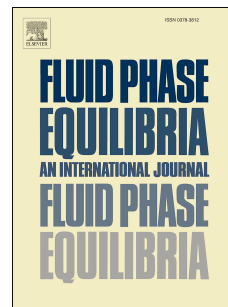


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Separation of the Mixture Pyridine + Methylbenzene via Several Acidic Ionic Liquids: Phase Equilibrium Measurement and Correlation

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Abstract: For the purpose of selecting the effective solvents to separate basic *N*-compound pyridine from coal tar, three acidic imidazolium-based ILs, 1-butyl-3-methylimidazolium hydrogen sulfate, [Bmim][HSO₄], 1-butyl-3-methylimidazolium dihydrogen phosphate, [Bmim][H₂PO₄], and 1-butyl-3-methylimidazolium perchlorate, [Bmim][ClO₄], were chosen for the extraction process. The liquid-liquid equilibrium tie-line data for the ternary systems of [Bmim][HSO₄], [Bmim][H₂PO₄] and [Bmim][ClO₄] + pyridine + methylbenzene were measured at $T = 298.15$ K under 101.3 kPa. Meanwhile, the interaction energies between the ILs, and pyridine and methylbenzene respectively were calculated. The results indicated that the selected ILs had strong interactions with pyridine than with methylbenzene, which were also verified by the distribution ratio and selectivity calculated from the experimental data. In addition, the experimental LLE data were correlated by the NRTL and UNIQUAC models, and the NRTL model showed good agreement in correlation than the UNIQUAC. The average *RMSDs* for the NRTL and UNIQUAC models of the investigated systems are 0.0153 and 0.0161, respectively.

Keywords: Extraction; Liquid-liquid equilibrium; Ionic liquids; Pyridine; NRTL; UNIQUAC

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