Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Counterion effect on rheology and morphology of polydimethylsiloxane ionomers CLAUDE COEHN, Cornell University, ASHISH BATRA, Cornell University, HANSOO KIM, University of Pennsylvania, KAREN WINEY, University of Pennsylvania — We have synthesized a series of polydimethylsiloxane ionomers with control over spacing between ions, number of ions/chain and molecular weight. Freshly precipitated transition metal zinc and cobalt ionomers with less than one mol % of ions flow at room temperature and exhibit a zero shear-rate viscosity. X-ray scattering data and scanning transmission electron microscopy (STEM) data do not show any evidence of ionic aggregates. These ionomers form a network on annealing and the time to network percolation follows an Arrhenius dependence with temperature. Annealed zinc and cobalt ionomers also do not show any evidence of ionic aggregates that could be detected by X-rays or STEM leading to the conclusion that individual ion pairs act as cross-link points. Under similar conditions of spacing between ions and number of ions, barium ionomers, on the other hand, precipitate as weak networks at room temperature and form stronger gels on annealing. STEM and X-ray scattering from these ionomers show aggregate formation. At the higher 8 mol% zinc ions, these ionomers also precipitate as gels and show rod-like aggregates with an aspect ratio of 20 and a diameter of 1nm as observed by STEM.

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Date submitted: 01 Dec 2004 Electronic form version 1.4