Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Self-Assembled Arrays of Non-Coalescent Water Drops VIVEK SHARMA, School of Polymer, Textile and Fiber Engineering, MOHAN SRINIVASARAO, School of Polymer, Textile and Fiber Engineering, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta GA 30332 — Condensation figures form over polymer dissolved in volatile solvent exposed to a stream of moist air. These patterns are hexagonally symmetric and they comprise of non-coalescent and nearly monodisperse water drops. Typical condensation figures have a range of drop sizes, resulting from the nucleation, growth and coalescence of different generations of water drops. In this study, we image the pattern formation over evaporating polymer solutions. We observe that rafts of growing drops evolve into a highly organized two dimensional lattice, which eventually evaporate away as well, templating ordered arrays of holes in polymer films. We derive the analytical and modeling framework for determining the key kinetic parameters that control the typical length scales and timescales of droplet growth, non-coalescence and assembly.

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Date submitted: 01 Dec 2007 Electronic form version 1.4