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Quantitative study of temperature-dependent order in thin films of cylindrical morphology block copolymer VINDHYA MISHRA, University of California, Santa Barbara, EDWARD KRAMER, Department of Materials and Department of Chemical Engineering, University of California Santa Barbara —
Disordering and defect generation in block copolymer systems at high temperatures is of significance to get a better understanding of the physics governing these systems, which can also direct efforts to minimize them. We have studied the smectic-nematic-isotropic transition in confined monolayers and bilayers of cylindrical morphology poly (styrene-b-2vinyl pyridine) diblock copolymer. Previous studies of melting phenomena in block copolymer thin films have relied on quantitative AFM studies alone. We have supplemented AFM studies with grazing incidence small angle X-ray diffraction lineshape analysis to quantify the decay of translational and orientational order with increasing temperature. The results have been interpreted in the context of the Toner-Nelson theory of melting for layered systems.

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