

Solubility measurement and prediction of carbon dioxide in ionic liquids containing cyanide anion

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The solubility of carbon dioxide 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]) were experimentally studied 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 aim of the study is to understand effect of cyanide anion on solubility of CO<sub>2</sub>. The experimental results showed that the solubility of CO<sub>2</sub> in ionic liquids, as is well known, increased as temperature decreases and pressure increases. Also, the ionic liquid which has the more number of cyanide anions and has the longer alkyl chain group shows the highest solubility of CO<sub>2</sub>. 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 predicted using the modified Lydersen-Joback-Reid method. The agreements between data and calculated solubility were found generally good for ionic liquids containing cyanide anion.