Ministry of Higher Education and Scientific Research

AL Mustaqbal university college

Chemical Engineering Department

Analytical chemistry laboratory

Experimental No.1

Preparation of standard solution of Na_2CO_3

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- Purpose of This Test:

Determination Normality of Solution.

- Introduction and theory :

- Primary Standard solution:

The primary standard is a highly purified compound that serves as a reference material in volumetric and mass titrimetric methods. The accuracy of a method is critically dependent on the properties of this compound. Important requirements for primary standard are the following: High purity (e.g.99.9%by weight), atmospheric stability, absent of hydrate water, modest cost, reasonable solubility in the titration medium and reasonable large molar mass. One of such compounds is sodium carbonate (Na_2CO_3).

- Secondary Standard solution:

Some compounds consider as secondary standard solution due missing one of the important requirements for primary standard. For that can prepare as an approximate normal solution and then calibrate with a known standard chemical solution by volumetric analysis. Such as: hydrochloric acid HCL, sodium hydroxide NaOH.

Procedure :

- **To prepare 250ml of 0.1N Sodium carbonate (Na_2CO_3).**

1- Dry Appropriate quantity of sodium carbonate in an oven set at 110^{o}C for 1hr. Store the dried material in desiccators.
2- Calculate the weight of (Na_2CO_3) from the law.
3- Weight (NaR2RCOR3R) using a microbalance (1.0 or 0.1) mg accuracy.
4- Transfer this quantity into a 250 ml beaker and solve it in about 50ml distilled water (D.W). Transfer the solution into a250ml volumetric flask. Complete the solution to the mark by distilled water with the same beaker. Stopper the volumetric flask and shake well.

Calculation :

$$N = \frac{wt}{eq.wt} X \frac{1000}{V \text{ in ml}} \quad eq/L$$

$$eq.wt = \frac{M.wt}{No.\ of\ eq}$$

W_t = Wight of Na_2CO_3(gm)
V= volume of volumetric flask (ml)

N = Normality of solution.

Discussion:

- Determine the volume (ml) required to dilute a solution containing 48.480g of K_2SO_4 in order to prepare a 1 N of the solution.
- What are the specifications of primary standard solution?

- **Preparation of approximately (0.1N) HCl from 37% and 1.2 Sp.g**

1- Calculate the Normality of the concentrated HCl from the law:

N_1 =

Sp. Gr. =

Eq. wt. =

2- To prepare (500ml) of 0.1N HCL:

$N_1 V_1 = N_2 V_2$

$N_1 x$? = 0.1 x 500

3- Transfer some of distilled water to 500ml volumetric flask and add the calculated volume of conc. HCl. Mix the content thoroughly. Complete to the mark with distilled water and make a label.

- **Discussion**:
  - What are the specifications of secondary standard solution?

- Determine the volume (ml) required to dilute a solution of HCl from conc. 37% and Sp.g. 1.2 to 1000ml if the Normality is 0.25 eq/l