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Supporting Information

A revisit to Gattermann reaction: interesting synthesis of nitrogen heterocyclic aromatic halides and their fluorescence properties

Juan Li, Ning Wang, Wen-Tao Liu, Hong-Lin Ding, Yue An* and Cheng-Wei Lü*

College of Chemistry and Chemical Engineering, Liaoning Normal University, Huanghe Road 850#, Dalian 116029, P.R. China.
E-mail: 18018928980@163.com; chengweilv@126.com

Supplementary Index

1. ^{1}H NMR 1

2. ^{13}C NMR 3

3. MS Spectra 5

4. UV Absorption Spectroscopy 6

5. Fluorescence Spectroscopy 7

1.^{1}H NMR

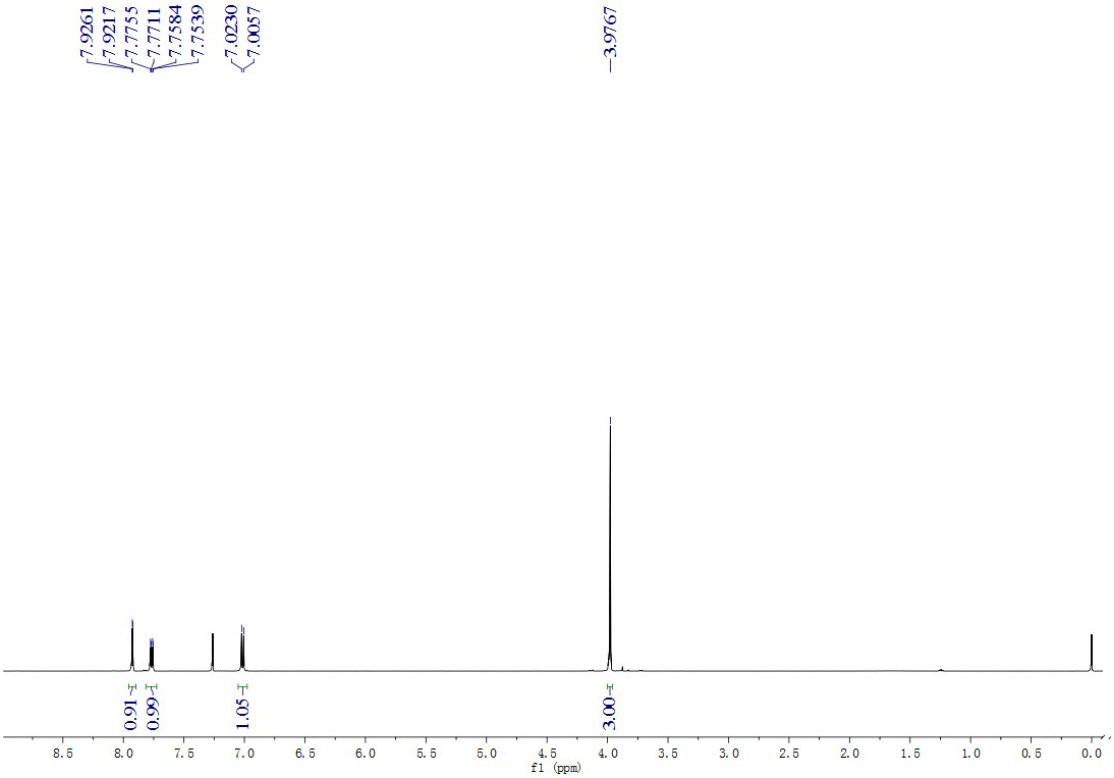


Fig. S1 ^{1}H NMR spectrum of compound **L1**

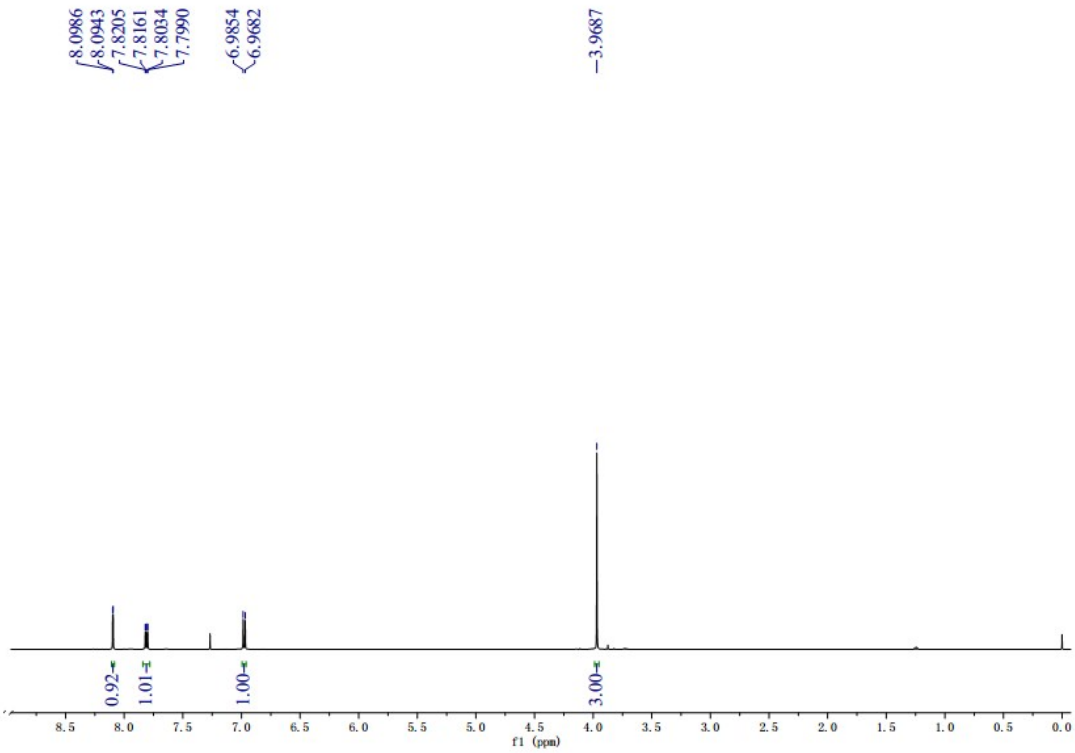


Fig. S2 ^{1}H NMR spectrum of compound **L2**

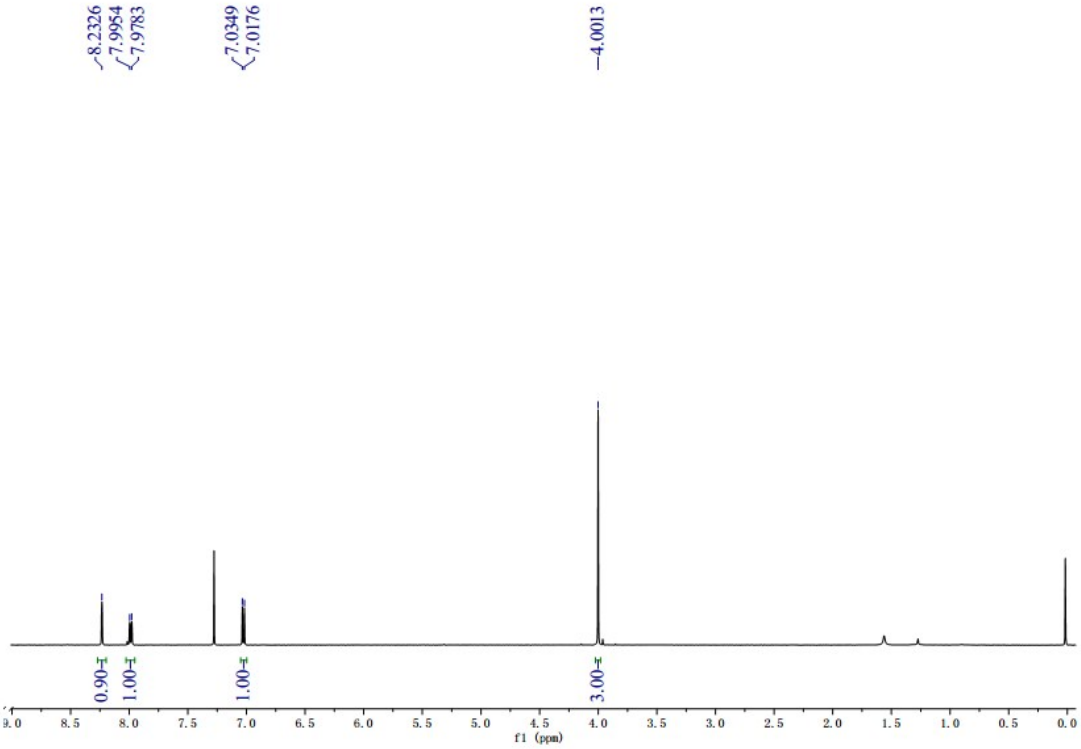


Fig. S3 ^{1}H NMR spectrum of compound **L3**

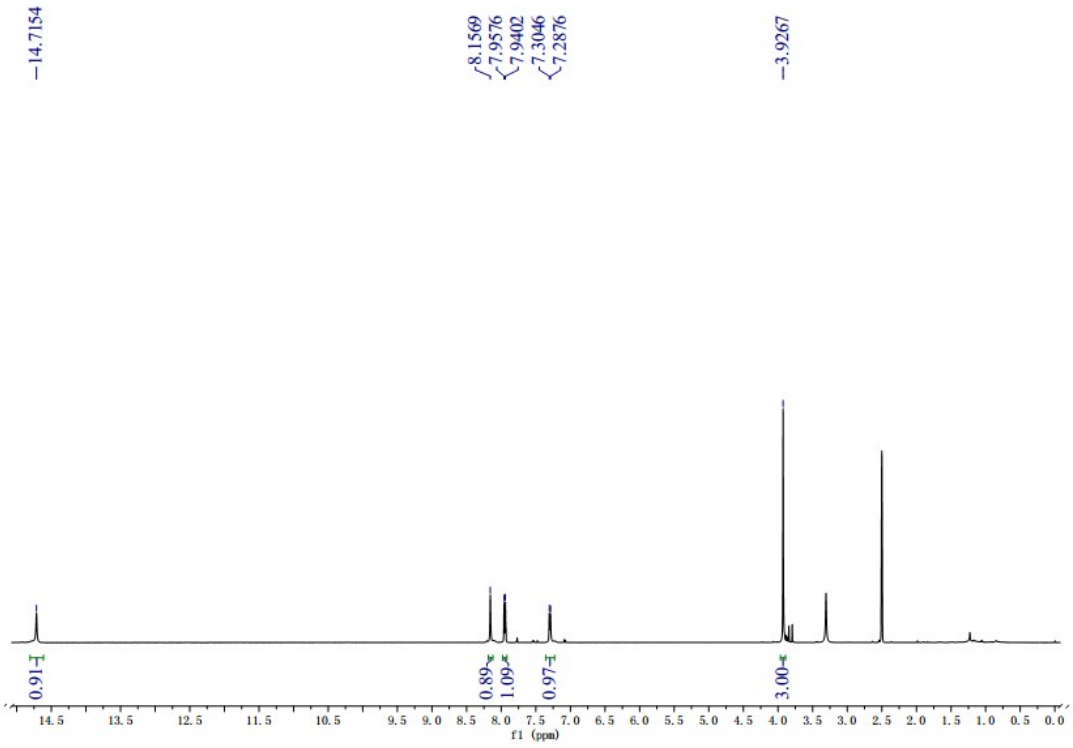


Fig. S4 ^{1}H NMR spectrum of compound **L4**

2. ^{13}C NMR

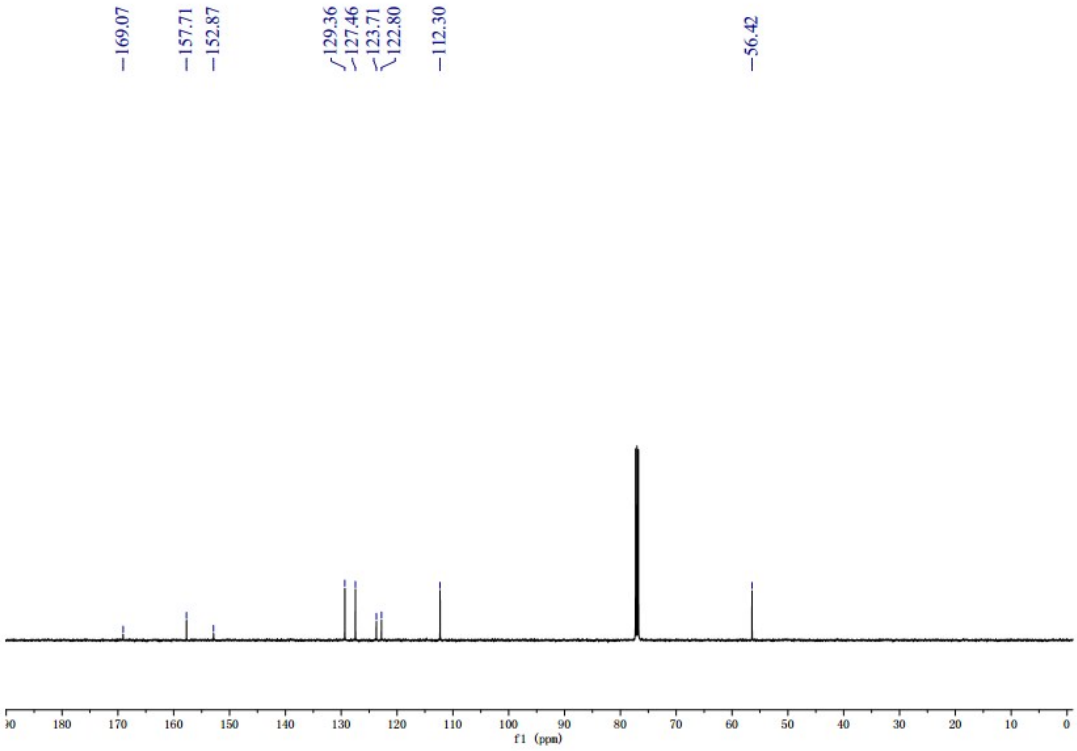


Fig. S5 ^{13}C NMR spectrum of compound **L1**

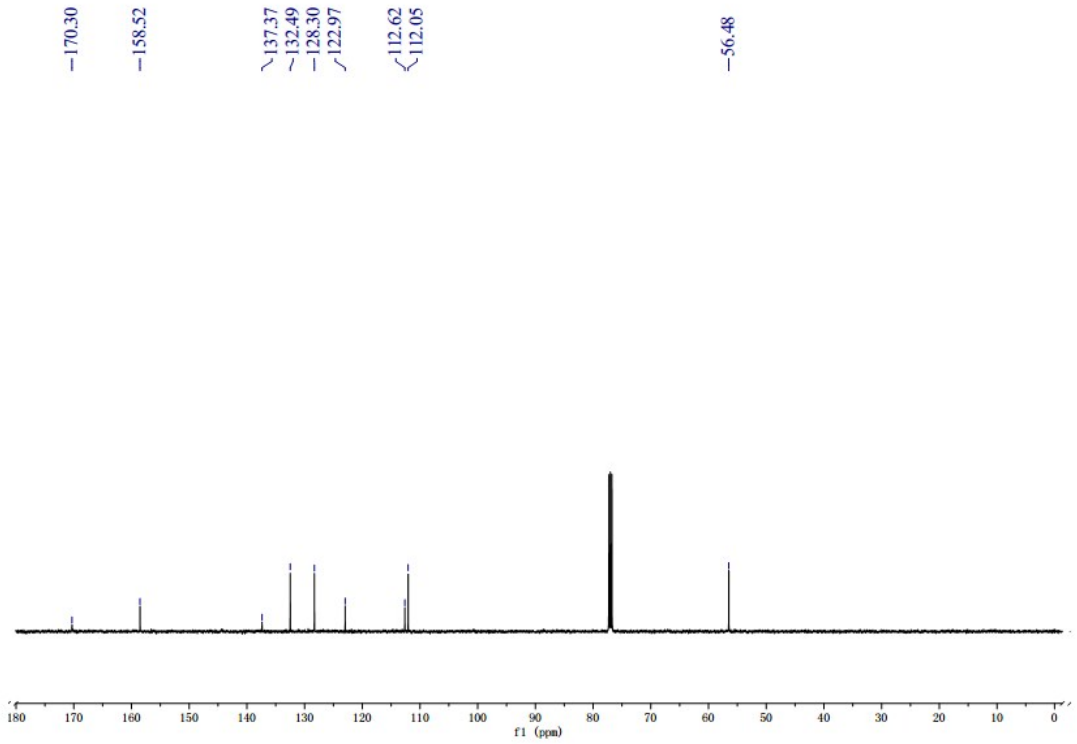


Fig. S6 ^{13}C NMR spectrum of compound **L2**

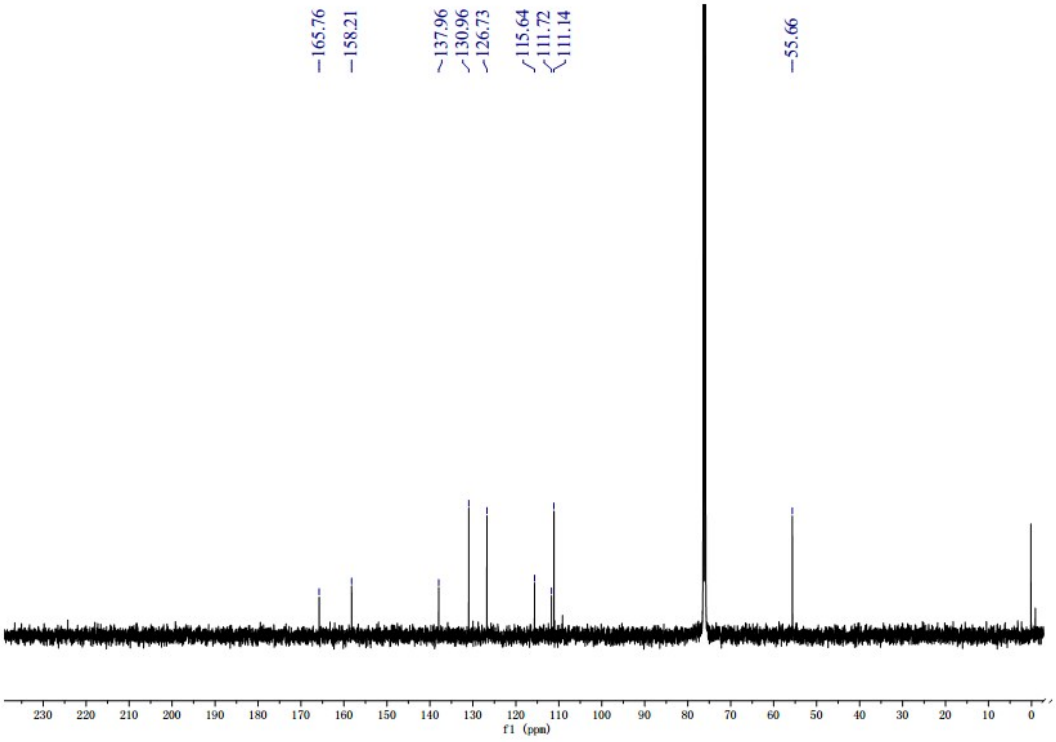


Fig. S7 ^{13}C NMR spectrum of compound **L3**

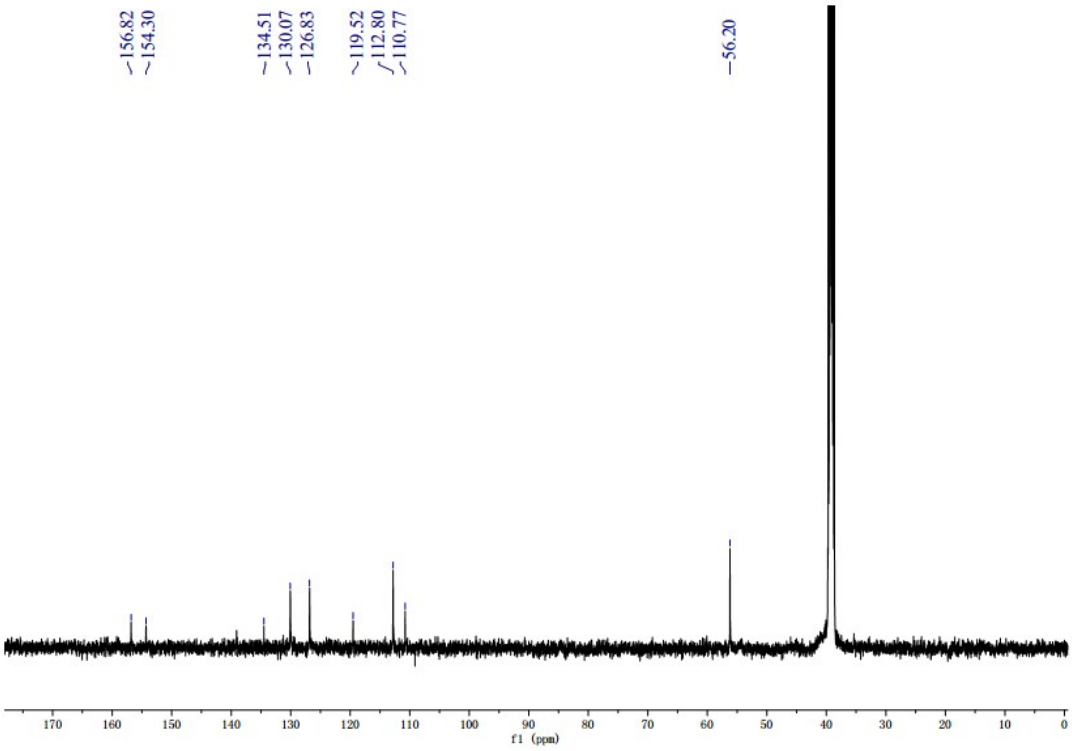


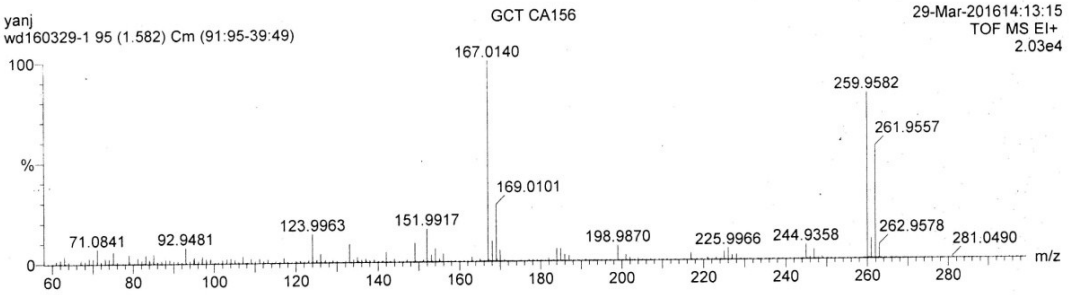
Fig. S8 ^{13}C NMR spectrum of compound **L4**

3. MS Spectra

Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 200.0 mDa / DBE: min = -1.5, max = 50.0
Isotope cluster parameters: Separation = 1.0 Abundance = 1.0%

Monoisotopic Mass, Odd and Even Electron Ions
26 formula(e) evaluated with 2 results within limits (up to 50 closest results for each mass)



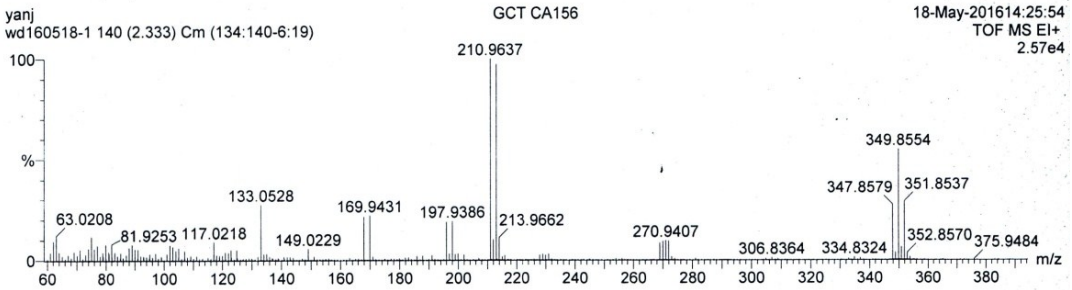
Minimum:				-1.5		
Maximum:		200.0	5.0	50.0		
Mass	Calc. Mass	mDa	PPM	DBE	Score	Formula
259.9582	259.9578	0.4	1.6	7.0	1	C9 H6 N2 O S Cl2
	259.9704	-12.2	-46.8	6.5	2	C10 H8 N O S Cl2

Fig. S9. EI-MS spectrum of compound **L1**

Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 200.0 mDa / DBE: min = -1.5, max = 50.0
Isotope cluster parameters: Separation = 1.0 Abundance = 1.0%

Monoisotopic Mass, Odd and Even Electron Ions
29 formula(e) evaluated with 2 results within limits (up to 50 closest results for each mass)



Minimum:				-1.5		
Maximum:		200.0	5.0	50.0		
Mass	Calc. Mass	mDa	PPM	DBE	Score	Formula
347.8579	347.8568	1.1	3.3	7.0	1	C9 H6 N2 O S Br2
	347.8693	-11.4	-32.9	6.5	2	C10 H8 N O S Br2

Fig. S10. EI-MS spectrum of compound **L2**

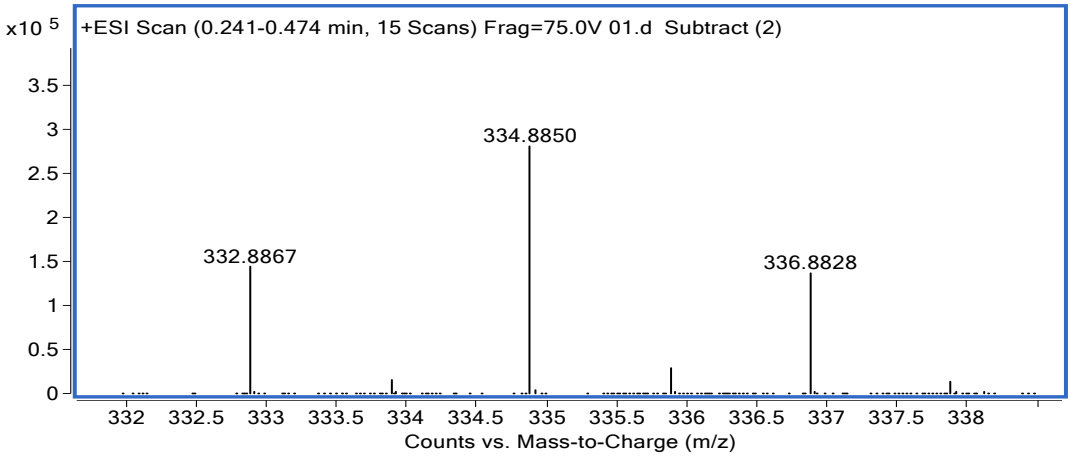


Fig. S11. ESI-MS spectrum of compound **L3**

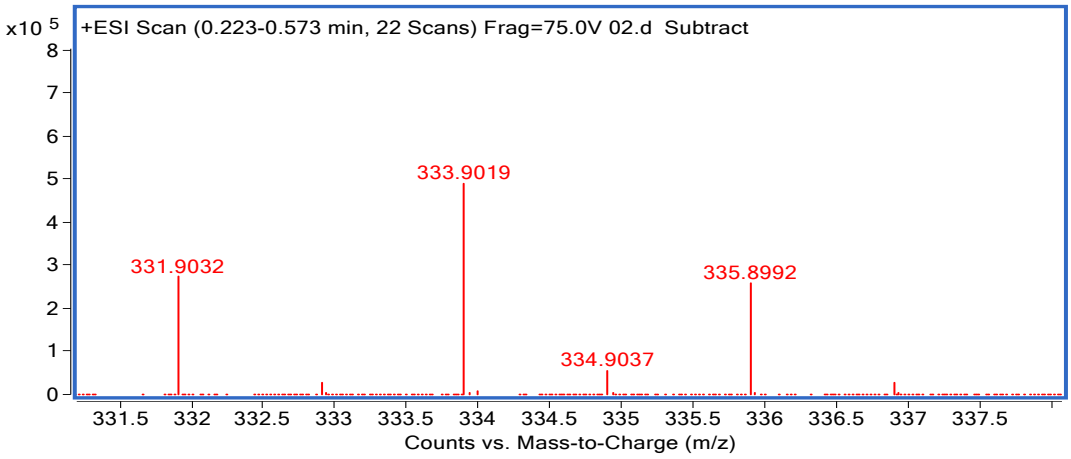


Fig. S12. ESI-MS spectrum of compound **L4**

4. UV Absorption Spectroscopy

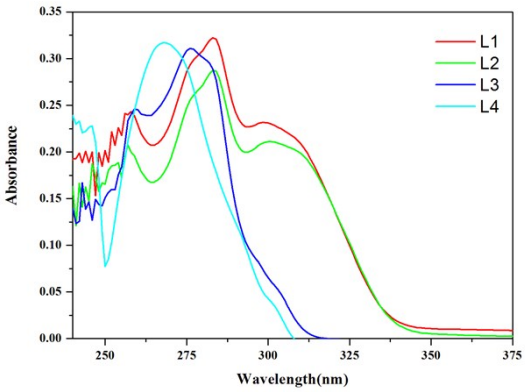
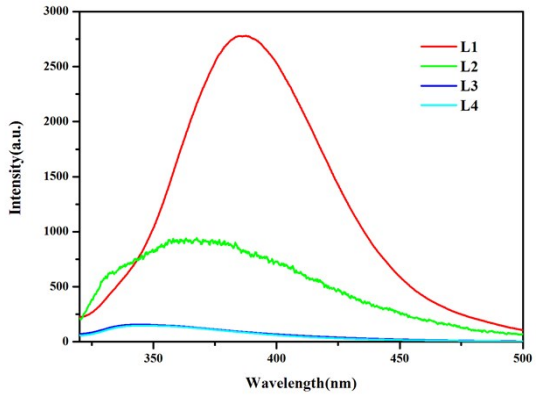


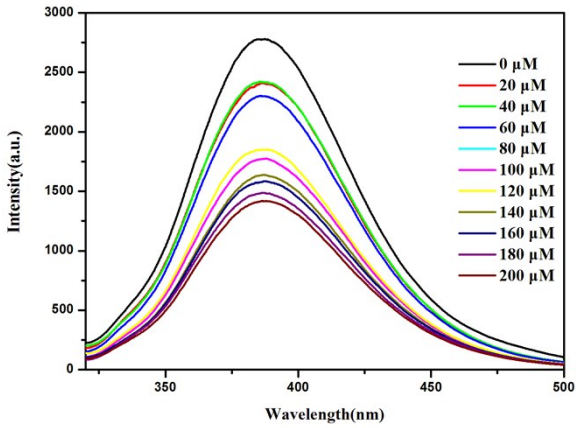
Fig. S13 UV absorption spectroscopy compound **L1**, **L2, L3** and **L4** dispersed in V_{DMSO}:V_{H2O}=2:1

5. Fluorescence Spectroscopy

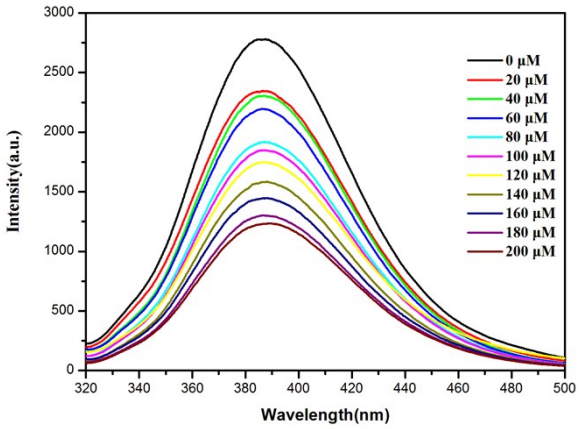


(a)

Fig. S14 Fluorescence spectroscopy of compound **L1**, **L2, L3** and **L4** dispersed in V_{DMSO}:V_{H2O}=2:1



(b)



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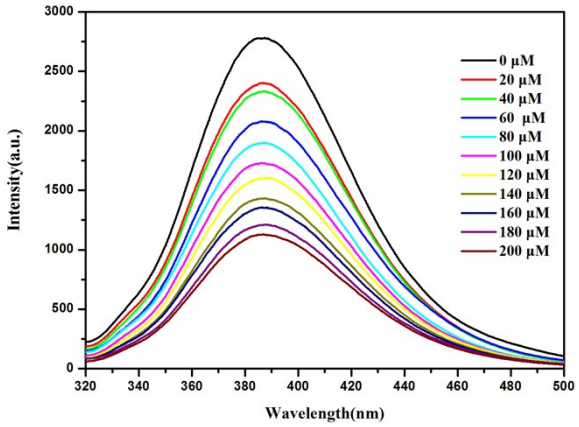
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100 μM
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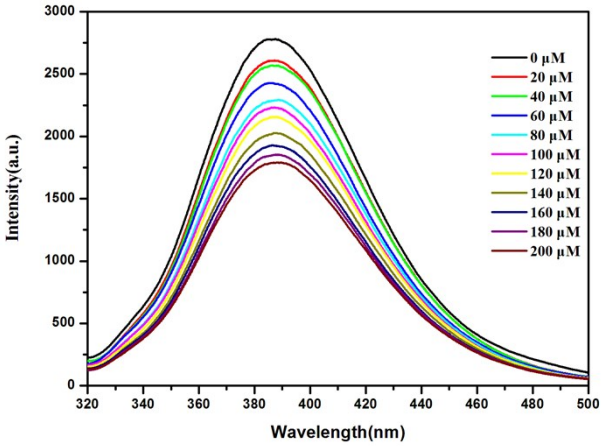
140 μM
160 μM
180 μM
200 μM

(d)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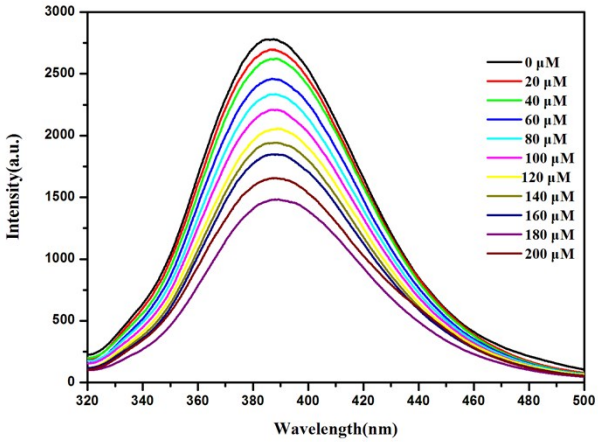
(e)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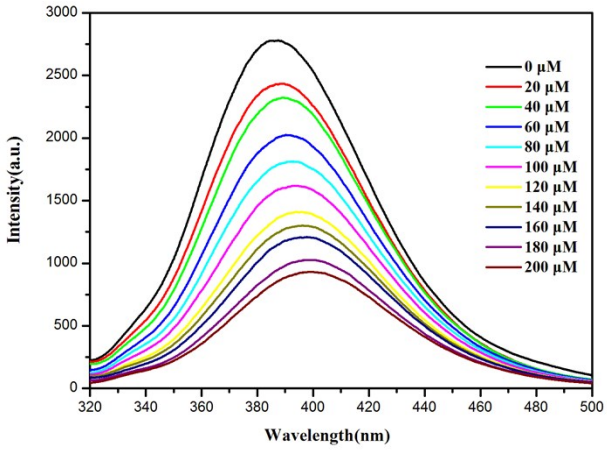
180 μM
200 μM

(f)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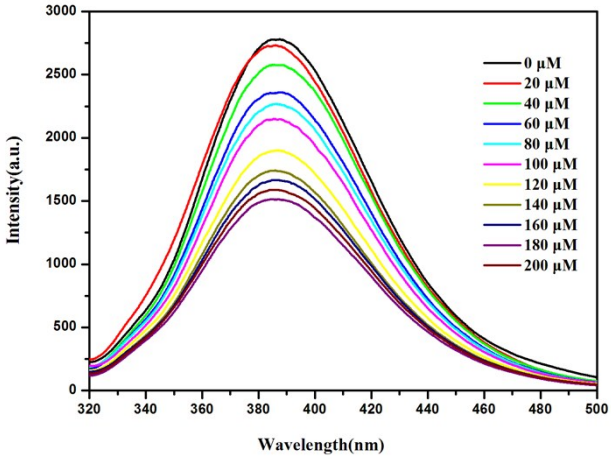
200 μM

(g)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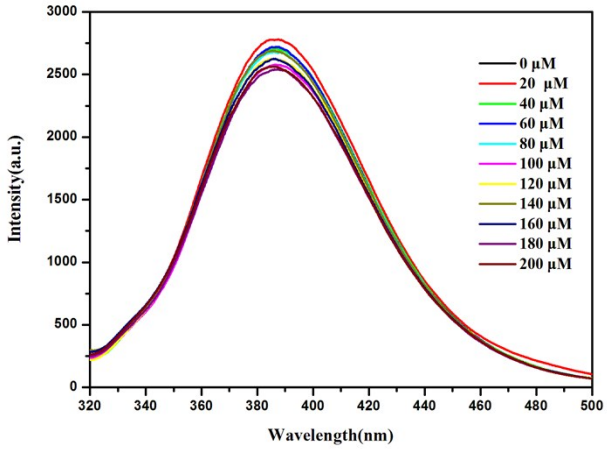
160 μM
180 μM
200 μM

(h)


Intensity(a.u.)
Wavelength(nm)
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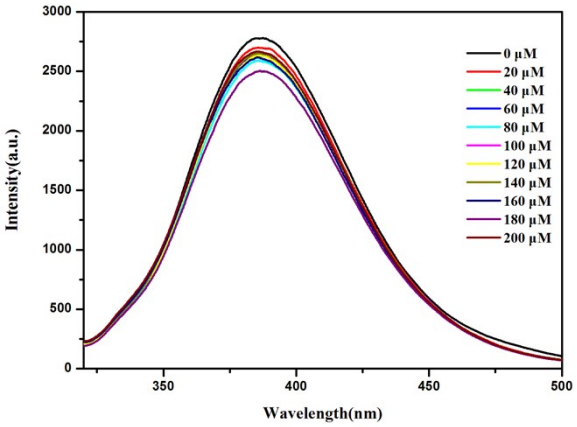
100 μM
120 μM
140 μM
160 μM
180 μM
200 μM

(i)



(j)

Fig. S15 Fluorescence quenching of sensor **L1** dispersed in V_{DMSO}:V_{H2O}=2:1 by gradually increasing different quenchers' concentration: (b) 2,4-DNT, (c) 1,4-DNB, (d) 4-NBA, (e) 1,3-DNB, (f) 1,2-DNB, (g) 2-NP, (h) NB, (i) Phe, (j) m-Thb.