

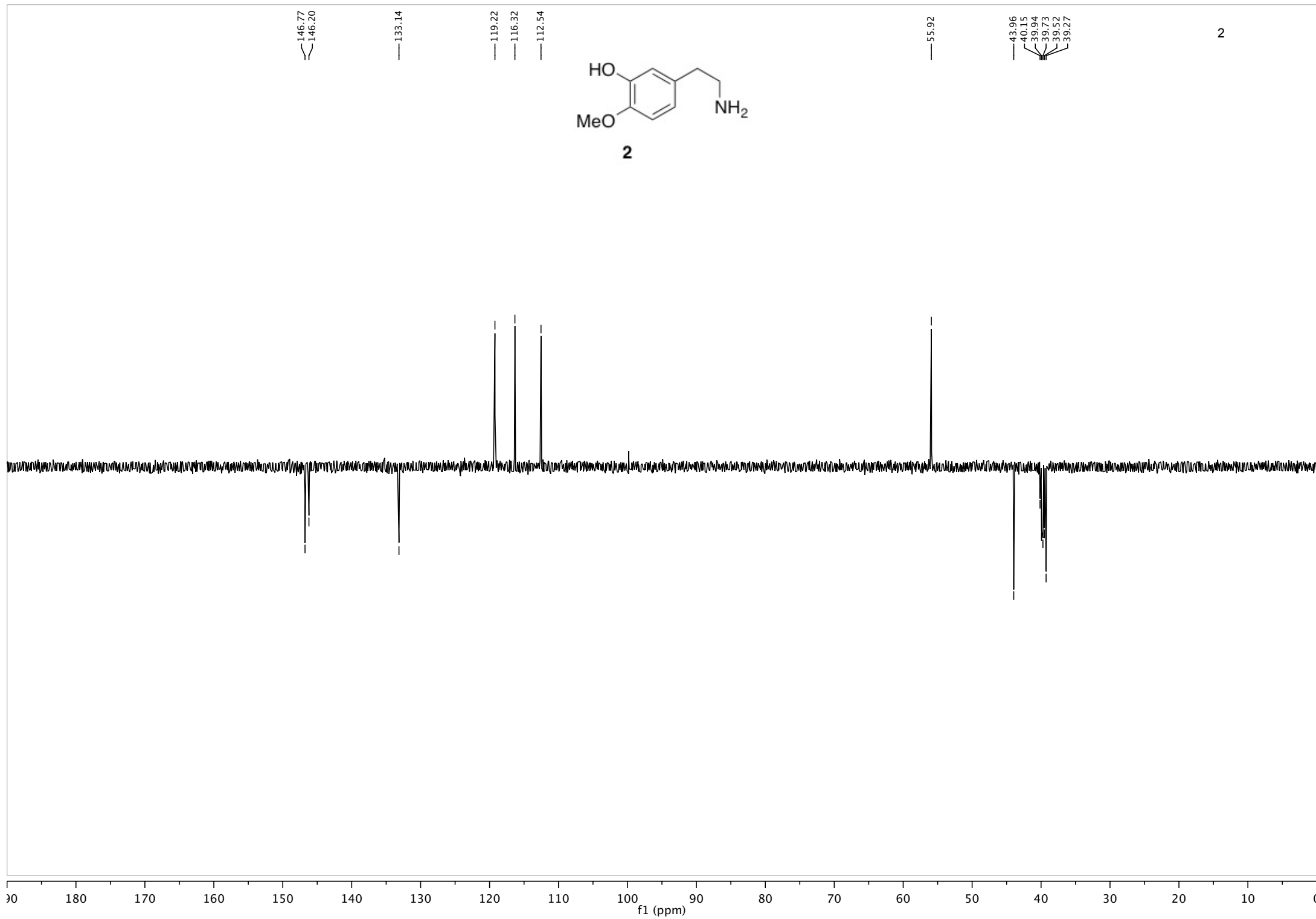
Organocatalytic Enantioselective Pictet–Spengler Reactions for the Syntheses of 1-Substituted 1,2,3,4-Tetrahydro-isoquinolines

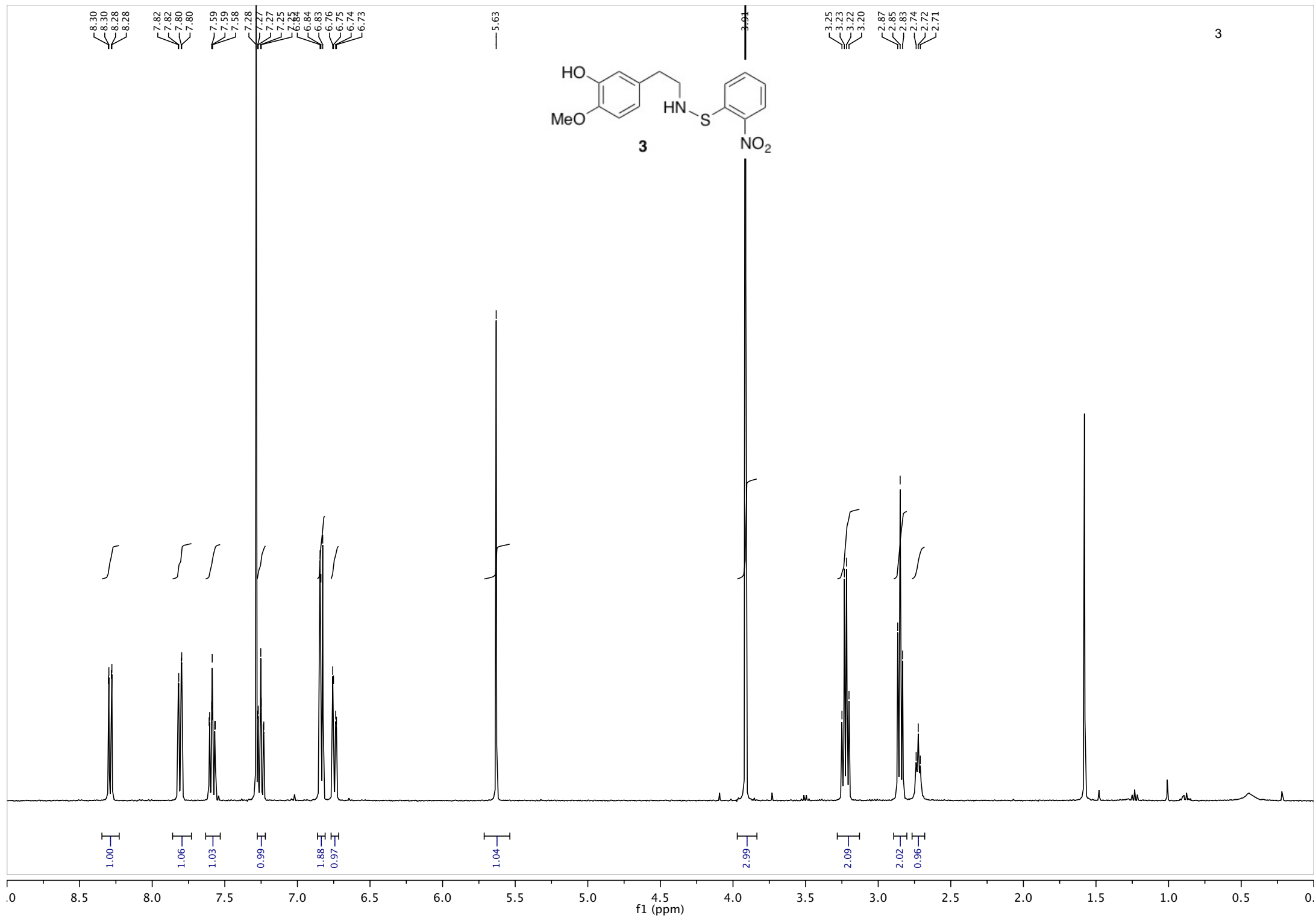
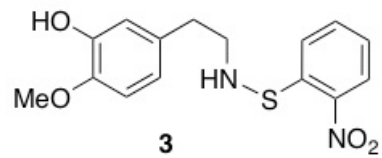
Elma Mons, Martin J. Wanner, Steen Ingemann, Jan H. van Maarseveen and Henk Hiemstra*

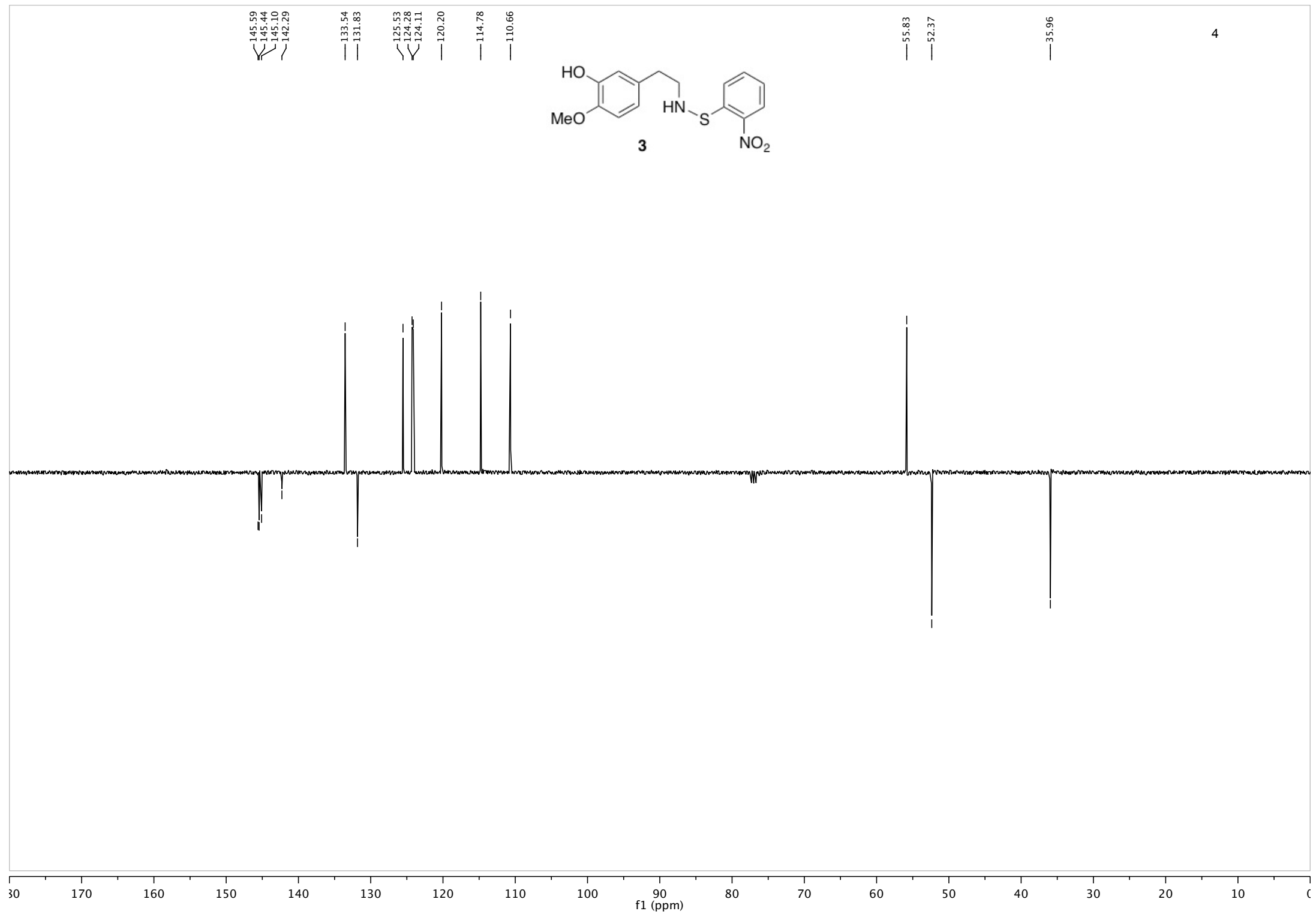
*Van 't Hoff Institute for Molecular Sciences, University of Amsterdam,
Science Park 904, 1098 XH Amsterdam, The Netherlands*

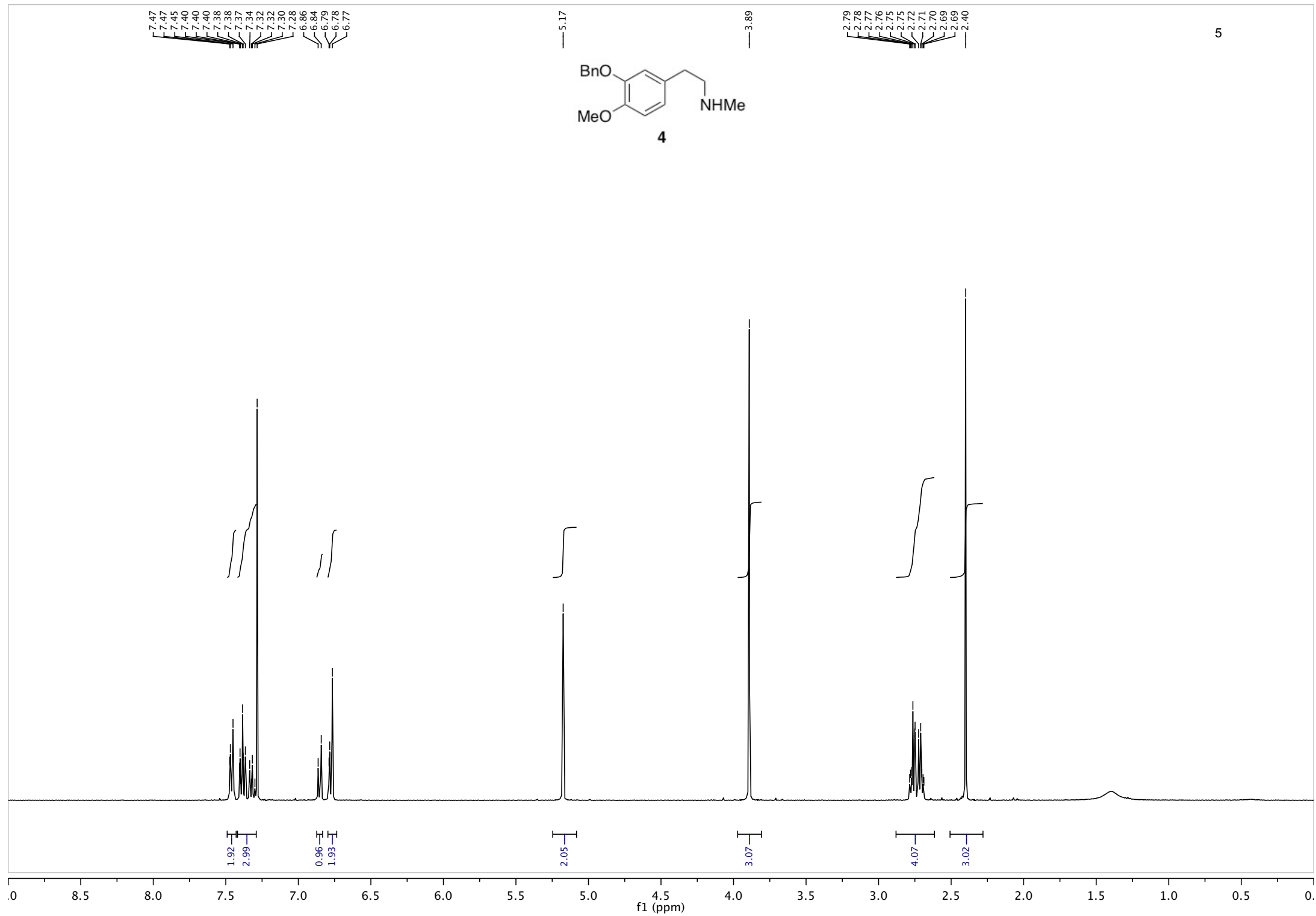
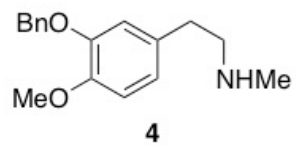
Supporting Information

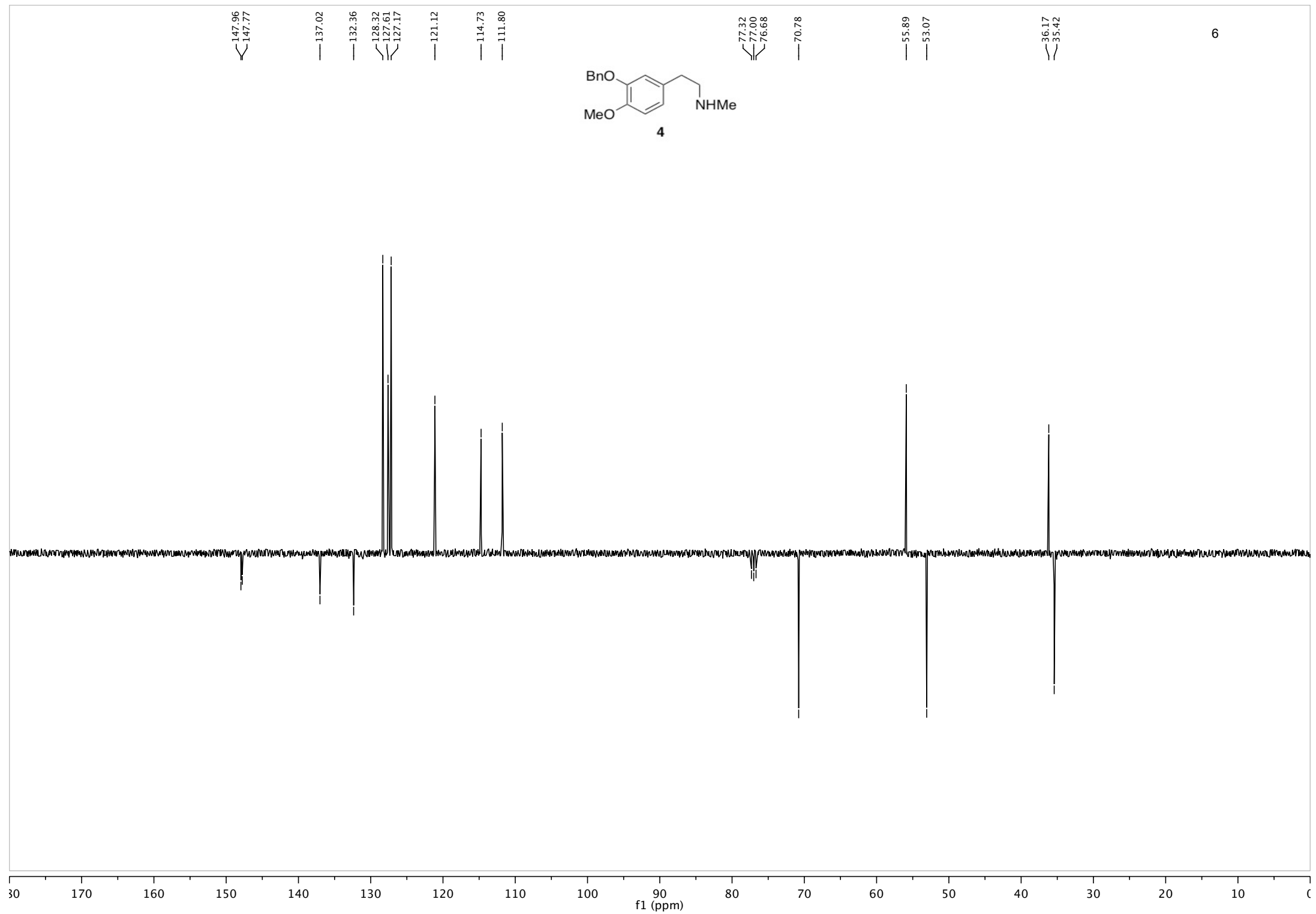
Copies of ^1H and ^{13}C -spectra	S2 – S72
HPLC analysis of 8d , 9d , 9f , 13 , 14 , 15 , 16 and 20	S73 – S79

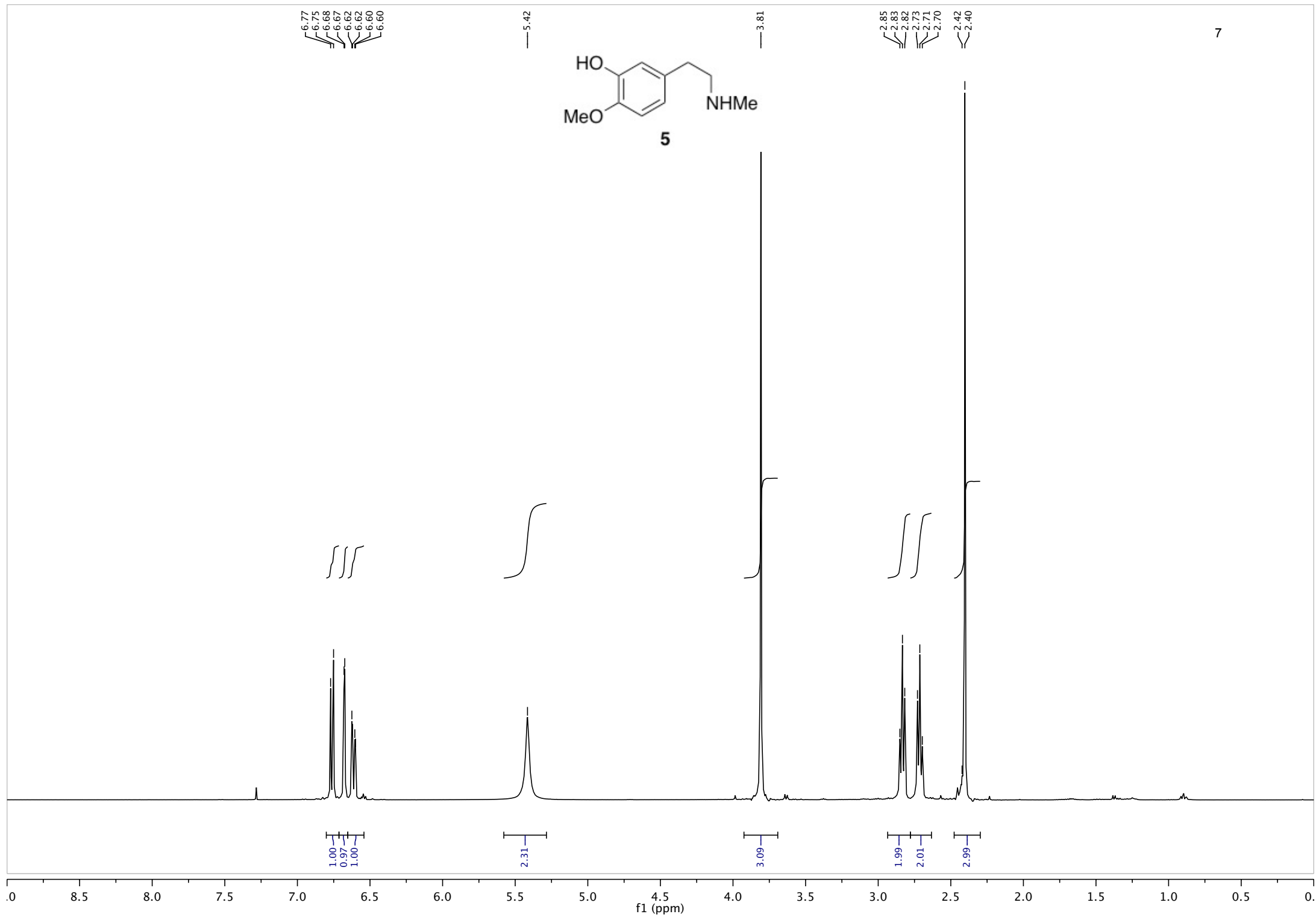


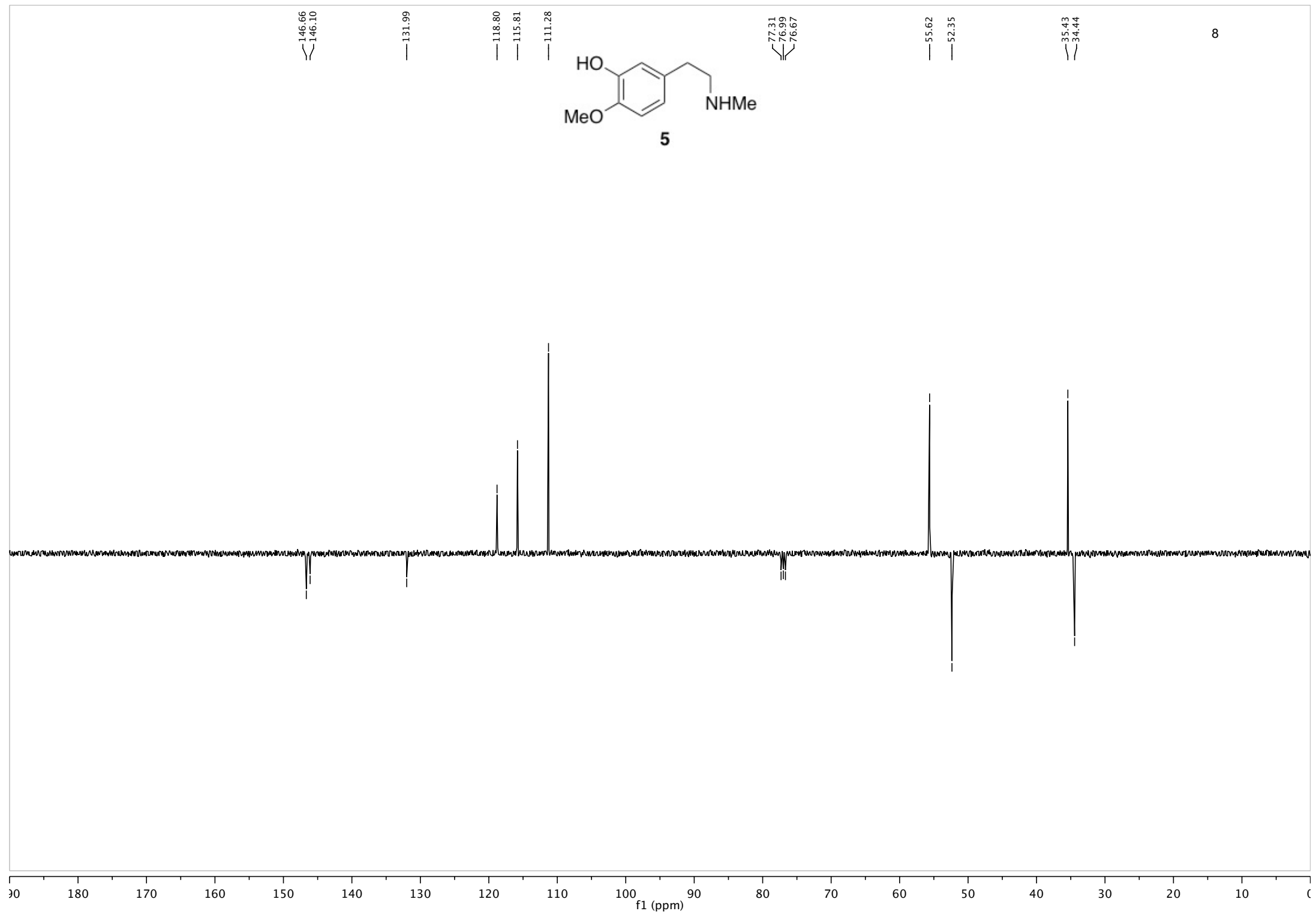


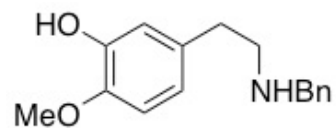








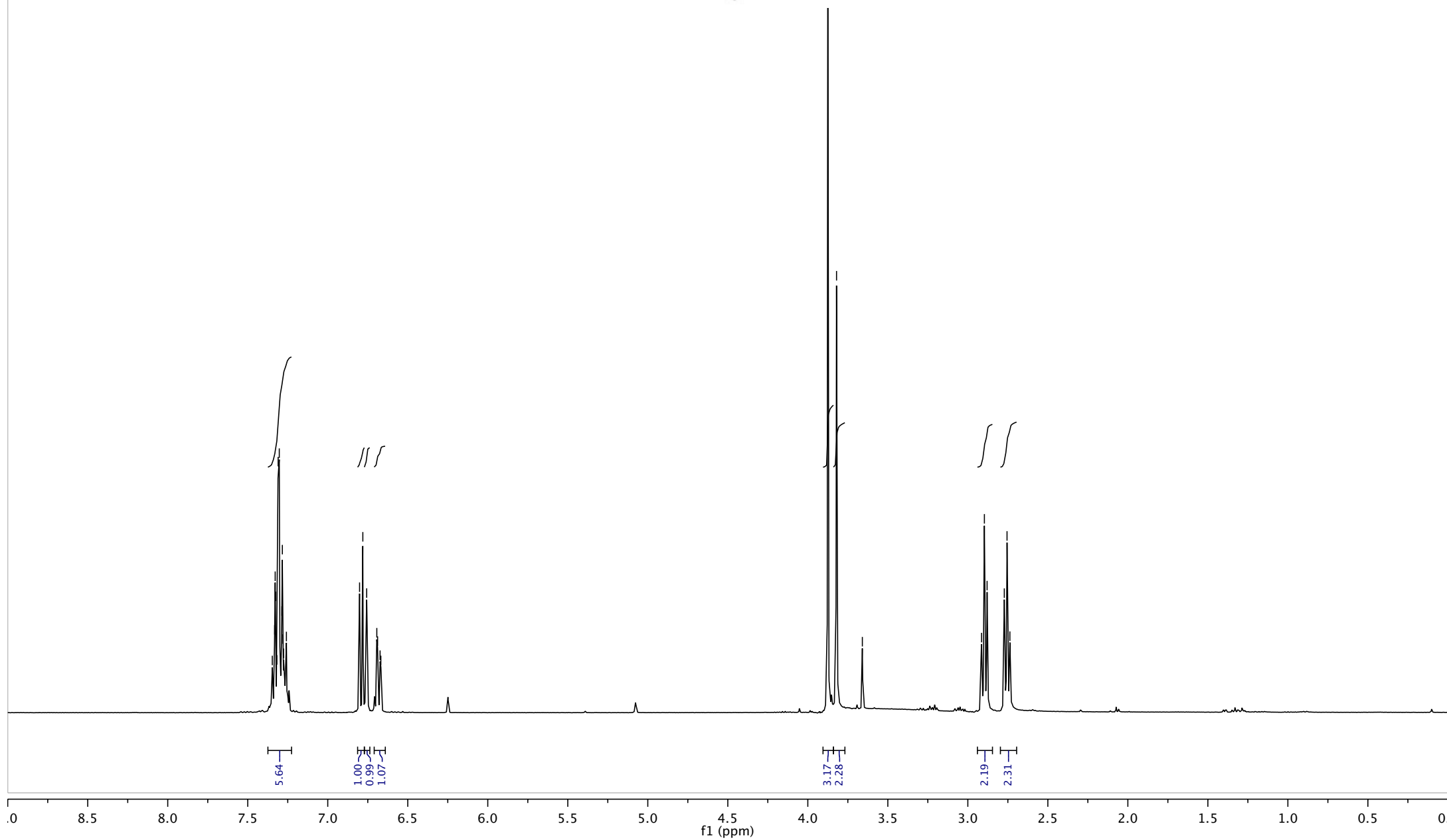


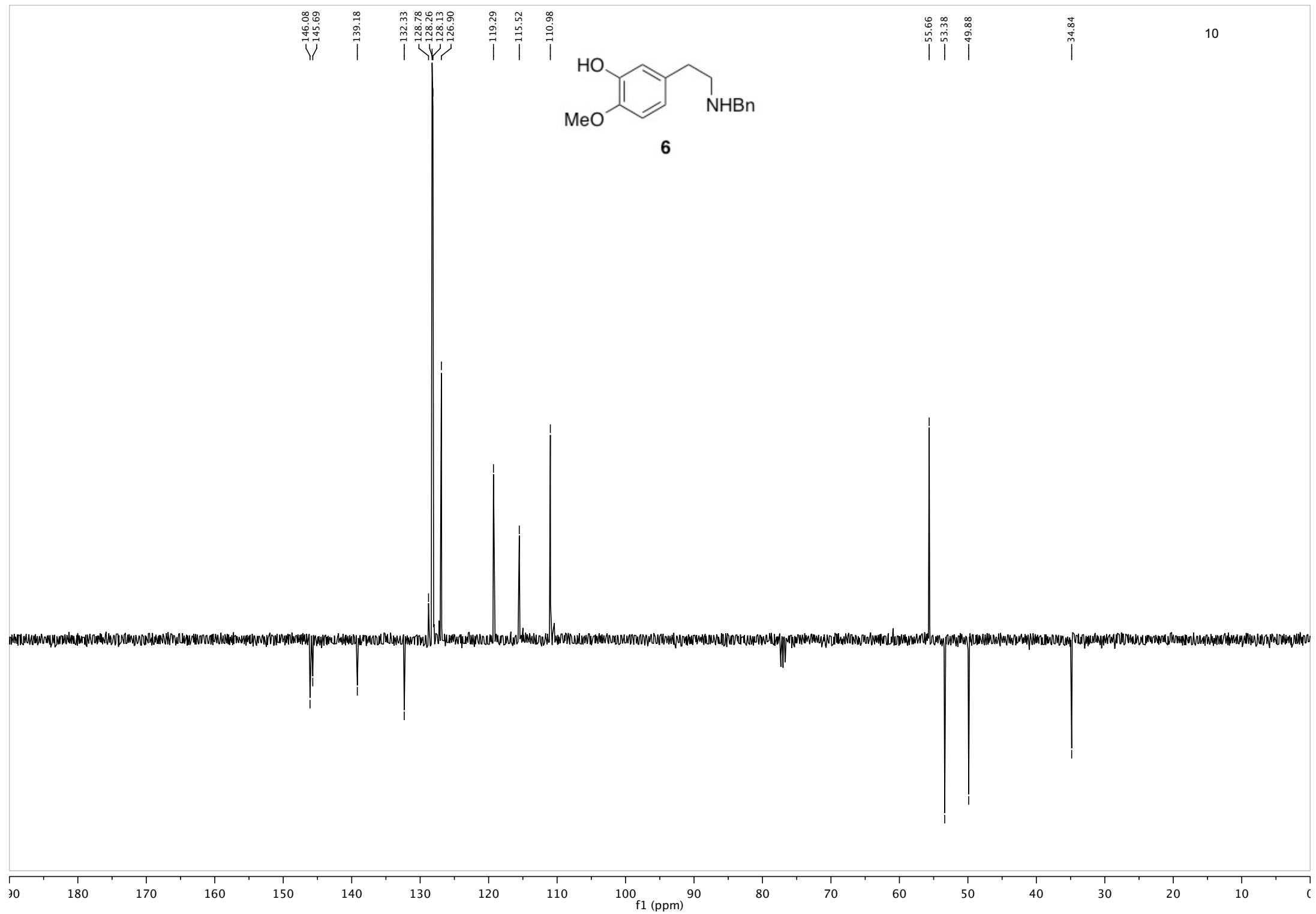
**6**

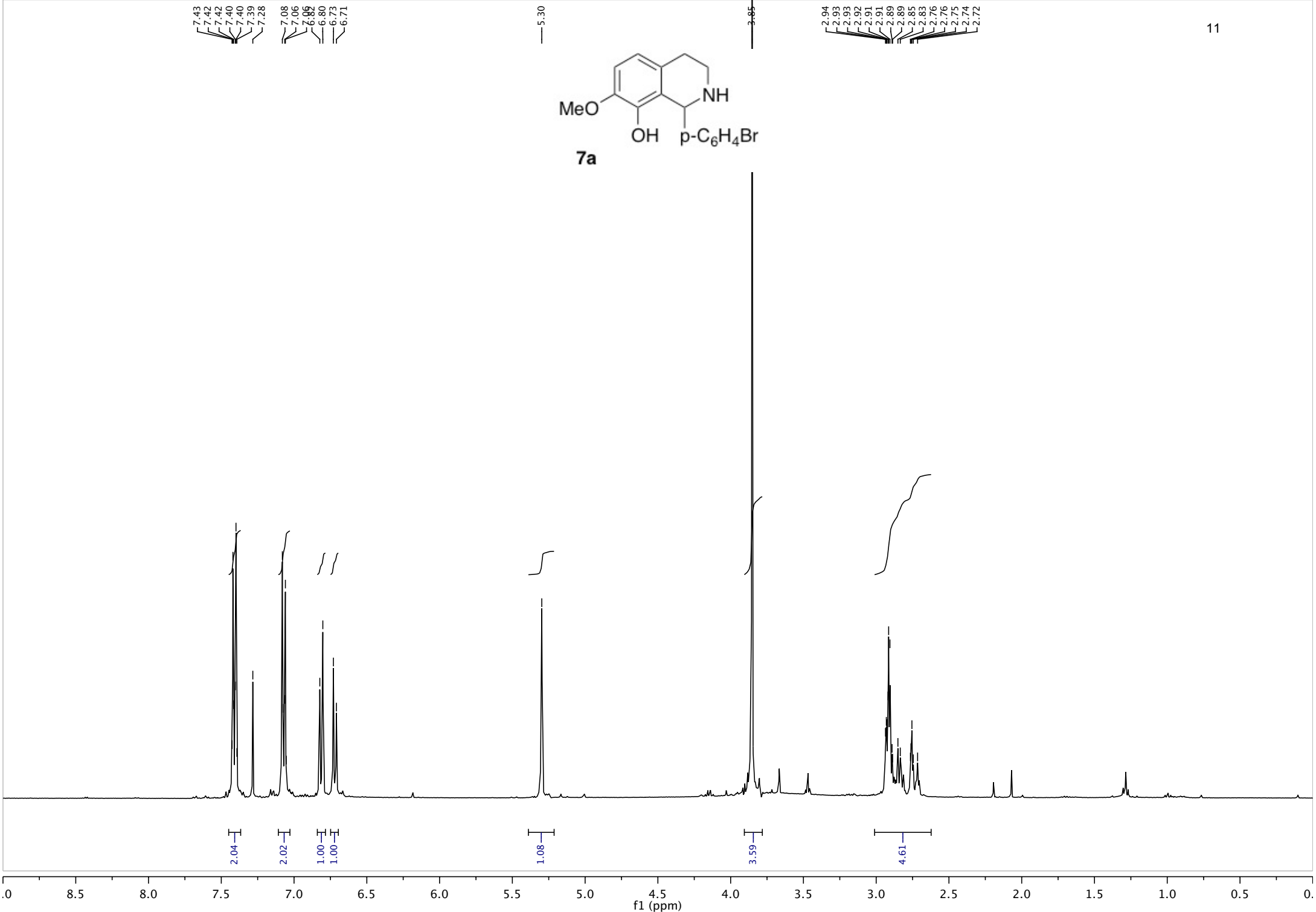
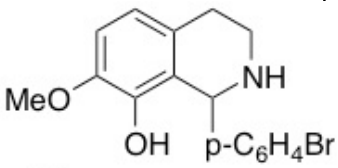
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7.31
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6.78
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6.69
6.69
6.67
6.67

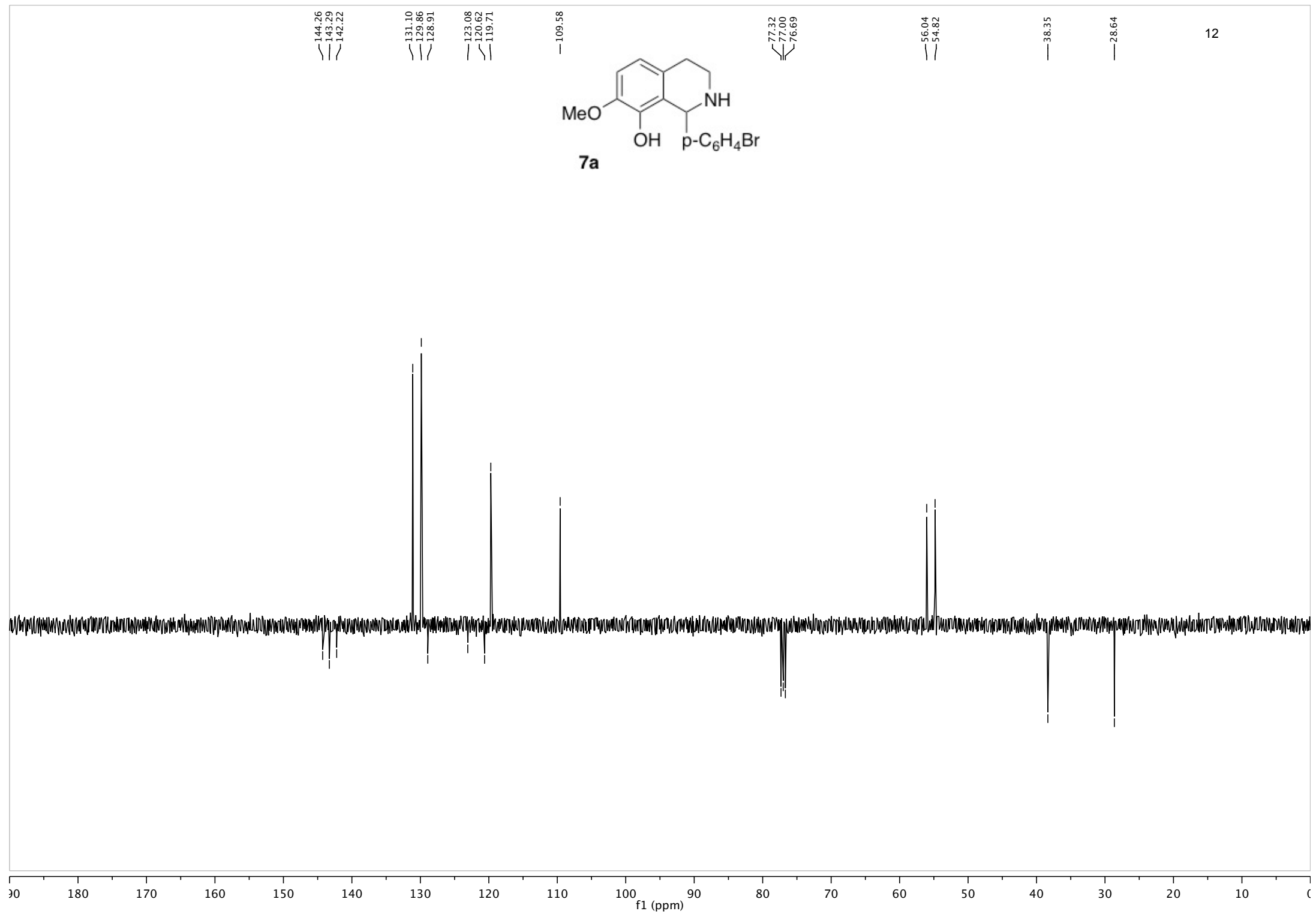
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3.82
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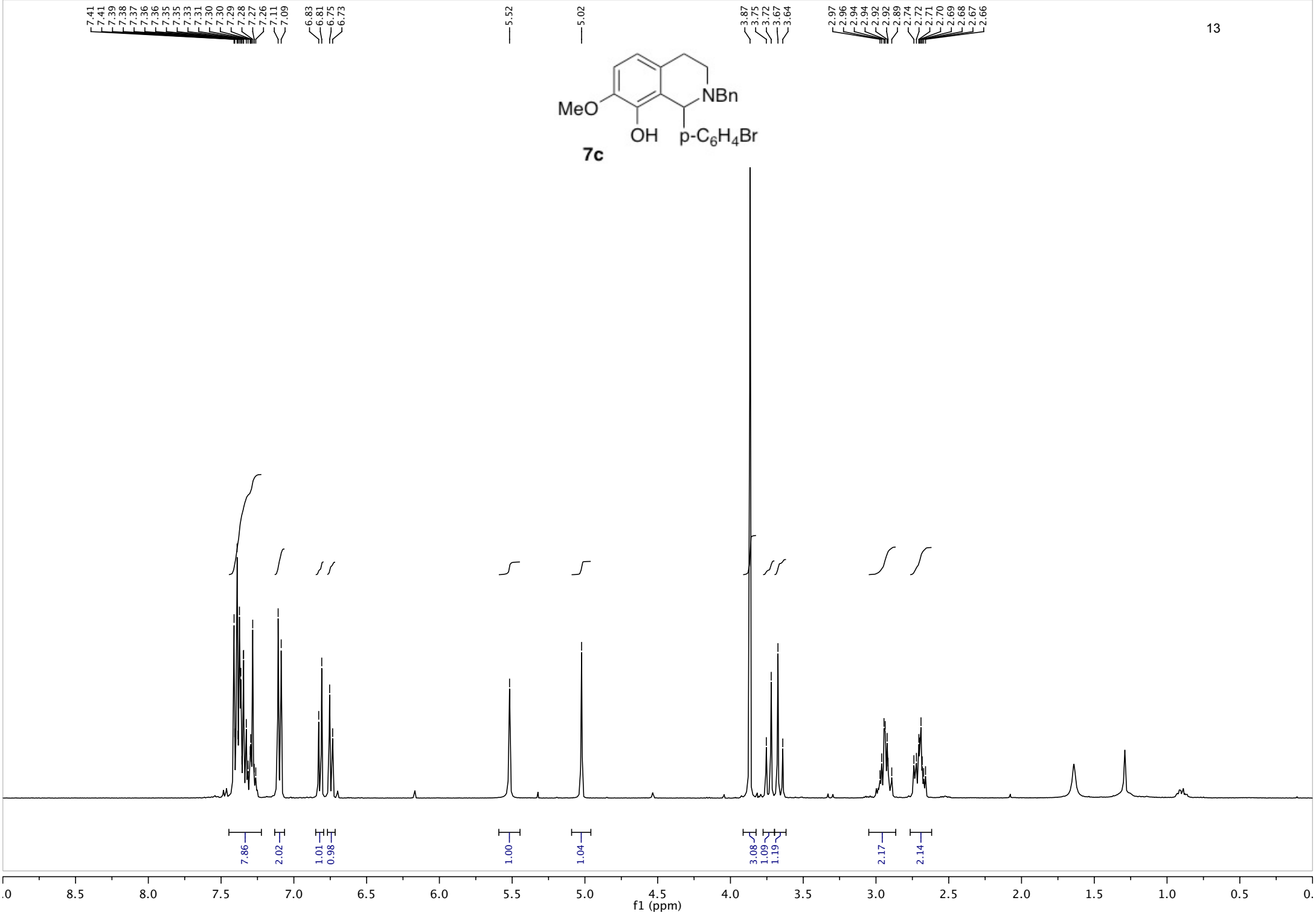
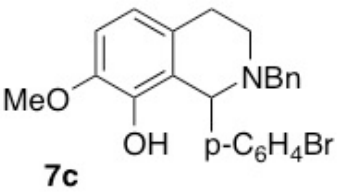
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2.90
2.88
2.77
2.76
2.74

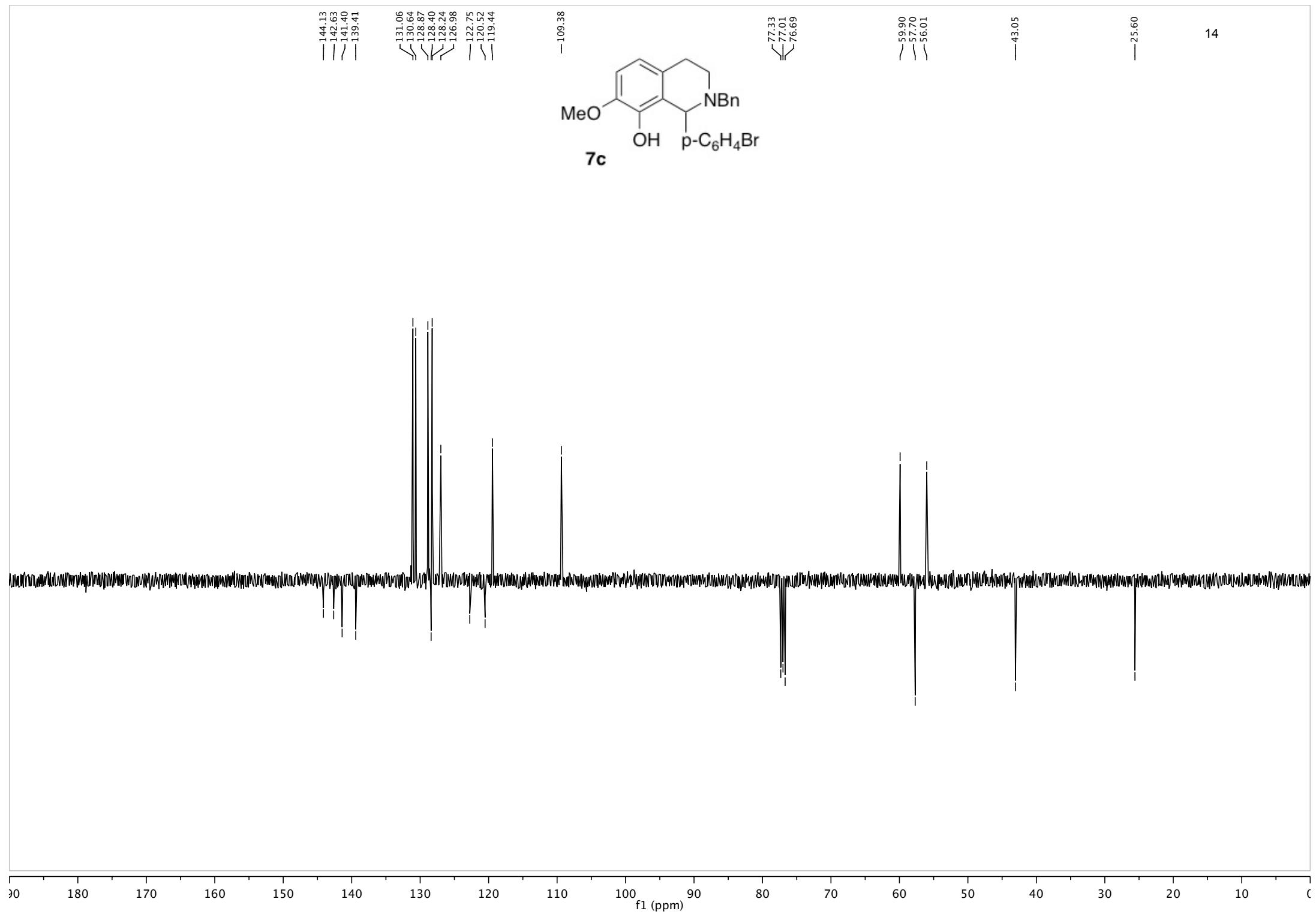


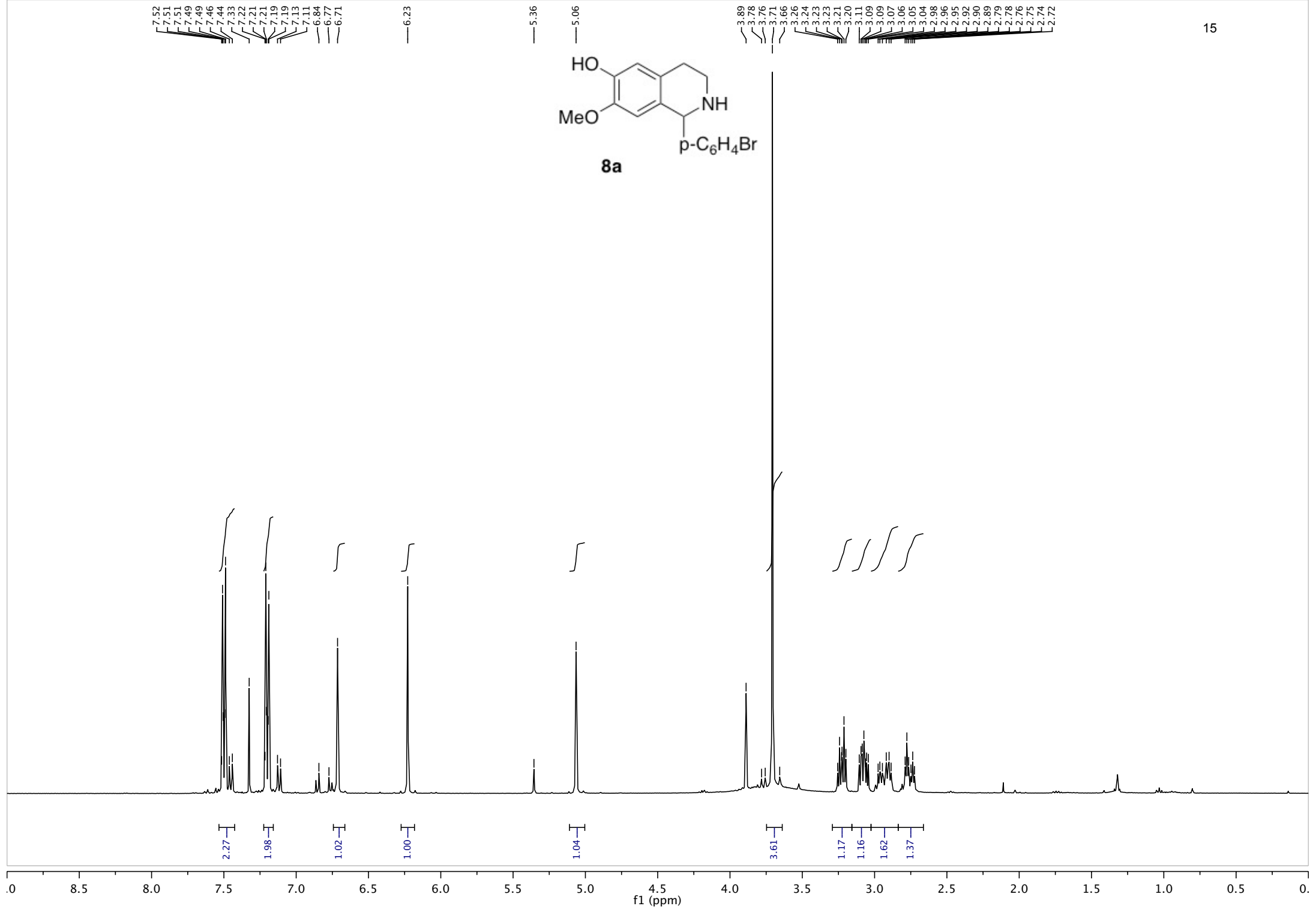


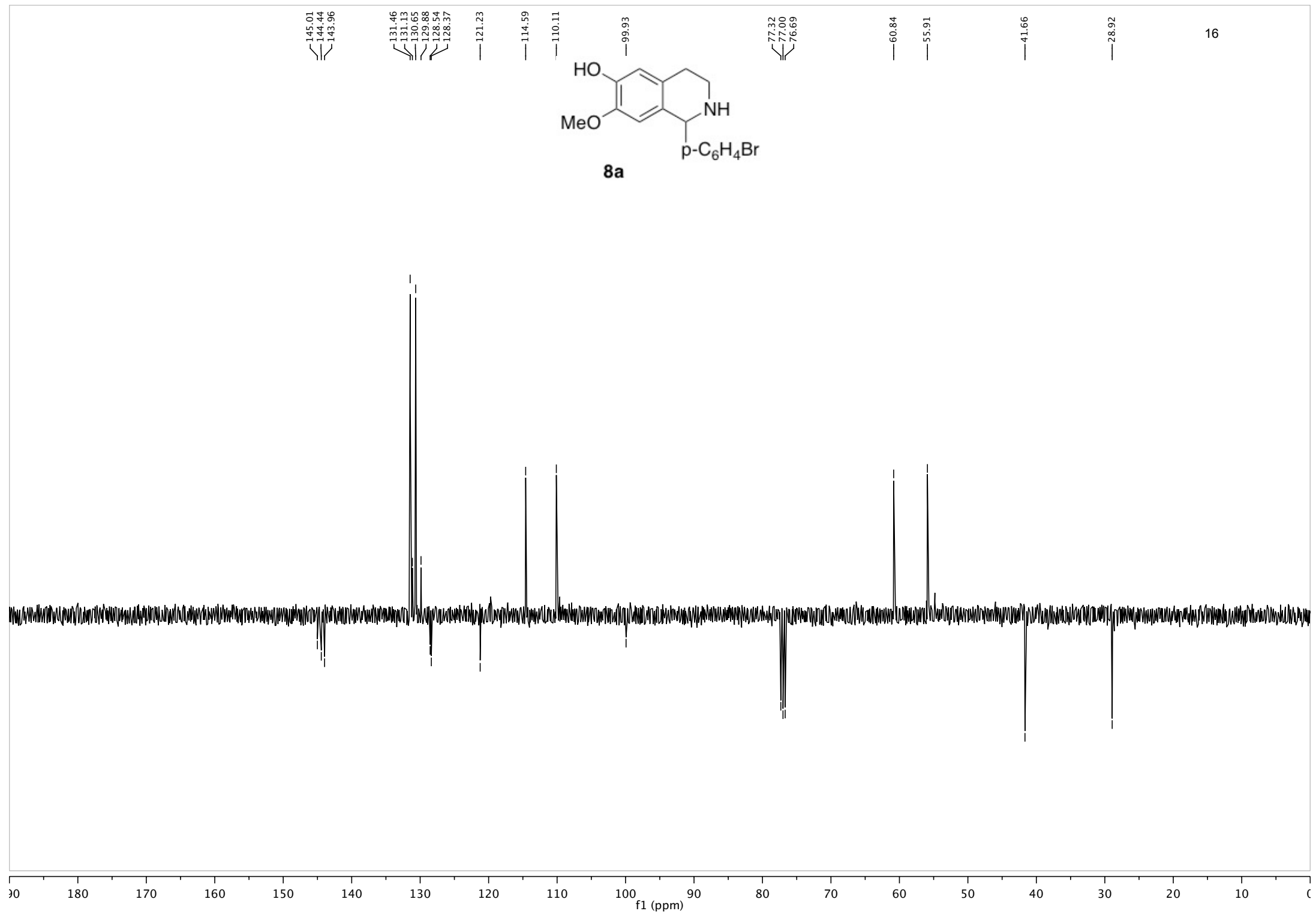


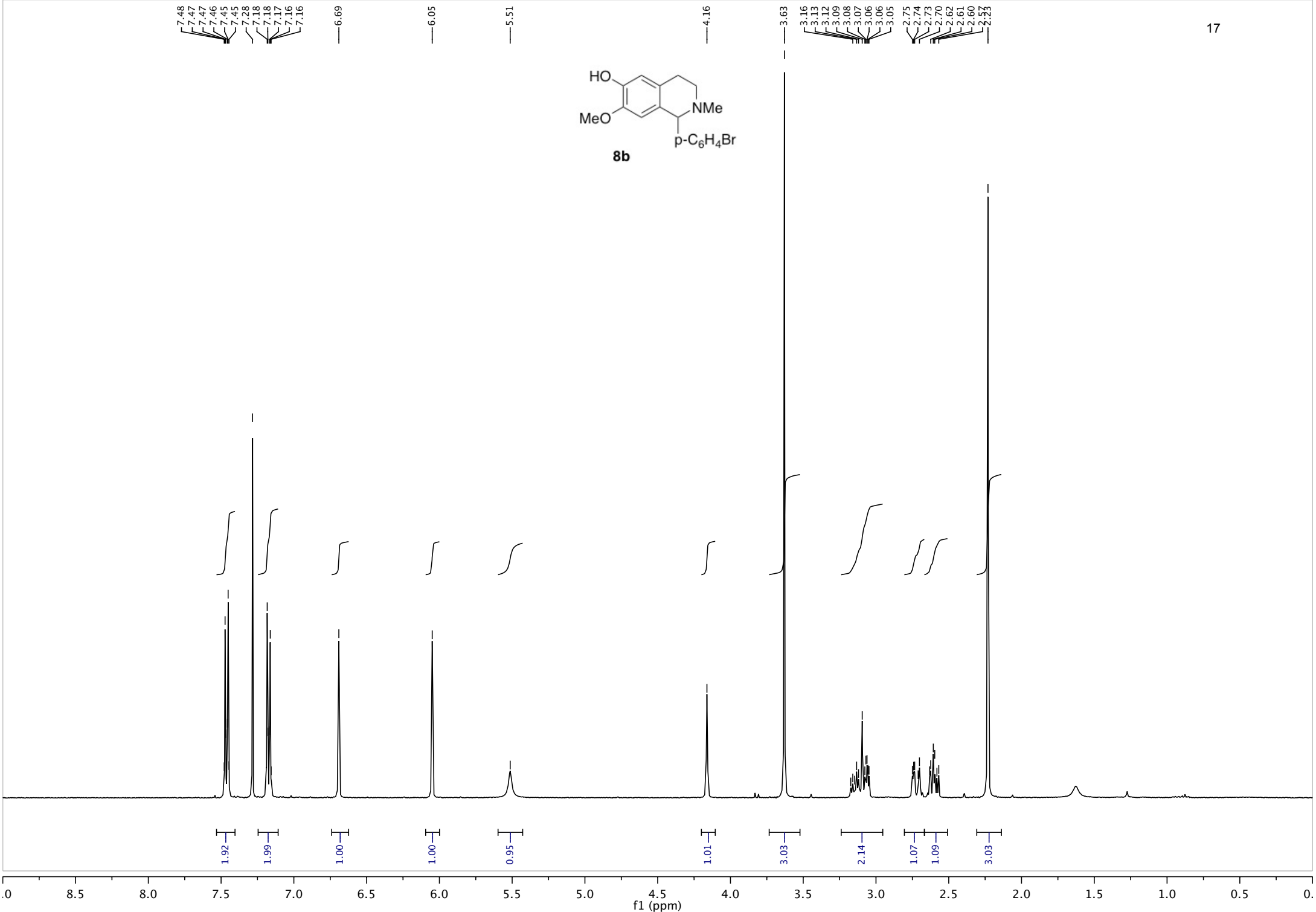


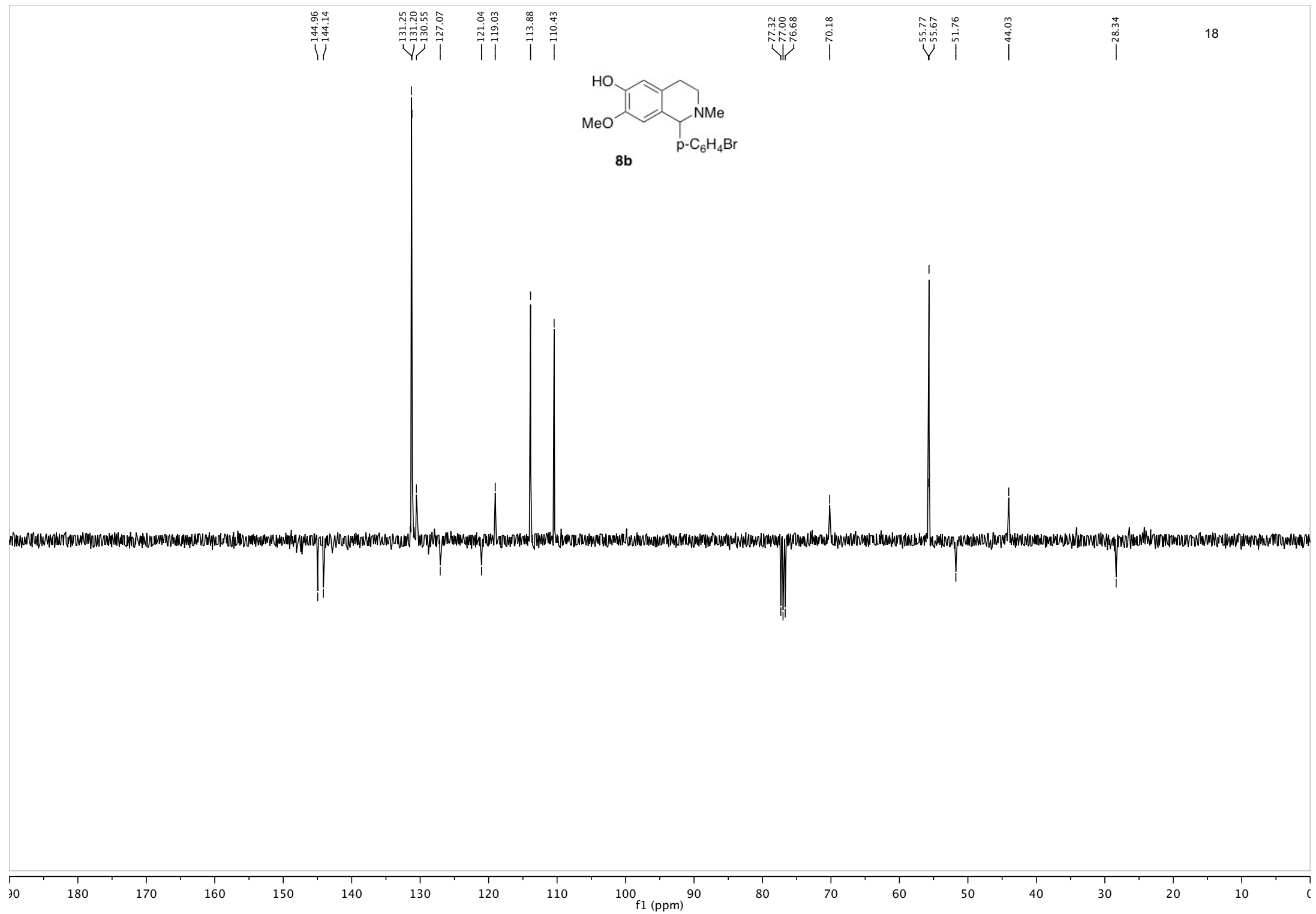


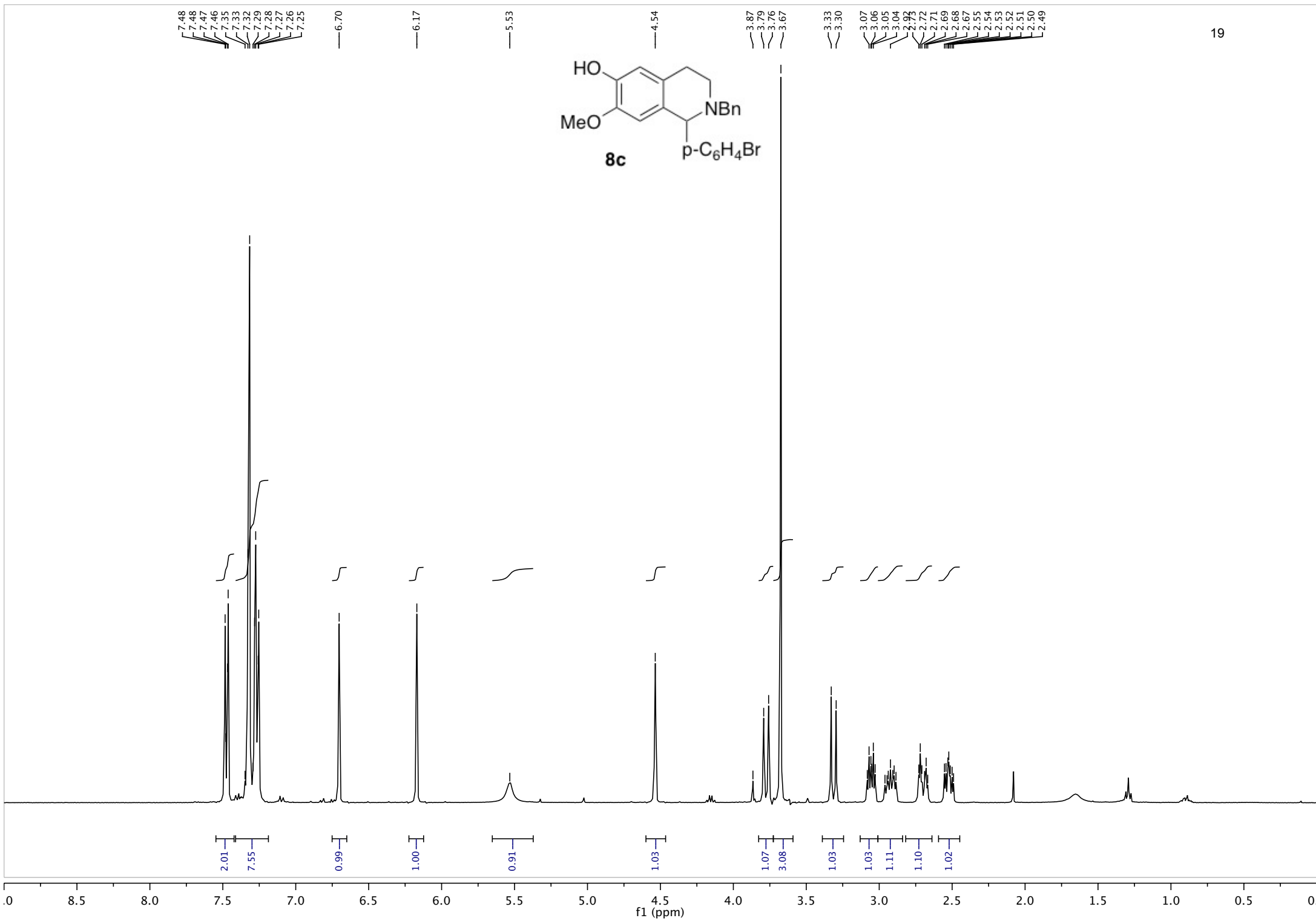


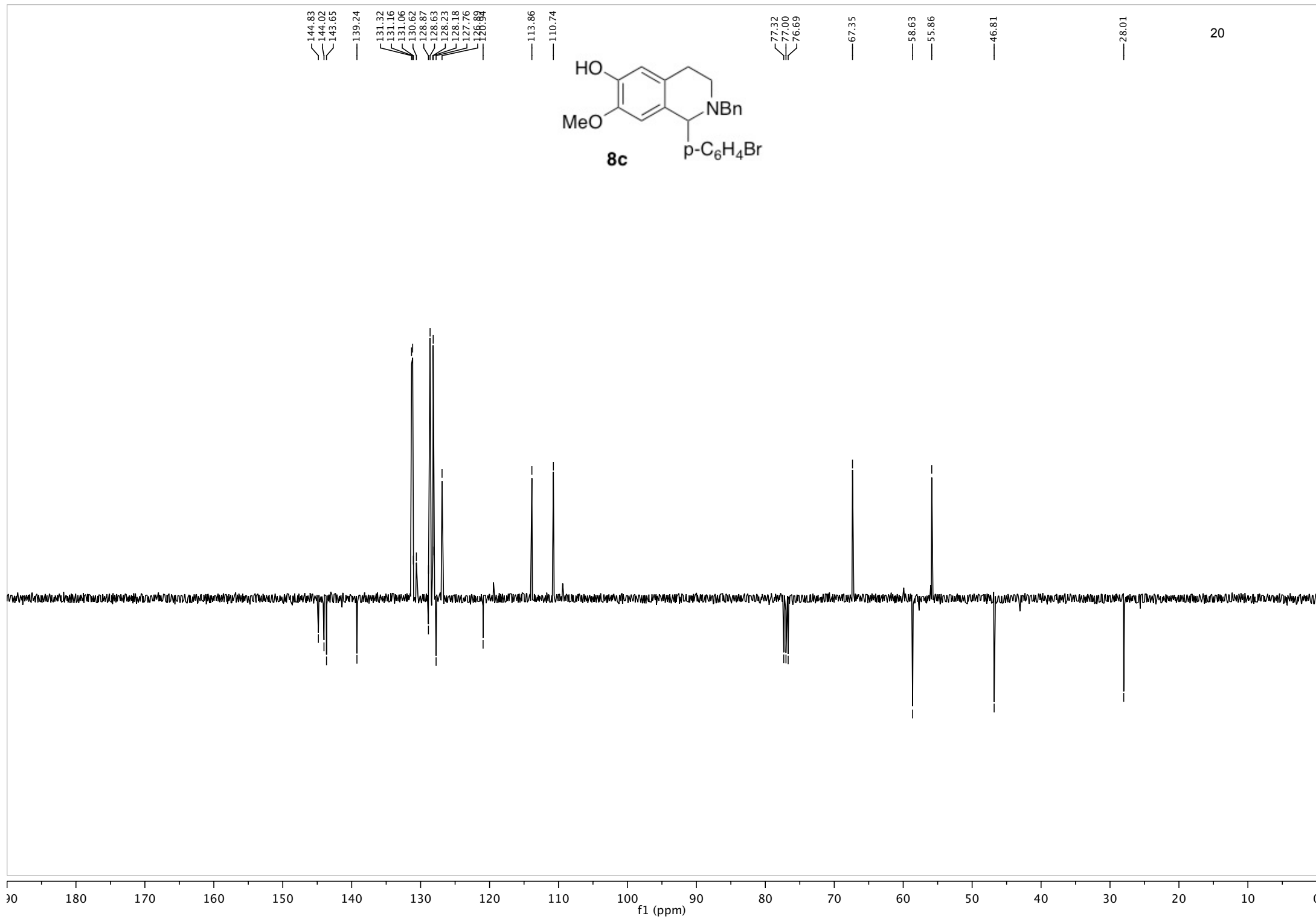


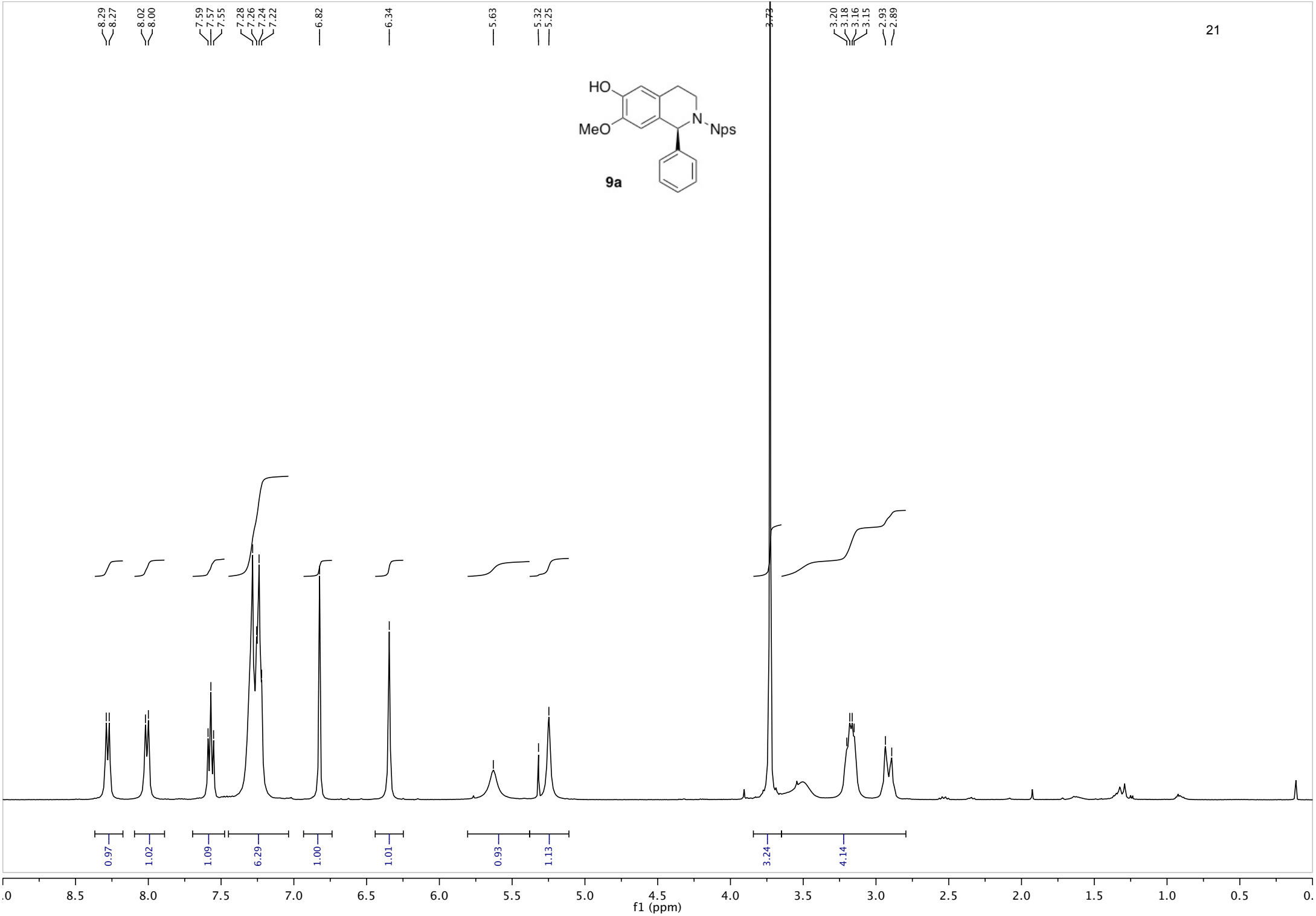


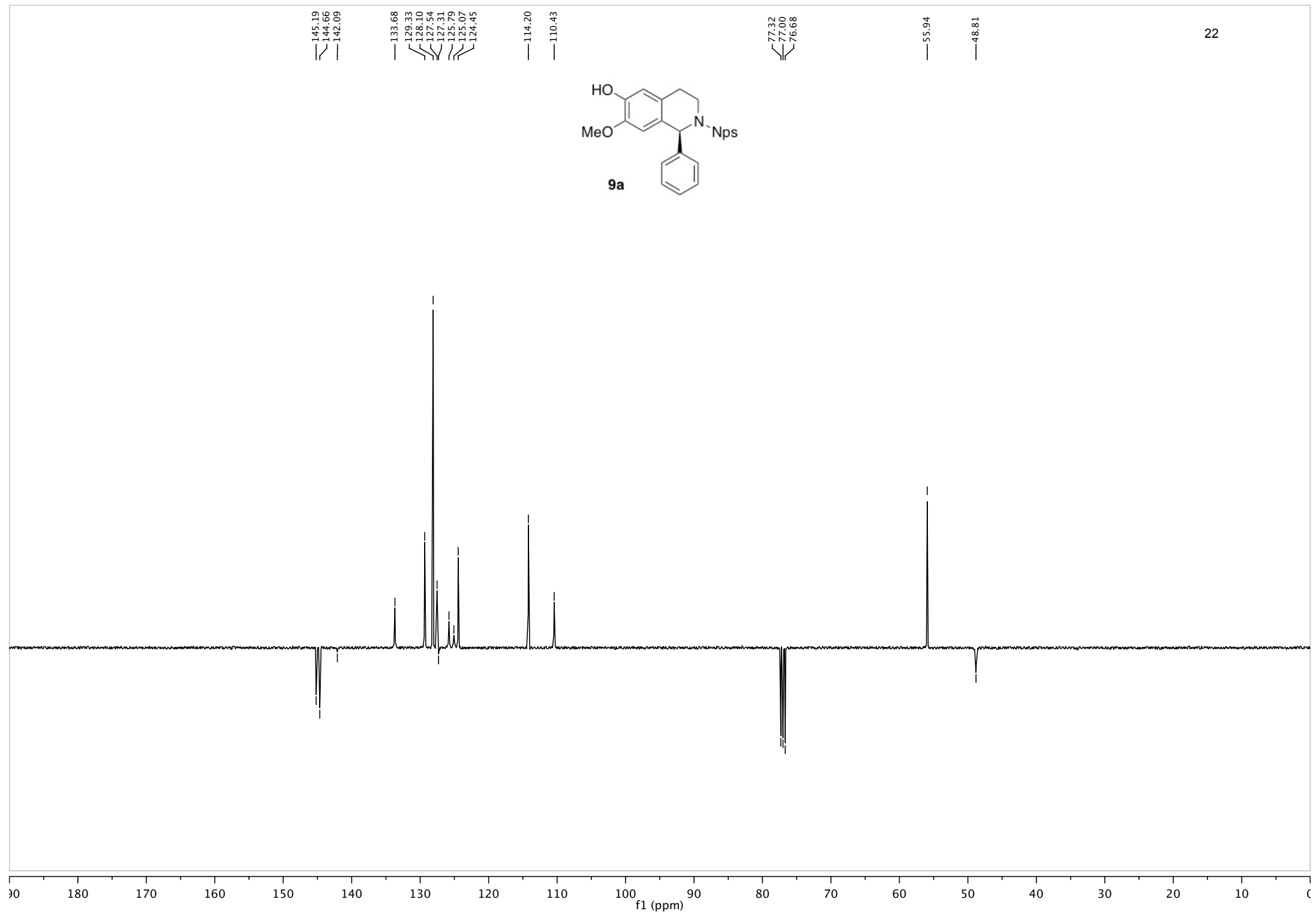


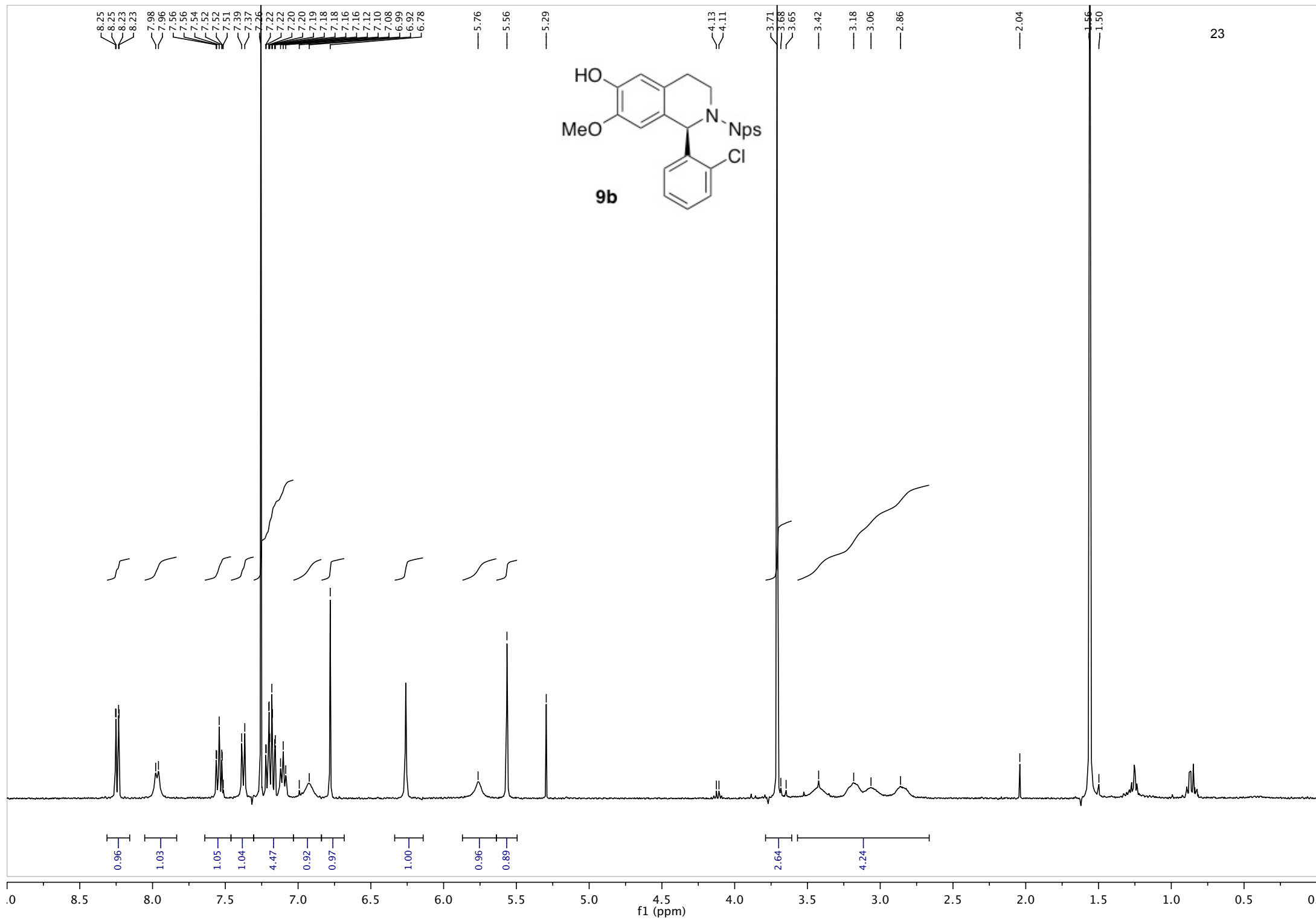


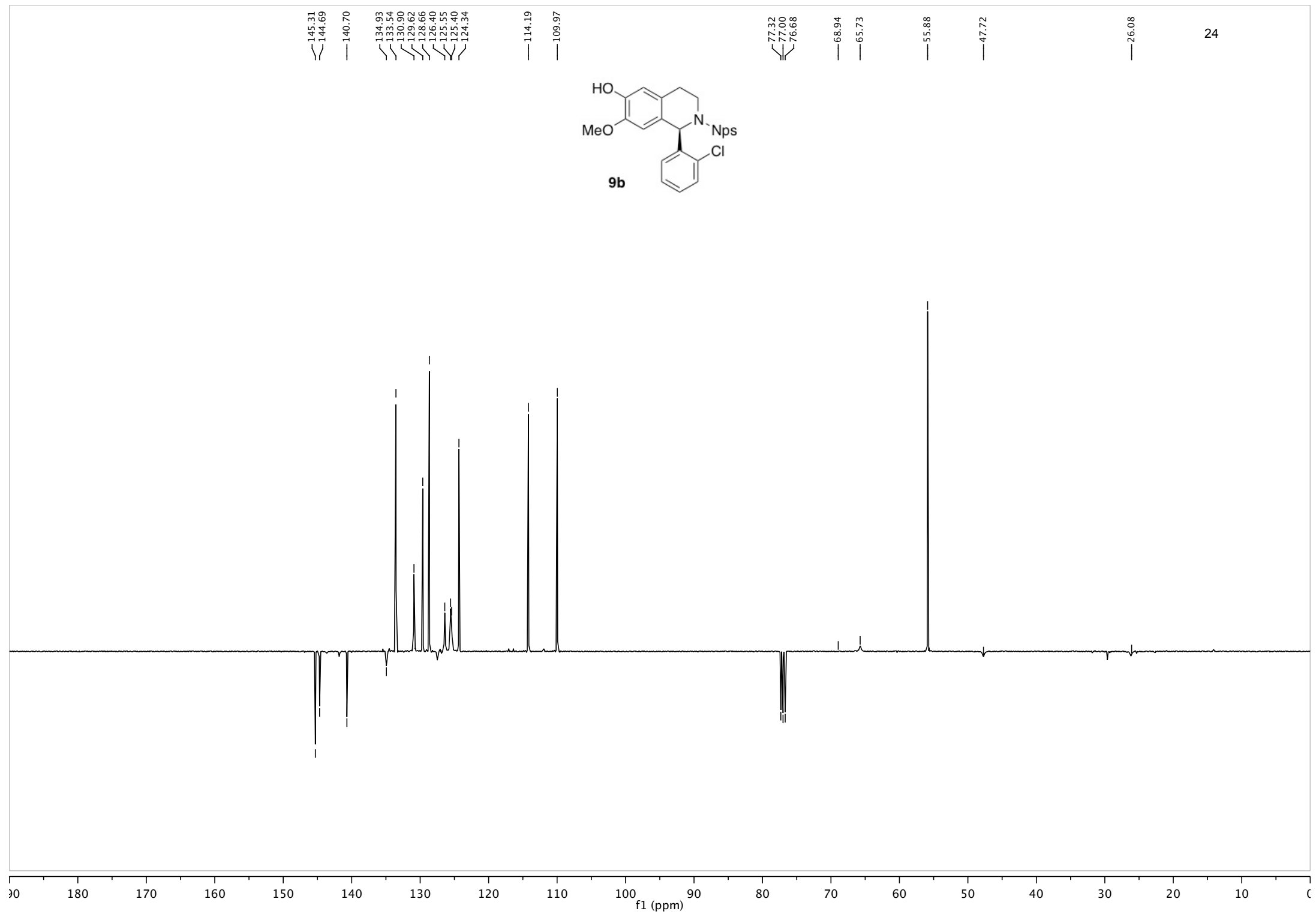


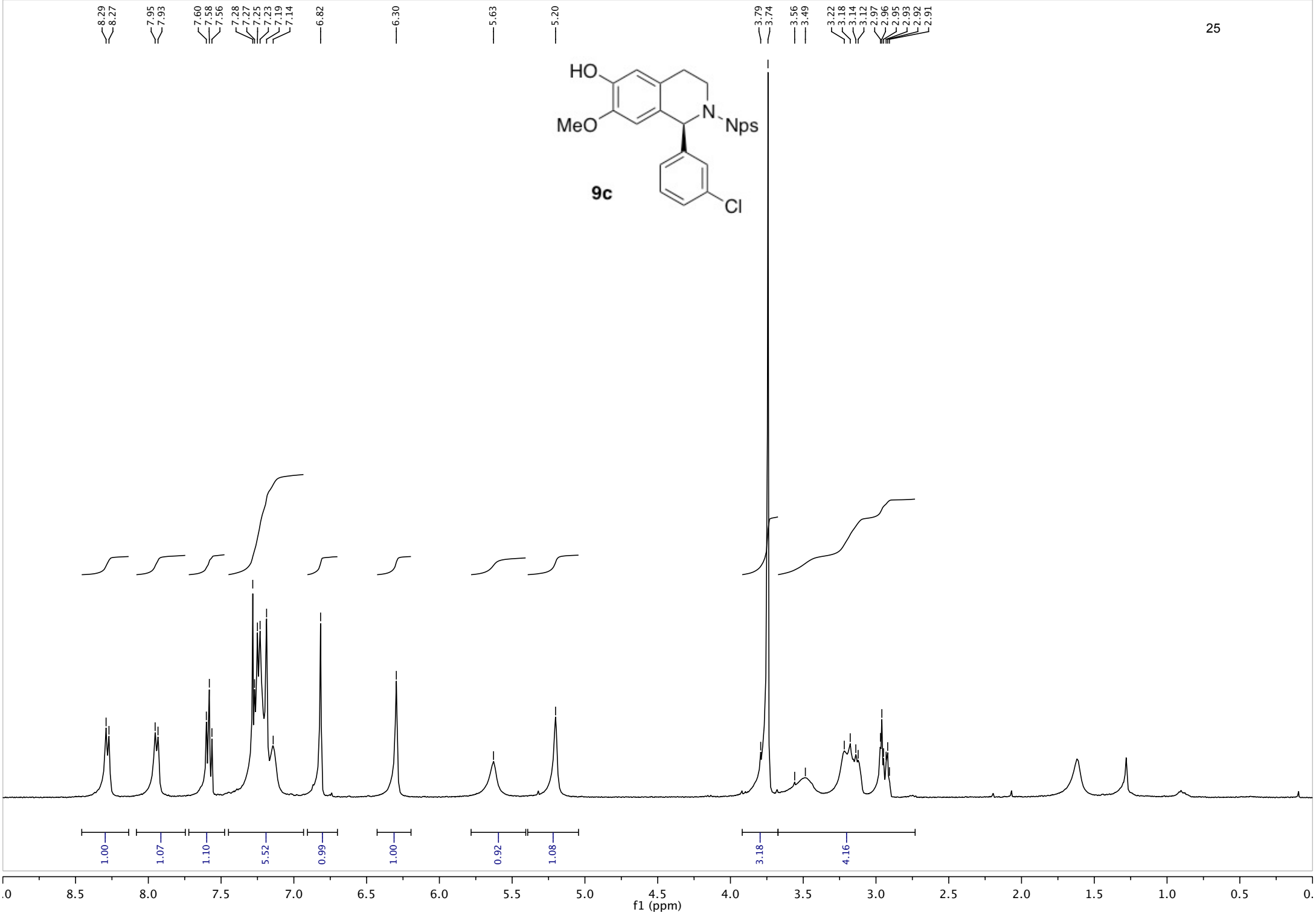


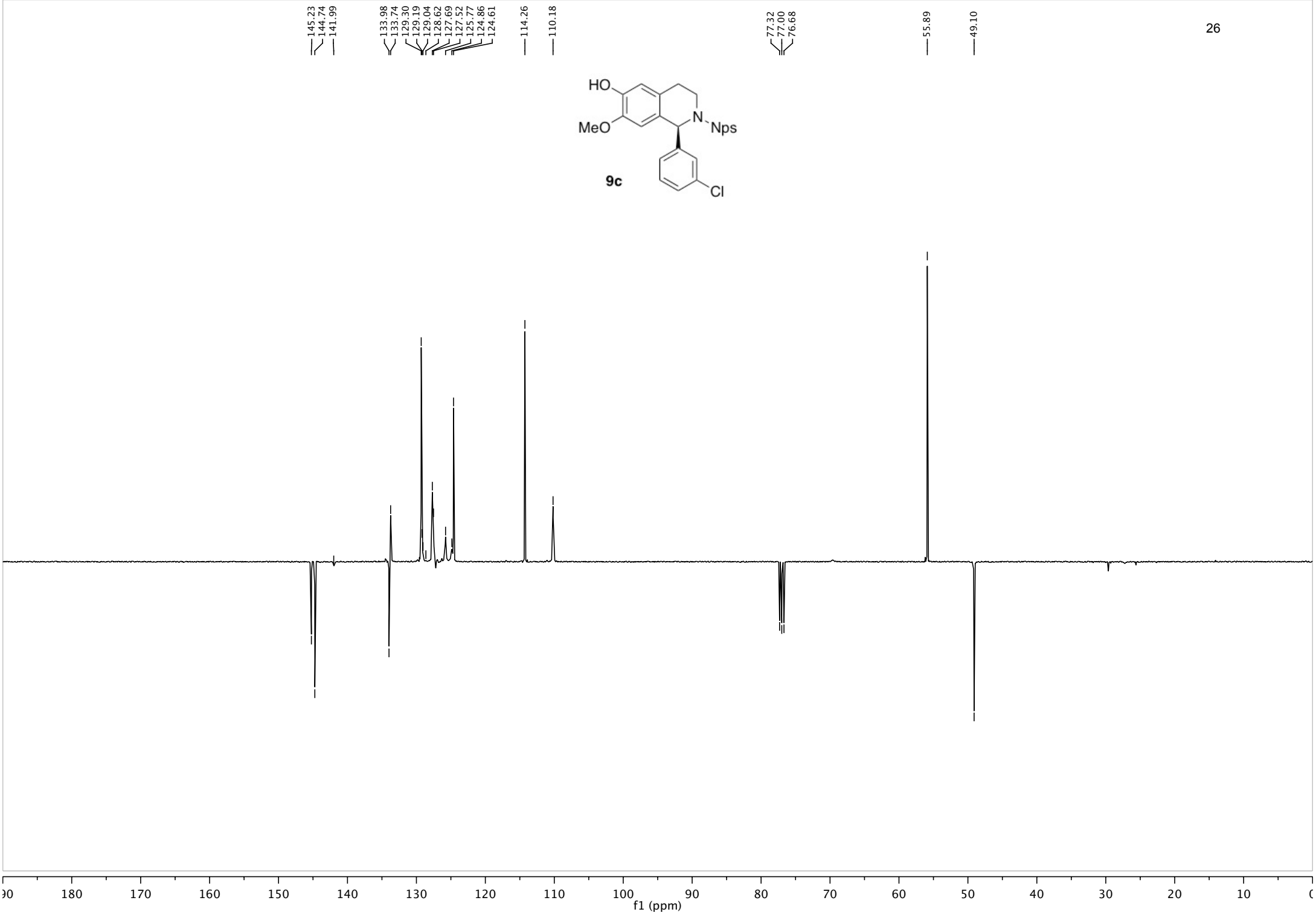


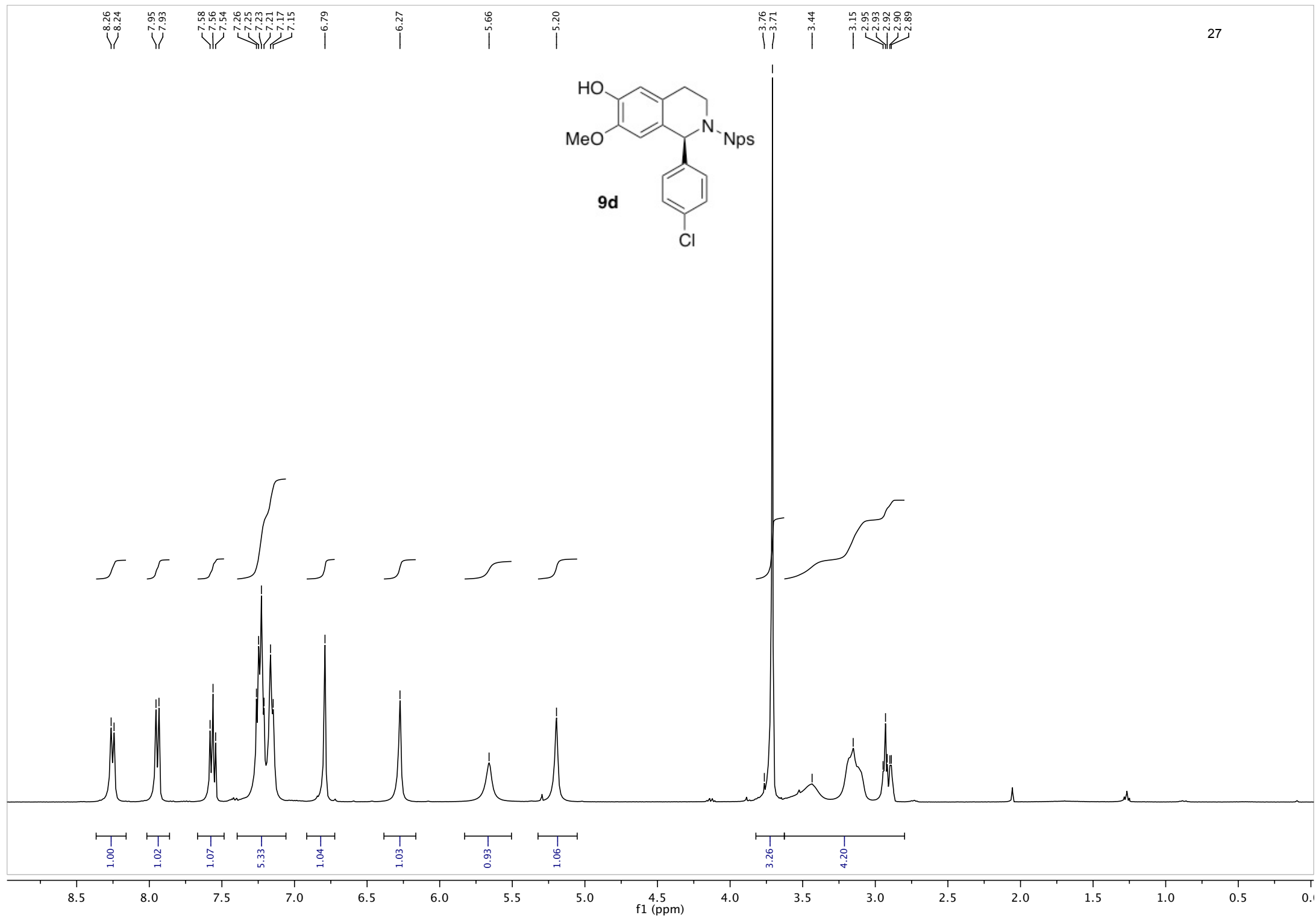


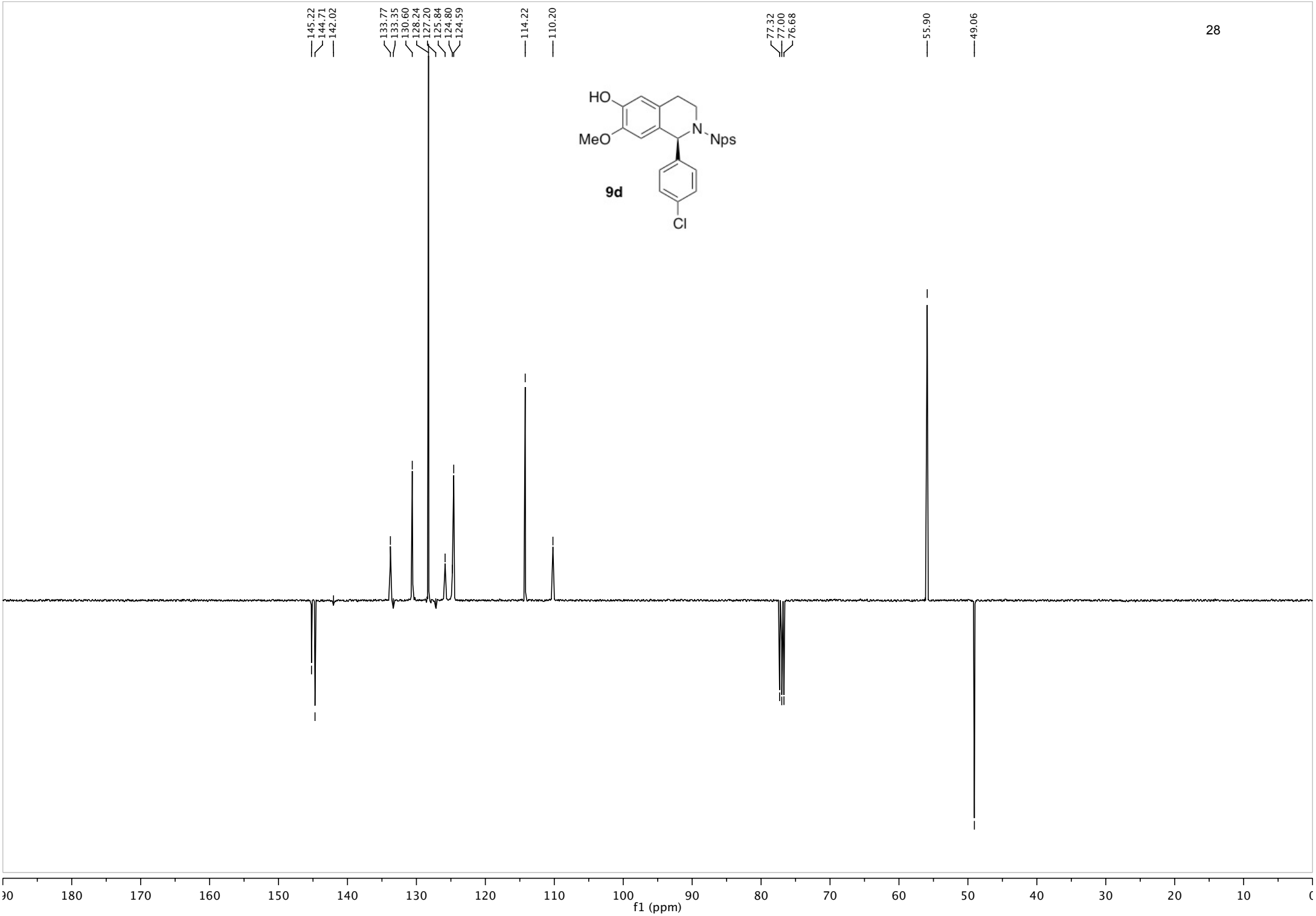


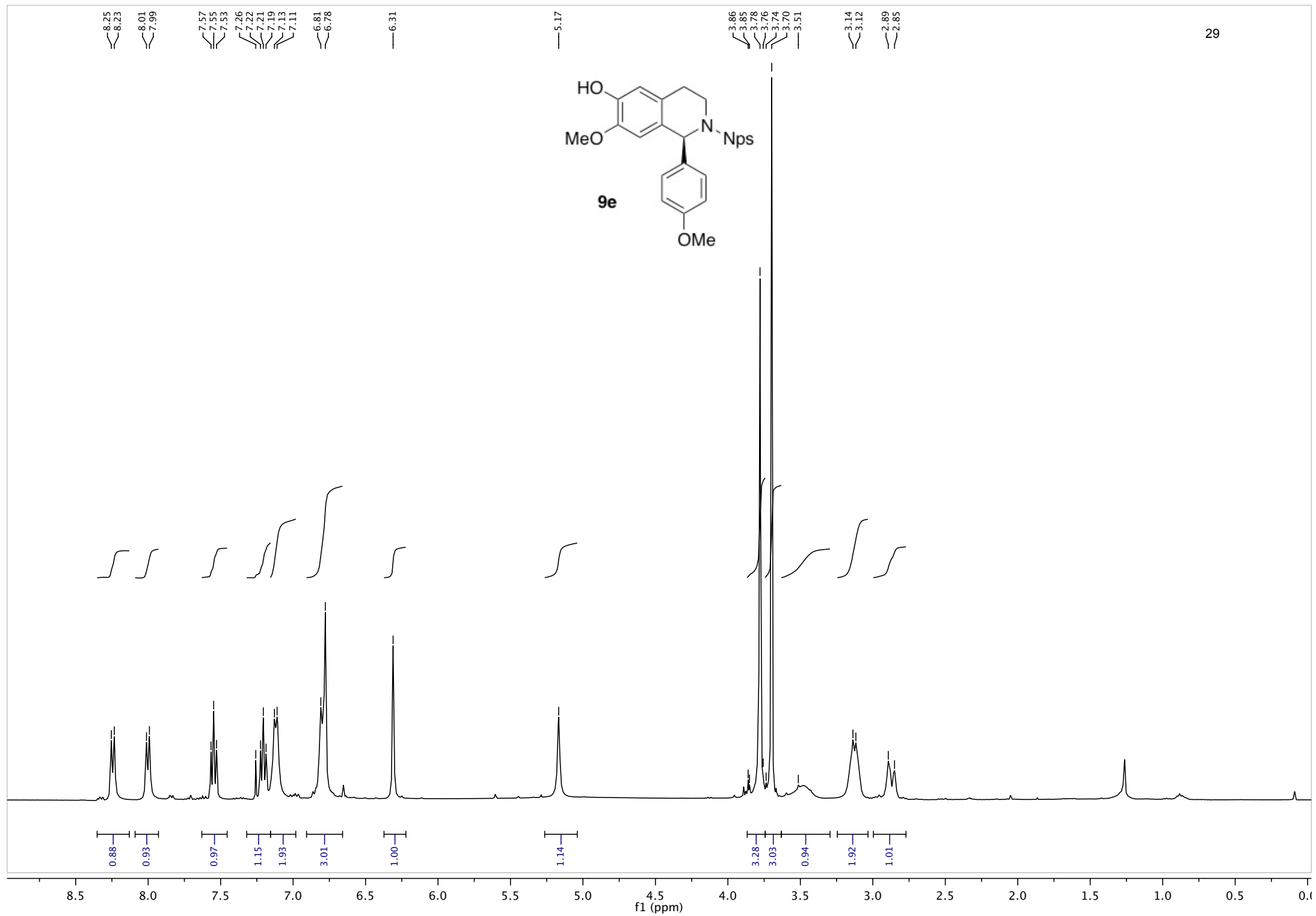


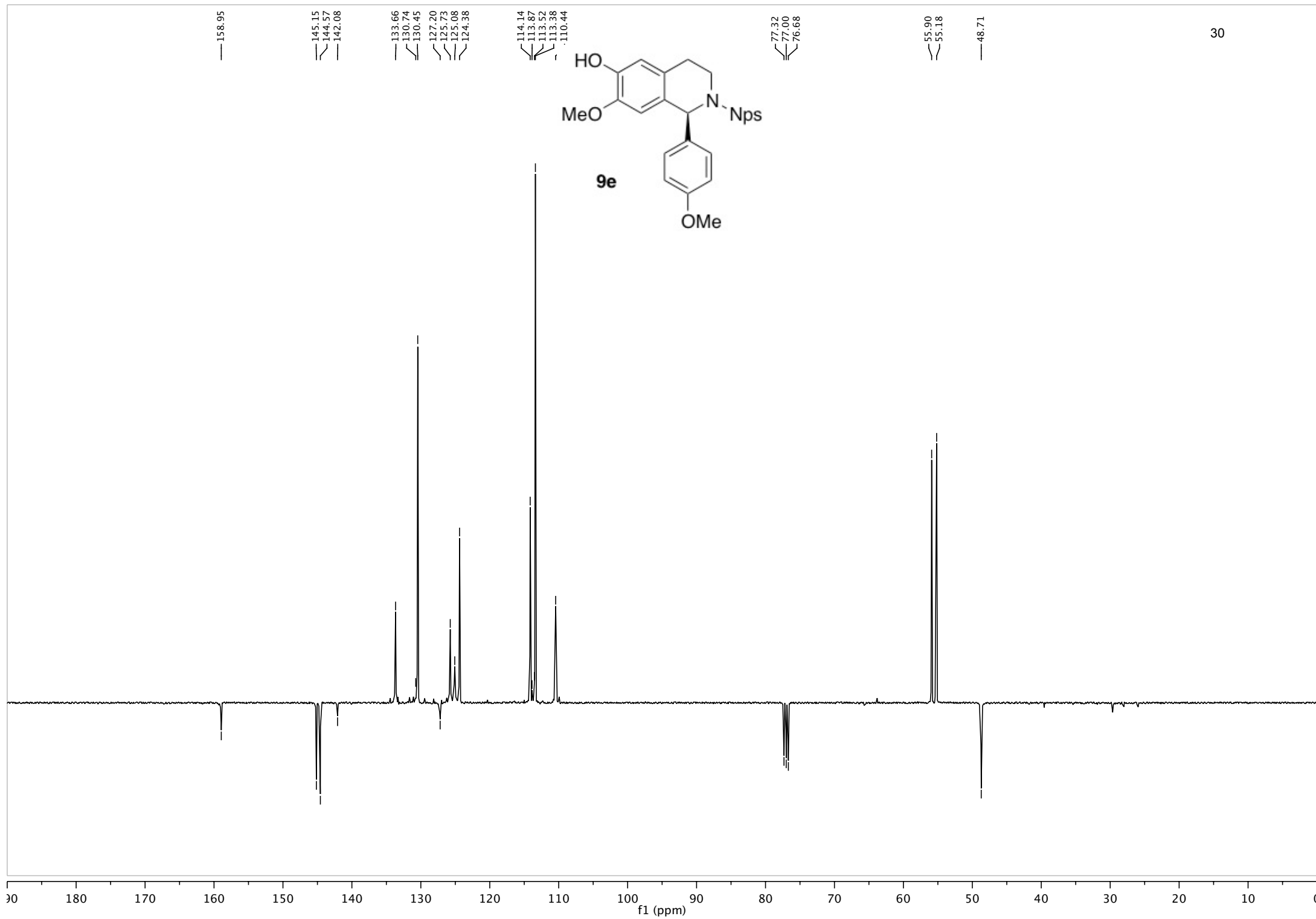


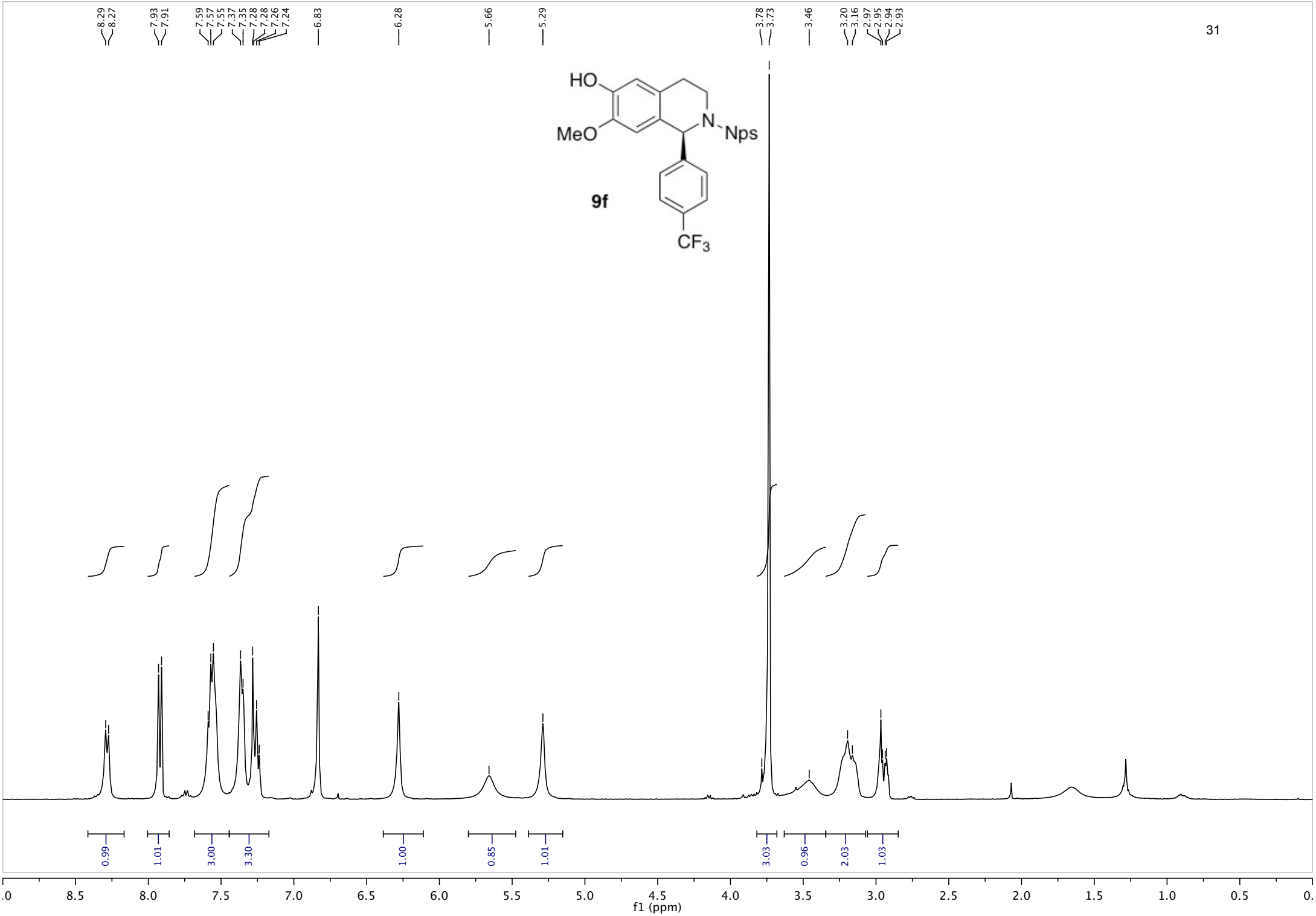


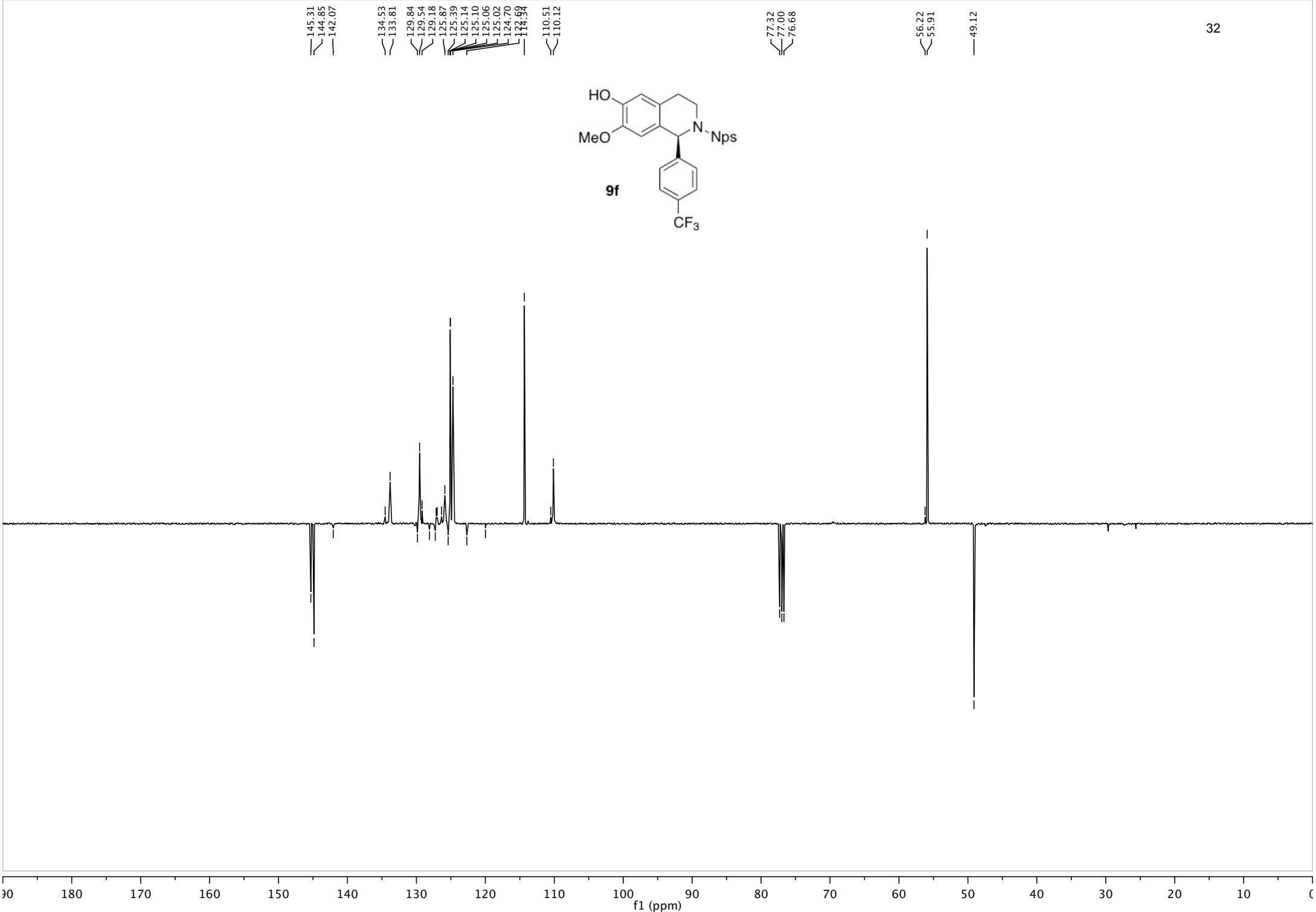


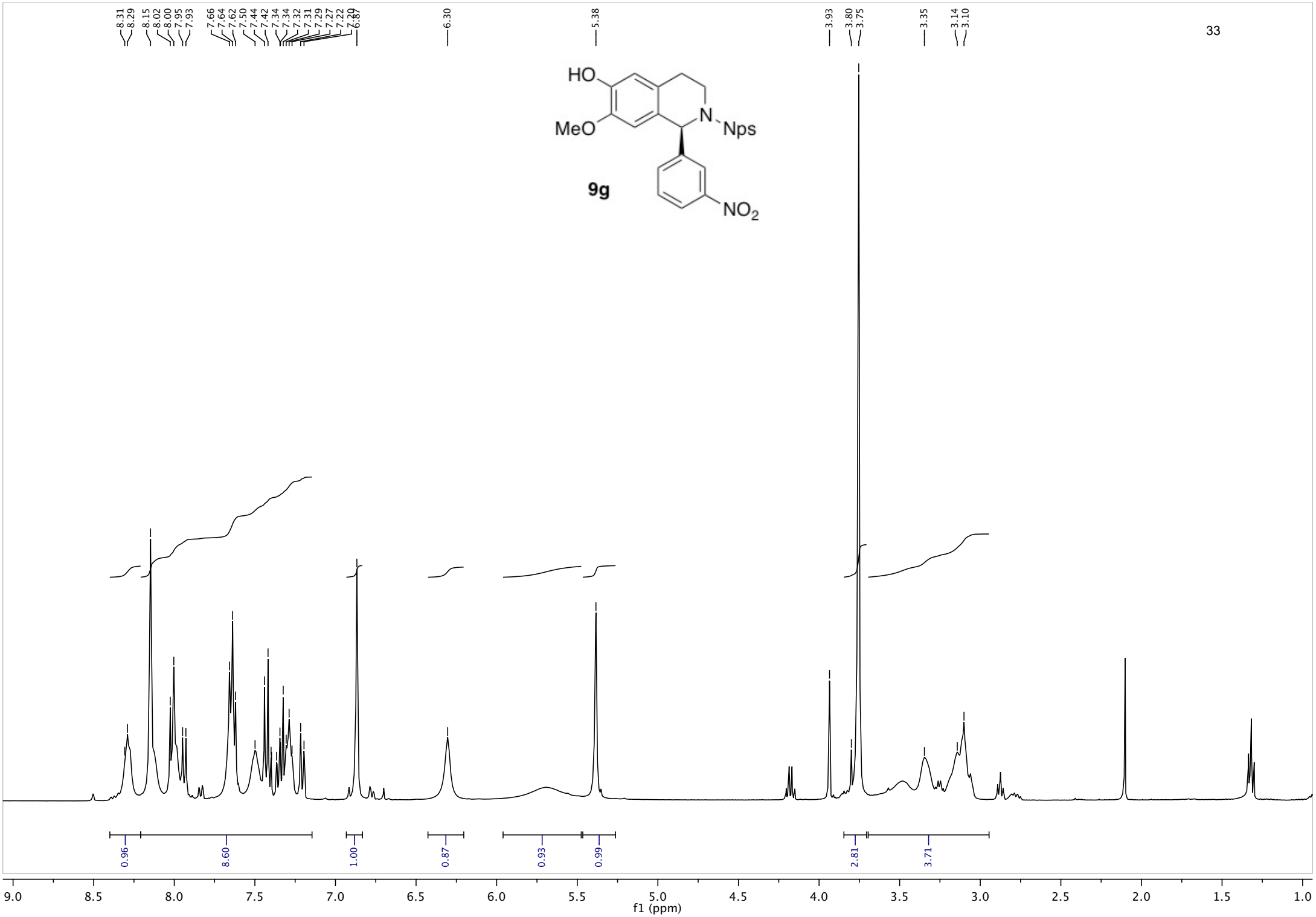


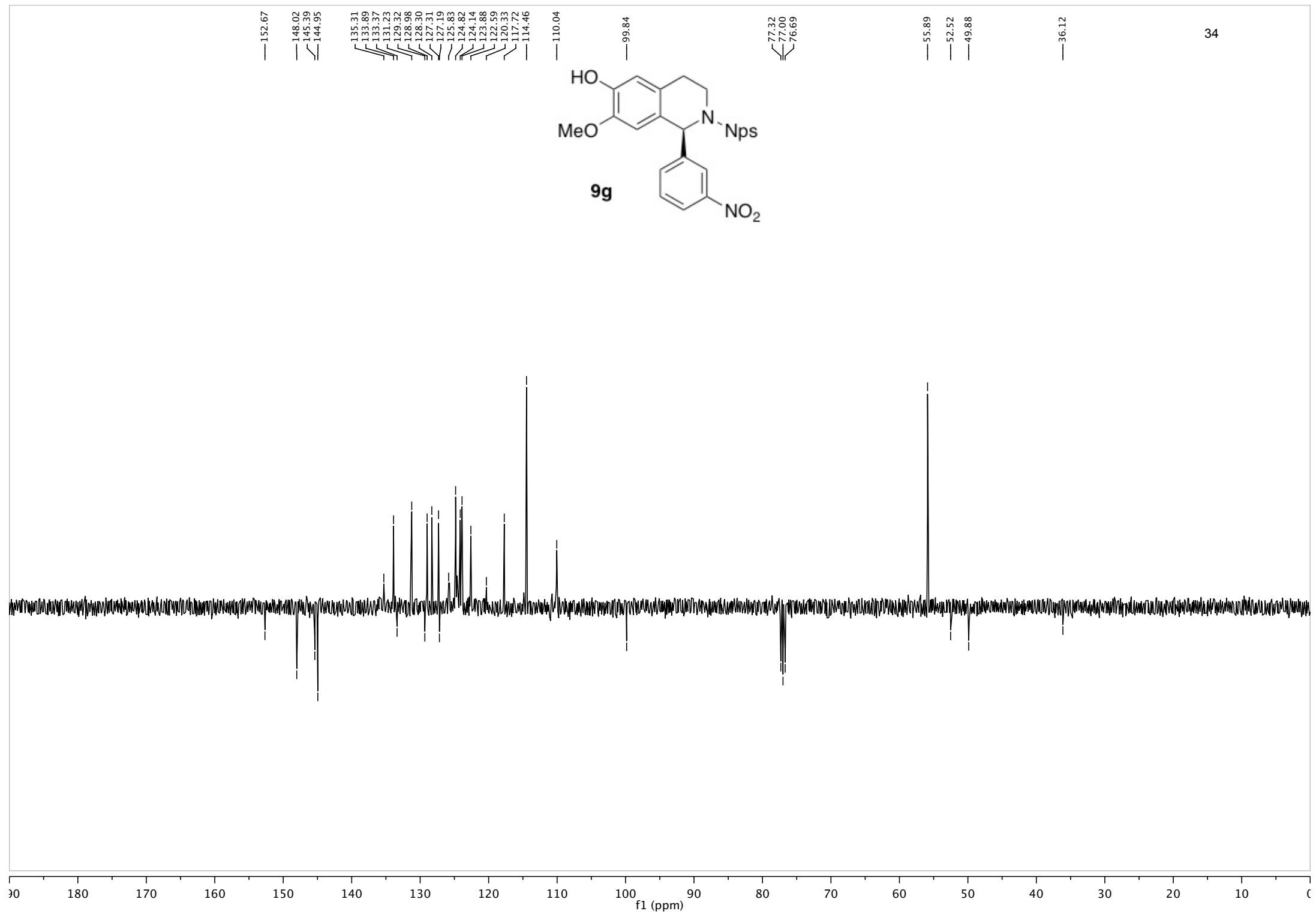


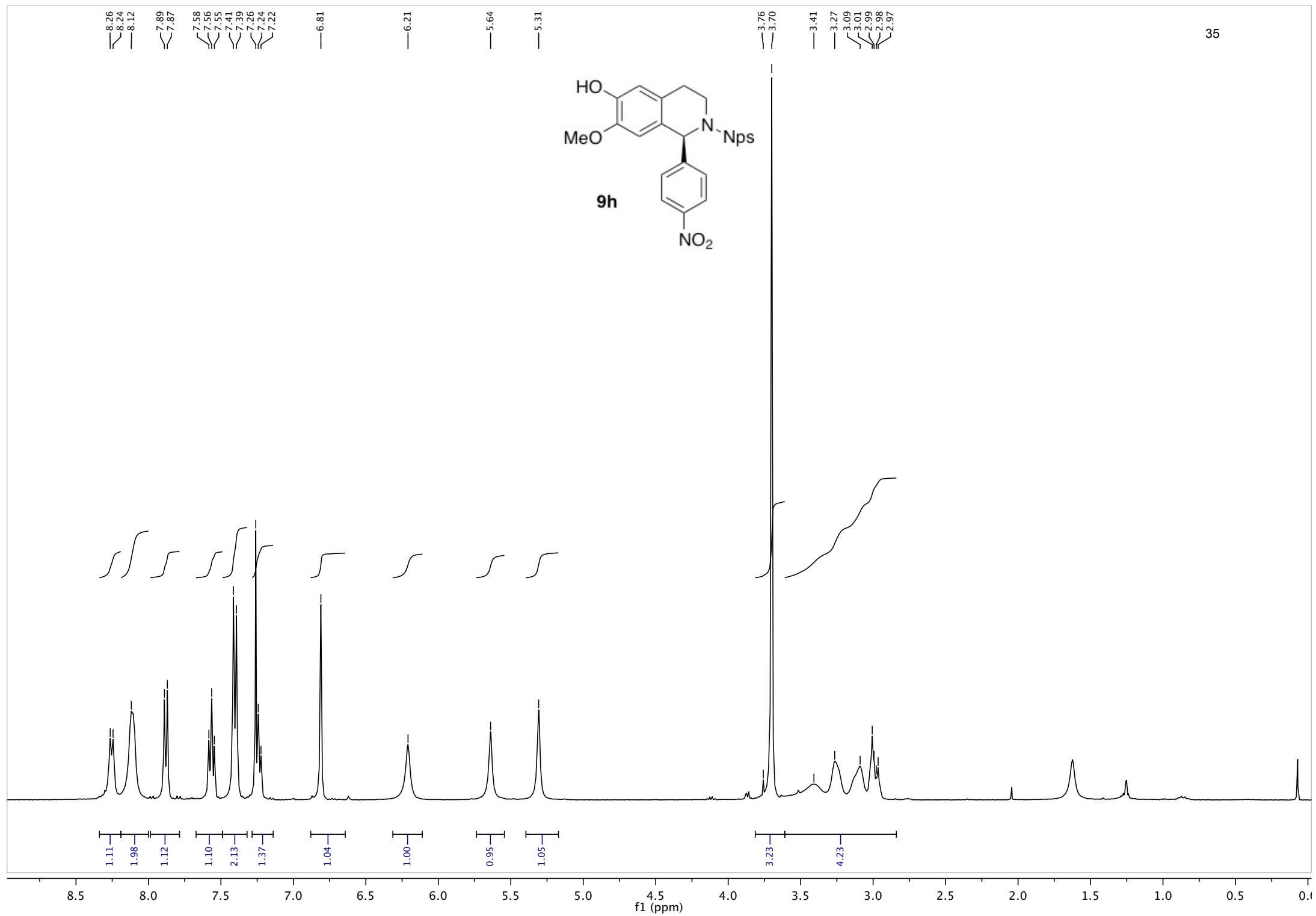


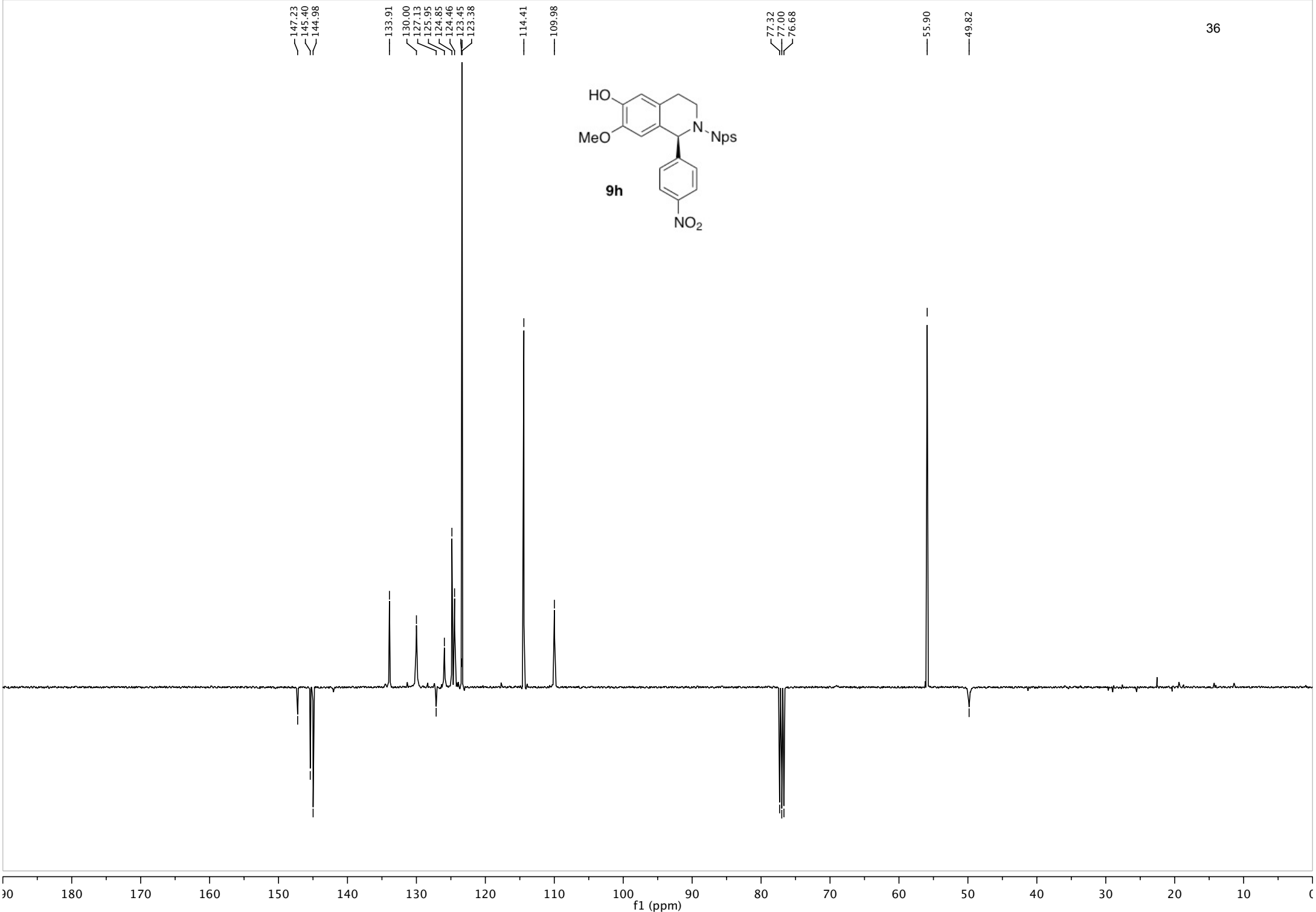


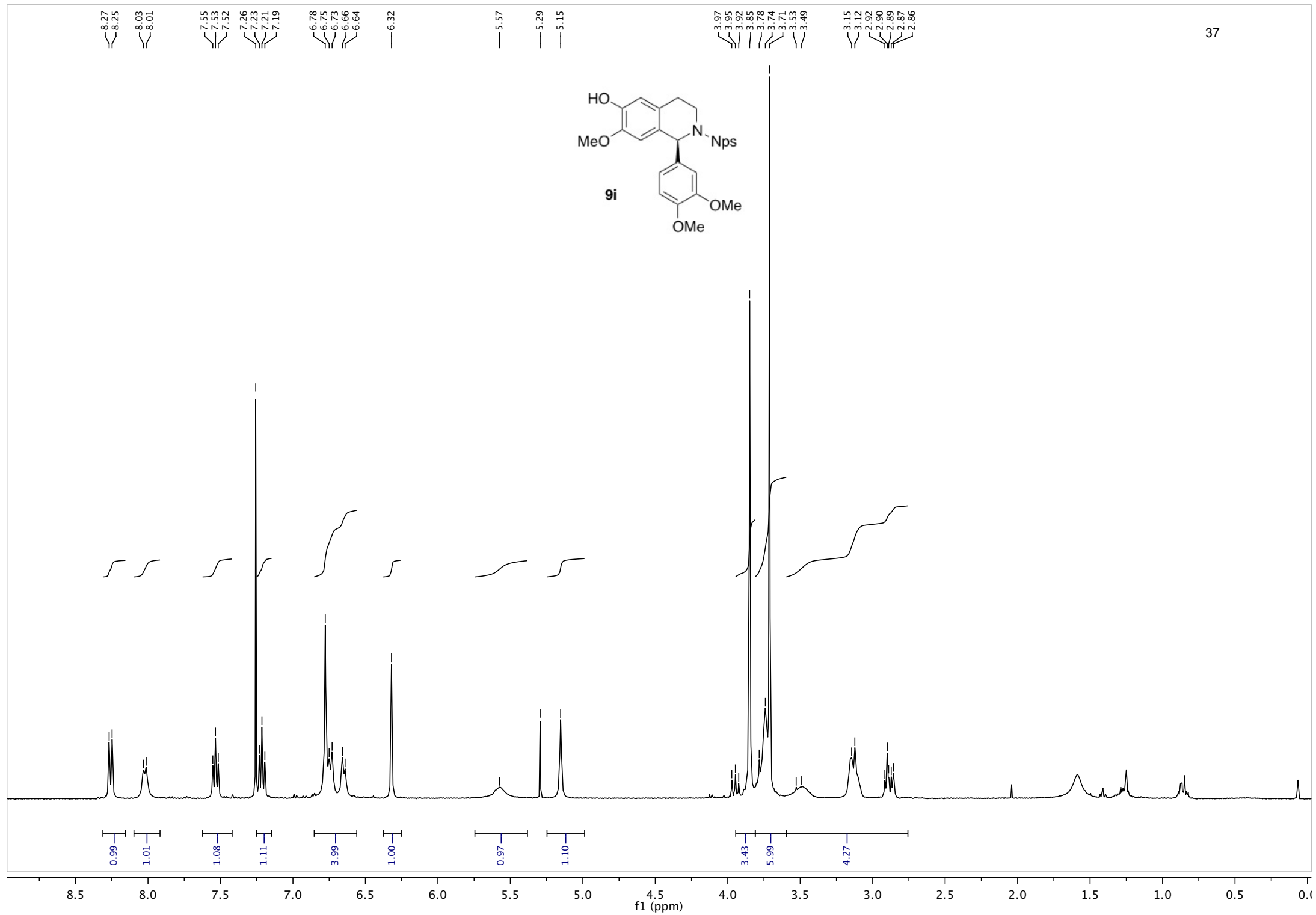


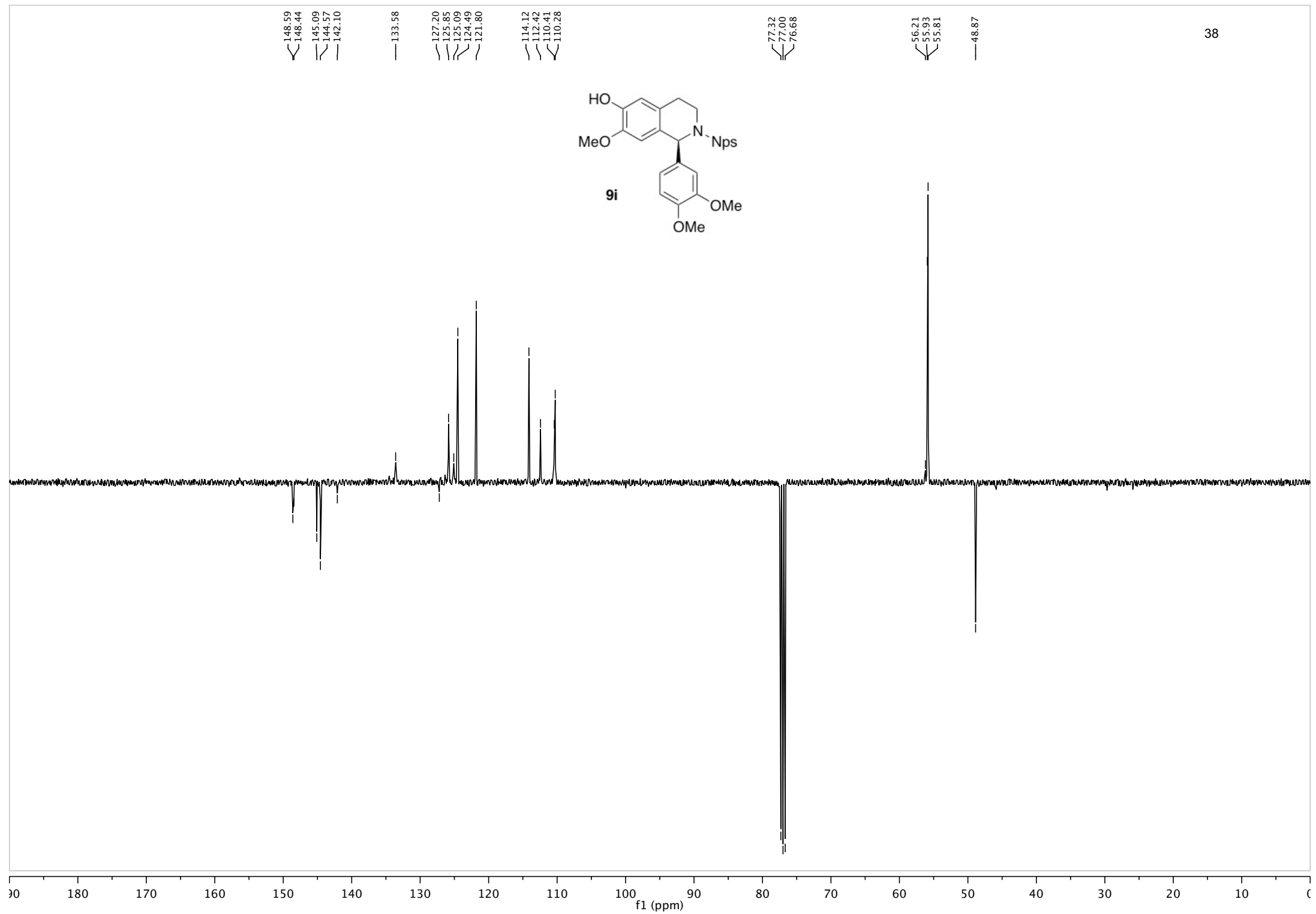


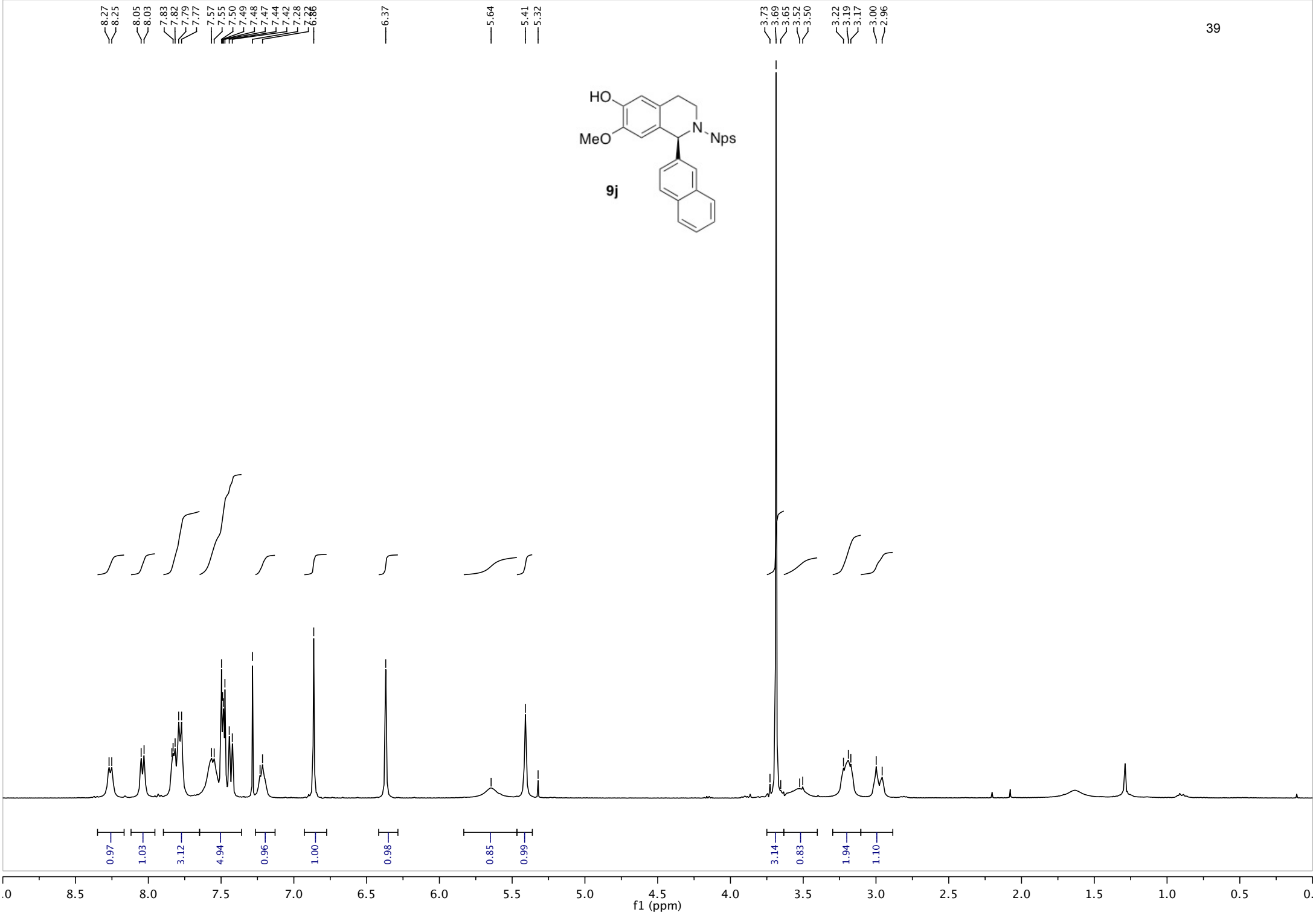


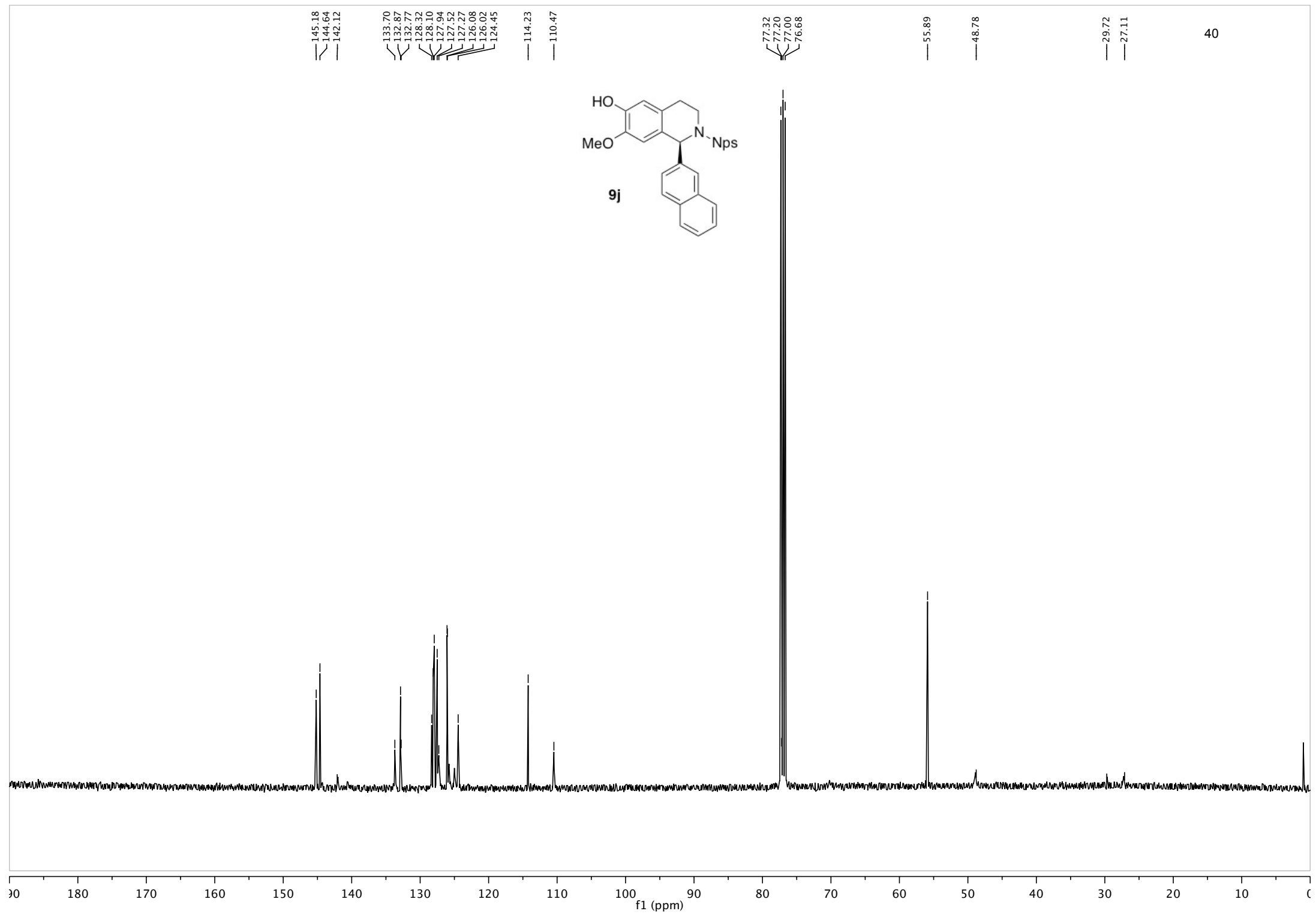


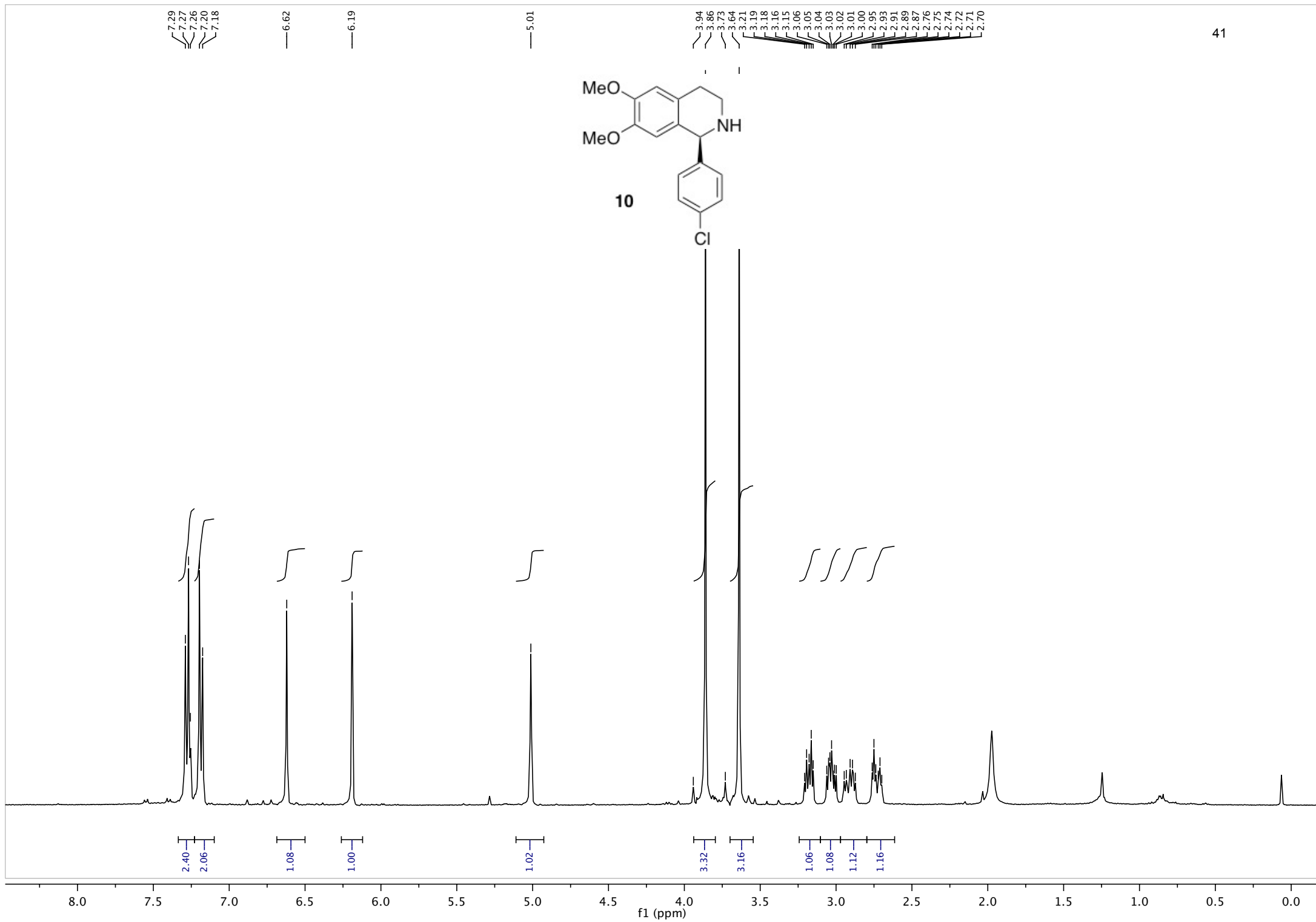


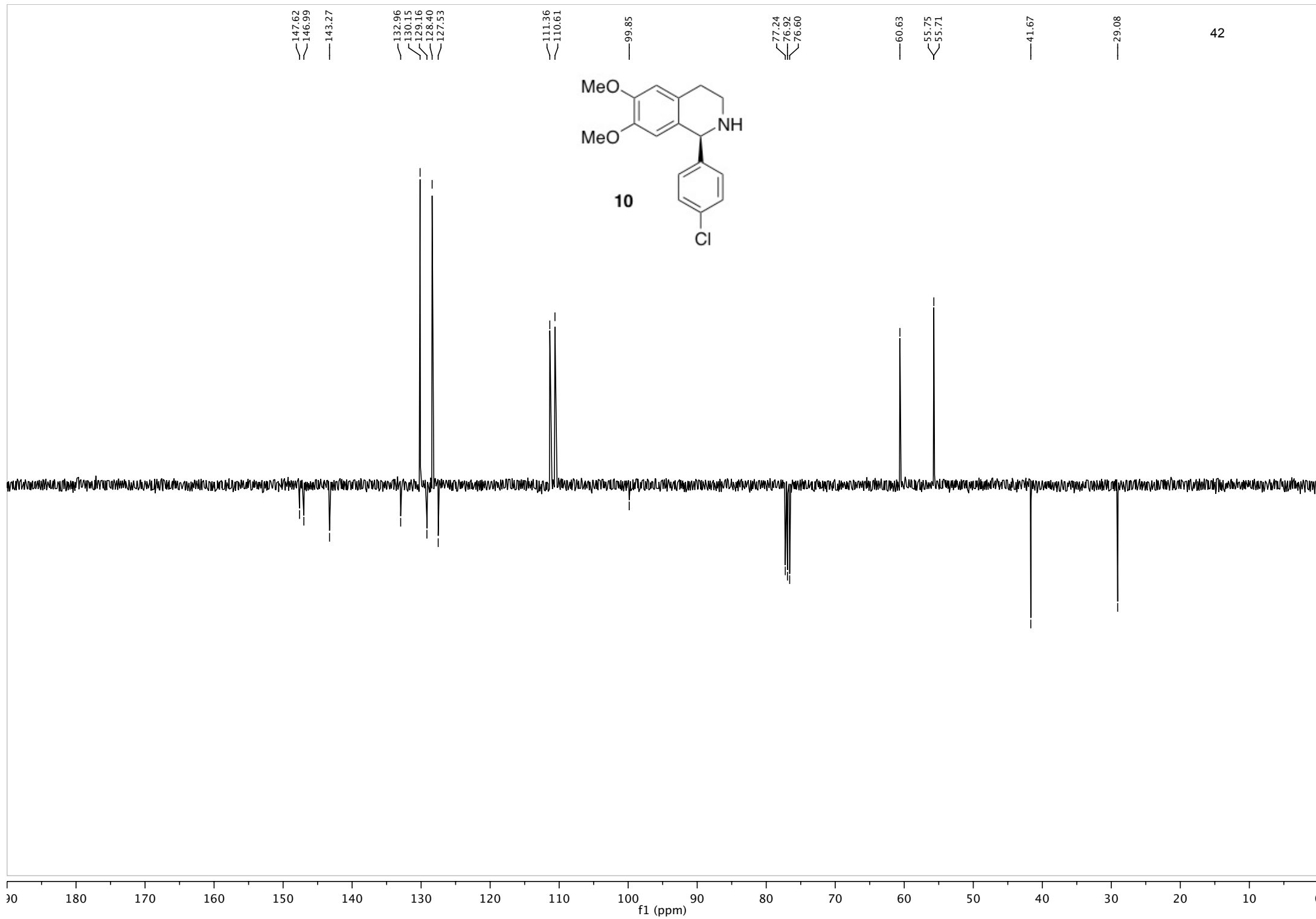


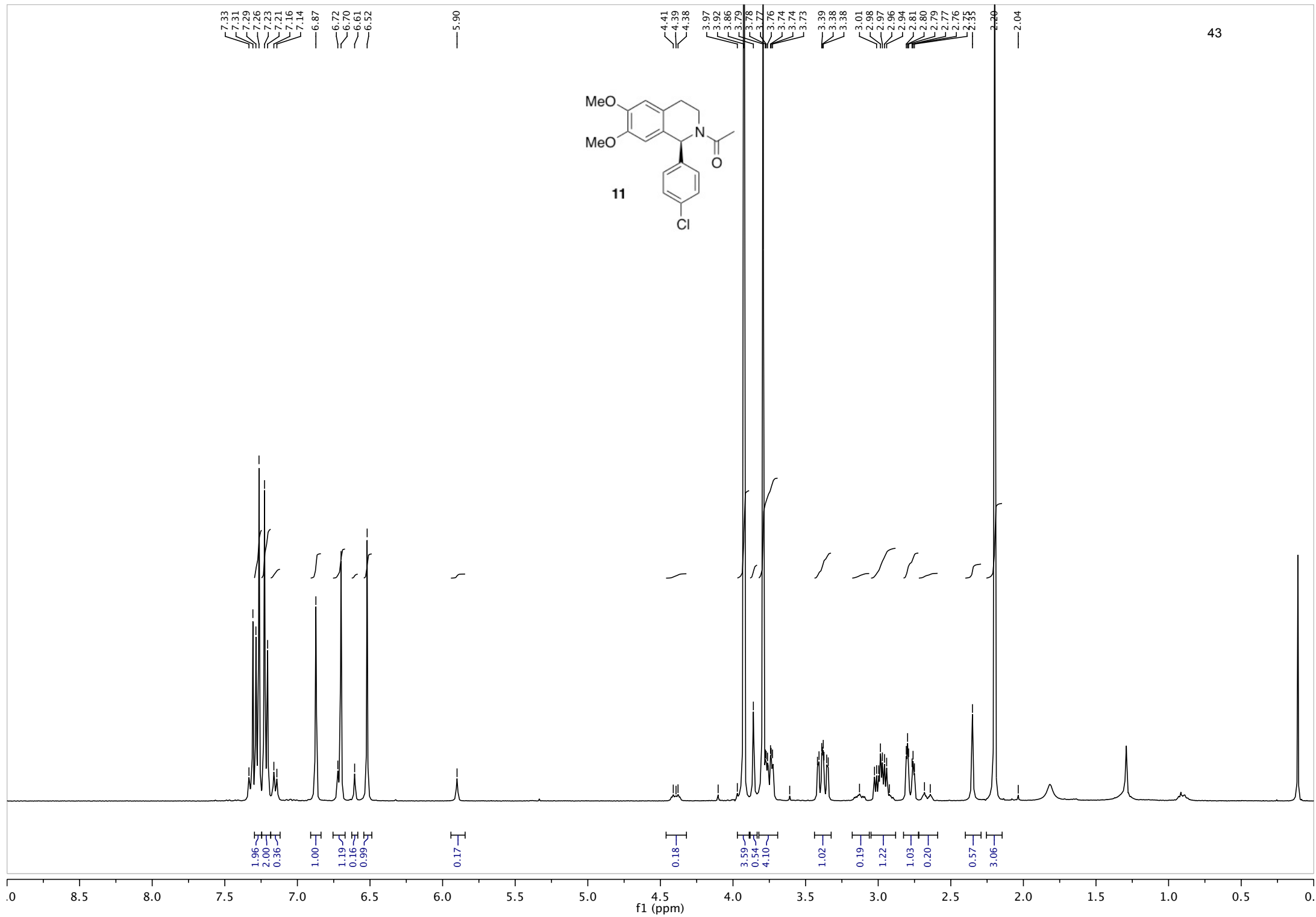


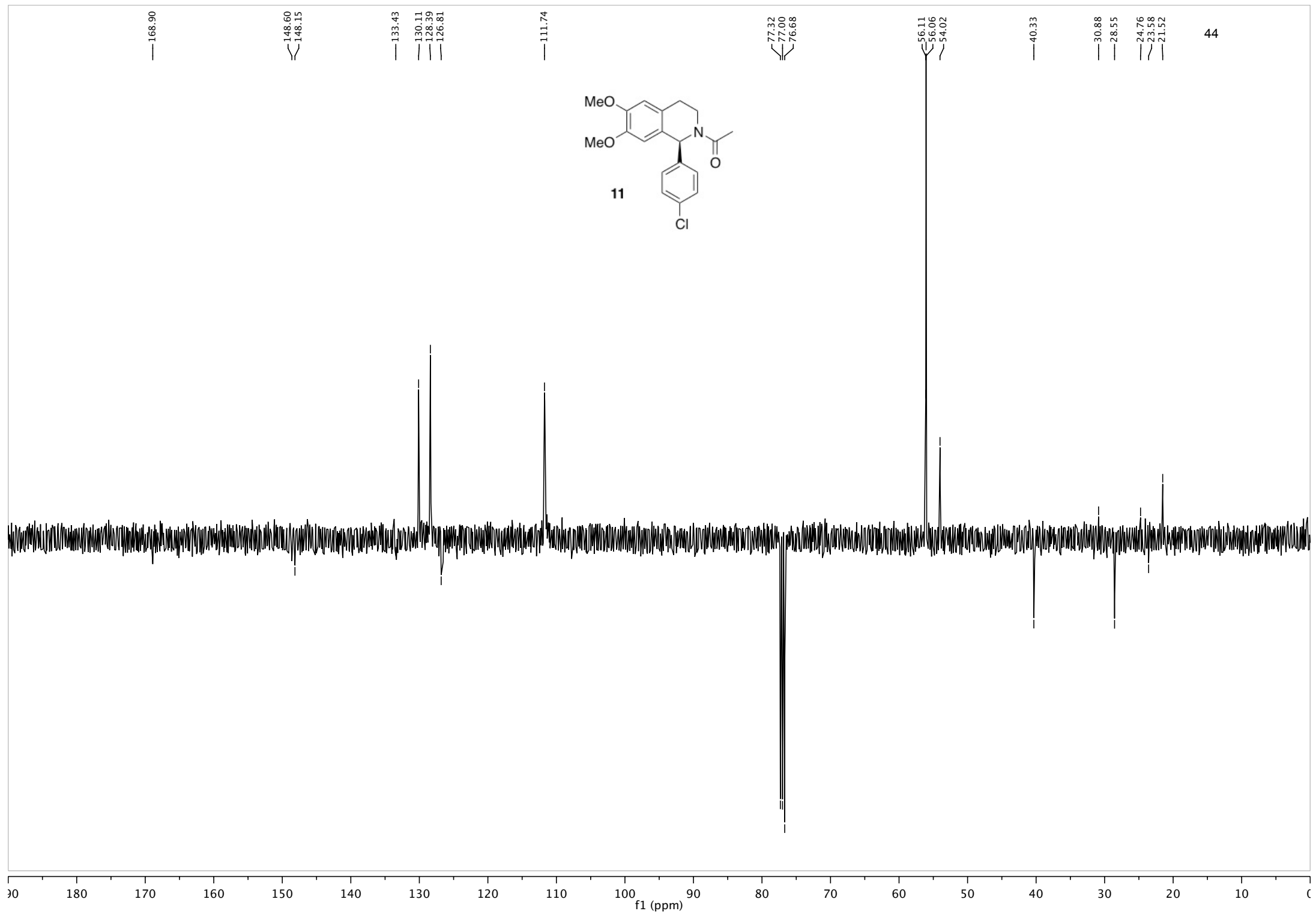


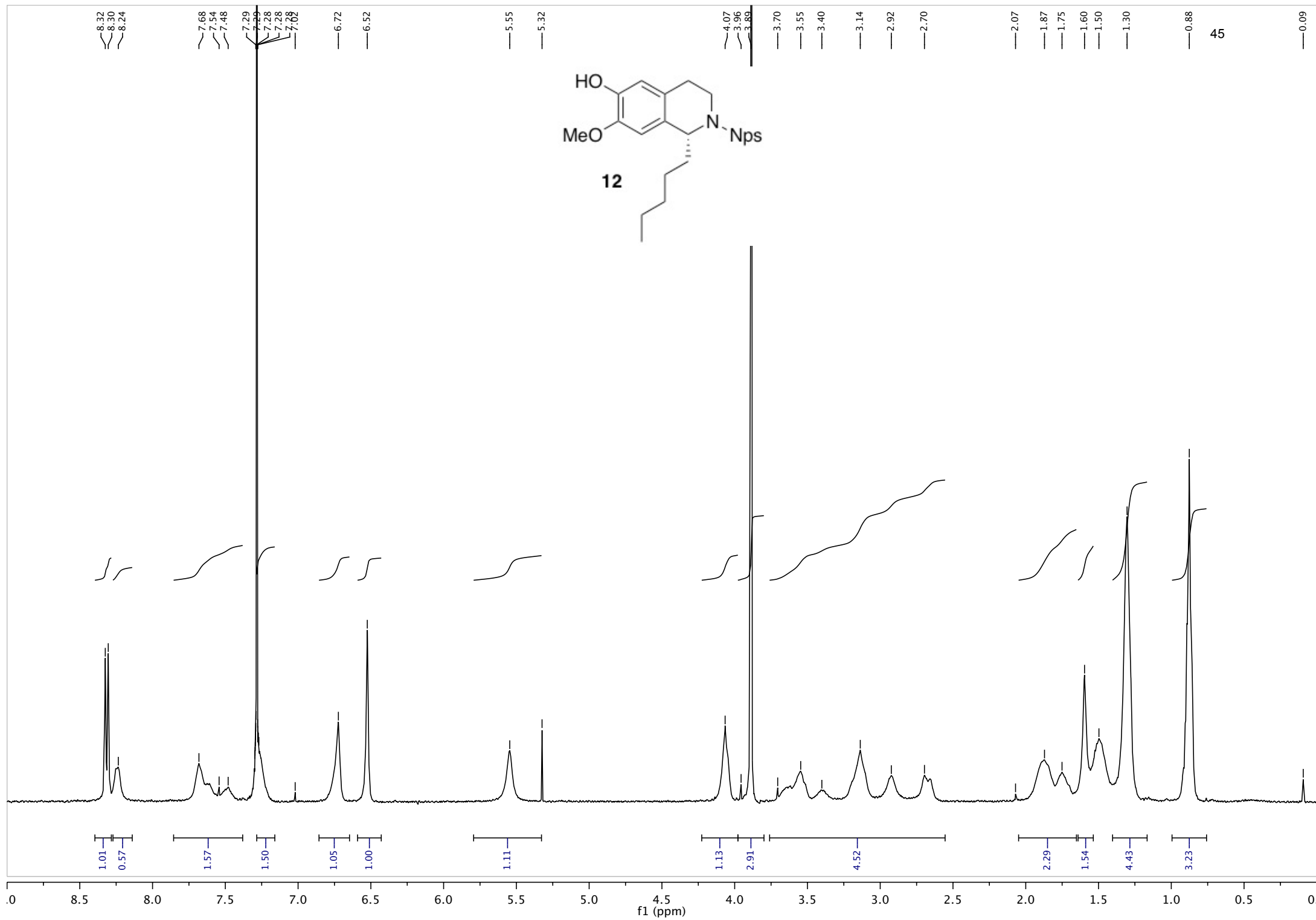


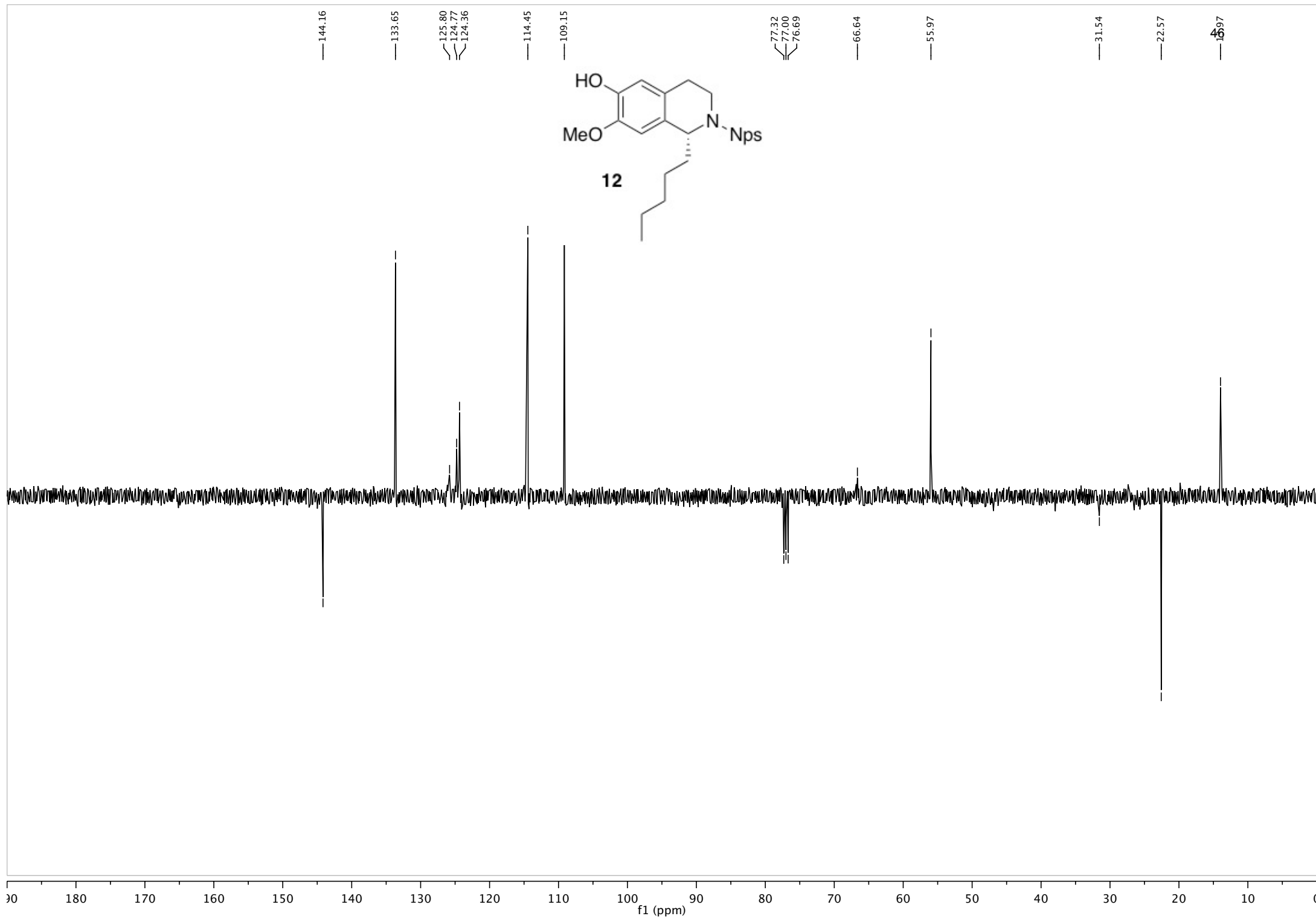


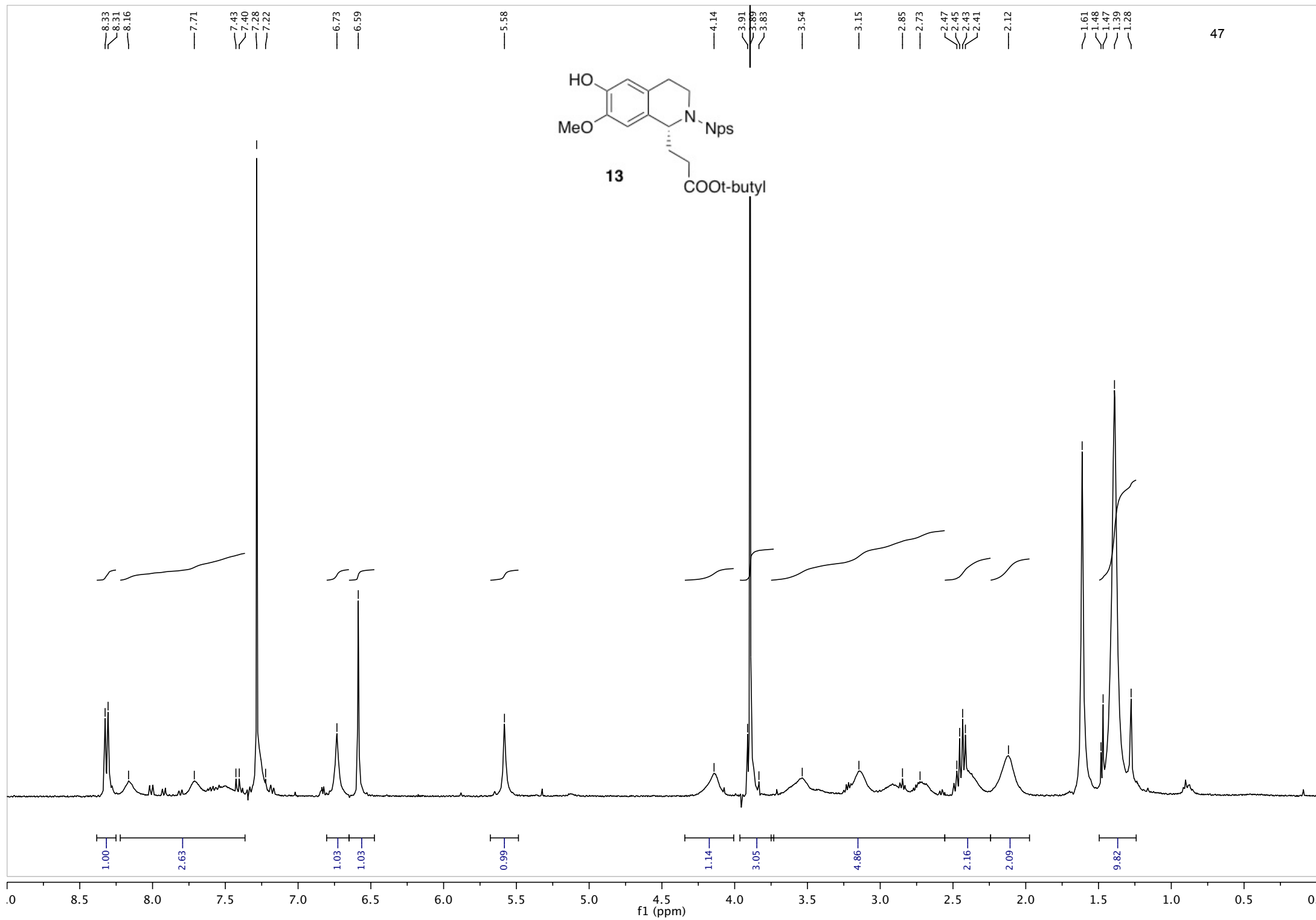


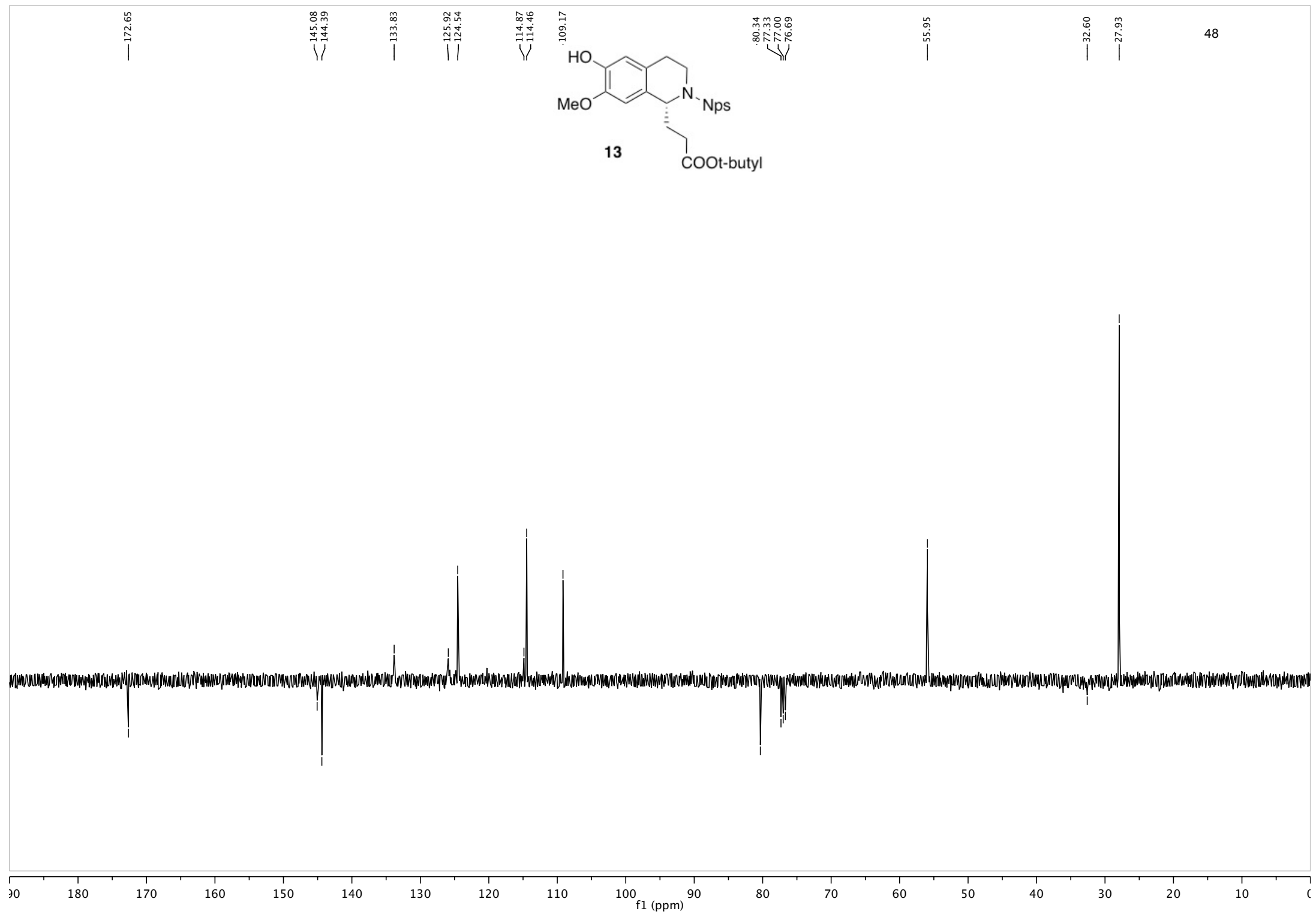


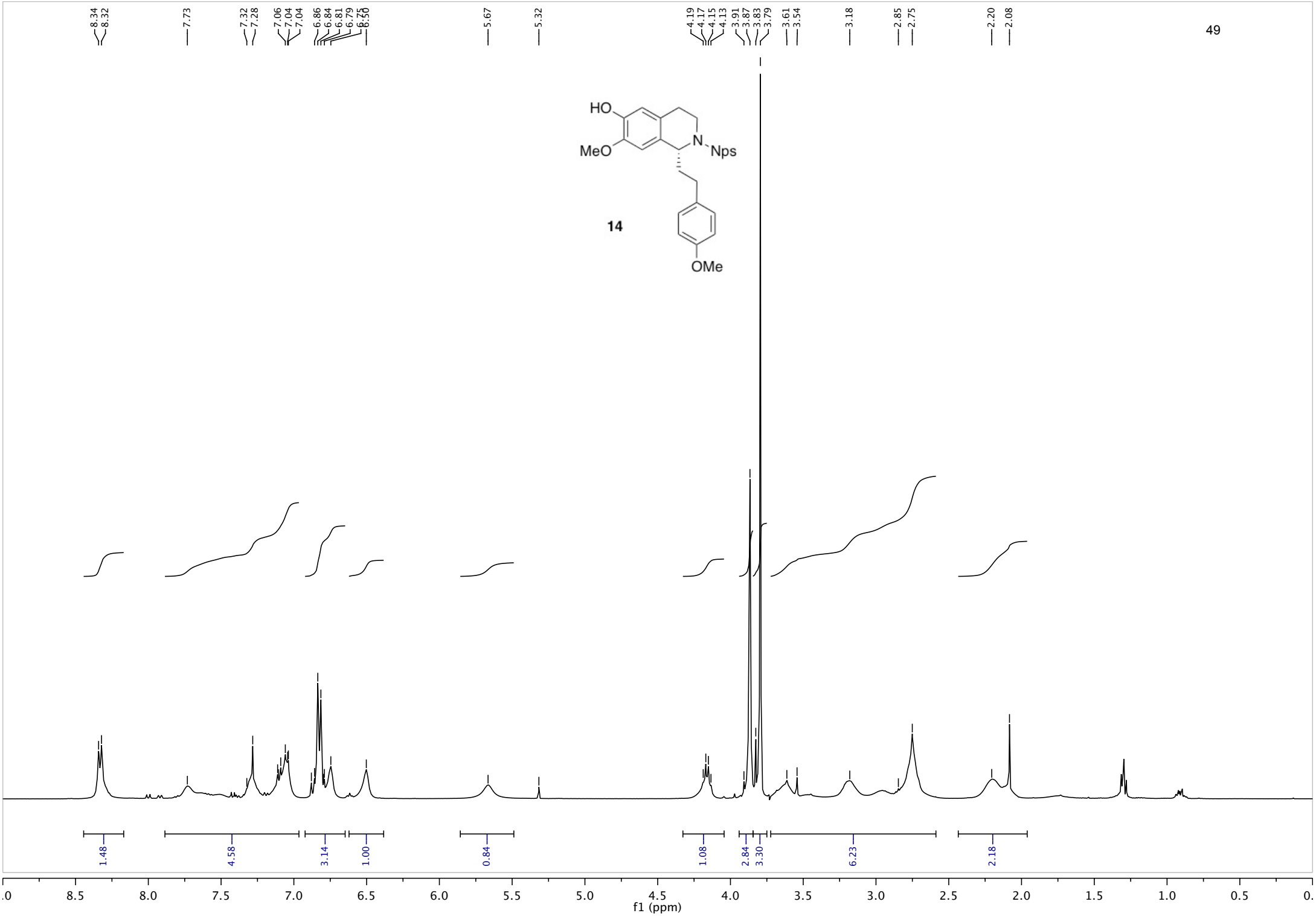


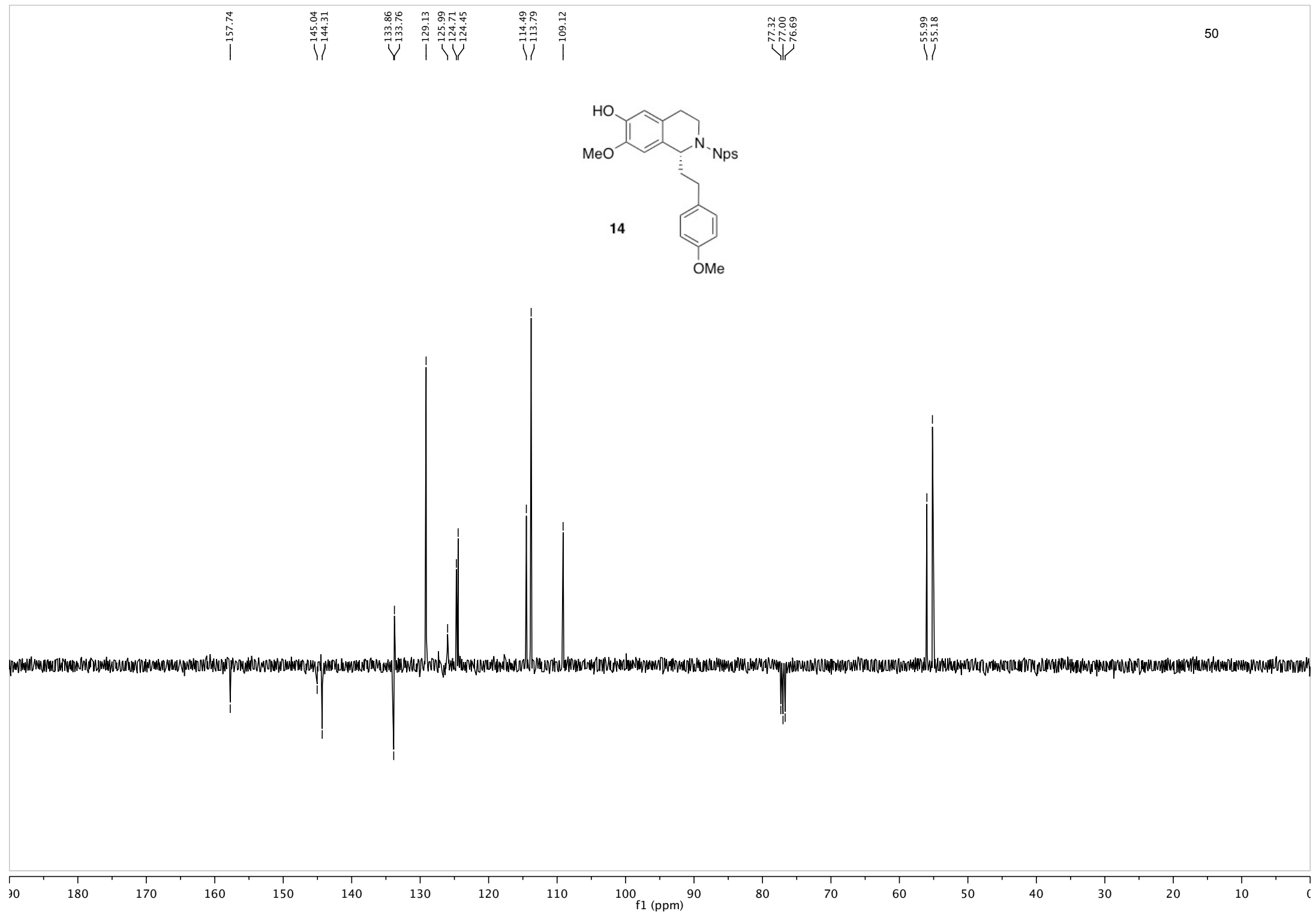


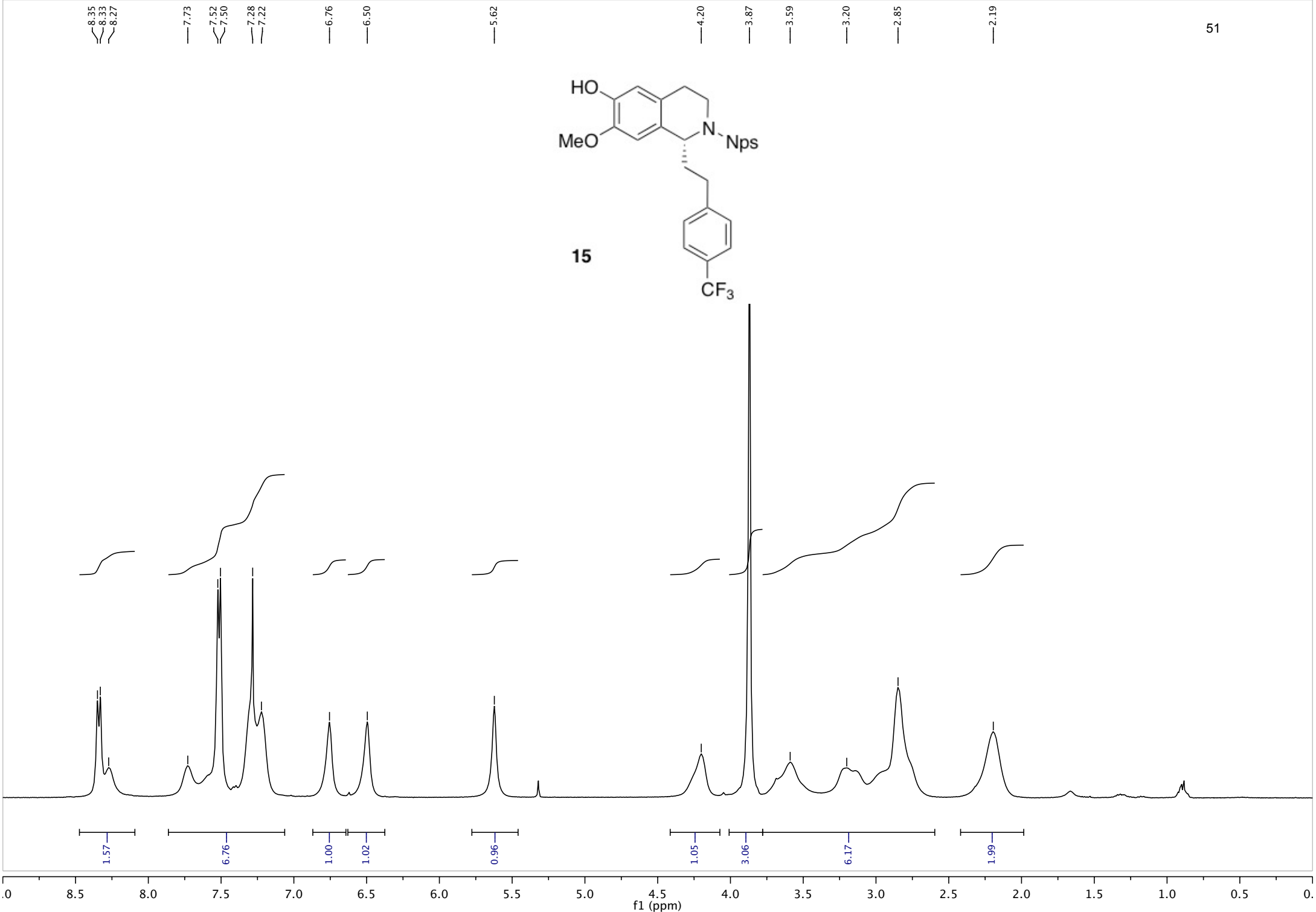


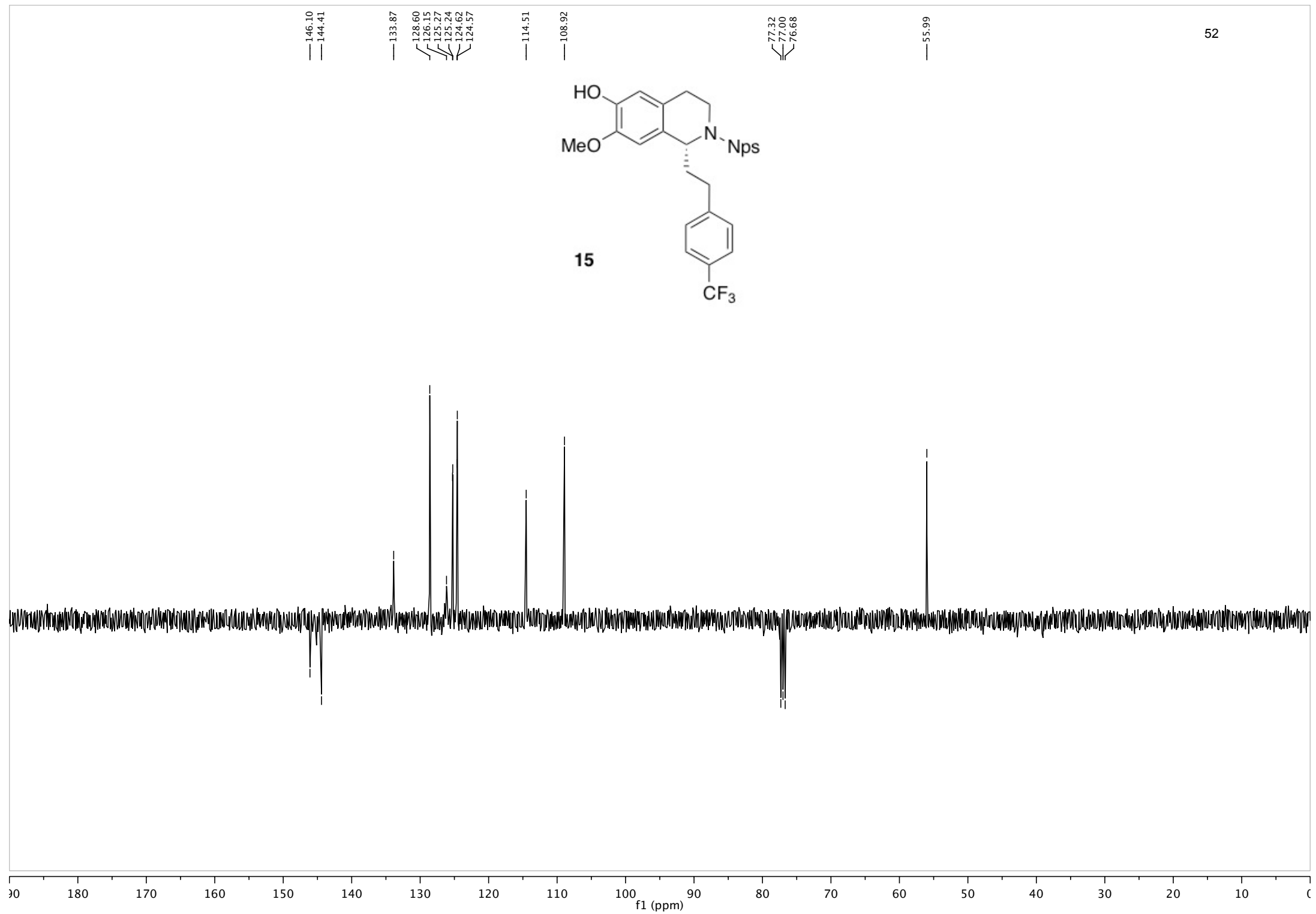


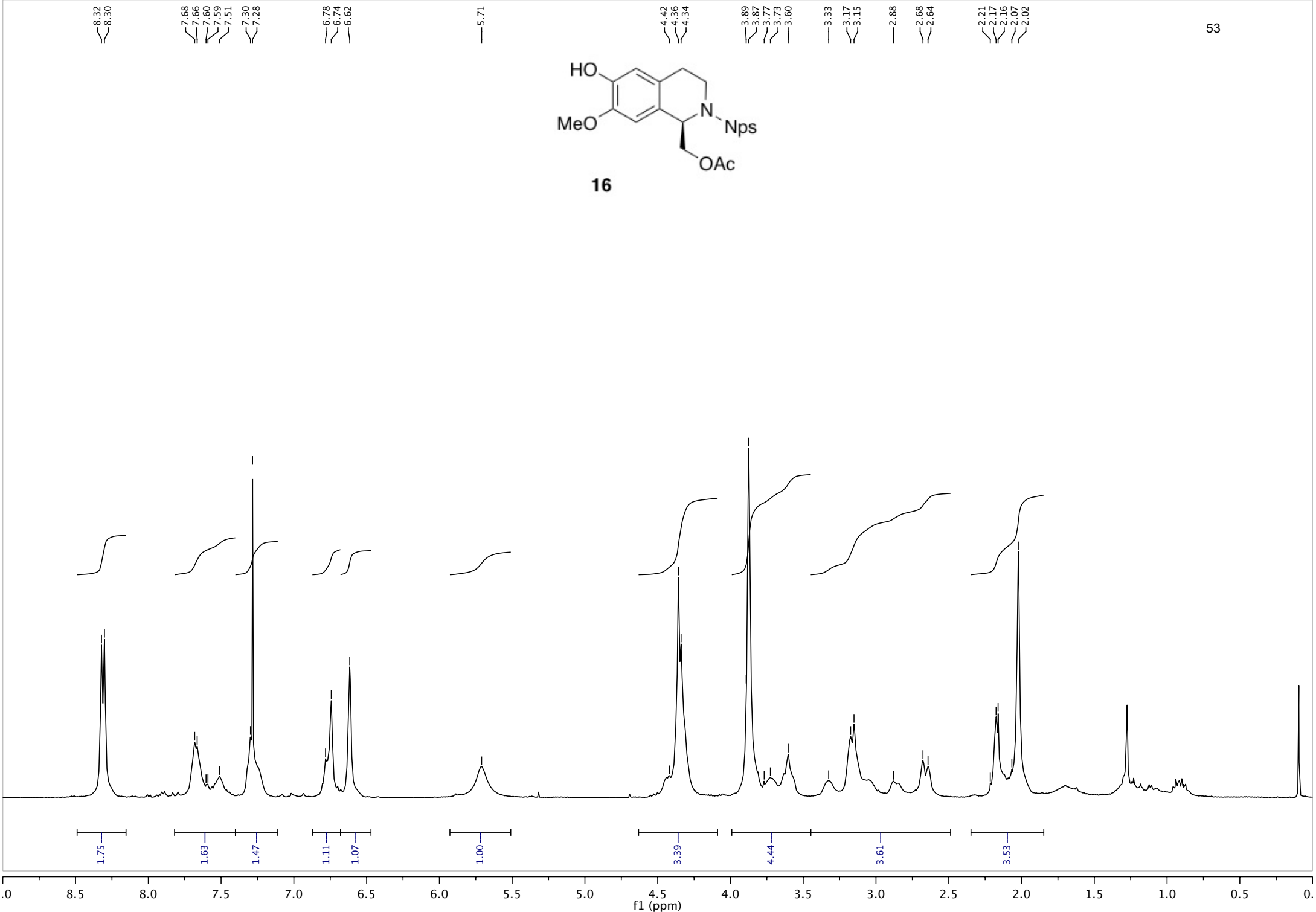
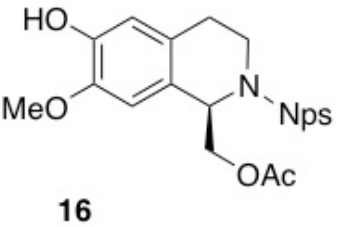


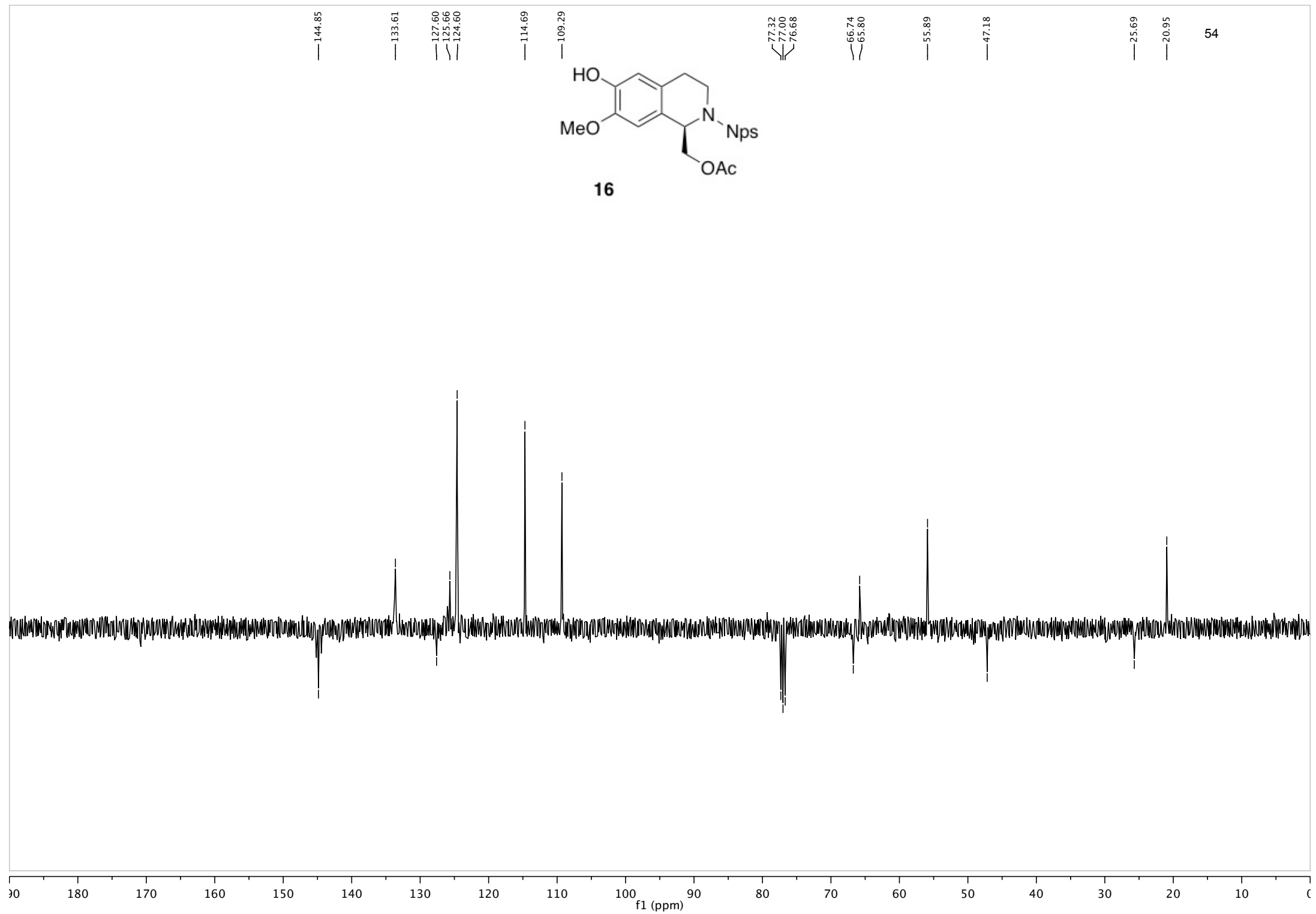


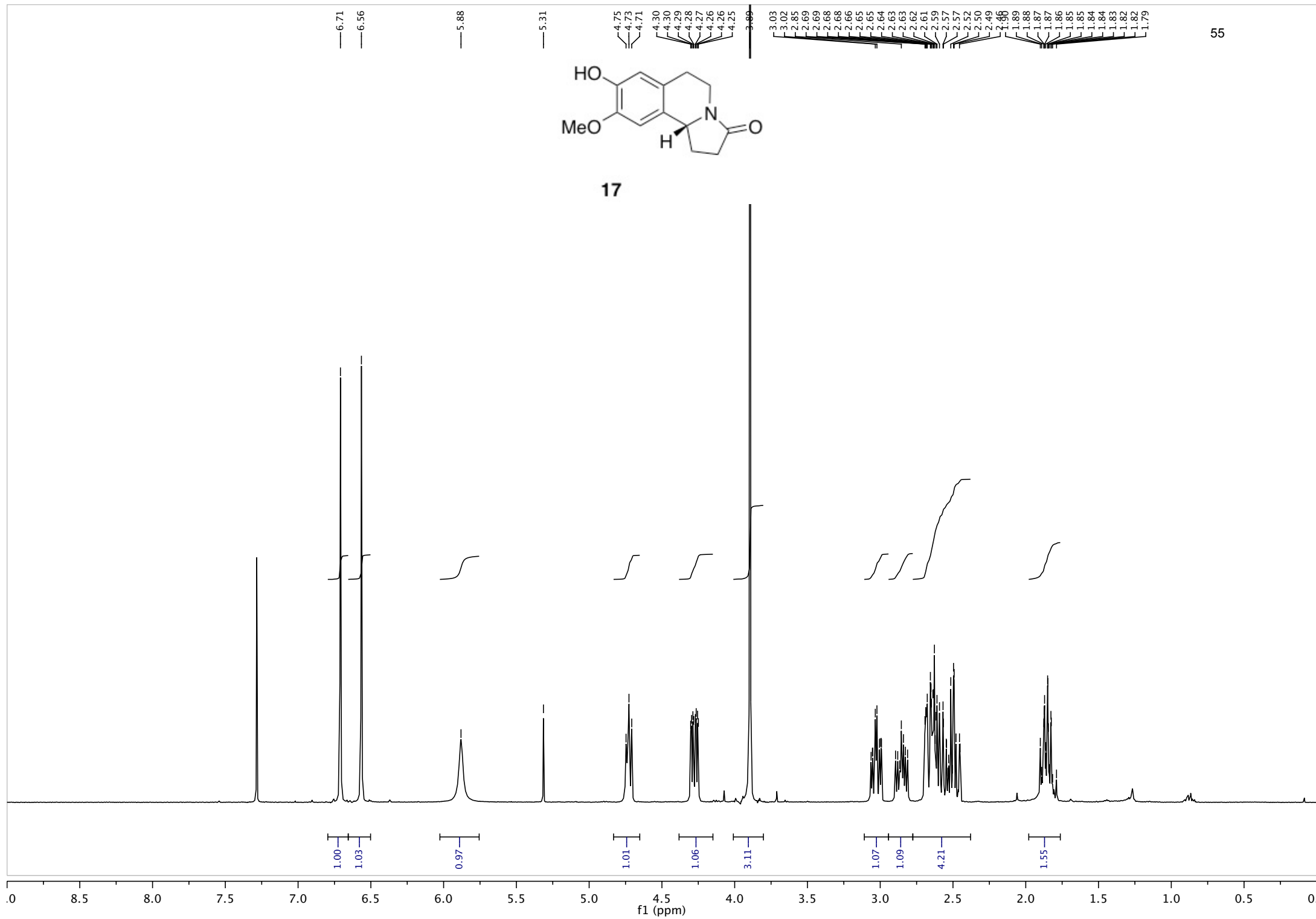


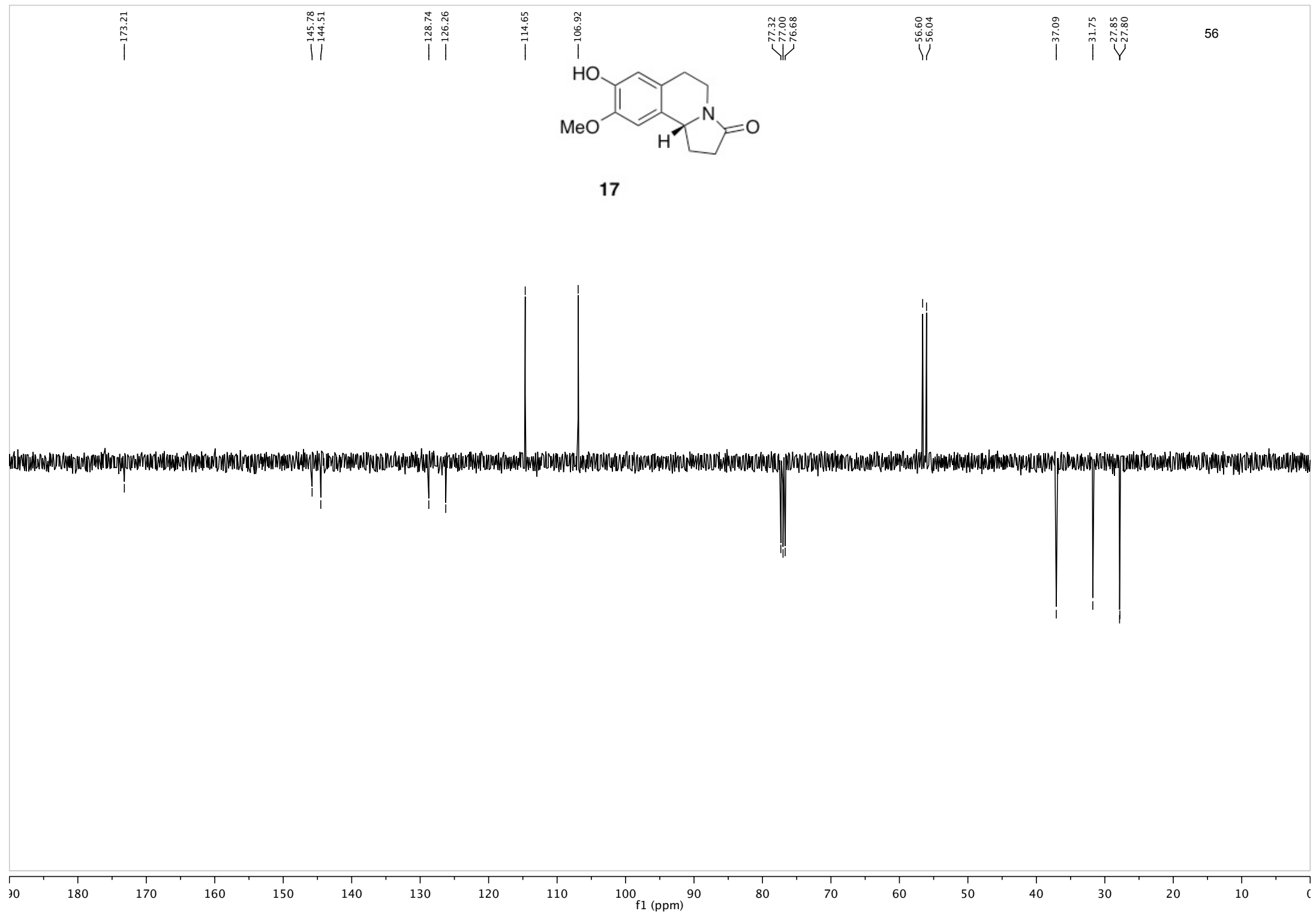


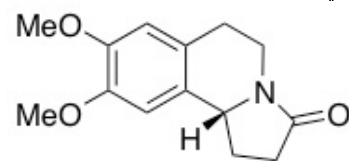
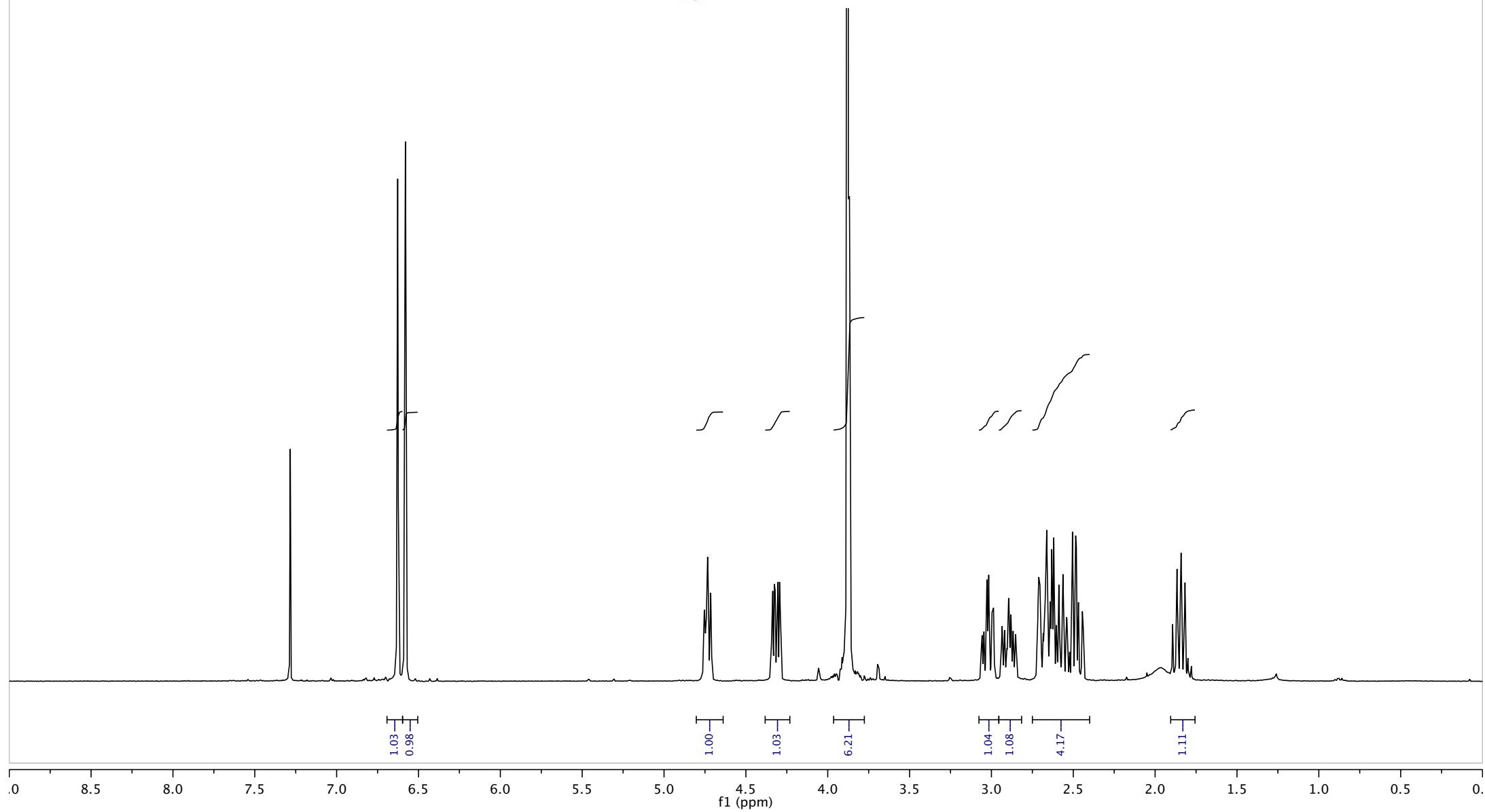


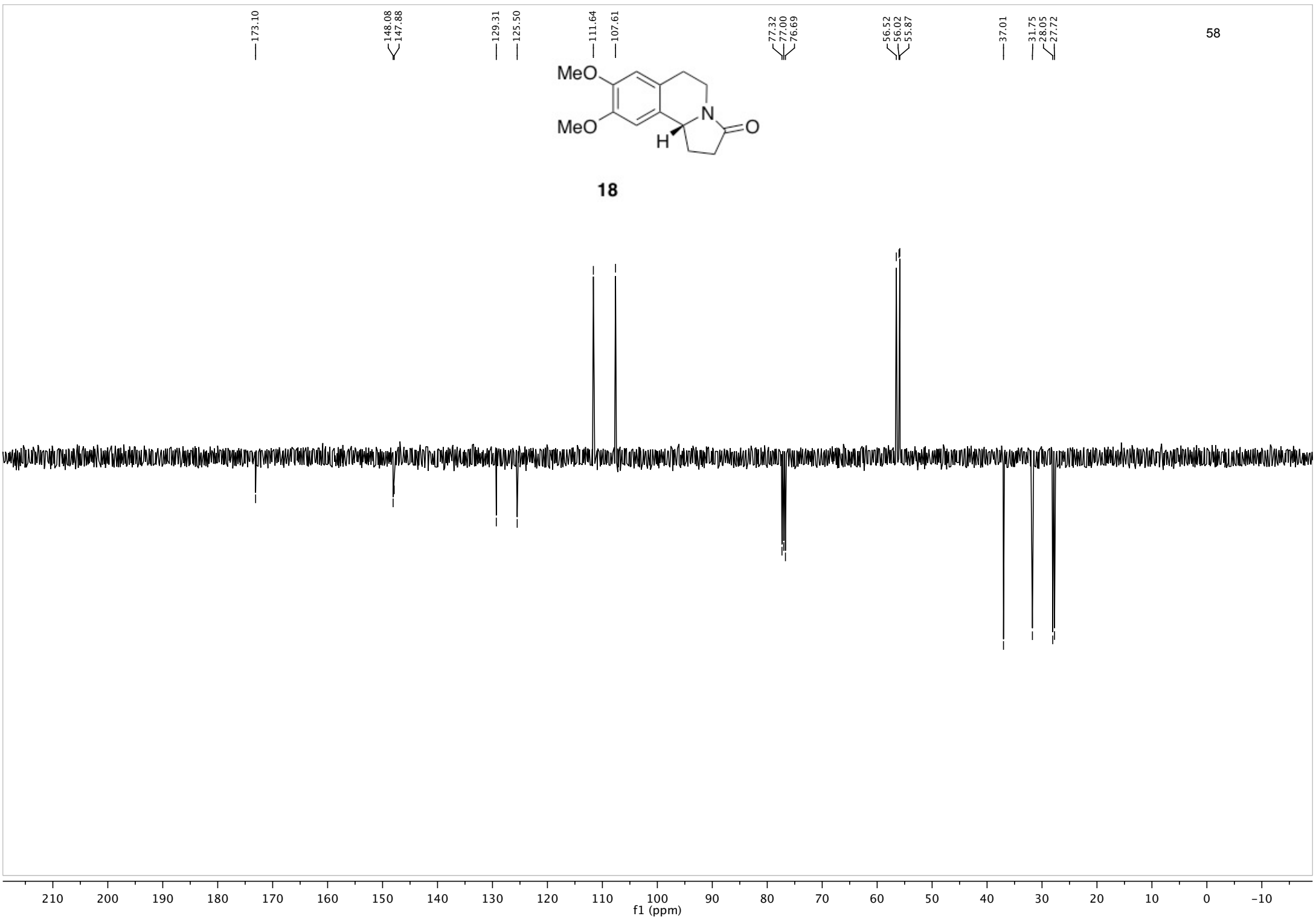


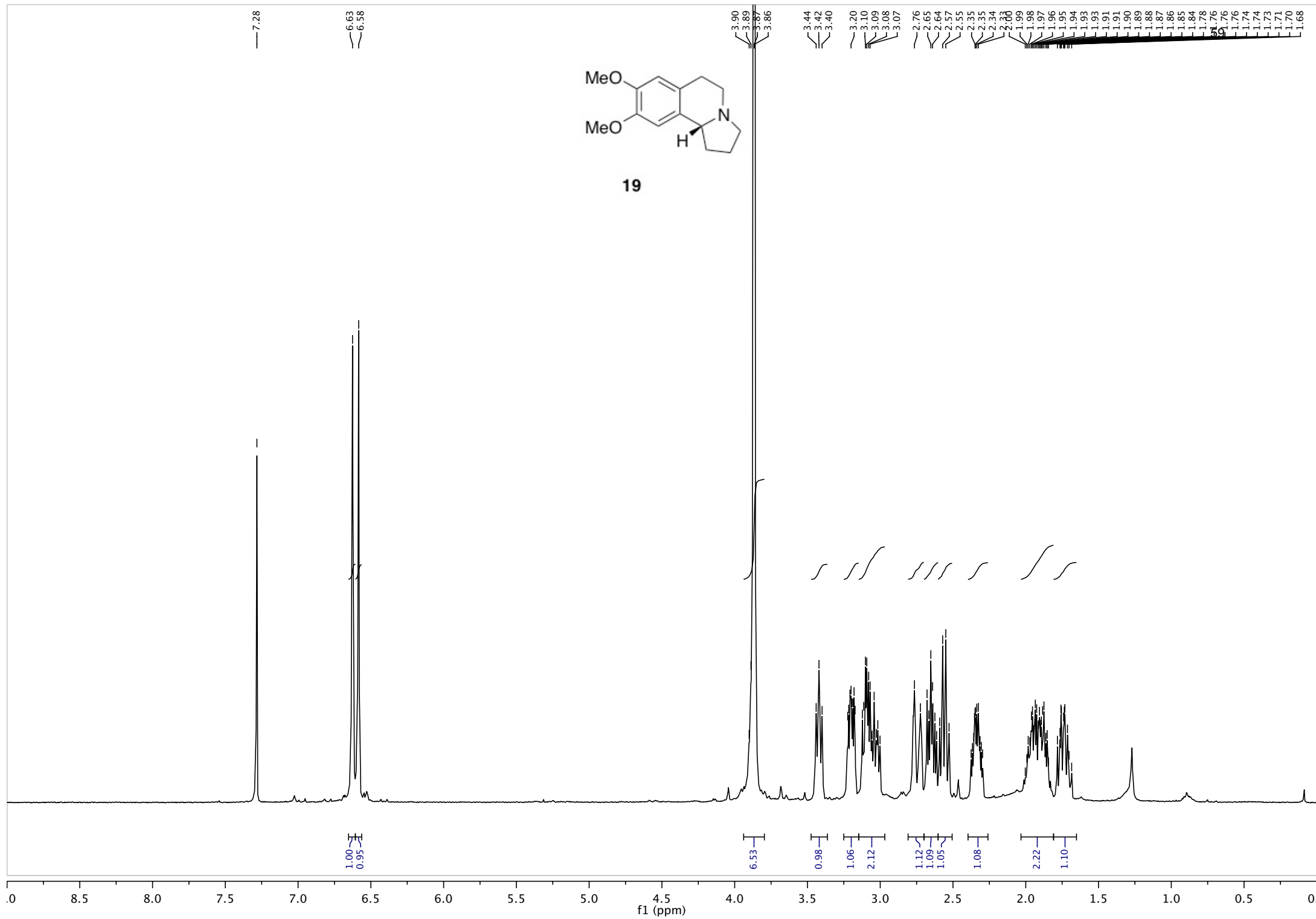


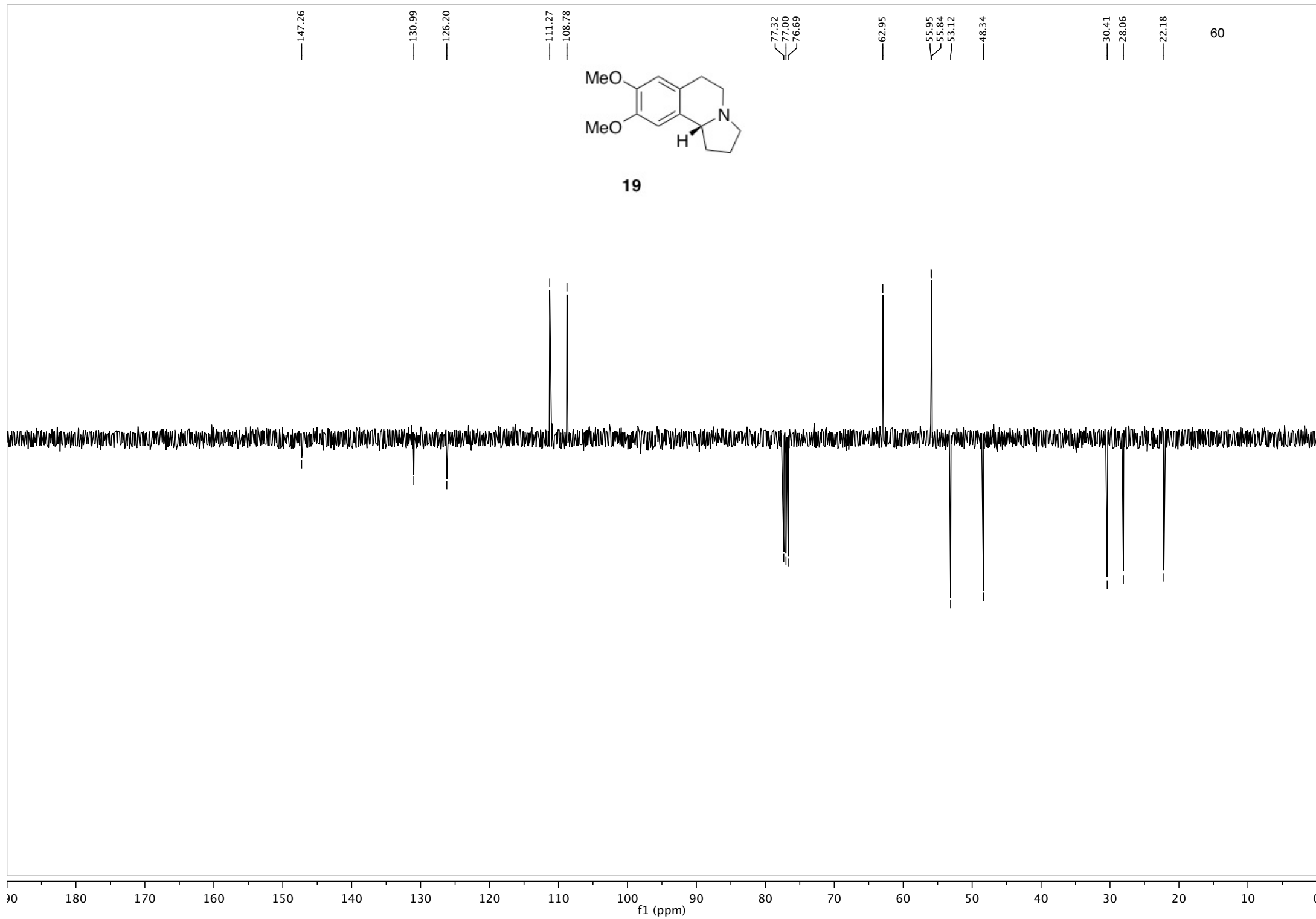


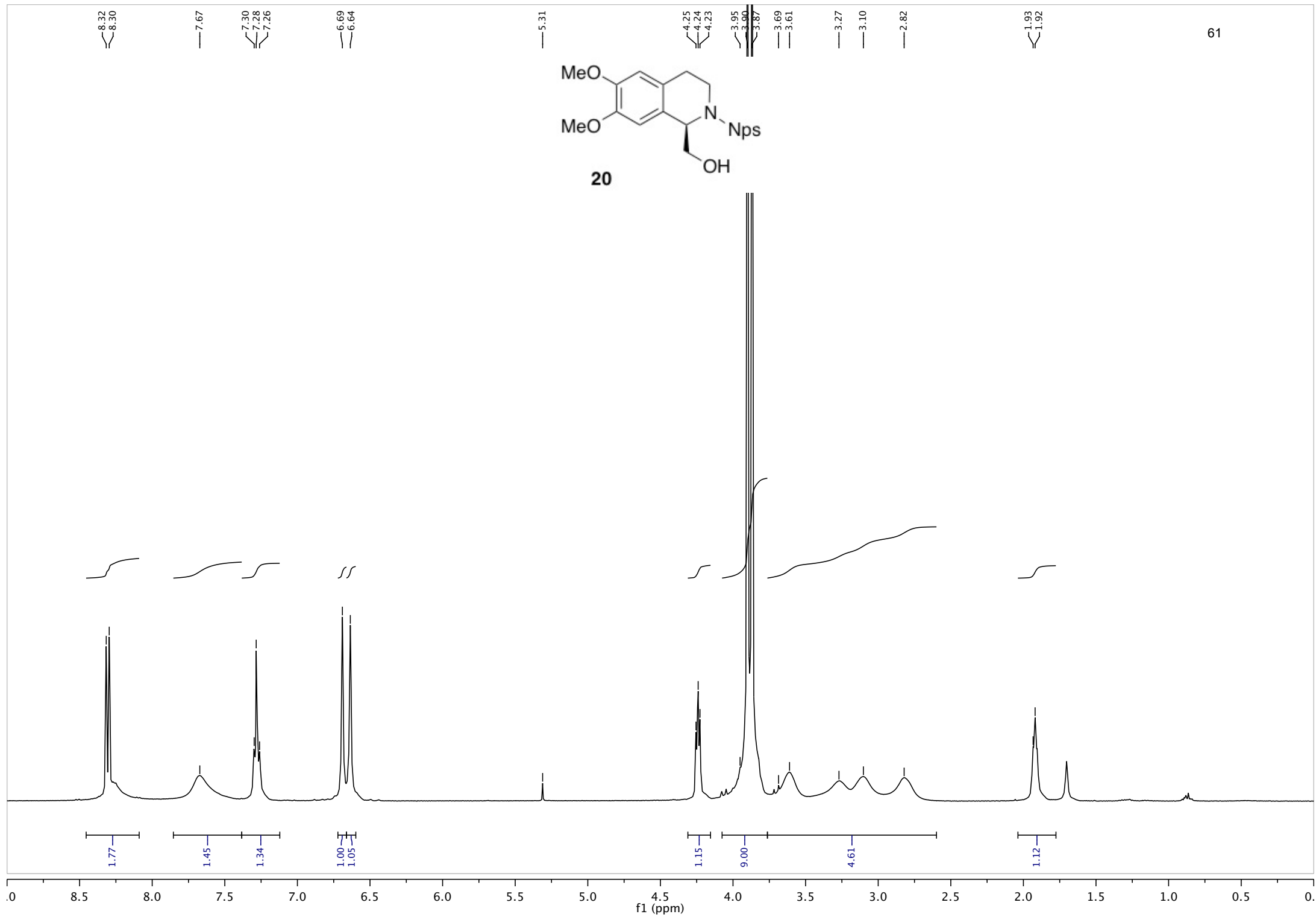


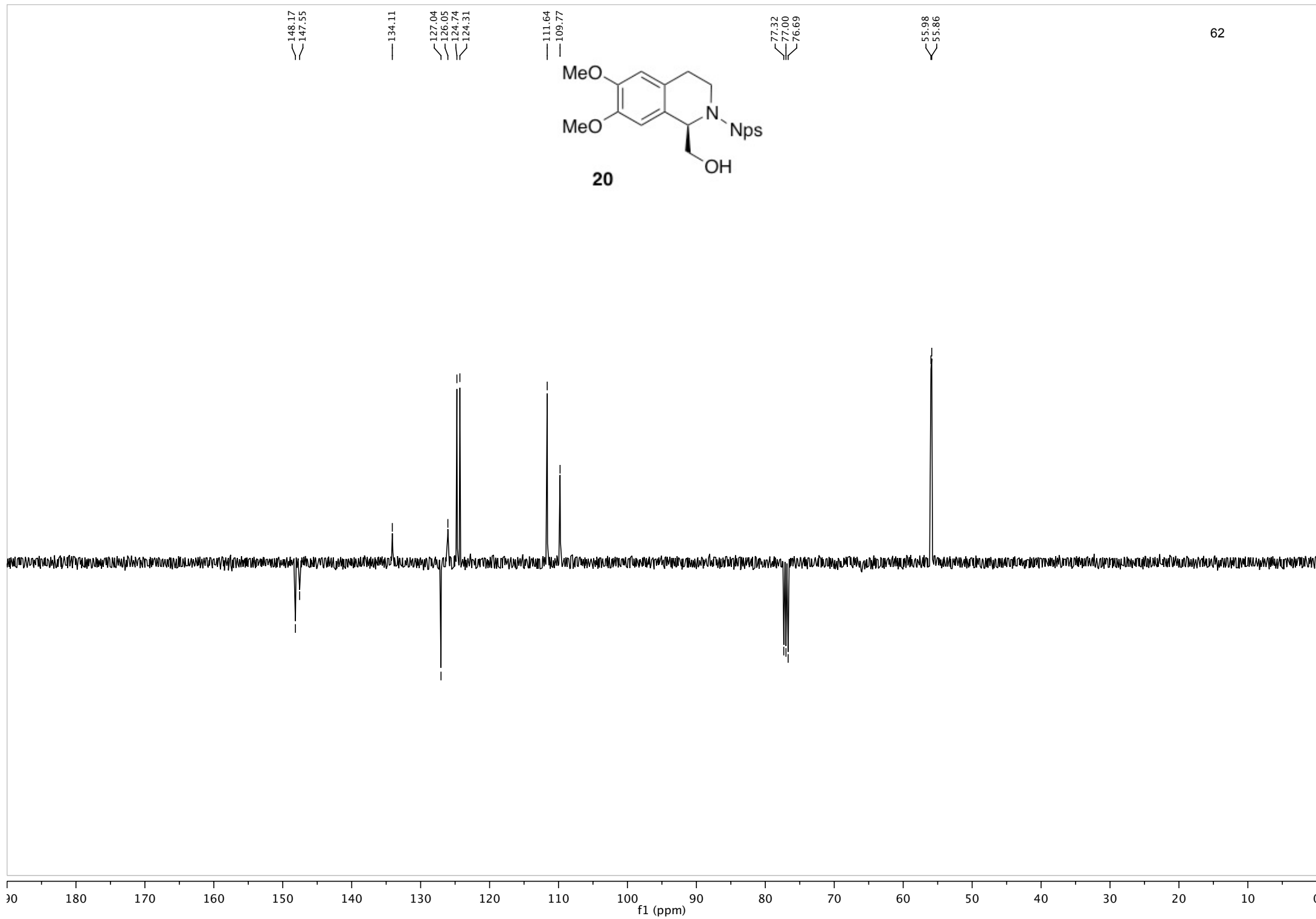
**18**

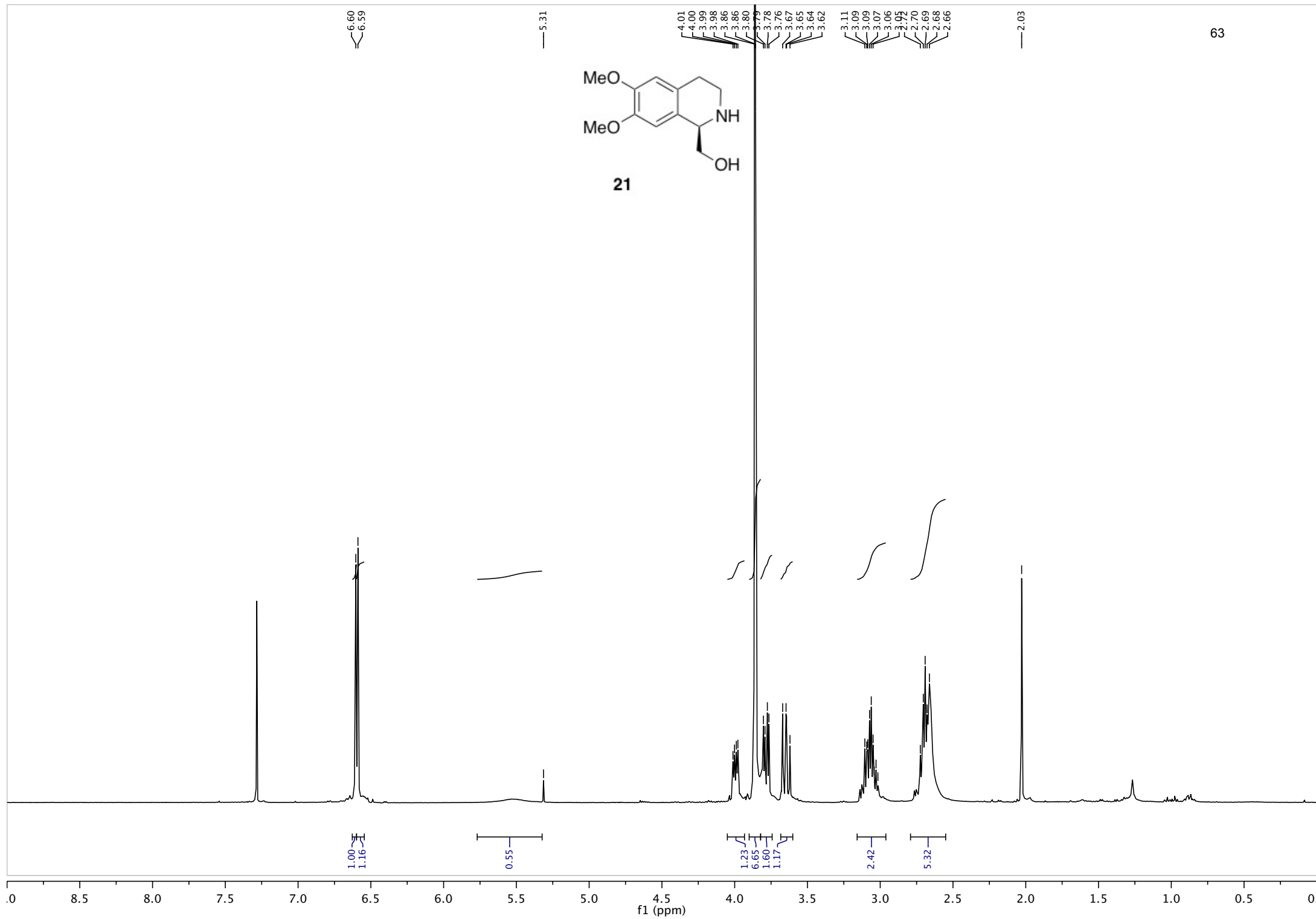


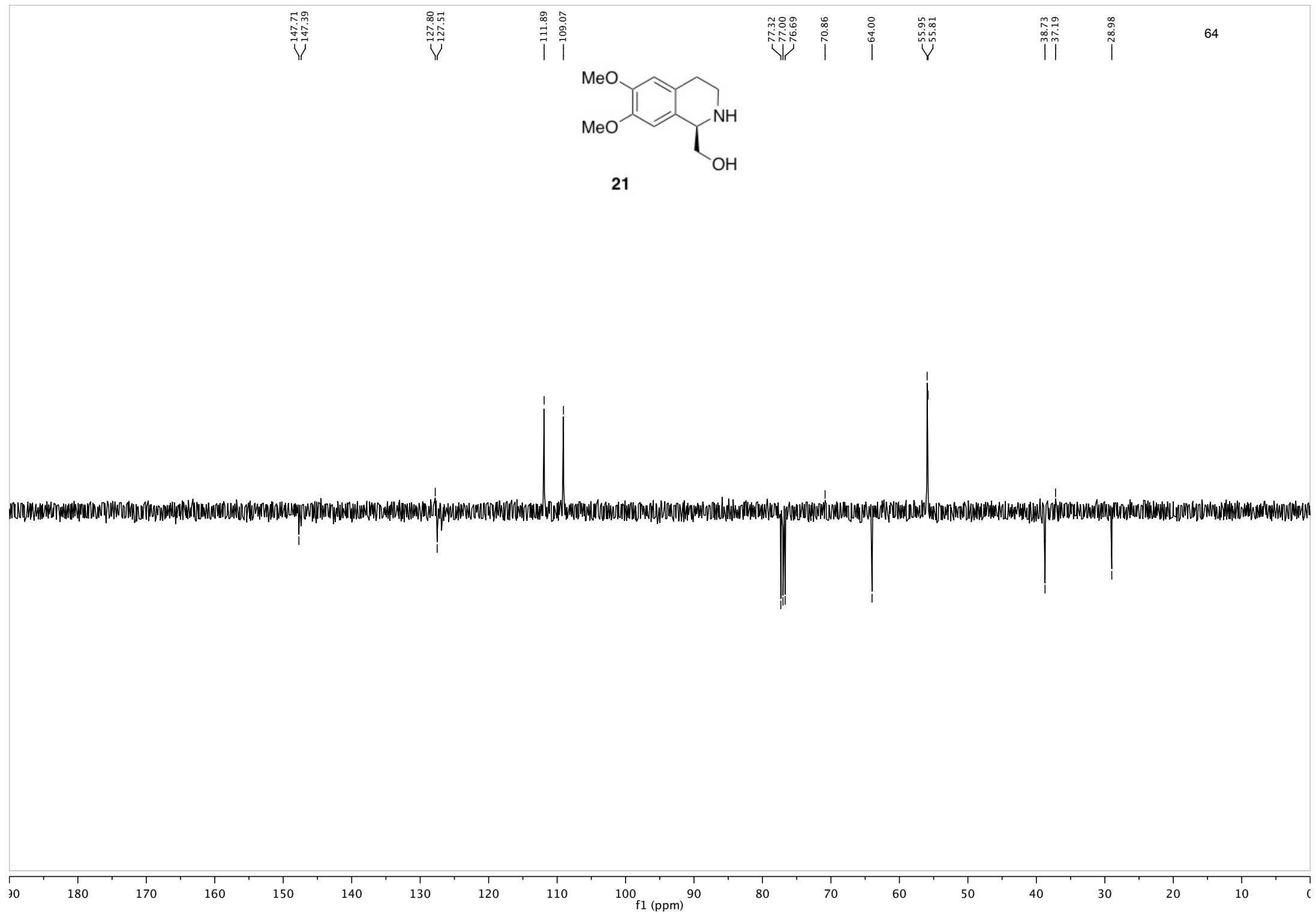


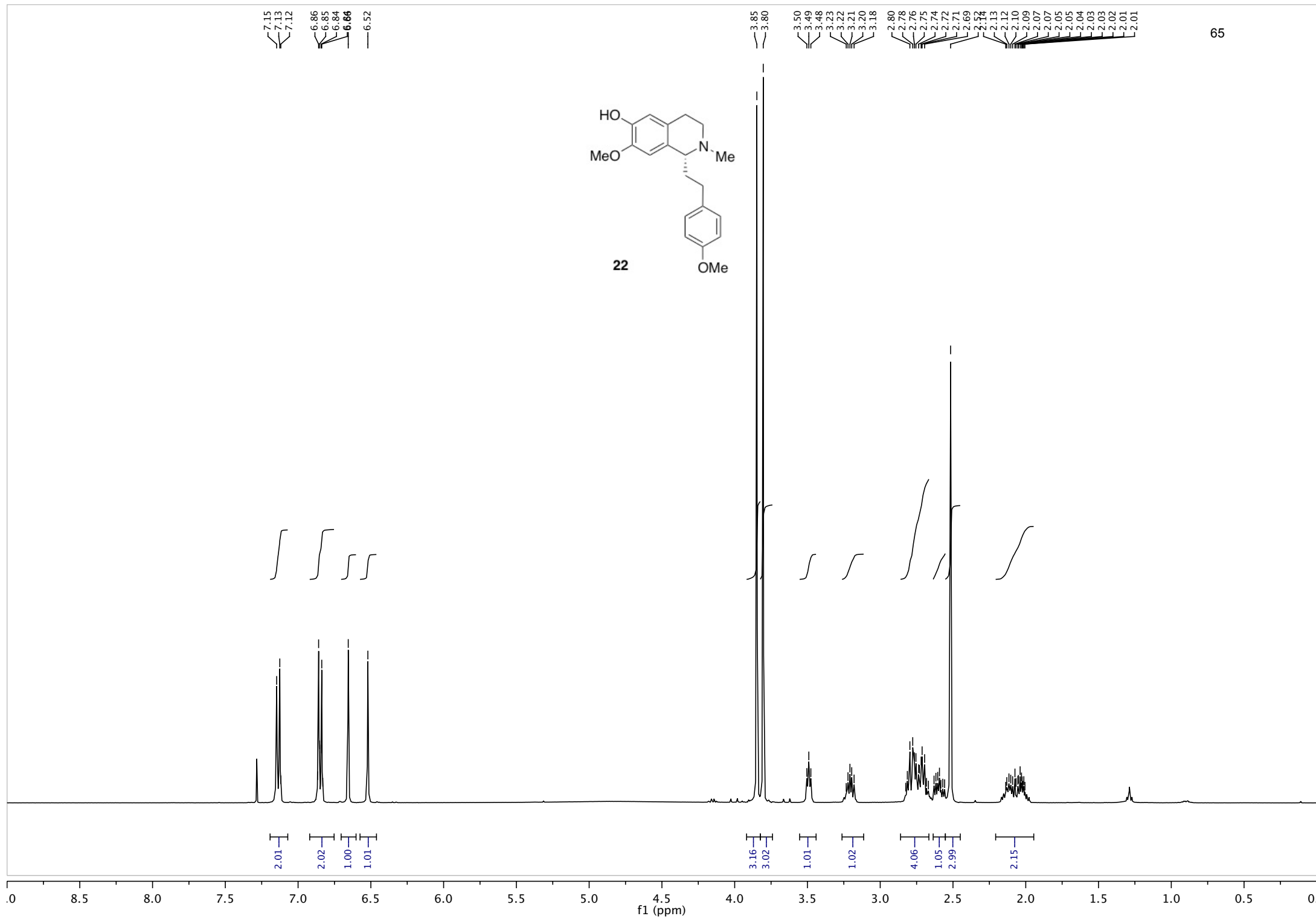


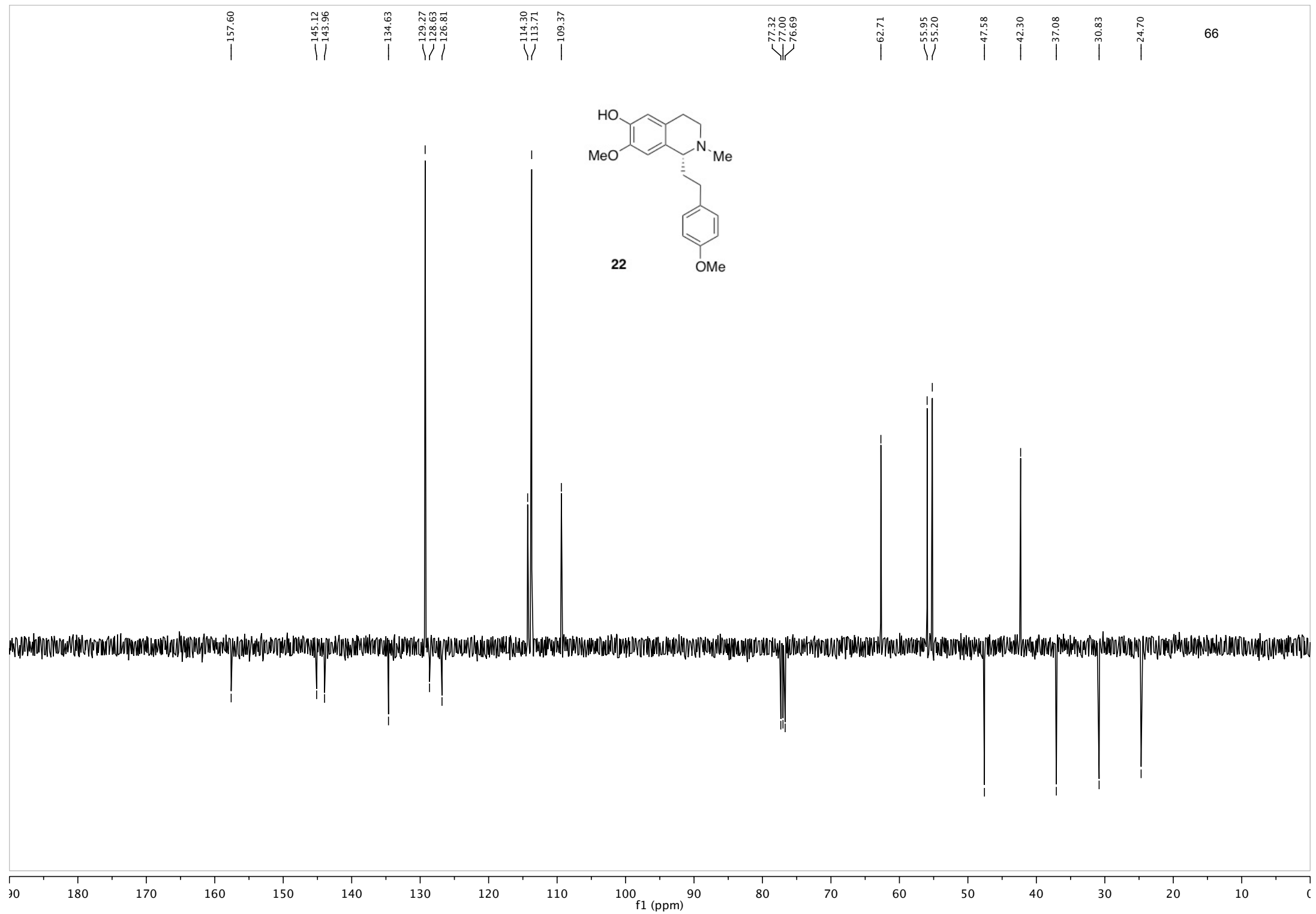


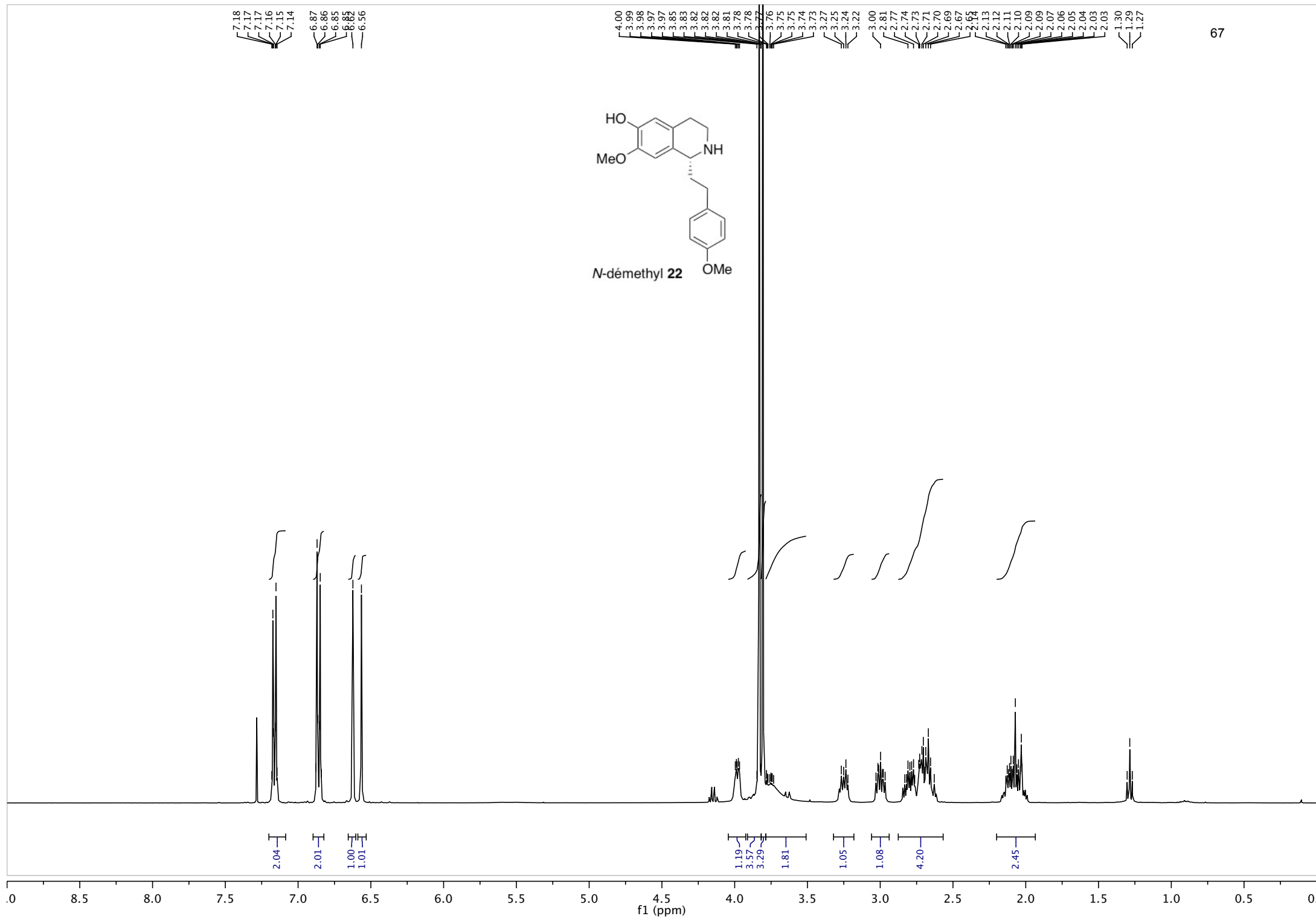


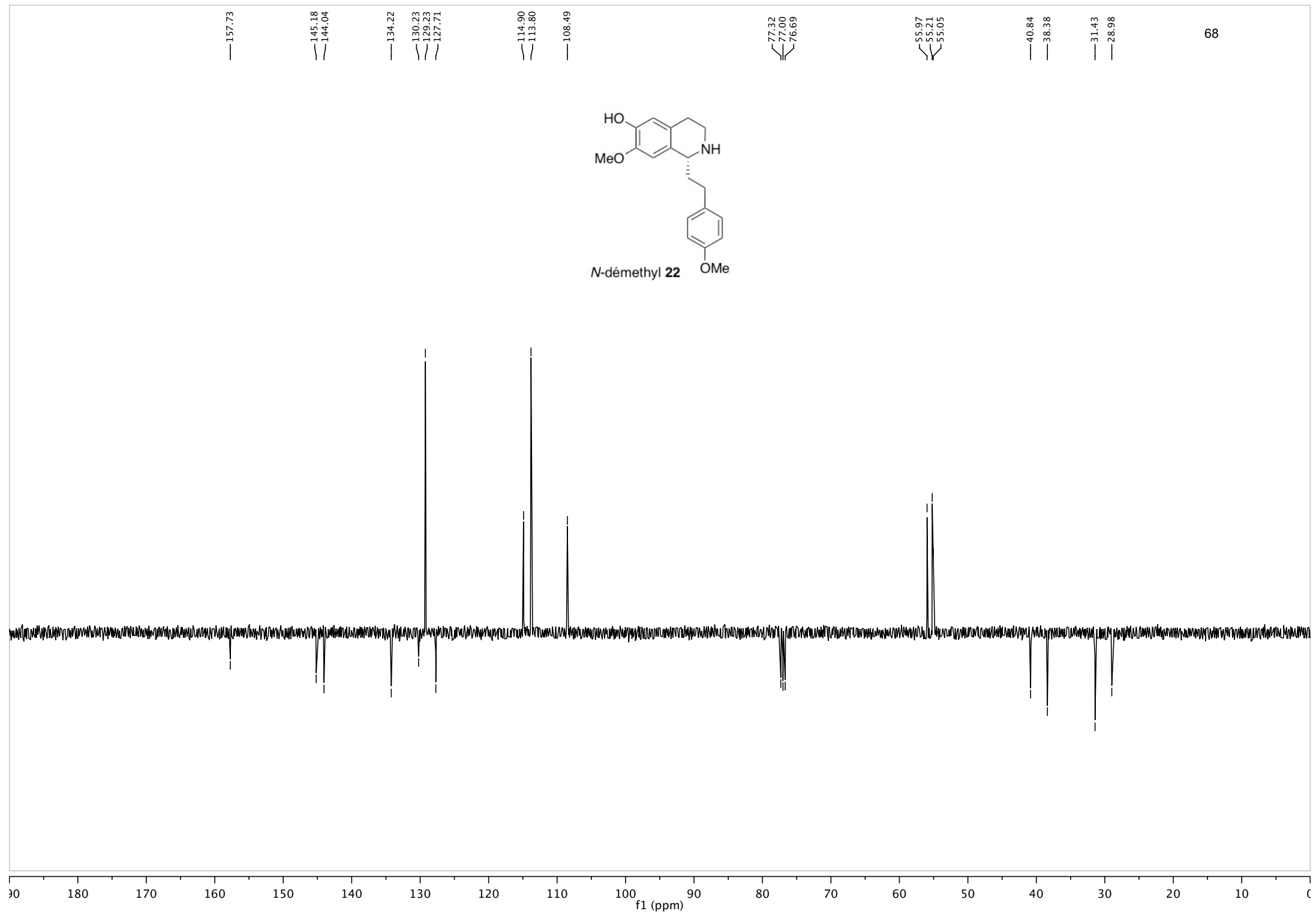


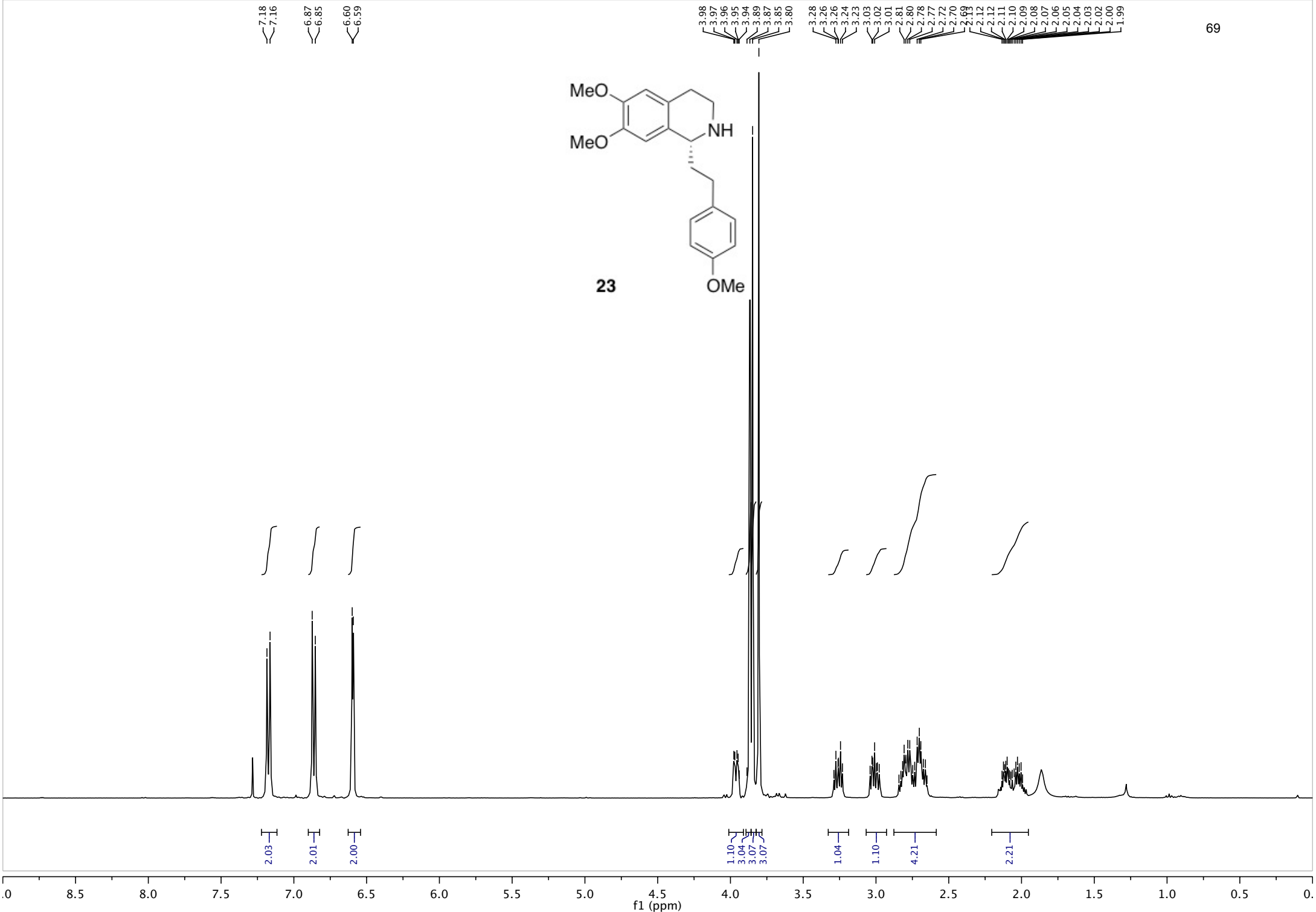


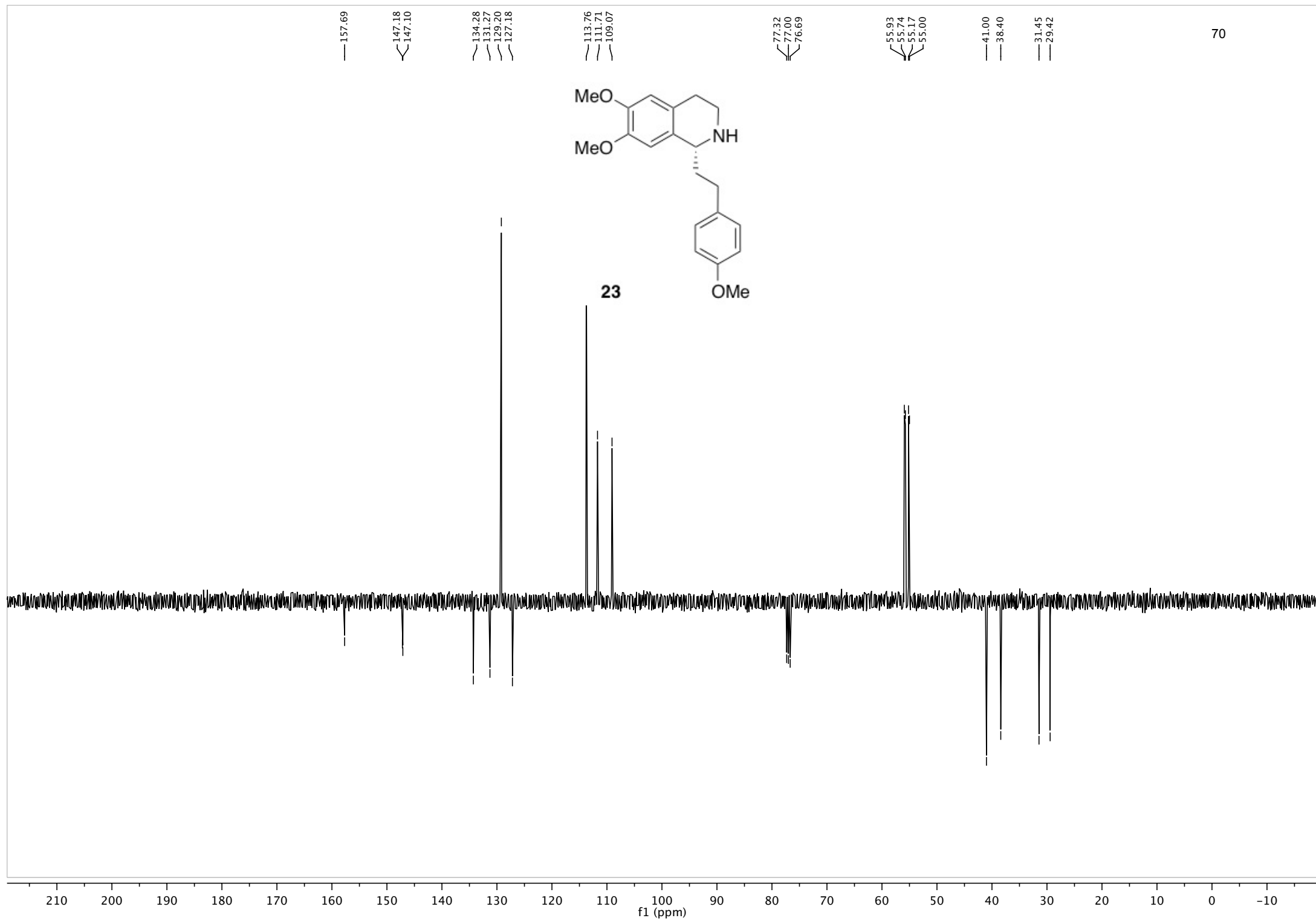


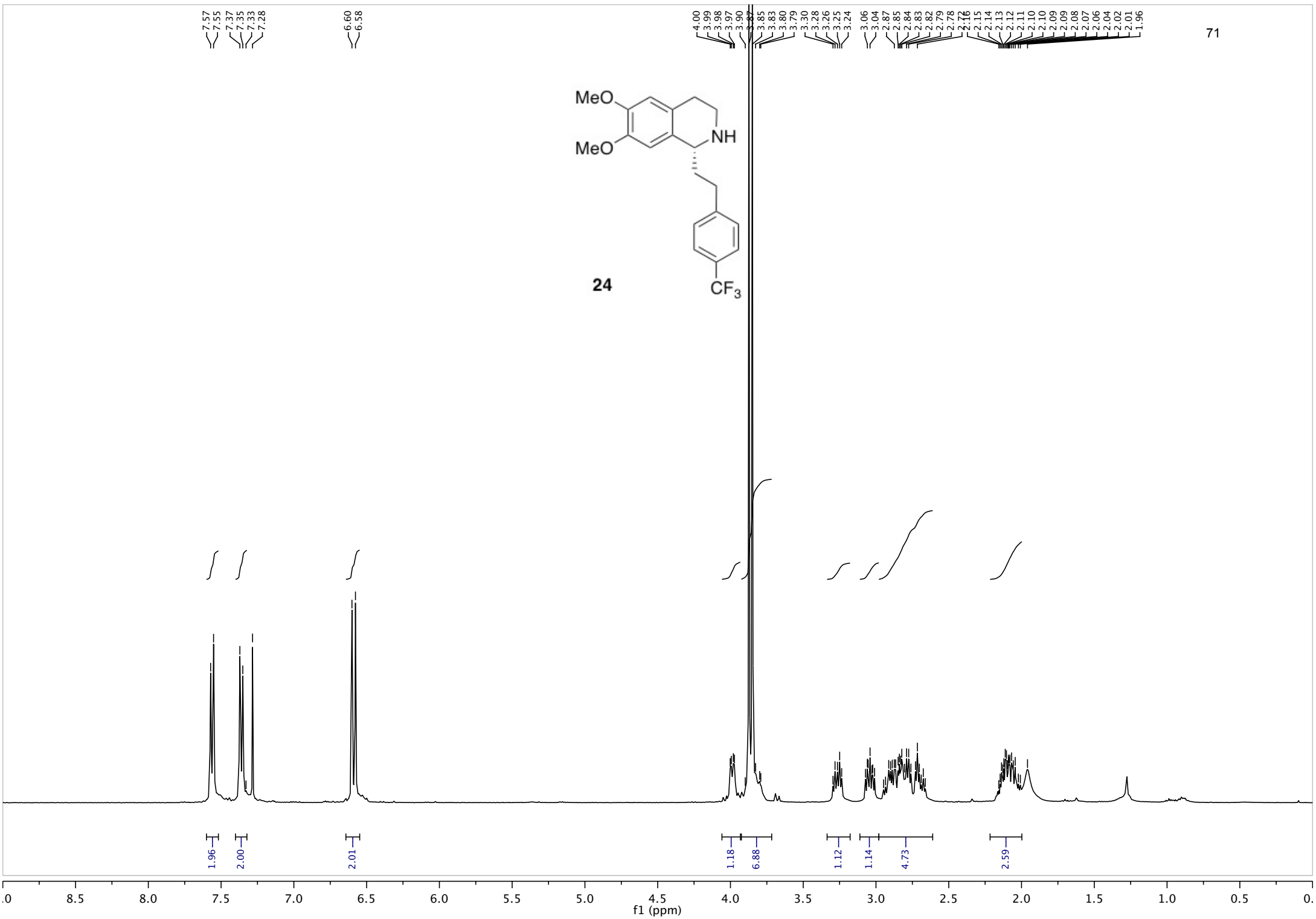


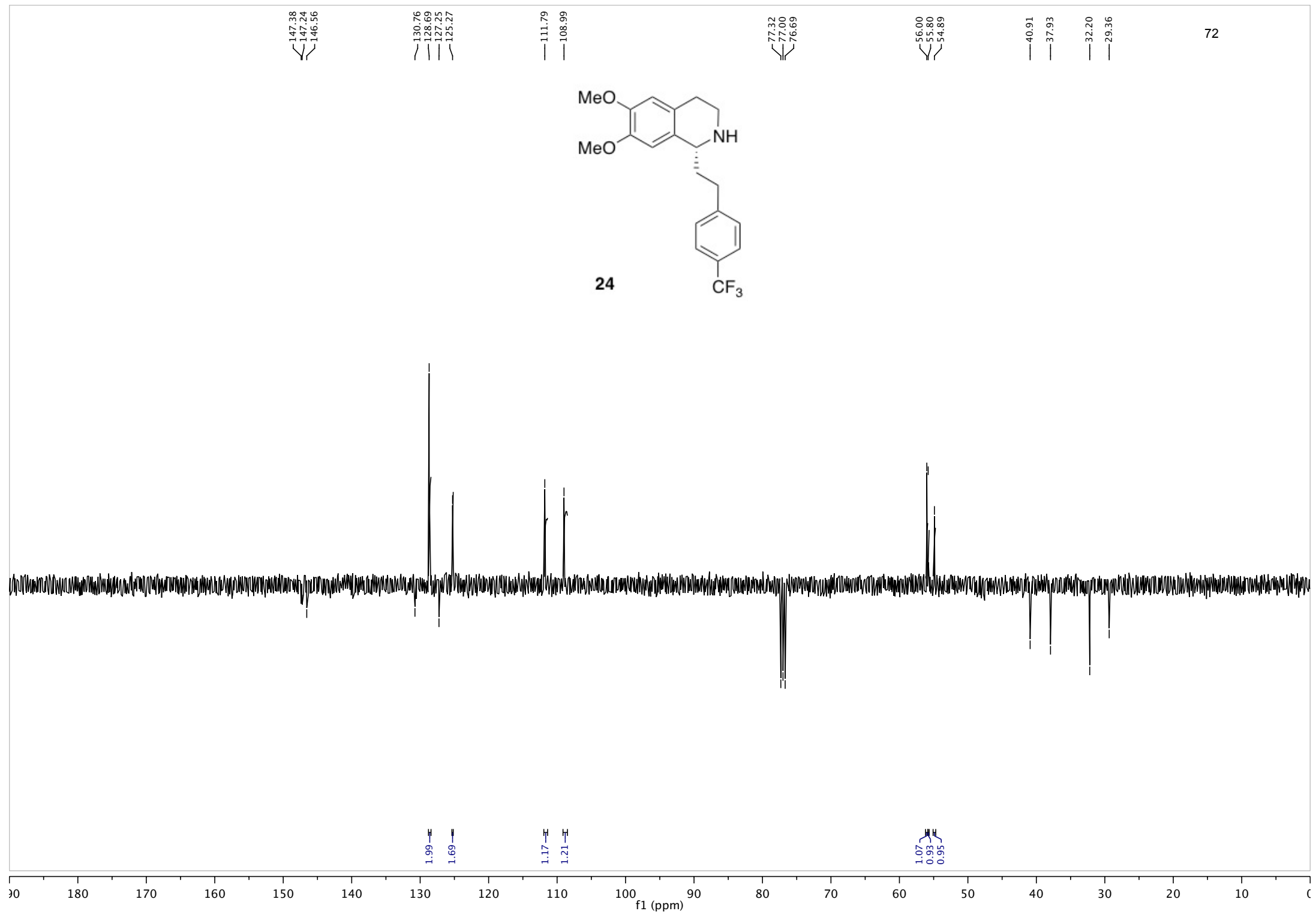




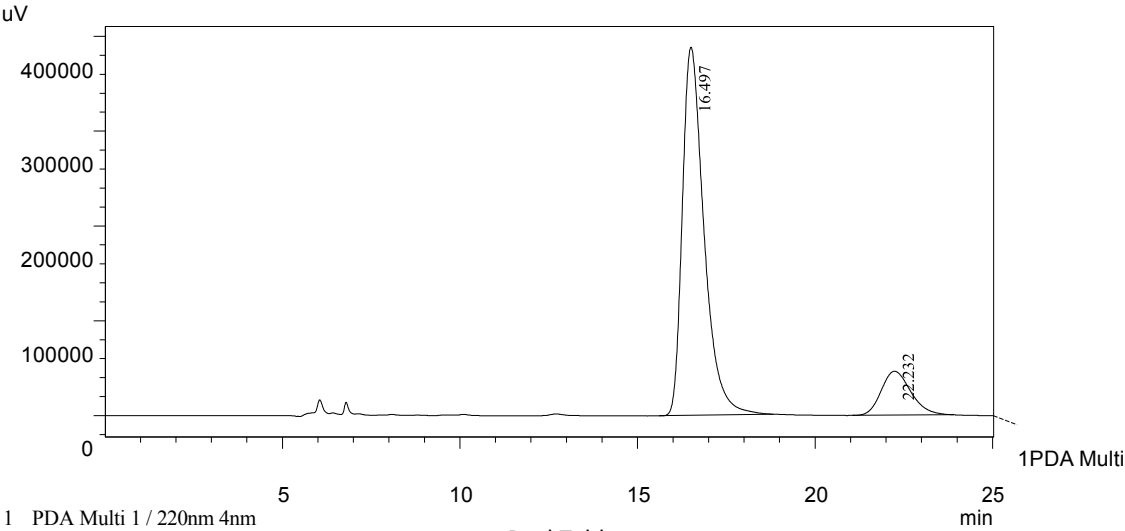








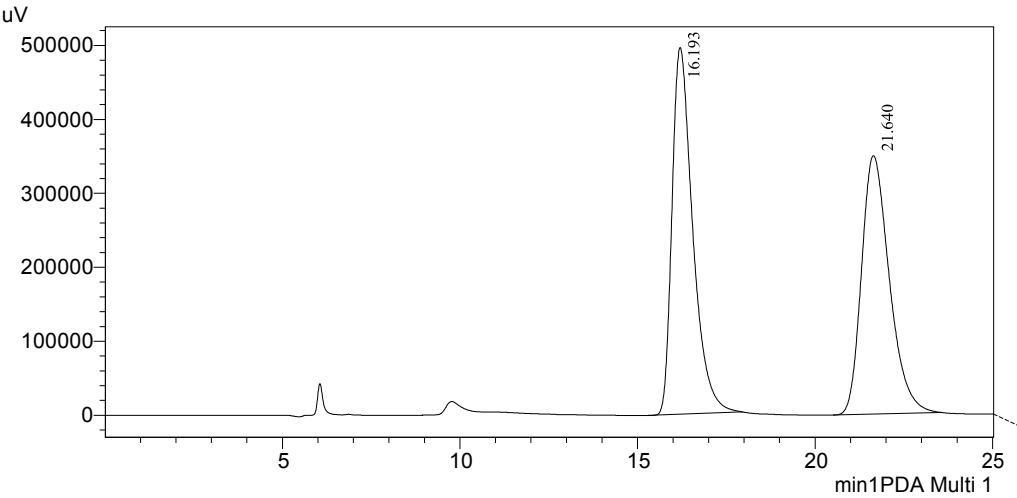
8d-catalysis



1 PDA Multi 1 / 220nm 4nm

PeakTable					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.497	16492230	388169	85.974	89.339
2	22.232	2690600	46321	14.026	10.661
Total		19182830	434490	100.000	100.000

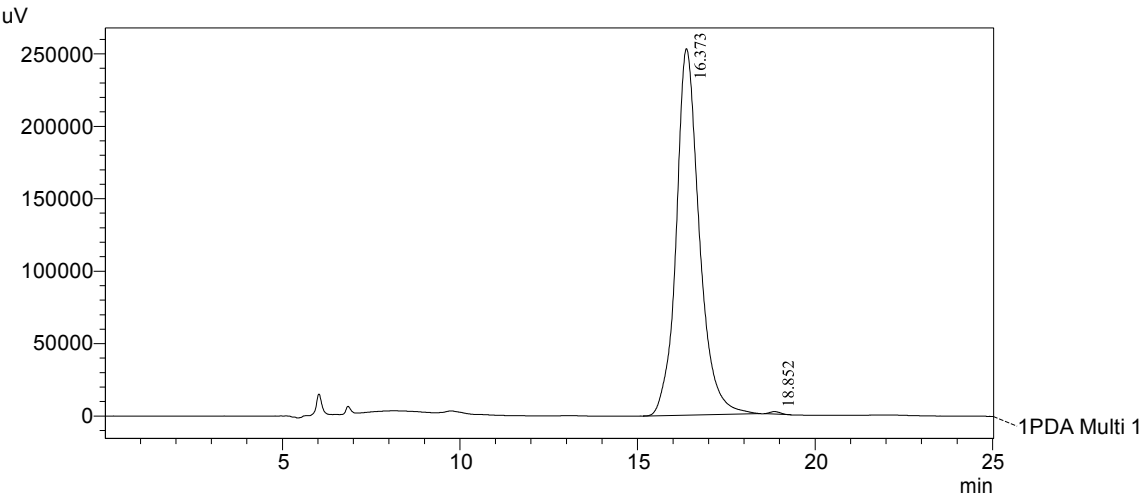
8d-crystal fraction



PDA Ch1 220nm 4nm

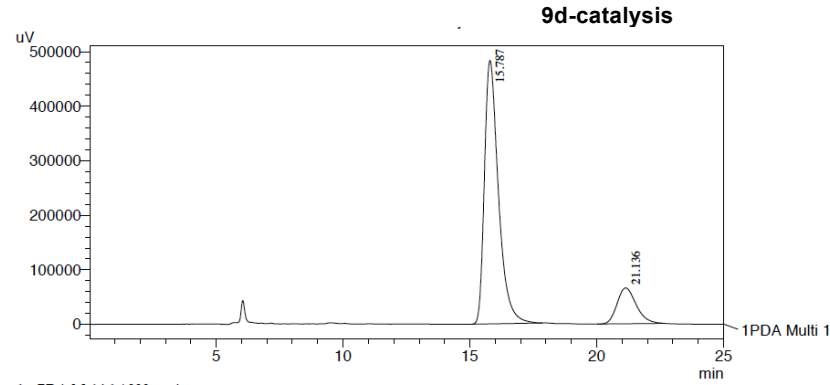
Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.193	20095788	495799	51.245	58.658
2	21.640	19119407	349433	48.755	41.342
Total		39215194	845232	100.000	100.000

8d-filtrate



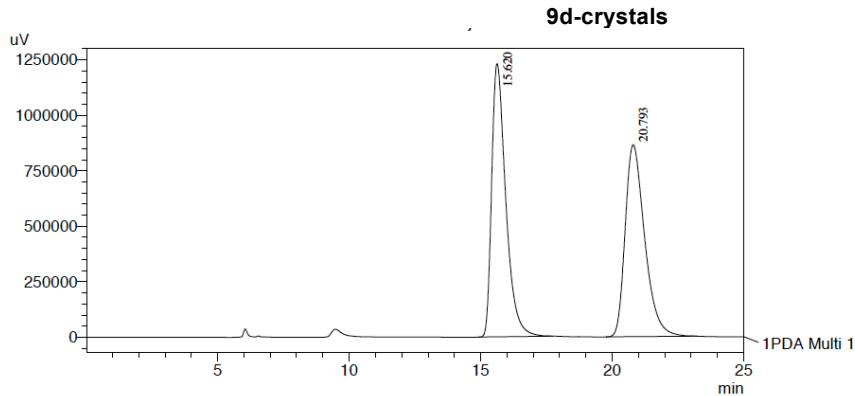
PDA Ch1 220nm 4nm

PeakTable					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.373	11469902	253041	99.684	99.298
2	18.852	36417	1789	0.316	0.702
Total		11506319	254829	100.000	100.000



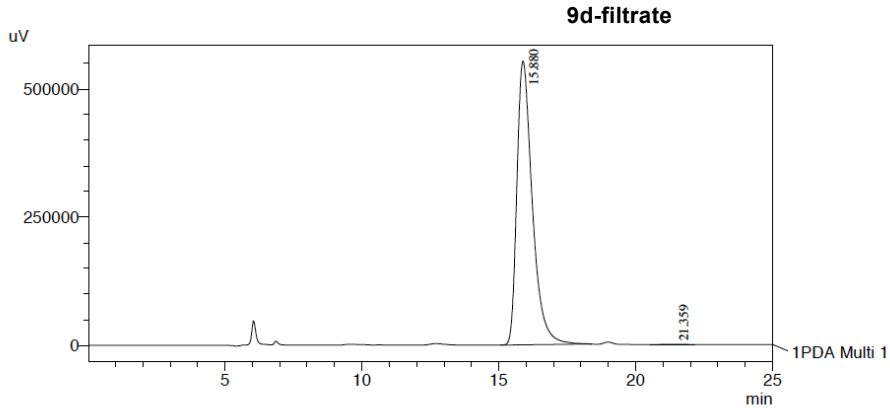
Results

PeakTable					
PDA Ch1 220nm 4nm					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.787	18526587	483193	84.258	88.007
2	21.136	3461451	65844	15.742	11.993
Total		21988038	549037	100.000	100.000



Results

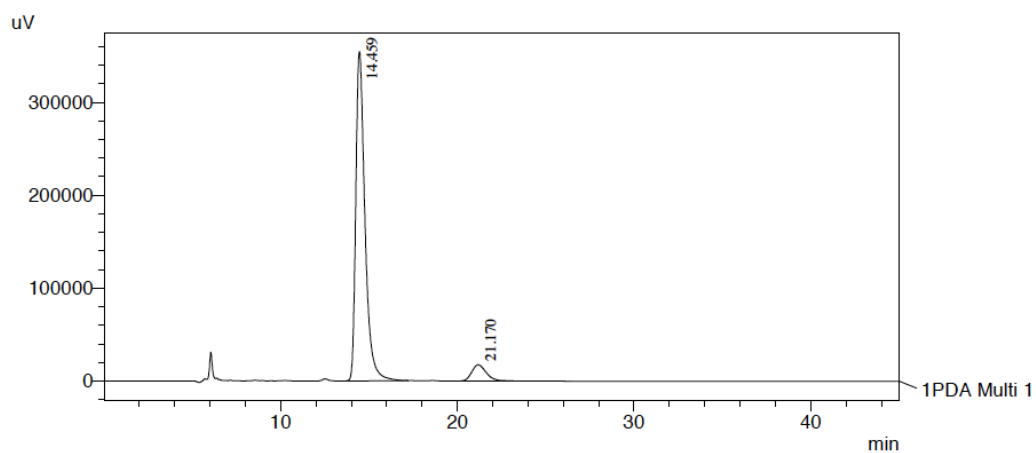
PeakTable					
PDA Ch1 220nm 4nm					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.620	45892337	1231493	50.689	58.758
2	20.793	44645544	864365	49.311	41.242
Total		90537882	2095858	100.000	100.000



Results

PeakTable					
PDA Ch1 220nm 4nm					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.880	21695014	553409	99.850	99.869
2	21.359	32680	725	0.150	0.131
Total		21727694	554134	100.000	100.000

9f-catalysis



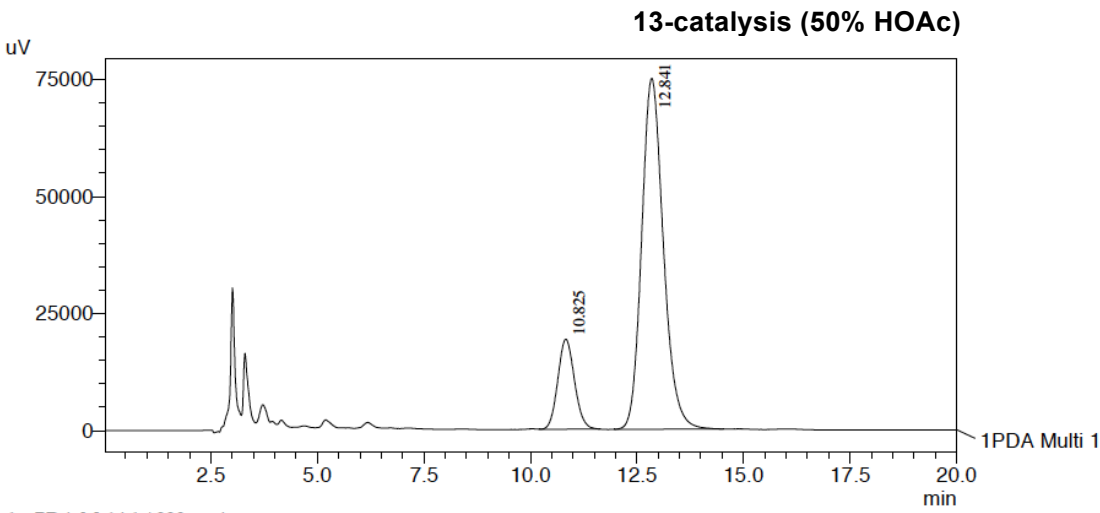
1 PDA Multi 1 / 220nm 4nm

Results

PeakTable

PDA Ch1 220nm 4nm

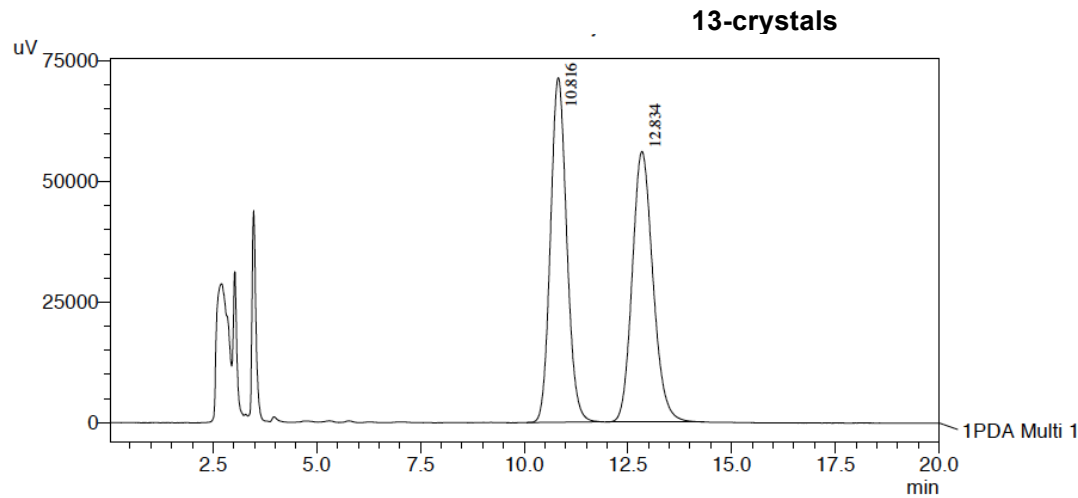
Peak#	Ret. Time	Area	Height	Area %	Height %
1	14.459	12794292	354657	92.721	95.310
2	21.170	1004363	17452	7.279	4.690
Total		13798655	372108	100.000	100.000



1 PDA Multi 1 / 220nm 4nm

Results

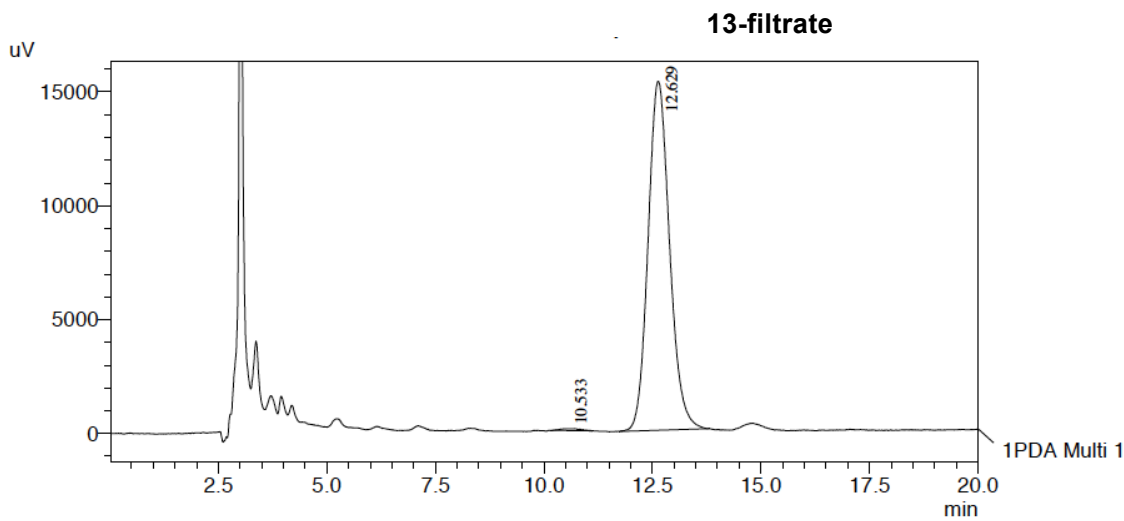
PeakTable					
PDA Ch1 220nm 4nm					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.825	522074	19194	16.398	20.389
2	12.841	2661744	74945	83.602	79.611
Total		3183817	94139	100.000	100.000



1 PDA Multi 1 / 220nm 4nm

Results

PeakTable					
PDA Ch1 220nm 4nm					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.816	1948701	71405	49.965	56.005
2	12.834	1951399	56092	50.035	43.995
Total		3900100	127496	100.000	100.000

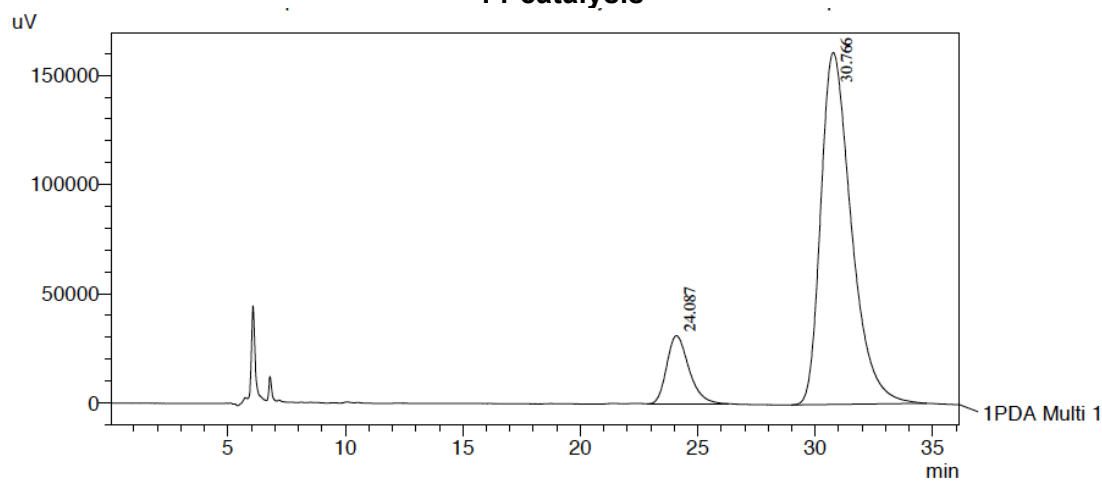


1 PDA Multi 1 / 220nm 4nm

Results

PeakTable					
PDA Ch1 220nm 4nm					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.533	2687	84	0.507	0.545
2	12.629	527493	15314	99.493	99.455
Total		530180	15398	100.000	100.000

14-catalysis



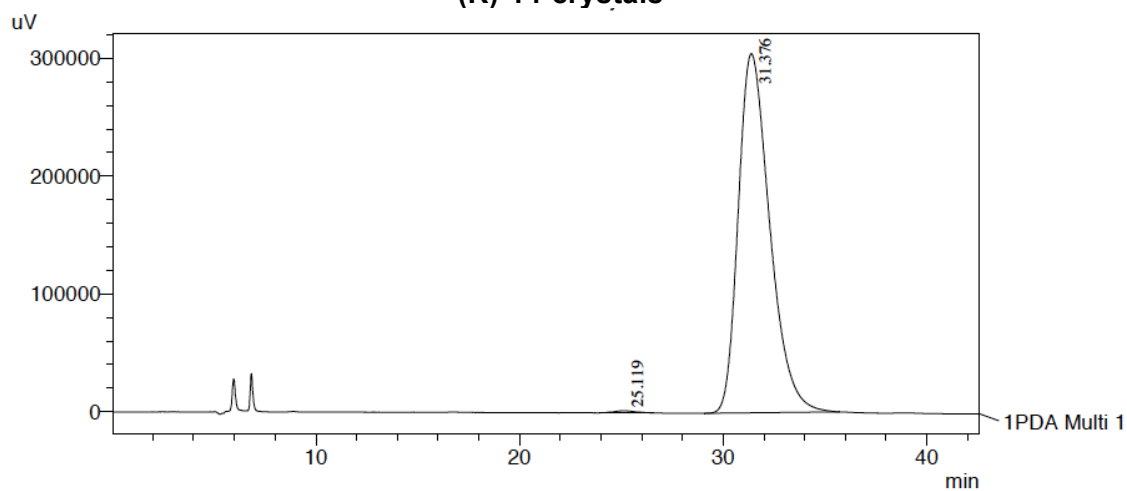
Results

PeakTable

PDA Ch1 220nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.087	2052913	31236	12.360	16.246
2	30.766	14556693	161038	87.640	83.754
Total		16609606	192274	100.000	100.000

(R)-14-crystals



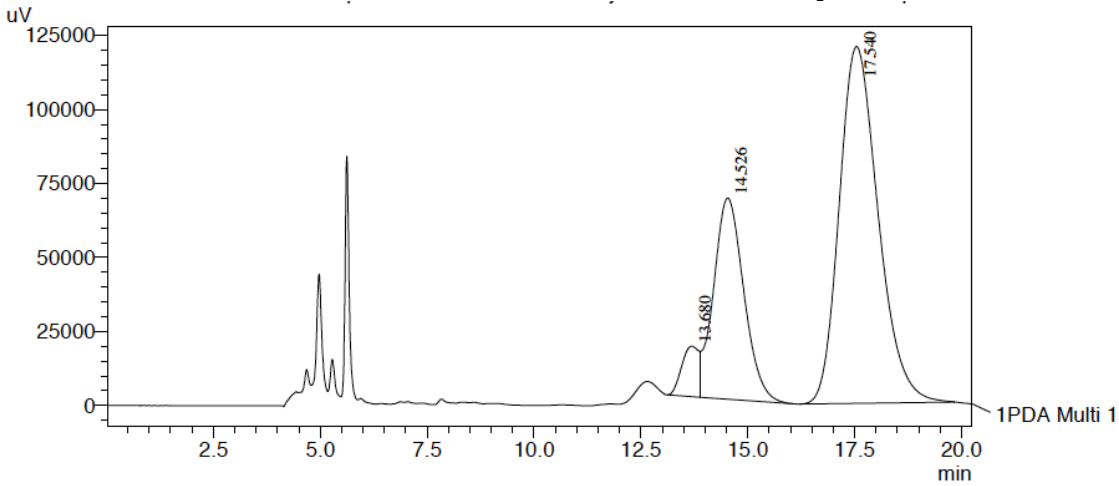
Results

PeakTable

PDA Ch1 220nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.119	137382	1854	0.418	0.605
2	31.376	32759526	304694	99.582	99.395
Total		32896907	306547	100.000	100.000

15-catalysis



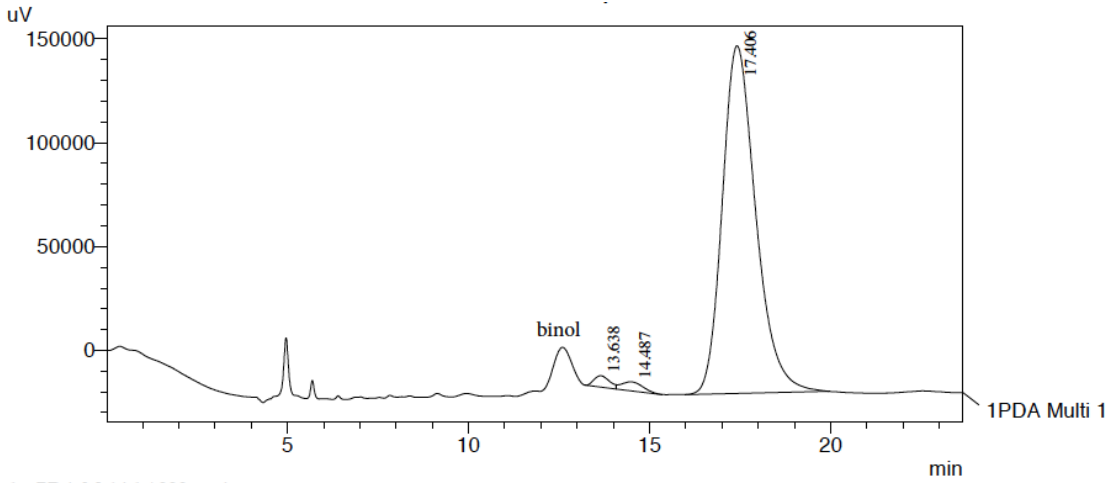
1 PDA Multi 1 / 220nm 4nm

Results

PeakTable

PDA Ch1 220nm 4nm					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.680	482076	17035	4.204	8.290
2	14.526	3339328	67935	29.121	33.058
3	17.540	7645588	120530	66.675	58.652
Total		11466993	205501	100.000	100.000

15-filtrate



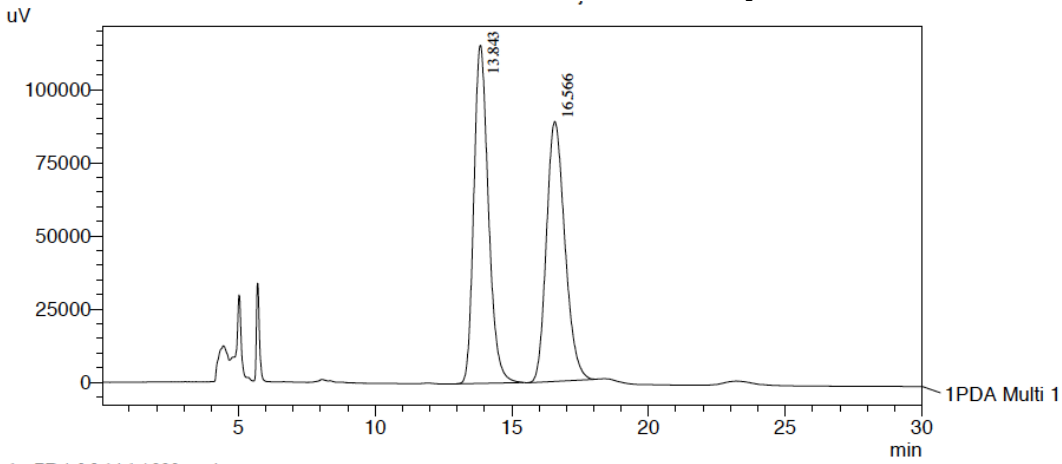
1 PDA Multi 1 / 220nm 4nm

Results

PeakTable

PDA Ch1 220nm 4nm					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.638	163091	5433	1.465	3.066
2	14.487	177497	4344	1.594	2.451
3	17.406	10794414	167438	96.941	94.483
Total		11135003	177215	100.000	100.000

15-crystals



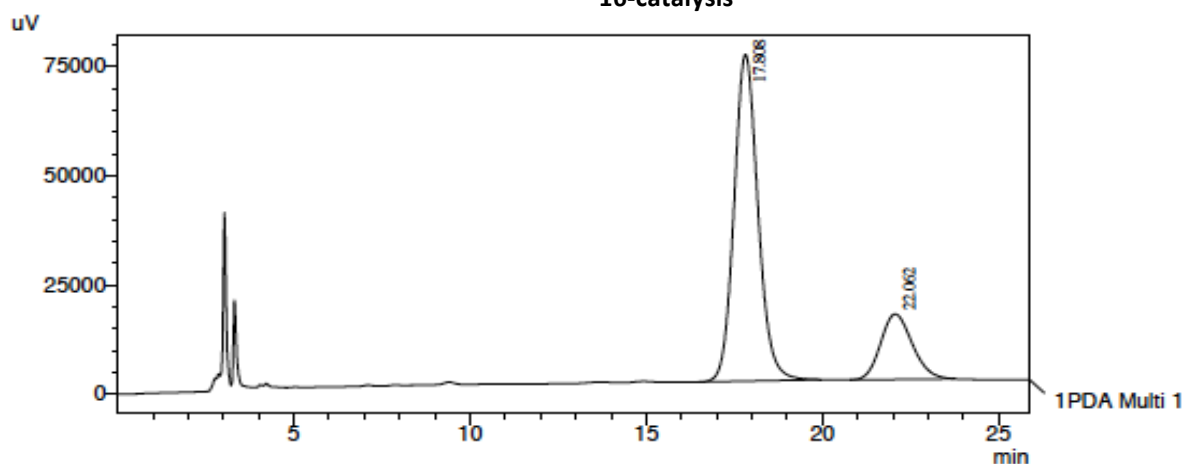
1 PDA Multi 1 / 220nm 4nm

Results

PeakTable

PDA Ch1 220nm 4nm					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.843	4287350	115489	50.710	56.537
2	16.566	4167279	88784	49.290	43.463
Total		8454628	204273	100.000	100.000

16-catalysis



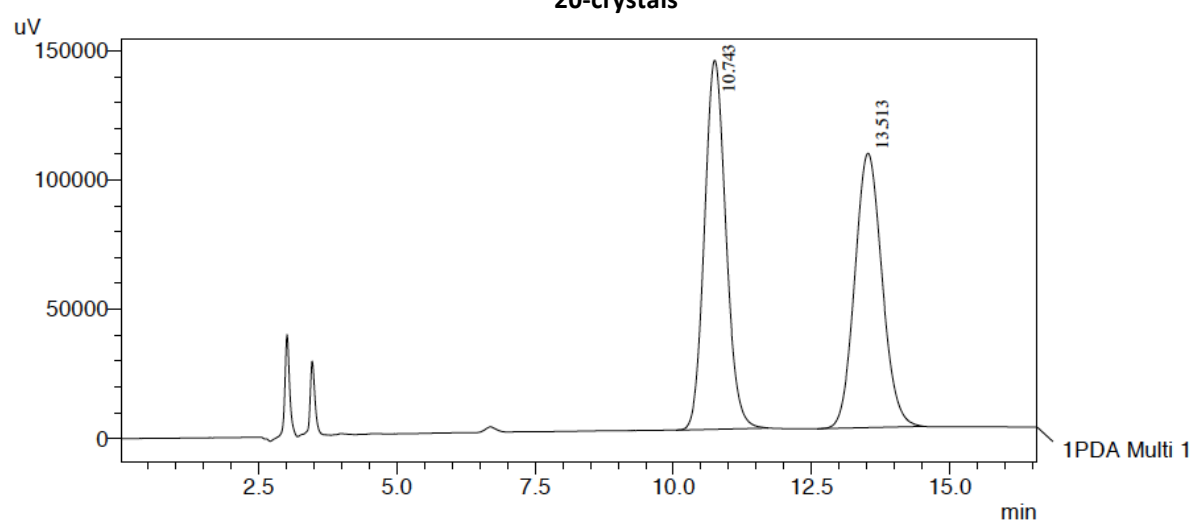
Results

PeakTable

PDA Ch1 220nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.808	3533700	74770	79.104	83.337
2	22.062	933442	14950	20.896	16.663
Total		4467142	89721	100.000	100.000

20-crystals



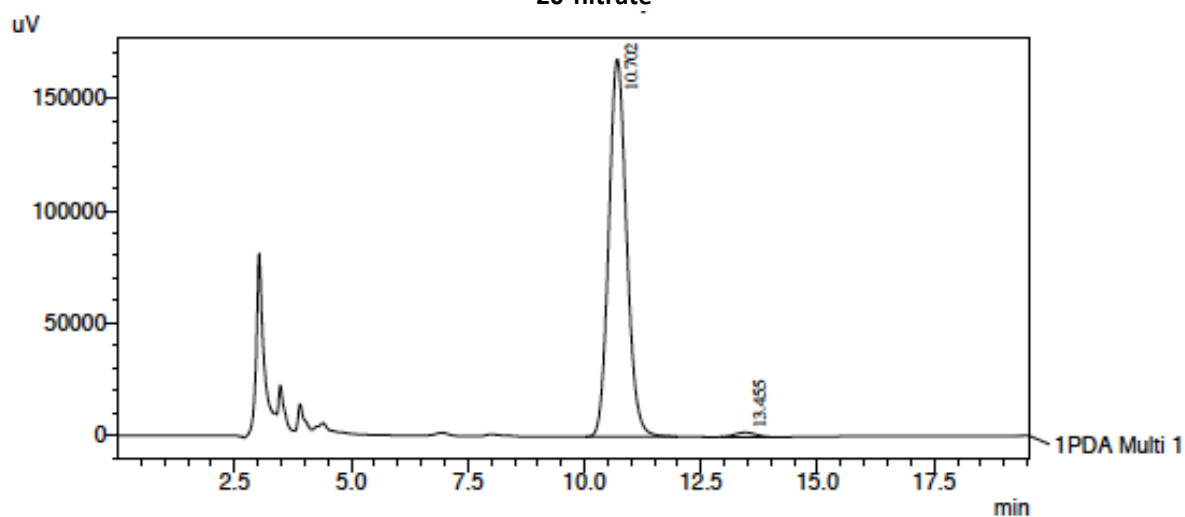
Results

PeakTable

PDA Ch1 220nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.743	3832501	142802	51.297	57.349
2	13.513	3638635	106202	48.703	42.651
Total		7471136	249004	100.000	100.000

20-filtrate



Results

PeakTable

PDA Ch1 220nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.702	4466894	168034	98.613	98.819
2	13.455	62845	2008	1.387	1.181
Total		4529739	170042	100.000	100.000