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ASSEMBLY OF BLOCK COPOLYMERS IN 3D CONFINED GEOMETRIES

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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) confinement, which can break the symmetry of a structure, has 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 dispersion medium. We will introduce the generation of the nano-objects with well tunable shapes by taking advantage of 3D confined assembly and supramolecular chemistry. Particles with various 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, potentially useful for drug delivery, bio-imaging, separation and diagnostics.

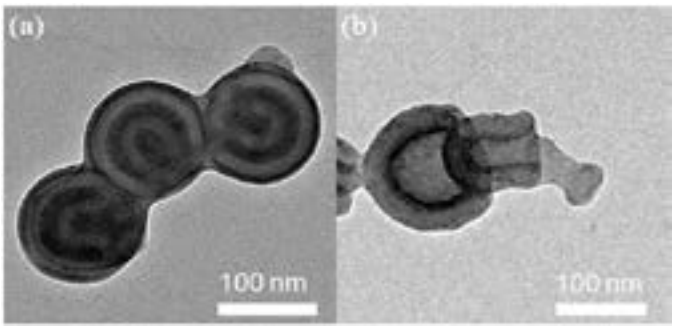

Figure 1: TEM images of self-assembled PS-P4VP(PDP) colloidal particles (a), and corresponding PS-P4VP nano-cups (b) after PDP was removed..

Recent Publications

1. **J P et al. (2016) Block copolymer capsules with structure-dependent release behavior. Angewandte Chemie International Edition. 55(47):14633-14637.**
2. **Deng R H et al. (2015) Soft colloidal molecules with tunable geometry by 3D confined assembly of block copolymers. Macromolecules. 48(16):5855-5860.**
3. **Wang K et al. (2016) Electric-directed assembly of polymer-tethered gold nanorods in cylindrical nanopores. ACS Nano. 10(5):4954-4960.**
4. **Deng R H et al. (2014) Janus nanodisc of diblock copolymers. Advanced Materials. 26(26):4469-4472.**
5. **Deng R H et al. (2012) Mesoporous block copolymer nanoparticles with tailored structures by hydrogen-bonding-assisted self-assembly. Advanced Materials. 24(14):1889-1893.**

Biography

Jintao Zhu received his PhD (Polymer Chemistry and Physics) in Changchun Institute of Applied Chemistry (CIAC), Chinese Academy of Sciences, China in 2005. Afterwards, he carried out Postdoctoral research in the University of Alberta, Canada and University of Massachusetts Amherst, USA. In 2009, he joined as a Professor in the School of Chemistry and Chemical Engineering at the Huazhong University of Science and Technology (HUST). Since 2016, he is the Dean of the School of the Chemistry and Chemical Engineering at HUST. His current research concentrated on confined assembly of block copolymers and inorganic nanoparticles, responsive photonic materials, functional polymer particles for drug delivery and imaging. He has published over 100 papers, contributed 3 book chapters and holds 5 patents. He is a Recipient of China National Funds for Distinguished Young Scholar (2015) and Chinese Chemical Society Youth Awards (2013).

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