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**Hierarchically UVO patterned elastomeric and thermoplastic structures** YING CHEN, MANISH KULKARNI, Univ of Akron, ALLAN MARSHALL, Omnova Solutions, ALAMGIR KARIM, Univ of Akron — We demonstrate a simple yet versatile method to fabricate tunable hierarchical micro-nanostructures on flexible Poly(dimethylsiloxane) (PDMS) elastomer and thermoplastic polymer surface by a two-step process. Nanoscale patterned PDMS was obtained by imprinting compact disc (CD)/digital video disc (DVD) patterns. The second micro pattern was superposed by selective densification of PDMS by exposing to ultraviolet-ozone radiation (UVO) through micro-patterned TEM grid as a mask. The nanoscale patterns are preserved through UVO exposure step leading to formation of deep hierarchical patterns, so that for a 19  $\mu\text{m}$  square mesh, the micro pattern has a depth of 600nm with 6h PDMS UVO exposure time. This simple method can be promoted to fabricate hierarchical structures of thermoplastic materials (such as polystyrene), from which the mechanism of capillary imprinting and thermal stability of hierarchical patterns are investigated. This study is potentially important to various applications ranging from biomimetic scaffolds to solar cell.

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