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Hierarchical Structures of a Multiblock Copolymer Melt WEIHUA

LI, AN-CHANG SHI, Department of Physics and Astronomy, McMaster University, Hamilton, Ontario — Hierarchical structures of a multiblock copolymer melt are investigated using real-space self-consistent mean-field theory. The polymer, $A(BC)_nBA$, is composed of three species A, B, and C. The parameter n indicates the number of short BC blocks with equal lengths. Hierarchical lamellar structures with parallel double periodicity have been observed in very recent experiments done by Masuda, et al. in this type of multiblock copolymer melts. These hierarchical structures are reproduced in our one-dimensional calculations. We locate the transitions between hierarchical lamellar phase and single lamellar phase as the composition f_A is varied for two types of hierarchical lamellae with five and seven thin layers, respectively. In addition, we explore hierarchical cylindrical structures using two-dimensional calculations.

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