Supporting information:

Fine-Tuning the Surface Functionality of Aqueous Luminescent Nanocrystals through Surfactant Bilayer Modification

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Figure S1. UV-vis absorption spectra of CdTe/DODAB/C_8E_4 NCs that measured at 25 °C (solid) and 40 °C (dash). NC solution was foggy at 25 °C, whereas it became clear only above 40 °C.

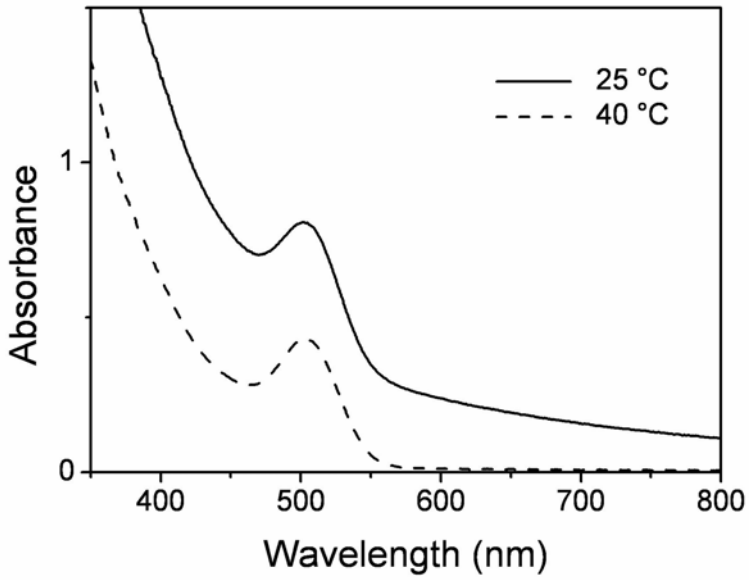

Figure S2. Optical (upper panel) and PL (lower panel) images of aqueous CdTe NCs in the presence of 10 mg mL^{-1} CTAB that measured at 40 °C. (Left) directly blending MPA-stabilized CdTe NCs and CTAB, and (right) formation of surfactant bilayer-modified CdTe/DODAB/CTAB NCs.

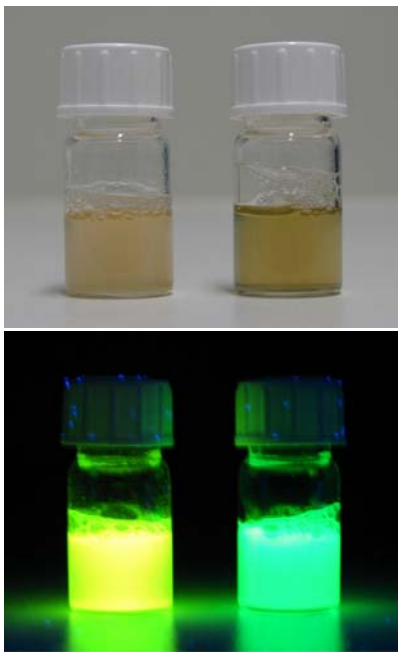

Figure S3. FTIR spectra of the original MPA-stabilized CdTe NCs, CdTe/DODAB/SDS NCs, and CdTe/DODAB/CTAB NCs.

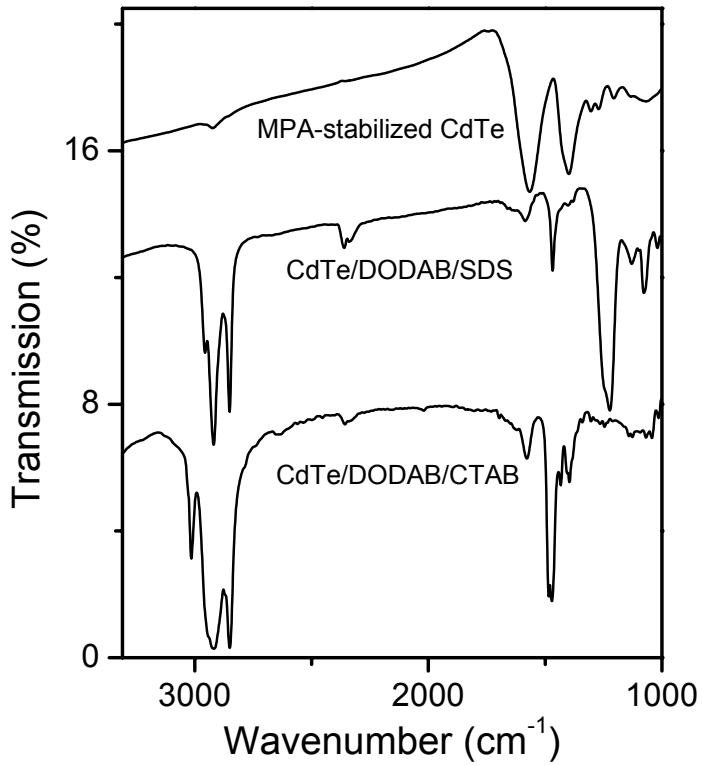

Table S1. Zeta potential of original CdTe NCs, CdTe/DODAB/CTAB NCs, CdTe/DODAB/SDS NCs, and CdTe/DODAB/C_8E_4 NCs.

	zeta potential (mV)
Aqueous CdTe	-38.4 (25 °C)
CdTe/DODAB/CTAB	+65.0 (25 °C)
CdTe/DODAB/SDS	-65.2 (25 °C)
CdTe/DODAB/C_8E_4	+17.1 (25 °C)
CdTe/DODAB/C_8E_4	+18.9 (40 °C)

Table S2. Zeta potential of the aqueous solution of CTAB (20 mg mL^{-1}), SDS (16 mg mL^{-1}), and C_8E_4 (26 uL mL^{-1}), which were measured at room temperature.

	zeta potential (mV)
CTAB	+61.4
SDS	-65.2
C_8E_4	-2.37

Table S3. The diameters of SDS and CTAB micelles, and the corresponding CdTe/DODAB/SDS and CdTe/DODAB/CTAB NCs, which were determined by the Zetasizer NanoZS.

	diameter (nm)
SDS	1.51
CdTe/DODAB/SDS	10.3
CTAB	0.71
CdTe/DODAB/CTAB	118.0

Figure S4. The PL spectra of CdTe/DODAB/CTAB NCs before (solid) and after (dash) embedding into silica spheres. CdTe NC-embedded silica spheres were prepared according to the previous publication (*J. Am. Chem. Soc.* **2006**, *128*, 688.). CTAB acted as the organic template for the formation of silica spheres, making CTAB modified NCs serve as the seeds.

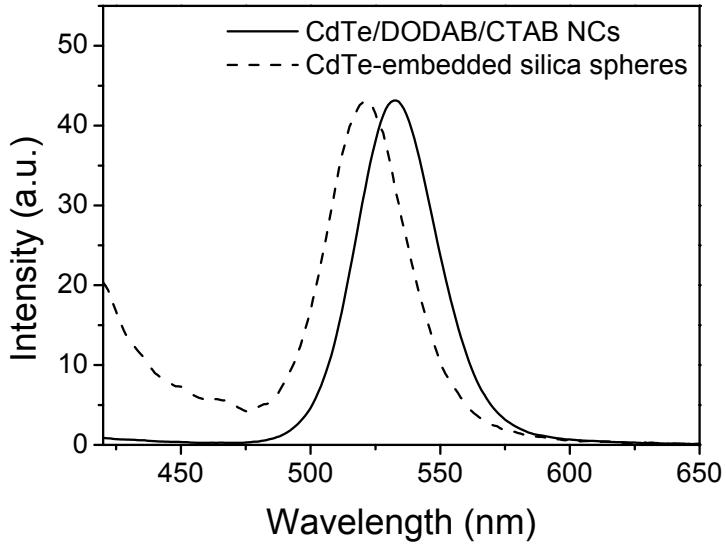

Figure S5. The PL spectra of CdTe/DODAB/SDS NCs (solid) and $BaSO_4$-capped CdTe/DODAB/SDS NCs (dash). The formation of $BaSO_4$-capped CdTe was through the stepwise addition of the aqueous solution of Ba^{2+} and SO_4^{2-} into the solution of CdTe/DODAB/SDS NCs. SDS modified NCs served as the seeds. Before PL measurement, the pH value of the NC solution was respectively tuned to 4.5 and 4.0. It was observed from the PL spectra that the formation of $BaSO_4$ shell significantly improved the luminescent stability of CdTe NCs in acidic solution.

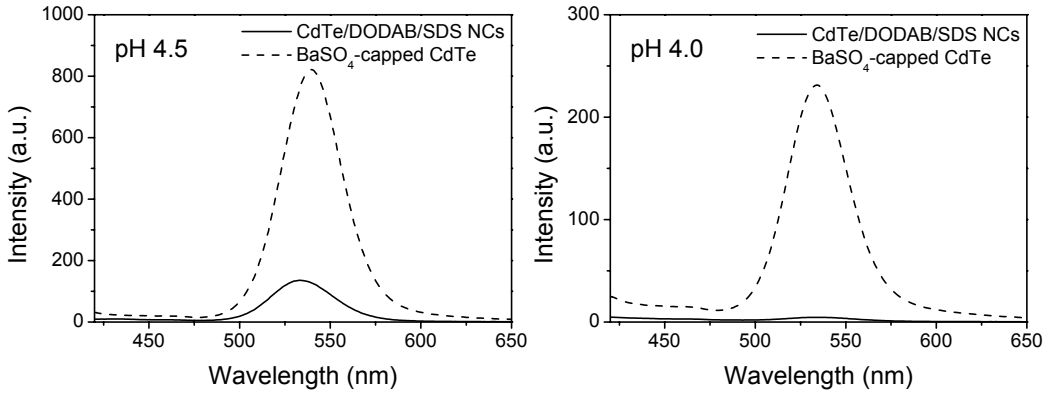

Figure S6. UV-vis absorption and PL spectra of aqueous CdHgTe NCs, CdHgTe/DODAB NCs in chloroform, and bilayer-modified CdHgTe/DODAB/SDS NCs. UV-vis absorption spectra were acquired using a Shimadzu 3600 UV-Vis-near-IR spectrophotometer. Fluorescence experiments were performed on a PTI Fluorescence Master Systems. The excitation wavelength was 600 nm.

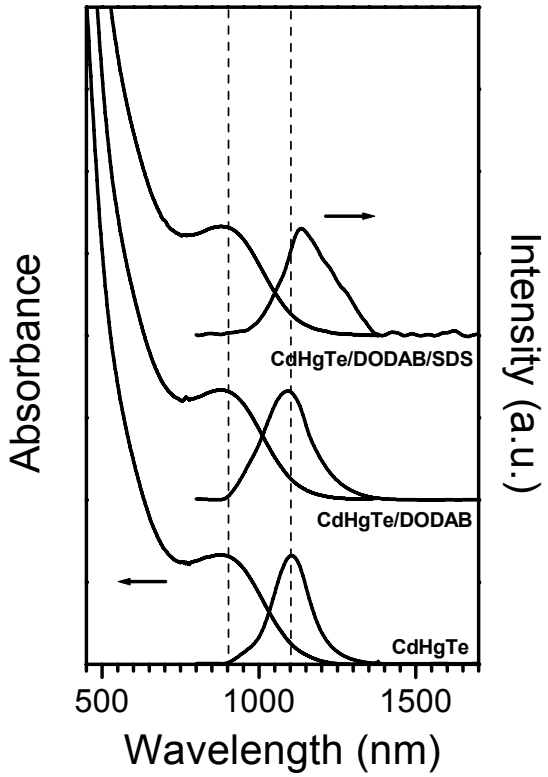

Figure S7. Fluorescent image of CdTe-PS composite spheres with red emission. Since the diameter of the spheres was only around 100 nm, no individual sphere was observed. The corresponding SEM image and the optical and PL image of the dispersion of spheres were indicated in Figure 4c and d.