Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Supporting Information

A novel Cd-MOF with enhanced thermo-sensitivity：The rational design, synthesis and multipurpose applications

Ping Ju,[a] Mengting Li,[a] Hua Yang,[b] Long Jiang,[c] Lian Xia,[a] Rongmei Kong,[a] Ensheng Zhang,*[a] Fengli Qu*[a]

[a] *College of Chemistry and Chemical Engineering, Qufu Normal University, Qufu, Shandong, 273165, P. R. China.*

[b] *Laboratory of New Energy & New Functional Materials, College of Chemistry and Chemical Engineering, Yan'an University, Yan'an, Shaanxi ,716000, P. R. China.*

[c] *Instrumental Analysis & Research Center, Sun Yat-Sen University, Guangzhou 510275, PR China*

E-mail address: sdzes2006@163.com; fengliquhn@hotmail.com

Table S1 Lanthanide metal ions based LMOF thermometers

LMOF thermometers	Metal center	Detection ranges (K)	Reference
$Eu_{0.0069}Tb_{0.9931}$-DMBDC	Eu^{3+} and Tb^{3+}	50-200	1
$Tb_{0.9}Eu_{0.1}$PIA	Eu^{3+} and Tb^{3+}	100-300	2
$Tb_{0.957}Eu_{0.043}$cpda	Eu^{3+} and Tb^{3+}	40-300	3
$Tb_{0.98}Eu_{0.02}(OA)_{0.5}(DSTP)\cdot 3H_2O$	Eu^{3+} and Tb^{3+}	77–275	4
$\{[Eu_2(L)_3\cdot(H_2O)_2\cdot(DMF)_2]\cdot 16H_2O\}n$	Eu^{3+}	10–150	5
$Tb_{0.95}Eu_{0.05}$FTPTC	Eu^{3+} and Tb^{3+}	25–300	6
Tb0.80Eu0.20BPDA	Eu^{3+} and Tb^{3+}	298-318	7
ZJU-88⊃perylene	Eu^{3+}	293-353	8

Table S2. Selected Bond Lengths (Å) and Bond Angles (°)

Bond	**Dist.**	**Bond**	**Dist.**	**Bond**	**Dist.**
Cd(1)-O(1)	2.507(2)	Cd(1)-N(1)	2.430(2)	Cd(1)-O(4W)	2.213(2)
Cd(1)-O(5)	2.518(2)	Cd(1)-O(6)	2.268(2)	Cd(1)-O(3)	2.293(2)
Cd(1)-O(2)	2.537(2)	Cd(2)-O(1W)	2.201(2)	Cd(2)-O(1W)	2.344(3)
Cd(2)-O(4)	2.510(2)	Cd(2)-O(3)	2.326(2)	Cd(2)-O(3W)	2.530(3)
Cd(2)-O(2)	2.312(2)	Cd(2)-O(2W)	2.368(2)	Cd(2)-N(2)	2.343(3)
Angle	**(°)**	**Angle**	**(°)**	**Angle**	**(°)**
N(1)-Cd(1)-O(1)	141.44(8)	O(1)-Cd(1)-O(2)	51.14(7)	O(1)-Cd(1)-O(5)	71.80(7)
O(3)-Cd(1)-O(2)	69.69(7)	O(3)-Cd(1)-O(5)	141.11(7)	O(3)-Cd(1)-N(1)	97.91(8)
O(3)-Cd(1)-O(1)	120.60(7)	O(6)-Cd(1)-O(2)	90.01(8)	O(6)-Cd(1)-O(3)	87.76(8)

O(6)-Cd(1)-O(5)	54.51(7)	O(6)-Cd(1)-N(1)	96.53(8)	O(6)-Cd(1)-O(1)	87.50(8)
O(5)-Cd(1)-O(2)	114.37(7)	O(4w)-Cd(1)-O(2)	89.99(9)	O(4w)-Cd(1)-O(3)	102.95(10)
O(4w)-Cd(1)-O(6)	168.56(10)	O(4w)-Cd(1)-O(5)	115.45(10)	O(4w)-Cd(1)-N(1)	86.07(9)
O(4w)-Cd(1)-O(1)	83.61(9)	N(1)-Cd(1)-O(2)	165.81(8)	N(1)-Cd(1)-O(5)	79.59(4)
O(2w)-Cd(2)-O(3w)	77.76(10)	O(2w)-Cd(2)-O(4)	163.70(8)	O(2)-Cd(2)-O(2w)	80.60(8)
O(2)-Cd(2)-O(3w)	102.57(9)	O(2)-Cd(2)-O(3)	73.25(7)	O(2)-Cd(2)-O(4)	115.54(8)
O(2)-Cd(2)-N(2)	84.88(8)	O(3)-Cd(2)-O(2w)	135.41(8)	O(3)-Cd(2)-O(3w)	73.64(9)
O(3)-Cd(2)-O(4)	53.77(7)	O(3)-Cd(2)-N(2)	104.05(8)	O(4)-Cd(2)-O(3w)	95.54(10)
N(2)-Cd(2)-O(2w)	108.91(8)	N(2)-Cd(2)-O(3w)	170.91(10)	N(2)-Cd(2)-O(4)	76.37(8)
O(1w)-Cd(2)-O(2w)	82.00(9)	O(1w)-Cd(2)-O(2)	161.62(8)	O(1w)-Cd(2)-O(3w)	79.39(10)
O(1w)-Cd(2)-O(3)	124.16(8)	O(1w)-Cd(2)-O(4)	82.16(8)	O(1w)-Cd(2)-N(2)	95.23(10)

Symmetry codes: #1 1-x,-1-y,-z; #2 +x,-1-y,1/2+z; #3 1-x,-y,-z; #4 +x,-1-y,-1/2+z; #5 1/2-x,-1/2-y,-z .

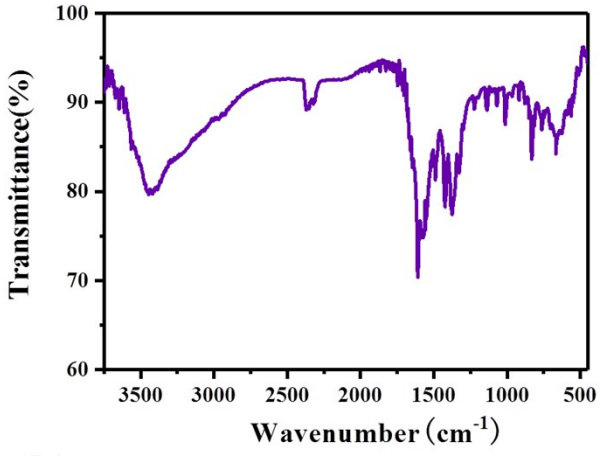

Fig. S1 FT-IR spectrum of complex **1**

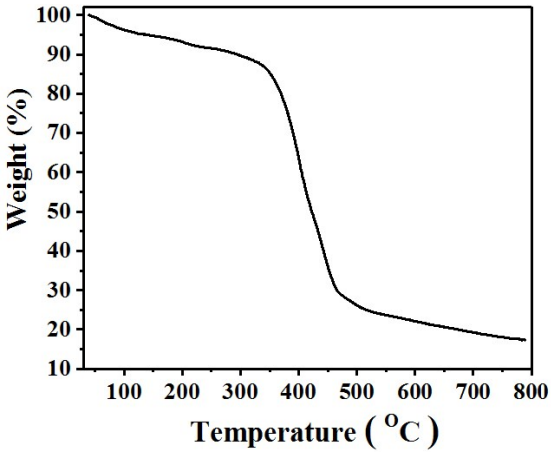

Fig. S2 TG curve for complex 1.

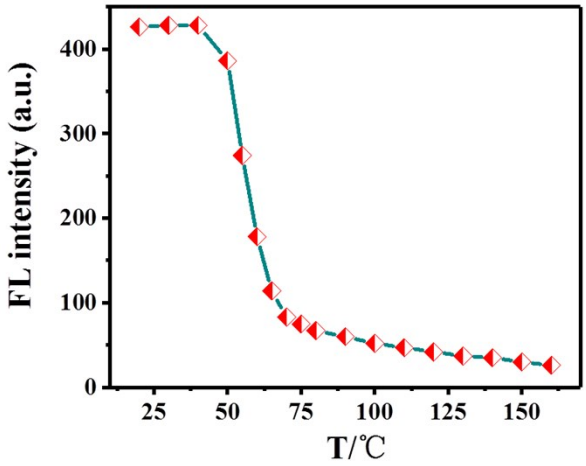

Fig. S3 Fluorescent intensity of complex **1** with gradually change temperature from 160 °C to 20 °C (λ_{ex} = 300 nm, slits: 2.5 nm/5 nm).

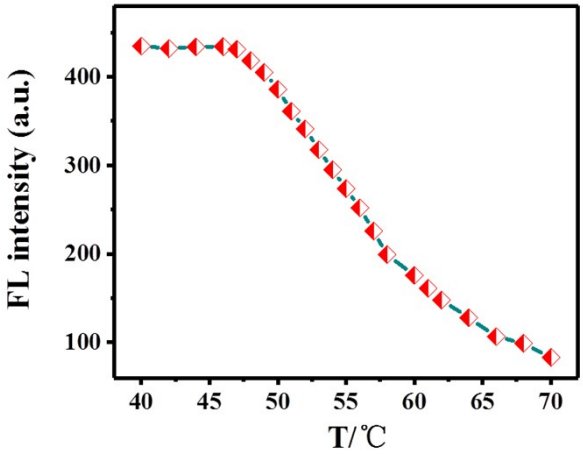

Fig. S4 Fluorescent intensity of complex **1** with gradually change temperature from 70 °C to 40 °C (λ_{ex} = 300 nm, slits: 2.5 nm/5 nm).

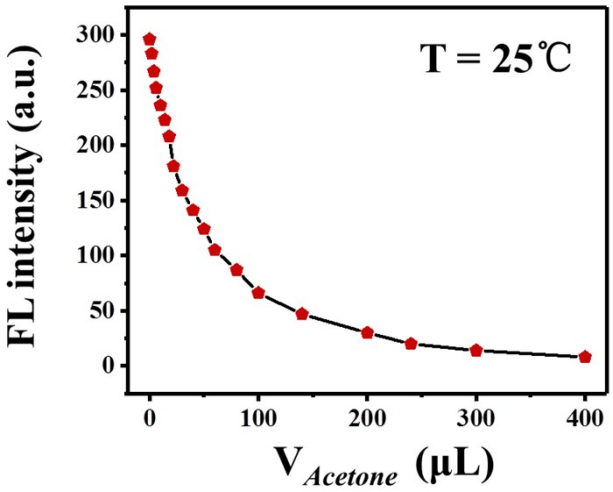

Fig. S5 Fluorescent intensity of complex **1**-H_2O suspension after the addition of acetone (λ_{ex} = 300 nm, λ_{em} = 410 nm, slits: 5 nm/10 nm, all the tests were carried out at 25℃).

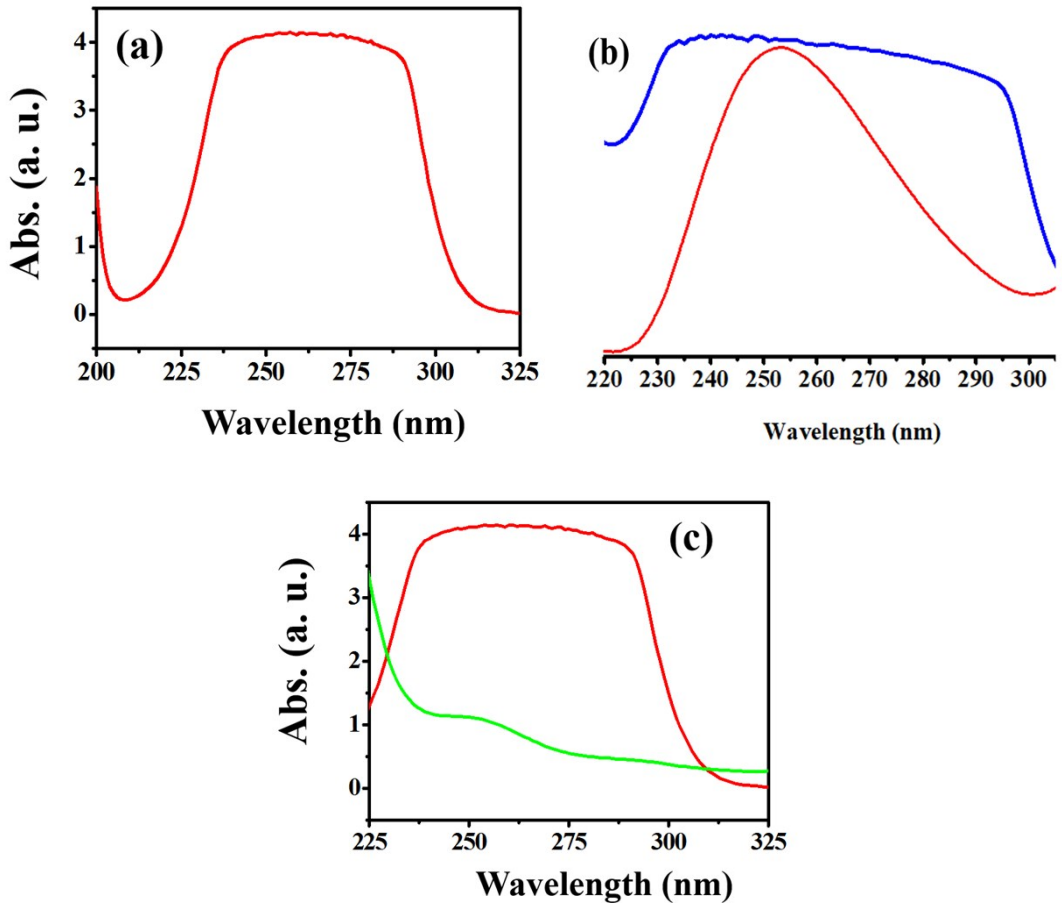

Fig. S6 (a) The UV-vis spectrum of acetone in water; (b) Overlap of absorption spectrum of acetone (the blue line) and fluorescent excitation spectrum of complex 1 (the red line) ; **(c)** Overlap of absorption spectra of acetone (the red line) and complex 1 (the green line).

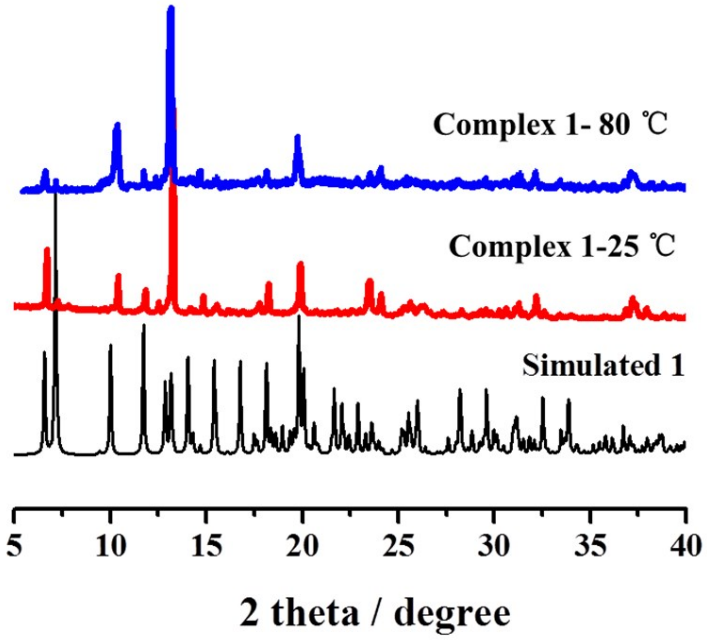

Fig. S7 PXRD patterns of complex 1 at 25 ℃ and 80 ℃.

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