**Supporting Information for** 

## Tuning core-shell SiO<sub>2</sub>@CdTe@SiO<sub>2</sub> fluorescent nanoparticles for cell labeling

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**Fig. S1.** (A) Fluorescence peak intensity of SiO<sub>2</sub>@CdTe (SQ) NPs after MPS incubation for different time. (B) TEM image of SQS NPs in which SQ seeds were incubated with excessive MPS (MPS =  $20 \mu L/10 mL$  SQ dispersion).



Fig. S2.  $N_2$  adsorption-desorption isotherms of SQ NPs. The inset shows the pore size distributions of silica core, SQ, and SQS NPs.



Fig. S3. TEM image of silica core refluxed with NaBH<sub>4</sub>. Scale bar: 100 nm.



Fig. S4. TEM image (left) and size distribution histograms (right) of SQ NPs.



**Fig. S5.** TEM image (left) and size distribution histograms (right) of SQS NPs (TEOS feeding amount 50  $\mu$ L).



Fig. S6. TEM image (left) and size distribution histograms (right) of SQS NPs (TEOS feeding amount 100  $\mu$ L).



Fig. S7. TEM image (left) and size distribution histograms (right) of SQS NPs (TEOS feeding amount 200  $\mu$ L).



Fig. S8. TEM image (left) and size distribution histograms (right) of SQS NPs (TEOS feeding amount  $300 \ \mu$ L).



Fig. S9. TEM image (left) and size distribution histograms (right) of SQS NPs (TEOS feeding amount 400  $\mu$ L).



Fig. S10. TEM image (left) and size distribution histograms (right) of SQS NPs (TEOS feeding amount 500  $\mu$ L).



Fig. S11. TEM image (left) and size distribution histograms (right) of SQS NPs (TEOS feeding amount 1000  $\mu$ L).



Fig. S12. TEM image (left) and size distribution histograms (right) of SQS NPs (TEOS feeding amount 2000  $\mu$ L).



**Fig. S13.** TEM image of SQS ( $R_M = 20.5$ ). No sandwich structure can be observed. QDs aggregated on the surface of NPs, or located in nanoparticle gaps.



**Fig. S14.** TEM images of SQS NPs synthesized at different ammonia concentrations. Ammonia/TEOS volume ratio equals to (A) 0.83 (B) 1.67 (C) 2.50 (D) 3.33



**Fig. S15.** (A) Representative adsorption and fluorescence spectra of SQ; (B) fluorescence spectra of SQ after incubation with MPS, and SQS NPs.



**Fig. S16.** Fluorescence efficiency of SQ and SQS NPs with different silica shell thicknesses in solutions against different pH values. The spectra were scanned at 405 nm excitation, and the integrated areas of the spectra were standardized by that of NPs in initial solution.



**Fig. S17.** Photostability of SQ and SQS NPs with different silica shell thicknesses. The photostability of MSA-capped CdTe QDs is also given for comparison.



**Fig. S18.** 3D structure constructed from Z-stack images of HEK293 cells incubated with SQS39 NPs (corresponding to Fig. 6J).