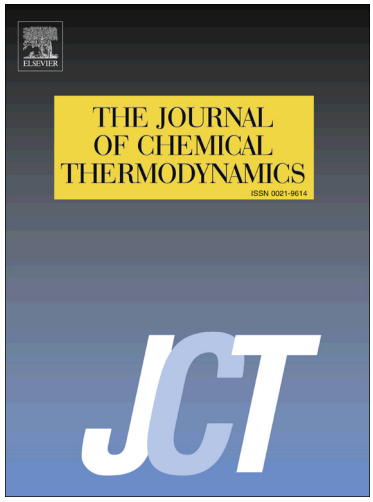

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Liquid-liquid equilibrium measurements and correlation for phase behaviors of alcohols + heptane + ILs ternary systems

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Abstract: Liquid–liquid equilibrium (LLE) for ternary systems of heptane + alcohols (ethanol, 1-propanol and 2-propanol) + ionic liquids (ILs) were carried out at 298.15 K and atmospheric pressure. The values of distribution coefficient (β) and selectivity (S) were calculated for the system to investigate the influence of ionic liquids' anion and length of the n-alkyl chain in alcohols on the LLE. The NRTL and UNIQUAC models were used to correlated the experimental data, and the results indicated that both the models fit the experimental systems. The UNIFAC model was used to predict the LLE behaviors of the studied systems and compare with experimental and correlated tie-lines.

Keywords: Liquid-liquid equilibrium; Ionic liquid; heptane; alcohols; NRTL; UNIQUAC; UNIFAC

1. Introduction

Gasoline is an important fuel which is composed with hydrocarbons, in order to reduce the lead content in gasoline, alcohols and alkanes have coexisted additives as gasoline [1]. This method to reduce the lead content in gasoline has been in industrial application for many years, and different azeotropic mixtures of alcohols and alkanes are present in these industrial processes [2]. The separation of these mixtures is basically impossible by a simple distillation process. Liquid-liquid extraction based on the immiscibility of two phases is one of the most important separation methods to separate these azeotropes [3], and it is pivotal to find suitable solvent.

The conventional organic solvents are negative environmental that lead to a huge interest to research the substitutes of organic solvents. Ionic liquids (ILs) have recently gained recognition as