Supplementary Information for

Rapid synthesis of nanoscale terbium-based metal-organic frameworks by an ultrasound-vapour phase diffusion combined method for highly selective sensing of picric acid

Juan-Ding Xiao, Ling-Guang Qiu, Fei Ke, Geng-Sheng Xu, Yi-Ming Wang* and *Xia Jiang*

* E-mail address: lgqiu@ahu.edu.cn

Table S1

Yields of Tb(1,3,5-BTC) crystals prepared by ultrasonic synthesis and ultrasonic-vapour phase diffusion methods

Synthetic methods	Reation time	Temperature (°C)	Yields(based on Tb)	Product
Ultrasound diffusion	2 min	60	65.7%	$[Tb(1,3,5\text{-btc})]_n$
	10 min	60	63.5%	$[Tb(1,3,5\text{-btc})]_n$
	20 min	60	64.0%	$[Tb(1,3,5\text{-btc})]_n$
	30 min	60	59.1%	$[Tb(1,3,5\text{-btc})]_n$
ultrasound	30 min	60	0.6%	$[Tb(1,3,5\text{-btc})]_n$
	60 min	60	1.7%	$[Tb(1,3,5\text{-btc})]_n$
	90 min	60	7.2%	$[Tb(1,3,5\text{-btc})]_n$
	140 min	60	14.2%	$[Tb(1,3,5\text{-btc})]_n$ and $[Tb(1,3,5\text{-btc})(H_2O)_6]_n$

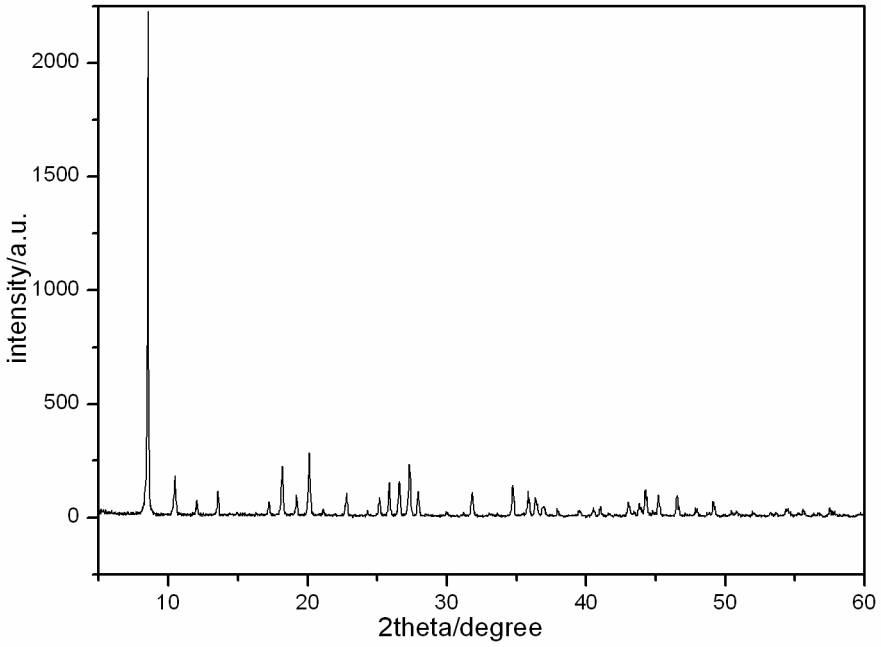


Fig. S1 PXRD patterns of the as-synthesized Tb(1,3,5-btc) by conventional sovolthermal heating method at 80 °C for 24h.

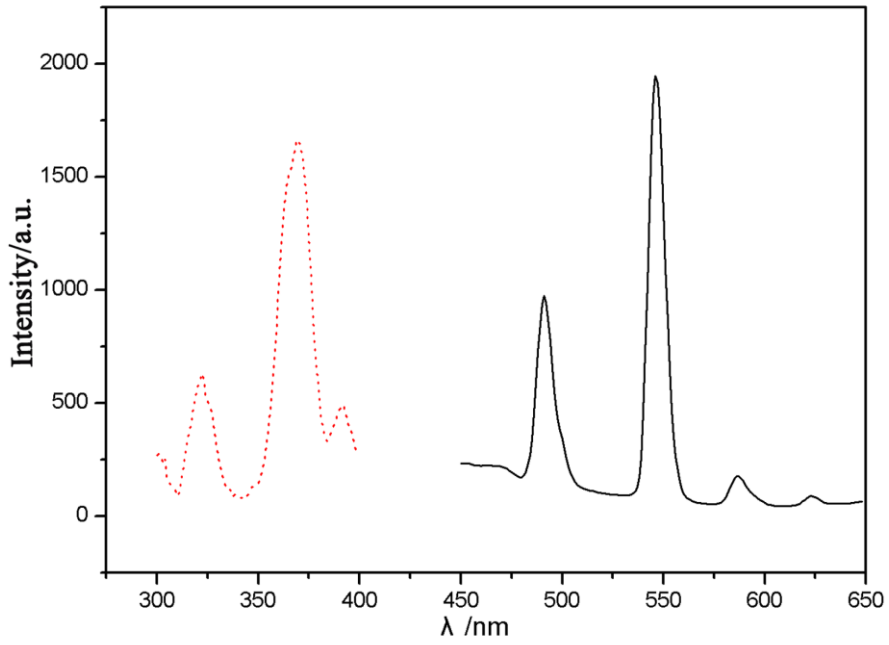


Fig. S2 Emission and excitation spectra of solid state [Tb(1,3,5-BTC)]n. The excitation wavelength is 324 nm and the emission wavelengths are 491, 546, and 589 nm.

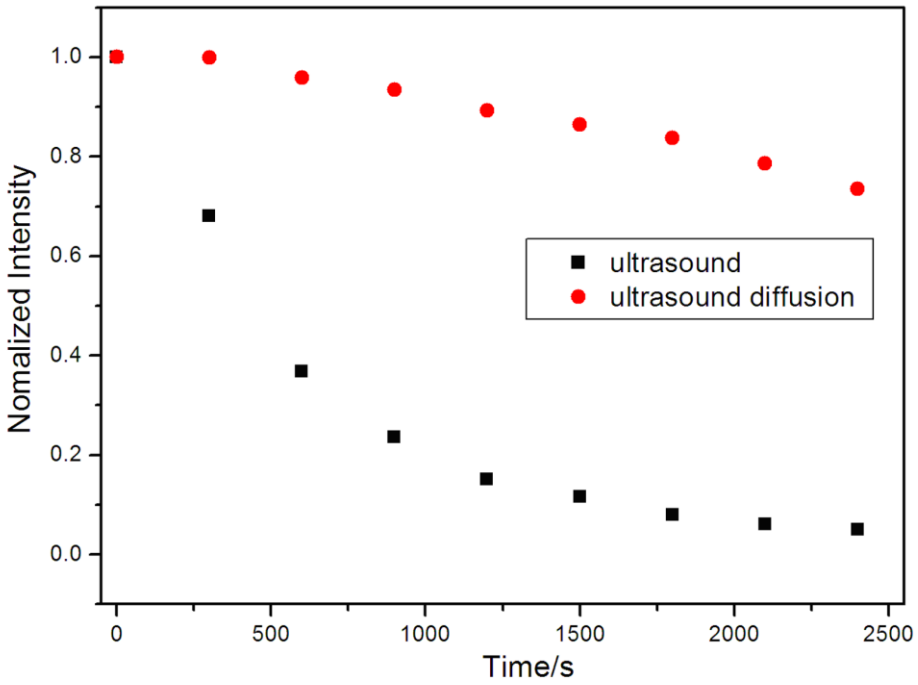
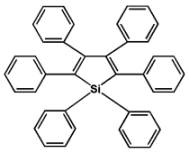
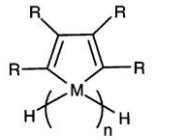
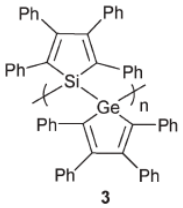
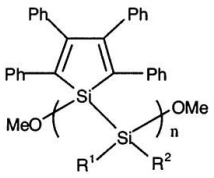
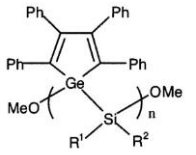


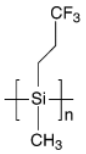
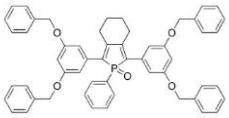
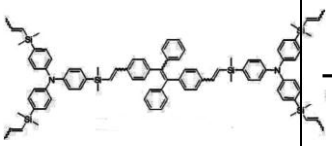
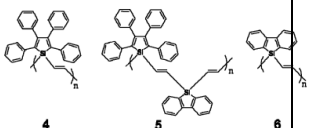
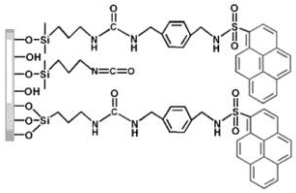
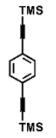
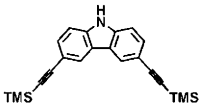
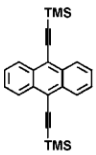
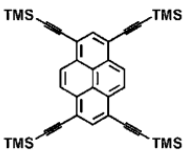
Fig. S3 Variation of luminescence intensity of suspension of the as-prepared [Tb(1,3,5-btc)]n nano- and microcrystals in ethanol solution with the standing time, clearly revealing better luminescence stability of [Tb(1,3,5-btc)]n nanocrystal suspension in solution. The excitation wavelength is 324 nm.

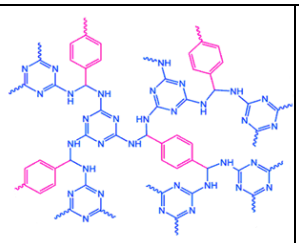
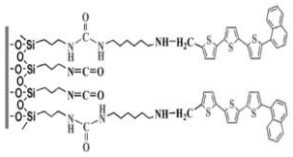
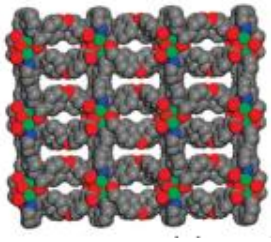
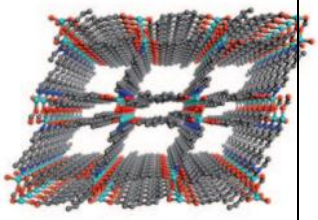
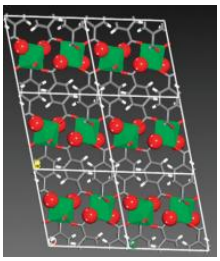
Table S2

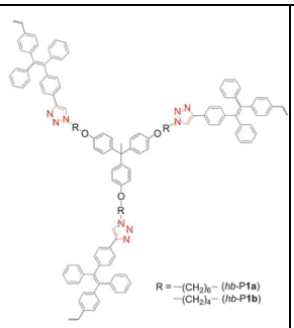
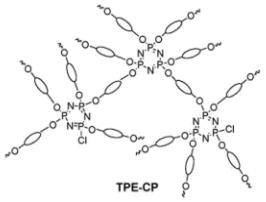
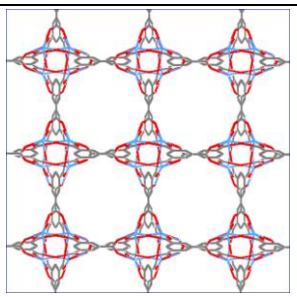
Summary of the selectivity of different sensor systems with picric acid reported previously and investigated in the present work.

"√"— sensitive; "×"— insensitive; "—" —not detected

Fluorophores	structures	NB	2-NT	4-NT	2,4-DNT	2,6-DNT	PA	Ref.
Hexaphenylsilole film		×	×	×	×	×	√	[1]
Organic conjugated polymers 1-12	 **1**; M = Si **2**; M = Ge	√	—	—	√	√	√	[47]
		×	—	—	√	√	√	
	 **3**	√	—	—	√	√	√	
	 **4**; R^1 = H, R^2 = Me **5**; R^1 = H, R^2 = Ph **6**; R^1 = H, R^2 = Me or Ph **7**; R^1 = Ph, R^2 = Ph **8**; R^1 = H, R^2 = H	√	—	—	√	√	√	
		√	—	—	√	√	√	
		√	—	—	√	√	√	
		√	—	—	√	√	√	
		√	—	—	√	√	√	
	 **9**; R^1 = H, R^2 = Me **10**; R^1 = H, R^2 = Ph **11**; R^1 = H, R^2 = Me or Ph **12**; R^1 = Ph, R^2 = Ph	√	—	—	√	√	√	
		√	—	—	√	√	√	
		√	—	—	√	√	√	
		√	—	—	√	√	√	

Fluoroalkylated polysilane Film		—	—	—	√	√	√	[46]
Phosphole oxide		—	—	—	√	—	√	[48]
Poly(silylene-vinylene)		—	—	—	—	—	√	[49]
Organic conjugated olymers		—	—	—	√	—	√	[51]
Pyrene moieties		√	—	—	√	—	√	[52]
Organic fluorophores **1**-**5**		√	—	√	—	—	√	[53]
		×	—	√	—	—	√	
		√	—	√	—	—	√	
		√	—	√	—	—	√	
		√	—	×	—	—	√	

SNW-1 nanoparticles		√	—	√	√	—	√	[54]
Terthiophene		×	—	—	×	—	√	[55]
An anthracene /porphyrin dimer	———	—	—	—	—	—	√	[57]
$[Zn_2(oba)_2(bpy)]$		√	√	—	×	—	—	[58]
$[Zn_2(bpdc)_2(bpee)]$		×	—	—	√	—	—	[59]
$[Eu_2(BDC)_3(H_2O)\cdot(H_2O)_2]$		√	—	√	—	—	—	[60]
$[Zn_4O(L)_2\cdot(H_2O)_3]$		√	√	—	√	√	√	[61]

Hyperbranched polytriazoles		—	—	—	—	—	√	[62]
Tetrakis(4-methoxylphenyl) porphyrin (TMOPP) film	———	—	—	—	√	—	×	[63]
TPE-CP		—	—	—	—	—	√	[64]
$[Tb(1,3,5\text{-}BTC)]_n$		×	×	×	×	×	√	this work

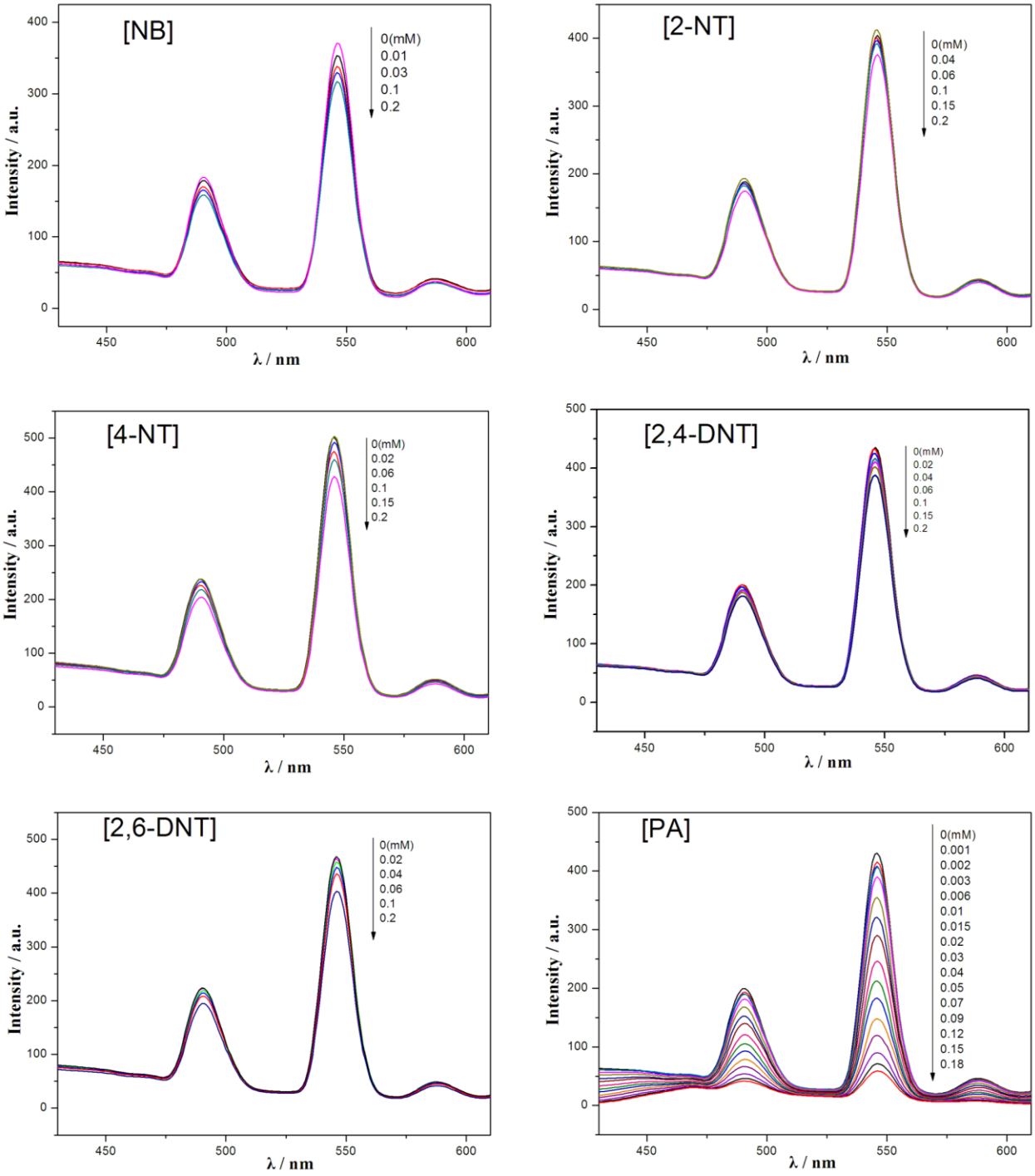


Fig. S4 Luminescence quenching of $[Tb(1,3,5\text{-}BTC)]_n$ nanocrystals with nitroaromatics (NB, NTs, DNTs, and PA) in aqueous solution.

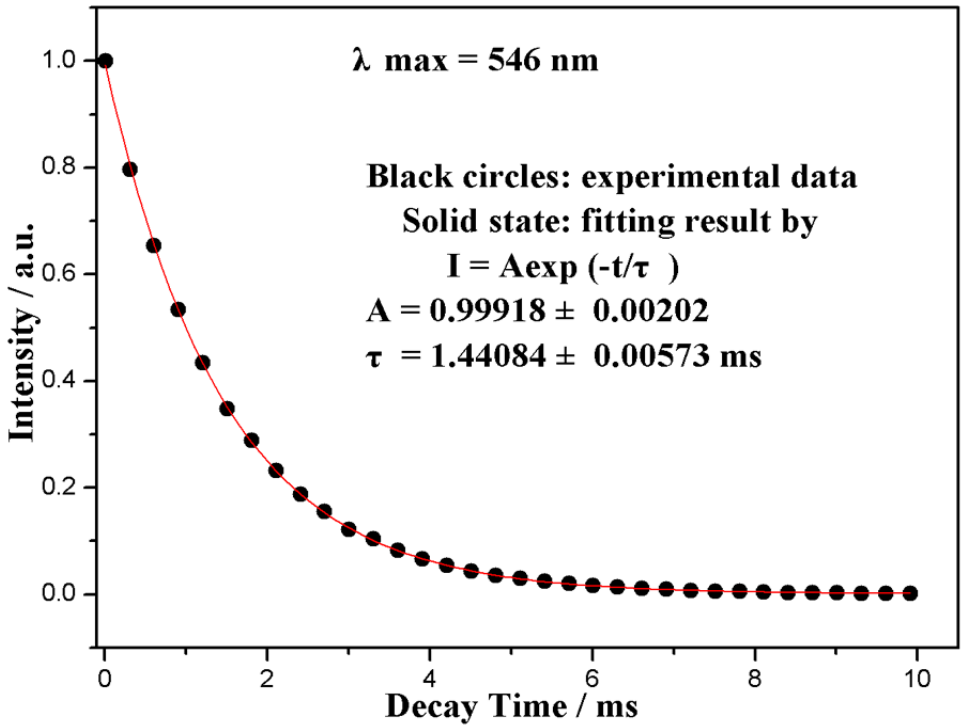


Fig. S5 The decay curves for the luminescence of $[Tb(1,3,5\text{-}BTC)]_n$ nanocrystals.