CHEMICAL ENGINEERING
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CHEMICAL ENGINEERING 290 SEMINAR SERIES PRESENTS

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Ionic Liquids for Sustainability

4pm - Tuesday, November 17th 2015 in ENGR II 1519

Ionic liquids (ILs) are low melting salts that are being designed, developed and explored for a myriad of energy and environmental applications. Even though they are liquids, they are salts with strong Coulombic forces between the cations and anions so they have extremely low vapor pressures. This means that they are not likely to contribute to air pollution. On the other hand, it is possible to make ILs that are highly toxic (and these should certainly be avoided). Nonetheless, their real potential for contributions to sustainability are the applications. Here we will explore how the unique properties of ILs – low vapor pressure, good thermal stability, widely tunable solvation properties and chemical functionalization – make previously inaccessible products and processes possible. Examples from our research at the University of Notre Dame include low energy separation of carbon dioxide from post-combustion flue gas, elimination of ozone depleting, global warming and flammable refrigerants, safer batteries and supercapacitors, and chrome plating without exposure to highly toxic hexavalent chromium.

Joan F. Brennecke is the Keating-Crawford Professor of Chemical Engineering at the University of Notre Dame and Director of the Notre Dame Energy Center. She joined 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 serves as Editor-in-Chief of the Journal of Chemical & Engineering Data. Her 130+ research publications have garnered over 13,000 citations. She was inducted into the National Academy of Engineering in 2012.

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