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## Synthesis of complex-shaped microparticles via phase separation in microfluidic device

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Complex-shaped micro-particles (MPs) with multi-compartments have been attempted to be produced for utilizing MPs in cell/drug delivery, multiplexing assays, actuators, as self-assembly building blocks, as well as photonic devices. Several methods have been suggested to synthesize the microparticles such as emulsification, micromolding, photolithography and microfluidics. Among these methods, microfluidic devices have been introduced to synthesized MPs having distinct characteristics, such as well-tailored sizes with narrow distribution and various morphologies. Although the microfluidic devices successfully increased the shape complexity of the MPs, they still required the integration of intricate microfluidic devices. Hence, in this work, several phase separation approaches including phase separation of: (1) Highly concentrated N-isopropylacrylamide, (2) Poly (ethylene glycol) diacrylate (PEGDA)-coacervate and 3) high molecular weight (PEGDA)-low molecular weight(PEGDA) are introduced for simplicity in synthesizing complex-shaped MPs with no need for intricate microfluidic devices. In microfluidic device, phase separated two aqueous phase solutions are dispersed in continuous oil phase and create micro-droplets having complex morphology (Janus and core-shell) while compartmentalizing their internals. After formation of the micro-droplets, MPs were synthesized with help of a UV-light source. These present phase separation methods based on microfluidic device may lead us to a simple and helpful direction in synthesizing various functional MPs with tailored morphology; Janus and core-shell. The suggested functional MPs will have implications on both the fundamental research and broad applications such as biomedicine and biochemical.

### Biography

Kyoung Duck Seo is currently an Assistant Professor in the Department of Mechanical Engineering at Wonkwang University, Jeonbuk, South Korea. He has received his BS, MS and PhD degrees (Mechanical Engineering) from POSTECH, Pohang, South Korea, in 2008, 2010 and 2016, respectively.

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