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Solvent, Thermal and Solvent-Thermal Methods on Block Copolymer Thin Films THOMAS RUSSELL, XIAODAN GU[1], University of Massachusetts, ILJA GUNKEL[2], ALEXANDER HEXEMER, Lawrence Berkeley National Laboratory — Real-time grazing-incidence small-angle X-ray scattering experiments were used to study block copolymer self-assembly in thin films during thermal and solvent vapor annealing, where copolymer thin films were exposed to the vapor of a solvent having near equal interactions with the blocks and to elevated temperature in an inert gas atmosphere, respectively. Similarities between both annealing techniques were identified and advantages and disadvantages of each annealing method are discussed. We show that the product of the effective Flory-Huggins interaction parameter, χ, and the degree of polymerization, N, determines the grain size, irrespective of the specific annealing technique. Thermal-solvent annealing, where the thin films were exposed to solvent vapors at elevated temperatures, is also discussed and compared to solvent vapor and thermal annealing.

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