

High-Pressure Phase Behavior of Carbon Dioxide in Ionic Liquids Containing Cyanide Anion: [c6mim][SCN], [c6mim][N(CN)2] and [c6mim][C(CN)3]

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The solubility of CO₂ in ionic liquids including cyanide anion, 1-hexyl-3-methylimidazolium tricyanomethanide([c6mim][C(CN)3]), 1-hexyl-3-methylimidazolium dicyanamide([c6mim][N(CN)2]), and 1-hexyl-3-methylimidazolium thiocyanate ([c6mim][SCN]) was measured. The solubility of CO₂ was determined by measuring the bubble point pressure or cloud point pressure at the temperature ranges from 303.15 to 373.15 K in 10 K intervals. The experimental data were correlated with the PR-EoS incorporated with the conventional van der Waals one fluid mixing rule. The critical properties of ionic liquids were estimated using the modified Lydersen-Joback-Reid method. The correlation results show good agreement with experimental data. The experimental results showed that the solubility of CO₂ in ionic liquids, as is well known, increased as temperature decreases and pressure increases. Also, ionic liquid composed of more cyanide anion and the longer alkyl chain group has the highest solubility of CO₂.