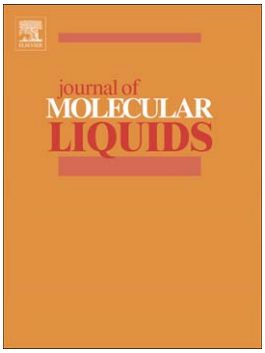

Excess properties and spectroscopic studies for a binary system of polyethylene glycol 200 and N-methyl-2-pyrrolidone at different temperatures

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Excess properties and spectroscopic studies for a binary system of polyethylene glycol 200 and N-methyl-2-pyrrolidone at different temperatures.

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Abstract

This work reports density (ρ) and viscosity (η) data for binary system of polyethylene glycol 200 (PEG) and N-methyl-2-pyrrolidone (NMP) over the whole concentration range, at 288.15, 293.15, 298.15, 303.15, and 308.15 K as a function of composition at atmospheric pressure. From the experimental density and viscosity data, excess molar volume (V_m^E), viscosity deviation (Δη) and the excess Gibbs free energies of activation for viscous flow (ΔG^{*E}) were calculated, and the results were fitted to a Redlich– Kister equation to obtain the coefficients and estimate the standard deviations between the experimental and calculated quantities. Based on kinematic viscosity (ϑ) data, enthalpy of activation for viscous flow (ΔH*), entropy of activation for viscous flow (ΔS*), and Gibbs energies of activation for viscous flow (ΔG*) were also calculated. In addition, the interactions between the unlike molecules of the PEG and NMP which were supported by FTIR spectra for the binary system of PEG and NMP were studied.

Keywords: Density; Viscosity; Excess molar volume; Viscosity deviation; Intermolecular interation.