Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

**Two-dimensional networks of nanowires with large-scale continuity and connectivity patterned by the self-assembly of block copolymers** MARK STOYKOVICH, IAN CAMPBELL, University of Colorado - Boulder — Self-assembled block copolymers in thin films have advantages for nanolithography including tunable and scalable feature sizes below 50 nm, and parallel patterning over large areas. Here we characterize the interconnectedness of two-dimensional networks self-assembled by a lamellar-forming diblock copolymer of polystyrene and poly(methyl methacrylate) in thin films. The topology of the network (its connectivity and large-scale continuity) was explored as a function of the copolymer composition and processing (i.e., solvent versus thermal annealing, film thickness, annealing temperature, annealing time). The block copolymer templates have then been used to fabricate metal and Si nanowires (less than 25 nm diameters) in the structure of the two-dimensional networks. The electrical and optical properties of the networks were measured over macroscopic areas, and were comparable to theoretical calculations based on the characteristic dimensions and network structure. Furthermore these two-dimensional nanowire networks have exciting mechanical properties; they can be stretched, compressed, twisted or folded with no significant changes in their optoelectronic characteristics, making such materials attractive for application in flexible or stretchable electronics.

Mark Stoykovich
University of Colorado - Boulder

Date submitted: 15 Nov 2013 Electronic form version 1.4