

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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Chemicals, Apparatus, and Unit Operations

Selecting and Handling Reagents and Other Chemicals

Cleaning and Marking of Laboratory Ware

Evaporating Liquids

Measuring Mass

Equipment and Manipulations Associated with Weighing

Filtration and Ignition of Solids

Measuring Volume

Safety in the Laboratory

2A Selecting and handling reagents and other chemicals

The **purity of reagents** has an important bearing on the accuracy attained in any analysis.

2A-1 Classifying chemicals

- **Reagent Grade**
- **Primary-Standard Grade**
- **Special-Purpose Reagent Chemicals**

2B Cleaning and marking of laboratory ware

Flasks, beakers, and some crucibles  acetate pencil
(semipermanent)

Porcelain surfaces  saturated solution of FeCl_3
(permanent)

2C Evaporating liquids

Reduce the volume of a solution that contains a nonvolatile solute.

The **bumping** causes partial loss of the solution.

➤ Careful and gentle heating will minimize the danger of such loss.

2D Measuring mass

Analytical balance must be used to measure masses with high accuracy.

- **Macrobalance:** 160 - 200 g, a precision of 0.1 mg.
- **Semimicroanalytical balance:** 10 - 30 g, a precision of 0.01 mg.
- **Microanalytical balance:** 1 - 3 g, a precision of 0.001 mg.

2E Equipment and manipulations associated with weighing

The mass of many solids changes with humidity because they absorb moisture.

- In the first step in a typical analysis, **the sample should be dried** so that the results are not affected by moisture.

2F Filtration and ignition of solids

Apparatus

Simple crucibles

Filtration crucibles

Filter paper

Heating equipment

Filtering and igniting precipitates

Preparation of crucibles

Preparation of a filter paper

Filtering and washing precipitates

Transferring paper and precipitate to a crucible

Ashing filter papers

2G Measuring volume

The precise measurement of volume is as important as the precise measurement of mass.

Units of volume

$$1 \text{ L} = 1 \text{ dm}^3$$

$$1 \text{ mL} = 1 \text{ cm}^3$$

$$1 \text{ L} = 10^3 \text{ mL}$$

$$1 \text{ L} = 10^6 \text{ }\mu\text{L}$$