Supplementary Information for

Dual emissive amphiphilic carbon dots as ratiometric fluorescent probes for the determination of critical micelle concentration of surfactants

Weiwei Lu[a,b], Yun Liu*[b], Zhi-ying Zhang[b], Junping Xiao[a] and Chun-yan Liu*[b]

[a]School of Chemistry and Biological Engineering University of Science and Technology Beijing, Beijing 100083, P. R. China

[b]Technical Institute of Physics and Chemistry Chinese Academy of Sciences Beijing 100190, P. R. China

E-mail: liuyun@mail.ipc.ac.cn, cyliu@mail.ipc.ac.cn.

Table S1. The surfactant concentrations used for the CMC measurements.

Sample	1	2	3	4	5	6	7	8	9	10
[Triton X-100]/mM	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
[CTAB]/mM	0.40	0.60	0.70	0.80	1.00	1.20	1.40	1.60	1.80	-
[SDS]/mM	2.0	4.0	6.0	7.0	8.0	10.0	12.0	14.0	16.0	18.0

Table S2. The elements proportion of the Cdots determined by XPS

Elements	Atomic percentage (at%)
C	79.61
N	2.78
O	17.61

Table S3. Fluorescence lifetimes of the Cdots estimated from the exponential fitting of the Time-resolved luminescent decay curves.

Ex (nm)	Em (nm)	τ_1 (ns)	A_1 (%)	τ_2 (ns)	A_2 (%)	τ_{avg}	χ^2
340	435	4.44	88.5	11.74	11.5	6.31	1.34
340	534	4.97	57.1	15.58	42.9	12.42	1.11

Where A_i, τ_i are the pre-exponential factor and the lifetime.

[1]The average lifetimes were calculated using the equation: $\tau_{ave} = \sum A_i \tau_i^2 / \sum A_i \tau_i$

Table S4. Absolute PLQYs of the Cdots in c-hexane solution measured at different excitation wavelengths.

Excitation wavelength (nm)	PLQY (%)
340	11.8
370	13.2
445	44.3
450	51.1

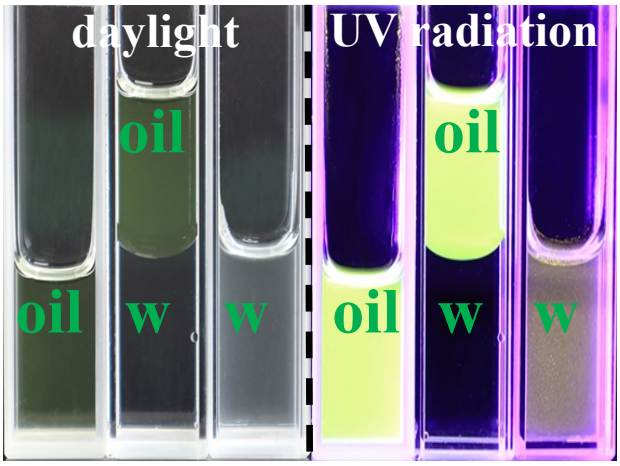

Fig. S1. Magnified photographs in daylight and under 365 nm UV light, 30 μg mL^{-1} Cdots n-hexane solution(left), and mixed solution (right). The mixed solution: 2 mL of 30 μg mL^{-1} Cdots aqueous solution joined 2 mL of n-hexane (middle) and 2 mL of 30 μg mL^{-1} Cdots aqueous solution.

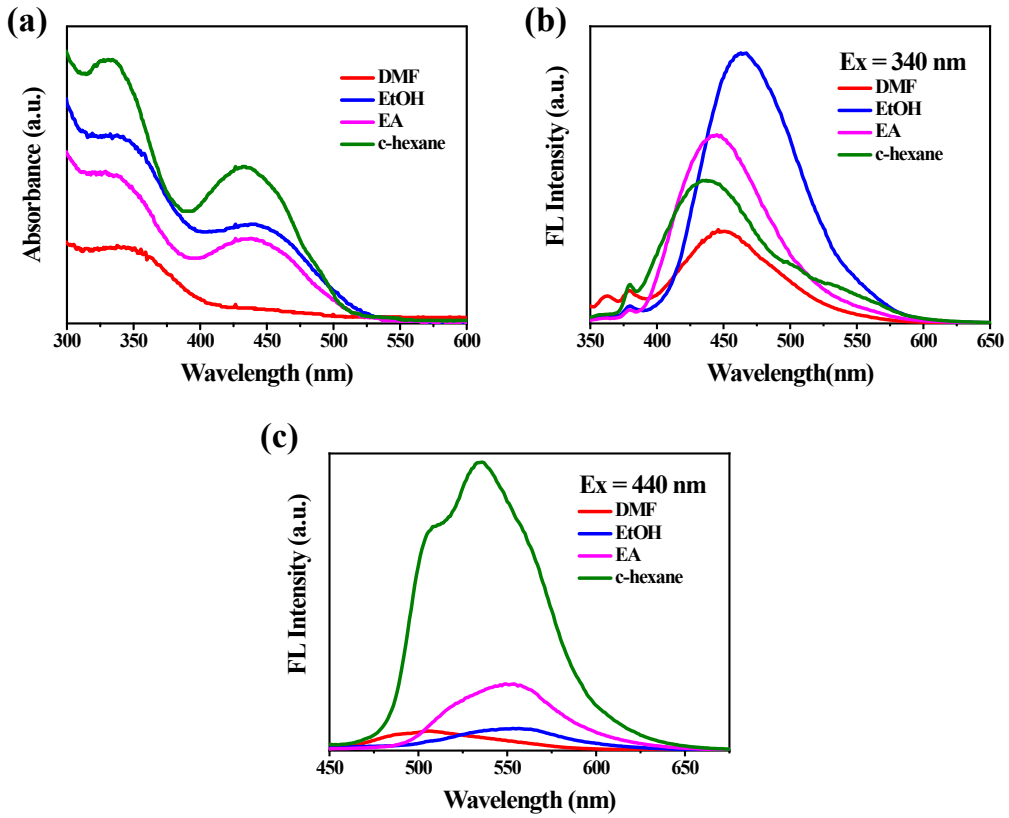

Fig. S2. UV-vis absorption (a) and fluorescent spectra of Cdots in various solvents (b, c).

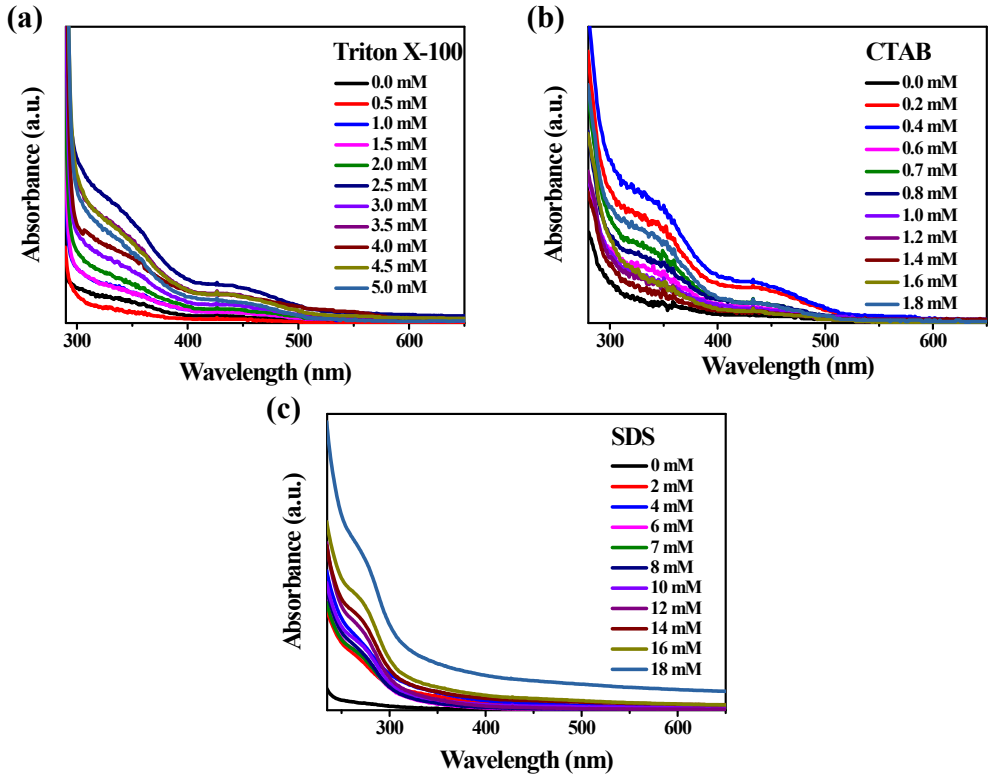

Fig. S3. UV–vis absorption spectra of the Cdots aqueous solution in the presence of different concentration of Triton X-100 (a), CTAB (b), and SDS (c).

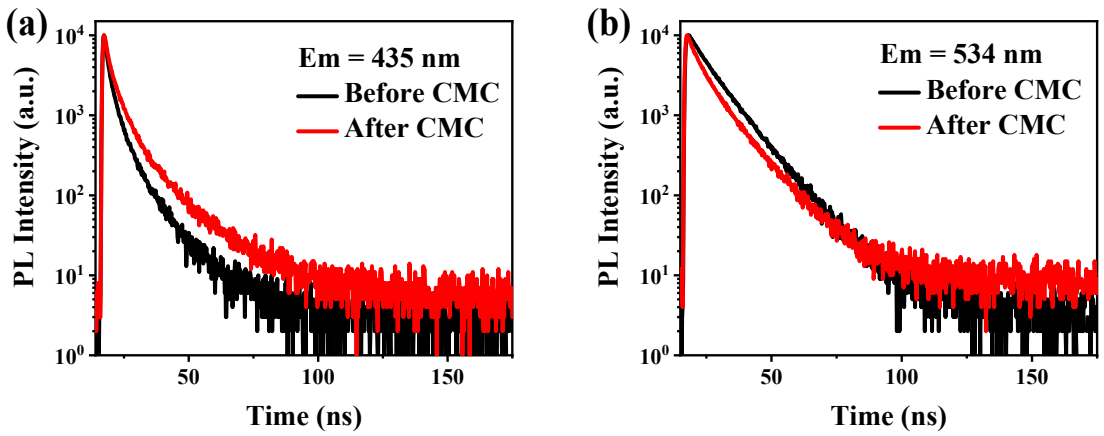

Fig. S4. Time-resolved luminescence decay curves of Cdots monitored at 435 nm (a) and 534 nm (b) in CTAB aqueous solution with concentration before (0.2 mM) and after its CMC (1.8 mM), respectively (Ex: 340 nm).

Table S5. Fluorescence lifetimes of the Cdots estimated from the exponential fitting of the time-resolved luminescent decay curves in Fig. S3.

lifetimes	Ex (nm)	Em (nm)	τ_1 (ns)	A_1 (%)	τ_2 (ns)	A_2 (%)	τ_{avg} (ns)	χ^2
before CMC	340	435	1.86	81.7	7.46	18.3	4.51	1.43
		534	5.89	37.9	11.20	62.1	9.91	1.07
after CMC	340	435	2.62	85.5	11.24	14.5	6.25	1.63
		534	3.85	55.3	10.95	44.7	8.80	1.21

Where A_i, τ_i are the pre-exponential factor and the lifetime.

[1]The average lifetimes were calculated using the equation: $\tau_{ave} = \sum A_i \tau_i^2 / \sum A_i \tau_i$