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Simulation of micelle lattice ordering via nucleation from disorder in a diblock copolymer melt RUSSELL SPENCER, ROBERT WICKHAM, University of Guelph — We examine the dynamics of the order-disorder transition (ODT) in diblock copolymer melts by simulating the nucleation of the BCC phase of spherical micelles out of the disordered phase, using the time-dependent Landau-Brazovskii model. Questions about the description of the disordered phase as a phase of disordered micelles, and the role of intermediate close-packed structures suggest a rich dynamics for this ordering transition. For a copolymer composition $f = 0.39$, we find that above a critical size, which diverges at the ODT, a spherical nucleus of the BCC micelle phase grows, forming the BCC phase directly. The growth rate varies linearly with undercooling. We also examine the growth of nuclei of the close-packed phases. For more asymmetric copolymers, $f = 0.35$ and $f = 0.3$, a region of disordered micelles surrounds a core of the BCC phase in the growing nucleus, suggesting that, for asymmetric copolymers, the ODT proceeds via a two-step mechanism.

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