

Abstract Submitted  
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**Hierarchical multiscale patterned flexible PDMS elastomeric film and its ice-retarding properties** YING CHEN, The University of Akron, DIYA BANDYOPADHYAY, BASF, ALAMGIR KARIM, The University of Akron — Hierarchical structures in nature inspired development of artificial micro-nano structures in recent years, because these structures exhibit unique properties like tunable adhesion and wetting. We demonstrate a simple yet versatile method to fabricate micro-nano surface based on combination of PDMS nano-imprinting and UVO lithography. Nanoscale patterned PDMS is fabricated by imprinting digital recording media discs (CD/DVD) pattern. The micro pattern was then built by selective densification of patterned PDMS by exposing to UVO through a bigger mask like TEM grid or wire mesh. The nano imprinted pattern remains unaffected during the UVO treatment. We observed that tunable hierarchical structures with height up to 900 nm can be created by simply controlling UVO exposure time. This method provides potential applications in various fields such as superhydrophobicity, icephobicity, microfluidics and solar cell. We demonstrate that these hierarchical surface exhibits improved icephobicity comparing to flat hydrophobic surface. Icephobicity experiments were carried out in a controlled humidity and temperature chamber. Patterned PDMS film coatings were cooled to  $-10\text{ }^{\circ}\text{C}$  at a relative humidity of 65%. Temporal formation of ice was observed under optical microscopy.

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