Supporting Information

A terbium metal–organic framework with stable luminescent emission in wide pH range that acts as a quantitative detection material for nitroaromatics

Jinzeng Wang,[a] Wei Sun,[a] Siyuan Chang,[a] Houting Liu,[a] Guonan Zhang,[a] Yanqin Wang,[a] Zhiliang Liu*[a,b]

College of Chemistry and Chemical Engineering, Key Lab of Nanoscience and Nanotechnology, Inner Mongolia University, Hohhot, 010021, P. R. China *Corresponding author. Fax: +86-471-4992147 Tel: +86-471-4995414

E-mail addresses: cezlliu@imu.edu.cn (Z. L. Liu)

1. **Crystal data collections, structure refinements, bond lengths [Å] and angles [°] for Tb-MOF**

Table S1.   Crystal data and structure refinement for Tb-MOF

Compound	Tb-MOF
Formula	$C_{20}H_{18}N_2O_{12}Tb$
Formula weight	637.28
Crystal system	Trigonal
Space group	R-3
a (Å)	29.4783(15)
b (Å)	29.4783(15)
c (Å)	14.1301(8)
V (Å3)	10633.6(9)
Z	18
ρcalc (mg·mm–3)	1.791
F(000)	5634
μ(mm^{-1})	15.320
T(K)	293
Θ range	3.00-67.23

Reflections collected /unique	21999 / 4235 [R(int) = 0.0725]		
Final R indices [I>2σ]	0.0399		
Final wR indices (F^2) [I>2σ]	0.0841		
Goodness of fit	1.025		
Max/min Δρ(e Å-3)	1.054 and -0.813		

Table S2. Selected bond lengths [Å] and angles [°] for Tb-MOF

Tb(1)-O(6)	2.271(4)	Tb(1)-O(1)	2.425(4)
Tb(1)-O(7)G	2.305(4)	Tb(1)-O(2)	2.481(4)
Tb(1)-O(4)	2.306(4)	Tb(1)-O(10)	2.506(4)
Tb(1)-O(5)G	2.388(4)		
Tb(1)-O(9)	2.421(4)		
O(6)-Tb(1)-O(7)G	151.95(15)	O(9)-Tb(1)-O(1)	129.46(13)
O(6)-Tb(1)-O(4)	95.35(14)	O(6)-Tb(1)-O(2)	77.69(14)
O(7)G-Tb(1)-O(4)	83.14(15)	O(7)G-Tb(1)-O(2)	127.07(13)
O(6)-Tb(1)-O(5)G	76.53(15)	O(4)-Tb(1)-O(2)	70.84(14)
O(7)G-Tb(1)-O(5)G	119.86(14)	O(5)G-Tb(1)-O(2)	73.55(14)
O(4)-Tb(1)-O(5)G	144.39(15)	O(9)-Tb(1)-O(2)	144.86(14)
O(6)-Tb(1)-O(9)	83.63(15)	O(1)-Tb(1)-O(2)	52.91(12)
O(7)G-Tb(1)-O(9)	80.38(15)	O(6)-Tb(1)-O(10)	77.10(15)
O(4)-Tb(1)-O(9)	141.10(14)	O(7)G-Tb(1)-O(10)	76.25(15)
O(5)G-Tb(1)-O(9)	73.29(15)	O(4)-Tb(1)-O(10)	68.98(13)
O(6)-Tb(1)-O(1)	129.23(14)	O(5)G-Tb(1)-O(10)	138.91(14)
O(7)G-Tb(1)-O(1)	78.30(13)	O(9)-Tb(1)-O(10)	72.95(13)
O(4)-Tb(1)-O(1)	80.31(13)	O(1)-Tb(1)-O(10)	141.93(13)
O(5)G-Tb(1)-O(1)	78.74(13)	O(2)-Tb(1)-O(10)	129.62(13)

G: 2/3−x+y, 4/3−x, 1/3+z.

2. The contrast PXRD and luminescence emission spectra of as made and
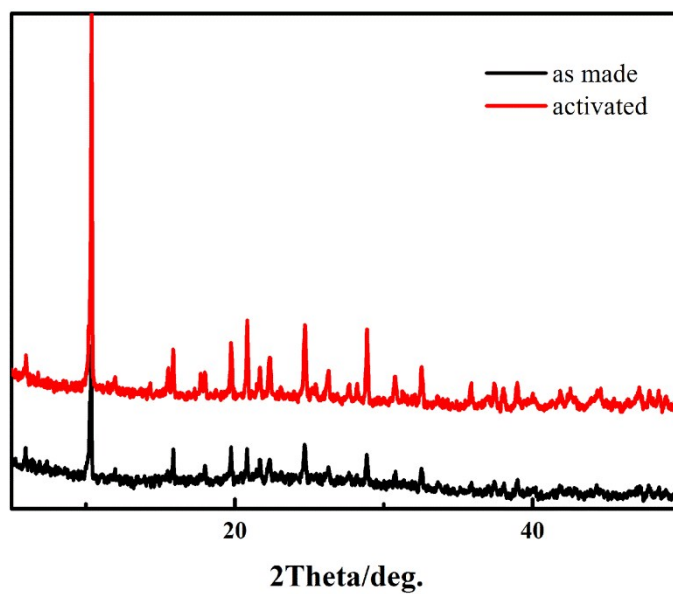
activated samples.

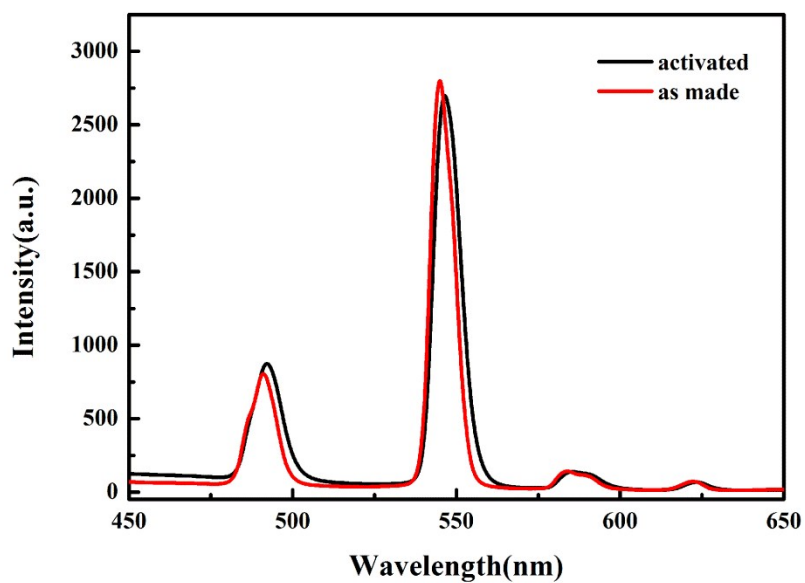**Fig. S1 PXRD of as made samples and activated samples**

Fig. S2 the luminescence emission spectra of as made and activated samples

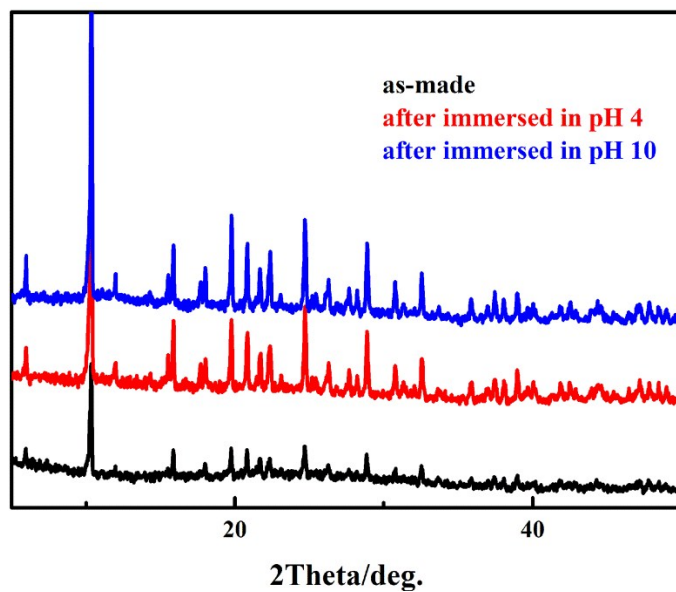**3. The PXRD of samples immersed in different pH**

Fig. S3 The PXRD of samples immersed in different pH

4. The Concentration dependent luminescence for the Tb-MOF dispersed in m-DNB
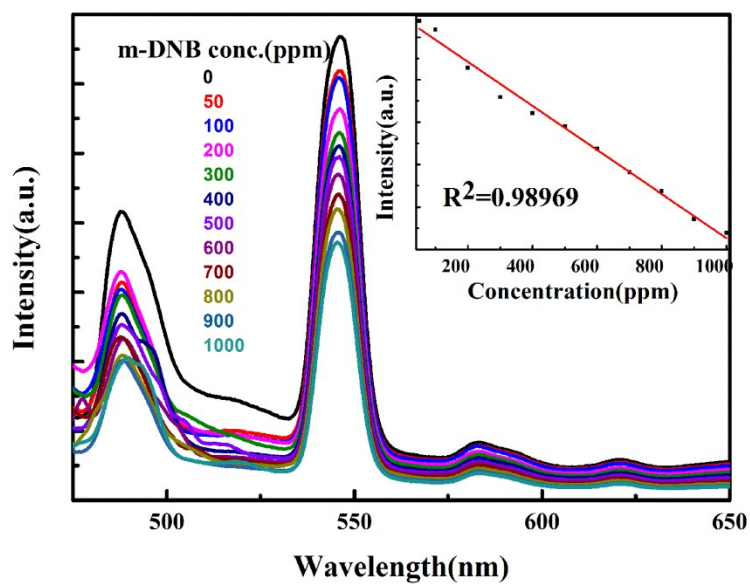

Fig. S4 Concentration dependent luminescence for the Tb-MOF dispersed in dinitrobenzene (m-DNB)
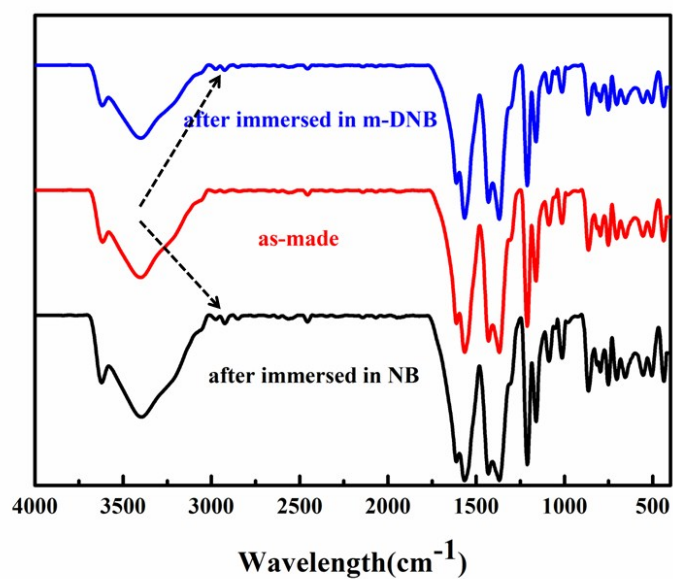
5. The IR spectra

Fig. S5 Infrared spectra of the as-made sample of Tb-MOF (red), Tb-MOF after immersed in m-DNB (blue), Tb-MOF after immersed in NB.
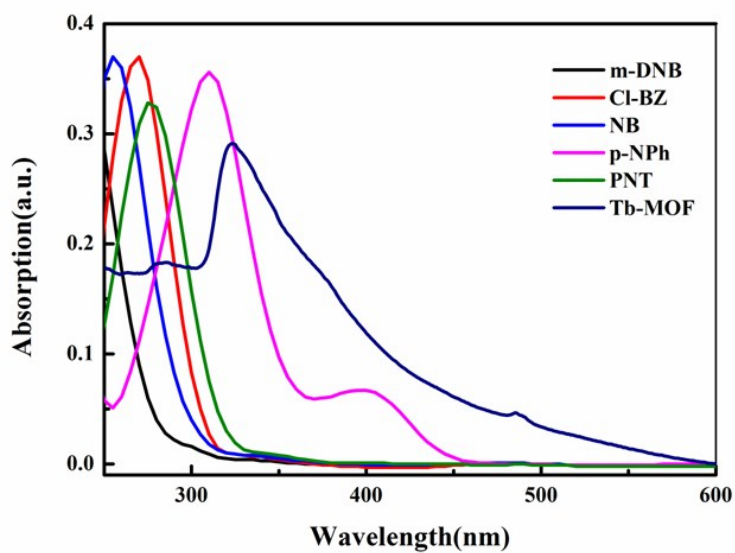
6. The UV-vis spectra of analytes in ethanol

Fig. S6 The UV-vis spectra of analytes in ethanol