

Abstract Submitted  
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**Surface roughness effect on Adhesion-Debonding of soft thin elastic film**<sup>1</sup> SATISH MISHRA, Mississippi State University, JAYATI SARKAR, Indian Institute of Technology, Delhi — Topologically patterned thin film surfaces have been used widely to enhance the modern day technologies. The key property of these materials is a high surface-to-volume ratio that is achieved through patterning their surfaces. These patterns can further be exploited to induce surface properties like adhesiveness, hydrophobicity etc. However, patterning these films through bottom-up approach is uneconomical. One of the top-down approach involves self-organization of soft elastic film in proximity contact of an external contactor. The interplay of elastic and contact force leads to formation of patterns on the film surface. However, the patterning lengthscales are limited to the mean thickness,  $h$ , of the film ( $3h-4h$ ). Here, we have performed Finite Element Analysis (FEA) of the soft thin elastic film (500nm) bonded to a rigid rough substrate in contact proximity of rigid contactor. It is also shown that highly miniaturized patterns can be produced utilizing the inherent roughness of the substrate without resorting to pre-patterning of the substrate to a definite regular form. The results also reveals how the miniaturized lengthscales help these films to behave as better adhesives.

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