Hilla University College
Medical physic department
Analytical Chemistry
First stage / First course

Lab. No. 4



Lecture

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Experiment No. (3): Determination of Chloride in Silver Chloride

the theory:

Chloride can be estimated in a water-soluble model by adding an excess of silver nitrate solution to the acidified solution with dilute nitric acid and then weighing the precipitate (silver chloride) formed after filtering, washing and drying. The process of estimating chloride in this way is carried out according to one chemical reaction, which is:

$$Ag^+ + Cl^- \longrightarrow \underset{\text{slightly soluble}}{AgCl\downarrow} \text{ white precipitate}$$

The precipitating agent is $AgNO_3$, so the chloride precipitates in the form of a colloidal precipitate that collects easily with stirring, which leads to the formation of a clear precipitate that can be separated by the filtration process.

Materials and tools:

1- Chloride salt dissolved in water (NaCl)

2- dilute nitric acid 3dil. HNO_3

3- Silver nitrate solution $AgNO_3$

4- Beaker

5- Funnel glass funnel

6- Stirrer

7- Filter papers

7- Conical flask

Procedure:

1- (5 ml) of the solution (containing chlorine ions) is taken using the included cylinder and placed in a clean beaker.

2- Add silver nitrate (15 ml) slowly, with continuous mixing.

3- Heat the mixture quickly to near boiling point for a minute or two so that the precipitate becomes agglomerated.

4- Remove the beaker from the heat and let the sediment settle for a period of time in a dark place, then filter and check the filter by adding a few drops of silver nitrate solution.

5- Wash the precipitate 2-3 times with cold nitric acid.

Calculation:

$$GF = \frac{\text{atomic weight (Cl)}}{\text{Molecular weight (AgCl)}} = \frac{35}{(107+35)} = 0.2464$$

$$\text{Percentage of chloride in the sample} = \frac{\text{mass of AgCl} \times GF}{\text{mass of sample}} \times 100$$

Where:

GF: Gravimetric factor

Discussion:

1- Why is sedimentation done in an acidic medium?

2- The precipitate is washed with diluted HNO_3 instead of pure water?