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**Controlling the Pore Size of Mesoporous Carbon Thin Films through Thermal and Solvent Annealing.** ZHENGPING ZHOU, GUOLIANG LIU, Virginia Tech — Herein we describe a method for controlling the pore size of mesoporous carbon thin films from poly(acrylonitrile-block-methyl methacrylate) (PAN-b-PMMA) synthesized via RAFT polymerization. We systematically investigated the self-assembly behavior of PAN-b-PMMA thin films during thermal and solvent annealing, as well as the pore size of mesoporous carbon thin films after pyrolysis. The as-spin-coated PAN-b-PMMA microphase-separated into globular nanostructures, and the globular nanostructures evolved into various morphologies after thermal or solvent annealing. Surprisingly, through thermal annealing and subsequent pyrolysis of PAN-b-PMMA into mesoporous carbon thin films, the pore size and the center-to-center spacing of pores increased significantly with annealing temperature, different from most block copolymers. In addition, the choice of solvent during solvent annealing strongly influenced the block copolymer nanostructures and the pore size of mesoporous carbon thin films. The discoveries herein provide a simple strategy to control the pore size of mesoporous carbon thin films by tuning thermal or solvent annealing conditions, instead of synthesizing a series of block copolymers of various molecular weights and compositions.

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