Electronic Supplementary Material

Highly Sensitive "Turn-on" Fluorescence Probe for the Detection of Sparfloxacin in Human Serum using Silica-functionalized CdTe Quantum Dots

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Content

Measuring the quantum yield (QY) of SQDs

Typically, the quantum yield (QY) for SQDs is calculated according to the following formula [1]:

$$Q = Q_R \times m / m_R \times n^2 / (n_R)^2$$

Where Q represents the quantum yield (QY), m is the slope of the plot of integrated PL intensity *vs*. absorbance and n is the refractive index (taken here as 1.33, the refractive index of distilled water). In order to minimize the re-absorption effects, the absorbance in the 1 cm quartz cuvette was kept below 0.10 at an excitation wavelength of 550 nm. R is the reference fluorophore, quinine sulfate in a 0.1 M H_2SO_4 solution. The absorbance was measured on a Shimadzu UV-2100 spectrophotometer.

The PL quantum yield of SQDs was calculated as 32%, indicating that the SQDs exhibit strong fluorescence intensity, which can be used as a novel PL probe for the analysis of SPFX in the biological system.

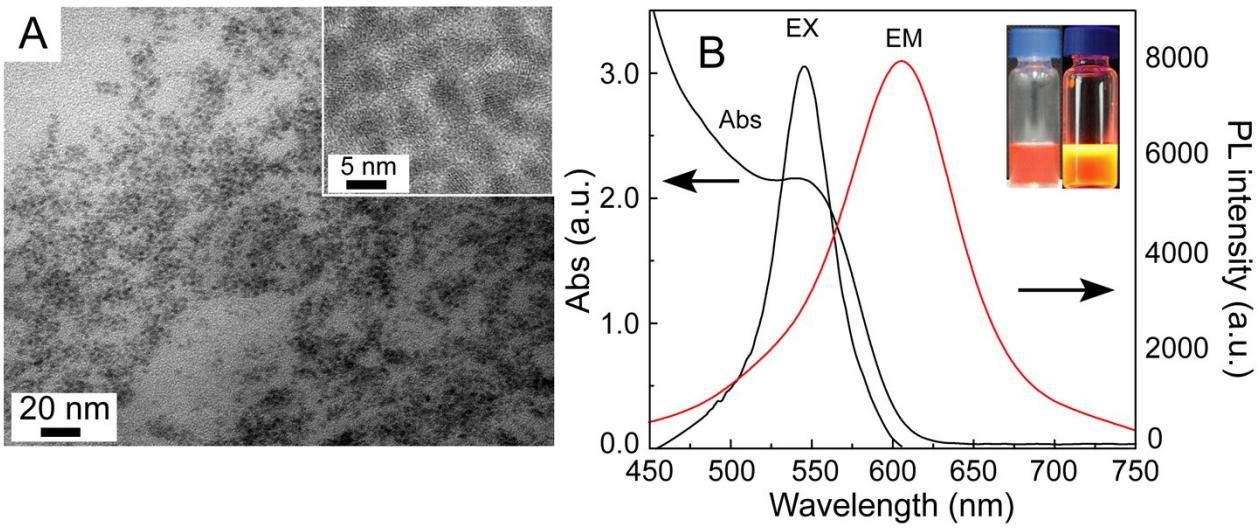

Fig. S1 (A) TEM image of photoluminescent QDs. Inset: the high-resolution TEM image of QDs. (B) UV and fluorescence spectra of QDs. Inset: photographs of photoluminescent QDs under daylight (left) and 365 nm UV light (right).

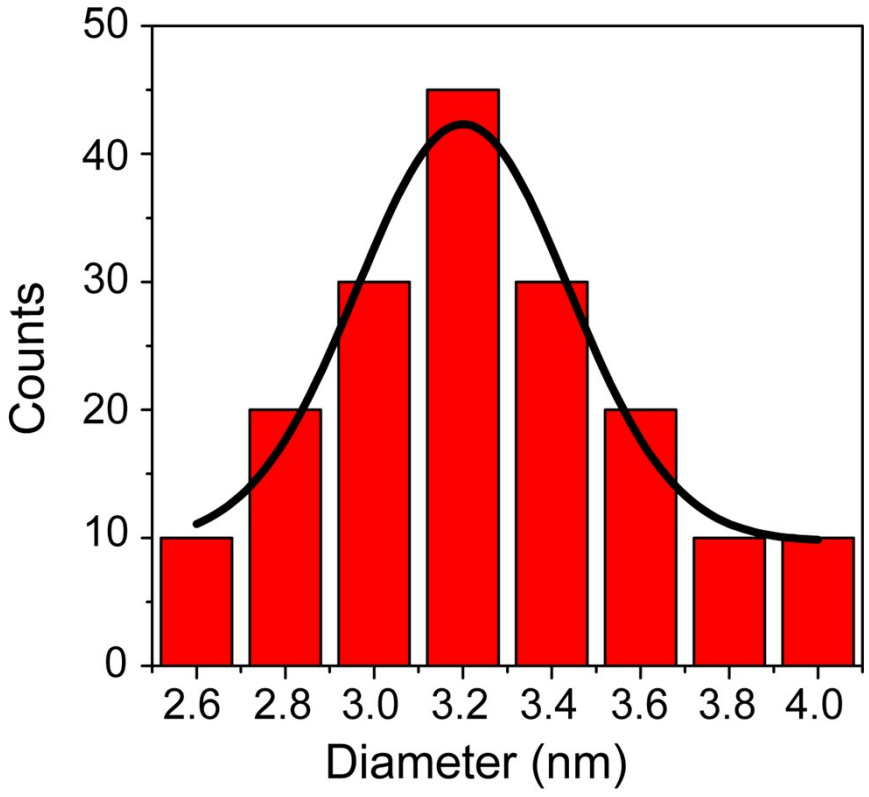

Fig. S2 Particle size statistics and Gauss fit of QDs.

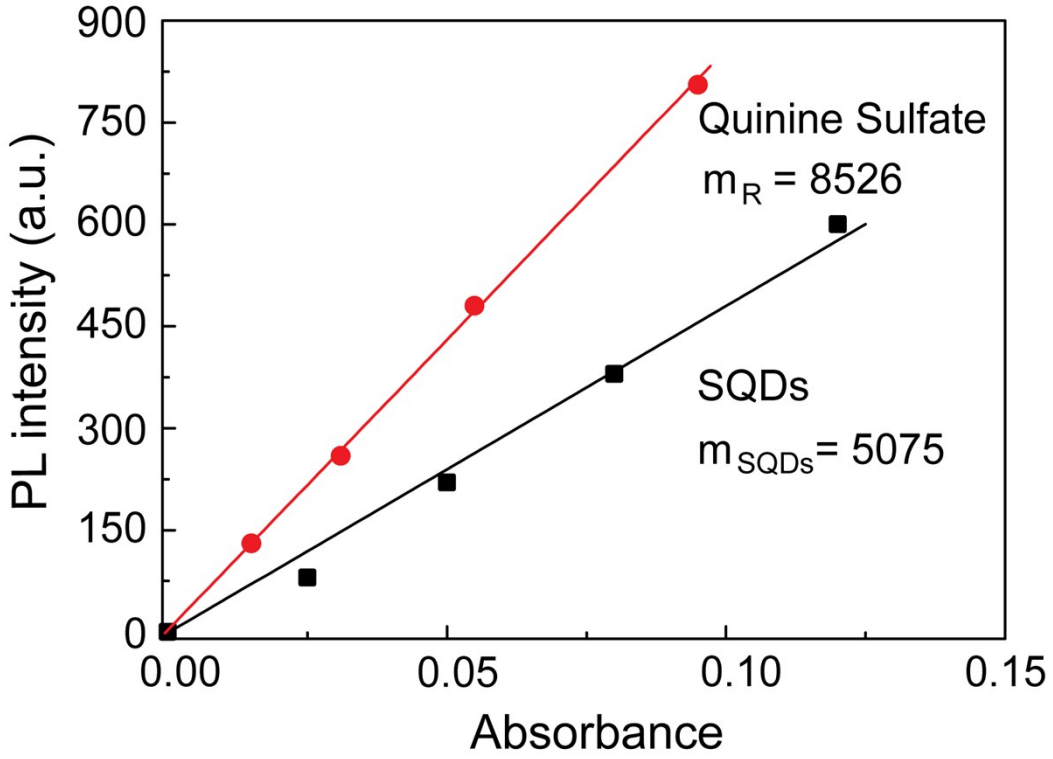

Fig. S3 Integrated PL intensity versus absorbance plot of SQDs and quinine sulfate.

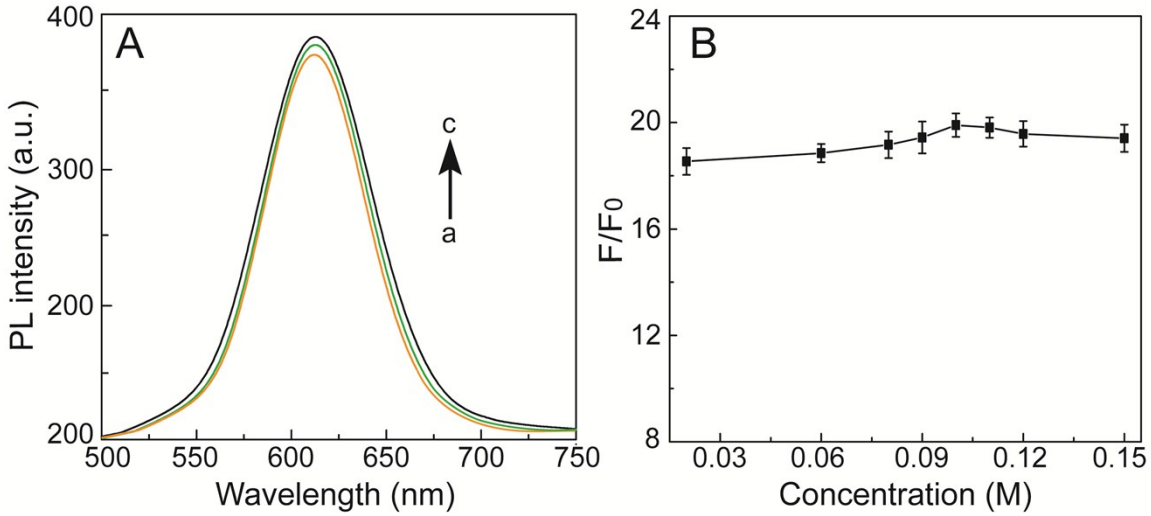

Fig. S4 The effects of buffer system (A) on the PL intensity of SQDs. a) HAc-NaAc, b) KH_2PO_4-K_2HPO_4, c) Tris-HCl. The concentrations of Tris-HCl on the PL response F/F_0 of SQDs toward SPFX (20 μM).

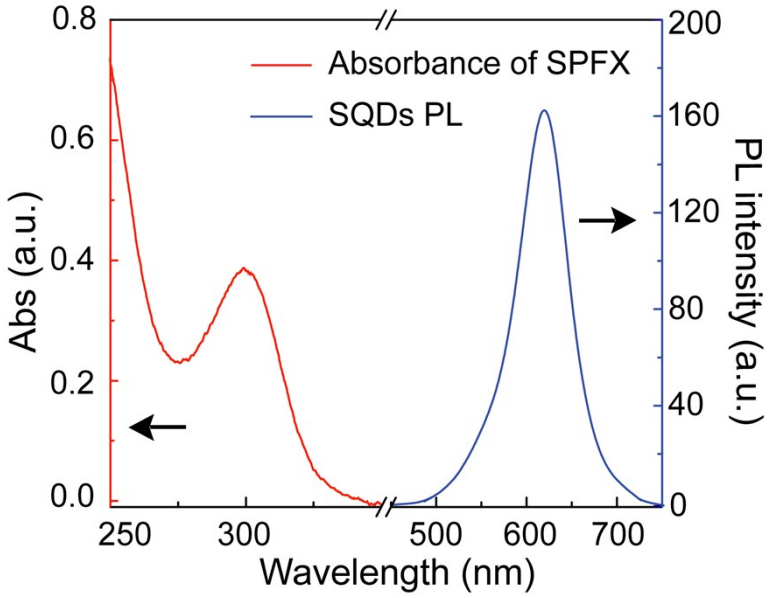

Fig. S5 The absorbance of SPFX and the PL intensity of SQDs.

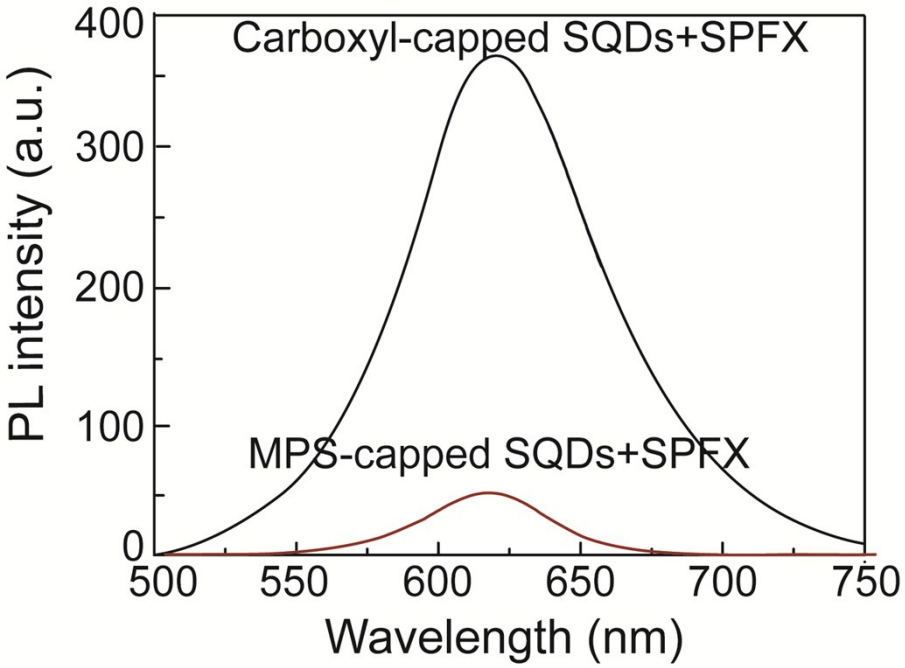

Fig. S6 PL spectra of carboxyl-capped SQDs suspension or MPS-capped SQDs containing SPFX (20 μM).

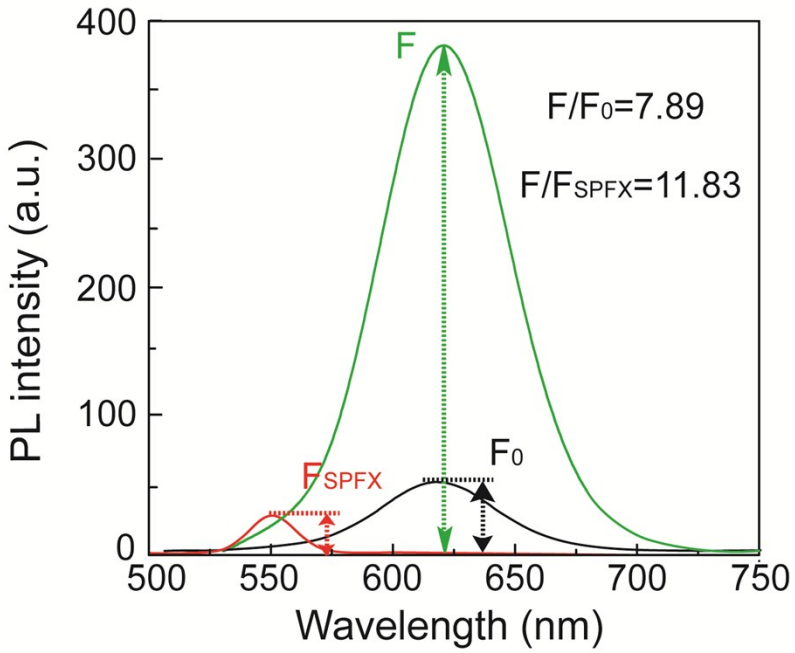

Fig. S7 PL spectra of SQDs, SPFX and SQDs–SPFX system with SPFX concentration of 20 μM (25 °C, pH=7.5, black trace-SQDs; red trace-SPFX; green trace-SQDs-SPFX system).

Table S1 Comparison of limit of detection (LOD) of different methods for the determination of SPFX.

Method	Linear range (μM)	Detection limit (μM)	Reference
UV-VIS	4.1–40	0.05	[2]
Electrochemistry (DPV)	0.2–1.4	0.08	[3]
Fluorescence (QDs)	1.3–76	0.35	[4]
Fluorescence (Yttrium)	0.8–14	0.09	[5]
HPTLC	0.25–2.0	0.13	[6]
LC-MS	0.03–2.5	0.005	[7]
This method (SQDs)	0.05–200	0.035	This work

Table S2 The F/F_0 when SQDs mixed with other substances.

Reagent	Groups	F/F_0
Dichlofluanid	–F	9.05
Citric Acid	–COOH	3.58
p-Dihydroxybenzene	–OH	1.35
Pyrrole	–N	2.39
5-Fluorouracil	–F, –N	6.53
Pyrrole-3-carboxylic acid	–N, –COOH	4.81
N-Phenylacetamide	–N, –CO	2.05
Benzene	–	0.51

References

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