Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Thermophysical and Rheological Properties of Imidazolium-Based Ionic Liquids: The Effect of Aliphatic versus Aromatic Functionality RAN TAO, LIANJIE XUE, GEORGE TAMAS, EDWARD QUITEVIS, SINDEE SIMON, Texas Tech Univ — As a material class, ionic liquids possess attractive properties and have a wide range of potential uses. In this work, a series of imidazolium-based ionic liquids with the same carbon number varying from aliphatic to aromatic functionalities are investigated. The effects of cation symmetry and larger aromatic polycyclic functionality are studied. The thermal properties, including the glass transition temperature, melting temperature, and decomposition temperature, are characterized, and the density and the ionic conductivity are measured as a function of temperature. Rheological studies are performed using both steady-state and dynamic shear modes. The Cox-Merz relationship between the steady shear viscosity and the dynamic viscosity is examined. The temperature dependence of viscosity is described by the Vogel-Fulcher-Tammann equation and the dynamic fragility is calculated for each ionic liquid and compared to the fragility obtained from calorimetry. Master curves of dynamic shear responses are also constructed and will be discussed.

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Date submitted: 15 Nov 2013 Electronic form version 1.4