Electronic Supplementary Information

One-pot Access to 2-Amino-3-arylbenzofurans: Direct Entry to Polyheterocyclic Chemical Spaces

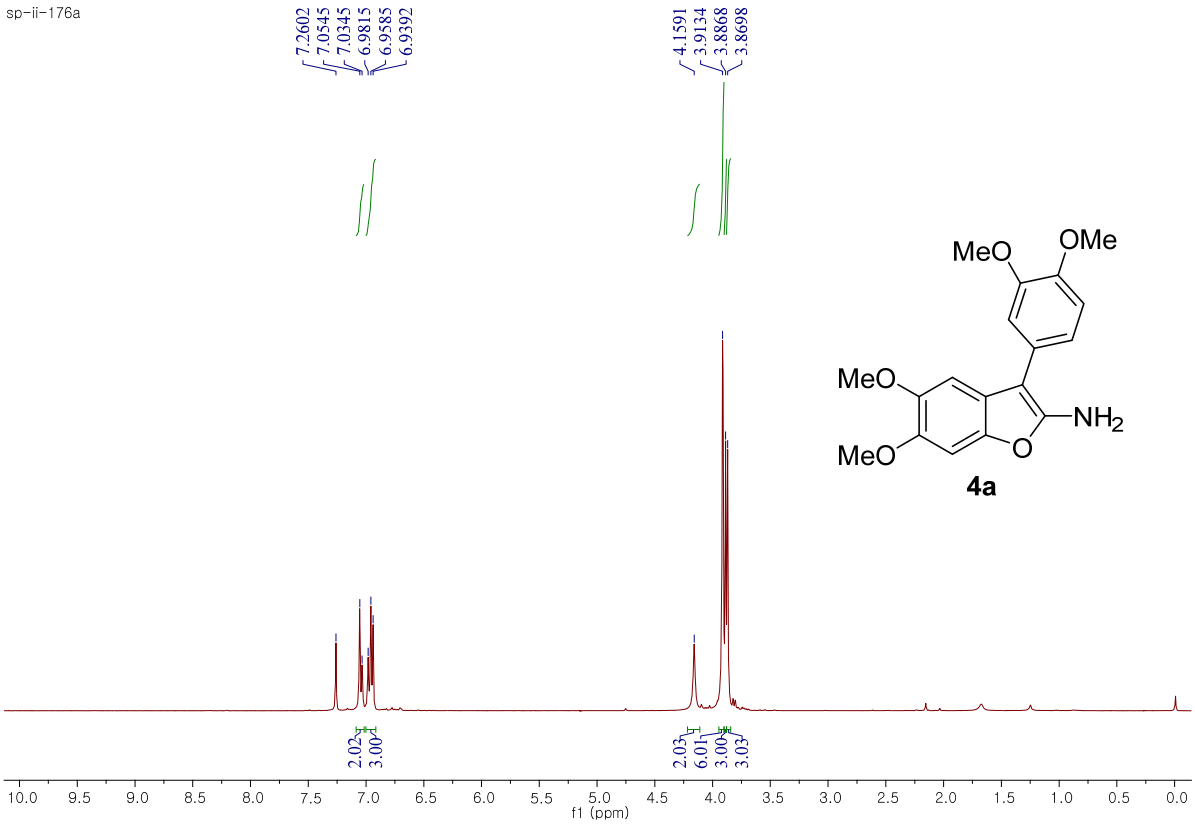
Sure Siva Prasad, Dirgha Raj Joshi, Jeong Hwa Lee, and Ikyon Kim*

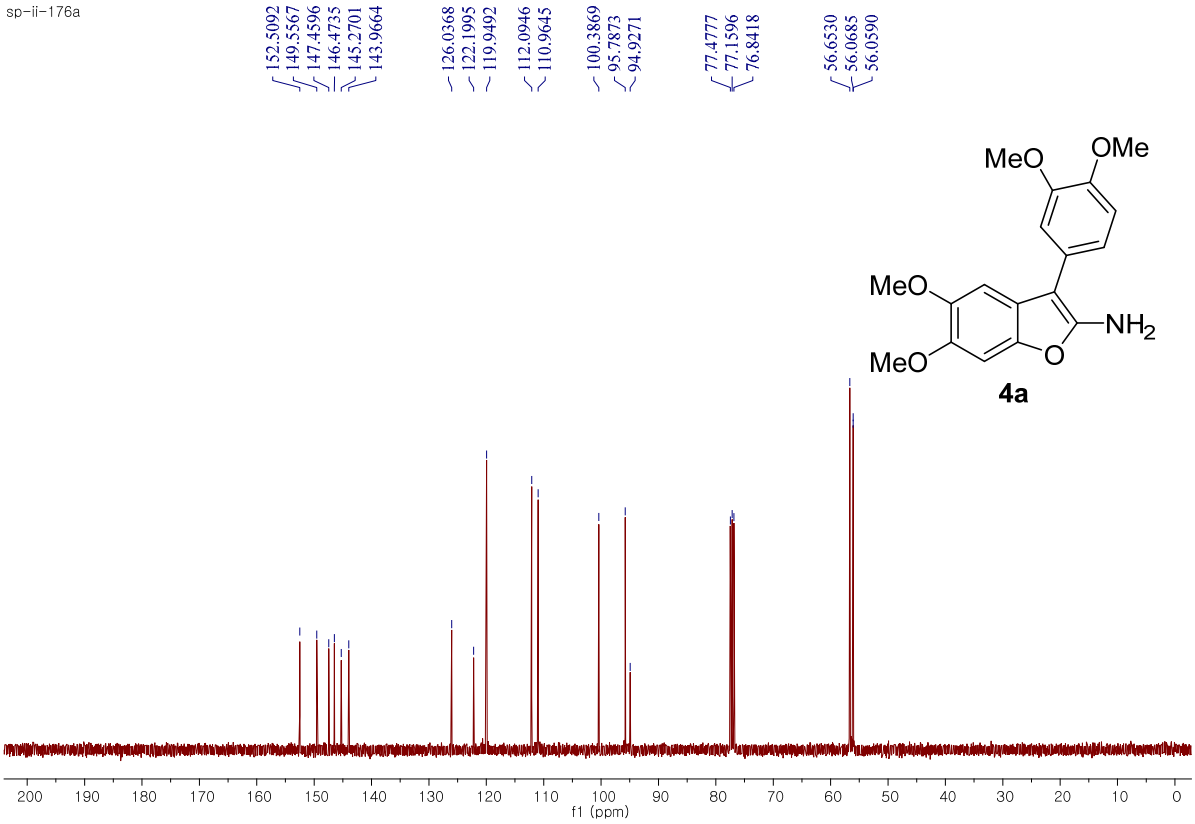
College of Pharmacy and Yonsei Institute of Pharmaceutical Sciences, Yonsei University

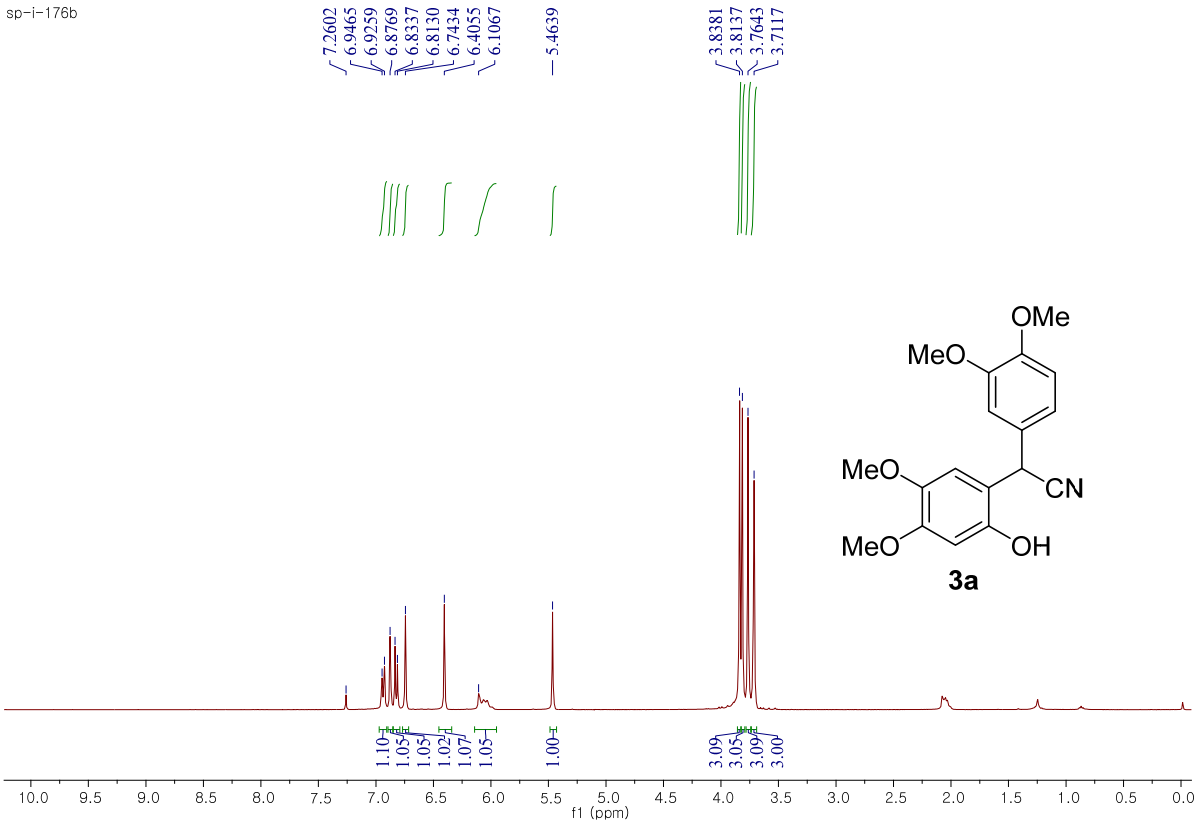
85 Songdogwahak-ro, Yeonsu-gu, Incheon, 21983, Republic of Korea

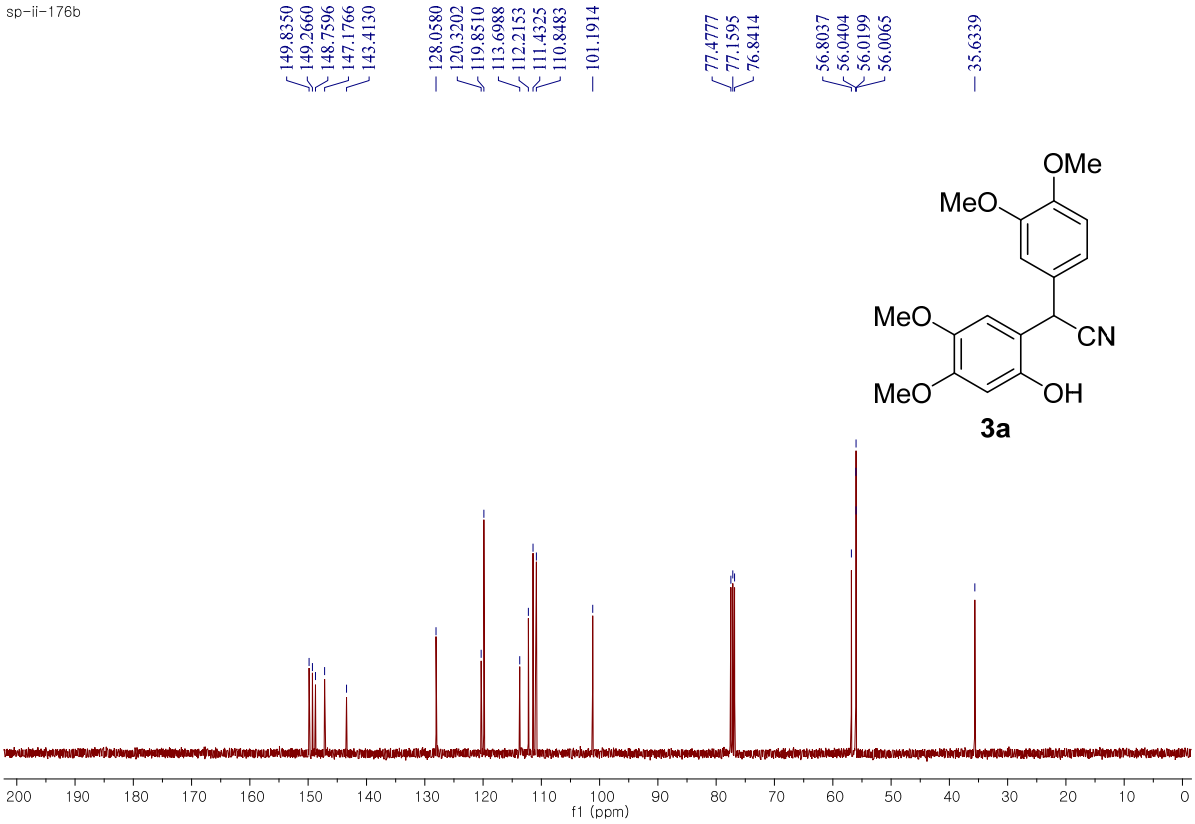
* Corresponding author. Tel.: +82 32 749 4515; fax: +82 32 749 4105; e-mail: ikyonkim@yonsei.ac.kr

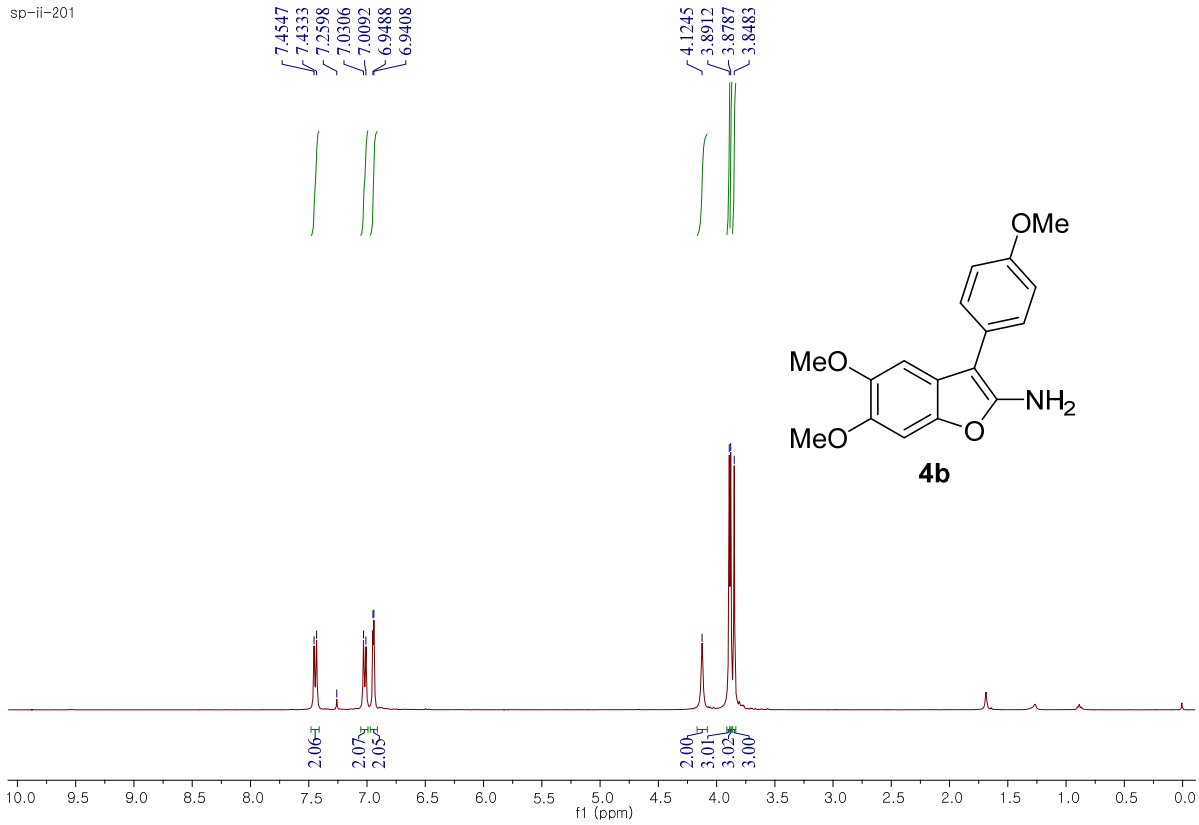
Table of Contents

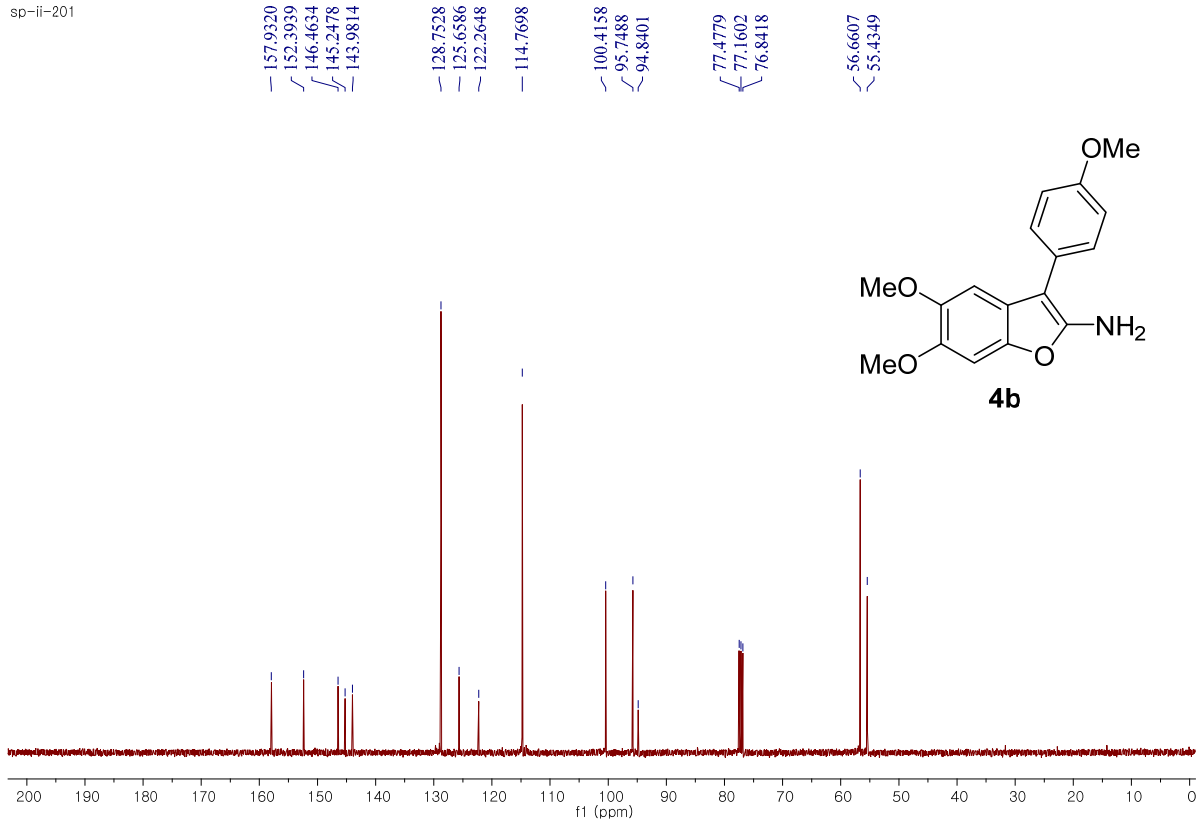

sp-ii-176a
7.2602
7.0545
7.0345
6.9815
6.9585
6.9392
4.1591
3.9134
3.8868
3.8698
MeO
OMe
MeO
NH2
MeO
O
4a
2.02
3.00
2.03
6.01
3.00
3.03
f1 (ppm)

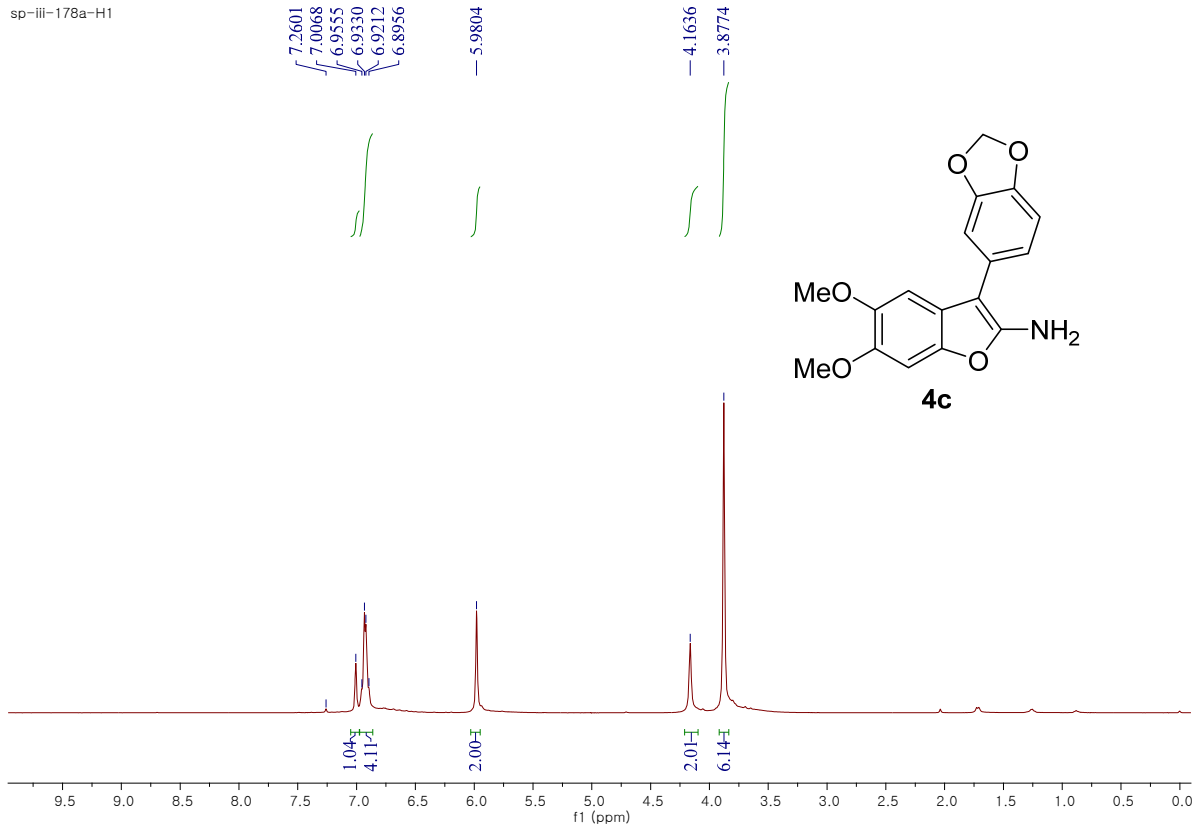

sp-ii-176a
152.5092
149.5567
147.4596
146.4735
145.2701
143.9664
126.0368
122.1995
119.9492
112.0946
110.9645
100.3869
95.7873
94.9271
77.4777
77.1596
76.8418
56.6530
56.0685
56.0590
MeO
OMe
MeO
NH2
MeO
O
4a
f1 (ppm)

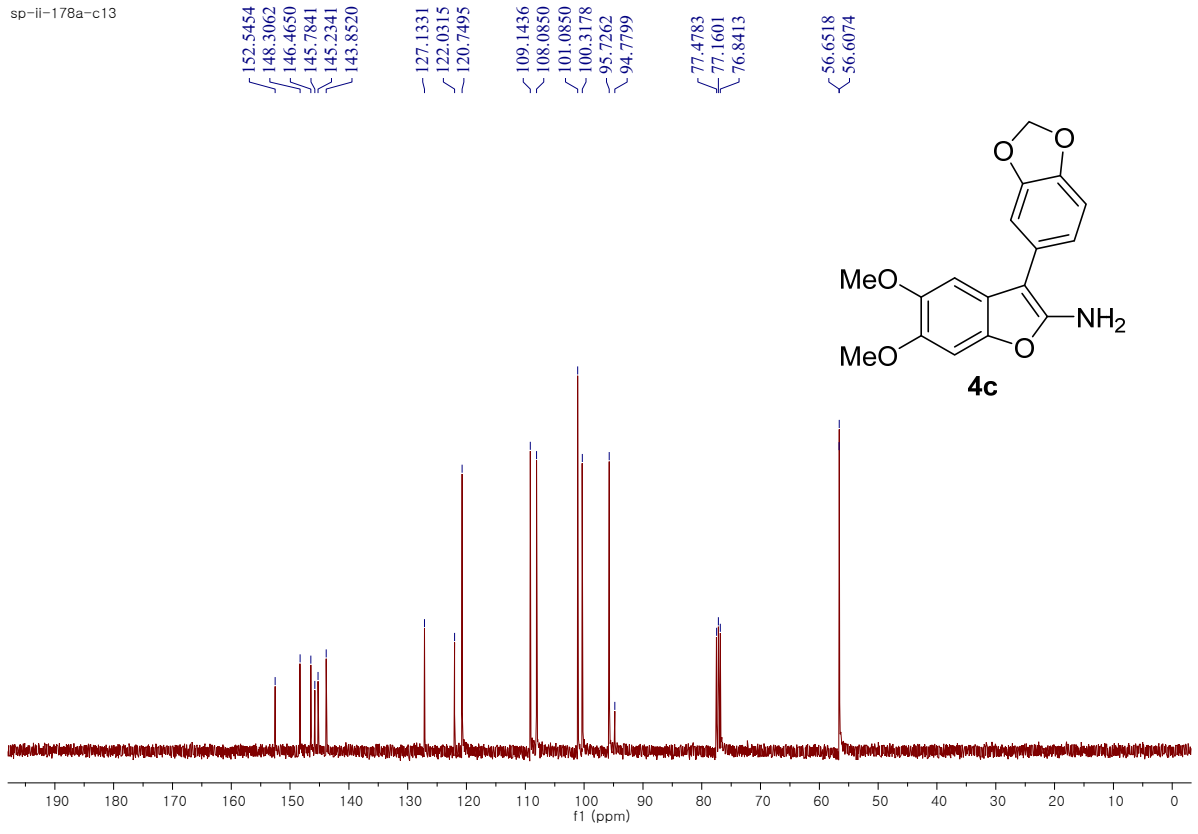

sp-i-176b
7.2602
6.9465
6.9259
6.8769
6.8337
6.8130
6.7434
6.4055
6.1067
5.4639
3.8381
3.8137
3.7643
3.7117
OMe
MeO
MeO
CN
MeO
OH
3a
1.10
1.05
1.05
1.02
1.07
1.05
1.00
3.09
3.05
3.09
3.00
f1 (ppm)

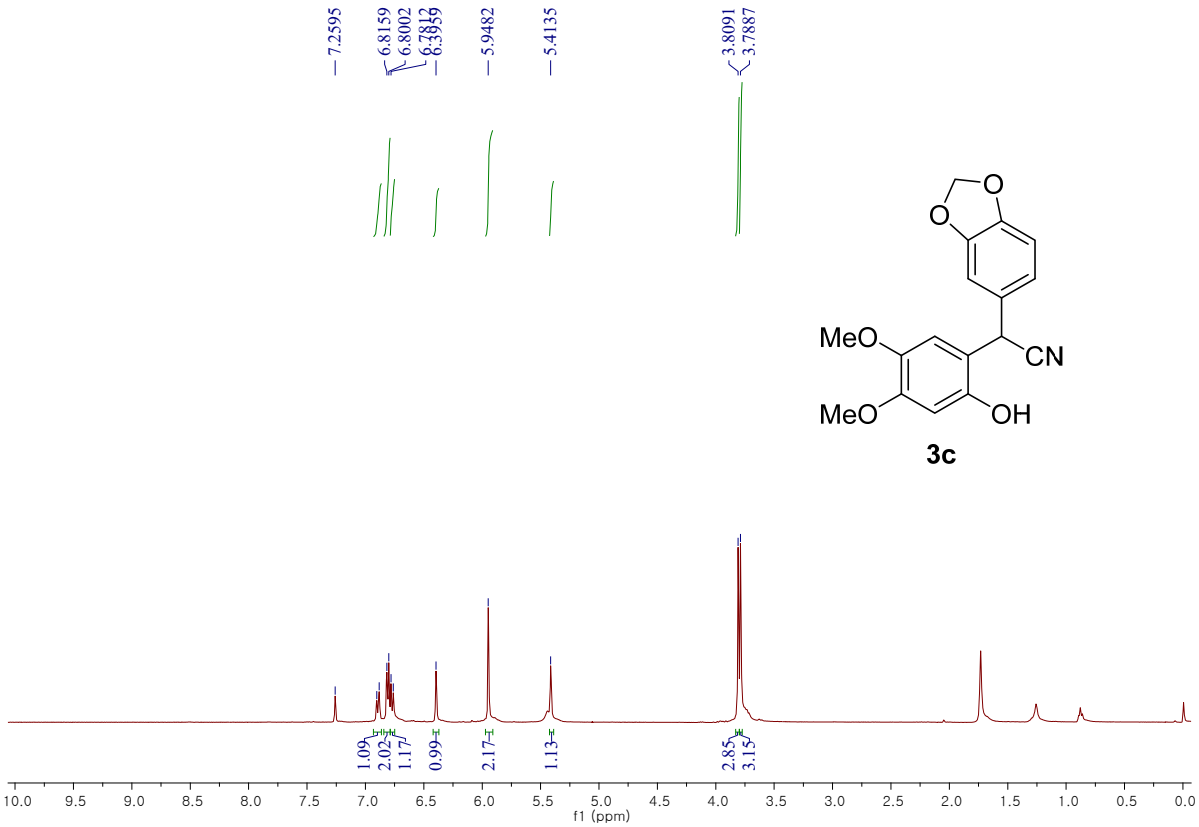

sp-ii-176b
149.8350
149.2660
148.7596
147.1766
143.4130
128.0580
120.3202
119.8510
113.6988
112.2153
111.4325
110.8483
101.1914
77.4777
77.1595
76.8414
56.8037
56.0404
56.0199
56.0065
35.6339
OMe
MeO
MeO
CN
MeO
OH
3a
f1 (ppm)

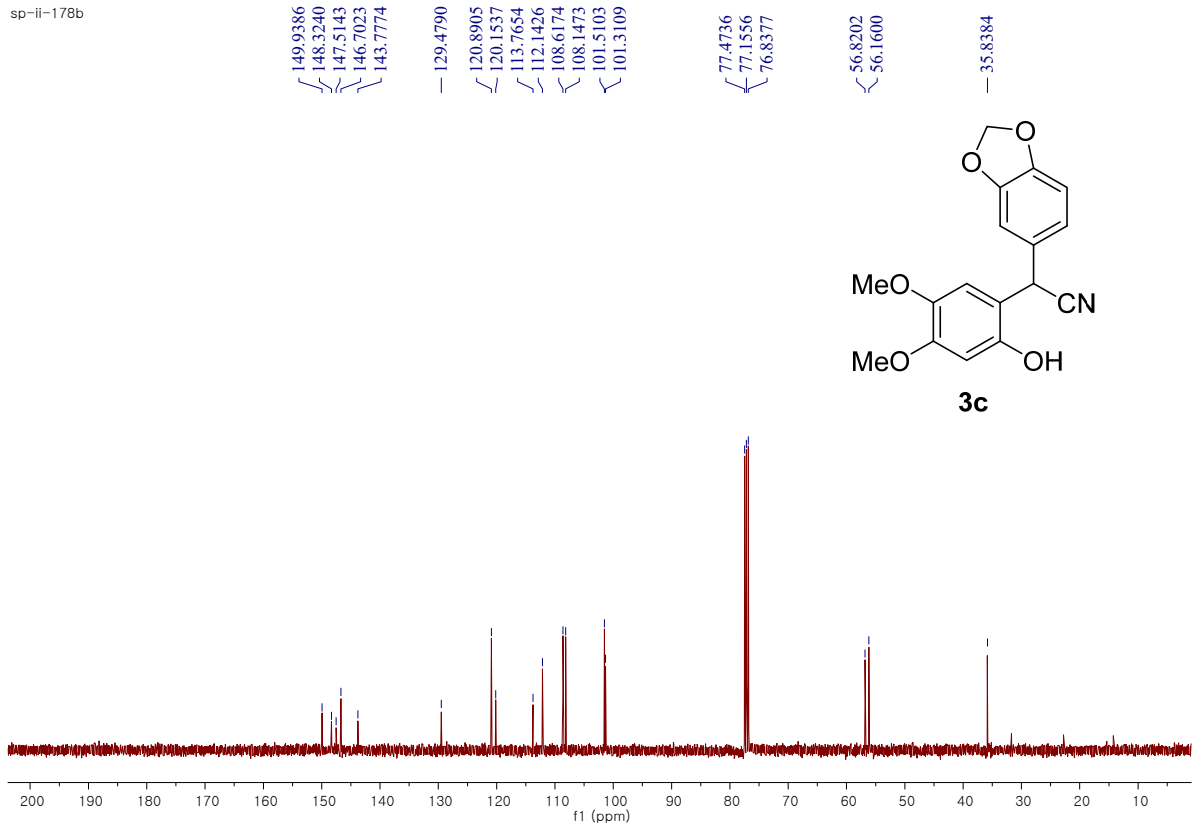

sp-ii-201
7.4547
7.4333
7.2598
7.0306
7.0092
6.9488
6.9408
4.1245
3.8912
3.8787
3.8483
OMe
MeO
MeO
NH2
O
4b
2.06
2.07
2.05
2.00
3.01
3.02
3.00
f1 (ppm)

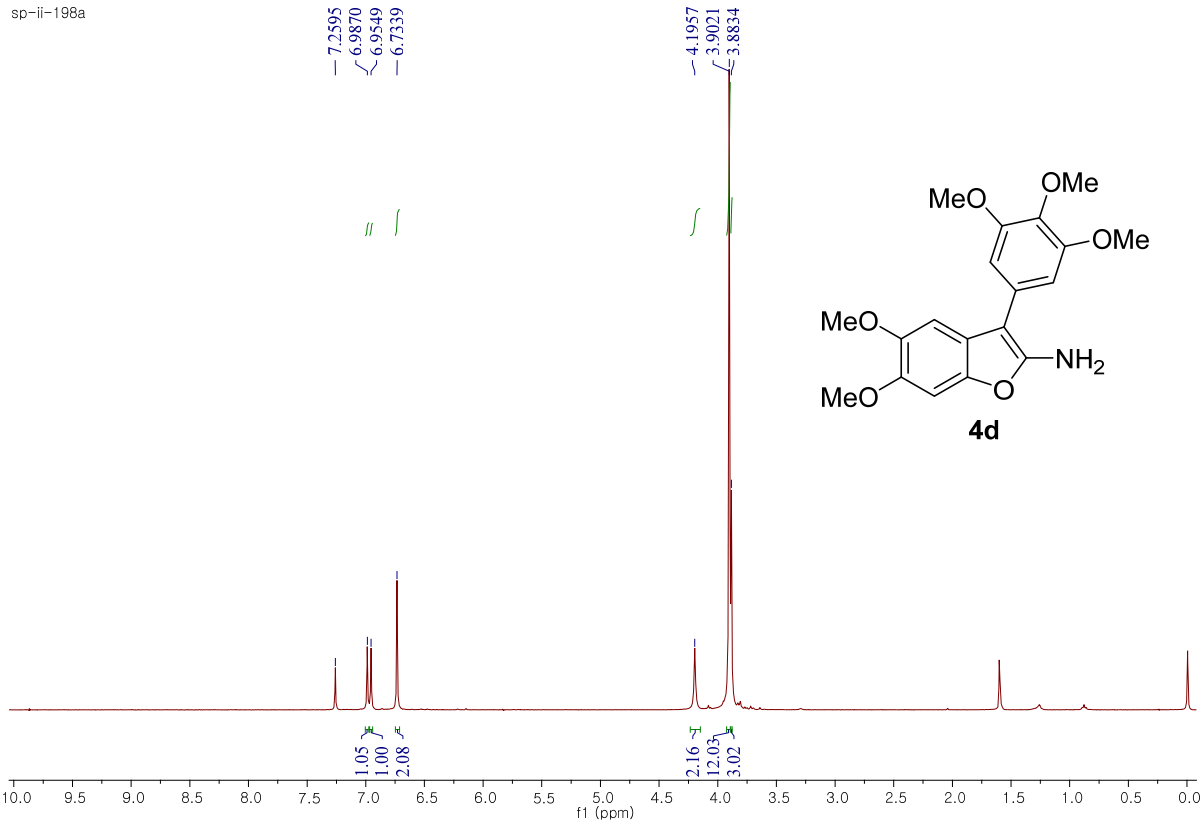

sp-ii-201
157.9320
152.3939
146.4634
145.2478
143.9814
128.7528
125.6586
122.2648
114.7698
100.4158
95.7488
94.8401
77.4779
77.1602
76.8418
56.6607
55.4349
OMe
MeO
MeO
NH2
O
4b
f1 (ppm)

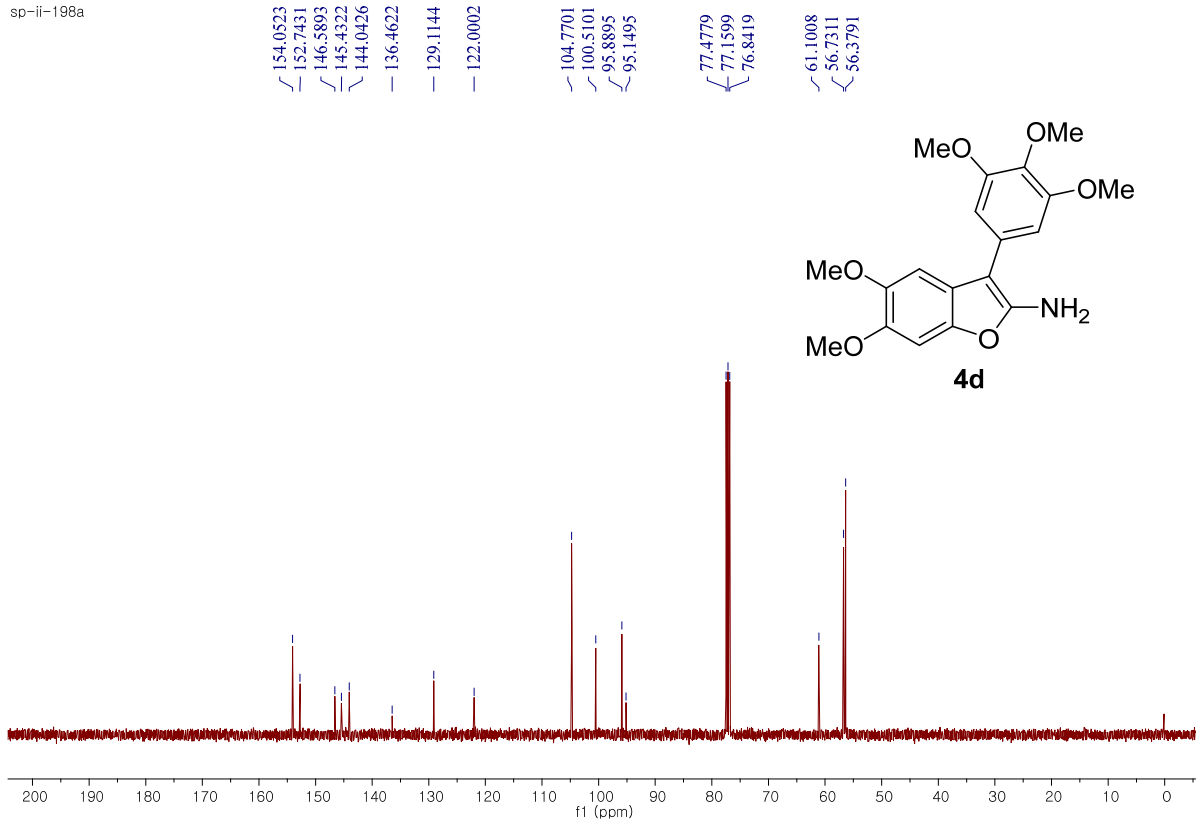

sp-iii-178a-H1
7.2601
7.0068
6.9555
6.9330
6.9212
6.8956
5.9804
4.1636
3.8774
MeO
MeO
NH2
O
O
O
4c
1.04
4.11
2.00
2.01
6.14
f1 (ppm)

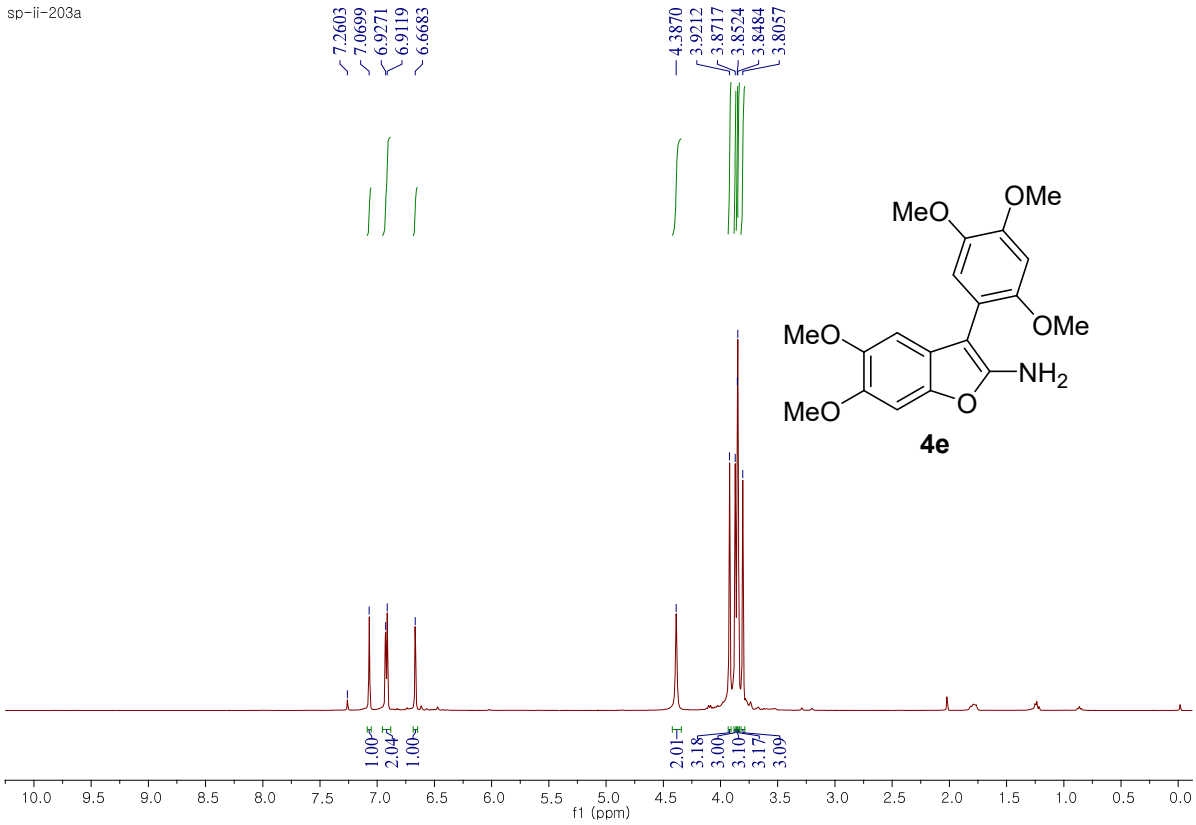

sp-ii-178a-c13
152.5454
148.3062
146.4650
145.7841
145.2341
143.8520
127.1331
122.0315
120.7495
109.1436
108.0850
101.0850
100.3178
95.7262
94.7799
77.4783
77.1601
76.8413
56.6518
56.6074
MeO
MeO
NH2
O
O
O
4c
f1 (ppm)

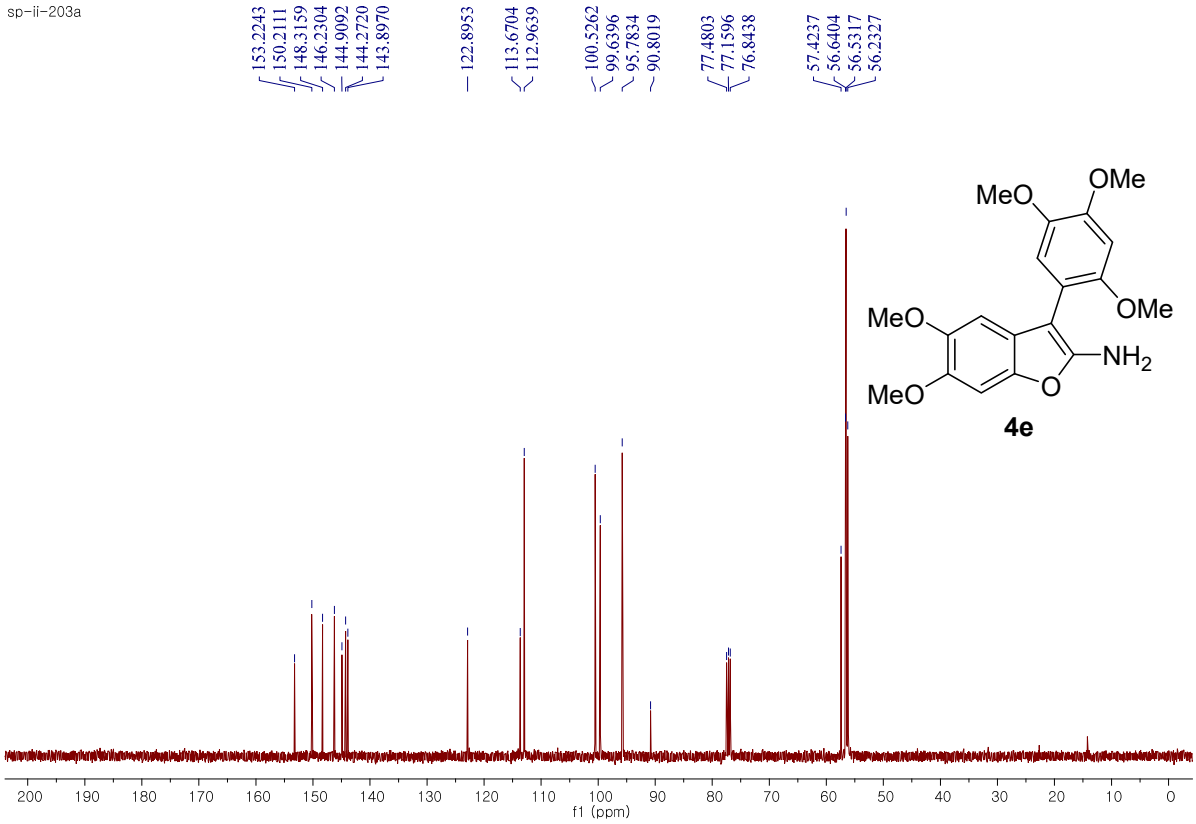

7.2595
6.8159
6.8002
6.3852
6.3559
5.9482
5.4135
3.8091
3.7887
MeO
MeO
CN
OH
3c
1.09
2.02
1.17
0.99
2.17
1.13
2.85
3.15
f1 (ppm)

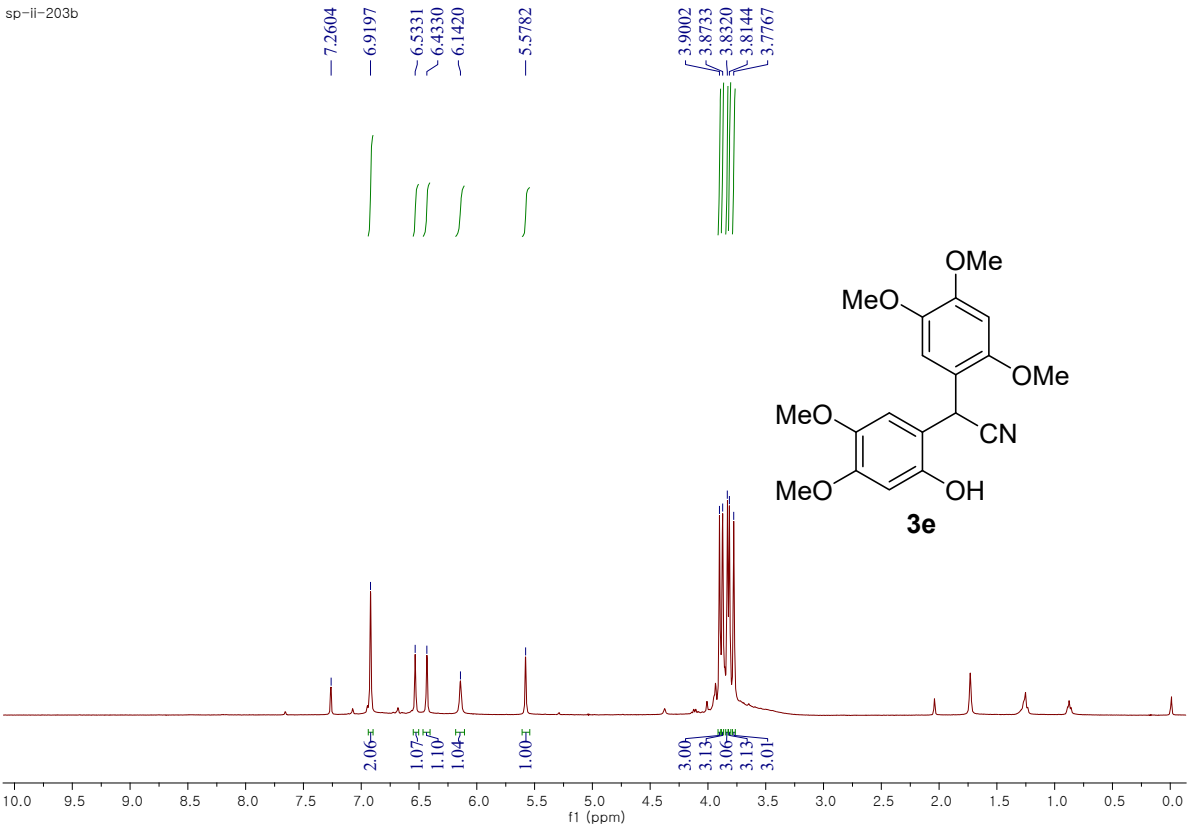

sp-ii-178b
149.9386
148.3240
147.5143
146.7023
143.7774
129.4790
120.8905
120.1537
113.7654
112.1426
108.6174
108.1473
101.5103
101.3109
77.4736
77.1556
76.8377
56.8202
56.1600
35.8384
MeO
MeO
CN
OH
3c
f1 (ppm)

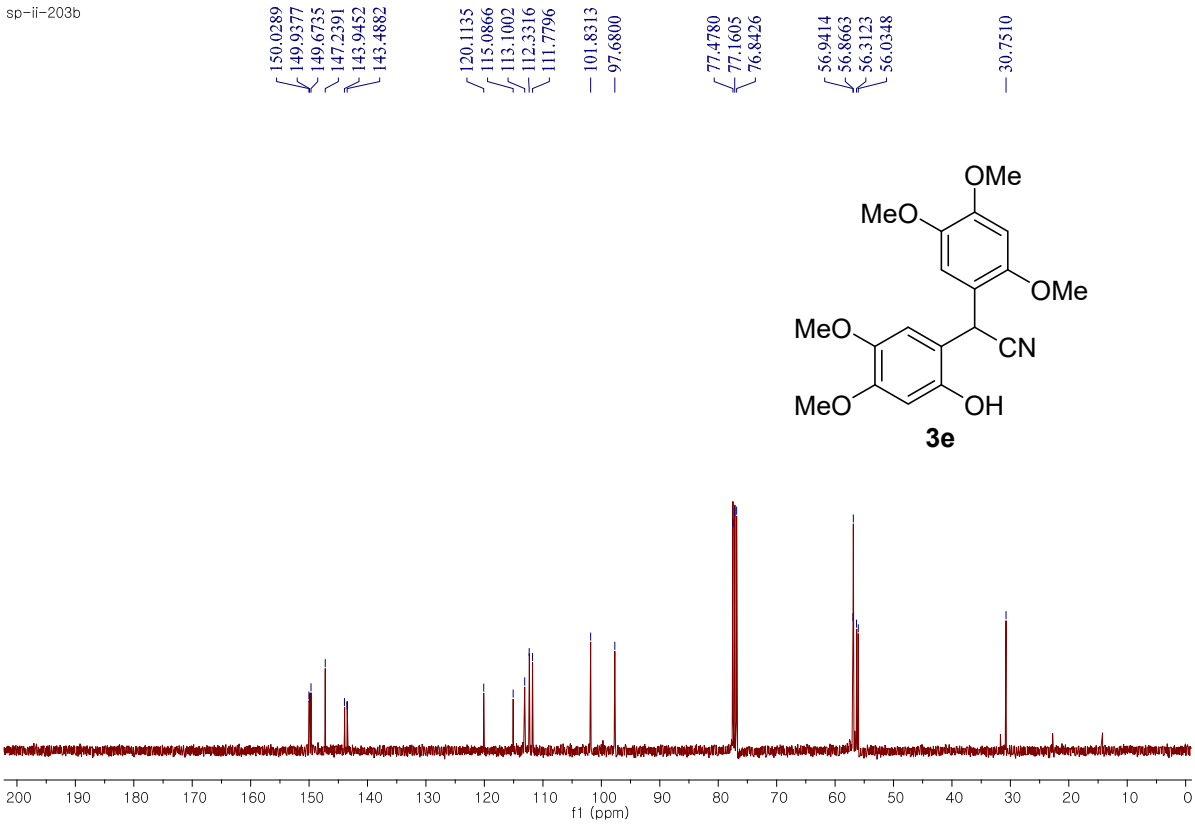

sp-ii-198a
7.2595
6.9870
6.9549
6.7339
4.1957
3.9021
3.8834
1.05
1.00
2.08
2.16
12.03
3.02
f1 (ppm)
MeO
OMe
OMe
MeO
NH2
MeO
O
4d

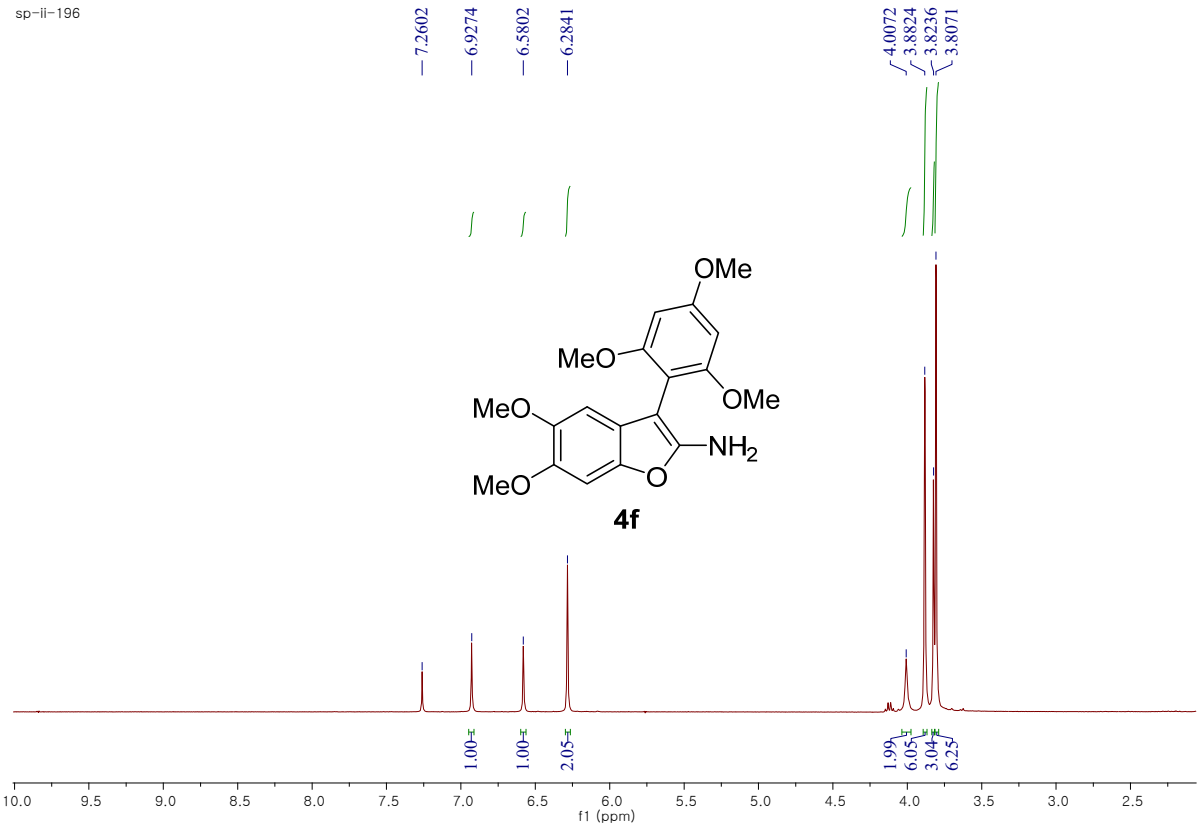

sp-ii-198a
154.0523
152.7431
146.5893
145.4322
144.0426
136.4622
129.1144
122.0002
104.7701
100.5101
95.8895
95.1495
77.4779
77.1599
76.8419
61.1008
56.7311
56.3791
f1 (ppm)
MeO
OMe
OMe
MeO
NH2
MeO
O
4d

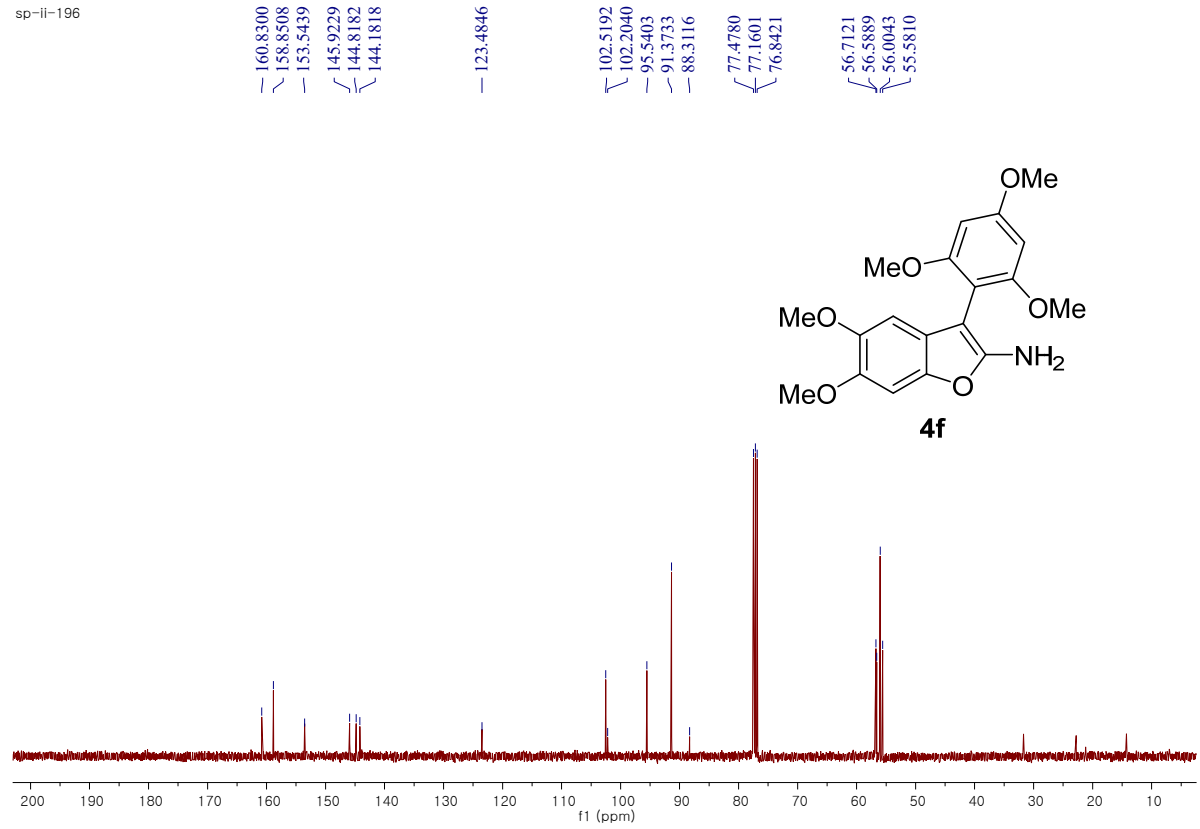

sp-ii-203a
7.2603
7.0699
6.9271
6.9119
6.6683
4.3870
3.9212
3.8717
3.8524
3.8484
3.8057
MeO
OMe
MeO
OMe
NH2
MeO
O
4e
1.00
2.04
1.00
2.01
3.18
3.00
3.10
3.17
3.09
f1 (ppm)

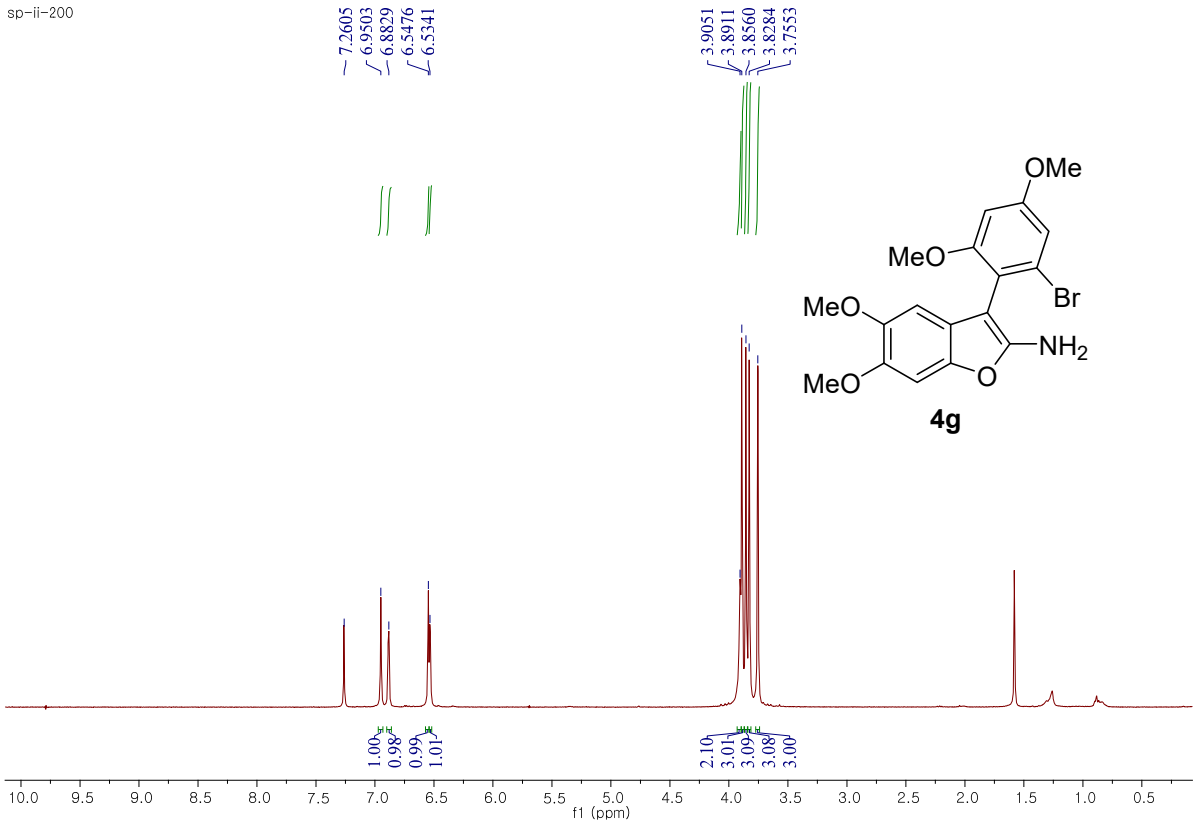

sp-ii-203a
153.2243
150.2111
148.3159
146.2304
144.9092
144.2720
143.8970
122.8953
113.6704
112.9639
100.5262
99.6396
95.7834
90.8019
77.4803
77.1596
76.8438
57.4237
56.6404
56.5317
56.2327
MeO
OMe
MeO
OMe
NH2
MeO
O
4e
f1 (ppm)

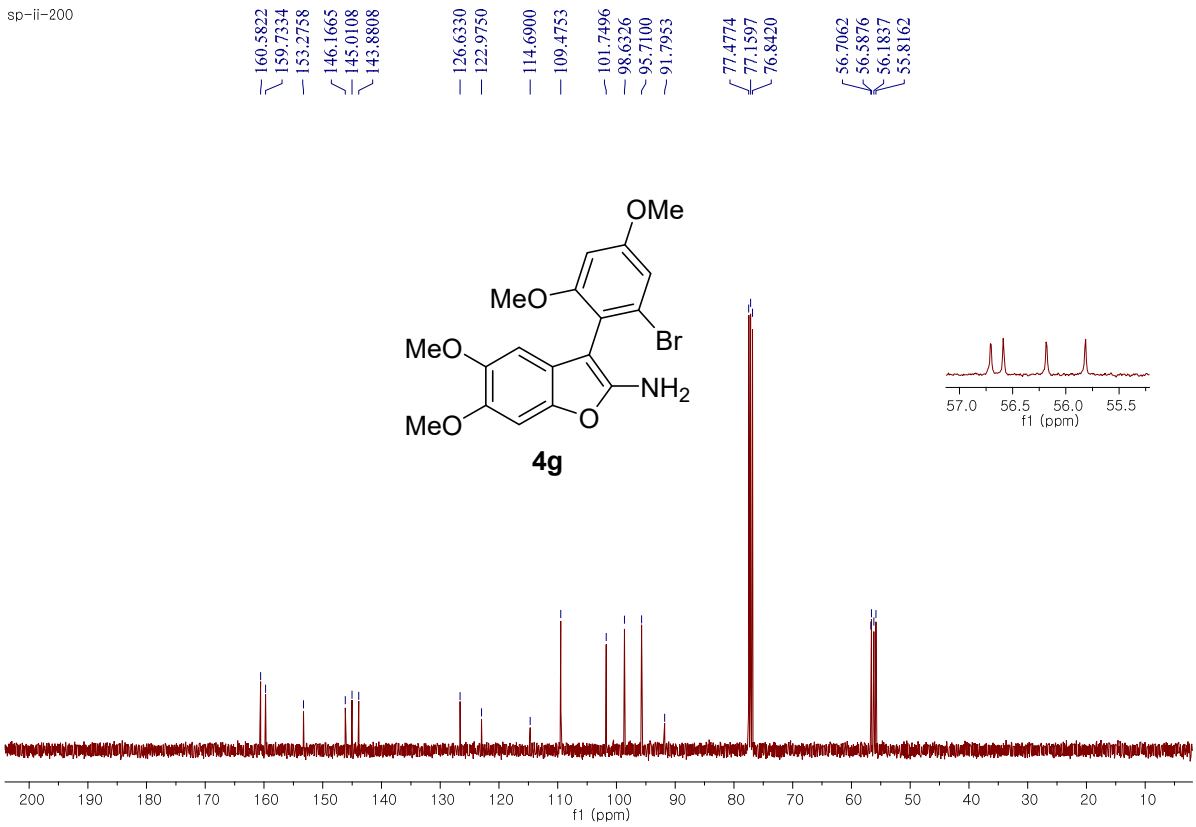

sp-ii-203b
7.2604
6.9197
6.5331
6.4330
6.1420
5.5782
3.9002
3.8733
3.8320
3.8144
3.7767
OMe
MeO
OMe
MeO
CN
MeO
OH
3e
2.06
1.07
1.10
1.04
1.00
3.00
3.13
3.06
3.13
3.01
f1 (ppm)

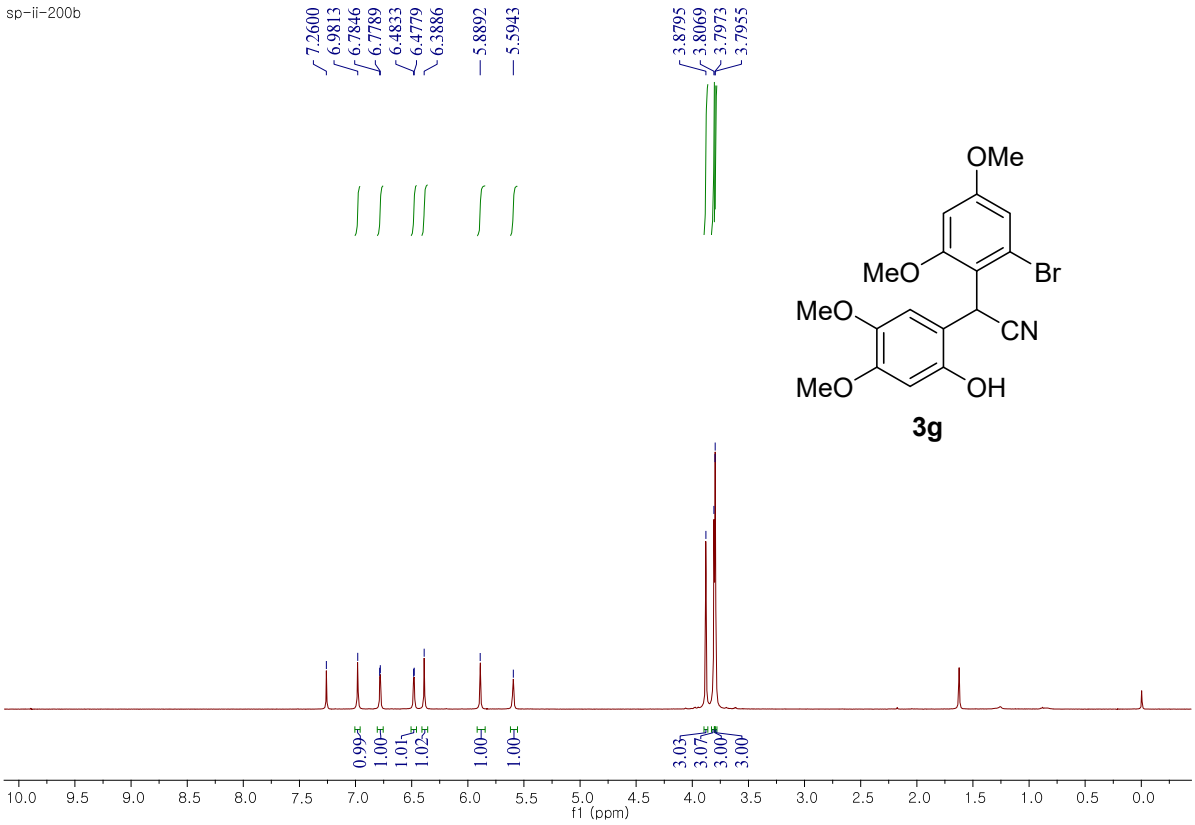

sp-ii-203b
150.0289
149.9377
149.6735
147.2391
143.9452
143.4882
120.1135
115.0866
113.1002
112.3316
111.7796
101.8313
97.6800
77.4780
77.1605
76.8426
56.9414
56.8663
56.3123
56.0348
30.7510
OMe
MeO
OMe
MeO
CN
MeO
OH
3e
f1 (ppm)

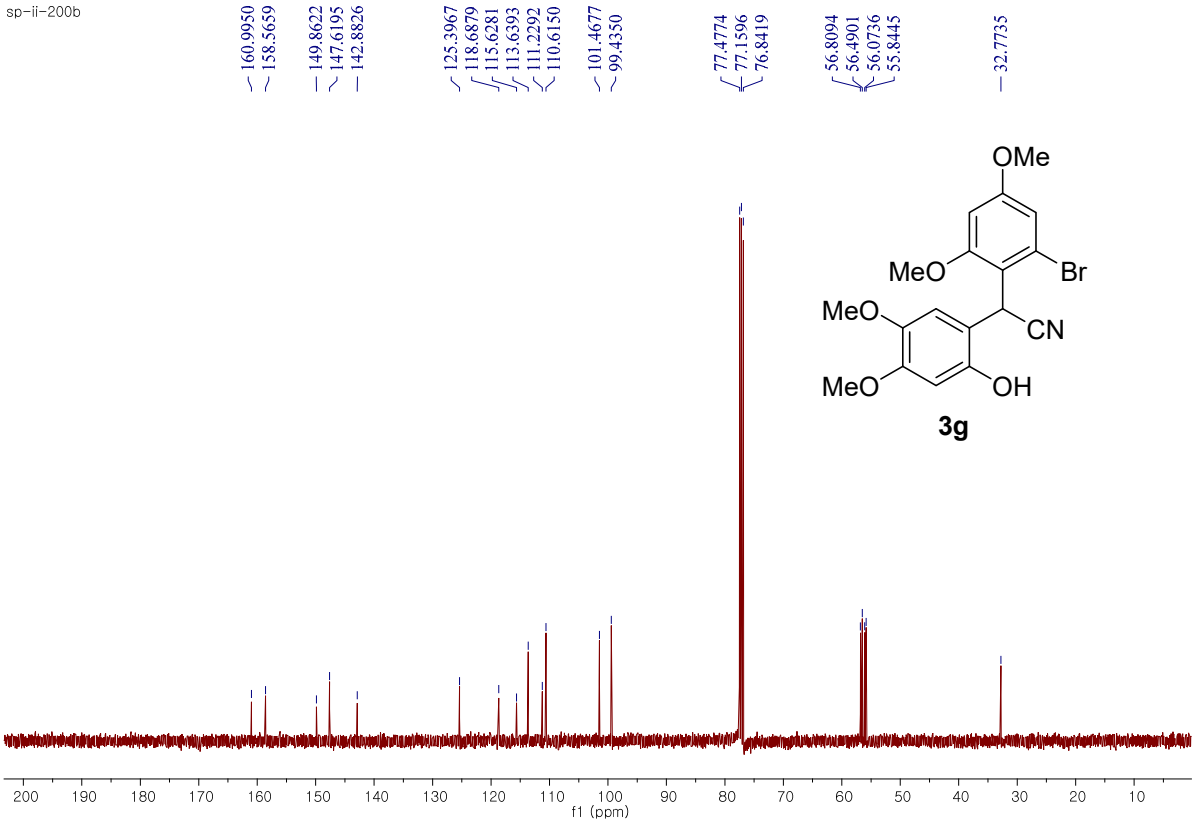

sp-ii-196
7.2602
6.9274
6.5802
6.2841
4.0072
3.8824
3.8236
3.8071
OMe
MeO
OMe
MeO
NH2
MeO
O
4f
1.00
1.00
2.05
1.99
6.05
3.04
6.25
f1 (ppm)

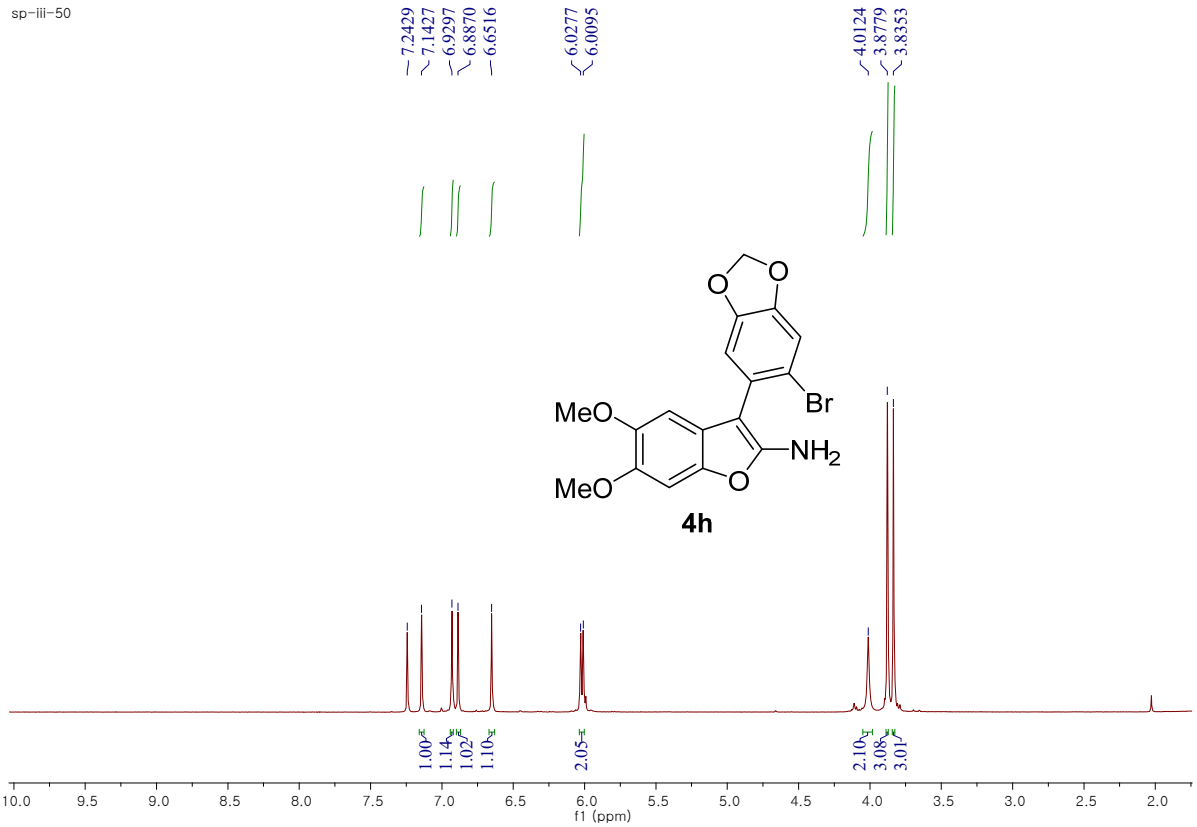

sp-ii-196
160.8300
158.8508
153.5439
145.9229
144.8182
144.1818
123.4846
102.5192
102.2040
95.5403
91.3733
88.3116
77.4780
77.1601
76.8421
56.7121
56.5889
56.0043
55.5810
OMe
MeO
OMe
MeO
NH2
MeO
O
4f
f1 (ppm)

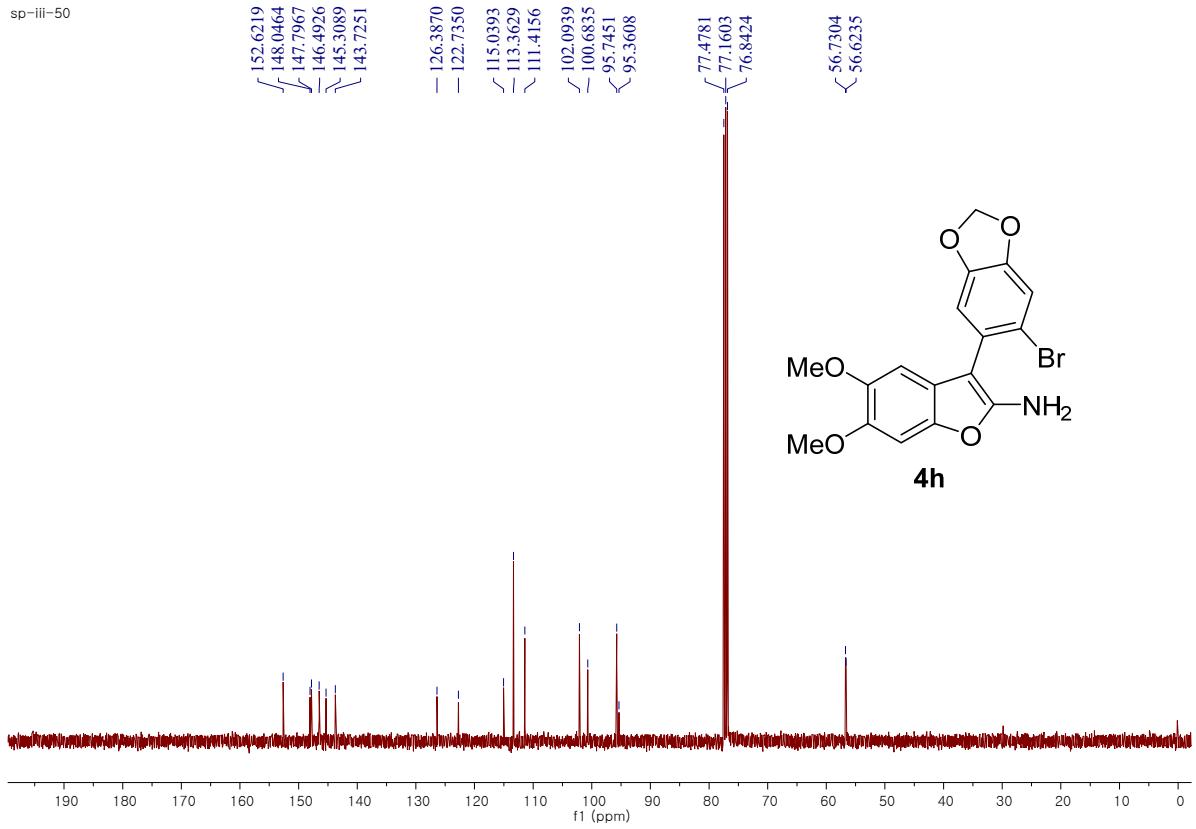

sp-ii-200
7.2605
6.9503
6.8829
6.5476
6.5341
3.9051
3.8911
3.8560
3.8284
3.7553
OMe
MeO
Br
MeO
NH2
MeO
O
4g
1.00
0.98
0.99
1.01
2.10
3.01
3.09
3.08
3.00
f1 (ppm)

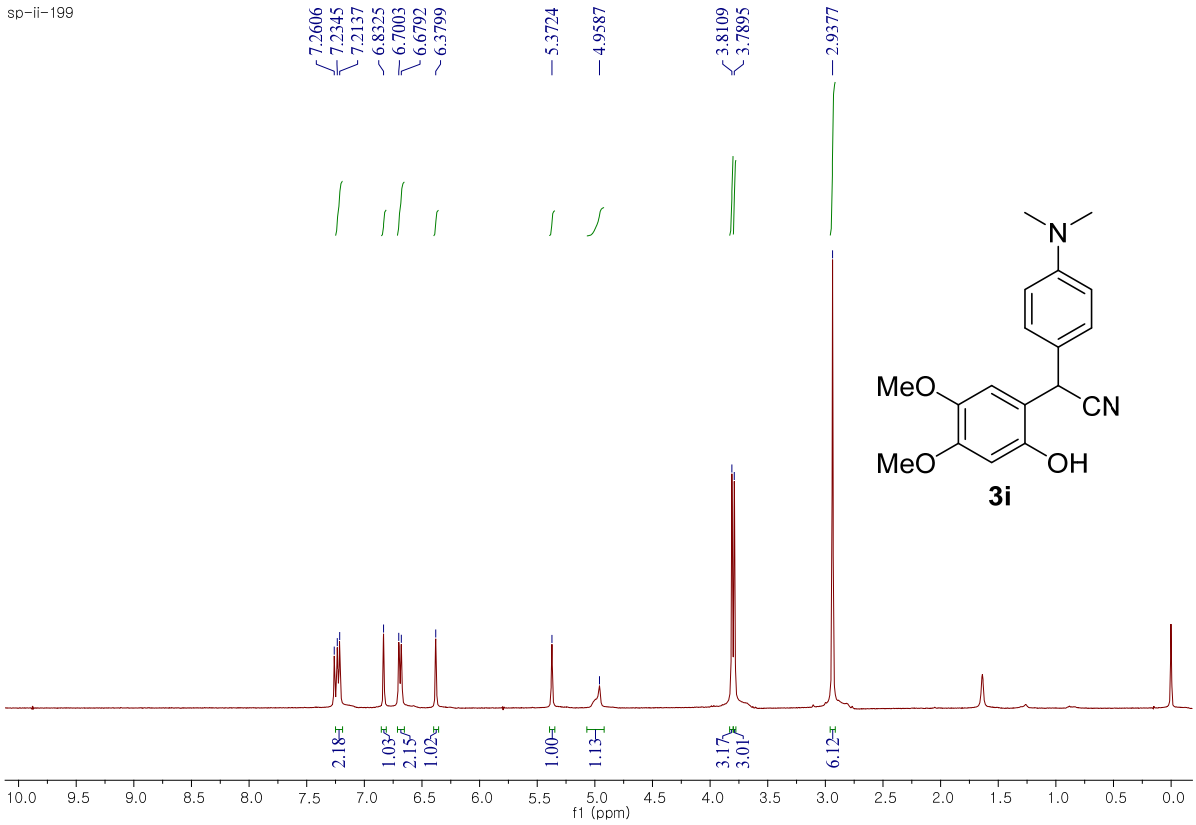

sp-ii-200
160.5822
159.7334
153.2758
146.1665
145.0108
143.8808
126.6330
122.9750
114.6900
109.4753
101.7496
98.6326
95.7100
91.7953
77.4774
77.1597
76.8420
56.7062
56.5876
56.1837
55.8162
OMe
MeO
Br
MeO
NH2
MeO
O
4g
57.0
56.5
56.0
55.5
f1 (ppm)
f1 (ppm)

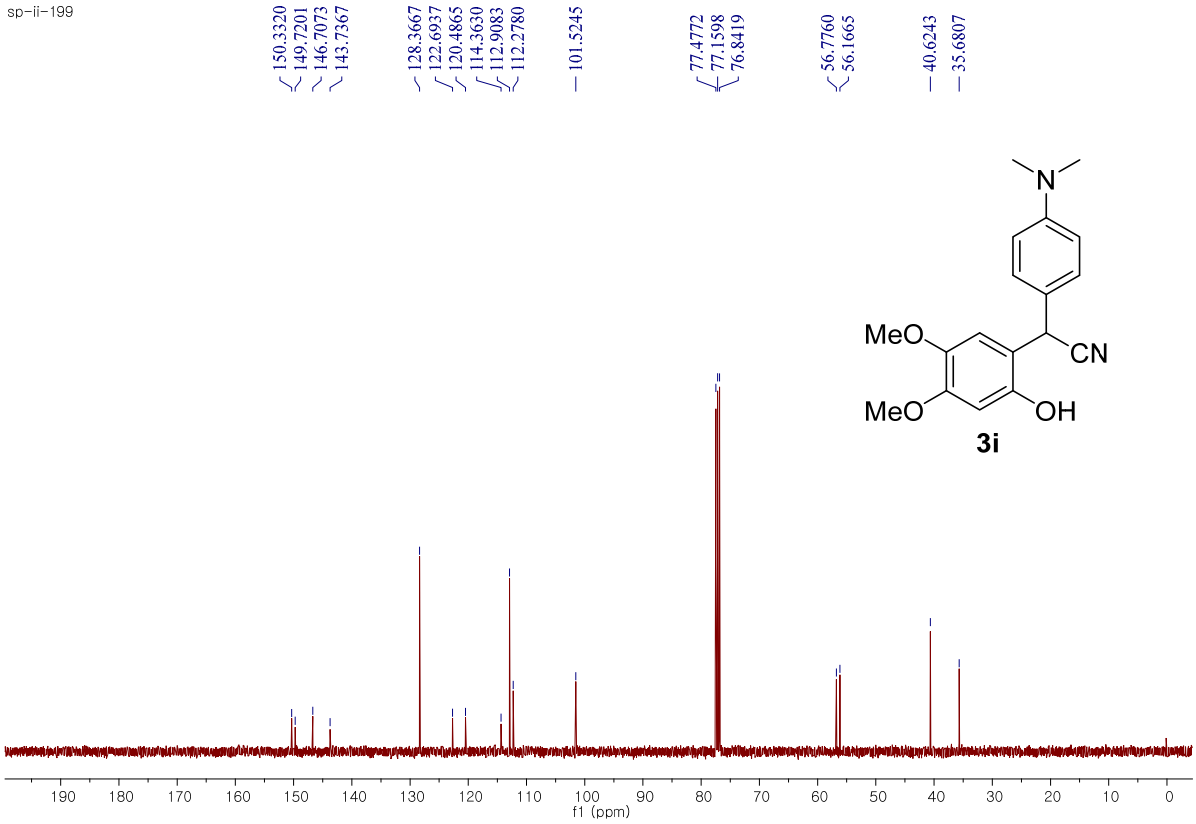

sp-ii-200b
7.2600
6.9813
6.7846
6.7789
6.4833
6.4779
6.3886
5.8892
5.5943
3.8795
3.8069
3.7973
3.7955
OMe
MeO
Br
MeO
CN
MeO
OH
3g
0.99
1.00
1.01
1.02
1.00
1.00
3.03
3.07
3.00
3.00
f1 (ppm)

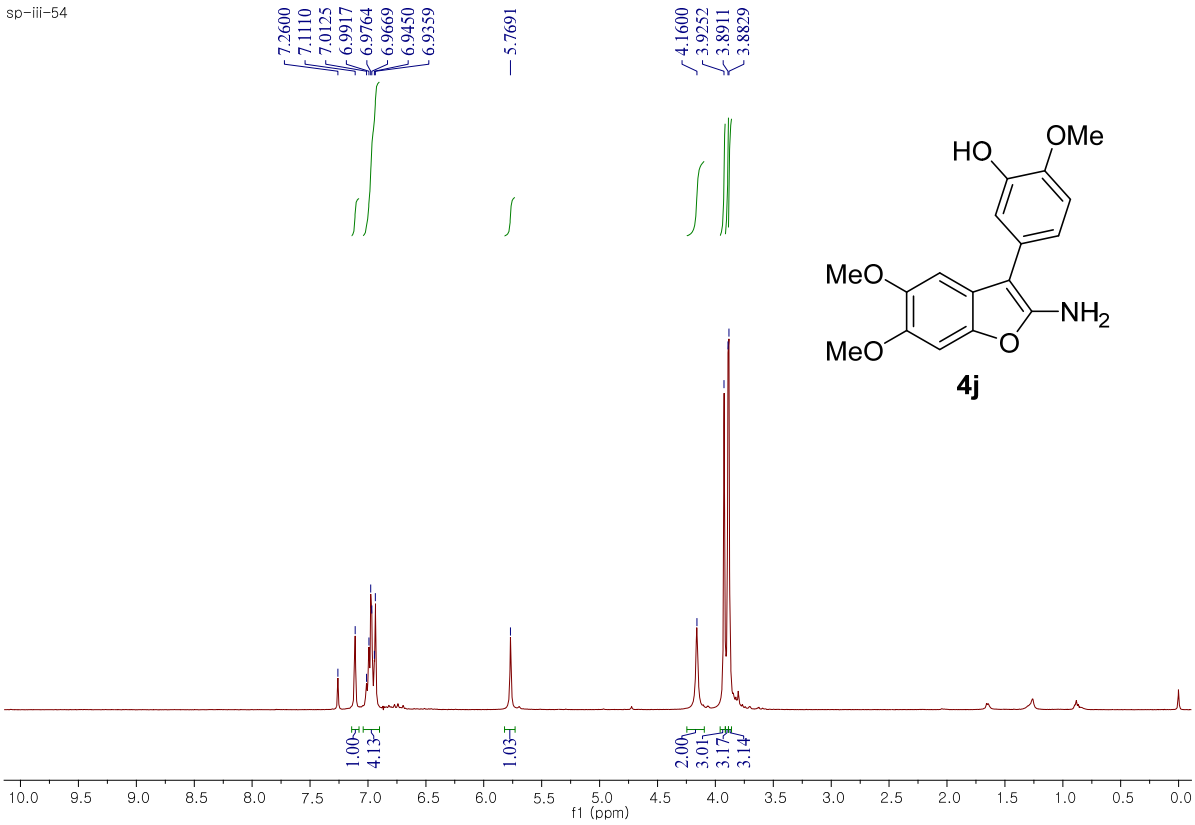

sp-ii-200b
160.9950
158.5659
149.8622
147.6195
142.8826
125.3967
118.6879
115.6281
113.6393
111.2292
110.6150
101.4677
99.4350
77.4774
77.1596
76.8419
56.8094
56.4901
56.0736
55.8445
32.7735
OMe
MeO
Br
MeO
CN
MeO
OH
3g
f1 (ppm)

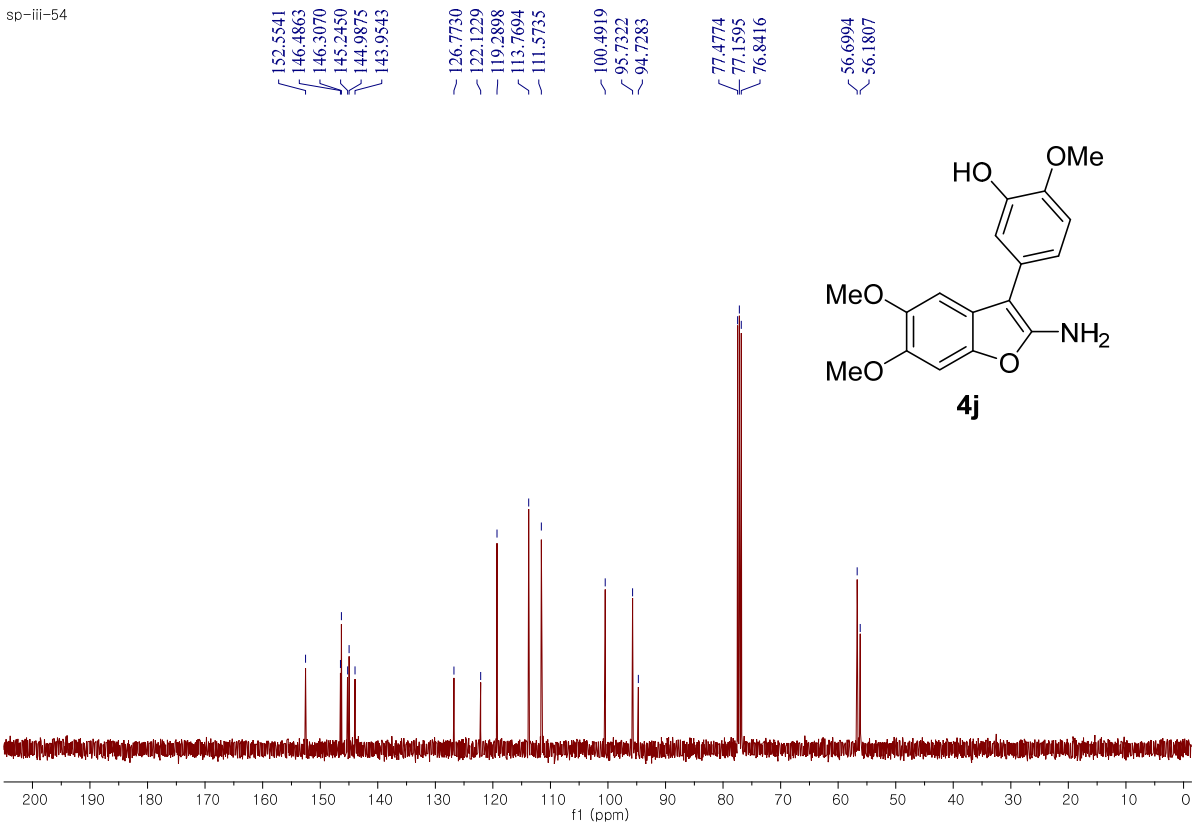

sp-iii-50
7.2429
7.1427
6.9297
6.8870
6.6516
6.0277
6.0095
4.0124
3.8779
3.8353
MeO
MeO
Br
NH2
O
O
4h
1.00
1.14
1.02
1.10
2.05
2.10
3.08
3.01
f1 (ppm)

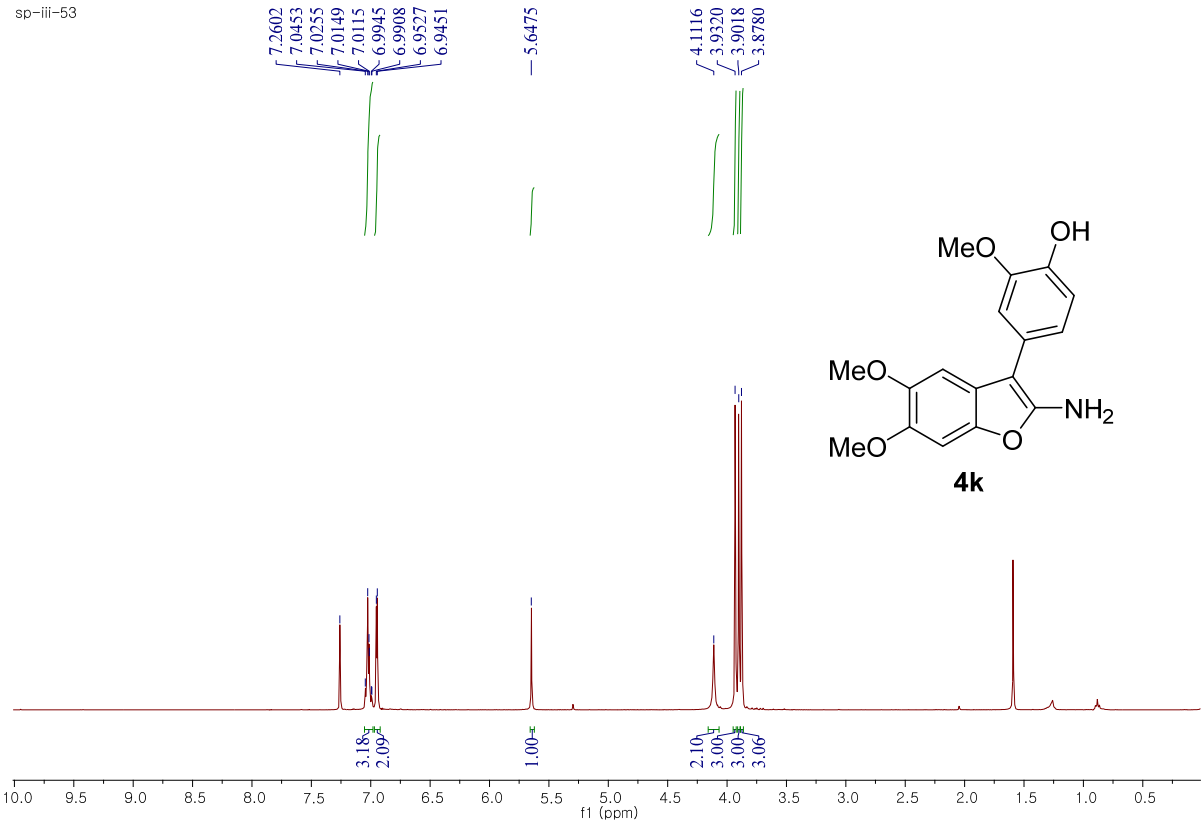

sp-iii-50
152.6219
148.0464
147.7967
146.4926
145.3089
143.7251
126.3870
122.7350
115.0393
113.3629
111.4156
102.0939
100.6835
95.7451
95.3608
77.4781
77.1603
76.8424
56.7304
56.6235
MeO
MeO
Br
NH2
O
O
4h
f1 (ppm)

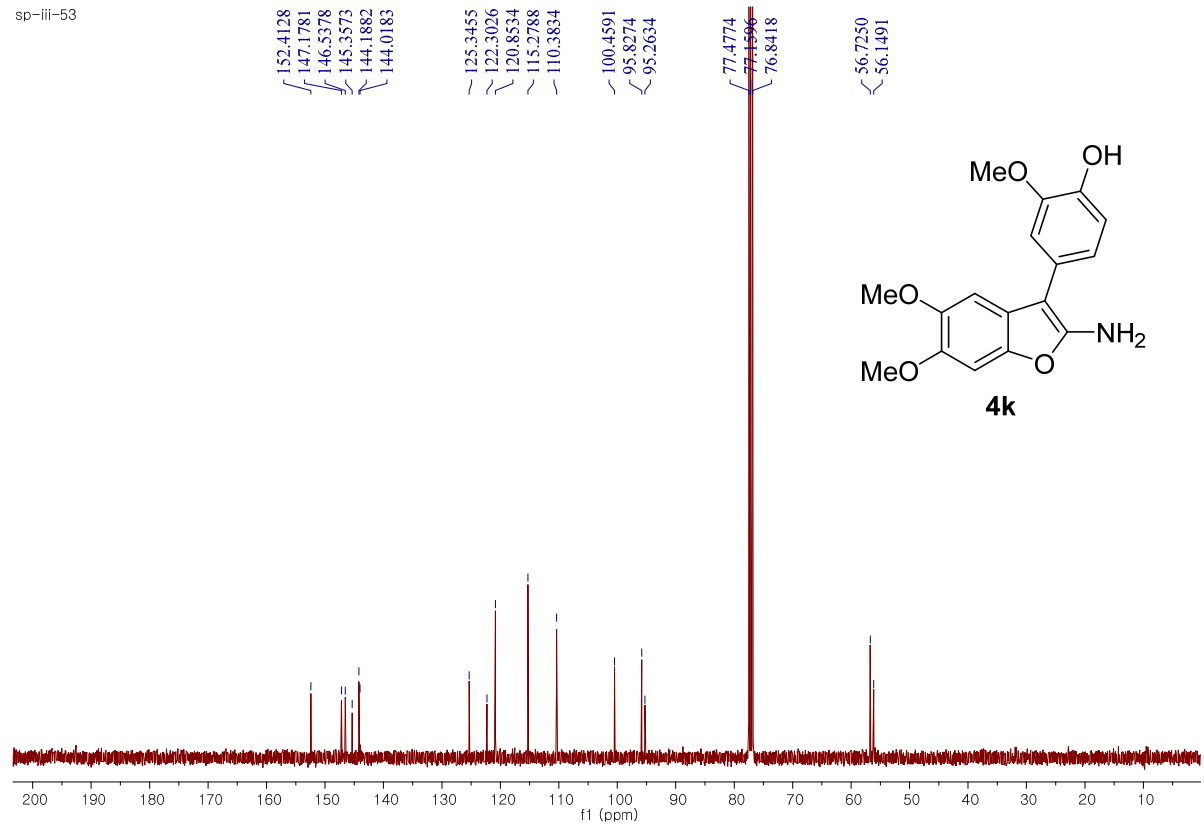

sp-ii-199
7.2606
7.2345
7.2137
6.8325
6.7003
6.6792
6.3799
5.3724
4.9587
3.8109
3.7895
2.9377
2.18
1.03
2.15
1.02
1.00
1.13
3.17
3.01
6.12
f1 (ppm)
N
MeO
MeO
CN
OH
3i

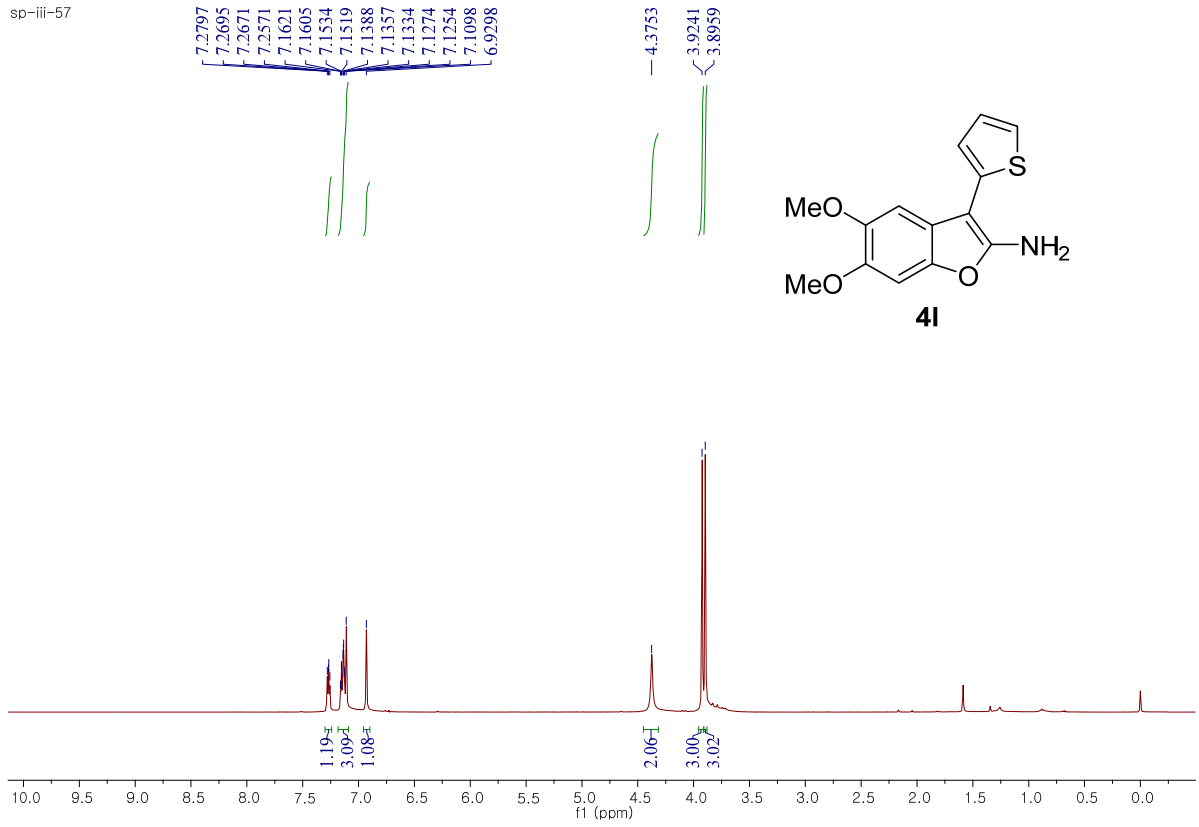

sp-ii-199
150.3320
149.7201
146.7073
143.7367
128.3667
122.6937
120.4865
114.3630
112.9083
112.2780
101.5245
77.4772
77.1598
76.8419
56.7760
56.1665
40.6243
35.6807
f1 (ppm)
N
MeO
MeO
CN
OH
3i

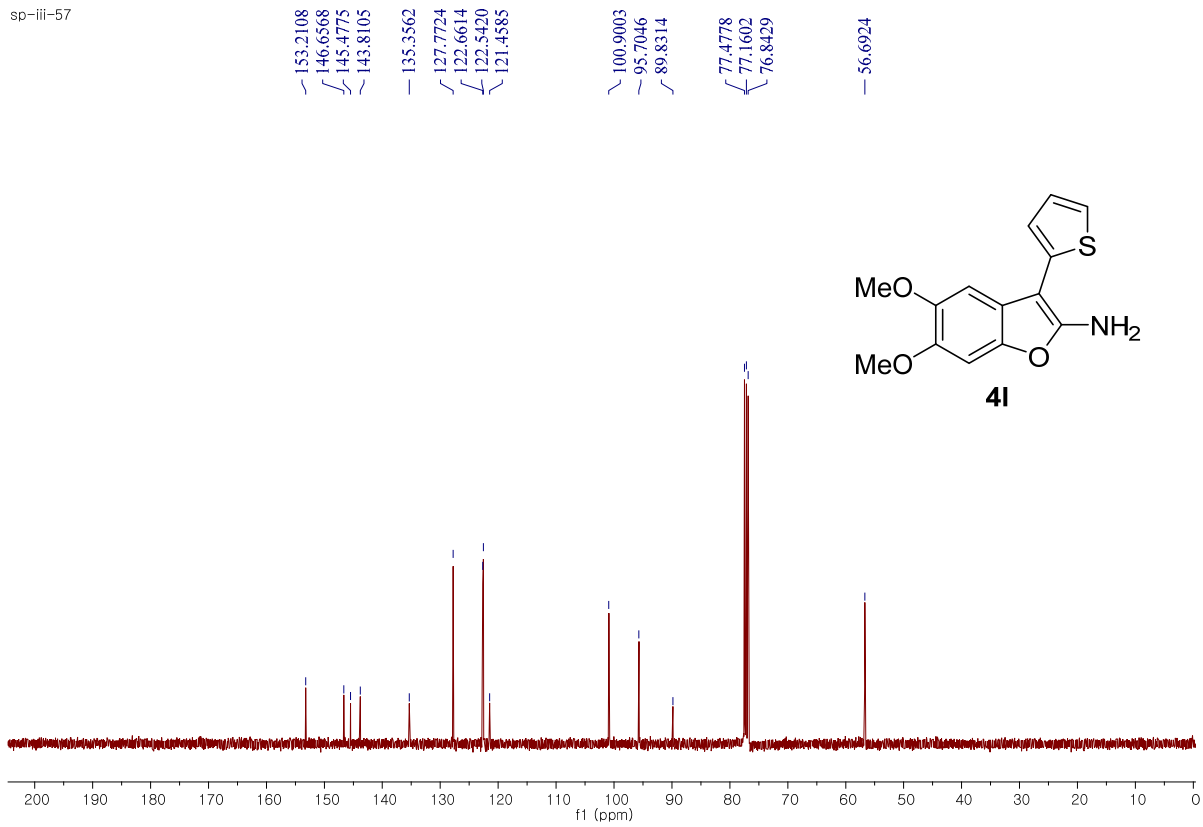

sp-iii-54
7.2600
7.1110
7.0125
6.9917
6.9764
6.9669
6.9450
6.9359
5.7691
4.1600
3.9252
3.8911
3.8829
HO
OMe
MeO
MeO
NH2
O
4j
1.00
4.13
1.03
2.00
3.01
3.17
3.14
f1 (ppm)

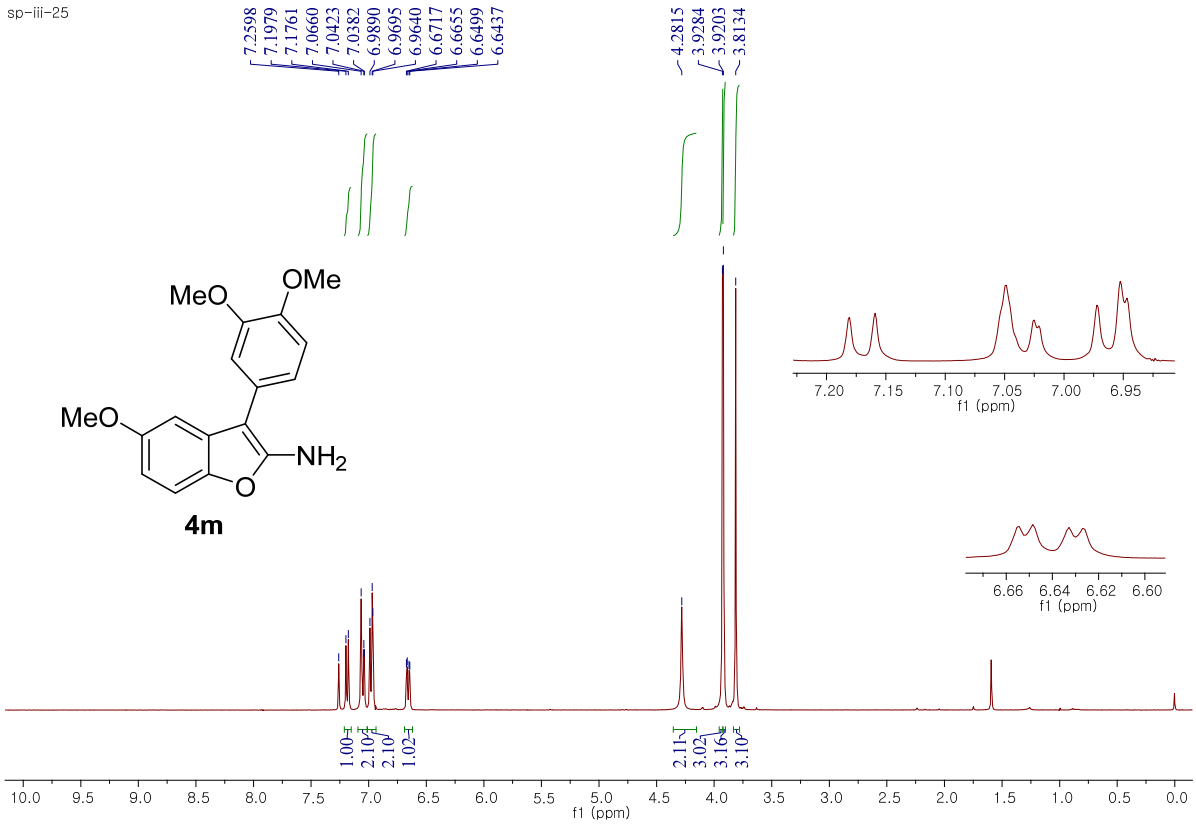

sp-iii-54
152.5541
146.4863
146.3070
145.2450
144.9875
143.9543
126.7730
122.1229
119.2898
113.7694
111.5735
100.4919
95.7322
94.7283
77.4774
77.1595
76.8416
56.6994
56.1807
HO
OMe
MeO
MeO
NH2
O
4j
f1 (ppm)

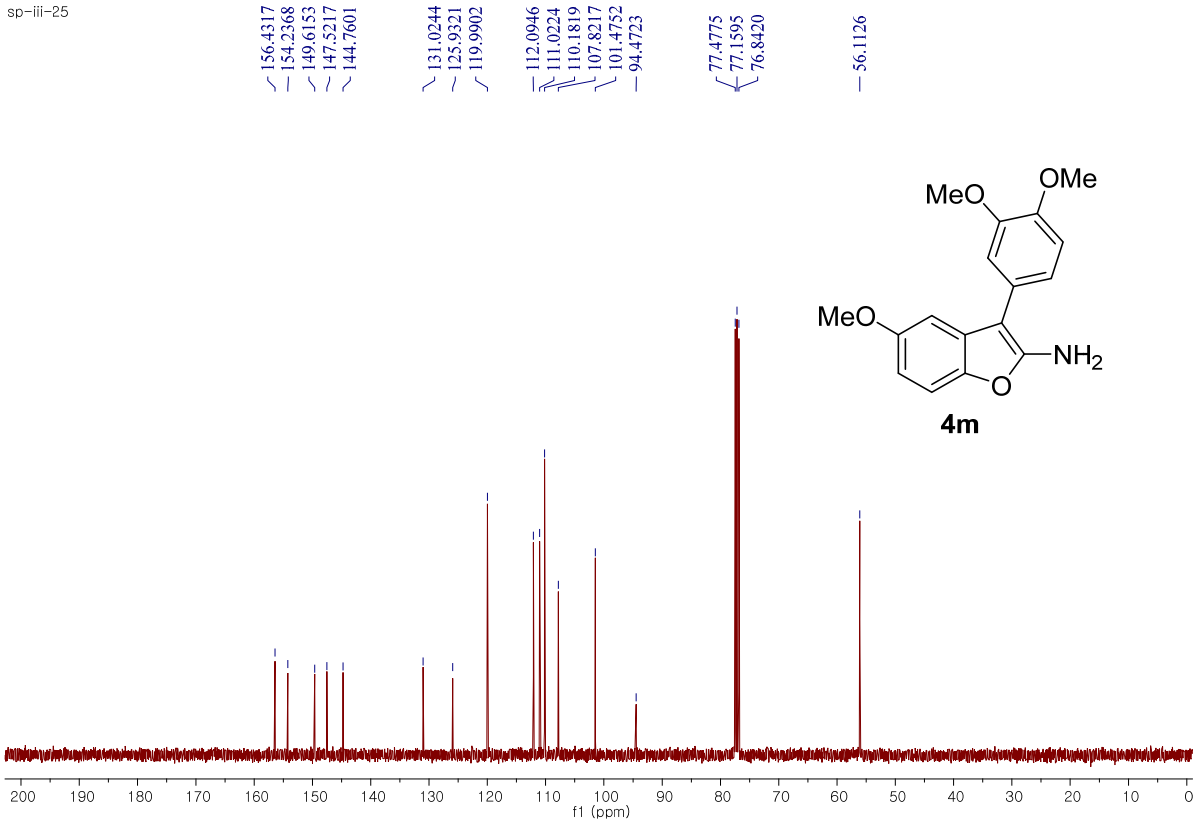

sp-iii-53
7.2602
7.0453
7.0255
7.0149
7.0115
6.9945
6.9908
6.9527
6.9451
5.6475
4.1116
3.9320
3.9018
3.8780
MeO
OH
MeO
NH2
MeO
O
4k
3.18
2.09
1.00
2.10
3.00
3.00
3.06
f1 (ppm)

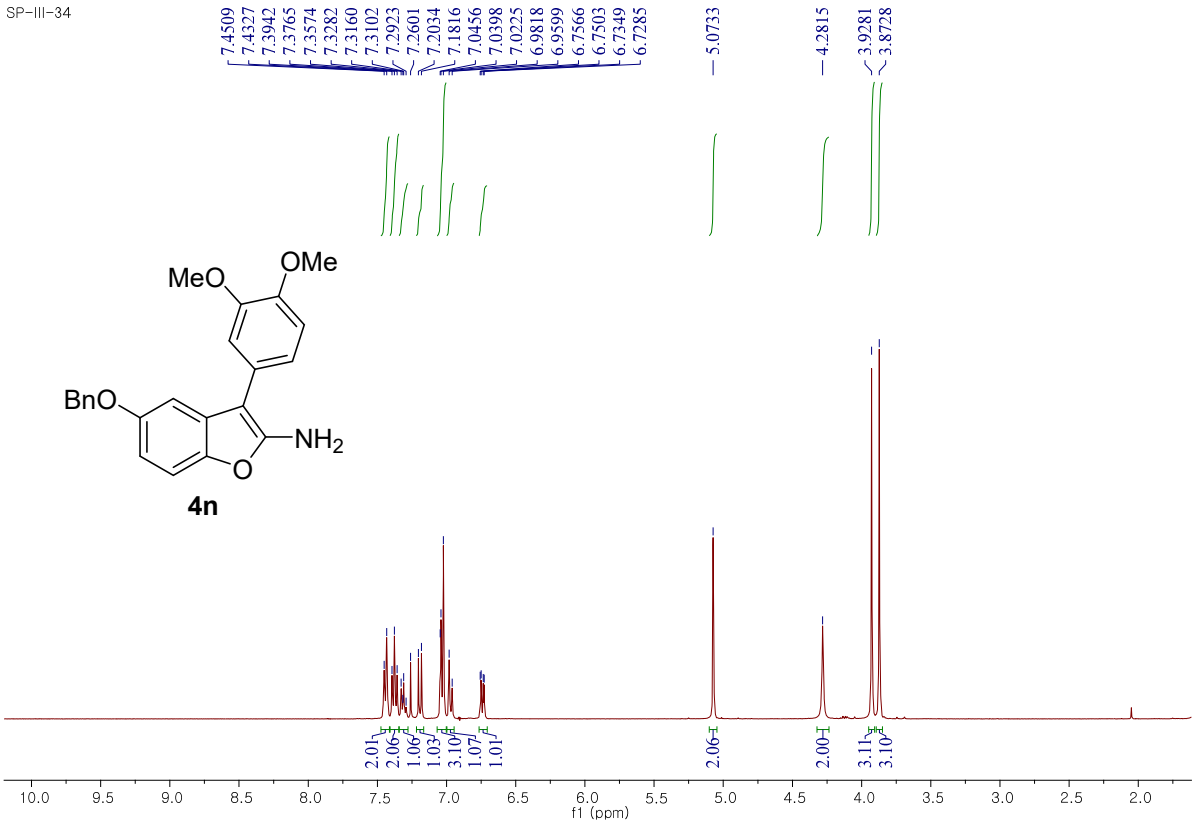

sp-iii-53
152.4128
147.1781
146.5378
145.3573
144.1882
144.0183
125.3455
122.3026
120.8534
115.2788
110.3834
100.4591
95.8274
95.2634
77.4774
77.1596
76.8418
56.7250
56.1491
MeO
OH
MeO
NH2
MeO
O
4k
f1 (ppm)

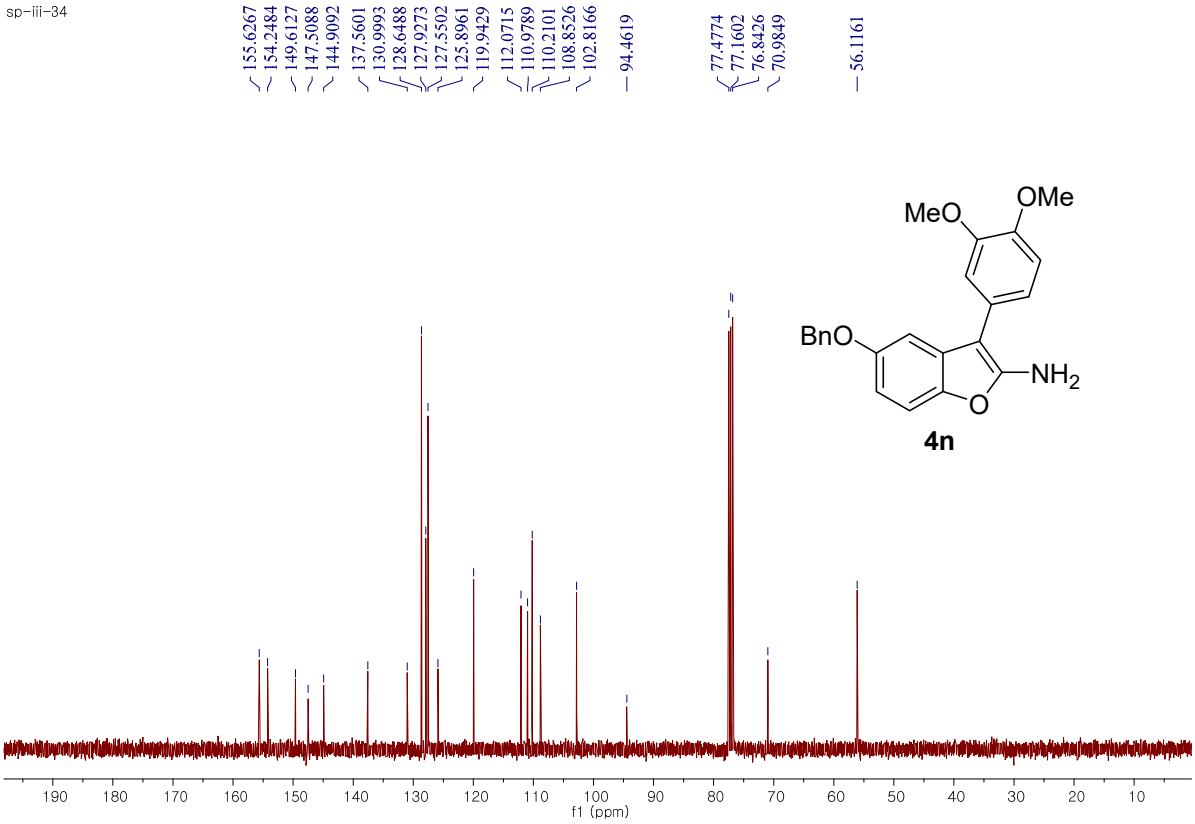

sp-iii-57
7.2797
7.2695
7.2671
7.2571
7.1621
7.1605
7.1534
7.1519
7.1388
7.1357
7.1334
7.1274
7.1254
7.1098
6.9298
4.3753
3.9241
3.8959
MeO
MeO
S
NH2
O
4l
1.19
3.09
1.08
2.06
3.00
3.02
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

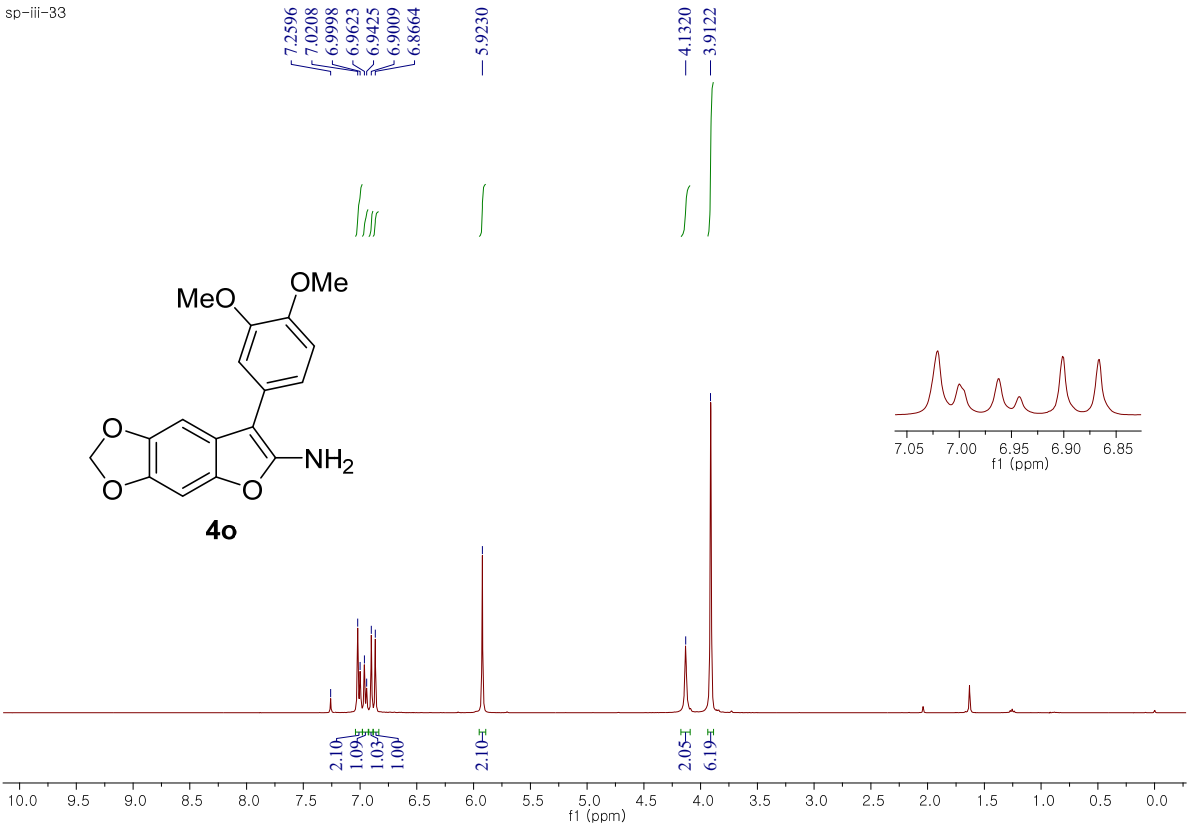

sp-iii-57
153.2108
146.6568
145.4775
143.8105
135.3562
127.7724
122.6614
122.5420
121.4585
100.9003
95.7046
89.8314
77.4778
77.1602
76.8429
56.6924
MeO
MeO
S
NH2
O
4l
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

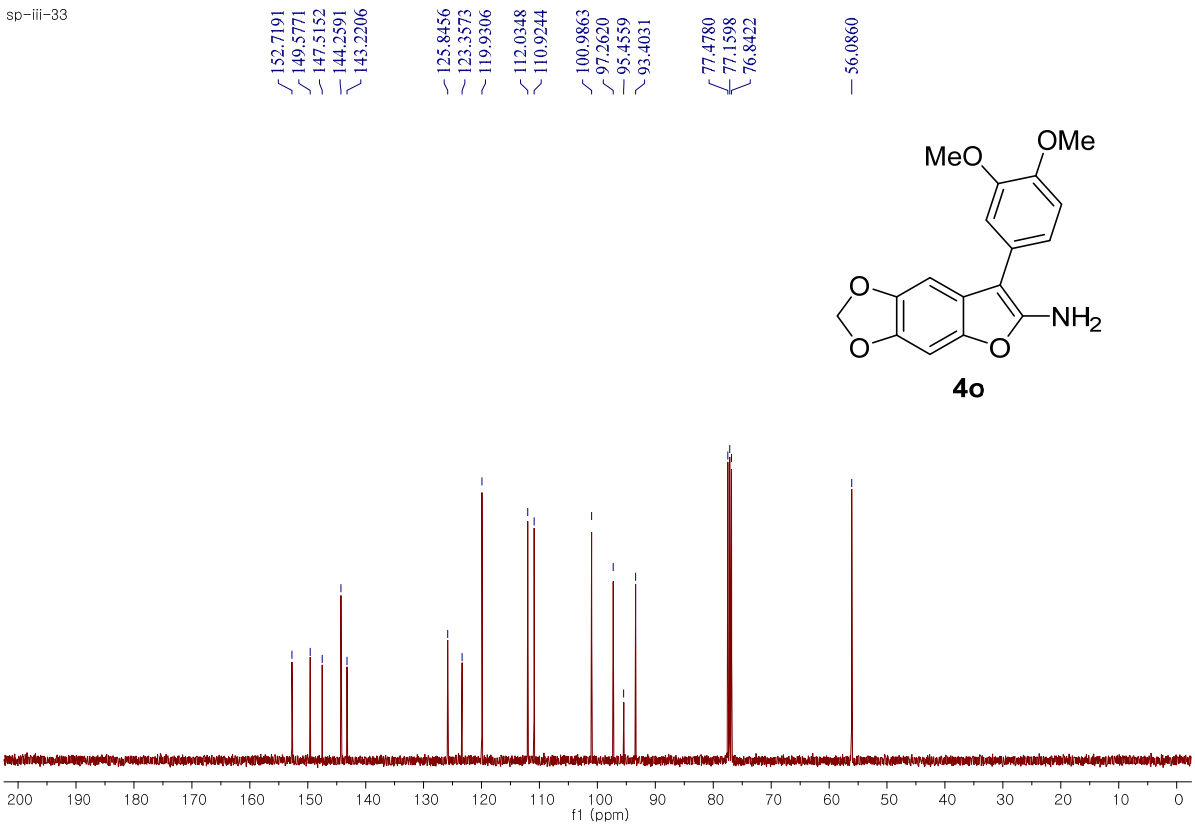

sp-iii-25
7.2598
7.1979
7.1761
7.0660
7.0423
7.0382
6.9890
6.9695
6.9640
6.6717
6.6655
6.6499
6.6437
4.2815
3.9284
3.9203
3.8134
MeO
OMe
MeO
NH2
O
4m
7.20 7.15 7.10 7.05 7.00 6.95
f1 (ppm)
6.66 6.64 6.62 6.60
f1 (ppm)
1.00
2.10
2.10
1.02
2.11
3.02
3.16
3.10
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

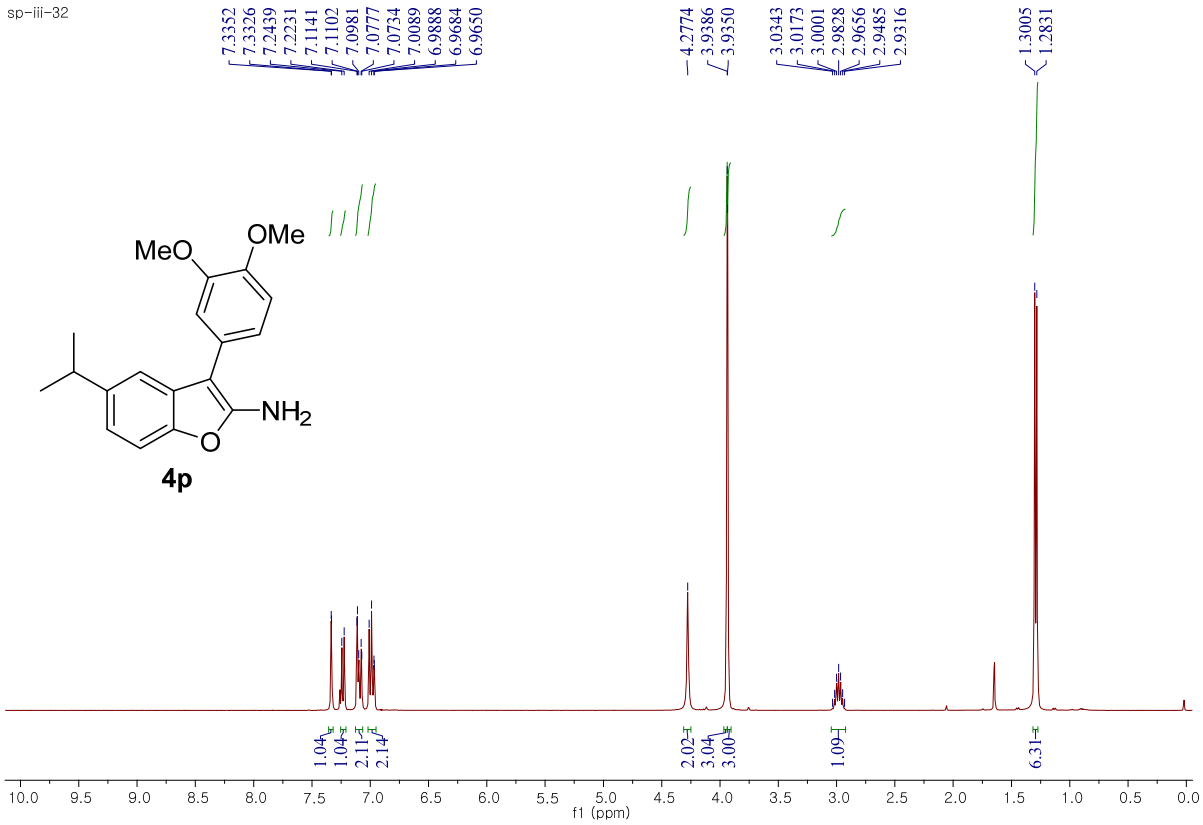

sp-iii-25
156.4317
154.2368
149.6153
147.5217
144.7601
131.0244
125.9321
119.9902
112.0946
111.0224
110.1819
107.8217
101.4752
94.4723
77.4775
77.1595
76.8420
56.1126
MeO
OMe
MeO
NH2
O
4m
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

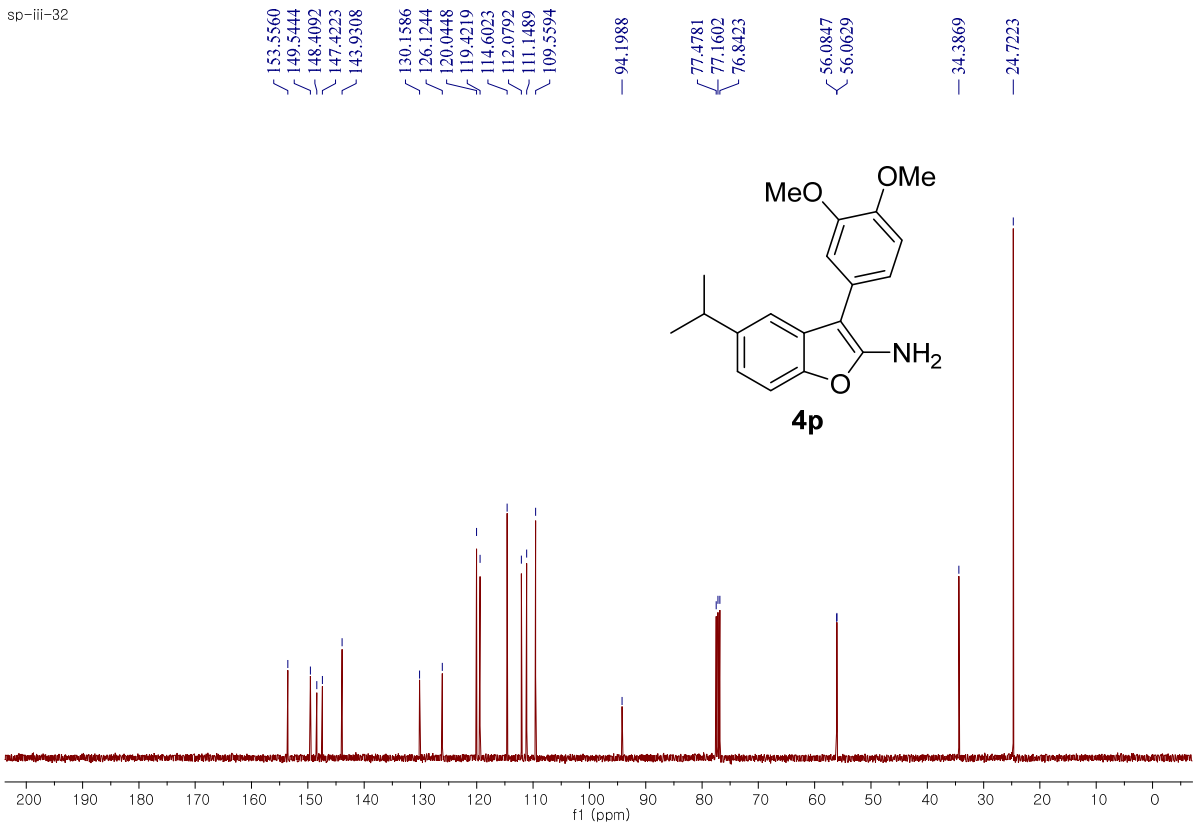

SP-III-34
7.4509
7.4327
7.3942
7.3765
7.3574
7.3282
7.3160
7.3102
7.2923
7.2601
7.2034
7.1816
7.0456
7.0398
7.0225
6.9818
6.9599
6.7566
6.7503
6.7349
6.7285
5.0733
4.2815
3.9281
3.8728
MeO
OMe
BnO
NH2
O
4n
2.01
2.06
1.06
1.03
3.10
1.07
1.01
2.06
2.00
3.11
3.10
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
f1 (ppm)

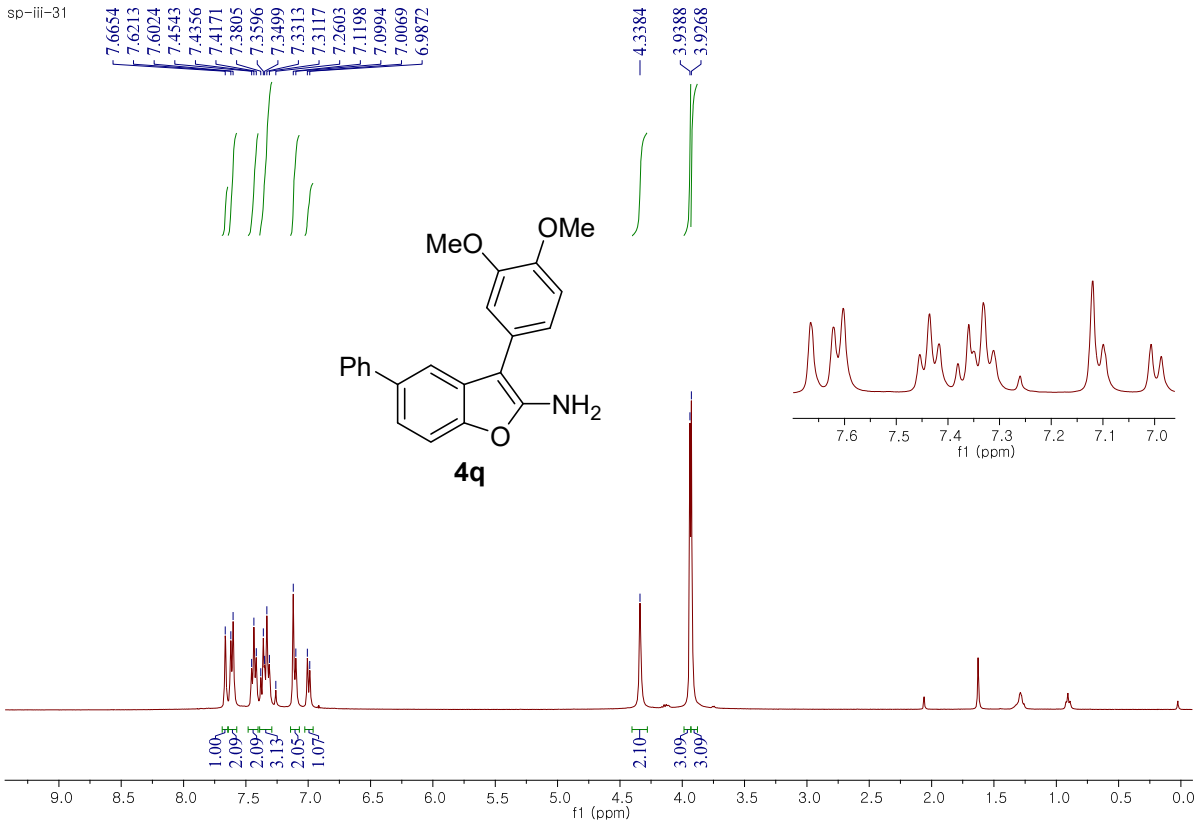

sp-iii-34
155.6267
154.2484
149.6127
147.5088
144.9092
137.5601
130.9993
128.6488
127.9273
127.5502
125.8961
119.9429
112.0715
110.9789
110.2101
108.8526
102.8166
94.4619
77.4774
77.1602
76.8426
70.9849
56.1161
MeO
OMe
BnO
NH2
O
4n
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

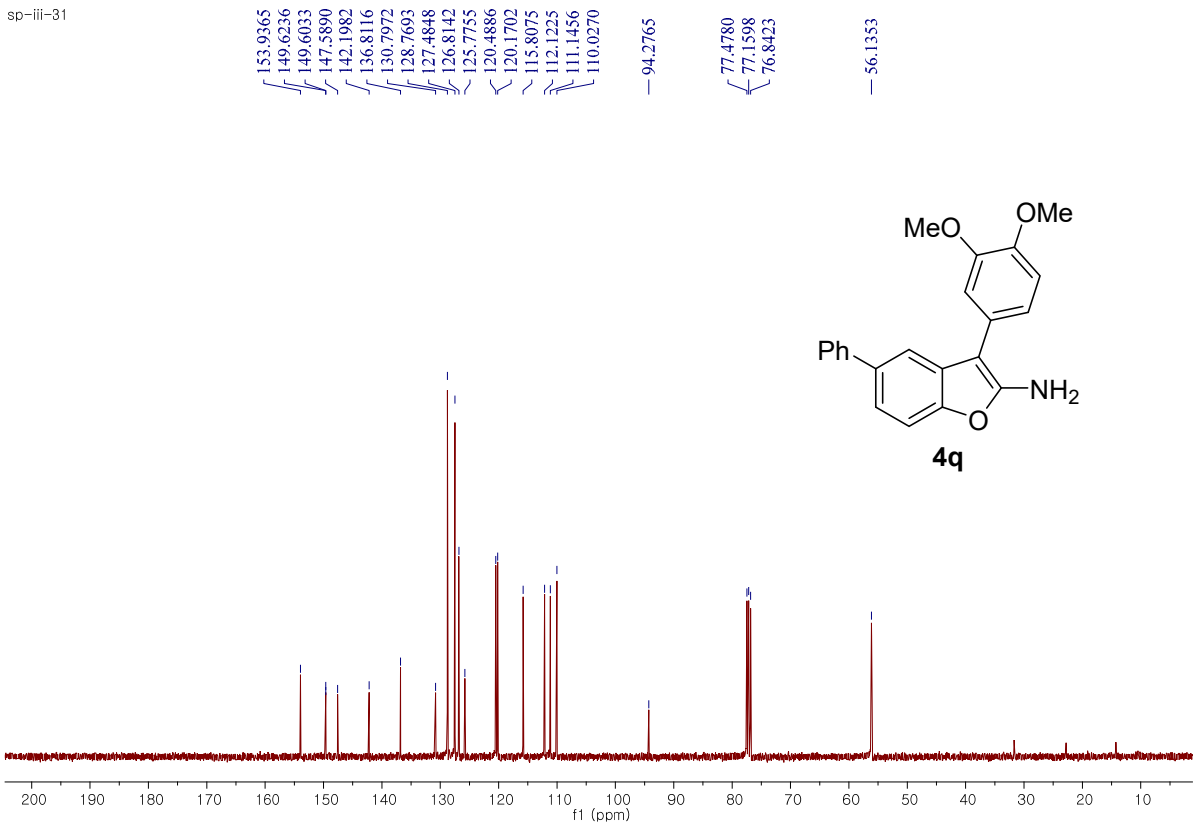

sp-iii-33
7.2596
7.0208
6.9998
6.9623
6.9425
6.9009
6.8664
5.9230
4.1320
3.9122
MeO
OMe
NH2
O
O
O
O
4o
7.05
7.00
6.95
6.90
6.85
f1 (ppm)
2.10
1.09
1.03
1.00
2.10
2.05
6.19
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

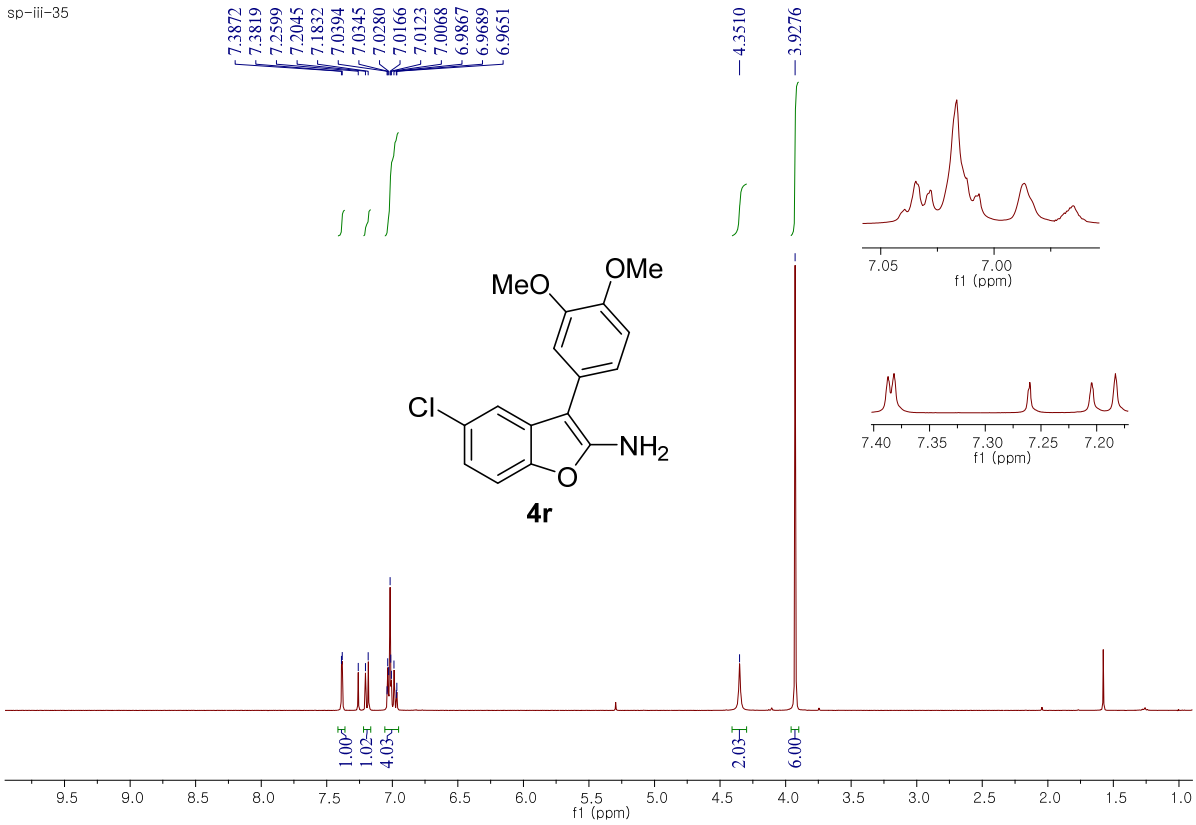

sp-iii-33
152.7191
149.5771
147.5152
144.2591
143.2206
125.8456
123.3573
119.9306
112.0348
110.9244
100.9863
97.2620
95.4559
93.4031
77.4780
77.1598
76.8422
56.0860
MeO
OMe
NH2
O
O
O
O
4o
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

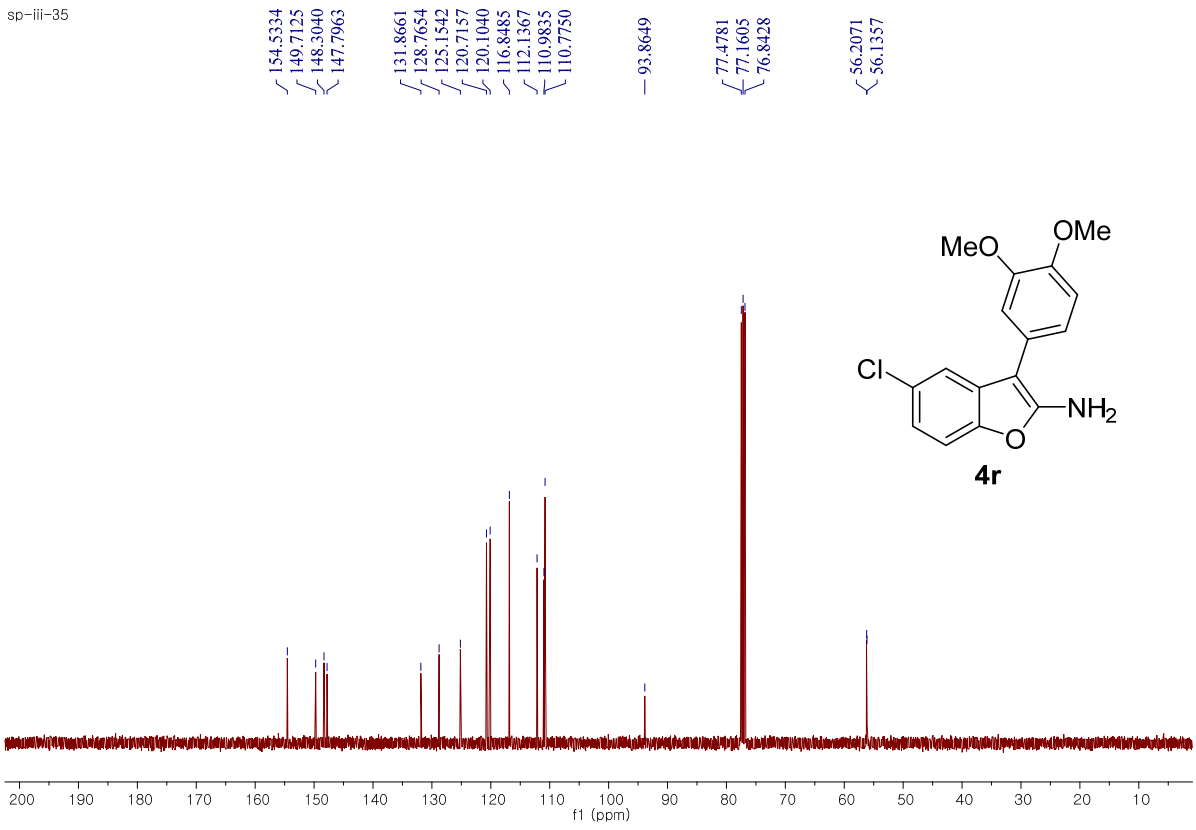

sp-iii-32
7.3352
7.3326
7.2439
7.2231
7.1141
7.1102
7.0981
7.0777
7.0734
7.0089
6.9888
6.9684
6.9650
4.2774
3.9386
3.9350
3.0343
3.0173
3.0001
2.9828
2.9656
2.9485
2.9316
1.3005
1.2831
MeO
OMe
NH2
O
4p
1.04
1.04
2.11
2.14
2.02
3.04
3.00
1.09
6.31
f1 (ppm)

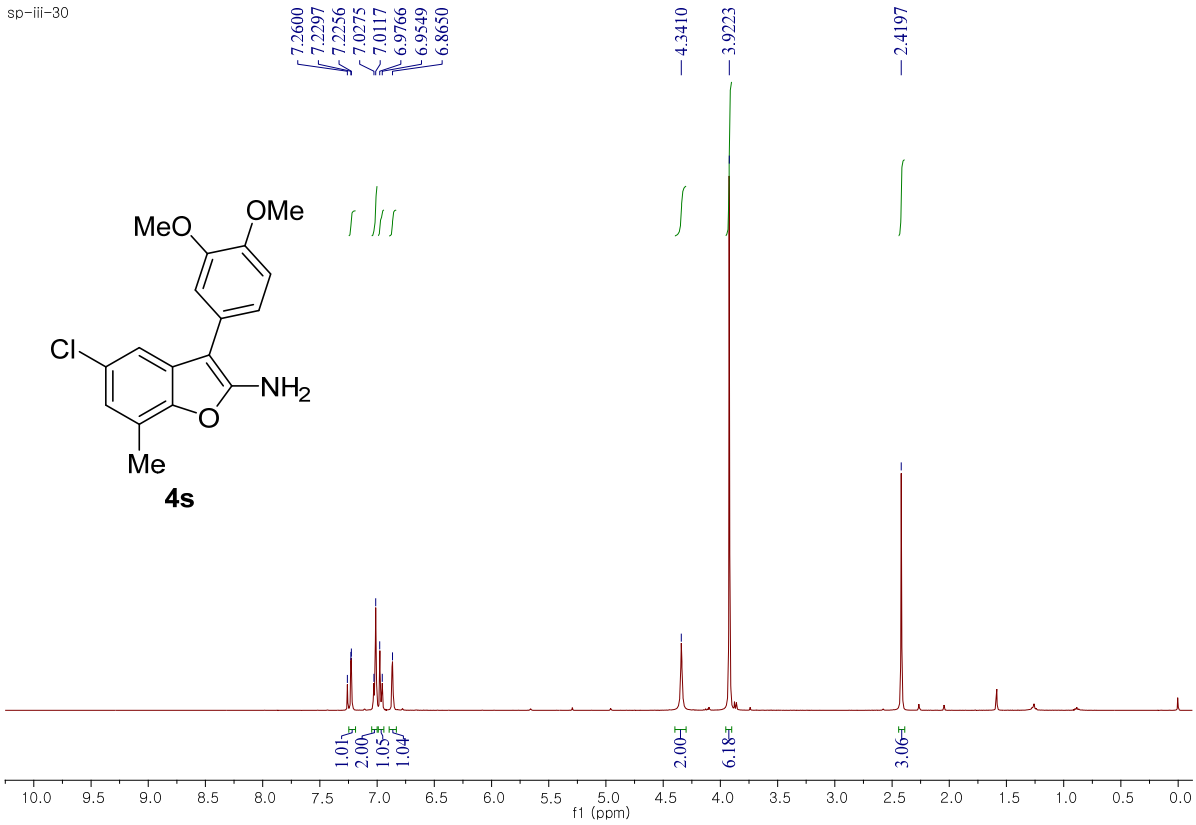

sp-iii-32
153.5560
149.5444
148.4092
147.4223
143.9308
130.1586
126.1244
120.0448
119.4219
114.6023
112.0792
111.1489
109.5594
94.1988
77.4781
77.1602
76.8423
56.0847
56.0629
34.3869
24.7223
MeO
OMe
NH2
O
4p
f1 (ppm)

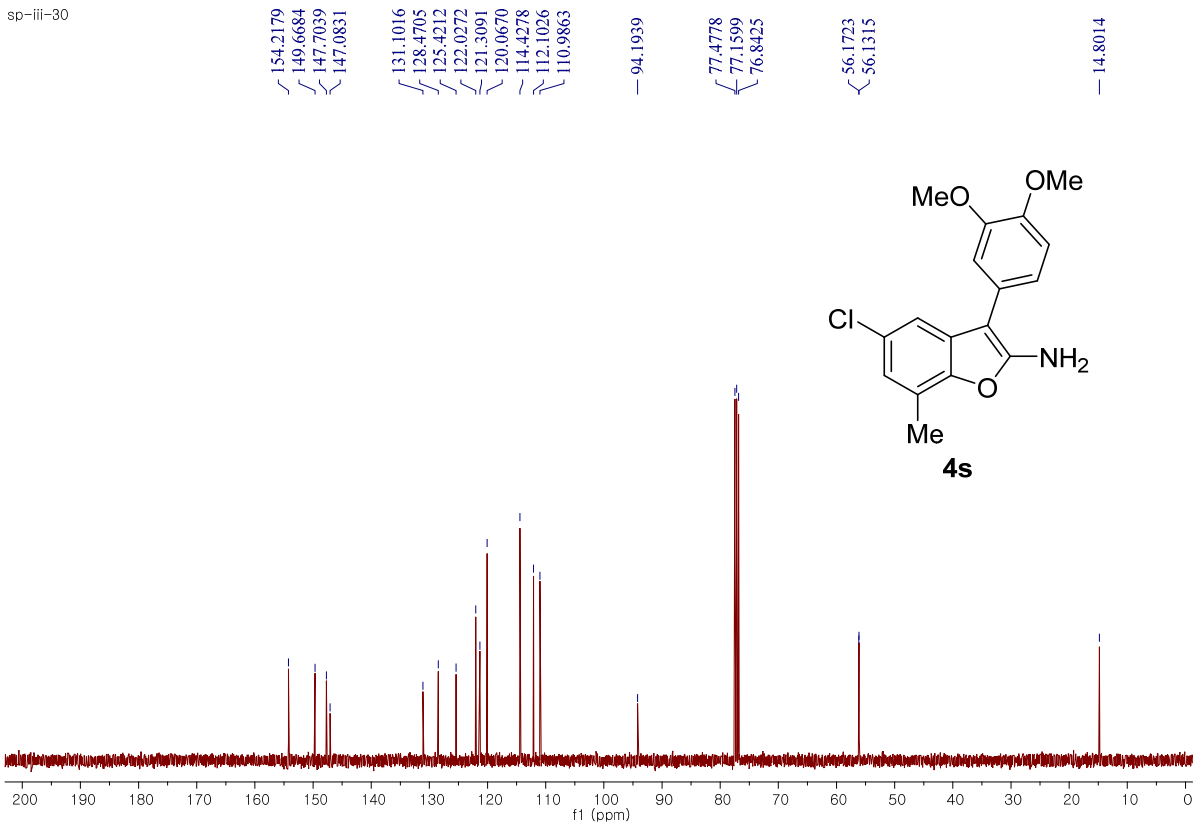

sp-iii-31
7.6654
7.6213
7.6024
7.4543
7.4356
7.4171
7.3805
7.3596
7.3499
7.3313
7.3117
7.2603
7.1198
7.0994
7.0069
6.9872
4.3384
3.9388
3.9268
MeO
OMe
Ph
NH2
O
4q
1.00
2.09
2.09
3.13
2.05
1.07
2.10
3.09
3.09
f1 (ppm)

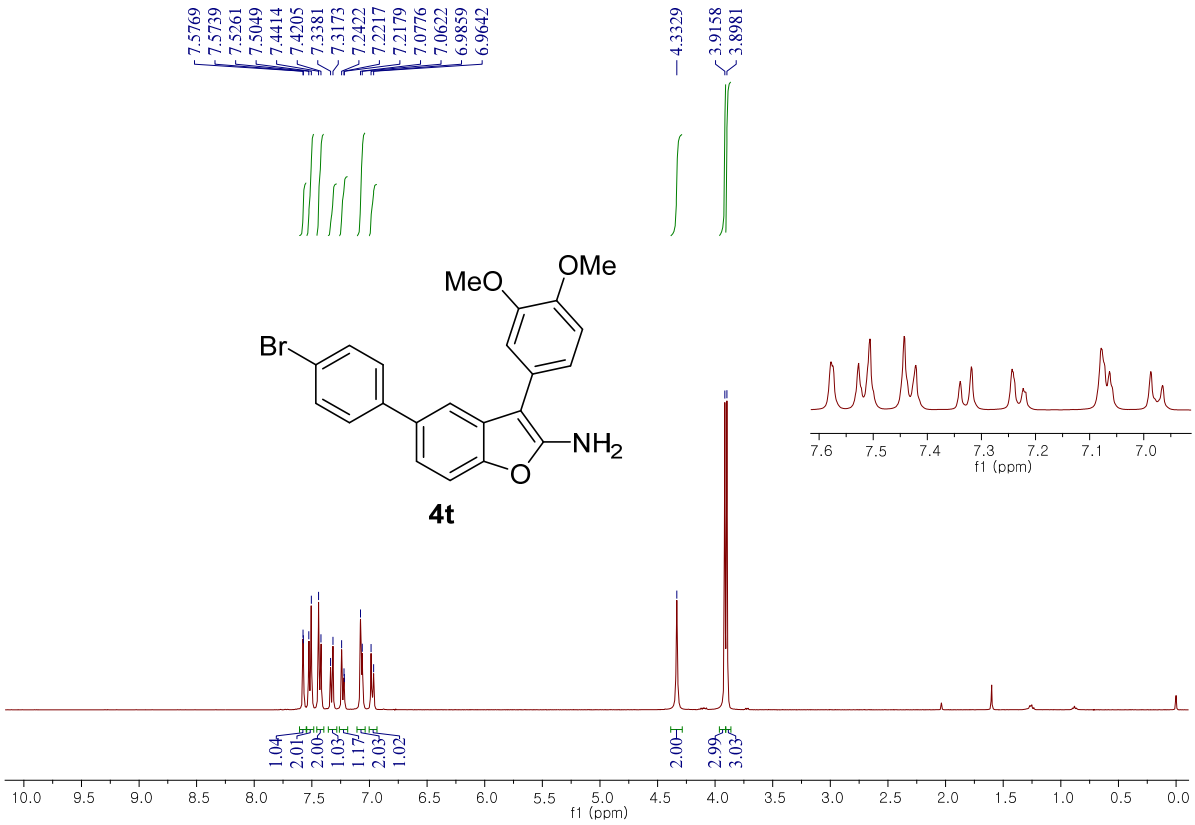

sp-iii-31
153.9365
149.6236
149.6033
147.5890
142.1982
136.8116
130.7972
128.7693
127.4848
126.8142
125.7755
120.4886
120.1702
115.8075
112.1225
111.1456
110.0270
94.2765
77.4780
77.1598
76.8423
56.1353
MeO
OMe
Ph
NH2
O
4q
f1 (ppm)

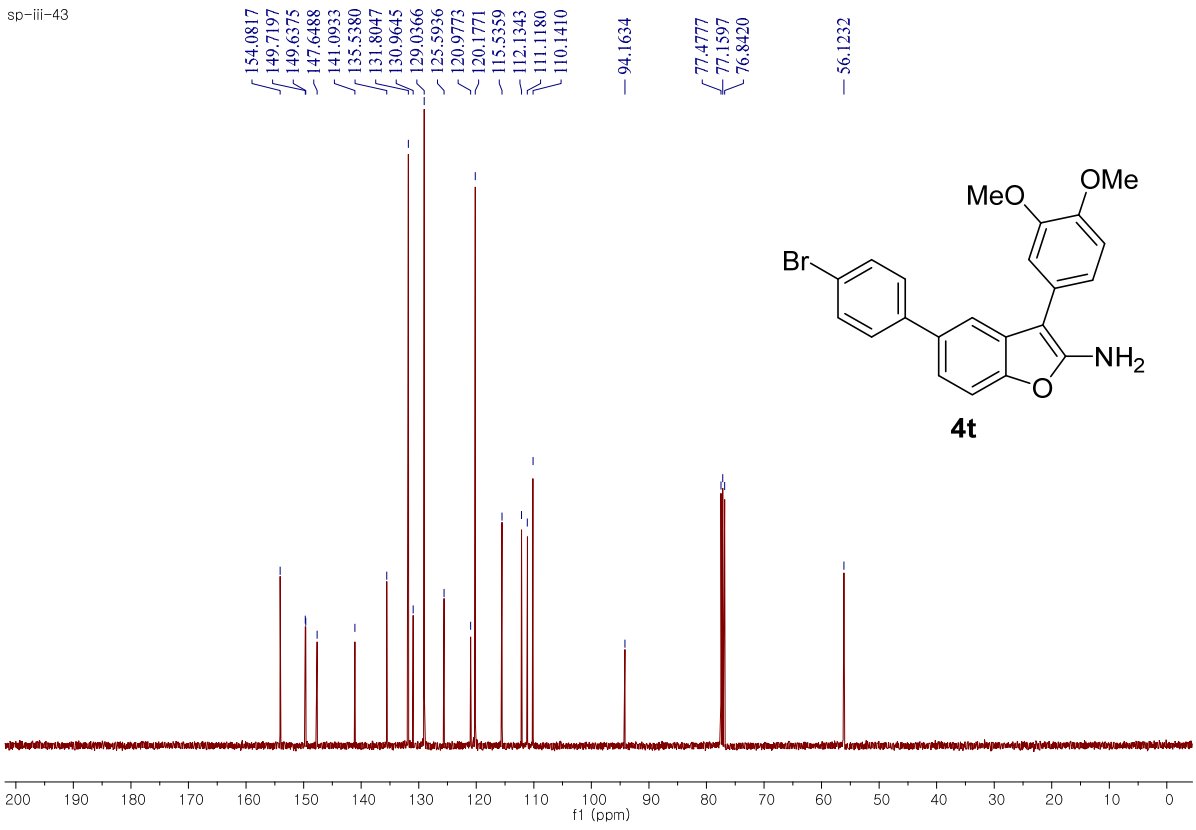

sp-iii-35
7.3872
7.3819
7.2599
7.2045
7.1832
7.0394
7.0345
7.0280
7.0166
7.0123
7.0068
6.9867
6.9689
6.9651
4.3510
3.9276
MeO
OMe
Cl
NH2
O
4r
7.05
7.00
f1 (ppm)
7.40
7.35
7.30
7.25
7.20
f1 (ppm)
1.00
1.02
4.03
2.03
6.00
f1 (ppm)

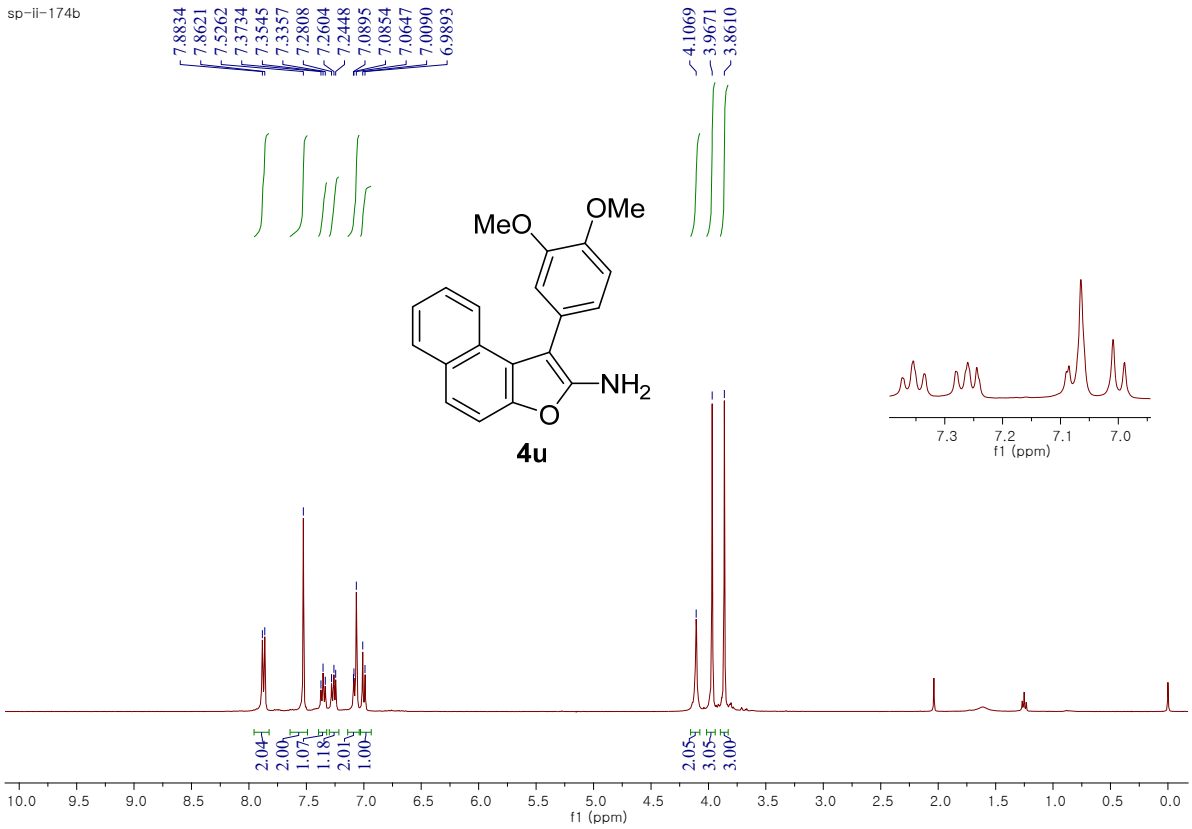

sp-iii-35
154.5334
149.7125
148.3040
147.7963
131.8661
128.7654
125.1542
120.7157
120.1040
116.8485
112.1367
110.9835
110.7750
93.8649
77.4781
77.1605
76.8428
56.2071
56.1357
MeO
OMe
Cl
NH2
O
4r
f1 (ppm)

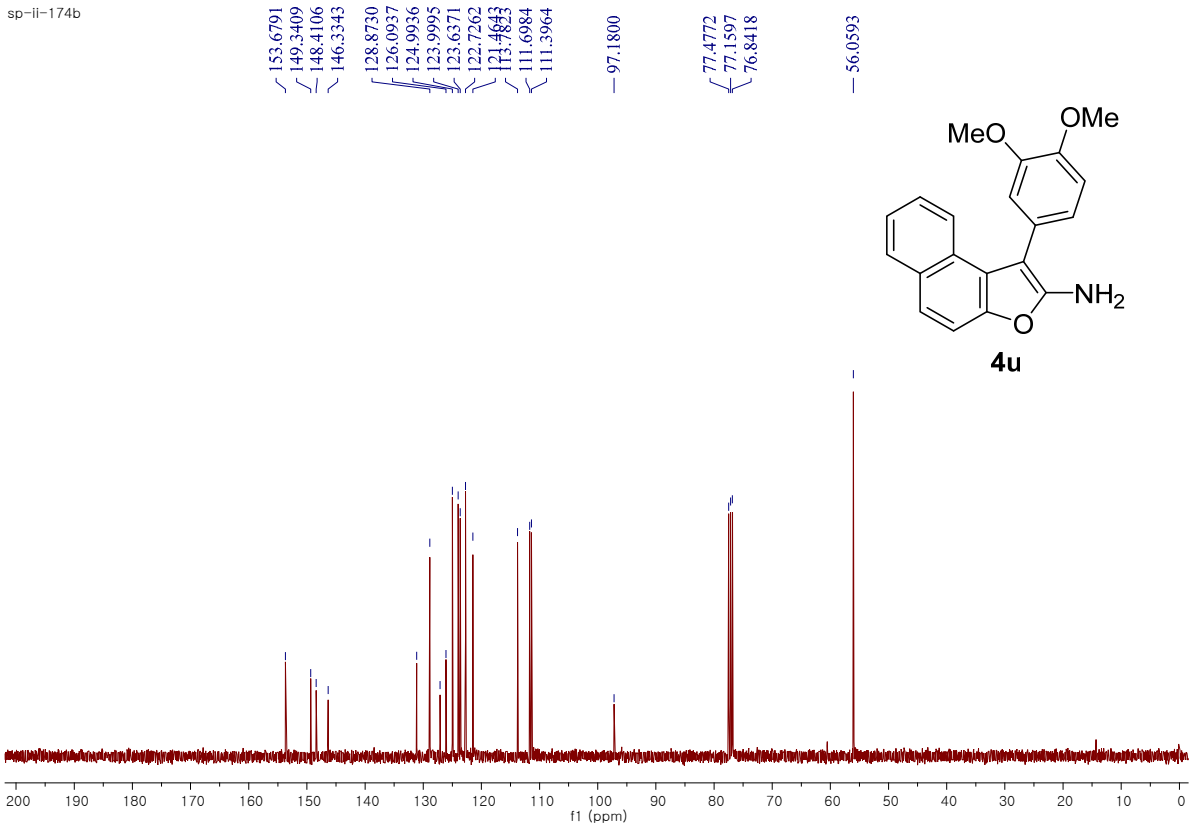

sp-iii-30
7.2600
7.2297
7.2256
7.0275
7.0117
6.9766
6.9549
6.8650
4.3410
3.9223
2.4197
MeO
OMe
Cl
NH2
O
Me
4s
1.01
2.00
1.05
1.04
2.00
6.18
3.06
f1 (ppm)

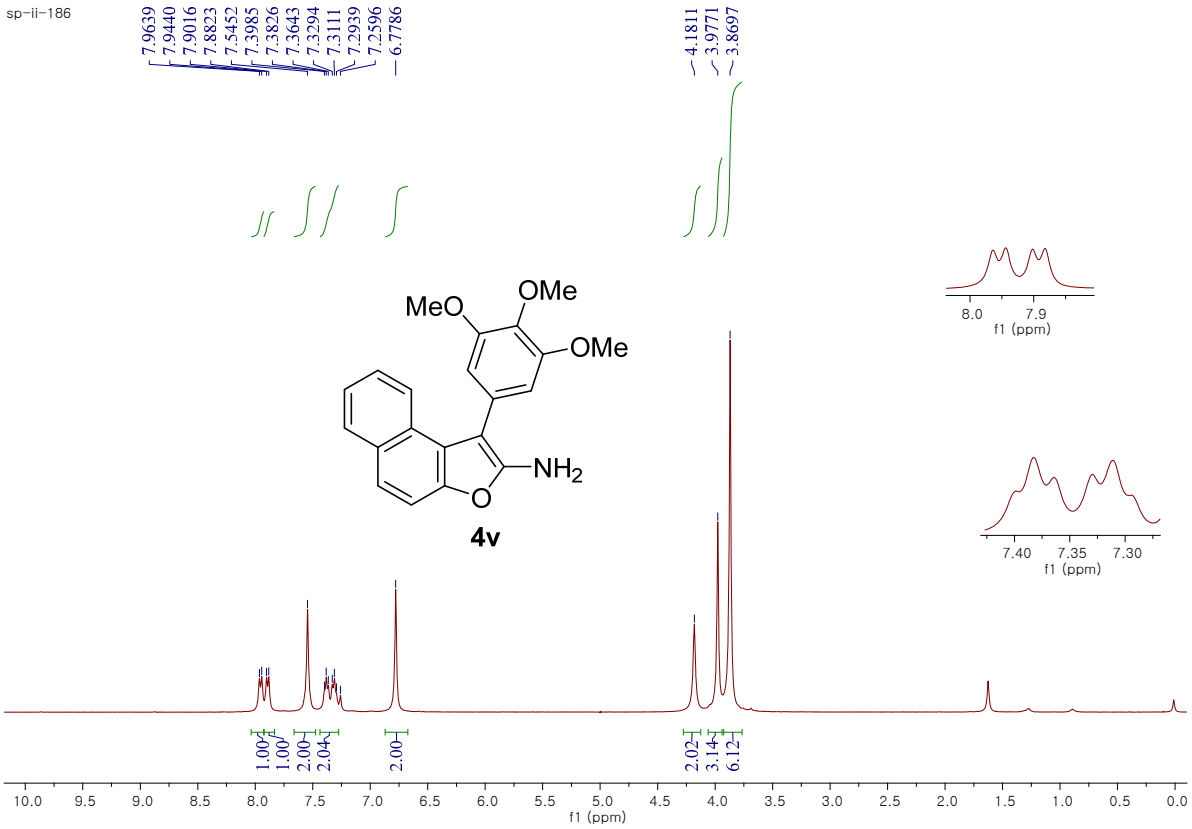

sp-iii-30
154.2179
149.6684
147.7039
147.0831
131.1016
128.4705
125.4212
122.0272
121.3091
120.0670
114.4278
112.1026
110.9863
94.1939
77.4778
77.1599
76.8425
56.1723
56.1315
14.8014
MeO
OMe
Cl
NH2
O
Me
4s
f1 (ppm)

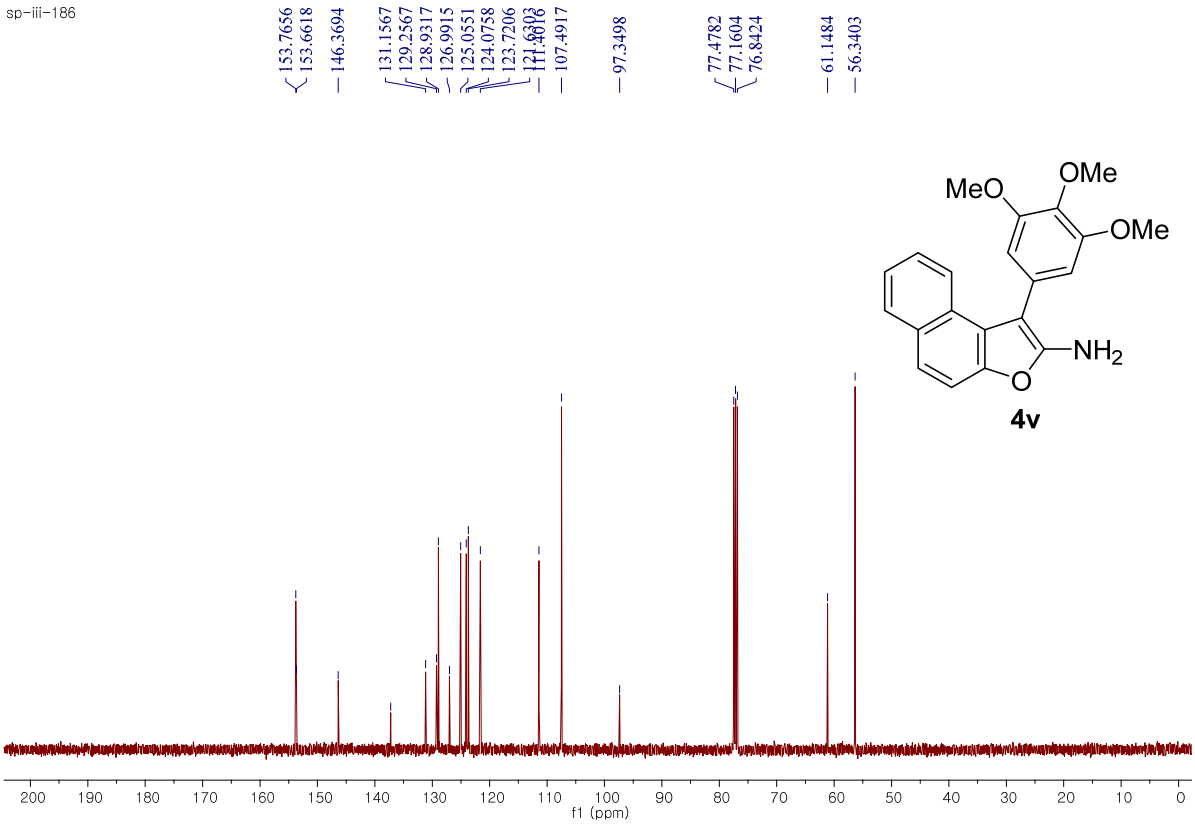

7.5769
7.5739
7.5261
7.5049
7.4414
7.4205
7.3381
7.3173
7.2422
7.2217
7.2179
7.0776
7.0622
6.9859
6.9642
4.3329
3.9158
3.8981
MeO
OMe
Br
NH2
O
4t
1.04
2.01
2.00
1.03
1.17
2.03
1.02
2.00
2.99
3.03
f1 (ppm)

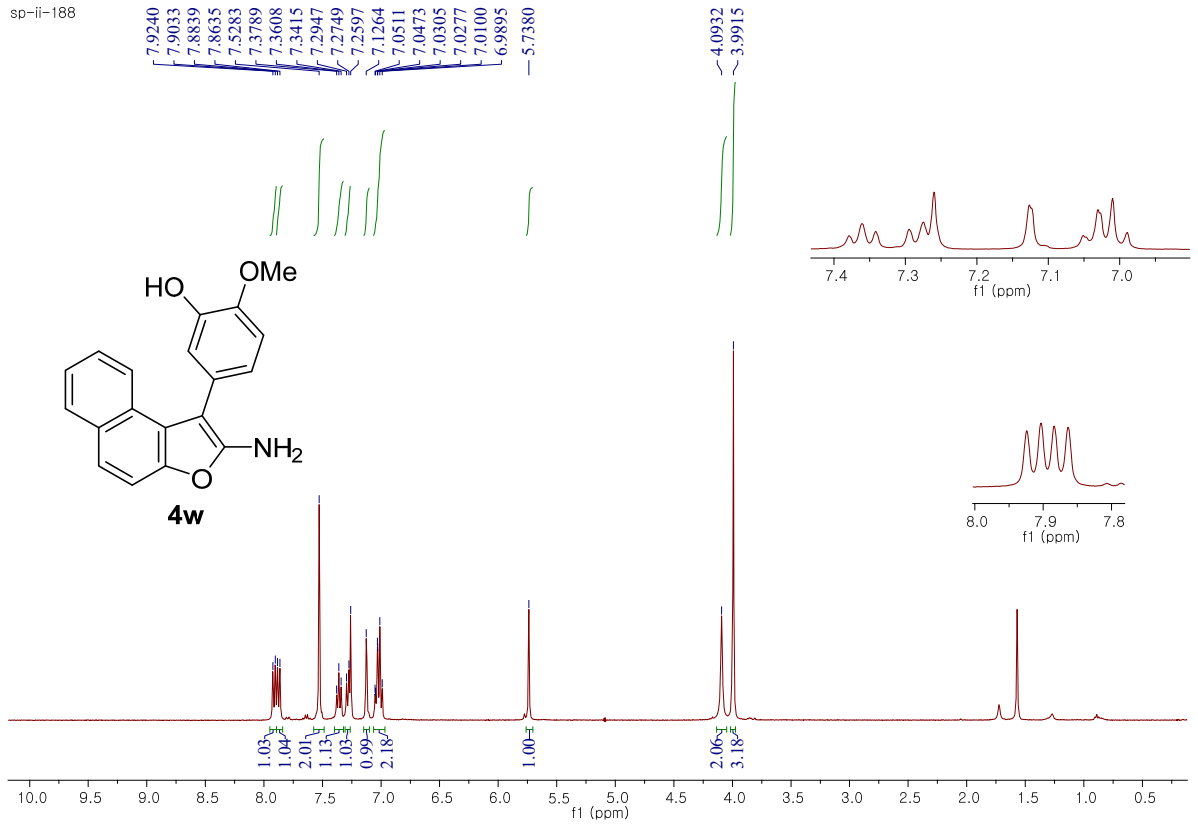

sp-iii-43
154.0817
149.7197
149.6375
147.6488
141.0933
135.5380
131.8047
130.9645
129.0366
125.5936
120.9773
120.1771
115.5359
112.1343
111.1180
110.1410
94.1634
77.4777
77.1597
76.8420
56.1232
MeO
OMe
Br
NH2
O
4t
f1 (ppm)

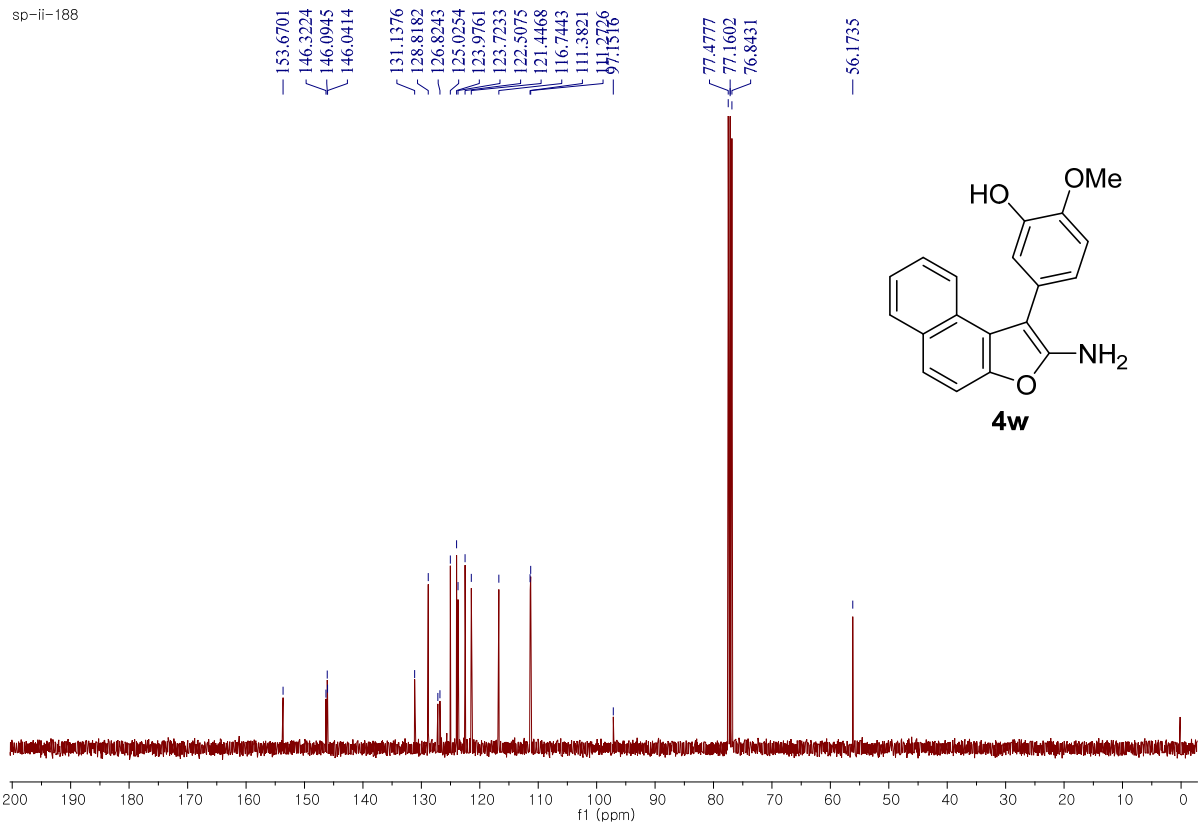

sp-ii-174b
7.8834
7.8621
7.5262
7.3734
7.3545
7.3357
7.2808
7.2604
7.2448
7.0895
7.0854
7.0647
7.0090
6.9893
4.1069
3.9671
3.8610
MeO
OMe
NH2
O
4u
2.04
2.00
1.07
1.18
2.01
1.00
2.05
3.05
3.00
f1 (ppm)

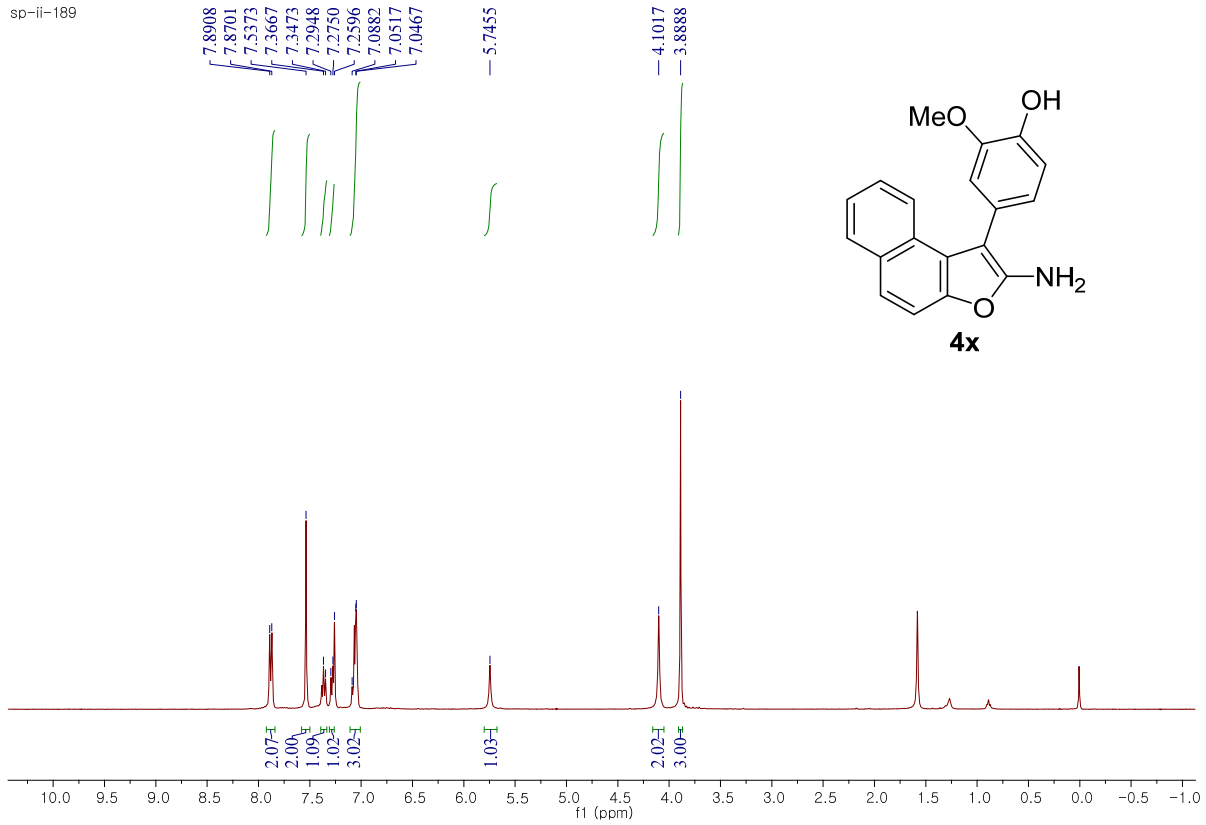

sp-ii-174b
153.6791
149.3409
148.4106
146.3343
128.8730
126.0937
124.9936
123.9995
123.6371
122.7262
111.6984
111.3964
97.1800
77.4772
77.1597
76.8418
56.0593
MeO
OMe
NH2
O
4u
f1 (ppm)

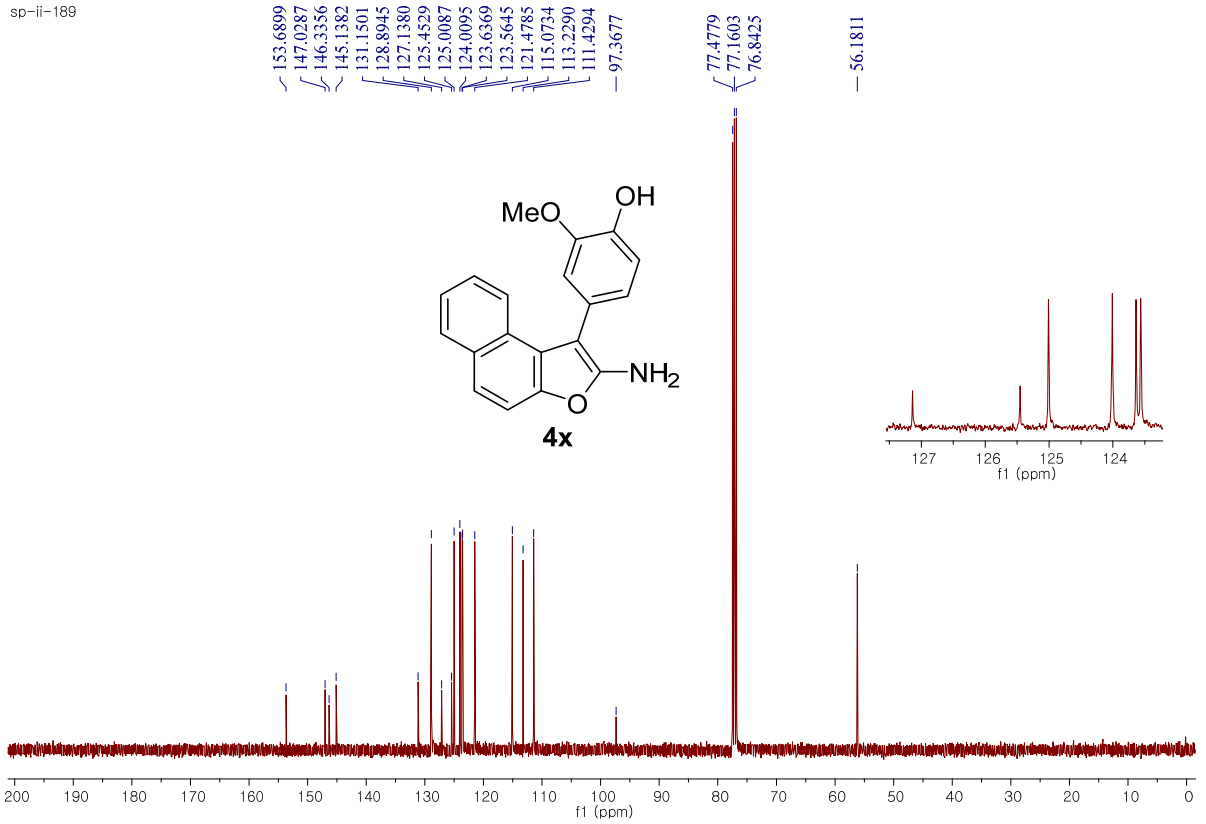

sp-ii-186
7.9639
7.9440
7.9016
7.8823
7.5452
7.3985
7.3826
7.3643
7.3294
7.3111
7.2939
7.2596
6.7786
4.1811
3.9771
3.8697
MeO
OMe
OMe
NH2
O
4v
8.0
7.9
f1 (ppm)
7.40
7.35
7.30
f1 (ppm)
1.00
1.00
2.00
2.04
2.00
2.02
3.14
6.12
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

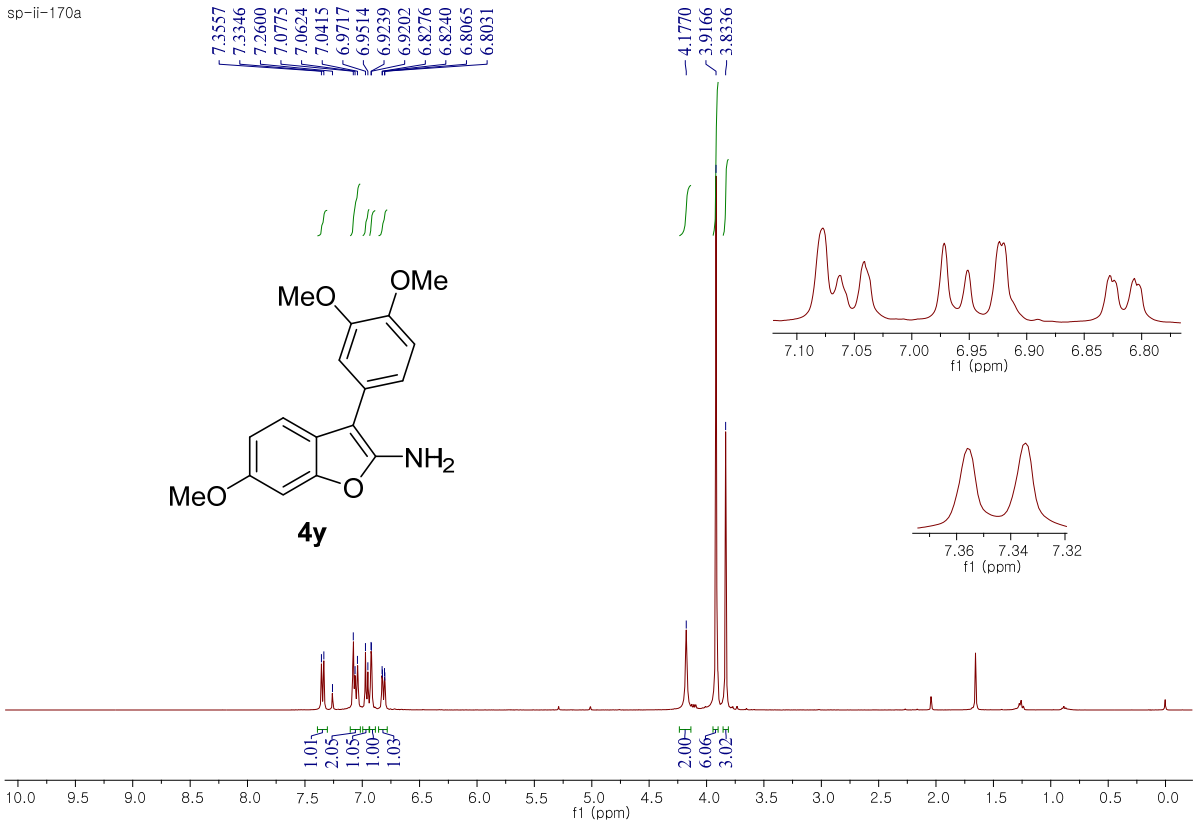

sp-iii-186
153.7656
153.6618
146.3694
131.1567
129.2567
128.9317
126.9915
125.0551
124.0758
123.7206
121.6303
111.4016
107.4917
97.3498
77.4782
77.1604
76.8424
61.1484
56.3403
MeO
OMe
OMe
NH2
O
4v
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

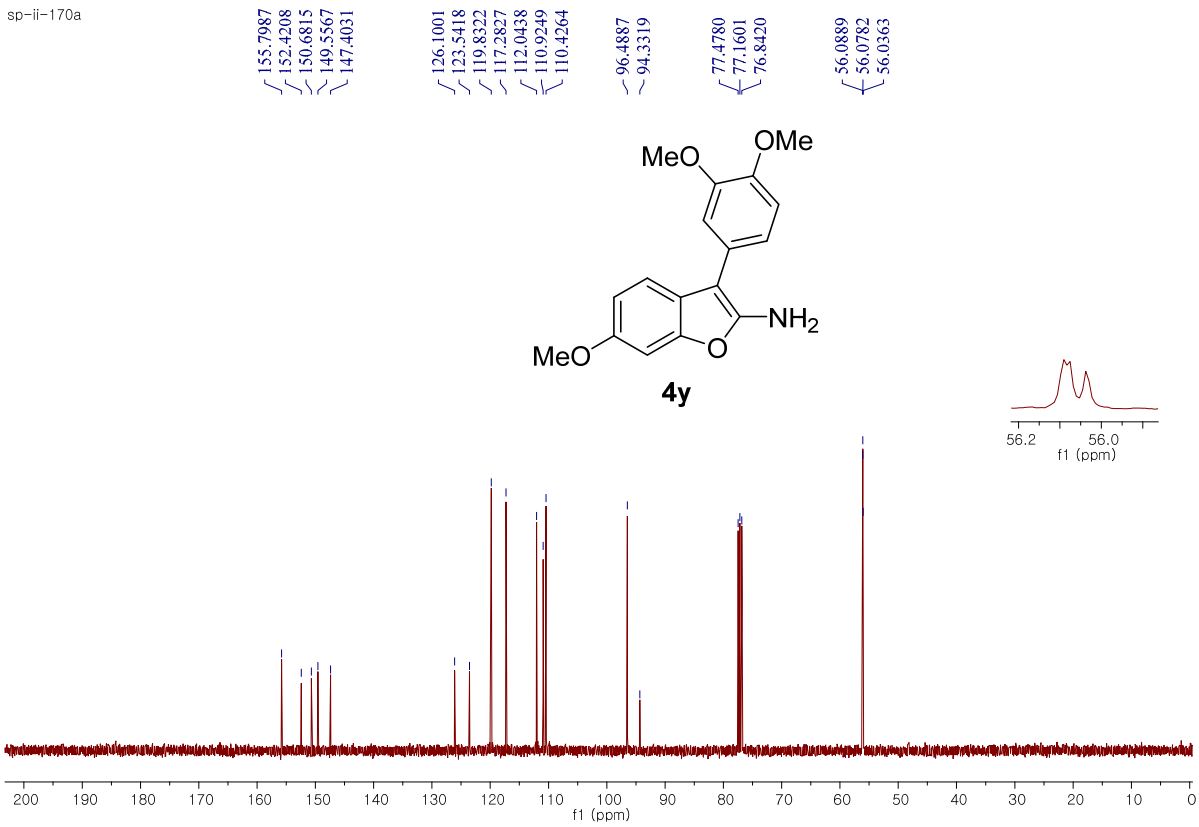

sp-ii-188
7.9240
7.9033
7.8839
7.8635
7.5283
7.3789
7.3608
7.3415
7.2947
7.2749
7.2597
7.1264
7.0511
7.0473
7.0305
7.0277
7.0100
6.9895
5.7380
4.0932
3.9915
HO
OMe
NH2
O
4w
1.03
1.04
2.01
1.13
1.03
0.99
2.18
1.00
2.06
3.18
f1 (ppm)

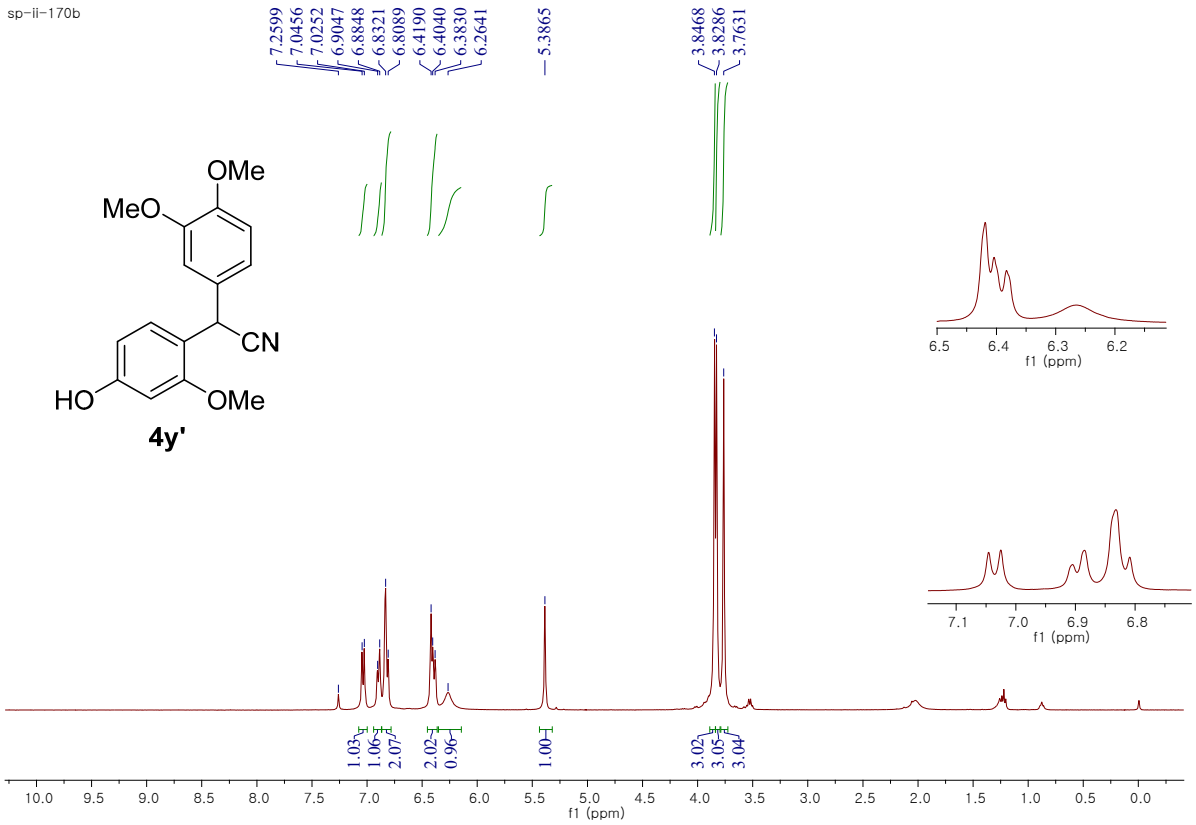

sp-ii-188
153.6701
146.3224
146.0945
146.0414
131.1376
128.8182
126.8243
125.0254
123.9761
123.7233
122.5075
121.4468
116.7443
111.3821
111.2726
97.1516
77.4777
77.1602
76.8431
56.1735
HO
OMe
NH2
O
4w
f1 (ppm)

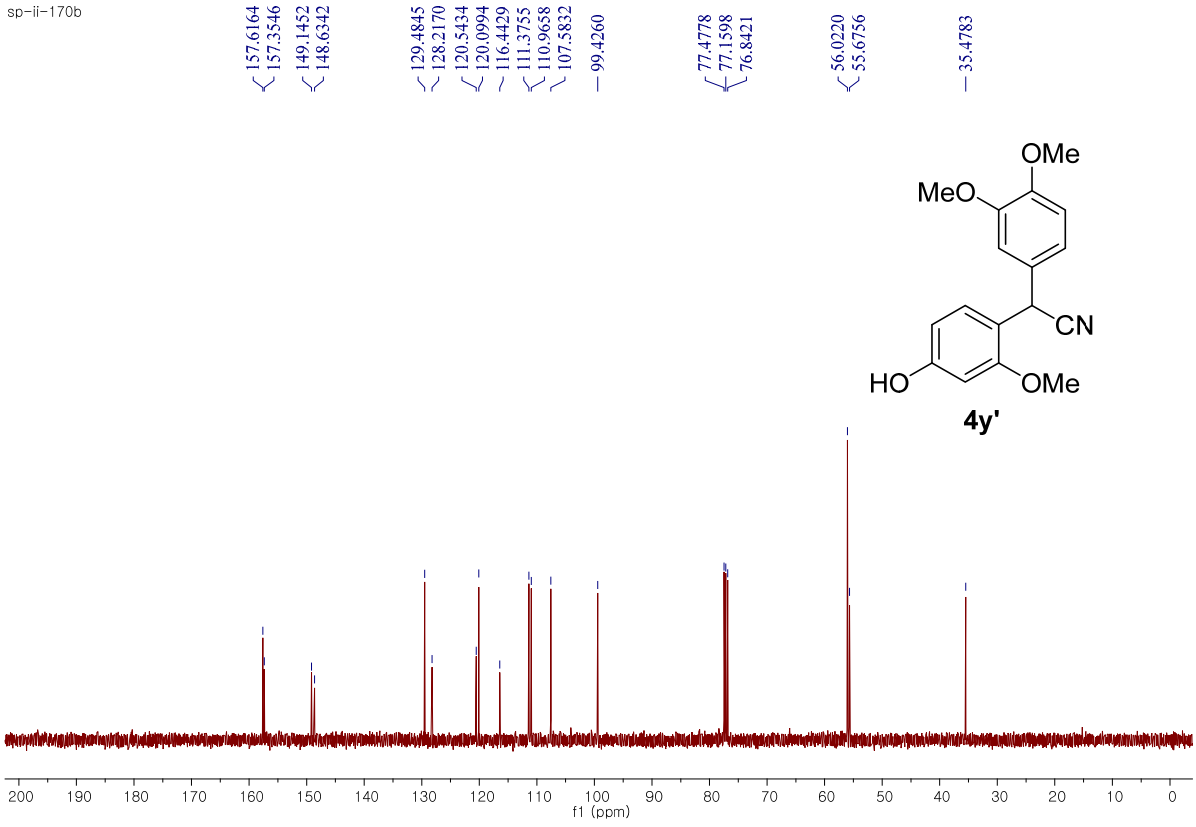

sp-ii-189
7.8908
7.8701
7.5373
7.3667
7.3473
7.2948
7.2750
7.2596
7.0882
7.0517
7.0467
5.7455
4.1017
3.8888
MeO
OH
NH2
O
4x
2.07
2.00
1.09
1.02
3.02
1.03
2.02
3.00
f1 (ppm)

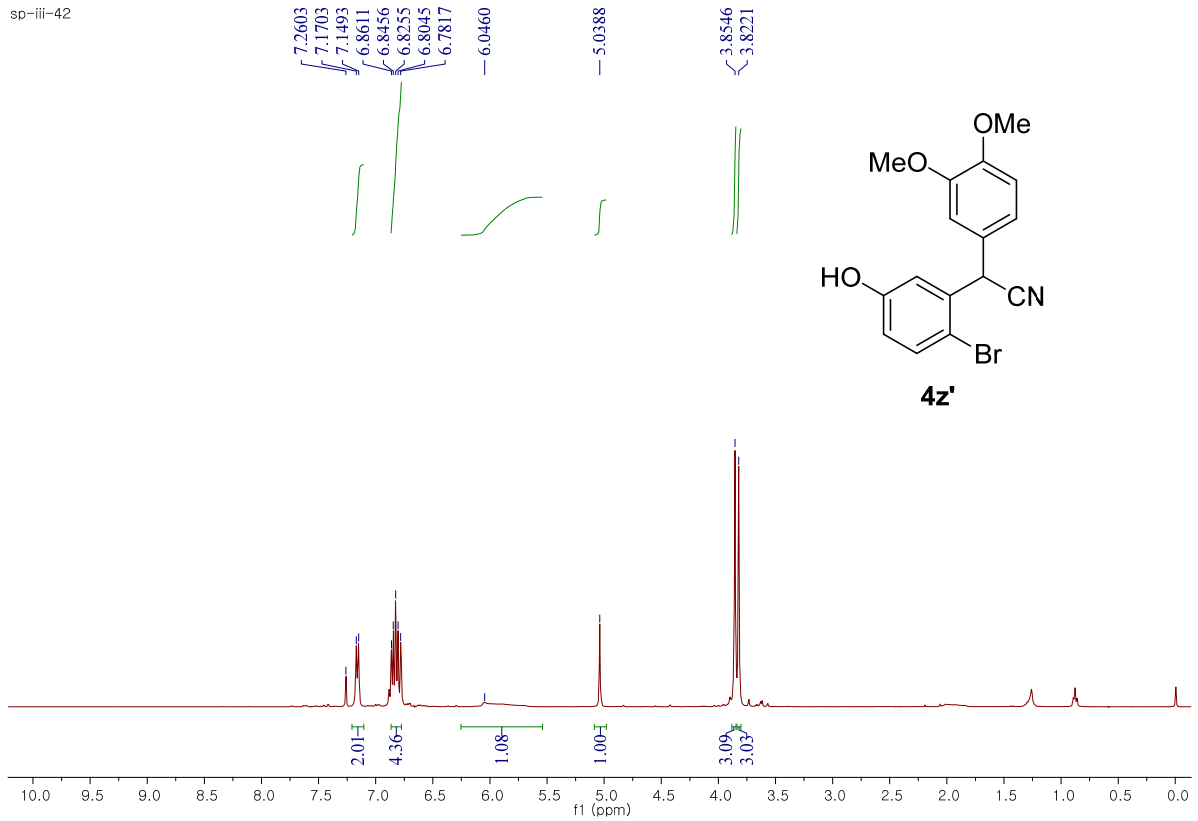

sp-ii-189
153.6899
147.0287
146.3356
145.1382
131.1501
128.8945
127.1380
125.4529
125.0087
124.0095
123.6369
123.5645
121.4785
115.0734
113.2290
111.4294
97.3677
77.4779
77.1603
76.8425
56.1811
MeO
OH
NH2
O
4x
f1 (ppm)

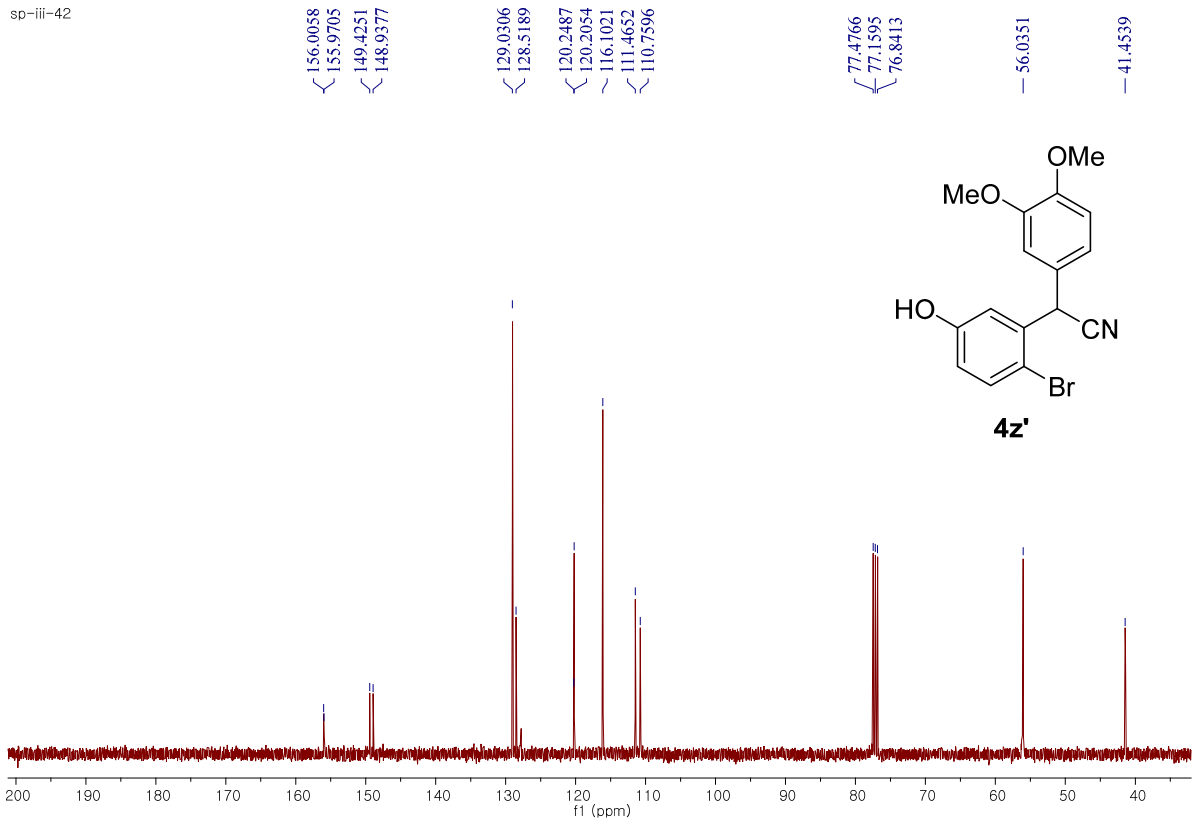

sp-ii-170a
7.3557
7.3346
7.2600
7.0775
7.0624
7.0415
6.9717
6.9514
6.9239
6.9202
6.8276
6.8240
6.8065
6.8031
4.1770
3.9166
3.8336
MeO
OMe
NH2
MeO
O
4y
7.10 7.05 7.00 6.95 6.90 6.85 6.80
f1 (ppm)
7.36 7.34 7.32
f1 (ppm)
1.01
2.05
1.05
1.00
1.03
2.00
6.06
3.02
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

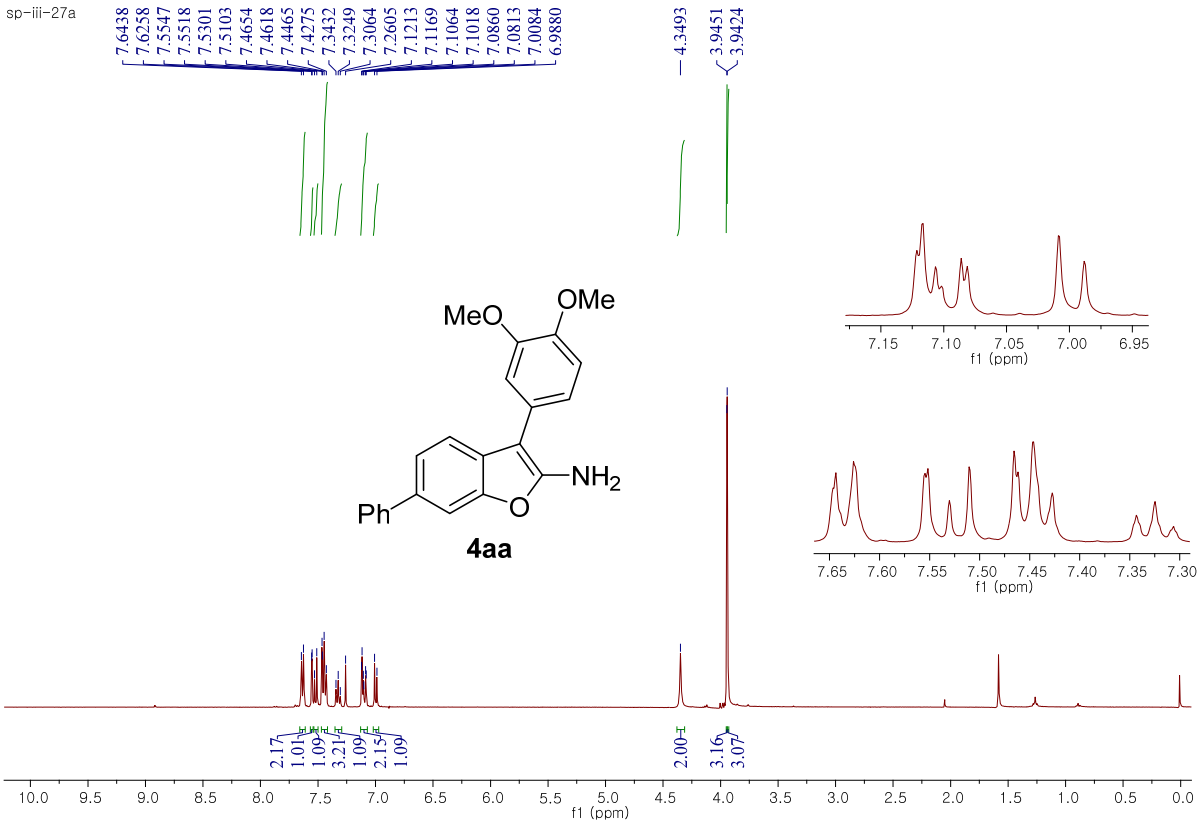

sp-ii-170a
155.7987
152.4208
150.6815
149.5567
147.4031
126.1001
123.5418
119.8322
117.2827
112.0438
110.9249
110.4264
96.4887
94.3319
77.4780
77.1601
76.8420
56.0889
56.0782
56.0363
MeO
OMe
NH2
MeO
O
4y
56.2 56.0
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

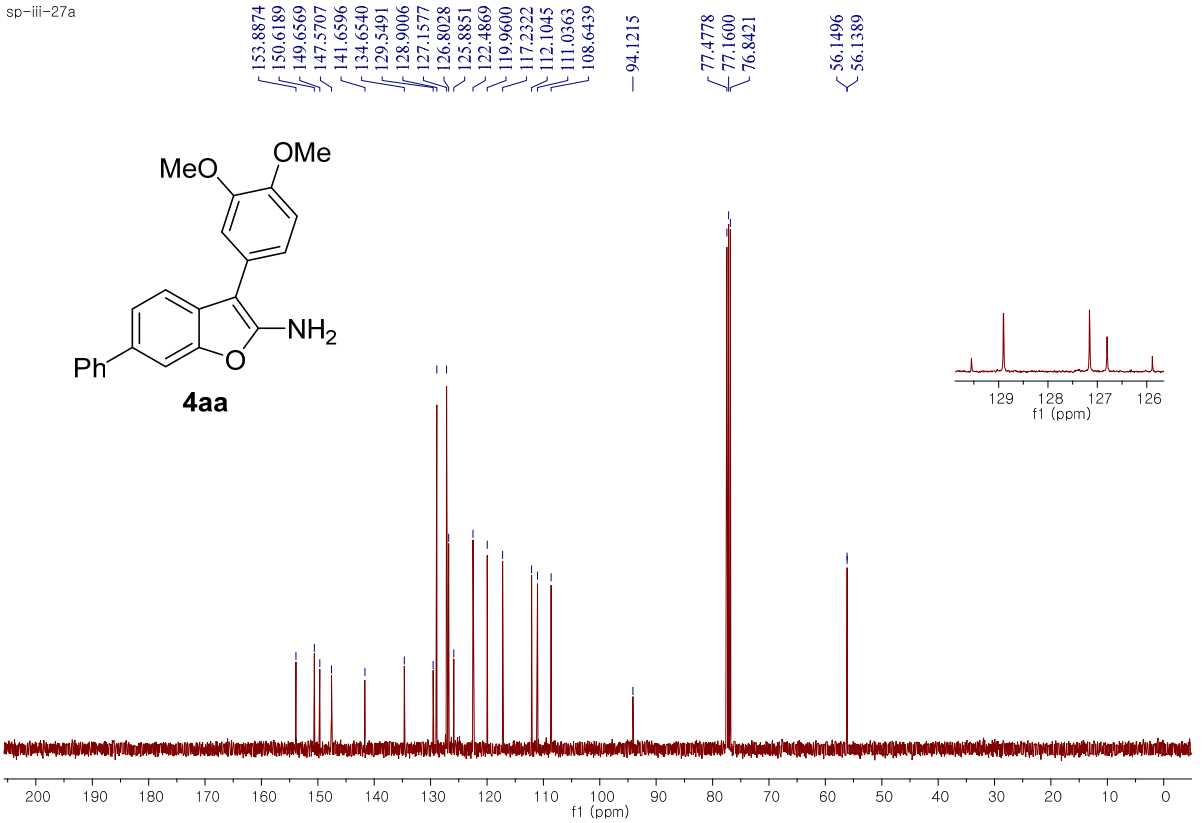

sp-ii-170b
7.2599
7.0456
7.0252
6.9047
6.8848
6.8321
6.8089
6.4190
6.4040
6.3830
6.2641
5.3865
3.8468
3.8286
3.7631
OMe
MeO
CN
HO
OMe
4y'
6.5 6.4 6.3 6.2
f1 (ppm)
7.1 7.0 6.9 6.8
f1 (ppm)
1.03
1.06
2.07
2.02
0.96
1.00
3.02
3.05
3.04
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

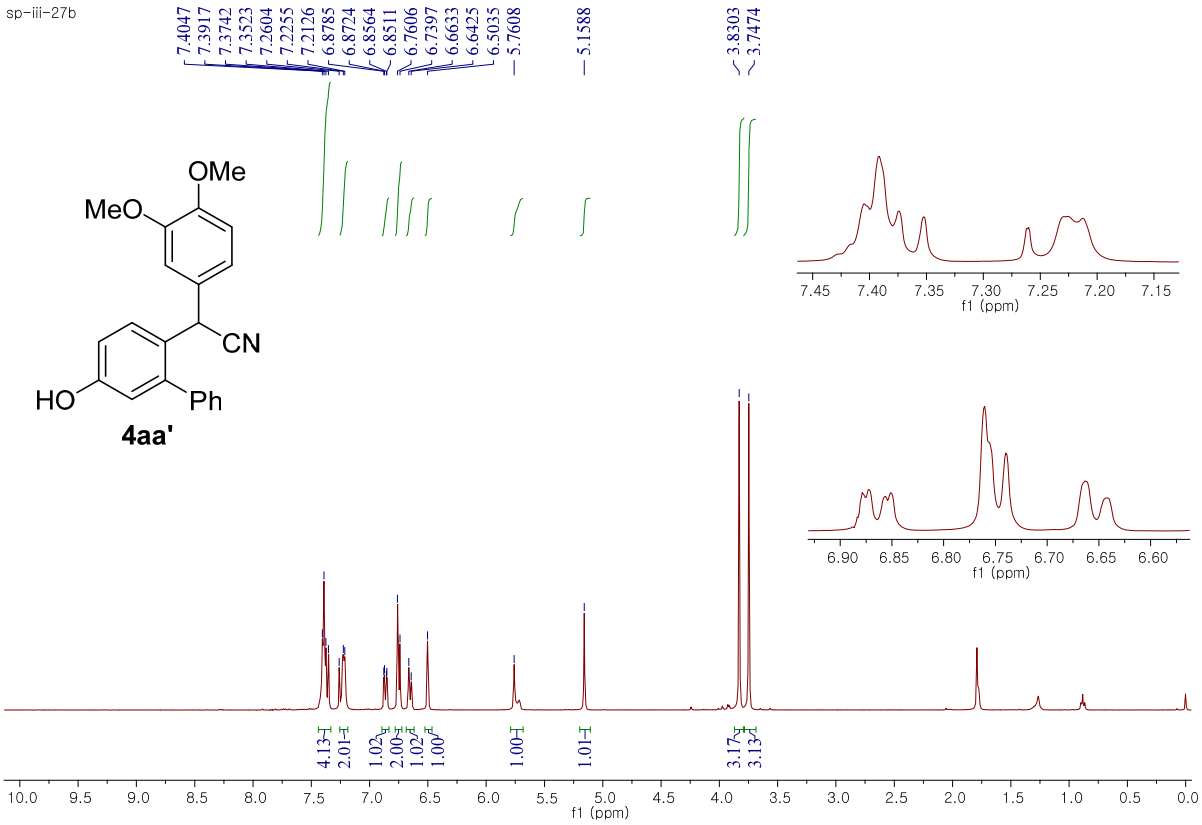

sp-ii-170b
157.6164
157.3546
149.1452
148.6342
129.4845
128.2170
120.5434
120.0994
116.4429
111.3755
110.9658
107.5832
99.4260
77.4778
77.1598
76.8421
56.0220
55.6756
35.4783
OMe
MeO
CN
HO
OMe
4y'
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

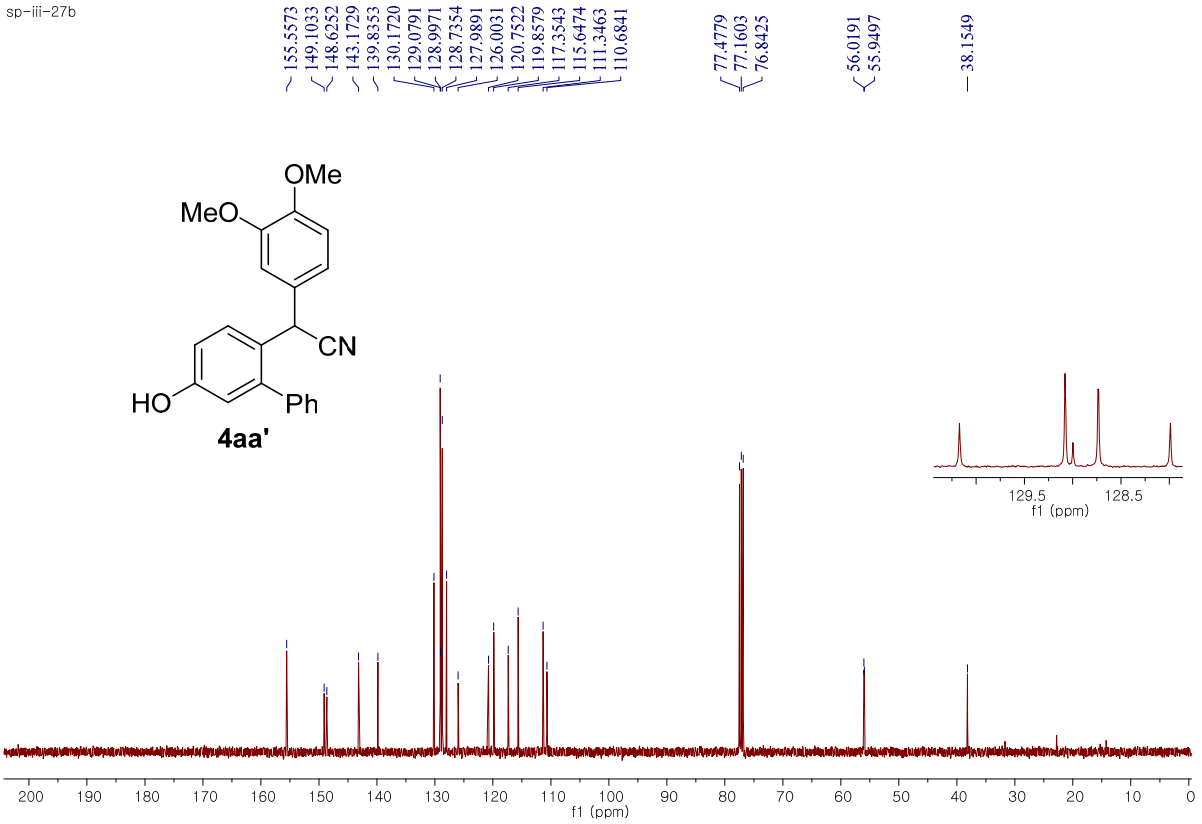

sp-iii-42
7.2603
7.1703
7.1493
6.8611
6.8456
6.8255
6.8045
6.7817
6.0460
5.0388
3.8546
3.8221
OMe
MeO
HO
CN
Br
4z'
2.01
4.36
1.08
1.00
3.09
3.03
f1 (ppm)

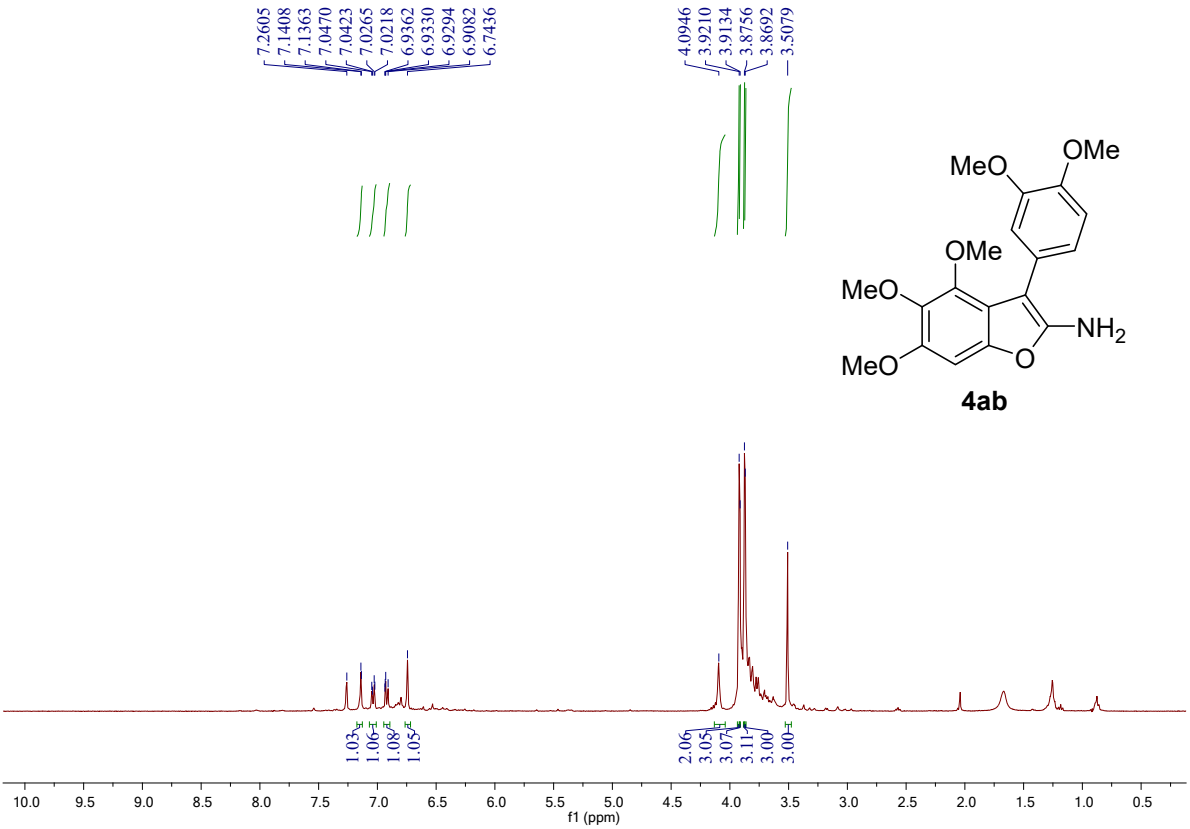

sp-iii-42
156.0058
155.9705
149.4251
148.9377
129.0306
128.5189
120.2487
120.2054
116.1021
111.4652
110.7596
77.4766
77.1595
76.8413
56.0351
41.4539
OMe
MeO
HO
CN
Br
4z'
f1 (ppm)

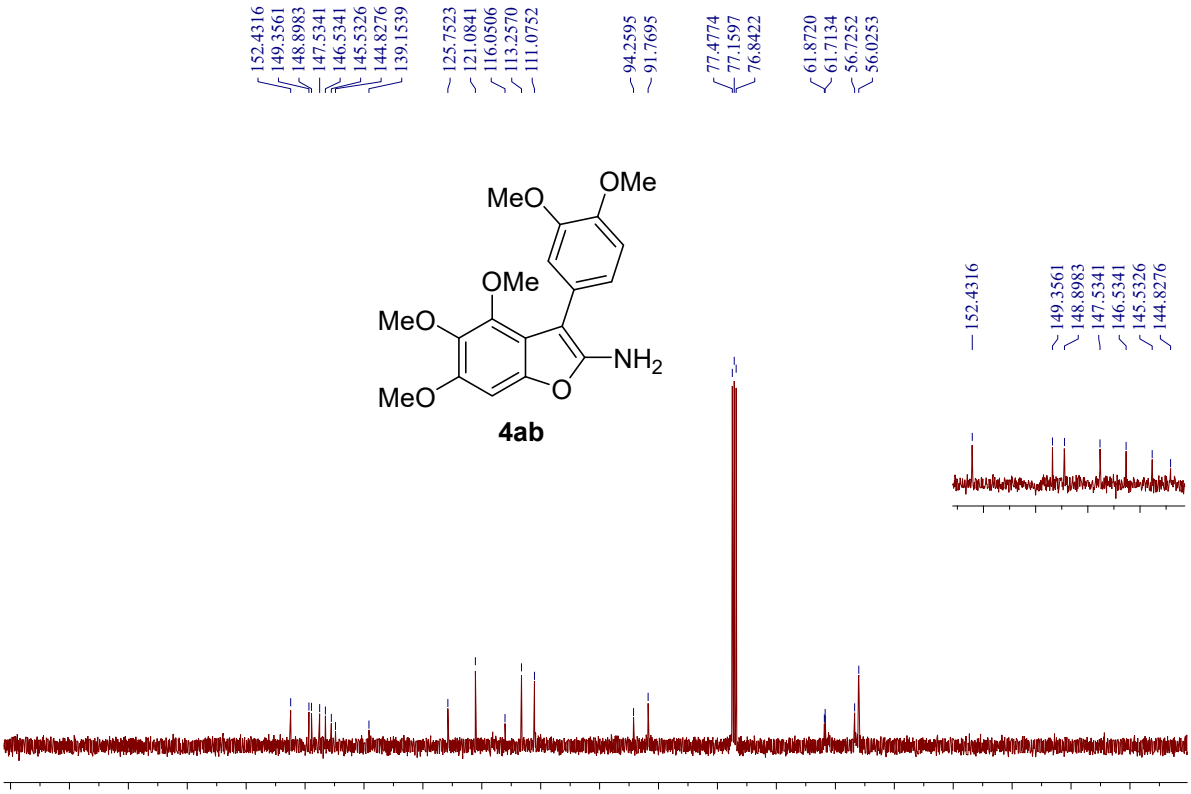

sp-iii-27a
7.6438
7.6258
7.5547
7.5518
7.5301
7.5103
7.4654
7.4618
7.4465
7.4275
7.3432
7.3249
7.3064
7.2605
7.1213
7.1169
7.1064
7.1018
7.0860
7.0813
7.0084
6.9880
4.3493
3.9451
3.9424
MeO
OMe
NH2
Ph
O
4aa
2.17
1.01
1.09
3.21
1.09
2.15
1.09
2.00
3.16
3.07
f1 (ppm)

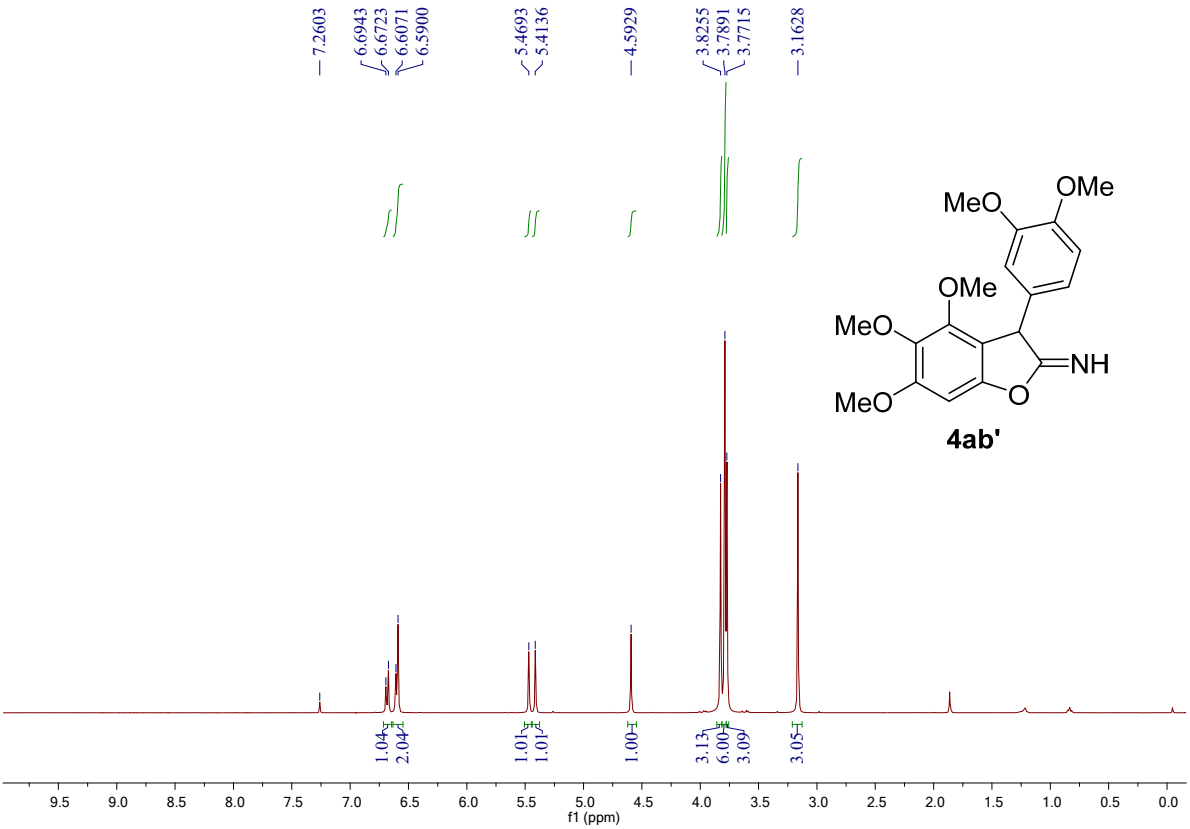

sp-iii-27a
153.8874
150.6189
149.6569
147.5707
141.6596
134.6540
129.5491
128.9006
127.1577
126.8028
125.8851
122.4869
119.9600
117.2322
112.1045
111.0363
108.6439
94.1215
77.4778
77.1600
76.8421
56.1496
56.1389
MeO
OMe
NH2
Ph
O
4aa
f1 (ppm)

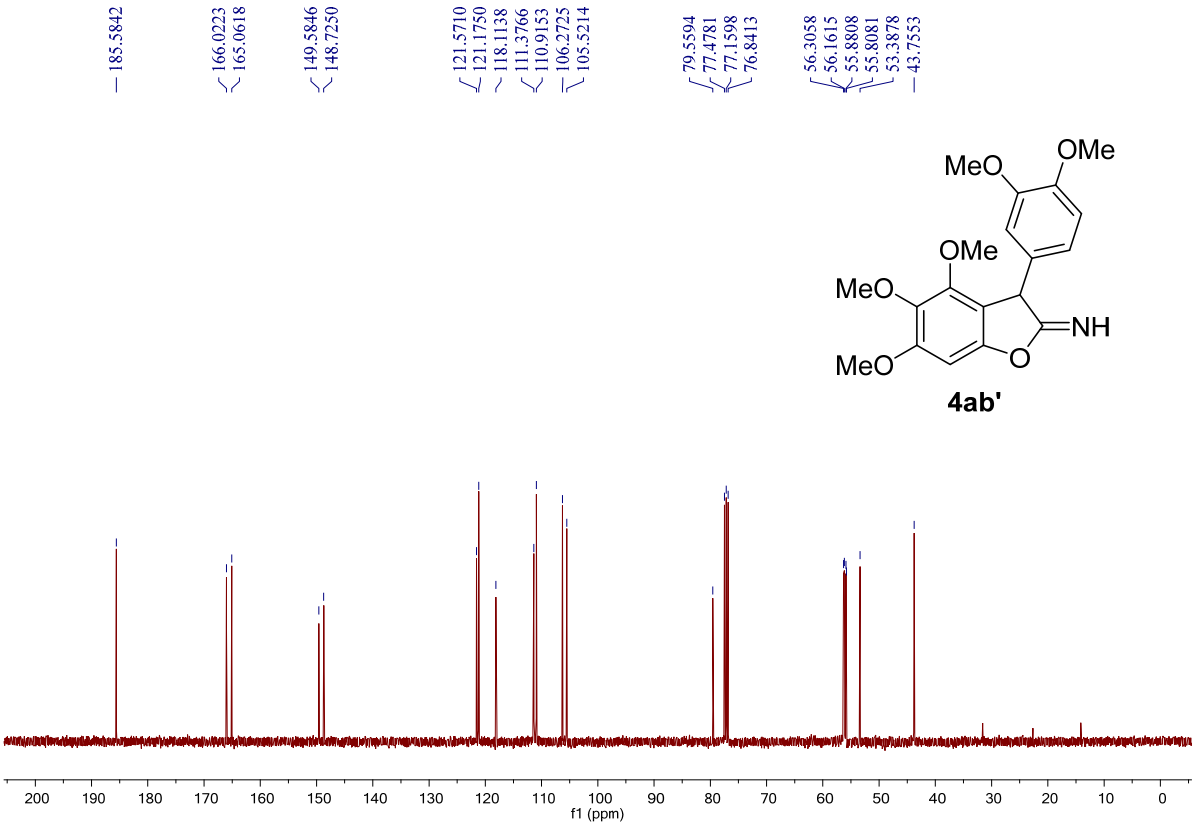

sp-iii-27b
7.4047
7.3917
7.3742
7.3523
7.2604
7.2255
7.2126
6.8785
6.8724
6.8564
6.8511
6.7606
6.7397
6.6633
6.6425
6.5035
5.7608
5.1588
3.8303
3.7474
OMe
MeO
CN
HO
Ph
4aa'
4.13
2.01
1.02
2.00
1.02
1.00
1.00
1.01
3.17
3.13
f1 (ppm)

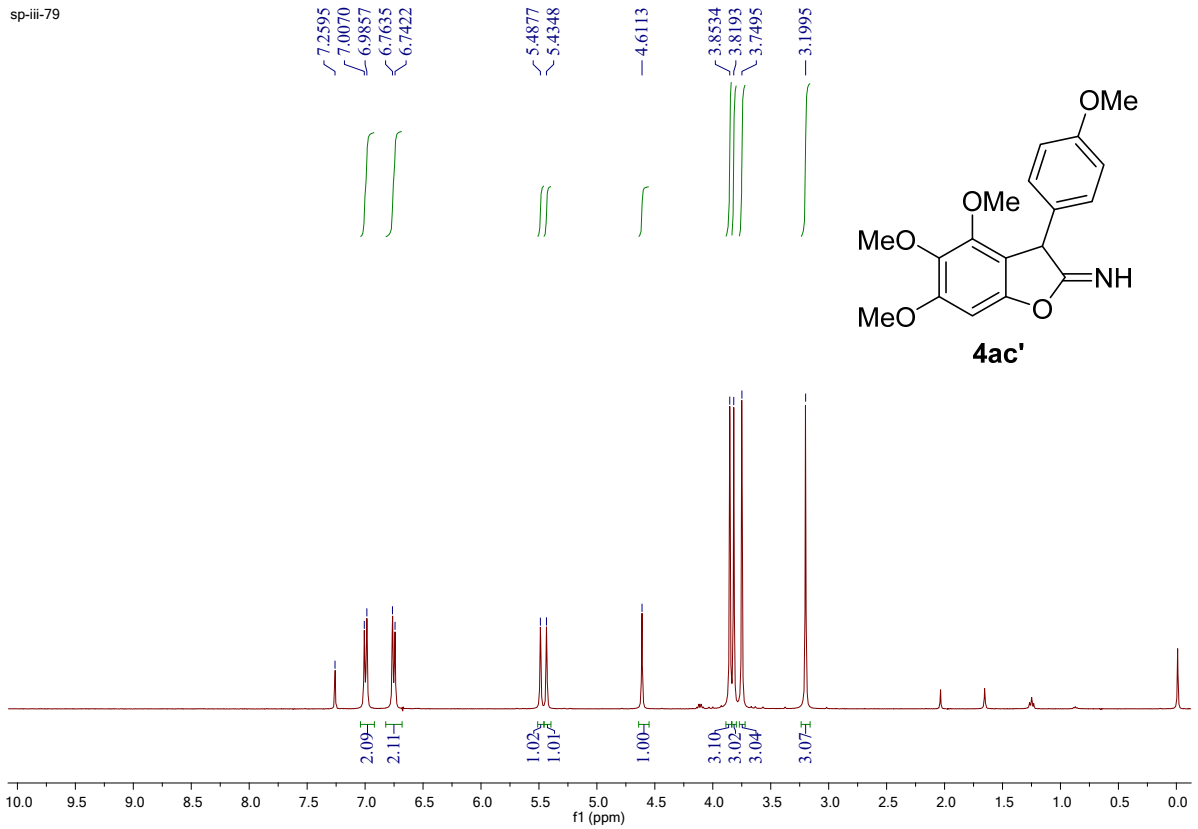

sp-iii-27b
155.5573
149.1033
148.6252
143.1729
139.8353
130.1720
129.0791
128.9971
128.7354
127.9891
126.0031
120.7522
119.8579
117.3543
115.6474
111.3463
110.6841
77.4779
77.1603
76.8425
56.0191
55.9497
38.1549
OMe
MeO
CN
HO
Ph
4aa'
f1 (ppm)

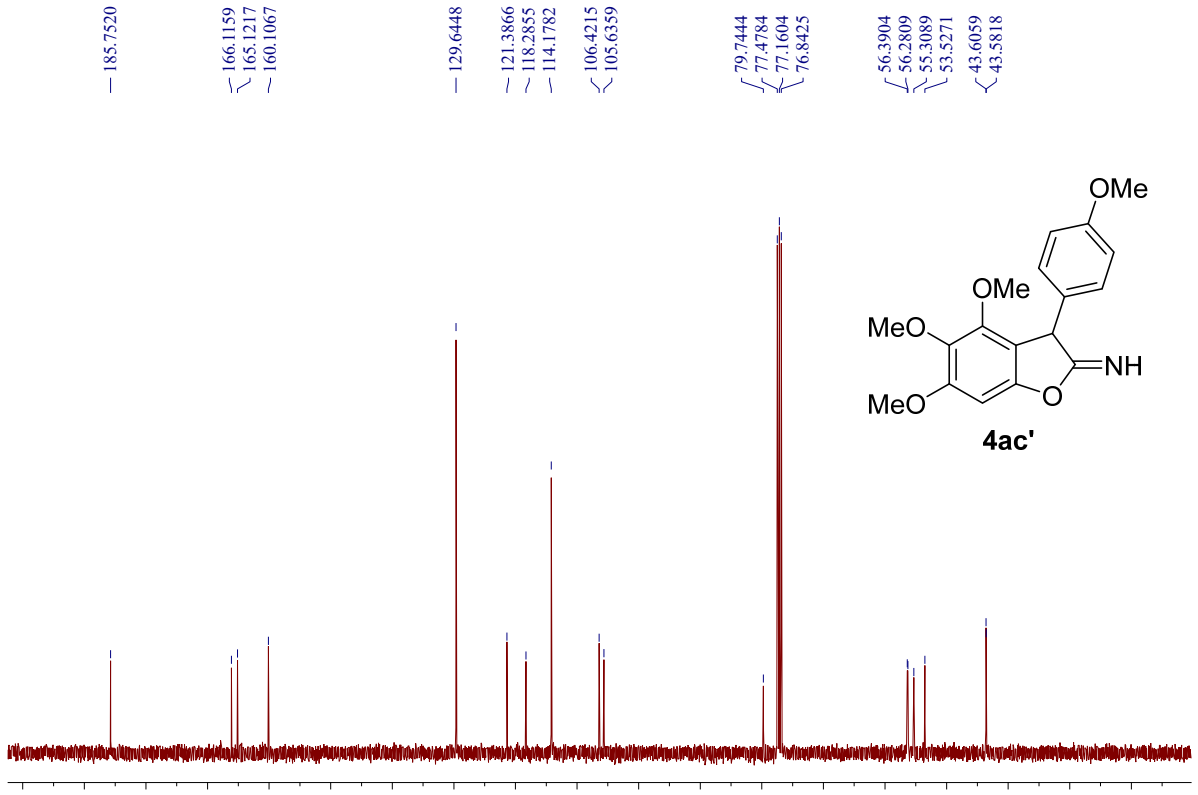

7.2605
7.1408
7.1363
7.0470
7.0423
7.0265
7.0218
6.9362
6.9330
6.9294
6.9082
6.7436
4.0946
3.9210
3.9134
3.8756
3.8692
3.5079
MeO
OMe
OMe
MeO
NH2
MeO
O
4ab
1.03
1.06
1.08
1.05
2.06
3.05
3.07
3.11
3.00
3.00
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

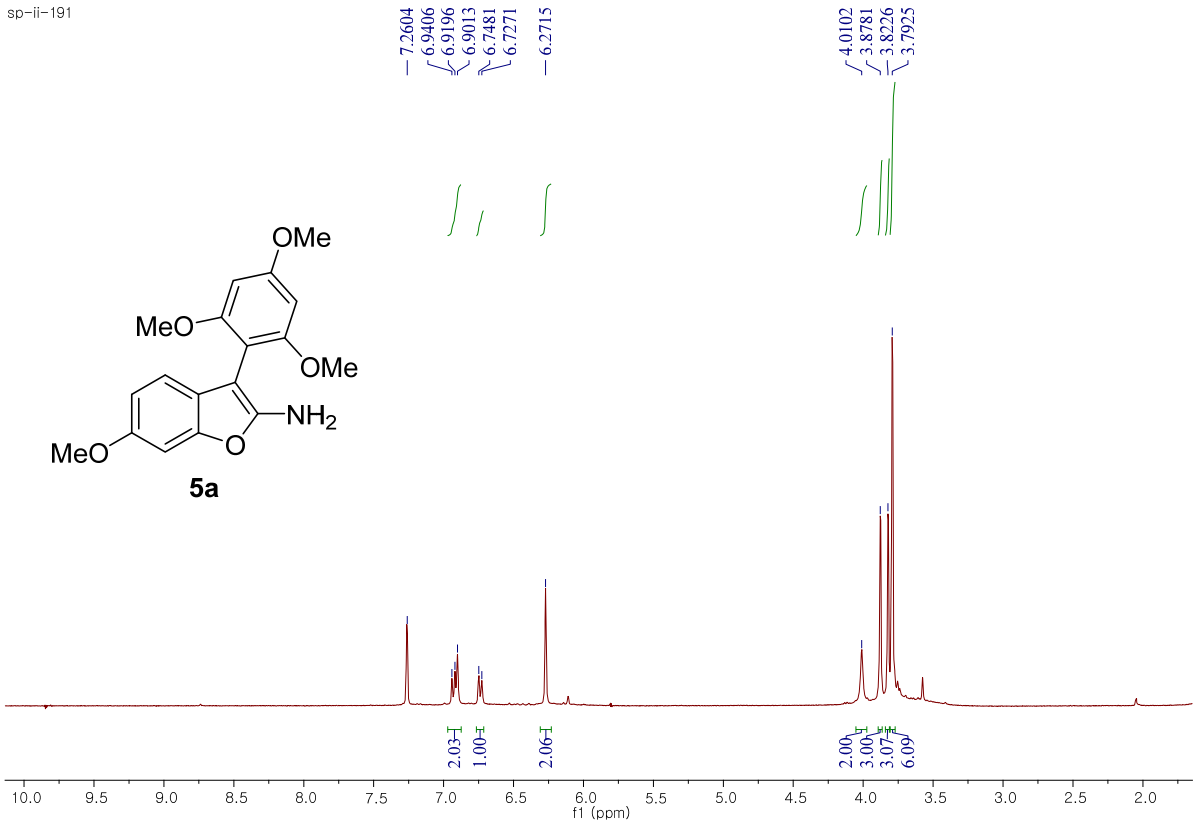

152.4316
149.3561
148.8983
147.5341
146.5341
145.5326
144.8276
139.1539
125.7523
121.0841
116.0506
113.2570
111.0752
94.2595
91.7695
77.4774
77.1597
76.8422
61.8720
61.7134
56.7252
56.0253
MeO
OMe
OMe
MeO
NH2
MeO
O
4ab
152.4316
149.3561
148.8983
147.5341
146.5341
145.5326
144.8276

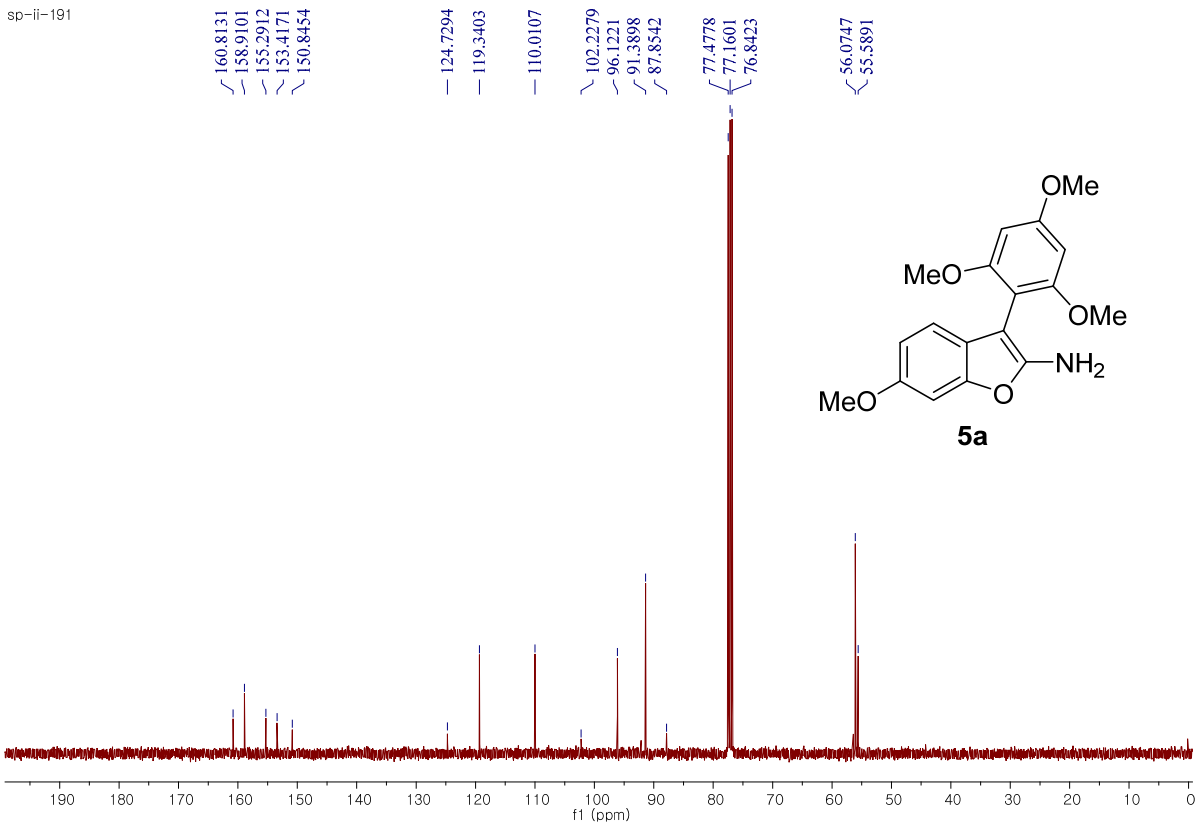

7.2603
6.6943
6.6723
6.6071
6.5900
5.4693
5.4136
4.5929
3.8255
3.7891
3.7715
3.1628
1.04
2.04
1.01
1.01
1.00
3.13
6.00
3.09
3.05
f1 (ppm)
MeO
OMe
OMe
MeO
MeO
NH
O
4ab'

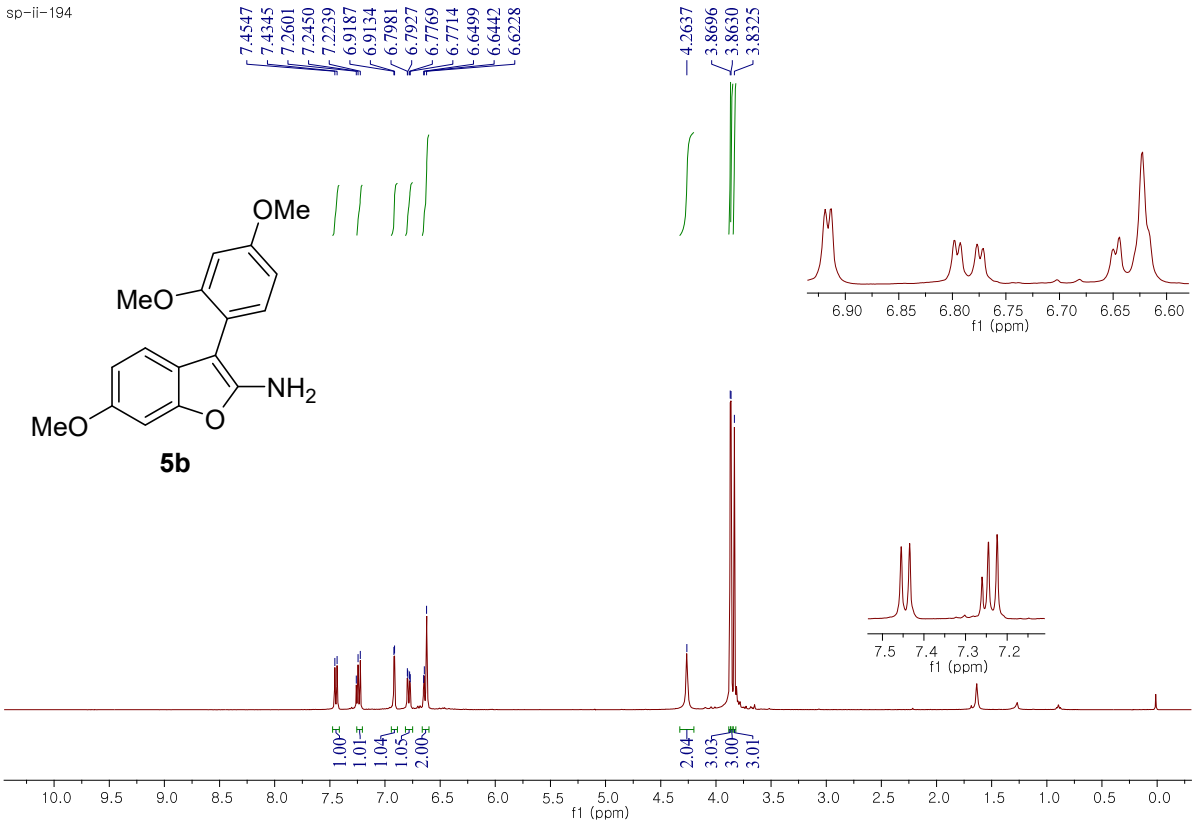

185.5842
166.0223
165.0618
149.5846
148.7250
121.5710
121.1750
118.1138
111.3766
110.9153
106.2725
105.5214
79.5594
77.4781
77.1598
76.8413
56.3058
56.1615
55.8808
55.8081
53.3878
43.7553
f1 (ppm)
MeO
OMe
OMe
MeO
MeO
NH
O
4ab'

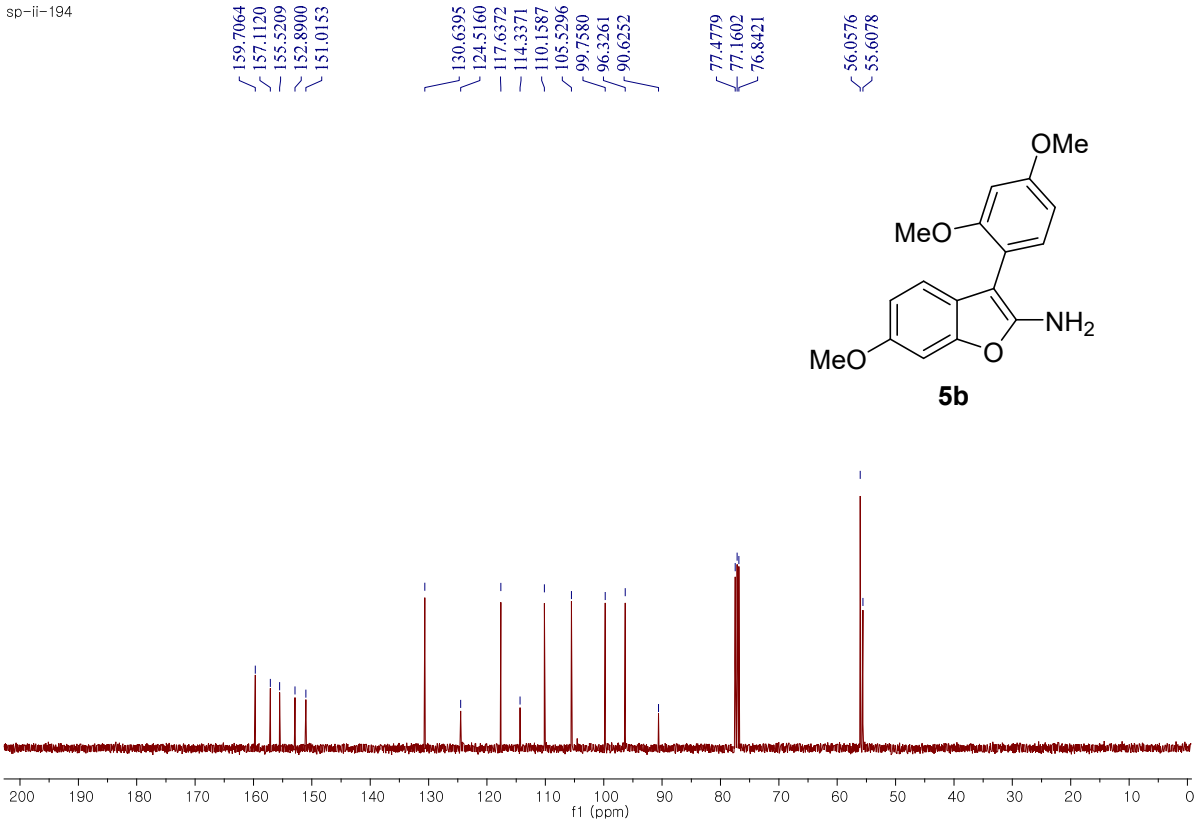

sp-iii-79
7.2595
7.0070
6.9857
6.7635
6.7422
5.4877
5.4348
4.6113
3.8534
3.8193
3.7495
3.1995
OMe
OMe
MeO
MeO
NH
O
4ac'
2.09
2.11
1.02
1.01
1.00
3.10
3.02
3.04
3.07
f1 (ppm)

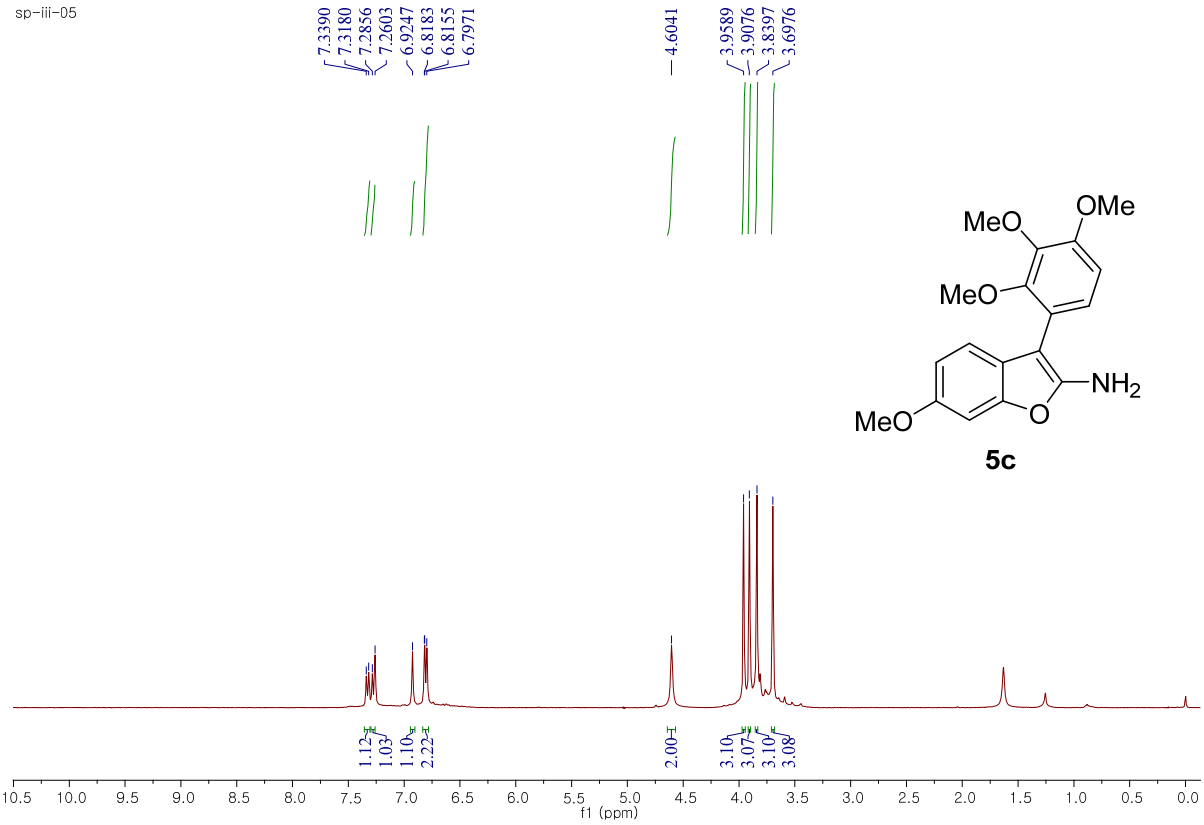

185.7520
166.1159
165.1217
160.1067
129.6448
121.3866
118.2855
114.1782
106.4215
105.6359
79.7444
77.4784
77.1604
76.8425
56.3904
56.2809
55.3089
53.5271
43.6059
43.5818
OMe
OMe
MeO
MeO
NH
O
4ac'

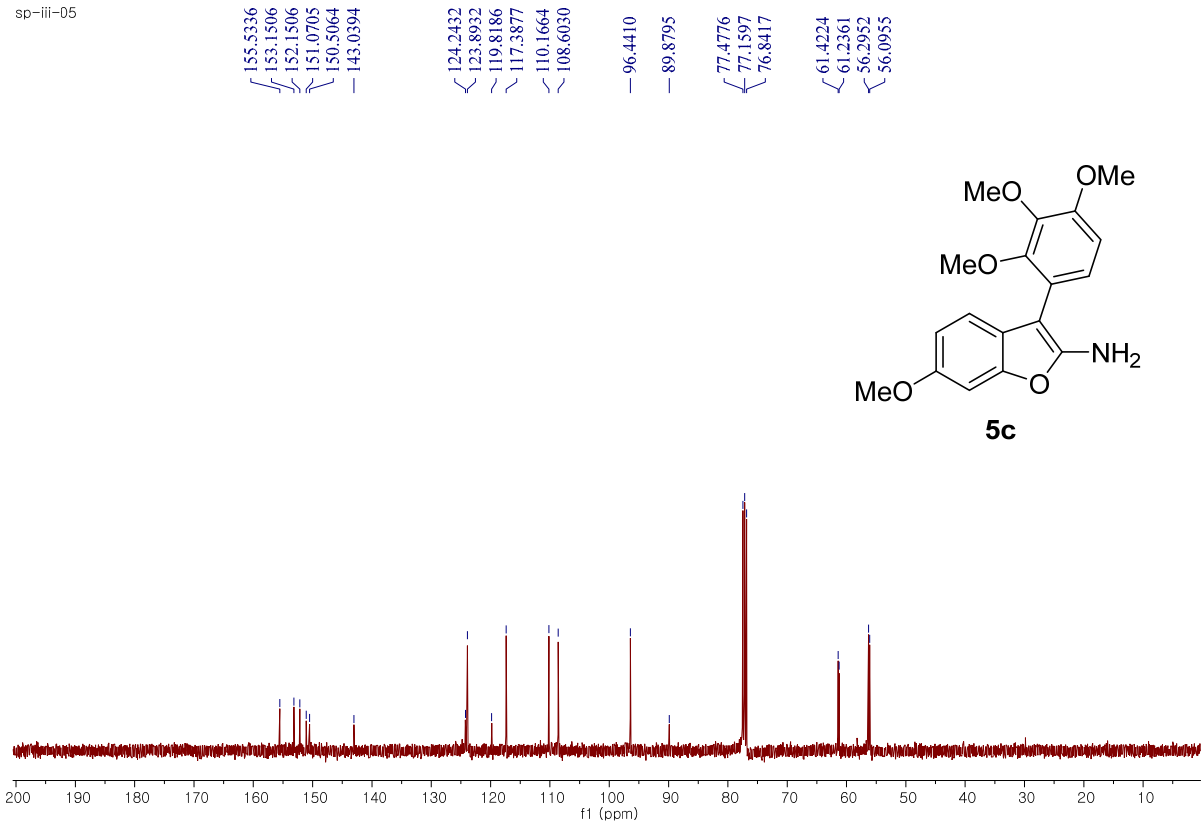

sp-ii-191
7.2604
6.9406
6.9196
6.9013
6.7481
6.7271
6.2715
4.0102
3.8781
3.8226
3.7925
OMe
MeO
OMe
NH2
MeO
O
5a
2.03
1.00
2.06
2.00
3.00
3.07
6.09
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
f1 (ppm)

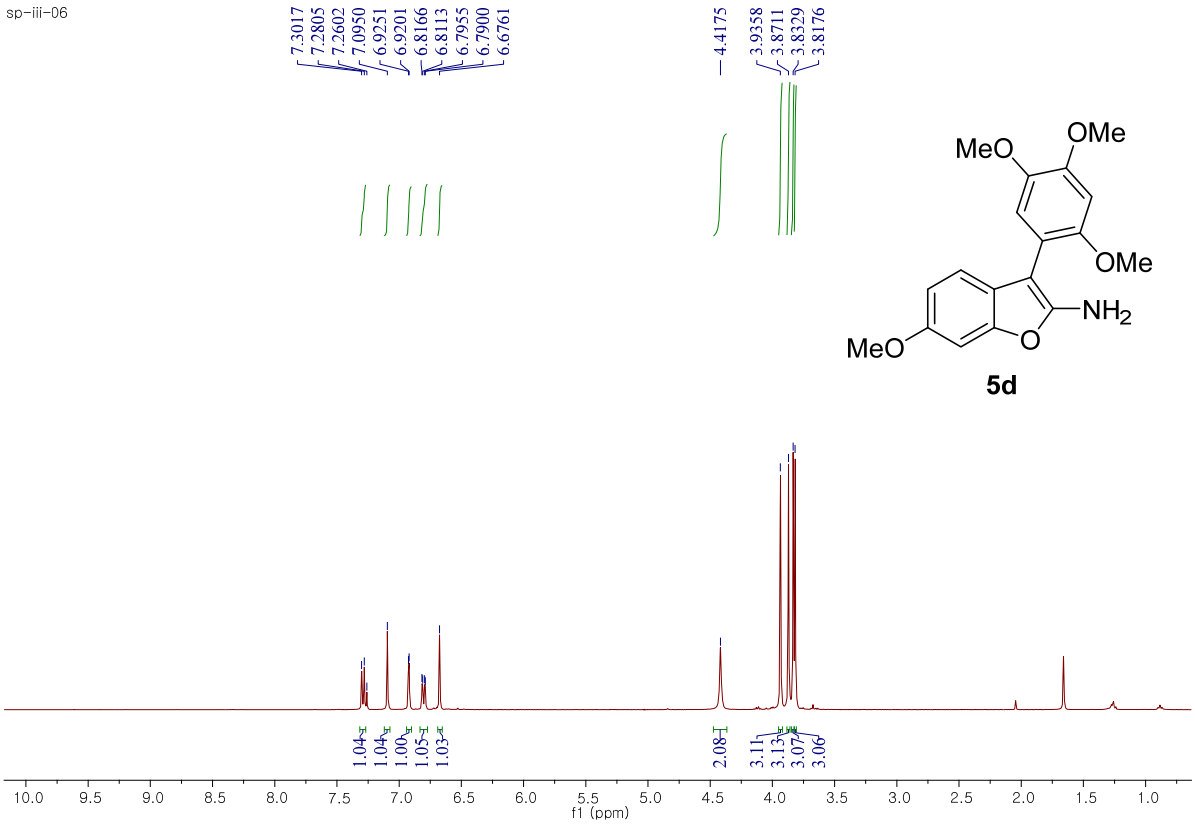

sp-ii-191
160.8131
158.9101
155.2912
153.4171
150.8454
124.7294
119.3403
110.0107
102.2279
96.1221
91.3898
87.8542
77.4778
77.1601
76.8423
56.0747
55.5891
OMe
MeO
OMe
NH2
MeO
O
5a
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

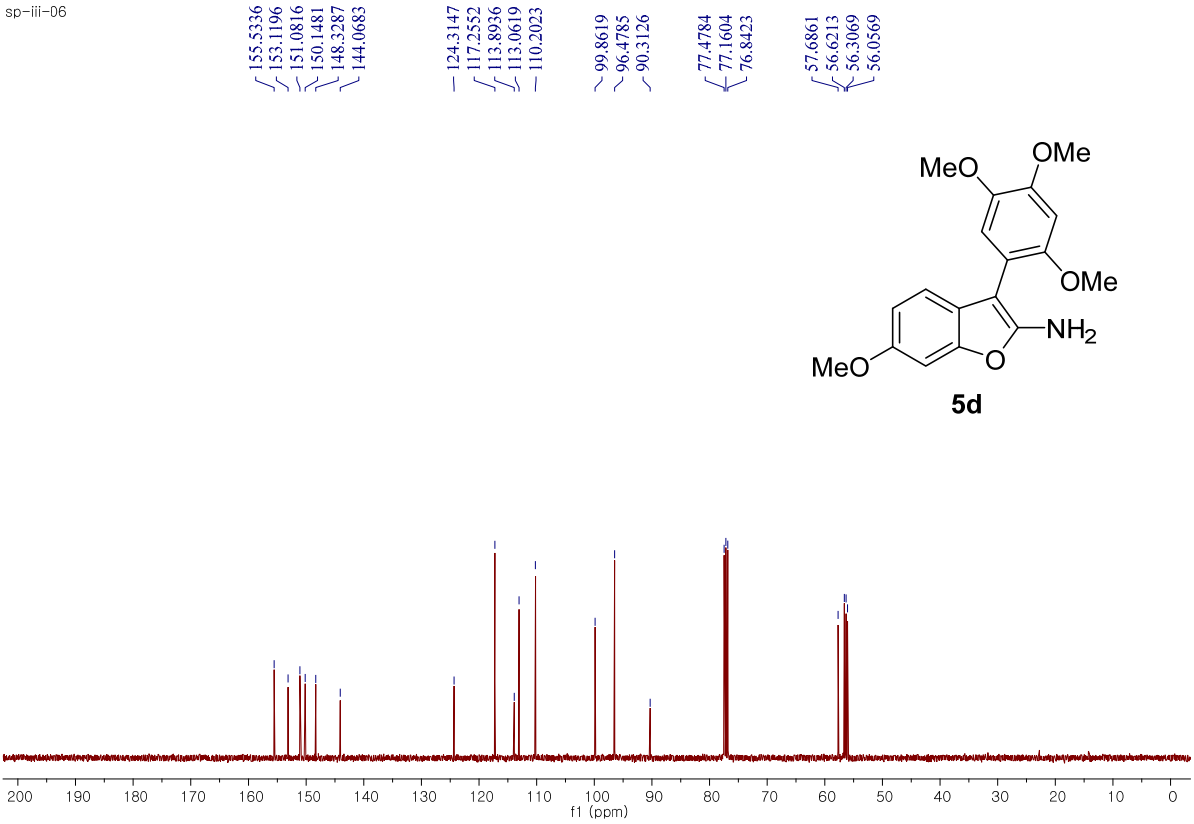

sp-ii-194
7.4547
7.4345
7.2601
7.2450
7.2239
6.9187
6.9134
6.7981
6.7927
6.7769
6.7714
6.6499
6.6442
6.6228
4.2637
3.8696
3.8630
3.8325
OMe
MeO
NH2
MeO
O
5b
6.90 6.85 6.80 6.75 6.70 6.65 6.60
f1 (ppm)
7.5 7.4 7.3 7.2
f1 (ppm)
1.00
1.01
1.04
1.05
2.00
2.04
3.03
3.00
3.01
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

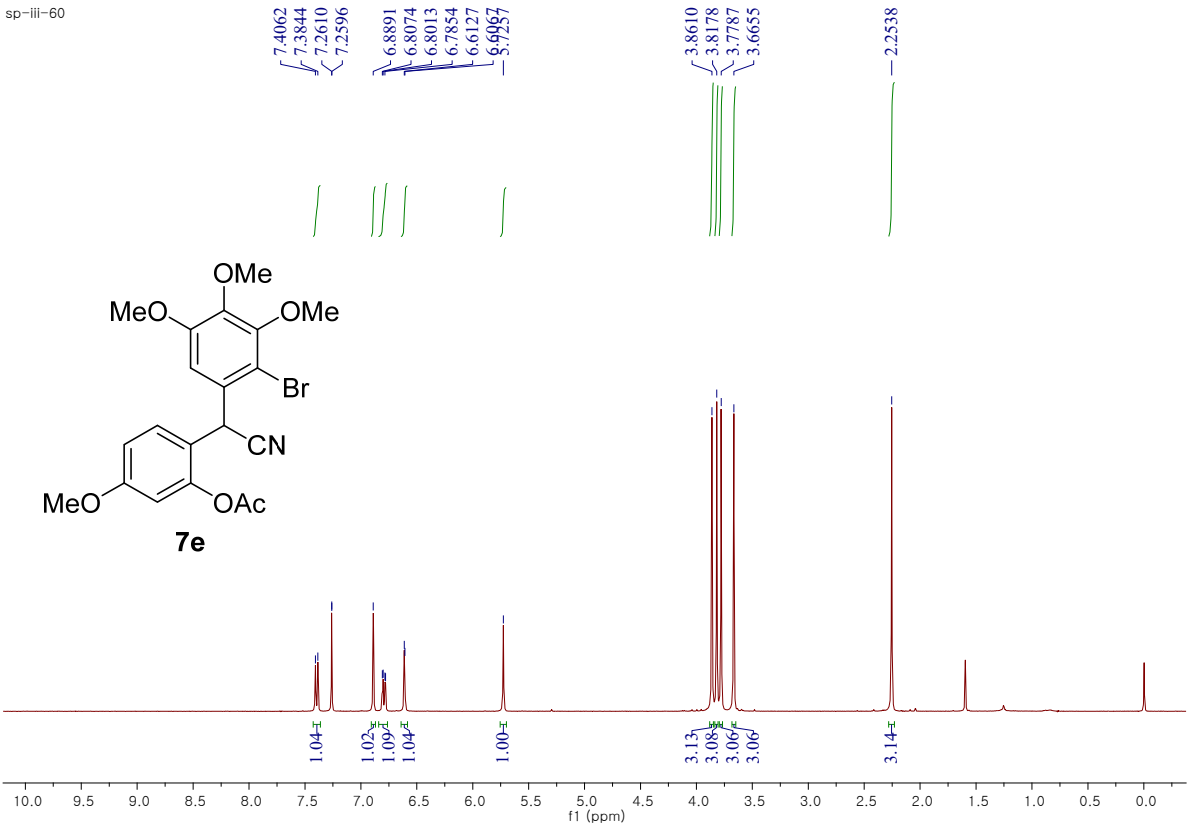

sp-ii-194
159.7064
157.1120
155.5209
152.8900
151.0153
130.6395
124.5160
117.6372
114.3371
110.1587
105.5296
99.7580
96.3261
90.6252
77.4779
77.1602
76.8421
56.0576
55.6078
OMe
MeO
NH2
MeO
O
5b
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

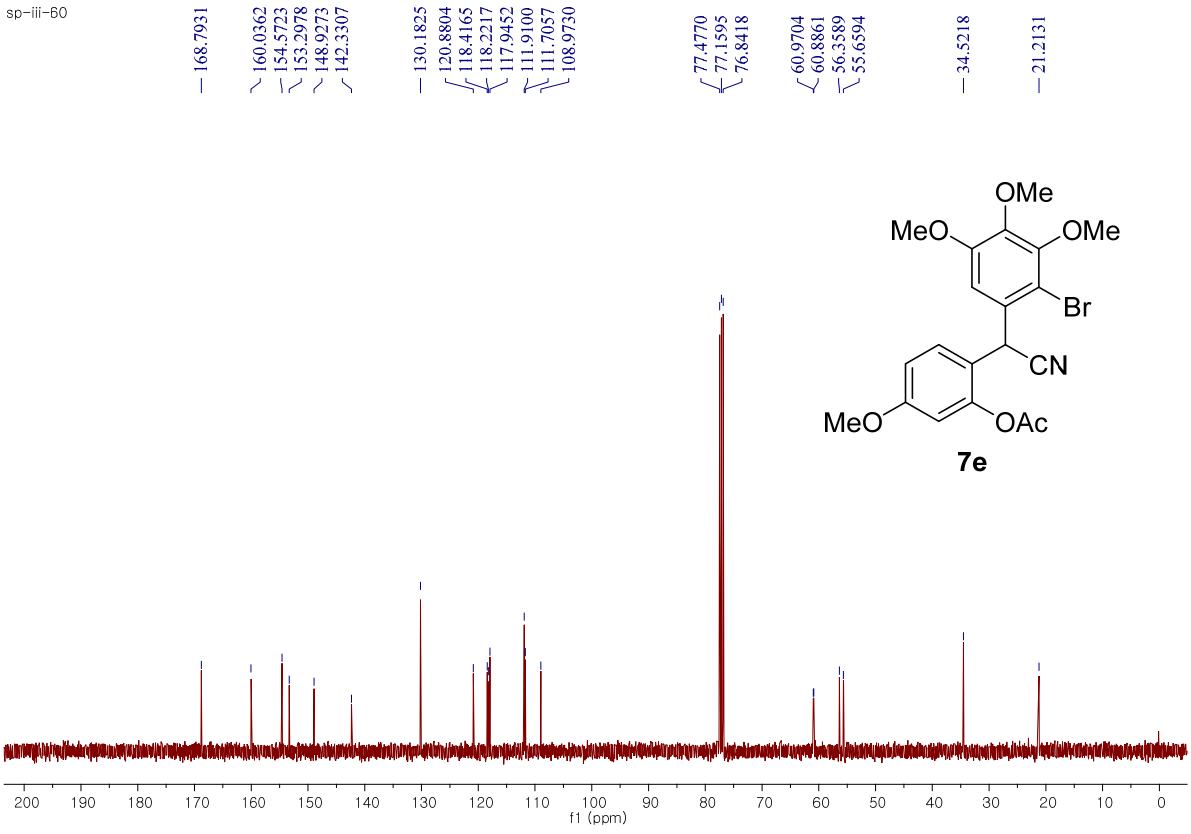

sp-iii-05
7.3390
7.3180
7.2856
7.2603
6.9247
6.8183
6.8155
6.7971
4.6041
3.9589
3.9076
3.8397
3.6976
MeO
OMe
MeO
NH2
MeO
O
5c
1.12
1.03
1.10
2.22
2.00
3.10
3.07
3.10
3.08
f1 (ppm)

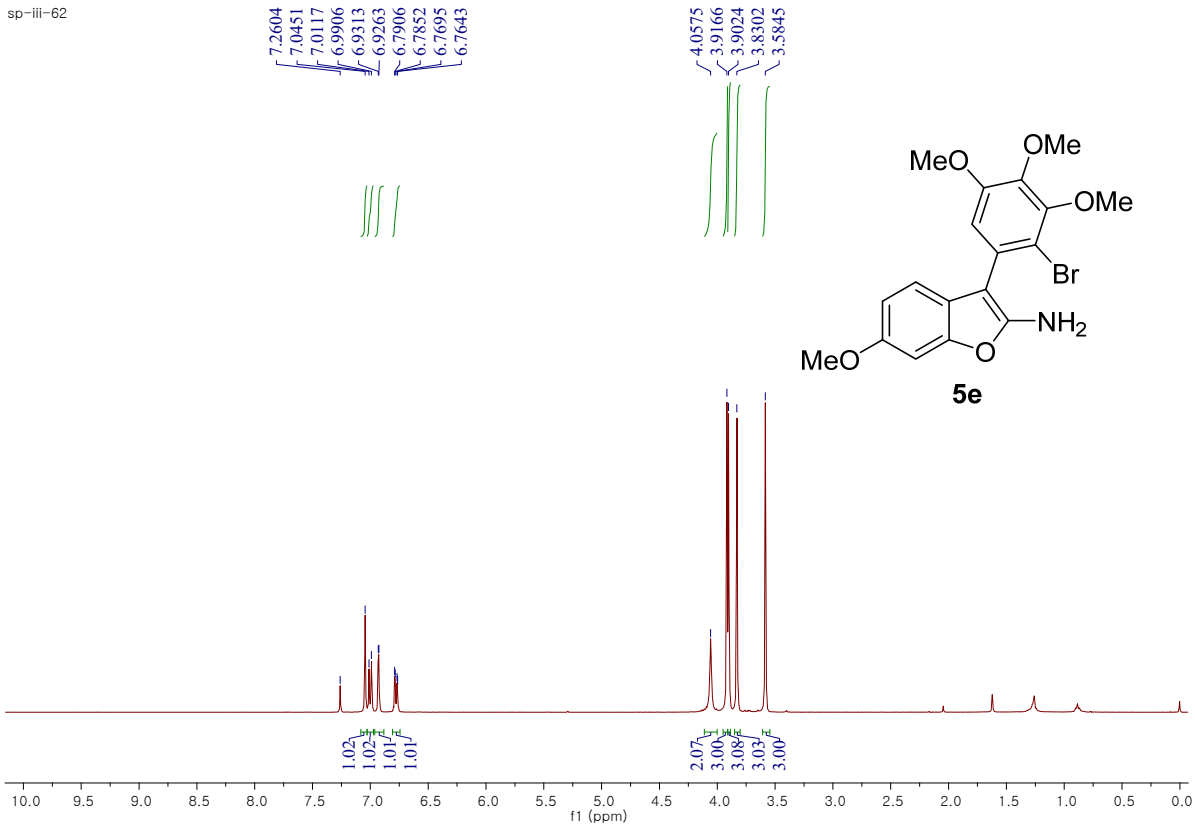

sp-iii-05
155.5336
153.1506
152.1506
151.0705
150.5064
143.0394
124.2432
123.8932
119.8186
117.3877
110.1664
108.6030
96.4410
89.8795
77.4776
77.1597
76.8417
61.4224
61.2361
56.2952
56.0955
MeO
OMe
MeO
NH2
MeO
O
5c
f1 (ppm)

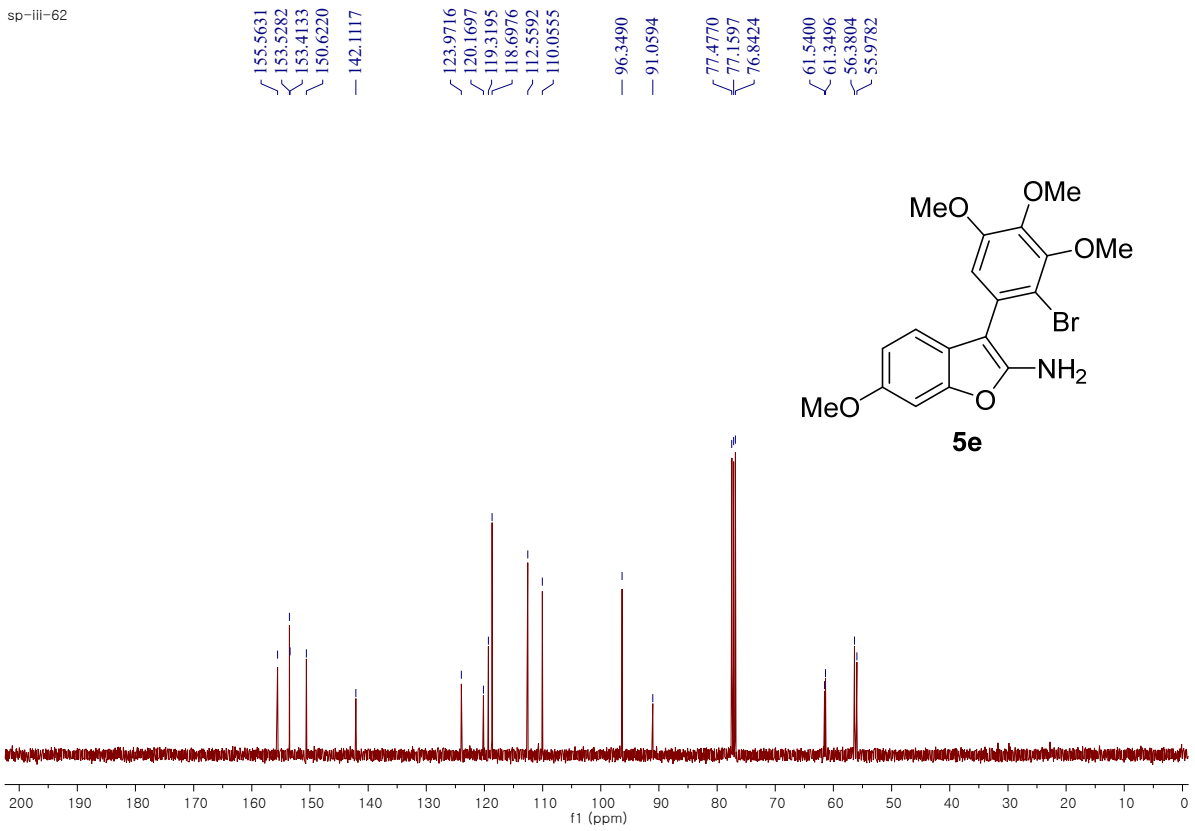

sp-iii-06
7.3017
7.2805
7.2602
7.0950
6.9251
6.9201
6.8166
6.8113
6.7955
6.7900
6.6761
4.4175
3.9358
3.8711
3.8329
3.8176
MeO
OMe
OMe
NH2
MeO
O
5d
1.04
1.04
1.00
1.05
1.03
2.08
3.11
3.13
3.07
3.06
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
f1 (ppm)

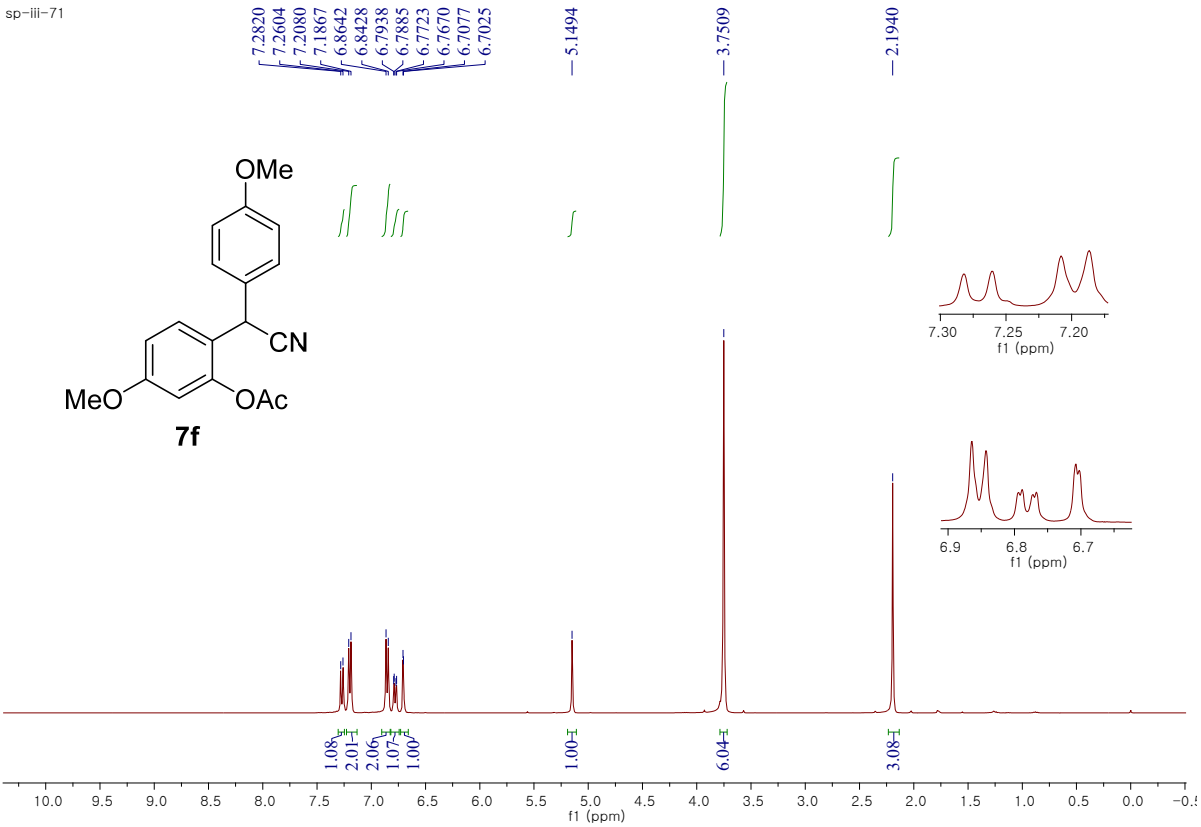

sp-iii-06
155.5336
153.1196
151.0816
150.1481
148.3287
144.0683
124.3147
117.2552
113.8936
113.0619
110.2023
99.8619
96.4785
90.3126
77.4784
77.1604
76.8423
57.6861
56.6213
56.3069
56.0569
MeO
OMe
OMe
NH2
MeO
O
5d
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

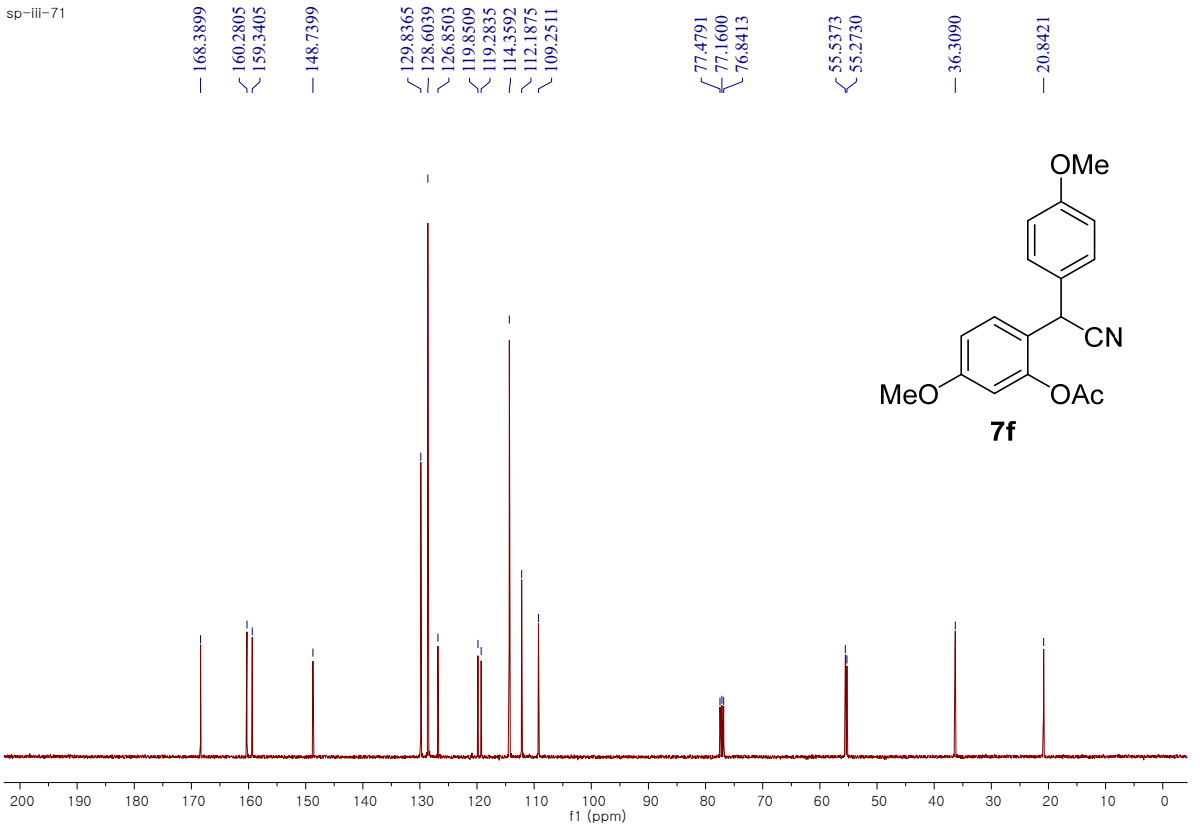

sp-iii-60
7.4062
7.3844
7.2610
7.2596
6.8891
6.8074
6.8013
6.7854
6.6127
6.6067
5.7257
3.8610
3.8178
3.7787
3.6655
2.2538
OMe
MeO
OMe
Br
CN
MeO
OAc
7e
1.04
1.02
1.09
1.04
1.00
3.13
3.08
3.06
3.06
3.14
f1 (ppm)

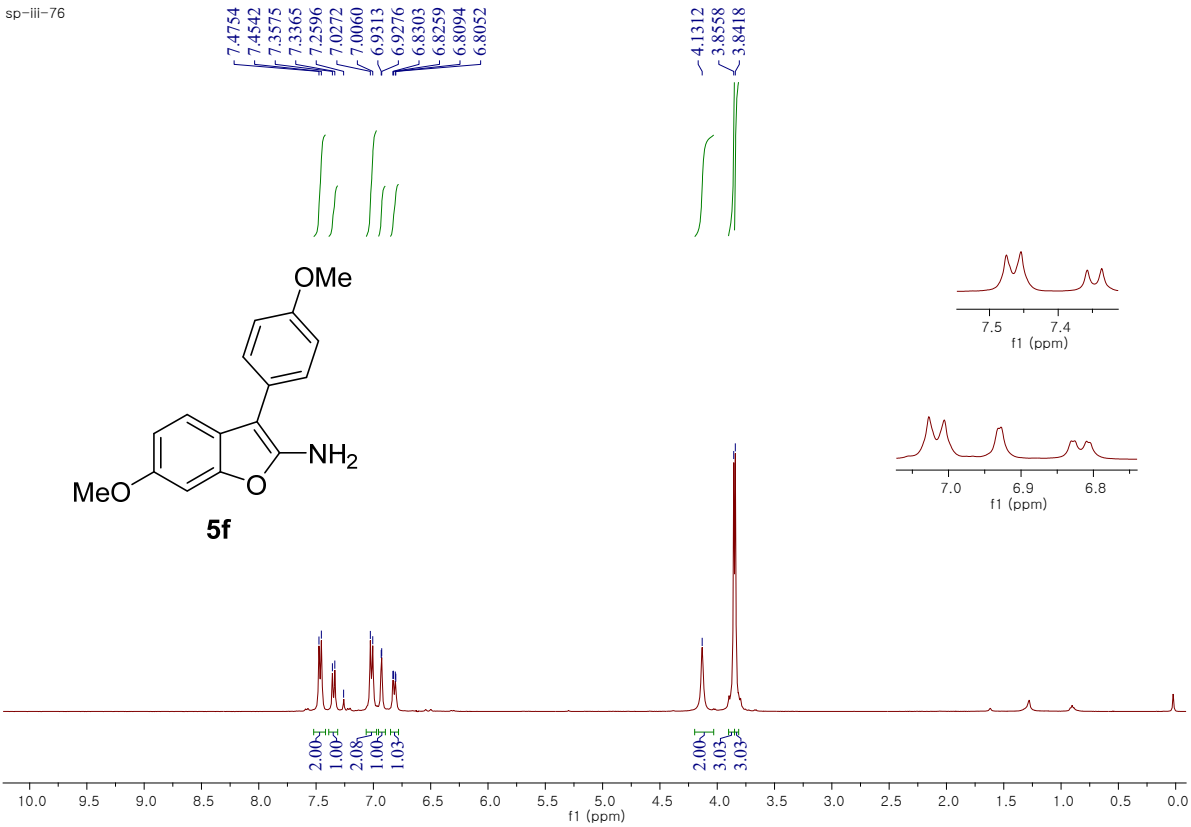

sp-iii-60
168.7931
160.0362
154.5723
153.2978
148.9273
142.3307
130.1825
120.8804
118.4165
118.2217
117.9452
111.9100
111.7057
108.9730
77.4770
77.1595
76.8418
60.9704
60.8861
56.3589
55.6594
34.5218
21.2131
OMe
MeO
OMe
Br
CN
MeO
OAc
7e
f1 (ppm)

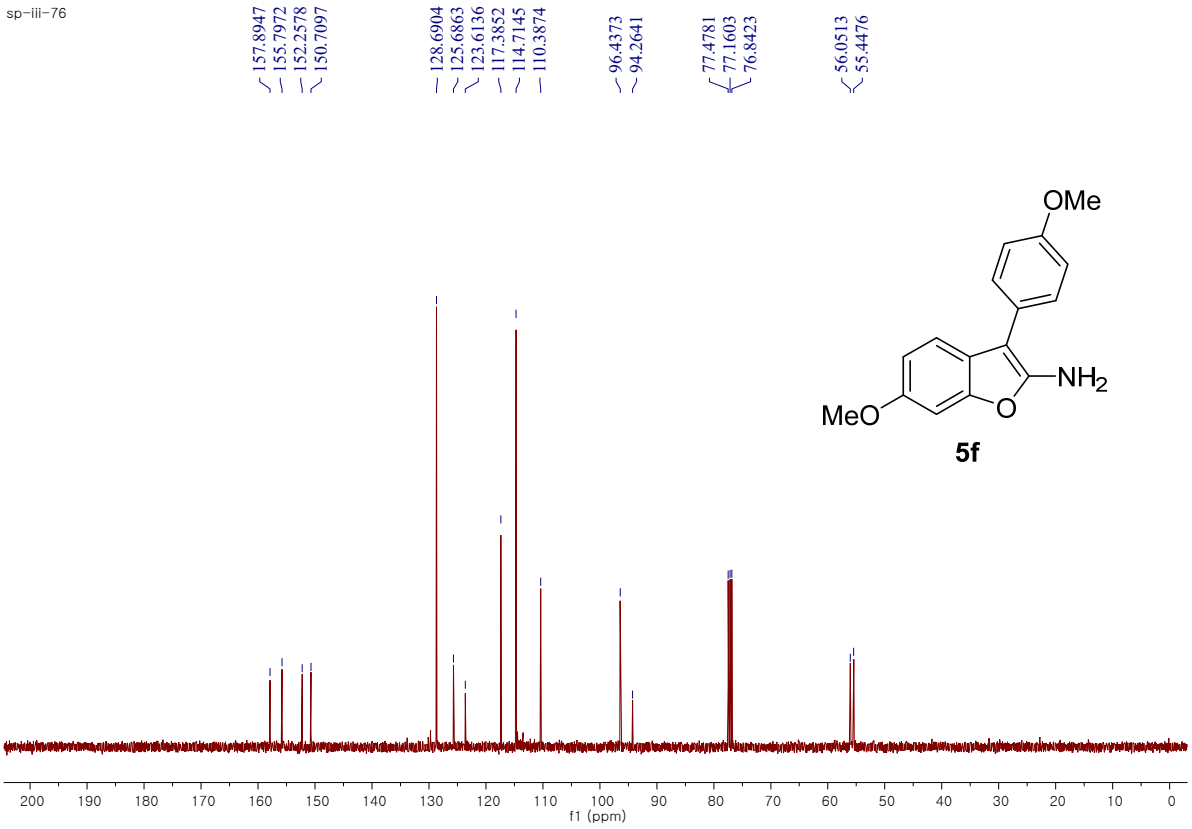

sp-iii-62
7.2604
7.0451
7.0117
6.9906
6.9313
6.9263
6.7906
6.7852
6.7695
6.7643
4.0575
3.9166
3.9024
3.8302
3.5845
MeO
OMe
OMe
Br
NH2
MeO
O
5e
1.02
1.02
1.01
1.01
2.07
3.00
3.08
3.03
3.00
f1 (ppm)

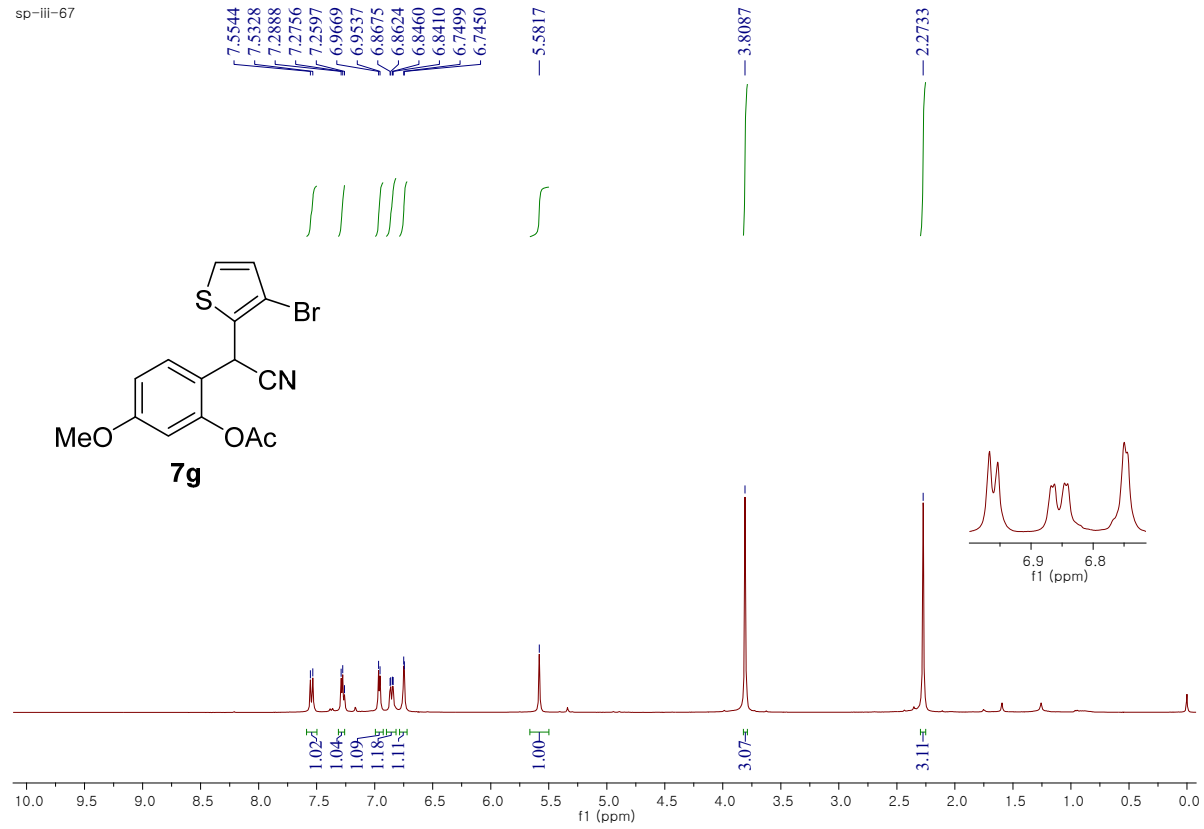

sp-iii-62
155.5631
153.5282
153.4133
150.6220
142.1117
123.9716
120.1697
119.3195
118.6976
112.5592
110.0555
96.3490
91.0594
77.4770
77.1597
76.8424
61.5400
61.3496
56.3804
55.9782
MeO
OMe
OMe
Br
NH2
MeO
O
5e
f1 (ppm)

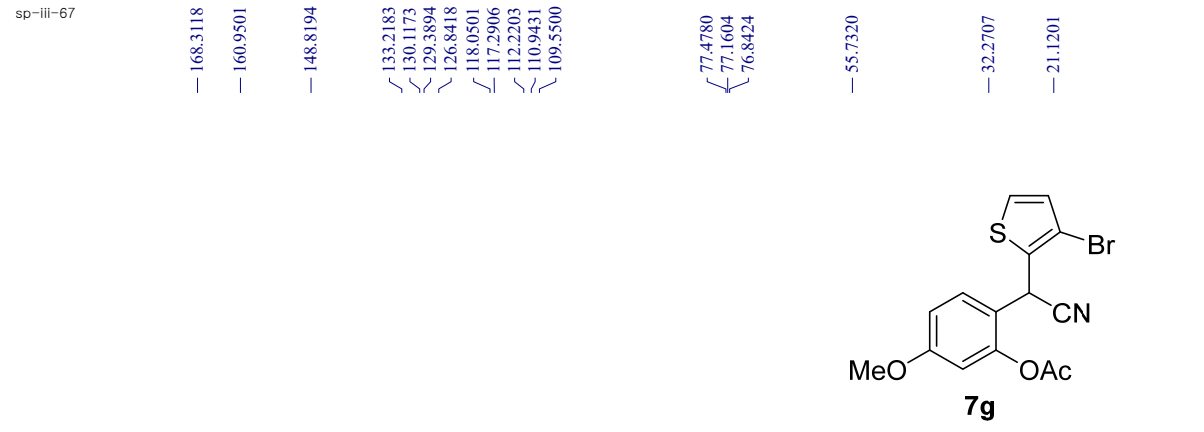

sp-iii-71
7.2820
7.2604
7.2080
7.1867
6.8642
6.8428
6.7938
6.7885
6.7723
6.7670
6.7077
6.7025
5.1494
3.7509
2.1940
OMe
CN
MeO
OAc
7f
7.30
7.25
7.20
f1 (ppm)
6.9
6.8
6.7
f1 (ppm)
1.08
2.01
2.06
1.07
1.00
1.00
6.04
3.08
f1 (ppm)

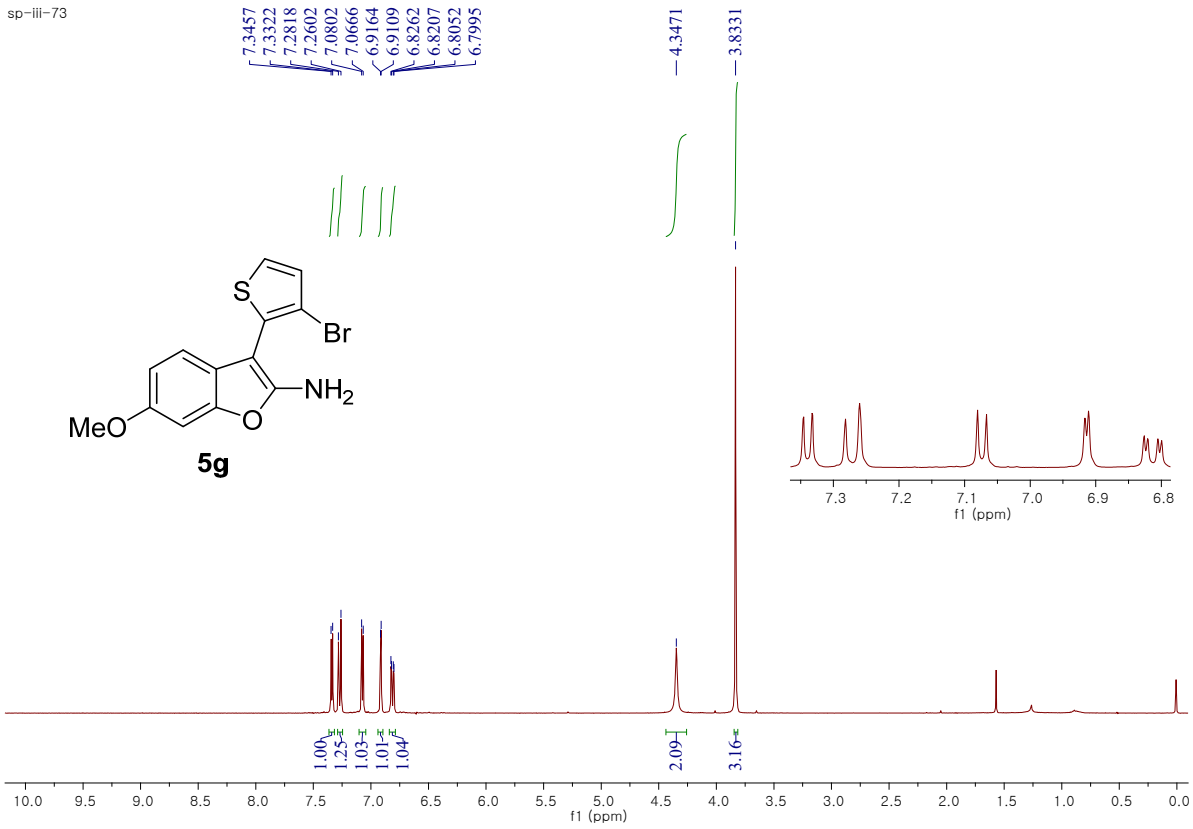

sp-iii-71
168.3899
160.2805
159.3405
148.7399
129.8365
128.6039
126.8503
119.8509
119.2835
114.3592
112.1875
109.2511
77.4791
77.1600
76.8413
55.5373
55.2730
36.3090
20.8421
OMe
CN
MeO
OAc
7f
f1 (ppm)

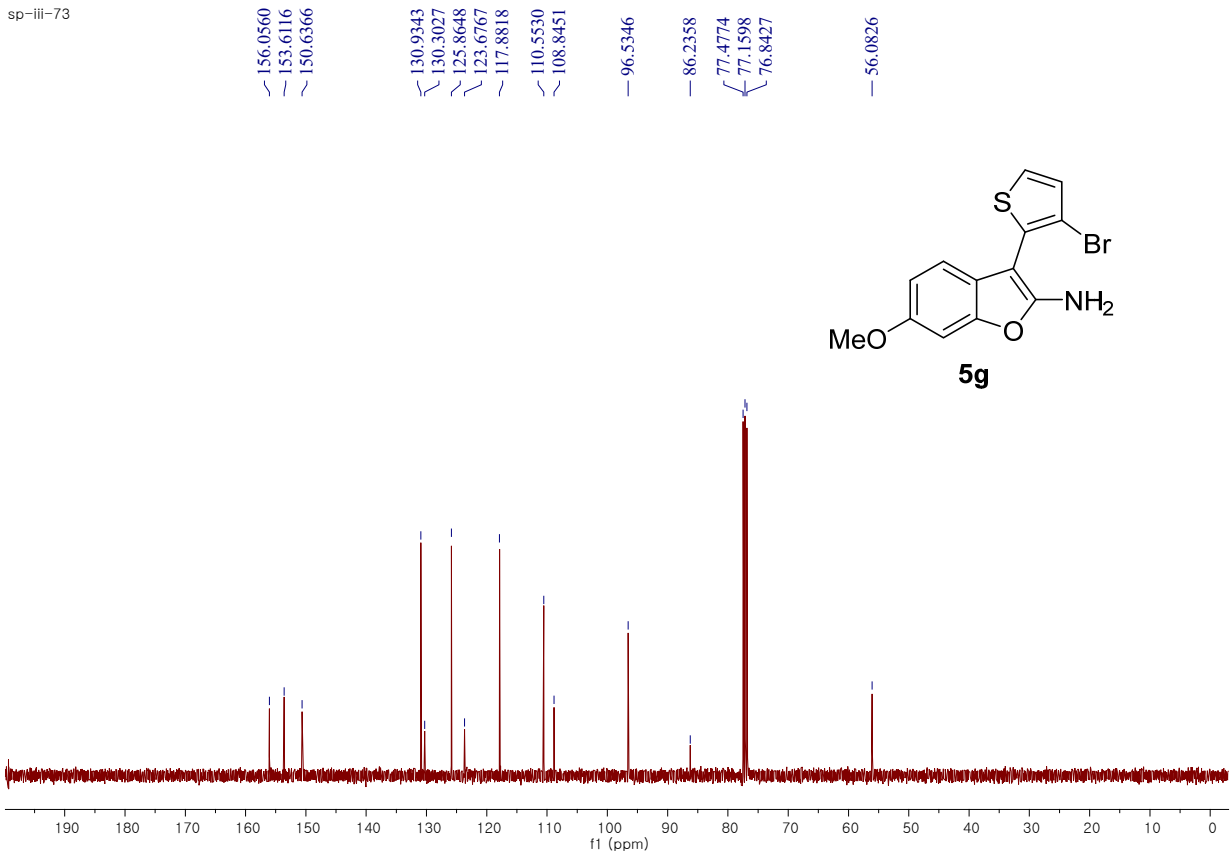

sp-iii-76
7.4754
7.4542
7.3575
7.3365
7.2596
7.0272
7.0060
6.9313
6.9276
6.8303
6.8259
6.8094
6.8052
4.1312
3.8558
3.8418
OMe
NH2
MeO
O
5f
7.5
7.4
f1 (ppm)
7.0
6.9
6.8
f1 (ppm)
2.00
1.00
2.08
1.00
1.03
2.00
3.03
3.03
f1 (ppm)

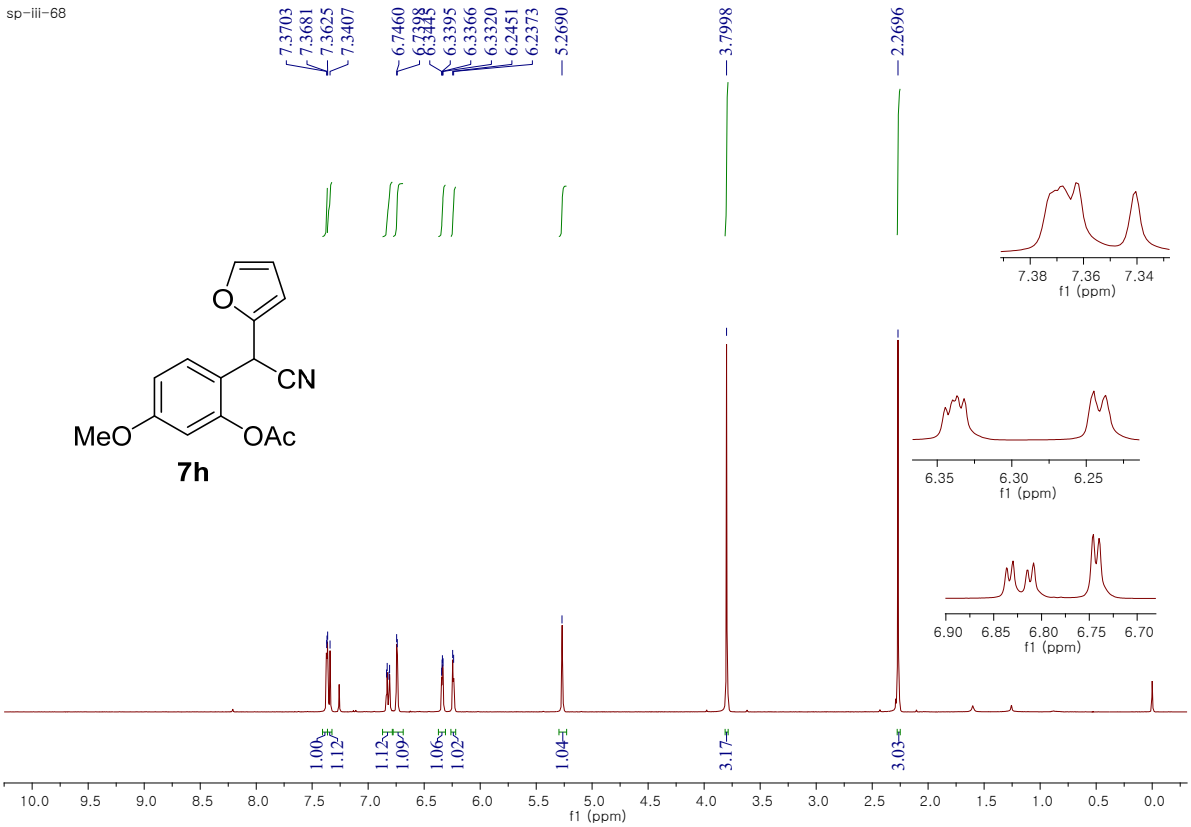

sp-iii-76
157.8947
155.7972
152.2578
150.7097
128.6904
125.6863
123.6136
117.3852
114.7145
110.3874
96.4373
94.2641
77.4781
77.1603
76.8423
56.0513
55.4476
OMe
NH2
MeO
O
5f
f1 (ppm)

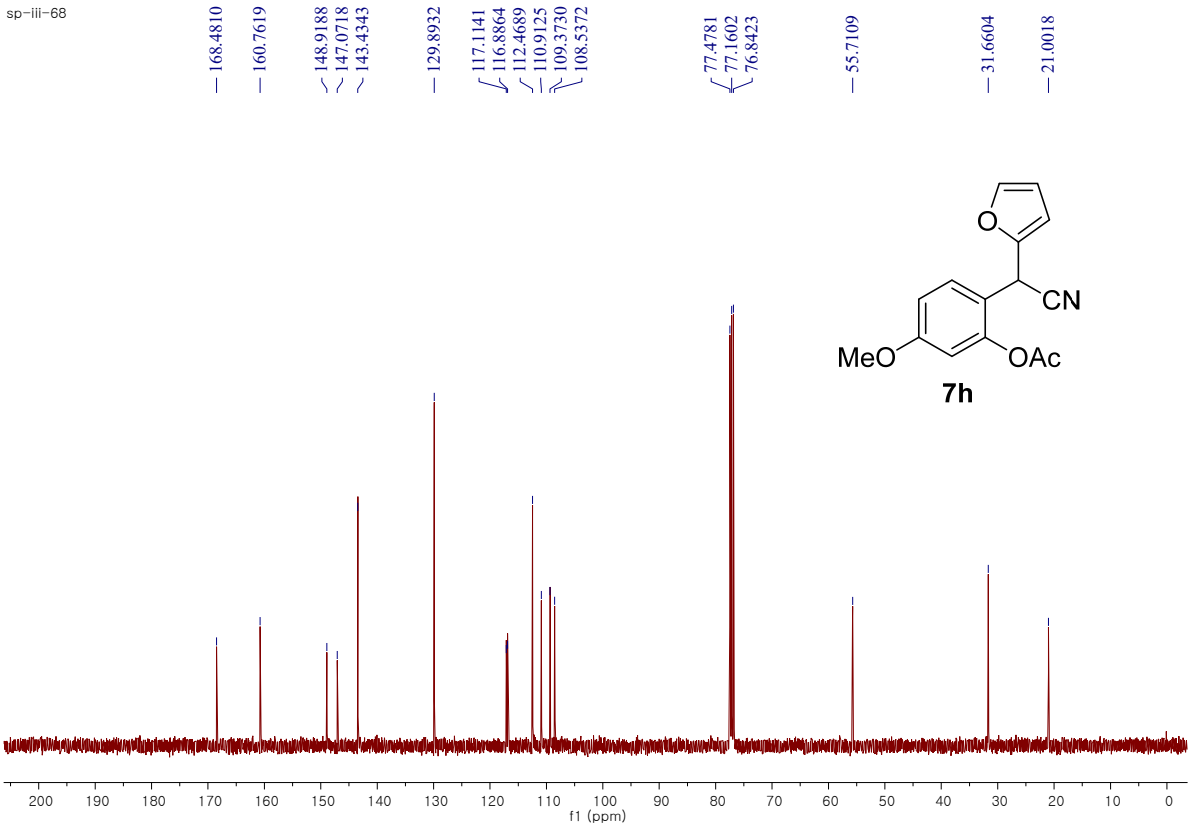

sp-iii-67
7.5544
7.5328
7.2888
7.2756
7.2597
6.9669
6.9537
6.8675
6.8624
6.8460
6.8410
6.7499
6.7450
5.5817
3.8087
2.2733
S
Br
CN
MeO
OAc
7g
6.9
6.8
f1 (ppm)
1.02
1.04
1.09
1.18
1.11
1.00
3.07
3.11
f1 (ppm)

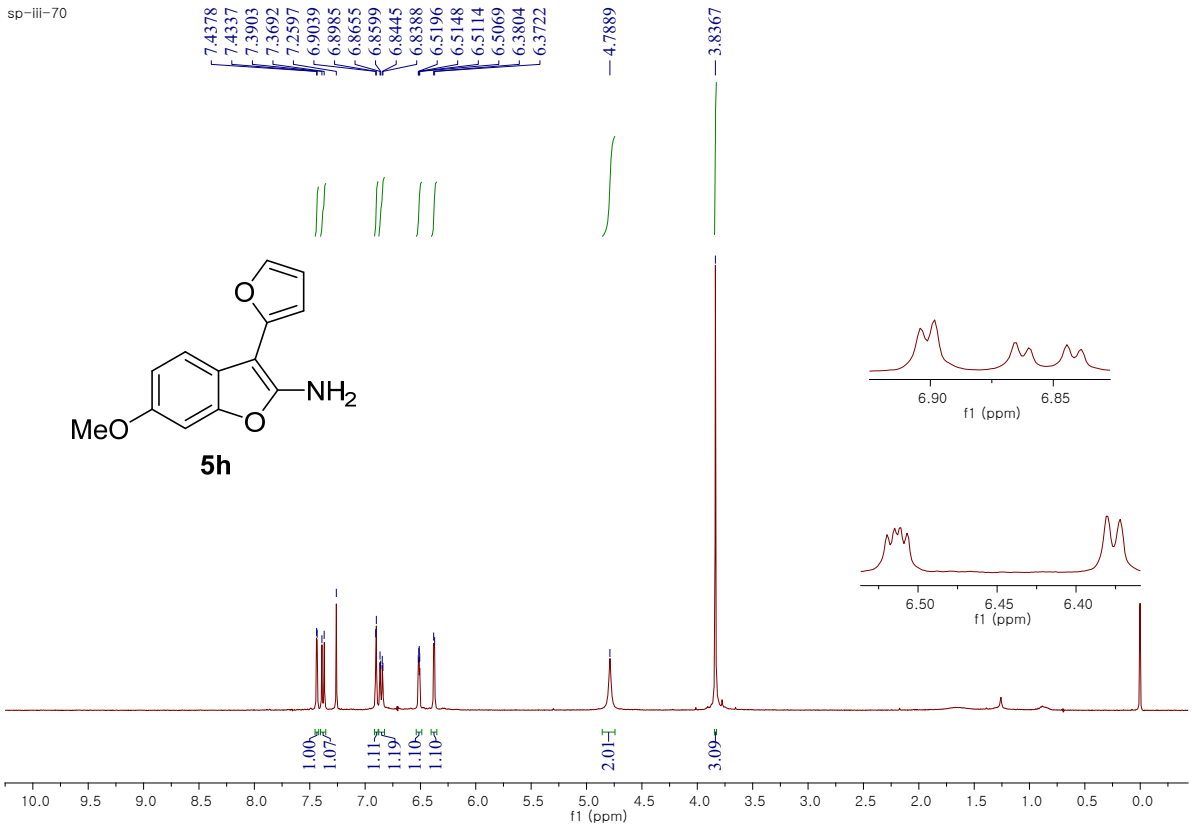

sp-iii-67
168.3118
160.9501
148.8194
133.2183
130.1173
129.3894
126.8418
118.0501
117.2906
112.2203
110.9431
109.5500
77.4780
77.1604
76.8424
55.7320
32.2707
21.1201
S
Br
CN
MeO
OAc
7g
f1 (ppm)

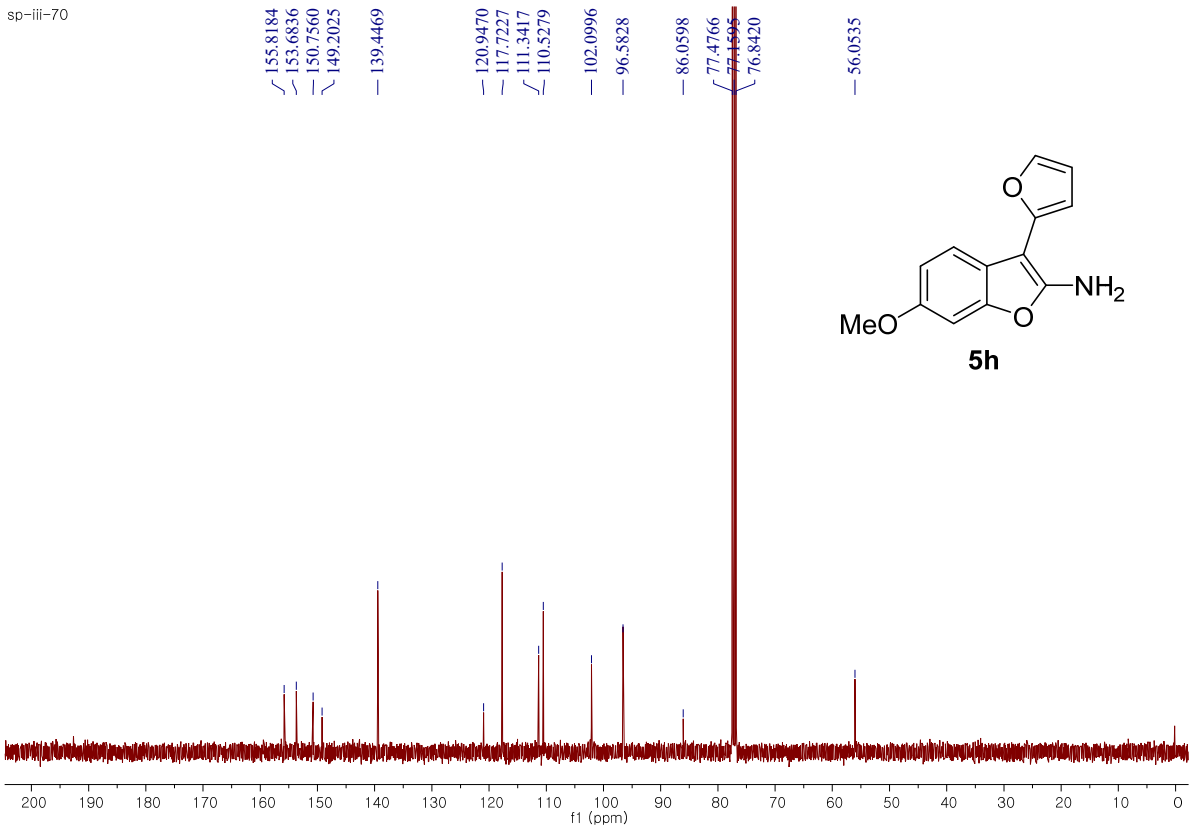

sp-iii-73
7.3457
7.3322
7.2818
7.2602
7.0802
7.0666
6.9164
6.9109
6.8262
6.8207
6.8052
6.7995
4.3471
3.8331
S
Br
NH2
MeO
O
5g
1.00
1.25
1.03
1.01
1.04
2.09
3.16
f1 (ppm)

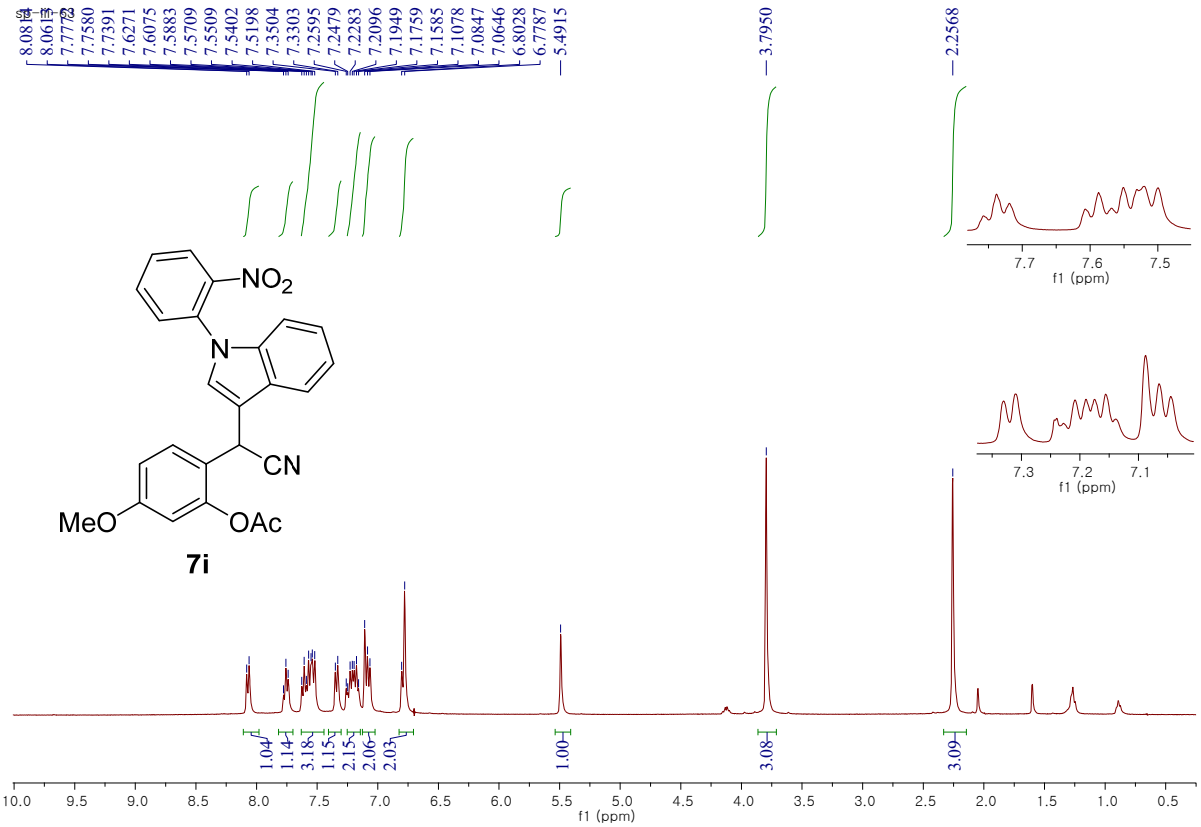

sp-iii-73
156.0560
153.6116
150.6366
130.9343
130.3027
125.8648
123.6767
117.8818
110.5530
108.8451
96.5346
86.2358
77.4774
77.1598
76.8427
56.0826
S
Br
NH2
MeO
O
5g
f1 (ppm)

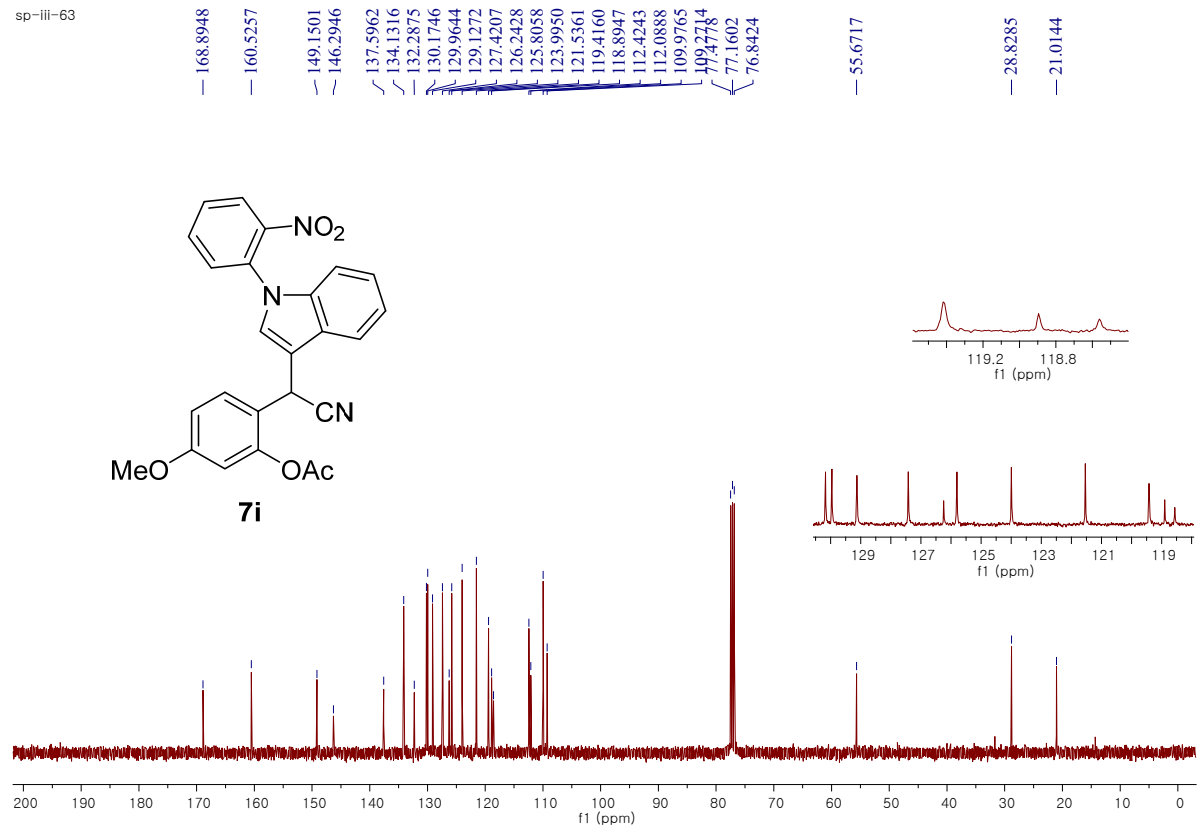

sp-iii-68
7.3703
7.3681
7.3625
7.3407
6.7460
6.7398
6.3445
6.3395
6.3366
6.3320
6.2451
6.2373
5.2690
3.7998
2.2696
O
CN
MeO
OAc
7h
7.38
7.36
7.34
f1 (ppm)
6.35
6.30
6.25
f1 (ppm)
6.90
6.85
6.80
6.75
6.70
f1 (ppm)
1.00
1.12
1.12
1.09
1.06
1.02
1.04
3.17
3.03
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

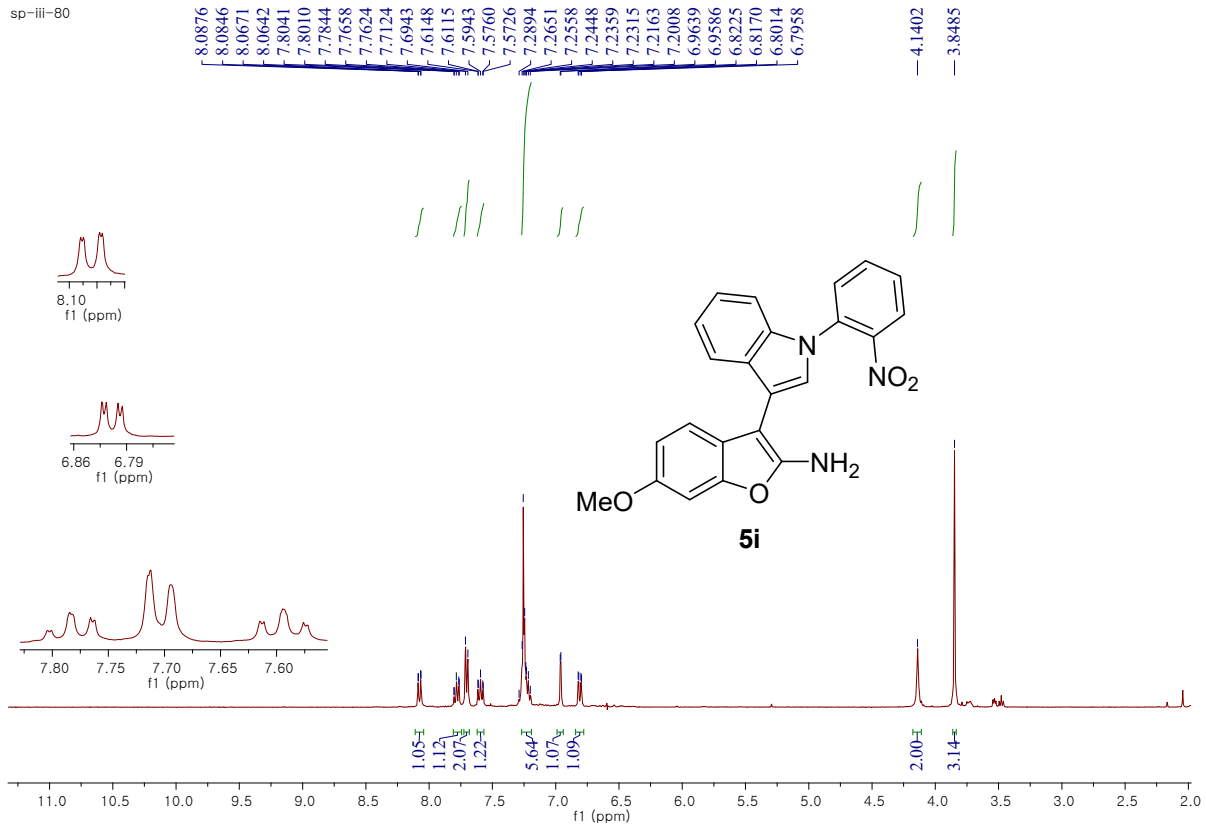

sp-iii-68
168.4810
160.7619
148.9188
147.0718
143.4343
129.8932
117.1141
116.8864
112.4689
110.9125
109.3730
108.5372
77.4781
77.1602
76.8423
55.7109
31.6604
21.0018
O
CN
MeO
OAc
7h
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

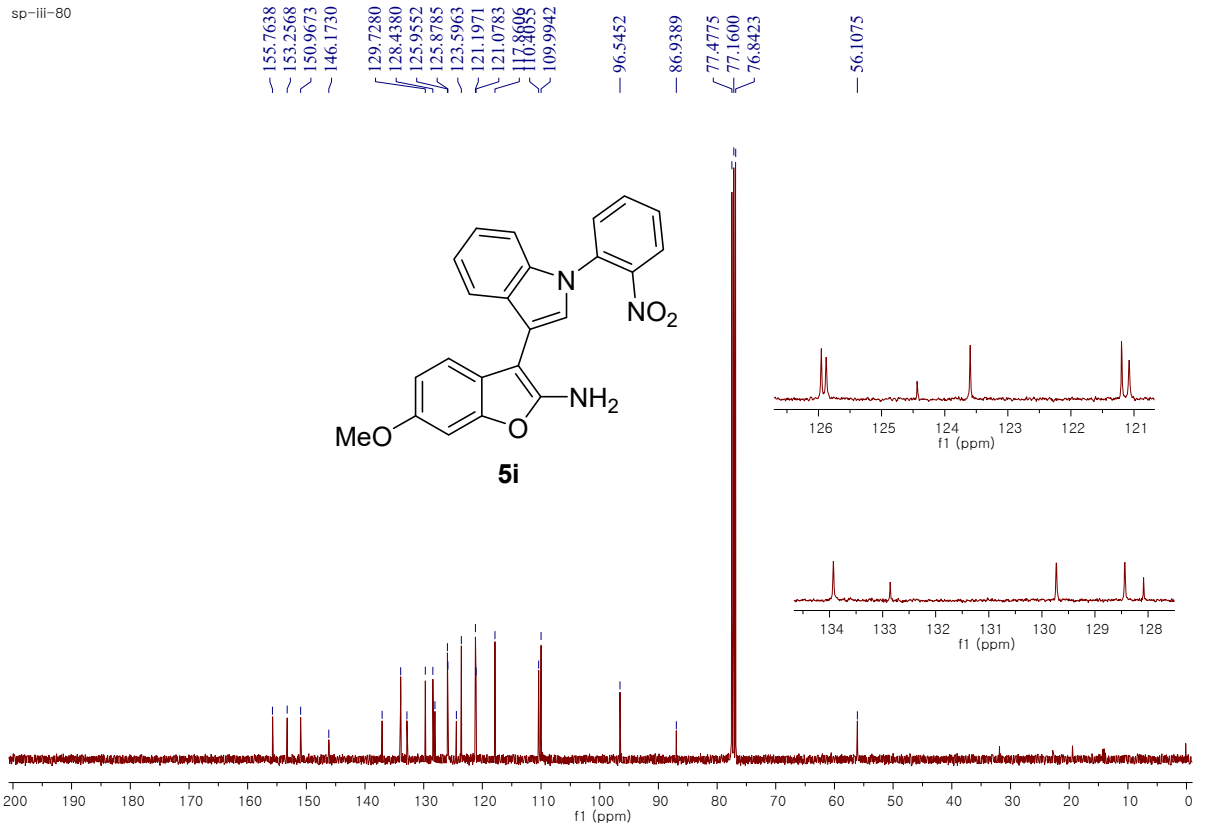

sp-iii-70
7.4378
7.4337
7.3903
7.3692
7.2597
6.9039
6.8985
6.8655
6.8599
6.8445
6.8388
6.5196
6.5148
6.5114
6.5069
6.3804
6.3722
4.7889
3.8367
O
NH2
MeO
O
5h
6.90
6.85
f1 (ppm)
6.50
6.45
6.40
f1 (ppm)
1.00
1.07
1.11
1.19
1.10
1.10
2.01
3.09
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

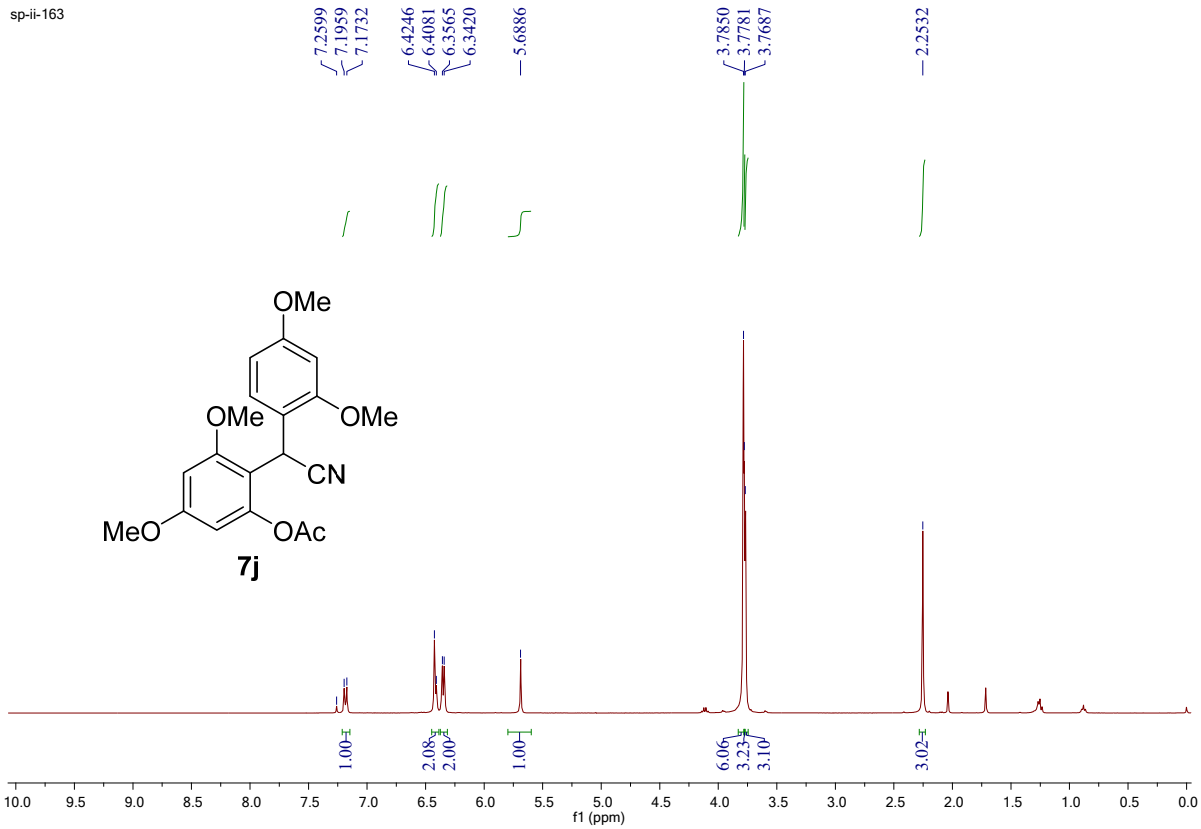

sp-iii-70
155.8184
153.6836
150.7560
149.2025
139.4469
120.9470
117.7227
111.3417
110.5279
102.0996
96.5828
86.0598
77.4766
77.1595
76.8420
56.0535
O
NH2
MeO
O
5h
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

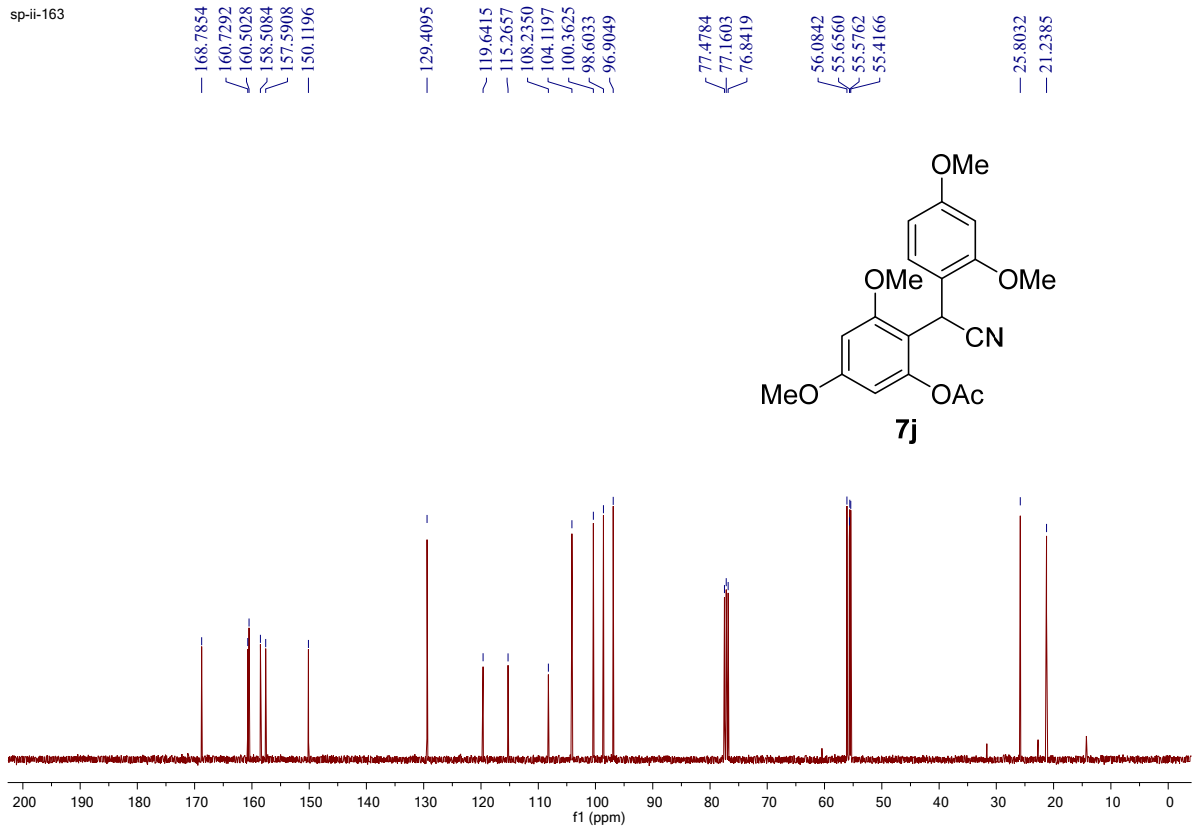

sp-iii-63
8.0818
8.0611
7.7763
7.7580
7.7391
7.6271
7.6075
7.5883
7.5709
7.5509
7.5402
7.5198
7.3504
7.3303
7.2595
7.2479
7.2283
7.2096
7.1949
7.1759
7.1585
7.1078
7.0847
7.0646
6.8028
6.7787
5.4915
3.7950
2.2568
NO2
N
CN
MeO
OAc
7i
1.04
1.14
3.18
1.15
2.15
2.06
2.03
1.00
3.08
3.09
f1 (ppm)


sp-iii-63
168.8948
160.5257
149.1501
146.2946
137.5962
134.1316
132.2875
130.1746
129.9644
129.1272
127.4207
126.2428
125.8058
123.9950
121.5361
119.4160
118.8947
112.4243
112.0888
109.9765
77.4778
77.1602
76.8424
55.6717
28.8285
21.0144
NO2
N
CN
MeO
OAc
7i
f1 (ppm)

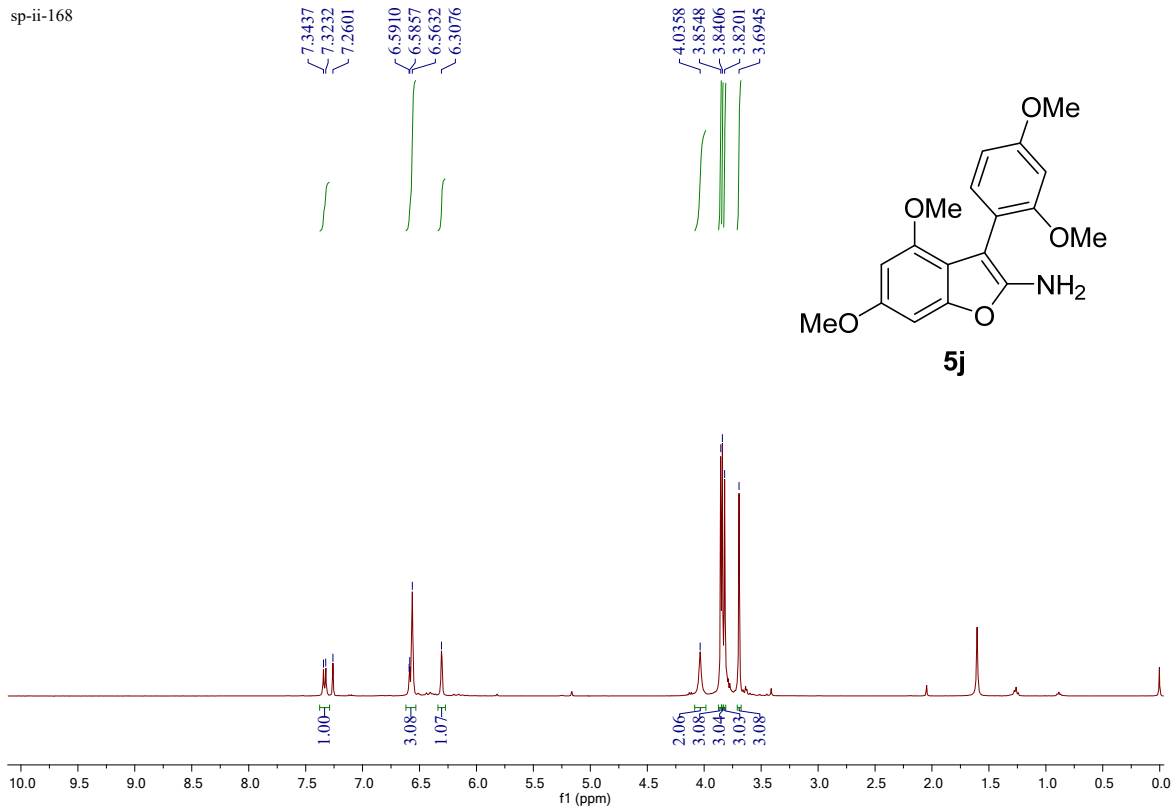

sp-iii-80
8.0876
8.0846
8.0671
8.0642
8.0411
8.0010
7.7844
7.7658
7.7624
7.7124
7.6943
7.6148
7.6115
7.5943
7.5760
7.5726
7.2894
7.2651
7.2558
7.2448
7.2359
7.2315
7.2163
7.2008
6.9639
6.9586
6.8225
6.8170
6.8014
6.7958
4.1402
3.8485
8.10
f1 (ppm)
6.86
6.79
f1 (ppm)
7.80
7.75
7.70
7.65
7.60
f1 (ppm)
N
NO2
NH2
MeO
O
5i
1.05
1.12
2.07
1.22
5.64
1.07
1.09
2.00
3.14
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
f1 (ppm)

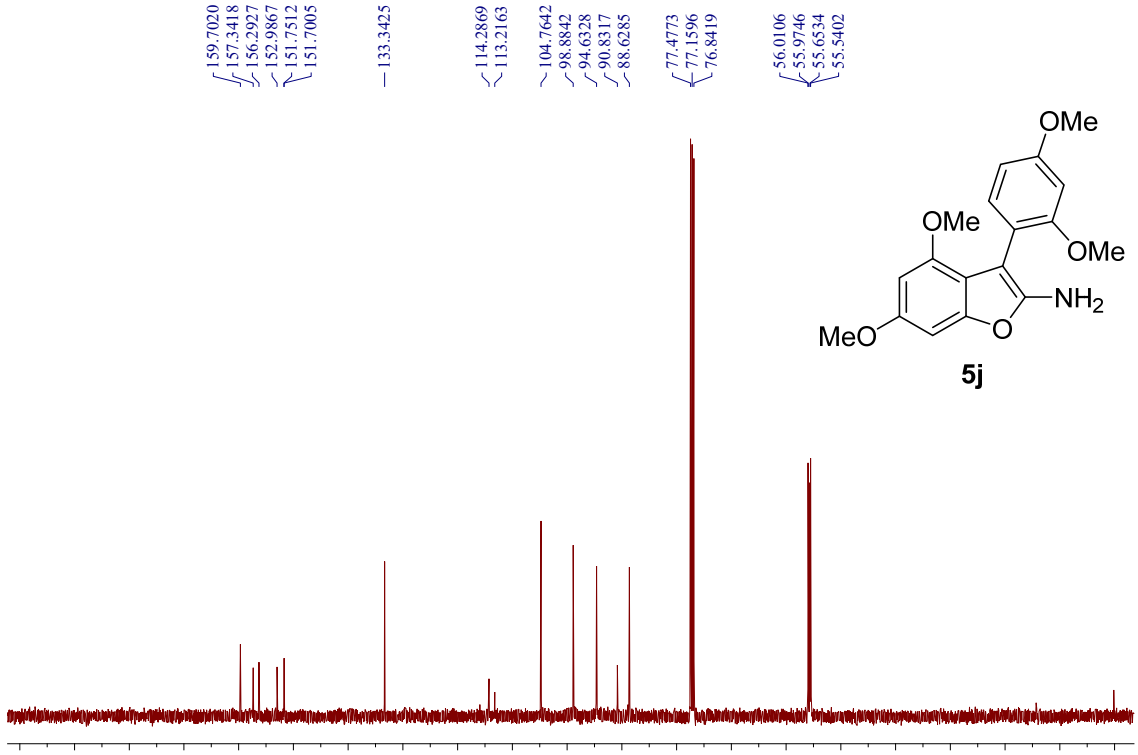

sp-iii-80
155.7638
153.2568
150.9673
146.1730
129.7280
128.4380
125.9552
125.8785
123.5963
121.1971
121.0783
117.8606
110.4055
109.9942
96.5452
86.9389
77.4775
77.1600
76.8423
56.1075
N
NO2
NH2
MeO
O
5i
126
125
124
123
122
121
f1 (ppm)
134
133
132
131
130
129
128
f1 (ppm)
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


sp-ii-163
7.2599
7.1959
7.1732
6.4246
6.4081
6.3565
6.3420
5.6886
3.7850
3.7781
3.7687
2.2532
OMe
OMe
OMe
CN
MeO
OAc
7j
1.00
2.08
2.00
1.00
6.06
3.23
3.10
3.02
f1 (ppm)

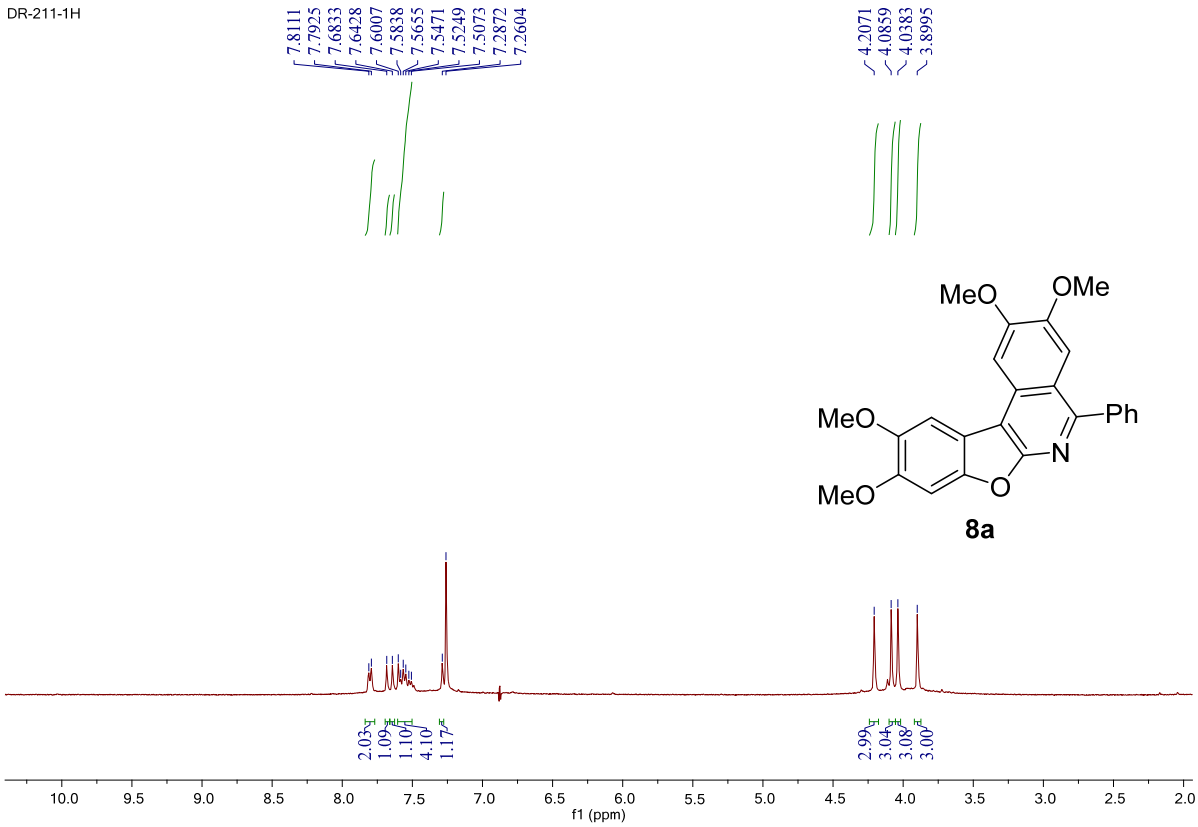

sp-ii-163
168.7854
160.7292
160.5028
158.5084
157.5908
150.1196
129.4095
119.6415
115.2657
108.2350
104.1197
100.3625
98.6033
96.9049
77.4784
77.1603
76.8419
56.0842
55.6560
55.5762
55.4166
25.8032
21.2385
OMe
OMe
OMe
CN
MeO
OAc
7j
f1 (ppm)

sp-ii-168


7.3437
7.3232
7.2601
6.5910
6.5857
6.5632
6.3076
4.0358
3.8548
3.8406
3.8201
3.6945
OMe
OMe
OMe
NH2
MeO
O
5j
1.00
3.08
1.07
2.06
3.08
3.04
3.03
3.08
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

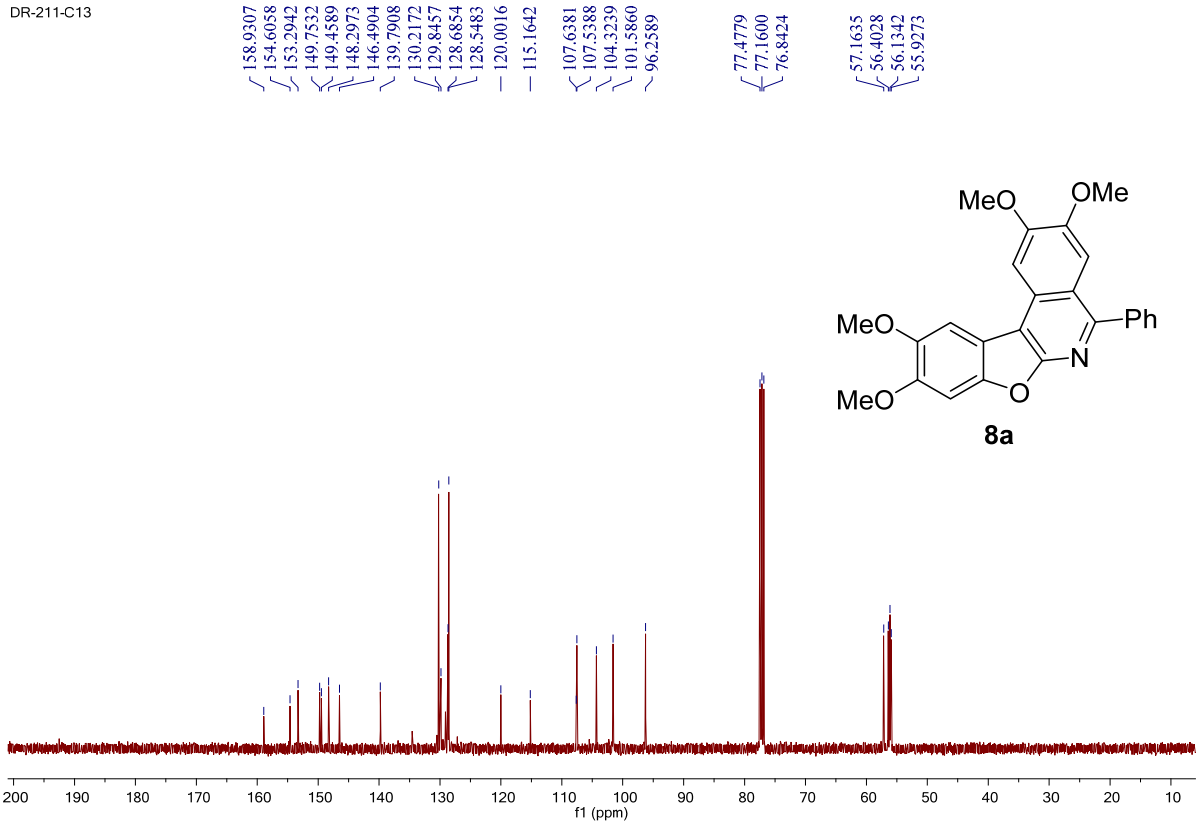

159.7020
157.3418
156.2927
152.9867
151.7512
151.7005
133.3425
114.2869
113.2163
104.7642
98.8842
94.6328
90.8317
88.6285
77.4773
77.1596
76.8419
56.0106
55.9746
55.6534
55.5402
OMe
OMe
OMe
NH2
MeO
O
5j

DR-211-1H



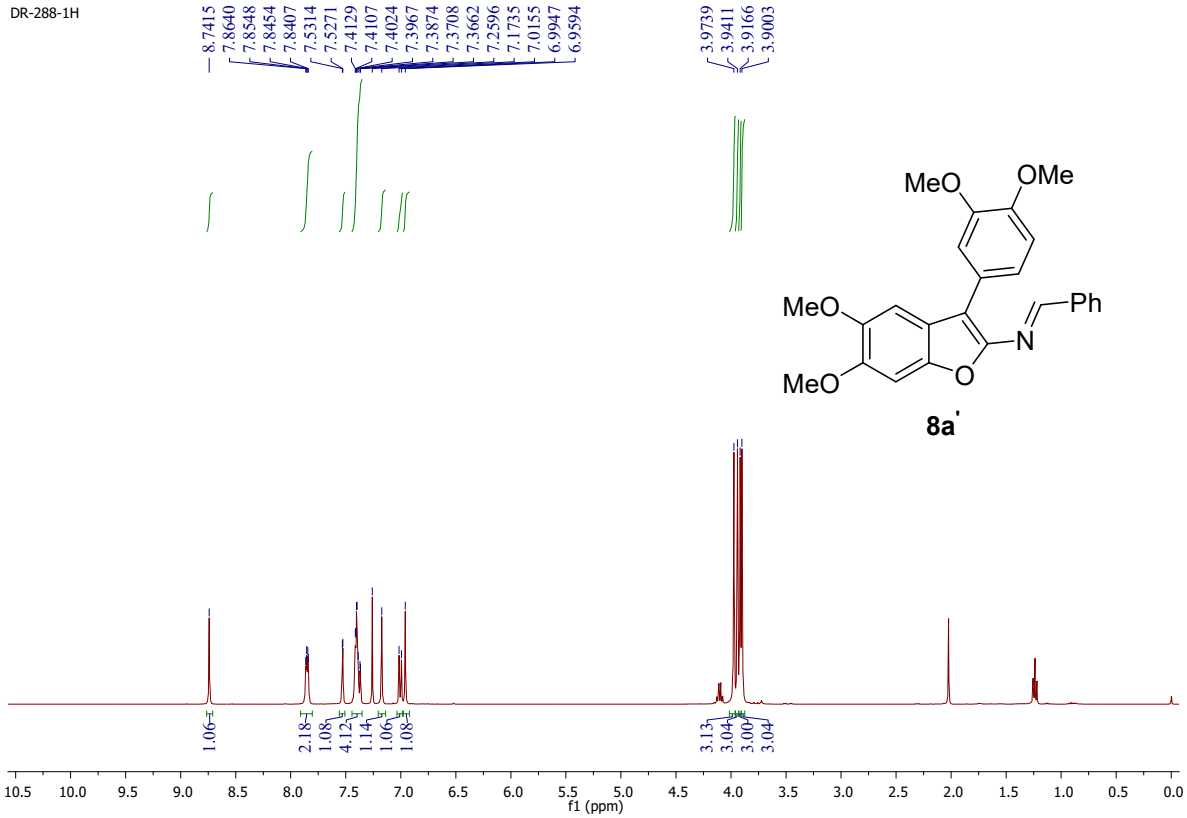
8a

DR-211-C13



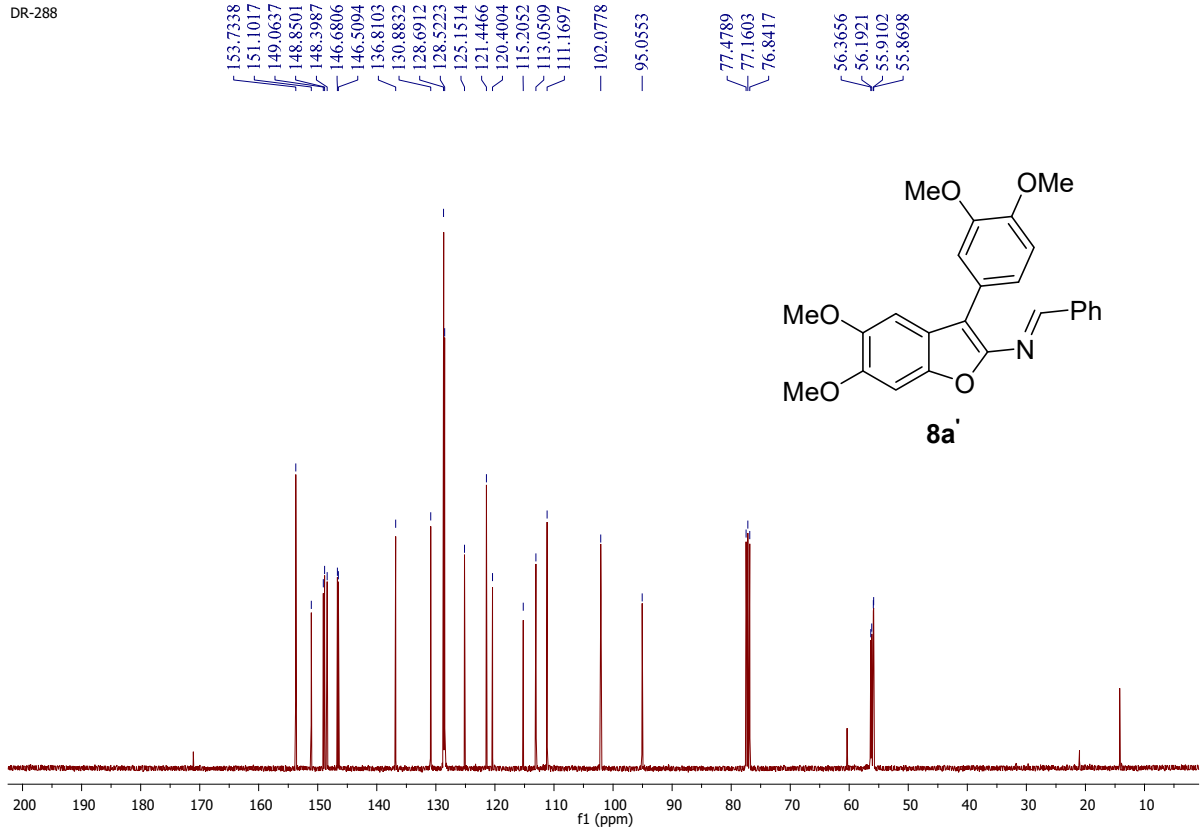
8a

DR-288-1H



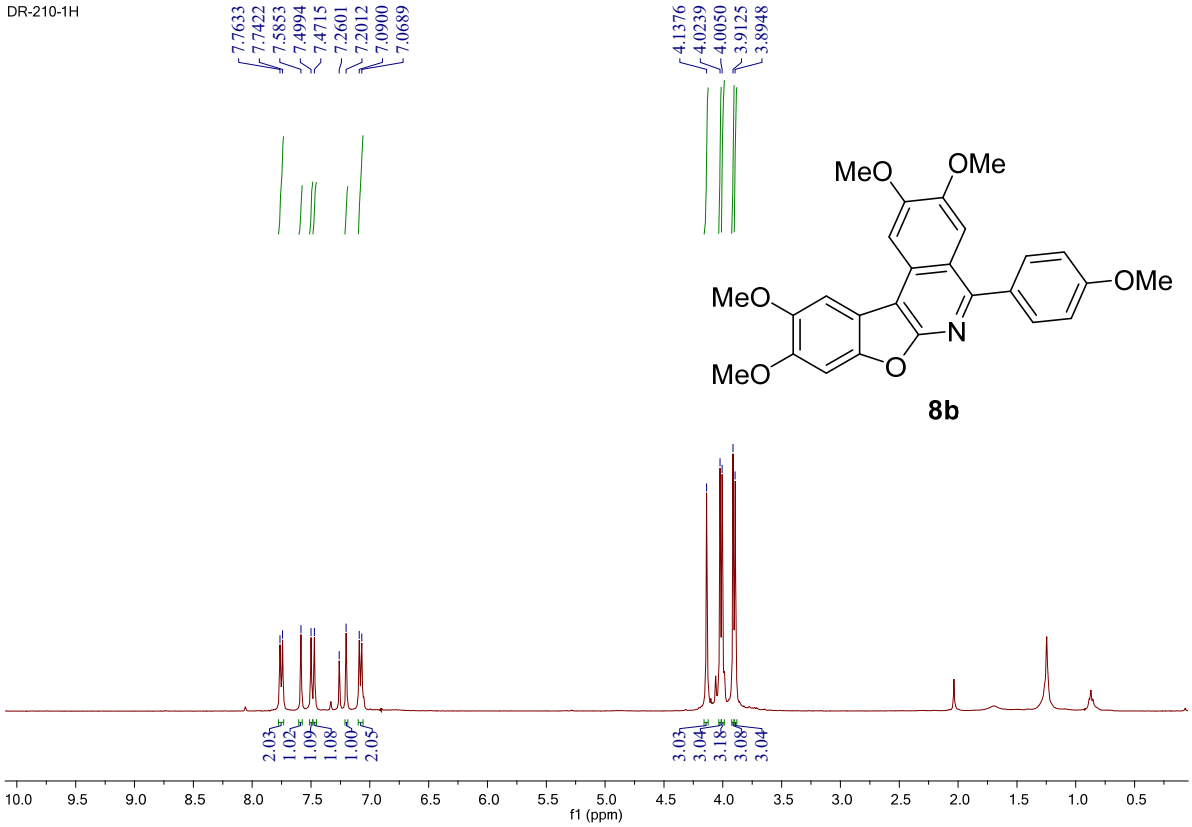
8a'

DR-288

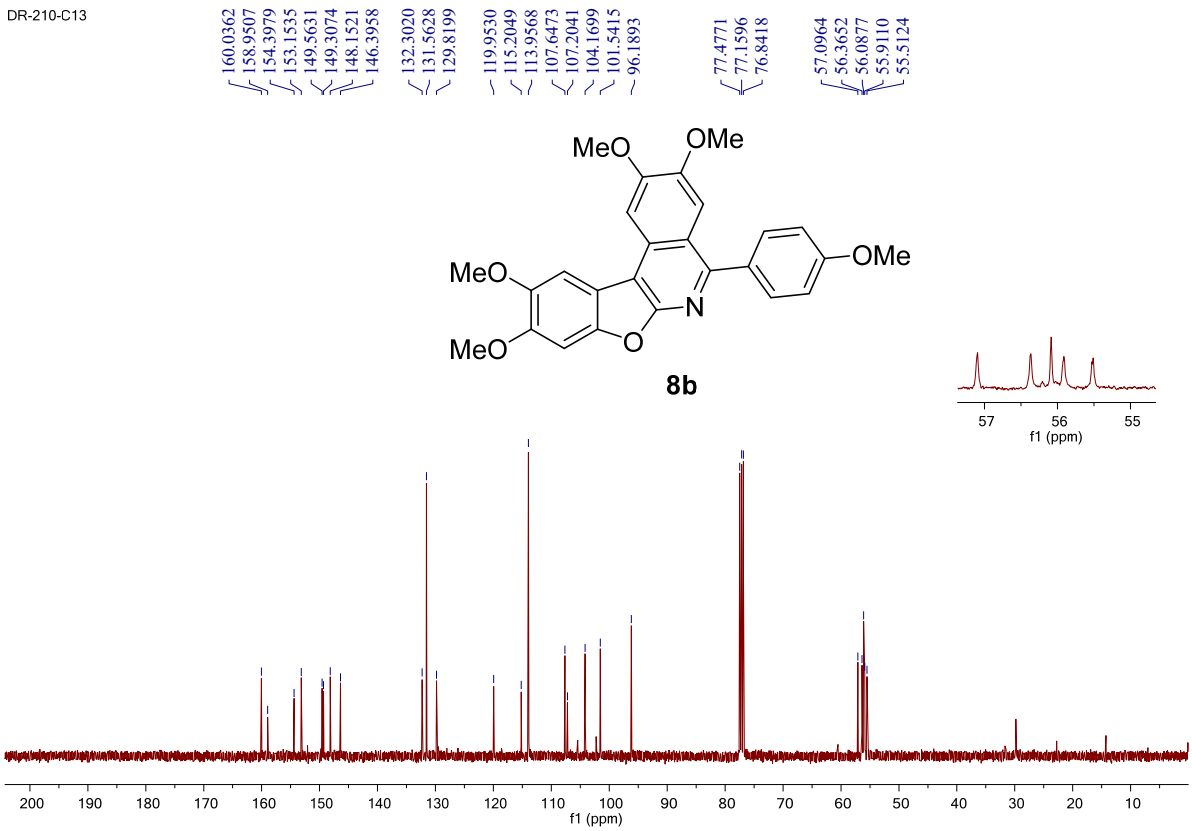


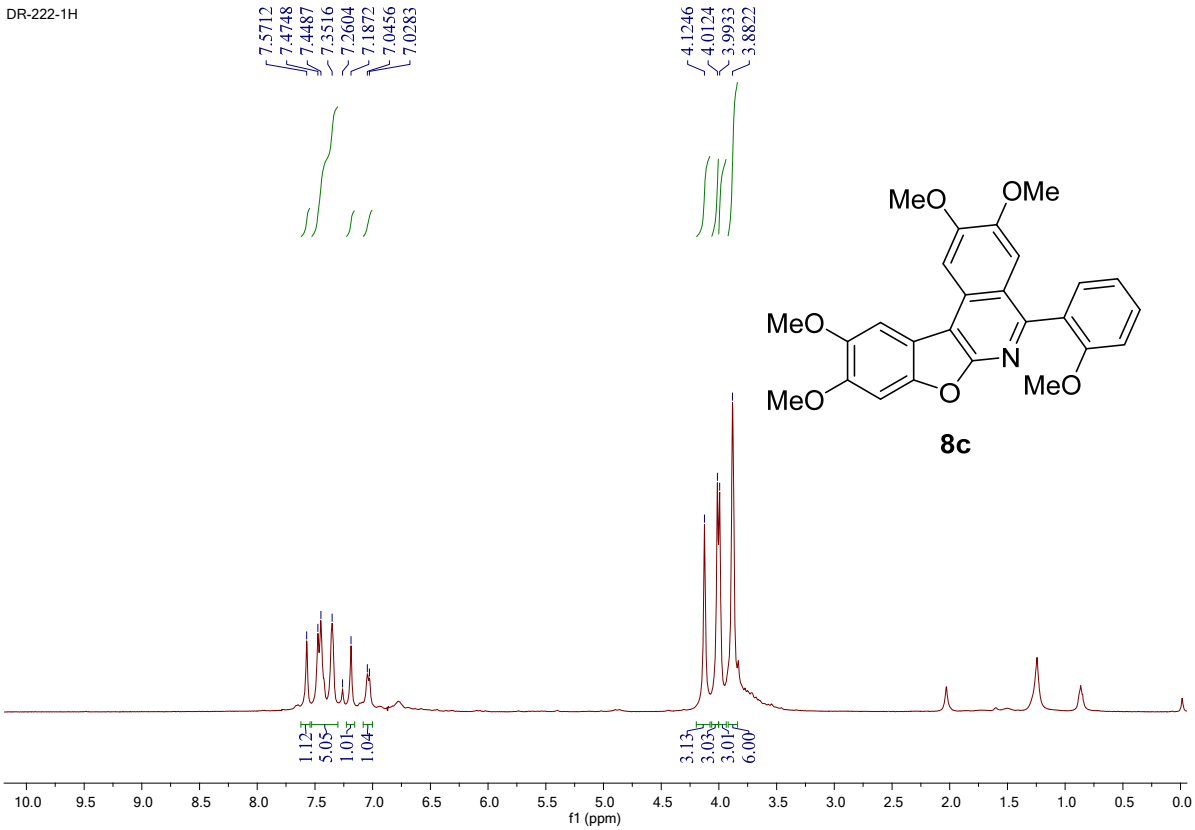
8a'

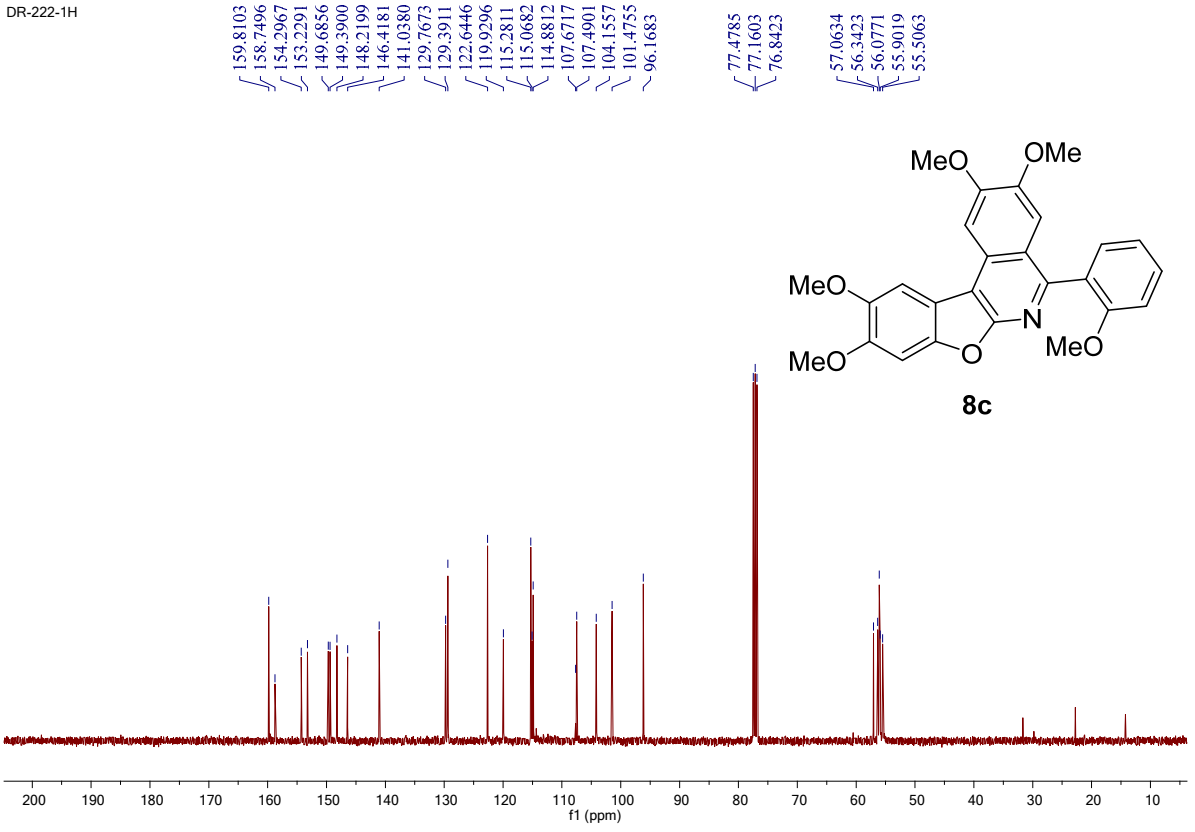
DR-210-1H

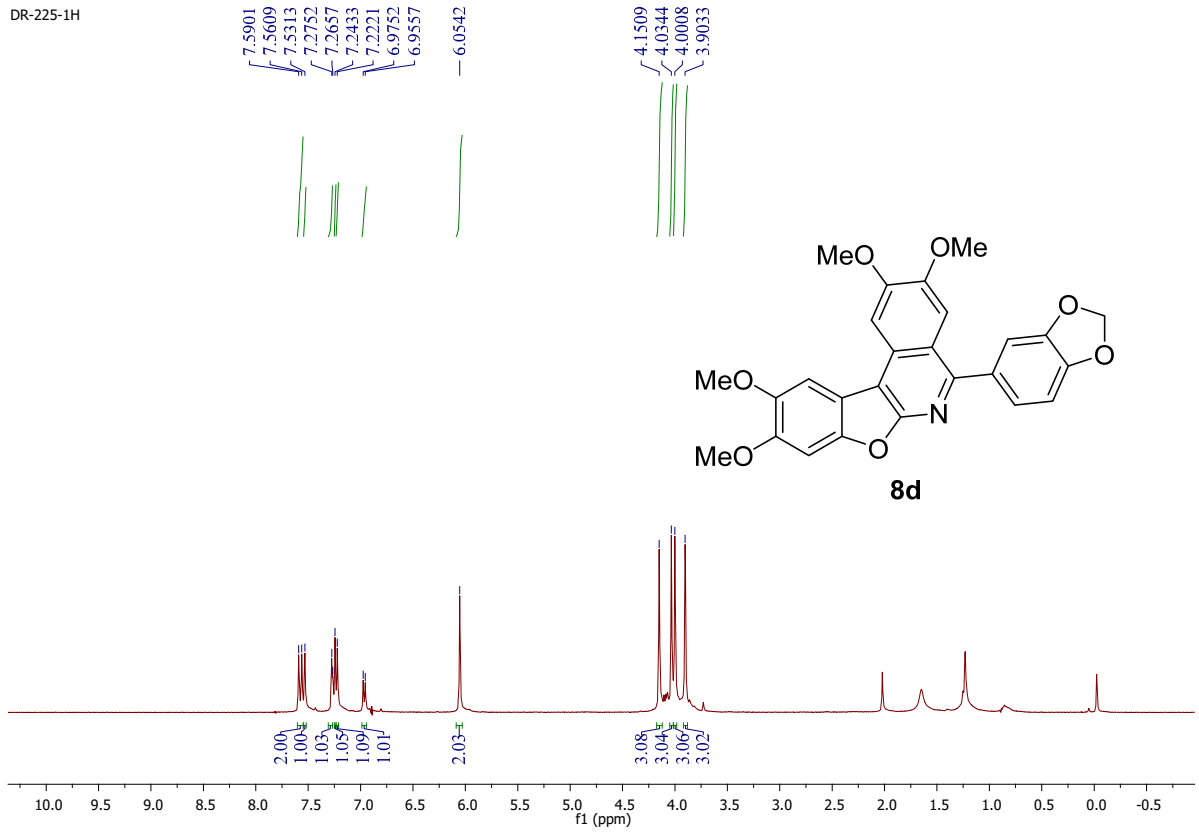


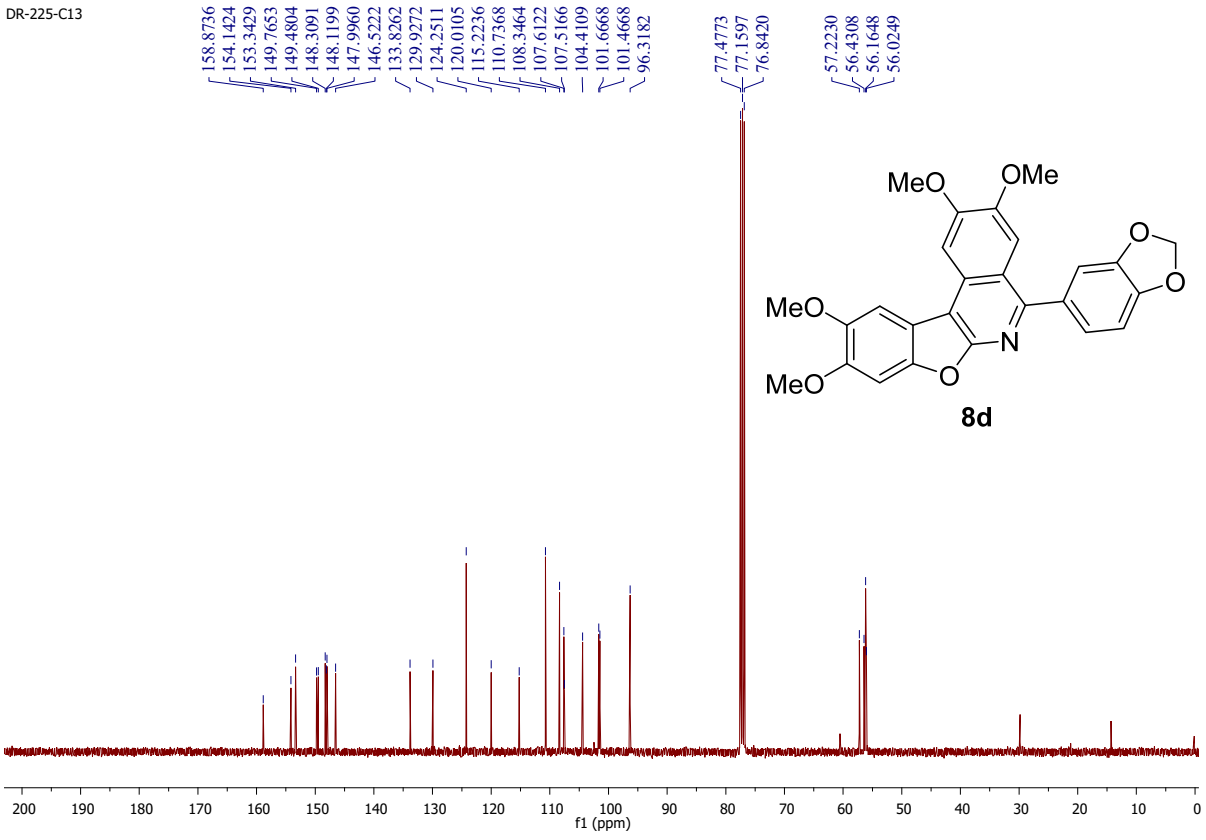
DR-210-C13

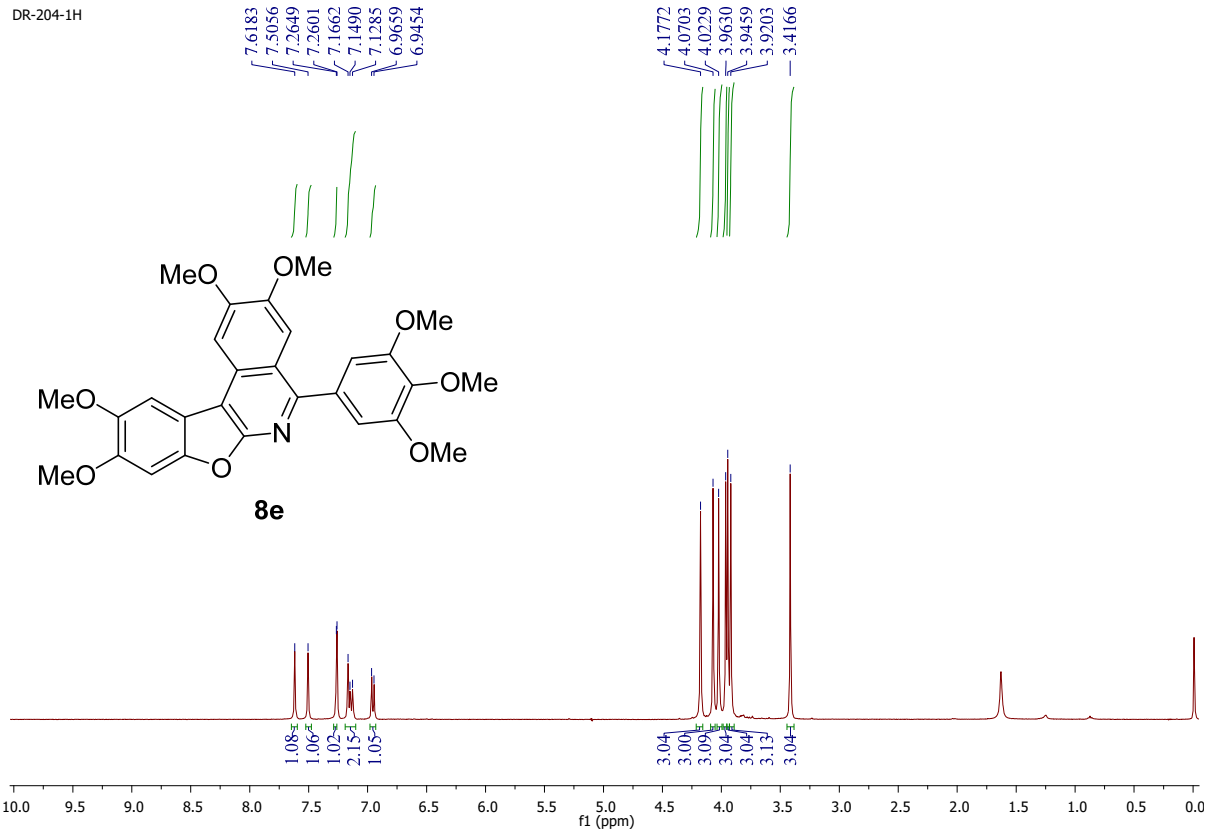


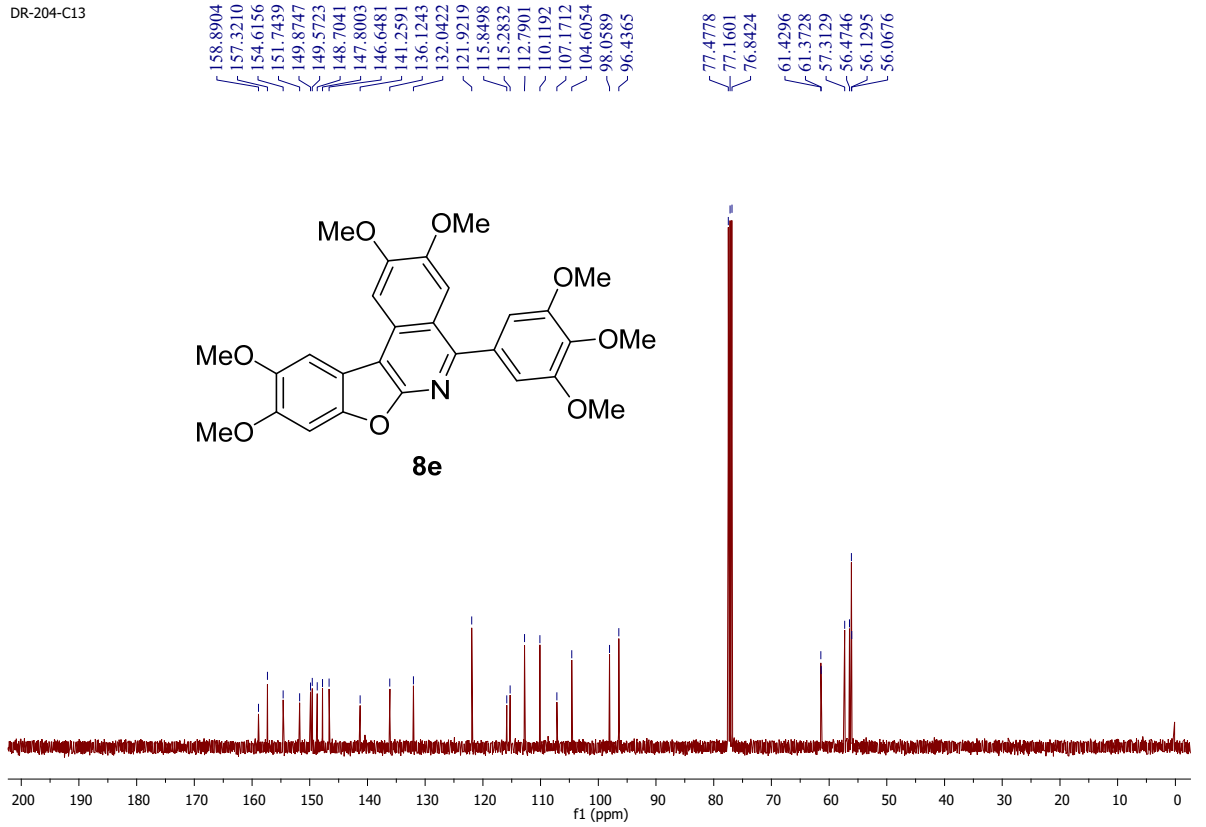

DR-222-1H
7.5712
7.4748
7.4487
7.3516
7.2604
7.1872
7.0456
7.0283
4.1246
4.0124
3.9933
3.8822
MeO
OMe
MeO
MeO
N
O
MeO
8c
1.12
5.05
1.01
1.04
3.13
3.03
3.01
6.00
f1 (ppm)


DR-222-1H
159.8103
158.7496
154.2967
153.2291
149.6856
149.3900
148.2199
146.4181
141.0380
129.7673
129.3911
122.6446
119.9296
115.2811
115.0682
114.8812
107.6717
107.4901
104.1557
101.4755
96.1683
77.4785
77.1603
76.8423
57.0634
56.3423
56.0771
55.9019
55.5063
MeO
OMe
MeO
MeO
N
O
MeO
8c
f1 (ppm)

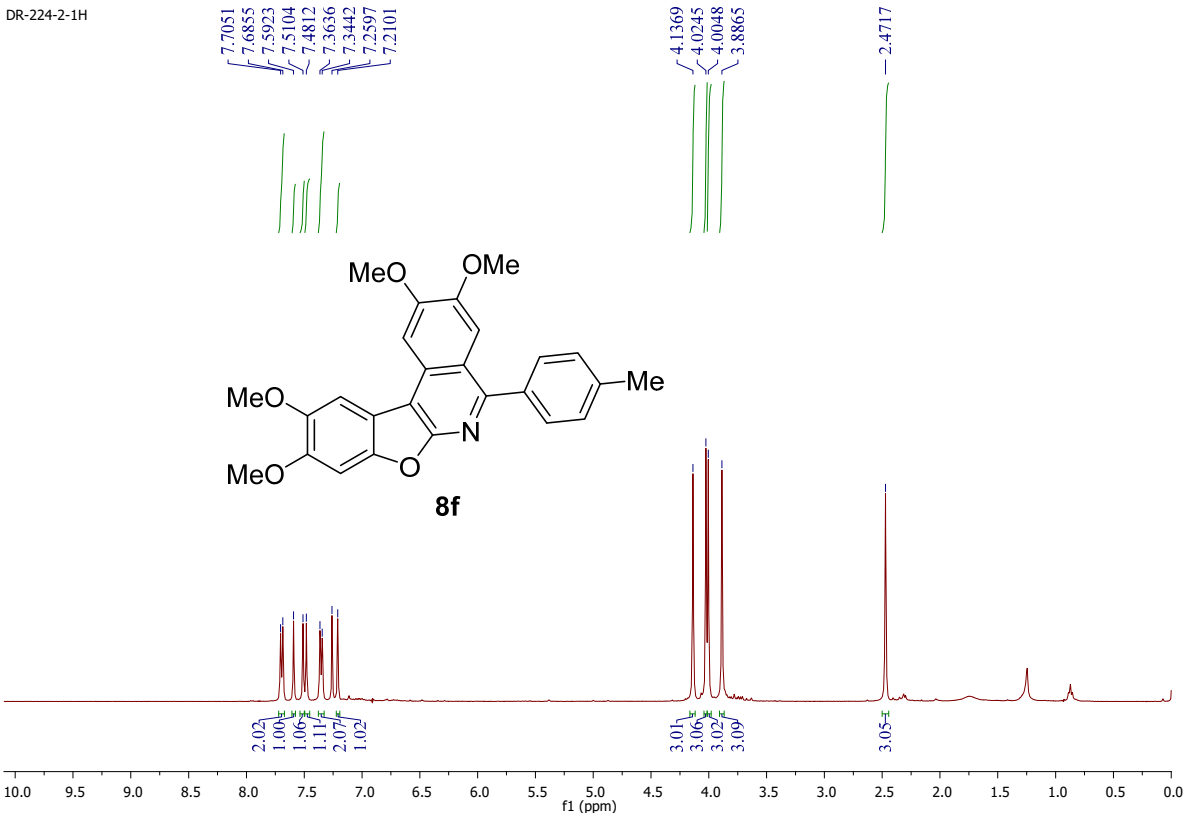

DR-225-1H
7.5901
7.5609
7.5313
7.2752
7.2657
7.2433
7.2221
6.9752
6.9557
6.0542
4.1509
4.0344
4.0008
3.9033
MeO
OMe
MeO
MeO
O
O
N
O
8d
2.00
1.00
1.03
1.05
1.09
1.01
2.03
3.08
3.04
3.06
3.02
f1 (ppm)


DR-225-C13
158.8736
154.1424
153.3429
149.7653
149.4804
148.3091
148.1199
147.9960
146.5222
133.8262
129.9272
124.2511
120.0105
115.2236
110.7368
108.3464
107.6122
107.5166
104.4109
101.6668
101.4668
96.3182
77.4773
77.1597
76.8420
57.2230
56.4308
56.1648
56.0249
MeO
OMe
MeO
MeO
O
O
N
O
8d
f1 (ppm)

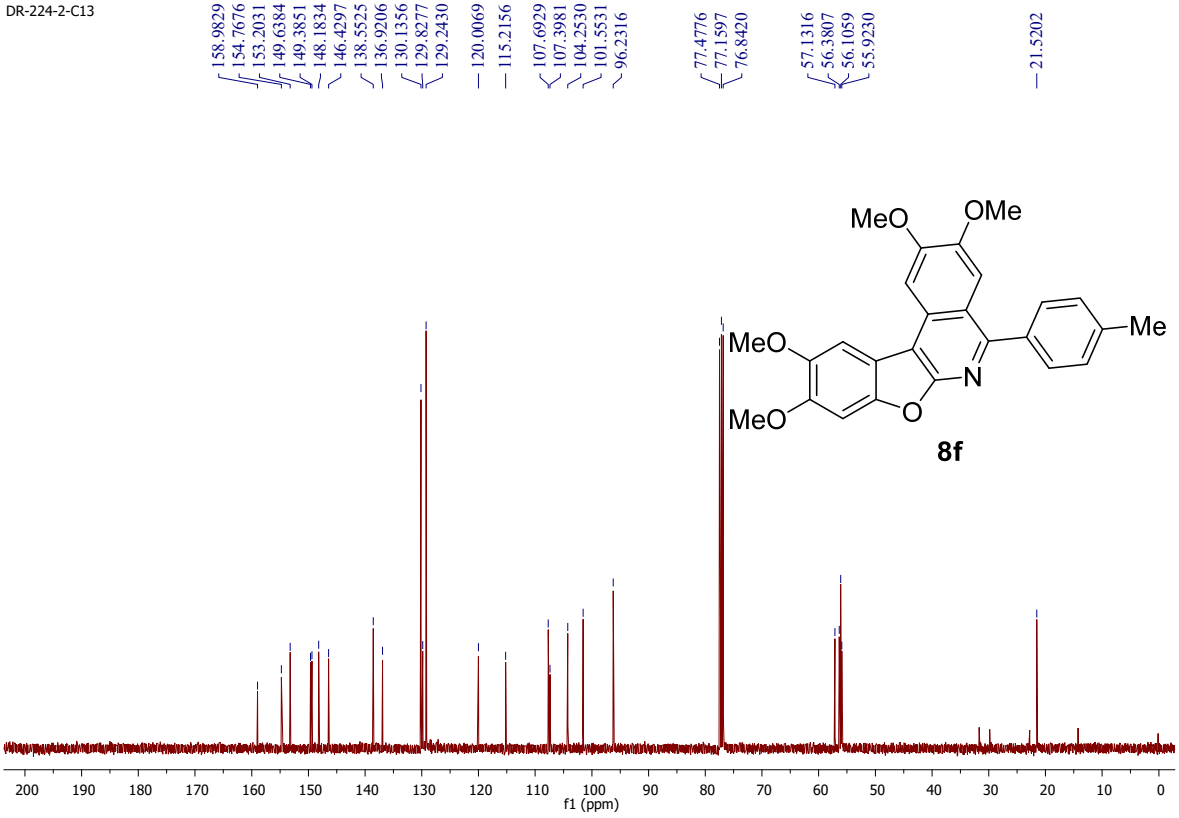

DR-204-1H
7.6183
7.5056
7.2649
7.2601
7.1662
7.1490
7.1285
6.9659
6.9454
4.1772
4.0703
4.0229
3.9630
3.9459
3.9203
3.4166
MeO
OMe
OMe
OMe
MeO
MeO
N
O
OMe
8e
1.08
1.06
1.02
2.15
1.05
3.04
3.00
3.09
3.04
3.04
3.13
3.04
f1 (ppm)


DR-204-C13
158.8904
157.3210
154.6156
151.7439
149.8747
149.5723
148.7041
147.8003
146.6481
141.2591
136.1243
132.0422
121.9219
115.8498
115.2832
112.7901
110.1192
107.1712
104.6054
98.0589
96.4365
77.4778
77.1601
76.8424
61.4296
61.3728
57.3129
56.4746
56.1295
56.0676
MeO
OMe
OMe
OMe
MeO
MeO
N
O
OMe
8e
f1 (ppm)

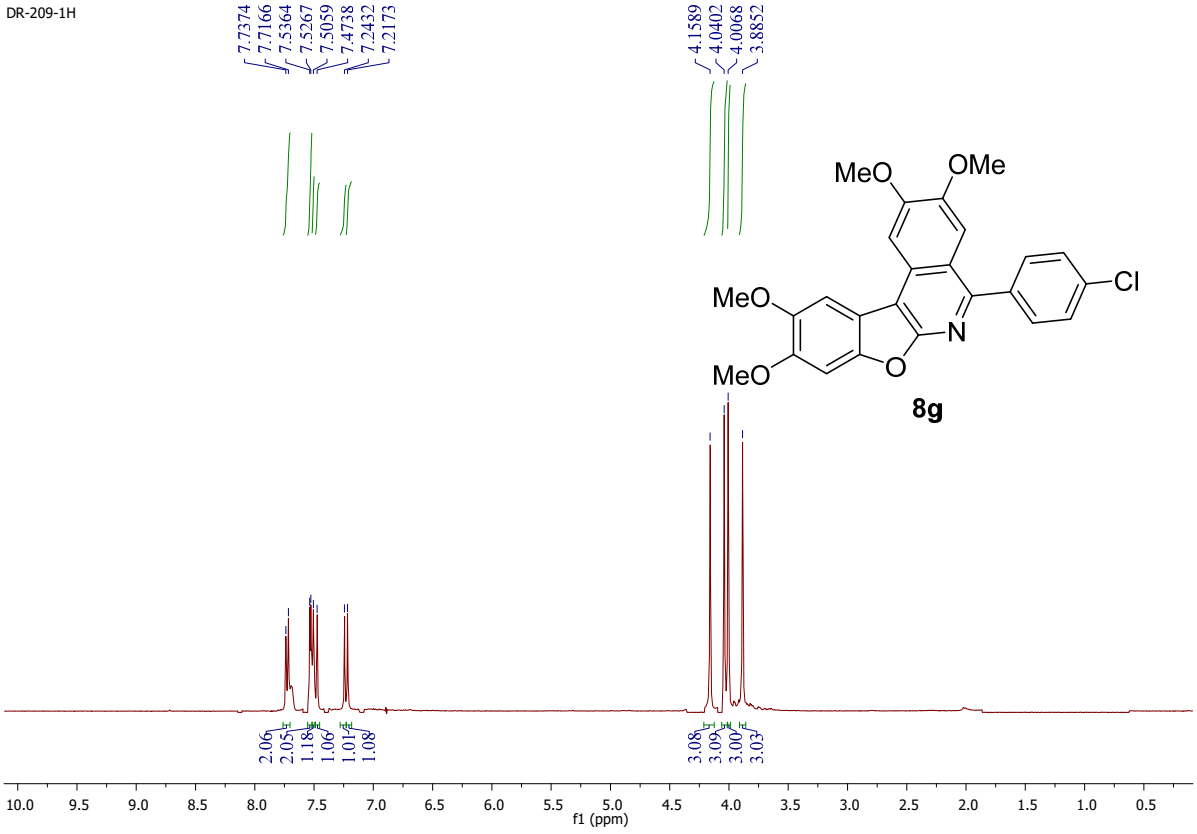
DR-224-2-1H



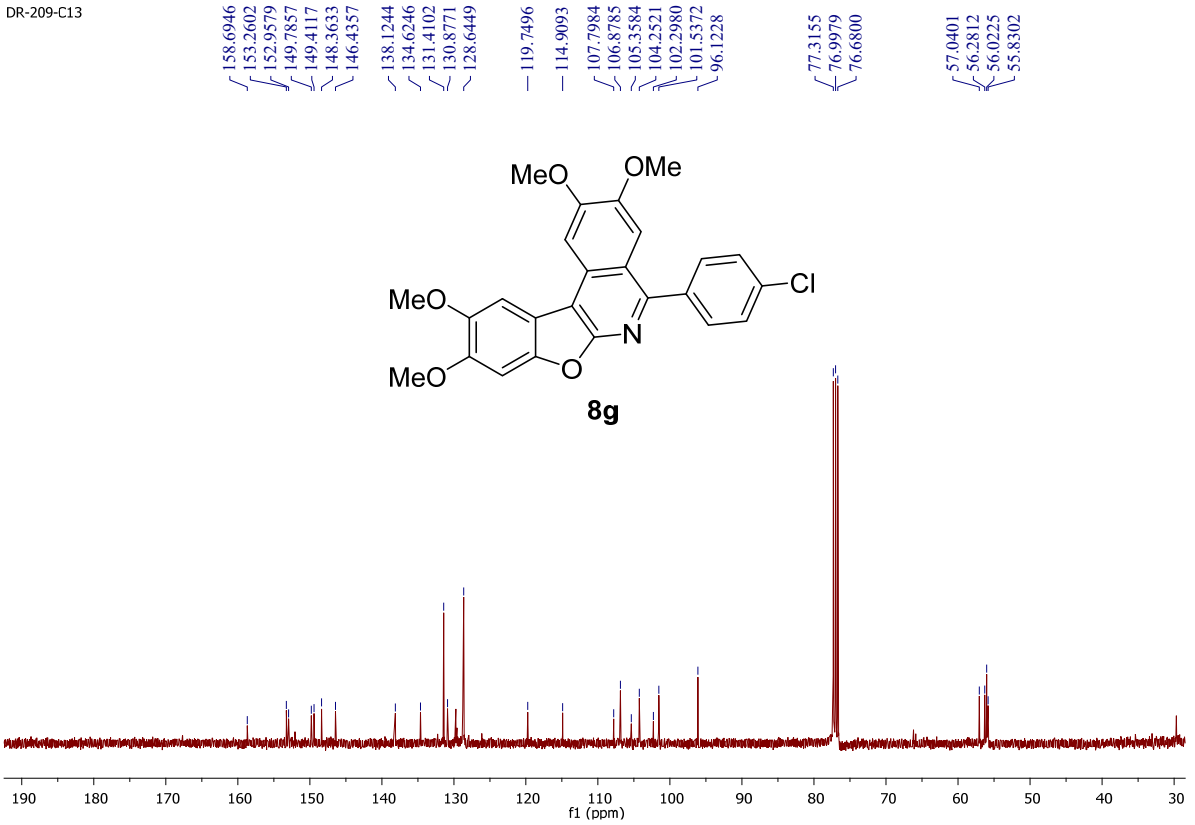
DR-224-2-C13



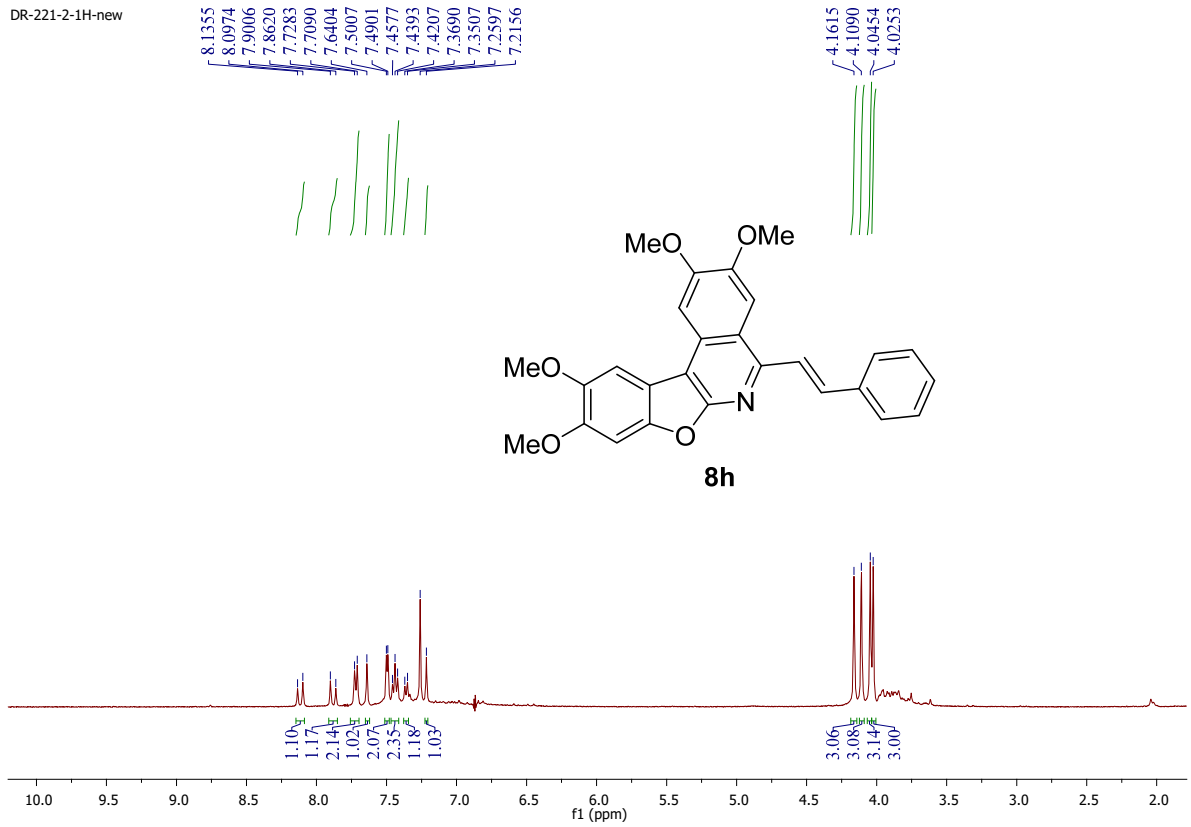
DR-209-1H



DR-209-C13

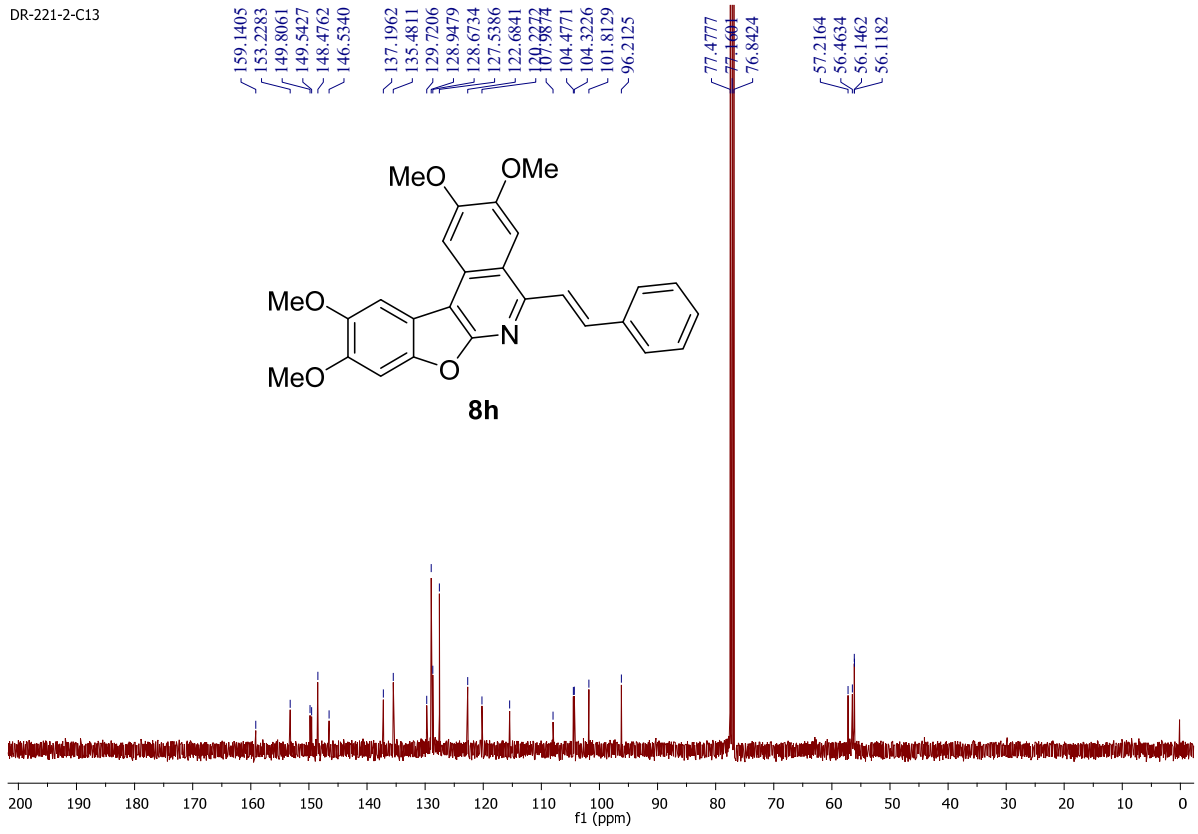


DR-221-2-1H-new



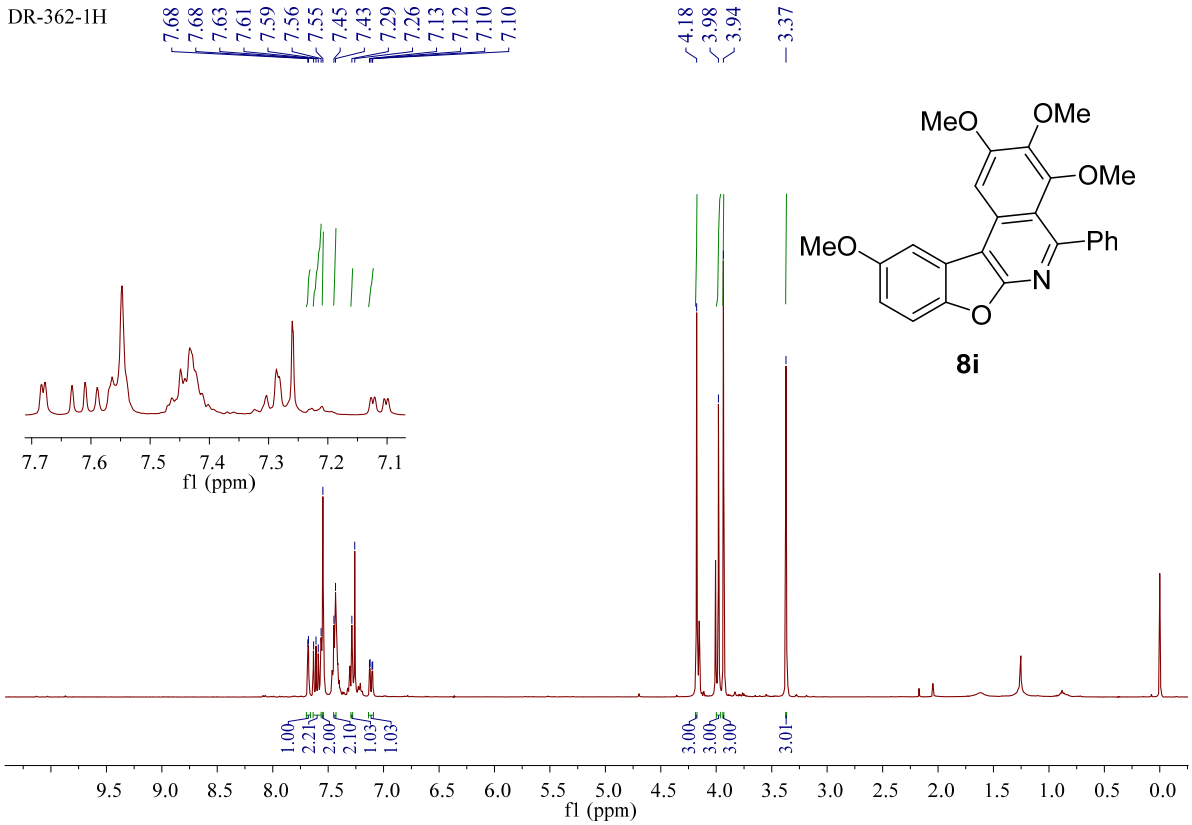
8h

DR-221-2-C13

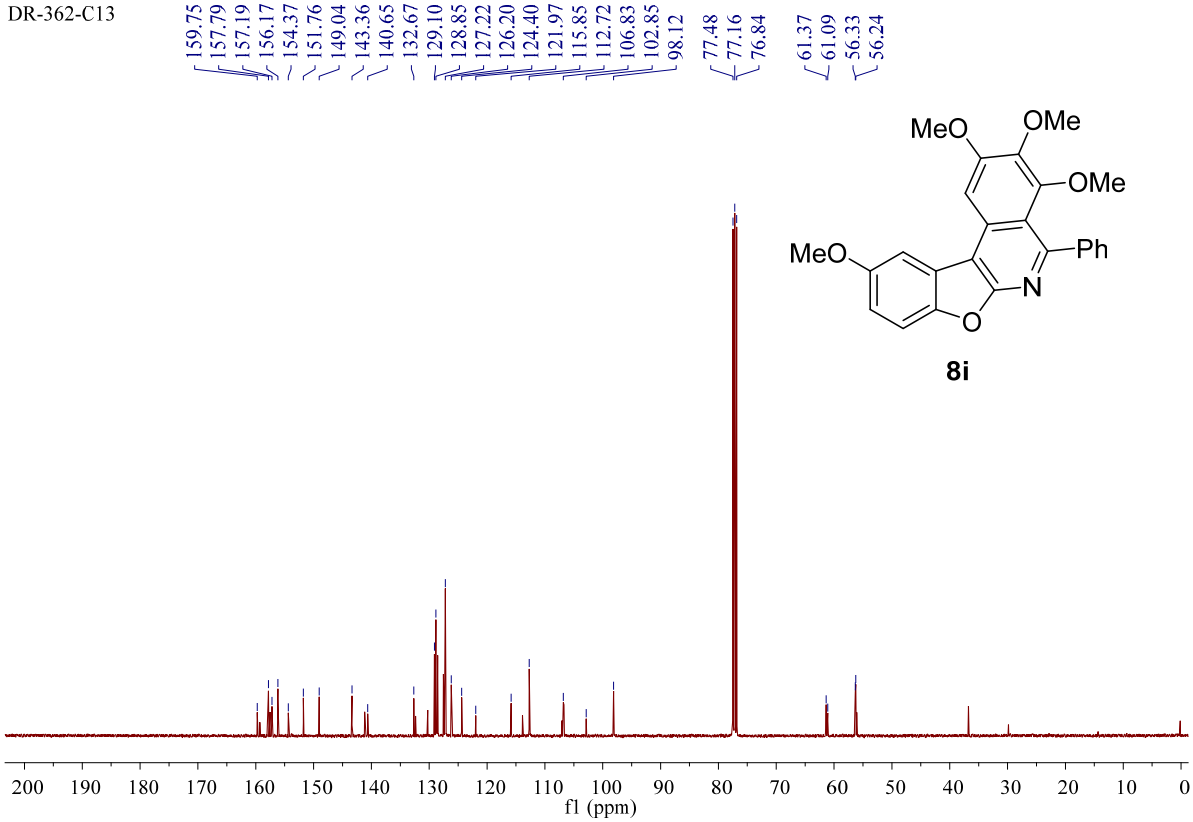


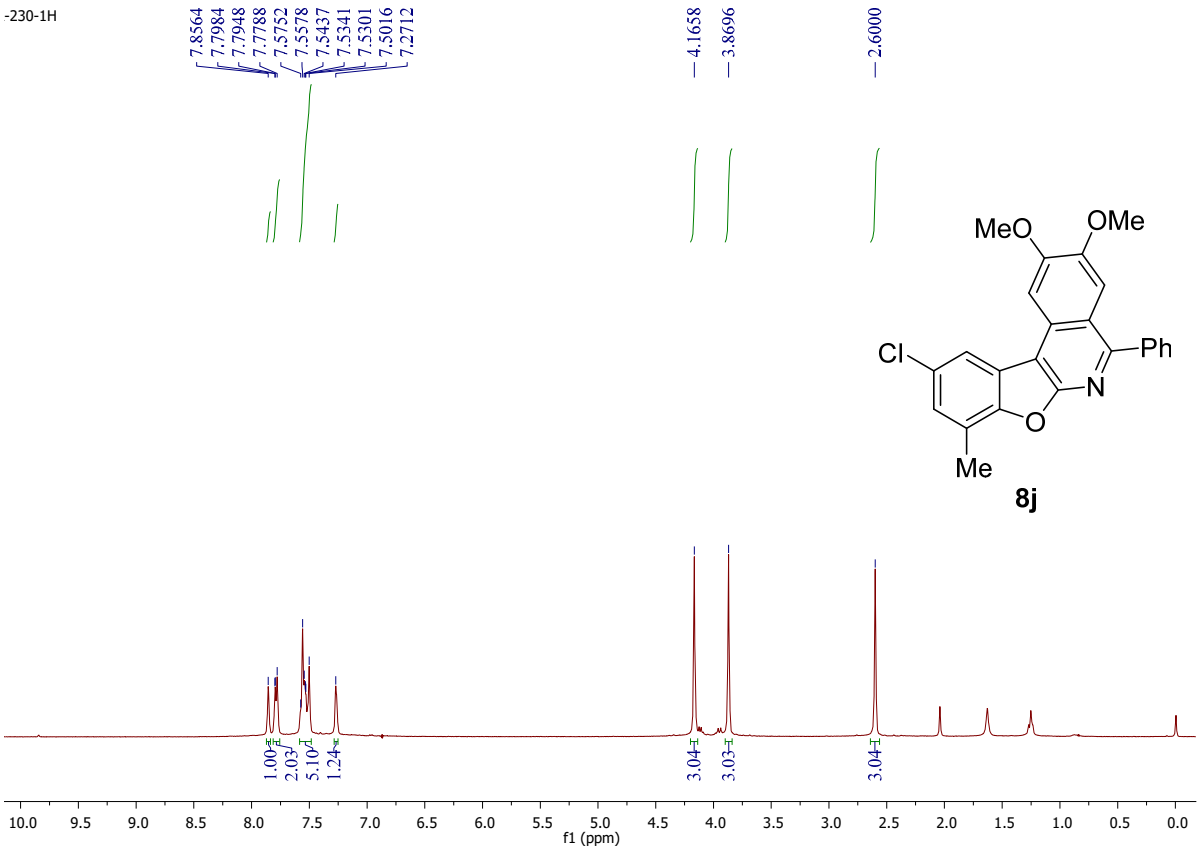
8h

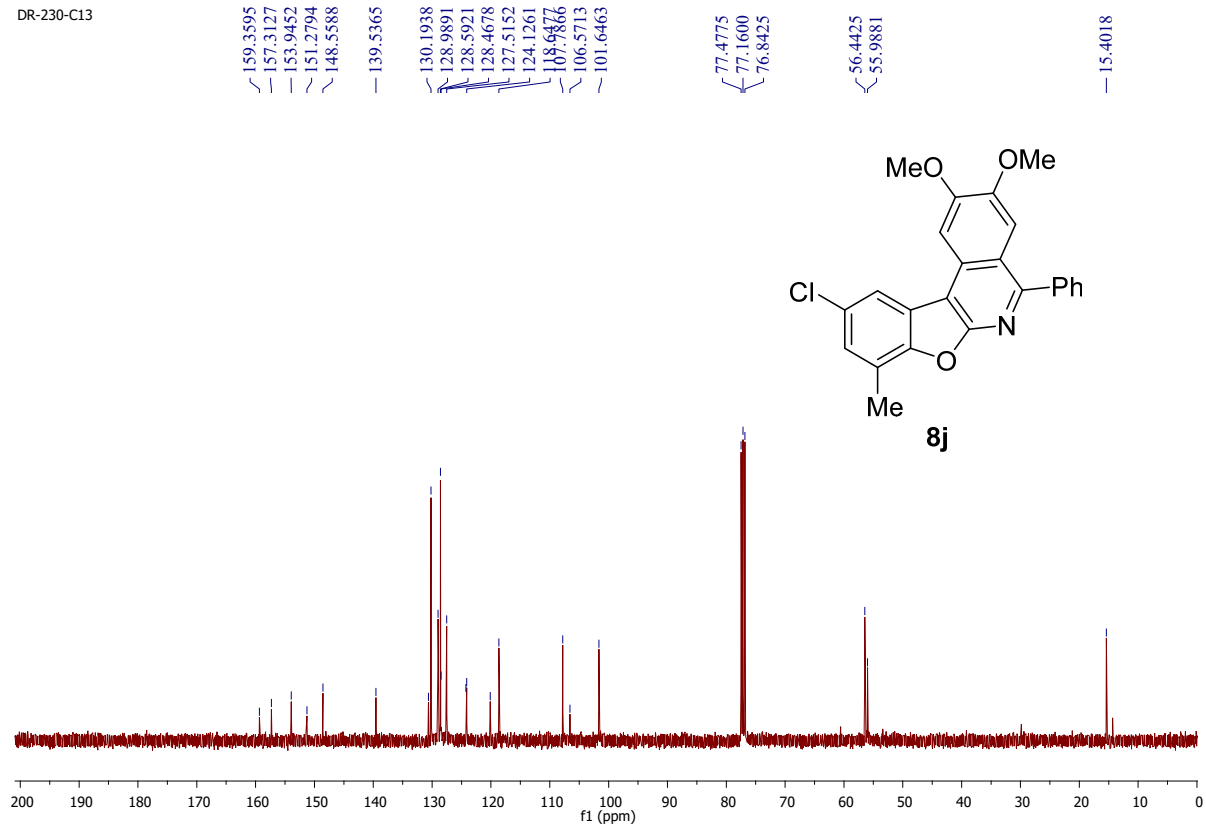
DR-362-1H



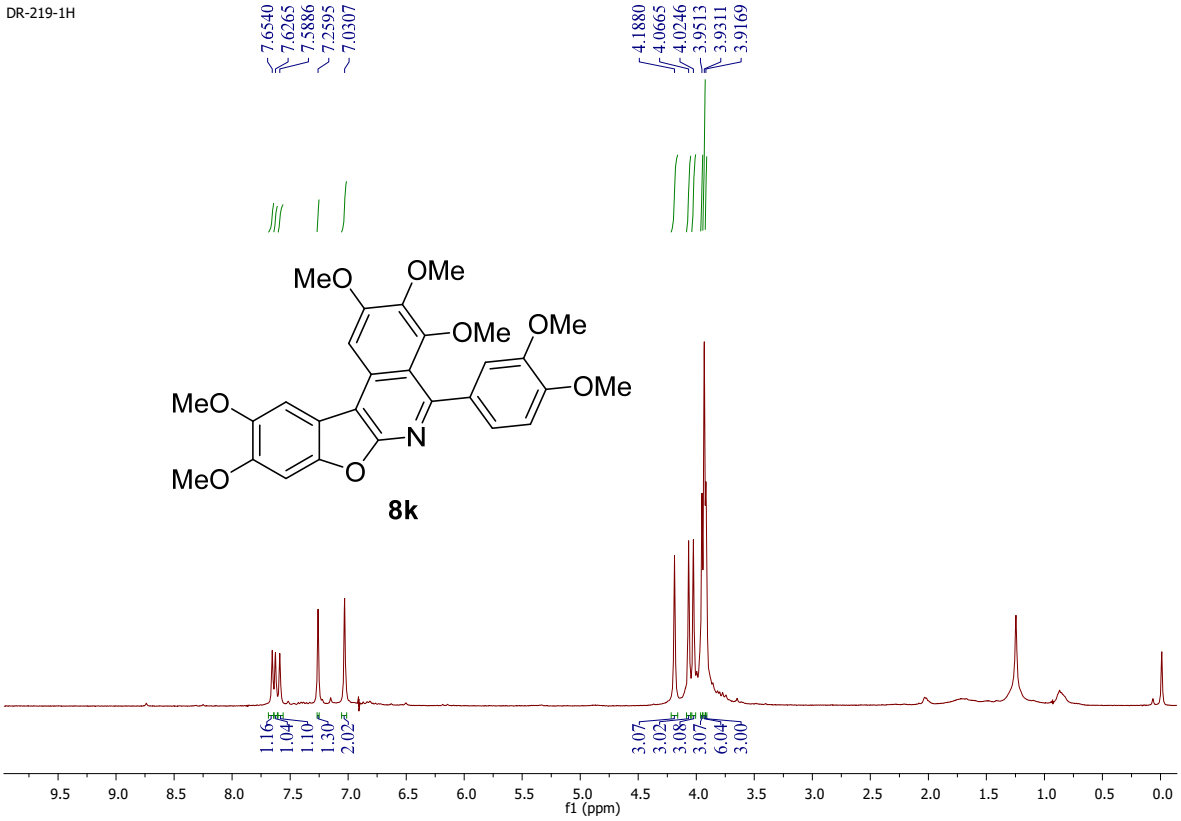
DR-362-C13



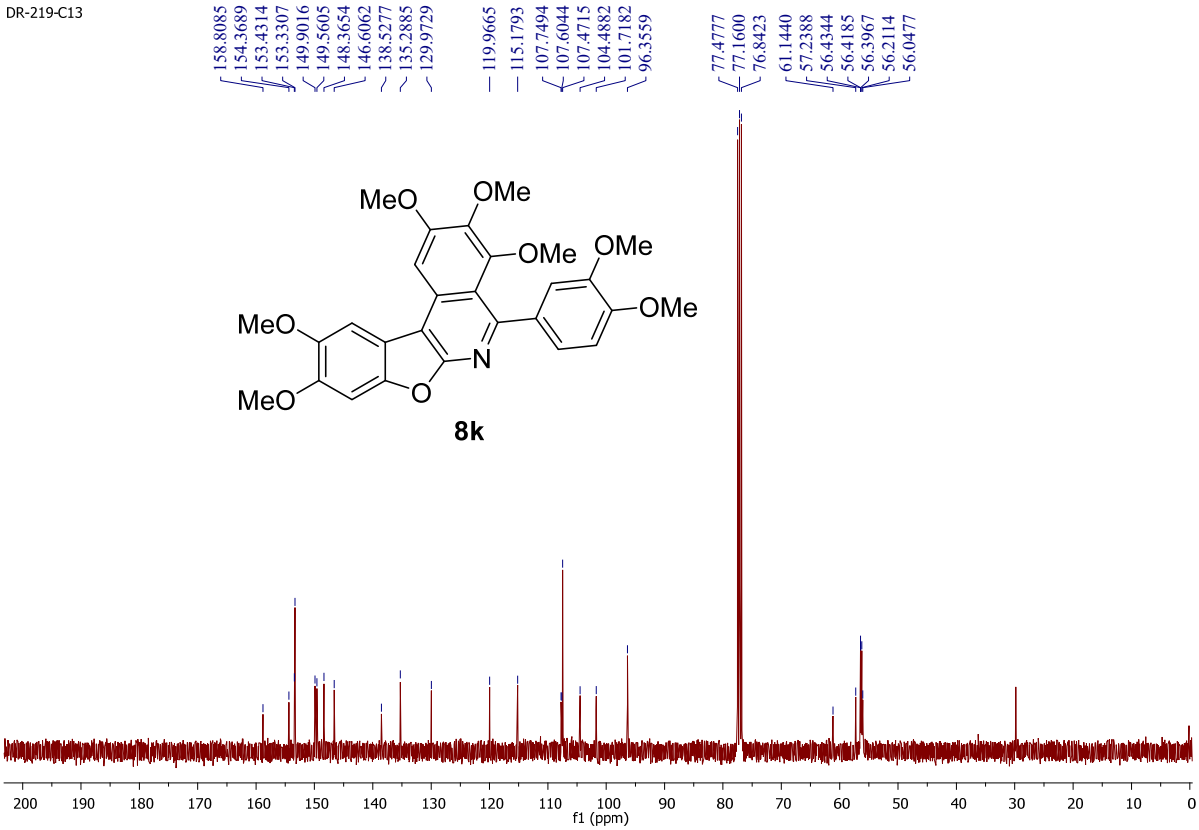

-230-1H
7.8564
7.7984
7.7948
7.7788
7.5752
7.5578
7.5437
7.5341
7.5301
7.5016
7.2712
4.1658
3.8696
2.6000
MeO
OMe
Cl
Ph
N
O
Me
8j
1.00
2.03
5.10
1.24
3.04
3.03
3.04
f1 (ppm)

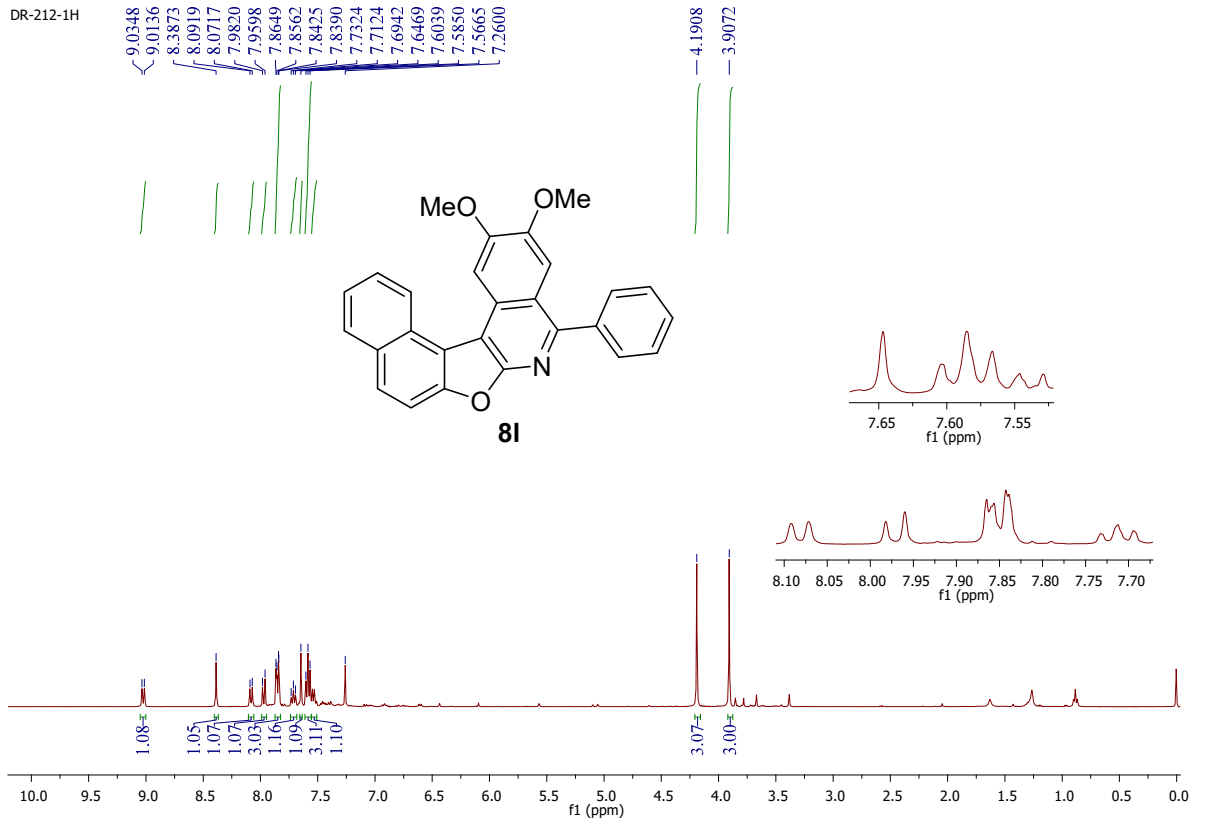

DR-230-C13
159.3595
157.3127
153.9452
151.2794
148.5588
139.5365
130.1938
128.9891
128.5921
128.4678
127.5152
124.1261
118.6477
107.7866
106.5713
101.6463
77.4775
77.1600
76.8425
56.4425
55.9881
15.4018
MeO
OMe
Cl
Ph
N
O
Me
8j
f1 (ppm)

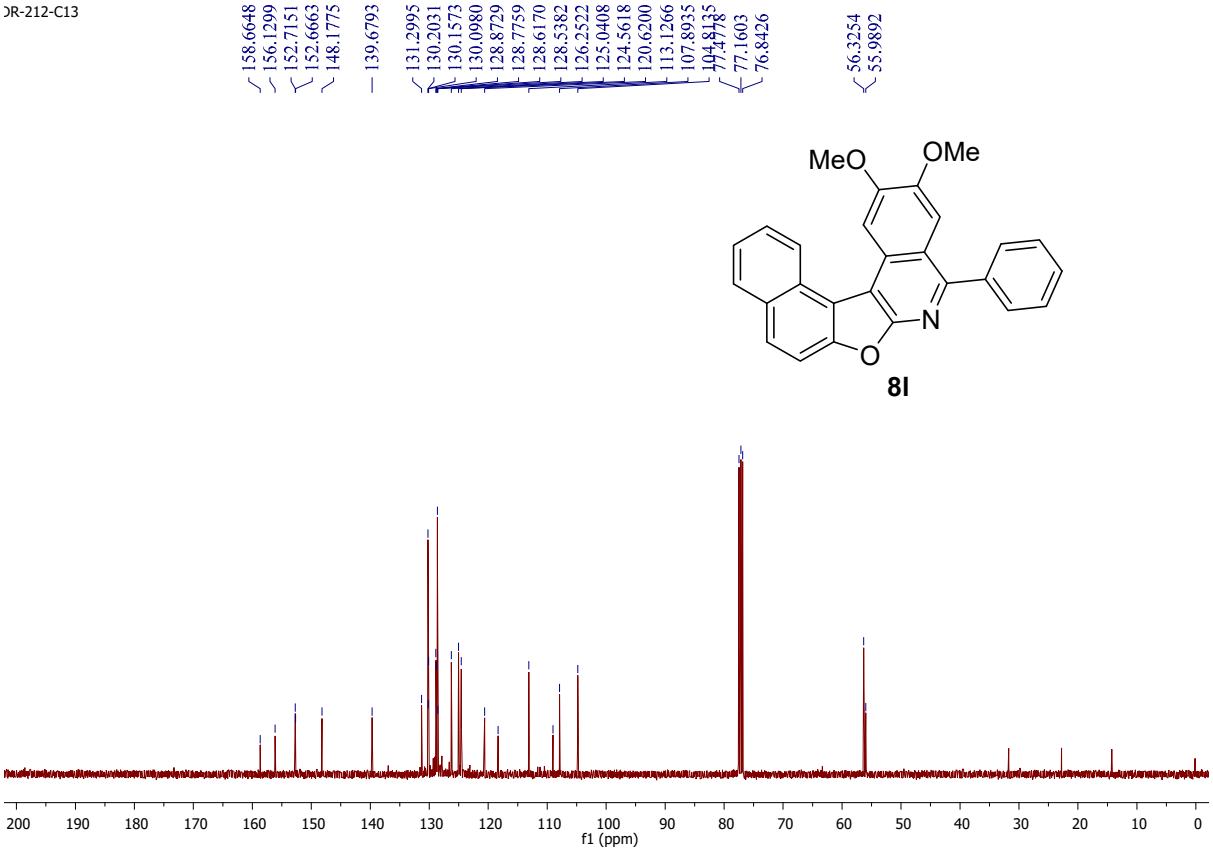
DR-219-1H



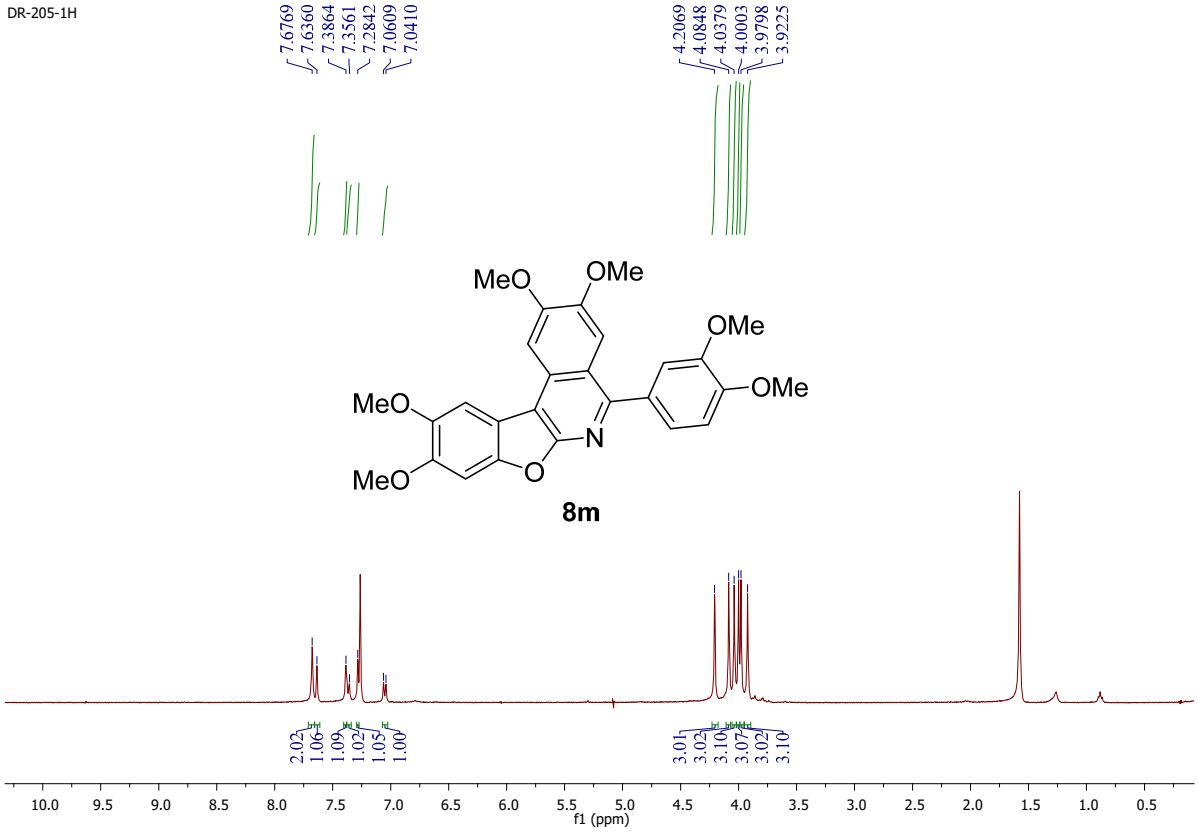
DR-219-C13



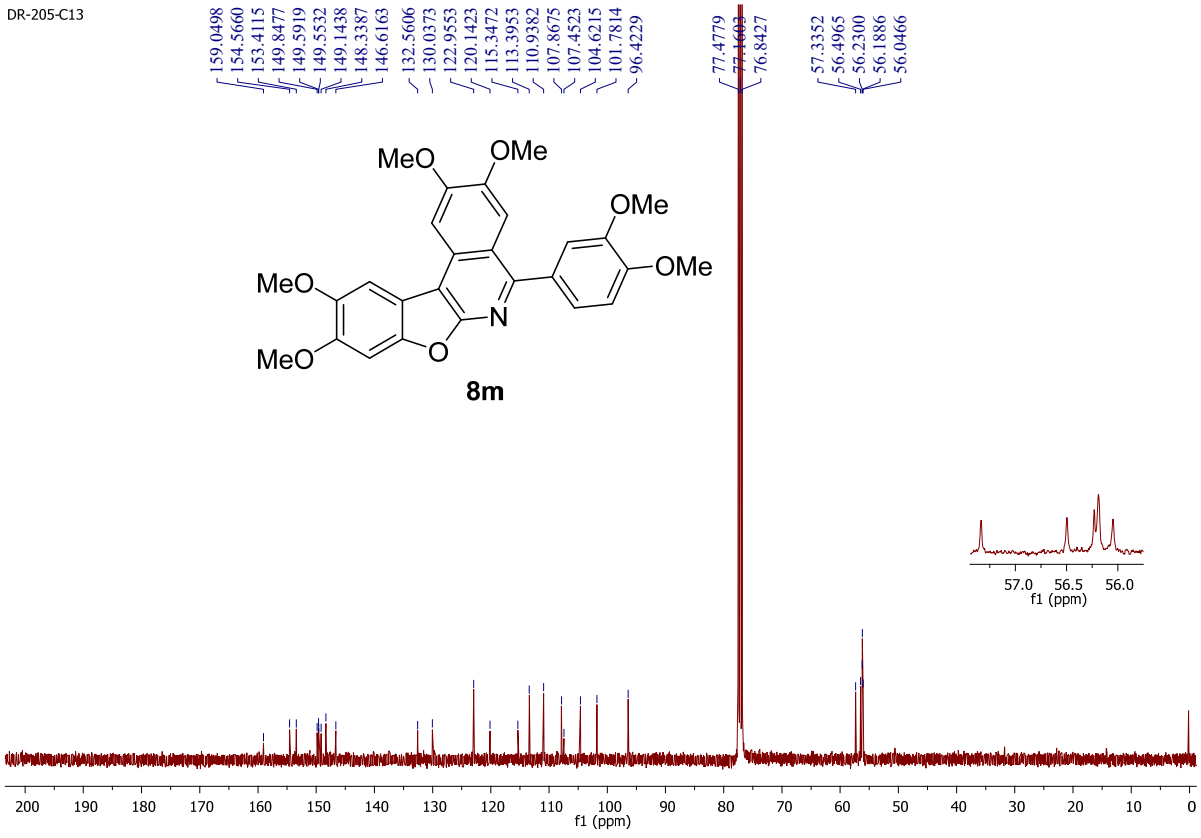

DR-212-1H
9.0348
9.0136
8.3873
8.0919
8.0717
7.9820
7.9598
7.8649
7.8562
7.8425
7.8390
7.7324
7.7124
7.6942
7.6469
7.6039
7.5850
7.5665
7.2600
4.1908
3.9072
MeO
OMe
N
O
8l
7.65
7.60
7.55
f1 (ppm)
8.10
8.05
8.00
7.95
7.90
7.85
7.80
7.75
7.70
f1 (ppm)
1.08
1.05
1.07
1.07
3.03
1.16
1.09
3.11
1.10
3.07
3.00
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


DR-212-C13
158.6648
156.1299
152.7151
152.6663
148.1775
139.6793
131.2995
130.2031
130.1573
130.0980
128.8729
128.7759
128.6170
128.5382
126.2522
125.0408
124.5618
120.6200
113.1266
107.8935
104.8135
77.4778
77.1603
76.8426
56.3254
55.9892
MeO
OMe
N
O
8l
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

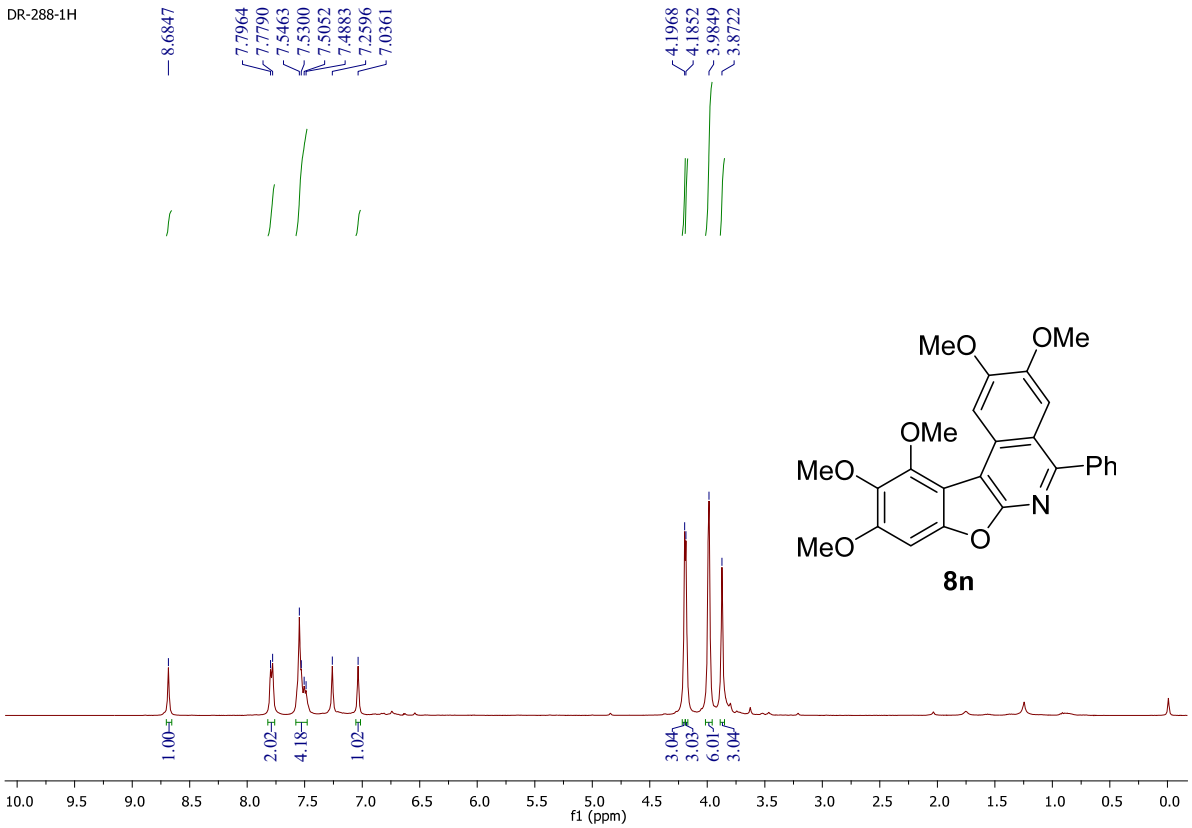
DR-205-1H



DR-205-C13

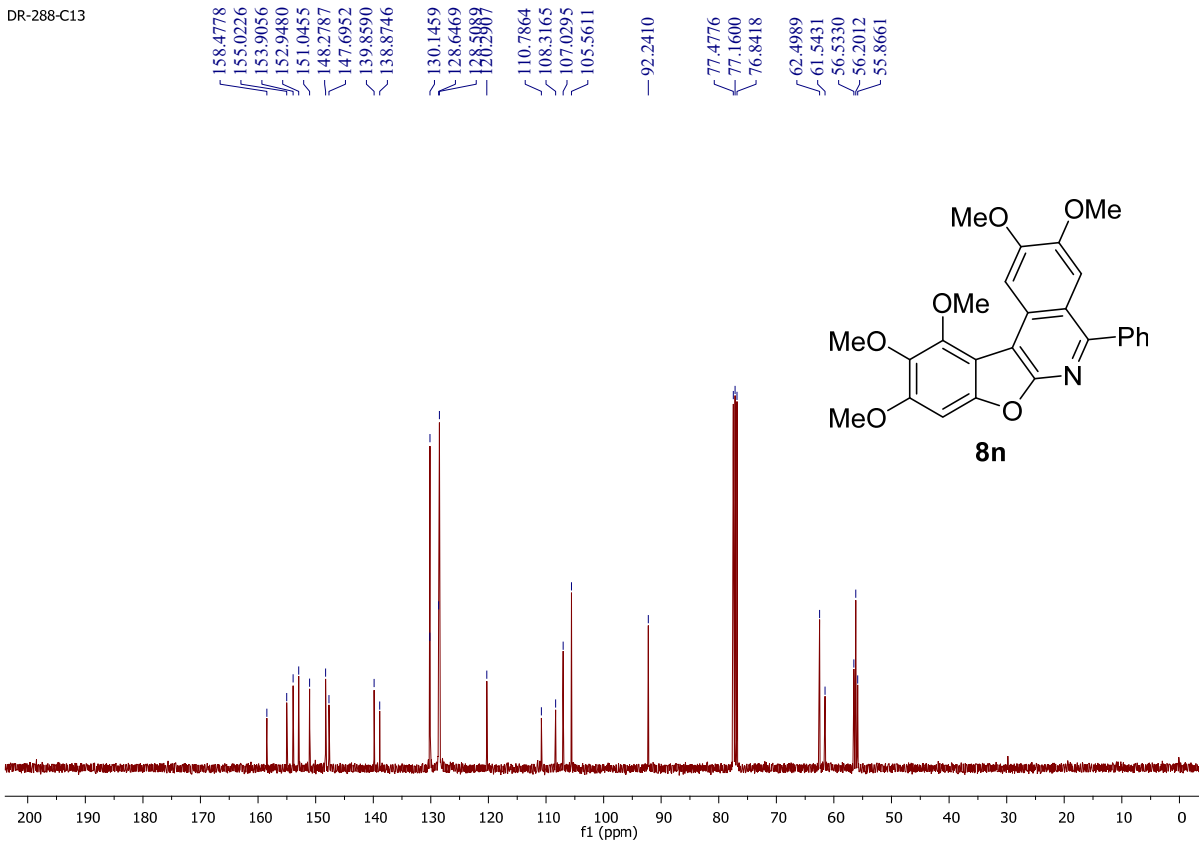


DR-288-1H



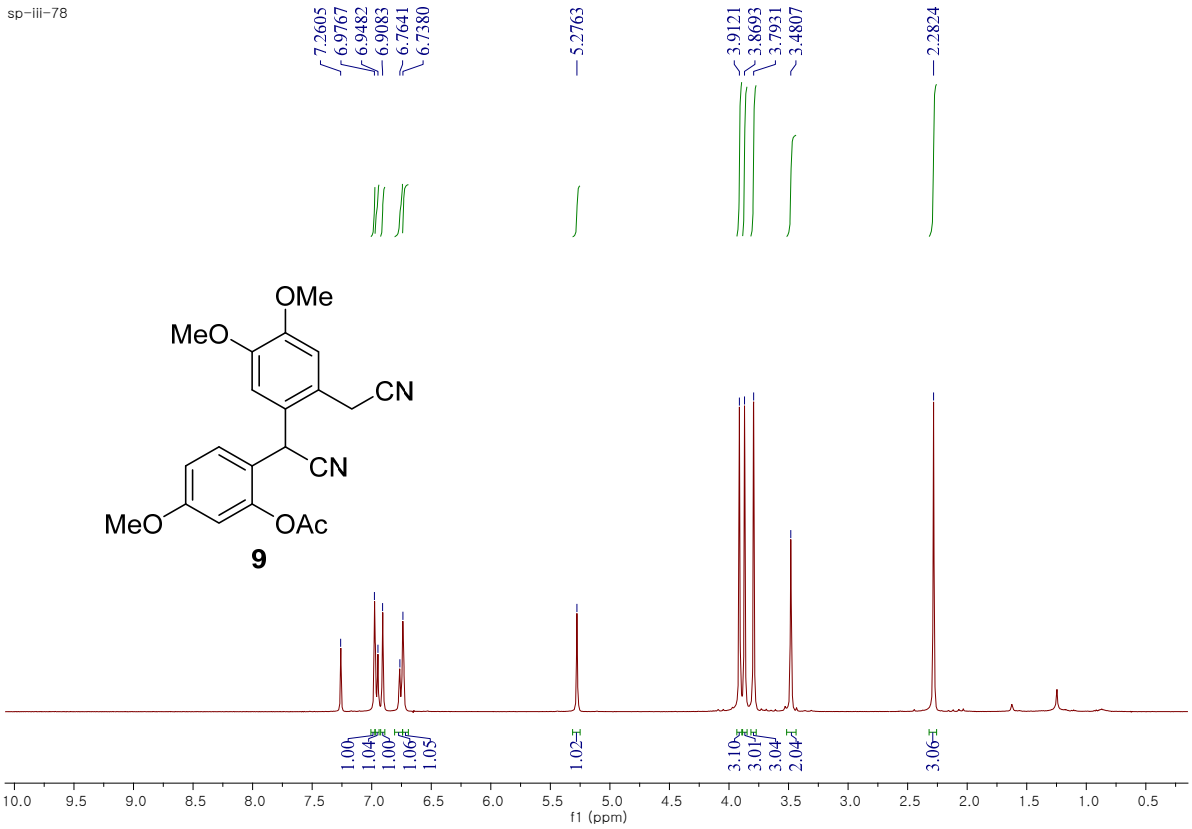
8n

DR-288-C13

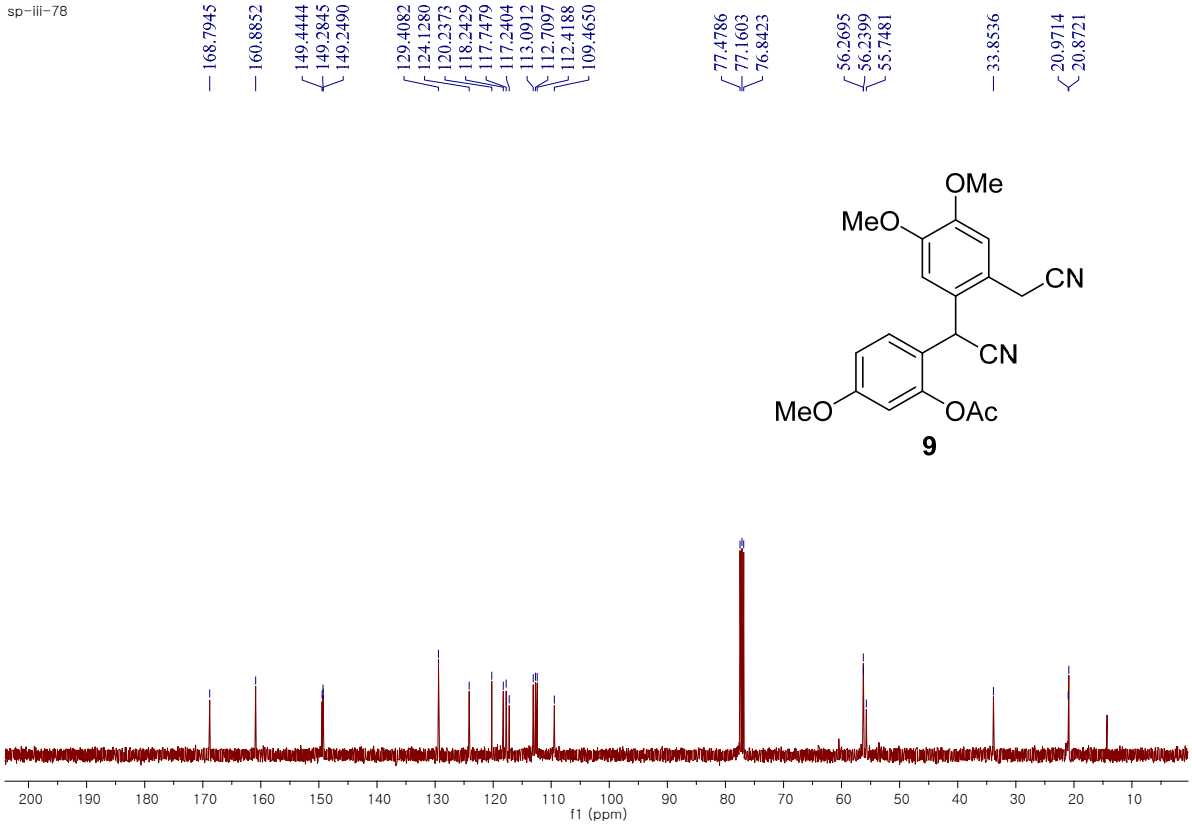


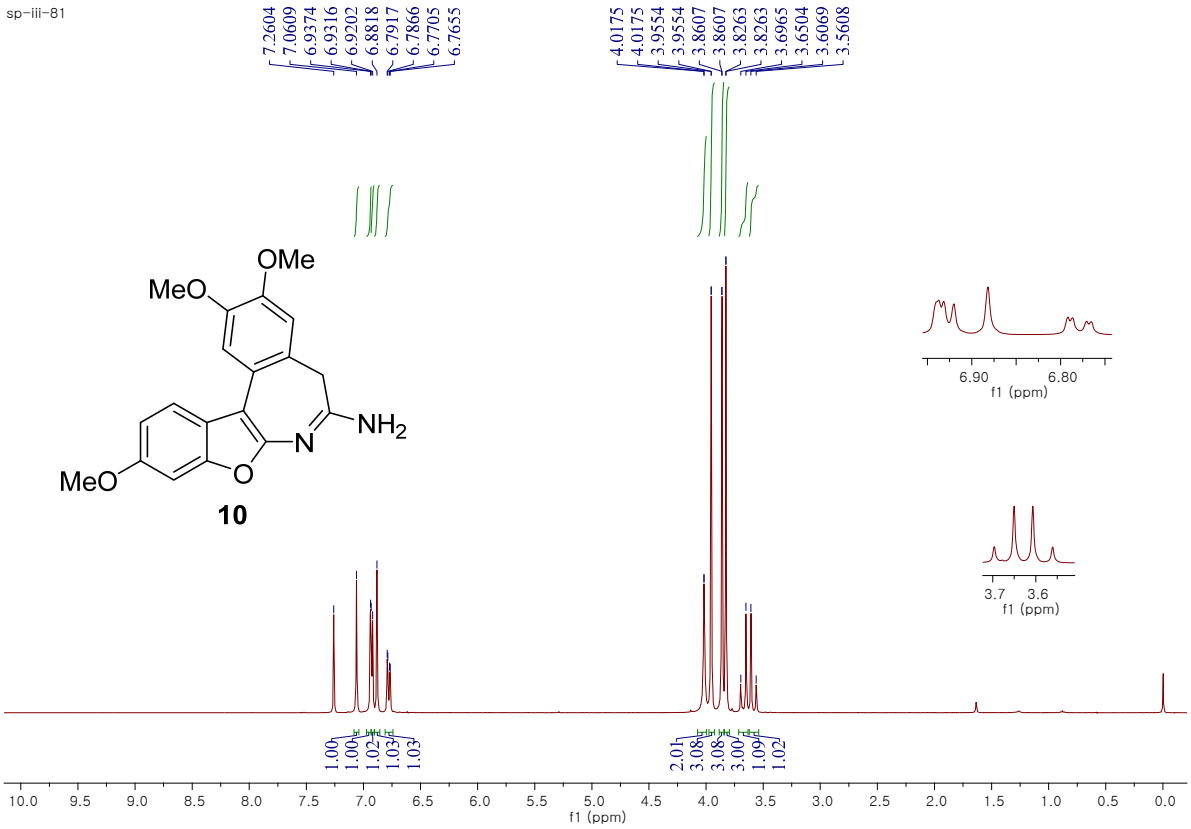
8n

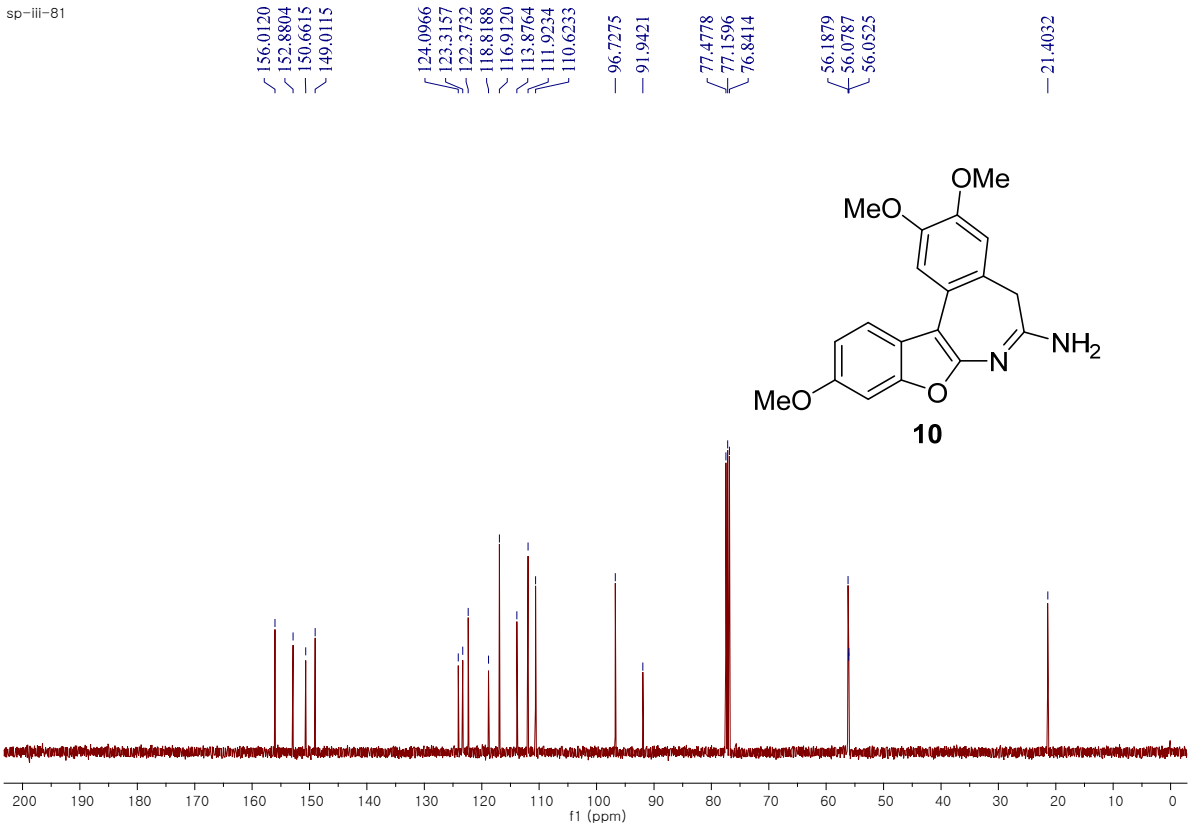
sp-iii-78

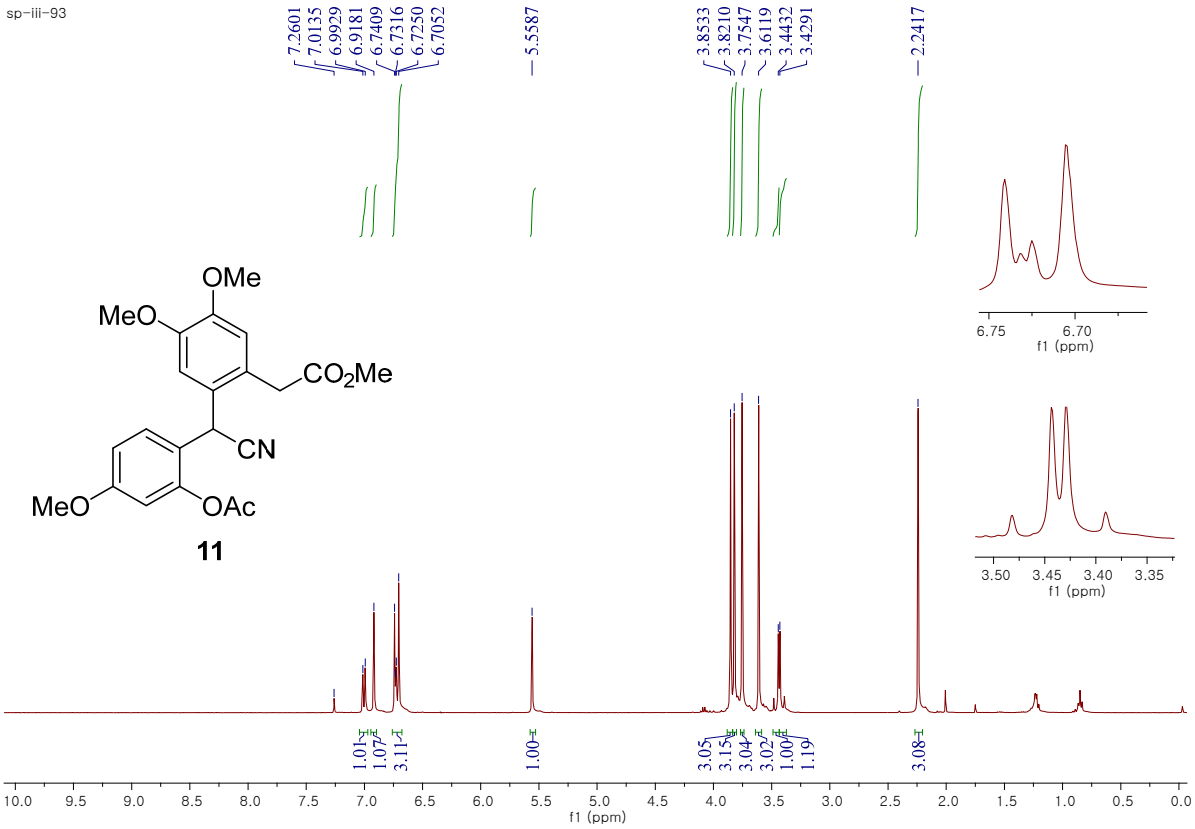


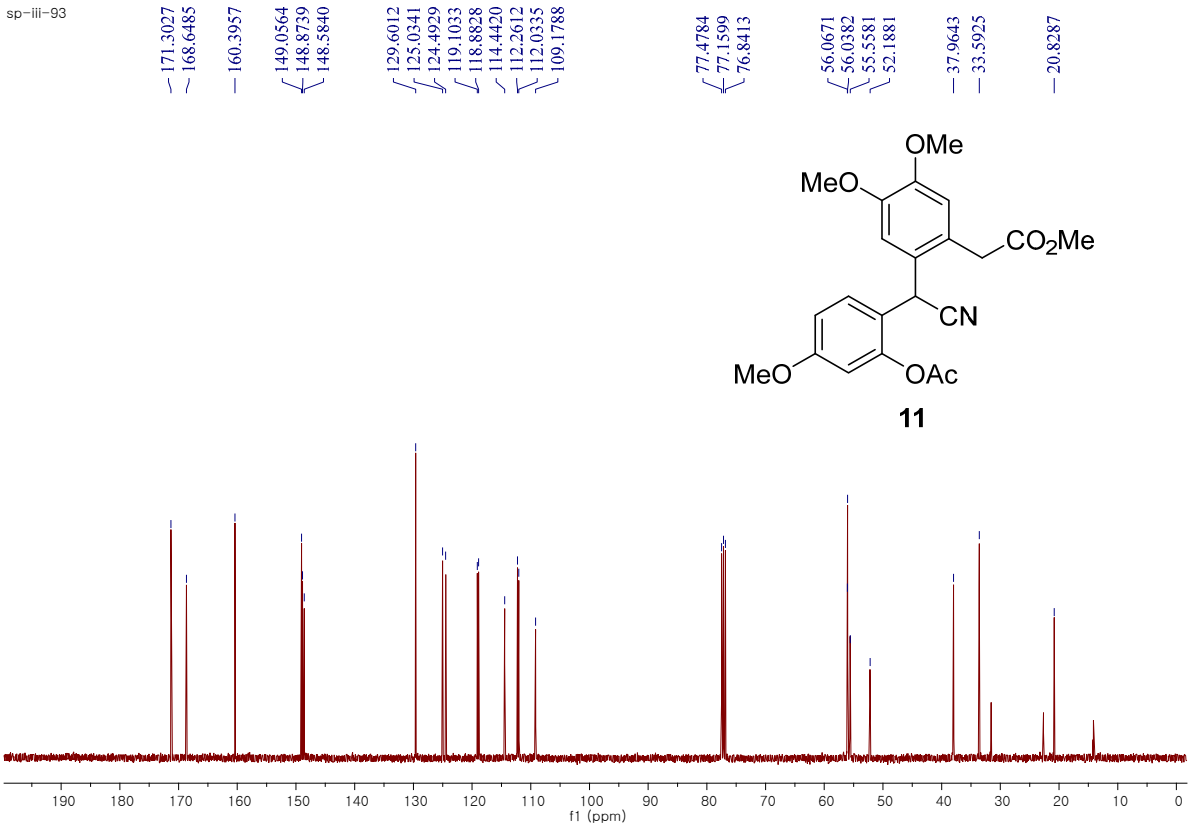
sp-iii-78

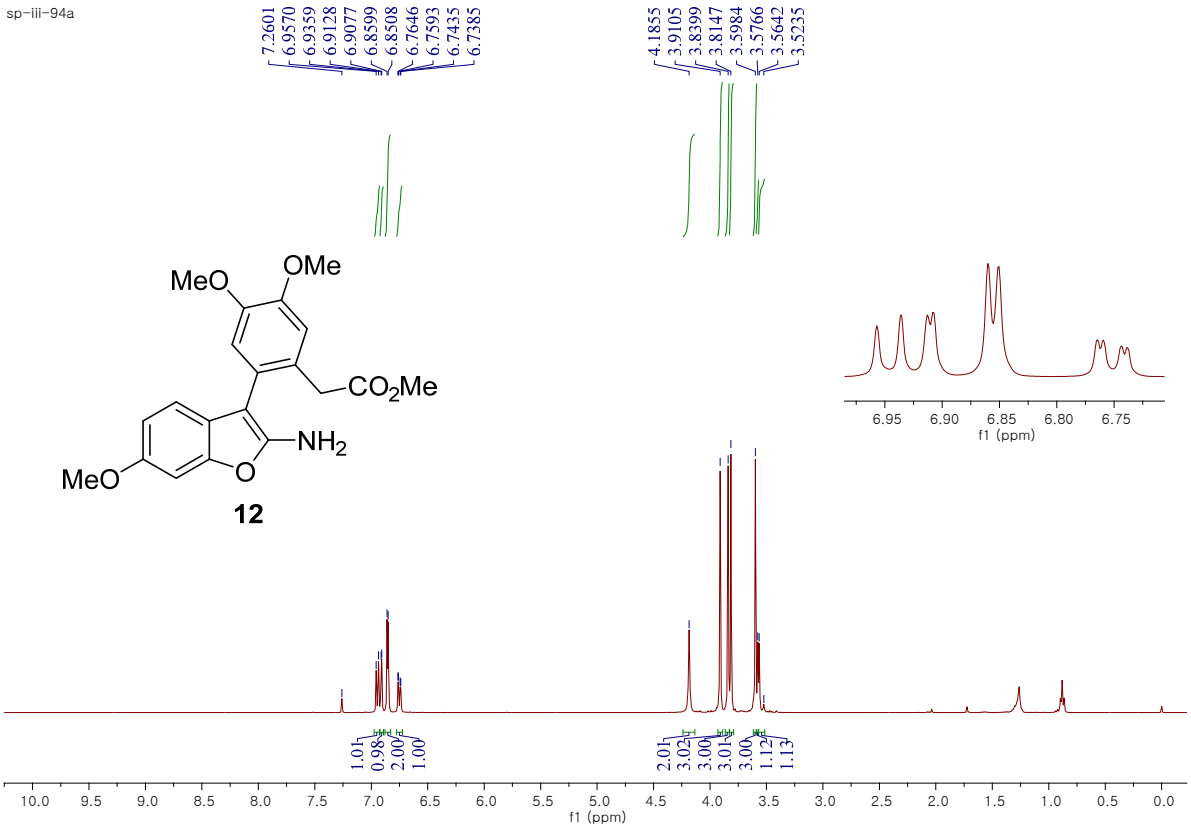


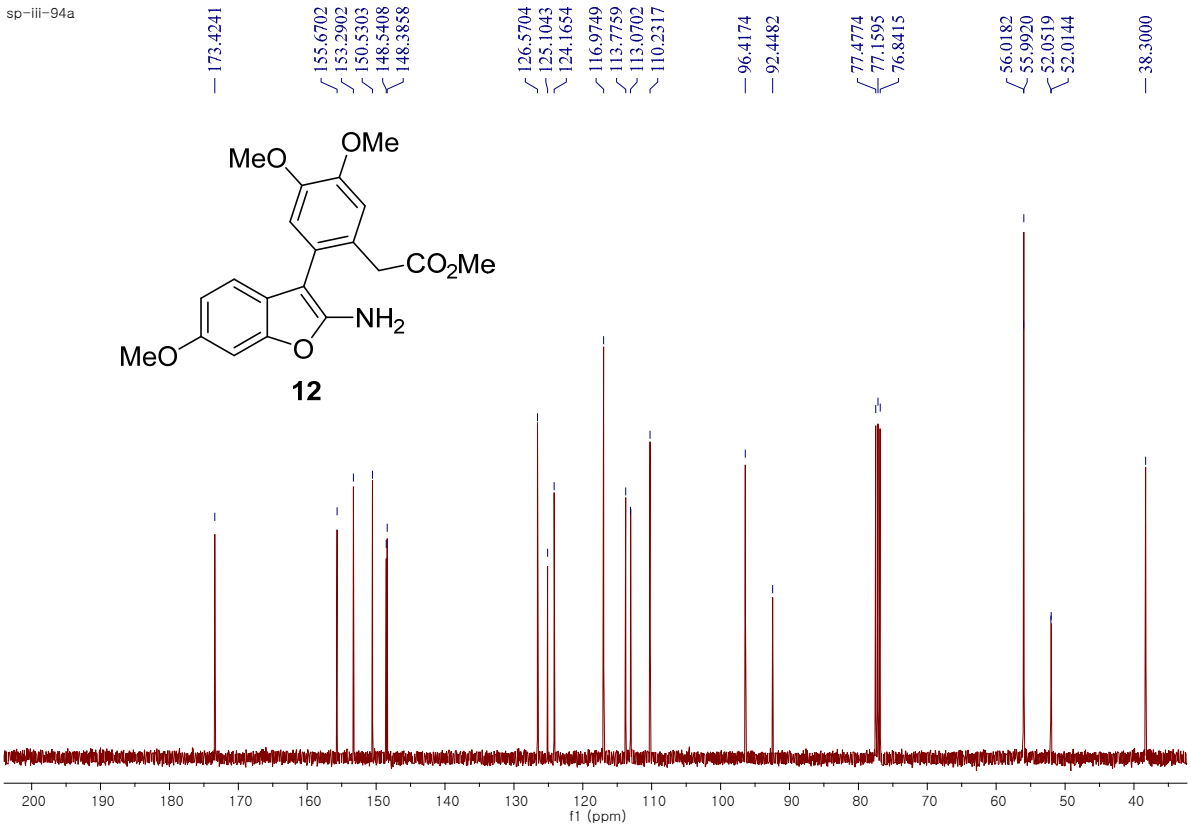

sp-iii-81
7.2604
7.0609
6.9374
6.9316
6.9202
6.8818
6.7917
6.7866
6.7705
6.7655
4.0175
4.0175
3.9554
3.9554
3.8607
3.8607
3.8263
3.8263
3.6965
3.6504
3.6069
3.5608
OMe
MeO
NH2
N
O
MeO
10
6.90
6.80
f1 (ppm)
3.7
3.6
f1 (ppm)
1.00
1.00
1.02
1.03
1.03
2.01
3.08
3.08
3.00
1.09
1.02
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

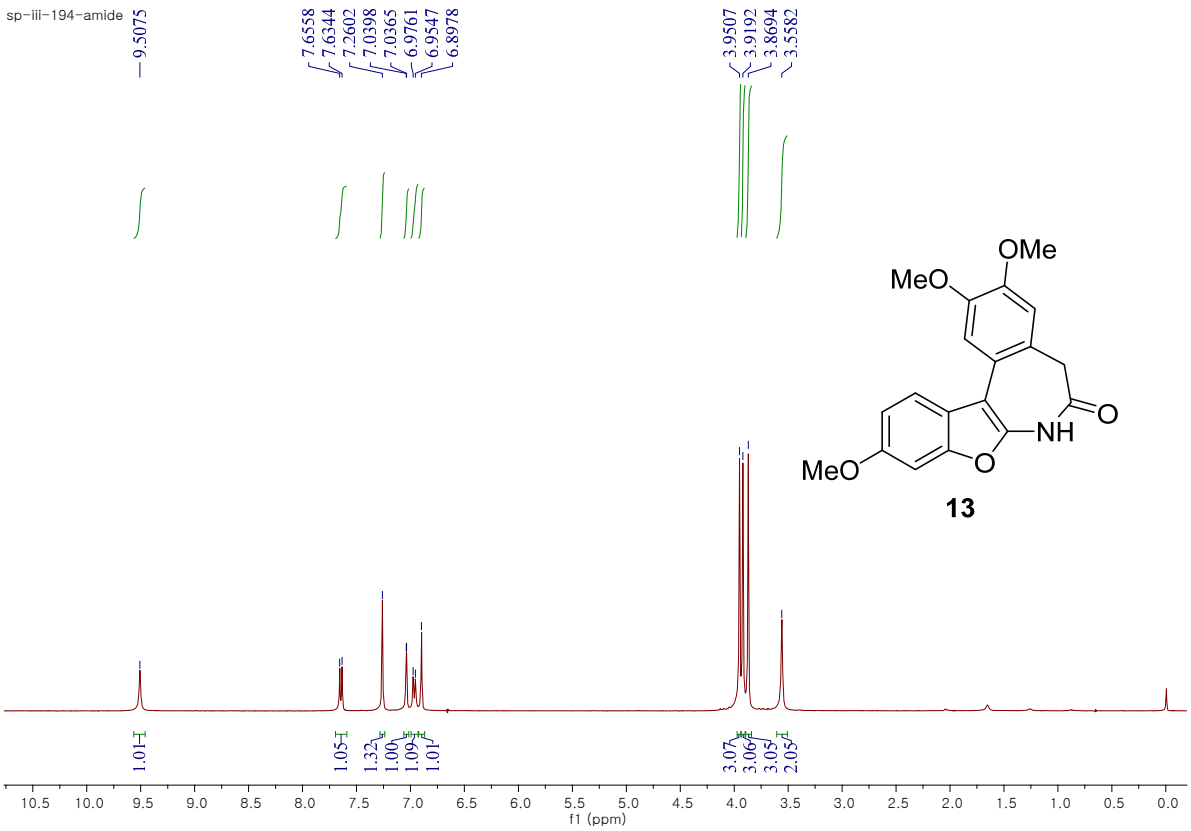

sp-iii-81
156.0120
152.8804
150.6615
149.0115
124.0966
123.3157
122.3732
118.8188
116.9120
113.8764
111.9234
110.6233
96.7275
91.9421
77.4778
77.1596
76.8414
56.1879
56.0787
56.0525
21.4032
OMe
MeO
NH2
N
O
MeO
10
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


sp-iii-93
7.2601
7.0135
6.9929
6.9181
6.7409
6.7316
6.7250
6.7052
5.5587
3.8533
3.8210
3.7547
3.6119
3.4432
3.4291
2.2417
OMe
MeO
CO2Me
CN
MeO
OAc
11
6.75
6.70
f1 (ppm)
3.50
3.45
3.40
3.35
f1 (ppm)
1.01
1.07
3.11
1.00
3.05
3.15
3.04
3.02
1.00
1.19
3.08
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


sp-iii-93
171.3027
168.6485
160.3957
149.0564
148.8739
148.5840
129.6012
125.0341
124.4929
119.1033
118.8828
114.4420
112.2612
112.0335
109.1788
77.4784
77.1599
76.8413
56.0671
56.0382
55.5581
52.1881
37.9643
33.5925
20.8287
OMe
MeO
CO2Me
CN
MeO
OAc
11
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


sp-iii-94a
7.2601
6.9570
6.9359
6.9128
6.9077
6.8599
6.8508
6.7646
6.7593
6.7435
6.7385
4.1855
3.9105
3.8399
3.8147
3.5984
3.5766
3.5642
3.5235
MeO
OMe
CO2Me
NH2
MeO
O
12
6.95
6.90
6.85
6.80
6.75
f1 (ppm)
1.01
0.98
2.00
1.00
2.01
3.02
3.00
3.01
3.00
1.12
1.13
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


sp-iii-94a
173.4241
155.6702
153.2902
150.5303
148.5408
148.3858
126.5704
125.1043
124.1654
116.9749
113.7759
113.0702
110.2317
96.4174
92.4482
77.4774
77.1595
76.8415
56.0182
55.9920
52.0519
52.0144
38.3000
MeO
OMe
CO2Me
NH2
MeO
O
12
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
f1 (ppm)


sp-iii-194-amide
9.5075
7.6558
7.6344
7.2602
7.0398
7.0365
6.9761
6.9547
6.8978
3.9507
3.9192
3.8694
3.5582
OMe
MeO
O
NH
O
MeO
13
1.01
1.05
1.32
1.00
1.09
1.01
3.07
3.06
3.05
2.05
f1 (ppm)

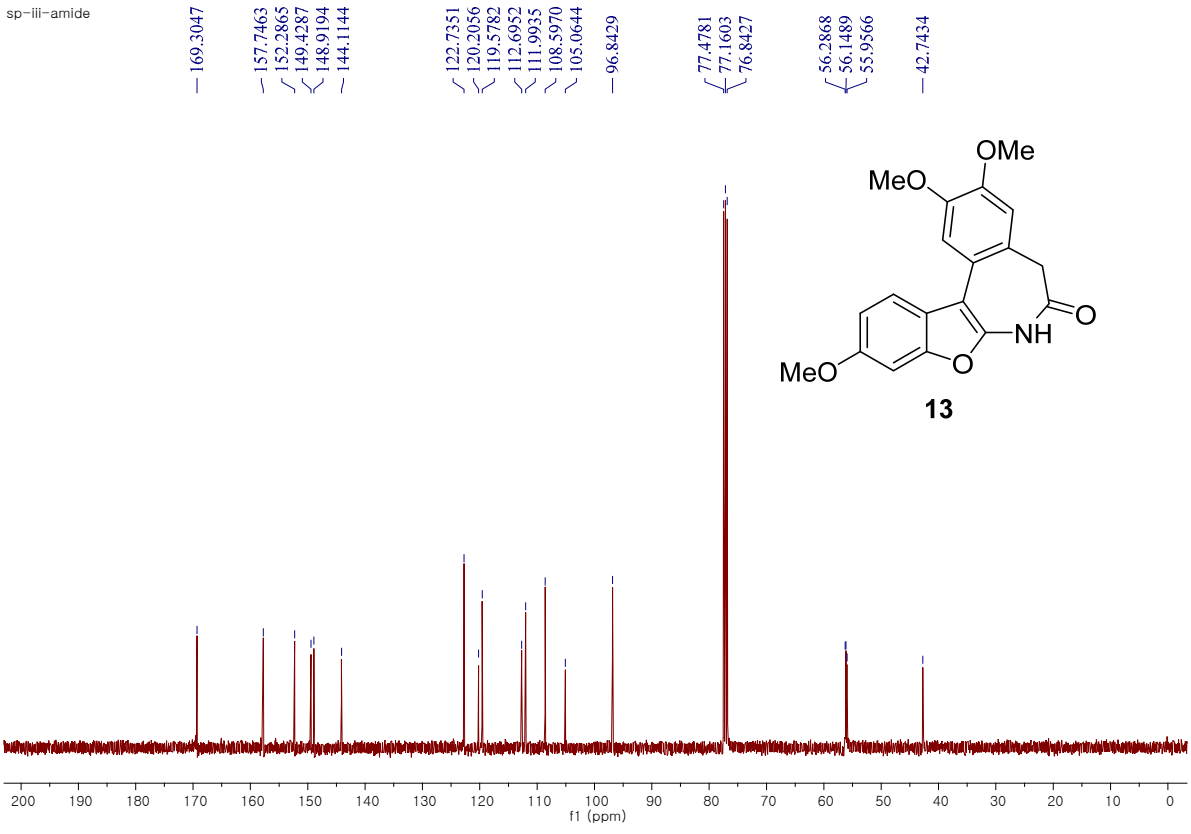
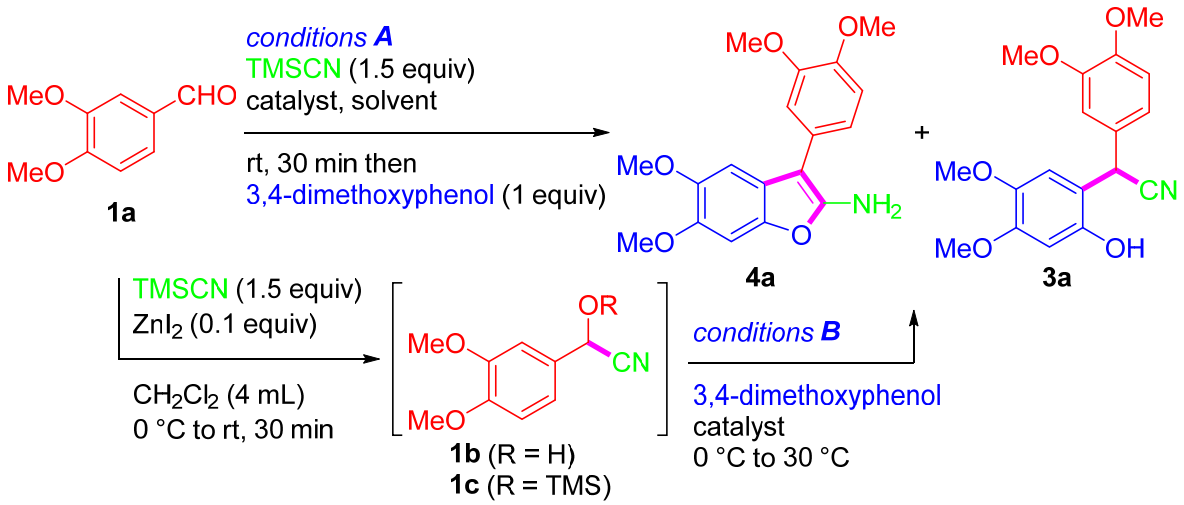

sp-iii-amide
169.3047
157.7463
152.2865
149.4287
148.9194
144.1144
122.7351
120.2056
119.5782
112.6952
111.9935
108.5970
105.0644
96.8429
77.4781
77.1603
76.8427
56.2868
56.1489
55.9566
42.7434
OMe
MeO
O
NH
O
MeO
13
f1 (ppm)

Table S1. Reaction Optimization[a]



entry	catalyst (equiv)	solvent	time (h)	yield (%)[b]		
	conditions A			**1b**	**4a**	**3a**
1	$Bi(OTf)_3$ (0.2)	DCM	48	10	-	51
2[c]	$Bi(OTf)_3$ (0.2)	DCE	12		decomposed	
3	$Bi(OTf)_3$ (0.3)	DCM	48	-	trace	54
4	$Bi(OTf)_3$ (0.2)	CH_3NO_2	48	12	-	30
5	Ag(OTf) (0.2)	DCM	48	30	-	42
6	$Cu(OTf)_2$ (0.2)	DCM	48	20	-	38
7	$Yb(OTf)_3$ (0.2)	DCM	48	32	-	10
8	$Sc(OTf)_3$ (0.2)	DCM	48	10	-	20
9	$Zn(OTf)_2$ (0.2)	DCM	48	41	-	trace
10	$FeCl_3$ (0.1)	DCM	48	10	-	28
11	$FeCl_3$ (0.2)	DCM	24	-	trace	34
12	ZnI_2 (0.2)	DCM	48	80	-	-
13	$ZnCl_2$ (0.2)	DCM	48	25	-	15
14	$In(OTf)_3$ (0.2)	DCM	48	20	-	20
15	BF_3-OEt_2 (0.5)	DCM	24	15	-	35
16[d]	BF_3-OEt_2 (0.5)	DCM	24	-	-	43
17	BF_3-OEt_2 (1.2)	DCM	24	-	20	31
18	BF_3-OEt_2 (1.5)	DCM	24	-	31	32
19	BF_3-OEt_2 (2.0)	DCM	48	-	47	15
20	PTSA (0.2)	DCM	48		NR	
21	TFA (0.2)	DCM	48		NR	
22	CH_3SO_3H (0.2)	DCM	48		decomposed	
23	TfOH (0.2)	CH_3NO_2	48		decomposed	
24	H_2SO_4 (0.2)	DCM	24		decomposed	
	conditions B					
25	$Bi(OTf)_3$ (0.2)	DCM	24	-	trace	57

26	Ag(OTf) (0.2)	DCM	24	-	trace	68
27	$Cu(OTf)_2$ (0.2)	DCM	24	-	-	54
28	BF_3-OEt_2 (1.2)	DCM	24	-	40	31
29	BF_3-OEt_2 (1.5)	DCM	24	-	52	34
30	BF_3-OEt_2 (2.0)	DCM	12	-	71	15
31	BF_3-OEt_2 (2.0)	DCM	14	-	78	10
32	BF_3-OEt_2 (2.0)	DCM	48	-	73	trace
33[d]	BF_3-OEt_2 (2.0)	DCM	12	-	70	trace
34	BF_3-OEt_2 (2.5)	DCM	12	-	72	10
35	BF_3-OEt_2 (3.0)	DCM	12	-	74	trace

[a] A mixture of **1a** (100 mg, 0.6 mmol, 1 equiv), TMSCN (1.5 equiv), 3,4-dimethoxyphenol (1 equiv), and catalyst in solvent (4 mL) was used. [b] Isolated yield (%) [c] Reaction at 70 °C. [d] Reaction at 50 °C.