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Stabilizing Binary Mesocrystals via Block Copolymer Blends

Thursday 9 June 2022 09:00 (15 minutes)

Previous work has demonstrated that multiblock block copolymers with designed architectures offer unlimited opportunities to obtain novel nanoscale structures. However, synthesizing multiblock copolymers with complex architectures is challenging and expensive. In this research we explore the possibility of using blends of simple copolymers with designed secondary interactions as an alternative route to access desired structures. Specifically, we examined the phase behavior of ABC/DB/EB ternary blends and AB/CD binary blends using the self-consistent field theory, aiming to stabilize the desired binary mesocrystals composed of two types of spherical domains. Conditions for forming various binary mesocrystals are obtained from the resulting phase diagrams. We also discuss the mechanisms to form these novel phases in both cases. Our study offers a simpler approach to access the novel macromolecular binary mesocrystals and adds to the understanding of the self-assembling behaviour of block copolymer blends.

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