Stereoselective Synthesis and Biological Evaluation of C1-Epimeric and Desmethyl Monomeric Nuphar Analogues

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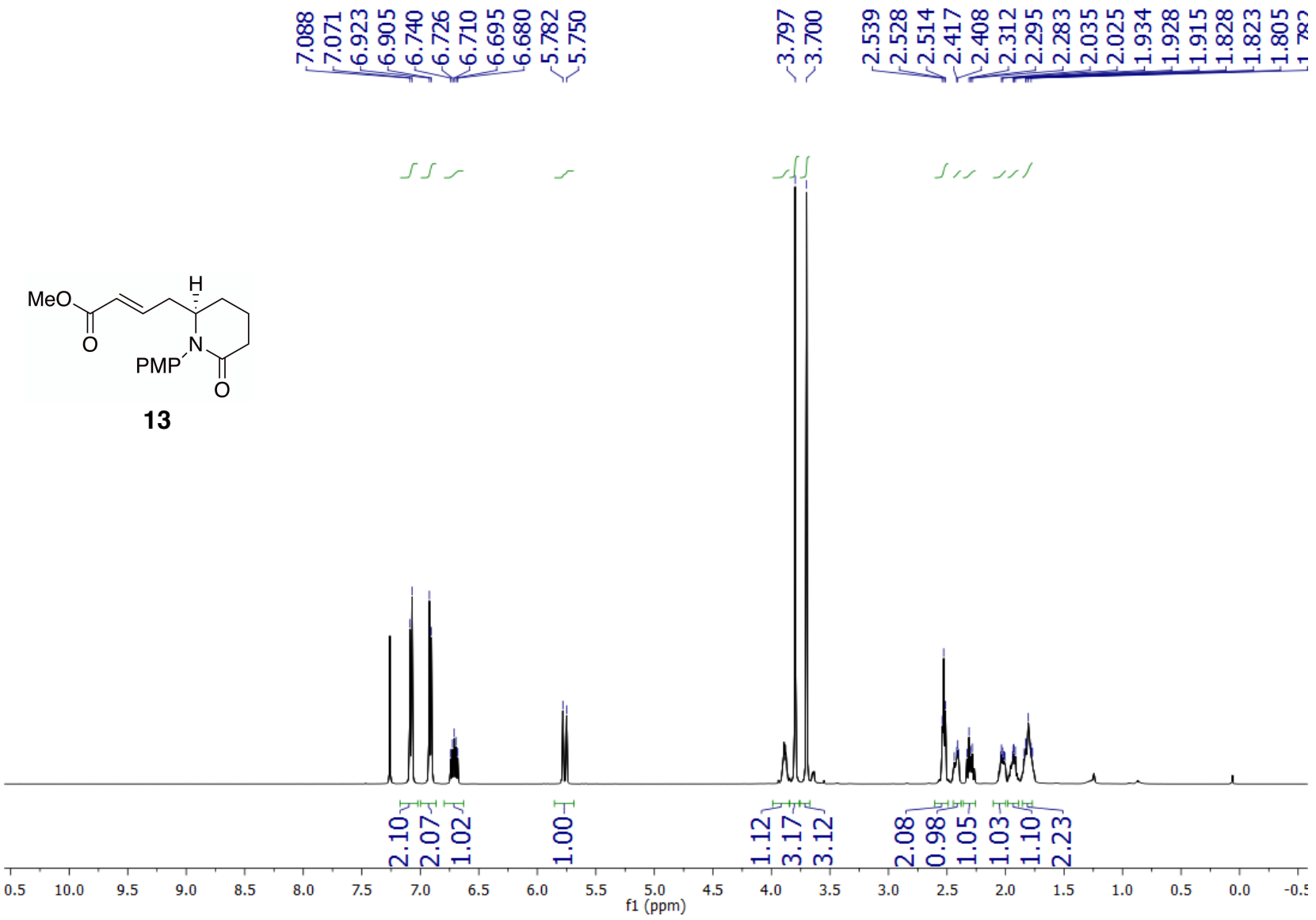
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6.695
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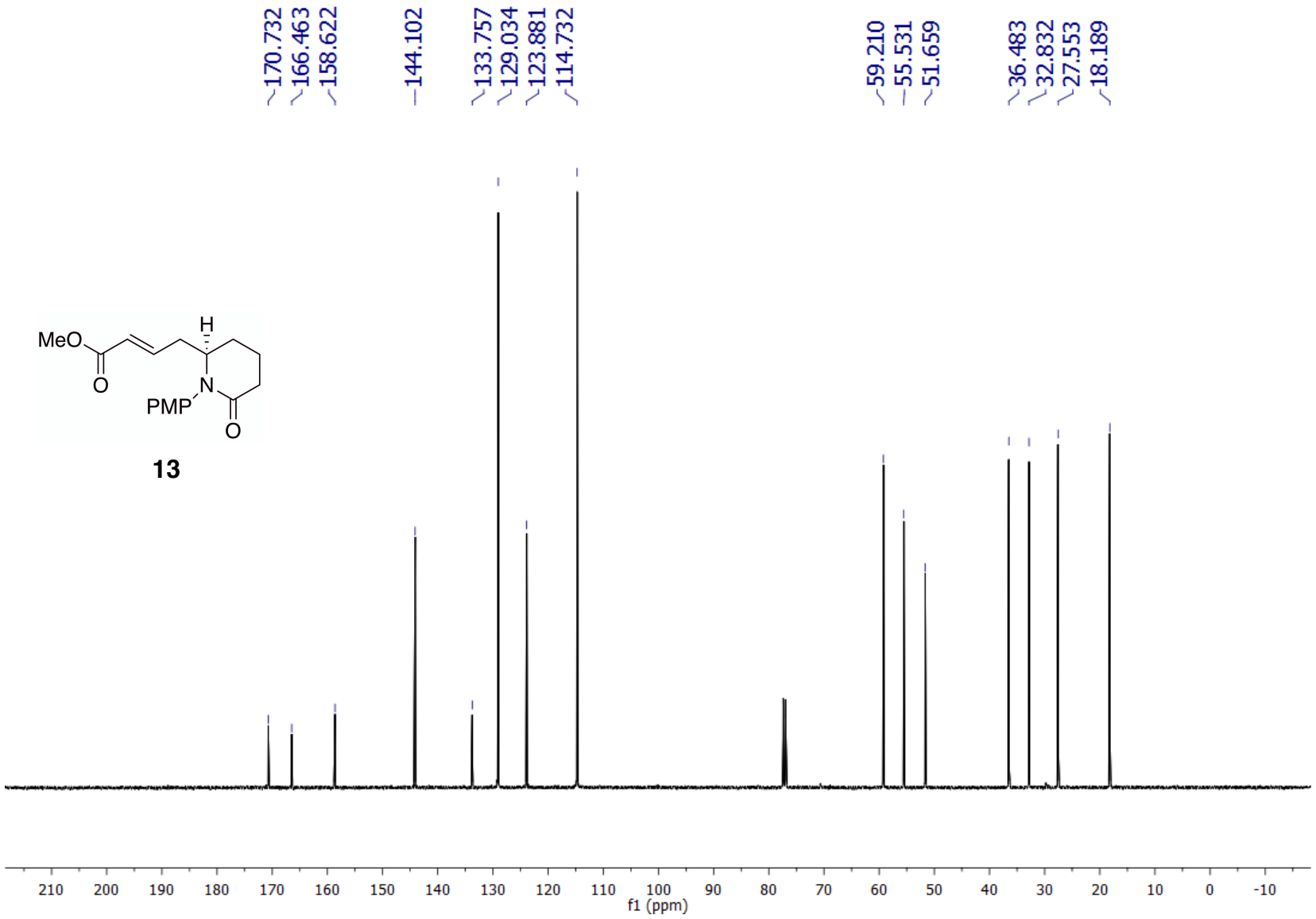
5.750
3.797
3.700
2.539
2.528
2.514
2.417
2.408
2.312
2.295
2.283
2.035
2.025
1.934
1.928
1.915
1.828
1.823
1.805
MeO
O
H
N
PMP
O
2.10
2.07
1.02
1.00
1.12
3.17
3.12
2.08
0.98
1.05
1.03
1.10
2.23
f1 (ppm)

13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158.622
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133.757
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32.832
27.553
18.189
MeO
O
H
N
PMP
O
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

13

Data File C:\CHEM32\1\DATA\HLI\HLI-XIV-90-RACEMIC 2015-09-01 16-55-03\HLI000001.D
Sample Name: HLI-XIV-98

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                                               Inj Volume : 20 µl
Acq. Method     : C:\Chem32\1\DATA\HLI\HLI-XIV-90-RACEMIC 2015-09-01 16-55-03\ODH-30(254)-20OC.M
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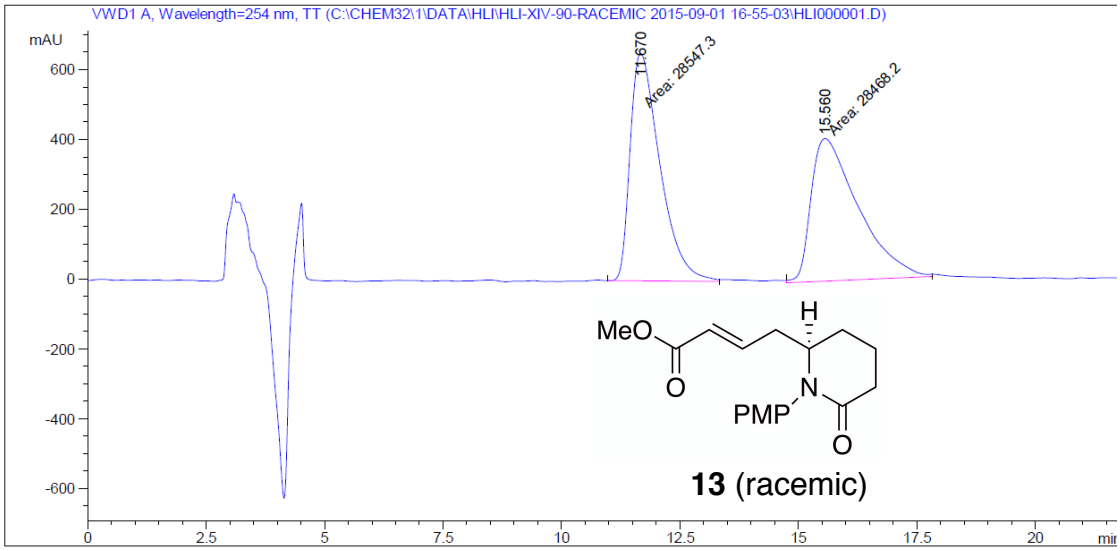

13 (racemic)

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==========================================================================
                          Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm, TT

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  11.670 MM    0.7295 2.85473e4   652.24341  50.0694
   2  15.560 MM    1.1588 2.84682e4   409.43762  49.9306

Totals :                 5.70156e4  1061.68103
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)ata File C:\CHEM32\1\DATA\HLI\HLI-XV-1C-CYCLIZED 2015-09-07 15-46-19\HLI000001.D
!ample Name: HLI-XV-7

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==========================================================================
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Injection Date  : 9/7/2015 3:49:19 PM              Inj :   1
                                              Inj Volume : 100 µl
Acq. Method     : C:\Chem32\1\DATA\HLI\HLI-XV-1C-CYCLIZED 2015-09-07 15-46-19\ODH-30(254)-20OC.M
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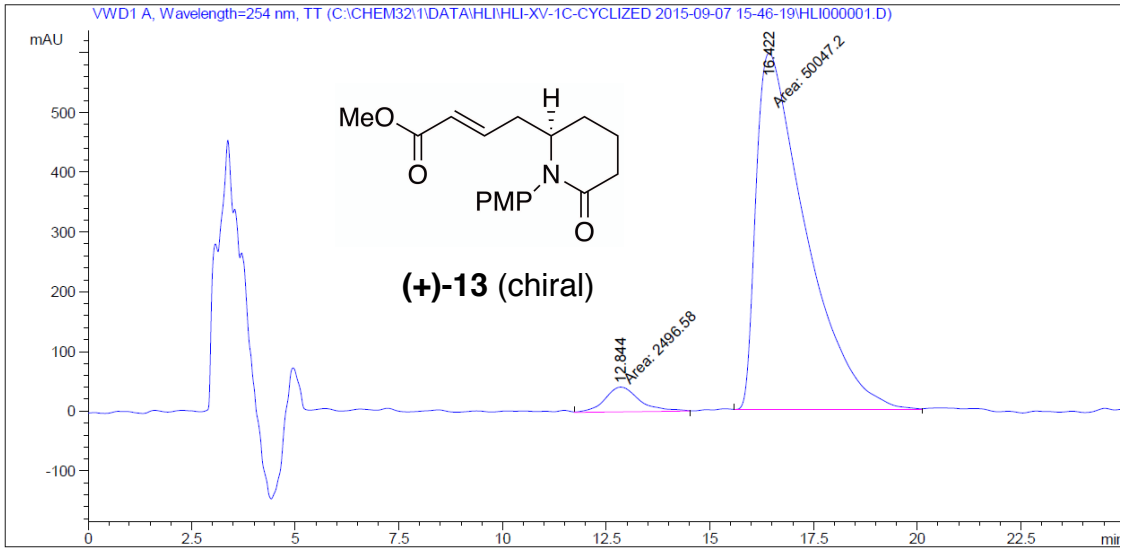


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==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm, TT

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.844 MM    0.9932 2496.58105   41.89553   4.7514
   2  16.422 MM    1.3966 5.00472e4   597.23413  95.2486

Totals :                  5.25438e4   639.12966
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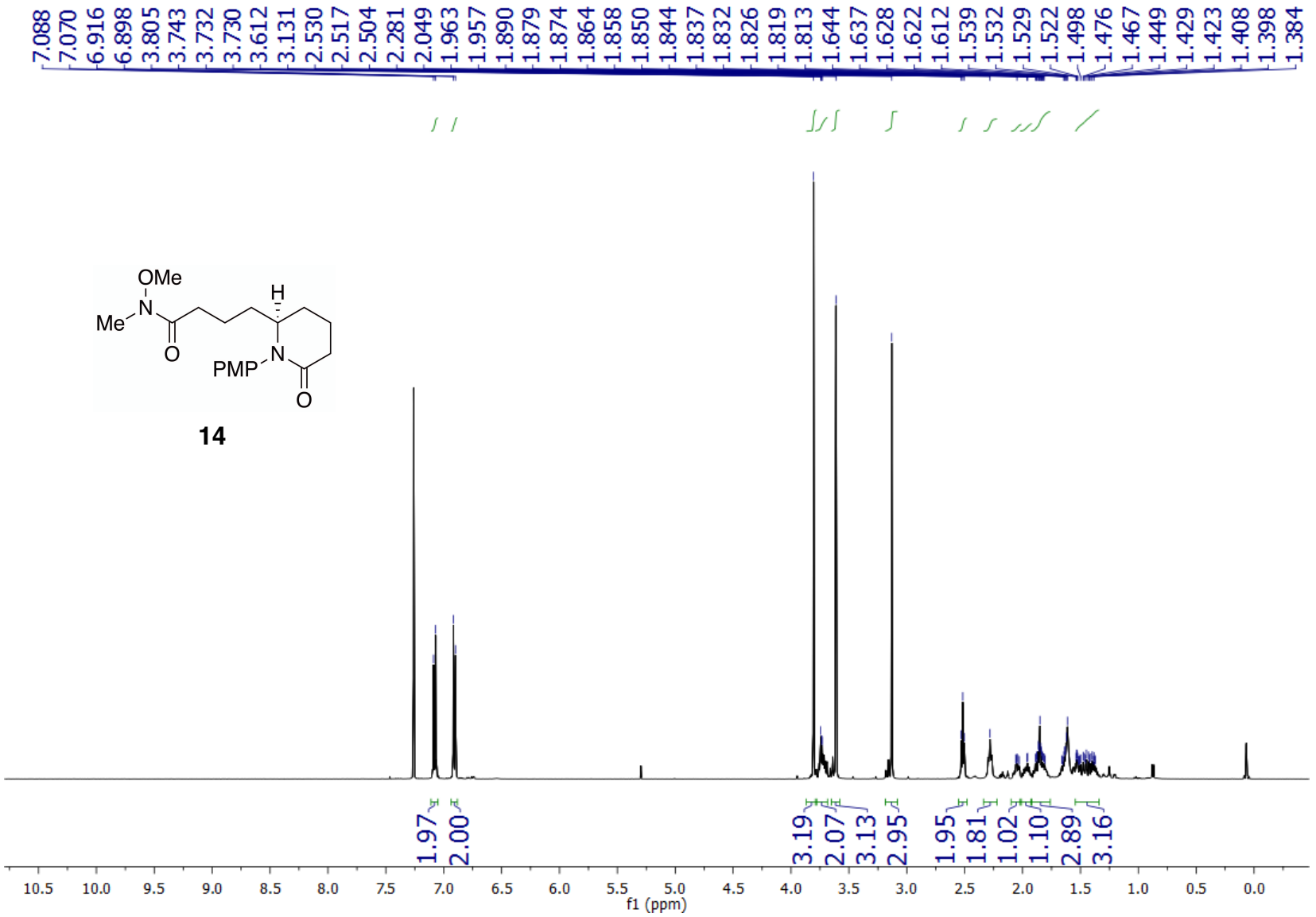
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3.730
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3.131
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2.517
2.504
2.281
2.049
1.963
1.957
1.890
1.879
1.874
1.864
1.858
1.850
1.844
1.837
1.832
1.826
1.819
1.813
1.644
1.637
1.628
1.622
1.612
1.539
1.532
1.529
1.522
1.498
1.476
1.467
1.449
1.429
1.423
1.408
1.398
1.384
OMe
N
Me
O
H
N
PMP
O
14
1.97
2.00
3.19
2.07
3.13
2.95
1.95
1.81
1.02
1.10
2.89
3.16
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
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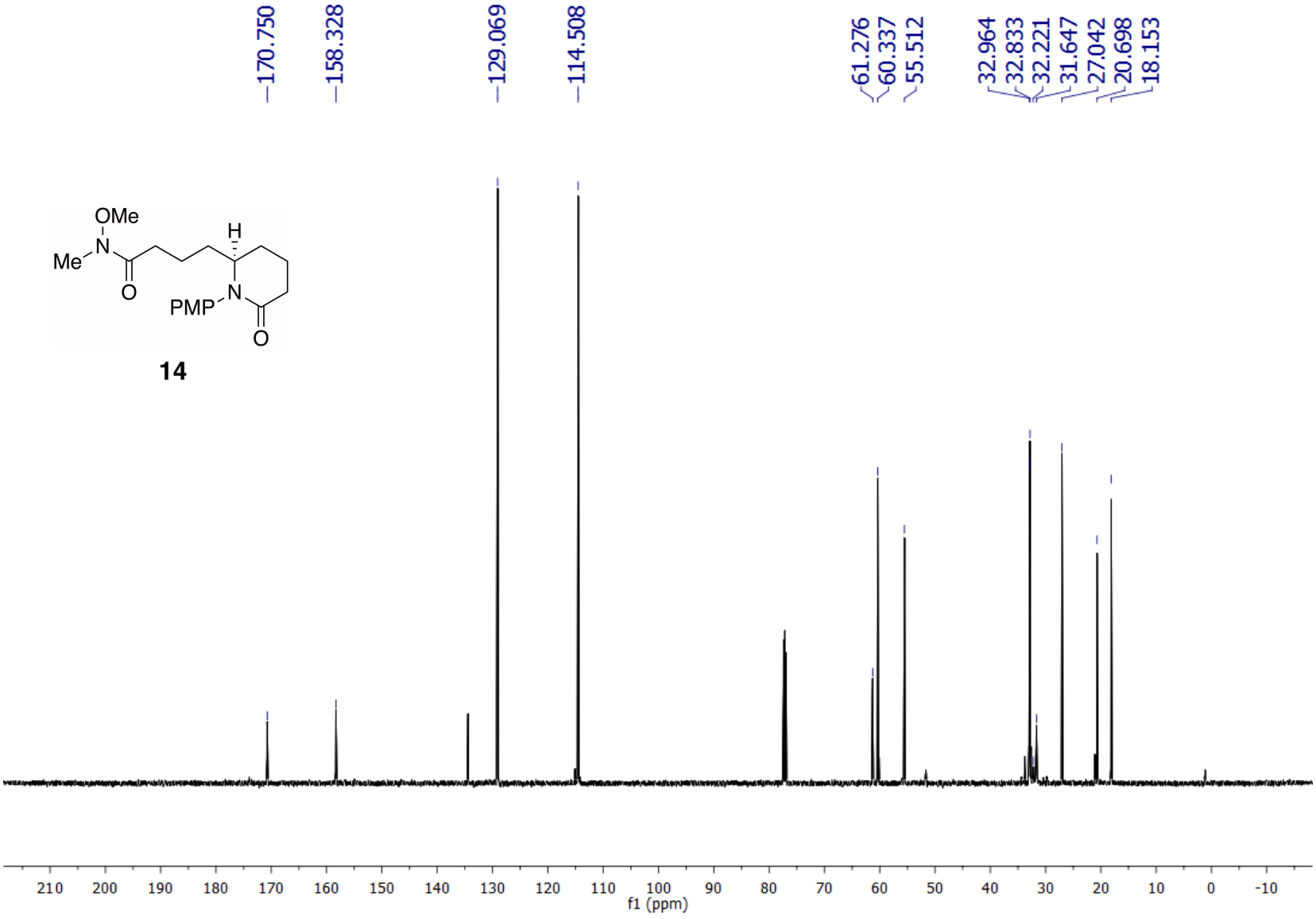
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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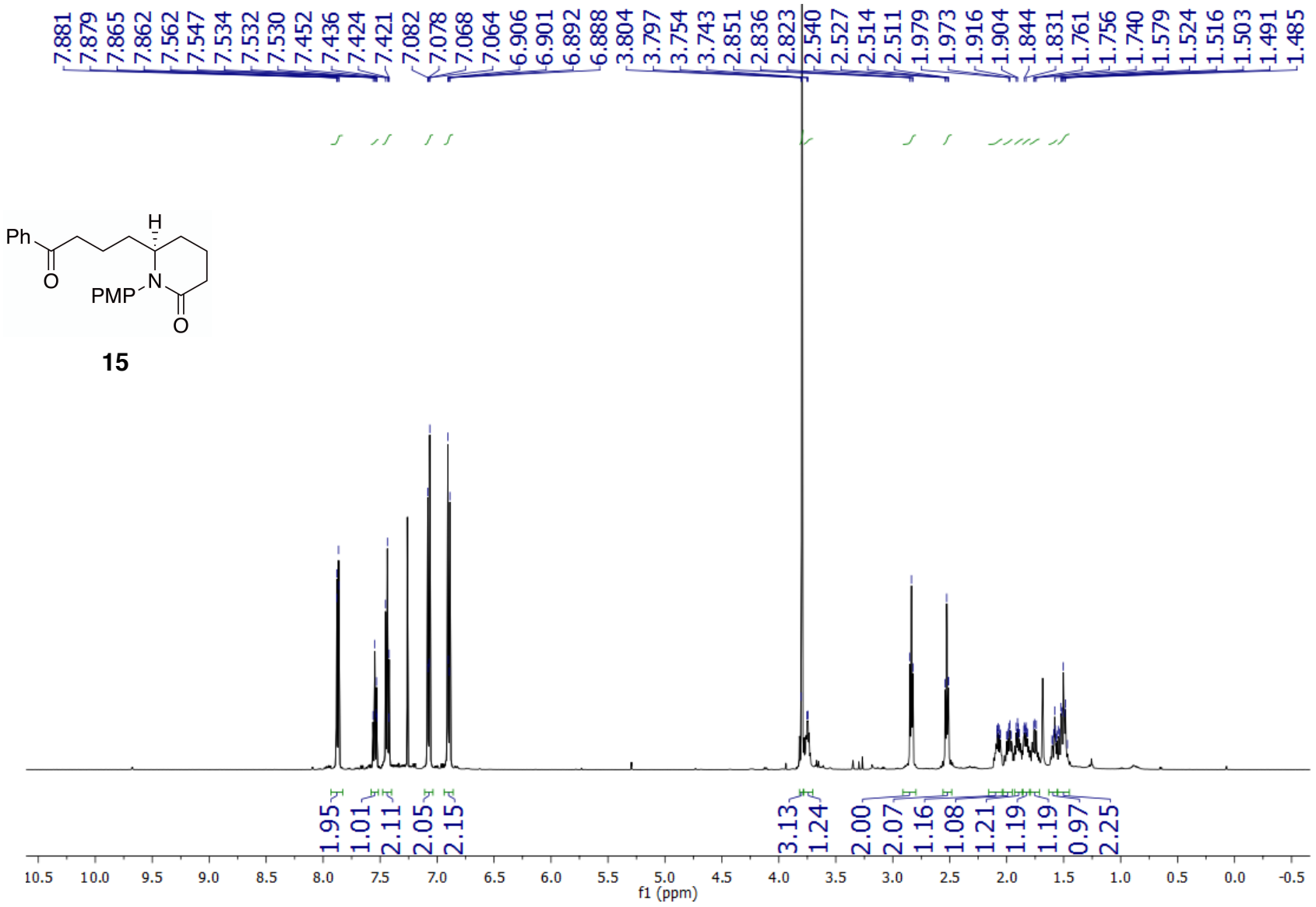
129.069
114.508
61.276
60.337
55.512
32.964
32.833
32.221
31.647
27.042
20.698
18.153
OMe
N
Me
O
H
N
PMP
O
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

14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7.452
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7.421
7.082
7.078
7.068
7.064
6.906
6.901
6.892
6.888
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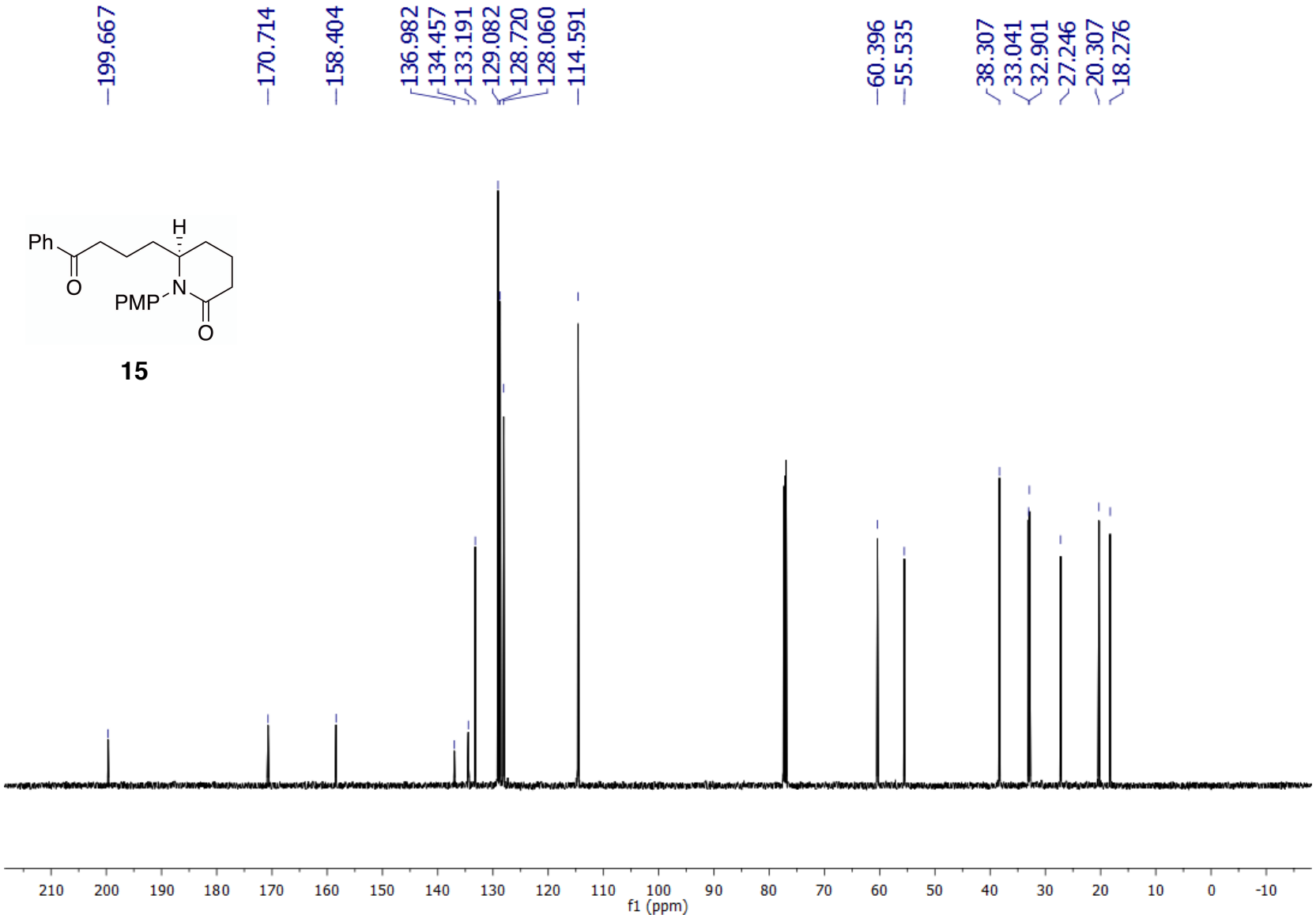
3.797
3.754
3.743
2.851
2.836
2.823
2.540
2.527
2.514
2.511
1.979
1.973
1.916
1.904
1.844
1.831
1.761
1.756
1.740
1.579
1.524
1.516
1.503
1.491
1.485
Ph
O
H
N
PMP
O
1.95
1.01
2.11
2.05
2.15
3.13
1.24
2.00
2.07
1.16
1.08
1.21
1.19
1.19
0.97
2.25
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

15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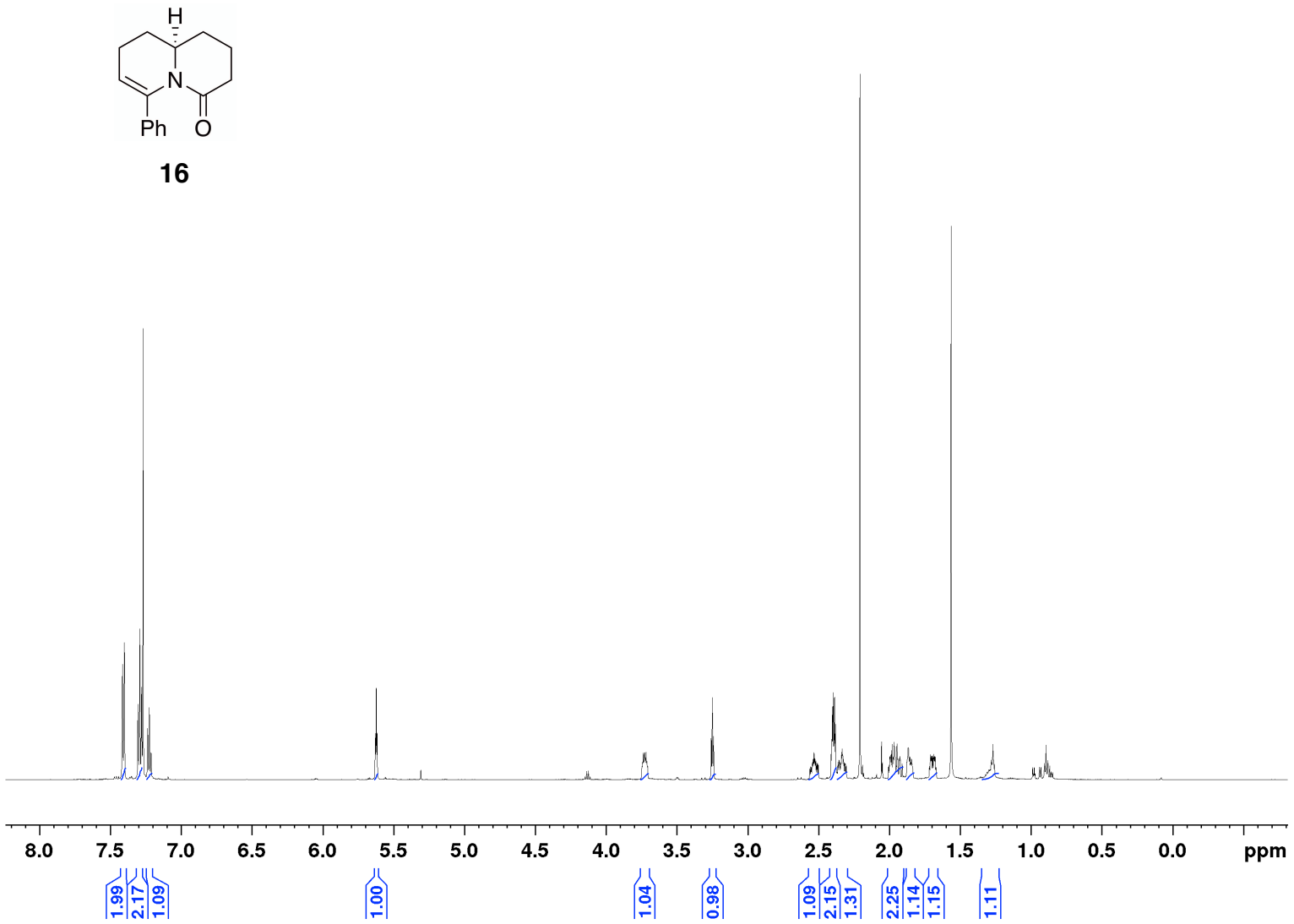
38.307
33.041
32.901
27.246
20.307
18.276
Ph
O
H
N
PMP
O
15
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


H
N
Ph
O
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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
ppm
1.99
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1.00
1.04
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1.09
2.15
1.31
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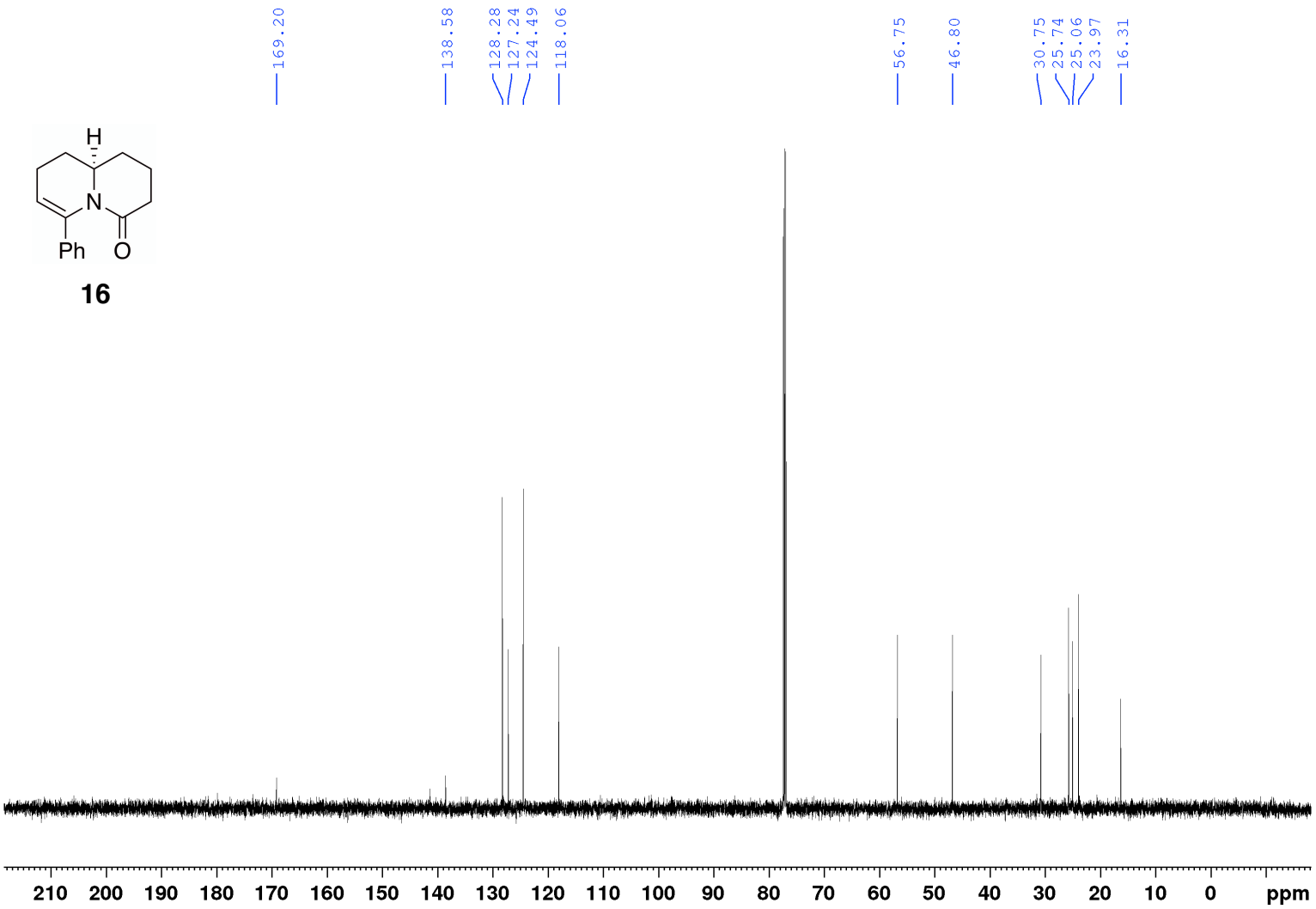
1.15
1.11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127.24
124.49
118.06
56.75
46.80
30.75
25.74
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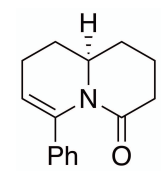
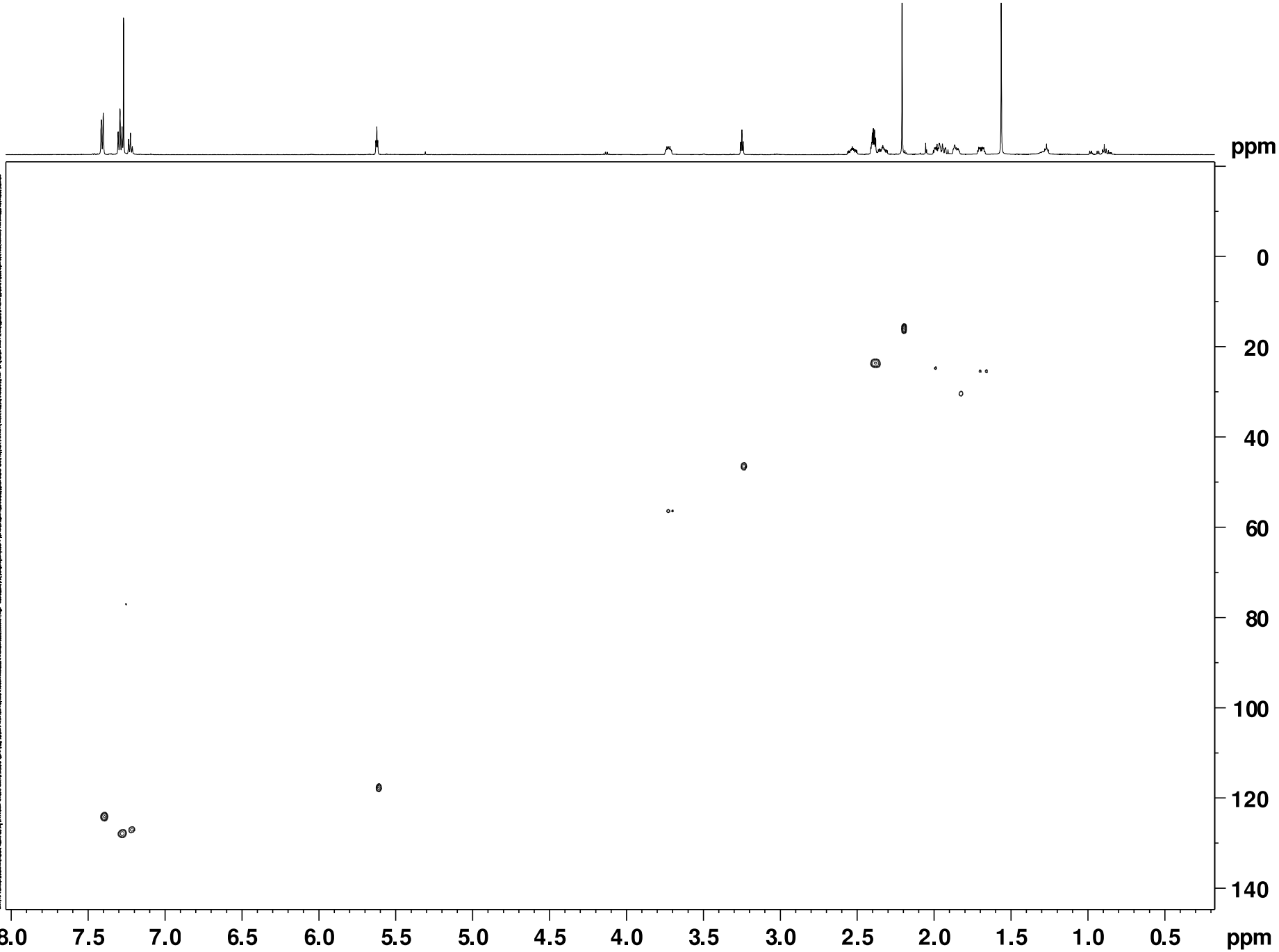
23.97
16.31
H
N
Ph
O
16
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm


H
N
Ph
O

16 (HMQC)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140
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2.0
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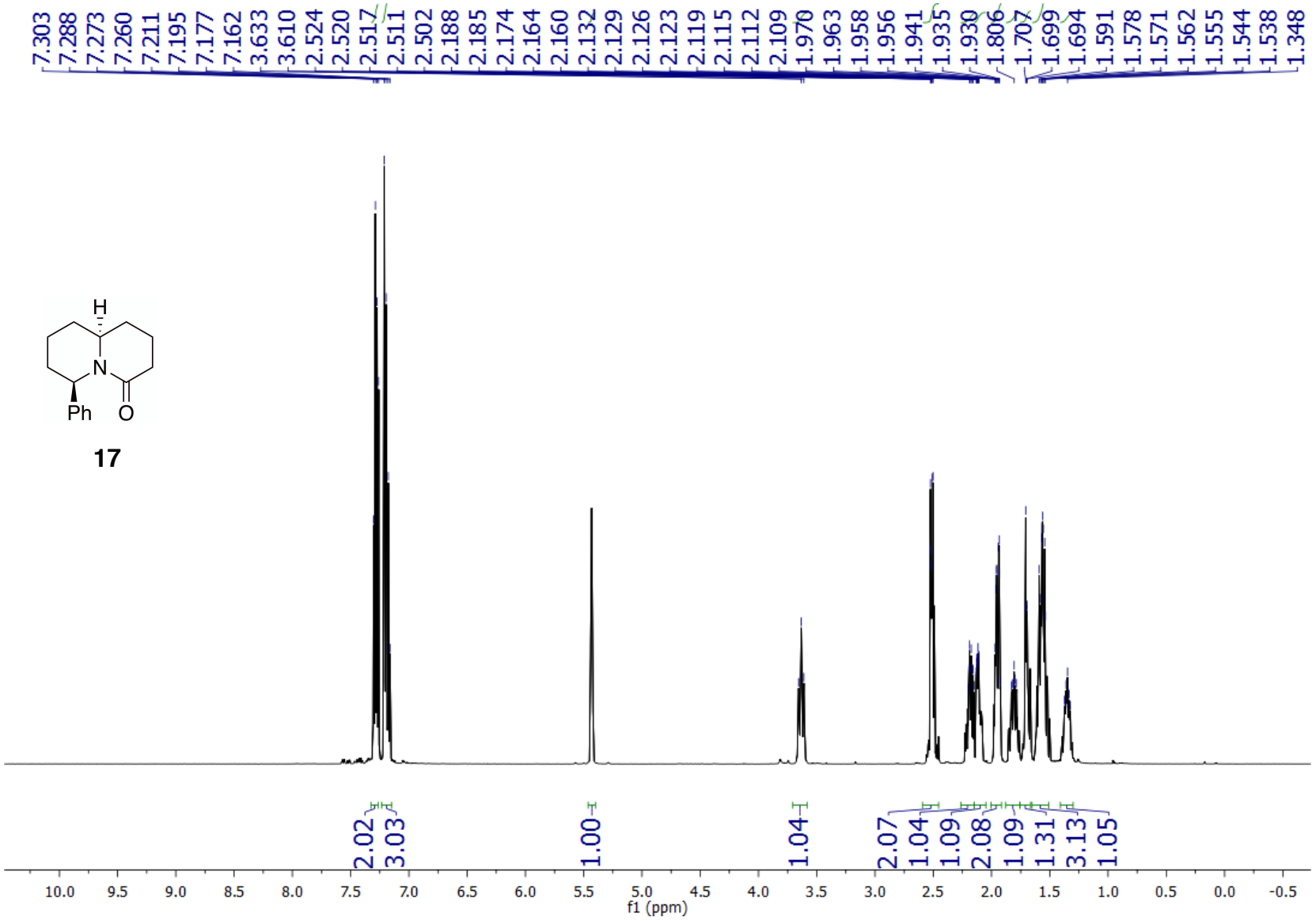
1.0
0.5
ppm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2.517
2.511
2.502
2.188
2.185
2.174
2.164
2.160
2.132
2.129
2.126
2.123
2.119
2.115
2.112
2.109
1.970
1.963
1.958
1.956
1.941
1.935
1.930
1.806
1.707
1.699
1.694
1.591
1.578
1.571
1.562
1.555
1.544
1.538
1.348
H
N
Ph
O
17
2.02
3.03
1.00
1.04
2.07
1.04
1.09
2.08
1.09
1.31
3.13
1.05
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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3.0
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0.5
0.0
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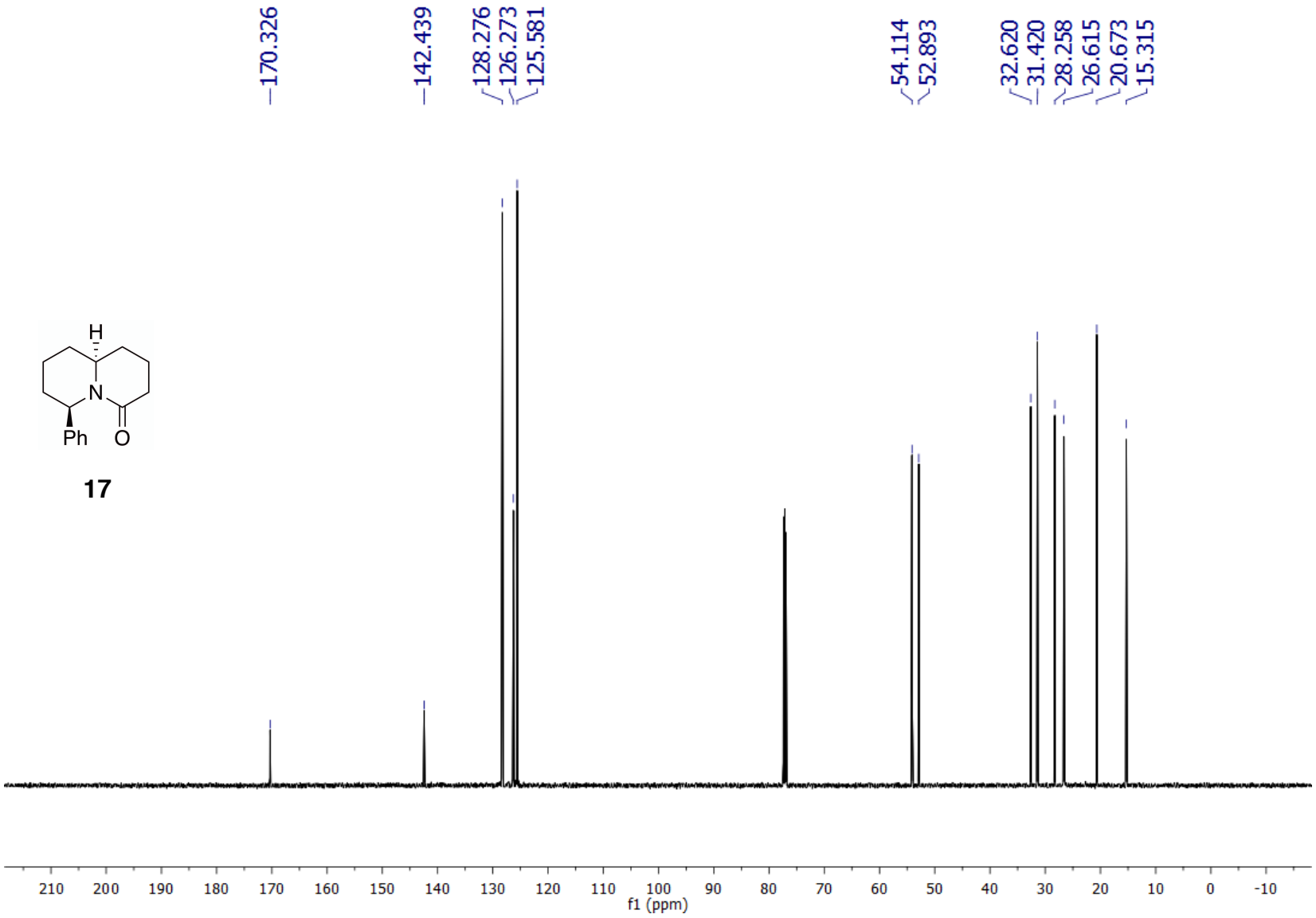
f1 (ppm)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54.114
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32.620
31.420
28.258
26.615
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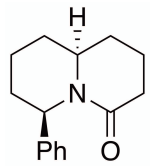
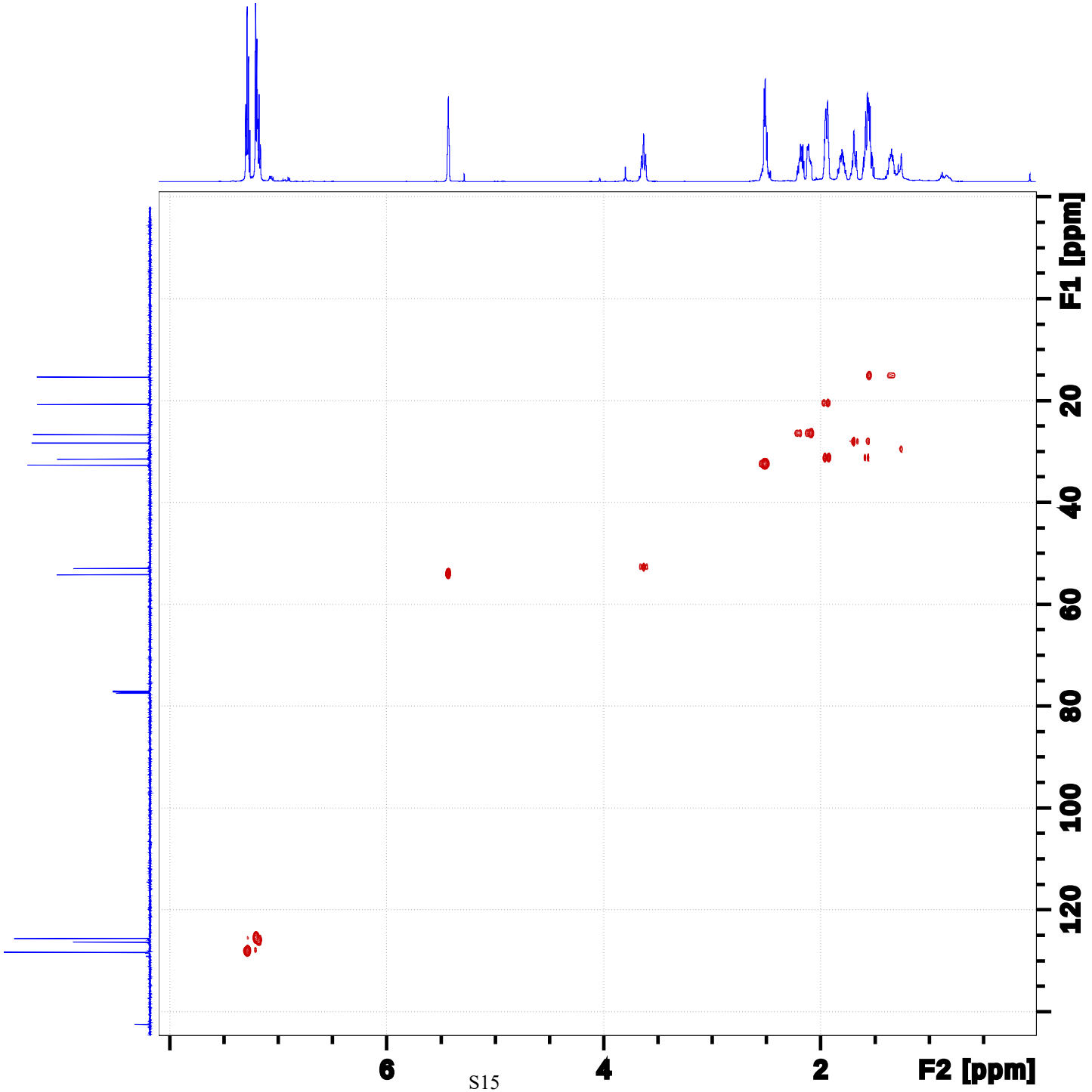
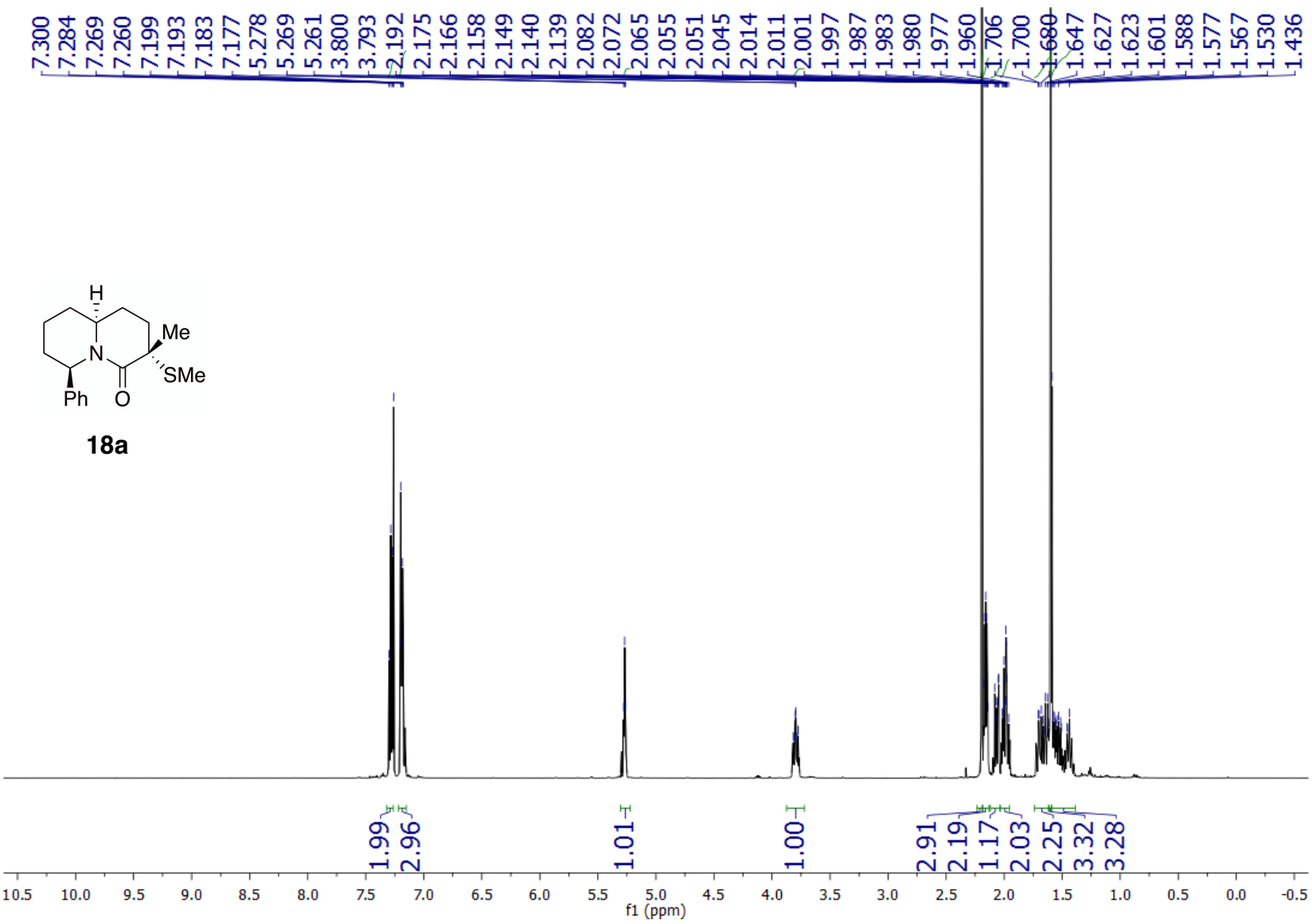
15.315
H
N
Ph
O
17
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)



17 (HMQC)

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2.192
2.175
2.166
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2.140
2.139
2.082
2.072
2.065
2.055
2.051
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N
Me
SMe
Ph
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1.00
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2.03
2.25
3.32
3.28
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6.0
5.5
5.0
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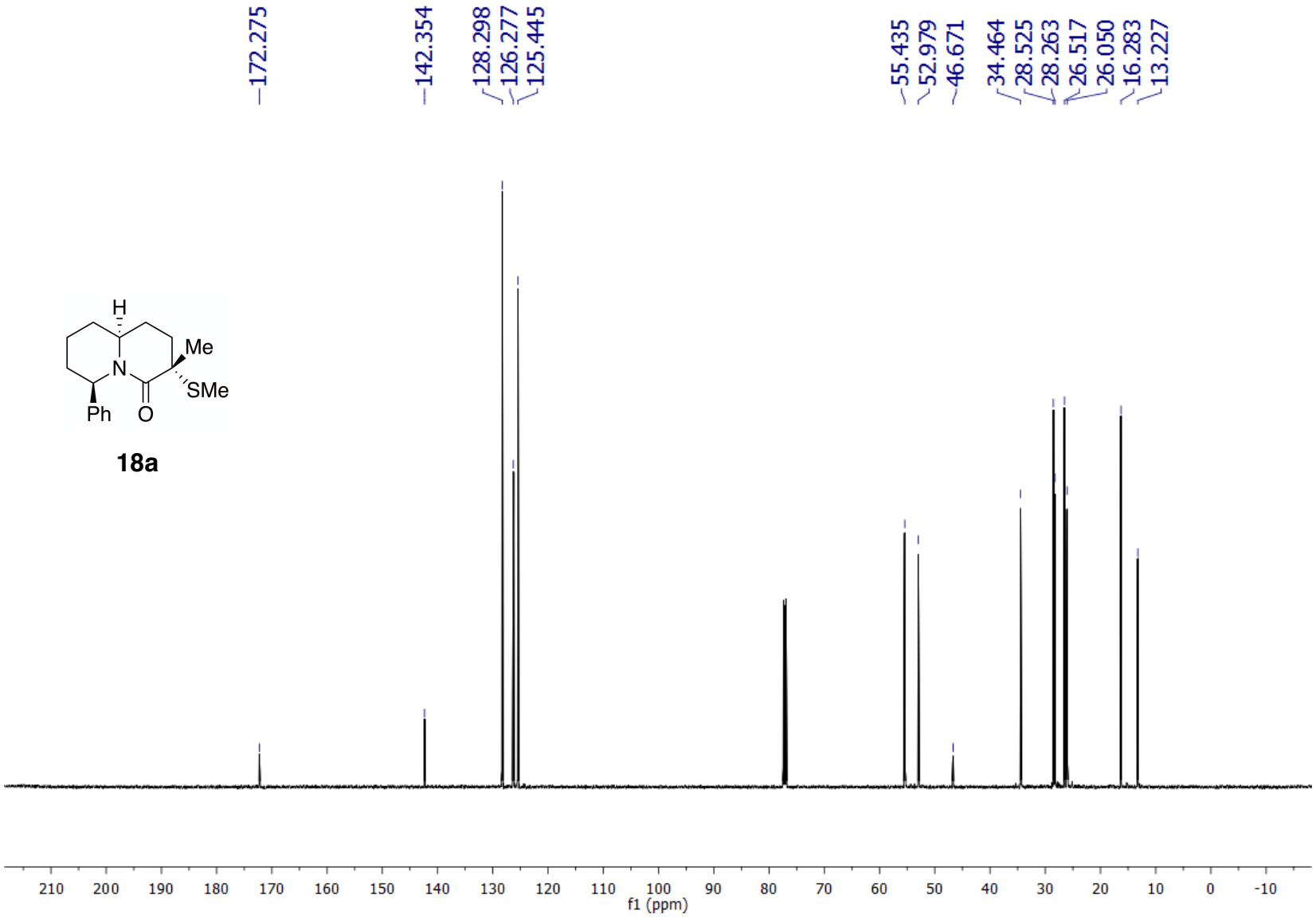
f1 (ppm)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26.050
16.283
13.227
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SMe
Ph
O
18a
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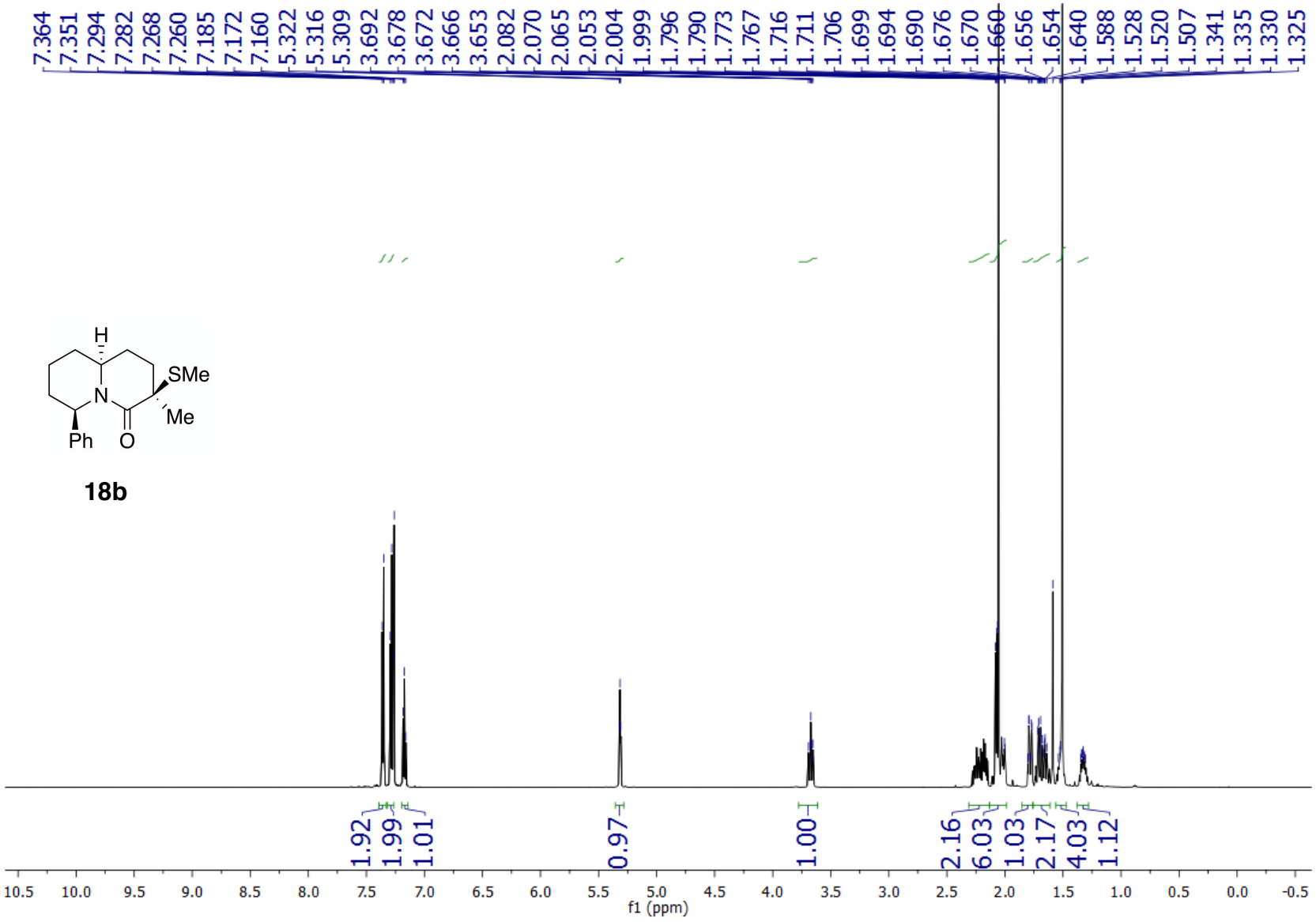
f1 (ppm)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3.672
3.666
3.653
2.082
2.070
2.065
2.053
2.004
1.999
1.796
1.790
1.773
1.767
1.716
1.711
1.706
1.699
1.694
1.690
1.676
1.670
1.660
1.656
1.654
1.640
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1.528
1.520
1.507
1.341
1.335
1.330
1.325
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N
SMe
Me
Ph
O
18b
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1.99
1.01
0.97
1.00
2.16
6.03
1.03
2.17
4.03
1.12
10.5
10.0
9.5
9.0
8.5
8.0
7.5
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6.5
6.0
5.5
5.0
4.5
4.0
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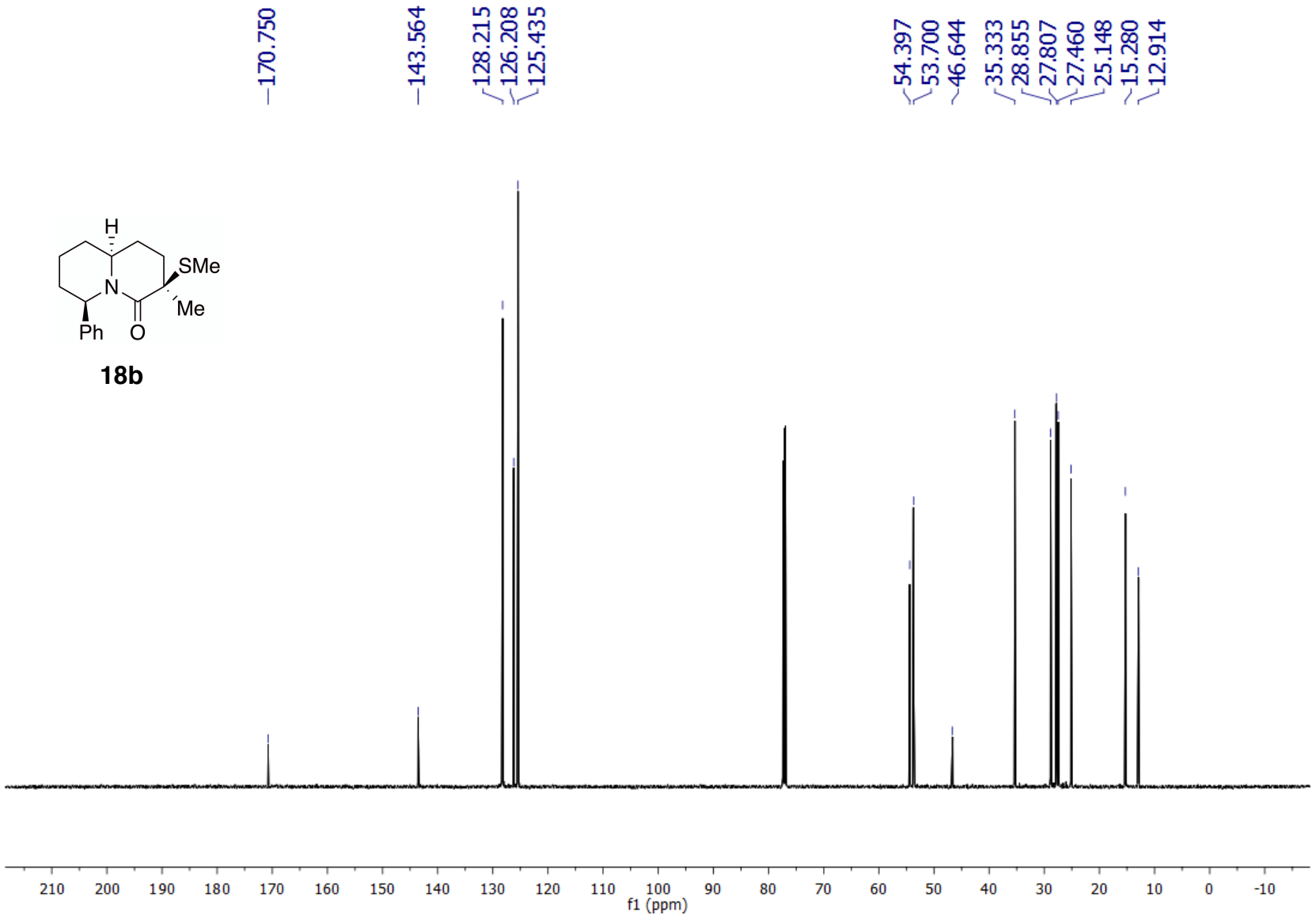
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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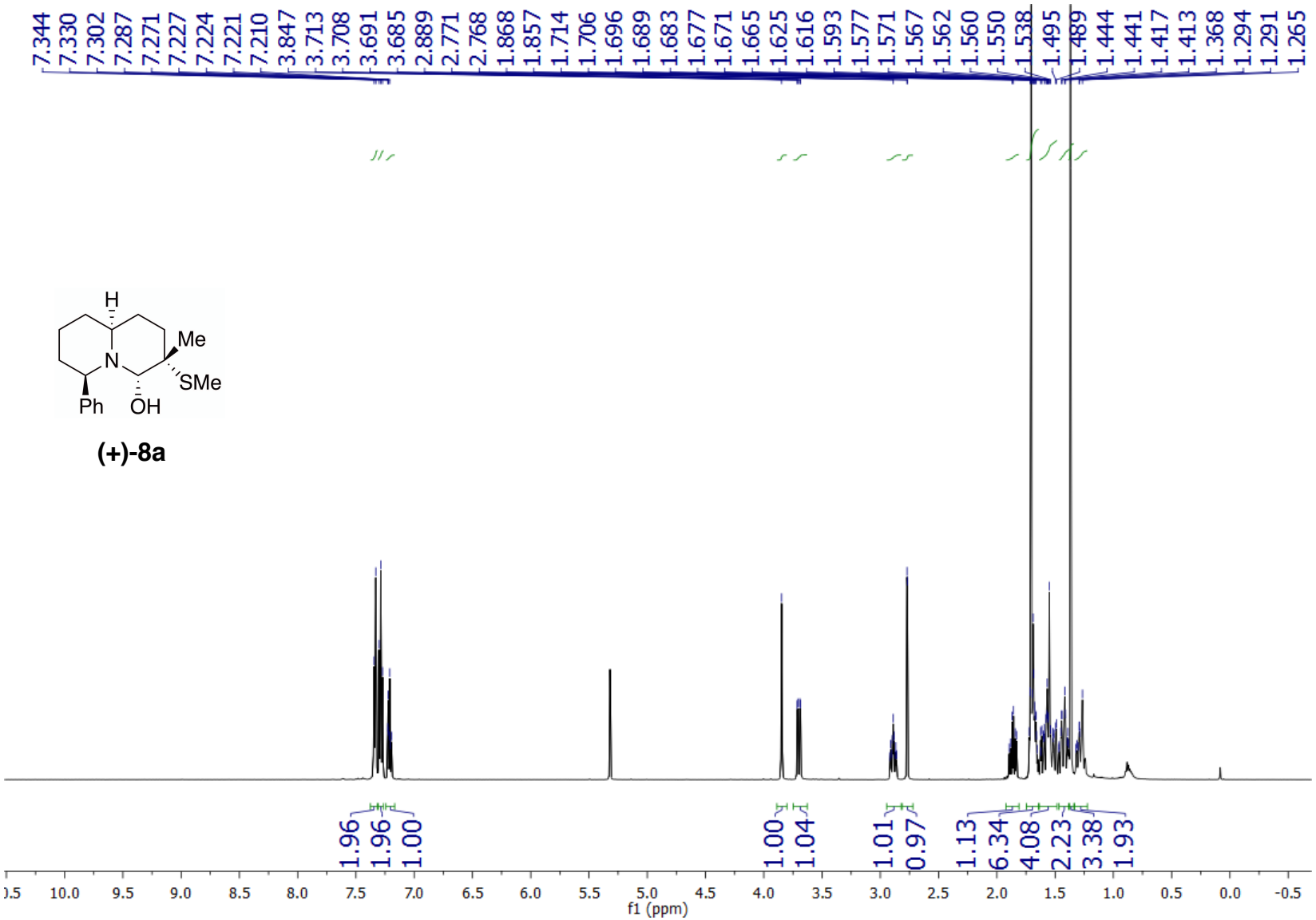
128.215
126.208
125.435
54.397
53.700
46.644
35.333
28.855
27.807
27.460
25.148
15.280
12.914
H
SMe
N
Me
Ph
O
18b
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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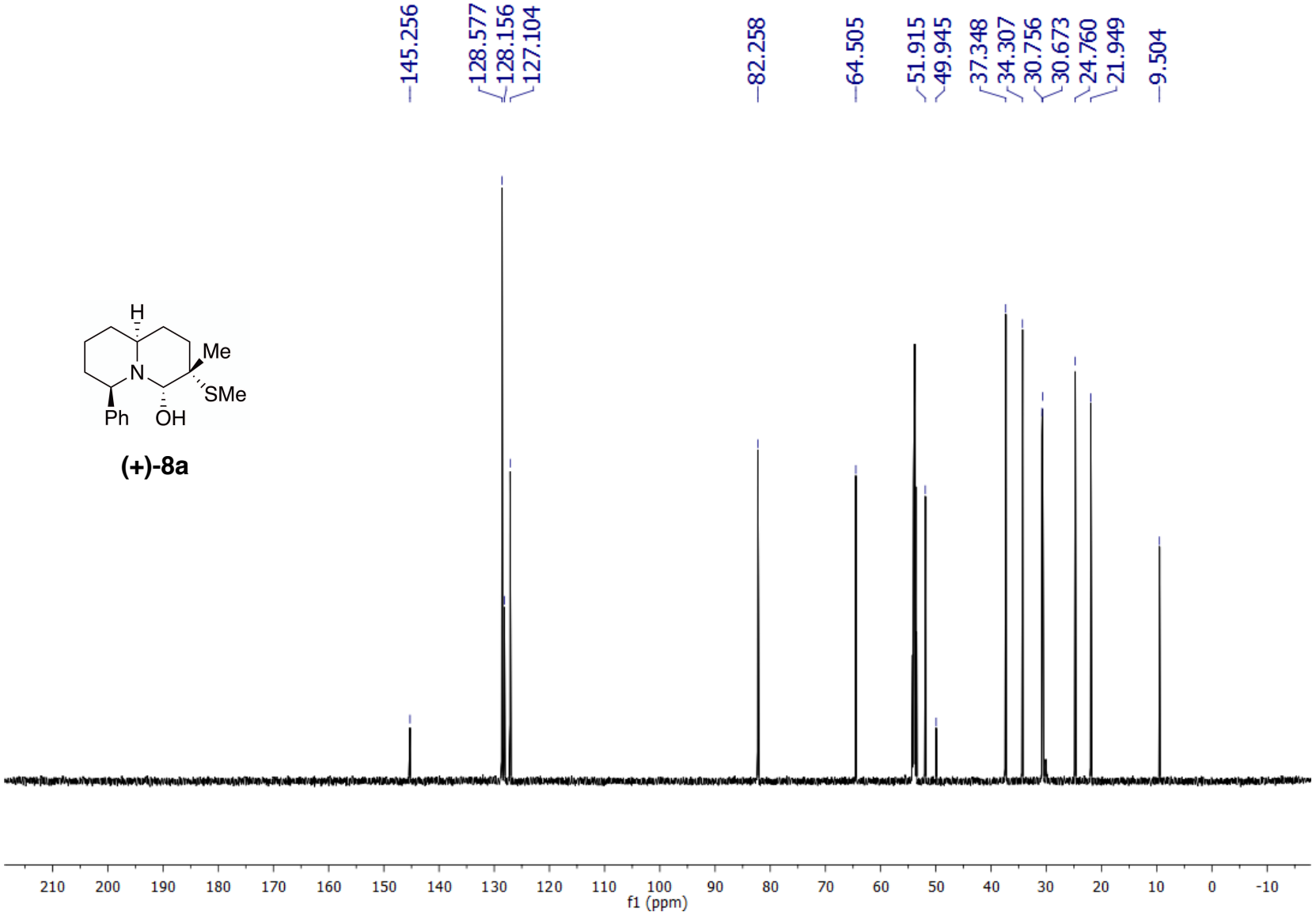
1.417
1.413
1.368
1.294
1.291
1.265
H
N
Me
SMe
Ph
OH
1.96
1.96
1.00
1.00
1.04
1.01
0.97
1.13
6.34
4.08
2.23
3.38
1.93
f1 (ppm)

(+)-8a


145.256
128.577
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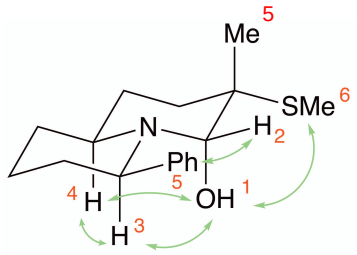
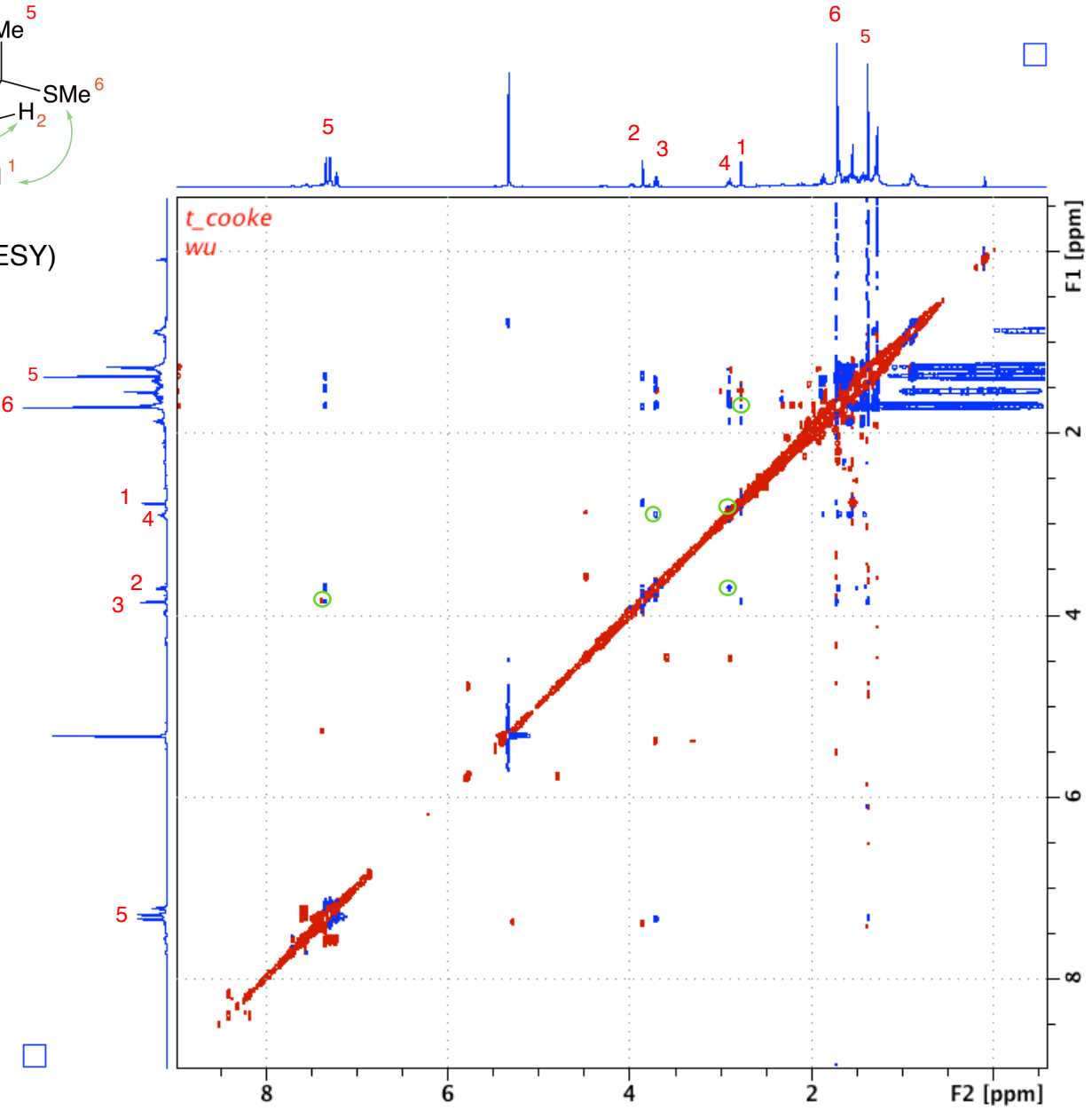
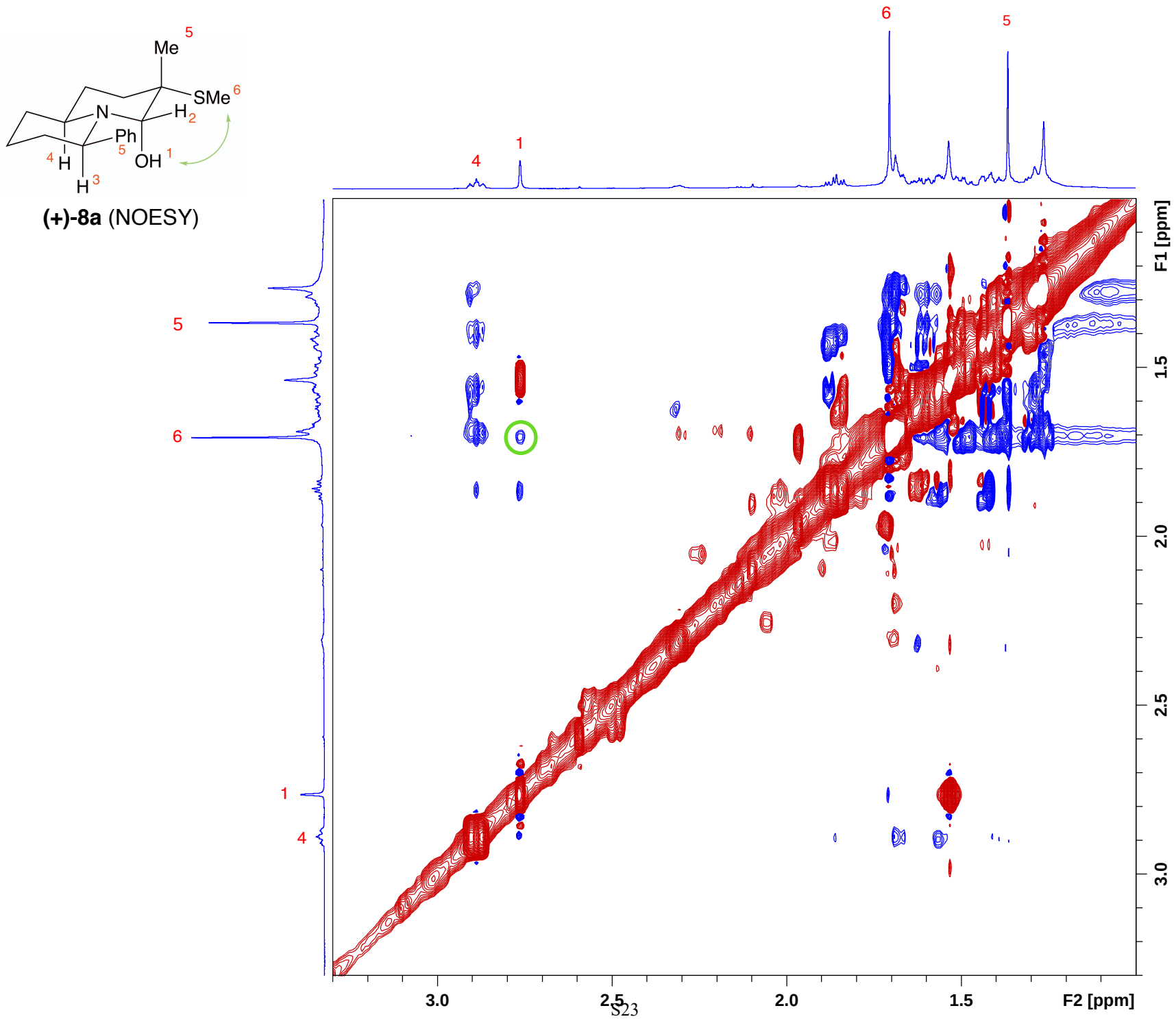
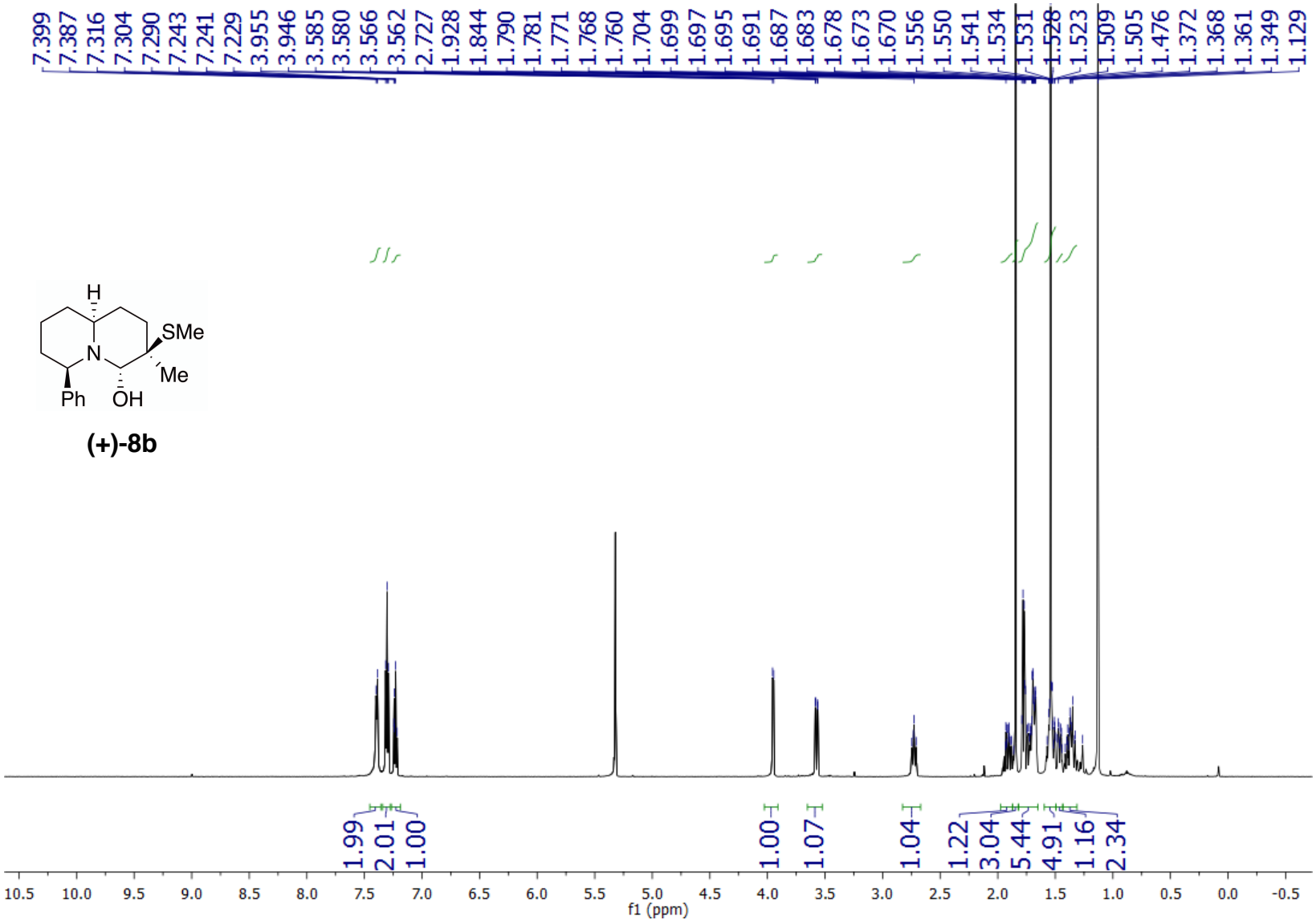
64.505
51.915
49.945
37.348
34.307
30.756
30.673
24.760
21.949
9.504
H
N
Me
SMe
Ph
OH
(+)-8a
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)



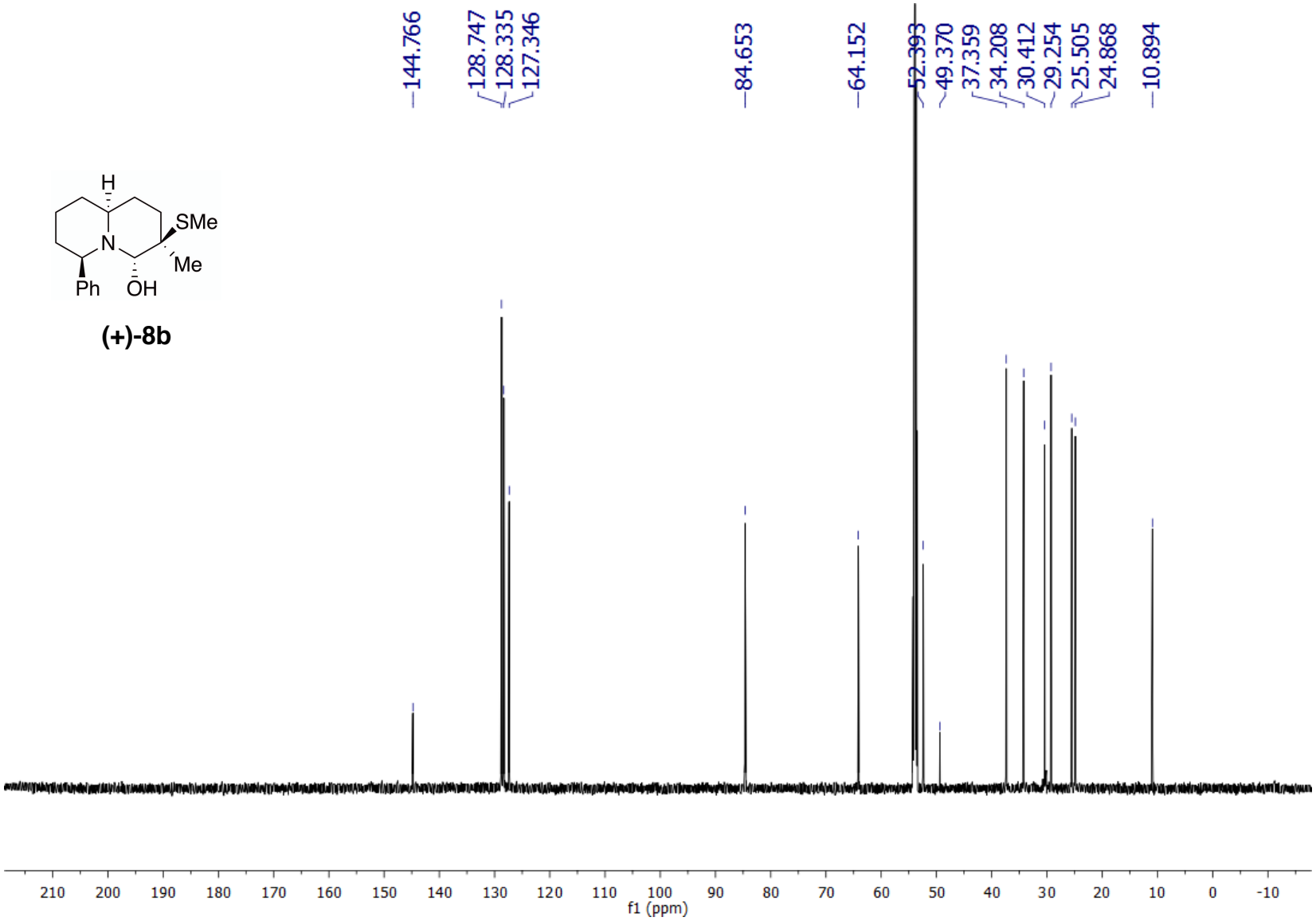
(+)-8a (NOESY)

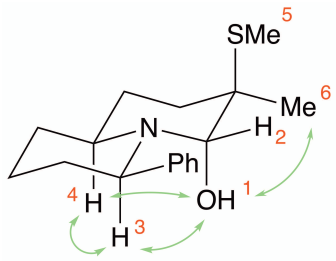



Me
5
SMe
6
N
H2
Ph
5
4
H
OH
1
H
3
(+)-8a (NOESY)
6
5
4
1
5
6
1
4
3.0
2.5
2.0
1.5
F2 [ppm]
F1 [ppm]
1.5
2.0
2.5
3.0

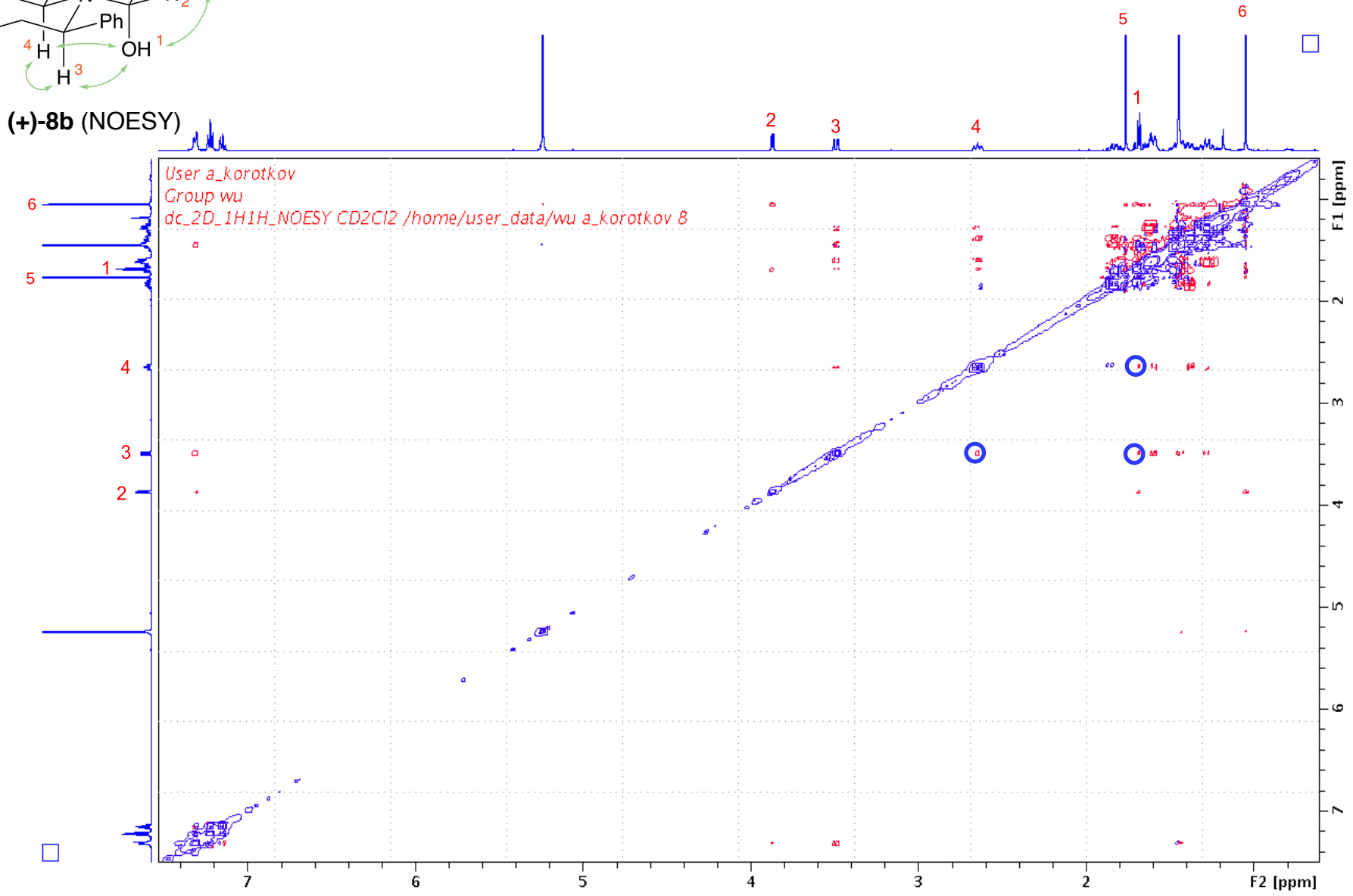

7.399
7.387
7.316
7.304
7.290
7.243
7.241
7.229
3.955
3.946
3.585
3.580
3.566
3.562
2.727
1.928
1.844
1.790
1.781
1.771
1.768
1.760
1.704
1.699
1.697
1.695
1.691
1.687
1.683
1.678
1.673
1.670
1.556
1.550
1.541
1.534
1.531
1.528
1.523
1.509
1.505
1.476
1.372
1.368
1.361
1.349
1.129
H
N
SMe
Me
Ph
OH
1.99
2.01
1.00
1.00
1.07
1.04
1.22
3.04
5.44
4.91
1.16
2.34
10.5
10.0
9.5
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
f1 (ppm)

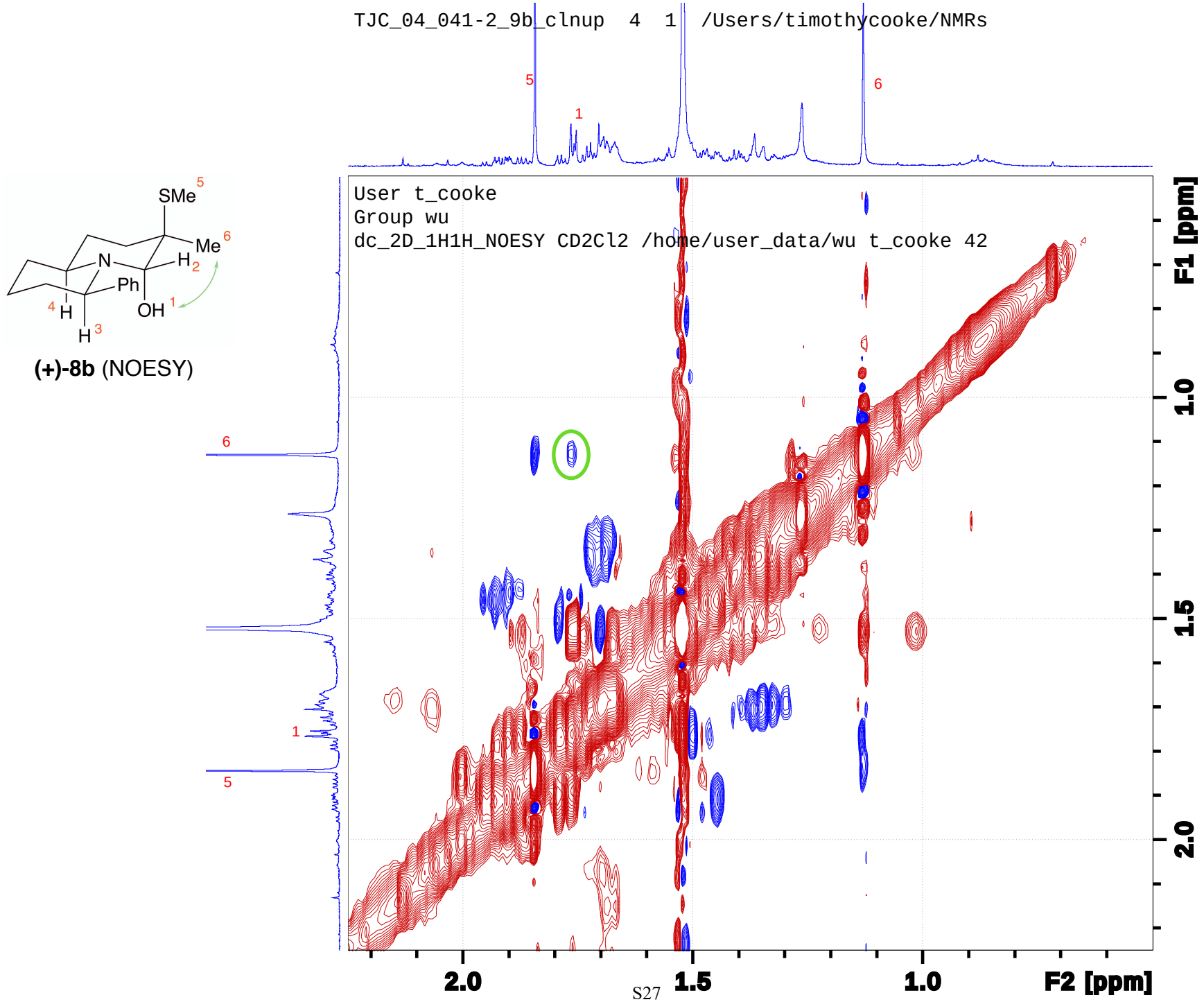
(+)-8b

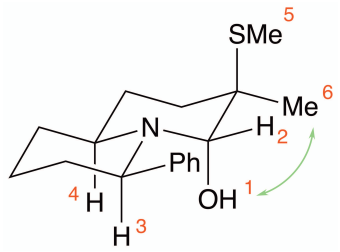

144.766
128.747
128.335
127.346
84.653
64.152
52.393
49.370
37.359
34.208
30.412
29.254
25.505
24.868
10.894
H
SMe
N
Me
Ph
OH
(+)-8b
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


SMe
5
Me
6
N
H
2
Ph
OH
1
4
H
H
3

(+)-8b (NOESY)


User a_korotkov
Group wu
dc_2D_1H1H_NOESY CD2Cl2 /home/user_data/wu a_korotkov 8
F1 [ppm]
F2 [ppm]


TJC_04_041-2_9b_clnup 4 1 /Users/timothycooke/NMRs
User t_cooke
Group wu
dc_2D_1H1H_NOESY CD2Cl2 /home/user_data/wu t_cooke 42
SMe
Me
N
Ph
OH
H
H2
H3
4
5
6
1
(+)-8b (NOESY)
F1 [ppm]
F2 [ppm]
1.0
1.5
2.0

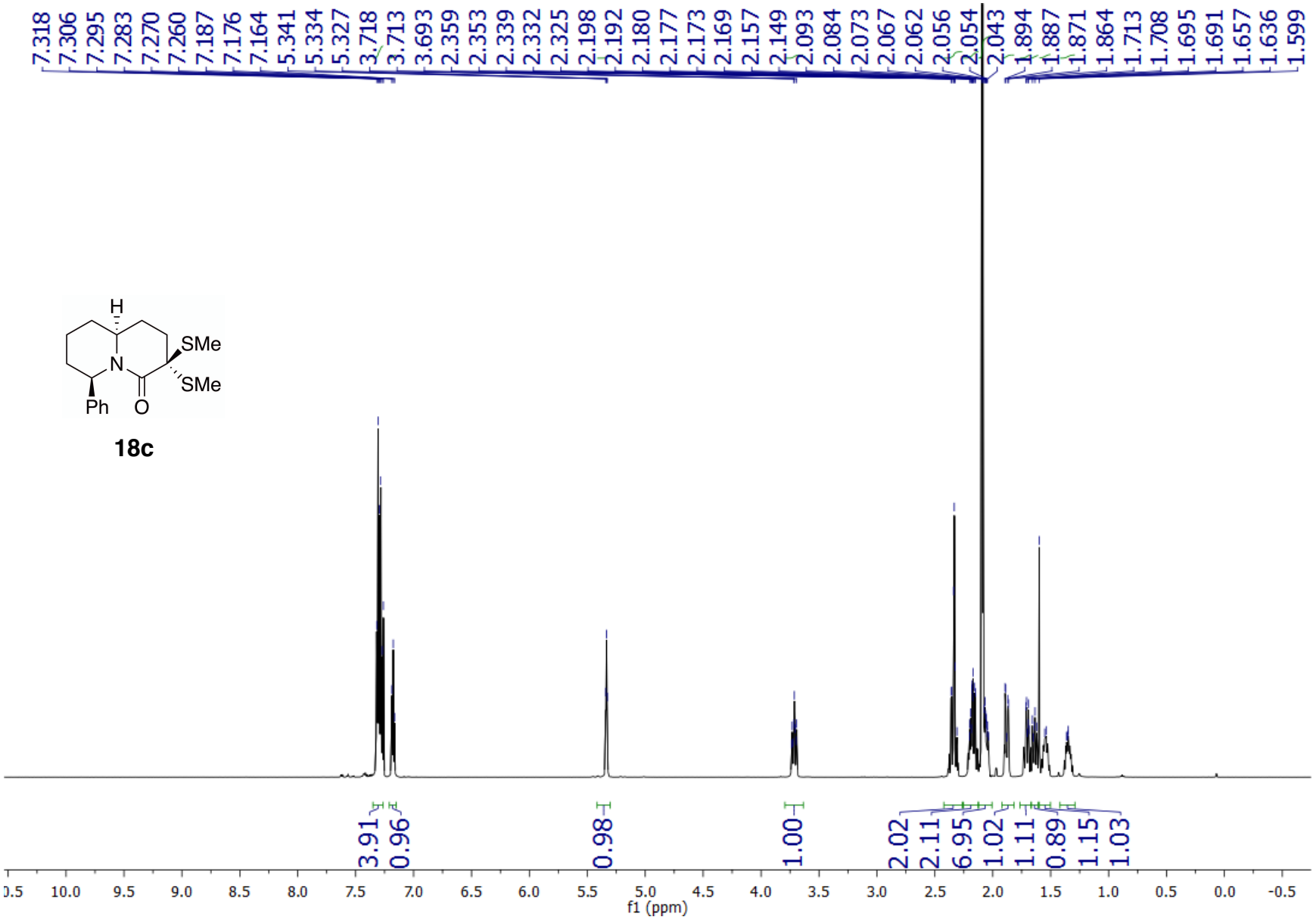


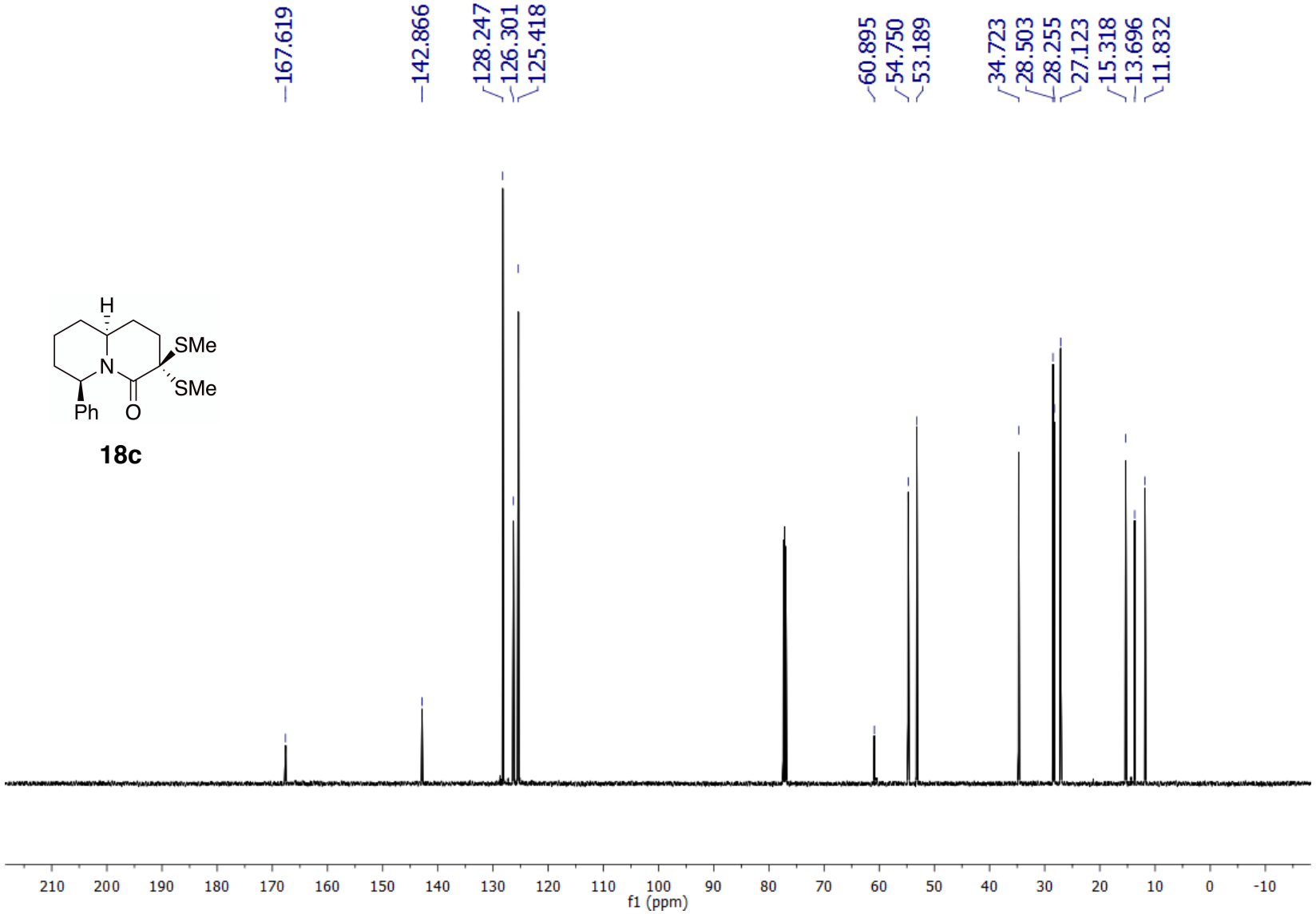
(+)-8b (NOESY)
negative phase removed
for clarity only

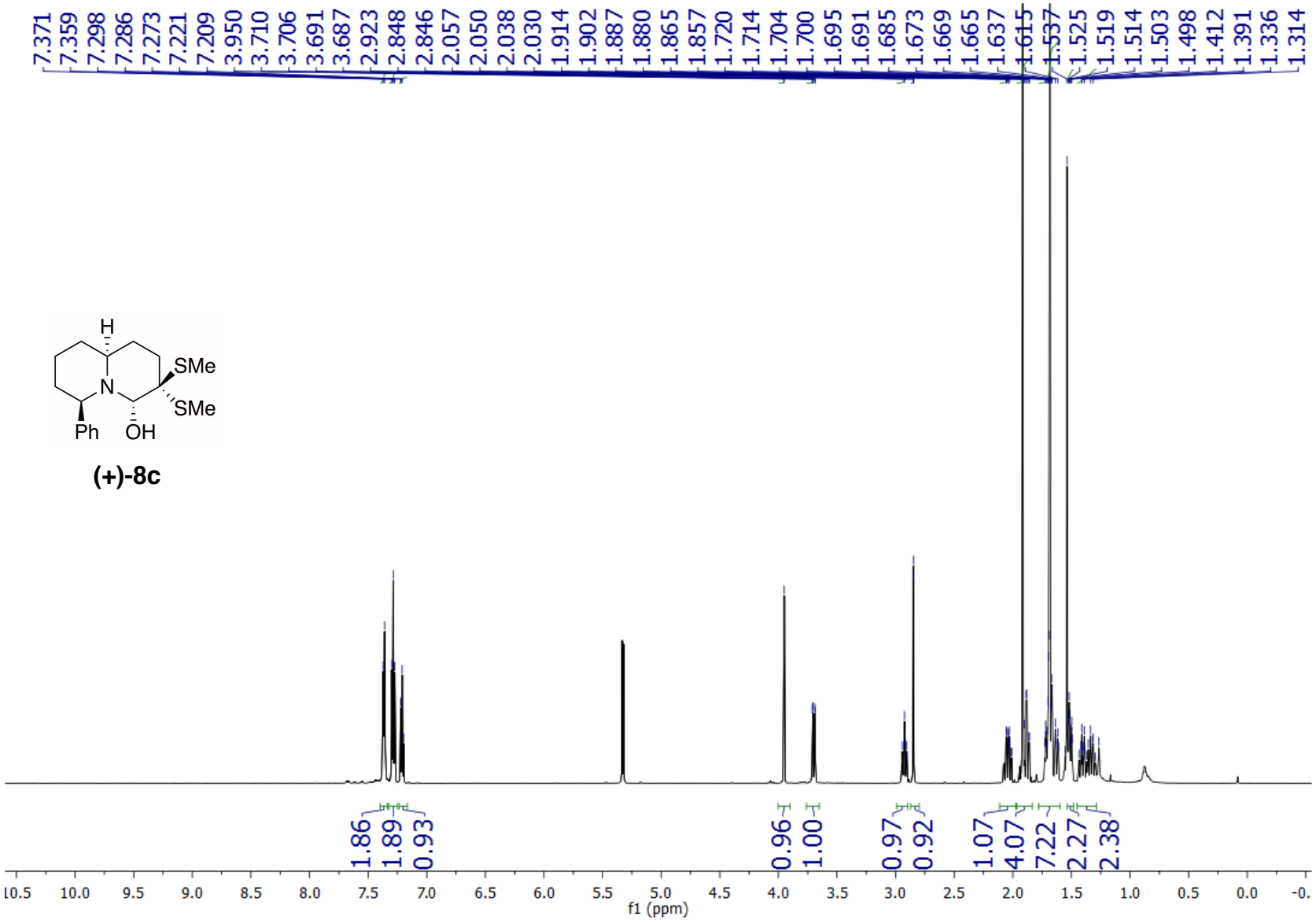
User t_cooke
Group wu
dc_2D_1H1H_NOESY CD2Cl2 /home/user_data/wu t_cooke 42

F1 artifact, as indicated by missing reciprocal signal

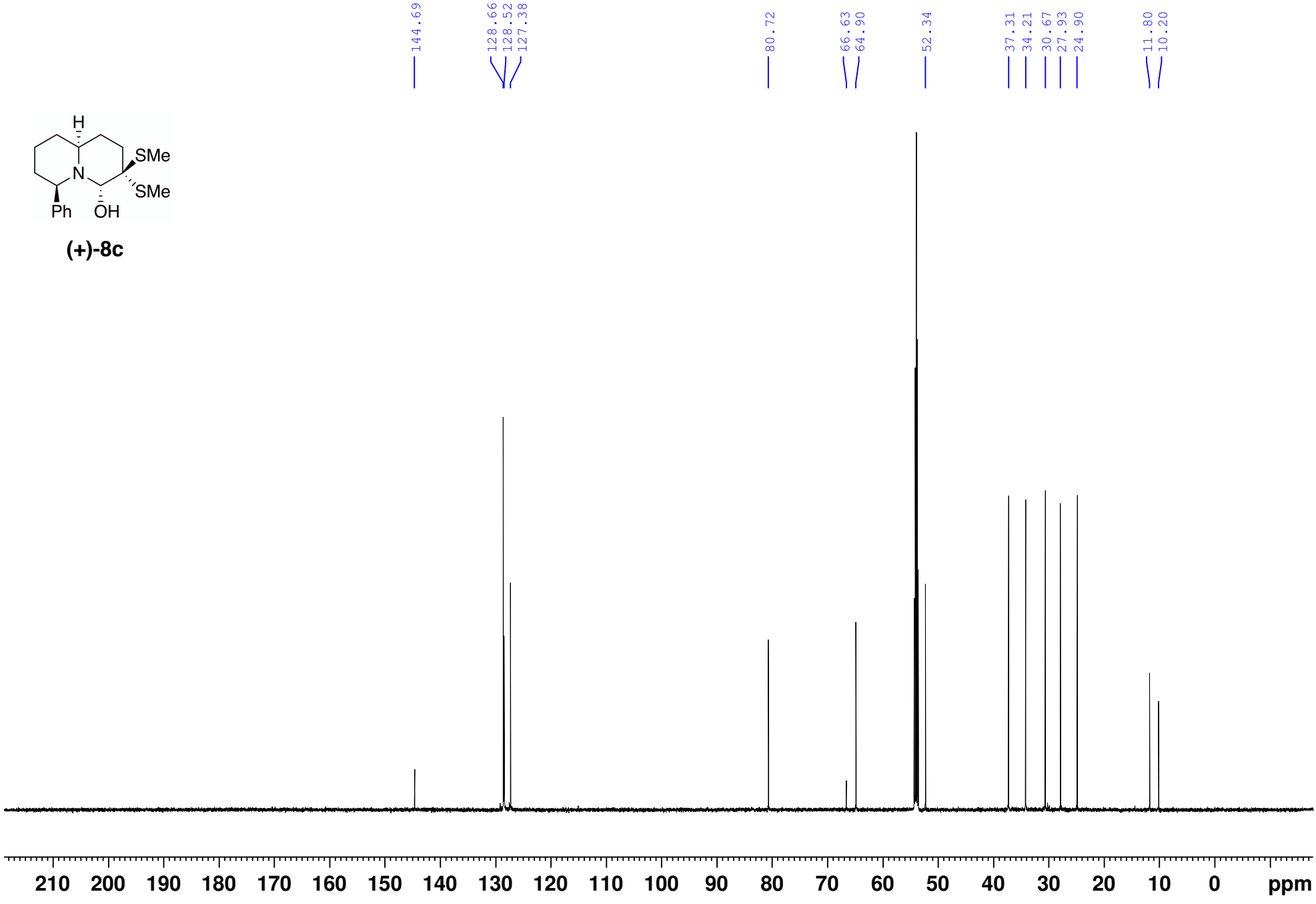
F1 [ppm]
F2 [ppm]

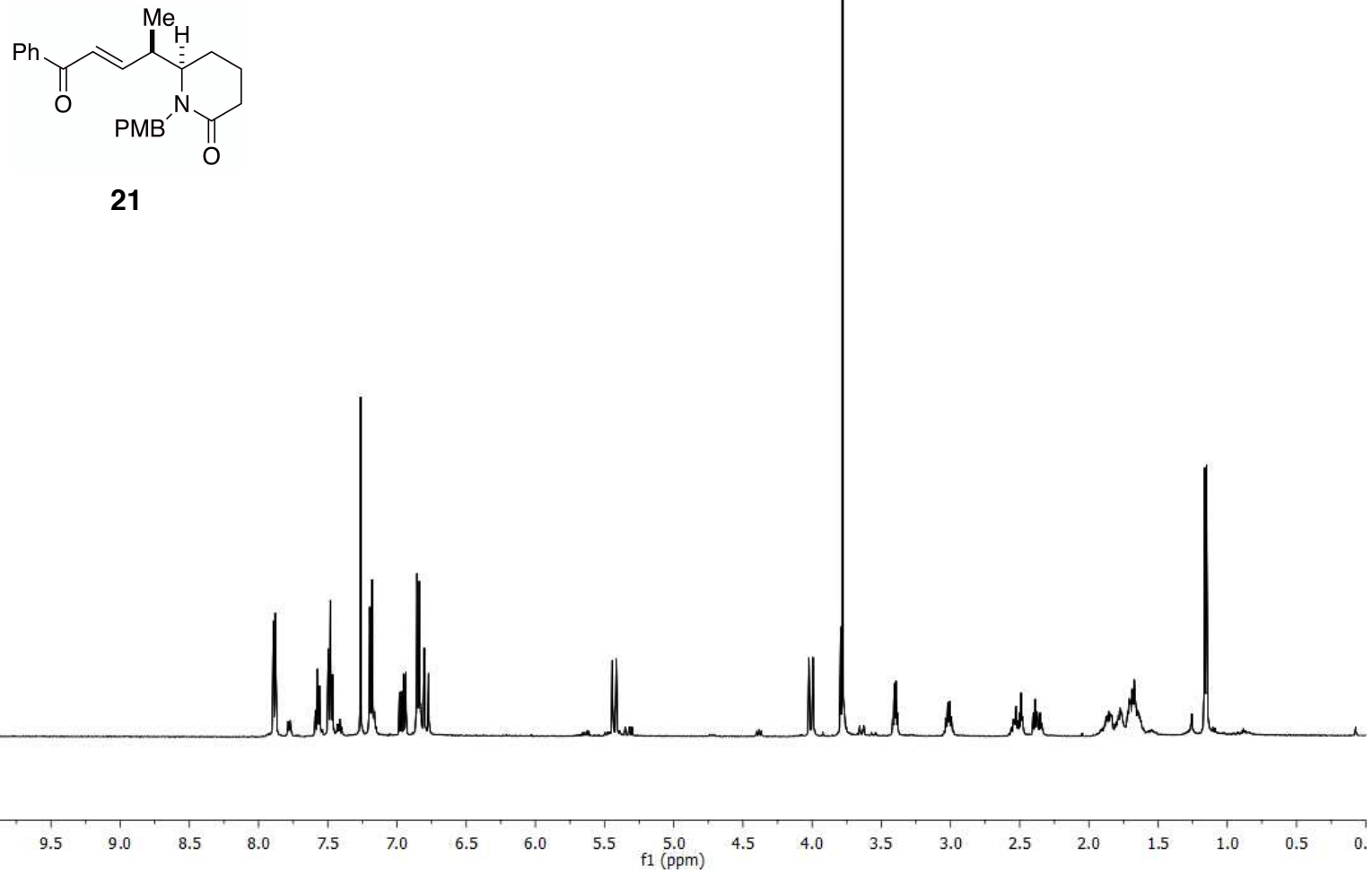

7.318
7.306
7.295
7.283
7.270
7.260
7.187
7.176
7.164
5.341
5.334
5.327
3.718
3.713
3.693
2.359
2.353
2.339
2.332
2.325
2.198
2.192
2.180
2.177
2.173
2.169
2.157
2.149
2.093
2.084
2.073
2.067
2.062
2.056
2.054
2.043
1.894
1.887
1.871
1.864
1.713
1.708
1.695
1.691
1.657
1.636
1.599
H
N
SMe
SMe
Ph
O
18c
3.91
0.96
0.98
1.00
2.02
2.11
6.95
1.02
1.11
0.89
1.15
1.03
f1 (ppm)


167.619
142.866
128.247
126.301
125.418
60.895
54.750
53.189
34.723
28.503
28.255
27.123
15.318
13.696
11.832
H
N
SMe
SMe
Ph
O
18c
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

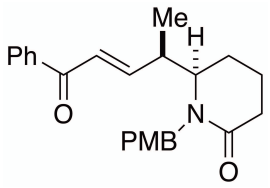

7.371
7.359
7.298
7.286
7.273
7.221
7.209
3.950
3.710
3.706
3.691
3.687
2.923
2.848
2.846
2.057
2.050
2.038
2.030
1.914
1.902
1.887
1.880
1.865
1.857
1.720
1.714
1.704
1.700
1.695
1.691
1.685
1.673
1.669
1.665
1.637
1.615
1.537
1.525
1.519
1.514
1.503
1.498
1.412
1.391
1.336
1.314
H
N
SMe
SMe
Ph
OH
1.86
1.89
0.93
0.96
1.00
0.97
0.92
1.07
4.07
7.22
2.27
2.38
f1 (ppm)

(+)-8c

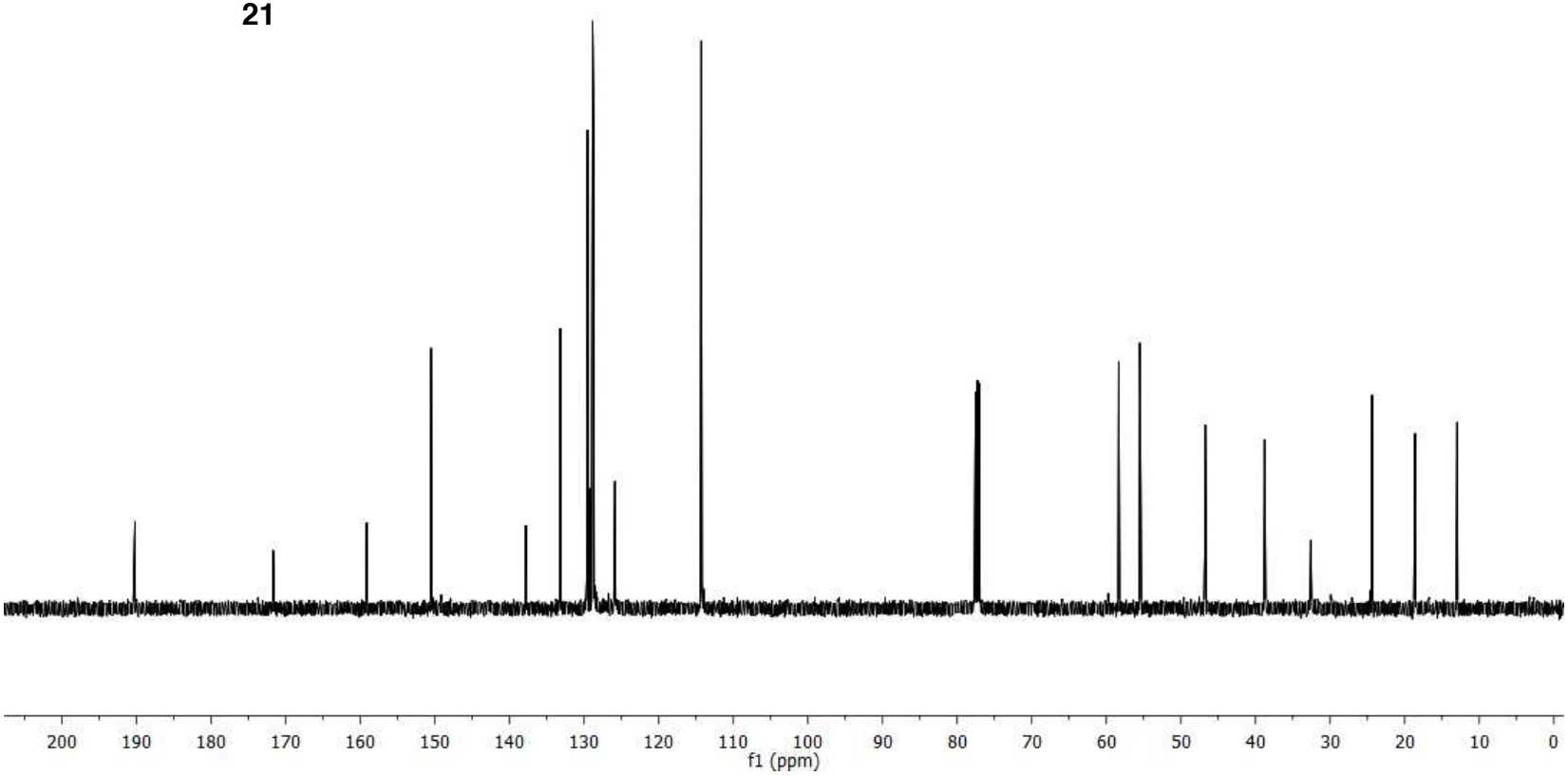

144.69
128.66
128.52
127.38
80.72
66.63
64.90
52.34
37.31
34.21
30.67
27.93
24.90
11.80
10.20
H
N
SMe
SMe
Ph
OH
(+)-8c
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

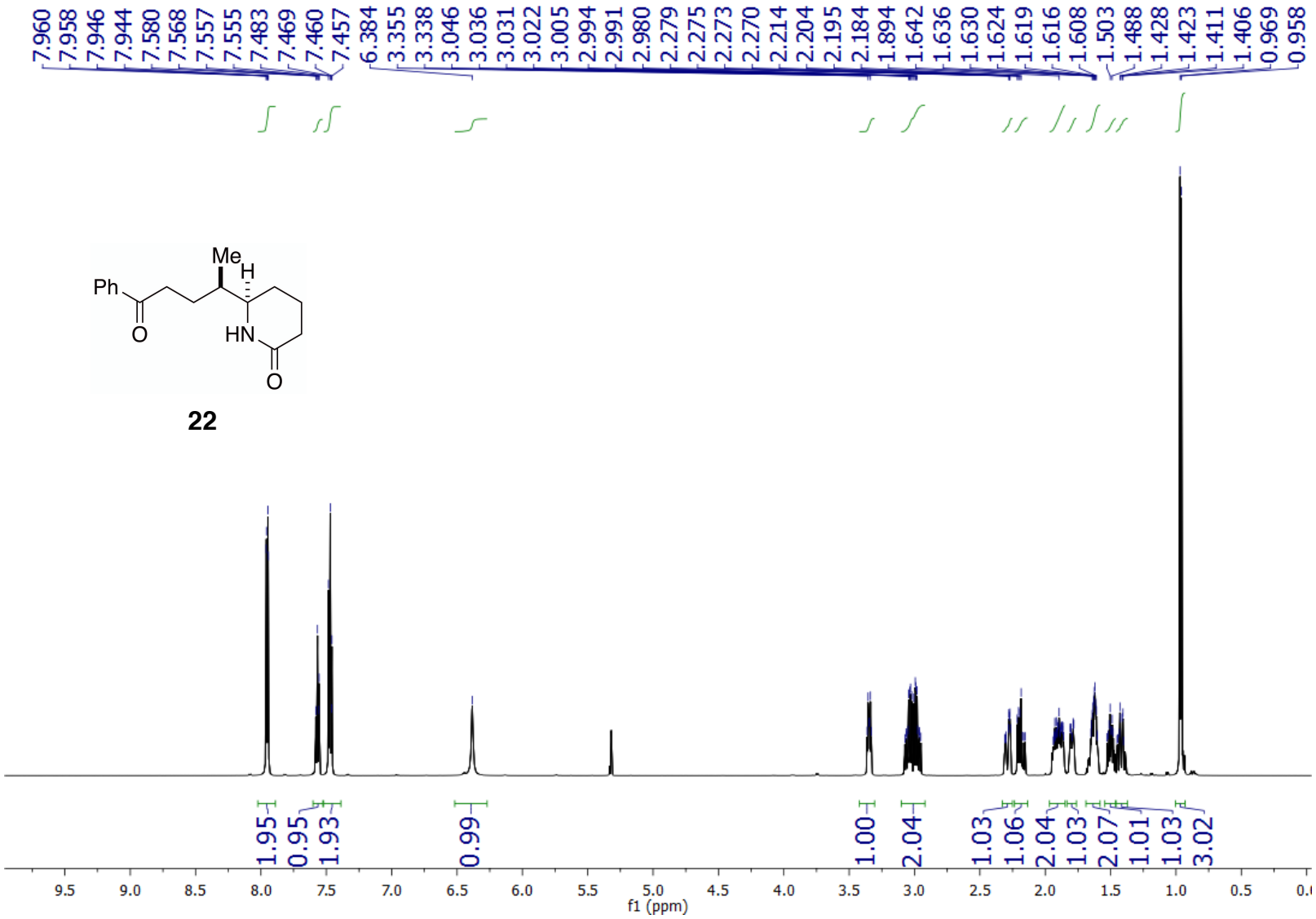

Me
H
Ph
O
N
PMB
O
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

21

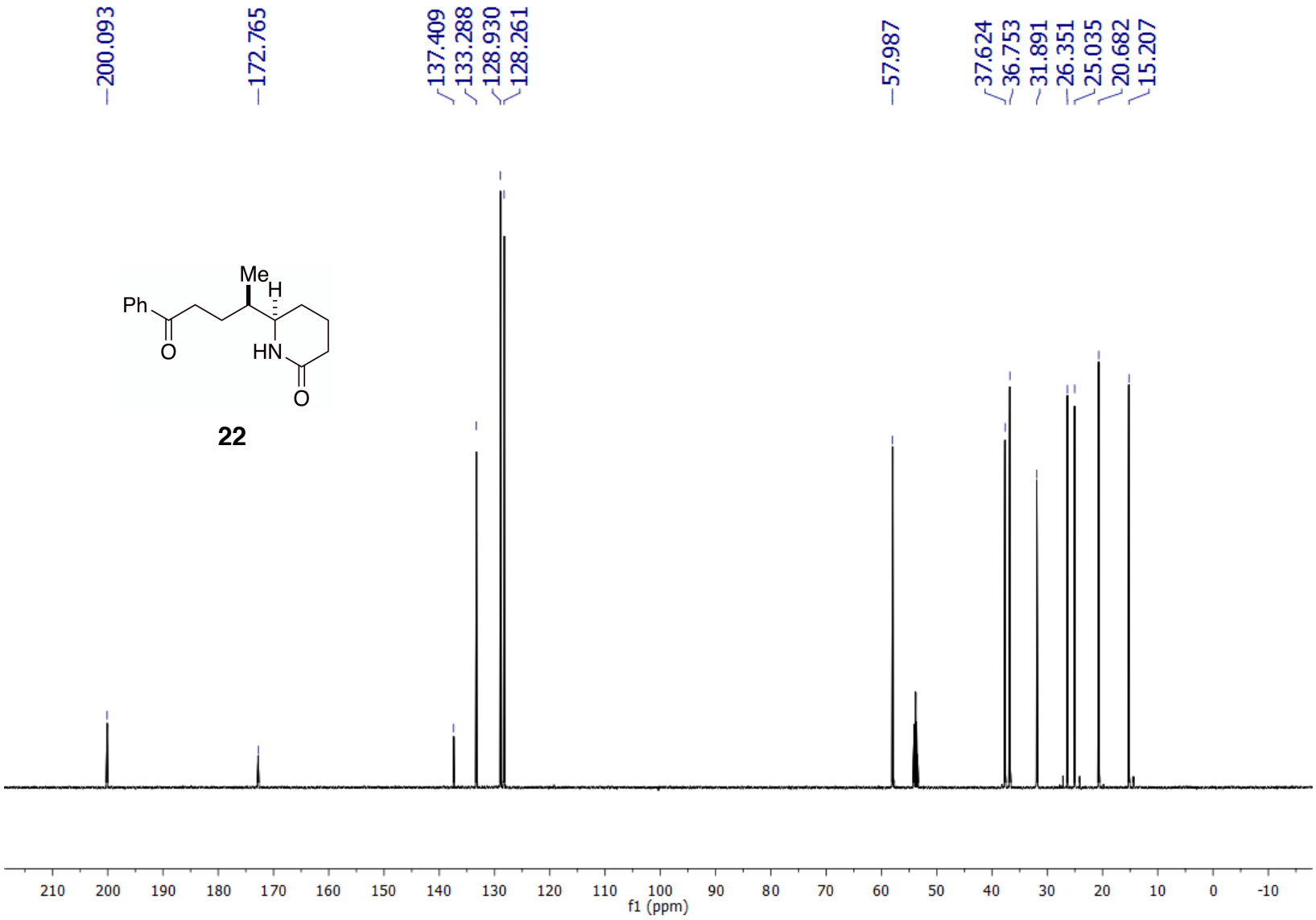

Me
H
Ph
O
N
PMB
O

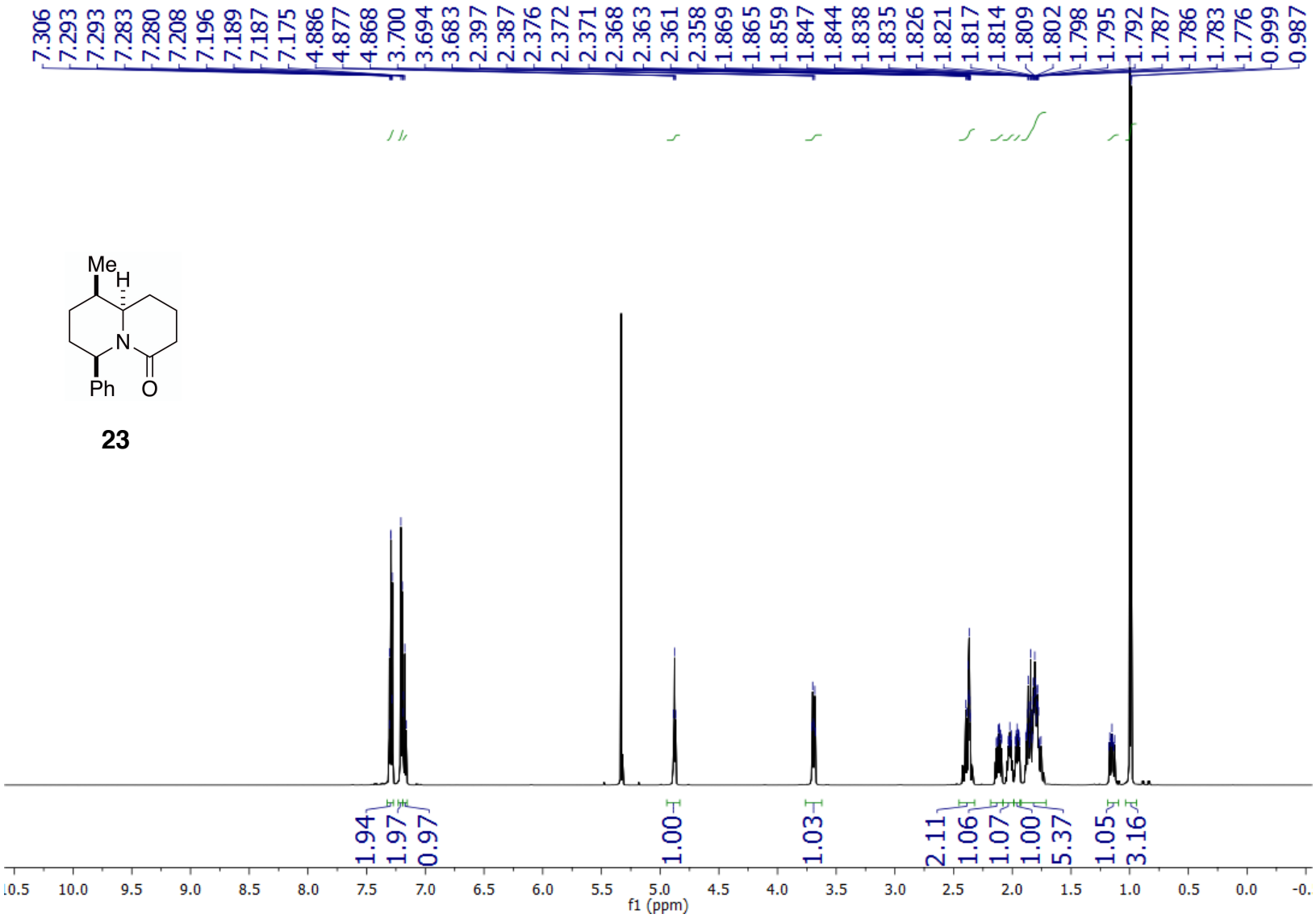
21


200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

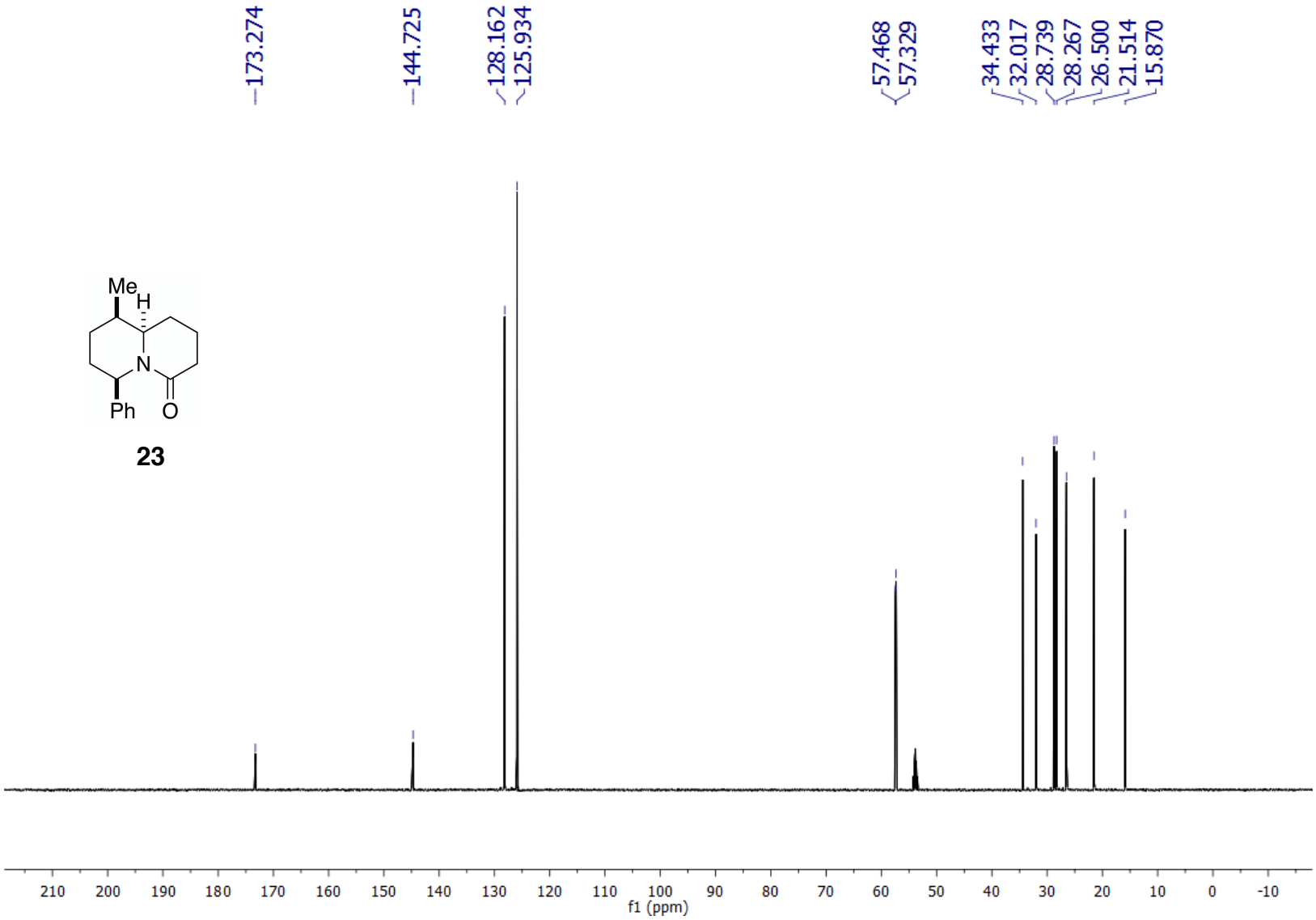

7.960
7.958
7.946
7.944
7.580
7.568
7.557
7.555
7.483
7.469
7.460
7.457
6.384
3.355
3.338
3.046
3.036
3.031
3.022
3.005
2.994
2.991
2.980
2.279
2.275
2.273
2.270
2.214
2.204
2.195
2.184
1.894
1.642
1.636
1.630
1.624
1.619
1.616
1.608
1.503
1.488
1.428
1.423
1.411
1.406
0.969
0.958
Me
H
Ph
O
HN
O
1.95
0.95
1.93
0.99
1.00
2.04
1.03
1.06
2.04
1.03
2.07
1.01
1.03
3.02
9.5
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
f1 (ppm)

22

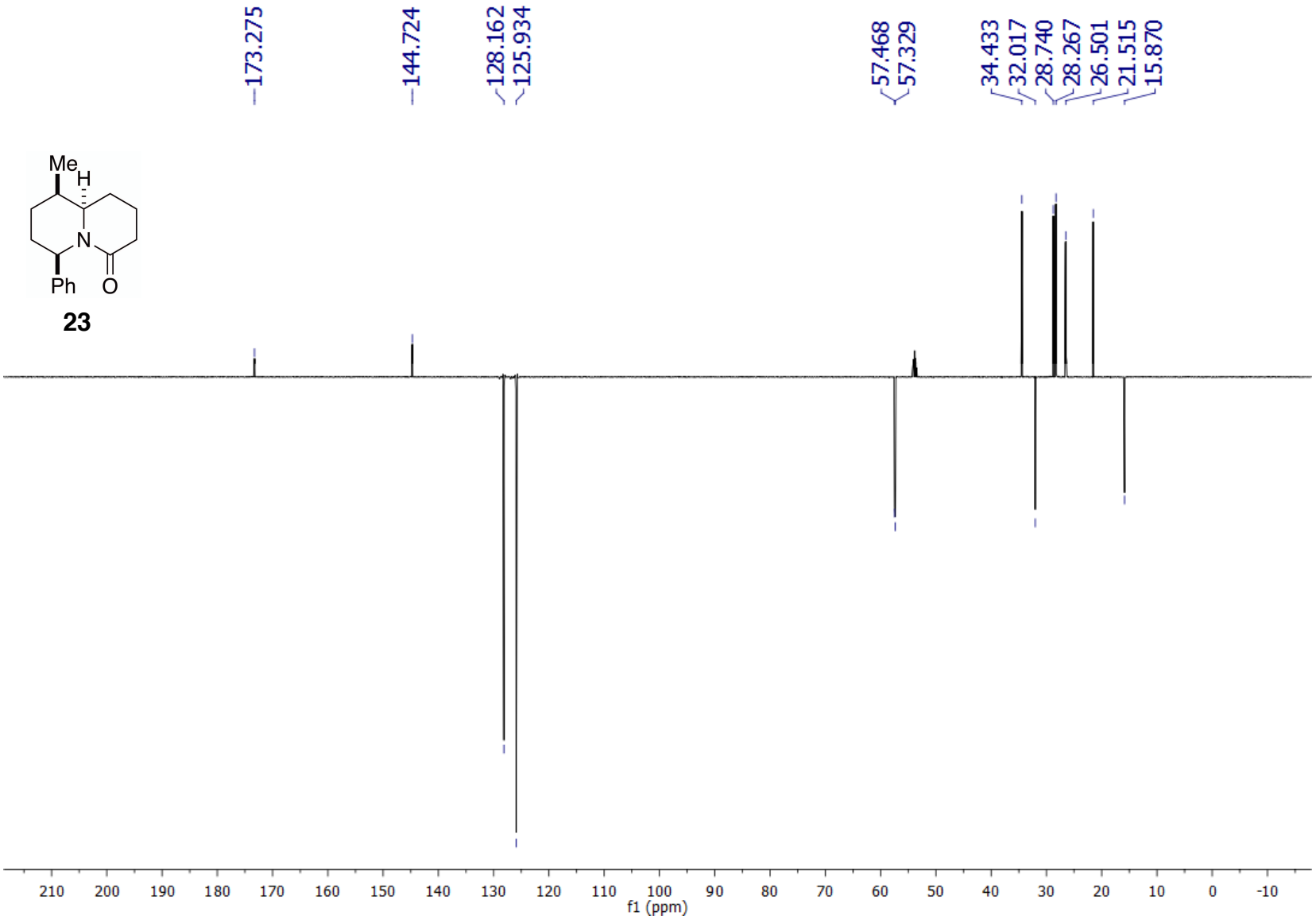

200.093
172.765
137.409
133.288
128.930
128.261
57.987
37.624
36.753
31.891
26.351
25.035
20.682
15.207
Me
H
Ph
O
HN
O
22
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

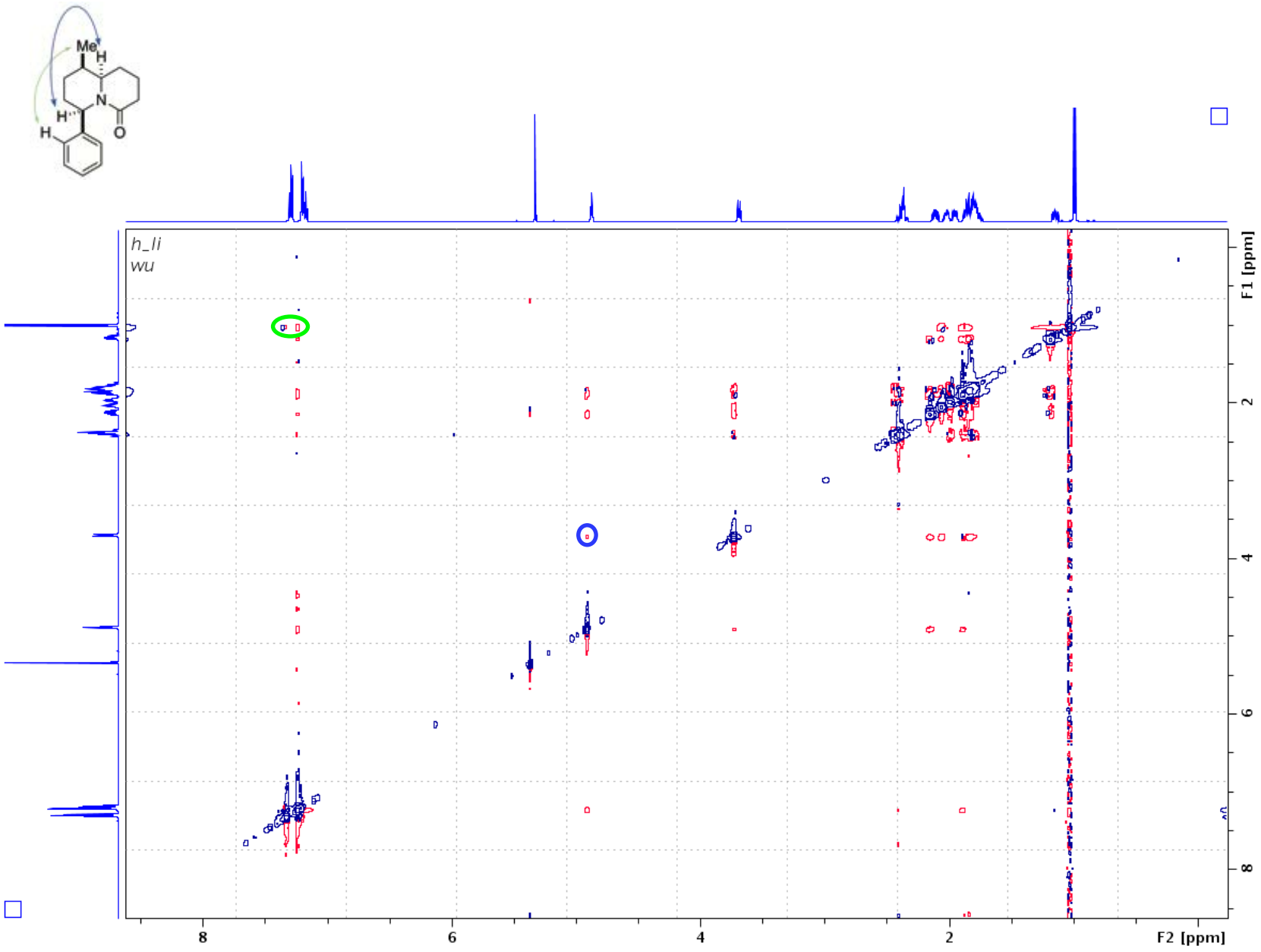

7.306
7.293
7.293
7.283
7.280
7.208
7.196
7.189
7.187
7.175
4.886
4.877
4.868
3.700
3.694
3.683
2.397
2.387
2.376
2.372
2.371
2.368
2.363
2.361
2.358
1.869
1.865
1.859
1.847
1.844
1.838
1.835
1.826
1.821
1.817
1.814
1.809
1.802
1.798
1.795
1.792
1.787
1.786
1.783
1.776
0.999
0.987
Me
H
N
Ph
O
1.94
1.97
0.97
1.00
1.03
2.11
1.06
1.07
1.00
5.37
1.05
3.16
f1 (ppm)

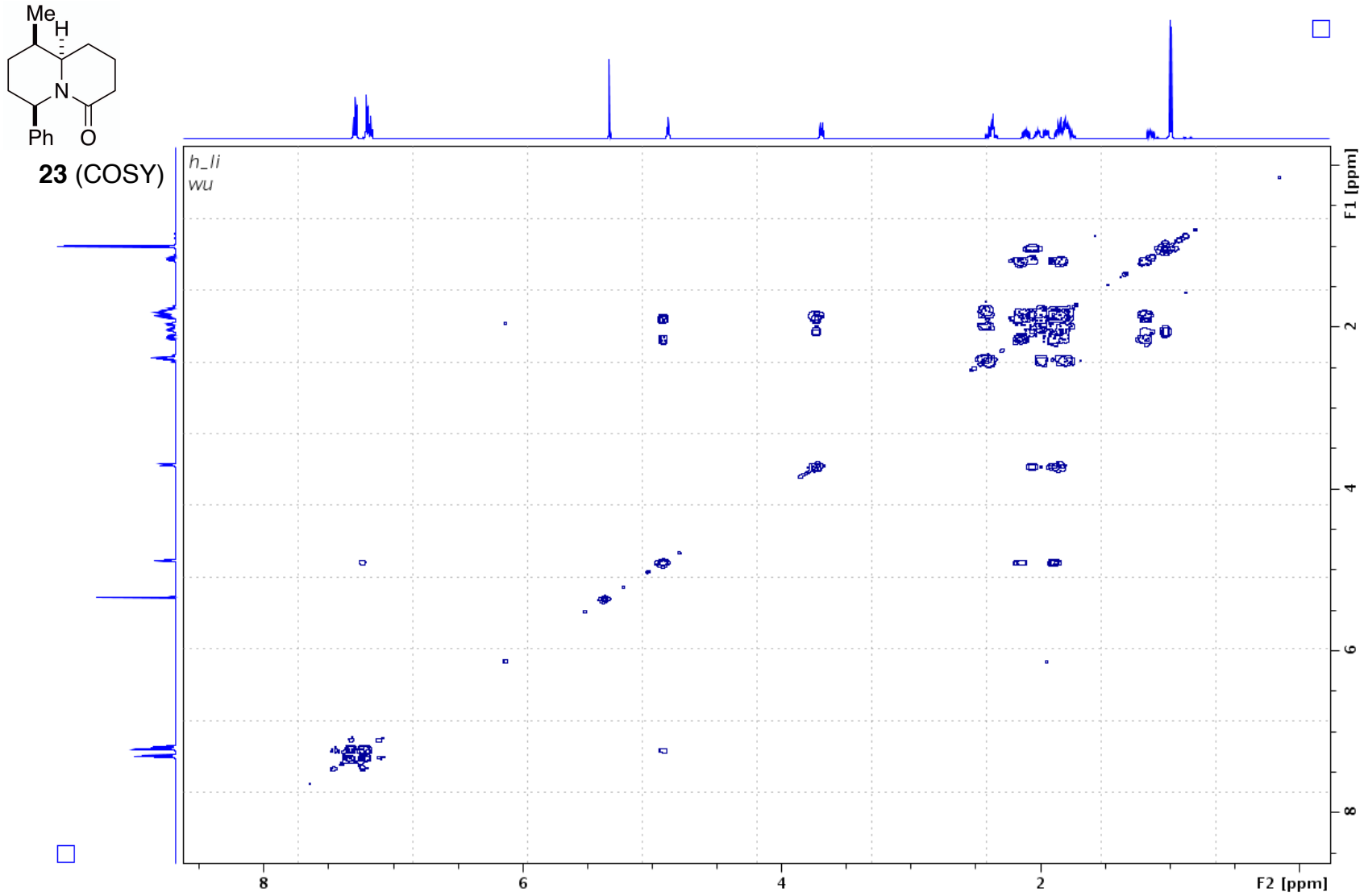
23

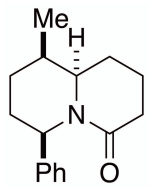

173.274
144.725
128.162
125.934
57.468
57.329
34.433
32.017
28.739
28.267
26.500
21.514
15.870
Me
H
N
Ph
O
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

23

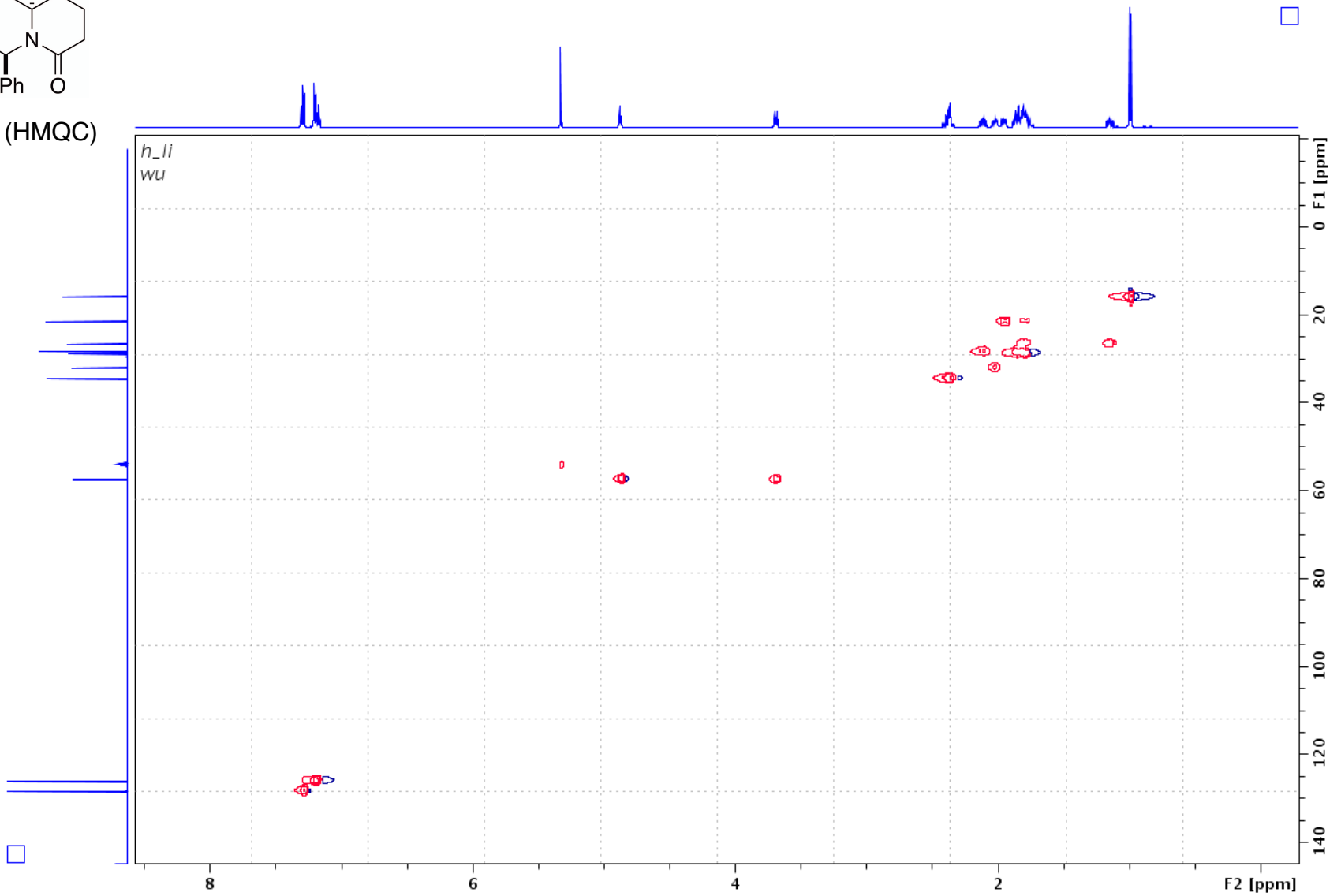

173.275
144.724
128.162
125.934
57.468
57.329
34.433
32.017
28.740
28.267
26.501
21.515
15.870
Me
H
N
Ph
O
23
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

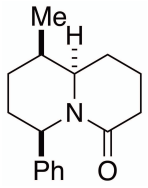

Me
H
N
O
H
H
h_li
wu
F1 [ppm]
F2 [ppm]
2
4
6
8


Me
H
N
Ph
O
23 (COSY)
h_li
wu
F1 [ppm]
F2 [ppm]
2
4
6
8

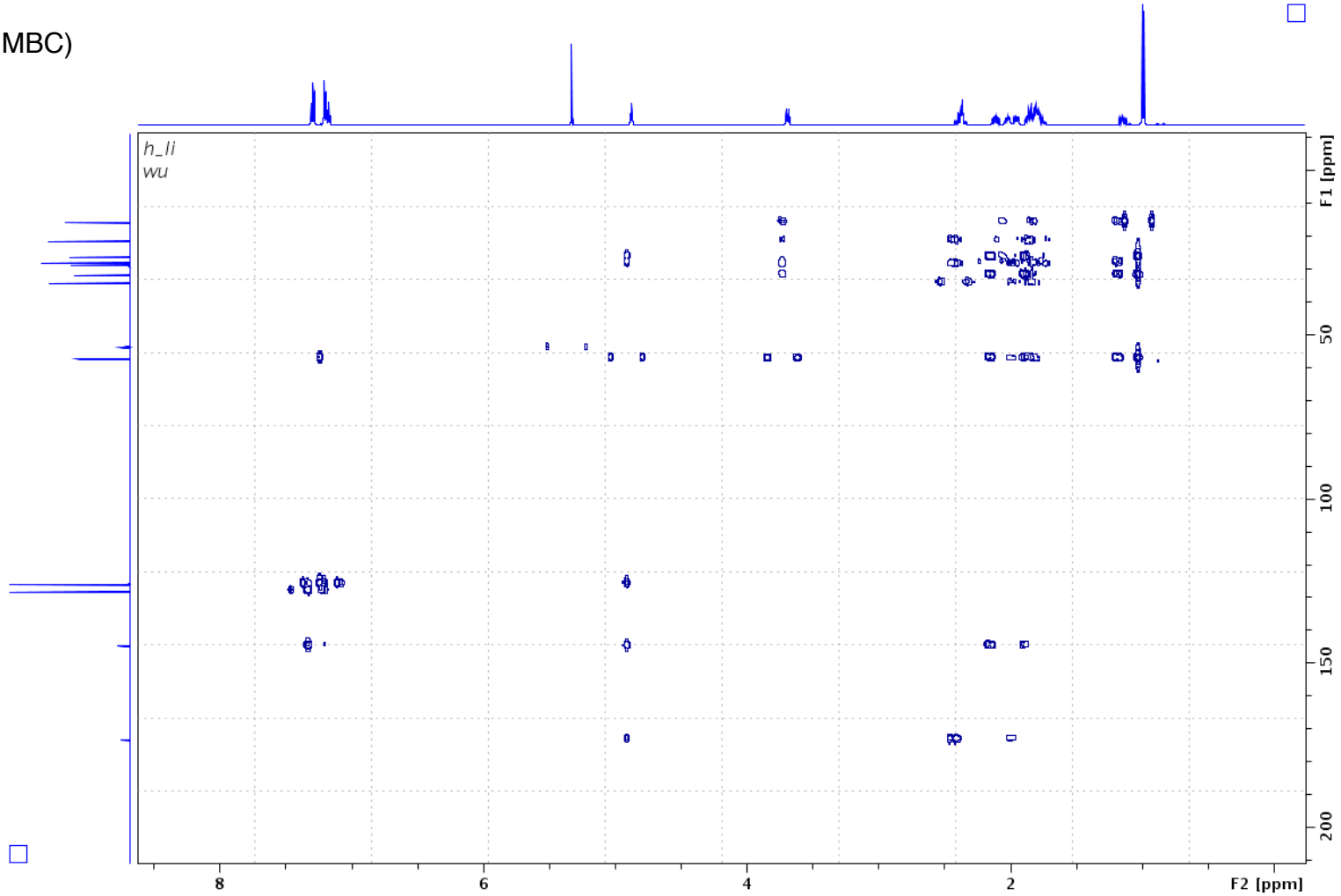


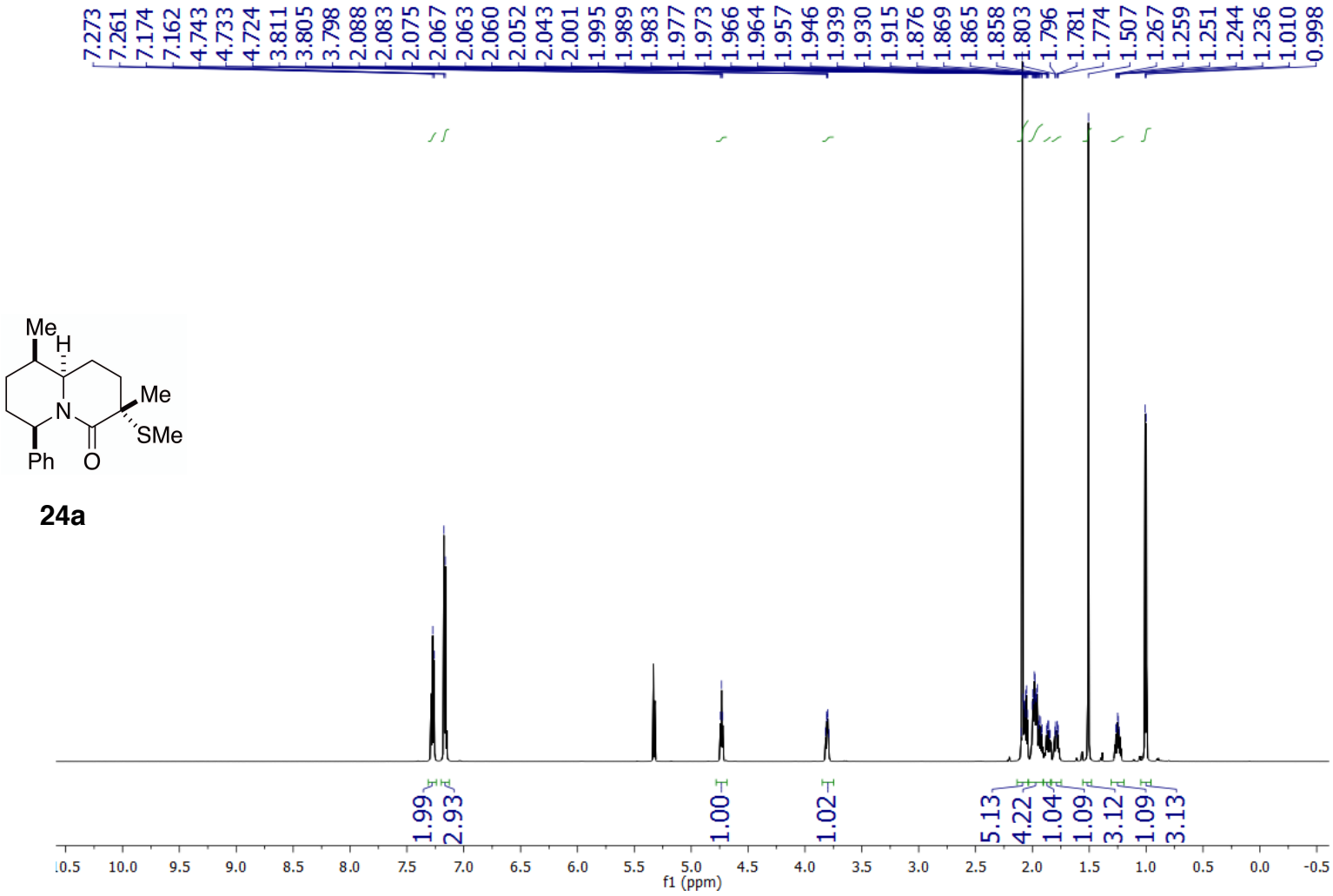
23 (HMQC)

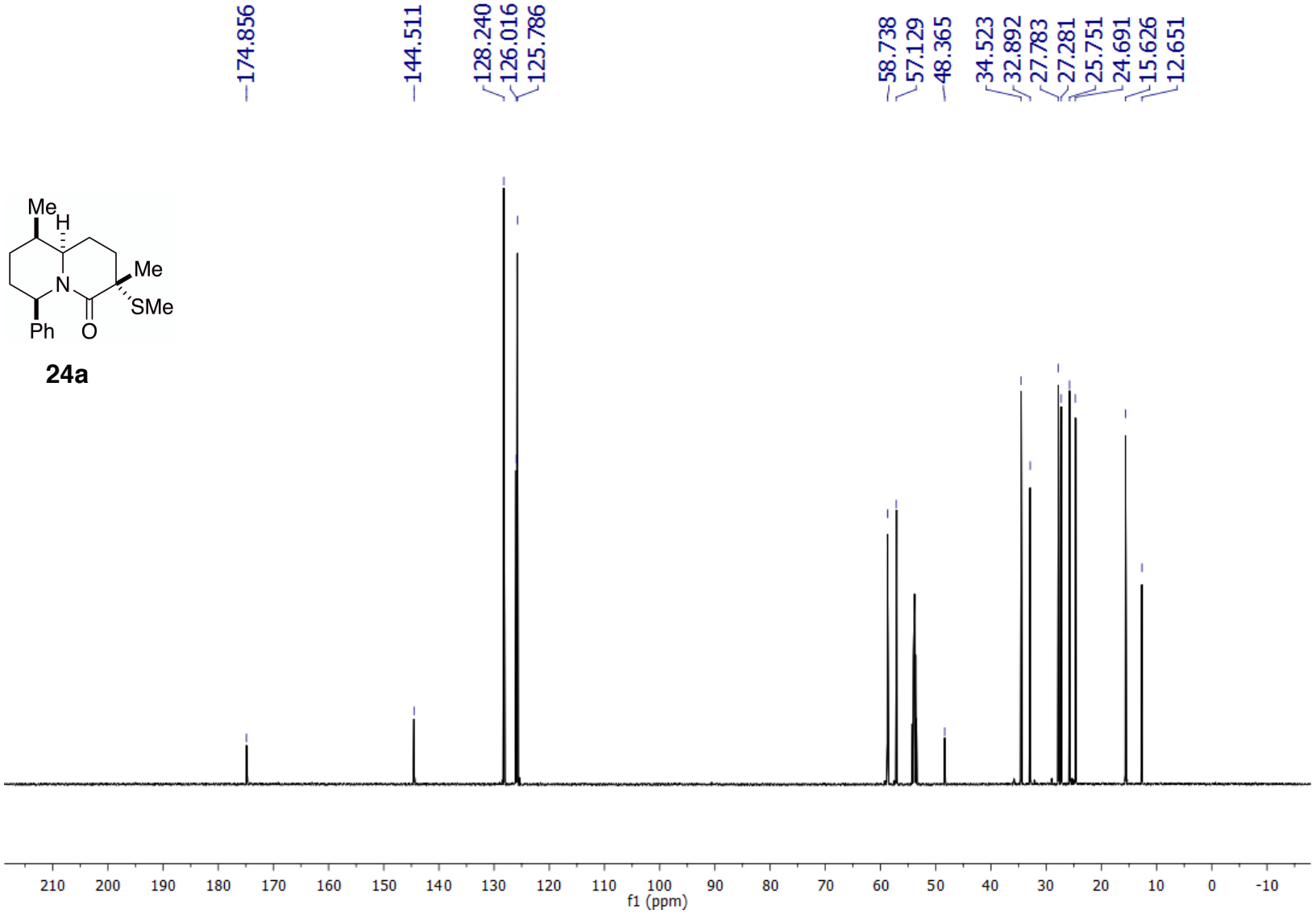




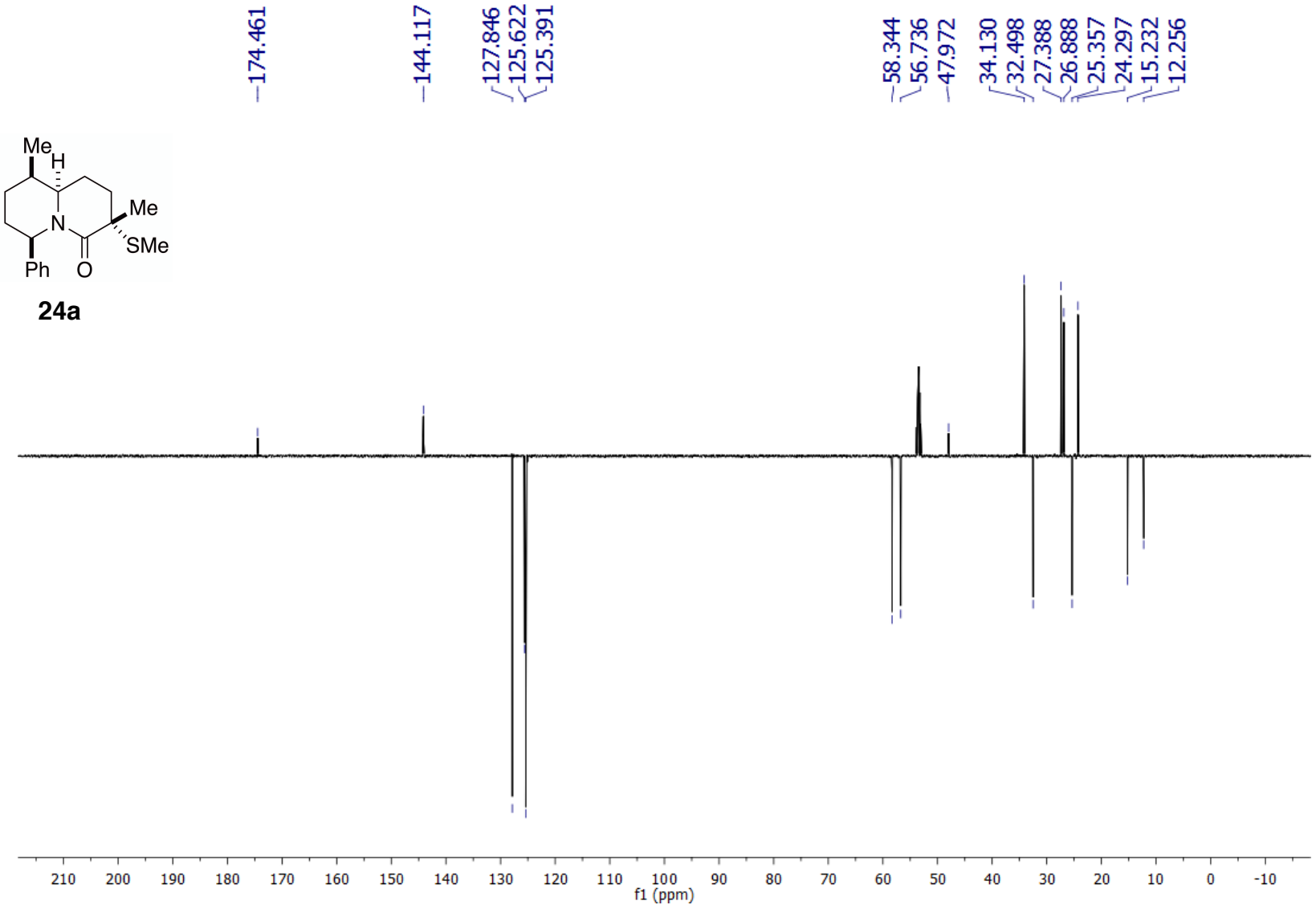
23 (HMBC)



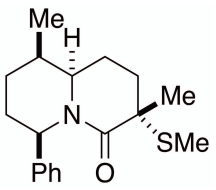

7.273
7.261
7.174
7.162
4.743
4.733
4.724
3.811
3.805
3.798
2.088
2.083
2.075
2.067
2.063
2.060
2.052
2.043
2.001
1.995
1.989
1.983
1.977
1.973
1.966
1.964
1.957
1.946
1.939
1.930
1.915
1.876
1.869
1.865
1.858
1.803
1.796
1.781
1.774
1.507
1.267
1.259
1.251
1.244
1.236
1.010
0.998
Me
H
N
Me
SMe
Ph
O
24a
1.99
2.93
1.00
1.02
5.13
4.22
1.04
1.09
3.12
1.09
3.13
f1 (ppm)


174.856
144.511
128.240
126.016
125.786
58.738
57.129
48.365
34.523
32.892
27.783
27.281
25.751
24.691
15.626
12.651
Me
H
N
Me
SMe
Ph
O
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

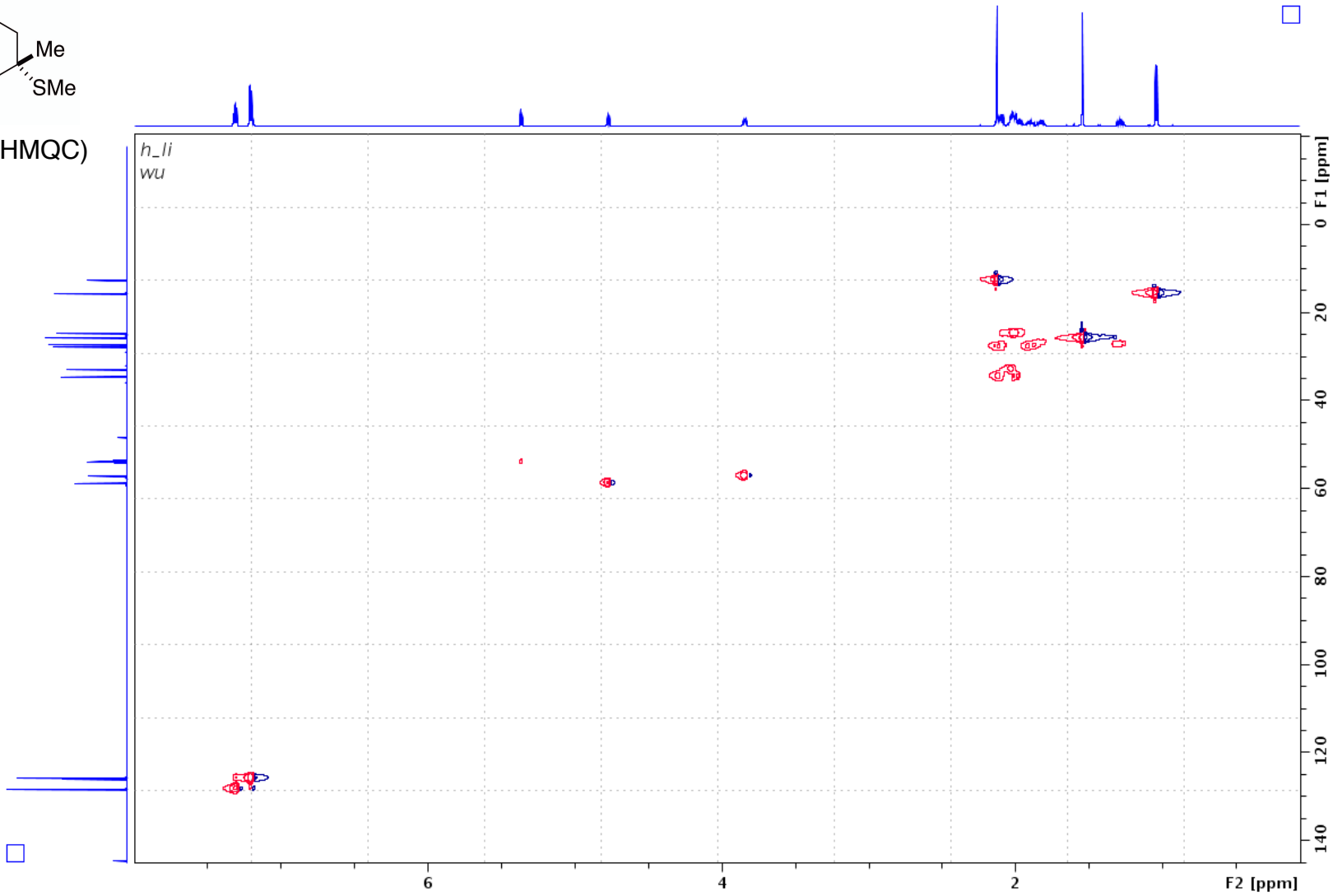
24a

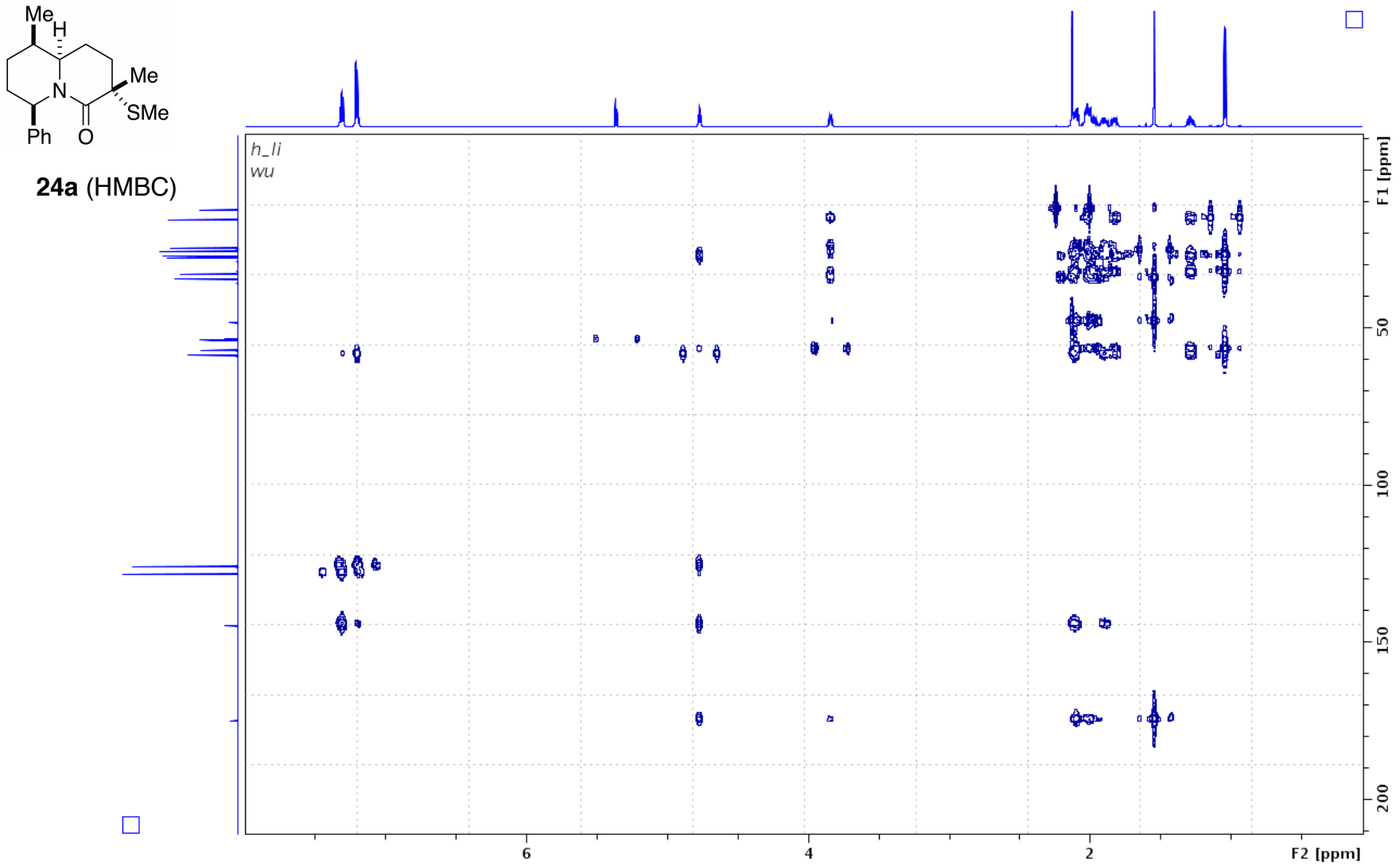

174.461
144.117
127.846
125.622
125.391
58.344
56.736
47.972
34.130
32.498
27.388
26.888
25.357
24.297
15.232
12.256
Me
H
N
Me
SMe
Ph
O
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

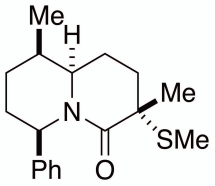
24a



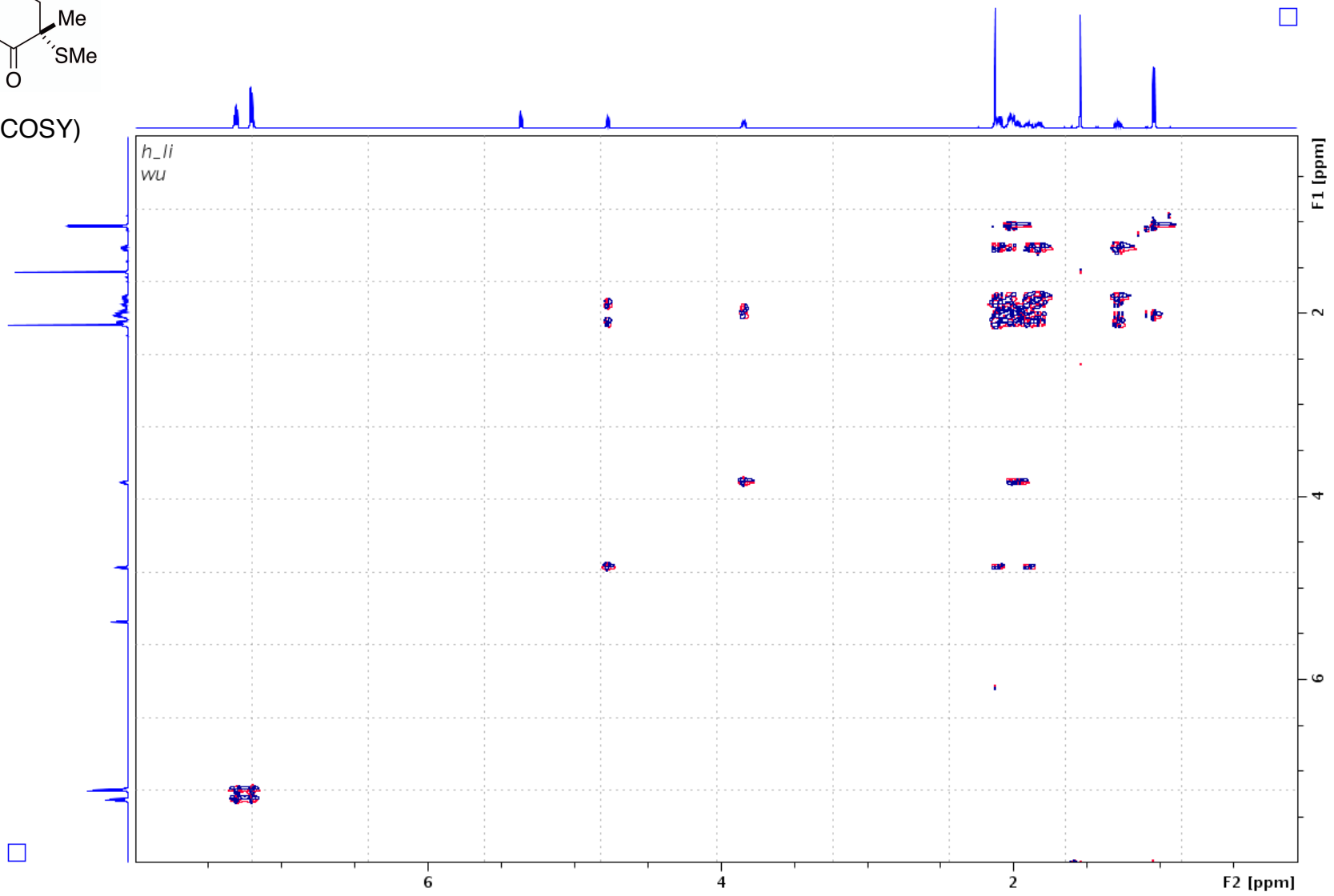
24a (HMQC)

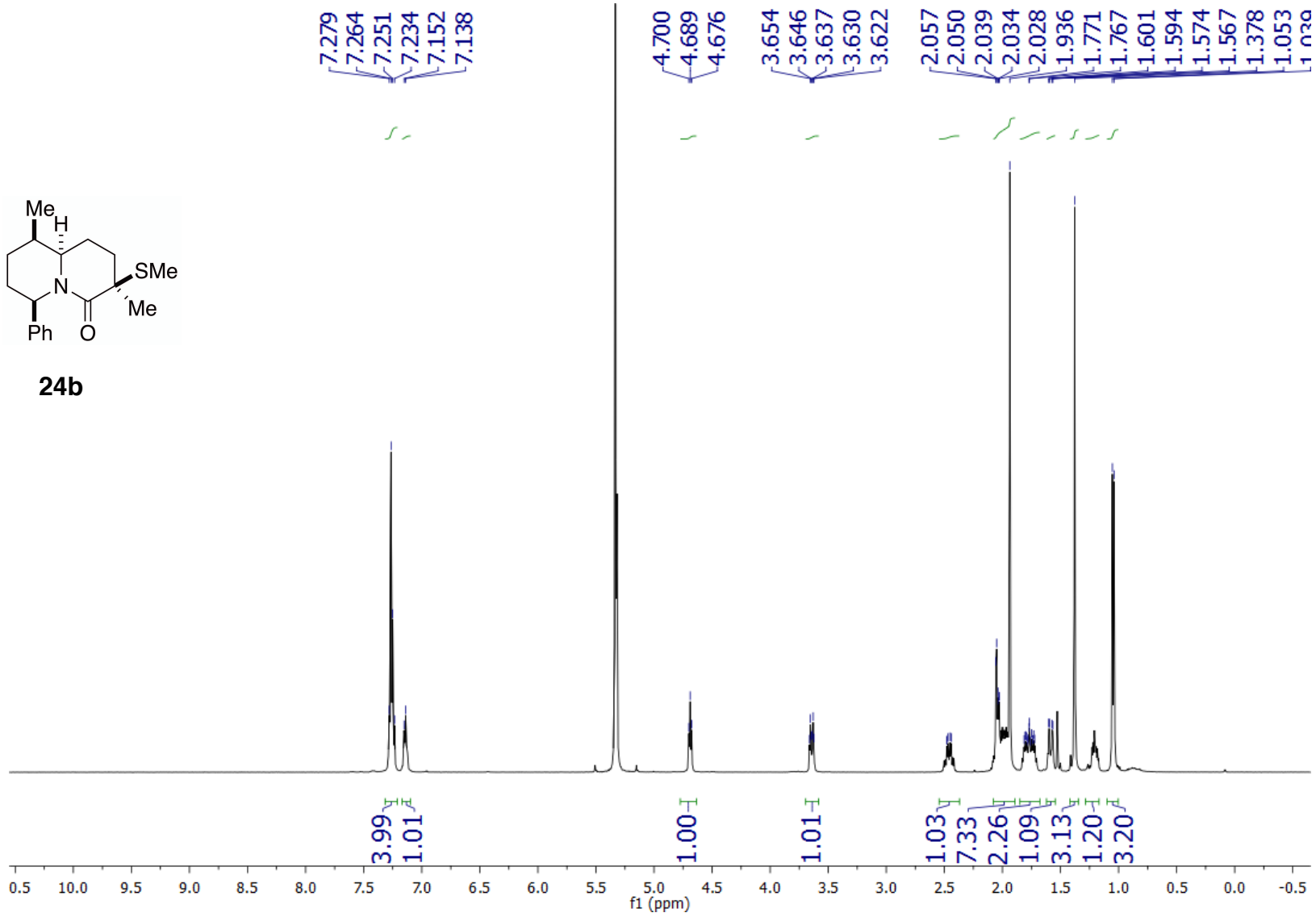



Me
H
Me
N
SMe
Ph
O
24a (HMBC)
h_li
wu
F1 [ppm]
50
100
150
200
6
4
2
F2 [ppm]

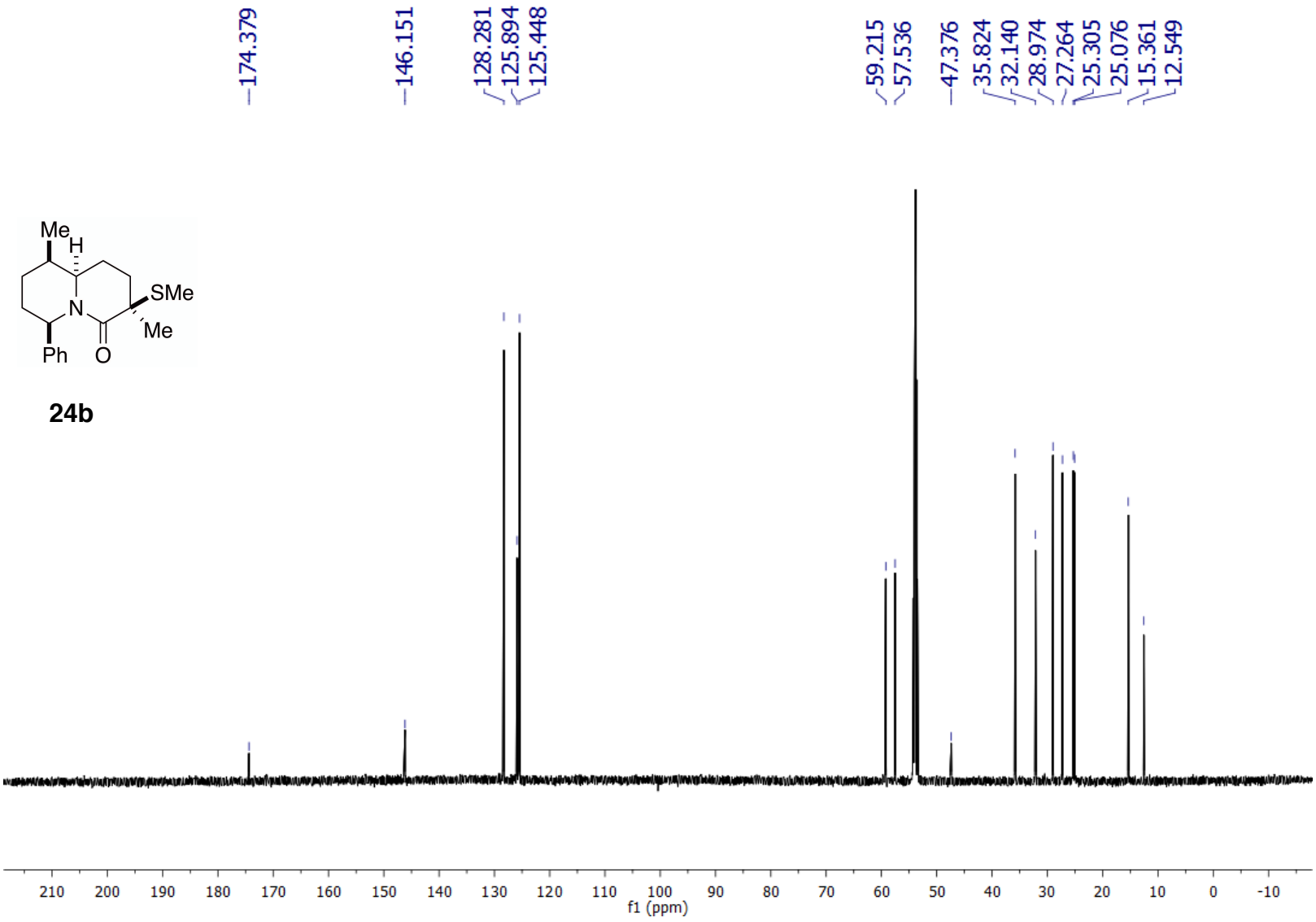


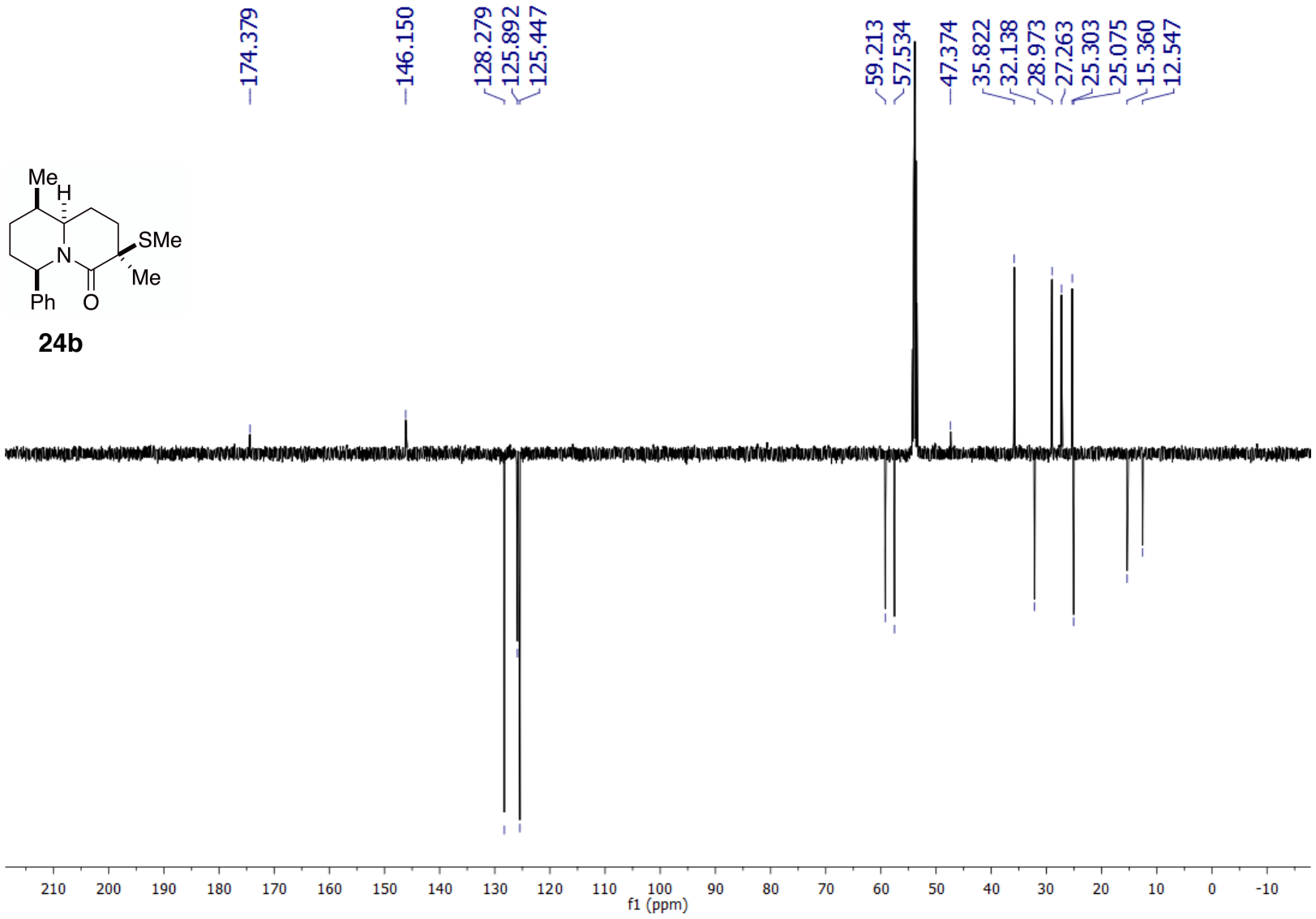
24a (COSY)

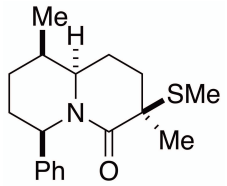



7.279
7.264
7.251
7.234
7.152
7.138
4.700
4.689
4.676
3.654
3.646
3.637
3.630
3.622
2.057
2.050
2.039
2.034
2.028
1.936
1.771
1.767
1.601
1.594
1.574
1.567
1.378
1.053
Me
H
N
SMe
Me
Ph
O
3.99
1.01
1.00
1.01
1.03
7.33
2.26
1.09
3.13
1.20
3.20
f1 (ppm)

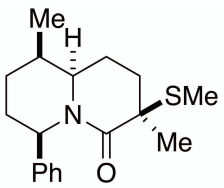
24b


174.379
146.151
128.281
125.894
125.448
59.215
57.536
47.376
35.824
32.140
28.974
27.264
25.305
25.076
15.361
12.549
Me
H
N
SMe
Me
Ph
O
24b
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

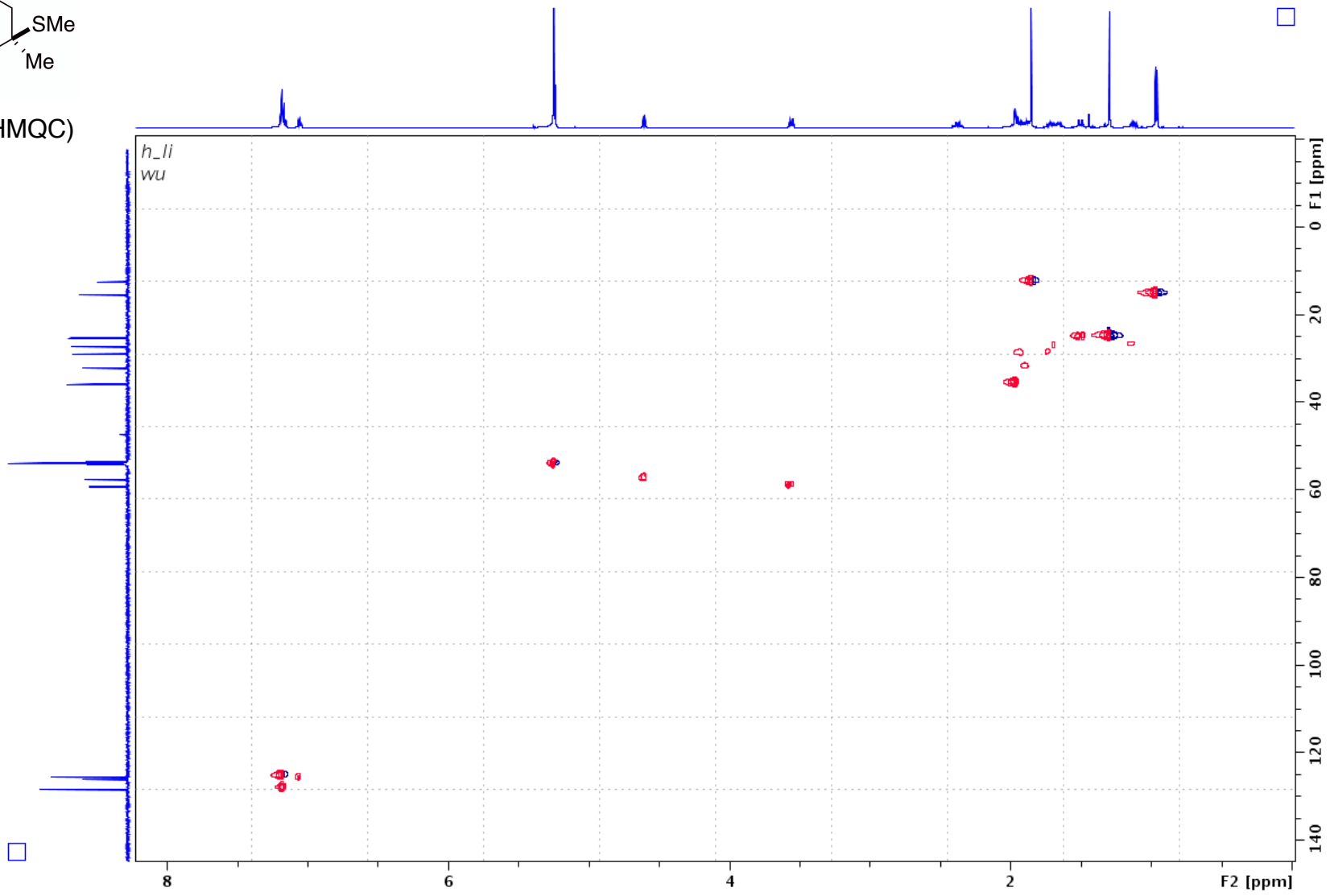

174.379
146.150
128.279
125.892
125.447
59.213
57.534
47.374
35.822
32.138
28.973
27.263
25.303
25.075
15.360
12.547
Me
H
N
SMe
Me
Ph
O
24b
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

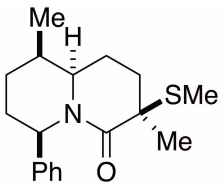


24b (HMBC)

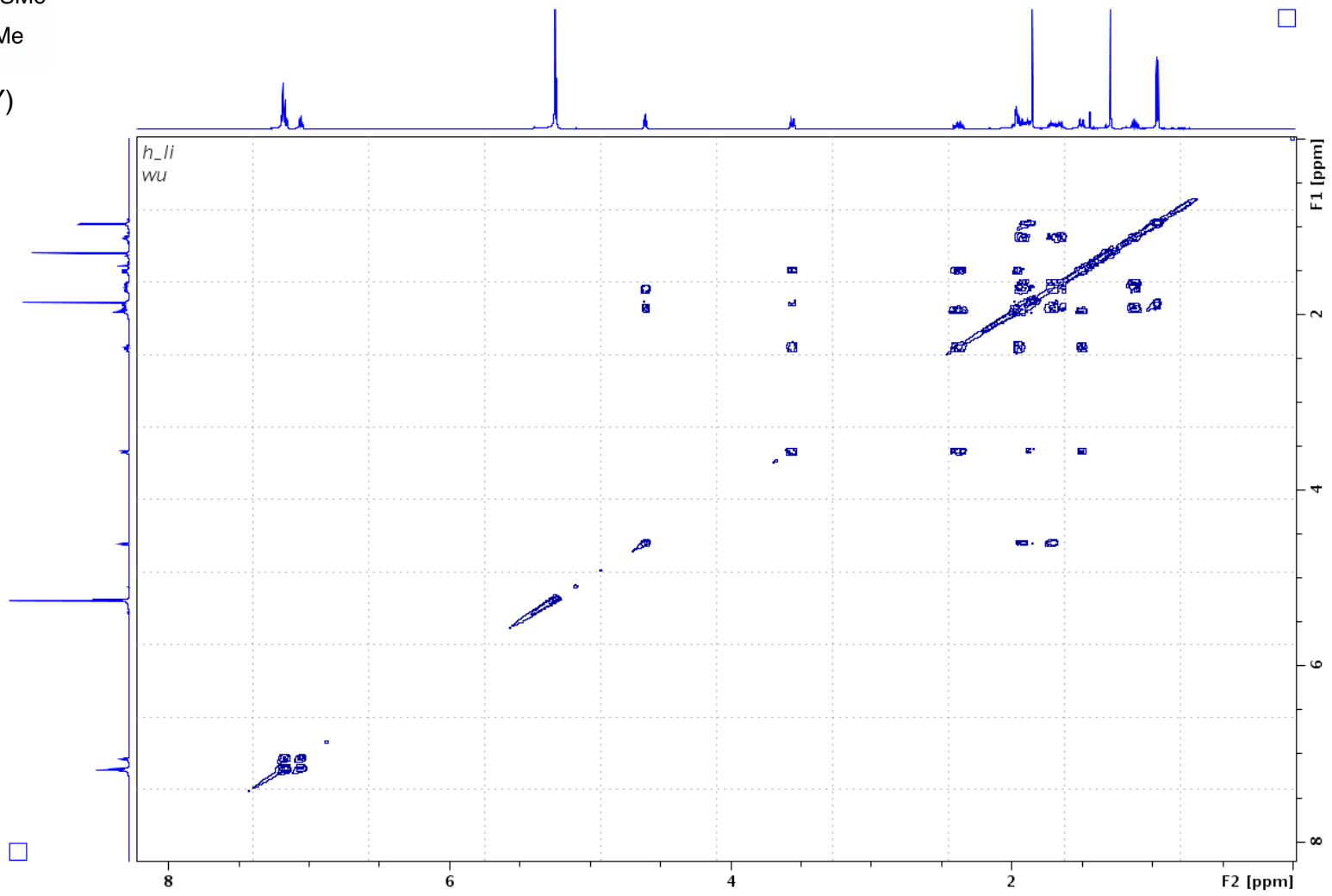


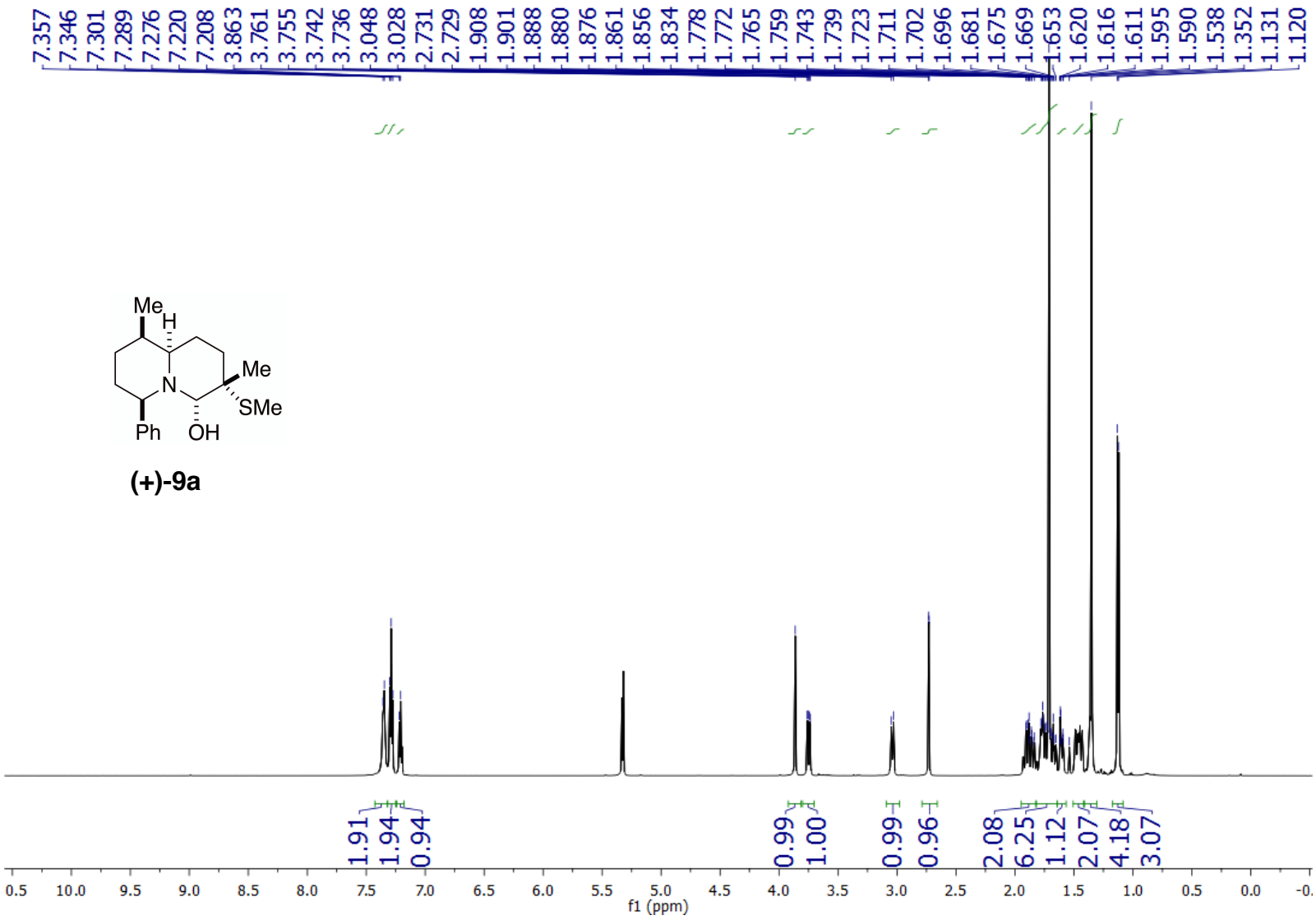
24b (HMQC)



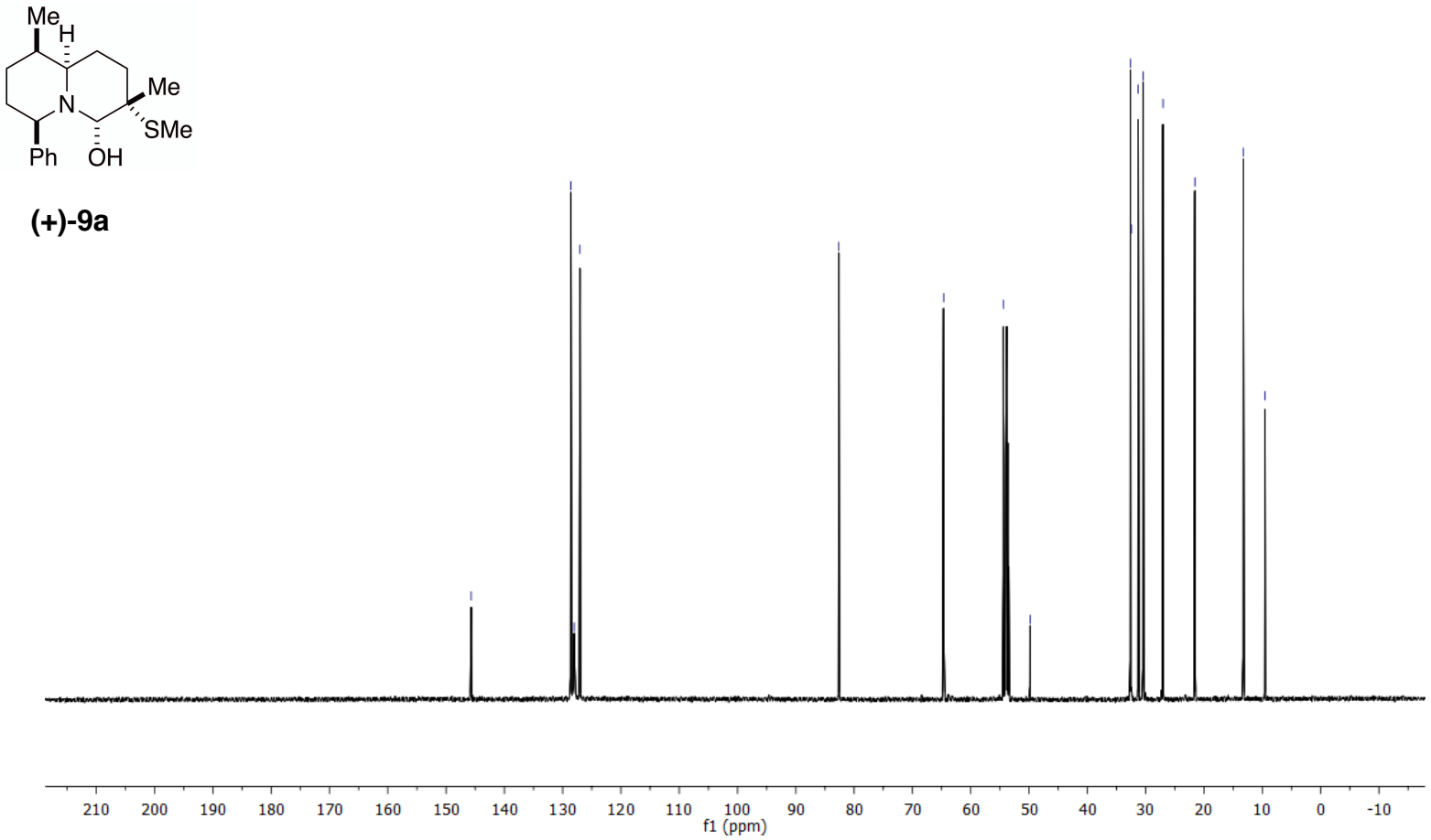


24b (COSY)



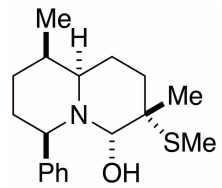

7.357
7.346
7.301
7.289
7.276
7.220
7.208
3.863
3.761
3.755
3.742
3.736
3.048
3.028
2.731
2.729
1.908
1.901
1.888
1.880
1.876
1.861
1.856
1.834
1.778
1.772
1.765
1.759
1.743
1.739
1.723
1.711
1.702
1.696
1.681
1.675
1.669
1.653
1.620
1.616
1.611
1.595
1.590
1.538
1.352
1.131
1.120
Me
H
N
Me
SMe
Ph
OH
1.91
1.94
0.94
0.99
1.00
0.99
0.96
2.08
6.25
1.12
2.07
4.18
3.07
f1 (ppm)

(+)-9a

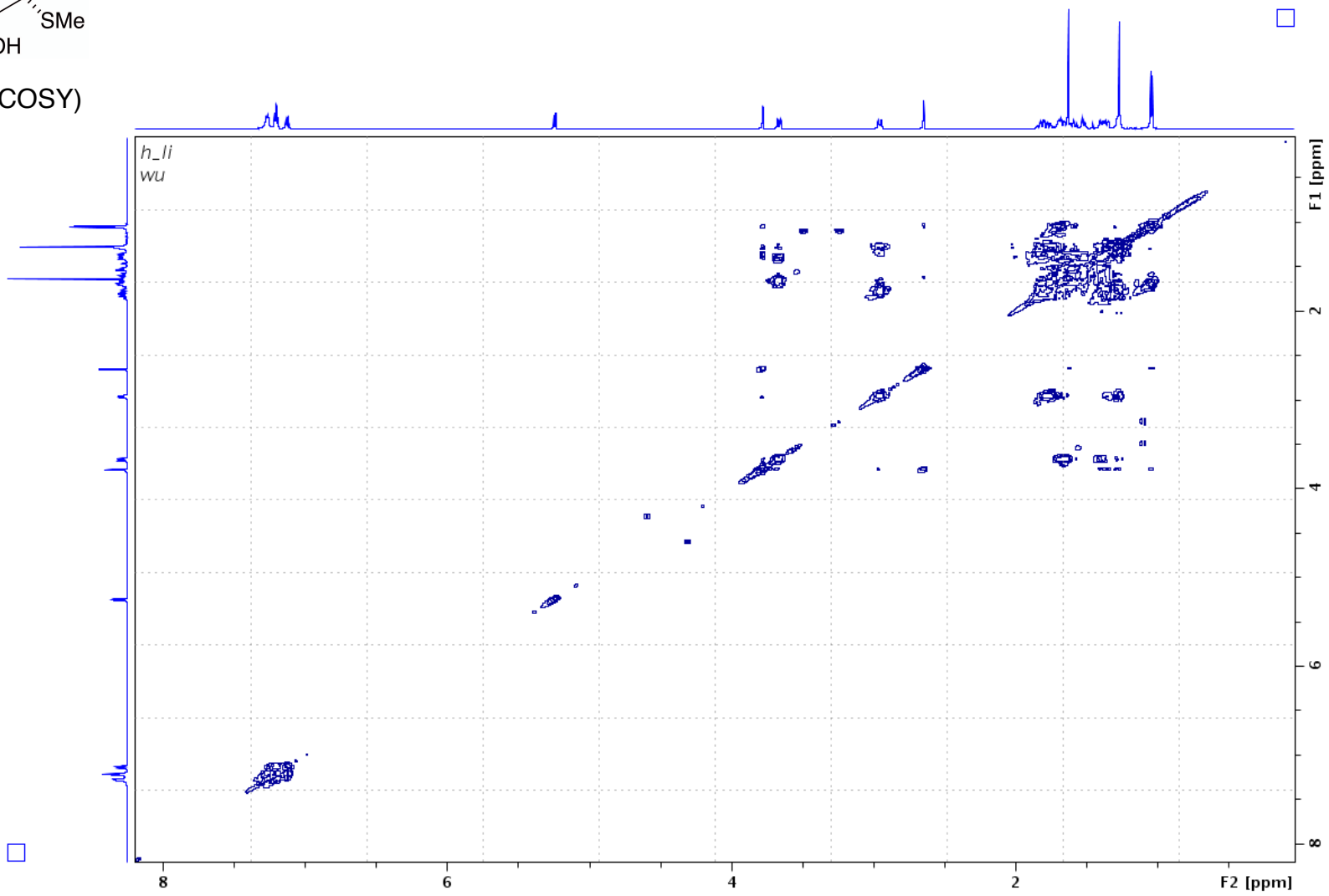

145.701
128.584
128.033
127.031
82.638
64.654
54.410
49.833
32.625
32.465
31.287
30.444
27.030
21.564
13.258
9.526
Me
H
Me
N
SMe
Ph
OH
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

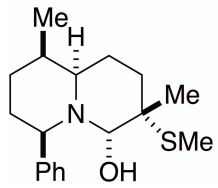
(+)-9a


Me
Me
SMe
H
N
H
Ph
H
O
H
H
h_li
wu
F1 [ppm]
2
4
6
8
8
6
4
2
F2 [ppm]

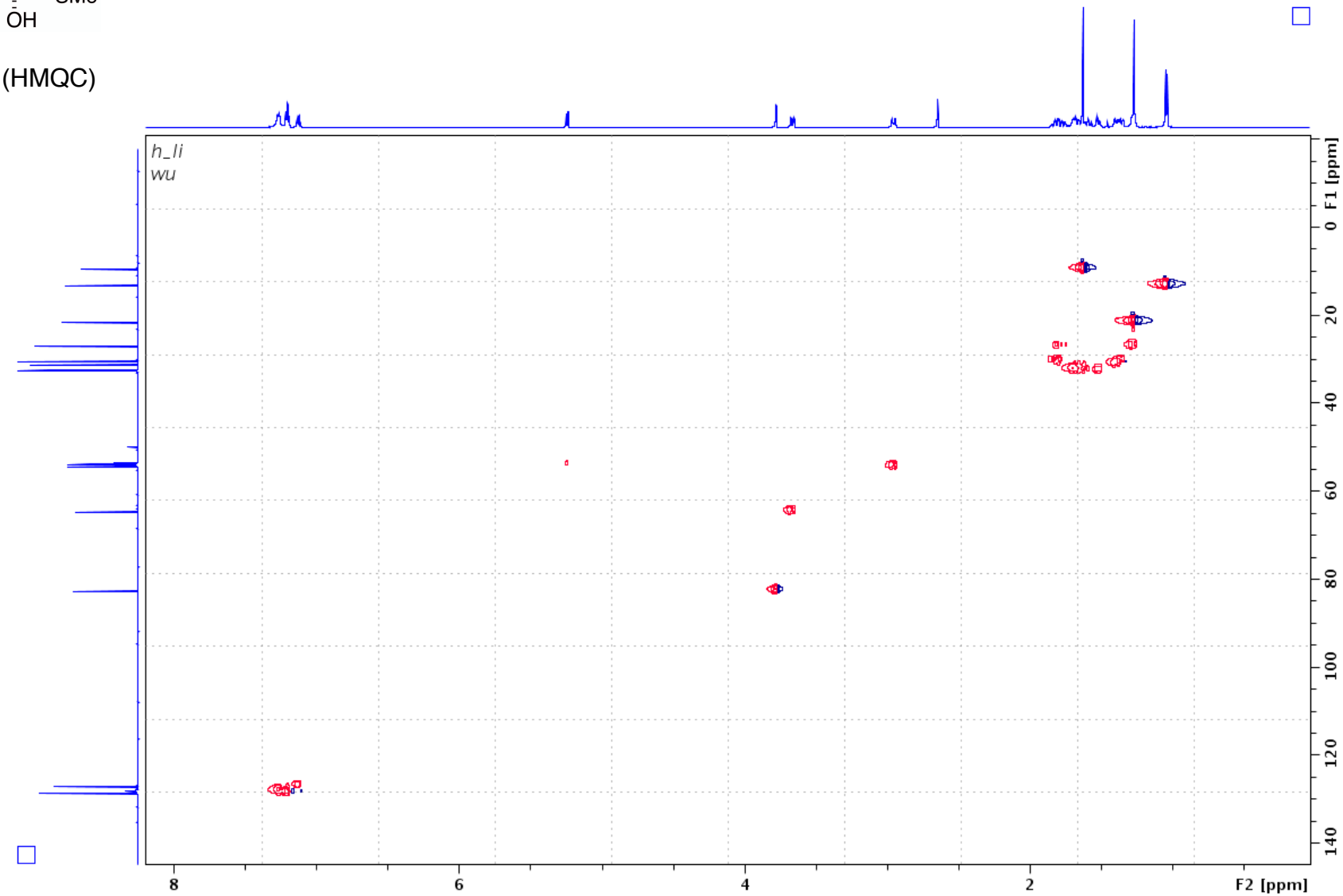


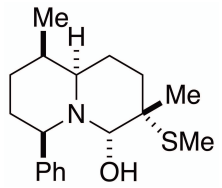
(+)-9a (COSY)



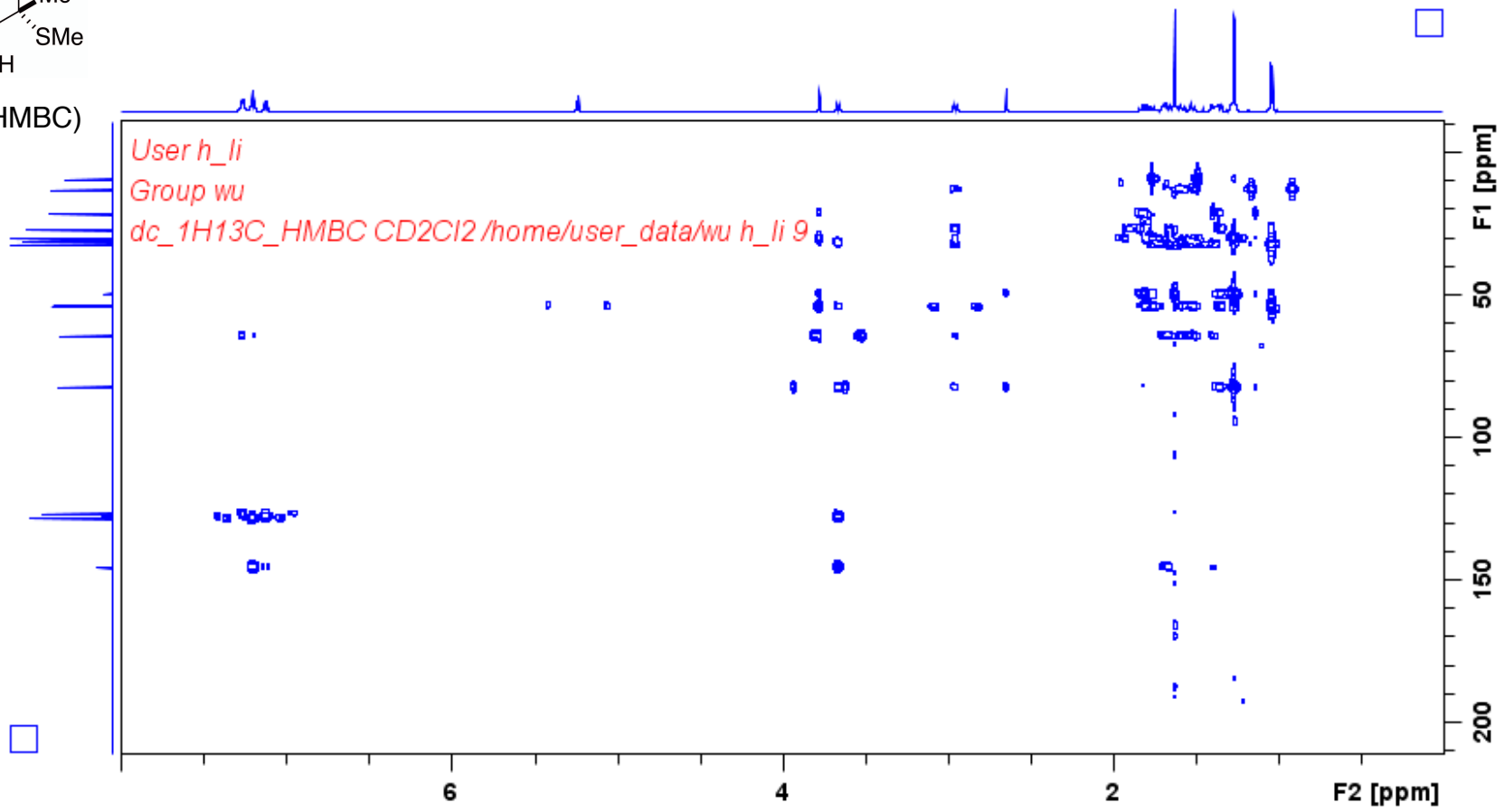

Me
H
N
Me
SMe
Ph
OH

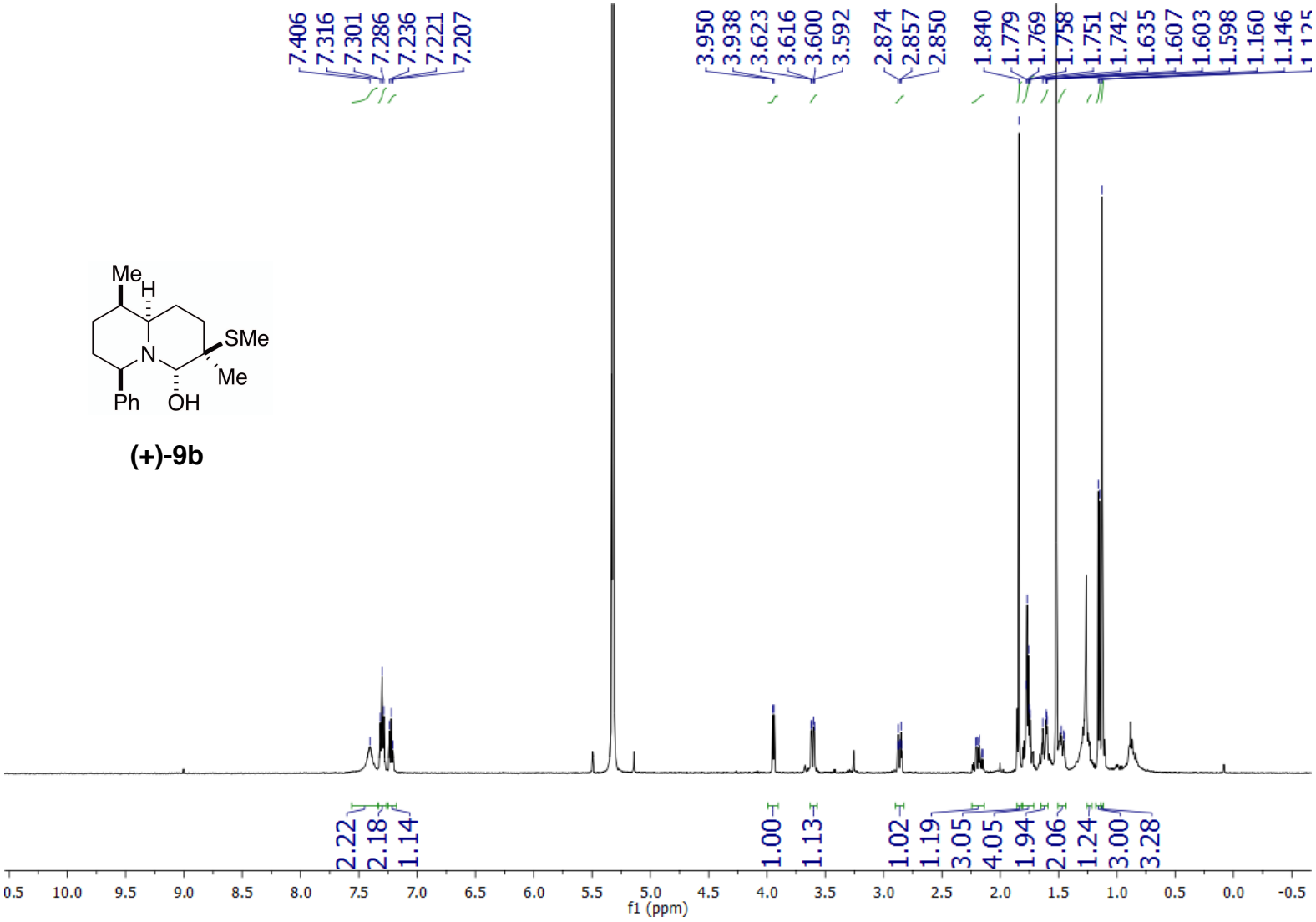
(+)-9a (HMQC)


h_li
wu
F1 [ppm]
0
20
40
60
80
100
120
140
8
6
4
2
F2 [ppm]

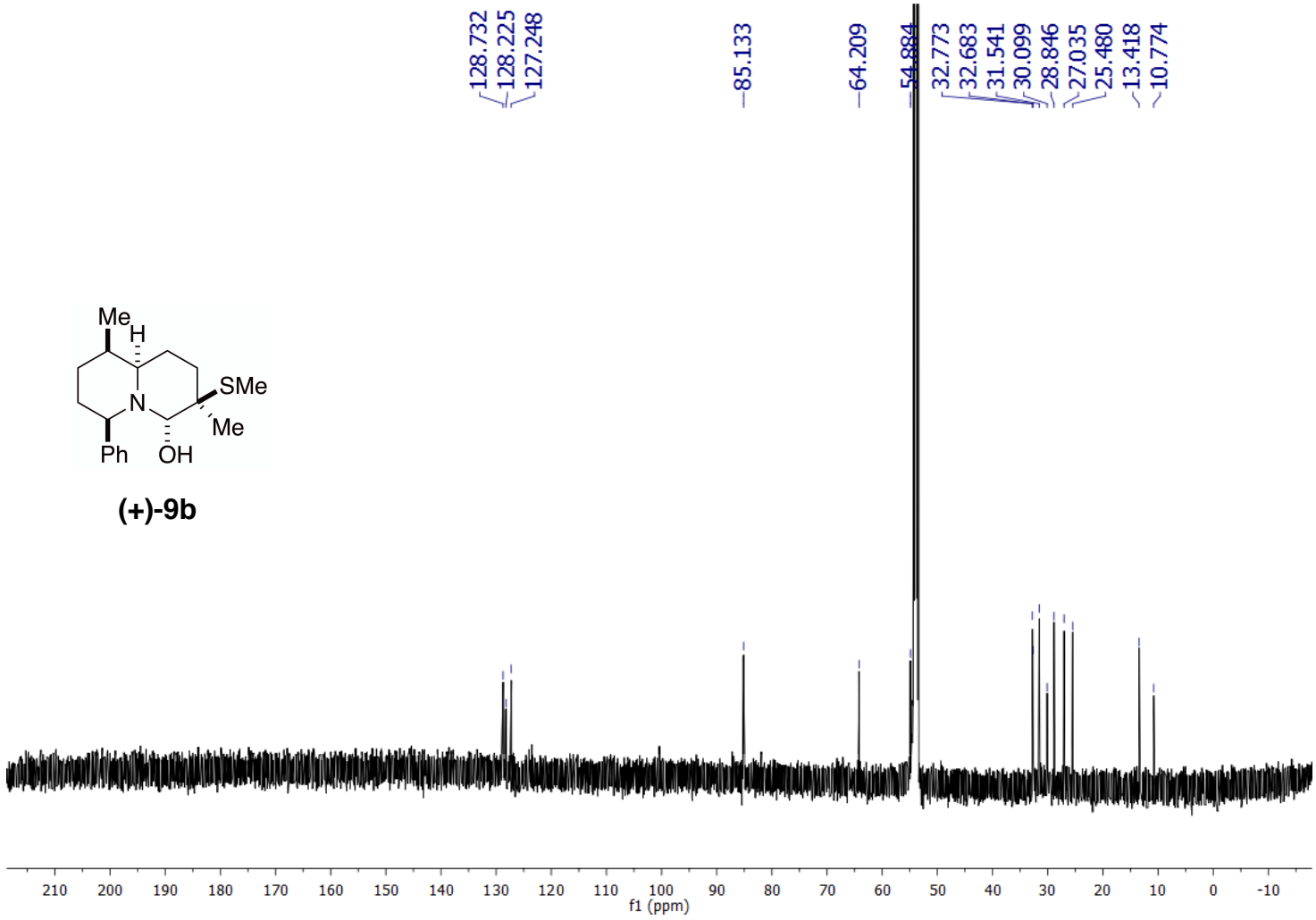

Me
H
Me
N
SMe
Ph
OH

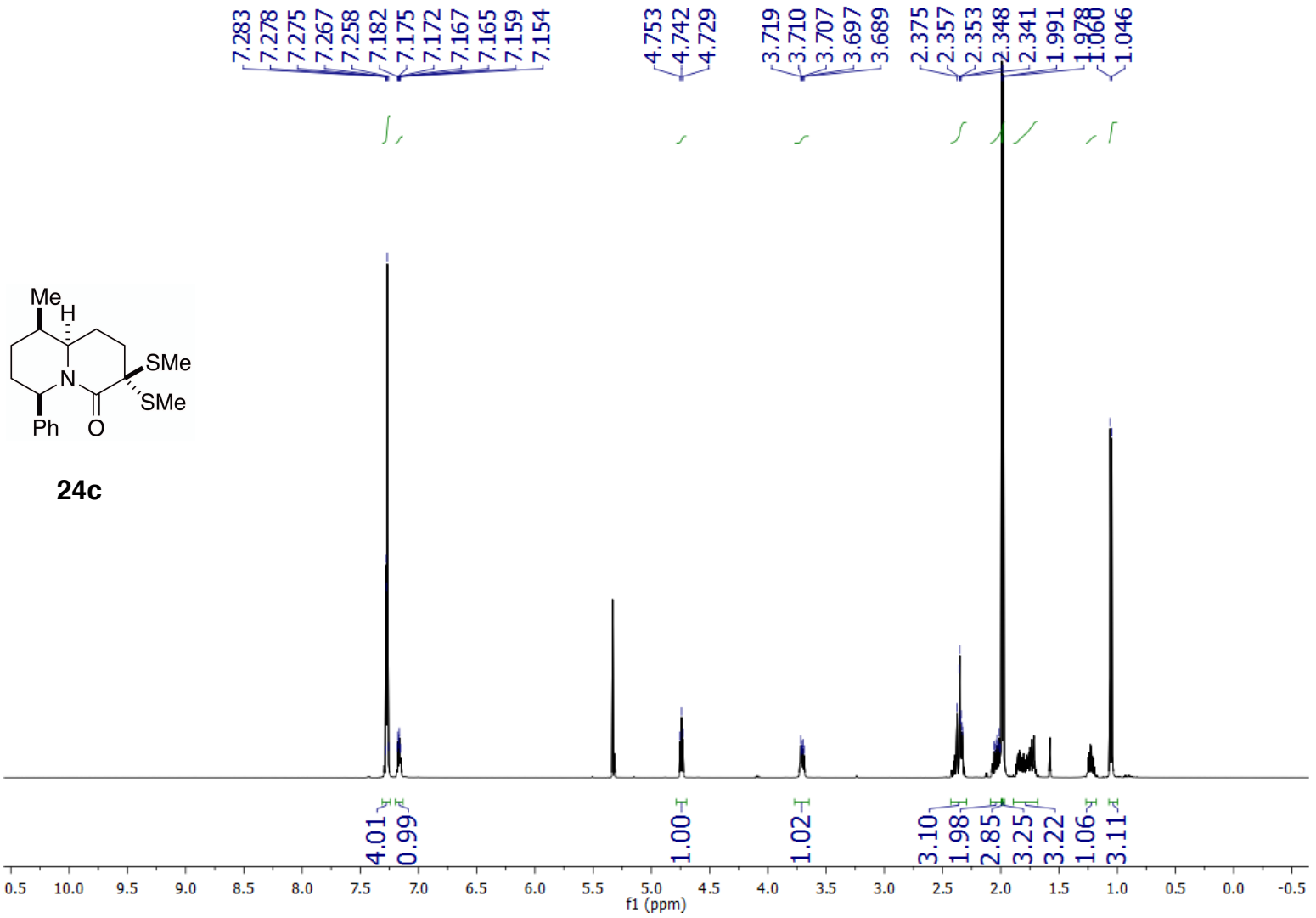
(+)-9a (HMBC)


User h_li
Group wu
dc_1H13C_HMBC CD2Cl2 /home/user_data/wu h_li 9
F1 [ppm]
50
100
150
200
6
4
2
F2 [ppm]

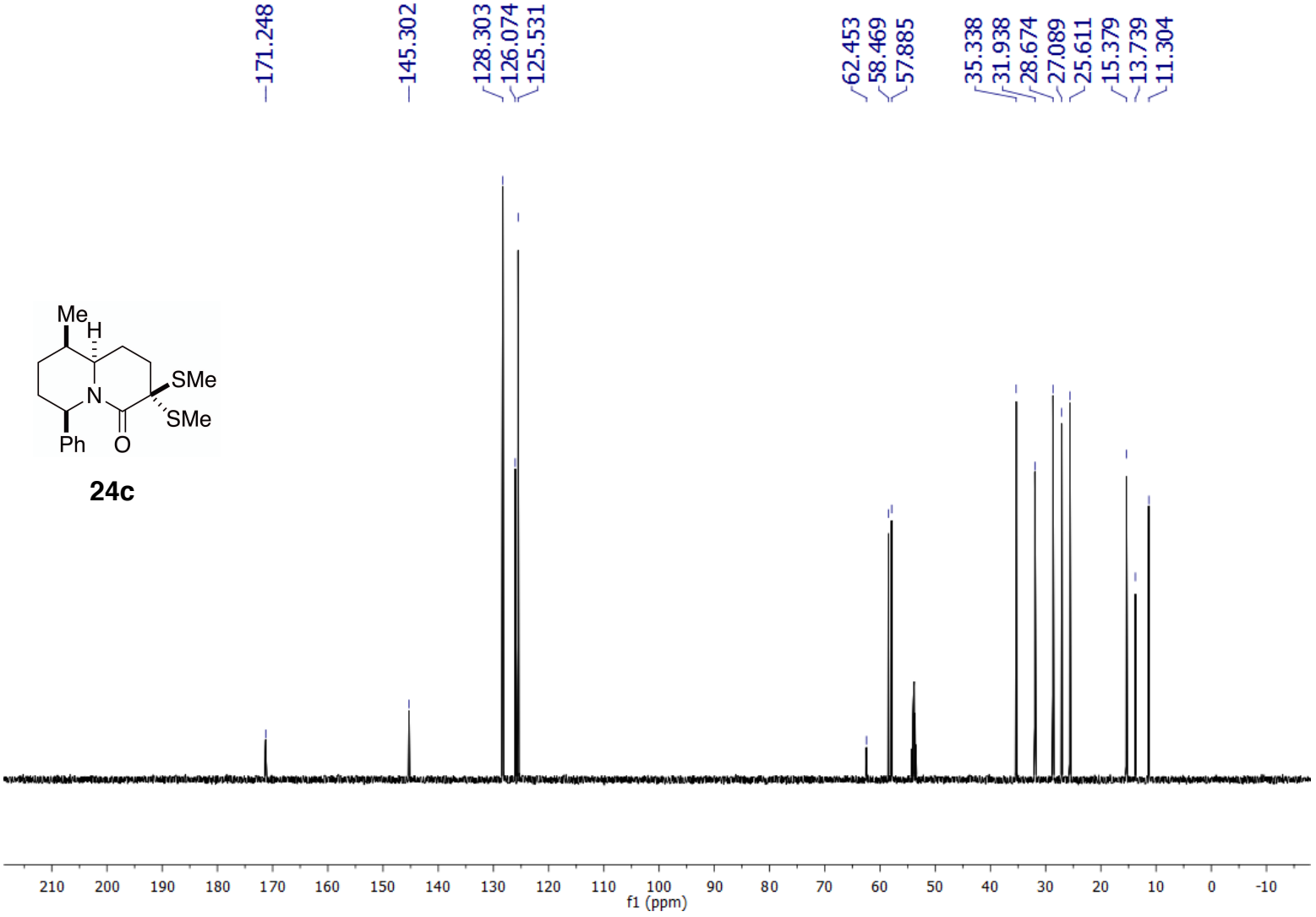

7.406
7.316
7.301
7.286
7.236
7.221
7.207
3.950
3.938
3.623
3.616
3.600
3.592
2.874
2.857
2.850
1.840
1.779
1.769
1.758
1.751
1.742
1.635
1.607
1.603
1.598
1.160
1.146
Me
H
SMe
N
Me
Ph
OH
2.22
2.18
1.14
1.00
1.13
1.02
1.19
3.05
4.05
1.94
2.06
1.24
3.00
3.28
f1 (ppm)

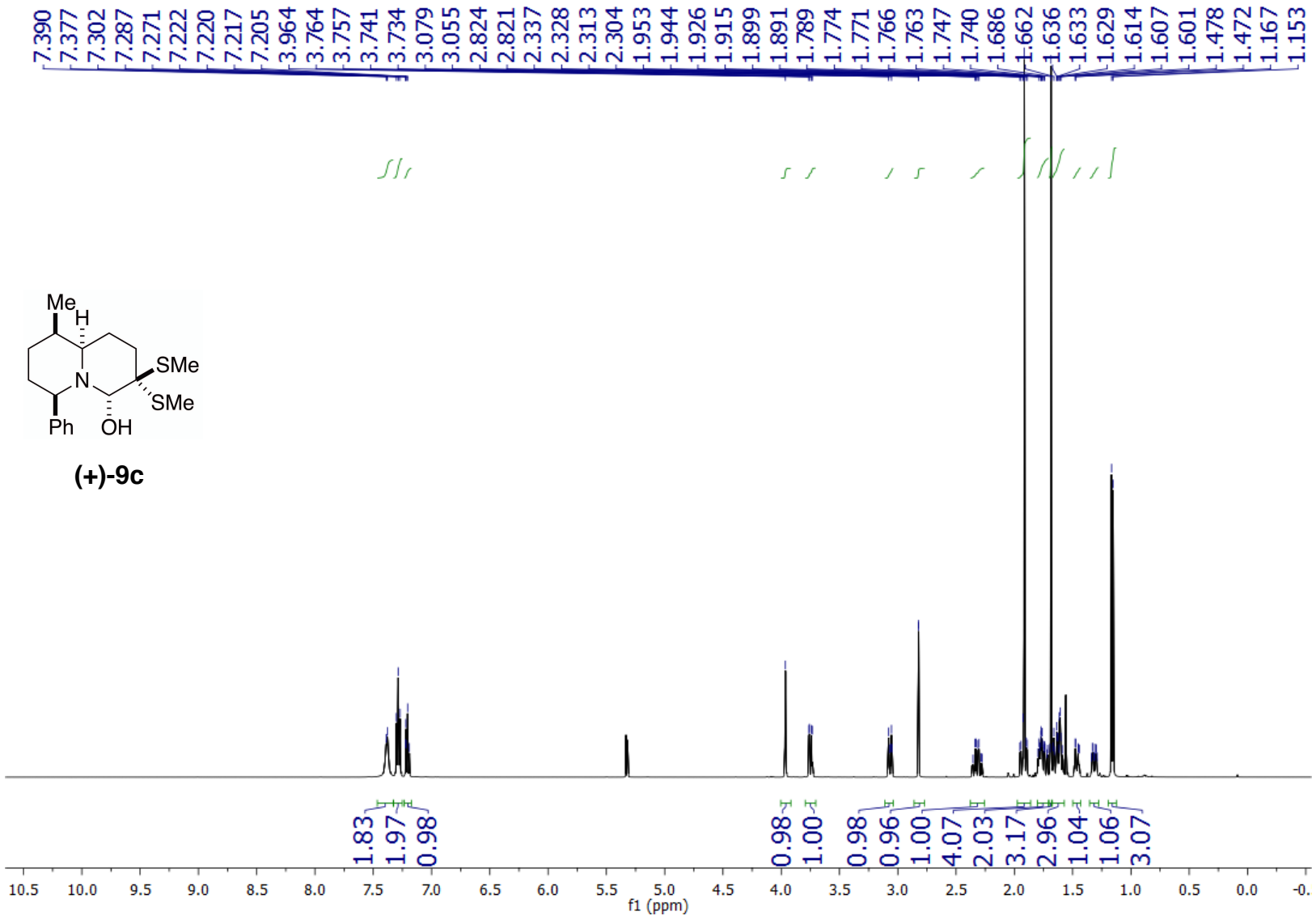
(+)-9b


128.732
128.225
127.248
85.133
64.209
54.884
32.773
32.683
31.541
30.099
28.846
27.035
25.480
13.418
10.774
Me
H
N
SMe
Me
Ph
OH
(+)-9b
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

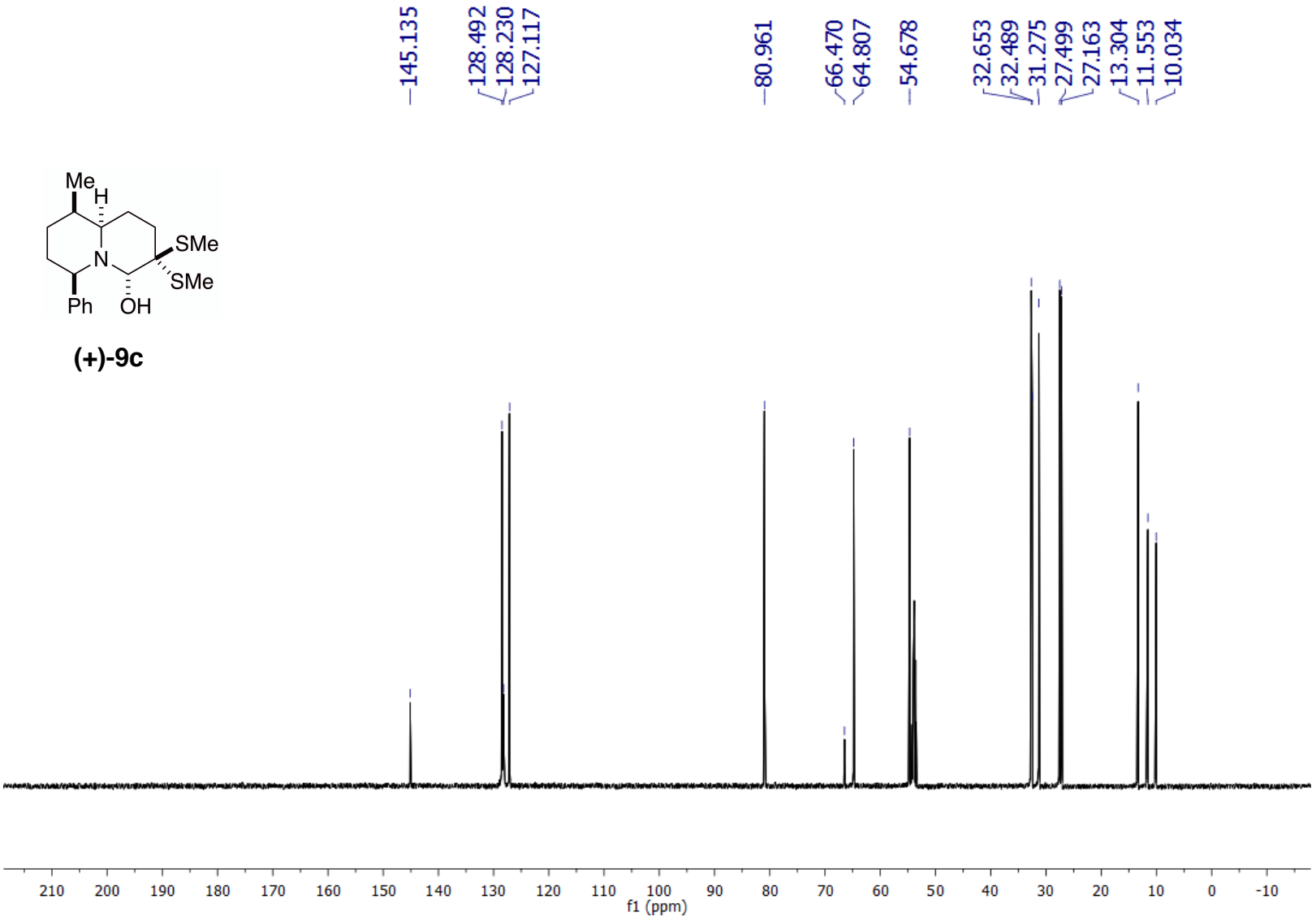

7.283
7.278
7.275
7.267
7.258
7.182
7.175
7.172
7.167
7.165
7.159
7.154
4.753
4.742
4.729
3.719
3.710
3.707
3.697
3.689
2.375
2.357
2.353
2.348
2.341
1.991
1.978
1.060
1.046
Me
H
N
SMe
SMe
Ph
O
4.01
0.99
1.00
1.02
3.10
1.98
2.85
3.25
3.22
1.06
3.11
0.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

24c

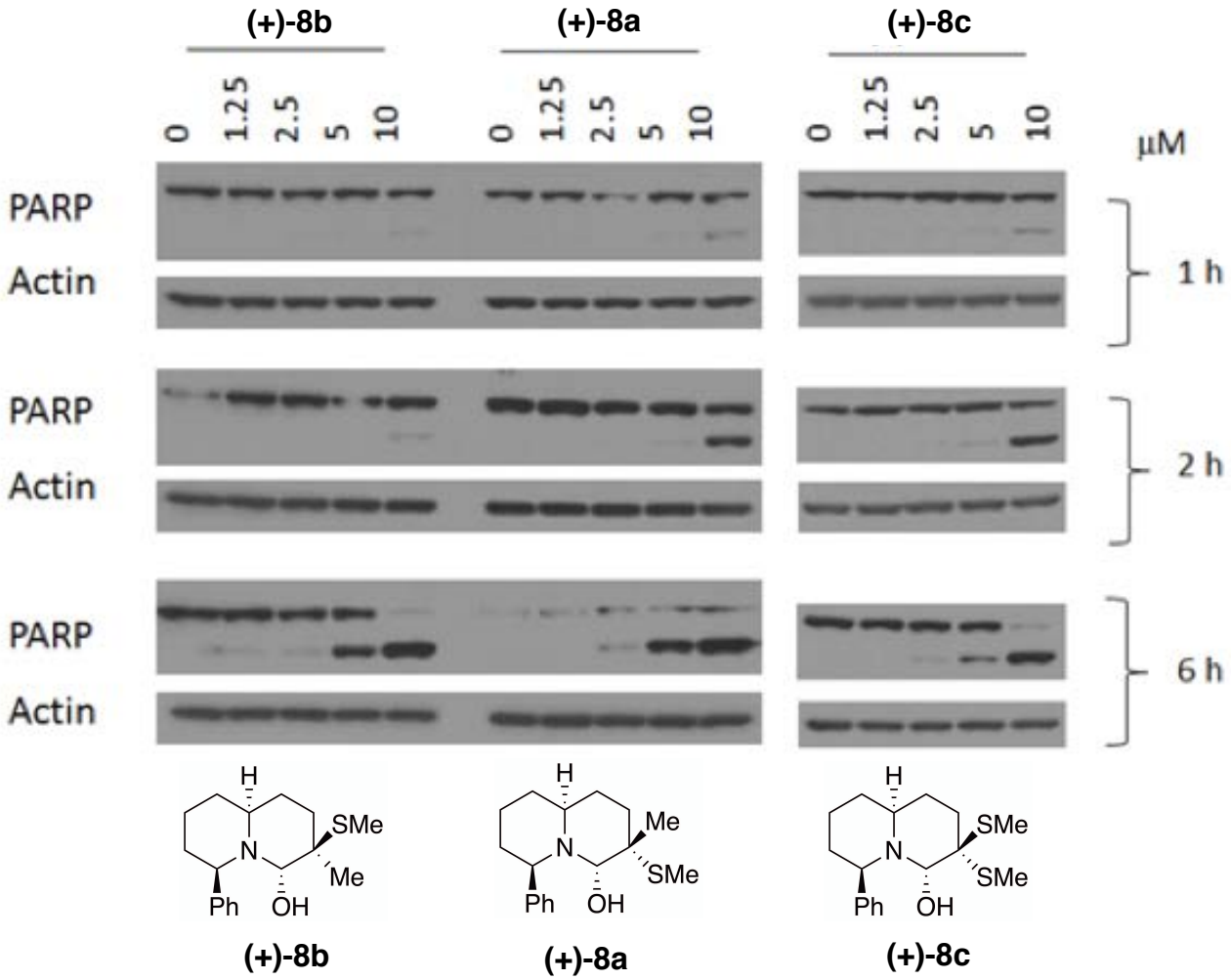

171.248
145.302
128.303
126.074
125.531
62.453
58.469
57.885
35.338
31.938
28.674
27.089
25.611
15.379
13.739
11.304
Me
H
N
SMe
SMe
Ph
O
24c
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

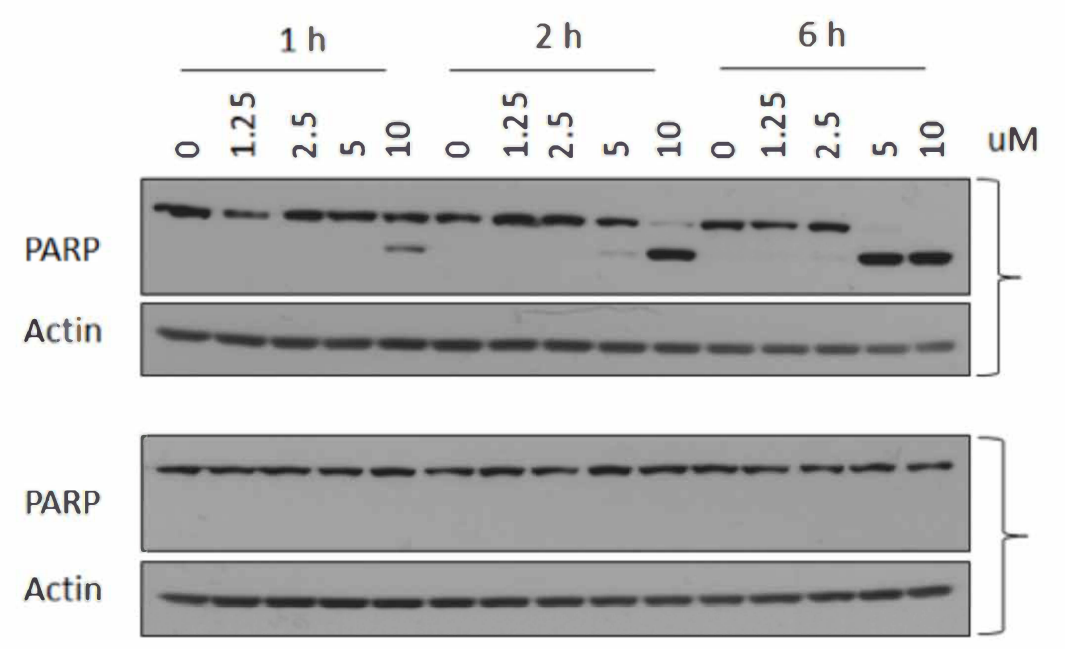

7.390
7.377
7.302
7.287
7.271
7.222
7.220
7.217
7.205
3.964
3.764
3.757
3.741
3.734
3.079
3.055
2.824
2.821
2.337
2.328
2.313
2.304
1.953
1.944
1.926
1.915
1.899
1.891
1.789
1.774
1.771
1.766
1.763
1.747
1.740
1.686
1.662
1.636
1.633
1.629
1.614
1.607
1.601
1.478
1.472
1.167
1.153
Me
H
N
SMe
SMe
Ph
OH
1.83
1.97
0.98
0.98
1.00
0.98
0.96
1.00
4.07
2.03
3.17
2.96
1.04
1.06
3.07
f1 (ppm)

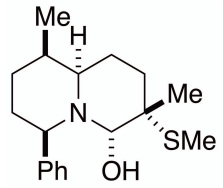
(+)-9c


145.135
128.492
128.230
127.117
80.961
66.470
64.807
54.678
32.653
32.489
31.275
27.499
27.163
13.304
11.553
10.034
Me
H
N
SMe
SMe
Ph
OH
f1 (ppm)

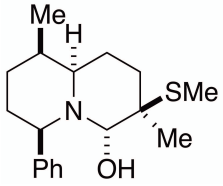
(+)-9c


(+)-8b
(+)-8a
(+)-8c
0
1.25
2.5
5
10
μM
PARP
Actin
1 h
2 h
6 h
H
N
SMe
Me
Ph
OH
(+)-8b
(+)-8a
(+)-8c

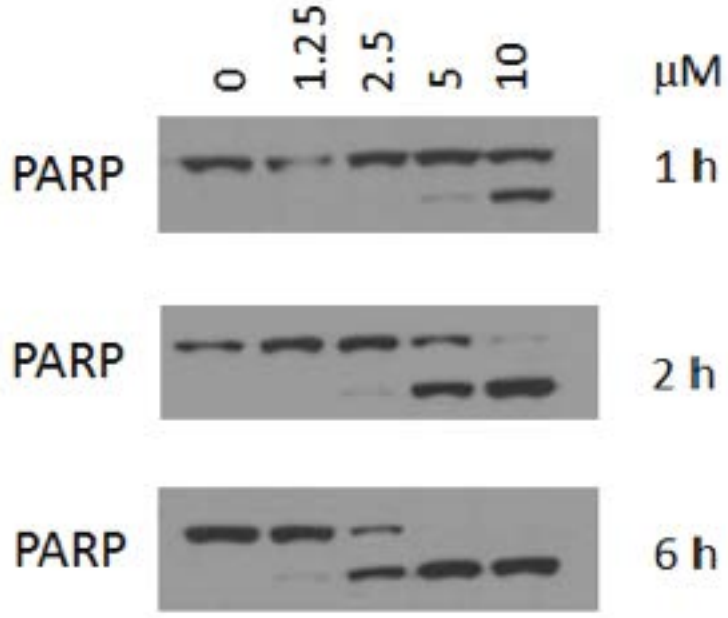

1 h
2 h
6 h
0
1.25
2.5
5
10
uM
PARP
Actin
PARP
Actin

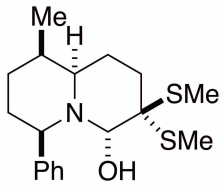

Me
H
Me
N
SMe
Ph
OH

(+)-9a


Me
H
SMe
N
Me
Ph
OH

(+)-9b


0
1.25
2.5
5
10
µM
PARP
1 h
PARP
2 h
PARP
6 h


Me
H
SMe
N
SMe
Ph
OH

(+)-9c