Amgen Seminar Series in Chemical Engineering

in

Cherry Auditorium, Kirk Hall, 1 PM

Presents on March 13, 2008

Ionic Liquids and Refrigerant Gases: Phase Behavior, Equilibrium and Mass Transport Properties

by

Professor Aaron M. Scurto

Department of Chemical & Petroleum Engineering
and NSF-ERC Center for Environmentally Beneficial Catalysis
University of Kansas, Lawrence, KS 66045, USA.

Ionic liquids (ILs) are organic salts that are liquid at or near room temperature ($T_m <$ 100°C) and are completely nonvolatile. A myriad of cation/anion combinations exist that can yield ILs optimized for specific processes. These properties have lead researchers to claim ionic liquids as potential "green" or benign solvents. Recently, the use of ionic liquids with refrigerant gases in separations and absorption refrigeration has been reported. For design of processes with ionic liquids and refrigerant gases, accurate thermodynamic and transport properties are needed. This presentation will report the high-pressure global phase behavior and equilibria, viscosity and diffusivity for imidazolium based ionic liquids with the common refrigerant gas, 1,1,1,2-tetrafluoroethane (R-134a) and with a potential alternative refrigerant, carbon dioxide (R-744). Hydrofluorocarbon refrigerants are highly soluble in ionic liquids, and, in certain regions of temperature and pressure, experience a variety of multi-phase phenomena, including vapor-liquid equilibrium (VLE), vapor-liquid-liquid equilibrium (VLLE), critical end points, and mixture critical points. In addition, the presence of the refrigerants in the ionic liquids dramatically improves their mass transport properties, i.e. decrease in viscosity and increase in diffusivity. .

This series is at the University of Rhode Island is made possible through the generosity of Amgen, West Greenwich, R.I.