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Self-organized Pattern Formation in Dewetting of Elastically Confined Thin Polymer Layer DANISH FARUQUI, Carnegie Mellon Univ, ASHUTOSH SHARMA, Indian Institute of Technology, Kanpur — We report various stages of self-organized, sub-micron, surface directed patterns in a thin polystyrene (PS) layer (thickness ∼20nm) sandwiched between a silicon substrate and a cross-linked elastomeric layer (polydimethylsiloxane; PDMS, thickness ∼20nm). Morphological evolution of the self-organized surface patterns was recorded both on the elastic PDMS surface and on visco-elastic PDMS-PS interface. The instability patterns could be aligned by placing a micro-stamp (pitch 1500 nm) in conformal contact on the surface of the PDMS-PS bilayer.inducing anisotropic and regular surface pattern very similar to that on the master stamp. AFM scans of the top elastic PDMS surface and optical micrographs confirmed this contact-less transfer of master pattern, at both interfaces, uniformly over a larger area (cm^2). The anisotropic surface pattern thus formed on the PDMS and PDMS-PS interfaces was employed to explore the subsequent stages of self-organized sub micron structures. Subsequent stages of self organization in this system refers to formation of ordered assembly of sub-micron structures in initial pattern followed by their morphological and topographical evolution in terms of shape, size, separation and aerial density.

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