Electronic Supplementary Material (ESI) for New Journal of Chemistry

Supporting Information

Organic–to–Water Dispersible Mn:ZnS–ZnS Doped Core–Shell Quantum Dots: Synthesis, Characterization and Its Application Towards Optical Bioimaging and Turn-Off Fluorosensor

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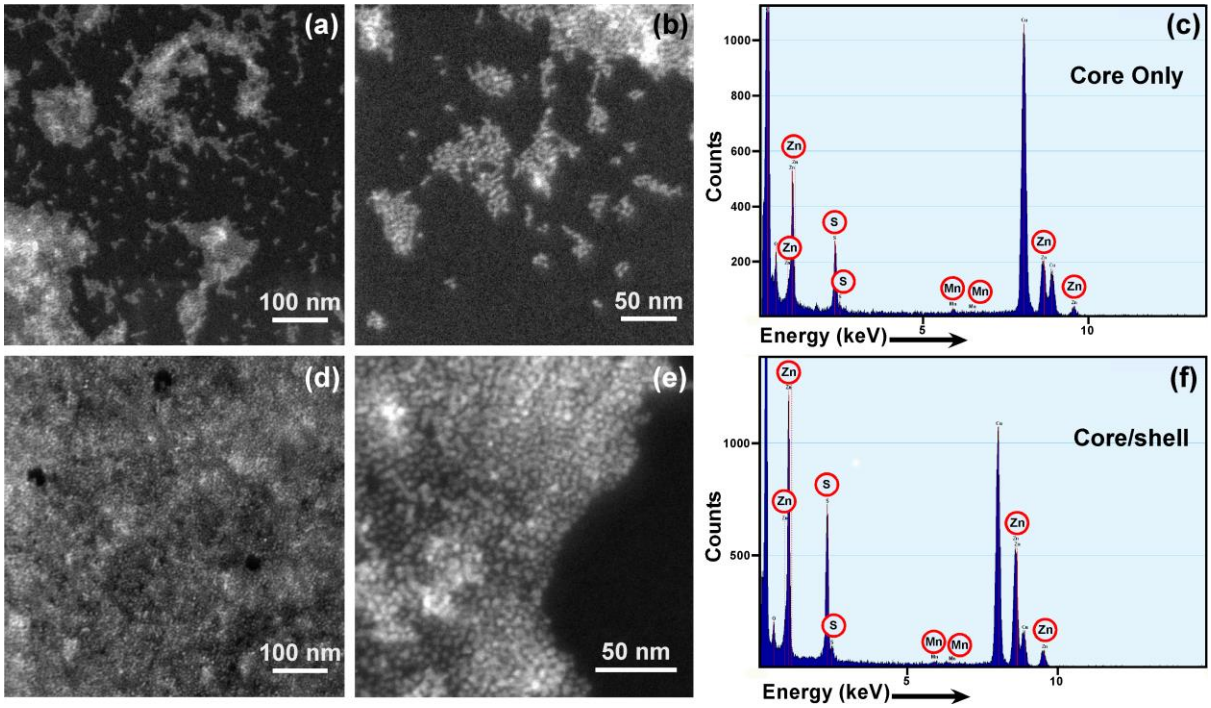

Figure S1. (a, b, d, e) HAADF micrographs, and **(c, f)** XEDS of Mn:ZnS d-QDs (top row) and Mn:ZnS–ZnS d-CSQDs (bottom row).

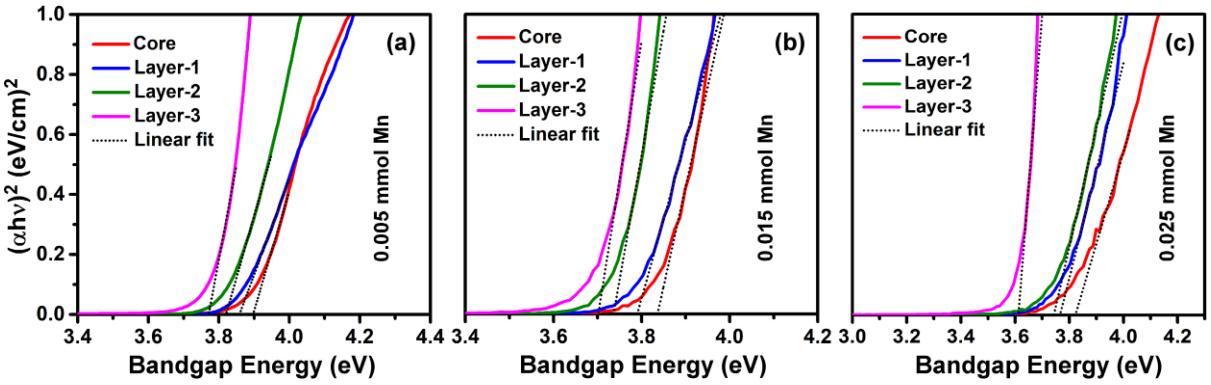

Figure S2. Tauc plots of **(a)** 0.005, **(b)** 0.015, and **(c)** 0.025 mmol concentration of Mn^{2+} ion doped ZnS core overcoated with ZnS shell with different shell thicknesses.

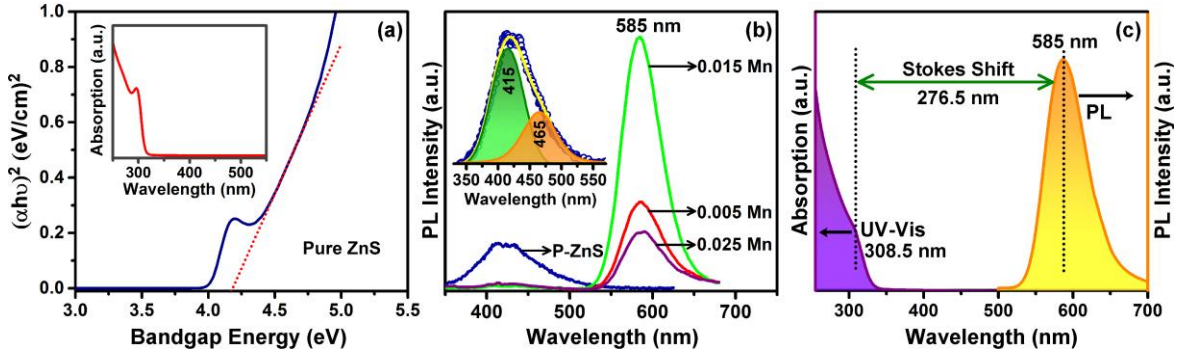

Figure S3. (a) Tauc plot of P-ZnS. Inset graph of (a) is the absorption spectrum of P-ZnS. **(b)** Photoluminescence spectra of bare and Mn:ZnS QDs with different Mn^{2+} ion concentrations (mmol). Inset of Figure (b) is the deconvoluted PL emission spectrum of P-ZnS QDs with Gaussian function. **(c)** The Stokes shift of Mn:ZnS–ZnS d-CSQDs is 276.5 nm.

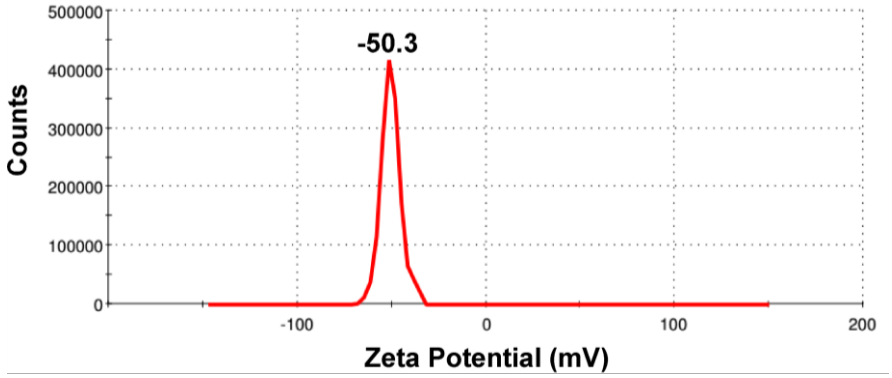

Figure S4. Zeta potential of hydrophilized Mn:ZnS–ZnS d-CSQDs.

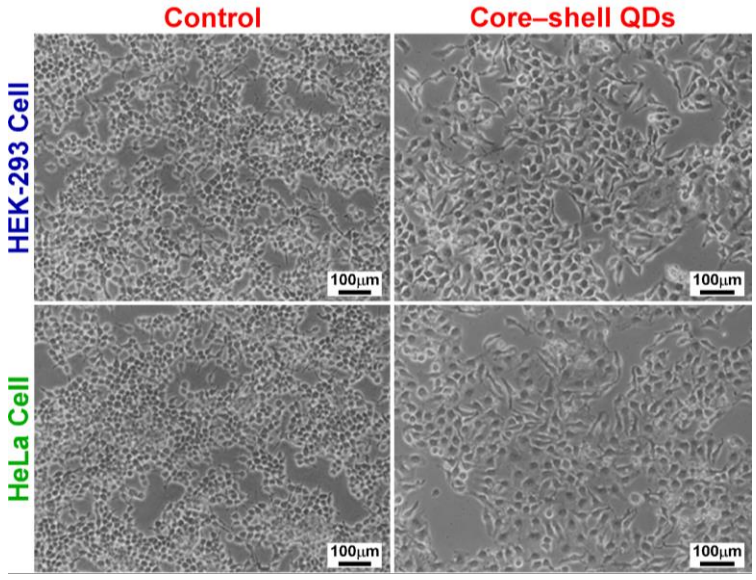

Figure S5. Morphological evaluation of HEK-293 and HeLa cells treated with 11-MUA-functionalized d-CSQDs (200 μg/mL) after 48 h incubation.

Table S1. Analytical results for determination of heavy metal ions (Hg^{2+} and Pb^{2+}) using 11-MUA-functionalized Mn:ZnS–ZnS d-CSQDs.

Sensor system	Linear range (nM)	Intercept	R^2	$K_{SV} \times 10^9$ (M^{-1})	LOD (nM)
Hg(II)	100–900	1.1473	0.9987	0.00213	16.3
Pb(II)	50–400	1.6292	0.9994	0.01245	8.0

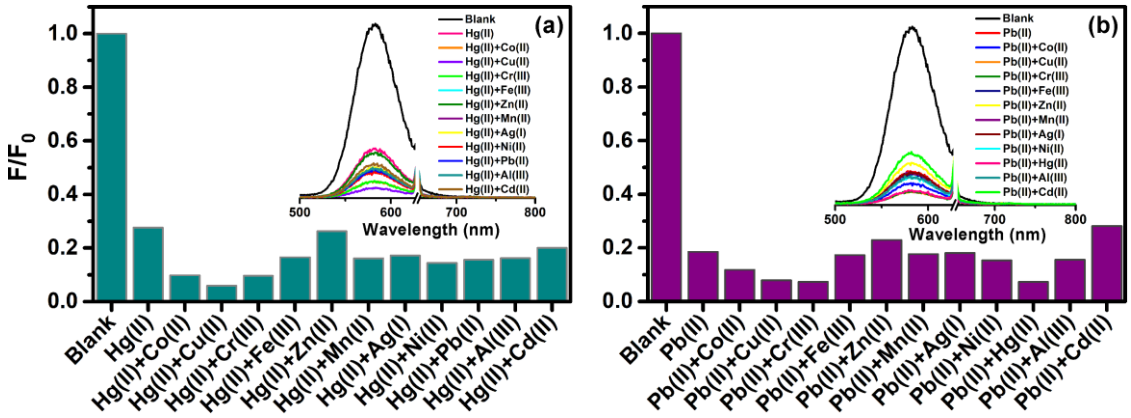

Figure S6. Photoluminescence response of hydrophilized Mn:ZnS–ZnS d-CSQDs upon addition of **(a)** Hg^{2+} (5 µM), **(b)** Pb^{2+} (5 µM) with various cations (10 µM). Insets of (a) and (b) are their corresponding photoluminescence spectra.