

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Decay of a Metastable Cylinder Phase via Nucleation of the Stable Lamellar Phase in a Diblock Copolymer Melt¹ RUSSELL SPENCER, ROBERT WICKHAM, University of Guelph — We simulate the time-dependent Landau-Brazovskii equation in three dimensions and study the kinetics of a lamellar phase nucleating from a metastable cylinder phase in a diblock copolymer melt. The underlying microstructure leads to a complicated droplet interface structure, an orientation-dependent interfacial velocity, and non-spherical nuclei. In part, our motivation is to compare with an earlier nucleation theory by Wickham, Shi and Wang (2003), which uses approximations not present in our simulations. Our numerically computed droplet shape compares well with the theory, as do our critical volume and free-energy near coexistence. Farther from coexistence, the droplet shape is more spherical, and the critical volume is larger than theory predicts. We go beyond the static theory to find the orientation-dependent interface velocity and droplet growth rates, the fastest of which is in the direction normal to the lamellae.

¹This work is supported by NSERC.

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Date submitted: 17 Nov 2009

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