QUASIELASTIC SCATTERING OF SLOW-NEUTRON IN WATER-ALCOHOL SOLUTIONS

N. O. Atamas, L. A. Bulavin, O. A. Vasilkevich, G. M. Verbinskaya, V. V. Krotenko, V. I. Slisenko

Research of molecules dynamics of solutions "water - propyl alcohol" of different concentration at the temperature 281 K is conducted by the method of slow-neutron quasi-elastic scattering. There were experimentally exposed the feature of effective self-diffusion coefficient of molecules of the indicated solutions. Based on the time- scale hierarchy the division of self-diffusion coefficient to one-particle and collective contributions was conducted, and the time of the molecules settled life in position of equilibrium was calculated. There were also exposed the feature of self-diffusion concentration dependence of coefficient of self-diffusion and his self-part contribution, namely: presence of two minimums is in the areas of concentrations (0,04 ÷ 0,05) of mass fraction and (0,18 ÷ 0,22) m.c. of the alcohol and continuous character of diffusion at concentrations higher then 0,4 m.c. of the alcohol. It is shown that the indicated concentration areas correspond the certain local structures of investigational solution.

Keywords: self-diffusion coefficient, the settle life time, one-particle and collective contributions, quasi-elastic scattering of neutron.