

Abstract Submitted  
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**Morphological Study of Model Poly(Ethylene-Acrylic Acid) Ionomers** CHRISTOPHER D. CHAN, Department of Chemical and Biomolecular Engineering, University of Pennsylvania, TRAVIS W. BAUGHMAN, Macromolecular and Organic Chemistry, Technical University of Eindhoven, KATHLEEN L. OPPER, KENNETH B. WAGENER, Department of Chemistry, University of Florida, KAREN I. WINEY, Department of Material Science and Engineering, University of Pennsylvania — We have synthesized *linear* poly(ethylene-co-acrylic acid) (EAA) copolymers with precisely and randomly placed acid groups using ADMET (acyclic diene metathesis) and ROMP (ring opening metathesis polymerization). In the acid form, the EAA copolymers with precisely placed acid groups exhibit the typical orthorhombic PE crystal structure along with a new layered structure. The layered structures are more pronounced at lower acid content and have spacings consistent with the separation between acid groups; at 9.5mol% acid the layer-to-layer spacing is 2.53 nm. Given the PE crystal lamellae spacing determined by SAXS, each PE lamellae contains 2 to 6 acid-rich layers. The EAA copolymers with random acid groups do not exhibit well-developed layered structures. When these linear EAA copolymers are neutralized with zinc acetate in solution, STEM and X-ray scattering are used to characterize the Zn-rich ionic aggregates. Preliminary results have indicated that the ionic interactions dominate and disrupt the acid-acid layered structure even at partial neutralization.

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