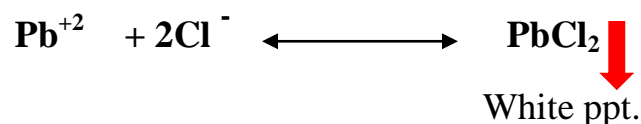
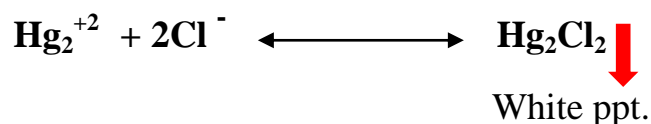
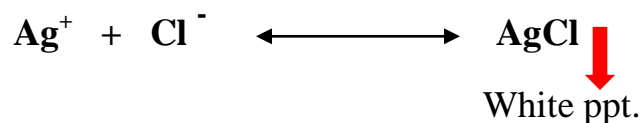


Chemical Reactions of Group I Ions

The group I ions are silver Ag^+ , mercury Hg_2^{+2} and lead Pb^{+2} . The chloride salts of these ions are insoluble, therefore, to prevent any interference with the cations of group II, hydrochloric acid is added to remove them as the chlorides:



A large excess of chloride ions must be avoided to prevent the formation of soluble silver chloride or lead chloride anions.

The Aim:

Is to teach students how to deal with laboratory glassware's, chemical reagents and observation of common colored products of chemical reactions.

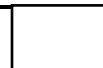
Reactions of the Aqueous Solution of Hg_2^{+2} :

1) HCl (diluted acid):

Put few drops (2-3) of the sample solution in a test tube, add dilute HCl drop by drop till a white precipitate of Hg_2Cl_2 is formed.

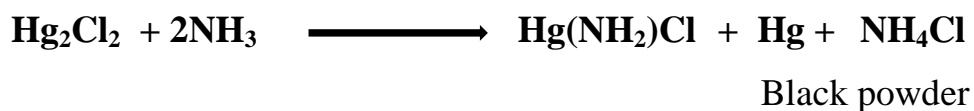


\downarrow = precipitate = p.p.t



This white precipitate of Hg_2Cl_2 is:

- a) Insoluble in hot water and cold diluted acids.
- b) Turns black when ammonia solution is added.



2) Potassium chromate solution (K_2CrO_4):

Add few drops of K_2CrO_4 to few drops of the sample in a test tube, Hg_2CrO_4 will be formed as a brown precipitate which turns to red crystals on boiling.

3) Ammonia solution:

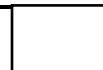
When ammonia solution is added to aqueous solution of Hg_2^{+2} a black precipitate will be formed which consists of the ammoniacal mercuric salt and fine powder of mercury.

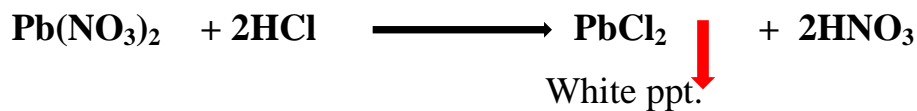
Reactions of the Aqueous Solution of Pb^{+2}

In all of these reactions only few drops are used:

1) HCl (diluted):

On addition of diluted HCl to the aqueous solution of Pb^{+2} , a white precipitate will be formed only when the solution is cold.





This precipitate dissolves in hot water but separates again as needle-like crystals when the solution is re-cooled

2) Potassium chromate solution:

It forms a yellow precipitate of **PbCrO₄** which is insoluble in acetic acid and ammonia solution but soluble in hydroxides and in HNO₃.

3) Sodium hydroxide:

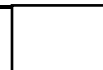
It forms a white precipitate of **Pb(OH)₂** which dissolves on adding excess of **NaOH** to form Na₂PbO₂.



Reactions of the Aqueous Solution of Ag⁺ :

1) HCl (diluted):

A cloudy white precipitate of **AgCl** is formed, this precipitate is insoluble in water and acids including HNO₃ but soluble in ammonia solution because it forms a complex ion.



2) Potassium chromate:

Red precipitate of Ag_2CrO_4 is formed, insoluble in acetic acid (diluted), but soluble in diluted HNO_3 and ammonia solution.

3) Sodium hydroxide:

Brown precipitate of Ag_2O is formed, insoluble on addition of excess of the precipitant (NaOH solution).

