Supporting Information

New fluorescent sensor for Cu^{2+} and S^{2-} in 100% aqueous solution based on displacement approach

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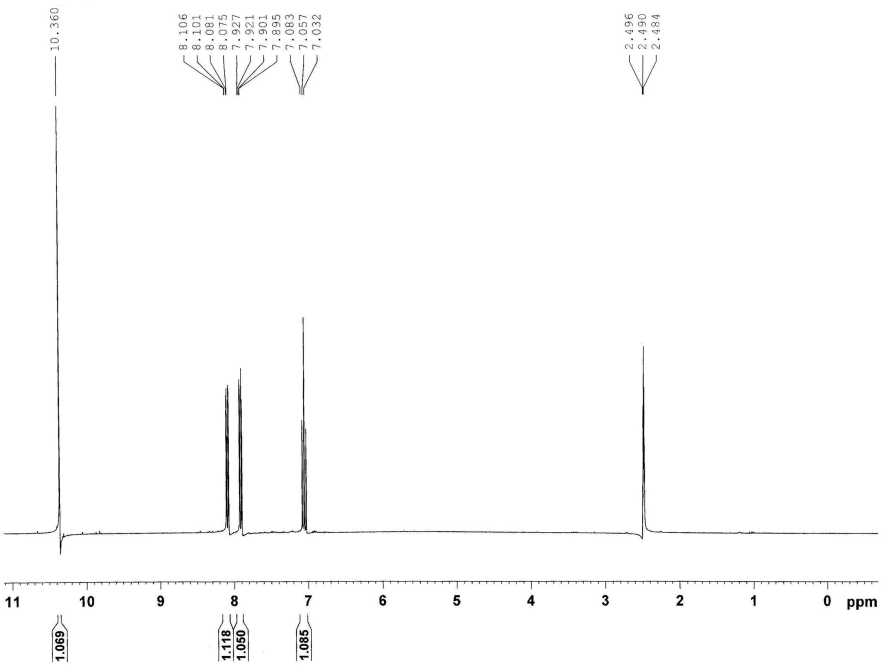

Fig. S1. ^{1}H NMR spectra of 3-formyl-2-hydroxy benzoic acid (400 MHz, DMSO-d_6).

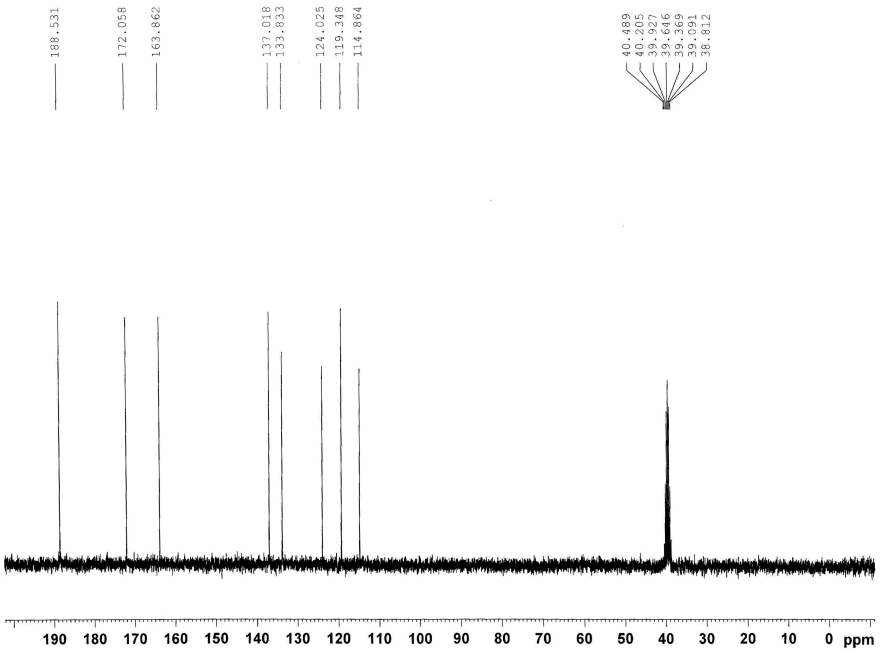

Fig. S2. ^{13}C NMR spectra of 3-formyl-2-hydroxy benzoic acid (400 MHz, DMSO-d_6).

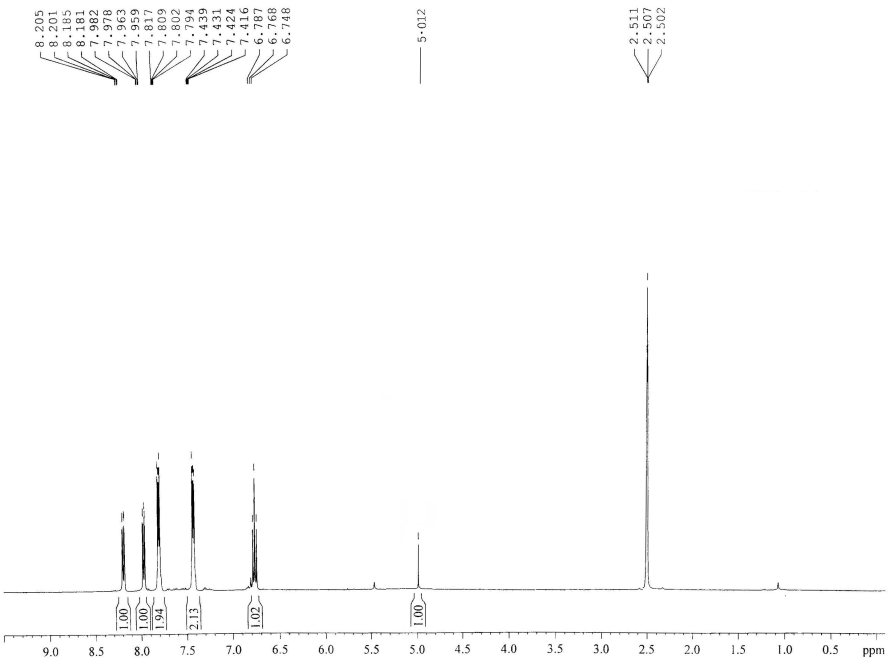

Fig. S3. ^{1}H NMR spectra of **HL** (400 MHz, DMSO-d_6).

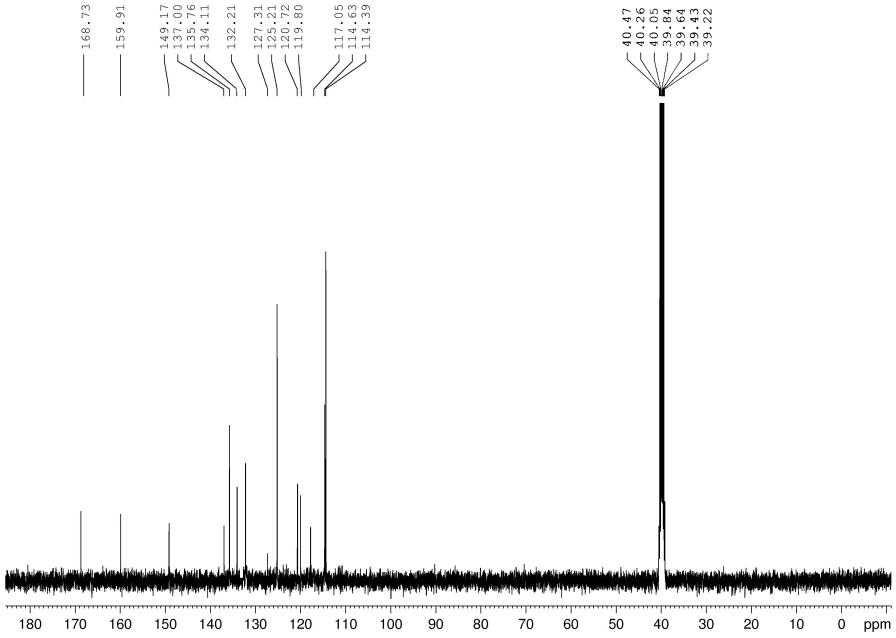

Fig. S4. ^{13}C NMR spectra of **HL** (400 MHz, DMSO-d_6).

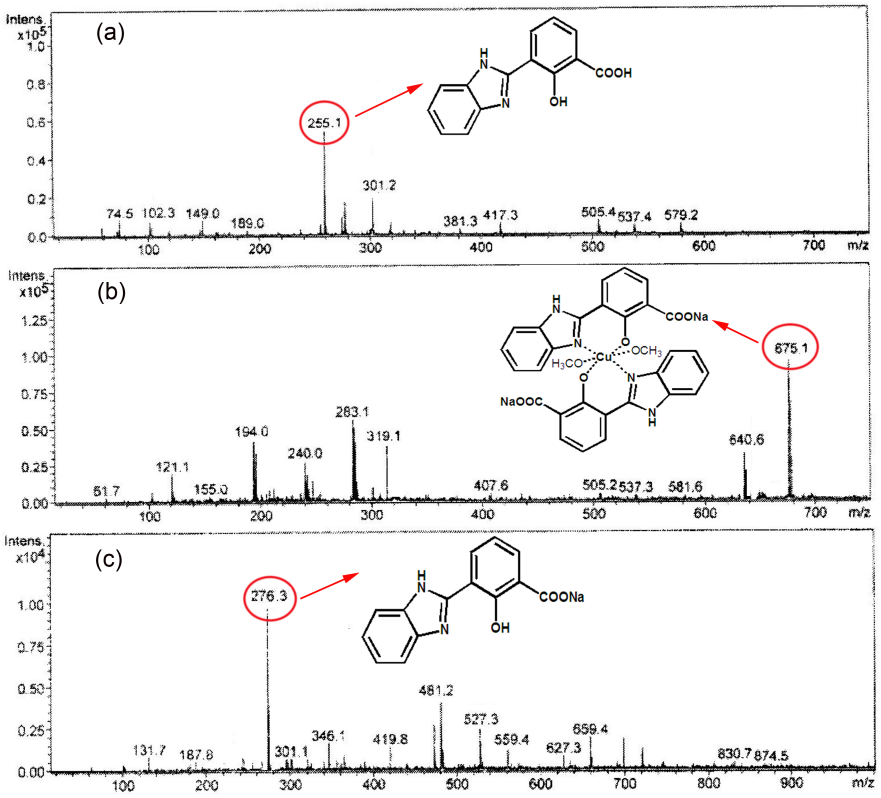

Fig. S5. ESI-MS spectrum of $\mathbf{H_2L}$ (a), **L-Cu** (b), **L-Cu** + S^{2-} (c).

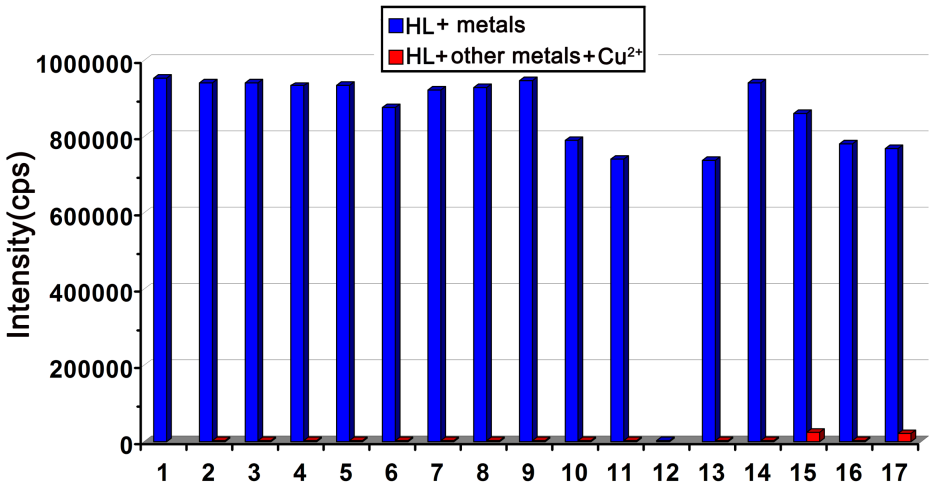

Fig. S6. Fluorescence responses of **HL** (5 μM) to various cations in aqueous solution HEPES-buffer (20 mM, pH 7.4). The blue bars represent the emission intensities of **HL** in the presence of cations of interest (50 μM). The red bars represent the change of the emission that occurs upon the subsequent addition of Cu^{2+} to the above solution. (λ_{ex} = 243 nm, λ_{em} = 436 nm). 1. **HL**, 2. Na^{+}, 3. K^{+}, 4. Mg^{2+}, 5. Ca^{2+}, 6. Zn^{2+}, 7. Cd^{2+}, 8. Mn^{2+}, 9. Co^{2+}, 10. Ni^{2+}, 11. Fe^{2+}, 12. Cu^{2+}, 13. Al^{3+}, 14. Ba^{2+},15. Ag^{+}, 16. Hg^{2+}, 17. Pb^{2+}.

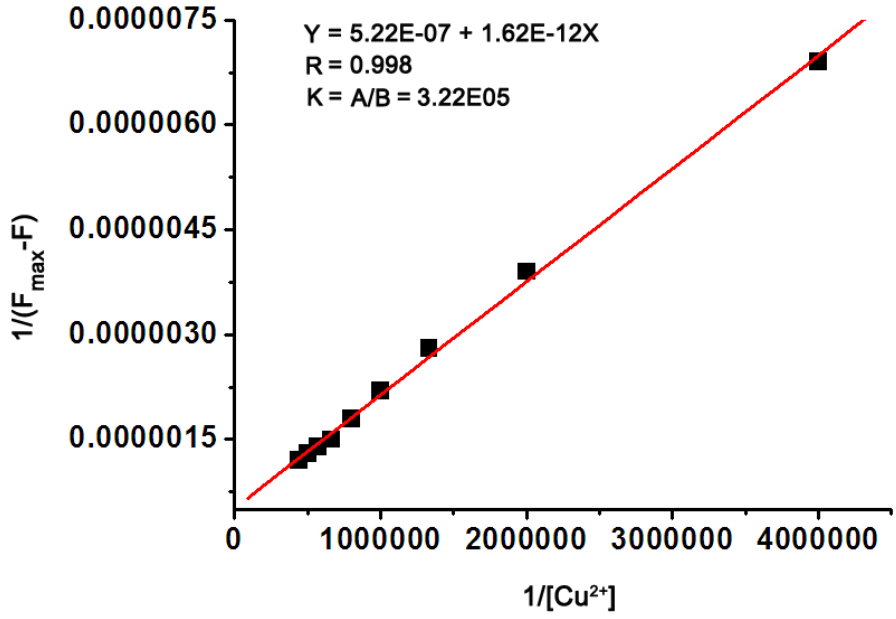

Fig. S7. Benesi–Hildebrand plot for **L-Cu**.

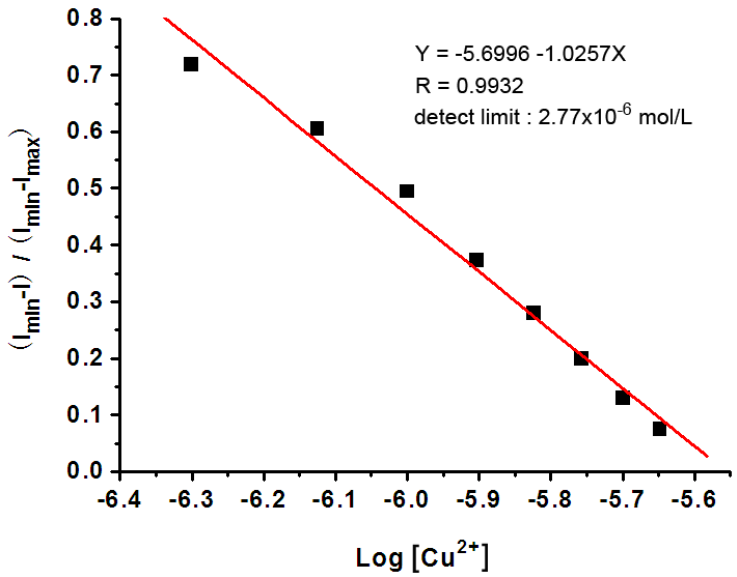

Fig. S8. The limit of detection (LOD) of **HL** for Cu^{2+}: fluorescence responses (λ_{em} = 436 nm) as a function of Cu^{2+} concentration. The solid line represents a linear fit to the experimental data. The detection limit for Cu^{2+} was determined to be 2.77×10^{-6} M.

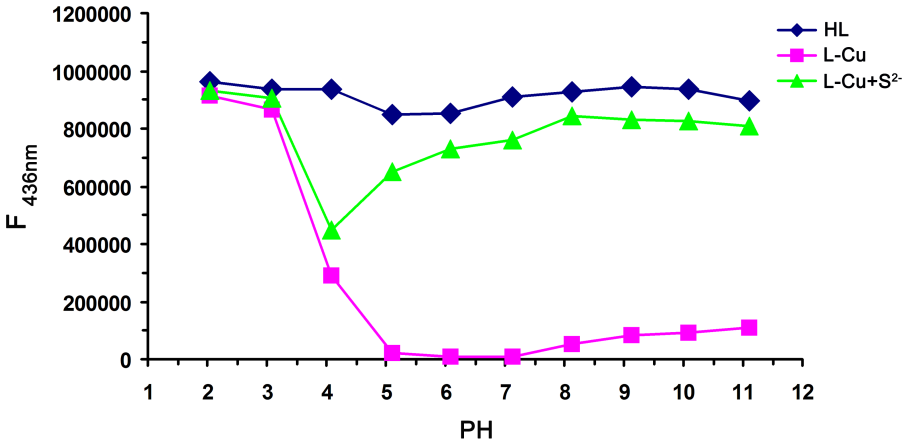

Fig. S9. The pH effects on the fluorescence intensity at 436 nm of the compound **HL** (5 μM) (◆), the **L-Cu** ensemble (5 μM) (■), and the ensemble (5 μM) toward S^{2-} (10 μM) (▲).

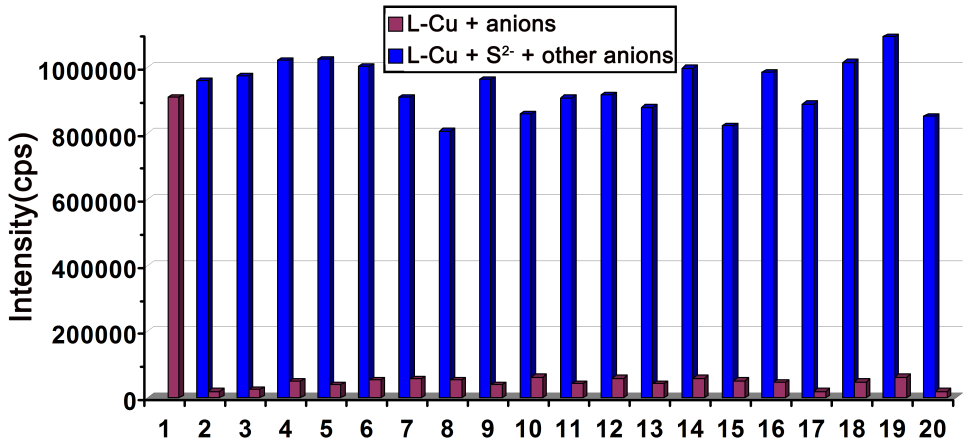

Fig. S10. Fluorescence responses of the **L-Cu** ensemble (5 μM) to various anions in aqueous solution HEPES-buffer (20 mM, pH 7.4). The violet bars represented the emission intensities of **L-Cu** in the presence of different anions (500 μM). The blue bars represented the subsequent addition of S^{2-} to the above solution. (λ_{ex} = 243 nm, λ_{em} = 436 nm). 1. S^{2-}, 2. F^-, 3. Cl^-, 4. Br^-, 5. I^-, 6. SO_3^{2-}, 7. NO_3^-, 8. NO_2^-, 9. SO_4^{2-}, 10. CO_3^{2-}, 11. $H_2PO_4^-$, 12. ClO_4^-, 13. AcO^-, 14. PO_4^{3-}, 15. N_3^-, 16. HSO_4^-, 17.HS^-, 18. HSO_3^-, 19. SCN^-, 20. $S_2O_5^{2-}$.

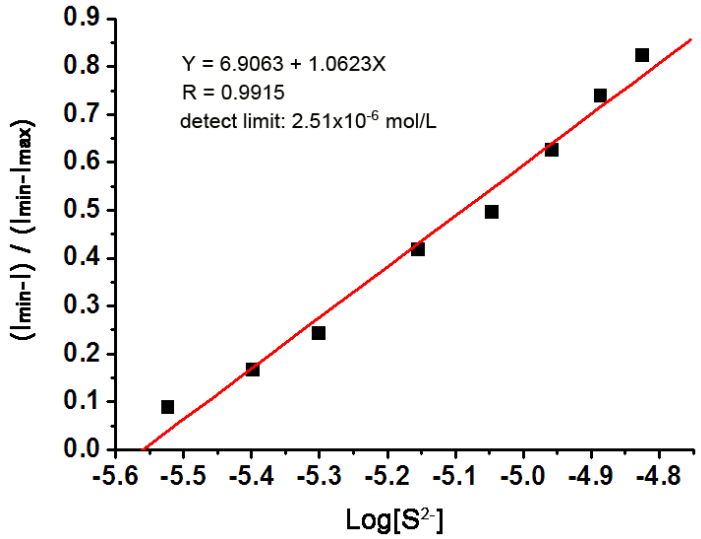

Fig. S11. The limit of detection (LOD) of **L-Cu** for S^{2-} was determined to be 2.51 × 10^{-6} M.

Table S1. Fluorescence lifetime decay parameters of **HL**, **L-Cu** ensemble and **L-Cu** + S^{2-}.

Samples	B_1	T_1/ns	B_2	T_2/ns	<T>/ns	χ^2
HL	4.9273	4.05452				1.1185
L-Cu	3.4177	2.0073	1.8380	6.2557	3.4930	1.1096
L-Cu+S^{2-}	4.7801	4.0494				1.0637