Supporting information of

A novel organic salt with water/humidity-induced fluorescence switching and heat-induced coloration performance

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List:

Figure S13. HRMS spectrum of compound **3a**.

Figure S14. HRMS spectrum of compound **3b**.

Figure S15. HRMS spectrum of compound **3c**.

Figure S1. The Oak Ridge Thermal Ellipsoid Plot (ORTEP) of the unsymmetrical unit of **1** with thermal ellipsoids at the 30% probability level.

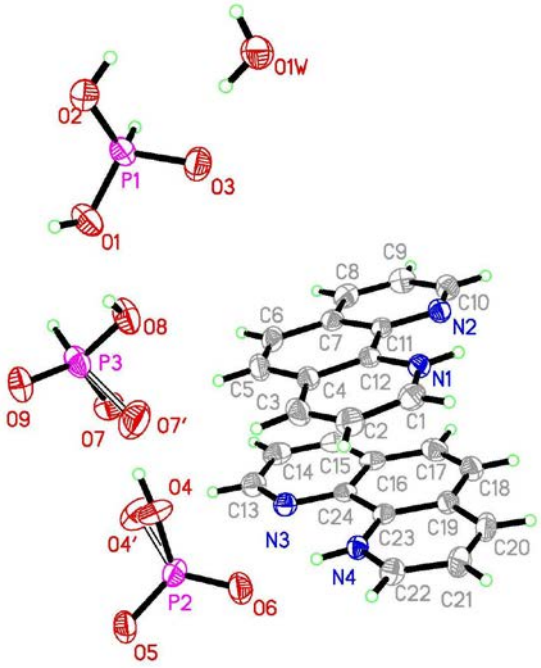

Figure S2. Emission spectra of sulfuric acid solution of phen with different concentrations (the mole ratio of phen and H_2SO_4 is 1:1, λ_{ex} = 360 nm).

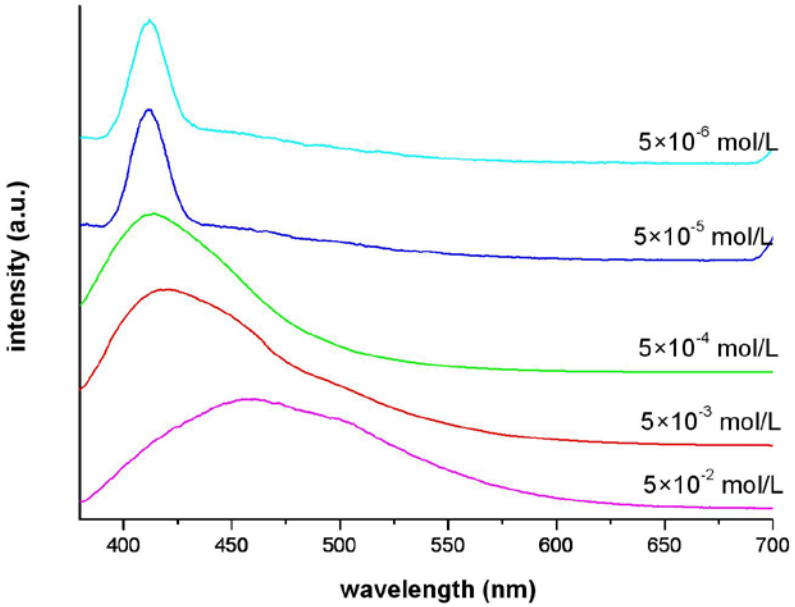

Figure S3. TG (green) and DSC (red) curve of compound **1**. This compound can be stable to 45 °C in nitrogen. Then it decomposes till 83 °C with a weight loss of 2.69 % (Calc. 2.88 %), attributed to the release of the lattice water molecule. In addition, there is an exothermic peak in the range of 145 °C~230 °C, which can be attributed to the *in situ* hydrogenation reaction of **1**.

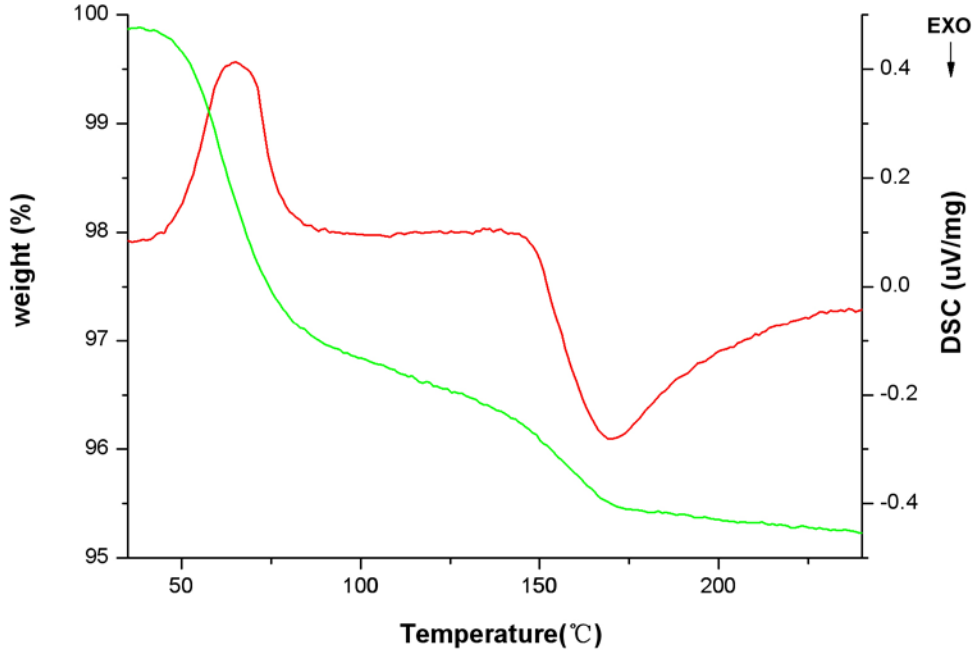

Figure S4. IR specturm of **1**.

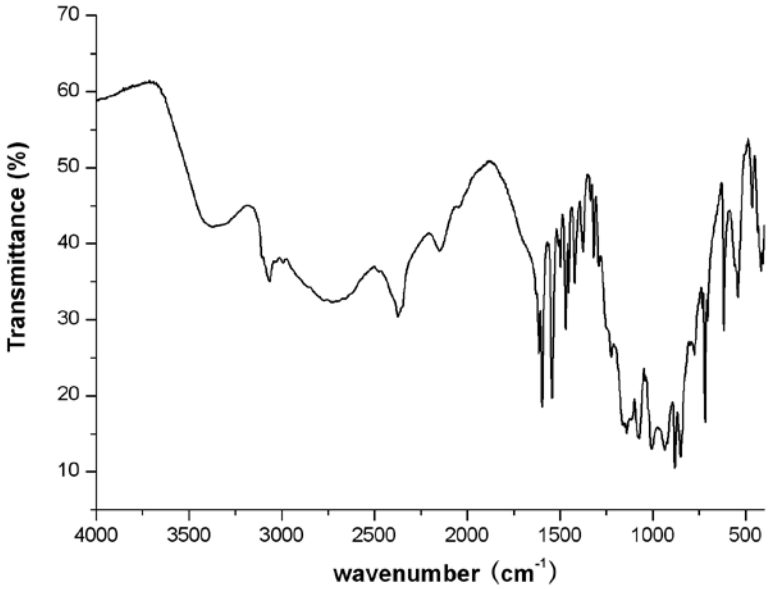

Figure S5. Green: PXRD pattern calculated from the single crystal data of **1**; Red: PXRD pattern of original dry compound **1**; Blue: PXRD pattern of **1** at 80% RH for 6 h, then at 30% RH for 24 h.

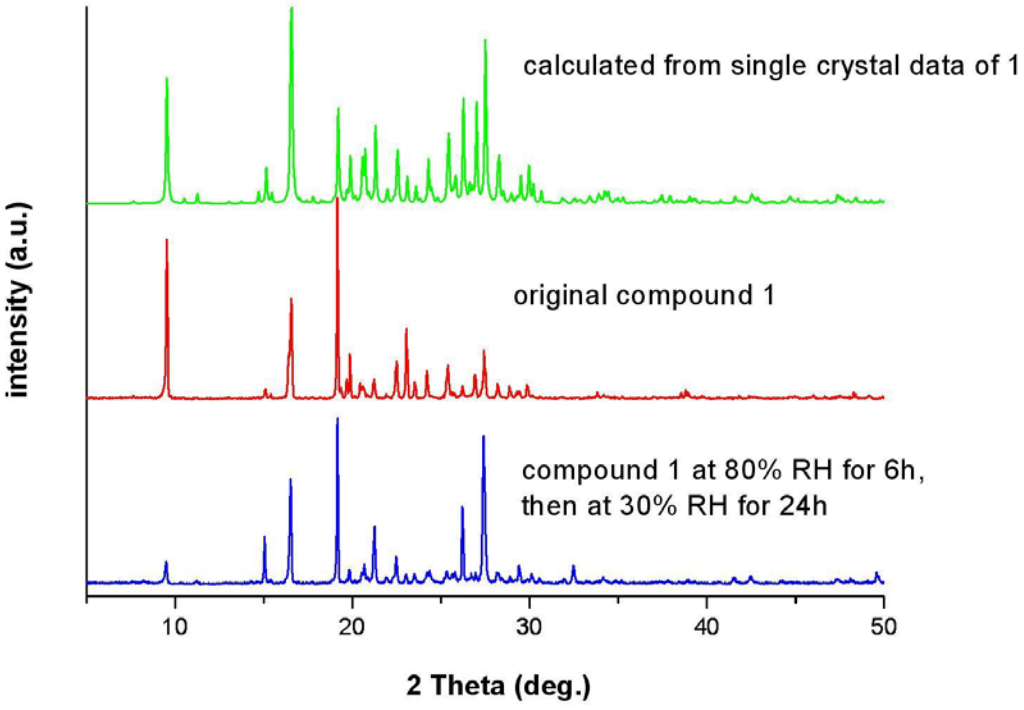

Table S6. PXRD data of the calculated result from the single crystal data of **1** (calc), original compound **1** (ori) and restored compound **1** (res, at 80% RH for 6 h, then at 30% RH for 24 h). [*I* = intensity (a.u.)]

h	k	l	The calculated result from the single crystal data of **1** (calc)		The original compound **1** (ori)		The restored compound **1** (res)	
			$2\theta_{calc}$ (°)	I_{calc}	$2\theta_{ori}$ (°)	I_{ori}	$2\theta_{res}$ (°)	I_{res}
0	1	1	9.54	6388	9.56	1222	9.50	203
1	1	-1	11.26	498	11.22	19	11.24	33
1	1	2	14.70	530	14.66	25	14.68	28
1	0	-3	15.14	1820	15.12	83	15.04	416
2	1	0	15.44	532	15.42	44	15.44	33
0	1	3	16.58	10000	16.56	774	15.62	917
1	2	0	17.78	363	17.78	21	17.76	20
0	0	4	19.20	4849	19.16	1538	19.16	1443
3	0	-1	19.70	693	19.70	158	19.68	43
1	2	-2	19.88	2409	19.86	348	19.82	128
1	2	2	20.56	2398	20.58	101	20.56	100
3	0	1	20.72	2787	20.62	91	20.66	182
1	1	-4	21.30	3948	21.22	156	21.24	507
2	2	1	21.98	734	21.90	45	21.94	62
1	1	4	22.56	2718	22.52	294	22.46	244
3	0	-3	23.10	1386	23.06	542	23.04	90
2	1	-4	23.60	892	23.52	137	23.50	94
3	1	2	24.28	2259	24.20	221	24.24	107
2	0	4	24.44	833	24.44	37	24.34	127
0	2	4	25.44	3564	25.38	264	25.32	117
2	1	4	25.84	1420	25.72	54	25.78	114
4	0	0	26.26	5336	26.22	105	26.20	679
3	2	1	26.62	1080	26.62	37	26.58	57
3	2	-2	26.76	930	26.76	44	26.70	100
4	0	-2	27.00	5163	26.92	197	26.92	109
2	1	-5	27.48	7538	27.44	378	27.40	1284
2	3	0	28.20	1780	28.18	124	28.14	108
4	1	-2	28.26	2445	28.24	96	28.24	101
3	2	-3	28.52	635	28.52	25	28.46	55
0	0	6	28.98	509	28.92	65	28.96	55
1	2	-5	29.50	1408	29.46	67	29.38	166
2	1	5	29.94	1793	29.86	102	29.88	50
0	1	6	30.18	824	30.12	38	30.10	96
1	2	5	30.66	636	30.60	29	30.60	54
2	3	3	32.46	211	32.48	18	32.46	169
0	4	0	33.40	374	33.44	21	33.42	26
5	0	1	33.90	495	33.90	41	33.92	37
3	3	-3	34.22	619	34.18	42	34.14	71

3	1	-6	34.42	582	34.44	27	34.44	28
5	2	-2	37.46	442	37.48	16	37.48	29
4	2	-5	37.90	389	37.86	21	37.92	28
1	4	-4	39.02	343	39.00	44	39.04	28
4	2	5	41.58	360	41.60	18	41.58	65
0	3	7	42.54	474	42.52	28	42.50	74
2	5	1	44.72	347	44.72	22	44.72	21
3	5	1	47.38	471	47.40	28	47.38	47

Figure S7. ^{1}H NMR spectrum of compound **3a**.

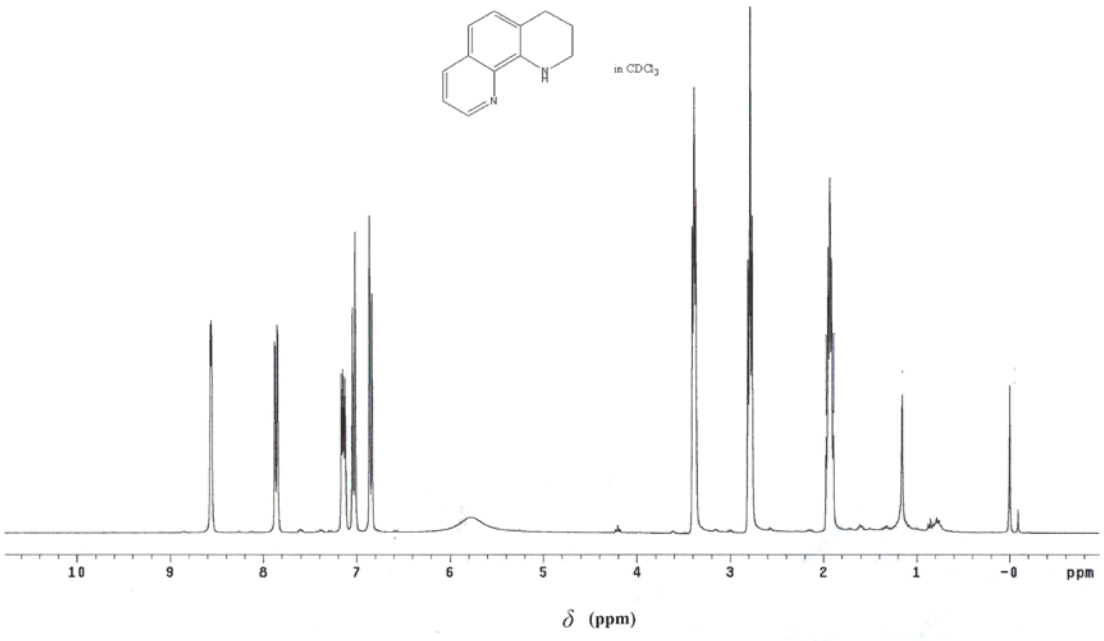

Figure S8. ^{1}H NMR spectrum of compound **3b**.

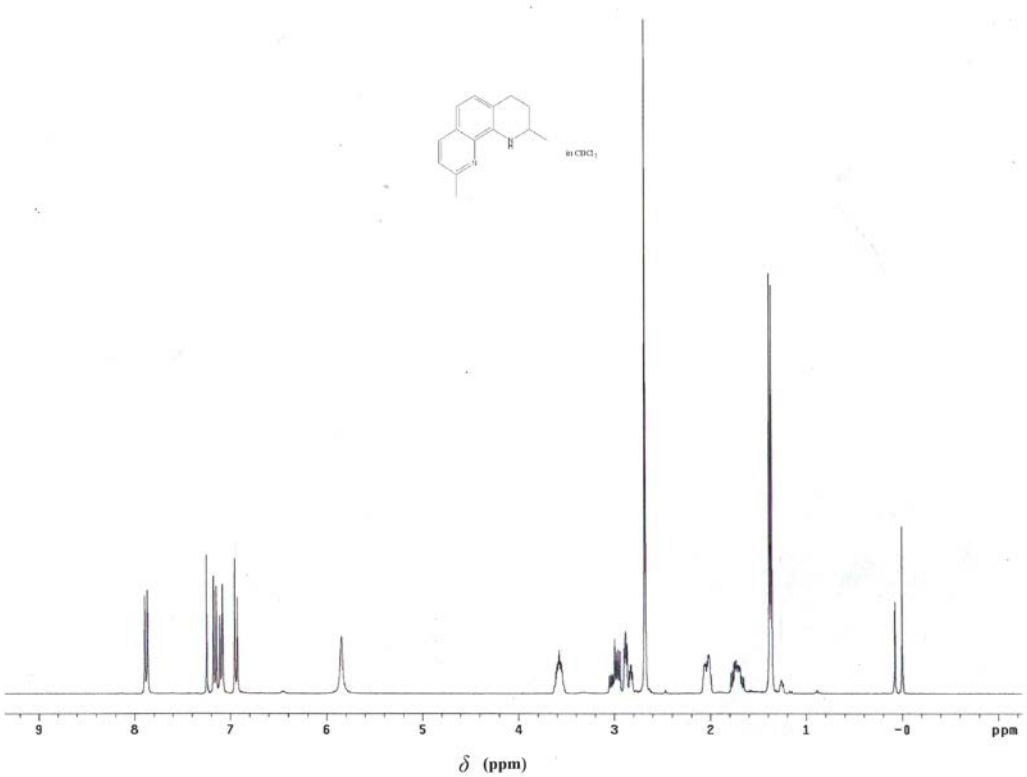

Figure S9. ^{1}H NMR spectrum of compound **3c**.

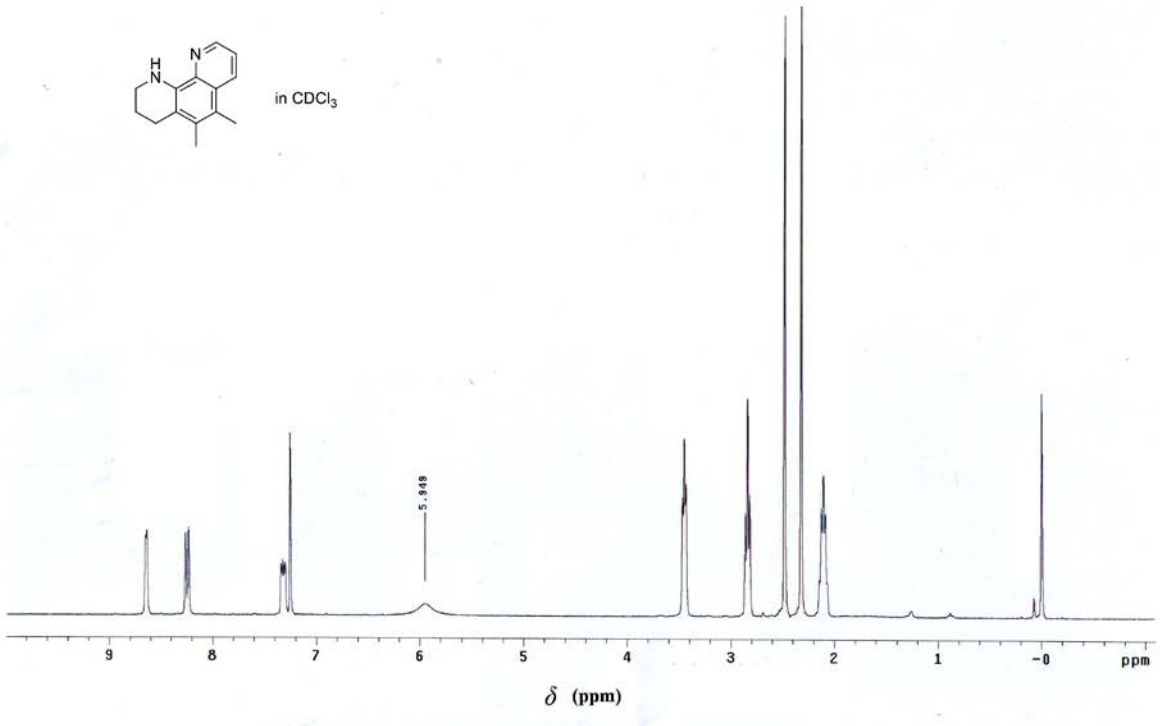

Figure S10. ^{13}C NMR spectrum of compound **3a**.

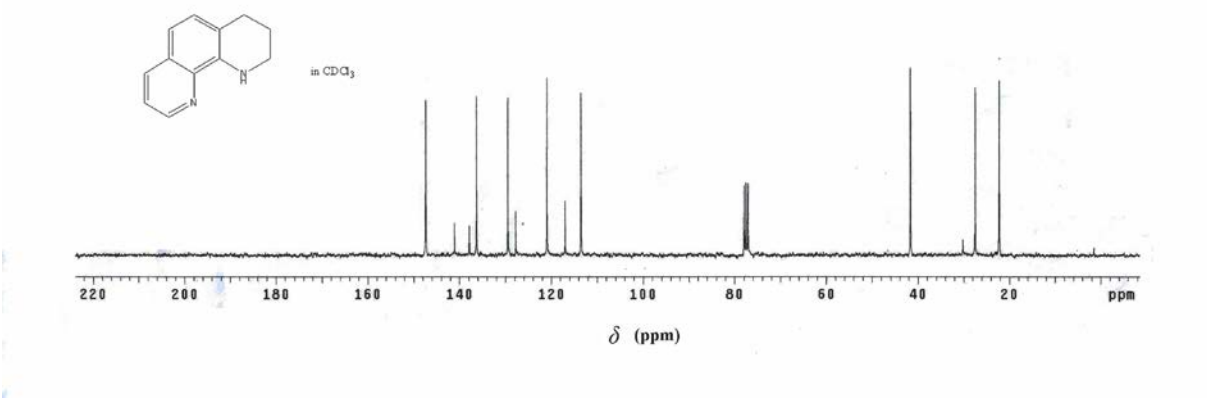

Figure S11. ^{13}C NMR spectrum of compound **3b**.

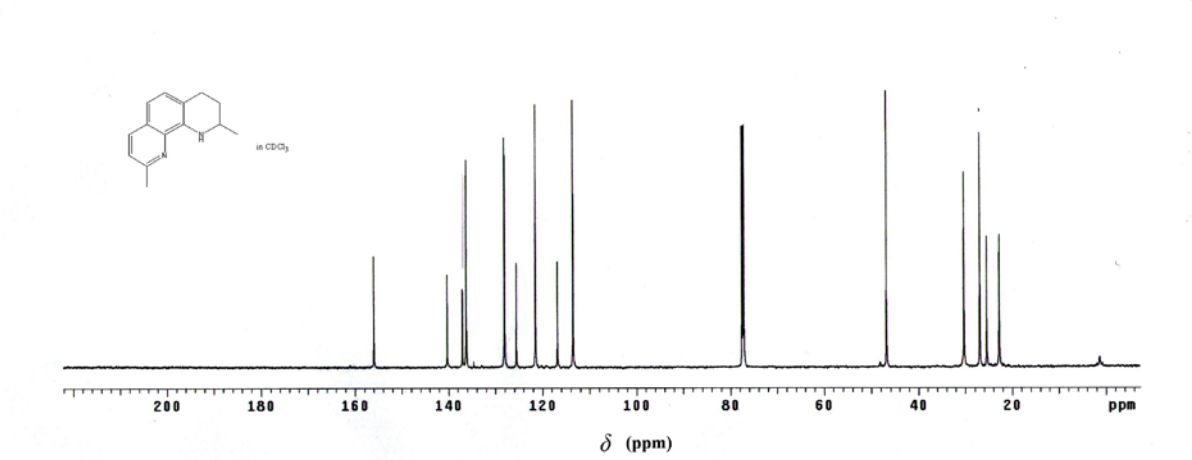

Figure S12. ^{13}C NMR spectrum of compound **3c**.

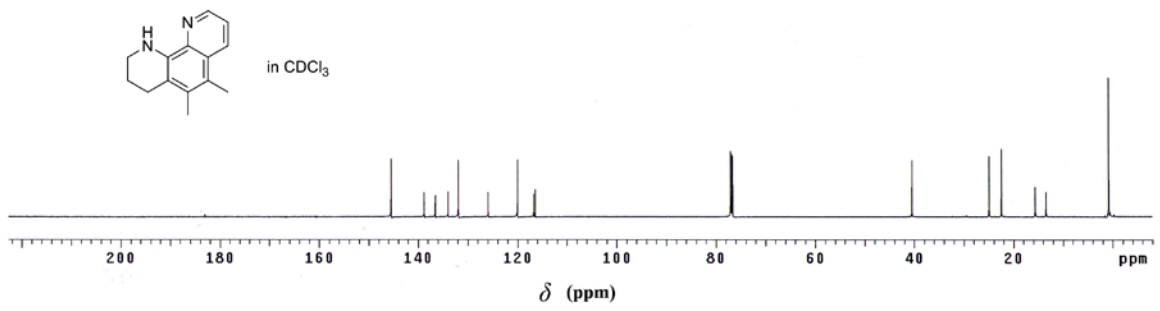

Figure S13. HRMS spectrum of compound **3a**.

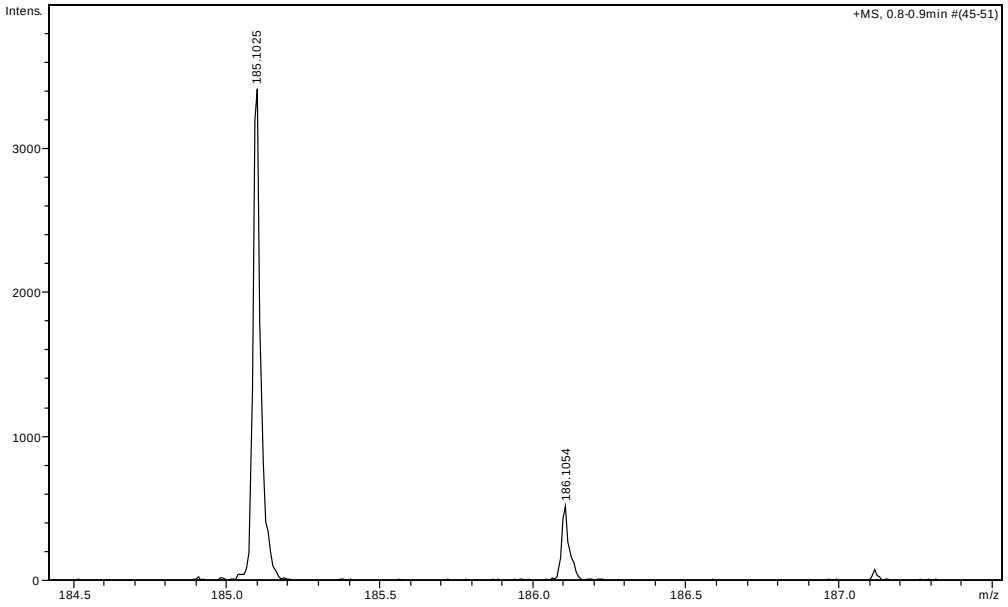

Figure S14. HRMS spectrum of compound **3b**.

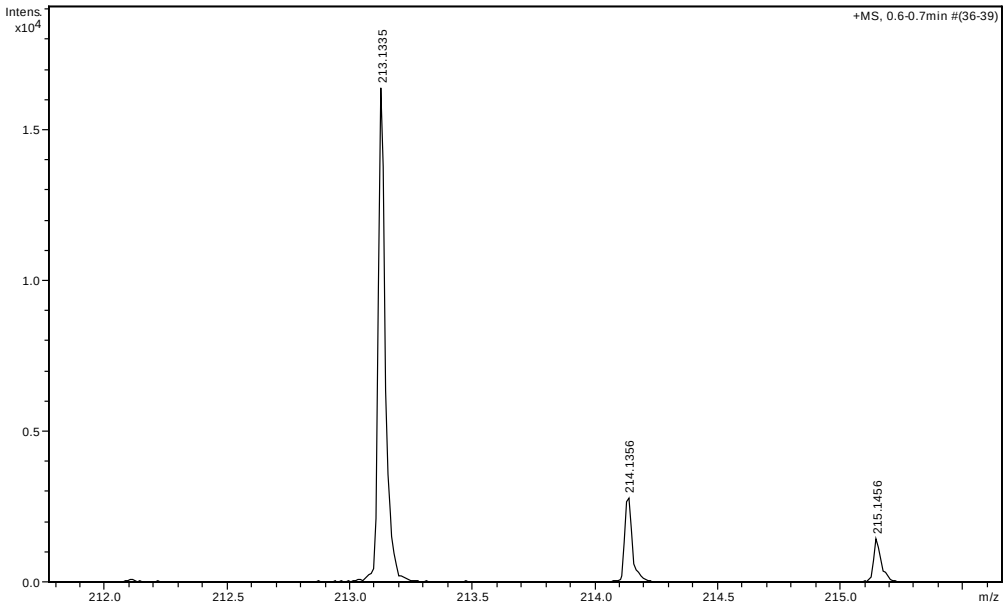

Figure S15. HRMS spectrum of compound **3c**.