High pressure CO_2 solubilities in 1,1,2,2-tetrafluoroethanesulfonate(TFES) anion based ionic liquids : [EMIM][TFES], [BMIM][TFES], [Benzyl][TFES]

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We measured the CO2 solubility in three different [TFES] anion-based ionic liquids: 1-Ethyl-3-methylimidazolium 1,1,2,2-tetrafluoroethanesulfonate, 1-Butyl-3-methylimidazolium 1,1,2,2-tetrafluoroethanesulfonate and 1-Benzyl-3-methylimidazolium 1,1,2,2-tetrafluoroethanesulfonate
in the experimental ranges of 0.8–36.8 MPa and 303.2–373.2 K.
We determined the CO2 solubility by measuring the bubble-point pressure for a fixed CO2 mole fraction, and the order of intensity for CO2 absorption ability was [BMIM][TFES] > [EMIM][TFES] > [Benzyl][TFES].
The Peng-Robinson equation of state (PR-EoS), the conventional van der Waals one fluid mixing rule, and the modified Lydersen-Joback-Reid method were used to correlate and calculate the experimental data. The overall average absolute deviations of pressure (AAD-P) were 1.81, 3.61, and 2.78 % for CO2 + [EMIM][TFES], CO2 + [BMIM][TFES], and CO2 + [Bezyl][TFES] systems, respectively.