Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Bicontinuous Porous Carbon Films Templated with ABC Triblock Copolymers KEVIN CAVICCHI, GUODONG DENG, BRYAN VOGT, University of Akron — Mesoporous carbons are useful for a range of applications such as separation and catalysis. A route to prepare porous materials is through cooperative self-assembly of a carbon precursor (e.g. phenolic resin) and a block copolymer, in which the precursor is selectively soluble, to drive mesophase formation. Typical soft templating uses AB or ABA block copolymers, which form classical morphologies, such as spheres, cylinders, and lamellae. Switching to an ABC type block copolymer provides greater flexibility in the design of the morphology potentially opening up larger processing windows for complex structures, such as bicontinuous morphologies. This presentation will discuss efforts to prepare bicontinuous porous carbon thin films using an ABC triblock copolymer of poly(ethylene oxide)-block-poly(ethyl acrylate)-block-polystyrene via spin-coating and a series of thermal annealing steps. It will be shown that direct thermal annealing can produce high porosity ($\sim$60%) carbon fiber networks. In addition, adding a solvent annealing step prior to the thermal annealing steps is able to produce longer range order structures with a small window of an ordered bicontinuous morphology. These high porosity films with organized fibers are promising for energy and separation applications.

Kevin Cavicchi
University of Akron

Date submitted: 15 Nov 2013 Electronic form version 1.4