Types of Gravimetric Methods

1. Particulate Methods
2. Volatilization Methods
3. Electrogravimetric Methods
4. Precipitation Methods
Steps Common to All Gravimetric Precipitation Methods

1. Preparation of the solution of the analyte
2. Precipitation
3. Digestion
4. Filtration
5. Washing
6. Drying or ignition
7. Weighing
8. Calculation
Properties of Precipitates and Precipitants

Give a product with the following characteristics:

- readily filtered and washed free of contaminants
- low solubility
- unreactive with constituents of the atm
- high purity and known composition after drying or ignition
What Factors Determine Particle Size?

- Mechanism of ppt formation is still not fully understood.

- Influenced by experimental variables such as ppt solubility, temperature, reactant concentrations, and rate at which reactants are mixed.
Why Are Colloids Stable?

- all particles present are either (+) or (-) charged

- the charge structures repel each other since they are similarly charged
Heating the Solution

- Decrease in ions in primary layer

- Increase in kinetic energy may be sufficient to overcome electrostatic repulsion

∴ colloidal suspensions can often be coagulated by heating, stirring, and adding an electrolyte.
Surface Adsorption

- normally soluble compound is carried out of solution on the surface of colloid
- usually consists of the 1° and the counter-ion layer
- can be minimized by digestion or reprecipitation
Calculations: Gravimetric Factor

Concerned with 2 Measurements

1. Mass of sample

2. Mass of product of known composition stoichiometrically related to the analyte
Problems

3. A 0.6407 g sample containing chloride and iodide ions gave a silver halide precipitate weighing 0.4430 g. This precipitate was then strongly heated in a stream of Cl₂ gas to convert the AgI to AgCl; on completion of this treatment, the precipitate weighed 0.3181 g. Calculate the percentage chloride and iodide in the sample.

4. A sample of impure iron ore is believed to be approximately 55% w/w Fe. The amount of Fe in the sample is to be determined gravimetrically by isolating it as Fe₂O₃. How many grams of the sample should be taken to ensure that approximately 1 g of Fe₂O₃ will be isolated?