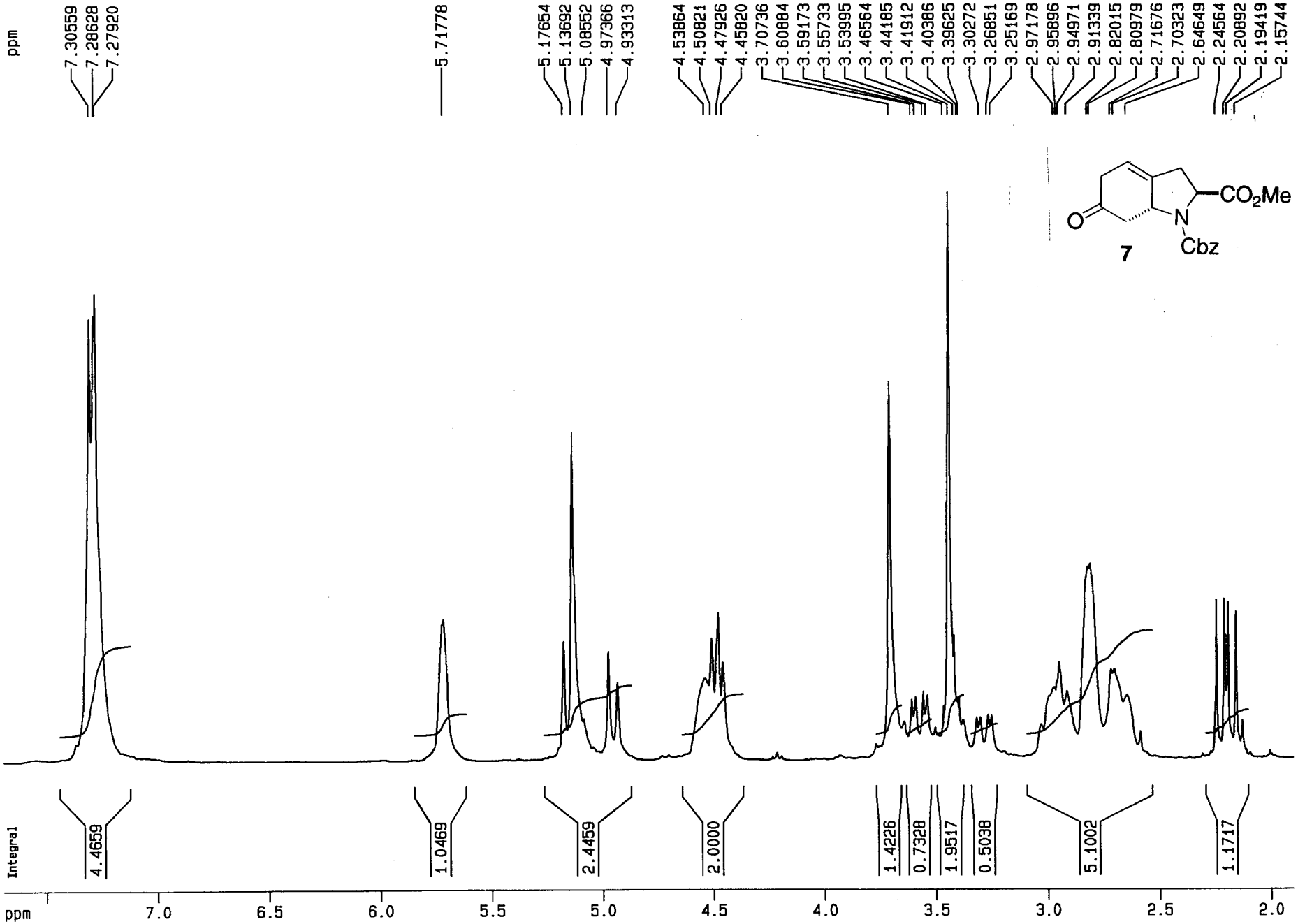
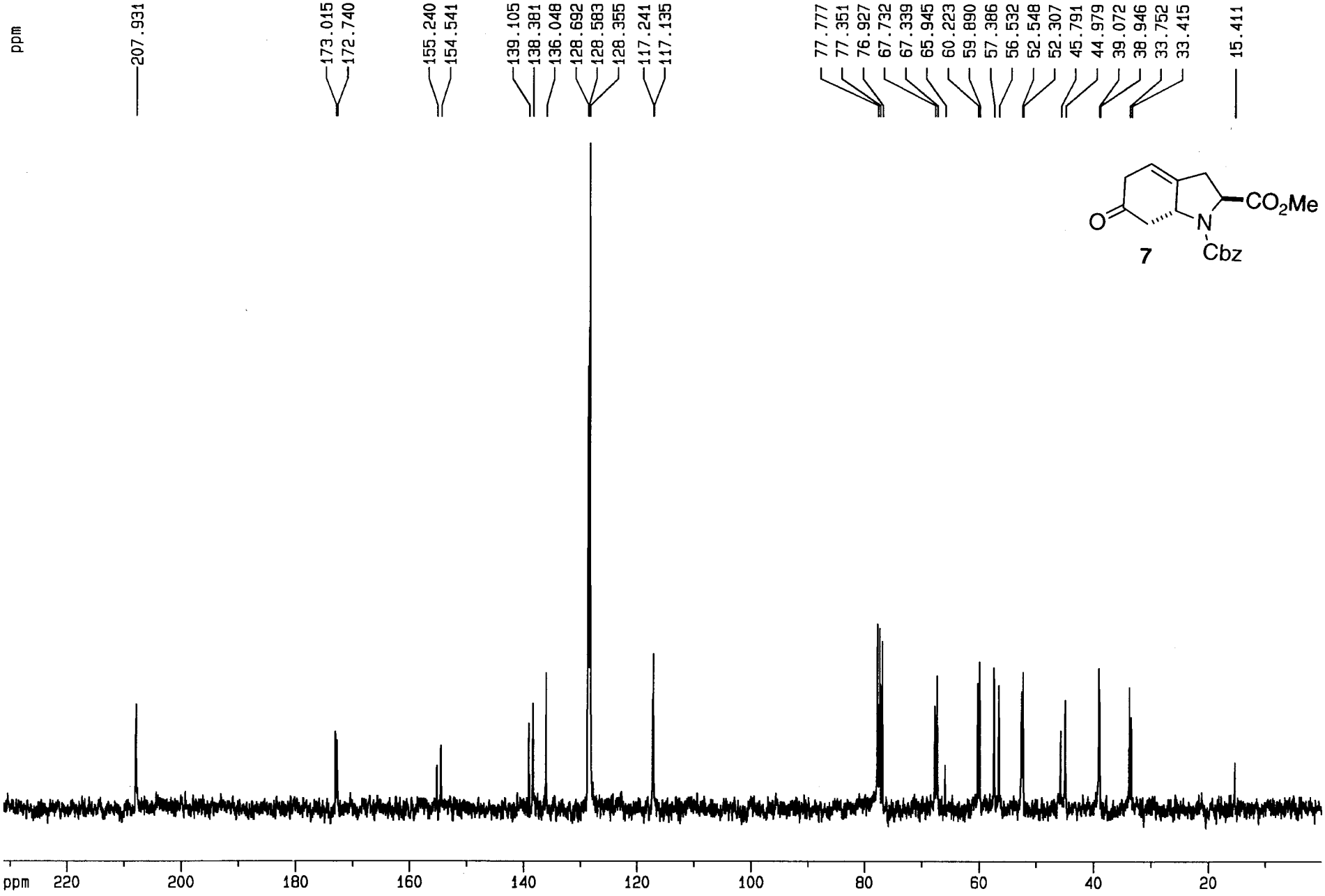
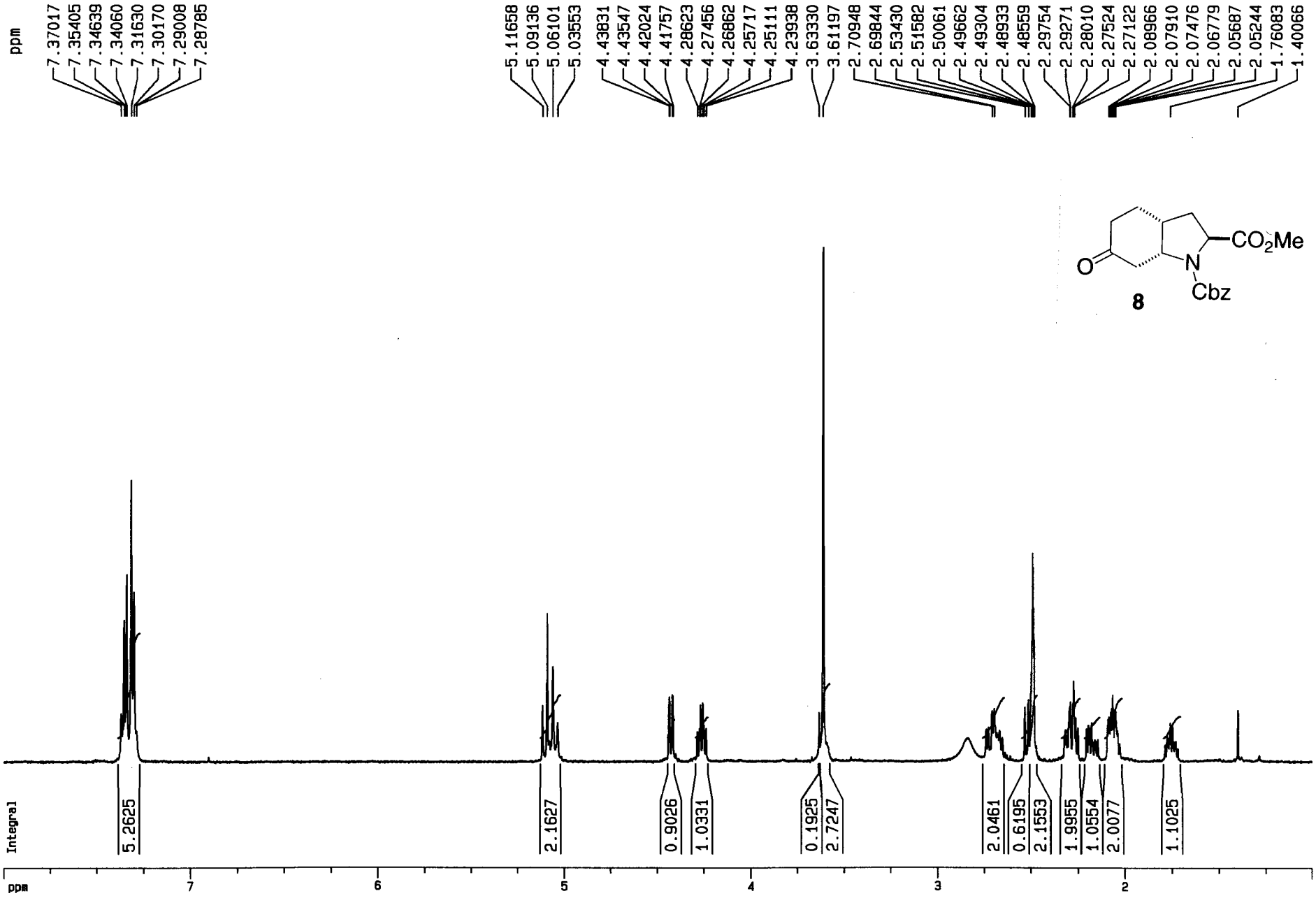
Zn Reduction - CDCl3



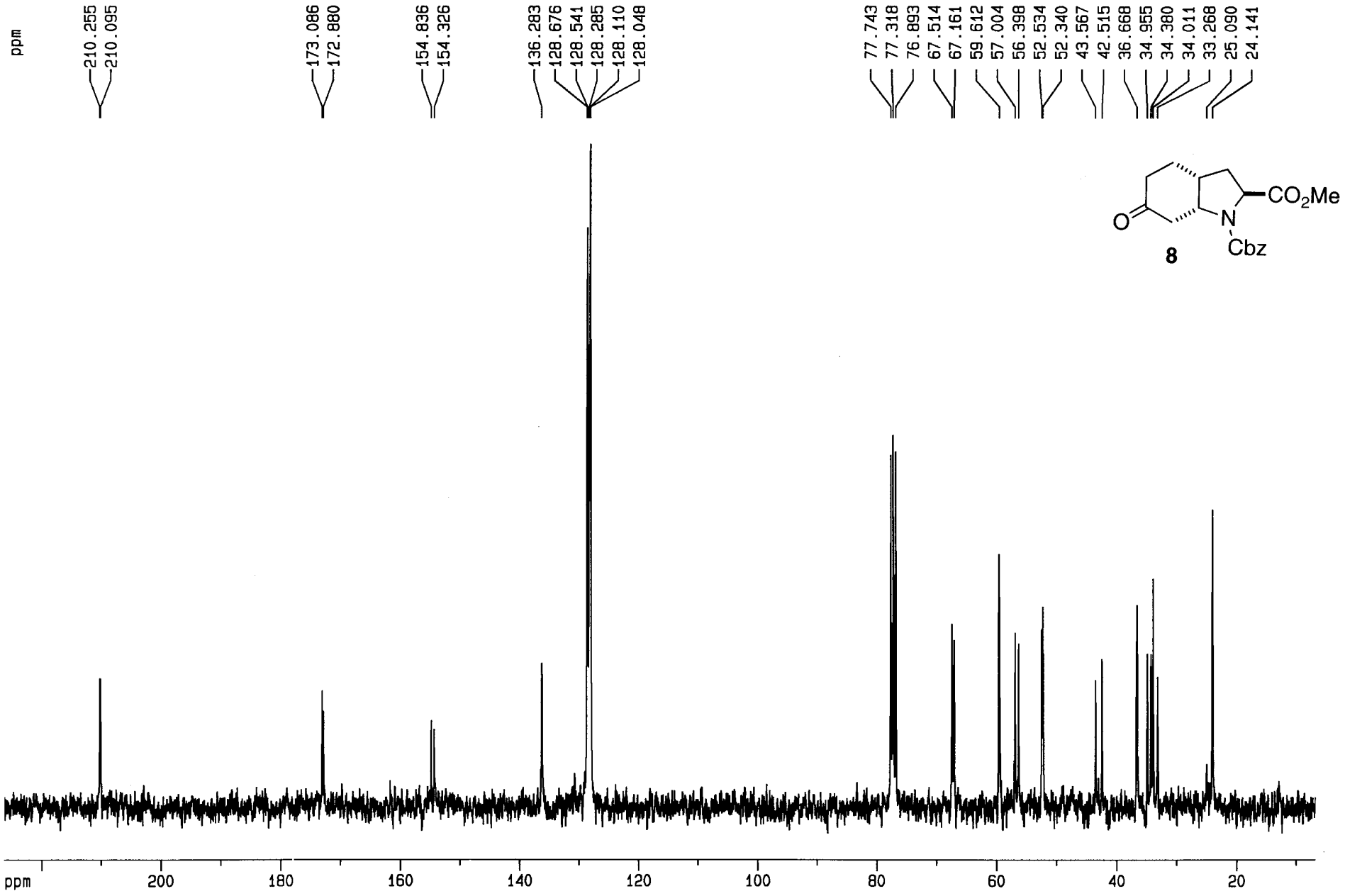
Zn Reduction - CDCl3

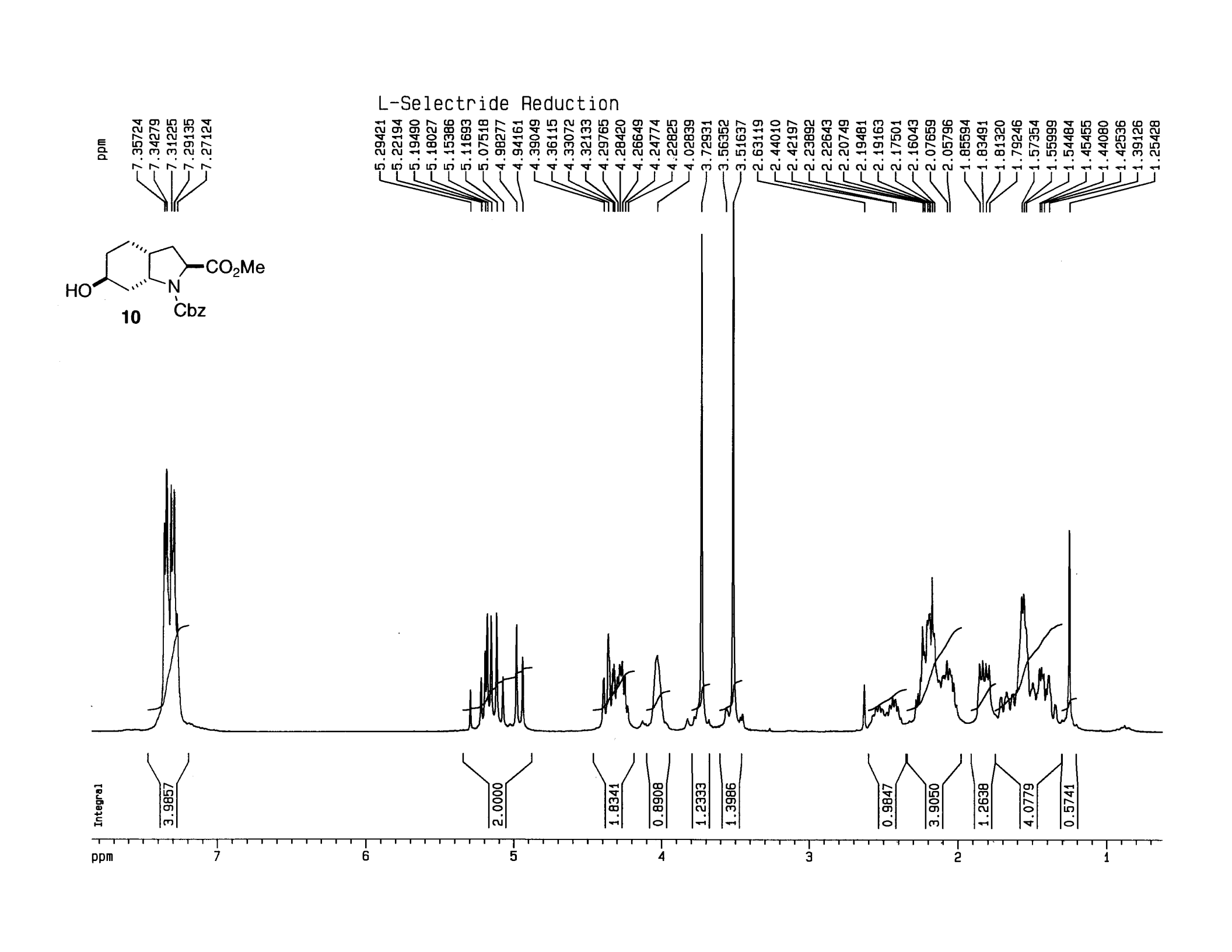


H2/PtO2 (route I) 500 MHz DMSO-d6 380 K

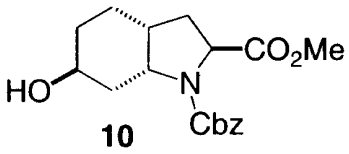


PtO2 Hydrogenation RT/CDCl3



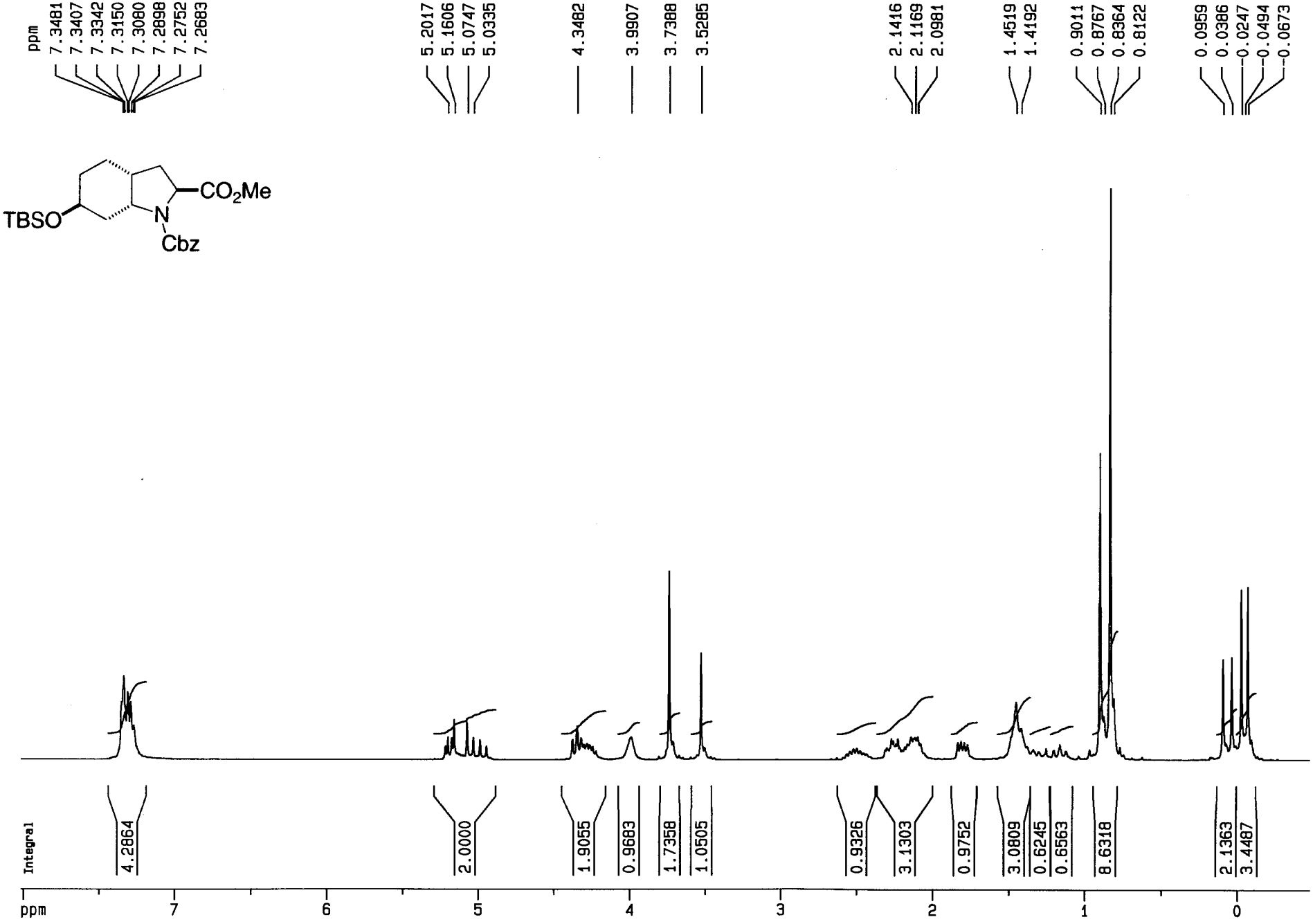

L-Selectride Reduction
ppm
7.35724
7.34279
7.31225
7.29135
7.27124
5.29421
5.22194
5.19490
5.18027
5.15386
5.11693
5.07518
4.98277
4.94161
4.39049
4.36115
4.33072
4.32133
4.29765
4.28420
4.26649
4.24774
4.22825
4.02839
3.72931
3.56352
3.51637
2.63119
2.44010
2.42197
2.23892
2.22643
2.20749
2.19481
2.19163
2.17501
2.16043
2.07659
2.05796
1.85594
1.83491
1.81320
1.79246
1.57354
1.55999
1.54484
1.45455
1.44080
1.42536
1.39126
1.25428
HO
CO2Me
N
Cbz
10
Integral
3.9857
2.0000
1.8341
0.8908
1.2333
1.3986
0.9847
3.9050
1.2638
4.0779
0.5741
ppm
7
6
5
4
3
2
1

L-Selectride Reduction

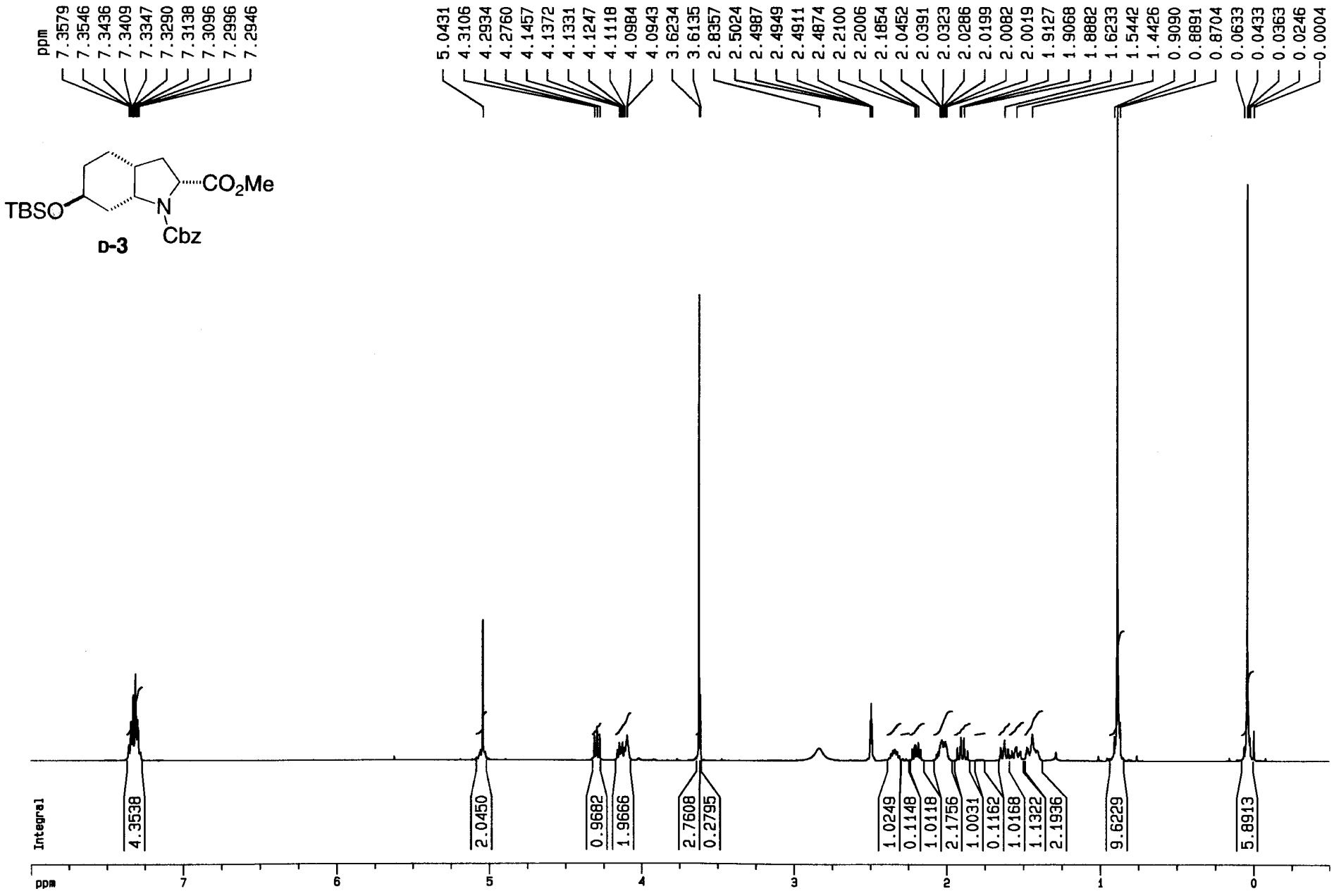



**10**

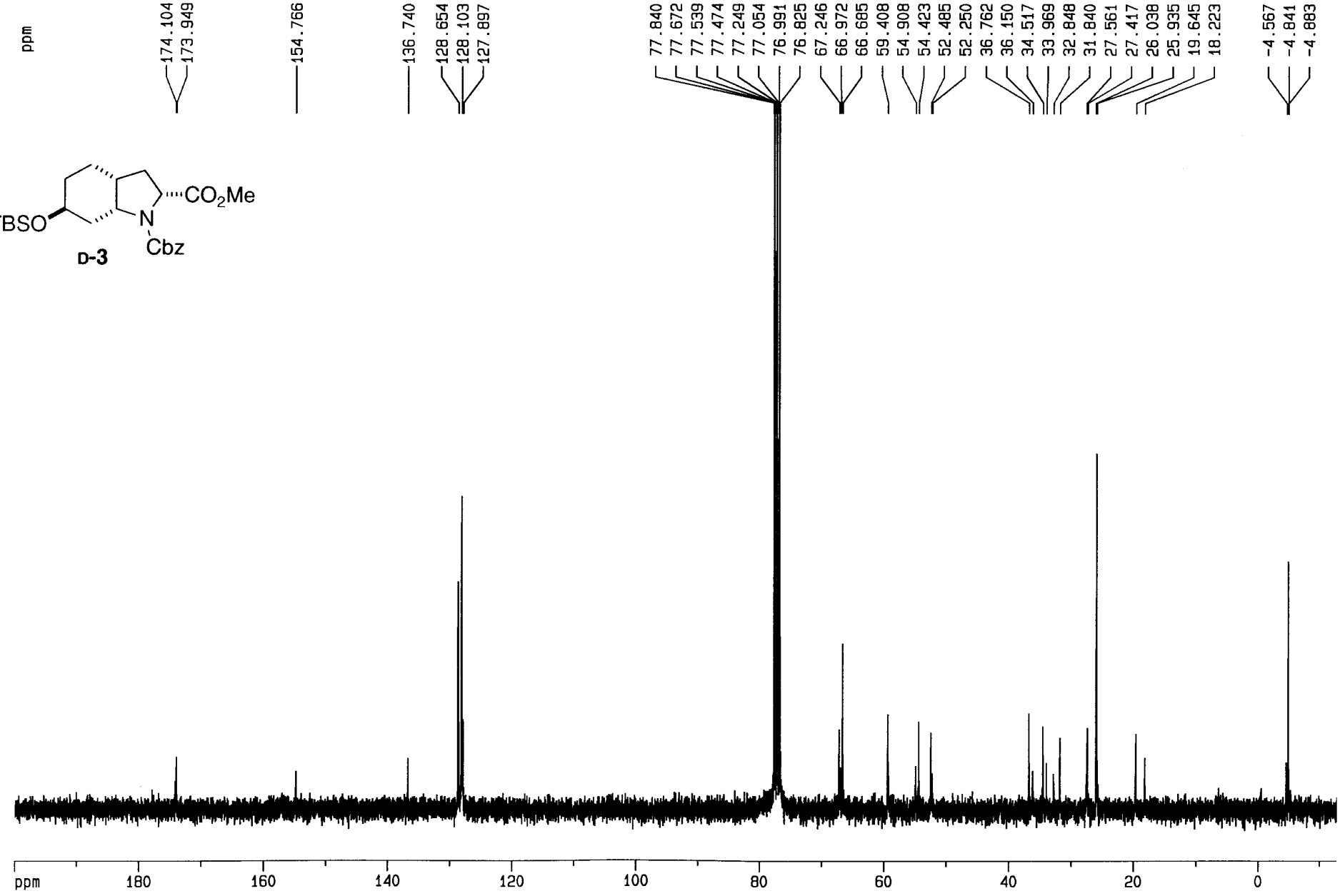
TBS-ether of L-Selectride Rdn Product



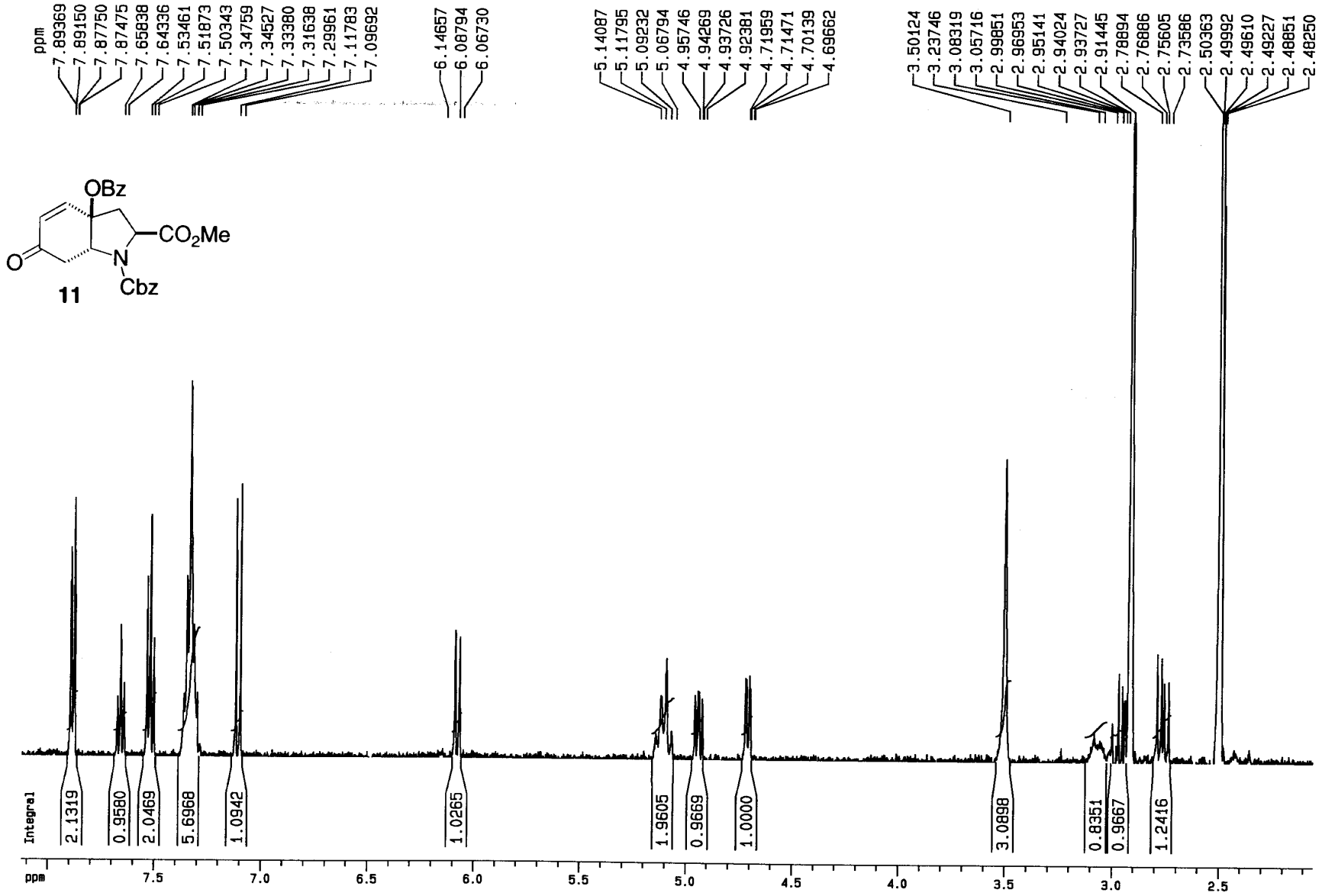
LiNEt2 Epimerization  500 MHZ DMSO-d6 380 K



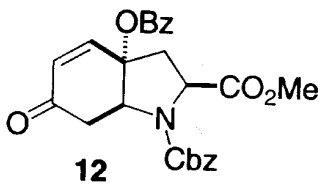
Epimerization Product (18:1 mixture by 1H NMR, CDCl3, 300 MHz, 300K)



Benzoate of Hydroxyenone dmso-d6 100C 500MHz



Retro-Michael Equilibration dmso-d6 90C 500MHz delay 12sec

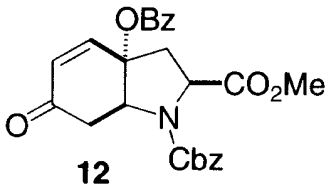



**12**

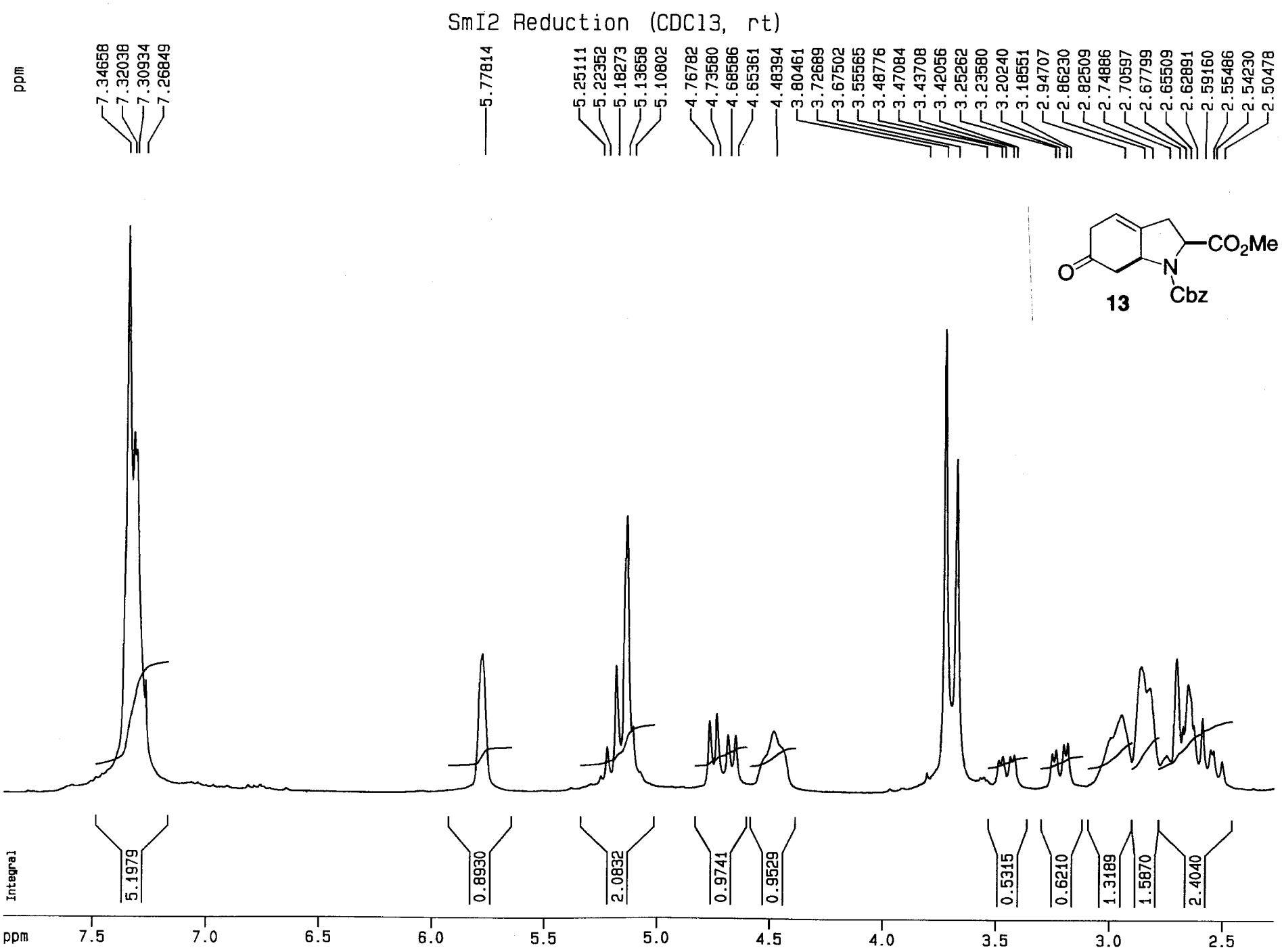
Equilibration Product (CDCl3)

ppm

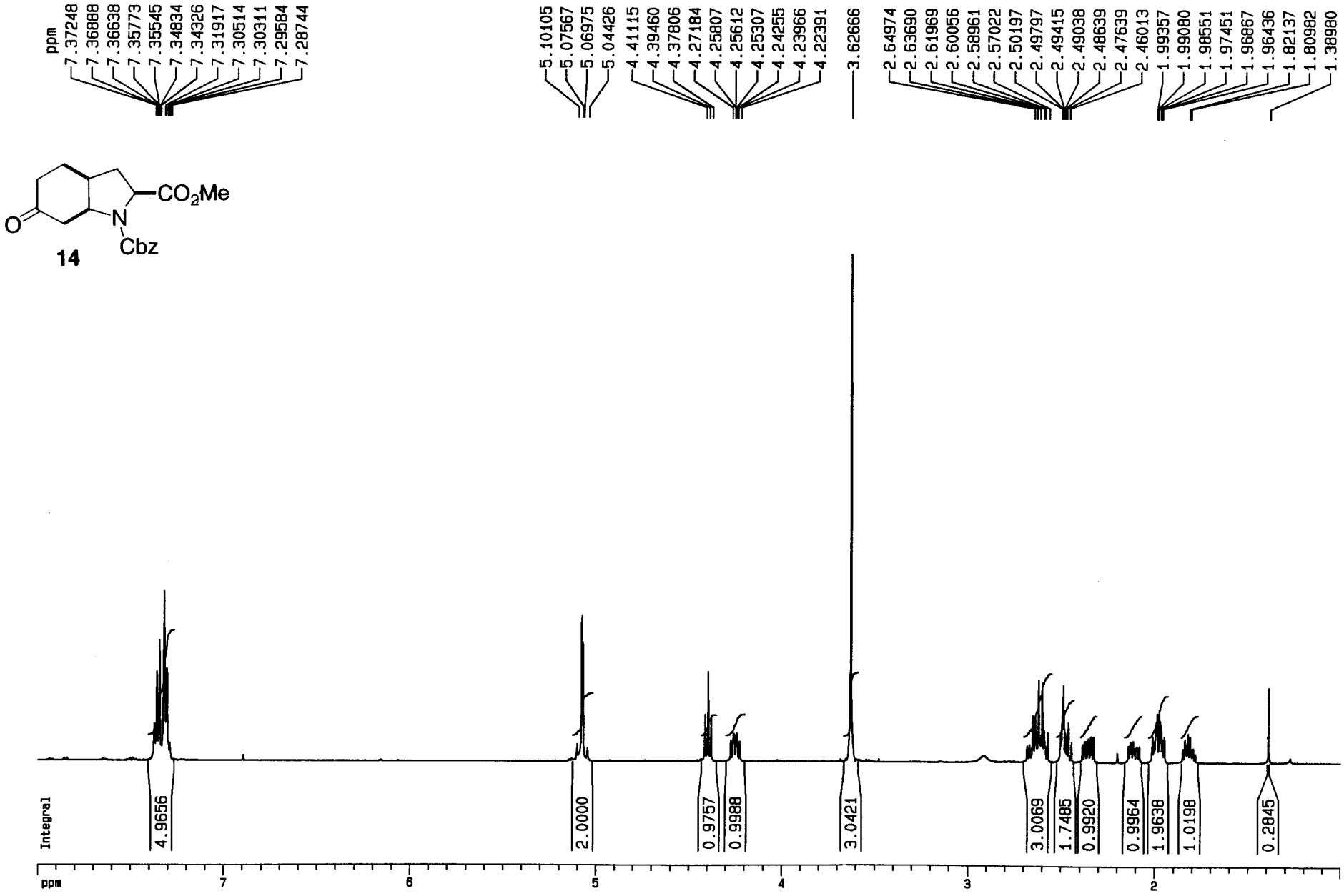
195.153
172.142
172.021
165.383
154.263
153.627
144.937
144.456
135.910
133.913
129.934
129.755
129.404
129.250
128.691
128.606
128.530
128.252
127.883
127.791
84.110
83.303
77.719
77.292
76.867
67.685
62.490
61.919
59.113
58.813
52.836
52.590
42.553
41.825
40.046
39.336
30.961



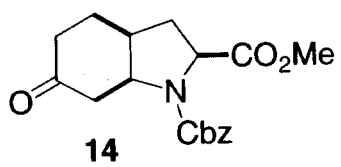

**12**


SmI2 Reduction (CDCl3, rt)
ppm
7.34658
7.32038
7.30934
7.26849
5.77814
5.25111
5.22352
5.18273
5.13658
5.10802
4.76782
4.73580
4.68586
4.65361
4.48394
3.80461
3.72689
3.67502
3.55565
3.48776
3.47084
3.43708
3.42056
3.25262
3.23580
3.20240
3.18551
2.94707
2.86230
2.82509
2.74886
2.70597
2.67799
2.65509
2.62891
2.59160
2.55486
2.54230
2.50478
CO2Me
N
Cbz
O
13
Integral
5.1979
0.8930
2.0832
0.9741
0.9529
0.5315
0.6210
1.3189
1.5870
2.4040
ppm
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5

H2/PtO2 (route II) 500 MHz DMSO-d6 360 K

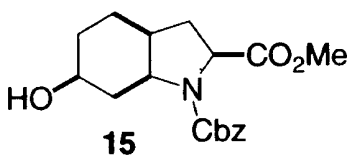


Hydrogenation Product (route II)

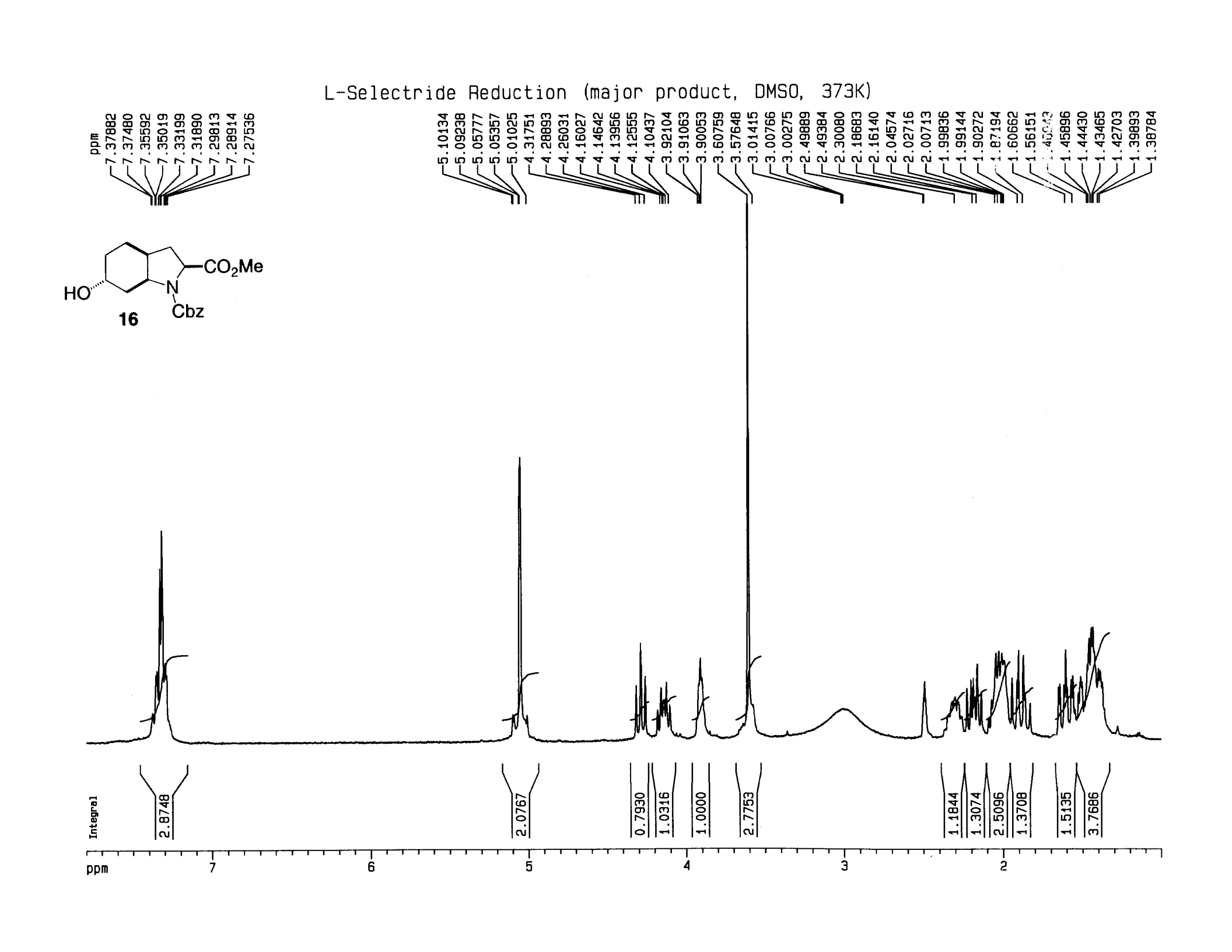



**14**

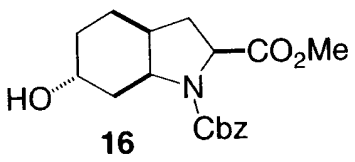
L-Selectride Reduction (minor product, DMSO, 373K)




**15**


L-Selectride Reduction (major product, DMSO, 373K)
ppm
7.37882
7.37480
7.35592
7.35019
7.33199
7.31890
7.29813
7.28914
7.27536
5.10134
5.09238
5.05777
5.05357
5.01025
4.31751
4.28893
4.26031
4.16027
4.14642
4.13956
4.12555
4.10437
3.92104
3.91063
3.90053
3.60759
3.57648
3.01415
3.00766
3.00275
2.49889
2.49384
2.30080
2.18683
2.16140
2.04574
2.02716
2.00713
1.99836
1.99144
1.90272
1.87194
1.60662
1.56151
1.45896
1.44430
1.43465
1.42703
1.39893
1.38784
HO
CO2Me
N
Cbz
16
Integral
2.8748
2.0767
0.7930
1.0316
1.0000
2.7753
1.1844
1.3074
2.5096
1.3708
1.5135
3.7686
ppm
7
6
5
4
3
2

L-Selectride Major Product (CDCl3)

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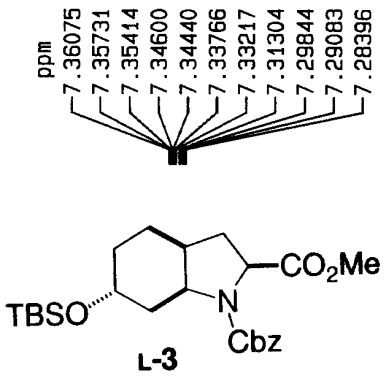
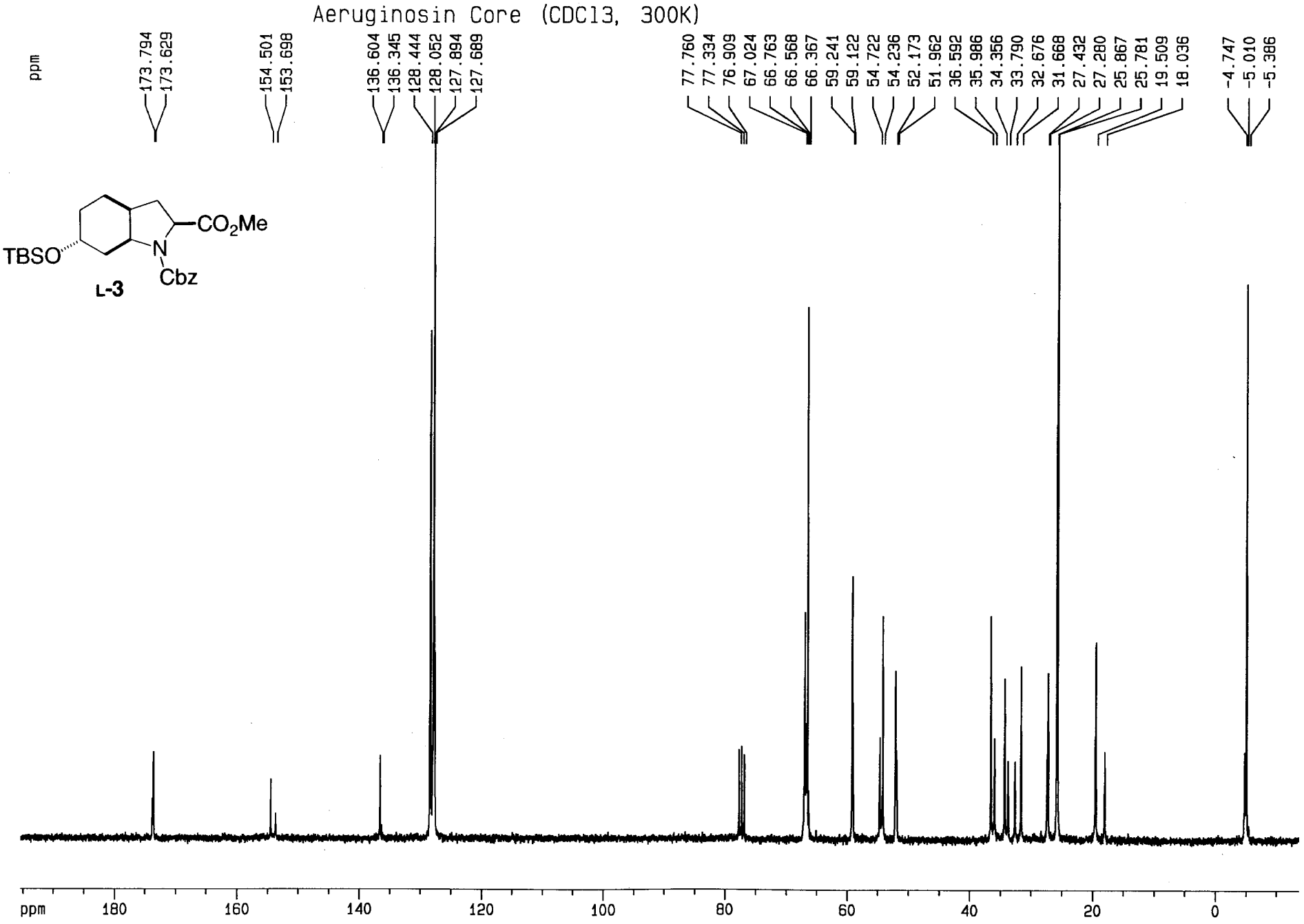
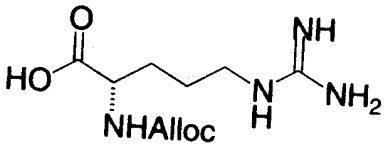
Aeruginosin Core dmso-d6 100C 500MHz 1H delay 12sec 11/1/99



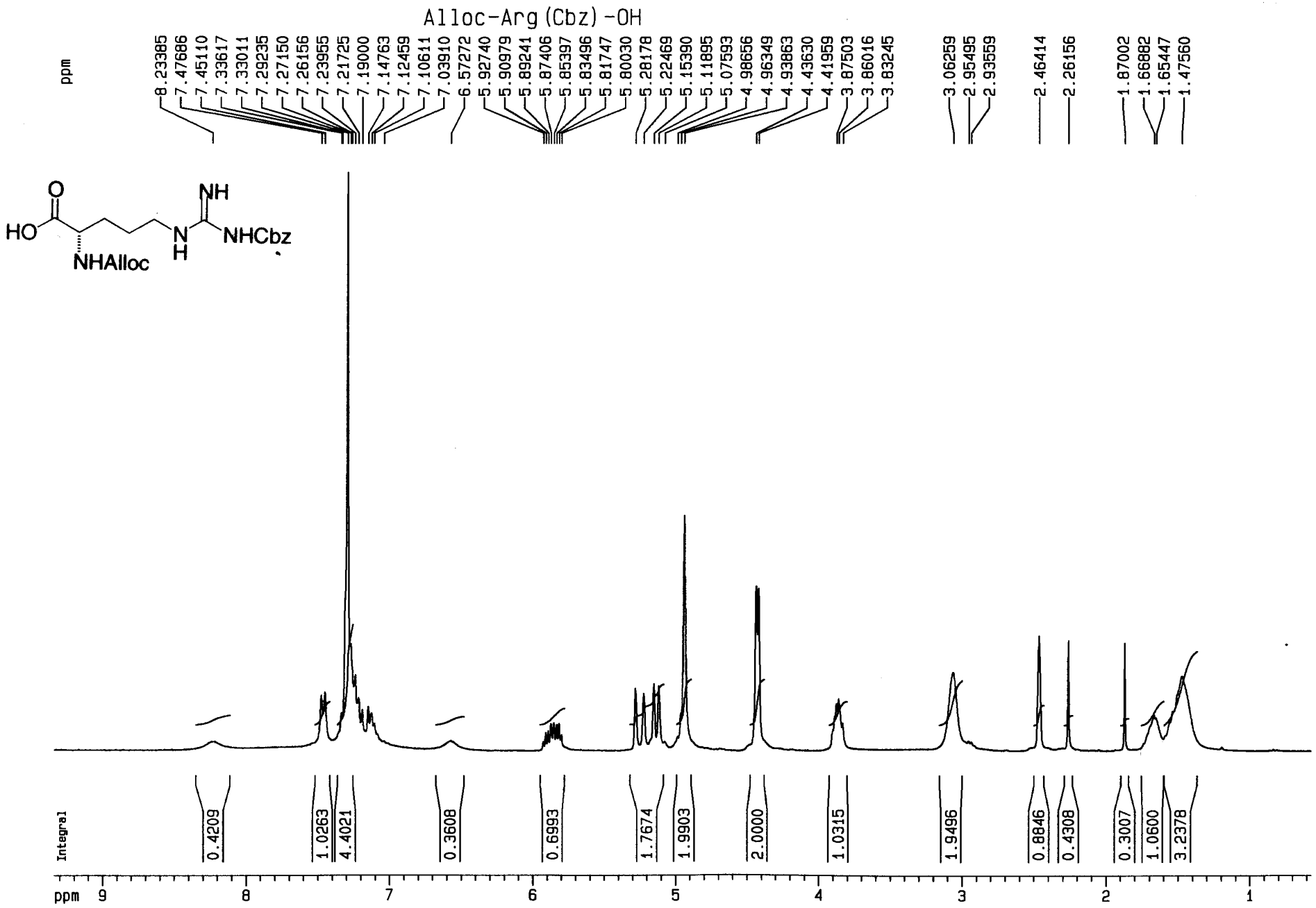

L-3

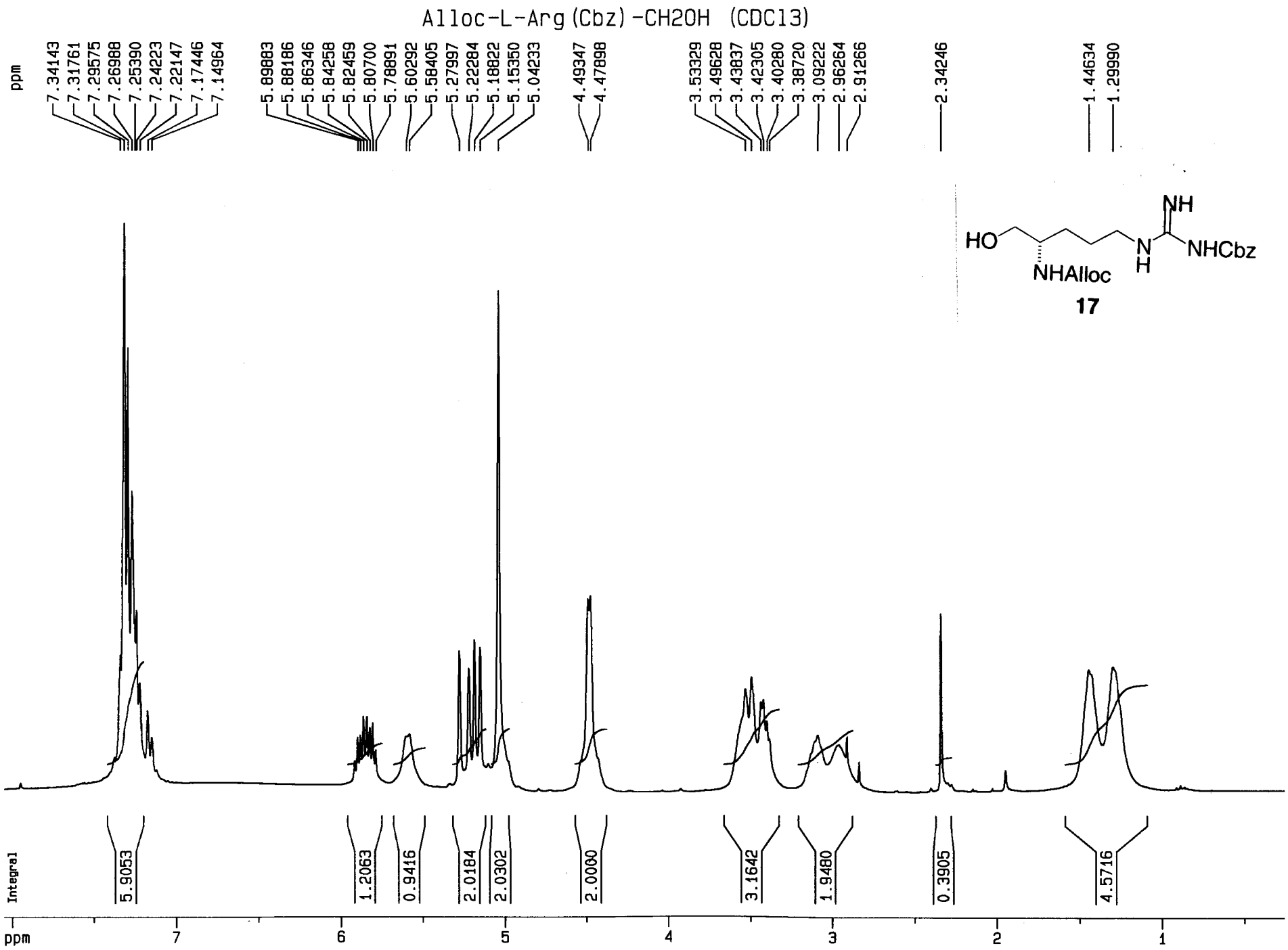

Aeruginosin Core (CDCl3, 300K)
ppm
173.794
173.629
154.501
153.698
136.604
136.345
128.444
128.052
127.894
127.689
77.760
77.334
76.909
67.024
66.763
66.568
66.367
59.241
59.122
54.722
54.236
52.173
51.962
36.592
35.986
34.356
33.790
32.676
31.668
27.432
27.280
25.867
25.781
19.509
18.036
-4.747
-5.010
-5.386
TBSO
CO2Me
N
Cbz
L-3
ppm
180
160
140
120
100
80
60
40
20
0

Alloc-L-Arg

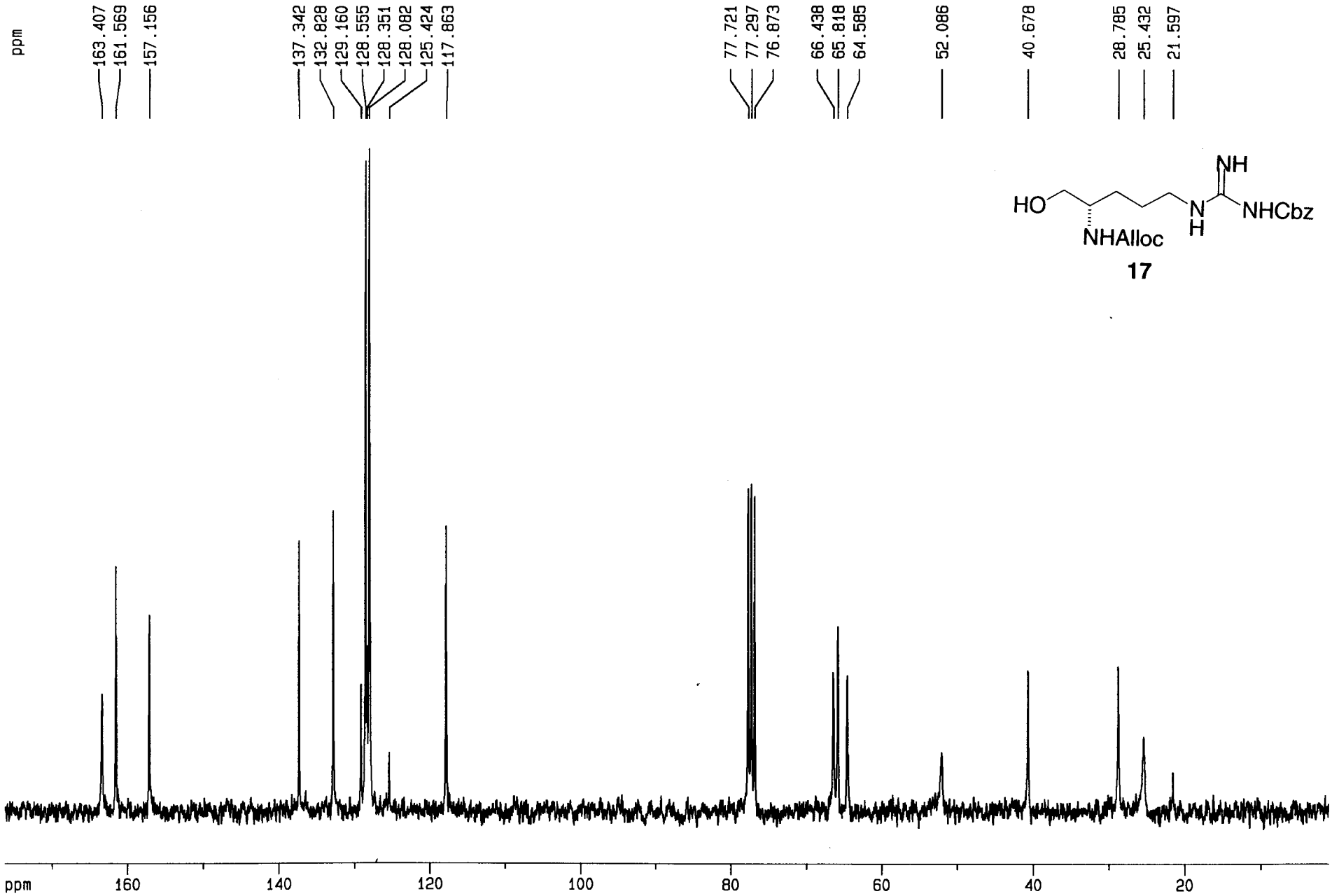

O
HO
NH
N
H
NH2
NHAlloc


ppm
9.07269
7.61021
6.57819
6.55399
5.91580
5.89846
5.88127
5.86253
5.84213
5.82381
5.80650
5.78926
5.26027
5.20313
5.12954
5.09467
4.40238
4.38699
3.65145
3.63105
3.34853
3.12205
2.99761
2.46535
2.25710
2.04479
1.62828
1.52147
1.49605
1.41183
Integral
1.0404
4.0704
0.8692
0.8511
1.9213
2.0000
1.0541
0.8077
2.1462
0.3519
4.2937
ppm
9
8
7
6
5
4
3
2
1


Alloc-Arg(Cbz)-OH
ppm
8.23385
7.47686
7.45110
7.33617
7.33011
7.29235
7.27150
7.26156
7.23955
7.21725
7.19000
7.14763
7.12459
7.10611
7.03910
6.57272
5.92740
5.90979
5.89241
5.87406
5.85397
5.83496
5.81747
5.80030
5.28178
5.22469
5.15390
5.11895
5.07593
4.98656
4.96349
4.93863
4.43630
4.41959
3.87503
3.86016
3.83245
3.06259
2.95495
2.93559
2.46414
2.26156
1.87002
1.66882
1.65447
1.47560
HO
O
NH
N
H
NHCbz
NHAlloc
Integral
0.4209
1.0263
4.4021
0.3608
0.6993
1.7674
1.9903
2.0000
1.0315
1.9496
0.8846
0.4308
0.3007
1.0600
3.2378
ppm
9
8
7
6
5
4
3
2
1


Alloc-L-Arg(Cbz)-CH2OH (CDCl3)
ppm
7.34143
7.31761
7.29575
7.26988
7.25390
7.24223
7.22147
7.17446
7.14964
5.89883
5.88186
5.86346
5.84258
5.82459
5.80700
5.78891
5.60292
5.58405
5.27997
5.22284
5.18822
5.15350
5.04233
4.49347
4.47898
3.53329
3.49628
3.43837
3.42305
3.40280
3.38720
3.09222
2.96264
2.91266
2.34246
1.44634
1.29990
HO
NHAlloc
N
H
NH
NHCbz
17
Integral
5.9053
1.2063
0.9416
2.0184
2.0302
2.0000
3.1642
1.9480
0.3905
4.5716
ppm
7
6
5
4
3
2
1

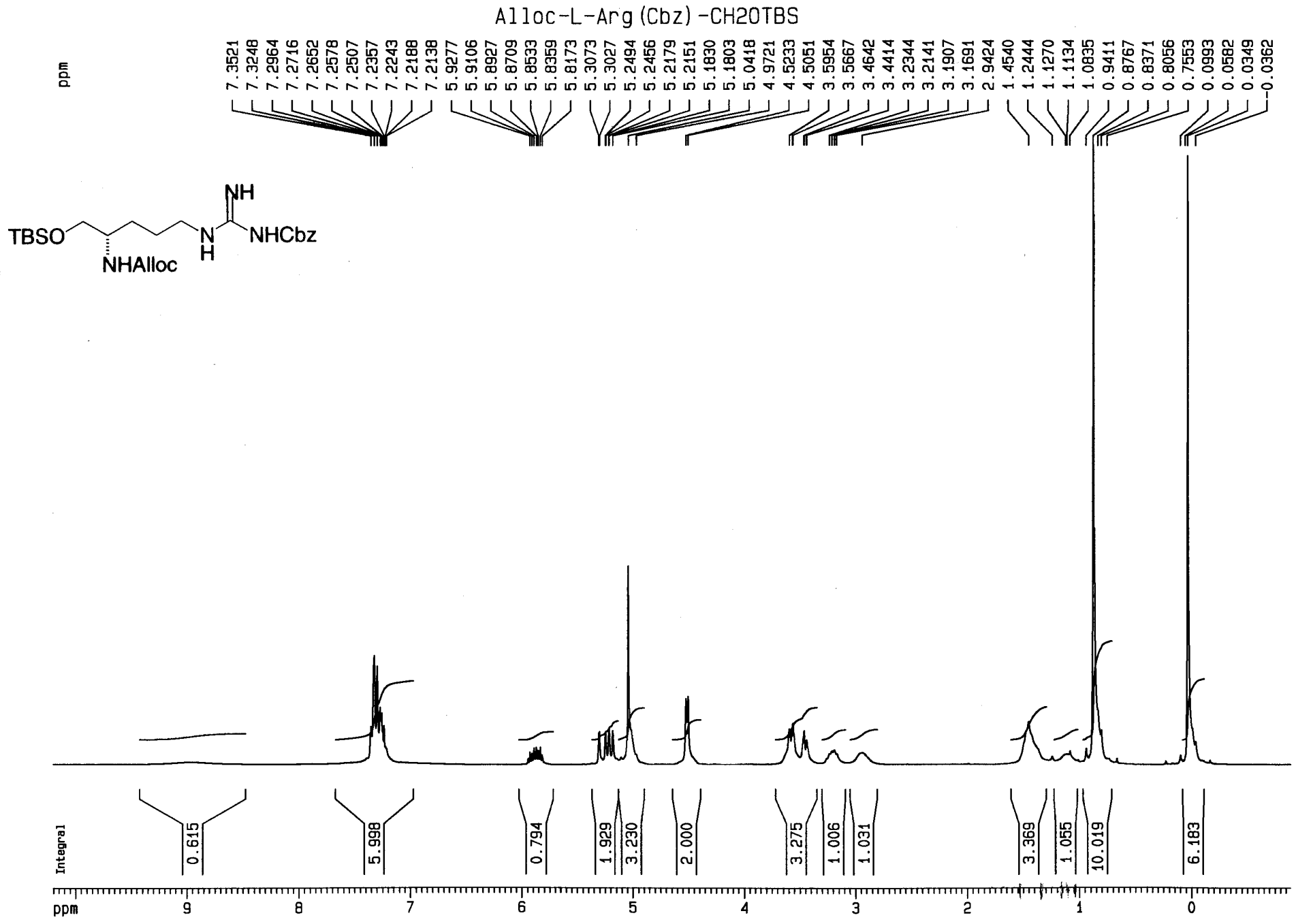
Alloc-L-Arg(Cbz)-CH2OH (CDCl3)



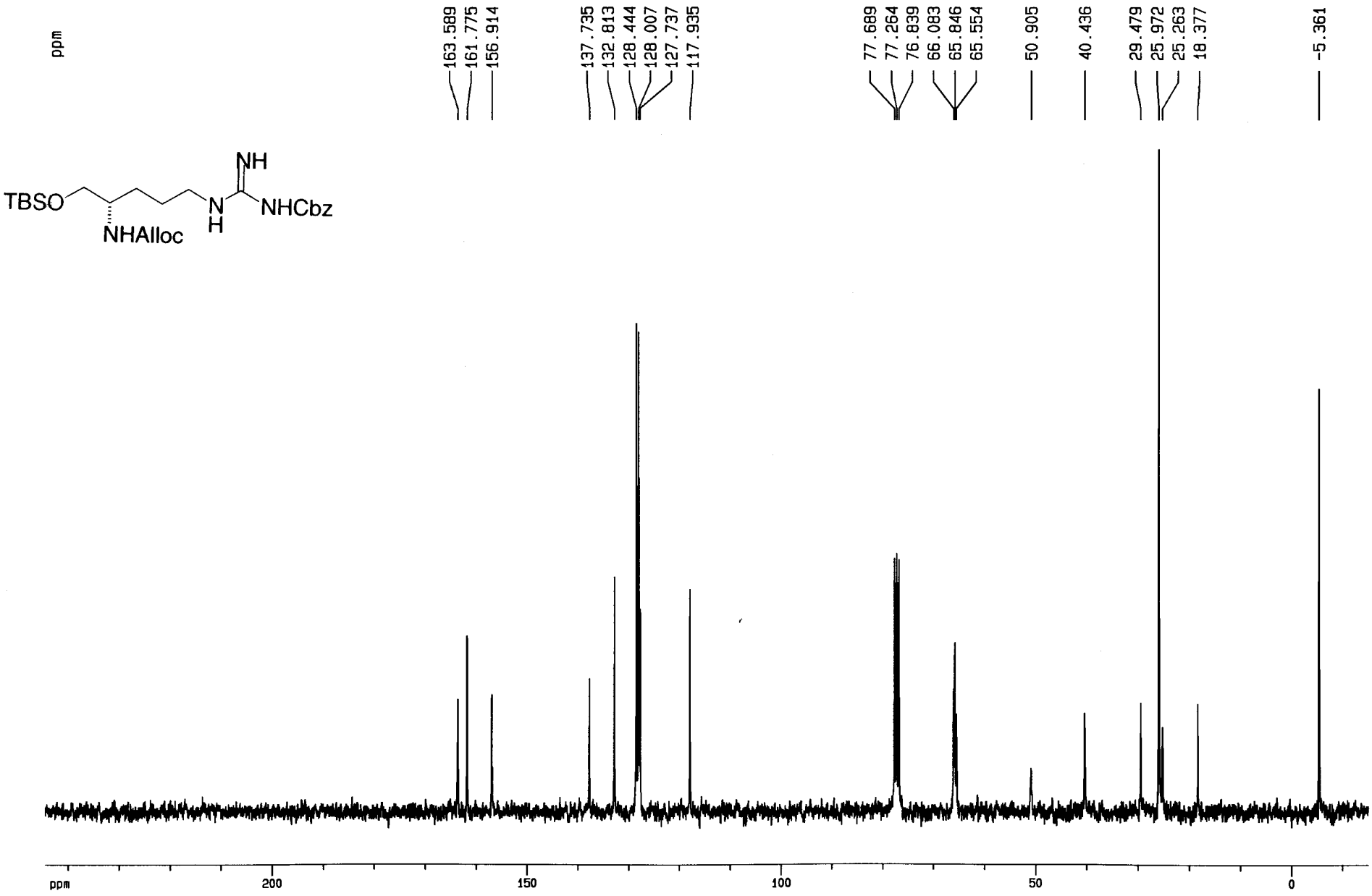


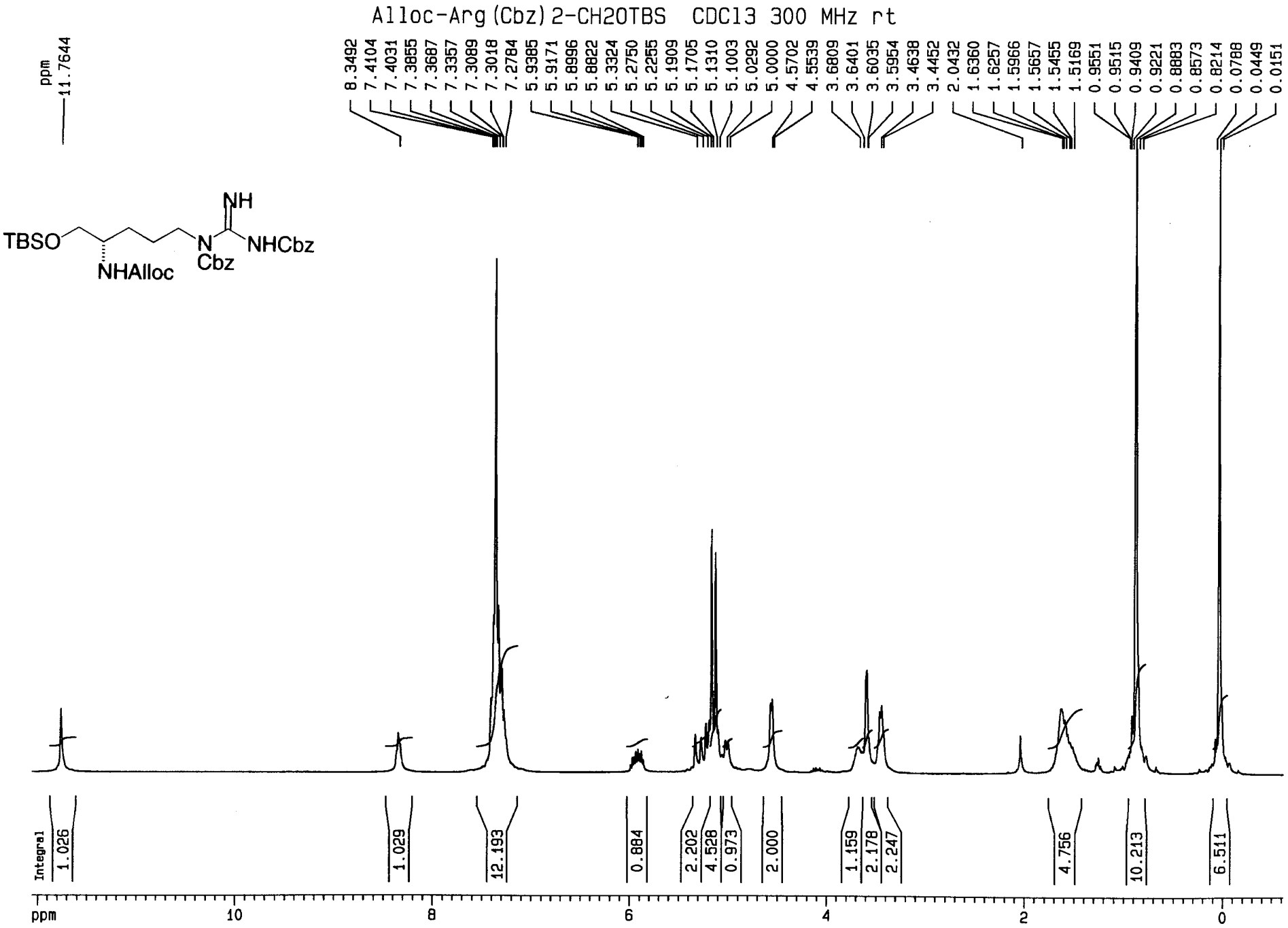


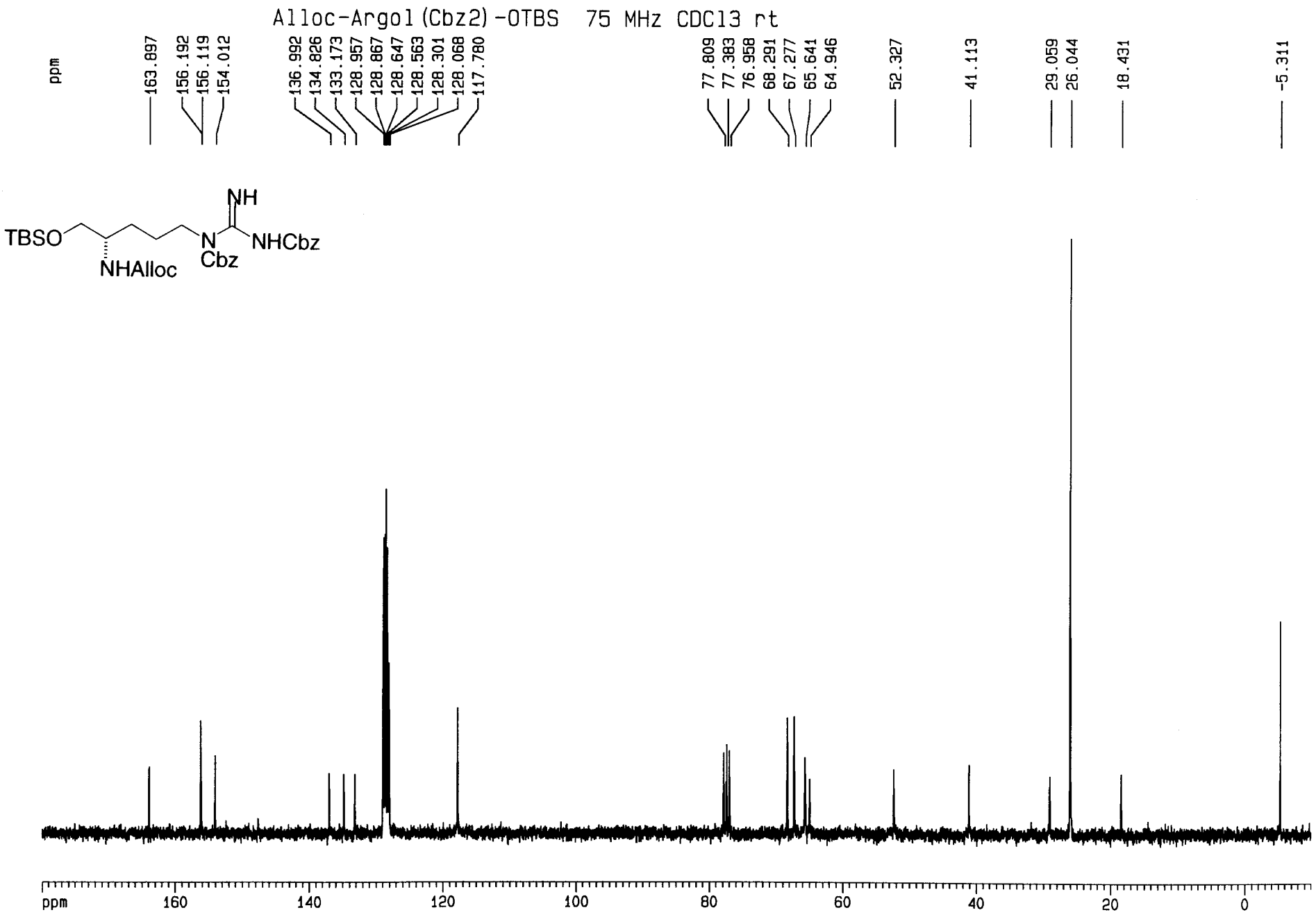
**17**


Alloc-L-Arg(Cbz)-CH2OTBS
ppm
7.3521
7.3248
7.2964
7.2716
7.2652
7.2578
7.2507
7.2357
7.2243
7.2188
7.2138
5.9277
5.9106
5.8927
5.8709
5.8533
5.8359
5.8173
5.3073
5.3027
5.2494
5.2456
5.2179
5.2151
5.1830
5.1803
5.0418
4.9721
4.5233
4.5051
3.5954
3.5667
3.4642
3.4414
3.2344
3.2141
3.1907
3.1691
2.9424
1.4540
1.2444
1.1270
1.1134
1.0835
0.9411
0.8767
0.8371
0.8056
0.7553
0.0993
0.0582
0.0349
-0.0362
TBSO
NHAlloc
N
H
NH
NHCbz
Integral
0.615
5.998
0.794
1.929
3.230
2.000
3.275
1.006
1.031
3.369
1.055
10.019
6.183
ppm
9
8
7
6
5
4
3
2
1
0

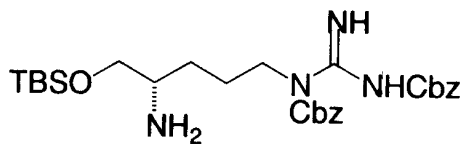
Alloc-L-Arg(Cbz)-CH2OTBS




Alloc-Arg(Cbz)2-CH2OTBS CDCl3 300 MHz rt
ppm
11.7644
8.3492
7.4104
7.4031
7.3855
7.3687
7.3357
7.3089
7.3018
7.2784
5.9385
5.9171
5.8996
5.8822
5.3324
5.2750
5.2255
5.1909
5.1705
5.1310
5.1003
5.0292
5.0000
4.5702
4.5539
3.6809
3.6401
3.6035
3.5954
3.4638
3.4452
2.0432
1.6360
1.6257
1.5966
1.5657
1.5455
1.5169
0.9551
0.9515
0.9409
0.9221
0.8883
0.8573
0.8214
0.0788
0.0449
0.0151
TBSO
NH
N
NHCbz
Cbz
NHAlloc
Integral
1.026
1.029
12.193
0.884
2.202
4.528
0.973
2.000
1.159
2.178
2.247
4.756
10.213
6.511
ppm
10
8
6
4
2
0

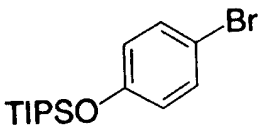

Alloc-Argol(Cbz2)-OTBS 75 MHz CDCl3 rt
ppm
163.897
156.192
156.119
154.012
136.992
134.826
133.173
128.957
128.867
128.647
128.563
128.301
128.068
117.780
77.809
77.383
76.958
68.291
67.277
65.641
64.946
52.327
41.113
29.059
26.044
18.431
-5.311
TBSO
NHAlloc
N
Cbz
NH
NHCbz
ppm
160
140
120
100
80
60
40
20
0

L-Arg(Cbz)2-CH2OTBS (300MHz, CDCl3)

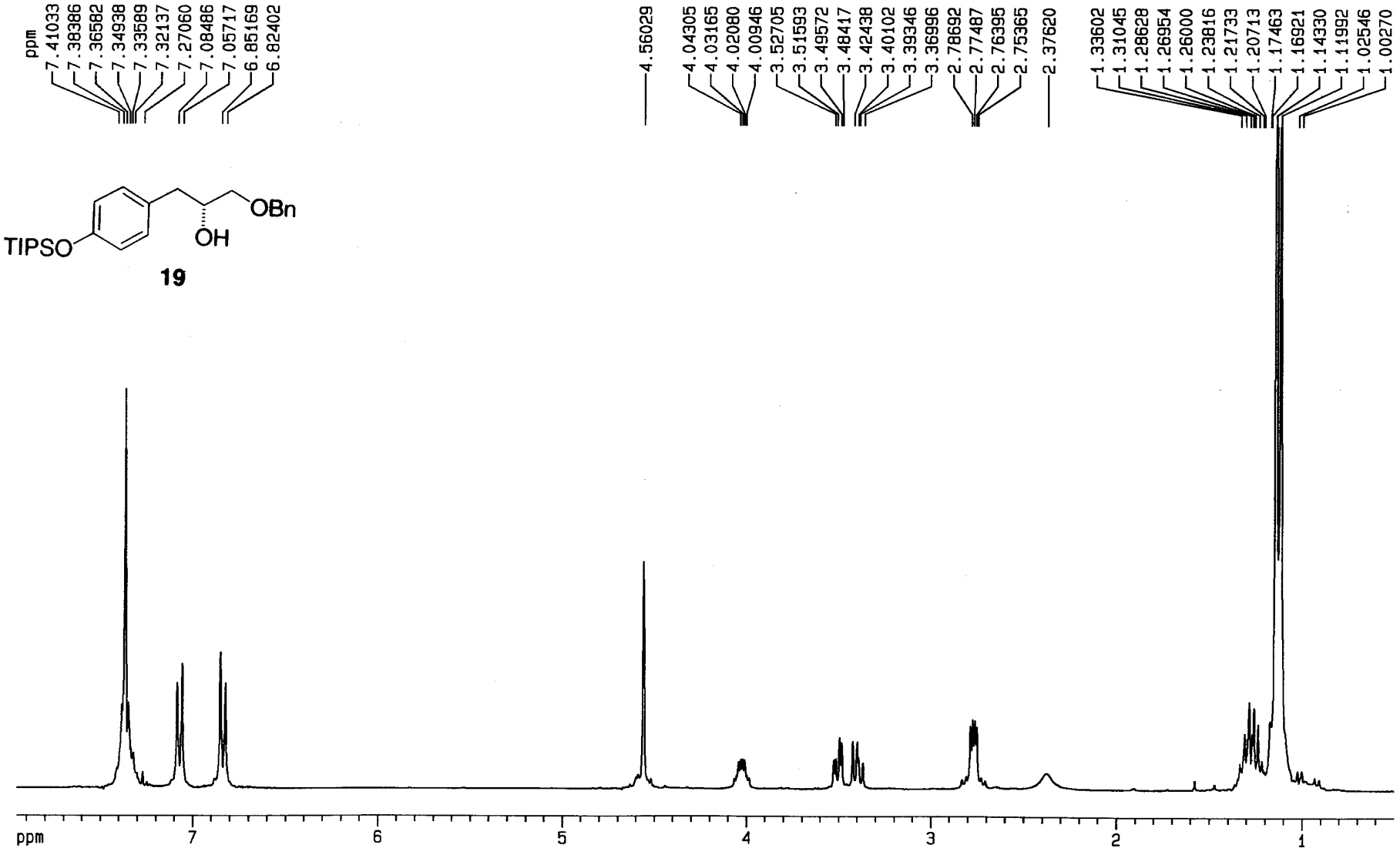



**18**

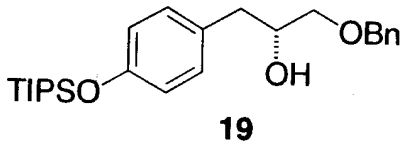
TIPS-Protected 4-Bromophenol (CDCl3)



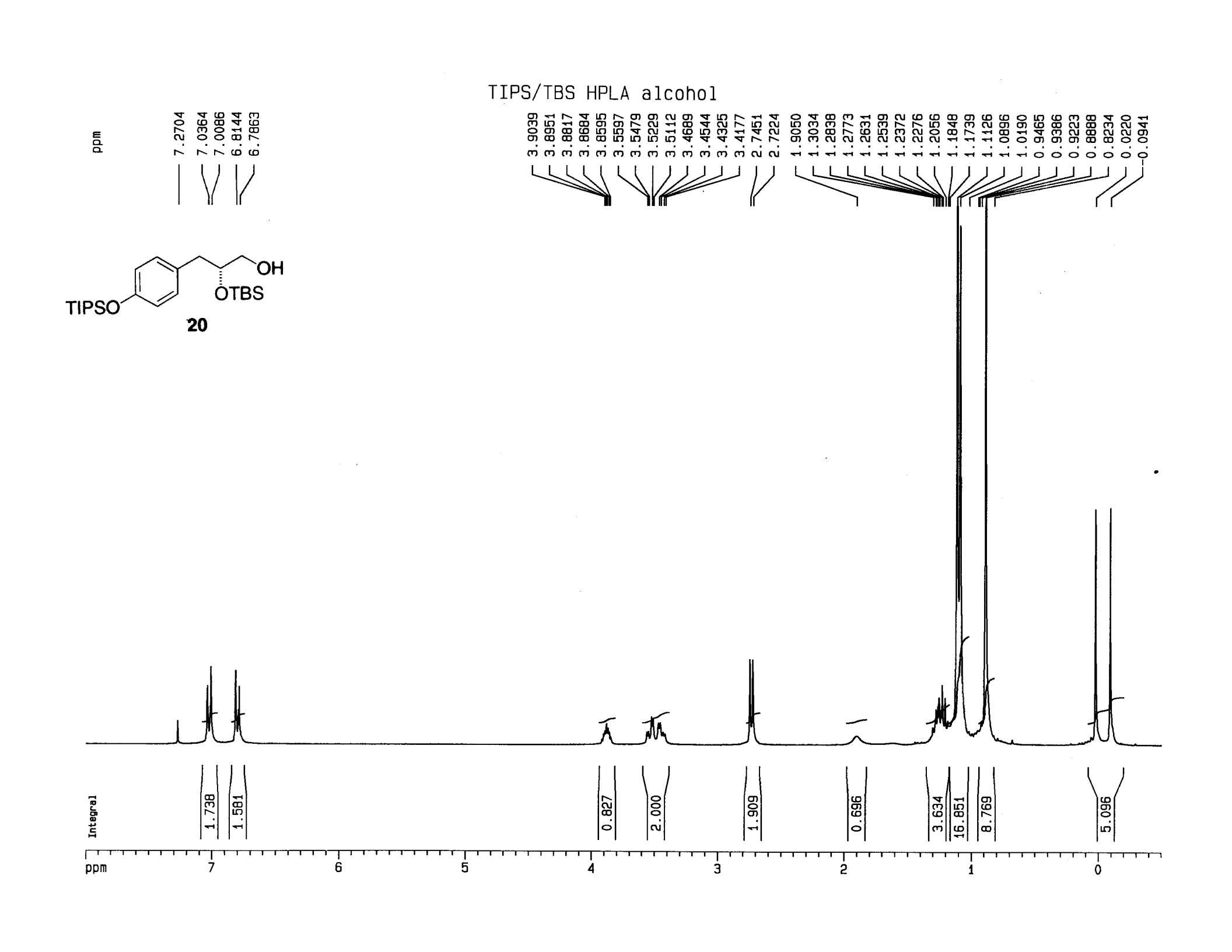
TIPS-Bromophenol + Benzyl Glycidol



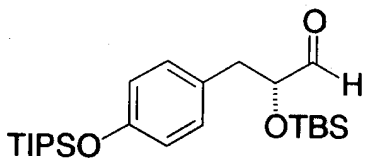
TIPS-Bromophenol + Benzyl Glycidol (delay 6 sec)



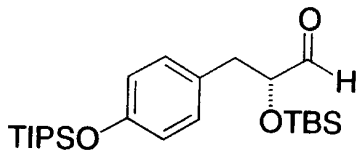

**19**


TIPS/TBS HPLA alcohol
ppm
7.2704
7.0364
7.0086
6.8144
6.7863
3.9039
3.8951
3.8817
3.8684
3.8595
3.5597
3.5479
3.5229
3.5112
3.4689
3.4544
3.4325
3.4177
2.7451
2.7224
1.9050
1.3034
1.2838
1.2773
1.2631
1.2539
1.2372
1.2276
1.2056
1.1848
1.1739
1.1126
1.0896
1.0190
0.9465
0.9386
0.9223
0.8888
0.8234
0.0220
-0.0941
OH
OTBS
TIPSO
20
Integral
1.738
1.581
0.827
2.000
1.909
0.696
3.634
16.851
8.769
5.096
ppm
7
6
5
4
3
2
1
0

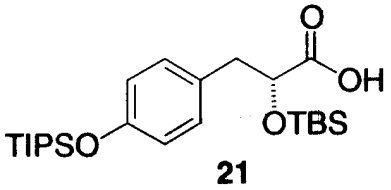
HPLA Aldehyde



HPLA Aldehyde

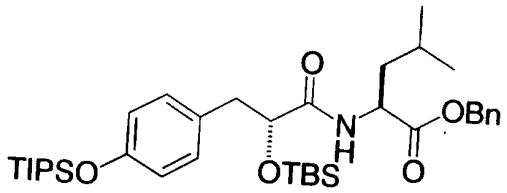


Crude TIPS/TBS HPLA

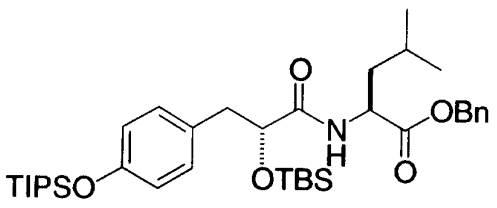



21

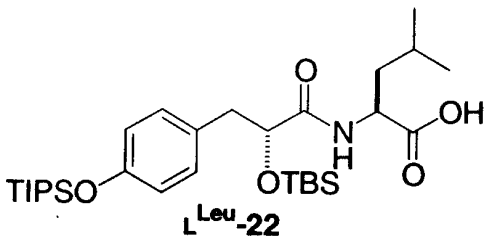
D-Hpla(TIPS, TBS)-L-Leu-OBn 300 MHz, CDCl3, rt



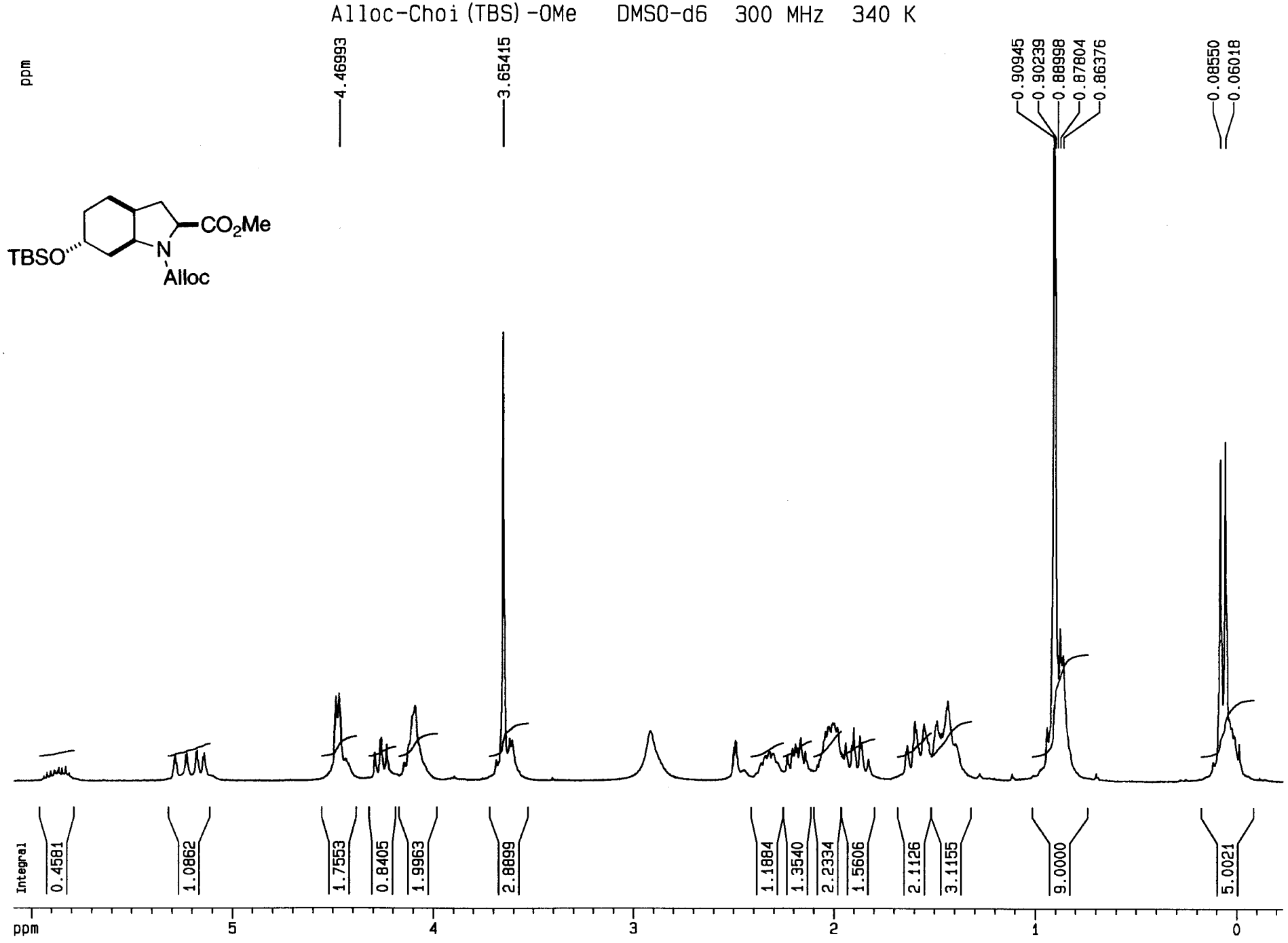
D-Hpla(TIPS, TBS)-L-Leu-OBn 300 MHz, CDCl3, rt



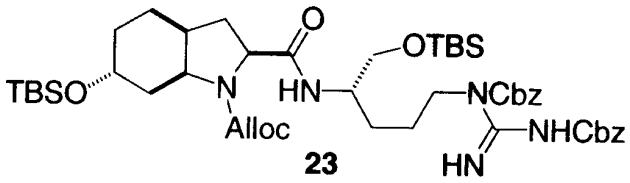
D-Hpla(TIPS, TBS)-L-Leu-OH (H2, Pd/C, EtOH) 300 MHz CDCl3



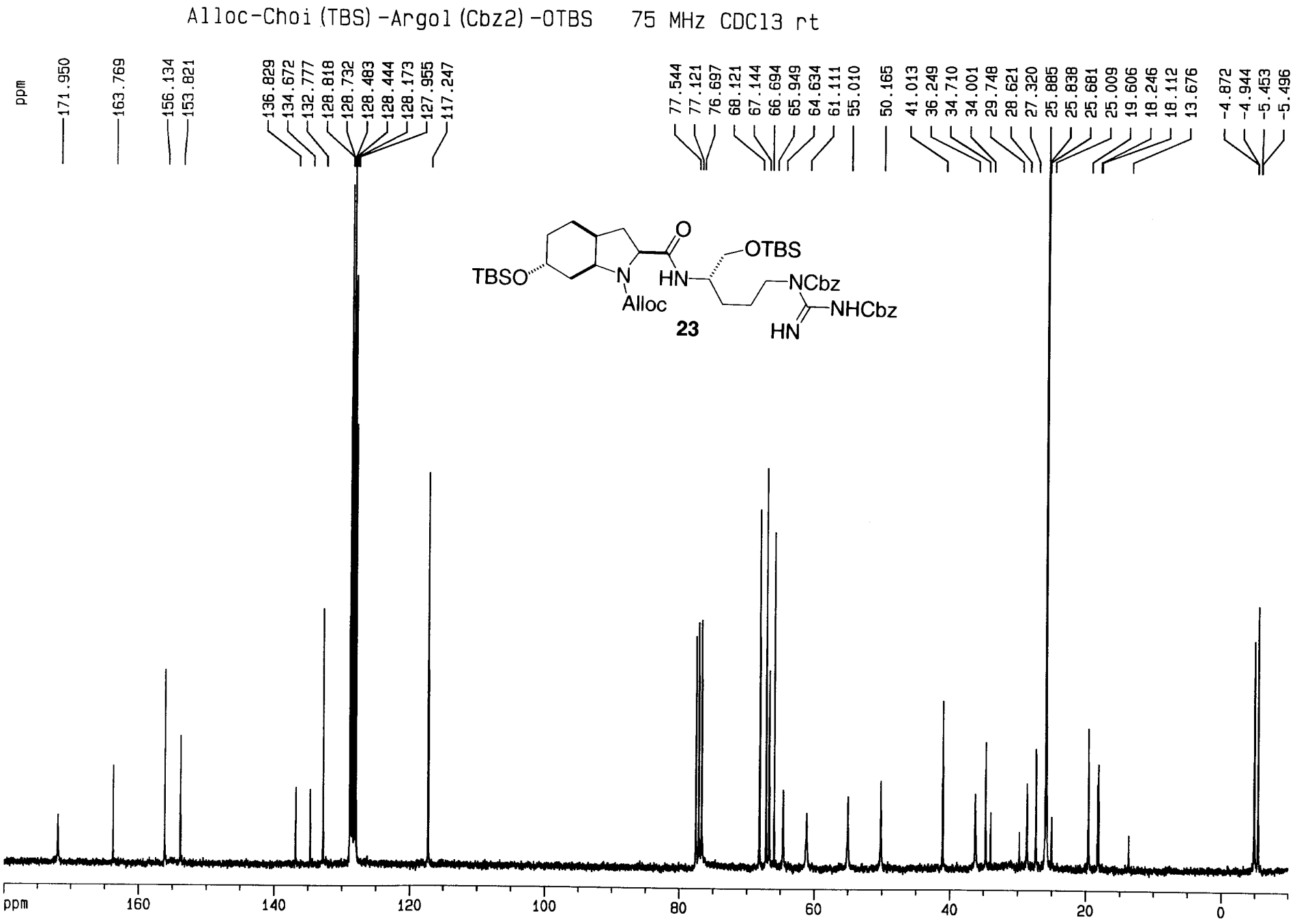

$L^{Leu}$-22


Alloc-Choi (TBS) -OMe DMSO-d6 300 MHz 340 K
ppm
4.46993
3.65415
0.90945
0.90239
0.88998
0.87804
0.86376
0.08550
0.06018
TBSO
CO2Me
N
Alloc
Integral
0.4581
1.0862
1.7553
0.8405
1.9963
2.8899
1.1884
1.3540
2.2334
1.5606
2.1126
3.1155
9.0000
5.0021
ppm
5
4
3
2
1
0

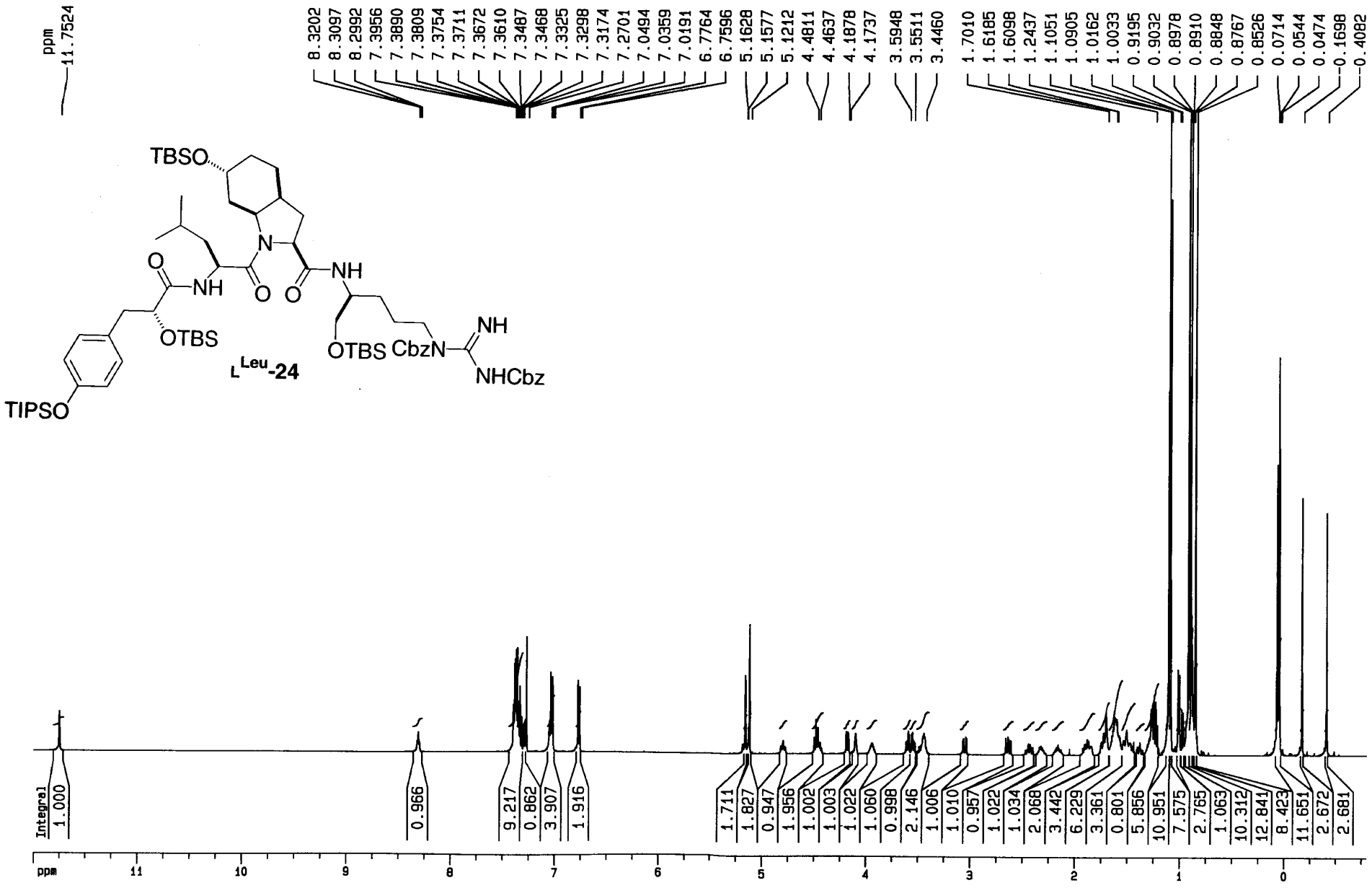
Alloc-Choi(TBS)-Argol(Cbz2)-OTBS 500 MHz CDCl3 rt

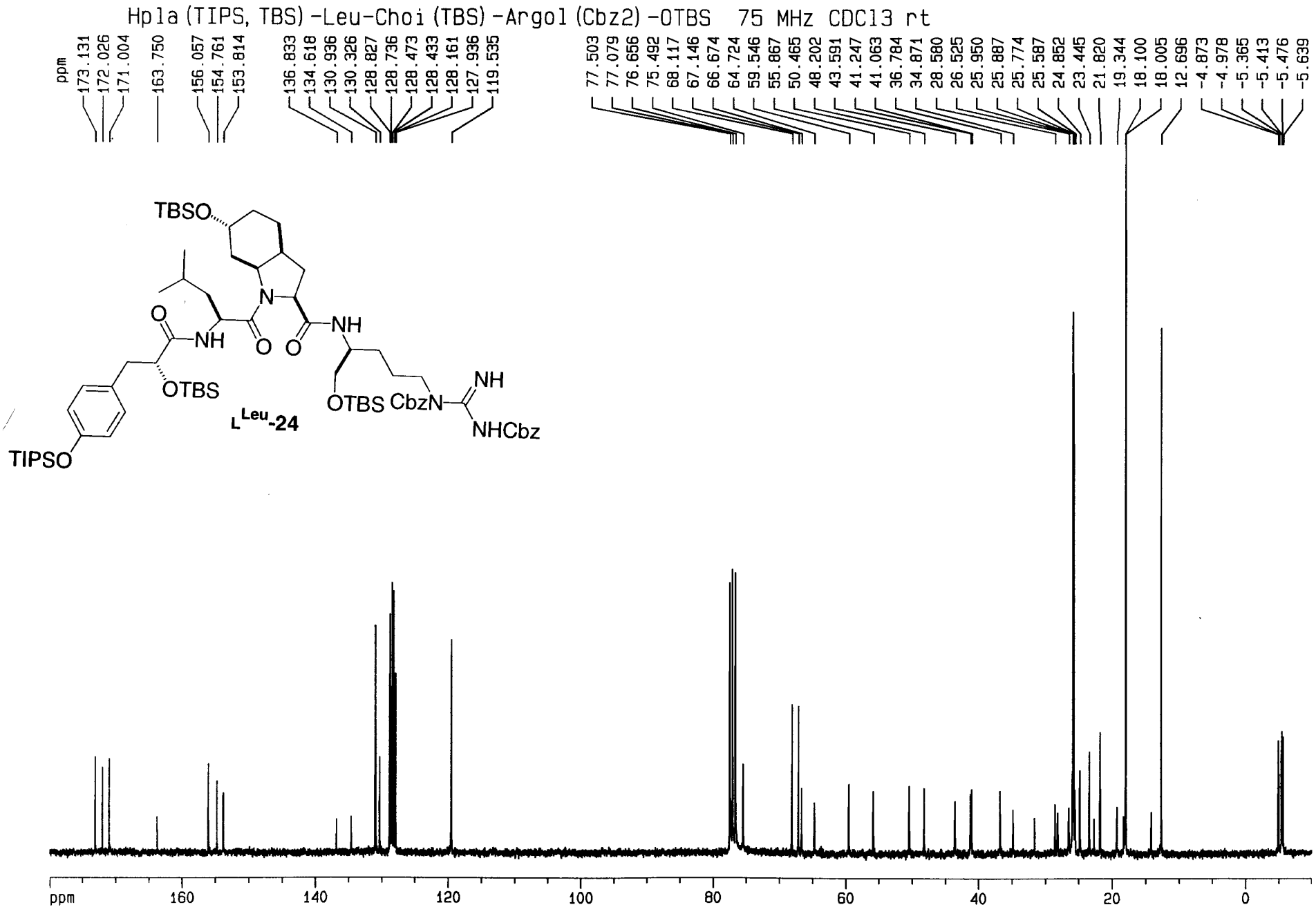



23

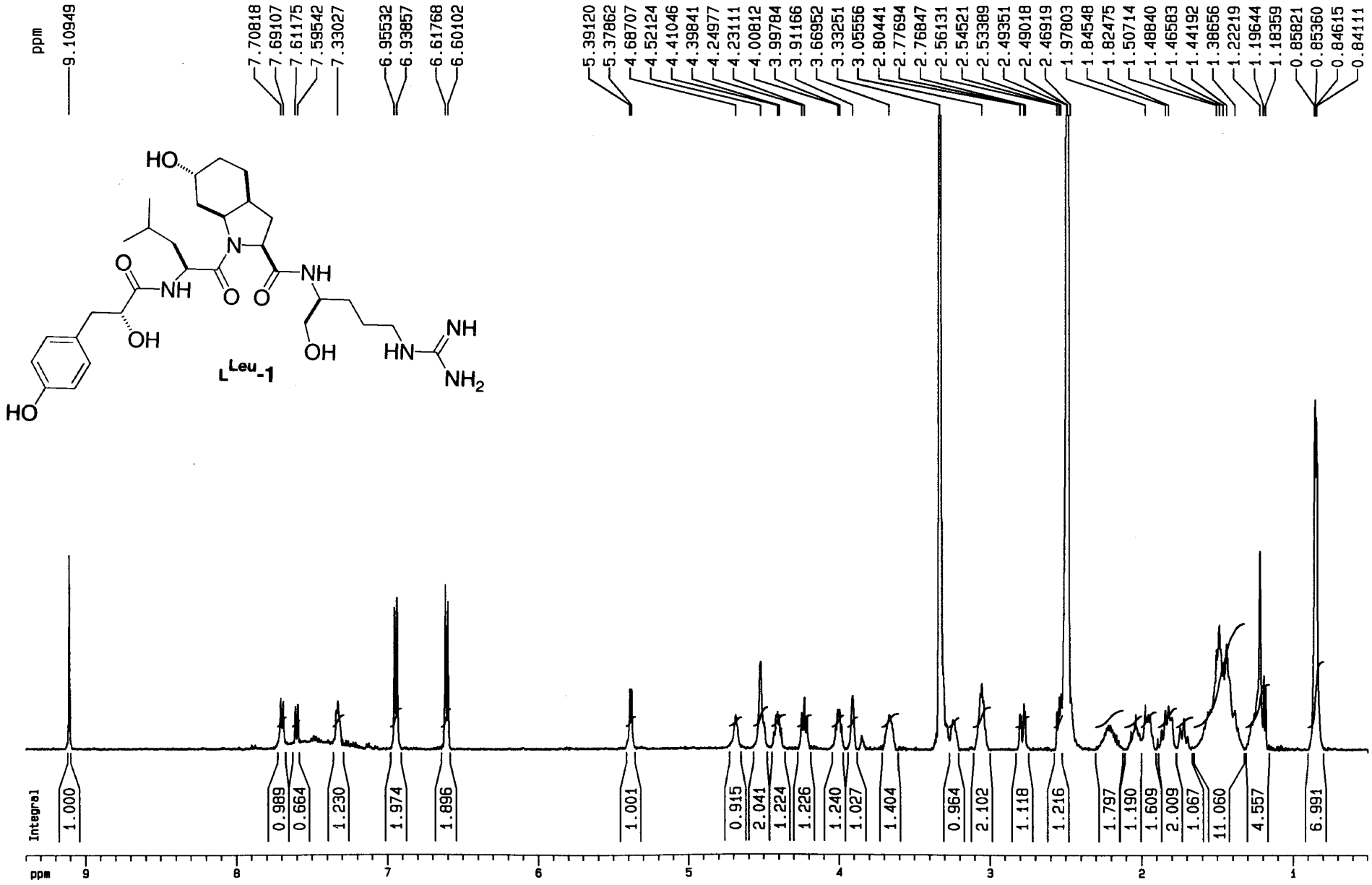

Alloc-Choi(TBS)-Argol(Cbz2)-OTBS 75 MHz CDCl3 rt
ppm
171.950
163.769
156.134
153.821
136.829
134.672
132.777
128.818
128.732
128.483
128.444
128.173
127.955
117.247
77.544
77.121
76.697
68.121
67.144
66.694
65.949
64.634
61.111
55.010
50.165
41.013
36.249
34.710
34.001
29.748
28.621
27.320
25.885
25.838
25.681
25.009
19.606
18.246
18.112
13.676
-4.872
-4.944
-5.453
-5.496
TBSO
N
Alloc
O
HN
OTBS
NCbz
NHCbz
HN
23
ppm
160
140
120
100
80
60
40
20
0

Hpla(TIPS, TBS)-L-Leu-Choi(TBS)-Argol(Cbz2)-OTBS 500 MHz CDCl3 rt

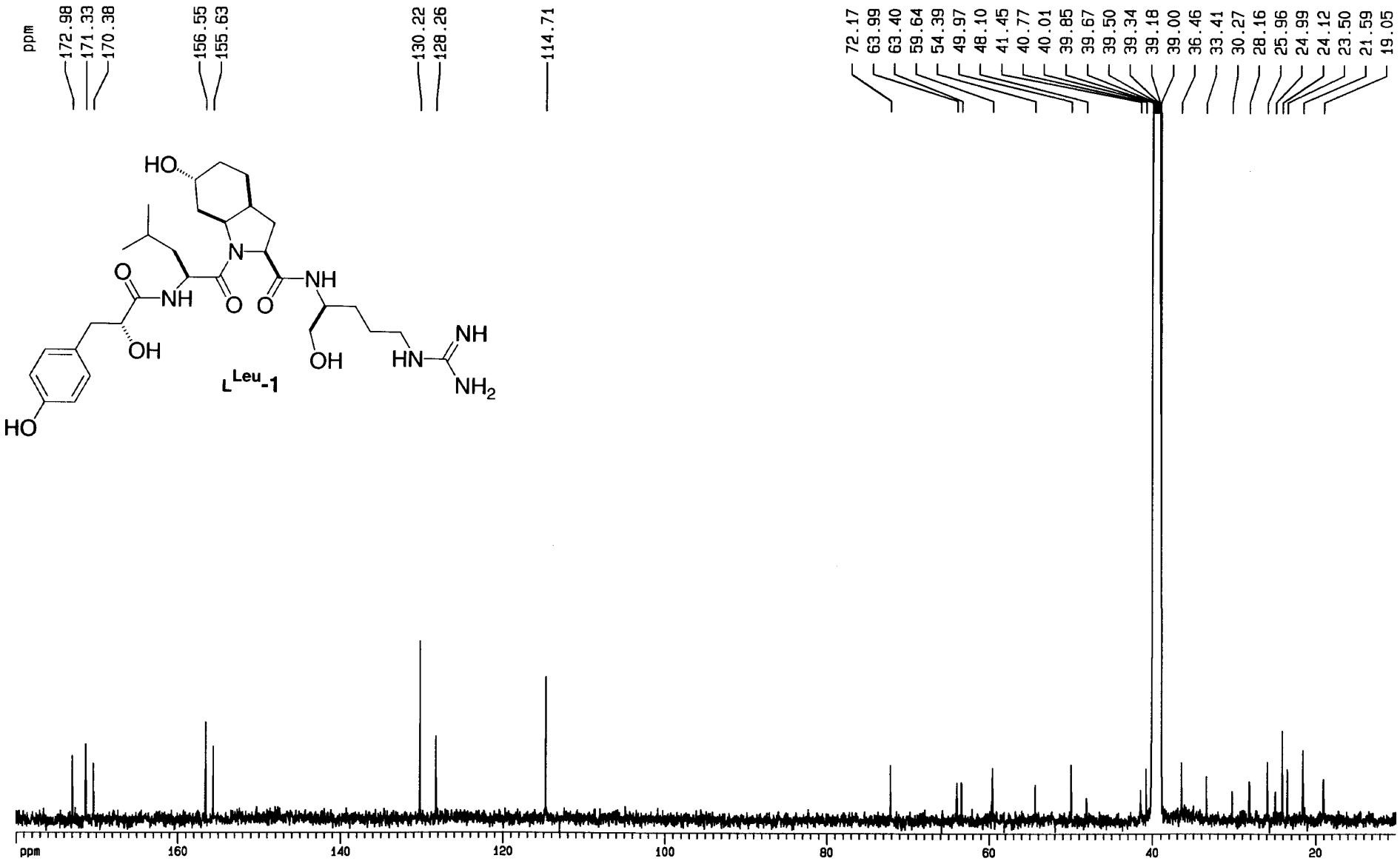



Hpla(TIPS, TBS)-Leu-Choi(TBS)-Argol(Cbz2)-OTBS 75 MHz CDCl3 rt
ppm
173.131
172.026
171.004
163.750
156.057
154.761
153.814
136.833
134.618
130.936
130.326
128.827
128.736
128.473
128.433
128.161
127.936
119.535
77.503
77.079
76.656
75.492
68.117
67.146
66.674
64.724
59.546
55.867
50.465
48.202
43.591
41.247
41.063
36.784
34.871
28.580
26.525
25.950
25.887
25.774
25.587
24.852
23.445
21.820
19.344
18.100
18.005
12.696
-4.873
-4.978
-5.365
-5.413
-5.476
-5.639
TBSO
N
O
NH
O
O
NH
OTBS
OTBS
CbzN
NH
NHCbz
TIPSO
L Leu-24
ppm
160
140
120
100
80
60
40
20
0

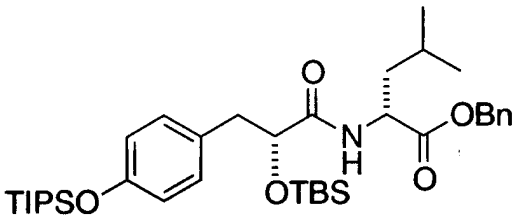
L-Leu Aeruginosin 298-A  1H NMR 500MHz DMSO-d6 rt



L-Leu Aeruginosin 298-A  13C NMR 125 MHz DMSO-d6 rt



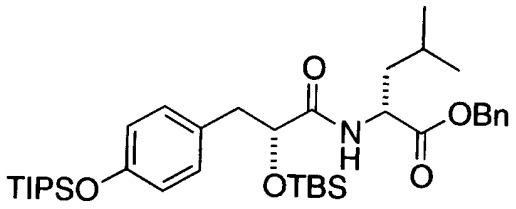
D-Hpla(TIPS, TBS)-D-Leu-OBn 300 MHz CDCl3 rt

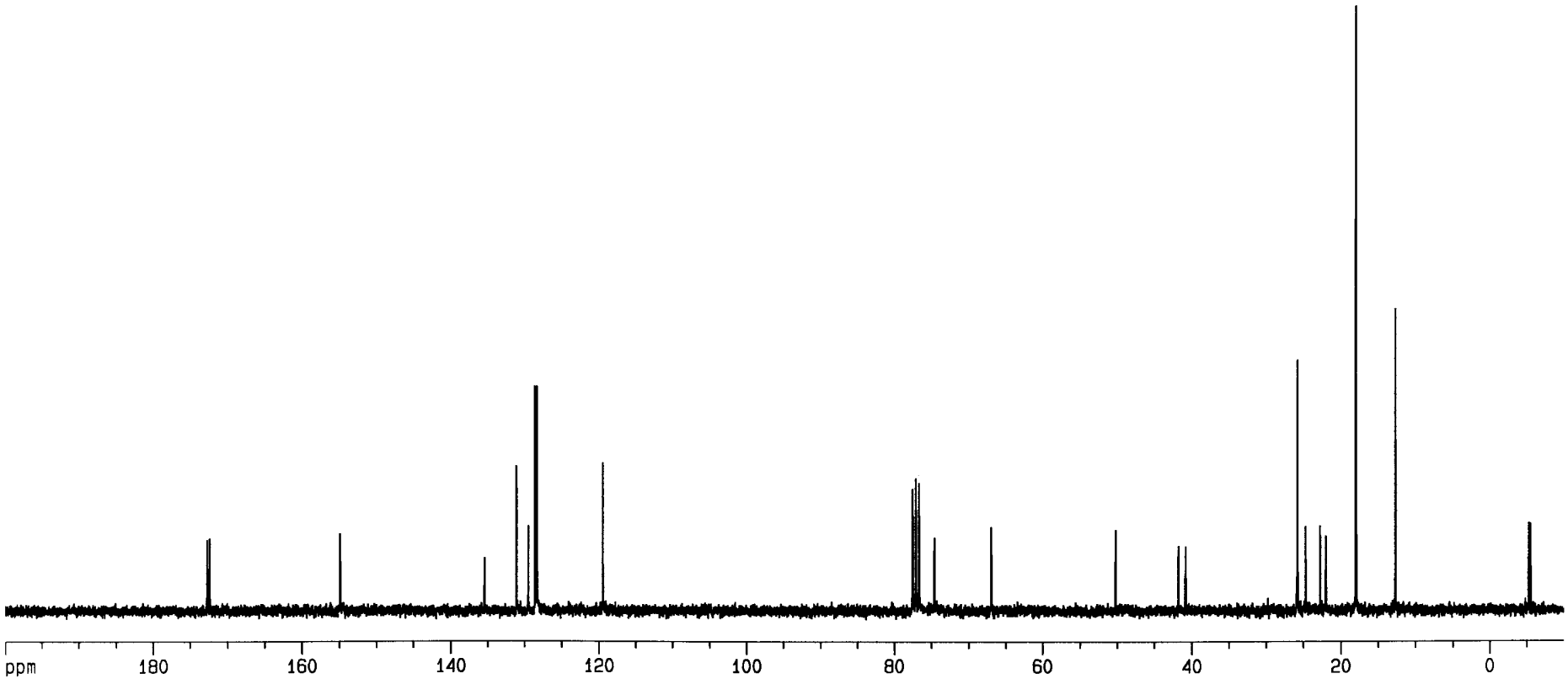


D-Hpla(TIPS, TBS)-D-Leu-OBn 75 MHz CDCl3 rt

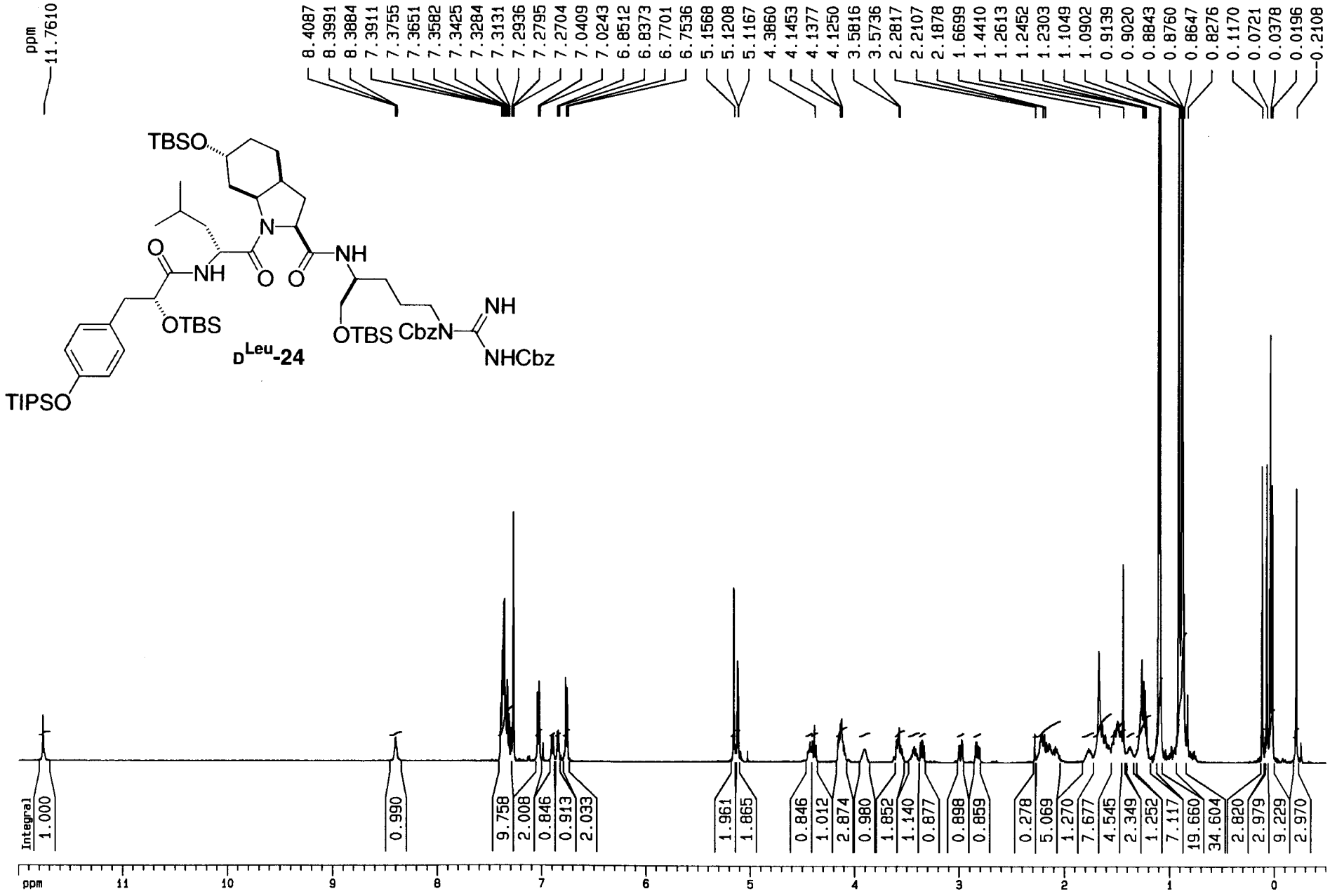
ppm

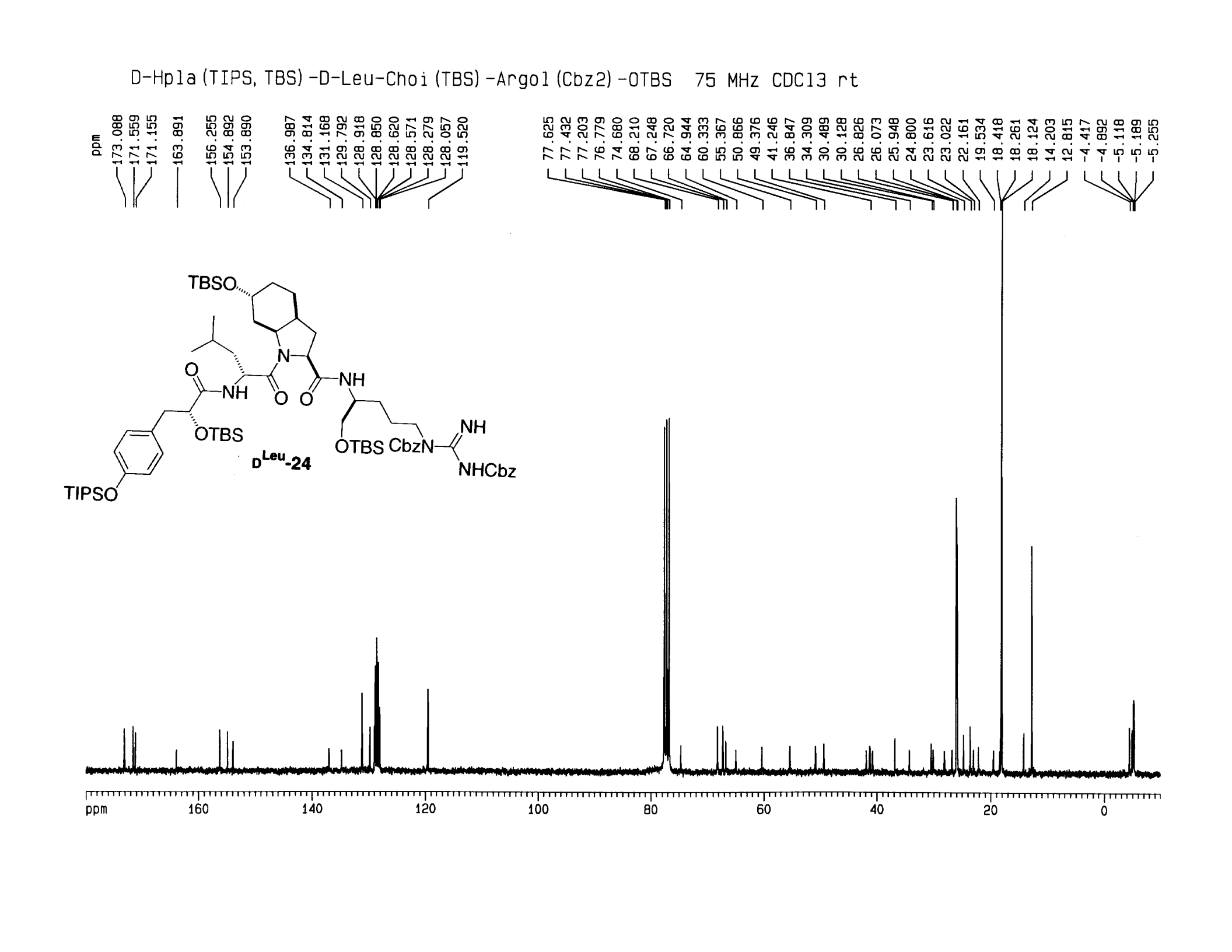
172.737
172.405
154.870
135.428
131.096
129.496
128.617
128.420
128.371
119.464
77.556
77.131
76.708
74.607
66.956
50.225
41.768
40.804
25.796
24.693
22.772
22.045
18.001
12.697
-5.276
-5.501



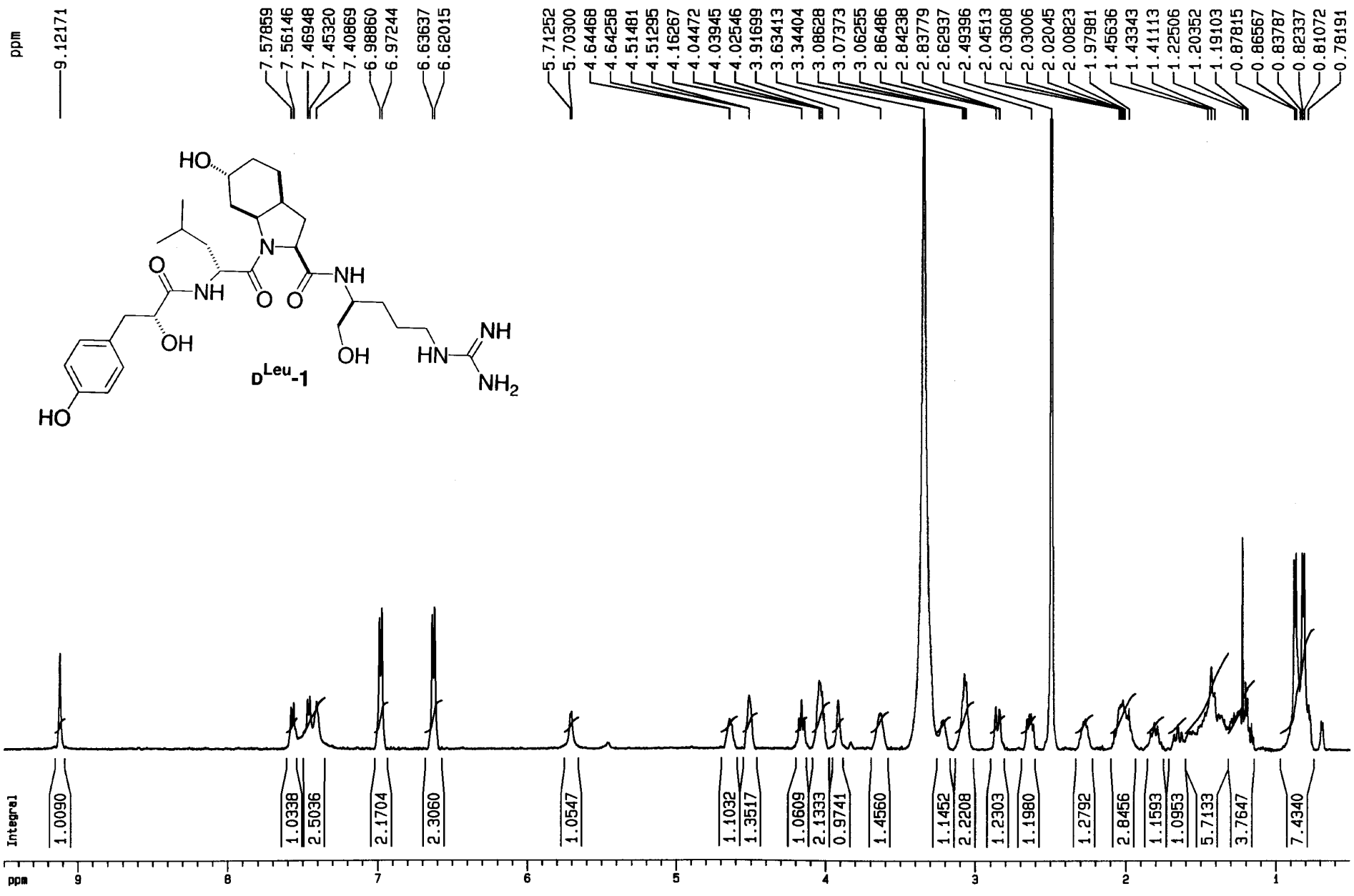



D-Hpla(TIPS, TBS)-D-Leu-Choi(TBS)-Argol(Cbz2)-OTBS 500 MHz CDCl3 rt

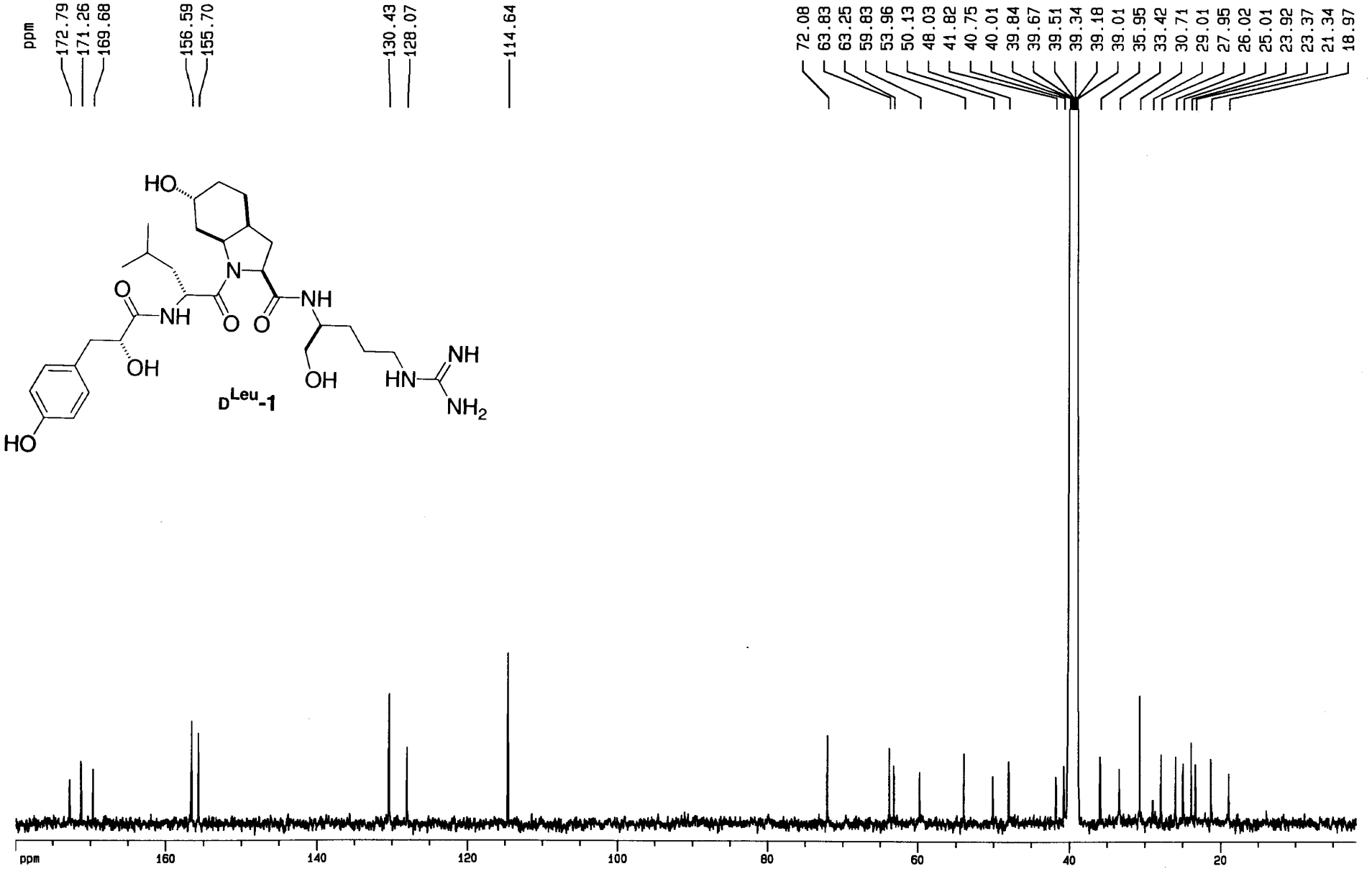



D-Hpla(TIPS, TBS)-D-Leu-Choi(TBS)-Argol(Cbz2)-OTBS 75 MHz CDCl3 rt
ppm
173.088
171.559
171.155
163.891
156.255
154.892
153.890
136.987
134.814
131.168
129.792
128.918
128.850
128.620
128.571
128.279
128.057
119.520
77.625
77.432
77.203
76.779
74.680
68.210
67.248
66.720
64.944
60.333
55.367
50.866
49.376
41.246
36.847
34.309
30.489
30.128
26.826
26.073
25.948
24.800
23.616
23.022
22.161
19.534
18.418
18.261
18.124
14.203
12.815
-4.417
-4.892
-5.118
-5.189
-5.255
TBSO
N
O
NH
O
O
NH
OTBS
OTBS
CbzN
NH
NHCbz
TIPSO
D Leu -24
ppm
160
140
120
100
80
60
40
20
0

D-Leu Aeruginosin 298A 1H NMR 500 MHz DMSO-d6 rt



D-Leu Aeruginosin 298A  13C NMR 125MHz DMSO-d6 rt



Natural
Aeruginosin 298-A