

Electronic Supplementary Information

Microwave synthesis of cyclen functional carbon dots to construct ratiometric
fluorescent probe for tetracycline detection

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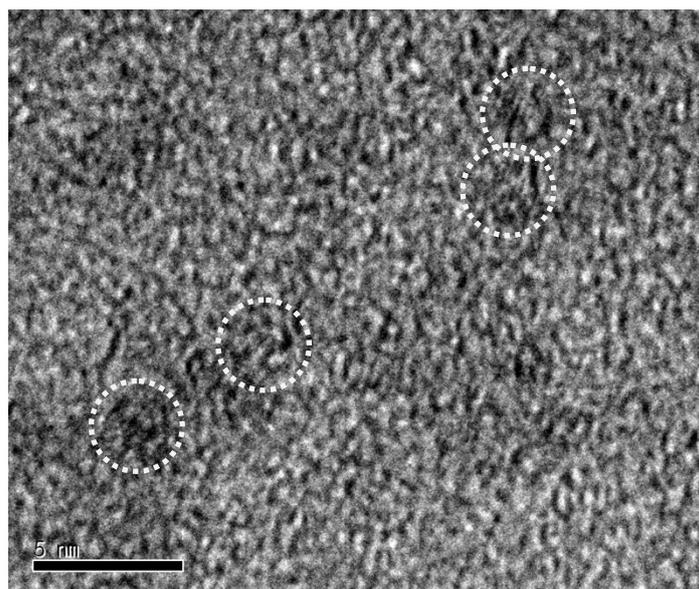


Figure S1. HR-TEM image of the as-synthesized CDs. Some CDs showed the lattice fringes, indicating the carbonization and crystallization of precursor.

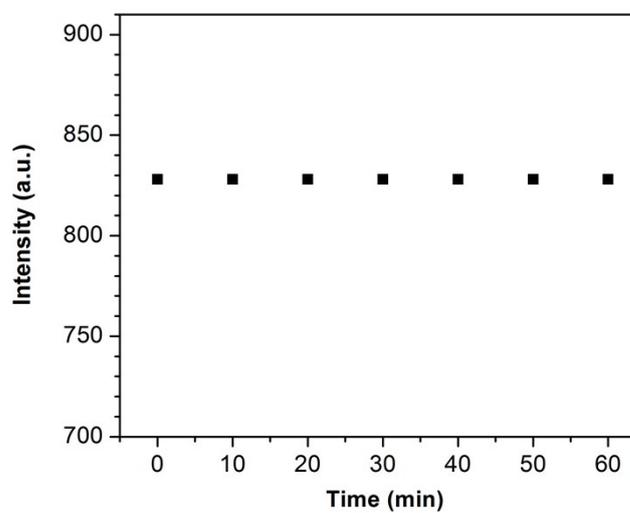


Figure S2. Time course of the CDs fluorescence intensity change under the air and sunlight condition within 60 min.

Table S1. Quantum yields of fluorescent carbon dots obtained by different reaction conditions.

NO.	CDs from different reaction ratios			Reaction conditions	QY (%)	Photos
1	Citric acid 0.1921 g	Cyclen 0.0172 g	Water 10 mL	750 W 5 min	---	No Fluorescence
2	Citric acid 0.1921 g	Cyclen 0.0342 g	Water 10 mL	750 W 5 min	2.5	
3	Citric acid 0.1921 g	Cyclen 0.0860 g	Water 10 mL	750 W 5 min	7.4	
4	Citric acid 0.1921 g	Cyclen 0.1723 g	Water 10 mL	750 W 5 min	27.6	
5	Citric acid 0.1921 g	Cyclen 0.3446 g	Water 10 mL	750 W 5 min	20.1	
6	Citric acid 0.1921 g	Cyclen 0.8615 g	Water 10 mL	750 W 5 min	12.8	
7	Citric acid 0.1921 g	Cyclen 1.7230 g	Water 10 mL	750 W 5 min	4.6	
8	---	Cyclen 1.7230 g	Water 10 mL	750 W 5 min	---	No Fluorescence

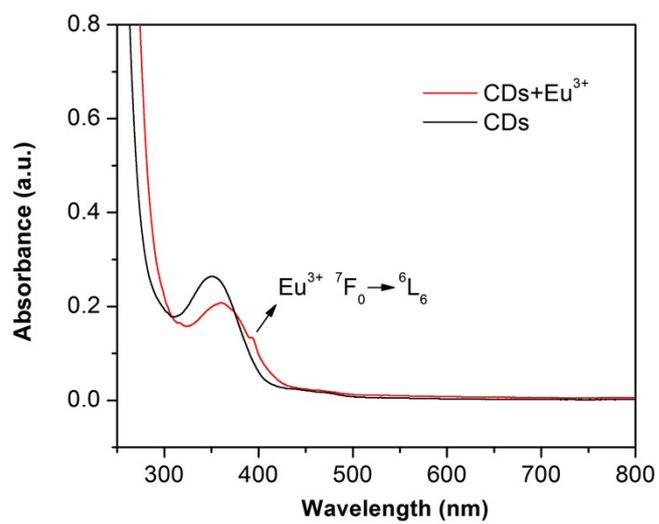


Figure S3. The UV-vis absorption spectra of CDs and CDs-Eu³⁺.

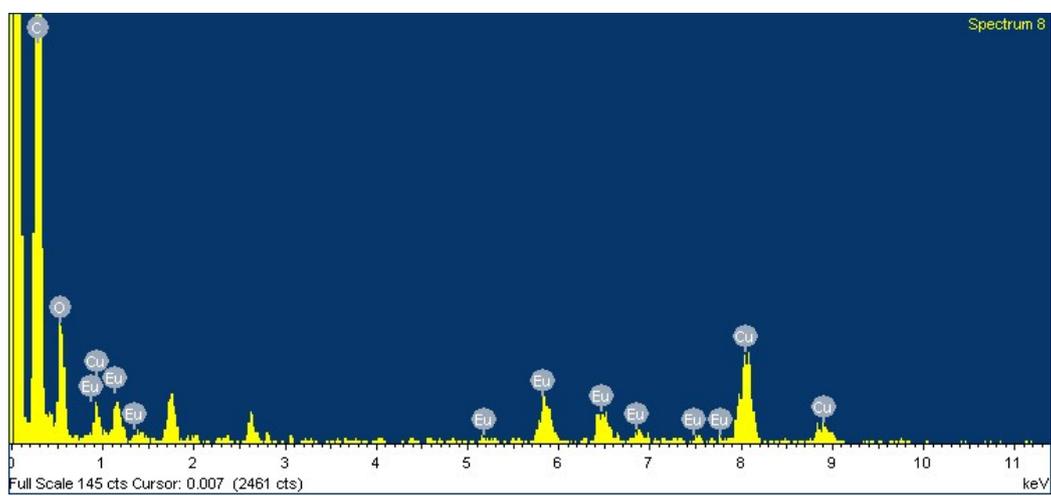


Figure S4. The energy-dispersive X-ray spectrum of the as-prepared probe confirms the presence of Eu³⁺ on the surface of CDs.

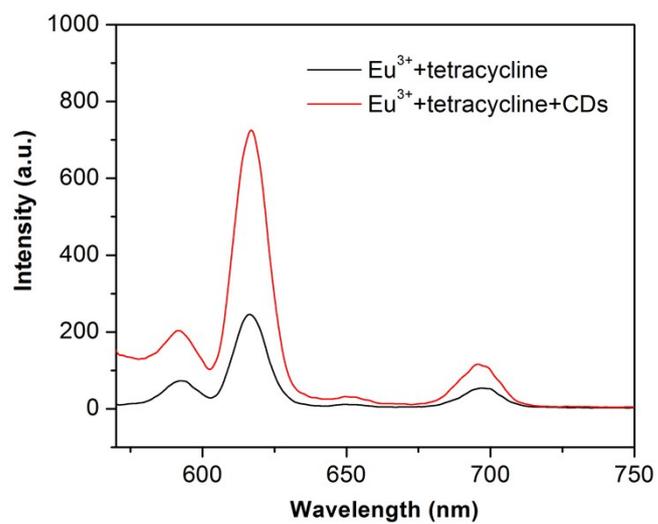


Figure S5. The fluorescent spectra of TC-Eu³⁺ in the presence (red line) and absence (black line) of cyclen functional CDs.

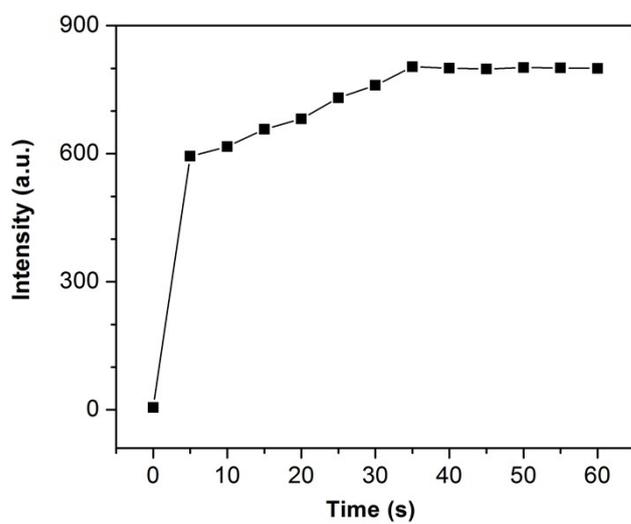


Figure S6. Time course of the fluorescence intensity change at 616 nm upon the addition of 3 µg/mL tetracycline.

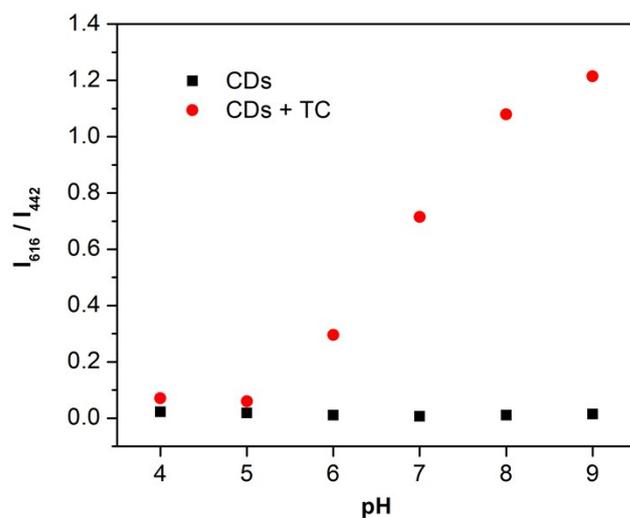


Figure S7. Effect of pH on the fluorescence intensity ratio (I_{616}/I_{442}) of the CDs-Eu³⁺ probe in the absence (black) and presence (red) of 3 $\mu\text{g}/\text{mL}$ tetracycline.

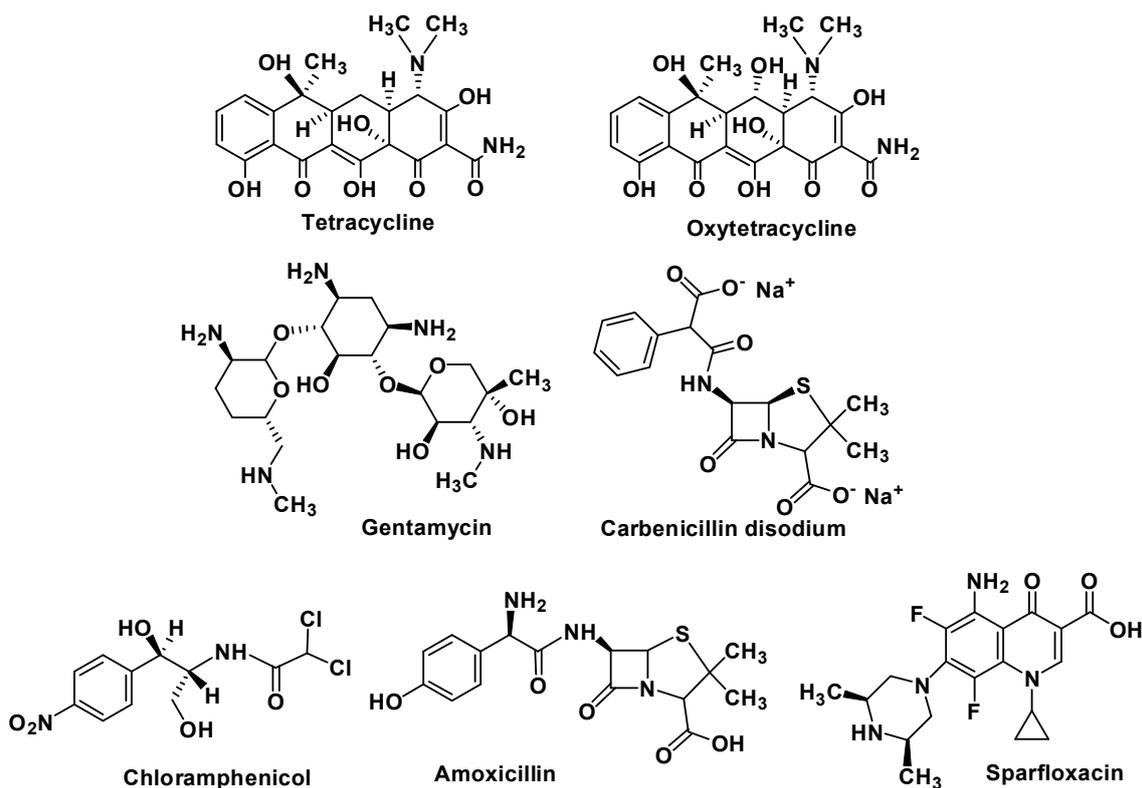


Figure S8. Chemical structure of typical antibiotics for selectivity detection.

Table S2. Determination of tetracycline in tap water and lake water samples.

Spiked concentration ($\mu\text{g/mL}$)	Tap water		Lake water	
	Found ($\mu\text{g/mL}$)	Recovery (%)	Found ($\mu\text{g/mL}$)	Recovery (%)
0.5	0.542	108.4	0.536	107.2
1.0	1.128	112.8	1.168	116.8
2.0	2.165	108.3	2.046	102.3