Supporting Information

Tetraphenylethene probe based fluorescent silica nanoparticles for the selective detection of nitroaromatic explosives

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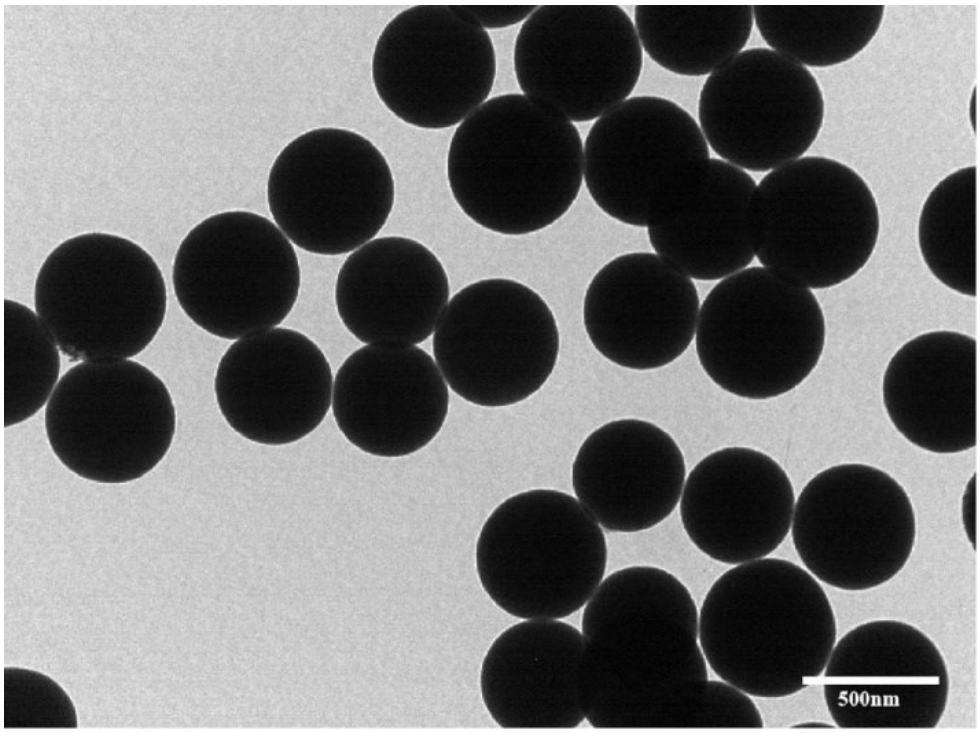

Fig. S1. TEM image of the prepared TPE-SiO_2 nanoparticles at 800 μM concentration of TPE-C2-2+ probe.

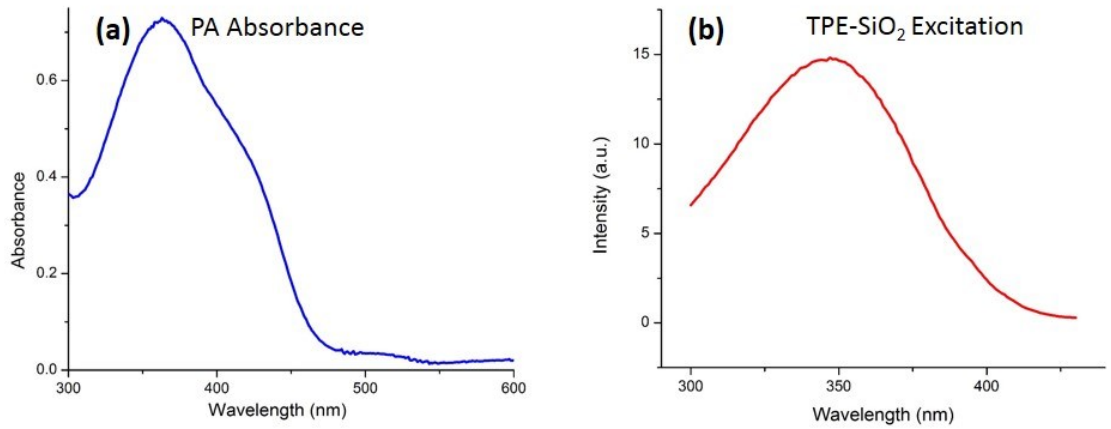

Fig. S2. (a) UV–vis light absorption spectrum of picric acid (PA). (b) Excitation spectrum of TPE-SiO_2 nanoparticles.

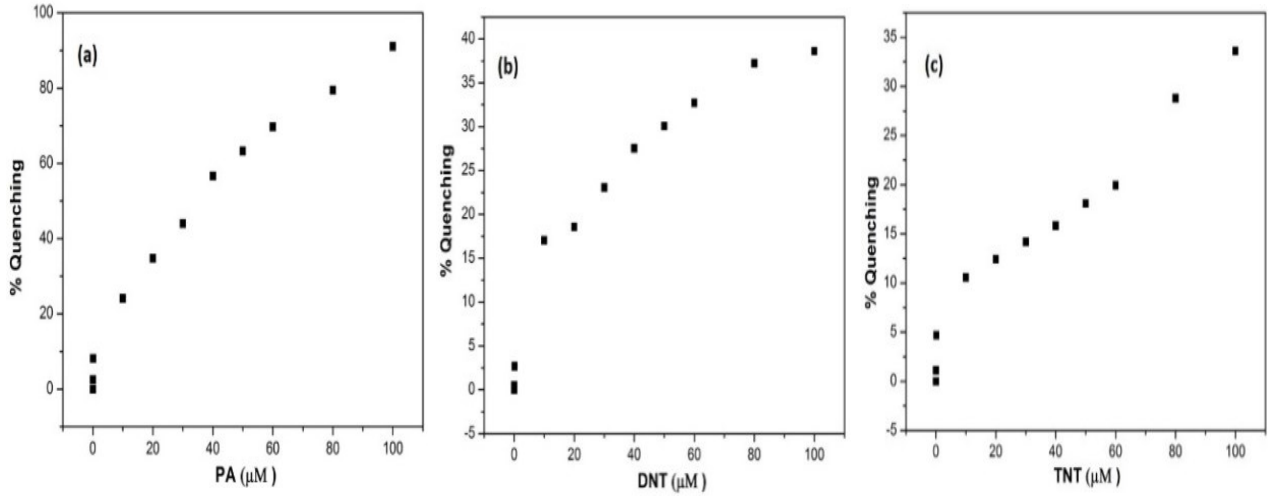

Fig. S3. Plots of % quenching of the TPE-SiO_2 fluorescent nanoparticles in the presence of different concentrations of the nitroaromatic explosives (a) PA, (b) DNT and (c) TNT.

Table S1. Comparison of the TPE-SiO_2 nanoparticles based fluorescence sensor and other reported fluorescent sensors for PA.

Materials	**Detection Limit**	**Linear range** (μM)	**Reference**
Fluorescent silica nanoparticles	1.01 ppm	_	1
Fluorescent AIE dots	32.1 nM	_	2
All inorganic Perovskite QDs	0.8nM	_	3
MoS_2 QDs	0.095 μM	0.099-36.5	4
Pyrene-based probe	99 nM	_	5
carbon dots	1 μM	_	6
graphene QDs	0.3 μM	1-60	7
COF	0.289 μM	0-5	8
COF	_	5-60	9

COF	-	0-64	10
Gold nanoparticles	79 nM	_	11
Copper (I) metallogel	50 μM	-	12
MOF	9.5 μM	9.3-467.7	13
MOF	-	0-50	14
MOFs	0.0682 μM 0.0694 μM	0-60	15
covalent-organic polymers	4.37 μM	_	16
conjugated polymer	_	_	17
conjugated polymers	0.5 μM 1 μM	0-220	18
conjugated polymer	0.11 μM	0-20	19
nonconjugated polymer	0.026 μM	0.05-70	20
small molecule	0.285 μM	0-2.75 0-1	21
TPE-SiO_2	0.01 μM	0.1-50 μM	This work

References

1. C. Miao, D. Li, Y. Zhang, J. Yu and R. Xu, *Microporous Mesoporous Materials*, 2014, **196**, 46-50.
2. C. Yan, W. Qin, Z. Li, Y. Zhou, Y. Cui and G. Liang, *Sensors Actuators B: Chemical*, 2020, **302**, 127201.
3. X. Chen, C. Sun, Y. Liu, L. Yu, K. Zhang, A. M. Asiri, H. M. Marwani, H.

Tan, Y. Ai and X. Wang, *Chemical Engineering Journal*, 2020, **379**, 122360.

4. Y. Wang and Y. Ni, *Analytical chemistry*, 2014, **86**, 7463-7470.

5. A. Kathiravan, A. Gowri, T. Khamrang, M. D. Kumar, N. Dhenadhayalan, K.-C. Lin, M. Velusamy and M. Jaccob, *Analytical chemistry*, 2019, **91**, 13244-13250.

6. Q. Niu, K. Gao, Z. Lin and W. Wu, *Analytical Methods*, 2013, **5**, 6228-6233.

7. L. Lin, M. Rong, S. Lu, X. Song, Y. Zhong, J. Yan, Y. Wang and X. Chen, *Nanoscale*, 2015, **7**, 1872-1878.

8. P. Das and S. K. Mandal, *Journal of Materials Chemistry A*, 2018, **6**, 16246-16256.

9. G. Das, B. P. Biswal, S. Kandambeth, V. Venkatesh, G. Kaur, M. Addicoat, T. Heine, S. Verma and R. Banerjee, *Chemical Science*, 2015, **6**, 3931-3939.

10. G. Lin, H. Ding, D. Yuan, B. Wang and C. Wang, *Journal of the American Chemical Society*, 2016, **138**, 3302-3305.

11. S. Kaja, D. P. Damera and A. Nag, *Analytica Chimica Acta*, 2020, **1129**, 12-23.

12. S. Sarkar, S. Dutta, S. Chakrabarti, P. Bairi and T. Pal, *ACS applied materials and interfaces*, 2014, **6**, 6308-6316.

13. F. Zhang, Y. Wang, T. Chu, Z. Wang, W. Li and Y. Yang, *Analyst*, 2016, **141**, 4502-4510.

14. S. S. Nagarkar, A. V. Desai and S. K. Ghosh, *Chemical Communications*, 2014, **50**, 8915-8918.

15. B. Wang, X.-L. Lv, D. Feng, L.-H. Xie, J. Zhang, M. Li, Y. Xie, J.-R. Li and

H.-C. Zhou, *Journal of the American Chemical Society*, 2016, **138**, 6204-6216.

16. N. Sang, C. Zhan and D. Cao, *Journal of Materials Chemistry A*, 2015, **3**, 92-96.

17. J. Liu, Y. Zhong, J. W. Lam, P. Lu, Y. Hong, Y. Yu, Y. Yue, M. Faisal, H. H. Sung and I. D. J. M. Williams, *Macromolecules*, 2010, **43**, 4921-4936.

18. W. Yuan, W. Chi, R. Liu, H. Li, Y. Li and B. Z. Tang, *Macromolecular Rapid Communications*, 2017, **38**, 1600745.

19. A. S. Tanwar, S. Patidar, S. Ahirwar, S. Dehingia and P. K. Iyer, *Analyst*, 2019, **144**, 669-676.

20. S. G. Liu, D. Luo, N. Li, W. Zhang, J. L. Lei, N. B. Li and H. Q. Luo, *ACS applied materials and interfaces*, 2016, **8**, 21700-21709.

21. A. Ding, L. Yang, Y. Zhang, G. Zhang, L. Kong, X. Zhang, Y. Tian, X. Tao and J. Yang, *Chemistry–A European Journal*, 2014, **20**, 12215-12222.