

IDENTIFICATION OF STRUCTURAL MOTIFS OF IMIDAZOLIUM BASED IONIC LIQUIDS FROM JET-COOLED INFRARED SPECTROSCOPY.

JUSTIN W. YOUNG, RYAN S BOOTH, CHRISTOPHER ANNESLEY, JAIME A. STEARNS, *Space Vehicles Directorate, Air Force Research Lab, Kirtland AFB, NM, USA.*

Highly variable and potentially revolutionary, ionic liquids (IL) are a class of molecules with potential for numerous Air Force applications such as satellite propulsion, but the complex nature of IL structure and intermolecular interactions makes it difficult to adequately predict structure-property relationships in order to make new IL-based technology a reality. For example, methylation of imidazolium ionic liquids leads to a substantial increase in viscosity but the underlying physical mechanism is not understood. In addition the role of hydrogen bonding in ILs, especially its relationship to macroscopic properties, is a matter of ongoing research. Here, structural motifs are identified from jet-cooled infrared spectra of different imidazolium based ionic liquids, such as 1-ethyl-3-methylimidazolium bis(trifluoromethyl-sulfonyl)imide. Measurements of the C-H stretches indicate three structural families present in the gas phase.