

Spectral Analysis of Ionic Liquids + Solvent Mixtures and Solutions from Extractions of Bamboo with Ionic Liquid + Ethanol Mixtures at High Pressures

Scott P. Holahan*, Mary E. McCorkill, Michael L. Williams, Erdogan Kiran**

Department of Chemical Engineering
Virginia Tech, Blacksburg, VA, USA

*scotth95@vt.edu

**ekiran@vt.edu

The use of mixtures of ionic liquids and traditional solvents in the processing of lignocellulosic materials is of current interest. In this study the effectiveness of mixtures of ionic liquids on extractions of bamboo chips has been explored at high pressures, elevated temperatures, and at relatively low ionic liquid addition levels. Compressed mixtures of ethanol containing 1 to 40 wt % [EMIM]Ac were used at pressures up to 35 MPa and temperatures up to 150 °C. The bamboo was loaded into a high-pressure view-cell, which was filled with the extraction solvent and raised to the target temperature and pressure. The extractions proceeded over a 24 hour period, after which point the chips were analyzed with TGA and FTIR, and the extract solutions were analyzed with UV-Vis and FTIR spectroscopy. To properly interpret the results, comprehensive characterization of the ionic liquids 1-ethyl-3-methylimidazolium acetate ([EMIM]Ac) and 1-butyl-3-methylimidazolium acetate ([BMIM]AC) in ethanol, methanol, and water was also conducted using UV-Vis and FTIR spectroscopy. The ionic liquid + solvent mixtures were analyzed across all concentrations, from pure solvent to pure ionic liquid.