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Morphologies of a diblock copolymer melt confined in a spherical nanopore BING MIAO, St. Francis Xavier University, JANINE TULKENS, ROBERT WICKHAM, St. Francis Xavier University — We systematically investigate the microdomain morphologies that self-assemble in a diblock copolymer melt confined in a spherical nanopore, using real-space self-consistent mean-field theory. Near the surface of the nanopore we find that perforated-layer structures form, with four-, five-, and six- fold coordinated pores, for melts that form the cylindrical phase in the bulk. Simultaneously, spherical domains, toroidal domains, or small networks form in the centre of the pore. We vary the diameter of the pore and accurately locate the diameters where phase transitions between these morphologies occur. The effect of confinement on melts that form spherical microdomains in the bulk is also examined. We find that convergence to regular structures is complicated by the formation of defects, and we develop techniques to eliminate these defects. Methods to distinguish the various morphologies will also be discussed.

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