

Surface-Tension-Induced Synthesis of Anisotropic Particles Using Confined Polymeric Fluids

최창형, 이진기¹, Anubhav Tripathi¹, Howard A. Stone², David A. Weitz³, 이창수*
충남대학교; ¹Brown University; ²Princeton University; ³Harvard University
(rhadum@cnu.ac.kr*)

This study presents a novel technique for synthesizing monodisperse anisotropic particles through surface-tension-driven flow. We suggest two routes for the generation of monodisperse polymeric particles with different morphologies such as convex and flat-top shapes. A photocurable solution (polyethylene glycol diacrylate; PEG-DA) and a nonphotocurable wetting solution (n-hexadecane) are sequentially loaded into a micromold. The different processes in a loading sequence of the two solutions of PEG-DA and Hexadecane resulted in formation of different contacting interfaces of n-hexadecane/PEG-DA and air/PEG-DA, respectively. Additionally, we provides examples of particles with diverse shapes such as bullets, cylinders, discs, hemispheres, hearts, twin cylinders, twin donuts, hexagons with open or closed ends. Furthermore, combinations of two different routes show the feasibility for the fabrication of Janus particles having compartment with different properties. The anisotropic particles produced by our approach can be exploited as building blocks for self-assembly.