Hilla University College
Medical physic department
Analytical Chemistry
First stage / First course

Lab. No. 2



Lecture

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Experience (1)

Experiment No. (1) Prepare a standard solution

Prepare an initial standard solution of sodium carbonate

the theory:

A standard solution is prepared by dissolving an amount of a standard substance which precisely weighted in a given volume of solvent. Standard materials are classified into a primary standard and a secondary standard.

Conditions that must be met in the standard materials:

1. That it is not affected by atmospheric conditions: that it be unfluid, not affected by moisture and carbon dioxide, that is, it does not change during the weighing process, is not affected by light, temperature, and is not colored. So that it does not interfere with the color of the guide.

2. It has a large molecular mass (with a high gram weight, so that the weight errors are negligible).

3. It is easy to dissolve in water at room temperature.

4. It is easy to obtain with a high degree of purity and is also easy to preserve and has a known chemical composition

5. React quickly and in specific and known quantities with the substance to be specified and with a clear end point.

Based on the foregoing, we note that the following materials are not valid to be primary standard materials:

- Sodium hydroxide because this substance absorbs water vapor and carbon dioxide from the atmosphere.

- Acids and bases because they absorb water vapor and carbon dioxide like alkalis.

In practice, it is difficult to obtain a standard material that meets all the conditions mentioned, but it is necessary to take into account these conditions when choosing the primary standard material.

Among the standard materials commonly used in volumetric analyzes are:

Acids: benzoic acid (C_6H_5COOH).

Bases: sodium carbonate (Na_2CO_3) and borax ($Na_2B_4O_7.10H_2O$)

Oxidizing agents: potassium dichromate ($K_2Cr_2O_7$), iodine (I_2).

materials and tools:

1- sensitive scale

2- Volumetric flask

3- Beaker

4- Anhydrous sodium carbonate Na_2CO_3

5- Stirrer

6- Distilled water

Procedure:

1- Weigh exactly (0.2 -0.3 gm) of pure anhydrous sodium carbonate in a clean, dry beaker.

2- The solid substance is transferred completely to the volumetric flask, after adding about (5-10 ml) of distilled water using a glass stirrer to completely dissolve the solid.

3- The solution is transferred from the beaker to a volumetric flask of (50ml) capacity. It is taken into account that the beaker is washed several times with a little distilled water and **the washing water is poured into the volumetric flask (in order to ensure that the dissolved substance descends into it) and the glass stirrer is washed every time.**

4- Distilled water is added to the volumetric flask up to the mark in the neck of the volumetric flask.

5- Close the nozzle of the volumetric flask with a suitable cap and shake it several times so that the solution is homogeneous inside the flask.

Important note: Any error in preparing the initial standard solution will be the cause of many errors when calibrating standard solutions in the future.

the accounts.

Discussion:

1- Calculate (N) of the prepared sodium carbonate solution?

2- Why is distilled water used in chemical preparations, especially in analytical chemistry?

3- Can an initial standard solution of silver nitrate be prepared? And why?