TYPES AND ANALYSIS OF GRAVIMETRIC ANALYSIS

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Abstract: *this article contains various opinions and information about the method of gravimetric analysis, its essence and methods of analysis, types of gravimetric analysis, their importance in the chemical industry and their wide use.*

Key words: *quantitative analysis, gravimetric analysis, analyte, precipitation, filtration.*

Gravimetric analysis is one of the laboratory methods in which the mass and concentration of a substance is determined by measuring the change in its mass. The chemical being analyzed quantitatively is sometimes called the analyte.

There are 2 common types of gravimetric analysis. In both types, the analyte undergoes a phase change and separates from the mixture, which in turn causes a mass change.

Quantitative analysis is closely related to mineral exploration, metallurgy and chemical technology, biochemistry and agrochemistry, soil science, plant physiology, pharmacology, medicine and other fields.

Quantitative analysis allows to obtain information about the composition of plant and animal organs, to study the effect of certain elements on their growth, development and productivity.

At the present time, the development of industries such as modern production and electronic technology increases the focus on determining the minimum amount of impurities in substances. Quantitative analysis is the main method of controlling chemical processes, raw materials, intermediate and finished products in production.

In the gravimetric driving method, the substances in the mixture are separated by heating or chemically decomposing the sample. Heating or chemical decomposition releases any volatiles in the mixture, resulting in a change in the mass of the sample, and we measure that mass.

Gravimetric sedimentation method uses a reaction that leads to the formation of a precipitate, and the substance to be determined is precipitated as a solid compound and separated. In this case, a phase change occurs, i.e., the analyte passes from the liquid phase, reacting, to the state of solid precipitation. The precipitate is separated from the liquid phase by filtration. By calculating the mass of the precipitate, it is possible to determine the amount or concentration of ionic compounds in the solution.

Gravimetric analysis is a laboratory technique that uses mass change to calculate the amount or concentration of an analyte. One type of gravimetric analysis is the driving method, in which the mass change is measured after the volatile compounds have been expelled. For example, metal hydrate is heated and water is expelled. The mass change is then used to determine the amount or purity of the metal hydrate. Some useful tips for gravimetric analysis experiments and calculations:

- Double-check the stoichiometric ratios and make sure the equations balance.
- Ensure that the volatiles are dried to a constant mass when removing them from the sample.
- Always consider the mass of your container!

The main stages of gravimetric analysis are as follows:

1. The component to be detected is isolated and weighed. A sample is withdrawn on an analytical balance and ignited in a crucible. It is burned thoroughly until the mass of the ash does not change. Based on the specific mass of ash, its proportion in the sample is calculated.

2. The component to be detected is removed and the remainder is weighed. In this case, the sample of the test substance (g) is thoroughly dried to a constant weight. The mass of water is found from the difference between the masses before drying and after drying, and its content (in percent) is calculated.

3. The detected component turns into a chemical compound. The latter is isolated and transformed into a form with a fixed composition. Based on the mass of sediment in the form of weight, the composition of the identified component is calculated.

Precipitates obtained during the analysis should usually be dried, during burning they often undergo chemical changes. As a result, sedimentation and gravimetric forms are distinguished in gravimetric analysis.

Determining the amount of substances by the sedimentation method of tensile analysis consists of the following stages:

- Taking samples for analysis;
- Dissolving the obtained sample;
- Choosing the form of deposition;
- Choosing a precipitating substance (reagent);
- Selection of deposition conditions;
- Sedimentation separation (filtering), washing;
- Transferring the precipitate to a drying form;
- Calculation of analysis results;

Filtering and washing the precipitate. Depending on the type, the precipitate is filtered to separate it from the solution. Filters are different according to the material

they are made of (ash, ashless), density and size. The size of the filter is important in filtering. The filter is selected not according to the volume of the liquid to be filtered, but according to the amount of sediment. When the sediment is put into the filter, it should not be more than half of it, otherwise the sediment cannot be washed thoroughly. The purpose of washing the sediment is to remove foreign additives and sediment from its surface.

Drying the precipitate and transferring it to a drawable form. The washed precipitate is dried in a drying oven at 90-150 °C for a certain period of time.

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