Gravimetric analysis

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Introduction

Gravimetric analysis is one of the quantitative method of chemical analysis. It involves the determination of the amount of some constituents of a given sample by weighing. In this method constituents to be estimated is separated from the sample in a solid form which has known percentage composition and thus it made suitable for weighing. The most widely used method for getting solid from its precipitation method.

Requisites of precipitation

The ideal requisites for precipitation are

- For precipitation optimum conditions like pH, temperature , dilution must be strictly maintained to get good precipiate.
- The precipitating reagent must be chosen to give as insoluble precipitate as possible. i,e., precipitating agent should be selective.
- The sample should be dissolved completely in a suitable solvent and a dilute solution is used for precipitation to avoid co precipitation.
- The precipitate should ordinarily be digested for longer duration on steam bath in order to avoid co precipitation and post precipitation.

Mechanism of precipitation

Mechanism of precipitation may be considered to take place in three stages or steps.

1. Super saturation 2. Nucleation 3. crystal growth

1. Supersatutation – precipitation cannot occur until the solution super saturated with respect to a given compound. A supersaturated solution contains grater concentration of solute.
2. Nucleation – it is the formation of a more stable phase from meta stable phase of super saturation.
3. Crystal growth – when nucleation pre dominates, more number of nuclei are formed, small particals are produced. Colloidal solutions do not settle and are not filterable as they pass through ordinary filter paper.

Factors influencing precipitation

The factors influencing precipitation are

- Effect of acids on the solubility of a precipitate.
- Effect of temperature on the solubility of a precipitate
- Effect of the nature of solvent on the solubility of a precipitate.
- Super saturation and precipitate formation
- The purity of the precipitate

Advantages of gravimetric analysis

- It is accurate and precise using modern analytical balance
- The procedures are simple
- Accurate determinations are possible
- The interference by other ions can be minimized
- The equipment required are less comercial
- Gravimetric analysis was used to determine the atomic masses of many elements to six figure accuracy.

Disadvantages of gravimetric analysis

- Gravimetric analysis is based on the measurement of mass .
- Procedures in some cases are time consuming
- There is lack of sensitivity
- The accuracy decreases with decrease in the amount of sample .