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Diamond-Forming Block Copolymers and Diamond-like Morphologies: a New Route towards efficient Block Copolymer Membranes?[1]
IGOR ERUKHIMOVICH[2], Moscow State Univ, YURY KRIKSIN, Keldysh Institute of Applied Mathematics, RAS, Moscow — Formation of ordered (microphase separated) block copolymer nanostructures is a promising route towards creating isoporous membranes suitable for technological applications. We propose a new route to achieve this target: to choose such block copolymer architectures, which would provide a practically isotropic permeability both in the bulk and in thin films. Basing both on the weak segregation theory extension into the thin films and the self-consistent field theory numerical procedure we present the results concerning the effects of the wall confinement both with neutral, selective and patterned walls on the structure and stability of the block copolymer ordered films. The diamond-like morphology is found to be the most promising one as to optimizing the permeability of thin films. A new effect of the diamond morphology stability enhancement in the presence of a properly designed lamellar-like wall pattern is discovered and the corresponding phase diagram demonstrating the effect of the pattern scale and film width on the diamond morphology stability is presented.

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