Supporting information

A fluorescence probe based on 6-phenylimidazo[2,1-b]thiazole and salicylaldehyde for relay discerning of In^{3+} and Cr^{3+}

Bing Li,[a] Xiaodong Shang[b,*], Linlin Li,[a] Yuankang Xu,[a] Hanyu Wang,[a] Xiaofeng Yang,[a] Meishan Pei, [a]Ruiqing Zhang,[a] Guangyou Zhang [a,*]

[a]*School of Chemistry and Chemical Engineering, University of Jinan, Jinan 250022 ,China. Email address: chm_zhanggy@ujn.edu.cn*

[b]*Henan Sanmenxia Aoke Chemical Industry Co. Ltd., Sanmenxia 472000, China. E-mail address: dong19840814.love@163.com*

[*]*Corresponding author: Guangyou Zhang, E-mail address: chm_zhanggy@ujn.edu.cn. Xiaodong Shang, E-mail address: dong19840814.love@163.com*

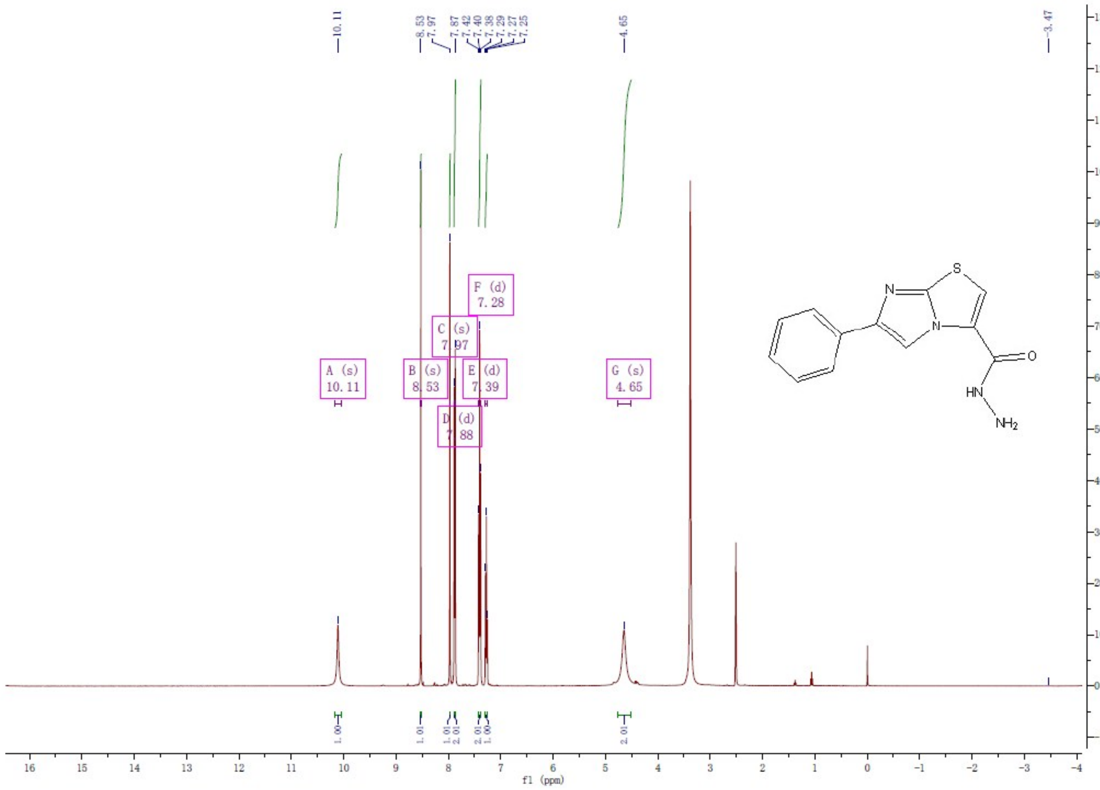

Fig.S1. ^{1}H NMR spectrum of compound **3.**

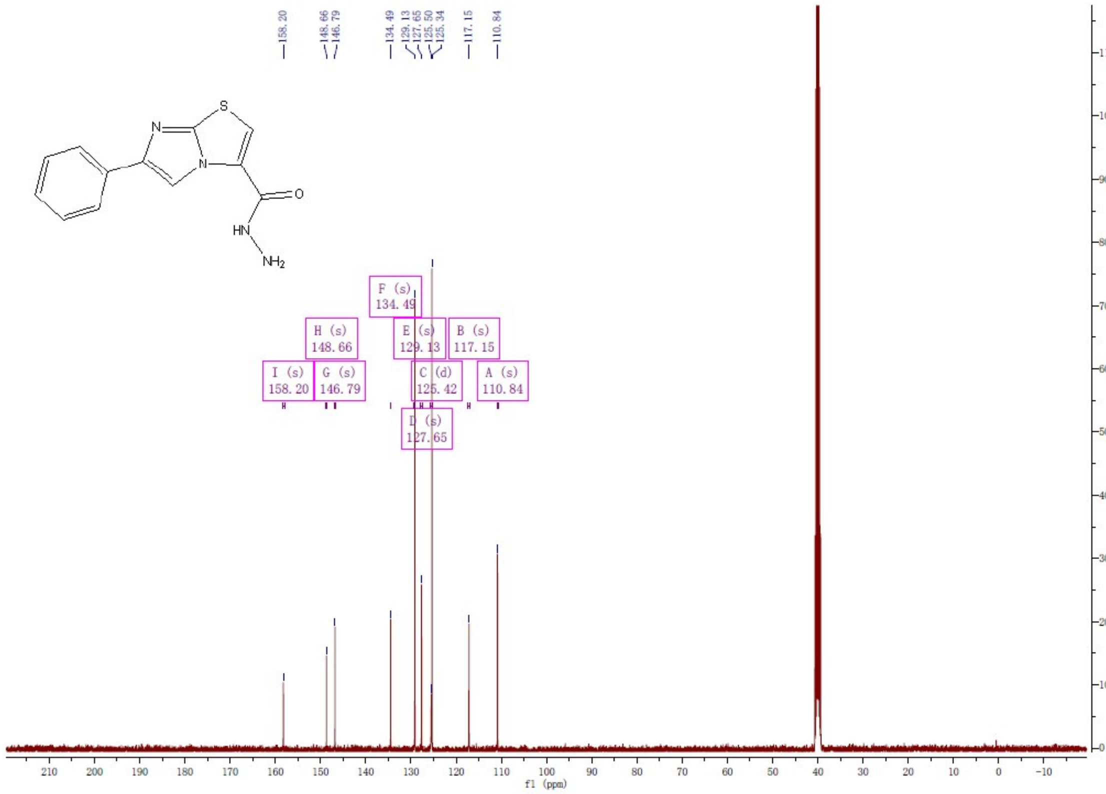

Fig.S2. ^{13}C NMR spectrum of compound **3**.

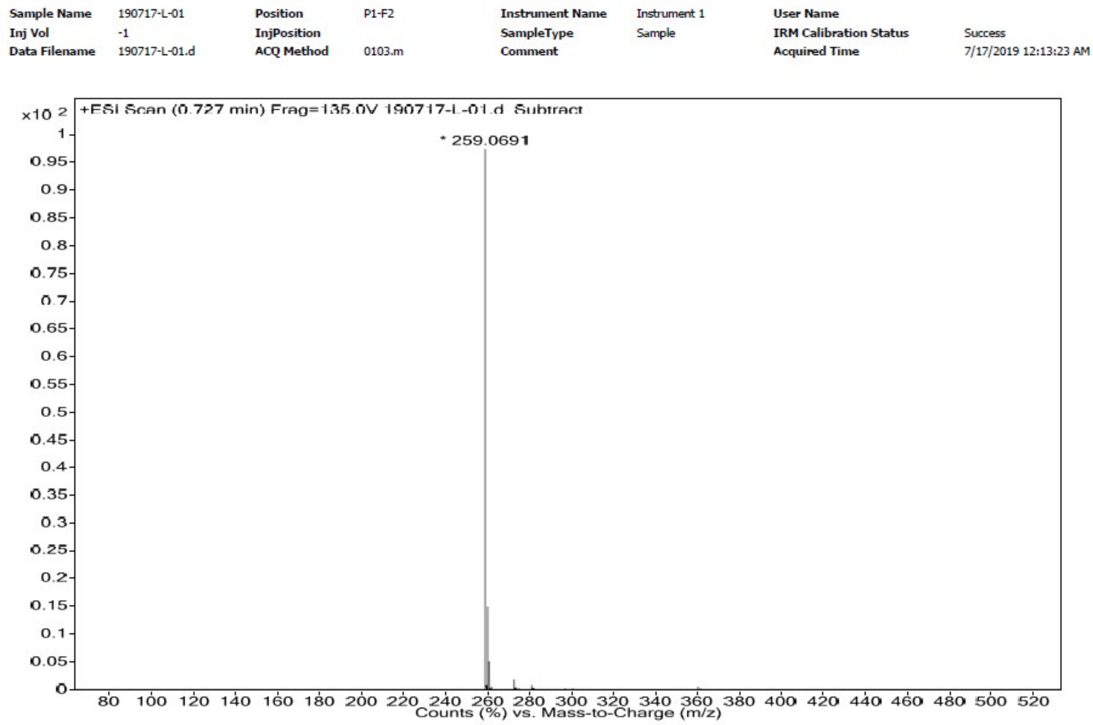

Fig.S3.ESI mass spectrum of compound **3**

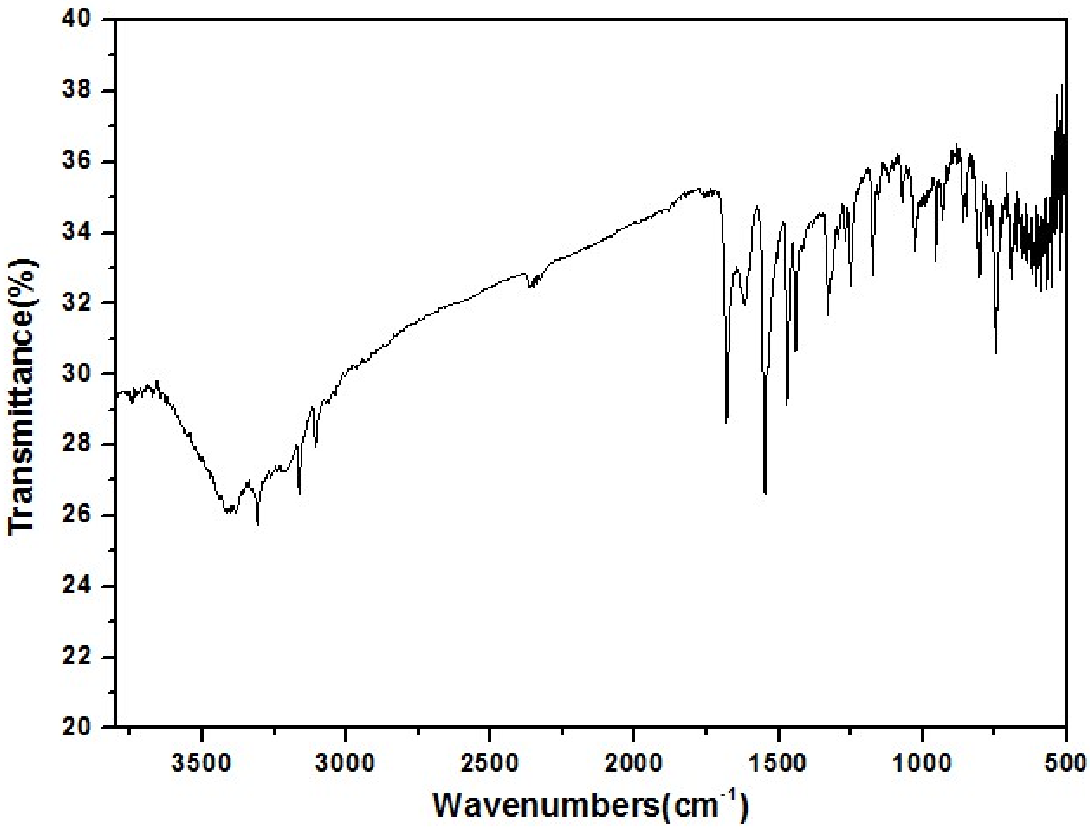

Fig.S4.The FTIR spectra of compound **3**

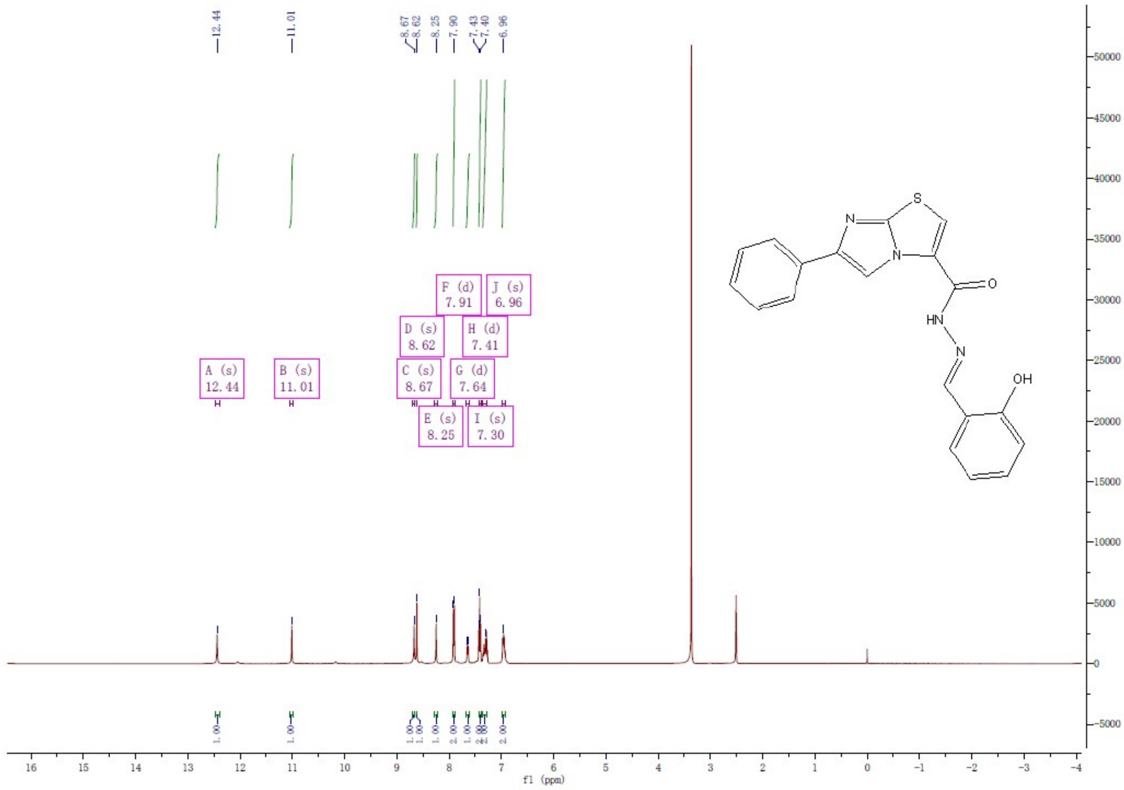

Fig.S5. ^{1}H NMR spectrum of **LB1.**

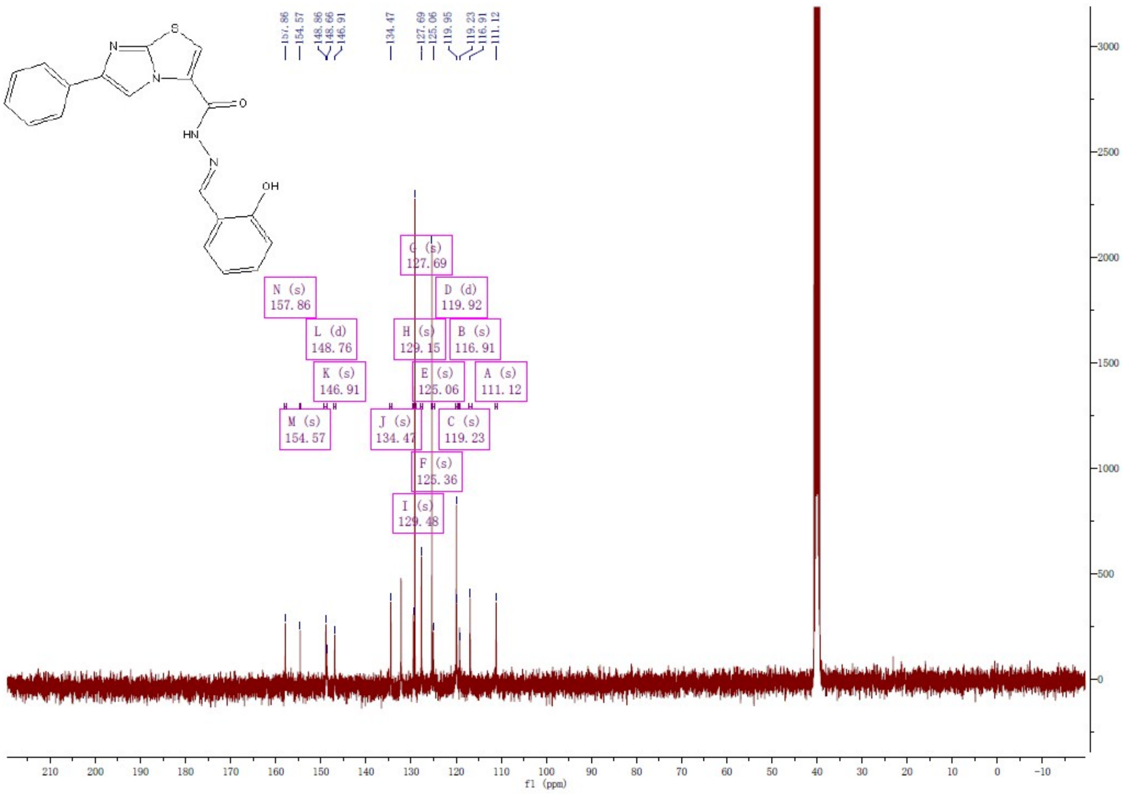

Fig.S6. ^{13}C NMR spectrum of **LB1**

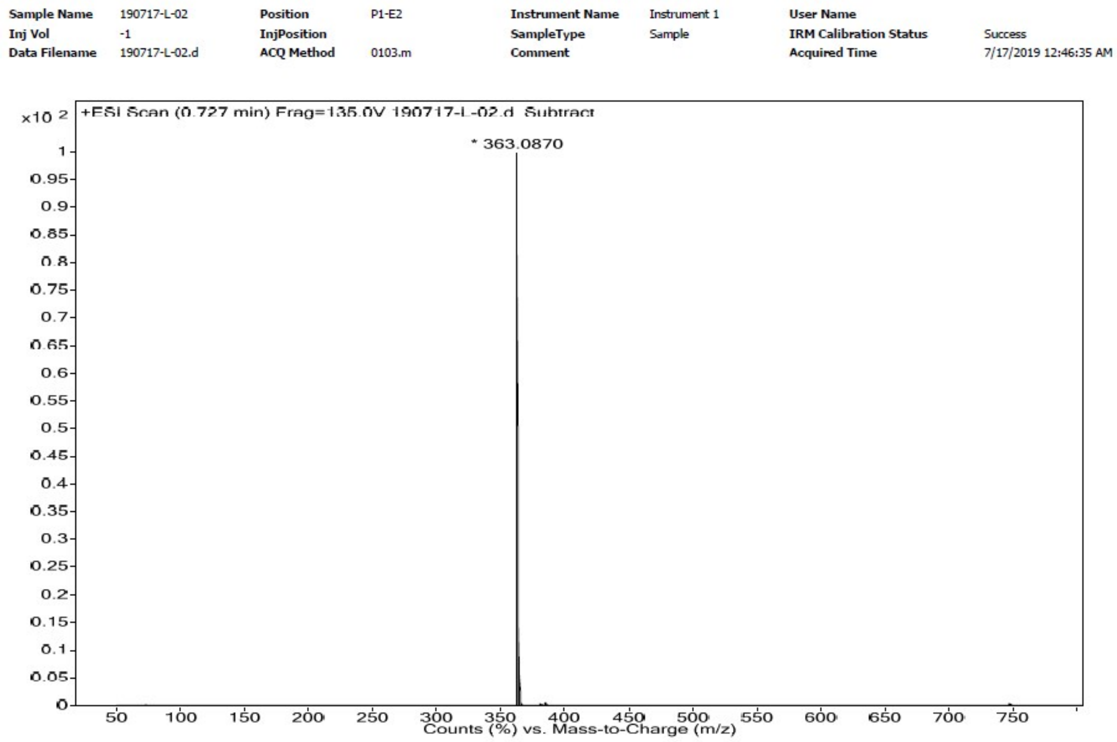

Fig.S7.ESI mass spectrum of **LB1**

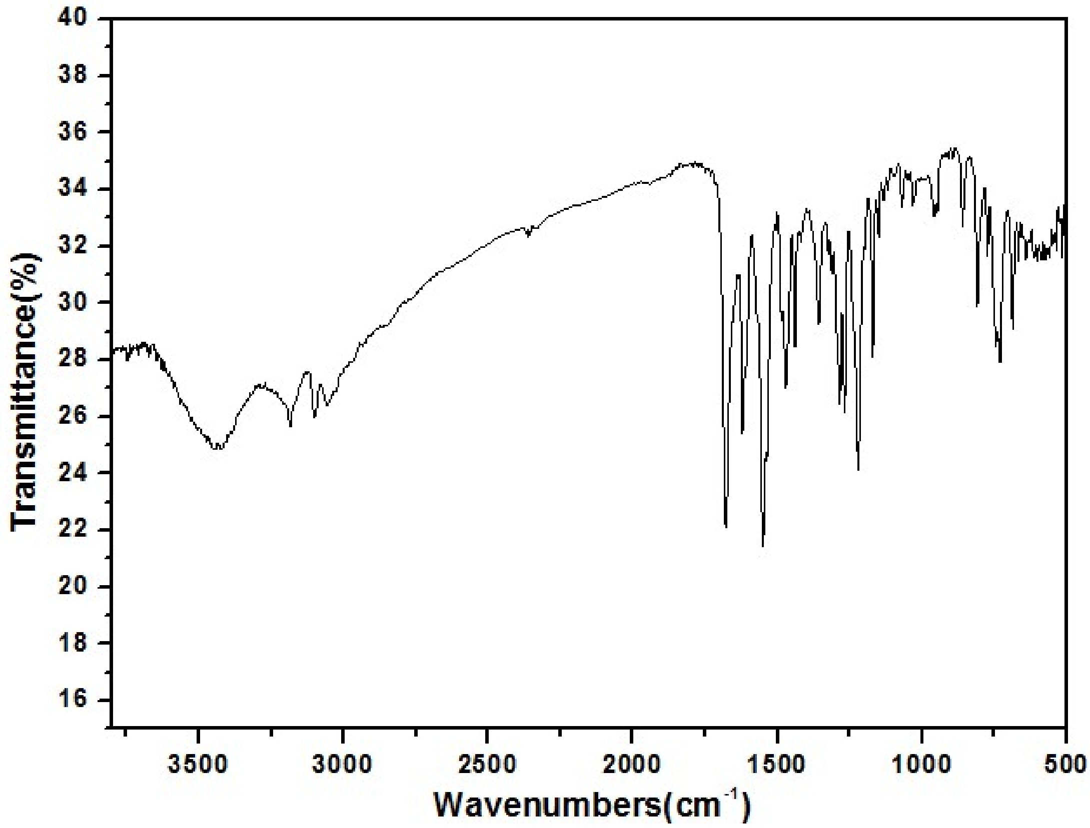

Fig.S8.The FTIR spectra of **LB1**

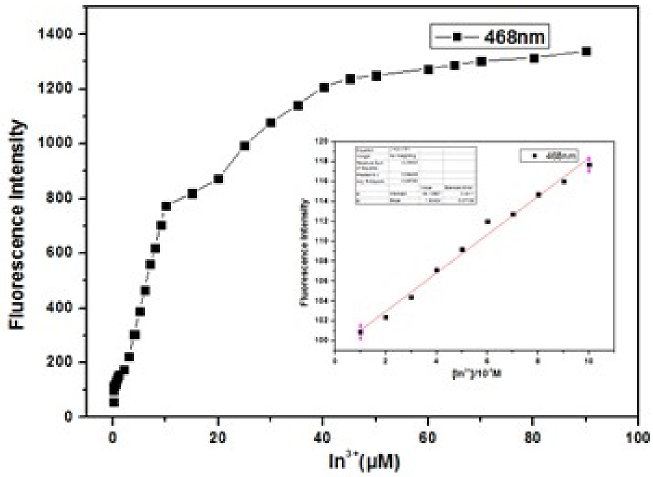

Fig.S9. Linear response of the emission intensity changes of **LB1** with the concentration of In^{3+}. Excitation is at 365 nm.

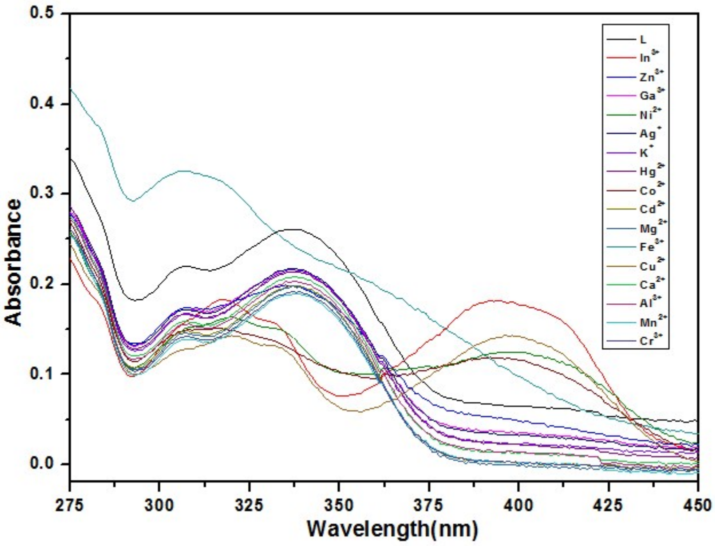

Fig.S10. Absorption spectra of **LB1** (1×10^{-5} M) in DMF/H_2O (9:1,v/v) containing Tris (0.01 M, pH=7.4) buffer solution in the presence of various metal ions(Mg^{2+}, Cu^{2+}, Co^{2+}, Al^{3+}, Hg^{2+}, Ag^{+}, Mn^{2+},Ga^{3+}, K^{+}, Ca^{2+}, Ni^{2+}, Fe^{3+},Cd^{2+}, Cr^{3+} and Zn^{2+})

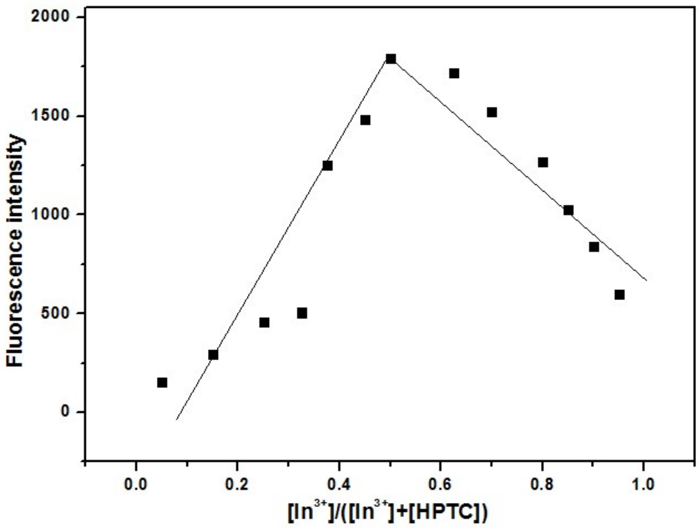

Fig.S11. Job's plot of the **LB1+In^{3+}** complex in DMF/H_2O (9:1, v/v) containing Tris (0.01 M, pH=7.4) at 25 °C. The total concentration of LB1 and In^{3+} was 0.1 mM. Excitation is at 365 nm, and emission was monitored at 468 nm.

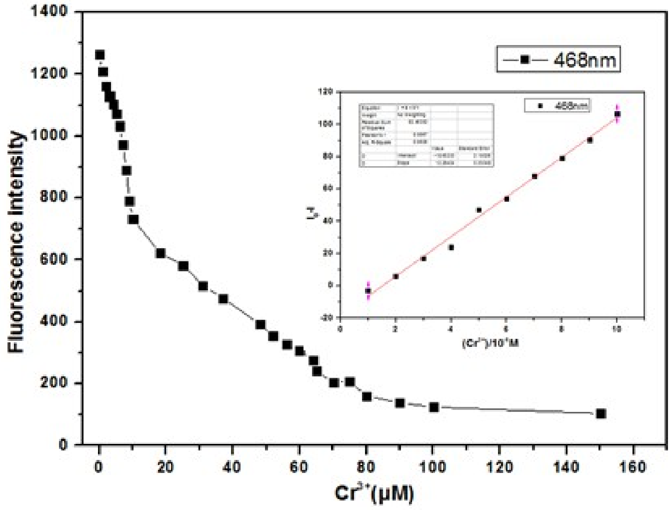

Fig.S12. Change ratio of [LB1 + In^{3+}] (1×10^{-5} M) in DMF/H_2O (9 : 1, v/v, Tris 0.01 M, pH= 7.4) upon titration with Cr^{3+} (1×10^{-6} M).Emission is monitored at 468 nm.

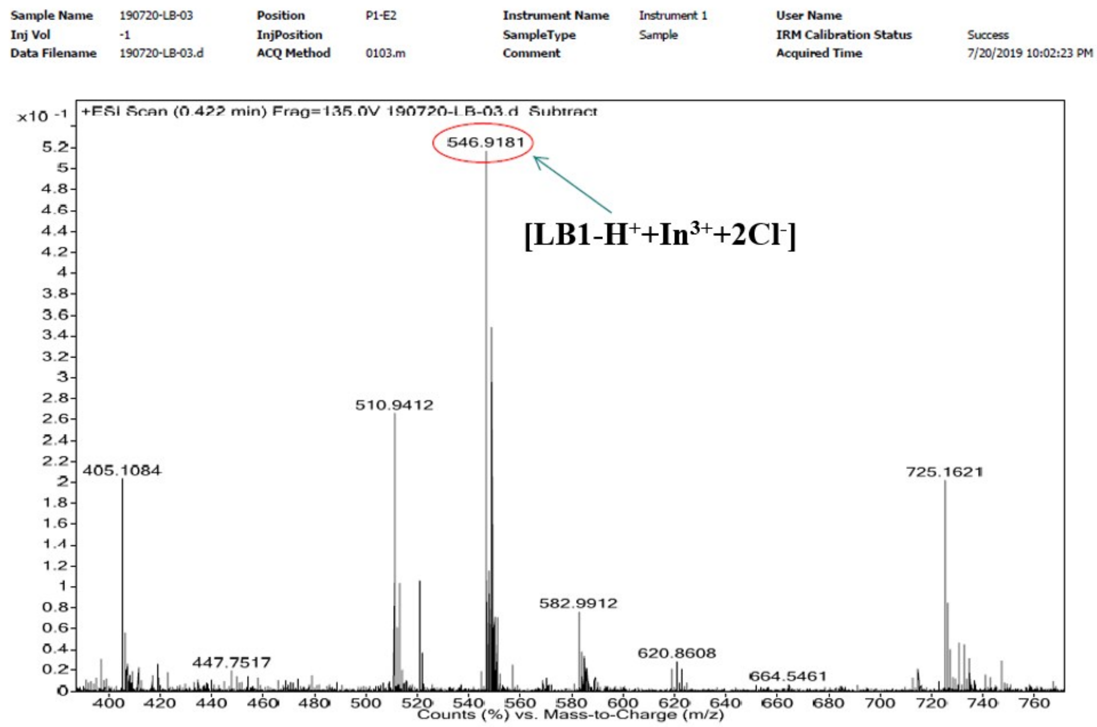

Fig.S13. ESI mass spectrum of complex **[LB1+In^{3+}].**

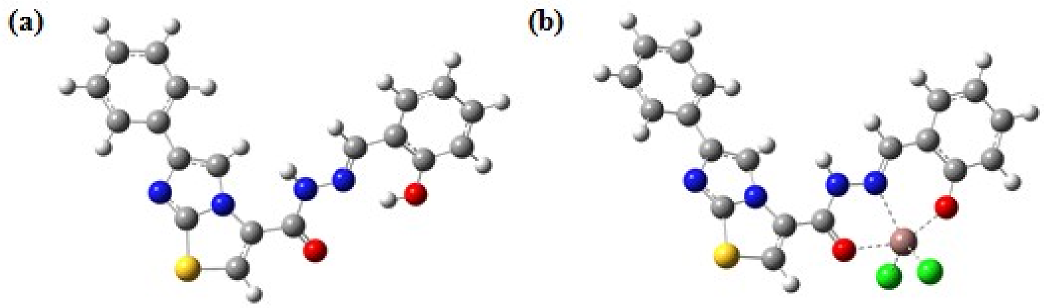

Fig.S14. XYZ coordination of the optimized structure of **LB1** (a) **and LB1+In^{3+}** (b).

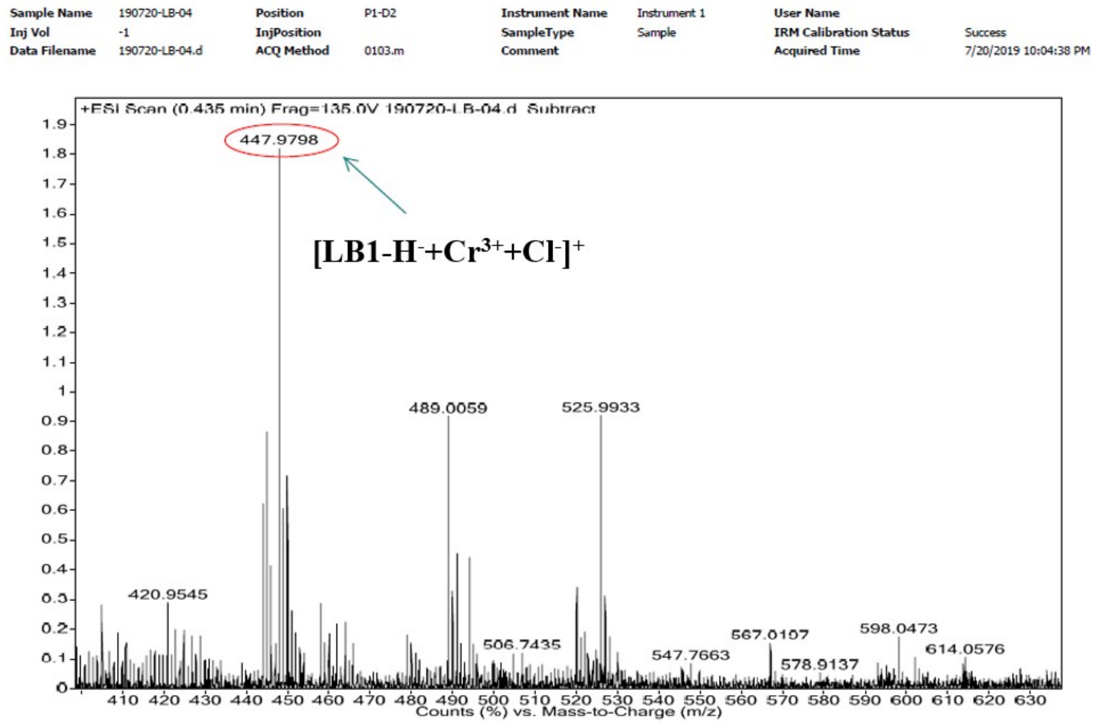

Fig.S15. ESI mass spectrum of complex **[LB1+Cr^{3+}].**

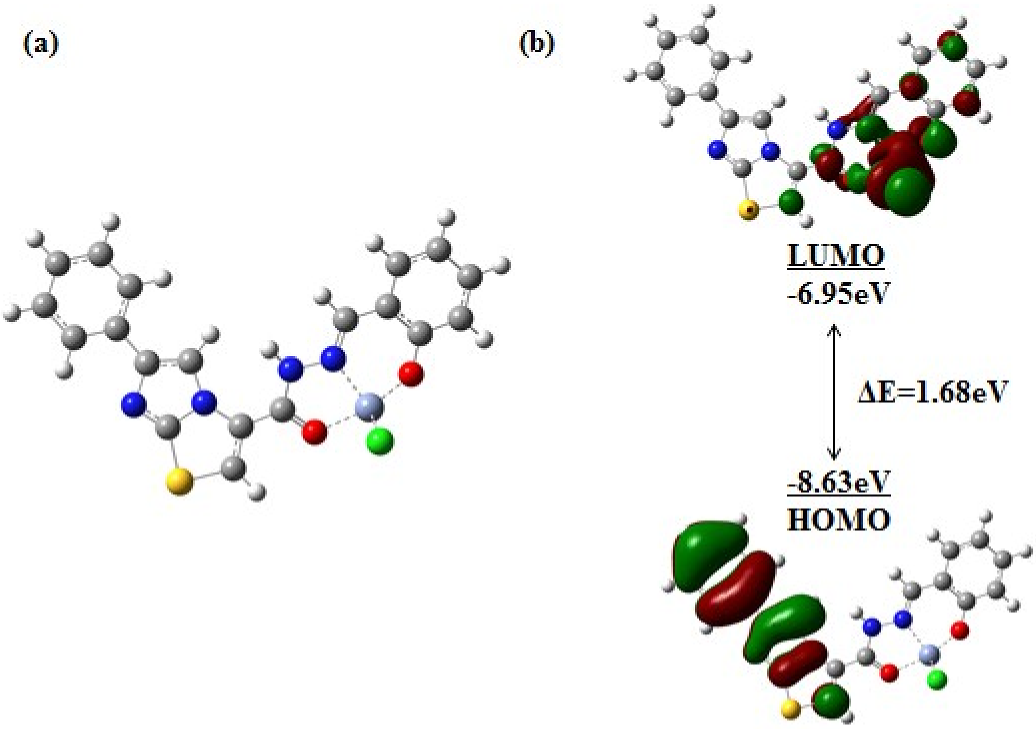

Fig.S16. (a) XYZ coordination of the optimized structure of **LB1+Cr^{3+}**.(b) Energy graphic illustration of HOMO and LUMO orbital **LB1+Cr^{3+}**

Table S1 Determination of the In^{3+} concentration in tap water samples

sample	In^{3+} added (mol L^{-1})	In^{3+} recovered (mol L^{-1})	Recovery (%)	RSD (%)

1	2×10^{-5}	2.1×10^{-5}	107.4	0.53
2	3×10^{-5}	3.1×10^{-5}	105.7	0.68
3	4×10^{-5}	3.9×10^{-5}	97.5	1.33

Table S2 Determination of the Cr^{3+} concentration in tap water samples

sample	Cr^{3+} added (mol L^{-1})	Cr^{3+} recovered (mol L^{-1})	Recovery (%)	RSD (%)
1	3×10^{-5}	3×10^{-5}	101.6	0.92
2	6×10^{-5}	6.3×10^{-5}	106.3	1.31
3	7×10^{-5}	6.9×10^{-5}	98.6	1.49

Table S3 Determination of the In^{3+} concentration in drink water samples

sample	In^{3+} added (mol L^{-1})	In^{3+} recovered (mol L^{-1})	Recovery (%)	RSD (%)
1	1×10^{-5}	1.0×10^{-5}	96.3	1.46
2	2×10^{-5}	2.1×10^{-5}	106.8	0.35
3	3×10^{-5}	3.2×10^{-5}	107.1	1.78

Table S4 Determination of the Cr^{3+} concentration in drink water samples

sample	Cr^{3+} added (mol L^{-1})	Cr^{3+} recovered (mol L^{-1})	Recovery (%)	RSD (%)
1	1×10^{-5}	1.0×10^{-5}	103.3	0.54
2	3×10^{-5}	2.9×10^{-5}	98.9	0.11
3	4×10^{-5}	3.7×10^{-5}	91.3	0.76

Table S5 Comparison of type of indium sensors and their detection limits

Solvent system	Detection limit	Response	Reference
CH_3CN	1.9×10^{-7} M	turn-off	5
CH_3CN/H_2O(v/v,1:1)	7×10^{-8} M	off-on	6
Methanol/H_2O(v/v,6:4)	1.4×10^{-8} M	-	15
Ethanol	6.1×10^{-7} M	turn-on	56
DMF/H_2O(v/v,9:1)	2.59×10^{-9} M	off-on	this work

Table S6 Comparison of type of chromium sensors and their detection limits

Solvent system	Detection limit	Response	Reference
DMF	4.8×10^{-6} M	turn-off	57
CH_3CN/HEPES	6.09×10^{-6} M	off-on	58
CH_3CN/HEPES(v/v,4:6)	1×10^{-6} M	turn-on	59
DMF/Water(v/v,9:1)	9×10^{-6} M	turn-off	60
DMSO/Methanol (v/v,9:1)	4×10^{-4} M	turn-on	61
DMF/H_2O(v/v,9:1)	8.05×10^{-7} M	on-off	this work