

A short review on practical analytical chemistry



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Important terms and expressions:

$$\text{no. of moles} = \frac{\text{weight (g)}}{\text{molecular weight (g/mole)}}$$

$$\text{no. of equivalents} = \frac{\text{weight (g)}}{\text{equivalent weight (g/eq.)}}$$

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Important terms and expressions:

Molarity is an expression used to determine the concentration of a solution in terms of number of moles of the reagent per liter of the solution.

$$\text{Molarity (M)} = \frac{\text{no. of moles}}{\text{volume of solution (L)}}$$

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Important terms and expressions:

Normality is an expression used to determine the concentration of a solution in terms of number of equivalents of the reagent per liter of the solution

$$\text{Normality (N)} = \frac{\text{no. of equivalents}}{\text{volume of solution (L)}}$$

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Important terms and expressions:

A *standard solution* is a solution of known normality or molarity.

Standardization is the determination of the molarity or normality of a solution by titration. Standardization is done by:

- a) the use of another standard solution, *the secondary standard*.
- b) the use of a carefully weighed sample of a substance of a high purity, *the primary standard*.

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Important terms and expressions:

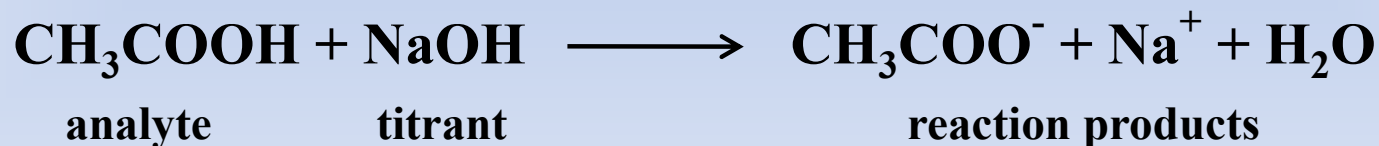
The primary standard should:

- be of high purity and known composition.
- be stable.
- not be hygroscopic or efflorescent.
- be readily available and of low cost.
- have high equivalent weight to minimize errors during weighing.
- be reasonably soluble in the titration medium.

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Important terms and expressions:

Titration is an analytical technique which allows the quantitative determination of a specific substance (*analyte*) dissolved in a sample. It is based on a complete chemical reaction between the analyte and a reagent (*titrant*) of known concentration which is added to the sample. A well-known example is the titration of acetic acid (CH_3COOH) in vinegar with sodium hydroxide,



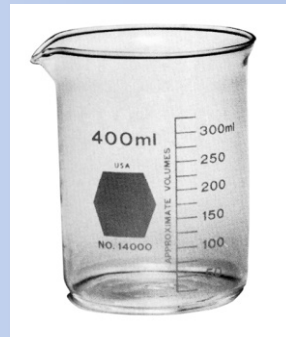
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Important terms and expressions:

The titrant is added until the reaction is complete at the end point. The end of a titration reaction should, then, be easily observable mostly by colour indicators. The reaction involved in a titration must be fast, complete, of known mechanism and observable. Titration reaction types include acid-base reactions, oxidation-reduction reactions, complexometric reactions, and precipitation reactions.

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Glassware and instruments:



beaker



glass stirrer



graduated cylinders



washing bottle



volumetric flask



fume hood

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Glassware and instruments:



conical flask



burette



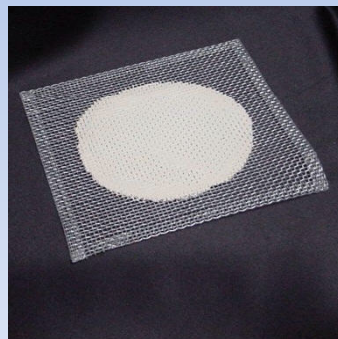
burette stand



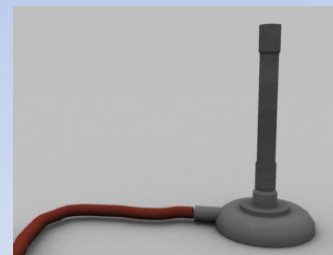
burette clamp



tripod stand



wire gauze



Bunsen burner



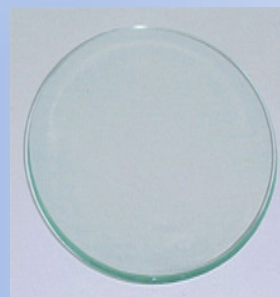
bulb pipette

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Glassware and instruments:



spatula



watch glass



electrical balance



oven