium carbonate extract<br>+ 1ml of dil .aommonia + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |
| **Preparation of salt solution:**<br>To a small amount of salt in a test tube add 2 to 3ml of dil.HCl, shake it and gently heat it. Thissolution is called "original solution". | | | |
| 1 | **GROUP 0**<br>1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | **GROUP I**<br>Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II**<br>To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | **GROUP III** To about 1ml of the salt solution add about 1ml each of $NH_4Cl$,$NH_4OH$ and shake it well | No ppt is obtained | Absence of 3rd group metal ions ($Al^{3+}$ / $Fe^{3+}$) |
| 5 | **GROUP IV** To the above solutionpass ($H_2S$) gas | No dirty white ppt is obtained | Absence of 4 th groupmetal ion ($Zn^{2+}$) |
| 6 | **GROUP V** To the salt solution add1mleach of $NH_4Cl$, $NH_4OH$ and $(NH_4)_2CO_3$ and shake it well. | A white ppt is obtained | Presence of 5th groupmetal ions ($Ba^{2+}$/ $Ca^{2+}$) |

| | | | |
|---|---|---|---|
| **Analysis of the 5th group ppt:** | | | |
| 1 | To the ppt add about 1ml of dil.acetic acid and gently heat it. | The ppt dissolves. | Presence of (Ba2+/Ca2+) |
| 2 | **Test for Calcium**<br>To the solution add about 1ml of ammonium sulphate | A white ppt is obtained. Filter.To the residue add a drop of Conc. HCl. Take the residue and introduce near the Bunsen flame.A crimsonred colour is seen | Presence of Calcium is Confirmed |
| | | If no ppt is obtained, to the solution add about 1ml of potassium ferrocyanide andshake it. A pale yellow ppt appears. | Presence of Calcium is Confirmed |

**Result:**

The Anion Present : CARBONATE
The cation Present : CALCIUM
The Given simple salt : CALCIUM CARBONATE

**SYSTEMATIC ANALYSIS OF SIMPLE SALT- X [BARIUM CHLORIDE]**

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Colourless | Absence of copper,Iron salts |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | No Characteristic ChangeOccurs | Absence of Zinc, Ammonium, Nitrate |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | Apple green Colour is Observed. | Presence of Bariumsalt |
| 4. | **Action of dil. HCl:** Small amount of salt + 1ml of dil. HCl . Gently heat it | No Charactristic gas evolves | Absence of Carbonate,Nitrate, Sulphide |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | A colourless gas evolves. Itgives a dense white fumes when a glass rod dipped inliquid ammonia is brought close to its mouth | Prsence of Chloride |



| | | | |
|---|---|---|---|
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ andgently heat it | A greenish yellow gas turning starch iodide paper blue evolves | Prsence of Chloride |
| 7. | **Action of Conc. $H_2SO_4$ and copper turning:** small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | No reddish brown gas evolves | Absence of Nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. Pass the vapours into dilute sodiumhydroxide solution. If a yellow solution is obtained, add dil. Acetic acid and leadacetate | A yellow ppt is obtained | Presence of chloride. |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | **Test for halides:** 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | A curdy white ppt insoluble in dil. Ammonia isformed | Presence of chloride |
| 11 | **Test with barium chloride:** One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake | No white ppt is obtained | Absence of sulphate |

| | | | |
|---|---|---|---|
| 12 | **Test with leadacetate:**<br>1ml of the sodium carbonate extract,<br>+ 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | No white ppt is obtained | Absence of sulphate |
| 13 | **Brown ring test:**<br>1ml of the sodium carbonate extract<br>+ dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of Nitrate |

| | | | |
|---|---|---|---|
| 14 | **Ammonium molybdate test:**<br>1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of Phosphate |
| 15 | **Test with sodium nitrobruside:**<br>1ml of the sodium carbonate extract<br>+ 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |
| **Preparation of salt solution:**<br>To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution". | | | |
| 1 | **GROUP 0**<br>1ml of the original salt solution add about 1mL each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | **GROUP I**<br>Take about 1 ml of the salt solution in a test tube Add about 1mL of dil HCl, and shake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II**<br>To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | **GROUP III** To about 1ml of the salt solution add about 1ml each of $NH_4Cl$,$NH_4OH$ and shake it well | No ppt is obtained | Absence of 3rd group metal ions ($Al^{3+}$ / $Fe^{3+}$) |
| 5 | **GROUP IV** To the above solutionpass ($H_2S$) gas | No dirty white ppt is obtained | Absence of 4 th groupmetal ion ($Zn^{2+}$) |
| 6 | **GROUP V** To the salt solution add1mleach of $NH_4Cl$, $NH_4OH$ and $(NH_4)_2CO_3$ and shake it well. | A white ppt is obtained | Presence of 5th groupmetal ions ($Ba^{2+}$/ $Ca^{2+}$) |
| **Analysis of the 5th group ppt:** | | | |
| 1 | To the ppt add about 1ml of dil.acetic acid and gently heat it. | The ppt dissolves. | Presence of ($Ba^{2+}$/$Ca^{2+}$) |

| | | | |
|---|---|---|---|
| 2 | **Test for Barium.**<br>To the solution add about 1ml of potassium chromate | A yellow ppt is obtained. Filter To the residue add adrop of Conc. HCl. Take aportion of the paste and introduce near the Bunsen flame. A transient green is imparted to the flame | Presence of Barium is Confirmed |

**Result:**

The Anion Present : CHLORIDE
The cation Present : BARIUM
The Given simple salt : BARIUM CHLORIDE

**SYSTEMATIC ANALYSIS OF SIMPLE SALT- XII [MAGNESIUM PHOSPHATE]**

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Colourless | Absence of copper,Iron salts |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | No Characteristic ChangeOccurs | Absence of Zinc, Ammonium, Nitrate |



| | | | |
|---|---|---|---|
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic flame Colour is Observed. | Absence of Copper, Barium, Calcium |
| 4. | **Action of dil. HCl:** Small amount of salt + 1ml of dil. HCl . Gently heat it | No Charactristic gas evolves | Absence of Carbonate,Nitrate, Sulphide |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | No Charactristic gas evolves | Absence of Chloride, Bromide, Nitrate |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ andgently heat it | No Characteristic Gas is evolved. | Absence of chloride, bromide |
| 7. | **Action of Conc. $H_2SO_4$ and copper turning:** small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | No reddish brown gas evolves | Absence of nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution andgently heat it. | No Characteristic gas is Observed. | Absence of ammoniumsalt |
| 9 | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. | No Red Orange Vapour is Observed. | Absence of chloride. |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | **Test for halides:** 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | No Characteristic ppt is Obtained. | Absence of chloride, bromide, sulphide |
| 11 | **Test with barium chloride:** One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake | No white ppt is obtained | Absence of sulphate |

| | | | |
|---|---|---|---|
| 12 | **Test with leadacetate:**<br>1ml of the sodium carbonate extract,<br>+ 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | No white ppt is obtained | Absence of sulphate |
| 13 | **Brown ring test:**<br>1ml of the sodium carbonate extract<br>+ dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of nitrate |
| 14 | **Ammonium molybdate test:**<br>1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | Canary yellow ppt is formed. | Presence of Phosphateis Confirmed |
| 15 | **Test with sodium nitrobruside:**<br>1ml of the sodium carbonate extract<br>+ 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |

**Preparation of salt solution:**

To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution".

| | | | |
|---|---|---|---|
| 1 | **GROUP 0**<br>1ml of the original salt solution add about 1mL each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | **GROUP I**<br>Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II**<br>To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | **GROUP III** To about 1ml of the salt solution add about 1ml each of $NH_4Cl$and$NH_4OH$ and shake it well | No ppt is obtained | Absence of 3rd group metal ions ($Al^{3+}$ / $Fe^{3+}$) |
| 5 | **GROUP IV** To the above solutionpass ($H_2S$) gas | No dirty white ppt is obtained | Absence of 4 th groupmetal ion ($Zn^{2+}$) |
| 6 | **GROUP V** To the salt solution add1mleach of $NH_4Cl$, $NH_4OH$ and $(NH_4)_2CO_3$ and shake it well. | No white ppt is obtained | Absence of 5th group metal ions ($Ba^{2+}$/ $Ca^{2+}$) |

| | | | |
|---|---|---|---|
| 7 | **GROUP VI** To the original salt solutionadd 1ml each of $NH_4Cl$, $NH_4OH$ and $NH_4H_2PO_4$, and scratchthe sides of thetest tube. | A white ppt is obtained. | Presence of 6th groupmetal ion $Mg^{2+}$ |
| **Analysis of the 6th group ppt:** | | | |
| 2 | **Test for Magnesium:** i)To about 1mlofthe original salt solution add dil.<br>NaOH in drops with shaking. | White Ppt insoluble in excessNaOH is Obtained | Presence of Magnesium is Confirmed |
| 3 | ii)To about 1ml of the original salt solution add about 1ml of Magnesonreagent. | A blue ppt is formed. | Presence of Magnesium is Confirmed |

**Result:**

The Anion Present : PHOSPHATEThe

cation Present : MAGNESIUM

The Given simple salt : MAGNESIUM PHOSPHATE

**SYSTEMATIC ANALYSIS OF SIMPLE SALT- XIII[MAGNESIUM CARBONATE]**

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Colourless | Absence of copper,Iron salts |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | A colourless, odourless gasturning lime water milky evolves | Presence of carbonate |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic flameColour is Observed. | Absence of Copper, Barium, Calcium |
| 4. | **Action of dil. HCl:** Small amount of salt + 1ml of dil. HCl . Gently heat it | A colourless, odourless gas evolves as a brisk Effervescenceand turns limewater milky | Presence of carbonateis Confirmed |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | No Charactristic gas evolves | Absence of Chloride, Bromide, Nitrate |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ and gently heat it | No Characteristic Gas isevolved. | Absence of chloride, bromide |
| **7.** | **Action of Conc. $H_2SO_4$ and copper turning: small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it** | **No reddish brown gas evolves** | **Absence of nitrate.** |
| **8.** | **Action of dil. NaOH solution: Small amont of a salt + dil.NaOH solution andgently heat it.** | **No Characteristic gas is Observed.** | **Absence of ammoniumsalt** |
| **9** | **Chromyl chloride test: Small amount of salt in + a pinch of potassium dichromate and three drops Conc. $H_2SO_4$.Gently heat it.** | **No Red Orange Vapour is Observed.** | **Absence of chloride.** |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** **Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract.** | | | |
| **10.** | **Test for halides: 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it** | **No Characteristic ppt is Obtained.** | **Absence of chloride, bromide, sulphide** |
| **11** | **Test with barium chloride: One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake** | **No white ppt is obtained** | **Absence of sulphate** |
| **12** | **Test with leadacetate: 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1mlof Lead Acetate** | **No white ppt is obtained** | **Absence of sulphate** |

| | | | |
|---|---|---|---|
| 13 | **Brown ring test:** 1ml of the sodium carbonate extract + dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of Nitrate |
| 14 | **Ammonium molybdate test:** 1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of Phosphate |
| 15 | **Test with sodium nitrobruside:** 1ml of the sodium carbonate extract + 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |
| **Preparation of salt solution:** To a small amount of salt in a test tube add 2 to 3ml of dil.HCl, shake it and gently heat it. Thissolution is called "original solution". | | | |
| 1 | **GROUP 0** 1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |
| 2 | **GROUP I** Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II** To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | **GROUP III** To about 1ml of the salt solution add about 1ml each of $NH_4Cl$and$NH_4OH$ and shake it well | No ppt is obtained | Absence of 3rd group metal ions ($Al^{3+}$ / $Fe^{3+}$) |
| 5 | **GROUP IV** To the above solutionpass ($H_2S$) gas | No dirty white ppt is obtained | Absence of 4 th groupmetal ion ($Zn^{2+}$) |
| 6 | **GROUP V** To the salt solution add1mleach of $NH_4Cl$, $NH_4OH$ and $(NH_4)_2CO_3$ and shake it well. | No white ppt is obtained | Absence of 5th group metal ions ($Ba^{2+}$/ $Ca^{2+}$) |
| 7 | **GROUP VI** To the original salt solutionadd 1ml each of $NH_4Cl$, $NH_4OH$ and $NH_4H_2PO_4$, and scratchthe sides of thetest tube. | A white ppt is obtained. | Presence of 6th groupmetal ion $Mg^{2+}$ |
| **Analysis of the 6th group ppt:** | | | |
| 2 | **Test for Magnesium:** i)To about 1mlofthe original salt solution add dil. NaOH in drops with shaking. | White Ppt insoluble in excessNaOH is Obtained | Presence of Magnesium is Confirmed |
| 3 | ii)To about 1ml of the original salt solution add about 1ml of Magnesonreagent. | A blue ppt is formed. | Presence of Magnesium is Confirmed |

**Result:**

**The Anion Present : CARBONATE**
**The cation Present : MAGNESIUM**
**The Given simple salt : MAGNESIUM CARBONATE**

**SYSTEMATIC ANALYSIS OF SIMPLE SALT- XIV [AMMONIUMCHLORIDE]**

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Colourless | Absence of copper,Iron salts |
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | A colourless gas with the pungent small turning red litmuspaper into blue evolves. It givesa dense white fumes when a glass roddipped in Conc. HCl isbrought close to its mouth | Presence of an ammonium salt |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic flame Colour is Observed. | Absence of Copper, Barium, Calcium |
| 4. | **Action of dil. HCl:** Small amount of salt + 1ml of dil. HCl . Gently heat it | No Charactristic gas evolves | Absence of Carbonate,Nitrate, Sulphide |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | A colourless gas evolves. Itgives a dense white fumes when a glass rod dipped inliquid ammonia is brought close to its mouth | Prsence of Chloride |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ and gently heat it | A greenish yellow gas turning starch iodide paper blue evolves | Prsence of Chloride |
| 7. | **Action of Conc. $H_2SO_4$ and copper turning:** small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | No reddish brown gasevolves | Absence of nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution andgently heat it. | A colourless gas with the pun gent smell giving dense white fumes with a glass rod dipped in dil. HCl evolves | Presence of ammoniumsalt |
| 9 | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. Pass the vapours into dilute sodiumhydroxide solution. If a yellow solution is obtained, add dil. Acetic acid and leadacetate | A yellow ppt is obtained | Presence of chloride. |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | **Test for halides:** 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | A curdy white ppt insoluble in dil. Ammonia isformed | Presence of chloride |

| | | | |
|---|---|---|---|
| 11 | **Test with barium chloride:** One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake | No white ppt is obtained | Absence of sulphate |
| 12 | **Test with leadacetate:** 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | No white ppt is obtained | Absence of sulphate |
| 13 | **Brown ring test:** 1ml of the sodium carbonate extract + dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of nitrate |
| 14 | **Ammonium molybdate test:** 1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of phosphate |
| 15 | **Test with sodium nitrobruside:** 1ml of the sodium carbonate extract + 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |
| **Preparation of salt solution:** To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution". | | | |

| | | | |
|---|---|---|---|
| 1 | **GROUP 0** 1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | A chocolate brown ppt is obtained. | Presence of 0 group metal ion ($NH_4^+$) |
| 2 | **GROUP I** Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II** To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |
| 4 | **GROUP III** To about 1ml of the salt solution add about 1ml each of $NH_4Cl$,$NH_4OH$ and shake it well | No ppt is obtained | Absence of 3rd group metal ions ($Al^{3+}$ / $Fe^{3+}$) |
| 5 | **GROUP IV** To the above solutionpass ($H_2S$) gas | No dirty white ppt is obtained | Absence of 4 th groupmetal ion ($Zn^{2+}$) |
| 6 | **GROUP V** To the salt solution add1mleach of $NH_4Cl$, $NH_4OH$ and $(NH_4)_2CO_3$ and shake it well. | No white ppt is obtained | Absence of 5th group metal ions ($Ba^{2+}$/ $Ca^{2+}$) |
| 7 | **GROUP VI** To the original salt solutionadd 1ml each of $NH_4Cl$, $NH_4OH$ and $NH_4H_2PO_4$, and scratchthe sides of thetest tube. | No white ppt is obtained. | Absence of 6th groupmetal ion ($Mg^{2+}$) |
| **Analysis of the Ammonium** | | | |
| 1 | To 1ml of the original salt solutionadd about 1ml each of Nessler's reagent and NaOH. | A chocolate brown ppt is obtained. | Presence of Ammonium is Confirmed |
| **Result:** The Anion Present : CHLORIDE<br>The cation Present : AMMONIUM<br>The Given simple salt : AMMONIUM CHLORIDE | | | |

**SYSTEMATIC ANALYSIS OF SIMPLE SALT- XV[AMMONIUM BROMIDE]**

| S NO | Experiment | Observation | Inference |
|---|---|---|---|
| | **Analysis of anions** | | |
| 1 | **Colour:** Note the colour of the salt | Colourless | Absence of copper,Iron salts |



| | | | |
|---|---|---|---|
| 2. | **Action of heat:** A small amount of a salt is heated inatest tube | A colourless gas with the pungent small turning red litmuspaper into blue evolves. It givesa dense white fumes when a glass roddipped in Conc. HCl isbrought close to its mouth | Presence of an ammonium salt |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take thepaste at thecharred end of the splinter and introduce it near the Bunsen flame | No Characteristic flame Colour is Observed. | Absence of Copper, Barium, Calcium |
| 4. | **Action of dil. HCl:** Small amount of salt + 1ml of dil. HCl . Gently heat it | No Charactristic gas evolves | Absence of Carbonate,Nitrate, Sulphide |
| 5 | **Action of Conc.$H_2SO_4$:** Small amount of a salt in a dry test tube + Conc. $H_2SO_4$ and gently heatit | A reddish brown gas turning moist fluorescein paper greenevolves | Prsence of Bromide |
| 6 | **Action of $MnO_2$ and Conc. $H_2SO_4$:** Small amount of salt in a dry test tube + pinch of $MnO_2$ + Conc.$H_2SO_4$ andgently heat it | A reddish brown gas turningmoist fluorescein paper red evolves | Prsence of Bromide |
| 7. | **Action of Conc. $H_2SO_4$ and copper turning:** small amount of salt in a drytesttube + few copper turnings + Conc. $H_2SO_4$. Gently heat it | No reddish brown gas evolves | Absence of nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution andgently heat it. | A colourless gas with the pungent smell giving densewhite fumes with a glass rod dipped in dil.HCl evolves | Presence of ammoniumsalt |
| 9 | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three dropsConc. $H_2SO_4$.Gently heat it. | No Red Orange Vapour is Observed. | Absence of chloride. |
| **Analysis with Sodium carbonate extract Preparation ofSodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solutionfor fewmins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10 | **Test for halides:** 1 ml of sodium carbonate extract +dil. $HNO_3$ + 1ml of $AgNO_3$, andshake it | A pale yellow ppt sparingly soluble in ammonia is formed | Presence of Bromide is Confirmed |
| 11 | **Test with barium chloride:** One ml of the sodium carbonateextract + dil. Aceticacid + 1ml of bariumchloride solution and shake | No white ppt is obtained | Absence of sulphate |

| | | | |
|---|---|---|---|
| 12 | **Test with leadacetate:**<br>1ml of the sodium carbonate extract,<br>+ 1ml of dil acetic acid and heat it + 1mlof Lead Acetate | No white ppt is obtained | Absence of sulphate |
| 13 | **Brown ring test:**<br>1ml of the sodium carbonate extract<br>+ dil.$H_2SO_4$ + freshly prepared ferrous sulphate solution then add Conc. $H_2SO_4$along the sides of thetest tube. | No brown ring is formed | Absence of nitrate |
| 14 | **Ammonium molybdate test:**<br>1 ml of the extract + dil $HNO_3$ + about1ml each of ammonium molybdate and Conc.$HNO_3$ | No canary yellow ppt is formed. | Absence of phosphate |
| 15 | **Test with sodium nitro bruside:**<br>1ml of the sodium carbonate extract<br>+ 1ml of dil .aommonia. + few dropsofsodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |
| **Preparation of salt solution:**<br>To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. Thissolution is called "original solution". | | | |
| 1 | **GROUP 0**<br>1ml of the original salt solution add about 1ml each of Nessler's reagentandNaOH. | A chocolate brown ppt is obtained. | Presence of 0 groupmetal ion ($NH_4^+$) |
| 2 | **GROUP I**<br>Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it | No White ppt is formed. | Absence of 1st groupmetal ions ($Pb^{2+}$) |
| 3 | **GROUP II**<br>To the above solution pass $H_2S$ gas. | No Black ppt is formed | Absence of 2nd groupmetal ions ($Cu^{2+}$) |

| | | | |
|---|---|---|---|
| 4 | **GROUP III** To about 1ml of the salt solution add about 1ml each of $NH_4Cl$,$NH_4OH$ and shake it well | No ppt is obtained | Absence of 3rd group metal ions ($Al^{3+}$ / $Fe^{3+}$) |
| 5 | **GROUP IV** To the above solutionpass ($H_2S$) gas | No dirty white ppt is obtained | Absence of 4 th groupmetal ion ($Zn^{2+}$) |
| 6 | **GROUP V** To the salt solution add1mleach of $NH_4Cl$, $NH_4OH$ and $(NH_4)_2CO_3$ and shake it well. | No white ppt is obtained | Absence of 5th group metal ions ($Ba^{2+}$, $Ca^{2+}$) |
| 7 | **GROUP VI** To the original salt solutionadd 1ml each of $NH_4Cl$, $NH_4OH$ and $NH_4H_2PO_4$, and scratchthe sides of thetest tube. | No white ppt is obtained. | Absence of 6th groupmetal ion ($Mg^{2+}$) |
| **Analysis of the Ammonium** | | | |
| 1 | To 1ml of the original salt solutionadd about 1ml each of Nessler's reagent and NaOH. | A chocolate brown ppt is obtained. | Presence of Ammonium is Confirmed |

**Result:**

**The Anion Present : BROMIDE The**
**cation Present : AMMONIUM**
**The Given simple salt : AMMONIUM BROMIDE**

MAGNESIUMSULPHATE
**(SALT NO 11)**

| | Experiment | Observation | Inference |
|---|---|---|---|
| **Analysis of anions** | | | |
| 1 | **Colour:** Note the colour of the salt | Colourless | Absence of copper, Iron salts |
| 2. | **Action of heat:** A small amount of a salt is heated in a test tube | No Characteristic Change Occurs | Absence of Zinc, Ammonium, Nitrate |
| 3. | **Flame test:** Small amount of salt + A drop of Conc. HCl ,form a paste. Take the paste at the charred end of the splinter and introduce it near the Bunsen flame | No Characteristic flame Colour is Observed. | Absence of Copper, Barium, Calcium |
| 4. | **Action of dil. HCl:** Small amount of salt + 1ml of dil. HCl . Gently heat it | No Charactristic gas evolves | Absence of Carbonate,Nitrate, Sulphide |
| 5 | **Action of Conc.H2SO4:** Small amount of a salt in a dry test tube + Conc. H2SO4 and gently heat it | No Charactristic gas evolves | Absence of Chloride, Bromide, Nitrate |
| 6 | **Action of MnO2 and Conc. H2SO4:** Small amount of salt in a dry test tube + pinch of MnO2 + Conc.H2SO4 and gently heat it | No Characteristic Gas is evolved. | Absence of chloride, bromide |
| 7. | **Action of Conc. H2SO4 and copper turning:** small amount of salt in a dry test tube + few copper turnings + Conc. H2SO4. Gently heat it | No reddish brown gas evolves | Absence of nitrate. |
| 8. | **Action of dil. NaOH solution:** Small amont of a salt + dil.NaOH solution and gently heat it. | No Characteristic gas is Observed. | Absence of ammonium salt |
| | **Chromyl chloride test:** Small amount of salt in + a pinch of potassium dichromate and three drops Conc. H2SO4.Gently heat it. | No Red Orange Vapour is Observed. | Absence of chloride. |
| **Analysis with Sodium carbonate extract Preparation of Sodium carbonate extract** Take 1g of the given salt + 3g of solid sodium carbonate + 20g of distilled water. Boil the solution for few mins, filter.The filtrate is called sodium carbonate extract. | | | |
| 10. | **Test for halides:** 1 ml of sodium carbonate extract +dil. HNO3 + 1ml of AgNO3, and shake it | No Characteristic ppt is Obtained. | Absence of chloride, bromide, sulphide |
| 11 | **Test with barium chloride:** One ml of the sodium carbonate extract + dil. Aceticacid + 1ml of bariumchloride solution and shake | A white ppt insoluble in dil H2SO4 is formed | Prsence of sulphate is Confirmed. |
| 12 | **Test with leadacetate:** 1ml of the sodium carbonate extract, + 1ml of dil acetic acid and heat it + 1 ml of Lead Acetate | A whit ppt soluble in excess of ammonium acetate is formed | Presence of sulphate |
| 13 | **Brown ring test:** 1ml of the sodium carbonate extract + dil.H2SO4 + freshly prepared ferrous sulphate solution then add Conc. H2SO4 along the sides of the test tube. | No brown ring is formed | Absence of nitrate |

| | | | |
|---|---|---|---|
| 14 | **Ammonium molybdate test:** 1 ml of the extract + dil HNO3 + about 1ml each of ammonium molybdate and Conc. HNO3 | No canary yellow ppt is formed. | Absence of phosphate |
| 15 | **Test with sodium nitrobruside:** 1ml of the sodium carbonate extract + 1ml of dil .aommonia. + few drops of sodium nitro bruside. | No purple or violet colouration appears | Absence of sulphide. |

**Preparation of salt solution:**
To a small amount of salt in a test tube add 2 to 3ml of water, shake it and gently heat it. This solution is called "original solution".

| | | | |
|---|---|---|---|
| 1 | **GROUP 0** 1ml of the original salt solution add about 1ml each of Nessler's reagent and NaOH. | No chocolate brown ppt is obtained. | Absence of ammonium |

| | | | |
|---|---|---|---|
| **2** | **GROUP I Take about 1 ml of the salt solution ina test tube Add about 1ml of dil HCl, andshake it** | **No White ppt is formed.** | **Absence of 1st groupmetal ions ($Pb^{2+}$)** |
| **3** | **GROUP II To the above solution pass $H_2S$ gas.** | **No Black ppt is formed** | **Absence of 2nd groupmetal ions ($Cu^{2+}$)** |
| **4** | **GROUP III To about 1ml of the salt solution add about 1ml each of $NH_4Cl$andNH4OH and shake it well** | **No ppt is obtained** | **Absence of 3rd group metal ions ($Al^{3+}$ / $Fe^{3+}$)** |
| **5** | **GROUP IV To the above solutionpass ($H_2S$) gas** | **No dirty white ppt is obtained** | **Absence of 4 th groupmetal ion ($Zn^{2+}$)** |
| **6** | **GROUP V To the salt solution add1mleach of $NH_4Cl$, NH4OH and $(NH_4)_2CO_3$ and shake it well.** | **No white ppt is obtained** | **Absence of 5th group metal ions ($Ba^{2+}$/ $Ca^{2+}$)** |

| | | | |
|---|---|---|---|
| **7** | **GROUP VI To the original salt solutionadd 1ml each of $NH_4Cl$, NH4OH and $NH_4H_2PO_4$, and scratchthe sides of thetest tube.** | **A white ppt is obtained.** | **Presence of 6th groupmetal ion $Mg^{2+}$** |
| **Analysis of the 6th group ppt:** | | | |
| **1** | **Test for Magnesium: i)To about 1mlofthe original salt solution add dil. NaOH in drops with shaking.** | **White Ppt insoluble in excessNaOH is Obtained** | **Presence of Magnesium is Confirmed** |
| | **ii)To about 1ml of the original salt solution add about 1ml of Magneson reagent.** | **A blue ppt is formed.** | **Presence of Magnesium is Confirmed** |

**Result: The Anion Present : SULPHATE The cation Present : MAGNESIUM The Given simple salt :MAGNESIUM SULPHATE**