

To Analyse the Given Salt For Acidic & Basic Radicals CO_3^{2-} , Zn^{2+}

To analyse the given salt for acidic and basic radicals.

<i>Experiment</i>	<i>Observations</i>	<i>Inference</i>
1. Physical examination (a) Noted the colour of the given salt. (b) Noted the smell of the salt.	White No specific odour	Cu^{2+} , Fe^{3+} , Ni^{2+} , Mn^{2+} , Co^{2+} absent. NH_4^+ , S^{2-} and CH_3COO^- may be absent.
2. Dry heating test Heated a pinch of the salt in a dry test tube and noted the following : (a) Gas evolved	A colourless, odourless gas evolved which turned lime water milky.	CO_3^{2-} may be present.
(b) Sublimation	No sublimate formed.	Ammonium halides, iodide may be absent.
(c) Decrepitation	No crackling sound observed.	Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent.
(d) Colour of the residue	Yellow when hot and white when cold.	Zn^{2+} may be present.
3. Charcoal cavity test Mixed a pinch of the salt with double the quantity of Na_2CO_3 and heated the mixture on a charcoal cavity in the reducing flame.	Yellow when hot and white when cold.	Zn^{2+} may be present.

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4. Cobalt nitrate test To the above white residue added a drop of cobalt nitrate solution and heated in oxidizing flame.	Green residue.	Zn^{2+} may be present.
5. Flame test Prepared a paste of the salt with conc. HCl and performed flame test.	Green flashes seen with naked eye.	Zn^{2+} may be present.
6. Borax bead test Did not perform this test since the given salt was white.	—	Cu^{2+} , Ni^{2+} , Fe^{2+} , Fe^{3+} , Mn^{2+} , Co^{2+} may be absent.
7. Dil. Sulphuric acid test Treated a pinch of the salt with dil. H_2SO_4 and warmed.	Colourless, odourless gas evolved with brisk effervescence, turned lime water milky. Salt did not dissolve.	CO_3^{2-} present Insoluble CO_3^{2-} indicated.
8. KMnO_4 test To a pinch of the salt added dilute H_2SO_4 warm and then a drop of KMnO_4 solution.	Pink colour of KMnO_4 was not discharged.	Cl^- , Br^- , I^- , Fe^{2+} , $\text{C}_2\text{O}_4^{2-}$ are absent.
9. Conc. Sulphuric acid test Did not perform this test because the salt reacted with dil. H_2SO_4 .	—	Cl^- , Br^- , I^- , NO_3^- , CH_3COO^- , $\text{C}_2\text{O}_4^{2-}$ are absent.

<p>10. Confirmatory tests for carbonate</p> <p>(a) Shook a pinch of the salt with water.</p> <p>(b) To the salt added dil. HCl.</p> <p>11. Heated a pinch of salt with conc. NaOH solution</p> <p>12. Preparation of Original solution (O.S.)</p> <p>(a) Shook a pinch of the salt with water.</p> <p>(b) Shook a pinch of the salt in dil. HCl.</p> <p>13. As the O.S. is prepared in dil. HCl.</p> <p>14. Through a part of O.S. passed H_2S gas.</p>	<p>Salt did not dissolve.</p> <p>Brisk effervescence with evolution of colourless, odourless gas which turned lime water milky.</p> <p>No ammonia gas evolved.</p> <p>Insoluble</p> <p>Clear solution obtained.</p> <p>No ppt. formed.</p>	<p>Insoluble carbonate indicated.</p> <p>Insoluble carbonate confirmed.</p> <p>NH_4^+ absent.</p> <p>Labelled it as O.S.</p> <p>Group I absent. (Pb^{2+} absent)</p> <p>Group II absent (Pb^{2+}, Hg^{2+}, Cu^{2+}, As^{3+} absent).</p>
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<p>15. To the remaining solution, added a pinch of solid ammonium chloride. Boiled the solution, cooled it and added excess of ammonium hydroxide solution.</p> <p>16. Through a part of this solution, passed H_2S gas.</p> <p>17. Confirmatory tests for Zn^{2+} ion</p> <p>Dissolved the above dull white ppt. in dil HCl. Boiled off H_2S.</p> <p>Divided the solution into two parts.</p> <p>(a) To one part added NaOH solution dropwise.</p> <p>(b) To another part, added potassium ferrocyanide solution.</p>	<p>No ppt. formed</p> <p>Dull white ppt. formed.</p> <p>White ppt. soluble in excess of NaOH.</p> <p>Bluish white ppt.</p>	<p>Group III absent. (Fe^{3+}, Al^{3+} absent).</p> <p>Group IV present. (Zn^{2+} present)</p> <p>Zn^{2+} confirmed.</p> <p>Zn^{2+} confirmed.</p>

Table 12.18. List of Common White Salts

<i>Name of the Salt</i>	<i>Basic Radical</i>	<i>Acidic Radical</i>
Lead Nitrate	Pb^{2+}	NO_3^-
Lead Acetate	Pb^{2+}	CH_3COO^-
Zinc Carbonate	Zn^{2+}	CO_3^{2-}
Zinc Sulphide	Zn^{2+}	S^{2-}
Zinc Nitrate	Zn^{2+}	NO_3^-
Zinc Acetate	Zn^{2+}	CH_3COO^-
Zinc Chloride	Zn^{2+}	Cl^-
Zinc Bromide	Zn^{2+}	Br^-
Zinc Sulphate	Zn^{2+}	SO_4^{2-}
Calcium Sulphite	Ca^{2+}	SO_3^{2-}
Calcium Carbonate	Ca^{2+}	CO_3^{2-}
Calcium Chloride	Ca^{2+}	Cl^-
Calcium Bromide	Ca^{2+}	Br^-
Calcium Acetate	Ca^{2+}	CH_3COO^-
Calcium Nitrate	Ca^{2+}	NO_3^-
Barium Carbonate	Ba^{2+}	CO_3^{2-}
Barium Chloride	Ba^{2+}	Cl^-

<i>Name of the Salt</i>	<i>Basic Radical</i>	<i>Acidic Radical</i>
Barium Nitrate	Ba^{2+}	NO_3^-
Strontium Carbonate	Sr^{2+}	CO_3^{2-}
Strontium Chloride	Sr^{2+}	Cl^-
Strontium Nitrate	Sr^{2+}	NO_3^-
Magnesium Carbonate	Mg^{2+}	CO_3^{2-}
Magnesium Acetate	Mg^{2+}	CH_3COO^-
Magnesium Sulphate	Mg^{2+}	SO_4^{2-}
Ammonium Carbonate	NH_4^+	CO_3^{2-}
Ammonium Chloride	NH_4^+	Cl^-
Ammonium Bromide	NH_4^+	Br^-
Ammonium Iodide	NH_4^+	I^-
Ammonium Nitrate	NH_4^+	NO_3^-
Ammonium Sulphate	NH_4^+	SO_4^{2-}
Ammonium Phosphate	NH_4^+	PO_4^{3-}

Table 12.19. List of Common Coloured Salts

<i>Name of the Salt</i>	<i>Basic Radical</i>	<i>Acidic Radical</i>
Copper Sulphate	Cu^{2+}	SO_4^{2-}
Ferrous Sulphate	Fe^{2+}	SO_4^{2-}
Manganese Chloride	Mn^{2+}	Cl^-
Cobalt Nitrate	Co^{2+}	NO_3^-
Nickel Carbonate	Ni^{2+}	CO_3^{2-}
Cobalt Acetate	Co^{2+}	CH_3COO^-
Copper Acetate	Cu^{2+}	CH_3COO^-
Manganese Sulphate	Mn^{2+}	SO_4^{2-}
Cobalt Sulphate	Co^{2+}	SO_4^{2-}
Copper Chloride	Cu^{2+}	Cl^-
Nickel Sulphate	Ni^{2+}	SO_4^{2-}
Copper Carbonate	Cu^{2+}	CO_3^{2-}