

AMMONIUM ION

Aim

To analyse ammonium ion (NH_4^+) in given salt

Experiment

Preliminary Test

salt + conc. NaOH

Observation

Smell of ammonia gas evolved which becomes white dense fumes if a drop of conc. HCl being over the mouth of the test tube

Inference

NH_4^+ may be present

Confirmatory Test

In a U-tube one of the limb salt is taken in another limb, Nessler reagent is taken. Add conc. NaOH to limb which contains salt & cover it by thumb & pass the gas produced to another limb.

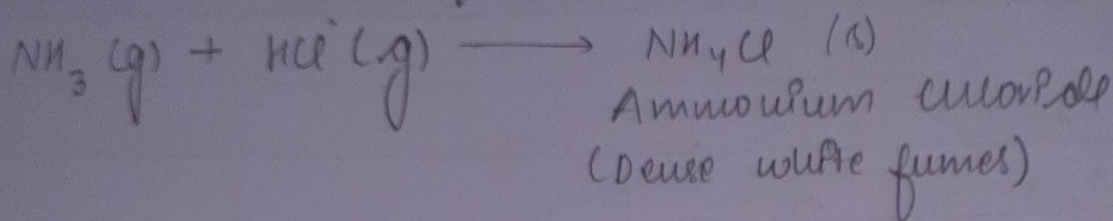
Brown ppt or colouration

NH_4^+ confirmed

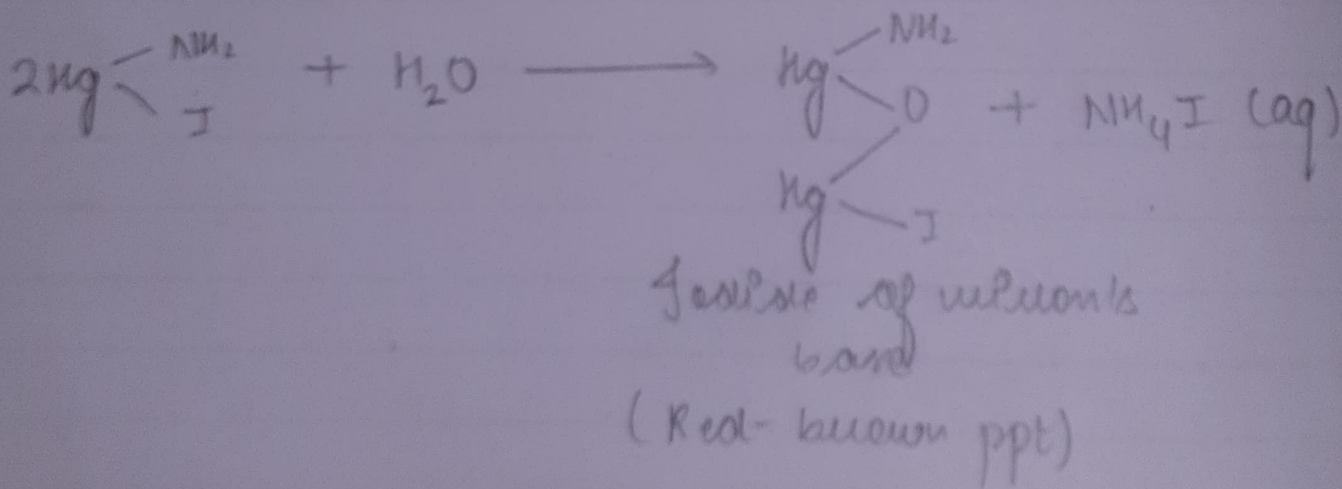
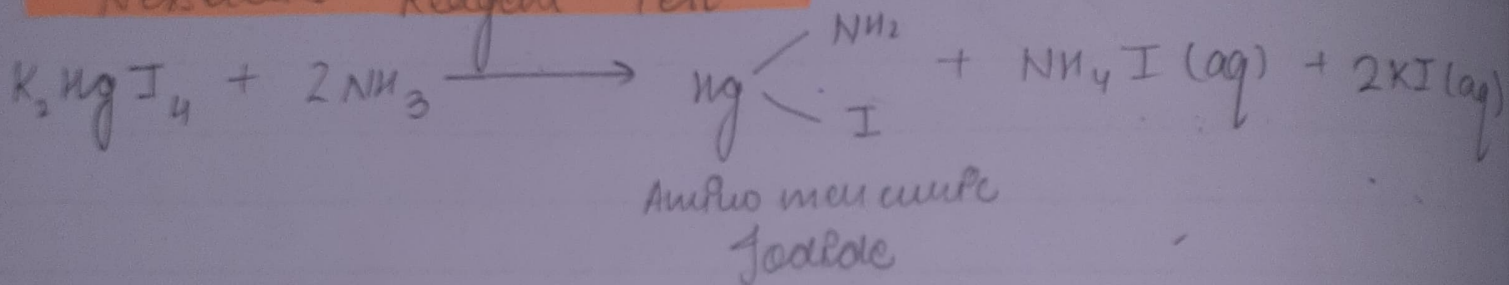
Result

The given salt contains ammonium ions

Sodium Hydroxide Test



Nessler's Reagent Test



LEAD ION

Aim

To analyse Pb^{2+} (group 2) in the given salt

ExperimentObservationInferencePreliminary Test

salt soln + dil. HCl

white ppt formed

Pb^{2+} may be present

Confirmatory Test

Add distilled water to the white ppt formed in Preliminary Test & boil the test tube till white ppt dissolve & divide the dissolved part into:

(a) first part: add potassium iodide soln

Yellow ppt

Pb^{2+} confirmed

(b) second part: add

potassium chromate soln (K_2CrO_4)

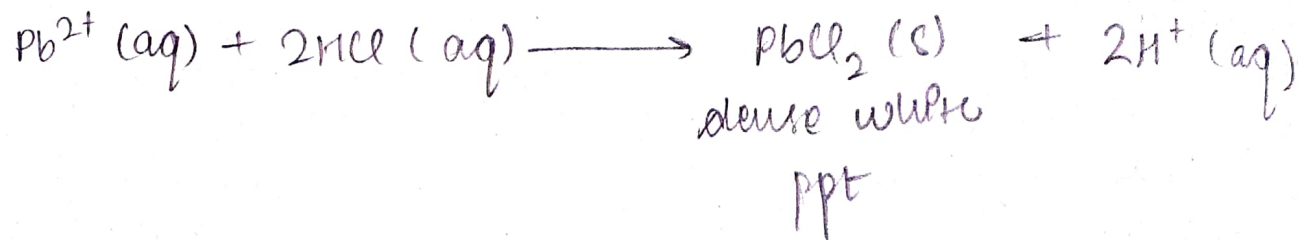
orange-yellow ppt

Pb^{2+} confirmed

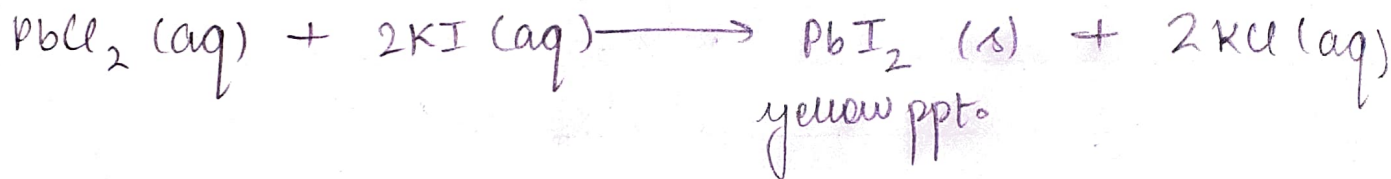
Result

The given salt contains Pb^{2+} ion.

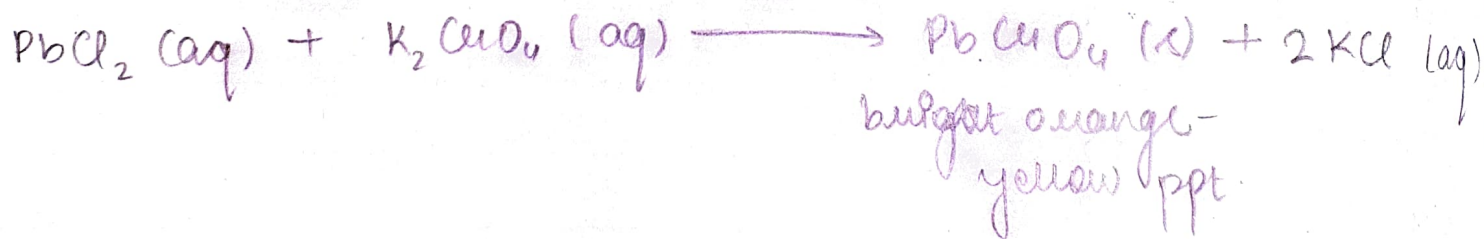
Precipitation with dil. HCl



Potassium Iodide test



Potassium Chromate Test



Aim

To analyse Al^{3+} (group III) in the given salt

ExperimentObservationInferencePreliminary Test

salt solⁿ + NH_4Cl (solid)
+ NH_4OH excess

white gelatinous
ppt

Al^{3+} may be
present.

Confirmatory Test

1. take Test: white ppt +
dil. HCl (excess) so that
white ppt gets dissolved
+ few drops of blue
litmus solⁿ + NH_4OH in
excess

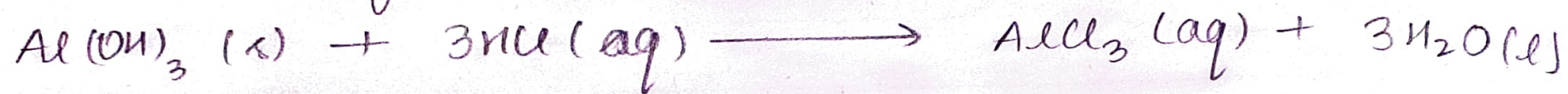
A blue ppt sus-
pended in a
colourless solⁿ

Al^{3+} is confirmed

Result

Al^{3+} ion is present in the given salt

Dissolution of gelatinous white precipitate



Lake Test



ZINC ION

Aim

To analyse (Zn^{2+}) Group IV in the given salt

ExperimentObservationInferencePreliminary Test

salt solⁿ + NH_4Cl (solid)
+ NH_4OH excess + pass
 H_2S gas

Dirty white ppt

Zn^{2+} may be present

Confirmatory Test

Dissolve the white ppt
in dil. HCl & divide

the solⁿ in two parts

white ppt soluble

Zn^{2+} confirmed

(a) First part: add
 $NaOH$ solⁿ

in $NaOH$ excess

(b) Second part: Add
potassium ferrocyanide
solⁿ

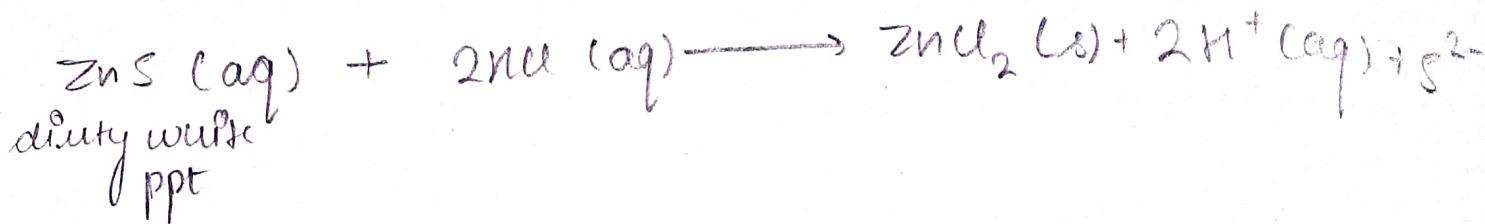
Bluish white ppt

Zn^{2+} confirmed

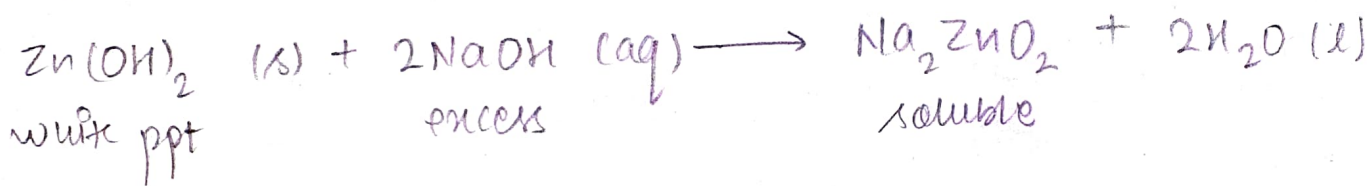
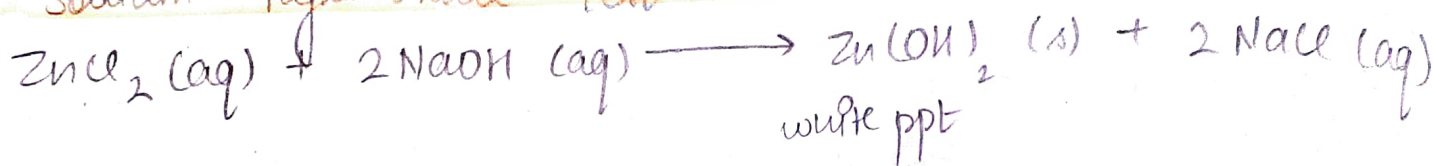
Result

The given salt contains Zn^{2+} ions.

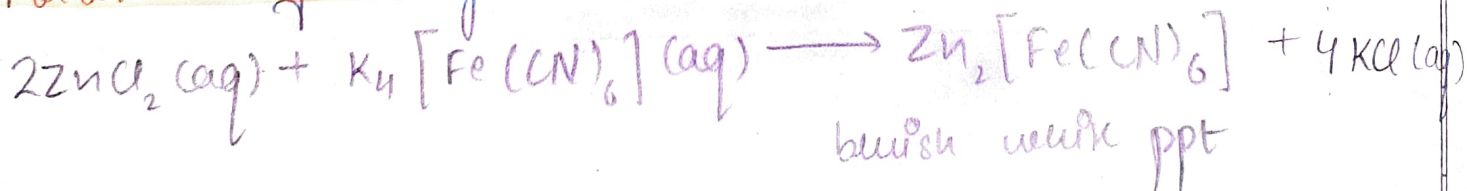
Dissolution of dirty white ppt in HCl



Sodium hydroxide Test



Potassium ferrocyanide Test



BARIUM ION

Aim

To detect Ba^{2+} ion in the given salt (group V)

Experiment

Preliminary Test

salt solⁿ + NH_4Cl +
 NH_4OH + $(NH_4)_2CO_3$

Observation

white ppt

Inference

group V ~~may~~ cations
may be present
(Ba^{2+} , Sr^{2+} , Ca^{2+})

Confirmatory Test

Dissolve the white ppt in
wt sol. Acetic acid
to obtain clear solⁿ.

Divide the solⁿ in
three parts :

(a) the first part : add
 K_2CrO_4

Yellow ppt

Ba^{2+} confirmed

(b) second part : $(NH_4)_2SO_4$ No change

Sr^{2+} is absent

(c) Third part : $(NH_4)_2C_2O_4$ No change

Ca^{2+} is absent

Flame test : (salt + conc.
 HCl) on watch glass
being over flame

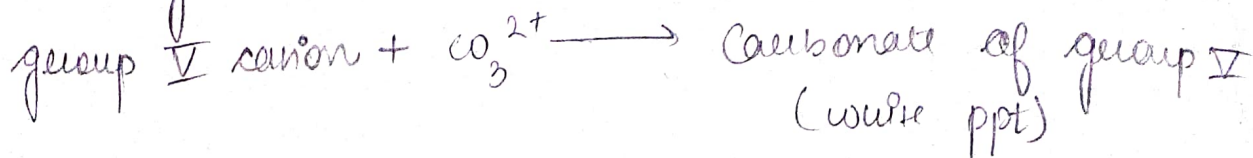
Apple green
flame

Ba^{2+} is confirmed

Result

Given salt contains Ba^{2+} ion

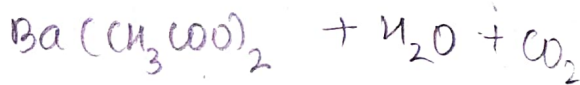
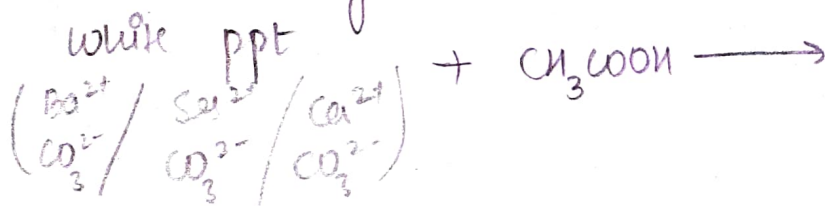
Preliminary Test



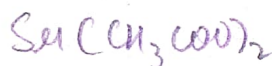
} white ppt formed

Confirmatory Test

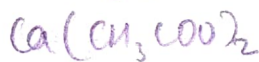
Dissolving in Acetic Acid



or

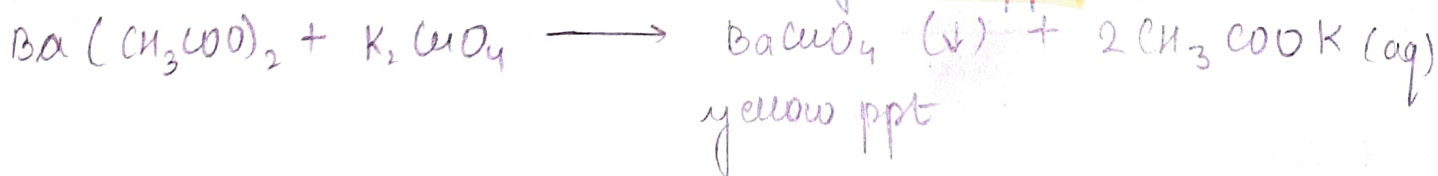


or



[clear solution]

clear solution + K₂CrO₄ → yellow ppt



STRONTIUM ION

Aim

To detect Sr^{2+} ion of group V in the given salt

Experiment

Preliminary Test

salt solⁿ + NH_4Cl +
 NH_4OH + $(\text{NH}_4)_2\text{CO}_3$

Observation

white ppt

Inference

Group V cation
may be present
(Ba^{2+} , Ca^{2+} , Sr^{2+})

Confirmatory Test

Dissolve the white ppt
in CH_3COOH + heat to
obtain clear solⁿ

Divide the solⁿ in 3
parts :

(a) First part : K_2CrO_4

No change

Ba^{2+} is absent

(b) Second part : $(\text{NH}_4)_2\text{SO}_4$

white ppt

Sr^{2+} confirmed

(c) Third part : $(\text{NH}_4)_2\text{C}_2\text{O}_4$

No change

Ca^{2+} is absent

Flame Test : Salt in
watch glass + conc. HCl
+ bring over the flame

Crimson red
flame

Sr^{2+} confirmed

Result

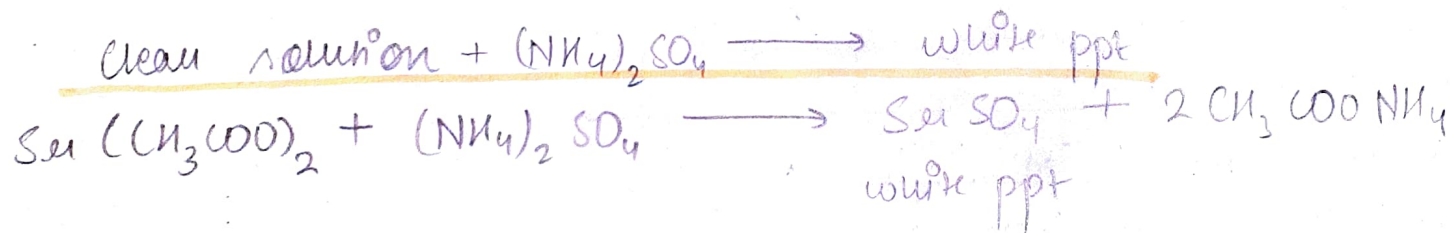
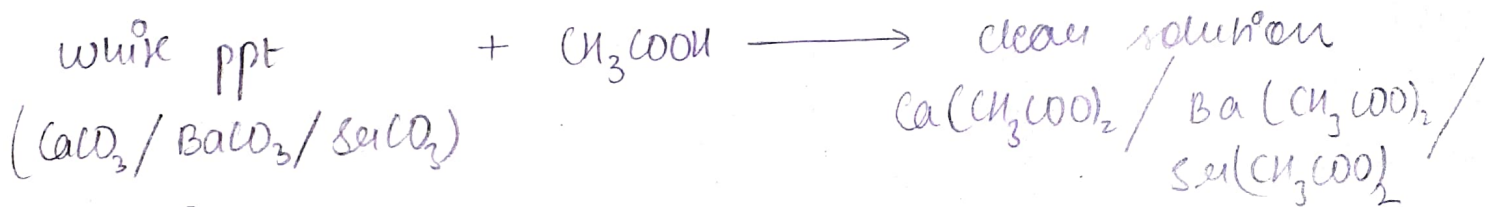
Given salt contains Sr^{2+} ion.

Preliminary Test



Confirmatory Test

dissolving white ppt in CH_3COOH



MAGNESIUM ION

Aim

To detect Mg^{2+} ion of group VI in the given salt

Experiment

salt solⁿ + NH_4Cl +
 NH_4OH + $(NH_4)_3PO_4$

Observation

white ppt

Inference

Mg^{2+} is confirmed

Result

Given salt contains Mg^{2+} ion

Reaction

