Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Alignment of Cylindrical Diblock Copolymer Thin Films Using Flow Stress VINCENT PELLETIER, MINGSHAW WU, Physics, DOUGLAS ADAMSON, PRISM, RICHARD REGISTER, Chemical Engineering, PAUL CHAIKIN, Physics, Princeton University — Producing macroscopic alignment of diblock copolymer thin film microdomains is of great interest in industry, as it can be used as pattern masks, especially when the alignment direction can be controlled. Our previous studies of the alignment of monolayer films of cylindrical phase diblock copolymers used shear applied through contact with an elastomer pad to obtain macroscopic order. Here we extend these studies with quantitative measurements using stress applied via a fluid, high viscosity polydimethylsiloxane. The shear stress is provided by a rotating disk on the viscous layer, or by Poiseuille flow of the fluid through a channel cut out of an elastomer sheet and placed on the diblock film. There is a minimum stress required for alignment of the microdomains. We can give the channels any shape we want, offering the possibility to pattern the nanometer scale cylindrical microdomain alignment on the micrometer-to-millimeter scale.

Vincent Pelletier
Princeton University

Date submitted: 30 Nov 2004 Electronic form version 1.4