

Abstract Submitted
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Aging properties of semi-dilute aqueous solutions of Polyethylene Oxide seeded with silica nanoparticles JING WANG, LINDA HEUER, DANIEL JOSEPH, University of Minnesota — Rheological properties of semi-dilute aqueous solutions of Polyethylene Oxide (PEO) seeded with silica nanoparticles are studied as a function of aging time. The viscosity, dynamic moduli and extensional properties of solutions of 0.5% PEO of 4 and 8 million g/mol molecular weight seeded with 10-20 nm silica particles in concentrations of 1, 2 and 3% by weight are greatly enhanced by the nanoparticles. The aforementioned properties were measured every week over a period of up to 18 weeks. The degradation of rheological properties with aging time in this period is greatly reduced and, in some cases is completely suppressed, by nanoparticles. The evolution of properties of these nanosolutions is not perfectly understood but is possibly determined in a resolution of the competing effects of absorption of PEO onto the silica with cleavage of the polymers due to oxidation and other effects at work in static samples.

Jing Wang
University of Minnesota

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