Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Synthesis and Co-assembly of Cyclopeptide-Polymer Conjugates with Block Copolymers RAMI HOURANI, NANA ZHAO, Department of Materials Science and Engineering, University of California, Berkeley, BRETT HELMS, Organic and Macromolecular Synthesis Facility, the Molecular Foundry, Lawrence Berkeley National Laboratory, TING XU, Department of Materials Science and Engineering, University of California, Berkeley — Thin films containing sub-nanometer channels aligned normal to the surface constitute promising materials for selective transport of small molecules for industrial and biological applications. The co-assembly of cyclopeptide-polymer conjugates with block copolymers (BCPs) allows the generation of such materials with molecular level control over the assemblies. The number, type, and dimensions of conjugated polymer chains influence the thermodynamics governing the microphase separation of BCPs, and the surface energy required to stabilize such small channels to obtain well-defined pore diameters at the sub-nanometer level. Coupling different synthetic homopolymers to a preformed cyclic (D-alt-L)-R-octapeptide, allowed the generation of coil-ring-coil conjugates. The co-assembly of blends of such conjugates with block copolymers was investigated, and the effect of the size, type and number of conjugated polymer chains on the thickness and packing of thin films was demonstrated. This study provides a general and reliable methodology to generate well-defined hierarchically structured nanoporous materials for ions and gas transport.

Rami Hourani
Department of Materials Science and Engineering,
University of California, Berkeley

Date submitted: 01 Dec 2009 Electronic form version 1.4