

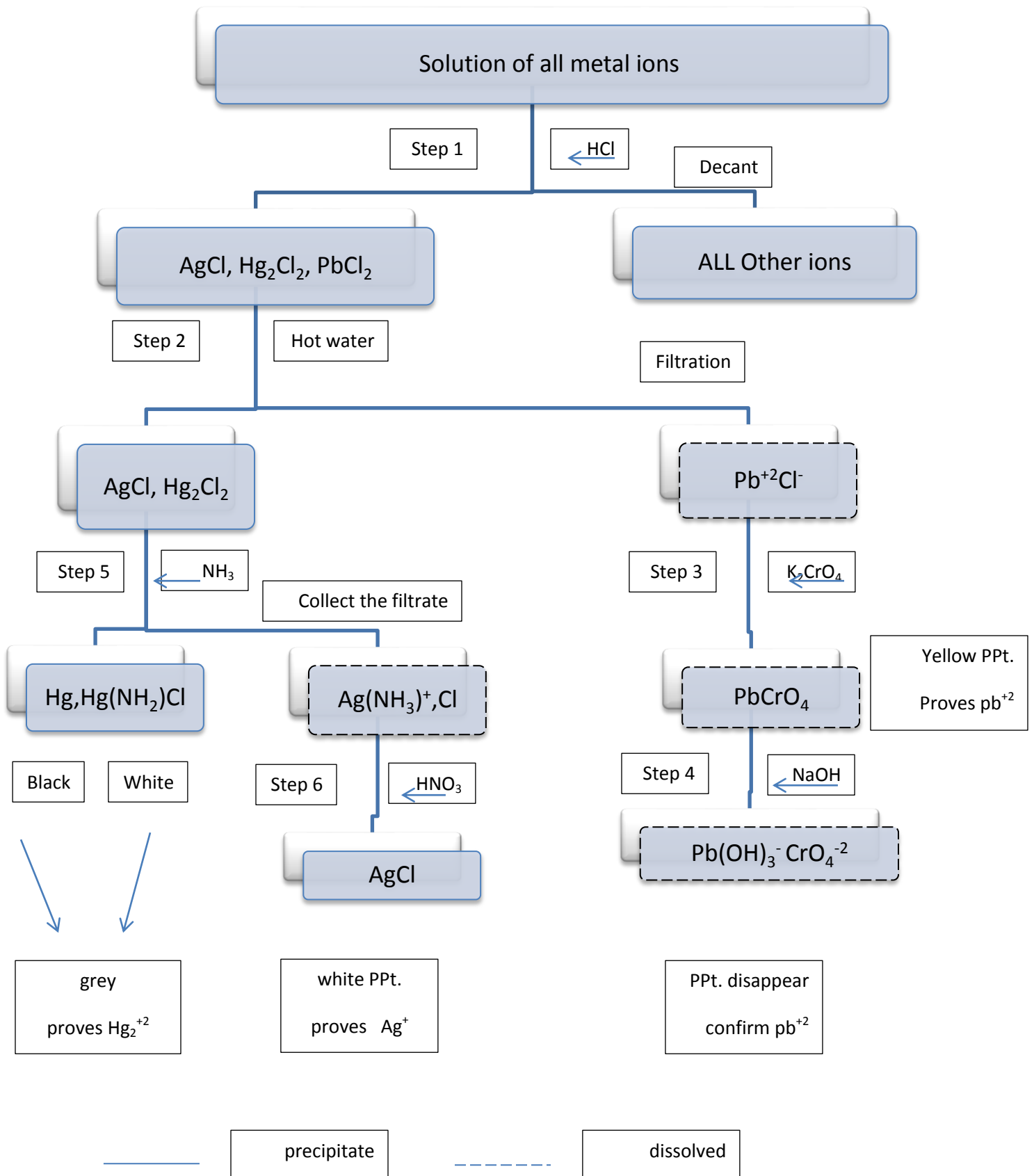
## **Qualitative Analysis of A mixture of Group I Ions** **(Ag<sup>+</sup>, Hg<sub>2</sub><sup>+2</sup>, Pb<sup>+2</sup>)**

**Analysis** means the separation and identification of a substance in a mixture; Analysis could be either Quantitative or Qualitative.

**Quantitative analysis** means the determination of the actual amount of the substance in a measured volume of unknown sample. Its units are gm/100ml, meq/L, mmol/L or I.U/L. While **Qualitative analysis** is used to detect whether a particular substance is present in an unknown sample or not, i.e. it is yes or no test.

There are many analytical methods used to separate a substance from a mixture, the simplest one is based on the solubility behavior of that substance in different solutions (which depend on the ionic equilibria). So that by adding a precipitating agent and filtration you can separate a particular substance and by knowing its reactional behavior with a second agent you identify it. The aim of this experiment is to learn a systematic procedure to separate ions and then to identify them.

# Analysis Chart for $\text{Ag}^+$ , $\text{Hg}_2^{+2}$ , $\text{Pb}^{+2}$



## **Procedure**

1. Place 20 drops of mixture solution in a test tube, add 20 drops of diluted HCL (drop by drop) till a precipitate is formed.
2. Decant the supernatant (clear fluid), then add 5-10 ml. of hot distilled water to the precipitate.
3. Heat the tube in hot water bath nearly to boiling for 2-3 minutes, then filter while still warm.
4. To the filtrate add 5 drops of 1 M  $K_2CrO_4$ , a yellow precipitate indicates the presence of lead ion, sometimes to confirm it more, add 5 drops of NaOH to the test tube (precipitate will dissolve).
5. Add 5-8 drops of 6 M  $NH_3$  to the precipitate and take the filtrate, a grey precipitate indicates mercury ion.
6. Acidify the filtrate from No.5 with 5-10 drops of 4 M  $HNO_3$ , a white precipitate confirms the presence of silver ion.