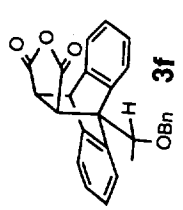
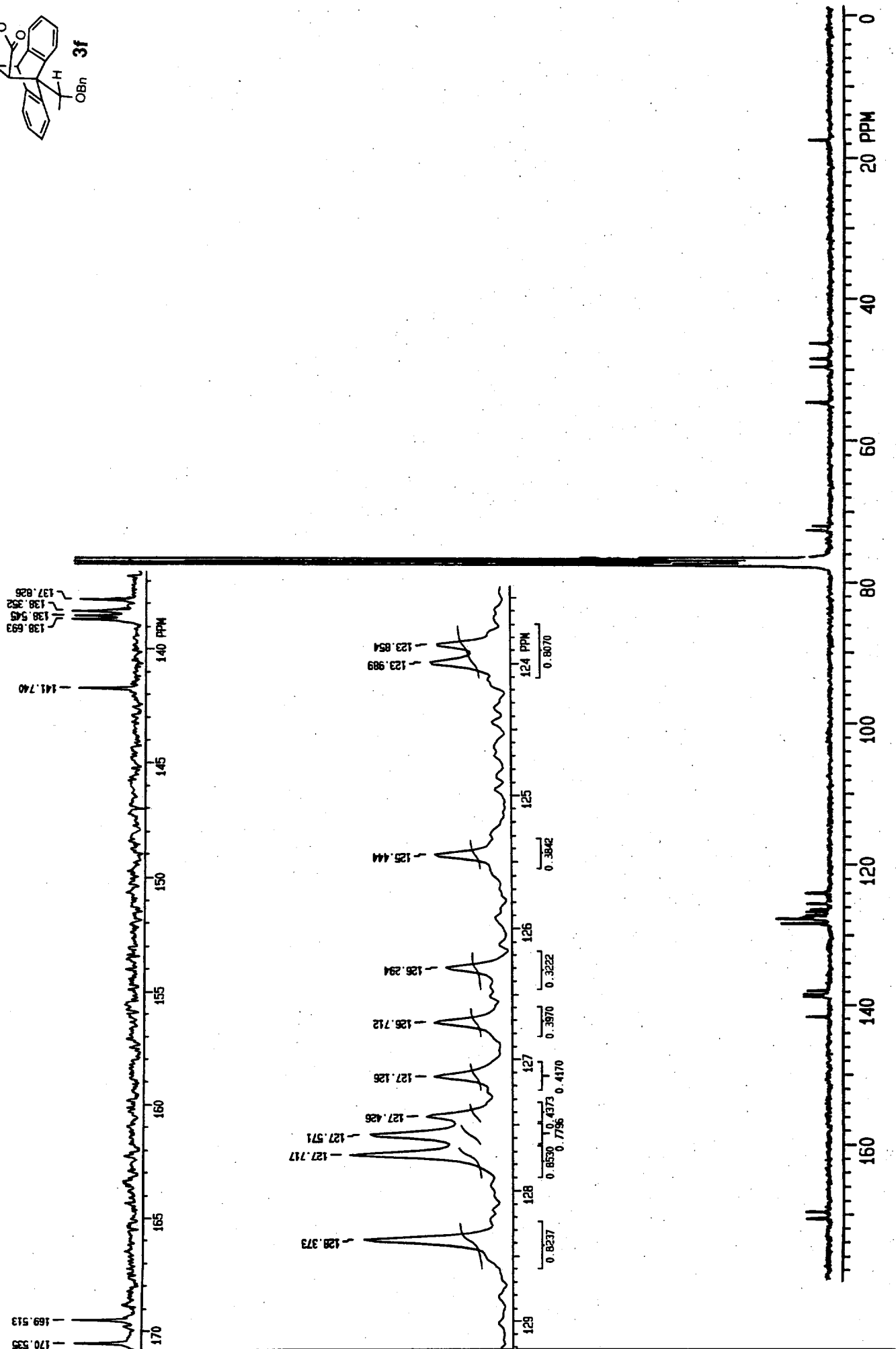
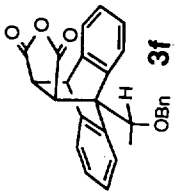
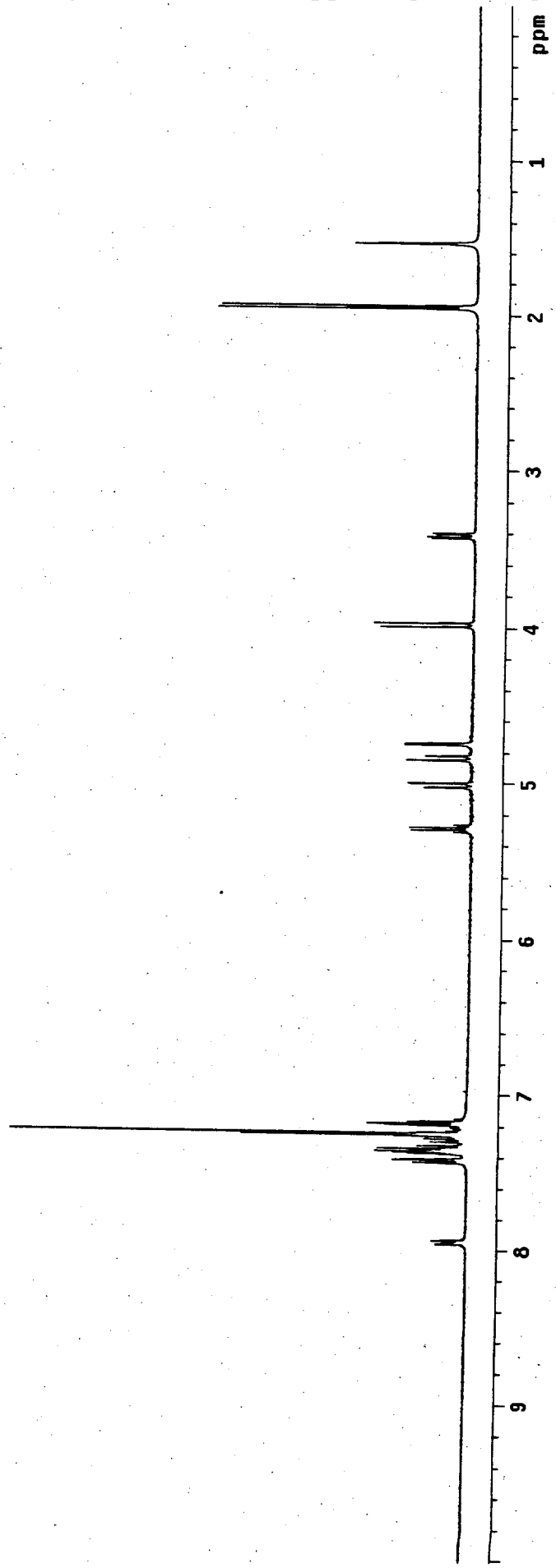
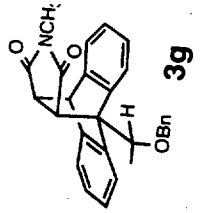

3f
OBn
H

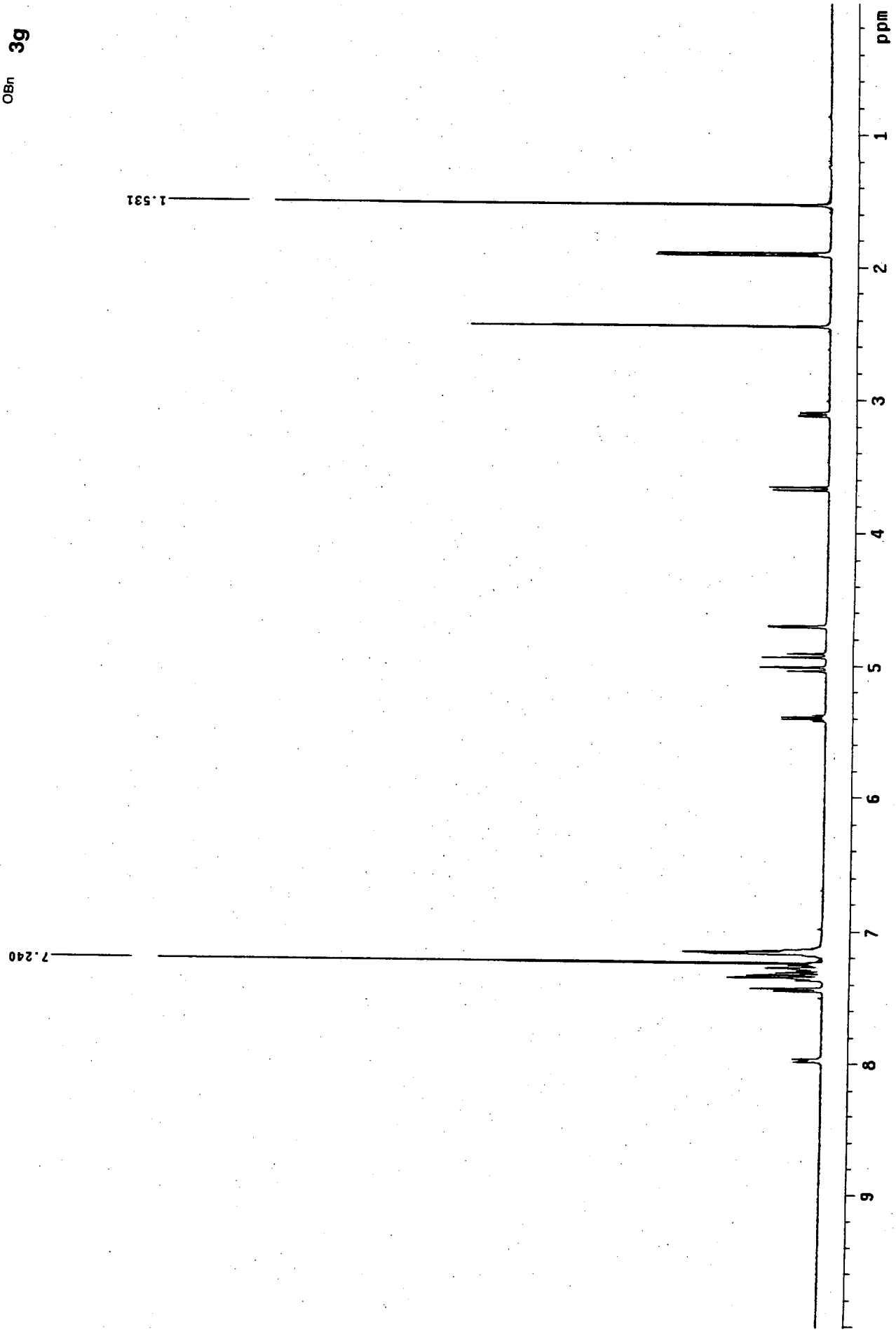

PPM
0
20
40
60
80
100
120
140
160
170.535
169.513
141.740
138.693
138.545
138.352
137.826
128.373
127.717
127.571
127.426
127.126
126.712
126.294
125.444
123.989
123.854
0.8237
0.8530
0.7796
0.4373
0.4170
0.3970
0.3222
0.3842
0.8070

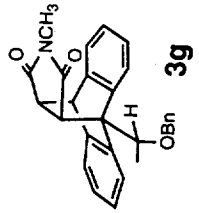

3f
OBn
H


ppm
1
2
3
4
5
6
7
8
9

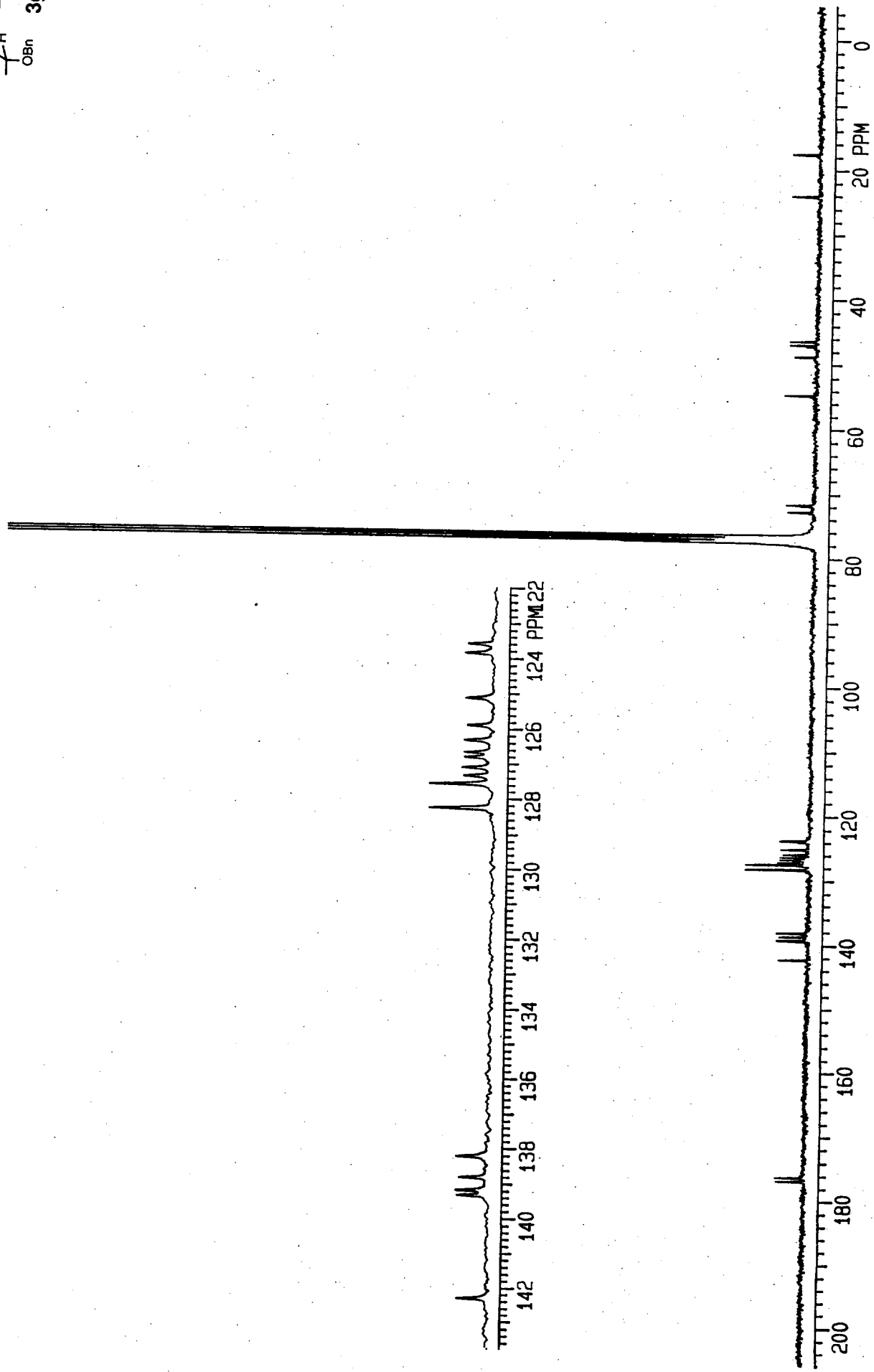


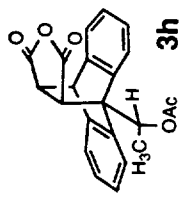
3g

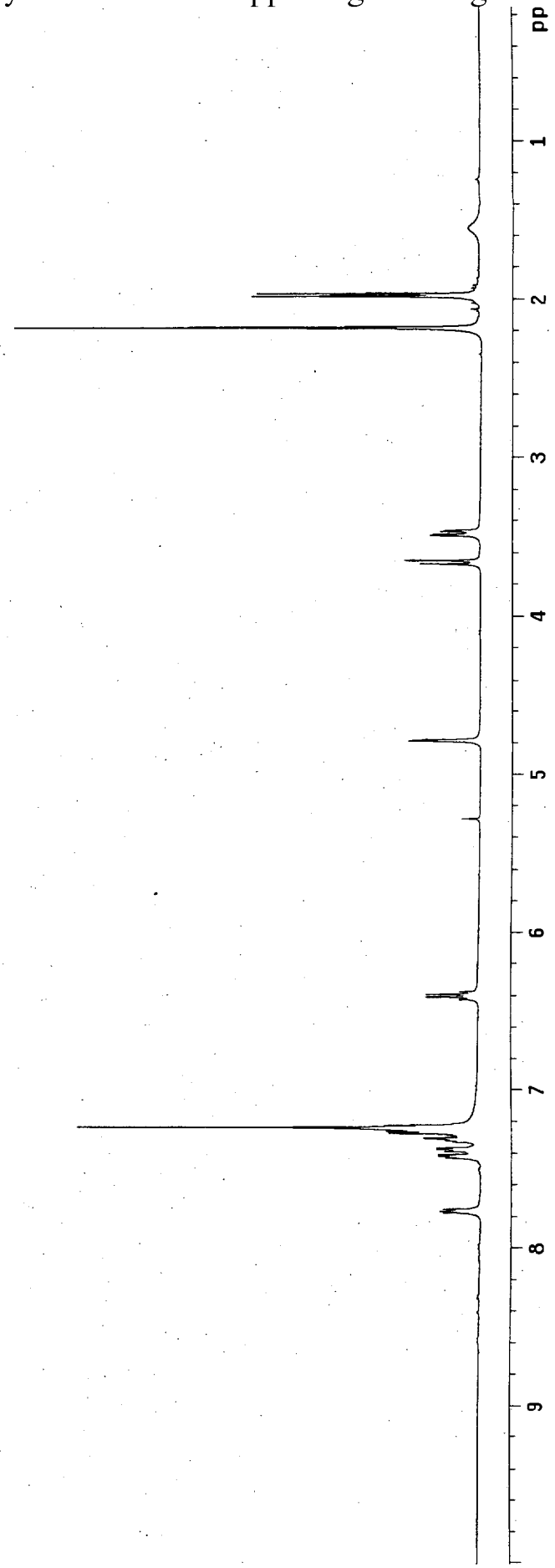


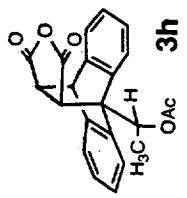

NCH3
O
O
H
OBn

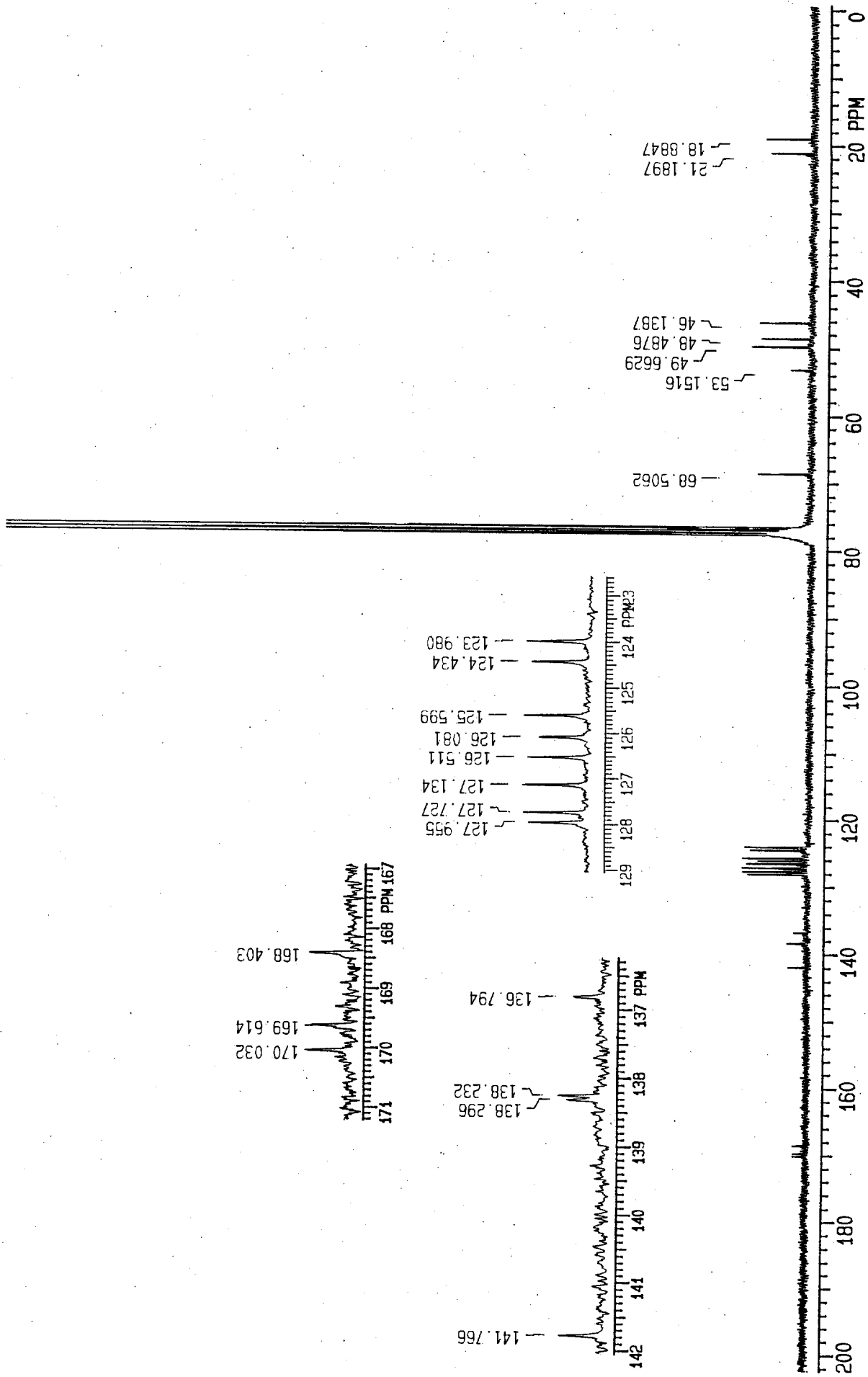
3g

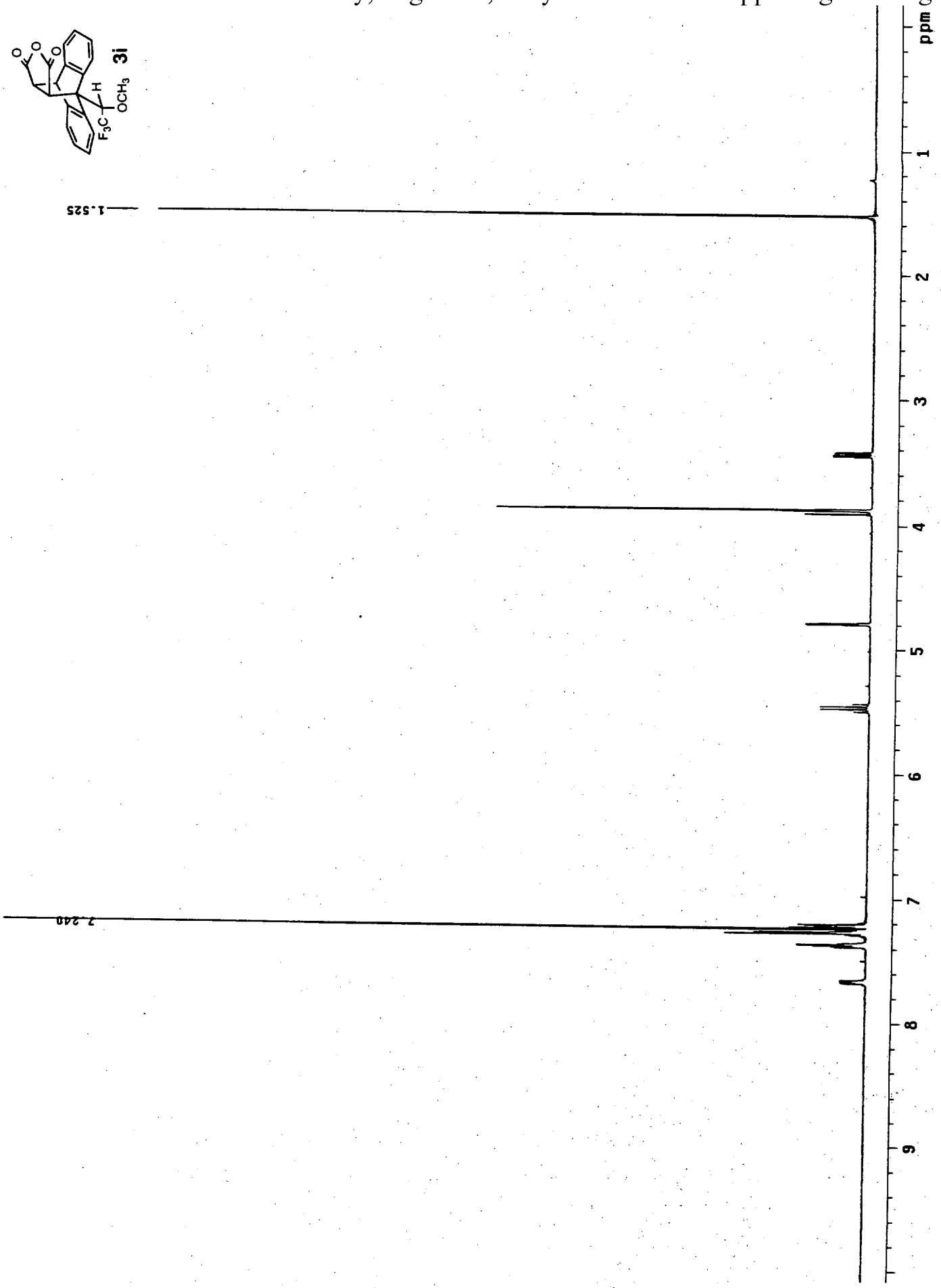

0
20 PPM
40
60
80
100
120
140
160
180
200
142
140
138
136
134
132
130
128
126
124 PPM 22

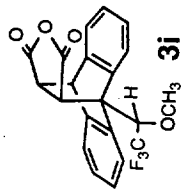

3h
O
O
O
H
OAc
H3C

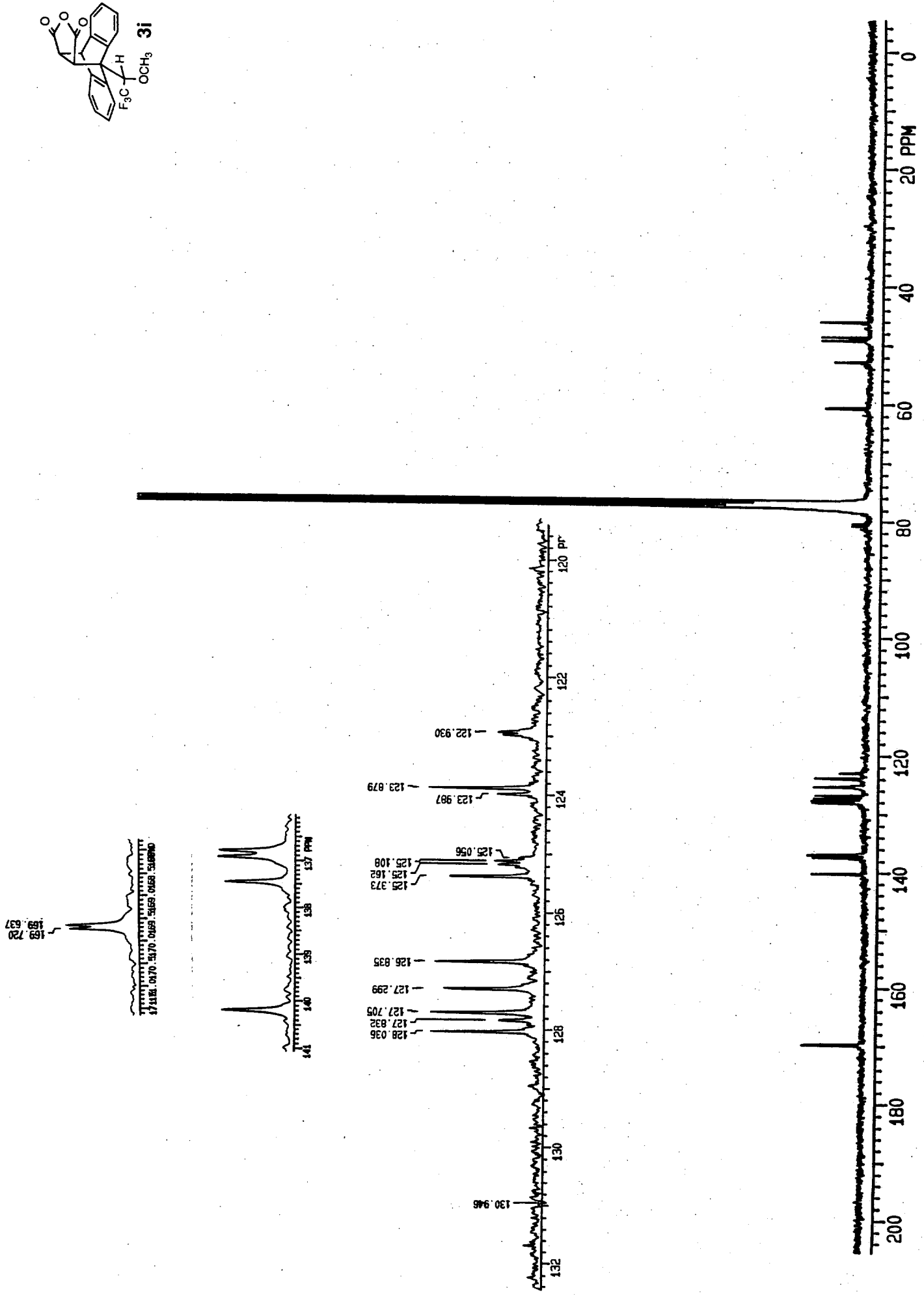

ppm
1
2
3
4
5
6
7
8
9

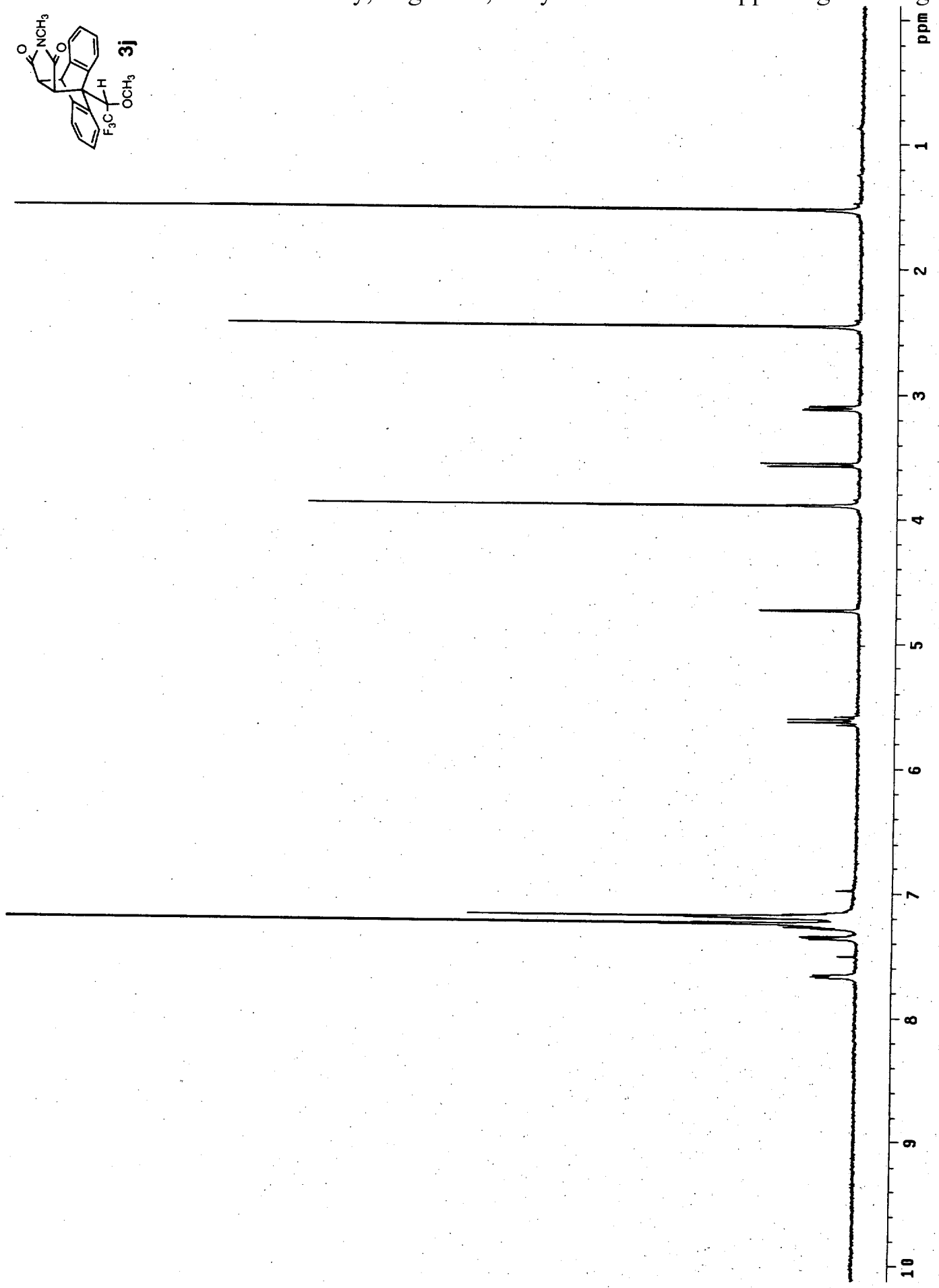

3h
H
OAc
H_3C

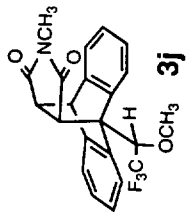

18.8847
21.1897
46.1387
48.4876
49.6629
53.1516
68.5062
141.766
136.794
138.296
138.232
127.955
127.727
127.134
126.511
126.081
125.599
124.434
123.980
170.032
169.614
168.403
PPM

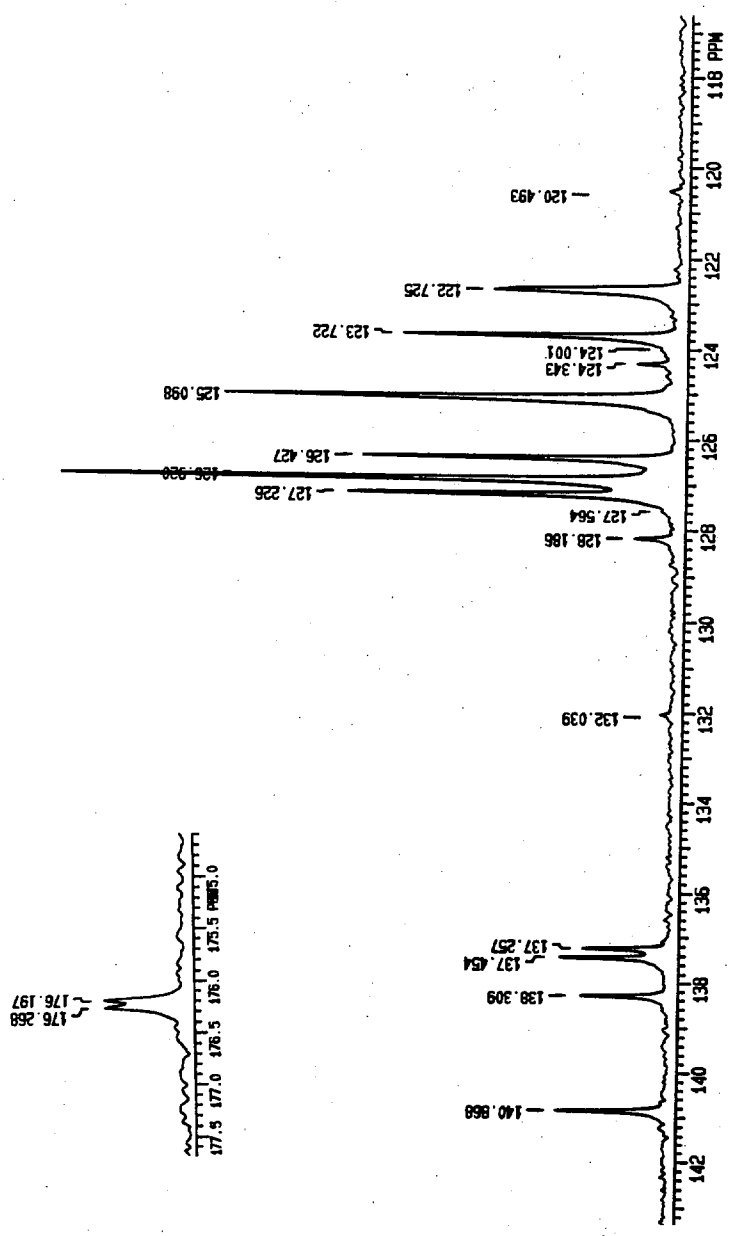

3i
1.525
7.240
ppm

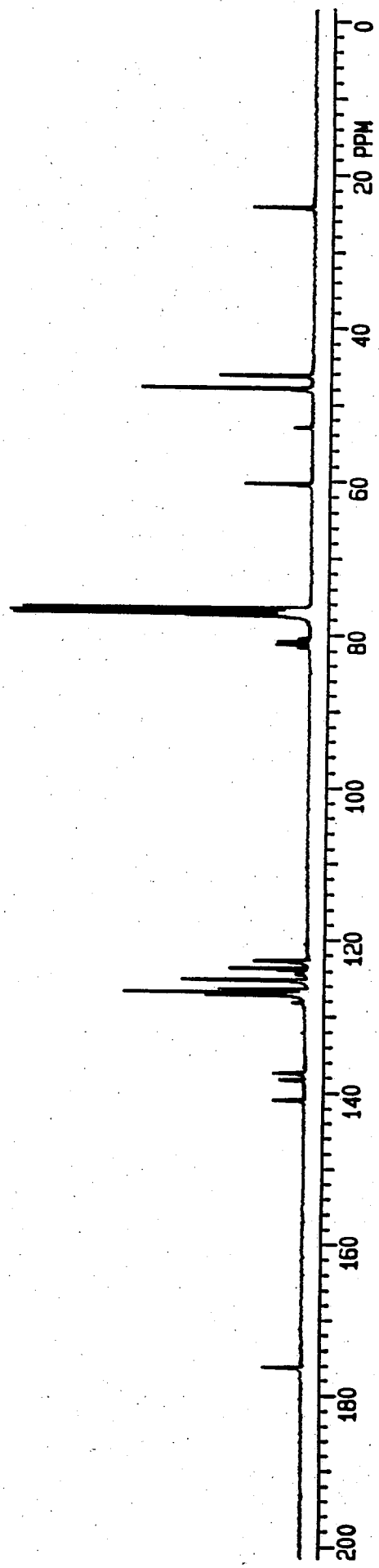

O
O
O
H
F_3C
OCH_3
3i

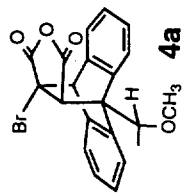

169.720
169.637
137 PPM
130.946
128.036
127.832
127.705
127.299
126.835
125.373
125.162
125.108
125.056
123.987
123.879
122.930
120 PPM
0
20 PPM
40
60
80
100
120
140
160
180
200

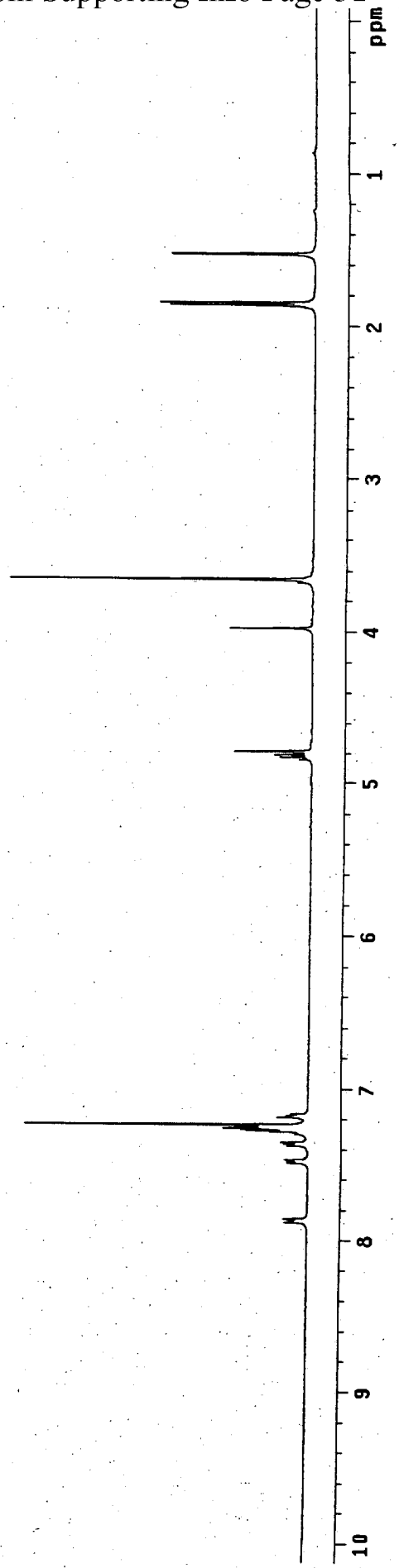

NCH3
O
O
H
F3C
OCH3
3j
ppm
1
2
3
4
5
6
7
8
9
10

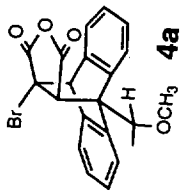

NCH3
O
O
H
OCH3
F3C
3j

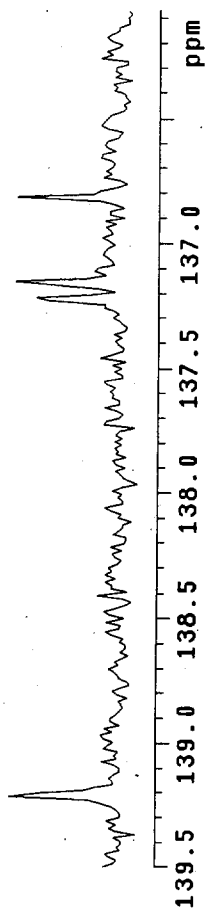

176.268
176.197
140.868
138.309
137.454
137.257
132.039
128.186
127.564
127.226
126.427
125.098
124.343
124.001
123.722
122.725
120.493
118 PPM

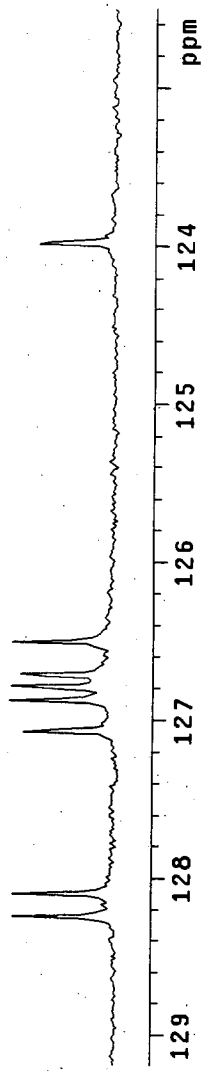

20 PPM

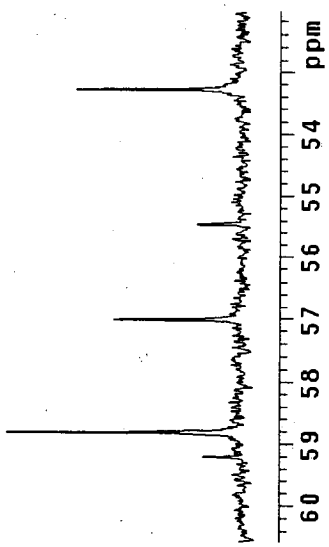

Br
H
OCH3
4a

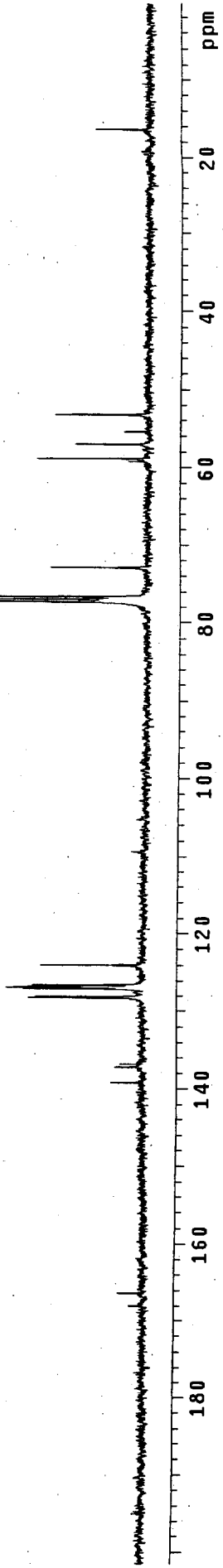

ppm
1
2
3
4
5
6
7
8
9
10

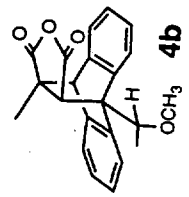

Br
H
OCH3
4a

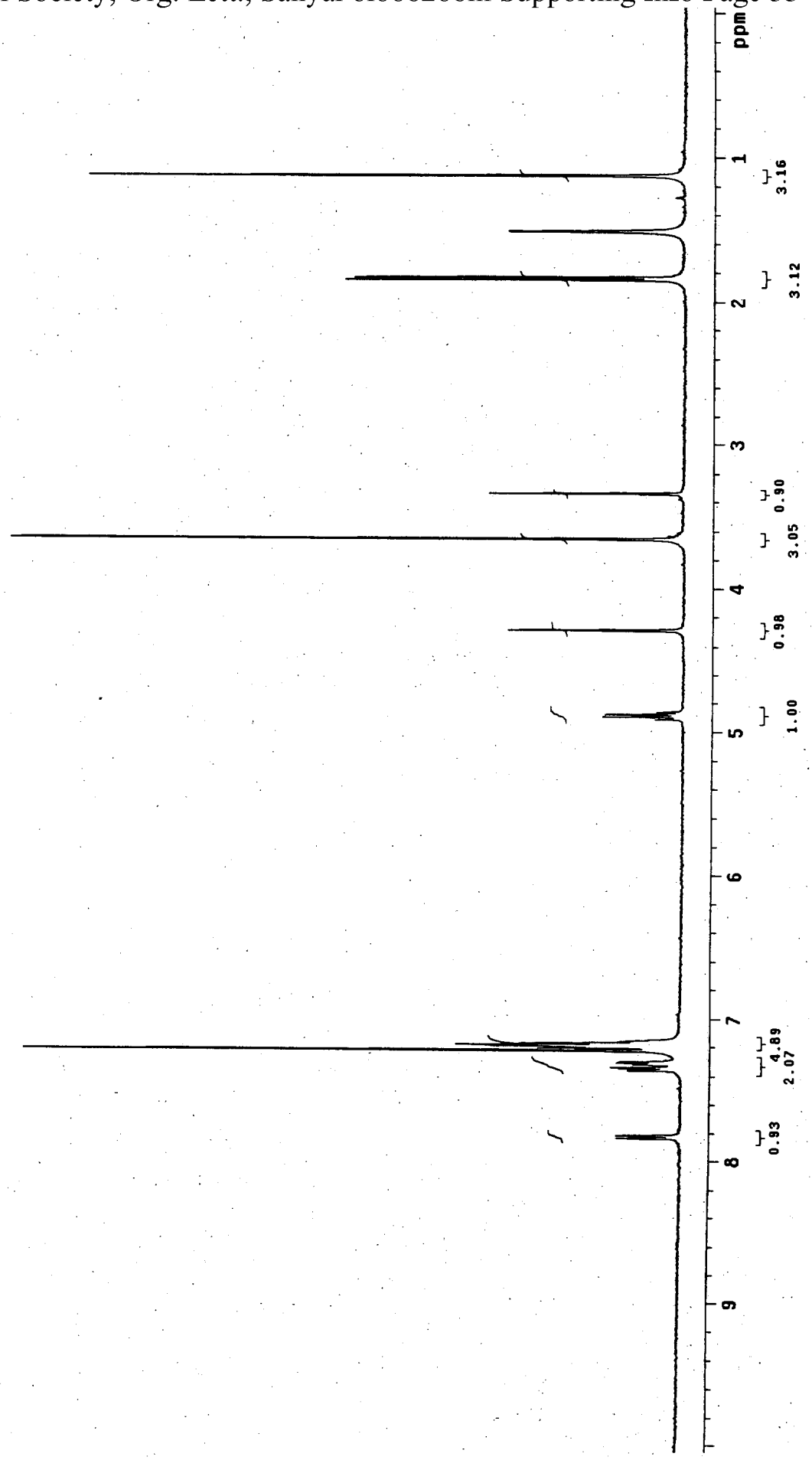

139.5
139.0
138.5
138.0
137.5
137.0
ppm

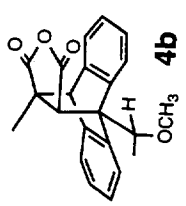

129
128
127
126
125
124
ppm

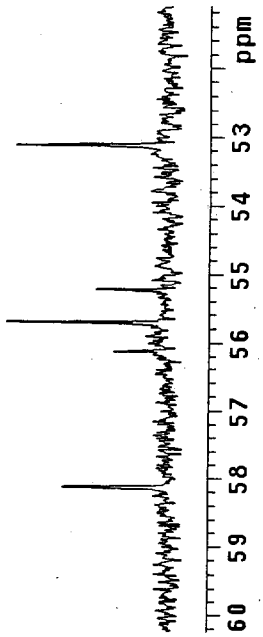

60
59
58
57
56
55
54
ppm

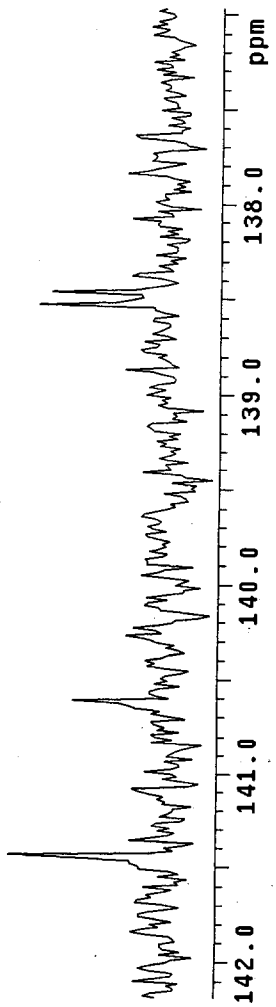

180
160
140
120
100
80
60
40
20
ppm


4b
OCH3
H

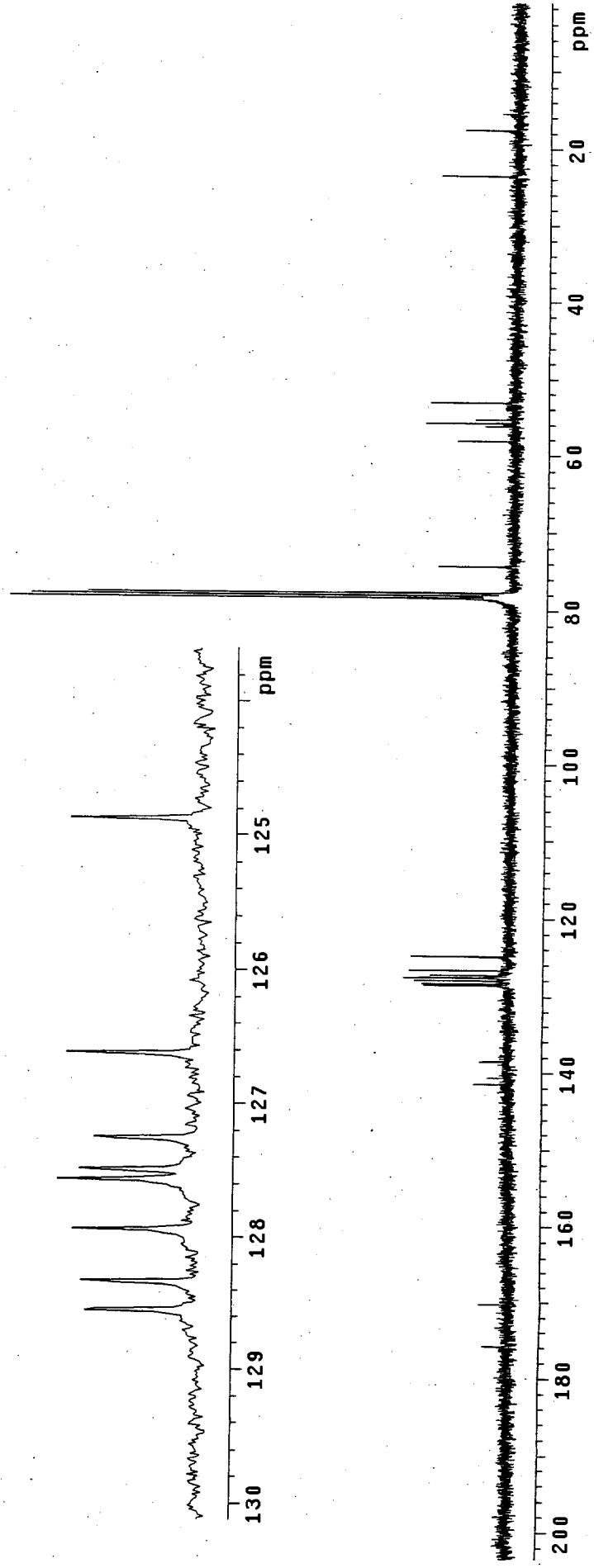

ppm
1
2
3
4
5
6
7
8
9
3.16
3.12
0.90
3.05
0.98
1.00
4.89
2.07
0.93

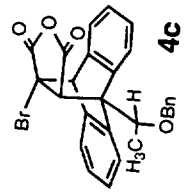

4b
OCH3
H

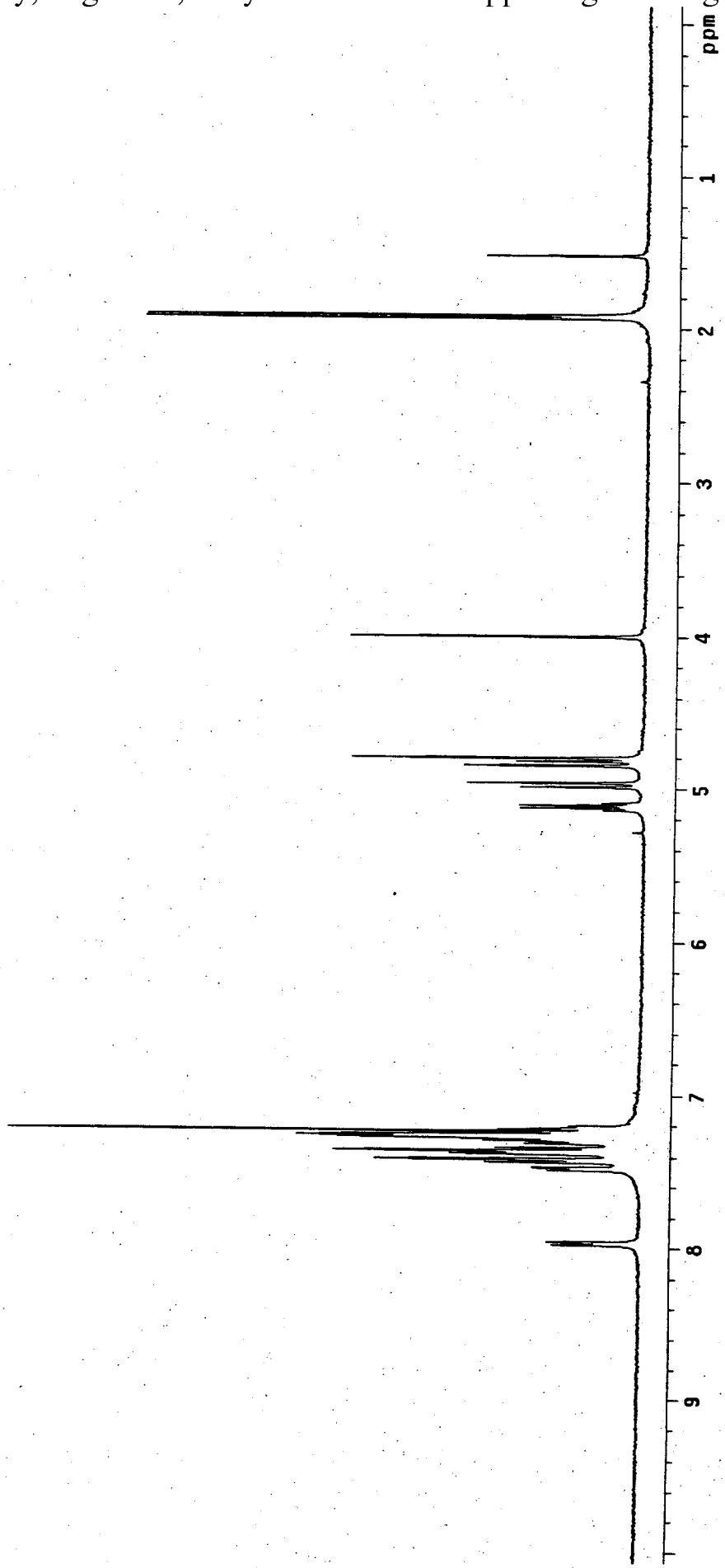

60 59 58 57 56 55 54 53
ppm

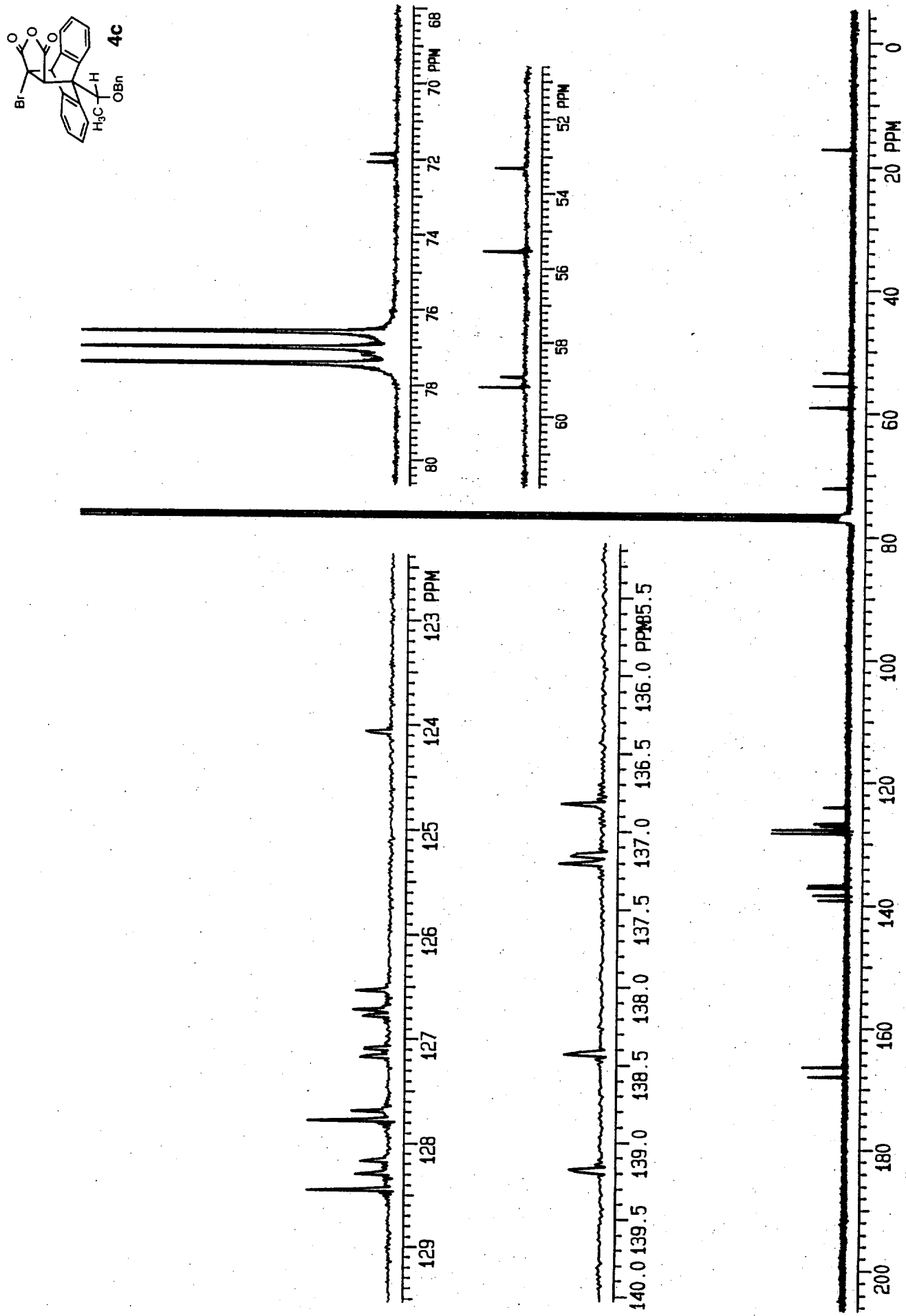

142.0 141.0 140.0 139.0 138.0
ppm

130 129 128 127 126 125
ppm

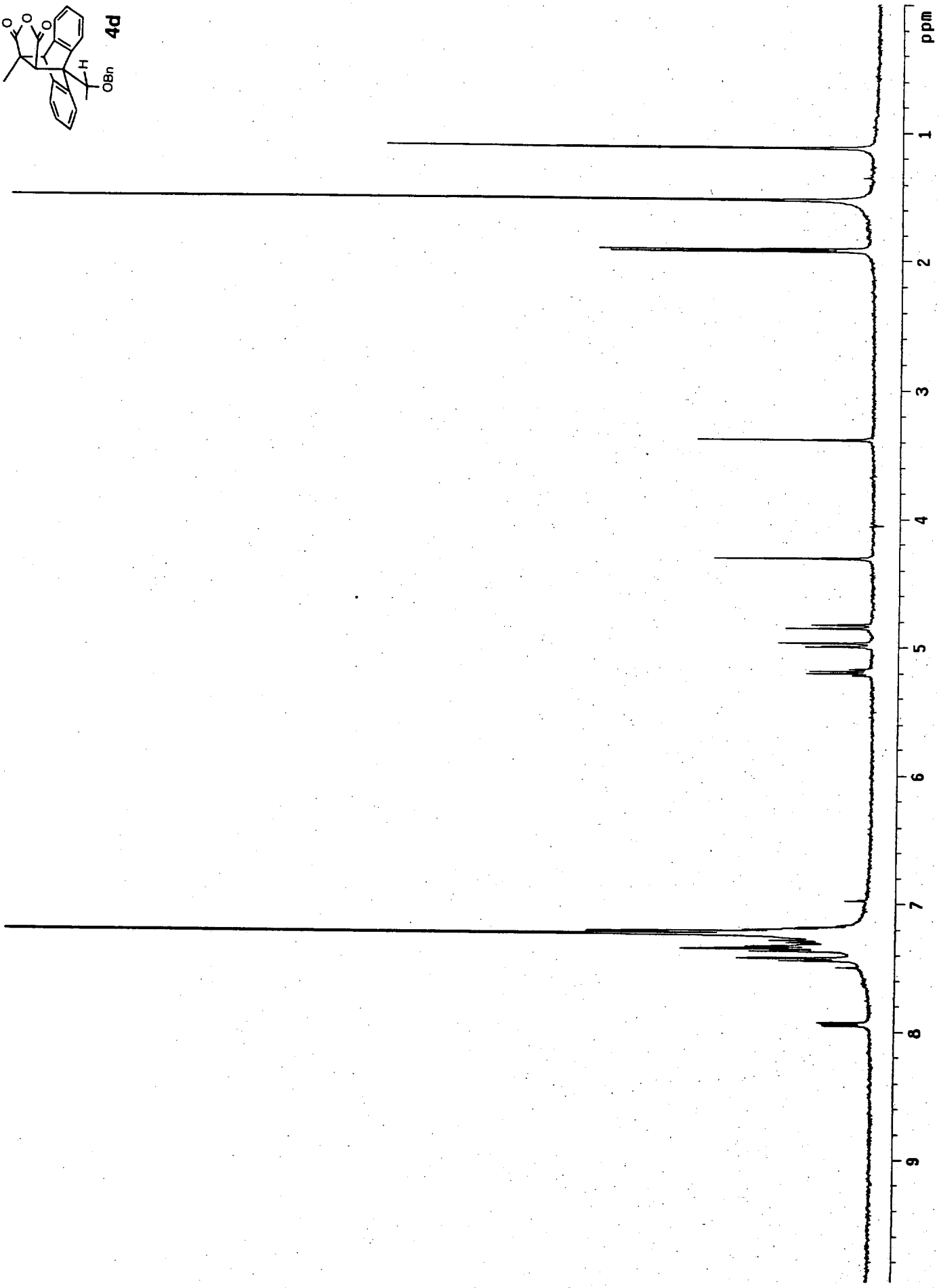

200 180 160 140 120 100 80 60 40 20
ppm


4c
Br
H
OBn
H_3C

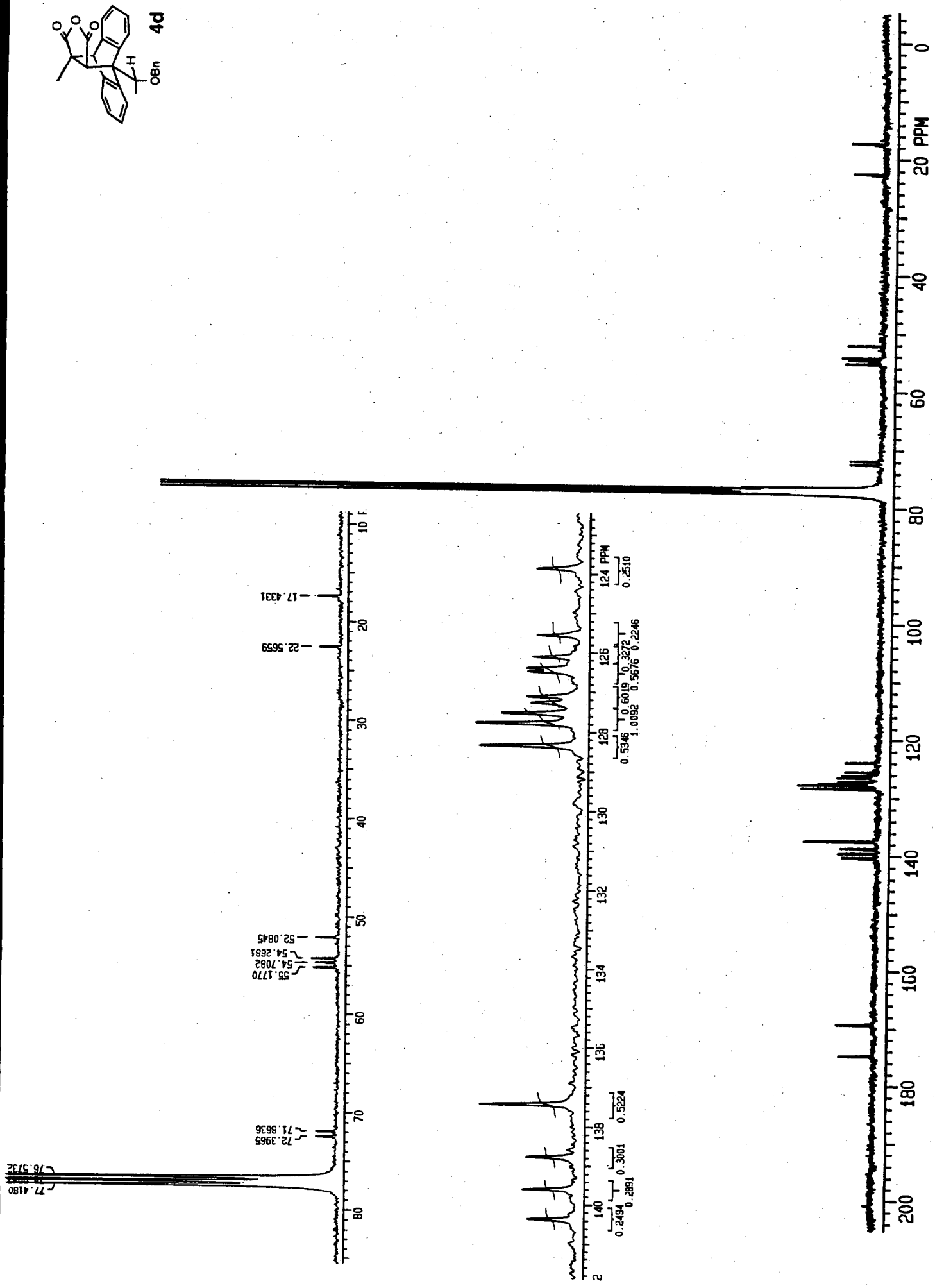

ppm
1
2
3
4
5
6
7
8
9

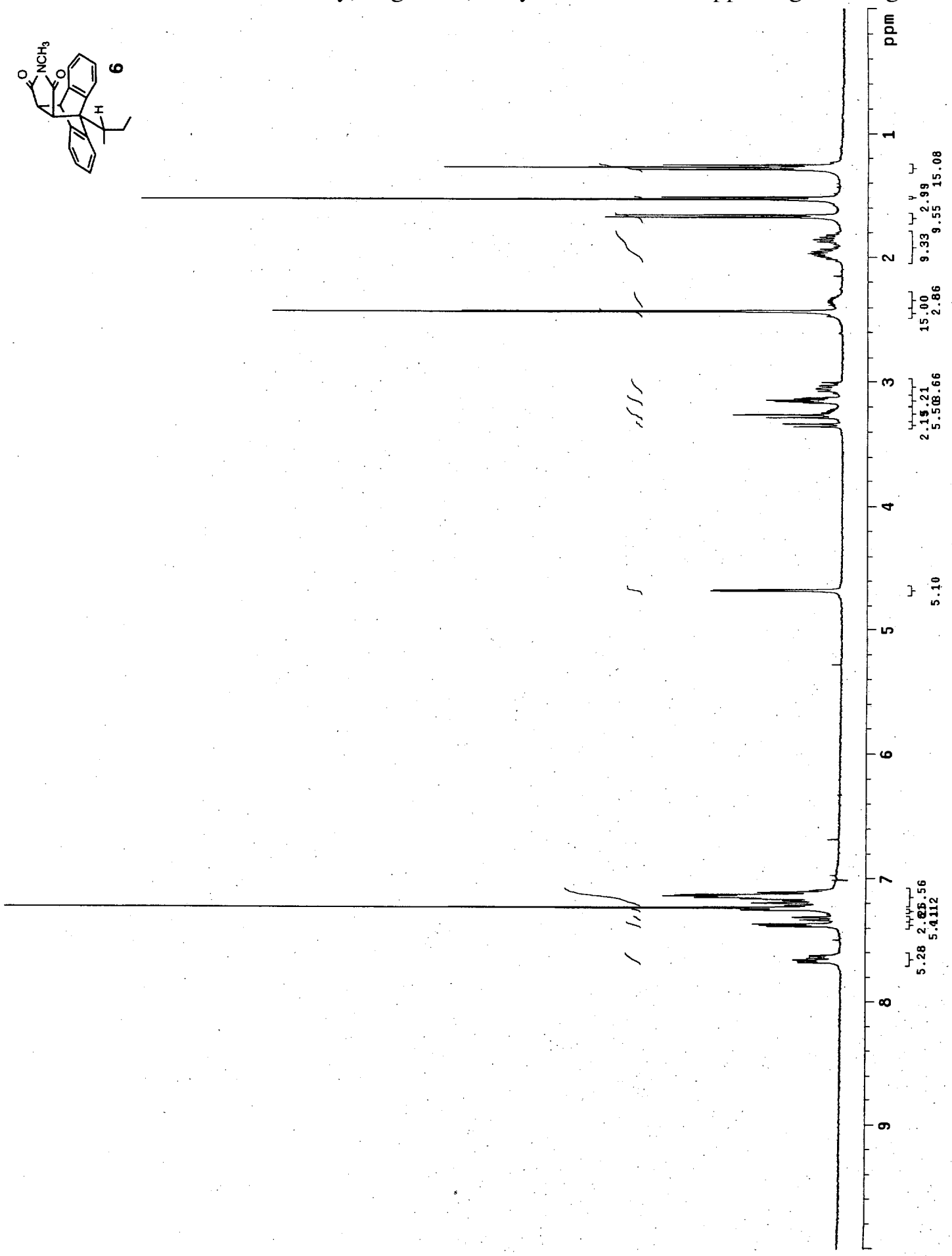

4c
Br
H
OBn
H3C
80
78
76
74
72
70 PPM
68
60
58
56
54
52 PPM
129
128
127
126
125
124
123 PPM
140.0
139.5
139.0
138.5
138.0
137.5
137.0
136.5
136.0 PPM
135.5
200
180
160
140
120
100
80
60
40
20 PPM
0

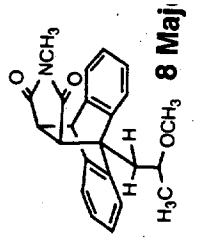
4d



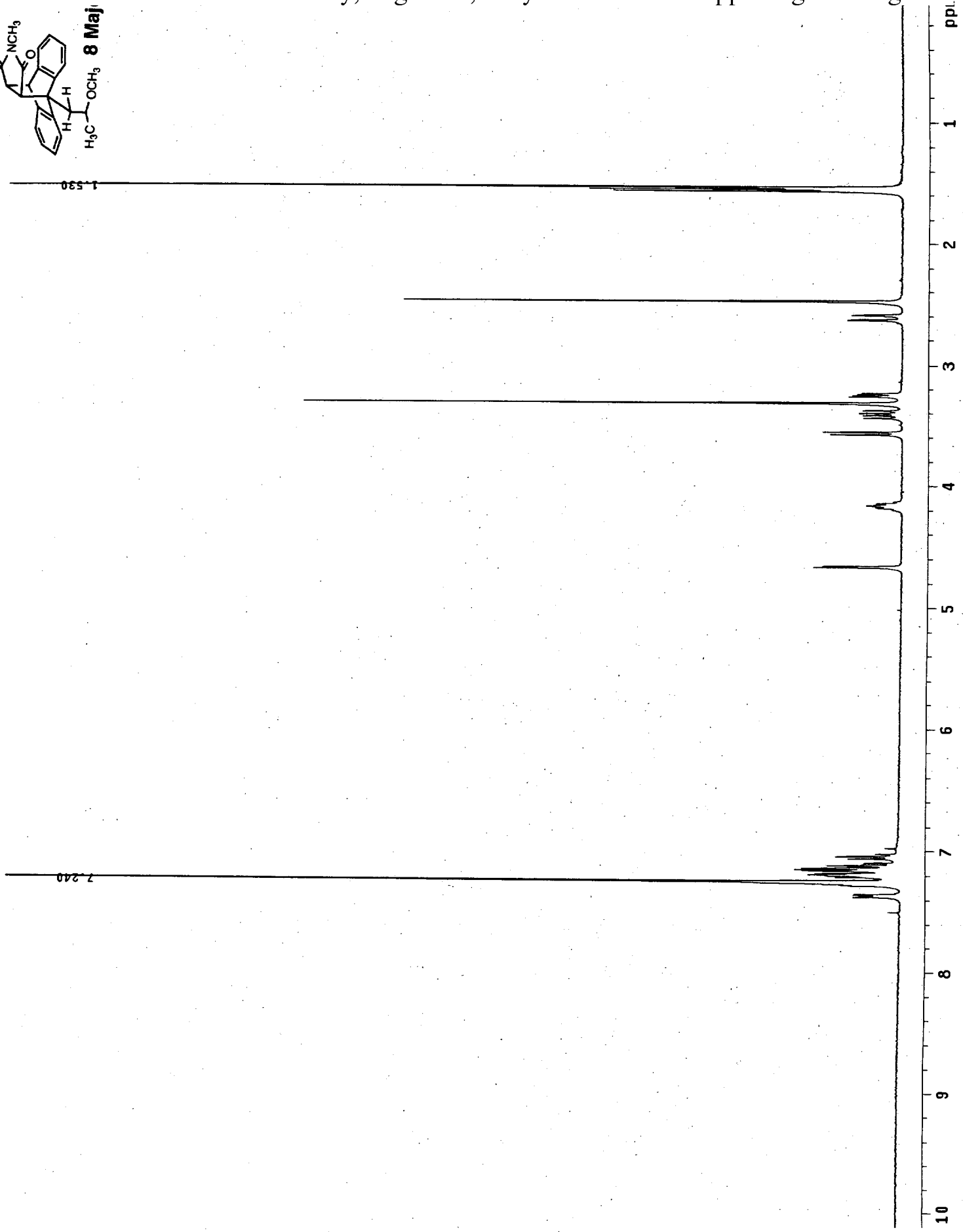
4d
OBn
H

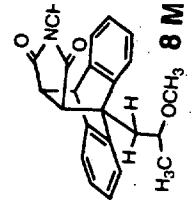

77.4180
76.5732
72.3965
71.8636
55.1770
54.7082
54.2681
52.0845
22.5659
17.4331
124 PPM
0.2510
0.2246
0.3272
0.5676
0.6019
1.0092
0.5346
0.5224
0.3001
0.2891
0.2494
20 PPM


NCH3
O
O
H
6
ppm
1
2
3
4
5
6
7
8
9
15.08
2.99
9.55
9.33
15.00
2.86
5.10
5.28
5.4112

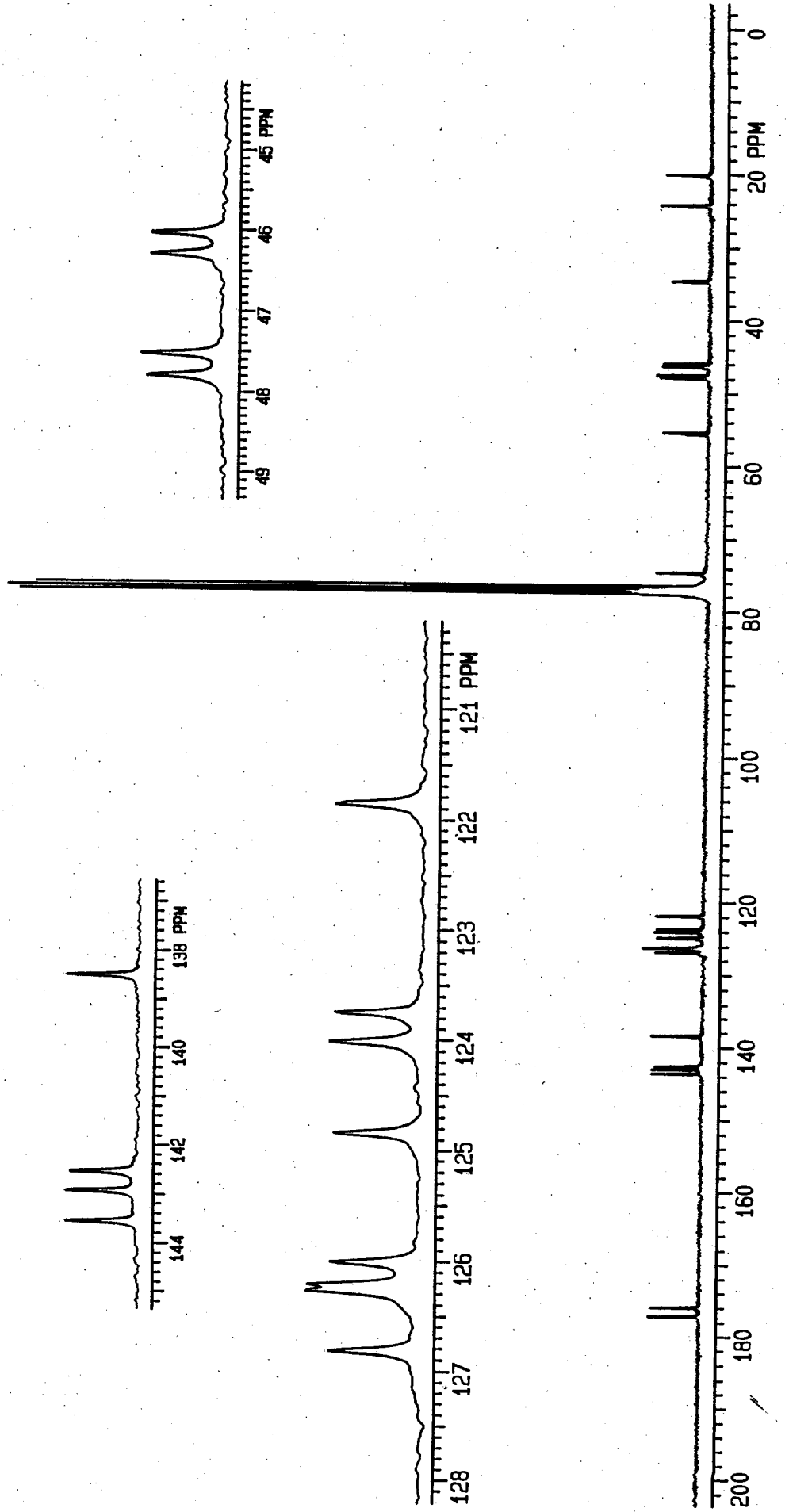


8 Maj

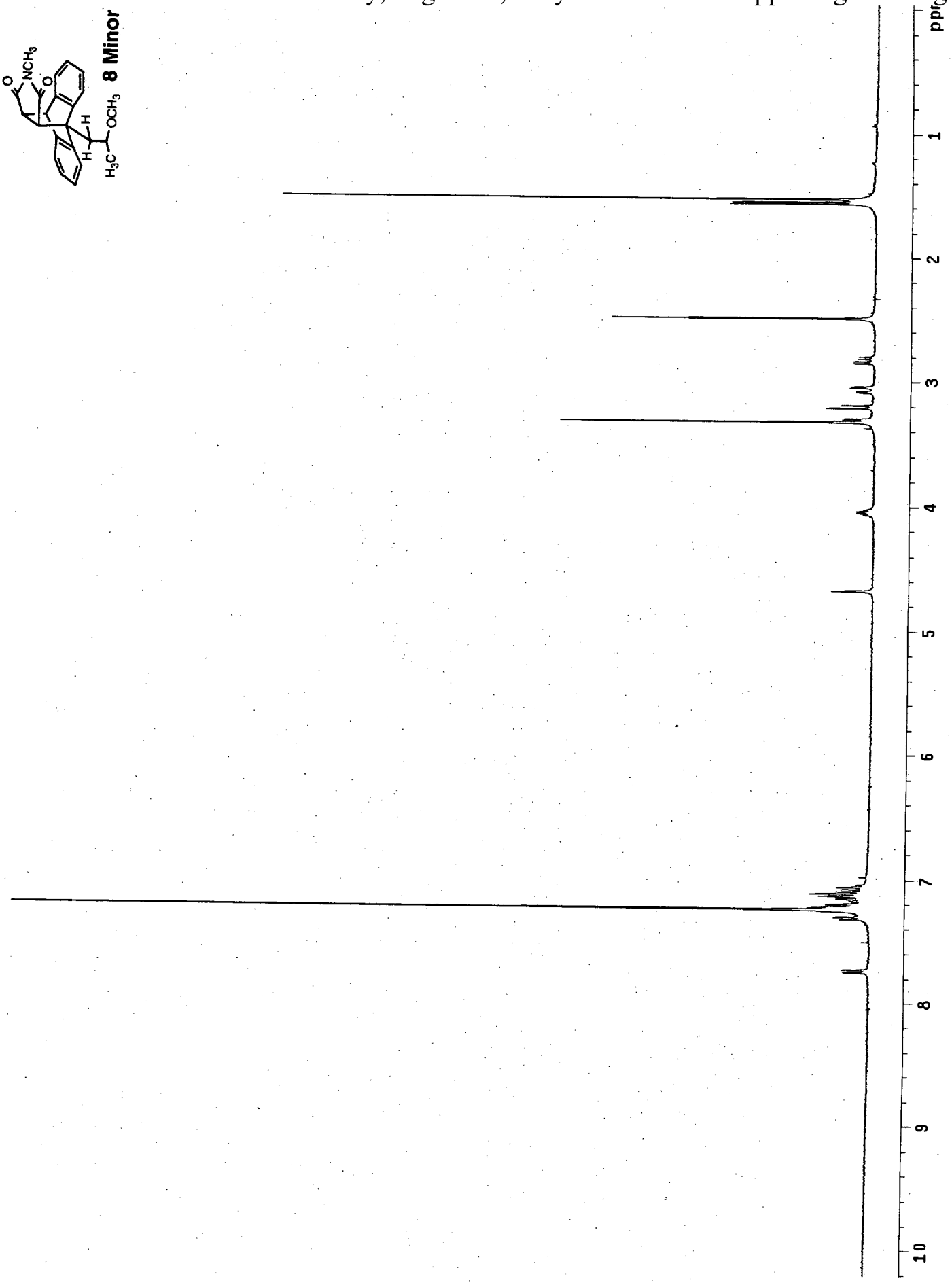


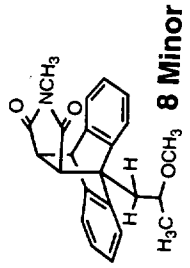

NCl
O
O
H
H
OCH3
H3C

8 Mor

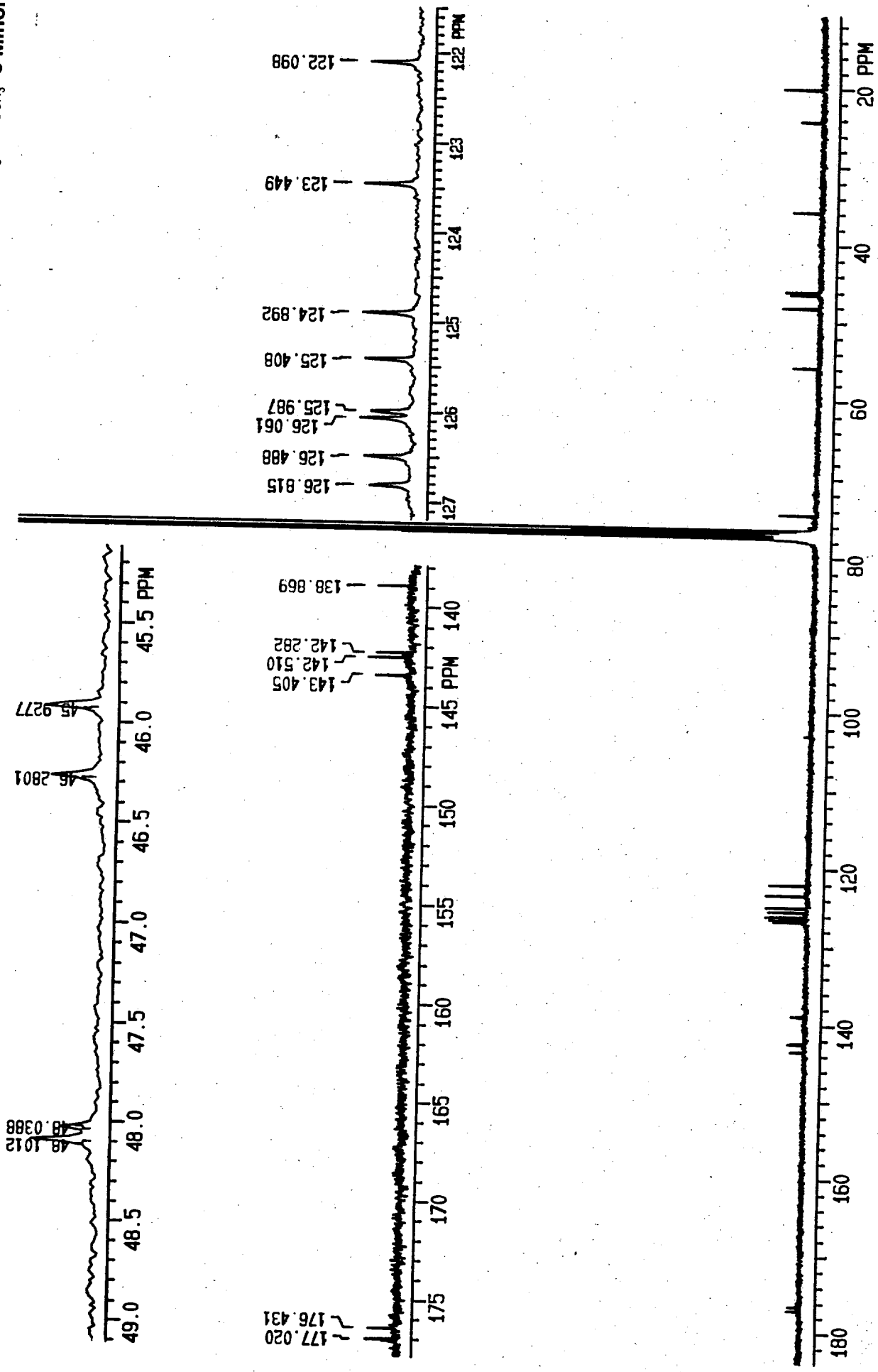

45 PPM
46
47
48
49
138 PPM
140
142
144
121 PPM
122
123
124
125
126
127
128
20 PPM
40
60
80
100
120
140
160
180
200
0

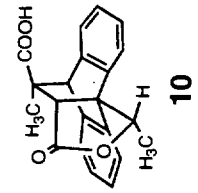
8 Minor

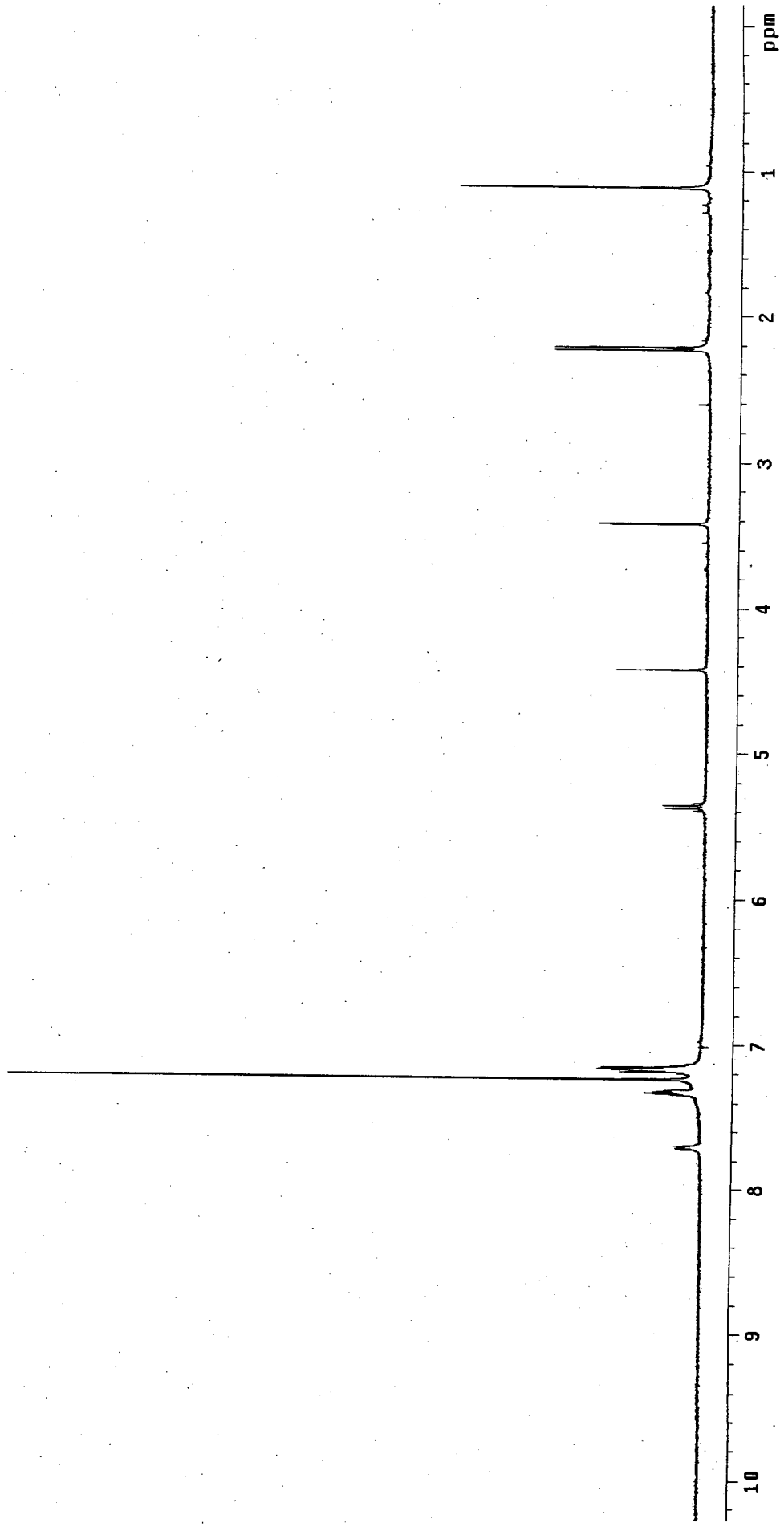


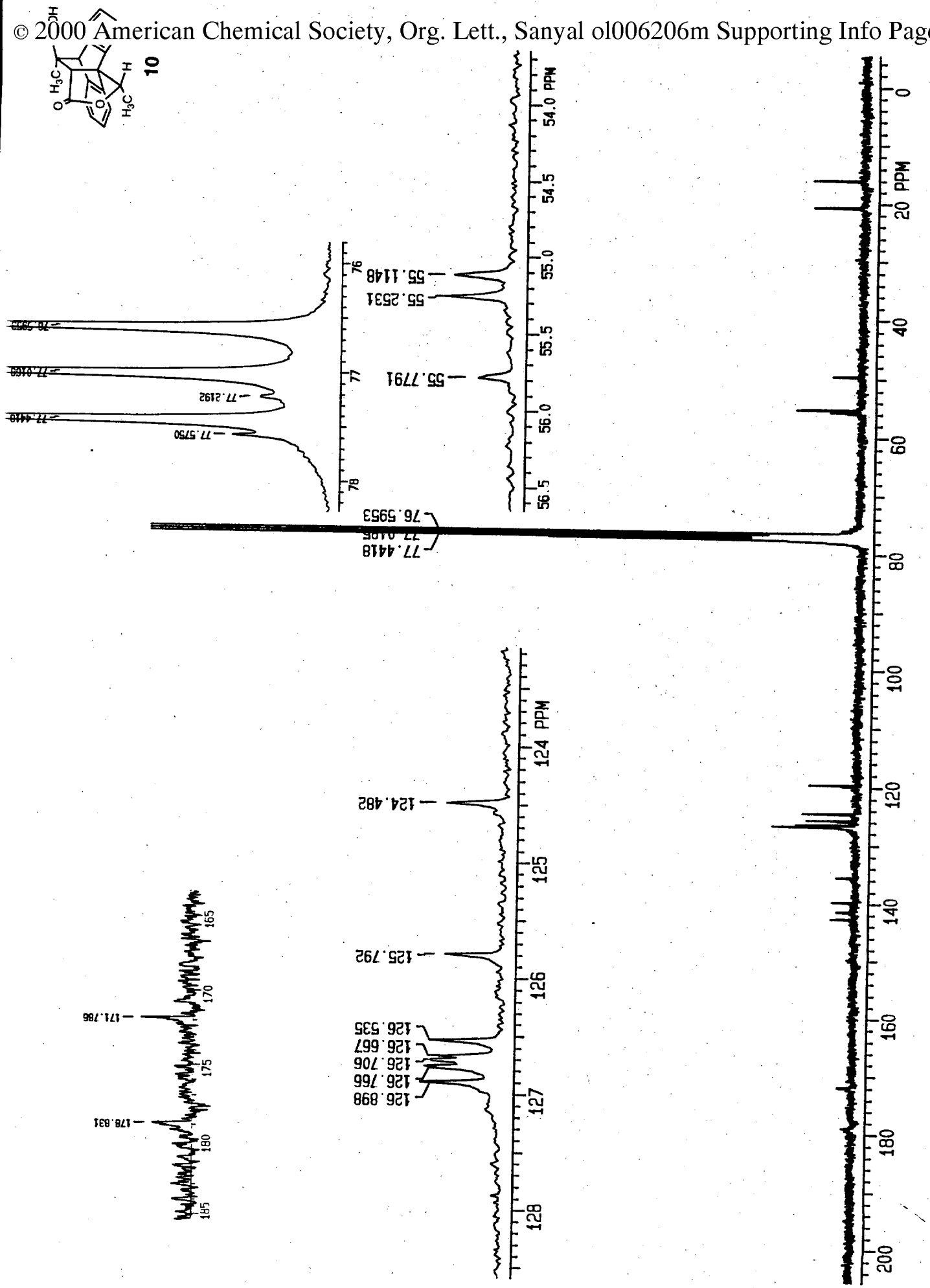

NCH3
O
O
H
H
H3C
OCH3

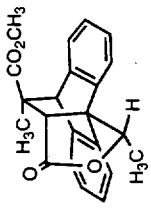
8 Minor


122.098
123.449
124.892
125.408
125.987
126.061
126.488
126.815
122 PPM
138.869
142.282
142.510
143.405
145 PPM
176.431
177.020
45.9277
46.2801
48.0388
48.1012
45.5 PPM
20 PPM

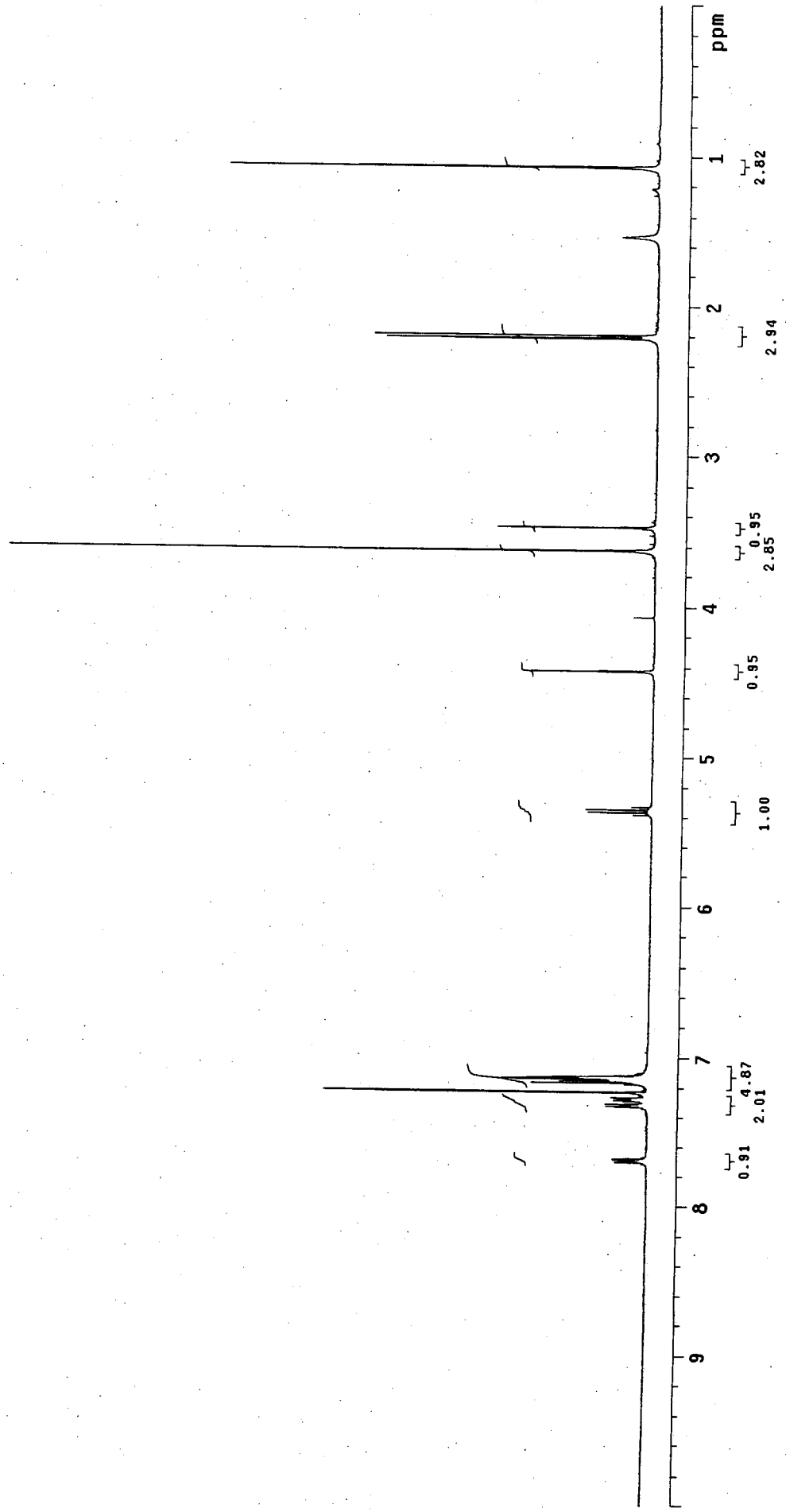

COOH
H3C
O
O
H3C
H
10

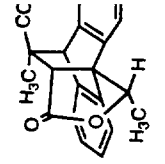

ppm
1
2
3
4
5
6
7
8
9
10


10
H3C
O
H
H3C
O
0
20 PPM
40
60
80
100
120
140
160
180
200
54.0 PPM
54.5
55.0
55.5
56.0
56.5
55.1148
55.2531
55.7791
76
77
78
76.5953
77.0165
77.4418
77.2192
77.5750
124 PPM
125
126
127
128
124.482
125.792
126.535
126.667
126.706
126.766
126.898
165
170
175
180
185
171.786
178.831

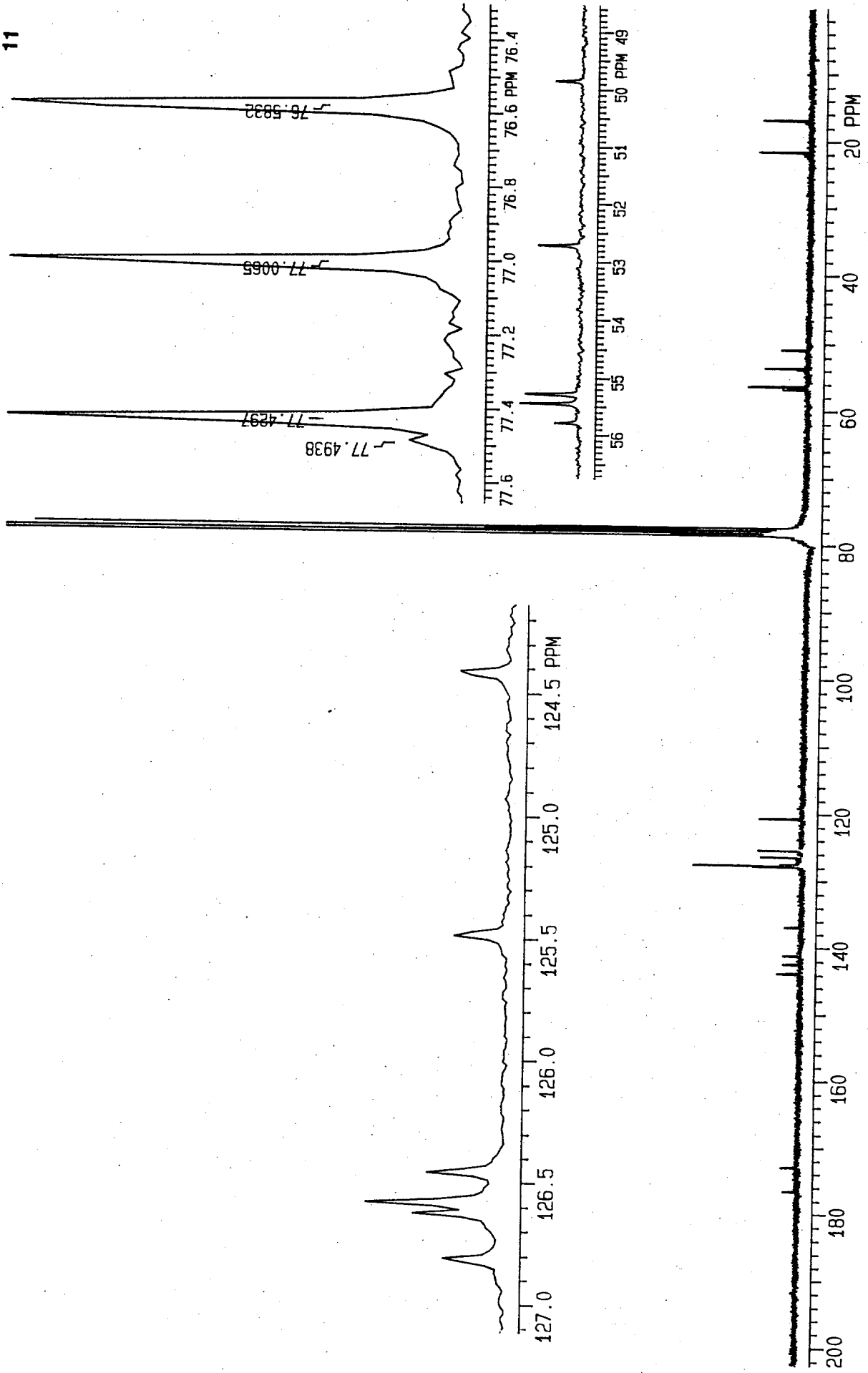

CO2CH3
H3C
O
O
H
H3C

11


ppm
1
2
3
4
5
6
7
8
9
2.82
2.94
0.95
2.85
0.95
1.00
4.87
2.01
0.91

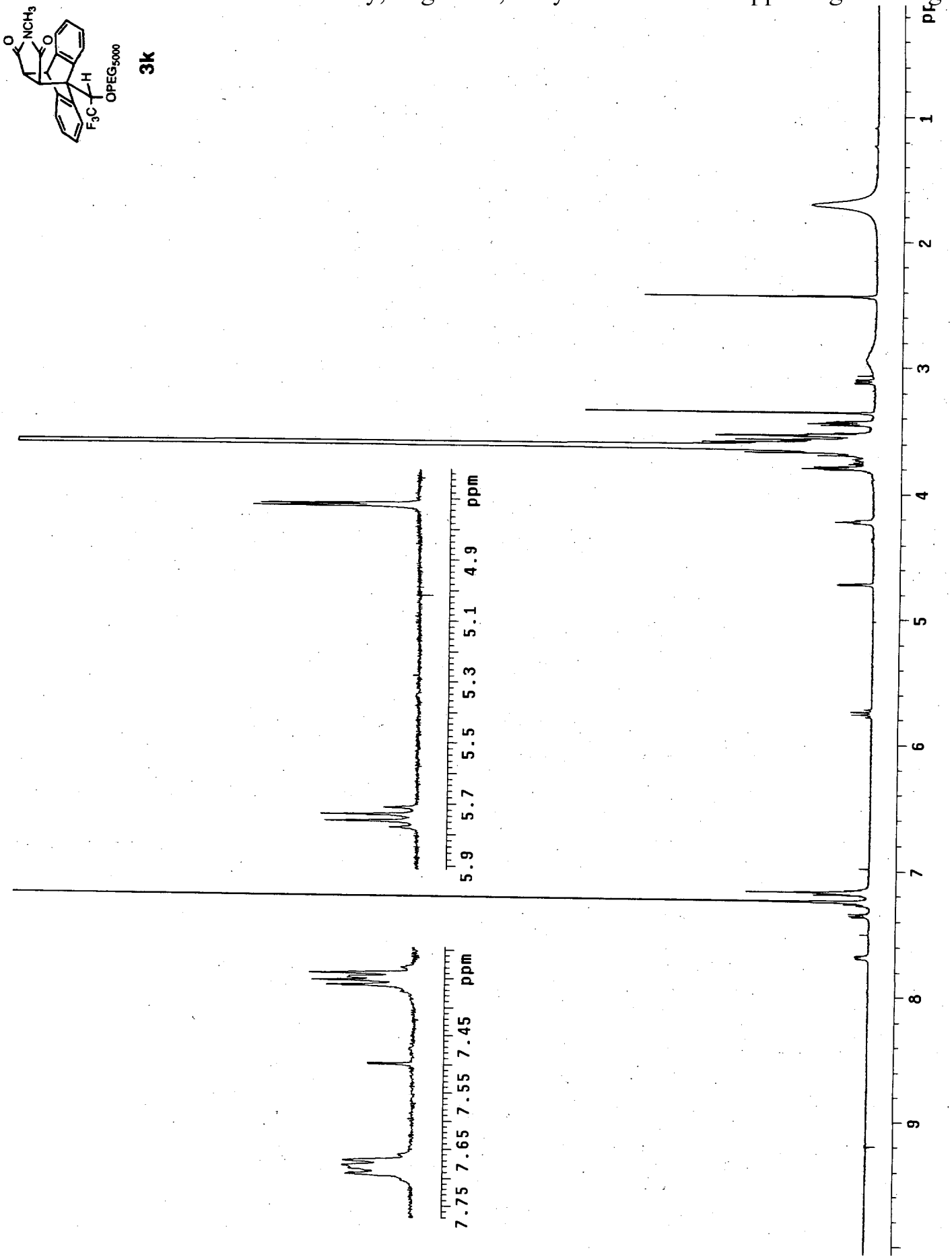


11


77.4938
77.4297
77.0065
76.5832
77.6
77.4
77.2
77.0
76.8
76.6 PPM 76.4
56
55
54
53
52
51
50 PPM 49
127.0
126.5
126.0
125.5
125.0
124.5 PPM
200
180
160
140
120
100
80
60
40
20 PPM

NCH3
O
O
H
F3C
OPEG5000

3k


ppm
1
2
3
4
5
6
7
8
9
5.9 5.7 5.5 5.3 5.1 4.9
ppm
7.75 7.65 7.55 7.45
ppm