Unconventional Polymer Patterning and Hybridization for Complex Engineering Applications

윤현식, 차국헌*
서울대학교
(khchar@plaza.snu.ac.kr*)

Among many attractive characteristics of polymeric materials, processability is the most important aspect from engineering perspectives. In order to construct polymer-based structures, various unconventional patterning techniques have been devised as economic ways to fabricate nanostructured patterns. Since the nanoimprint lithography (NIL) has been demonstrated to minimize the feature size for semiconductor processes, many researchers have fabricated unique polymeric structures such as 3D structures or high aspect ratio pillars for superhydrophobic or antireflective surfaces. Recently, the demand for polymeric nanostructures is shifted to multi-scale, hierarchical structures to mimic structures in Nature such as structural colors of morpho butterfly, self cleaning of lotus leaves, and gecko-inspired dry adhesives. In this presentation, we will first talk about general trends on the fabrication of polymeric patterns from simple nanostructures to more complex hierarchical structures and, more specifically, introduce our recently developed asymmetric polymeric structures to realize directional optical, wetting and adhesion properties and also their applications in three-dimensional displays, microfludics, residue-free adhesives, and energy-related devices.