The importance of quantitative analysis in the study of the topic of solutions

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ABSTRACT

This article reflects the importance of quantitative analysis in the study of the topic of solutions. Types of solutions based on different methods, methods of their expression are highlighted. The role of quantitative analysis in medicine is also indicated.

Keywords: Solutions, quantitative analysis, nonelectrolytes, electrolytes, ampholites, methods, concentration.

Nowadays, the use of innovative technologies in the theoretical and practical study of chemistry is one of the urgent tasks of the educational system. In teaching using innovative technologies, through a full, reduced and deepened stratification of curricula, there will be an opportunity to stratify teaching, that is, it will be possible to individualize teaching. From this modern innovative technology method can be used all methods, depending on the type of educational process [1].

In the school chemistry course, it is important to prepare solutions, the process of forming precipitates, quantitatively determine their composition.

Solutions are of great importance in marriage, industry, medicine and especially in the decree. Blood plasma, lymph and other fluids in the body are in the solution State. The drug is also more effective when the substances are in a dissolved state or when the body passes into a dissolved state. The study of the properties of solutions requires them to be subject to certain laws and necessarily refer to them when faced with solutions in practice.

Analytical chemistry is a branch of chemical science that develops fundamental methods and techniques of qualitative and quantitative analysis based on the fundamental laws of chemistry and physics.

Quantitative analysis - determination of the content (mass, concentration) or quantitative ratios of components in the analyzed sample. The components to be determined can be atoms, molecules, isotopes, functional groups, phases, etc. Quantitative analysis can be:

- gravimetric (weight);
- titrimetric (volumetric).

The gravimetric method of analysis is based on the determination of a substance after interaction with a solution of a substance during a chemical reaction.

A solution of small substances with a molecular mass of 5000 g/mole - a solution of small molecules of substances, a solution of substances with a molecular mass of more than 5000 g/mole – is called a solution of high-molecular substances.

Depending on whether the electrolytic dissociation as a result of melting does not go away, the solutions are divided into 3 groups; electrolyte solution, nonelectrolyte and ampholyte solution [2].

Electrolyte solution is a solution of salts, acids and bases that dissociate into ions. For example: KNO_3 , HCL, KOH mining solutions. The electrical conductivity of the solution is higher than that of the solvent.

Noelectrolyte solution. An aqueous solution is a solution of substances that are practically not dissociated. For example: sucrose, glucose, mochevina solutions are examples of noelectrolyte solutions. Their electrical conductivity is almost no different from the electrical conductivity of the solvent.

A solution of ampholites is a solution of dissociable substances, such as both acidic and base compounds. For example: $Al(OH)_3$, glycine solutions.

The most important indicator of solutions is the concentration indicator. By concentration, many properties of solutions are determined. It is said that the concentration of the component (substance) of the solution is the measured value of the dissolved substance stored in a certain mass or volume of the solution or solvent. Consequently, the concentration-indicates in what proportion the solvent and dissolved substances are obtained (by weight, volumetric). The most commonly used concentrations are; mass, molar, molyal, molar concentration of the equivalent, titr [3].

Solutions are solid or liquid homogeneous systems consisting of two or more component (components), in which the relative amounts can vary in a wide range. Any solution consists of a dissolved substance and a solvent; molekula or ions in it are distributed in multiples. It is necessary to distinguish between dissolved substances with a solvent in the solution. As a rule, as a solvent, both in pure form and in solution, an unchanged substance is obtained from the aggregate state. For example, in a solution of salt in water, a solvent is obtained.

Modern educational technologies are used to study the subject better. For example, during the repetition of the lesson passed to the student, a question is asked about the method of mental attack - the subject mentioned in this method students give an oral answer, during the lesson or at the end of the lesson, it can be done through the B/BX/B method, the FSMU method, the essay method, or the methods of conducting the assessment. In the B/BX / B method, the student learns the information he / she wants to know, the information he / she wants to know.

The transfer of the Assesment is mainly given at the end of the lesson will consist of a test and a short answer questions, the result of which will determine how much the students have mastered the lesson and the result of the teacher's passing the lesson. The use of such modern methods increases the student's interest in the lesson, leads to a thorough acquisition of the sphere [4].

The method of discussion is a method of teaching, conducted in a way of mutual discussion, exchange of views with educators on a topic. This method is used provided that any subject and problem can be discussed on the basis of available knowledge and experience.

The task of leading the discussion can be entrusted to one of the educators, or it can be carried out by the educator himself. It is necessary to conduct the discussion in a Free State and try to attract every educator to the discussion. When this method is carried out, it is necessary to try to immediately eliminate the conflicts that arise between the educators.

When conducting a dispute method, it is necessary to follow the following rules:

- ✓ all misdemeanors that create an opportunity for students to participate in education;
- ✓ observance of the rule of the hand (raise your hand, speak after the right) do not;

- ✓ listening to ideas-culture of listening to ideas;
- ✓ mutual respect-mutual respect for each other.

The stages of the discussion method are as follows:

1. The educator chooses the topic of the discussion and develops questions about it.
2. The educator questions the educators on the problem and invites them to the discussion.
3. The educator grabs the answers expressed to the question posed, that is, different ideas and opinions, or appoints one of the educators as a secretary in order to fulfill this task. At this stage, the educator creates conditions for the educators to freely express their thoughts.
4. The educator divides, generalizes and analyzes the ideas and ideas expressed together with the educators.
5. As a result of the analysis, the optimal solution to the problem posed is selected.

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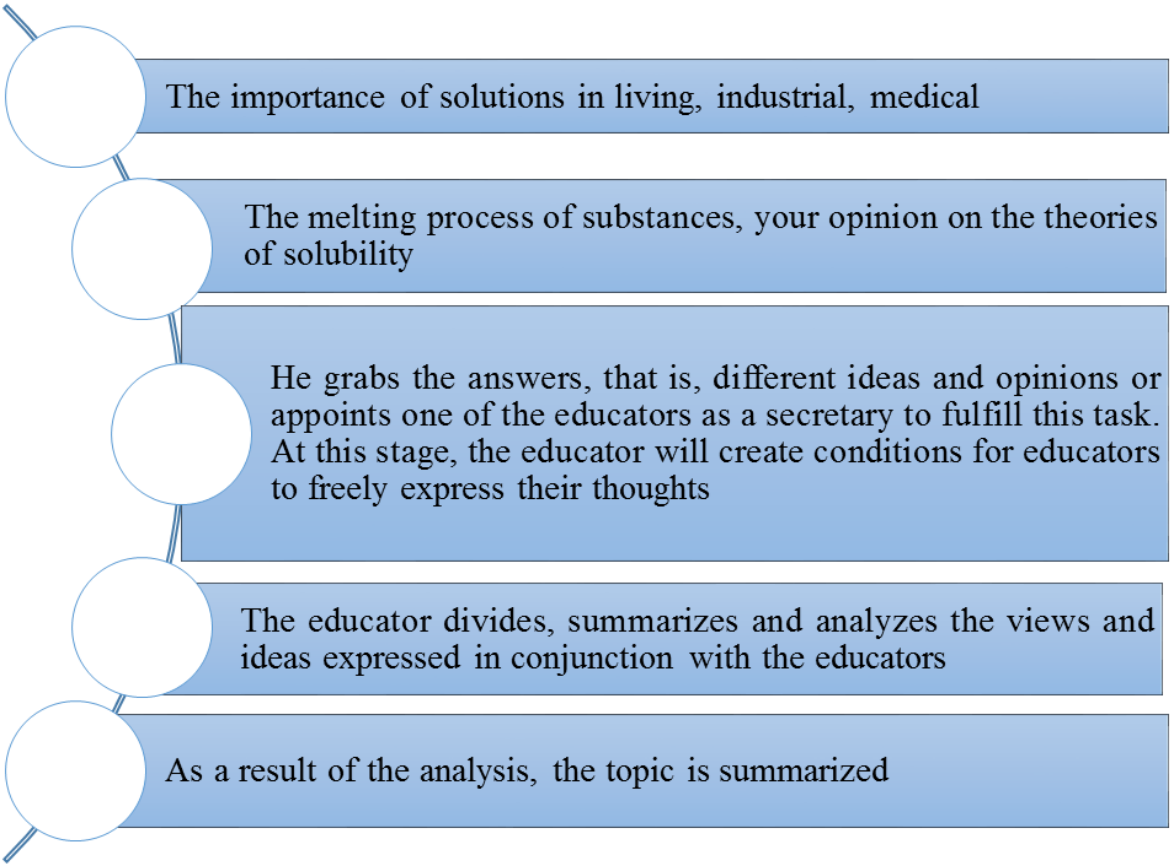
Appropriate, purposeful, effective application of pedagogical methods by teachers (educators)in the process of education and training accessibility to communication, collective activity, logical thinking in the educational recipient, it provides a wide range of opportunities for training the ability to synthesize, analyze existing ideas, find a logical link between different views.



Blitz-survey questions:

1. How many different is the solution?
2. By what methods is the composition of the solutions determined?
3. How many percent of the solution of flat land is used as a physiologic solution?

If the two substances are in a liquid aggregate state until dissolved in one another, the amount in the solution is considered to be more component solvent. In a solution of alcohol with water, which of these substances is more abundant in the solution, it is obtained as a solvent. The uniformity of the composition of the solution makes them closer to chemical substances. Heat dissociation or absorption when some substances dissolve in solvents is evidence of the presence of chemical effects between them [6].

The change in the composition of the solution indicates that they differ from chemical compounds. In addition, it is possible to determine the properties of individual components contained in the solution, and in chemical compounds it cannot be determined.

The concentration of solutions is expressed in several ways. Percentage concentration-indicates how many grams of dissolved substance is contained in 100 g of solution and is expressed in percent.

Percentage concentration (C%) can be represented by the following formula:

$$C_{\%} = m_1 / m_2 \bullet 100$$

there: m - the mass of the soluble substance m1 - the mass of the solution (soluble + solvent)

If the mass of a solution is its density (d) and if the volume (V) is expressed through, $m_1 = d \cdot V$ because it is:

$$C_{\%} = m_1 / dv \bullet 100;$$

Titrimetric or volumetric analysis is a method of quantitative analysis, based on the accurate measurement of the volume of solutions of interacting substances.

Solutions in which the titration is clear are called titrated solution (titrants). Titrated solutions are slightly added to the checked solution by inserting into the nozzle. This process is called vibration. Vibration is carried out until it reaches the equivalent point. The equivalent, equally strong amount of titrant added to the titration solution during titration (that is, the volume of the Titrant solution) is called the titration equivalent point. The equivalent point is determined in different ways, most often with a change in the color of the indicator solution. For example, with a pronounced concentrated oxalic acid, it is possible to determine the concentration of alkali in the presence of a phenolphthalein indicator.

$$H_2C_2O_4 + 2NaOH \rightarrow Na_2C_2O_4 + 2H_2O$$

One of the main signs of analytical reactions is the formation of sediment. The formation of sediment is a factor that is immediately noticeable, especially when it is colored. In quantitative analysis, too, the method of deposition is used. A number of methods of analysis for the separation and determination of substances based on these properties of sediments were invented. Sediments are classified into two groups:

1. Crystal precipitates formed when the saturated hot solution is slowly cooled.
2. Precipitate – amorphous precipitations, which are formed as a result of a sharp cooling of extremely saturated solutions.

Deposition and deposition of deposition structure on its private properties depending on the conditions

The deposition of the substance with low solubility depends on the properties of the elements entering the deposition. Ions with the same sign go to a decrease in the number of compounds with an increase in the solubility ion and a decrease in electromagnetism (the ratio of the square of the nuclear charge to the atomic mass). This condition is explained by an increase in the polarity of ions and chemical bond covalency. For example, with an increase in cation radiusin in the range of calcium, strontium, barium sulphates and a decrease in the ratio of Z^2/r, the solubility decreases.

1-table

Sulphates	$CaSO_4$	$SrSO_4$	$BaSO_4$
Radiusi, nm	0,104	0,120	0,138
$Z^2/_r$	38,5	33,8	29
Solubility m/l	$4 - 10^{-3}$	$7 - 10^{-4}$	$1 - 10^{-5}$

Such legislation is observed in a group of compounds: sulfides, galogenides, selenides and others, similar in ion electronic configuration, salts. As the degree of oxidation of the element increases, the solubility of the compounds formed is usually reduced.

At present, in a number of cases, an increase in the level of oxidation as a result of a change in the chemical properties of ions is also observed, which leads to an increase in solubility. It is more likely to precipitate the cation with a large and easy polar anion. Suffice it to say that as proof of our opinion large anions of acid residues with p-element content: carbonate, phosphate, silicate and arsenates also form sediment.

The polarity of anion electronic cloud depends on the chemical bond Covalence. According to the size and shape of the sediment particle, there is no sharp difference between them, even if it is divided into crystalline and amorphous types, since when amorphous sediment particles are observed under a microscope, it is possible to see crystalline particles in its composition. The property of the sediment depends on its composition and description of granulometric (grainadorlik), that is, its size and shape. Properties such as the speed of germination formation, maturity, filtration rate depend on the same grain size [7].

Since the majority of gravimetric methods of analysis-the formation of sediment, based on its quantitative, complete separation, it is important that the sediment has 3 different characteristics, namely its composition, particle size and shape.

For the analysis to be carried out quickly and accurately, the identifiable substance must be completely and precipitated in the form of large crystals or dense amorphous deposition, so that the deposition is easily washable by rapid filtration. If the sediment is in the form of very small crystals or without amorphous (iviq), then slowly precipitates, as a result of covering the holes of the filter, slowly fillets.

The solubility of the substance depends on the polarity of its and solvent molecules. Dielectric constant of polar molecules is large, polar, well soluble in solvents, and on the contrary, substances whose molecule is polar, for example, hydrocarbons, fats are well soluble in polar solvents, for example, benzene, in solvents such as four-chlorinated uglerod.

The formation of crystals deposition involves two processes:

1.The formation of crystalline centers and their approximation to the account of crystallization. It is added as a center of crystallization from the particles of the substance, which must sink into the solution for crystallization to begin. Solvated ions in the saturated solution are desolated, forming an association, that is, the center of crystallization, that is, the deposition. When the solution is saturated, tiny crystals are formed from them, as many crystallization centers are formed in a short time.

2.The time of formation of the sediment is called the deposition. When the solution is heated, the tiny crystals dissolve easier than their tears. Again, when cooled slowly, the surface of the crystals is covered with pus, which causes the crystal to tear, ripen.

The order of obtaining amorphous sediments is radically different and is associated with the formation of colloidal particles. In order for the colloidal solution to remain intact, amorphous precipitates are quickly precipitated from extremely saturated solutions and filtered without sediment.

As a result of joint deposition, the sediment becomes dirty. There are two types of joint deposition, one is adsorption deposition – that is, if there is deposition as a result of adsorption to the surface of the deposition, the other is an occlusion – that is, in the process of crystal formation, it is combined deposition into an alien ion, which is equal to the internal (defect) cavities, radiusi precipitating ion.

Another reason for occlusion is the phenomenon of isomorphism, when the

precipitated substance changes the ion in the nodes of the crystal lattice, an alien ion whose size is close, forming a crystal. The phenomenon of joint deposition negatively affects the results of quantitative analysis due to sediment pollution, that is, it causes errors. Ways to eliminate joint deposition:

1. When washing the sediment with a scraper, adsorption impurities on the surface of the sediment are cleaned.
2. The precipitate recrystallizes to get rid of occlusion pollution.
3. Joint deposition is more observed in amorphous sediments with a large surface, so it is desirable to form a crystal deposition.

The role of us – teachers in the development of students as mature people in all aspects is incomparable [8]. At present, one of the main requirements of modern pedagogical technology is the formation of their interest in the subjects of independent thinking, using a variety of meaningful games, revealing the essence of the lesson in the process of each lesson, which can transform students from a boring listener into an active participant.

This means that even in the process of formation of sediments, the role of quantitative analysis is great. When teaching students the topic of solutions, it is important to study the methods of preparing solutions, determining their concentration.

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