Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Solvent-controlled and solvent-responded strategies for synthesis of multiple-color carbon dots for pH sensing and cell imaging

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The PL decay curves are analysed by fitting the following equation:

$$Y(t) = A1 \exp(-\tau/t_1) + A2 \exp(-\tau/t_2) \quad (1)$$

Here, A1 and A2 are the constants specifying the effect on the decay with lifetimes τ1 and τ2. The average lifetime can be evaluated using the following relation [1-2]:

$$\tau_{avg} = (A1\tau1^2 + A2\tau2^2)/ (A1\tau1 + A2\tau2) \quad (2)$$

[1] H. Ding, J.-S. Wei, P. Zhang, Z.-Y. Zhou, Q.-Y. Gao and H.-M. Xiong, *Small,* 2018, **14**, 1800612.

[2] L. Ma, W. D. Xiang, H. H. Gao, L. Pei, X. Ma, X. Y. Huang and X. J. Liang *J. Mater. Chem. C*, 2015, **3**, 6764-6770.

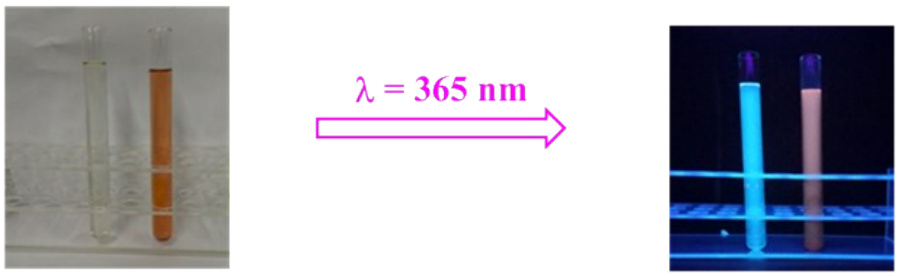

Fig. S1. Photographs of b-CDs and r-CDs dispersed in CH_3CH_2OH, in daylight (left) and under UV irradiation (right).

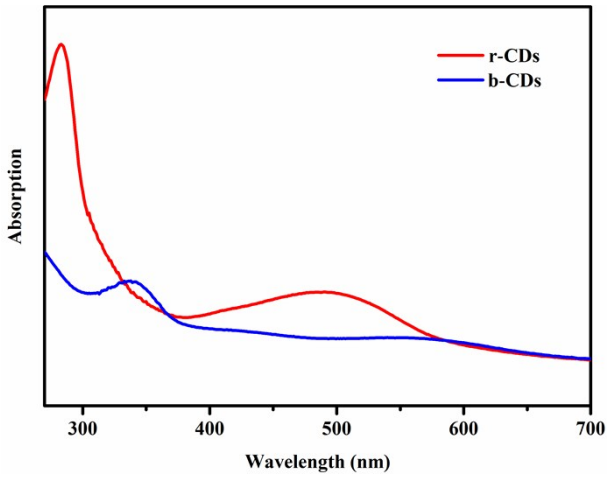

Fig. S2. The UV-vis absorption (ABS) spectra of b-CDs and r-CDs.

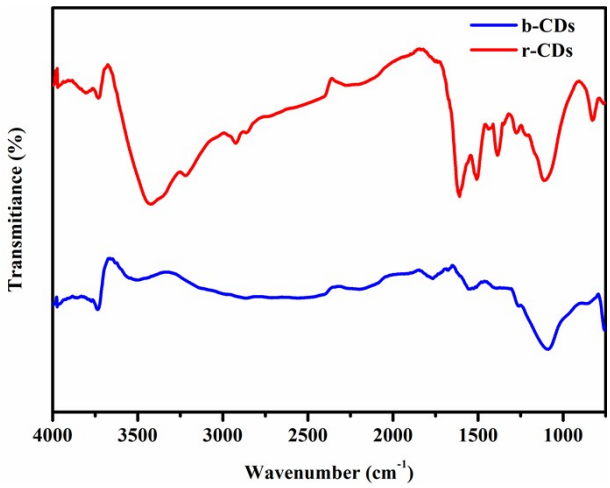

Fig. S3. FT-IR spectra for b-CDs and r-CDs.

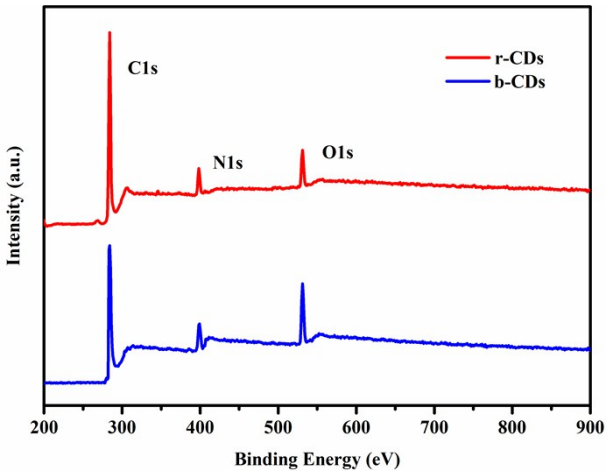

Fig. S4. The XPS spectra of the two selected samples (b-CDs and r-CDs).

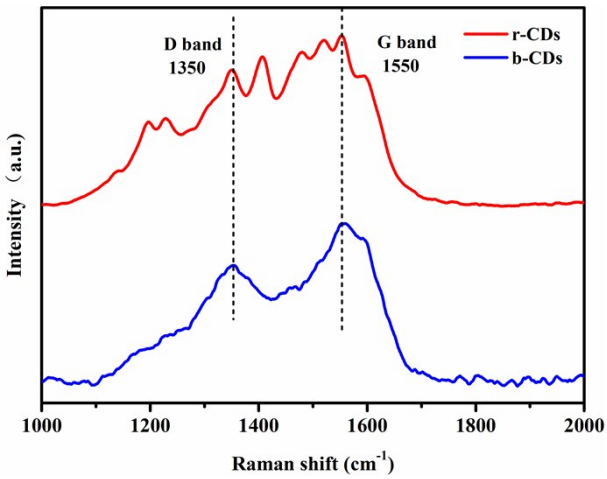

Fig. S5. Raman spectra of b-CDs and r-CDs.

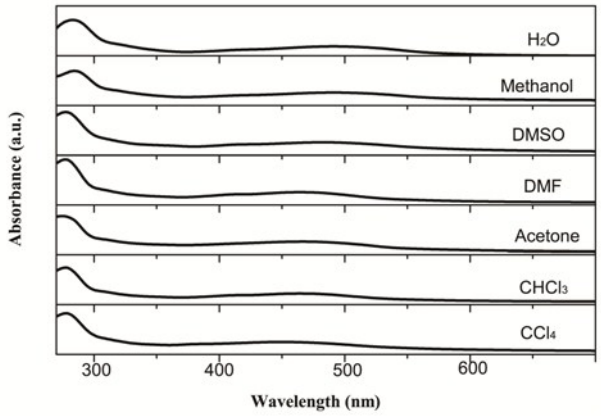

Fig. S6. The complete UV-vis absorption spectra of CDs in different solvents.

Fig. S7. The photo of the b-CDs in different solvents excited by 365 nm light.

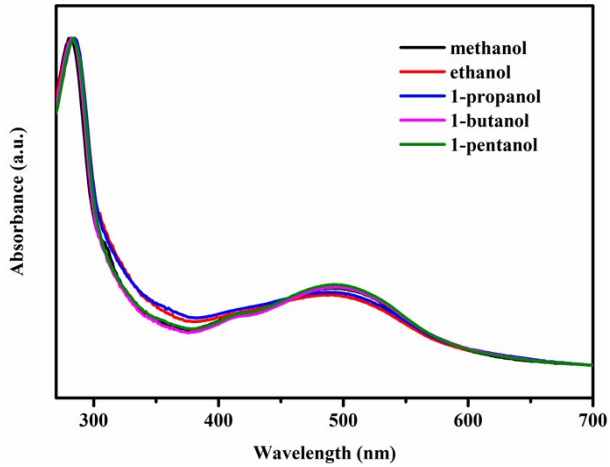

Fig. S8. The UV-Vis absorption spectra of the r-CDs in methanol, ethanol, 1-propanol, 1-butanol and 1-pentanol.

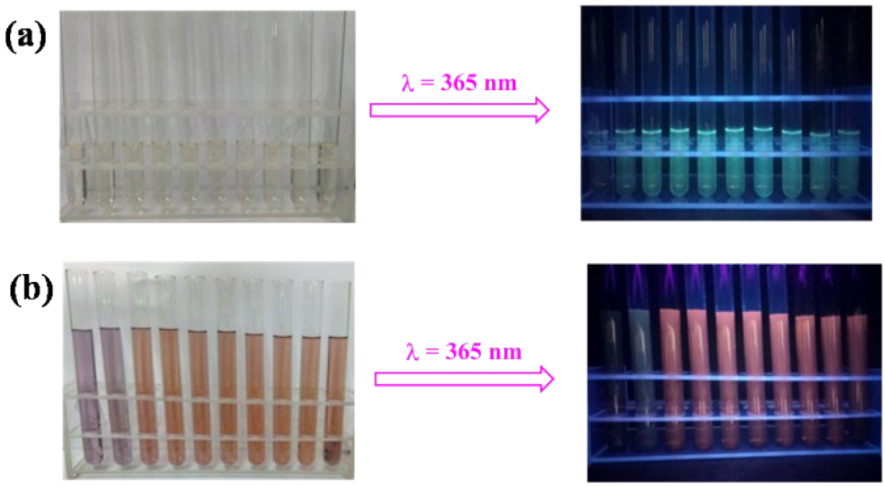

Fig. S9. The photos of the b-CDs (a) and r-CDs (b) in different pH (1→10) in daylight (left) or excited by 365 nm light (right).

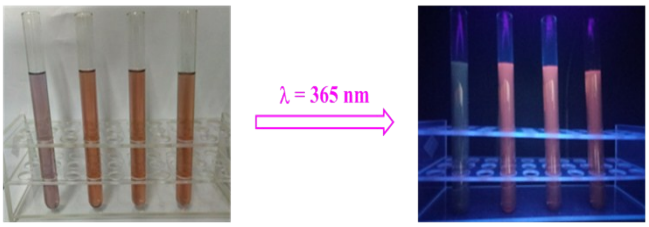

Fig. S10. The photos of the r-CDs in different pH (2, 6, 7, 9) in daylight (left) or excited by 365 nm light (right).

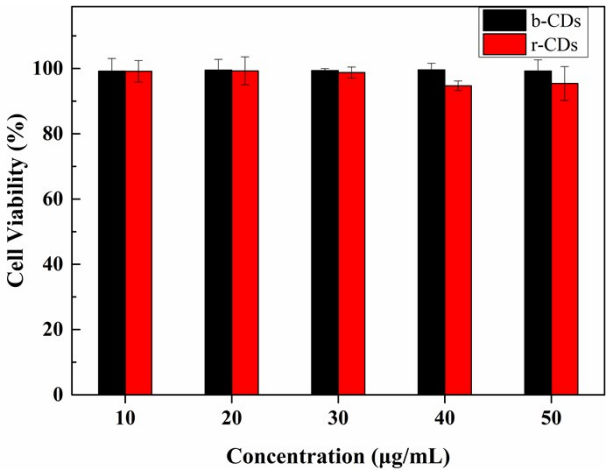

Fig. S11. Cytotoxicity assessment of the b-CDs and r-CDs with the standard MTT assays toward HeLa cells.

Table S1. The C, N, and O element contents of the three selected products determined by XPS results.

CDs	Size (nm)	C (at.%)	O (at.%)	N(at.%)
b-CDs	1.90	74.18	13.75	12.07
r-CDs	2.66	83.75	7.7	8.55

Table S2. The fluorescence lifetimes of b-CDs and r-CDs in CH_3CH_2OH.

CDs	τ1 (ns)	A1 (%)	τ2 (ns)	A2 (%)	τ_{avg} (ns)	χ 2
b-CDs	2.24	38.68	7.19	61.32	6.38	1.078
r-CDs	2.63	32.89	6.91	67.11	6.24	1.081