Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Probing the interlamellar amorphous phase in semicrystalline polyolefins using vapor flow and neutron scattering AMANDA MCDERMOTT, CHAD SNYDER, RONALD JONES, NIST - Natl Inst of Stds & Tech — Measuring equilibrium swelling as a function of solvent vapor activity is an established method of simultaneously measuring the polymer-solvent interaction parameter and the properties of crosslinks—or in semicrystalline polymers, tie-chains, which strongly impact mechanical properties. Gravimetric experiments do not differentiate between uptake by extralamellar and interlamellar amorphous material and determine amorphous layer swelling by treating the permeant and amorphous phase as incompressible fluids. Measurements of swelling and solvent uptake that are *independent* of one another and *specific* to interlamellar amorphous material could enhance understanding of mechanical properties, barrier properties, and solvent processing. Small-angle neutron scattering combined with *in situ* swelling by deuterated solvent vapor fulfills this requirement. A shift in the long-period peak wavevector indicates swelling, while peak intensity independently indicates interlamellar solvent concentration. Preliminary results suggest that interlamellar polymer-solvent energetic interactions may be affected by mesophases with chain orientation and mobility different from the bulk.

Amanda McDermott
NIST - Natl Inst of Stds & Tech

Date submitted: 13 Nov 2013 Electronic form version 1.4