

Electronic Supplementary Information

A highly sensitive fluorescence assay for 2,4,6-trinitrotoluene using amine-capped silicon quantum dots as a probe

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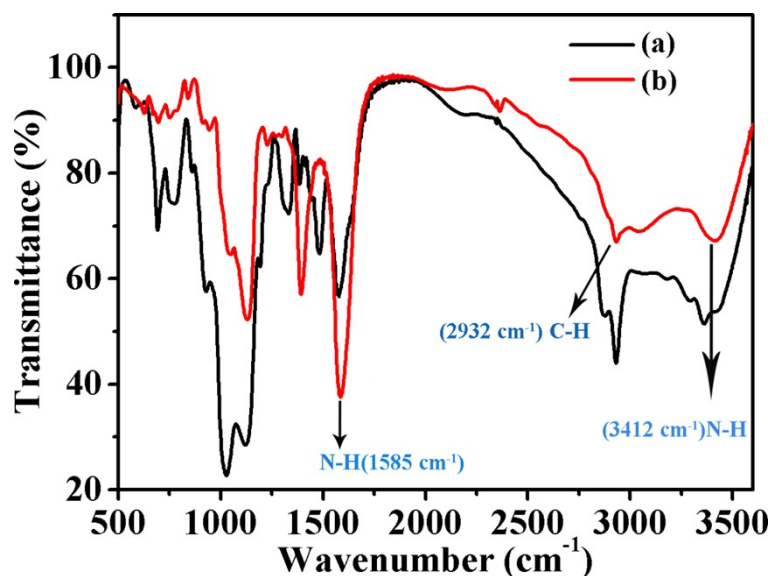


Fig.S1 The FTIR spectrum of the APTMS (a) and the prepared SiQDs (b).

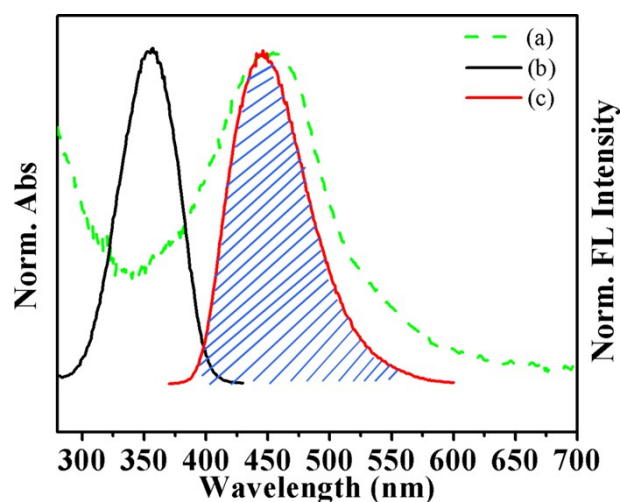


Fig.S2 Normalized absorption spectrum of TNT-amine-capped SiQDs solution (a), normalized excitation spectra (b) and emission spectra (curve c) of the prepared SiQDs solution.

Table S1. Comparison of different methods for TNT detection

Detection technique	Probe	Linear range	LOD	Real samples	Ref.
ECL	APTES-modified RuSiNPs	1–1000 nM	0.3 nM	N/A ^a	[1]
dynamic light scattering	p-ATP modified gold nanoparticle	N/A ^a	100 pM	N/A ^a	[2]
electrochemistry	graphene nanoribbon-based electrode	4.4–66 μ M	4.4 μ M	seawater	[3]
absorbance	magnetic nanoparticle-QD composite	6.25–600 nM	4.6 nM	N/A ^a	[4]
fluorescence	amine-capped ZnS-Mn ²⁺ nanocrystals	N/A ^a	1 nM	N/A ^a	[5]
fluorescence	graphene quantum dots	2.2–8000 μ M	2.2 μ M	N/A ^a	[6]
fluorescence	white-UCNPs	0.04–19.8 μ M	37 nM	N/A ^a	[7]
fluorescence	FITC functionalized NH ₂ - β -cyclodextrin	0.176–2.29 μ M	20 nM	water	[8]
fluorescence	BSA functionalized AuNCs	0.01–10 μ M	10 nM	N/A ^a	[9]
fluorescence	amine-capped SiQDs	5–500 nM	1 nM	tap water	This work

^aNot available.

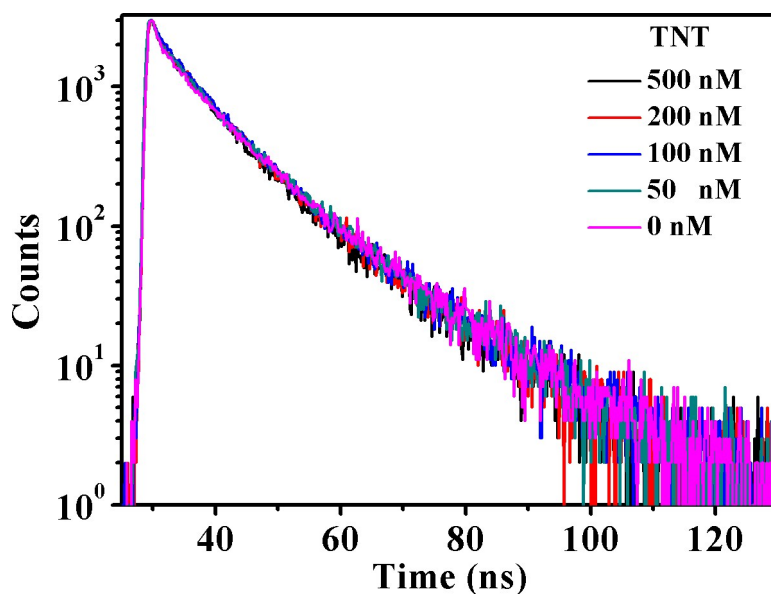


Fig. S3 The PL lifetimes of SiQDs with varying concentrations of TNT in solution

Reference

1. W. Qi, M. Xu, L. Pang, Z. Liu, W. Zhang, S. Majeed and G. Xu, *Chem.- Eur. J.*, 2014, **20**, 4829-4835.
2. S. S. R. Dasary, D. Senapati, A. K. Singh, Y. Anjaneyulu, H. Yu and P. C. Ray, *ACS Appl. Mater. Interfaces*, 2010, **2**, 3455-3460.
3. M. Goh and M. Pumera, *Anal. Bioanal. Chem.*, 2011, **399**, 127-131.
4. W.-S. Zou, J. Yang, T.-T. Yang, X. Hu and H.-Z. Lian, *J. Mater. Chem.*, 2012, **22**, 4720-4727.
5. R. Tu, B. Liu, Z. Wang, D. Gao, F. Wang, Q. Fang and Z. Zhang, *Anal. Chem.*, 2008, **80**, 3458-3465.
6. L. Fan, Y. Hu, X. Wang, L. Zhang, F. Li, D. Han, Z. Li, Q. Zhang, Z. Wang and L. Niu, *Talanta*, 2012, **101**, 192-197.
7. Y. Ma, S. Huang, M. Deng and L. Wang, *ACS Appl. Mater. Interfaces*, 2014, **6**, 7790-7796.
8. L. Feng, C. Tong, Y. He, B. Liu, C. Wang, J. Sha and C. Lü, *J. Lumin.*, 2014, **146**, 502-507.
9. X. Yang, J. Wang, D. Su, Q. Xia, f. chai, c. wang and F. Qu, *Dalton Trans.*, 2014, **43**, 10057-10063.