Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting information

Schiff base receptor as fluorescence turn-on sensor for Ni^{2+} ions in live cells and logic gate application

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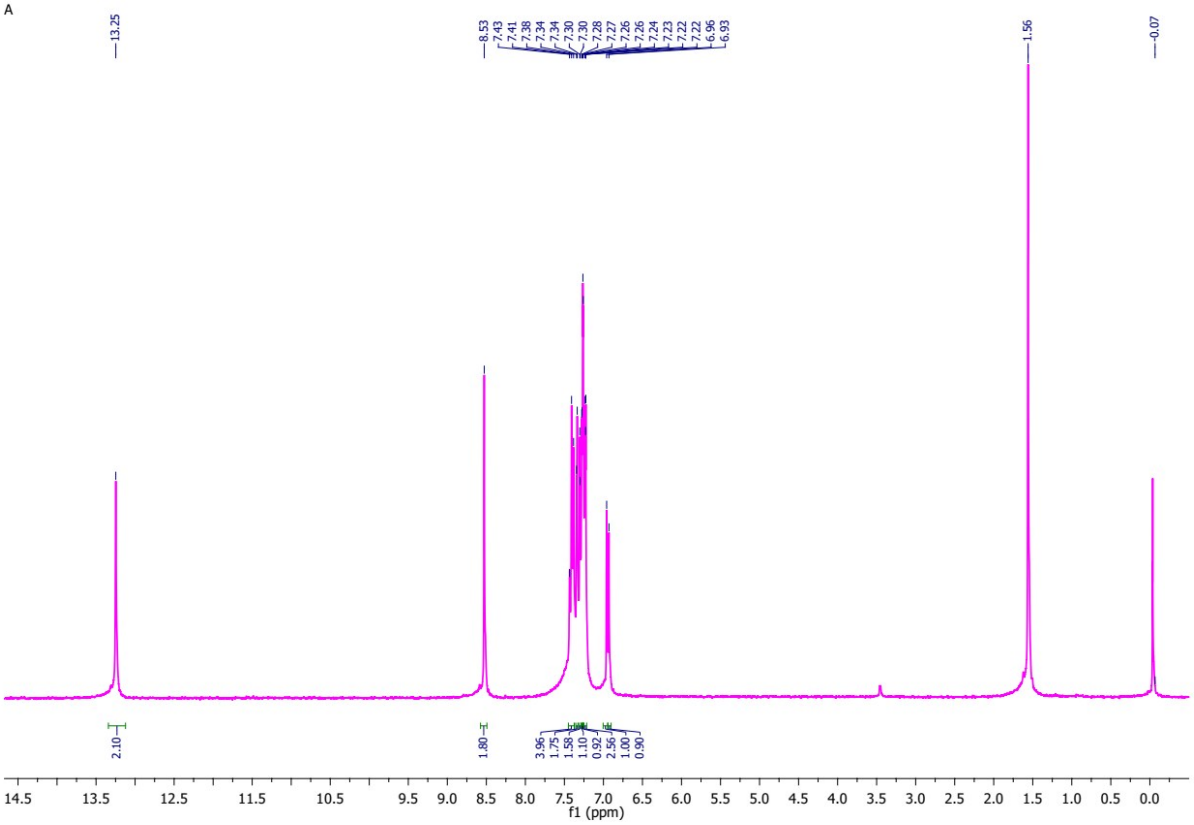
A


13.25
8.53
7.43
7.41
7.38
7.34
7.34
7.30
7.30
7.28
7.27
7.26
7.26
7.24
7.23
7.22
7.22
6.96
6.93
1.56
-0.07
2.10
1.80
3.96
1.75
1.58
1.10
0.92
2.56
1.00
0.90
f1 (ppm)

(b)

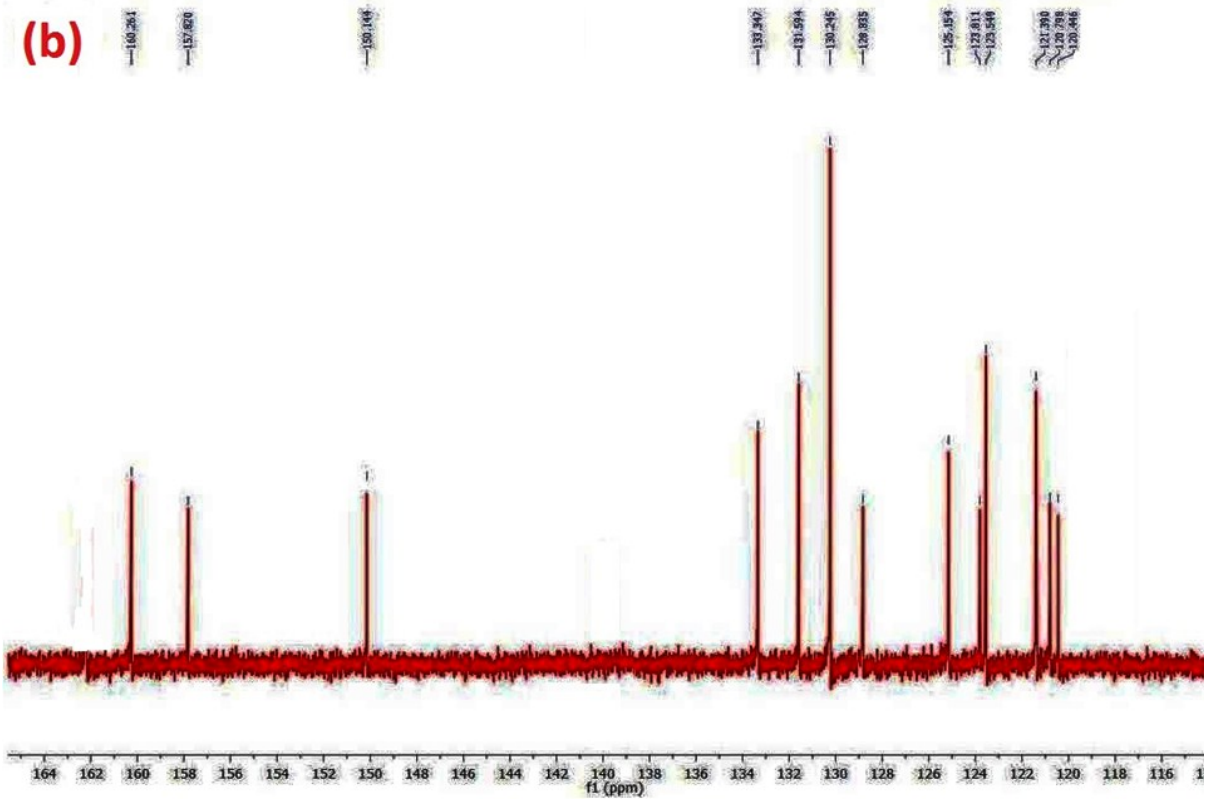

160.264
157.820
150.144
133.347
131.594
130.245
128.835
125.459
123.911
123.549
121.390
120.798
120.446
f1 (ppm)

Fig. S1 (a) ^{1}H NMR spectrum of receptor R. (b) ^{13}C NMR spectrum of receptor R.

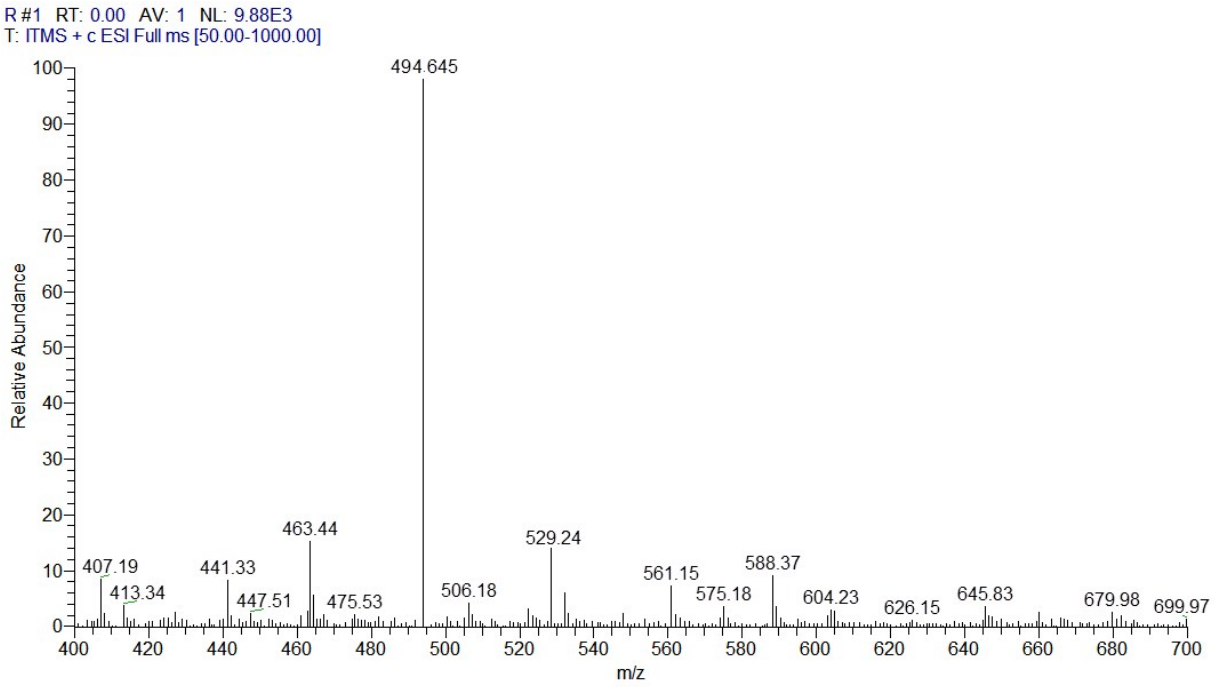


Fig. S2 ESI-MS spectra of the synthesized receptor R.

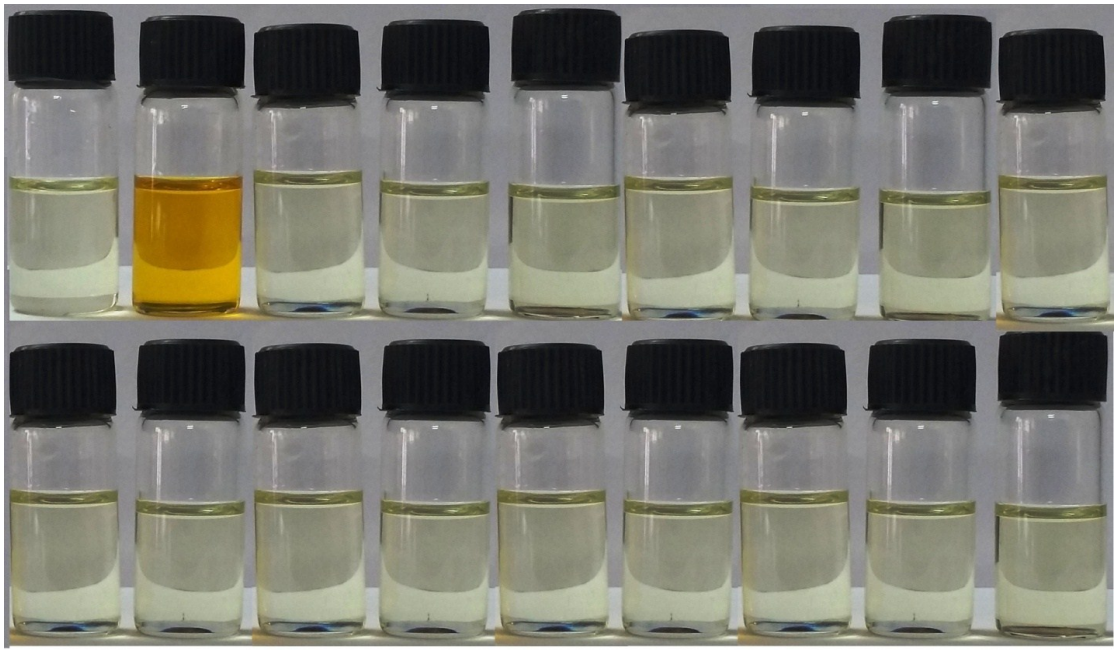


Fig. S3 Color changes of receptor R in CH_3CN solution (from left to right: R only; R+Ni^{2+}; R+ Cu^{2+}; R+Fe^{2+}; R+Mn^{2+}; R+Mg^{2+}; R+Co^{2+}; R+Zn^{2+}; R+Cd^{2+}; R+Ag^{+}; R+Na^{+}; R+Al^{3+}; R+Cr^{3+}; R+Li^{+}; R+Ca^{2+}; R+Ba^{2+}; R+Hg^{2+}; R+K^{+}).

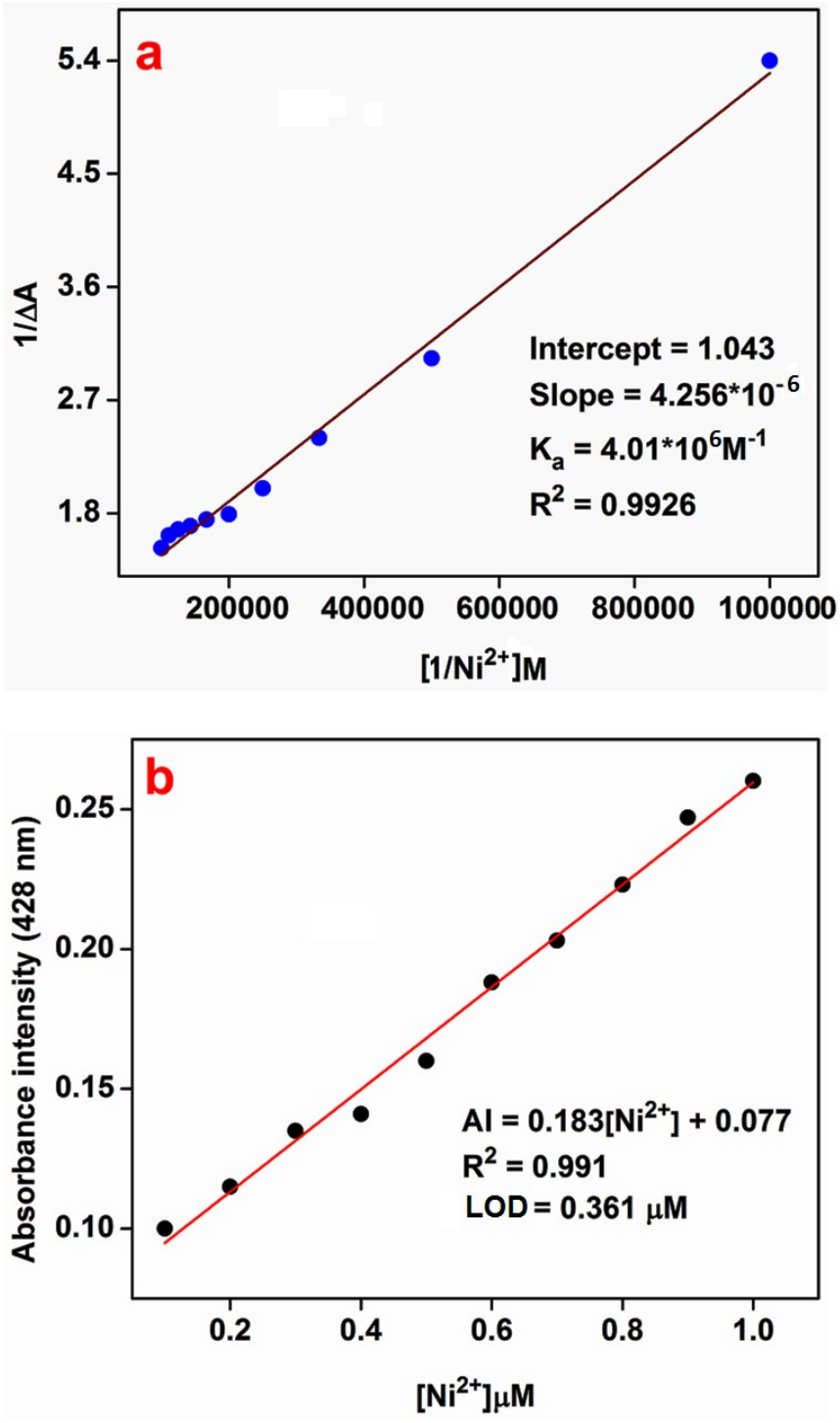


Fig. S4 (a) Absorption titration of Benesi-Hildebrand plot of R-Ni^{2+}. (b) Absorption spectra of the calibration curve of R-Ni^{2+}.

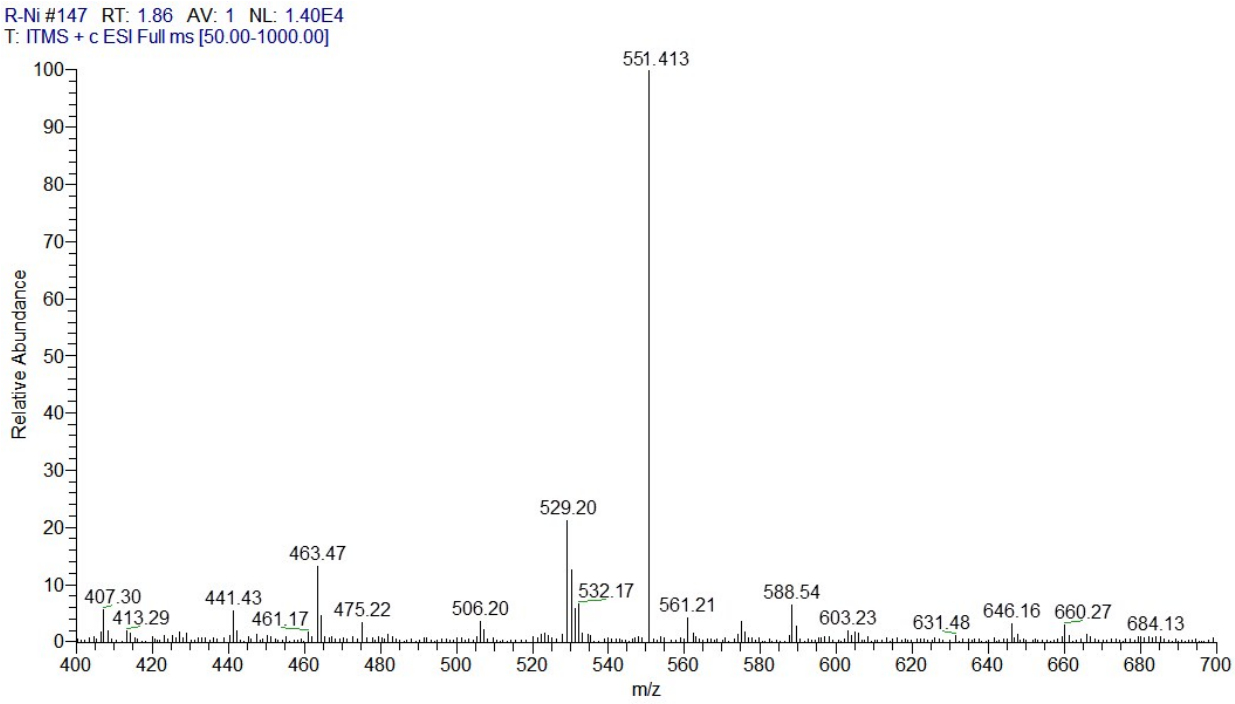


Fig. S5 ESI-MS spectra of the receptor R with addition of 2 equiv. of Ni^{2+} ion.

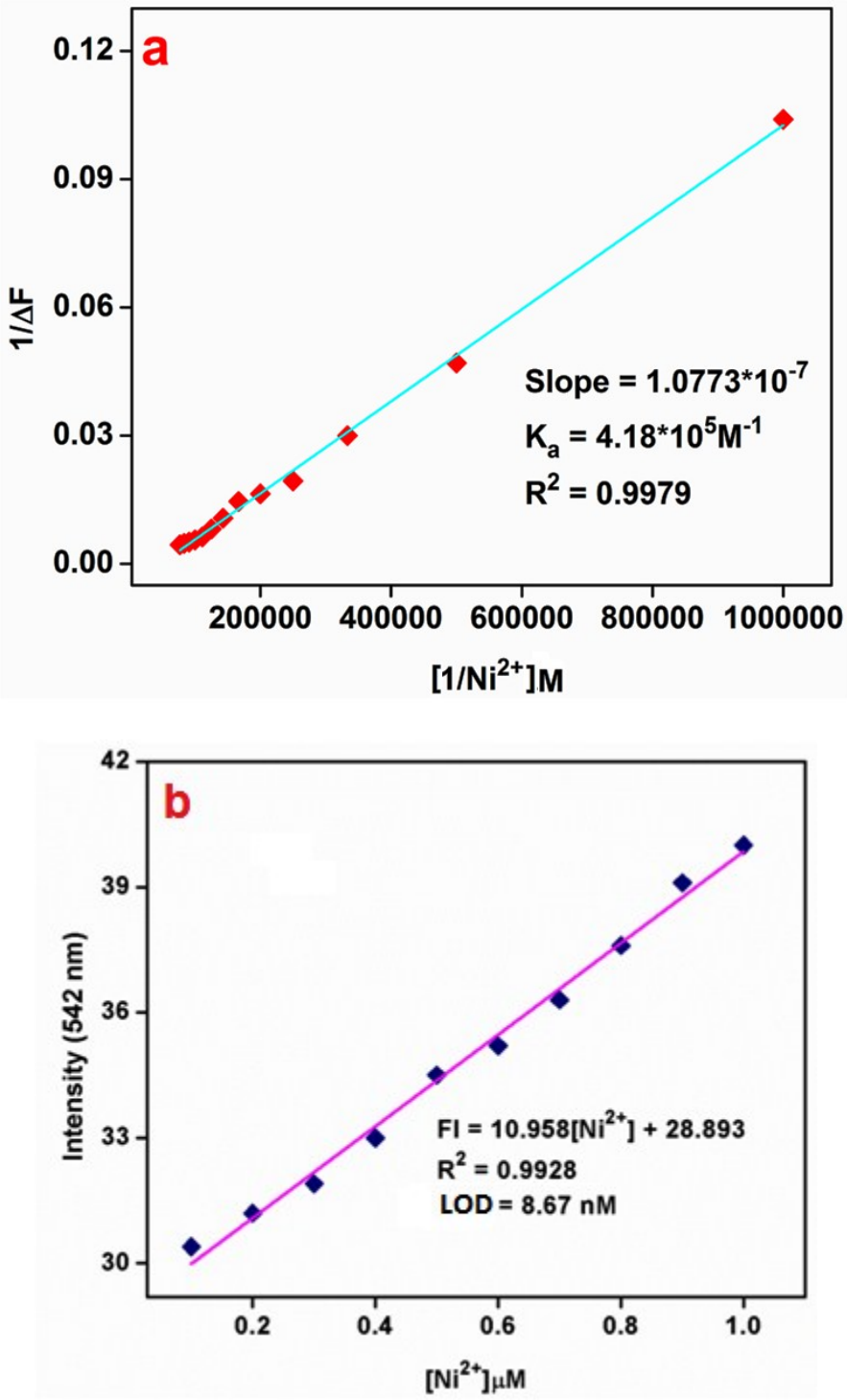


Fig. S6 (a) Fluorescence spectra of association constant between R and Ni^{2+}. (b) Fluorescence spectra of the calibration curve of R-Ni^{2+}.

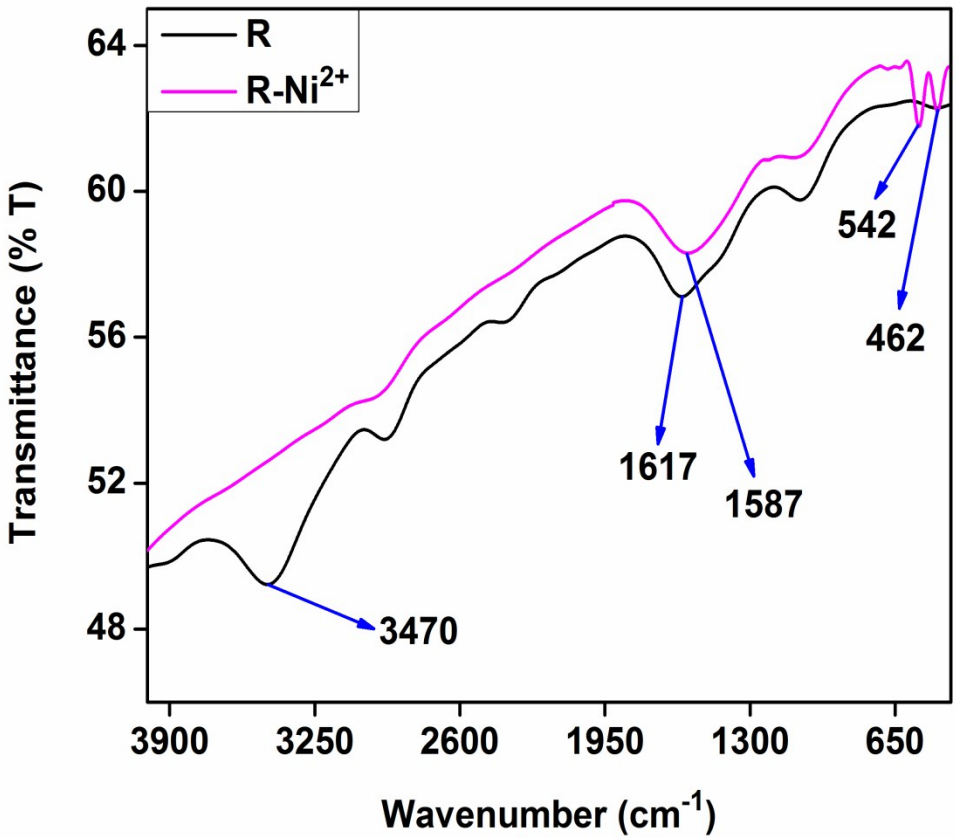


Fig. S7 FTIR spectra of receptor R and R-Ni^{2+} ion.

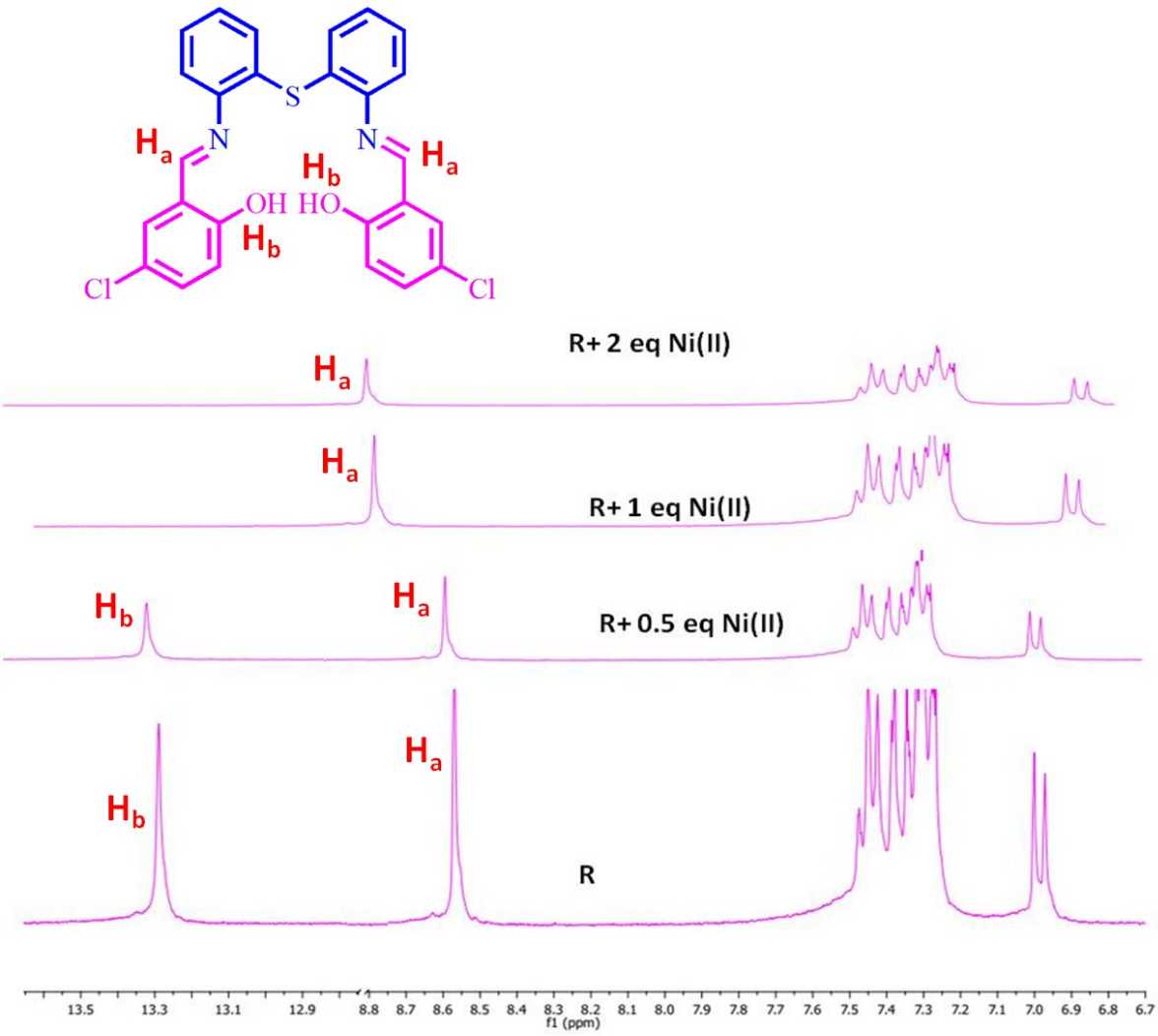


Fig. S8 ^{1}H-NMR titration of R with Ni(II) ions.

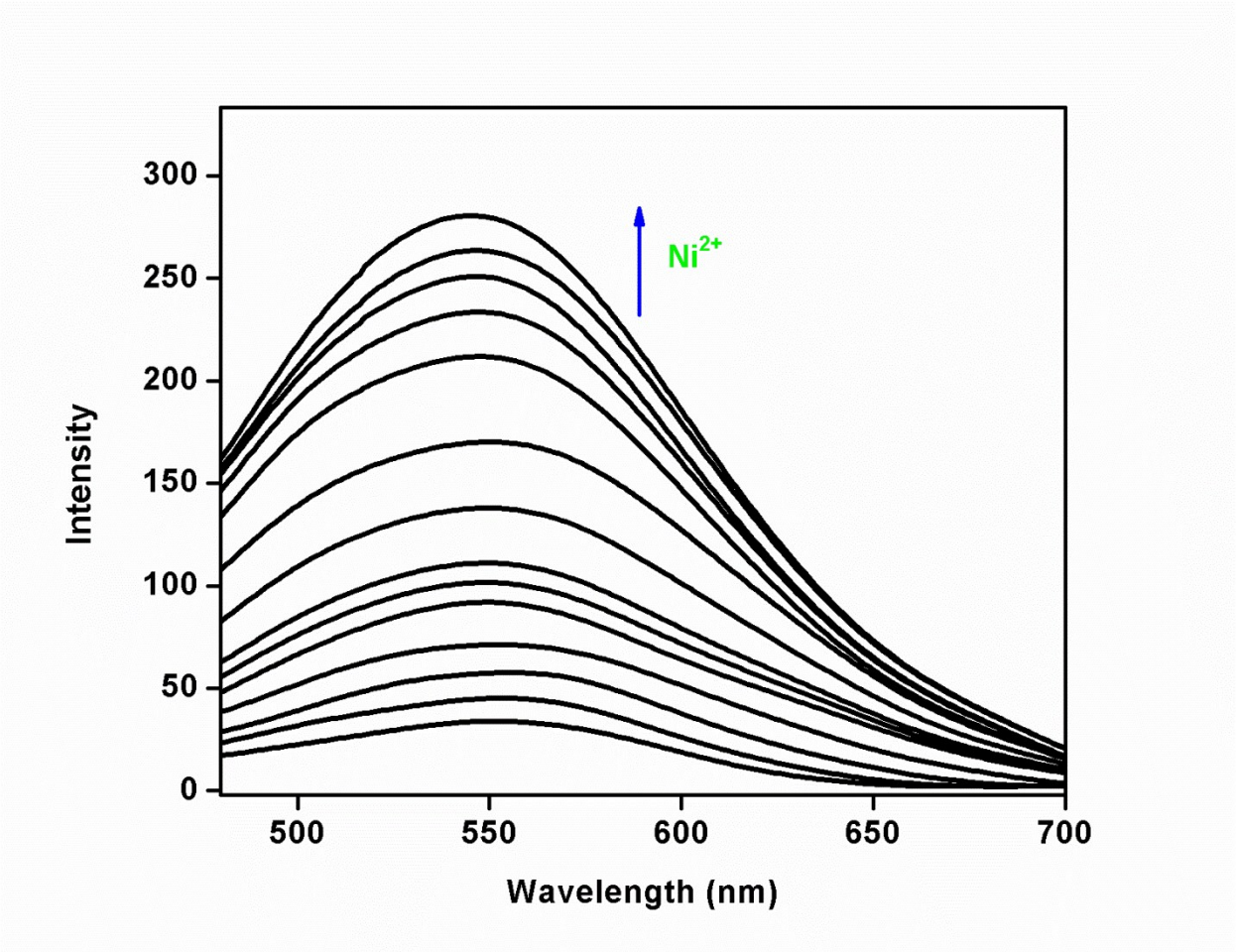


Fig. S9 Fluorescenece titration of R with Ni(II) in HEPES buffer (pH=7.4) (10% Acetonitrile) as co solvent.

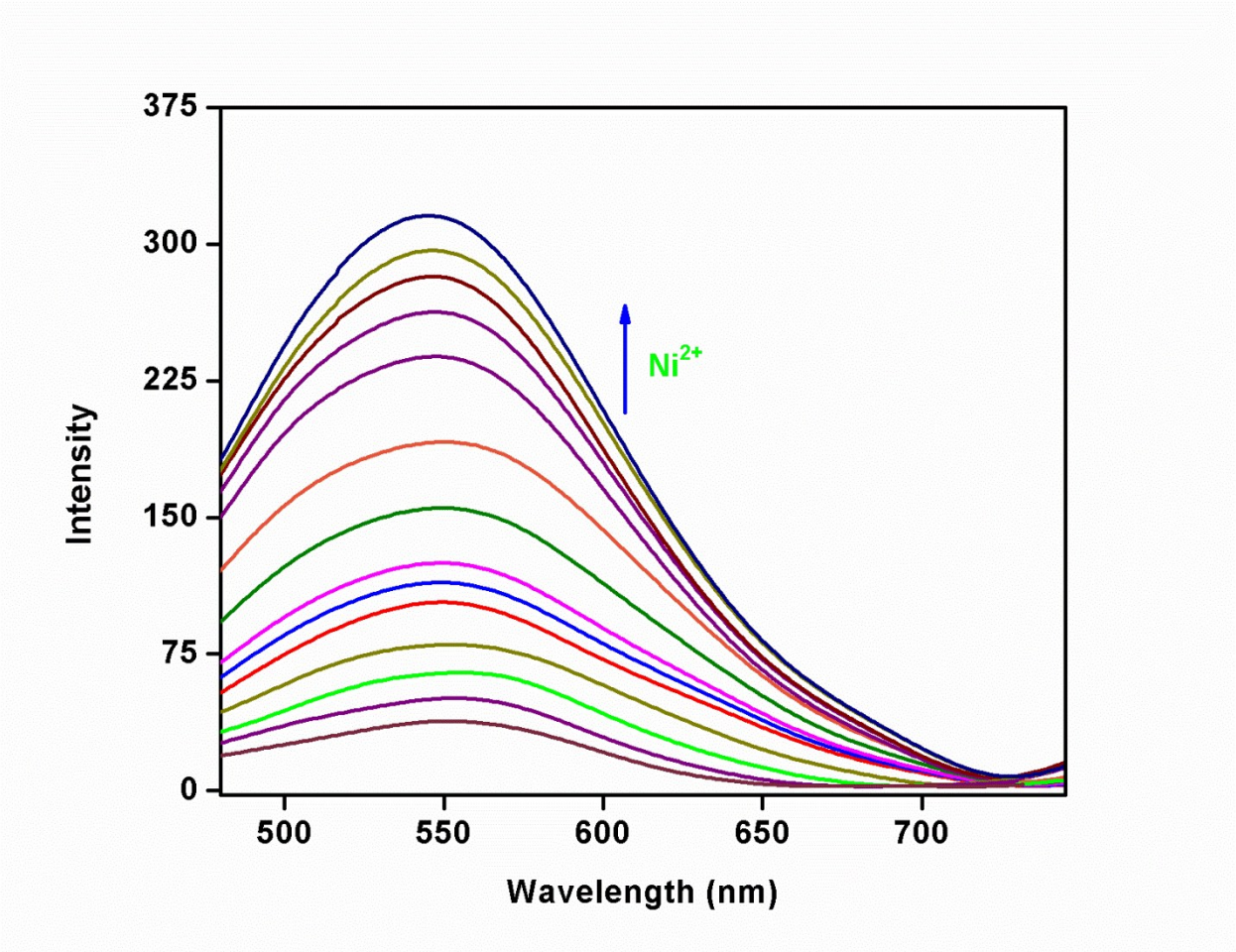


Fig. S10 Fluorescenece titration of R with Ni(II) in HEPES buffer (pH=7.4) (10% DMSO) as co solvent.

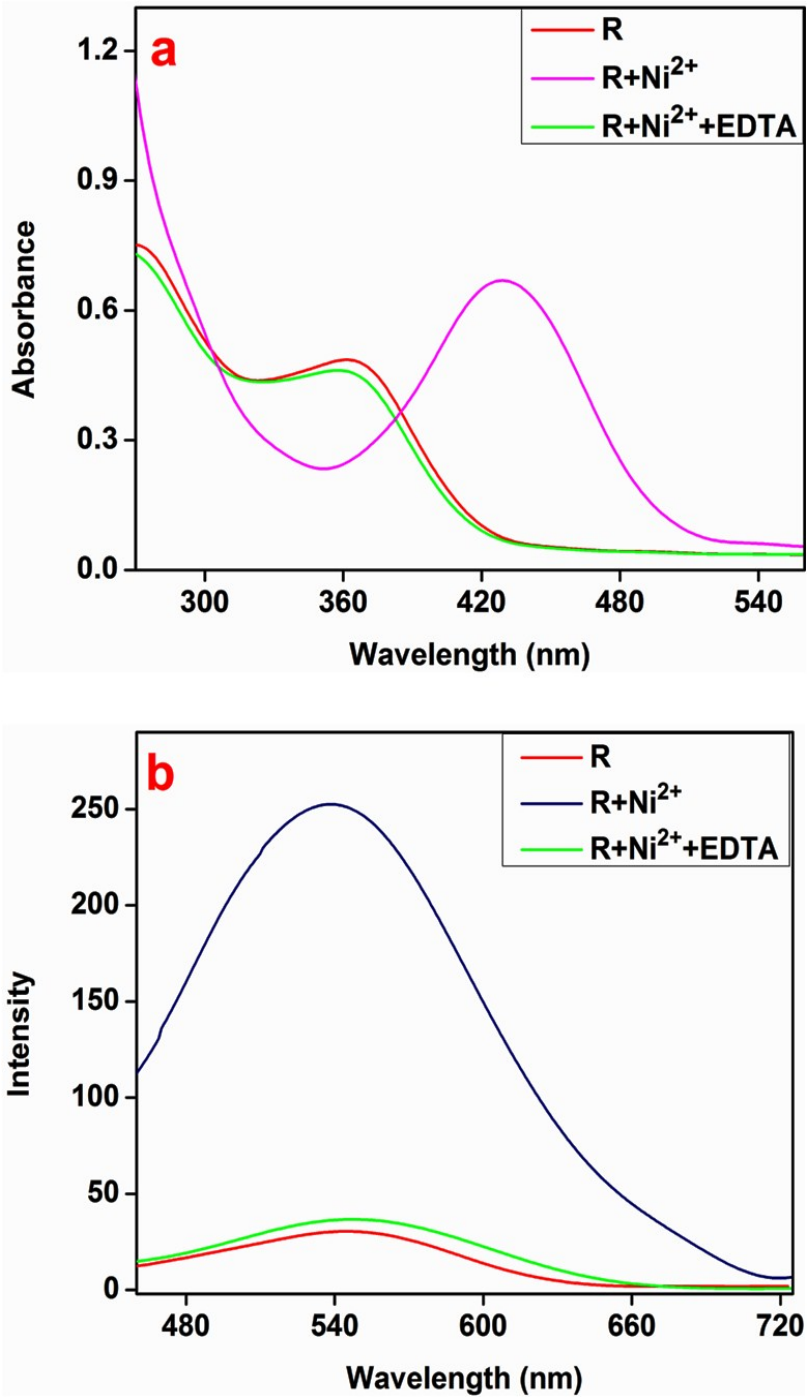


Fig. S11 (a) UV-Vis spectra of R (30 μM) upon successive addition of Ni^{2+} (60 μM) and EDTA (120 μM). (b) Fluorescence spectra of R (30 μM) upon successive addition of Ni^{2+} (60 μM) and EDTA (120 μM).

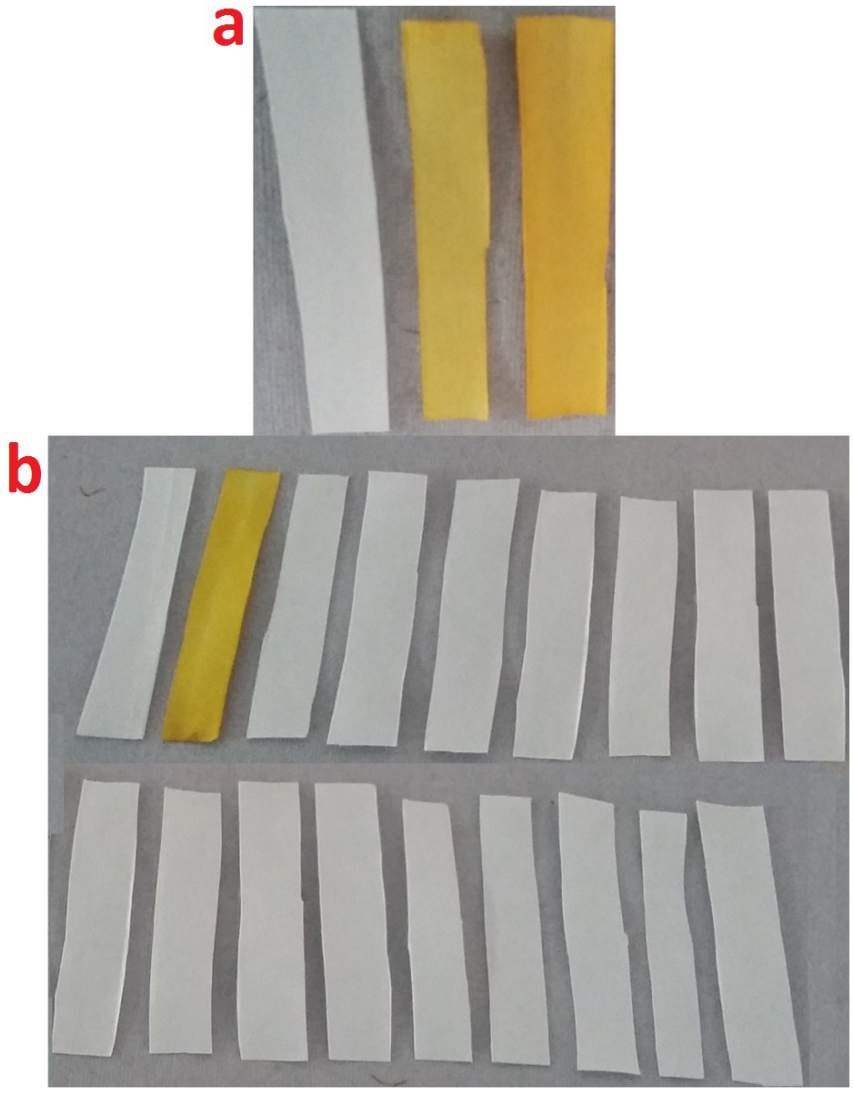


Fig. S12 Photograph of the test kits with receptor R for sensing Ni^{2+} ion in aqueous solution (a) Different concentration of Ni^{2+} ion. From left to right: 0; 1×10^{-3} M; 1×10^{-4} M. (b) sensing various metal ions (1×10^{-4} M). From left to right: R, Ni^{2+}, Cu^{2+}, Fe^{2+}, Mn^{2+}, Mg^{2+}, Co^{2+}, Zn^{2+}, Cd^{2+}, Ag^{+}, Na^{+}, Al^{3+}, Cr^{3+}, Li^{+}, Ca^{2+}, Ba^{2+}, Hg^{2+}, and K^{+}.

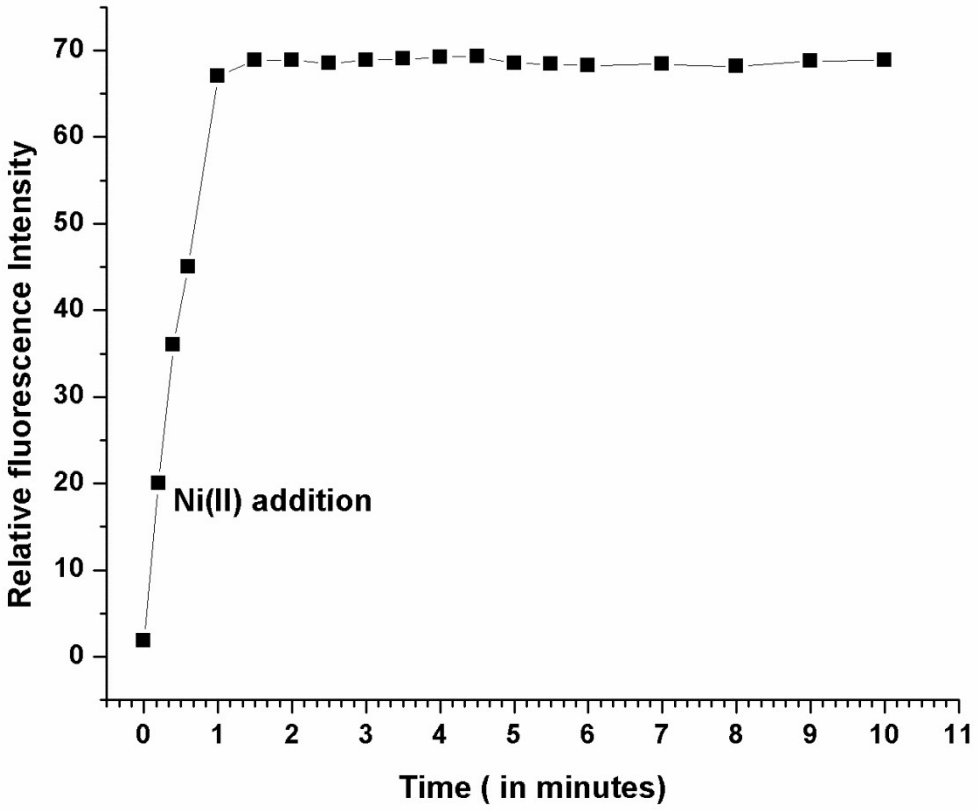


Fig. S13 Time dependent fluorescence response of the probe with Ni(II).

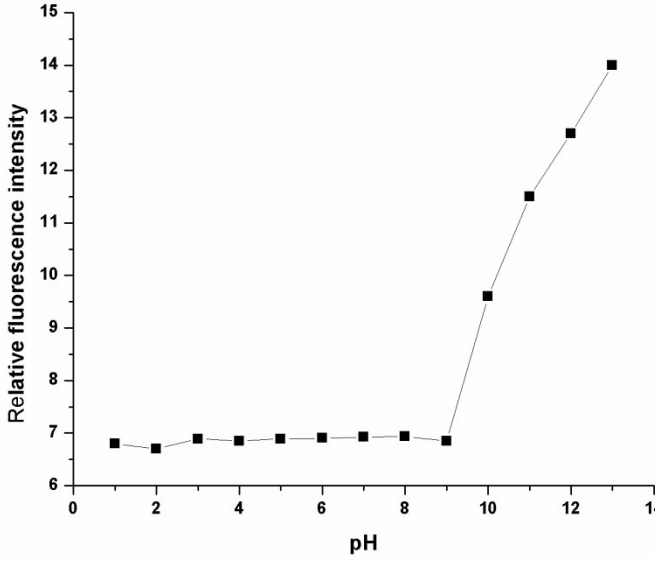
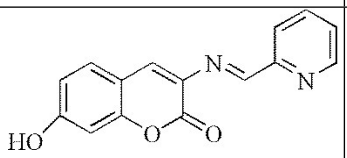
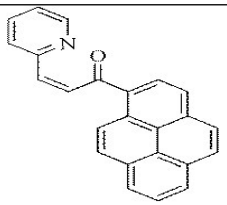
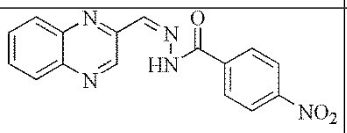
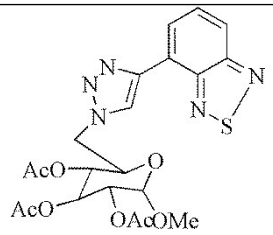
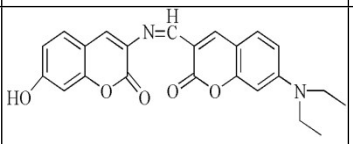
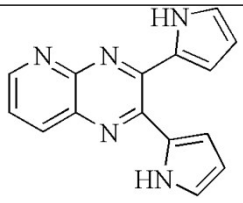


Fig. S14 pH dependent fluorescence response of the probe.

Receptor	Selectivity	Method	Solvent system	Detection limit	Structure	References
Coumarin	Ni^{2+}	Colorimetric	EtOH	5×10^{-7}		1
Chalcone based	Ni^{2+}	Fluorescence	MeOH/H_2O	5.14×10^{-6}		2
Glutathione-Ag Nps based	Ni^{2+}	Colorimetric	H_2O	7.5×10^{-5}	-	3
Quinoxaline based	Ni^{2+}	Colorimetric	CH_3CN-HEPES	1.47×10^{-6}		4
Benzothiadiazoyl-triazole	Ni^{2+}	Colorimetric/ Fluorescence	CH_3CN	ND		5
Coumarin schiffbase	Ni^{2+}	Colorimetric	CH_3CN	ND		6
Dipyrrolyl	Ni^{2+}	Fluorescence	CH_3CN	ND		7

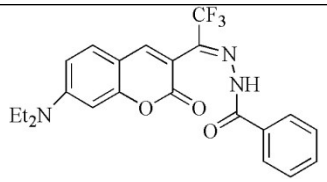
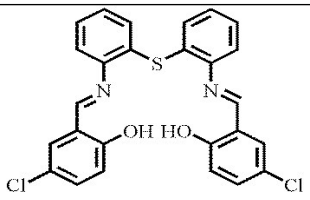
Coumarin dye	Ni^{2+}	UV-Vis/ Fluorescence	HEPES buffer in EtOH/H_2O	ND		8
Schiff base	Ni^{2+}	colorimetric	CH_3CN	3.61×10^{-7}		Present work

Table-1: comparision of the reported Ni(II) sensors.

ND – Not Determined

References

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