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Dynamics of Lithium Polymer Electrolytes using X-ray Photon Correlation Spectroscopy and Rheology ONYEKACHI OPARAJI, Florida State Univ, SURESH NARAYANAN, ALEC SANDY, Argonne National Laboratory, Argonne, Illinois 60439, USA, DANIEL HALLINAN JR, Florida State Univ — Polymer electrolytes are promising materials for high energy density rechargeable batteries. Battery fade can be caused by structural evolution in the battery electrode and loss of electrode/electrolyte adhesion during cycling. Both of these effects are dependent on polymer mechanical properties. In addition, cycling rate is dictated by the ion mobility of the polymer electrolyte. Lithium ion mobility is expected to be strongly coupled to polymer dynamics. Therefore, we investigate polymer dynamics as a function of salt concentration using X-ray Photon Correlation Spectroscopy (XPCS) and rheology. We report the influence of lithium salt concentration on the structural relaxation time (XPCS) and stress relaxation time (rheology) of high molecular weight poly(styrene – ethylene oxide) block copolymer membranes.

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