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Polymer particles with tunable shapes and internal structures

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Block copolymer assemblies have attracted great attention due to their potential applications in the fields of drug delivery, targeting therapy, medical diagnosing and imaging. Three dimensional (3D) confinements, which can break the symmetry of a structure, have proven to be a powerful route to tailor the morphologies of block copolymer particles. Particle shape and internal structure can thus be tuned by using the supramolecular strategy or tailoring the interfacial interaction of the particles with the dispersed medium. Herein, we will introduce the generation of the block copolymer assemblies with well tunable shapes and structures by taking advantage of 3D confined assembly, supramolecular chemistry and interfacial manipulation. Particles with various overall shapes and internal structures can be obtained due to the 3D soft confinement in emulsion droplets. Moreover, we will show that selective disassembly of the structured particles will give rise to mesoporous particles or nano objects with unique shapes. The block copolymer assemblies with tunable shapes, internal structures and built in functionalities will find applications in controlled drug/gene delivery, catalysis, bioimaging and optical/electronic devices.

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