

Accepted Manuscript

Elucidating the triethylammonium acetate system: Is it molecular or is it ionic?

Paula Berton, Steven P. Kelley, Hui Wang, Robin D. Rogers



PII: S0167-7322(18)32535-2
DOI: [doi:10.1016/j.molliq.2018.08.006](https://doi.org/10.1016/j.molliq.2018.08.006)
Reference: MOLLIQ 9451
To appear in: *Journal of Molecular Liquids*
Received date: 16 May 2018
Revised date: 4 July 2018
Accepted date: 1 August 2018

Please cite this article as: Paula Berton, Steven P. Kelley, Hui Wang, Robin D. Rogers , Elucidating the triethylammonium acetate system: Is it molecular or is it ionic?. Molliq (2018), doi:[10.1016/j.molliq.2018.08.006](https://doi.org/10.1016/j.molliq.2018.08.006)

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.

Elucidating the Triethylammonium Acetate System: Is it Molecular or Is it Ionic?

Paula Berton^{a,†}, Steven P. Kelley^{a,‡}, Hui Wang^{b,c}, Robin D. Rogers^{a,c,d}

^a Department of Chemistry, McGill University, 801 Sherbrooke St. West, Montreal, QC H3A 0B8, Canada

^b Department of Chemistry, The University of Alabama, Tuscaloosa, AL 35487, United States

^c Institute of Process Engineering, Chinese Academy of Sciences, No. 1 Beierjie Zhongguancun Haidian District, Beijing 100190, China

^d 525 Solutions, Inc., PO Box 2206, Tuscaloosa, AL 35403, United States

[†] Current address: Chemical and Petroleum Engineering Department, University of Calgary, Calgary, AB T2N 1N4, Canada.

[‡] Current address: Department of Chemistry, University of Missouri, Columbia, MO 65211, USA

ABSTRACT

The speciation of protic ionic liquids (ILs) has attracted high attention in the recent years, due to its effect in the properties of the resulting liquids. In this work we analyze the behavior of mixtures between triethylamine (N₂₂₂) and acetic acid (HOAc), a system that generates controversy about its speciation. Using different synthetic strategies, liquids were obtained with molar compositions that were always between 1:2 and 1:4 mol/mol N₂₂₂:HOAc. However, the experimentally observed normal boiling points indicate that the actual IL has a molar composition of 1:4 N₂₂₂:[HOAc]/[OAc]⁻. Furthermore, when the synthesized liquid is mixed with the aprotic IL 1-ethyl-3-methylimidazolium acetate, more triethylamine is expelled, indicating that the excess N₂₂₂ forms an [HN₂₂₂]⁺-N₂₂₂ complex rather than becoming ionized by the remaining HOAc present in the system. Our experimental data emphasizes the consideration of these systems not as mere “mixtures of ions and non-ionized molecules,” but as complex systems of oligomeric ions, with distinctive and characteristic properties.

Keywords: Acetic acid; Oligomeric Ions; Protic Ionic Liquid; Speciation; Triethylamine.

* Corresponding author. E-mail: robin.rogers@525solutions.com

Download English Version:

<https://daneshyari.com/en/article/7841593>

Download Persian Version:

<https://daneshyari.com/article/7841593>

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