

Measurement and correlation of CO<sub>2</sub> solubility in bis(pentafluoroethylsulfonyl)imide ([BETI]) anion based ionic liquids: [EMIM][BETI], [BMIM][BETI], [HMIM][BETI]

박광우, 임종성<sup>†</sup>  
서강대학교

(limjs@sogang.ac.kr<sup>†</sup>)

We measured the CO<sub>2</sub> 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 303.15–373.15 K.

In this paper, we report the CO<sub>2</sub> solubility in three [BETI] anion-based ILs under various experimental conditions and compare the effect of three different cations, [HMIM], [BMIM], and [EMIM]. We determined the CO<sub>2</sub> solubility by measuring the bubble-point pressure for a fixed CO<sub>2</sub> mole fraction, and the order of intensity for CO<sub>2</sub> 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. The overall average absolute deviations of pressure (AAD–P) were 0.0204, 0.0275, and 0.0227 for each systems, respectively