Supporting Information

One-Pot Synthesis of Monodisperse Latex Particles with Single-Cavity Structure

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Experimental Details

Materials: Styrene (99%, Aldrich), divinylbenzene (DVB, 80%, Alfa Aesar,), methyl methacrylate (MMA, International Laboratory), and potassium persulfate (KPS, Merck) were used without further purification. Water was purified with an inverse osmosis filtration (Nano Pure, Barnstead) until its resistivity reached 18.2 MΩ • cm at 20 ^{o}C and then filtered with a Milipore PTFE 0.45 μm hydrophilic filter.

Poly(styrene-*co*-methyl methacrylate) (PS-PMMA) particle preparation: PS-PMMA polymer particles were synthesized using soap-free emulsion polymerization (SFEP). Typically, 4.50 g of styrene, 0.14 g of DVB, 0.14 g of MMA and 0.14 g KPS were added into 150 mL of deionized water in a 250 mL one neck reactor fitted a reflux condenser under nitrogen protection, and stirred with a stir bar. The polymerization was carried out at 70 ^{o}C for 12 h. The synthesized particles had a concentration about 3.2 × 10^{-2} g/mL and were used without any further purification. The synthesized particles were highly negative charged with Zeta Potential of about -50 mV.

Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM) and High Resolution Transmission Electron Microscopy (HRTEM)

Characterization: For SEM observation, the diluted particles (9×10^{-3} g/mL) were dried at room temperature for 24 h and directly observed on a FEI Quanta 400 FEG microscope operating at 5 kV. For TEM observation, one drop of the diluted particles (9×10^{-3} g/mL) was first placed on the copper grid, dried at room temperature for 24 h and then imaged with FEI CM120 at 120 kV. For HRTEM observation, one drop of the diluted particles (9×10^{-3} g/mL) was first placed lacey-carbon-film TEM grid, dried at room temperature for 24 h and then imaged with FEI TEM (Tecnai G2, FEG) at 200 kV. The electron energy-loss spectroscopy (EELS) was performed in TEM (Tecnai G2, FEG) attached with a Gatan imaging filtering (GIF) system. The Oxygen element map of the PS-PMMA particles was obtained at O K edge (at 532 eV).

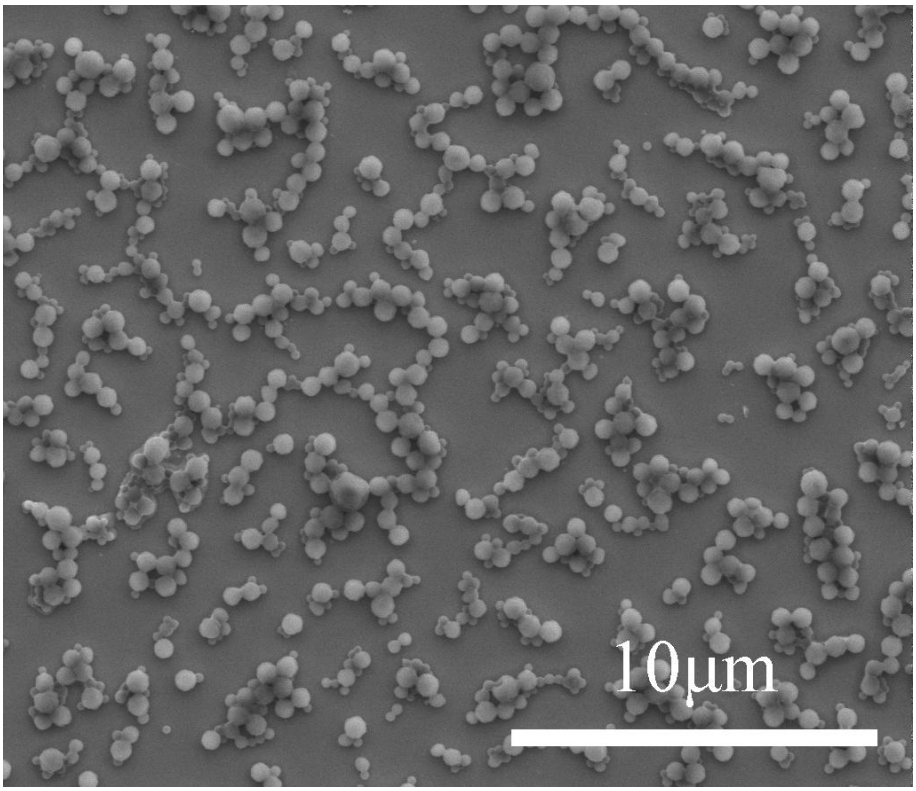

Fig. S1: SEM image of PS-PMMA polymer particles cross-linked with 0.42 g DVB, styrene 4.50 g and MMA 0.14 g.

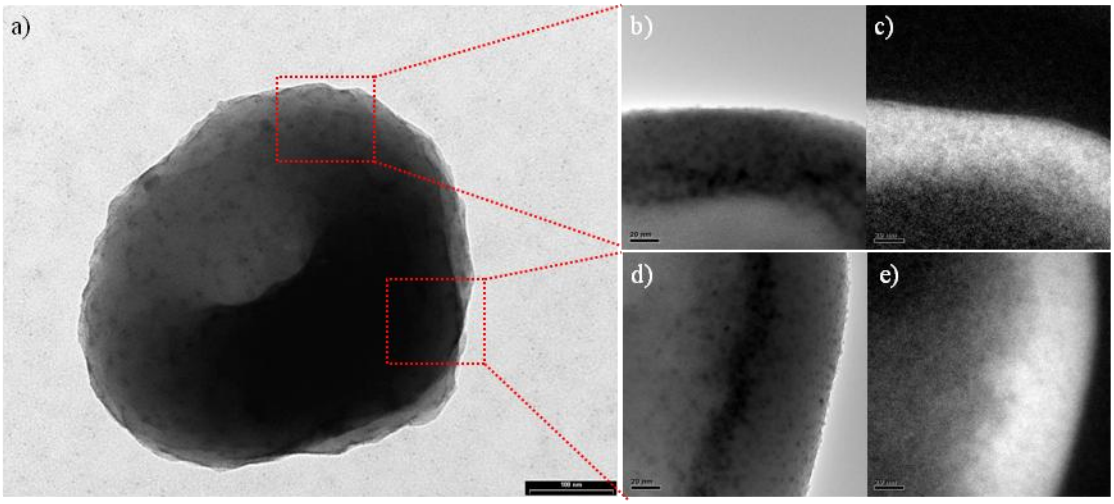

Fig. S2: (a) HRTEM image of the PS-PMMA particle; (b) Oxygen element map of the PS-PMMA particle from the same place as shown in (a); (c) HRTEM image of the PS-PMMA particle; (d) Oxygen element map of the PS-PMMA particle from the same place as shown in (c); The scale bars in Fig (b)-(e) are 20 nm.