Organocatalytic asymmetric synthesis of 3-difluoroalkyl 3-hydroxyoxindoles

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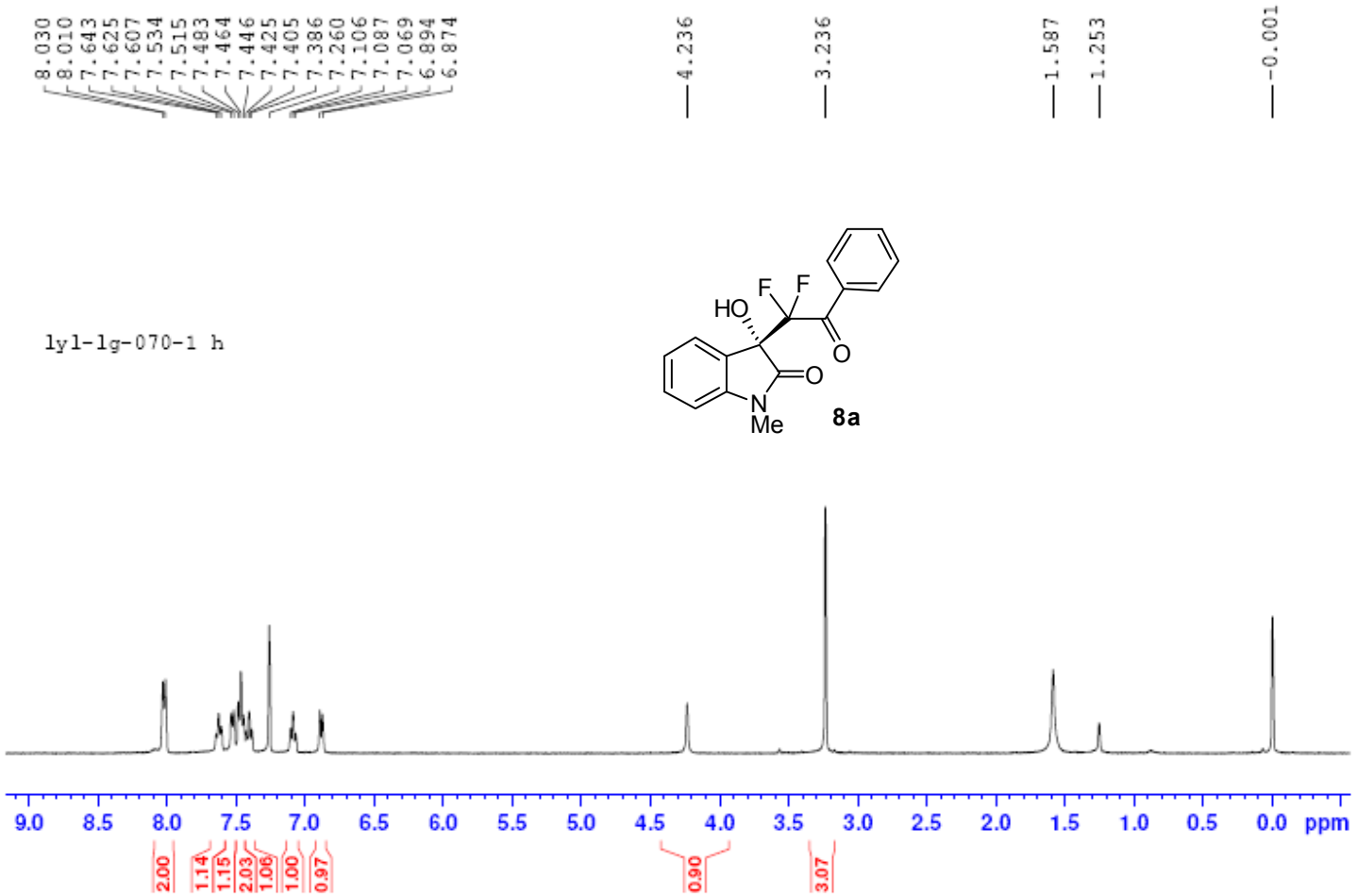
Supporting Information

(Part II)

Content **Page**

^{1}H, ^{13}C NMR and ^{19}F NMR spectra were recorded on 400 MHz. Chemical shifts are reported in ppm from $CDCl_3$, $(CD_3)_2SO$ or D_2O with the solvent resonance as the internal standard. The following abbreviations were used to designate chemical shift multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, h = heptet, m = multiplet, br = broad. Coupling constants, *J*, are reported in Hertz.



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188.63
188.33
172.69
144.72
134.68
132.00
131.17
130.20
130.17
130.13
128.59
128.29
126.01
124.20
123.21
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115.56
112.92
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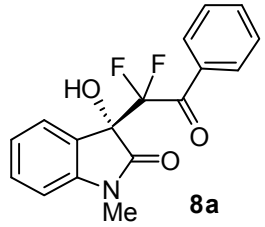
76.12
26.42



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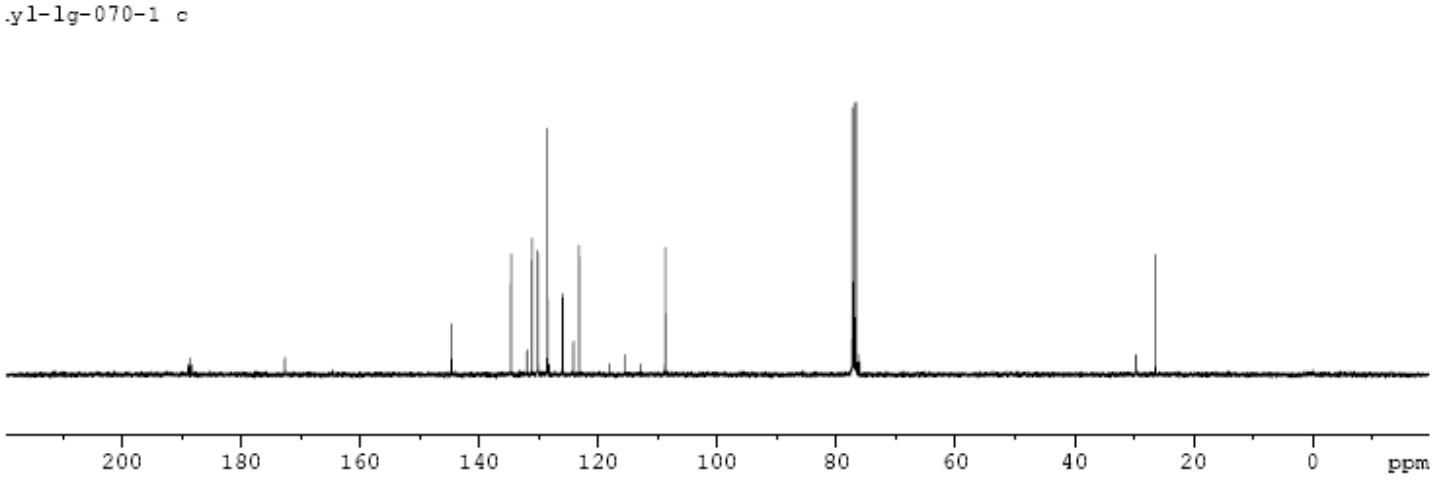

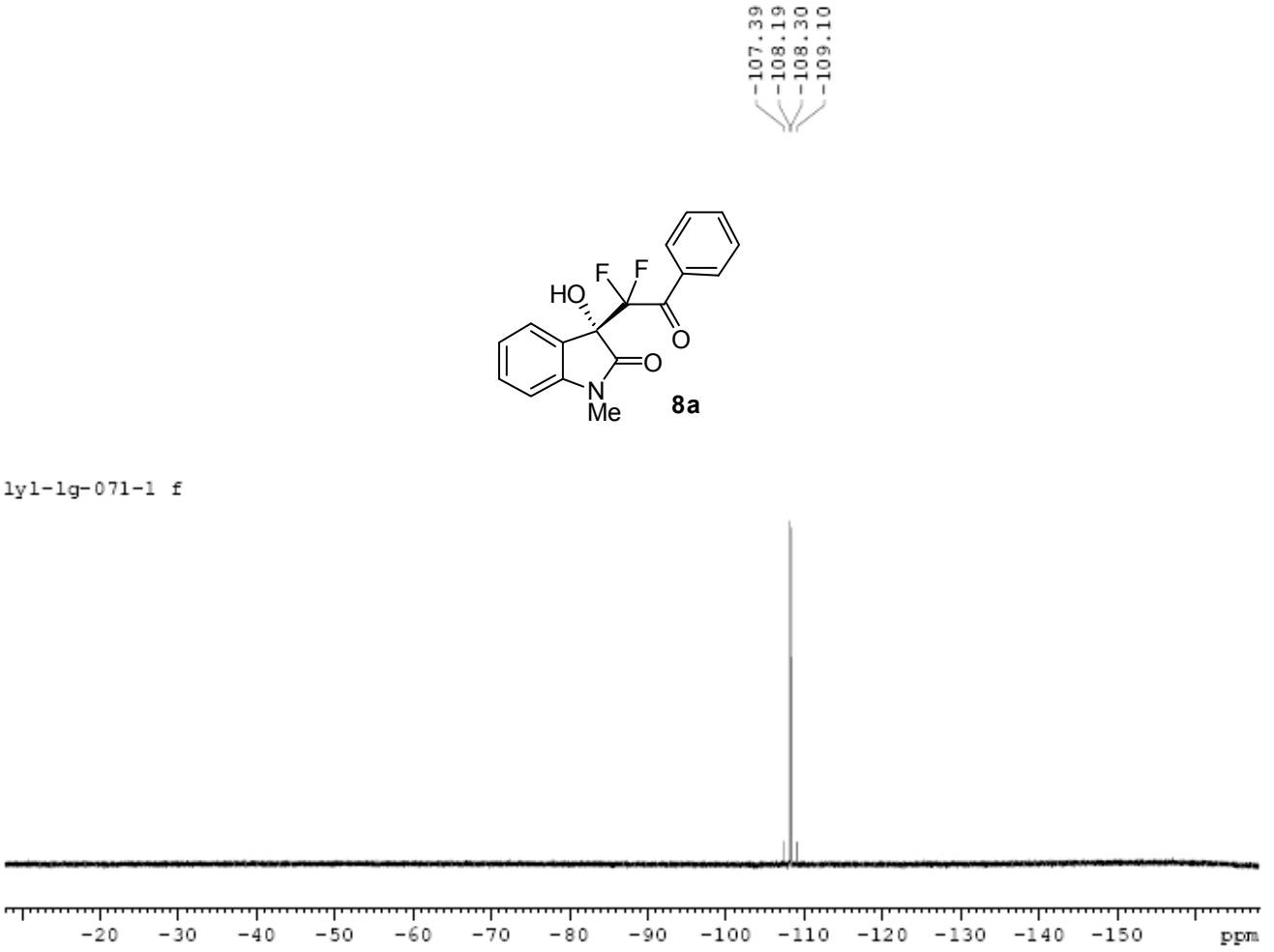

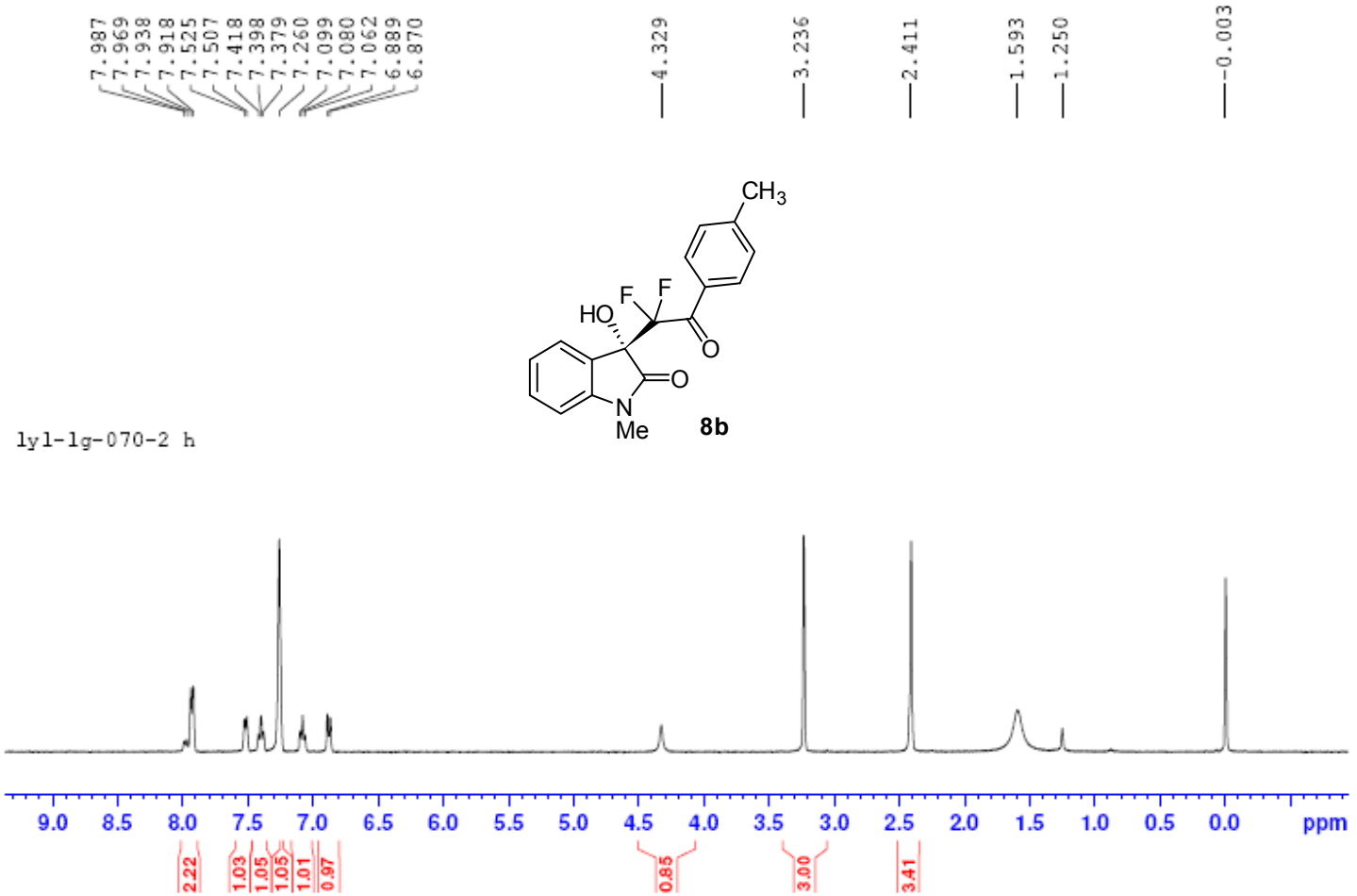

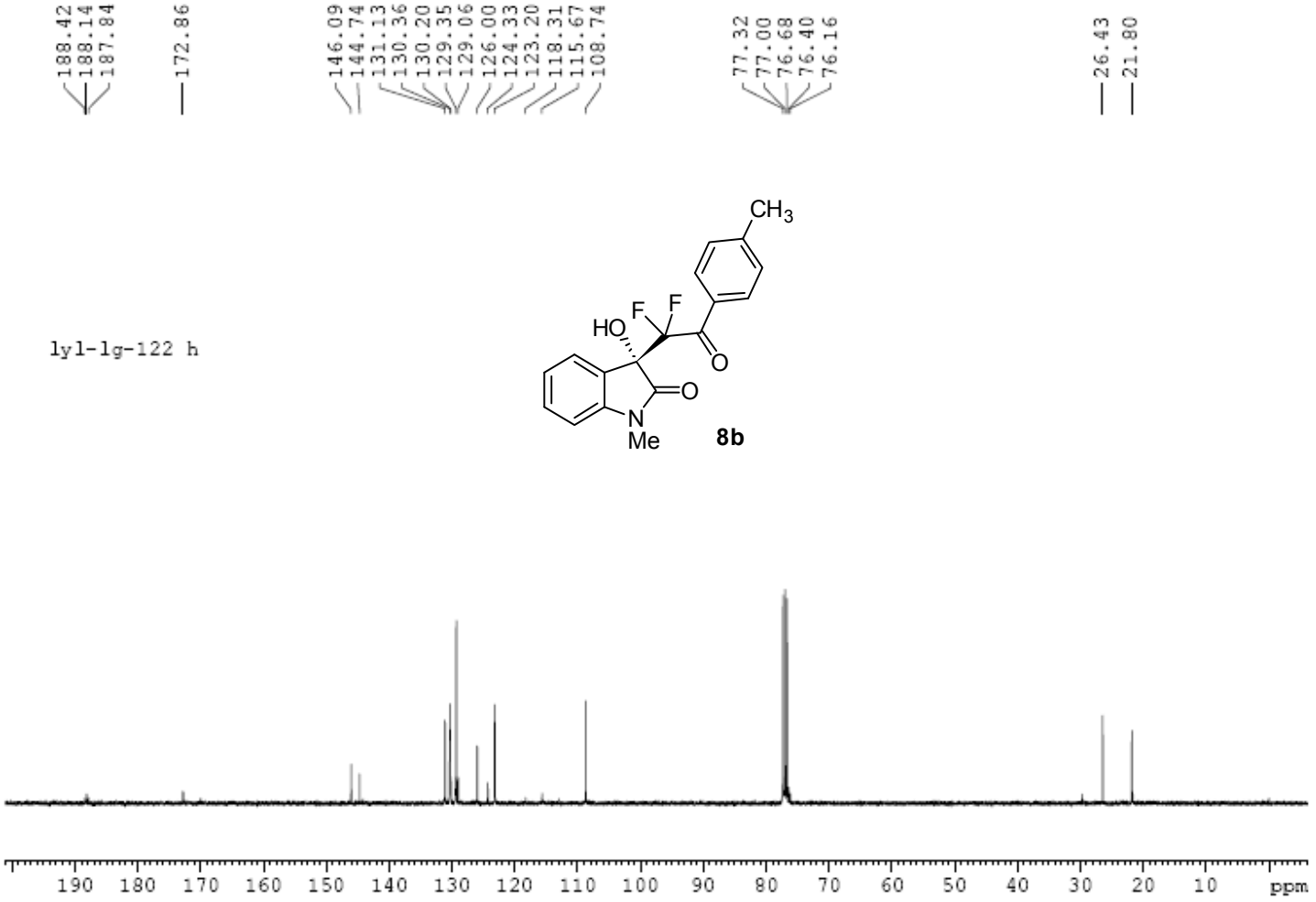

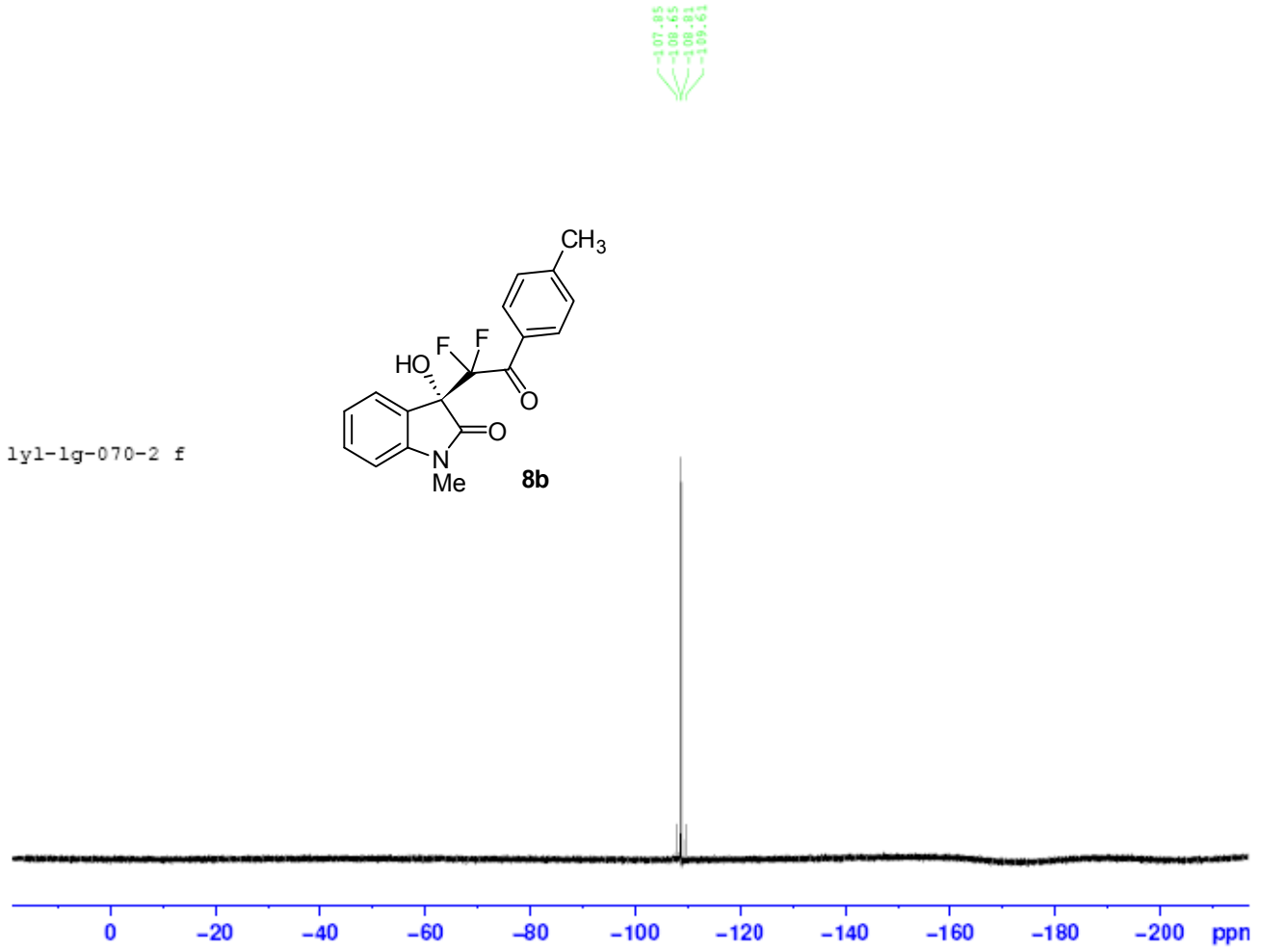

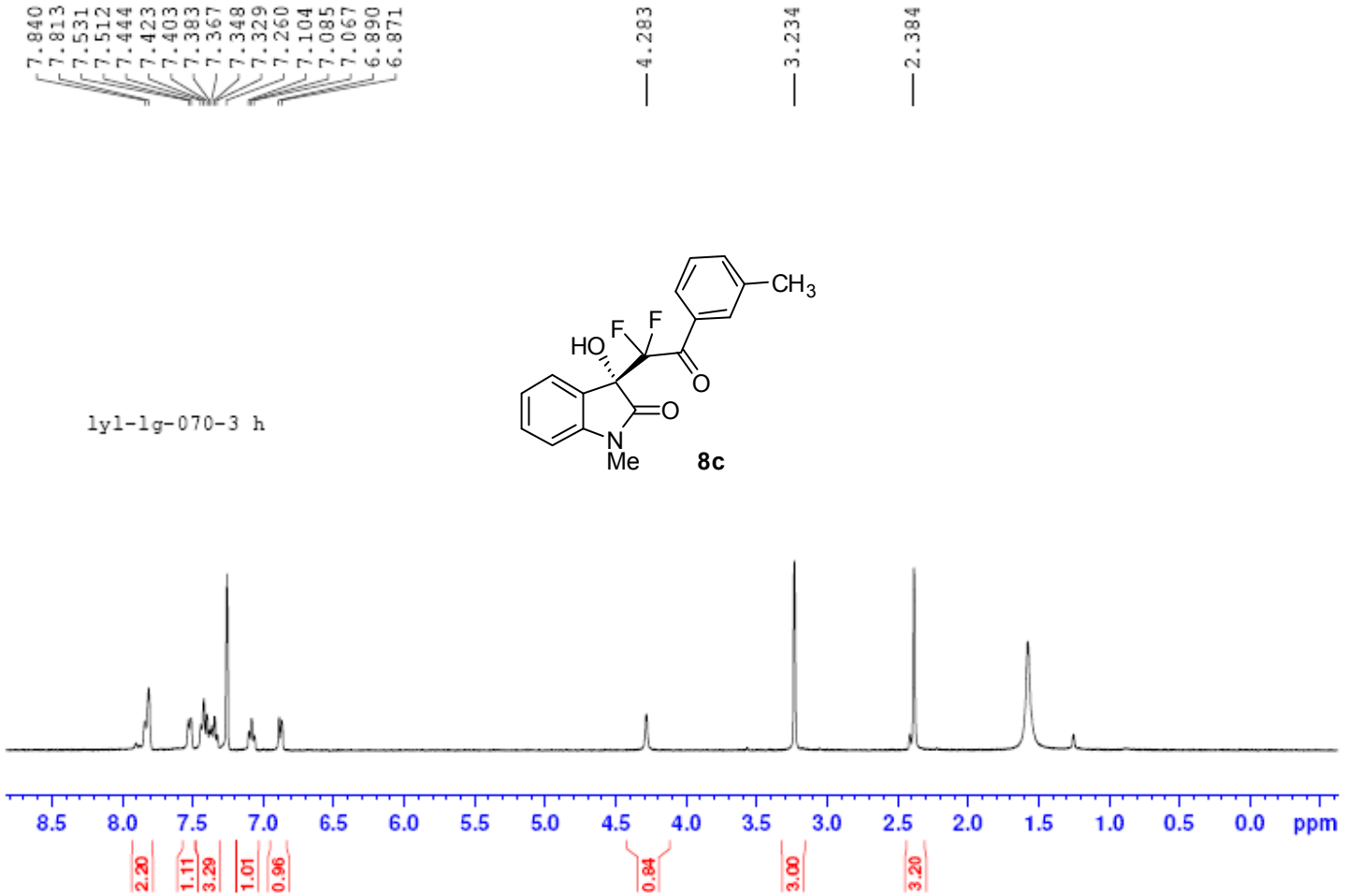

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172.82
144.63
138.43
138.03
135.48
134.04
131.92
131.07
130.62
130.49
128.41
128.17
127.39
127.24
125.91
124.34
123.15
118.29
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26.37
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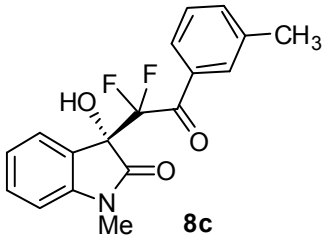

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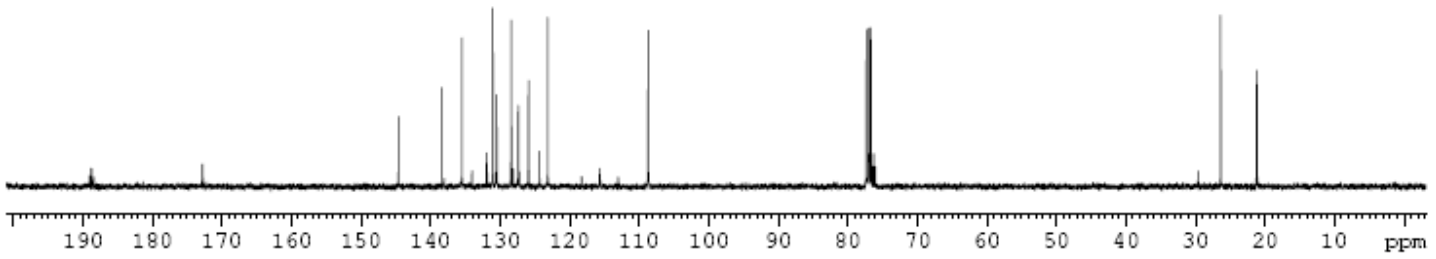

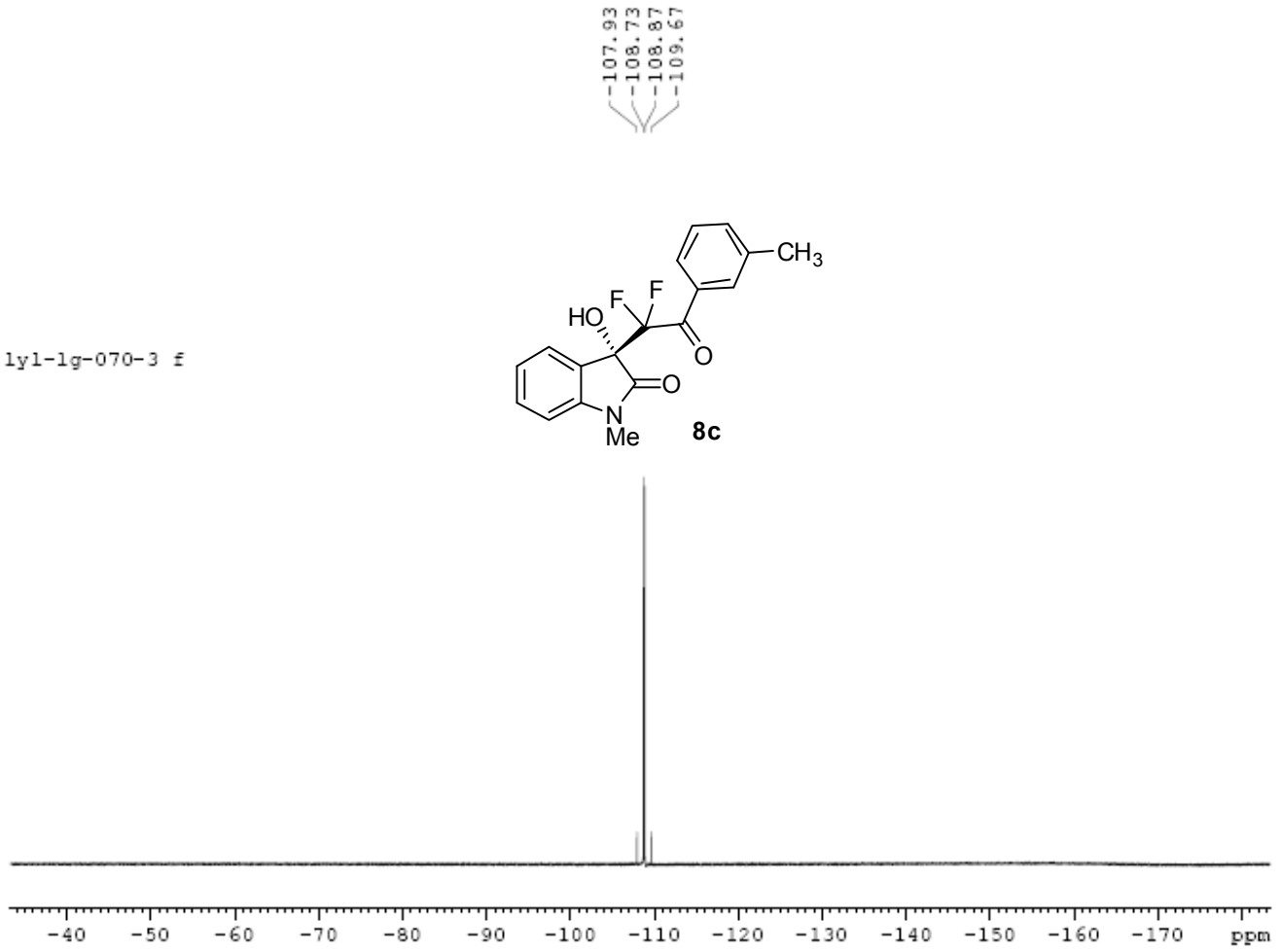
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-108.87
-109.67
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CH3
F
F
HO
O
O
N
Me
8c
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-70
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-130
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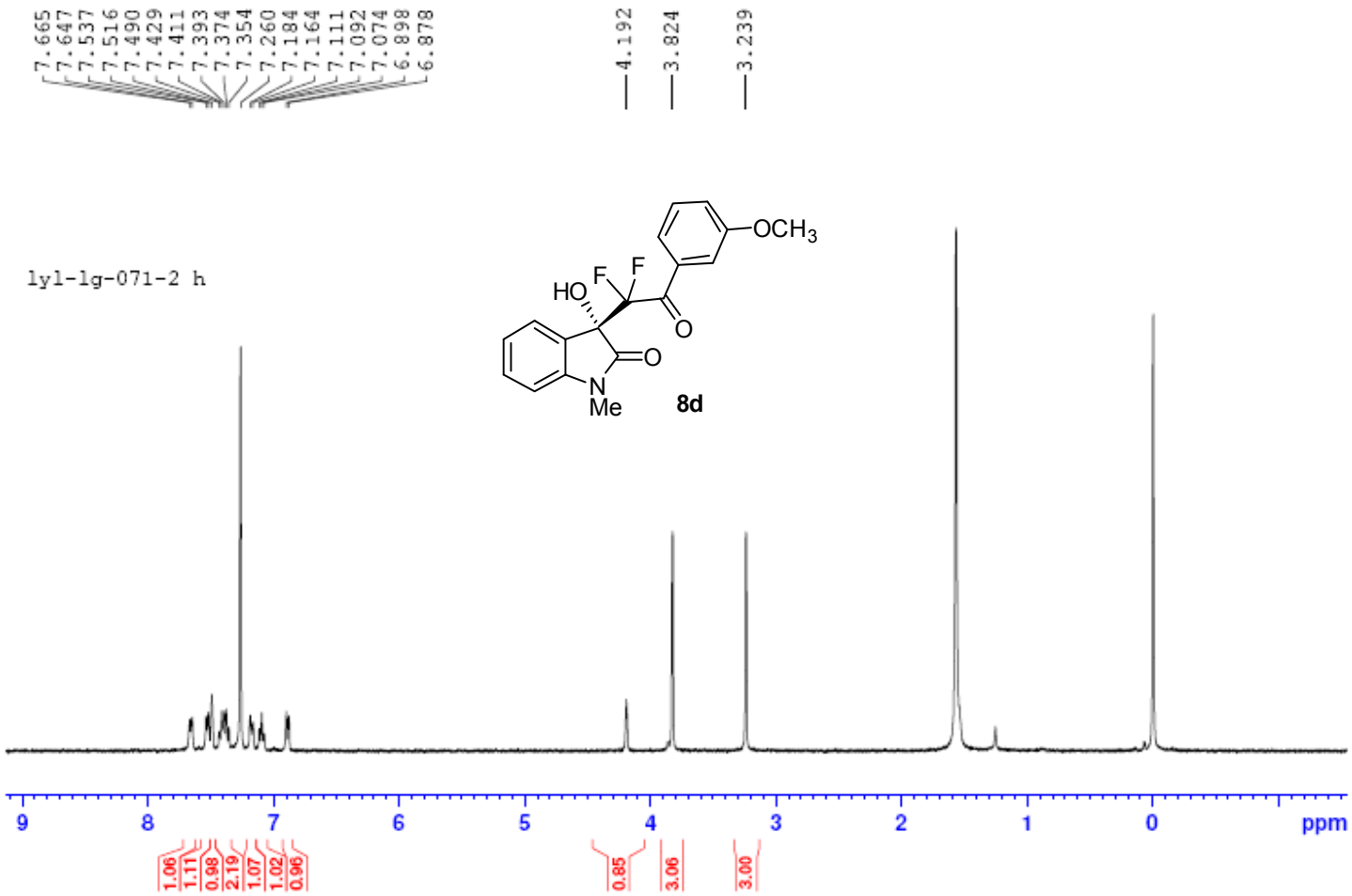
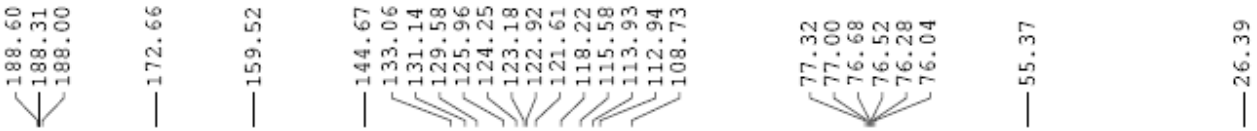
-170
ppm





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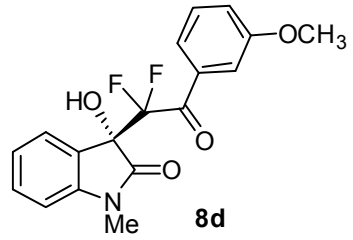

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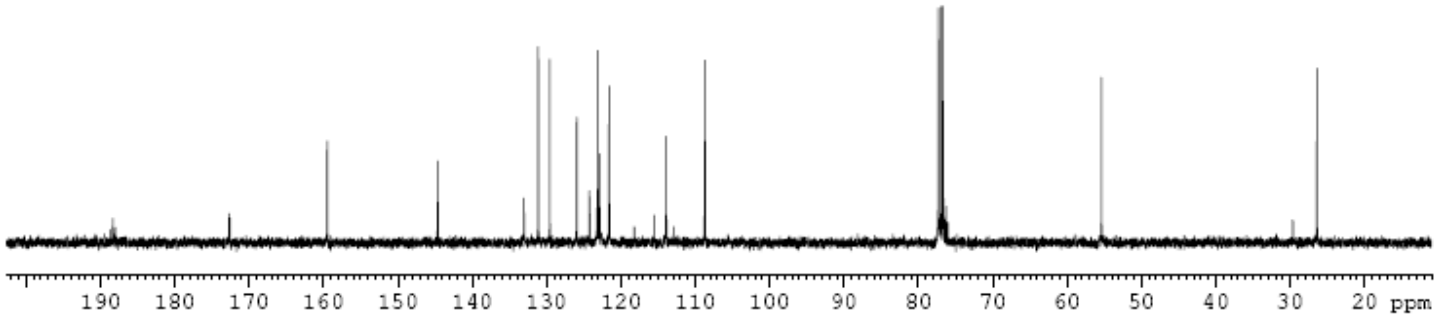

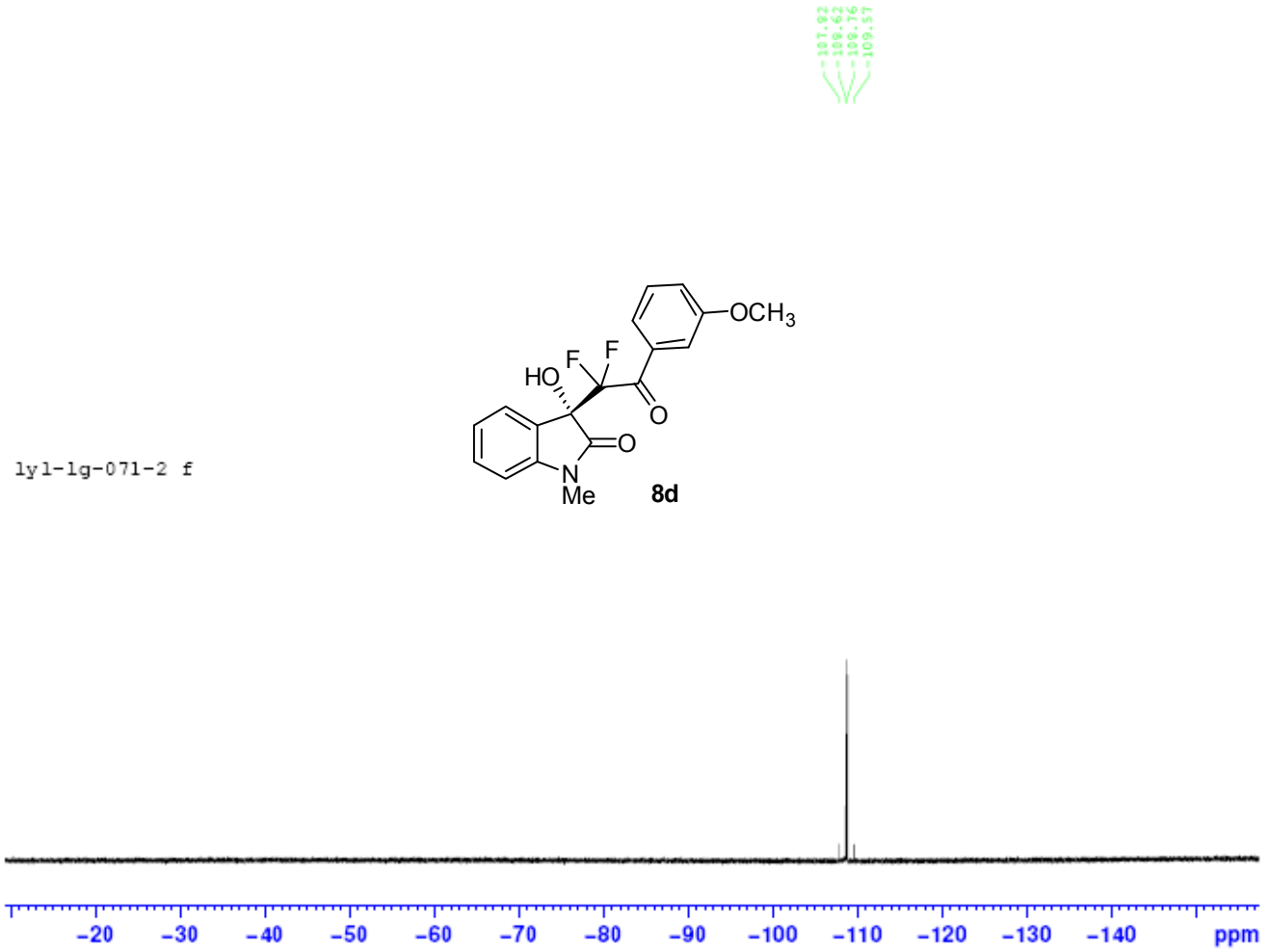
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-108.62
-108.76
-109.57
OCH3
F
F
HO
O
O
N
Me
8d
lyl-lg-071-2 f
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-30
-40
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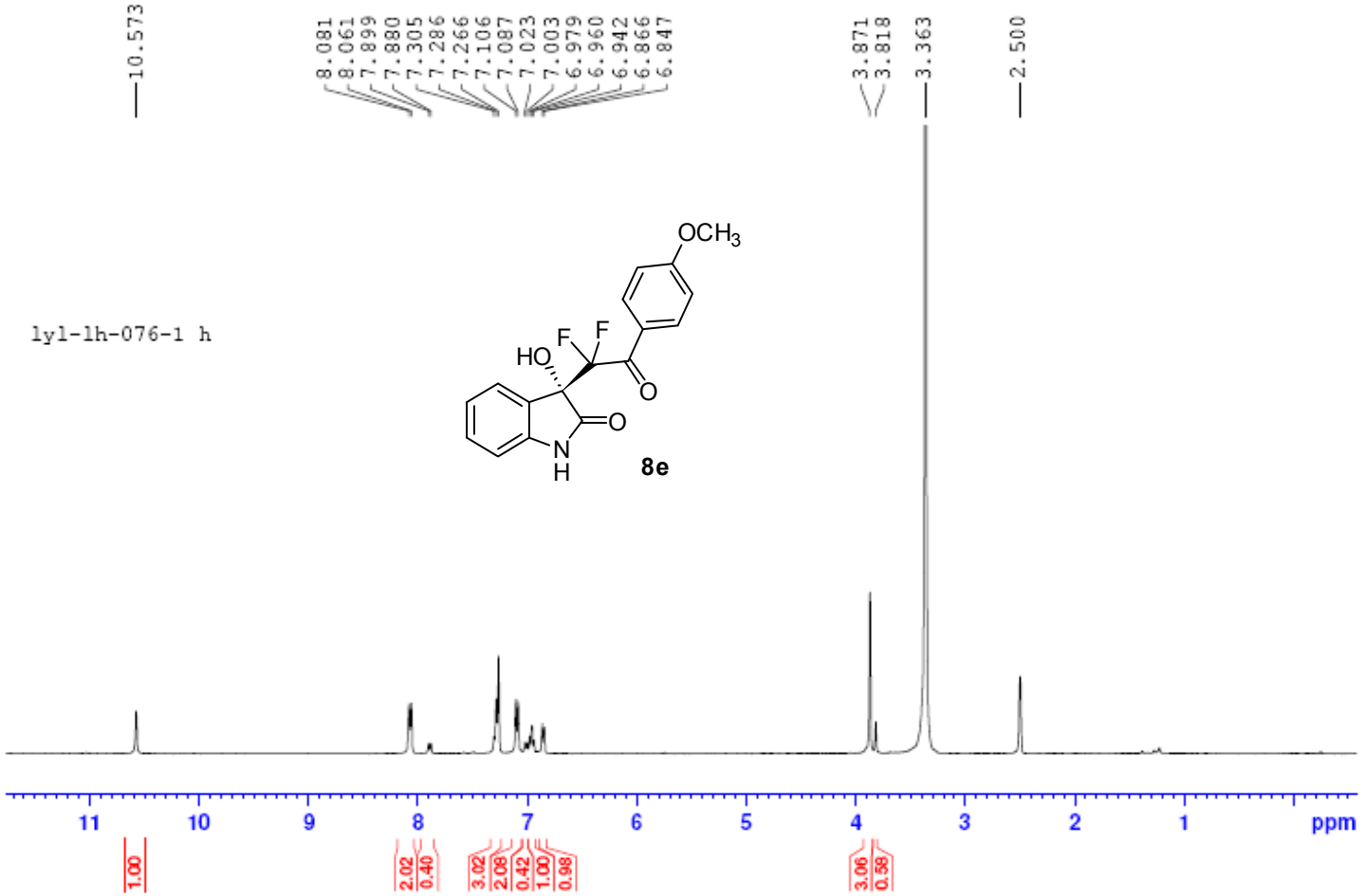
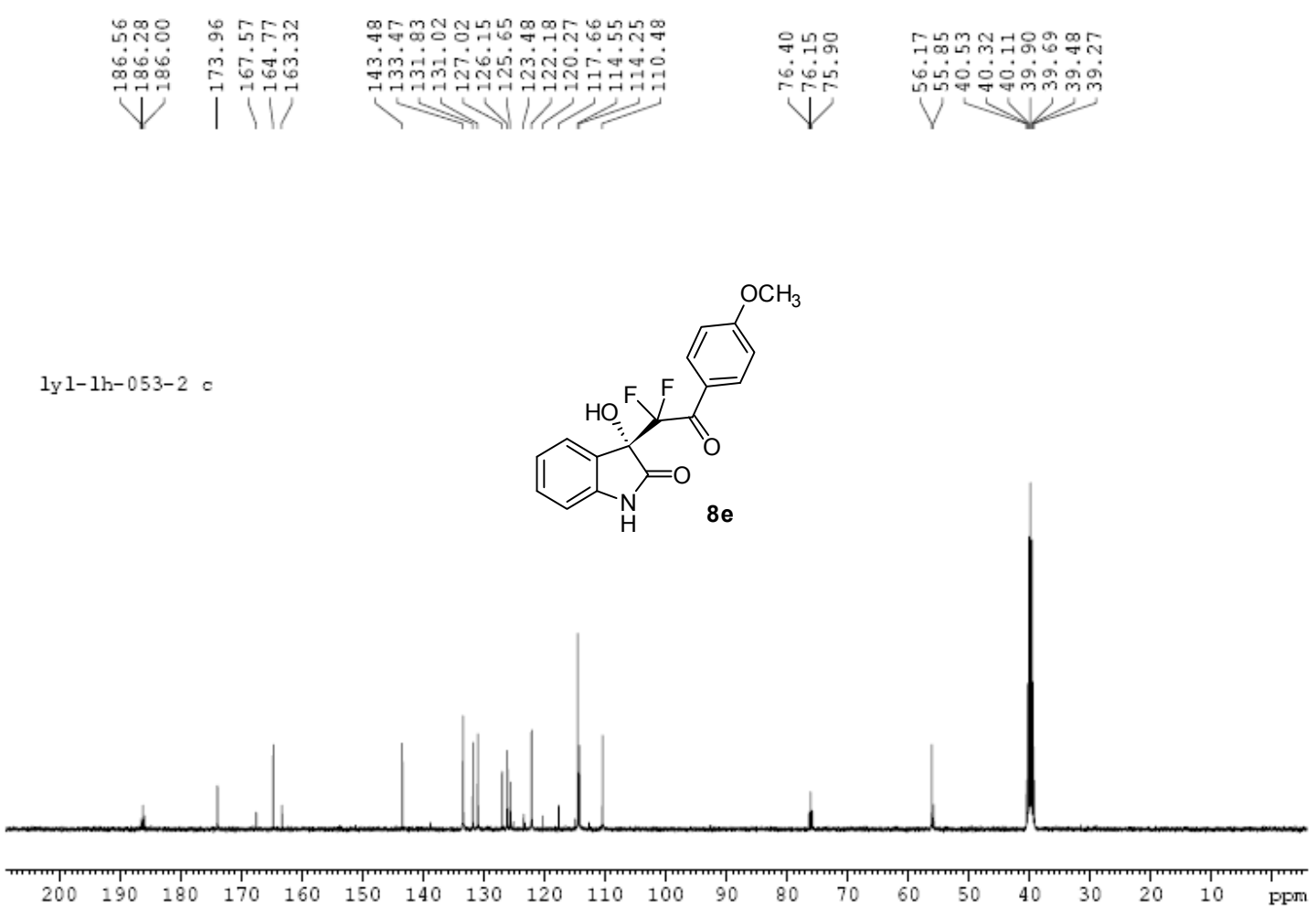
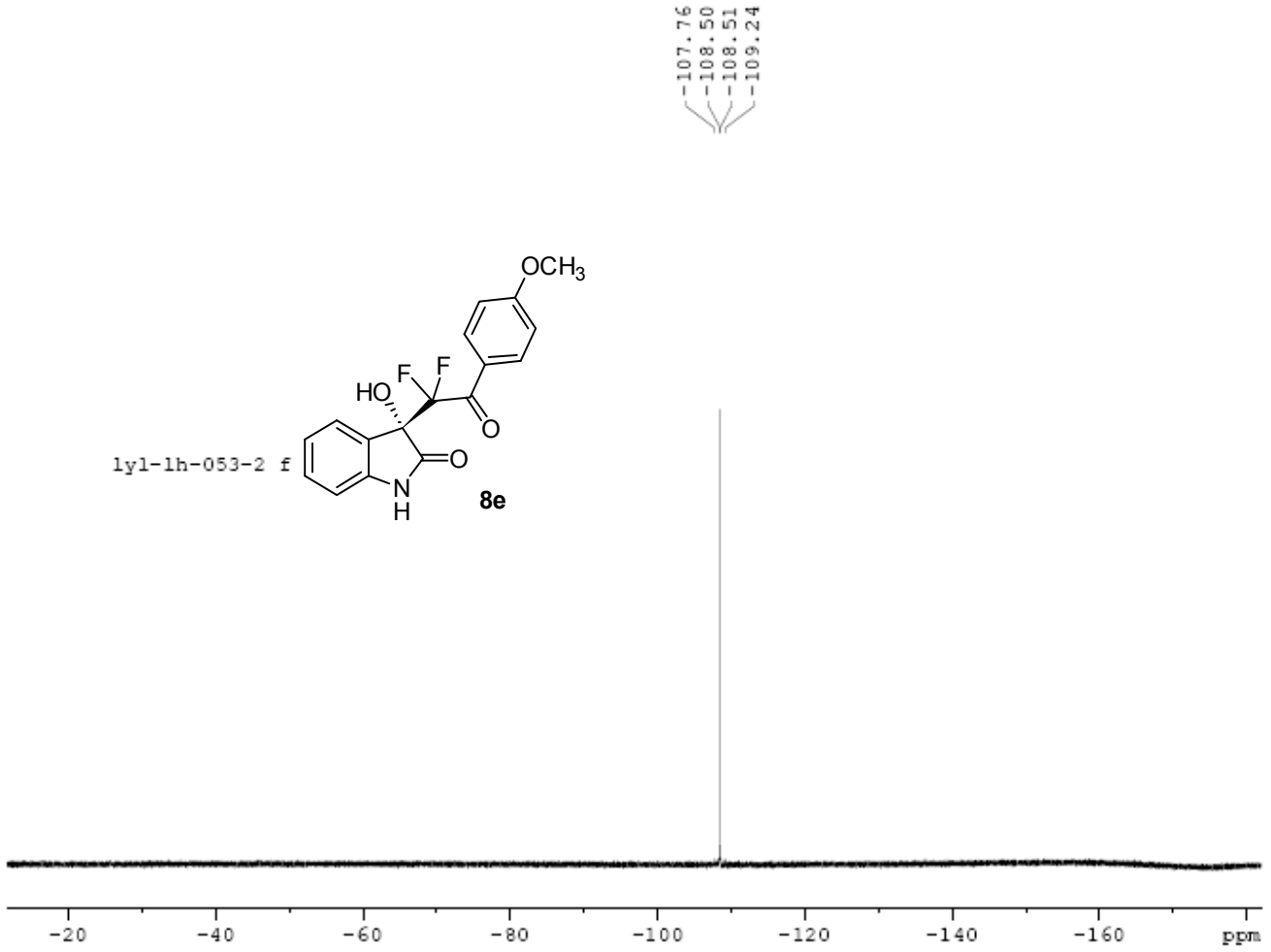
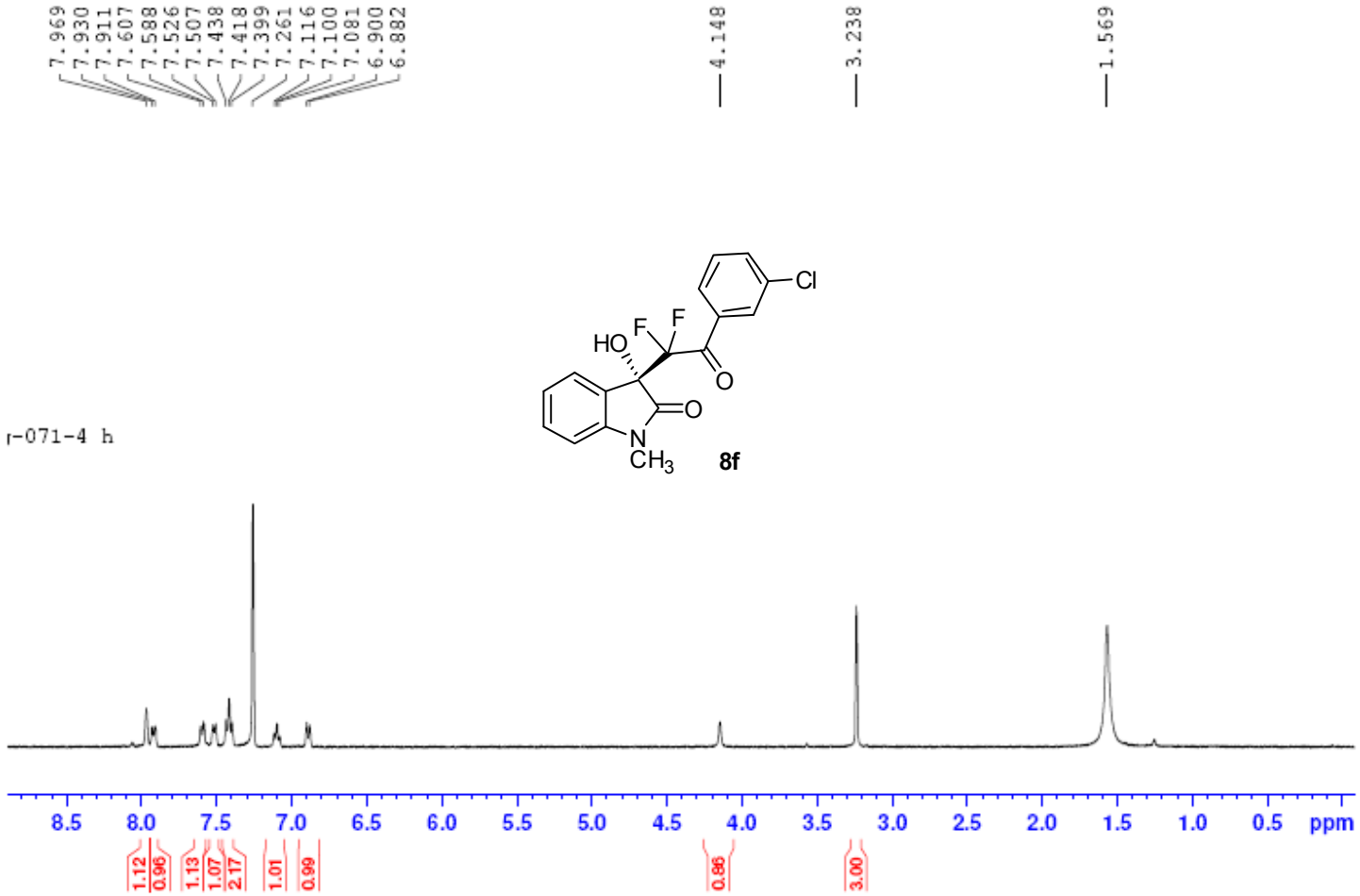
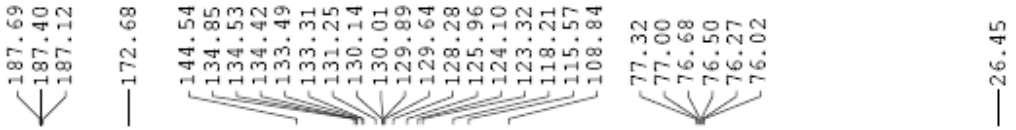
-60
-70
-80
-90
-100
-110
-120
-130
-140
ppm

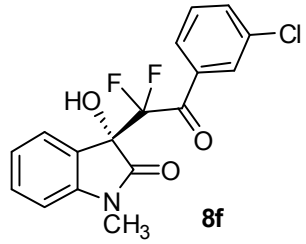












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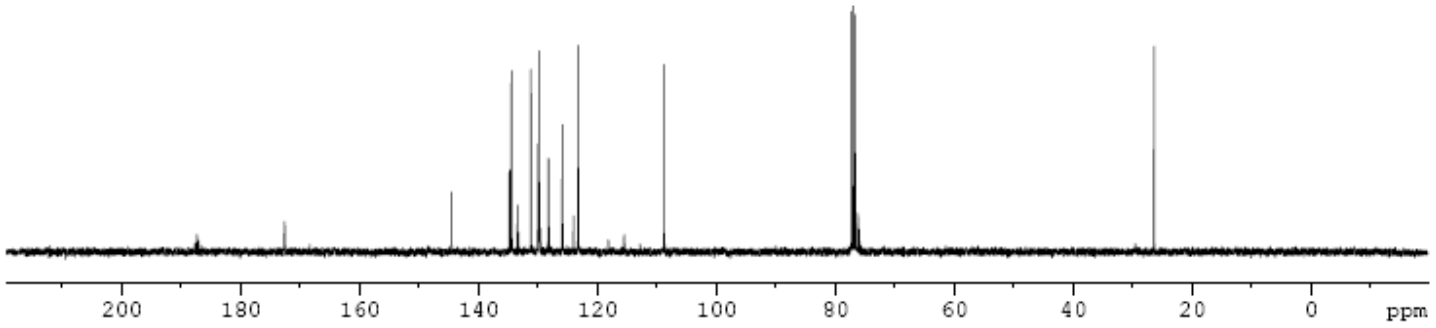

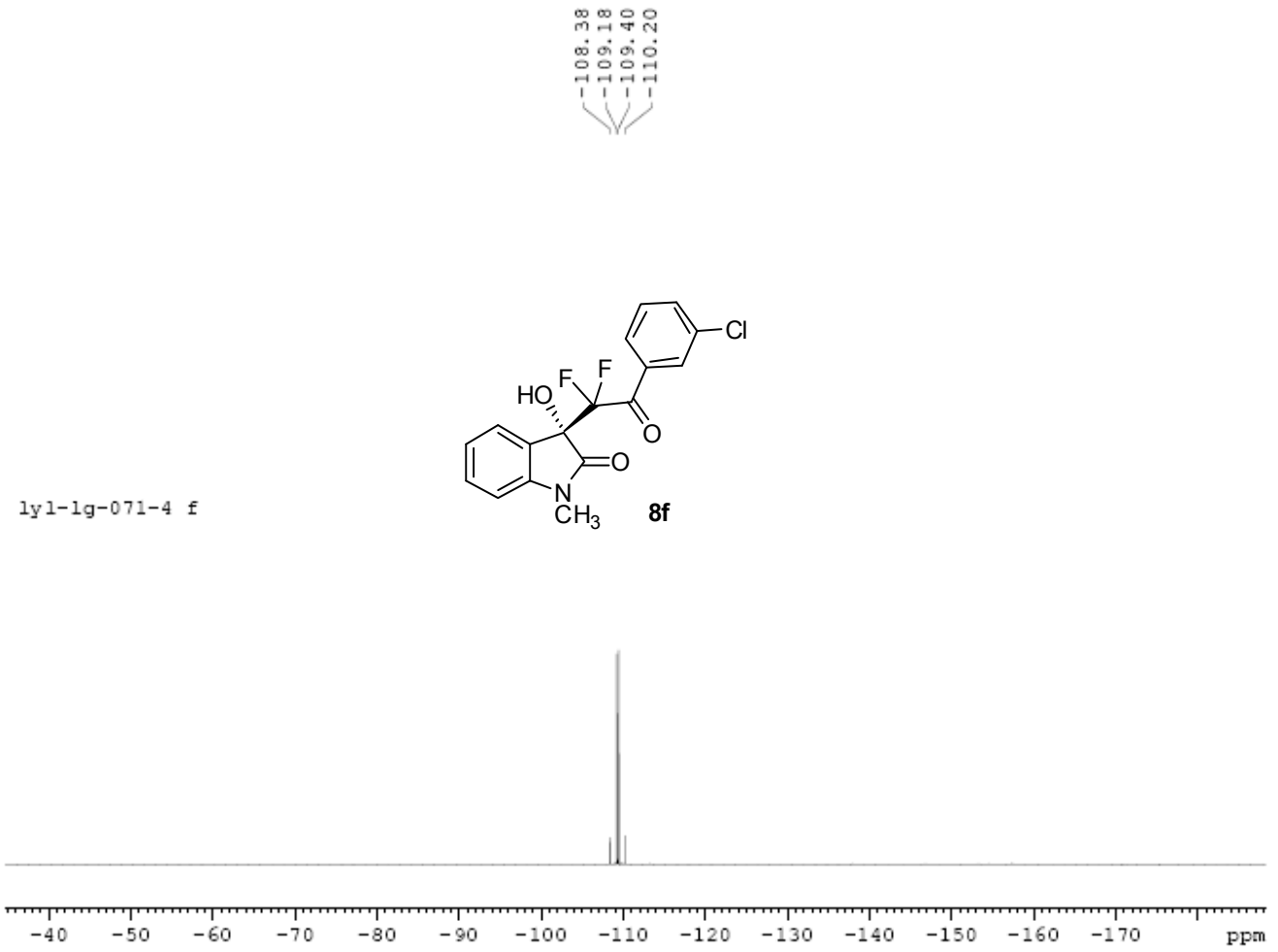
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HO
O
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CH3
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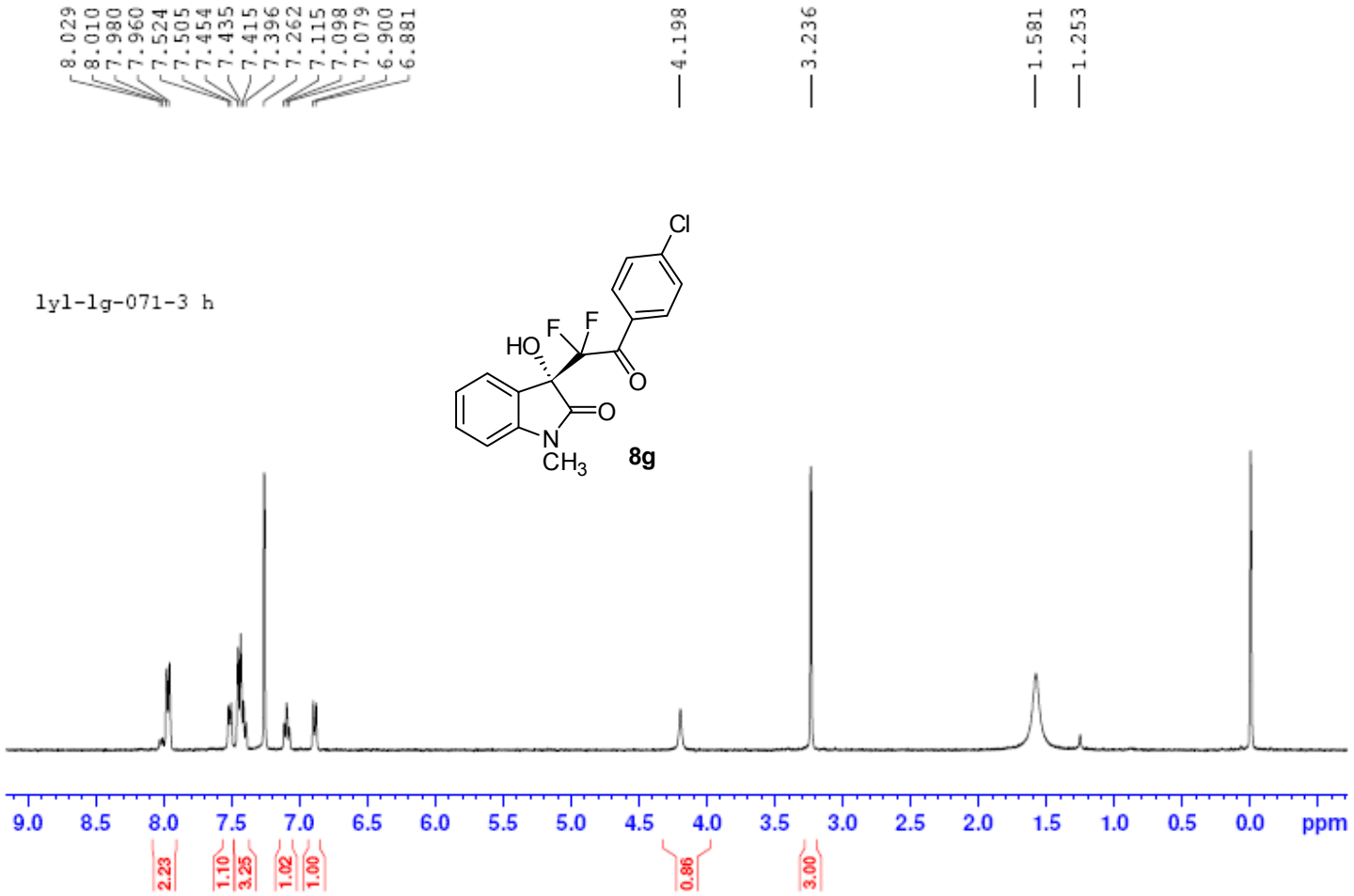
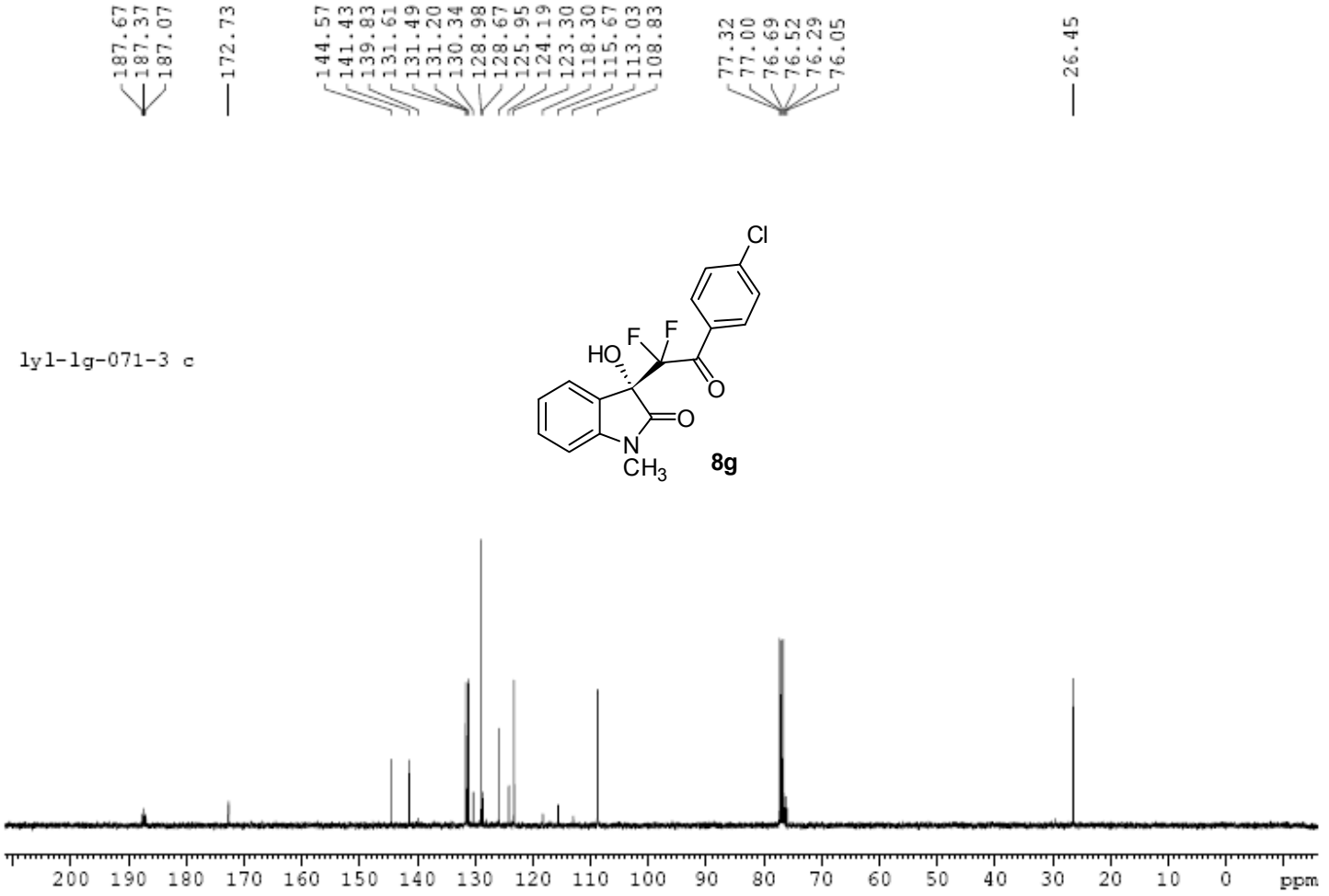
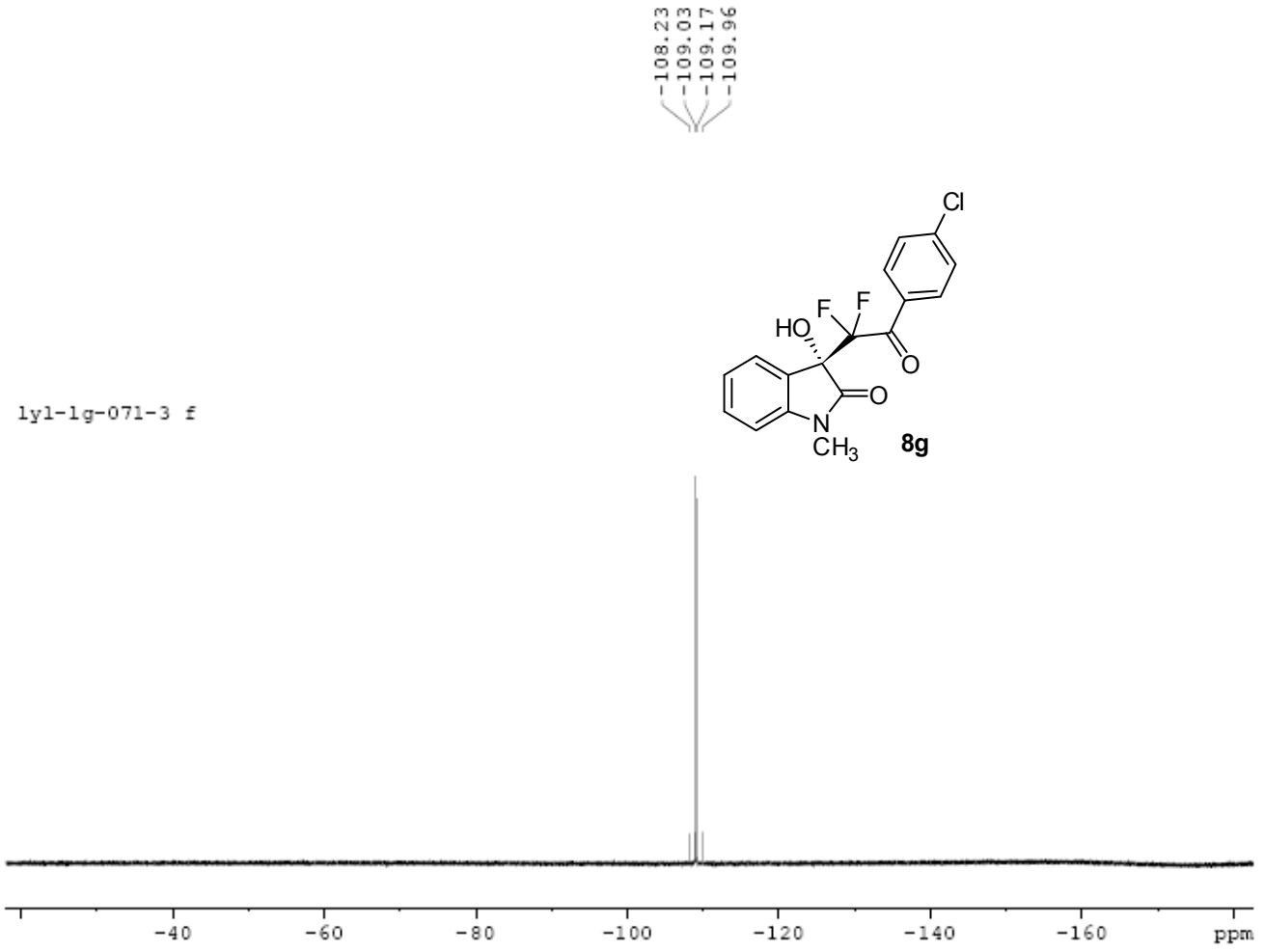
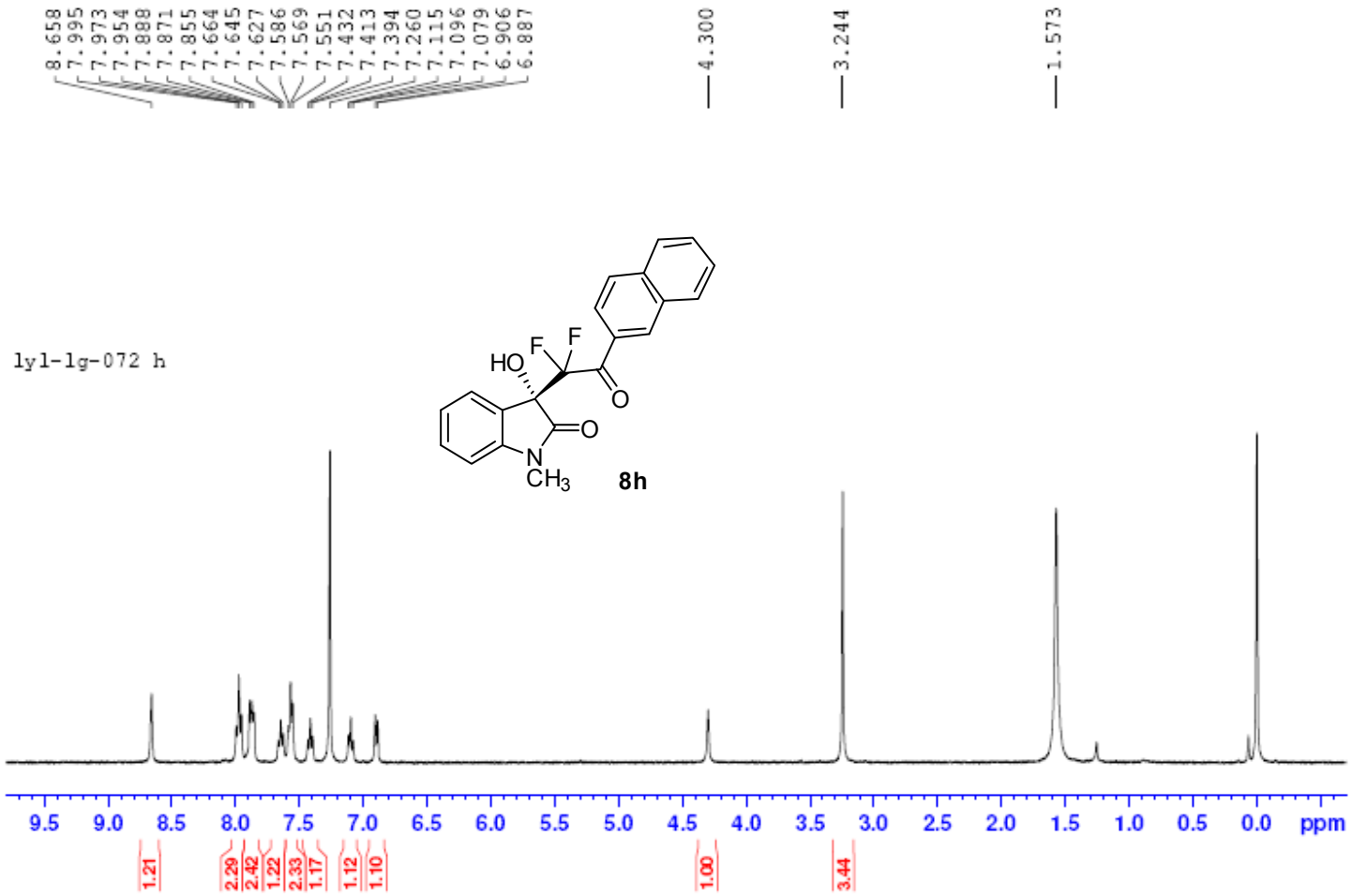
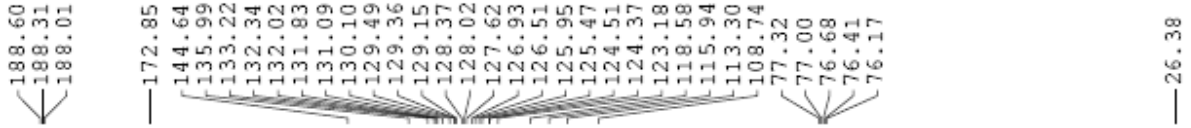
-140
-150
-160
-170
ppm











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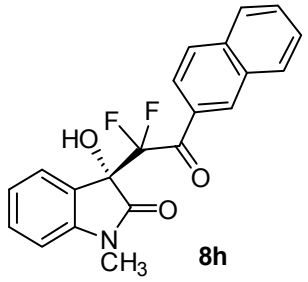

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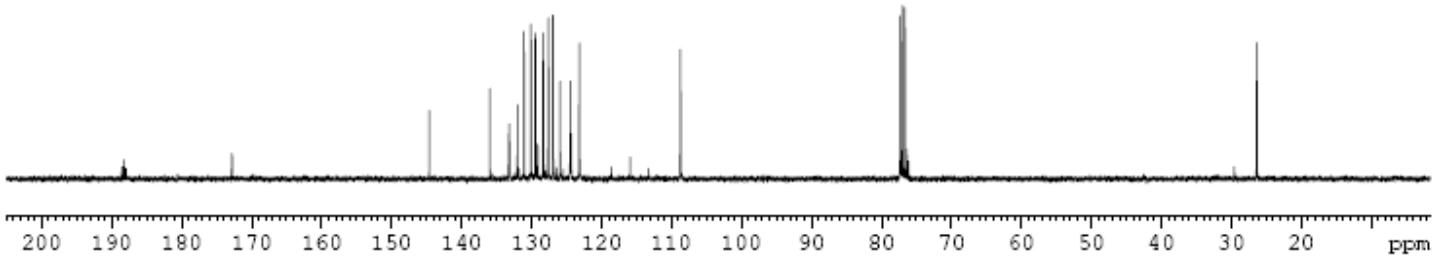

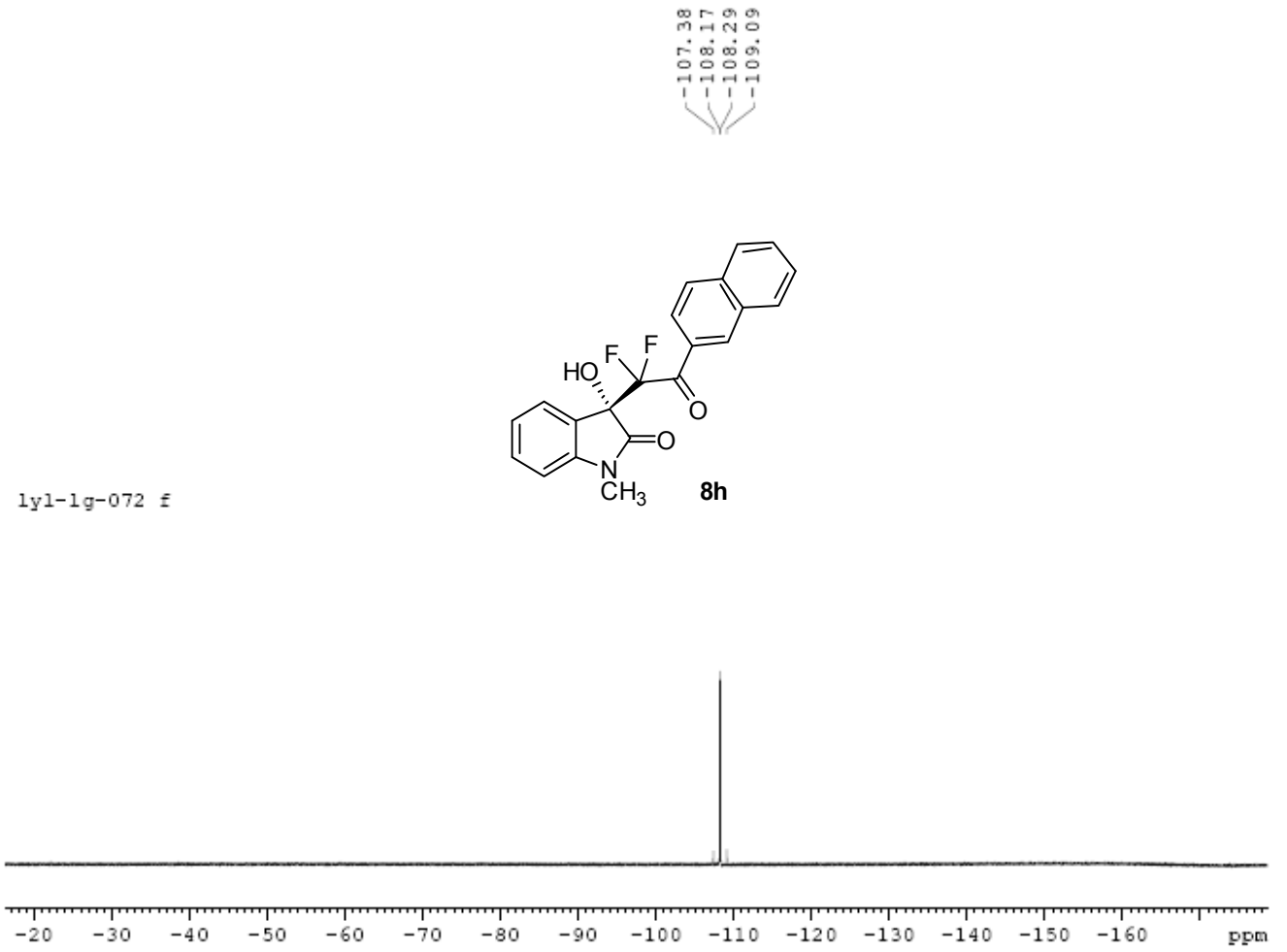

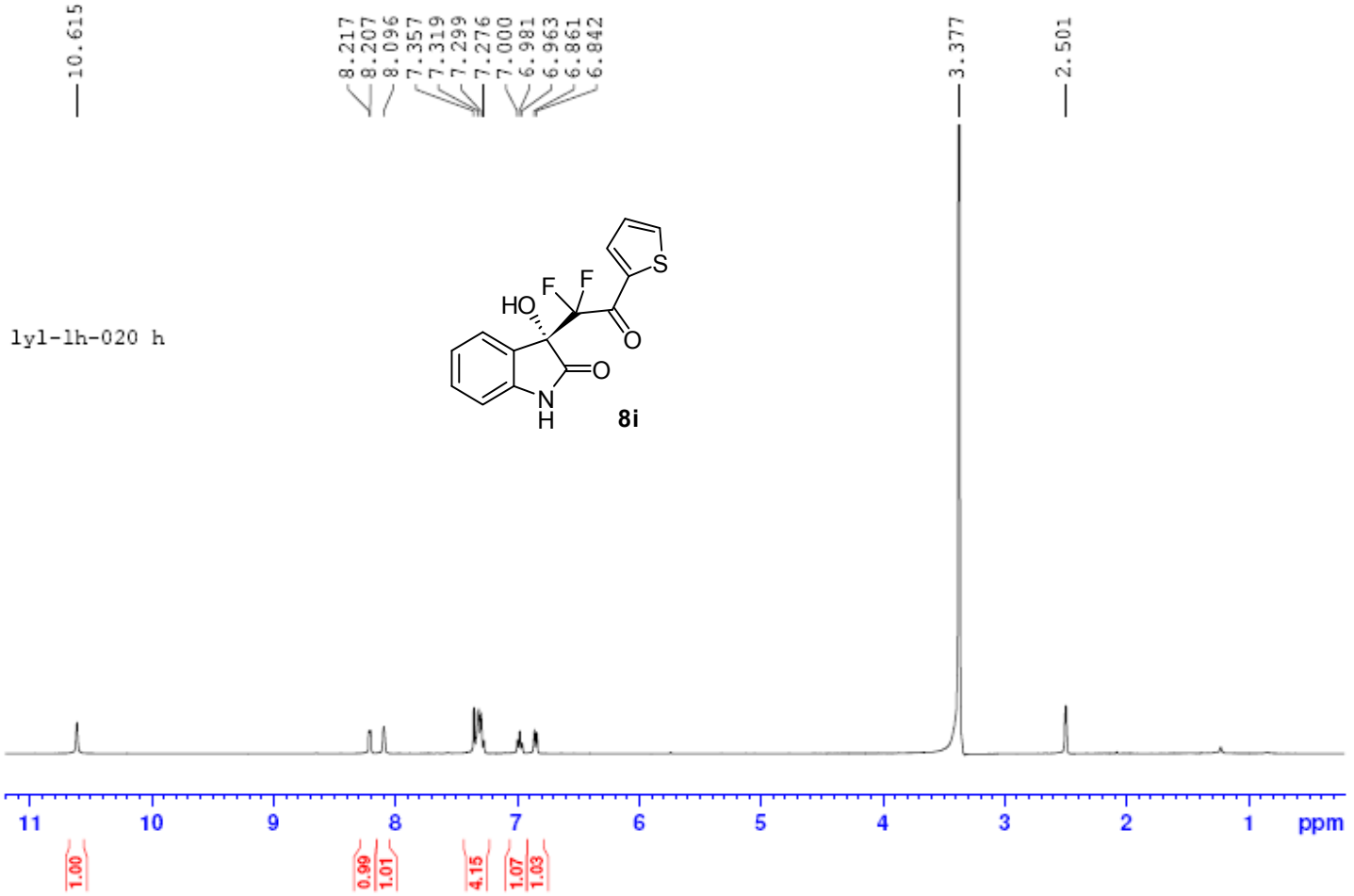
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7.319
7.299
7.276
7.000
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6.963
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6.842
3.377
2.501
lyl-lh-020 h
HO
F
F
S
O
O
N
H
8i
11
10
9
8
7
6
5
4
3
2
1
ppm
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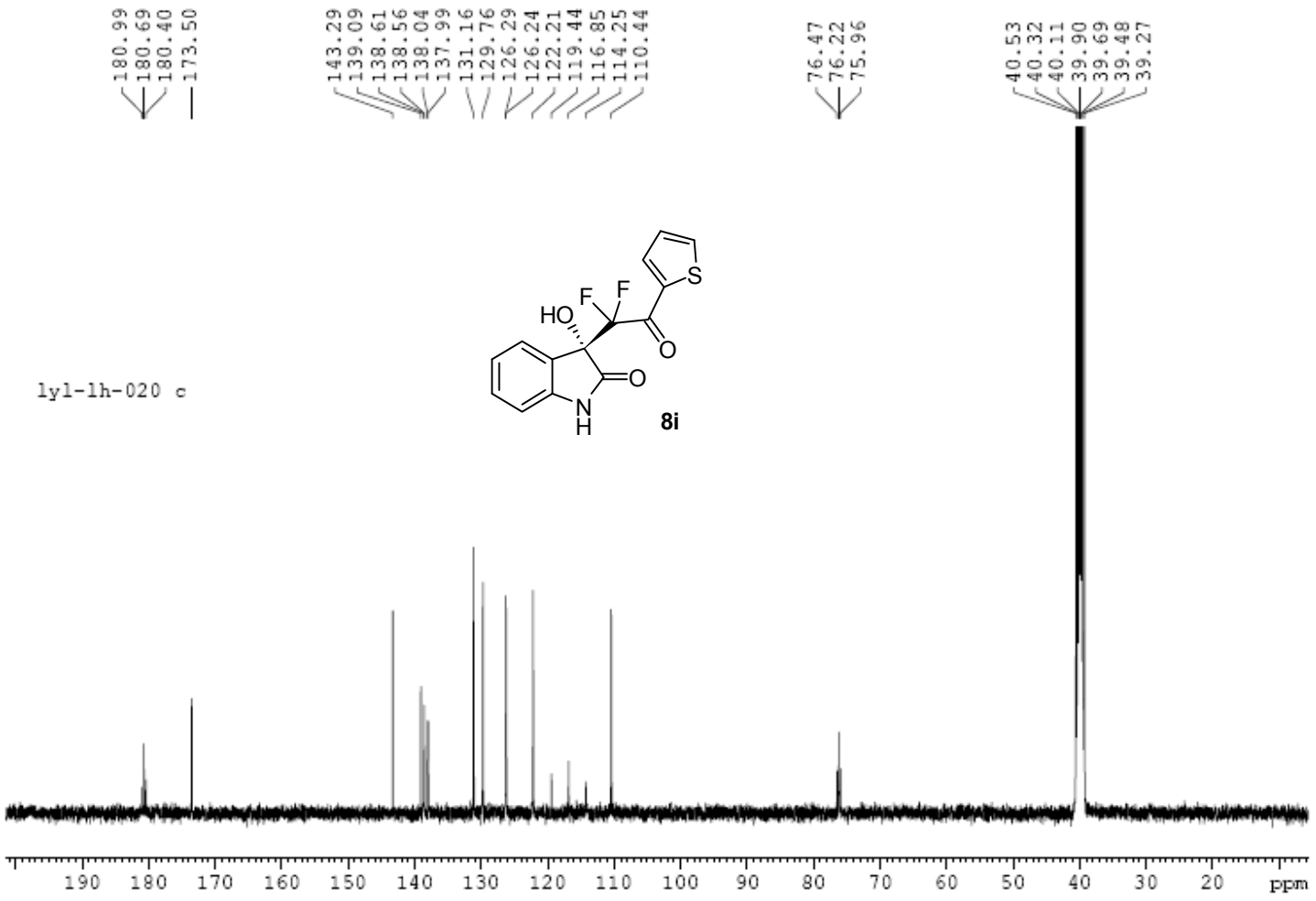
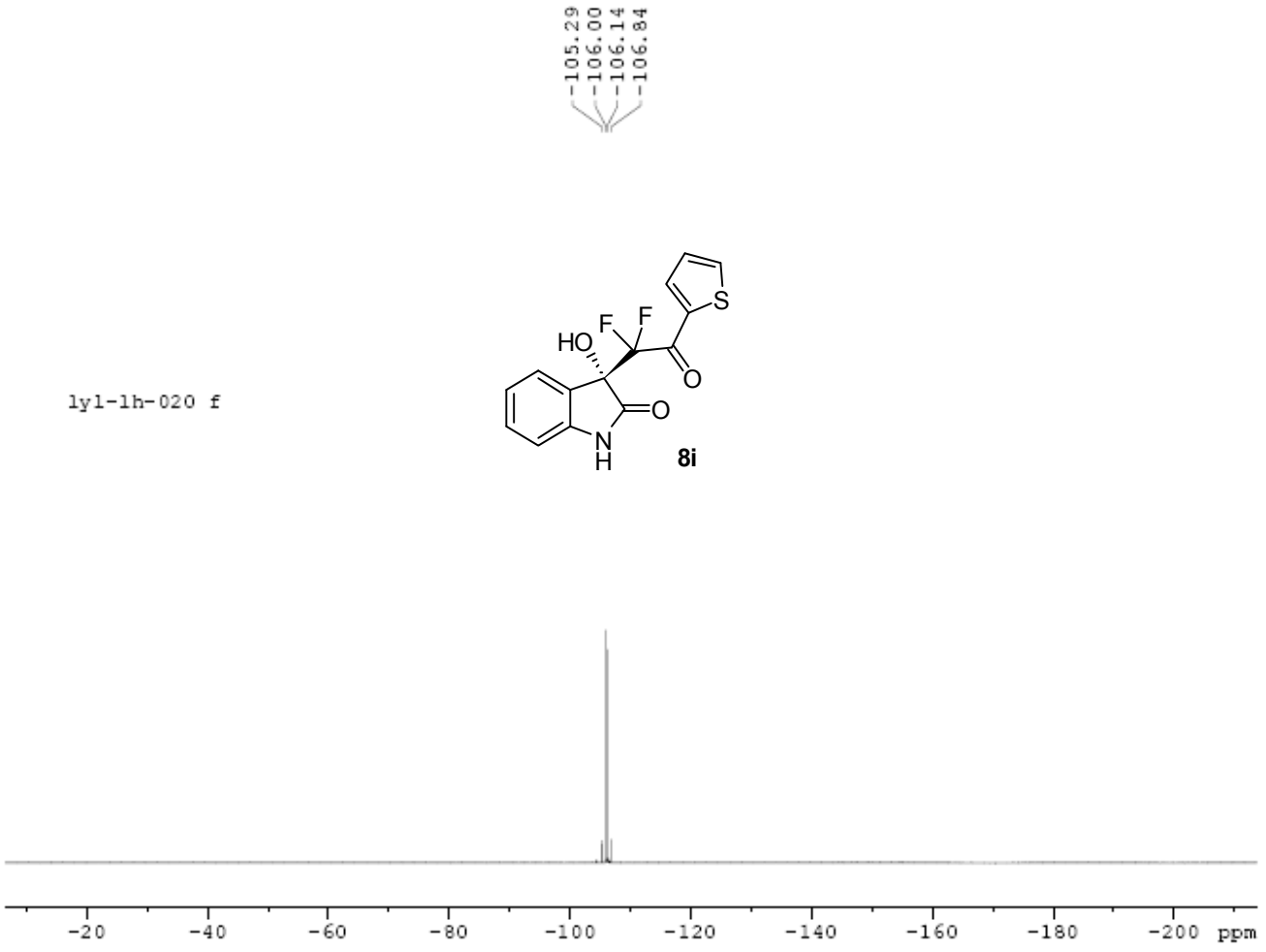
4.15
1.07
1.03

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HO
F
F
S
O
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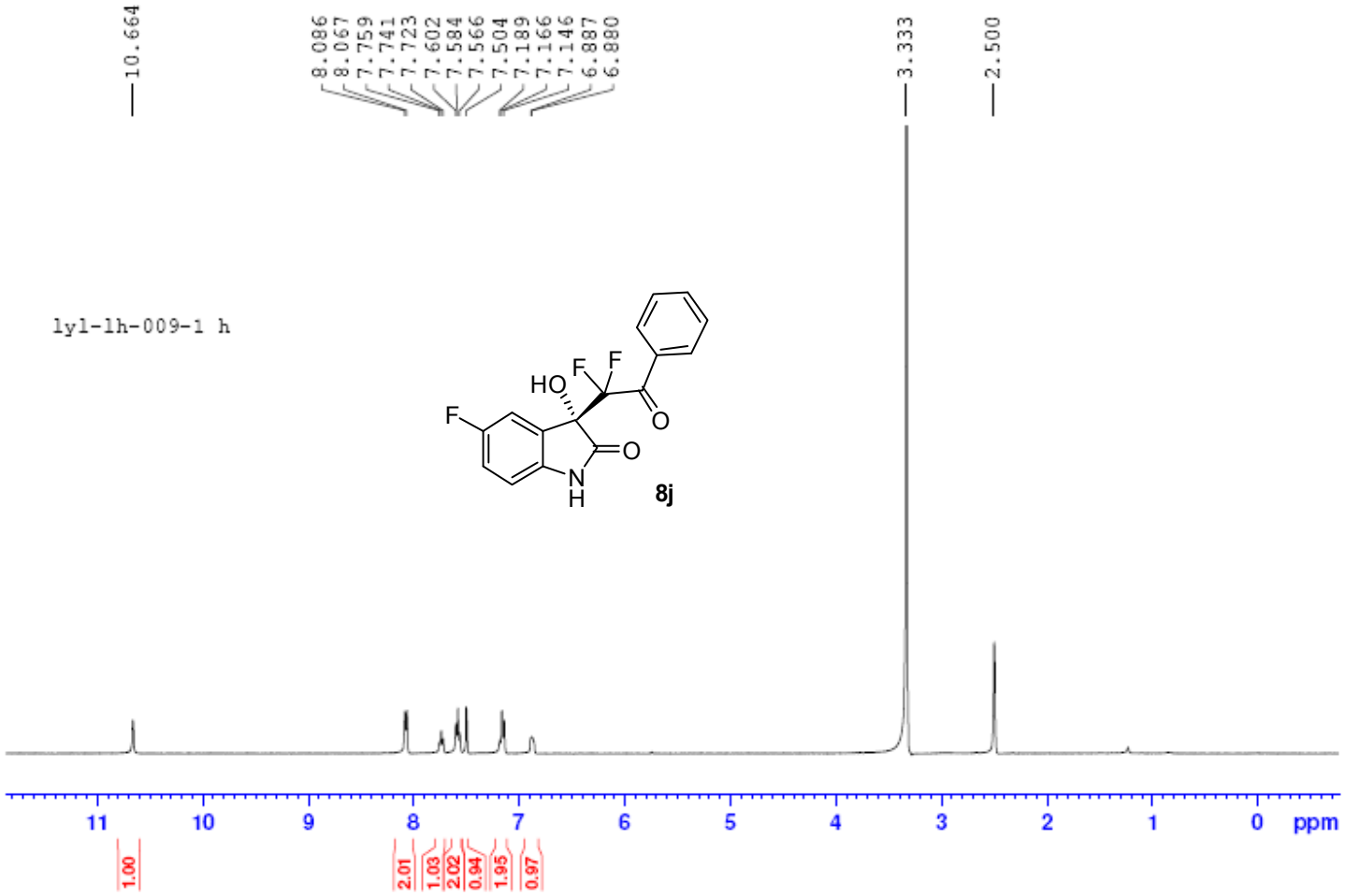
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7.759
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7.566
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7.146
6.887
6.880
3.333
2.500
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HO
F
F
F
O
O
N
H
8j
11
10
9
8
7
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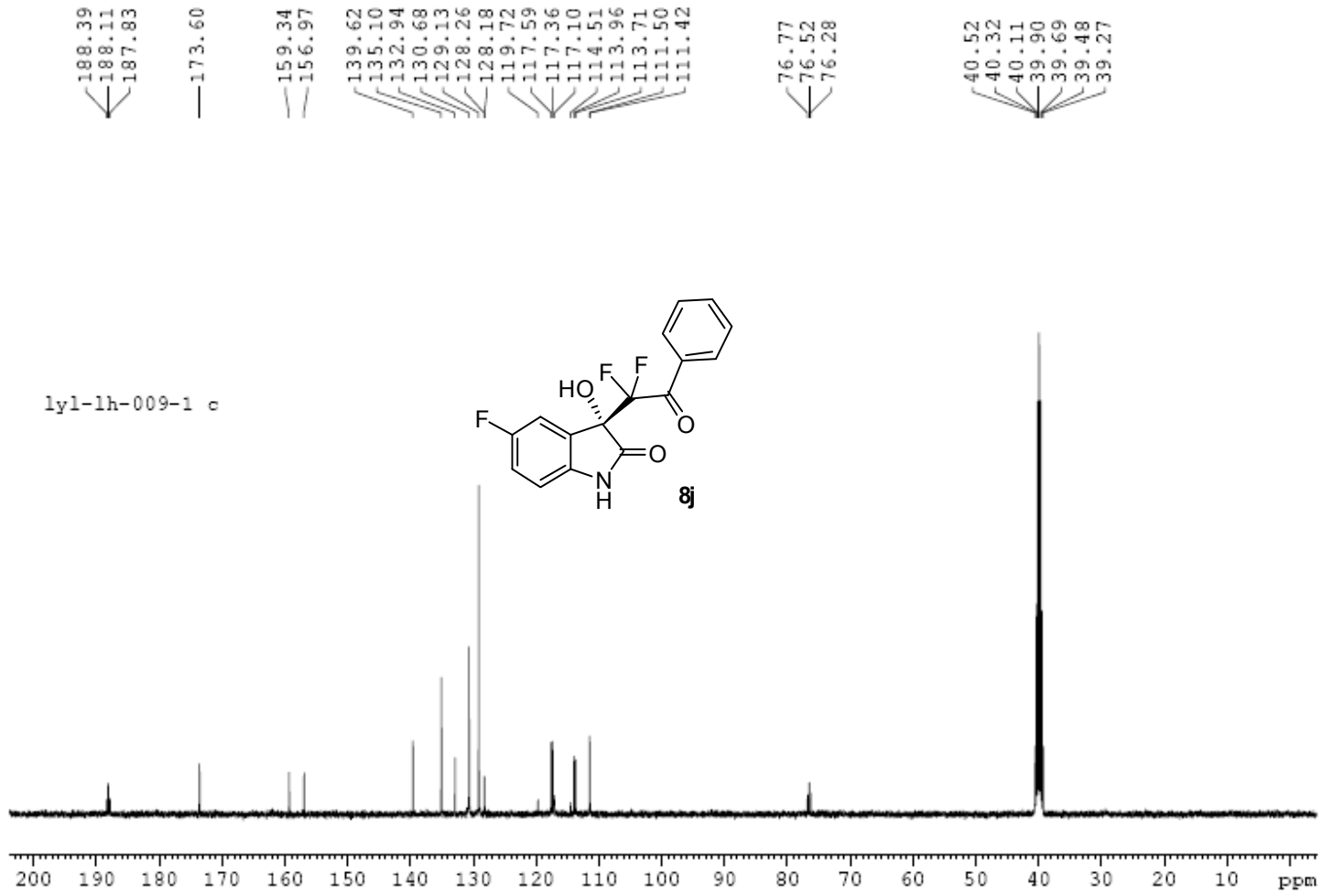
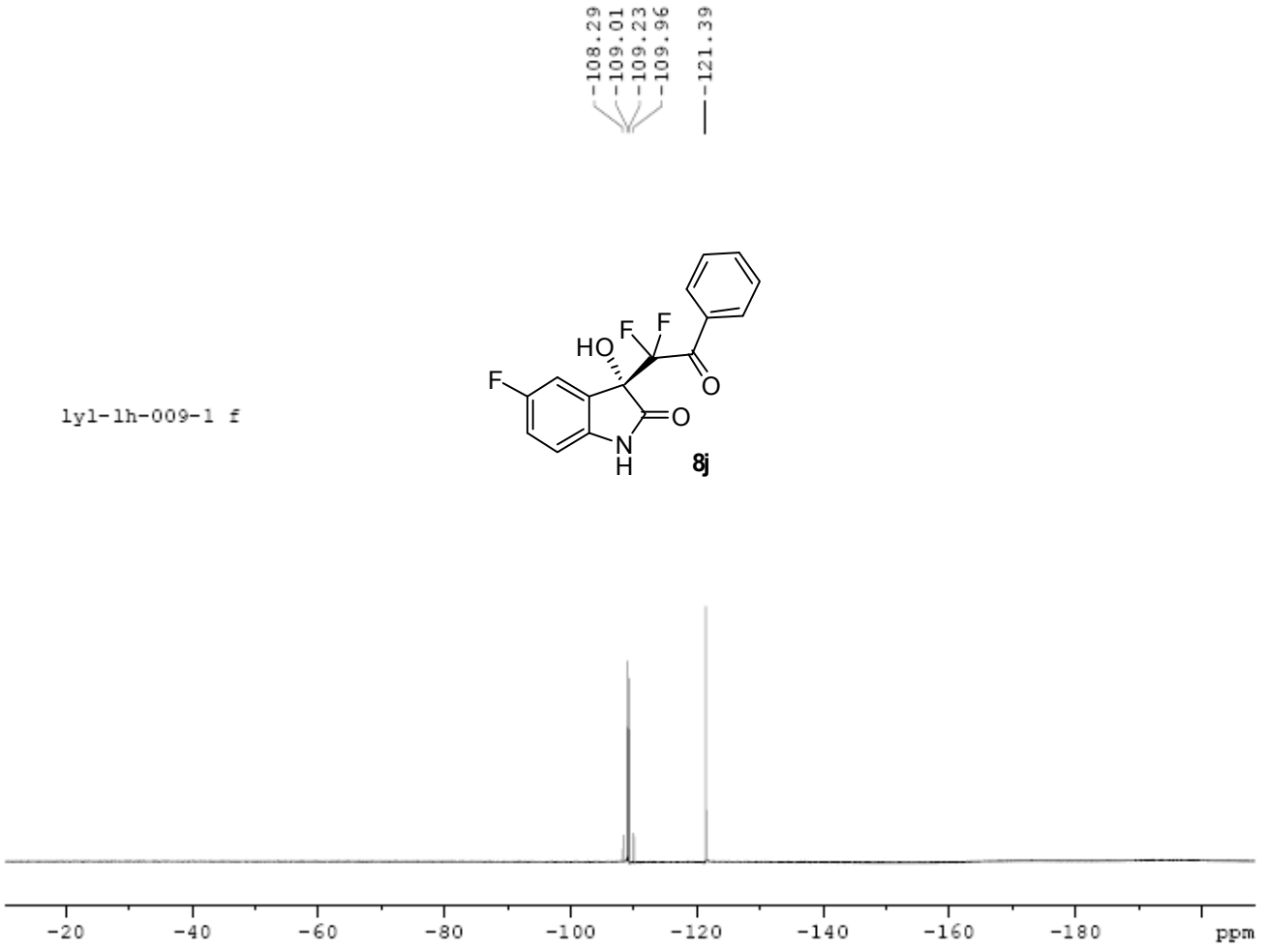
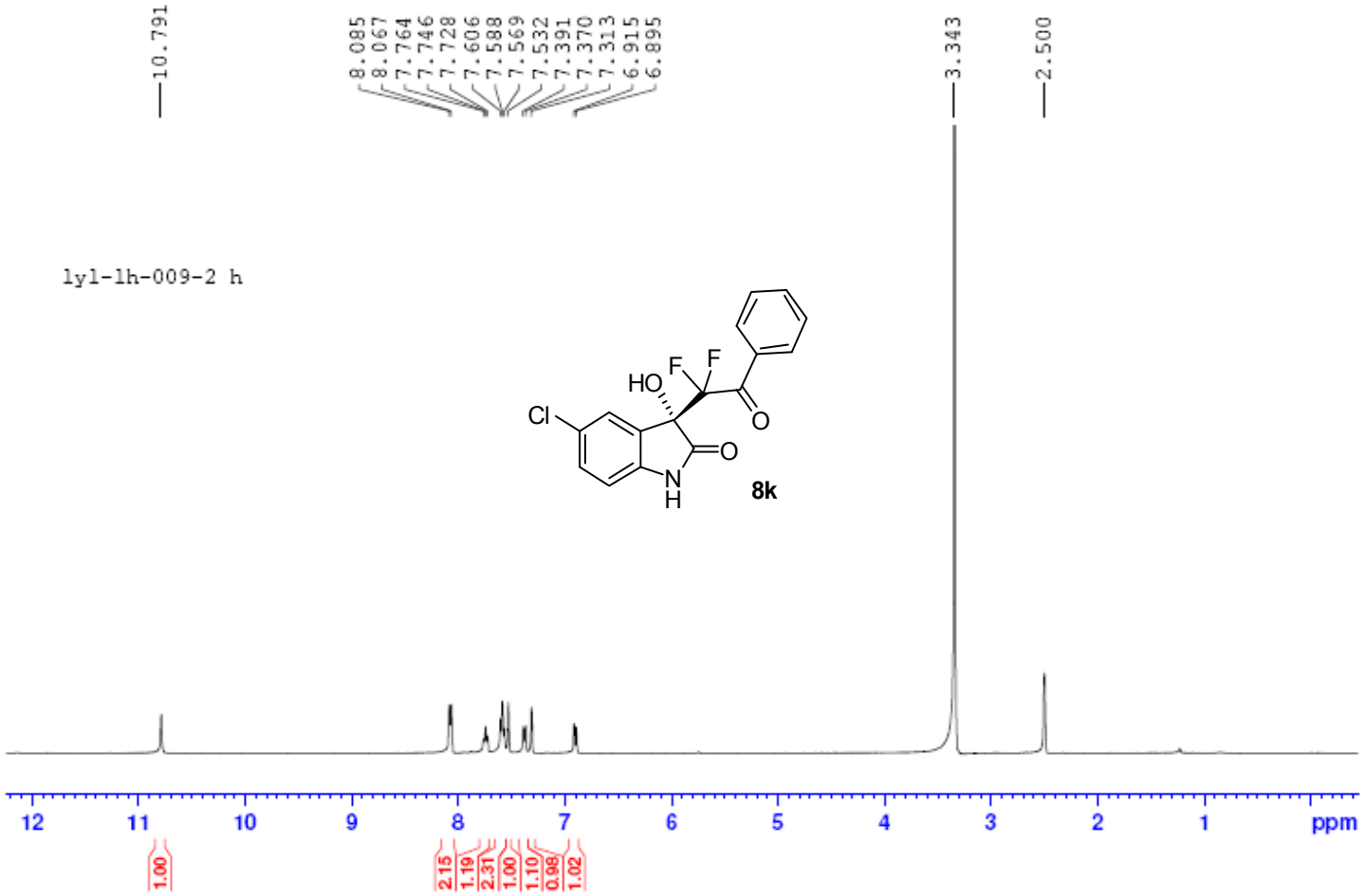
1.95
0.97



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7.370
7.313
6.915
6.895
3.343
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lyl-lh-009-2 h
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F
O
Cl
O
N
H
8k
12
11
10
9
8
7
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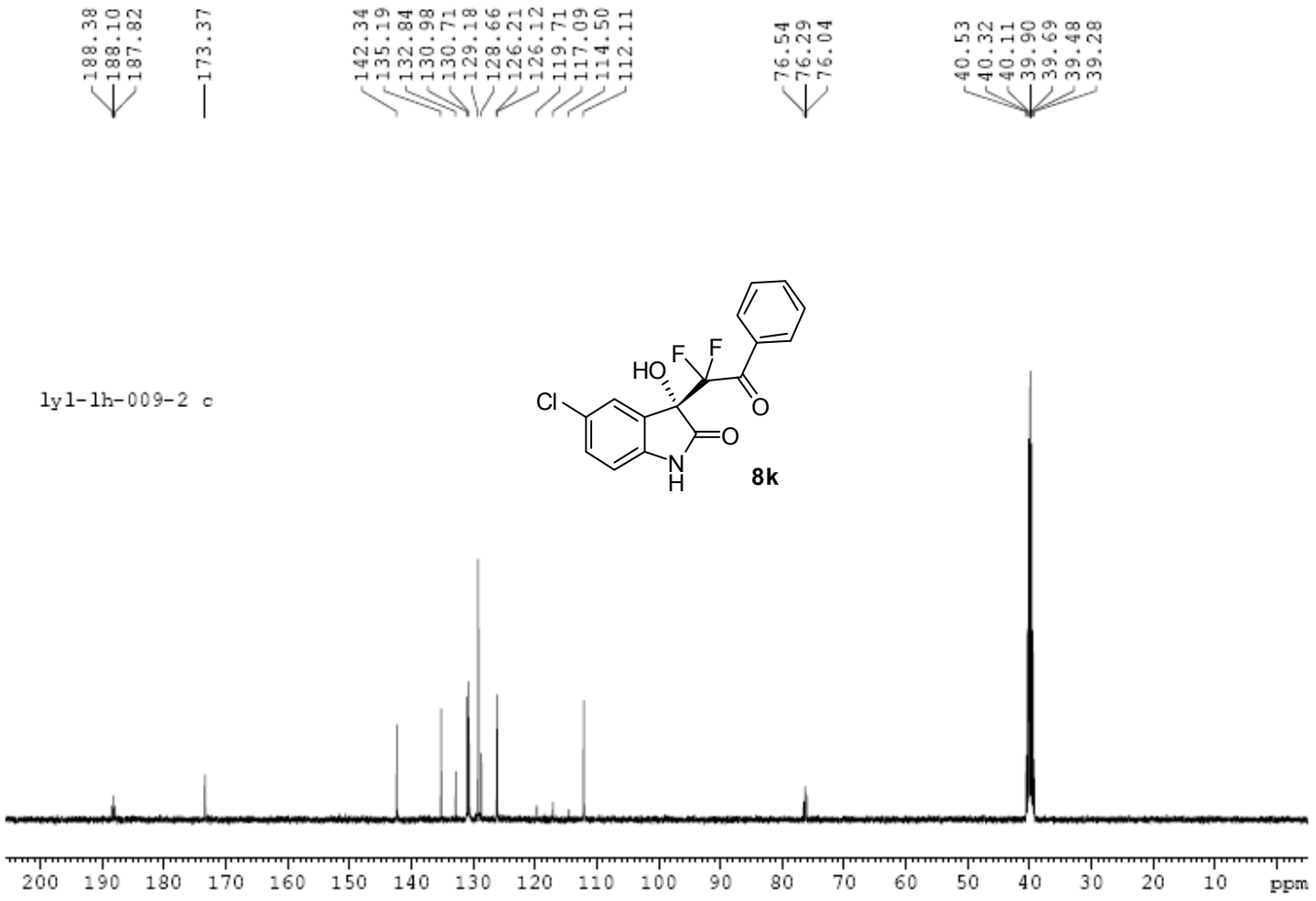
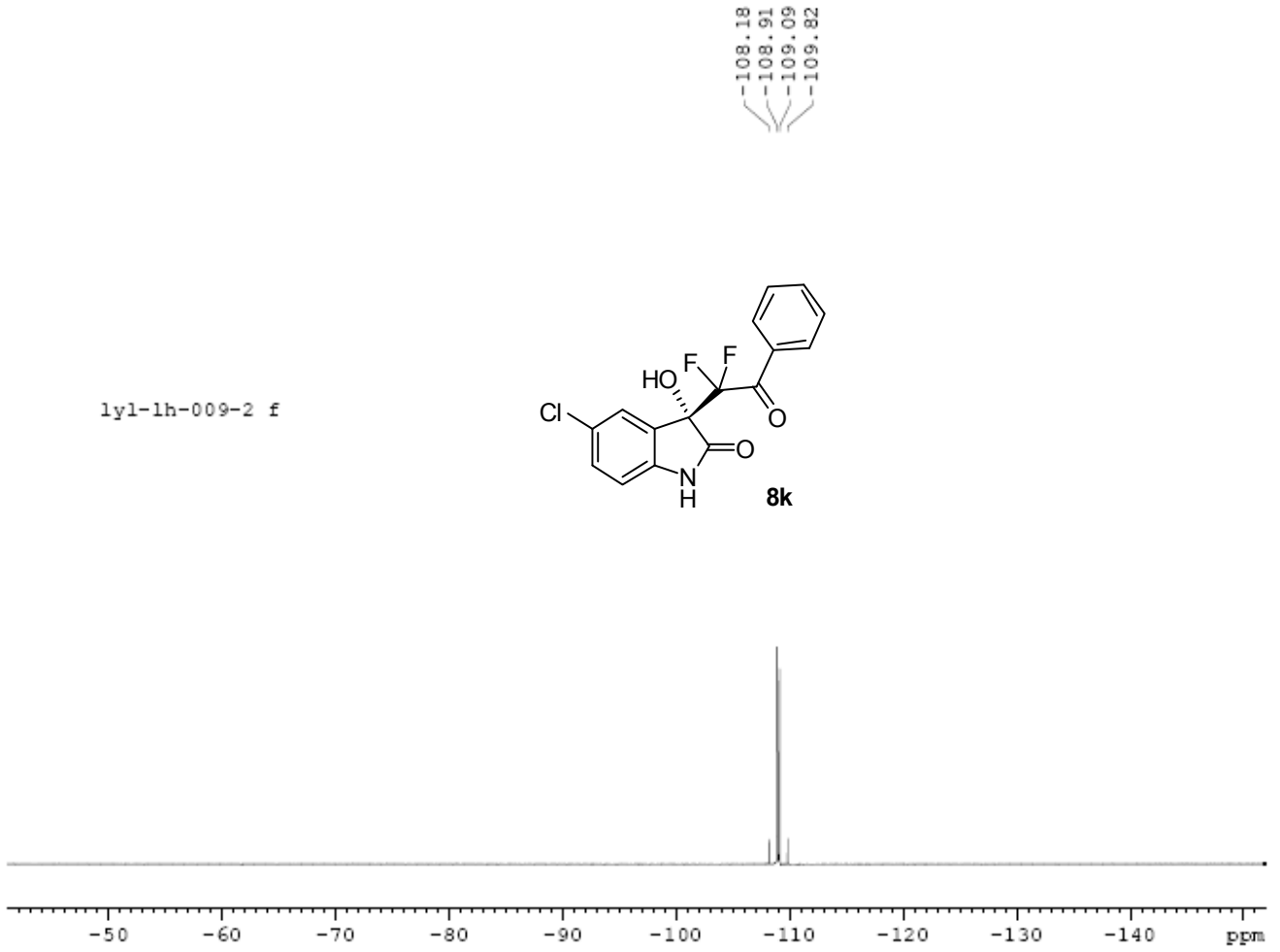
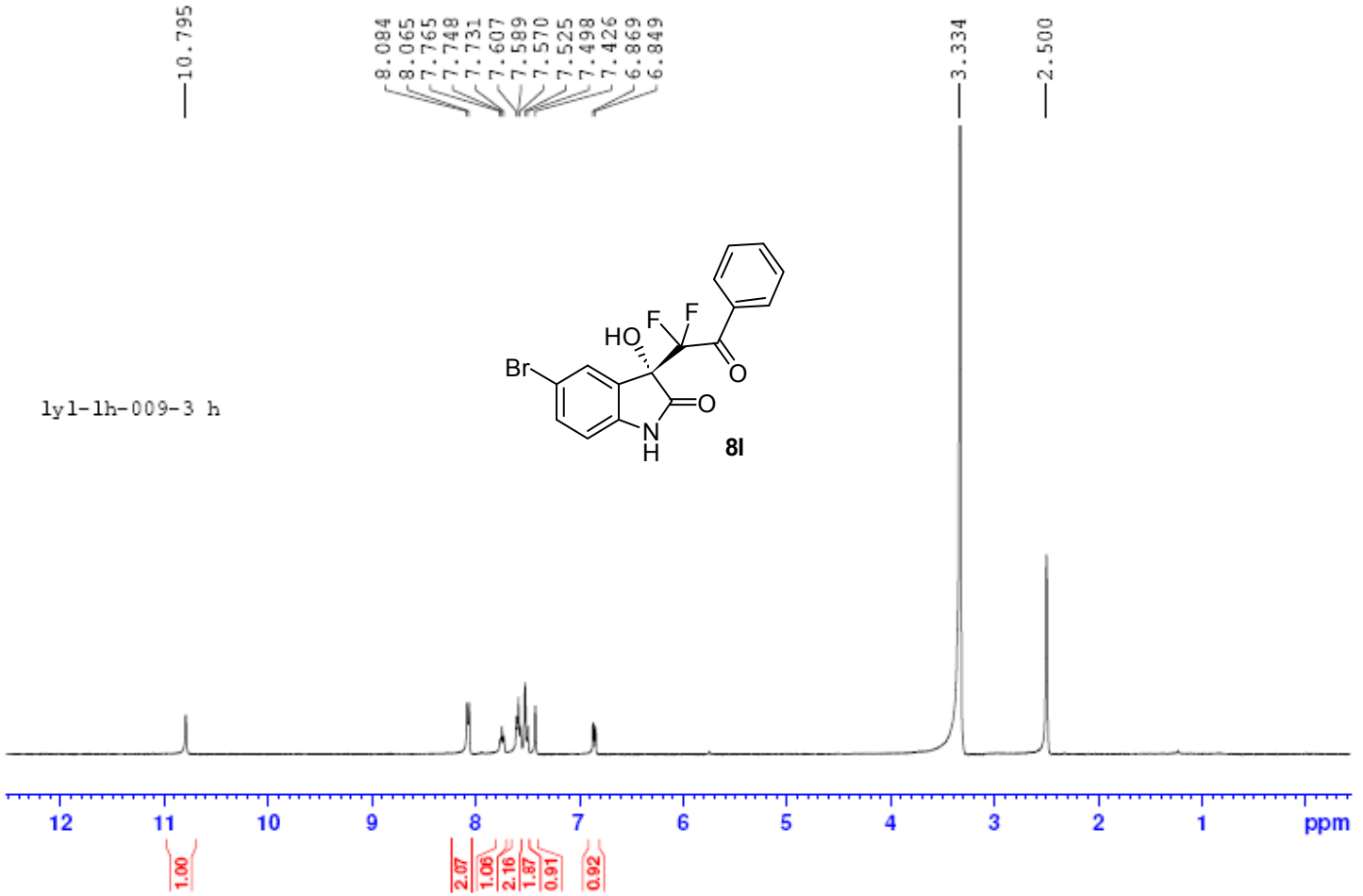
2.31
1.00
1.10
0.98
1.02



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7.570
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7.498
7.426
6.869
6.849
3.334
2.500
lyl-lh-009-3 h
Br
HO
F
F
O
O
N
H
8l
12
11
10
9
8
7
6
5
4
3
2
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ppm
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1.06
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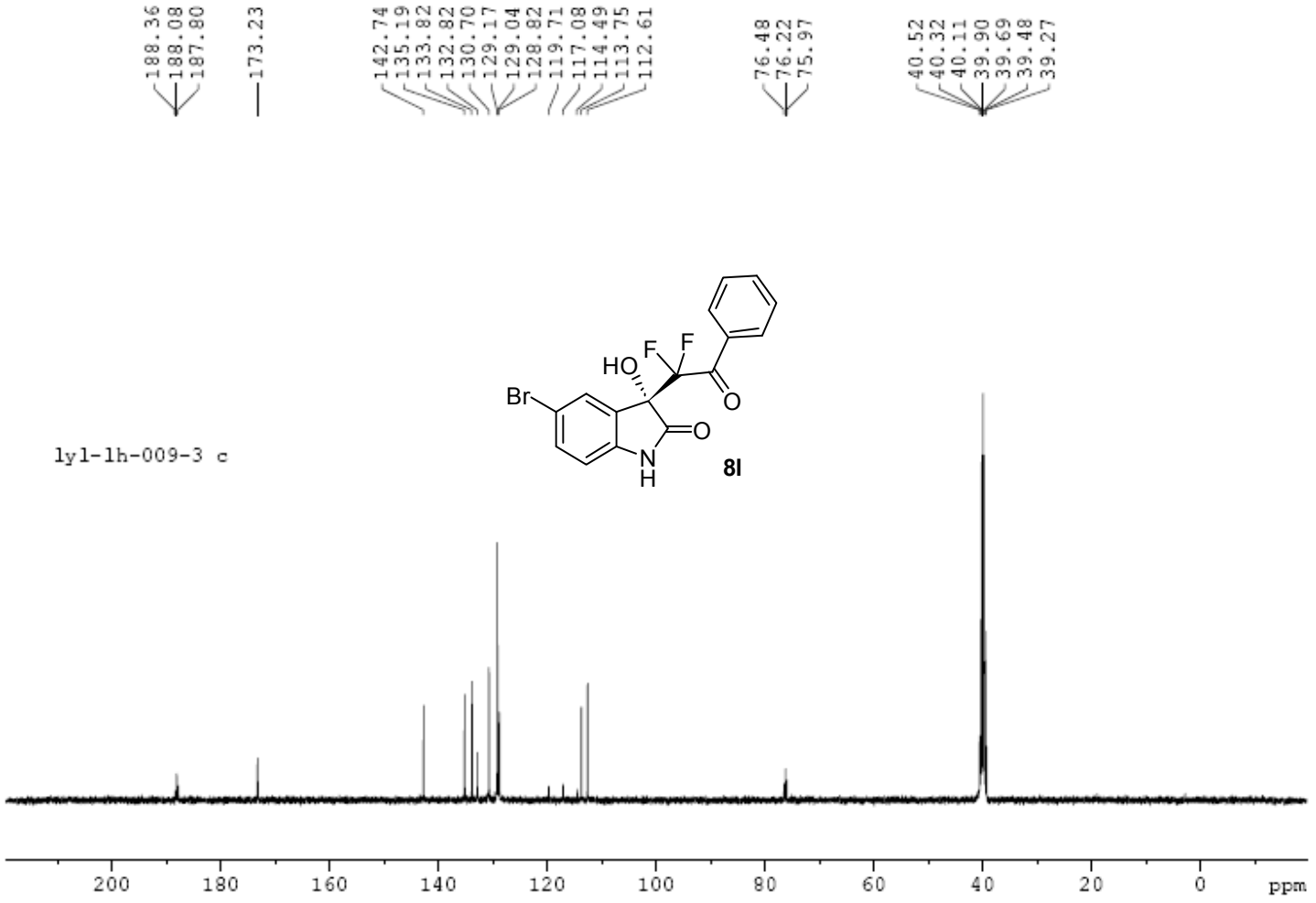
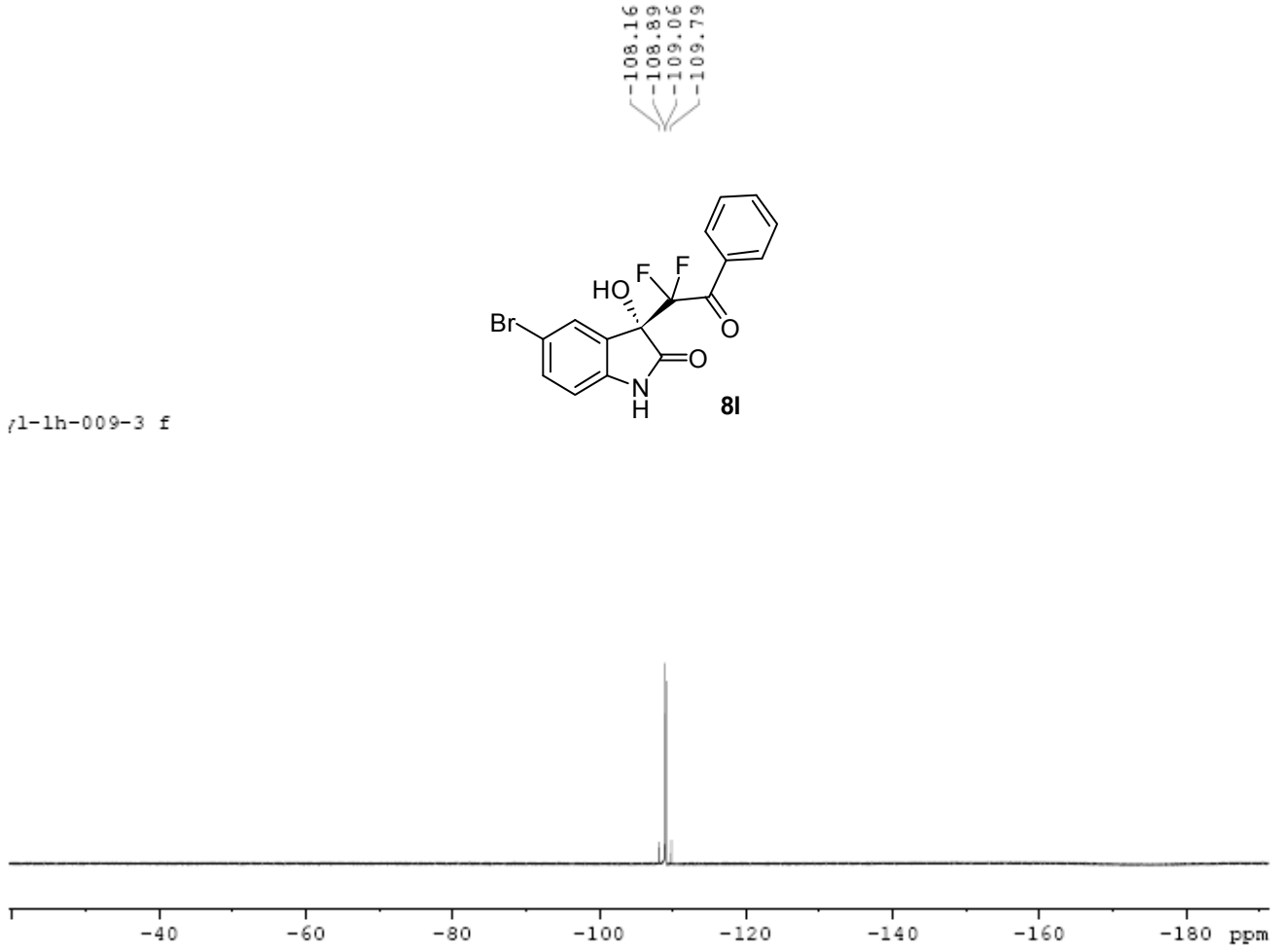
0.91
0.92

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F
HO
Br
O
O
N
H
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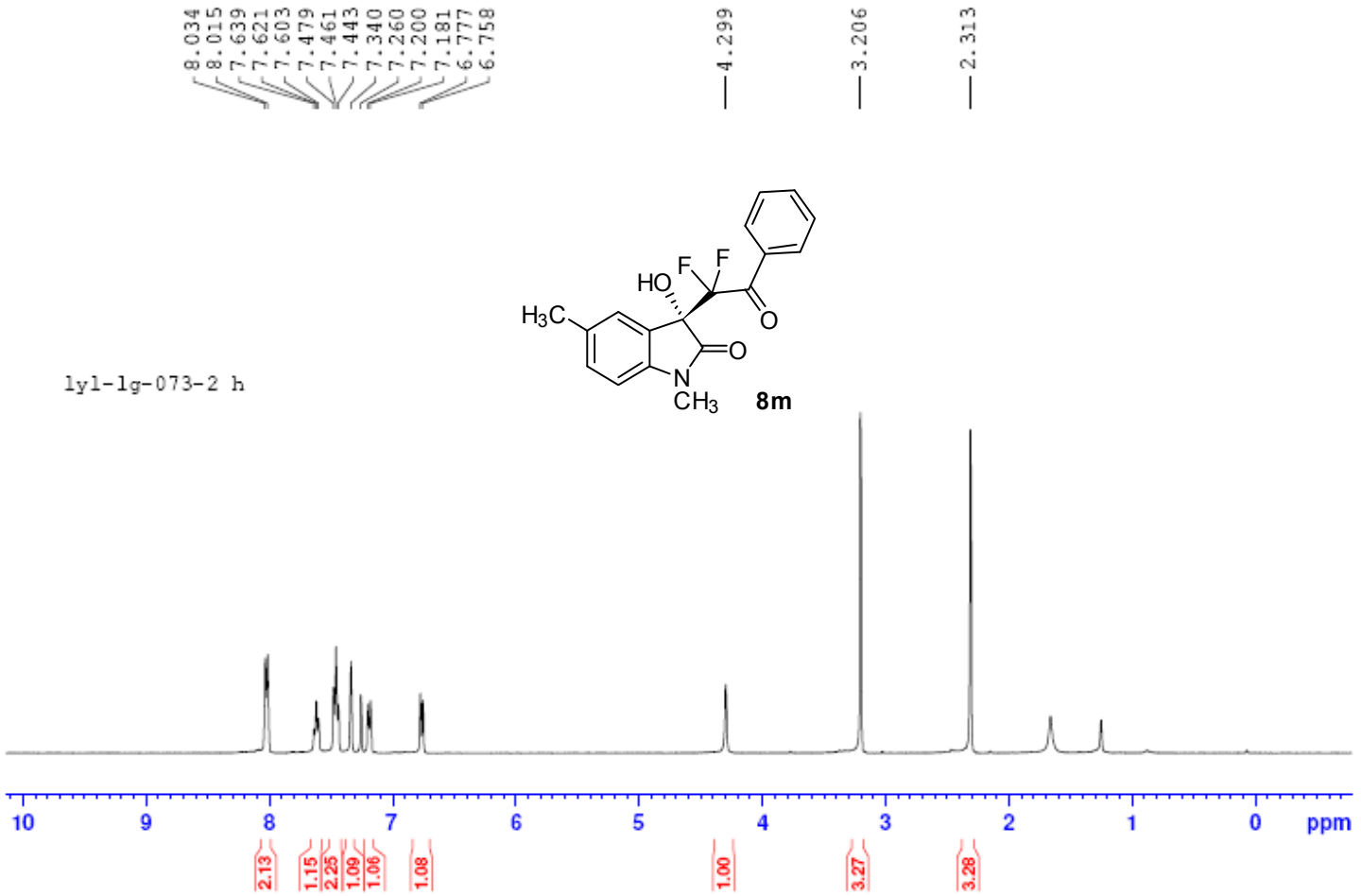
ppm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6.777
6.758
4.299
3.206
2.313
lyl-lg-073-2 h
F
F
HO
H3C
O
O
N
CH3
8m
10
9
8
7
6
5
4
3
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1
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ppm
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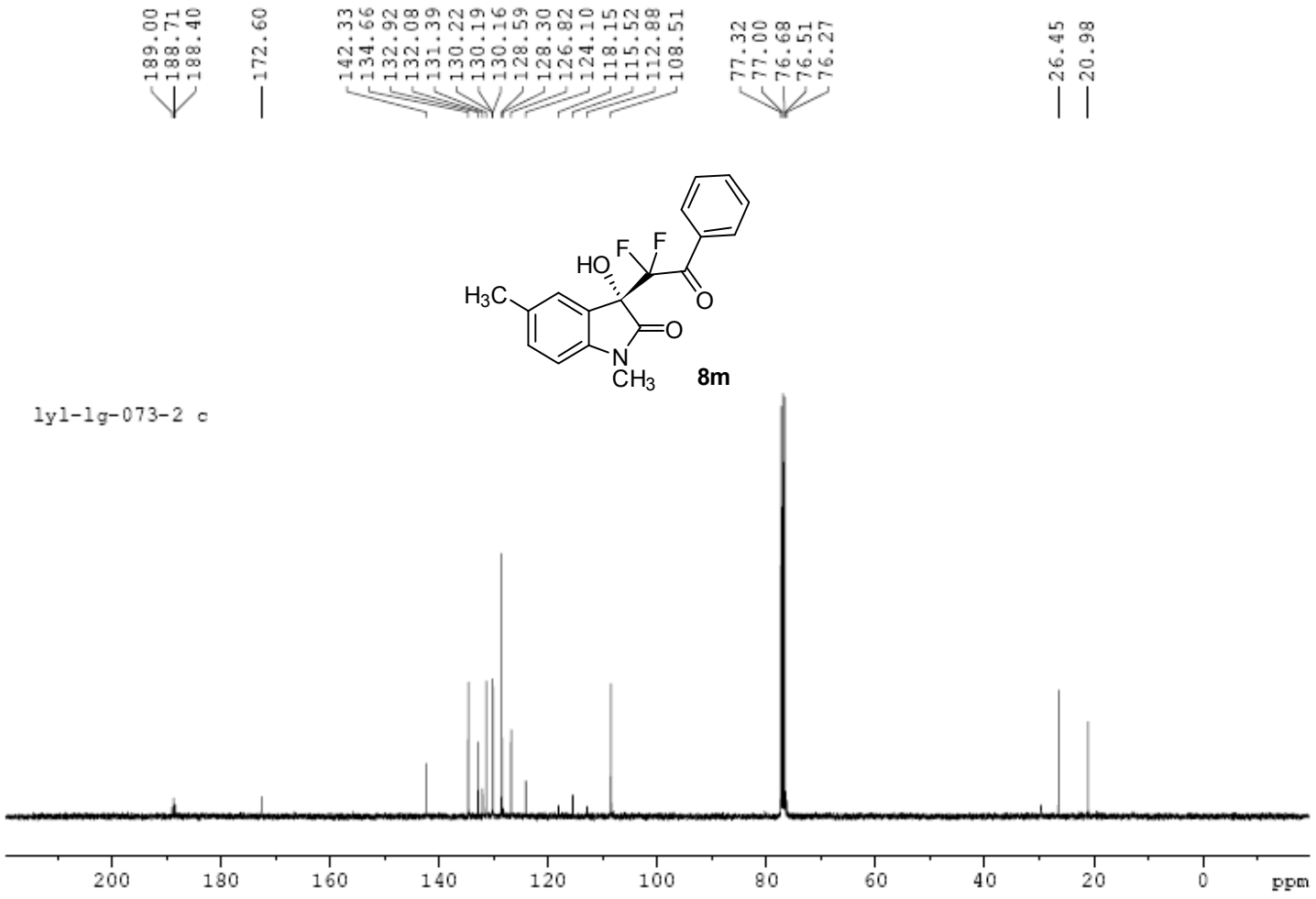
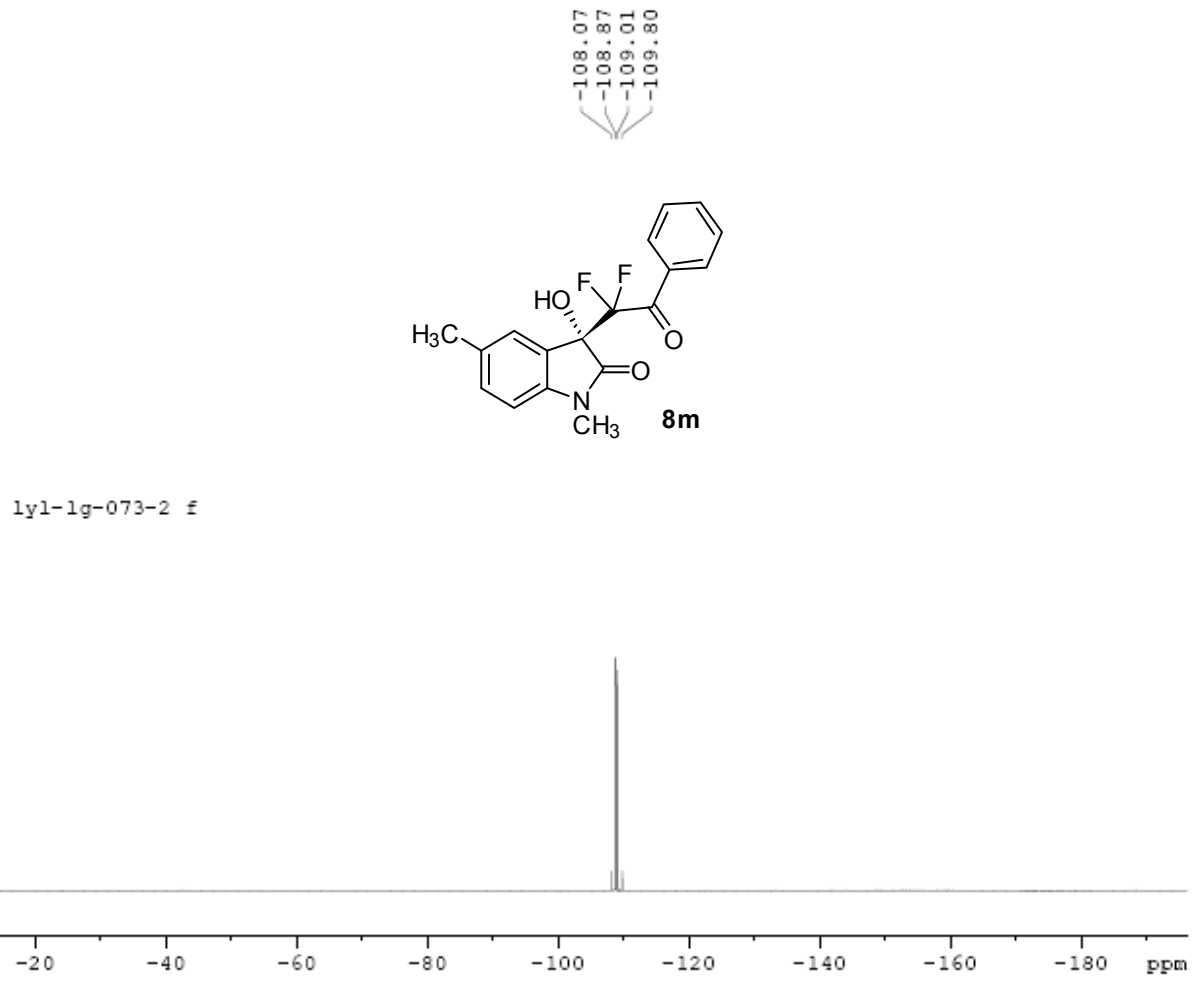
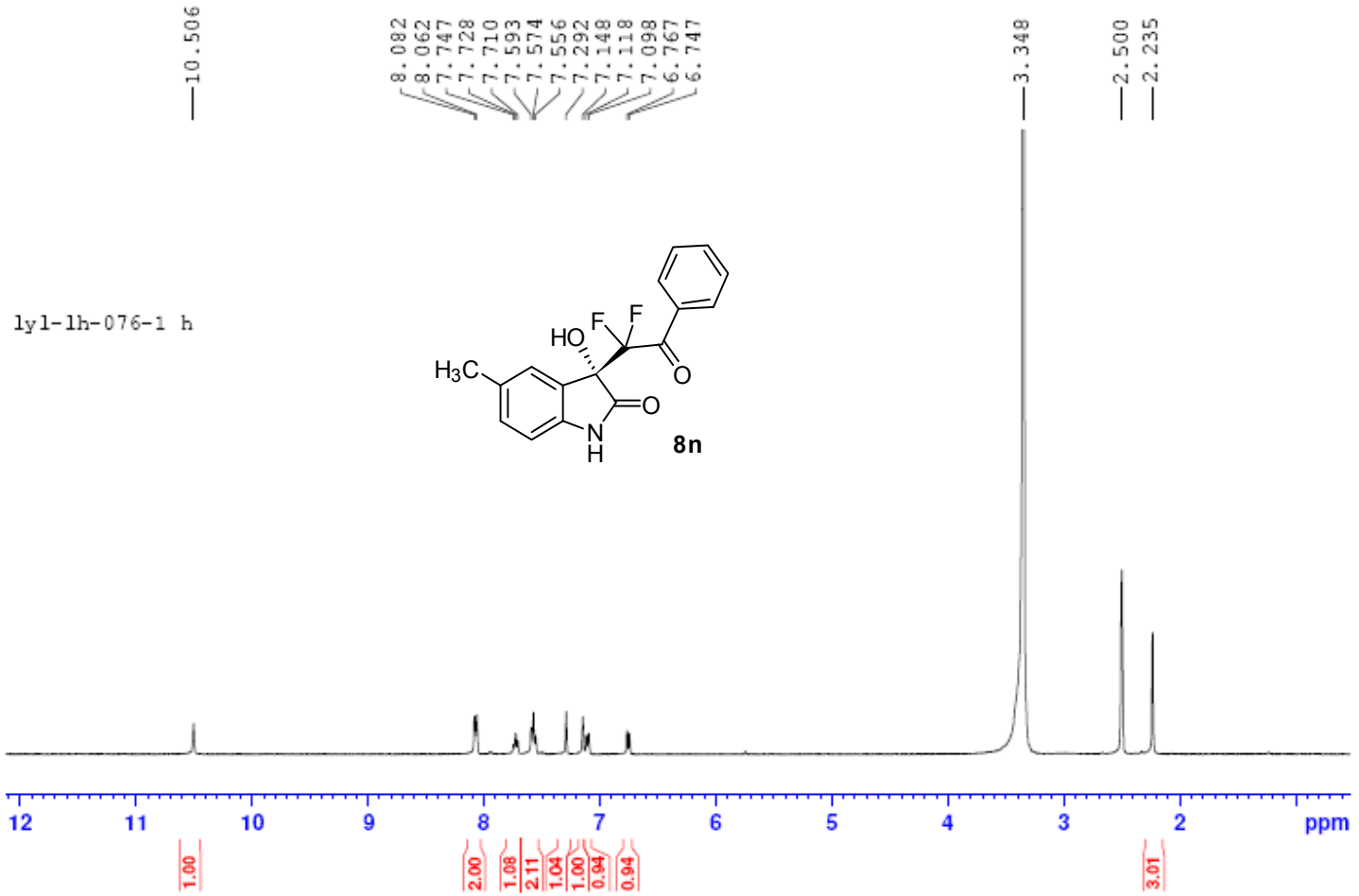
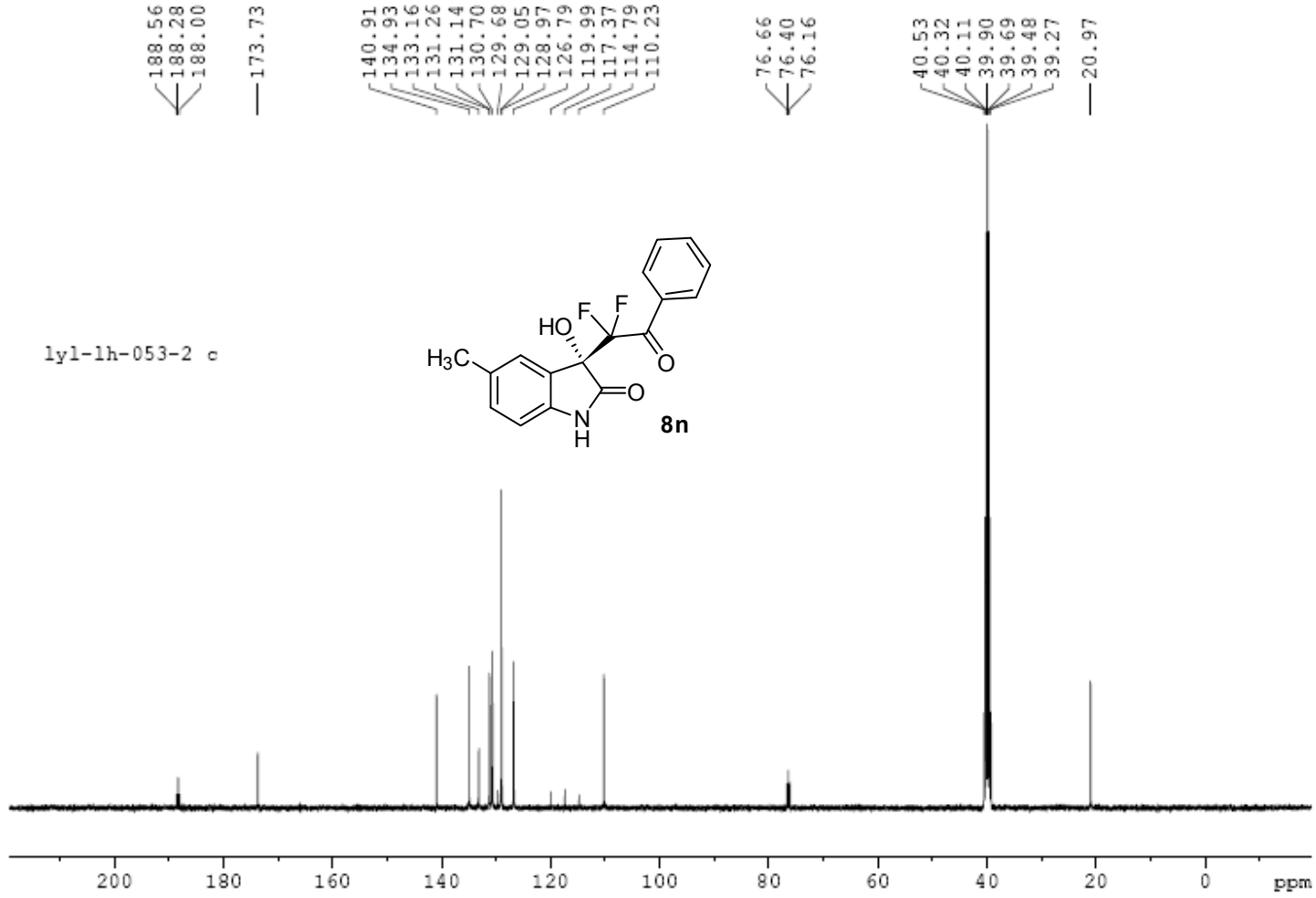
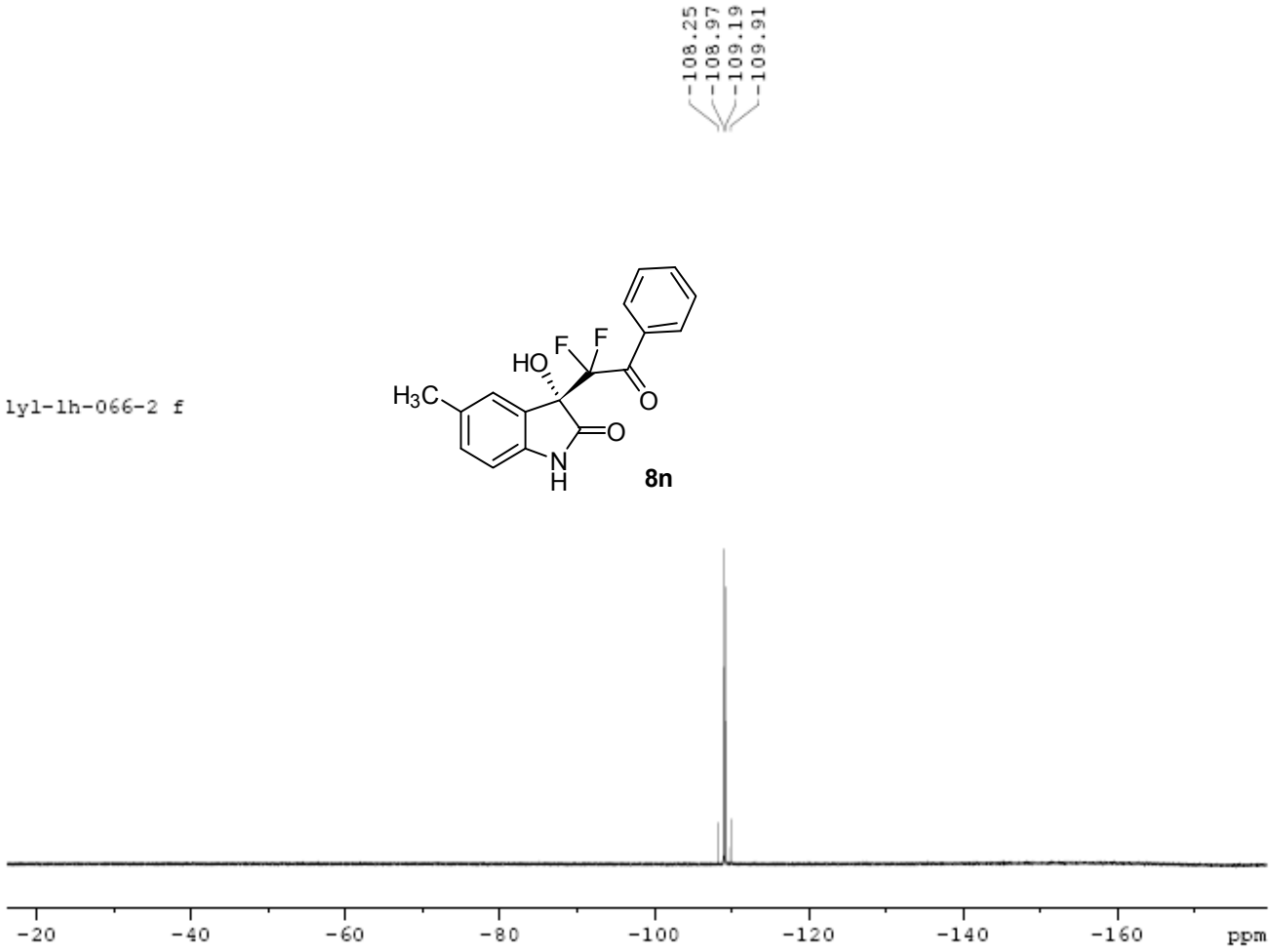
1.15
2.25
1.09
1.06
1.08
1.00
3.27
3.28

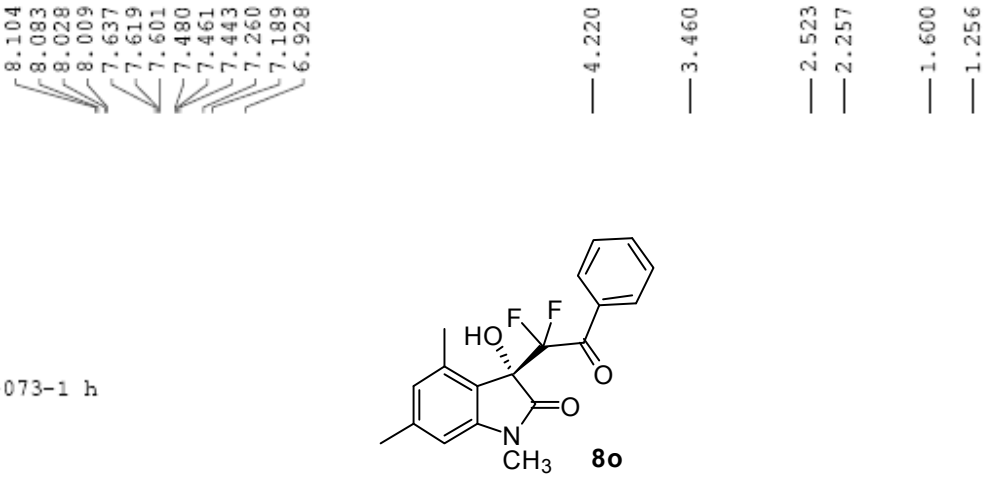


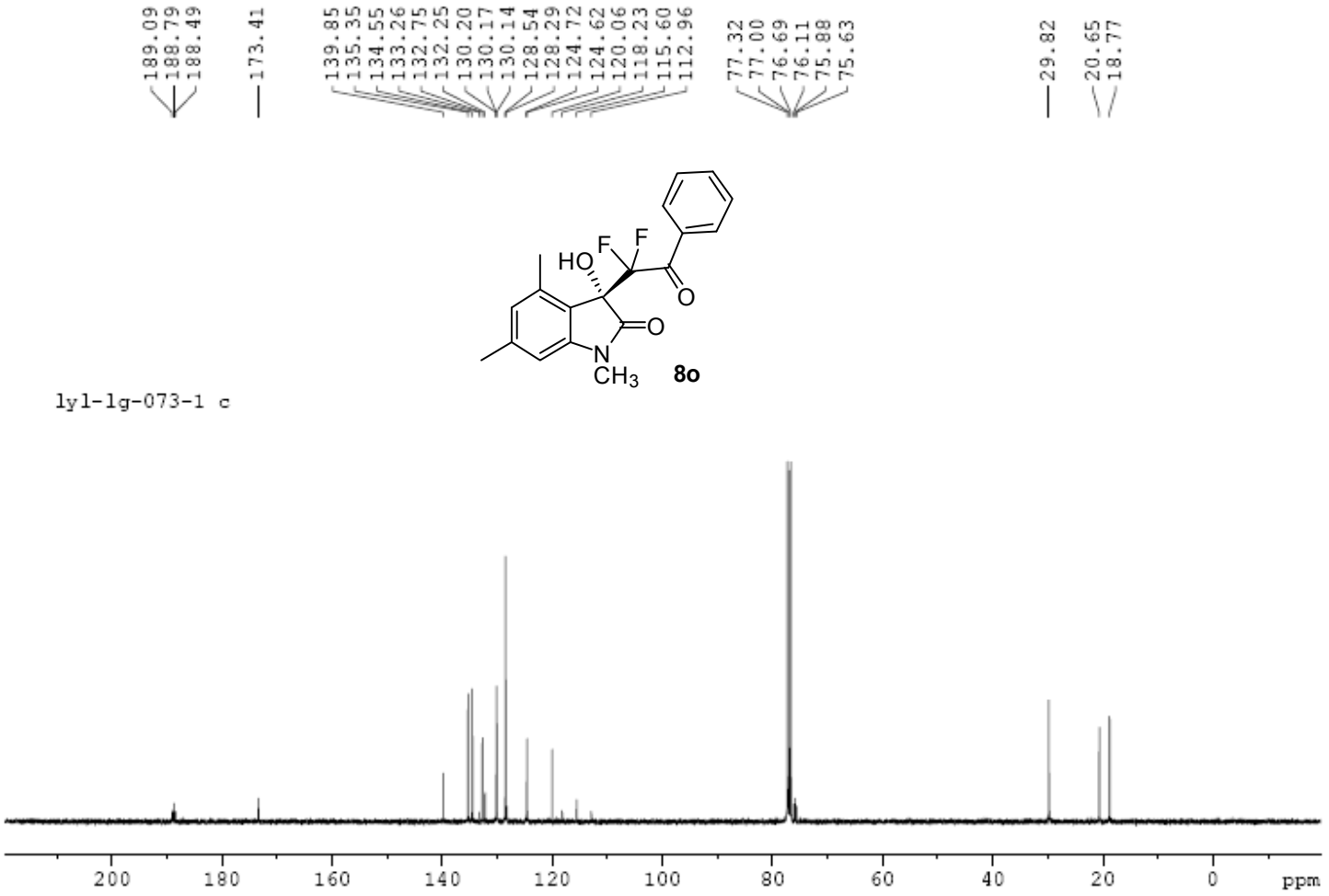


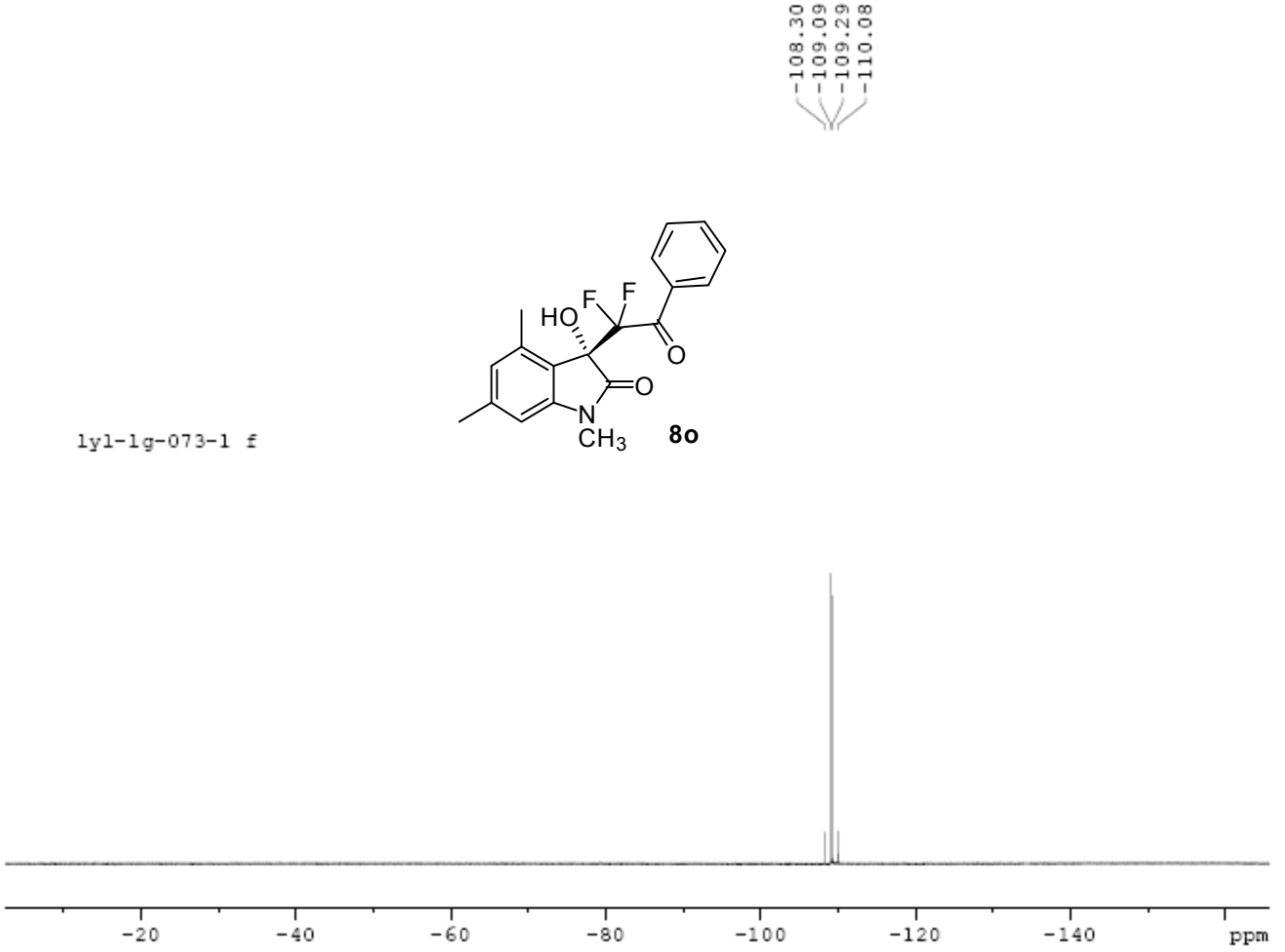


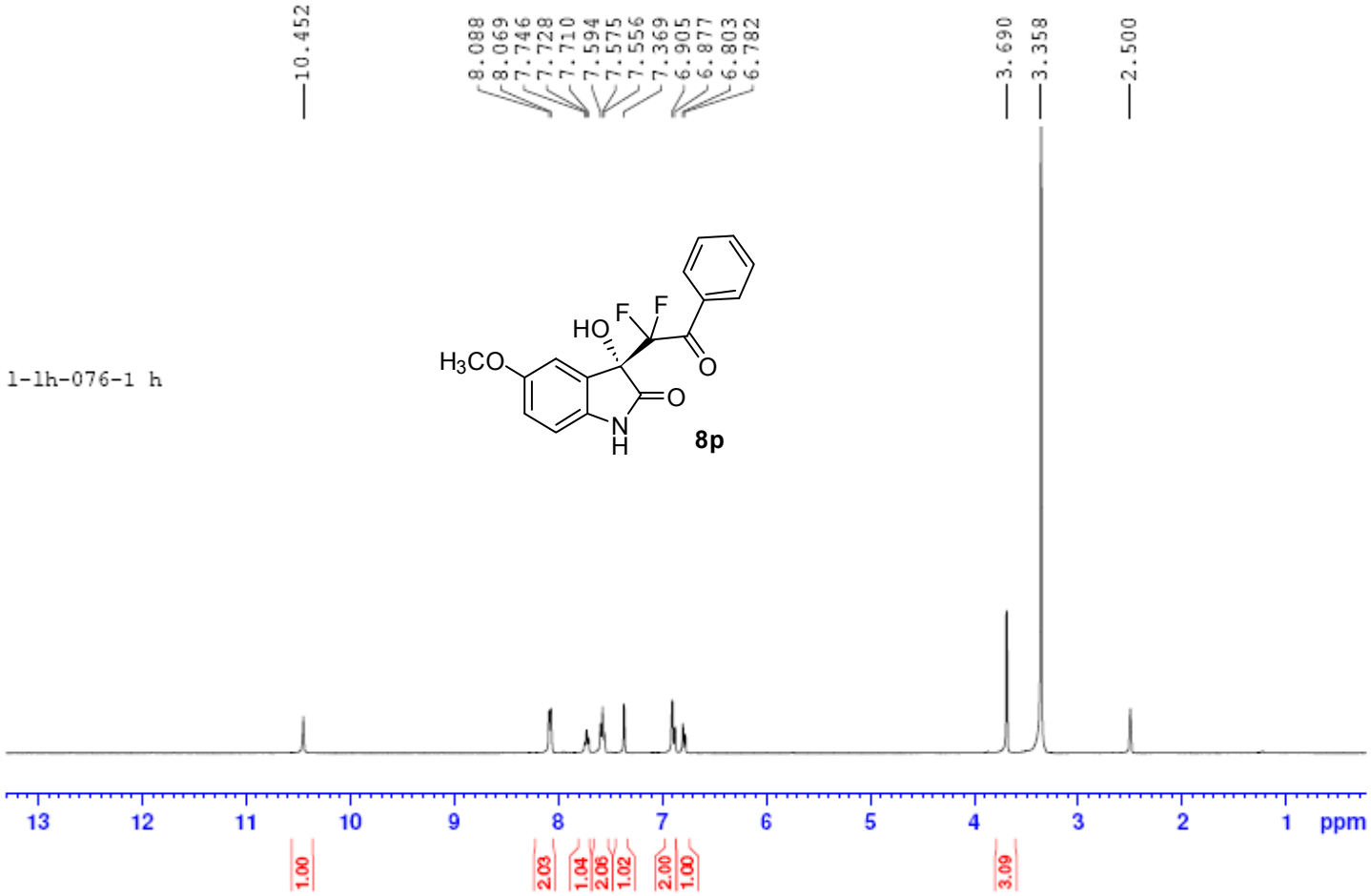


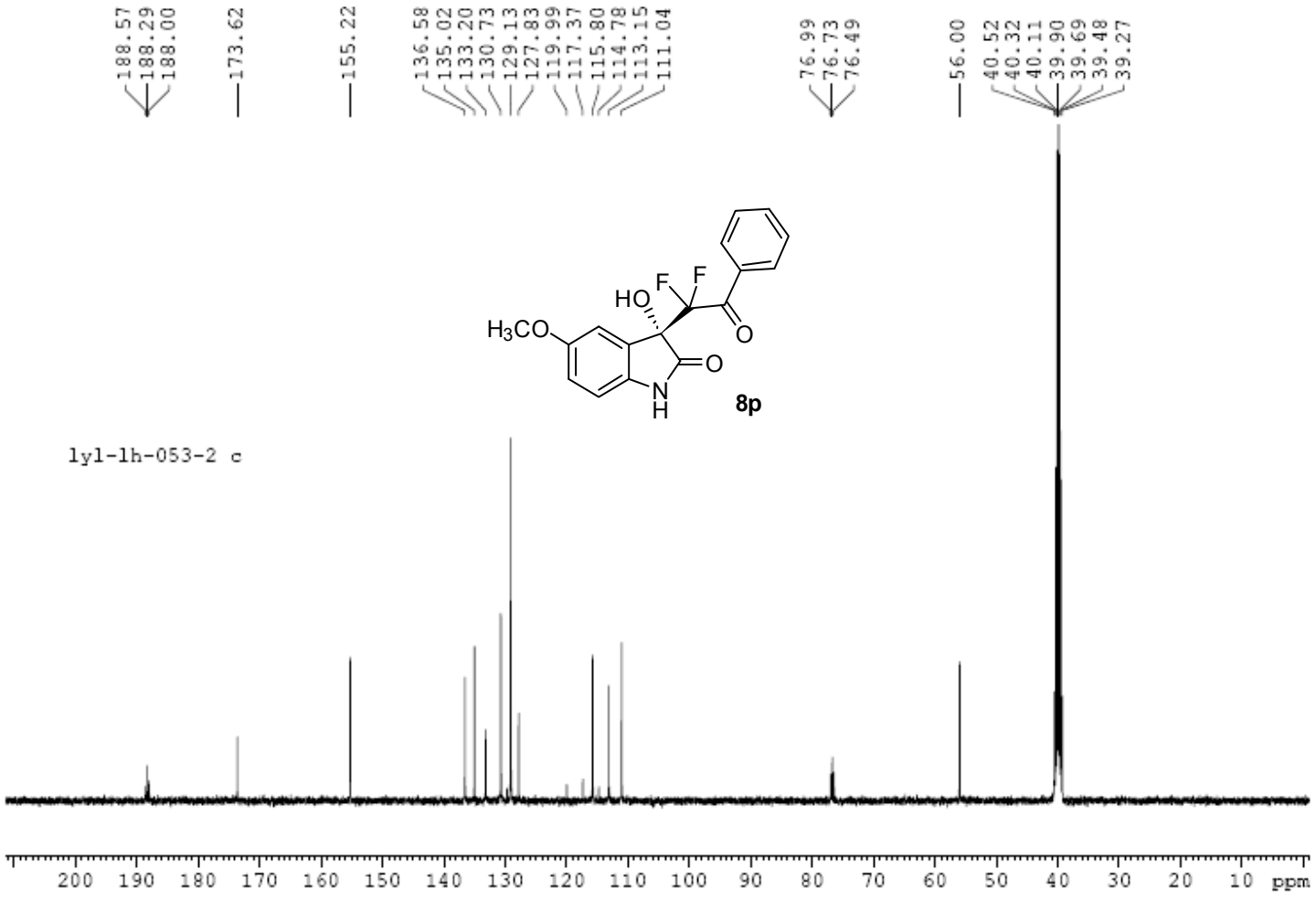


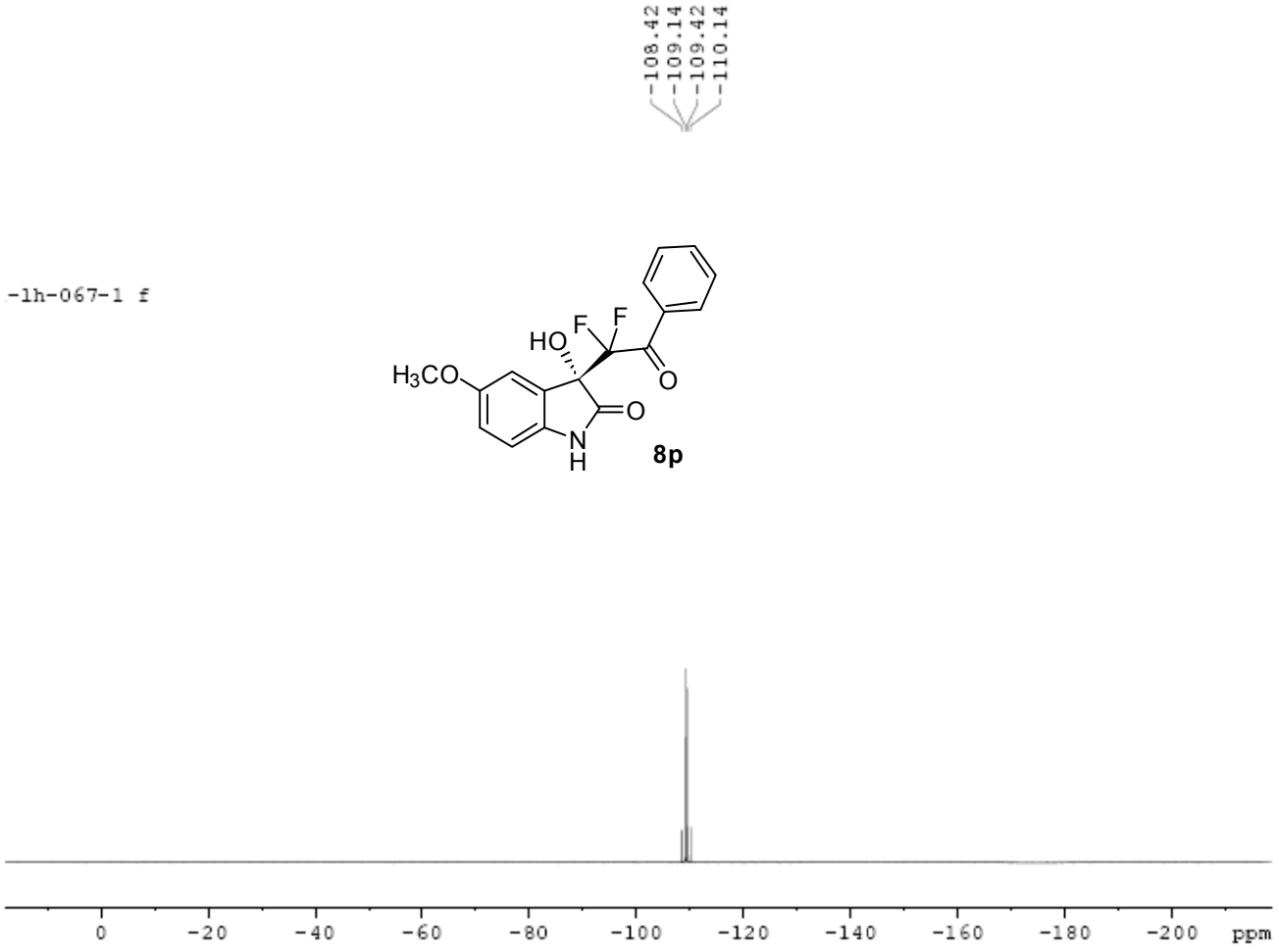


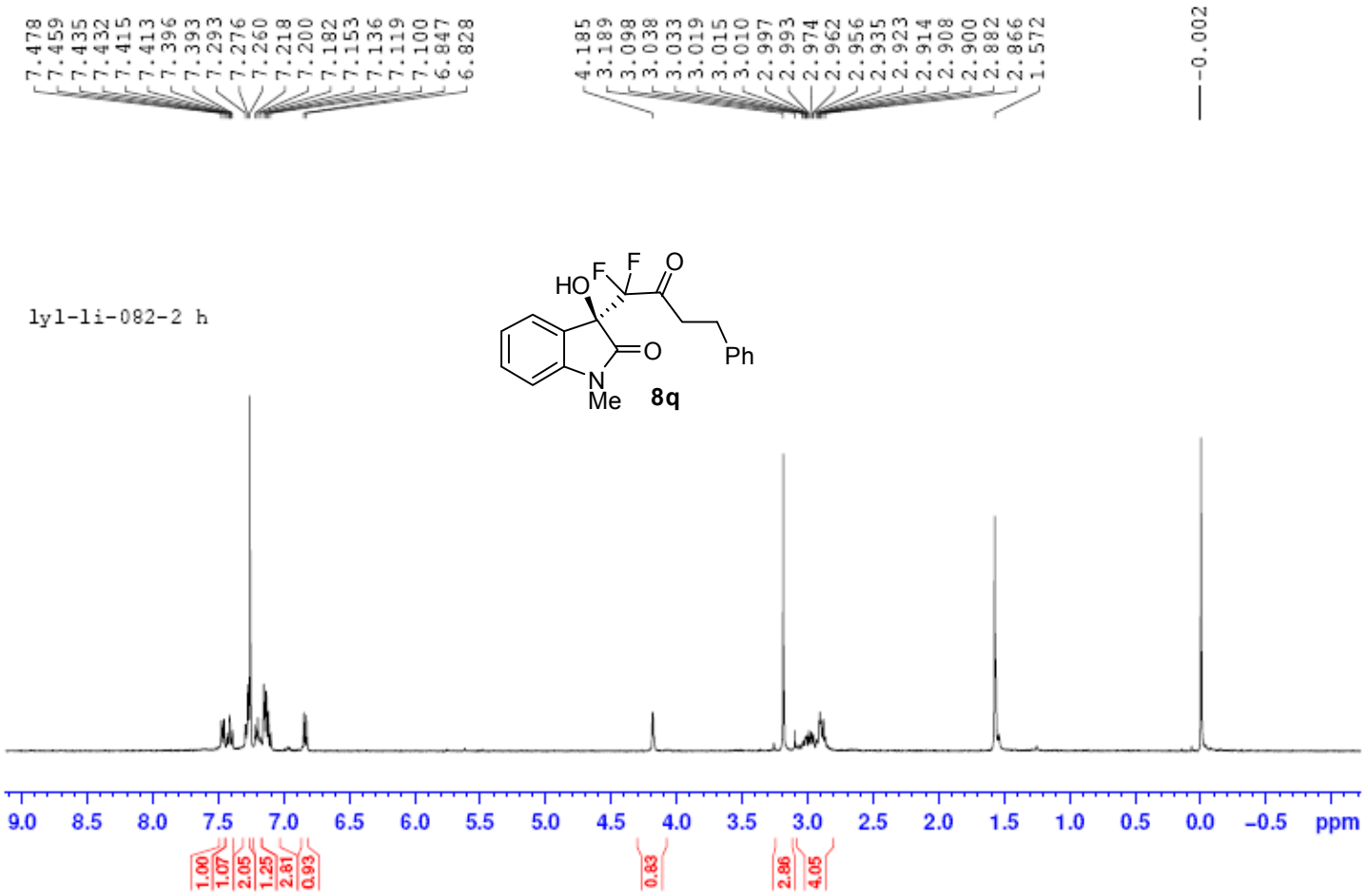


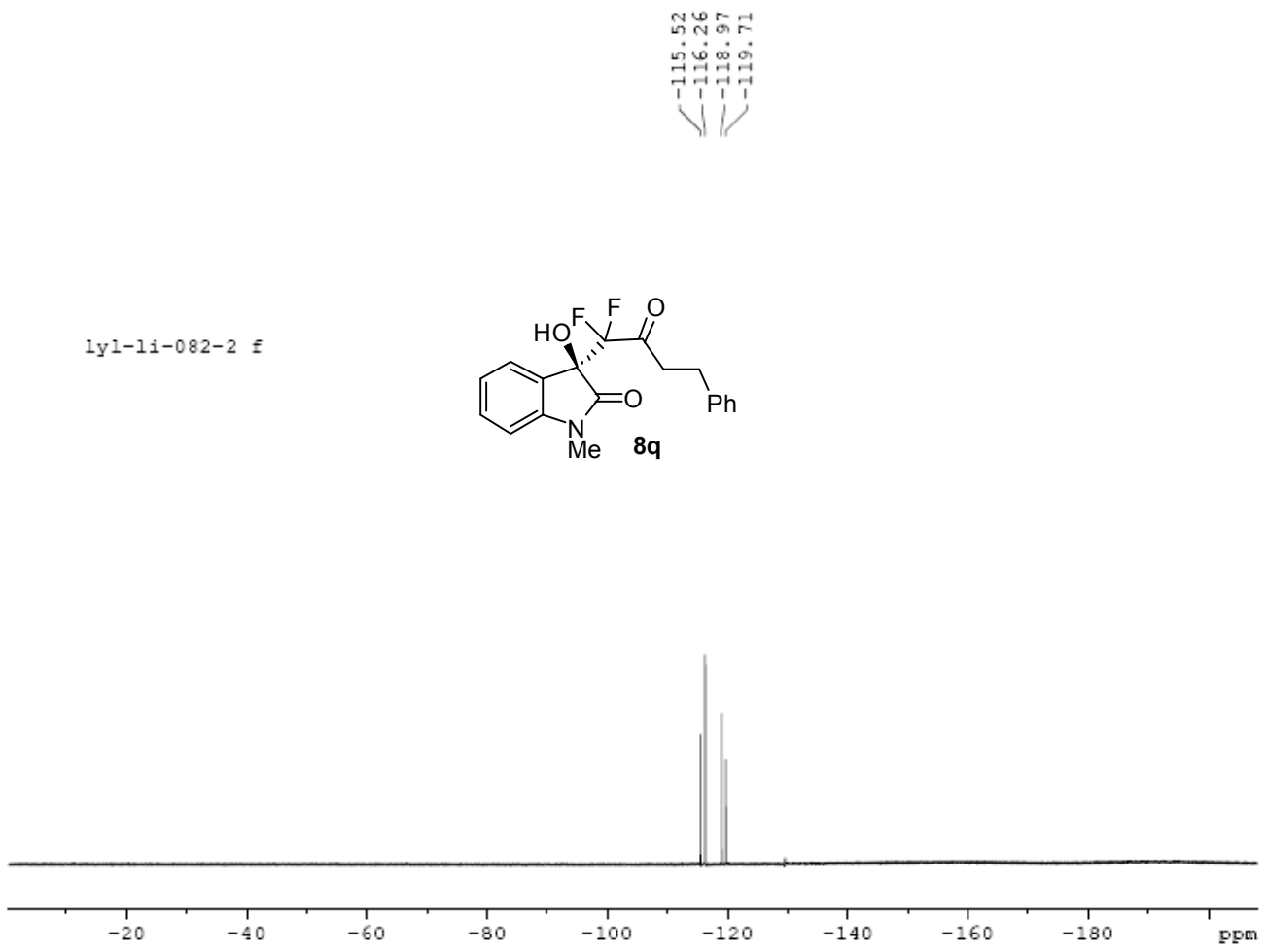


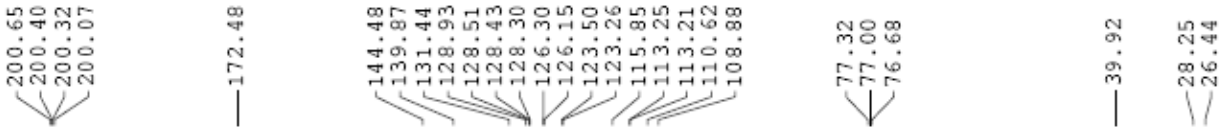








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128.51
128.43
128.30
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126.15
123.50
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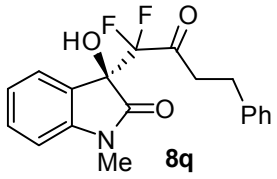
113.25
113.21
110.62
108.88
77.32
77.00
76.68
39.92
28.25
26.44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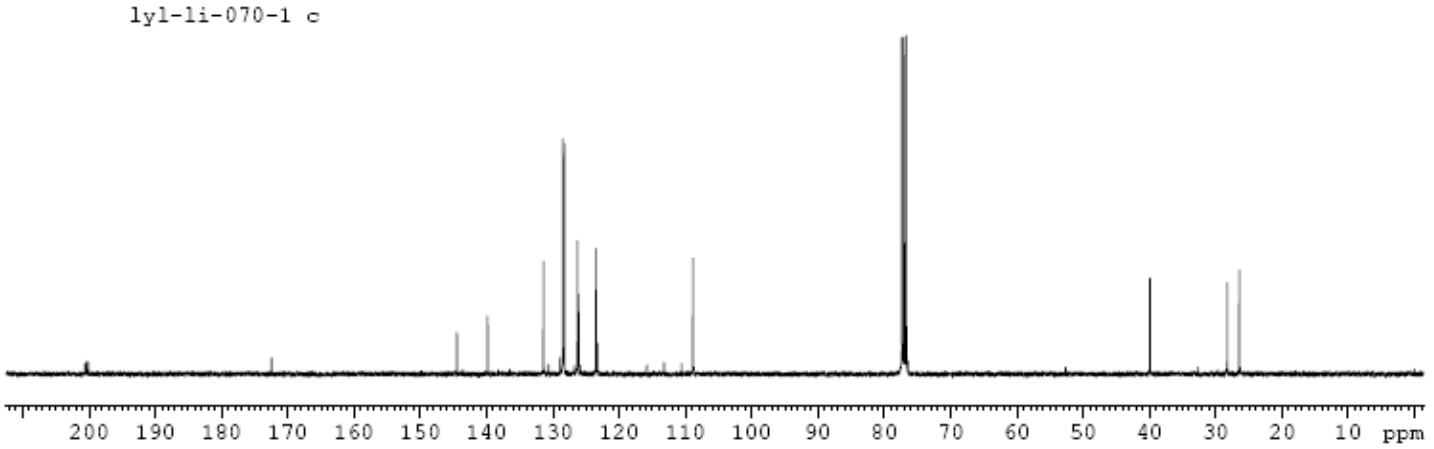
F
F
O
O
Ph
N
Me

8q


lyl-li-070-1 c
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70
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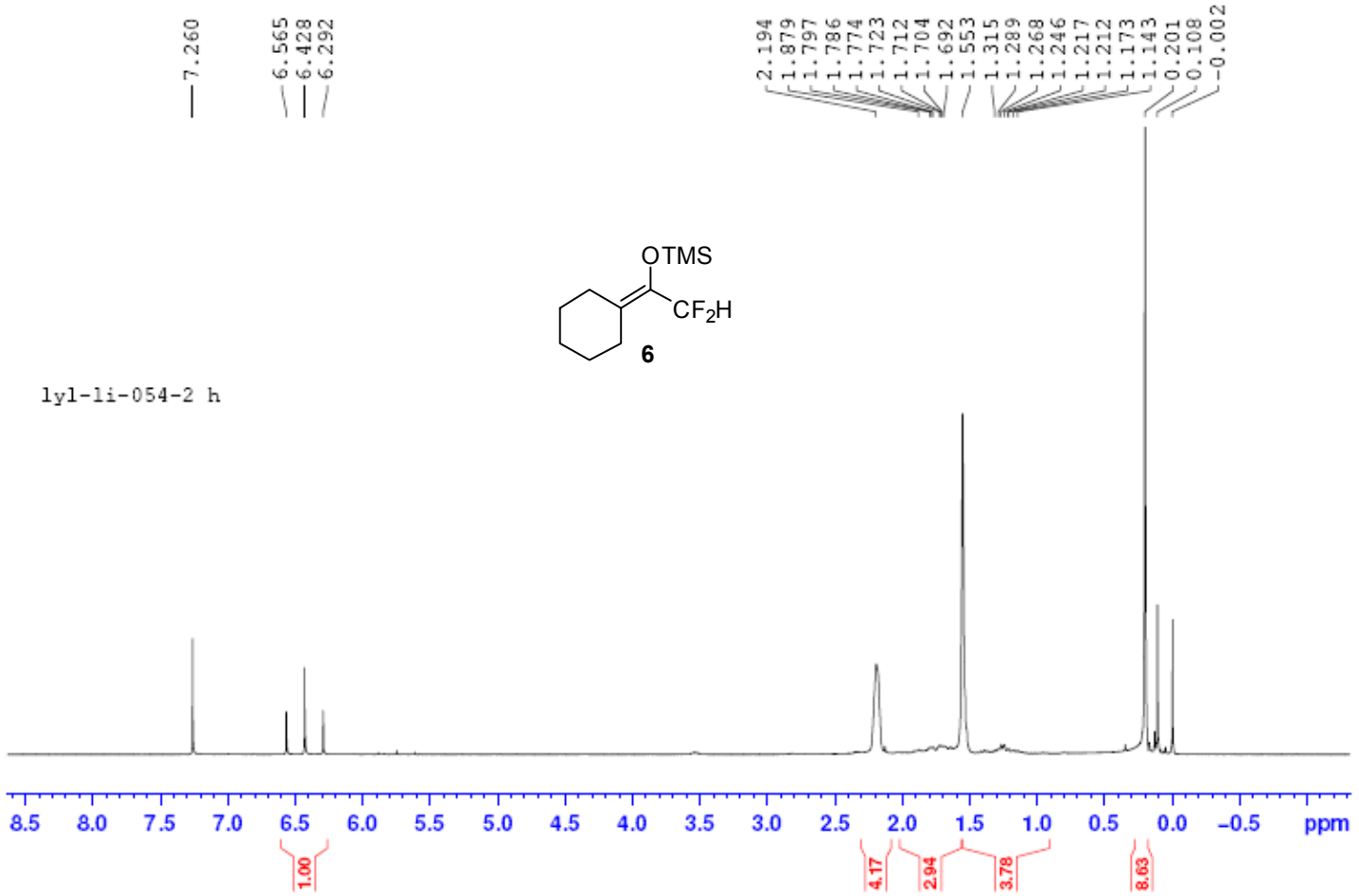
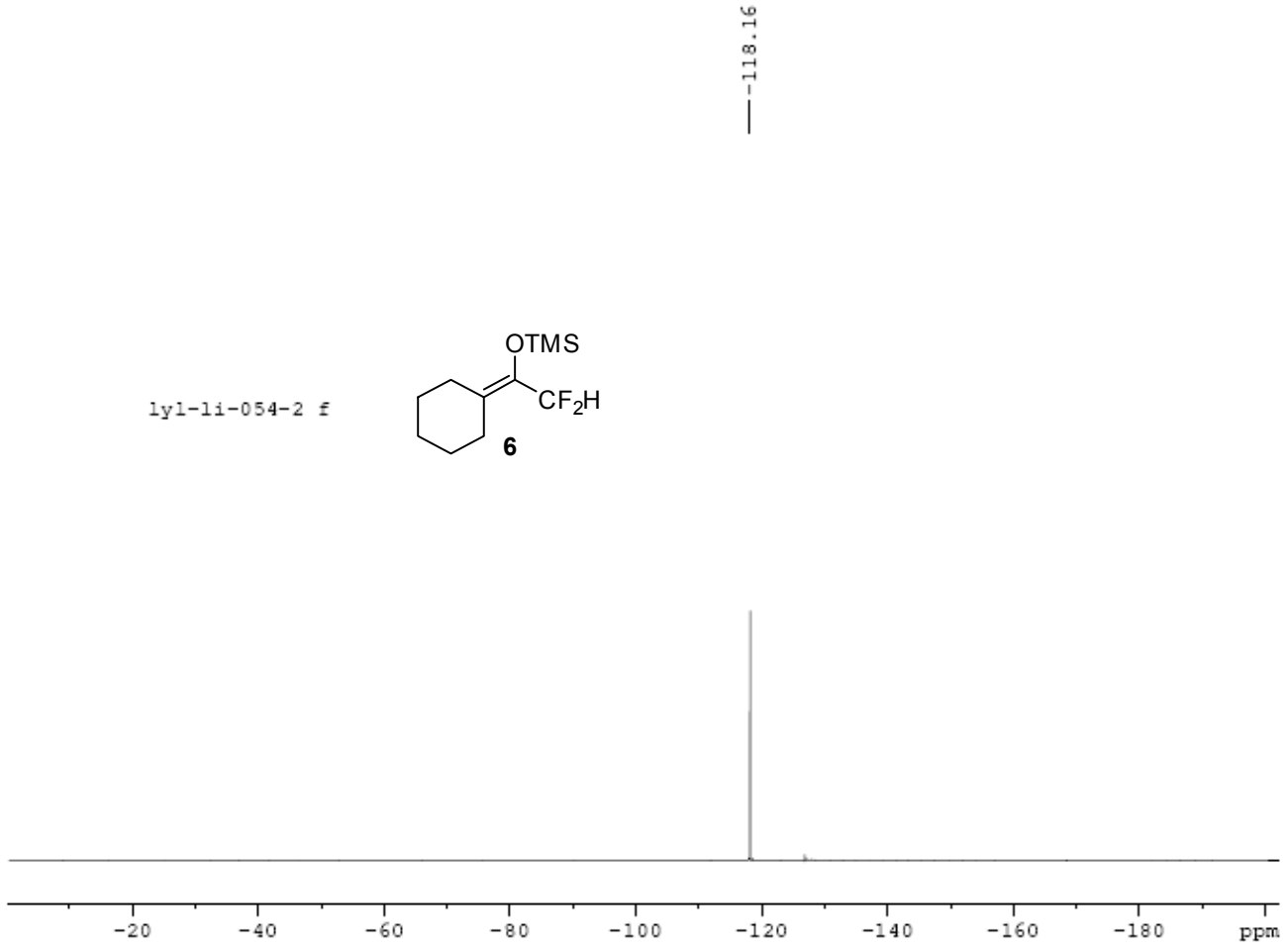
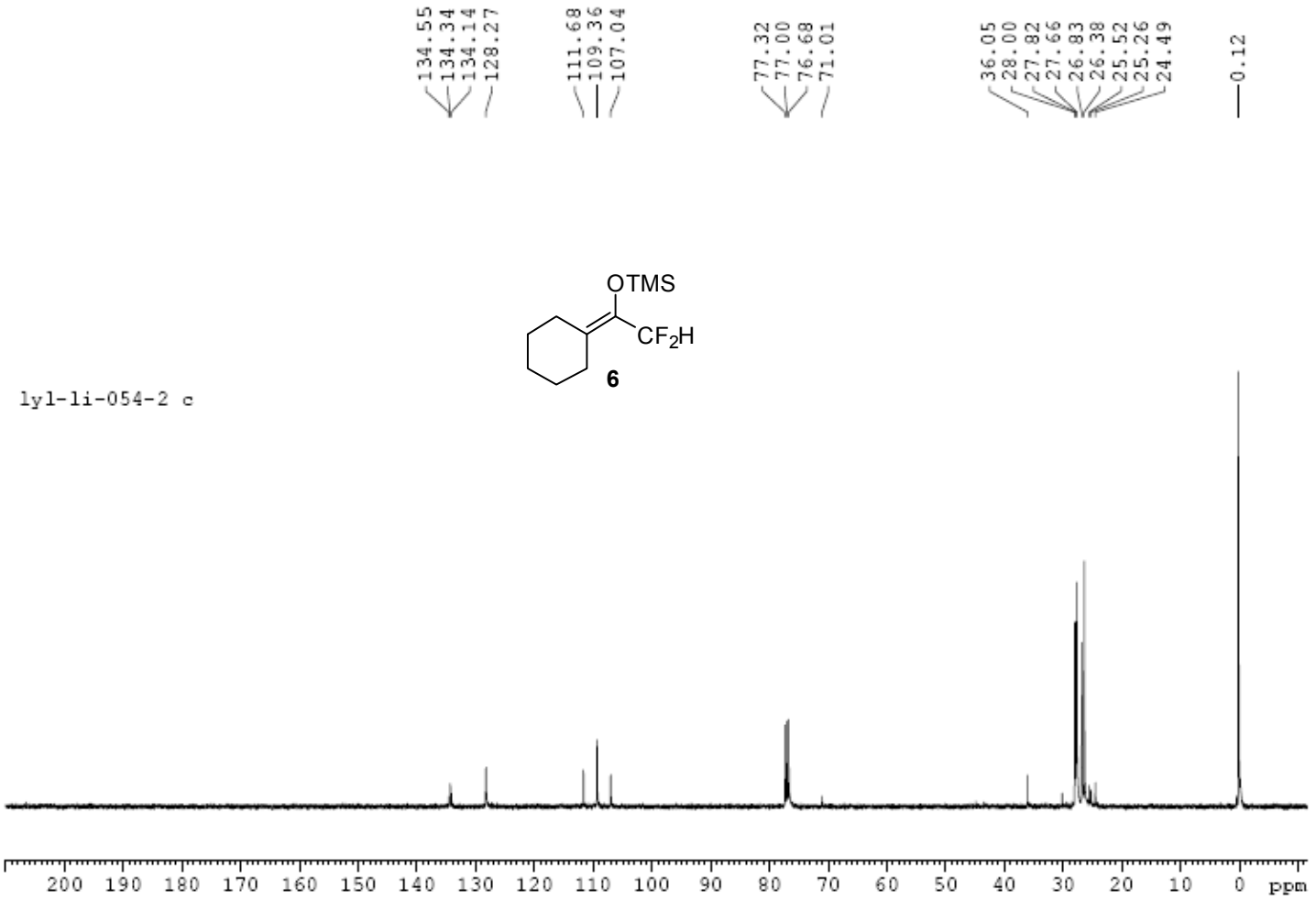
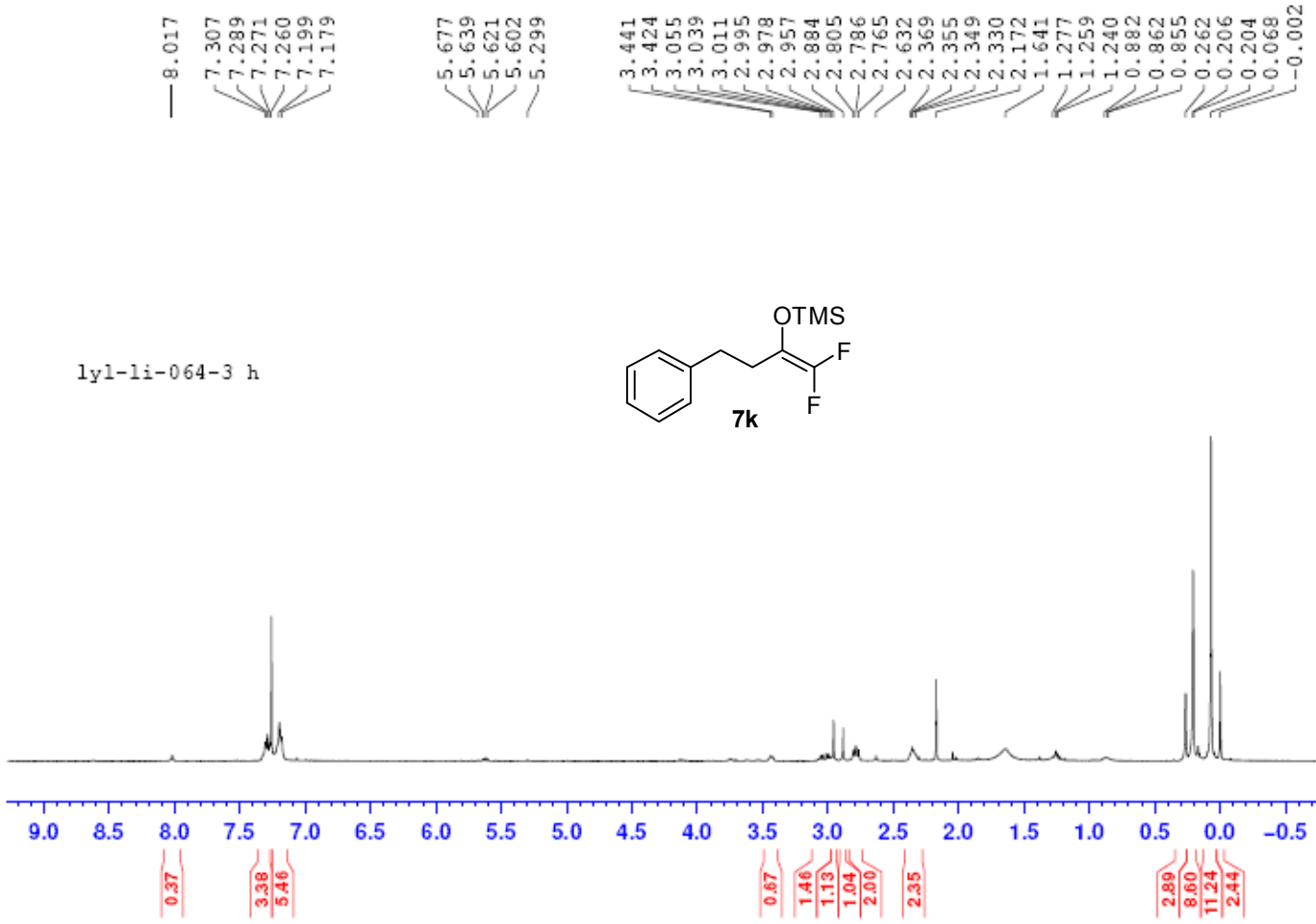
10
ppm





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3.424
3.055
3.039
3.011
2.995
2.978
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2.884
2.805
2.786
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2.632
2.369
2.355
2.349
2.330
2.172
1.641
1.277
1.259
1.240
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0.862
0.855
0.262
0.206
0.204
0.068
-0.002
lyl-li-064-3 h
OTMS
F
F
7k
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
ppm
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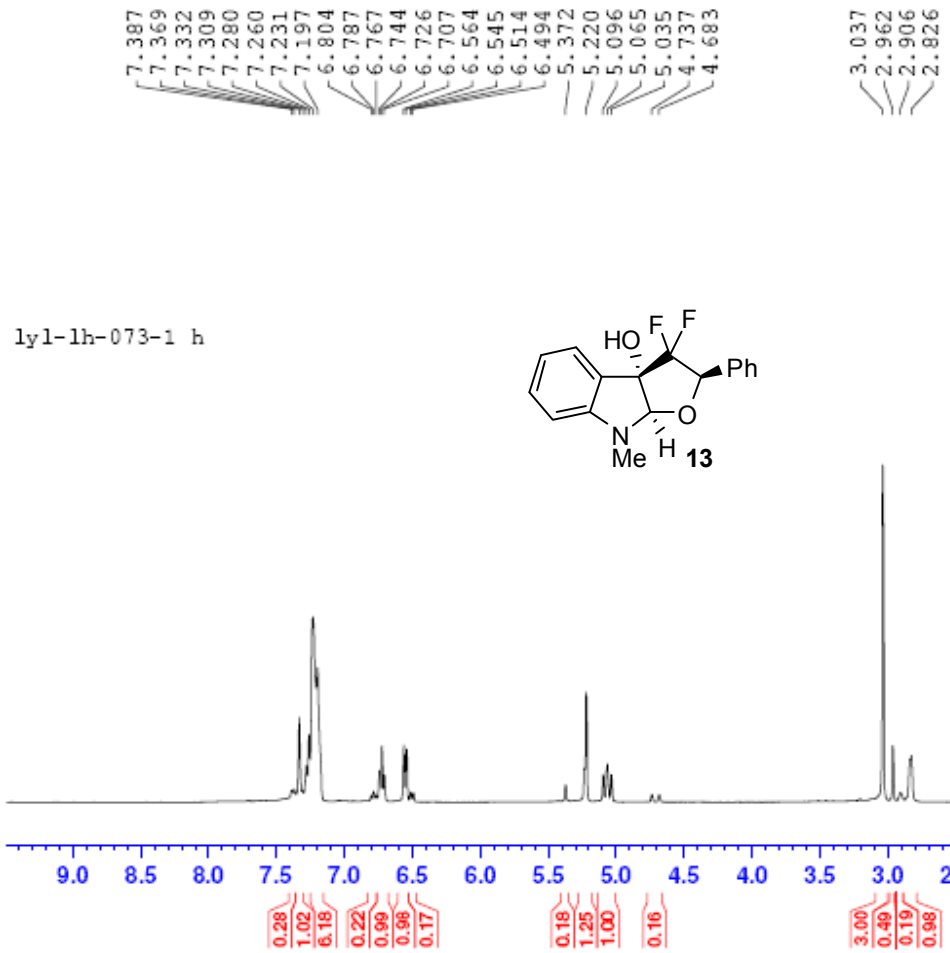

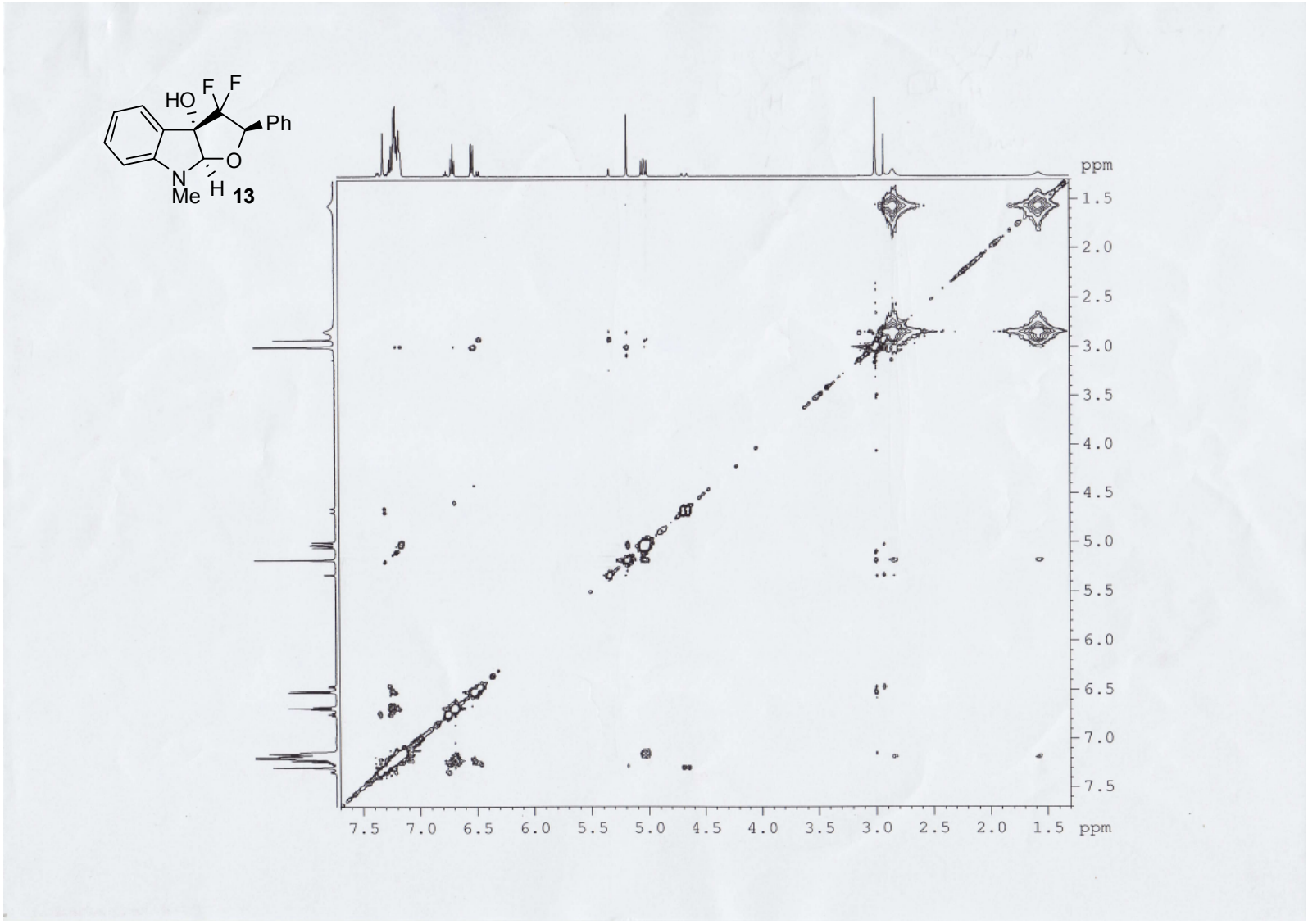

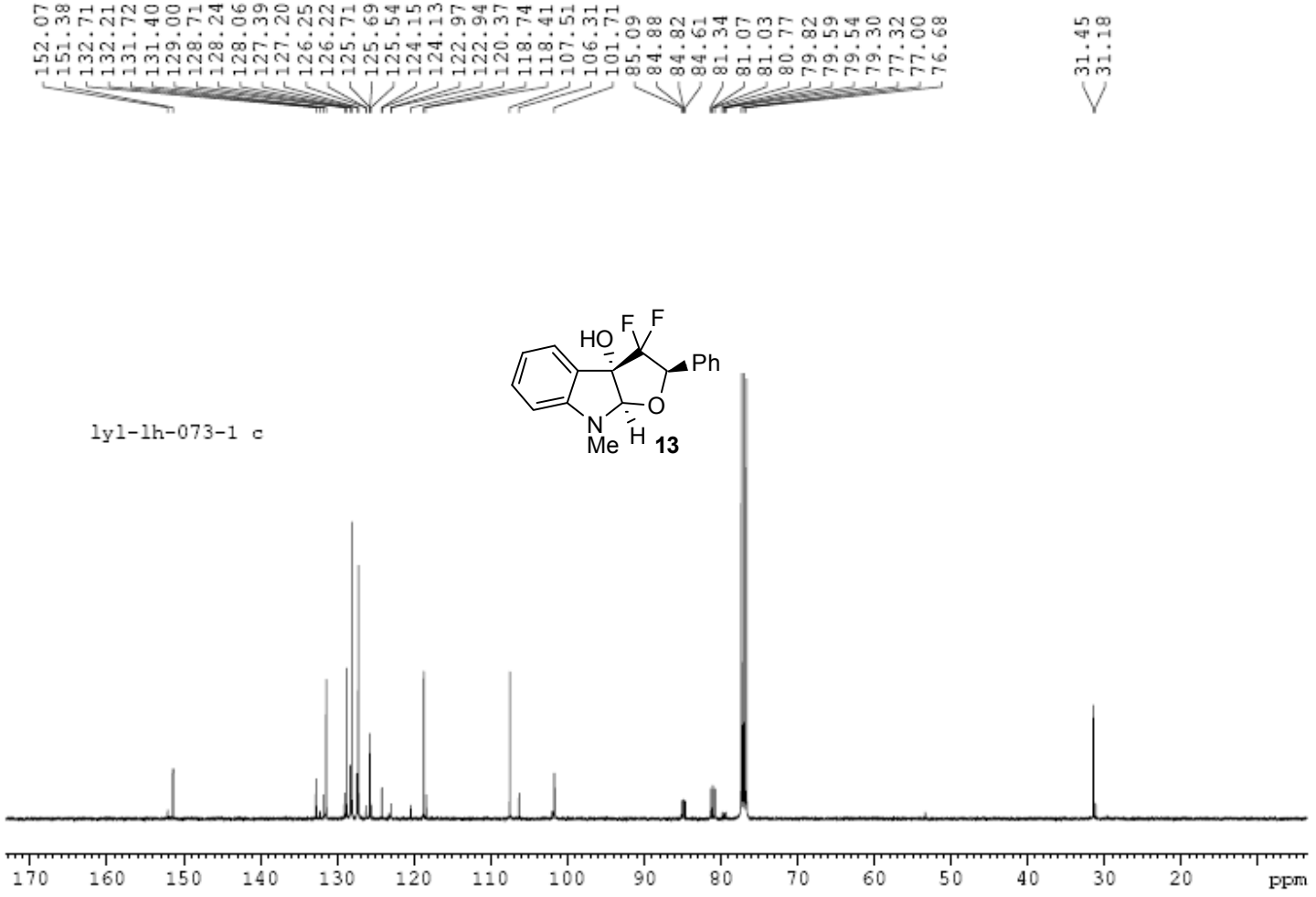
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126.22
125.71
125.69
125.54
124.15
124.13
122.97
122.94
120.37
118.74
118.41
107.51
106.31
101.71
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84.82
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81.07
81.03
80.77
79.82
79.59
79.54
79.30
77.32
77.00
76.68
31.45
31.18
HO
F
F
Ph
O
N
Me
H
13
lyl-1h-073-1 c
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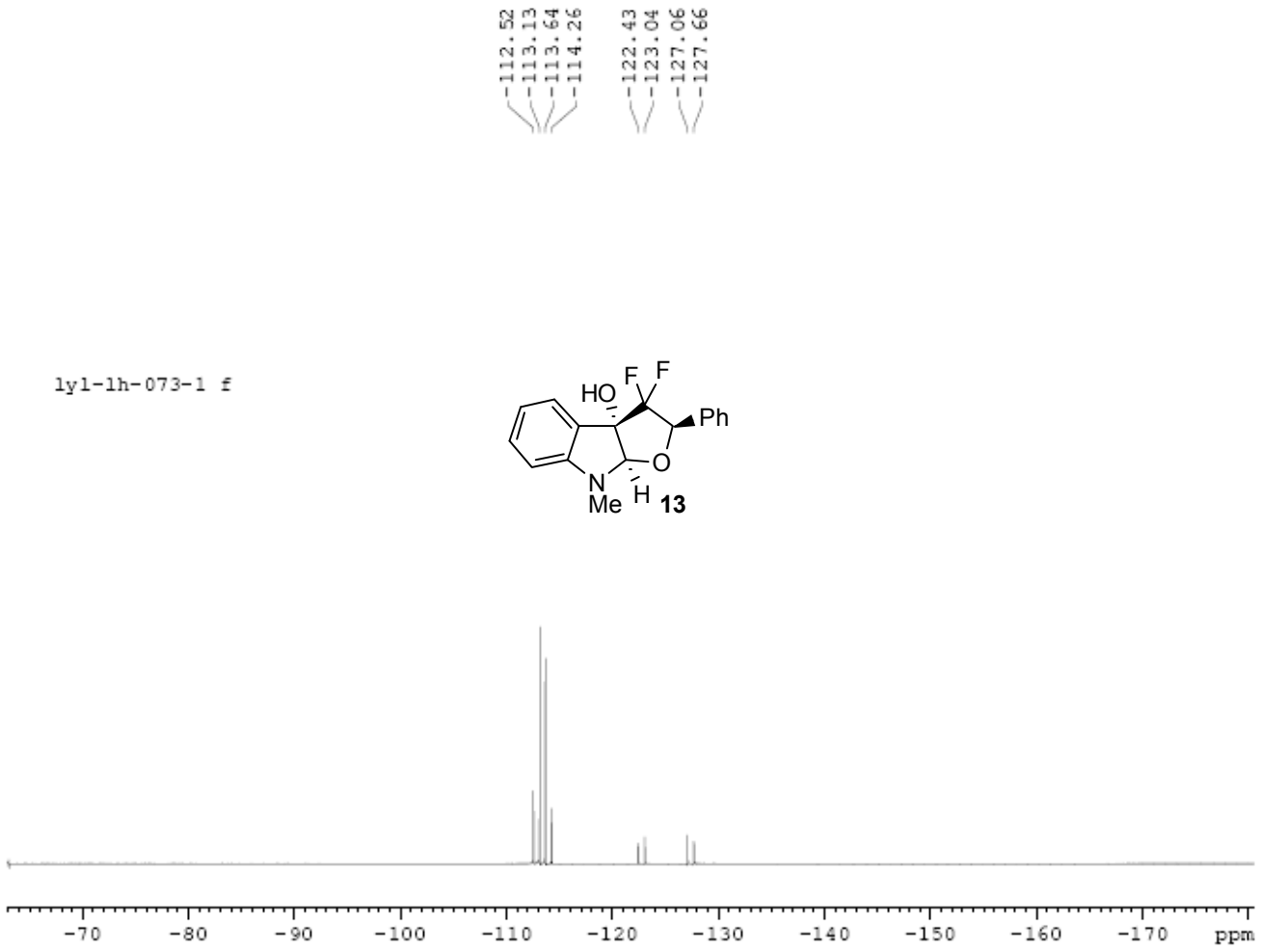
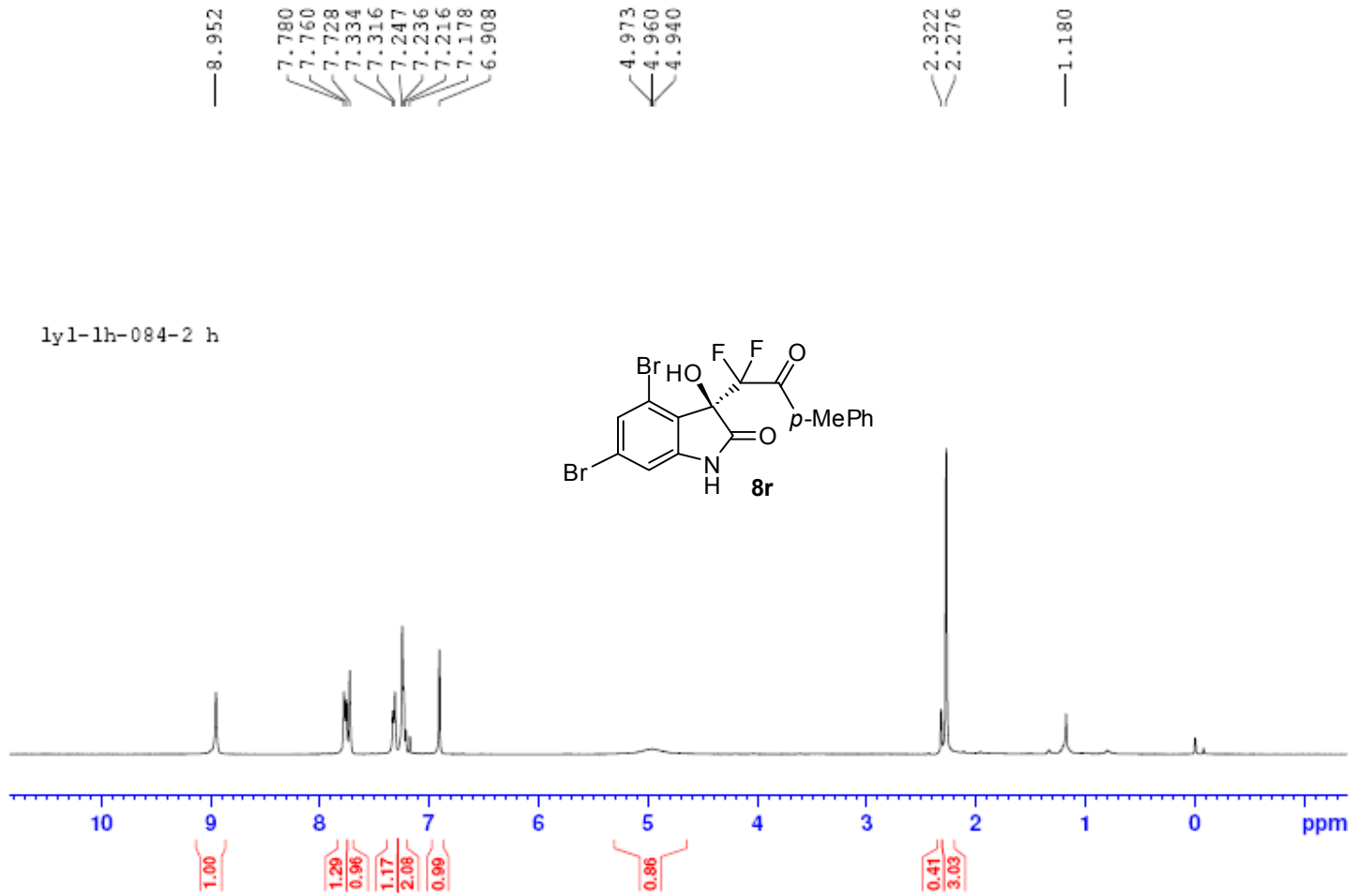
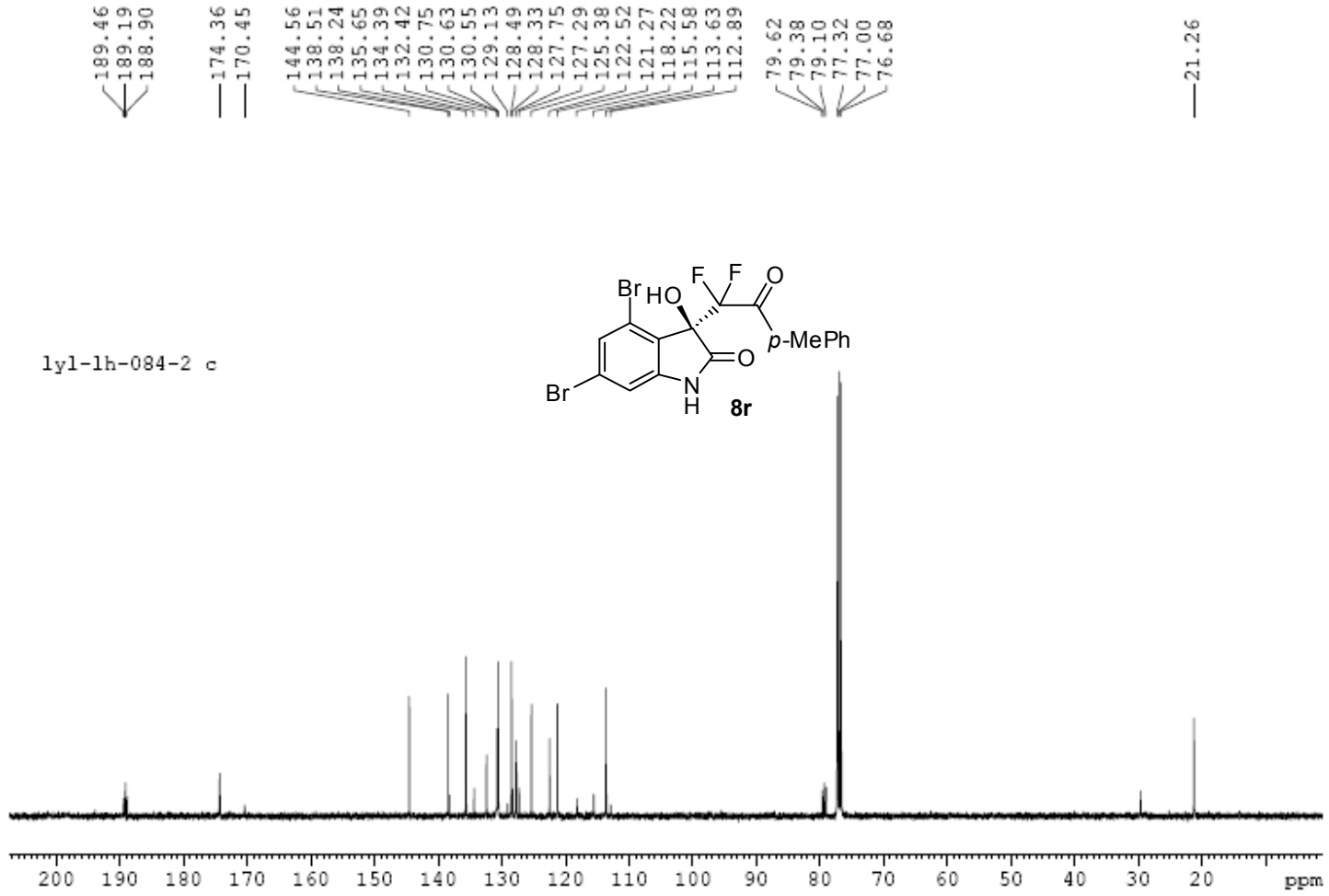
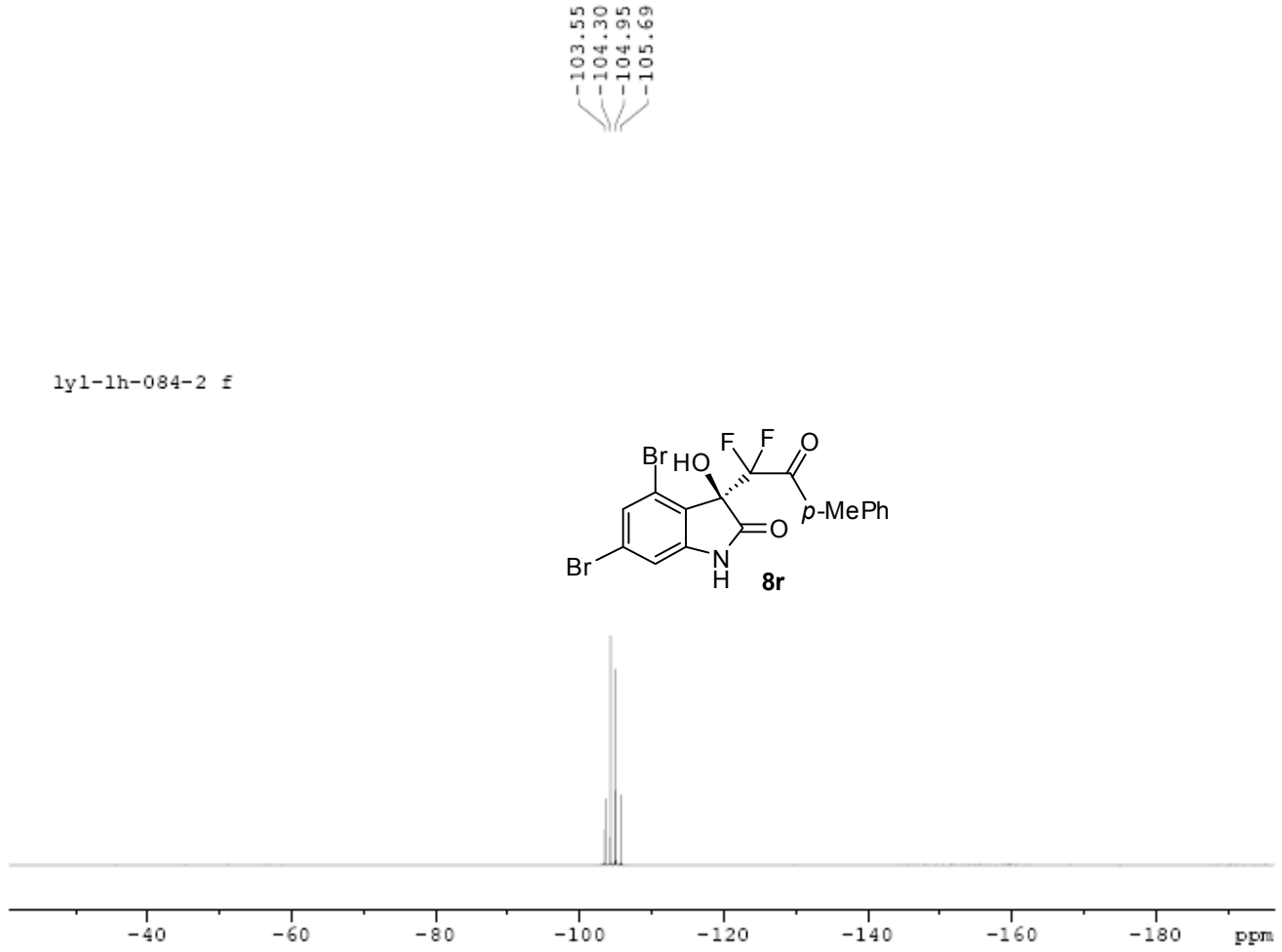
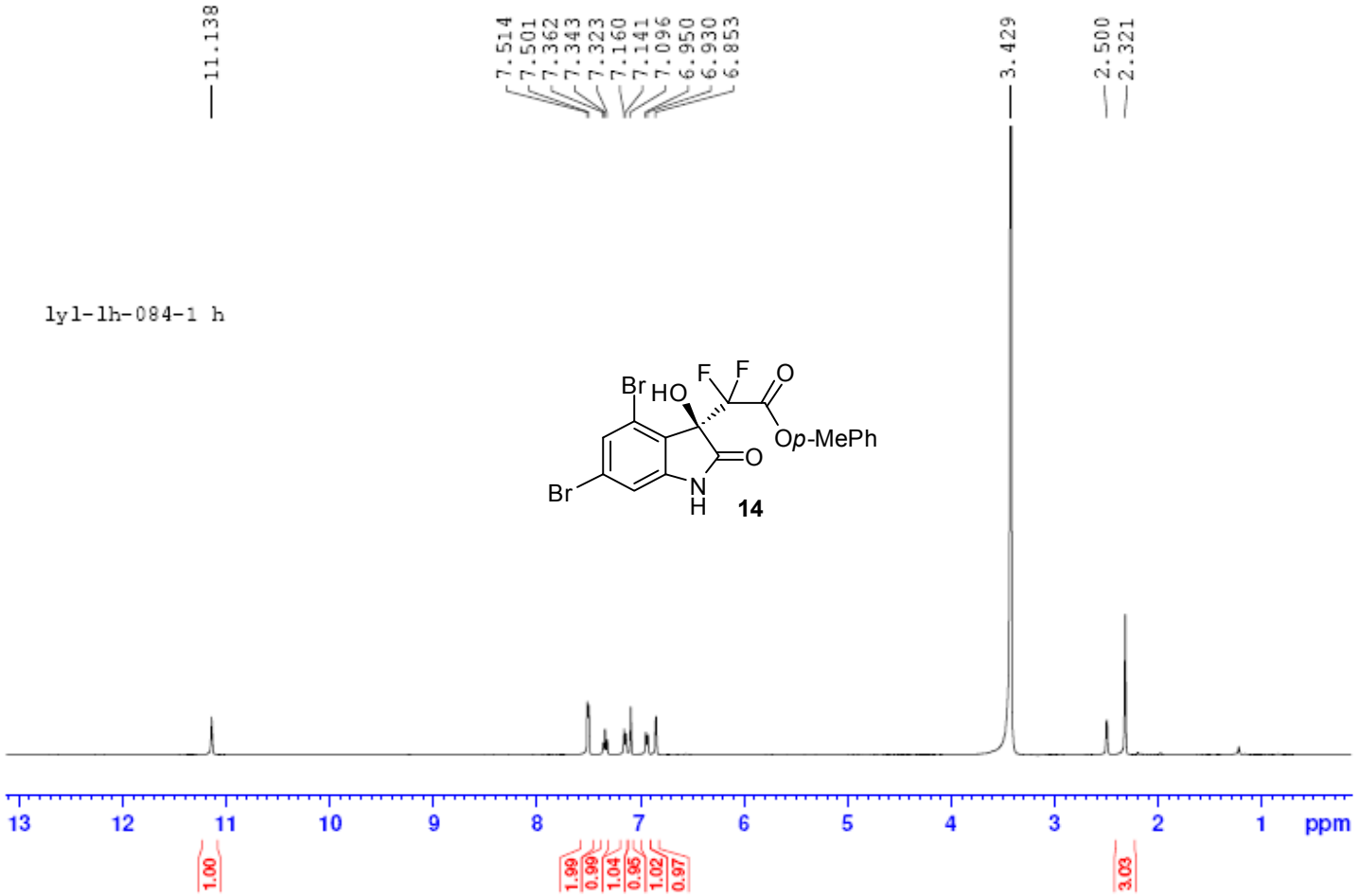
ppm

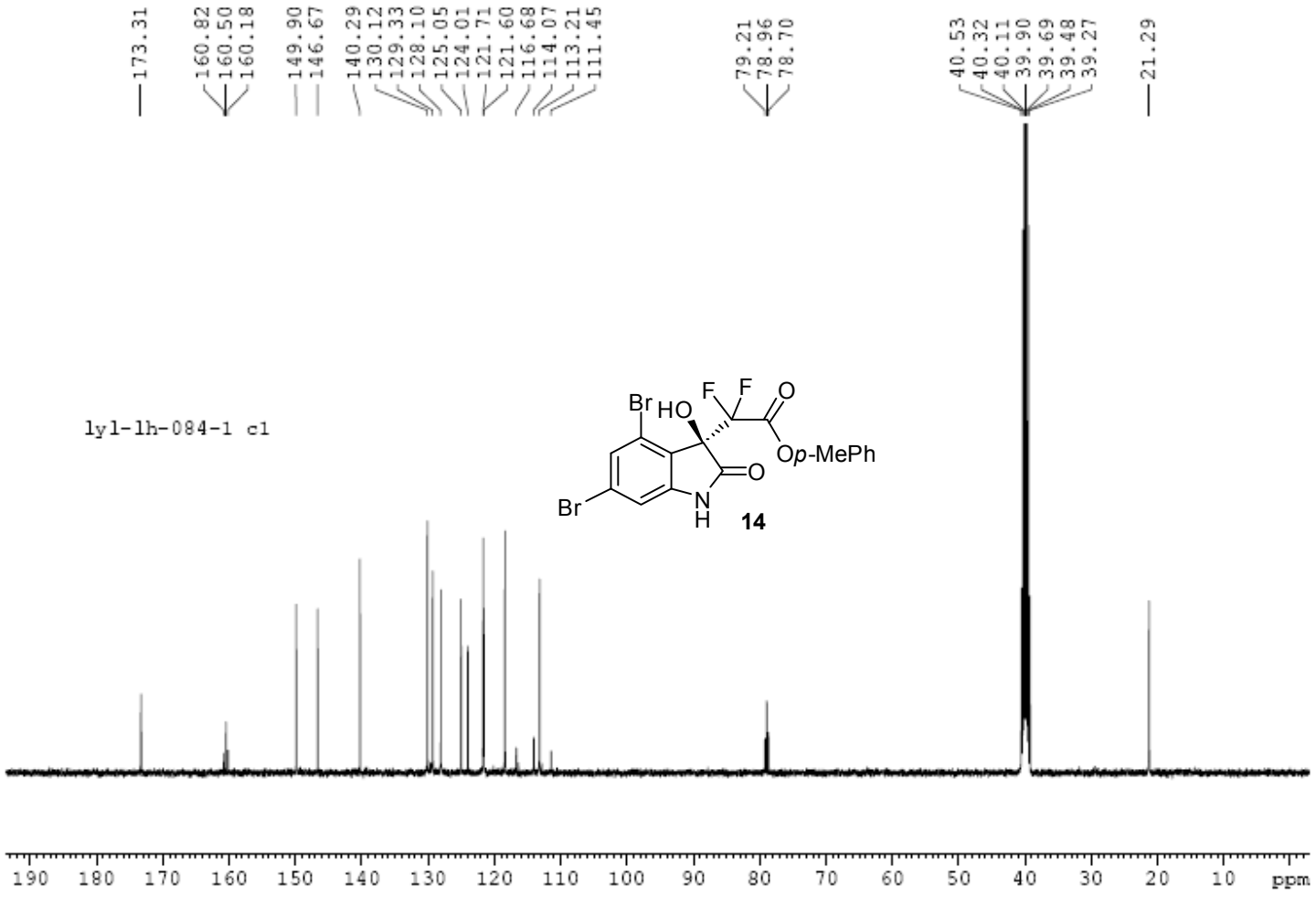


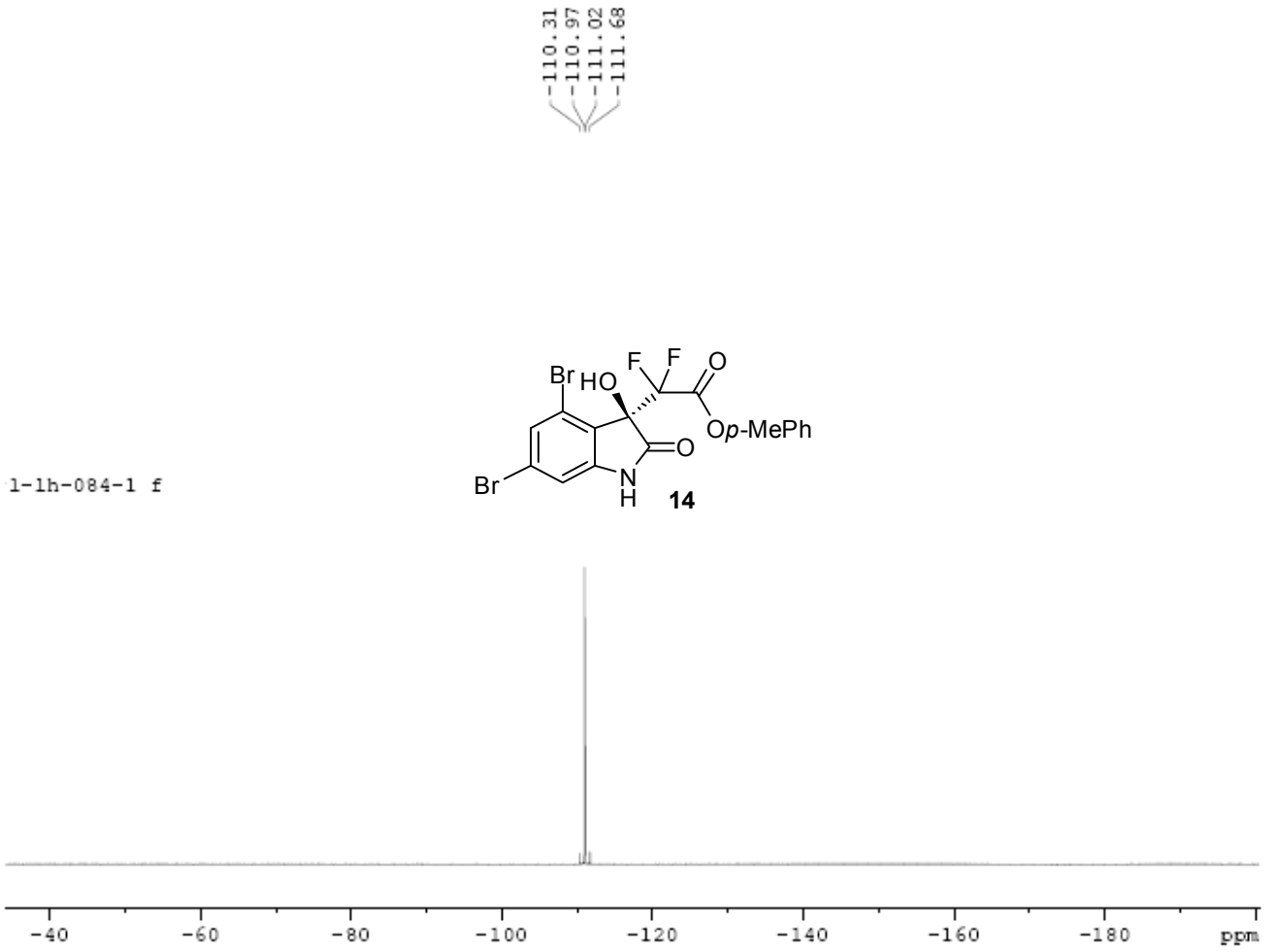








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-111.02
-111.68
Br
HO
F
F
O
O
Op-MePh
Br
N
H
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1-1h-084-1 f
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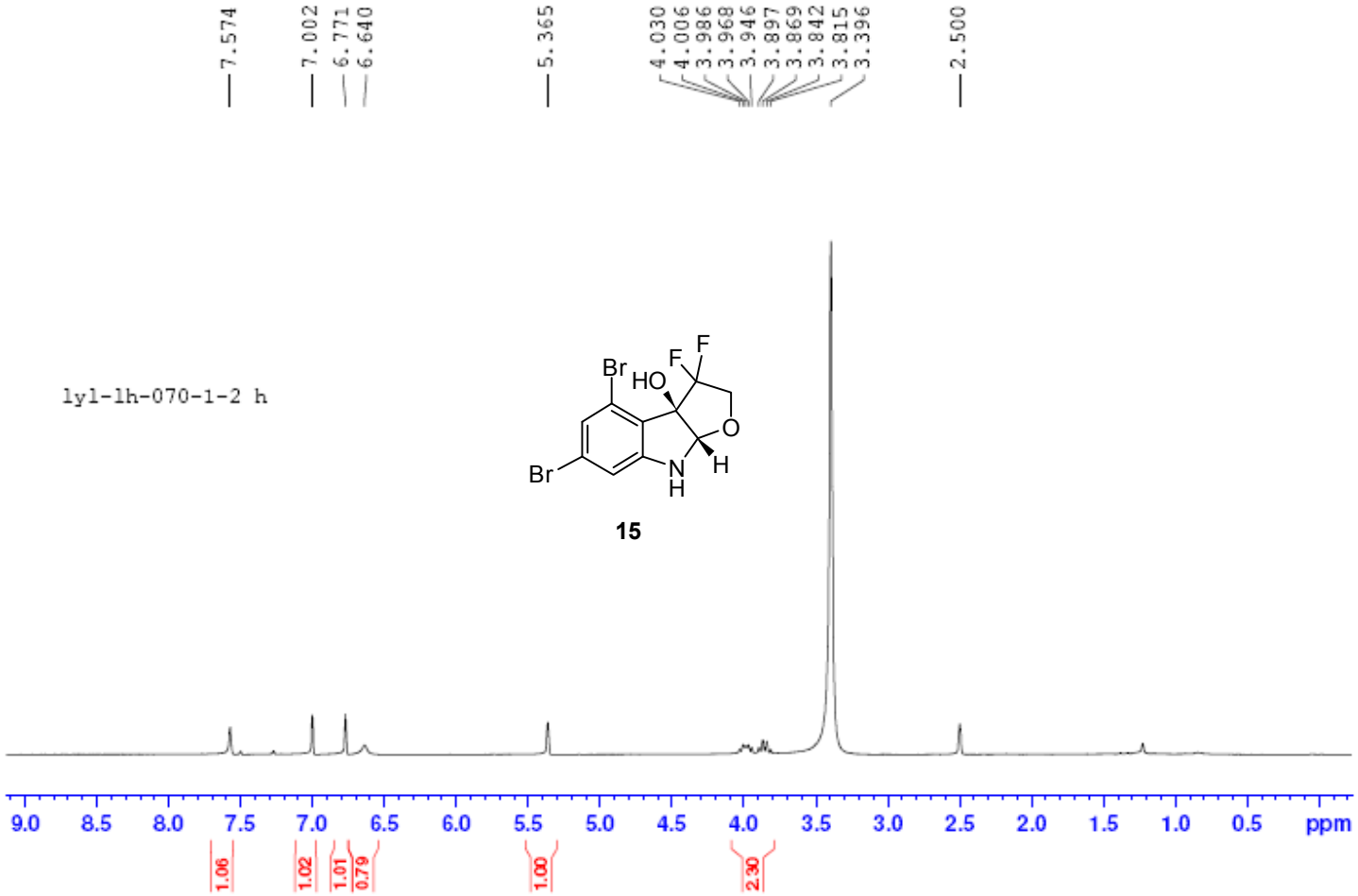
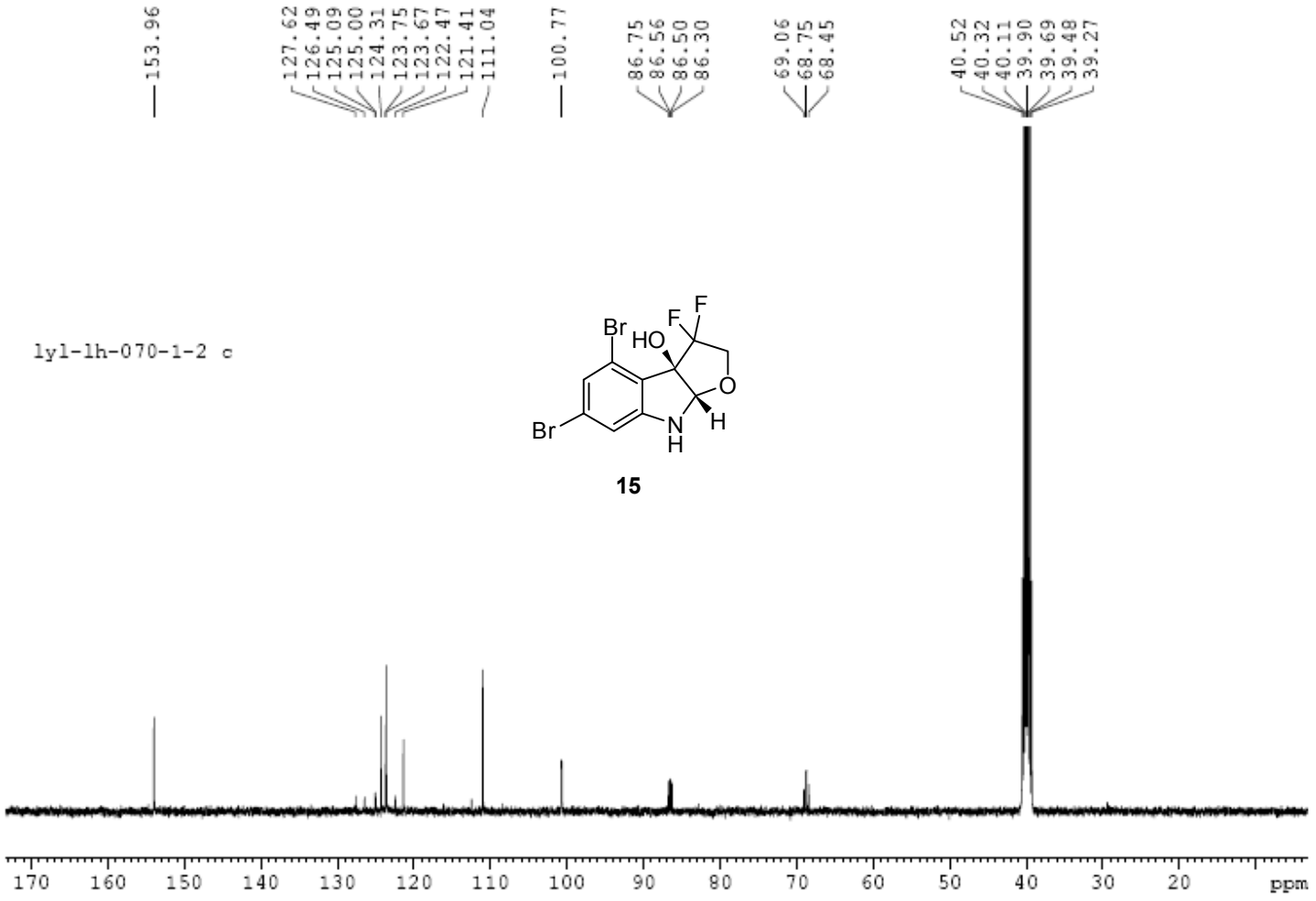
-60
-80
-100
-120
-140
-160
-180
ppm





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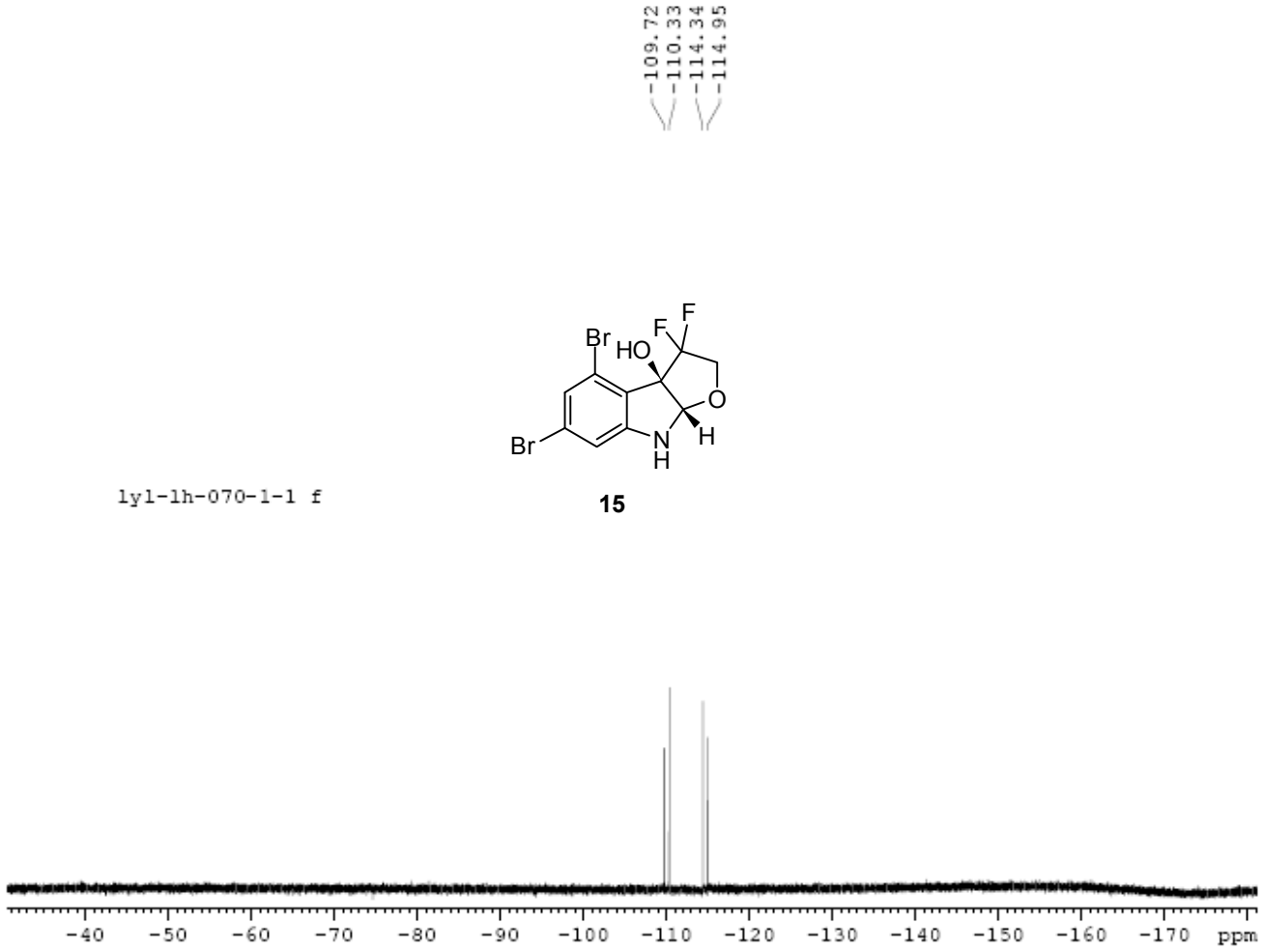

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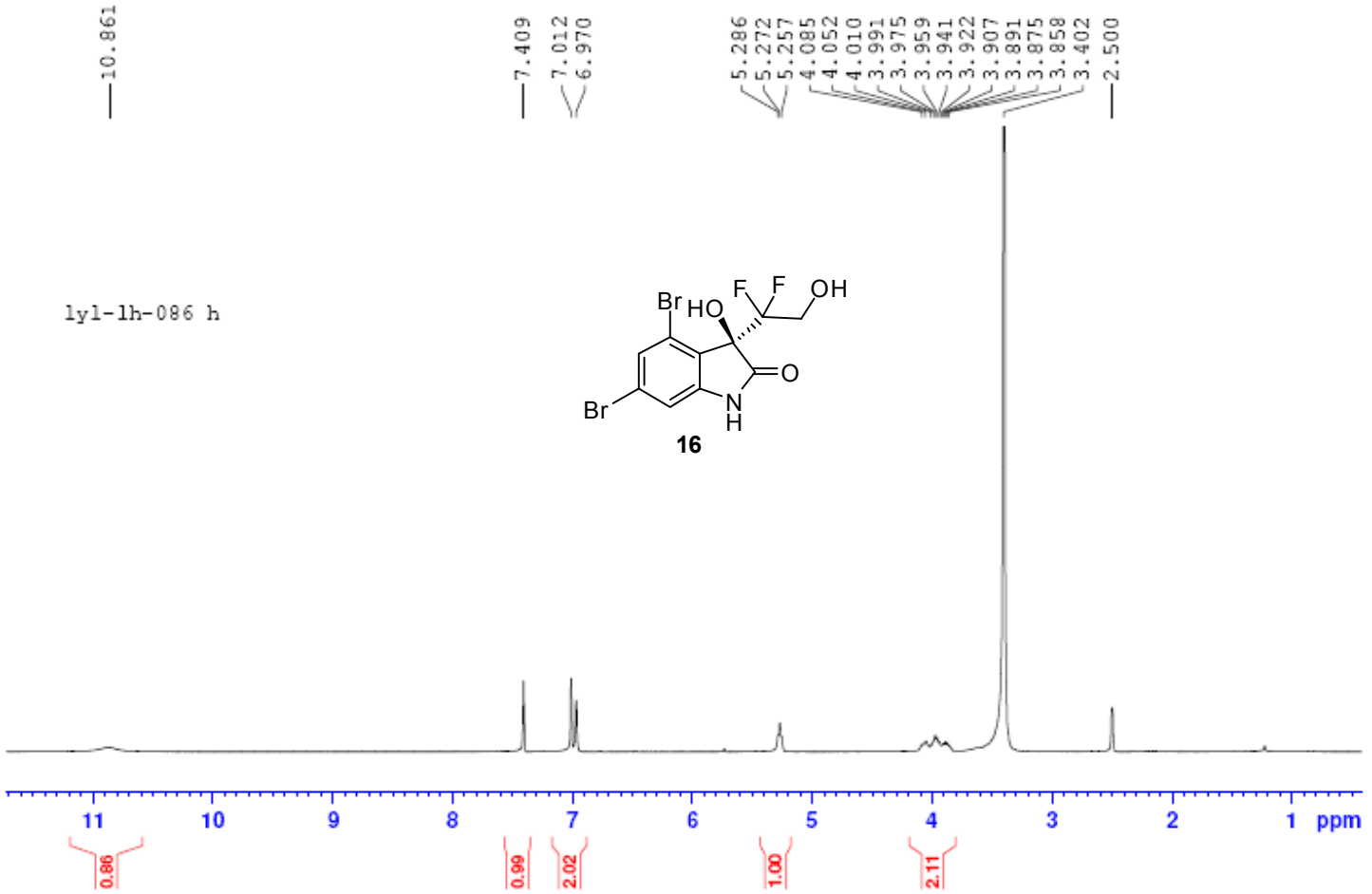
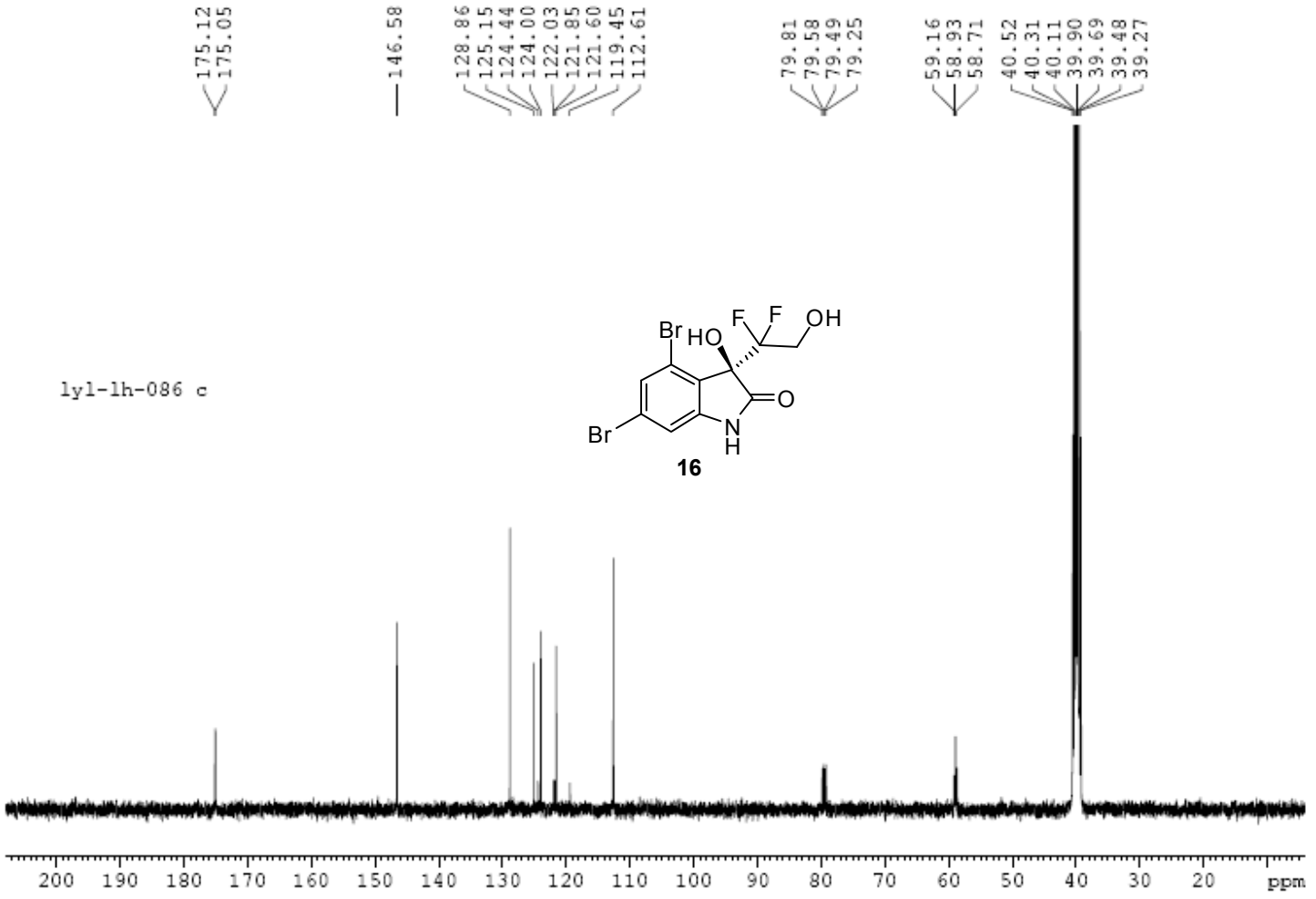
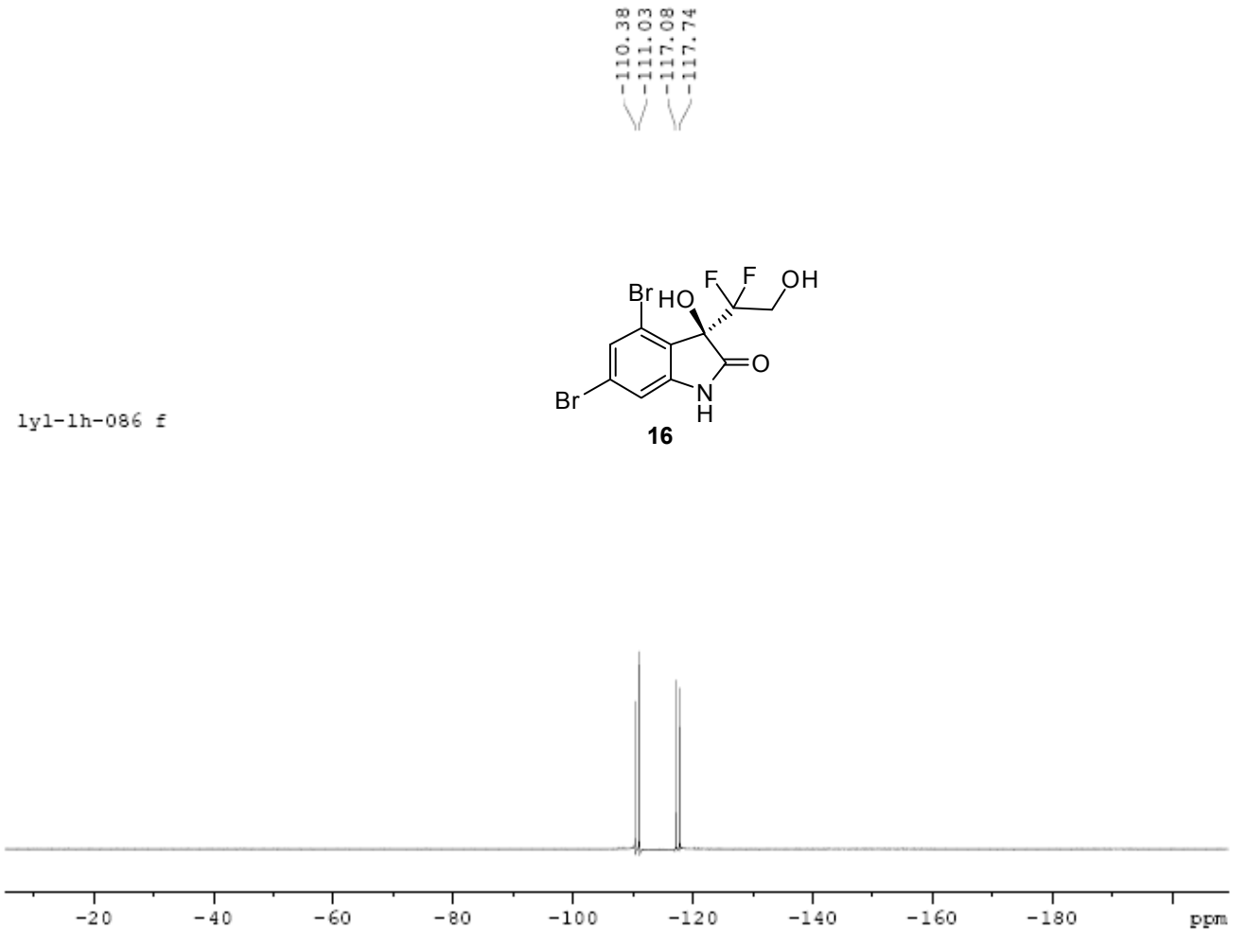
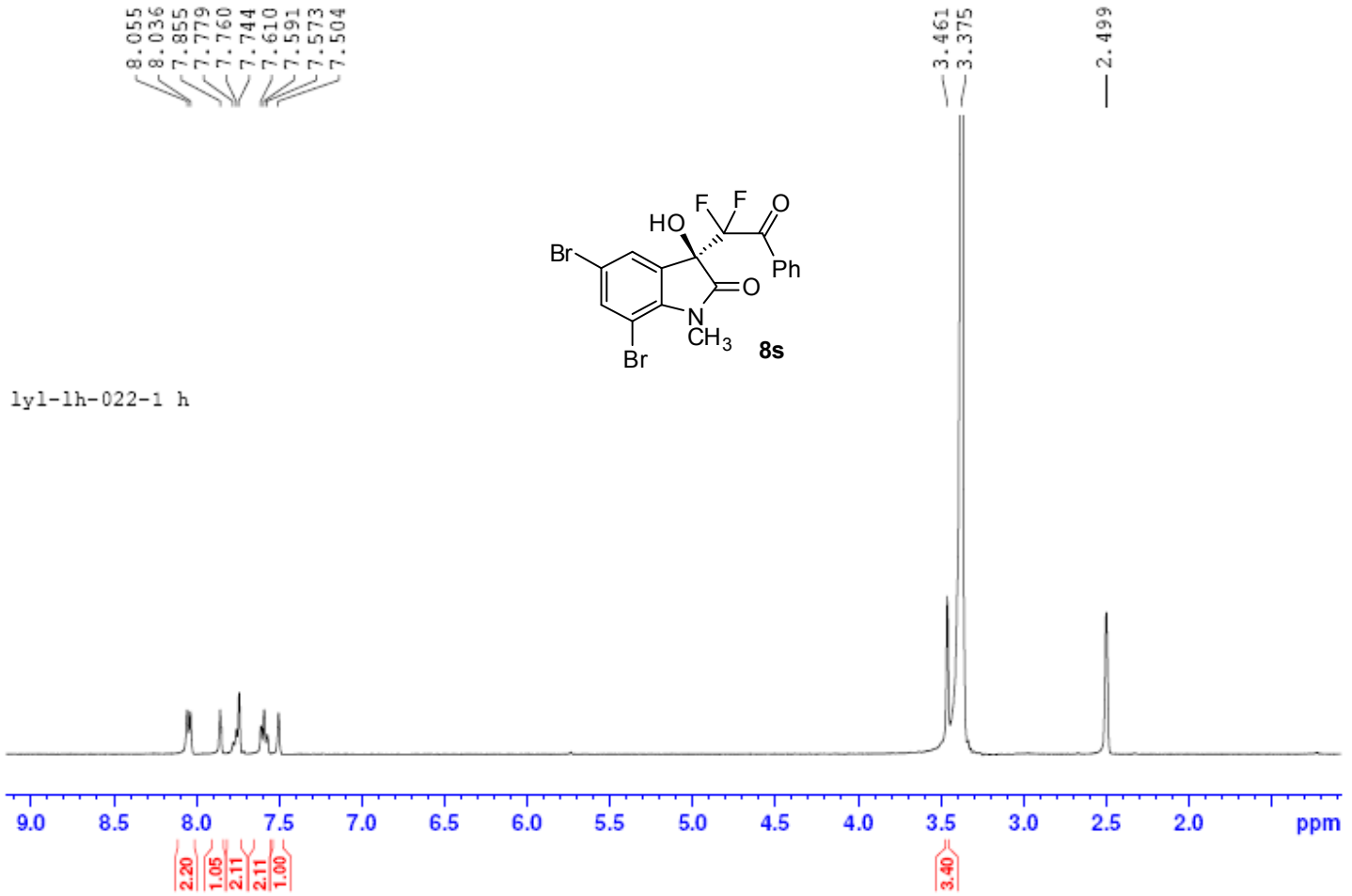
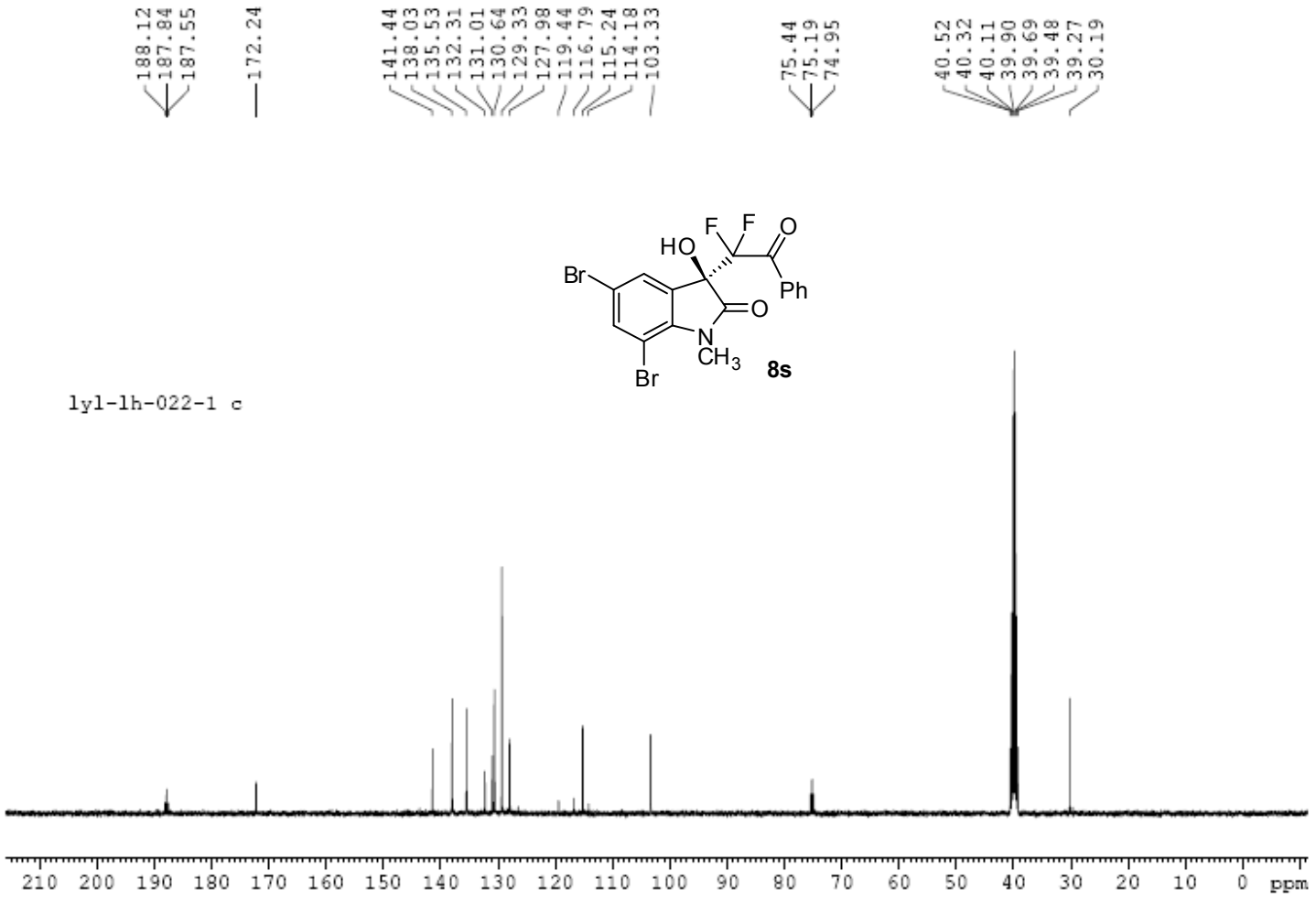


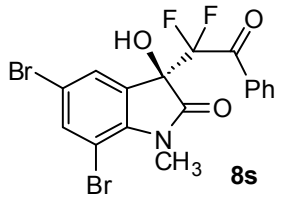








-107.89
-108.64
-108.77
-109.51



8s

yl-1h-022-1 f