

Study of Thermoacoustic Parameters and Statistical Analysis of Liquid State Theories

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Abstract: Molecular interaction in binary liquid mixtures can be evaluated from the thermodynamic properties of the liquid mixture. Nature of interaction of liquid molecules can be explained by various liquid state theories, such as Collision factor theory, Free length theory, Eyring's significant structure theory, Flory theory etc., In present work experimental parameters such as ultrasonic velocity (U), density (ρ) of binary mixtures of *p*-Xylene-Piperidine and Toluene-Piperidine has been measured over the entire range of composition at different temperatures 303, 313, 323K. The observed experimental data have been utilized to evaluate thermo-acoustical parameter i.e. adiabatic compressibility β_a , free length L_f , molar volume V etc., Theoretical ultrasonic velocities calculated by applying Jacobson's free length theory and Kalidoss revised free length theory, statistical analysis carried out by applying Chi-square (χ^2) test for both the liquid systems to verify the applicability of liquid state theories..

Keywords: Thermo acoustic parameters, Chi-square (χ^2) test.

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