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Characterization of Mixed Polypeptide Colloidal Particles by Light Scattering HANNAH E. SHUMAN, GRACE K. GAECKLE, JOHN GAVIN, NOLAN B. HOLLAND, KIRIL A. STRELETZKY, Cleveland State University — Temperature-dependent polymer surfactants have been developed by connecting three elastin-like polypeptide (ELP) chains to a charged protein domain (foldon), forming a three-armed star polymer. At low temperatures the polymer is soluble, while at higher temperatures it forms micelles. The behavior of mixtures of the three-armed star ELP (E20-Foldon) and H40-Linear ELP chains was analyzed under different salt and protein concentrations and various foldon to linear ELP ratio using Depolarized Dynamic Light Scattering. It was expected that under certain conditions the pure E20-Foldon would form spherical micelles, which upon adding the linear ELP would change in size and possibly shape. The pure E20-Foldon indeed formed largely spherical micelles with R_h of 10-20nm in solutions with 15-100mM salt and protein concentration between 10μM and 100μM. For the mixtures of 50μM E20-Foldon and varying concentrations of H40-Linear in 25mM of salt, it was discovered that low and high H40-Linear concentration (4μM and 50μM) had only one transition. For the mixtures with of 10 and 25μM of H40-Linear the two distinct transition temperatures were observed by spectrophotometry. The first transition corresponded to significantly elongated diffusive particles of apparent R_h of 30-50nm, while the second transition corresponded to slightly anisotropic diffusive particles with apparent R_h of about 20nm. At all H40-Linear concentrations studied, diffusive particles were seen above the second transition. Their radius and ability to depolarize light increased with the increase of H40-Linear concentration.

Hannah Shuman
Cleveland State University

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