

Accepted Manuscript

Solubility of carbon dioxide and methane in 1-hexyl-3-methylimidazolium nitrate ionic liquid, experimental and thermodynamic modeling

Mojtaba Mirzaei, Babak Mokhtarani, Alireza Badiei, Ali Sharifi

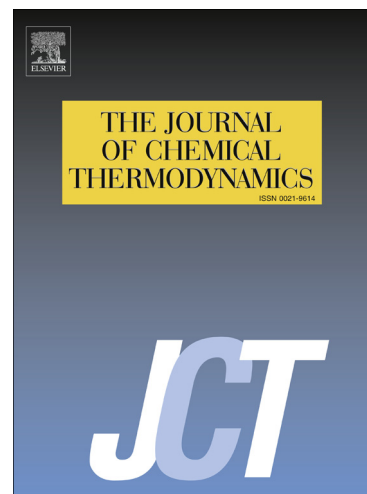
PII: S0021-9614(18)30146-0
DOI: <https://doi.org/10.1016/j.jct.2018.03.003>
Reference: YJCHT 5348

To appear in: *J. Chem. Thermodynamics*

Received Date: 30 May 2017
Revised Date: 1 March 2018
Accepted Date: 4 March 2018

Please cite this article as: M. Mirzaei, B. Mokhtarani, A. Badiei, A. Sharifi, Solubility of carbon dioxide and methane in 1-hexyl-3-methylimidazolium nitrate ionic liquid, experimental and thermodynamic modeling, *J. Chem. Thermodynamics* (2018), doi: <https://doi.org/10.1016/j.jct.2018.03.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Solubility of carbon dioxide and methane in 1-hexyl-3-methylimidazolium nitrate ionic liquid, experimental and thermodynamic modeling

Mojtaba Mirzaei[†], Babak Mokhtarani^{•‡}, Alireza Badiei[†] and Ali Sharifi[‡]

[†]School of Chemistry, College of Science, University of Tehran, Tehran, Iran

[‡]Chemistry and Chemical Engineering Research Center of Iran, P.O. Box 14335-186, Tehran, Iran.

Abstract:

Experimental data for solubility of CO₂ and CH₄ in 1-hexyl-3-methylimidazolium nitrate [Hmim][NO₃] at temperature range of 293.15 – 343.15 K and pressure up to 4 MPa are reported. The solubility of CO₂ is higher than that of CH₄ in the entire temperature region studied. The experimental data show that the temperature has a little effect on CH₄ solubility. The Henry's constant of both gas in [Hmim][NO₃] are calculated and the ideal selectivity of CO₂ to CH₄ are reported. The ideal selectivity is increased with temperature reduction. The experimental data for CO₂ solubility are compared with other types of nitrate based ionic liquids (ILs) at different temperatures and pressure. The results of this comparison reveal that the solubility of CO₂ is increased with enlargement the alkyl chain length of IL cation. The experimental data are correlated with the extended Henry's law model. The virial expansion model of Pitzer is used for interpretation of the activity coefficient of the gases and the interaction parameters of the model are estimated as a function of temperature.

[•]Corresponding author *E-mail:* mokhtarani@ccerci.ac.ir Tel.: +98 21 44787770; Fax: +98 21 44787781.

Download English Version:

<https://daneshyari.com/en/article/6659717>

Download Persian Version:

<https://daneshyari.com/article/6659717>

[Daneshyari.com](https://daneshyari.com)