Electronic Supporting Information

A water-stable Tb(III)-based metal-organic gel (MOG) for detection of antibiotics and explosives

Zheng-Sheng Qin,‡[a] Wen-Wen Dong,‡[a] Jun Zhao,*[a] Ya-Pan Wu,[a] Qichun Zhang*[b,c] and Dong-Sheng Li*[a]

[a]*College of Materials and Chemical Engineering, Key Laboratory of Inorganic Nonmetallic Crystalline and Energy Conversion Materials, Hubei Provincial Collaborative Innovation Center for New Energy Microgrid, China Three Gorges University, Yichang 443002, P. R. China.*

E-mail:junzhao08@126.com; lidongsheng1@126.com

[b]*School of Materials Science and Engineering, Nanyang Technological University, Singapore, 639798, Singapore*
E-mail: qczhang@ntu.edu.sg

[c]*Division of Chemistry and Biological Chemistry, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore, 637371, Singapore*

‡*These authors contributed equally to this work.*

Table of Contents

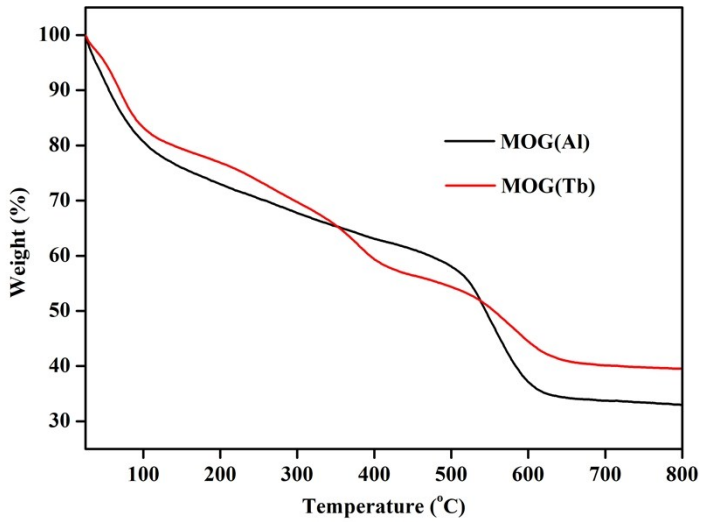

Fig. S1 TG analysis of MOG(Al) xerogel and MOG(Tb) xerogel.

Table S1. ICP measurement results of contents of Al^{3+} and Tb^{3+} ions in MOG(Al) xerogel and MOG(Tb) xerogel.

Element	MOG(Al)	MOG(Tb)		
		3 days	7 days	15 days
Al (mmol/g)	4.95	4.11	3.21	2.54
Tb (mmol/g)	0	0.82	1.71	2.4

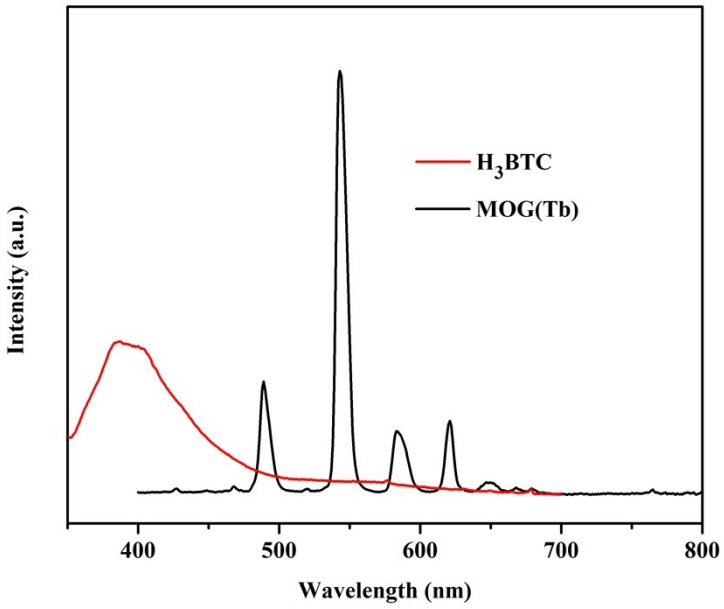

Fig. S2 Emission spectra of H_3btc ligand and MOG(Tb) xerogel.

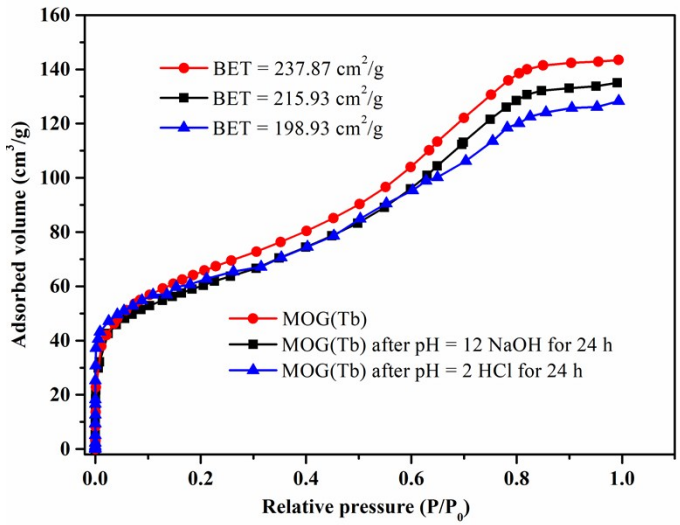

Fig. S3 N_2 adsorption isotherms of MOG(Tb) xerogel and MOG(Tb) xerogel after treatment with pH = 2/12 aqueous solution.

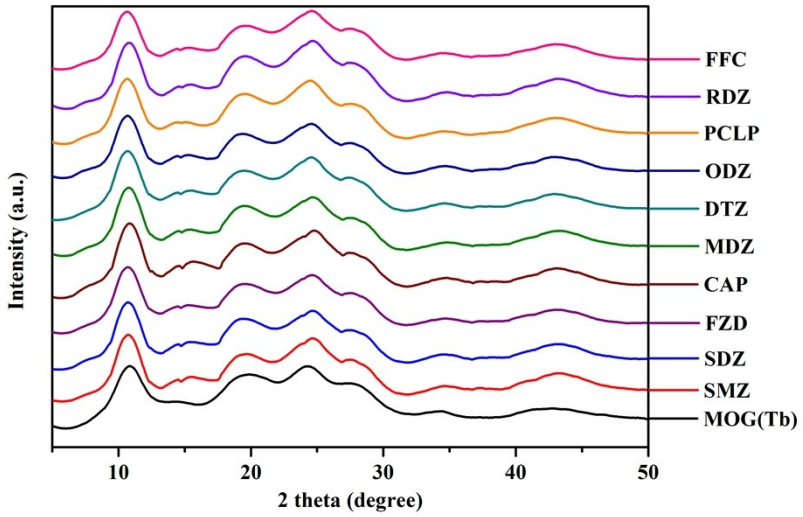

Fig. S4 PXRD patterns of MOG(Tb) xerogel after the detection of antibiotics.

Table S2. Summary of Standard deviation, quenching constants (K_{sv}), and detection limit of MOG(Tb) xerogel towards SDZ, SMZ, 2,6-DNT and 2,4-DNT.

	Standard deviation (S_b)	**K_{sv} (M^{-1})**	**Detection limit (ppm)**
SDZ	0.0119	4.1×10^4	0.218
SMZ	0.0082	8.0×10^4	0.086
2,6-DNT	0.0118	4.1×10^3	1.589
2,4-DNT	0.0283	1.4×10^4	1.115

Table S3. Summary of quenching constants (K_{sv}) of related materials for SDZ, SMZ, 2,6-DNT and 2,4-DNT.

Samples	Analytes	K_{sv} (M^{-1})	Refs
BUT-12	SDZ	5.0×10^3	1
BUT-13	SDZ	2.2×10^3	1
MOG(Tb)	SDZ	4.1×10^4	This work
BUT-12	SMZ	7.4×10^3	1
BUT-13	SMZ	8.1×10^3	1
MOG(Tb)	SMZ	8.0×10^4	This work
BUT-12	2,6-DNT	1.1×10^4	1
BUT-13	2,6-DNT	1.7×10^4	1
MOG(Tb)	2,6-DNT	4.1×10^3	This work
BUT-12	2,4-DNT	1.5×10^4	1
BUT-13	2,4-DNT	2.9×10^4	1
Tb@1'	2,4-DNT	3.5×10^4	2
Dehydrated 1	2,4-DNT	5.0×10^4	3
JUC-135	2,4-DNT	3.3×10^3	4
7a	2,4-DNT	1.6×10^3	5
7b	2,4-DNT	0.4×10^3	5
7c	2,4-DNT	0.2×10^3	5
1b	2,4-DNT	1.6×10^3	6
MOG(Tb)	2,4-DNT	1.4×10^4	This work

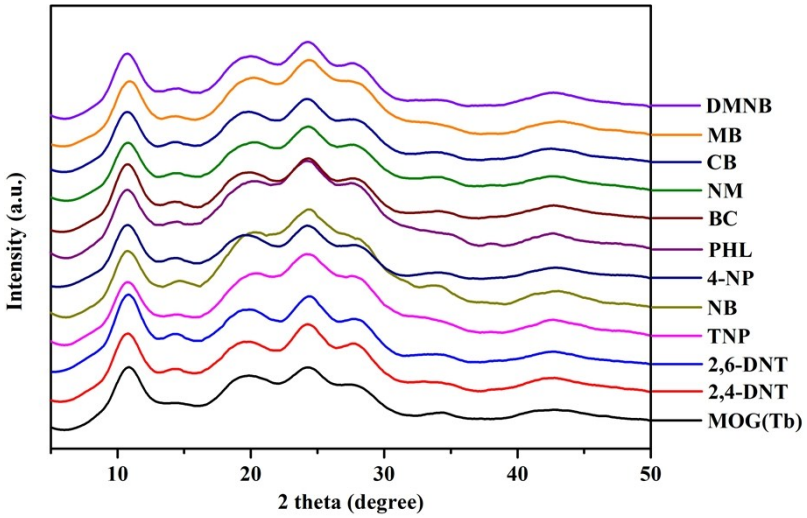

Fig. S5 PXRD of MOG(Tb) xerogel after the detection of selected nitroaromatics and non-nitroaromatics.

Table S4. ICP measurement results of contents of Al^{3+} and Tb^{3+} ions in MOG(Tb) xerogel after six cycles.

Sample	MOG(Al)	MOG(Tb)	
		7 days	after six cycles
Content of Al (mmol/g)	4.95	3.21	3.02
Content of Tb (mmol/g)	0	1.71	1.83

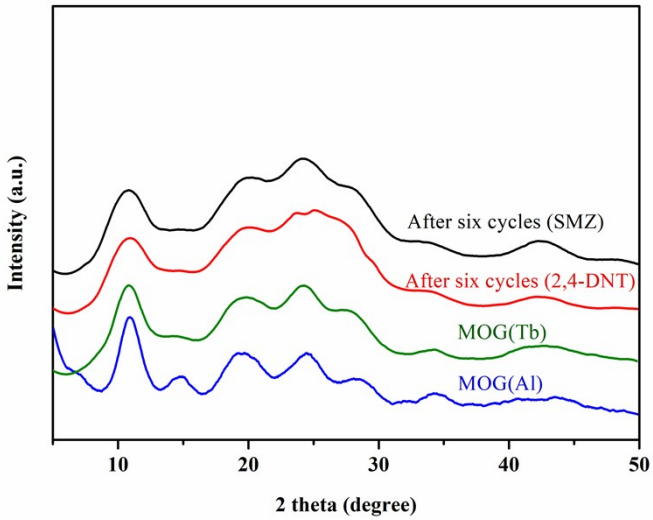

Fig. S6 PXRD patterns of MOG(Tb) xerogel after the six cycles.

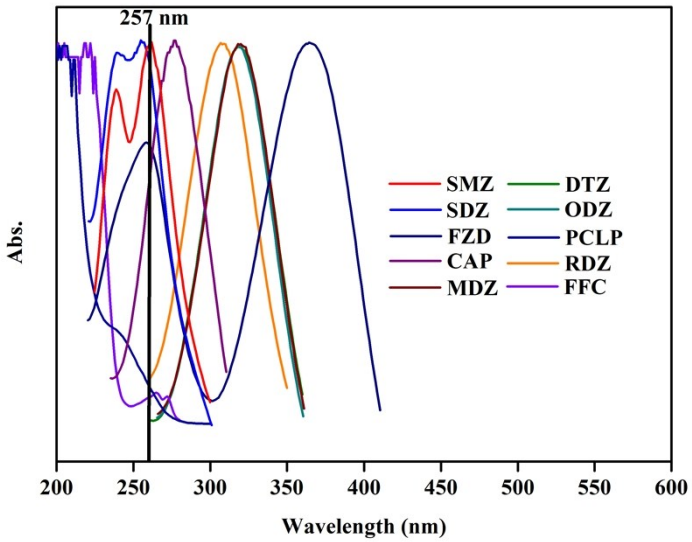

Fig. S7 Liquid UV-Vis absorption of antibiotics.

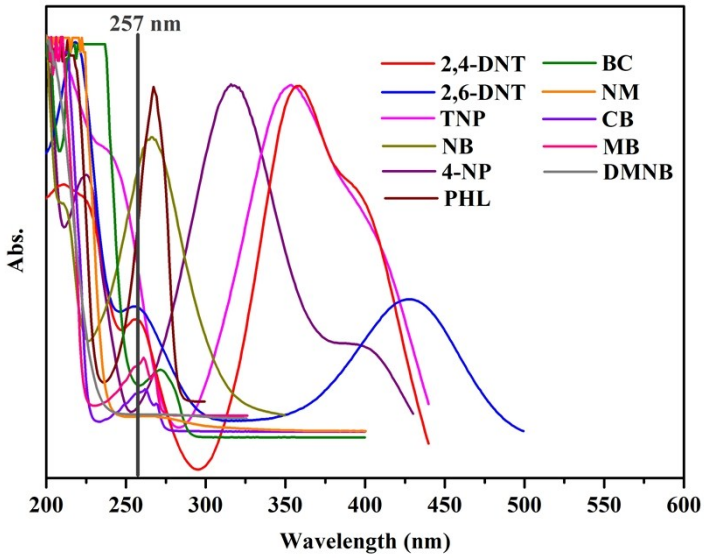

Fig. S8 Liquid UV-Vis absorption of selected nitroaromatics and non-nitroaromatics.

References

1 B. Wang, X. L. Lv, D. W. Feng, L. H. Xie, J. Zhang, M. Li, Y. B. Xie, J. R. Li and H. C. Zhou, *J. Am. Chem. Soc.*, 2016, **138**, 6204-6216.

2 T. T. Cheng, J. S. Hu, C. H. Zhou, Y. M. Wang and M. D. Zhang, *Sci. China Chem.*, 2016, **59**, 929-947.

3 D. K. Singha, P. Majee, S. K. Mondal and P. Mahata, *Eur. J. Chem.*, 2015, 1390-1397.

4 H. M. He, Y. Song, F. X. Sun, Z. Bian, L. X. Gao and G. S. Zhu, *J. Mater. Chem. A*, 2015, **3**, 16598-16603.

5 E. V. Verbitskiy, E. B. Gorbunov, A. A. Baranova, K. I. Lugovik, K. O. Khokhlov, E. M. Cheprakova, G. A. Kim, G. L. Rusinov, O. N. Chupakhin and V. N. Charushin, *Tetrahedron*, 2016, **72**, 4954-4961.

6 X. H. Zhou, L. Li, H. H. Li, A. Li, T. Yang and W. Huang, *Dalton Trans.*, 2013, **42**, 12403-12409.