Supporting Information

Disulfide bond-based self-crosslinked carbon-dots for turn-on fluorescence imaging of GSH in living cells

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Supplementary Figures and Tables

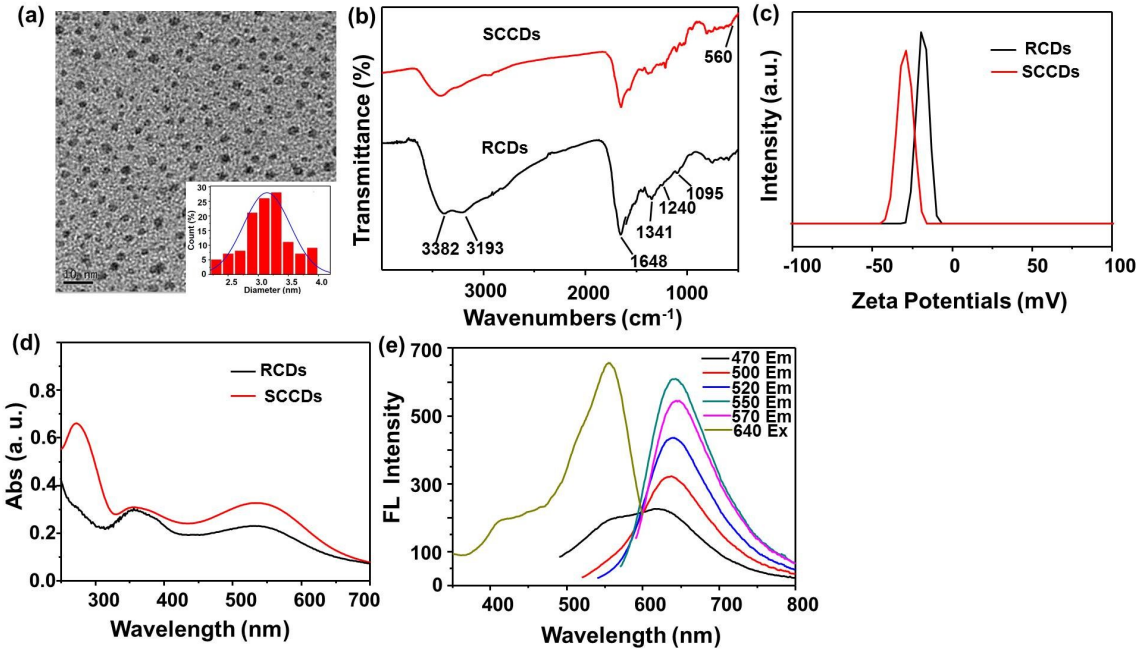

Fig. S1. (a) TEM image of the RCDs (inset: diameter distribution). (b) FTIR spectra of the RCDs and the SCCDs. (c) Zeta potentials of the RCDs and the SCCDs. (d) UV-vis absorption spectra of the RCDs and the SCCDs. (e) Fluorescence excitation and emission spectra of the RCDs in PB buffer (10 mM, pH. 7.4).

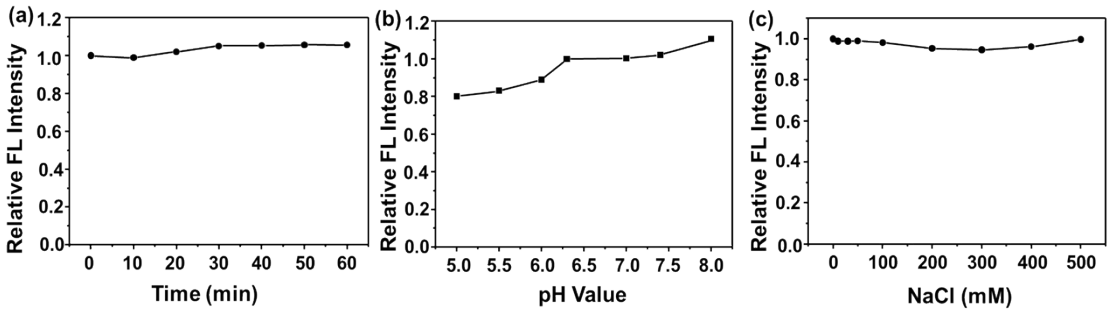

Fig. S2. (a) Photostability of the RCDs under continuous irradiation of a ultraviolet lamp. Normalized fluorescence intensities of the RCDs under different pH values (b)

and ionic strengths (c). All the normalized fluorescence intensities were measured at 640 nm under the excitation of 550 nm. The concentration of RCDs is 20 μg/mL.

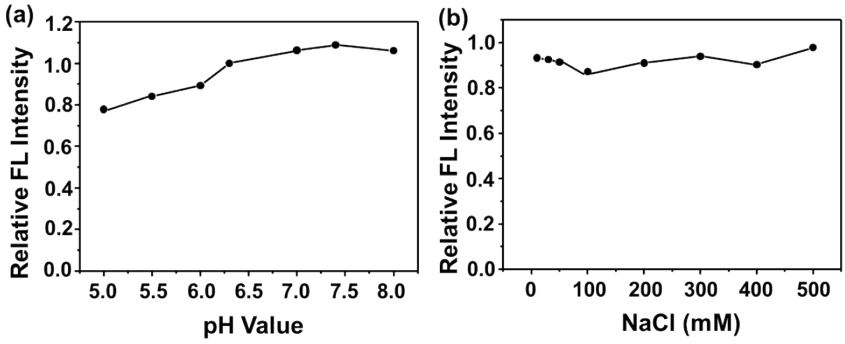

Fig. S3. Normalized fluorescence intensities of the SCCDs under different pH values (a) and ionic strengths (b). All the normalized fluorescence intensities were measured at 640 nm under the excitation of 550 nm. The concentration of SCCDs is 20 μg/mL.

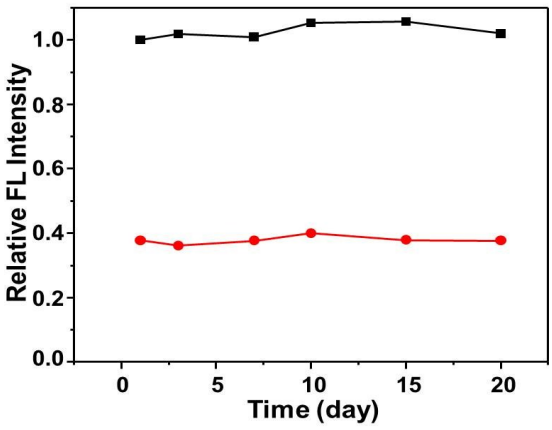

Fig. S4. Storage stability of the SCCDs nanoprobe (20 μg/mL) in the absence (red line) and presence (black line) of GSH (1 mM).

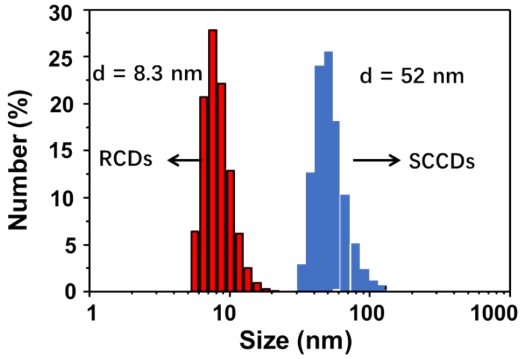

Fig. S5. DLS measurements of the SCCDs and the SCCDs upon the addition of GSH (1 mM).

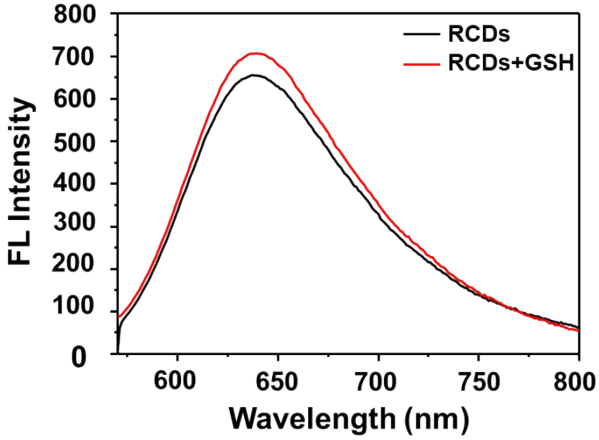

Fig. S6. Fluorescence emission spectra of the RCDs (20 μg/mL) in the absence and presence of GSH (1 mM).

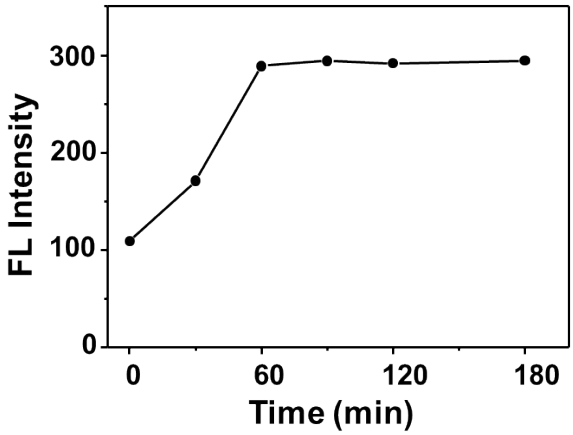

Fig. S7. Time course of the fluorescence recovery of the SCCDs nanoprobe (20 μg/mL) in the presence of GSH (1 mM).

Table S1. Absolute quantum yields of the RCDs and the SCCDs using R6G as the internal reference.

Sample	Solvent	λ_{ex}/nm	Φ_1/%	Φ_2/%	Φ_3/%	$\Phi_{average}$/%	$\Phi_{corr.}$/%
R6G	EtOH	488	95.04	94.24	92.02	93.77	95
RCDs	H_2O	550	8.25	7.22	8.95	8.14	8.25
SCCDs	H_2O	550	2.11	1.84	2.32	2.09	2.12

Table S2. A detailed comparison between previously reported disulfide bond-based luminescent probes and this SCCDs nanoprobe.

Probe	LOD (μM)	Selectivity	Stability	Preparation	Ref
UCPs	5	Poor	Yes	Difficult	S1
SiNPs–S–S–AuNPs	0.5	Poor	No	Difficult	S2
AuNCs	4	Good	No	Easy	S3
S-S-BODIPY-S	0.85	Good	Yes	Difficult	S4
Bis-Naphthalimide	2.9	Good	Yes	Difficult	S5
DCM	24	Poor	No	Difficult	S6
Naphthalimide	28	Poor	No	Difficult	S7
AMC	36	Poor	Yes	Easy	S8
SCCDs	5.7	Good	Yes	Easy	This work

References

S1. P.-D. Nguyen, V. T. Cong, S. J. Son, and J. Min, *J. Nanosci. Nanotech.*, 2015, 15, 7950-7954.

S2. Y. Shi, H. Zhang, Z. Yue. Z. Zhang, K.-S. Teng, M.-J. Li, C. Yi and M. Yang, *Nanotechnology*, 2013, 375501.

S3. C. Dai, C. Yang and X. Yan, *Nano. Res.*, 2018, **11**, 2488-2497.

S4. F. Wang, L. Zhou, C. Zhao,R. Wang, Q. Fei, S. Luo, Z. Guo, H. Tian and W. Zhu, *Chem. Sci.*, 2015, 6, 2584-2589.

S5. W. Shen, J. Ge, S. He, R. Zhang, C. Zhao, Y. Fan, S. Yu, B. Liu and Q. Zhu, *Chem. Asia. J.*, 2017, 12, 1532 – 1537.

S6. X. Wu, A. Shao, S. Zhu, Z. Guo and W. Zhu, *Sci. China. Chem*., 2016, 59, 62-69.

S7. B. Zhu, X. Zhang, Y. Li, P. Wang, H. Zhang and X. Zhuang, *Chem. Commun*., 2010, 46, 5710-5712.

S8. L. Hu, X. Wei, J. Meng, X. Wang, X. Chen and J. Wang, *Sensor. Actuat. B-Chem*., 2018, 268, 264-269.