Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Pathway Dependent Self-Assembly of Amphiphilic Diblock Copolypeptides LISA PAKSTIS, University of Delaware, ANDREW NOWAK, ERIC HOLOWKA, JEFFERY THOMPSON, TIMOTHY DEMING, University of California Los Angeles, DARRIN POCHAN, University of Delaware — Diblock copolypeptides consisting of a hydrophilic lysine (K) block and a hydrophobic leucine (L) block were designed to self- assemble due to their amphiphilic nature and the defined secondary structure of the hydrophobic block. In aqueous solution, these amphiphilic copolypeptides assemble into stiff, porous hydrogels at low volume fractions of polymer (vol. fraction polypeptide ($>$ 0.5 wt %). However, different self-assembly pathways (e.g. dissolution of the polypeptide into an organic solvent with subsequent addition of water followed by evaporation of the organic component) produce drastically different materials, spanning weak hydrogels, vesicles, twisted fibrils or hexagonal single crystals. Characterization of these disparate materials indicates that assembly is intrinsically controlled on the nanoscale by the interaction of the ahelical hydrophobic block into membranes. Hierarchical, microscale assembly is controlled through the pathway, i.e. kinetics, of assembly.

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Date submitted: 24 Nov 2004 Electronic form version 1.4