Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Novel Sulfonamido Spirobifluorene as Fluorescent Sensorsfor Mercury(II) Ion and Glutathione

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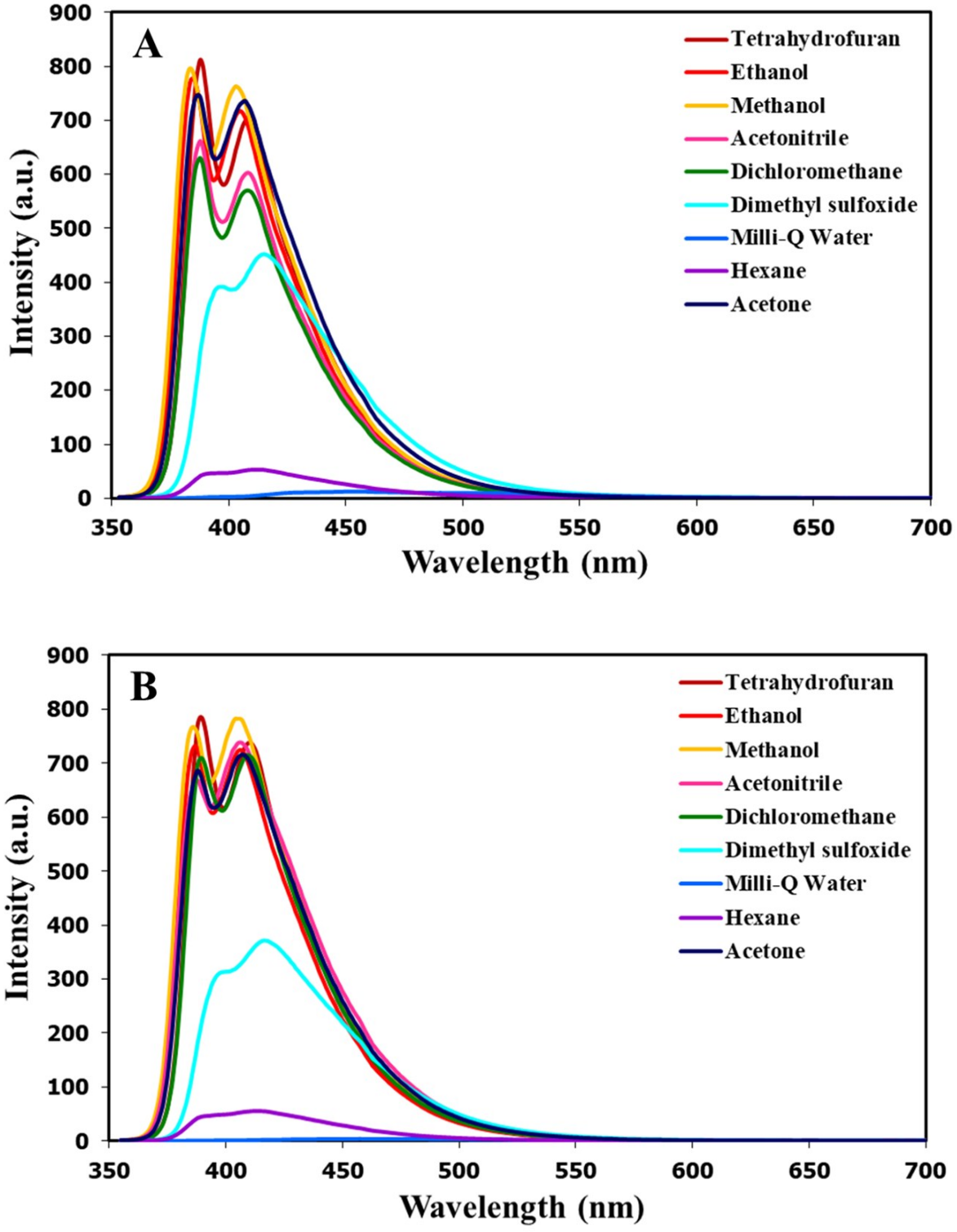

Figure S1. Fluorescence emission spectra of (A) **DSS** (10µM)and (B)**TSS**(10µM) in various solvents

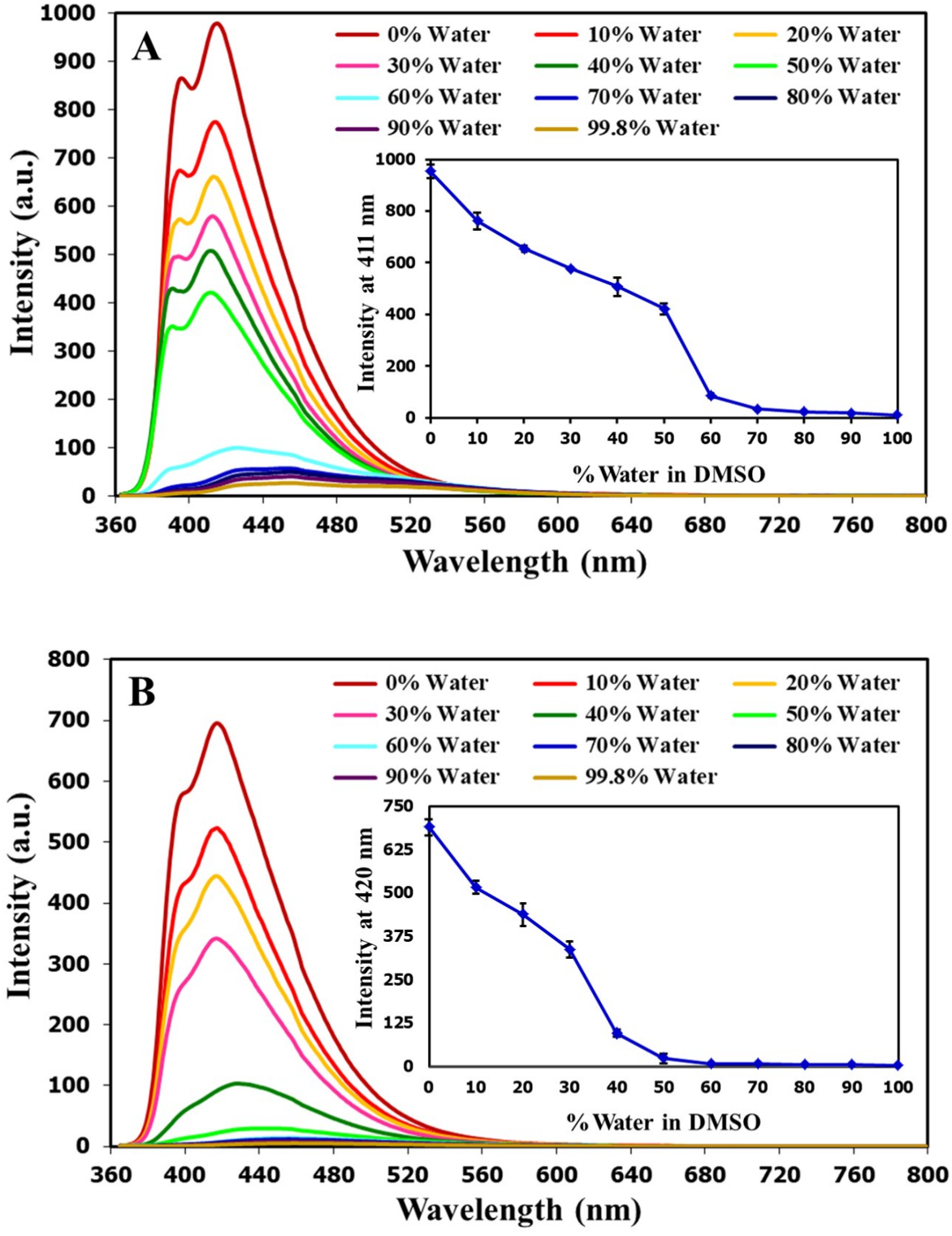

Figure S2. Fluorescence spectra of (A) **DSS**(10μM) and (B)**TSS**(10μM) in various water/DMSO ratios.

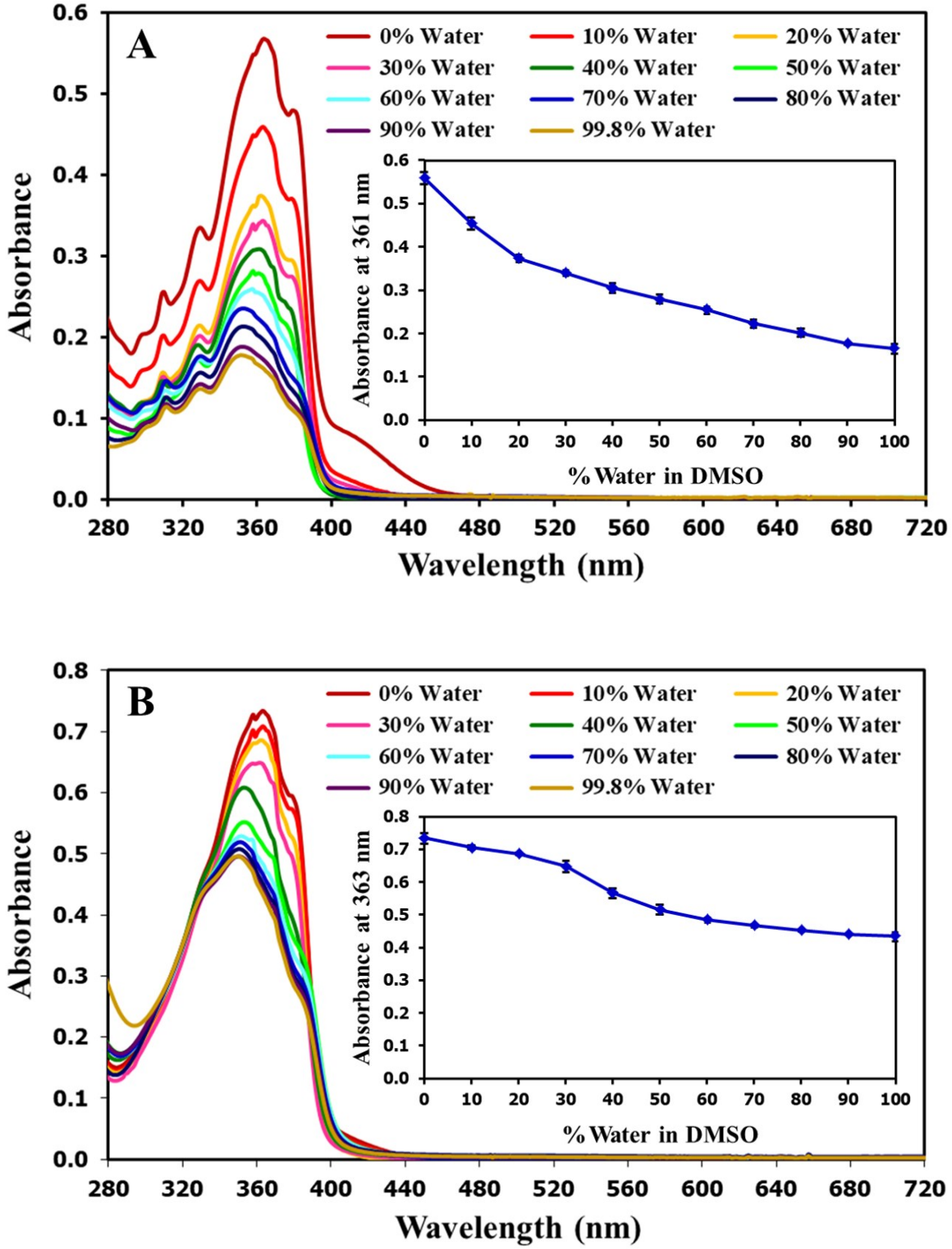

Figure S3. Absorption spectra of (A) **DSS**(10μM) and (B) **TSS**(10μM) in various water/DMSO ratios.

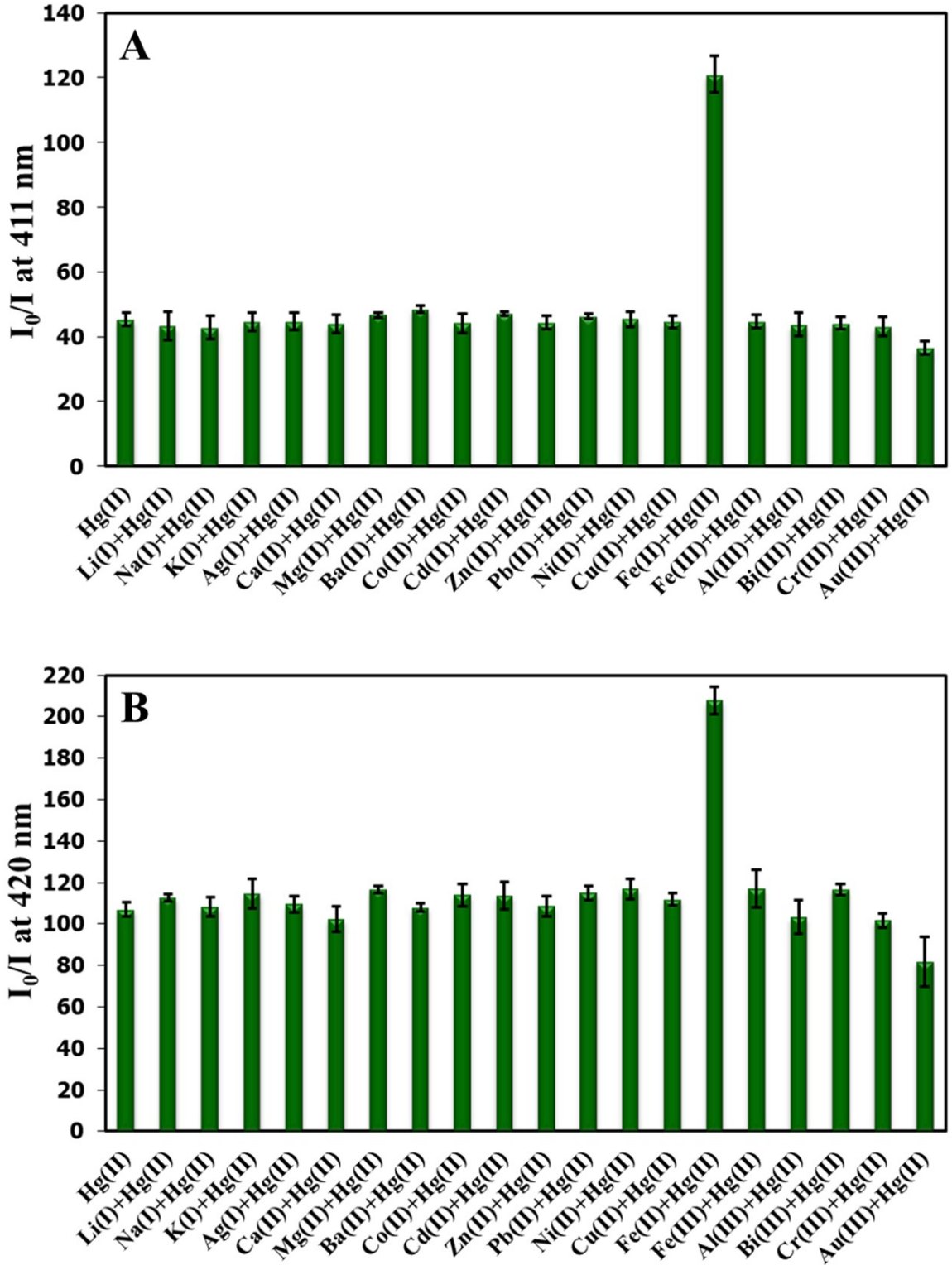

Figure S4. Fluorescence responses of (A) **DSS**(10μM) and (B) **TSS**(10μM) in the presence of Hg(II) (100μM) andforeign ions (1000μM)

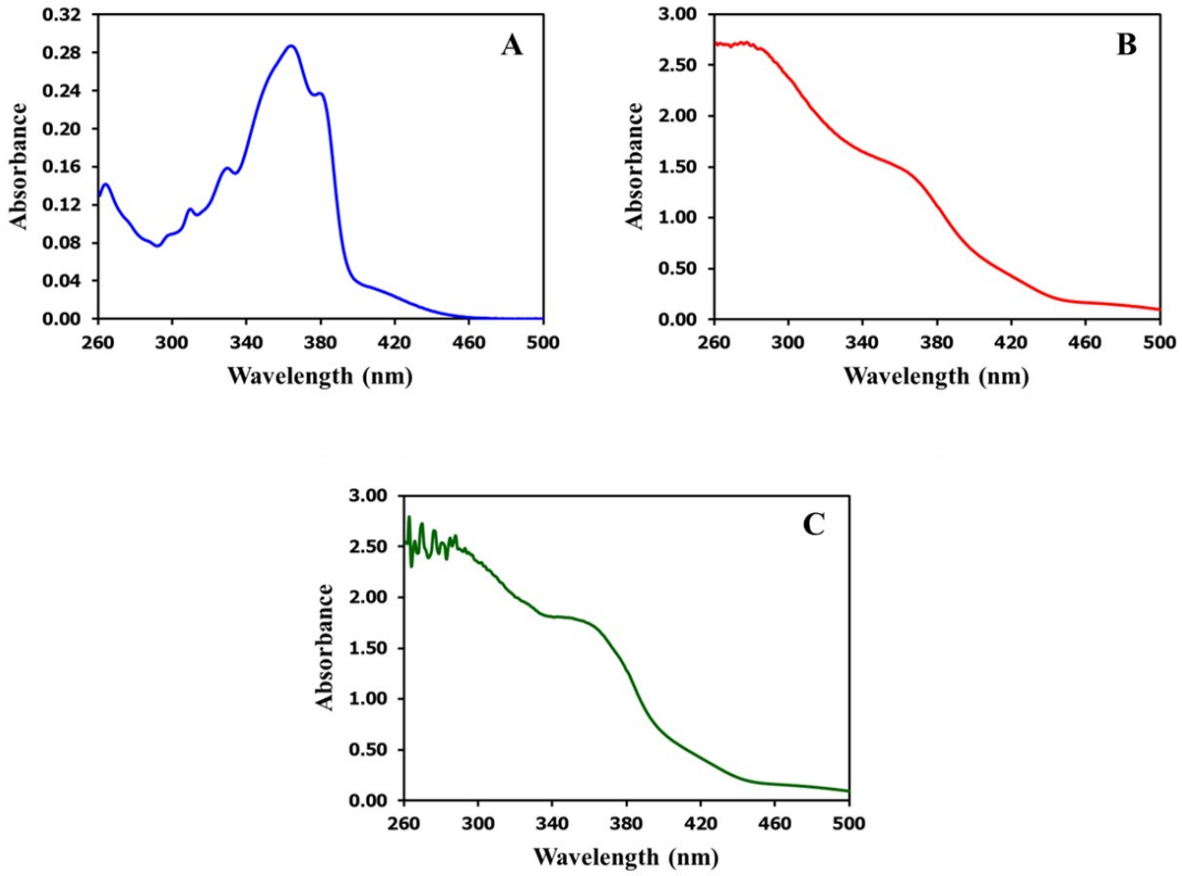

Figure S5. UV spectra of (A) 10 µM **DSS**, (B) 1000 µM $Fe(OAc)_2$, and (C) 10 µM **DSS** + 1000 µM $Fe(OAc)_2$in 50% of 10 mM HEPES buffer in DMSO, pH 7.0.

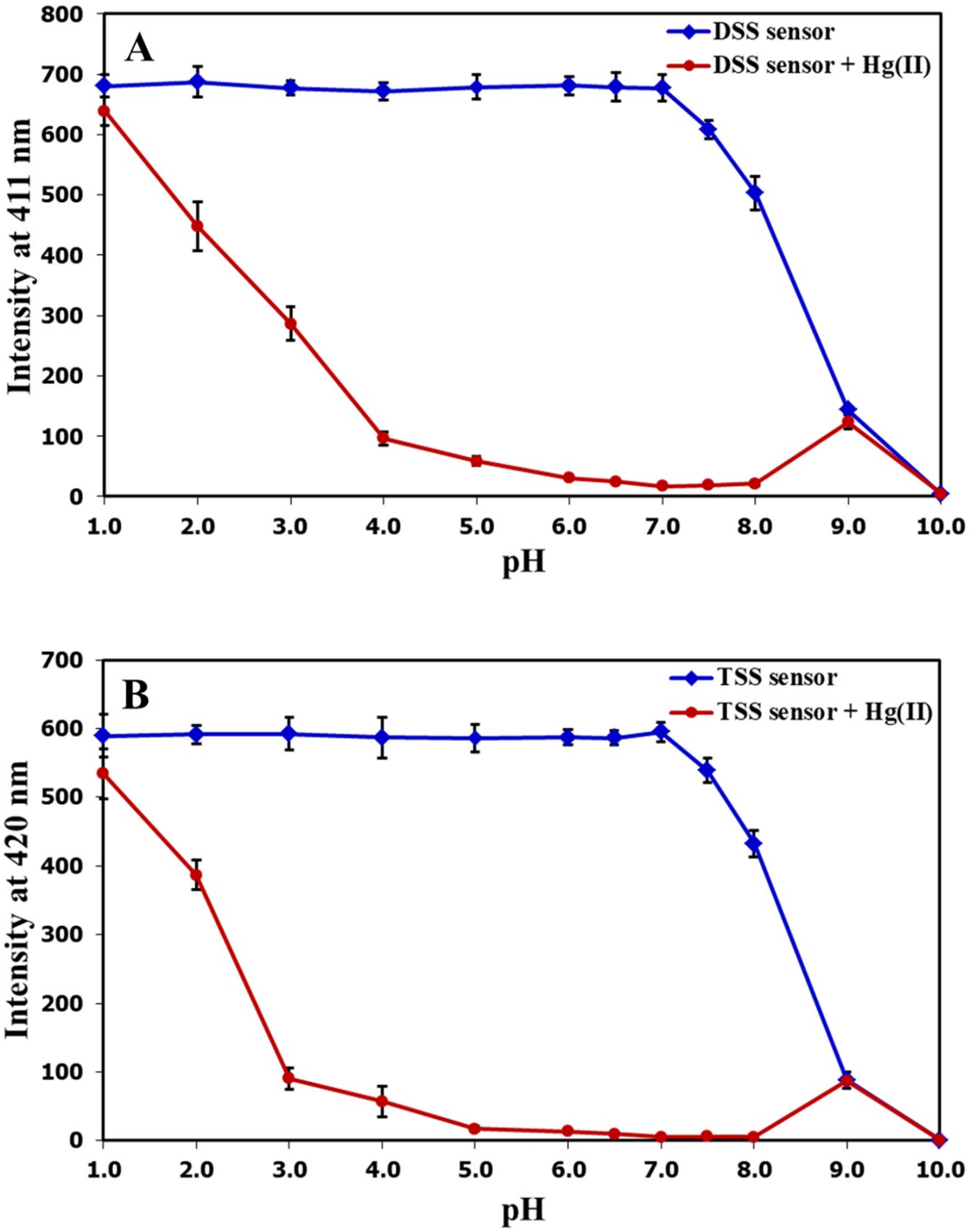

Figure S6. pH effects on emission intensities of (A) **DSS**(10μM) and (B)**TSS** (10μM) before and after addition of Hg(II) (100μM)

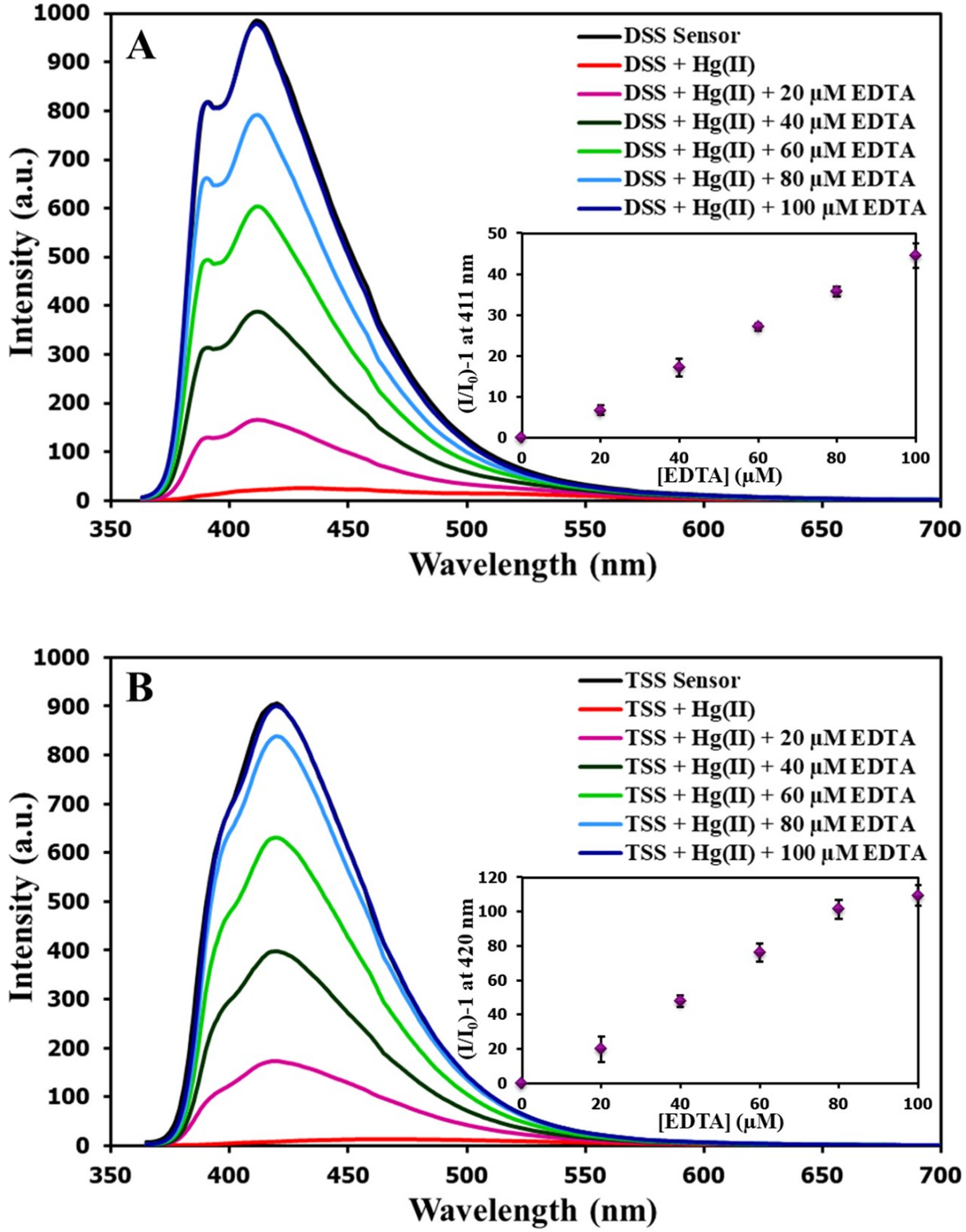

Figure S7. Fluorescence spectra of (A) **DSS** (10µM) and (B) **TSS** (10µM) with Hg(II) (100µM) and various amounts of EDTA

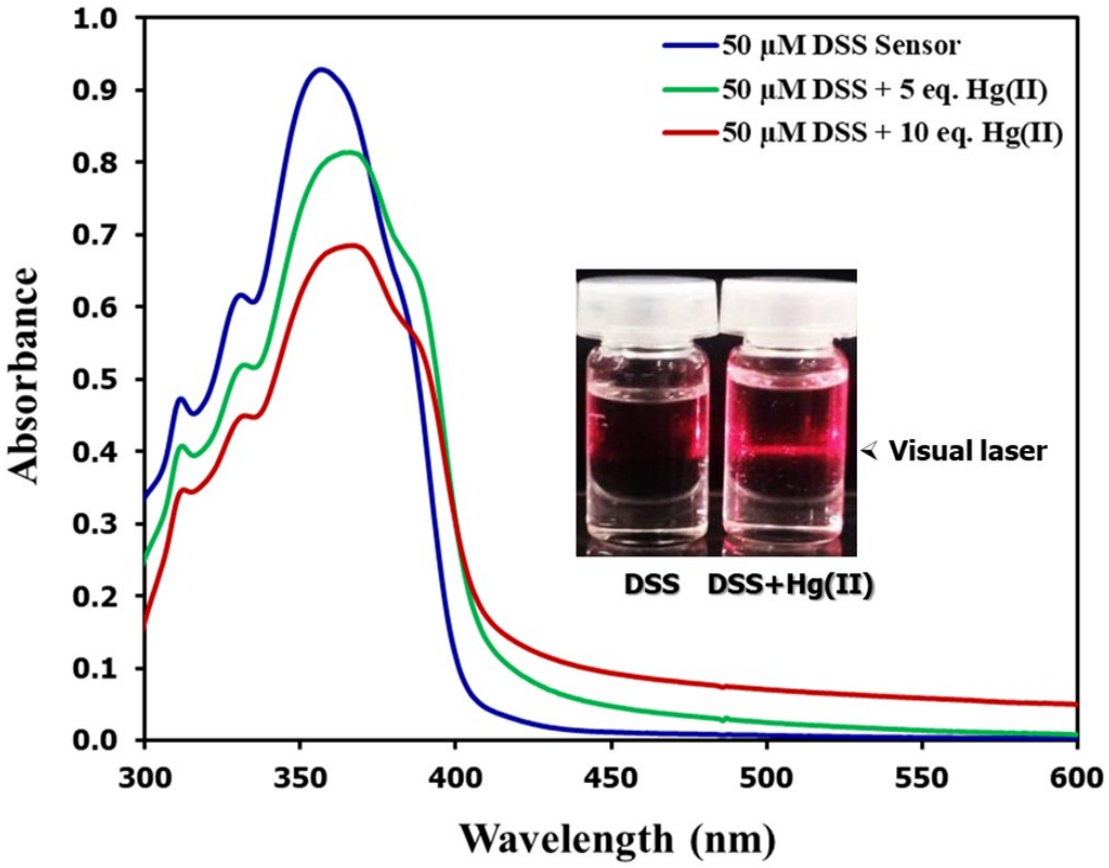

Figure S8. UV spectra for **DSS** before and after addition of $Hg(OAc)_2$ (5 and 10 eq.) in 50% of 10 mM HEPES buffer in DMSO, pH 7.0. Inset is the photographed image showing the Tyndall effect.

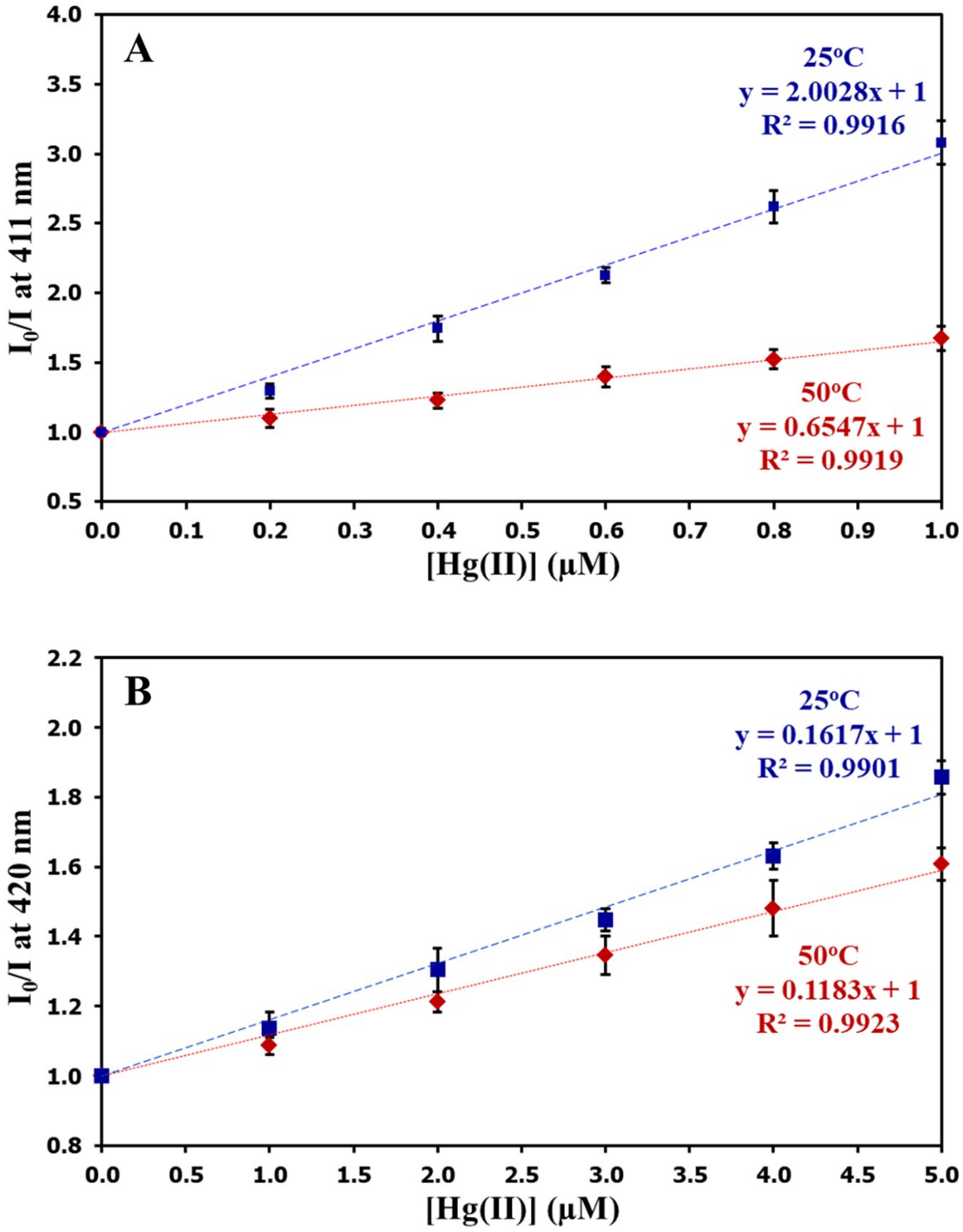

Figure S9. Stern-Volmer plots for (A) **DSS** (10µM) and (B)**TSS** (10µM) at 25 and 50°C.

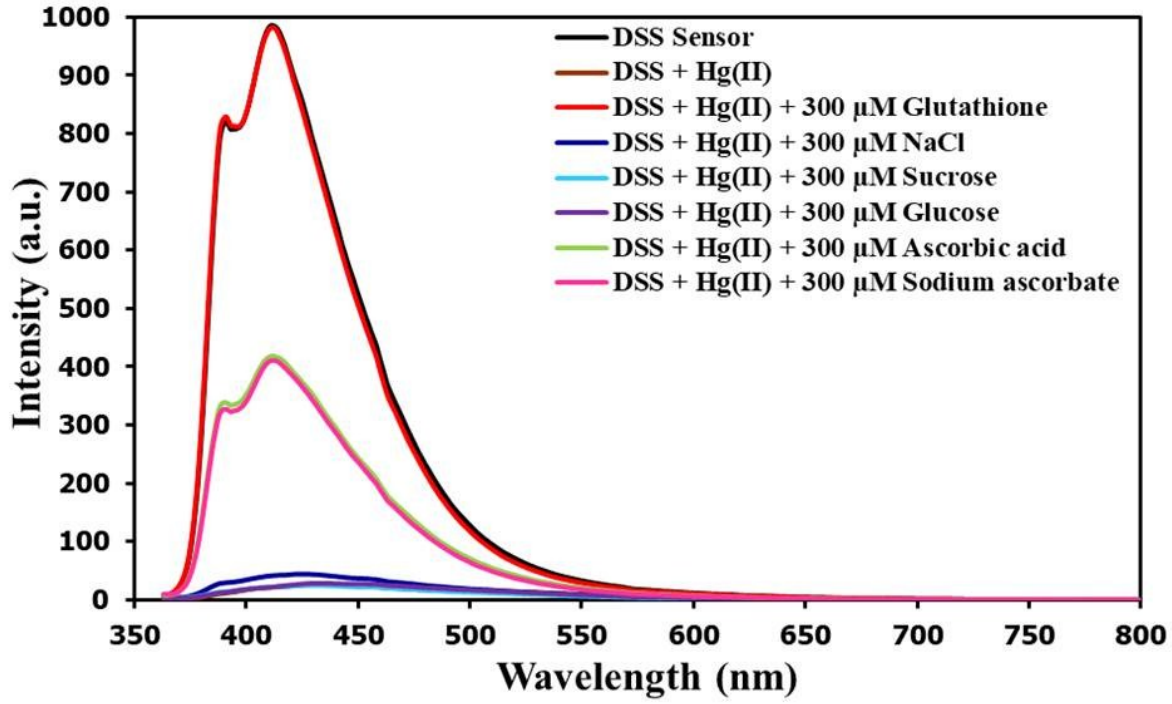

Figure S10. Fluorescence spectra of mixtures between **DSS** (10µM) and Hg(II) (100 µM) in the presence of type of some beverage ingredients (300 µM).

Table S1. Statistic data

Quantitative Analysis of DSS Sensor

Type	[Hg(II)] (ppm)	[Hg(II)] in sample (ppm)				
		1st	2nd	3rd	Average	SD
Bottled water	0.00	0.029	-0.020	-0.020	-0.003	0.028
	0.50	0.517	0.588	0.536	0.547	0.037
	1.00	1.000	1.053	1.012	1.022	0.028
Rain water	0.00	0.032	-0.020	-0.021	-0.003	0.031
	0.50	0.423	0.523	0.500	0.482	0.052
	1.00	1.096	1.017	1.009	1.041	0.048
Tap water	0.00	0.006	-0.005	-0.013	-0.004	0.009
	0.50	0.486	0.557	0.473	0.506	0.045
	1.00	1.122	1.027	1.016	1.055	0.058
P-value		0.12	0.12	0.12	0.13	

Quantitative Analysis of TSS Sensor

Type	[Hg(II)] (ppm)	[Hg(II)] in sample (ppm)				
		1st	2nd	3rd	Average	SD
Bottled water	0.00	0.017	-0.011	-0.034	-0.009	0.026
	0.50	0.597	0.532	0.568	0.565	0.032
	1.00	0.971	1.104	0.996	1.024	0.071
Rain water	0.00	0.019	0.010	-0.060	-0.011	0.043

	0.50	0.515	0.435	0.471	0.474	0.040
	1.00	1.197	1.034	1.072	1.101	0.085
Tap water	0.00	0.009	-0.106	0.071	-0.009	0.090
	0.50	0.576	0.518	0.441	0.512	0.067
	1.00	1.086	1.226	1.036	1.116	0.099
P-value		0.10	0.15	0.15	0.13	

Quantitative Analysis of ICP-OES

Type	**[Hg(II)] (ppm)**	**[Hg(II)] in sample (ppm)**			
		Hg1849		**Hg1942**	
		Average	**SD**	**Average**	**SD**
Bottled water	0.00	0.025	0.001	0.027	0.002
	0.50	0.571	0.011	0.559	0.012
	1.00	1.082	0.019	1.071	0.016
Rain water	0.00	0.032	0.006	0.040	0.005
	0.50	0.504	0.032	0.500	0.034
	1.00	1.118	0.022	1.096	0.015
Tap water	0.00	0.028	0.004	0.033	0.004
	0.50	0.513	0.030	0.507	0.033
	1.00	1.185	0.036	1.173	0.031
P-value		0.09		0.09	

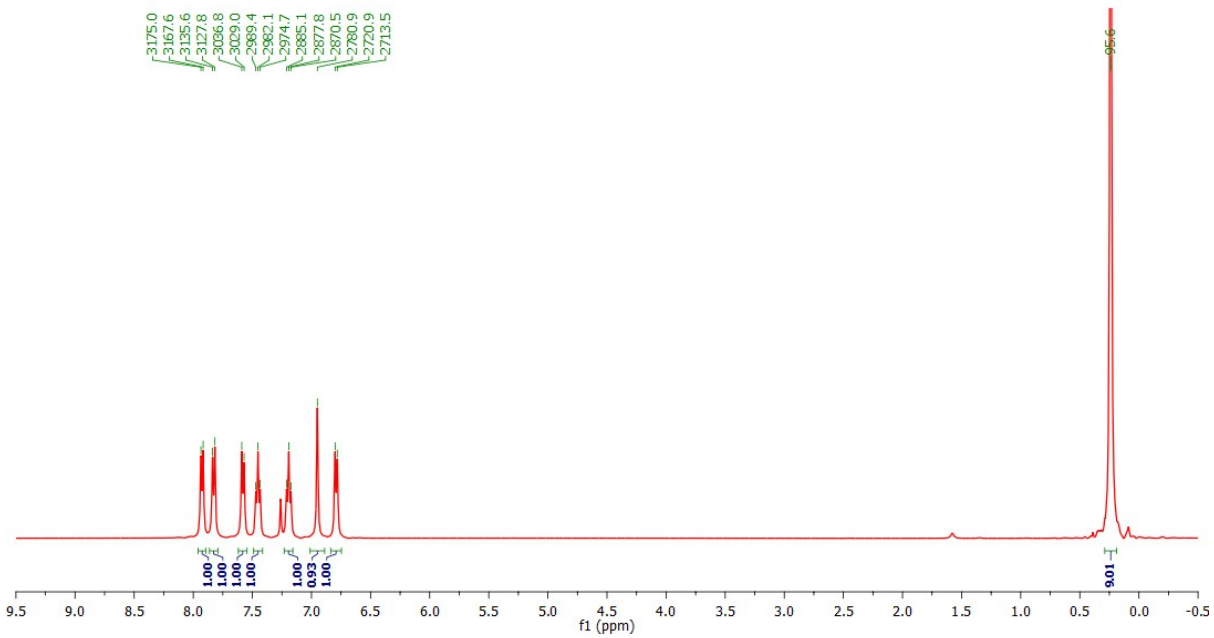

Figure S11. ^{1}H-NMR spectrum of compound **2a**.

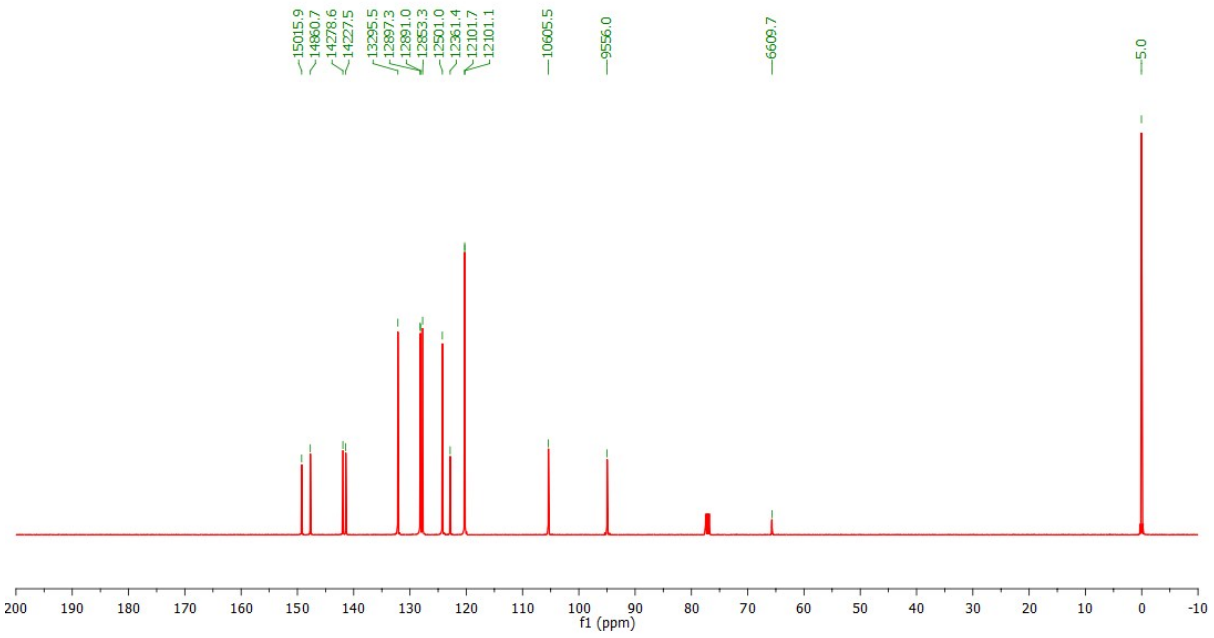

Figure S12. ^{13}C-NMR spectrum of compound **2a**.

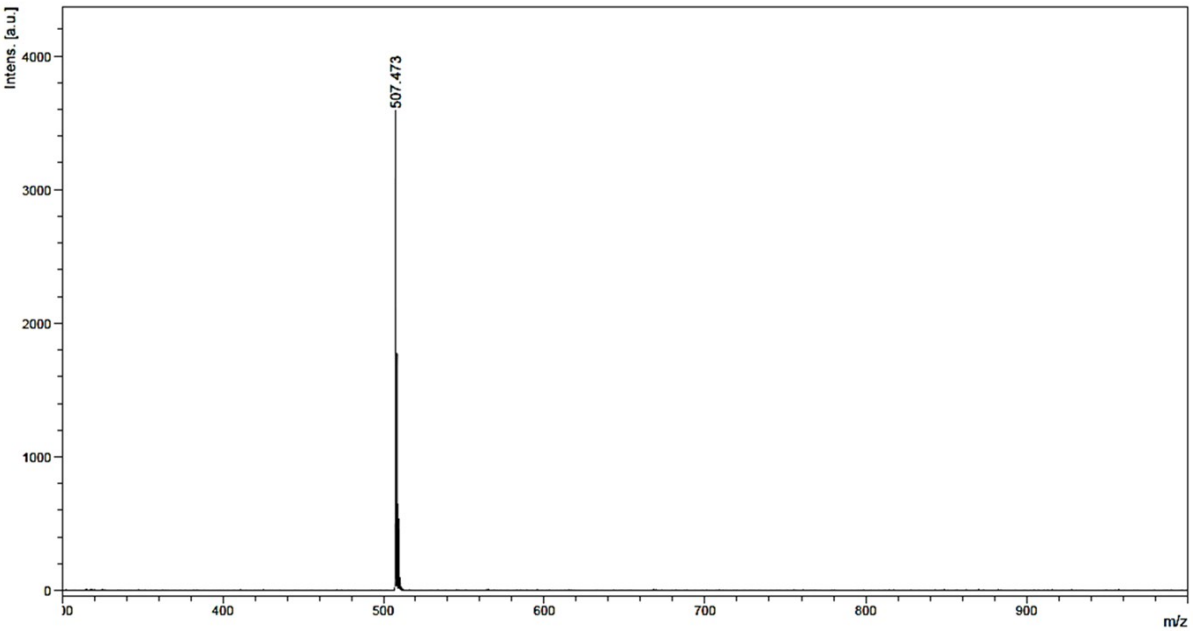

Figure S13. Mass spectrum of compound **2a**.

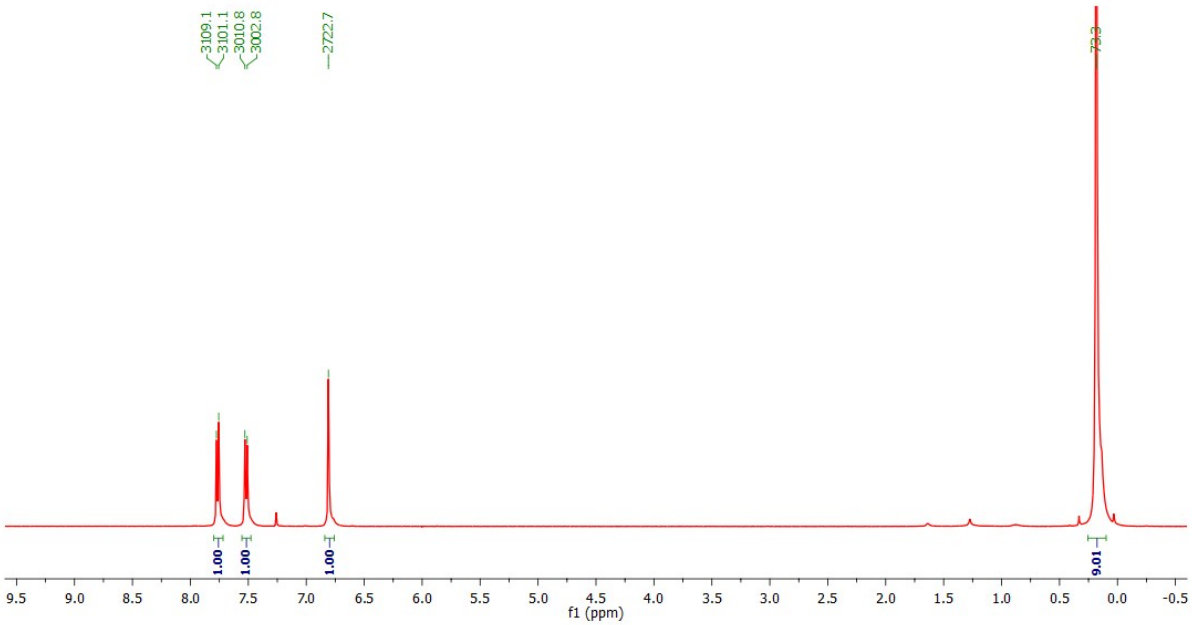

Figure S14. ^{1}H-NMR spectrum of compound **2b**.

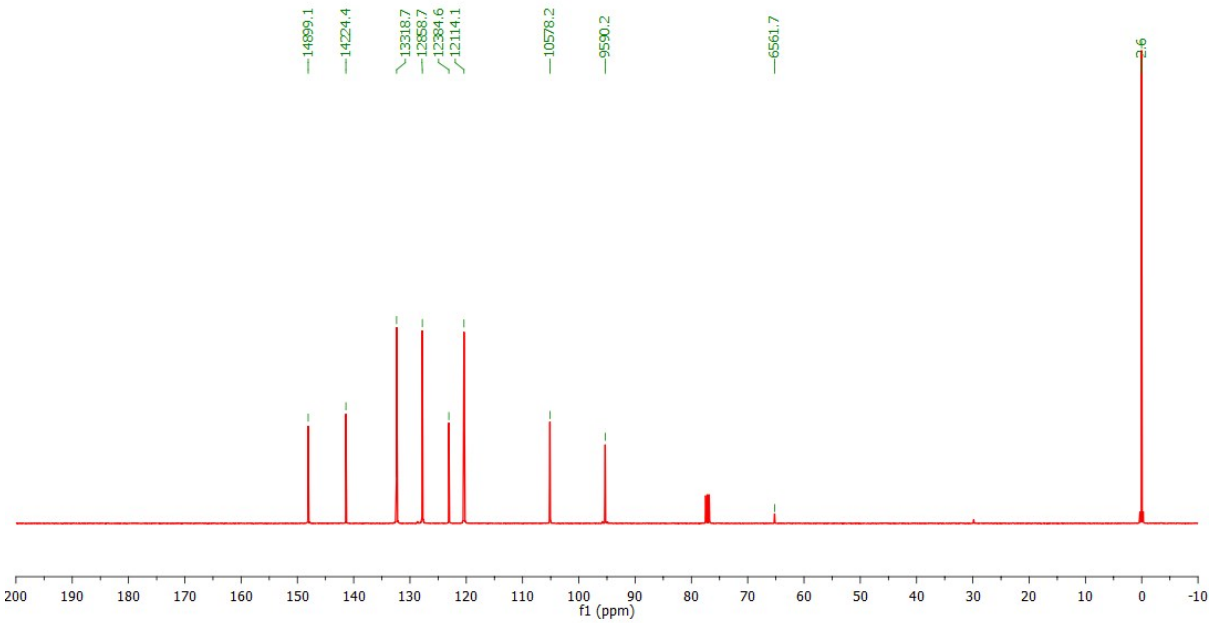

Figure S15. ^{13}C-NMR spectrum of compound **2b**.

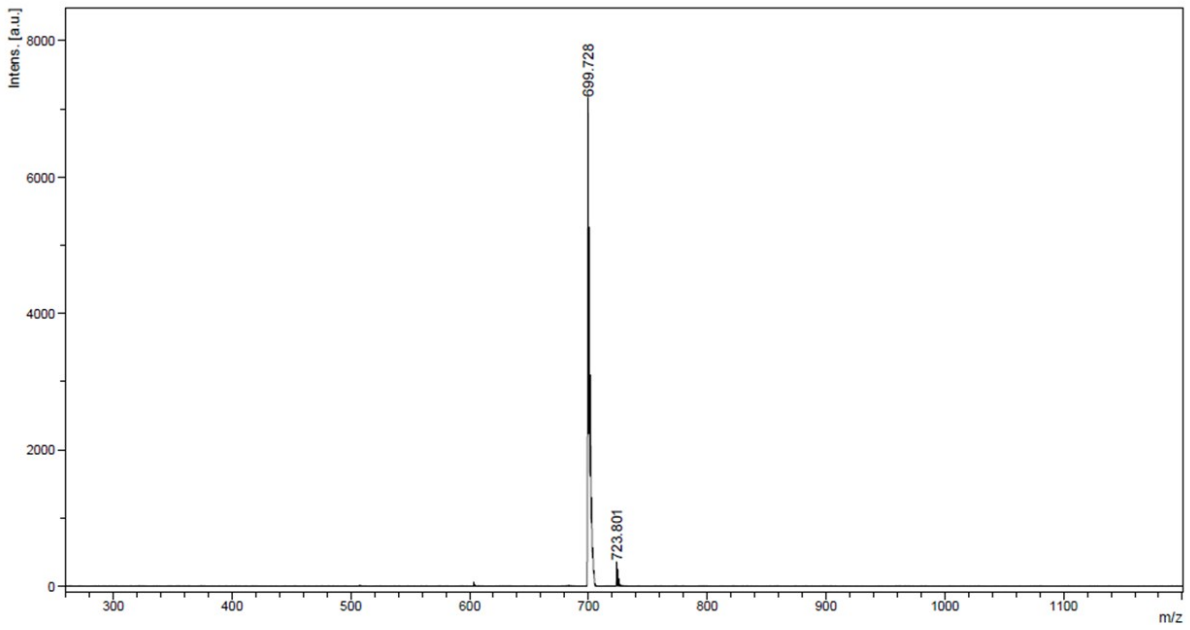

Figure S16. Mass spectrum of compound **2b**.

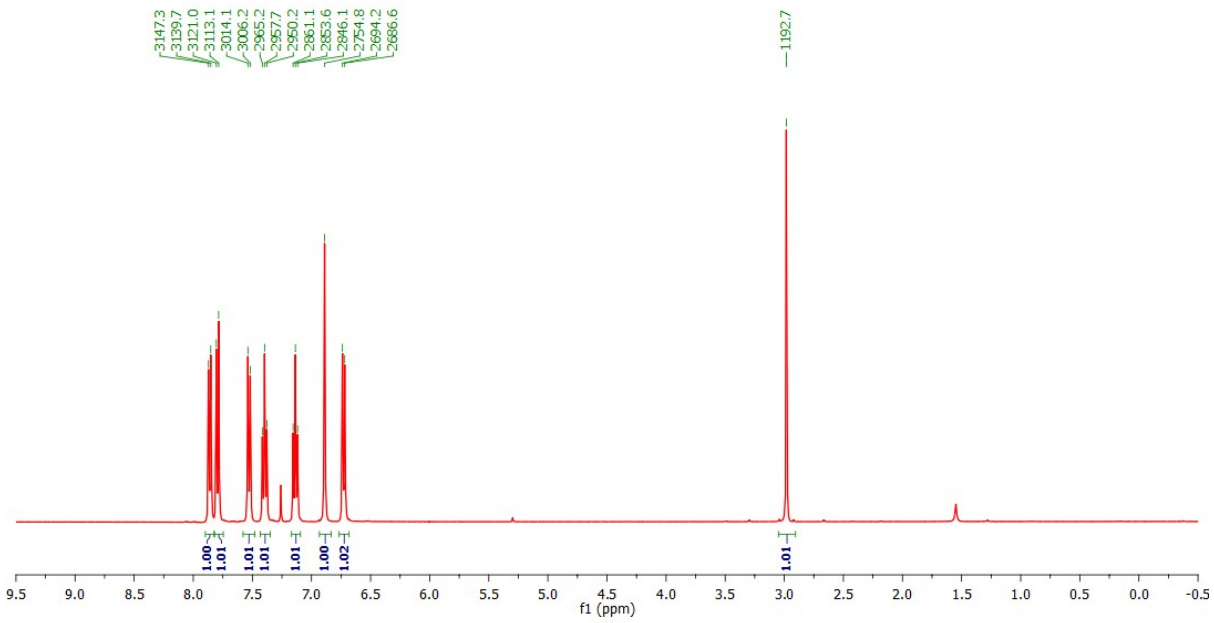

Figure S17. ^{1}H-NMR spectrum of compound **3a**.

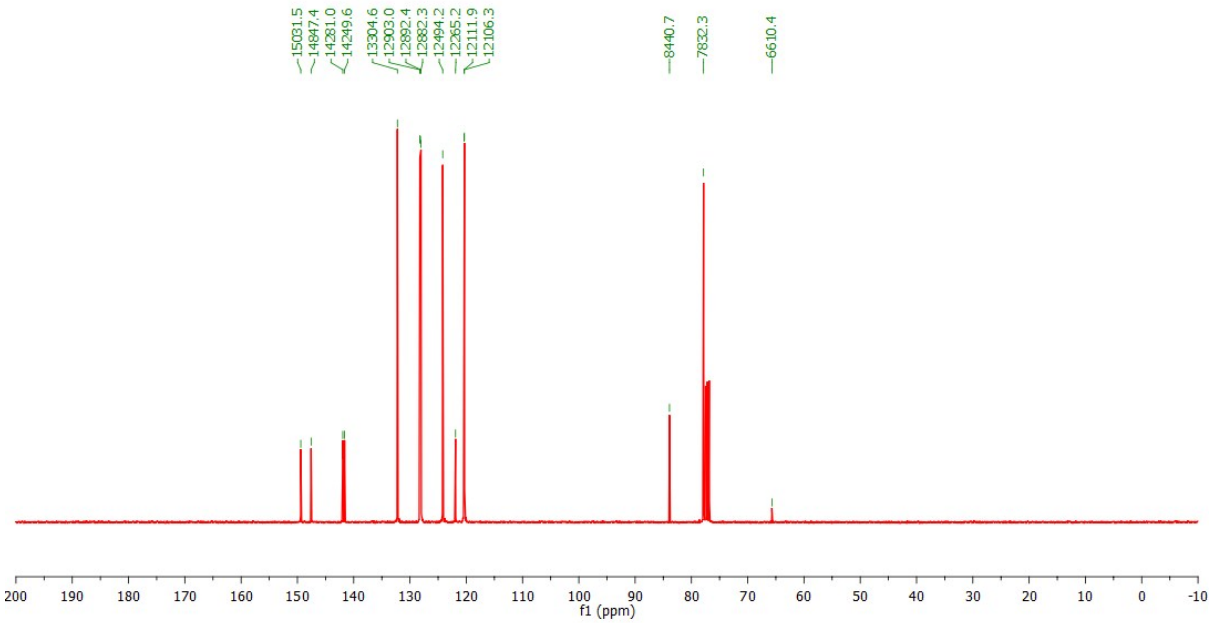

Figure S18. ^{13}C-NMR spectrum of compound **3a**.

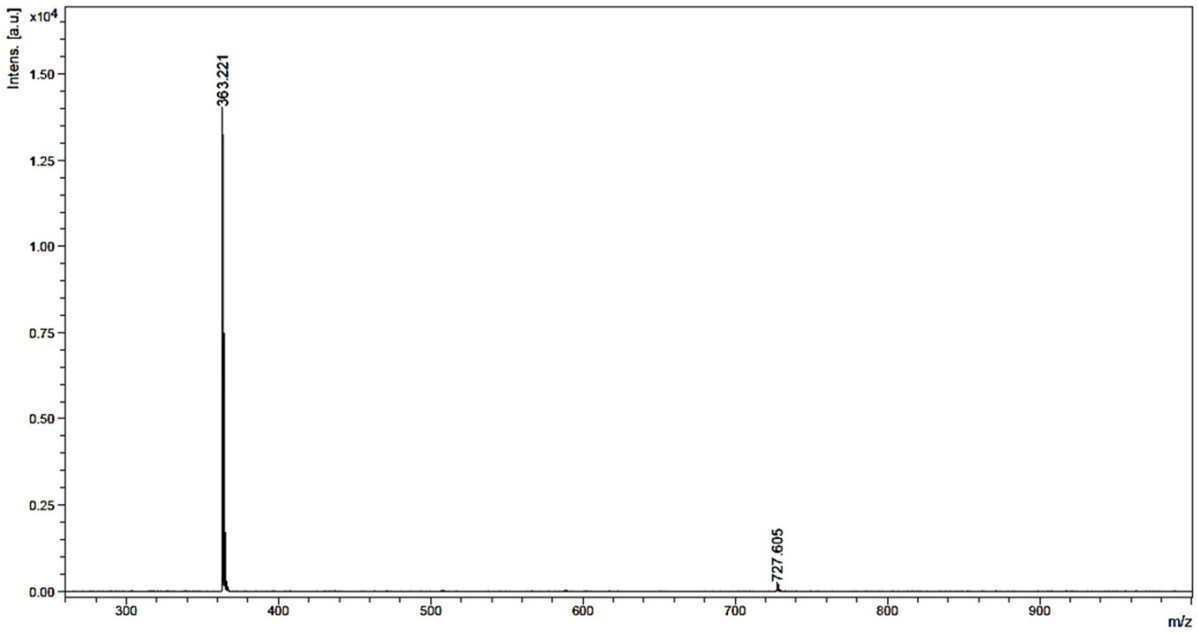

Figure S19. Mass spectrum of compound **3a**.

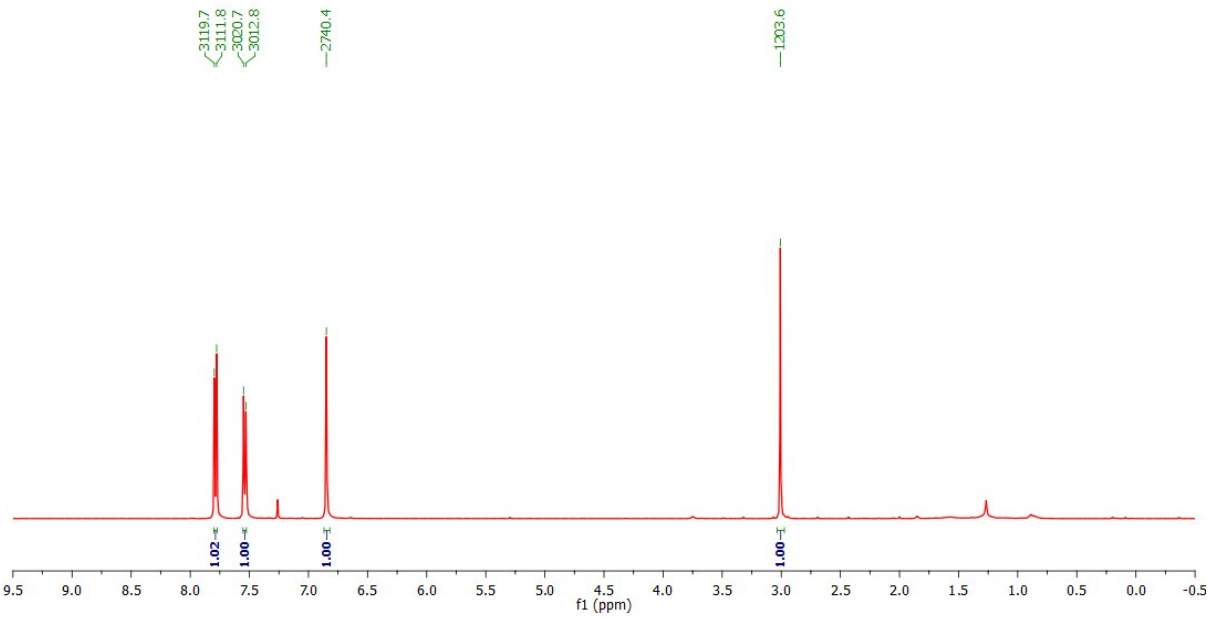

Figure S20. ^{1}H-NMR spectrum of compound **3b**.

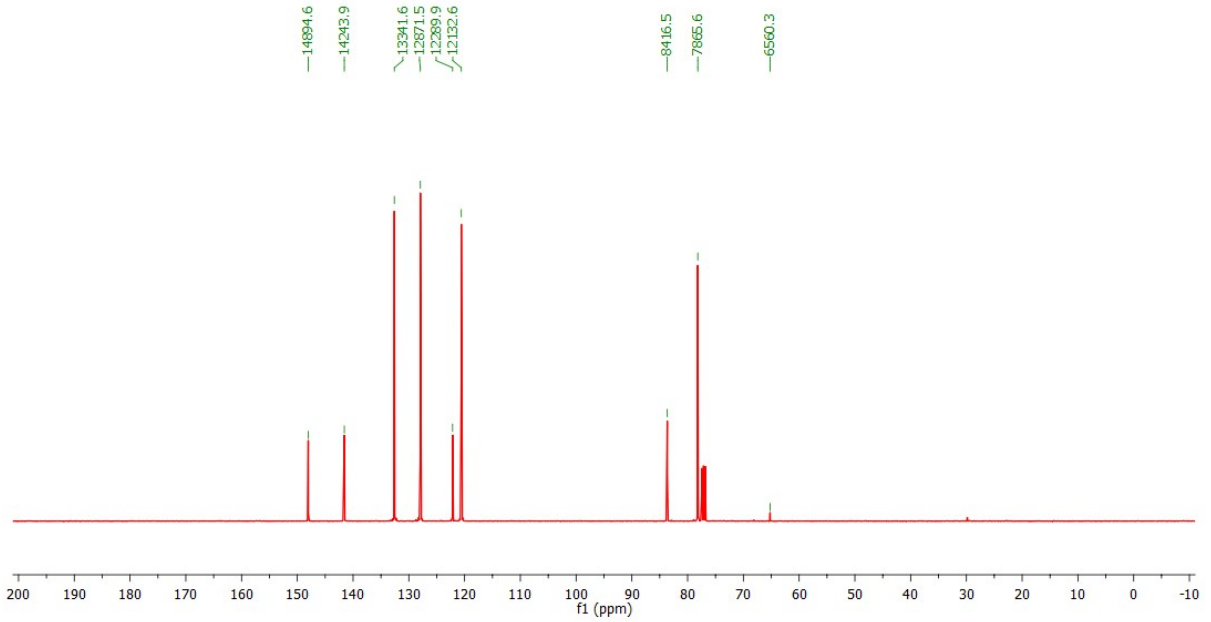

Figure S21. ^{13}C-NMR spectrum of compound **3b**.

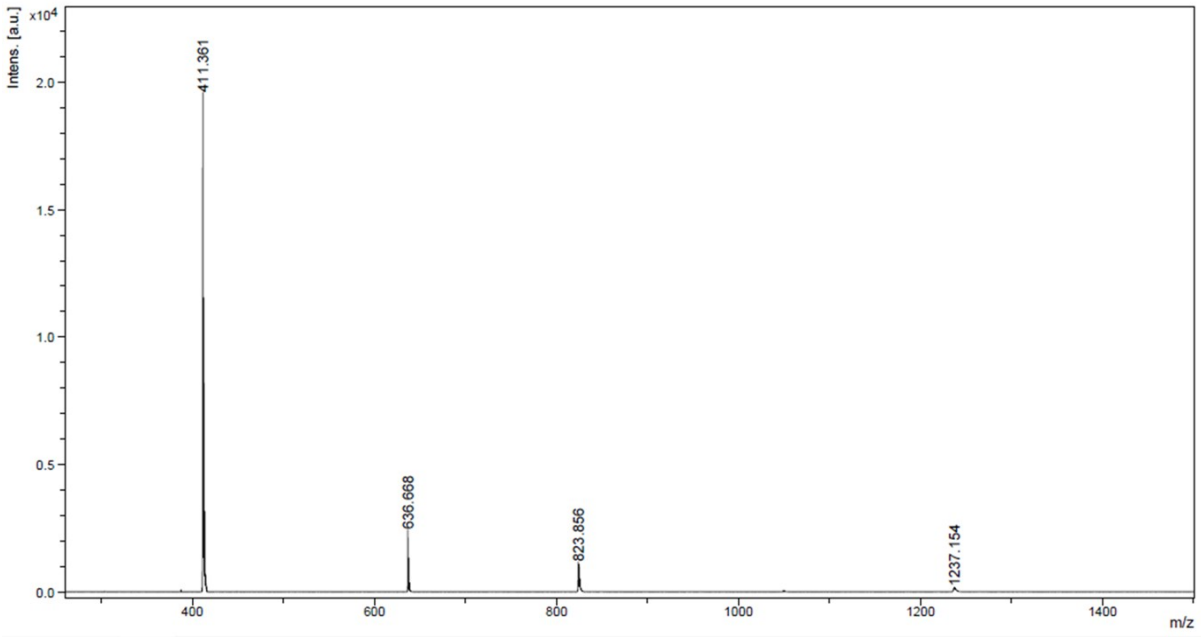

Figure S22. Mass spectrum of compound **3b**.

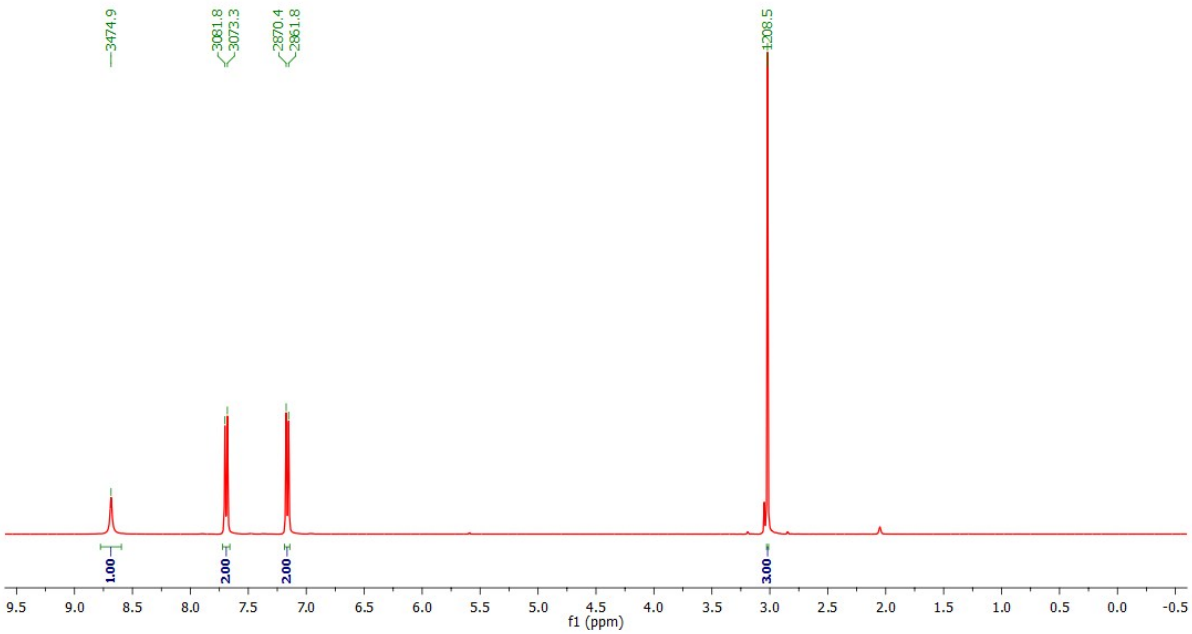

Figure S23. ^{1}H-NMR spectrum of compound **CH_3SO_2NH-C_6H_4-I**.

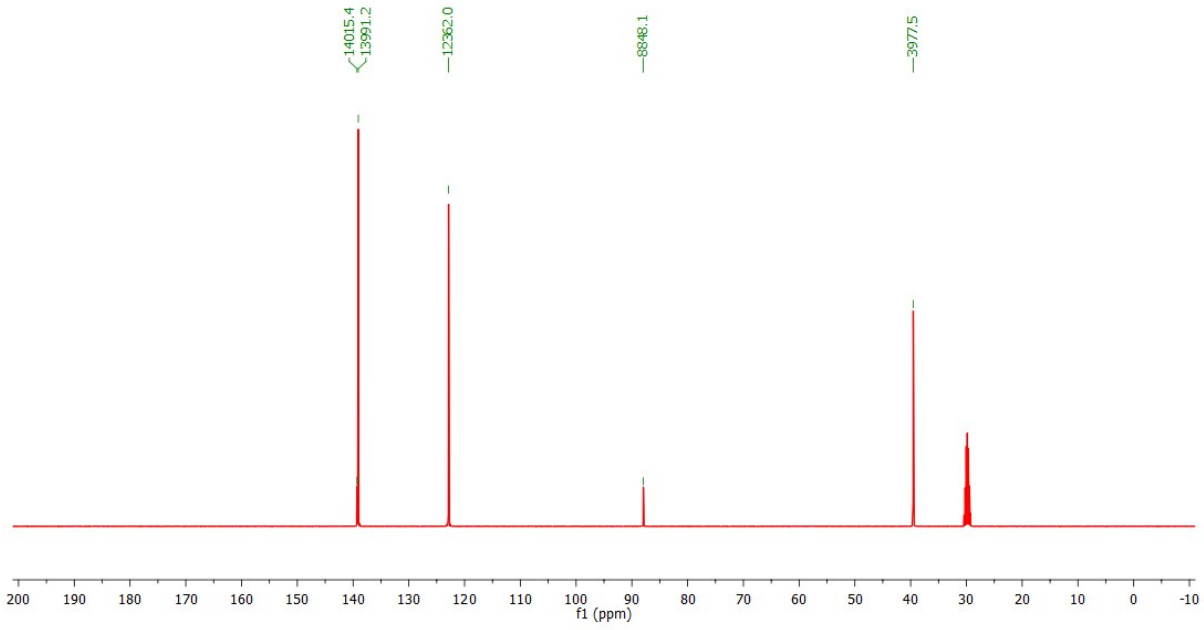

Figure S24. ^{13}C-NMR spectrum of compound **CH_3SO_2NH-C_6H_4-I**.

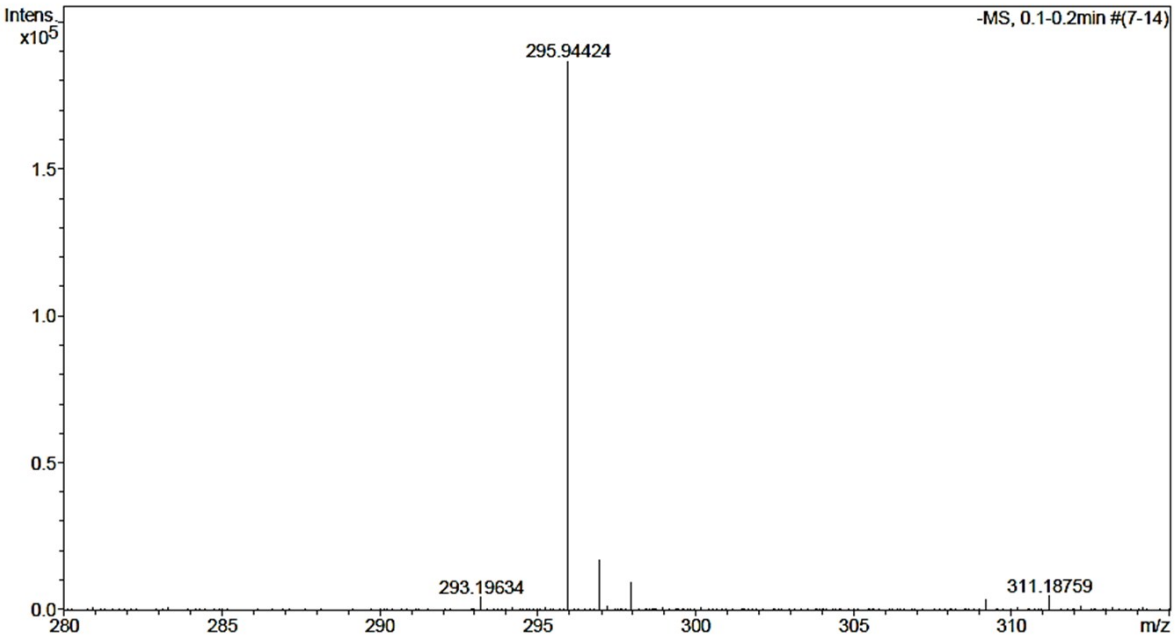

Figure S25. High resolution mass spectrum of compound **CH_3SO_2NH-C_6H_4-I**.

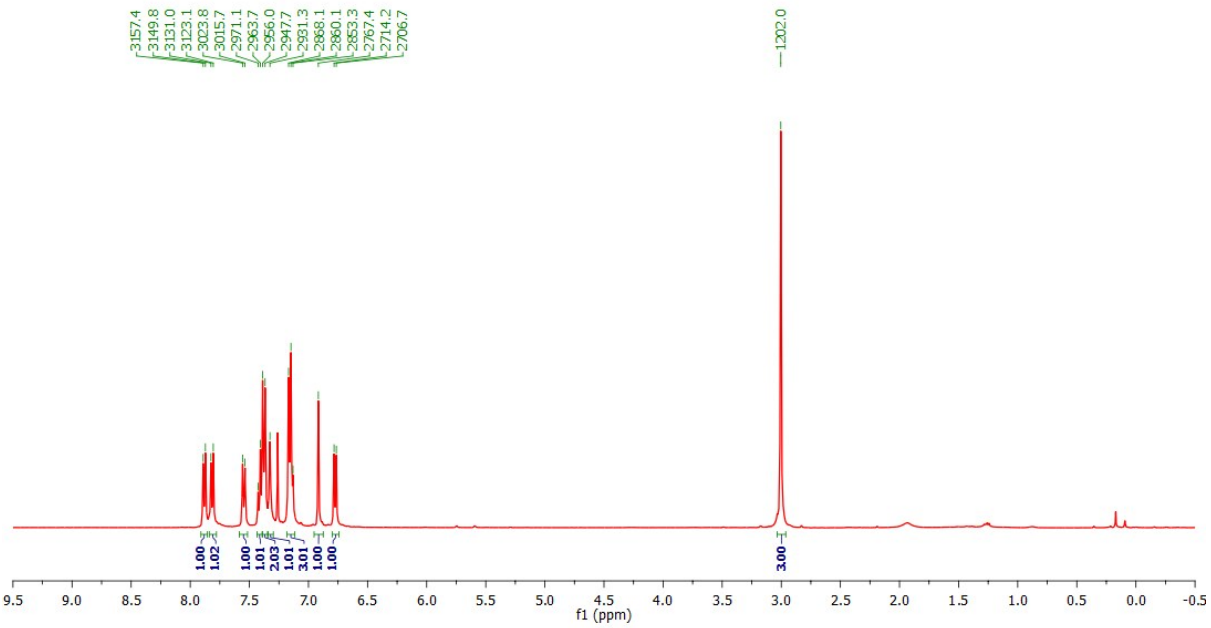

Figure S26.[1]H-NMR spectrum of **DSS**.

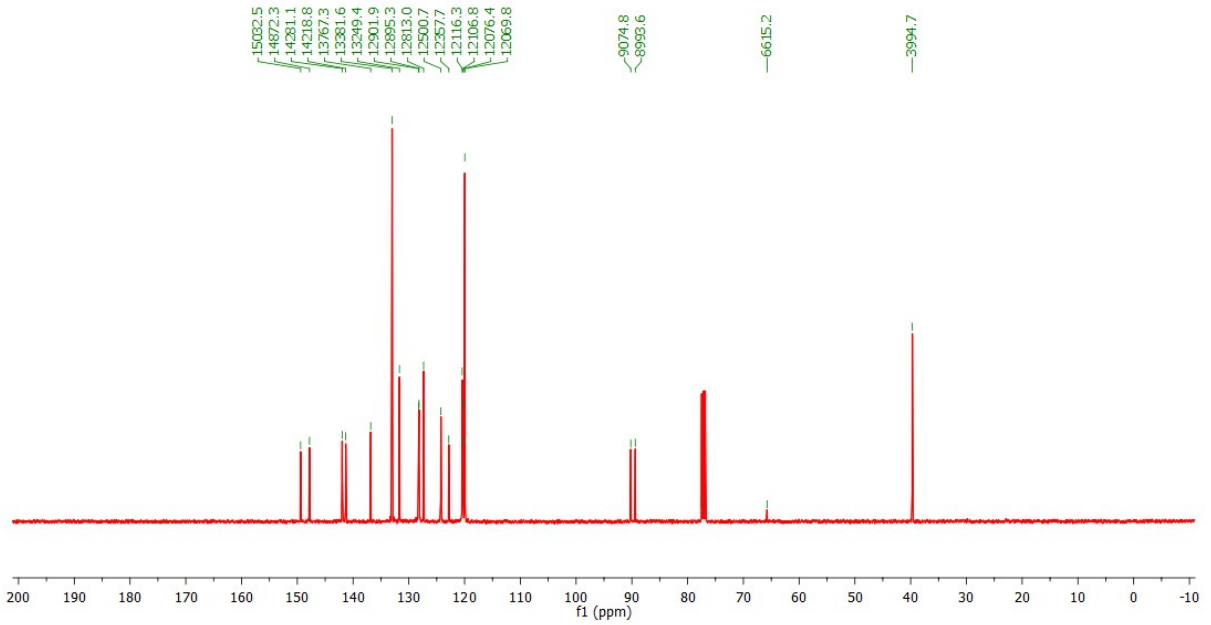

Figure S27.[13]C-NMR spectrum of **DSS**.

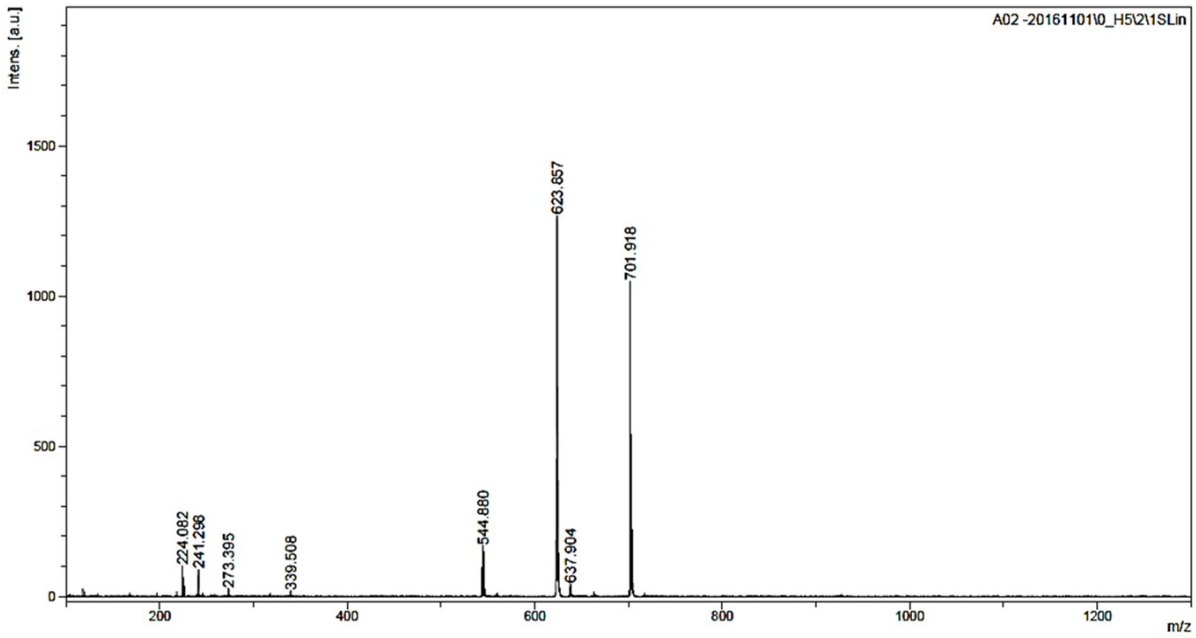

Figure S28. Mass spectrum of **DSS**.

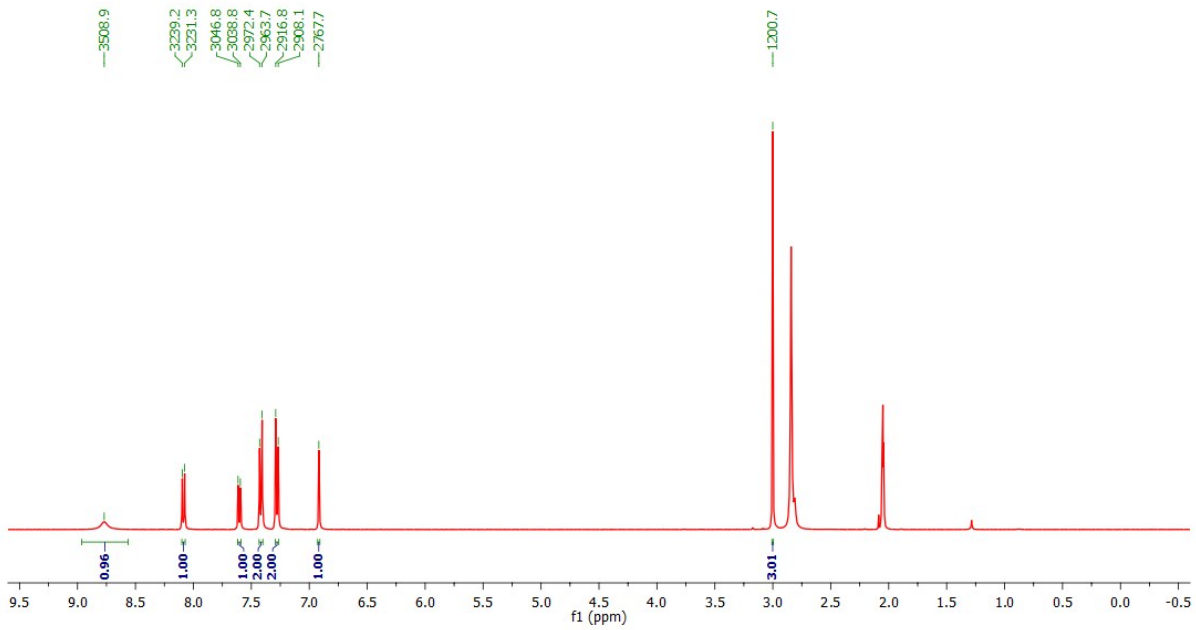

Figure S29.[1]H-NMR spectrum of **TSS**.

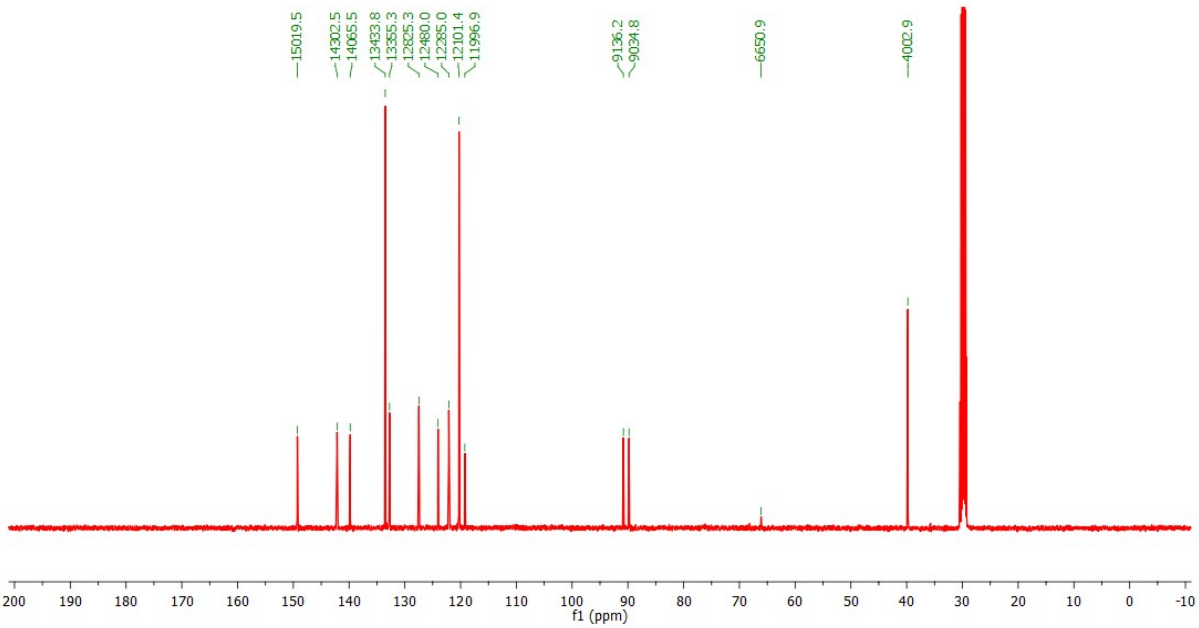

Figure S30.[13]C-NMR spectrum of **TSS**.

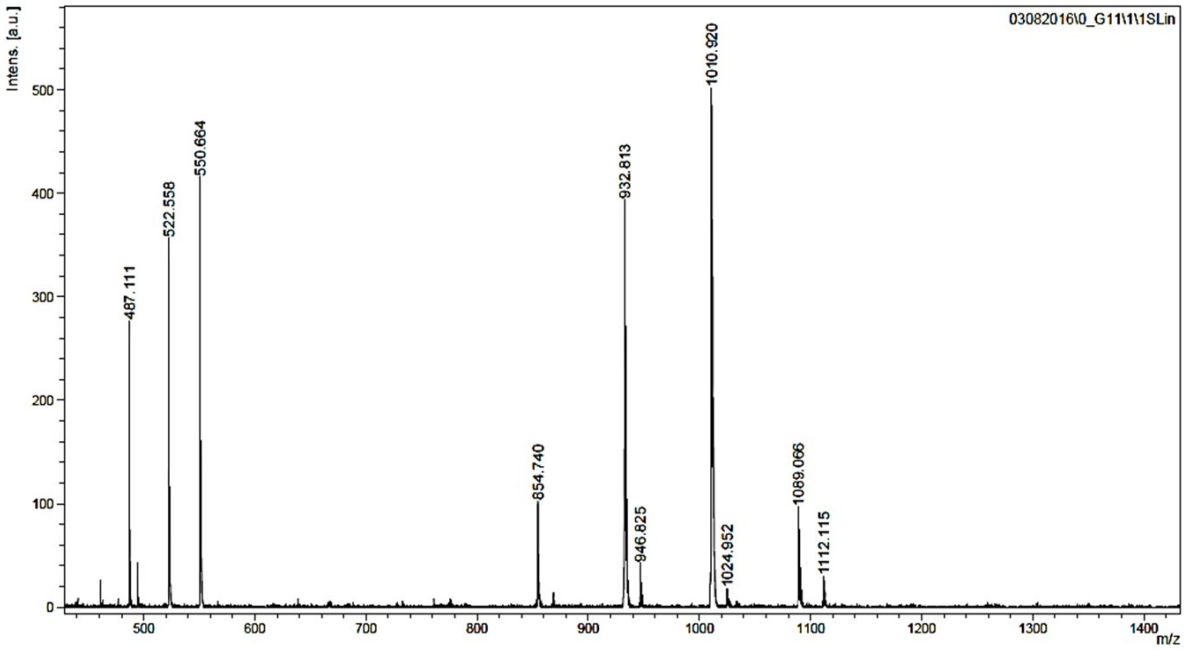

Figure S31. Mass spectrum of **TSS**.