



Thermodynamic Properties of Electrolytes Solutions in Aqueous Serine and Valine at Different Temperatures

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ABSTRACT

Ultrasonic velocities (u), densities (ρ) and viscosities (η) have been measured for the binary liquid systems (1M serine + 1M NaCl) and (1M valine + 1M MgCl₂). The ultrasonic velocity measurements have been carried out by ultrasonic interferometer technique at 2 MHz frequency and at different temperatures of 303.15, 308.15 and 313.15K. Using these experimental data, derived thermodynamic parameters such as adiabatic compressibility (β_a), intermolecular free length (L_f), acoustic impedance (Z), and relative association (R_A) have been computed using standard formulae. The results have been interpreted on the basis of variations in thermodynamic parameters. The variations in ultrasonic velocity and adiabatic compressibility with concentrations in both the systems show similar trends of increasing ultrasonic velocity and decreasing adiabatic compressibility of constituent electrolytes at different temperatures. This is due to complex formation and co-ordinate covalent bond form between the molecules of liquid solutions. The thermodynamic parameters were highly useful in elucidating solute – solvent interactions in aqueous solutions and binary mixtures.

Keywords: Ultrasonic Velocity(u), Adiabatic Compressibility(β_a), Intermolecular Free Length(L_f), Acoustic Impedance(Z), Relative Association (R_A).
