

ANALYTICAL CHEMISTRY

Read the details of the information given below from Skoog and West's "Fundamentals of Analytical Chemistry" book, which is recommended as a reference.

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Gravimetric Methods of Analysis

Precipitation Gravimetry

Calculation of Results from Gravimetric Data

Applications of Gravimetric Methods

Gravimetric methods: Quantitative methods that are based on determining the mass of a pure compound to which the analyte is chemically related.

- **Precipitation gravimetry**
- **Volatilization gravimetry**
- **Electrogravimetry**

12A Precipitation gravimetry



12A-1 Properties of precipitates and precipitating reagents

The ideal precipitating reagent would react with the analyte to give a product that is:

1. easily filtered and washed free of contaminants;
2. of sufficiently low solubility that no significant loss of the analyte occurs during filtration and washing;
3. unreactive with constituents of the atmosphere;
4. of known chemical composition after it is dried or, if necessary, ignited.

Factors that determine the particle size of precipitates

The particle size of a precipitate is influenced by

1. precipitate solubility,
2. temperature,
3. reactant concentrations,
4. the rate at which reactants are mixed

Relative Supersaturation

$$\text{relative supersaturation} = \frac{Q - S}{S}$$

12A-3 Colloidal precipitates

- Coagulation of colloids

To hasten the coagulation: **heating**, **stirring**, **adding an electrolyte**

- Peptization of colloids

Peptization is a process by which a coagulated colloid returns to its dispersed state.

- Practical treatment of colloidal precipitates

Digestion is a process in which a precipitate is heated in the solution from which it was formed (the mother liquor) and allowed to stand in contact with the solution.

12A-4 Crystalline precipitates

1. More easily filtered.
2. Easily purified than are coagulated colloids.
3. Digestion (without stirring) yields a purer, more filterable product.
4. Recrystallization yields larger and more easily filtered crystalline aggregates.

12A-5 Coprecipitation

Coprecipitation is a process in which *normally soluble* compounds are carried out of solution by a precipitate.

1. Surface adsorption
2. Mixed-crystal formation
3. Occlusion
4. Mechanical entrapment