

Volumetric, acoustic and thermal properties of aqueous *N,N*-dimethylformamide system. Effect of temperature and composition.

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Streszczenie

This paper presents the density (ρ), speed of sound (u) and isobaric specific heat capacity (c_p) of an aqueous *N,N*-dimethylformamide (DMF) system. The measurements were performed over the entire composition range of (DMF+water) at four temperatures: 293.15, 298.15, 303.15 and 308.15K. The density data was used to calculate the excess molar volume of the system (V_m^E), the partial molar volume of DMF and water, as well as the molar expansion volume coefficient. Based on the sound velocity and heat capacity values, it was possible to calculate the isobaric ($C_{p,m}$) and isochoric ($C_{v,m}$) molar heat capacities, as well as the isentropic (κ_S) and isothermal compressibility (κ_T) coefficients and their molar counterparts ($K_{S,m}$, $K_{T,m}$). To study the structural changes in the examined system, excess molar functions were determined and the results were compared with ideal systems. Changes in the obtained values of the physicochemical parameters, as functions of composition and temperature, were analyzed in terms of the molecular interactions and structural differentiation of the investigated binary mixtures. The temperature effect exhibited a regular relationship with regard to the analyzed functions.

Słowa kluczowe

Density, Speed of sound, Isobaric molar heat capacity, Isochoric molar heat capacity, *N,N*-dimethylformamide+water mixture

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