To Analyse the Given Salt For Acidic & Basic Radicals

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Experiment	Observations	Inference
1. Physical examination :		
(*a*) Noted the colour of the given salt.	White	Cu^{2+}, Fe^{2+}, Fe^{3+}, Ni^{2+}, Mn^{2+}, Co^{2+} absent.
(*b*) Noted the smell of the salt.	No specific odour	NH_4^+, S^{2-} and CH_3COO^- may be absent.
2. Dry heating test		
Heated a pinch of the salt in a dry test tube and noted the following observations :		
(*a*) *Gas evolved*	A reddish brown gas evolved which turned $FeSO_4$ solution black.	NO_3^- may be present.
(*b*) *Sublimation*	No sublimate formed.	Ammonium halides, aluminium chloride, iodide may be absent.
(*c*) *Decrepitation*	No crackling sound observed.	Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent.
(*d*) *Fusion*	Salt does not fuse.	Alkali (sodium, potassium) salts may be absent.
(*e*) *Colour of the residue*	White	Zn^{2+}, Pb^{2+} may be absent.
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.	White residue.	Zn^{2+}, Pb^{2+}, Mn^{2+} etc. may be absent.
4. Cobalt nitrate test		
To the above white residue added a drop of cobalt nitrate solution. Heated it in oxidising flame.	No characteristic colour.	Zn^{2+}, Mg^{2+}, Al^{3+}, PO_4^{3-}, may be absent.
5. Flame test		
Prepared a paste of the salt with conc. HCl and performed flame test.	Persistent grassy green flame on prolonged heating.	Ba^{2+} present.
6. Borax bead test		
Did not perform this test since the given salt was white.	—	Cu^{2+}, Ni^{2+}, Fe^{3+}, Mn^{2+}, Co^{2+} may be absent.

7. Dil. sulphuric acid test Treated a pinch of the salt with dil. H_2SO_4 and warmed.	No gas evolved.	CO_3^{2-}, S^{2-}, NO_2^-, SO_3^{2-} may be absent.
8. $KMnO_4$ test To a pinch of the salt added dil. H_2SO_4 warm and then a drop of $KMnO_4$ solution.	Pink colour of $KMnO_4$ was not discharged.	Cl^-, Br^-, I^-, $C_2O_4^{2-}$, Fe^{2+} may be absent.
9. Conc. sulphuric acid test Heated a pinch of the salt with conc. sulphuric acid and added to it a paper pellet.	A reddish brown gas evolved which turned $FeSO_4$ solution black.	NO_3^- may be present.
10. Confirmatory test for nitrate (*a*) *Copper chips test*. Heated a pinch of the salt with conc. sulphuric acid and a few copper chips.	Reddish brown gas evolved.	NO_3^- confirmed.
(*b*) *Ring test*. To 2–3 ml of the salt solution, added freshly prepared $FeSO_4$ solution. Now added conc. sulphuric acid along the sides of the test tube.	A dark brown ring formed at the junction of the two liquids.	NO_3^- confirmed.
11. Heated a pinch of salt with conc. NaOH solution	No ammonia gas evolved.	NH_4^+ absent.
12. Preparation of Original Solution (O.S.) Shook a pinch of the salt with water.	Solution obtained	Labelled it as Original Solution (O.S.)
13. To a part of the O.S. added 1–2 mls of dilute hydrochloric acid.	No ppt. formed.	Group I absent. (Pb^{2+} absent)
14. Through a part of the above solution, passed H_2S gas.	No ppt. formed.	Group II absent (Pb^{2+}, Cu^{2+}, As^{3+}, absent)
15. To the remaining solution, added a pinch of solid ammonium chloride. Boiled the solution, cooled it and added excess of ammonium hydroxide solution.	No ppt. formed.	Group III absent. (Fe^{3+}, Al^{3+} absent)
16. Through a part of this solution, passed H_2S gas.	No ppt. formed.	Group IV absent. (Zn^{2+}, Mn^{2+}, Ni^{2+}, Co^{2+}, absent)
17. To the remaining ammonical solution added ammonium carbonate solution.	White ppt. formed.	Group V present. (Ca^{2+}, Ba^{2+}, Sr^{2+} may be present)

18. **Confirmatory test for Barium** Filtered the above white ppt. Dissolved the ppt. in hot dilute acetic acid.		
(*a*) *Pot. chromate test*. To one part of the above solution, added a few drops of pot. chromate solution.	Yellow ppt.	Ba^{2+} confirmed.
(*b*) *Flame test*. Performed flame test with the salt.	Persistent grassy green flame on prolonged heating.	Ba^{2+} confirmed.

Result. *Acid radical*: NO_3^-
Basic radical: Ba^{2+}.