Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supplementary Information

One-step microwave synthesis of carbon dots for highly sensitive and selective detection of copper ion in aqueous solution

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1. Determination of fluorescence quantum yield

Rhodamine B (Φ=0.31 in water) was chosen as a standard. The quantum yield of the CDs was calculated as follows. [1, 2]

$$\Phi_{sam} = \Phi_{ref} \frac{I_{sam}}{I_{ref}} \cdot \frac{A_{ref}}{A_{sam}} \cdot \left(\frac{n_{sam}}{n_{ref}}\right)^2$$

Where Φ is the fluorescence quantum yield, I is the integrated emission intensity, A is the absorbance, and n is the refractive index. The subscripts $_{sam}$ and $_{ref}$ stand for the sample and the reference, respectively. Herein, the CDs and Rhodamine B were dissolved in ultrapure water (n = 1.33) and excited under 420 nm and kept the absorbance below 0.05. The results showed that I_{sam} *and* I_{ref} were 6846.6 and 16079.2, and A_{sam} and A_{ref} were 0.035 and 0.021, respectively.

2. Supplementary figures

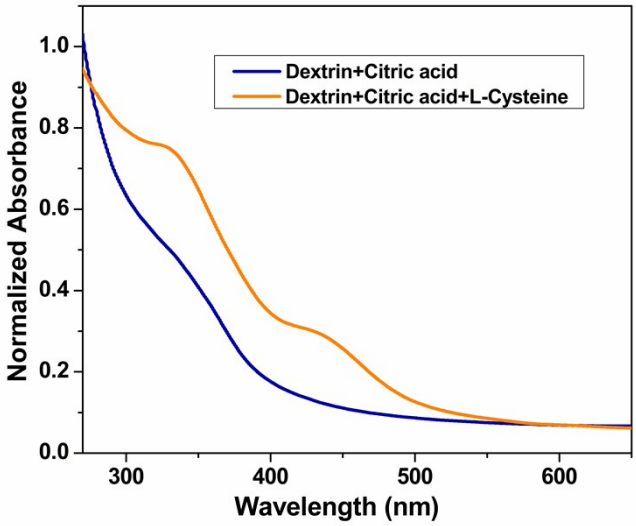

Fig.S1 The absorption spectra of undoped CDs based citric acid and dextrin as the precursors and doped CDs based citric acid, L-cysteine and dextrin as the precursors.

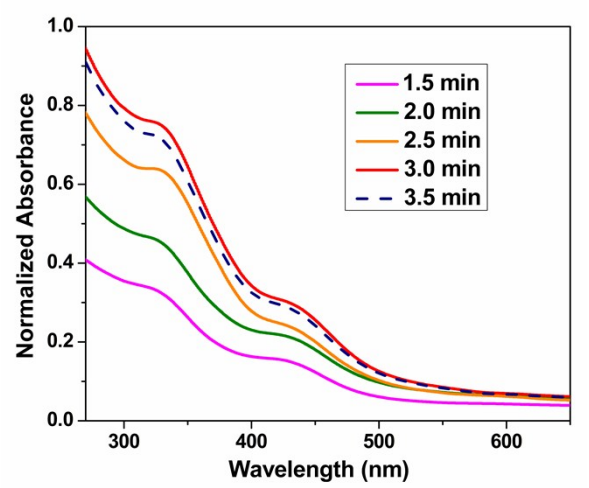

Fig. S2 The absorption spectra of the CDs with different reaction times.

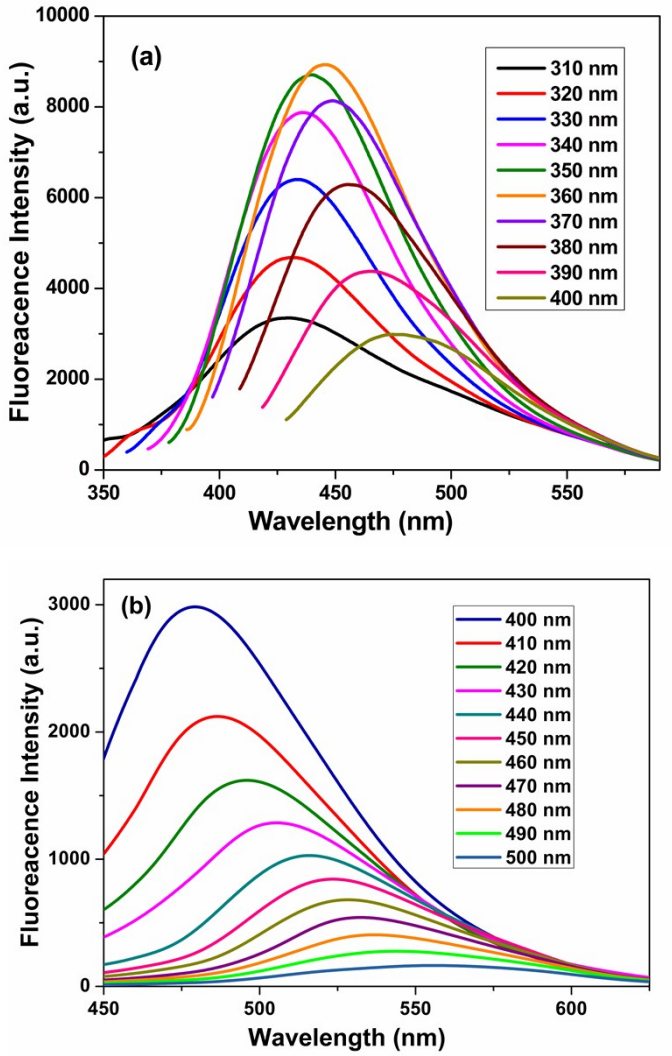

Fig. S3 The fluorescence emission spectra of the CDs with the excitation in ultraviolet region (a) and in visible region (b) with different excitation wavelengths.

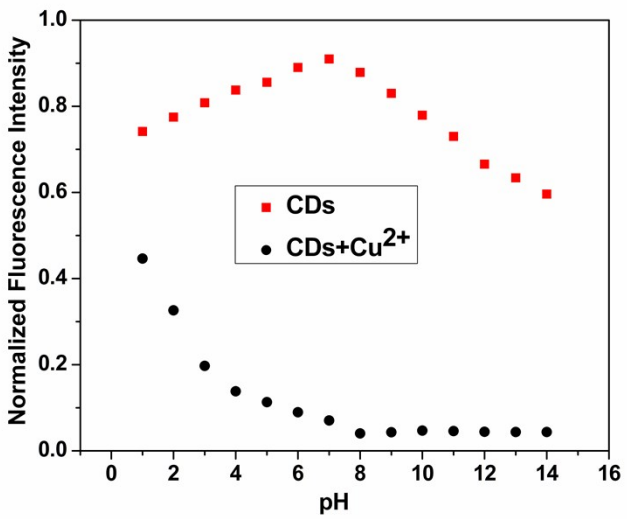

Fig.S4 Fluorescent pH titration of the free CDs and the CDs-Cu^{2+} complex in 20 mM HEPES buffer solution (pH 1.0-14.0).

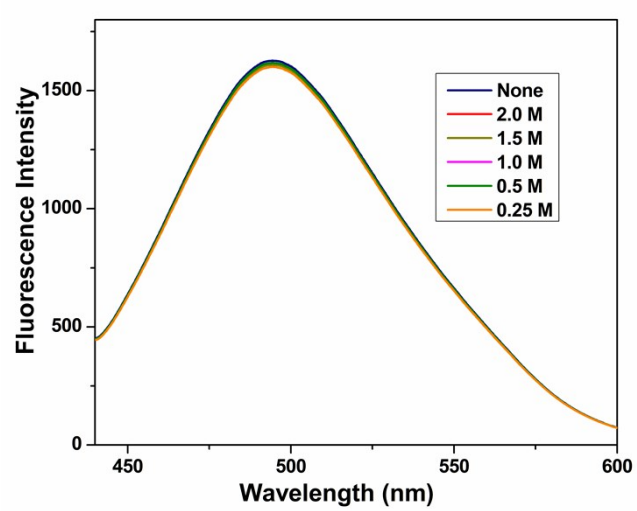

Fig.S5 The influences of the different ionic strengths (0.0-2.0 M KCl) on the fluorescence emission spectra of the CDs (0.04 mg mL^{-1}).

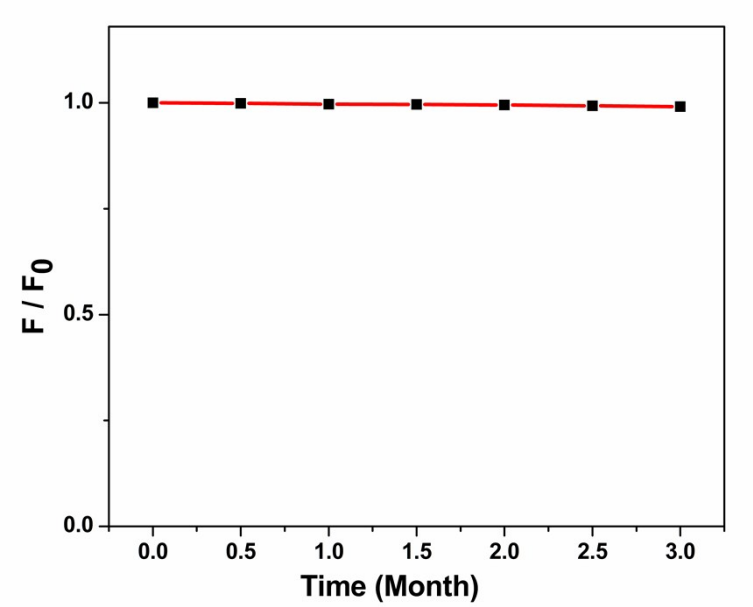

Fig.S6 Photostability of the CDs as a function of the storage times.

3. References

1. M. Zhang, Y. Gao, M. Li, M. Yu, F. Li, L. Li, M. Zhu, J. Zhang, T. Yi, C. Huang, Tetrahedron Lett. 2007, 48, 3709-3712.

2. Z. B. Qu, X. Zhou, L. Gu, R. Lan, D. Sun, D. Yu and G. Shi, Chem. Commun., 2013, 49, 9830-9832.