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The Effect of Structural Modifications on Ionic Conductivity in Newly-Designed Polyester Electrolytes DANIELLE PESKO, Univ of California - Berkeley, YUKI JUNG, GEOFF COATES, Cornell University, NITASH BALSARA, Univ of California - Berkeley — Gaining a fundamental understanding of the relationship between molecular structure and ionic conductivity of polymer electrolytes is an essential step toward designing next generation materials for battery applications. In this study, we use a systematic set of newly-designed polyesters with varying side-chain lengths and oxygen functional groups to elucidate the effects of structural modifications on the conductive properties of the corresponding electrolytes. Mixtures of polyesters and lithium bis(trifluromethanesulfonyl)imide (LiTFSI) were characterized using ac impedance spectroscopy to measure the ionic conductivity at various temperatures and salt concentrations. The relative conductivities of these electrolytes in the dilute limit are directly comparable to results of molecular dynamics simulations performed using the same polymers. The simulations correspond well with the experimental results, and provide molecular level insight about the solvation environment of the lithium ions and how the ions transport through these polyesters.

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