

*Electronic Supplementary Information for*

**Highly sensitive detection for nitrobenzene of a series of fluorescent  
2D zinc(II) organic frameworks with a flexible triangular ligand**

Xue Yang, Yixia Ren\*, Hongmei Chai, Xiufang Hou\*, Zhixiang Wang, Jijiang Wang

*College of Chemistry and Chemical Engineering, Laboratory of New Energy and New Function Materials,  
Shaanxi Key Laboratory of Chemical Reaction Engineering, Yan'an University, Yan'an 716000, P. R. China.*

*E-mail: [renyixia1@163.com](mailto:renyixia1@163.com)*

**RSC adv.**

**Table S1 Selected bond lengths (Å) and bond angles (°) for 1**

Bond	Dist.	Bond	Dist.
Zn(1)-O(7)	1.920(2)	Zn(1)-N(1)	2.046(2)
Zn(1)-O(4)#1	1.9470(19)	Zn(1)-N(2)	2.054(2)
Angle	(°)	Angle	(°)
O(7)-Zn(1)-O(4)#1	121.45(10)	O(4)#1-Zn(1)-N(1)	99.22(8)
O(7)-Zn(1)-N(1)	123.44(9)	O(4)#1-Zn(1)-N(2)	105.90(9)
O(7)-Zn(1)-N(2)	102.71(10)	N(1)-Zn(1)-N(2)	101.49(9)

(symmetrical codes: #1 -x+2,-y+1,-z #2 -x,-y+1,-z #3 -x+1,-y,-z+1 )

**Table S2 Selected bond lengths (Å) and bond angles (°) for 2**

Bond	Dist.	Bond	Dist.
Zn(1)-O(8)	1.8923(19)	Zn(2)-O(8)	1.8848(19)
Zn(1)-O(7)#1	1.9662(16)	Zn(2)-O(1)	1.9517(18)
Zn(1)-O(4)#2	1.9786(16)	Zn(2)-N(5)	2.000(2)
Zn(1)-N(4)#3	2.005(2)	Zn(2)-N(1)	2.0067(19)
Angle	(°)	Angle	(°)
O(8)-Zn(1)-O(7)#1	107.99(7)	O(8)-Zn(2)-O(1)	113.63(8)
O(8)-Zn(1)-O(4)#2	115.54(8)	O(8)-Zn(2)-N(5)	118.07(9)
O(7)#1-Zn(1)-O(4)#2	104.64(7)	O(1)-Zn(2)-N(5)	103.62(8)
O(8)-Zn(1)-N(4)#3	120.84(10)	O(8)-Zn(2)-N(1)	111.20(9)
O(7)#1-Zn(1)-N(4)#3	101.55(8)	O(1)-Zn(2)-N(1)	98.28(8)
O(4)#2-Zn(1)-N(4)#3	104.35(8)	N(5)-Zn(2)-N(1)	110.05(9)

(symmetrical codes: #1 -x-1,-y,-z+1 #2 -x,-y,-z+1 #3 -x+1,-y-1,-z #4 -x+1,-y,-z+1 )

**Table S3 Selected bond lengths (Å) and bond angles (°) for 3**

Bond	Dist.	Bond	Dist.
Zn(1)-O(8)	1.925(2)	Zn(2)-O(8)	1.938(2)
Zn(1)-O(1)	1.9358(19)	Zn(2)-O(4)#1	2.0066(19)
Zn(1)-O(3)#1	1.9841(19)	Zn(2)-O(6)#3	2.022(2)
Zn(1)-N(4)#2	2.004(2)	Zn(2)-N(1)	2.024(2)
Angle	(°)	Angle	(°)
O(8)-Zn(1)-O(1)	110.50(9)	O(8)-Zn(2)-O(4)#1	103.91(8)
O(8)-Zn(1)-O(3)#1	106.96(8)	O(8)-Zn(2)-O(6)#3	101.91(9)
O(1)-Zn(1)-O(3)#1	103.85(9)	O(4)#1-Zn(2)-O(6)#3	117.11(9)
O(8)-Zn(1)-N(4)#2	116.51(9)	O(8)-Zn(2)-N(1)	115.08(9)
O(1)-Zn(1)-N(4)#2	119.59(9)	O(4)#1-Zn(2)-N(1)	103.37(9)
O(3)#1-Zn(1)-N(4)#2	96.68(9)	O(6)#3-Zn(2)-N(1)	115.37(9)

(symmetrical codes: #1 -x+1/2,y+1/2,-z+1/2 #2 x-1,y+1,z #3 -x,-y+2,-z

#4 -x+1/2,y-1/2,-z+1/2 #5 x+1,y-1,z )

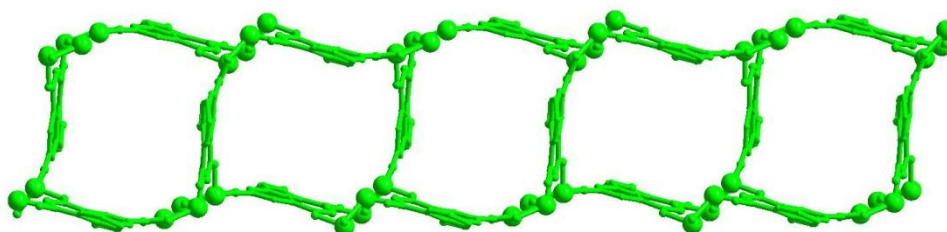
**Table S4 Selected bond lengths (Å) and bond angles (°) for 4**

Bond	Dist.	Bond	Dist.
Zn(1)-O(1)#1	1.938(2)	Zn(1)-N(1)	1.986(3)
Zn(1)-O(7)	1.962(3)	Zn(1)-N(4)#2	2.029(3)
Angle	(°)	Angle	(°)
O(1)#1-Zn(1)-O(7)	104.90(12)	O(1)#1-Zn(1)-N(4)#2	111.17(12)
O(1)#1-Zn(1)-N(1)	117.75(13)	O(7)-Zn(1)-N(4)#2	96.88(12)
O(7)-Zn(1)-N(1)	120.06(13)	N(1)-Zn(1)-N(4)#2	104.03(13)

(symmetrical codes: #1 x,y+1,z #2 x+1,y+1,z+1 #3 x,y-1,z #4 x-1,y-1,z-1 )

**Table S5** The repeated test for luminescence emission intensities of 1-4 and the test errors.

Complex	1		2		3		4	
	intensity	error	intensity	error	intensity	error	intensity	error
Test 1	3539	2.27%	4648	0.12%	4583	2.89%	4206	-1.04%
Test 2	3427	-0.96%	4587	-1.19%	4308	-3.29%	4203	-1.13%
Test 3	3415	-1.31%	4692	1.07%	4472	0.39%	4344	2.19%
Mean	3460		4642		4454		4251	

**Fig. S1** 1D ladder-like chain in 3

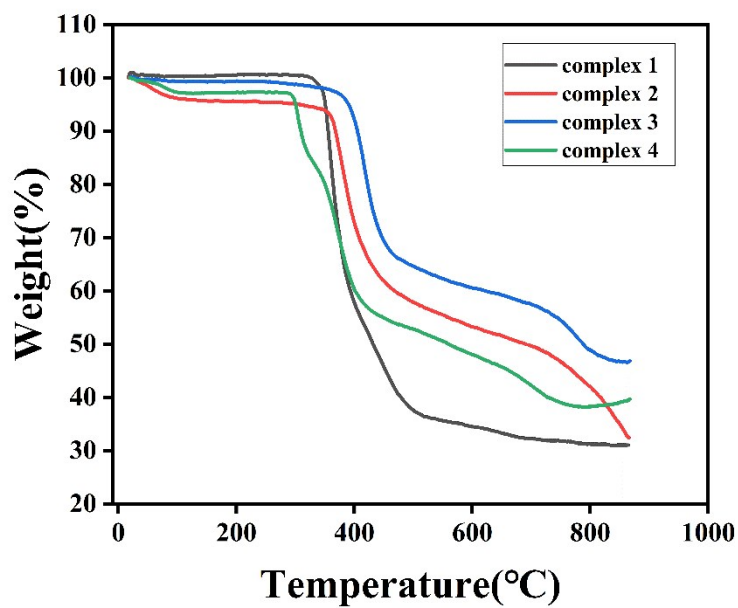


Fig. S2 TG curves of complexes 1-4.

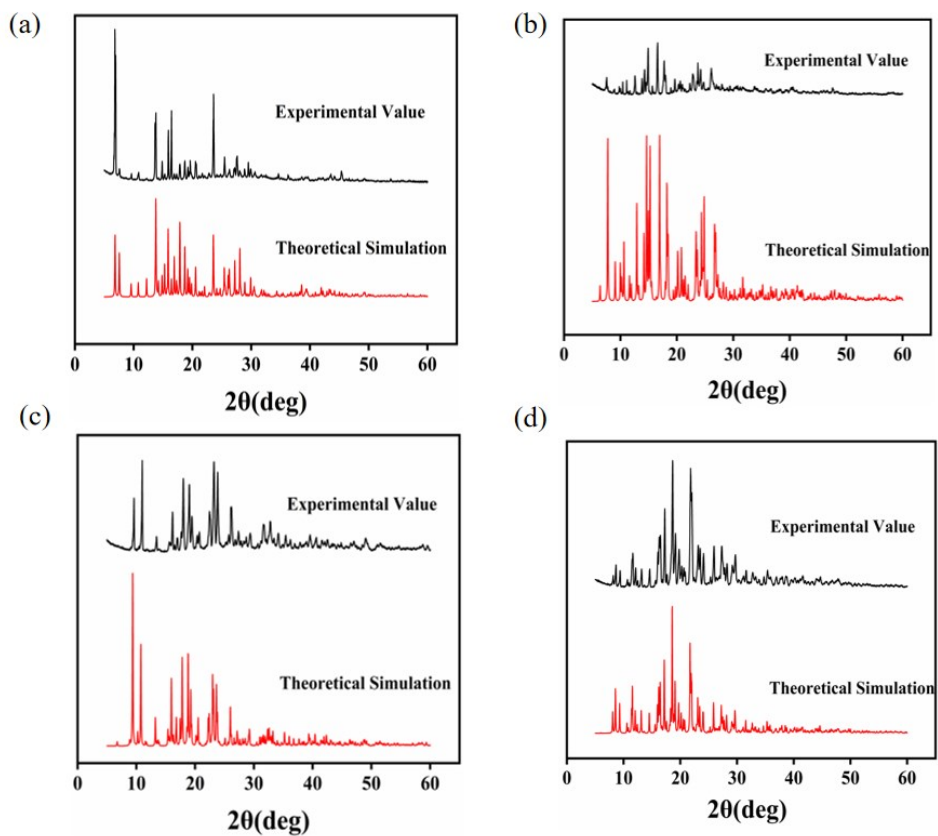


Fig.S3 The PXRD patterns of complexes 1(a), 2(b), 3(c) and 4(d).

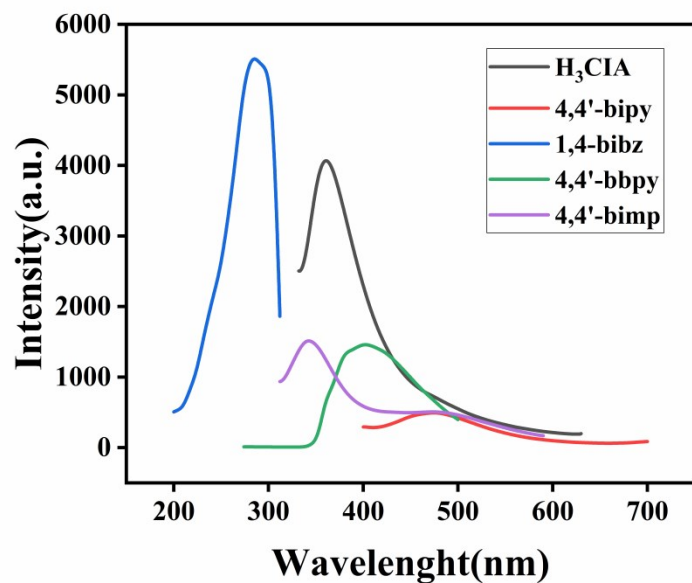


Fig.S4 The emission of the free ligands (H<sub>3</sub>CIA, 4,4'-bipy, 1,4-bibz, 4,4'-bbpy, 4,4'-bimp)

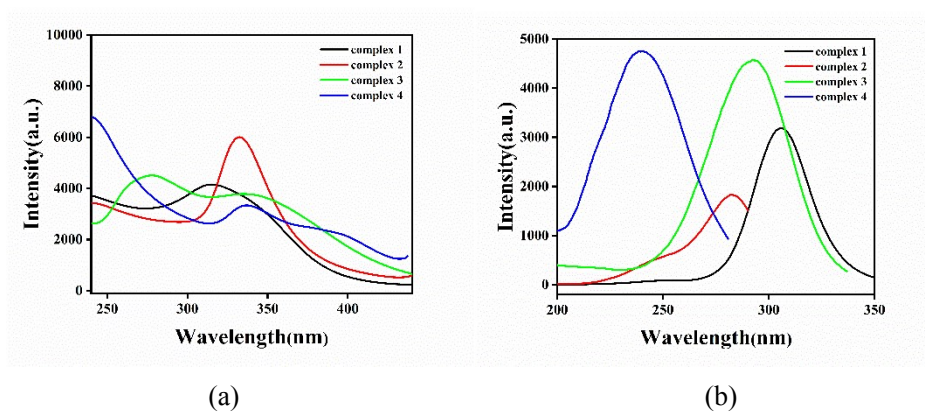
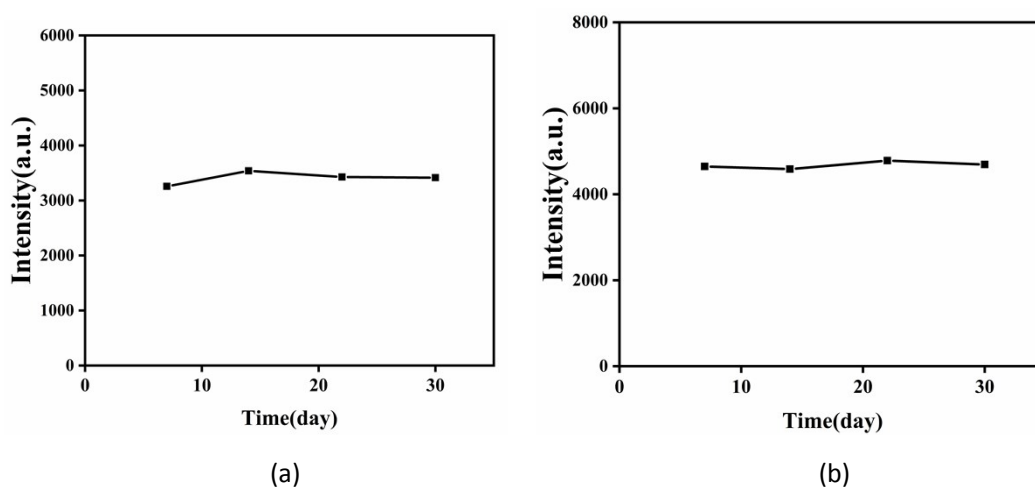
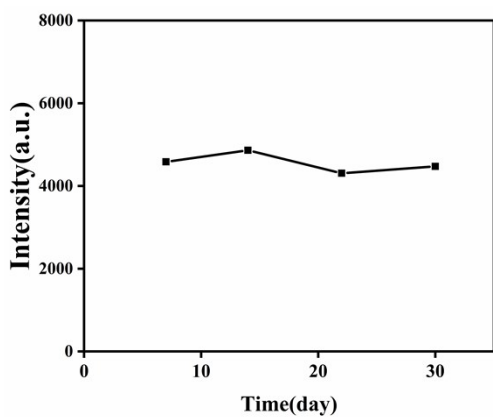
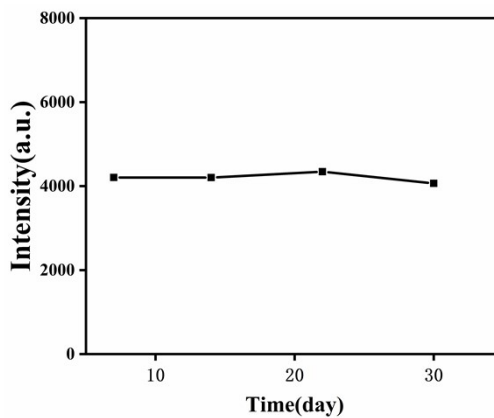


Fig.S5 The excitation spectra of complexes 1-4



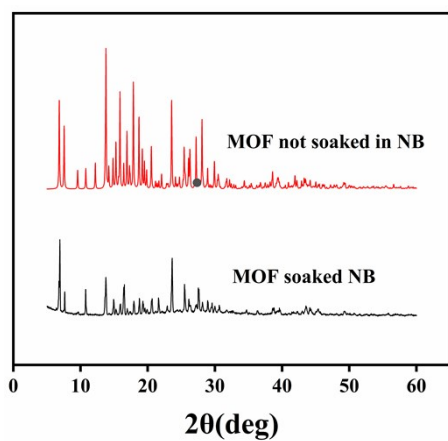


(c)

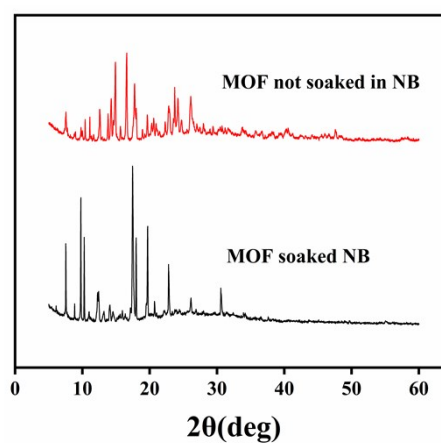


(d)

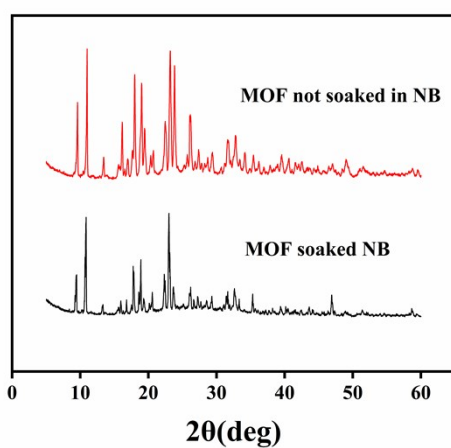
**Fig. S5** Fluorescence time diagram of the complexes 1(a),2(b),3(c),4(d).



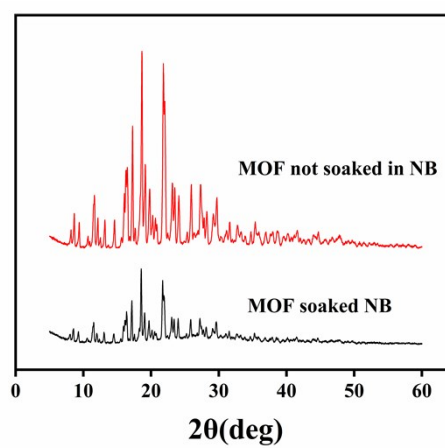
(a)



(b)



(c)



(d)

**Fig. S6** PXRD patterns of complexes 1(a),2(b),3(c),4(d) with and without NB immersion