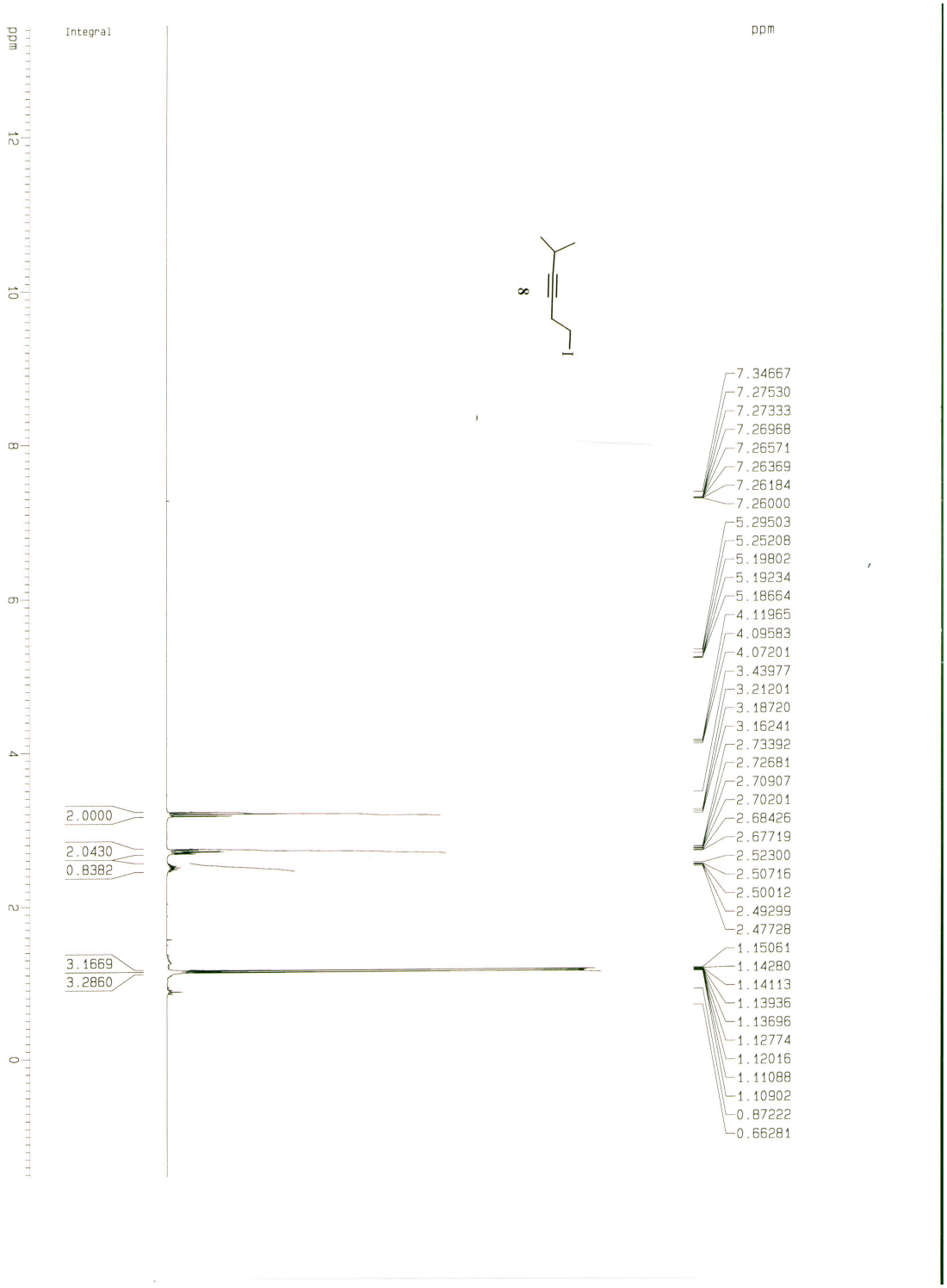
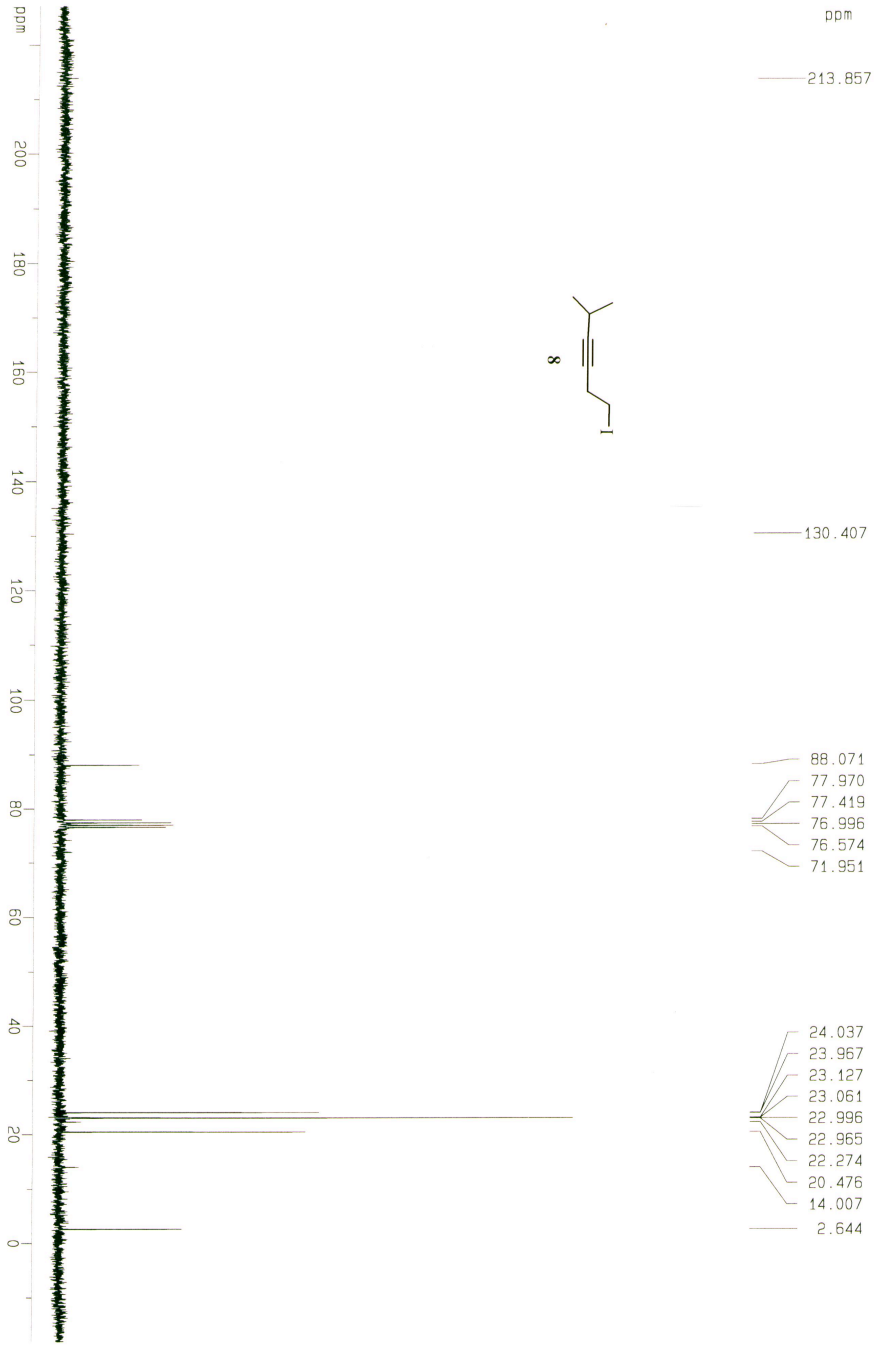
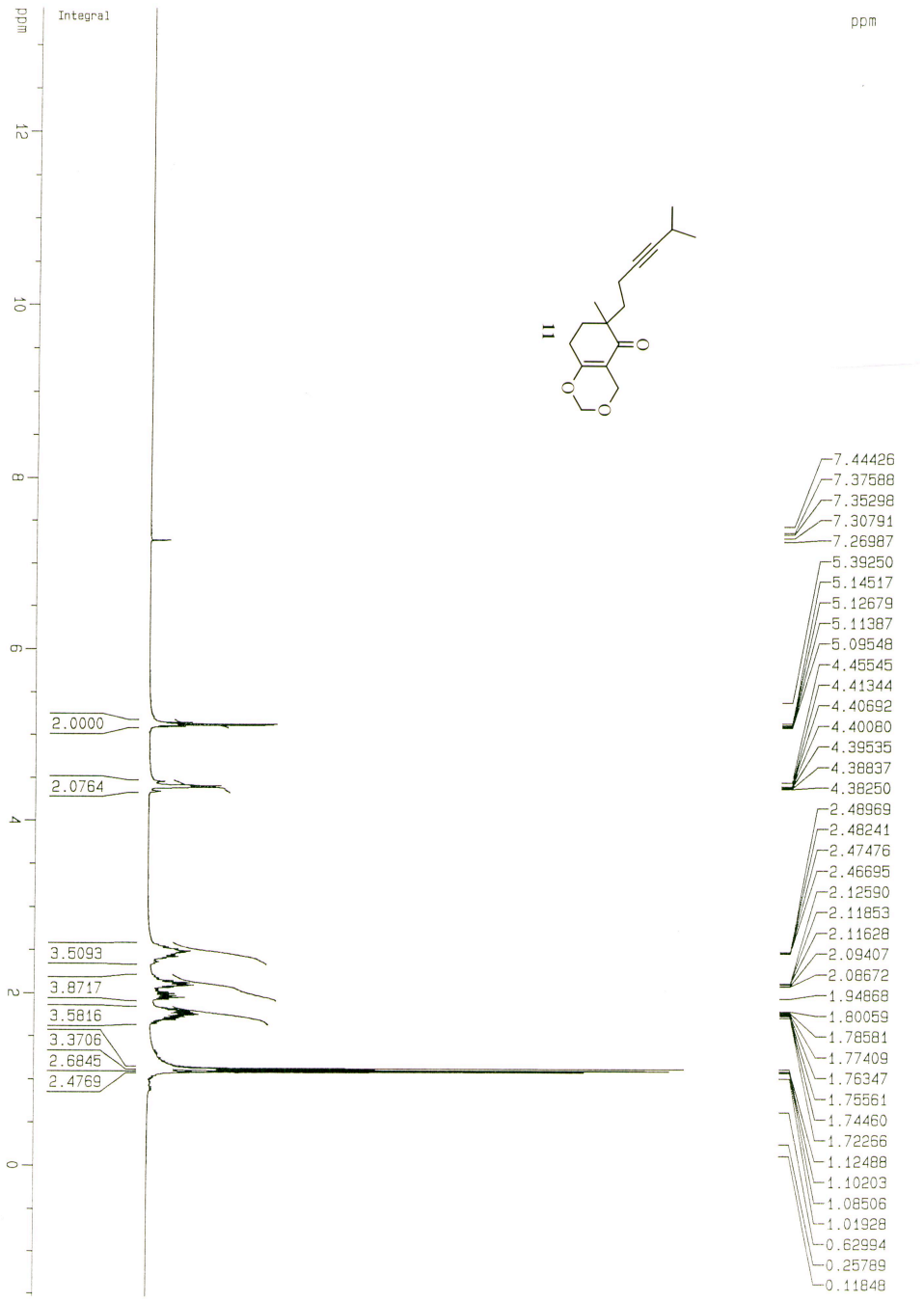
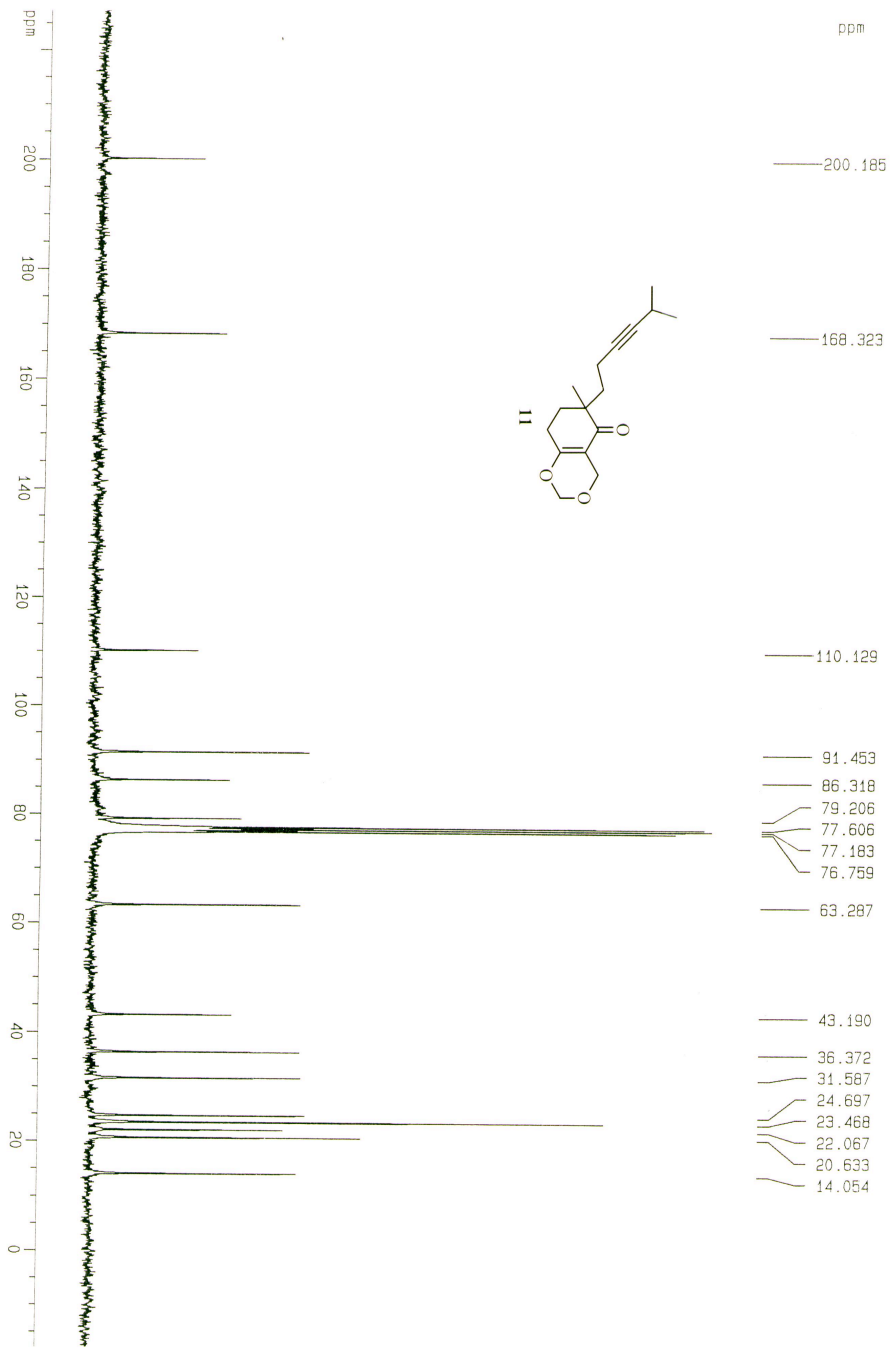
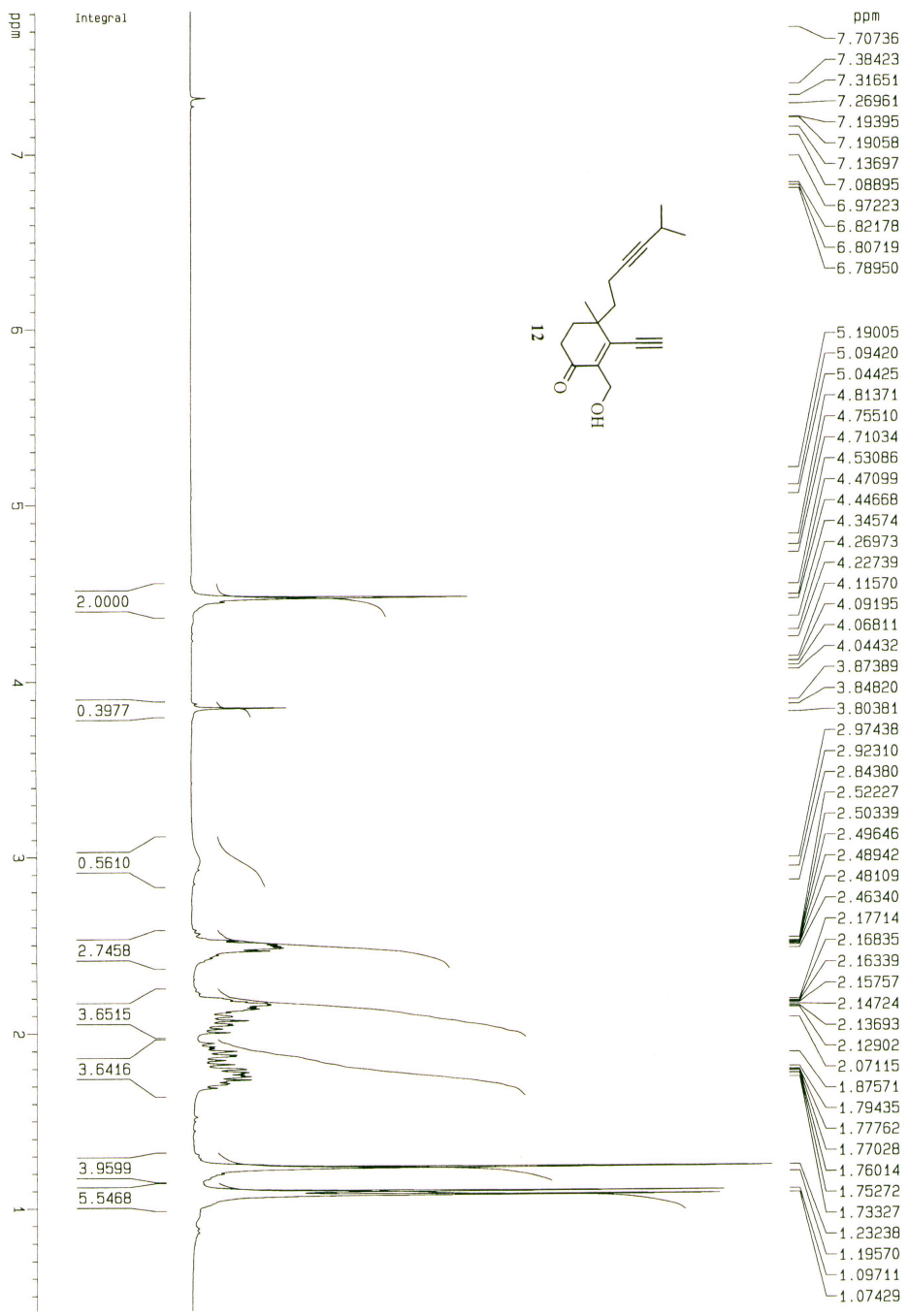
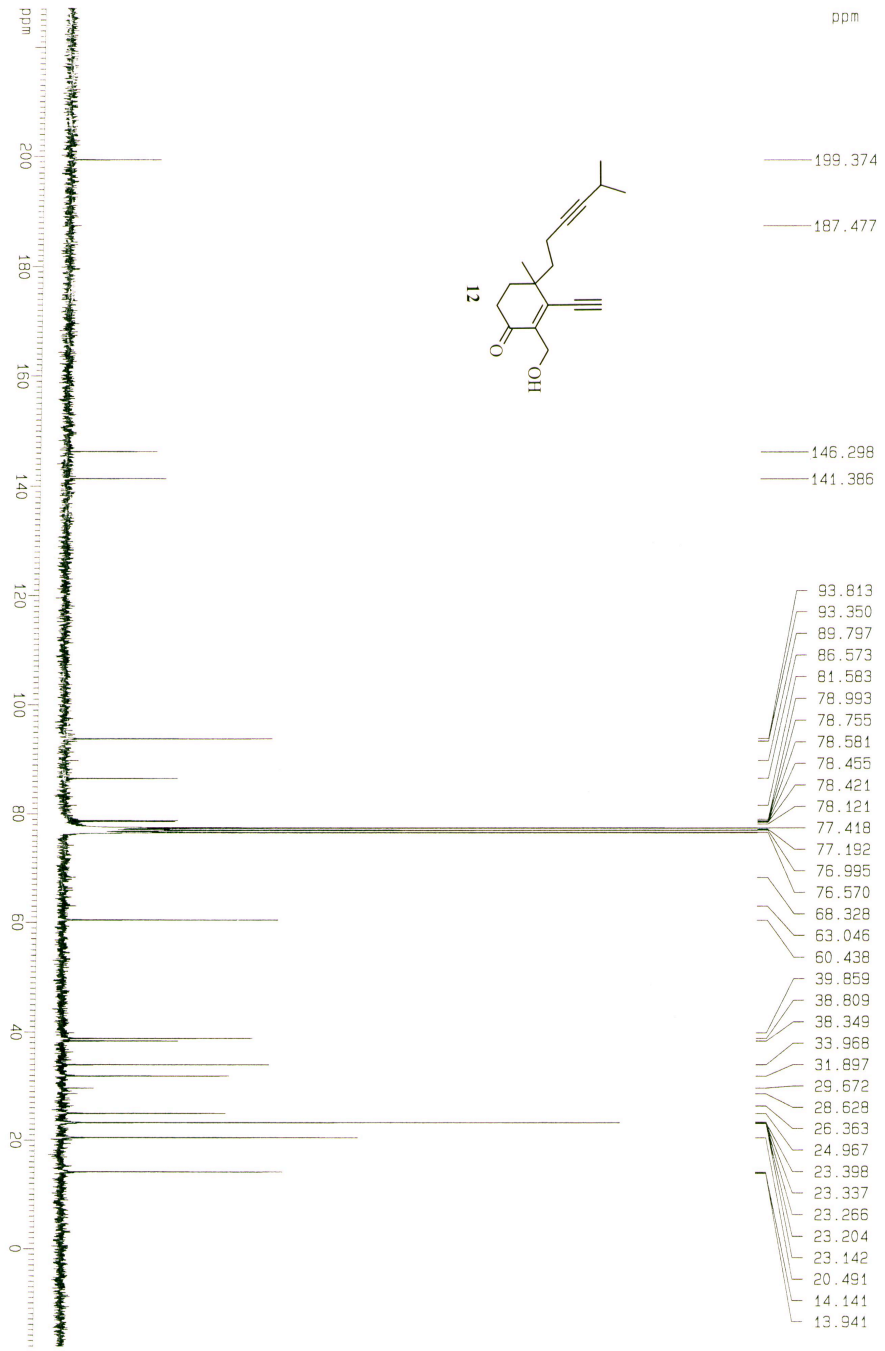

Integral
ppm
8
I
2.0000
2.0430
0.8382
3.1669
3.2860
7.34667
7.27530
7.27333
7.26968
7.26571
7.26369
7.26184
7.26000
5.29503
5.25208
5.19802
5.19234
5.18664
4.11965
4.09583
4.07201
3.43977
3.21201
3.18720
3.16241
2.73392
2.72681
2.70907
2.70201
2.68426
2.67719
2.52300
2.50716
2.50012
2.49299
2.47728
1.15061
1.14280
1.14113
1.13936
1.13696
1.12774
1.12016
1.11088
1.10902
0.87222
0.66281

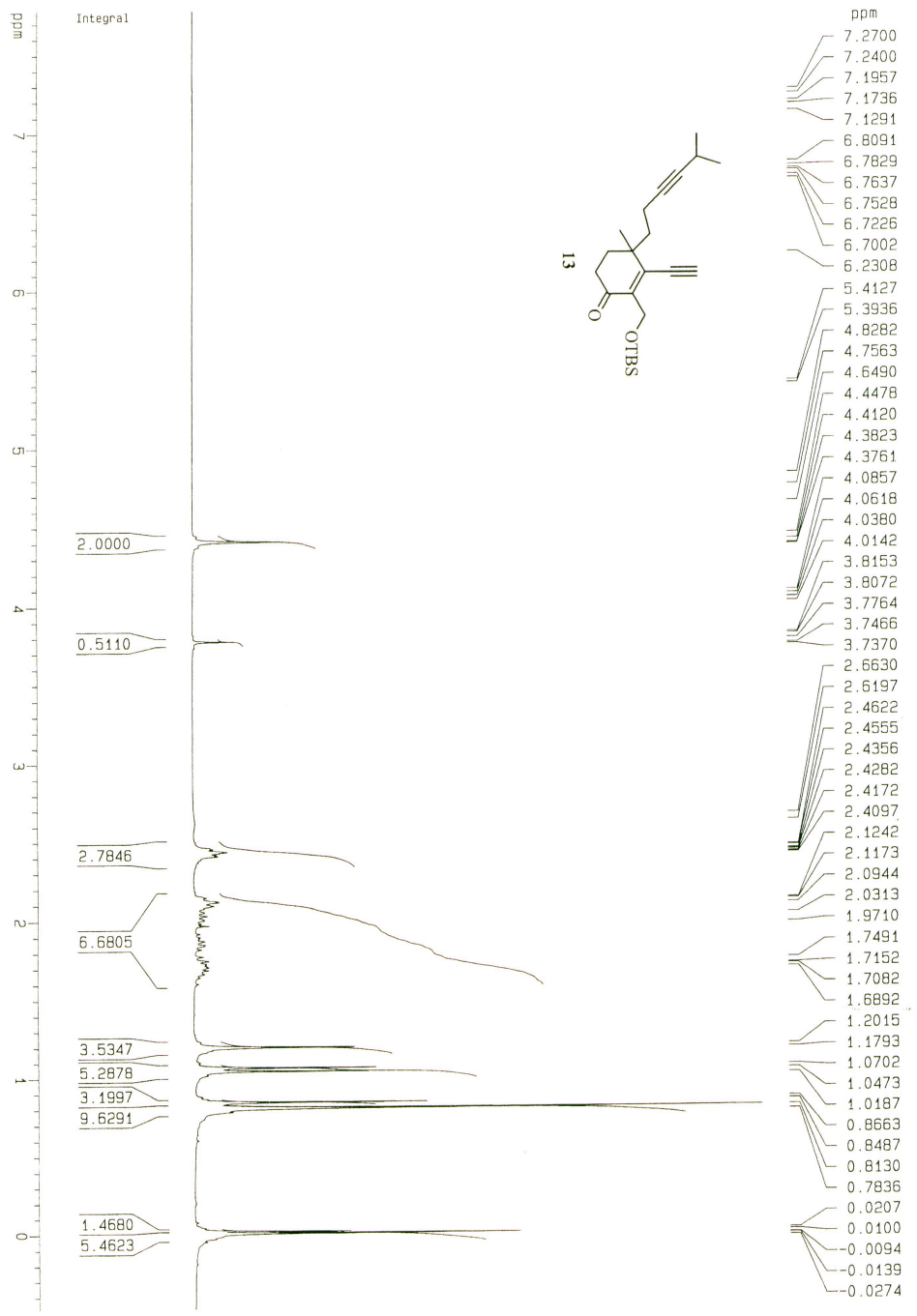

ppm
213.857
130.407
88.071
77.970
77.419
76.996
76.574
71.951
24.037
23.967
23.127
23.061
22.996
22.965
22.274
20.476
14.007
2.644
8
I
ppm
200
180
160
140
120
100
80
60
40
20
0

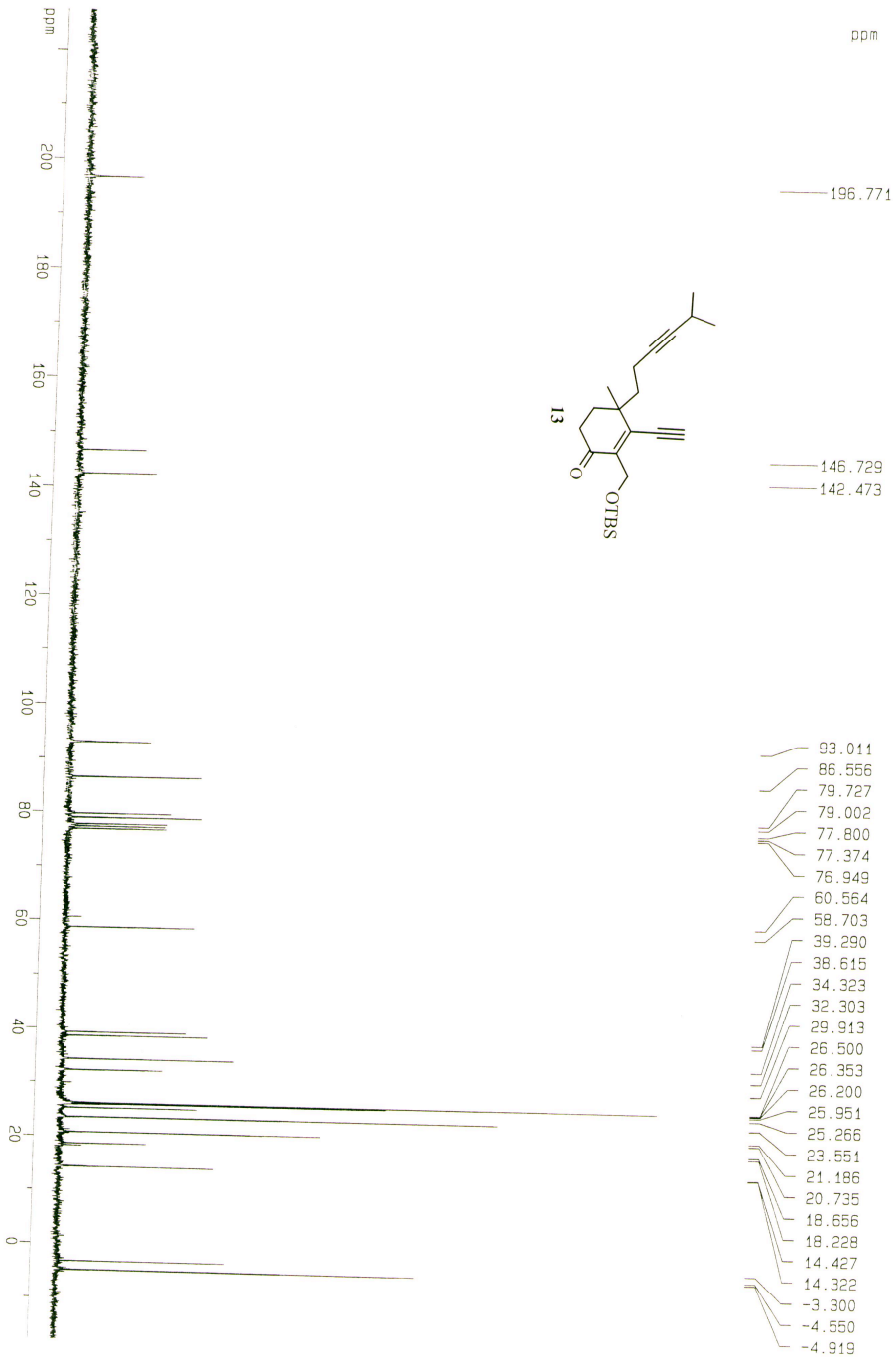

ppm
Integral
ppm
12
10
8
6
4
2
0
11
O
O
O
2.0000
2.0764
3.5093
3.8717
3.5816
3.3706
2.6845
2.4769
7.44426
7.37588
7.35298
7.30791
7.26987
5.39250
5.14517
5.12679
5.11387
5.09548
4.45545
4.41344
4.40692
4.40080
4.39535
4.38837
4.38250
2.48969
2.48241
2.47476
2.46695
2.12590
2.11853
2.11628
2.09407
2.08672
1.94868
1.80059
1.78581
1.77409
1.76347
1.75561
1.74460
1.72266
1.12488
1.10203
1.08506
1.01928
0.62994
0.25789
0.11848

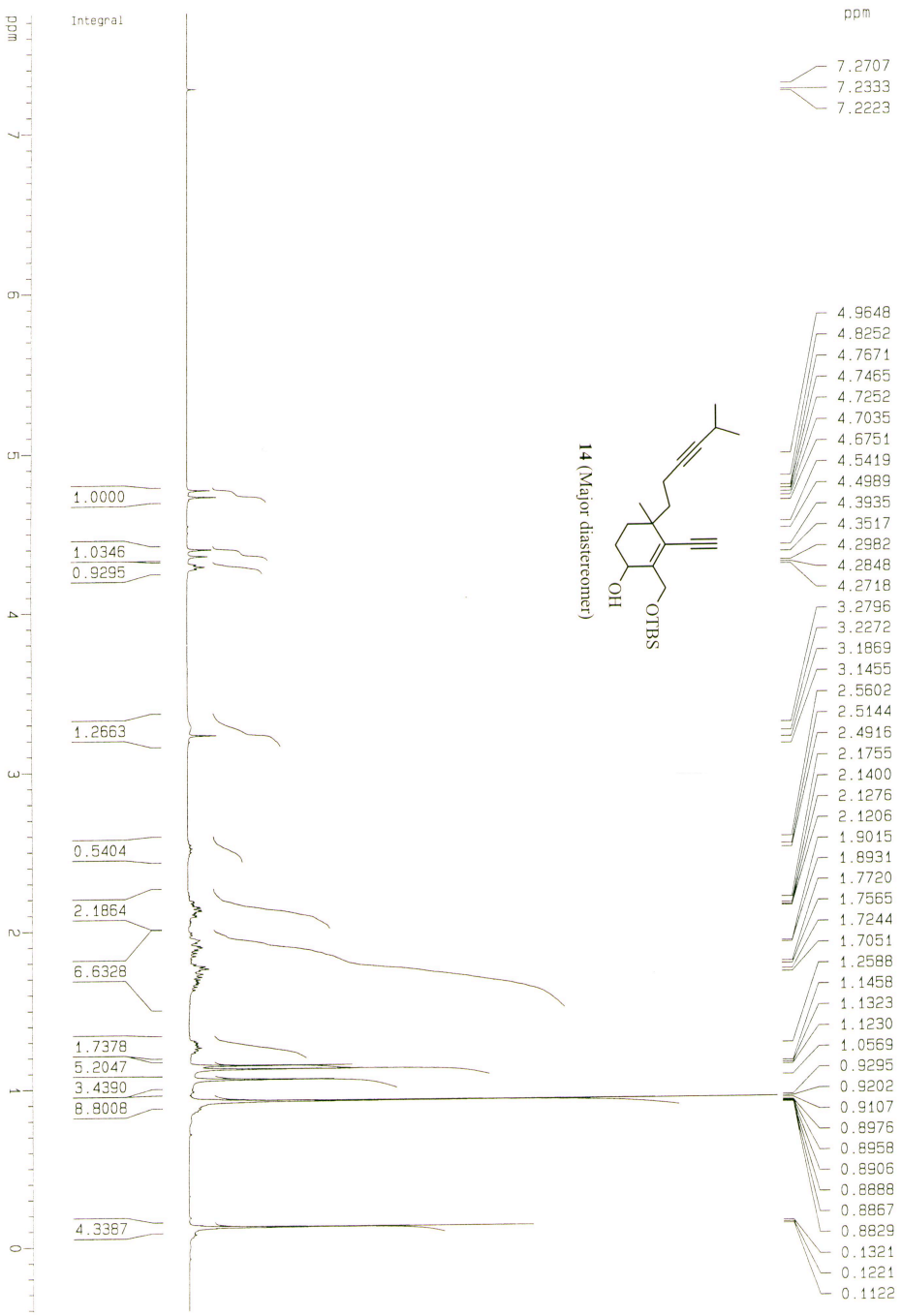

ppm
200.185
168.323
110.129
91.453
86.318
79.206
77.606
77.183
76.759
63.287
43.190
36.372
31.587
24.697
23.468
22.067
20.633
14.054
11

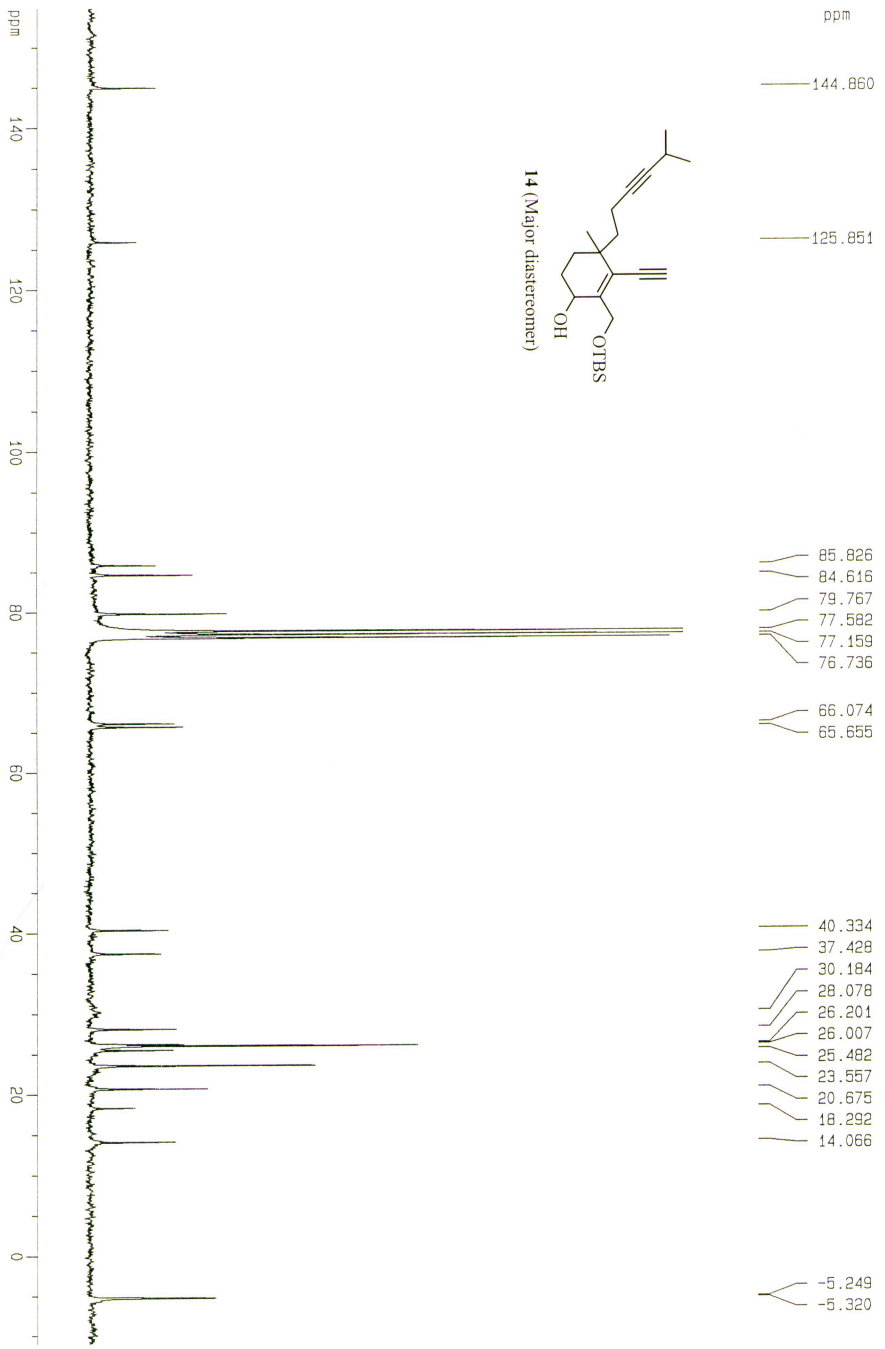

Integral
ppm
2.0000
0.3977
0.5610
2.7458
3.6515
3.6416
3.9599
5.5468
12
O
OH
ppm
7.70736
7.38423
7.31651
7.26961
7.19395
7.19058
7.13697
7.08895
6.97223
6.82178
6.80719
6.78950
5.19005
5.09420
5.04425
4.81371
4.75510
4.71034
4.53086
4.47099
4.44668
4.34574
4.26973
4.22739
4.11570
4.09195
4.06811
4.04432
3.87389
3.84820
3.80381
2.97438
2.92310
2.84380
2.52227
2.50339
2.49646
2.48942
2.48109
2.46340
2.17714
2.16835
2.16339
2.15757
2.14724
2.13693
2.12902
2.07115
1.87571
1.79435
1.77762
1.77028
1.76014
1.75272
1.73327
1.23238
1.19570
1.09711
1.07429

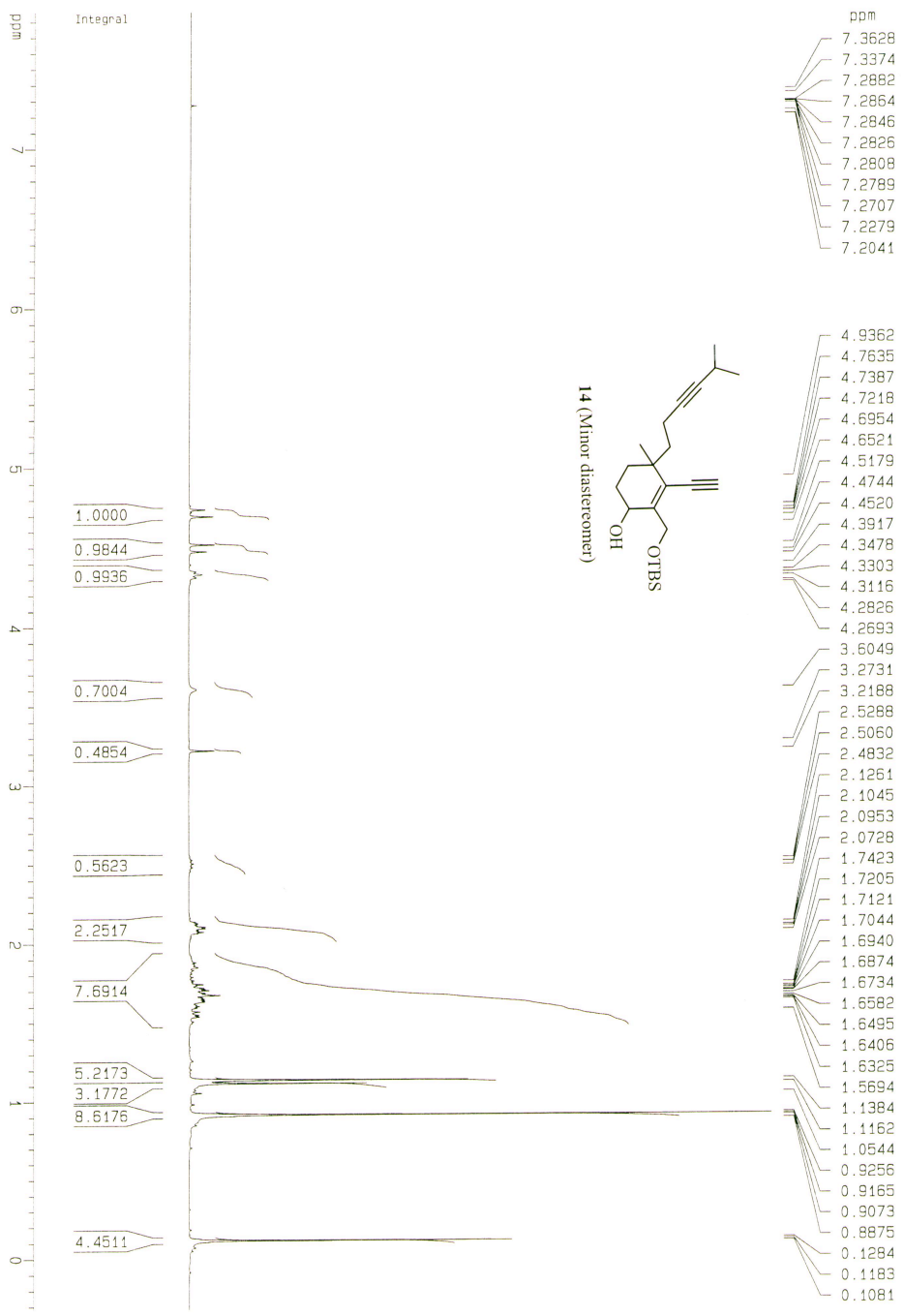

ppm
200
180
160
140
120
100
80
60
40
20
0
12
O
OH
199.374
187.477
146.298
141.386
93.813
93.350
89.797
86.573
81.583
78.993
78.755
78.581
78.455
78.421
78.121
77.418
77.192
76.995
76.570
68.328
63.046
60.438
39.859
38.809
38.349
33.968
31.897
29.672
28.628
26.363
24.967
23.398
23.337
23.266
23.204
23.142
20.491
14.141
13.941


Integral
ppm
2.0000
0.5110
2.7846
6.6805
3.5347
5.2878
3.1997
9.6291
1.4680
5.4623
13
OTBS
O
ppm
7.2700
7.2400
7.1957
7.1736
7.1291
6.8091
6.7829
6.7637
6.7528
6.7226
6.7002
6.2308
5.4127
5.3936
4.8282
4.7563
4.6490
4.4478
4.4120
4.3823
4.3761
4.0857
4.0618
4.0380
4.0142
3.8153
3.8072
3.7764
3.7466
3.7370
2.6630
2.6197
2.4622
2.4555
2.4356
2.4282
2.4172
2.4097
2.1242
2.1173
2.0944
2.0313
1.9710
1.7491
1.7152
1.7082
1.6892
1.2015
1.1793
1.0702
1.0473
1.0187
0.8663
0.8487
0.8130
0.7836
0.0207
0.0100
-0.0094
-0.0139
-0.0274

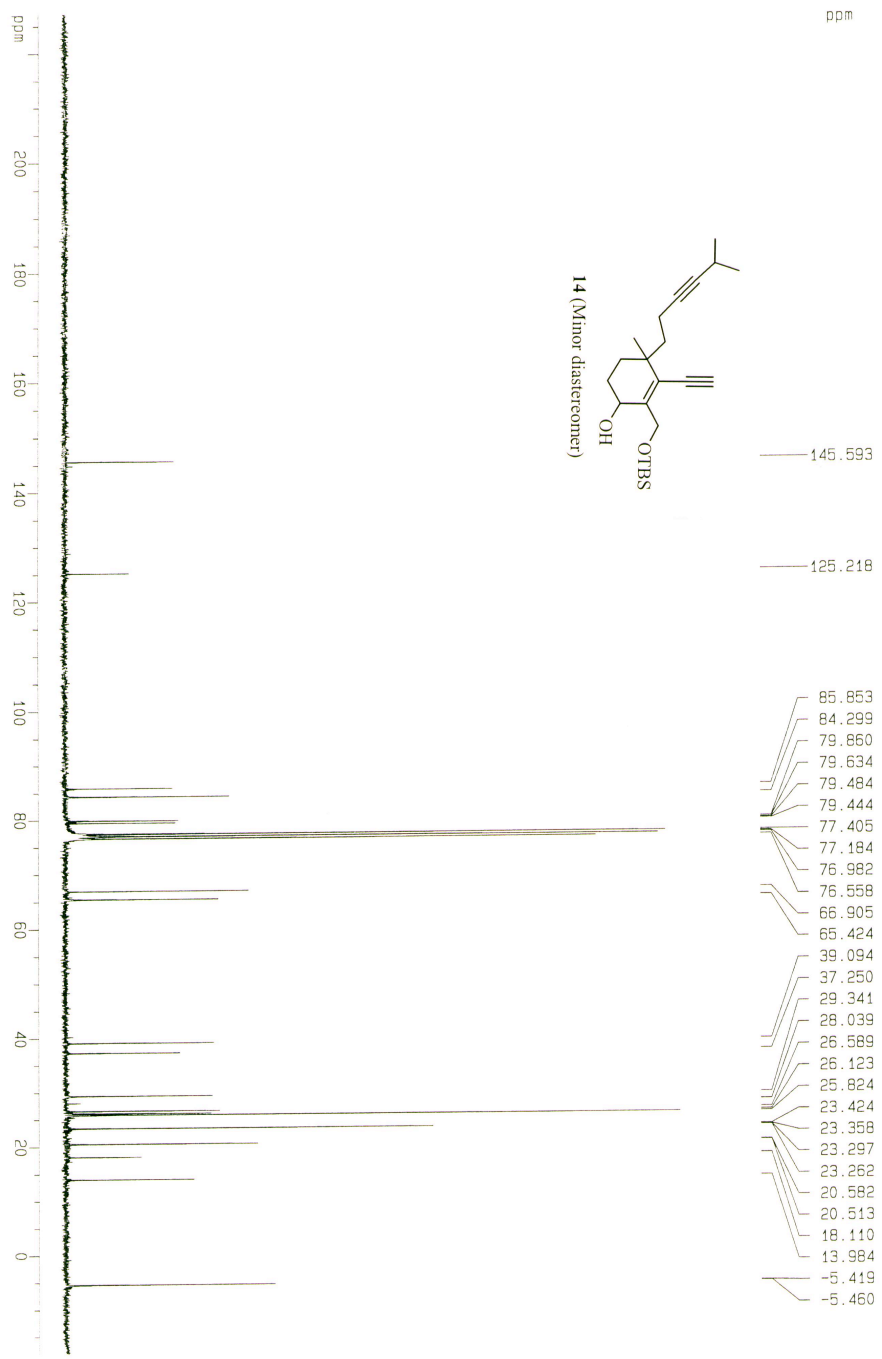

ppm
200
180
160
140
120
100
80
60
40
20
0
ppm
196.771
146.729
142.473
93.011
86.556
79.727
79.002
77.800
77.374
76.949
60.554
58.703
39.290
38.615
34.323
32.303
29.913
26.500
26.353
26.200
25.951
25.266
23.551
21.186
20.735
18.656
18.228
14.427
14.322
-3.300
-4.550
-4.919
13
O
OTBS


ppm
Integral
7.2707
7.2333
7.2223
4.9648
4.8252
4.7671
4.7465
4.7252
4.7035
4.6751
4.5419
4.4989
4.3935
4.3517
4.2982
4.2848
4.2718
3.2796
3.2272
3.1869
3.1455
2.5602
2.5144
2.4916
2.1755
2.1400
2.1276
2.1206
1.9015
1.8931
1.7720
1.7565
1.7244
1.7051
1.2588
1.1458
1.1323
1.1230
1.0569
0.9295
0.9202
0.9107
0.8976
0.8958
0.8906
0.8888
0.8867
0.8829
0.1321
0.1221
0.1122
1.0000
1.0346
0.9295
1.2663
0.5404
2.1864
6.6328
1.7378
5.2047
3.4390
8.8008
4.3387
OH
OTBS
14 (Major diastereomer)

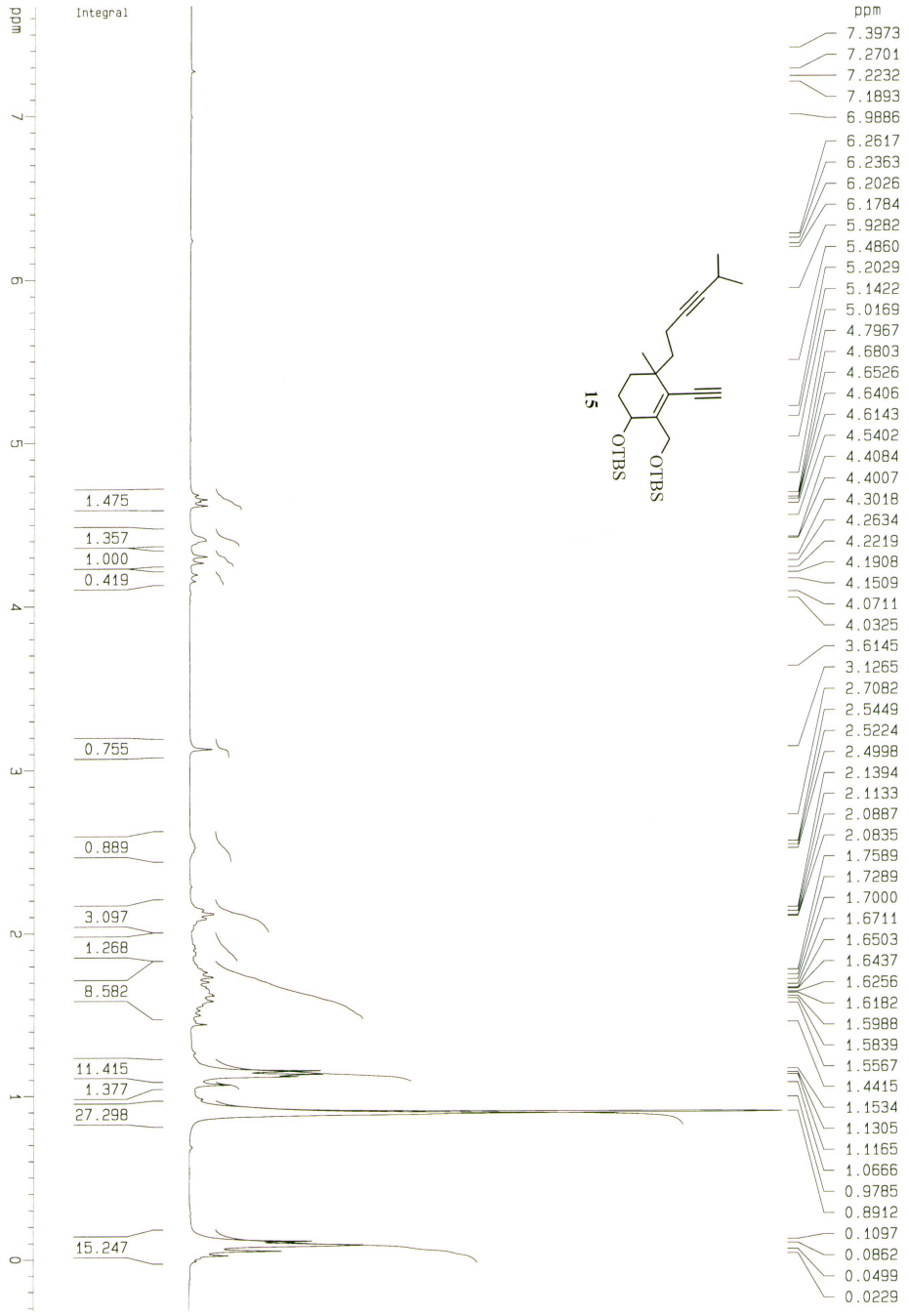

ppm
140
120
100
80
60
40
20
0
14 (Major diastereomer)
OH
OTBS
ppm
144.860
125.851
85.826
84.616
79.767
77.582
77.159
76.736
66.074
65.655
40.334
37.428
30.184
28.078
26.201
26.007
25.482
23.557
20.675
18.292
14.066
-5.249
-5.320

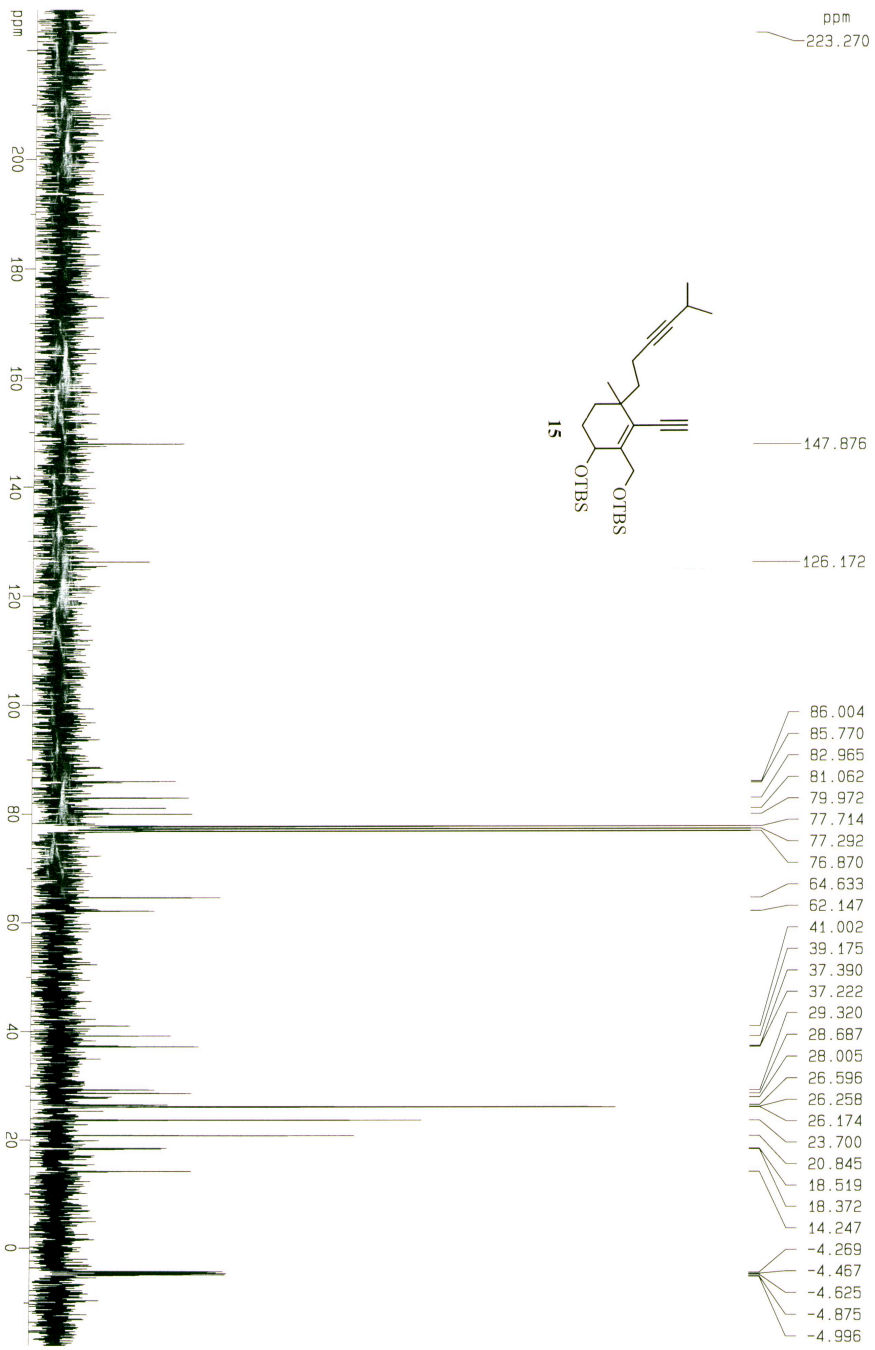


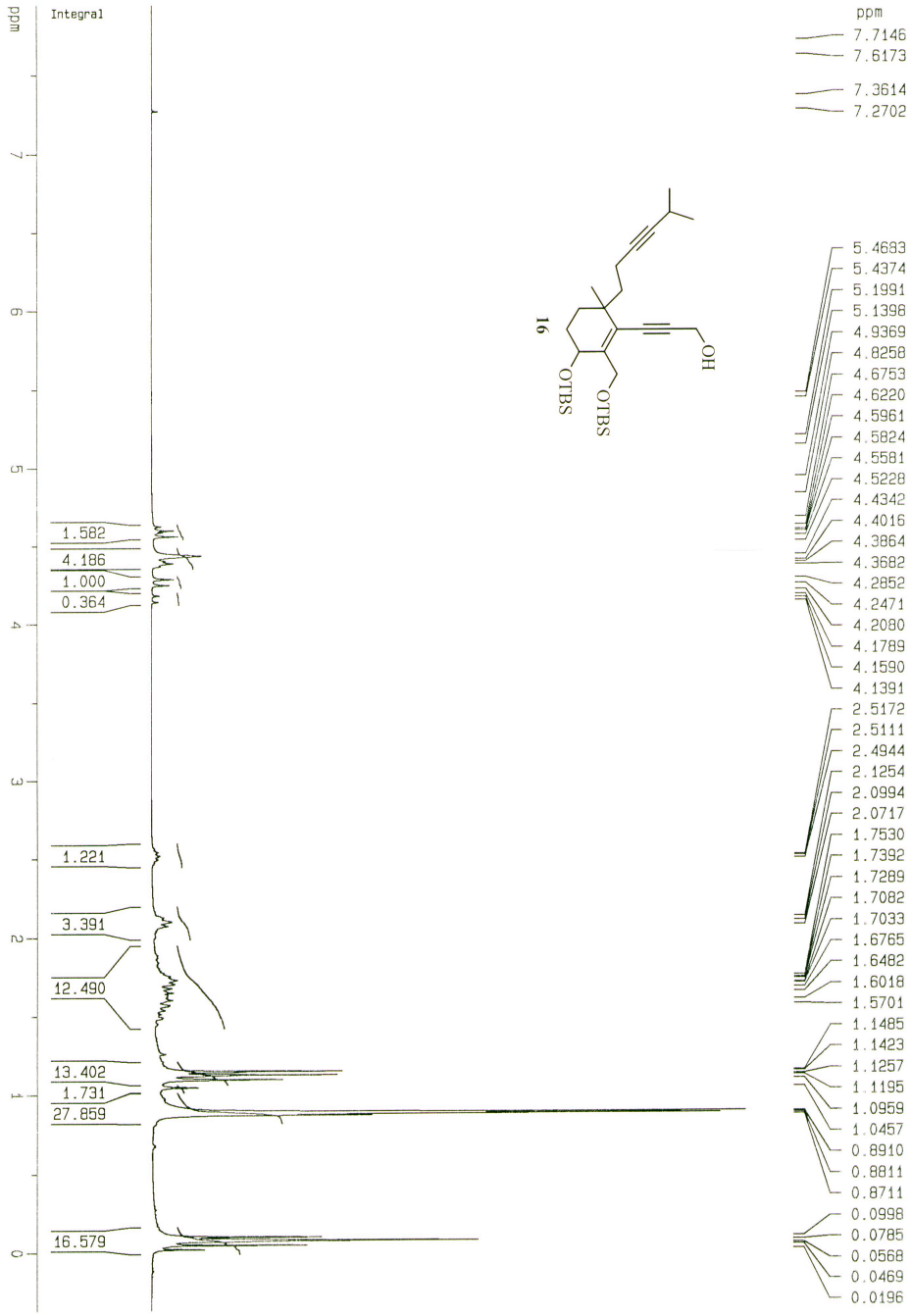
14 (Minor diastereomer)

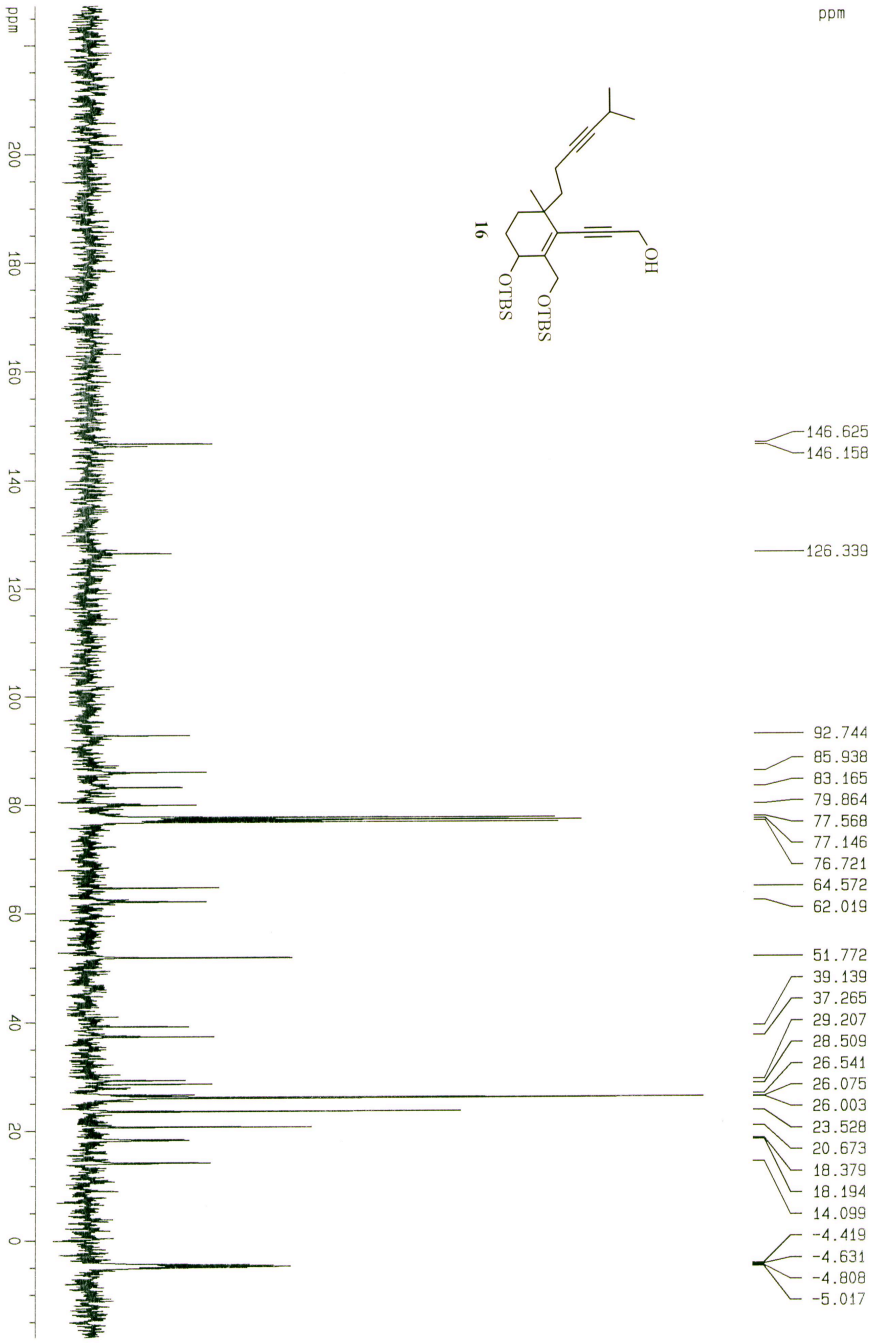


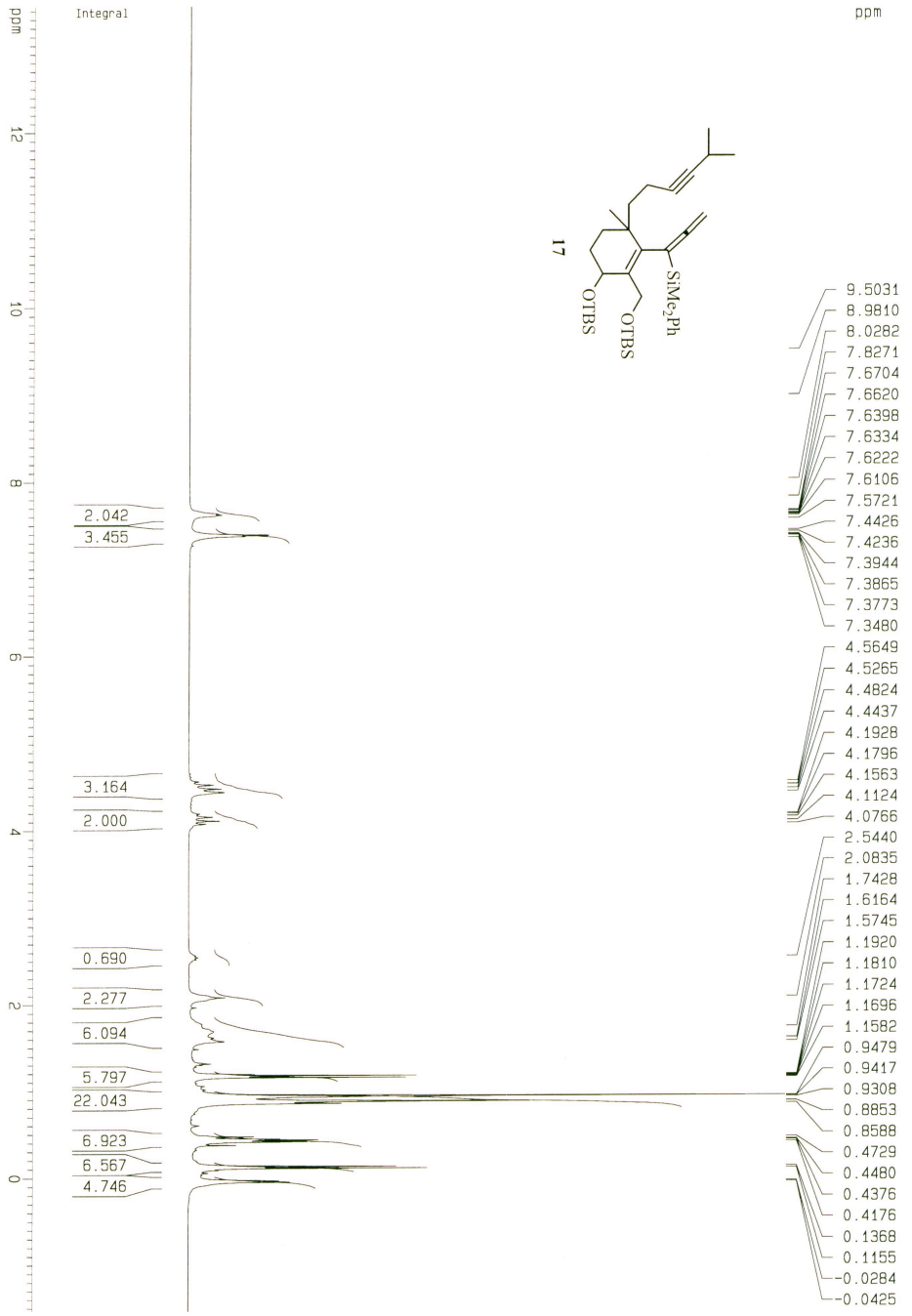
14 (Minor diastereomer)

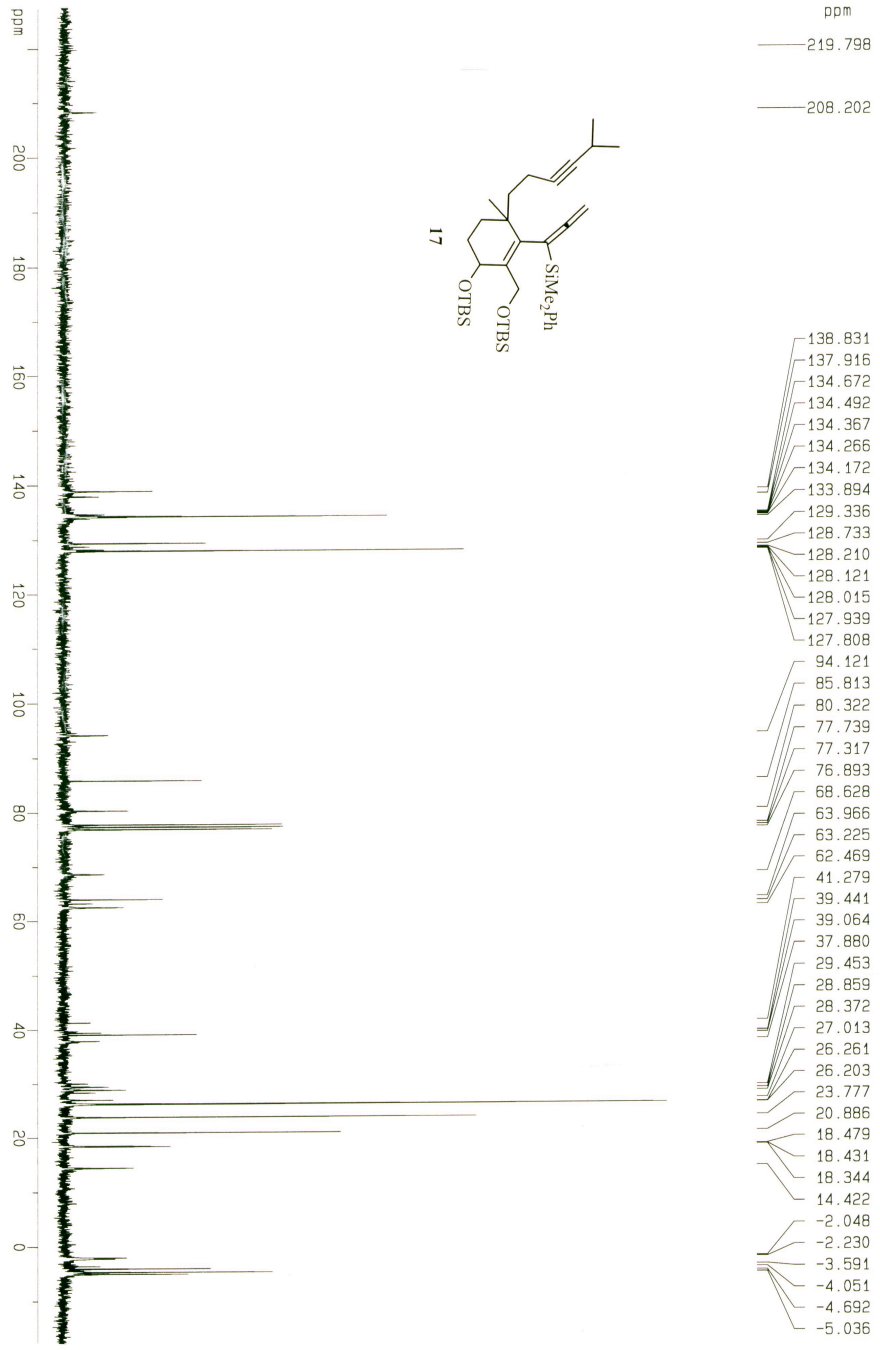

ppm
Integral
1.475
1.357
1.000
0.419
0.755
0.889
3.097
1.268
8.582
11.415
1.377
27.298
15.247
ppm
7.3973
7.2701
7.2232
7.1893
6.9886
6.2617
6.2363
6.2026
6.1784
5.9282
5.4860
5.2029
5.1422
5.0169
4.7967
4.6803
4.6526
4.6406
4.6143
4.5402
4.4084
4.4007
4.3018
4.2634
4.2219
4.1908
4.1509
4.0711
4.0325
3.6145
3.1265
2.7082
2.5449
2.5224
2.4998
2.1394
2.1133
2.0887
2.0835
1.7589
1.7289
1.7000
1.6711
1.6503
1.6437
1.6256
1.6182
1.5988
1.5839
1.5567
1.4415
1.1534
1.1305
1.1165
1.0666
0.9785
0.8912
0.1097
0.0862
0.0499
0.0229
OTBS
OTBS
15

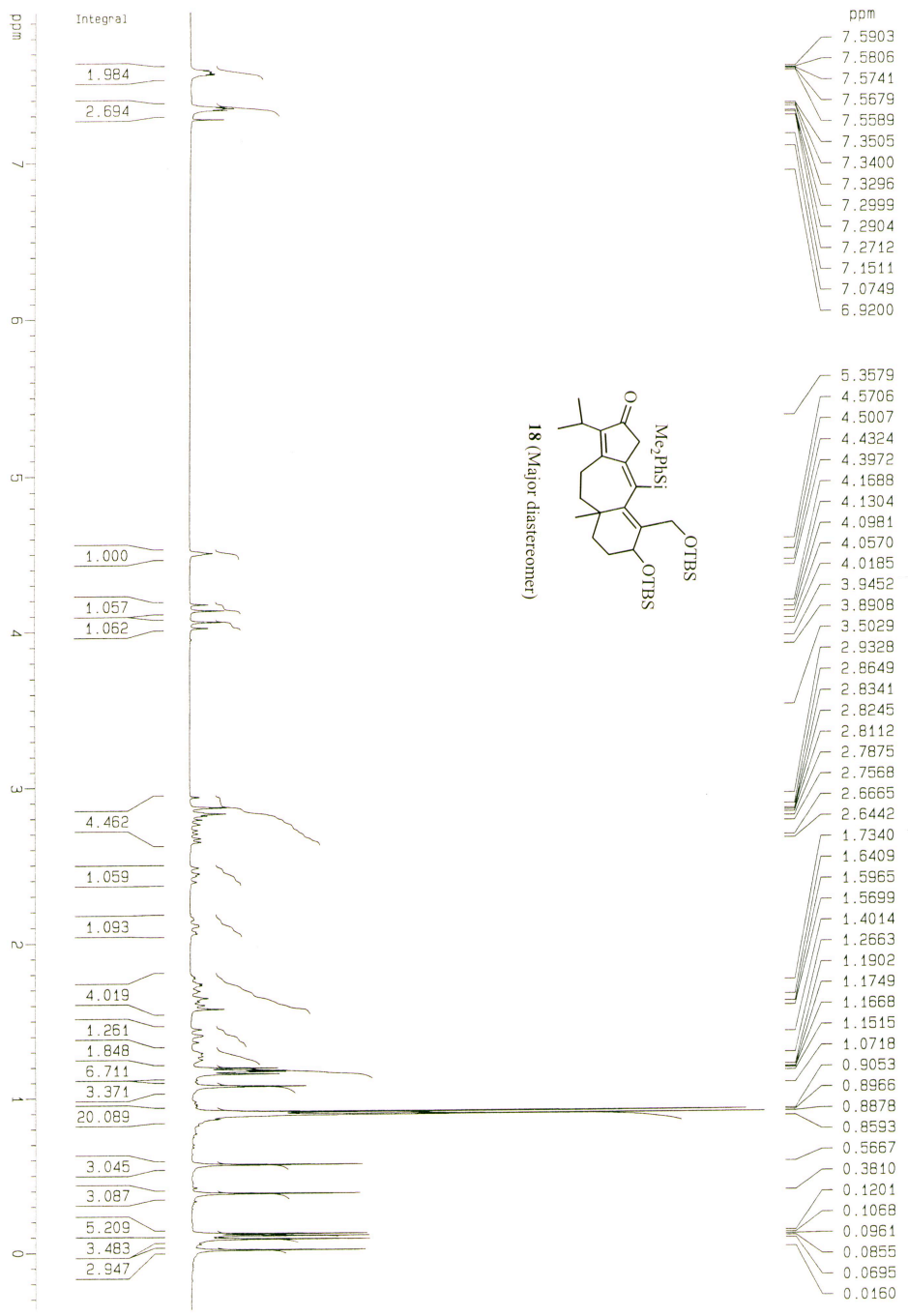

ppm
223.270
147.876
126.172
86.004
85.770
82.965
81.062
79.972
77.714
77.292
76.870
64.633
62.147
41.002
39.175
37.390
37.222
29.320
28.687
28.005
26.596
26.258
26.174
23.700
20.845
18.519
18.372
14.247
-4.269
-4.467
-4.625
-4.875
-4.996
15
OTBS
OTBS
ppm
200
180
160
140
120
100
80
60
40
20
0


ppm
Integral
1.582
4.186
1.000
0.364
1.221
3.391
12.490
13.402
1.731
27.859
16.579
16
OTBS
OTBS
OH
ppm
7.7146
7.6173
7.3614
7.2702
5.4683
5.4374
5.1991
5.1398
4.9369
4.8258
4.6753
4.6220
4.5961
4.5824
4.5581
4.5228
4.4342
4.4016
4.3864
4.3682
4.2852
4.2471
4.2080
4.1789
4.1590
4.1391
2.5172
2.5111
2.4944
2.1254
2.0994
2.0717
1.7530
1.7392
1.7289
1.7082
1.7033
1.6765
1.6482
1.6018
1.5701
1.1485
1.1423
1.1257
1.1195
1.0959
1.0457
0.8910
0.8811
0.8711
0.0998
0.0785
0.0568
0.0469
0.0196

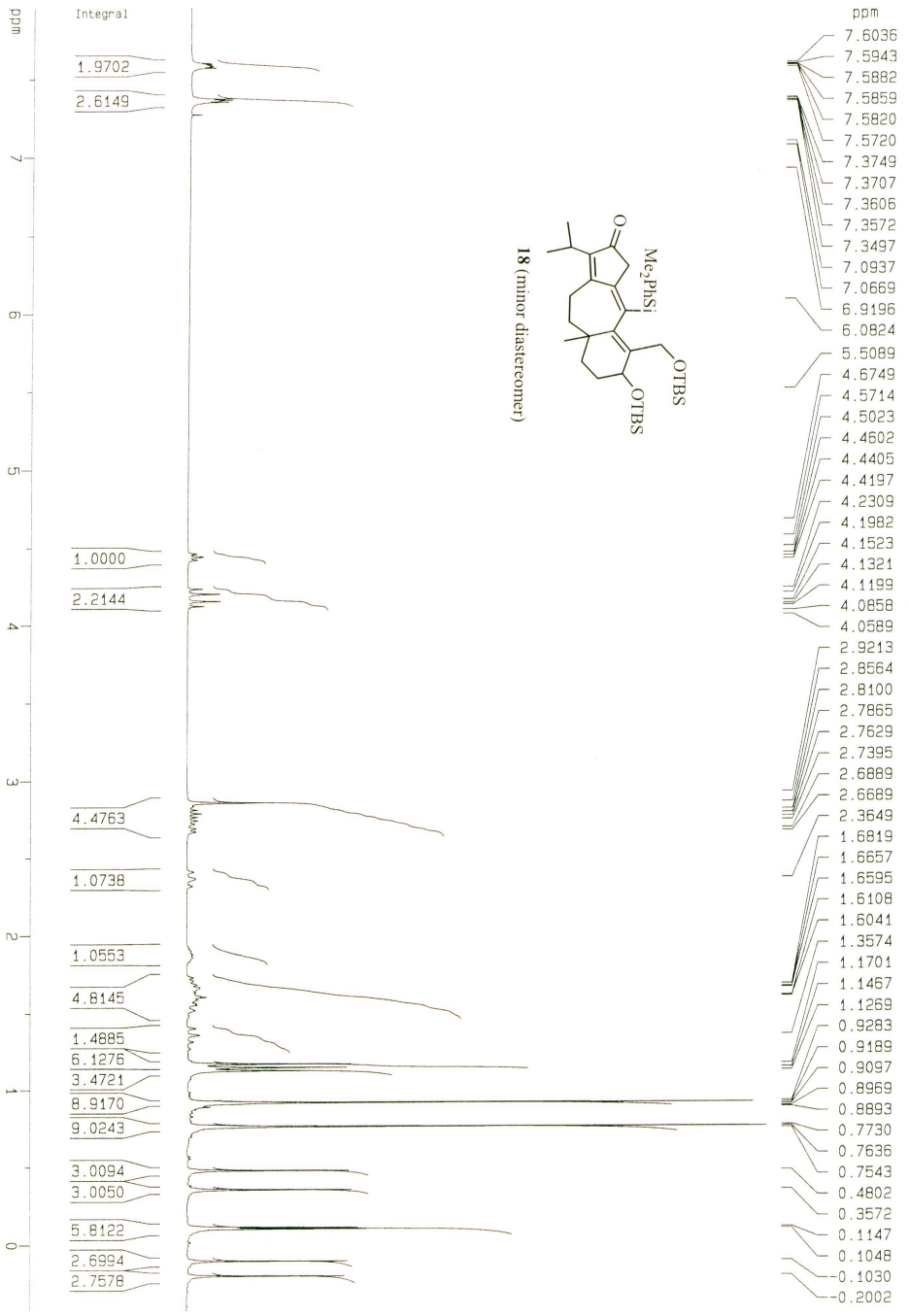

ppm
200
180
160
140
120
100
80
60
40
20
0
16
OTBS
OTBS
OH
ppm
146.625
146.158
126.339
92.744
85.938
83.165
79.864
77.568
77.146
76.721
64.572
62.019
51.772
39.139
37.265
29.207
28.509
26.541
26.075
26.003
23.528
20.673
18.379
18.194
14.099
-4.419
-4.631
-4.808
-5.017

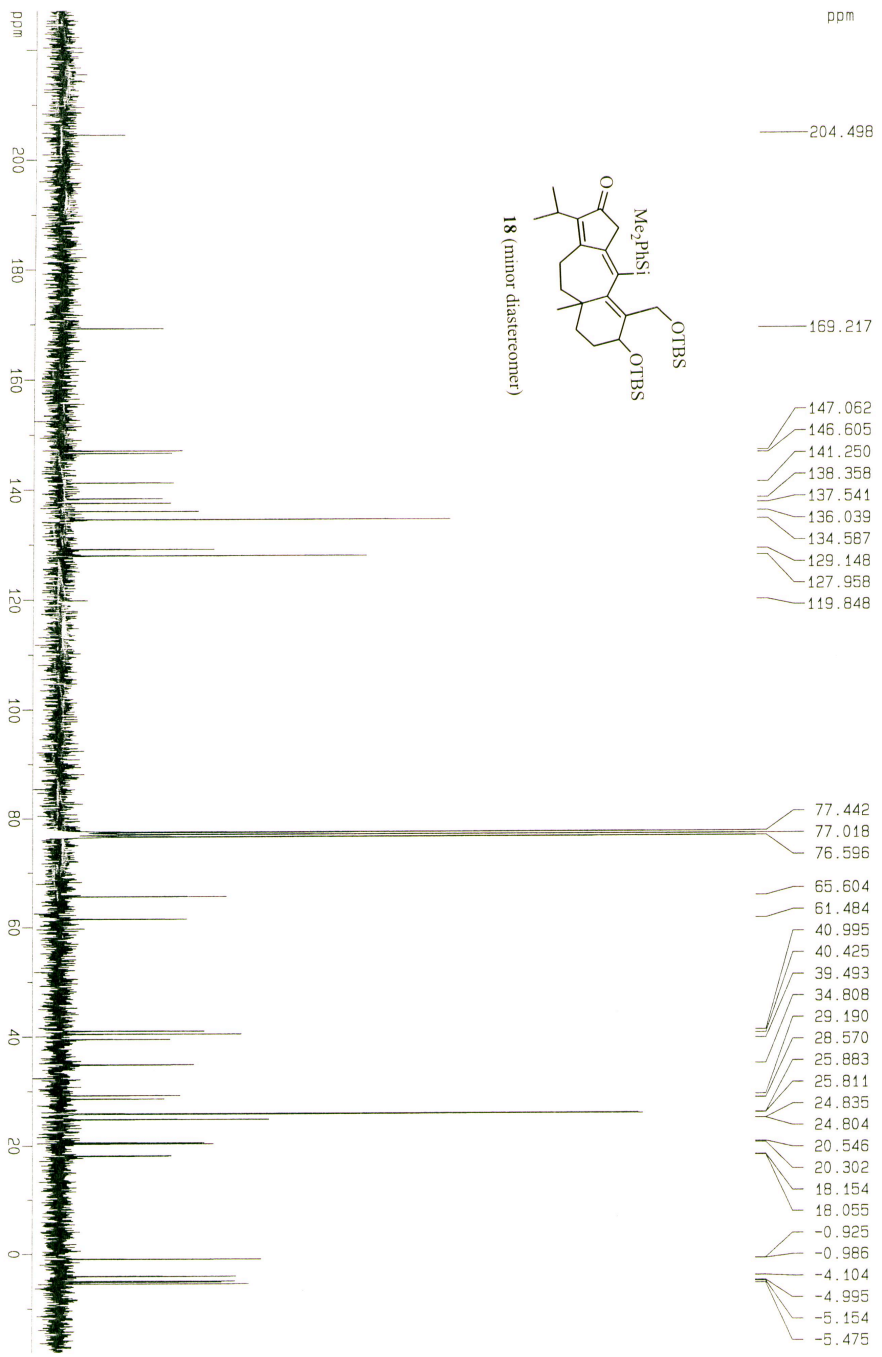

Integral
ppm
2.042
3.455
3.164
2.000
0.690
2.277
6.094
5.797
22.043
6.923
6.567
4.746
ppm
9.5031
8.9810
8.0282
7.8271
7.6704
7.6620
7.6398
7.6334
7.6222
7.6106
7.5721
7.4426
7.4236
7.3944
7.3865
7.3773
7.3480
4.5649
4.5265
4.4824
4.4437
4.1928
4.1796
4.1563
4.1124
4.0766
2.5440
2.0835
1.7428
1.6164
1.5745
1.1920
1.1810
1.1724
1.1696
1.1582
0.9479
0.9417
0.9308
0.8853
0.8588
0.4729
0.4480
0.4376
0.4176
0.1368
0.1155
-0.0284
-0.0425
OTBS
OTBS
SiMe2Ph
17


ppm
219.798
208.202
138.831
137.916
134.672
134.492
134.367
134.266
134.172
133.894
129.336
128.733
128.210
128.121
128.015
127.939
127.808
94.121
85.813
80.322
77.739
77.317
76.893
68.628
63.966
63.225
62.469
41.279
39.441
39.064
37.880
29.453
28.859
28.372
27.013
26.261
26.203
23.777
20.886
18.479
18.431
18.344
14.422
-2.048
-2.230
-3.591
-4.051
-4.692
-5.036
ppm
200
180
160
140
120
100
80
60
40
20
0
OTBS
OTBS
SiMe2Ph
17


ppm
Integral
1.984
2.694
1.000
1.057
1.062
4.462
1.059
1.093
4.019
1.261
1.848
6.711
3.371
20.089
3.045
3.087
5.209
3.483
2.947
ppm
7.5903
7.5806
7.5741
7.5679
7.5589
7.3505
7.3400
7.3296
7.2999
7.2904
7.2712
7.1511
7.0749
6.9200
5.3579
4.5706
4.5007
4.4324
4.3972
4.1688
4.1304
4.0981
4.0570
4.0185
3.9452
3.8908
3.5029
2.9328
2.8649
2.8341
2.8245
2.8112
2.7875
2.7568
2.6665
2.6442
1.7340
1.6409
1.5965
1.5699
1.4014
1.2663
1.1902
1.1749
1.1668
1.1515
1.0718
0.9053
0.8966
0.8878
0.8593
0.5667
0.3810
0.1201
0.1068
0.0961
0.0855
0.0695
0.0160
O
Me2PhSi
OTBS
OTBS
18 (Major diastereomer)

ppm
204.489
190.107
170.154
148.276
146.660
141.519
138.318
136.812
135.307
134.390
128.903
127.934
78.899
78.666
77.419
77.198
76.997
76.573
76.387
63.465
60.640
52.169
41.752
40.593
40.111
31.214
28.073
26.887
25.991
25.930
25.857
24.728
23.951
20.412
20.346
18.172
18.075
5.842
-0.530
-0.610
-3.743
-4.604
-4.667
-4.982
Me2PhSi
OTBS
OTBS
O
18 (major diastereomer)


ppm
Integral
1.9702
2.6149
1.0000
2.2144
4.4763
1.0738
1.0553
4.8145
1.4885
6.1276
3.4721
8.9170
9.0243
3.0094
3.0050
5.8122
2.6994
2.7578
Me2PhSi
OTBS
OTBS
18 (minor diastereomer)
ppm
7.6036
7.5943
7.5882
7.5859
7.5820
7.5720
7.3749
7.3707
7.3606
7.3572
7.3497
7.0937
7.0669
6.9196
6.0824
5.5089
4.6749
4.5714
4.5023
4.4602
4.4405
4.4197
4.2309
4.1982
4.1523
4.1321
4.1199
4.0858
4.0589
2.9213
2.8564
2.8100
2.7865
2.7629
2.7395
2.6889
2.6689
2.3649
1.6819
1.6657
1.6595
1.6108
1.6041
1.3574
1.1701
1.1467
1.1269
0.9283
0.9189
0.9097
0.8969
0.8893
0.7730
0.7636
0.7543
0.4802
0.3572
0.1147
0.1048
-0.1030
-0.2002


ppm
204.498
169.217
147.062
146.605
141.250
138.358
137.541
136.039
134.587
129.148
127.958
119.848
77.442
77.018
76.596
65.604
61.484
40.995
40.425
39.493
34.808
29.190
28.570
25.883
25.811
24.835
24.804
20.546
20.302
18.154
18.055
-0.925
-0.986
-4.104
-4.995
-5.154
-5.475
Me2PhSi
OTBS
OTBS
O
18 (minor diastereomer)