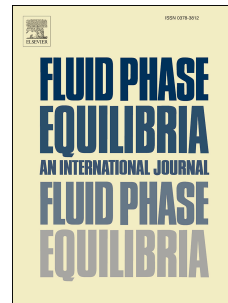


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Morteza Mafi, Mohammad Reza Dehghani, Babak Mokhtarani



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Liquid-liquid equilibrium data for extractive desulfurization using 1-butyl-3-methyl imidazolium thiocyanate, *n*-alkane and thiophene

Morteza Mafi^a, Mohammad Reza Dehghani^{1b}, Babak Mokhtarani^a

a Chemistry and Chemical Engineering Research Center of Iran, 14335-186, Tehran, Iran

b School of Chemical Engineering, Iran University of Science and Technology, 16846-13114, Tehran, Iran

Abstract

The experimental liquid – liquid equilibrium (LLE) data for three ternary mixtures containing an ionic liquid (IL) (1-butyl-3-methyl imidazolium thiocyanate [Bmim][SCN]), alkanes (*n*-hexane, *n*-octane and *n*-decane) and sulfur compound (thiophene) have been measured experimentally. Distribution and selectivity coefficients have been calculated using experimental data. The LLE data have been obtained at 25°C and ambient pressure. The experimental LLE data of ternary mixtures have been compared with our previous works. It has been shown that the IL with higher molecular weight of cation has higher solute distribution and lower selectivity coefficients. It has been found that the solubility decreases as the cation length decreases, meanwhile ILs cation chain length has a remarkable effect on solubility of alkanes. Moreover, the experimental data have been demonstrated that the selectivity decreases as alkane chain length of alkane decreases while the solubility of alkanes in the ILs increases, hence the removal costs of aromatic sulfur components will be increased. The results show that [Bmim][SCN] has the lowest alkane solubility and highest selectivity coefficient, in the system containing *n*-decane and thiophene. A comparative study reveals that compared to other ILs, [Bmim][SCN] is a more suitable solvent. Finally, the experimental data have been correlated utilizing non-randomness two liquid (NRTL) model. The binary energy parameters were obtained, it can be seen that the model can correlate the experimental data efficiently.

Keywords: Desulfurization, Ionic Liquids, Thiophene Derivatives, Alkane, Fuel

¹ Corresponding author: E-mail addresses: m_dehghani@iust.ac.ir (Mohammad Reza Dehghani)

mokhtarani@ccerci.ac.ir (Babak Mokhtarani)

mafi@ccerci.ac.ir (Morteza Mafi)

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