Supporting Information

Y^{3+}@CdTe quantum dots nanoprobe for fluorescence signal enhancement sensing platform for visualization of norfloxacin

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Number of tables: 2

Materials and characterization

3-mercaptopropionic acid (99.0%, MPA) were obtained from Shanghai Macklin Biochemical Company (Shanghai, China). Tellurium powder (99.99%), cadmium chloride hydrate (99.0%, $CdCl_2 \cdot 2.5H_2O$), and sodium borohydride (98.0%, $NaBH_4$) were provided by Sinopharm Chemical Reagent Company (Shanghai, China). Phosphate buffer solution (PBS) was prepared by mixing disodium hydrogen phosphate (Na_2HPO_4, 0.01 M) and sodium dihydrogen phosphate (NaH_2PO_4, 0.01 M) uniformly. Water used in the experiment was ultrapure water and the reagents used were all analytical purity. Human serum sample was obtained from Solarbio Science & Technology Co., Ltd. (Beijing, China) and the corresponding experiments were performed in compliance with the protocol approved by the Ethics Committee of Nanjing Tech University (No. 2019–1). All reagents were analytical reagent and could be utilized without further purification. Ultrapure water was obtained from a Millipore Milli-Qwater system (USA) and used for all aqueous solutions.

The Fourier infrared (FTIR) spectroscopy was recorded by a Nicolet iS spectrometer. The morphology of the material was determined by a Quanta FEG 250 scanning electron microscope (SEM) and a Talos L 120C transmission electron microscope (TEM) and the X-ray photoelectron spectroscopy (XPS) is obtained by Thermo Scientific K-Alpha spectrometer. Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) was characterized by an ICAP-7000 (Agilent, American). The thermogravimetric (TG) analysis curve is obtained by a METTLER TGA2 thermogravimetric analyzer. The electromotive potential of the material was obtained by a 90Plus Zeta potential analyzer. The pH was determined with a Sartorius PB-10 basic pH meter. The photoluminescent (PL) spectra of the material was tested by F97XP fluorescence spectrophotometer, both the excitation and emission slits were kept at a width of 10 nm.

Preparation of real samples

These two water samples were pretreated by centrifugation for 10 min (1000 r/min) to remove the precipitate and then filtered through a 0.22 μm microporous membrane filter. Human serum was obtained and diluted 100 times for testing. For the honey sample[1], a nominal 1 g mass was accurately weighed and mixed with 5 mL of deionized water, stirred to form a homogeneous solution, diluted to 10 mL and filtered through a 0.22 μm microporous membrane filter. For the milk sample[2], a mixture of 5.0 mL milk and 15 mL acetonitrile was vortexed and sonicated for 10 min. The protein and fat were separated by centrifugation at 10,000 rpm for 10 min and the supernatant collected and evaporated at 60 °C. The extract was redispersed in 10 mL of deionized water. Treated samples were stored in a refrigerator at 4 °C prior to use.

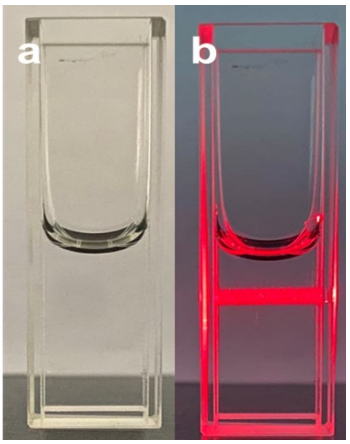

Figure S1. Photograph of Y^{3+}@CdTe QDs dispersed in aqueous solution (a) natural light,(b) under laser beam.

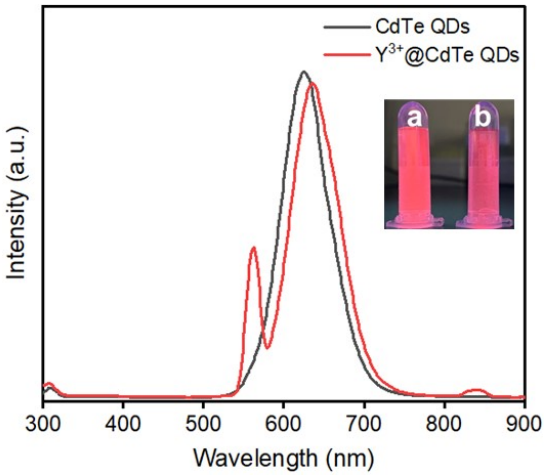

Figure S2. Fluorescence spectral changes of CdTe QDs before and after Y^{3+} coordination. (Inset: under 254nm UV lamp)

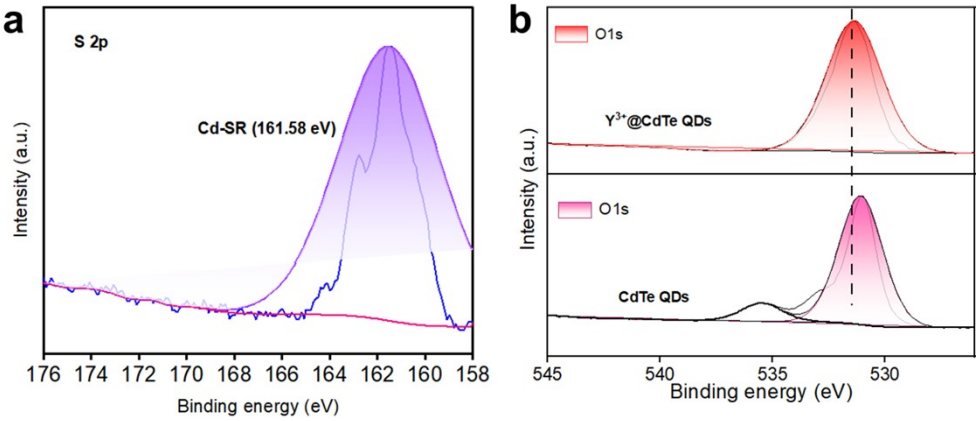

Figure S3. The XPS spectra of (a) S 2p and (b) O 1s.

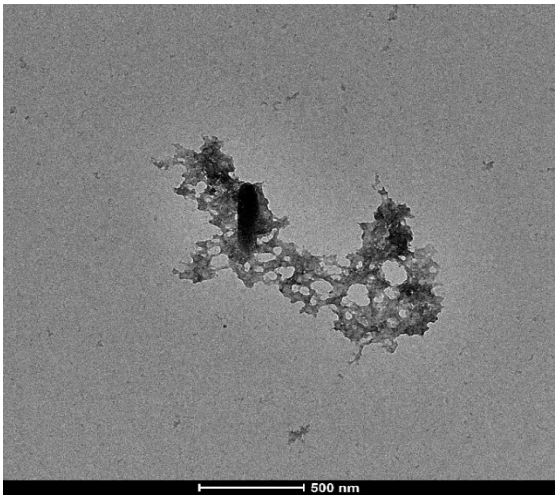

Figure S4. TEM image of NOR after binding to nanoprobe Y^{3+}@CdTe QDs.

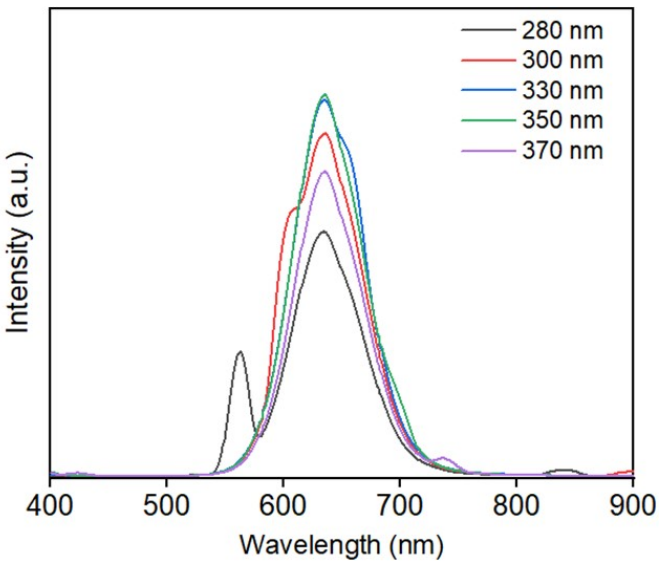

Figure S5. Emission spectra of Y^{3+}@CdTe QDs at different excitation wavelengths.

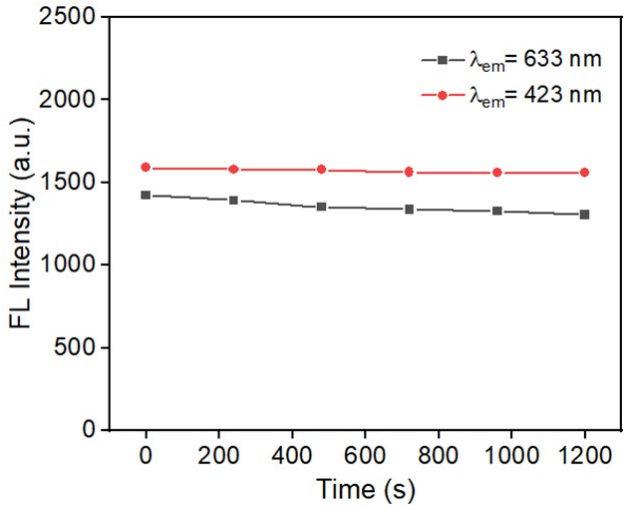

Figure S6. Stability of Y^{3+}@CdTe QDs + NOR under xenon lamp irradiation.

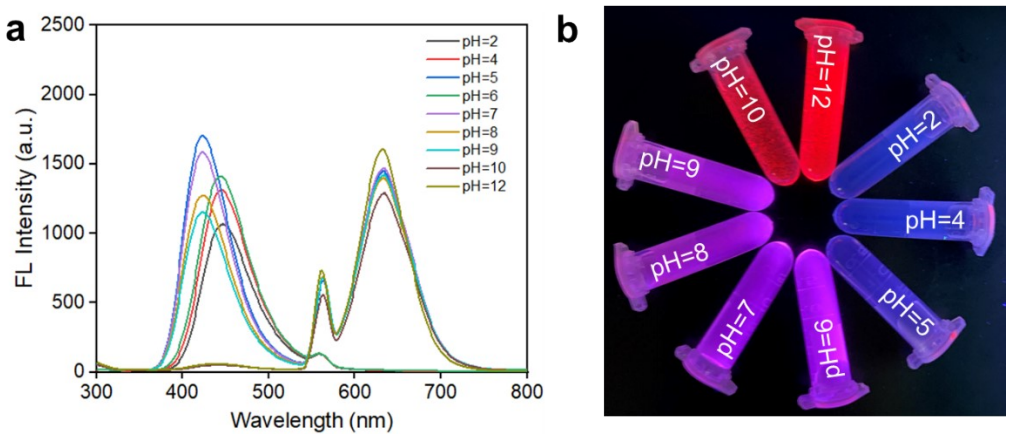

Figure S7. (a) Emission spectra of Y^{3+}@CdTe QDs + NOR at different pH conditions. (b) Photograph of the corresponding solution under a 254 nm UV lamp.

Table S1. Comparison of structural strategies and sensing performance with reported fluorescent sensors for the detection of norfloxacin.

Fluorescent Probe	Targets	Fluorescence Linear range	LOD	Color variance	Ref.
g-CDs@UiO-66	norfloxacin	1-8 μM	0.082 μM		3
Cs_2ZnCl_4	norfloxacin	0.2-50.0 μM	0.1499 μM		4
HA-GQDs-MIP	norfloxacin	1-100 μg L^{-1}	0.35 μg L^{-1}		5
NAC-Cu@AuNCs	norfloxacin	0.02-16 μM	38.3 nM		6
Cys-CuNCs	norfloxacin	0.5-50 μM	50 nM		7
SiO_2-CdTe QDs	norfloxacin	0.5-28 μM	0.18 μM		8
Y^{3+}@CdTe QDs	norfloxacin	1-150 μM	31.8 nM		This work

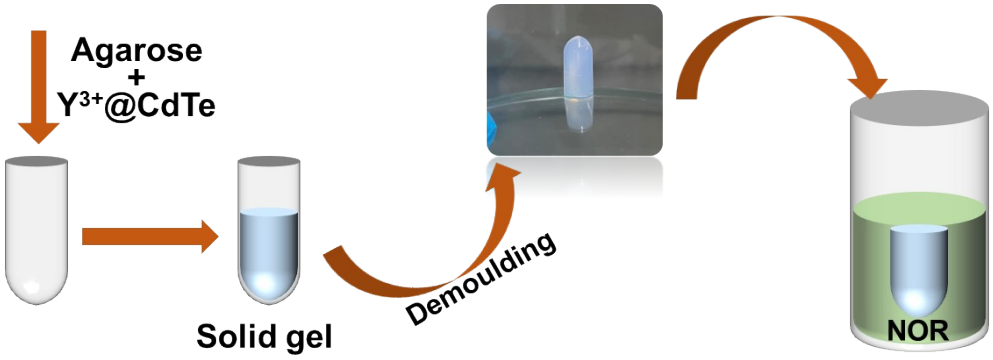

Figure S8. Schematic diagram for fabricating flexible devices based on solid gels.

Table S2. Detection of NOR in real samples (n=3).

Sample	Found (μM)	Added (μM)	Found (μM)	Recovery (%)
Tap water	0	1	1.08	108
	0	5	4.80	96
Lake water	0	1	1.02	102
	0	5	5.20	104
Honey	0	1	1.05	105
	0	5	4.55	91
Milk	0	1	0.91	91
	0	5	4.87	97
Human serum	0	1	0.85	85
	0	5	4.35	87

References

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