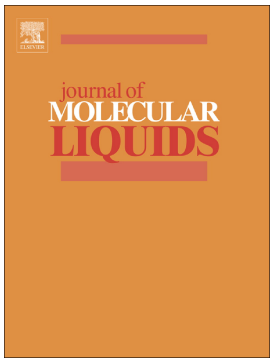

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The experimental investigations on viscosity, surface tension, interfacial tension and solubility of the binary and ternary systems for tributyl phosphate (TBP) extractant in various organic solvents with water: thermodynamic NRTL model and molecular interaction approach

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Abstract

In order to provide a database for supporting stability in the separation processes, the physical properties of the mixing solutions between extractant and organic solvents, with/without water, were investigated at temperature 303.2 K and pressure 0.1 MPa. The extractant of tributyl phosphate (TBP) as well as the following organic solvents i.e. cyclohexane, *n*-heptane, kerosene and toluene were selected for use in this work. Further, the physical properties of the mixing solutions such as viscosity, surface tension, interfacial tension and solubility with water were observed when the percent weights of the extractant increased. The principle of intermolecular attraction between the molecules in the mixing solutions was considered in order to explain the tendencies of results. Tie-line data were determined for ascertaining the solubility of extractant in the organic and aqueous phases. A thermodynamic NRTL model was also evaluated and its data compared with the experimental results. Consequently, good correlations were displayed by the root-mean square deviation (*rmsd*) at values about 2%. Finally, for understanding the solvation of solute