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Novel diblock copolymer morphologies under cylindrical confinement PRIYANKA DOBRIYAL, THOMAS P. RUSSELL, University of Massachusetts, Amherst — Cylinder forming polystyrene-b-polybutadiene diblock copolymers were introduced inside nanopores of alumina membrane. The pore diameter was varied in order to study the effect of confinement on diblock copolymer morphologies. The, molecular weights of the copolymers were also varied and similar morphologies were obtained for similar degree of confinement. The morphologies observed were dependent on the structural frustration (D/L_0), where D is the pore diameter and L_0 is equilibrium period spacing. D/L_0 was varied from 0.75 to 2. A rich variety of novel morphologies that include single helix, torroids and double helices were observed which are not observed in the bulk. These morphologies also depended upon the surface of the pore walls. Different morphologies were obtained when the pore wall was preferential to one of the components of the diblock copolymer and when the pore wall was neutral for same structural confinement.

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