Facile synthesis of quantum dots/mesoporous silica/quantum dots core/shell/shell hybrid microspheres for ratiometric fluorescence detection of 5-fluorouracil in human serum

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Part S1: Preparation of MPA-capped CdTe QDs

Firstly, NaHTe precursor was synthesized by redox reaction of Te power and NaBH₄ according to the procedure reported in Ref. [S1]. And then, CdTe QDs were prepared with a modified method of Ref. [S2, S3]. Briefly, 50 mL of aqueous solution, containing 0.25 mmol of Cd²⁺, 0.05 mmol of thiourea and 0.53 mmol of MPA, were placed in a three-necked flash, adjusting pH of the mixture solution to 12.0 by dropwise adding 1.0 M of NaOH. Under the protection of N₂, freshly prepared 0.025 mmol of NaHTe was injected swiftly with a syringe into the mixture at room temperature. The resultant mixture was heated to reflux with a condenser attached at 100 °C. Aliquots of the production were taken out at different time intervals to record temporal evolution of UV-visible and fluorescence spectra. When expected fluorescence wavelength was observed, following work was to remove the heating source and cool this mixture to room temperature. Finally, the as-prepared products were concentrated by circumrotate evaporation, precipitated with 2-propanol and collected by centrifugation. The colloidal precipitates were dried at 60 °C in vacuum, and dispersed in aqueous solution for applications in subsequent experiments.

References