Electronic Supplementary Material (ESI) for RSC Advances.
This journal is © The Royal Society of Chemistry 2017

Electronic Supplementary Information (ESI)

for

Guest dependent structure and acetone sensing properties of a 2D Eu^{3+} coordination polymer

Meng Zhao,[ac] Zhao-Quan Yao,[ac] Yue-Ling Xu,[ac] Ze Chang*[ac] and Xian-He Bu[abc]

[a]*School of Materials Science and Engineering, National Institute for Advanced Materials, TKL of Metal- and Molecule-Based Material Chemistry, Nankai University, Tianjin 300350, China.*

[b]*State Key Laboratory of Elemento-Organic Chemistry, College of Chemistry, Nankai University, Tianjin 300071, China*

[c]*Collaborative Innovation Center of Chemical Science and Engineering (Tianjin), Tianjin 300071, China*

Table S1. Crystal data and structure refinement parameters for **1**.

	1
chemical formula	$C_{30}H_{22}EuNO_9$
formula weight	692.45
crystal system	Trigonal
space group	*P* -1
a/Å	9.5960(15)
b/Å	13.277(2)
c/Å	15.277(3)
α/ (°)	104.260(4)
β/(°)	96.594(2)
γ/ (°)	97.594(3)
V/Å^3	1847.7(5)
Z	2
D/g cm^{-3}	1.245
T/K	113
μ/mm^{-1}	1.740
F(000)	688
R^a [$I > 2\sigma(I)$]	0.0359
wR^b [all data]	0.0999

[a] $R = \Sigma||F_o| - |F_c|| / \Sigma|F_o|$; [b] $R_w = [\Sigma[w(F_o^2 - F_c^2)^2] / \Sigma w(F_o^2)^2]^{1/2}$.

Table S2. Bond lengths [Å] and angles [deg] for **1**.

Eu(1)-O(4)#2	2.400(2)	O(4)#2-Eu(1)-O(5)	73.44(9)
Eu(1)-O(2)#3	2.409(2)	O(2)#3-Eu(1)-O(5)	140.81(9)
Eu(1)-O(8)	2.411(3)	O(8)-Eu(1)-O(5)	75.97(10)
Eu(1)-O(1)	2.424(2)	O(1)-Eu(1)-O(5)	77.53(8)
Eu(1)-O(7)	2.432(3)	O(7)-Eu(1)-O(5)	136.77(9)
Eu(1)-O(5)	2.485(2)	O(4)#2-Eu(1)-O(6)	126.15(8)
Eu(1)-O(6)	2.490(2)	O(2)#3-Eu(1)-O(6)	93.49(8)
Eu(1)-O(3)#2	2.532(3)	O(8)-Eu(1)-O(6)	74.96(10)
Eu(1)-O(1)#3	2.702(2)	O(1)-Eu(1)-O(6)	76.41(8)
O(1)-Eu(1)#3	2.702(2)	O(7)-Eu(1)-O(6)	141.96(9)
O(2)-Eu(1)#3	2.409(2)	O(5)-Eu(1)-O(6)	52.71(8)
O(3)-Eu(1)#2	2.532(3)	O(4)#2-Eu(1)-O(3)# 2	52.89(8)
O(4)-Eu(1)#2	2.400(2)	O(2)#3-Eu(1)-O(3)#2	83.21(8)
O(4)#2-Eu(1)-O(2)#3	135.57(9)	O(8)-Eu(1)-O(3)#2	72.01(10)
O(4)#2-Eu(1)-O(8)	93.93(10)	O(1)-Eu(1)-O(3)#2	134.30(9)
O(2)#3-Eu(1)-O(8)	76.24(10)	O(7)-Eu(1)-O(3)#2	70.58(10)
O(4)#2-Eu(1)-O(1)	93.55(9)	O(5)-Eu(1)-O(3)#2	113.33(9)
O(2)#3-Eu(1)-O(1)	117.13(8)	O(6)-Eu(1)-O(3)#2	146.64(9)
O(8)-Eu(1)-O(1)	149.07(10)	O(4)#2-Eu(1)-O(1)#3	149.69(9)
O(4)#2-Eu(1)-O(7)	77.85(9)	O(2)#3-Eu(1)-O(1)#3	50.63(8)
O(2)#3-Eu(1)-O(7)	81.57(9)	O(8)-Eu(1)-O(1)#3	114.71(9)
O(8)-Eu(1)-O(7)	138.24(10)	O(1)-Eu(1)-O(1)#3	67.27(9)
O(1)-Eu(1)-O(7)	72.68(9)	O(7)-Eu(1)-O(1)#3	74.16(8)
O(5)-Eu(1)-O(1)#3	121.32(8)	O(3)#2-Eu(1)-O(1)#3	125.01(8)
O(6)-Eu(1)-O(1)#3	73.78(8)		

Symmetry codes: #1 -x+2,-y+1,-z；#2 -x+1,-y+2,-z；#3 -x+1,-y+1,-z-1

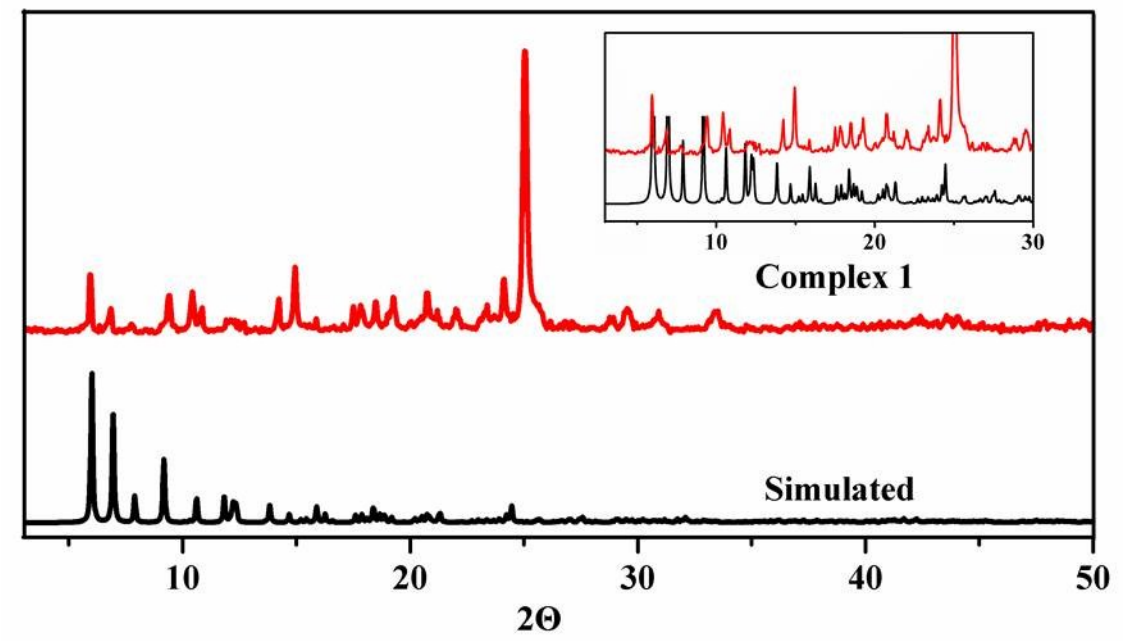

Fig. S1 Simulated and experimental PXRD patterns of complex **1**. The inset shows the detailed view of the patterns in the range of 3-30 degree.

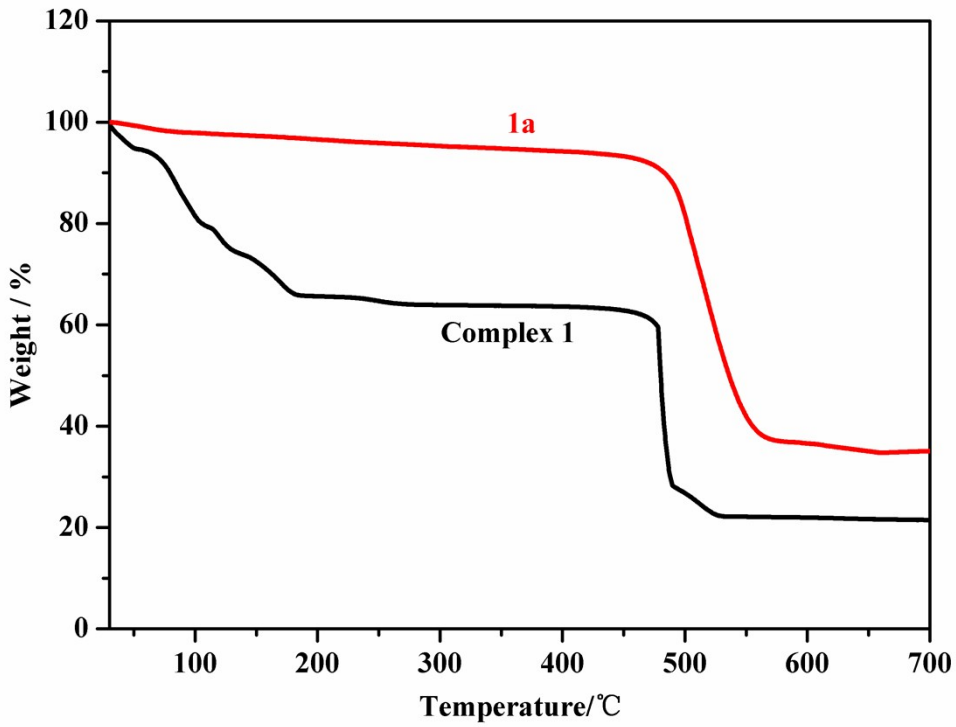

Fig. S2 Thermal gravity analysis (TGA) profiles of complex **1** and **1a**.

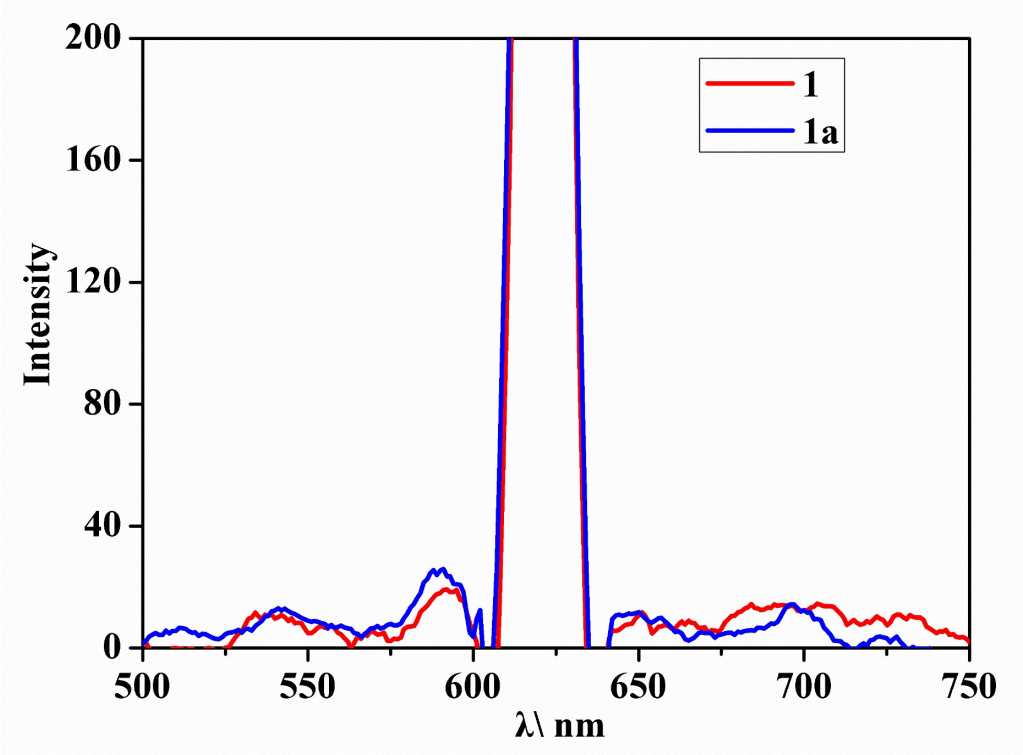

Fig. S3 Solid state fluorescent spectra of **1** and **1a** under excitation at 310 nm. The Y-axis is magnified to present the characteristic emission peak of Eu^{3+} ion with low intensities.

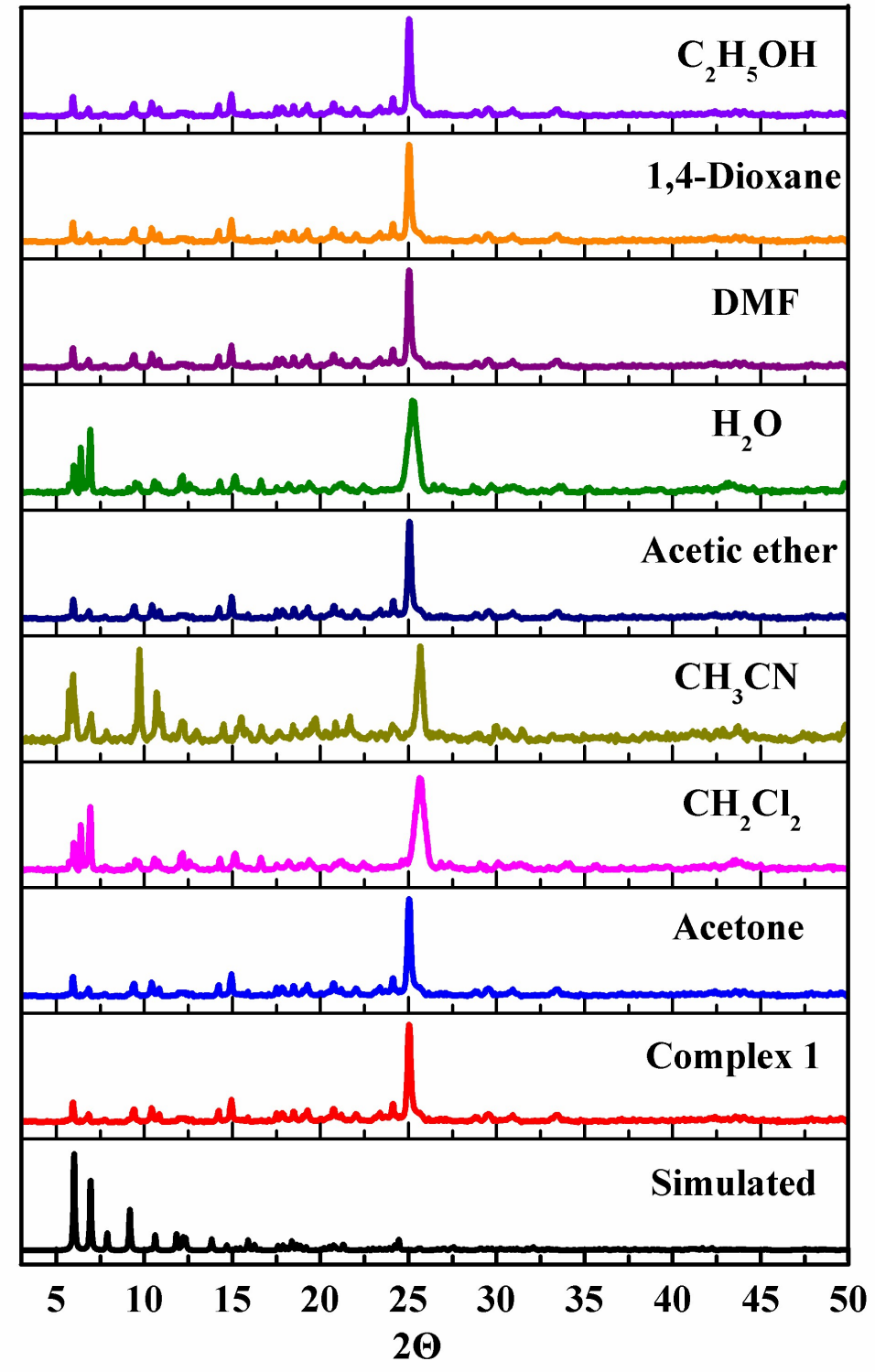

Fig. S4 Simulated and experimental PXRD patterns of **1** soaked in different solvents for 48 hours.

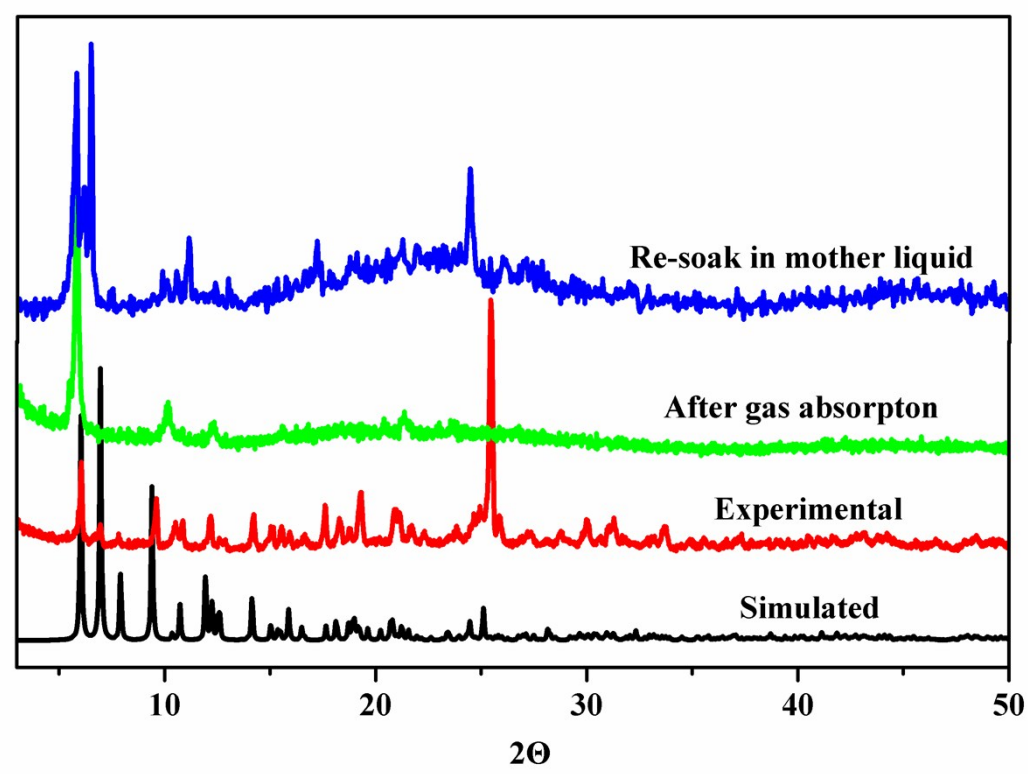

Fig. S5. PXRD patterns of **1** after different treatments.

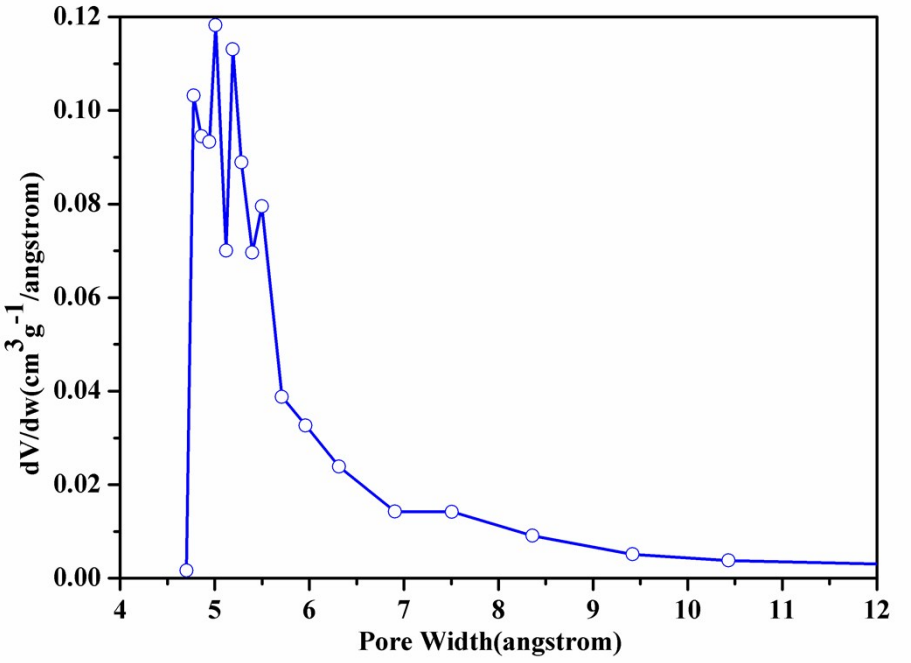

Fig. S6 The pore size distribution of **1a** calculated by Horvath-Kawazoe method.

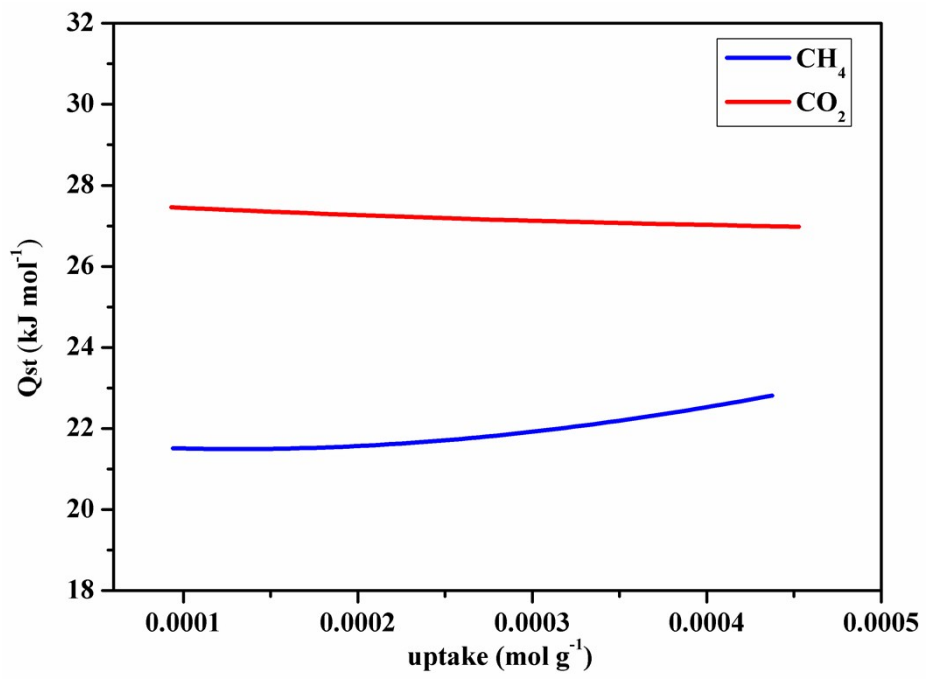

Fig. S7 Isosteric heat of sorption (Q_{st}) of **1a** to CO_2 (red) and CH_4(blue)

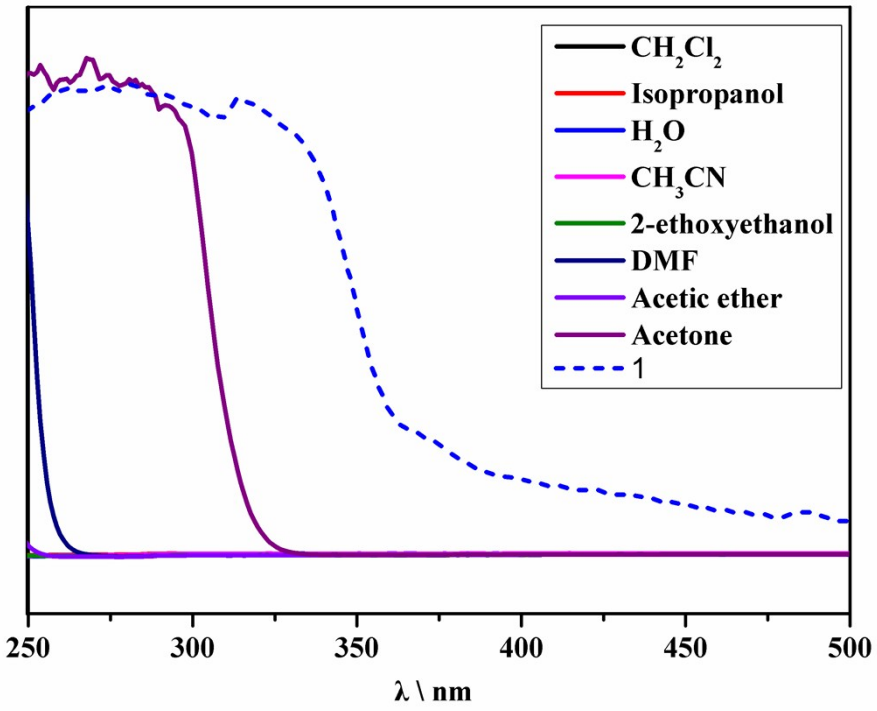

Fig. S8 The solid state UV-Visible spectrum of **1** and the UV-Visible absorption spectra of different solvents.

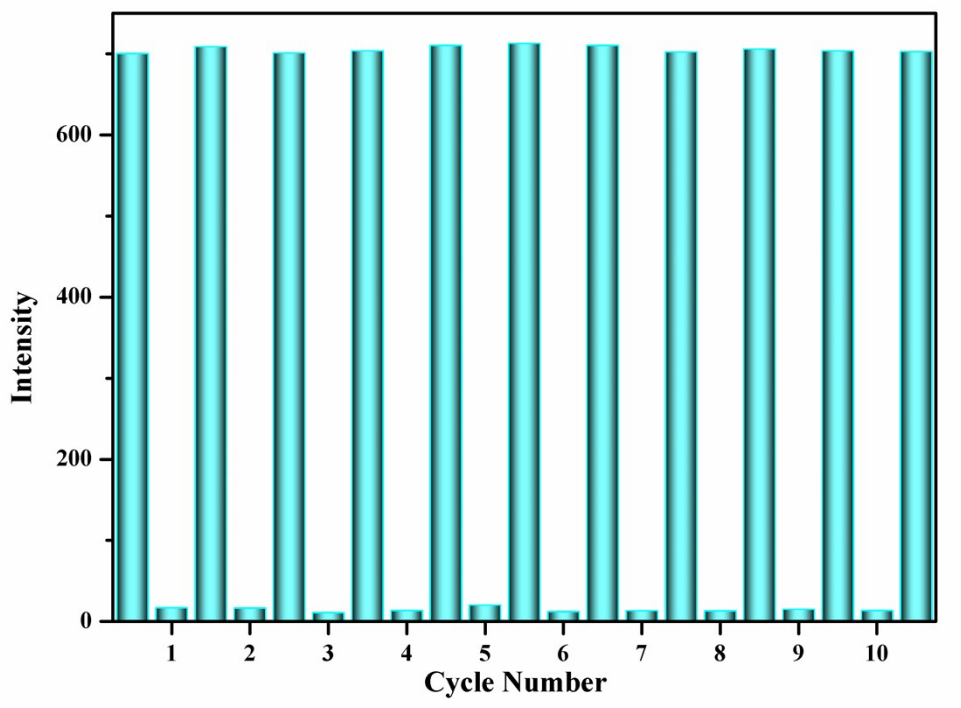

Fig. S9 The sensing recyclability of **1**. The emission at 621 nm was used for comparison.

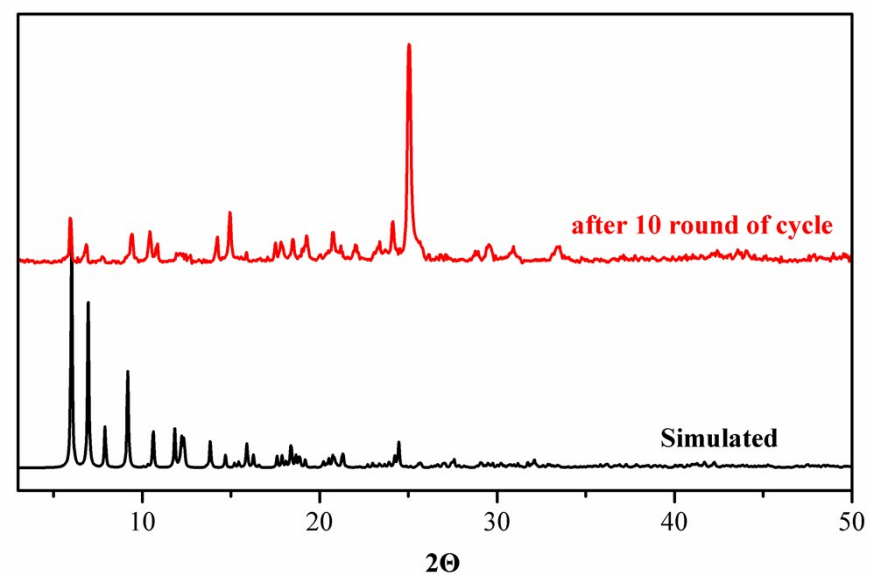

Fig. S10 PXRD pattern of **1** after 10 cycles of acetone sensing.

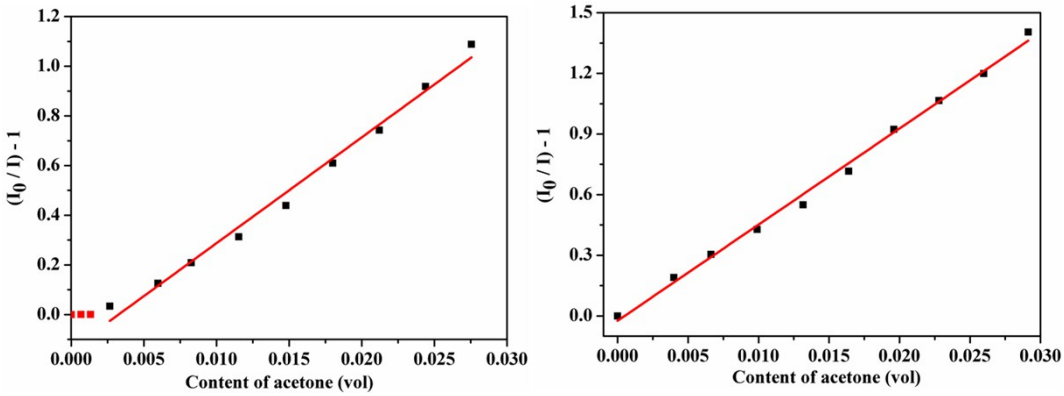

Fig. S11 The relationship between quenching efficiency and acetone content of 1(left) and 1a (right) fitted by the Stern–Volmer (SV) equation.

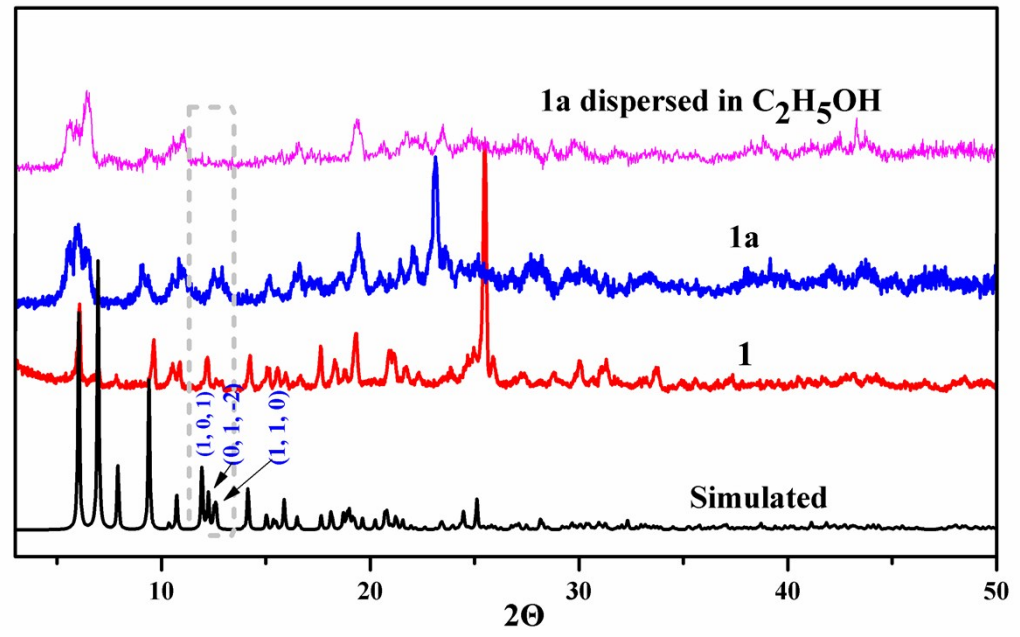

Fig. S12 The PXRD patterns of **1** change after different treatments.