

Supplementary Material (ESI) for Chemical Communications

Experimental Section

Materials

Selenium powder (Se, 99.5%, 200 mesh) and tellurium powder (Te, 99.8%, 200 mesh) were purchased from Acros Organics (New Jersey, USA). Cadmium chloride was purchased from Tingxin Chemical Reagent (Shanghai, China). Sodium borohydride and Rhodamine B were purchased from Tianjin Chemical Research Institute (Tianjin, China). L-cysteine (98%) was purchased from Sigma-Aldrich. Sodium sulphide and zinc chloride were purchased from Zhenxin Chemical Reagent (Shanghai, China). The 0.01 mol l⁻¹ PBS solutions with various pH values were prepared by mixing stock solutions of NaH₂PO₄ and Na₂HPO₄, and then adjusted with 0.01 mol l⁻¹ NaOH and H₃PO₄. All other reagents were of analytical grade and used without further purification. Ultrapure water with 18.2 MΩ cm⁻¹ (Millipore Simplicity, USA) was used throughout the experiments.

The synthesis of CdSeTe/ZnS CS QDs

In the synthesis, all reactions were carried out in oxygen free water under nitrogen. L-cysteine as a sulfur amino acid was selected as capping agent for its good compatibility and the protection of Qdots-induced toxicity. Firstly, highly luminescent L-cysteine-capped CdSeTe A-QDs were prepared according to our previous reports. In brief, 0.25 mmol of CdCl₂ and 0.6 mmol of L-cysteine were dissolved in 200 ml water and the pH adjusted to 11.5 with 1 mol l⁻¹ NaOH. The resulting transparent solution was deaerated by bubbling of nitrogen for 20 min and was heated to 95°C. Under vigorous stirring, 2.0 ml of fresh NaHTe aqueous solution prepared from KBH₄ and Te powder (0.125 mmol) was injected into the reaction system under vigorous stirring; the solution was then refluxed at 95°C. After heating for 0.5 h, 0.05 mmol freshly prepared sodium hydroselenide (NaHSe) solution that premixed with an appropriate amount of L-cysteine was added into CdTe precursor solution (pH 11.5). Further nucleation and growth of the CdSeTe A-QDs proceeded upon refluxing the solution at 95°C under open air. The emission wavelength of the A-QDs could be

tuned by changing the refluxing time. Then, a quarter of the A-QDs solution was ultrafiltered to 5 ml with a Millipore filtration tube (CMW = 5000). The CdSeTe/ZnS core-shell QDs were prepared by adding the purified A-QDs to 45 ml N₂-saturated solution with 0.06 mmol ZnCl₂ (pH 11-12), and heated to 65°C. Under vigorous stirring, the prepared 31.25 mM Na₂S solution was added slowly to the heated precursor solution. Further nucleation and growth of the CS QDs proceeded upon refluxing at 65°C for 40-60 min. The CdSeTe CS QDs with a maximum emission wavelength of 650-750 nm were obtained.