

GRAVIMETRIC TITRATIONS

Q.1. Define Gravimetric analysis & explain the general principle involved.

Ans. These are quantitative analysis by weight which involves the process of isolating and weighing an element or a definite compound of the element in as pure a form as possible. A technique in which the amount of an analyte in a sample is determined by converting the analyte to some product.

Advantages - when done correctly it is highly accurate (most accurate of all time); requires minimal equipment.

Disadvantage - requires skilled operator, slow.

General principle is based on following reaction.



a molecule of analyte A react with r molecules of the reagent R. The product AaRr is usually is slightly soluble substance; which can be weighed as such after drying or ignited to another compound of known composition & then weighed.

Eg. Calcium (calcium) is determined by gravimetry; by precipitation of calcium oxalate & ignition of oxalate to calcium oxide.



Generally excess of reagent R is added to repress the solubility of the precipitate.

Q.2. Enlist the various steps involved in Gravimetric Titrations.

Ans. Following are the steps involved in Gravimetric Titrations:

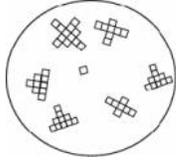
- Preparation of the solutions
- Precipitation
- Digestion
- Filtration
- Washing of the precipitates
- Drying and Ignition
- Weighing
- Calculations

Q.3. Explain the precipitation process involved in gravimetry.

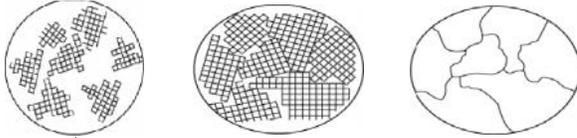
Ans. Precipitation process involves two steps

- Nucleation
- Particle growth

Nucleation is nothing but formation of nuclei/ molecules in solution come together randomly and form small aggregates.



Growth of these nuclei to form particles to form visible precipitates is particle growth.



Nucleation and Particle growth always compete for molecules/ions being precipitated.

If nucleation is faster than particle growth:

a large number of small aggregates occur giving colloidal suspensions

If particle growth is faster than nucleation:

only a few, large particles form giving pure crystals

If rate of nucleation is small when compared to rate of growth of nuclei, less particles are finally produced and particles produced will be larger in size. This is desirable, since such precipitates are easy to filter and will be more pure.