

A study on the CO₂ solubility in [Tf₂N] anion based ionic liquids: [BVMIM][Tf₂N], [P4441][Tf₂N], [N4222][Tf₂N]

오재준, 임종성[†]

서강대학교

(limjs@sogang.ac.kr[†])

In this study, three different [Tf₂N] anionic ionic liquids were selected for measuring high pressure CO₂ solubility.

Solubility data were obtained by measuring the bubble point pressure of the mixture using a variable volume view cell. Experimental conditions were set at 10 K interval from 303.15 K to 373.15 K.

The new solubility database for three ionic liquids were constructed by this work, and it is confirmed that CO₂ absorption capacity is better in order of [BVMIM][Tf₂N], [P4441][Tf₂N], and [N4222][Tf₂N].

From experimental data, thermodynamic modeling was correlated through Peng–Robinson equation of state and van der Waals one fluid mixing rule to predict CO₂ solubility for ionic liquids at various temperature and composition ranges. The critical properties and acentric factor of the ionic liquid were calculated using the modified Lydersen–Joback–Reid method.

Keywords: CO₂ solubility, Ionic liquids, PR–EoS, [Tf₂N] anion