

# Volumetric Methods

## Titration

### An Overview of Titrations

Volumetric or titrimetric analyses are quantitative analytical techniques which employ a titration in comparing an unknown with a standard. In a titration, a volume of a standardized solution containing a known concentration of reactant "A" is added incrementally to a sample containing an unknown concentration of reactant "B". The titration proceeds until reactant "B" is just consumed (stoichiometric completion). This is known as the *equivalence point*. At this point the number of equivalents of "A" added to the unknown equals the number of equivalents of "B" originally present in the unknown.

To be successful, a titration must involve a chemical reaction between the two solutions which are being mixed. This chemical reaction should be simple, rapid and complete. Although a titration may involve an acid base reaction, a precipitation reaction, a complexation reaction, or an oxidation reduction reaction.

**Titration** : The gradual addition of one solution to another until the reaction is complete (as indicated by an "indicator "

**Endpoint** : Is the point at which the indicator dictates that the reaction is complete.

**Indicators** : Indicators are organic compounds that have different colors in solutions of different pH.

**Equivalence point** : Is the point at which the chemical reaction is complete.

**Standard solutions** : A standard solution is a solution of known and exactly defined concentration. A primary standard can be used to produce a standard solution

### Primary Standards

A highly purified compound that serves as a reference material in volumetric methods. The basic requirements of primary standard substance are:

1. Obtainable in high purity.
2. Stable in air, can be stored, Nonhygroscopic.
3. Absence of hydrated water.
4. Low cost.

5. Moderate solubility.
6. Large molecular weight.
7. Reacts stoichiometrically and rapidly.

## General Procedure of Titration

