

Viscosity Modeling of Ionic Solutions using the Eyring Theory

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In this work, an Eyring-theory model based on concepts of excess Gibbs energy of activation of the viscous flow has been developed for the accurate correlation and/or prediction of the dynamic viscosity of ionic solutions: inorganic salt (electrolyte) + solvent and organic salt (ionic liquid) + solvent. For the excess Gibbs energy of activation, a well-known solution model (UNIQUAC) originally devised for non-electrolytes was used to overall represent the main molecular interactions typically encountered in ionic solutions and thus affecting viscosity such as electrostatic forces, solvation effects and short-range forces. The resulting model was successfully validated during the representation of experimental dynamic viscosities of various non-aqueous and aqueous ionic solutions within wide ranges of temperature and composition (or salt molality).