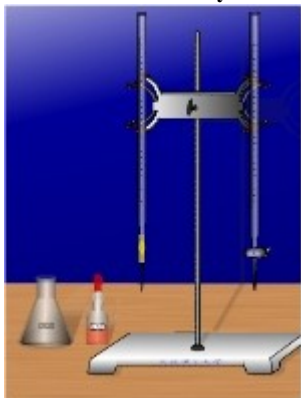


§ 3.1.1 Generalization

I - Terms of Titrimetric Analysis

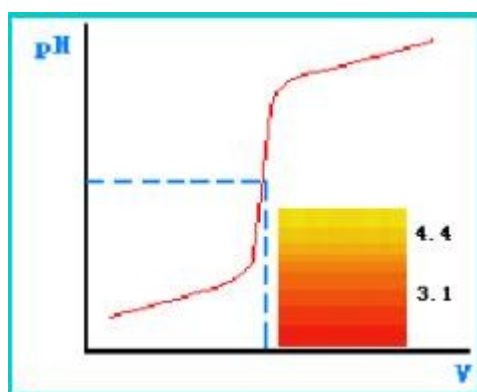
1. Titrimetry



The method to determine the concentration of a sample by employing volumetric instruments (buret, pipet, volumetric flask) and indicator.

2. standard solution In titrimetric analysis, a reagent added as a solution of known concentration—referred to as a standard solution. To determine the concentration of an analyte by the accurate volume of the standard solution that consumed in the process of the titration. The number of the significant figures of standard solutions must be four.

3. Stoichiometric point(Equivalence point) The point at which the titrant added just completely reacts with the analyte.



4. Titration curve The curve to describe the relationship between the titrant volume and the solution parameter during the process of the titration. In acid-base titration, the parameter is pH; In compleximetry, the parameter is pM; In redox titration, the parameter is electrode potential.

5. Indicator The material used to indicate the end point because of the color

change near the stoichiometric point.

6. End point The point at which the color of the indicator changes and the titration is stopped. The end point is not necessarily equal to the stoichiometric point.

7. Titration error

The difference between the end point and the equivalence point. Unsuitable indicator will cause large titration error.

8. Primary standard A stable, definite composition and highly pure material, used to determine the accurate concentration of standard solution.

9. Titration and Standardization The titration procedures of determining the concentration of standard solution with primary standard is called standardization. The operation to determine the analyte with standard solution is called titration. Titrimetric analysis is simple, convenient and high accurate, is applied widely in macro analysis. Some fundamental operations of titrimetric analysis must also be mastered by the operators who employ instrumental analysis, such as the preparation, transferring of the test solution, determination of the concentration of standard solution, pretreatment of the test solution etc.. Grasping the operations of titrimetric analysis and relevant calculation is the fundamental ability that owned by chemists.

II \ Requirements for Reactions Used in Titrimetric Analysis

Because of the requirement of "quantity" in titrimetric analysis, not every reaction can be used for titration, in fact, only a few reactions meet the requirements of titration, what are they?

1. The reaction must proceed according to a definite chemical equation without side reaction, which means that the reaction follow the definite stoichiometric relationship.

2. The reaction must proceed to virtual completion at the equivalence point. The equilibrium constant of the reaction should be very large ($K' \text{ MY, high; } K_{\text{Sp}} \text{ low}$).

The above two will provide a basis for stoichiometric calculation.

3. Some means must be *available for determining* when the equivalence point is reached, such as an indicator or some instrumental methods to tell the end point.
4. The reaction should be *rapid*: The most titration process don't need heat, but individual titration process do. Such as the reaction occurred between potassium permanganate and oxalic acid is very slow when the temperature is low.
-

The key point in this page: grasp the terms of titrimetric analysis and requirements for reactions used in titrimetric analysis

Problems in this page: What are the volumetric glasswares used in titrimetric analysis? Are the end point and stoichiometric point same? Why?

Problems in next page: How many types of titrimetric analysis? What are they?