Electronic Supplementary Material (ESI) for Analytical Methods.
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# Supporting information for

# Pyrrole-containing hydrazone and its resultant $Cu^{2+}$ complex: an easily accessible optical chemosensor system for the successive detection of $Zn^{2+}/Cu^{2+}$ and pyrophosphate

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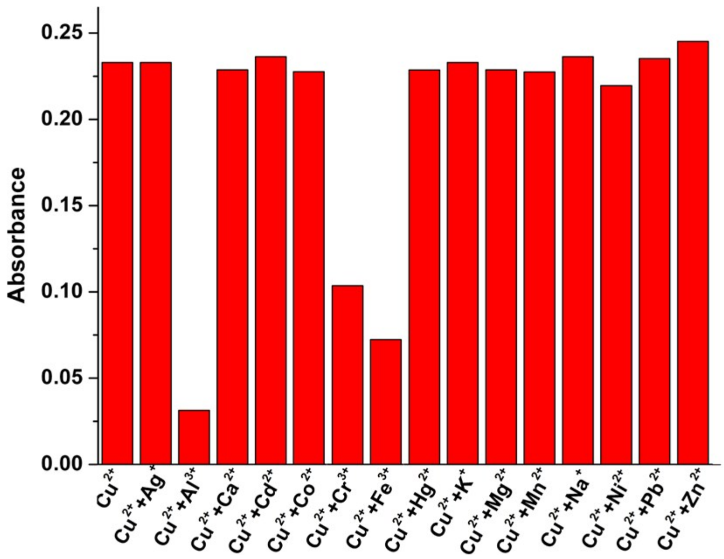


**Fig. S1** The effect of 10 μM coexistent metal cations on the absorbance at 432 nm of 10 μM **1** with 10 μM $Cu^{2+}$ in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution.

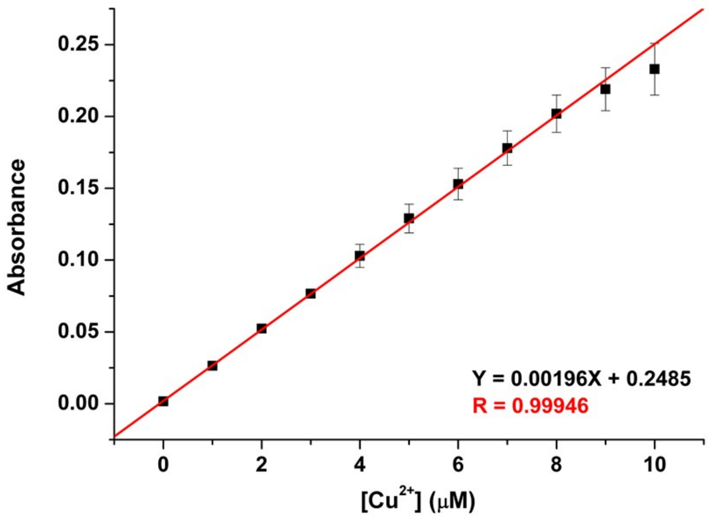


**Fig. S2** The linear relation of the absorbance at 432 nm and the concentration of $Cu^{2+}$ (0-10 μM).

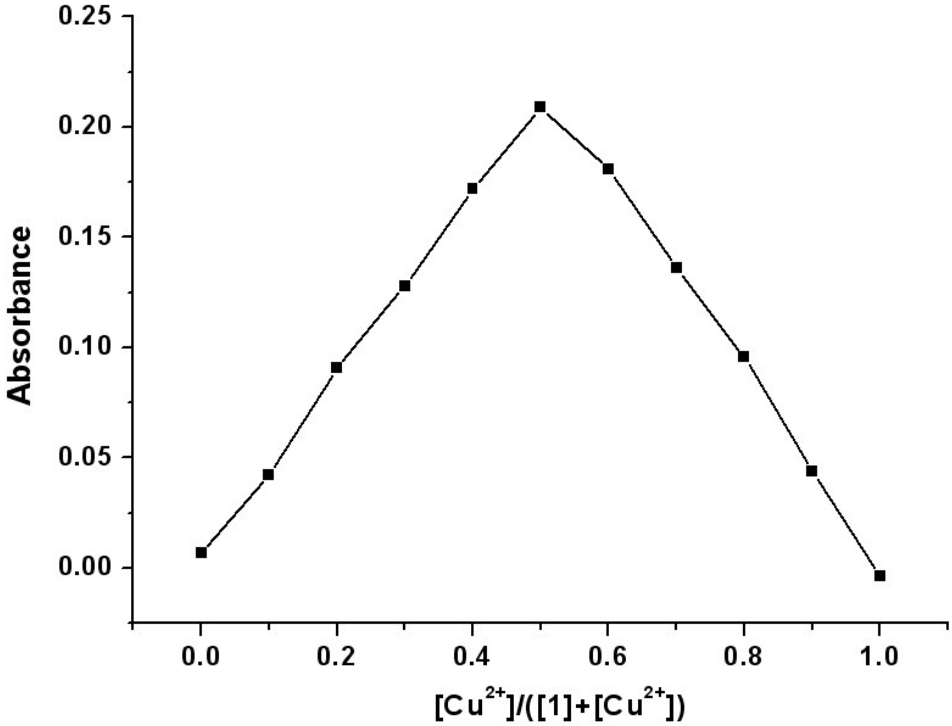


**Fig. S3** Job plots of **1** and $Cu^{2+}$ in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution according to the absorbance at 432 nm. The total concentration of **1** and $Cu^{2+}$ were all kept at 20 μM.

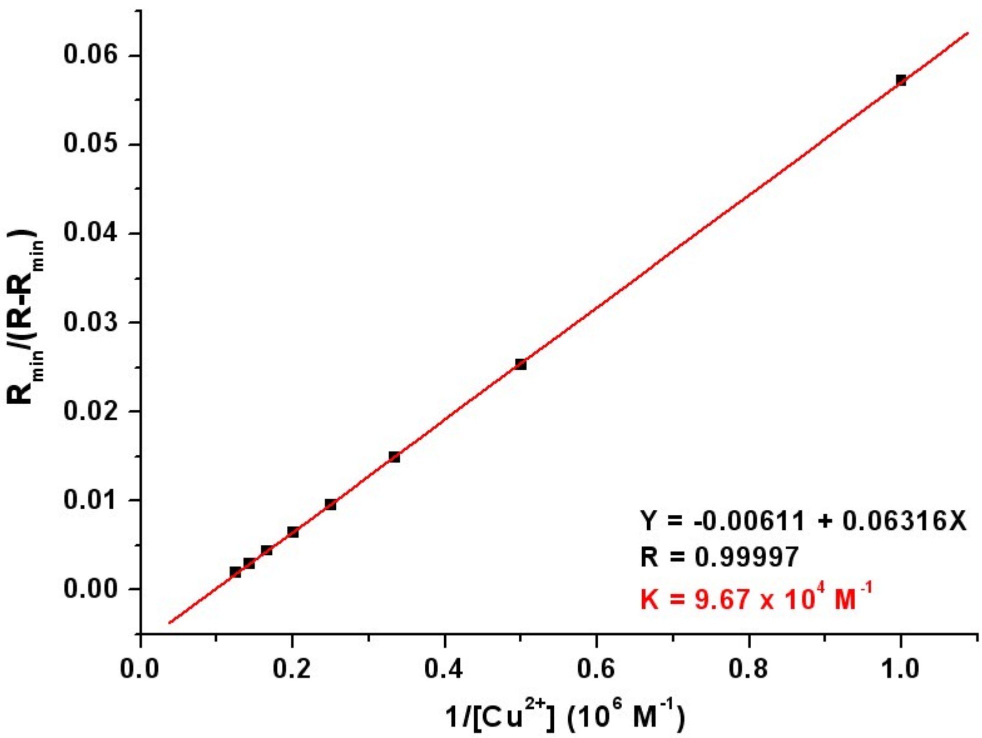


**Fig. S4** The Benesi-Hildebrand plot of the **1**+$Cu^{2+}$ complex (where R = $A_{432}/A_{346}$).

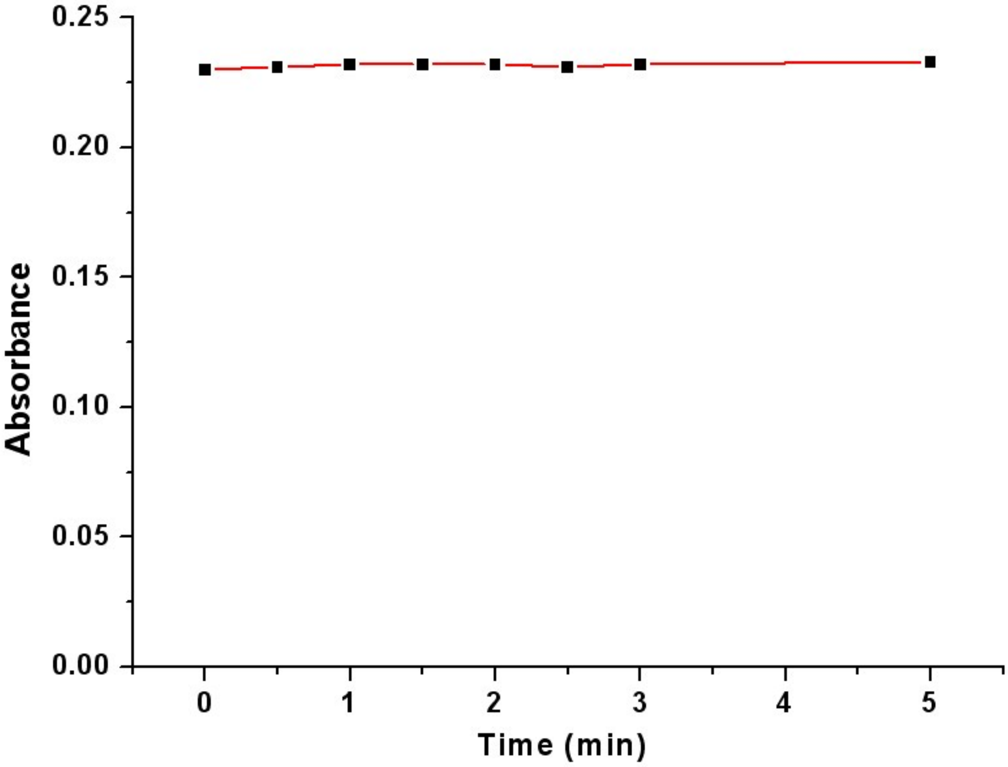


**Fig. S5** Time course for the absorbance response of 10 μM **1** upon the addition of 10 μM $Cu^{2+}$ in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution at room temperature.

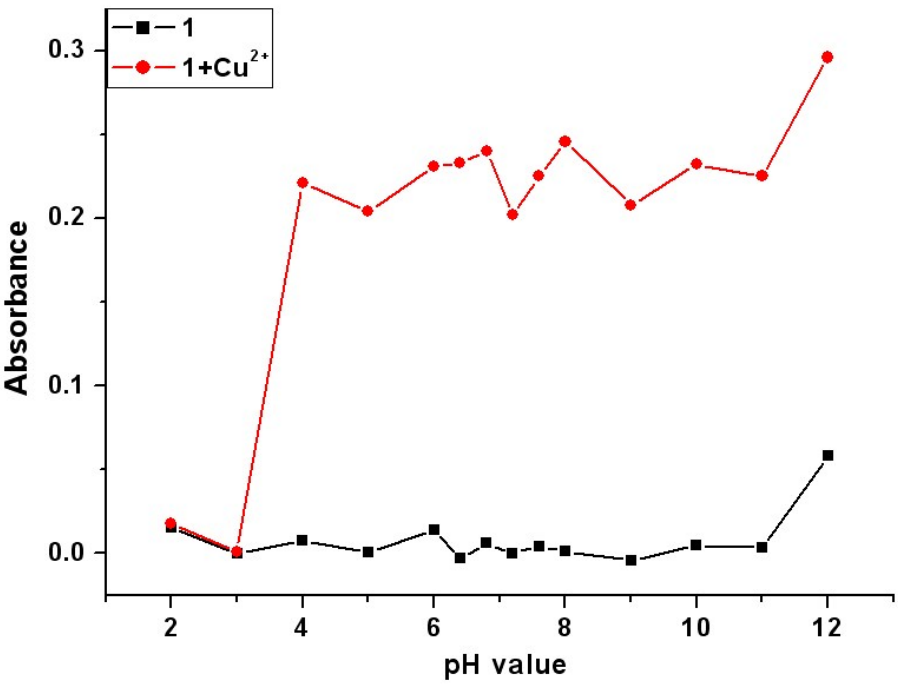


**Fig. S6** The effect of pH (2.0-12.0) on the absorbance at 432 nm of 10 μM probe **1** with 10 μM $Cu^{2+}$ in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution.

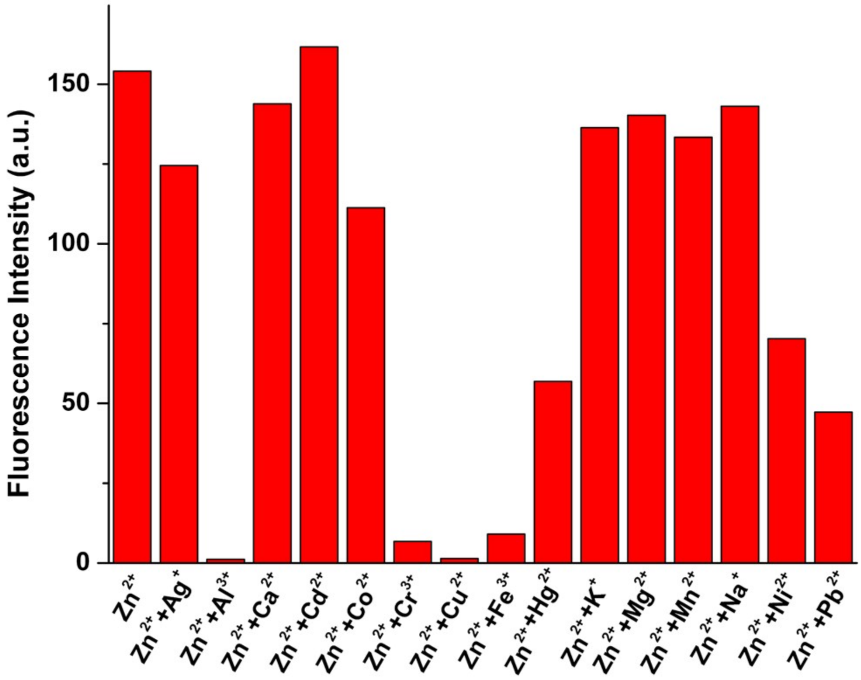


**Fig. S7** The effect of 10 μM coexistent metal cations on the fluorescence intensity at 532 nm of 10 μM **1** with 10 μM $Zn^{2+}$ in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution.

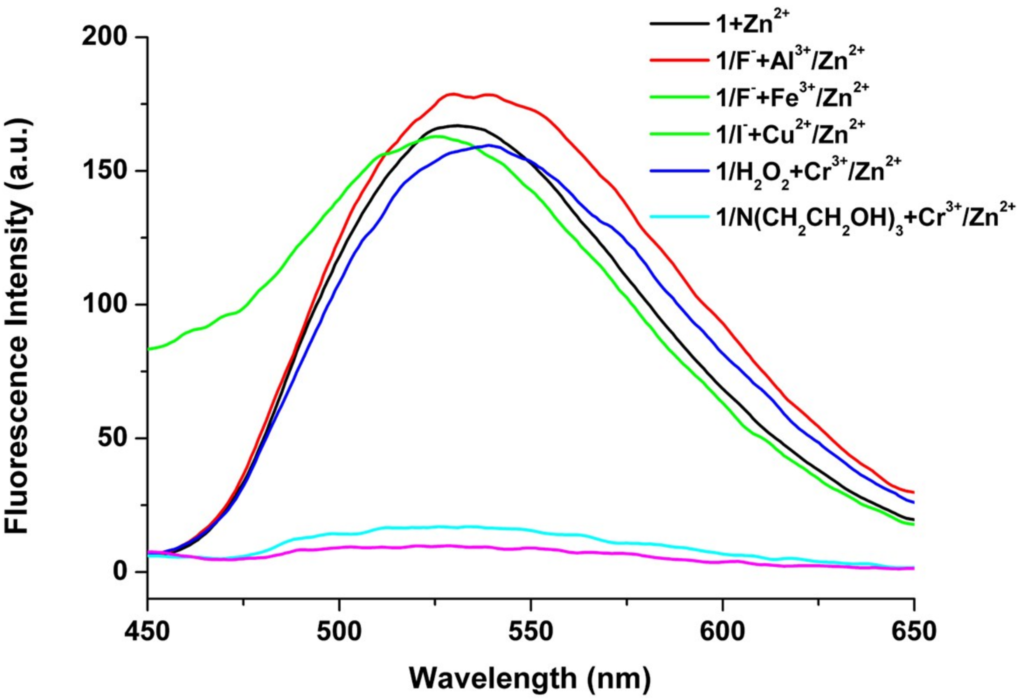


**Fig. S8** The effect of 20 μM masking reagents ($F^-$ for $Al^{3+}$/$Fe^{3+}$, $I^-$ for $Cu^{2+}$, $H_2O_2$ and $N(CH_2CH_2OH)_3$ for $Cr^{3+}$) on the fluorescence emission of 10 μM **1** with 10 μM $Zn^{2+}$ and 10 μM coexistent metal cations in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution.

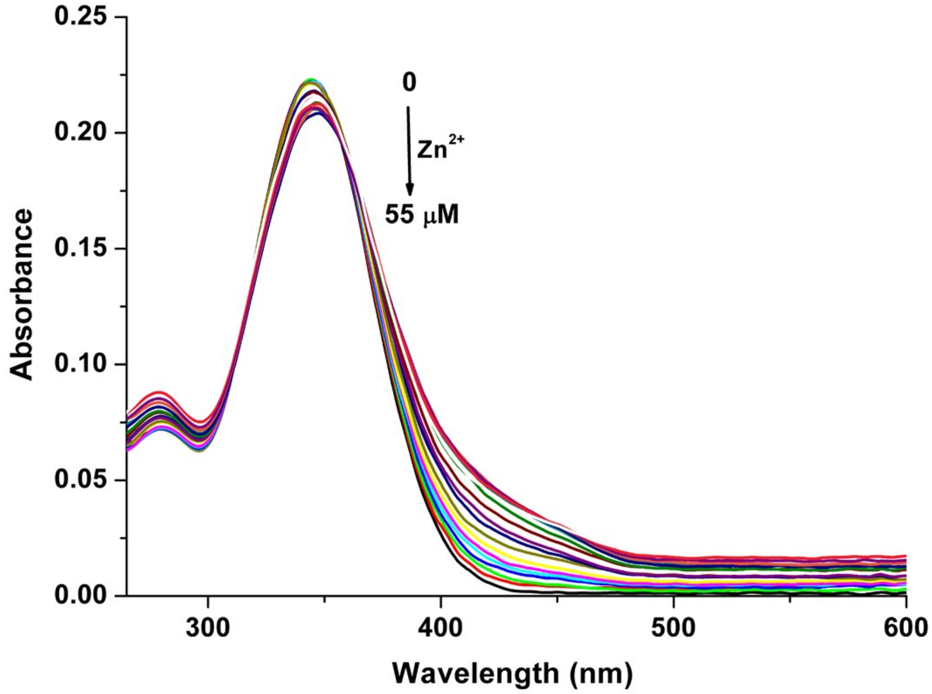


**Fig. S9** Absorption spectra of 10 μM probe **1** upon the addition of $Zn^{2+}$ (0-55 μM) in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution.

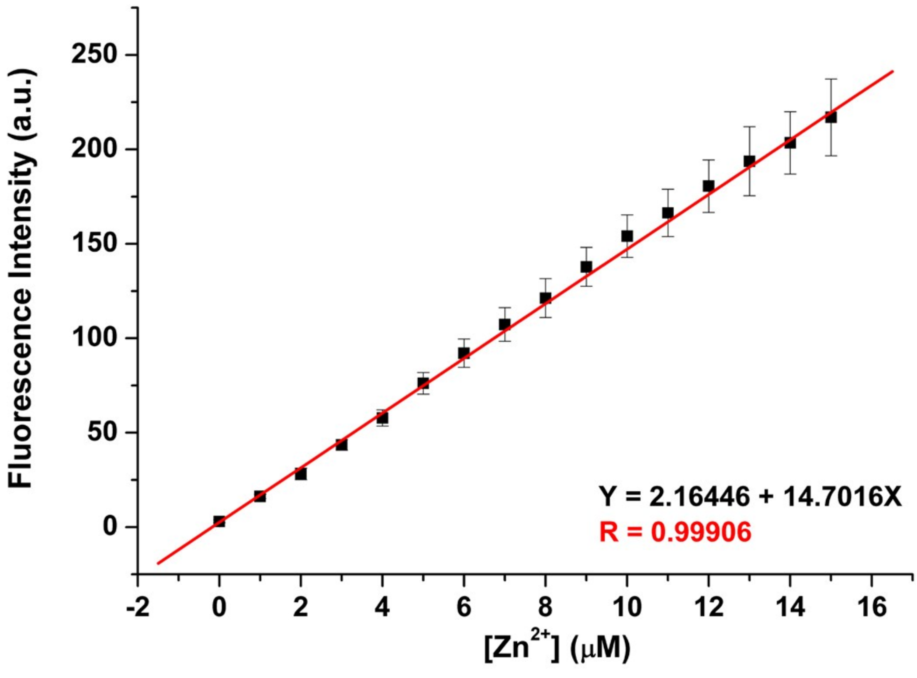


**Fig. S10** The linear relation of the fluorescence intensity at 532 nm and the concentration of $Zn^{2+}$ (0-15 μM).

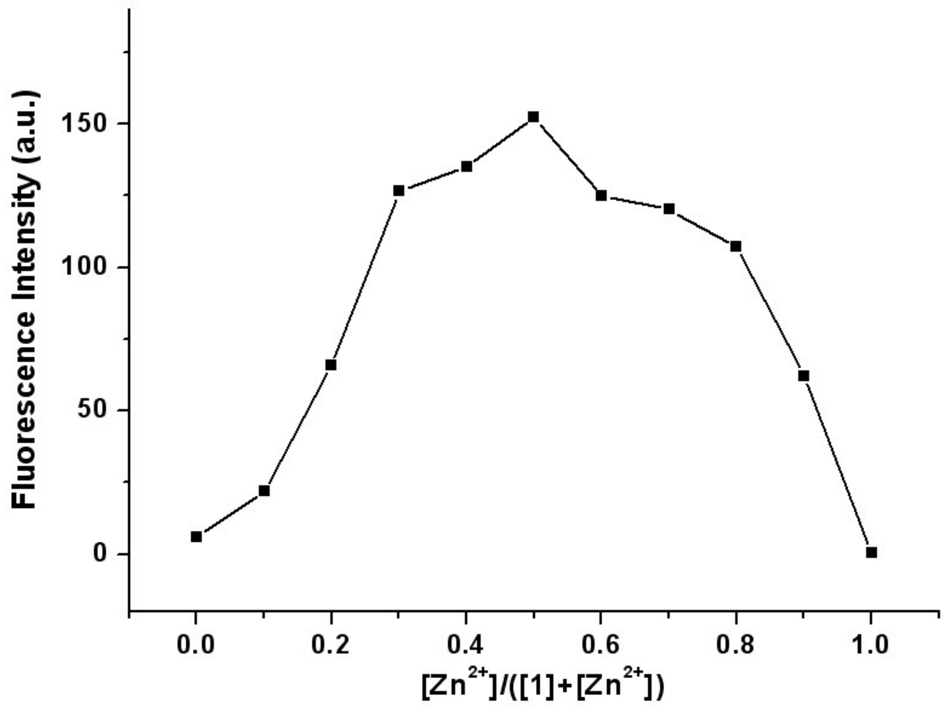


**Fig. S11** Job plots of **1** and $Zn^{2+}$ in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution according to the fluorescence intensity at 532 nm. The total concentration of **1** and $Zn^{2+}$ were all kept at 20 μM.

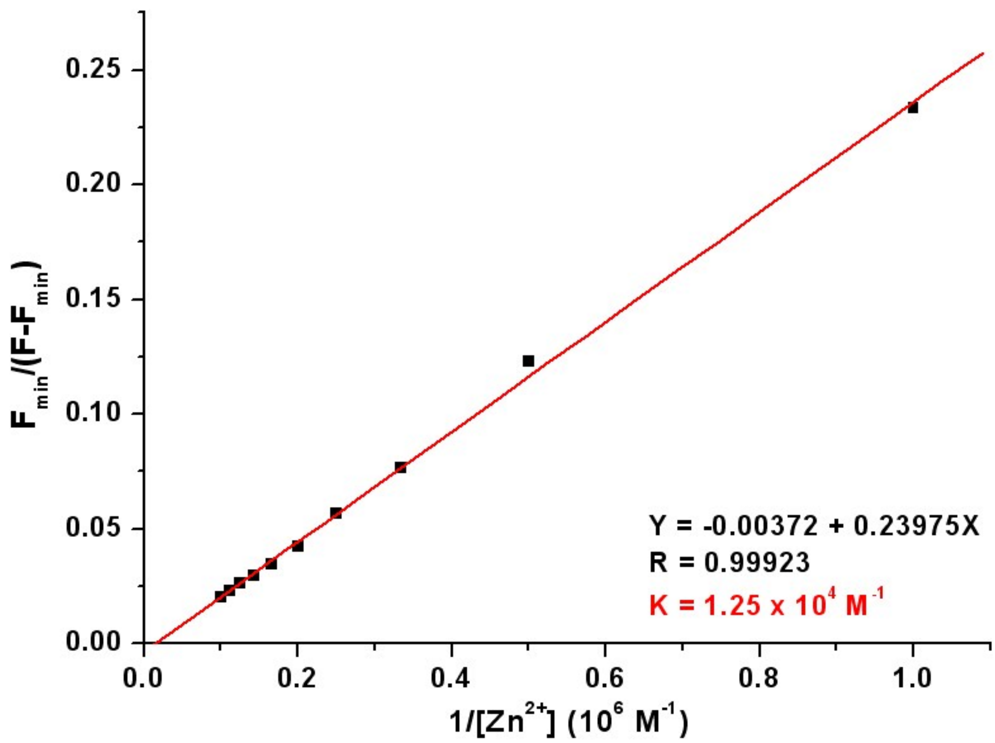


**Fig. S12** The Benesi-Hildebrand plot of the **1**+$Zn^{2+}$ complex.

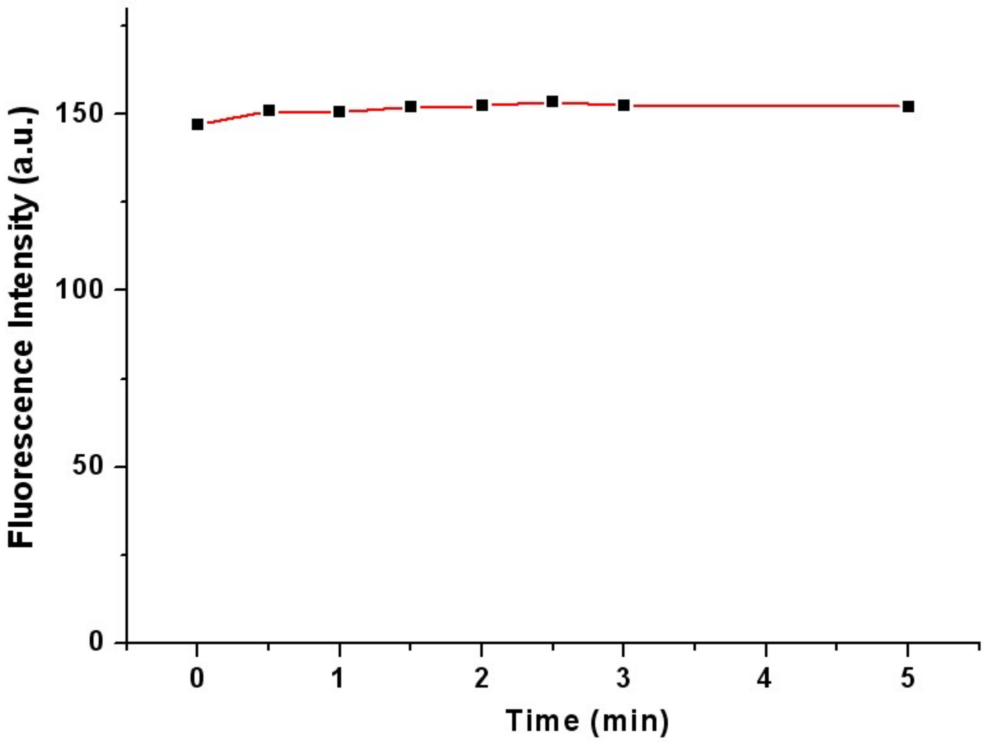


**Fig. S13** Time course for the fluorescence response of 10 μM **1** upon the addition of 10 μM $Zn^{2+}$ in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution at room temperature.

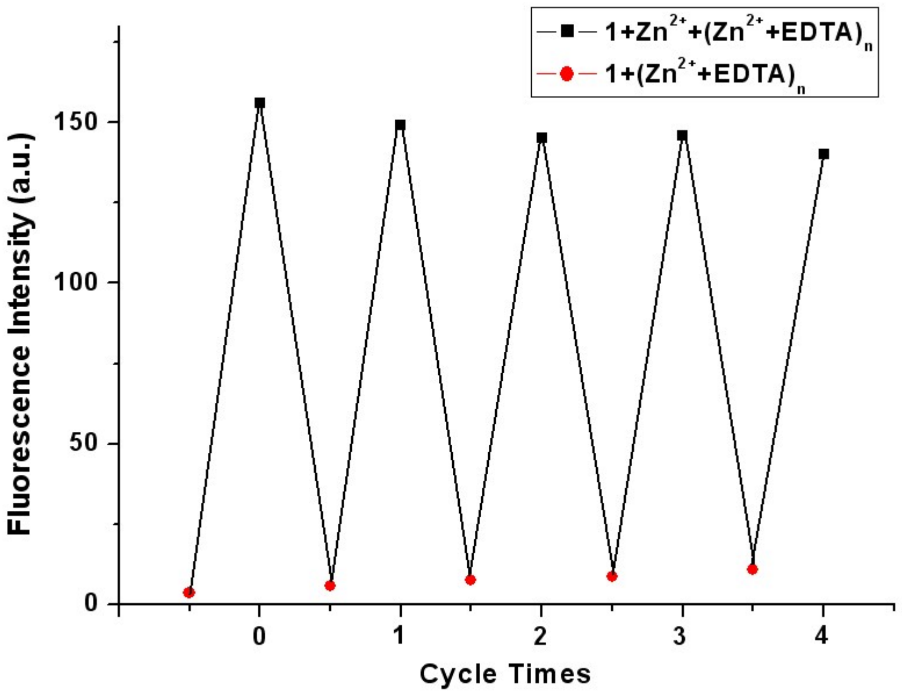


**Fig. S14** Fluorescence intensity changes at 532 nm of **1** (10 μM) upon alternating addition of $Zn^{2+}$ (10 μM) and EDTA (10 μM) in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution.

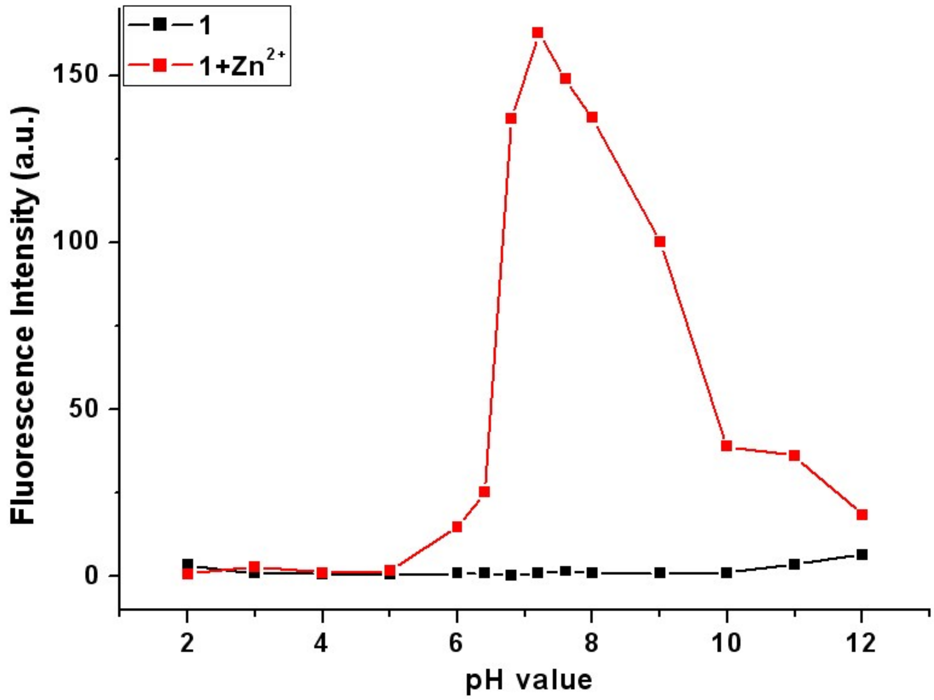


**Fig. S15** The effect of pH (2.0-12.0) on the fluorescence intensity at 532 nm of 10 μM probe **1** with 10 μM $Zn^{2+}$ in DMF/$H_2O$ (8/2, v/v, pH = 7.40) solution.

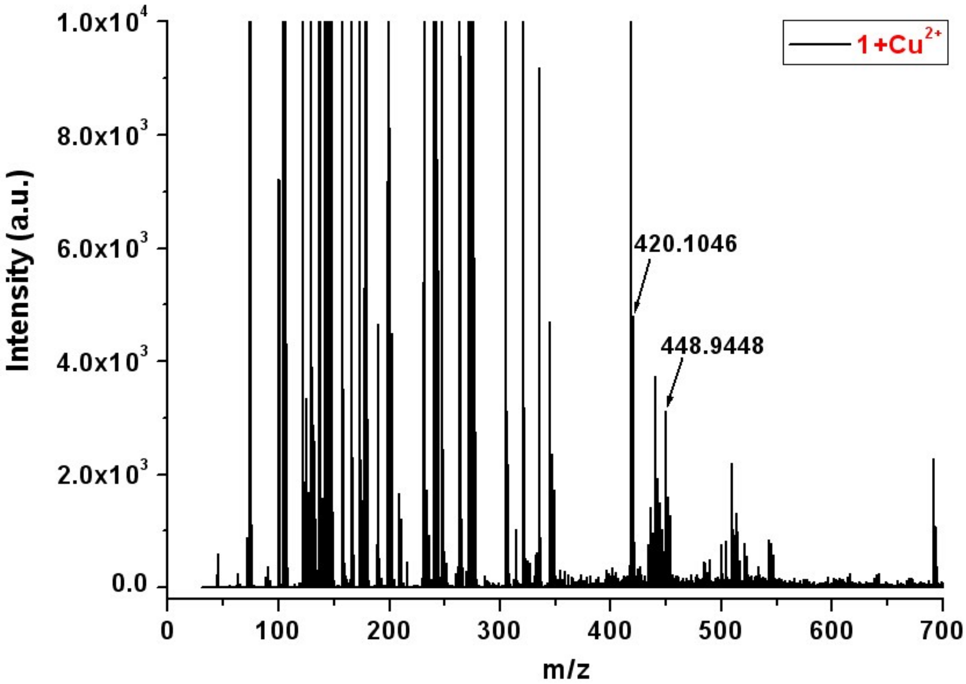


**Fig. S16** Partial of ESI-MS spectra of **1** with $Cu^{2+}$ in DMF solution.

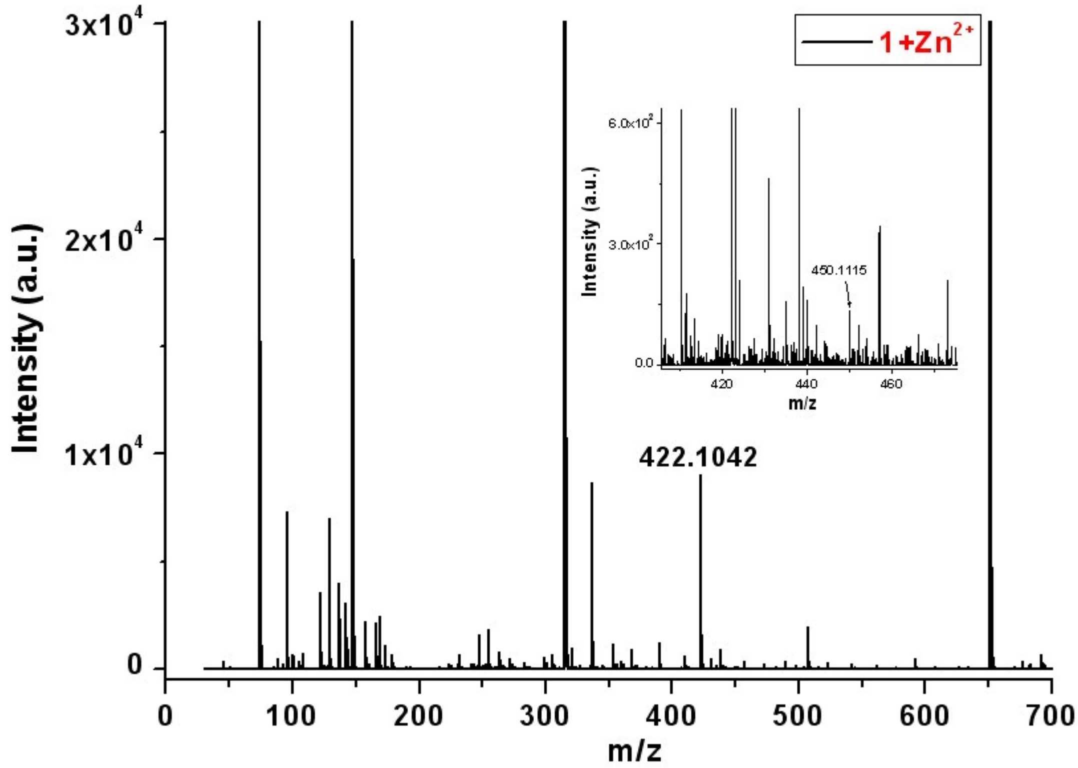


**Fig. S17** Partial of ESI-MS spectra of **1** with $Cu^{2+}$ in DMF solution.

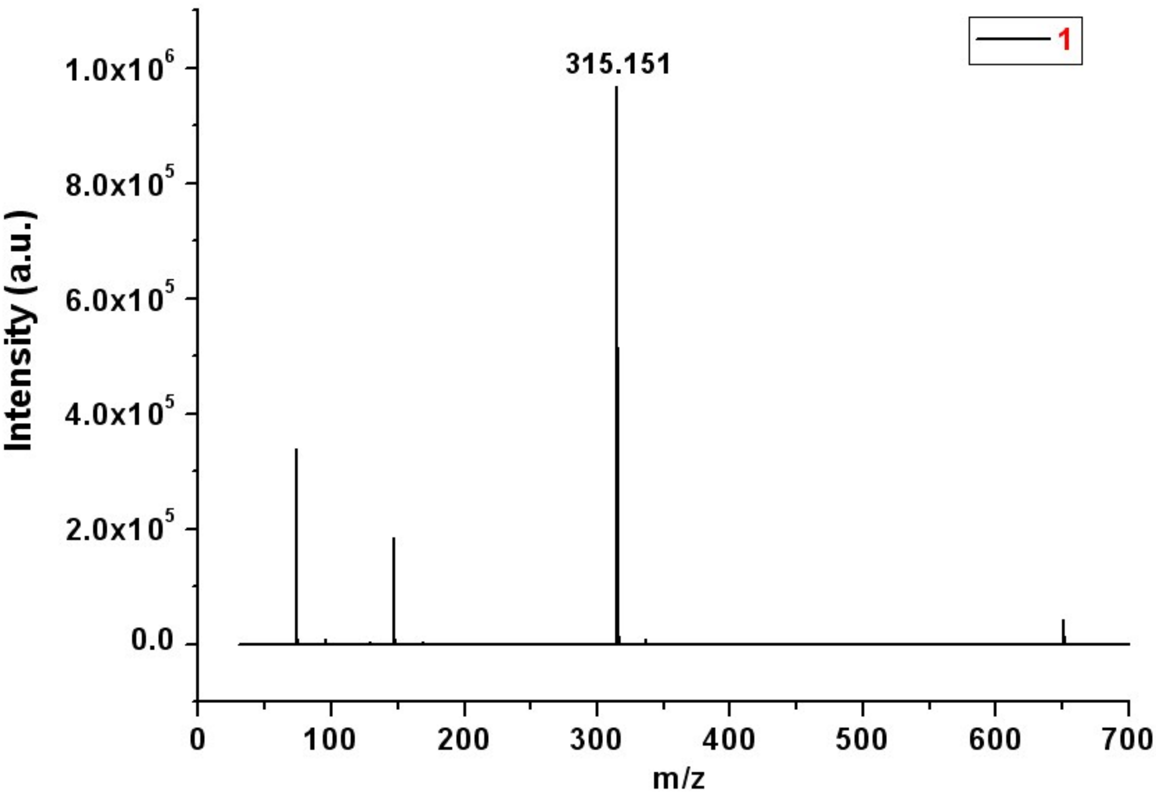


**Fig. S18** Partial of ESI-MS spectra of **1** in DMF solution.

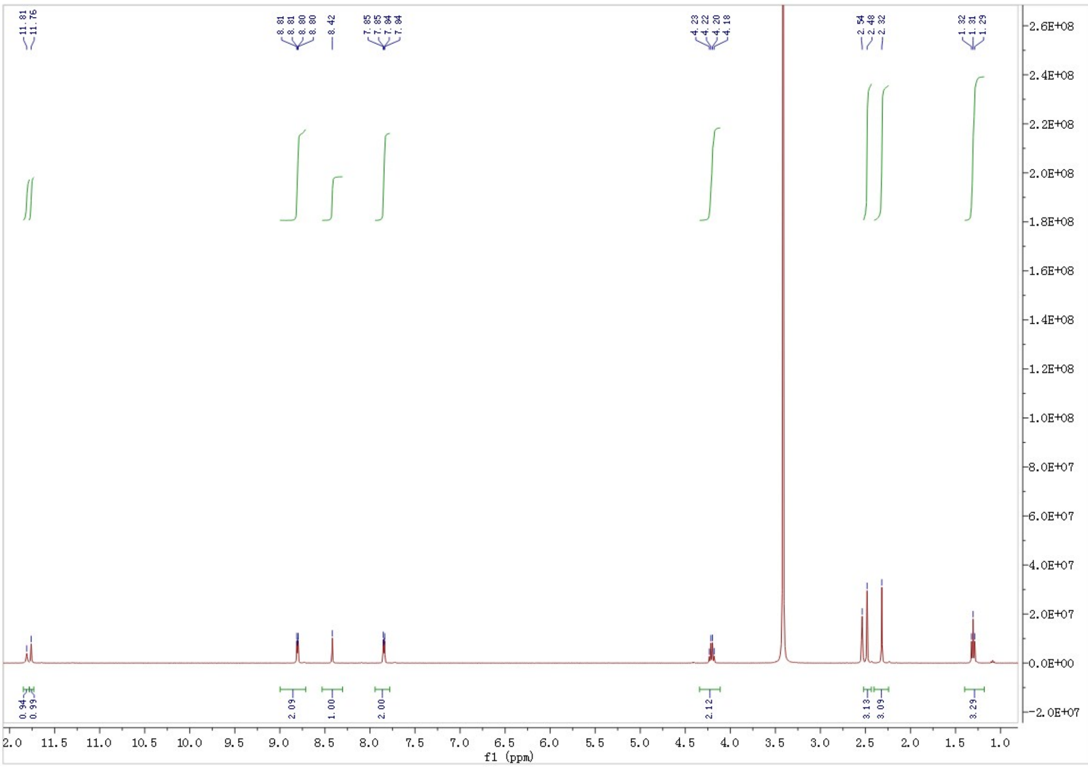

**Fig. S19** $^{1}H$ NMR of **1** in DMSO-$d_6$ solution.

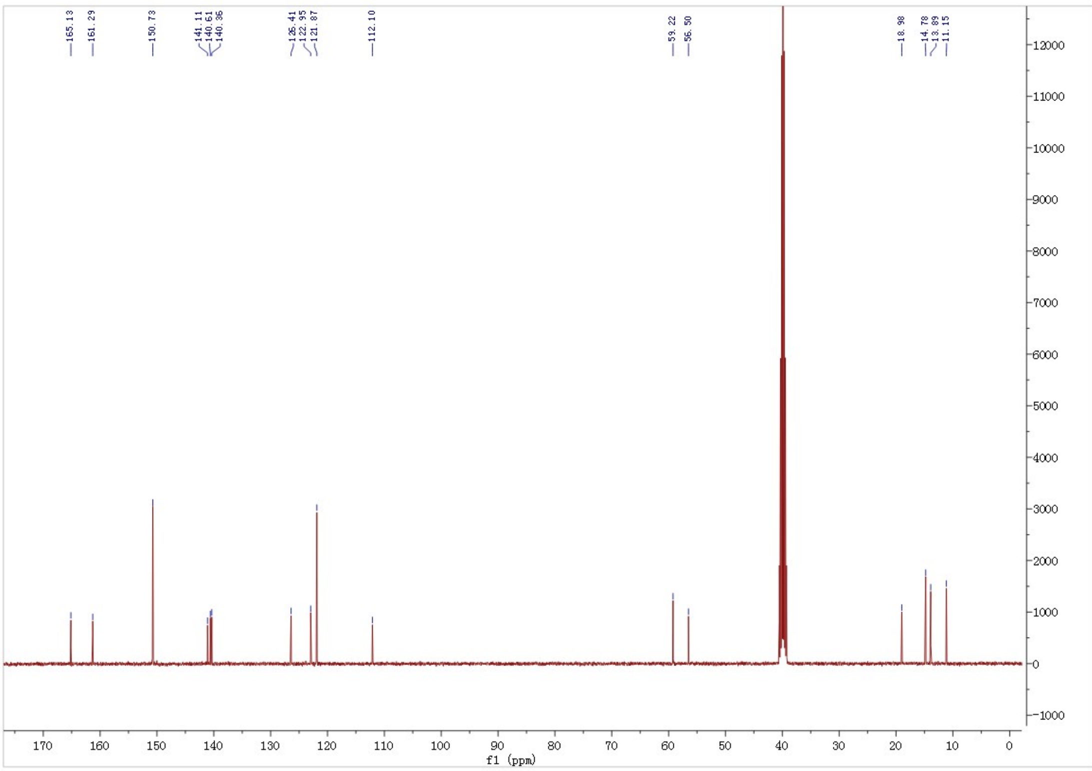

**Fig. S20** $^{13}C$ NMR of **1** in DMSO-$d_6$ solution.