Supplementary Material

A selective fluorescent probe based on bis-Schiff base for "turn-on" detection of Al^{3+} and cysteine on different mechanisms

Yang Li [a], Caiyun Liao [a], Shanshan Huang [a], Hui Xu [a], Baozhan Zheng [a], Juan Du [a]*, and Dan Xiao [a,b]*

a College of Chemistry, Sichuan University, 29 Wangjiang Road, Chengdu 610064, PR China

b College of Chemical Engineering, Sichuan University, 29 Wangjiang Road, Chengdu 610065, PR China

E-mail: xiaodan@scu.edu.cn;

E-mail: lxdj@vip.sina.com

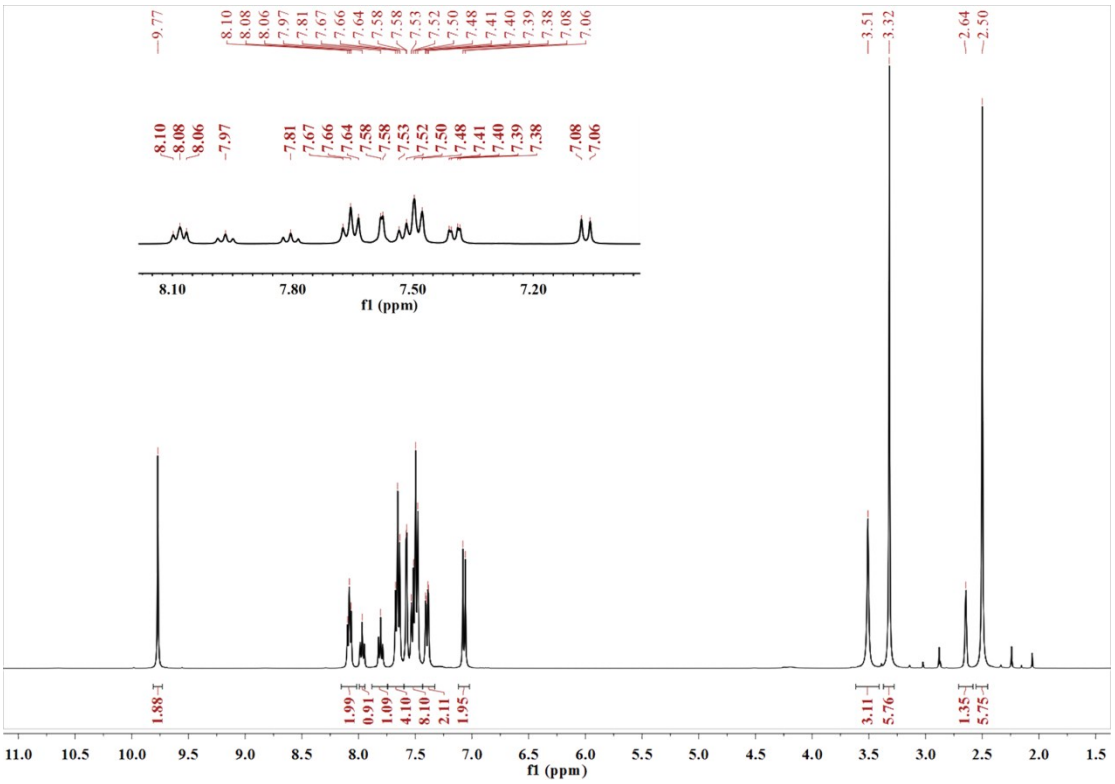

Fig. S1. ^{1}H-NMR spectrum of compound L in DMSO-d_6

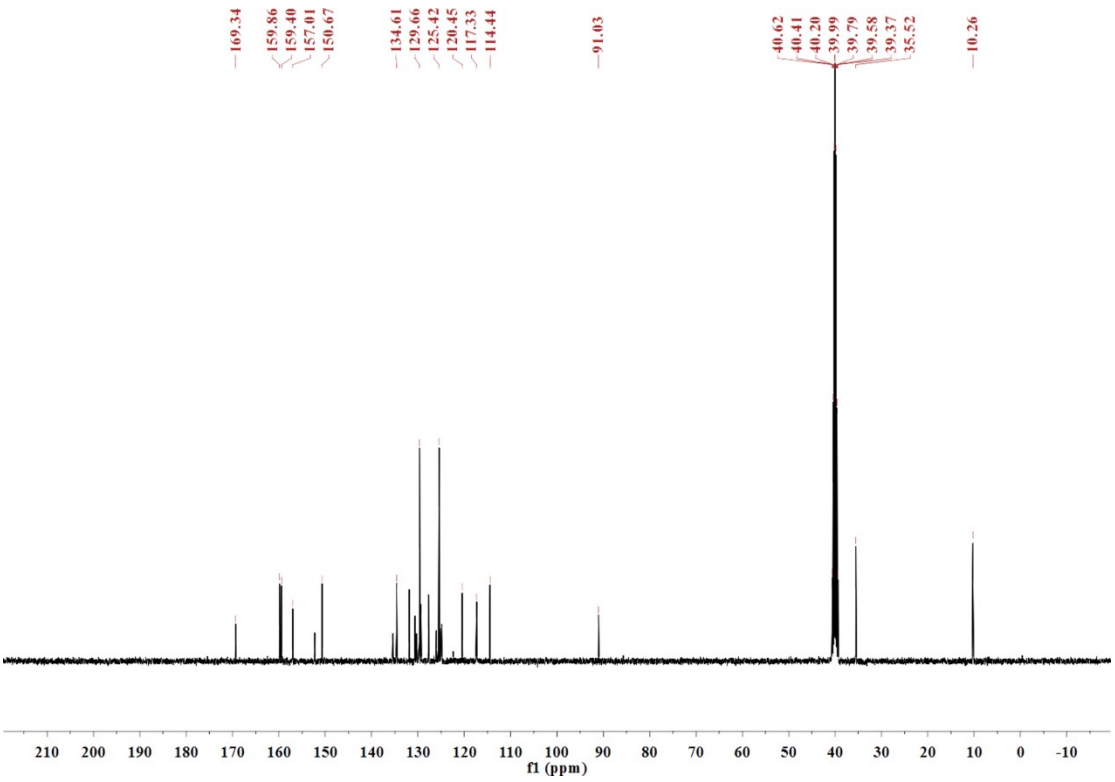

Fig. S2. ^{13}C-NMR spectrum of compound L in DMSO-d_6

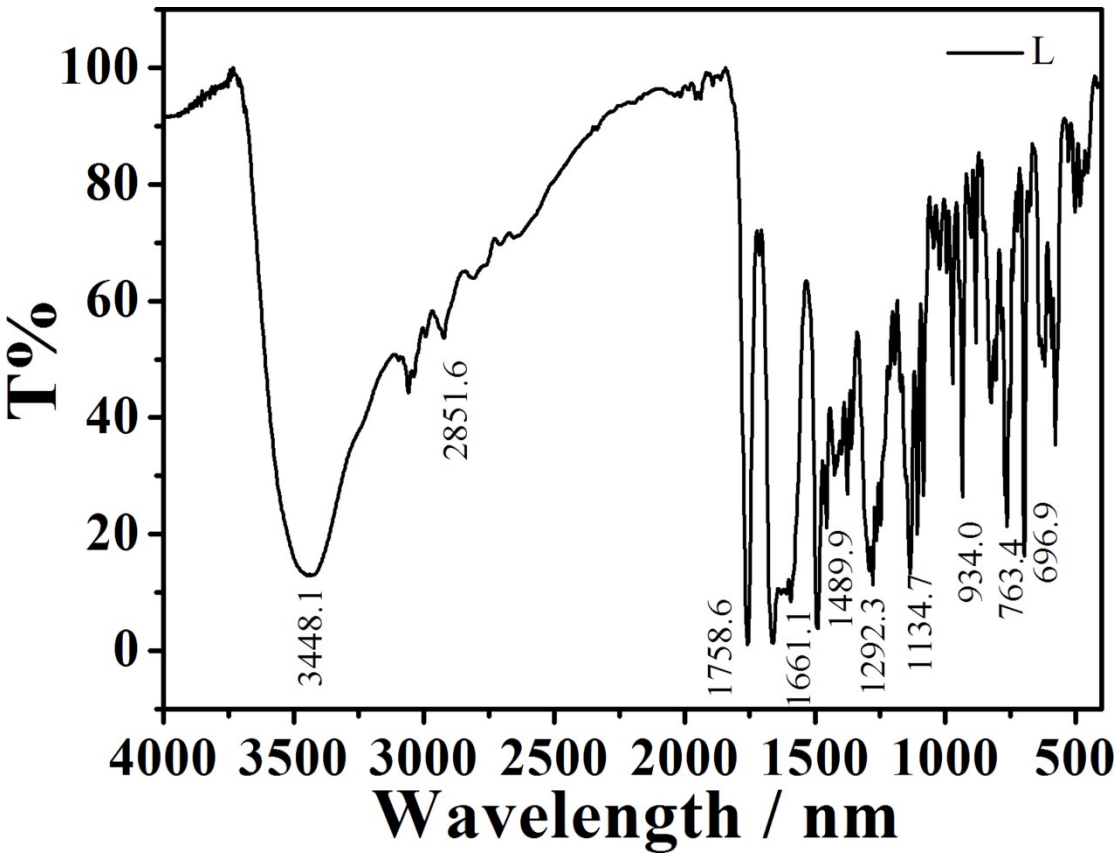

Fig. S3. FT-IR spectra of compound L

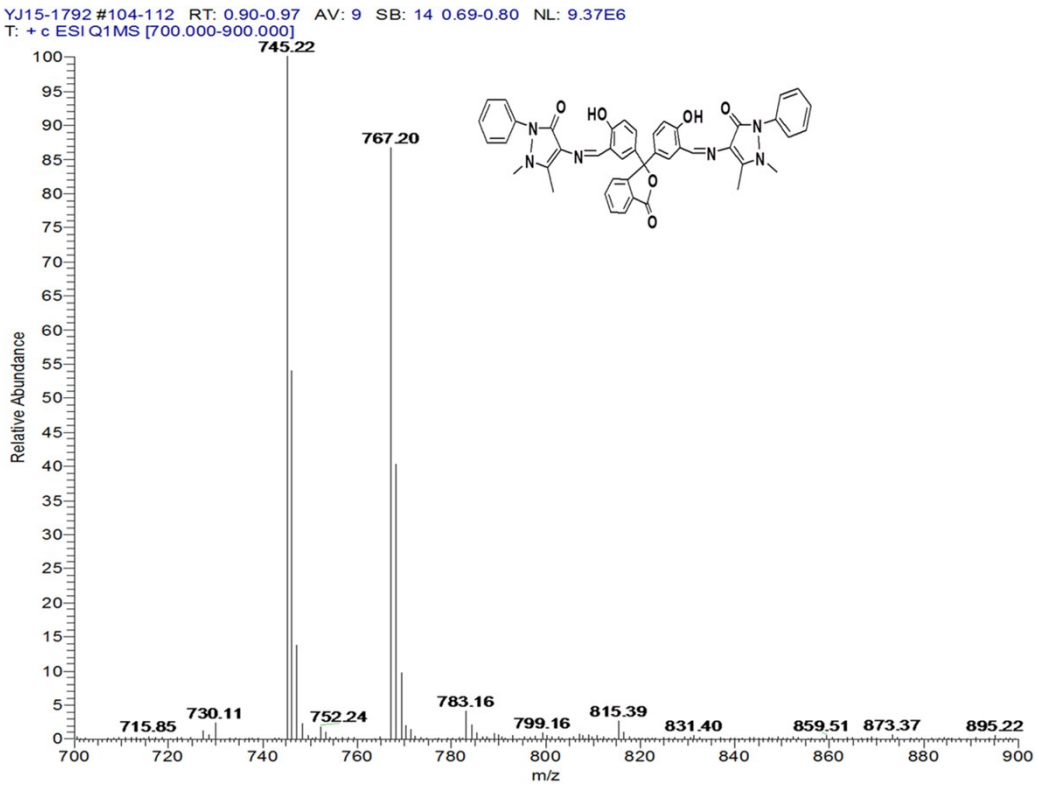

Fig. S4. ESI-MS spectrum of compound L

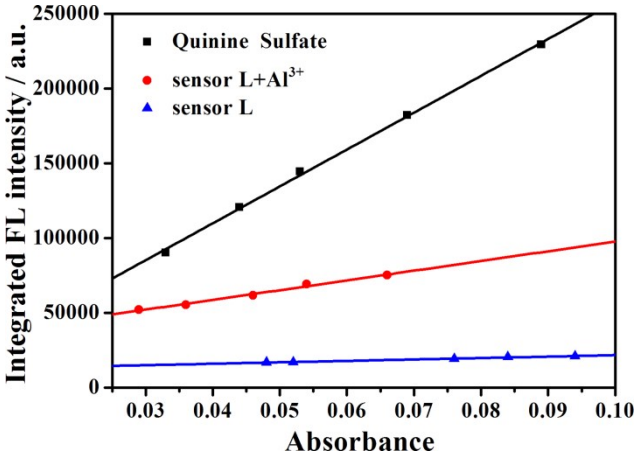

Fig. S5. Plots and fitting line of integrated fluorescence intensity (excited at 350 nm) aginst absorbance values at 350 nm of sulfate quinine (square dots, black), sensor L with Al^{3+} (round dots, red), free sensor L (upper triangle dots, blue).

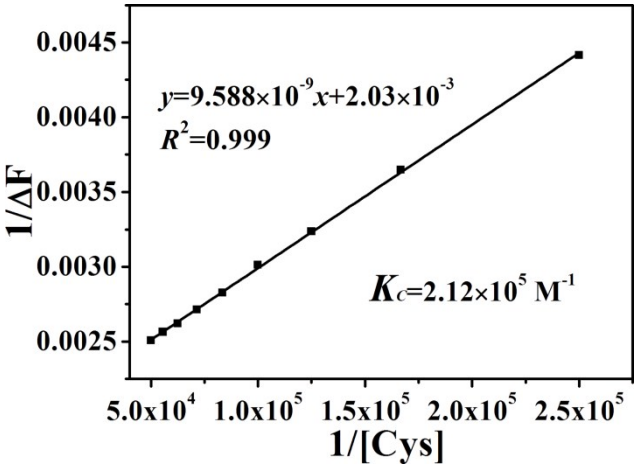

Fig. S6. Benesi-Hildebrand analysis of L-Cu(II) at different Cys concentrations.

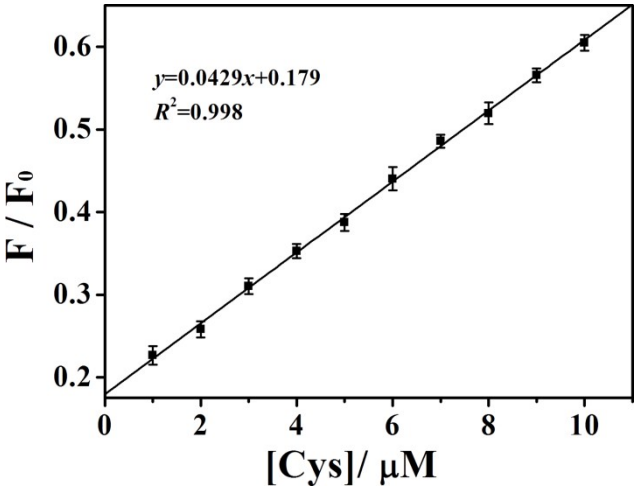

Fig. S7. Correlation of the fluorescence ratio (F/F_0) with different additions of Cys standards to the solution of L-Cu(II) with blood serum.

Table S1. Comparison of our probe with other Schiff base chemosensors for Al^{3+} detection.

Sensor	Probe type	Binding constant	Linear range	LOD	Interfere-nce	Ref.
PMBA	Turn on	4.63×10^6 M^{-1}	0–30 μM	2×10^{-6} M	Cu^{2+} and Zn^{2+}	[1]
1-H	Turn on	3.5×10^4 M^{-1}	—	6.03×10^{-7} M	—	[2]
Sensor 1	Turn on	logβ=8.012	—	1×10^{-7} M	Cu^{2+} and Fe^{3+}	[3]
HANQ	Turn on	—	0–1.5 μM	4×10^{-8} M	—	[4]
CQH	Turn on	3.3×10^6	0–15 μM	8.2×10^{-7} M	Zn^{2+}	[5]
HNN	Turn on	5.08×10^4 M^{-1}	—	2.94×10^{-9} M	Fe^{3+}	[6]
Receptor 1	Turn on	3.5×10^3 M^{-1}	—	1×10^{-5} M	Cu^{2+}	[7]
Receptor L	Turn on	2.63×10^4 M^{-1}	0–50 μM	1.5×10^{-8} M	Cu^{2+}	This work

Table S2. Comparison of our probe with other organic chemosensors for sequential detection of Cys.

Sensor	Method	Binding constant	Linear range	Detection Limit (μM)	Interfere-nce	Analyte	Ref.
Receptor 1	Fluorescence	—	2–8 μM	0.17	—	Cys, Hcy	[8]
BINOL	Fluorescence	1.52×10^3 M^{-1}	—	—	Arg, Lys	Cys,Hcy, GSH	[9]
Cu^{2+}-morin	Fluorescence	—	0.65–22 μM	0.065	—	Cys	[10]
Calcein	Fluorescence	—	0.3–12 μM	0.04	GSH	Cys	[11]
Sensor 1	UV-vis	9.1×10^4 M^{-1}	—	10.77	—	Cys	[12]
Compound 1	Fluorescence	—	0–20 μM	9.0	Hcy and GSH	Cys	[13]
Compound 2	Fluorescence	3.4×10^4 M^{-1}	0–30 μM	6.0	GSH	Cys	[14]
Probe 1	Fluorescence and UV-vis	—	0–25 μM	0.18	—	Cys	[15]
L	Fluorescence and UV-vis	2.12×10^5 M^{-1}	0–20 μM	0.00036	GSH	Cys	This work

References

[1]. J. Q. Wang, L. Huang, L. Gao, J. H. Zhu, Y. Wang, X. Fan and Z. Zou, *Inorg. Chem. Commun.*, 2008, **11**, 203-206.

[2]. S. Sen, T. Mukherjee, B. Chattopadhyay, A. Moirangthem, A. Basu, J. Marek and P. Chattopadhyay, *Analyst*, 2012, **137**, 3975-3981.

[3]. X. H. Jiang, B.-d. Wang, Z. Y. Yang, Y. C. Liu, T.-r. Li and Z. C. Liu, *Inorg. Chem. Commun.*, 2011, **14**, 1224-1227.

[4]. Y. Wang, L. Xiong, F. Geng, F. Zhang and M. Xu, *Analyst*, 2011, **136**, 4809-4814.

[5]. J. C. Qin, T. R. Li, B. D. Wang, Z. Y. Yang and L. Fan, *Spectrochim. Acta, Part A*, 2014, **133**, 38-43.

[6]. X.B. Li, J. Y. Chen and E. J. Wang, *Aust. J. Chem.*, 2015, **68**, 156-160.

[7]. Y. K. Jang, U. C. Nam, H. L. Kwon, I. H. Hwang and C. Kim, *Dyes Pigm.*, 2013, **99**, 6-13.

[8]. Q. Li, Y. Guo and S. Shao, *Sens. Actuators, B*, 2012, **171**, 872-877.

[9]. R. Peng, L. Lin, X. Wu, X. Liu and X. Feng, *J. Org. Chem.*, 2013, **78**, 11602-11605.

[10]. W. S. Liao, F. Y. Wu, Y. M. Wu and X. J. Wang, *Microchim. Acta*, 2008, **162**, 147-152.

[11]. L. Chang, T. Wu and F. Chen, *Microchim. Acta*, 2012, **177**, 295-300.

[12]. S. A. Lee, J. J. Lee, J. W. Shin, K. S. Min and C. Kim, *Dyes Pigm.*, 2015, **116**, 131-138.

[13]. H. Wang, G. Zhou and X. Chen, *Sens. Actuators, B*, 2013, **176**, 698-703.

[14]. O. G. Tsay, K. M. Lee and D. G. Churchill, *New J. Chem.*, 2012, **36**, 1949-1952.

[15]. S. Xue, S. Ding, Q. Zhai, H. Zhang and G. Feng, *Biosens. Bioelectron.*, 2015, **68**, 316-321.