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Hierarchical Self-Assembly of Block Copolymers for Lithography-Free Nanopatterning.[1] SANG OUK KIM, BONG HOON KIM, Materials Science and Engineering, KAIST, South Korea, SANG CHUL JEON, National Nanofab Center (NNFC), Daejeon, Southe Korea — Development of a truly macroscopic scale nanopatterning process applying self-assembling materials has proved limited success. Hierarchical self-assembly is an alternative approach, which may produce complex architectures accommodating diverse functionalities. The mutually interacting multi-scale orderings of a hierarchical assembly may provide an opportunity to control over the diverse length scales simultaneously. We present lithography-free, truly macroscopic scale nanopatterning process utilizing hierarchical self-assembly of block copolymers. A micropatterned block copolymer film was self-organized from an evaporating block copolymer solution over an arbitrarily large area. The thickness modulation of the patterned film directed the spontaneous alignment of nanoscale morphology, producing a marvelous hierarchical morphology comprising microscale and nanoscale orderings. This facile and robust nanopatterning process employing the two levels of spontaneous orderings represents a versatile pathway to control nanoscale morphology by manipulating microscale architecture. Reference: B. H. Kim, et al. Adv. Mater. in press.

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