Supporting Information

Robust Hybrid Raspberry-like Hollow Particles with Complex Structure: a Facile Method of Swelling Polymerization towards Composite Spheres

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Experimental details

Preparation of PS spheres. PS spheres in diameter of about 400 nm were prepared via an emulsion polymerization method described as follow. First, 10 mL of 6% SDS aqueous solution was poured into 50 mL of $NaHCO_3$ aqueous solution with mechanically stirring at the constant speed of 190 rpm. 10 mL of St was added into the system drop by drop. After stirring for 30 min, 15 mL of 0.5% KPS aqueous solution was added dropwise in 30 min. The system was heated to polymerize at 70 ^{o}C for 13 h. With following filtration and washing by ethanol to remove surfactant, the PS spheres of about 400 nm were successfully prepared.

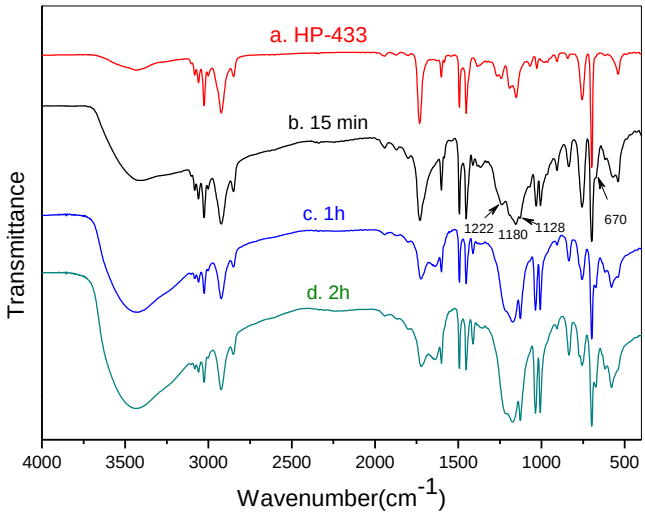

Figure. S1 FT-IR spectra of (a) parent PS hollow sphere and the template with different sulfonation time: (b) 15 min, (c) 1 h, and (d) 2 h.

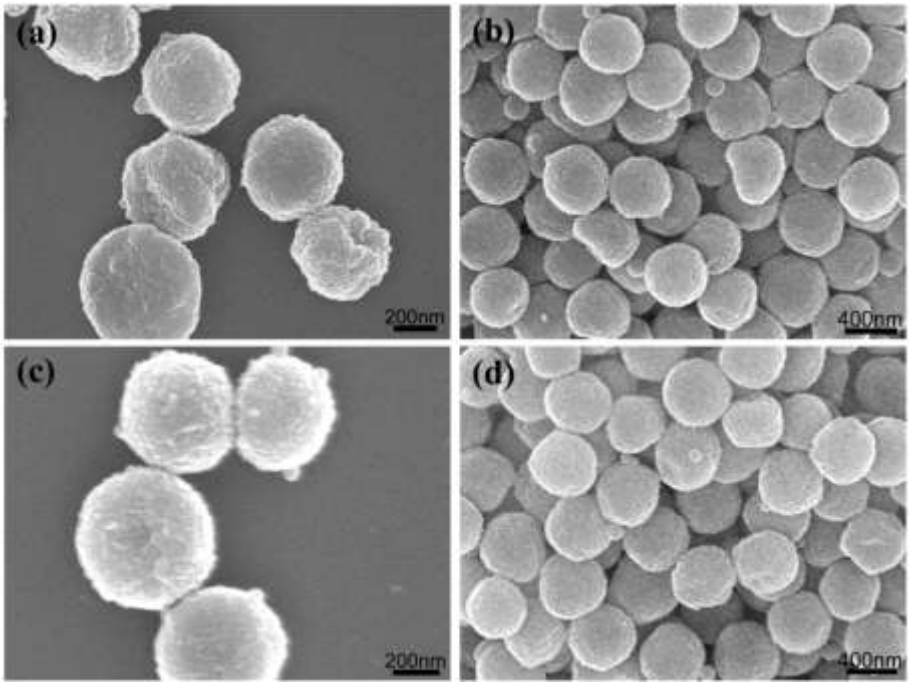

Figure. S2 Hybrid particles after emulsion swelling: (a, b) templated from **S2**, swelling for 20 min and 2 h, respectively; (c, d) templated from **S3**, swelling for 20 min and 2 h, respectively.

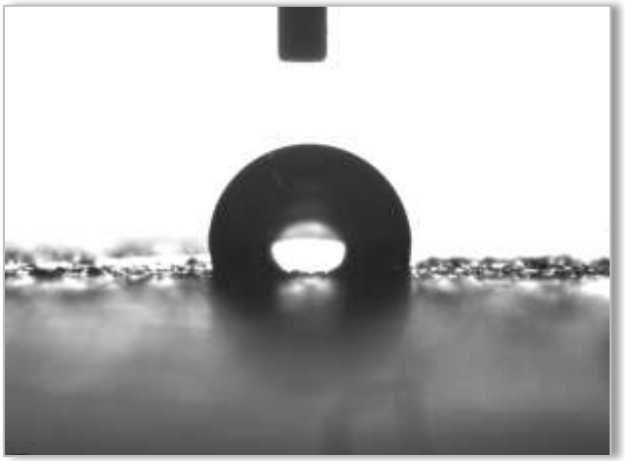

Figure. S3 Photograph of water droplet shape on the film prepared by PS spheres. The water CA is 109^{o}.