Supplementary information

A highly sensitive and fast responsive naphthalimide-based fluorescent probe for Cu^{2+} and its application

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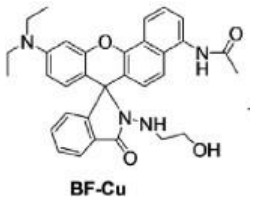
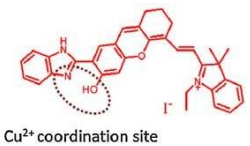
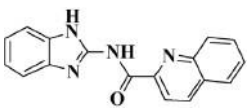
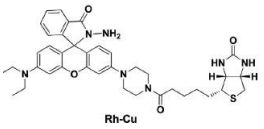
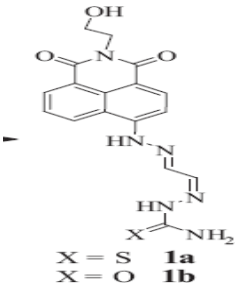
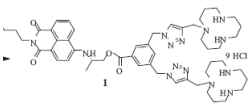
Table S1. Comparison of some reported probes for Cu^{2+}

Probe	Linear range	Detection limit	Response time	applications	Ref.
 BF-Cu	/	7.8x10^{-8} M	30 min	L929 cells	25
 Cu^{2+} coordination site	1×10^{-7} to 5×10^{-7}M	14 nM	/	Hela cells	21
	0-50 uM	1.35 × 10−7M	4 min	HeLa cells	22

N-doped carbon dots from lemon juice	0 to 15 μM.	0.047 μM	few minutes.	river water sample	20
A hydrophobic carbon dots (HCDs) prepared by self-assembly of polymer DSPE-PEG	2×10^{-7} to 1×10^{-6} M	36 nM	/	live HL-7702 cells	23
 Rh-Cu	0–40 μM	0.15 μM	30 min	HeLa cells 4T1 cells	24
 X = S 1a X = O 1b	/	0.0326 μM	/	Hela cells	17
	0–10 μM	1.3×10^{-8} M	/	HeLa and A549 cells	28
naphthalimide-based fluorescent probe containing diglycolamine	0-10 μM	49 nM	20 s	MCF-7 cells	This work

"/" not mentioned

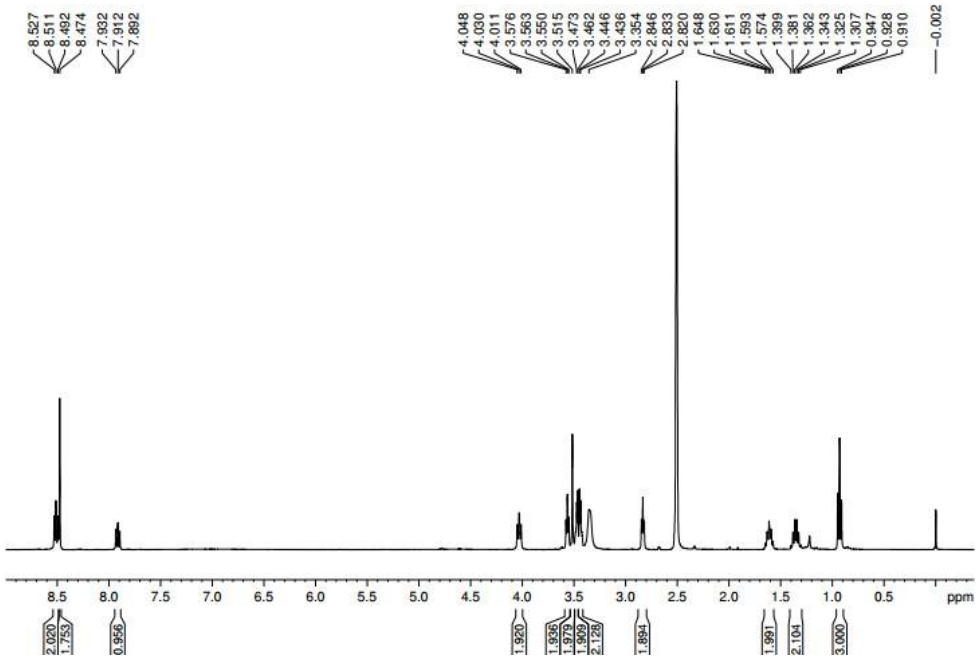


Figure S1. ^{1}H NMR spectra of L (400 MHz, DMSO)

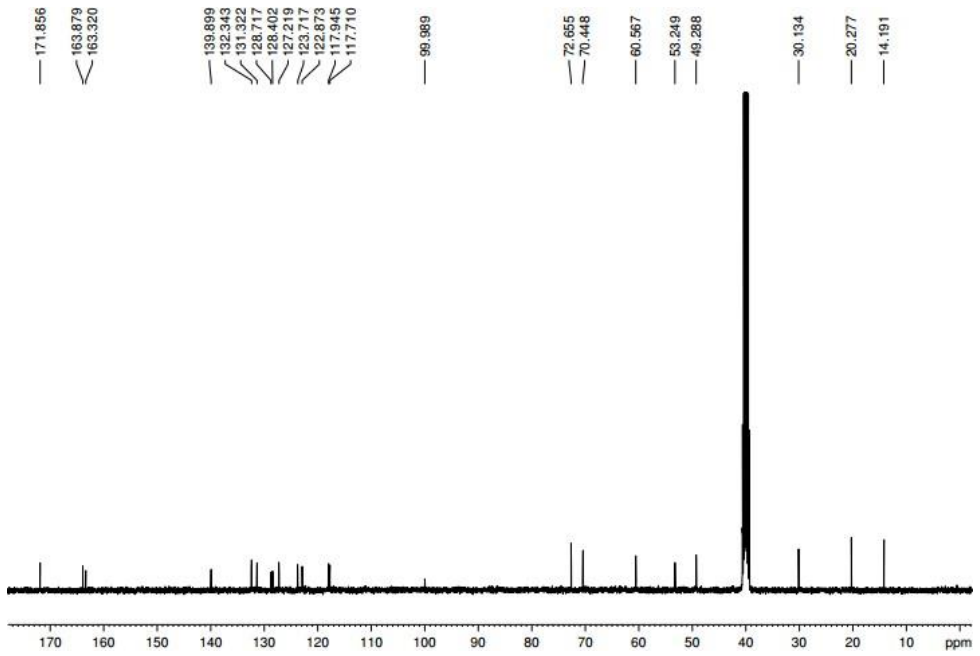


Figure S2. ^{13}C NMR spectra of L (400 MHz, DMSO)

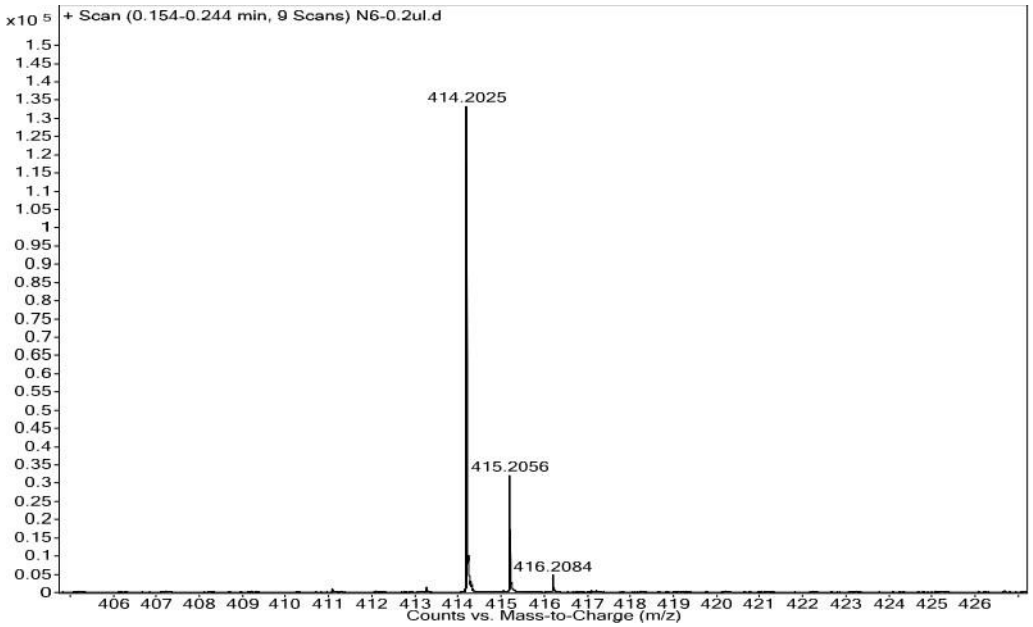


Figure S3. HR-MS of L

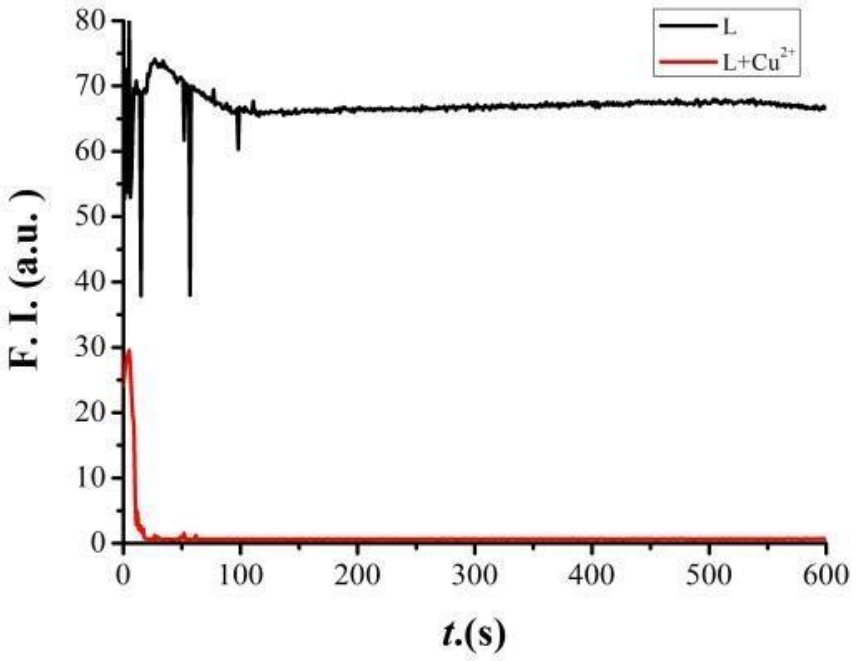


Figure S4. Changes in fluorescence intensity of L (10 μM) solution versus time in the presence of 10.0 equiv. of Cu^{2+}.

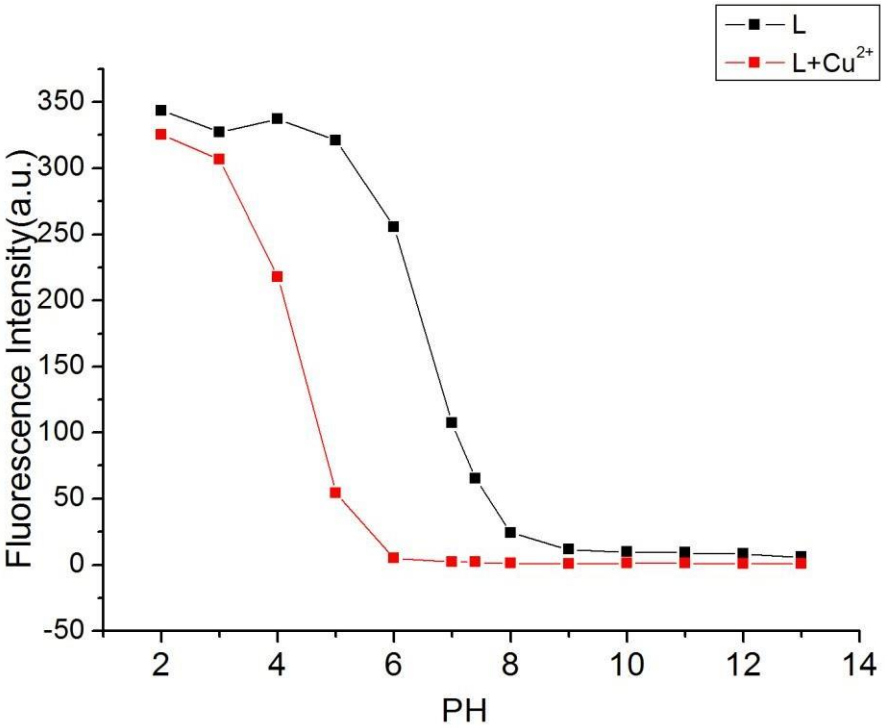


Figure **S5.** Fluorescence intensity of probe **L** (10 μM) at 463 nm under different pH values in the absence and the presence of 10 equiv. of Cu^{2+} (100 μM) measured in HEPES buffer (1.0 mM, pH = 7.4, containing 10% DMF)

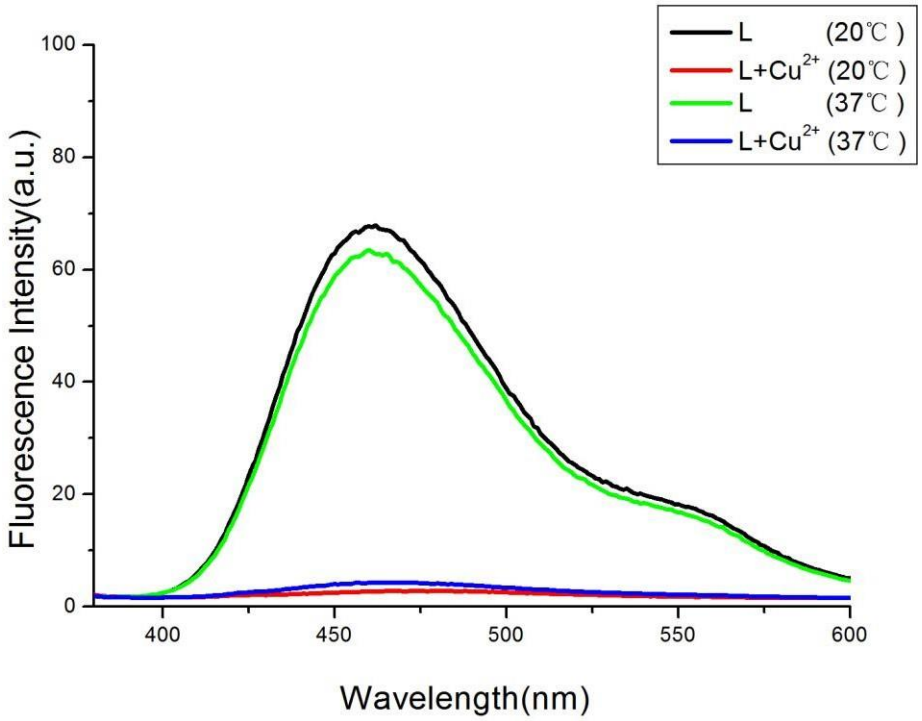


Figure **S6.** Fluorescence intensity of probe **L** (10 μM) at 463 nm under different temperature in the absence and the presence of 10 equiv. of Cu^{2+} (100 μM) measured in HEPES buffer (1 .0 mM, pH = 7.4, containing 10% DMF) .

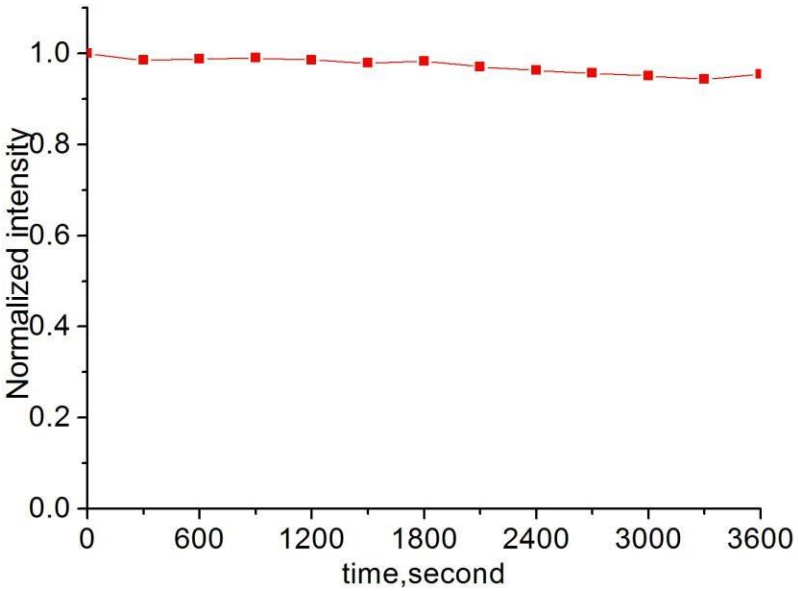


Figure S7. Photostability of **L** in HEPES buffer (1.0 mM, pH = 7.4, containing 10% DMF). The samples were continuously irradiated by a xenon lamp (150 W) at 5 nm slit width at the maximal absorption wavelength of 370nm.

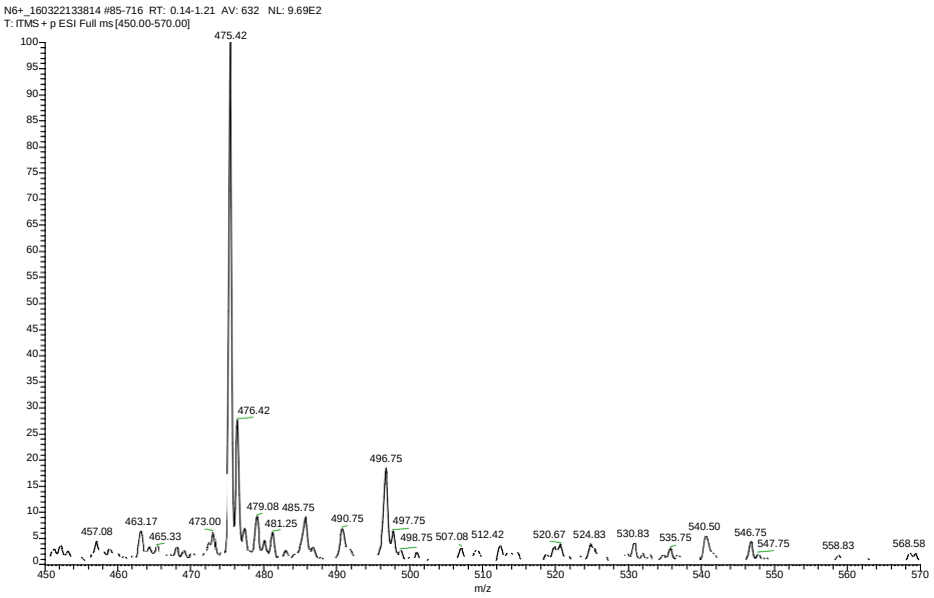


Figure **S8**. ESI-MS spectrum of L-Cu^{2+} in CH_3OH solution.

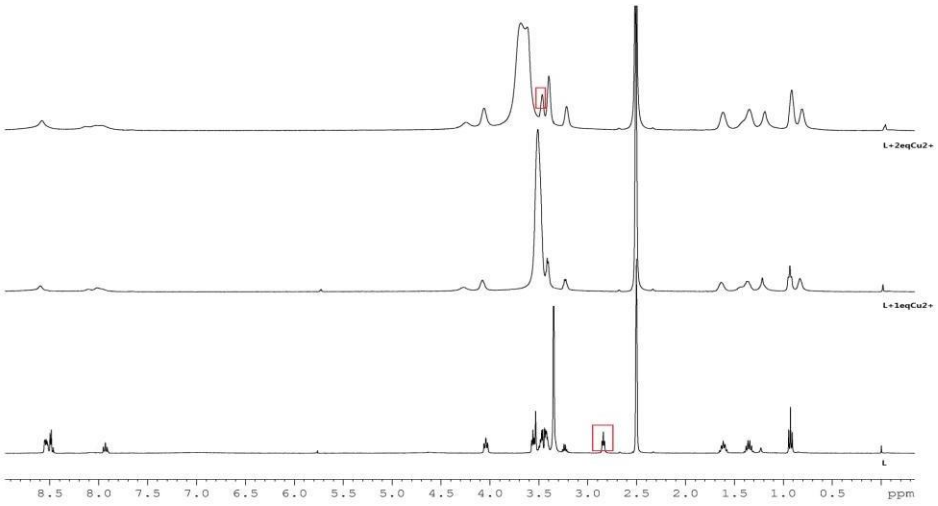


Figure **S9.** ^{1}H NMR (400 MHz) spectra of (down) free L in d6-DMSO, (middle) L + 1 eq. Cu^{2+}, (upper) L + 2 eq. Cu^{2+}.

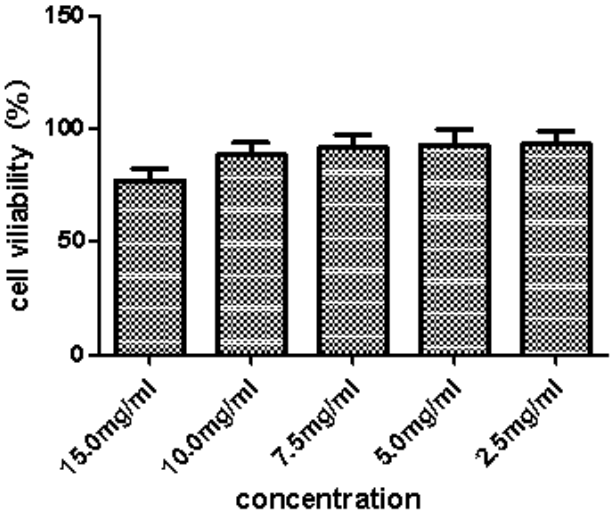


Figure S10. The cell viability of living MCF-7 cell treated with **L** of various concentrations (2.5 , 5, 7.5 , 10 , or 15 μM) for 24 hours measured by standard MTT assay at 37℃.