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Deposition and Grafting of Collapsed Elastin-Like Co-Polypeptides on Silicon ROBIN MAYS, North Carolina State University, JULIE ALBERT, Tulane University, SARAH MACEWAN, Duke University, MICHAEL DICKEY, North Carolina State University, ASHUTOSH CHILKOTI, Duke University, JAN GENZER, North Carolina State University — Protein-based polymers offer the potential for responsive, bio-compatible, well-defined (molecular weight and sequence) systems. Elastin-like peptides (ELPs) are well suited for solution-based biomedical applications, including drug delivery and biomolecular purification. In order to use ELPs for stimuli-responsive surfaces, a detailed understanding of deposition conditions and behavior is instrumental. We grafted diblock ELPs with lower critical solution temperature (LCST) behavior to silicon surfaces. We synthesized 33kDa ELPs through genetic expression in bacteria with recombinant DNA technology. The diblock copolypeptides we used have a hydrophobic block (VPGVG) and a hydrophilic block (VPGSG), with each block having a different LCST. These diblock ELPs form micelles in solution when heated above the transition temperature of the hydrophobic block. We can graft either fully solvated ELPs or micellar ELP structures to an EDC/NHS activated surface. Our findings indicate a surprising stability of ELP aggregation on surfaces. We investigated the effects of time, temperature, and grafting block on the morphology, thickness, and water contact angle of our surfaces. Using atomic force microscopy, we studied the morphology of the deposited ELPs both in air and water.

Robin Mays
North Carolina State University

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