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Study of molecular interactions using excess thermo-acoustical parameters at different temperatures

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Abstract : Ultrasonic velocities, densities and viscosities have been measured in two binary liquid mixtures of quinoline with alkanols (ethanol and 1-propanol) over the entire molefraction range of quinoline at temperatures $T=(303.15, 308.15, 313.15$ and $318.15)$ K. From the experimentally measured data, excess thermo-acoustical parameters such as excess intermolecular frelength (L_f^E), excess adiabatic compressibility (β^E), excess free volume (V_f^E), excess internal pressure (π^E), excess enthalpy (H^E) and excess Gibb's free energy of activation function (G^{*E}) have been calculated. These results are fitted to the Redlich-Kister polynomial equation and have been explained on the basis of intermolecular interactions present between the component molecules of the liquid mixtures.

Keywords: Density; ultrasonic velocity; viscosity; excess intermolecular frelength; excess adiabatic compressibility; quinoline; ethanol; 1-propanol.

INTRODUCTION

The study of the excess thermo-acoustical parameters is important in order to understand the nature of molecular interactions between the components of the liquid

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