

## Simple, Ultrafast Initiators for Epoxide Polymerization

Polyethers derived from epoxides represent a versatile class of functional polymeric materials. Epoxide ring-strain depends little on monomer structure. This fact enables the potential for true compositional control of structure-property relationships in a macromolecular materials platform. Unfortunately, epoxides do not polymerize to high molecular weights and low dispersities by any method in common usage not requiring sophisticated synthetic skill and equipment. As a first step toward a fundamental simplification of polyether chemistry, our lab has developed a class of stable, crystalline mono- $\mu$ -oxo-dialuminum (MOD) initiators that offer the control of anionic ring-opening polymerization, but the tolerance to chemical functionality and access to high molecular weight of catalytic approaches. The MODs can be synthesized in a single step with purification afforded by direct crystallization from the reaction medium. The MOD-initiated living polymerizations create materials at controlled molecular weights and with low dispersities. In this presentation, the historical and technical basis, facile synthesis, mechanism, and versatility of MOD chemistry will be presented.