

Abstract Submitted
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Mechanics of Thin Film Buckling¹ YURI EBATA, ALFRED CROSBY, University of Massachusetts, Amherst — Buckling of thin polymer films can be used to fabricate unique patterned surfaces while also providing fundamental insights into molecular mechanisms associated with nonlinear deformation processes. In this study, thin polystyrene films with thickness ranging from 50nm to 800nm are attached to patterned polydimethylsiloxane substrates and compressed uniaxially. At low applied strains, the polystyrene film wrinkles above the patterned depressions and a scaling relationship between the number of wrinkles and the pattern size is found. At higher compression, the polystyrene film localizes the strain by proceeding into a series of sharp folds. Observed strains in the polystyrene film along the fold ridge approach 50%. The reversibility of these sharp features is studied.

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