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SUPPORTING INFORMATION

Selenocysteinyl electrophile efficiently promotes the formation of coumarin and quinolinone core by 6-*endo*-*dig* cyclization

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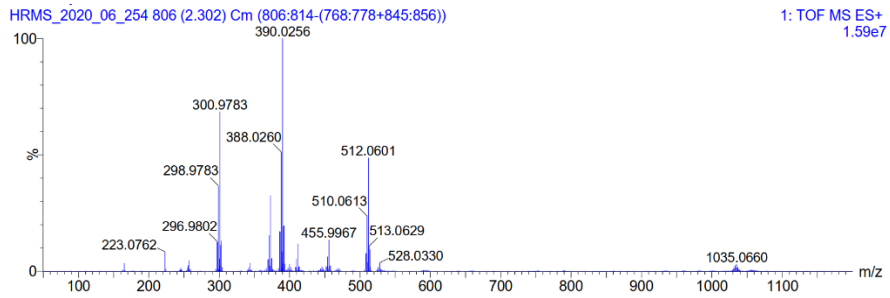
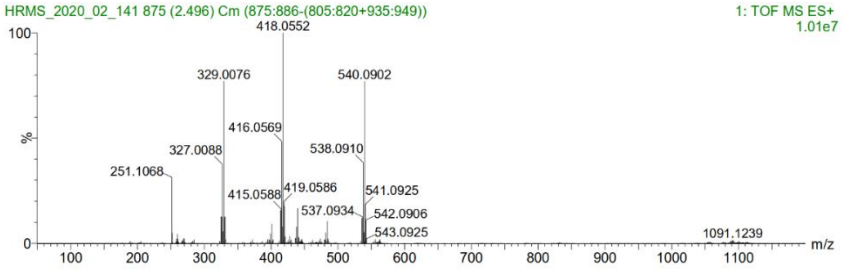
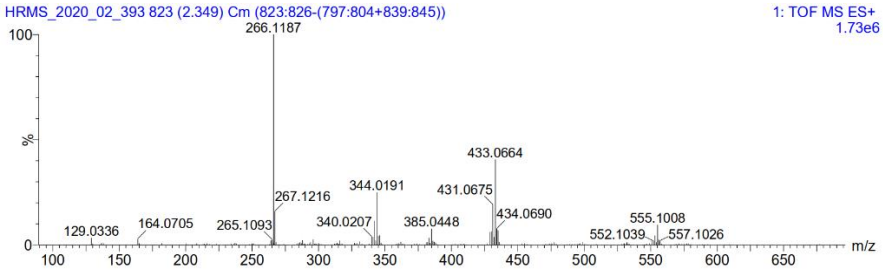
(*R*)-2-((*tert*-butoxycarbonyl)amino)-3-((2-oxo-4-phenyl-2*H*-chromen-3-yl)selanyl)propanoic acid (3a)



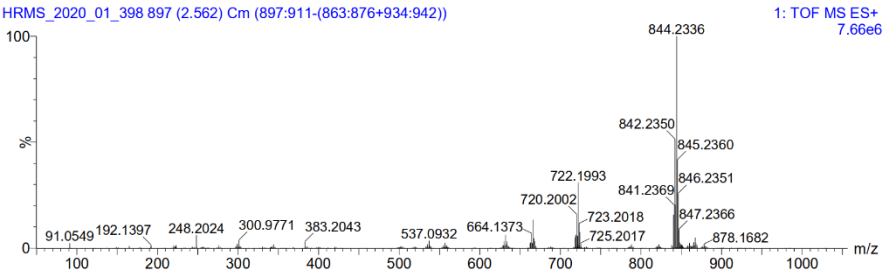
(*R*)-2-((*tert*-butoxycarbonyl)amino)-3-((5,7-dimethyl-2-oxo-4-phenyl-2*H*-chromen-3-yl)selanyl)propanoic acid (3b)



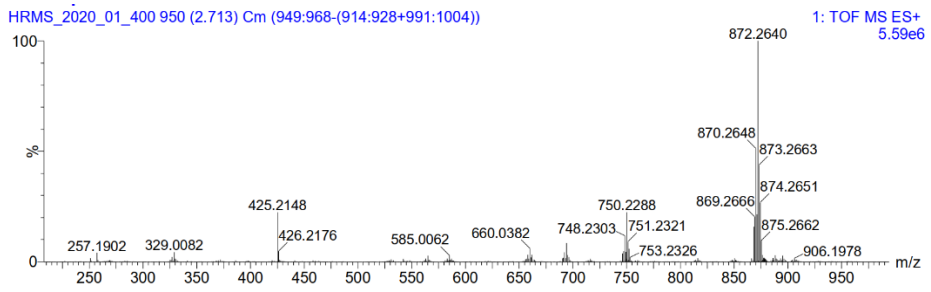
(*R*)-2-((*tert*-butoxycarbonyl)amino)-3-((7-(dimethylamino)-2-oxo-4-phenyl-2*H*-chromen-3-yl)selanyl)propanoic acid (3c)



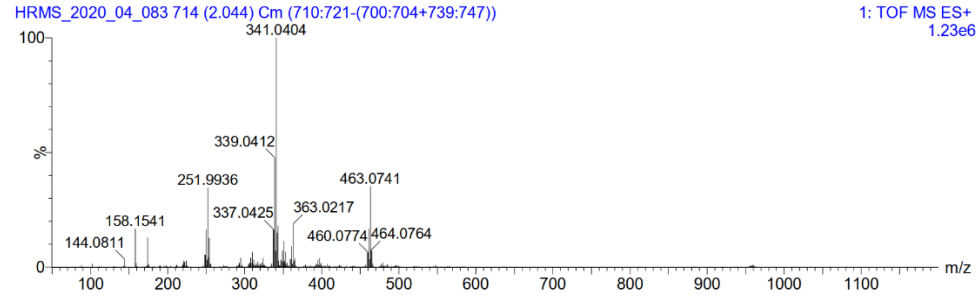
***Tert*-butyl N^5-((*R*)-1-((2-(benzyloxy)-2-oxoethyl)amino)-1-oxo-3-((2-oxo-4-phenyl-2*H*-chromen-3-yl)selanyl)propan-2-yl)-N^2-(*tert*-butoxycarbonyl)-L-glutaminate (3d)**



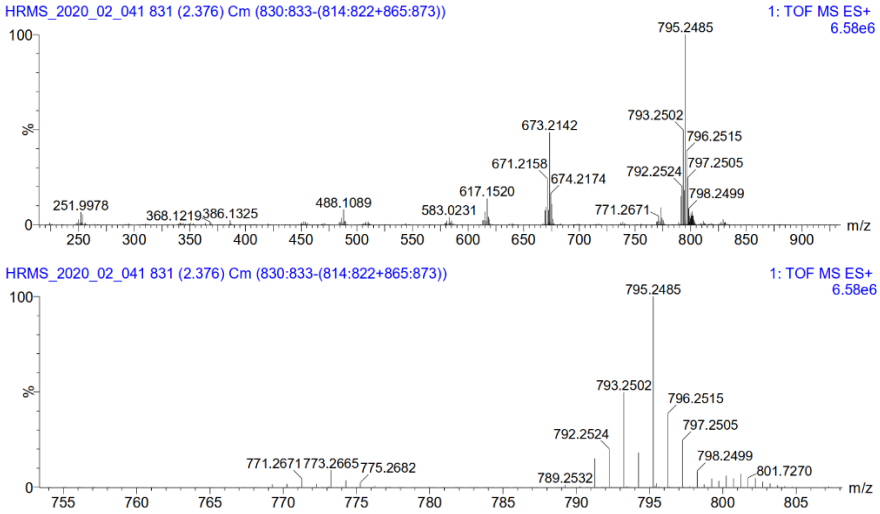
***Tert*-butyl N^5-((*R*)-1-((2-(benzyloxy)-2-oxoethyl)amino)-3-((5,7-dimethyl-2-oxo-4-phenyl-2*H*-chromen-3-yl)selanyl)-1-oxopropan-2-yl)-N^2-(*tert*-butoxycarbonyl)-L-glutaminate (3e)**



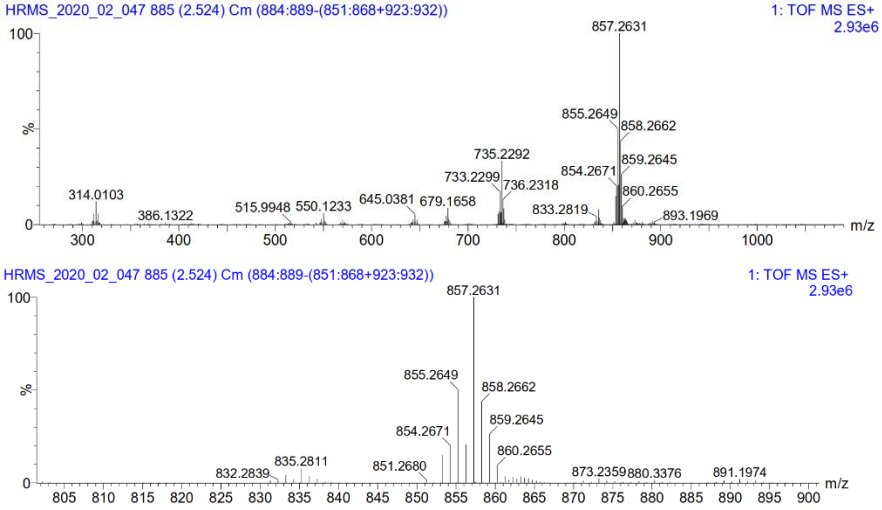
(*R*)-2-((*tert*-butoxycarbonyl)amino)-3-((1,4-dimethyl-2-oxo-1,2-dihydroquinolin-3-yl)selanyl)propanoic acid (5a)



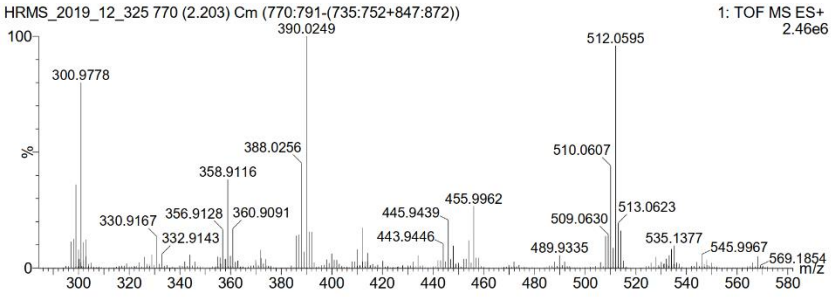
***Tert*-butyl N^5-((*R*)-1-((2-(benzyloxy)-2-oxoethyl)amino)-3-((1,4-dimethyl-2-oxo-1,2-dihydroquinolin-3-yl)selanyl)-1-oxopropan-2-yl)-N^2-(*tert*-butoxycarbonyl)-L-glutaminate (5b)**



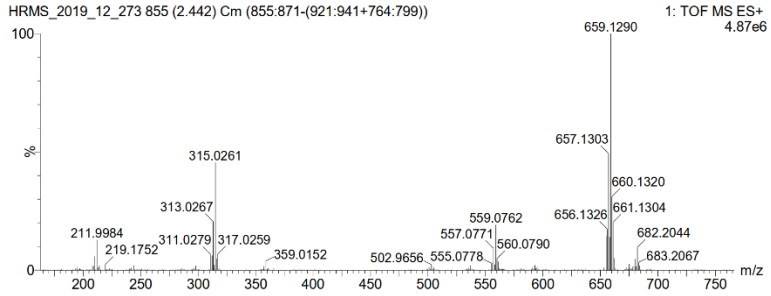
Tert-butyl N^5-((_R_)-1-((2-(benzyloxy)-2-oxoethyl)amino)-3-((1-methyl-2-oxo-4-phenyl-1,2-dihydroquinolin-3-yl)selanyl)-1-oxopropan-2-yl)-N^2-(_tert_-butoxycarbonyl)-L-glutaminate (5c)



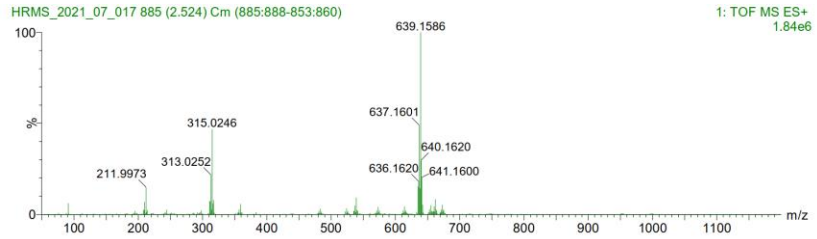
(_R_)-2-((_tert_-butoxycarbonyl)amino)-3-((1-oxo-3-phenyl-1_H_-isochromen-4-yl)selanyl)propanoic acid (7a)



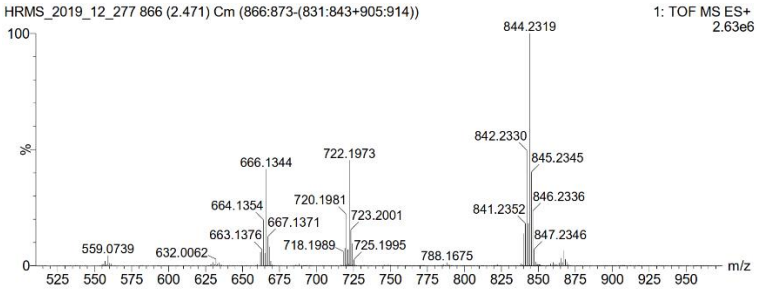
Benzyl (_R_)-(2-((_tert_-butoxycarbonyl)amino)-3-((1-oxo-3-phenyl-1_H_-isochromen-4-yl)selanyl)propanoyl)glycinate (7b)



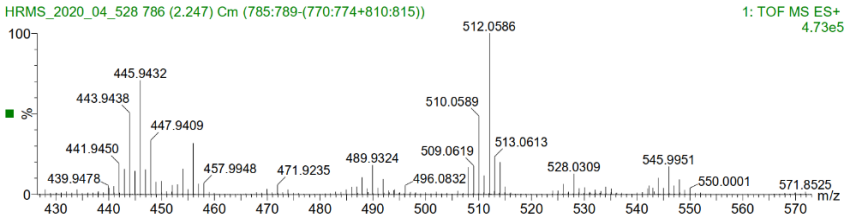
Benzyl (*R*)-(2-((*tert*-butoxycarbonyl)amino)-3-((3-butyl-1-oxo-1*H*-isochromen-4-yl)selanyl)propanoyl)glycinate (7c)



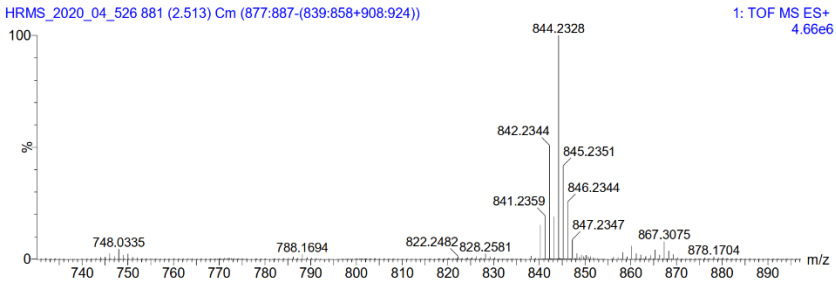
***Tert*-butyl N^5-((*R*)-1-((2-(benzyloxy)-2-oxoethyl)amino)-1-oxo-3-((1-oxo-3-phenyl-1*H*-isochromen-4-yl)selanyl)propan-2-yl)-N^2-(*tert*-butoxycarbonyl)-L-glutaminate (7d)**



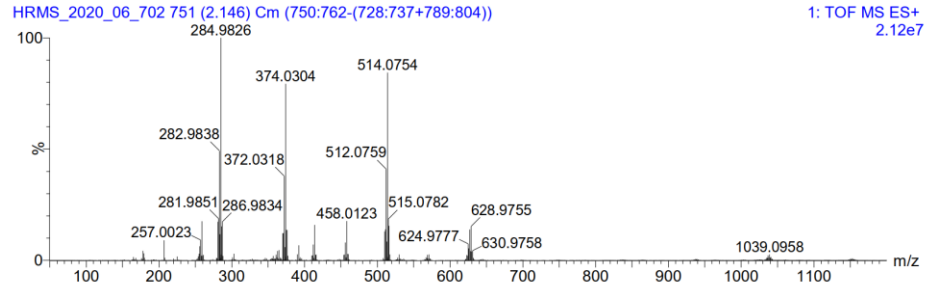
(*R*)-2-((*tert*-butoxycarbonyl)amino)-3-((1-oxo-3-phenyl-1,2-dihydroisoquinolin-4-yl)selanyl)propanoic acid (7e)



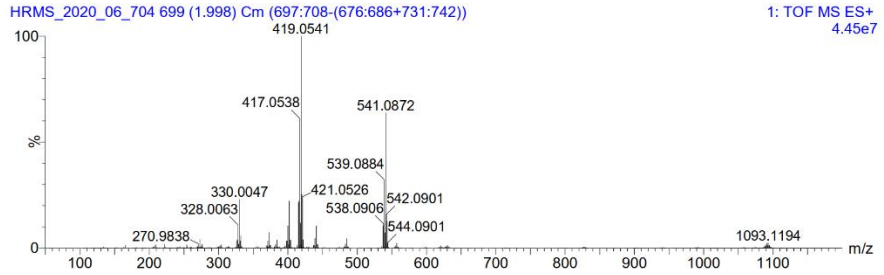
***Tert*-butyl N^5-((*R*)-1-((2-(benzyloxy)-2-oxoethyl)amino)-1-oxo-3-((1-oxo-3-phenyl-1,2-dihydroisoquinolin-4-yl)selanyl)propan-2-yl)-N^2-(*tert*-butoxycarbonyl)-L-glutaminate (7f)**



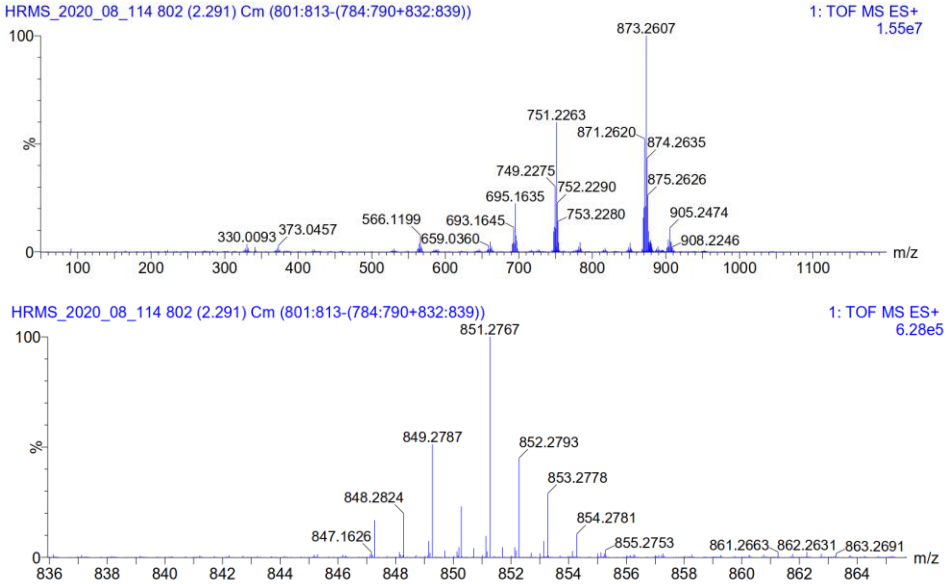
(*R*,*Z*)-2-((*tert*-butoxycarbonyl)amino)-3-((3-oxo-3-phenoxy-1-phenylprop-1-en-1-yl)selanyl)propanoic acid (8).

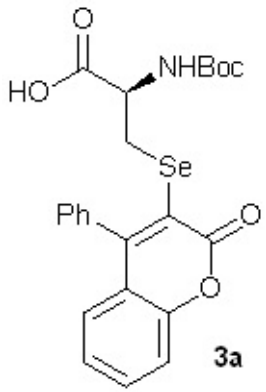


(*R*)-2-((*tert*-butoxycarbonyl)amino)-3-((1-methyl-2,8-dioxo-4-phenyl-1-azaspiro[4.5]deca-3,6,9-trien-3-yl)selanyl)propanoic acid (10a).



***Tert*-butyl N^5-((*R*)-1-((2-(benzyloxy)-2-oxoethyl)amino)-3-((1-methyl-2,8-dioxo-4-phenyl-1-azaspiro[4.5]deca-3,6,9-trien-3-yl)selanyl)-1-oxopropan-2-yl)-N^2-(*tert*-butoxycarbonyl)-L-glutaminate (10b).**




O
HO
NHBoc
Se
Ph
O
O

3a

1.31
7.60
7.52
7.42
7.41
7.40
7.39
7.33
7.31
7.30
7.27
7.23
7.22
7.21
7.21
7.20
7.19
7.18
7.02
7.02
7.00
7.00
4.33
4.32
4.31
4.30
3.44
3.43
3.41
3.40
3.31 CD3OD
3.29
3.27
4.19
1.04
0.95
1.11
1.04
1.01
0.85
1.00
0.49
9.21
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
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6.0
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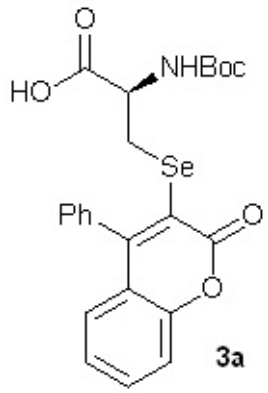
f1 (ppm)


O
HO
NHBoc
Se
Ph
O
O

3a

173.88
161.19
159.33
157.34
154.48
137.80
132.95
130.11
129.81
129.79
129.62
129.39
128.67
125.61
121.83
119.65
117.59
80.71
55.80
28.67
28.57
200
190
180
170
160
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50
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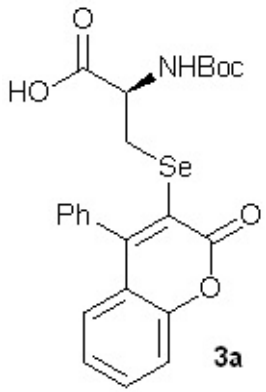
10
0
f1 (ppm)

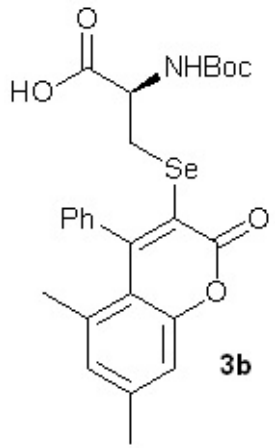


3a

244.85

1350 1300 1250 1200 1150 1100 1050 1000 950 900 850 800 750 700 650 600 550 500 450 400 350 300 250 200 150 100 50 0

f1 (ppm)


O
HO
NHBoc
Se
Ph
O
O
3b

1.34
3.44
3.43
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3.38
3.31 CD3OD
2.38
1.68
7.52
7.47
7.30
7.21
7.12
6.90
4.31
4.30
4.29
4.27
3.07
2.11
1.00
1.03
0.88
0.95
3.13
3.12
9.30
12.0
11.5
11.0
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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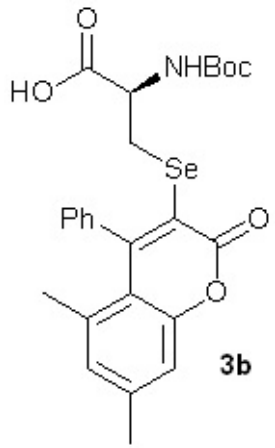
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


O
HO
NHBoc
Se
Ph
O
O

3b

173.98
160.88
159.78
157.37
155.52
143.83
142.02
138.41
131.09
129.86
129.79
129.30
119.86
117.52
116.49
80.69
55.80
28.69
28.59
23.35
21.26
200
190
180
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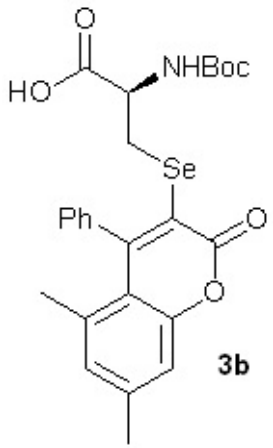
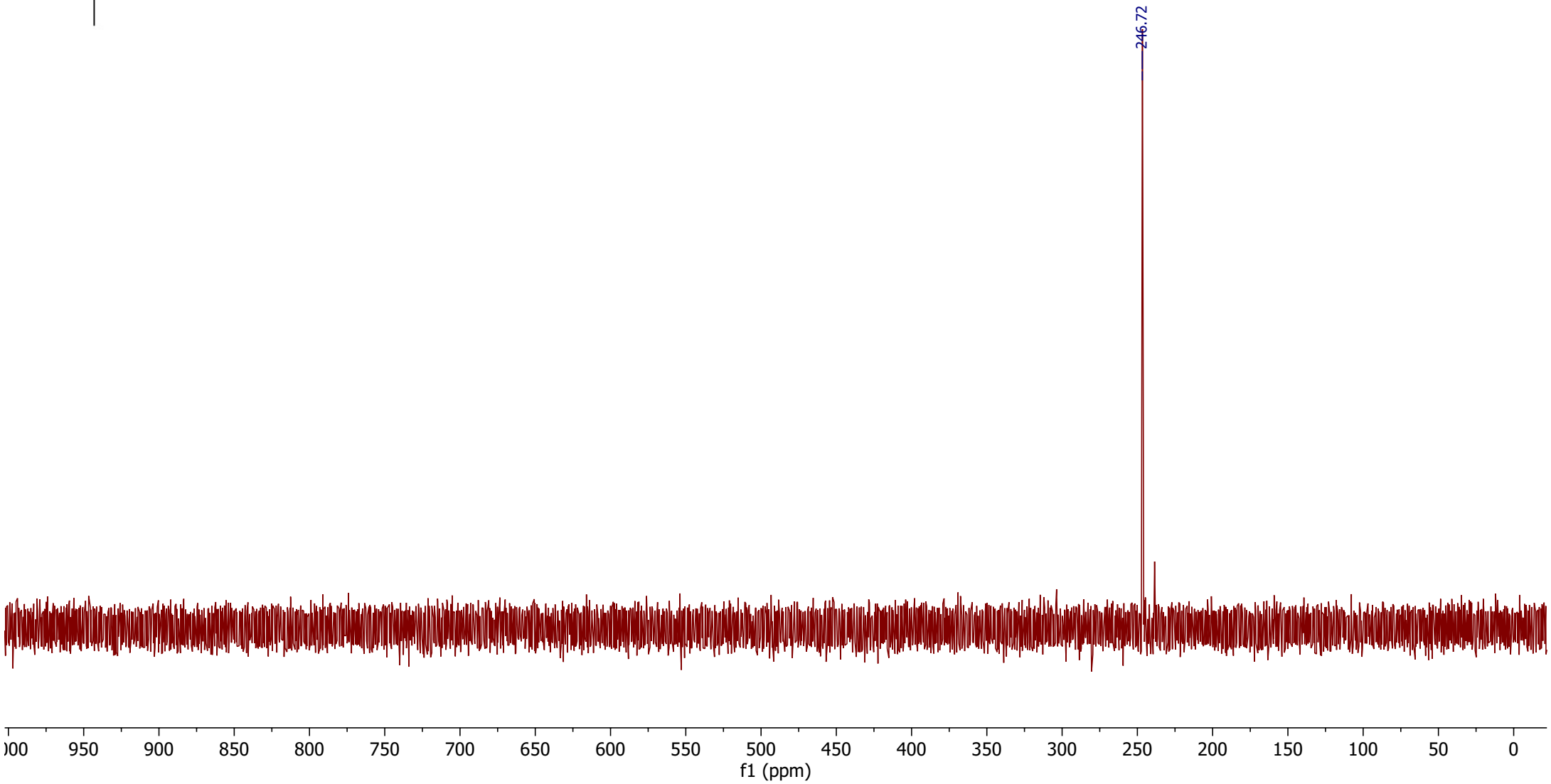
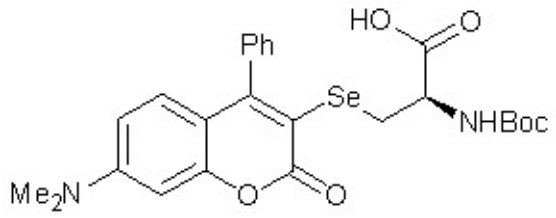
f1 (ppm)



3b




HO
O
Ph
Se
NHBoc
Me2N
O
O

3c

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3.19
3.19
3.17
3.03
2.99
2.97
1.40
7.65
7.62
7.55
7.52
7.48
7.42
6.65
6.64
6.62
6.61
6.56
6.55
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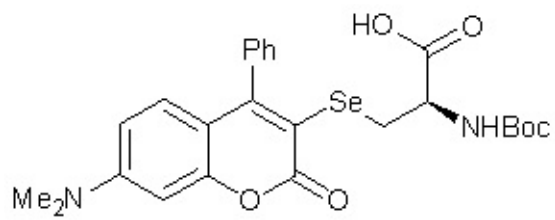
f1 (ppm)


HO
O
Ph
Se
NHBoc
Me2N
O
O

3c

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153.84
153.63
139.20
134.21
132.31
129.95
120.45
112.33
107.63
106.99
89.47
81.15
80.58
40.42
30.95
28.69
220
210
200
190
180
170
160
150
140
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100
90
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60
50
40
30
20
10
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-10
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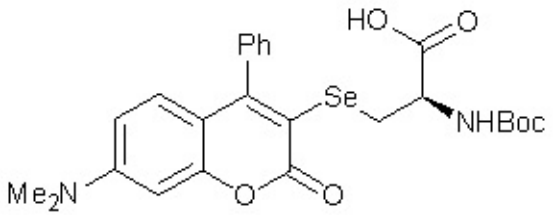
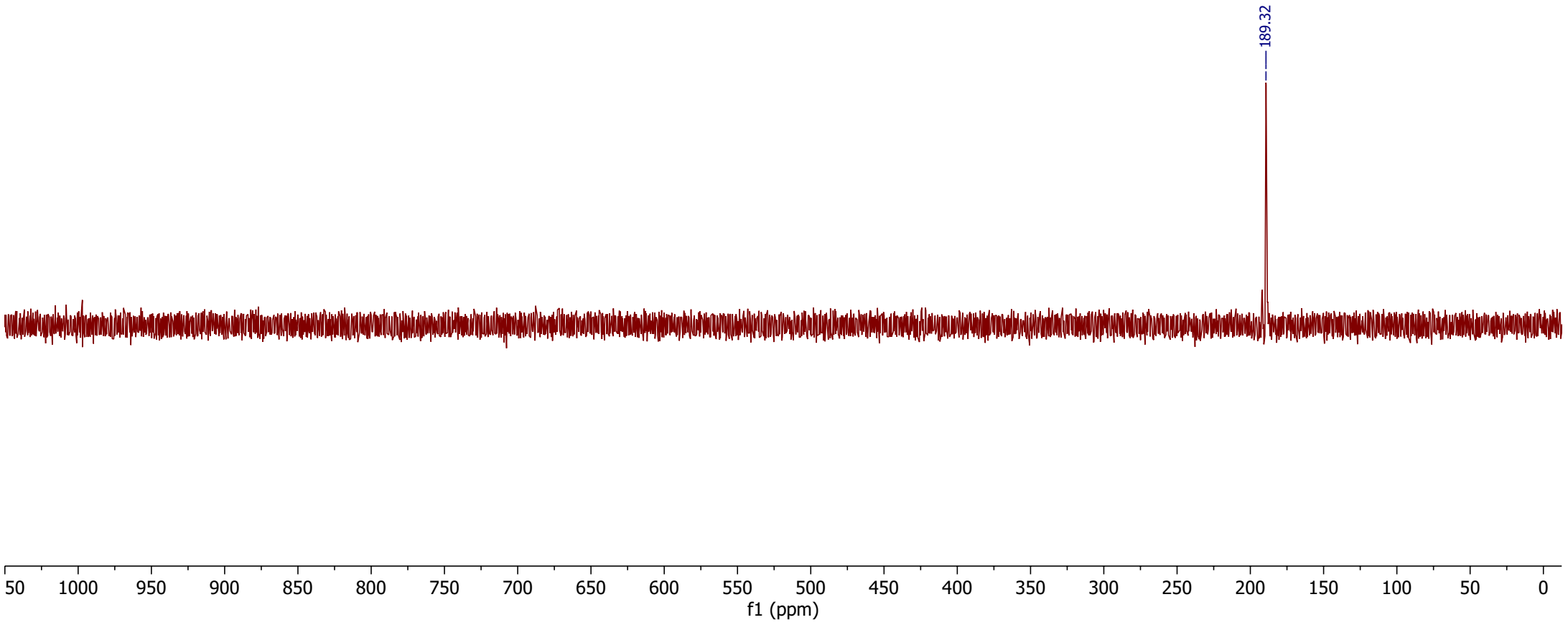
f1 (ppm)


HO
O
Ph
Se
NHBoc
Me2N
O
O

3c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250
200
150
100
50
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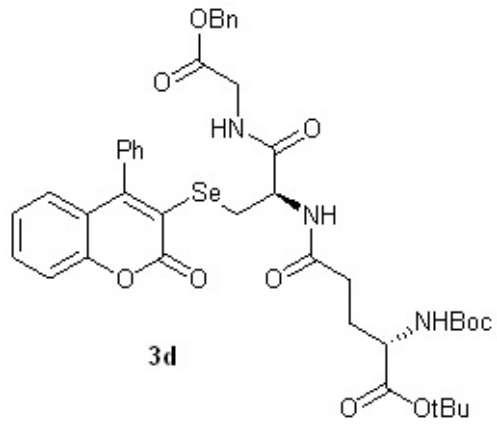
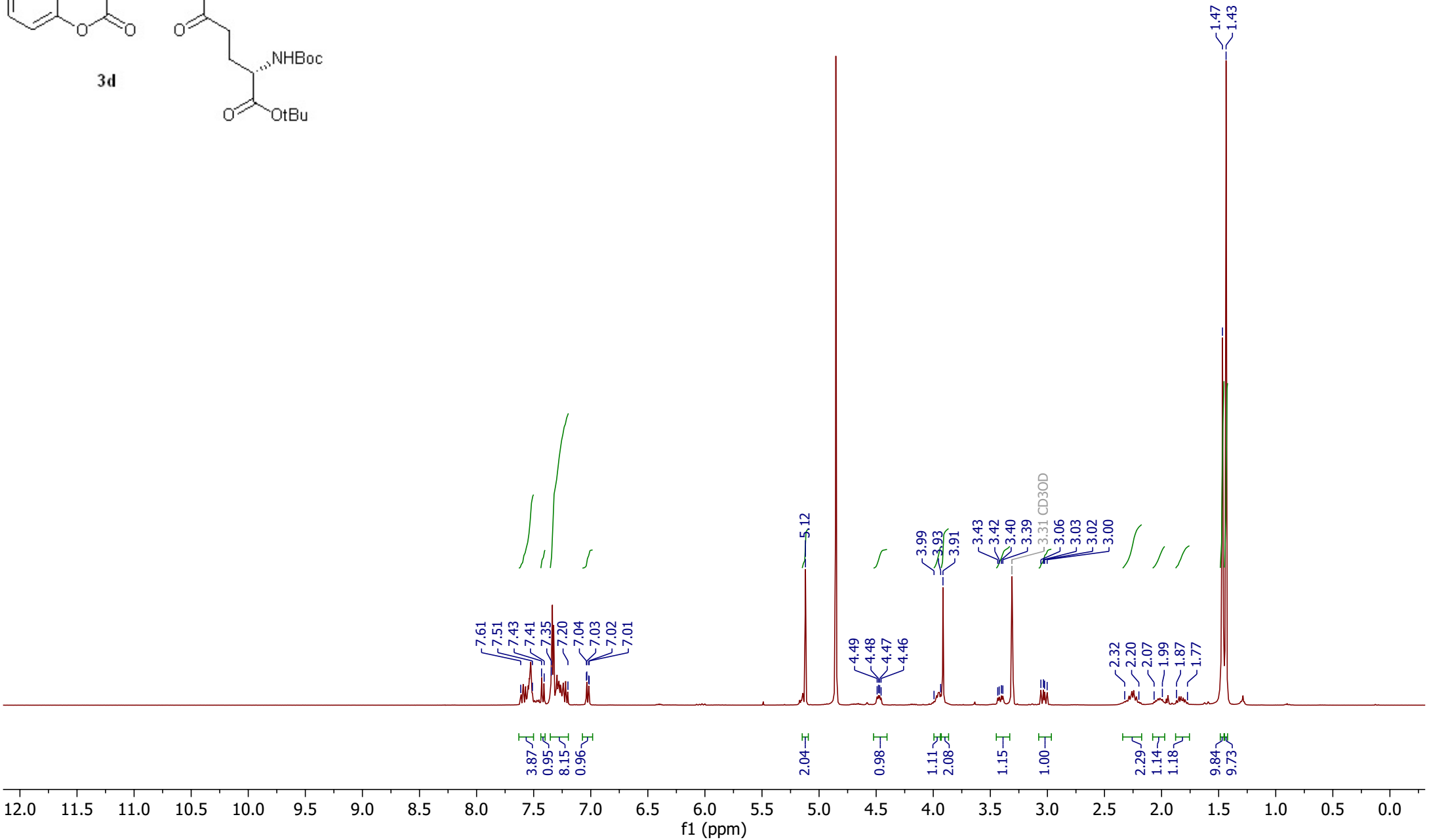
f1 (ppm)


OBn
HN
Ph
Se
NH
NHBoc
OtBu

3d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7.20
7.04
7.03
7.02
7.01
5.12
4.49
4.48
4.47
4.46
3.99
3.93
3.91
3.43
3.42
3.40
3.39
3.31 CD3OD
3.06
3.03
3.02
3.00
2.32
2.20
2.07
1.99
1.87
1.77
1.47
1.43
3.87
0.95
8.15
0.96
2.04
0.98
1.11
2.08
1.15
1.00
2.29
1.14
1.18
9.84
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11.0
10.5
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9.5
9.0
8.5
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7.5
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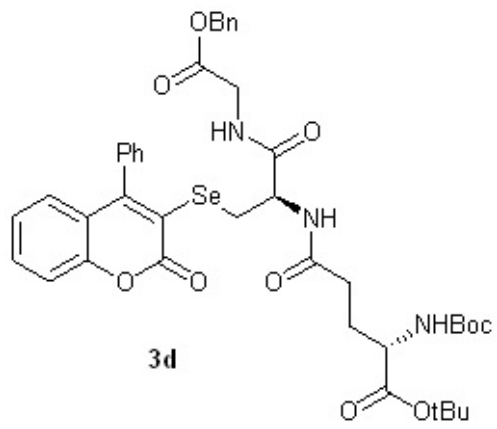
f1 (ppm)


OBn
HN
Ph
Se
NH
NHBoc
OtBu

3d

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129.65
129.59
129.55
129.44
129.31
129.29
128.76
125.67
121.78
119.48
117.61
176.36
174.73
173.23
170.69
161.42
159.85
158.02
154.48
82.76
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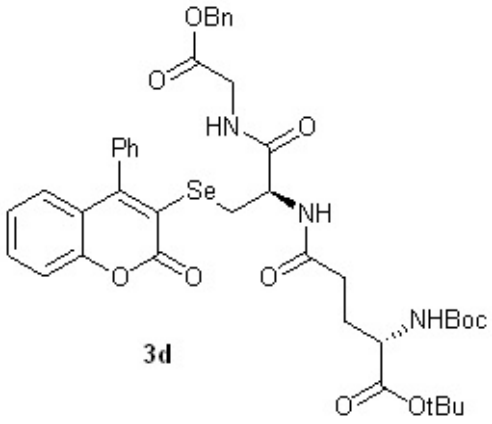
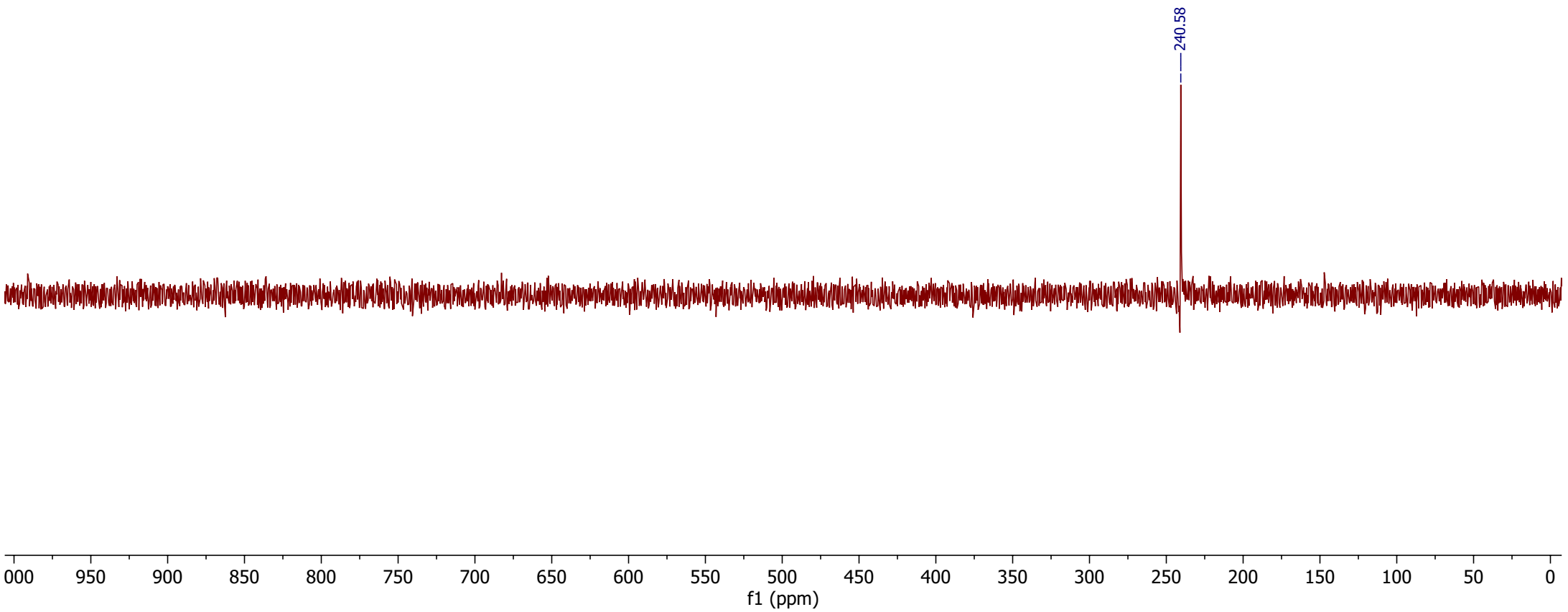
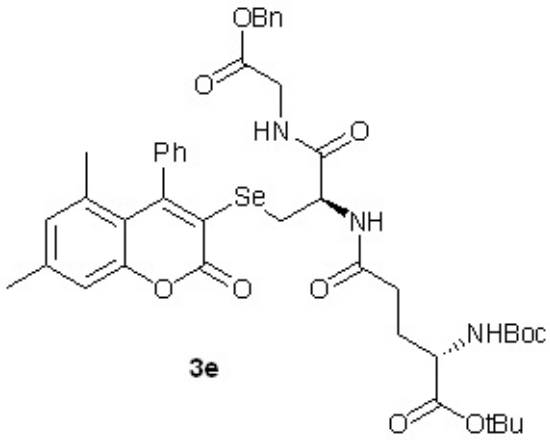
22.06
f1 (ppm)


OBn
O
HN
O
Ph
Se
NH
O
O
O
O
NHBoc
O
OtBu

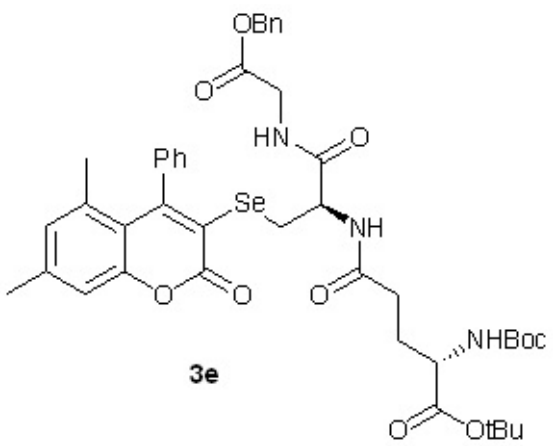
3d


240.58
000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)


OBn
O
HN
O
Ph
Se
NH
O
O
O
O
NHBoc
O
OtBu

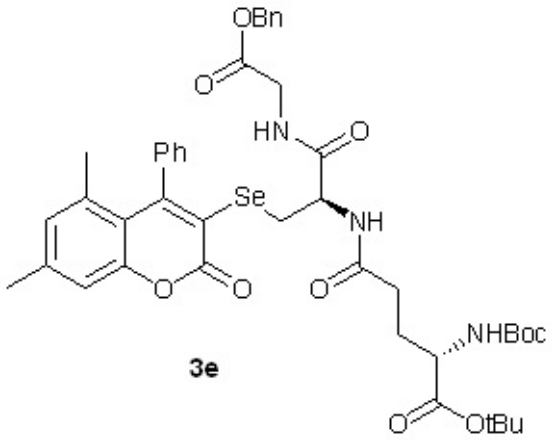
3e

2.37
2.30
2.21
2.07
2.00
1.88
1.78
1.67
1.47
1.44
7.49
7.46
7.35
7.33
7.31
7.27
7.24
7.23
7.21
7.19
7.17
7.12
6.90
5.12
4.48
4.47
4.46
4.44
3.97
3.96
3.95
3.92
3.44
3.43
3.41
3.39
3.31 CD3OD
3.07
3.04
3.03
3.01
2.92
4.00
1.28
0.97
0.92
0.95
0.99
1.95
1.00
0.87
2.23
1.02
0.99
3.07
2.32
1.19
1.19
3.03
9.37
9.42
12.0
11.5
11.0
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
f1 (ppm)

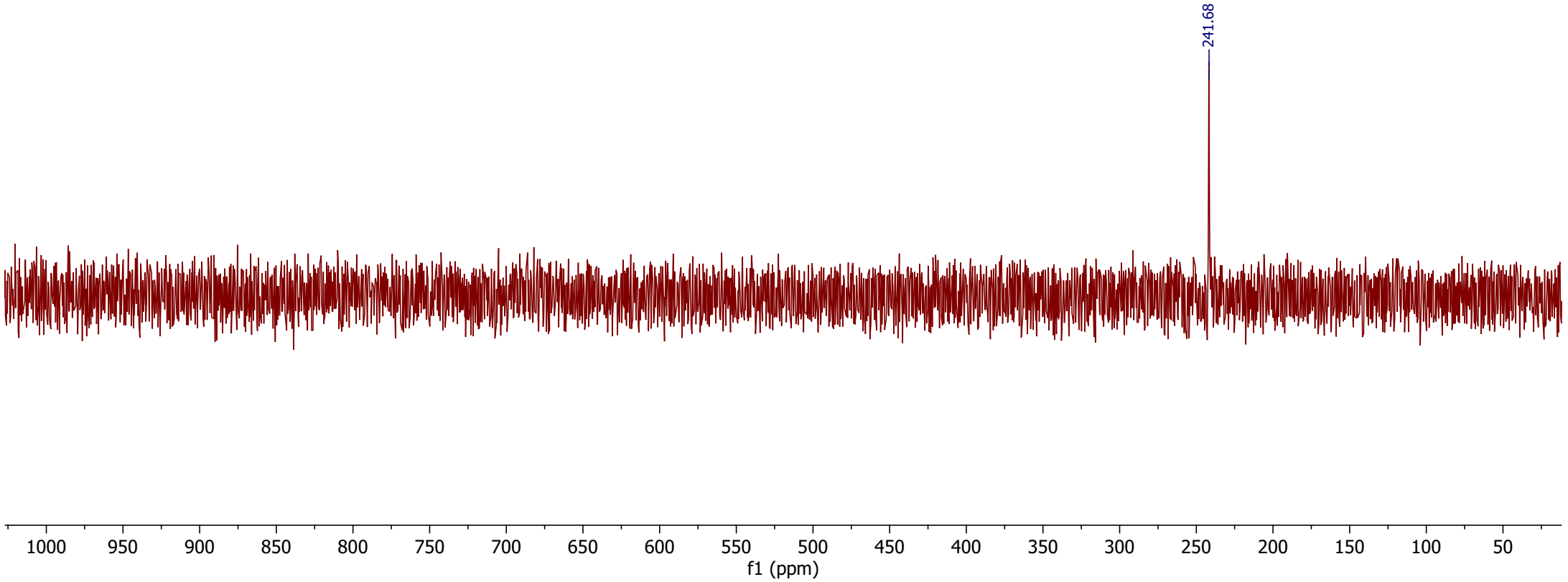

OBn
O
HN
O
Ph
Se
NH
O
O
O
O
NHBoc
O
OtBu

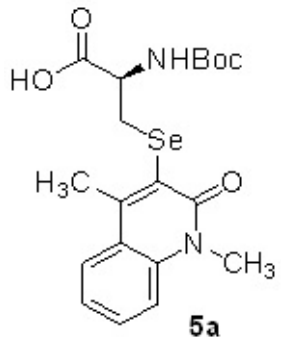
3e

131.19
129.93
129.83
129.81
129.56
129.33
129.31
129.29
129.10
174.75
173.33
173.23
170.70
161.17
160.37
158.04
155.54
144.06
142.03
138.53
137.15
119.71
117.57
116.47
82.77
80.53
67.87
55.44
54.98
42.19
33.07
29.06
28.76
28.28
23.35
21.28
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


OBn
O
HN
O
Ph
Se
NH
O
O
O
NHBoc
O
OtBu

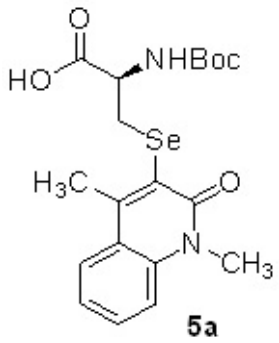
3e


241.68
1000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
f1 (ppm)


O
HO
NHBoc
Se
H3C
O
N
CH3

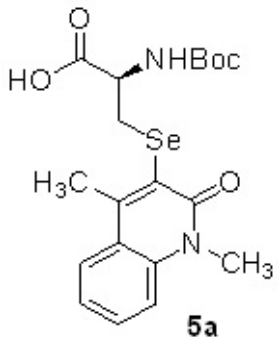
5a

1.29
3.75
2.85
7.91
7.88
7.66
7.64
7.61
7.56
7.53
7.34
7.32
7.29
4.31
4.29
4.28
4.27
3.46
3.45
3.42
3.40
3.31 CD3OD
3.28
3.25
1.02
1.04
1.03
1.06
0.82
3.00
1.03
0.59
3.06
9.20
f1 (ppm)

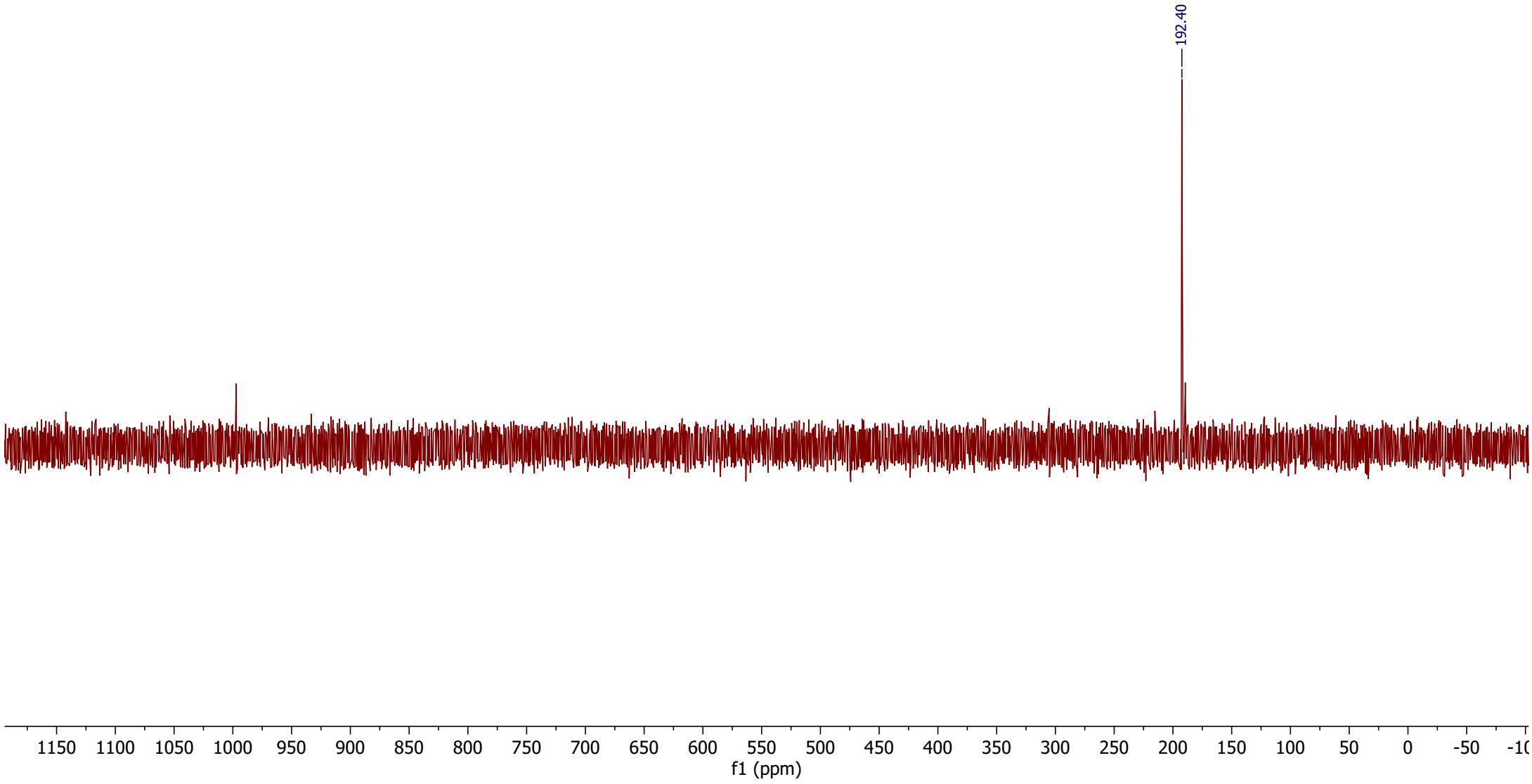

O
HO
NHBoc
Se
H3C
O
N
CH3

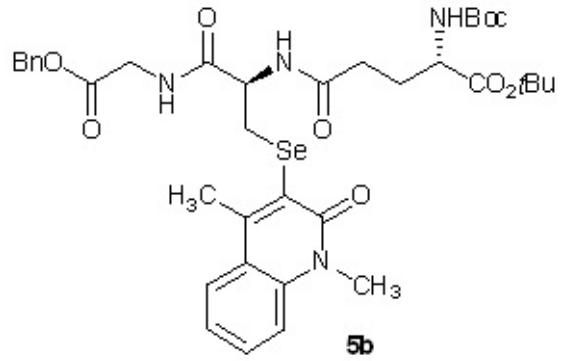
5a

174.15
162.33
157.42
153.38
140.37
132.19
127.50
124.55
123.80
122.26
116.01
80.51
55.68
31.27
29.10
28.75
28.55
21.32
00
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


O
HO
NHBoc
Se
H3C
O
N
CH3

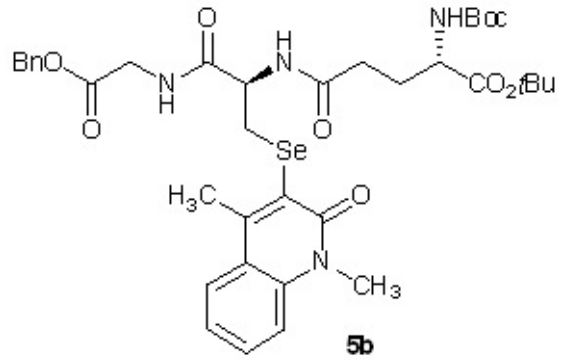
5a


192.40
1150
1100
1050
1000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
-50
-10
f1 (ppm)


BnO
O
N
H
O
H
N
O
NHBoc
CO2tBu
Se
H3C
O
N
CH3

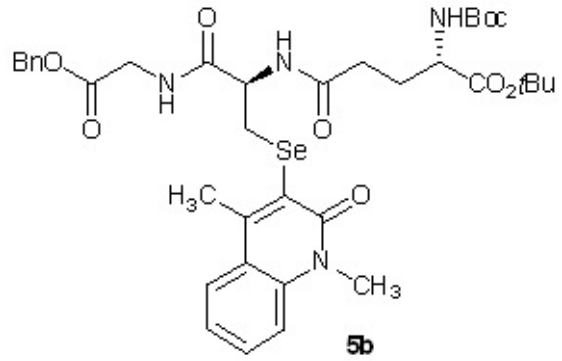
5b

1.47
1.45
1.44
1.43
1.42
3.99
3.98
3.97
3.95
3.90
3.76
2.82
5.10
3.31 CD3OD
3.29
3.25
3.21
3.19
3.17
3.15
7.89
7.89
7.87
7.87
7.66
7.66
7.64
7.64
7.63
7.62
7.62
7.55
7.55
7.53
7.53
7.34
7.21
4.54
4.52
4.52
4.50
2.38
2.34
2.13
2.03
1.92
1.84
1.04
1.05
1.06
6.70
2.02
1.00
1.16
2.25
3.08
1.00
1.05
3.10
2.09
1.21
1.17
9.84
9.46
f1 (ppm)

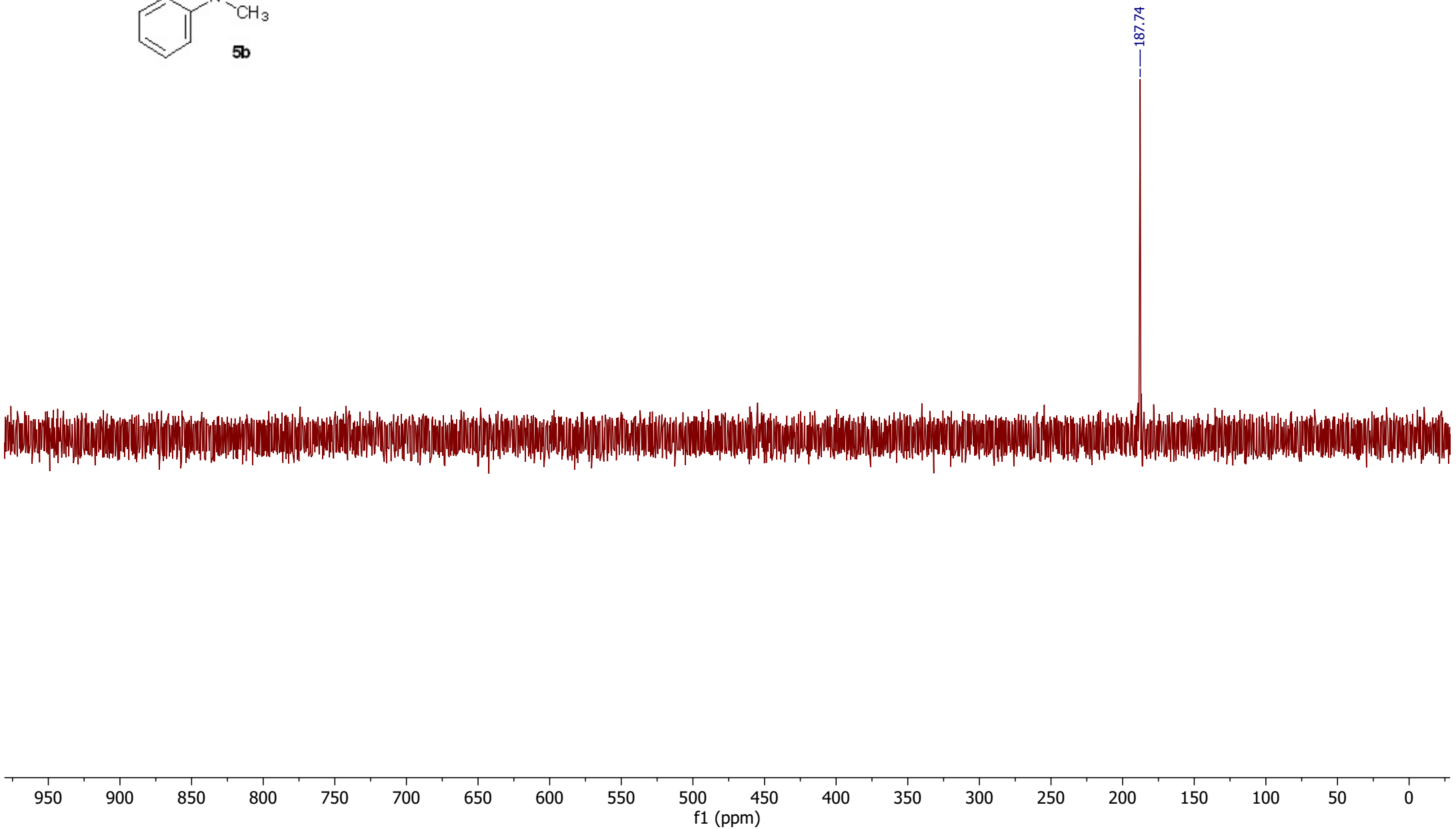

BnO
O
N
H
O
O
N
H
O
NHBoc
CO2tBu
Se
H3C
O
N
CH3

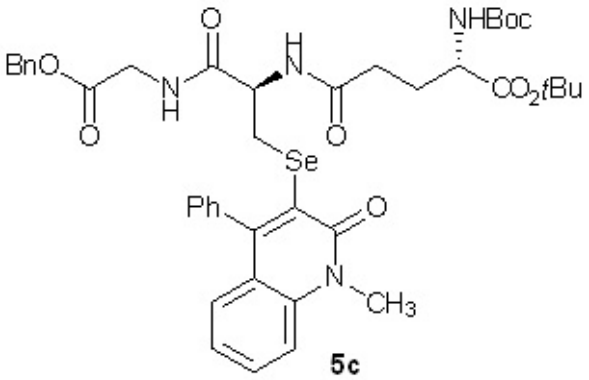
5b

174.89
173.38
173.25
170.68
162.41
158.02
153.56
140.31
137.09
132.34
129.50
129.29
129.25
127.52
123.89
116.06
82.70
80.47
67.85
55.42
54.97
42.17
33.09
31.41
29.23
28.74
28.27
21.40
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


BnO
O
N
H
O
O
H
N
O
NHBoc
CO2tBu
Se
H3C
O
N
CH3

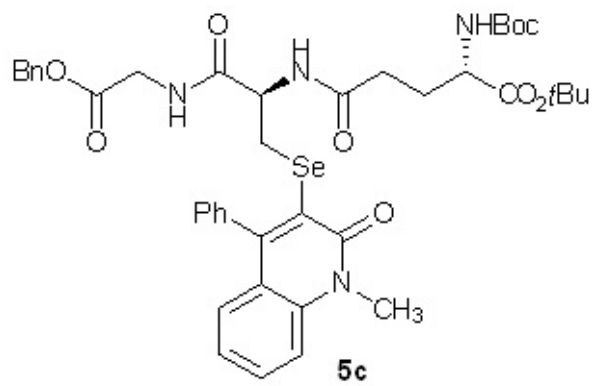
5b


187.74
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)


BnO
O
N
H
O
O
N
H
O
NHBoc
CO_2tBu
Se
Ph
O
N
CH_3

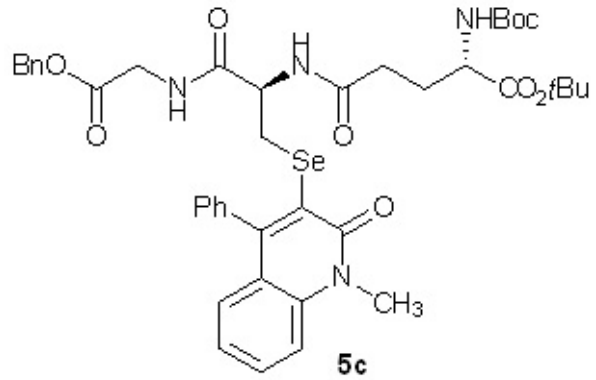
5c

7.64
7.62
7.53
7.47
7.34
7.30
7.29
7.25
7.14
7.11
7.09
5.11
4.44
4.42
4.41
4.40
4.03
3.96
3.92
3.86
3.31 CD3OD
3.28
3.26
3.24
3.23
3.07
3.04
3.03
3.01
2.38
2.28
2.09
2.02
1.91
1.83
1.45
1.42
1.86
2.91
3.14
1.33
4.10
1.03
2.03
1.00
1.11
2.29
3.28
0.98
1.01
2.17
1.11
1.18
9.28
8.82
12.0
11.5
11.0
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
f1 (ppm)


BnO
O
N
H
O
O
NHBoc
O
O
tBu
Se
Ph
O
N
CH3

5c

174.91
173.50
173.23
170.68
162.59
158.00
156.76
140.75
139.68
137.12
132.28
130.04
129.84
129.64
129.57
129.51
129.30
129.25
124.41
123.68
122.74
116.01
82.71
80.48
67.84
55.45
55.09
42.18
33.10
31.53
28.75
28.28
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

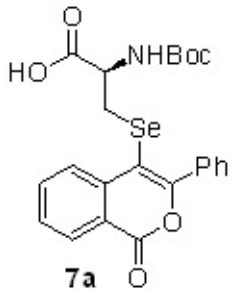


5c

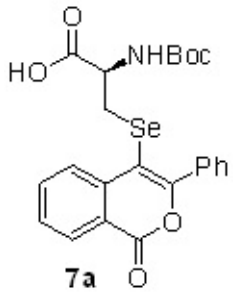
227.34

1000 950 900 850 800 750 700 650 600 550 500 450 400 350 300 250 200 150 100 50 0

f1 (ppm)

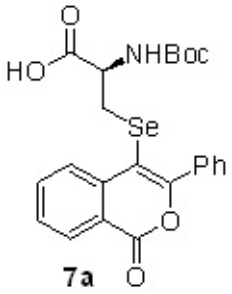

HO
O
NHBoc
Se
Ph
O
O
7a

8.28
8.24
7.91
7.87
7.72
7.69
7.63
7.59
7.50
7.46
4.16
4.16
3.31 CD3OD
3.00
2.99
2.97
2.96
2.91
2.90
2.88
2.87
1.35
1.94
1.00
1.97
1.01
2.95
0.78
0.94
1.00
8.79
12.0
11.5
11.0
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
f1 (ppm)

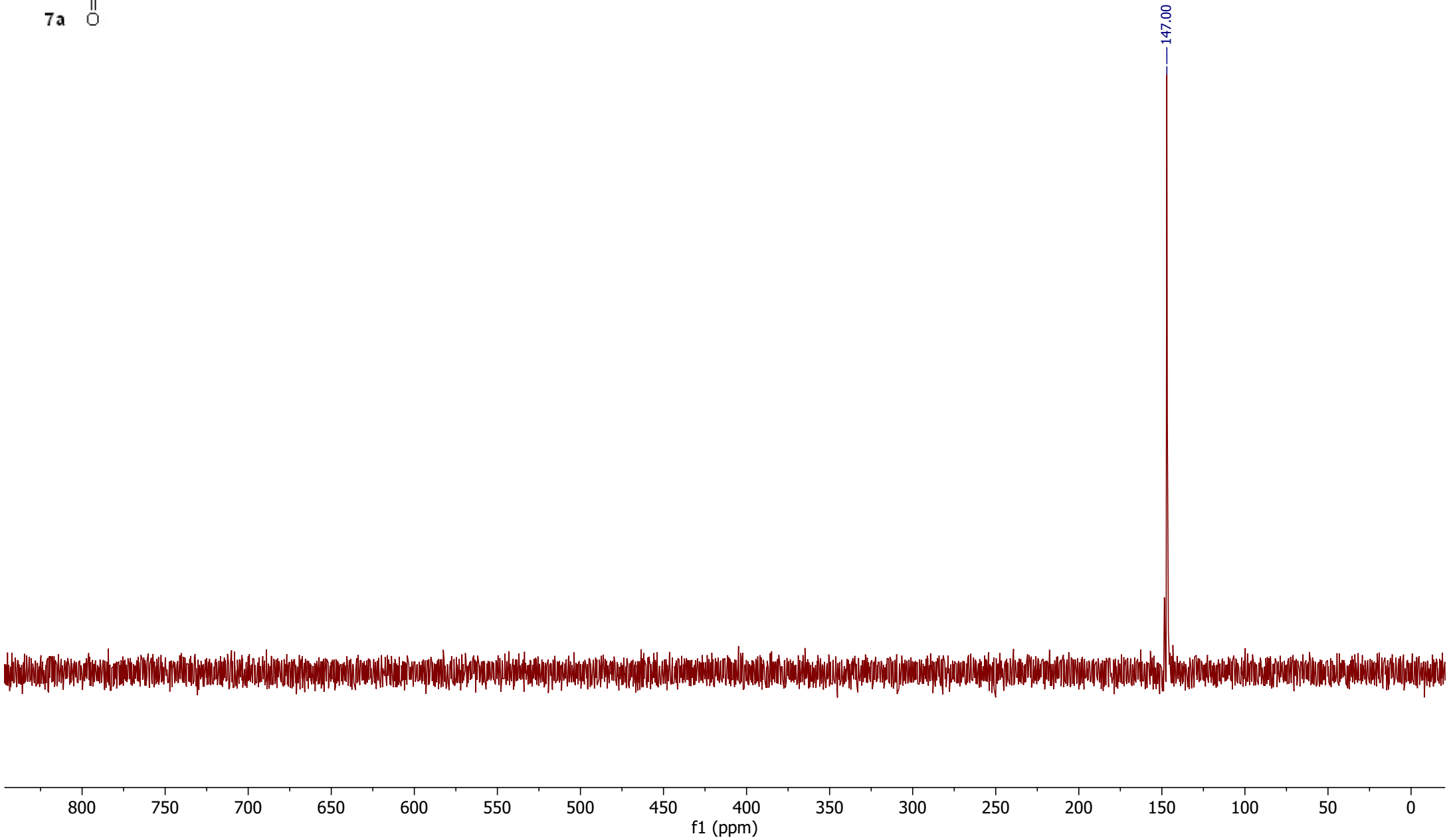

O
HO
NHBoc
Se
Ph
O
O

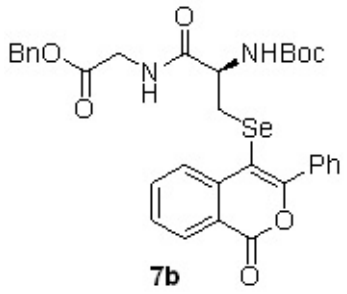
7a

176.38
163.53
159.45
157.17
140.02
136.72
135.57
131.25
131.06
130.54
129.86
129.31
128.96
121.74
106.22
80.75
30.42
28.61
22.07
00
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

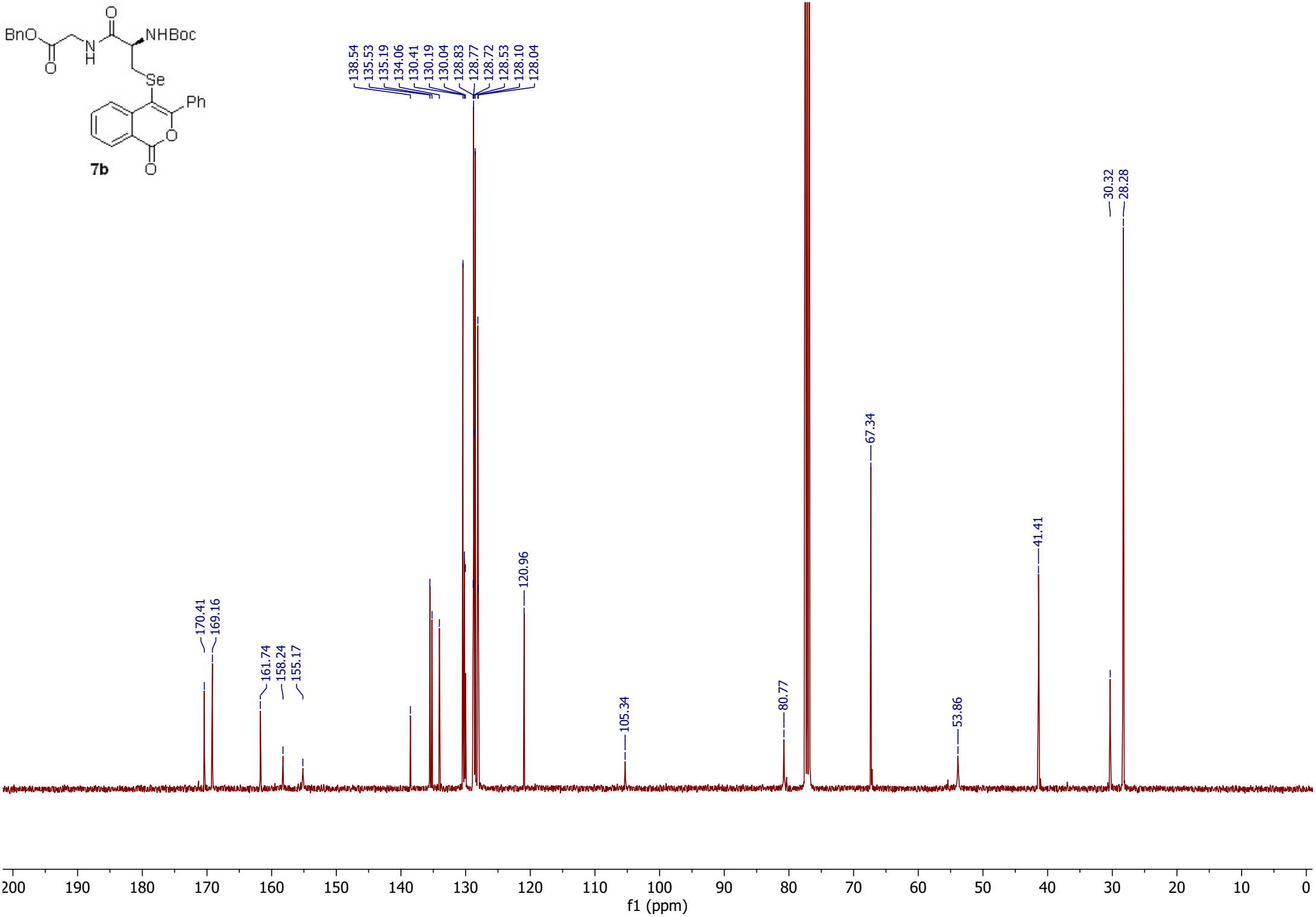

O
HO
NHBoc
Se
Ph
O
O

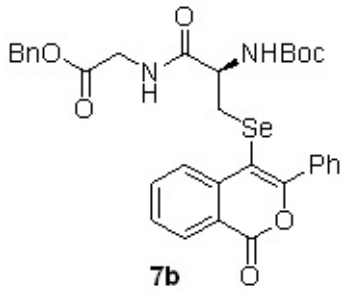
7a


147.00
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)

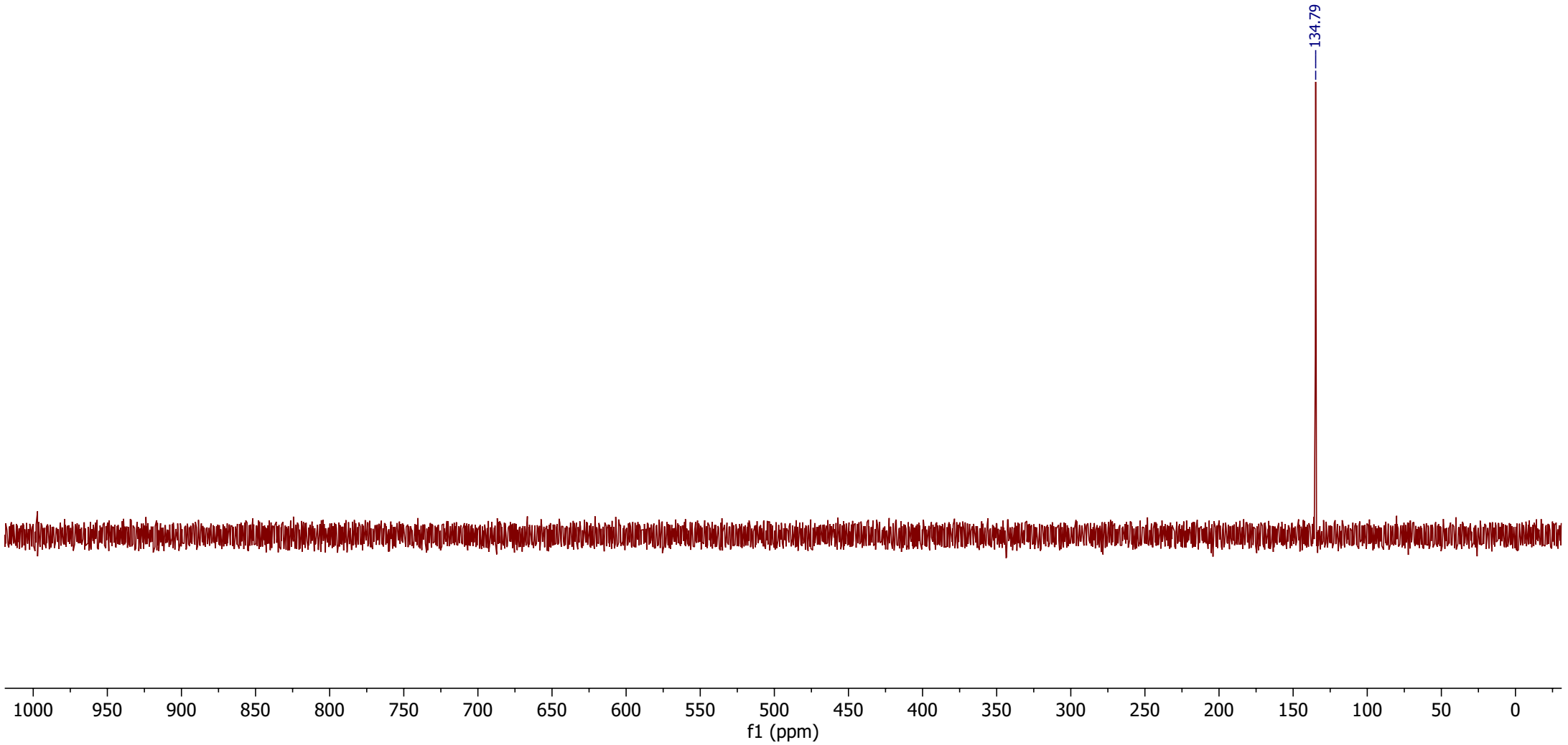

BnO
O
N
H
O
NHBoc
Se
Ph
O
O
7b

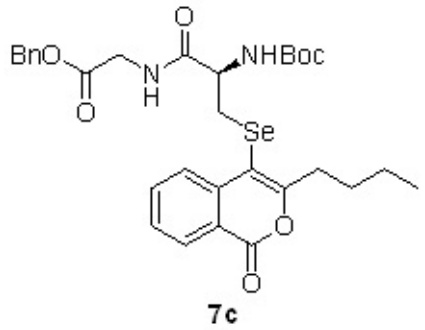
1.35
5.15
4.89
4.87
8.35
8.35
8.33
8.33
8.21
8.21
8.19
8.19
7.84
7.80
7.72
7.69
7.57
7.57
7.55
7.55
7.53
7.53
7.45
7.41
7.37
7.33
7.26 CDCl3
6.42
4.21
4.19
3.84
3.83
3.03
2.98
2.78
2.76
2.75
2.73
1.06
1.10
1.10
2.13
1.13
3.28
5.29
0.76
2.30
1.03
1.00
2.15
0.93
1.11
10.04
f1 (ppm)


BnO
O
N
H
O
NHBoc
Se
Ph
O
O
O
7b
138.54
135.53
135.19
134.06
130.41
130.19
130.04
128.83
128.77
128.72
128.53
128.10
128.04
170.41
169.16
161.74
158.24
155.17
120.96
105.34
80.77
67.34
53.86
41.41
30.32
28.28
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


BnO
O
N
H
O
NHBoc
Se
Ph
O
O

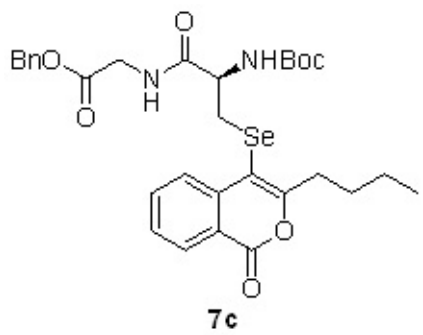
7b


134.79
1000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)


BnO
O
N
H
O
NHBoc
Se
O
O
O

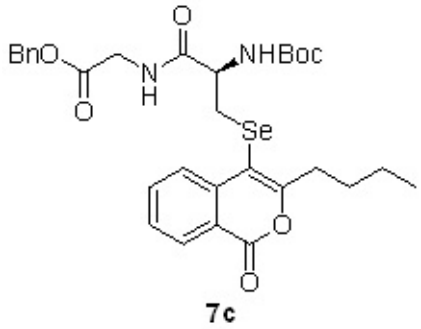
7c

8.22
8.22
8.20
8.20
8.14
8.12
7.85
7.85
7.83
7.83
7.83
7.81
7.81
7.56
7.56
7.55
7.54
7.54
7.53
7.52
7.34
7.26
5.12
4.22
4.21
4.19
4.18
3.99
3.94
3.89
3.85
3.31 CD3OD
3.18
2.98
2.91
2.88
2.88
2.85
1.74
1.67
1.47
1.34
1.00
0.98
0.96
0.97
0.94
0.96
0.98
4.83
2.00
0.81
2.06
3.00
0.99
2.02
10.86
2.93
f1 (ppm)

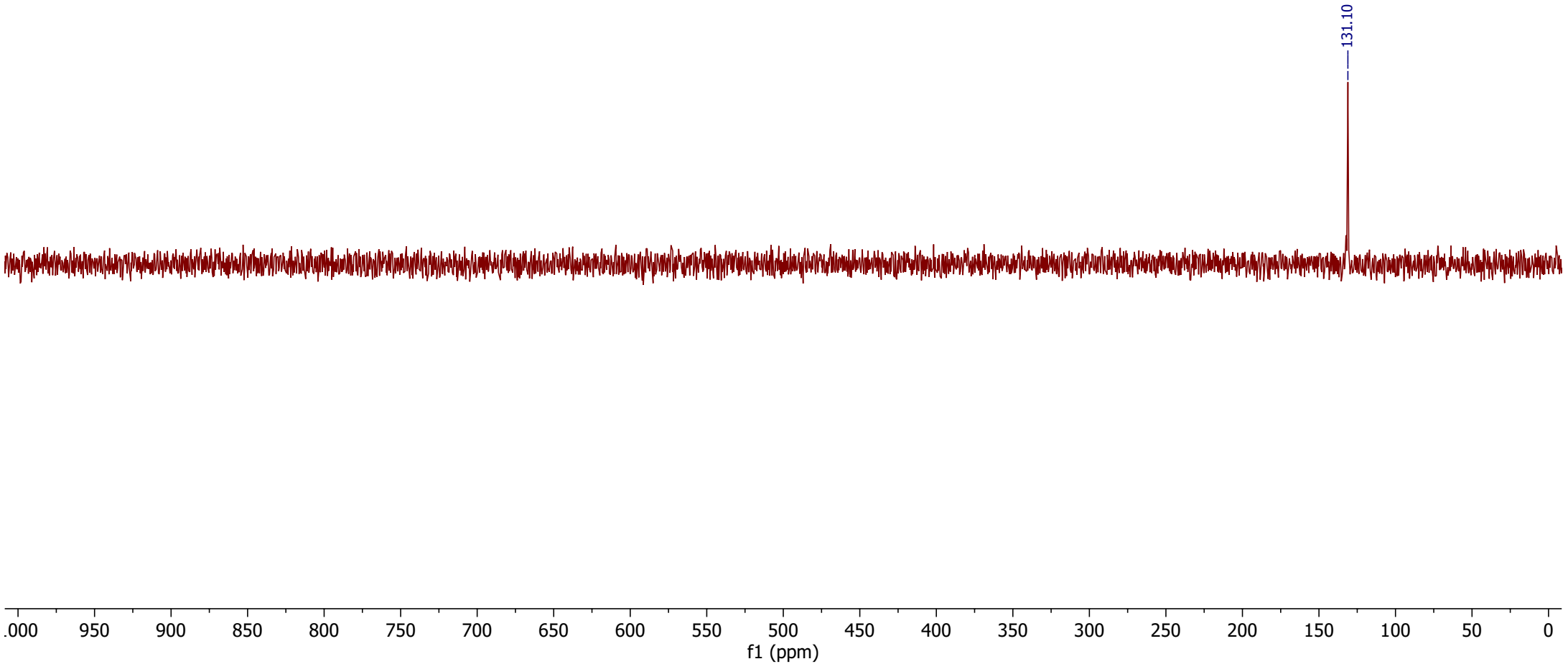

BnO
O
N
H
O
NHBoc
Se
O
O

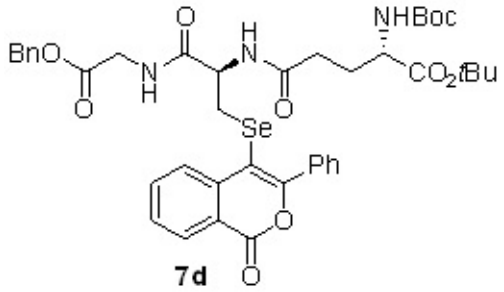
7c

173.79
170.75
163.86
157.48
139.95
137.10
136.72
130.45
129.54
129.33
129.31
129.23
128.65
127.98
121.50
105.33
80.95
67.91
55.97
42.13
35.29
31.40
30.88
28.70
23.38
14.24
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


BnO
O
N
H
O
NHBoc
Se
O
O

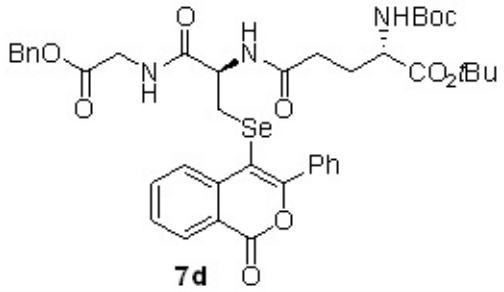
7c


131.10
.000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)

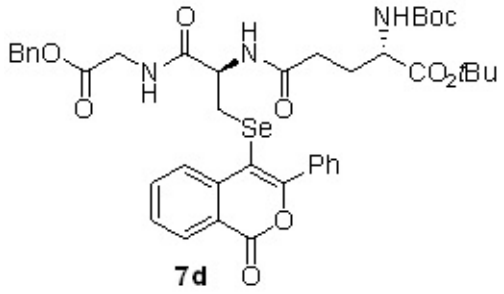

BnO
O
N
H
O
O
H
N
O
NHBoc
CO2tBu
Se
Ph
O
O

7d

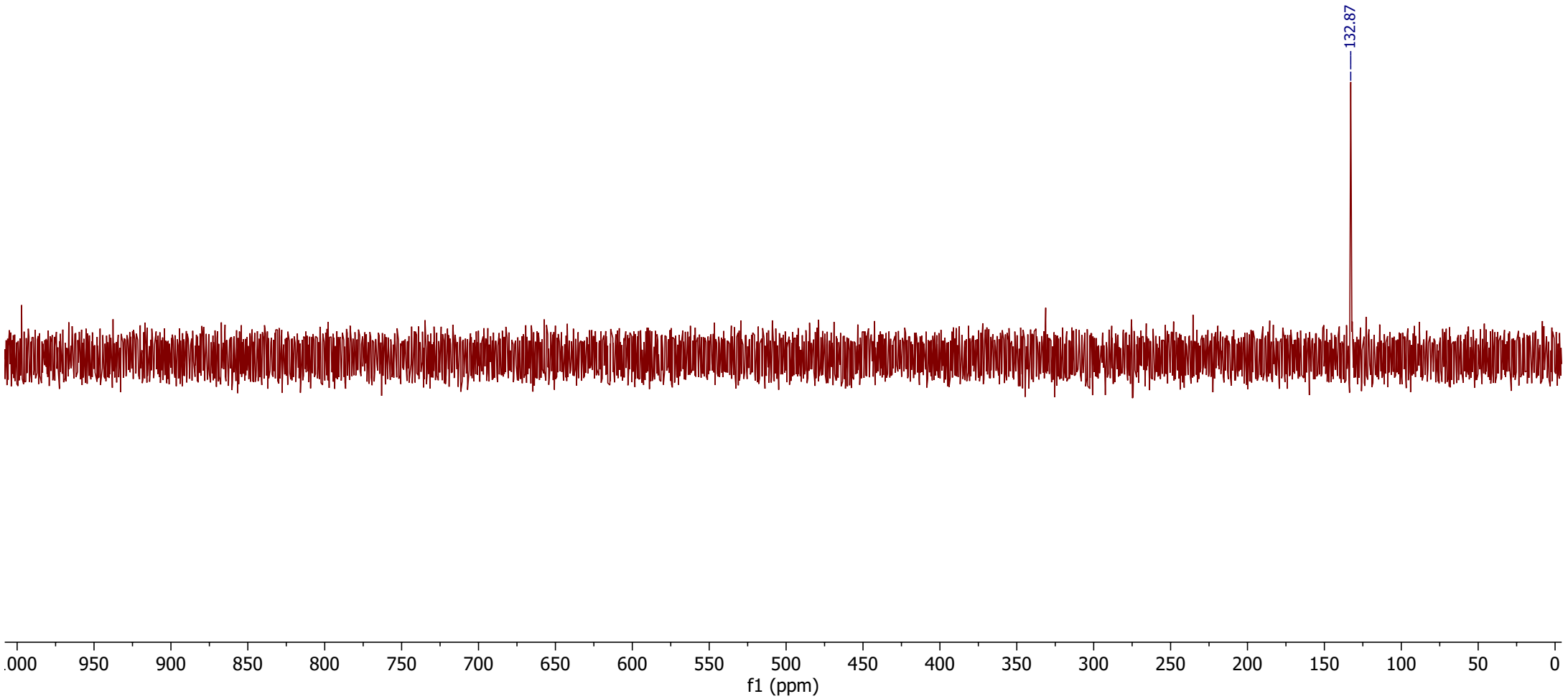
8.35
8.33
8.23
8.21
7.84
7.80
7.73
7.70
7.57
7.53
7.46
7.44
7.36
7.32
7.26 CDCl3
5.16
5.10
4.34
4.31
4.11
3.90
3.75
3.04
3.02
3.01
2.99
2.86
2.85
2.05
1.99
1.75
1.44
1.42
0.94
0.98
0.98
1.93
1.04
2.90
5.40
0.48
0.42
2.23
0.78
0.76
2.05
1.00
1.01
2.71
0.68
9.12
8.80
f1 (ppm)

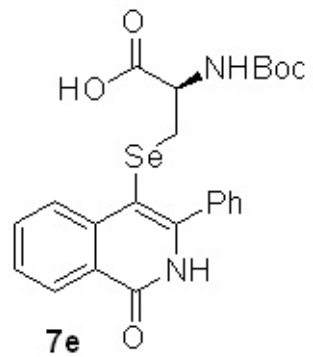

BnO
O
N
H
O
O
H
N
O
NHBoc
CO2tBu
Se
Ph
O
O
7d

82.51
80.19
32.08
28.44
28.11
135.55
130.59
130.21
130.05
128.89
128.76
128.69
128.55
128.11
172.23
171.46
170.22
169.23
161.71
158.39
155.91
120.93
105.31
67.29
53.34
52.44
41.38
41.27
00
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


BnO
O
N
H
O
H
N
O
NHBoc
CO2tBu
Se
Ph
O
O

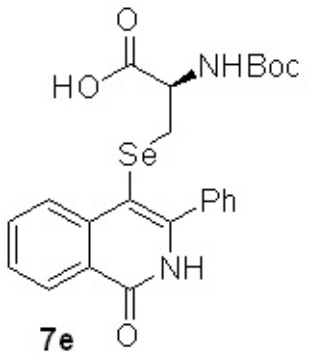
7d


132.87
.000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)

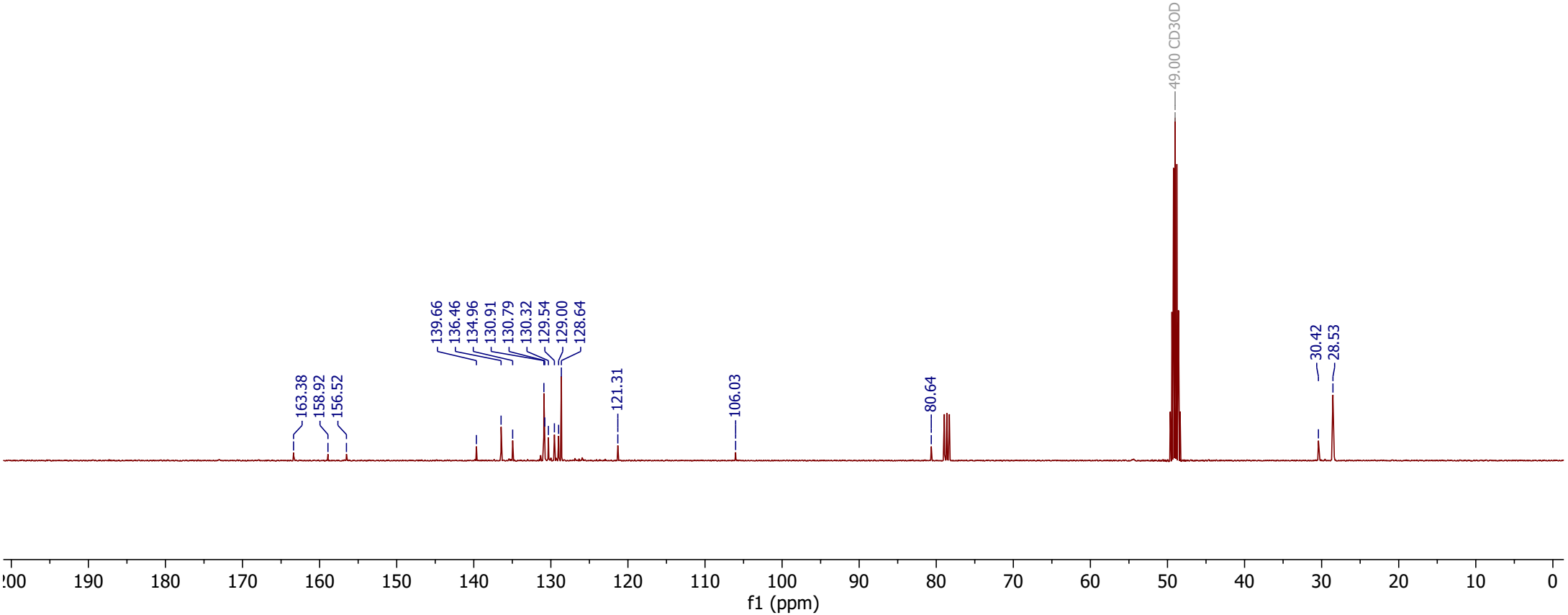

O
HO
NHBoc
Se
Ph
NH
O

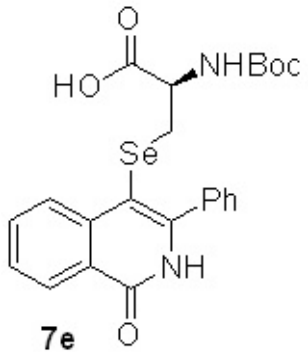
7e

8.38
8.36
8.29
8.29
8.27
8.27
7.94
7.90
7.73
7.71
7.65
7.61
7.49
7.45
4.10
3.31 CD3OD
3.08
3.07
3.05
3.04
3.00
2.99
2.97
2.96
1.33
0.83
0.87
1.01
1.82
0.98
2.80
0.75
1.00
1.04
8.82
f1 (ppm)

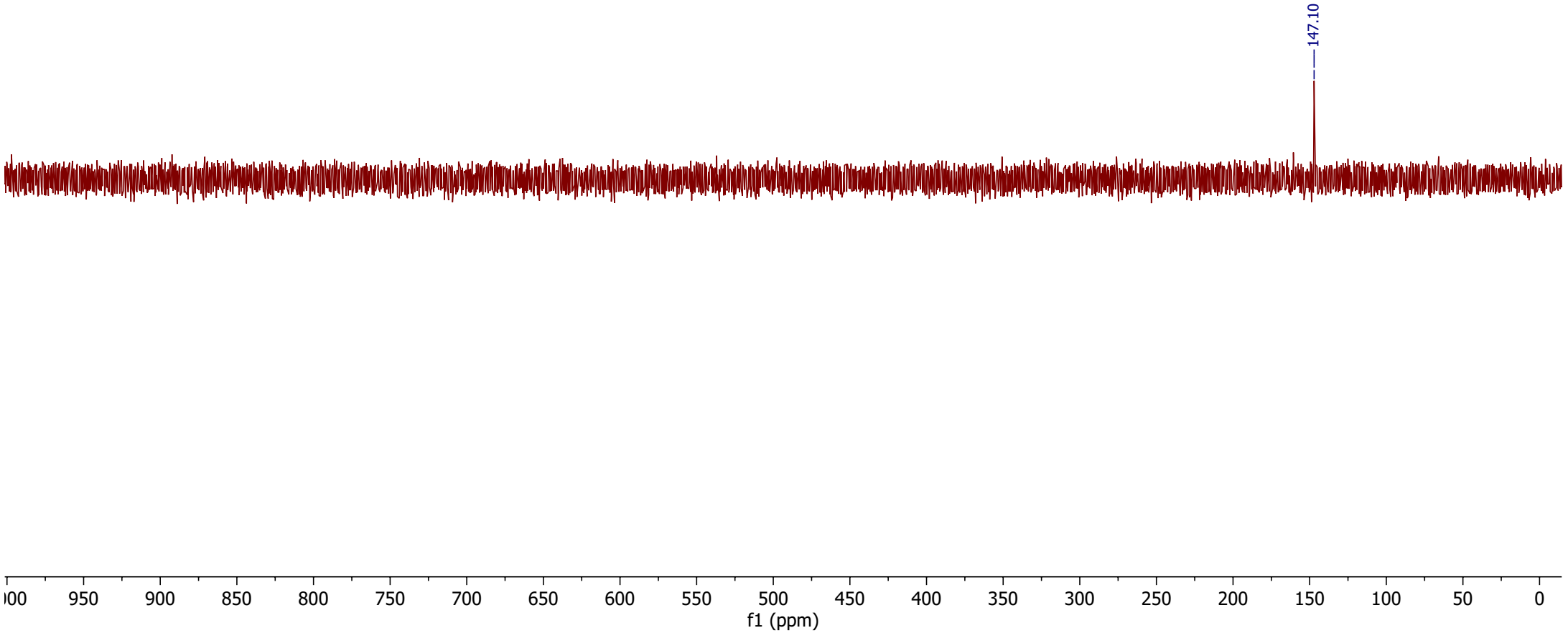

O
HO
NHBoc
Se
Ph
NH
O

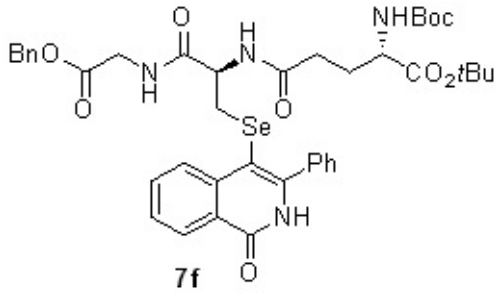
7e


163.38
158.92
156.52
139.66
136.46
134.96
130.91
130.79
130.32
129.54
129.00
128.64
121.31
106.03
80.64
49.00 CD3OD
30.42
28.53
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

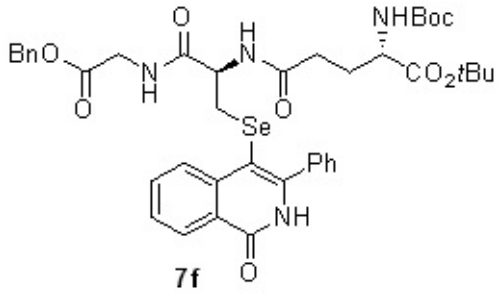


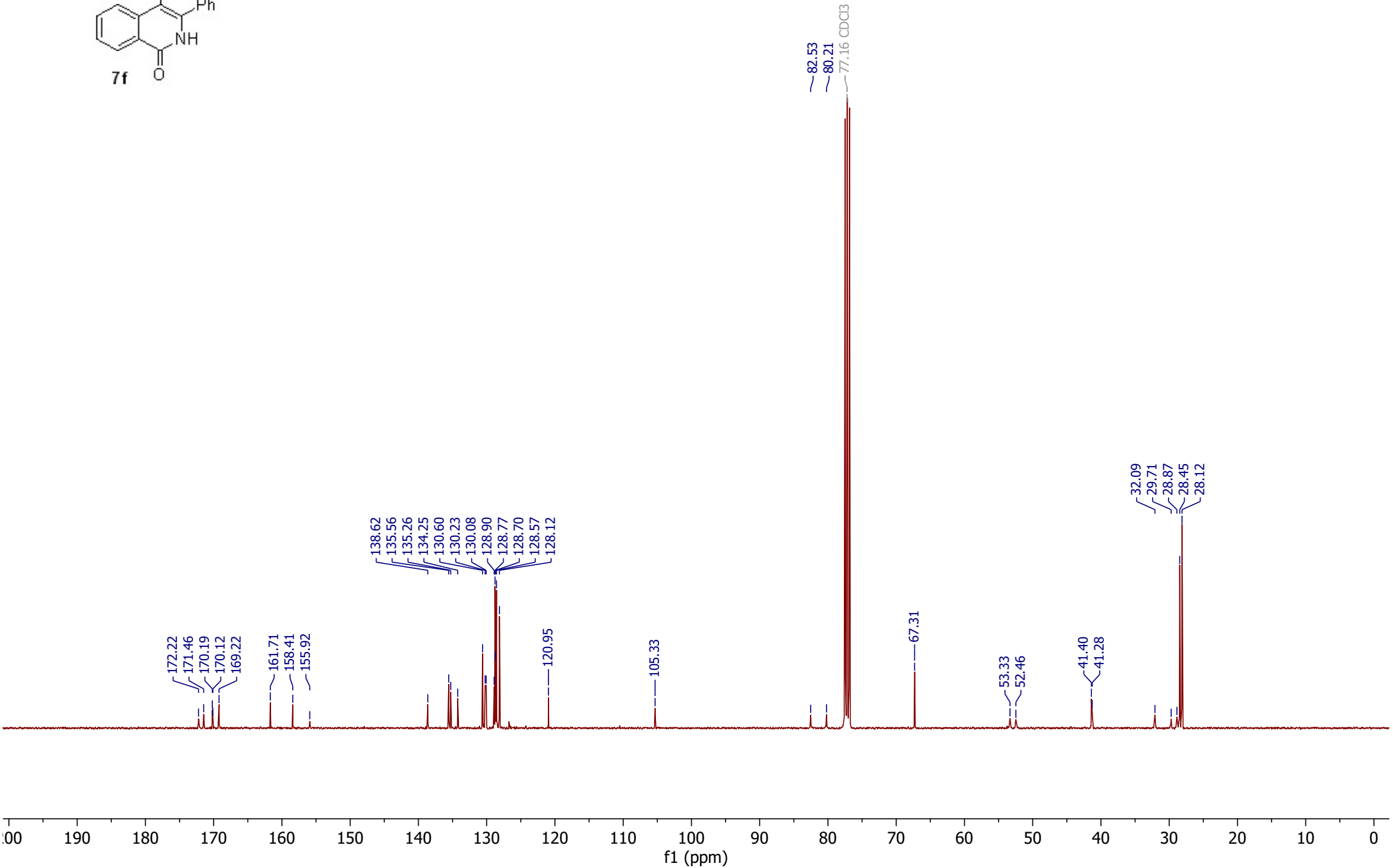
7e

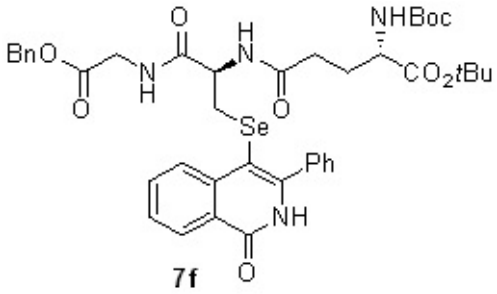



BnO
NHBoc
CO2tBu
Se
Ph
NH
7f

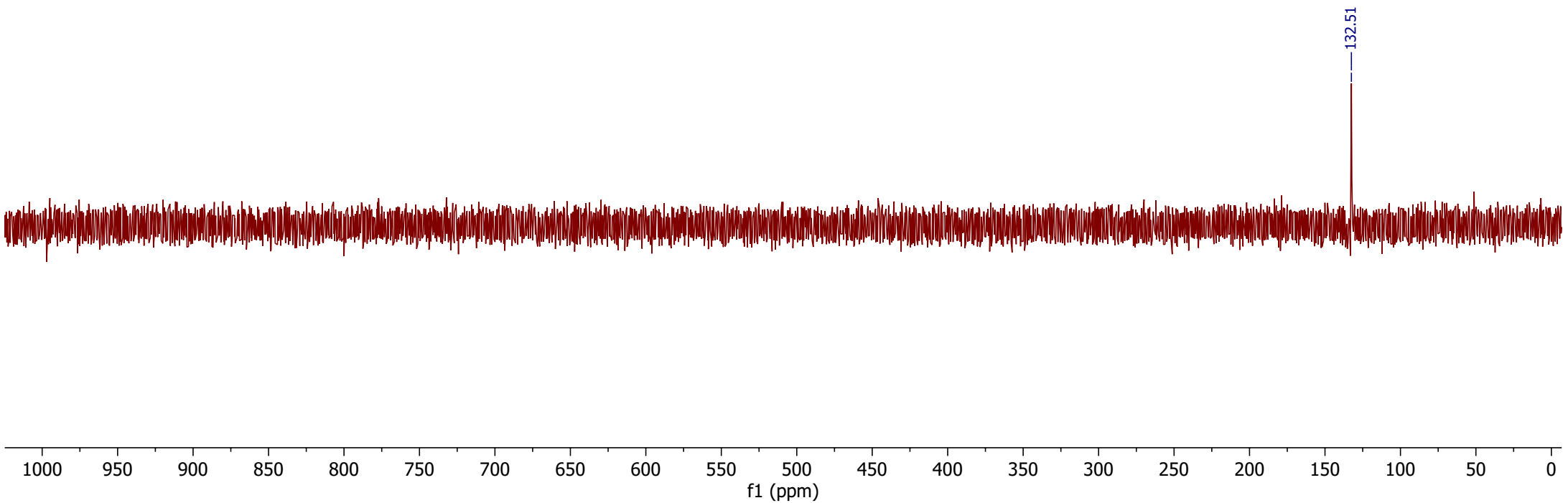
2.05
1.97
1.75
1.73
1.44
1.43
8.36
8.33
8.23
8.21
7.84
7.80
7.73
7.71
7.57
7.53
7.47
7.45
7.37
7.32
7.26 CDCl3
6.63
6.22
6.20
5.19
5.18
5.17
5.13
4.33
4.30
4.14
4.11
3.91
3.76
3.05
3.03
3.02
3.00
2.86
2.81
0.86
0.91
0.98
1.84
1.24
2.91
5.46
0.53
0.51
0.75
2.09
0.88
1.05
2.13
1.00
0.98
2.84
1.08
8.87
8.97
12.0
11.5
11.0
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
f1 (ppm)

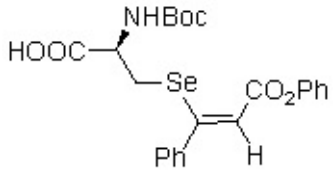

BnO
NHBoc
CO2tBu
Se
Ph
NH
7f


82.53
80.21
77.16 CDCl3
32.09
29.71
28.87
28.45
28.12
138.62
135.56
135.26
134.25
130.60
130.23
130.08
128.90
128.77
128.70
128.57
128.12
172.22
171.46
170.19
170.12
169.22
161.71
158.41
155.92
120.95
105.33
67.31
53.33
52.46
41.40
41.28
f1 (ppm)


BnO
O
N
H
O
O
H
N
O
NHBoc
CO2tBu
Se
Ph
NH
O

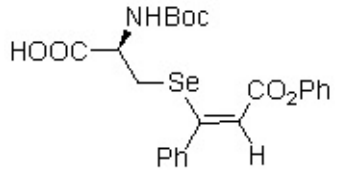
7f


132.51
1000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)


NHBoc
HOOC
Se
CO2Ph
Ph
H

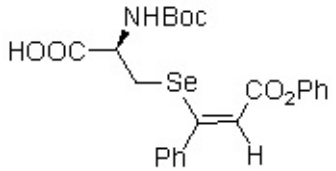
8

1.45
3.31 CD3OD
3.27
3.26
3.23
3.22
3.01
2.99
2.98
2.96
7.37
7.22
4.36
4.35
4.34
4.33
9.65
0.90
1.00
0.98
10.95
2.0
11.5
11.0
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
f1 (ppm)

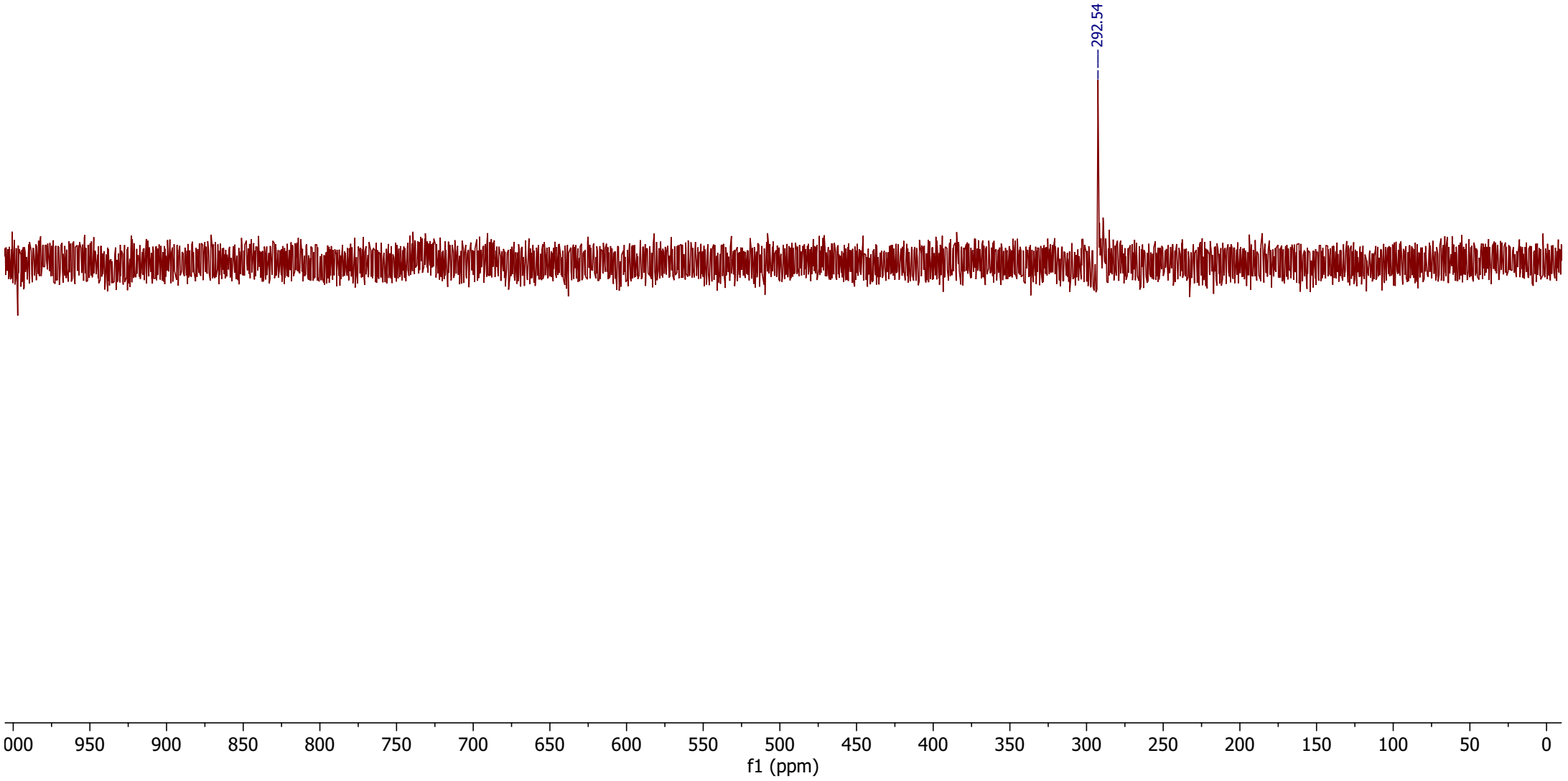

NHBoc
HOOC
Se
CO2Ph
Ph
H

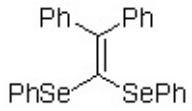
8

174.29
157.76
147.65
142.58
142.47
130.49
129.24
129.12
129.10
123.72
80.76
55.86
28.99
28.76
f1 (ppm)

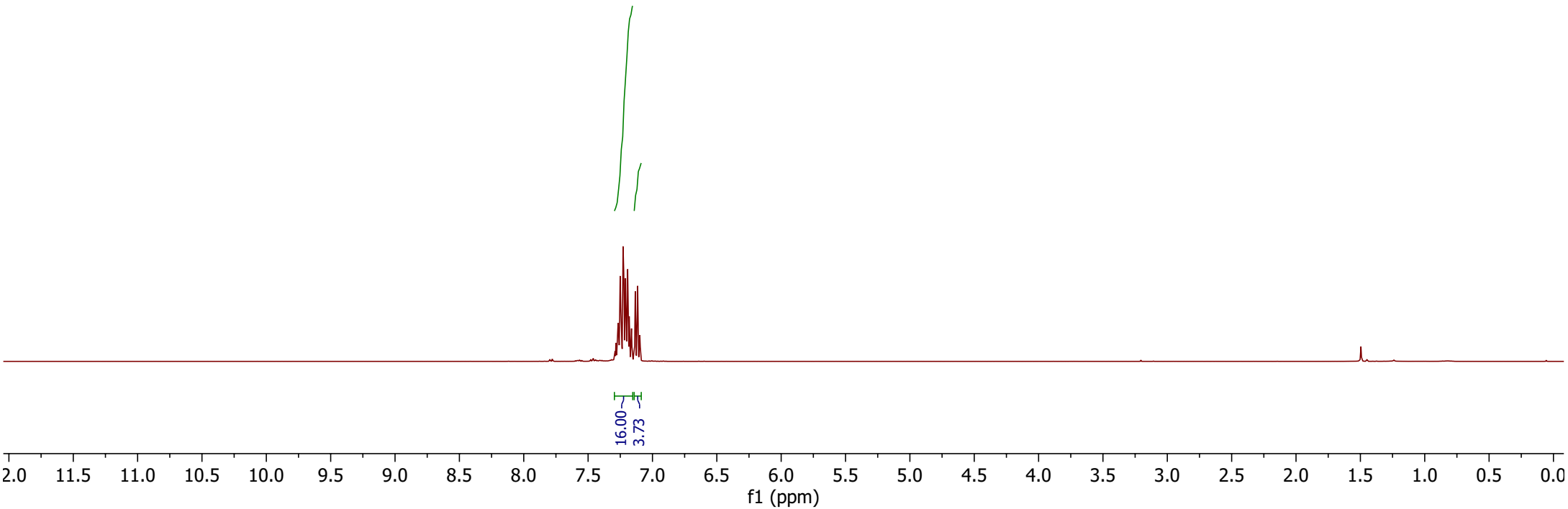

NHBoc
HOOC
Se
CO2Ph
Ph
H

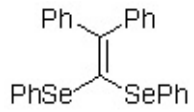
8


292.54
000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)

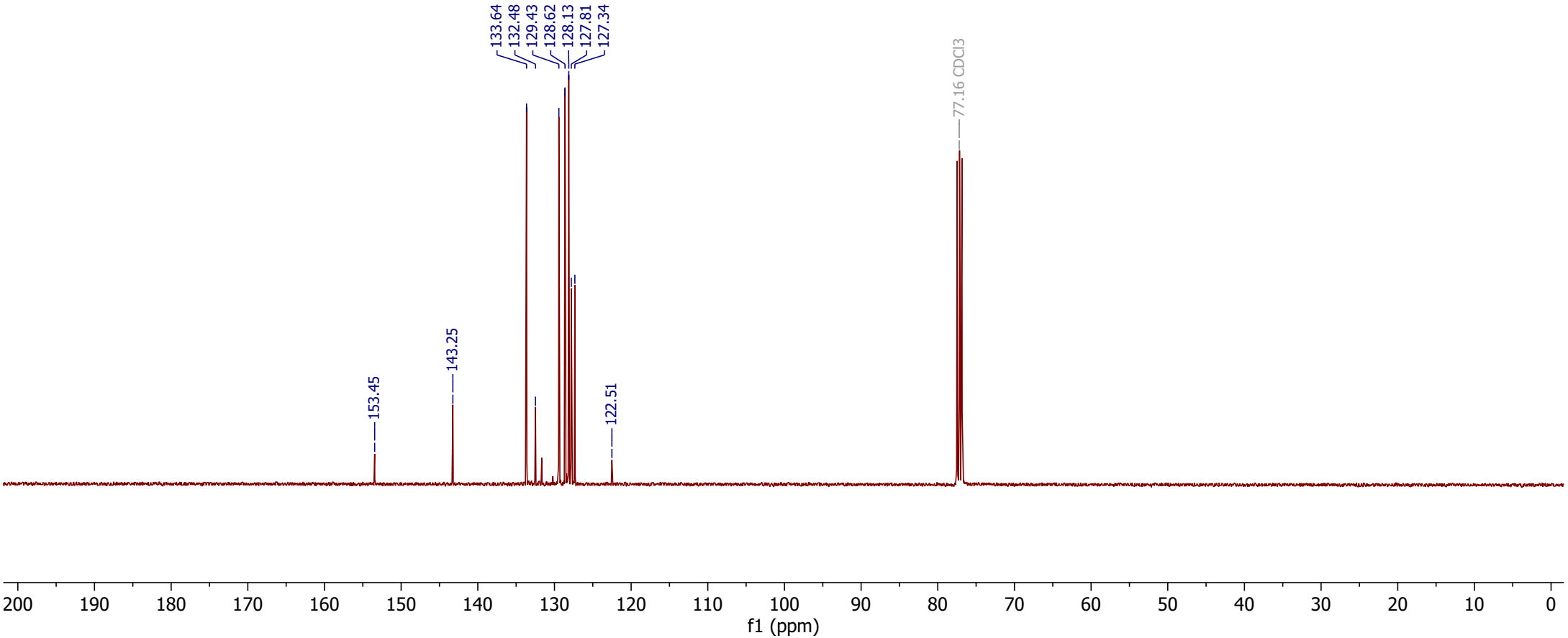

Ph
Ph
PhSe
SePh

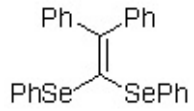
9


16.00
3.73
2.0
11.5
11.0
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
f1 (ppm)

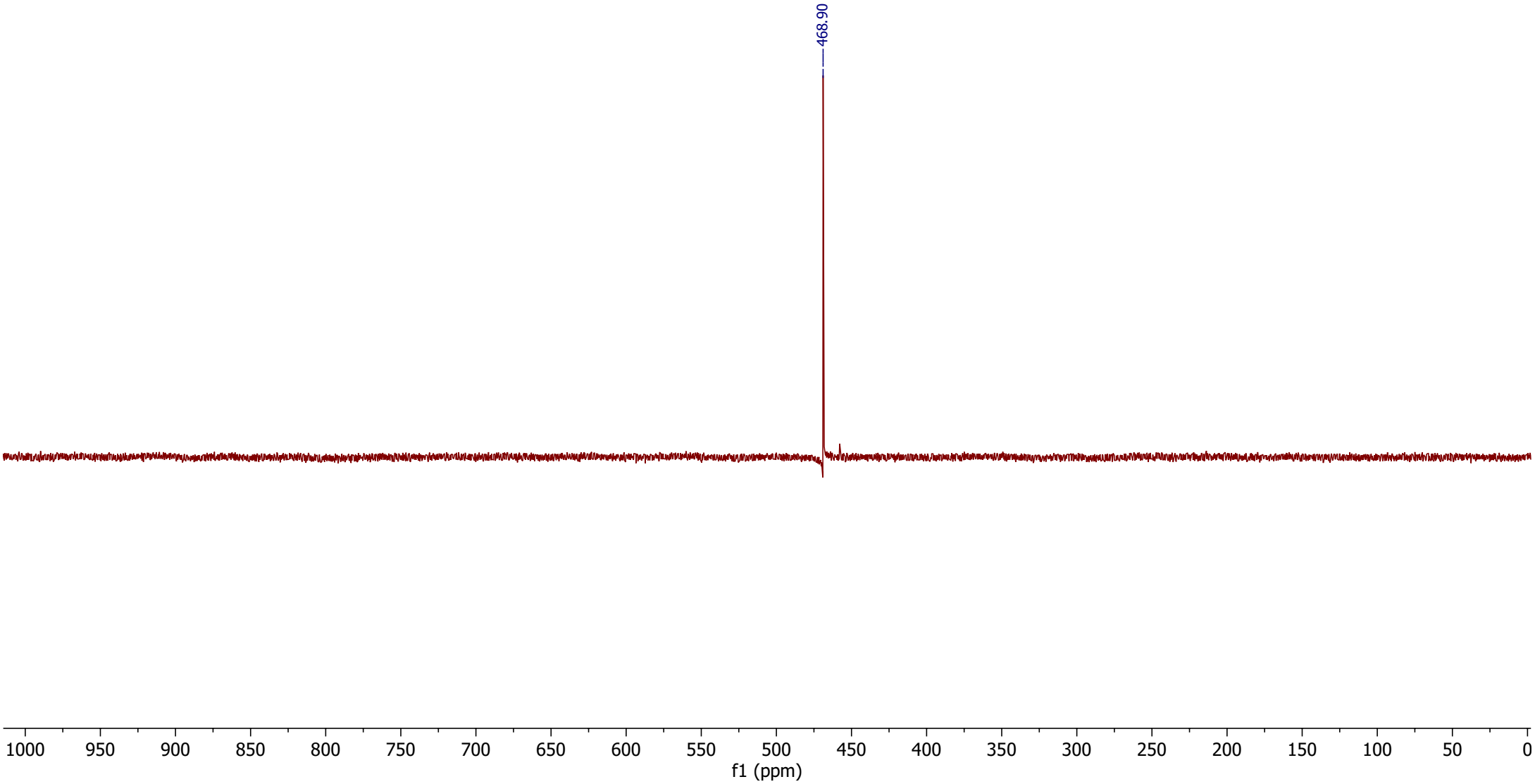

Ph
Ph
PhSe
SePh

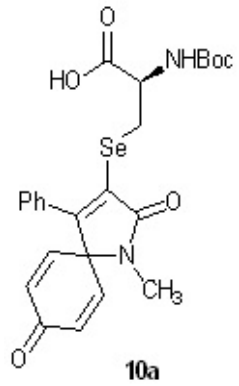
9


133.64
132.48
129.43
128.62
128.13
127.81
127.34
77.16 CDCl3
153.45
143.25
122.51
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


Ph
Ph
PhSe
SePh

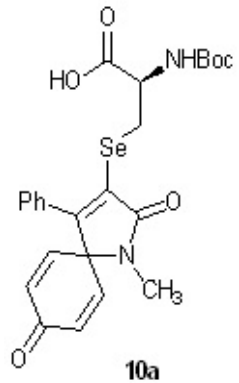
9


468.90
1000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)


O
HO
NHBoc
Se
Ph
O
N
CH3
O

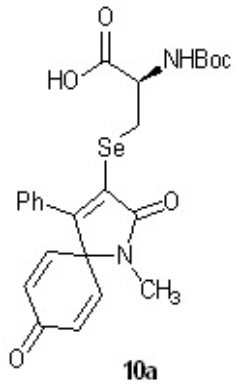
10a

1.42
3.53
3.52
3.50
3.49
3.31 CD30D
3.20
3.18
3.17
3.15
2.92
7.39
7.29
6.80
6.74
6.44
6.44
6.42
6.41
4.30
4.29
4.28
4.27
5.30
1.97
1.97
1.00
1.04
0.88
3.00
8.70
11.5 11.0 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
f1 (ppm)

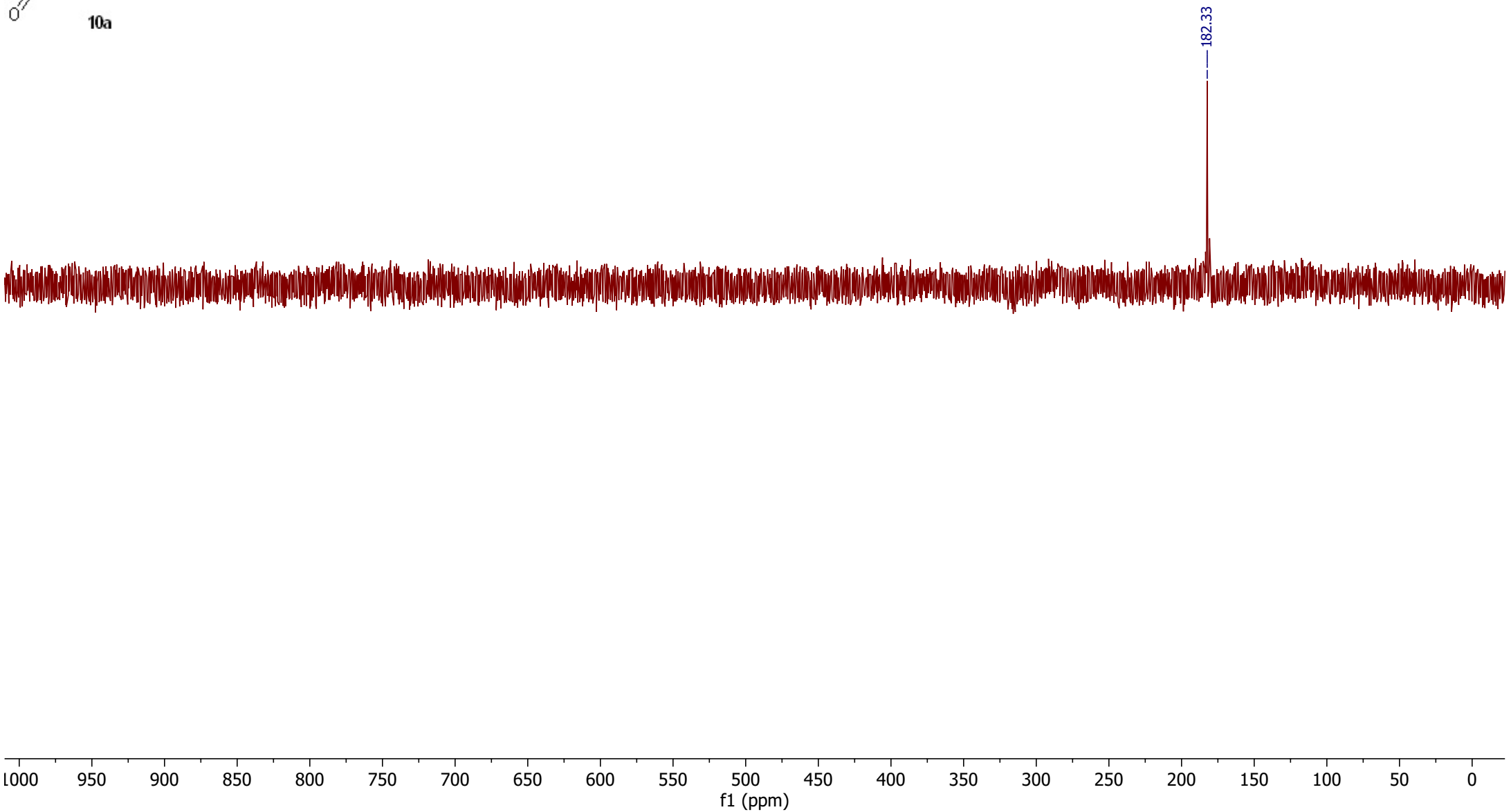

O
HO
NHBoc
Se
Ph
O
N
CH3
O

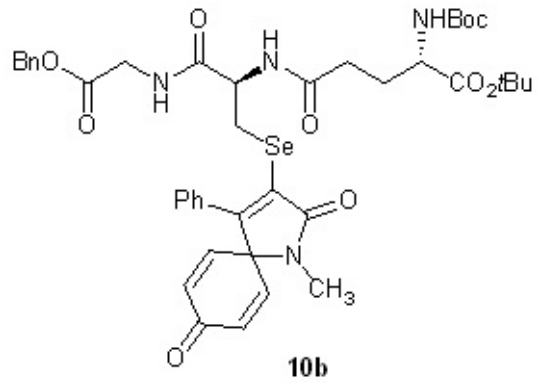
10a

185.86
174.02
171.12
157.72
155.96
147.08
133.89
133.17
130.68
129.57
129.43
128.41
80.74
70.74
55.14
28.74
26.97
26.79
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


O
HO
NHBoc
Se
Ph
O
N
CH3
O

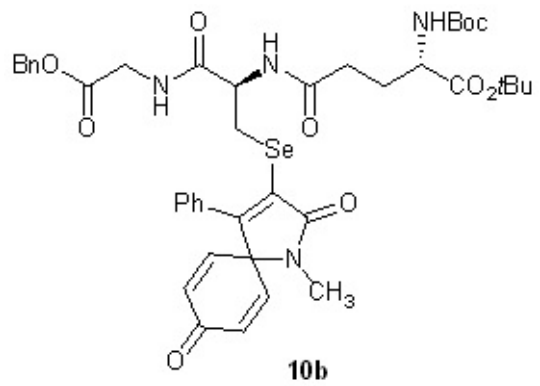
10a


182.33
1000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)


BnO
O
N
H
O
O
H
N
O
NHBoc
CO2tBu
Se
Ph
O
N
CH3
O

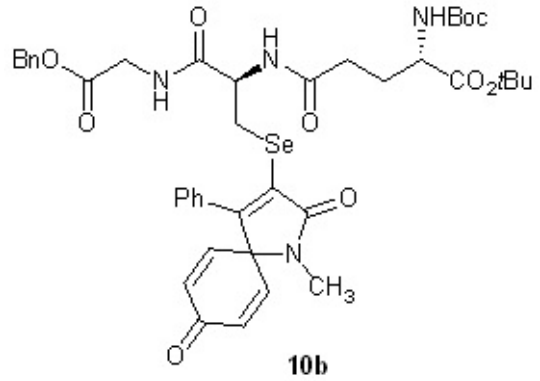
10b

7.40
7.26
6.81
6.73
6.46
6.40
5.16
4.58
4.56
4.55
4.54
4.53
3.92
3.49
3.48
3.46
3.45
3.31 CD3OD
3.05
3.03
3.02
3.00
2.93
2.40
2.26
2.07
2.02
1.90
1.84
1.47
1.44
9.12
1.53
1.42
2.00
1.05
2.86
0.88
0.78
2.26
1.94
1.15
1.05
9.01
8.71
11.5
11.0
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
f1 (ppm)

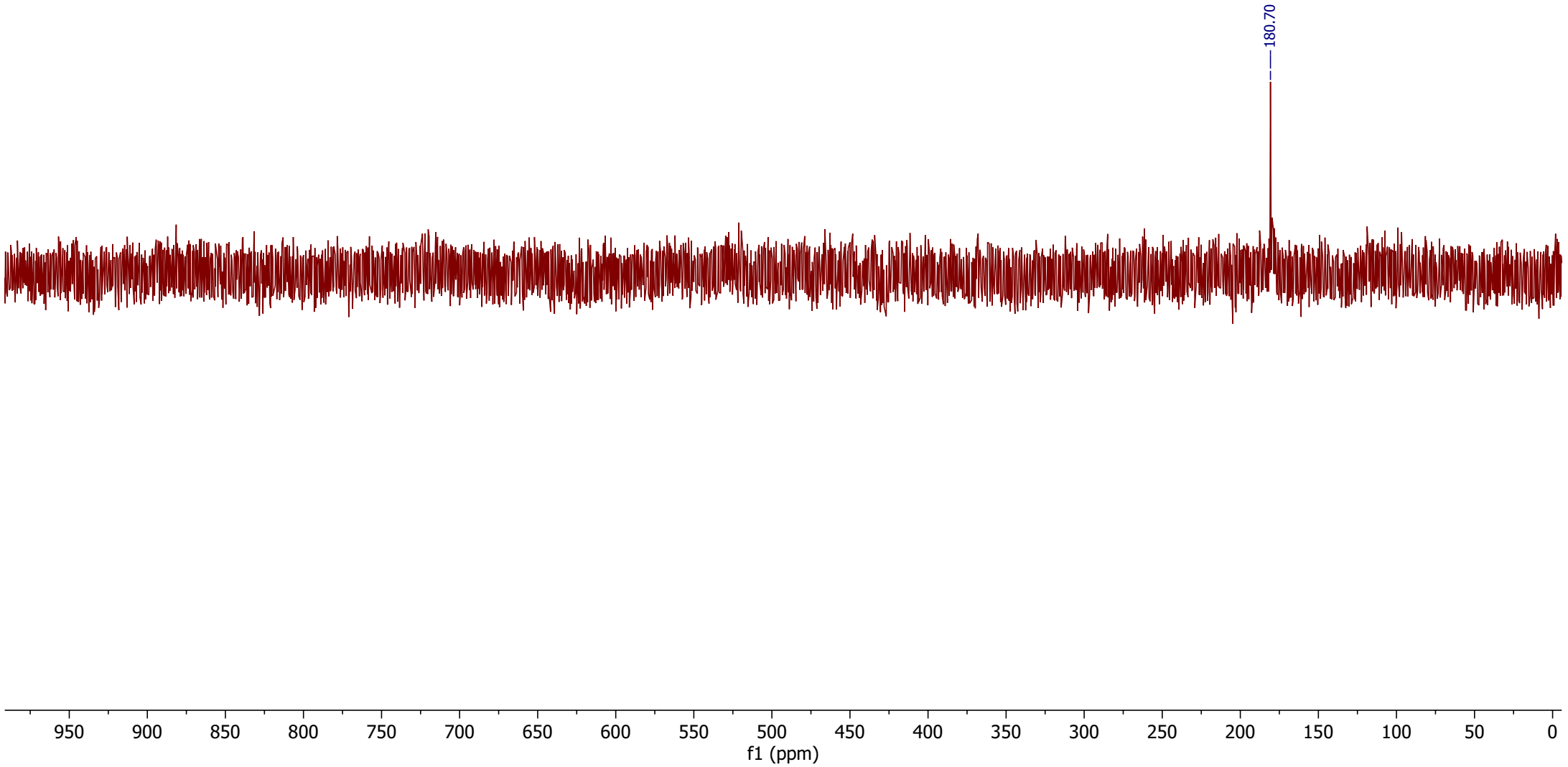

BnO
O
N
H
O
O
H
N
O
NHBoc
CO2tBu
Se
Ph
O
N
CH3
O

10b

185.84
174.90
173.26
173.12
171.25
170.75
158.05
156.66
146.91
137.17
134.01
133.94
133.12
130.79
129.58
129.47
129.34
129.31
128.46
82.78
80.55
70.73
67.90
55.48
54.47
42.21
33.07
28.76
28.43
28.29
27.41
26.88
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


BnO
O
N
H
O
O
H
N
O
NHBoc
CO2tBu
Se
Ph
O
N
CH3
O

10b


180.70
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
f1 (ppm)