



tally-research activity in nature. At the same time, in order to systematize knowledge of senior preschool age children means we have developed the program “Child-researcher” and tested it based on kindergarten № 86 in Poltava. A number of relevant experiments is acquainted the children with an object or phenomenon to observe it by direct contacting.

Thus, pedagogical organization and guidance of experimental research activity in nature is the effective mean of development of personality of a preschool child. This type of activity provides research of objects and properties of living and lifeless nature in a certain logical sequence.

During this activity the preschoolers learn that everything in nature is connected with each other, that a human being, as a part of nature, should actively and positively influence the environment.

#### REFERENCES

1. Менщикова Л. Н. Экспериментальная деятельность детей 4–6 лет: из опыта работы / Л. Н. Менщикова. – Волгоград : Учитель, 2009. – 130с.
2. Прохорова Л. Н. Организация экспериментальной деятельности дошкольников: методические рекомендации / Л. Н. Прохорова. – М. : АРКТИ, 2005. – 64 с.
3. Тугушева Г. Экспериментальная деятельность детей среднего и старшего дошкольного возраста : метод. пособ. / Г. Тугушева, Е. Чистяков. – СПб : Детство-ПРЕСС, 2008. – 128 с.

*Світлана Федорина*

### **THE COMPUTATION OF SPURIOUS MOLAR COMPRESSIBILITY OF WATER SOLUTIONS OF CALCIUM NITRATE**

At the state-of-the-art the physics of liquids is less advanced than solid and gas theories. One of the main tasks of the solution theory is the determination of the regularities of water solutions and the strength of electrolytes. The analysis of such values as equation factor, adiabatic compressibility factor, spurious molar compressibility provides the valuable information about the structure of electrolyte solution. Thus the main task of the solution theory is the acquisition of the solid data on different qualities of solutions and its theoretical generalization.

The ultimate aims of our scientific research are the computation of spurious molar compressibility of water solutions of calcium nitrate and the analysis of the variation of the compressibility of  $\text{Ca}(\text{NO}_3)_2$



solutions according to the salt concentration. The received results of measurements and computations can be used for the analysis of structural and dynamical properties of fluid systems, in particular the fluid electrolytes.

During the analysis of the spurious molar compressibility we used the mass concentration scale for the strength range with the values from 7.14 to 39.68%. In our research the velocity of sound was measured using pulse-phase with the relative error of 0.5 % on a frequency of 10 MHz. The bottle method was used for the analysis of the substance density. The density bottle (the pycnometer) was calibrated in the twice-distilled water in advance. The estimated error of the density measurement is 0,05%. The given measurements have been carried out at the temperature of  $T=20$ .

According to the received experimental data for water solutions of calcium nitrate we calculated the spurious molar compressibility using the following formula

$$\varphi_{\pi} = \frac{1000}{C \rho_0} (\rho_0 \beta - \rho \beta_0) + \frac{M_2}{\rho_0} \beta_0$$

where  $\beta$ ,  $\beta_0$  and  $\rho$ ,  $\rho_0$  – adiabatic compressibility and density of the respective solution and the solvent,  $M_2$  – the spurious molar weight of the dissolved substance,  $C$  – the number of moles of the dissolved matter in one thousand cubic centimeters of the solution [1].

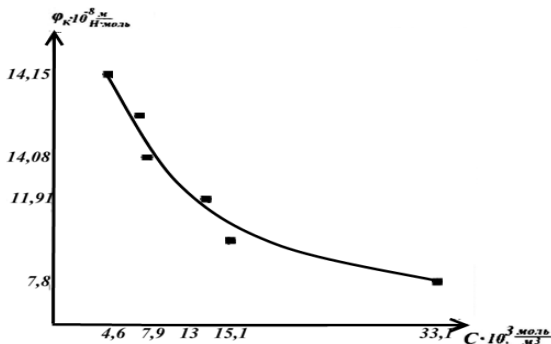
Before the calculation of the molar compressibility one should calculate the adiabatic compressibility of the solution under investiga-

tion that can be determined by the following formula  $\beta = \frac{1}{\rho c^2}$ ,

where  $\rho$  – density of the fluid,  $c$  – the measured sound velocity [2].

The data on the compressibility can be used for the determination of the number of water molecules bound with the electrolyte ions in the water solution [2].

The graphical version of the results of the computation of compressibility of water solutions with the strength varying from 7.14% to 39.68% at a given temperature is presented on the picture number 1.



Picture 1. Concentration – molar compressibility diagram

Thus, one can conclude that the spurious molar compressibility of solutions decreases with the increase of the strength of solutions. One can observe it on the picture 1. At the points of the maximal magnitude of compressibility the value of concentration is minimal and the minimal value of compressibility would be reached under circumstances of the maximal magnitude of the concentration in the respective range of concentrations. There exists a considerable difference between the compressibility values for the solution with the strength of 7.14% and one with the strength of 39,68%. The abnormal trend of a curve can be explained by the phenomenon of hydrolysis that increases by the strength abatement, but one cannot assert about the influence of the hydrolysis for sure as the error of measurements of solution densities increases by the significant dilution.

#### REFERENCES

1. Бокастов Г. М. Оценка степени гидратации фтористого алюминия в водных растворах различной концентрации путем измерения скорости ультразвука / Г. М. Бокастов // Журнал прикладной химии. – № 7, – 1967. – С. 1609.
2. Илгунас В. Исследование парциальных мольных сжимаемостей ионов в водных растворах многовалентных электролитов / В. Илгунас, Д. Руткунене // Акустический журнал, – № 1, – 1985. – С. 58–61.

*Віка Фісенко*

#### MANAGEMENT PLANNING ACTIVITY FOR EQUIPPING PAVLENKIVSKIY PARK WITH MODERN AMENITIES

Being in society a person cannot be free of administrative influence of the state, society, coworkers, direct supervisors. First attempts