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"Ultrasonic Investigation of the Effects of Concentration and Temperature on Ferulic Acid–Polyethylene Glycol Interactions

Smita S. Kharkale-Bhuyar
Assistant Professor, Department of Chemistry
Shri Lemdeo Patil Mahavidyalaya, Mandhal, Kuhi, Nagpur, Maharashtra, India.
Corresponding Author - Smita S. Kharkale-Bhuyar

Abstract: *Higher concentrations of PEG lead to enhanced molecular interactions, as evidenced by increased acoustic impedance and decreased adiabatic compressibility and intermolecular free length. To assess key acoustic properties—namely acoustic impedance (Z), adiabatic compressibility (β), intermolecular free length (Lf), relaxation time, and Gibbs free energy—the experimental parameters of density (ρ), viscosity (η), and ultrasonic velocity (U) were employed. As temperature rises, these molecular interactions weaken, resulting in a decline in acoustic impedance and shifts in thermodynamic behavior, including an increase in Gibbs free energy*

Keywords: Ultrasonic Velocities, Isentropic Compressibility, Intermolecular Free Length, Specific Acoustic Impedance and Thermo-Acoustic Parameters

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