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Design and Characterization of Thermally Responsive Nanoparticles: Exploring Structure, Shape and Dynamics with Light Scattering KAITLIN VANDEMARK, ALI GHOORCHIAN, KIRIL STRELETZKY, NOLAN HOLLAND, Cleveland State University — Environmentally responsive nanoparticles synthesized from elastic-like polypeptides (ELP) present a promising system for applications as biosensors, drug delivery vehicles, and viscosity modifiers. These nanoparticles undergo a transition from a soluble state at room temperature to micelles above the transition. The size, shape, and dynamics of micelles above the transition as well as effects of the solvent salt concentration and pH on the transition are important to understand from scientific and application points of view. This system has been characterized with high resolution multiangle Dynamic and Static Light Scattering Spectroscopies. We confirmed the transition of the system from ELP extended trimers and their non-spherical formations into compact micelles. We discovered that micellar size and structure are sensitive to pH of the solution and that samples show signs of aging upon storing and air exposure. We found that micelles generally exhibit properties of the hyperbranched spheres while their shape becomes much more elongated in the window of pH: 10.1-10.3. We also found that the size of micelles strongly depends on salt concentration displaying at three different size regimes (2Rh: 20-45nm at 0-15mM; 100-150nm at 25-40mM; 250nm at 45mM) with different salt concentration dependences.

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