Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Self-assembly of elastin-like polypeptides diblocks into micelles of various morphologies WAFA HASSOUNEH, Department of Biomedical Engineering, Duke University, Durham, NC, EKATERINA ZHULINA, Institute of Macromolecular Compounds, Russian Academy of Sciences, St. Petersburg, Russia, MICHAEL RUBINSTEIN, Department of Chemistry, University of North Carolina, Chapel hill, NC, ASHUTOSH CHILKOTI, Department of Biomedical Engineering, Duke University, Durham, NC — Elastin-like polypeptides (ELPs) are a promising class of biopolymers for biomedical applications such as drug delivery. These biopolymers are composed of the pentapeptide repeat VPGXG, where X is any amino acid except proline. ELP diblocks, each block of which contains a different X residue composition, self-assemble into spherical micelles for certain lengths and ratios of hydrophobic and hydrophilic blocks. Our objective is to study morphological transitions, from spherical to cylindrical to lamellar structures, for the ELP diblock system by examining a wider range of diblock ratios and lengths. We employ a model that derives the phase boundaries of spherical-to-cylindrical and cylindrical-to-lamellar by balancing the corona elastic energy, the core elastic energy and the surface tension between the core and corona. Theoretical predictions from the model are compared with experimental results by independently measuring 1) surface tension at the core-corona interface and 2) second virial coefficient of the hydrophilic block monomer-monomer interaction. We report the measurements of these parameters and the initial comparison of experimental and theoretical phase boundaries for the ELP diblock system.

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Date submitted: 09 Nov 2012 Electronic form version 1.4