

## ***Supporting Information***

### **Organocatalyzed Cascade Aza-Michael/Aldol Reaction for Atroposelective Construction of 4-Naphthylquinoline-3-carbaldehydes**

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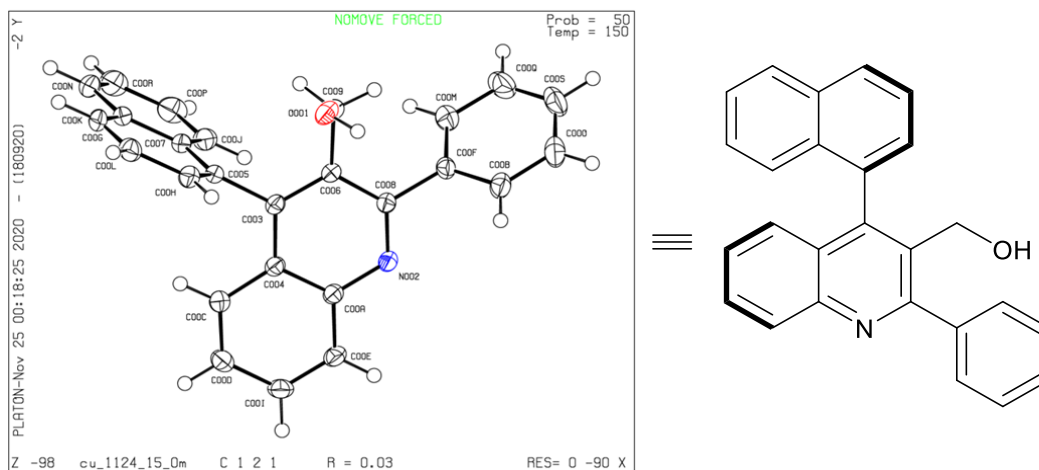
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## 1. X-Ray Crystallographic Information

The crystal of product **4** was obtained by slow evaporation in  $\text{CHCl}_3$  and hexane. The X-ray data were collected on a Bruker APEX-II CCD diffractometer with CuK $\alpha$  radiation for determination of the absolute configuration. Crystal data have been deposited to CCDC, number 2050040. The ellipsoid contour percent probability level of **4** is 50%.



**Figure S1. X-ray Structure of 4**

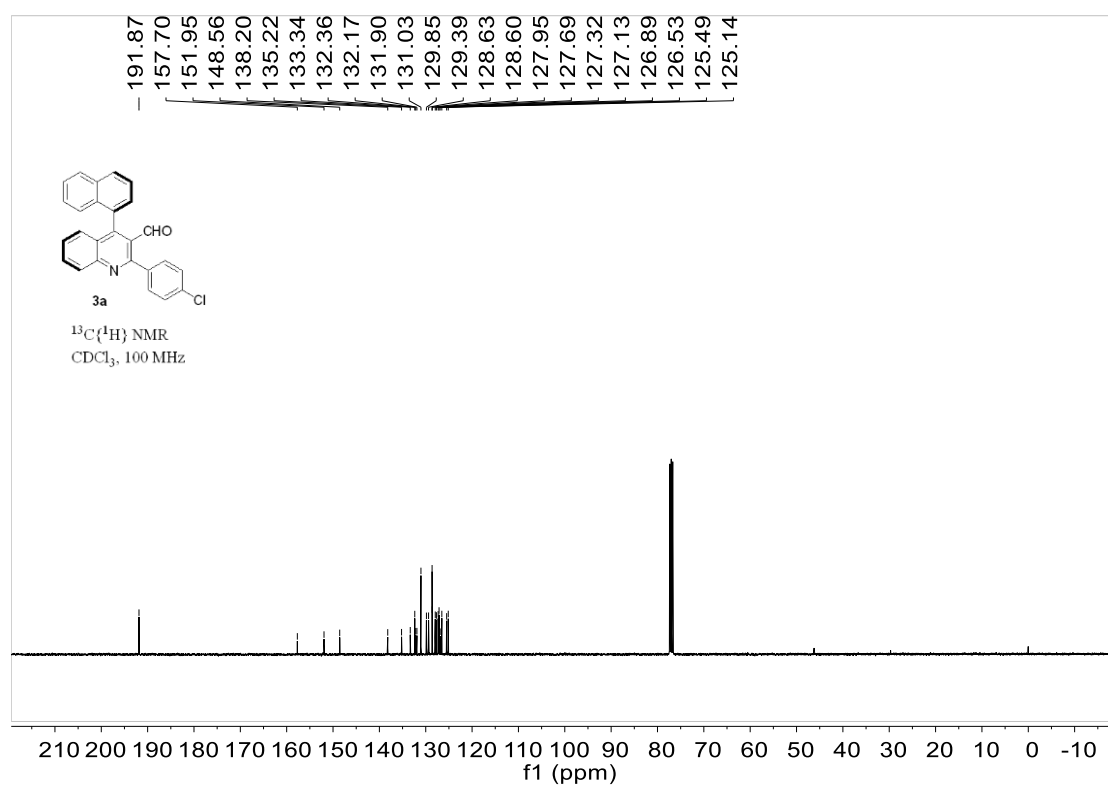
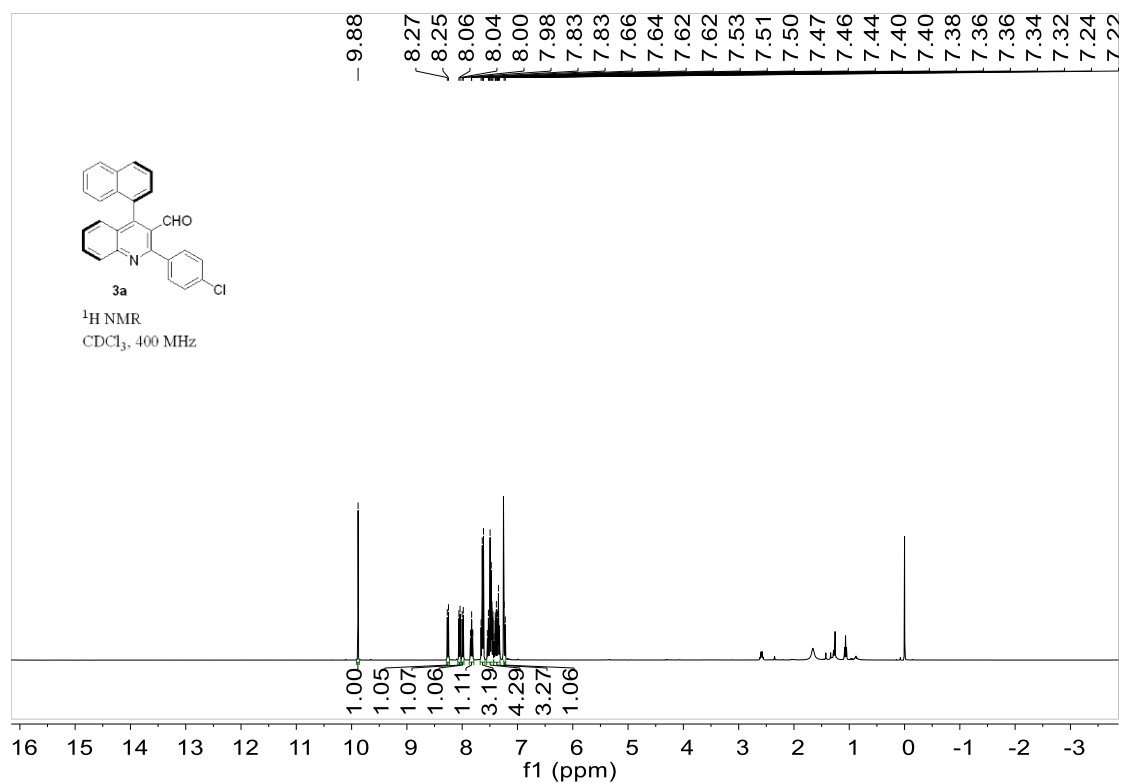
**Crystal Data.**  $\text{C}_{26}\text{H}_{19}\text{NO}$ ,  $M_r = 361.42$ , monoclinic, C2 (No. 5),  $a = 16.7081(11)$  Å,  $b = 8.1960(5)$  Å,  $c = 13.8836(9)$  Å,  $b = 101.802(2)$ ,  $a = g = 90^\circ$ ,  $V = 1861.0(2)$  Å<sup>3</sup>,  $T = 150.0$  K,  $Z = 4$ ,  $Z' = 1$ ,  $m(\text{CuK}\alpha) = 0.608$ , 22204 reflections measured, 3942 unique ( $R_{\text{int}} = 0.0312$ ) which were used in all calculations. The final  $wR_2$  was 0.0803 (all data) and  $R_1$  was 0.0297 ( $I \geq 2 \sigma(I)$ ).

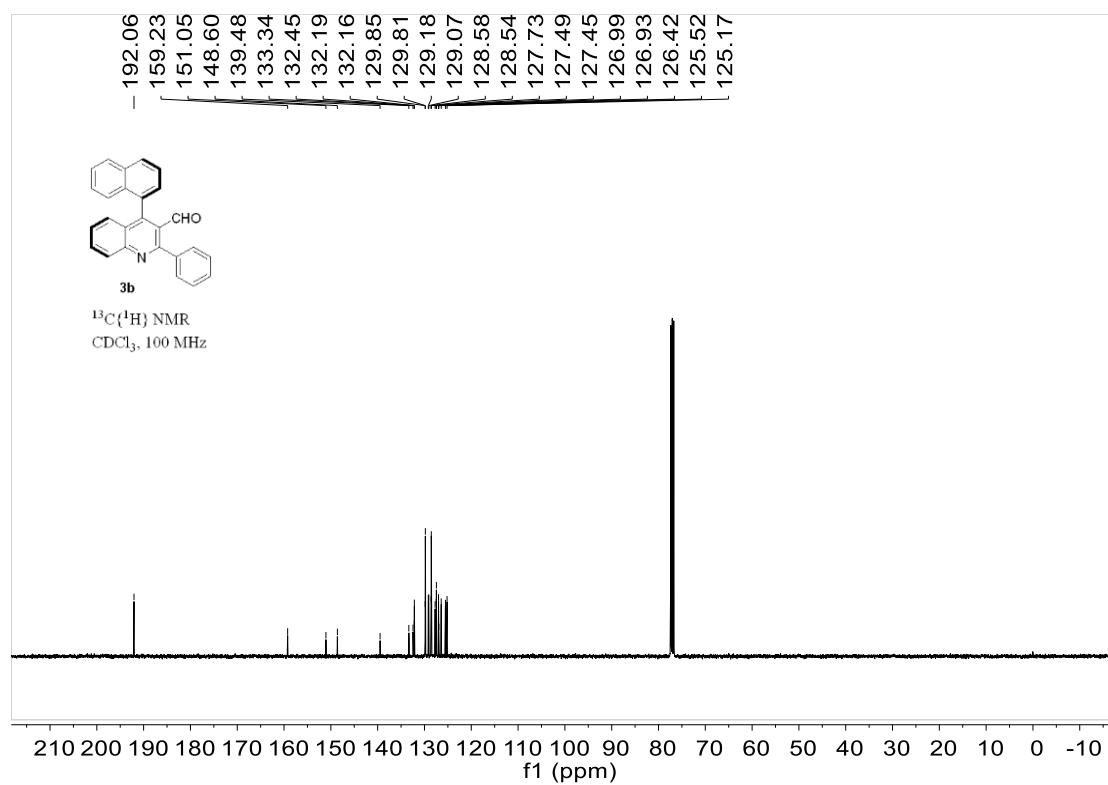
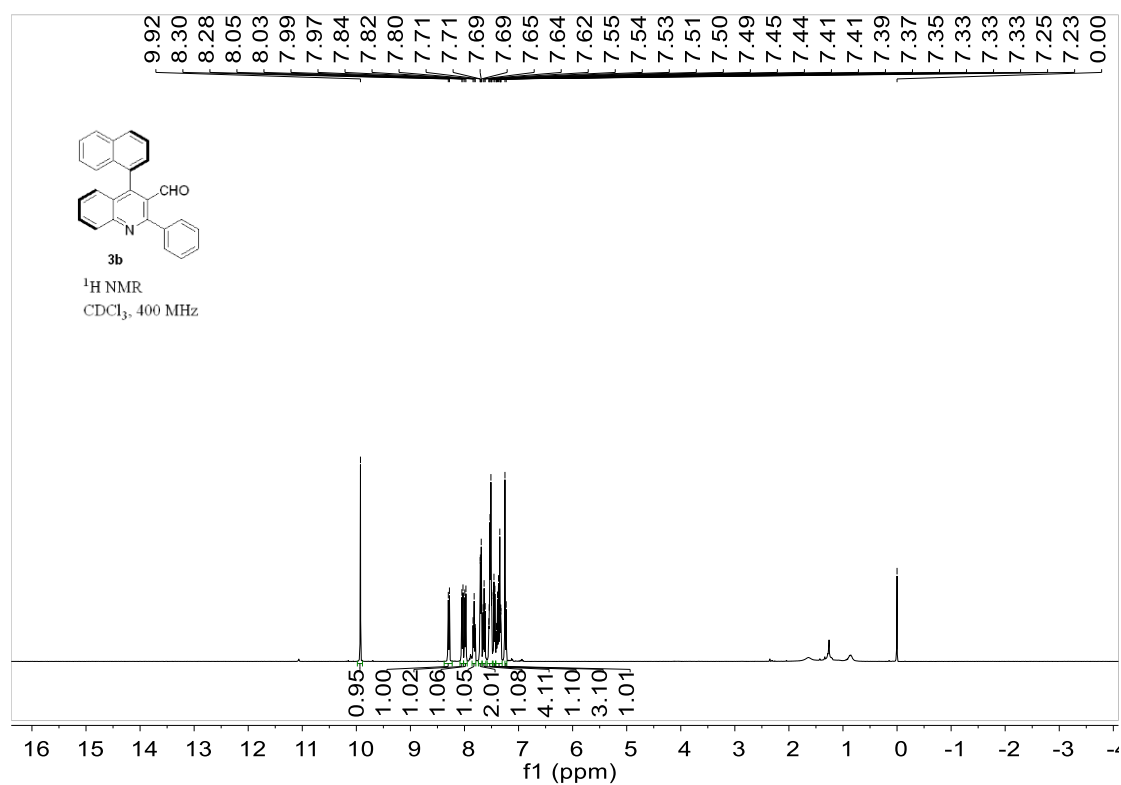
Table S1. X-ray Data of 4

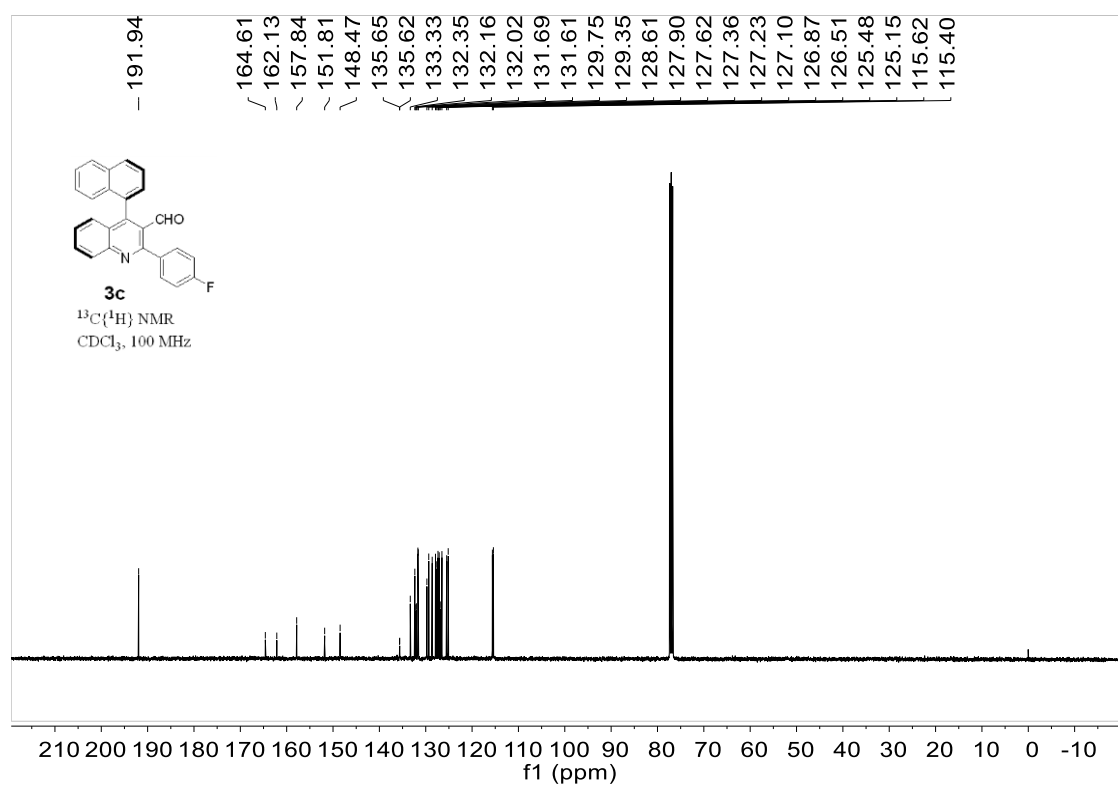
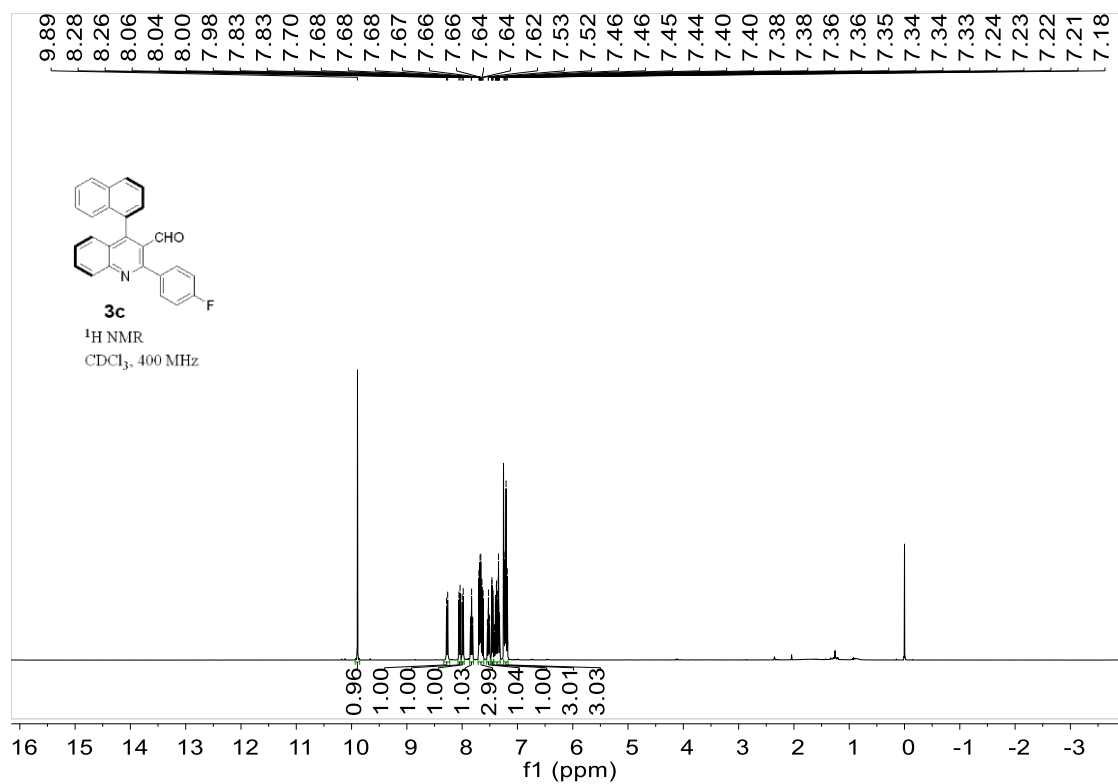
Compound	cu_1124_15
Formula	C <sub>26</sub> H <sub>19</sub> NO
$D_{calc.}/\text{g cm}^{-3}$	1.290
$m/\text{mm}^{-1}$	0.608
Formula Weight	361.42
Colour	colourless
Shape	block
Size/mm <sup>3</sup>	0.18×0.15×0.10
$T/\text{K}$	150.0
Crystal System	monoclinic
Flack Parameter	0.00(7)
Hooft Parameter	0.02(7)
Space Group	C2
$a/\text{\AA}$	16.7081(11)
$b/\text{\AA}$	8.1960(5)
$c/\text{\AA}$	13.8836(9)
$a^\circ$	90
$b^\circ$	101.802(2)
$g^\circ$	90
$V/\text{\AA}^3$	1861.0(2)
$Z$	4
$Z'$	1
Wavelength/ $\text{\AA}$	1.54178
Radiation type	CuK $\alpha$
$Q_{min}^\circ$	3.252
$Q_{max}^\circ$	79.484
Measured Refl's.	22204
Indep't Refl's	3942
Refl's $I \geq 2\sigma(I)$	3840
$R_{int}$	0.0312
Parameters	254
Restraints	1
Largest Peak	0.215
Deepest Hole	-0.144
GooF	1.027
$wR_2$ (all data)	0.0803
$wR_2$	0.0792
$R_1$ (all data)	0.0307
$R_1$	0.0297

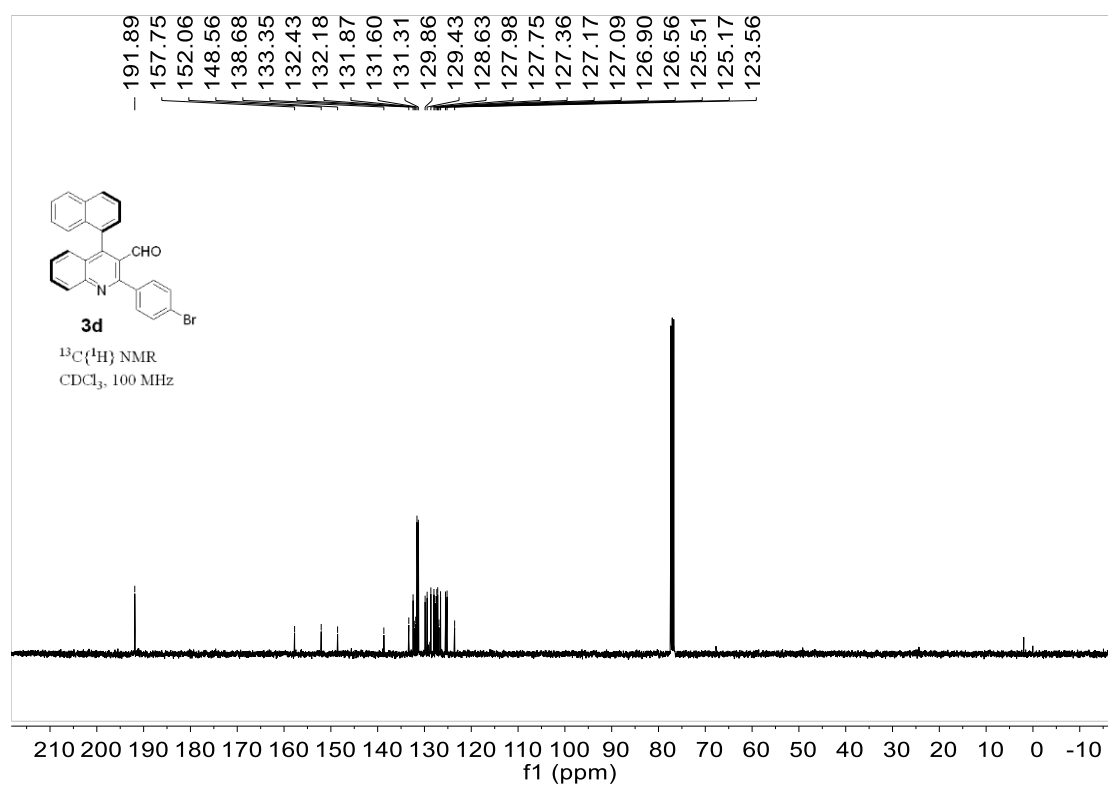
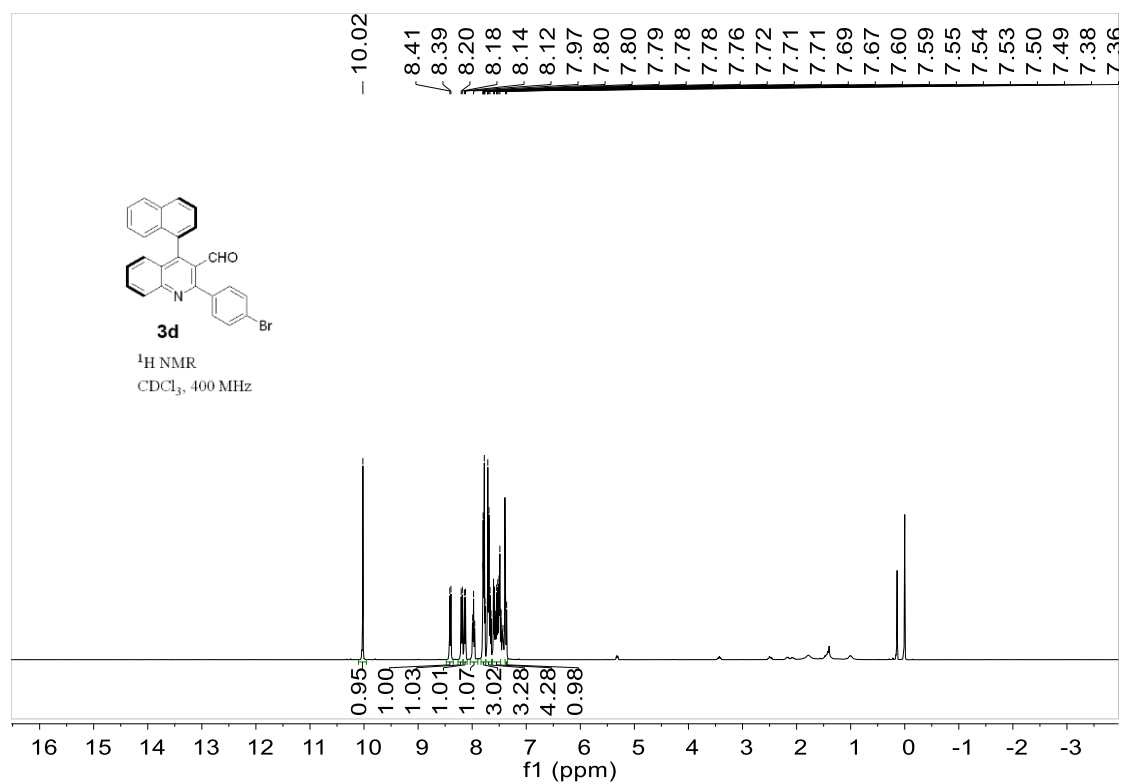


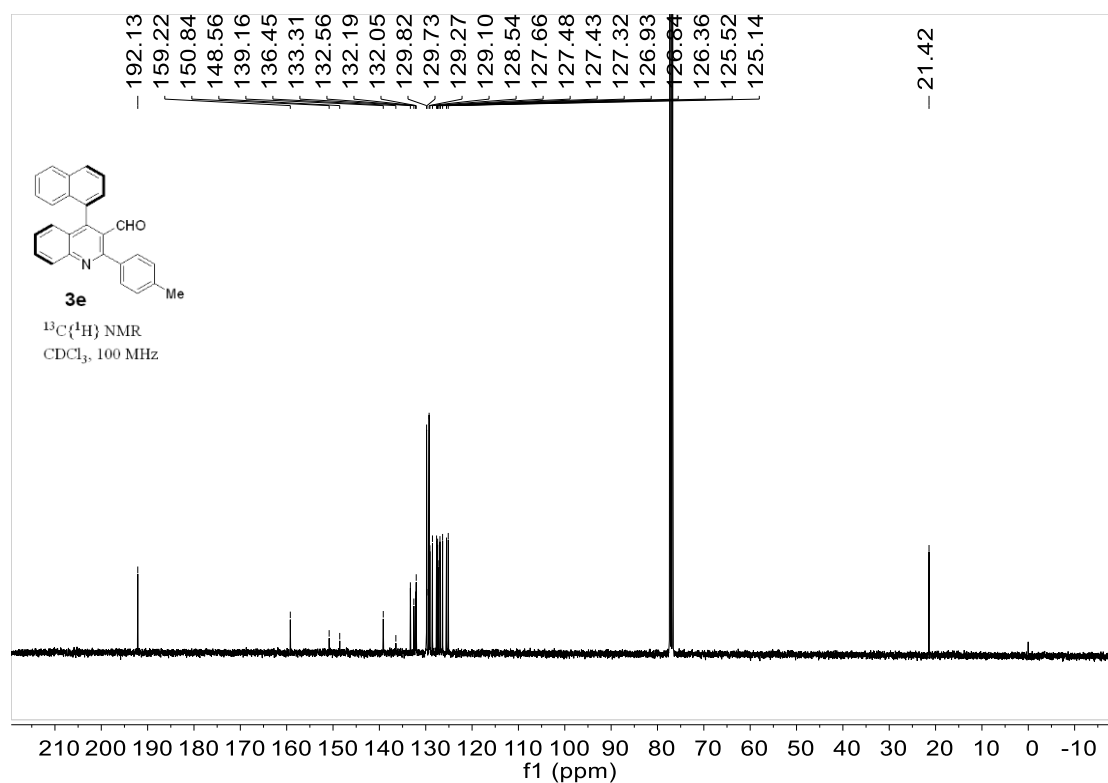
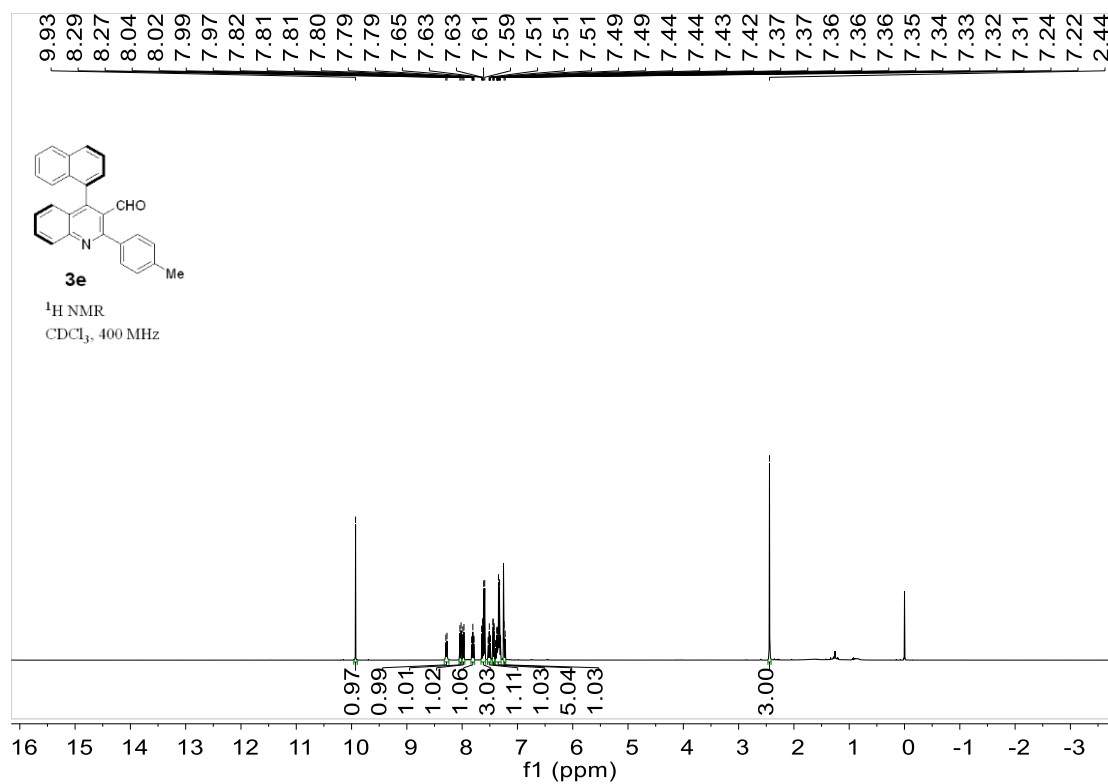
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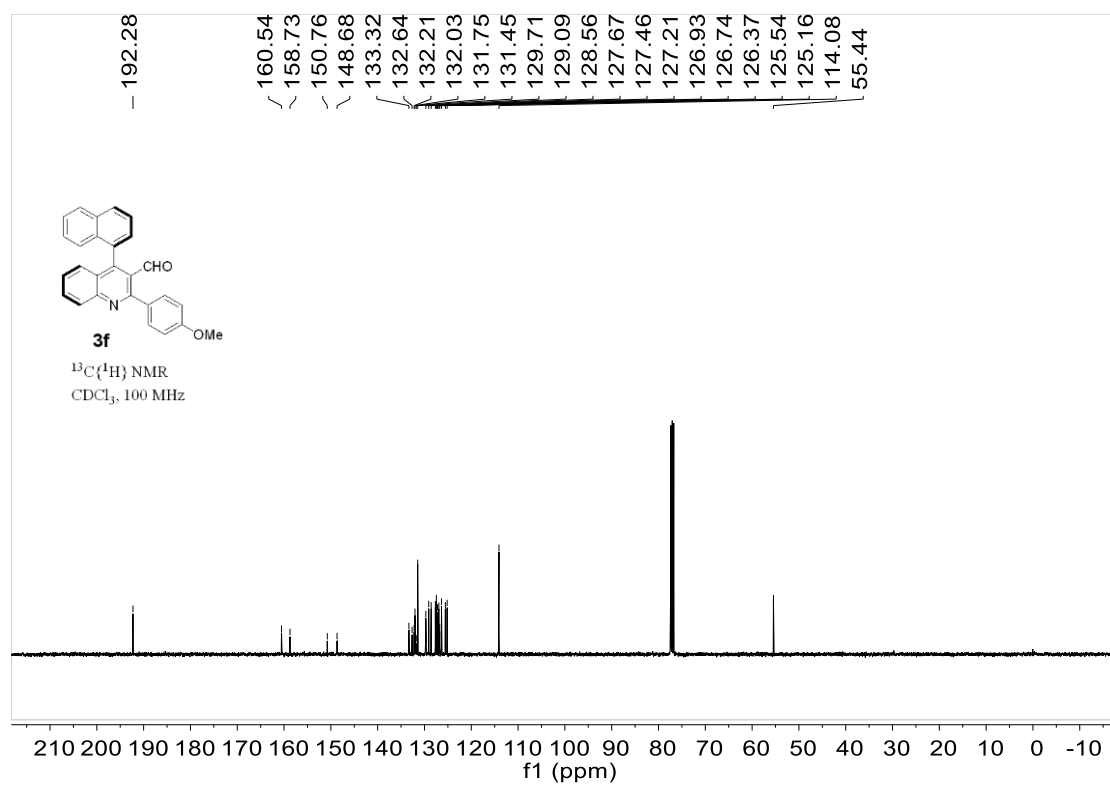
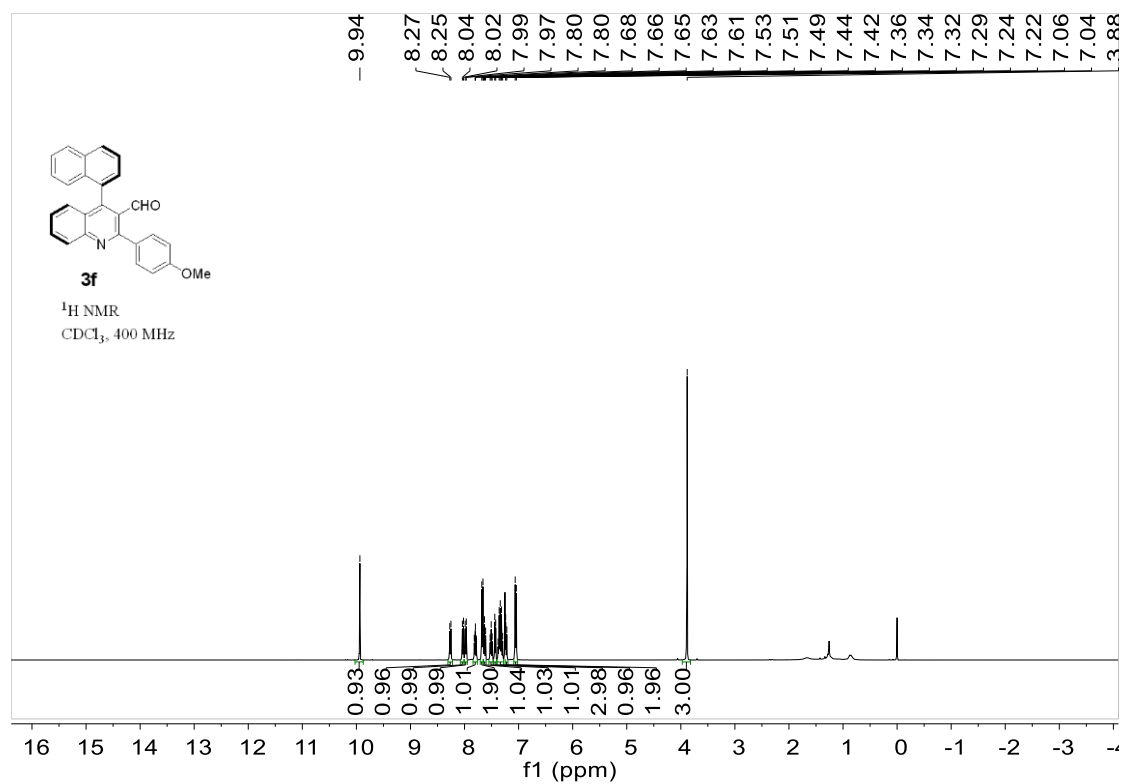


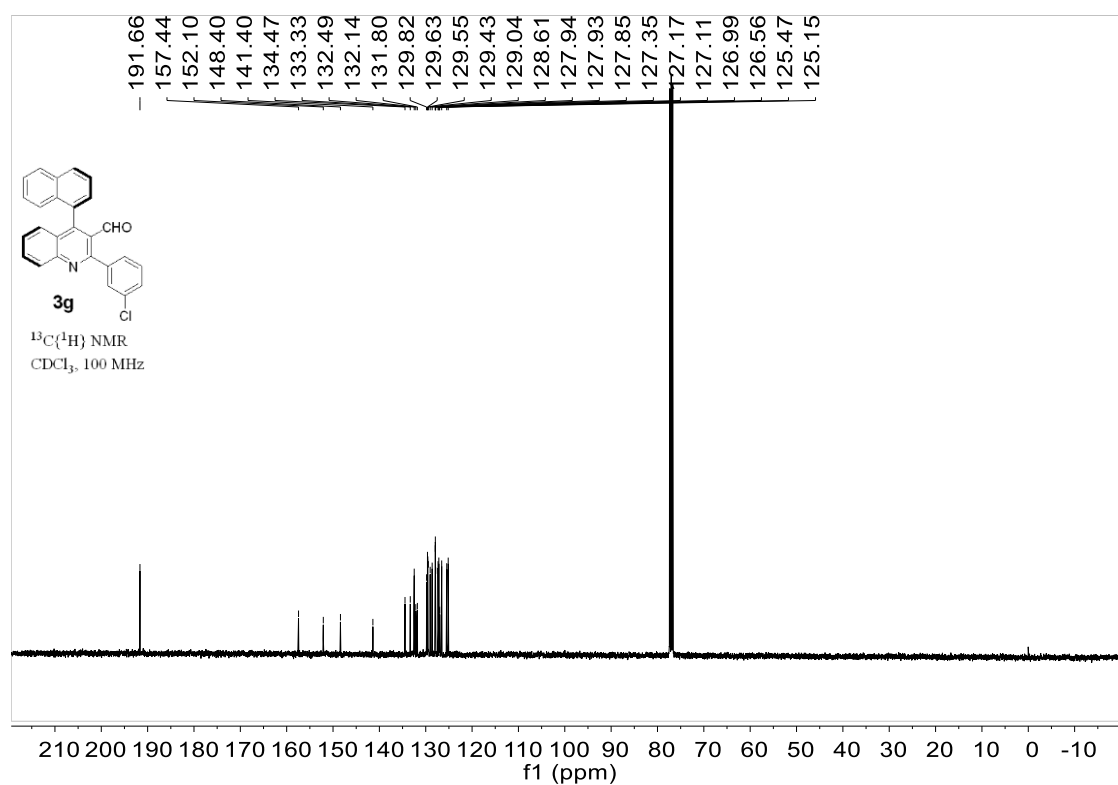
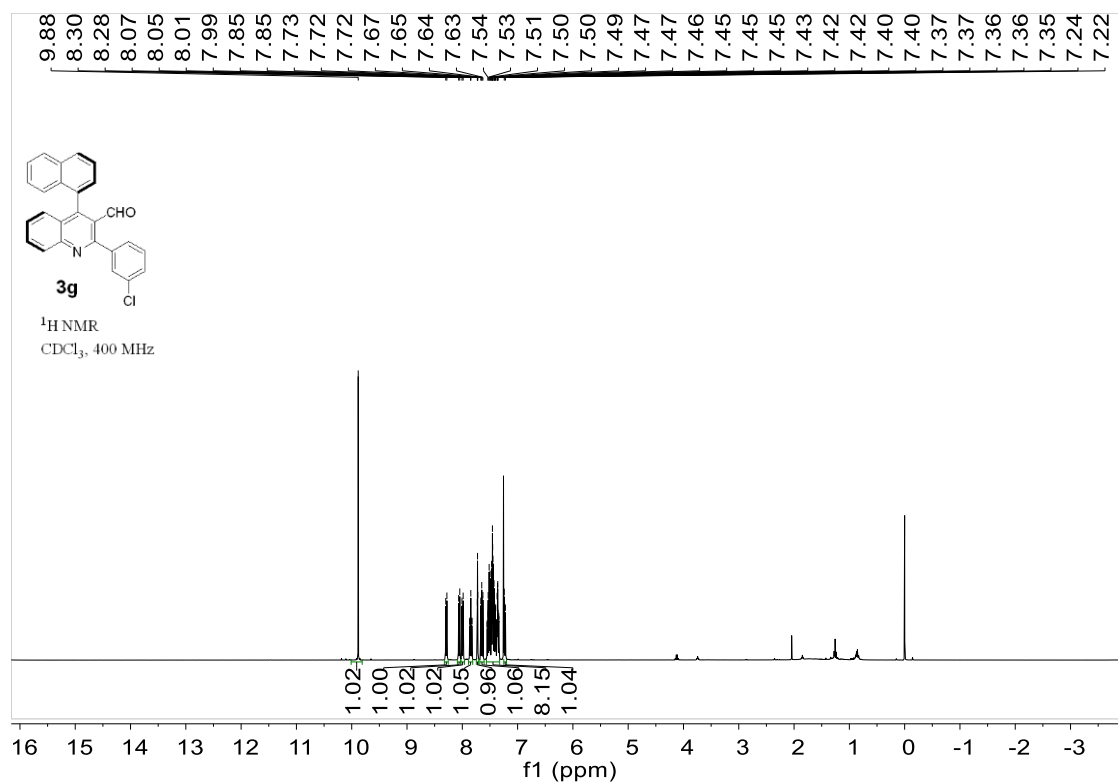


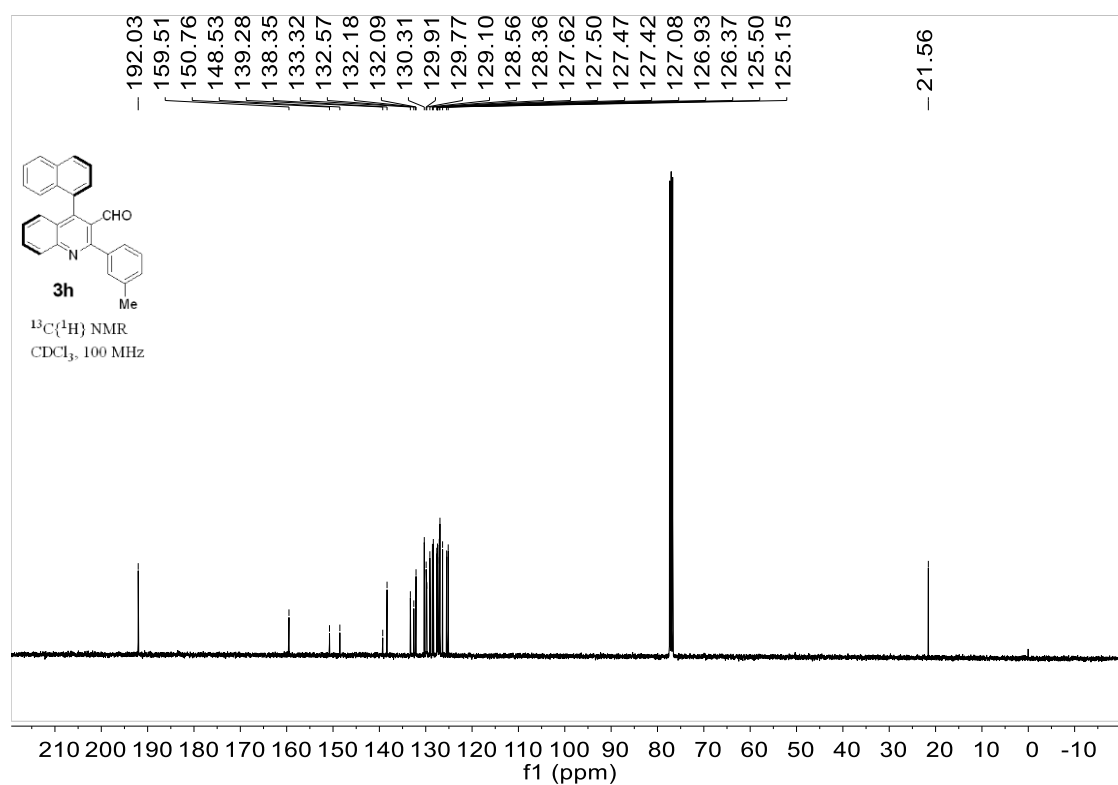
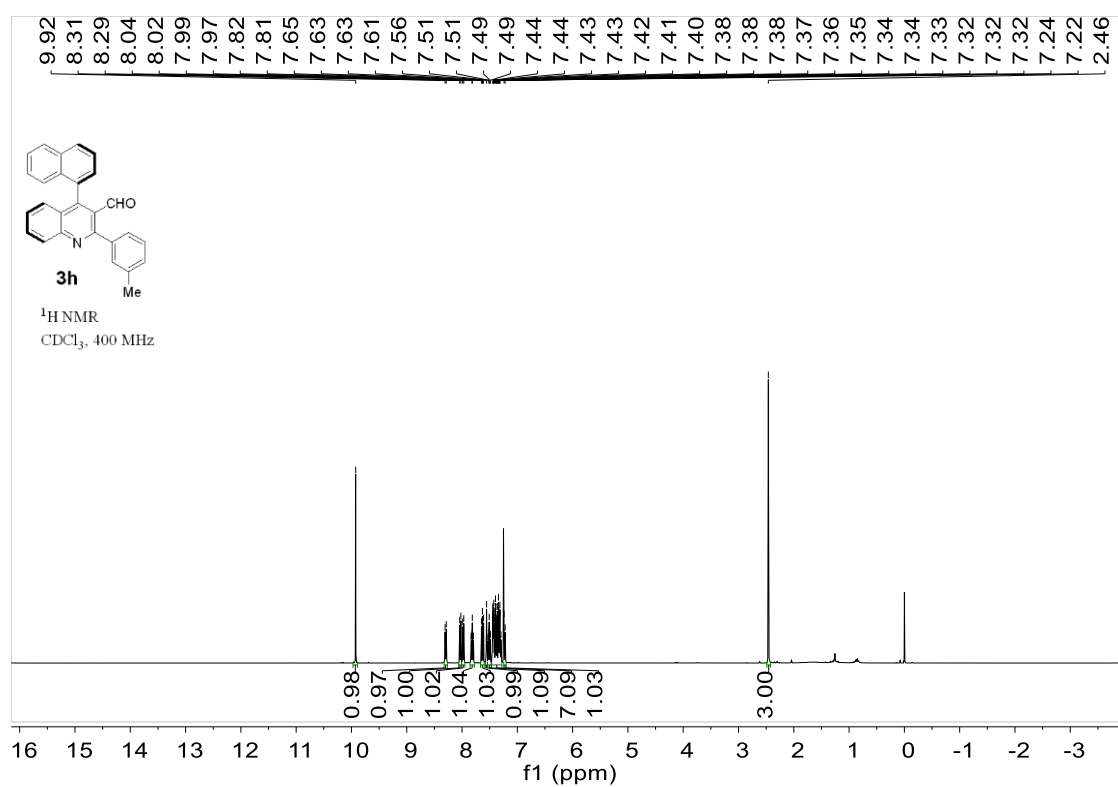




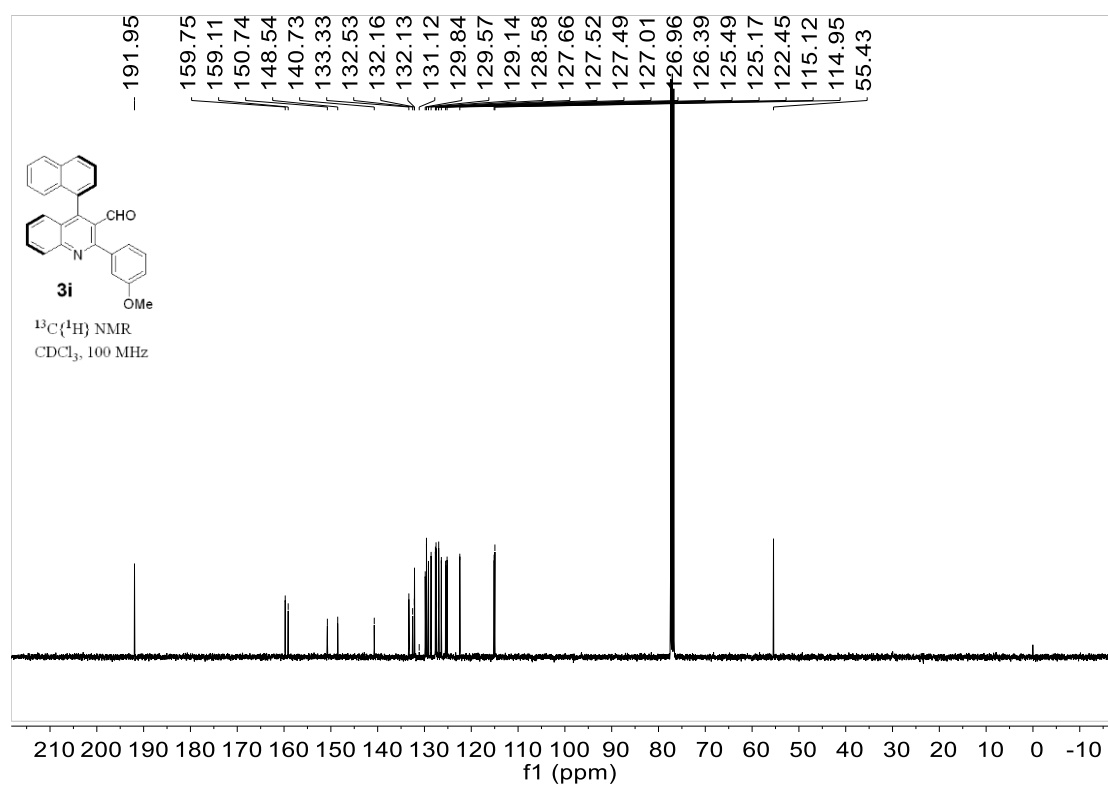
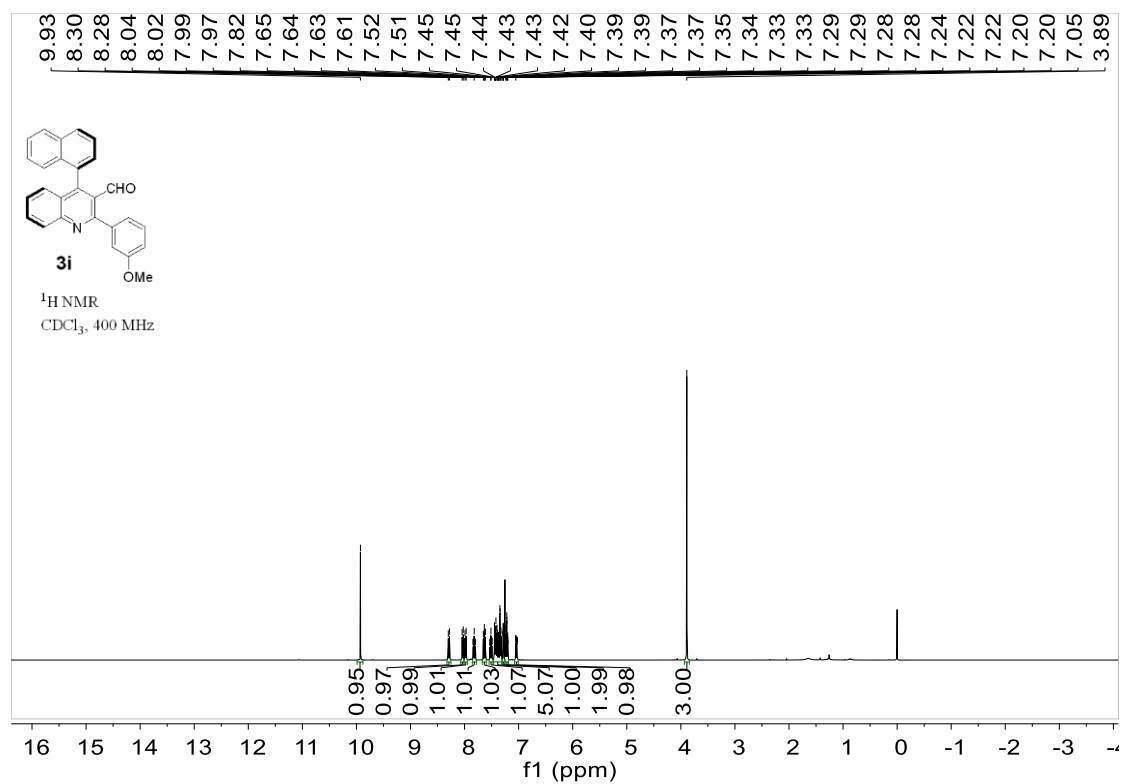


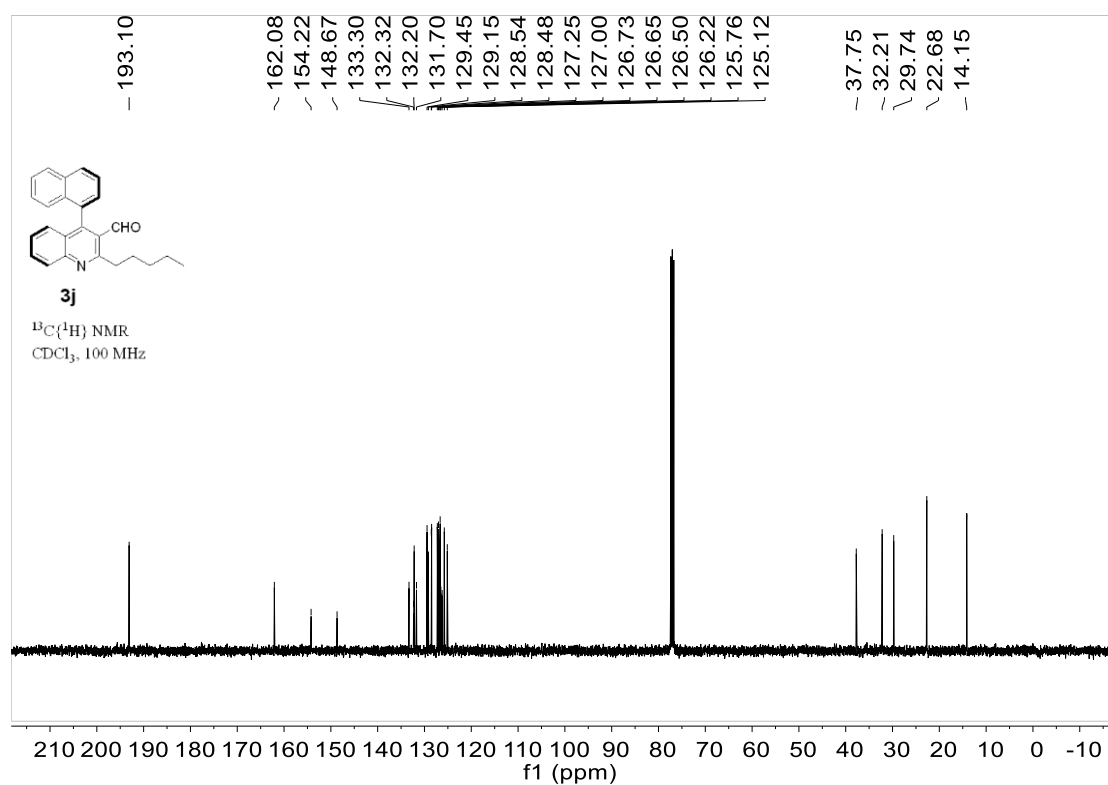
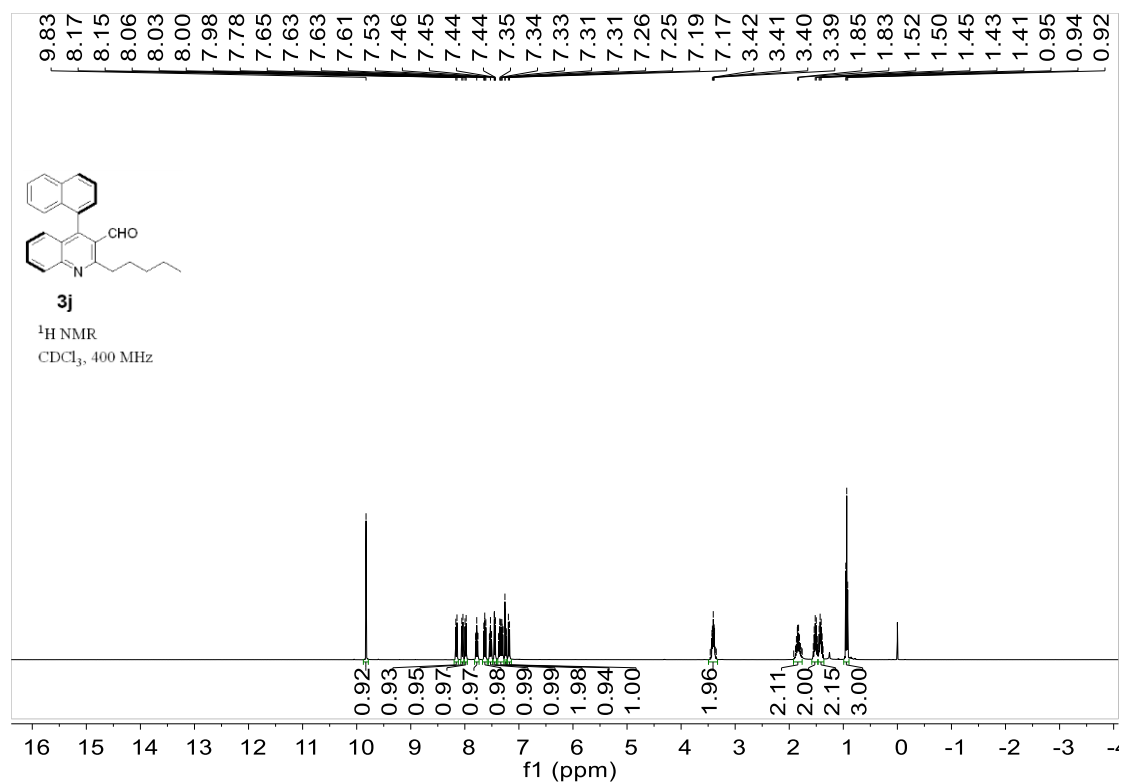


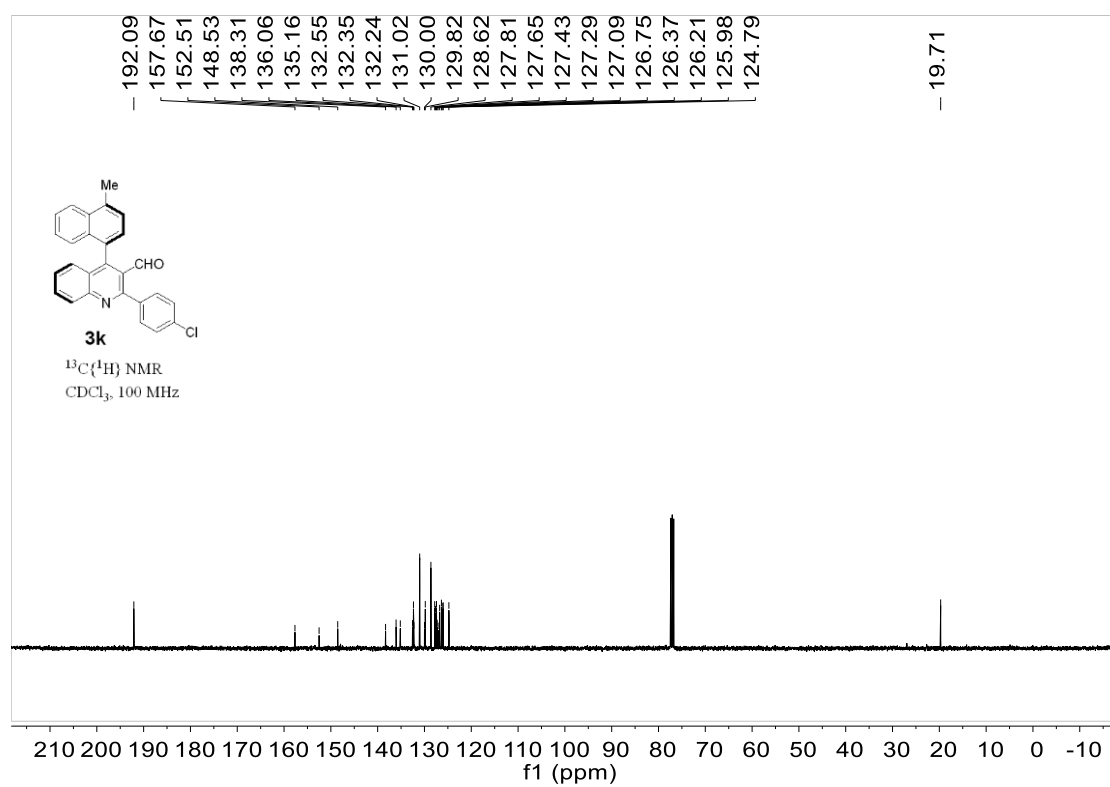
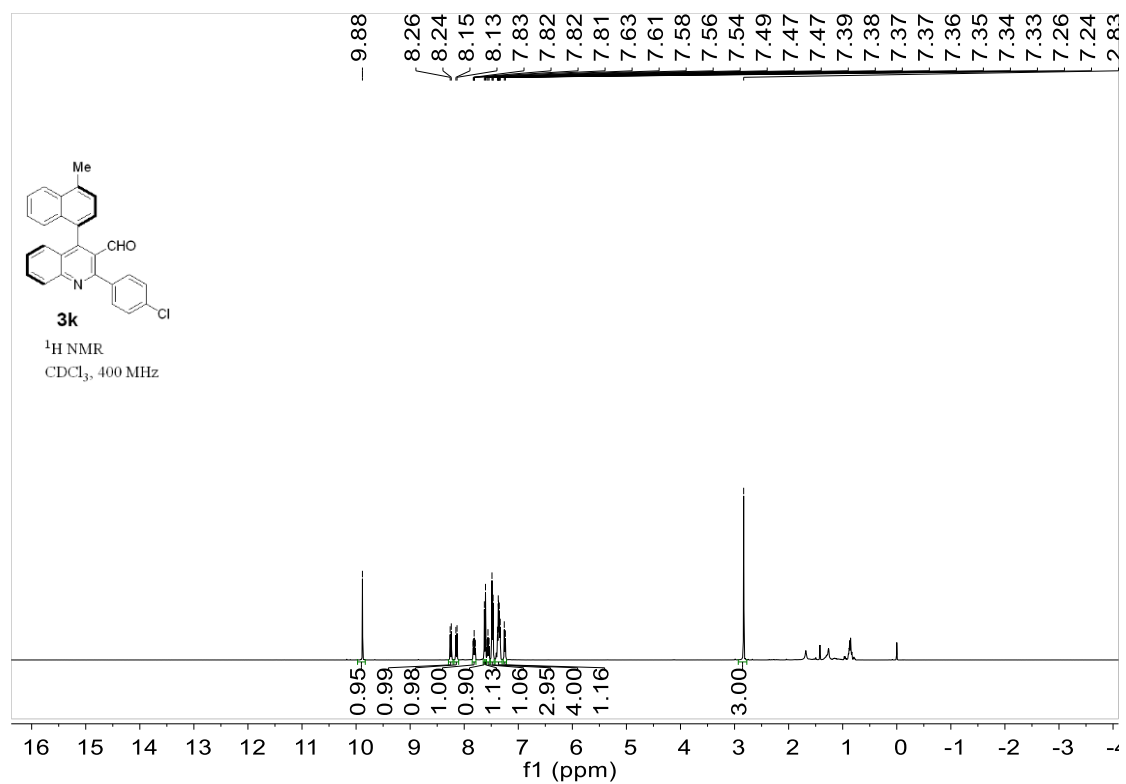


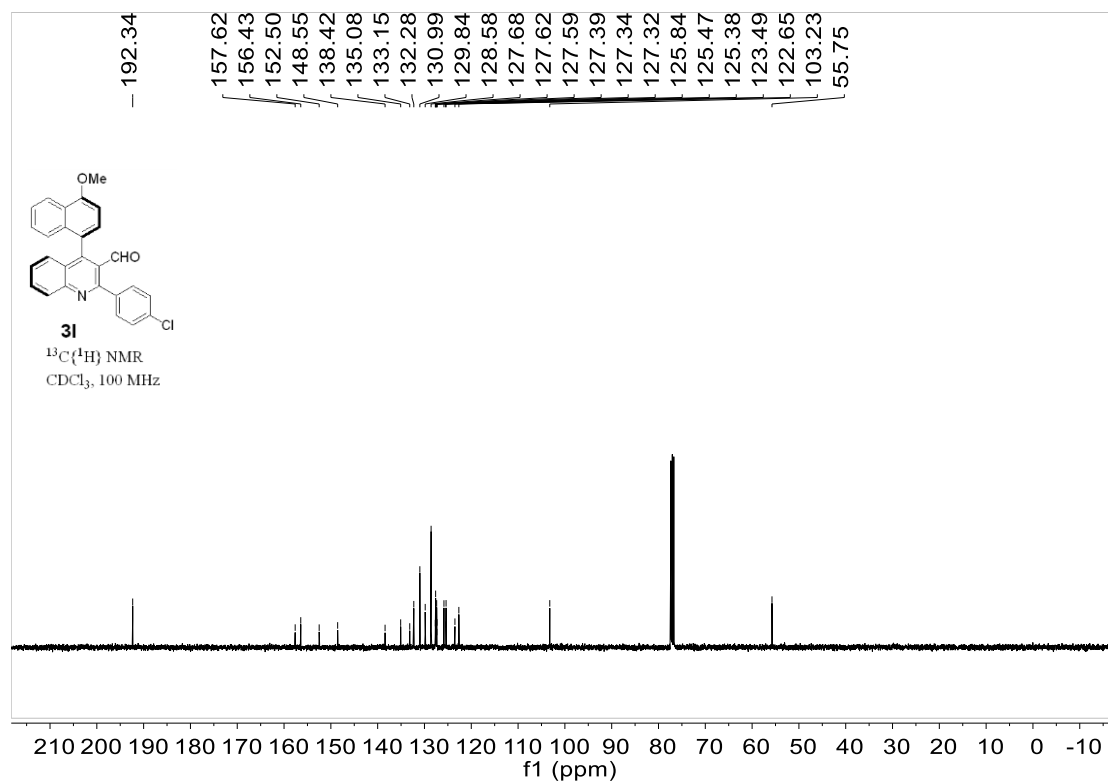
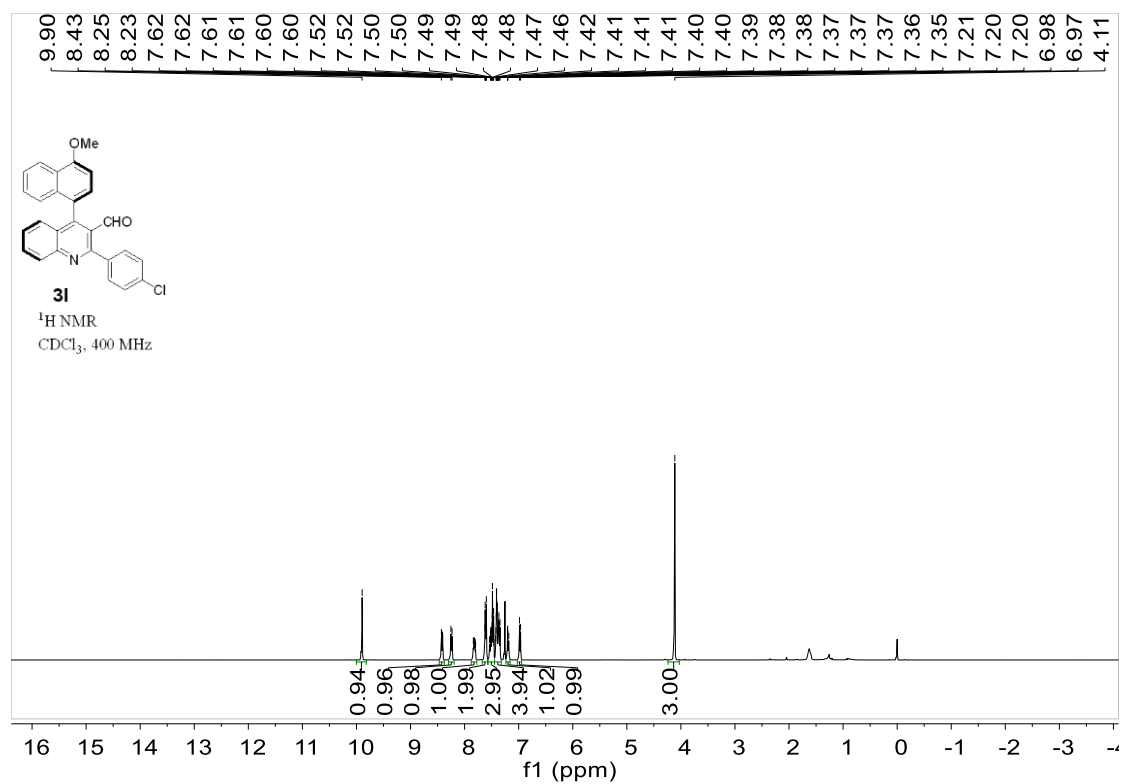


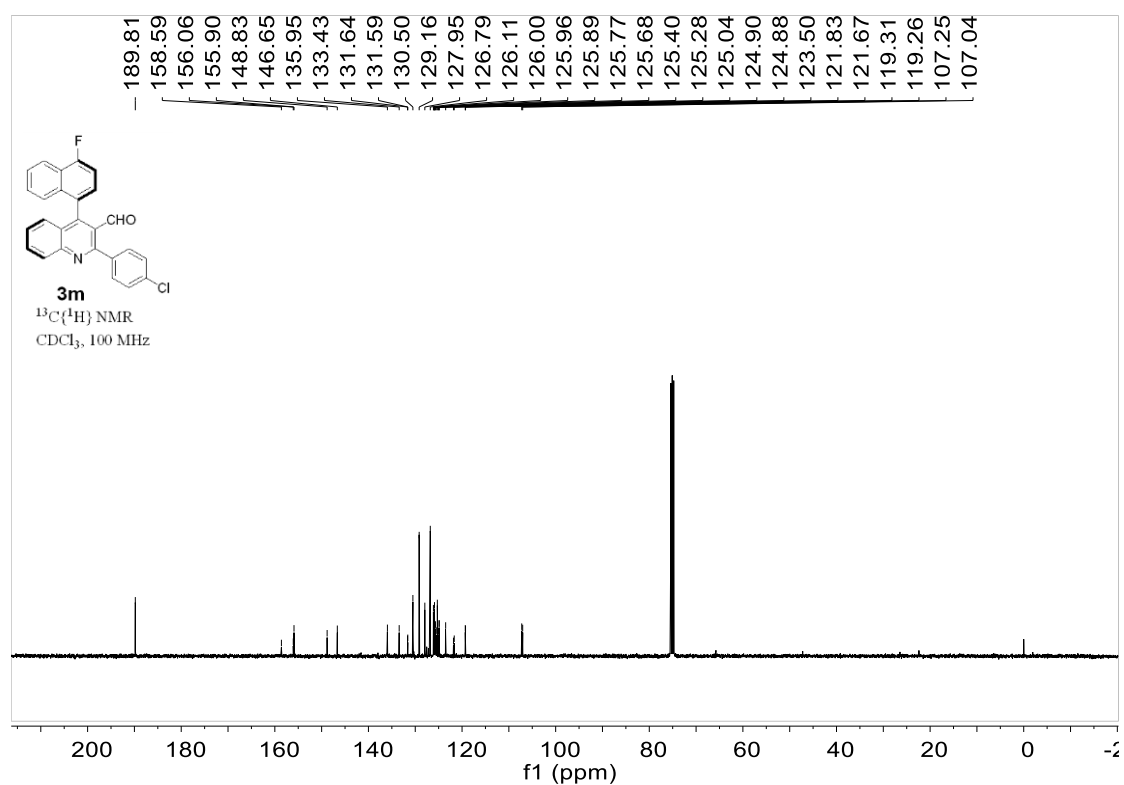
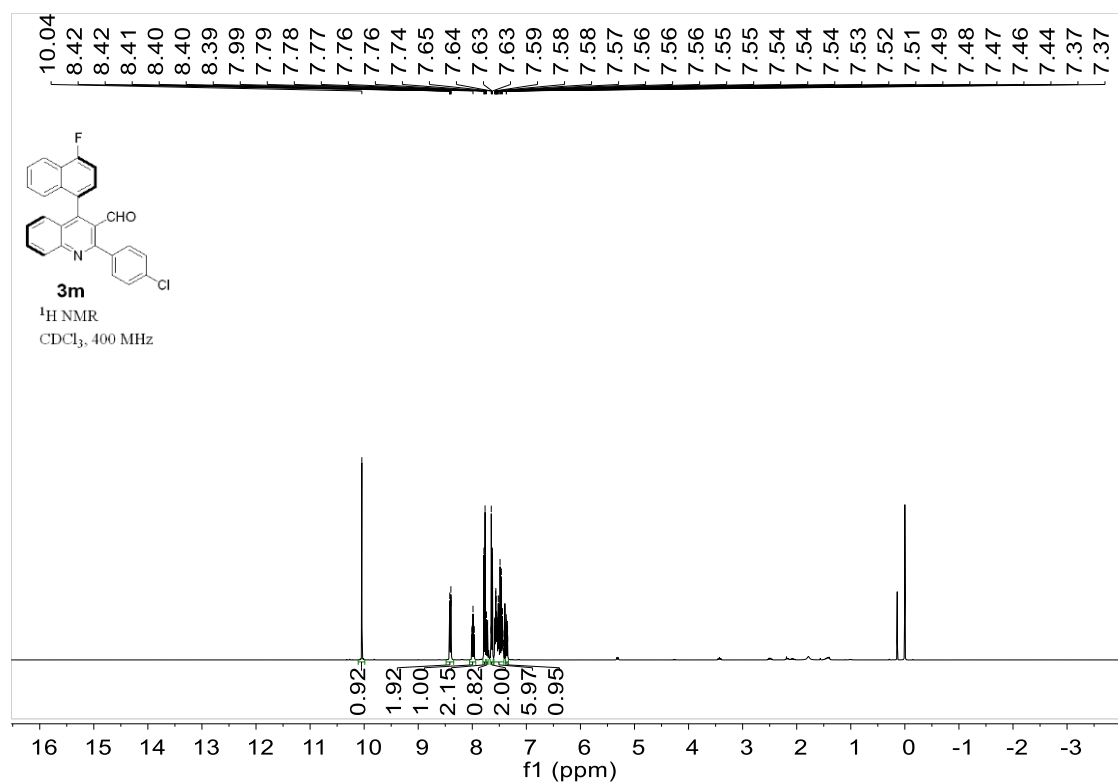






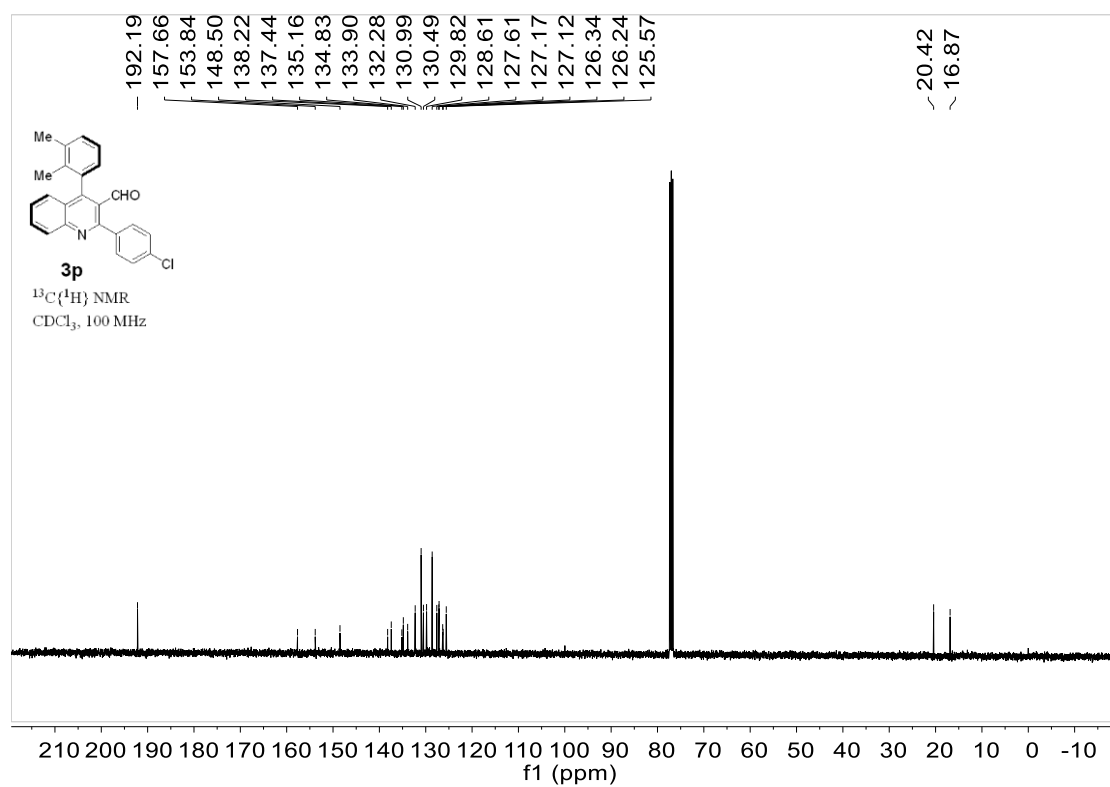
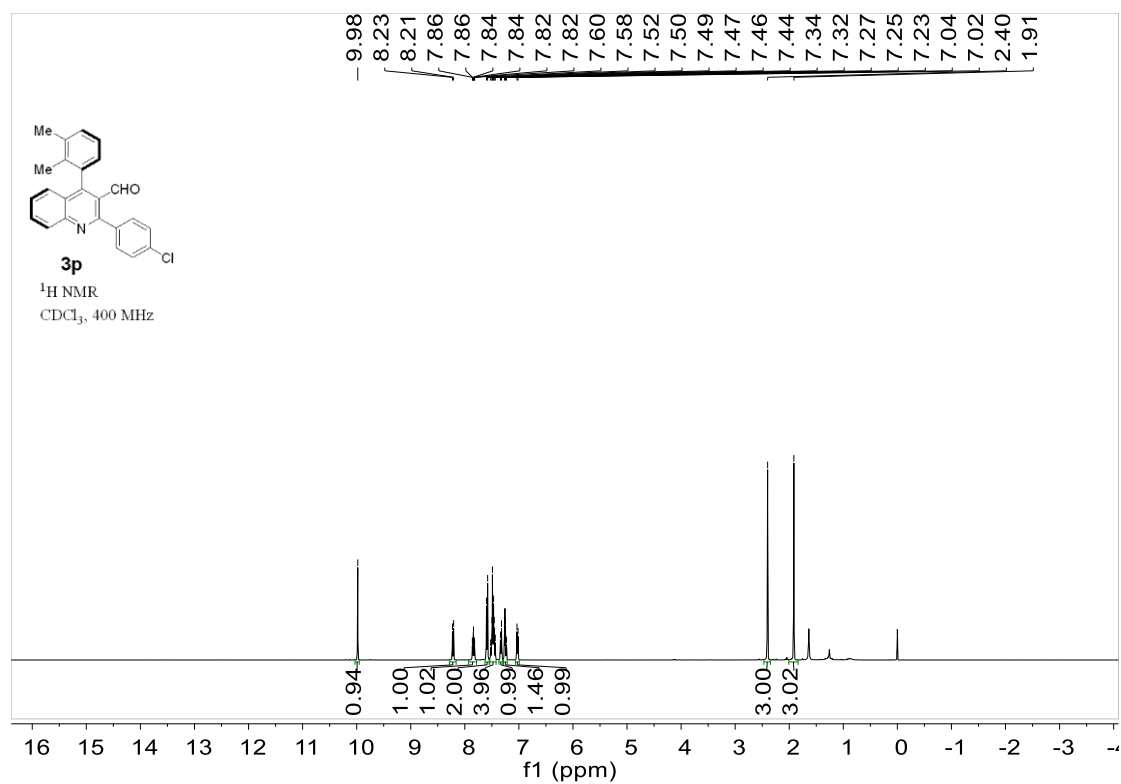




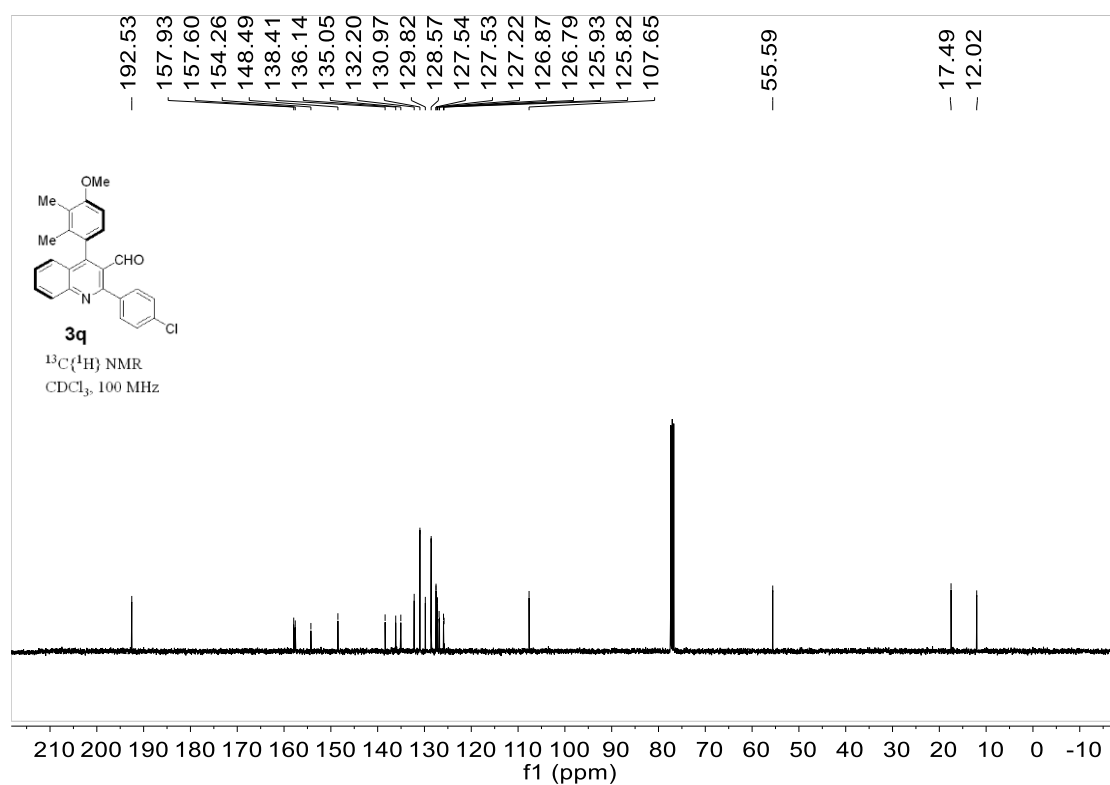
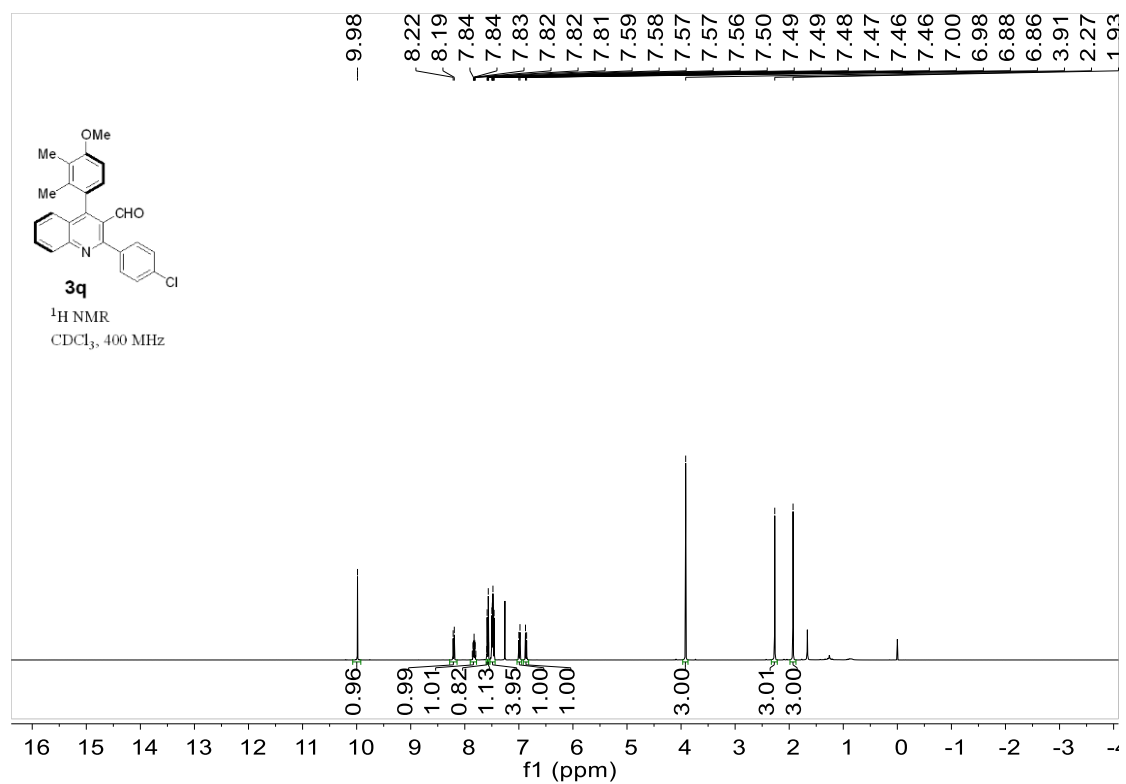


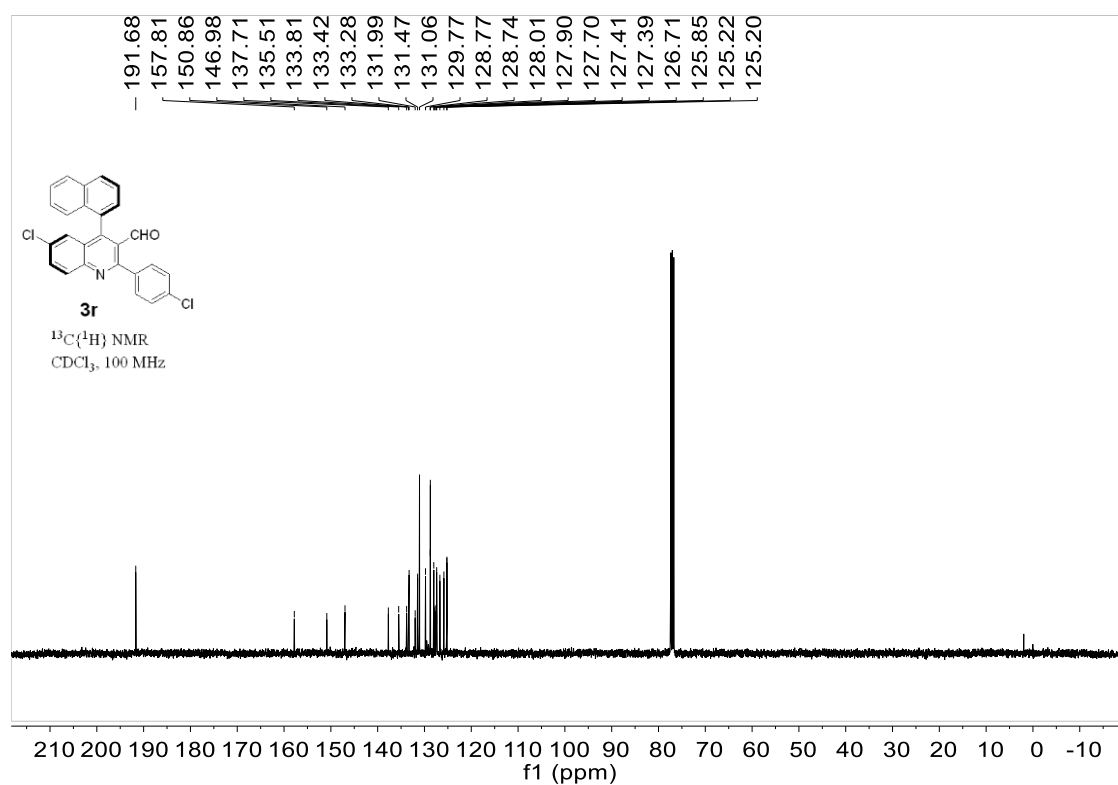
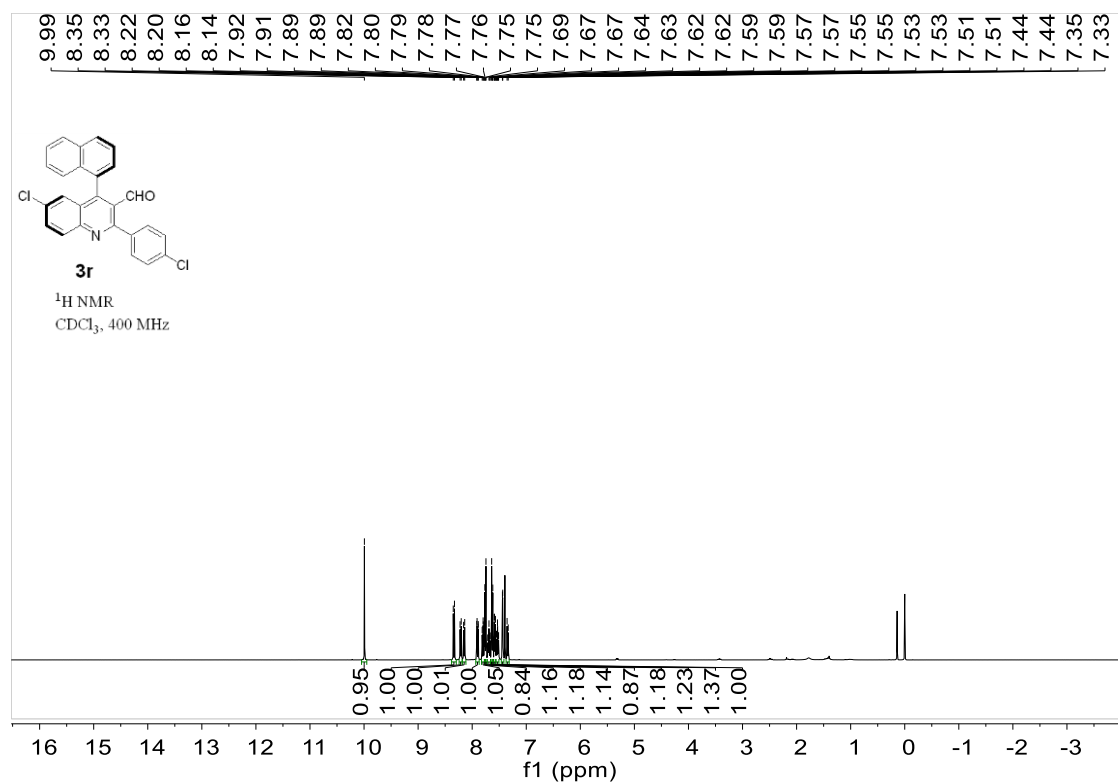


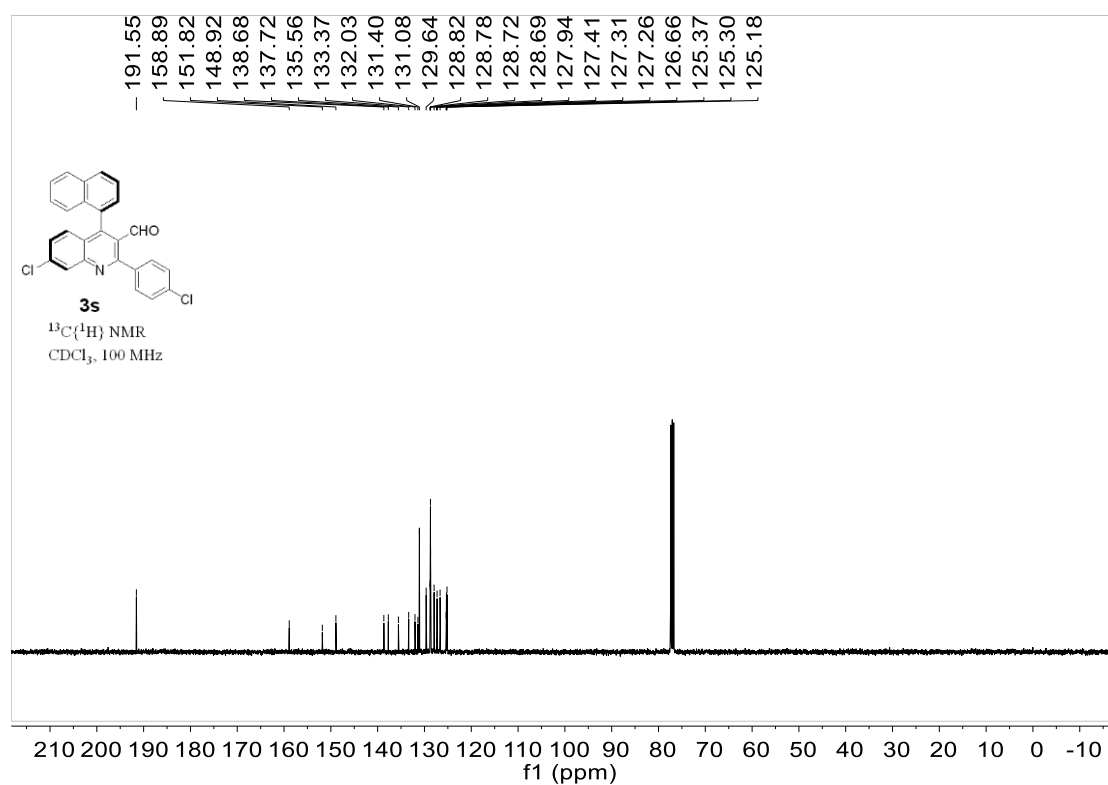
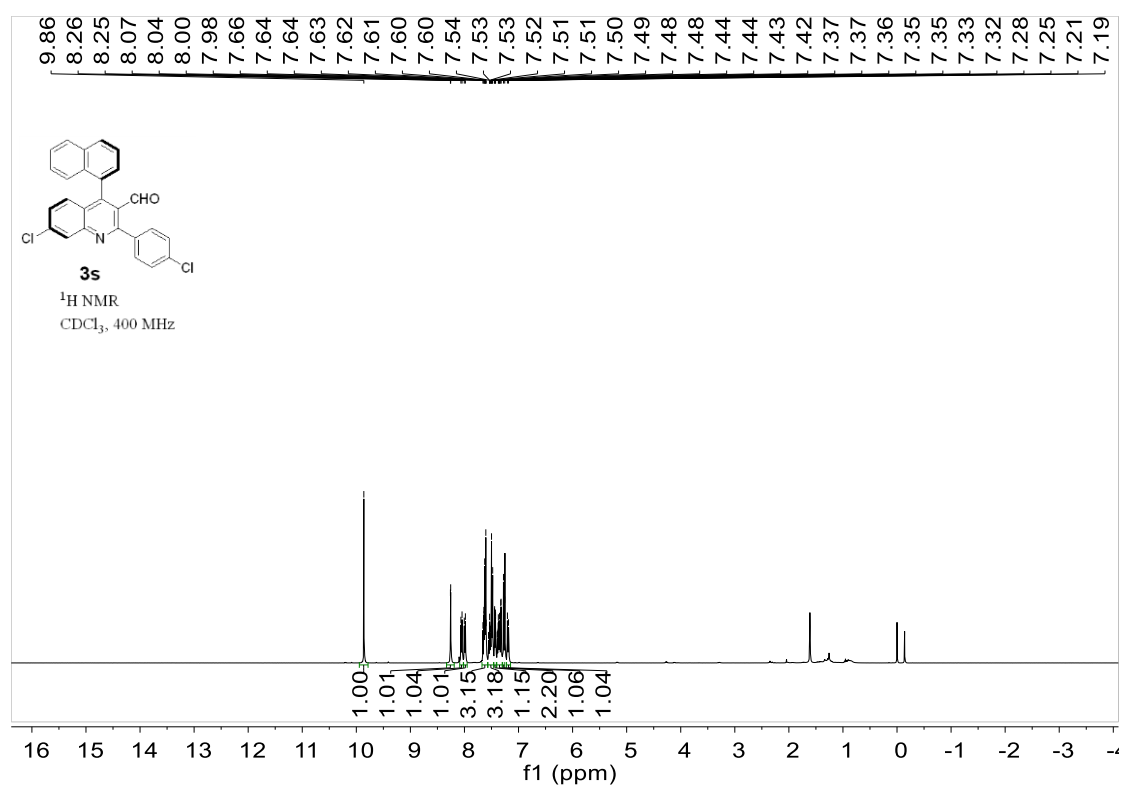


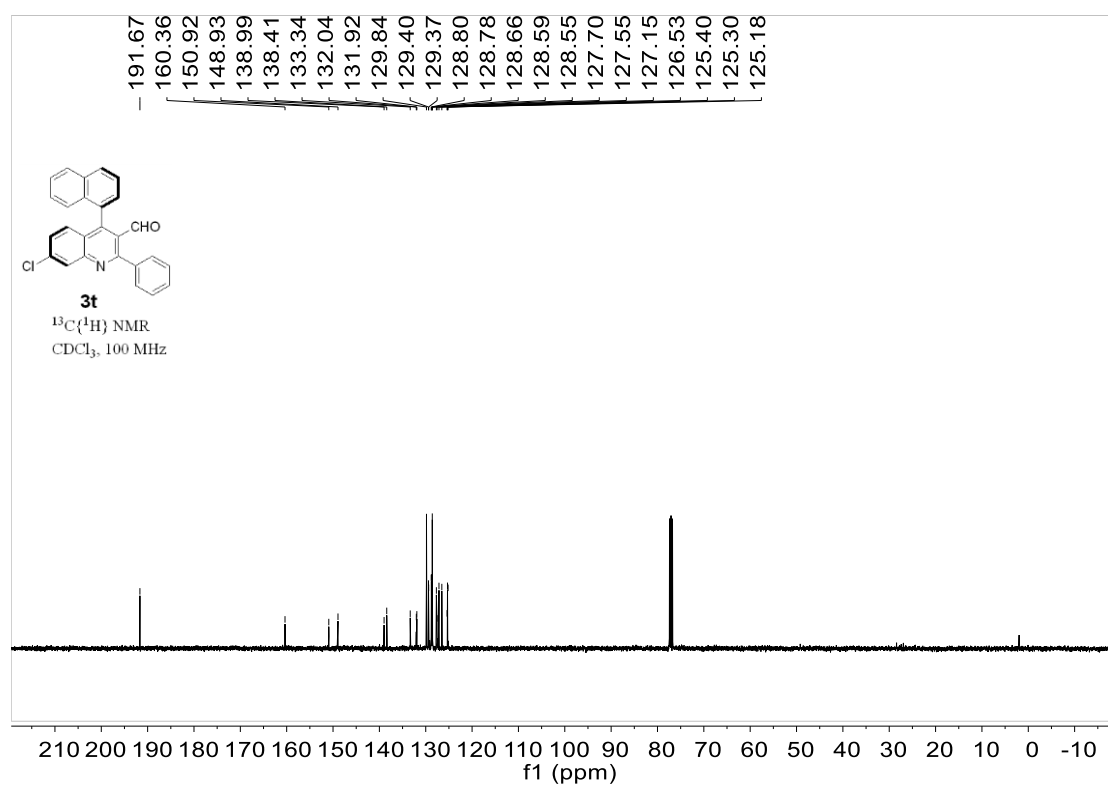
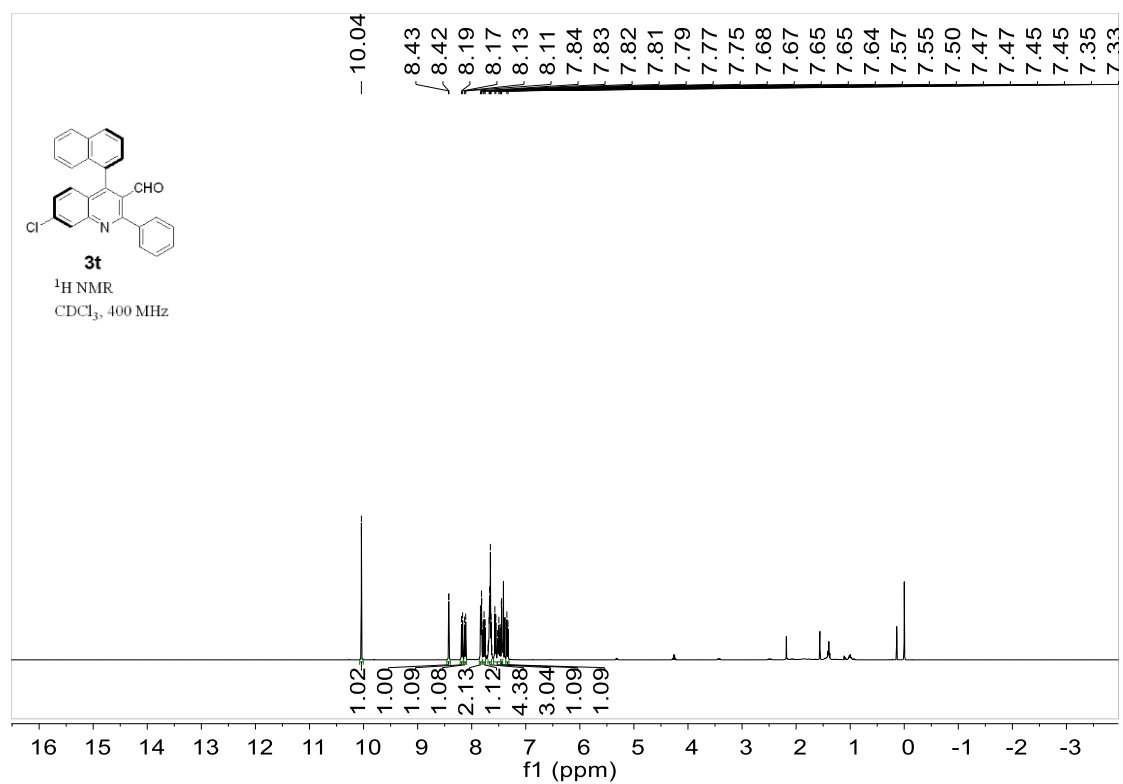


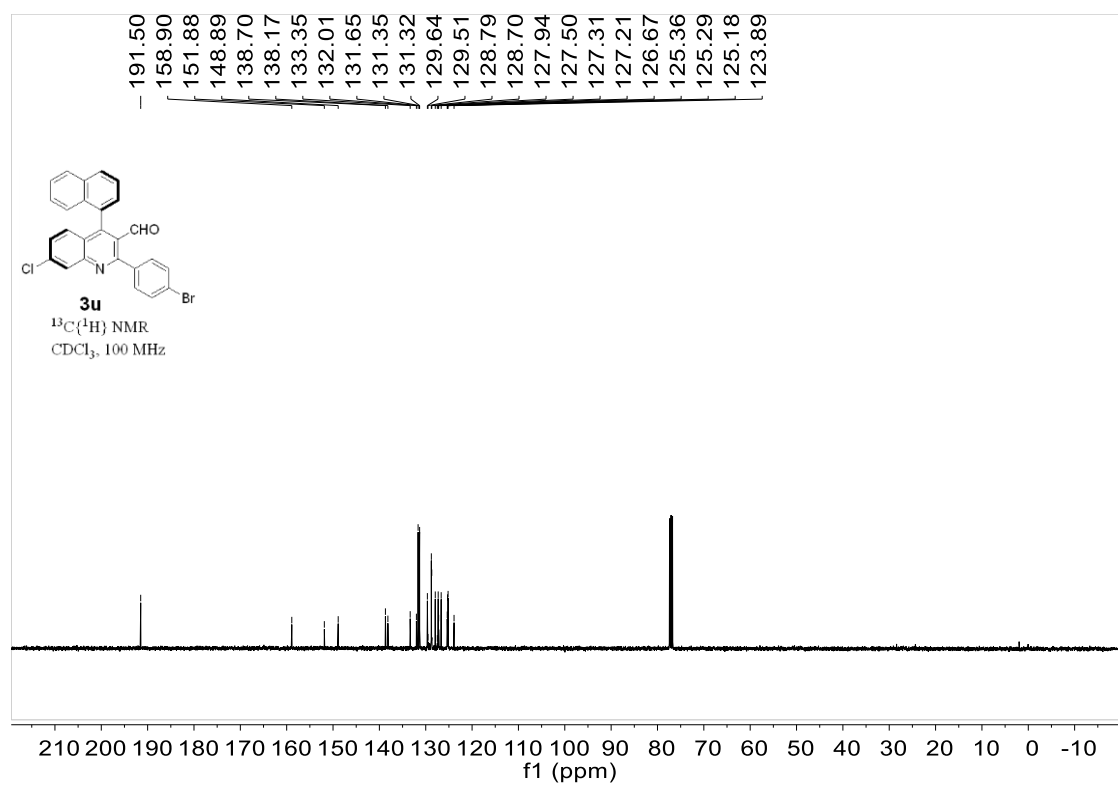
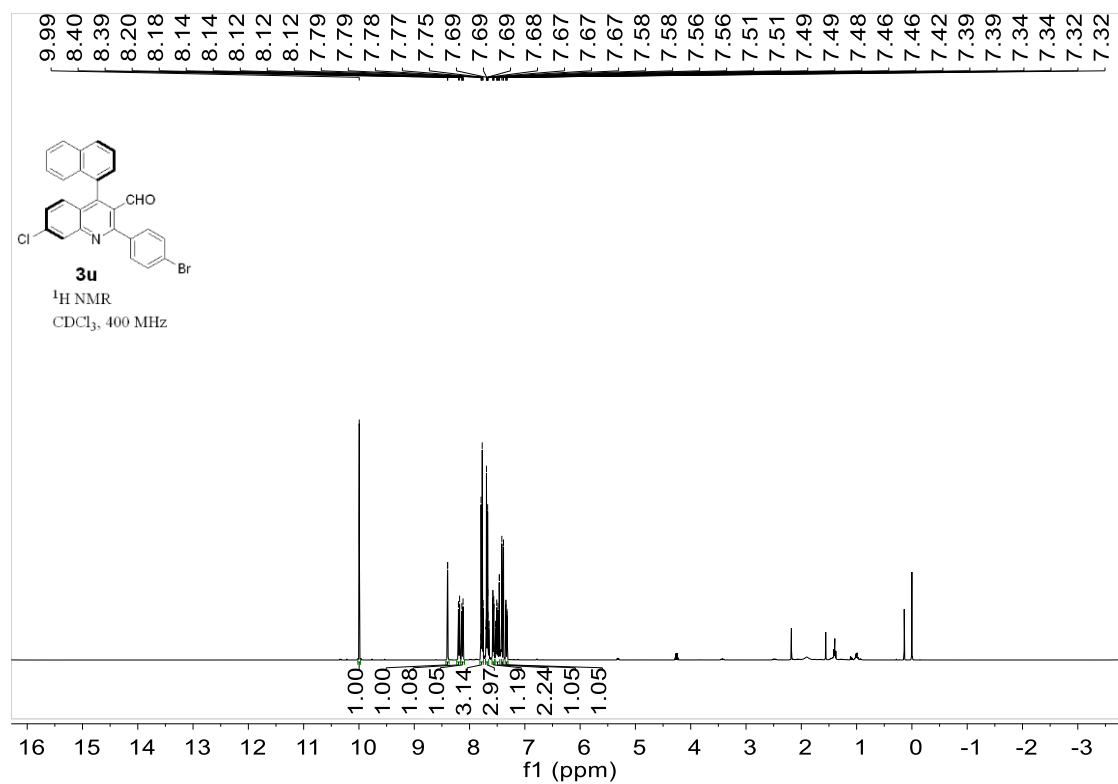


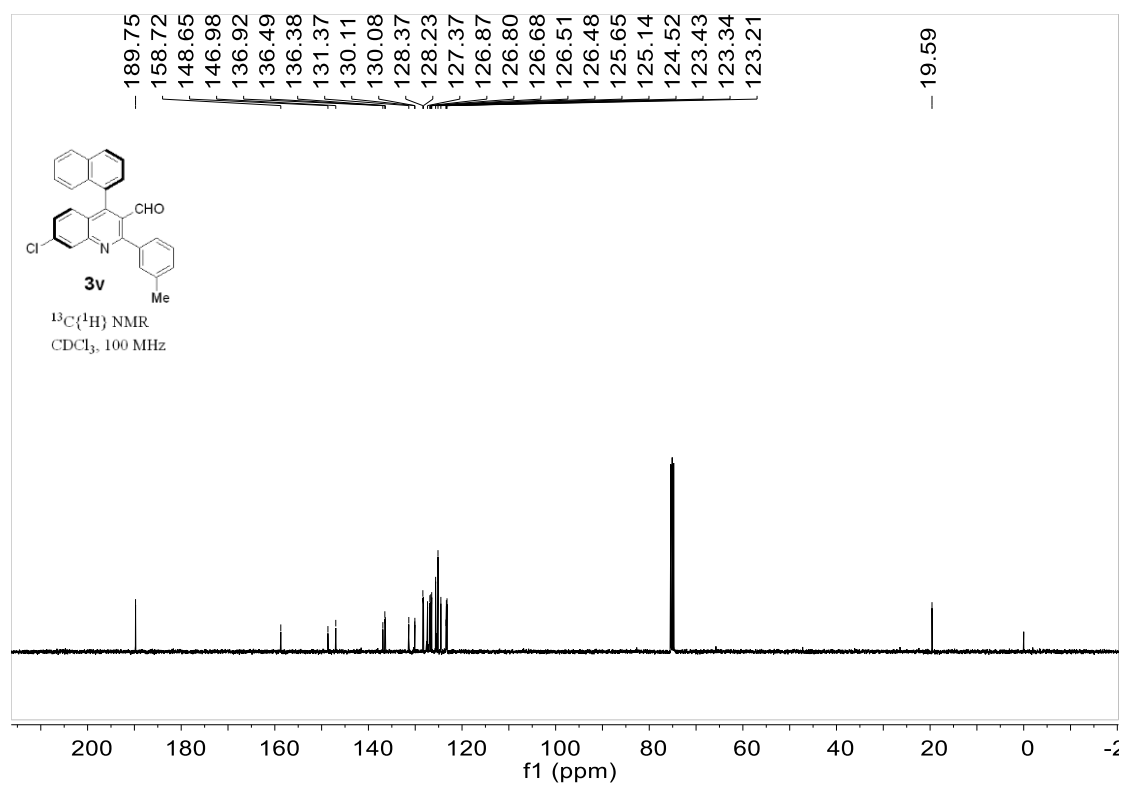
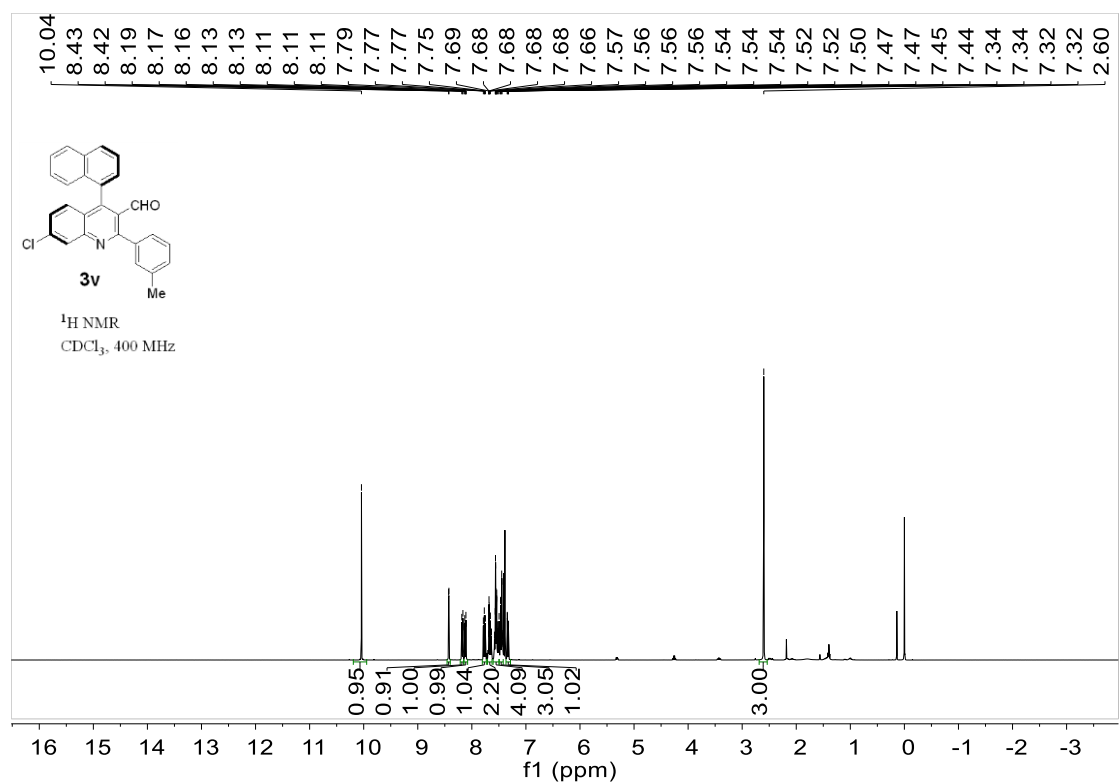


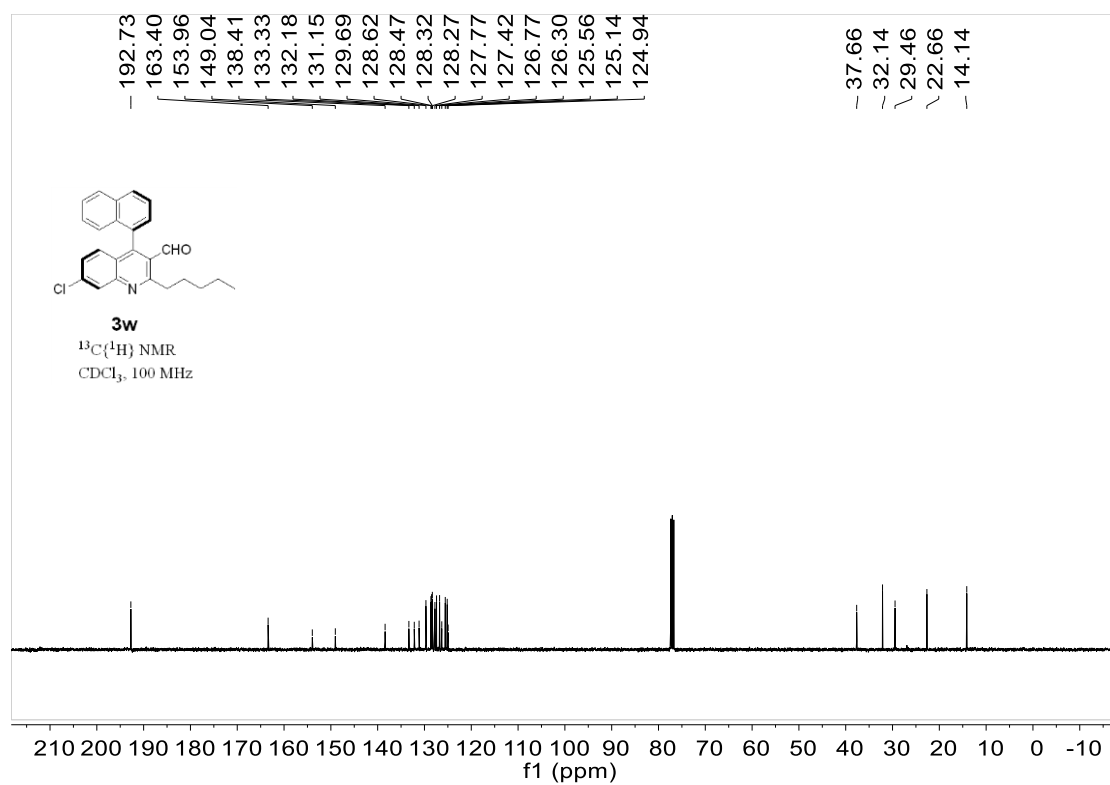
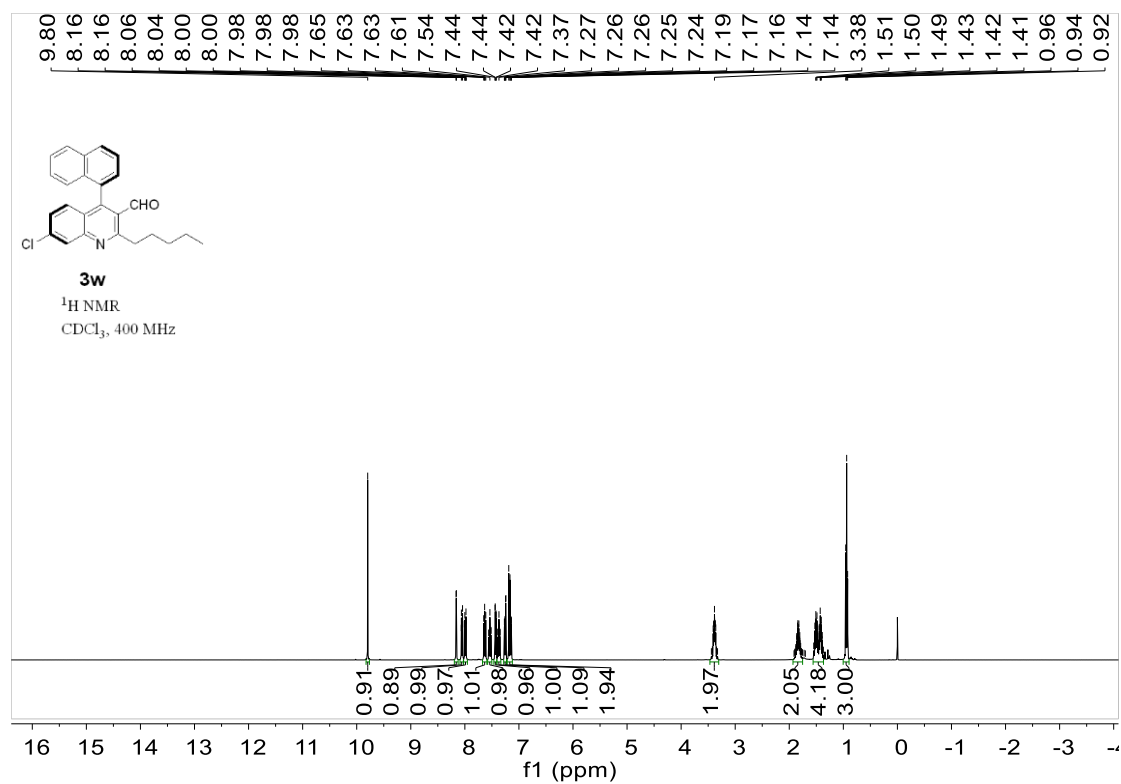


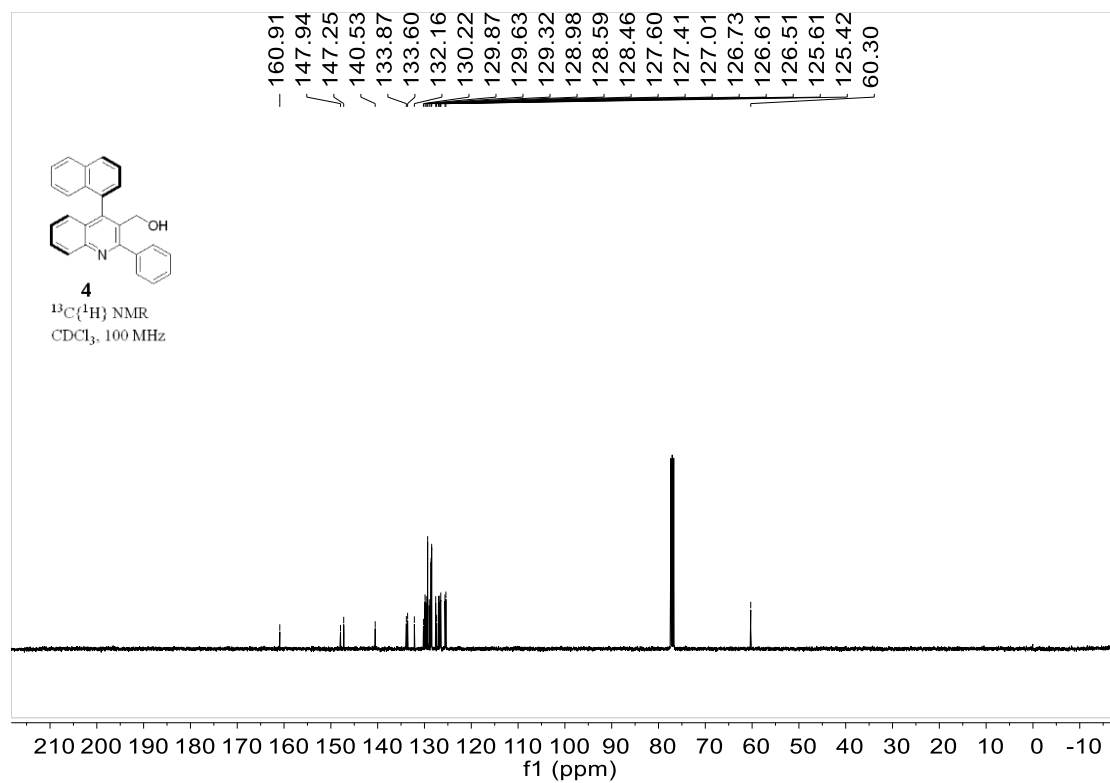
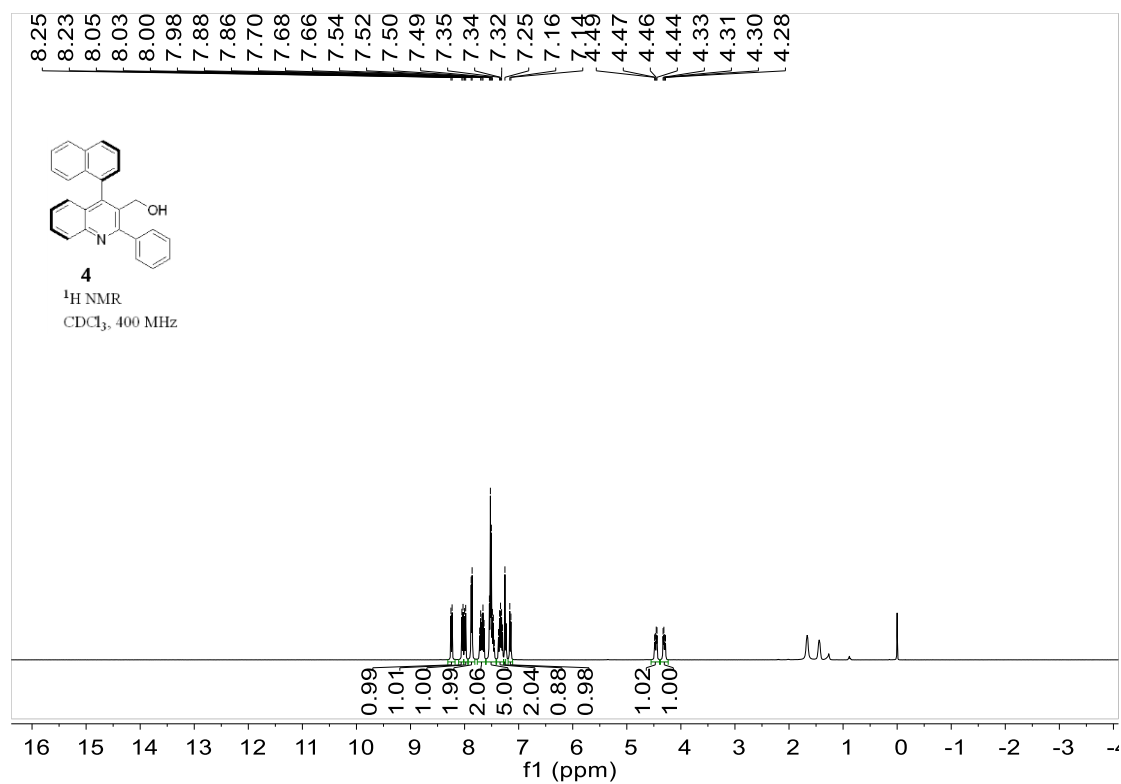




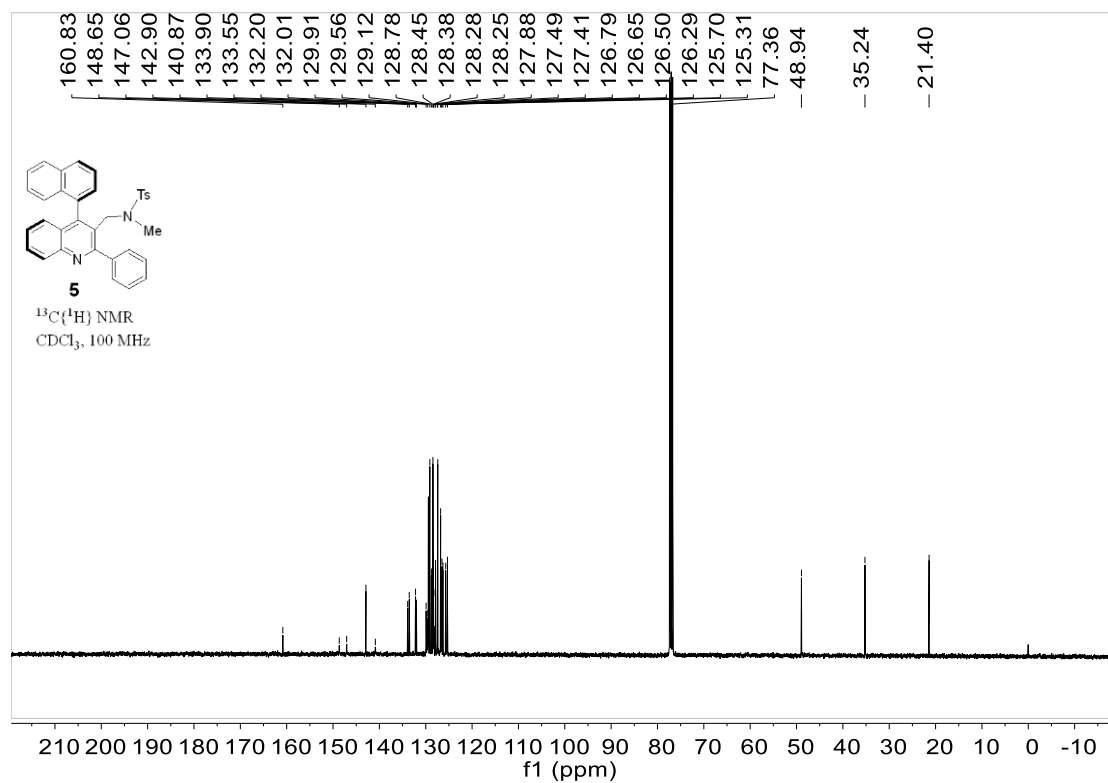
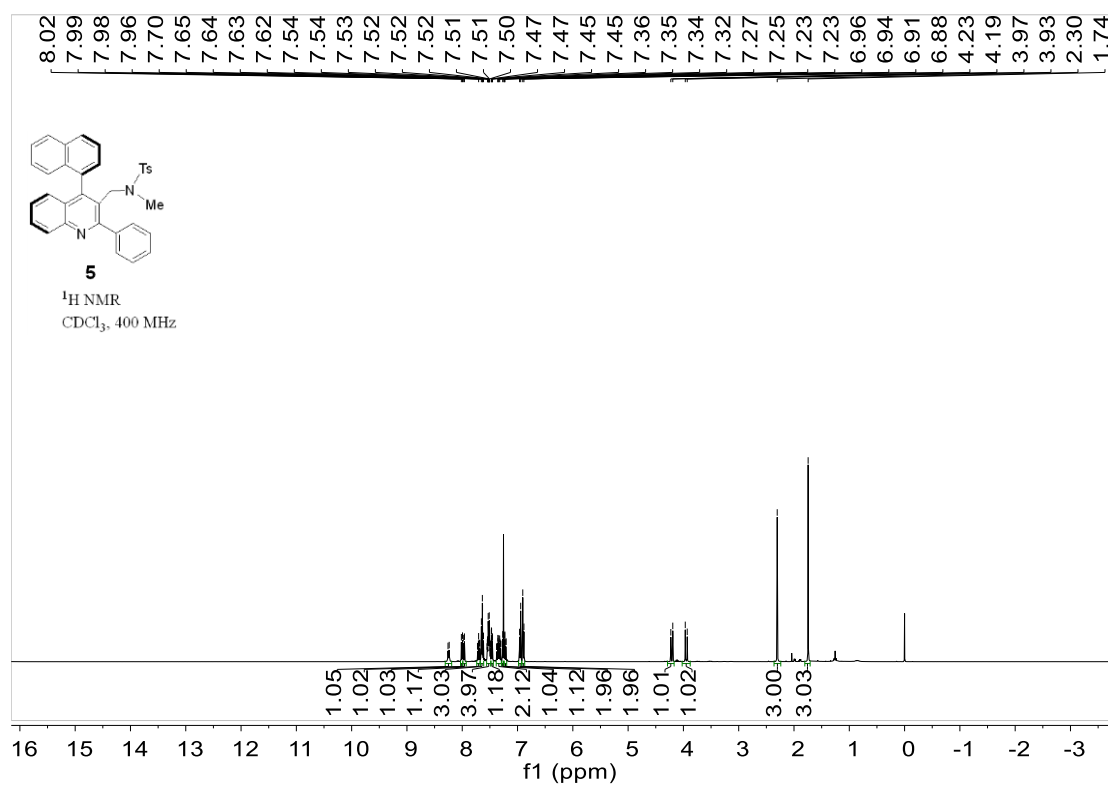


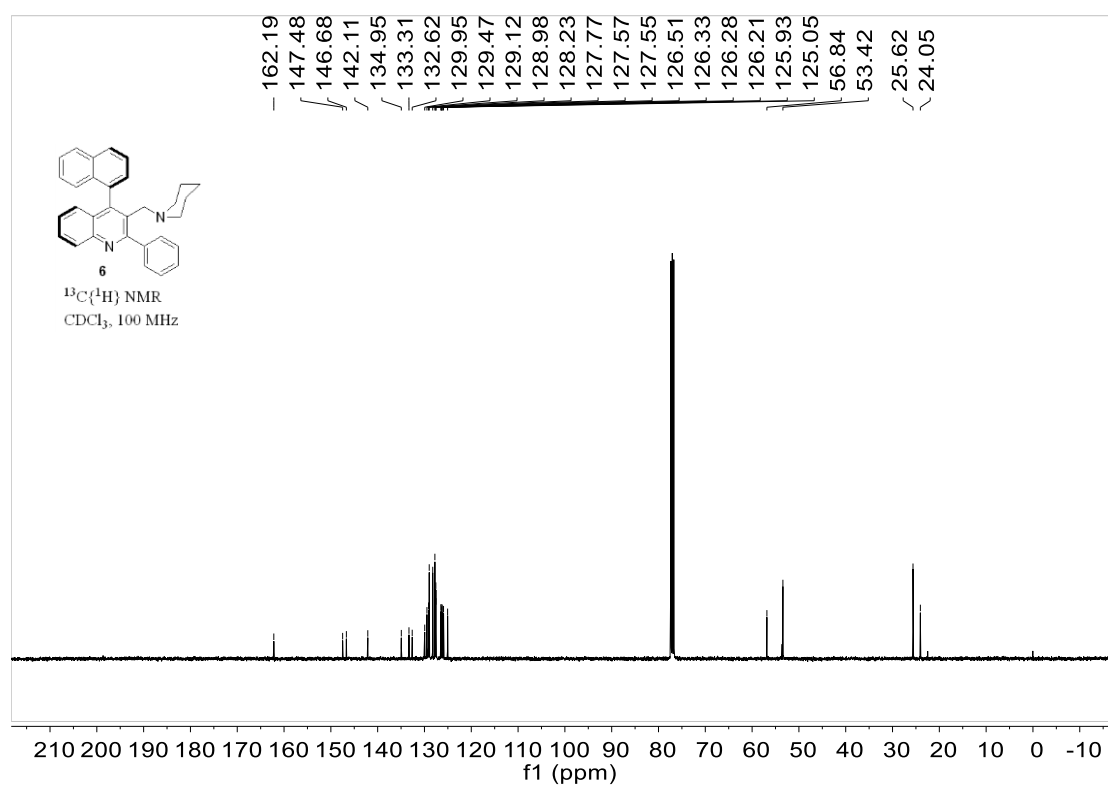
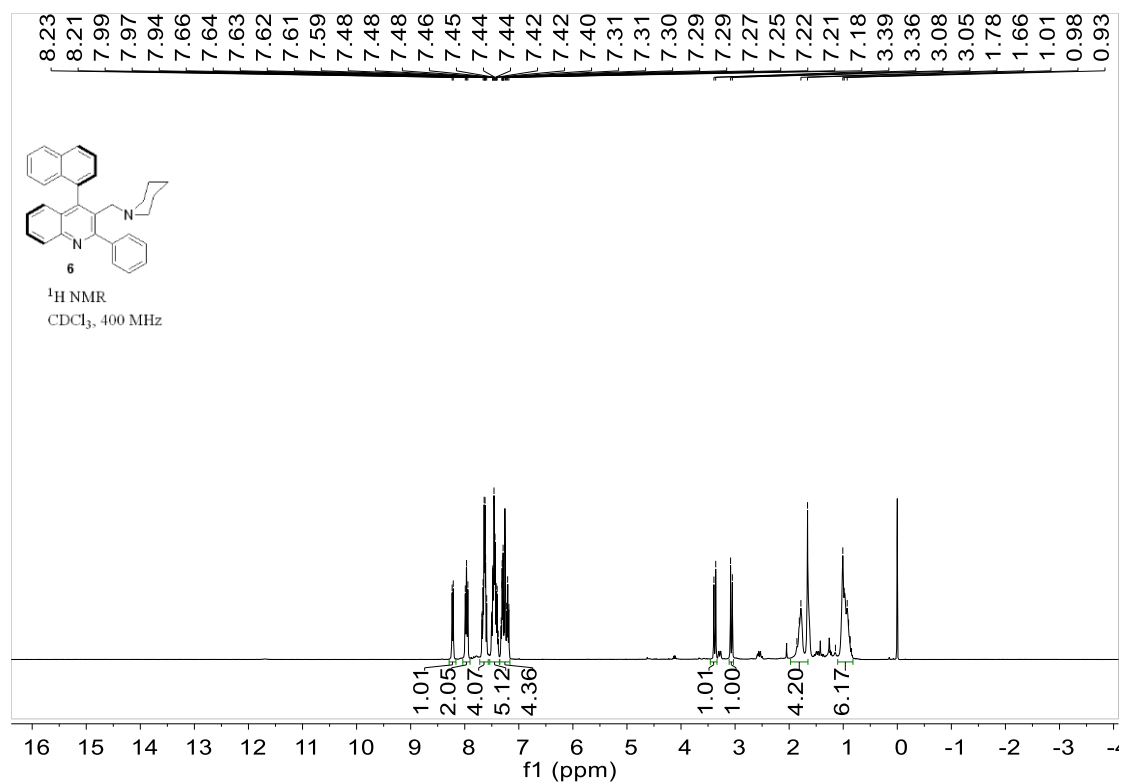


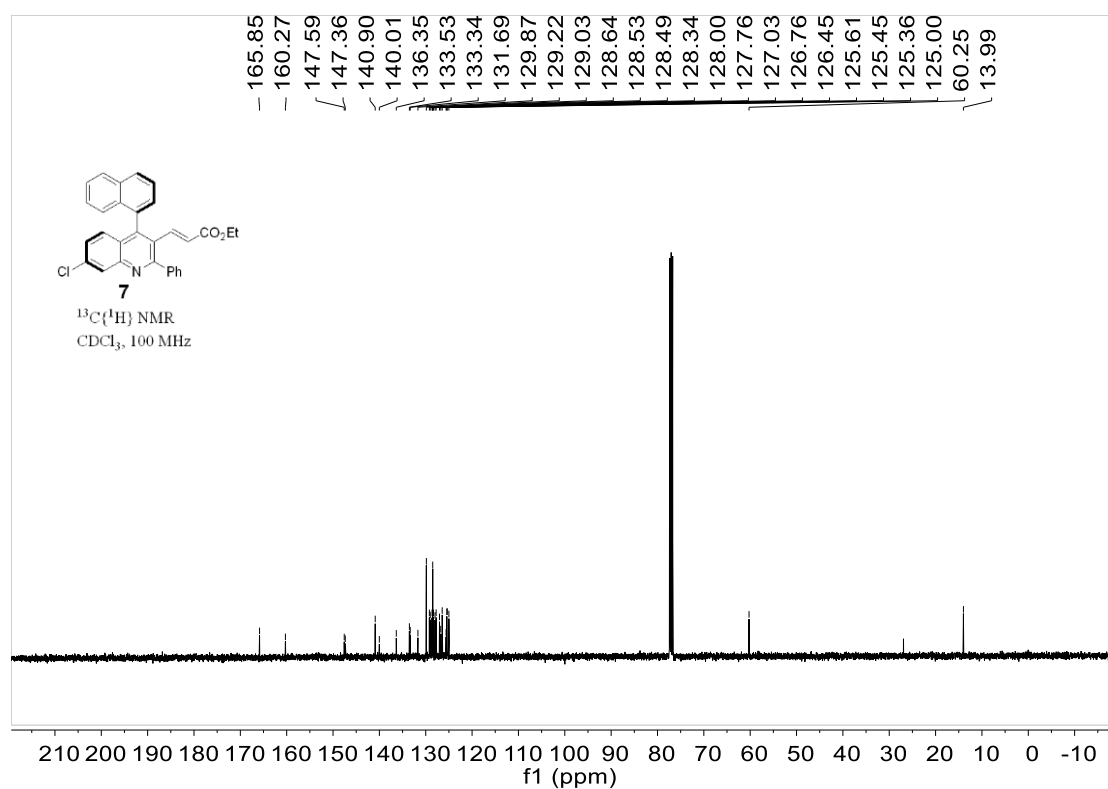
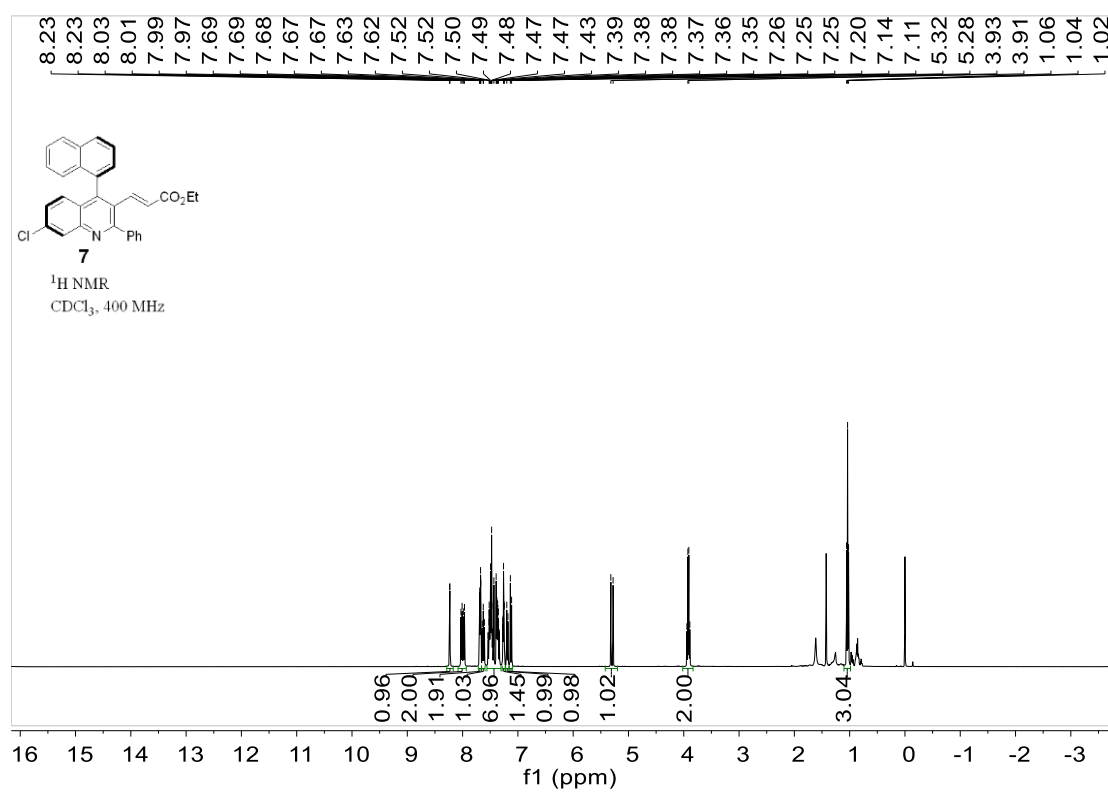


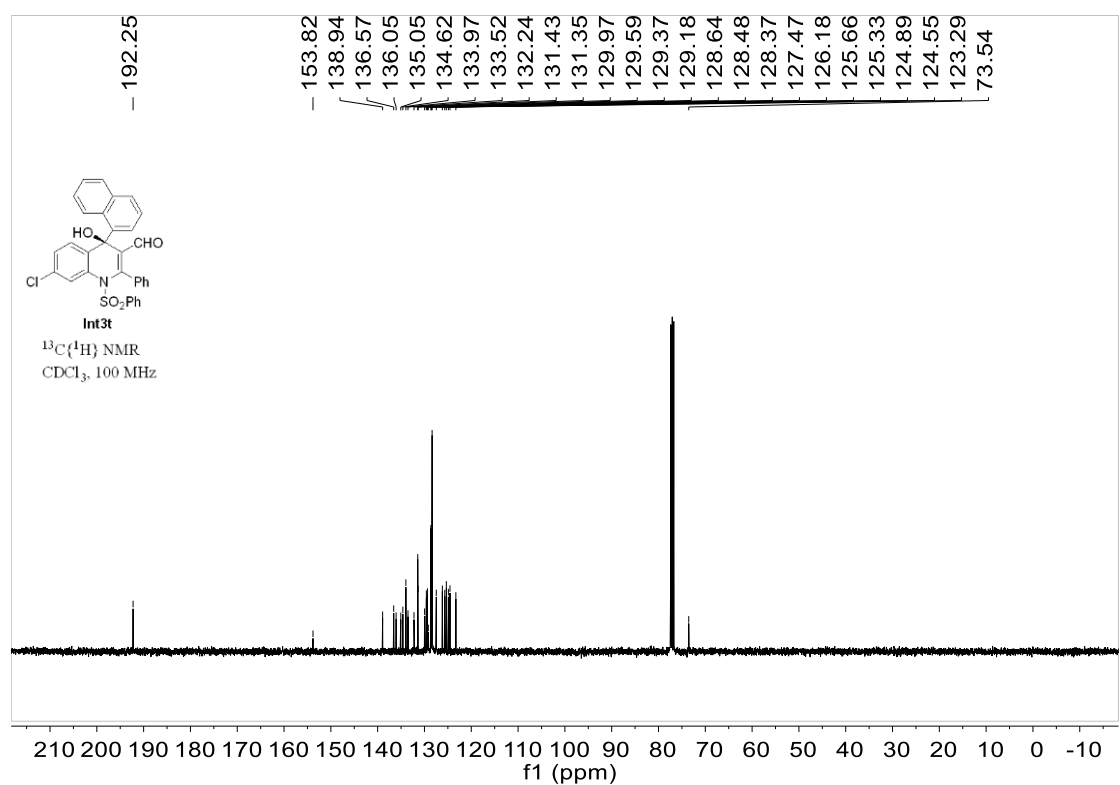
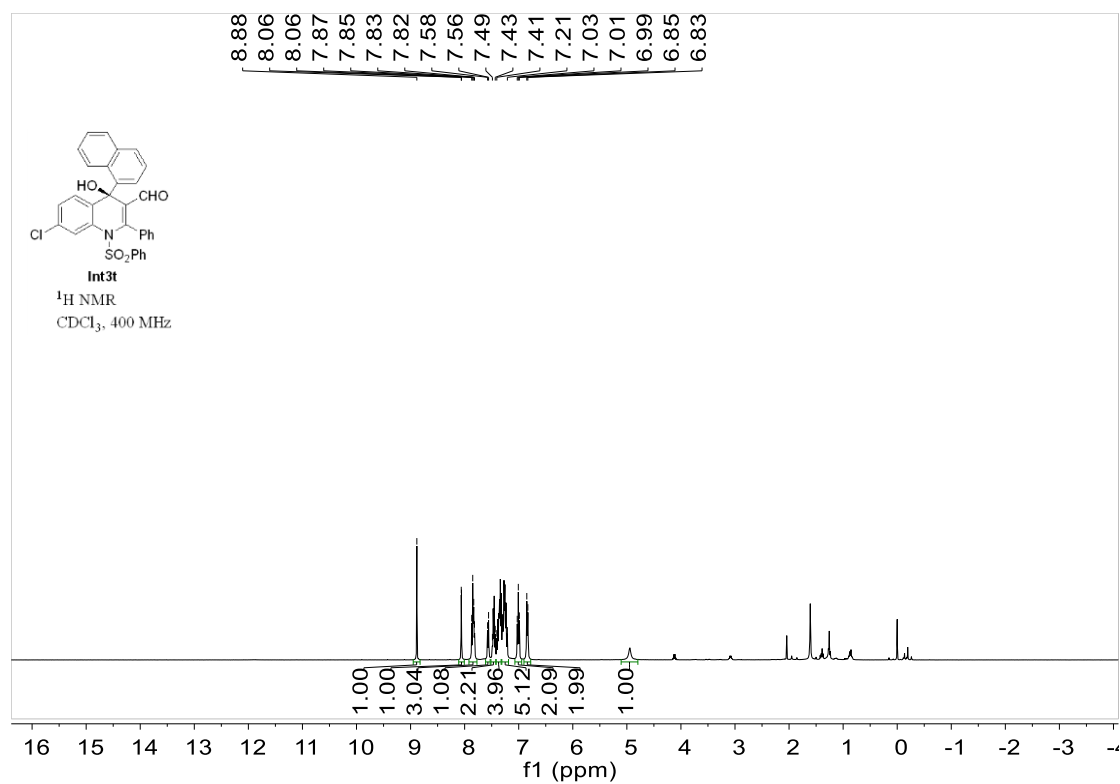


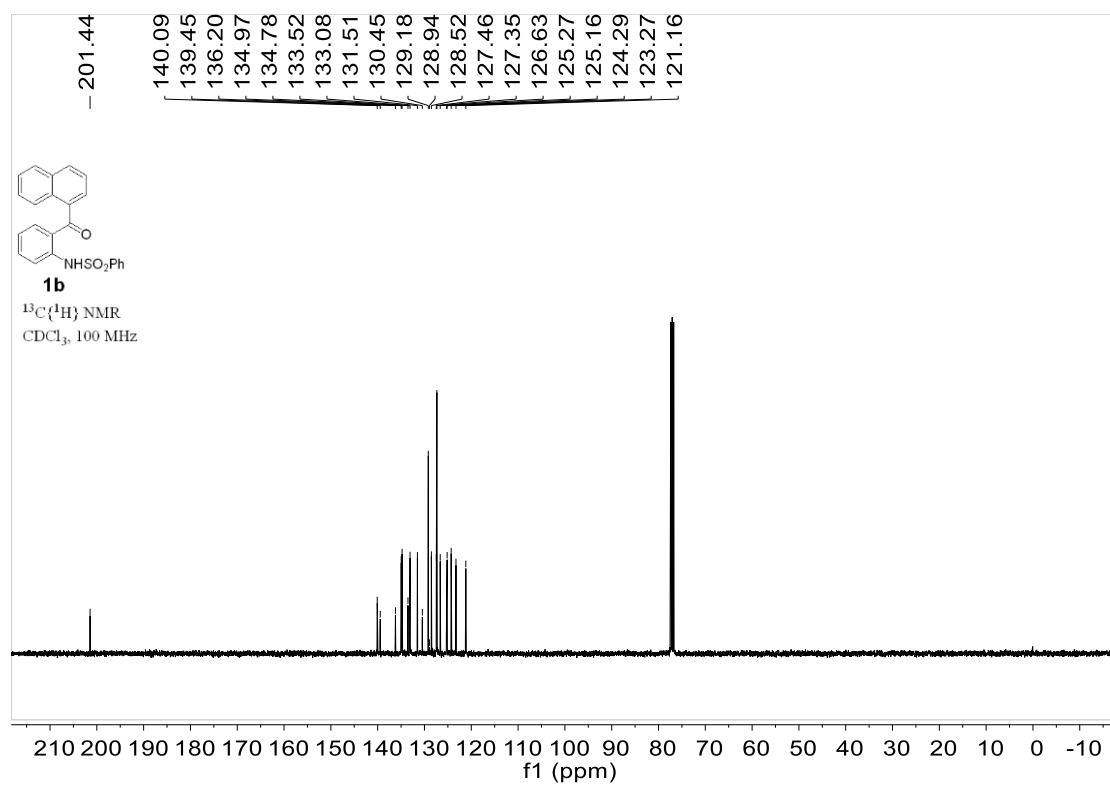
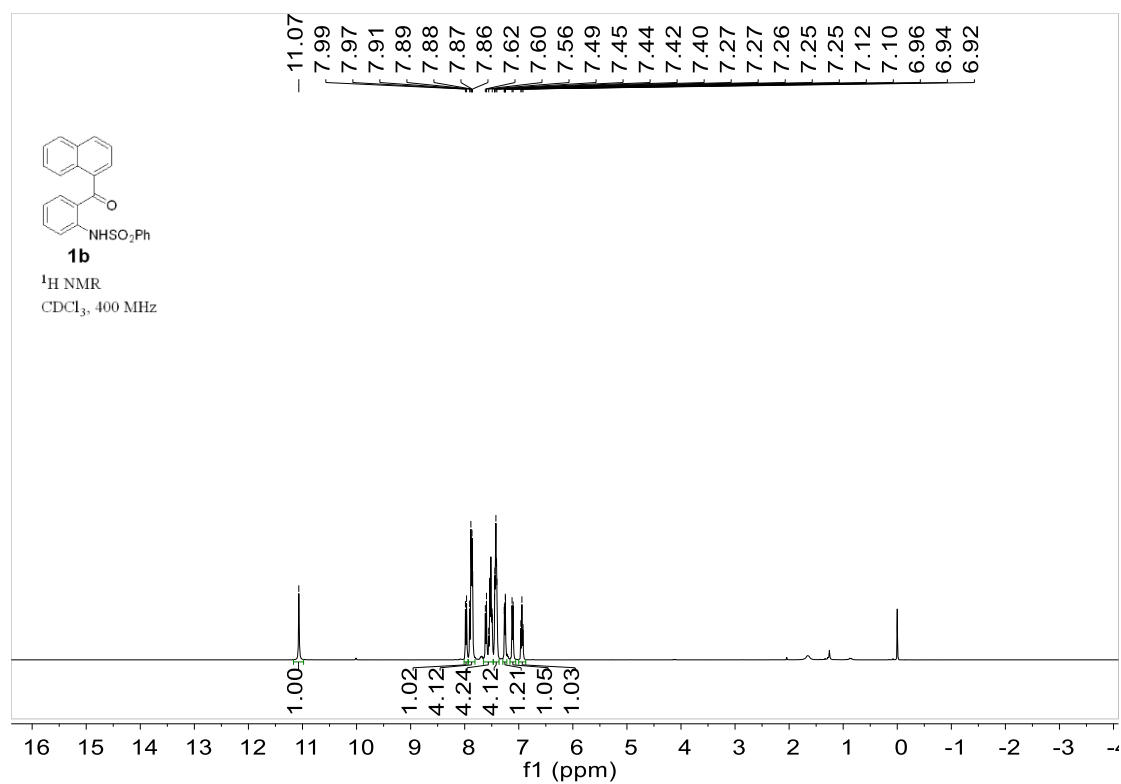


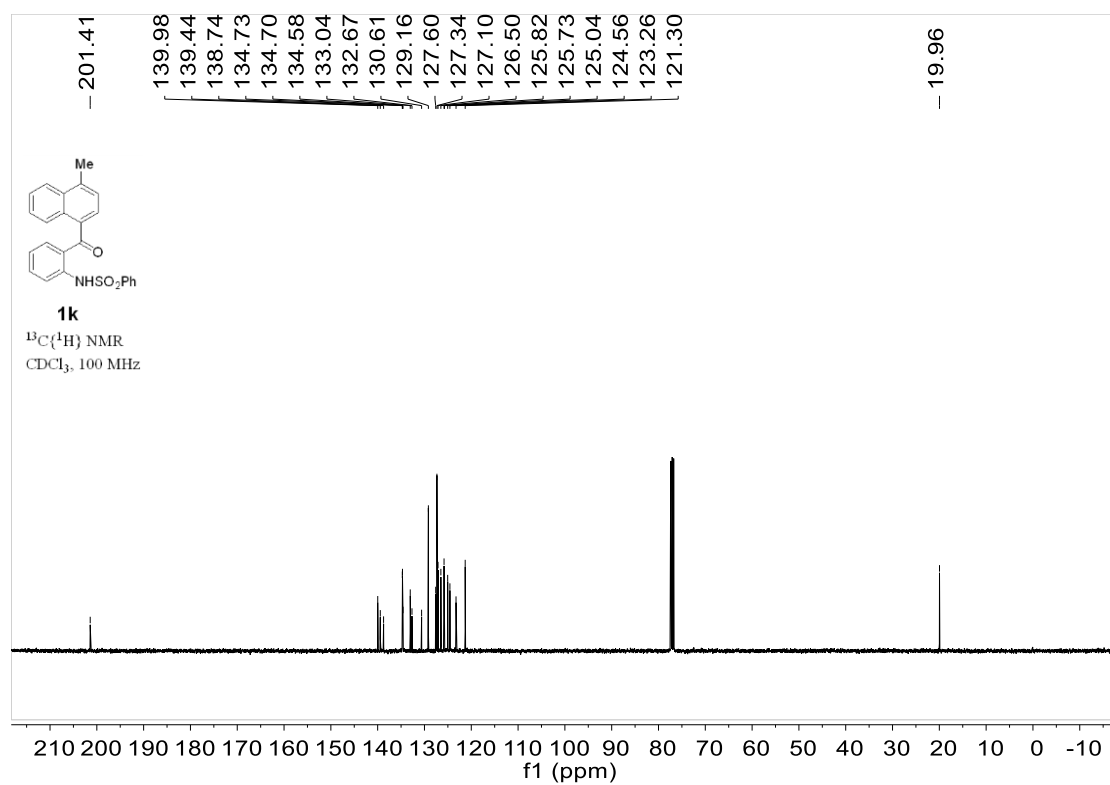
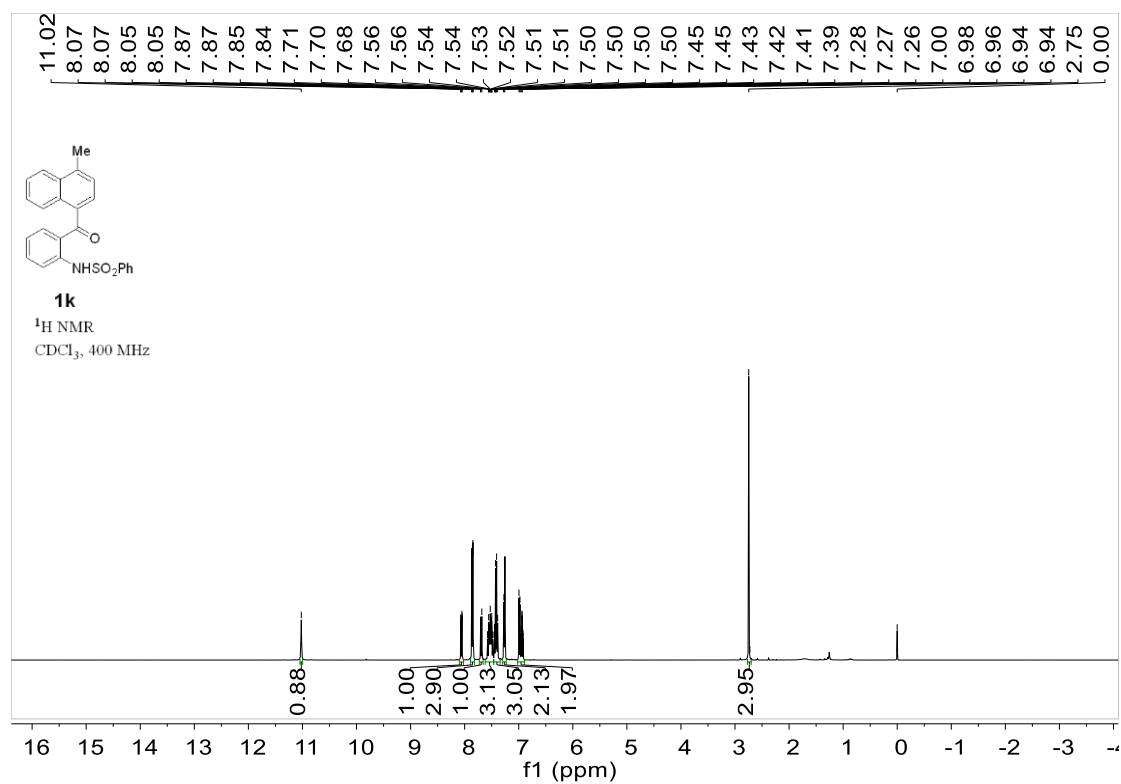


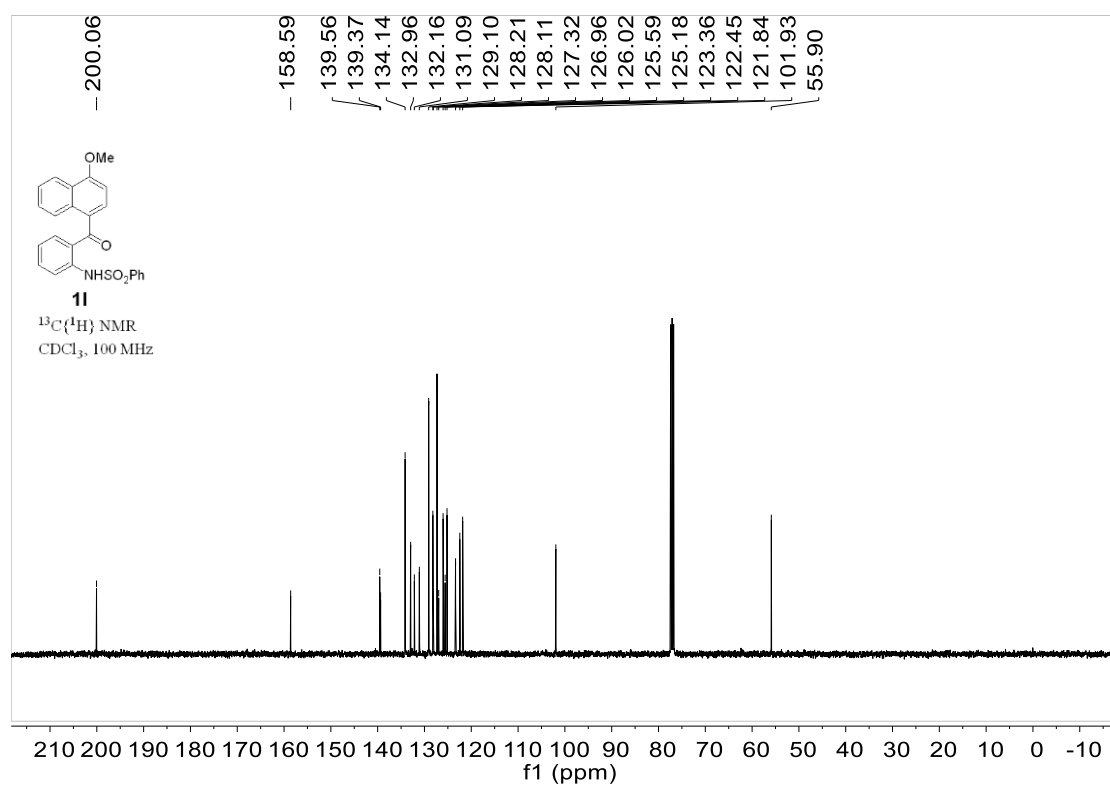
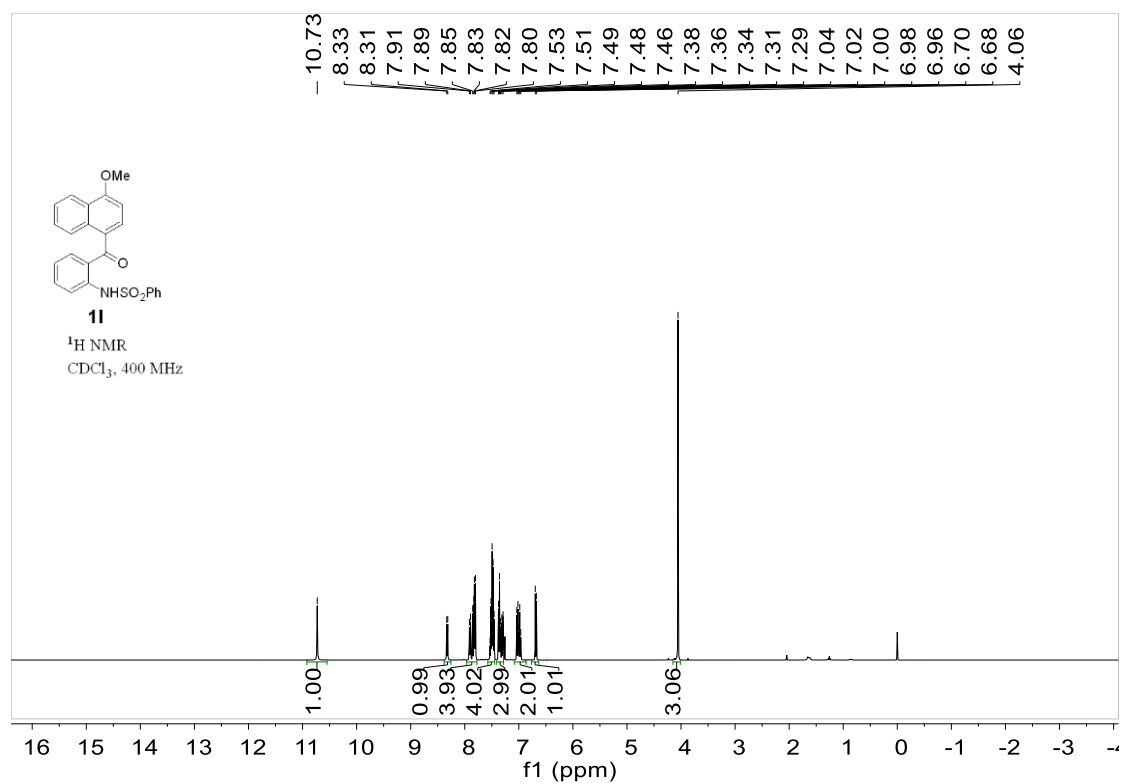


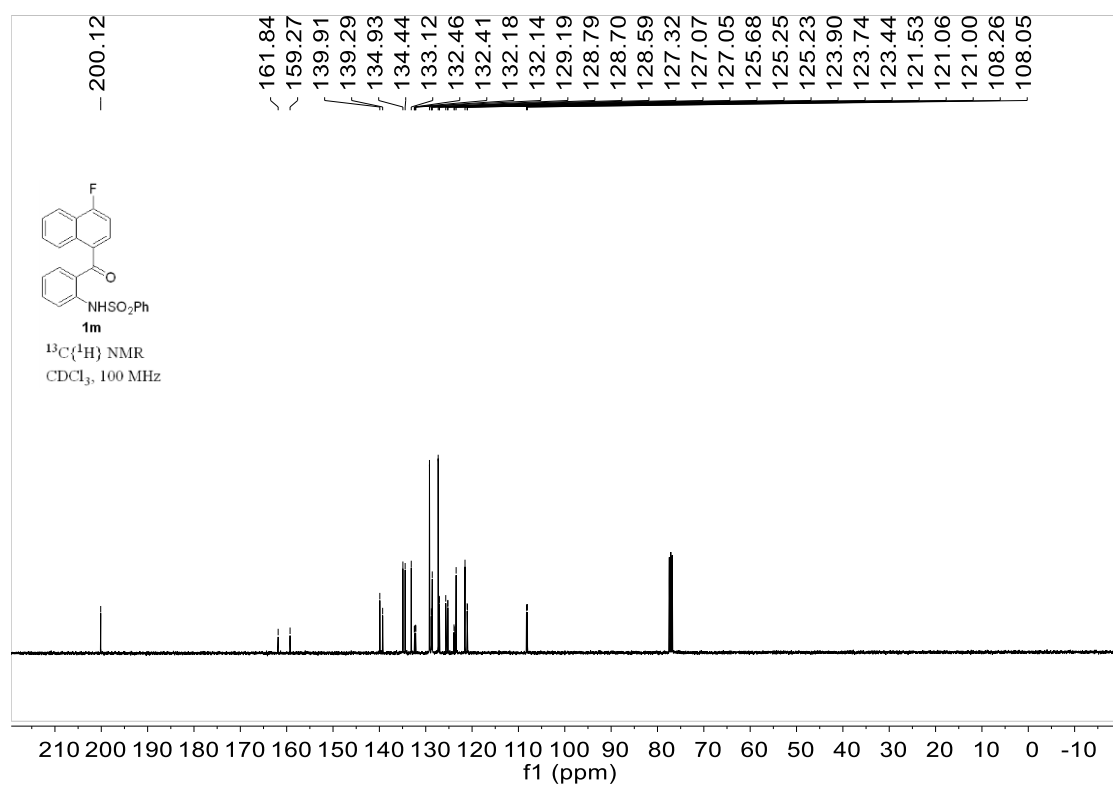
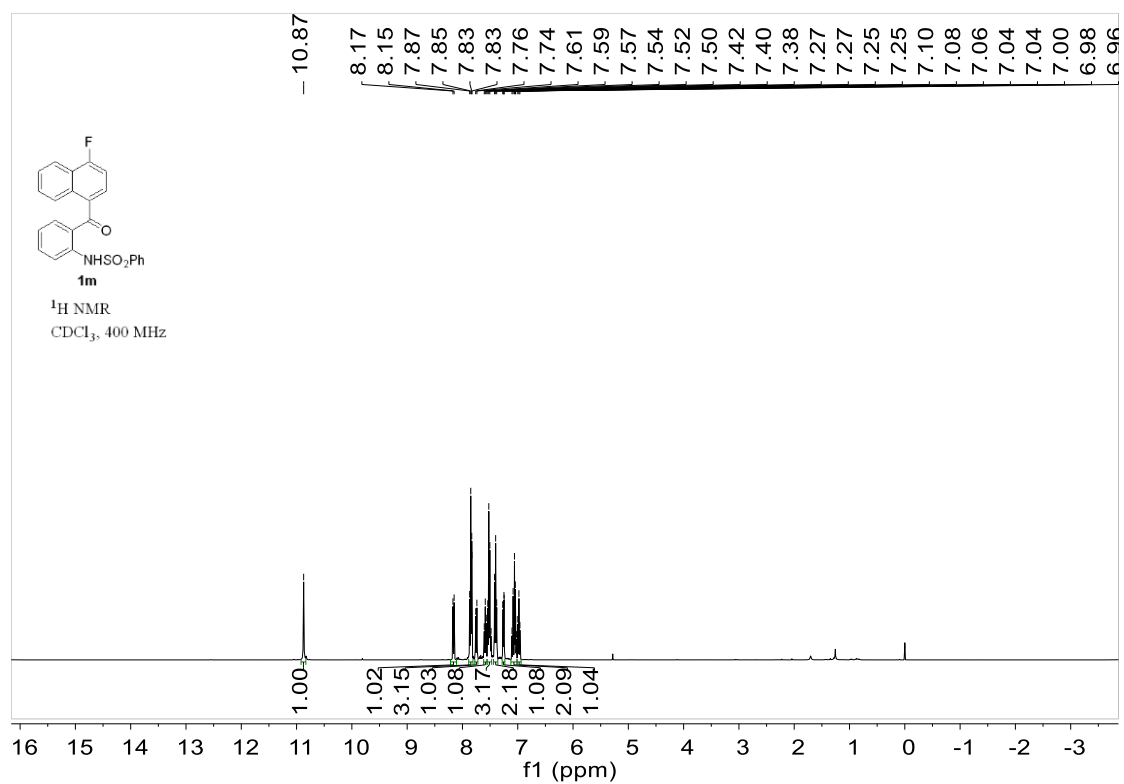




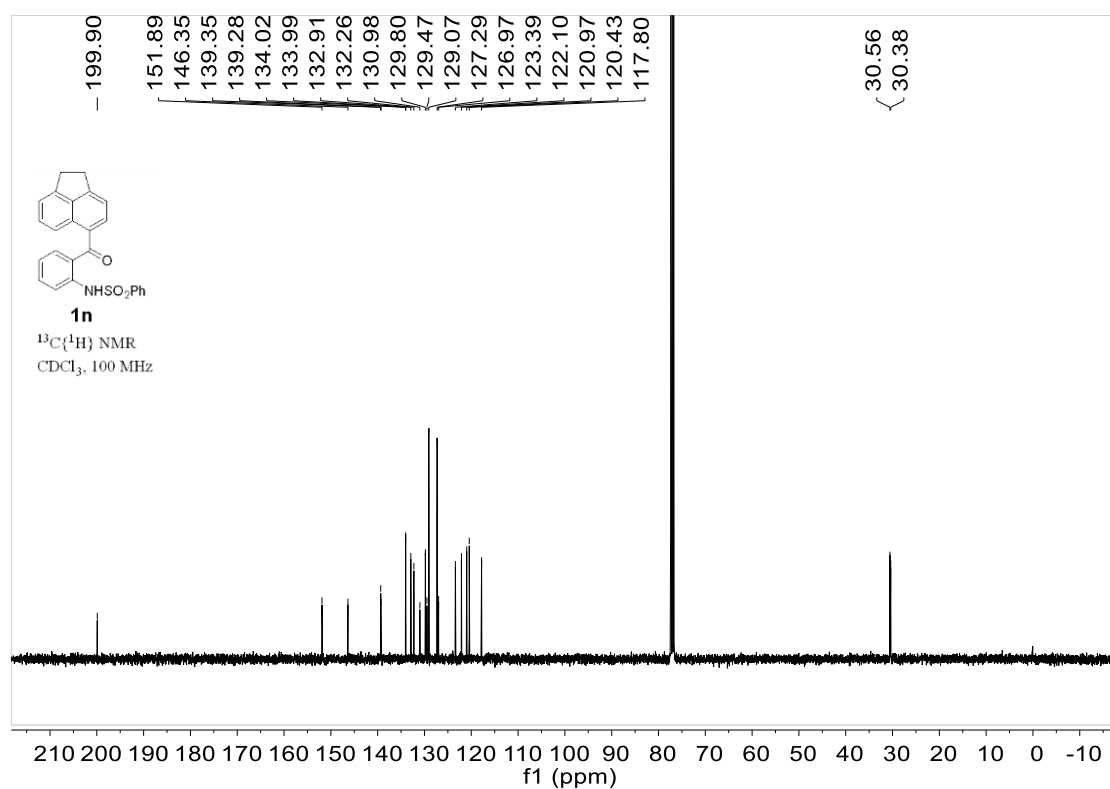
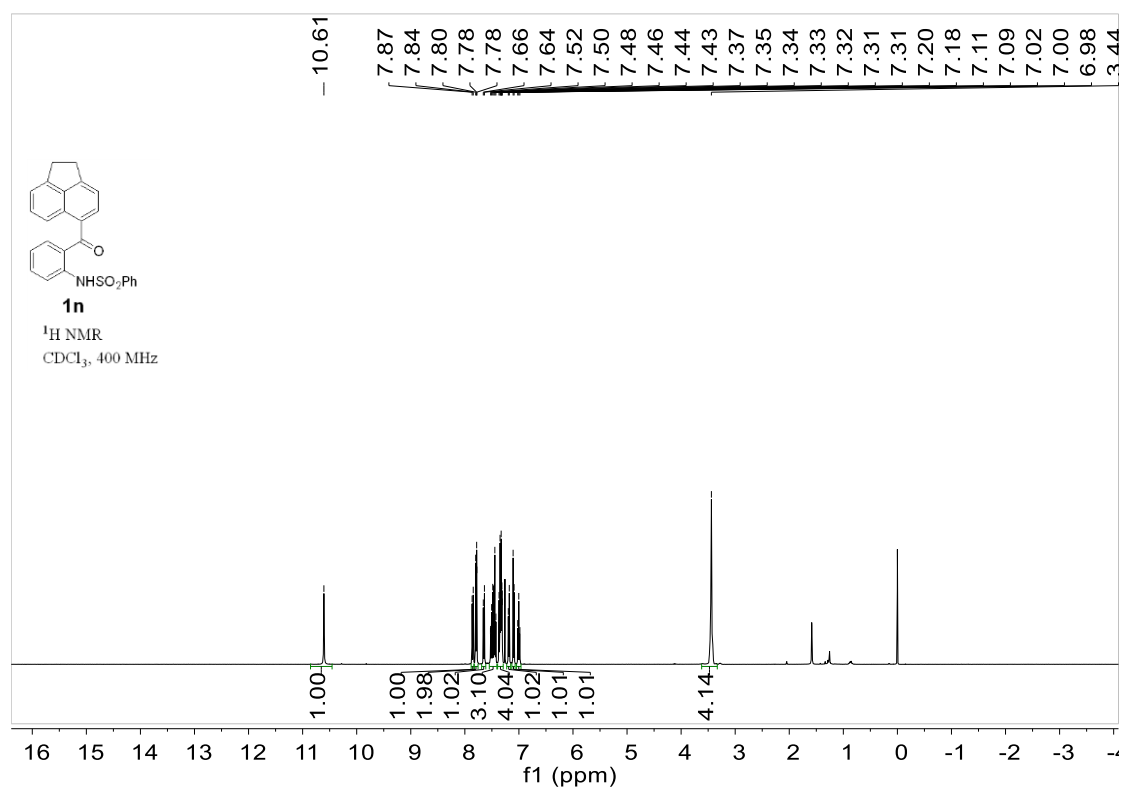


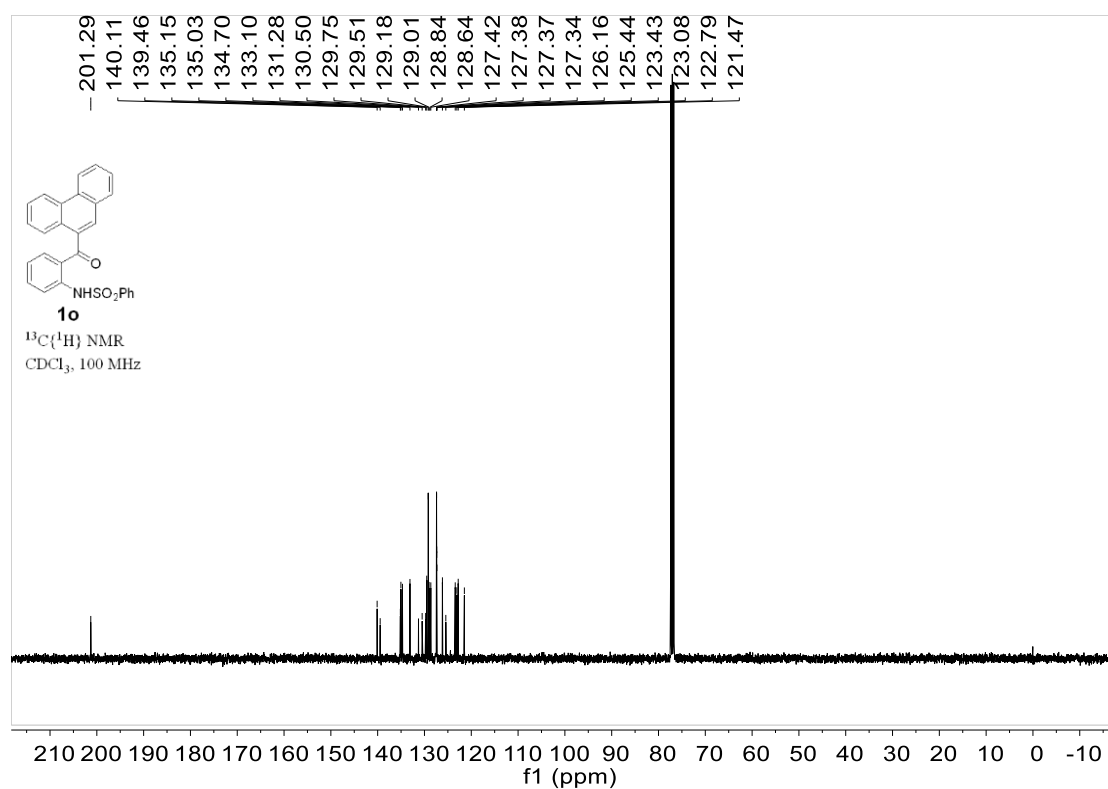
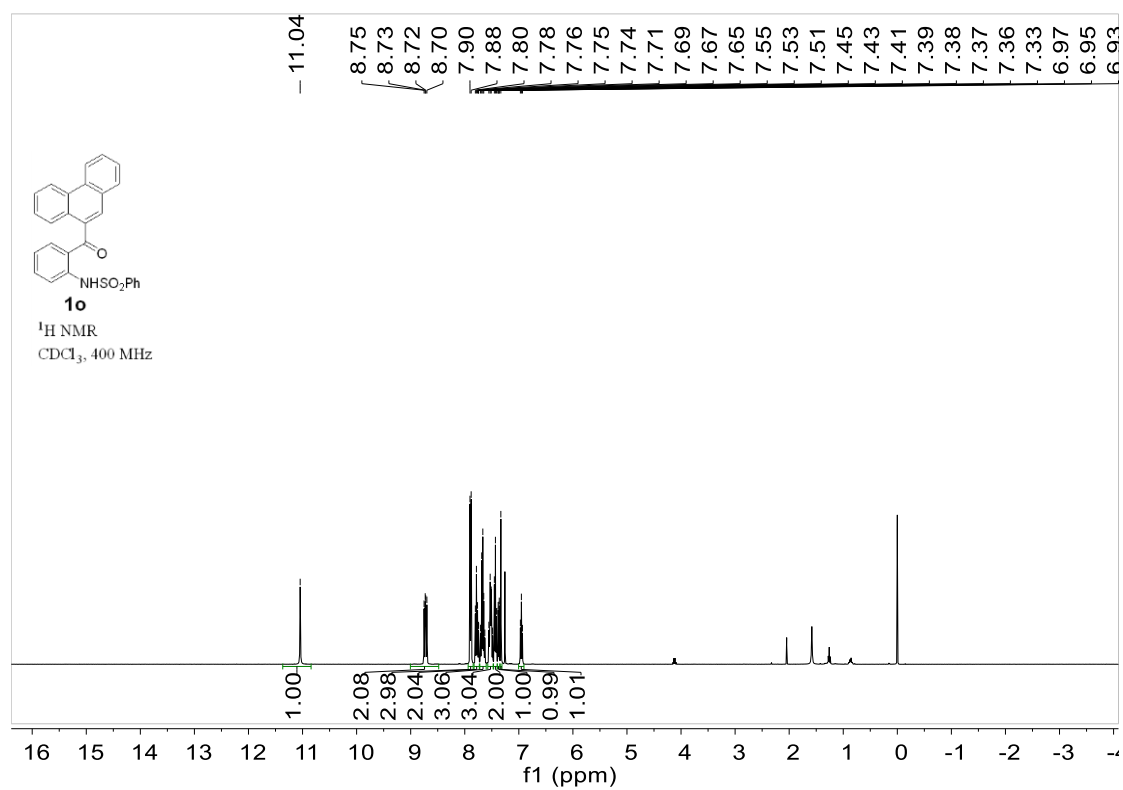


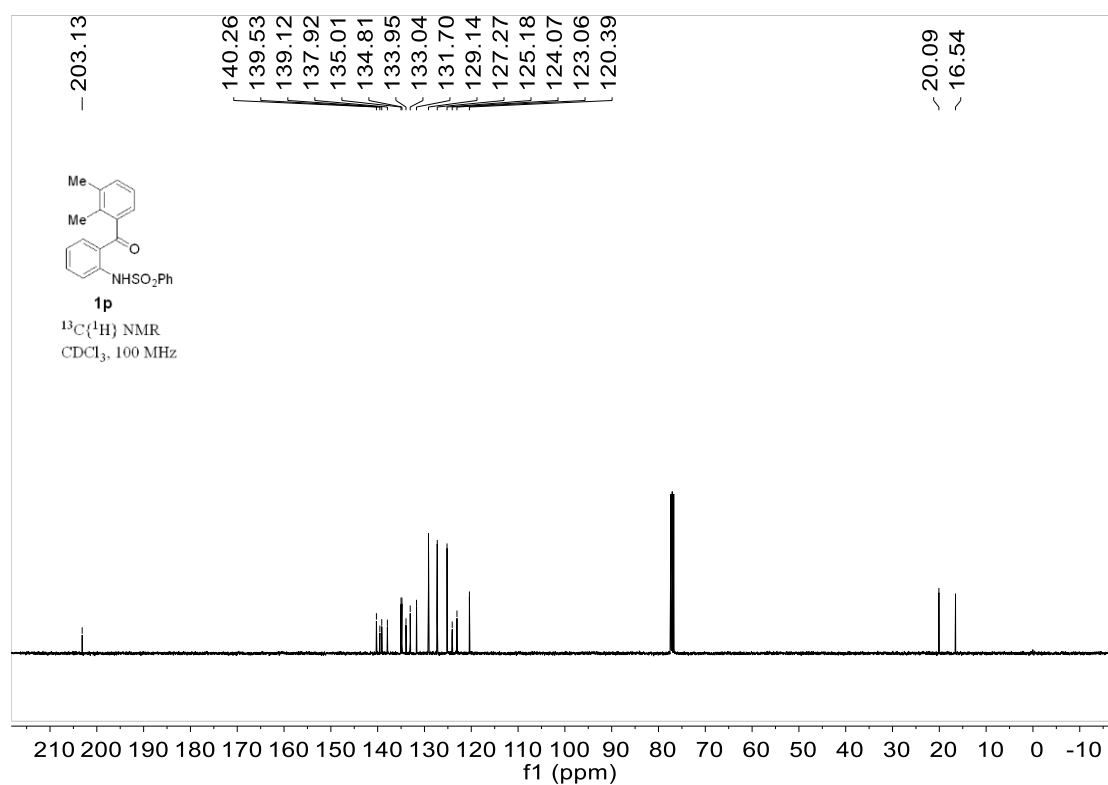
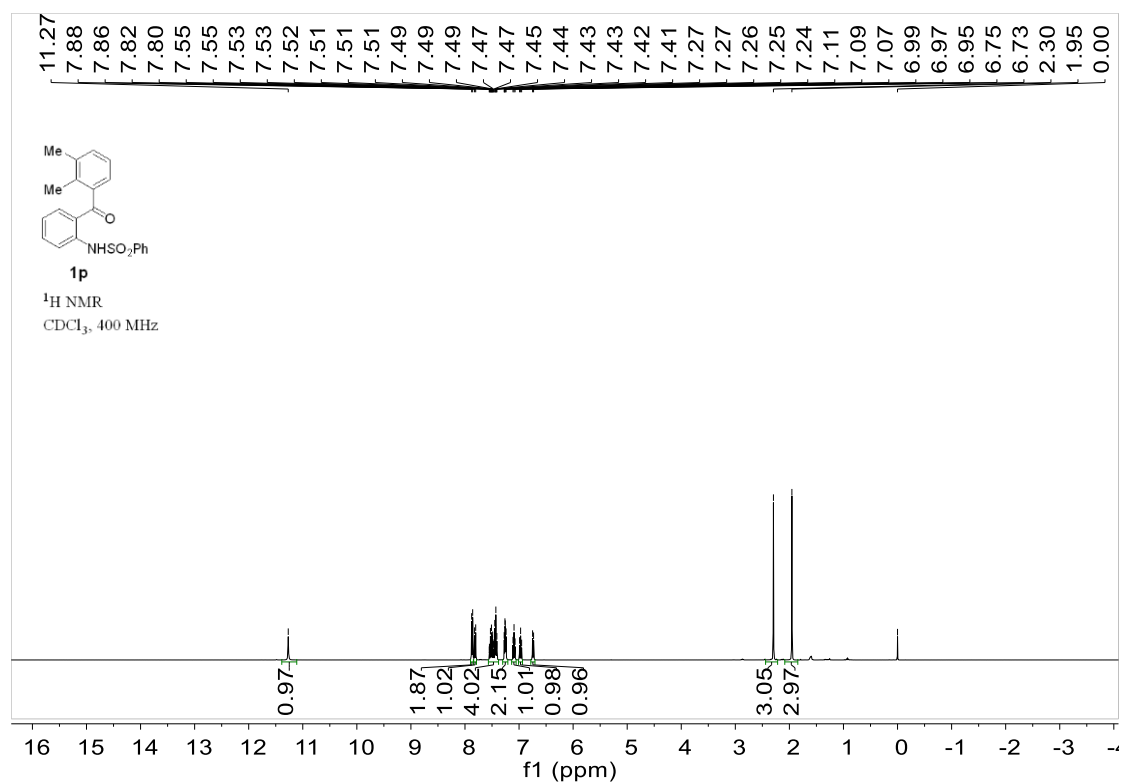


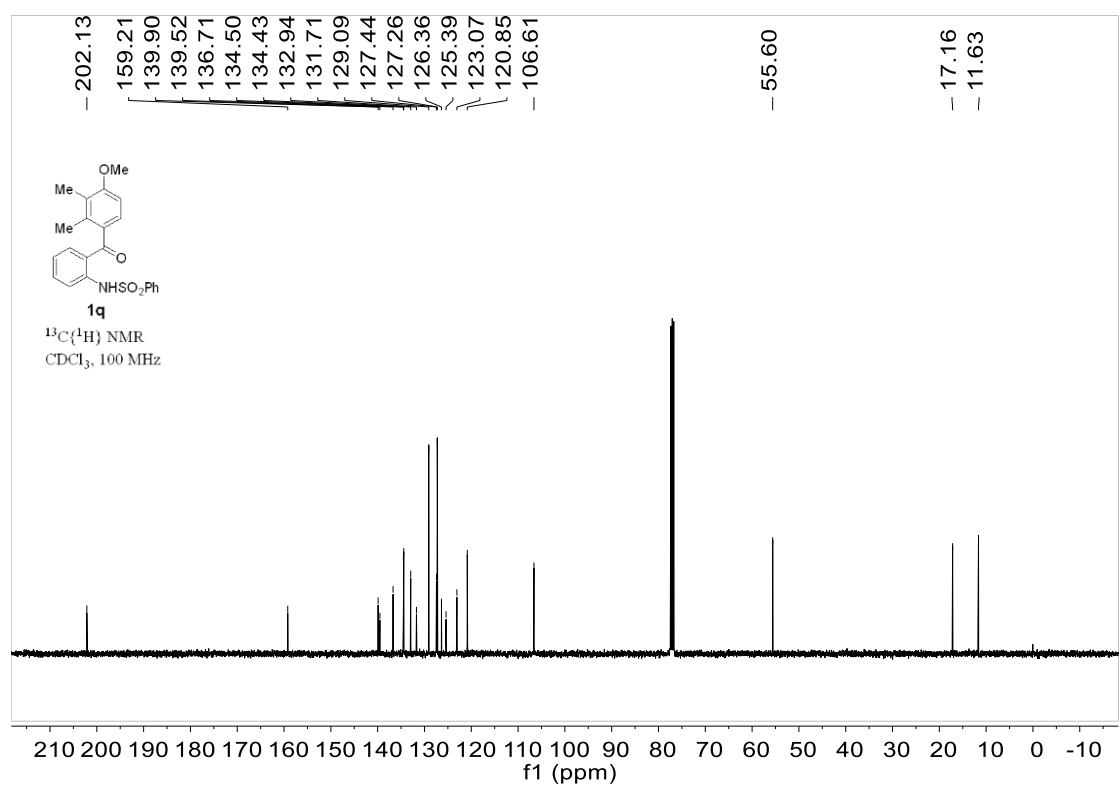
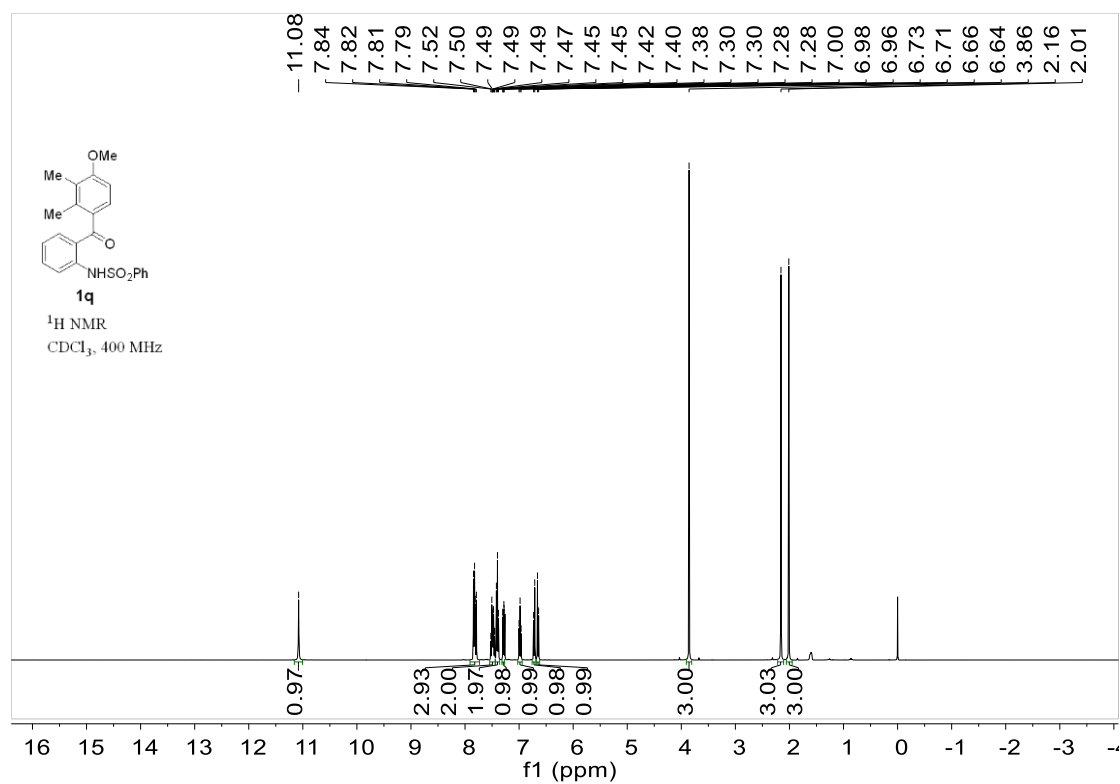


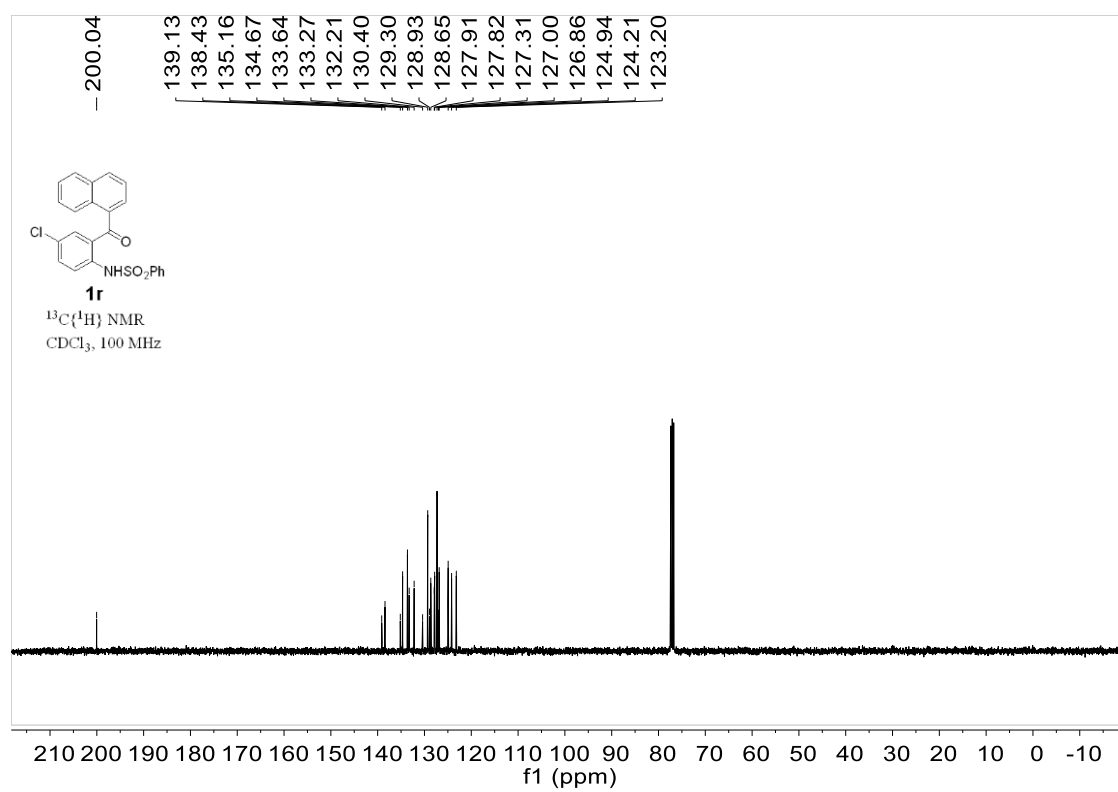
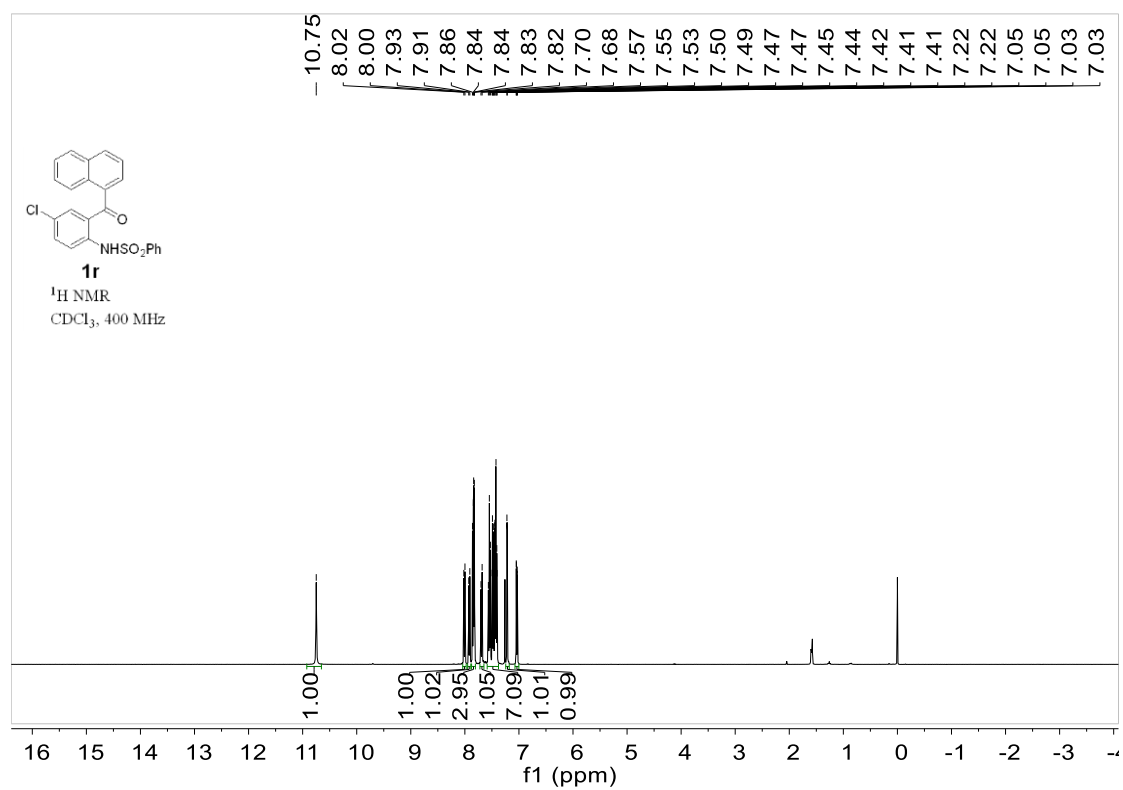


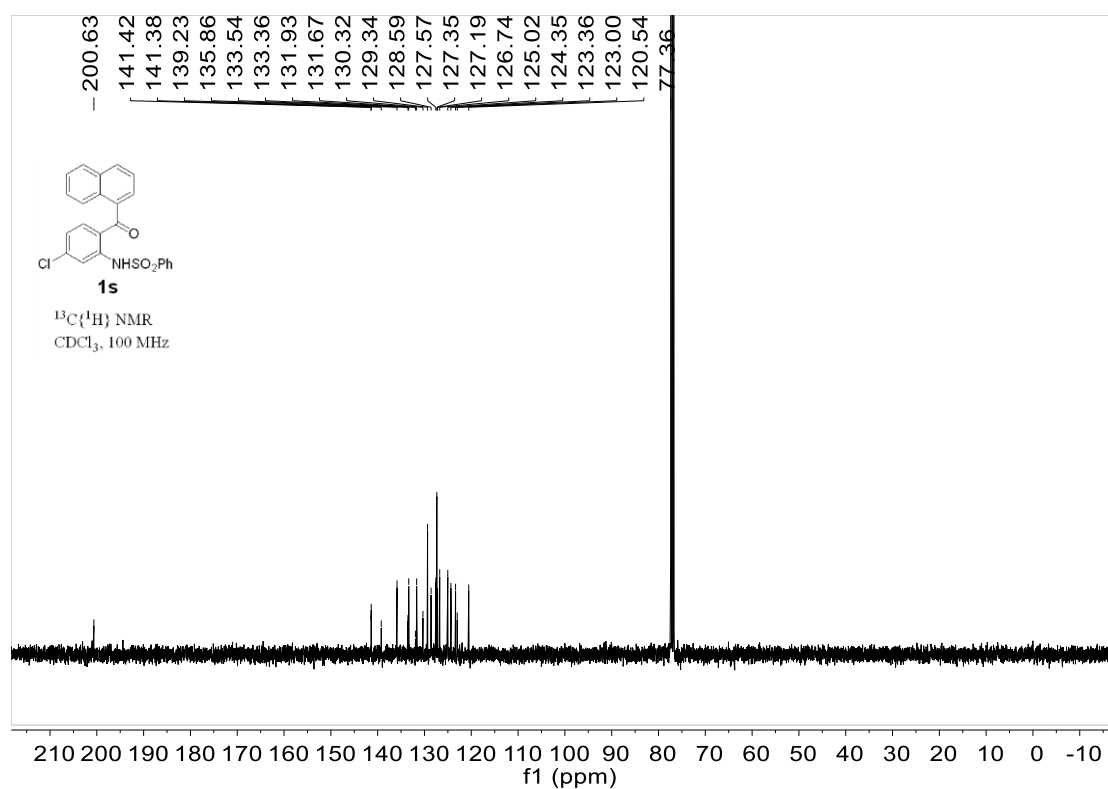
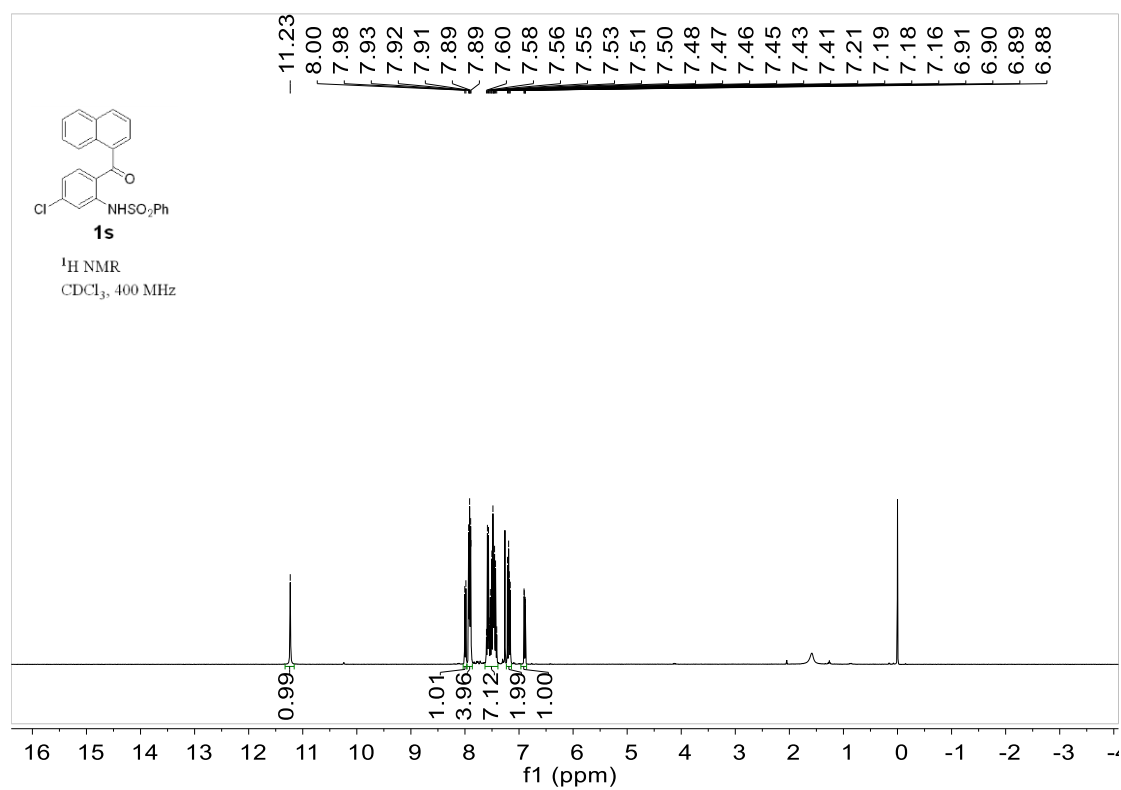




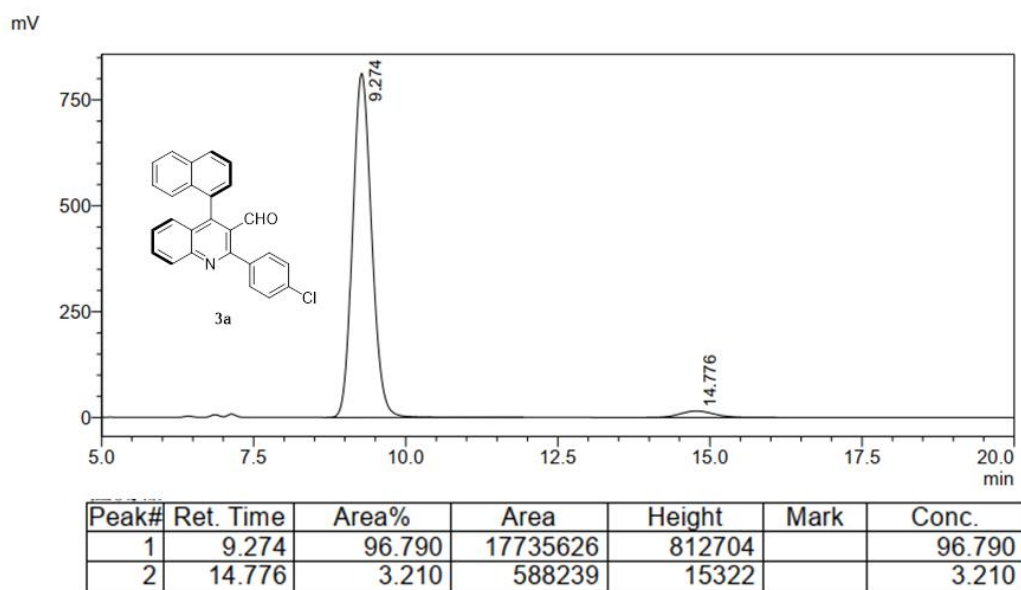
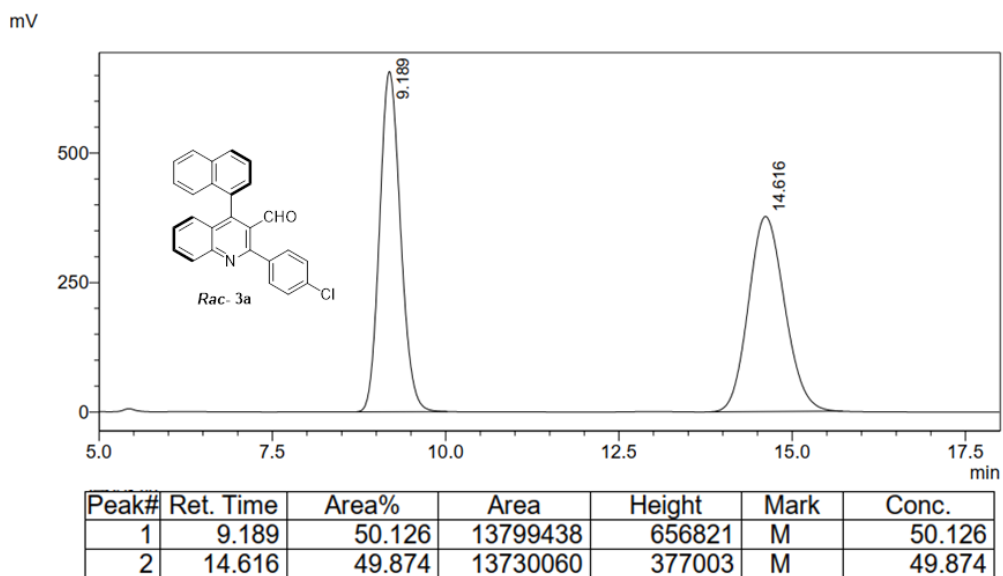


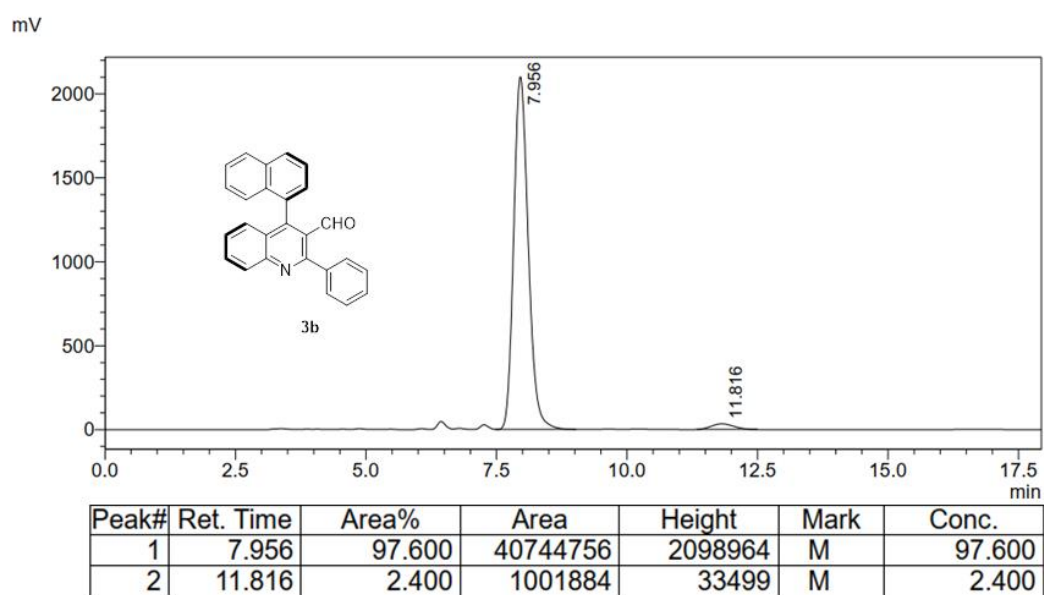
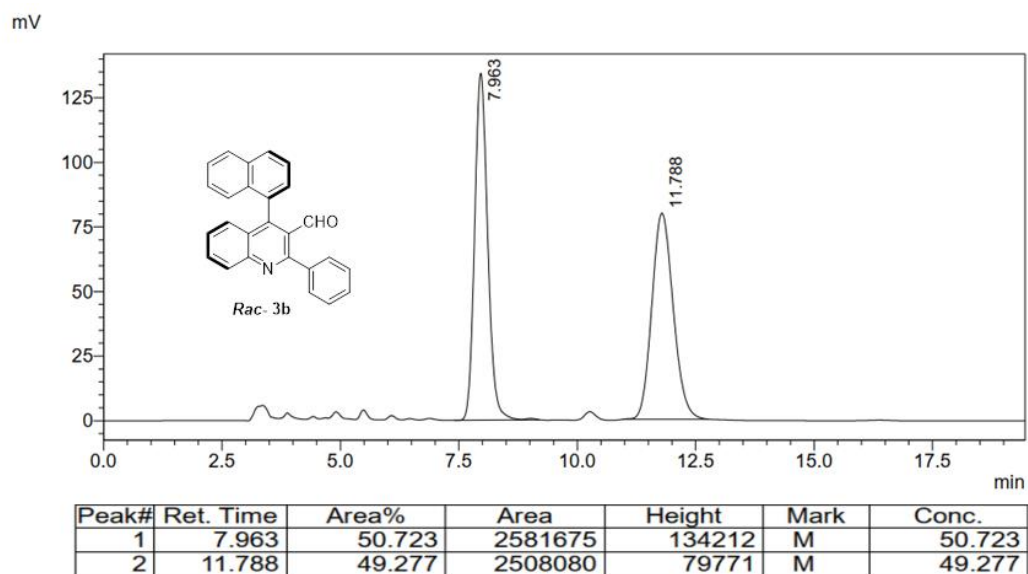




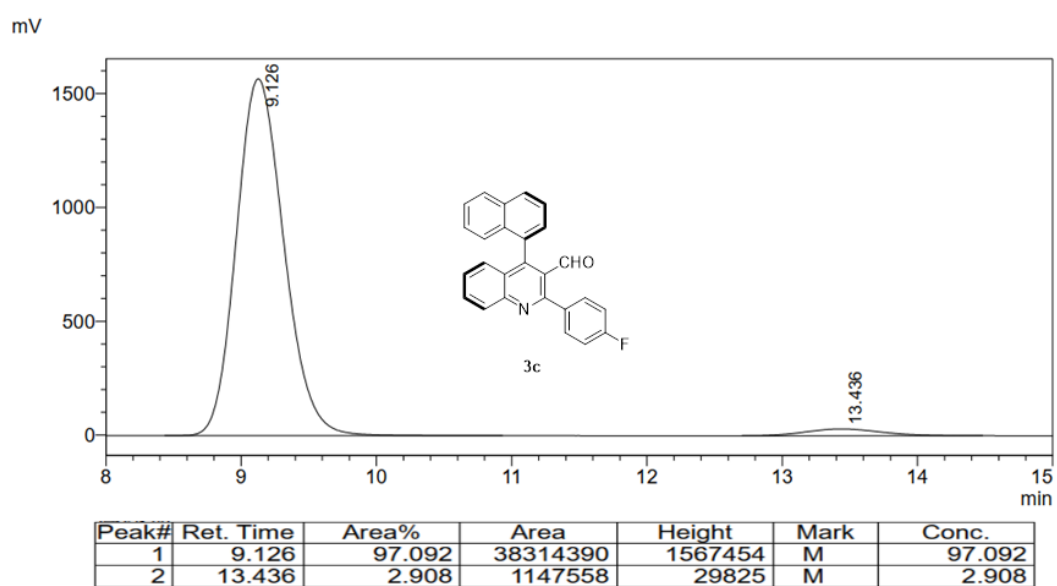
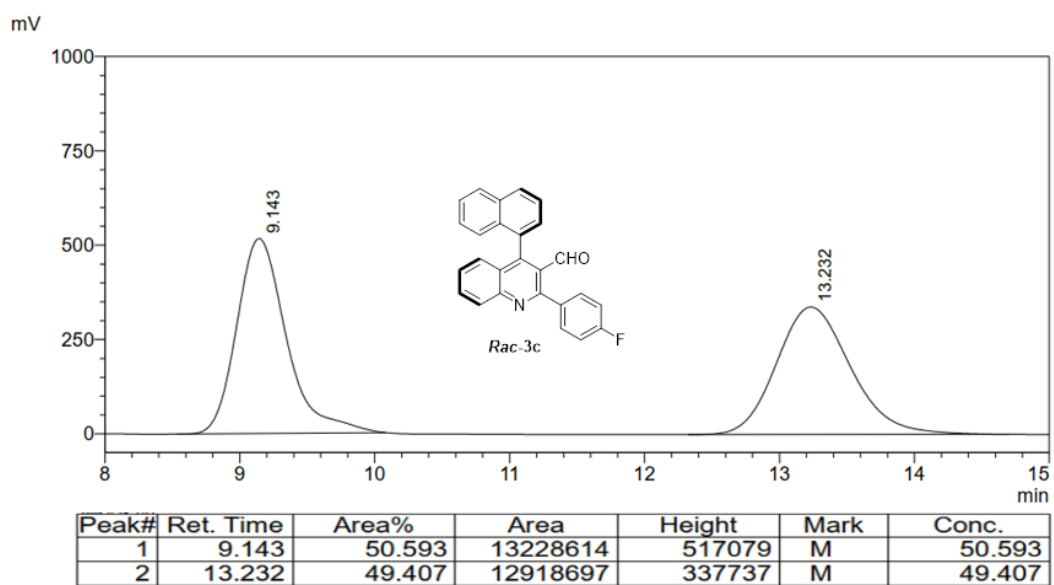


### 3. Chiral HPLC Analysis

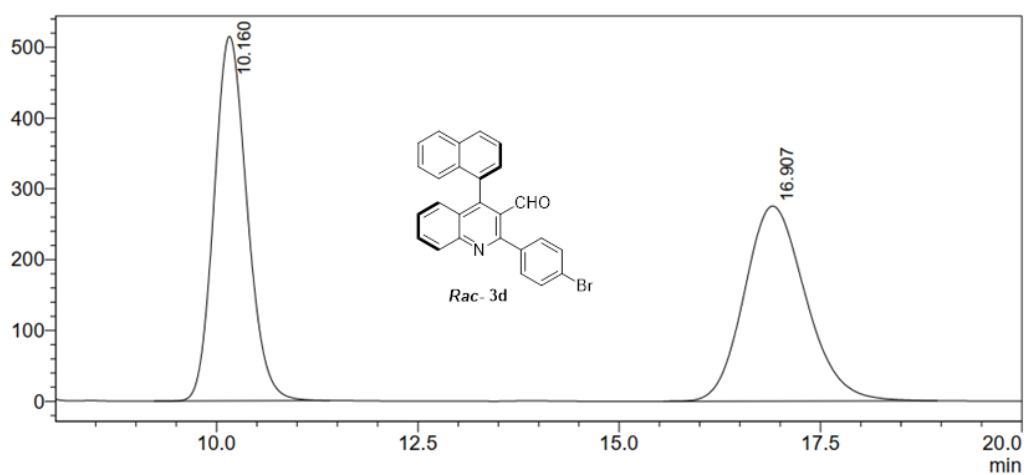






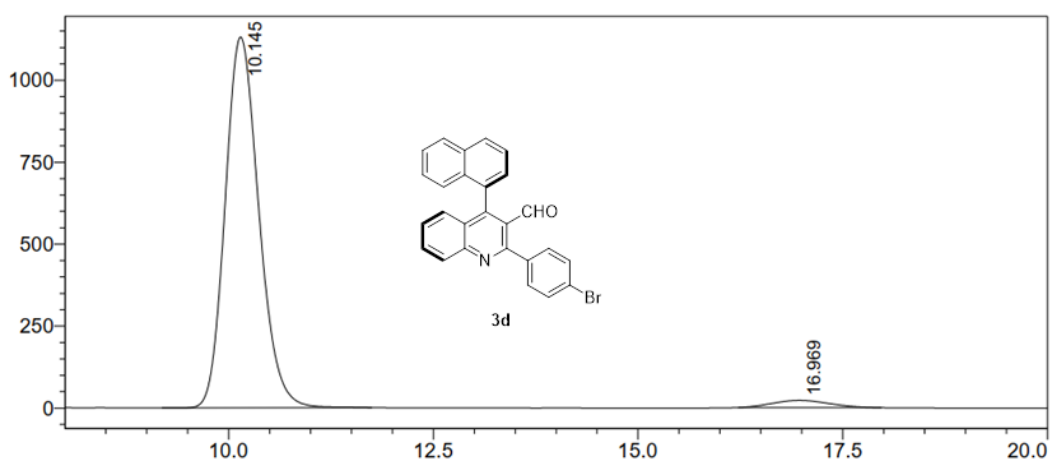


mV

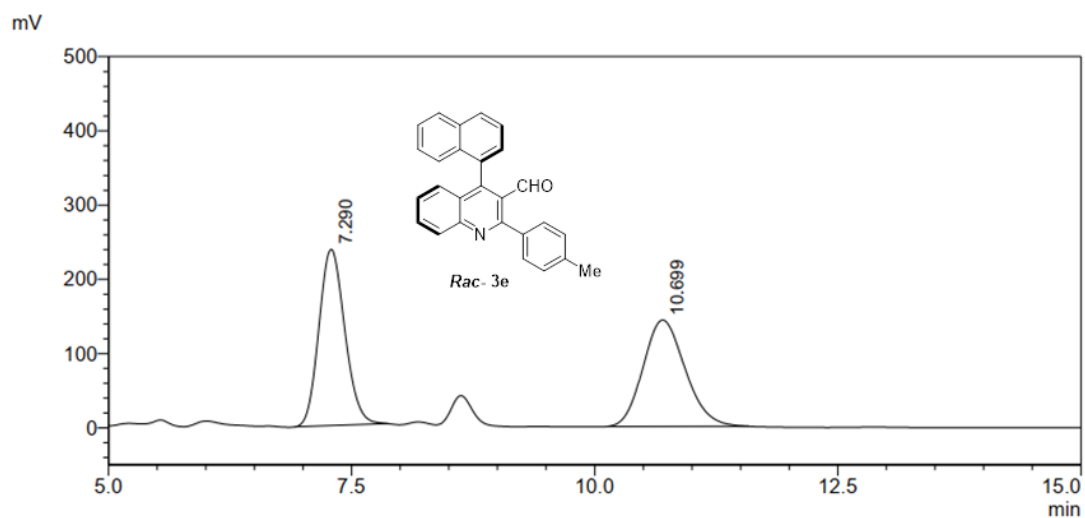


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2	16.907	49.883	14616692	275365	M	49.883

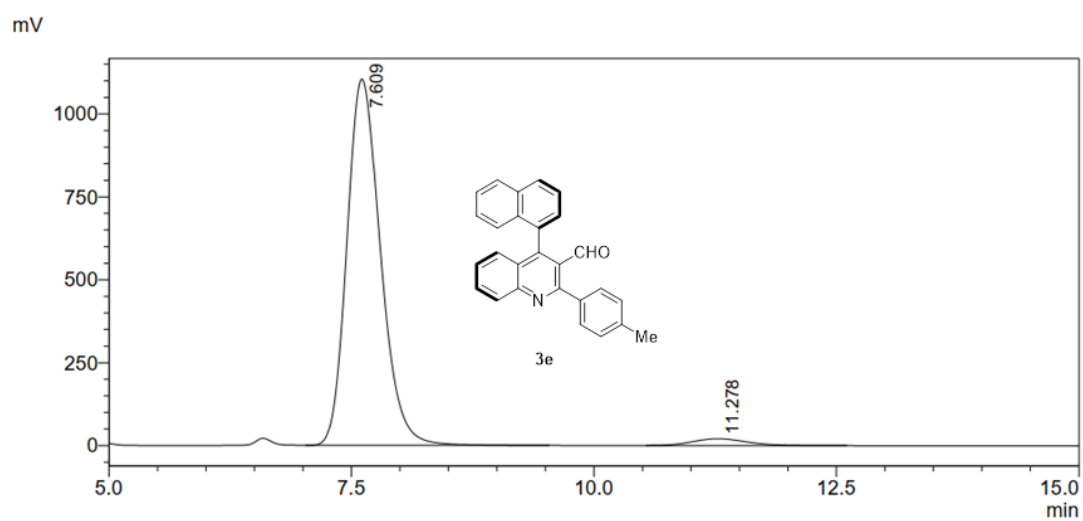
mV



Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	10.145	96.835	32412259	1131108	M	96.835
2	16.969	3.165	1059330	21962	M	3.165

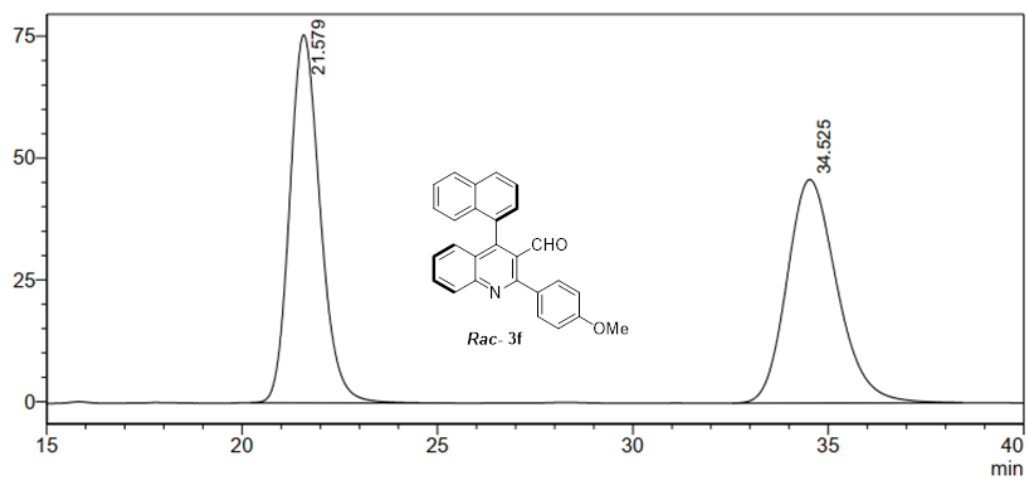


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.290	50.371	4385993	237601	M	50.371
2	10.699	49.629	4321302	143408	M	49.629



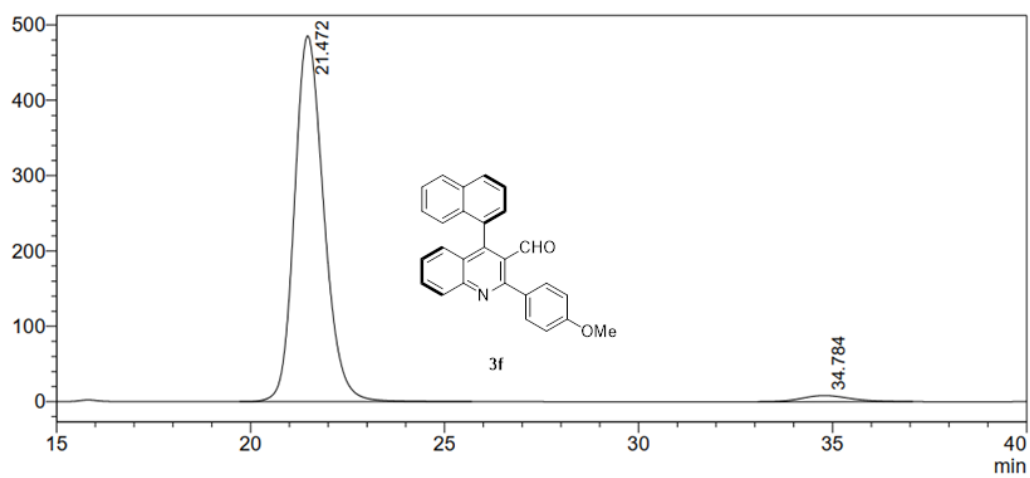
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.609	97.106	26638209	1104344	M	97.106
2	11.278	2.894	793820	20420	M	2.894

mV

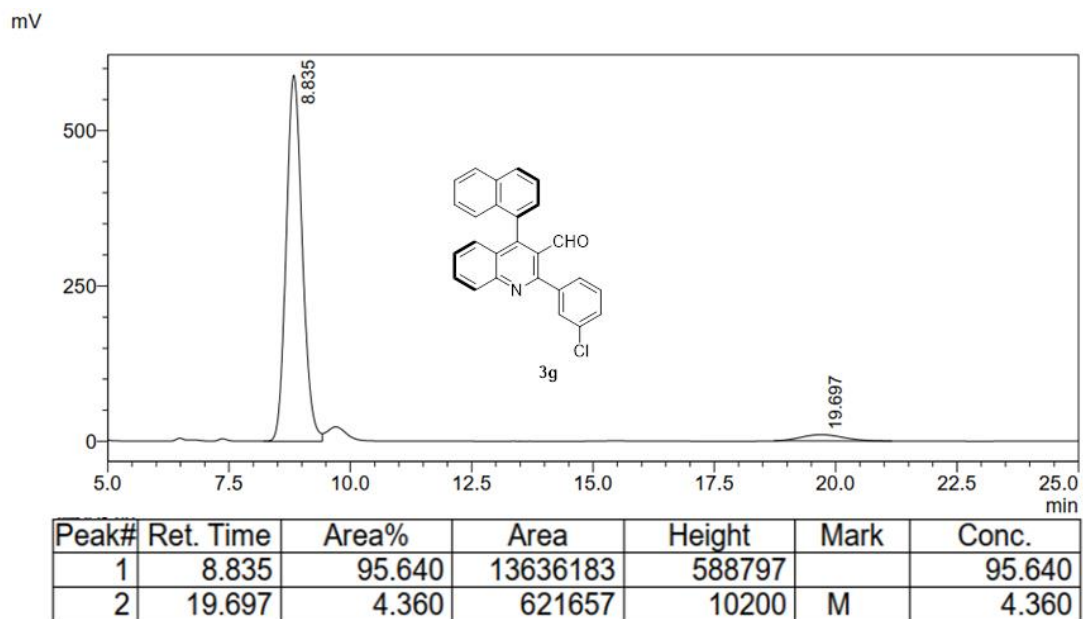
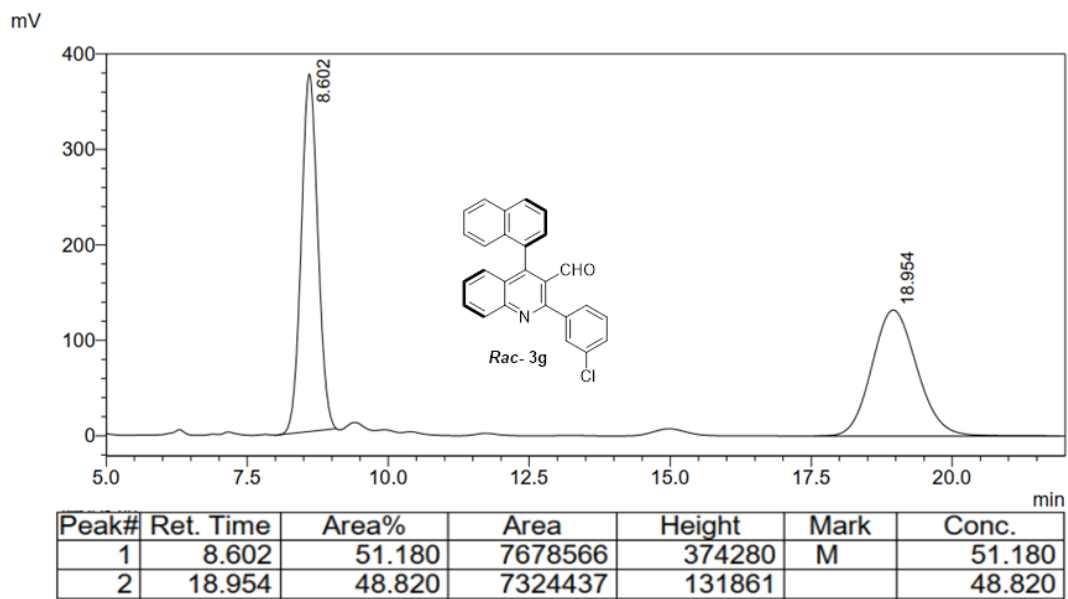


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	21.579	50.088	4099155	75533		50.088
2	34.525	49.912	4084804	45861		49.912

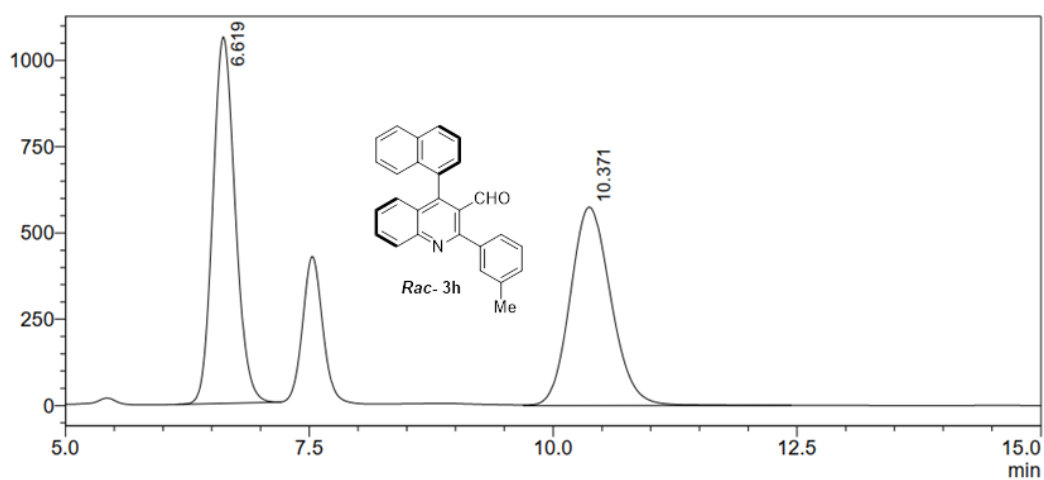
mV



Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	21.472	97.335	25504159	485457		97.335
2	34.784	2.665	698404	8118	M	2.665

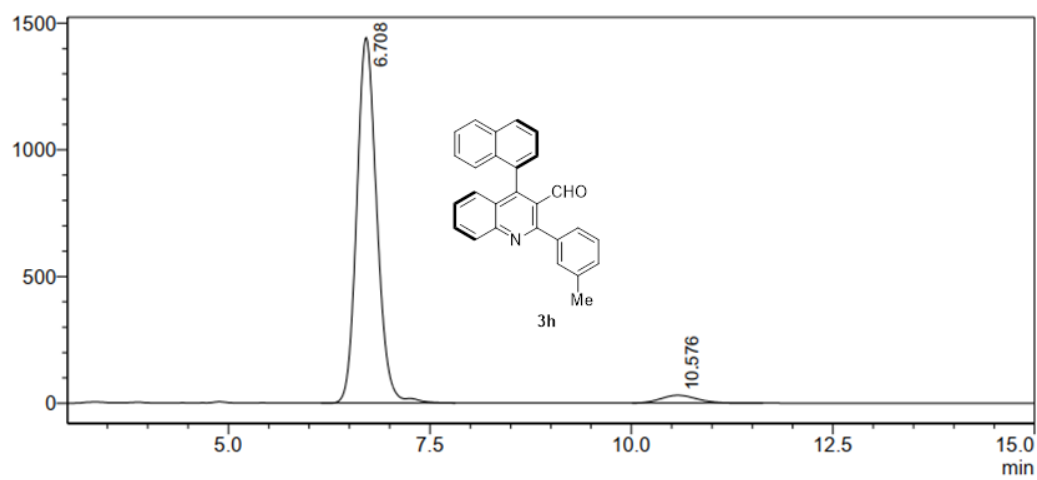


mV



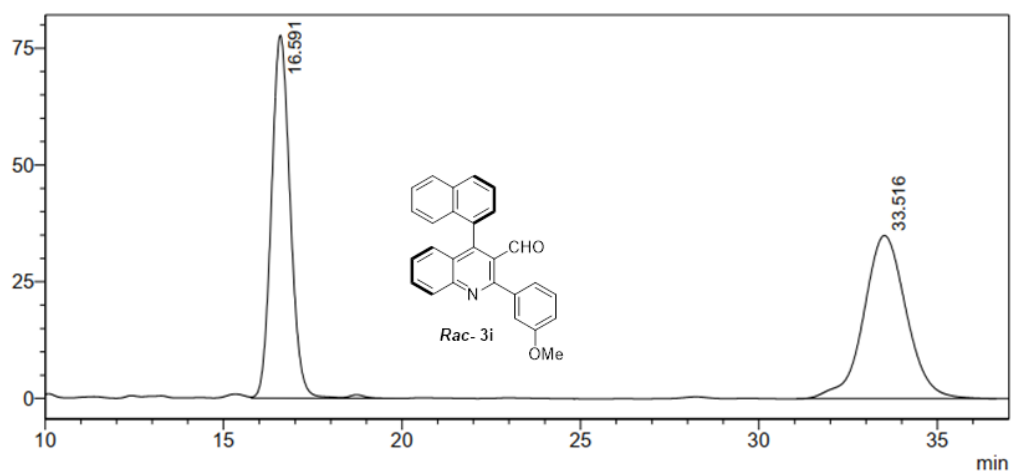
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	6.619	50.409	16967844	1061363	M	50.409
2	10.371	49.591	16692561	574554		49.591

mV



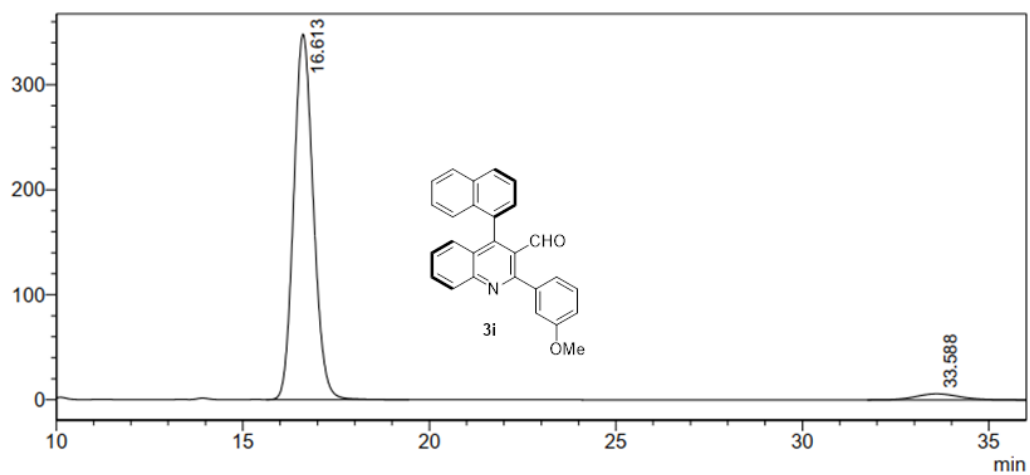
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	6.708	96.313	24918710	1441992	M	96.313
2	10.576	3.687	953831	30590	M	3.687

mV



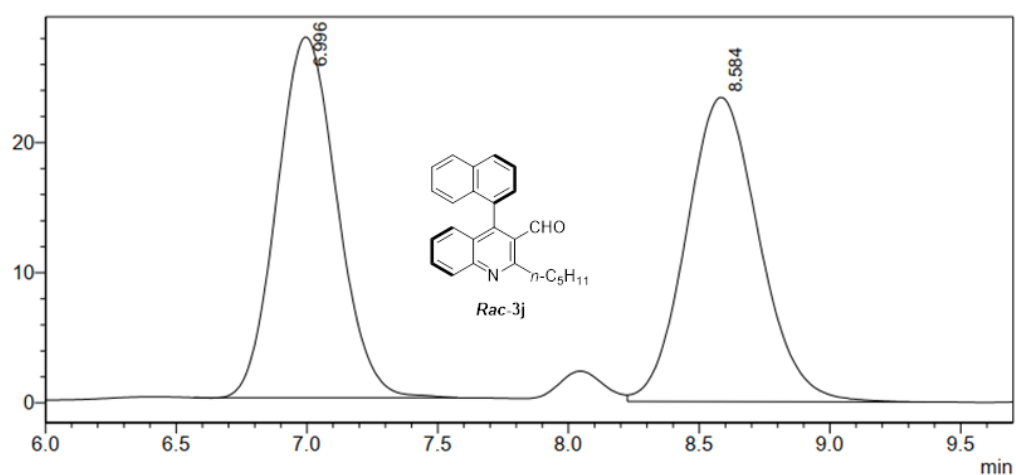
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	16.591	49.599	2859522	77699		49.599
2	33.516	50.401	2905753	34947		50.401

mV



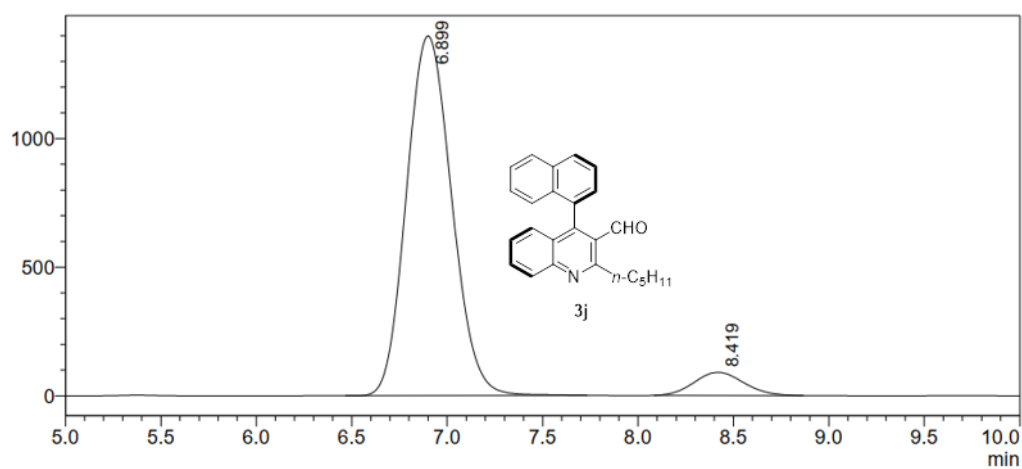
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	16.613	96.509	12749320	348124		96.509
2	33.588	3.491	461218	5708		3.491

mV



Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	6.996	49.495	443453	27690	M	49.495
2	8.584	50.505	452497	23368		50.505

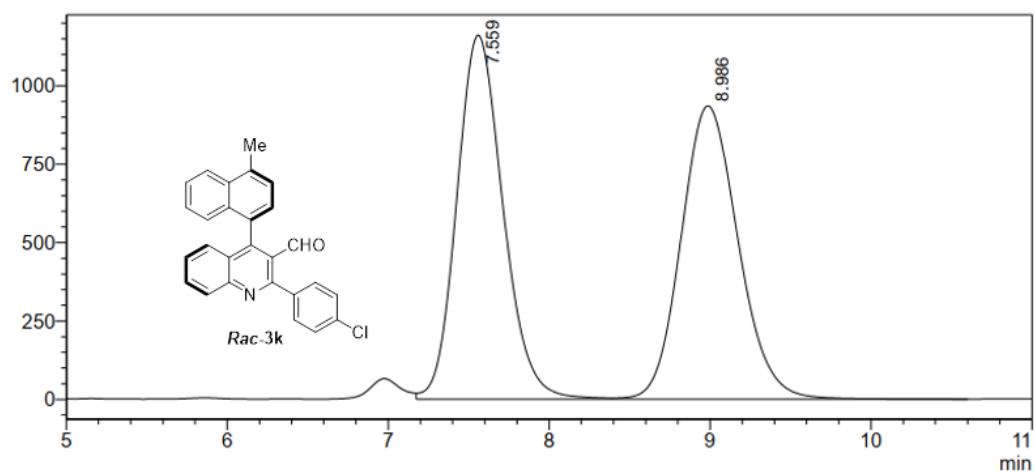
mV



Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	6.899	93.381	23007099	1398382	M	93.381
2	8.419	6.619	1630768	89893	M	6.619

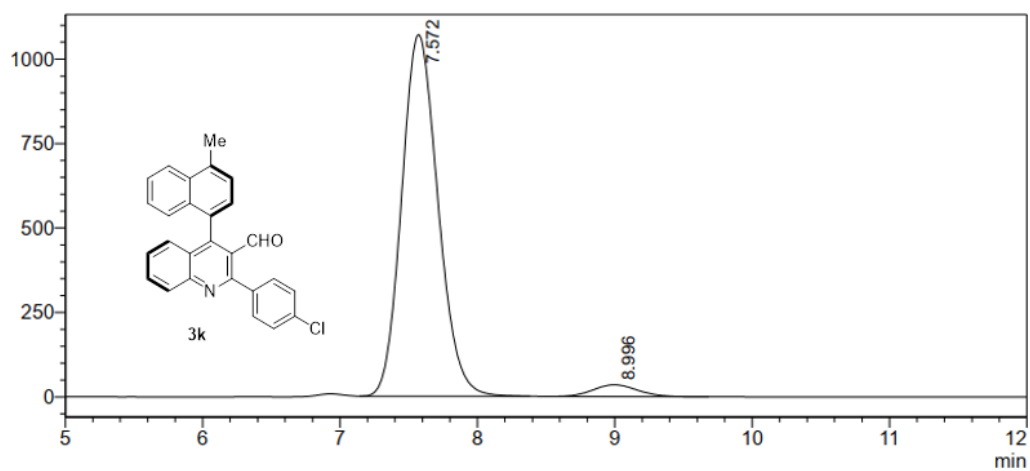


mV



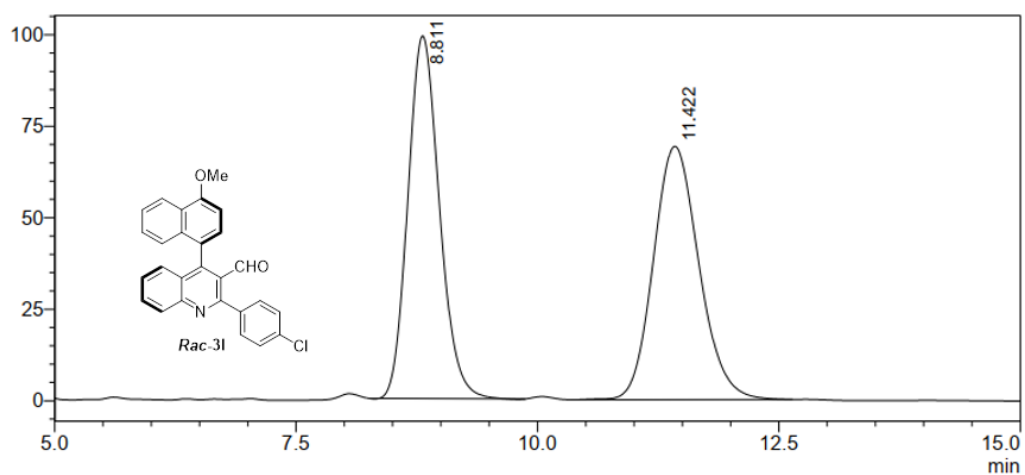
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.559	50.080	23219823	1161670		50.080
2	8.986	49.920	23145398	935782	V	49.920

mV



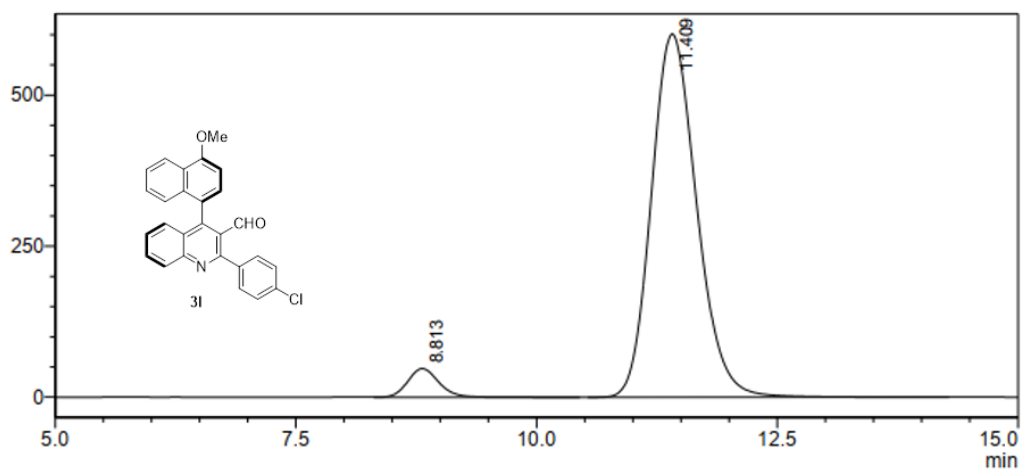
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.572	96.142	19716931	1070066	M	96.142
2	8.996	3.858	791109	35051	M	3.858

mV



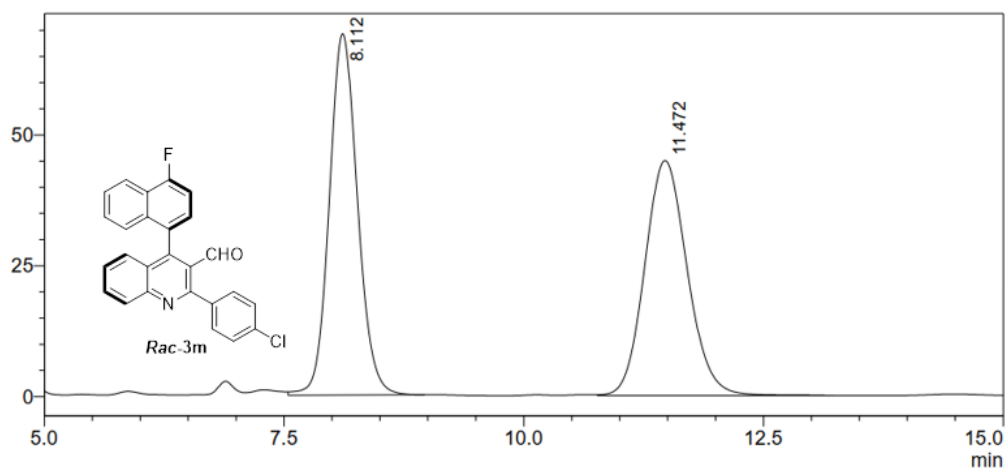
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	8.811	49.823	2254425	99115	M	49.823
2	11.422	50.177	2270434	69226		50.177

mV



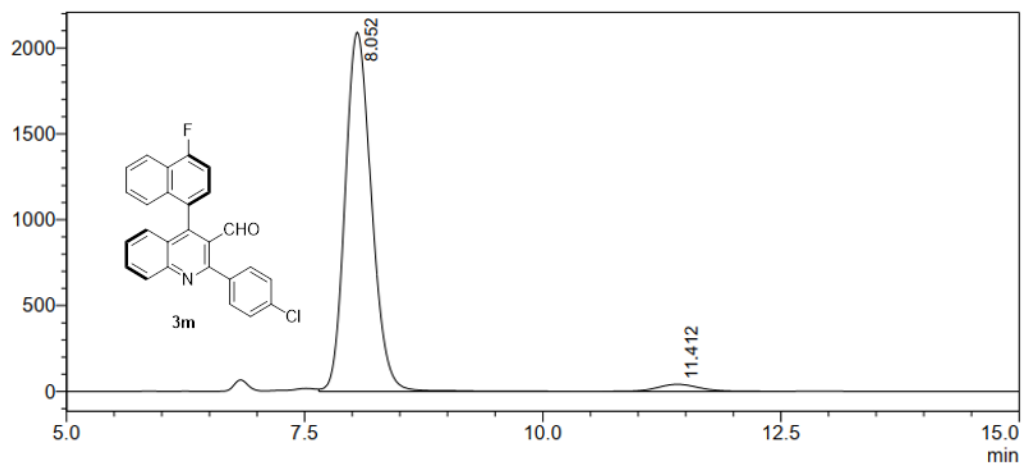
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	8.813	5.150	1069144	47368		5.150
2	11.409	94.850	19690201	601201		94.850

mV



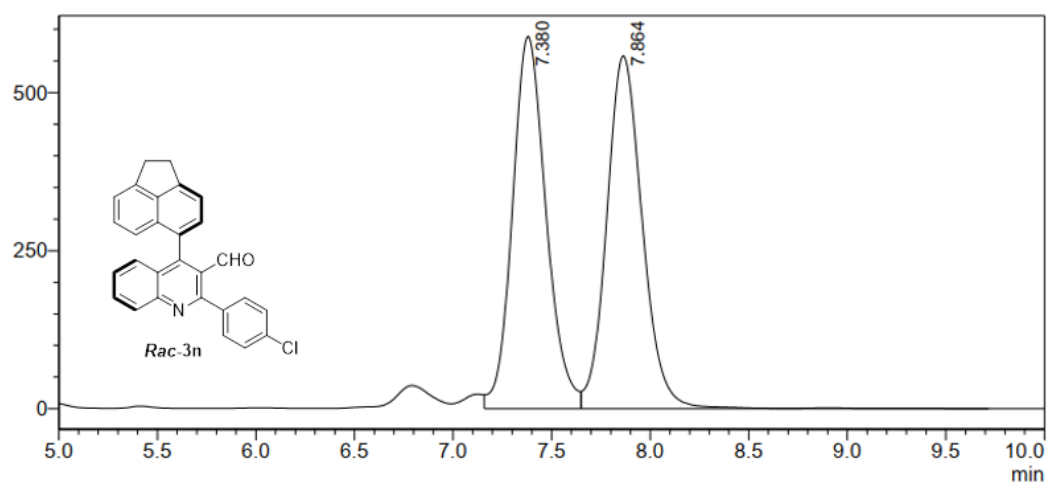
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	8.112	50.480	1414237	69026		50.480
2	11.472	49.520	1387352	44932	S	49.520

mV



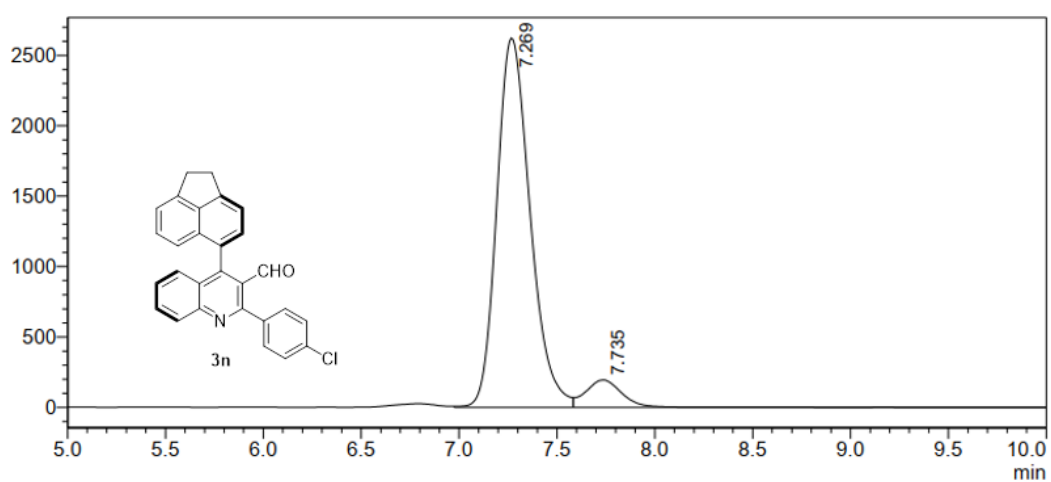
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	8.052	97.085	40253660	2091278		97.085
2	11.412	2.915	1208423	41036		2.915

mV

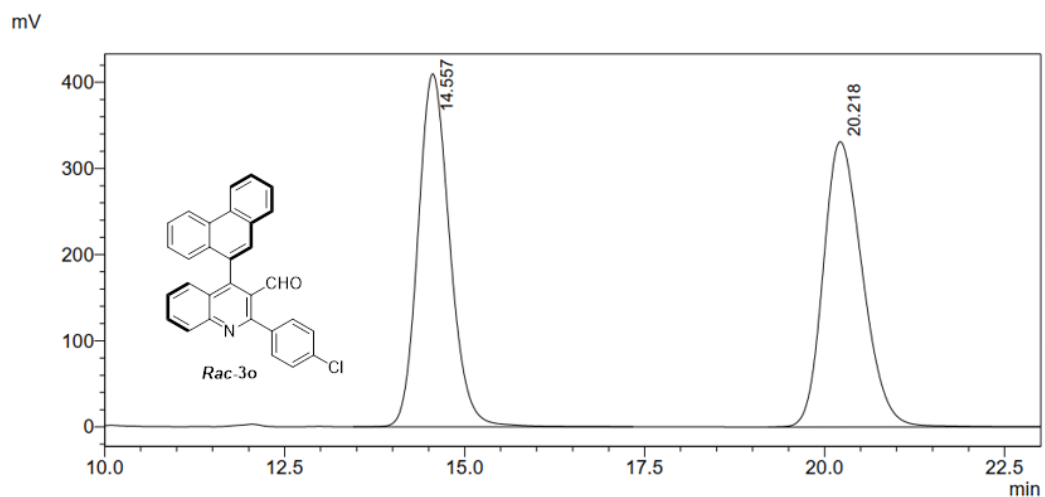


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.380	49.843	6996728	588362		49.843
2	7.864	50.157	7040676	557791	V	50.157

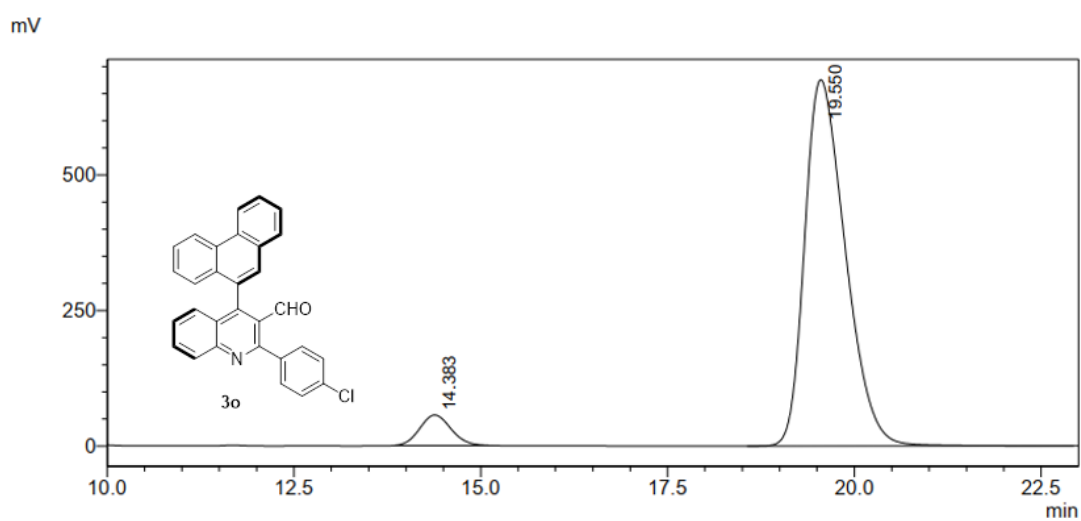
mV



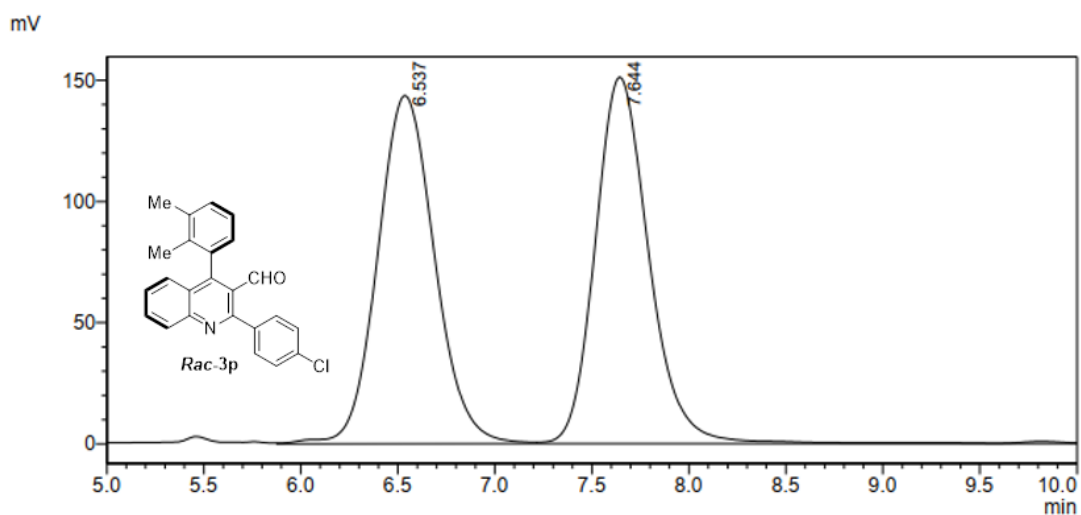
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.269	92.474	31056388	2622517		92.474
2	7.735	7.526	2527606	193941	V	7.526



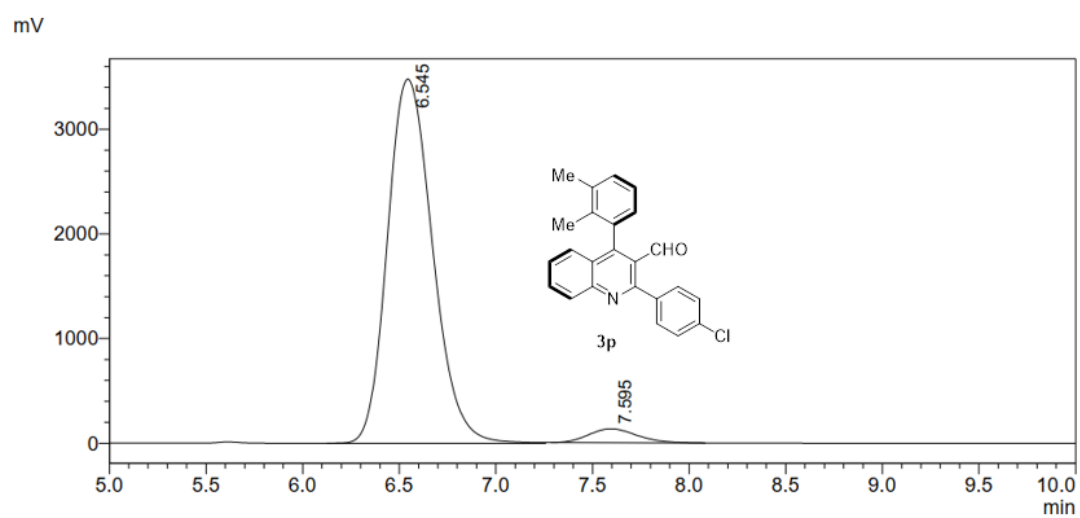
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	14.557	49.944	12555082	409893		49.944
2	20.218	50.056	12583281	331254		50.056



Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	14.383	6.023	1640175	56239	M	6.023
2	19.550	93.977	25589710	675460		93.977

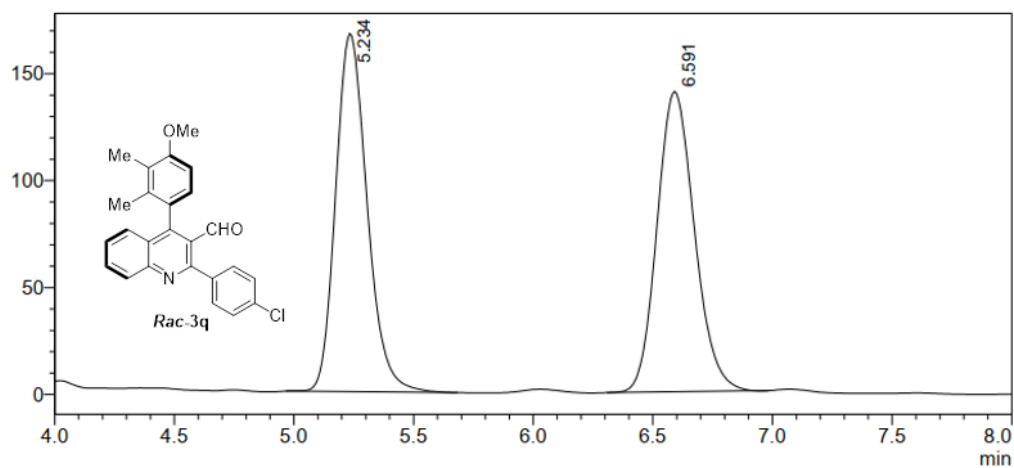


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	6.537	49.941	2940270	143610		49.941
2	7.644	50.059	2947171	151252	V	50.059



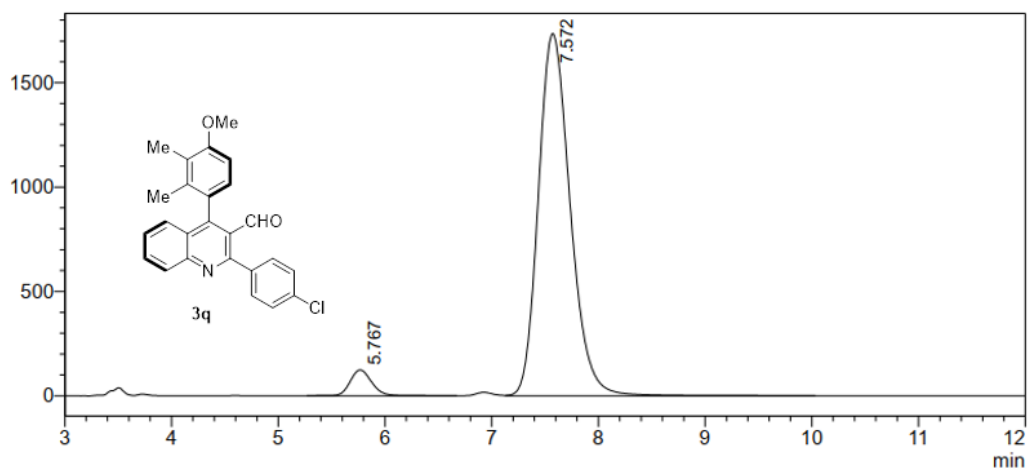
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	6.545	96.068	56597543	3479406		96.068
2	7.595	3.932	2316685	133230	M	3.932

mV



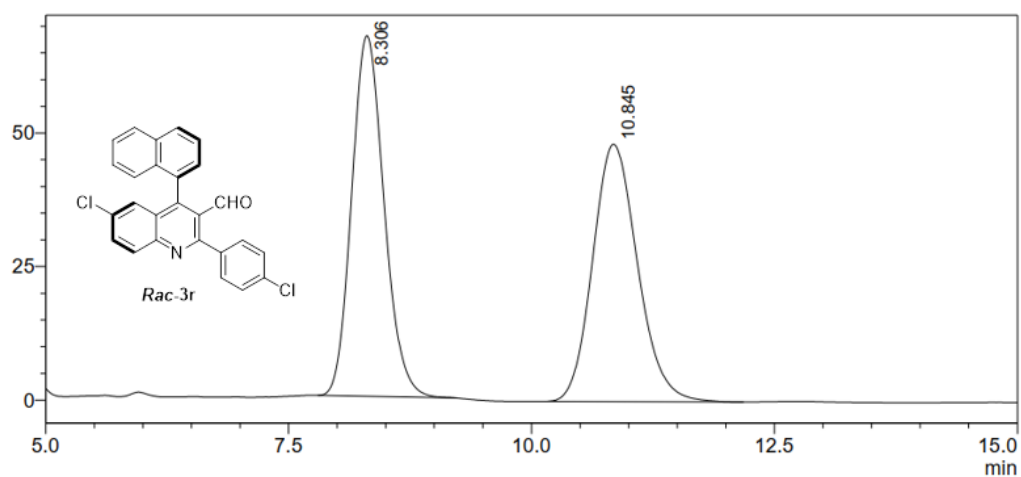
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	5.234	50.055	1531036	167417	M	50.055
2	6.591	49.945	1527674	140393	M	49.945

mV



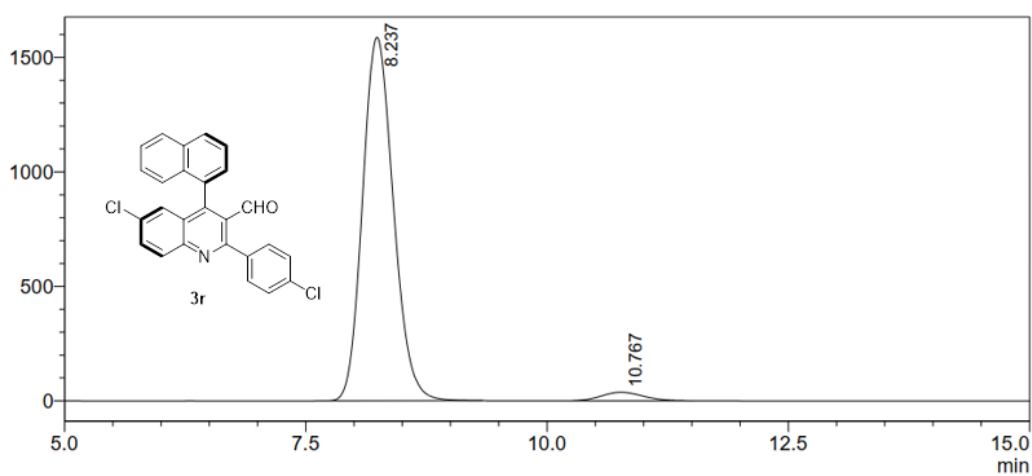
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	5.767	4.744	1787908	124903	S	4.744
2	7.572	95.256	35903059	1734820		95.256

mV



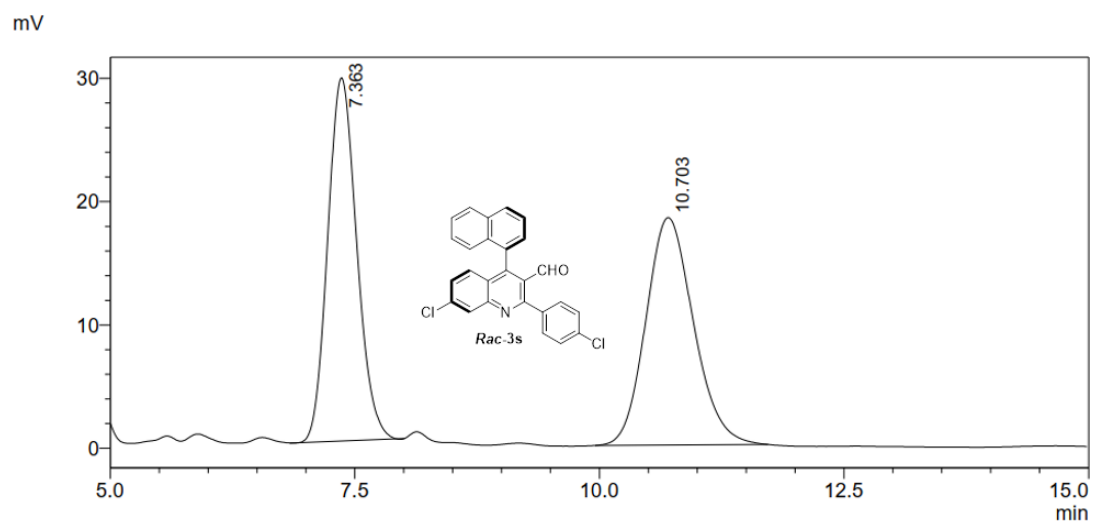
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	8.306	50.272	1569270	67520	M	50.272
2	10.845	49.728	1552308	48210		49.728

mV

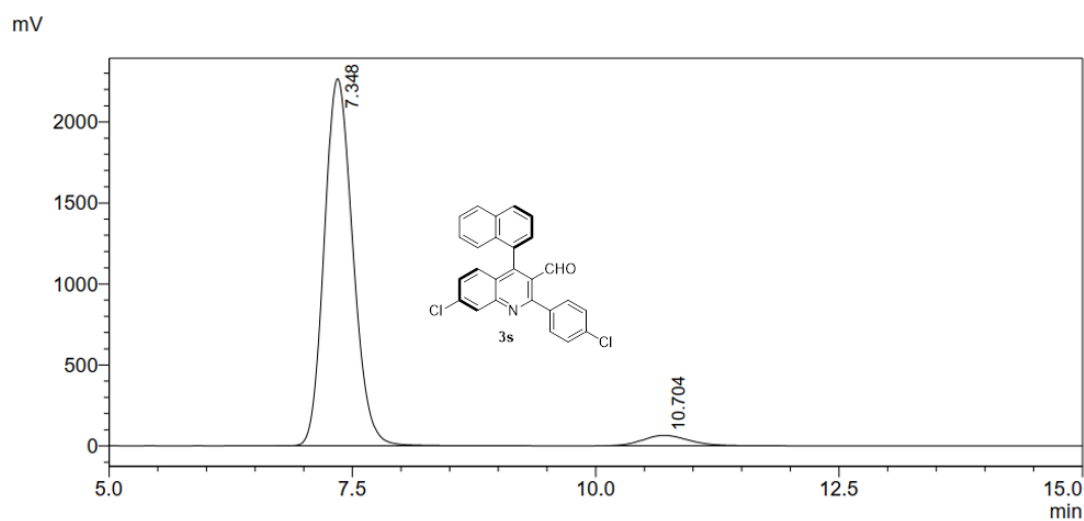


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	8.237	96.976	35313190	1587344	M	96.976
2	10.767	3.024	1100985	36996	M	3.024

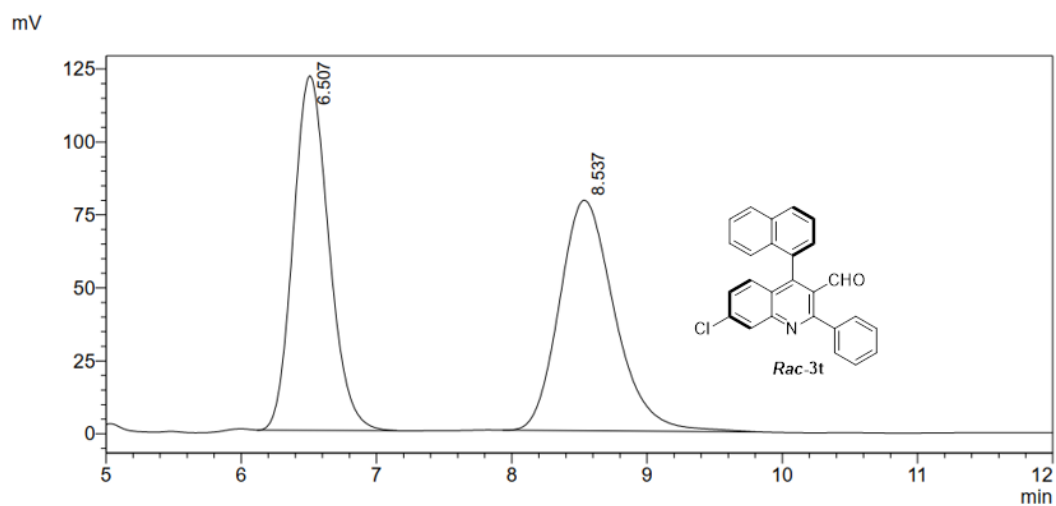




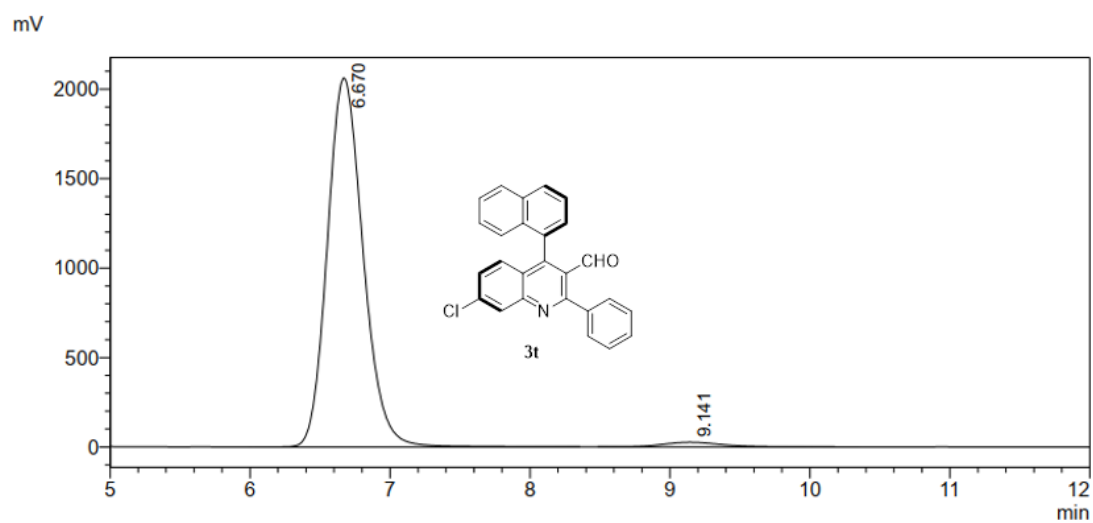
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.363	49.288	607554	29445	M	49.288
2	10.703	50.712	625095	18447	M	50.712



Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.348	95.599	46223528	2265935	M	95.599
2	10.704	4.401	2128185	64459	M	4.401

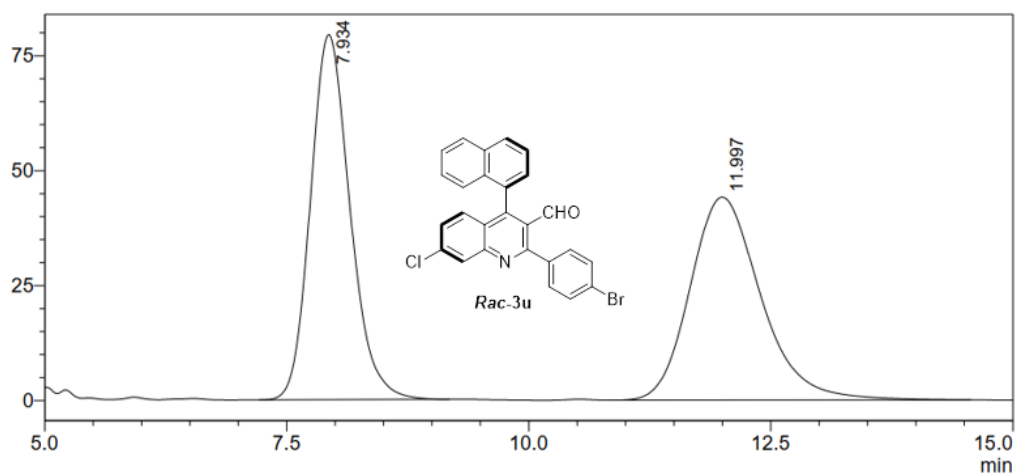


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	6.507	49.754	2218275	121475	M	49.754
2	8.537	50.246	2240235	78950	M	50.246



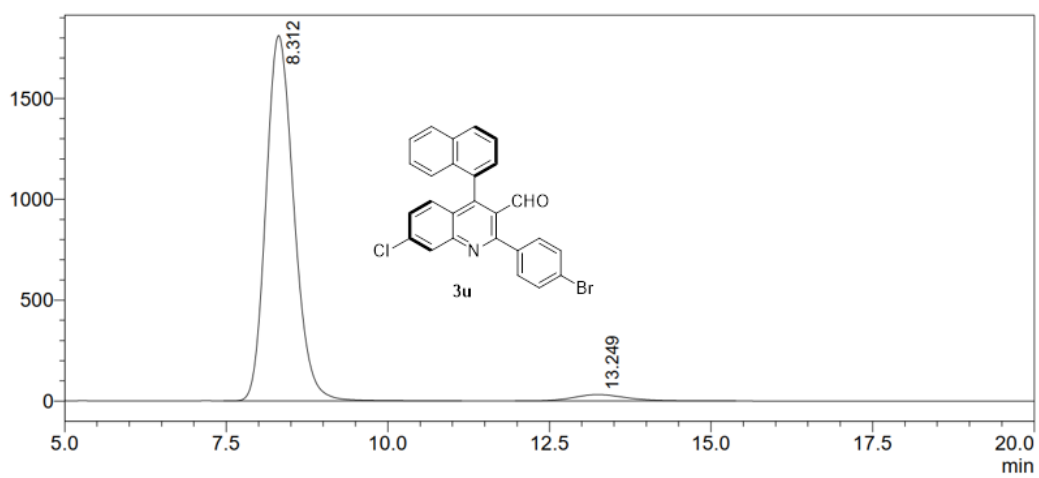
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	6.670	98.003	36663338	2061199	M	98.003
2	9.141	1.997	747053	25702	M	1.997

mV

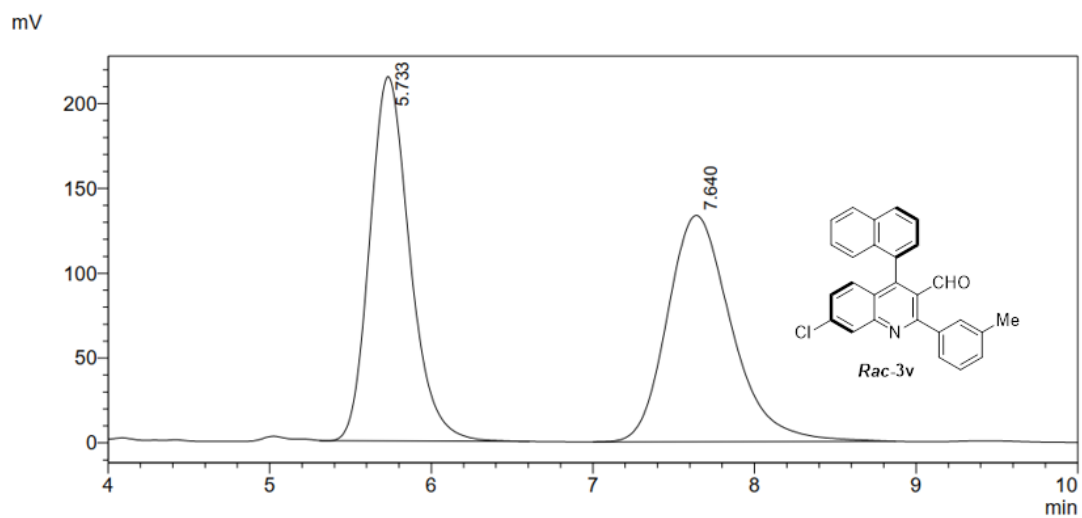


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.934	50.152	2260245	79393		50.152
2	11.997	49.848	2246587	44159		49.848

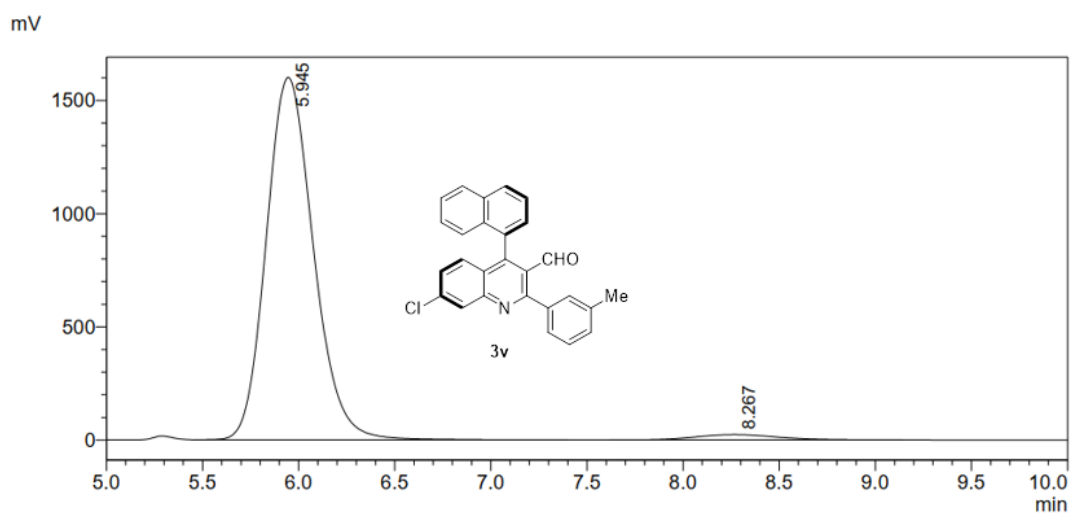
mV



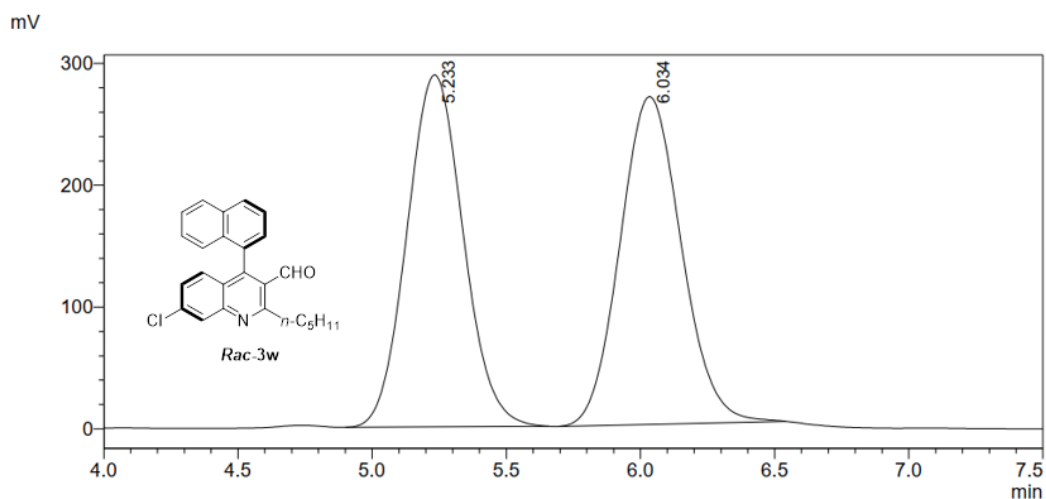
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	8.312	96.800	54306029	1810992	M	96.800
2	13.249	3.200	1795088	31396	M	3.200



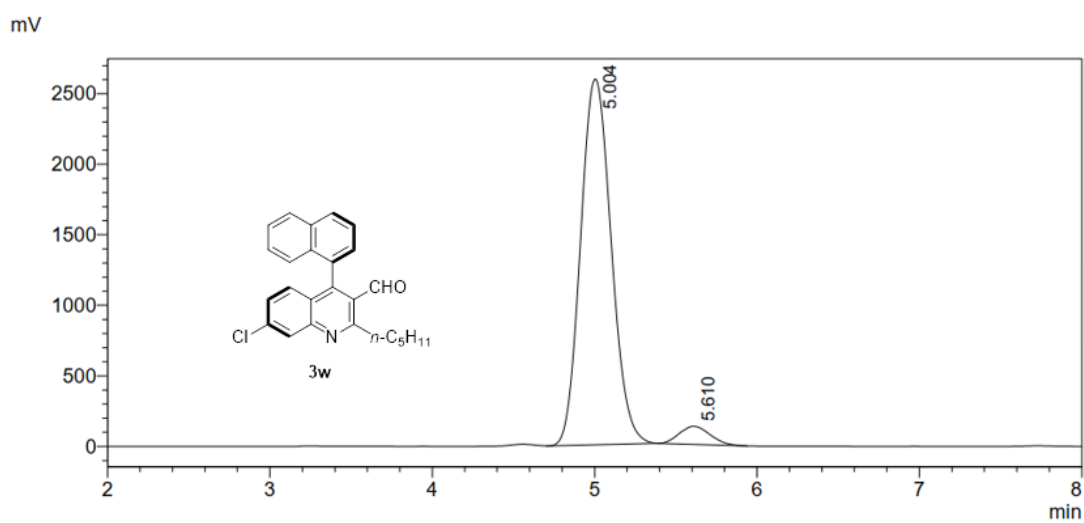
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	5.733	50.161	3701635	214748	M	50.161
2	7.640	49.839	3677833	133402	M	49.839



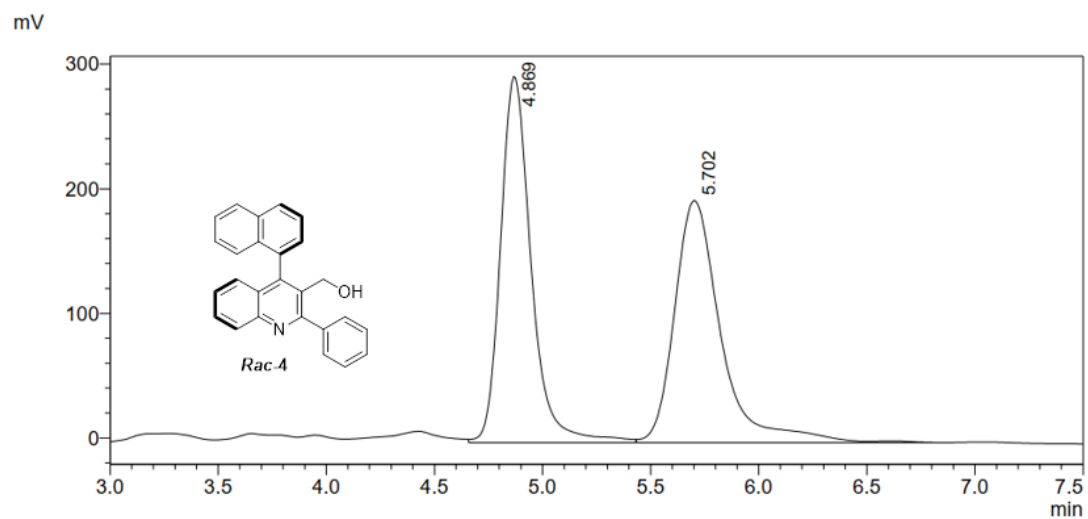
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	5.945	97.498	27313608	1600613	M	97.498
2	8.267	2.502	700887	23440	M	2.502



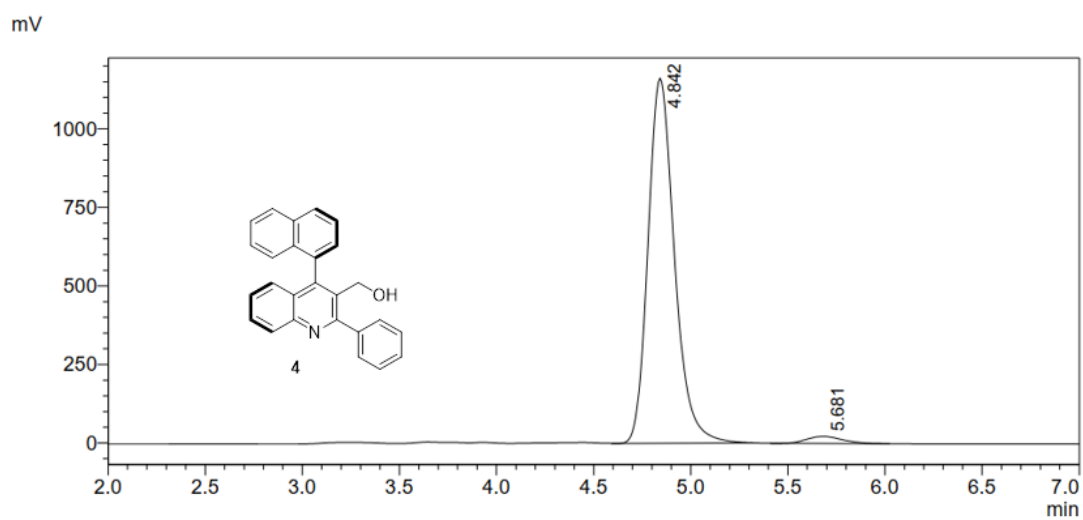
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	5.233	49.612	4215130	289192	M	49.612
2	6.034	50.388	4281141	269192	M	50.388



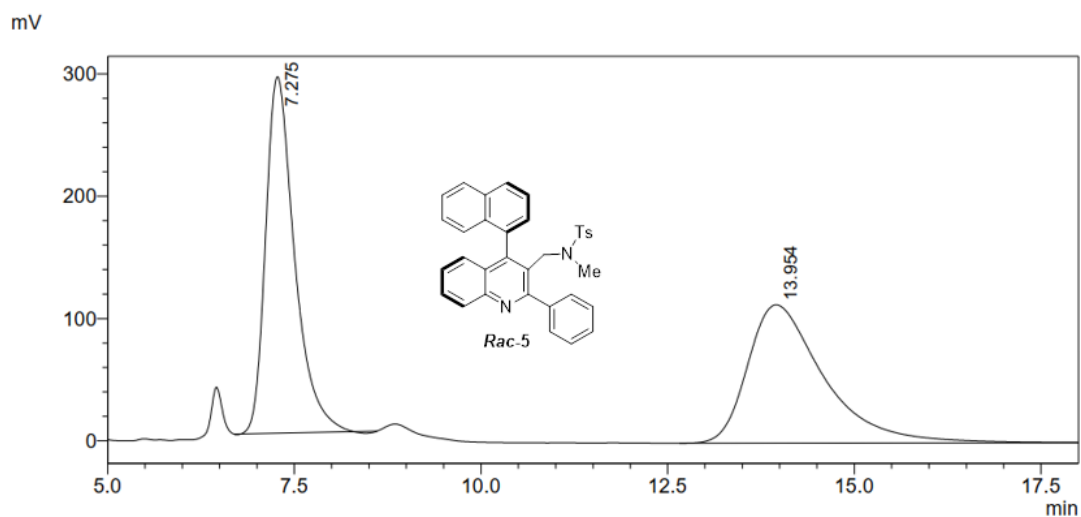
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	5.004	95.258	33899231	2590992	M	95.258
2	5.610	4.742	1687554	127615	M	4.742



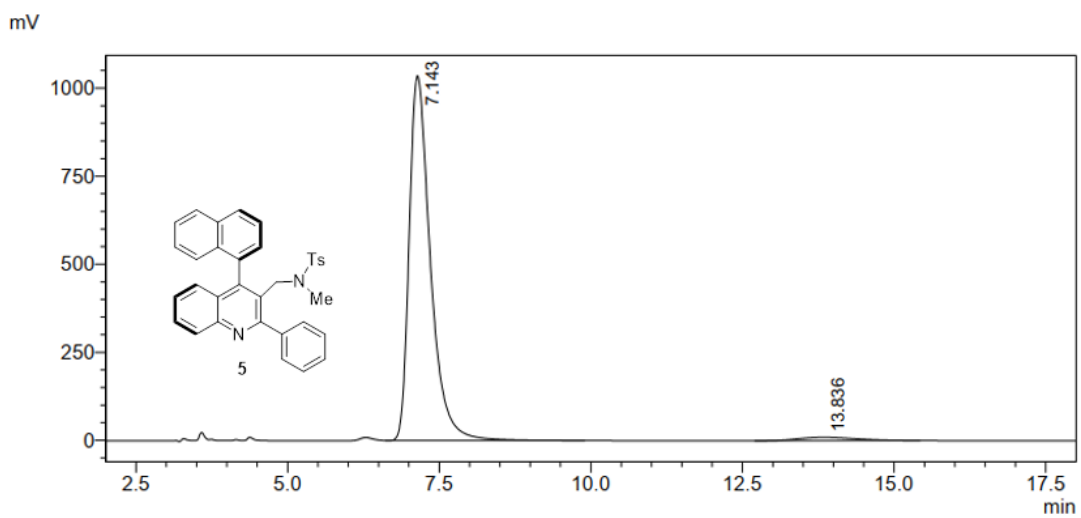
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	4.869	49.980	2901035	293576		49.980
2	5.702	50.020	2903380	194261	V	50.020



Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	4.842	97.428	11053384	1161514	M	97.428
2	5.681	2.572	291755	22628	M	2.572

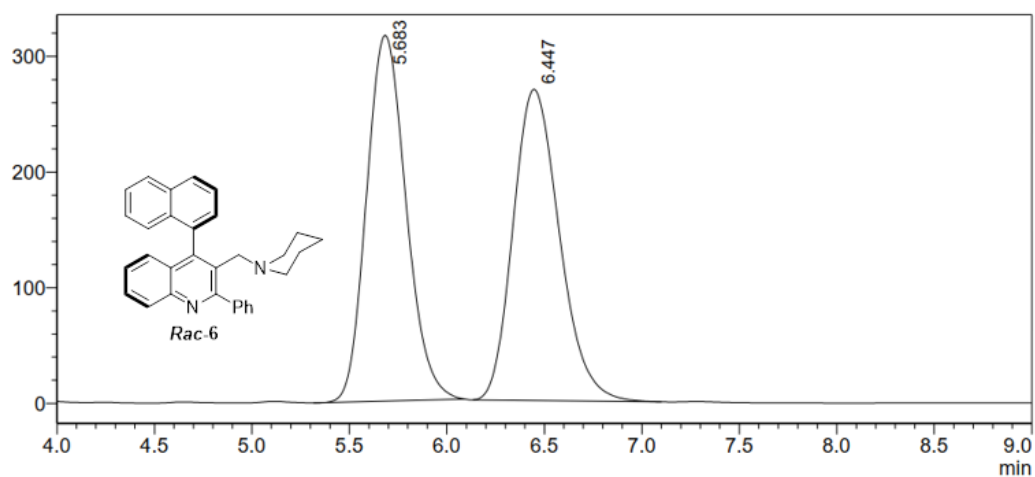


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.275	49.507	7851158	291508	M	49.507
2	13.954	50.493	8007545	112951		50.493



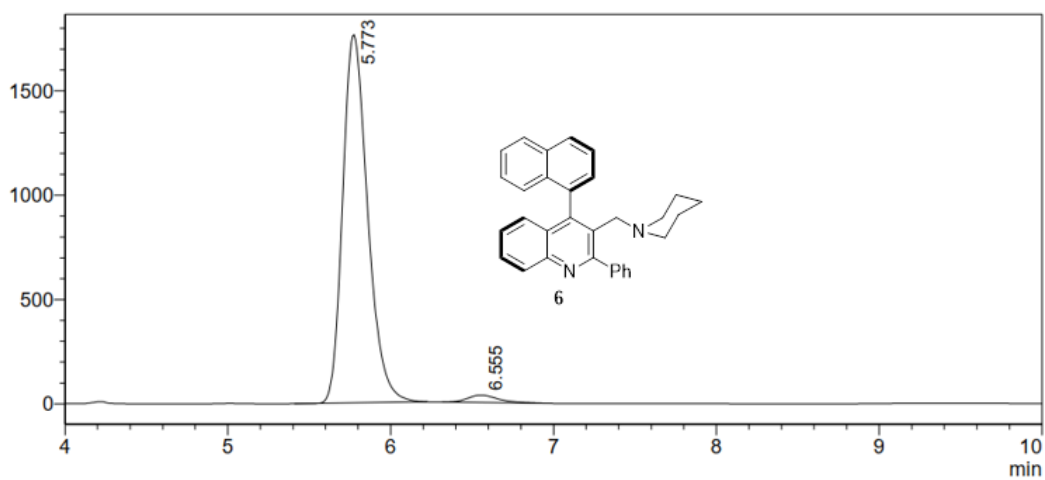
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.143	97.566	25163526	1035464	M	97.566
2	13.836	2.434	627758	9477	M	2.434

mV



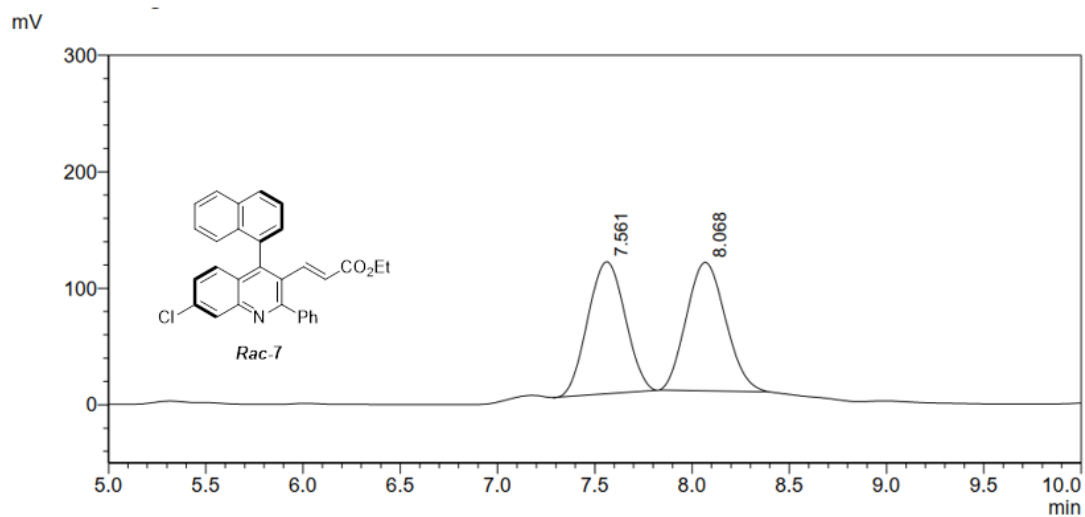
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	5.683	50.076	4469347	316457	M	50.076
2	6.447	49.924	4455741	269059	M	49.924

mV

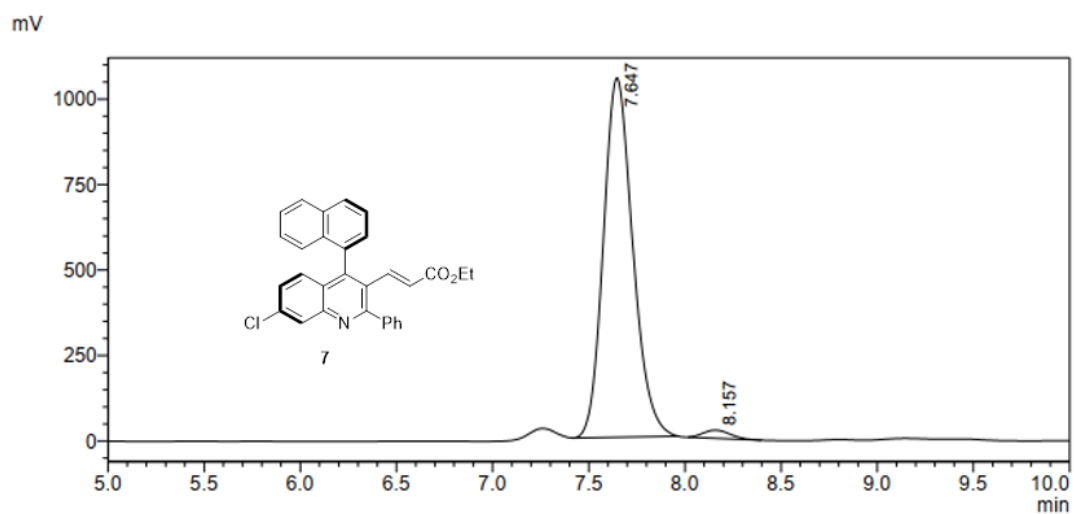


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	5.773	97.582	18878222	1763856	M	97.582
2	6.555	2.418	467789	35341	M	2.418



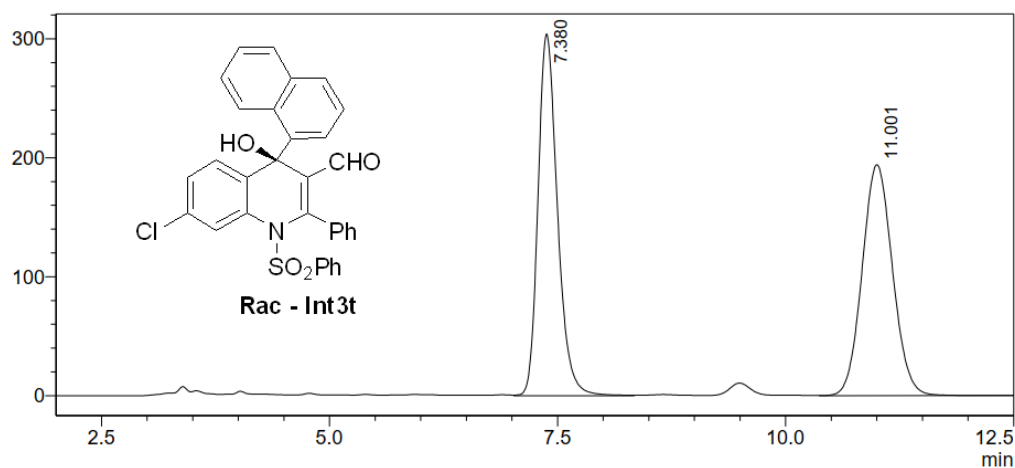


Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.561	49.566	1518410	113251	M	49.566
2	8.068	50.434	1544990	110186	M	50.434



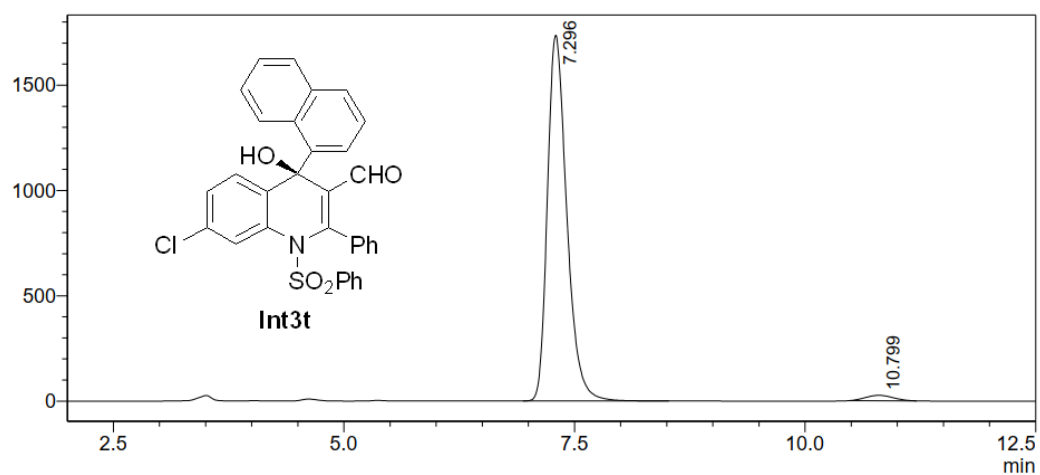
Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.647	97.982	11189311	1050176	M	97.982
2	8.157	2.018	230426	23739	M	2.018

mV



Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.380	50.073	4506991	303899		50.073
2	11.001	49.927	4493860	194051		49.927

mV



Peak#	Ret. Time	Area%	Area	Height	Mark	Conc.
1	7.296	97.941	25424823	1735653	M	97.941
2	10.799	2.059	534547	25803	M	2.059