



Joan F. Brennecke

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Joan F. Brennecke is currently Cockrell Family Chair in Engineering #16 in the McKetta Department of Chemical Engineering at the University of Texas at Austin. She began her academic career at the University of Notre Dame after completing her Ph.D. and M.S. (1989 and 1987) degrees at the University of Illinois at Urbana-Champaign and her B. S. at the University of Texas at Austin (1984).

Her research interests are primarily in the development of less environmentally harmful solvents. These include supercritical fluids and ionic liquids. In developing these solvents, Dr. Brennecke's primary interests are in the measurement and modeling of thermodynamics, thermophysical properties, phase behavior and separations. Major awards include the 2001 Ipatieff Prize from the American Chemical Society, the 2006 Professional Progress Award from the American Institute of Chemical Engineers, the J. M. Prausnitz Award at the Eleventh International Conference on Properties and Phase Equilibria in Greece in May, 2007, the 2008 Stieglitz Award from the American Chemical Society, the 2009 E. O. Lawrence Award from the U.S. Department of Energy, and the 2014 E. V. Murphree Award in Industrial and Engineering Chemistry from the American Chemical Society. She has served as the Editor-in-Chief of the Journal of Chemical & Engineering Data since 2010. Her 150+ research publications have garnered over 18,000 citations (ISI). She was inducted into the National Academy of Engineering in 2012. She is currently serving as the Chair of The National Academies study on A Research Agenda for a New Era in Separations Science.

“Ion Dissociation in Ionic Liquids and Their Aqueous Solutions”

Abstract

The existence of a myriad of salts that are liquid at room temperature, even in the absence of any water or other solvent, encourages a re-examination of our concepts of ion dissociation. It is easy to think of the ions in dilute aqueous salt solutions as being completely dissociated and fully solvated by water. But what happens when there is not just a concentrated salt solution, but a sea of ions with no solvent present whatsoever? How does this picture change as water is added to the ionic liquid? Watanabe (J. Phys. Chem. B, 2004, 108, 16593-16600) first started exploring this question for pure ionic liquids by examining the ratio of the molar conductivity obtained from impedance measurements to that calculated from the ionic diffusivity (self-diffusion coefficients determined by pulsed-field-gradient spin-echo NMR) using the Nernst-Einstein equation. This ratio is frequently referred to as the ‘ionicity.’ Here we present a simplified method to estimate the ‘ionicity’ from just ionic conductivity, viscosity and density, along with estimates of the ionic radii from either group contribution methods or limiting ionic conductivity data. We show how the ‘ionicity’ and/or the radii change with composition for aqueous solutions of a series of dialkylimidazolium-based ionic liquids. {Reference on back of flyer}

Tuesday, February 26th

1:00 – 1:50PM | Spahr Auditorium

References

Oscar Nordness^a, Luke D. Simoni^{b#}, Pratik Kelkar^a, Mark A. Stadtherr^a and **Joan F. Brennecke^a**

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