## Abstract Submitted for the MAR10 Meeting of The American Physical Society

Hierarchical Structure of Poly(ethylene) Based Ionomers MICHELLE E. SEITZ, Department of Materials Science and Engineering, University of Pennsylvania, CHRISTOPHER D. CHAN, DuPont, KATHLEEN L. OP-PER, Department of Chemistry, University of Florida, TRAVIS W. BAUGHMAN, Eindhoven University of Technology, KENNETH B. WAGENER, Department of Chemistry, University of Florida, KAREN I. WINEY, Department of Materials Science and Engineering, University of Pennsylvania — The effect of chain architecture (linear vs branched), acid placement (precise vs random), acid content, neutralization extent, and crystallinity on the hierarchical structure of poly(ethylene-acrylic acid) ionomers was investigated via X-ray scattering and high angle annular dark field scanning transmission electron microscopy (HAADF STEM). HAADF STEM reveals randomly dispersed, spherical ionic aggregates in all materials. At temperatures where the ionomers are fully amorphous, the scattering at intermediate angle arises from interaggregate interference and can be described by the Kinning-Thomas model. If the acid groups are placed every  $21^{st}$  carbon, the materials are semicrystalline at room temperature and contributions from acid layers associated with crystallites are convoluted with interaggregate scattering. The ionic aggregates have diameters of  $\sim 1$  nm for all samples; however, the number density of aggregates is strongly dependent on the acid content but weakly dependent on the extent of neutralization.

> Michelle E. Seitz Department of Materials Science and Engineering, University of Pennsylvania

Date submitted: 19 Nov 2009

Electronic form version 1.4