Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Low-q X-ray scattering behavior in polymers[1] AMANDA MCDERMOTT, GREGORY TUDRYN, Penn State University, JAN ILAVSKY, Argonne National Laboratory, ANDREW ALLEN, National Institute of Standards and Technology, RALPH COLBY, JAMES RUNT, Penn State University — Many polymer systems display low-q scattering following a power law, and ultra-small-angle X-ray scattering reveals that this behavior persists at scattering wavevectors corresponding to length scales of several microns. Amorphous homopolymers are expected to be homogeneous at these scales, so the identity of the phases required to account for such scattering is an unresolved question. Our investigation of both ionomer and polymer/salt systems suggests that ions can change the morphology of large-scale inhomogeneities as well as increasing the scattering contrast. However, it is difficult to draw quantitative conclusions without first understanding the phenomenon in ion-free polymers. We discuss recent data on homopolymers of varying thermal history, tacticity, and molecular weight in relation to theoretical models, including the Fischer cluster mode observed in light scattering studies.

[1]Supported by the Department of Energy, the Advanced Photon Source at Argonne National Laboratory, and the NSF Graduate Research Fellowship Program

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Date submitted: 18 Nov 2009 Electronic form version 1.4