

Abstract Submitted
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Temperature controlled nanoparticle stability in concentrated polymer solutions SO YOUN KIM, Ulsan Natl Inst of Sci & Tech, CHARLES F. ZUKOSKI, University at Buffalo — Polyethylene glycol (PEG) in water is known to display a lower critical solution temperature (LCST) and a closed loop at high temperature. When silica nanoparticles are suspended in concentrated PEG solution, we observe temperature dependent phase separation even below the 60C which is much lower temperature than the LCST for the lowest PEG reported. Depending on the conditions, nanoparticles form clusters and show gelation and both can be reversible. Small angle x-ray scattering (SAXS) is used to characterize microstructure of nanoparticle dispersion and diffusing wave spectroscopy (DWS) and other light scattering techniques are employed to understand particle correlations in dense systems. Polymer dynamics near particle substrate is discussed with NMR Free Induction decay experiment. These combined experimental studies help to understand the detailed mechanism of nanoparticle gelation in polymer solutions.

So Youn Kim
Ulsan Natl Inst of Sci & Tech

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