

Abstract Submitted  
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**Temperature Gradient effects in Directed Assembly of Block Copolymer Films via Cold Zone Annealing**<sup>1</sup> GURPREET SINGH, MANISH KULKARNI, Department of Polymer Engineering, University of Akron, Ohio 44325, KEVIN YAGER, Center for Functional Nanomaterials, Brookhaven National Laboratory, Upton, NY 11973, BRIAN BERRY, Department of Chemistry, University of Arkansas at Little Rock, Little Rock, AR 72204, ALAMGIR KARIM<sup>2</sup>, Department of Polymer Engineering, University of Akron, Ohio 44325 — Vertically oriented micro-phases of block copolymers (BCPs) are generally preferable for applications like organic photovoltaic devices and nanoscale lithography. Here we demonstrate a Cold Zone Annealing (CZA) technique that produces a very sharp thermal gradient in contrast to our previous studies that produced well-ordered parallel BCP microphases [1]. Under these conditions, initial experiments on cold zone annealed PS-b-PMMA BCP films, yielded long range vertical orientation order in PMMA cylinders. GISAXS analysis indicates that the vertical morphology is maintained throughout the film thickness. Comparison of the CZA with conventional oven annealed samples show a magnitude of improvement in the ordering of BCP phases.

[1] Berry et al., *Nano Lett.*, **7**, pg 2789 (2007)

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