

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Adhesion of Surface Ribbons CHELSEA DAVIS, ALFRED J. CROSBY, University of Massachusetts Amherst — Inspired by numerous examples in nature, significant research advances have recently demonstrated the ability to use topographic surface patterns to control critical surface properties such as adhesion and friction. Although most efforts have focused on the use of lithographically-fabricated fibrillar structures, alternative patterns such as surface wrinkles have also been shown to be advantageous for the control of adhesion. We present a new surface structure for soft, elastomeric materials called surface ribbons. These surface structure shells are formed by the controlled buckling of a surface-attached film, and offer many advantages for the control of adhesion, including on-command responsiveness. We present methods for the fabrication of these structures, results demonstrating the ability for these structures to enhance adhesion, and scaling relationships that link the structures' geometry, materials properties, and measured surface properties. In addition to providing attractive avenues for the creation of responsive surfaces, these structures offer fundamental insight into the mechanisms controlling general patterned surface adhesion.

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Date submitted: 27 Nov 2007

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