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Diblock Copolymers under Nano-Confinement DONG MENG, YUHUA YIN, QIANG WANG, Department of Chemical and Biological Engineering, Colorado State University — Nano-confinement strongly affects and can thus be used to control the self-assembled morphology of block copolymers. Understanding such effects is of both fundamental and practical interest. In this work, we use real-space self-consistent field calculations with high accuracy to study the self-assembled morphology of diblock copolymers (DBC) under nano-confinement for several systems, including 1D lamellae-forming DBC confined between two homogeneous and parallel surfaces, in nano-pores, and on topologically patterned substrates; 2D cylinder-forming DBC on chemically strip-patterned substrates; and 3D gyroid-forming DBC confined between two homogeneous and parallel surfaces. The stable phases are identified through free-energy comparison, and our SCF results are compared with available experiments and Monte Carlo simulations in each case.

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