Tuning photoluminescence and surface properties of carbon nanodots for chemical sensing

*Zhaomin Zhang,[a] Yi Pan,[a] Yaning Fang,[a] Lulu Zhang,[a] Junying Chen,[a] Changqing Yi[a]**

a. Key Laboratory of Sensing Technology and Biomedical Instruments (Guangdong Province), School of Engineering, Sun Yat-Sen University, Guangzhou, China.

[*] Corresponding author. Email: yichq@mail.sysu.edu.cn; Tel: 86-20-39342380.

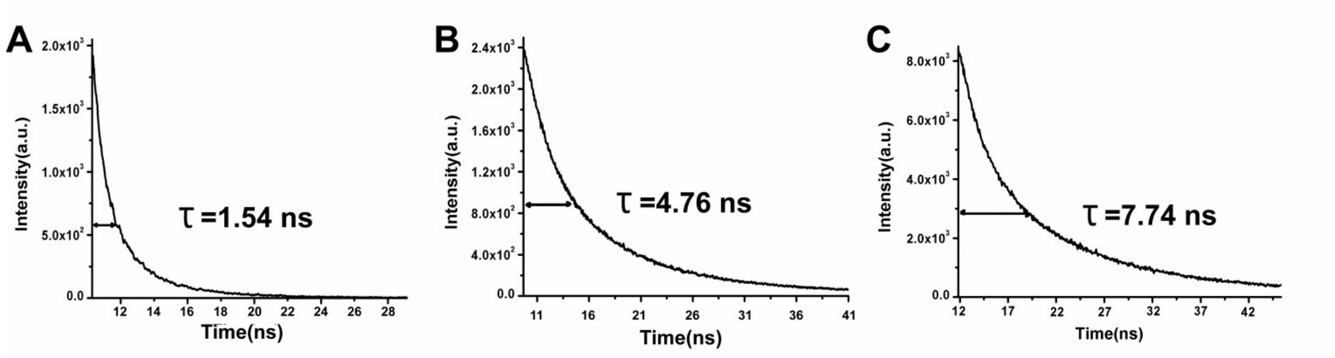

Figure S1. Photoluminescence decay spectra of B-fCDs (A), G-fCDs (B) and O-fCDs (C).

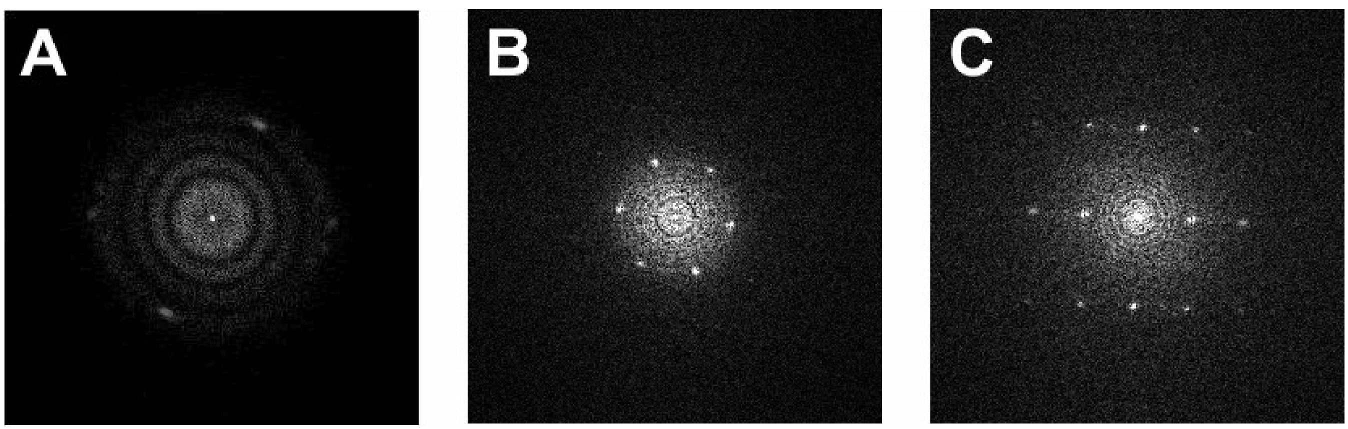

Figure S2. Photoluminescence decay spectra of B-fCDs (A), G-fCDs (B) and O-fCDs (C).

Table S1. Elemental analysis results of B-fCDs, G-fCDs and O-fCDs.

Name	Weight (mg)	C (%)	H (%)	N (%)	O (%)	C/N ratio	C/H ratio	O/C ratio
B-fCDs	1.8170	51.63	8.236	0	40.134	0	6.2694	0.777
G-fCDs	2.0680	51.80	7.740	0	40.46	0	6.6926	0.781
O-fCDs	1.9260	53.38	8.654	0.83	37.136	64.0789	6.1680	0.696

Table S2. Comparison of Fe^{3+} detection system based on different nanoprobes

Nanoprobe	Linear range	LOD	Ex_{max} (nm)	Em_{max} (nm)	Time	Ref.
germanium nanocrystals (Ge NCs)	0-800 μM	0.83 μM	340	430	2 min	[1]
Grapheme oxide (AGO)	0-120 μM	4.6 μM	350	450	4 min	[2]
Fluorescent organic nanoparticles (NDQ FONs)	1 nm-100 μM	0.35 nM	403	515-524	-	[3]
GQDs	0-400 μM	7.22 μM	360	440	-	[4]
fluorescent graphitic carbon nitride	0-50 μM	1 nM	360	437	10 min	[5]
fCDs	-	17.9 μM	360	450	-	[6]
	0.04-50 mM	0.04 μM	380	450-510	-	[7]
	0-50 μM	0.02 μM	340	405	5 min	[8]
	0.025-100 μM	0.075 μM	330	440	< 4 min	[9]
	0.002-5 μM	2 nM	340	445	5 s	[10]
	10-60 μM	1 μM	370	417	-	[11]
	0.50-1000 μM	0.43 μM	470	600	<5 s	This work

References

[1] D. Carolan, H. Doyle, *Nanoscale*, 2015, **7**, 5488.

[2] L. He, J. N. Li, J. H. Xin, *Biosens. Bioelectron.*, 2015, **70**, 69.

[3] C. P. Han, T. H. Huang, Q. Liu, H. T. Xu, Y. P. Zhuang, J. J. Li, J. F. Hu, A. M. Wang, K. Xu, *J. Mater. Chem. C*, 2014, **2**, 9077.

[4] A. Ananthanarayanan, X. W. Wang, P. Routh, B. Sana, S. Lim, D. H. Kim, K. H. Lim, J. Li, P. Chen, *Adv. Funct. Mater.*, 2014, **24**, 3021.

[5] S. W. Zhang, J. X. Li, M. Y. Zeng, J. Z. Xu, X. K. Wang, W. P.Hu, *Nanoscale*, 2014, **6**, 4157.

[6] S. J. Zhu, Q. N. Meng, L. Wang, J. H. Zhang, Y. B. Song, H. Jin, K. Zhang, H. C. Sun, H. Y. Wang, B. Yang, *Angew. Chem. Int. Ed.*, 2013, **52**, 3953.

[7] S. N. Qu, H. Chen, X. M. Zheng, J. S. Cao, X. Y. Liu, *Nanoscale*, 2013, **5**, 5514.

[8] A. D. Zhao, C. Q. Zhao, M. Li, J. S. Ren, X. G. Qu. *Anal. Chim. Acta*, 2014, **809**, 128.

[9] J. Yu, N. Song, Y. K. Zhang, S. X. Zhong, A. J. Wang, J. R. Chen, *Sens. Actuator B-Chem.*, 2015, **214**, 29.

[10] Y. L. Zhang, L. Wang, H. C. Zhang, Y. Liu, H. Y. Wang, Z. H. Kang, S. T. Lee, *RSC Adv.*, 2013, **3**, 3733.

[11] Y. L. Jiang, Q. R. Han, C. Jin, J. Zhang, B. X.Wang, *Mater. Lett.*, 2015, **141**, 366.