Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

In situ real time measurement of temperature responsive nanoparticles. DENIS PRISTINSKI, THOMAS Q. CHASTEK, VIVEK PRABHU, KALMAN MIGLER, Polymers Division, NIST — In this work, we combine dynamic light scattering (DLS) and diffusing wave spectroscopy (DWS) to evaluate the size of temperature responsive nanoparticles over a broad range of concentrations. A fiber optic probe DLS instrument was previously demonstrated to measure nanoparticle solutions at a relatively high concentration. The incorporation of back-scattering DWS further extends the technique application to highly turbid conditions. The combined setup was designed to have a simplified and compact optical arrangement employing singlemode fiber based components. Data analysis for both methods was carried out using integrated open source cross-platform software. Measurements were conducted to monitor the progress of poly(N-isopropyl acrylamide) nanoparticle syntheses, including a multi-step seeded polymerization, commonly used to prepare core-shell particles. These particles have received a lot of attention due to their potential for use as targeted drug delivery systems. It was found that DLS and DWS were in good quantitative agreement, and able to accurately characterize the samples.

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Date submitted: 21 Nov 2008 Electronic form version 1.4