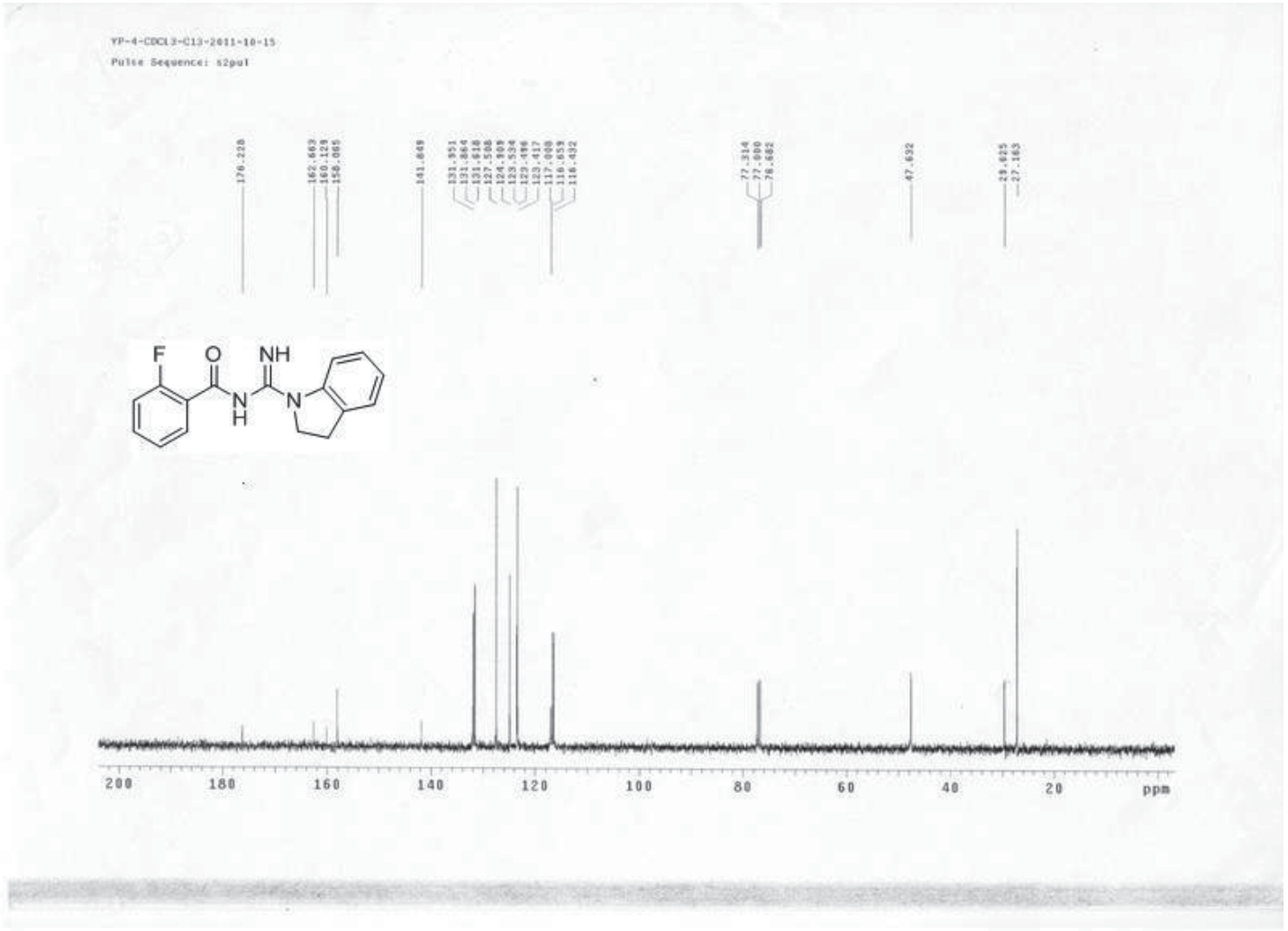
SYNTHESIS Journal of Synthetic Organic Chemistry SUPPORTING INFORMATION

Supporting Information
for DOI: 10.1055/s-0033-1338511

Thieme

5aa-C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Pulse Sequence: s2pul
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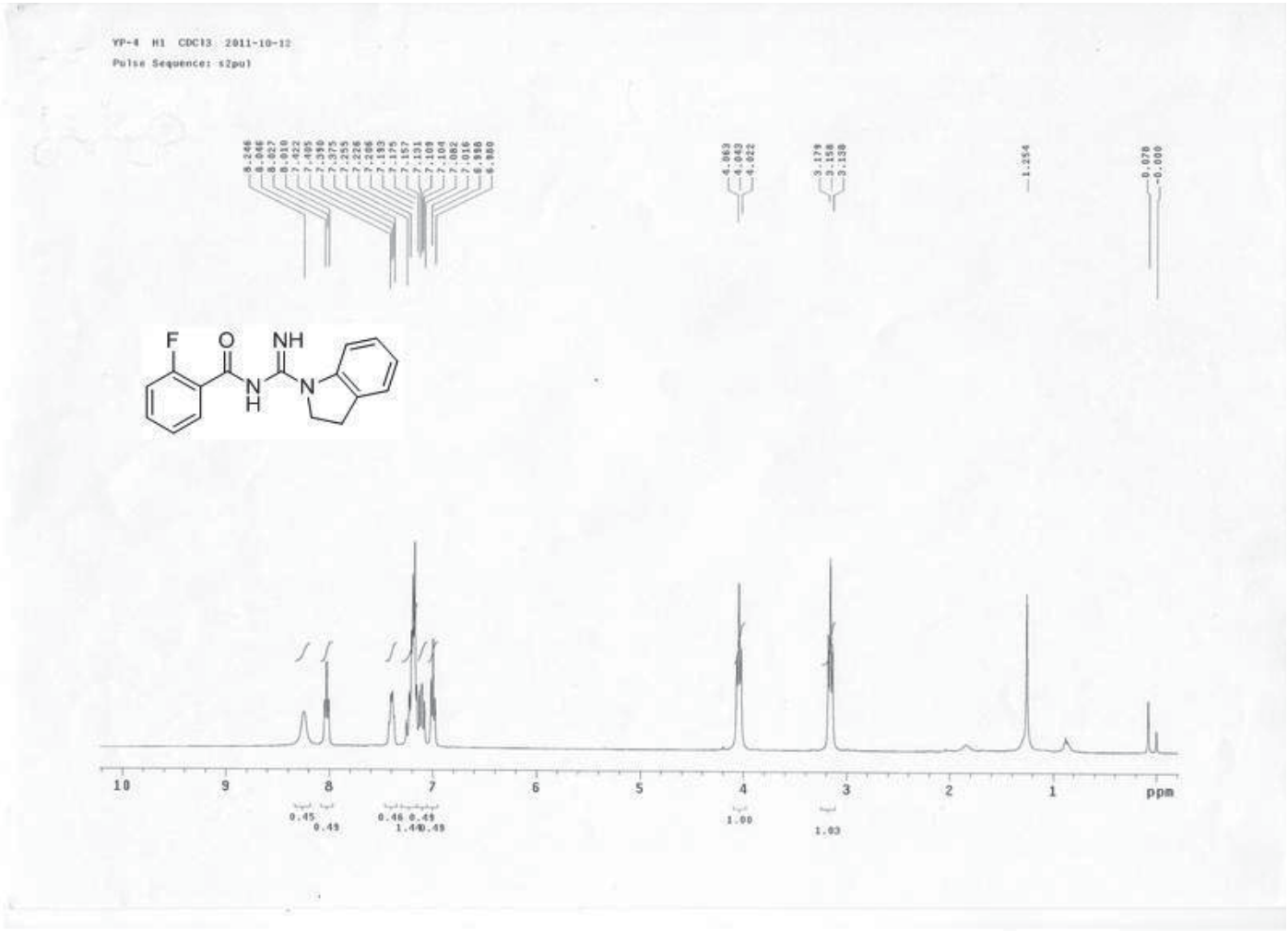
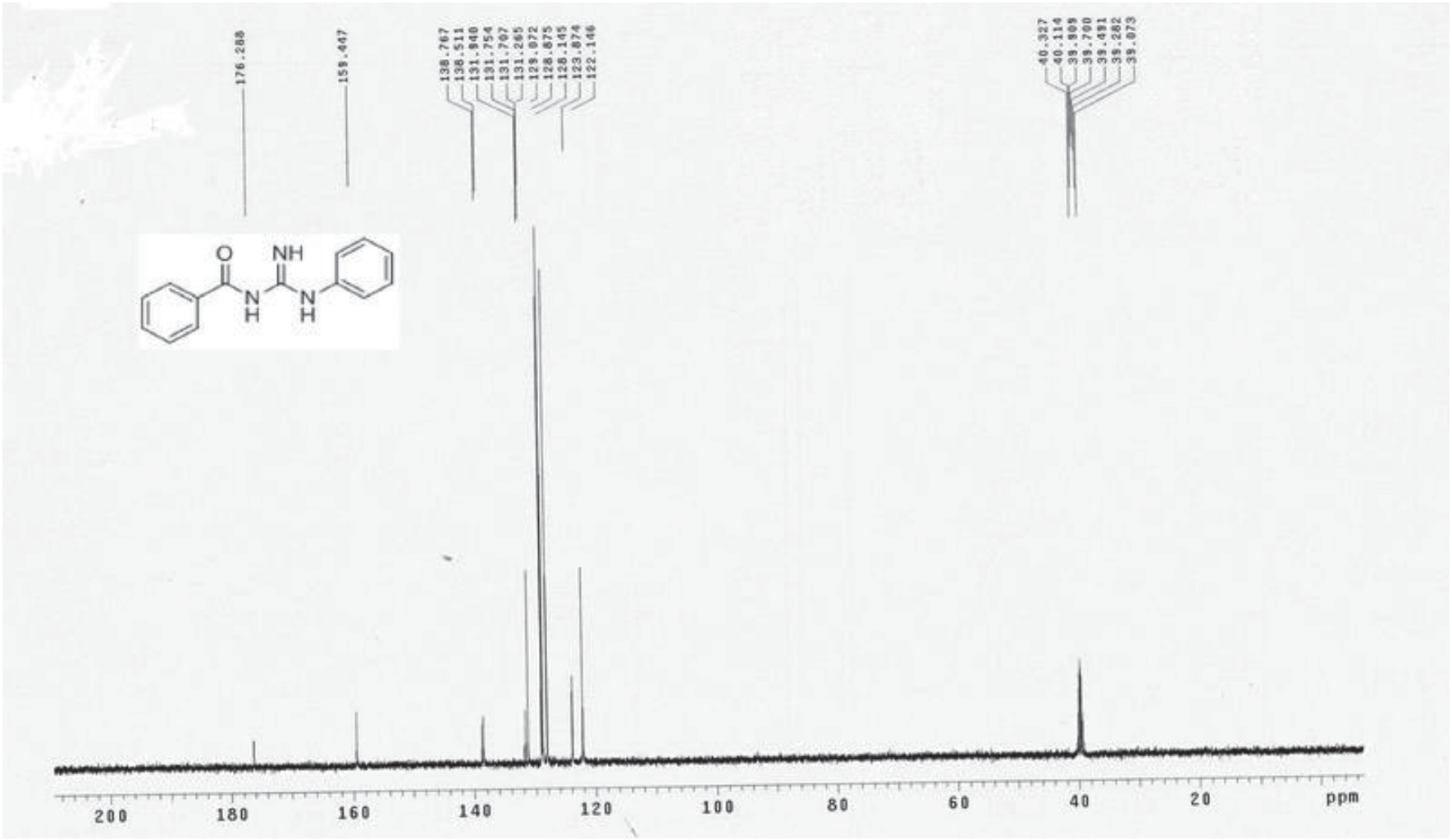
162.663
160.129
158.065
141.649
131.951
131.864
131.610
127.586
124.909
123.534
123.496
123.417
117.008
116.659
116.432
77.314
77.000
76.682
47.632
29.025
27.163
F
O
NH
N
H
N
200
180
160
140
120
100
80
60
40
20
ppm

5aa-H


YP-4 H1 CDCl3 2011-10-12
Pulse Sequence: s2pul
F
O
NH
N
H
N
10
9
8
7
6
5
4
3
2
1
ppm
0.45
0.49
0.46
0.49
1.44
0.49
1.00
1.03

5a-C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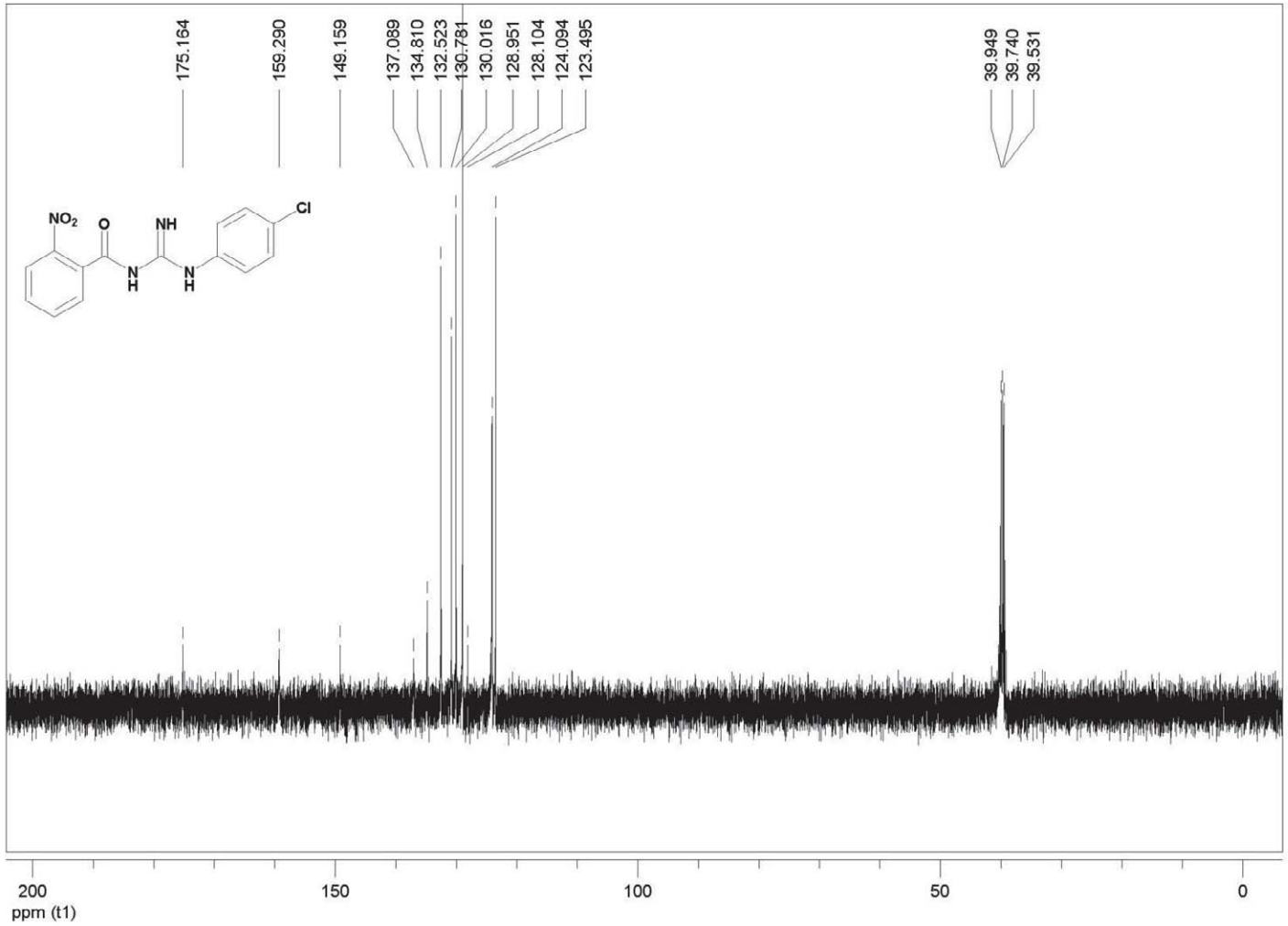
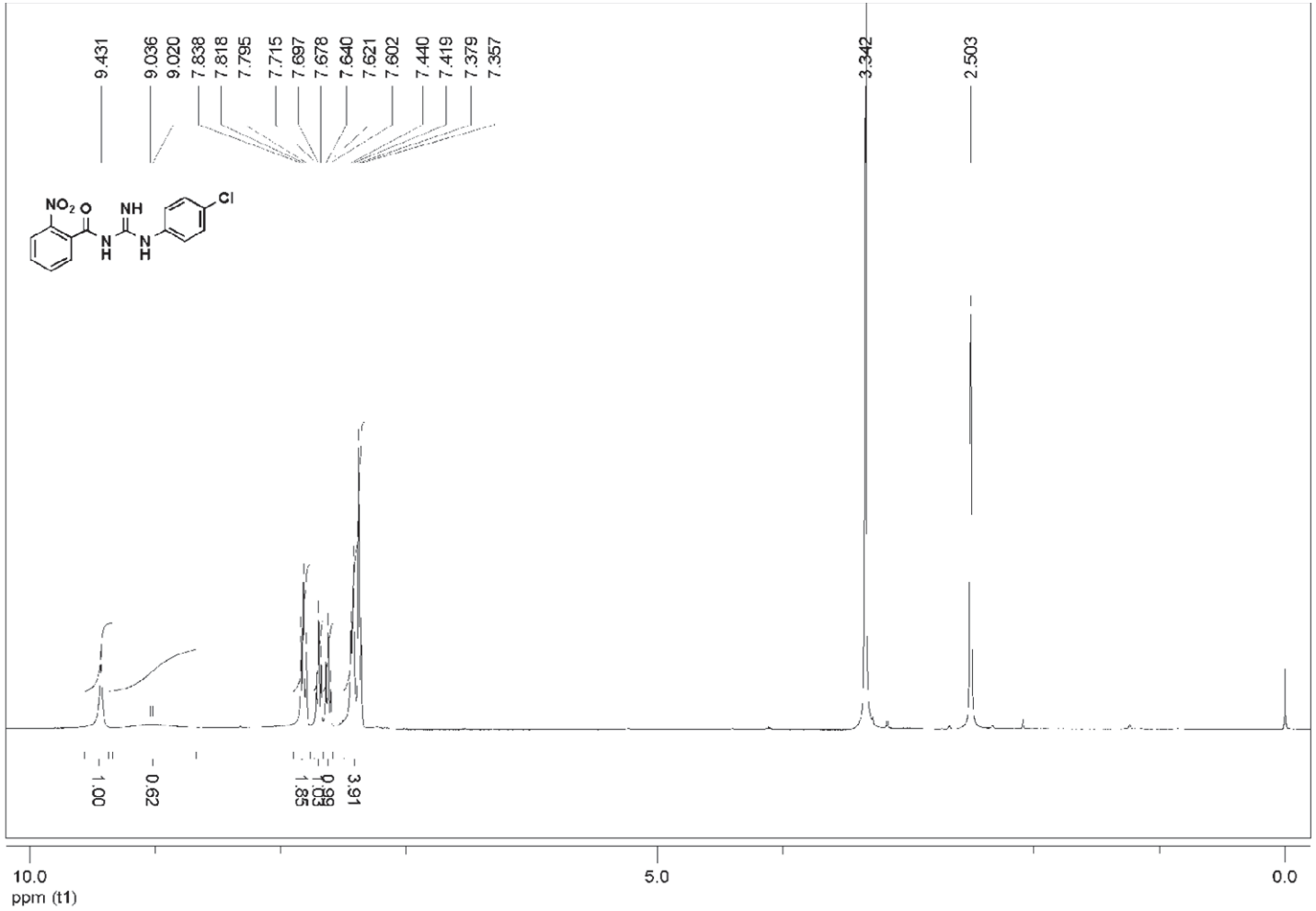
159.447
138.767
138.511
131.940
131.754
131.707
131.265
129.072
128.875
128.145
123.874
122.146
40.327
40.114
39.909
39.700
39.491
39.282
39.073
O
NH
N
H
N
H
200
180
160
140
120
100
80
60
40
20
ppm

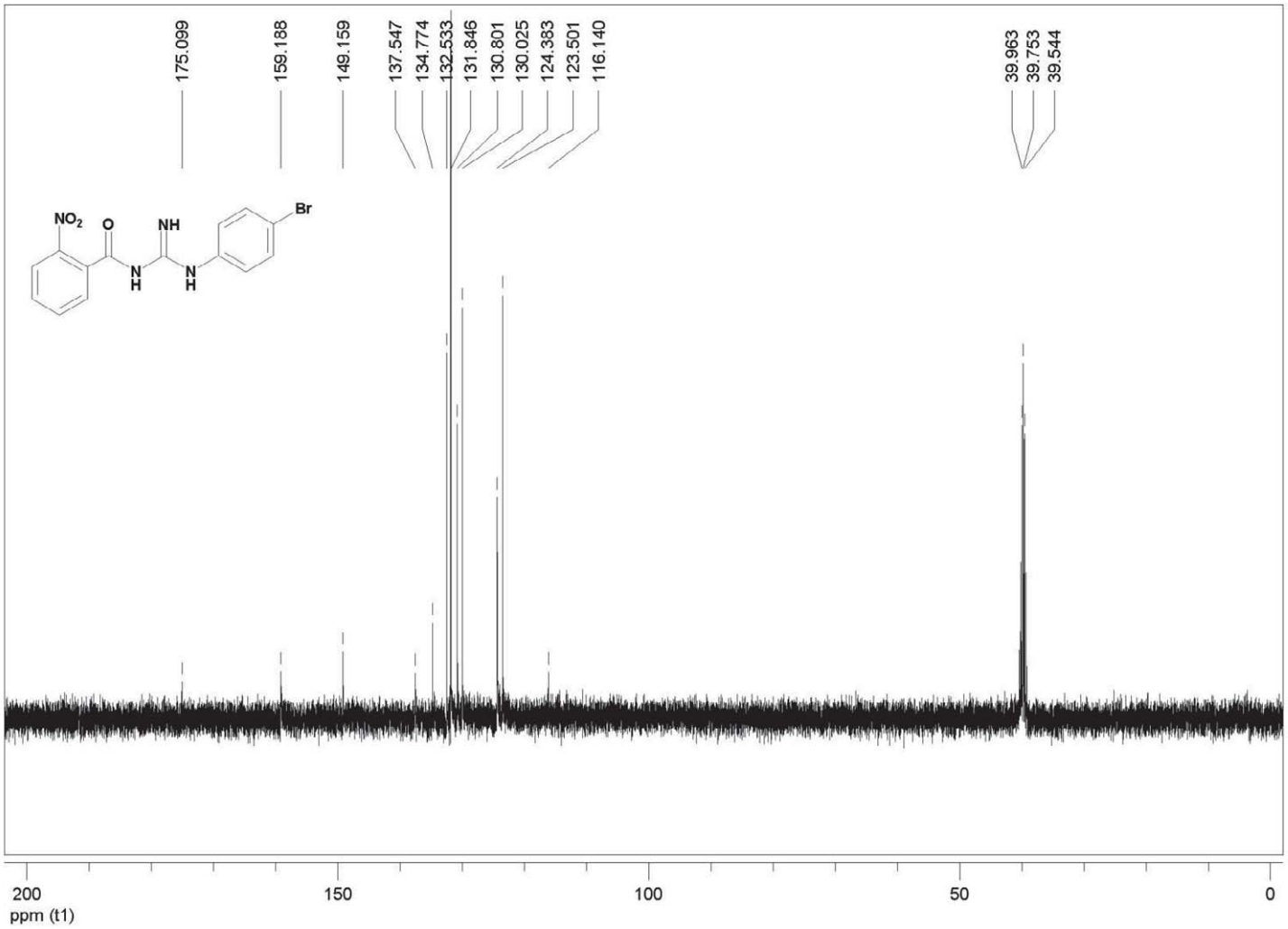
5ac-C


175.164
159.290
149.159
137.089
134.810
132.523
130.781
130.016
128.951
128.104
124.094
123.495
39.949
39.740
39.531
NO2
O
NH
Cl
N
H
N
H
200
150
100
50
0
ppm (t1)

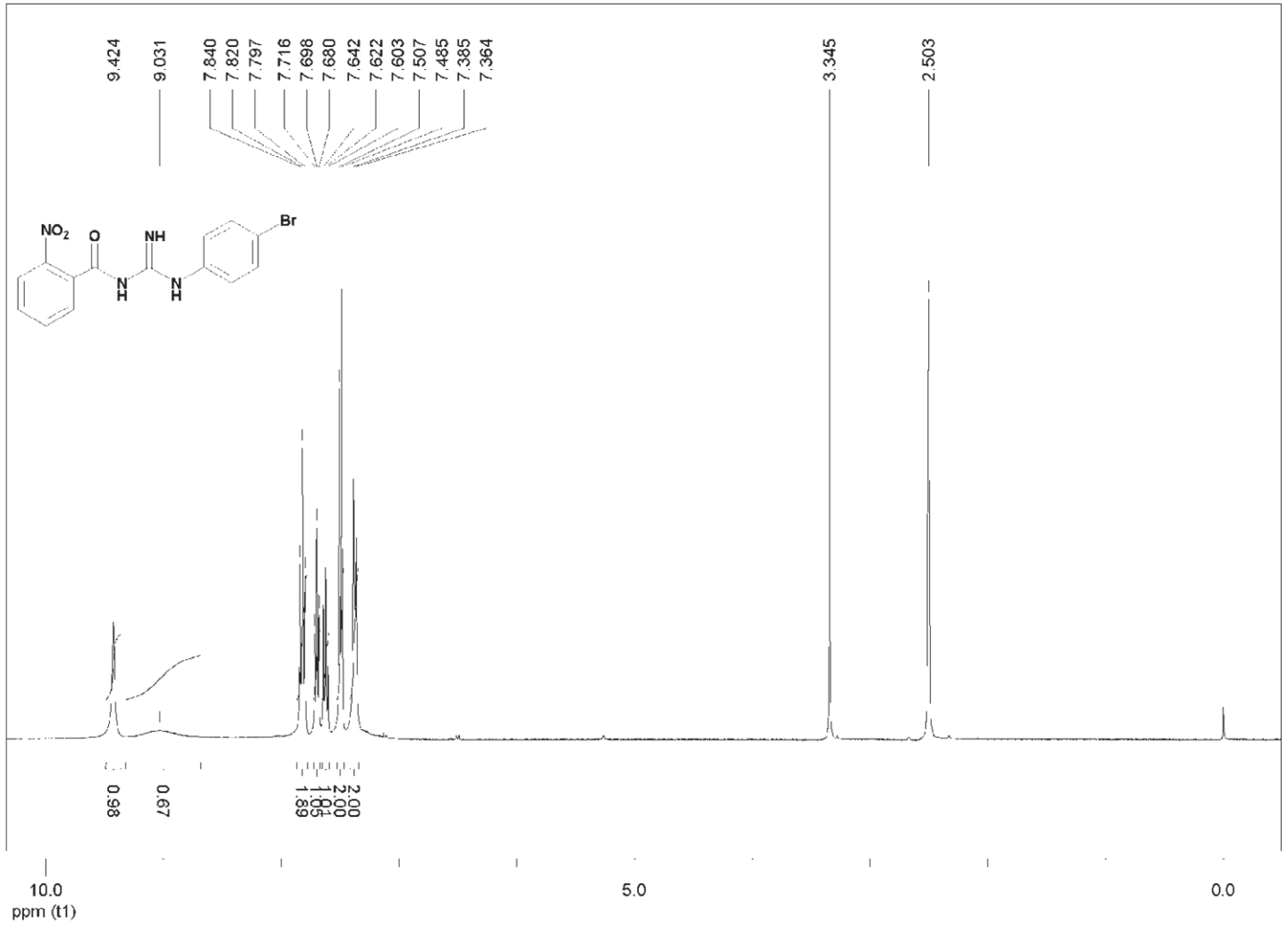
5ac-H


9.431
9.036
9.020
7.838
7.818
7.795
7.715
7.697
7.678
7.640
7.621
7.602
7.440
7.419
7.379
7.357
3.342
2.503
NO2
O
NH
N
H
N
H
Cl
1.00
0.62
1.85
0.99
1.03
0.88
3.91
10.0
5.0
0.0
ppm (t1)

5ad-C


175.099
159.188
149.159
137.547
134.774
132.533
131.846
130.801
130.025
124.383
123.501
116.140
39.963
39.753
39.544
NO2
O
NH
Br
N
H
N
H
200
150
100
50
0
ppm (t1)

5ad-H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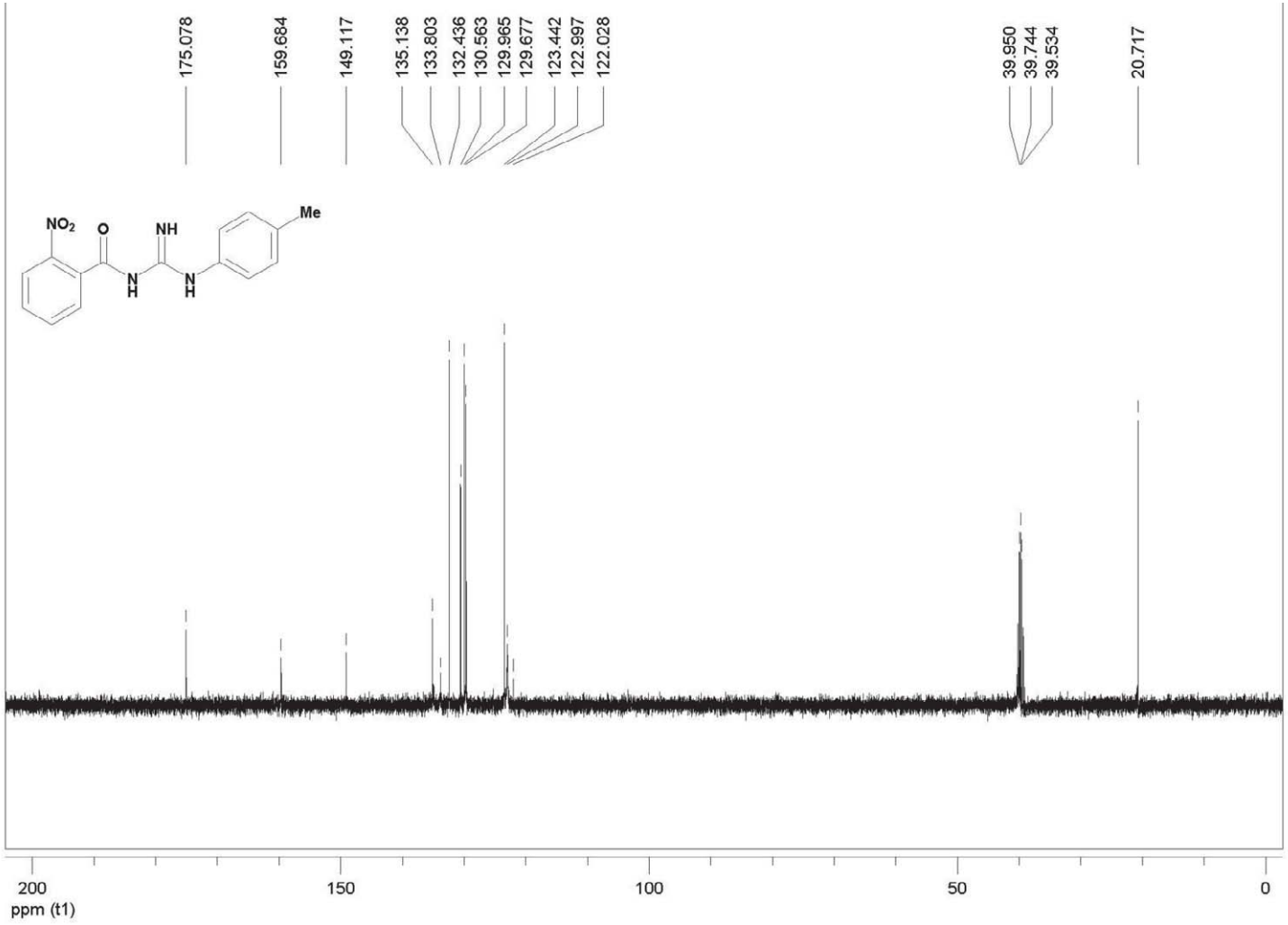
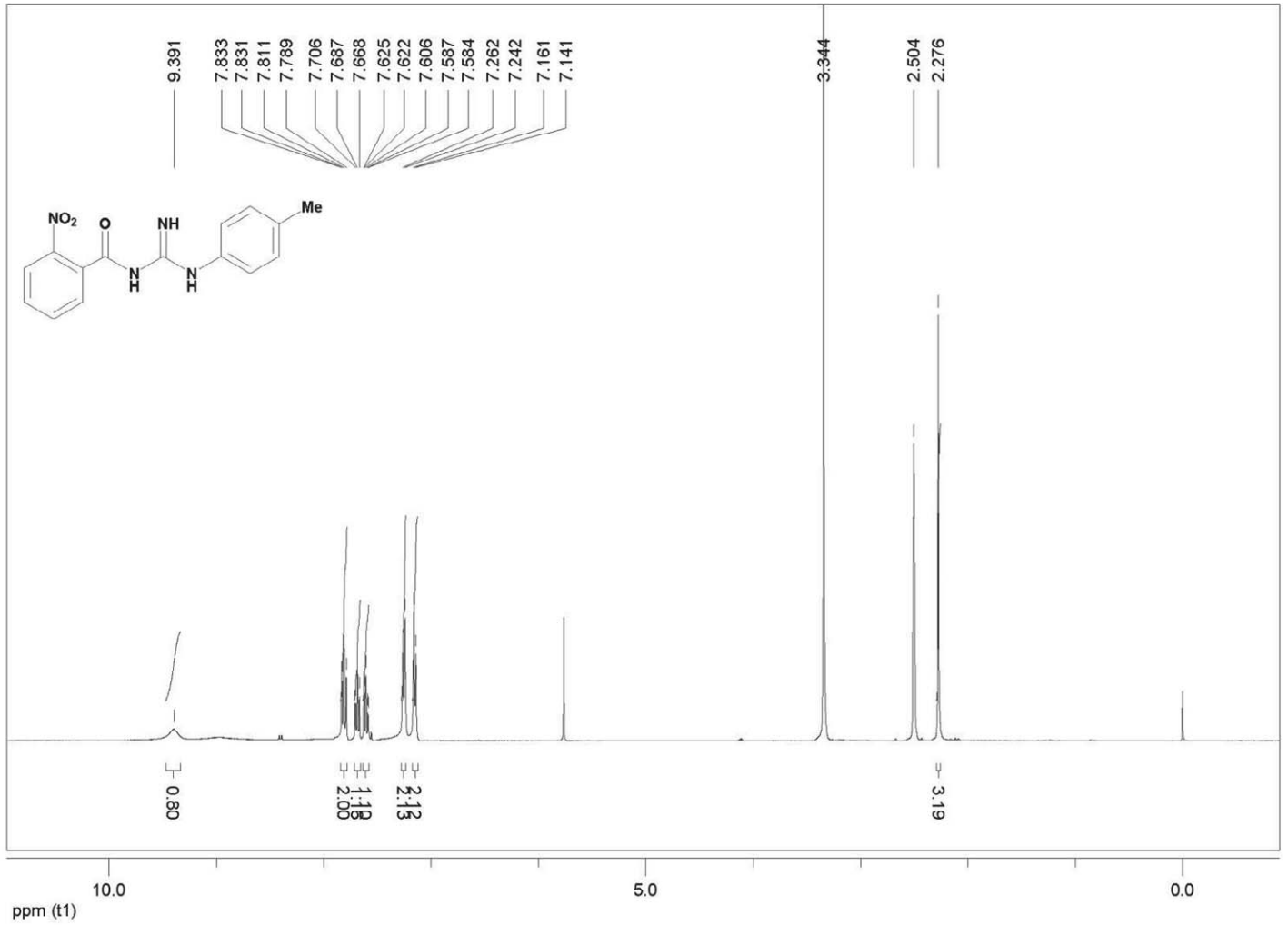
9.031
7.840
7.820
7.797
7.716
7.698
7.680
7.642
7.622
7.603
7.507
7.485
7.385
7.364
3.345
2.503
NO2
O
NH
Br
0.98
0.97
1.89
1.01
1.05
2.00
2.00
10.0
ppm (t1)
5.0
0.0

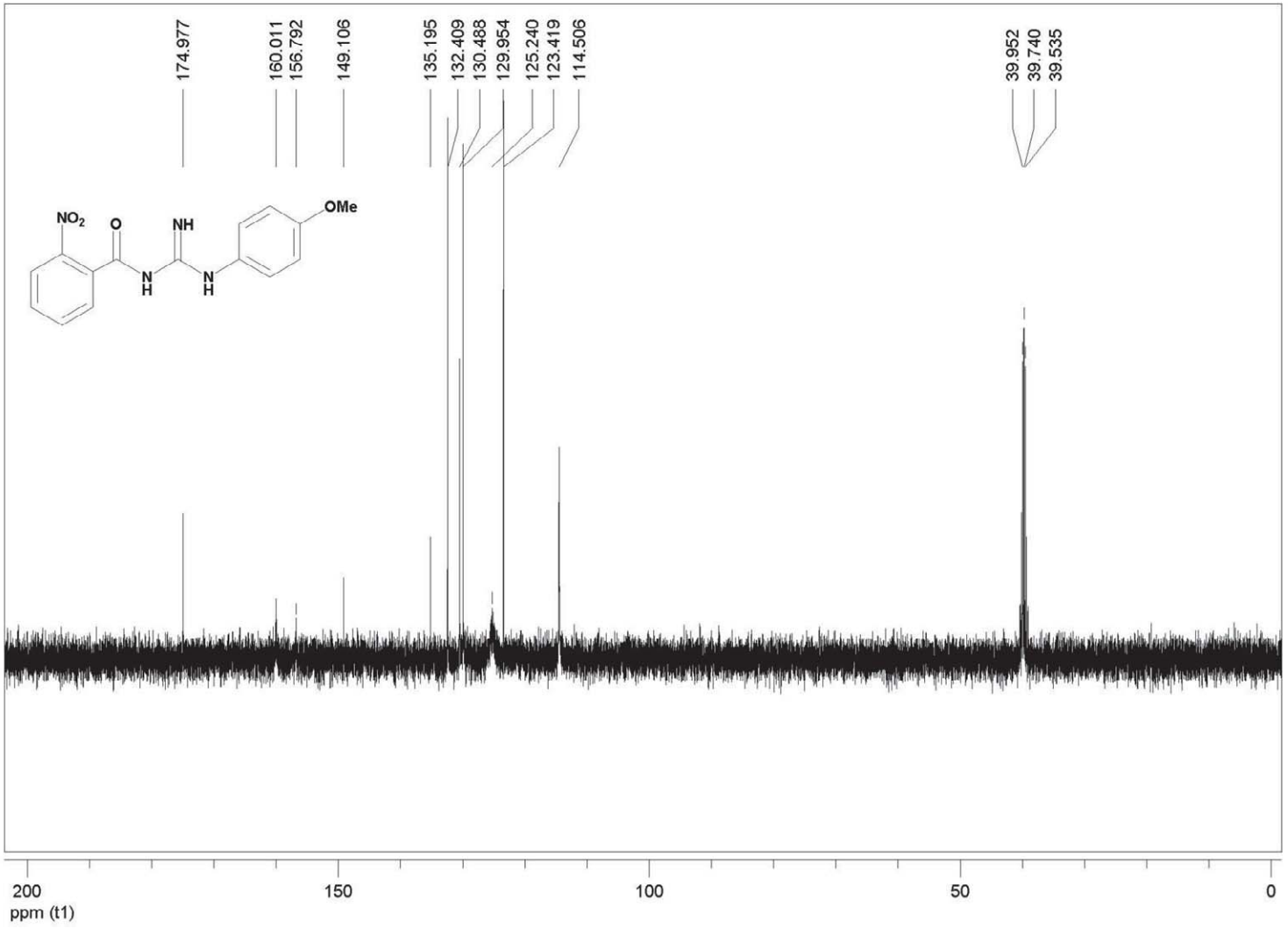
5ae-C


175.078
159.684
149.117
135.138
133.803
132.436
130.563
129.965
129.677
123.442
122.997
122.028
39.950
39.744
39.534
20.717
NO2
O
NH
Me
N
H
N
H
200
150
100
50
0
ppm (t1)

5ae-H


9.391
7.833
7.831
7.811
7.789
7.706
7.687
7.668
7.625
7.622
7.606
7.587
7.584
7.262
7.242
7.161
7.141
3.344
2.504
2.276
NO2
O
NH
Me
N
H
N
H
0.80
2.00
2.13
3.19
10.0
5.0
0.0
ppm (t1)

5af-C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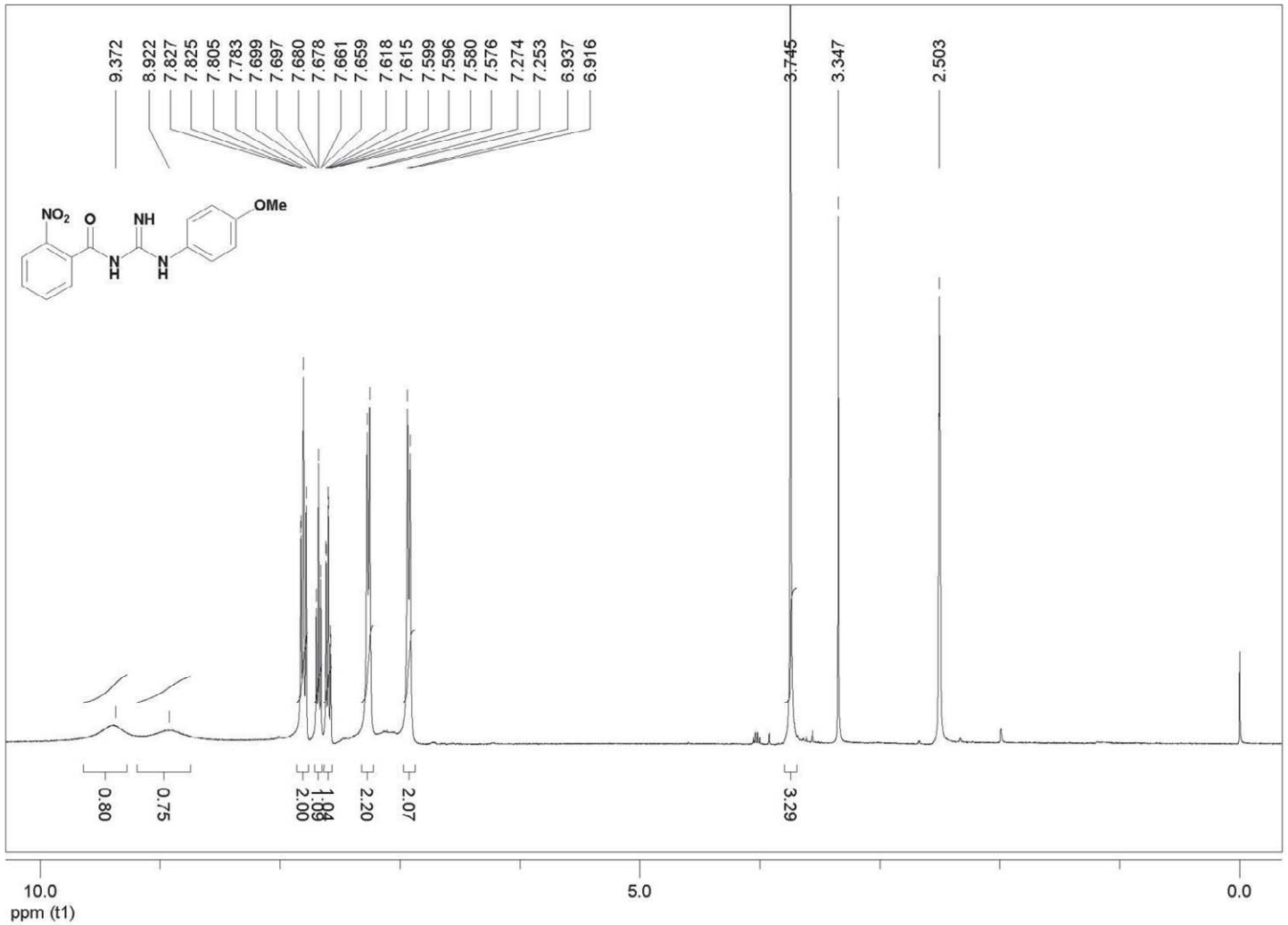
160.011
156.792
149.106
135.195
132.409
130.488
129.954
125.240
123.419
114.506
39.952
39.740
39.535
NO2
O
NH
OMe
N
H
N
H
200
150
100
50
0
ppm (t1)

5af-H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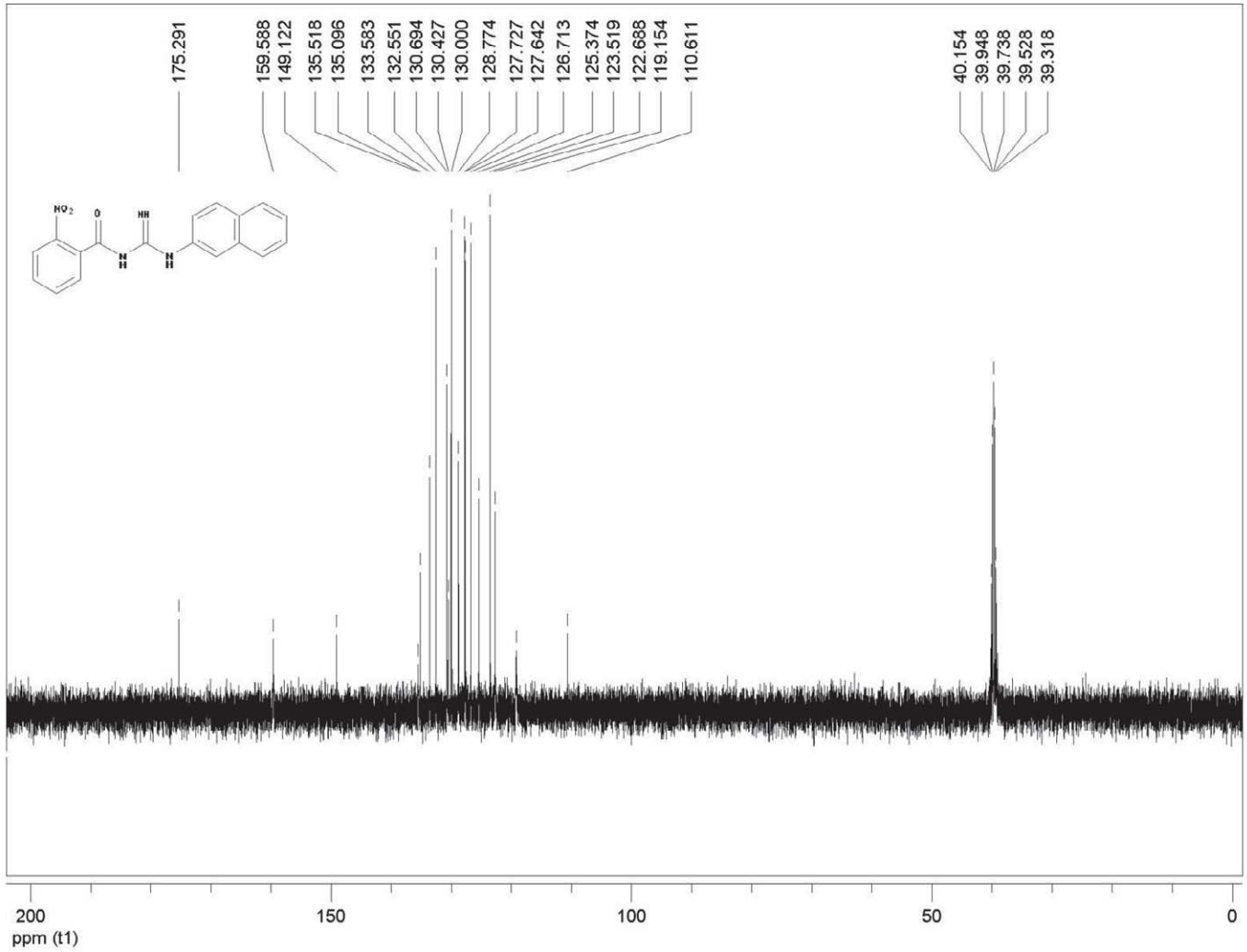
8.922
7.827
7.825
7.805
7.783
7.699
7.697
7.680
7.678
7.661
7.659
7.618
7.615
7.599
7.596
7.580
7.576
7.274
7.253
6.937
6.916
3.745
3.347
2.503
NO2
O
NH
OMe
0.80
0.75
2.00
2.20
2.07
3.29
10.0
ppm (t1)
5.0
0.0

5ag-C


175.291
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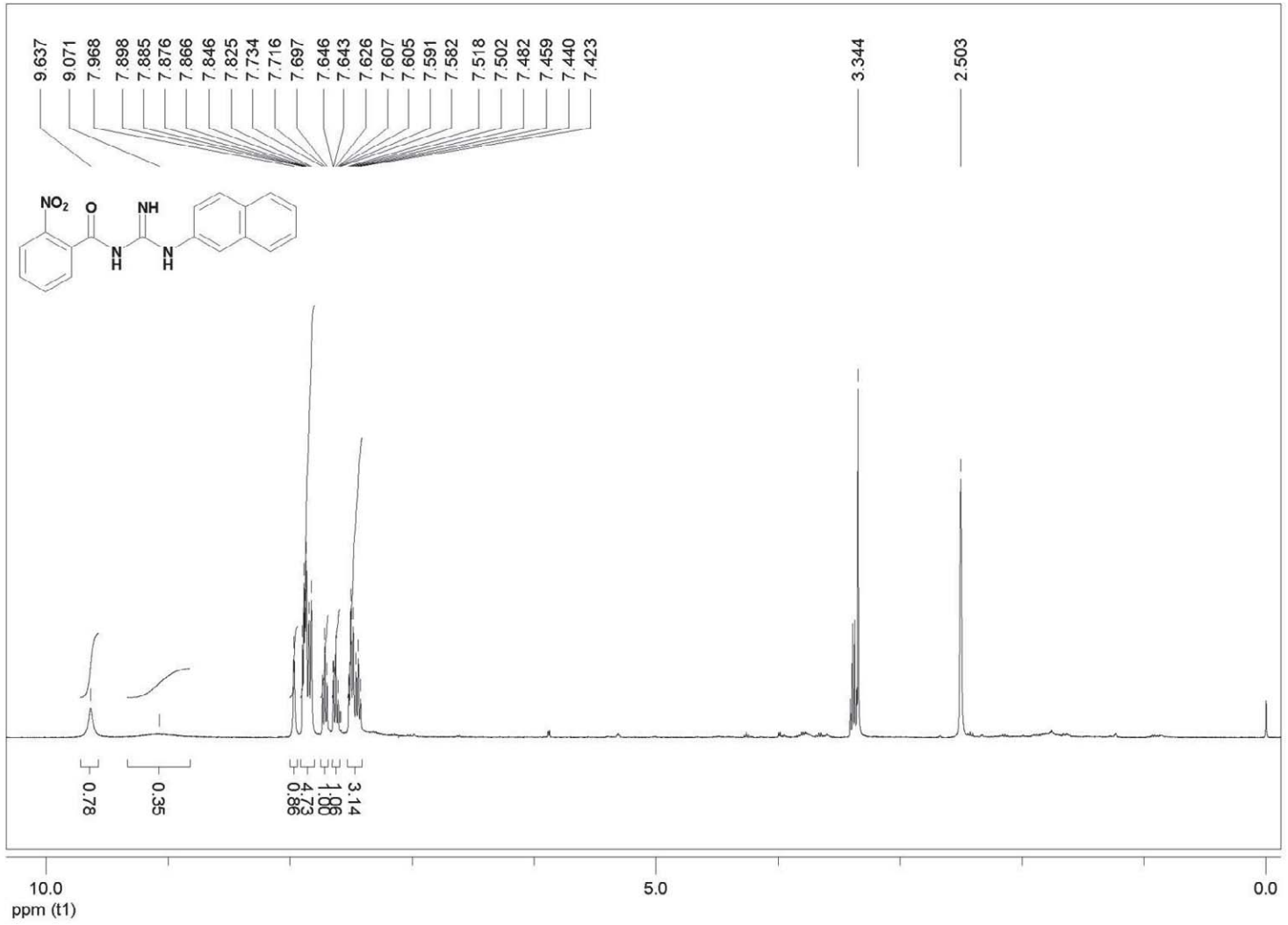
149.122
135.518
135.096
133.583
132.551
130.694
130.427
130.000
128.774
127.727
127.642
126.713
125.374
123.519
122.688
119.154
110.611
40.154
39.948
39.738
39.528
39.318
200
150
100
50
0
ppm (t1)

5ag-H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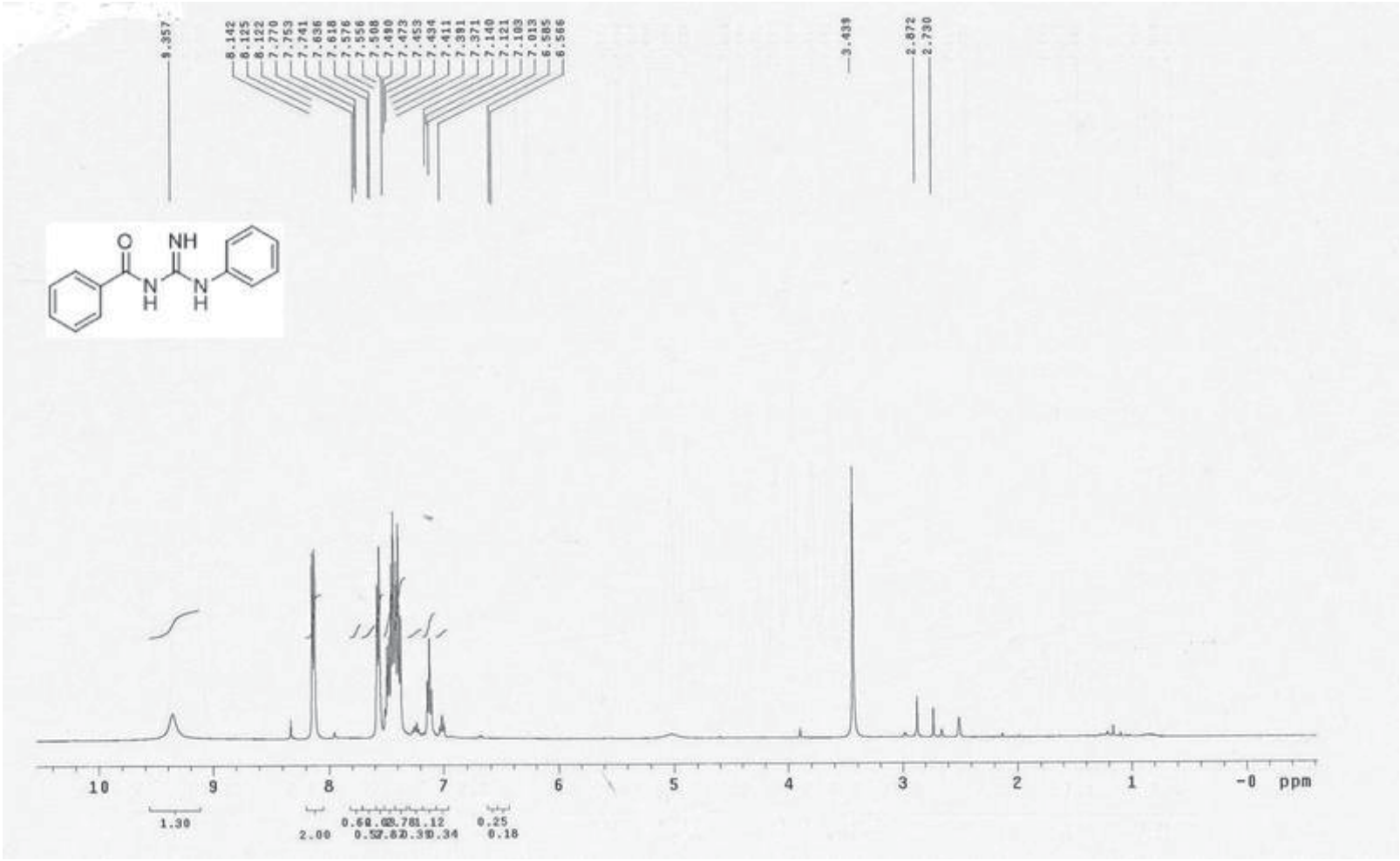
7.968
7.898
7.885
7.876
7.866
7.846
7.825
7.734
7.716
7.697
7.646
7.643
7.626
7.607
7.605
7.591
7.582
7.518
7.502
7.482
7.459
7.440
7.423
3.344
2.503
NO2
O
NH
N
H
N
H
0.78
0.35
0.86
4.73
1.00
1.06
3.14
10.0
ppm (t1)
5.0
0.0

5a-H


9.357
8.142
8.125
8.122
7.770
7.753
7.741
7.636
7.618
7.576
7.556
7.508
7.480
7.473
7.453
7.434
7.411
7.381
7.371
7.140
7.121
7.103
7.013
6.585
6.566
3.439
2.872
2.730
O
NH
N
H
N
H
10
9
8
7
6
5
4
3
2
1
-0
ppm
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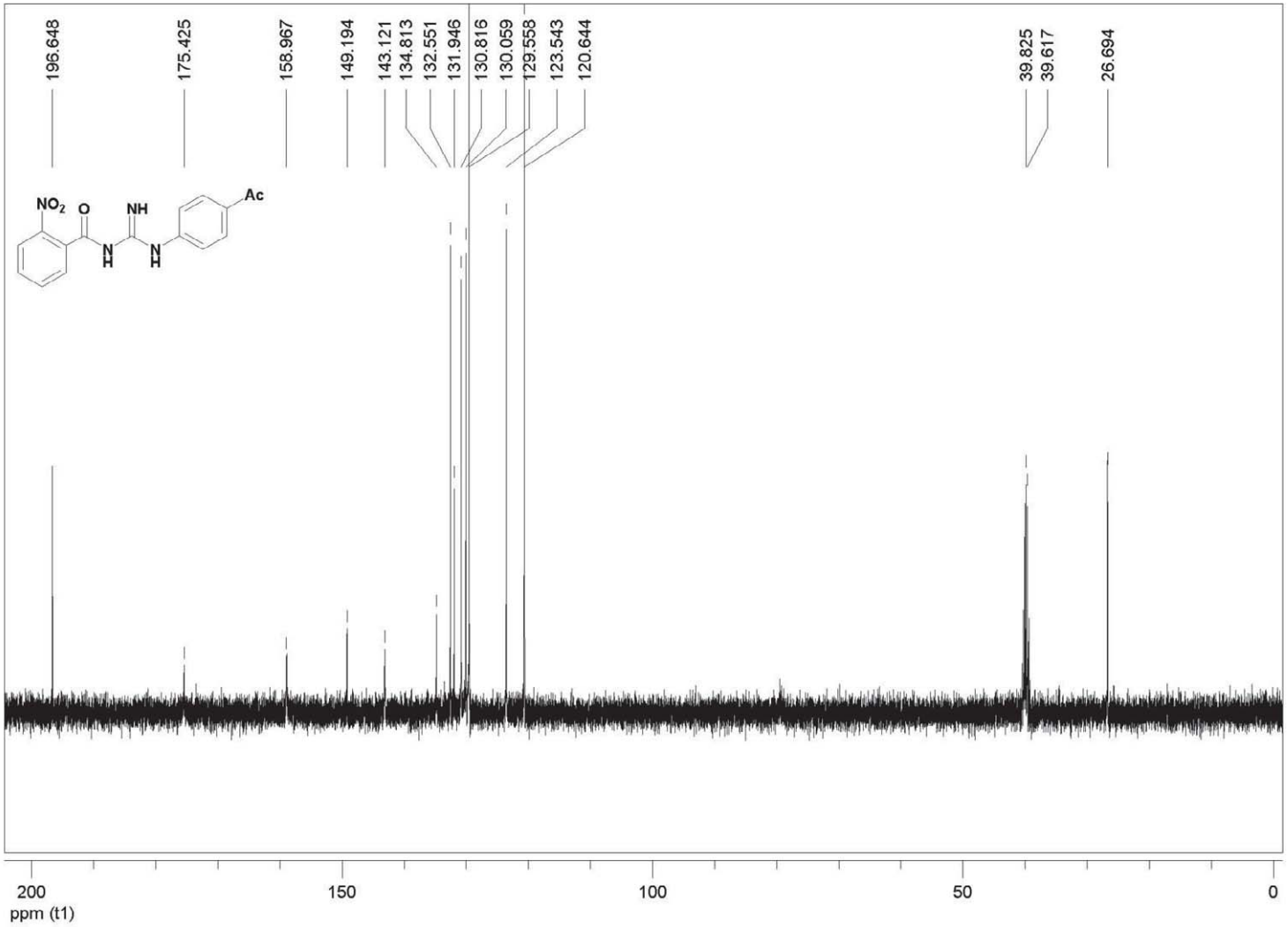
2.00
0.25
0.18

5ah-C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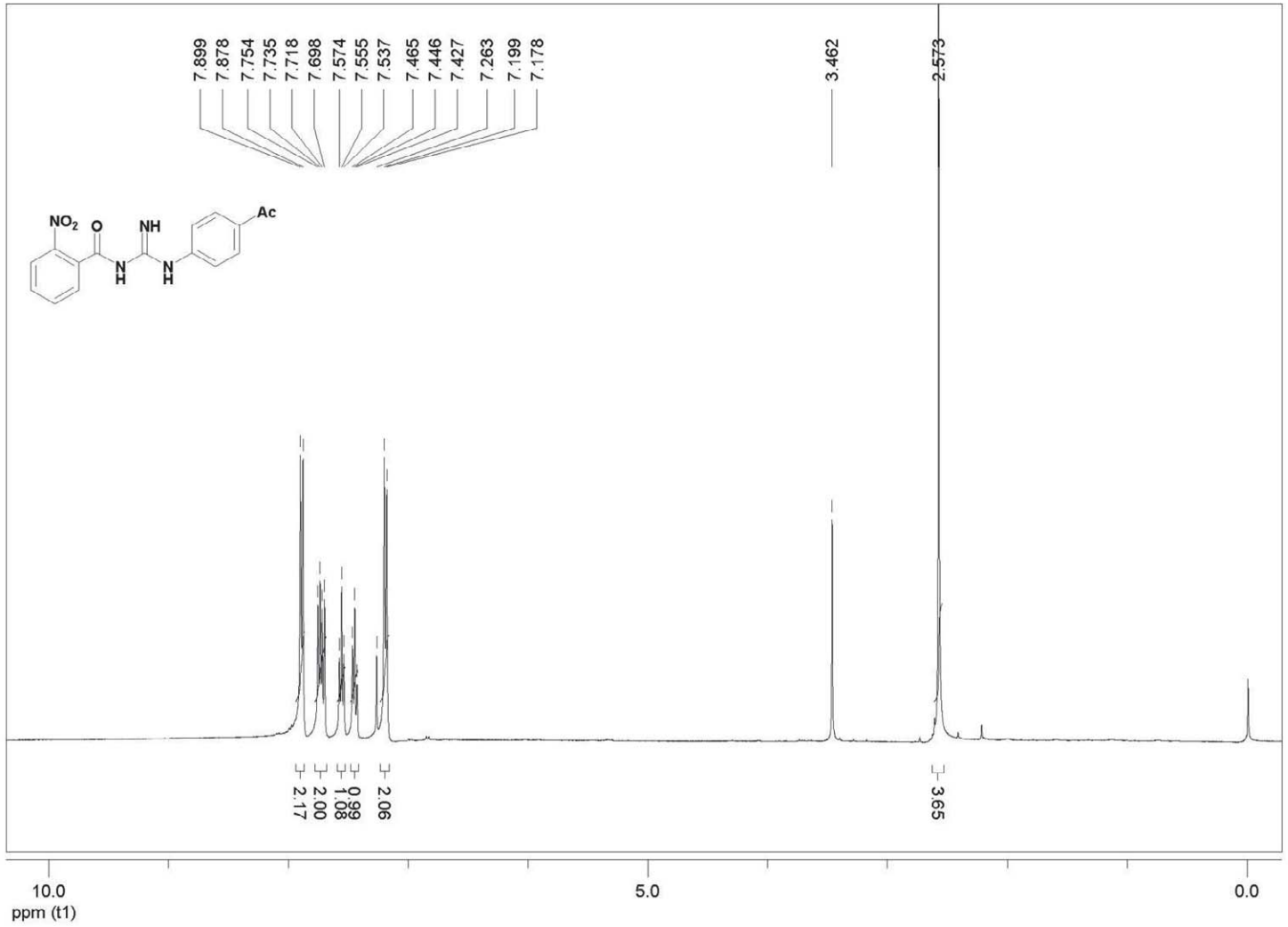
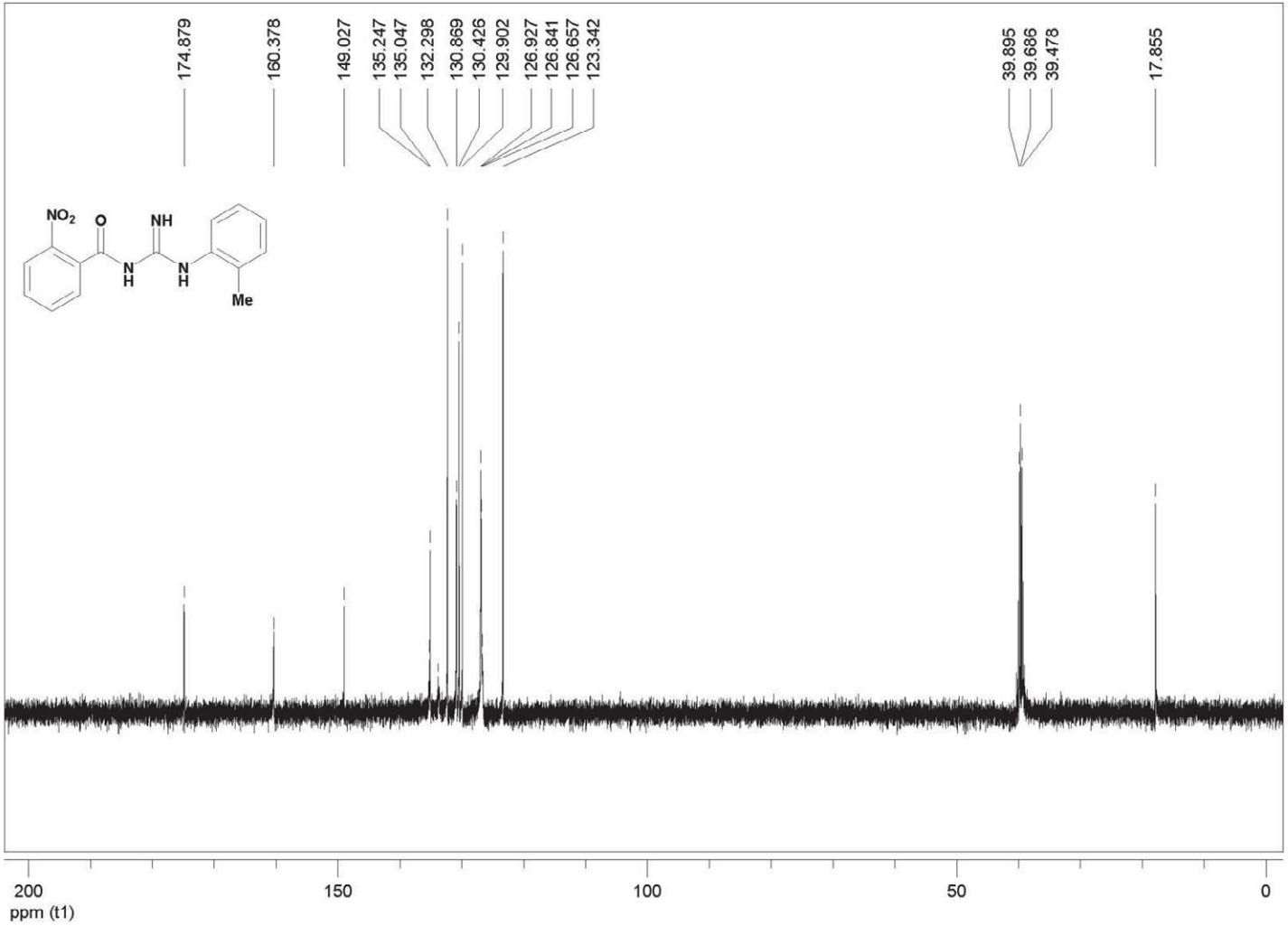
175.425
158.967
149.194
143.121
134.813
132.551
131.946
130.816
130.059
129.558
123.543
120.644
39.825
39.617
26.694
NO2
O
NH
Ac
200
150
100
50
0
ppm (t1)

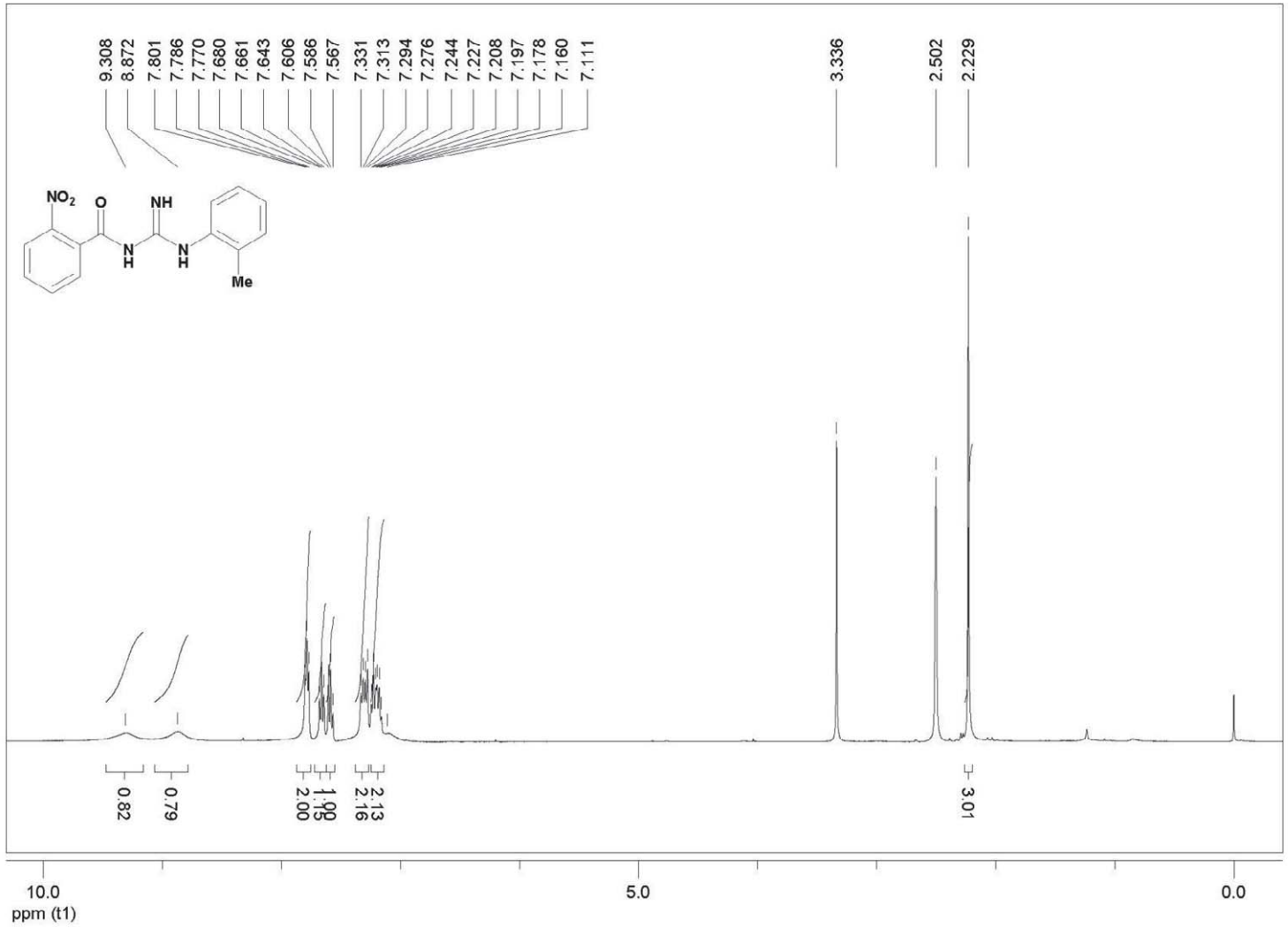
5ah-H


7.899
7.878
7.754
7.735
7.718
7.698
7.574
7.555
7.537
7.465
7.446
7.427
7.263
7.199
7.178
3.462
2.573
NO2
O
NH
Ac
N
H
N
H
2.17
2.00
1.08
0.99
2.06
3.65
10.0
ppm (t1)
5.0
0.0

5ai-C


174.879
160.378
149.027
135.247
135.047
132.298
130.869
130.426
129.902
126.927
126.841
126.657
123.342
39.895
39.686
39.478
17.855
NO2
O
NH
N
H
N
H
Me
200
150
100
50
0
ppm (t1)

5ai-H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7.770
7.680
7.661
7.643
7.606
7.586
7.567
7.331
7.313
7.294
7.276
7.244
7.227
7.208
7.197
7.178
7.160
7.111
3.336
2.502
2.229
NO2
O
NH
N
H
N
H
Me
0.82
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1.99
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10.0
ppm (t1)
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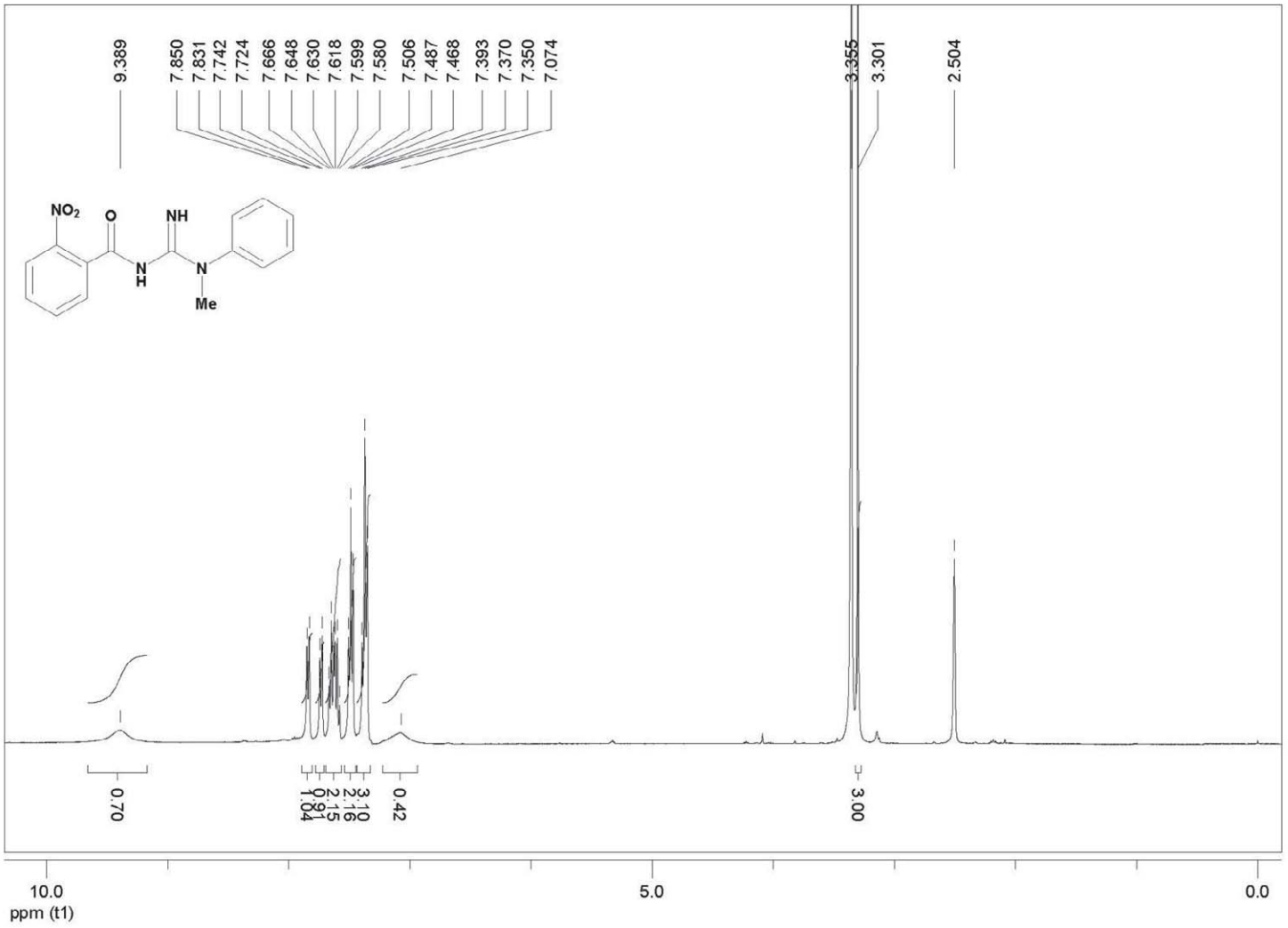
5aj-H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7.630
7.618
7.599
7.580
7.506
7.487
7.468
7.393
7.370
7.350
7.074
3.355
3.301
2.504
NO2
O
NH
N
H
N
Me
0.70
1.04
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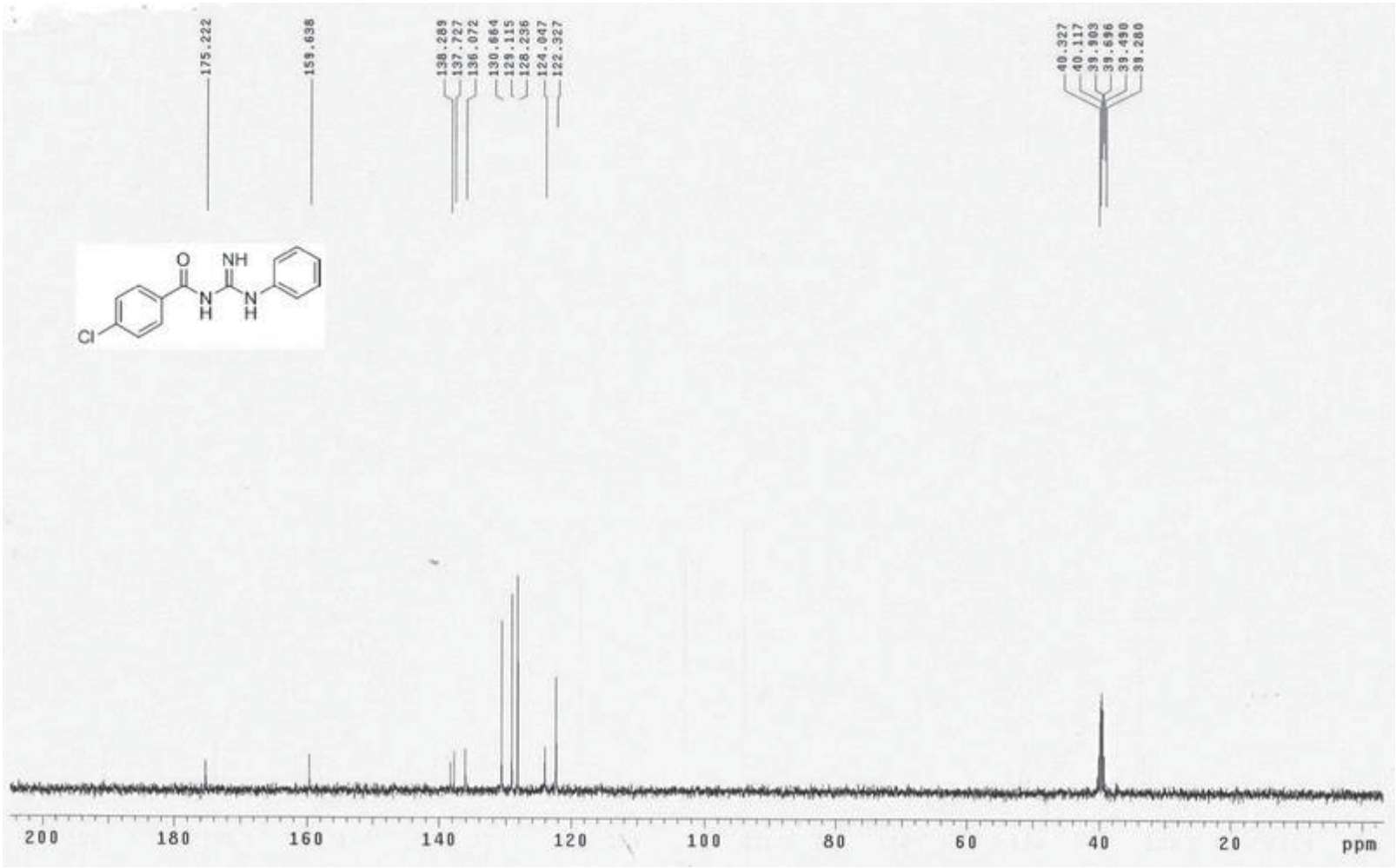
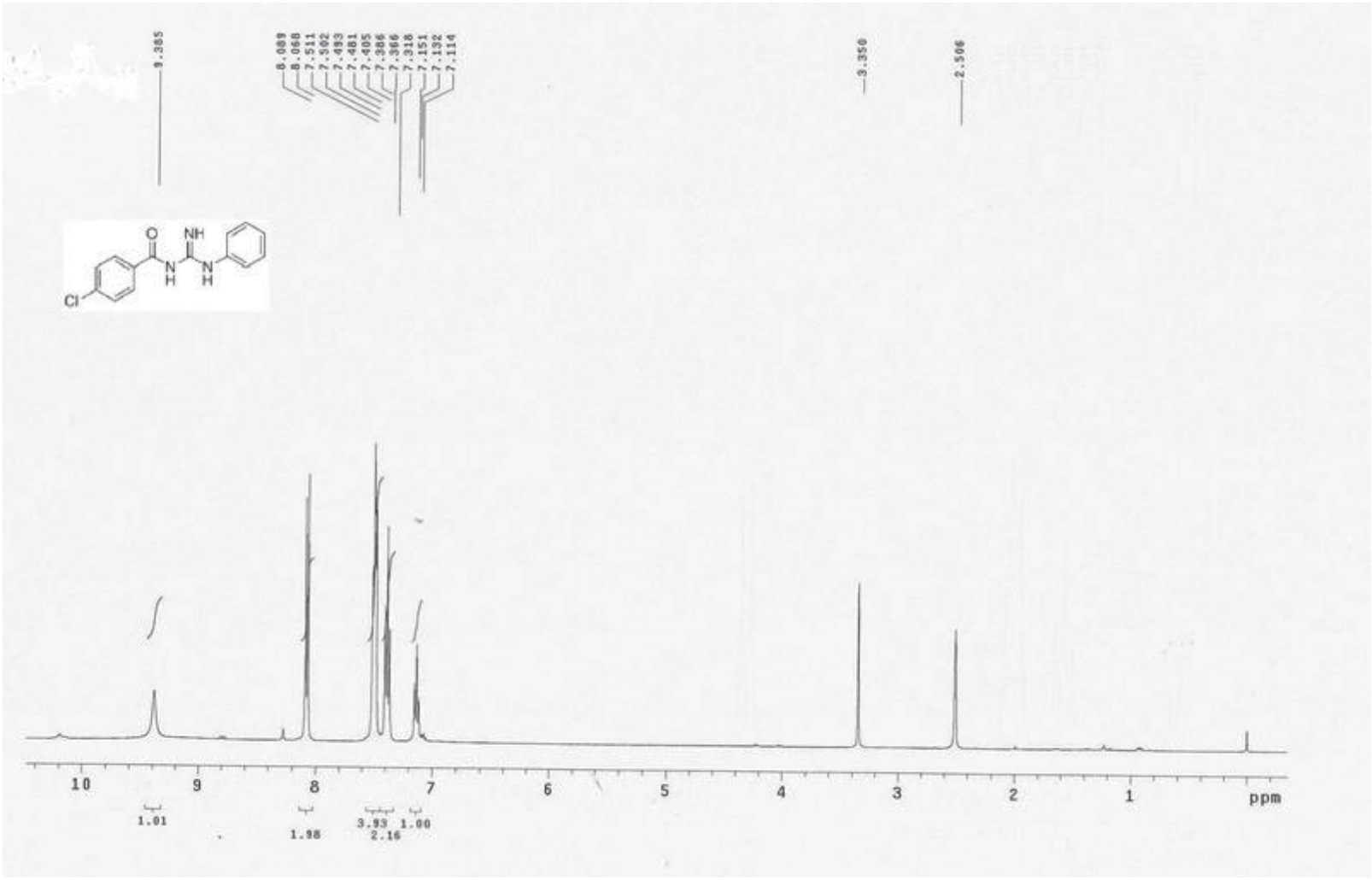
5b-C


175.222
159.638
138.289
137.727
136.072
130.664
129.115
128.236
124.047
122.327
40.327
40.117
39.903
39.696
39.490
39.280
O
NH
N
H
N
H
Cl
200
180
160
140
120
100
80
60
40
20
ppm

5b-H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7.386
7.366
7.318
7.151
7.132
7.114
3.350
2.506
O
NH
N
H
N
H
Cl
10
9
8
7
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5
4
3
2
1
ppm
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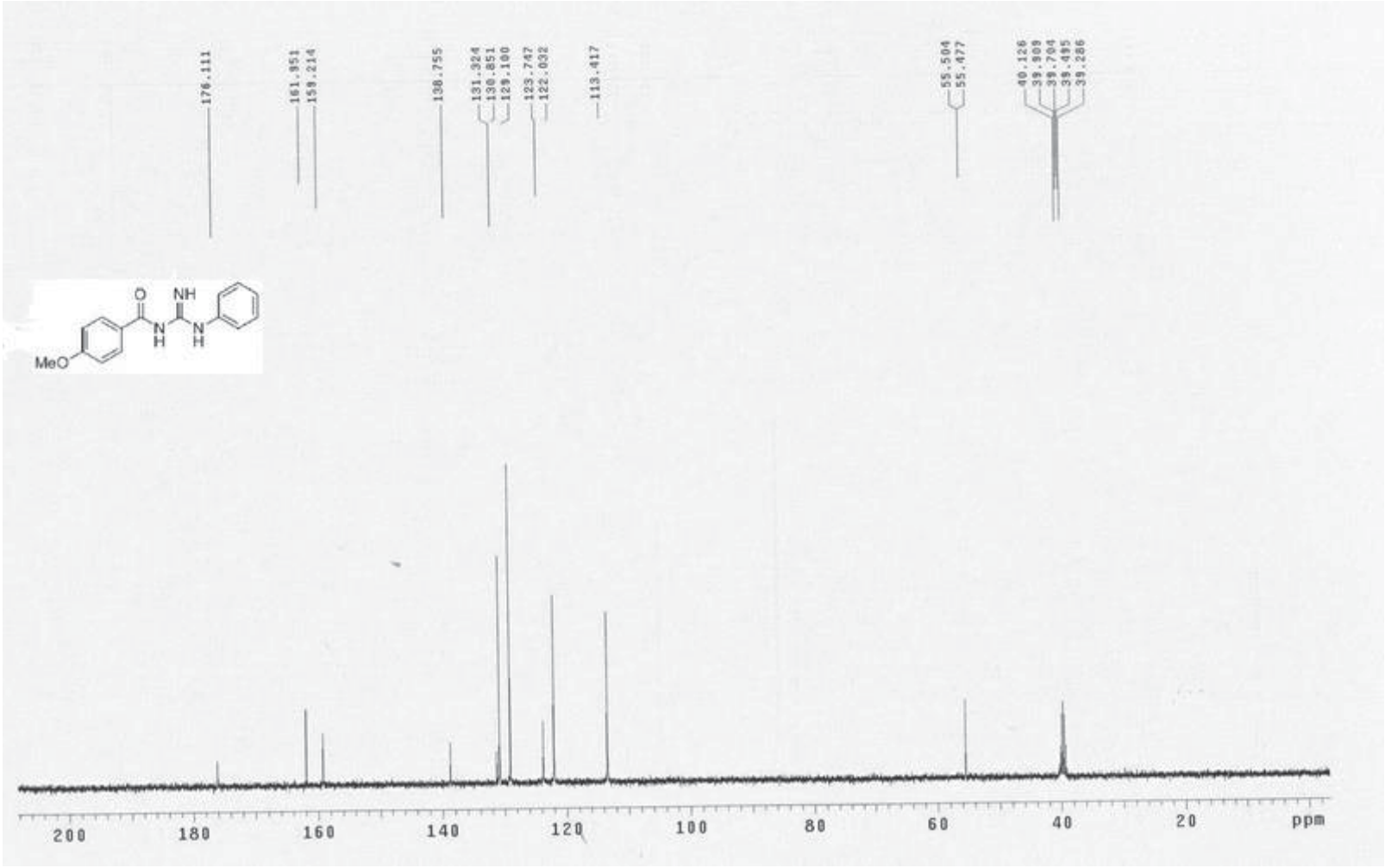
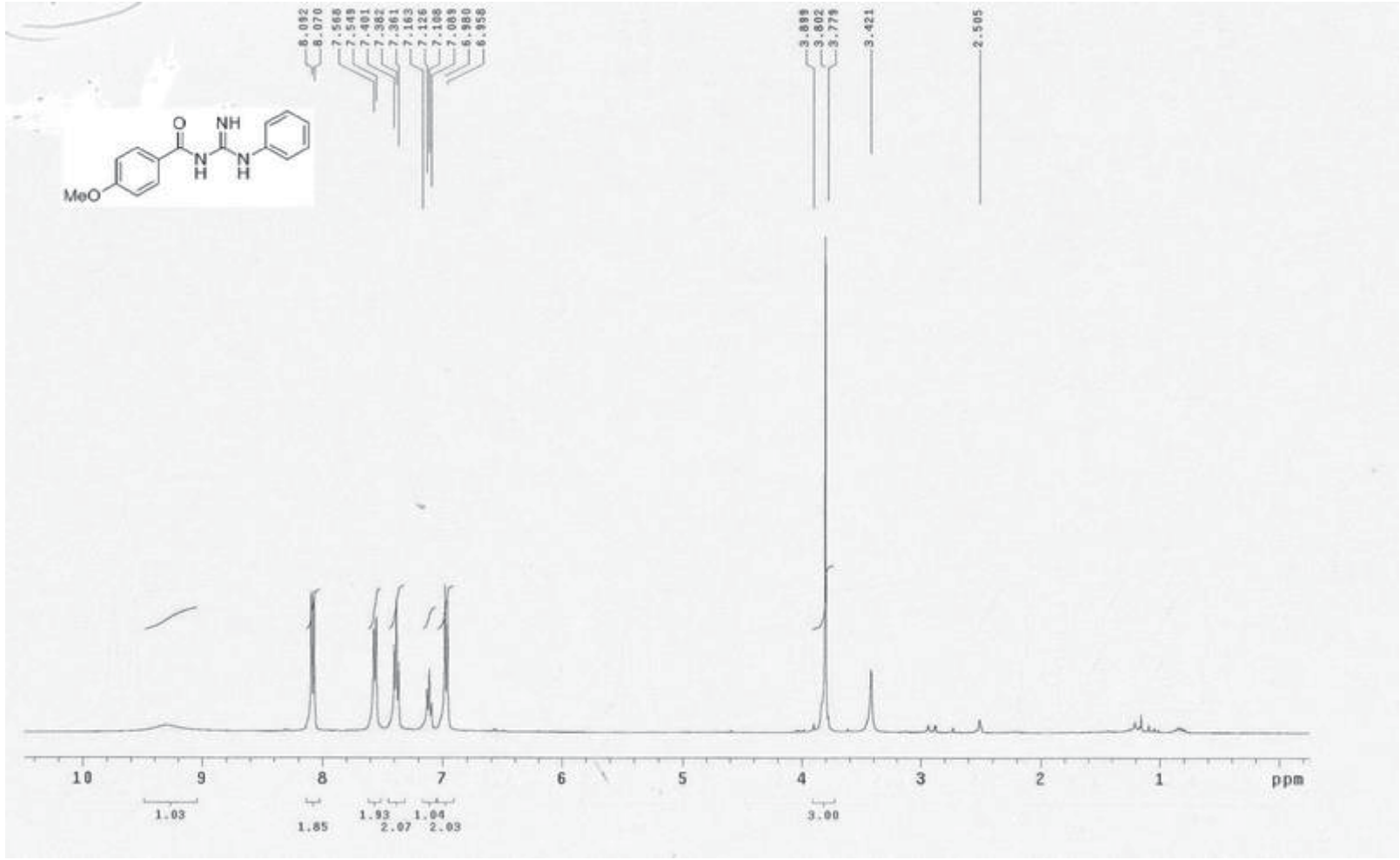
2.16
1.00

5c-C


176.111
161.951
159.214
138.755
131.324
130.851
129.100
123.747
122.032
113.417
55.504
55.477
40.126
39.909
39.704
39.495
39.286
O
NH
N
N
MeO
200
180
160
140
120
100
80
60
40
20
ppm

5c-H


8.092
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7.401
7.382
7.361
7.163
7.126
7.108
7.089
6.980
6.958
3.889
3.802
3.779
3.421
2.505
O
NH
N
H
N
H
MeO
10
9
8
7
6
5
4
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2
1
ppm
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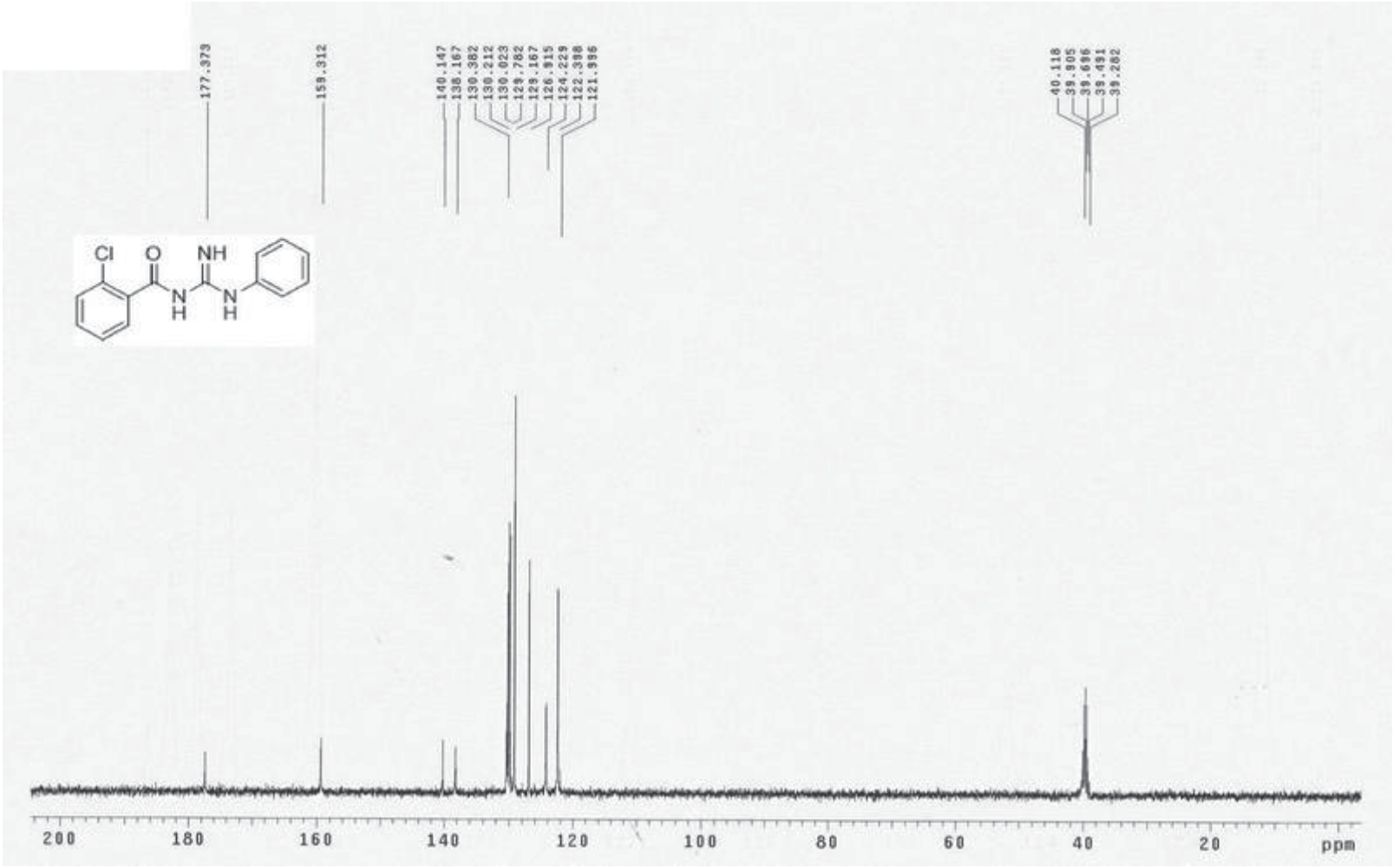
1.04
2.03
3.00

5d-C


177.373
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130.382
130.212
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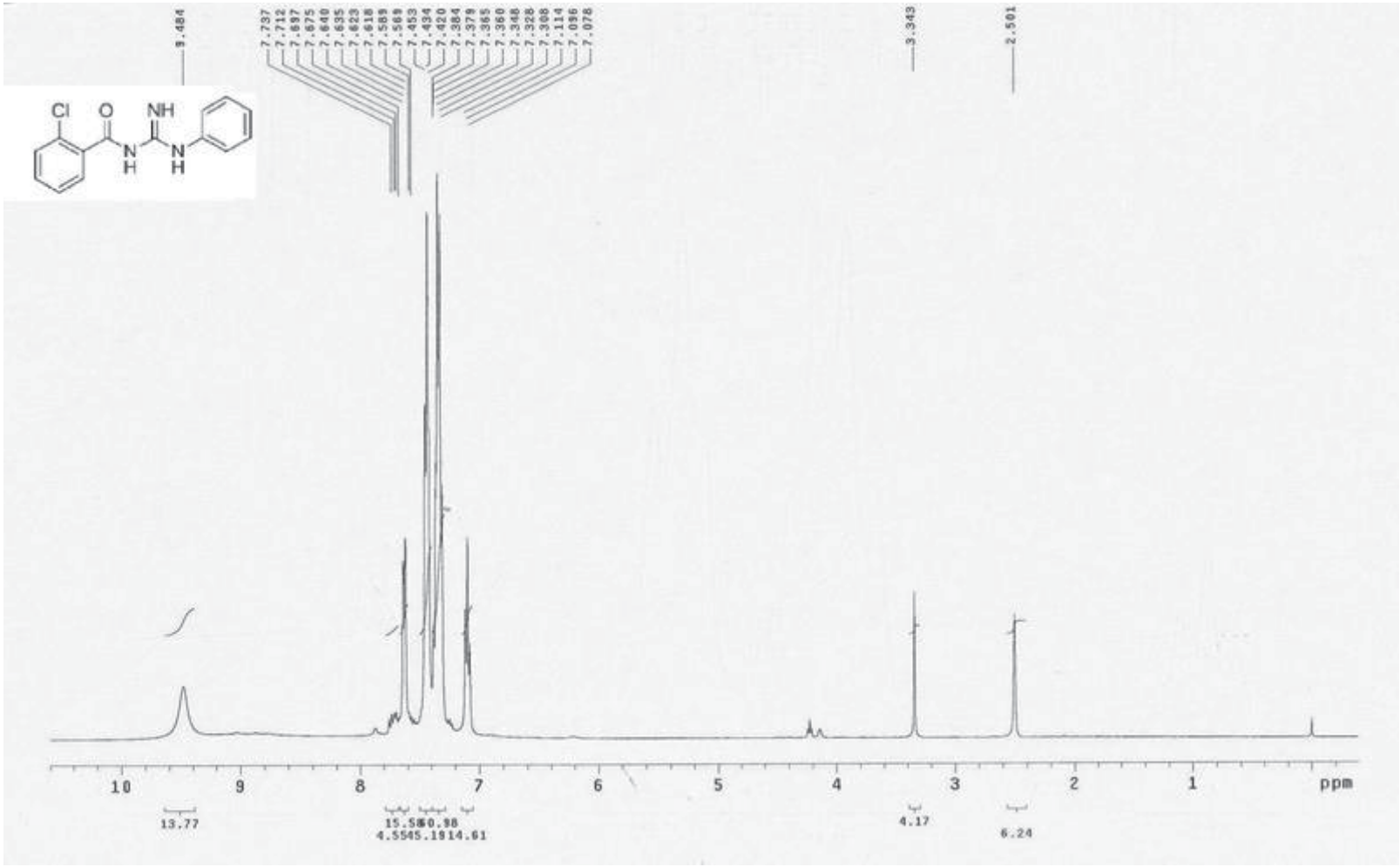
129.782
129.167
126.915
124.229
122.398
121.996
40.118
39.905
39.696
39.491
39.282
Cl
O
NH
N
H
N
H
200
180
160
140
120
100
80
60
40
20
ppm

5d-H


9.484
7.737
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7.697
7.675
7.640
7.635
7.623
7.618
7.569
7.569
7.453
7.434
7.420
7.384
7.379
7.365
7.360
7.348
7.328
7.308
7.114
7.096
7.078
3.343
2.501
Cl
O
NH
N
H
N
H
10
9
8
7
6
5
4
3
2
1
ppm
13.77
15.58
0.98
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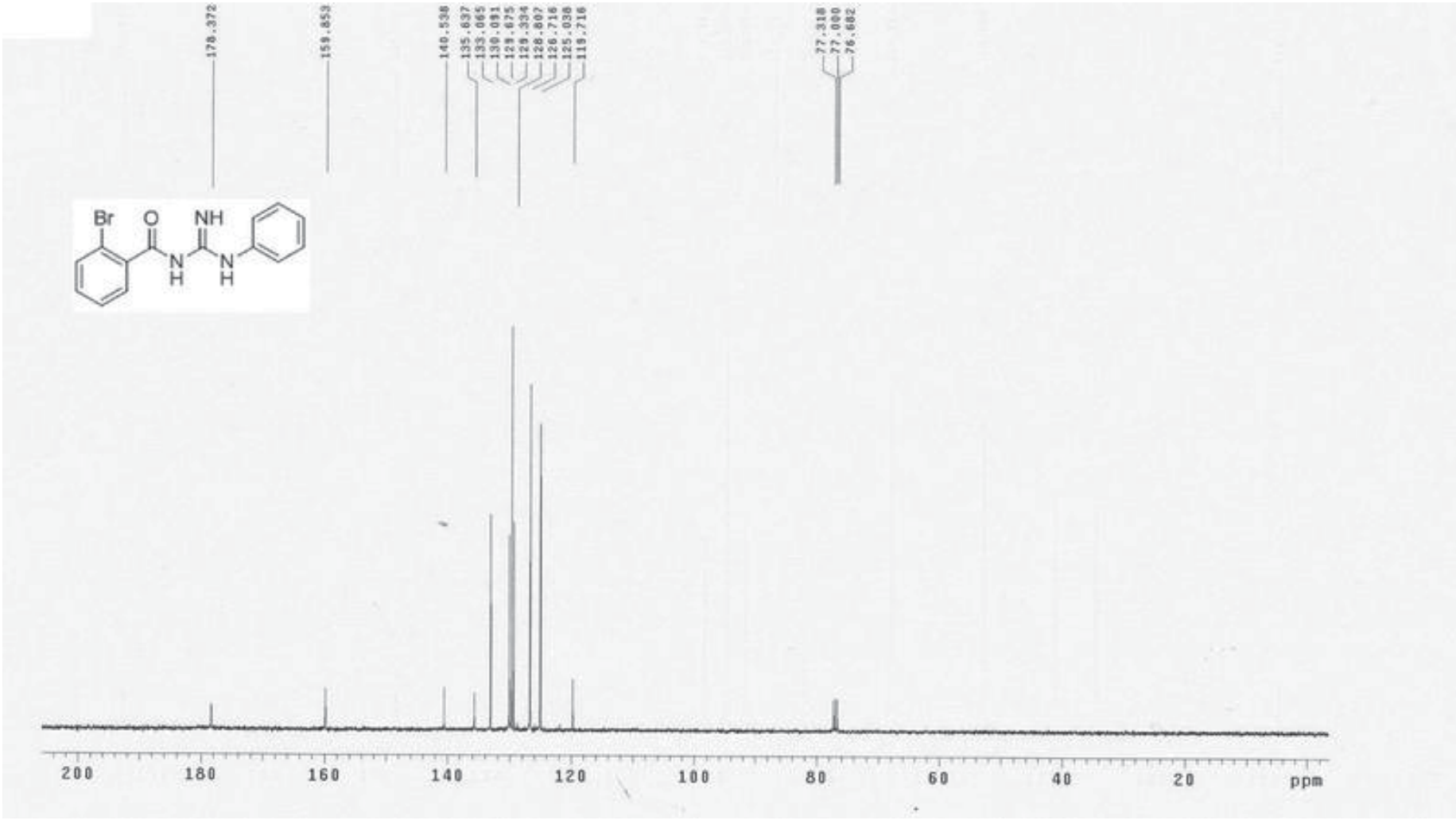
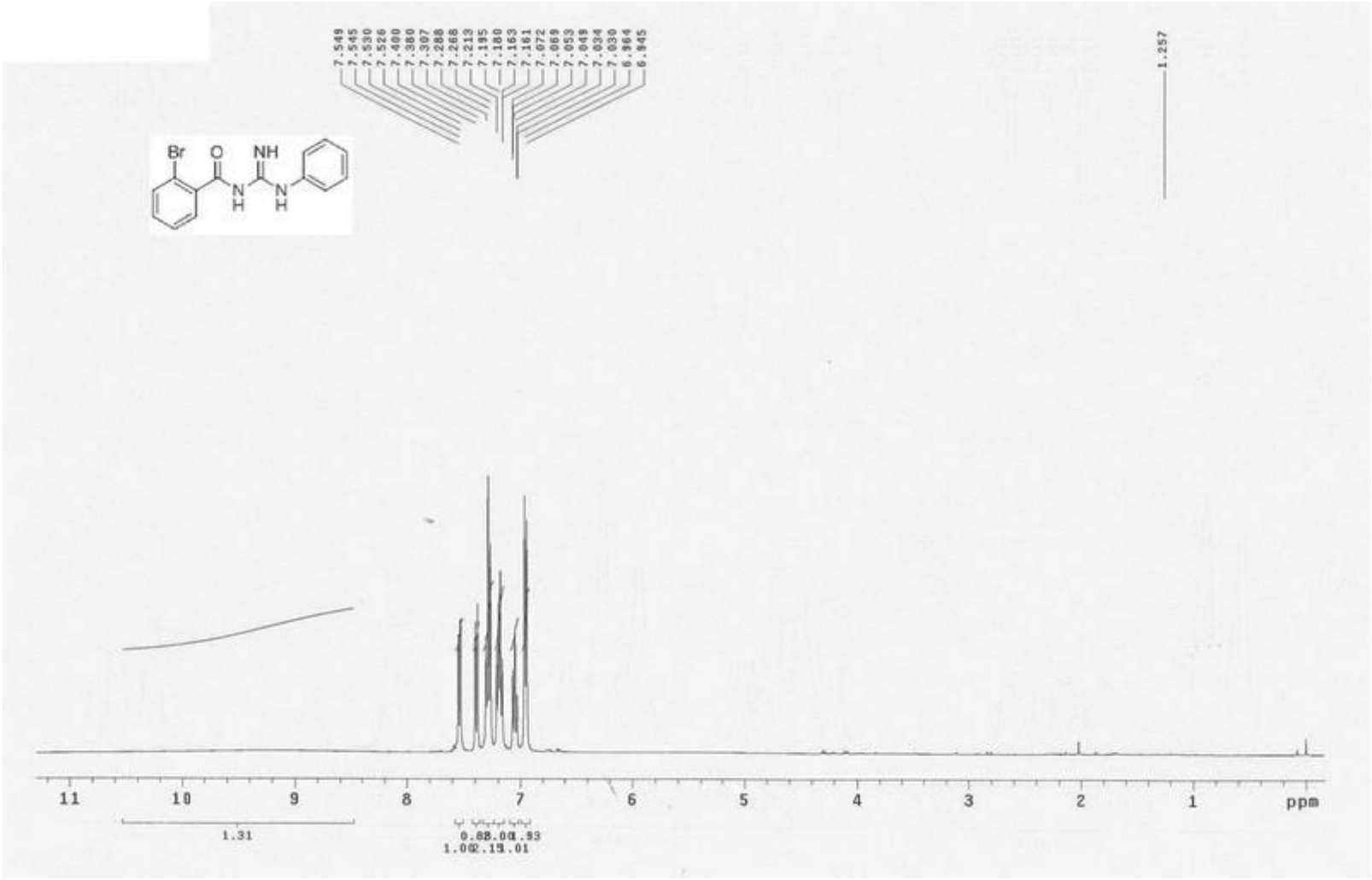
45.19
14.61
4.17
6.24

5e-C


178.372
159.853
140.538
135.637
133.065
130.091
129.675
129.334
128.807
126.716
125.038
119.716
77.318
77.000
76.682
Br
O
NH
N
H
N
H
200
180
160
140
120
100
80
60
40
20
ppm

5e-H


7.549
7.545
7.530
7.526
7.400
7.380
7.307
7.288
7.268
7.213
7.195
7.180
7.163
7.161
7.072
7.069
7.053
7.049
7.034
7.030
6.964
6.945
1.257
Br
O
NH
N
H
N
H
11
10
9
8
7
6
5
4
3
2
1
ppm
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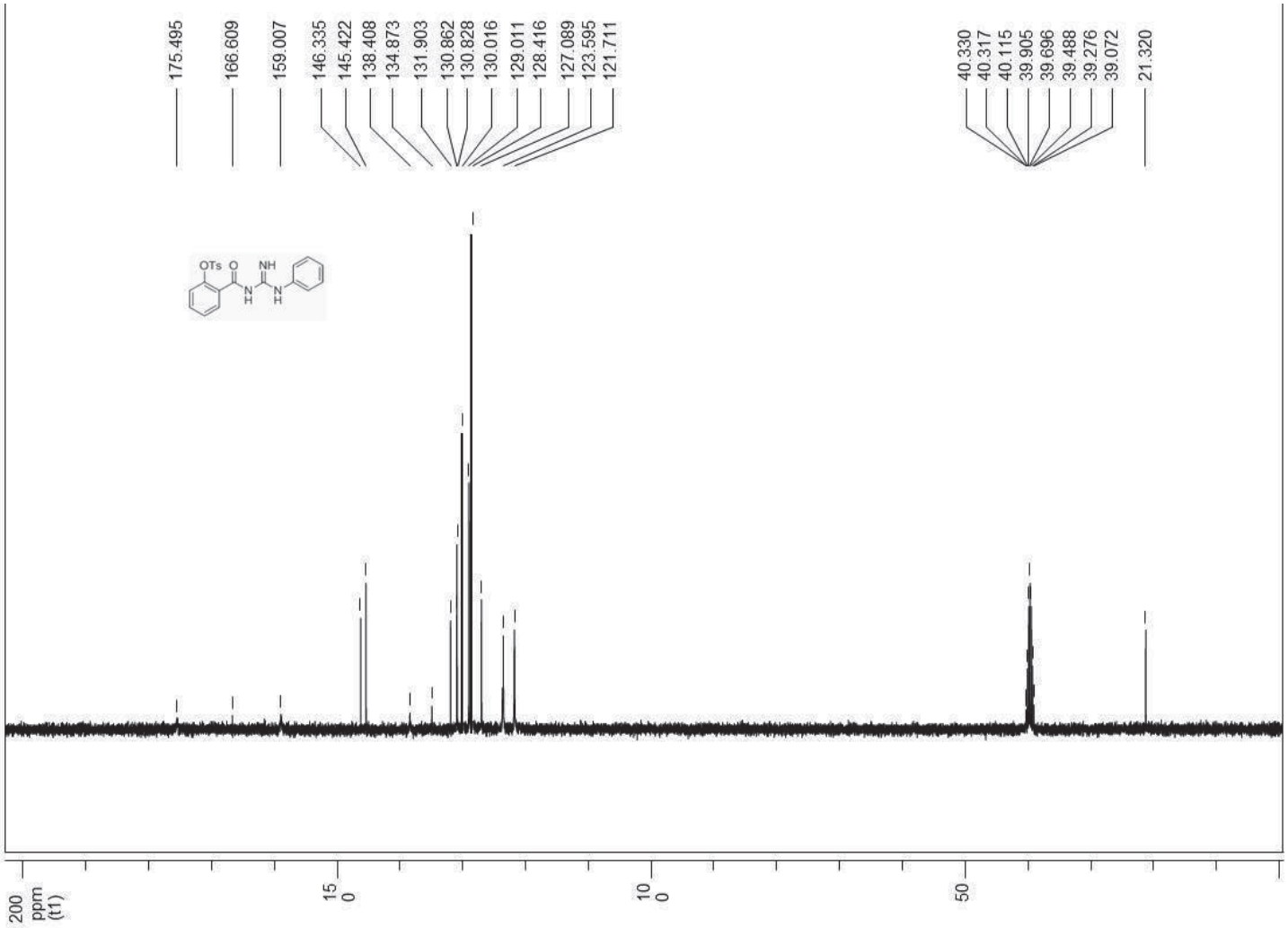
5f-C


175.495
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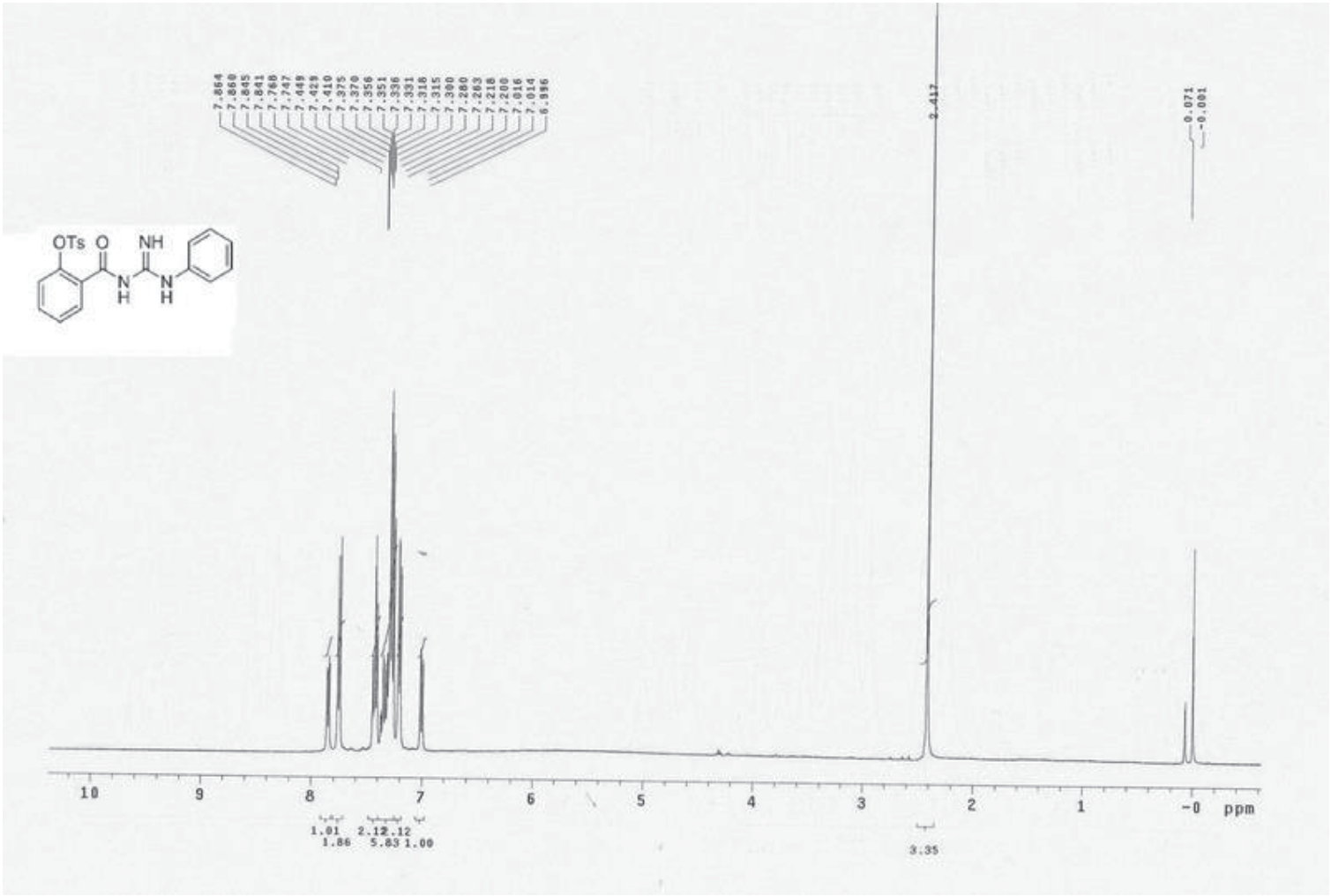
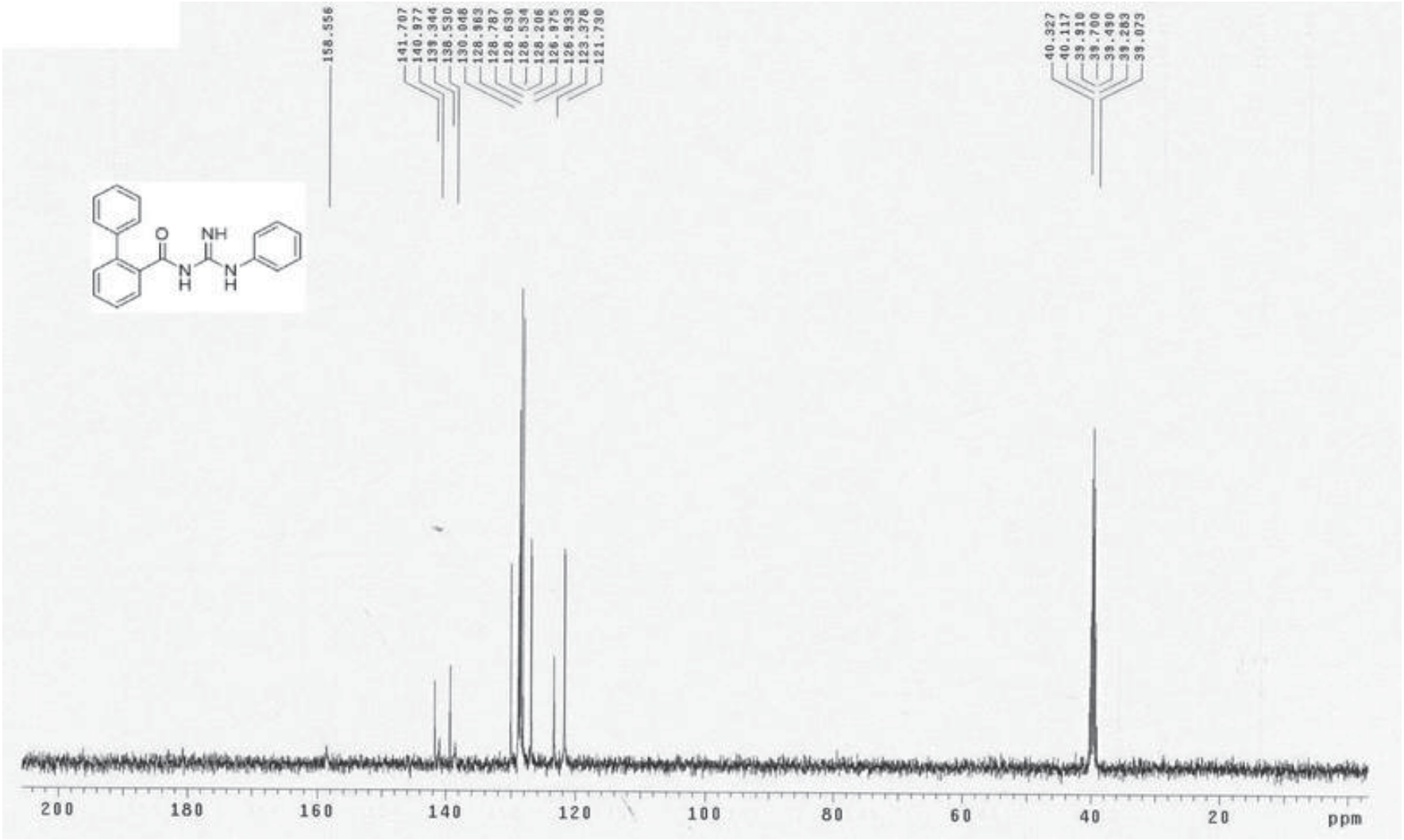
145.422
138.408
134.873
131.903
130.862
130.828
130.016
129.011
128.416
127.089
123.595
121.711
40.330
40.317
40.115
39.905
39.696
39.488
39.276
39.072
21.320
OTs
O
NH
N
H
N
H
200
ppm
(t1)
150
100
50

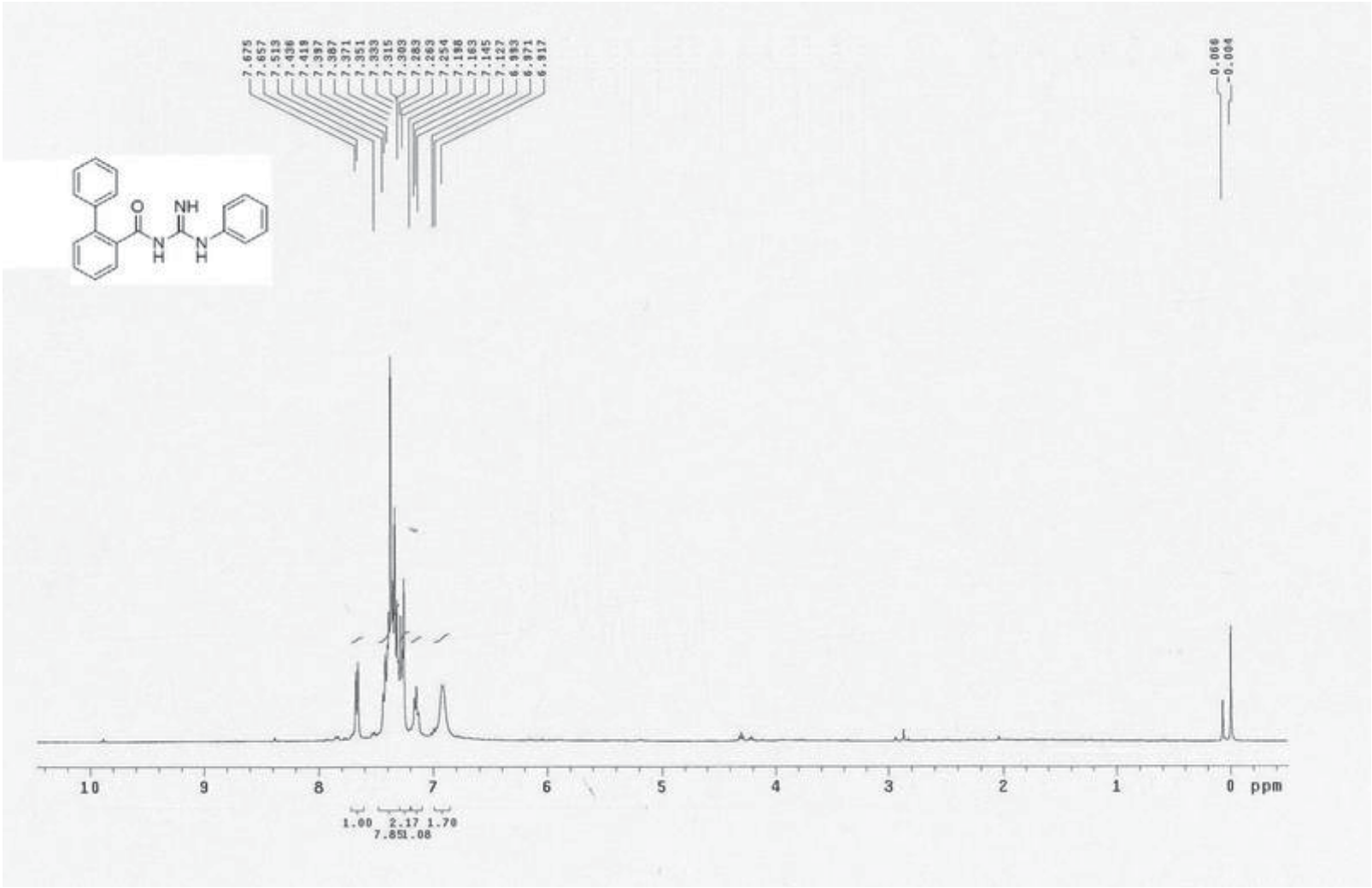
5f-H


7.864
7.860
7.845
7.841
7.768
7.747
7.449
7.429
7.410
7.375
7.370
7.356
7.351
7.336
7.331
7.316
7.315
7.300
7.280
7.263
7.218
7.200
7.016
7.014
6.996
2.417
0.071
-0.001
OTs
O
NH
N
H
N
H
10
9
8
7
6
5
4
3
2
1
-0
ppm
1.01
1.86
2.12
5.83
1.00
3.35

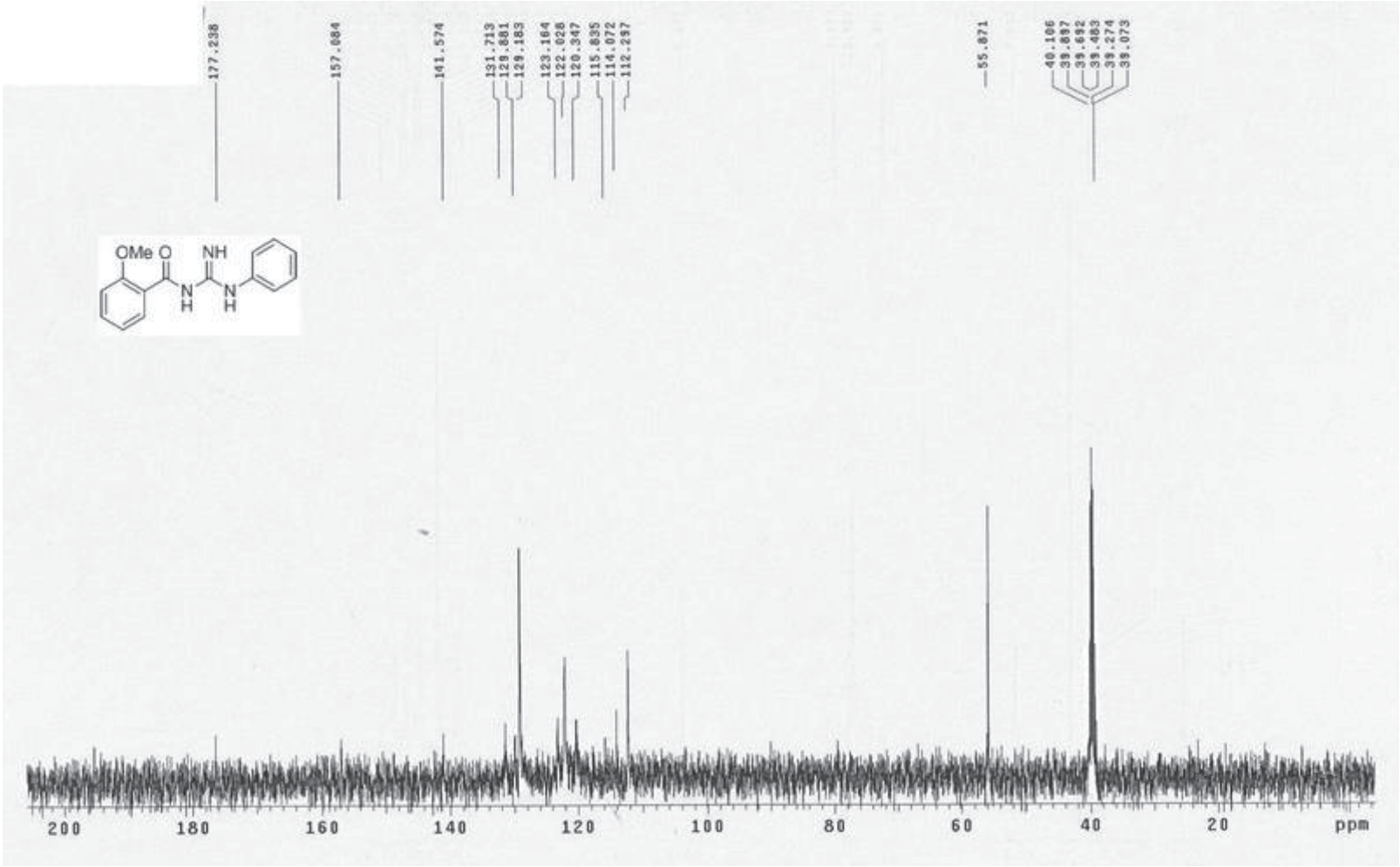
5g-C


158.556
141.707
140.977
139.344
138.530
130.048
128.963
128.787
128.630
128.534
128.206
126.975
126.933
123.378
121.730
40.327
40.117
39.910
39.700
39.490
39.283
39.073
O
NH
N
H
N
H
200
180
160
140
120
100
80
60
40
20
ppm

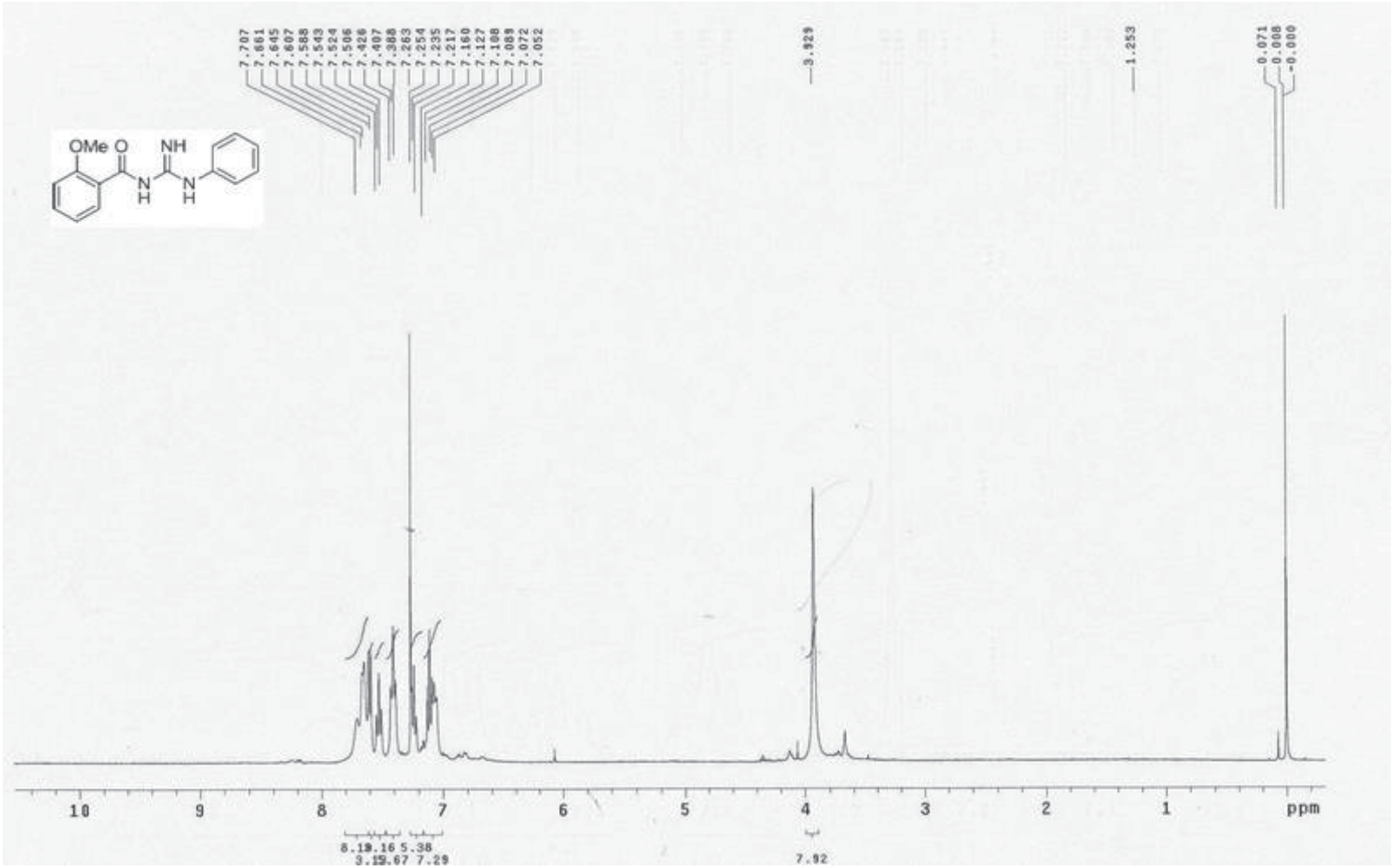
5g-H


7.675
7.657
7.513
7.436
7.419
7.397
7.387
7.371
7.351
7.333
7.315
7.303
7.283
7.263
7.254
7.198
7.163
7.145
7.127
6.993
6.971
6.917
0.008
-0.004
O
NH
N
H
N
H
10
9
8
7
6
5
4
3
2
1
0 ppm
1.00
2.17
1.70
7.85
1.08

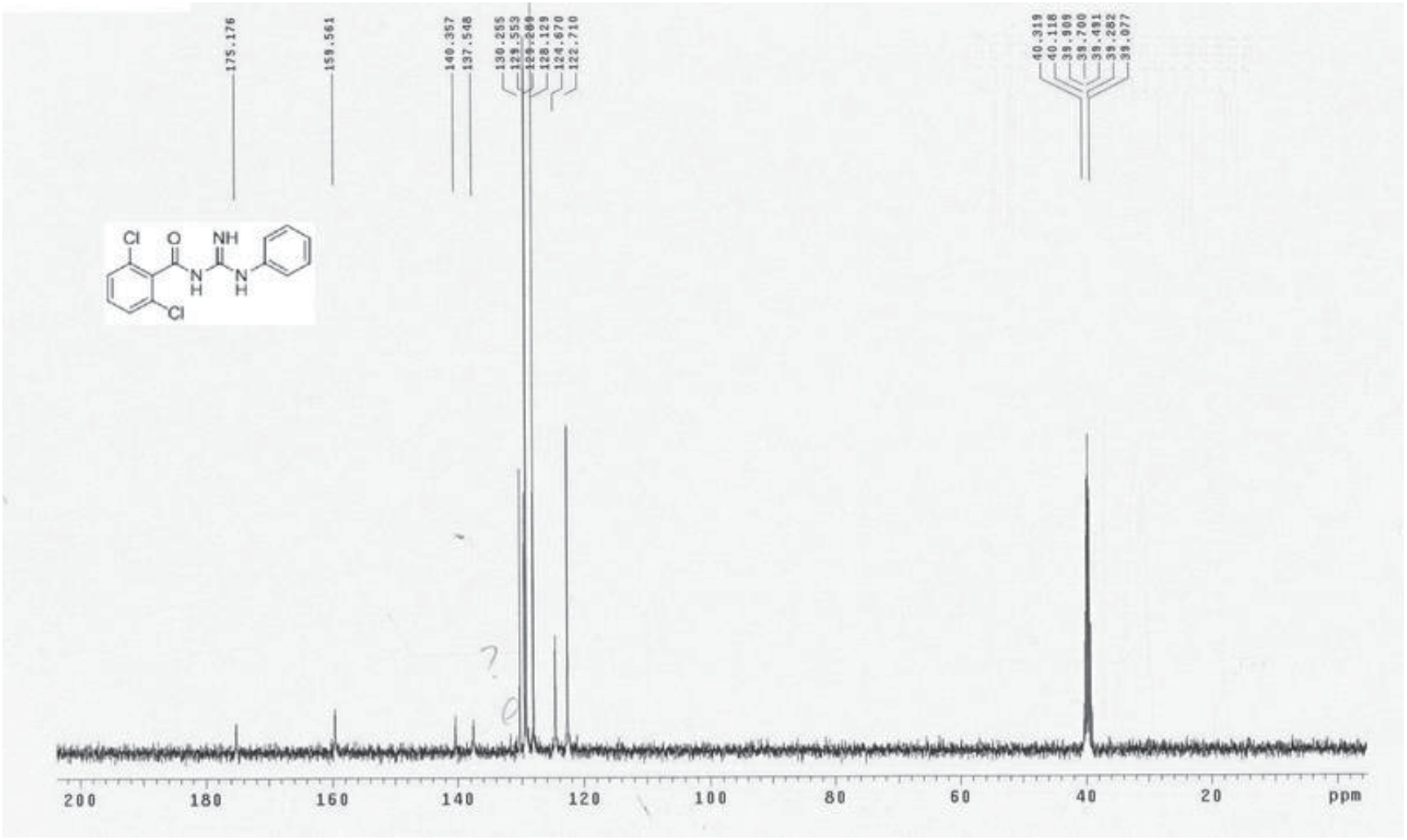
5h-C


177.238
157.684
141.574
131.713
129.881
129.183
123.164
122.028
120.347
115.835
114.072
112.297
55.871
40.106
39.897
39.692
39.483
39.274
39.073
OMe
O
NH
N
H
N
H
200
180
160
140
120
100
80
60
40
20
ppm

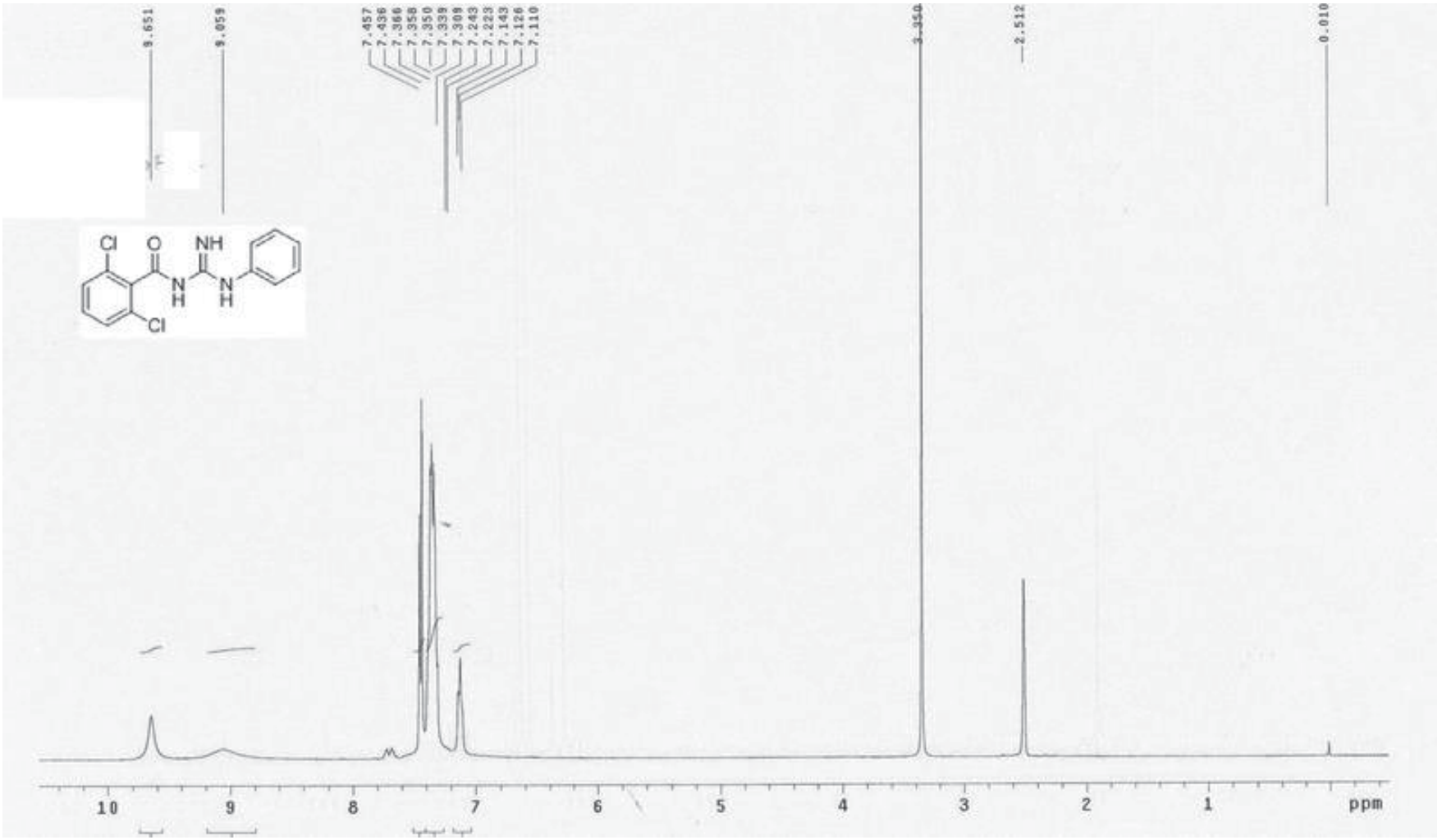
5h-H


7.707
7.661
7.645
7.607
7.588
7.543
7.524
7.506
7.426
7.407
7.388
7.263
7.254
7.235
7.217
7.160
7.127
7.108
7.089
7.072
7.052
3.929
1.253
0.071
0.008
-0.000
OMe O
NH
N
H
N
H
10
9
8
7
6
5
4
3
2
1
ppm
8.19
9.16
5.38
3.15
9.67
7.29
7.92

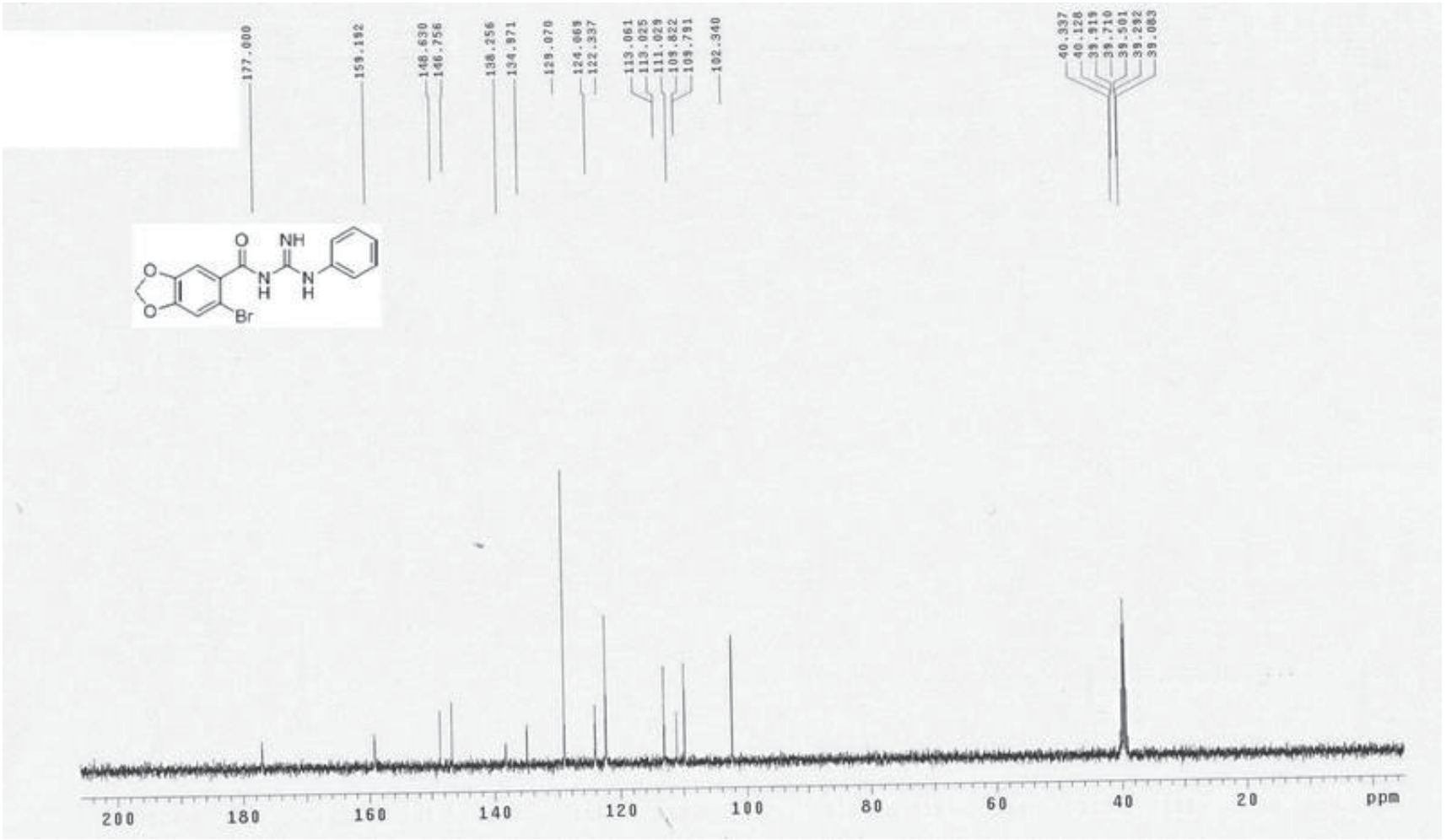
5i-C


175.176
159.561
140.357
137.548
130.255
129.553
129.200
128.129
124.670
122.710
40.319
40.118
39.909
39.700
39.491
39.282
39.077
Cl
O
NH
N
H
N
H
Cl
200
180
160
140
120
100
80
60
40
20
ppm

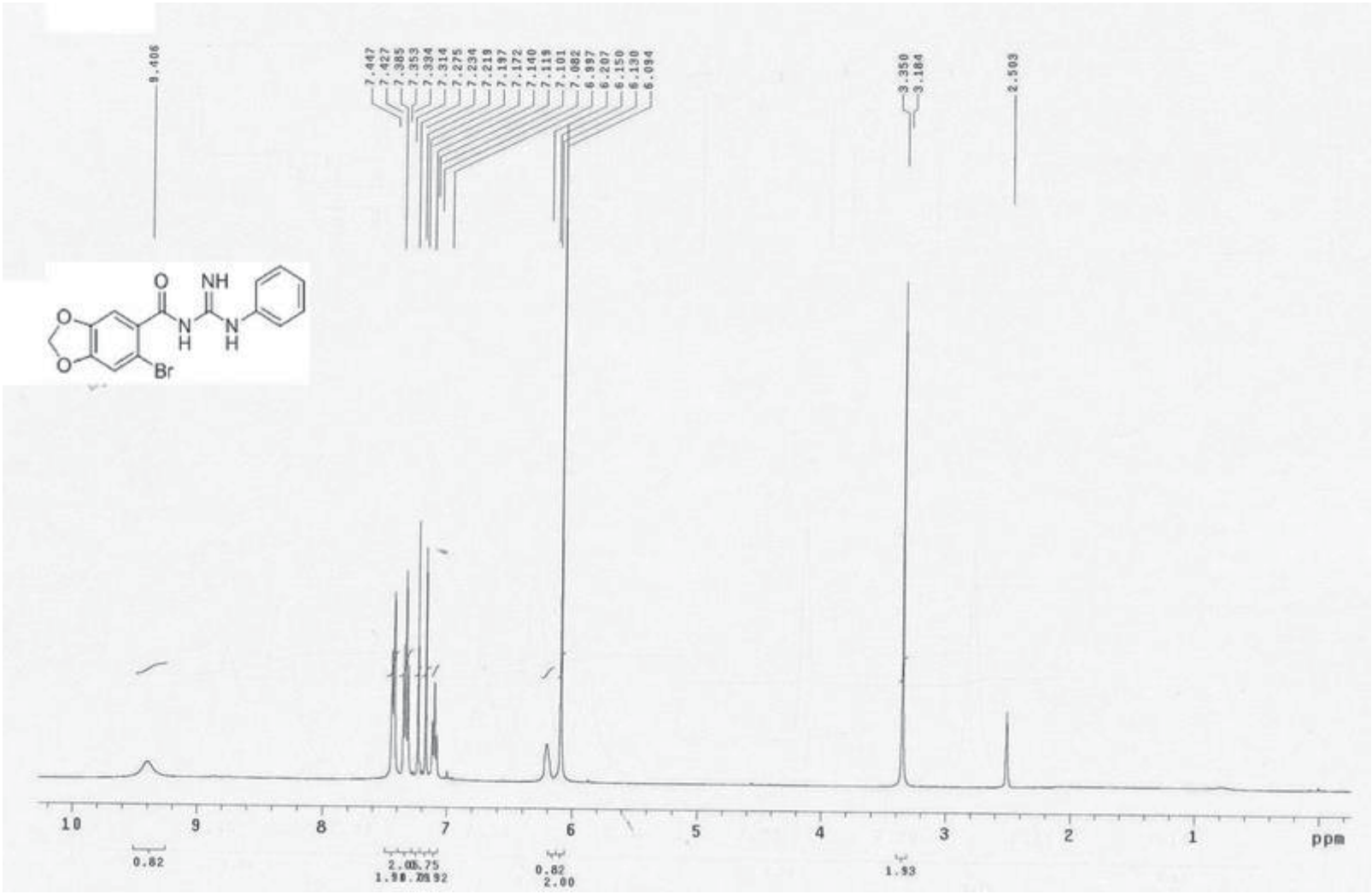
5i-H


9.651
9.059
7.457
7.436
7.366
7.358
7.350
7.339
7.309
7.243
7.223
7.143
7.126
7.110
3.350
2.512
0.010
Cl
O
NH
N
H
N
H
Cl
10
9
8
7
6
5
4
3
2
1
ppm

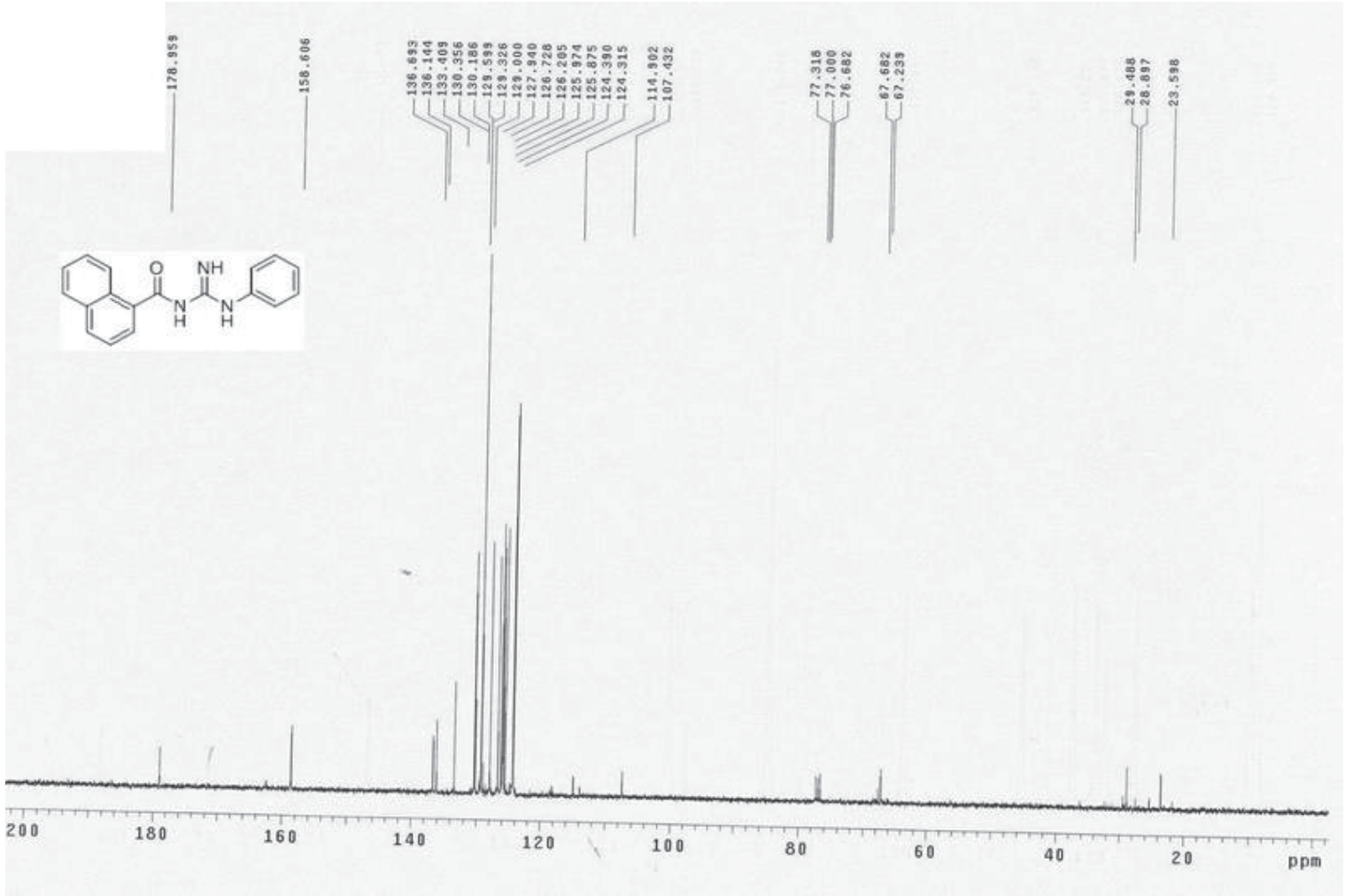
5j-C


177.000
159.192
148.630
146.756
138.256
134.871
129.070
124.069
122.337
113.061
113.025
111.029
103.822
103.791
102.340
40.337
40.128
39.919
39.710
39.501
39.292
39.083
O
NH
N
H
N
H
O
O
Br
200
180
160
140
120
100
80
60
40
20
ppm

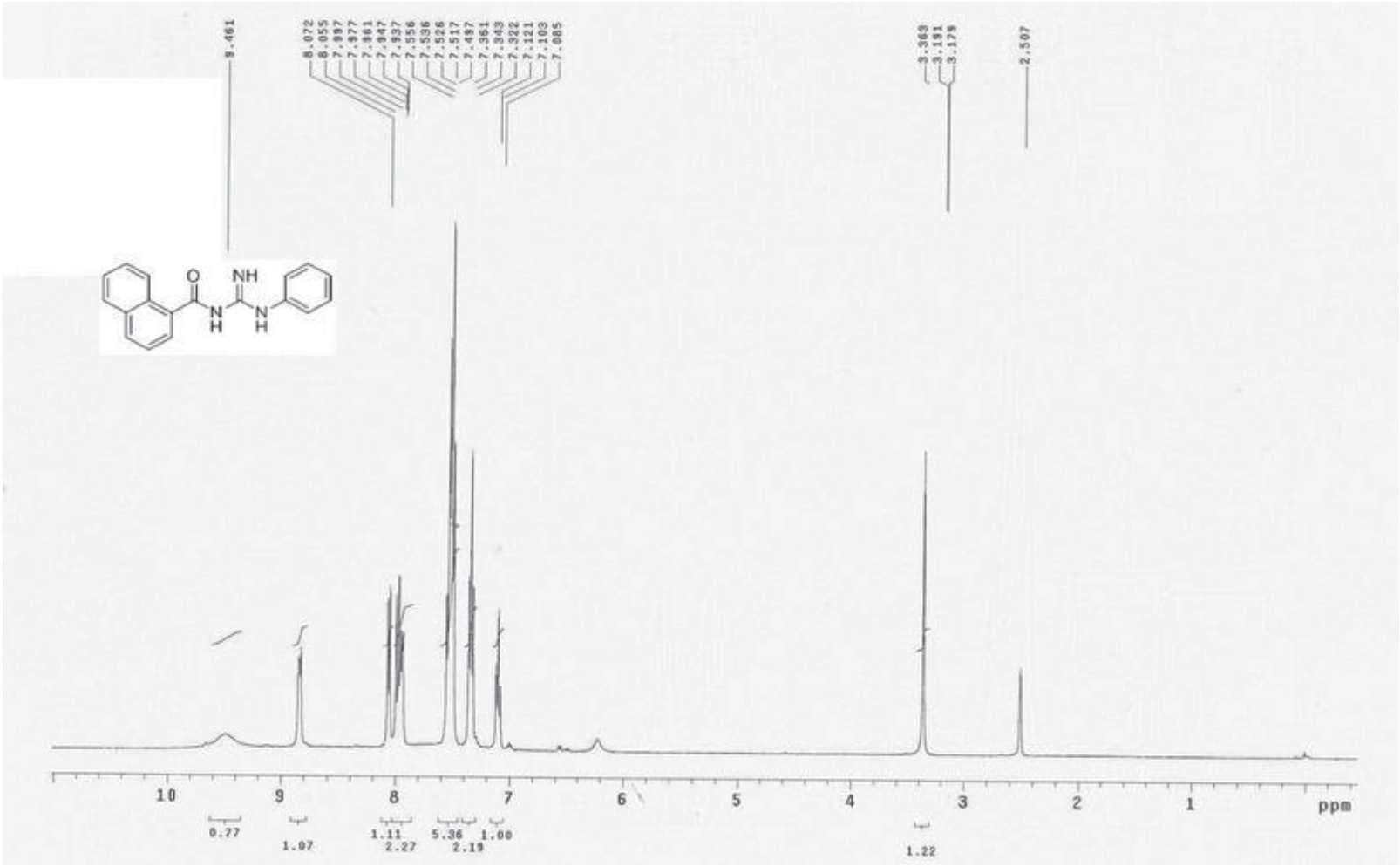
5j-H


9.406
7.447
7.427
7.385
7.353
7.334
7.314
7.275
7.234
7.219
7.197
7.172
7.140
7.119
7.101
7.082
6.957
6.207
6.150
6.130
6.094
3.350
3.184
2.503
O
NH
N
H
N
H
O
O
Br
10
9
8
7
6
5
4
3
2
1
ppm
0.82
2.00
0.82
2.00
1.93

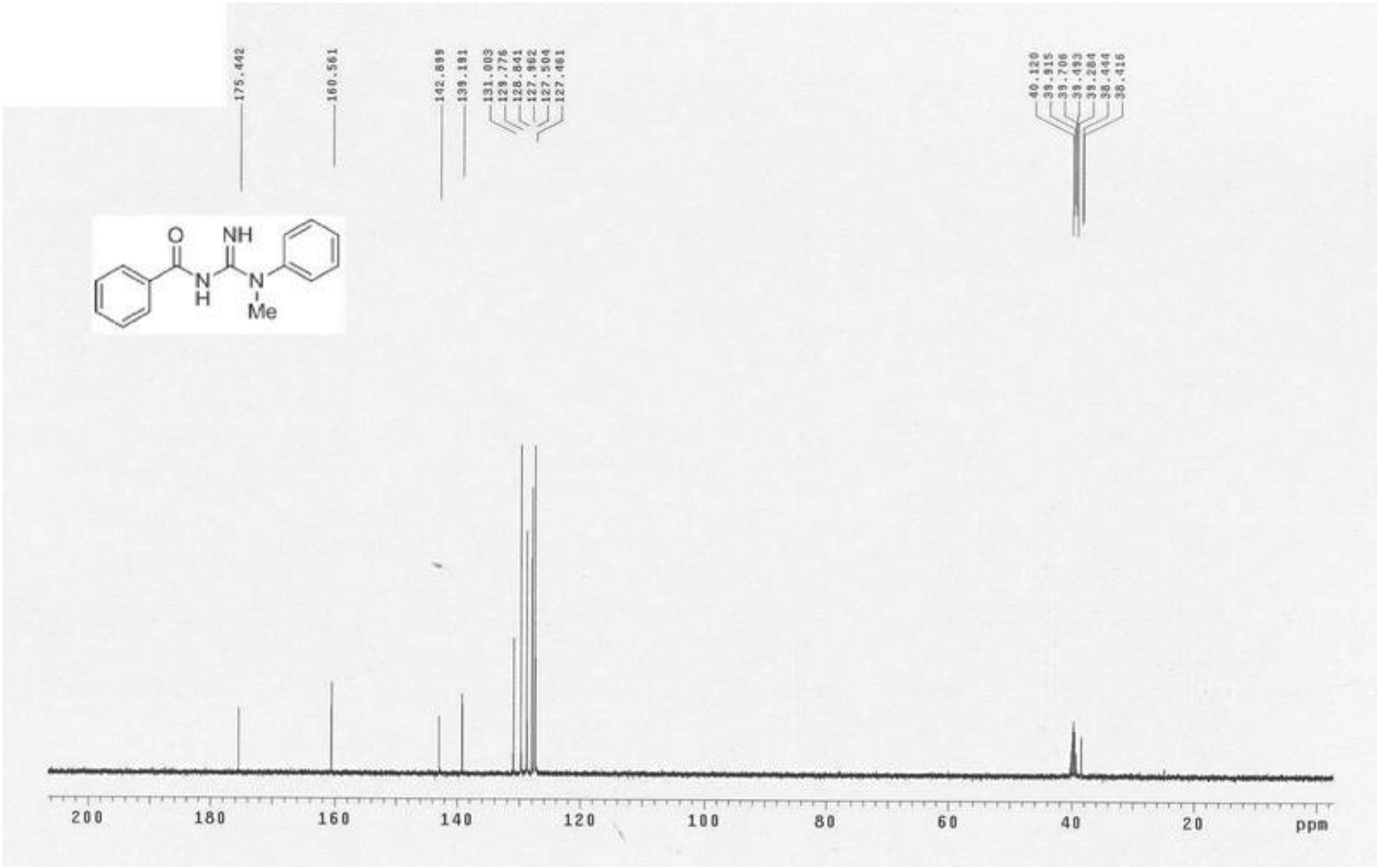
5k-C


178.959
158.606
136.693
136.144
133.409
130.356
130.186
129.599
129.326
129.000
127.940
126.728
126.205
125.974
125.875
124.390
124.315
114.902
107.432
77.318
77.000
76.682
67.682
67.239
29.488
28.897
23.598
O
NH
N
H
N
H
200
180
160
140
120
100
80
60
40
20
ppm

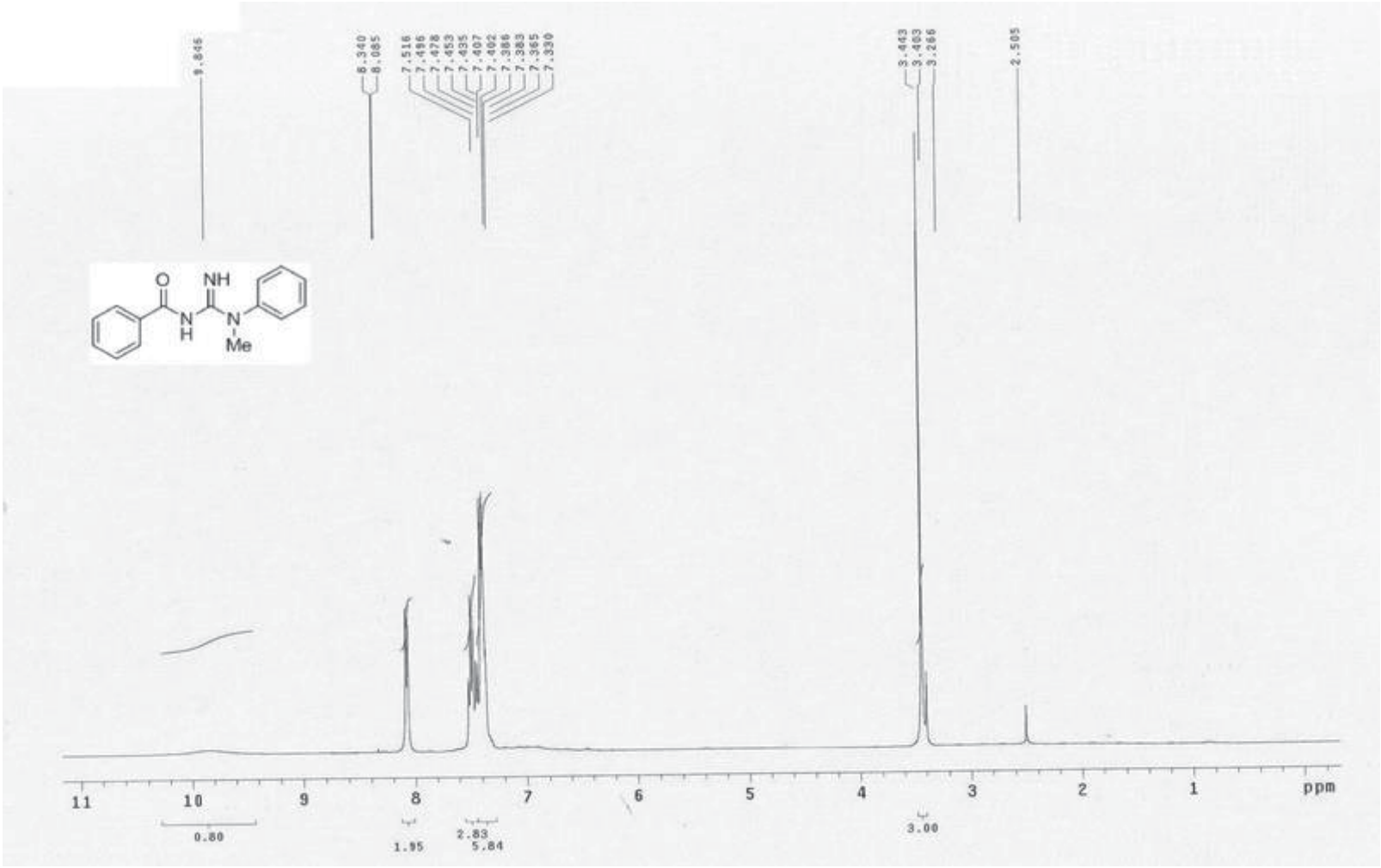
5k-H


9.461
8.072
8.055
7.997
7.977
7.961
7.947
7.937
7.556
7.536
7.526
7.517
7.497
7.361
7.343
7.322
7.121
7.103
7.085
3.363
3.191
3.178
2.507
O
NH
N
H
N
H
10
9
8
7
6
5
4
3
2
1
ppm
0.77
1.07
1.11
2.27
5.36
2.19
1.00
1.22

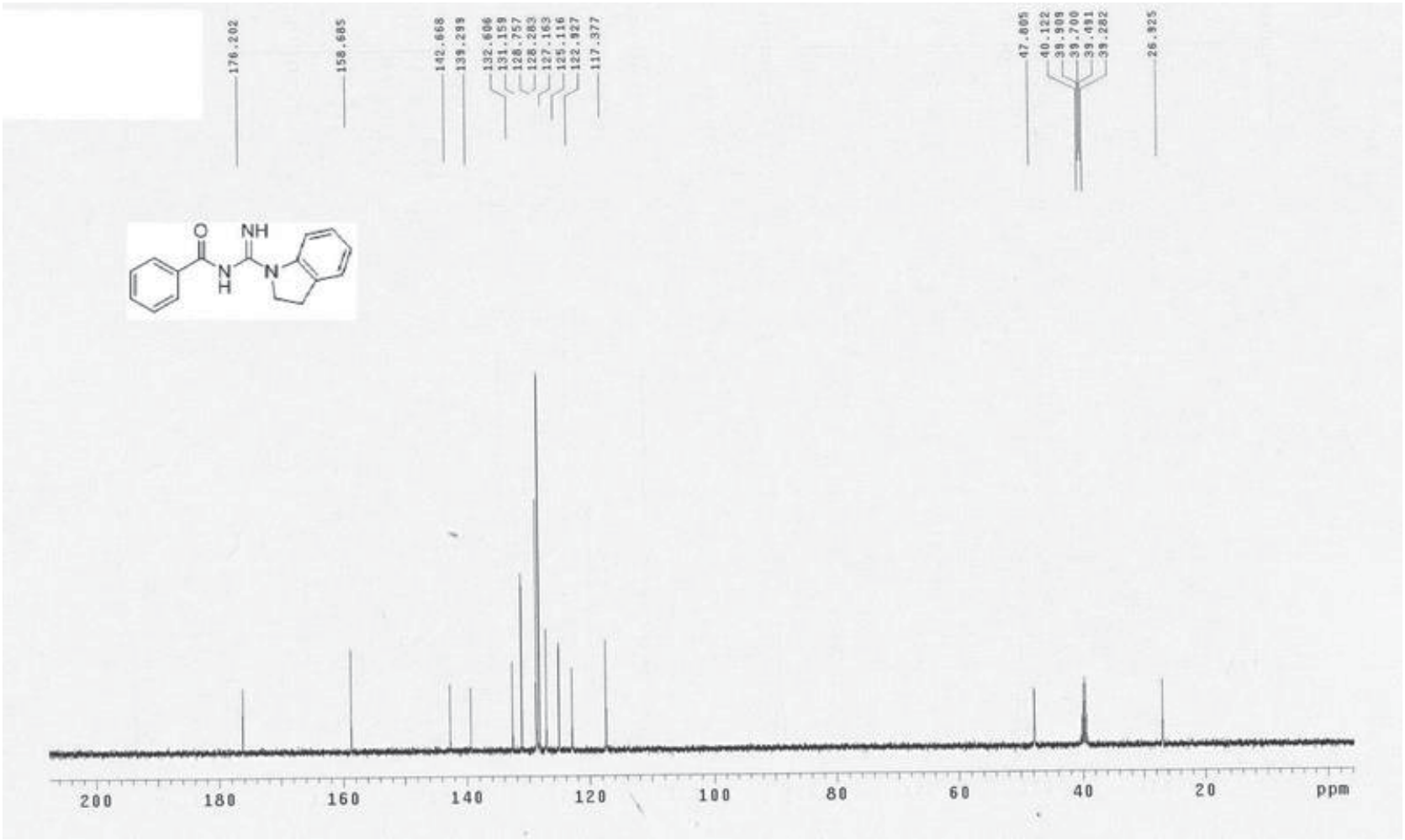
5l-C


175.442
160.561
142.899
139.191
131.003
129.776
128.841
127.962
127.504
127.461
40.120
39.915
39.706
39.493
39.284
38.444
38.416
O
NH
N
H
N
Me
200
180
160
140
120
100
80
60
40
20
ppm

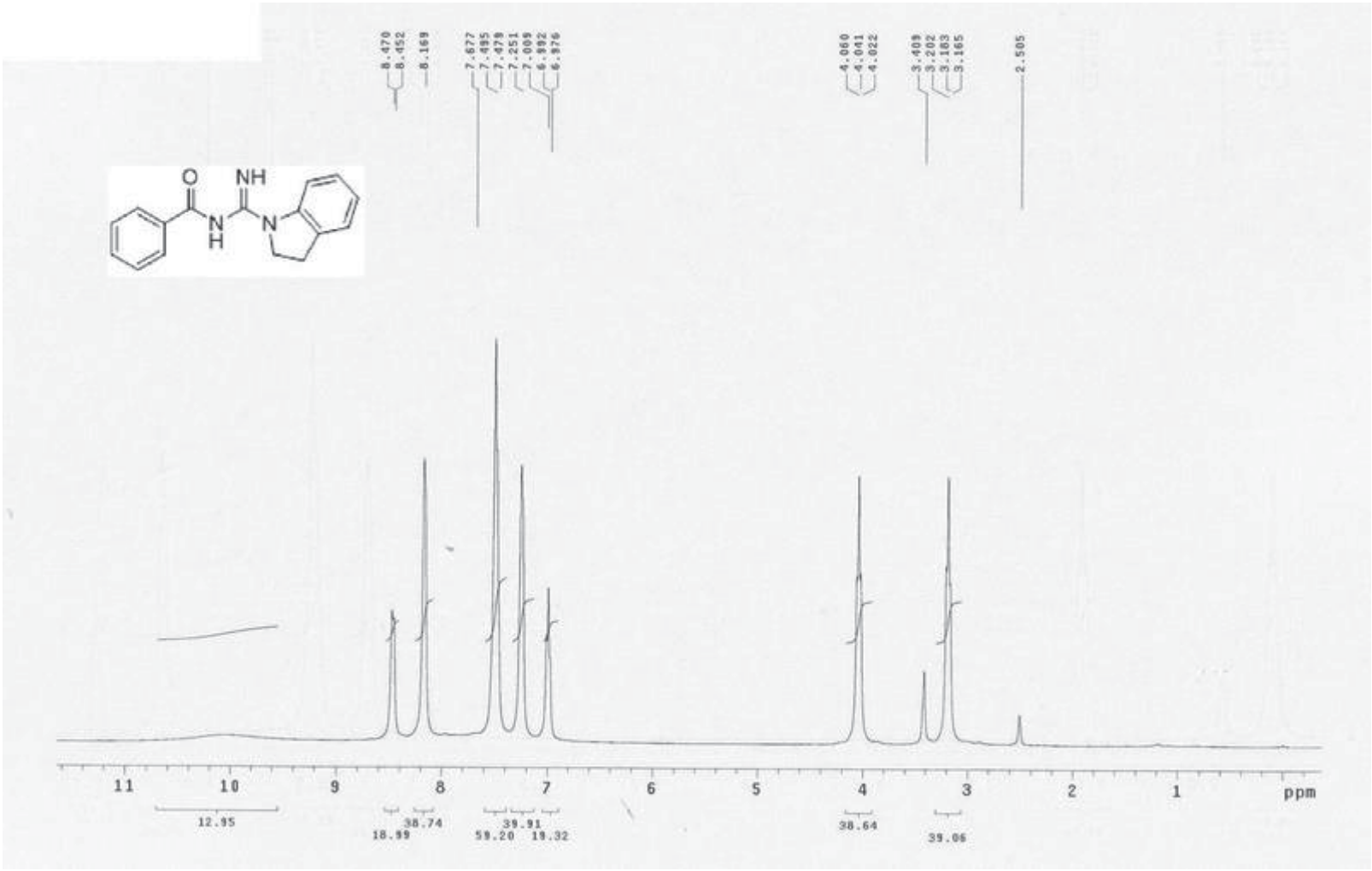
5l-H


9.845
8.340
8.065
7.516
7.496
7.478
7.453
7.435
7.407
7.402
7.386
7.383
7.365
7.330
3.443
3.423
3.266
2.505
O
NH
N
H
N
Me
11
10
9
8
7
6
5
4
3
2
1
ppm
0.80
1.95
2.83
5.84
3.00

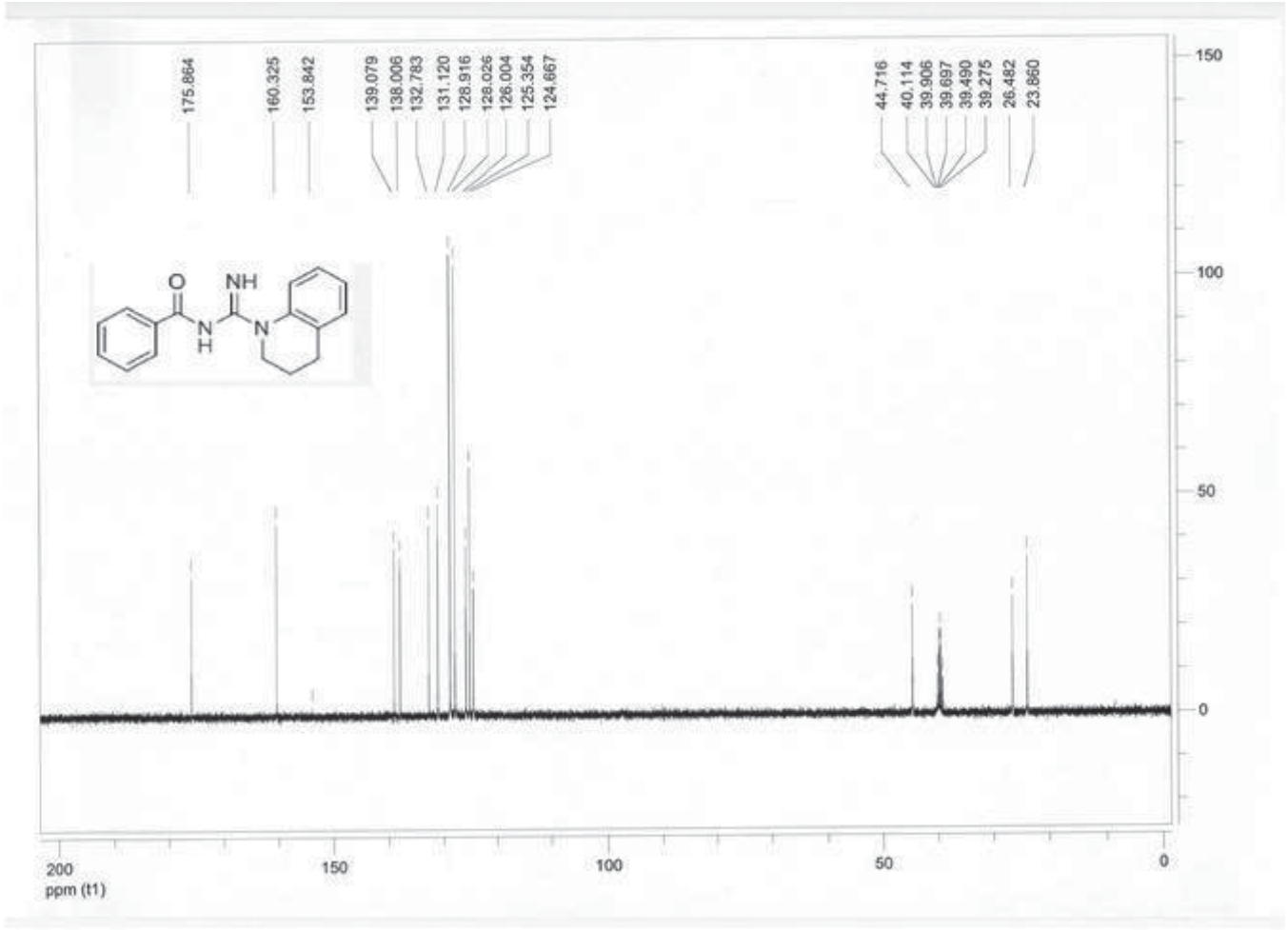
5m-C


176.202
158.685
142.668
139.299
132.606
131.159
128.757
128.283
127.163
125.116
122.927
117.377
47.805
40.122
39.909
39.700
39.491
39.282
26.925
O
NH
N
H
N
200
180
160
140
120
100
80
60
40
20
ppm

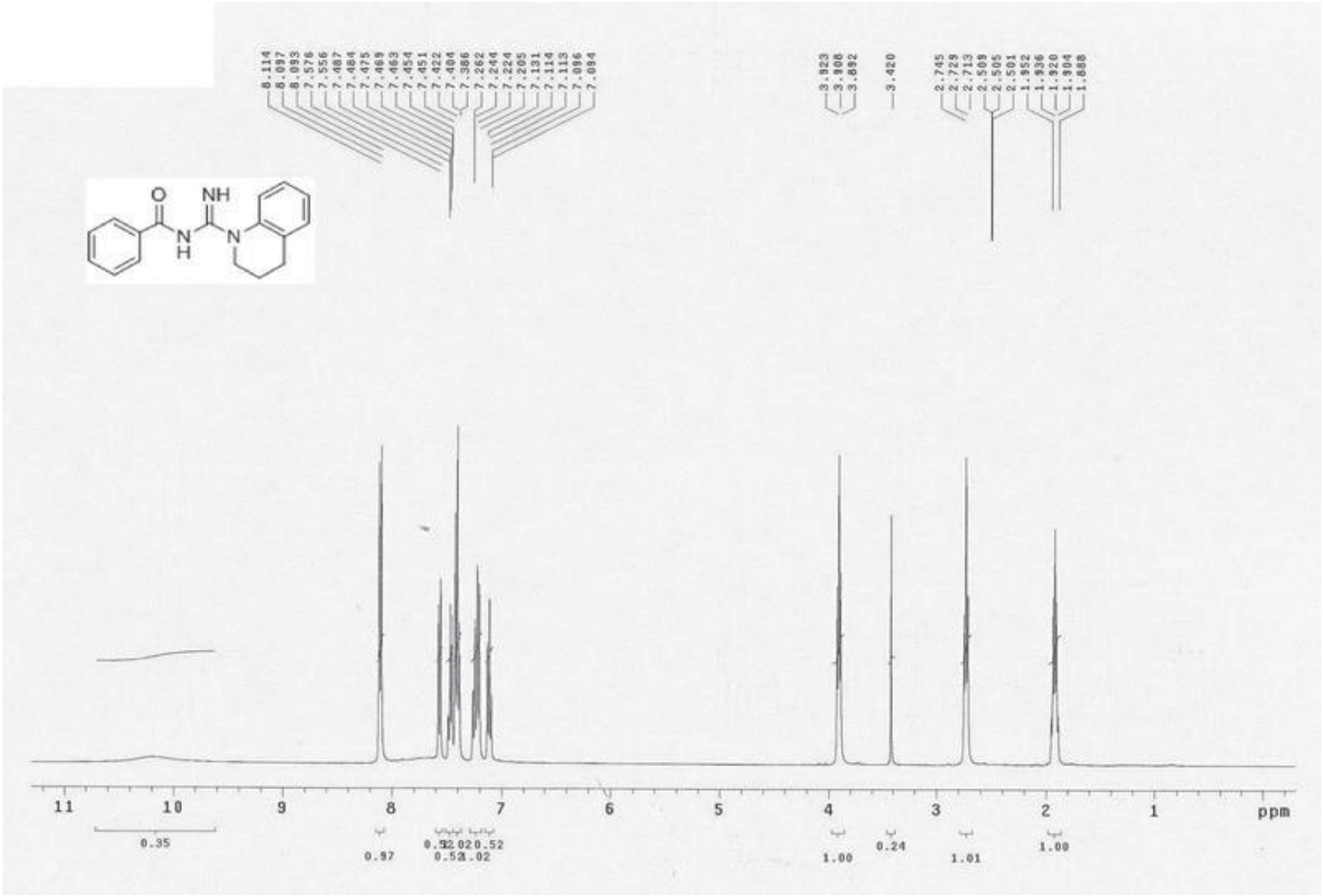
5m-H


8.470
8.452
8.169
7.677
7.495
7.479
7.251
7.009
6.992
6.976
4.060
4.041
4.022
3.409
3.202
3.183
3.165
2.505
O
NH
N
H
N
11
10
9
8
7
6
5
4
3
2
1
ppm
12.95
18.99
38.74
59.20
39.91
19.32
38.64
39.06

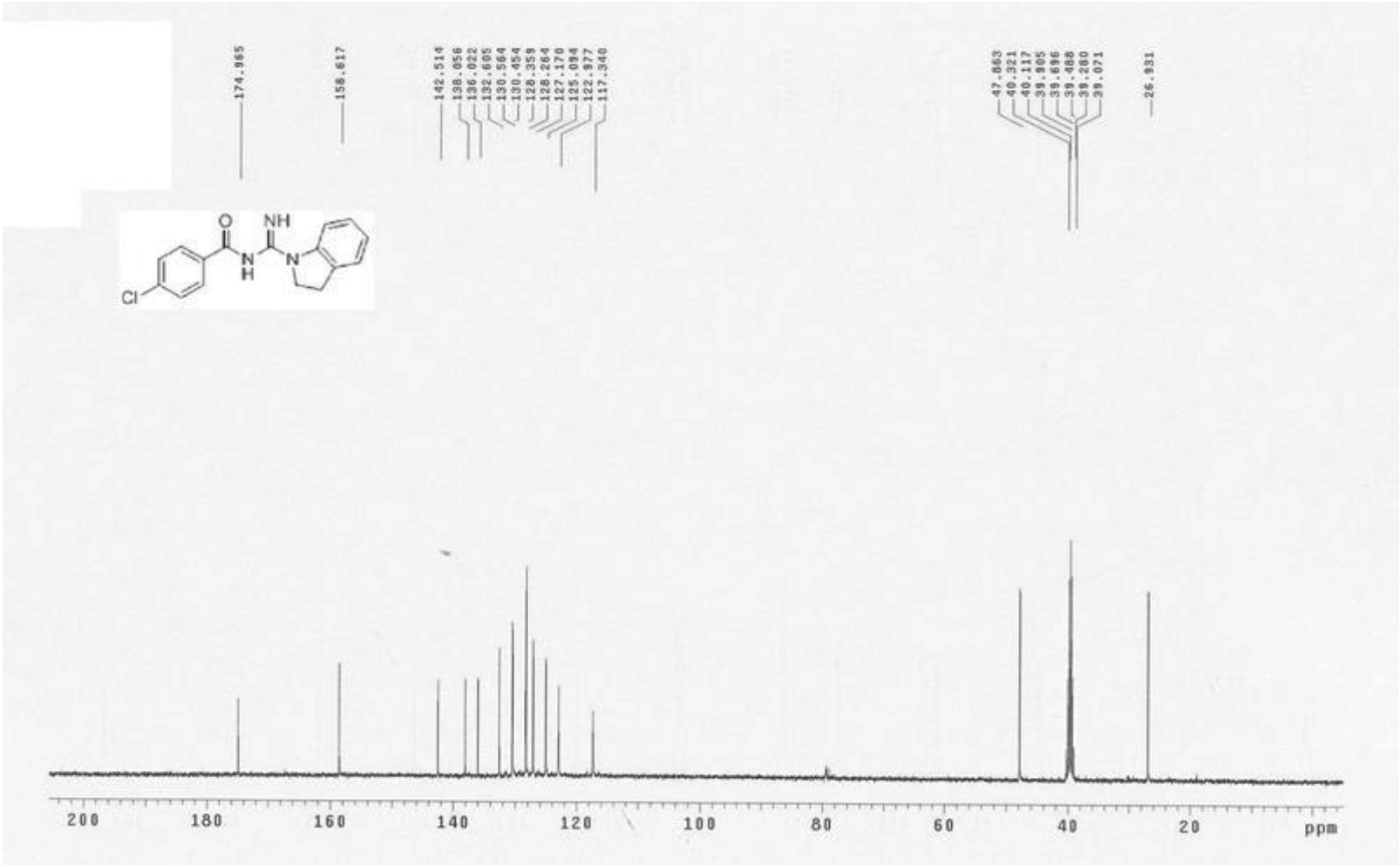
5n-C


175.864
160.325
153.842
139.079
138.006
132.783
131.120
128.916
128.026
126.004
125.354
124.667
44.716
40.114
39.906
39.697
39.490
39.275
26.482
23.860
O
NH
N
H
N
150
100
50
0
200
150
100
50
0
ppm (t1)

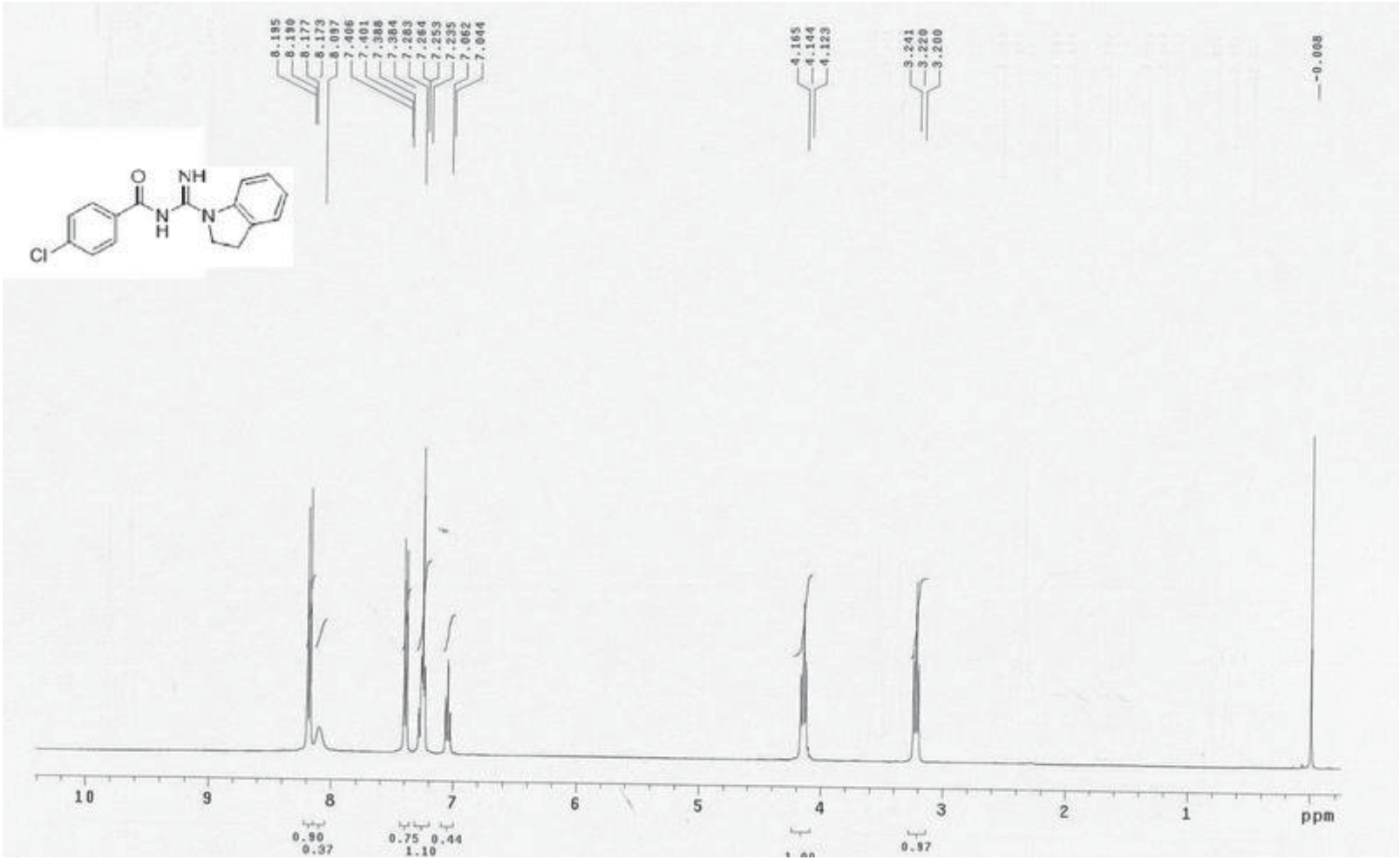
5n-H


8.114
8.097
8.093
7.576
7.556
7.487
7.484
7.475
7.469
7.463
7.454
7.451
7.422
7.404
7.386
7.262
7.244
7.224
7.205
7.131
7.114
7.113
7.096
7.094
3.923
3.906
3.882
3.420
2.745
2.729
2.713
2.509
2.505
2.501
1.952
1.936
1.920
1.904
1.888
O
NH
N
H
N
11
10
9
8
7
6
5
4
3
2
1
ppm
0.35
0.97
1.00
0.24
1.01
1.00

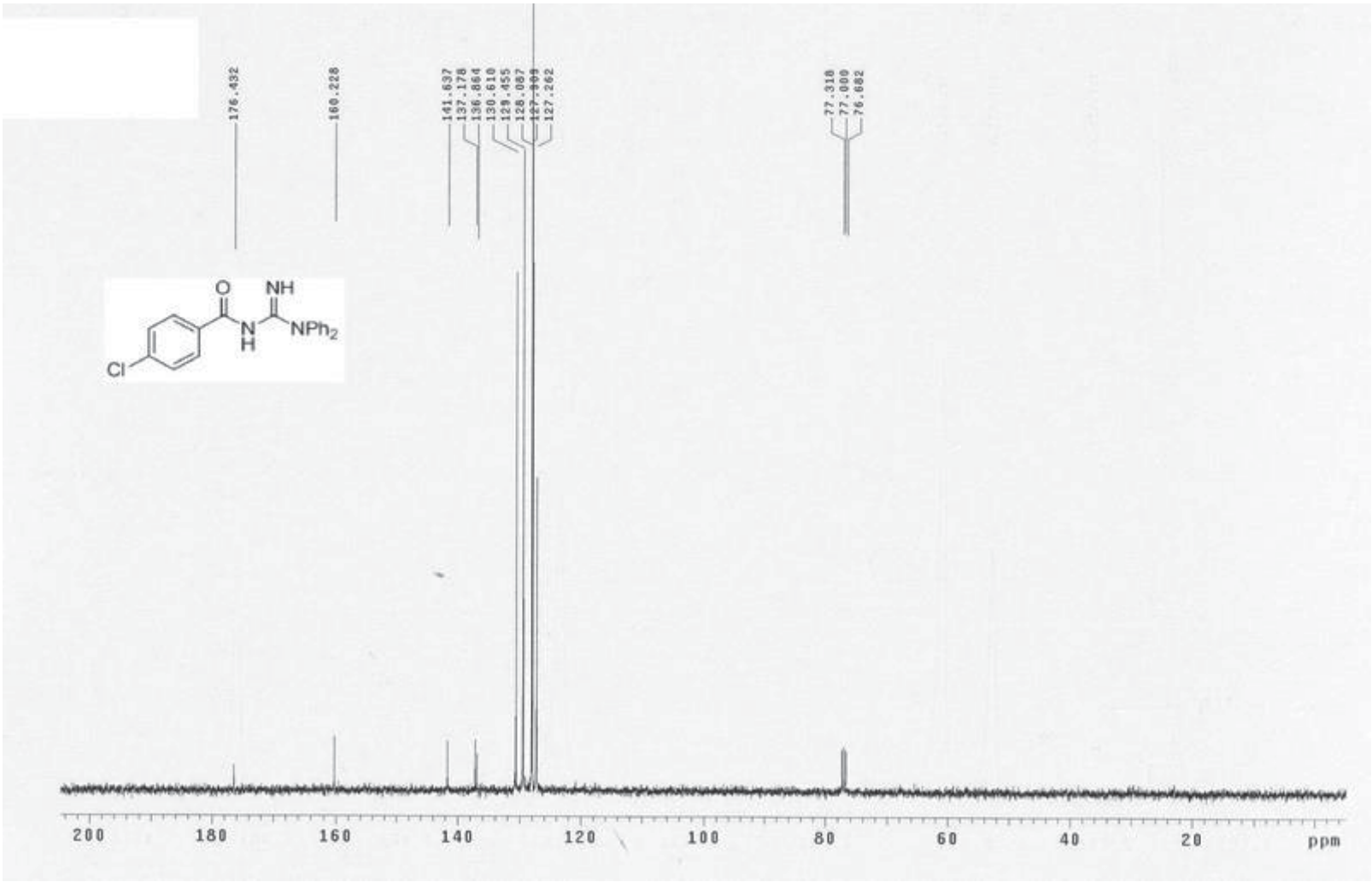
5o-C


174.985
158.617
142.514
138.056
136.022
132.605
130.564
130.454
128.359
128.264
127.170
125.094
122.977
117.340
47.663
40.321
40.117
39.905
39.696
39.488
39.280
39.071
26.931
O
NH
N
H
N
Cl
200
180
160
140
120
100
80
60
40
20
ppm

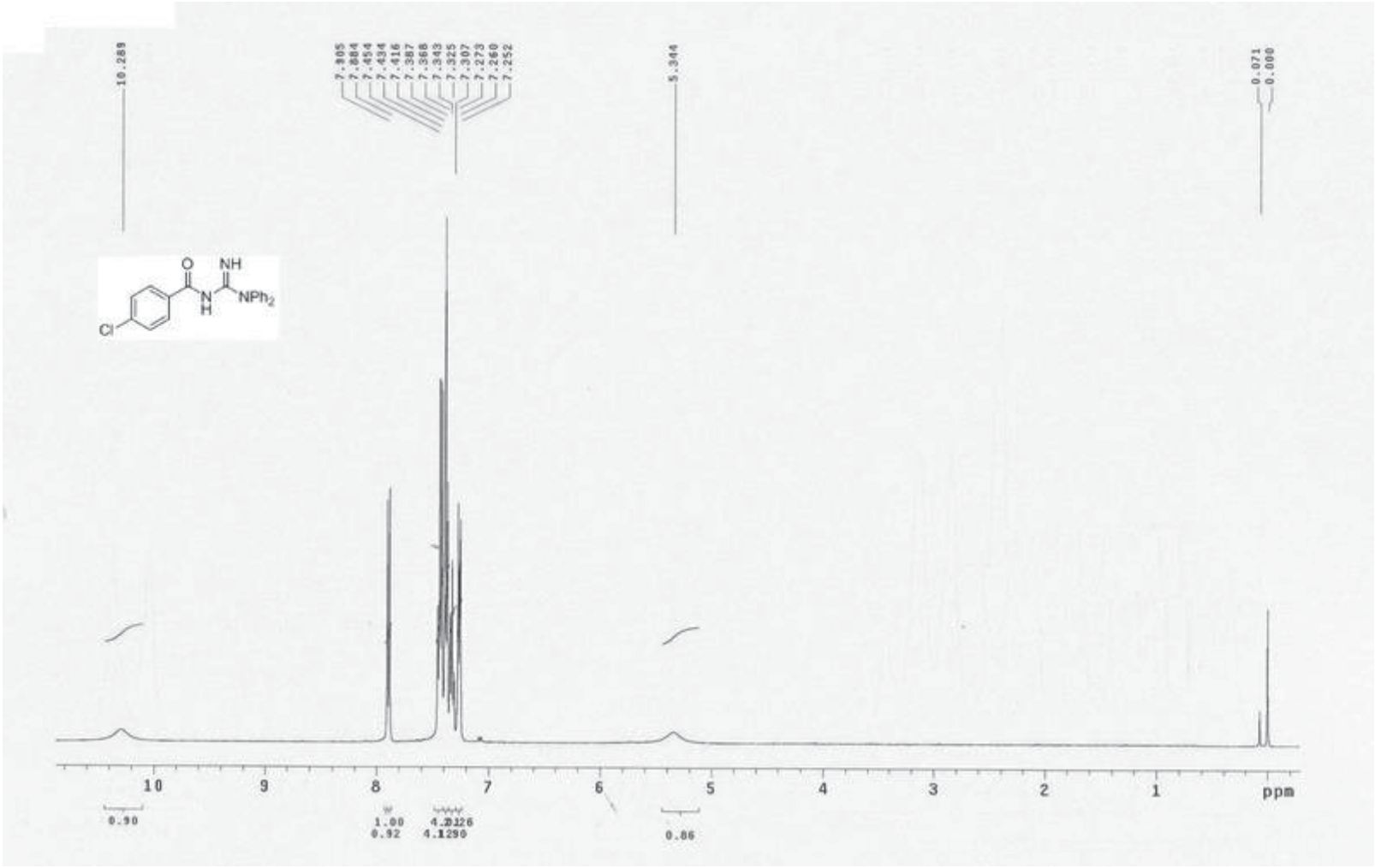
5o-H


8.195
8.190
8.177
8.173
8.097
7.406
7.401
7.388
7.384
7.263
7.264
7.253
7.235
7.062
7.044
4.165
4.144
4.123
3.241
3.220
3.200
-0.008
O
NH
N
H
N
Cl
10
9
8
7
6
5
4
3
2
1
ppm
0.90
0.37
0.75
0.44
1.10
0.97

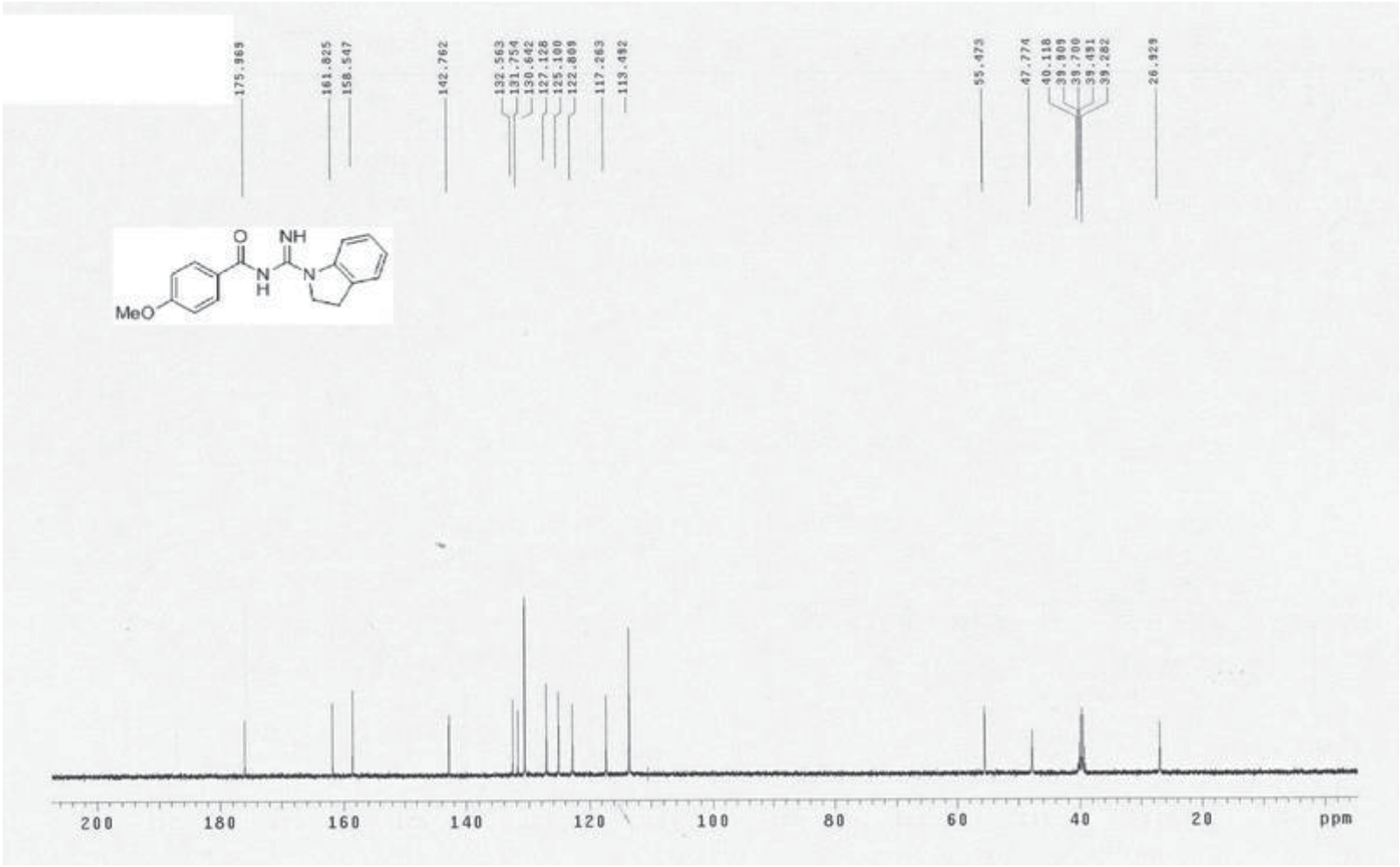
5p-C


176.432
160.228
141.637
137.178
136.864
130.610
129.455
128.087
127.899
127.262
77.310
77.000
76.682
O
NH
N
H
NPh2
Cl
200
180
160
140
120
100
80
60
40
20
ppm

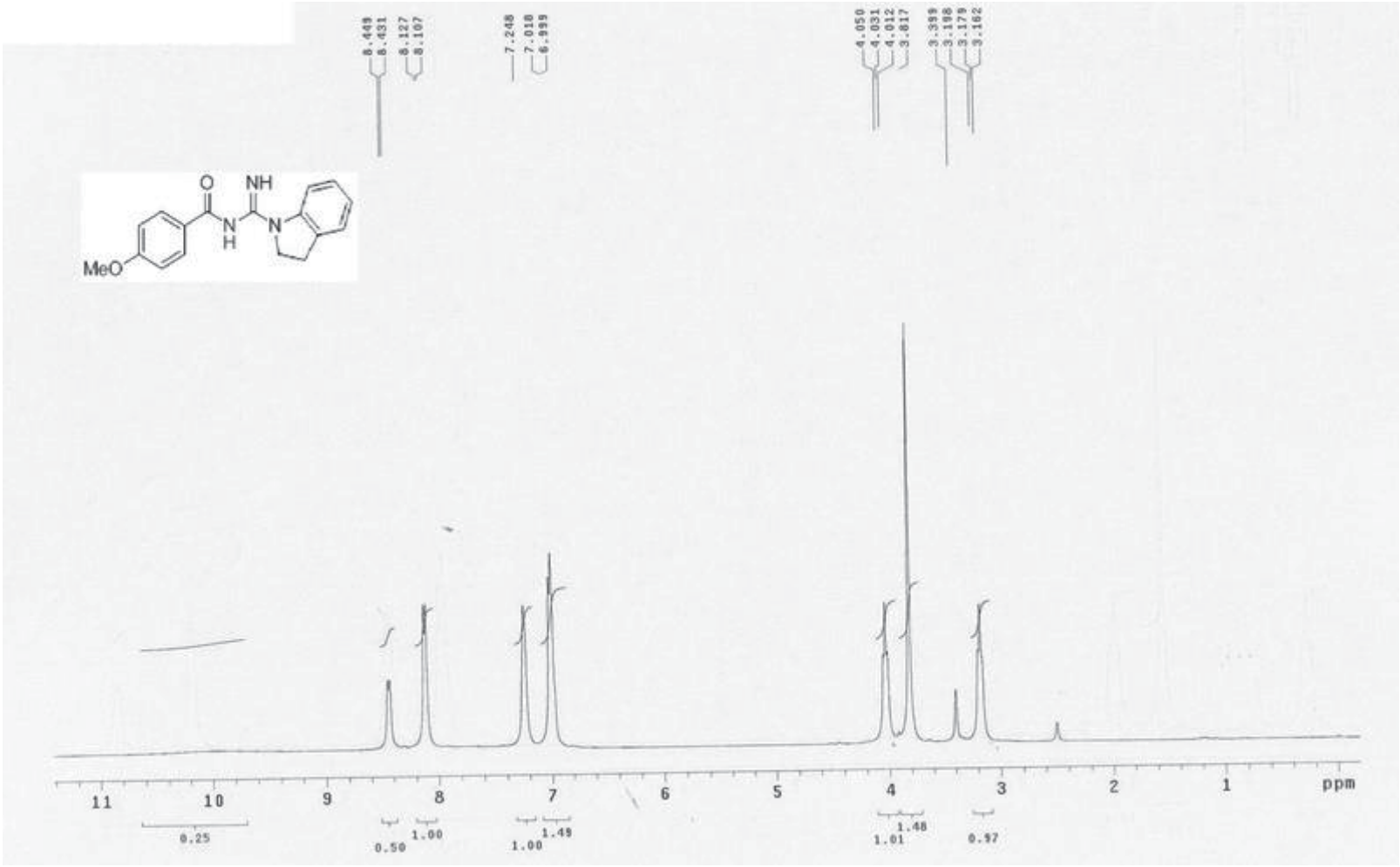
5p-H


10.289
7.905
7.884
7.454
7.434
7.416
7.387
7.368
7.343
7.325
7.307
7.273
7.260
7.252
5.344
0.071
0.000
O
NH
N
H
NPh2
Cl
10
9
8
7
6
5
4
3
2
1
ppm
0.90
1.00
0.92
4.2326
4.1290
0.86

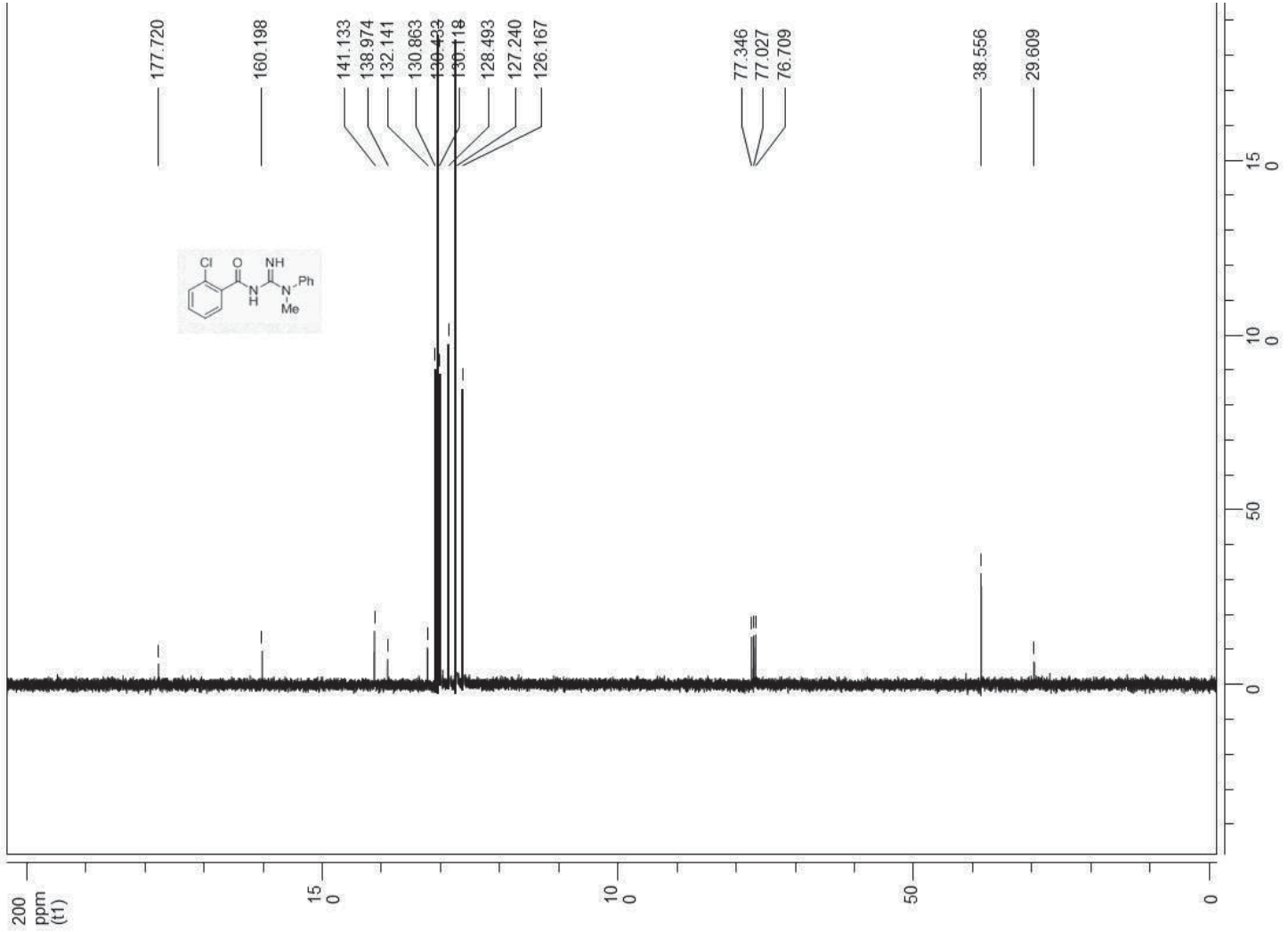
5q-C


175.969
161.825
158.547
142.762
132.563
131.754
130.642
127.128
125.100
122.809
117.263
113.492
55.473
47.774
40.118
39.909
39.700
39.491
39.282
26.929
O
NH
N
H
N
MeO
200
180
160
140
120
100
80
60
40
20
ppm

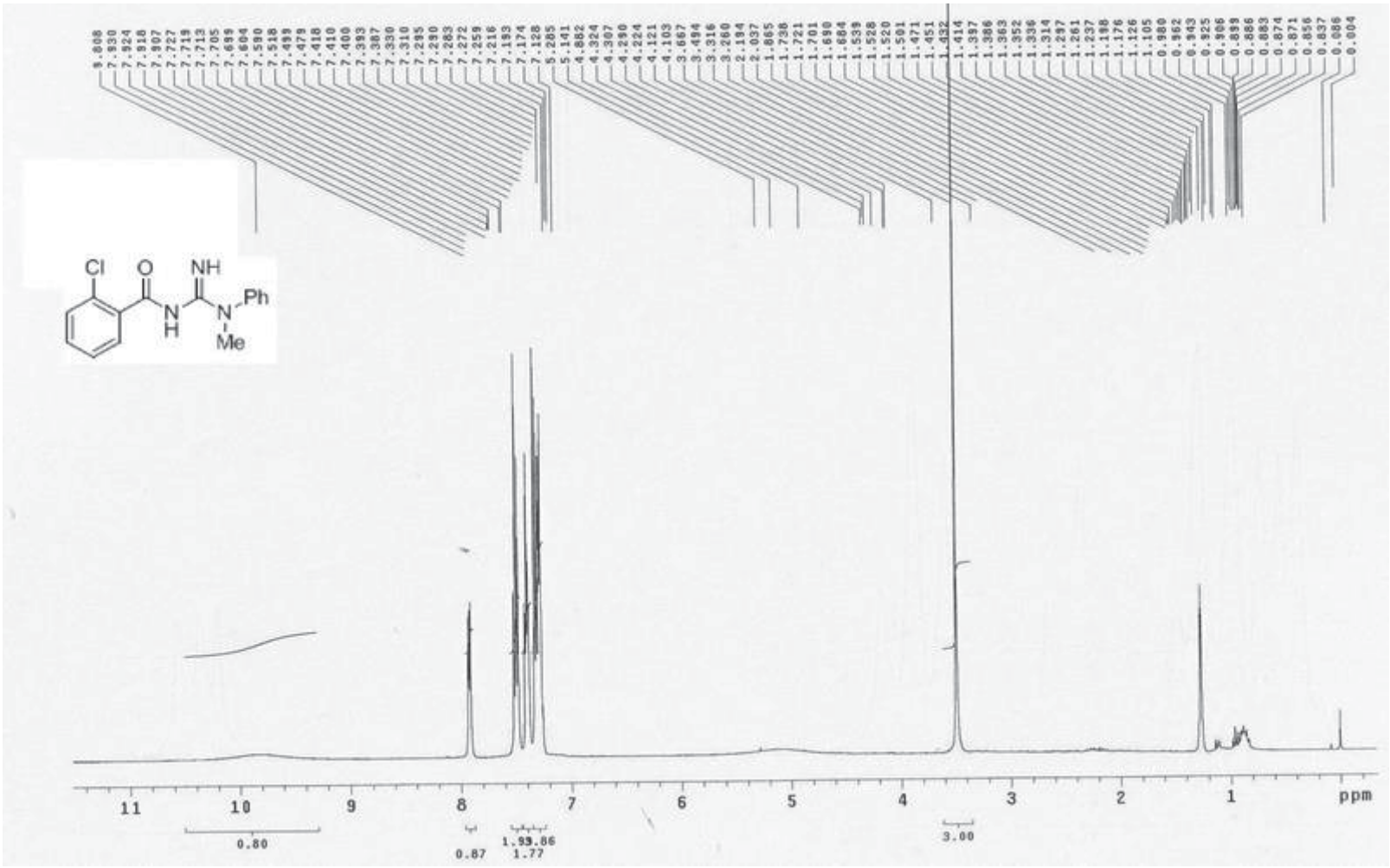
5q-H


8.449
8.431
8.127
8.107
7.248
7.018
6.999
4.050
4.031
4.012
3.817
3.399
3.198
3.179
3.162
O
NH
N
H
N
MeO
11
10
9
8
7
6
5
4
3
2
1
ppm
0.25
0.50
1.00
1.00
1.49
1.01
1.48
0.97

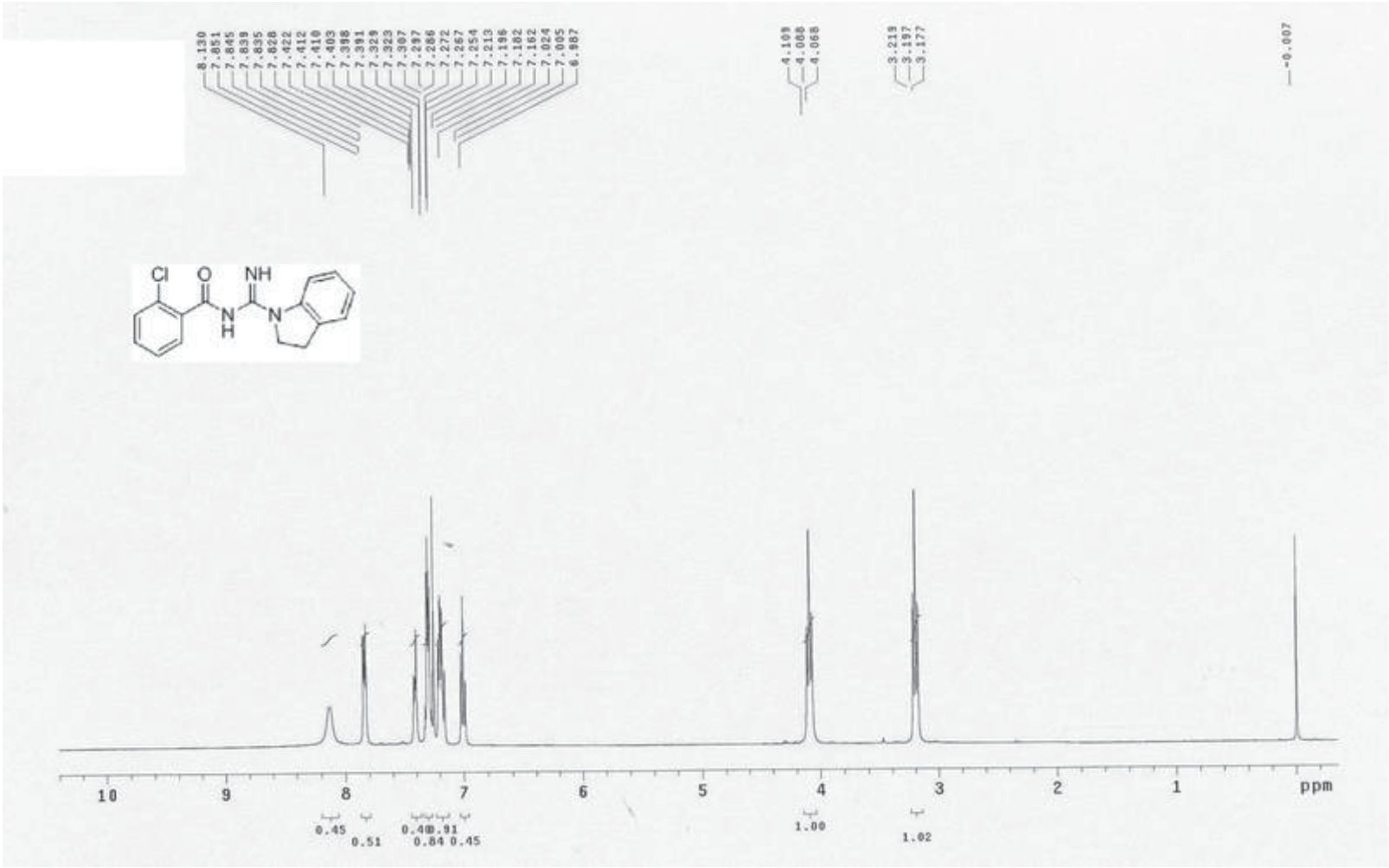
5r-C


177.720
160.198
141.133
138.974
132.141
130.863
130.433
130.118
128.493
127.240
126.167
77.346
77.027
76.709
38.556
29.609
Cl
O
NH
N
Ph
Me
H
200
ppm
(t1)
15
0
10
0
50
0
0
15
0
10
0
50
0

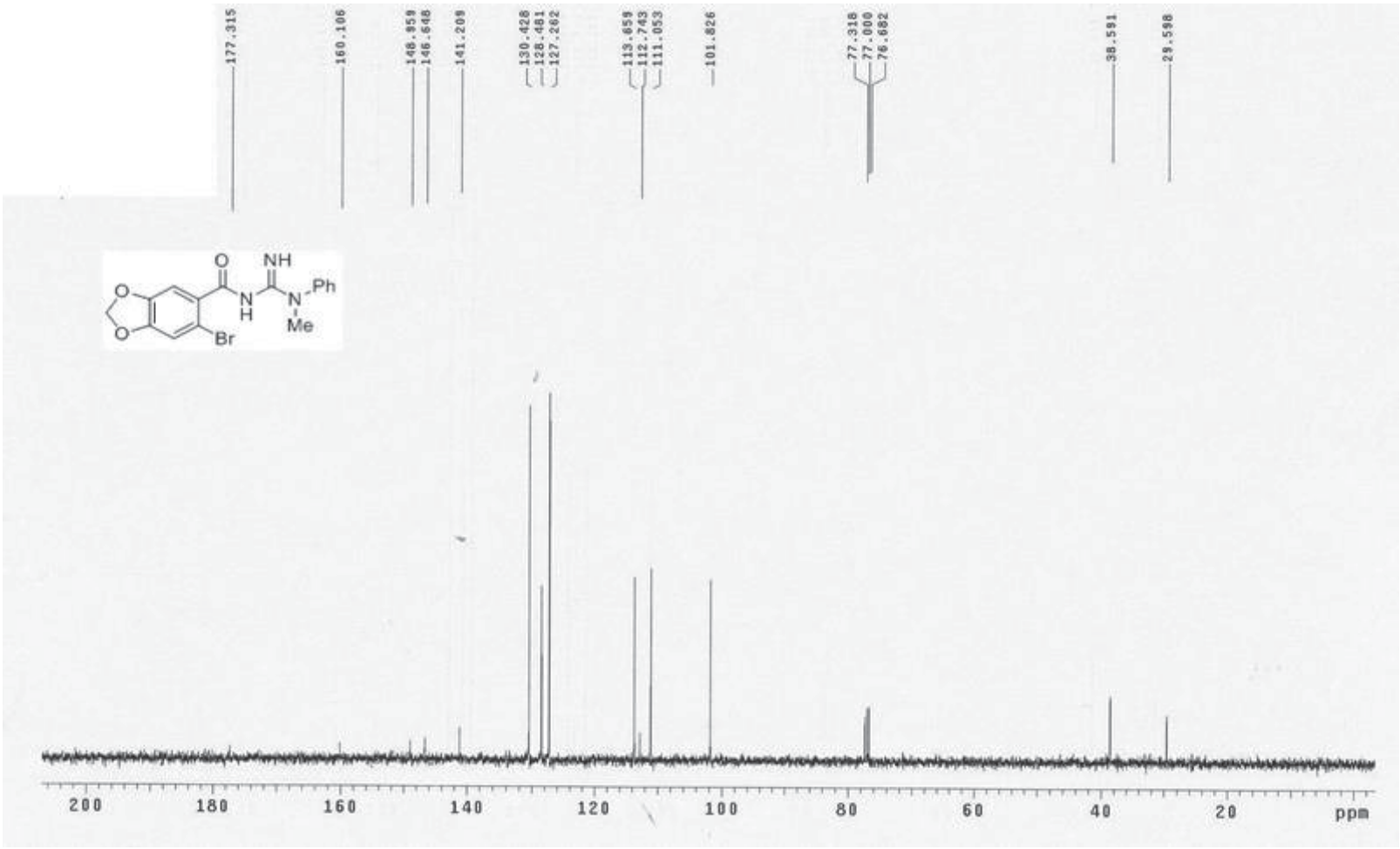
5r-H



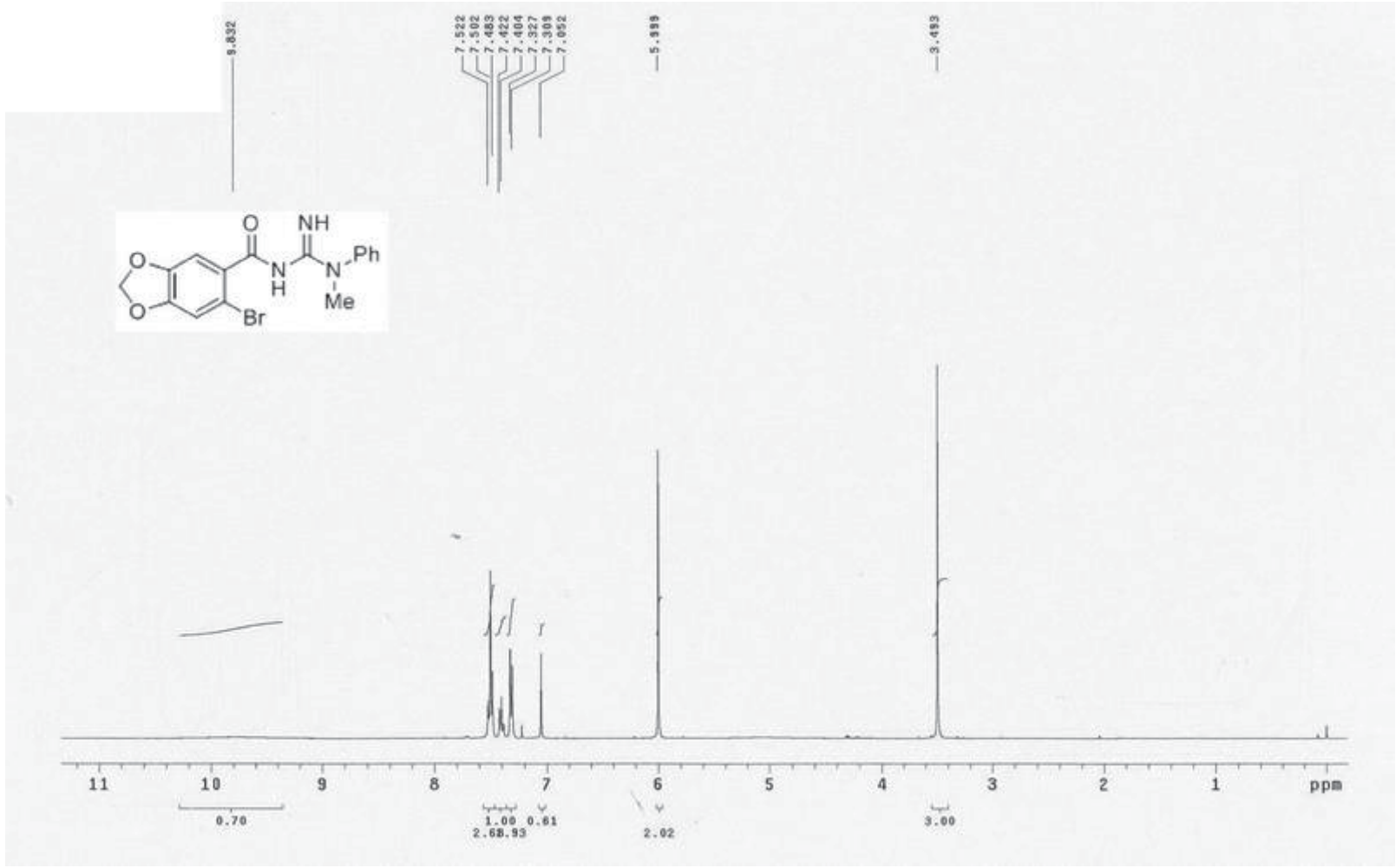
5s-H


8.130
7.851
7.845
7.839
7.835
7.828
7.422
7.412
7.410
7.403
7.398
7.391
7.329
7.323
7.307
7.297
7.286
7.272
7.267
7.254
7.213
7.196
7.182
7.162
7.024
7.005
6.987
4.109
4.088
4.068
3.219
3.197
3.177
-0.007
Cl
O
NH
N
H
N
10
9
8
7
6
5
4
3
2
1
ppm
0.45
0.51
0.40
0.84
0.91
0.45
1.00
1.02

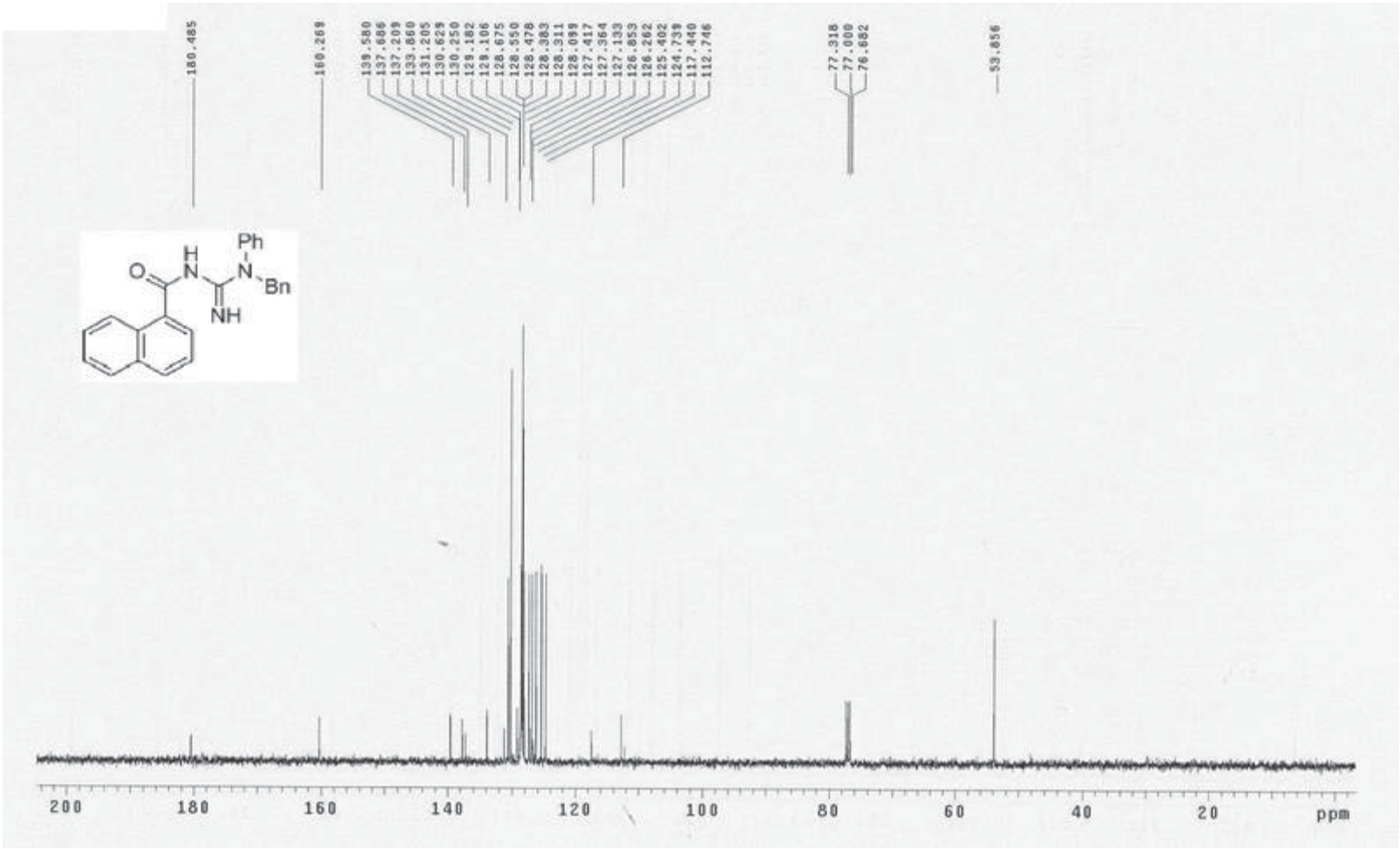
5t-C


177.315
160.106
148.859
146.648
141.209
130.428
128.481
127.262
113.659
112.743
111.053
101.826
77.318
77.000
76.682
38.591
29.598
O
NH
O
N
H
N
Ph
Me
O
Br
200
180
160
140
120
100
80
60
40
20
ppm

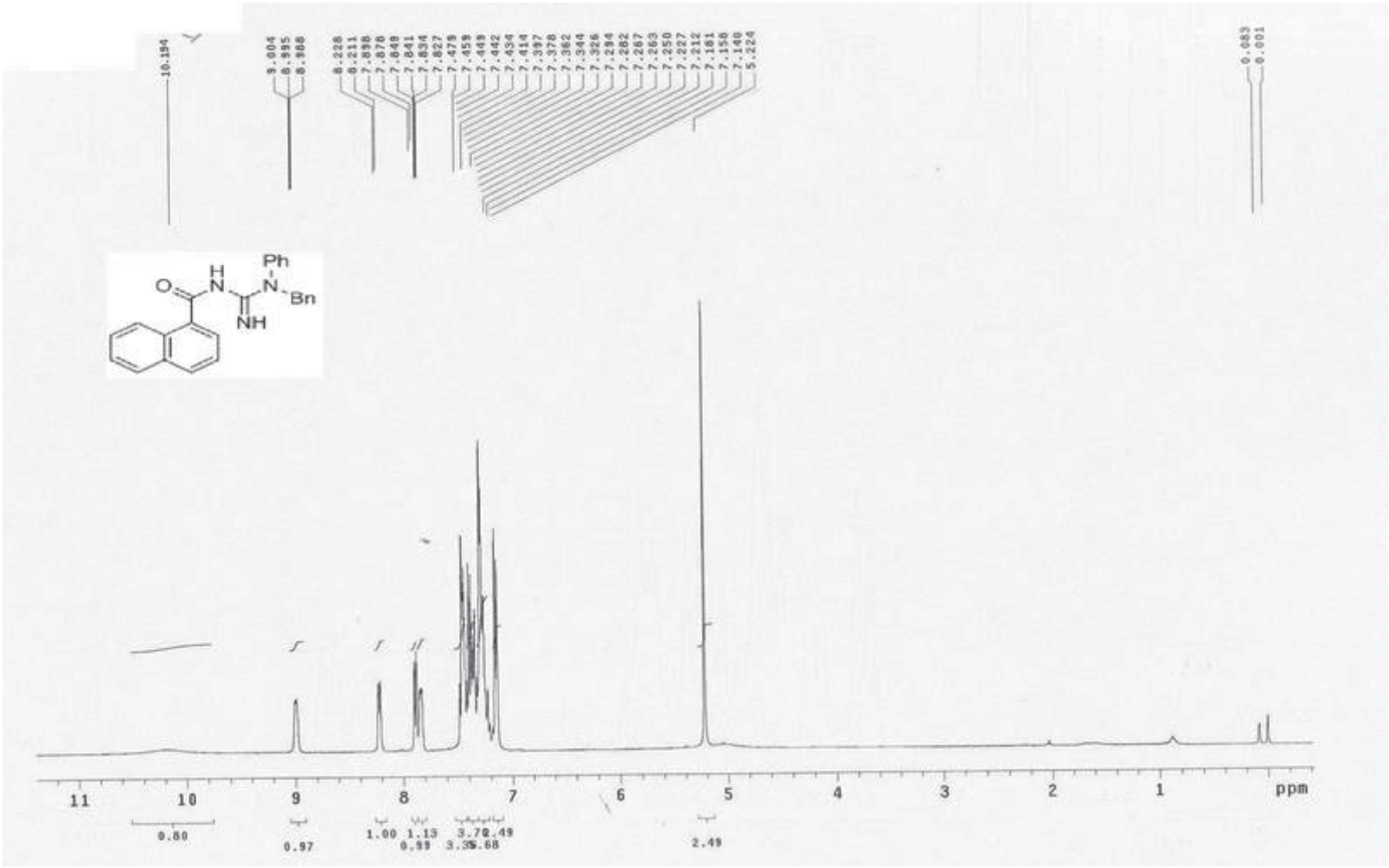
5t-H


8.832
7.522
7.502
7.483
7.422
7.404
7.327
7.309
7.052
5.999
3.493
O
NH
N
H
N
Ph
Me
O
O
Br
11
10
9
8
7
6
5
4
3
2
1
ppm
0.70
1.00
2.68
0.61
2.02
3.00

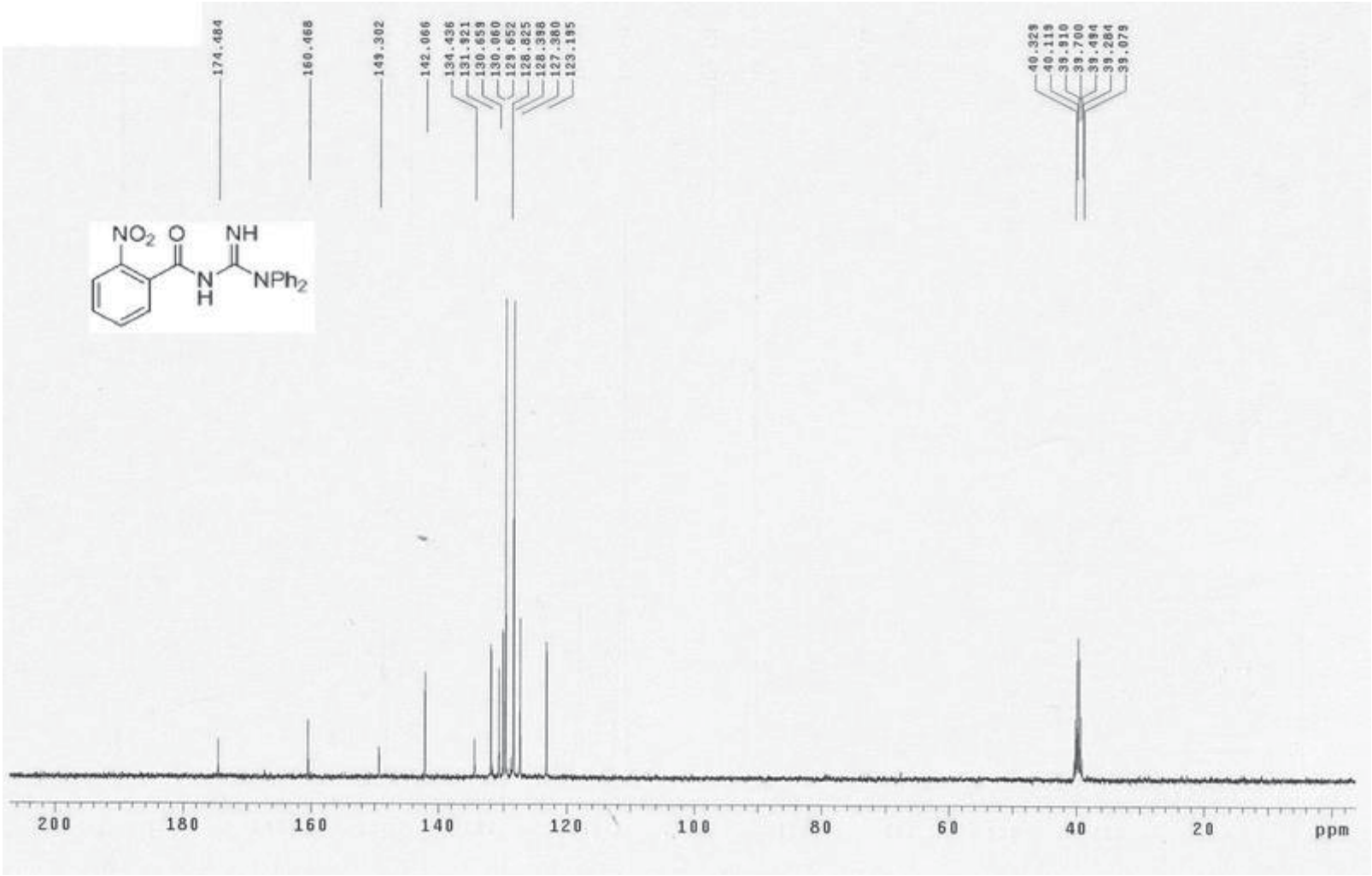
5u-C


180.485
160.269
139.580
137.686
137.209
133.860
131.205
130.629
130.250
129.182
129.106
128.675
128.550
128.478
128.383
128.311
128.099
127.417
127.364
127.133
126.853
126.262
125.402
124.739
117.440
112.746
77.318
77.000
76.682
53.656
O
H
N
N
Ph
Bn
NH
200
180
160
140
120
100
80
60
40
20
ppm

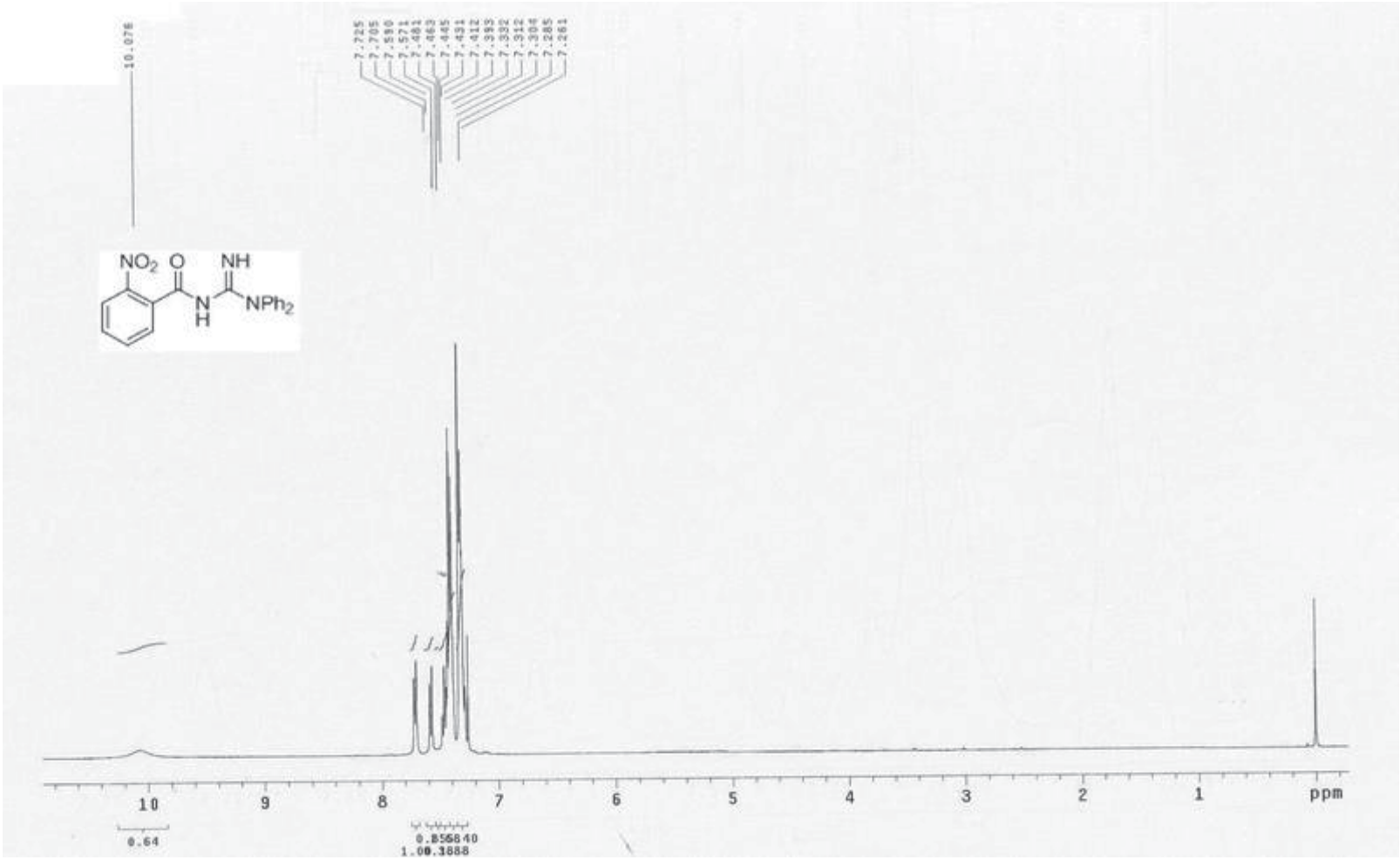
5u-H


10.194
9.004
8.995
8.988
8.228
8.211
7.898
7.876
7.848
7.841
7.834
7.827
7.479
7.459
7.449
7.442
7.434
7.414
7.397
7.378
7.362
7.344
7.326
7.294
7.282
7.267
7.263
7.250
7.227
7.212
7.181
7.156
7.140
5.224
0.083
0.001
Ph
N
Bn
H
N
O
NH
11
10
9
8
7
6
5
4
3
2
1
ppm
0.80
0.97
1.00
1.13
0.99
3.70
2.49
3.35
5.68
2.49

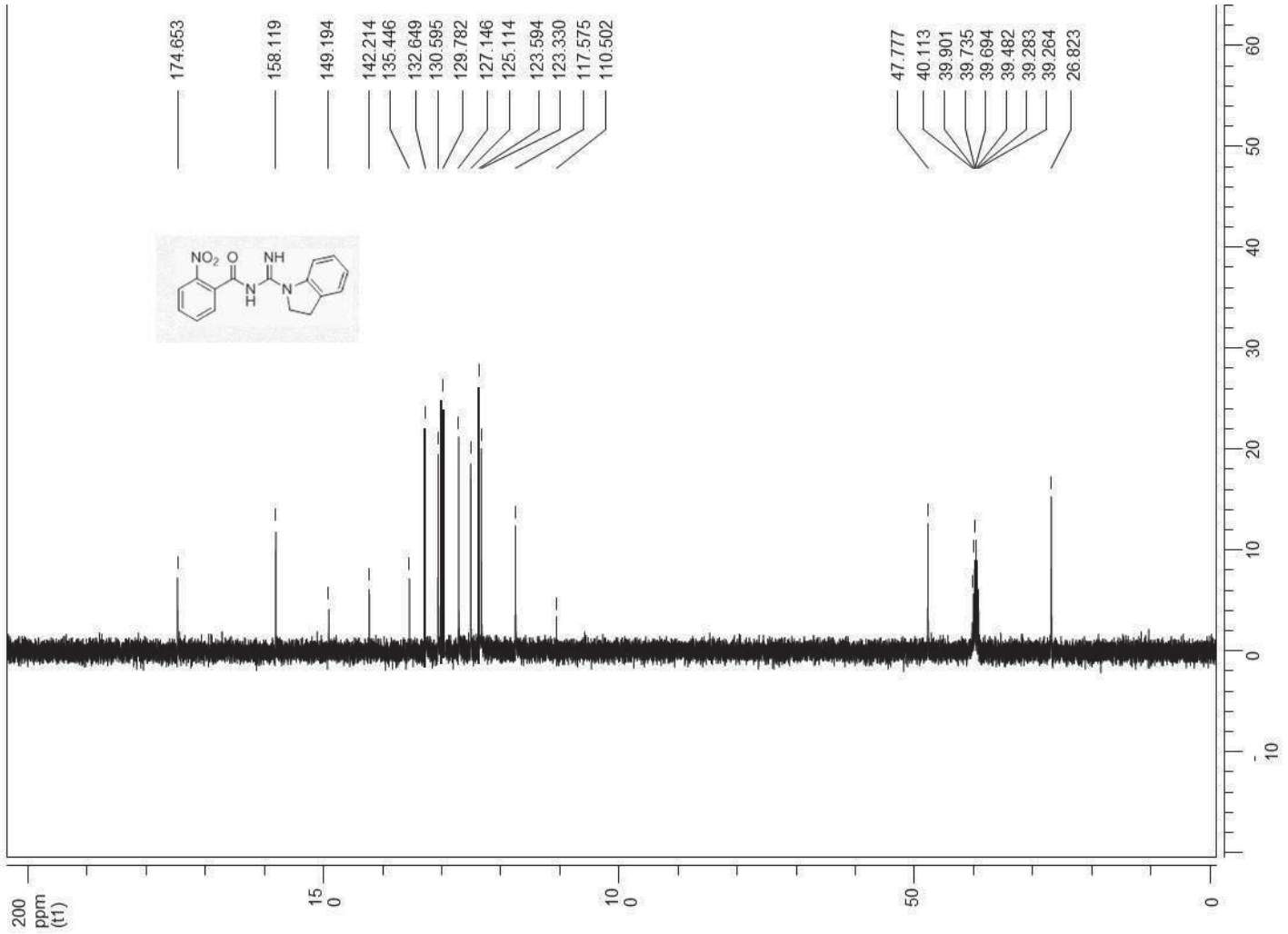
5v-C


174.484
160.468
149.302
142.066
134.436
131.921
130.659
130.060
129.652
128.825
128.398
127.380
123.195
40.329
40.119
39.910
39.700
39.494
39.284
39.079
NO2
O
NH
N
H
NPh2
200
180
160
140
120
100
80
60
40
20
ppm

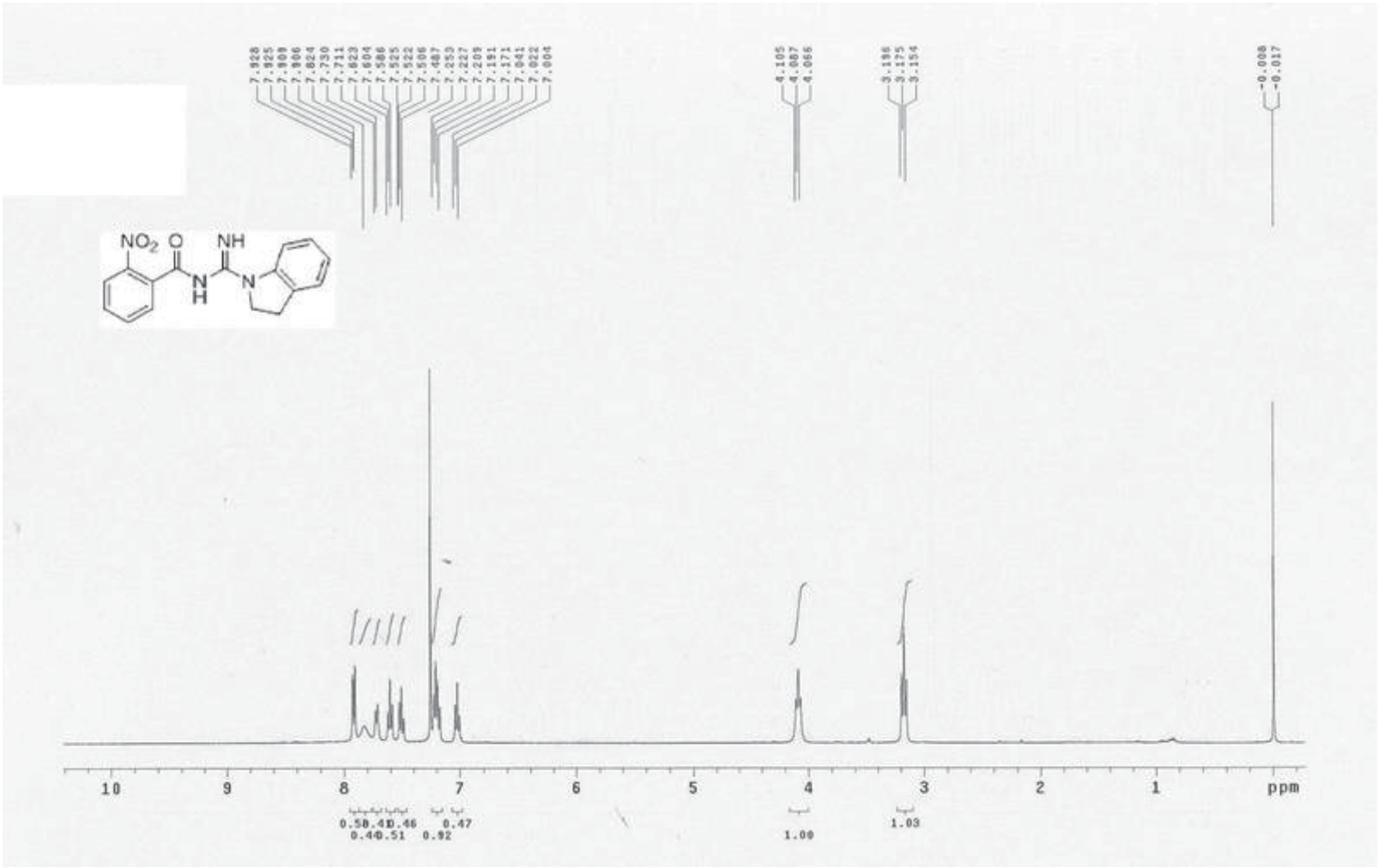
5v-H


10.078
7.725
7.705
7.590
7.571
7.461
7.459
7.445
7.431
7.412
7.389
7.382
7.312
7.304
7.285
7.261
NO2
O
NH
N
H
NPh2
10
9
8
7
6
5
4
3
2
1
ppm
0.64
0.8568
40
1.00
.3888

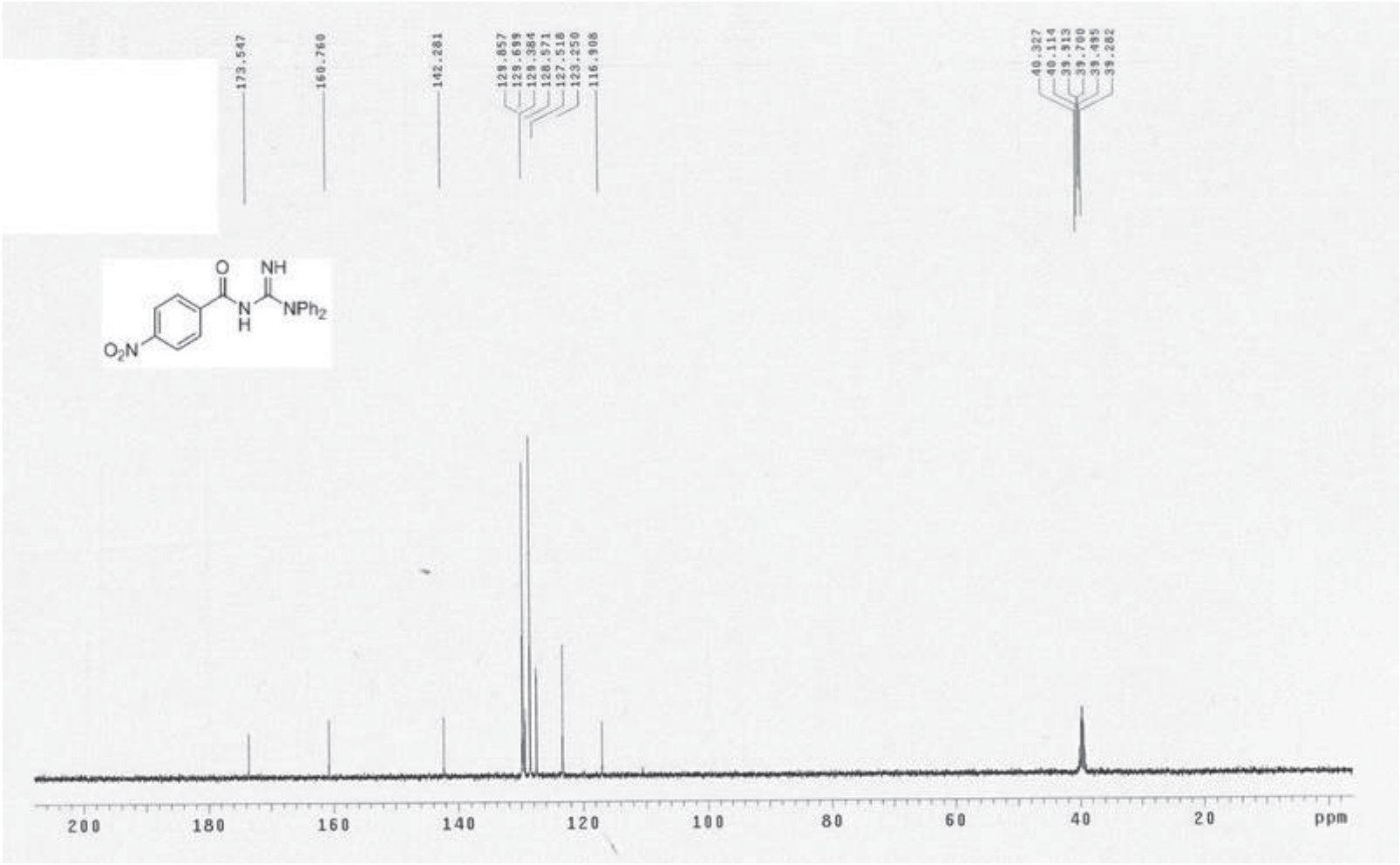
5w-C


174.653
158.119
149.194
142.214
135.446
132.649
130.595
129.782
127.146
125.114
123.594
123.330
117.575
110.502
47.777
40.113
39.901
39.735
39.694
39.482
39.283
39.264
26.823
NO2
O
NH
N
H
N
200
ppm
(t1)
150
100
50
0
60
50
40
30
20
10
0
-10

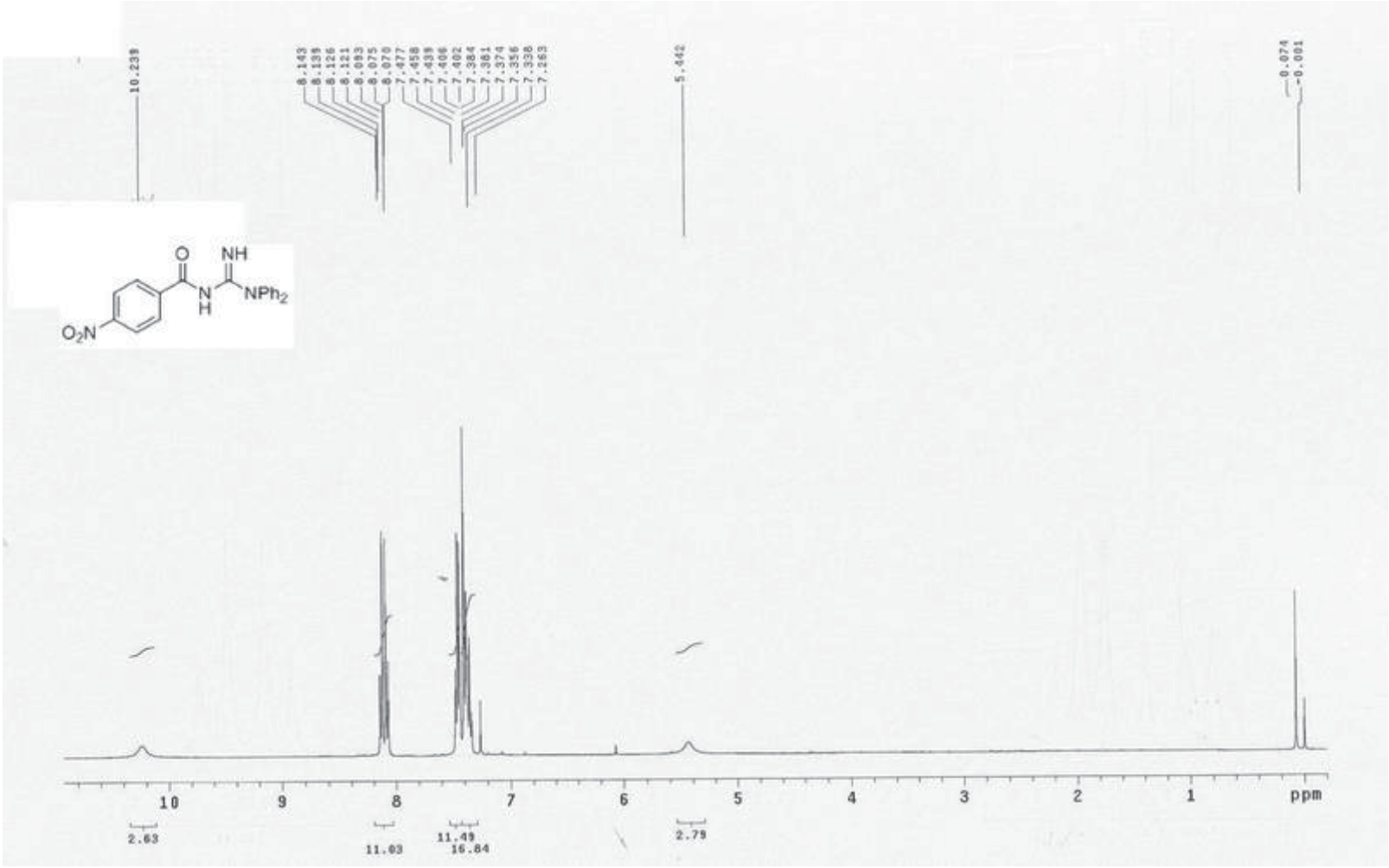
5w-H


7.928
7.925
7.909
7.906
7.824
7.730
7.711
7.623
7.604
7.586
7.525
7.522
7.506
7.487
7.253
7.227
7.209
7.191
7.171
7.041
7.022
7.004
4.105
4.087
4.066
3.196
3.175
3.154
-0.008
-0.017
NO2
O
NH
N
H
N
10
9
8
7
6
5
4
3
2
1
ppm
0.58
0.44
0.46
0.51
0.47
0.92
1.00
1.03

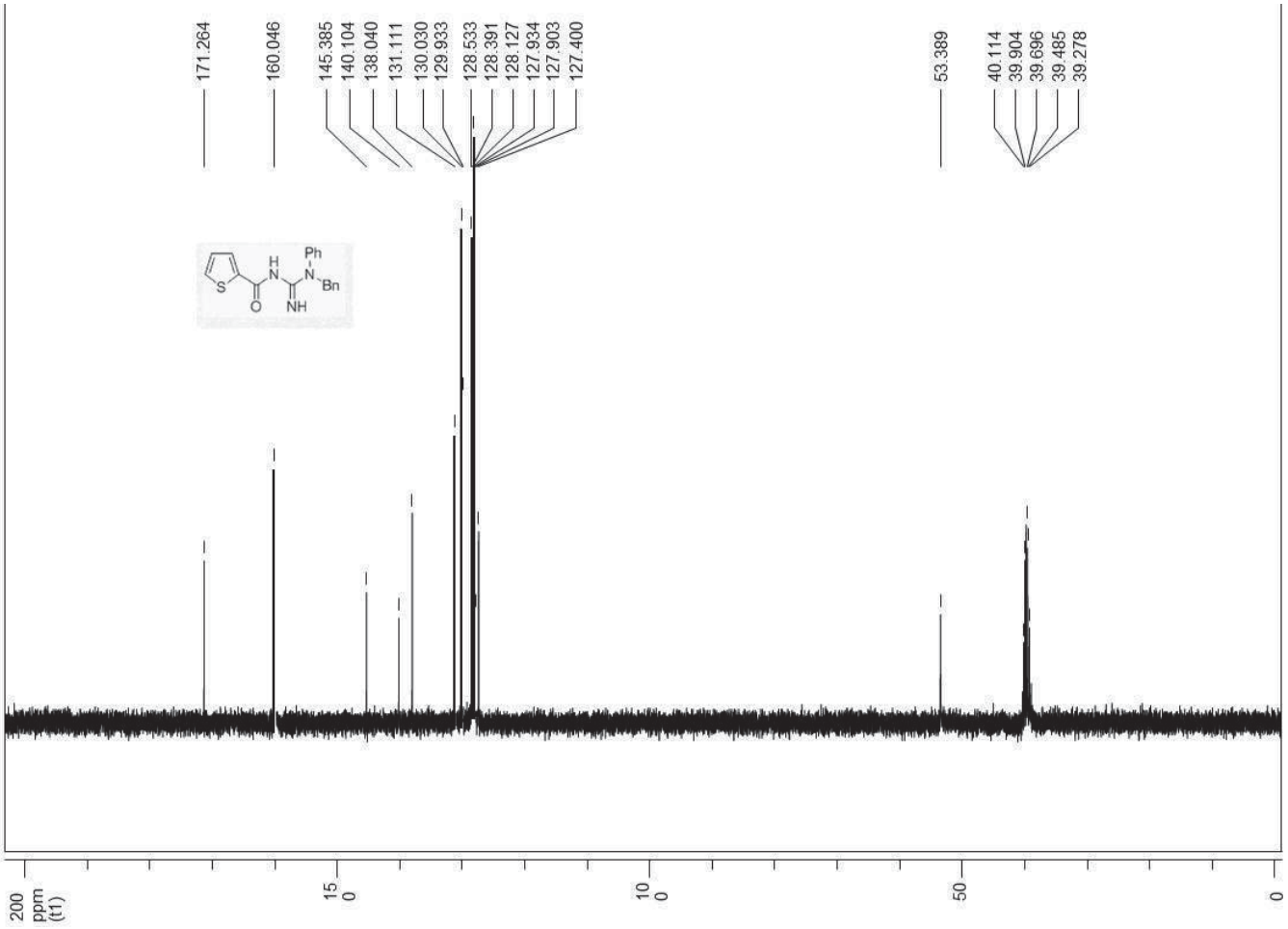
5x-C


173.547
160.760
142.281
129.857
129.699
129.384
128.571
127.518
123.250
116.908
40.327
40.114
39.913
39.700
39.495
39.282
O
NH
N
H
NPh2
O2N
200
180
160
140
120
100
80
60
40
20
ppm

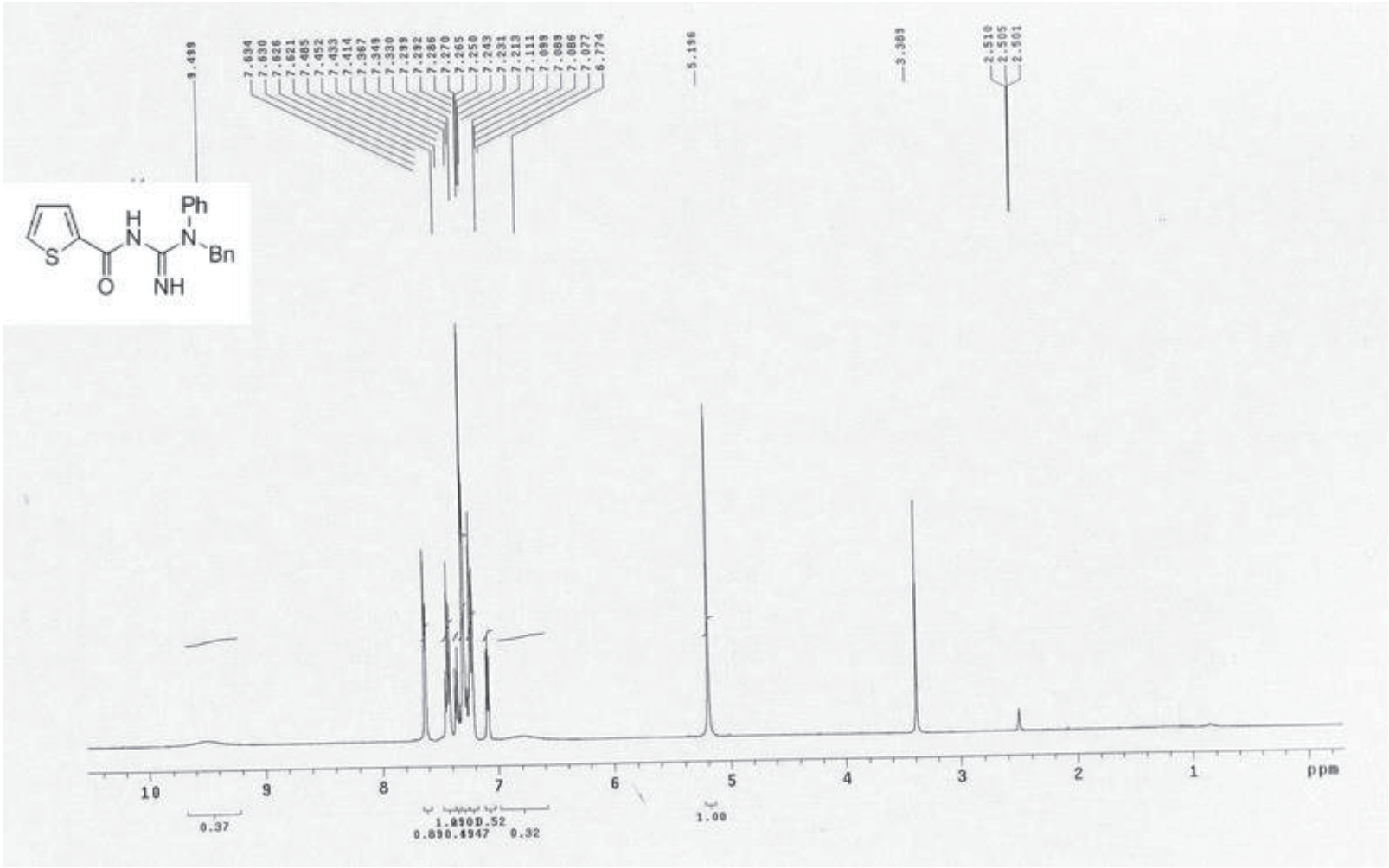
5x-H


10.239
8.143
8.139
8.126
8.121
8.093
8.075
8.070
7.477
7.458
7.439
7.406
7.402
7.384
7.361
7.374
7.356
7.338
7.263
5.442
0.074
-0.001
O
NH
N
H
NPh2
O2N
10
9
8
7
6
5
4
3
2
1
ppm
2.63
11.03
11.49
16.84
2.79

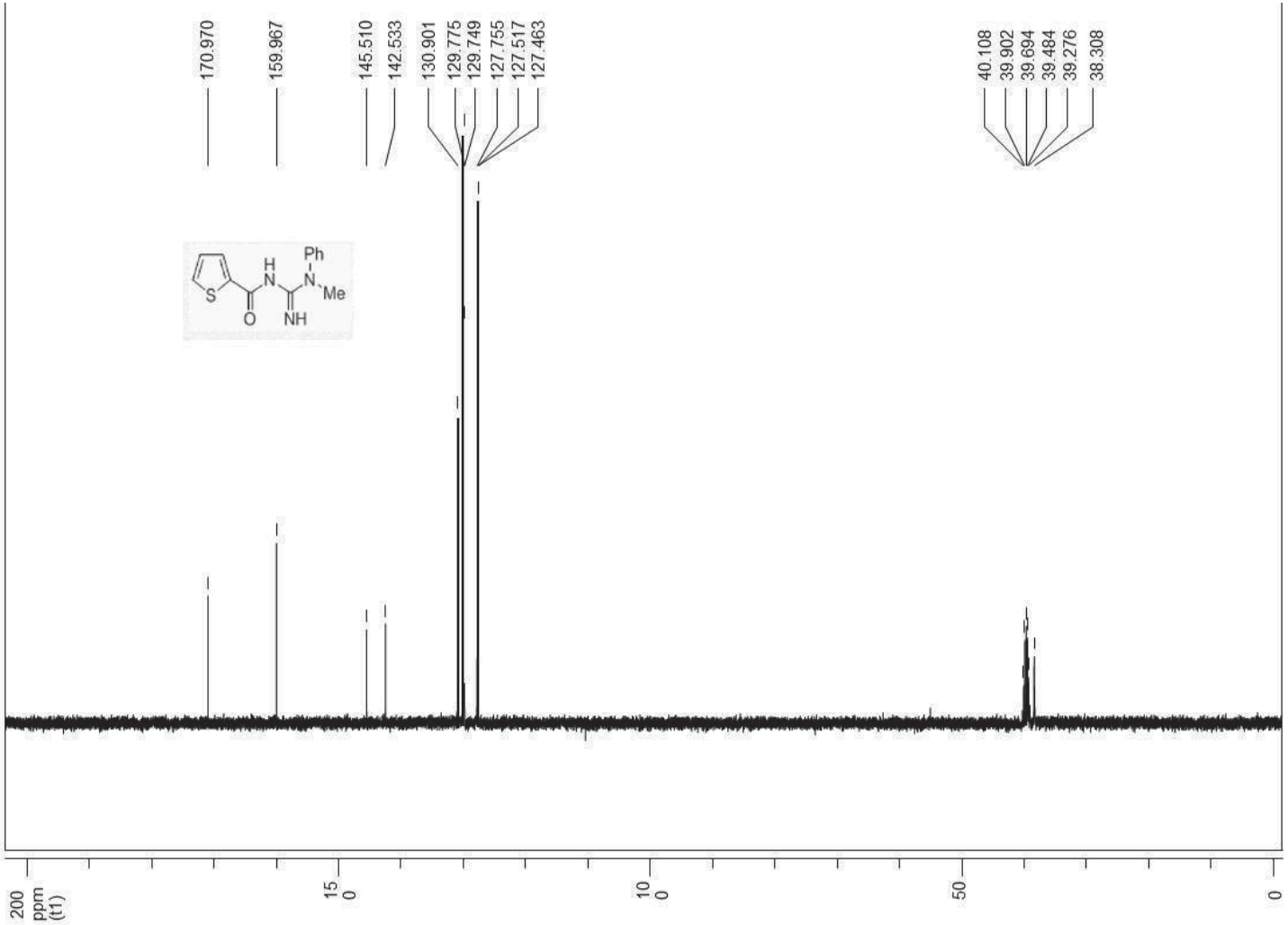
5y-C


171.264
160.046
145.385
140.104
138.040
131.111
130.030
129.933
128.533
128.391
128.127
127.934
127.903
127.400
53.389
40.114
39.904
39.696
39.485
39.278
Ph
N
Bn
H
N
S
O
NH
200
ppm
(f1)
150
100
50
0

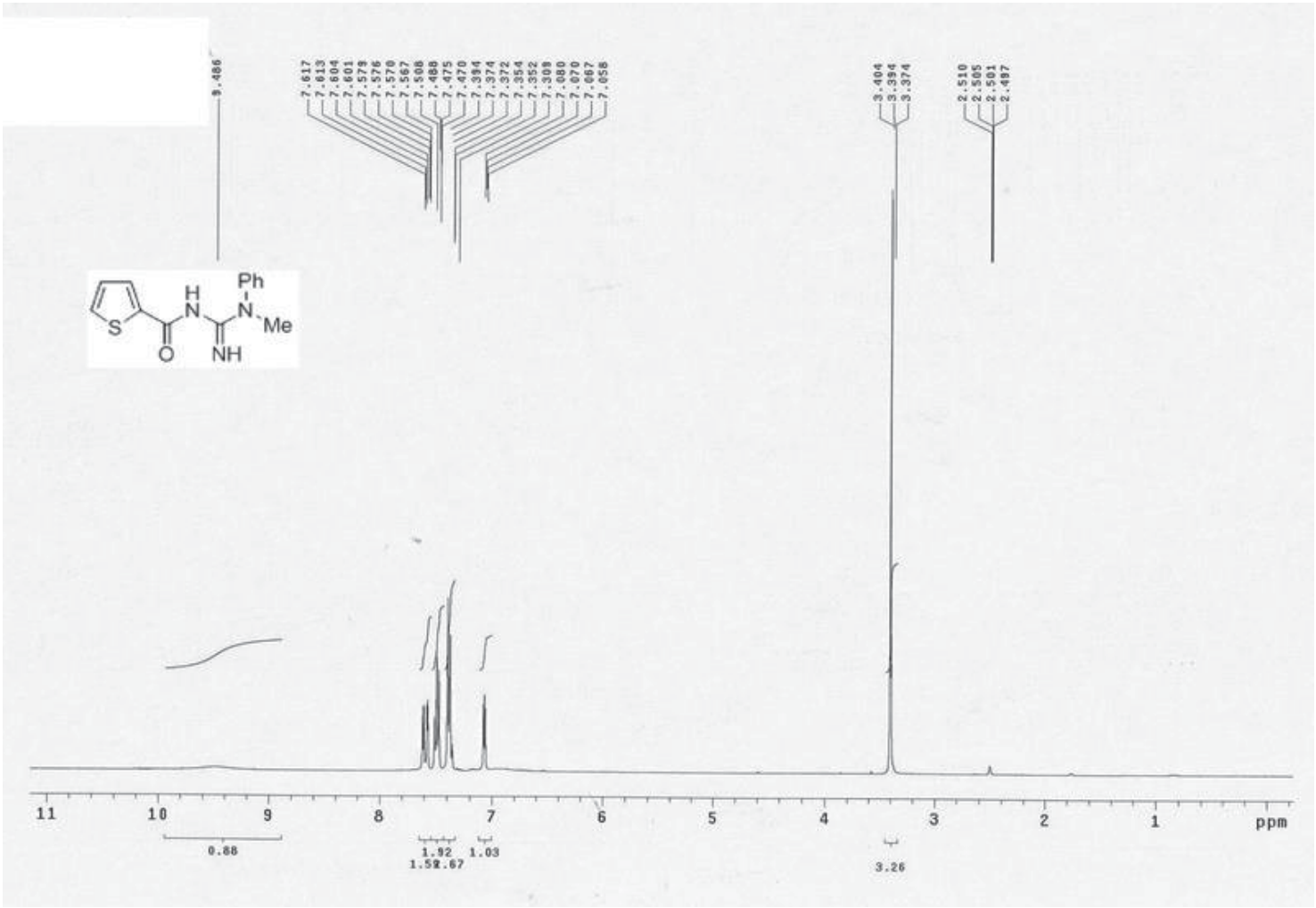
5y-H


9.499
7.634
7.630
7.626
7.621
7.485
7.452
7.433
7.414
7.367
7.349
7.330
7.299
7.292
7.286
7.270
7.265
7.250
7.243
7.231
7.213
7.111
7.099
7.083
7.066
7.077
6.774
5.196
3.389
2.510
2.505
2.501
Ph
N
H
N
Bn
S
O
NH
10
9
8
7
6
5
4
3
2
1
ppm
0.37
1.00
0.32

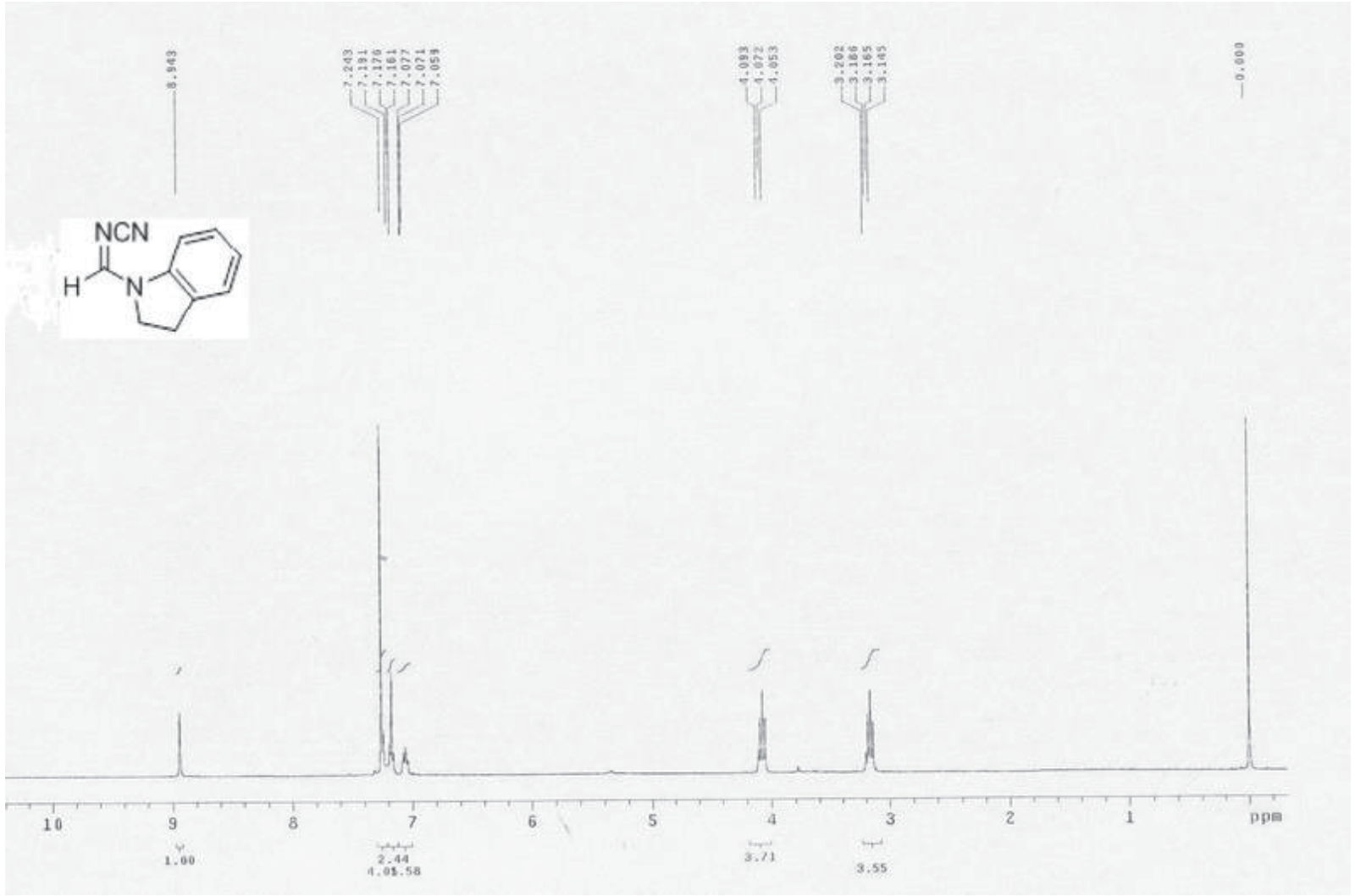
5z-C


170.970
159.967
145.510
142.533
130.901
129.775
129.749
127.755
127.517
127.463
40.108
39.902
39.694
39.484
39.276
38.308
Ph
N
H
N
Me
S
O
NH
200
ppm
(t1)
150
100
50
0

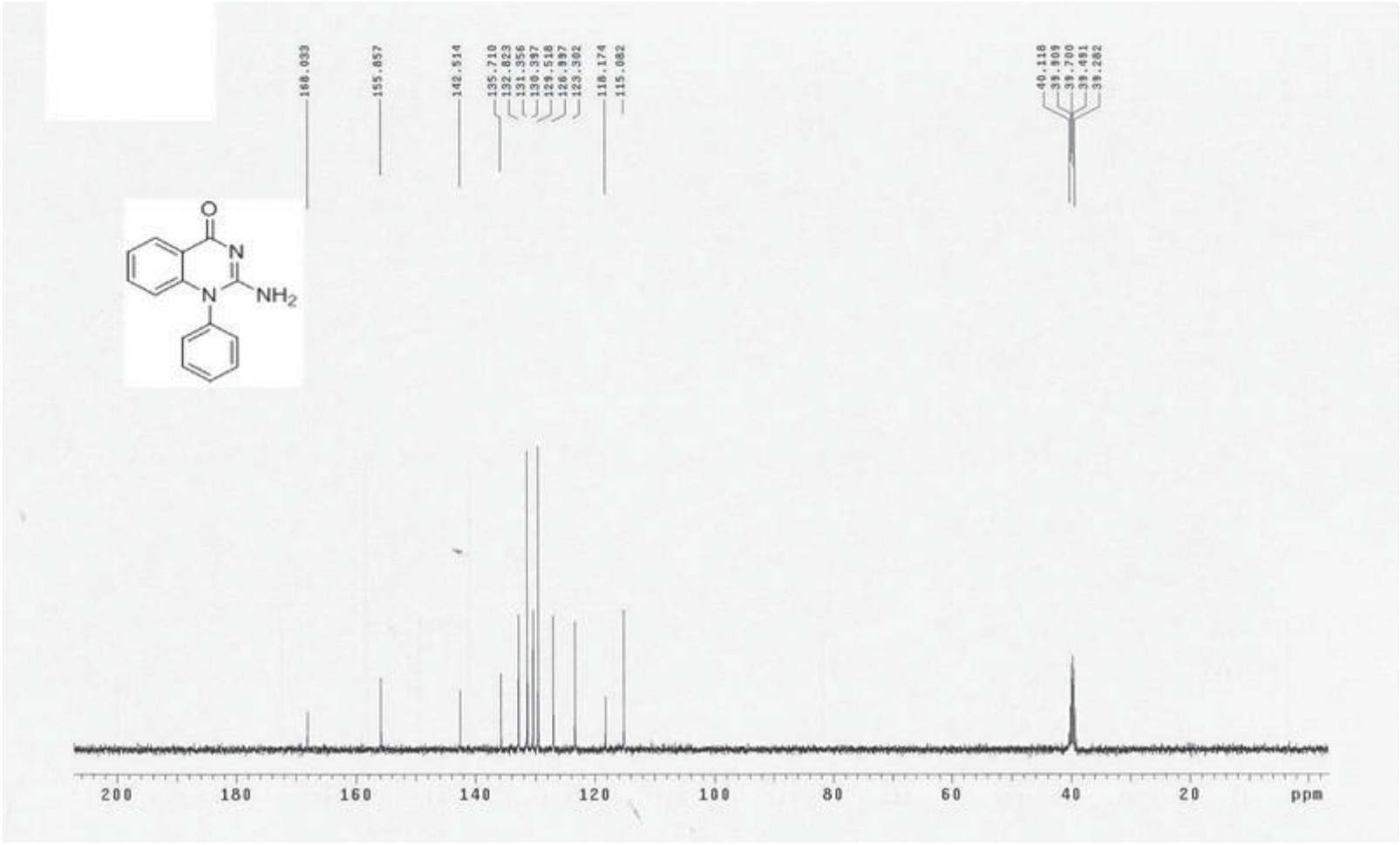
5z-H


9.486
7.617
7.613
7.604
7.601
7.579
7.576
7.570
7.567
7.508
7.488
7.475
7.470
7.394
7.374
7.372
7.354
7.352
7.309
7.080
7.070
7.067
7.058
3.404
3.394
3.374
2.510
2.505
2.501
2.497
H
N
Ph
N
Me
S
O
NH
11
10
9
8
7
6
5
4
3
2
1
ppm
0.88
1.92
1.03
3.26

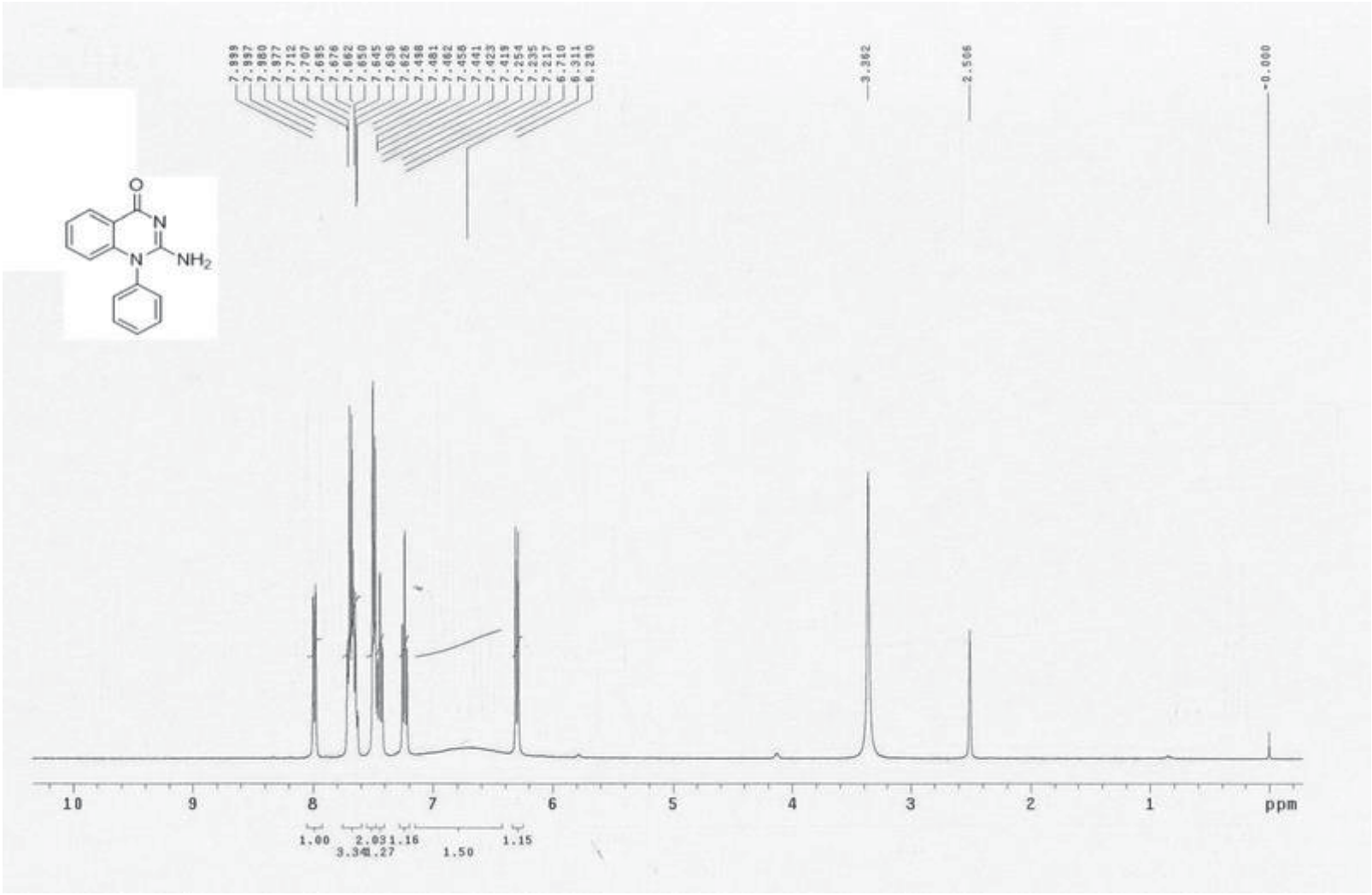
6o-H


8.943
7.243
7.191
7.176
7.161
7.077
7.071
7.059
4.093
4.072
4.053
3.202
3.186
3.165
3.145
0.000
NCN
H
N
10
9
8
7
6
5
4
3
2
1
ppm
1.00
2.44
4.05.58
3.71
3.55

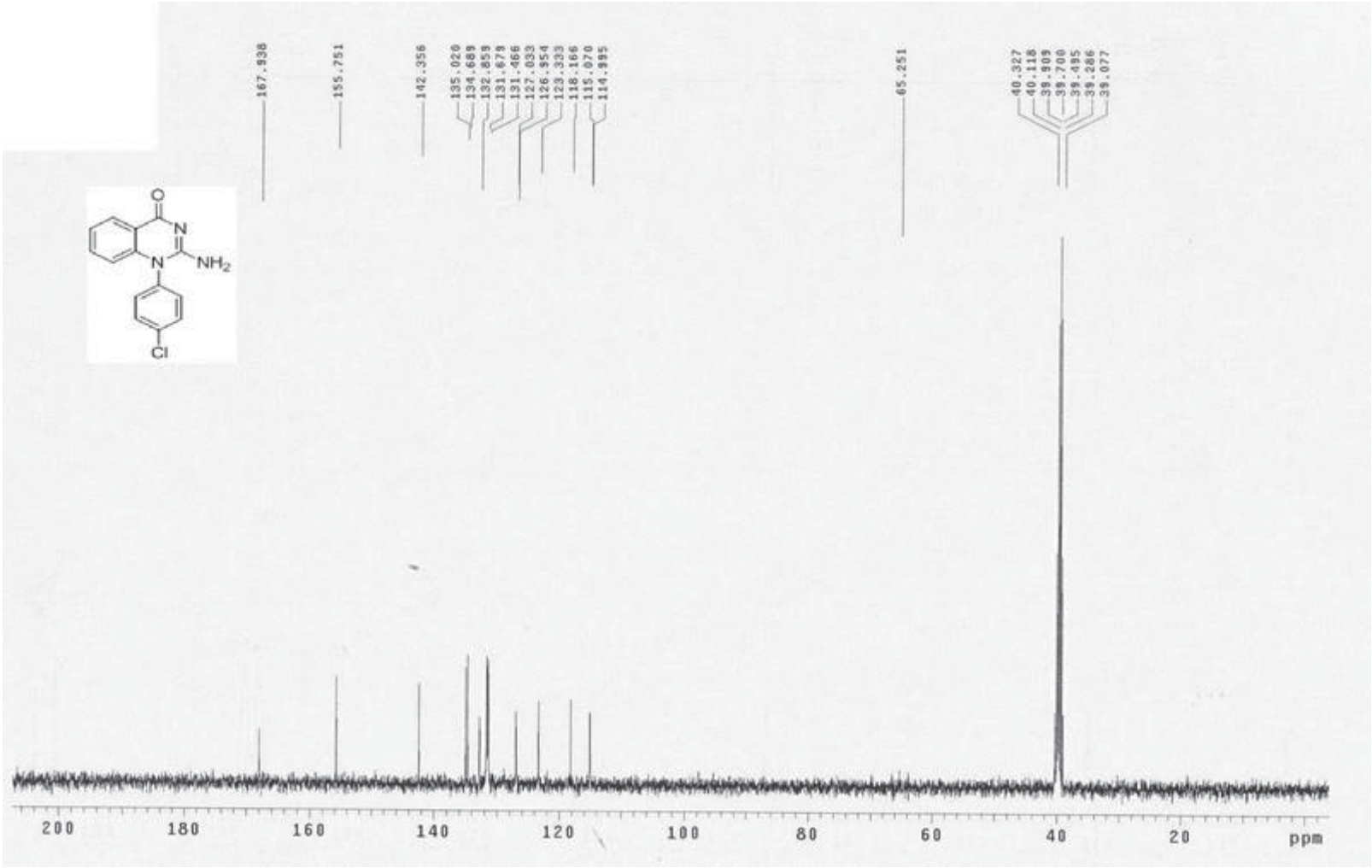
7a-C


168.033
155.857
142.514
135.710
132.823
131.356
130.397
129.518
126.897
123.302
118.174
115.082
40.118
39.909
39.700
39.491
39.282
O
N
N
NH2
200
180
160
140
120
100
80
60
40
20
ppm

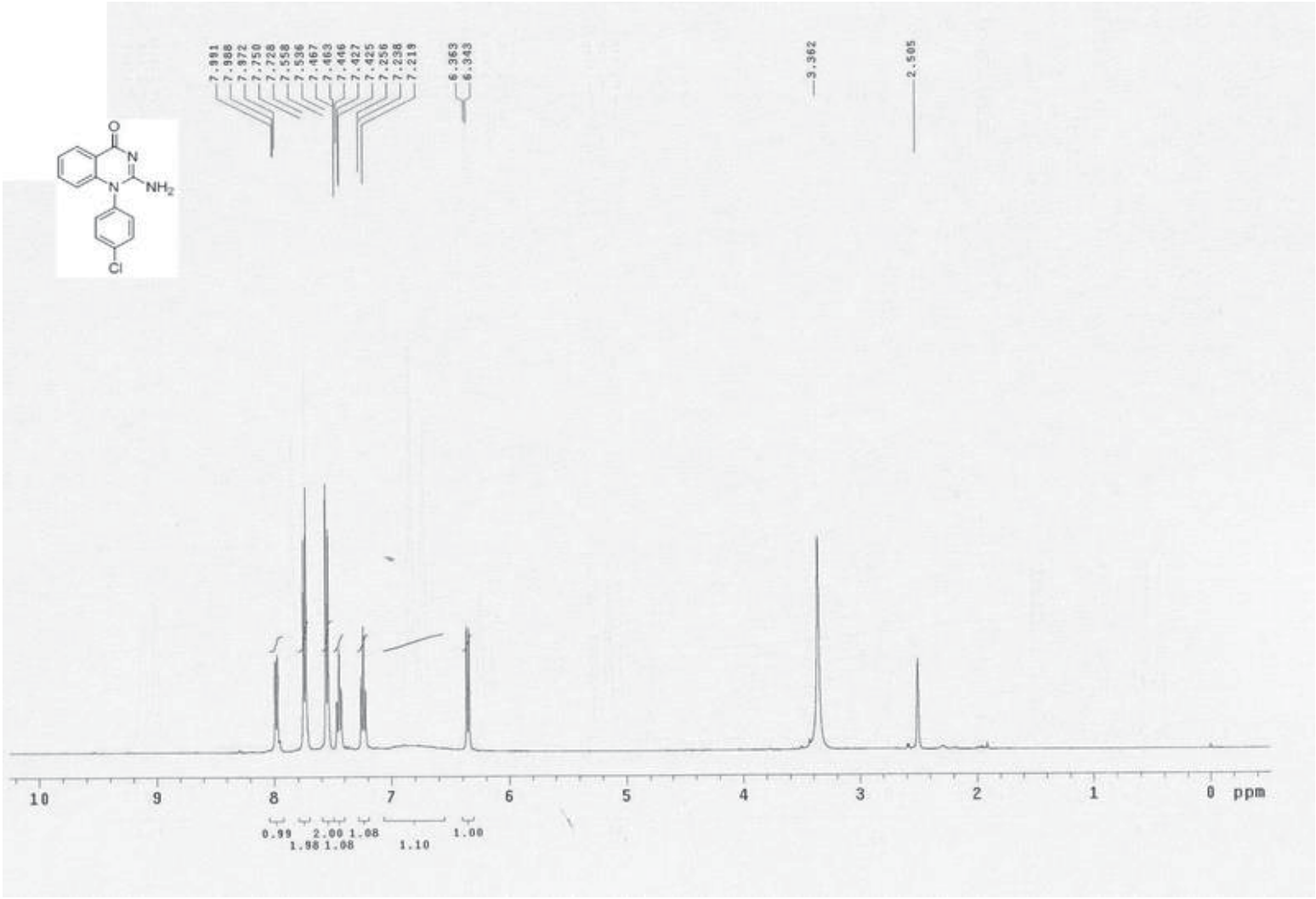
7a-H


7.999
7.997
7.980
7.977
7.712
7.707
7.695
7.676
7.662
7.650
7.645
7.636
7.626
7.438
7.481
7.462
7.456
7.441
7.423
7.419
7.254
7.235
7.217
6.710
6.311
6.290
3.362
2.506
0.000
O
N
N
NH2
10
9
8
7
6
5
4
3
2
1
ppm
1.00
2.03
1.16
1.15
3.34
1.27
1.50

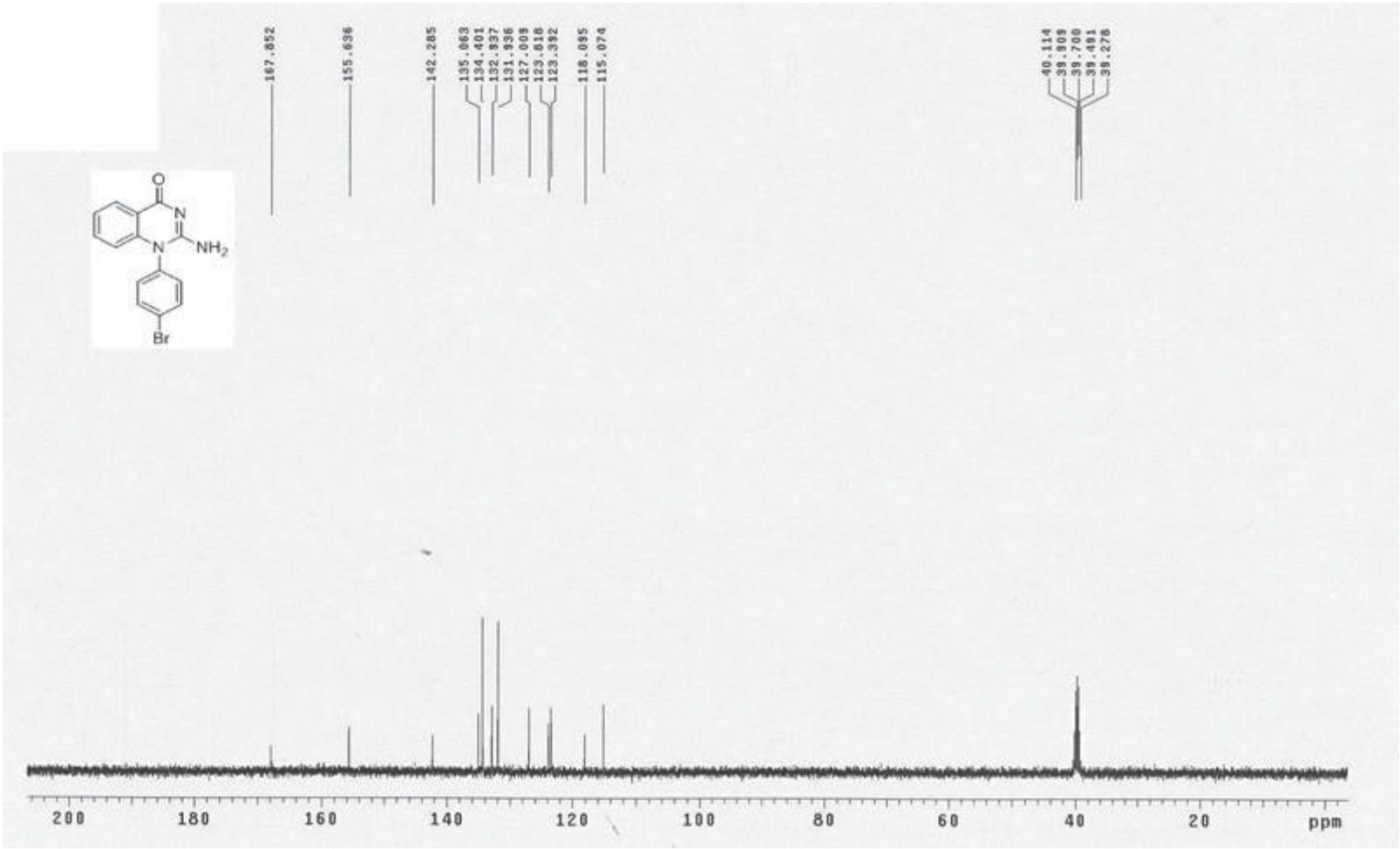
7b-C


167.938
155.751
142.356
135.020
134.689
132.859
131.679
131.466
127.033
126.954
123.333
118.166
115.070
114.995
65.251
40.327
40.118
39.909
39.700
39.495
39.286
39.077
O
N
N
NH2
Cl
200
180
160
140
120
100
80
60
40
20
ppm

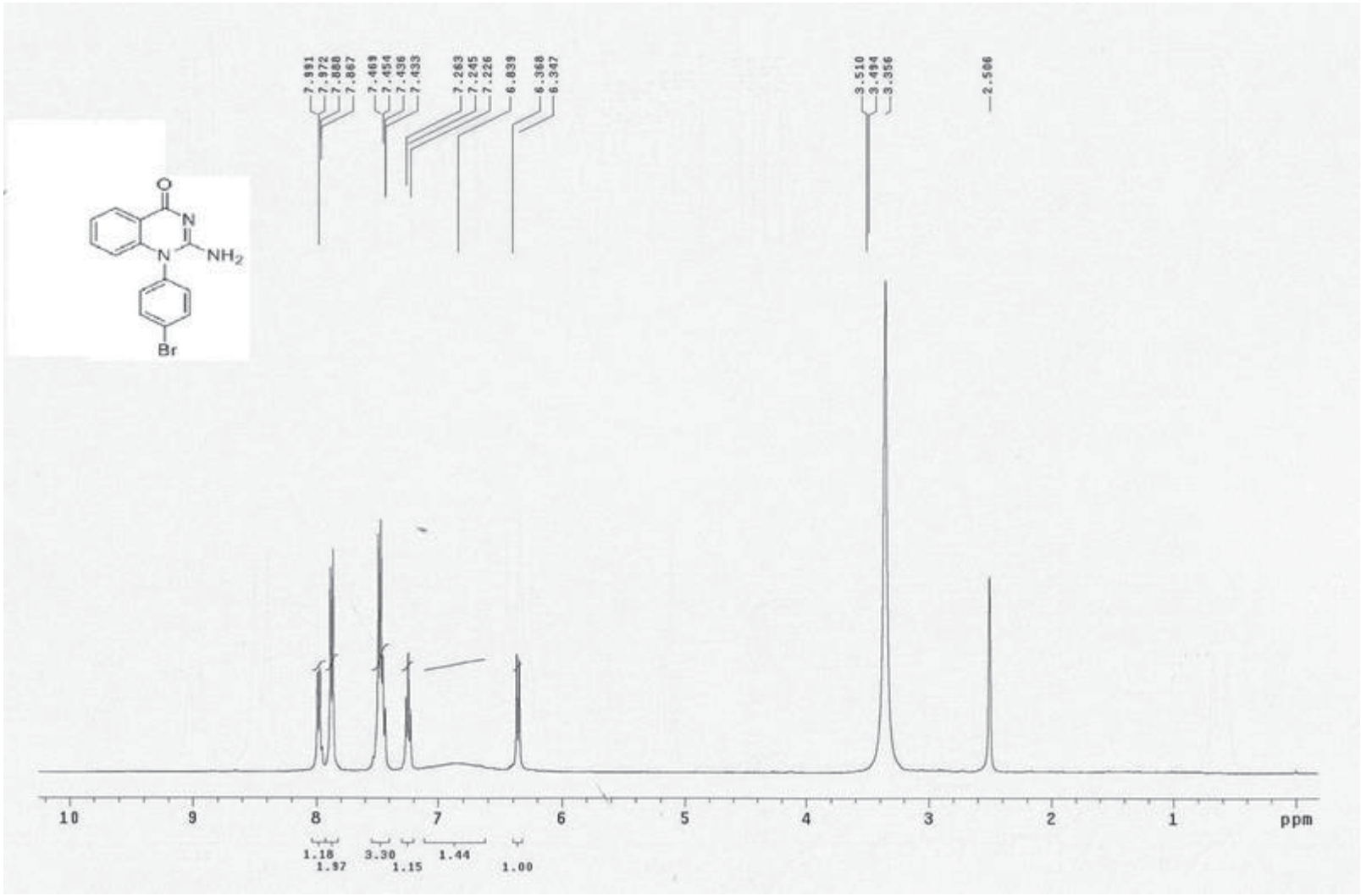
7b-H


7.991
7.988
7.972
7.750
7.728
7.558
7.536
7.467
7.463
7.446
7.427
7.425
7.256
7.238
7.219
6.363
6.343
3.362
2.505
O
N
NH2
N
Cl
10
9
8
7
6
5
4
3
2
1
0 ppm
0.99
2.00
1.08
1.08
1.10
1.00

7c-C


167.852
155.636
142.285
135.063
134.401
132.937
131.936
127.009
123.618
123.392
118.095
115.074
40.114
39.909
39.700
39.491
39.278
O
N
N
NH2
Br
200
180
160
140
120
100
80
60
40
20
ppm

7c-H


7.391
7.372
7.888
7.867
7.469
7.454
7.436
7.433
7.263
7.245
7.226
6.839
6.368
6.347
3.510
3.494
3.356
2.506
O
N
N
NH2
Br
10
9
8
7
6
5
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3
2
1
ppm
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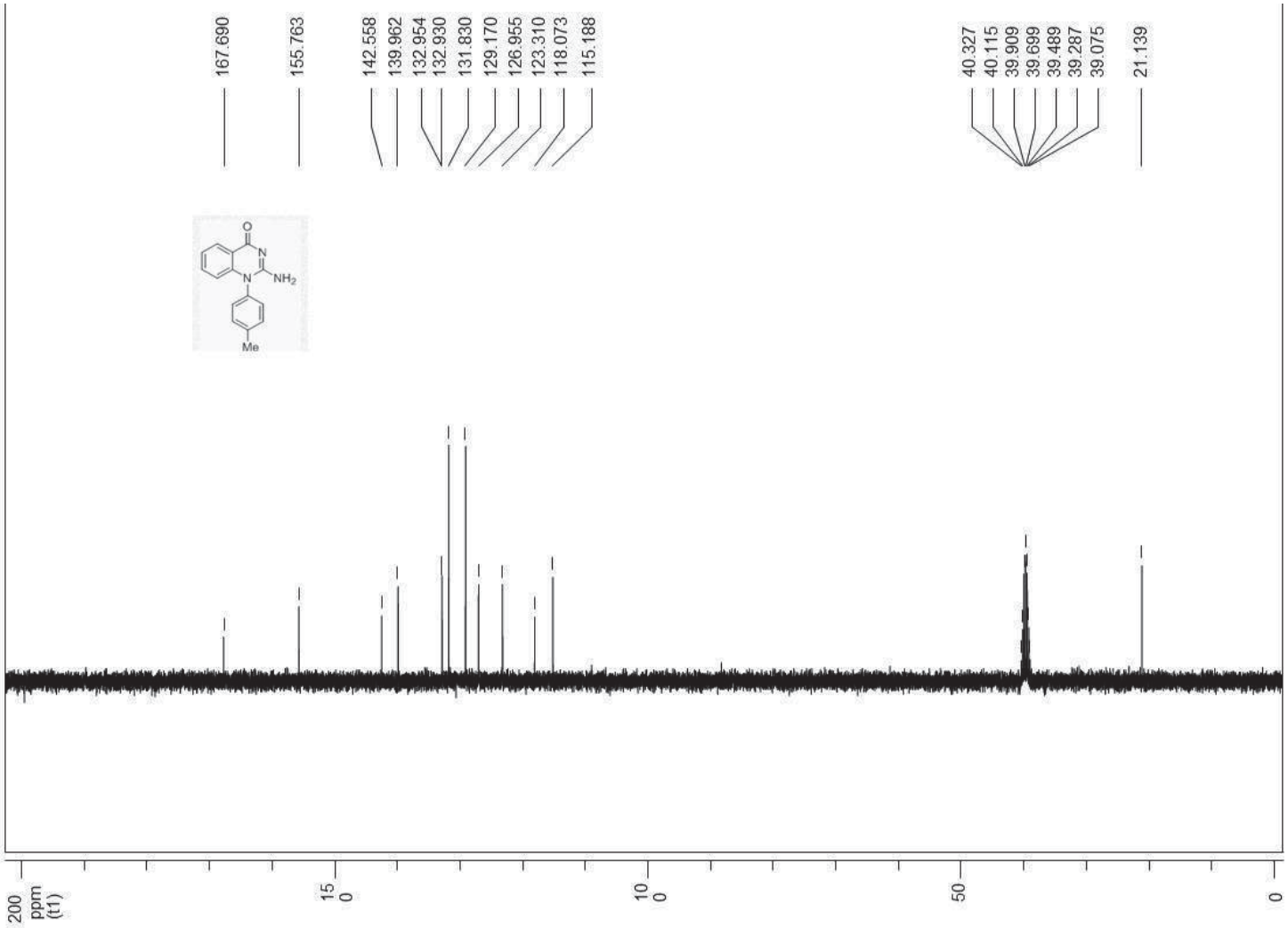
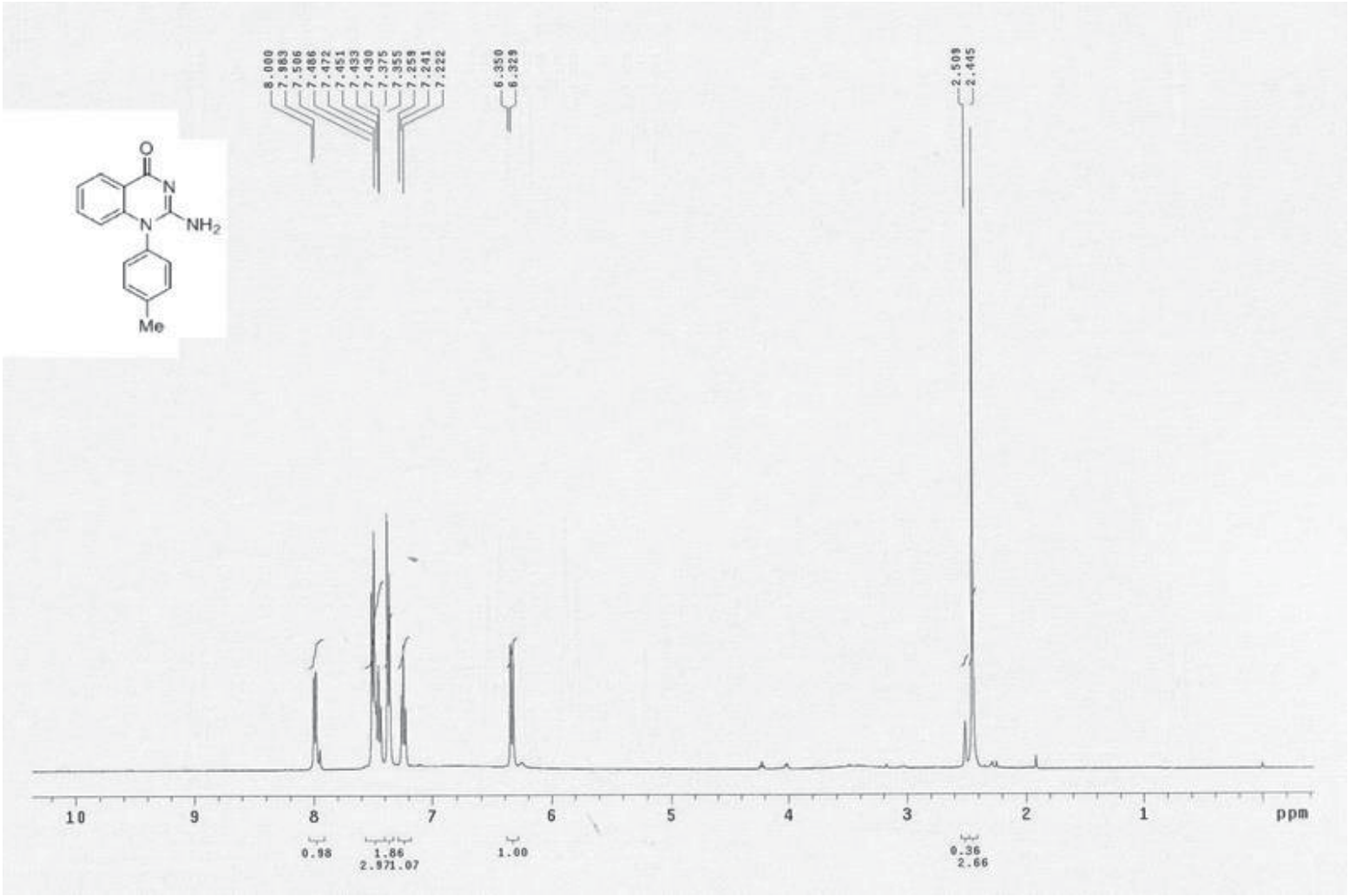
3.30
1.15
1.44
1.00

7d-C


167.690
155.763
142.558
139.962
132.954
132.930
131.830
129.170
126.955
123.310
118.073
115.188
40.327
40.115
39.909
39.699
39.489
39.287
39.075
21.139
O
N
NH2
N
Me
200
ppm
(t1)
150
100
50
0

7d-H


8.000
7.983
7.506
7.486
7.472
7.451
7.433
7.430
7.375
7.355
7.259
7.241
7.222
6.350
6.329
2.509
2.445
O
N
N
NH2
Me
10
9
8
7
6
5
4
3
2
1
ppm
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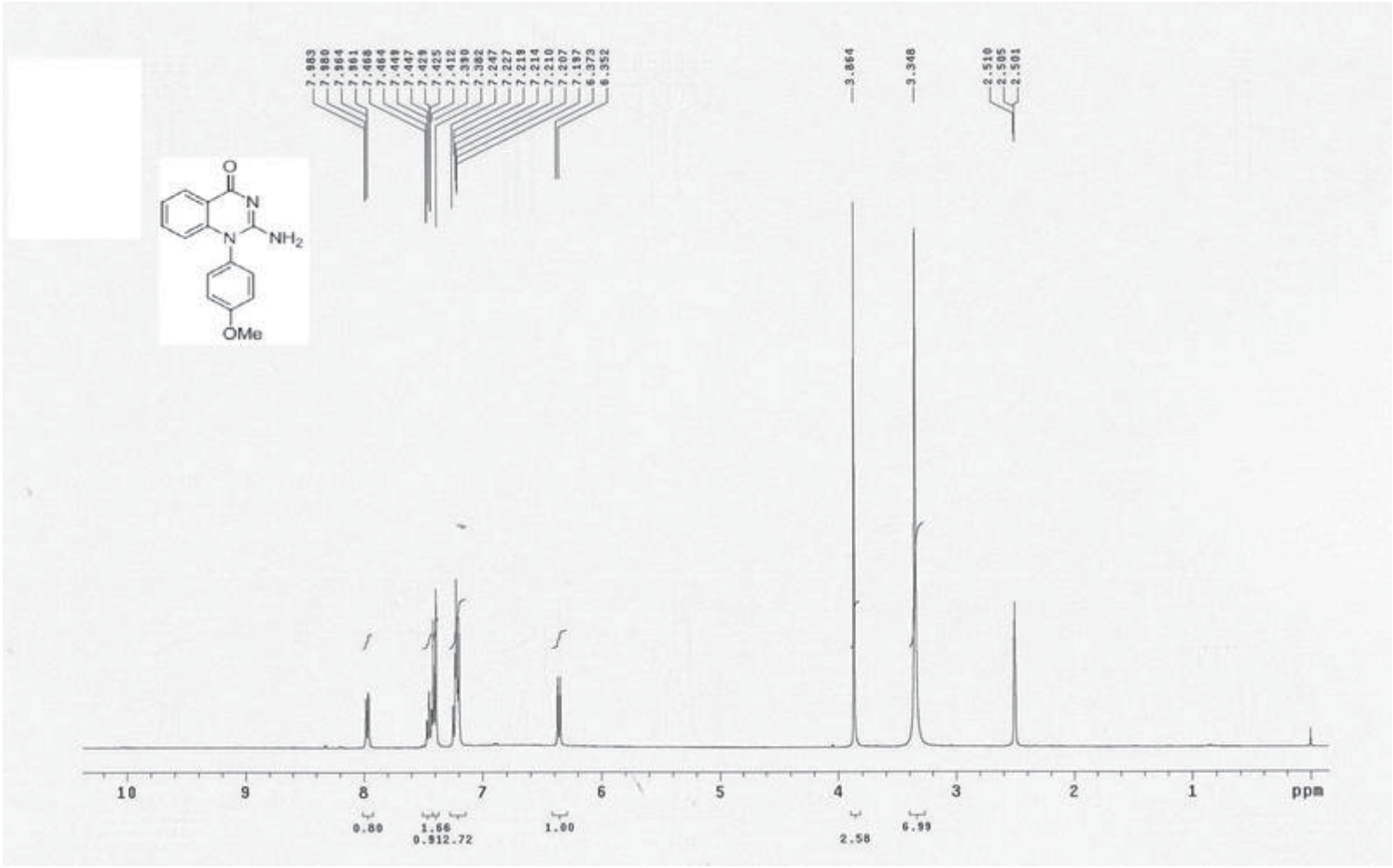
2.971.07
1.00
0.36
2.66

7e-H


7.983
7.980
7.964
7.961
7.466
7.464
7.449
7.447
7.429
7.425
7.412
7.390
7.382
7.247
7.227
7.219
7.214
7.210
7.207
7.197
6.373
6.352
3.864
3.348
2.510
2.505
2.501
O
N
N
NH2
OMe
10
9
8
7
6
5
4
3
2
1
ppm
0.80
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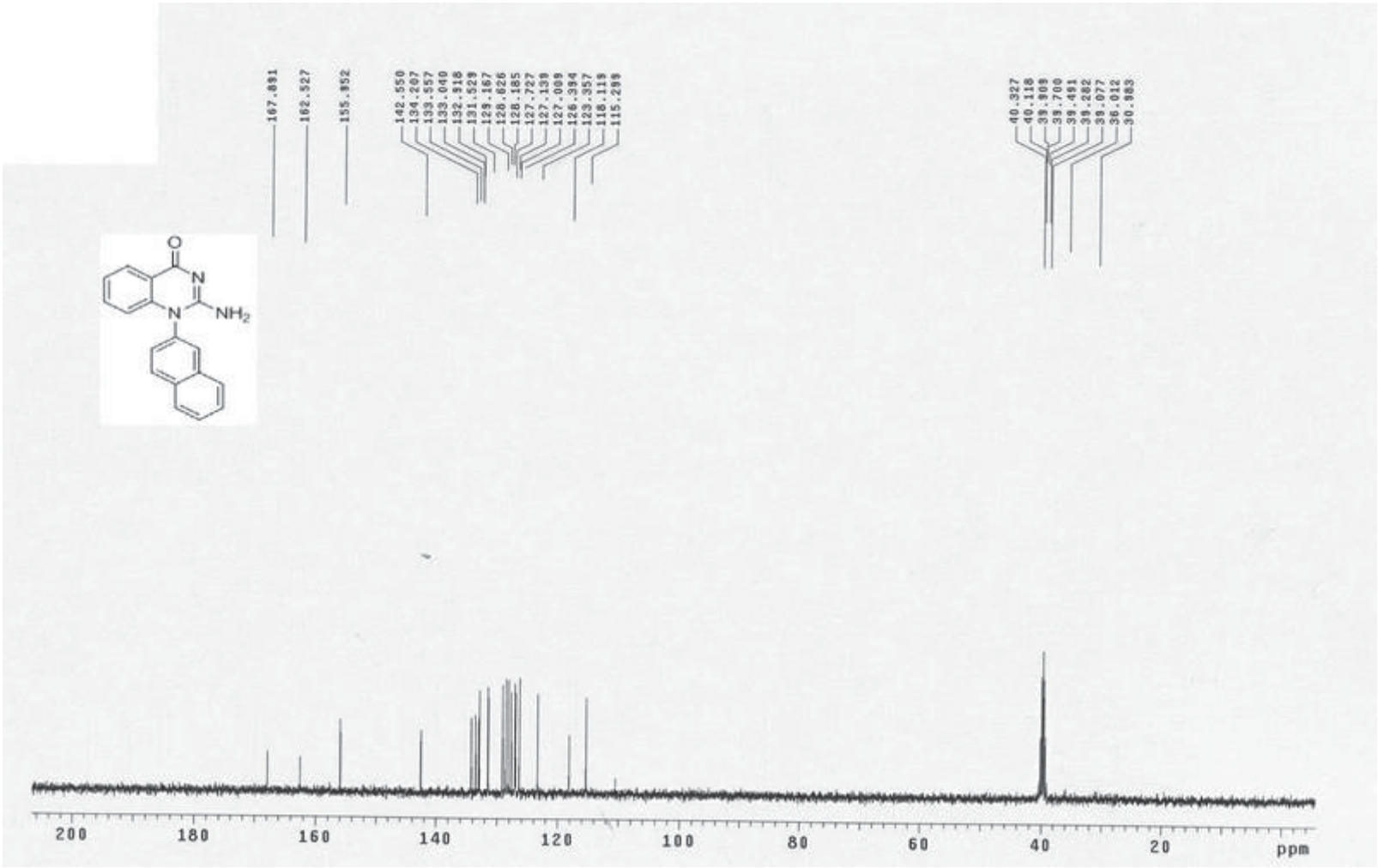
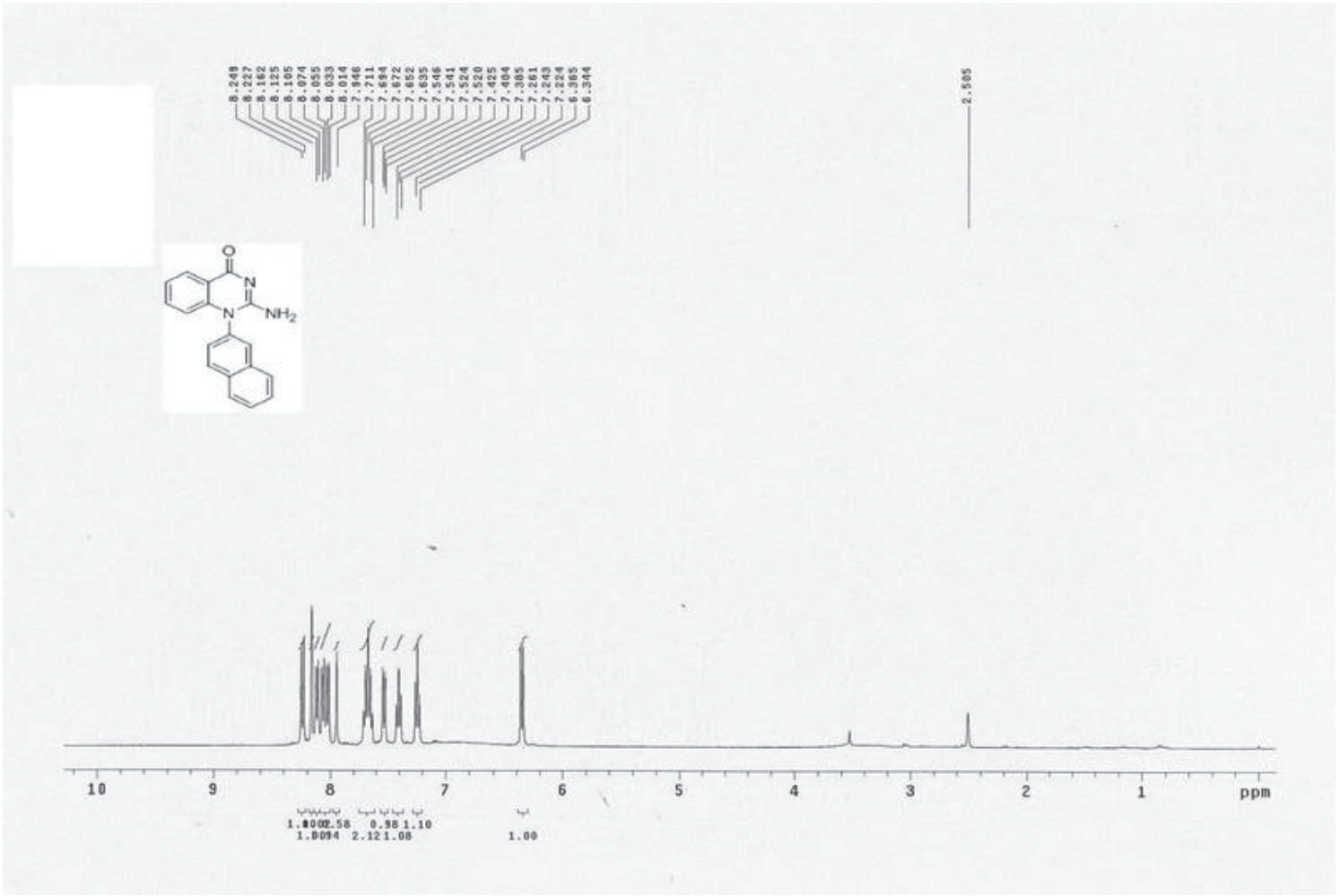
0.912.72
1.00
2.58
6.99

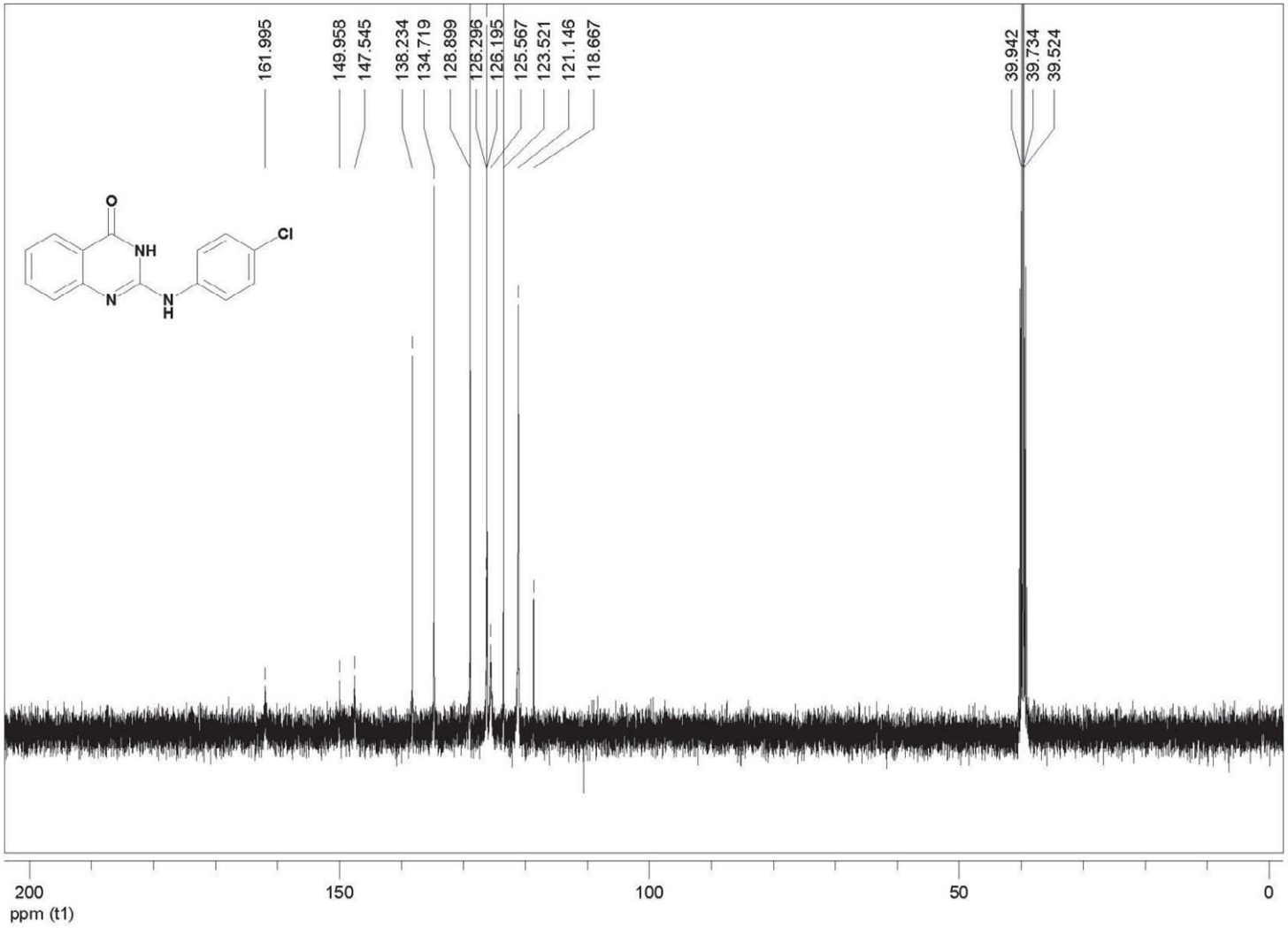
7f-C


167.891
162.527
155.352
142.550
134.207
133.557
133.040
132.318
131.529
129.167
128.626
128.185
127.727
127.139
127.009
126.394
123.357
118.119
115.299
40.327
40.118
39.909
39.700
39.491
39.282
39.077
38.012
30.983
O
N
N
NH2
200
180
160
140
120
100
80
60
40
20
ppm

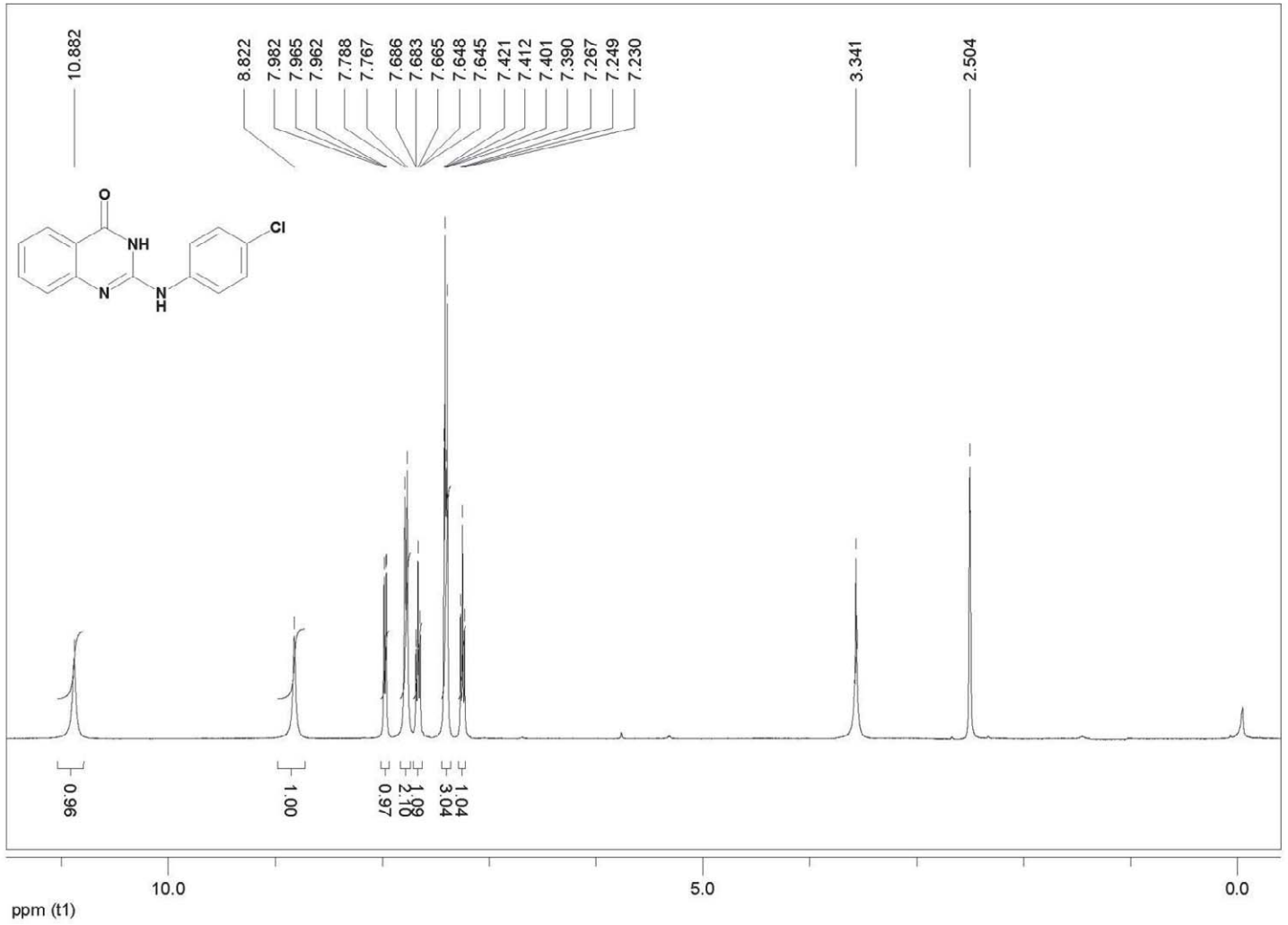
7f-H


8.249
8.227
8.162
8.125
8.105
8.074
8.055
8.033
8.014
7.946
7.711
7.694
7.672
7.652
7.635
7.546
7.541
7.524
7.520
7.485
7.464
7.385
7.261
7.243
7.224
6.365
6.344
2.565
O
N
N
NH2
10
9
8
7
6
5
4
3
2
1
ppm
1.00
2.12
1.08
0.98
1.10

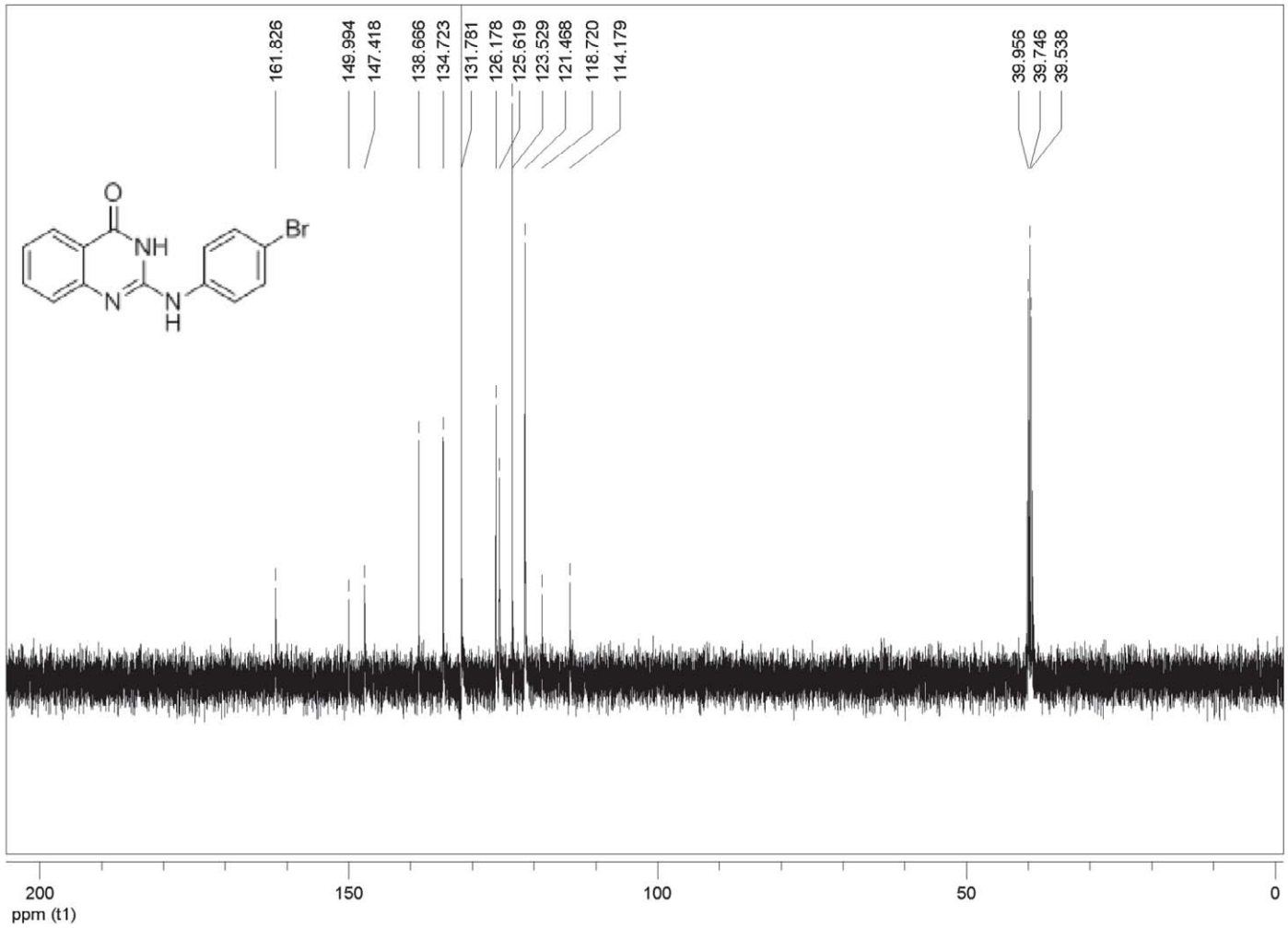
8b-C


161.995
149.958
147.545
138.234
134.719
128.899
126.296
126.195
125.567
123.521
121.146
118.667
39.942
39.734
39.524
O
NH
N
N
H
Cl
200
150
100
50
0
ppm (t1)

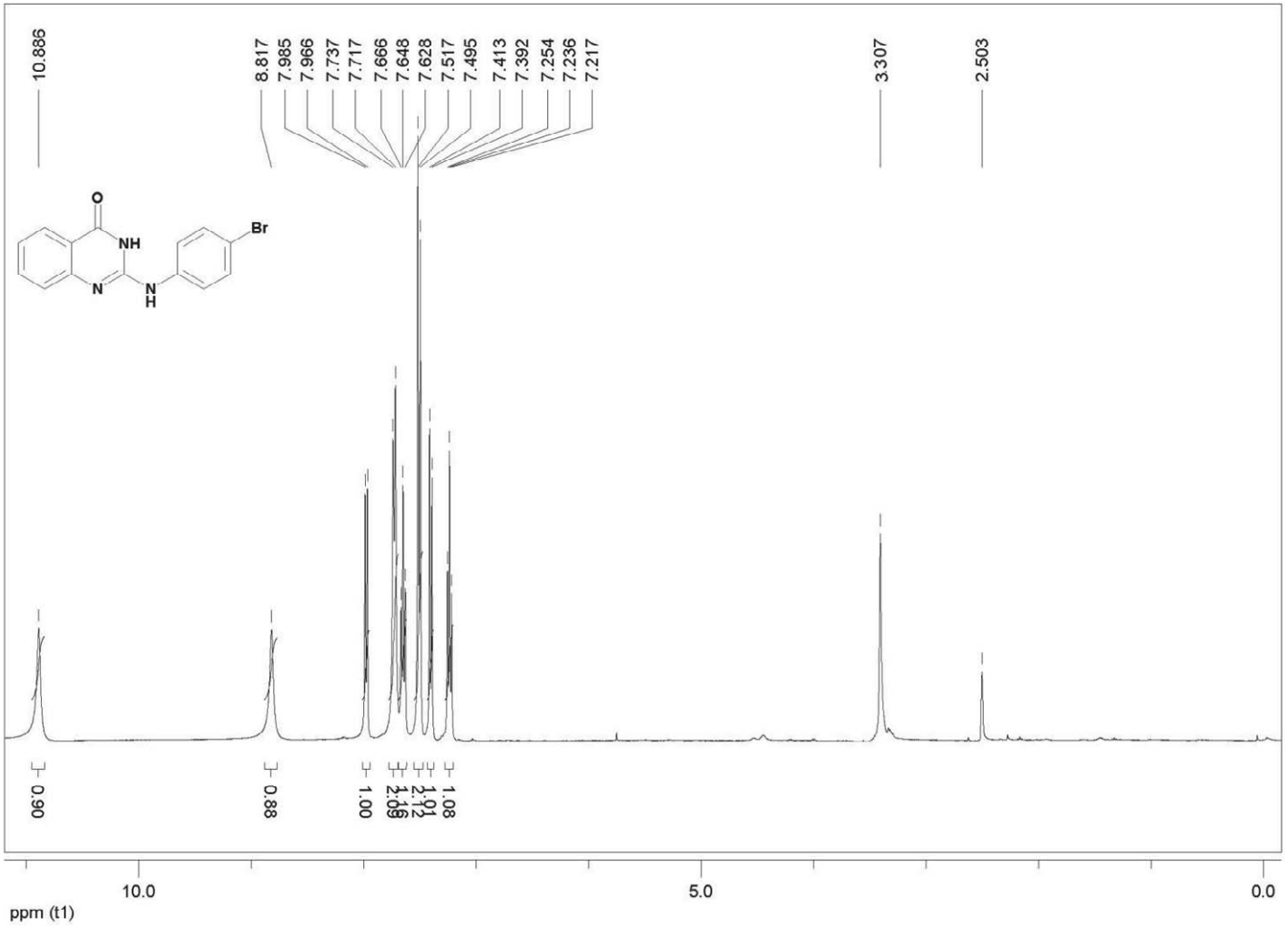
8b-H


10.882
8.822
7.982
7.965
7.962
7.788
7.767
7.686
7.683
7.665
7.648
7.645
7.421
7.412
7.401
7.390
7.267
7.249
7.230
3.341
2.504
O
NH
N
N
H
Cl
0.96
1.00
0.67
2.10
1.09
3.04
1.04
10.0
5.0
0.0
ppm (t1)

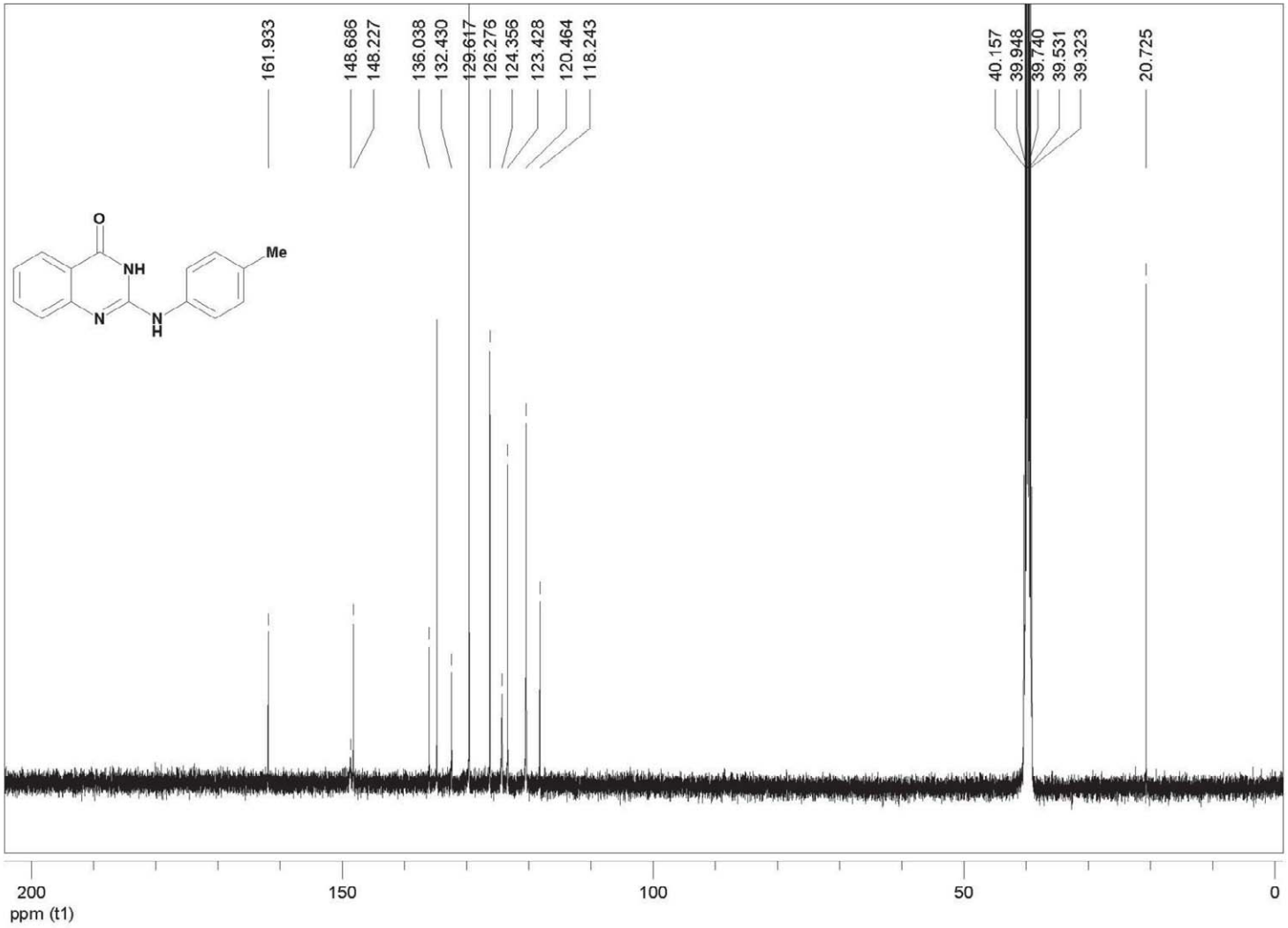
8c-C


161.826
149.994
147.418
138.666
134.723
131.781
126.178
125.619
123.529
121.468
118.720
114.179
39.955
39.746
39.538
O
NH
N
N
H
Br
200
150
100
50
0
ppm (t1)

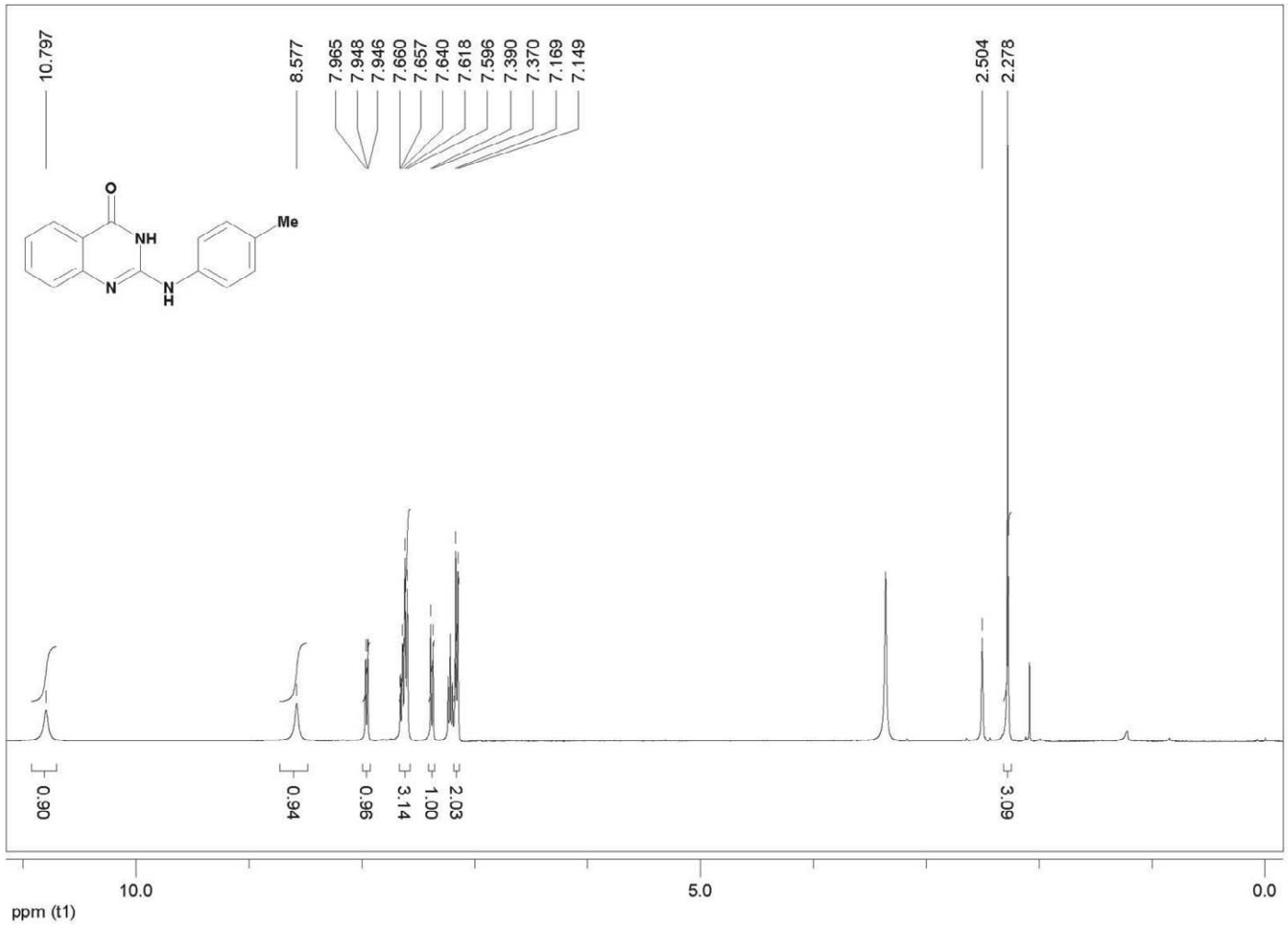
8c-H


10.886
8.817
7.985
7.966
7.737
7.717
7.666
7.648
7.628
7.517
7.495
7.413
7.392
7.254
7.236
7.217
3.307
2.503
O
NH
N
N
H
Br
0.90
0.88
1.00
1.08
10.0
5.0
0.0
ppm (t1)

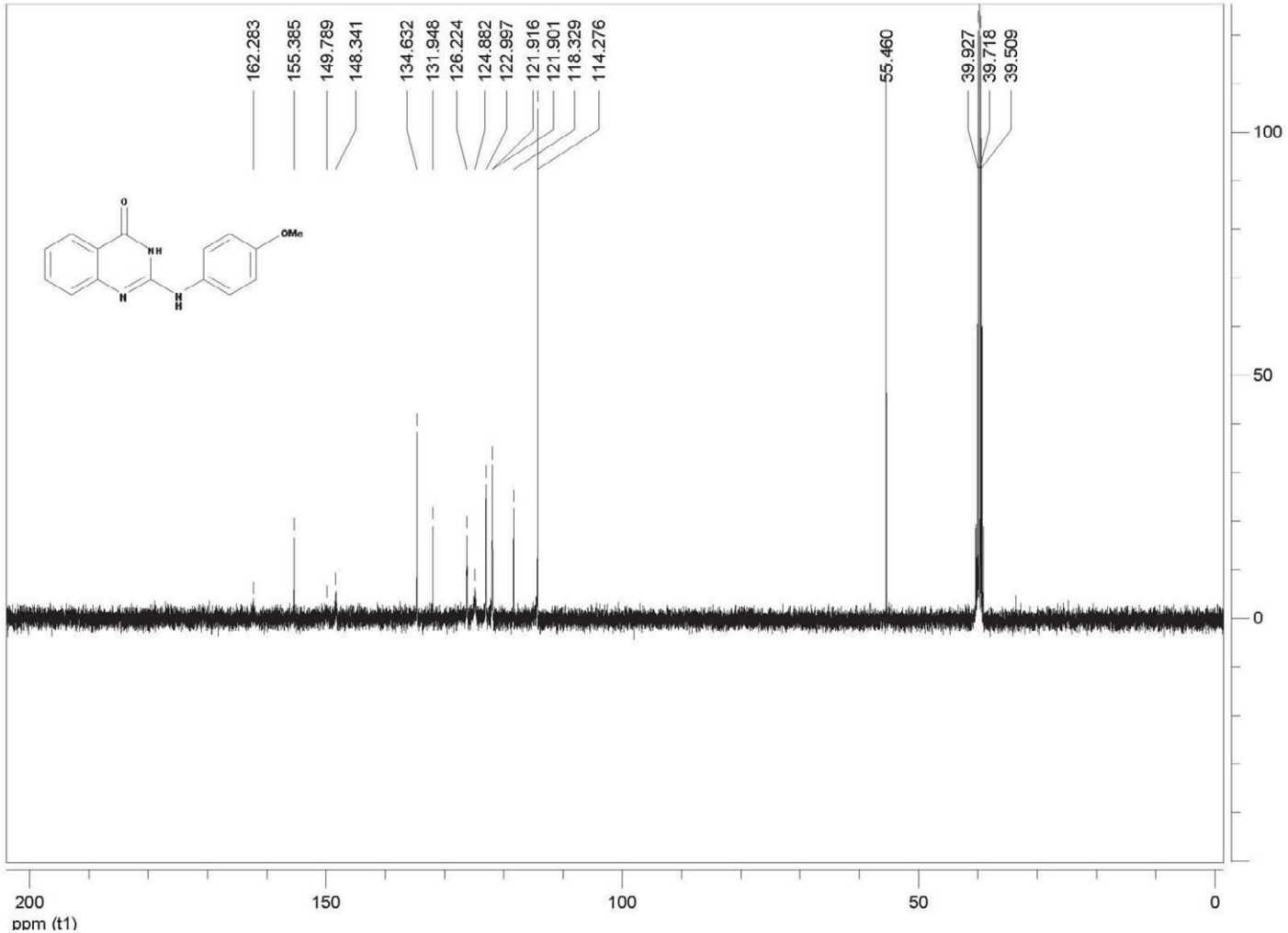
8d-C


161.933
148.686
148.227
136.038
132.430
129.617
126.276
124.356
123.428
120.464
118.243
40.157
39.948
39.740
39.531
39.323
20.725
O
NH
N
N
H
Me
200
150
100
50
0
ppm (t1)

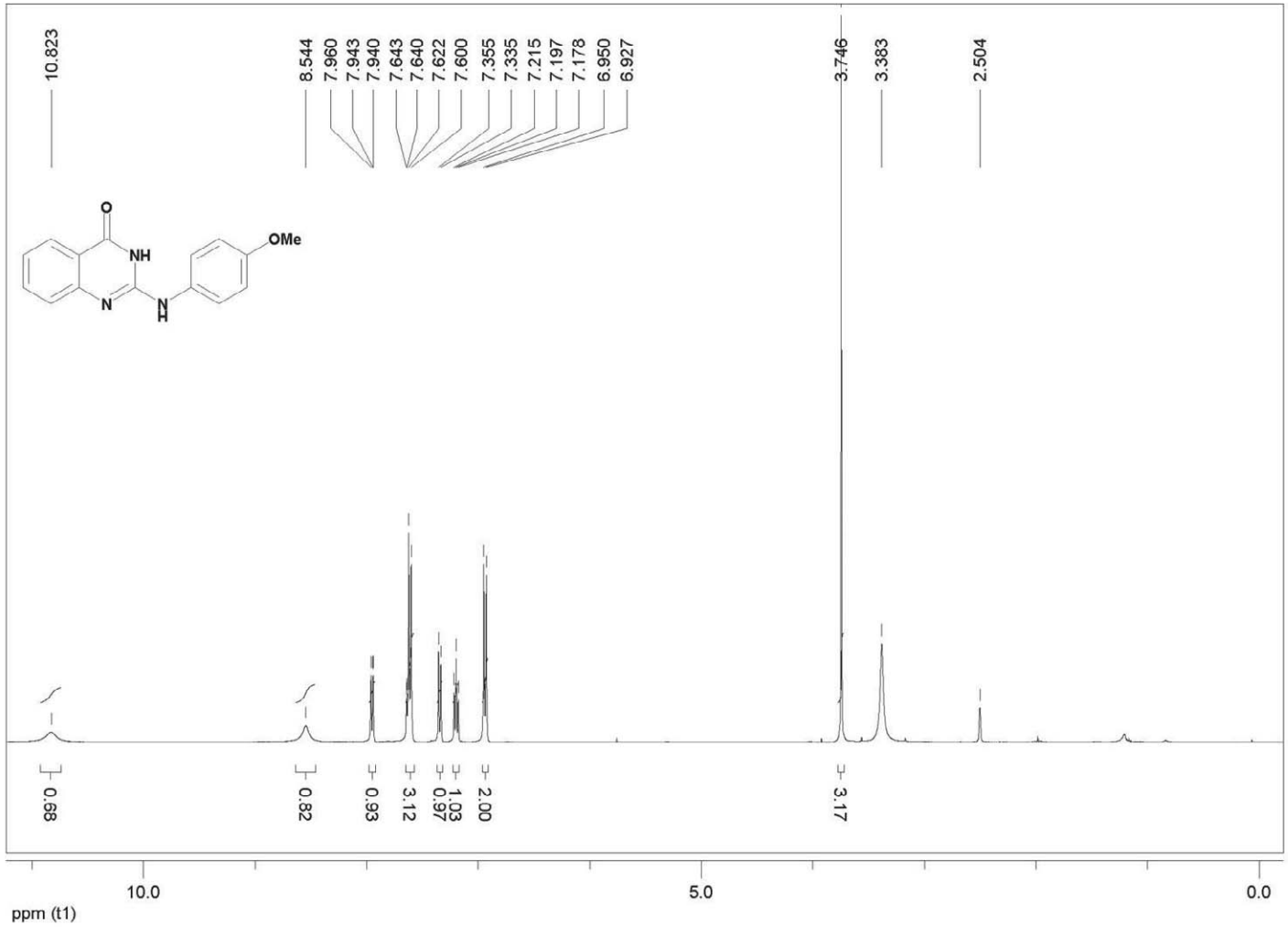
8d-H


10.797
8.577
7.965
7.948
7.946
7.660
7.657
7.640
7.618
7.596
7.390
7.370
7.169
7.149
2.504
2.278
O
NH
N
N
H
Me
0.90
0.94
0.96
3.14
1.00
2.03
3.09
10.0
5.0
0.0
ppm (t1)

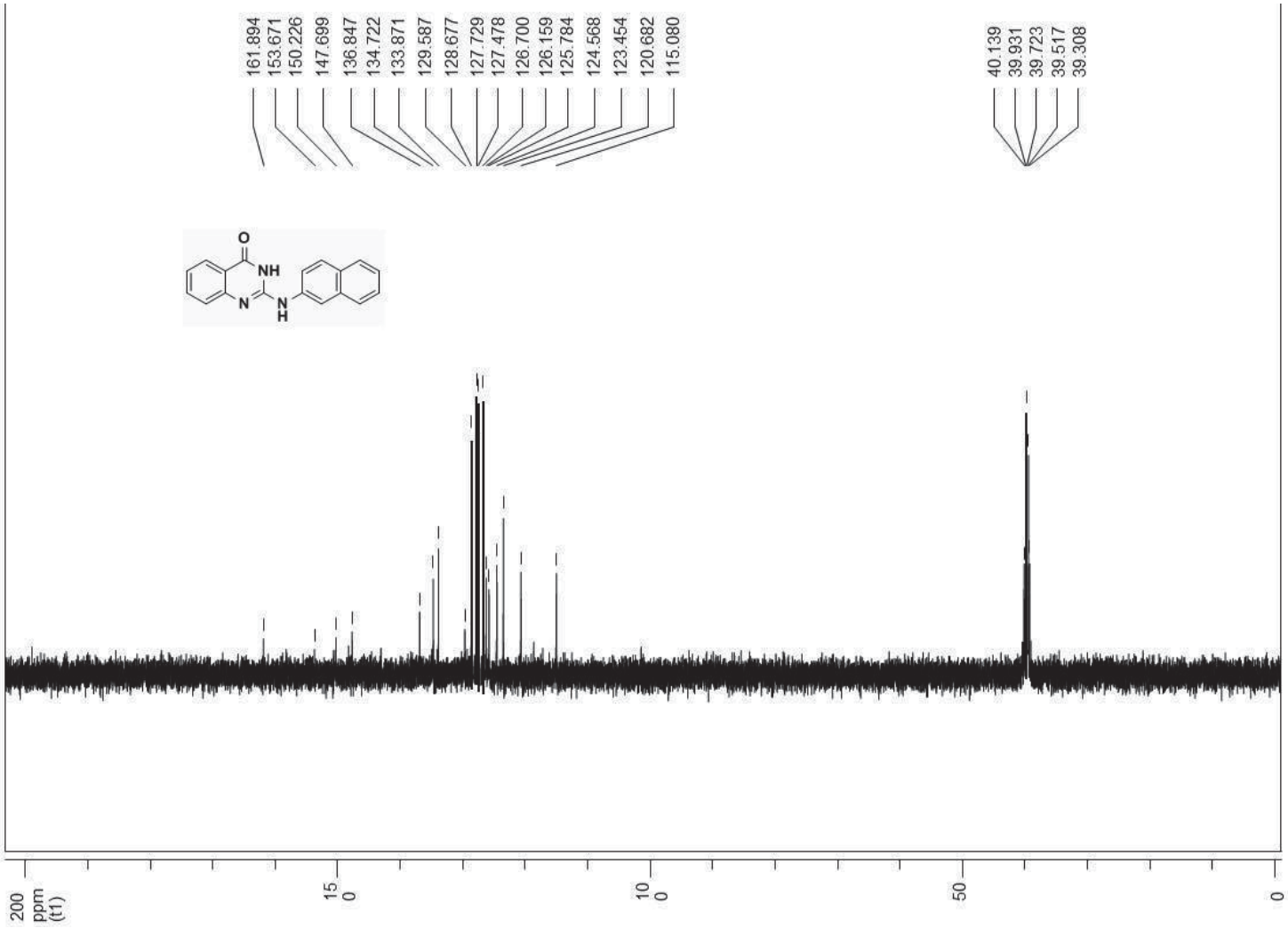
8e-C


162.283
155.385
149.789
148.341
134.632
131.948
126.224
124.882
122.997
121.916
121.901
118.329
114.276
55.460
39.927
39.718
39.509
100
50
0
200
150
100
50
0
ppm (t1)

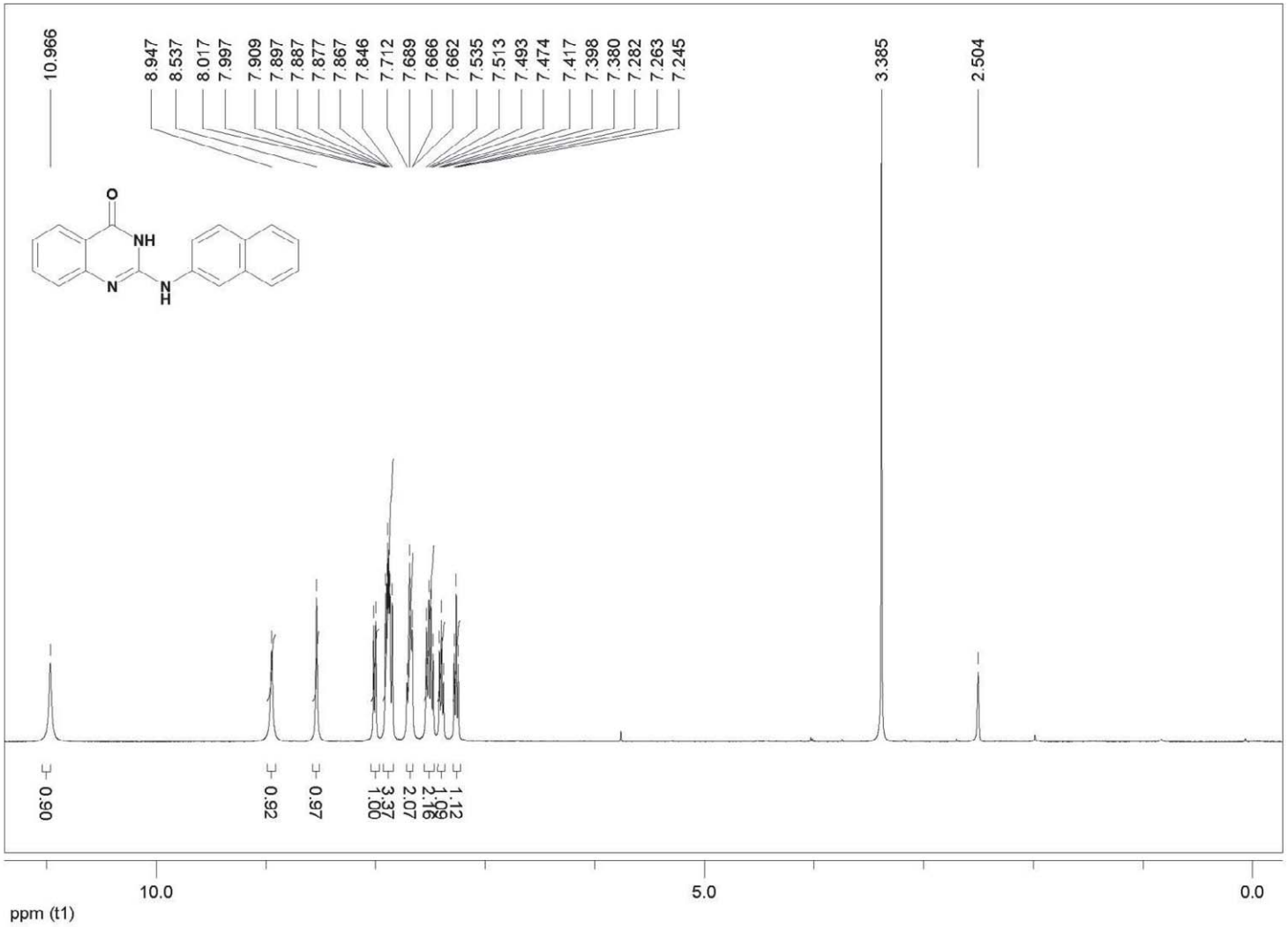
8e-H


10.823
8.544
7.960
7.943
7.940
7.643
7.640
7.622
7.600
7.355
7.335
7.215
7.197
7.178
6.950
6.927
3.746
3.383
2.504
O
NH
N
N
H
OMe
0.98
0.82
0.93
3.12
0.97
1.03
2.00
3.17
10.0
5.0
0.0
ppm (t1)

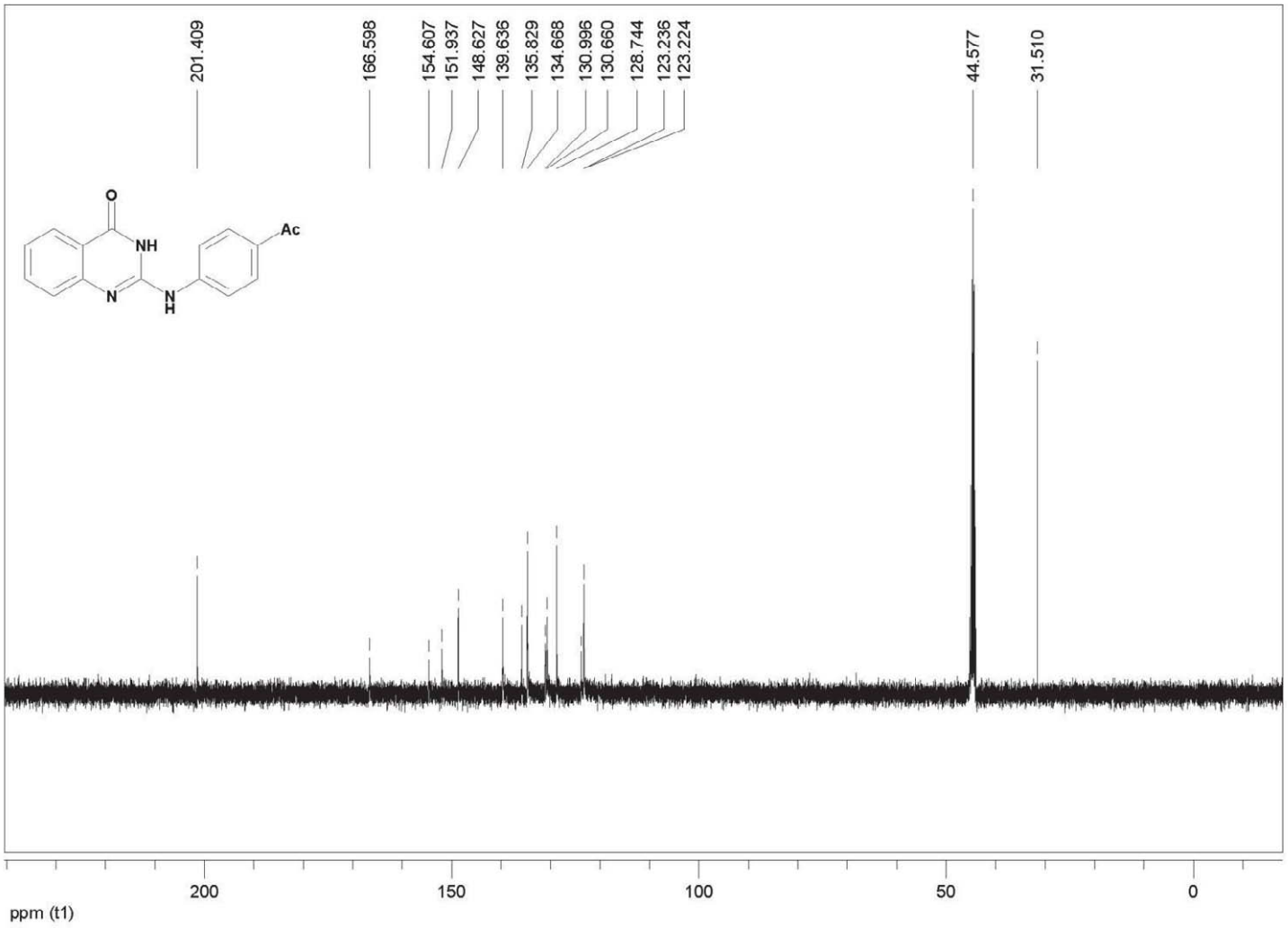
8f-C


161.894
153.671
150.226
147.699
136.847
134.722
133.871
129.587
128.677
127.729
127.478
126.700
126.159
125.784
124.568
123.454
120.682
115.080
40.139
39.931
39.723
39.517
39.308
O
NH
N
N
H
200
ppm
(t1)
150
100
50
0

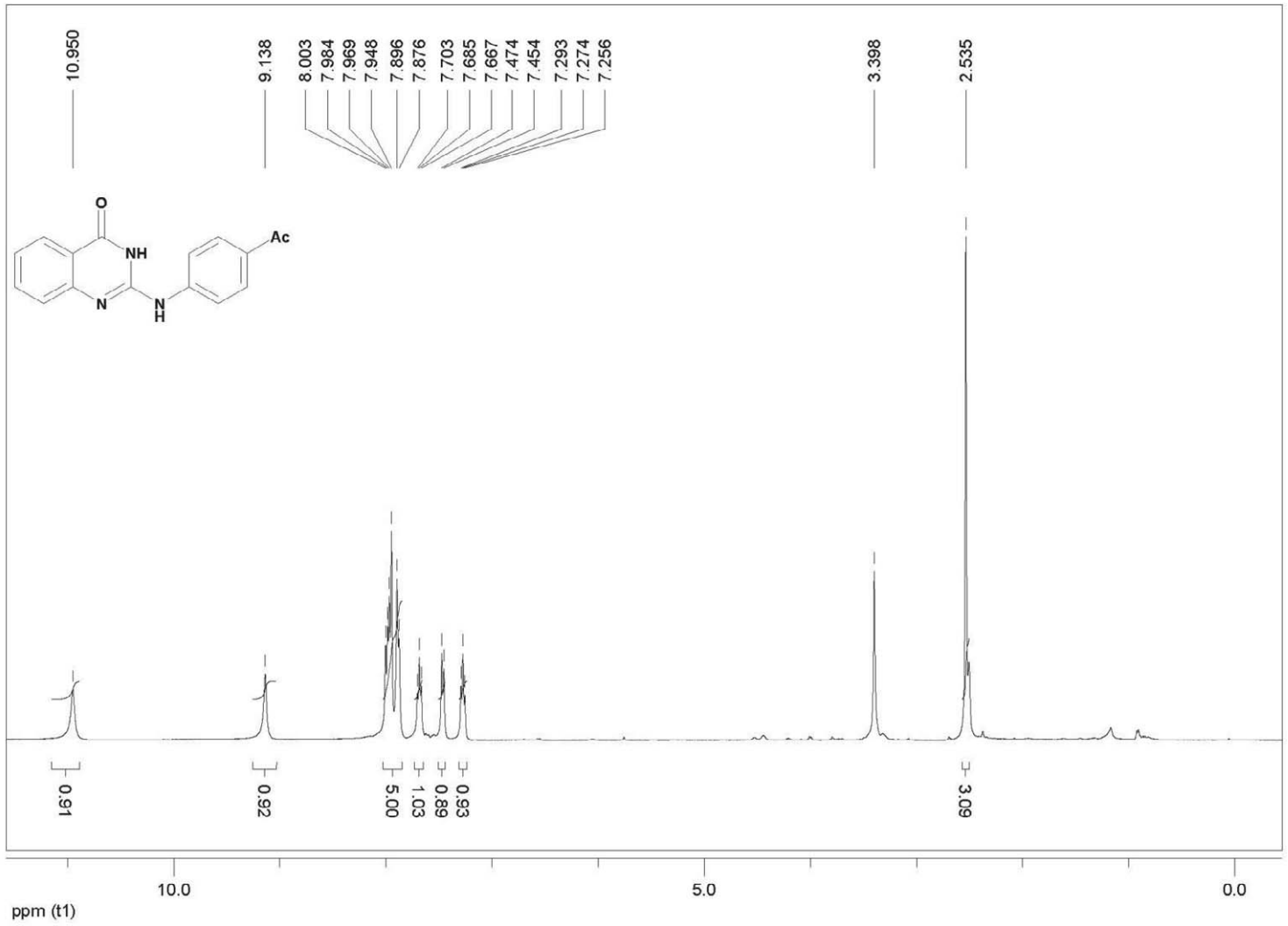
8f-H


10.966
8.947
8.537
8.017
7.997
7.909
7.897
7.887
7.877
7.867
7.846
7.712
7.689
7.666
7.662
7.535
7.513
7.493
7.474
7.417
7.398
7.380
7.282
7.263
7.245
3.385
2.504
O
NH
N
N
H
0.90
0.92
0.97
3.37
1.00
2.07
2.16
1.12
10.0
5.0
0.0
ppm (t1)

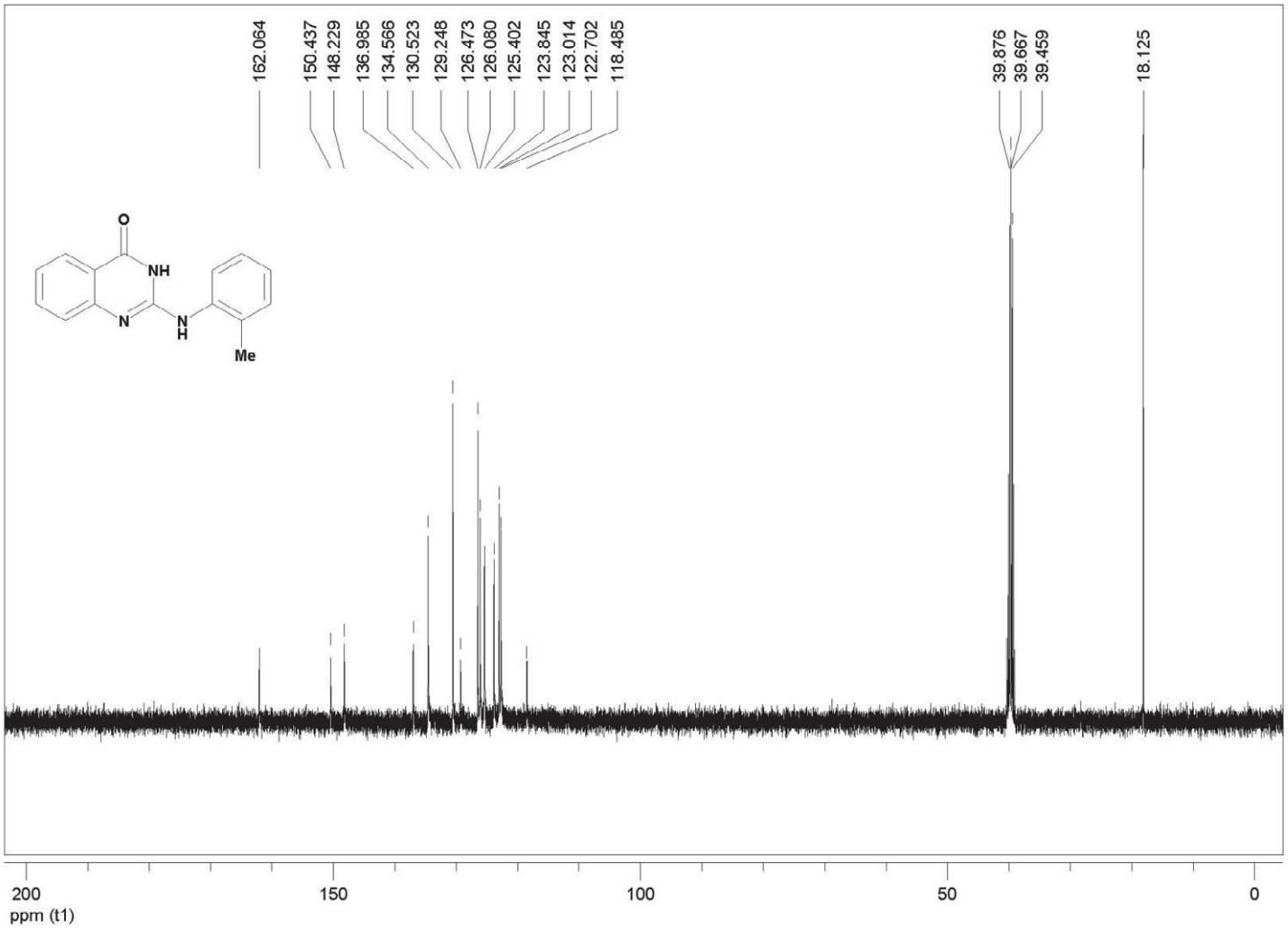
8g-C


201.409
166.598
154.607
151.937
148.627
139.636
135.829
134.668
130.996
130.660
128.744
123.236
123.224
44.577
31.510
O
NH
N
N
H
Ac
200
150
100
50
0
ppm (t1)

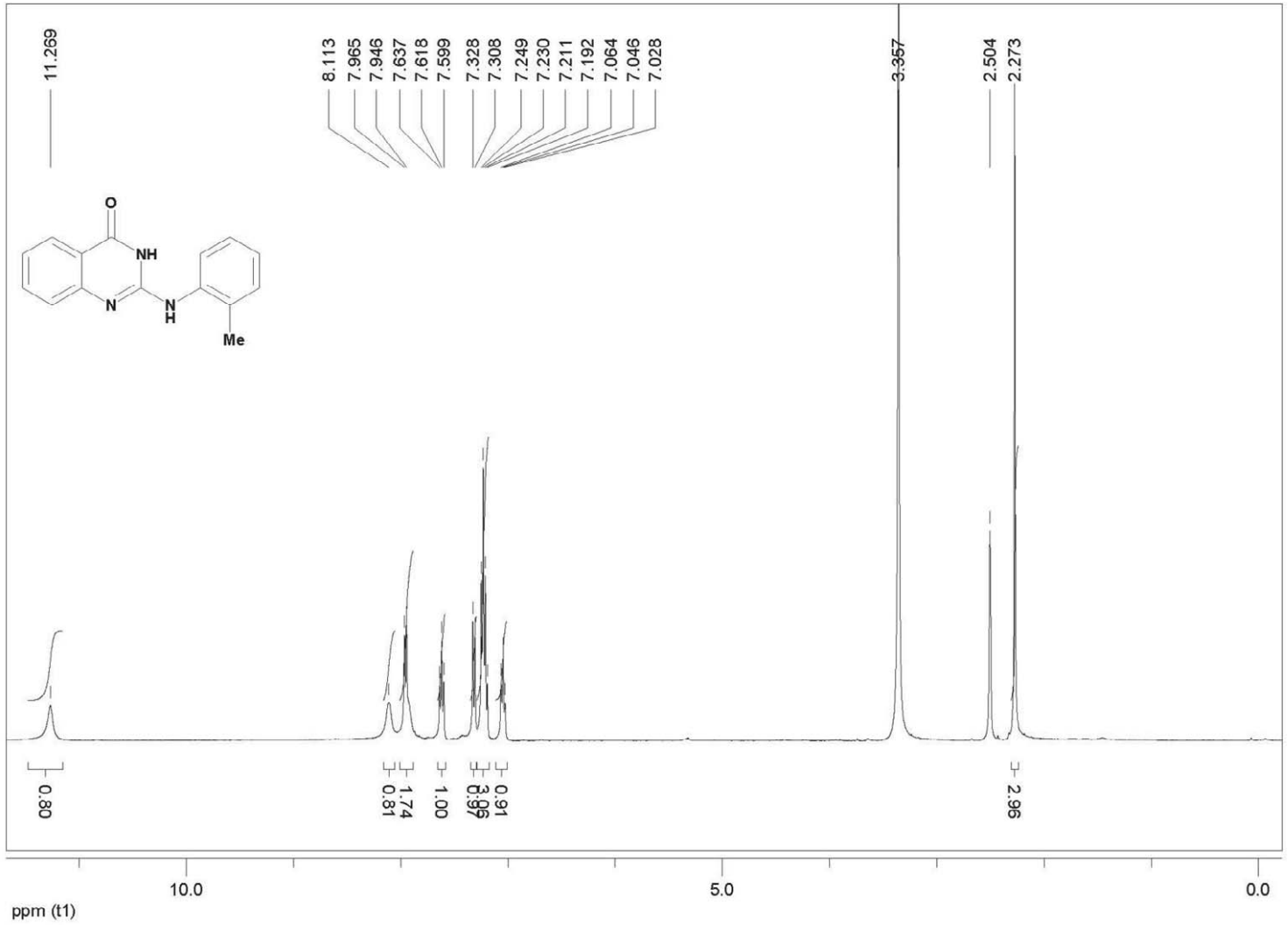
8g-H


10.950
9.138
8.003
7.984
7.969
7.948
7.896
7.876
7.703
7.685
7.667
7.474
7.454
7.293
7.274
7.256
3.398
2.535
O
NH
N
N
H
Ac
0.91
0.92
5.00
1.03
0.89
0.93
3.09
10.0
5.0
0.0
ppm (t1)

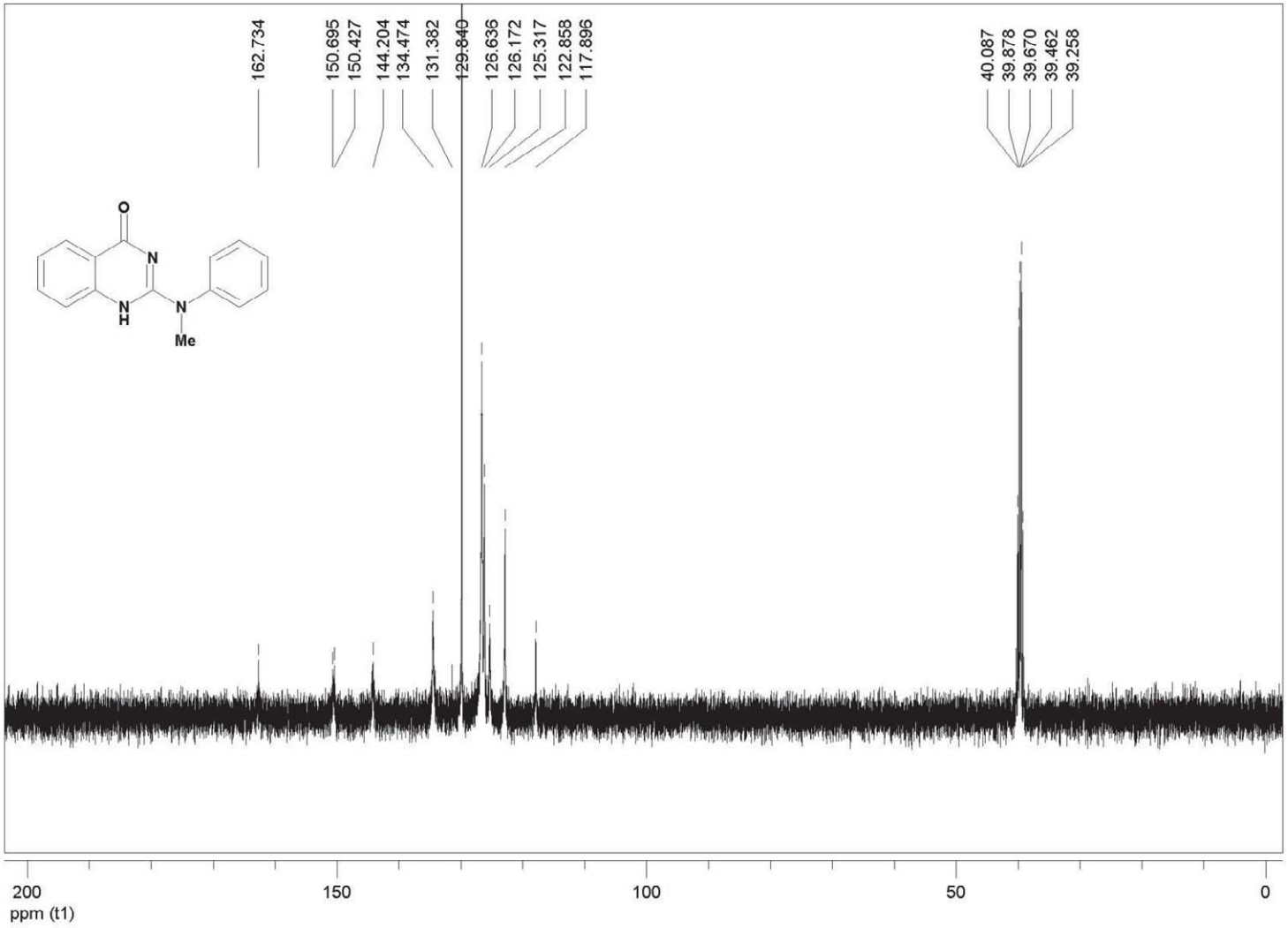
8h-C


162.064
150.437
148.229
136.985
134.566
130.523
129.248
126.473
126.080
125.402
123.845
123.014
122.702
118.485
39.876
39.667
39.459
18.125
O
NH
N
N
H
Me
200
150
100
50
0
ppm (t1)

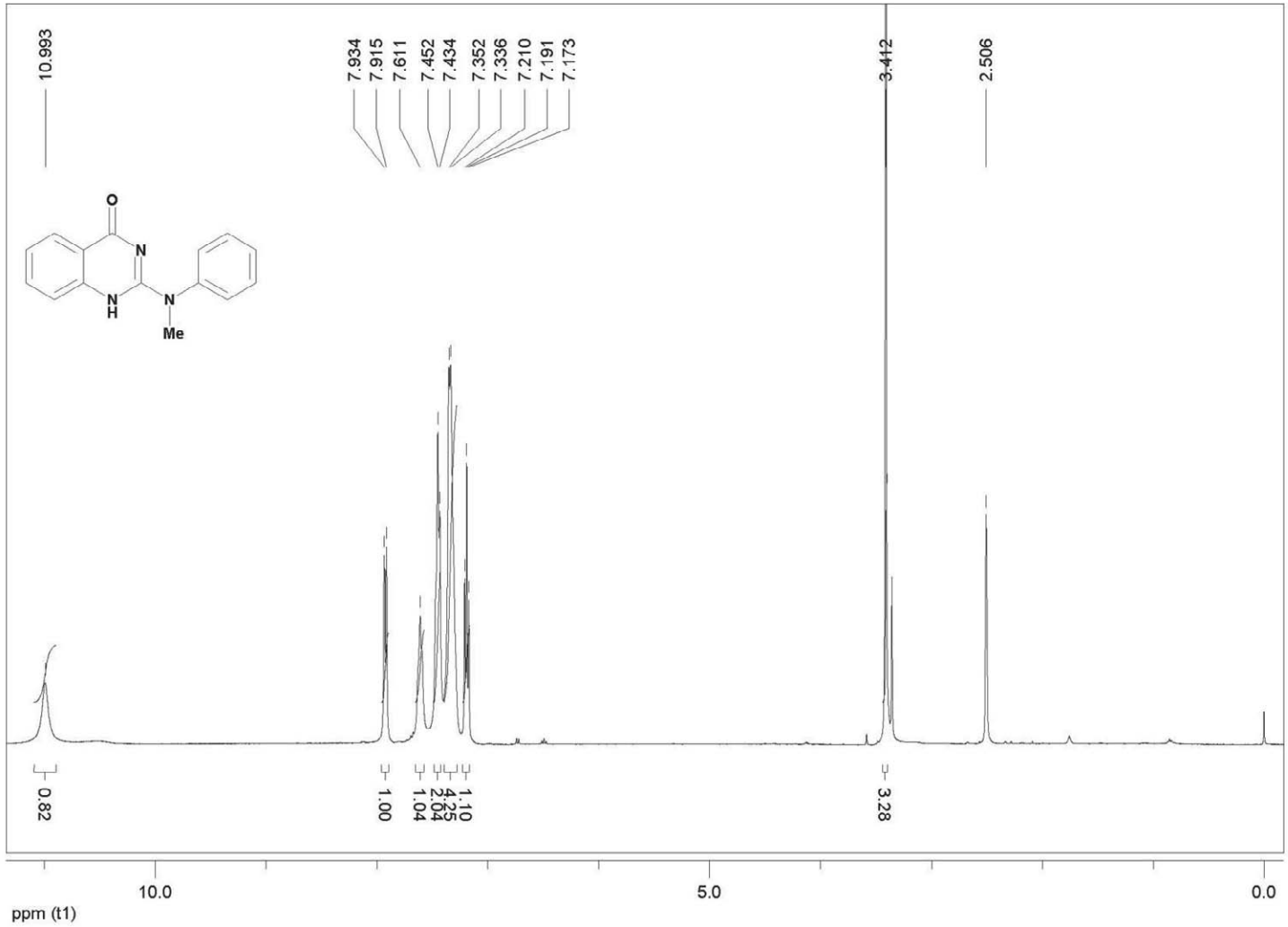
8h-H

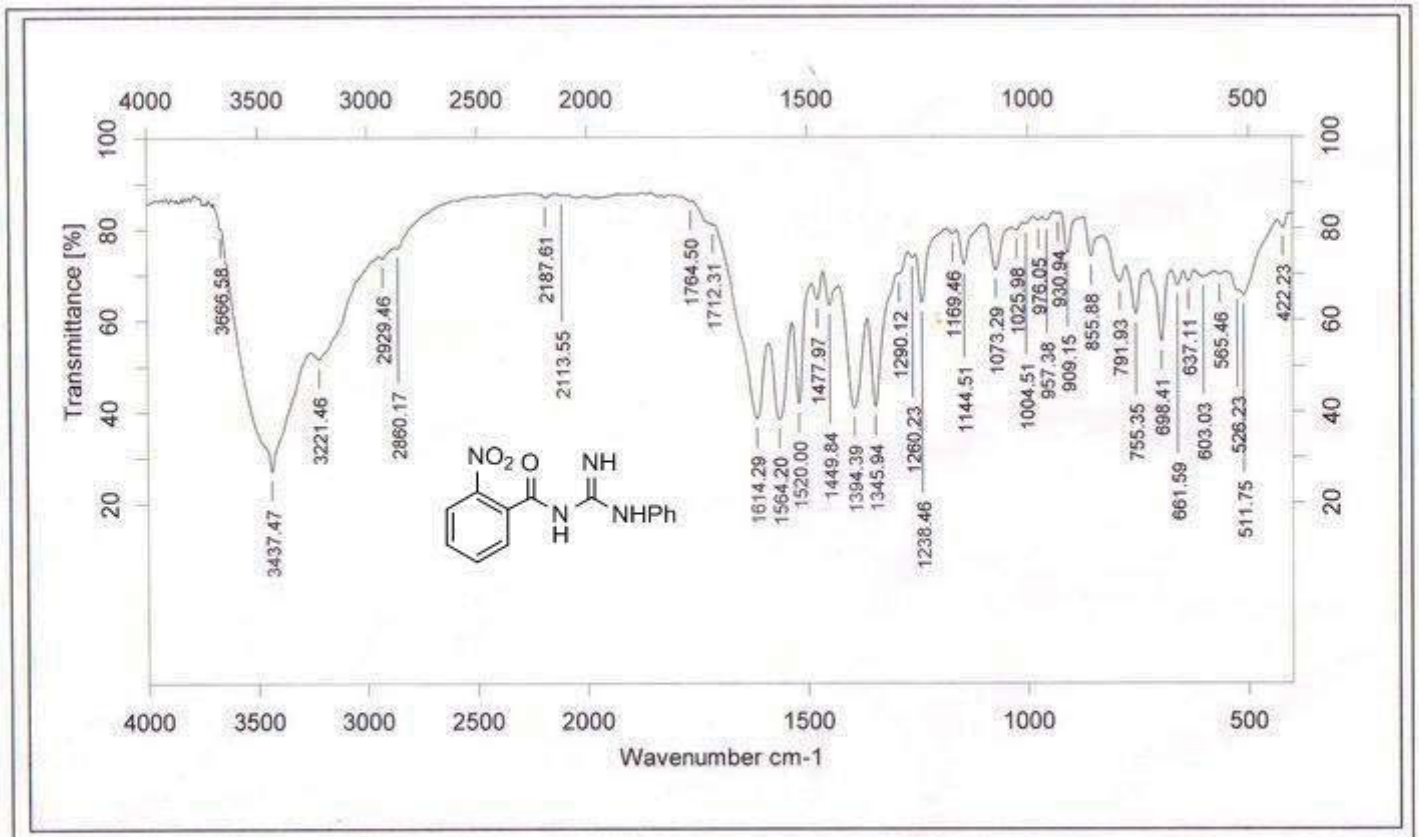

11.269
8.113
7.965
7.946
7.637
7.618
7.599
7.328
7.308
7.249
7.230
7.211
7.192
7.064
7.046
7.028
3.357
2.504
2.273
O
NH
N
N
H
Me
0.80
1.74
0.81
1.00
0.91
2.96
10.0
5.0
0.0
ppm (t1)

8i-C

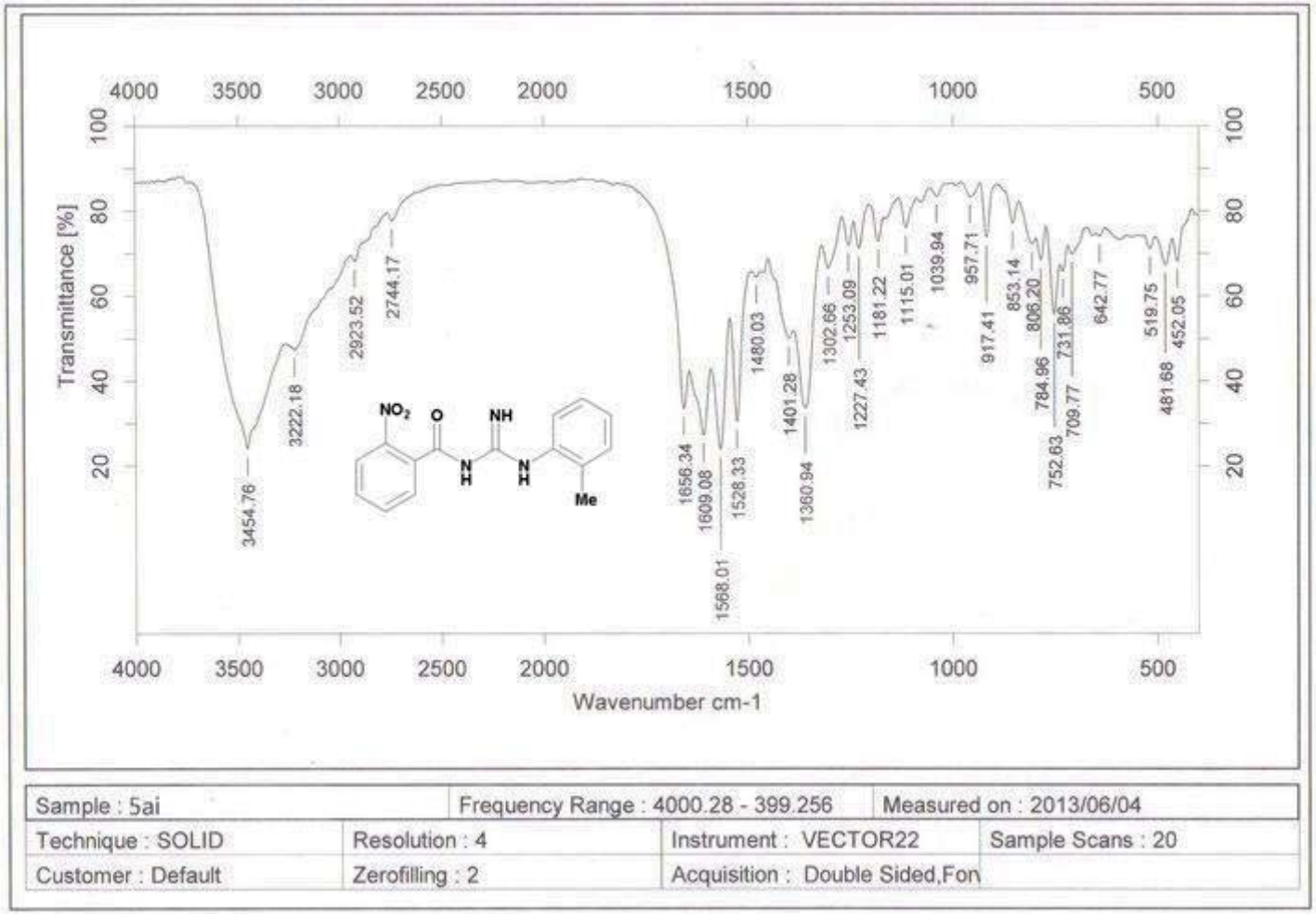

162.734
150.695
150.427
144.204
134.474
131.382
129.840
126.636
126.172
125.317
122.858
117.896
40.087
39.878
39.670
39.462
39.258
O
N
N
H
N
Me
200
150
100
50
0
ppm (t1)

8i-H

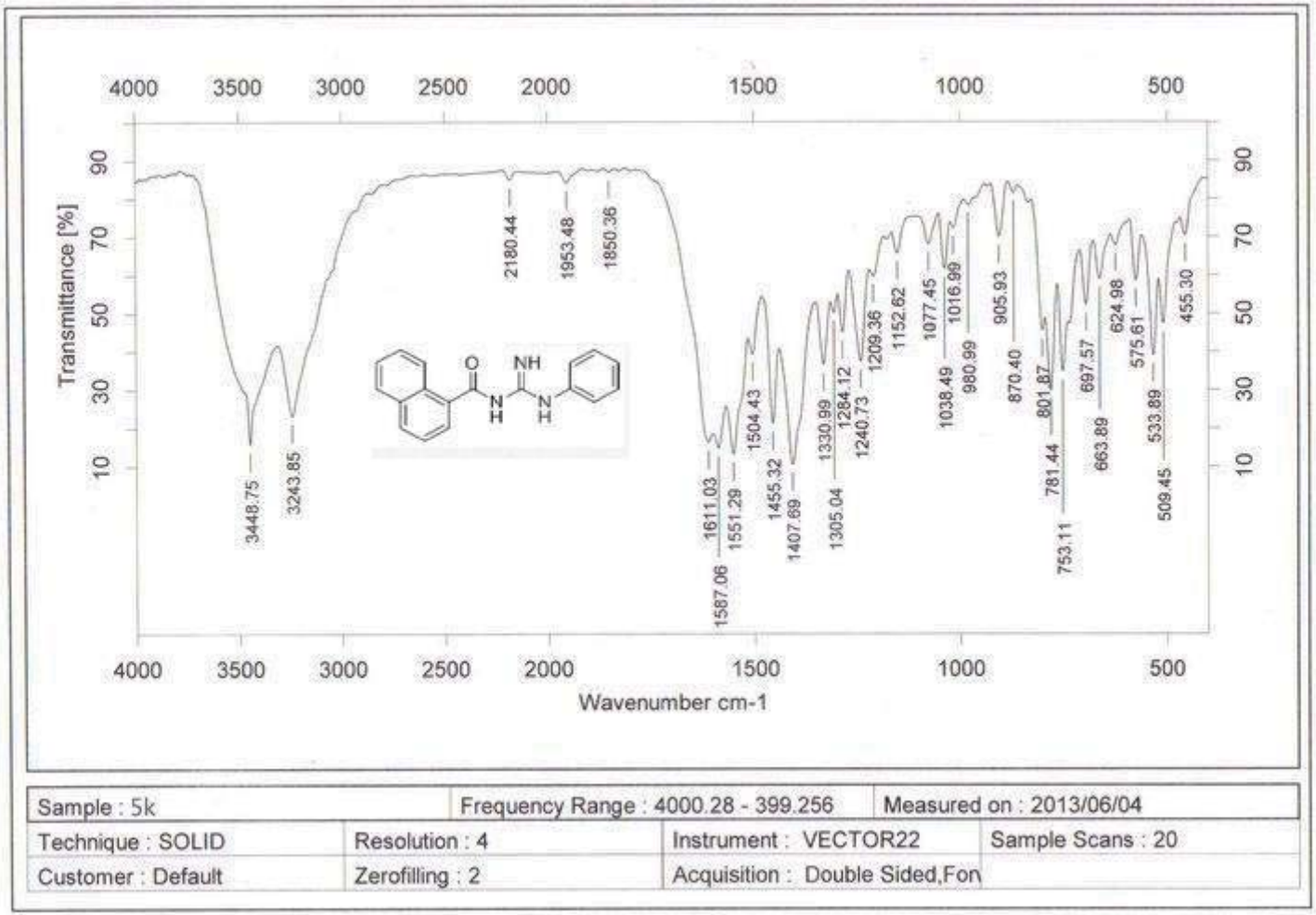

10.993
7.934
7.915
7.611
7.452
7.434
7.352
7.336
7.210
7.191
7.173
3.412
2.506
O
N
N
H
N
Me
0.82
1.00
1.04
2.04
4.25
1.10
3.28
10.0
5.0
0.0
ppm (t1)



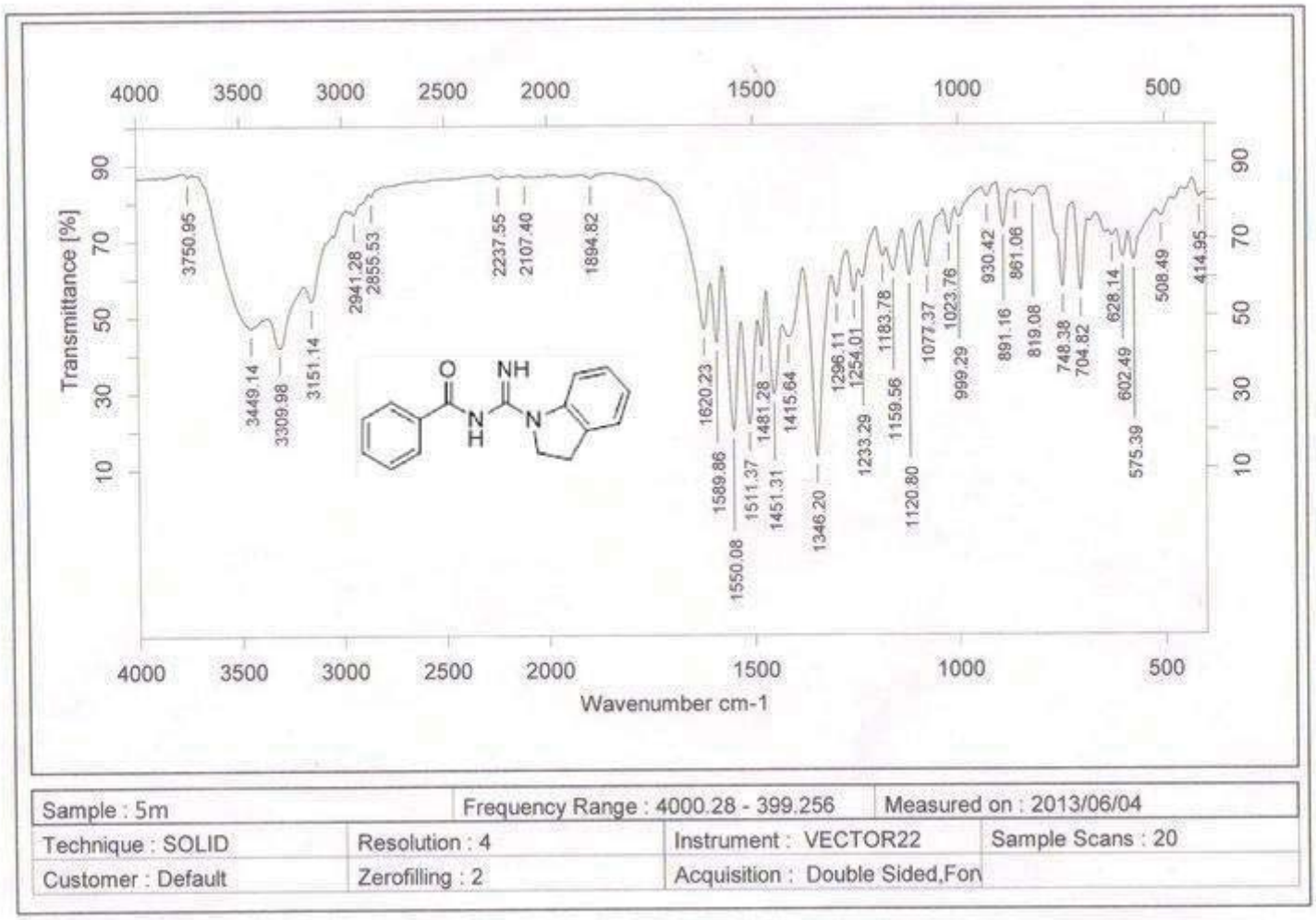
Sample : 5ab	Frequency Range : 4000.28 - 399.256		Measured on : 2013/06/04
Technique : SOLID	Resolution : 4	Instrument : VECTOR22	Sample Scans : 20
Customer : Default	Zerofilling : 2	Acquisition : Double Sided,For	



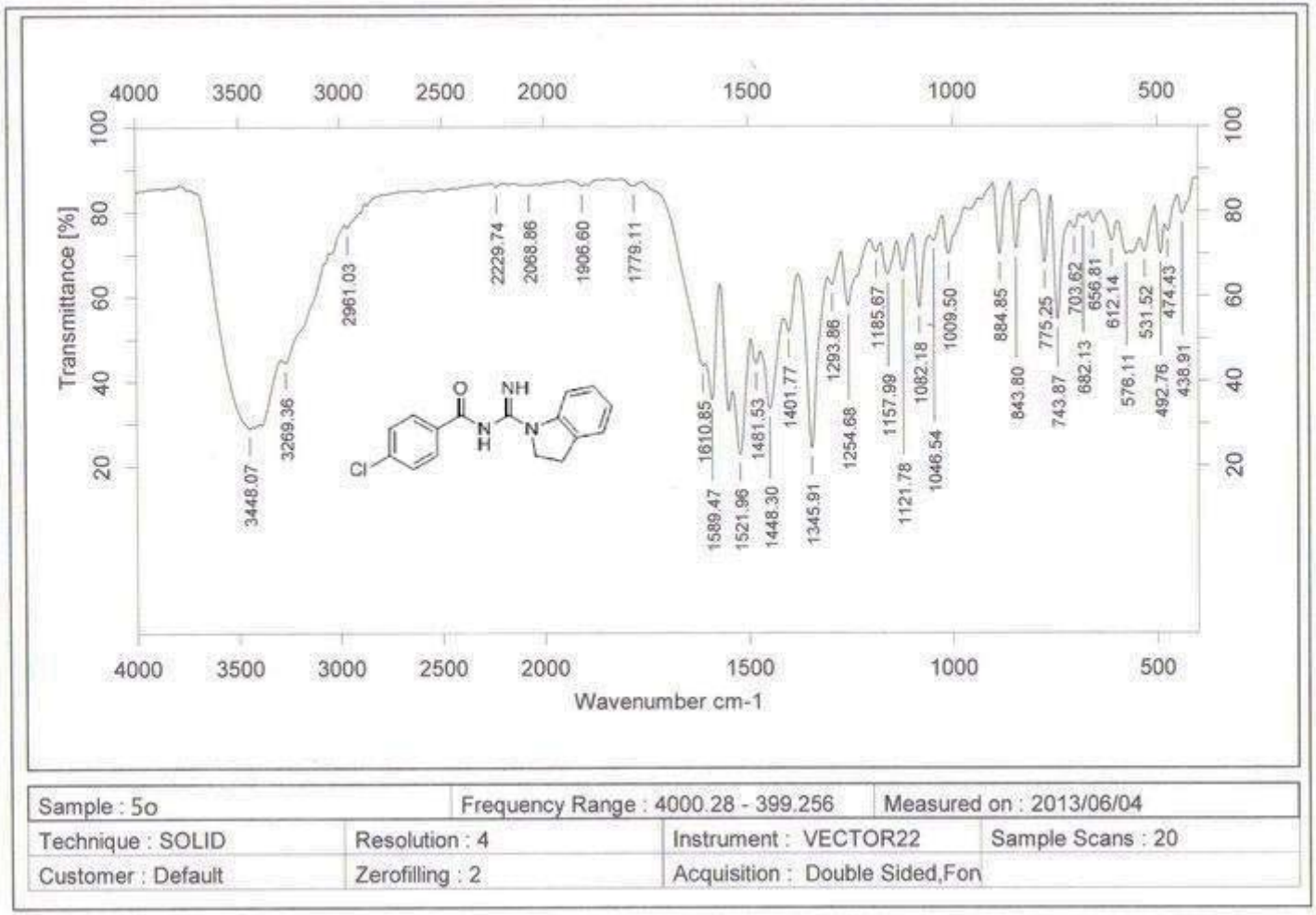
Sample : 5ai	Frequency Range : 4000.28 - 399.256	Measured on : 2013/06/04	
Technique : SOLID	Resolution : 4	Instrument : VECTOR22	Sample Scans : 20
Customer : Default	Zerofilling : 2	Acquisition : Double Sided,For	



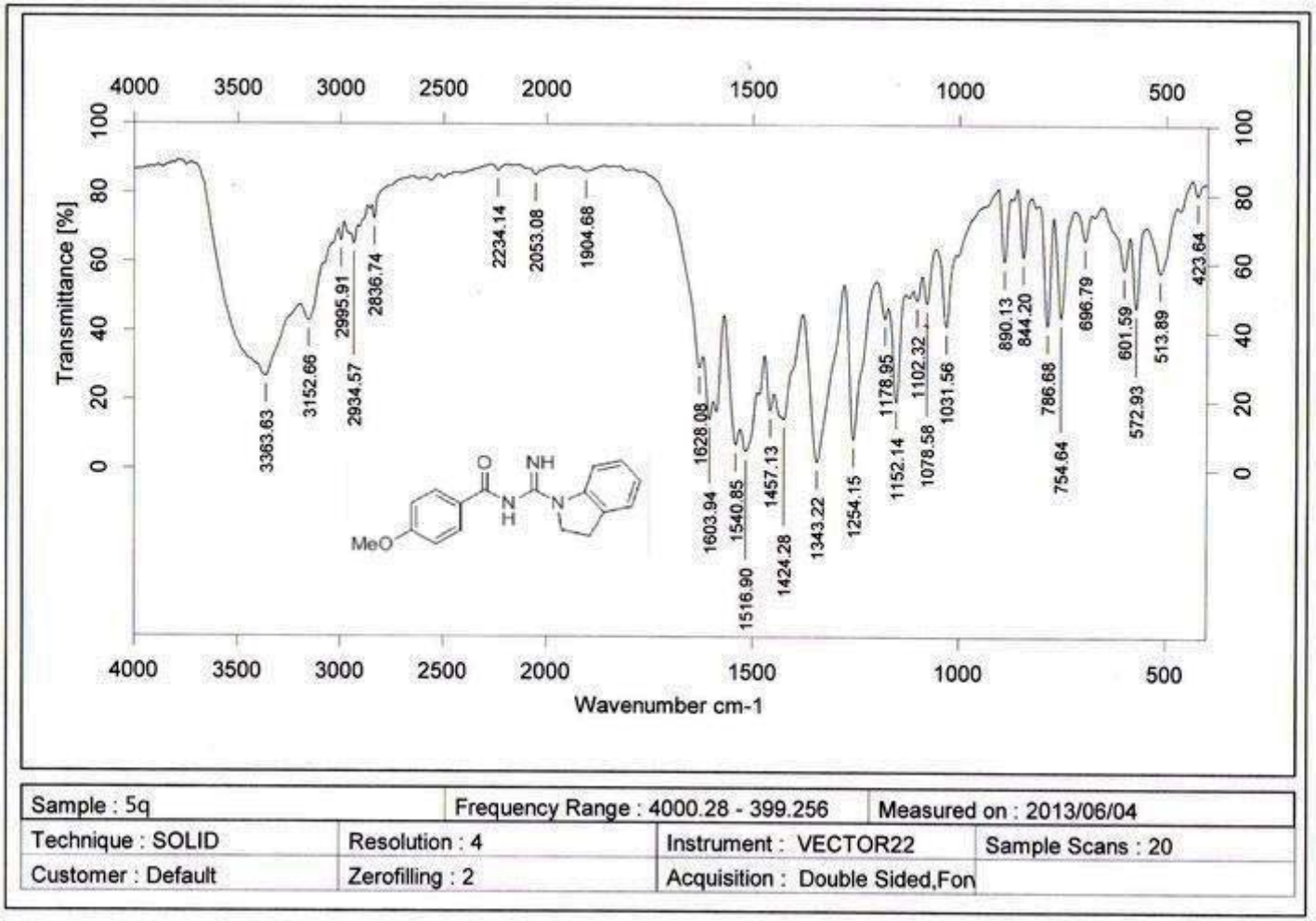
Sample : 5k	Frequency Range : 4000.28 - 399.256	Measured on : 2013/06/04	
Technique : SOLID	Resolution : 4	Instrument : VECTOR22	Sample Scans : 20
Customer : Default	Zerofilling : 2	Acquisition : Double Sided,For	



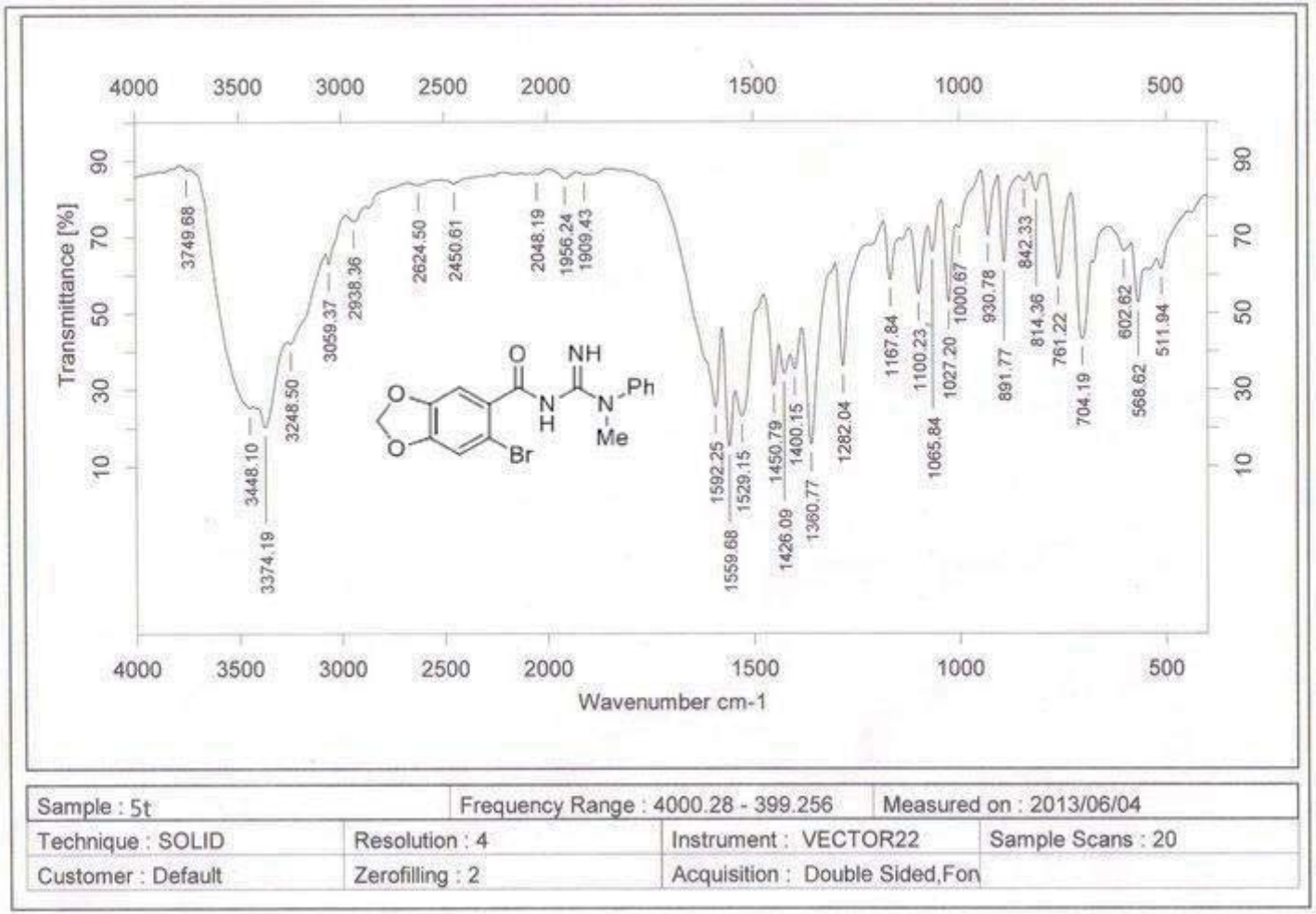
Sample : 5m	Frequency Range : 4000.28 - 399.256	Measured on : 2013/06/04	
Technique : SOLID	Resolution : 4	Instrument : VECTOR22	Sample Scans : 20
Customer : Default	Zerofilling : 2	Acquisition : Double Sided,For	



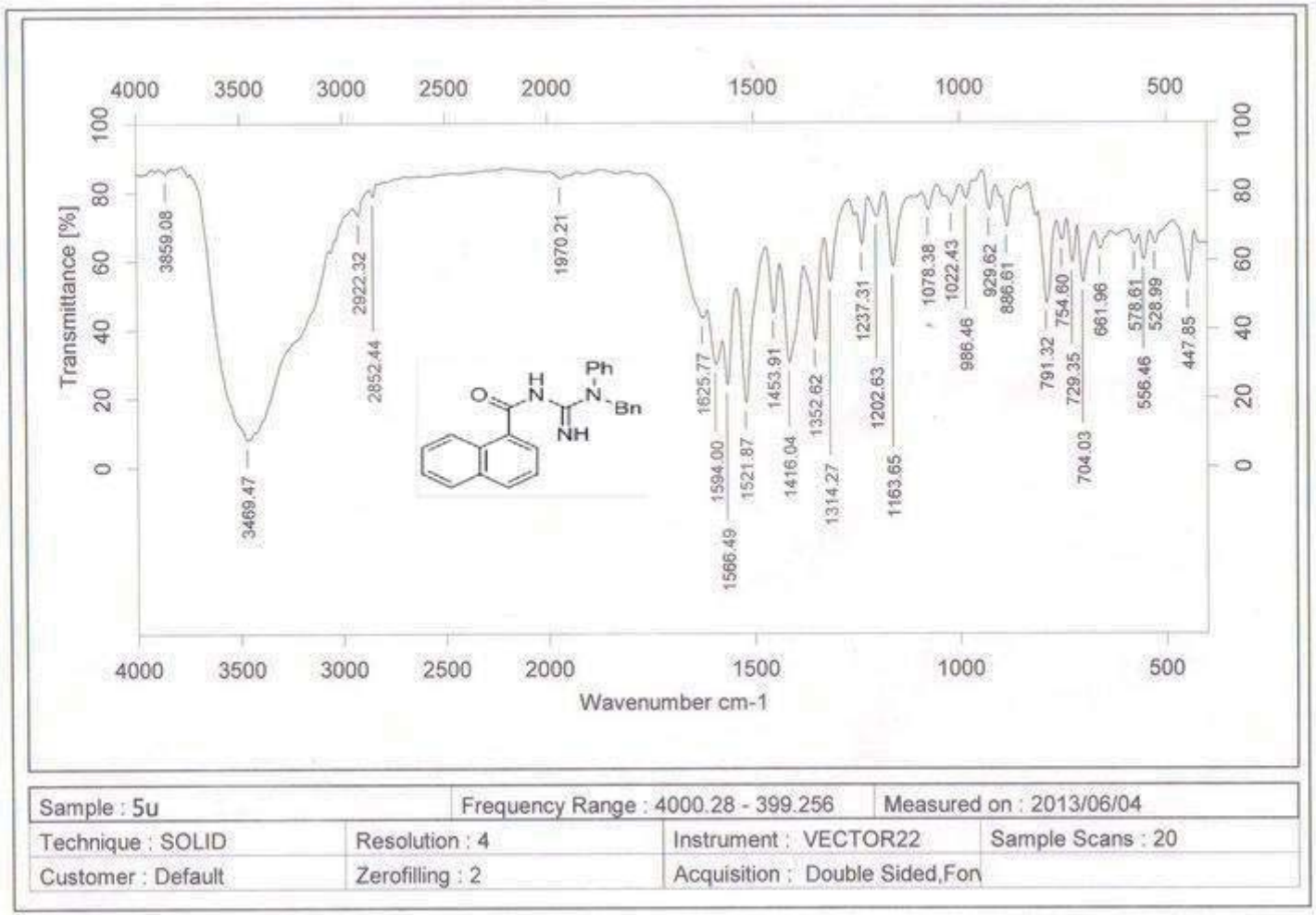
Sample : 5o	Frequency Range : 4000.28 - 399.256		Measured on : 2013/06/04
Technique : SOLID	Resolution : 4	Instrument : VECTOR22	Sample Scans : 20
Customer : Default	Zerofilling : 2	Acquisition : Double Sided,Fon	



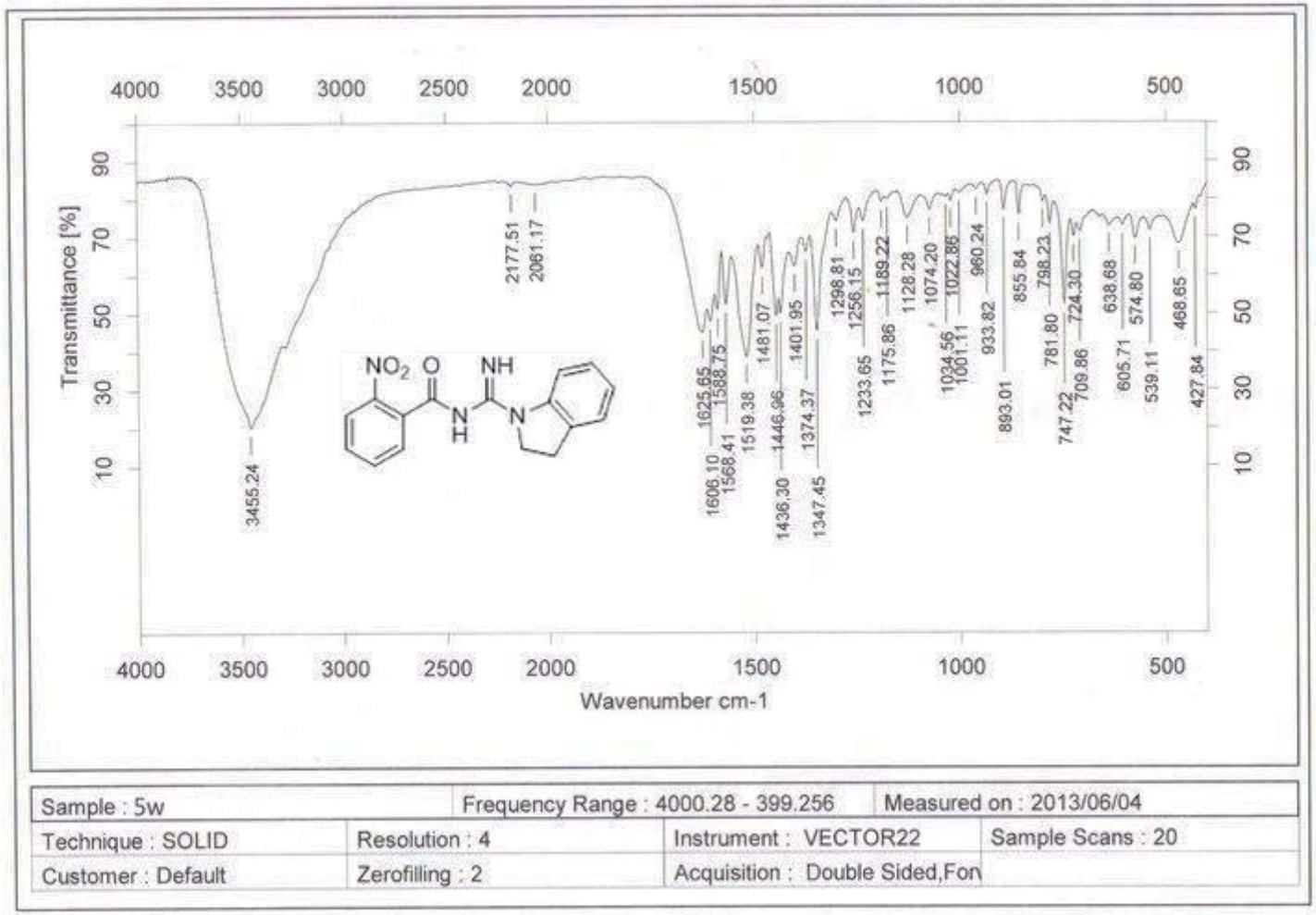
Sample : 5q	Frequency Range : 4000.28 - 399.256		Measured on : 2013/06/04
Technique : SOLID	Resolution : 4	Instrument : VECTOR22	Sample Scans : 20
Customer : Default	Zerofilling : 2	Acquisition : Double Sided,Fon	



Sample : 5t	Frequency Range : 4000.28 - 399.256	Measured on : 2013/06/04	
Technique : SOLID	Resolution : 4	Instrument : VECTOR22	Sample Scans : 20
Customer : Default	Zerofilling : 2	Acquisition : Double Sided,Fon	



Sample : 5u	Frequency Range : 4000.28 - 399.256	Measured on : 2013/06/04	
Technique : SOLID	Resolution : 4	Instrument : VECTOR22	Sample Scans : 20
Customer : Default	Zerofilling : 2	Acquisition : Double Sided,For	



Sample : 5w	Frequency Range : 4000.28 - 399.256	Measured on : 2013/06/04	
Technique : SOLID	Resolution : 4	Instrument : VECTOR22	Sample Scans : 20
Customer : Default	Zerofilling : 2	Acquisition : Double Sided,For	

中国科学院成都分院分析测试中心

分析测试结果报告单

送样单位	四川大学	送样时间	2013.6.3
样品名称 编　号	5ab、5s、5d		
分析测试 要　求	C、H、N、Cl 含量测定		
分析仪器	意大利 CARLO ERBA 1106 元素分析仪、氧瓶燃烧法		

分析测试结果

样品名称	N %	C %	H %	Cl %
5ab	19.72	59.23	4.39	
	19.66	59.26	4.32	
5s	14.00	64.51	4.85	11.82
	13.95	64.63	4.85	11.48
5d	15.39	61.48	4.53	13.08
	15.41	61.62	4.50	

（以下空白）

分析人		分析时间	2013.6.4
备　注	本结果只对来样负责		

单位盖章

2013 年 6 月 5 日