

Preparation of Janus Particles in Microfluidic Device

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In this article, we present a facile but robust approach for in situ synthesis of copolymer PNIPAAm-co-SPO-co-fluorophore-MBA Janus particles with narrow size distribution by UV-directed phase separation in a PDMS-based microfluidic device. The monodisperse water-in-oil (W/O) droplets produced based on shear-force-driven break-off mechanism, are instantaneously converted to “acorn-like” Janus particles when subjected to UV irradiation in the downstream channel. The particles bear two classifiable architectures: the hollow body mainly composed of poly (MBA) shell having a smooth surface and the protruded head, is an aggregation of poly (NIPAM-co-SPO-co-fluorophore) with relatively rough raspberry surface, and which also shows color change at variable temperature. The phase separation of copolymer poly (NIPAM-co-SPO-co-fluorophore-MBA) to form Janus particles under the action of UV-irradiation is unidirectional and the protrusion always moves away from UV-direction. In addition the morphology of the microparticles can be controlled by varying the MBA concentration. The particles are characterized by optical, scanning electron, fluorescent and confocal laser microscopy.