

High pressure Phase behavior of CO₂ in bis(pentafluoroethylsulfonyl)imide(BETI) anion based ionic liquids : [EMIM][BETI], [BMIM][BETI], [HMIM][BETI]

박광우, 임종성[†]
서강대학교

(limjs@sogang.ac.kr[†])

We measured the CO₂ solubility in three different [BETI] anion-based ionic liquids: 1-ethyl-3-methylimidazolium bis(pentafluoroethylsulfonyl)imide ([EMIM][BETI]), 1-butyl-3-methylimidazolium bis(pentafluoroethylsulfonyl)imide ([BMIM][BETI]), and 1-hexyl-3-methylimidazolium bis(pentafluoroethylsulfonyl)imide ([HMIM][BETI]) in the experimental ranges of 0.08–29.27 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 [HMIM][BETI] > [BMIM][BETI] > [EMIM][BETI].

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 0.0204, 0.0275, and 0.0227 for CO₂ + [EMIM][BETI], CO₂ + [BMIM][BETI], and CO₂ + [HMIM][BETI] systems, respectively.