

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Fabrication of microstructured polymer films using breath-figure-templated assembly MOHAN SRINIVASARAO, School of Polymer, Textile & Fiber Eng., Georgia Tech. Atlanta, GA 30332, VIVEK SHARMA, Hatsopoulos Microfluids Laboratory, Mechanical Eng., MIT, Cambridge, MA, MATIJA CRNE, Procter & Gamble, Germany — Breath figures formed on evaporating polymer solutions exposed to the blast of humid air involve growth and self-assembly of water drops that are non-coalescent. The ordered arrays of nearly monodisperse drops, eventually evaporate away, leaving a microstructured, porous polymer film. We elucidate the mechanism of this breath-figure-templated assembly, by accounting for various transport and thermodynamic processes that control the dynamics of drop nucleation, growth, noncoalescence and self-assembly. The theoretical framework developed in this study allows one to rationalize and predict the structure and size of pores. We provide an exemplary study where we use coat these films with inorganic oxides and mimic the structural color of *Papilio palinurus* butterfly.

Vivek Sharma
Hatsopoulos Microfluids Laboratory, Dept of Mechanical Eng.,
Massachusetts Institute of Technology, Cambridge, MA 02139

Date submitted: 28 Nov 2009

Electronic form version 1.4