Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Li+ transport in poly(ethylene oxide) based electrolyte: A combined study of neutron scattering, dielectric spectroscopy, and MD simulation CHANGWOO DO, Oak Ridge National Laboratory, PETER LUNKENHEIMER, Experimental Physics V, Center for Electronic Correlations and Magnetism, University of Augsburg, 86159 Augsburg, Germany, DIDDO DIDDENS, Institut für Physikalische Chemie, Westfälische Wilhelms-Universität Münster, 48149 Münster, Germany, MARION GÖTZ, MATTHIAS WEIß, ALOIS LOIDL, Experimental Physics V, Center for Electronic Correlations and Magnetism, University of Augsburg, 86159 Augsburg, Germany, XIAO-GUANG SUN, Oak Ridge National Laboratory, JÜRGEN ALLGAIER, MICHAEL OHL, Jülich Centre for Neutron Science, Forschungszentrum Jülich, 52425 Jülich, Germany — Dynamics of Li+ transport in polyethylene oxide (PEO) and lithium bis(trifluoromethanesulfonyl)imde (LiTFSI) mixtures are investigated by combining various experimental techniques (neutron spin-echo and dielectric spectroscopy) with molecular dynamics (MD) simulations. Our results suggest that the characteristic live times within the cages formed by oxygens are mainly determined by the alpha-relaxation which corresponds to local segmental motions of polymers, to a much lesser extent by the main chain relaxation, and not at all by the beta-relaxation or any other faster processes. The significant contribution of Li+ hopping process to the ion conductivity is also identified. Subsequently, detailed characteristic length and time scales of various Li+ transport processes in solid polymer electrolytes are presented and interpreted.

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Date submitted: 17 Dec 2012 Electronic form version 1.4