

New Solvents Findings from University of Minnesota Discussed

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According to news reporting out of Minneapolis, Minnesota, by VerticalNews editors, research stated, "Ionic liquids feature a combination of properties that make them very interesting solvents for polymers, but many questions remain regarding the thermodynamics of polymer/ionic liquid solutions. In this work, the lower-critical-solution-temperature (LCST) phase behavior of poly(*n*-butyl methacrylate) (PnBMA) in mixtures of the ionic liquids 1-butyl-3-methylimidazolium:bis (trifluoromethylsulfonyl)imide ([BMIm][TFSI]) and 1-ethyl-3-methylimidazolium:TFSI ([EMIm][TFSI]) is characterized by transmittance, light scattering, and small-angle neutron scattering measurements."

Our news journalists obtained a quote from the research from the University of Minnesota, "Several relevant thermodynamic parameters are easily tuned by varying the ionic liquid composition. In particular, the cloud point, spinodal, and Theta temperatures are all found to increase linearly with [BMIm] content. The interaction parameters, χ , are determined as a function of temperature and concentration using three different methods, and the results from each method are compared. The entropic and enthalpic components of the interaction parameter, χ , are also found to vary linearly with [BMIm] content in the ionic liquid, increasing and decreasing, respectively. The increase in the enthalpic driving force for mixing with increasing [BMIm] content dominates over the decrease in the entropic penalty for mixing, leading to improved solubility. This result is discussed in terms of molecular interactions and oriented solvation."

According to the news editors, the research concluded: "This work characterizes the solution thermodynamics of one representative system in a very interesting class of polymer solutions, and provides insight into the molecular mechanisms underlying its LCST phase behavior."

For more information on this research see: Lower Critical Solution Temperature Phase Behavior of Poly(*n*-butyl methacrylate) in Ionic Liquid Mixtures. *Macromolecules*, 2013;46(23):9464-9472. *Macromolecules* can be contacted at: Amer Chemical Soc, 1155 16TH St, NW, Washington, DC 20036, USA.

Our news journalists report that additional information may be obtained by contacting M.L. Hoarfrost, University of Minnesota, Dept. of Chem Engr & Mat Sci, Minneapolis, MN 55455, United States. Additional authors for this research include Y.P. He and T.P. Lodge.

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