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Light Scattering Characterization of Salt Dependent Thermoreversible Micelles Synthesized from Elastin-Like Polypeptides[1] KAITLIN VANDEMARK, ALI GHOORCHIAN, KIRIL STRELETZKY, NOLAN HOLLAND, Cleveland State University — Environmentally responsive nanoparticles synthesized from Elastin-Like Polypeptides (ELP) present a promising system for applications such as biosensors, drug delivery vehicles, and viscosity modifiers. These nanoparticles undergo a transition from a soluble state at T_{room} to micellar aggregates above the transition. The ELP micelles have been found to be sensitive to various outside stimuli including pH, salt concentration, and solvent. Dynamic and Static Light Scattering were used to study structure and dynamics of ELP nanoparticles below the transition and of formed ELP micelles above the transition. Micelles were found to generally depend strongly on solution pH, however, in the pH window of 10.1-10.4 their size stayed constant. The apparent radius and molecular weight of micelles in this pH range strongly depend on salt concentration with three apparent regimes. At low salt (0-15mM), largely spherical micelles were found with Rh=15nm, which corresponds to the size of folded ELP hydrophilic tail; and molecular weight of 5000-6000kg/mol. At the intermediate salt (15-30mM) the observed particles are spherical micelles that increase in size (by about 3 fold) and molecular weight (by about 50 fold) as salt concentration increases. At high salt concentrations (30-60mM), $R_g/R_h \sim 1.3$, indicating the micelles behave as elongated particles with R_h ~75nm that corresponds to the size of a stretched ELP chain with an apparent molecular weight of 300000-600000kg/mol.

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