**Polymeric Ionic Liquids as Functional Materials**

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Ionic liquids (IL’s) have been suggested for applications as diverse as solubilizing cellulose, antimicrobial treatments, and electrolytes in batteries due to their molten salt properties. We have recently discovered that a polymerized cation (such as imidazolium) is an excellent host for *any* associated anion. As a result, polymerized ionic liquids are not just solid counterparts to IL’s, but are excellent vectors for the inclusion of a massive variety of functionalities ranging from multi-valent ions for batteries to magnetic anions. Moreover, PIL block copolymers allow orthogonal control over mechanical and morphological properties, ultimately leading to a conceptual framework for processable, tunable, multifunctional materials. In this talk, I will discuss a class of protic polymerized ionic liquids (PILs) based on imidazolium cations which exhibit high ionic conductivities in the solid state. Further, I will also discuss PIL’s that are useful for applications ranging from magnetic materials to thermoelectrics.