Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information

A Facile Fluorescent Chemosensor Based On Naphthalene-derived Schiff Base for Zinc Ions in Aqueous Solution

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Contents

Materials and general methods

All the solvents were of analytic grade. NMR experiments were carried out on a Bruker AV-400 NMR spectrometer with chemical shifts reported in ppm (in $CDCl_3$, CD_3OD or TMS as an internal standard). All pH measurements were made with a Sartorius basic pH-Meter PB-10. Fluorescence spectra were determined on a PerkinElmer LS55 Fluorescence spectrophotometer. Absorption spectra were determined on a Shimadzu UV 2501(PC)S UV-Visible spectrophotometer. The excitation and emission widths for **NS** were all 5.

Synthesis and characterization

1-((pyridin-2-ylmethylimino) methyl) naphthalen-2-ol (NS): 2-picolyamine (0.34 mL, 3.48 mmol) was dissolved in anhydrous ethanol (1.0 mL) and then added dropwise into a 10 ml bottom flask containing an ethanol solution (5.0 mL) of 2-hydroxy-1-naphthaldehyde (0.50 g, 2.90 mmol) under magnetic stirring. After stirring at room temperature for 1h, the precipitate was filtered, washed several times with small amount of cooled ethanol and dried to give a pale yellow solid. Yield: 0.64 g (84 %). ^{1}H NMR (400 MHz, $CDCl_3$) δ 14.75 (s, 1H), 9.00 (s, 1H), 8.60 (d, J = 4.7 Hz, 1H), 7.93 (d, J = 8.4 Hz, 1H), 7.69 (ddd, J = 9.3, 6.9, 2.9 Hz, 2H), 7.63 (d, J = 7.9 Hz, 1H), 7.45 (t, J = 7.7 Hz, 1H), 7.35 (d, J = 7.8 Hz, 1H), 7.29-7.20 (m, 2H), 6.97 (d, J = 9.3 Hz, 1H), 4.93 (s, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 173.70, 159.74, 156.82, 149.72, 137.11, 136.89, 133.55, 129.24, 127.98, 126.61, 123.81, 123.00, 122.77, 121.74, 118.32, 107.46, 59.78.

Other Photophysical property of NS

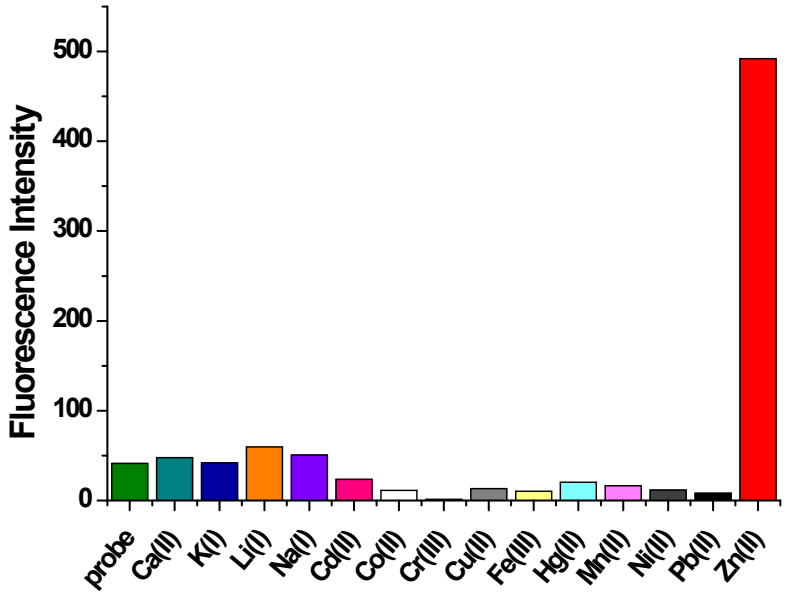


Figure S1. The fluorescence intensity of **NS** (10 μM) at 446 nm with 10.0 equiv of metal ions in 0.01 M HEPES buffer (pH 7.2). Metal ions include Ca^{2+}, K^{+}, Li^{+}, Na^{+}, Cd^{2+}, Co^{2+}, Cr^{3+}, Cu^{2+}, Fe^{3+}, Hg^{2+}, Mn^{2+}, Ni^{2+}, Pb^{2+}, Zn^{2+}. λ_{ex} = 352 nm.

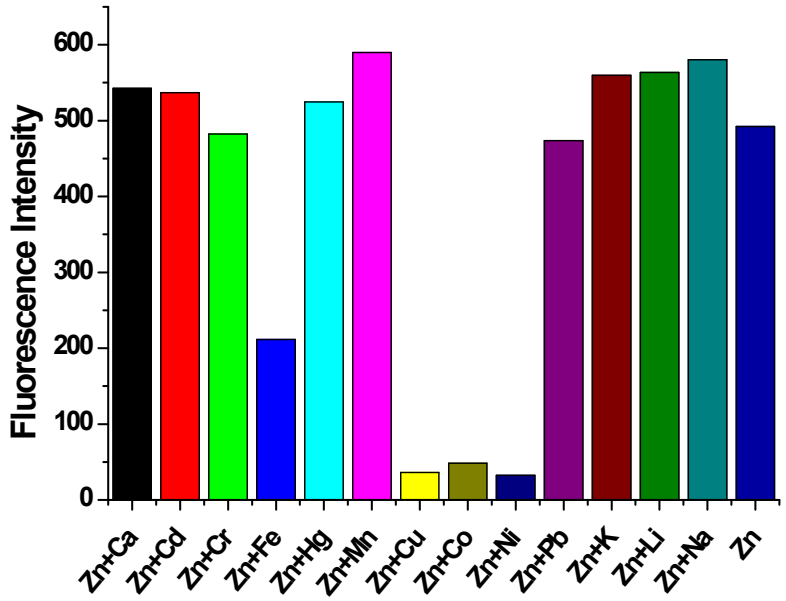


Figure S2. The fluorescence intensity of **NS** (10 μM) at 446 nm with 10.0 equiv of the competing metal ions, followed by 10.0 equiv of Zn^{2+} in 0.01 M HEPES buffer (pH 7.2). λ_{ex} = 352 nm.

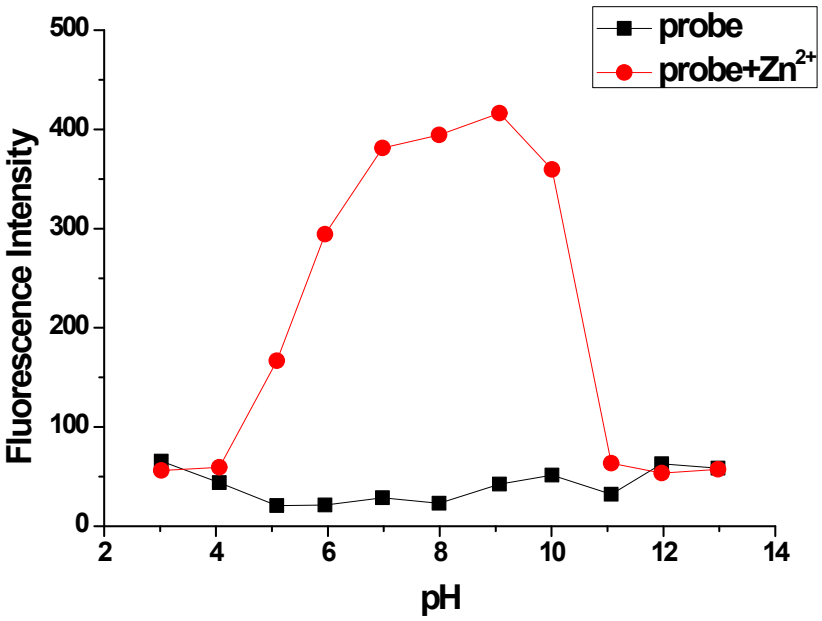
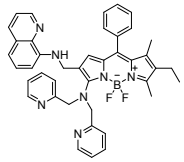
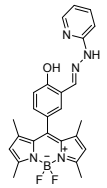
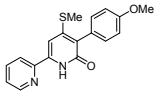
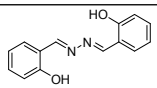
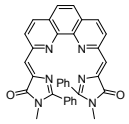
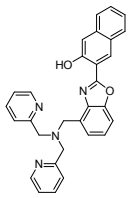
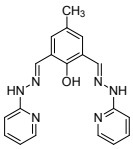
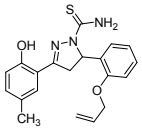
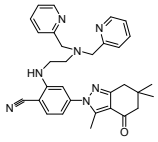
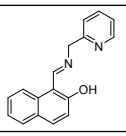


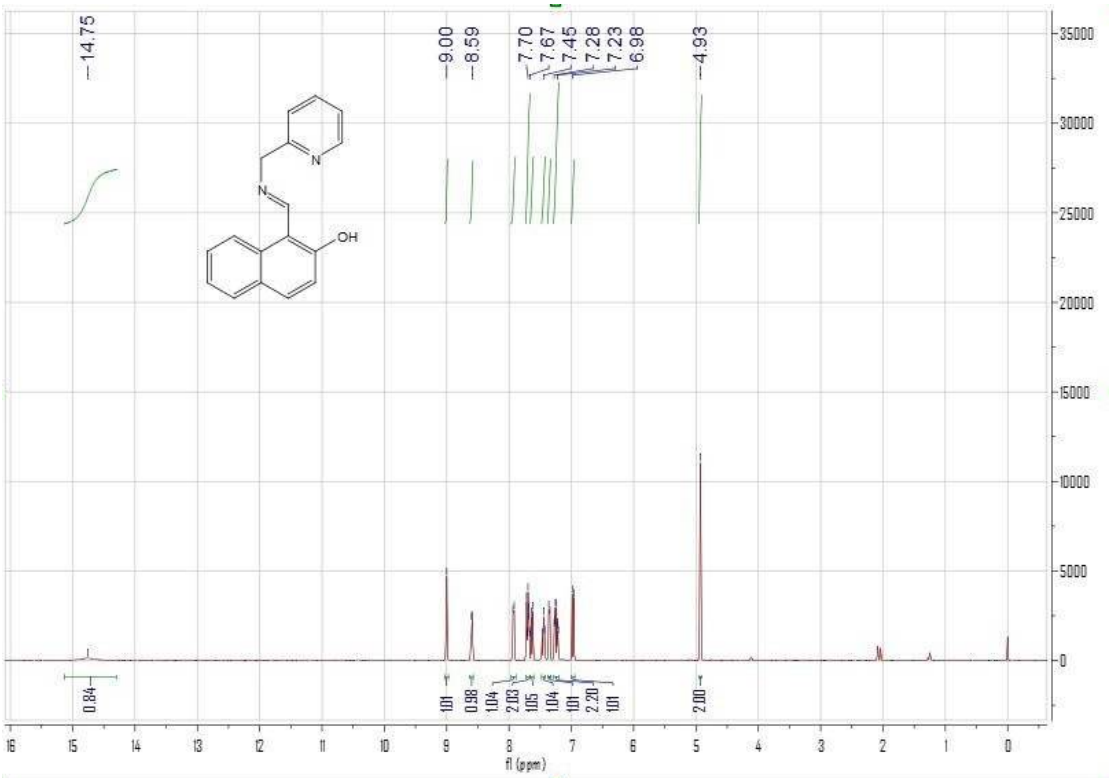
Figure S3. Effect of the pH on the fluorescence intensity of **NS** (10 μM) and NS/Zn2+ complex (5.0 equiv of Zn^{2+}).

Table S1. Comparison of the properties of **NS** and other zinc sensors.

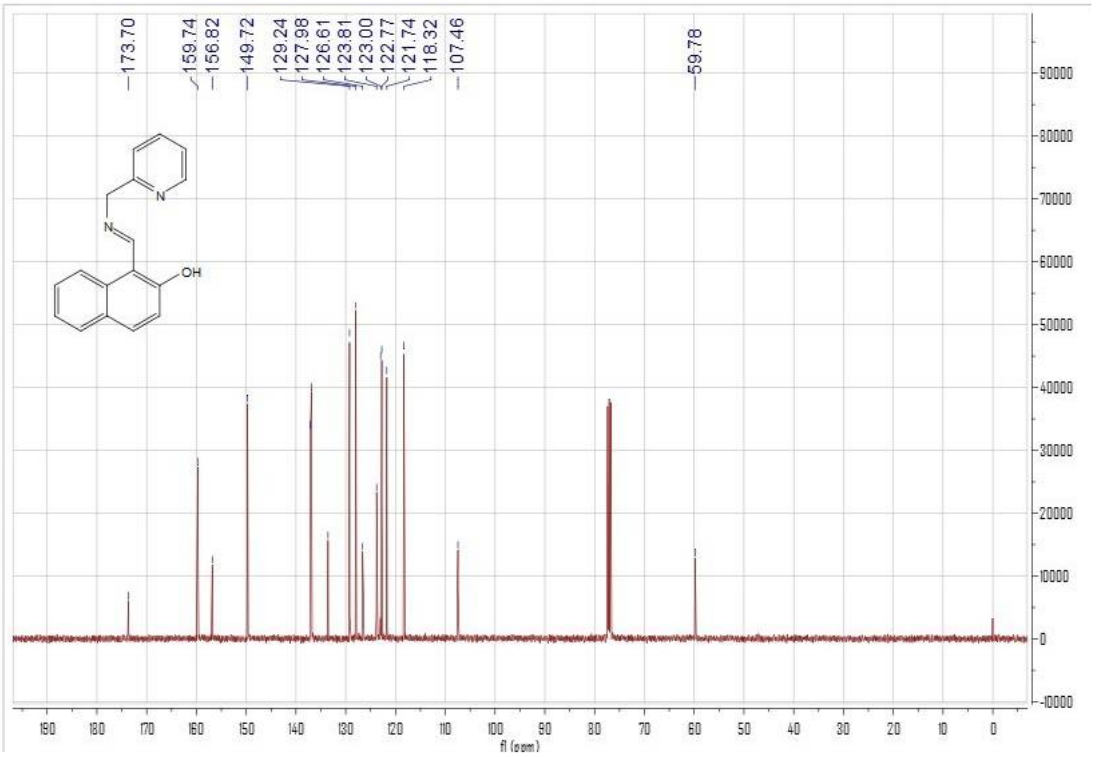
Entry	Structure of Probes	Solvent	Distinguish Cd^{2+} from Zn^{2+}	LOD (M)	K_a (M^{-1})	K_d (M)	Ref.
1		CH_3CN:MOPS=1:1	No		0.94×10^5		[1]
2		CH_3OH:HEPES=2:1	Yes		1.1×10^7		[2]
3		HEPES	No			7×10^{-6}	[3]
4		H_2O-DMF=1:9	Yes	1×10^{-7}			[4]
5		CH_3CN-HEPES=4:1	Yes		2.44×10^6		[5]
6		PIPES	No			1.2×10^{-11}	[6]
7		DMSO:H_2O=1:9	No		3.2×10^7		[7]
8		EtOH:H_2O=1:1	Yes	6.1×10^{-7}	4.83×10^4		[8]
9		HEPES	No			2.06×10^{-9}	[9]
10		HEPES	Yes	1.91×10^{-6}	7.88×10^6		This work

The characterization data of compound

^{1}H NMR of compound **NS**



^{13}C NMR of compound **NS**



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