

EXPERIMENT No. : 17

DATE :

AIM OF THE EXPERIMENT: To detect cation present in the given compound
(Zinc ion, Lead ion and Calcium ion)

a) Detection of Zinc ion

EXPERIMENT	OBSERVATION	INFERENCE
1. Add few drops of sodium hydroxide solution to the colourless aqueous solution taken in the test tube	Gelatinous white ppt. is formed. $\text{ZnSO}_4 (\text{aq}) + 2\text{NaOH}(\text{limt}) \rightarrow \text{Na}_2\text{SO}_4(\text{aq}) + \text{Zn}(\text{OH})_2\downarrow$	Zinc ion may be present.
2. Treat the gelatinous white precipitate present in the test tube with excess sodium hydroxide solution	Gelatinous white ppt. dissolves and clear solution is formed. $\text{Zn}(\text{OH})_2 + 2\text{NaOH}(\text{exe}) \rightarrow \text{Na}_2\text{ZnO}_2 + 2\text{H}_2\text{O}$	Presence of zinc ion is confirmed.
1. Similarly, add few drops of ammonium hydroxide solution to the colourless aqueous solution taken in another test tube	Gelatinous white ppt. is formed. $\text{ZnSO}_4 (\text{aq}) + 2\text{NH}_4\text{OH}(\text{limt}) \rightarrow (\text{NH}_4)_2\text{SO}_4(\text{aq}) + \text{Zn}(\text{OH})_2\downarrow$	Zinc ion may be present.
2. Treat the gelatinous white precipitate present in the test tube with excess ammonium hydroxide solution	Gelatinous white ppt. dissolves and clear solution is formed. $\text{Zn}(\text{OH})_2 + 4\text{NH}_4\text{OH}(\text{exe}) \rightarrow \text{Zn}(\text{NH}_3)_4.(\text{OH})_2 + 4\text{H}_2\text{O}$	Presence of zinc ion is confirmed.

b)Detection of Lead ion

EXPERIMENT	OBSERVATION	INFERENCE
1.Add few drops of sodium hydroxide solution to the colourless aqueous solution taken in the test tube	Chalky white ppt. is formed. $\text{Pb}(\text{NO}_3)_2(\text{aq}) + 2\text{NaOH}(\text{limt}) \rightarrow 2\text{NaNO}_3(\text{aq}) + \text{Pb}(\text{OH})_2\downarrow$	Lead ion may be present.
2.Treat the chalky white precipitate present in the test tube with excess sodium hydroxide solution	Chalky white ppt. dissolves and clear solution is formed. $\text{Pb}(\text{OH})_2 + 2\text{NaOH}(\text{exe}) \rightarrow \text{Na}_2\text{PbO}_2 + 2\text{H}_2\text{O}$	Presence of lead ion is confirmed.
1.Similarly, add few drops of ammonium hydroxide solution to the colourless aqueous solution taken in another test tube	Chalky white ppt. is formed. $\text{Pb}(\text{NO}_3)_2(\text{aq}) + 2\text{NH}_4\text{OH}(\text{limt}) \rightarrow 2\text{NH}_4\text{NO}_3(\text{aq}) + \text{Pb}(\text{OH})_2\downarrow$	Lead ion may be present.
2.Treat the chalky white precipitate present in the test tube with excess ammonium hydroxide solution	Chalky white ppt. remains insoluble	Presence of lead ion is confirmed.

c)Detection of Calcium ion

EXPERIMENT	OBSERVATION	INFERENCE
1 Add few drops of sodium hydroxide solution to the colourless aqueous solution taken in the test tube	Milky white ppt. is seen. $\text{CaCl}_2(\text{aq}) + 2\text{NaOH}(\text{aq}) \rightarrow 2\text{NaCl}(\text{aq}) + \text{Ca}(\text{OH})_2\downarrow$	Calcium ion may be present.
2 Treat the milky white precipitate present in the test tube with excess sodium hydroxide solution	Milky white ppt. remains insoluble.	Presence of calcium ion is confirmed.
3 Similary, add few drops of ammonium hydroxide solution to the colourless aqueous solution taken in another test tube	No observable change is seen.	Calcium ion is present.

AIM OF THE EXPERIMENT: To detect cation present in the given compound
(*Ferrous ion and Ferric ion*)

a) Detection of Ferrous ion

EXPERIMENT	OBSERVATION	INFERENCE
1. Add few drops of sodium hydroxide solution to the light green aqueous solution taken in the test tube	<p>Dirty/marshy green precipitate is seen.</p> $\text{FeSO}_4(\text{aq}) + 2\text{NaOH}(\text{Imt}) \rightarrow \text{Na}_2\text{SO}_4(\text{aq}) + \text{Fe}(\text{OH})_2\downarrow$	Ferrous ion may be present.
2. Treat the dirty/marshy green precipitate present in the test tube with excess sodium hydroxide solution	Dirty/marshy green precipitate remains insoluble.	Presence of ferrous ion is confirmed.
1. Similarly, add few drops of ammonium hydroxide solution to the aqueous solution taken in the test tube	<p>Dirty/marshy green precipitate is seen.</p> $\text{FeSO}_4(\text{aq}) + 2\text{NH}_4\text{OH}(\text{Imt}) \rightarrow (\text{NH}_4)_2\text{SO}_4(\text{aq}) + \text{Fe}(\text{OH})_2\downarrow$	Ferrous ion may be present.
2. Treat the dirty/marshy green precipitate present in the test tube with excess ammonium hydroxide solution	Dirty/marshy green precipitate remains insoluble.	Presence of ferrous ion is confirmed.

b) Detection of Ferric ion

EXPERIMENT	OBSERVATION	INFERENCE
1. Add few drops of sodium hydroxide solution to the reddish orange aqueous solution taken in the test tube	Reddish orange precipitate is seen. $\text{FeCl}_3(\text{aq}) + 3\text{NaOH}(\text{limt}) \rightarrow 3\text{NaCl}(\text{aq}) + \text{Fe}(\text{OH})_3\downarrow$	Ferric ion may be present.
2. Treat the gelatinous reddish orange precipitate present in the test tube with excess sodium hydroxide solution	Reddish orange precipitate remains insoluble.	Presence of ferric ion is confirmed.
1. Similarly, add few drops of ammonium hydroxide solution to the reddish orange aqueous solution taken in the test tube	Reddish orange precipitate is seen. $\text{FeCl}_3(\text{aq}) + 3\text{NH}_4\text{OH}(\text{limt}) \rightarrow 3\text{NH}_4\text{Cl}(\text{aq}) + \text{Fe}(\text{OH})_3\downarrow$	Ferric ion may be present.
2. Treat the gelatinous reddish orange precipitate present in the test tube with excess ammonium hydroxide solution	Reddish orange precipitate remains insoluble.	Presence of ferric ion is confirmed.

AIM OF THE EXPERIMENT: To detect cation present in the given compound
(*Cupric ion and Ammonium ion*)

a) Detection of Cupric ion

EXPERIMENT	OBSERVATION	INFERENCE
1 Add few drops of sodium hydroxide solution to the blue coloured aqueous solution taken in the test tube	Pale blue / bluish white precipitate is seen. $\text{CuSO}_4(\text{aq}) + 2\text{NaOH}(\text{limt}) \rightarrow \text{Na}_2\text{SO}_4(\text{aq}) + \text{Cu}(\text{OH})_2\downarrow$	Cupric ion may be present.
2 Treat the pale blue / bluish white precipitate present in the test tube with excess sodium hydroxide solution	Pale blue / bluish white precipitate remains insoluble.	Cupric ion is present.
1 Similarly, add few drops of ammonium hydroxide solution to the blue coloured aqueous solution taken in the test tube	Pale blue / bluish white precipitate is seen. $\text{CuSO}_4(\text{aq}) + 2\text{NH}_4\text{OH}(\text{limt}) \rightarrow (\text{NH}_4)_2\text{SO}_4(\text{aq}) + \text{Cu}(\text{OH})_2\downarrow$	Cupric ion may be present.
2 Treat the pale blue / bluish white precipitate present in the test tube with excess ammonium hydroxide solution	Pale blue / bluish white precipitate dissolves and inky blue colouration is seen. $\text{Cu}(\text{OH})_2 + 4\text{NH}_4\text{OH}(\text{exe}) \rightarrow \text{Cu}(\text{NH}_3)_4(\text{OH})_2 + 4\text{H}_2\text{O}$	Cupric ion is present.

b)Detection of Ammonium ion

EXPERIMENT	OBSERVATION	INFERENCE
Boil equal volume of the given colourless aqueous solution with sodium hydroxide solution in a test tube	Some fumes are seen. Sharp pungent biting odour is observed. $\text{NH}_4\text{Cl} + \text{NaOH} \rightarrow \text{NaCl} + \text{NH}_3 + \text{H}_2\text{O}$	Ammonium ion may be present.
Place a glass rod dipped in concentrated hydrochloric acid over the mouth of the test tube	Dense white fumes are seen. $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$	Ammonium ion is present.