Phase Equilibrium Calculations of CO_2-IL System Using Cubic EoS and GC NLF-HB EoS

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Having negligible vapor pressures and the ability to dissolve both organic and inorganic substances, room temperature ionic liquid(RTIL)s are actively studied as a leading candidate to replace many of the organic solvents used in present industries. Because almost endless combinations of cations and anions are possible, a model which can predict the behavior of an IL from its structure is appreciated.

In this work, the phase equilibrium behavior of a number of carbon dioxide + IL systems is examined. The solubility data of carbon dioxide in different ILs are correlated using two equations of state – Peng-Robinson, and group contribution hydrogen bonding non-random lattice fluid (GC NLF-HB) EoS. The calculated results are compared to evaluate the ability of the NLF-HB EoS as a model to describe the phase equilibrium of CO_2+ IL systems.