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Self-assembly of Cylindrically Confined Block Copolymers in Core-Shell Electrospun Fibers MINGLIN MA, GREGORY RUTLEDGE, Chemical Engineering, MIT — We report the development of electrospun fibers with internal structure by two-fluid coaxial electrospinning of block copolymers. Microphase separated morphologies with a long-range order were obtained by annealing the fibers at a temperature greater than the glass transition temperature of either block of the copolymer core but less than the glass transition temperature of the polymer shell. Various interesting, unusual and in some cases unprecedented self-assembled morphologies of block copolymers have been observed. Based on quantitative analyses, confinement within the cylindrical geometry was found to affect both the microphase morphology and fundamental period of the block copolymer. These internally nanostructured fibers have both practical and fundamental intellectual importance. For example, these fibers have unique potential for applications in optics, photonics, drug delivery, and other uses because of their small diameter, unique internal structure, and continuous filamentary nature.

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