

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Shrinky Dinks : Dynamic Shape Transformations** AJAY GOPINATHAN, MICHELLE KHINE, ARNOLD KIM, University of California, Merced — Biaxially oriented polystyrene thermoplastic sheets (shrinky dinks) have been recently used by one of us (Khine, Lab on a Chip, 2008) as a template for rapid and non-photolithographic microfluidic pattern generation. This method utilizes the shrinkage properties of the shrinky dinks upon heating to generate microscale structures. During the heating process the sheets show a variety of non-trivial three dimensional intermediate structures before returning to a shrunken flat state upon completion of the process. We show that these structures arise due to the imposition of a non-uniform spatial metric on the sheet which in turn is governed by the dynamic temperature gradients generated in the sheet. Our results allow us to quantitatively describe the dynamic sequence of structures generated and suggest routes to the design and fabrication of different structures in a controllable fashion.

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Date submitted: 27 Nov 2007

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