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Mesoscale Dynamics of Solvent Evaporation in Block Copolymer Thin Films SEAN PARADISO, SU-MI HUR, KRIS DELANEY, HECTOR CENICEROS, CARLOS GARCIA-CERVERA, GLENN FREDRICKSON, University of California, Santa Barbara — Block copolymer thin films are being investigated for a wide variety of applications ranging from separation membranes, organic photovoltaics, and lithographic masks. In order to accelerate defect annihilation in the periodic structures that develop within these films, solvent annealing techniques are often employed that exploit control over solvent atmosphere to modify the free surface thermodynamics and evaporation rate in an attempt to influence the alignment of ordered domains. The inherently non-equilibrium nature of this problem complicates standard theoretical treatments based on relative free energy calculations, so we have employed a dynamical extension of Self-Consistent Field Theory coupled with a solvent evaporation mechanism to gain insights into the interplay between component-surface interactions, evaporation rate, and observed film morphology. The effects of these factors on the micro-phase separation trajectory of the film will be discussed.

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