Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information for

Synthesis of Heterocycle-Tethered Acylbenzofurans and Benzodifurans from Odorless and Recyclable Seleno Polystyrene Resin

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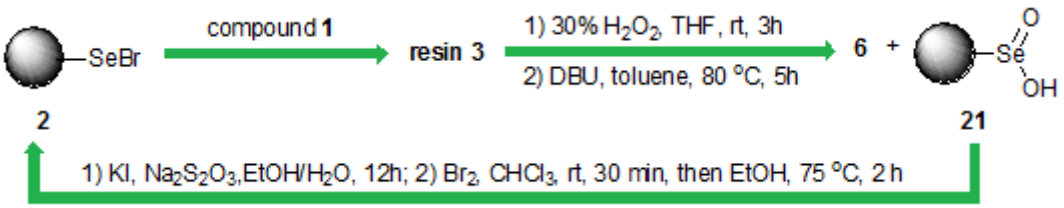
CONTENTS

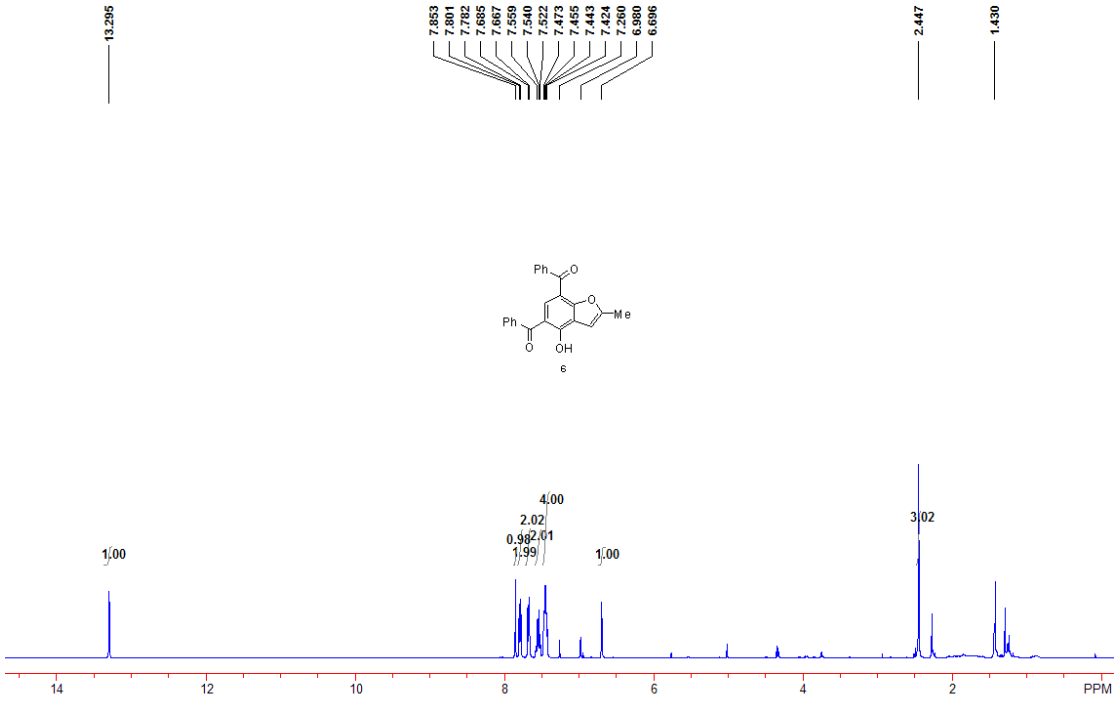
Table S1 Seleno resin carrier recovery and reuse.[a]

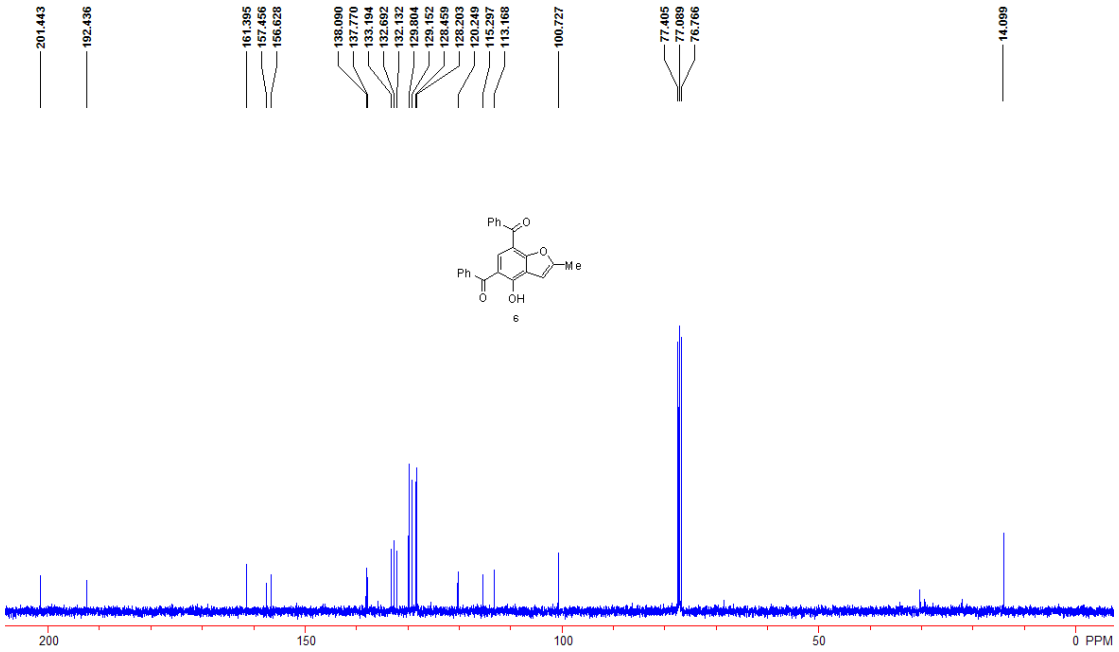


Recycle time	**5** yield/%[b]	**5** purity/%[c]
1	93	96
2	92	95
3	91	95
4	90	95
5	91	95
6	90	94
7	89	94
8	89	93

[a] For detailed procedures see experimental section in texe. [b] Isolated yields of crude product **5** based on Br loading of resin **2**. [c] Purities of product **5** were determined by HPLC analysis.

NMR Spectra copies of the products

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100.727
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Me
Ph
O
OH
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100
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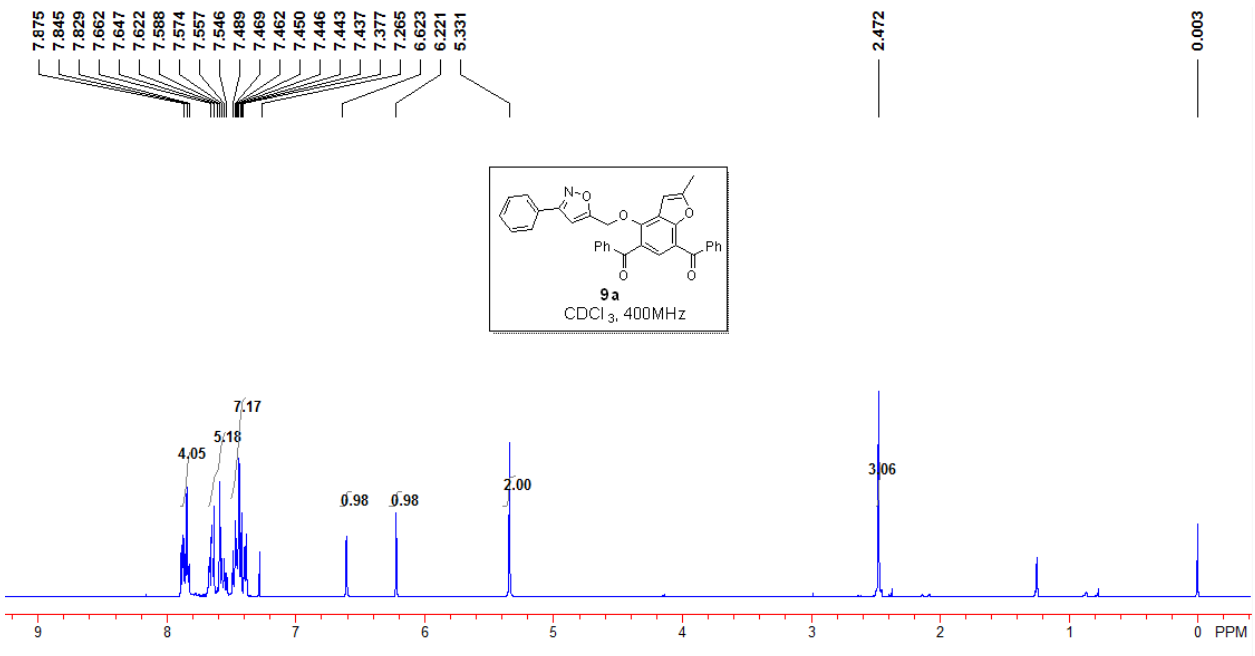
0 PPM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7.462
7.450
7.446
7.443
7.437
7.377
7.265
6.623
6.221
5.331
2.472
0.003
N
O
O
O
Ph
Ph
O
O
9 a
CDCl 3, 400MHz
7.17
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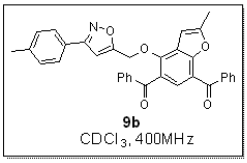

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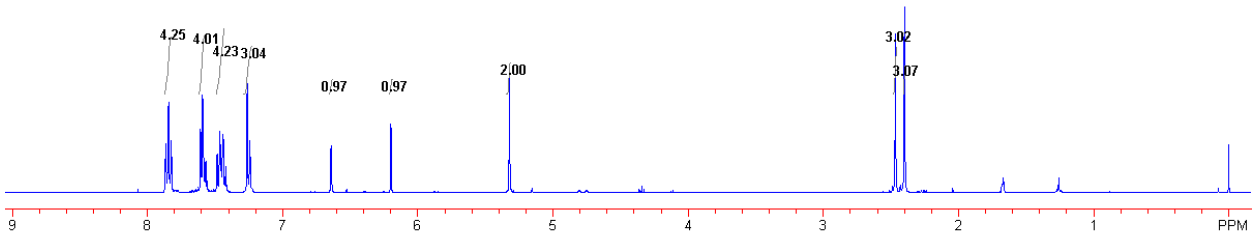

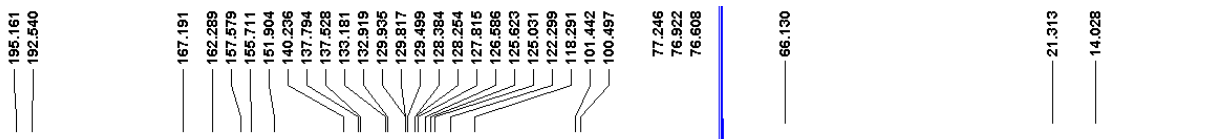

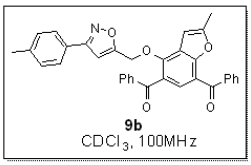

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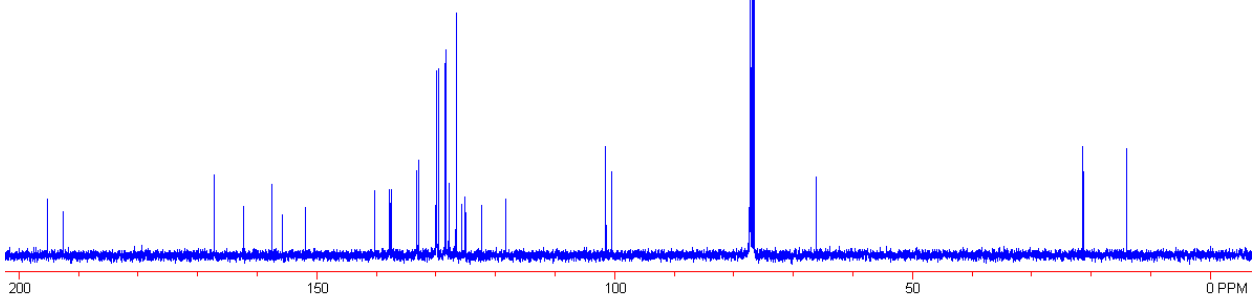

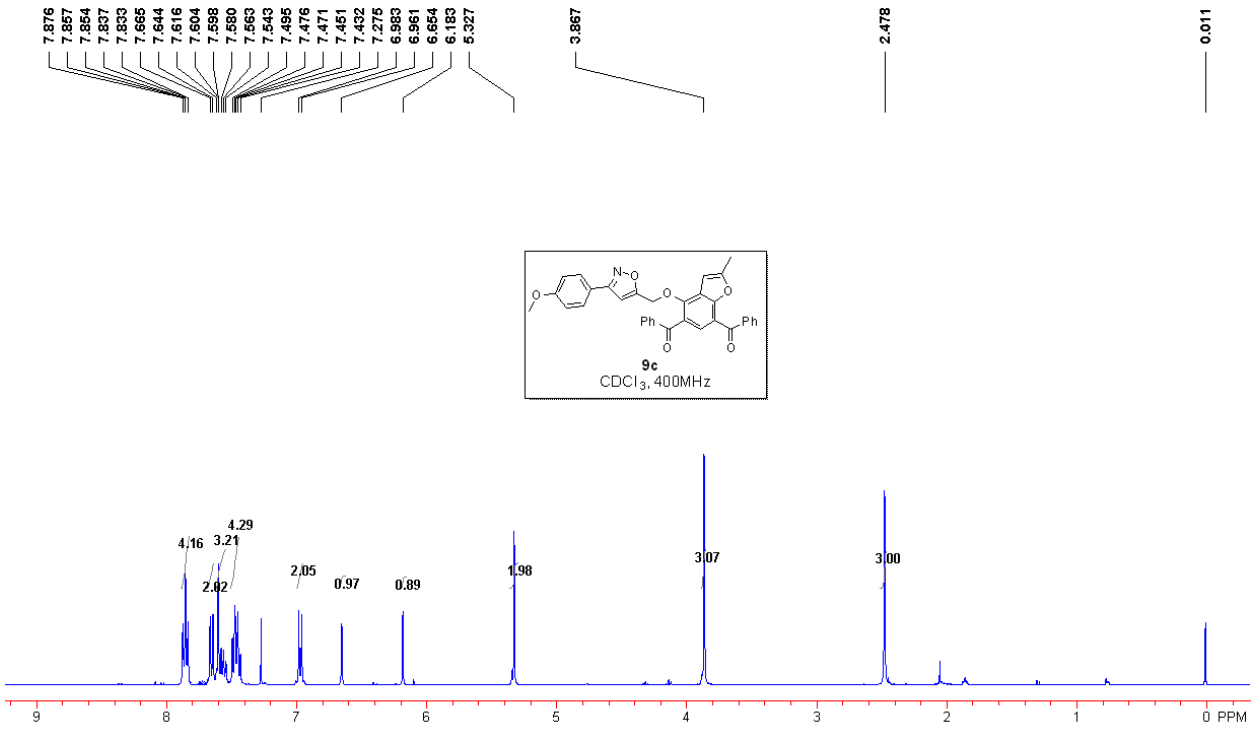
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7.432
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4.29
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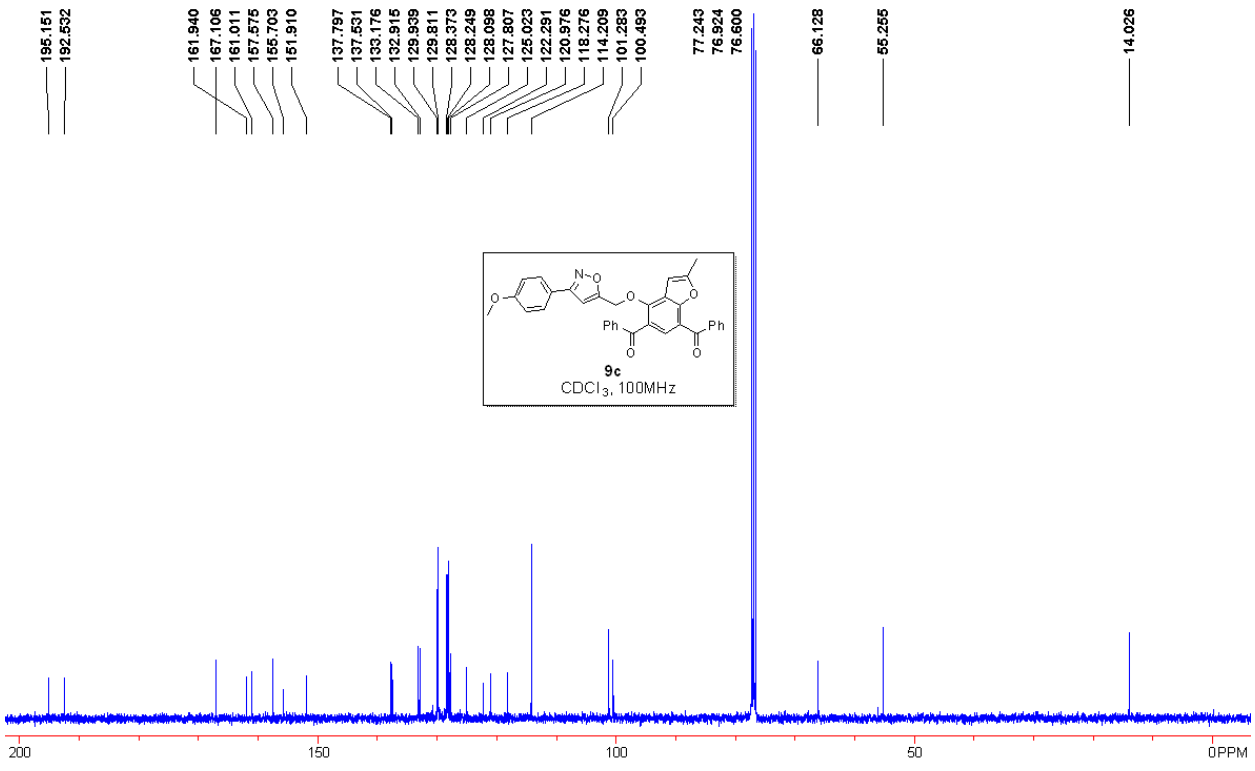
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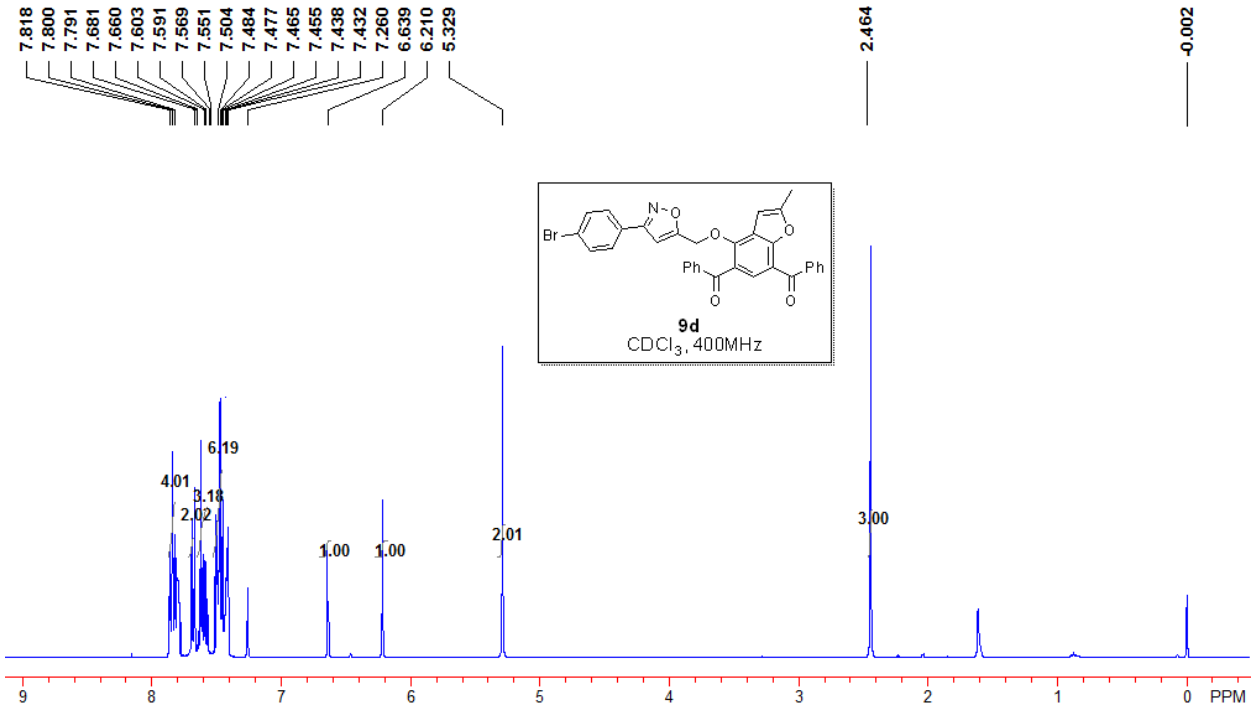
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O
Ph
Ph
O
O
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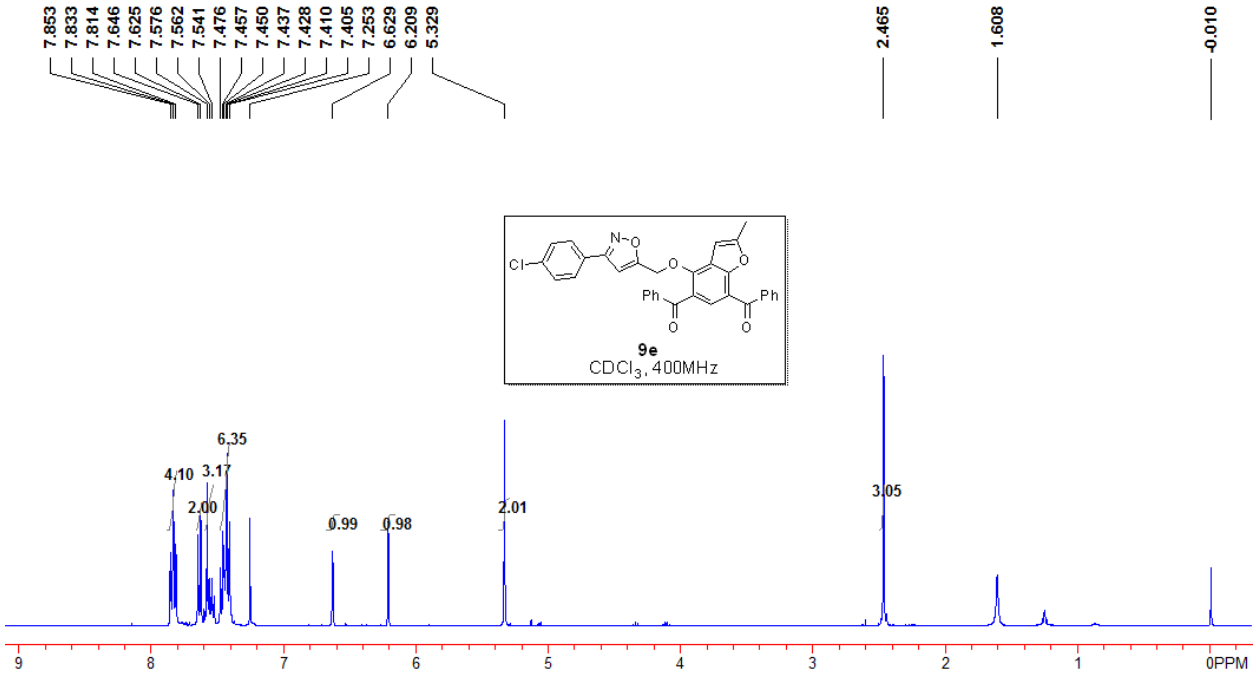
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O
Ph
Ph
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O
9e
CDCl3, 400MHz
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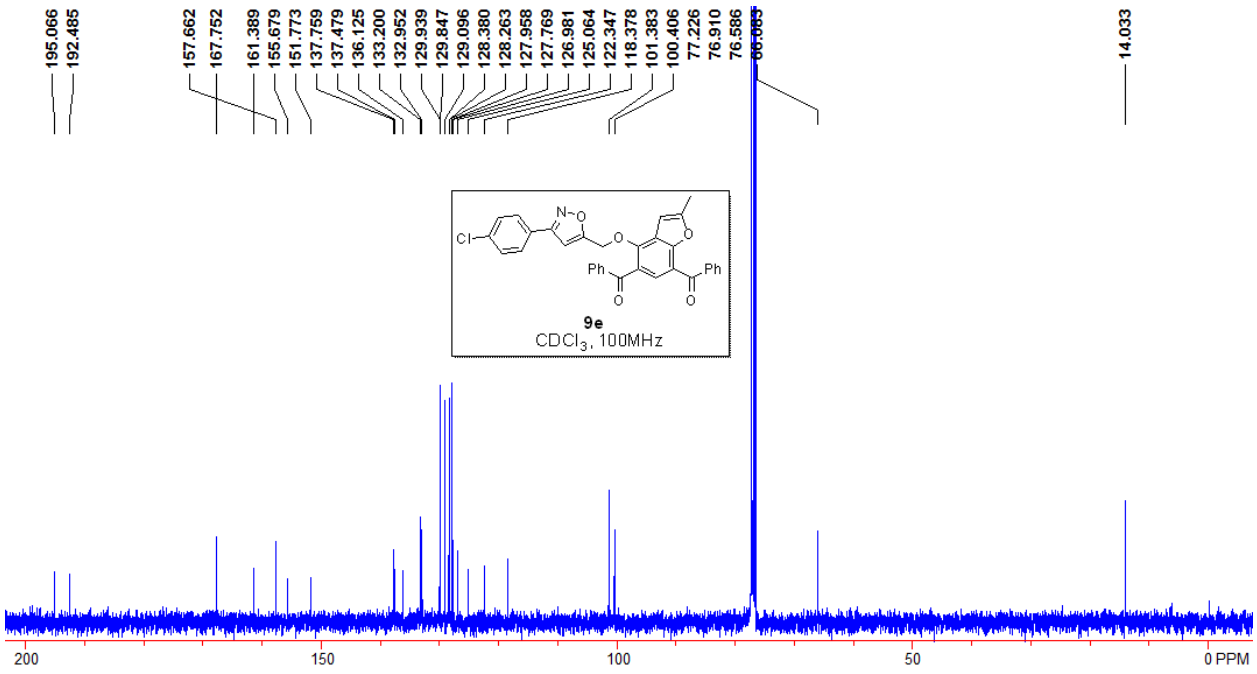
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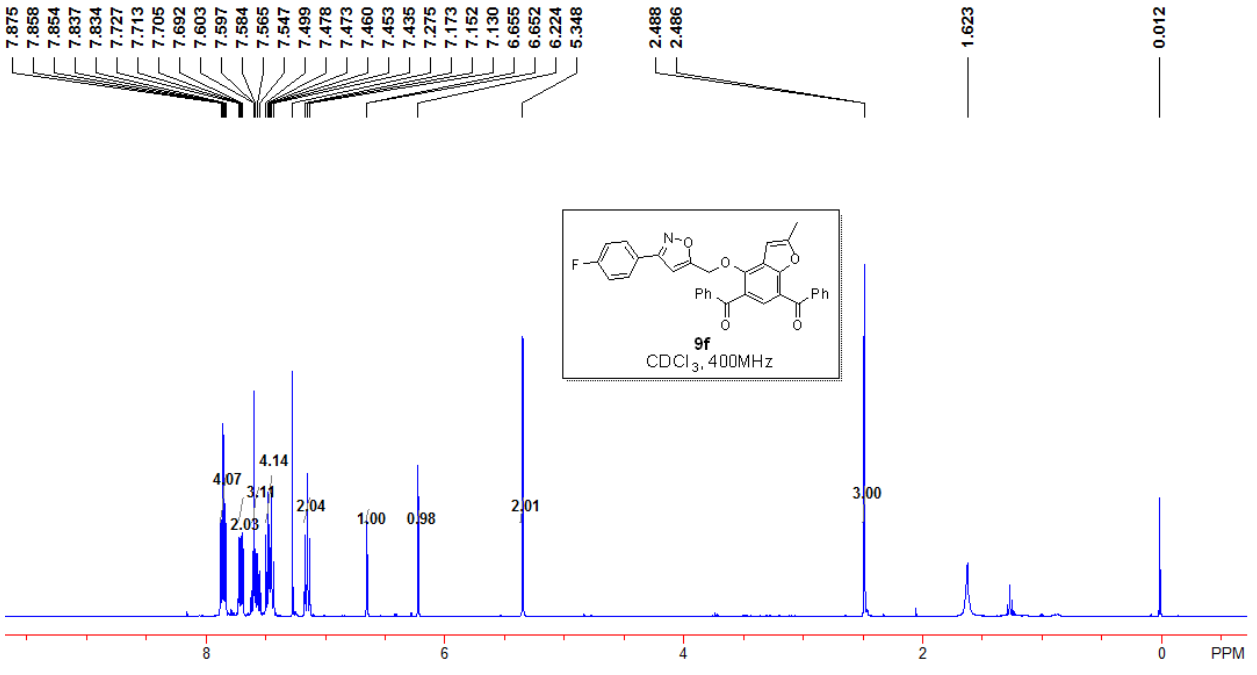
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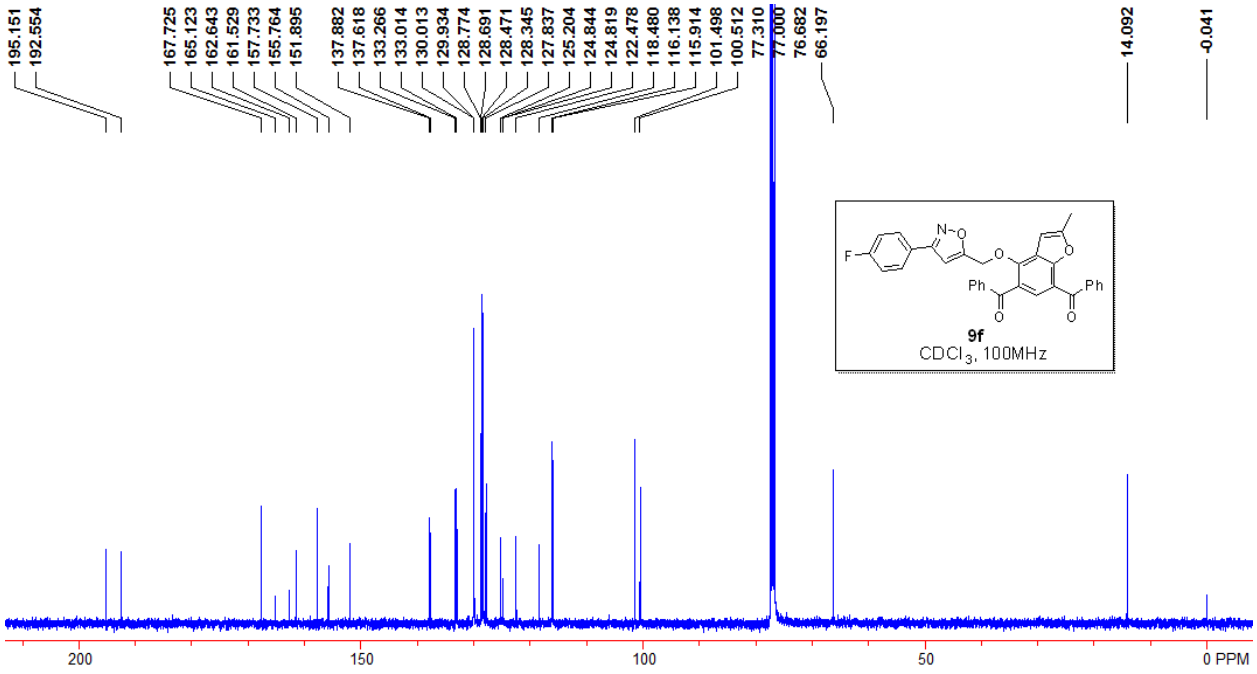
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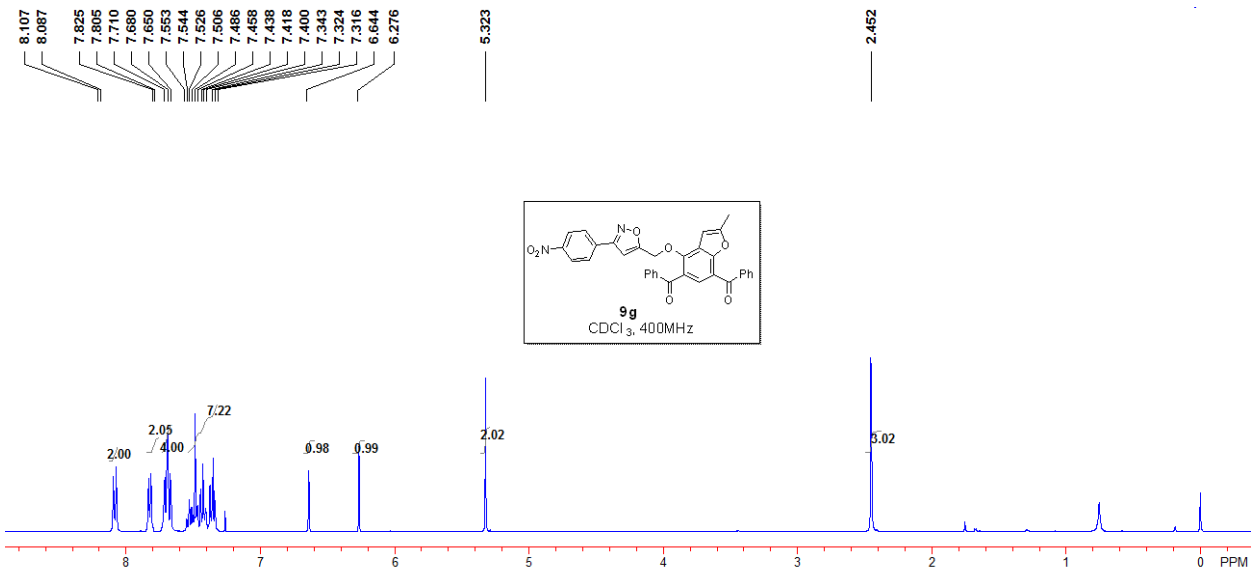
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Ph
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O
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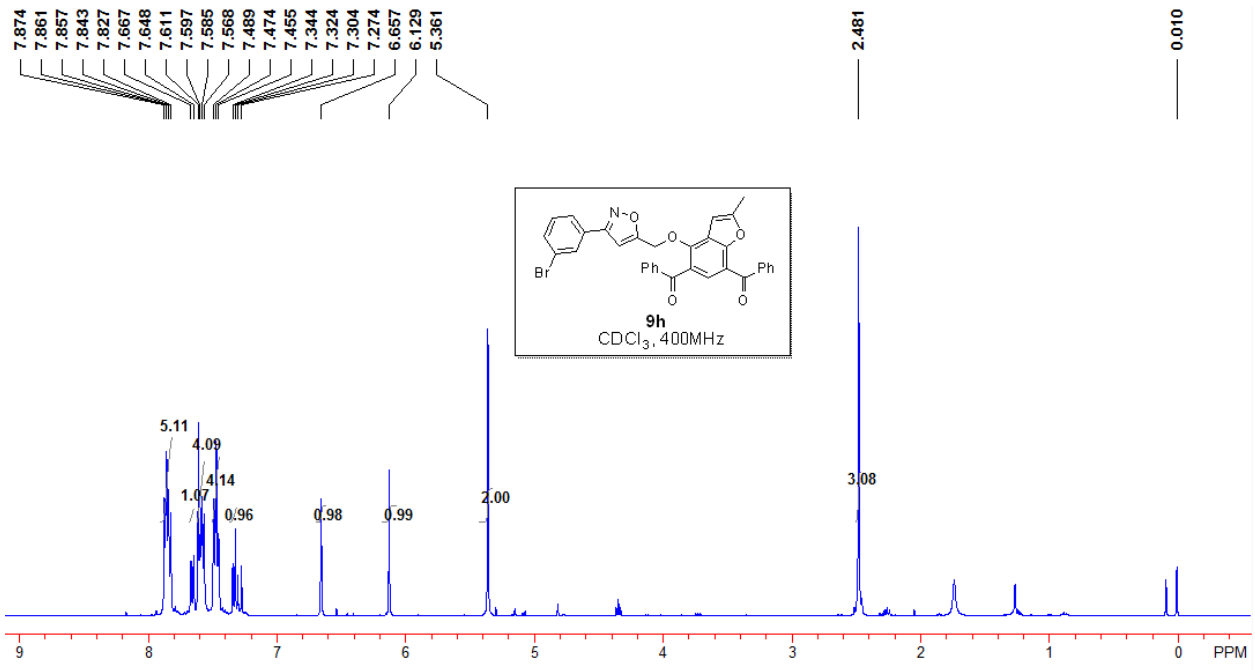
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6.129
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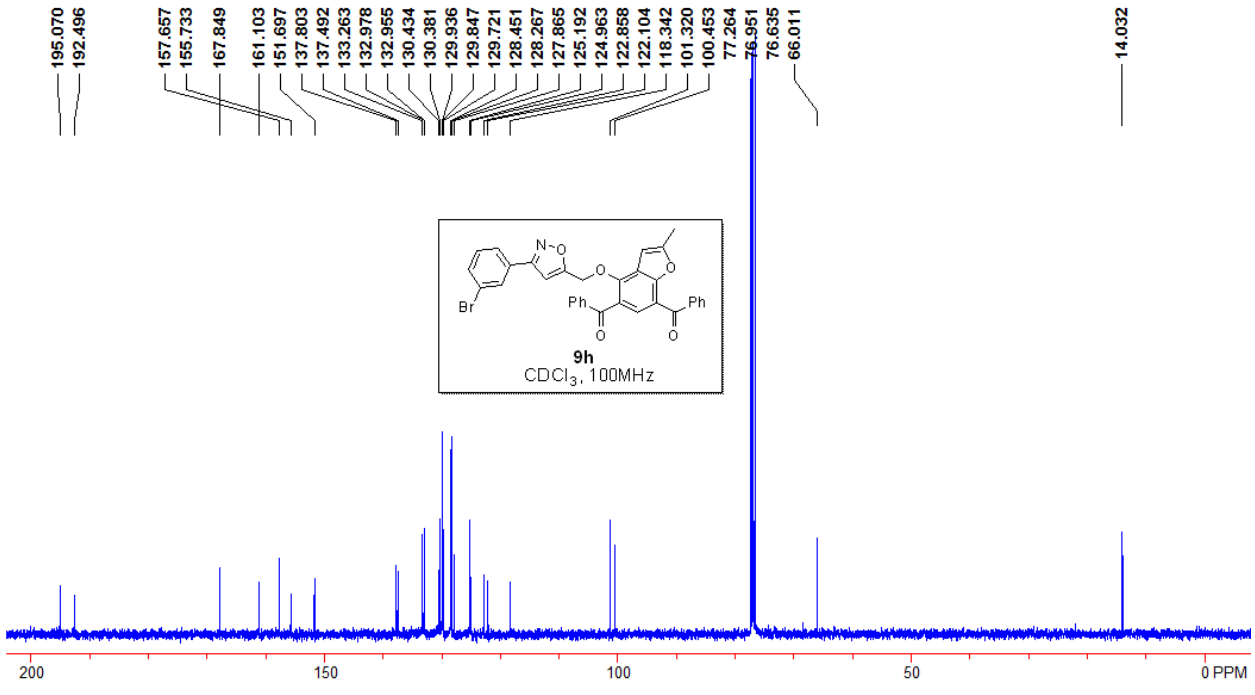
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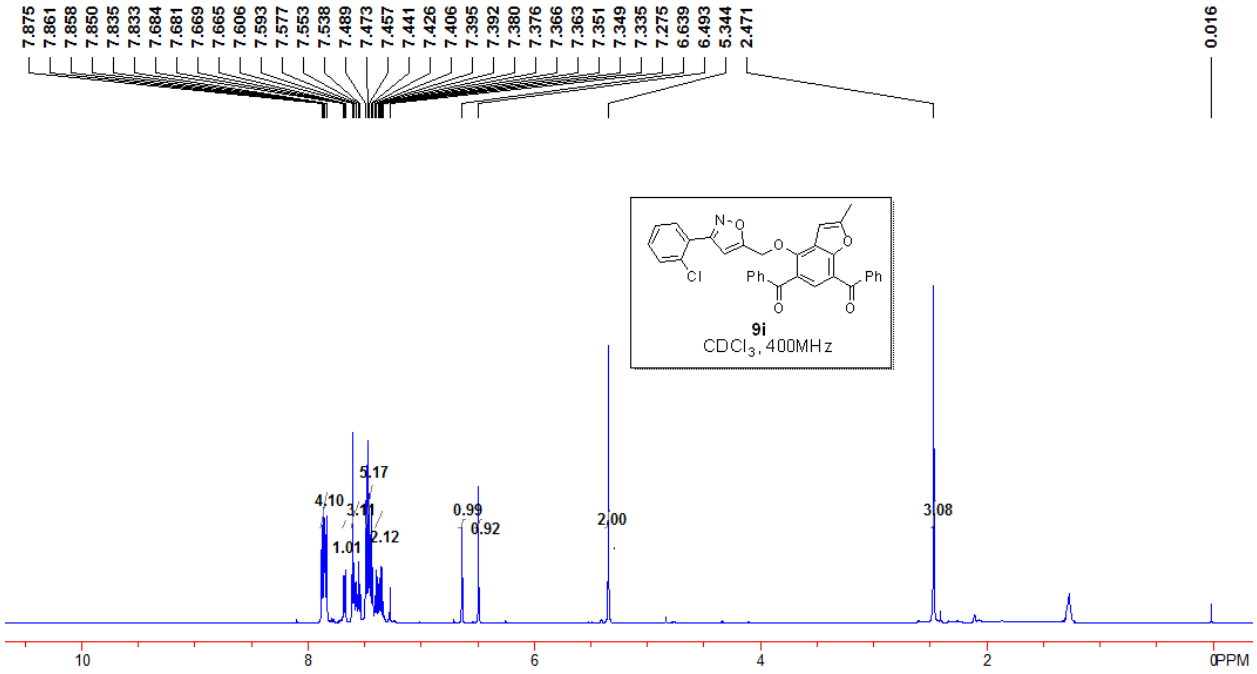
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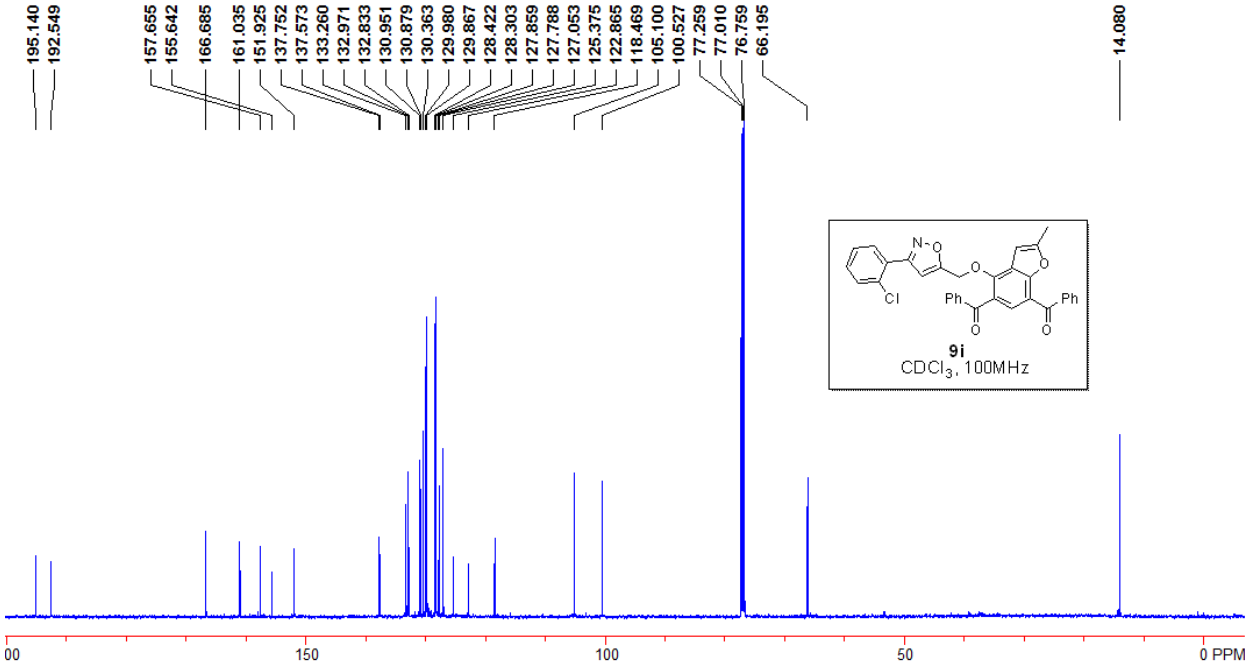
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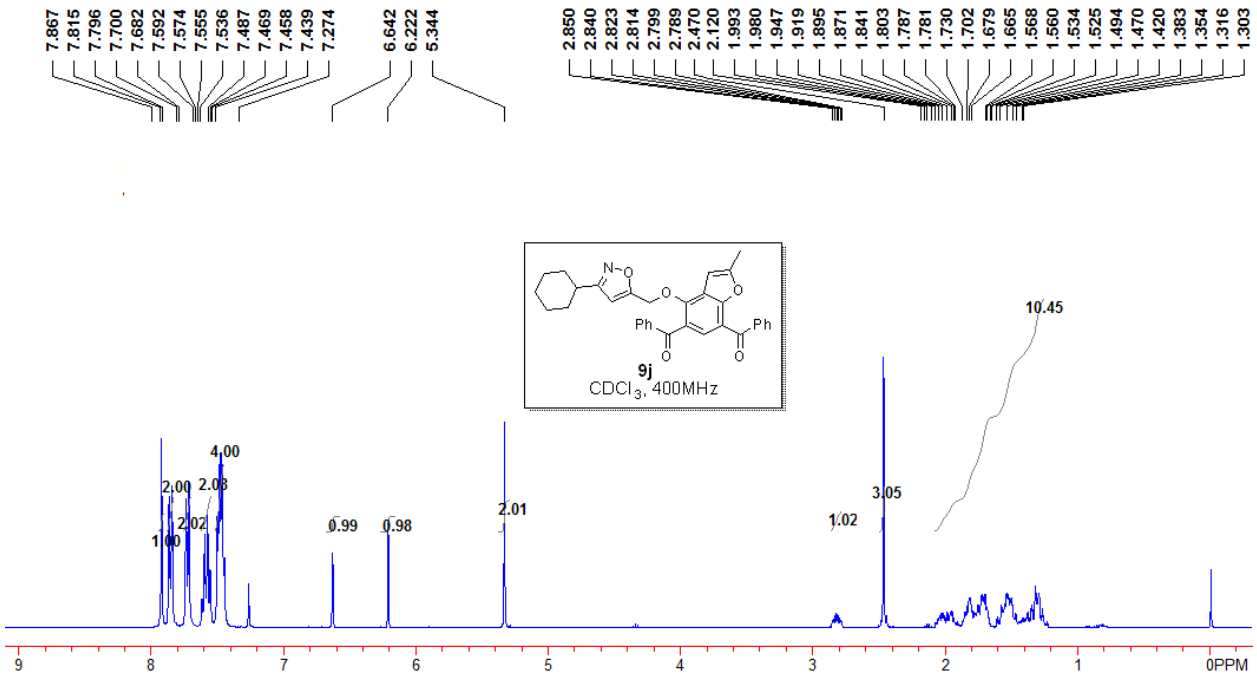
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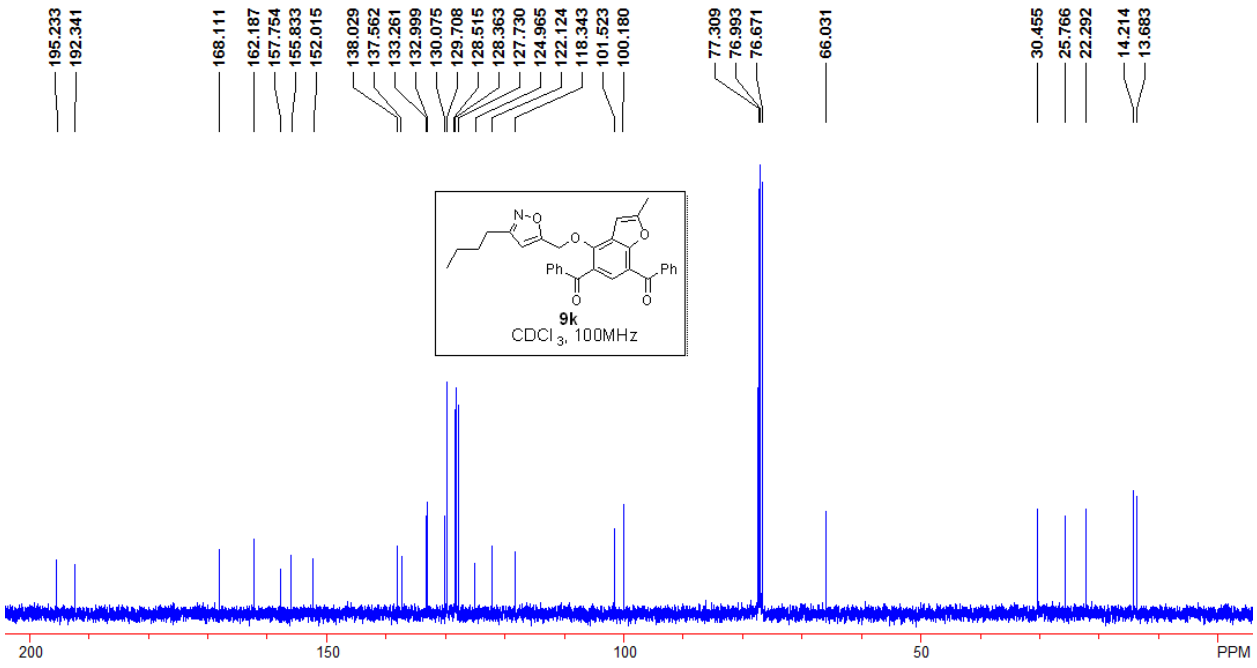
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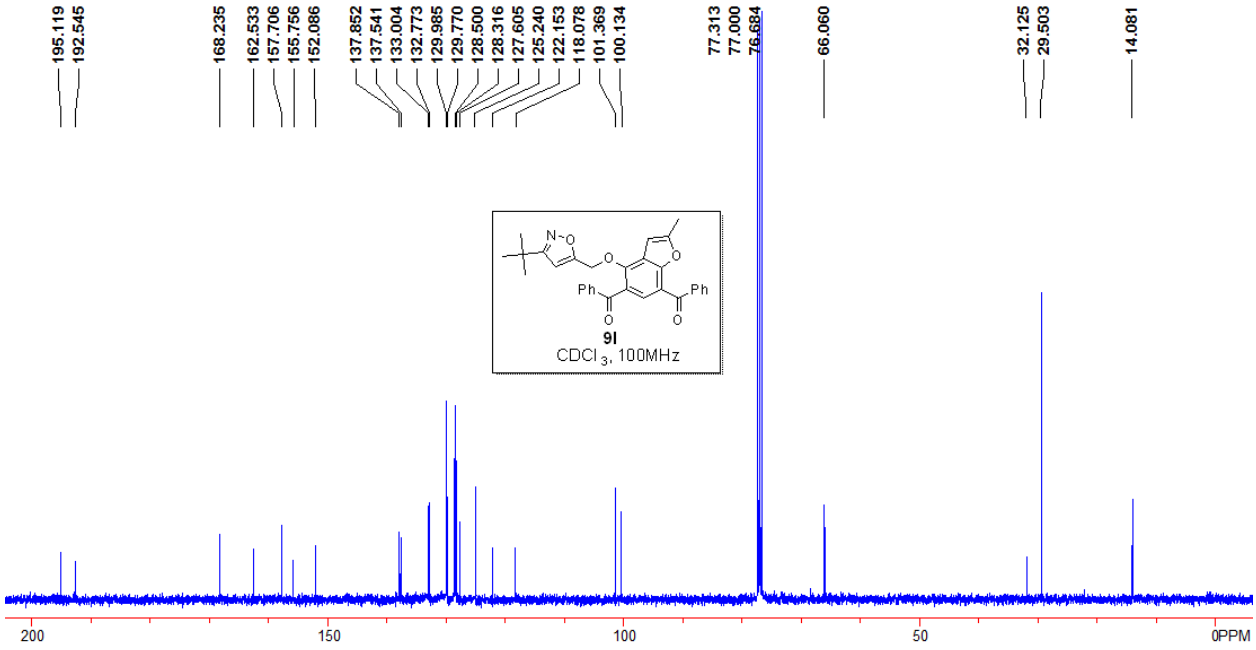
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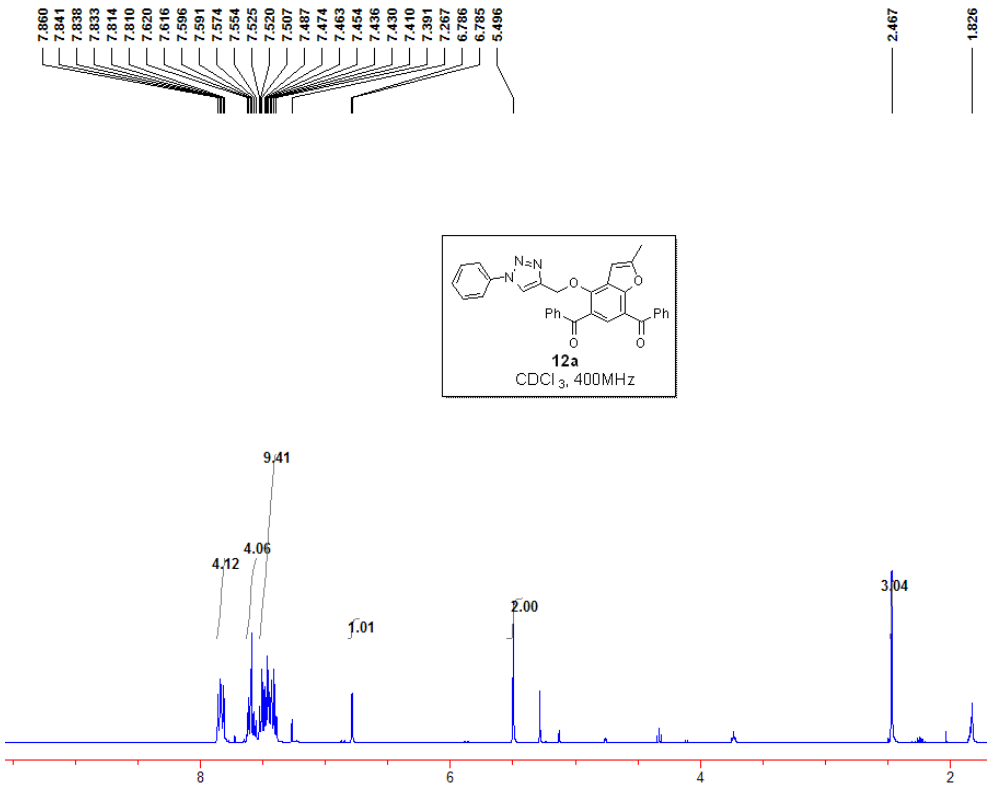
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7.267
6.786
6.785
5.496
2.467
1.826
12a
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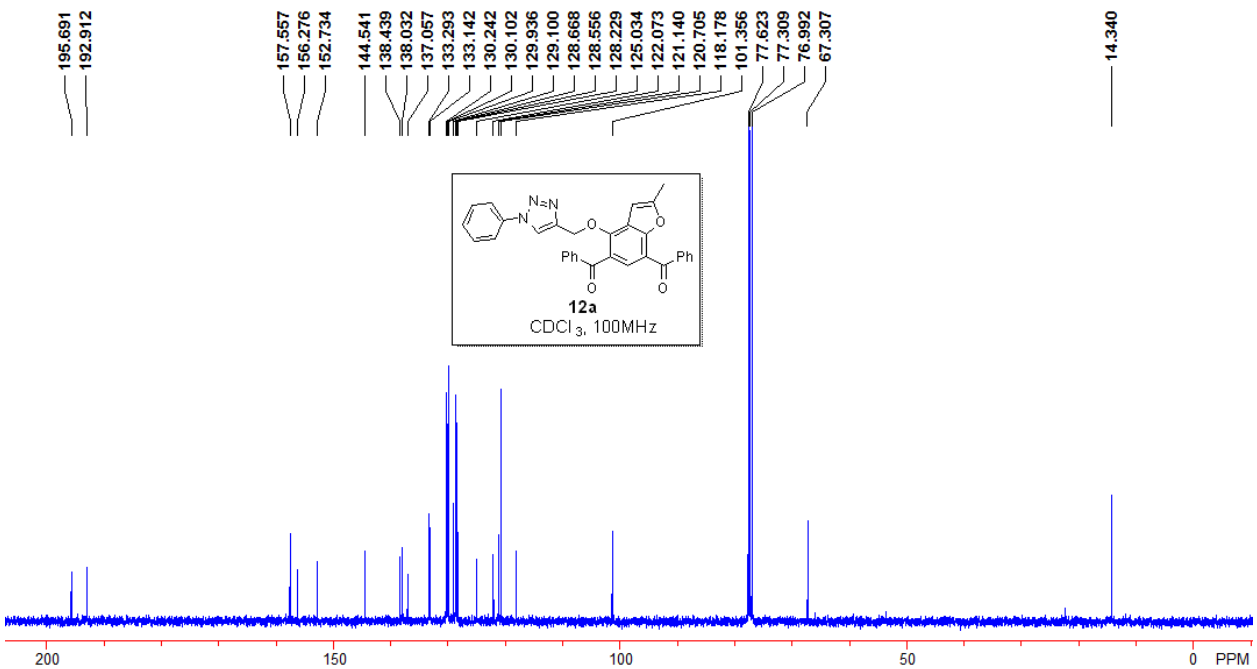
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14.340
12a
CDCl 3, 100MHz
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100
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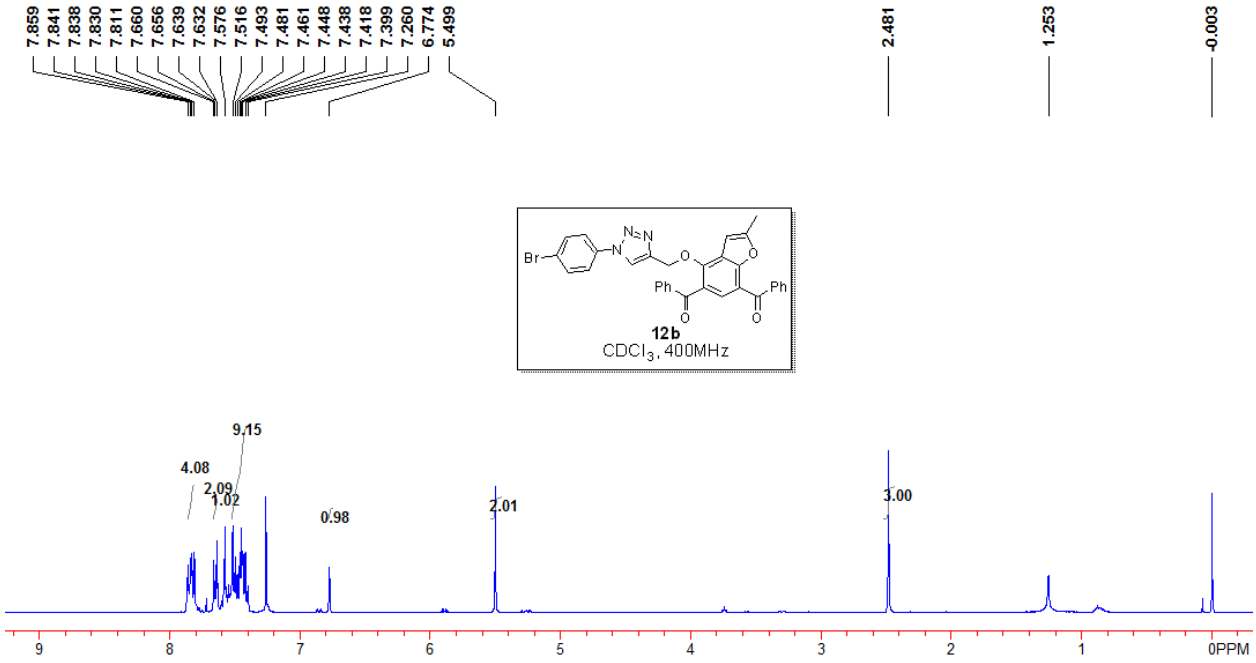
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1.253
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Br
Ph
Ph
12b
CDCl3, 400MHz
9.15
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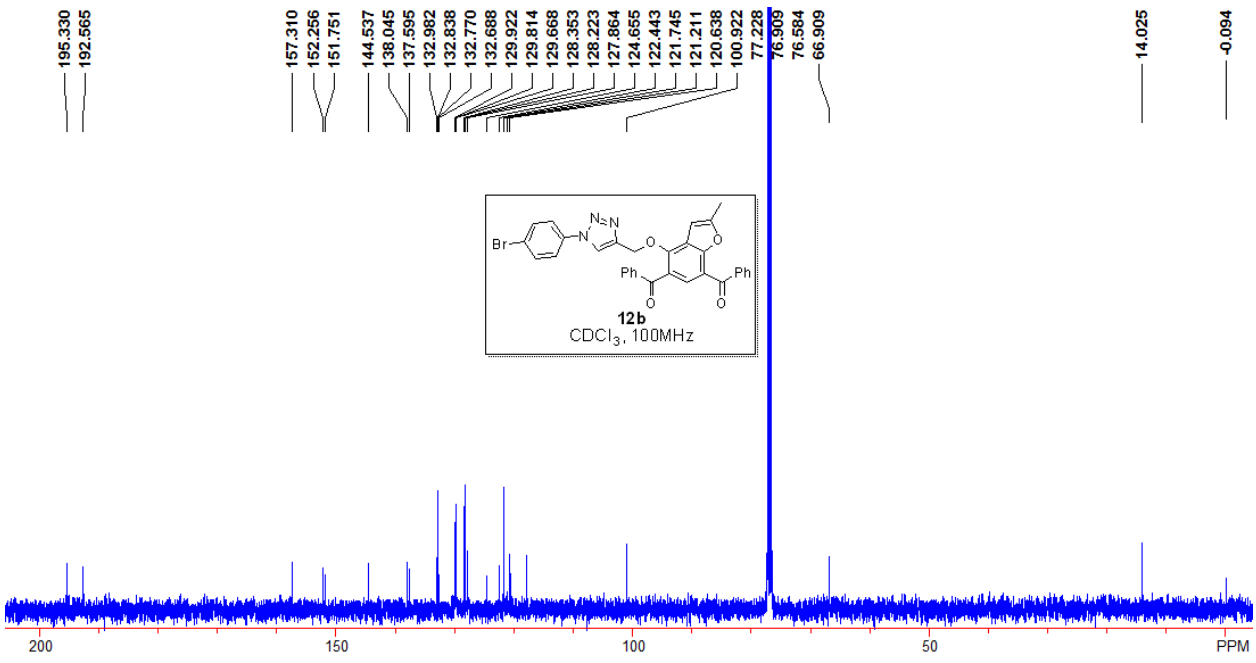
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124.655
122.443
121.745
121.211
120.638
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77.228
76.909
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Ph
Ph
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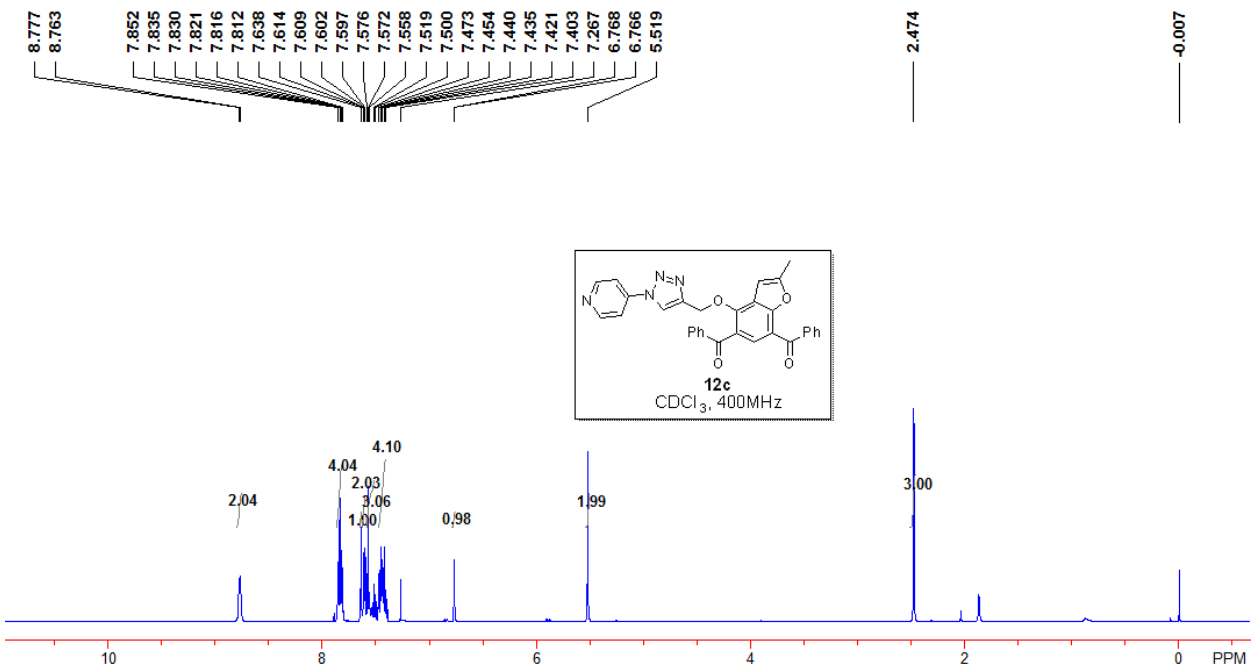
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7.597
7.576
7.572
7.558
7.519
7.500
7.473
7.454
7.440
7.435
7.421
7.403
7.267
6.768
6.766
5.519
2.474
-0.007
12c
CDCl3, 400MHz
2.04
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2.03
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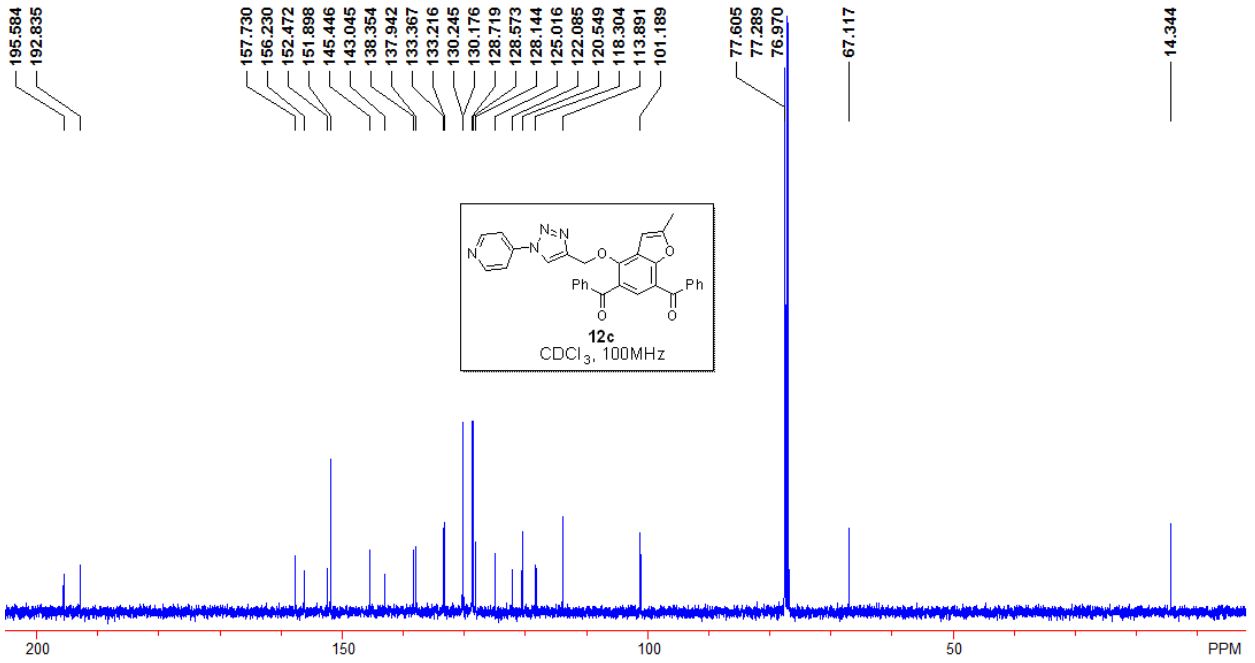
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130.176
128.719
128.573
128.144
125.016
122.085
120.549
118.304
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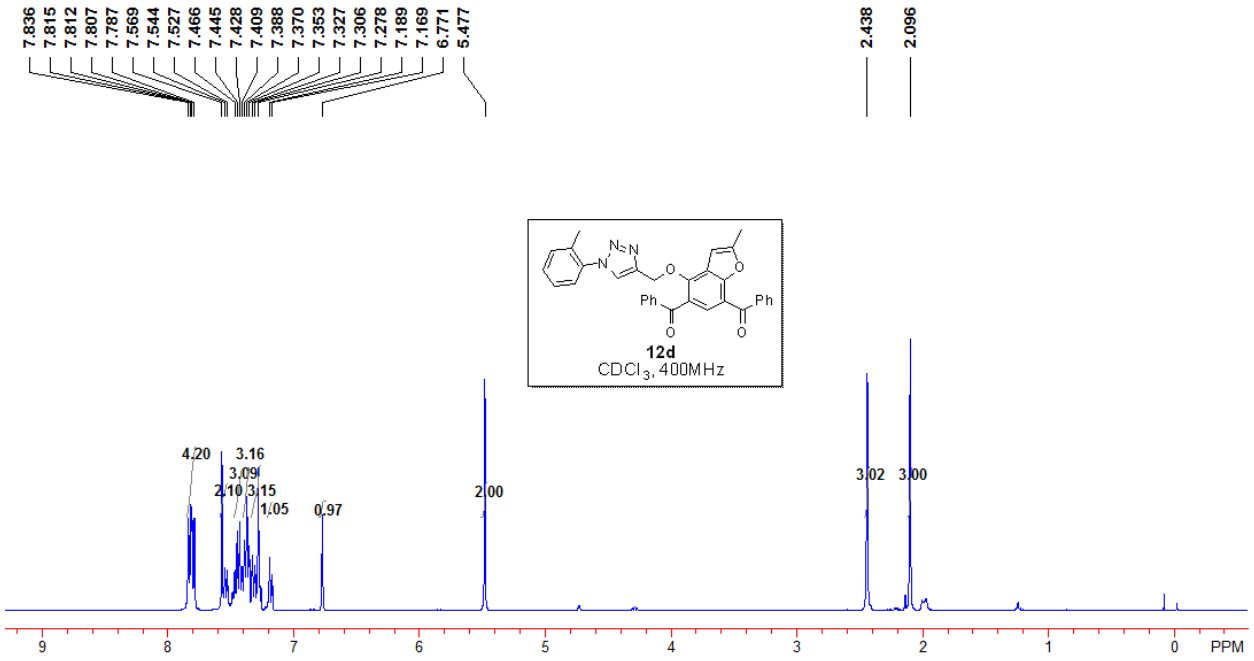
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7.370
7.353
7.327
7.306
7.278
7.189
7.169
6.771
5.477
2.438
2.096
12d
CDCl3, 400MHz
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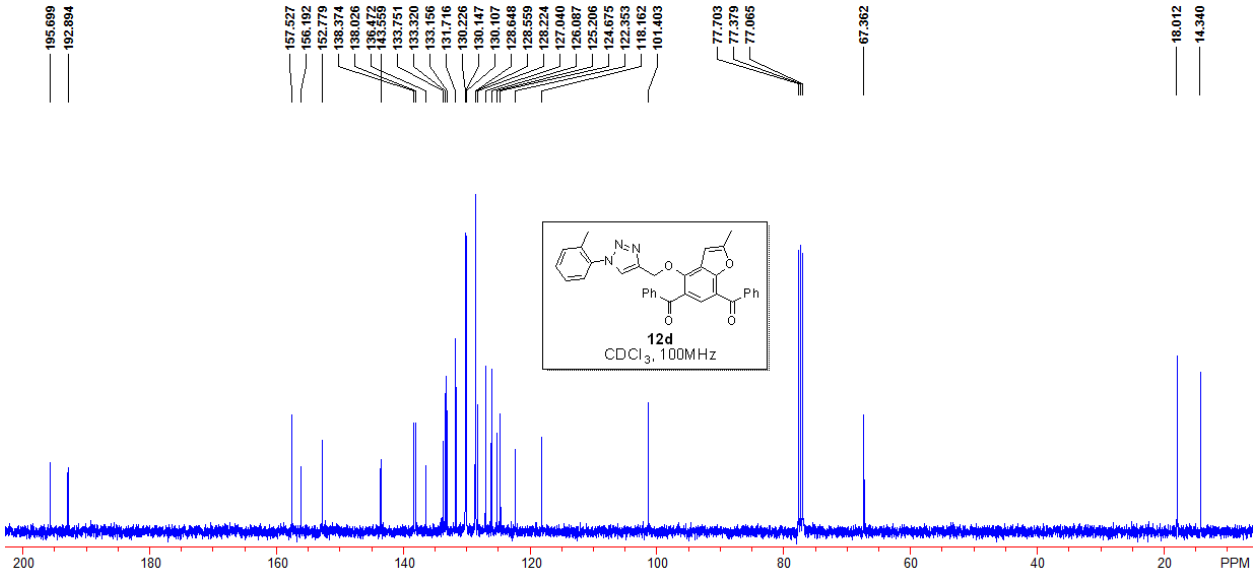
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130.147
130.107
128.648
128.559
128.224
127.040
126.087
125.206
124.675
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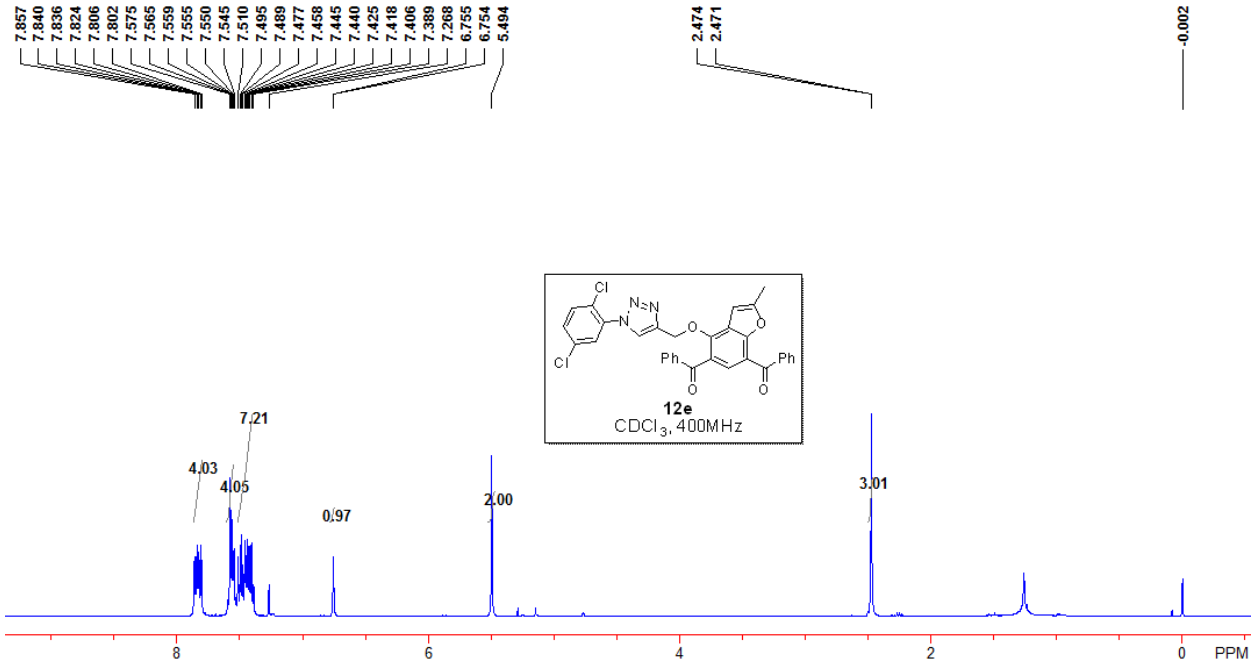
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7.545
7.510
7.495
7.489
7.477
7.458
7.445
7.440
7.425
7.418
7.406
7.389
7.268
6.755
6.754
5.494
2.474
2.471
-0.002
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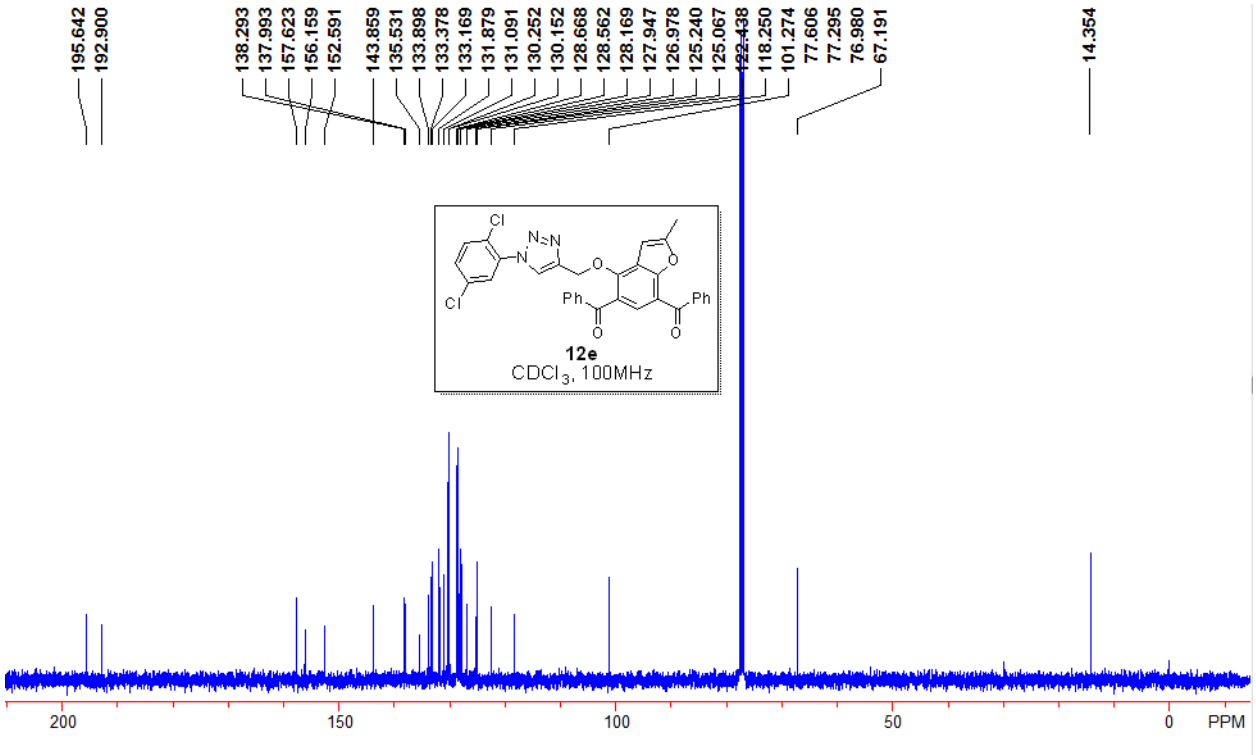
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131.091
130.252
130.152
128.668
128.562
128.169
127.947
126.978
125.240
125.067
122.438
118.250
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76.980
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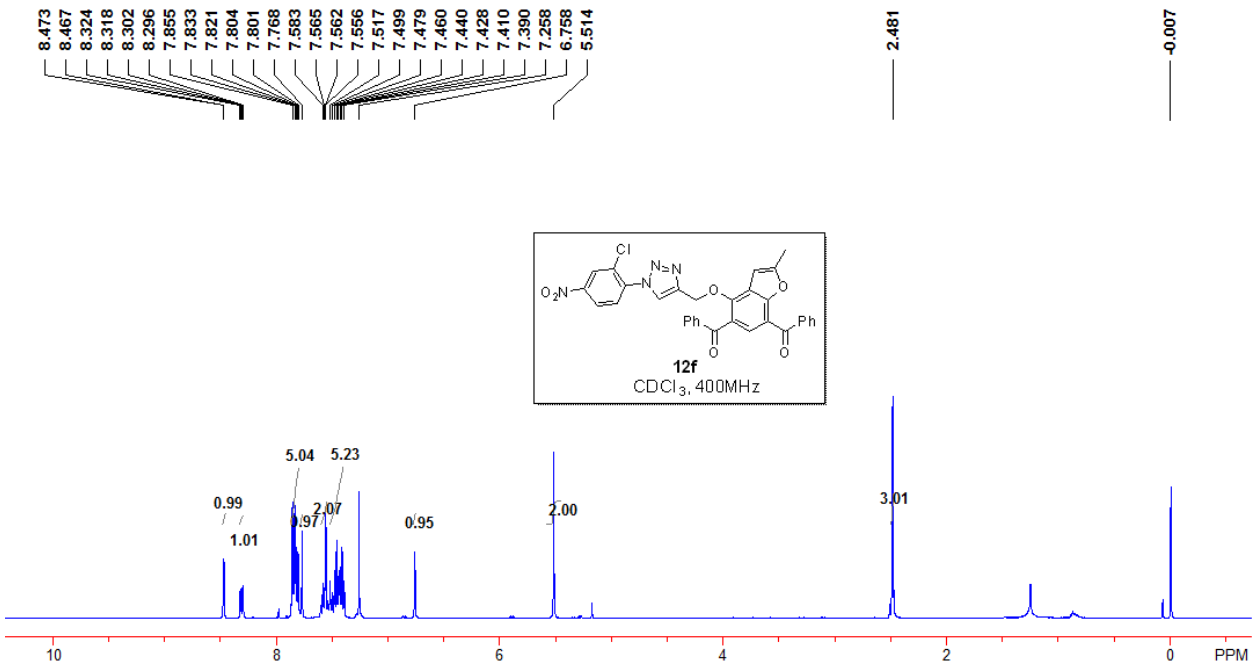
PPM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7.833
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7.583
7.565
7.562
7.556
7.517
7.499
7.479
7.460
7.440
7.428
7.410
7.390
7.258
6.758
5.514
2.481
-0.007
12f
CDCl3, 400MHz
5.04
5.23
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1.01
2.07
0.97
0.95
2.00
3.01
10
8
6
4
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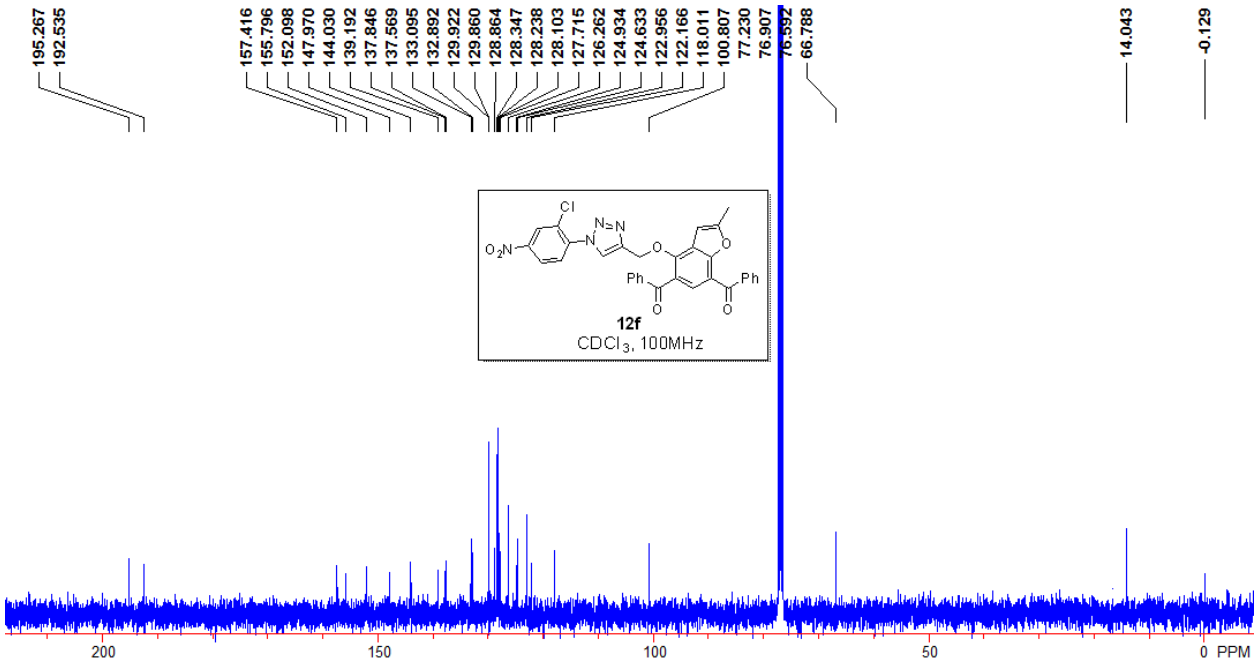
PPM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128.864
128.347
128.238
128.103
127.715
126.262
124.934
124.633
122.956
122.166
118.011
100.807
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CDCl3, 100MHz
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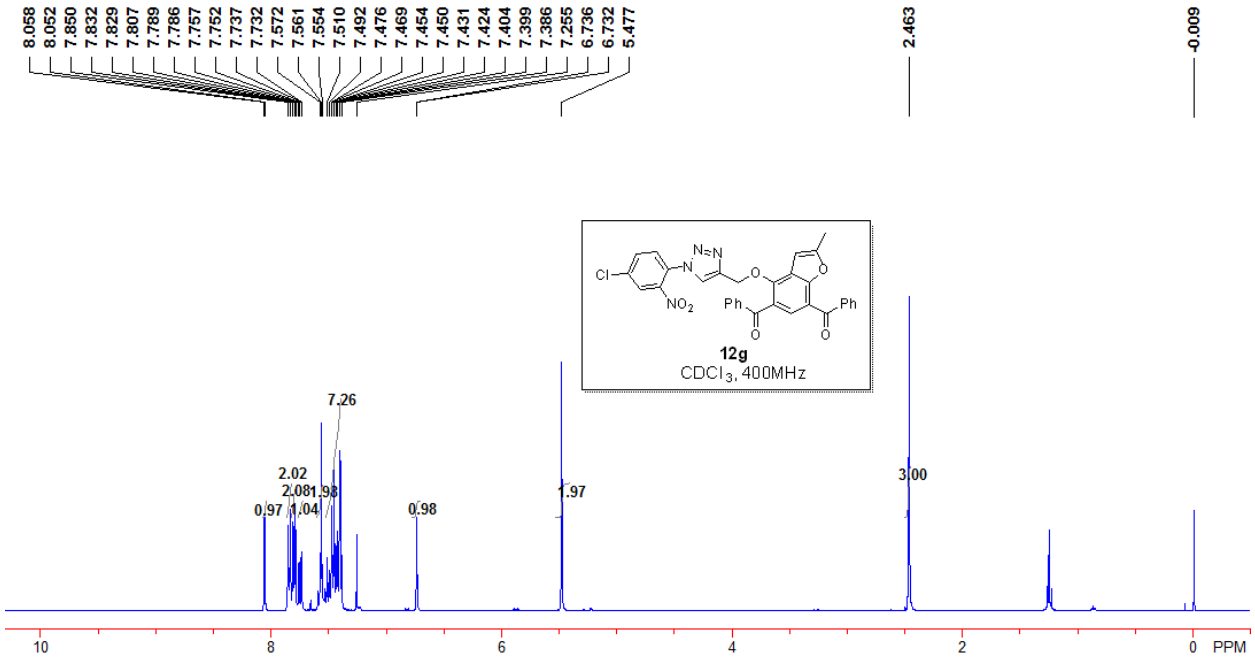
100
50
0
PPM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7.832
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7.807
7.789
7.786
7.757
7.752
7.737
7.732
7.572
7.561
7.554
7.510
7.492
7.476
7.469
7.454
7.450
7.431
7.424
7.404
7.399
7.386
7.255
6.736
6.732
5.477
2.463
-0.009
12g
CDCl3, 400MHz
7.26
2.02
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1.93
0.97
1.04
0.98
1.97
3.00
10
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6
4
2
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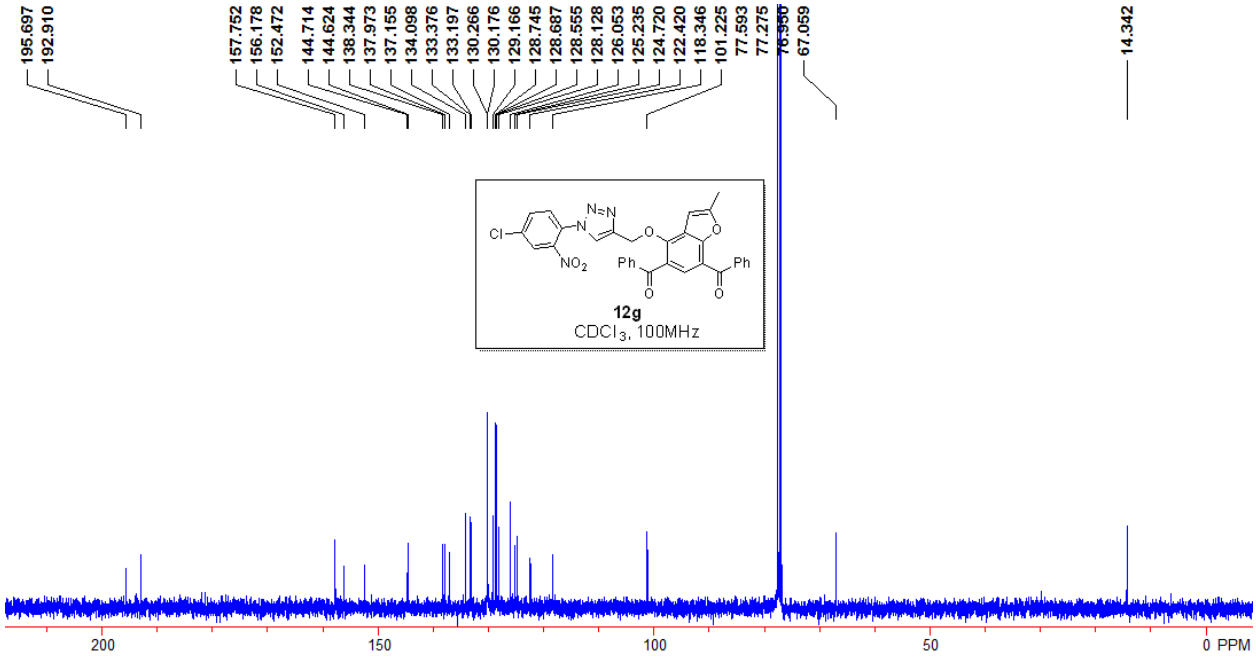
PPM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133.197
130.266
130.176
129.166
128.745
128.687
128.555
128.128
126.053
125.235
124.720
122.420
118.346
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CDCl3, 100MHz
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100
50
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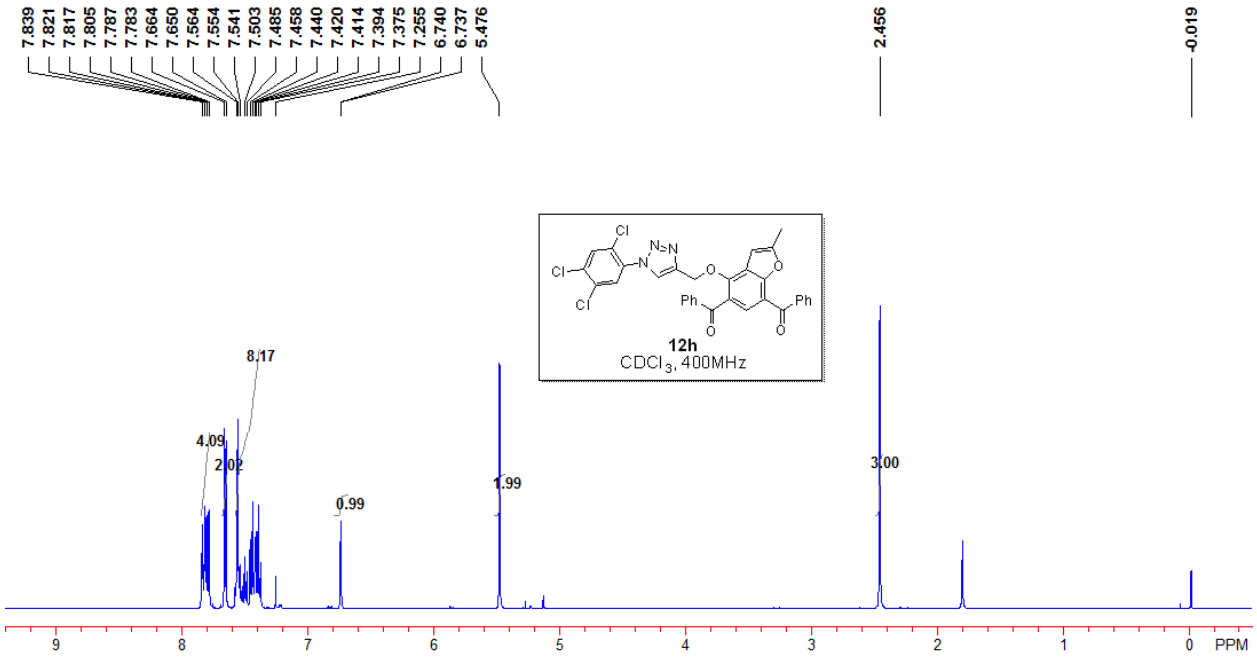
PPM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7.554
7.541
7.503
7.485
7.458
7.440
7.420
7.414
7.394
7.375
7.255
6.740
6.737
5.476
2.456
-0.019
12h
CDCl3, 400MHz
8.17
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7
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5
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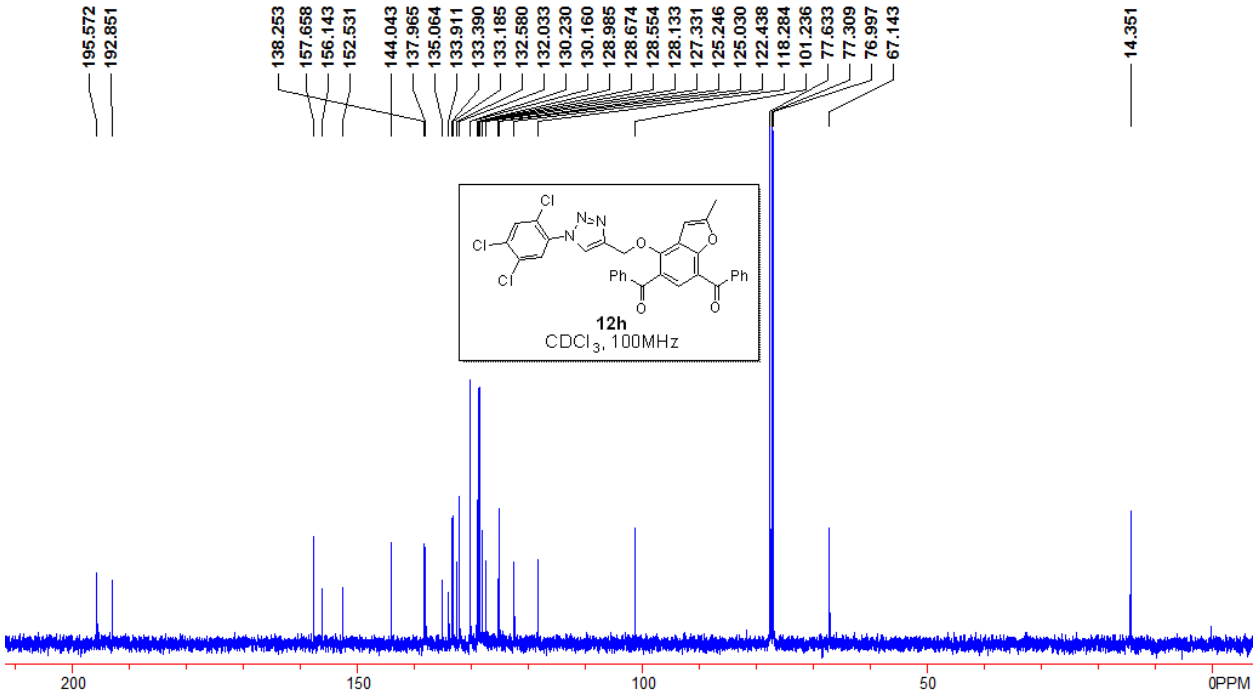
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132.580
132.033
130.230
130.160
128.985
128.674
128.554
128.133
127.331
125.246
125.030
122.438
118.284
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77.309
76.997
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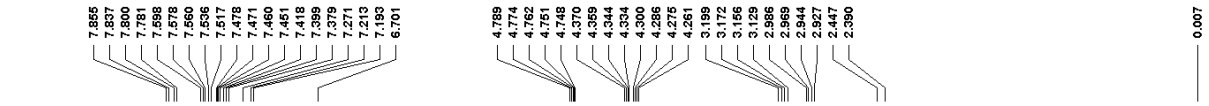
CDCl3, 100MHz
200
150
100
50
0PPM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7.451
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7.213
7.193
6.701
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4.762
4.751
4.748
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4.359
4.344
4.334
4.300
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4.275
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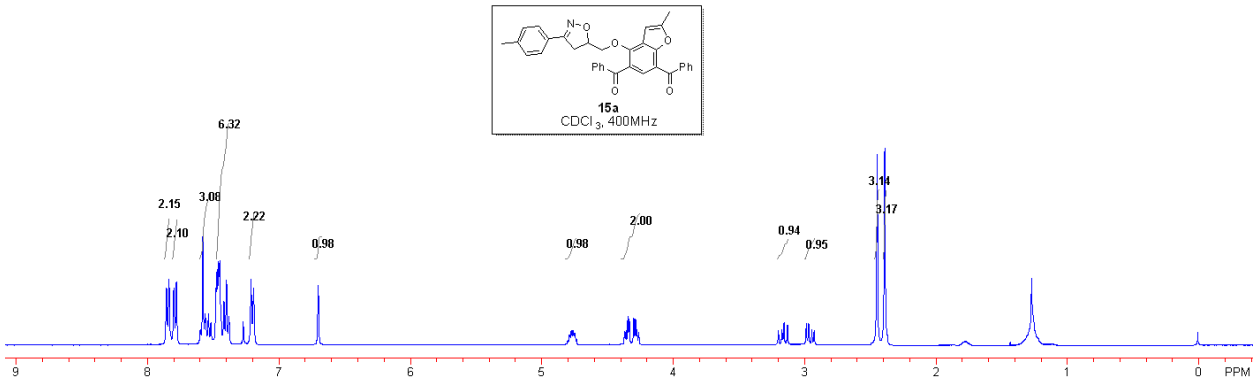
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3.08
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2.10
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0.98
0.98
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0.95
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3
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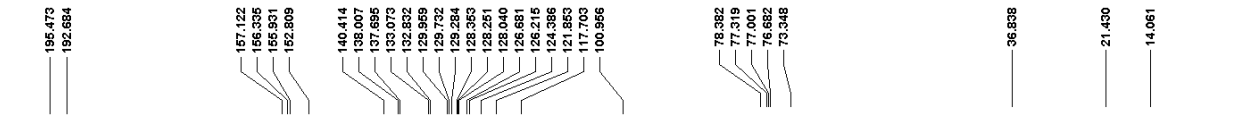
PPM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129.732
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128.353
128.251
128.040
126.681
126.215
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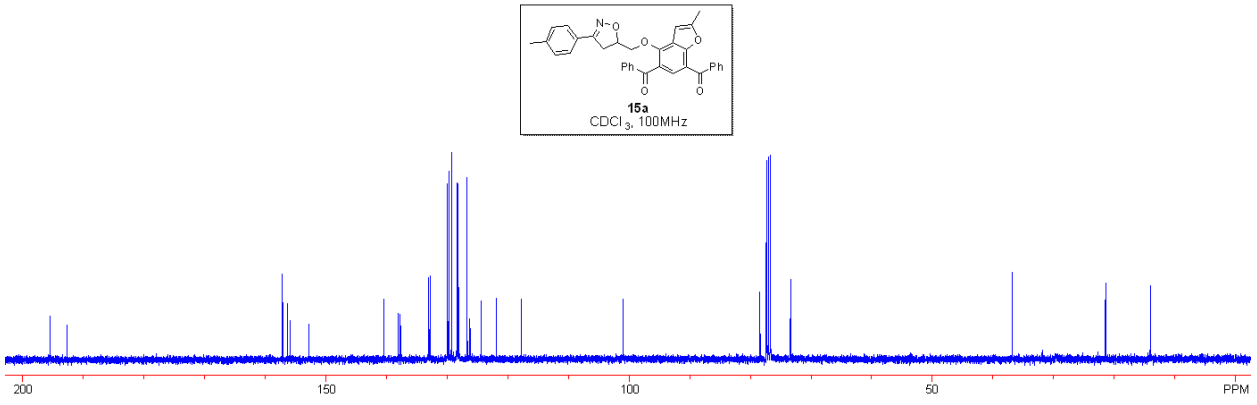
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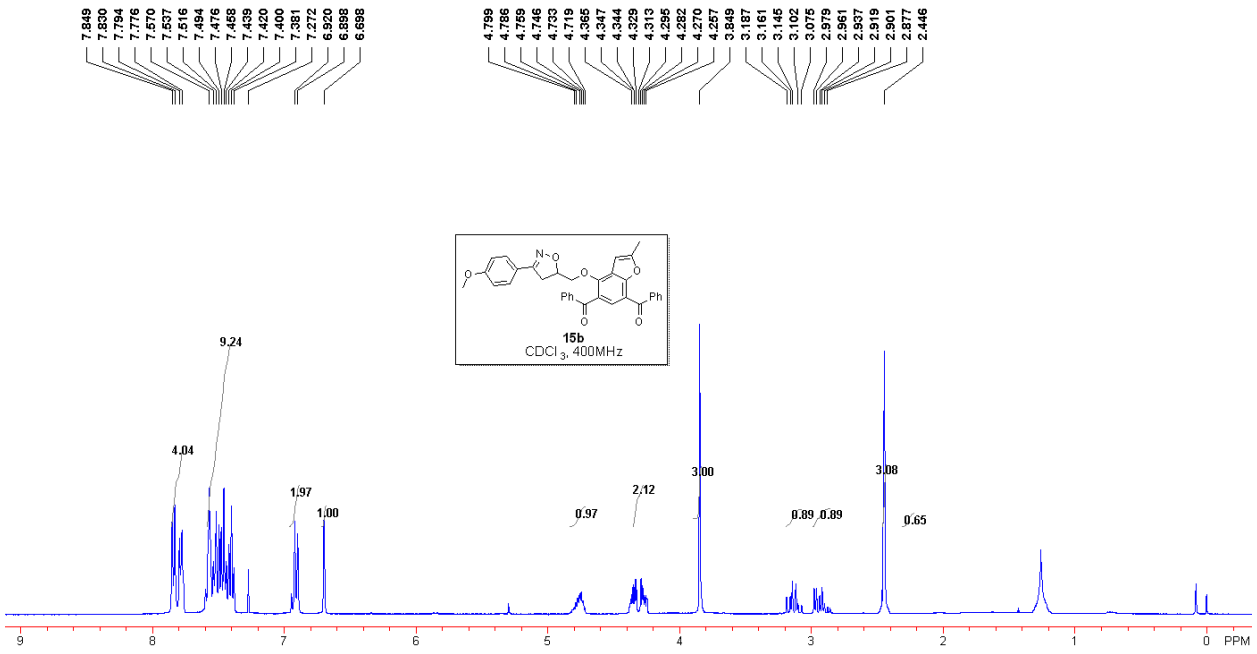
CDCl3, 100MHz
200
150
100
50
PPM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7.439
7.420
7.400
7.381
7.272
6.920
6.898
6.698
4.799
4.786
4.769
4.746
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4.719
4.365
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4.344
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4.313
4.295
4.282
4.270
4.257
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3.187
3.161
3.145
3.102
3.075
2.979
2.961
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2.901
2.877
2.446
15b
CDCl3, 400MHz
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1.00
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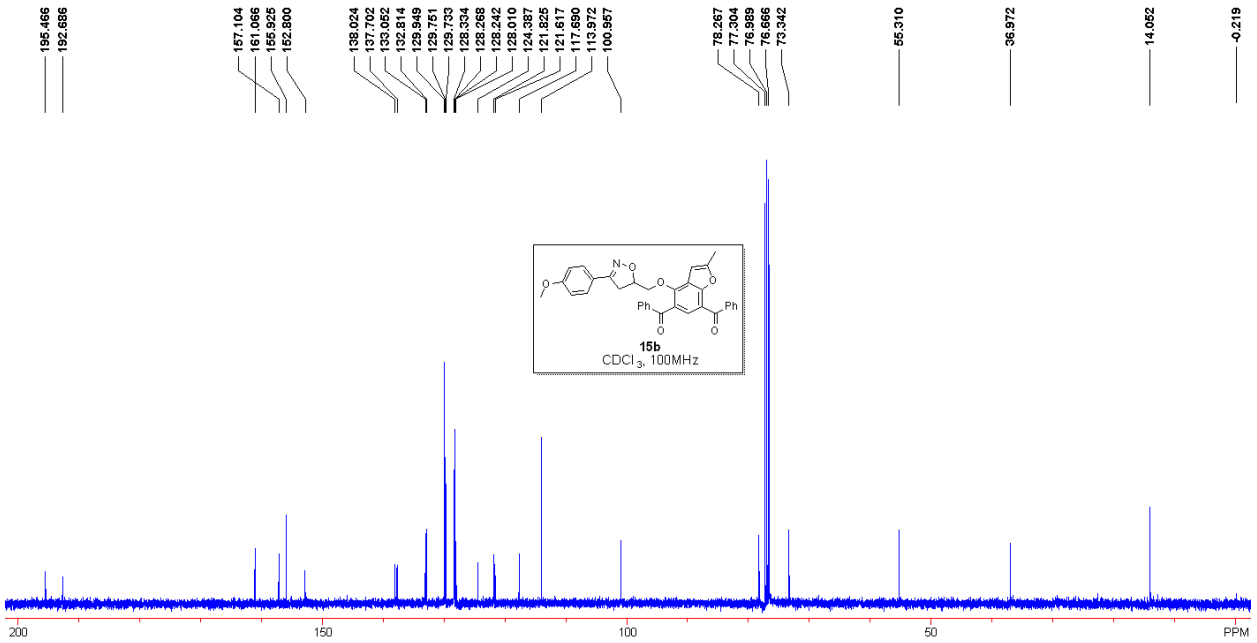
PPM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121.617
117.690
113.972
100.957
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76.666
73.342
55.310
36.972
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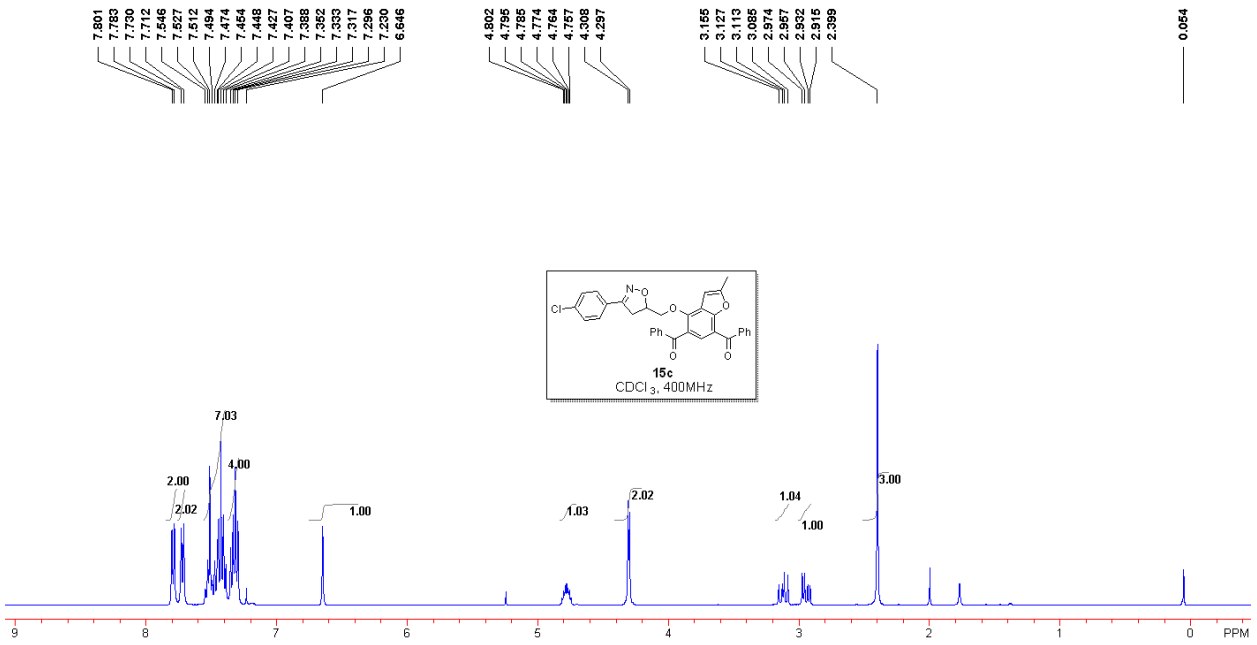
-0.219
15b
CDCl3, 100MHz
PPM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7.407
7.388
7.352
7.333
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7.296
7.230
6.646
4.802
4.795
4.785
4.774
4.764
4.757
4.308
4.297
3.155
3.127
3.113
3.085
2.974
2.957
2.932
2.915
2.399
0.054
15c
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1.03
2.02
1.04
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3.00
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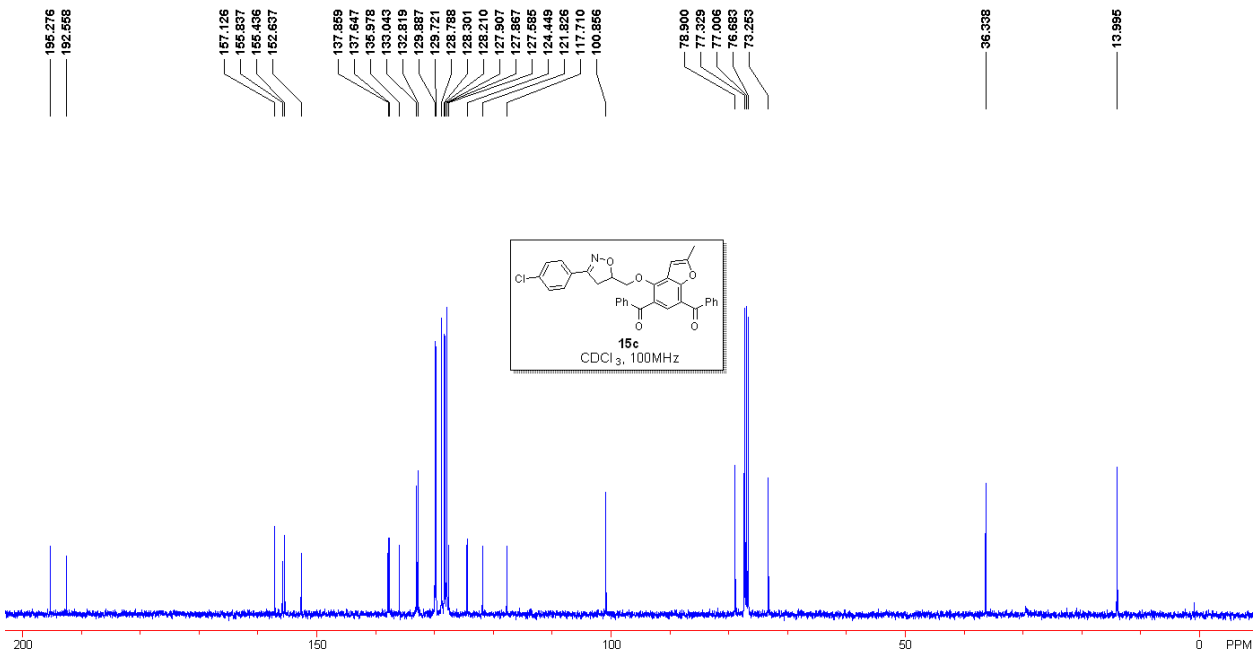
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128.301
128.210
127.907
127.867
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124.449
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77.329
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76.683
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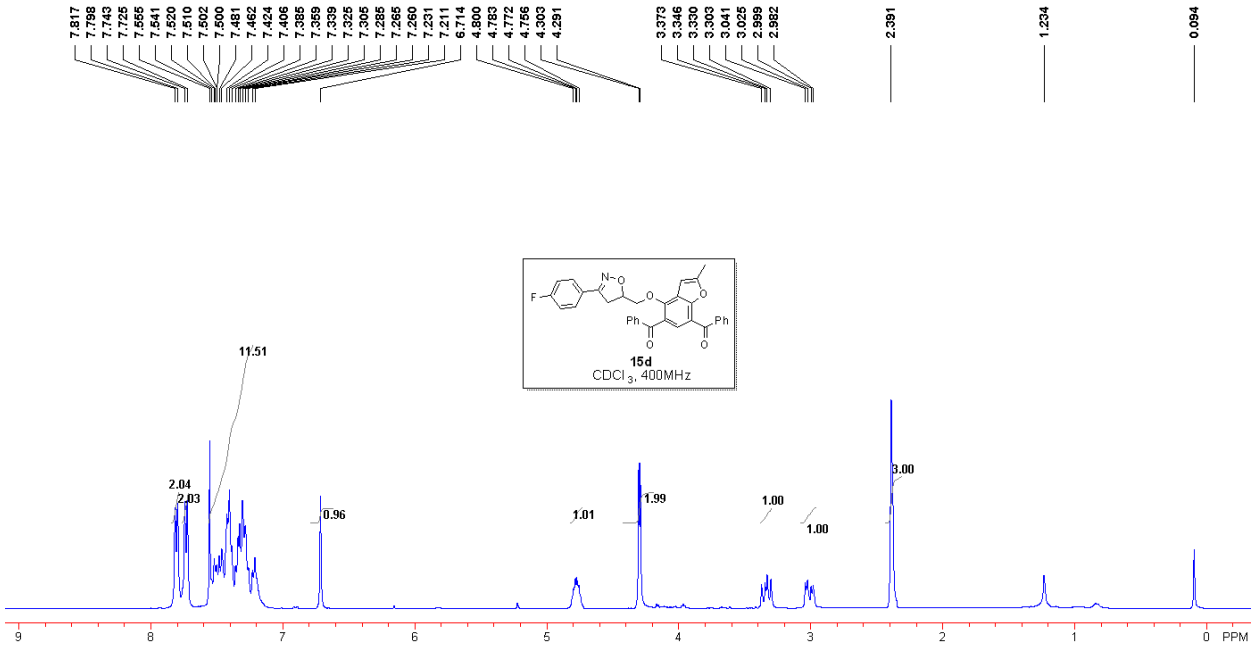
CDCl 3, 100MHz
PPM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7.481
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7.424
7.406
7.385
7.369
7.339
7.325
7.305
7.285
7.265
7.260
7.231
7.211
6.714
4.800
4.783
4.772
4.756
4.303
4.291
3.373
3.346
3.330
3.303
3.041
3.025
2.999
2.982
2.391
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15d
CDCl 3, 400MHz
11.51
2.04
2.03
0.96
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1.00
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5
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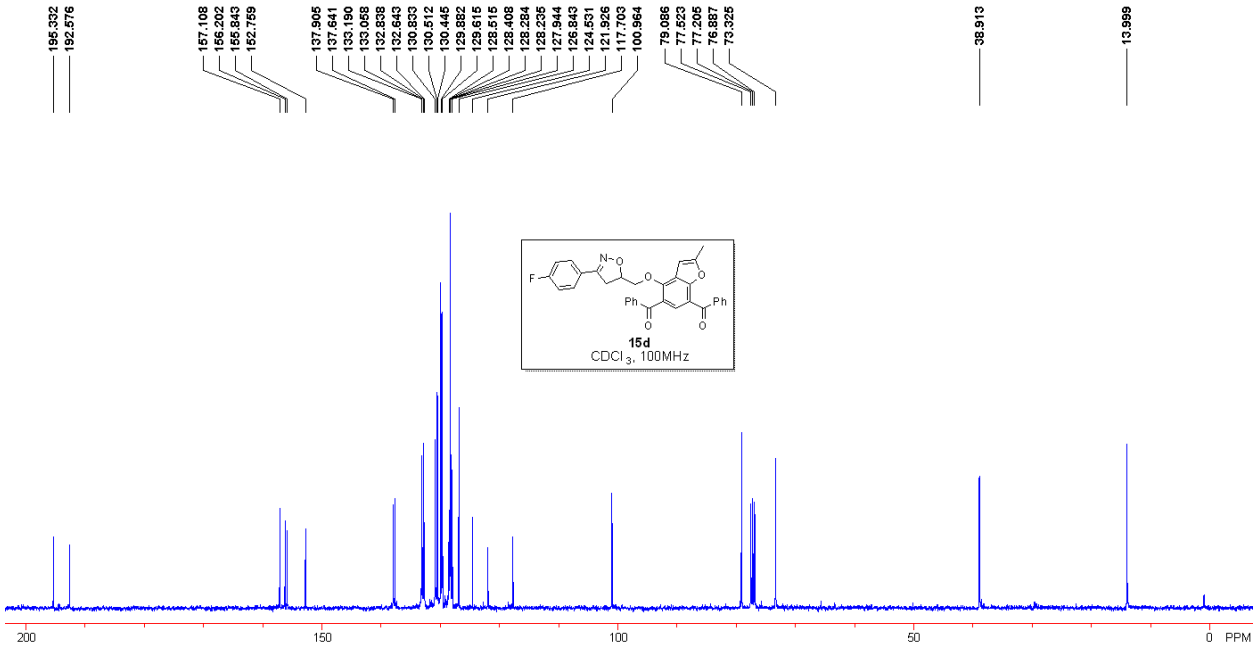
PPM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130.833
130.512
130.445
129.882
129.615
128.515
128.408
128.284
128.235
127.944
126.843
124.531
121.926
117.703
100.964
79.086
77.523
77.205
76.887
73.325
38.913
13.999
15d
CDCl 3, 100MHz
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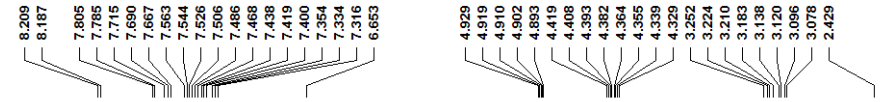
PPM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7.526
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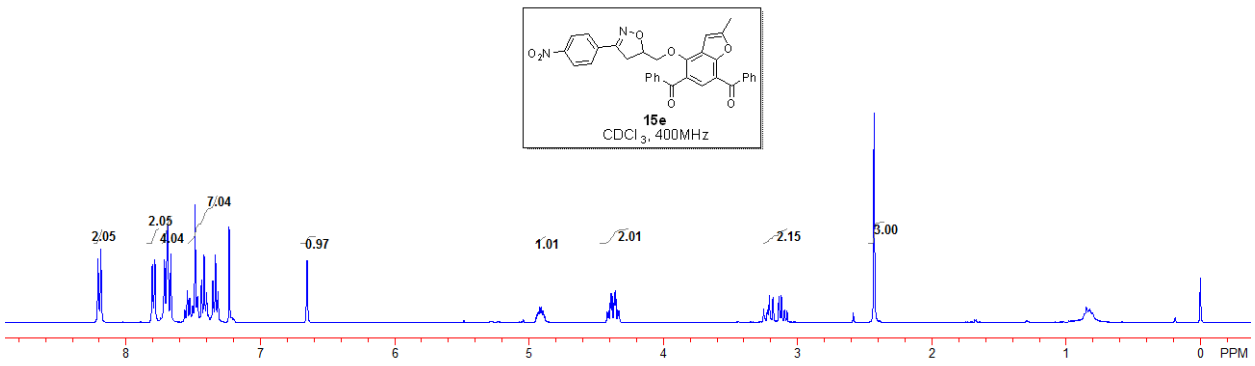
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CDCl 3, 400MHz
2.05
2.05
4.04
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0.97
1.01
2.01
2.15
3.00
8
7
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5
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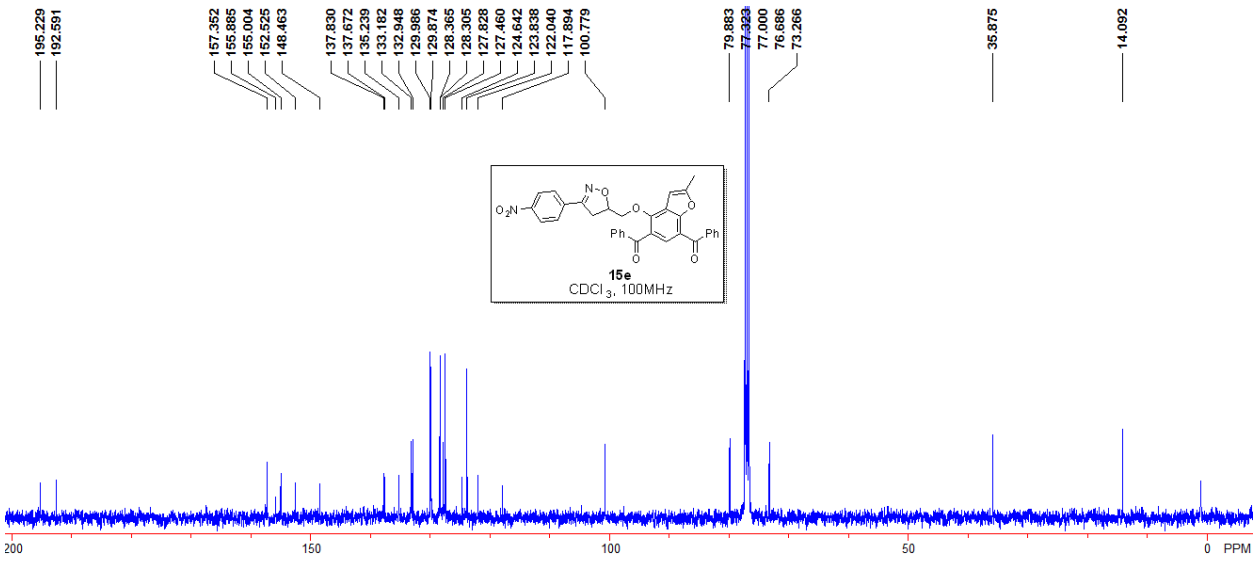
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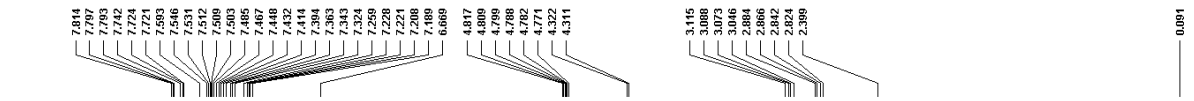
192.591
157.352
155.885
155.004
152.525
148.463
137.830
137.672
135.239
133.182
132.948
129.986
129.874
128.365
128.305
127.828
127.460
124.642
123.838
122.040
117.894
100.779
79.883
77.323
77.000
76.686
73.266
35.875
14.092
15e
CDCl 3, 100MHz
200
150
100
50
0
PPM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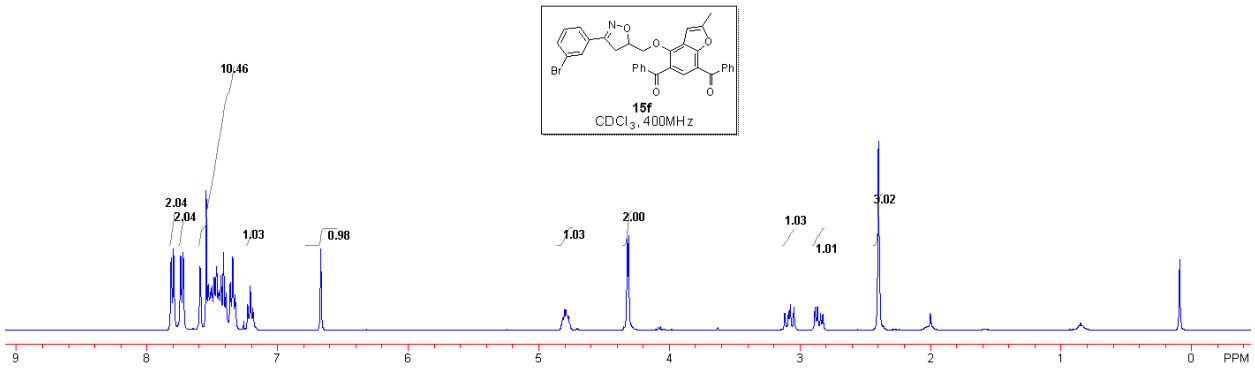
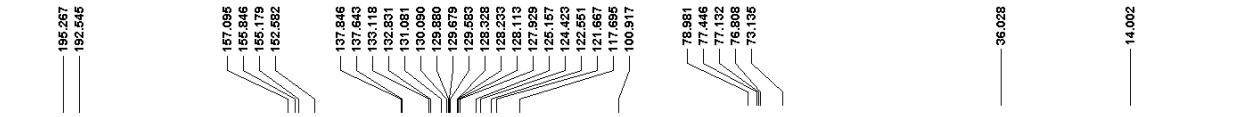
7.797
7.793
7.742
7.724
7.721
7.593
7.546
7.531
7.512
7.509
7.503
7.485
7.467
7.448
7.432
7.414
7.394
7.363
7.343
7.324
7.259
7.228
7.221
7.208
7.189
6.669
4.817
4.809
4.799
4.788
4.782
4.771
4.322
4.311
3.115
3.088
3.073
3.046
2.884
2.866
2.842
2.824
2.399
0.091


15f
CDCl3, 400MHz
10.46
2.04
2.04
1.03
0.98
1.03
2.00
1.03
1.01
3.02
9
8
7
6
5
4
3
2
1
0
PPM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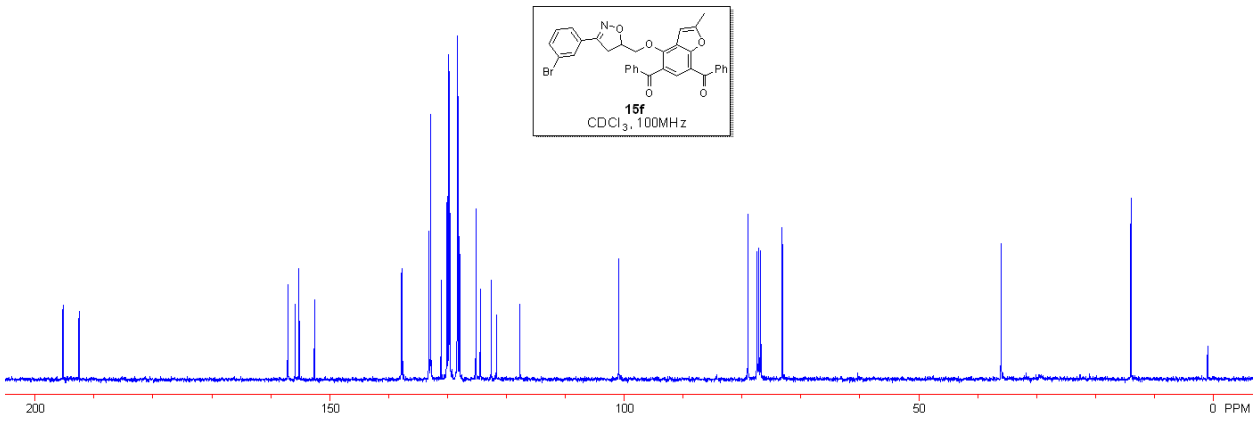
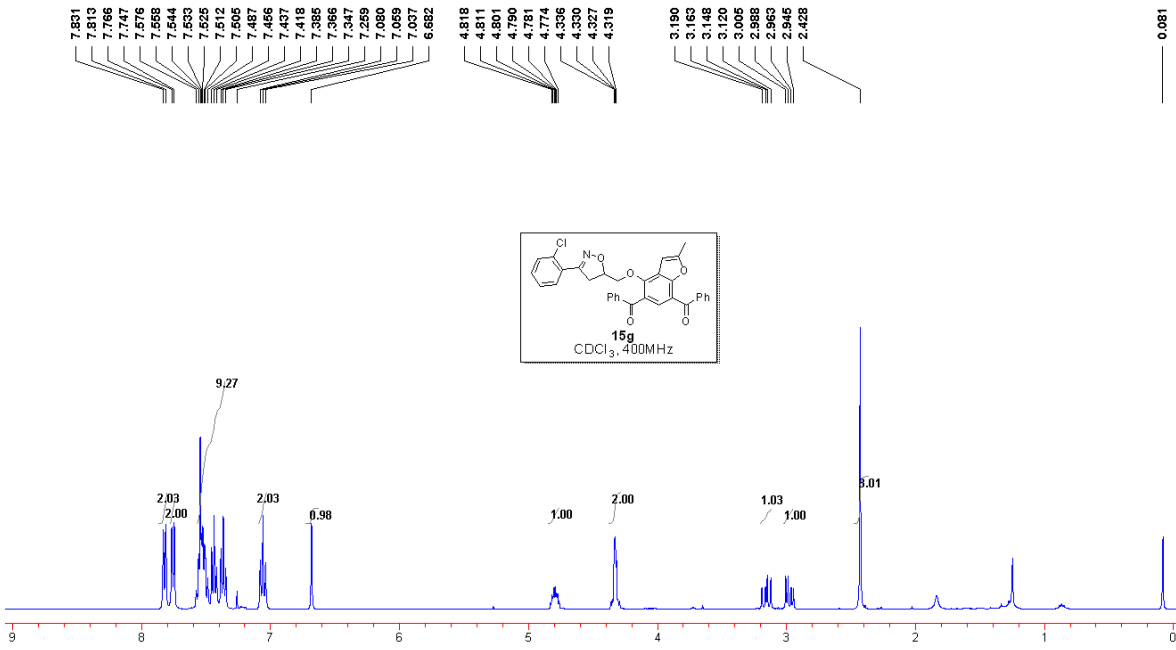
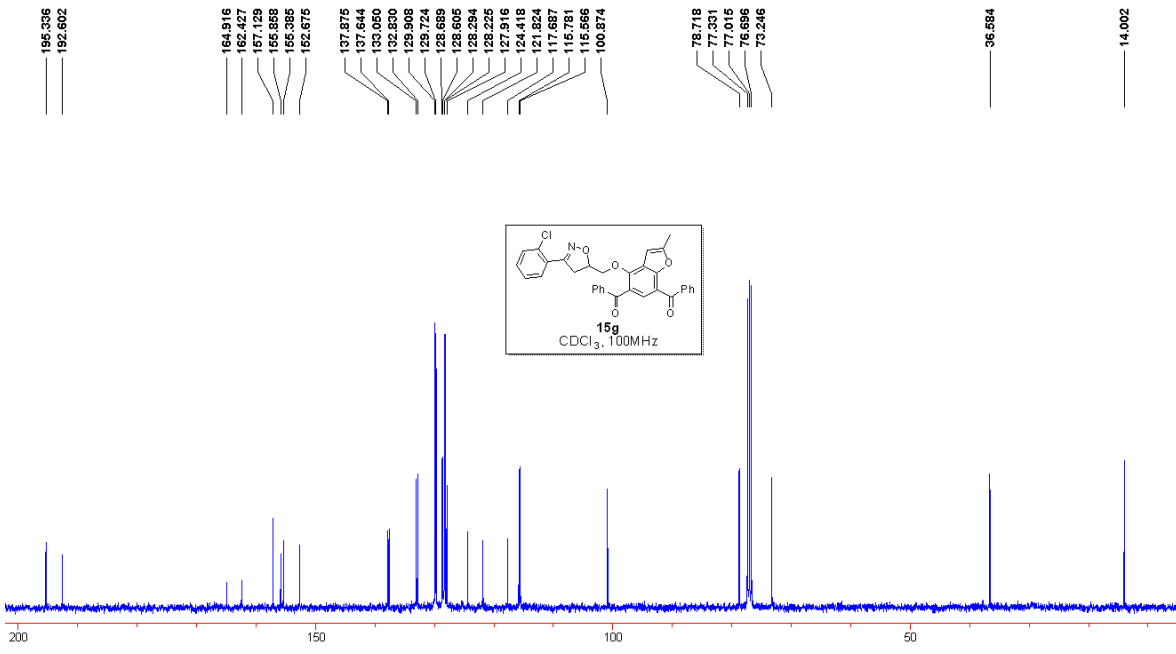
192.545
157.095
155.846
155.179
152.582
137.846
137.643
133.118
132.831
131.081
130.090
129.880
129.679
129.583
128.328
128.233
128.113
127.929
125.157
124.423
122.551
121.667
117.695
100.917
78.981
77.446
77.132
76.808
73.135
36.028
14.002


15f
CDCl3, 100MHz
200
150
100
50
0 PPM


7.831
7.813
7.766
7.747
7.576
7.558
7.544
7.533
7.525
7.512
7.505
7.487
7.456
7.437
7.418
7.385
7.366
7.347
7.259
7.080
7.059
7.037
6.682
4.818
4.811
4.801
4.790
4.781
4.774
4.336
4.330
4.327
4.319
3.190
3.163
3.148
3.120
3.005
2.988
2.963
2.945
2.428
0.081
15g
CDCl3, 400MHz
9.27
2.03
2.00
2.03
0.98
1.00
2.00
1.03
1.00
3.01
9
8
7
6
5
4
3
2
1
0
PPM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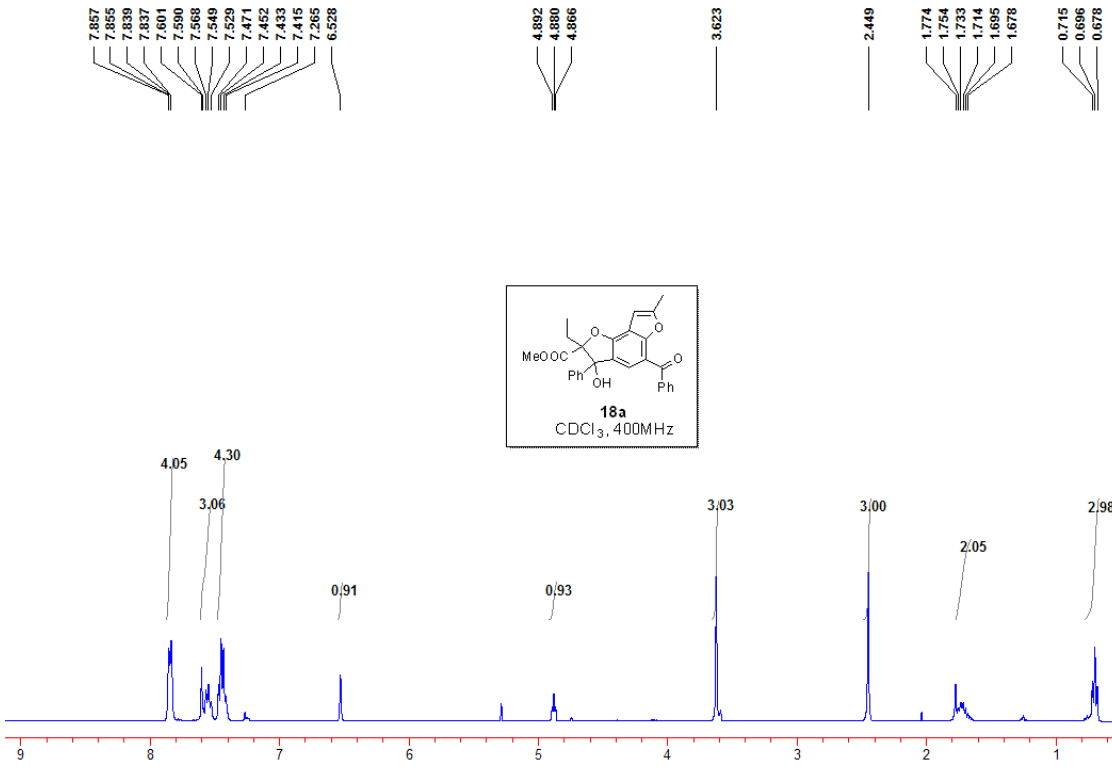
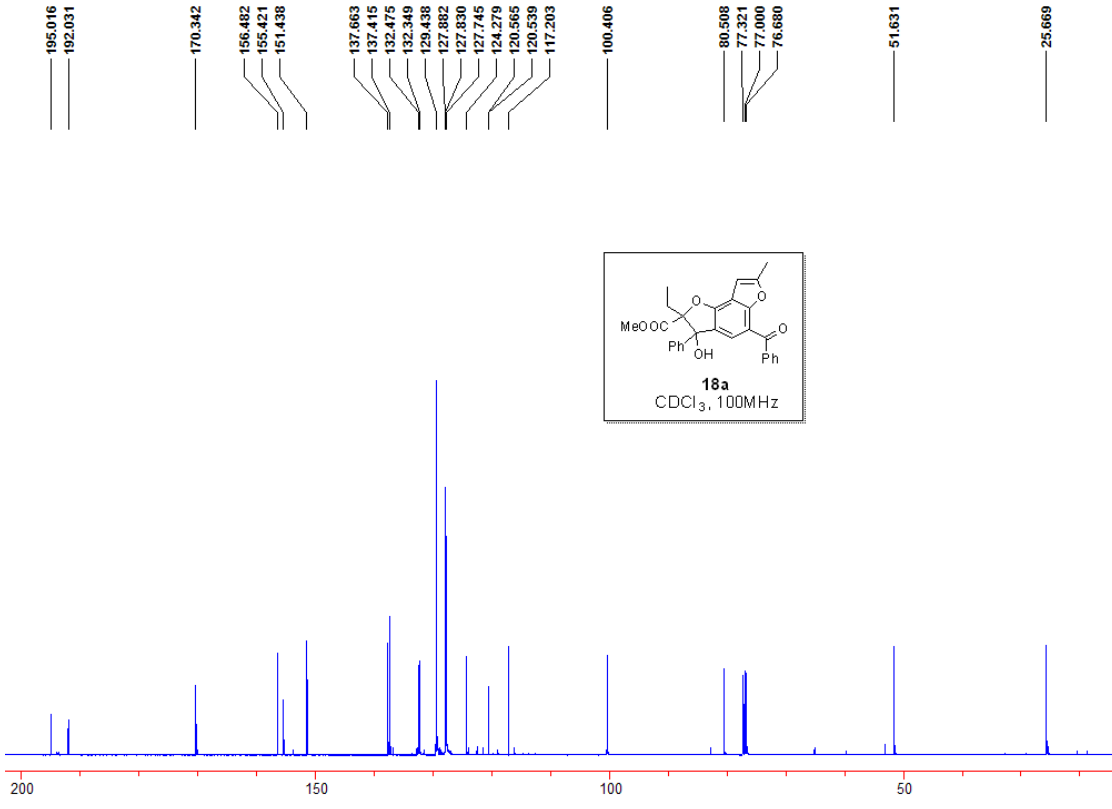
192.602
164.916
162.427
157.129
155.858
155.385
152.675
137.875
137.644
133.050
132.830
129.908
129.724
128.689
128.605
128.294
128.225
127.916
124.418
121.824
117.687
115.781
115.566
100.874
78.718
77.331
77.015
76.696
73.246
36.584
14.002
15g
CDCl3, 100MHz
200
150
100
50
0
PPM


7.857
7.855
7.839
7.837
7.601
7.590
7.568
7.549
7.529
7.471
7.452
7.433
7.415
7.265
6.528
4.892
4.880
4.866
3.623
2.449
1.774
1.754
1.733
1.714
1.695
1.678
0.715
0.696
0.678
MeOOC
Ph
OH
O
Ph
18a
CDCl3, 400MHz
4.05
4.30
3.06
0.91
0.93
3.03
3.00
2.05
2.98
9
8
7
6
5
4
3
2
1
0
PPM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192.031
170.342
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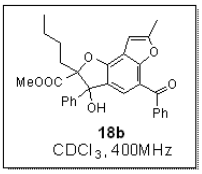
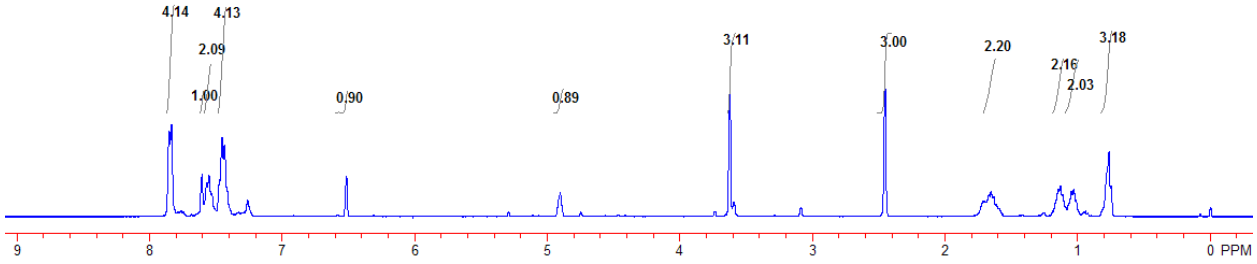
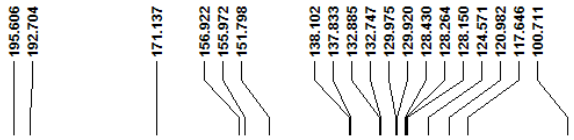
155.421
151.438
137.663
137.415
132.475
132.349
129.438
127.882
127.830
127.745
124.279
120.565
120.539
117.203
100.406
80.508
77.321
77.000
76.680
51.631
25.669
13.531
8.128
MeOOC
Ph
OH
O
Ph
18a
CDCl3, 100MHz
200
150
100
50
0
PPM


7.853
7.852
7.845
7.836
7.604
7.569
7.552
7.532
7.472
7.454
7.435
7.417
7.260
6.514
4.912
4.902
3.620
2.450
1.708
1.698
1.684
1.665
1.652
1.631
1.144
1.126
1.116
1.110
1.044
1.028
1.010
0.777
0.761
0.747


MeOOC
Ph
OH
O
Ph
18b
CDCl3, 400MHz


4.14
4.13
2.09
1.00
0.90
0.89
3.11
3.00
2.20
2.16
2.03
3.18
9
8
7
6
5
4
3
2
1
0 PPM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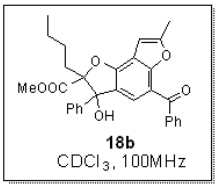
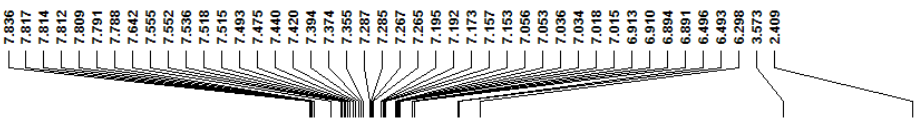
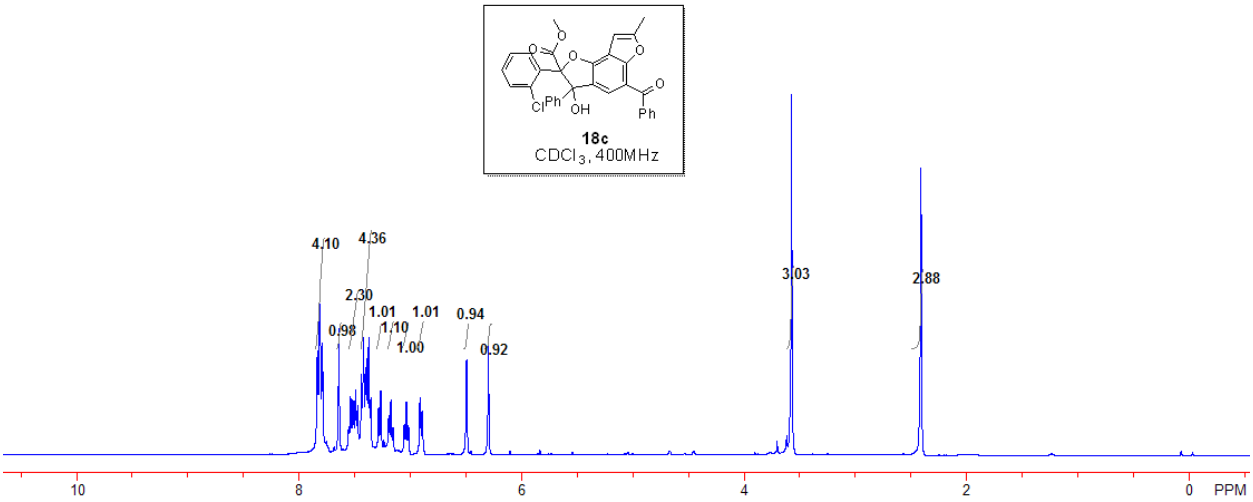
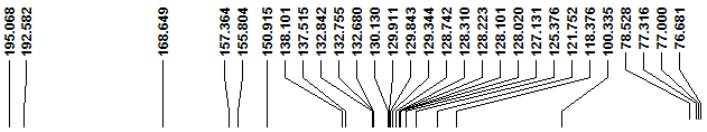
192.704
171.137
156.922
155.972
151.798
138.102
137.833
132.885
132.747
129.975
129.920
128.430
128.264
128.150
124.571
120.982
117.646
100.711
80.152
77.316
77.000
76.684
52.122
32.565
26.300
22.237
14.077
13.687

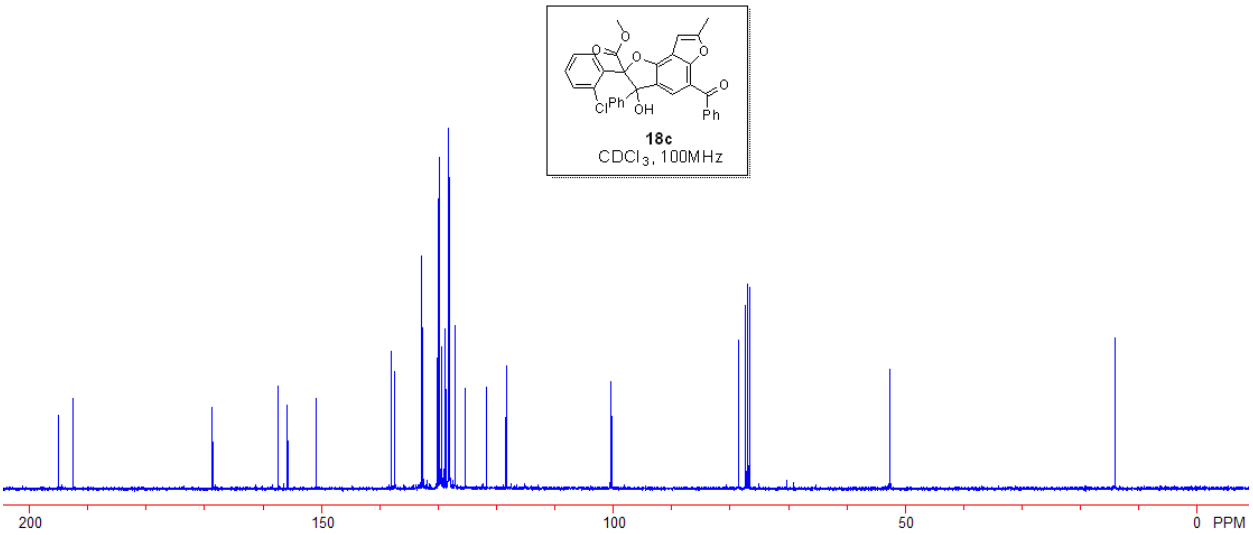

MeOOC
Ph
OH
O
Ph
18b
CDCl3, 100MHz

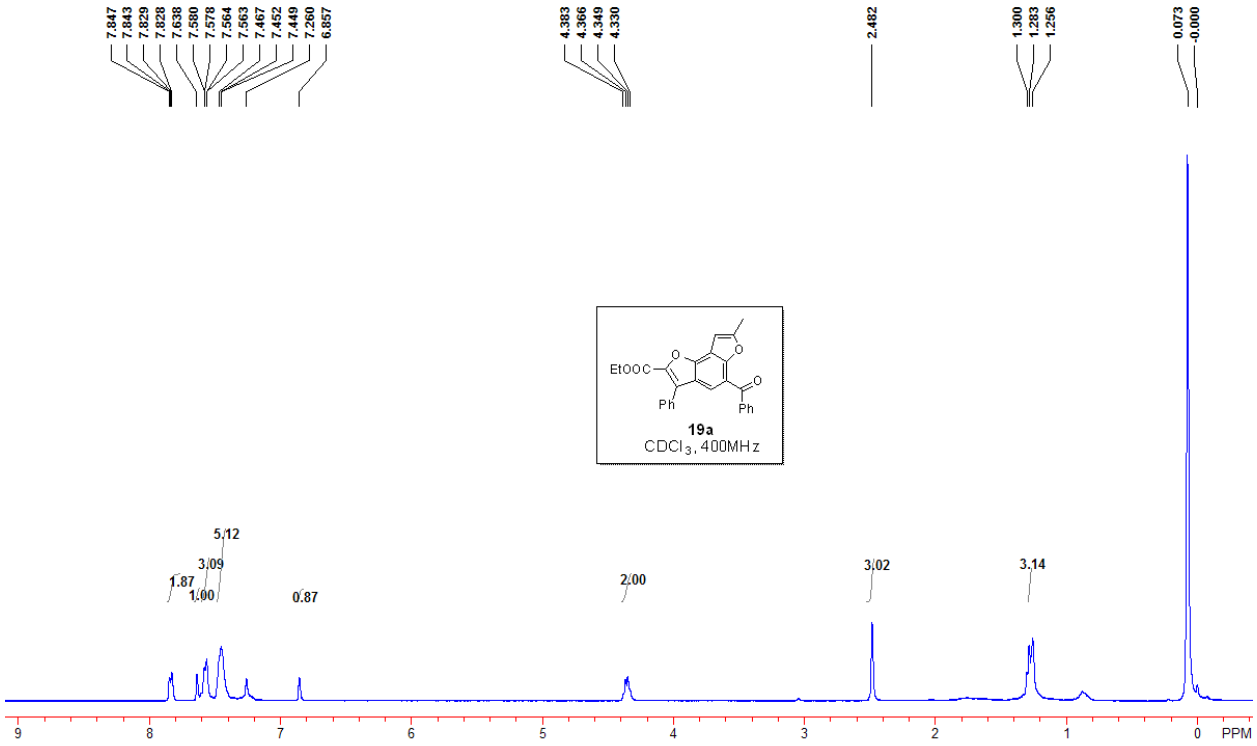
200
150
100
50
0 PPM


7.836
7.817
7.814
7.812
7.809
7.791
7.788
7.642
7.555
7.552
7.536
7.518
7.515
7.493
7.475
7.440
7.420
7.394
7.374
7.355
7.287
7.285
7.267
7.265
7.195
7.192
7.173
7.157
7.153
7.056
7.053
7.036
7.034
7.018
7.015
6.913
6.910
6.894
6.891
6.496
6.493
6.298
3.573
2.409


18c
CDCl3, 400MHz
4.10
4.36
2.30
1.01
1.01
0.94
0.98
1.10
1.00
0.92
3.03
2.88
10
8
6
4
2
0
PPM


195.068
192.582
168.649
157.364
155.804
150.915
138.101
137.515
132.842
132.755
132.680
130.130
129.911
129.843
129.344
128.742
128.310
128.223
128.101
128.020
127.131
125.376
121.752
118.376
100.335
78.528
77.316
77.000
76.681
52.601
14.058


18c
CDCl3, 100MHz
200
150
100
50
0
PPM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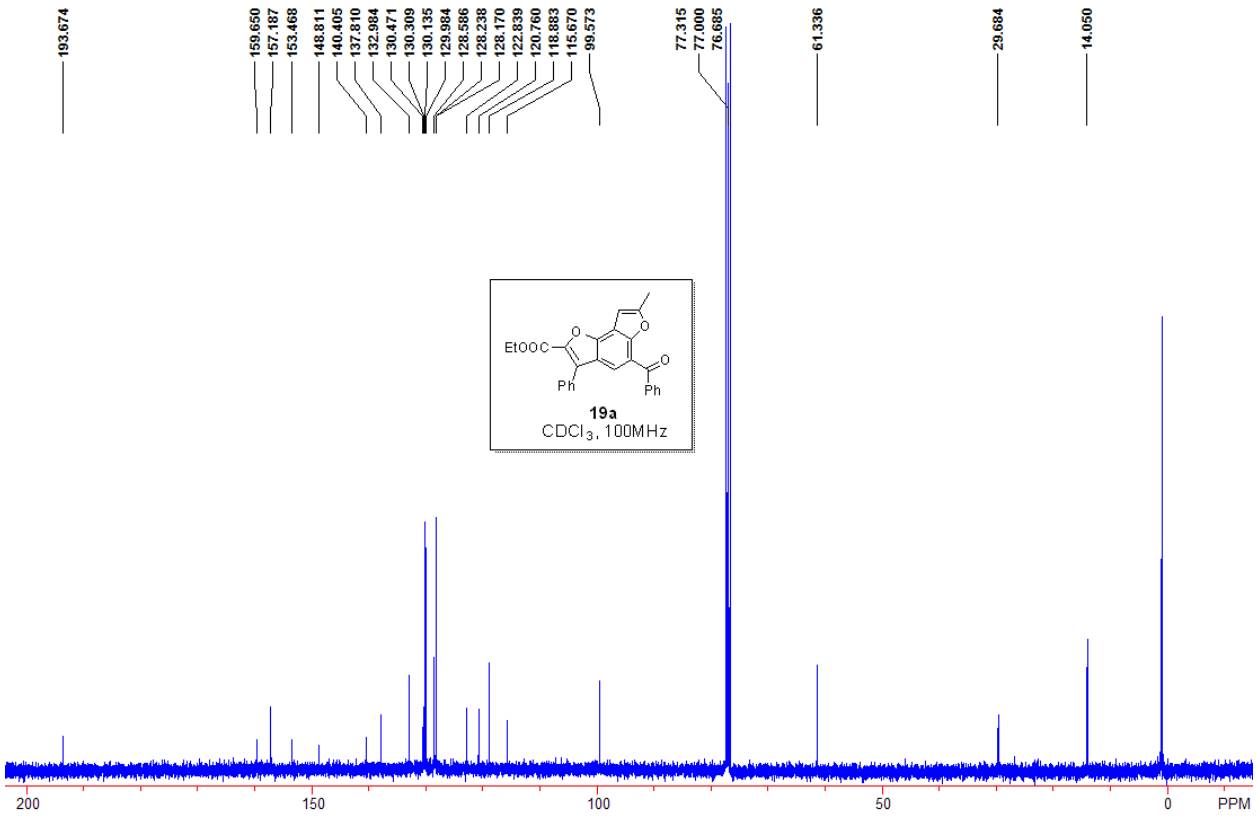
7.843
7.829
7.828
7.638
7.580
7.578
7.564
7.563
7.467
7.452
7.449
7.260
6.857
4.383
4.366
4.349
4.330
2.482
1.300
1.283
1.256
0.073
-0.000
EtOOC
O
Ph
Ph
19a
CDCl3, 400MHz
5.12
3.09
1.87
1.00
0.87
2.00
3.02
3.14
9
8
7
6
5
4
3
2
1
0
PPM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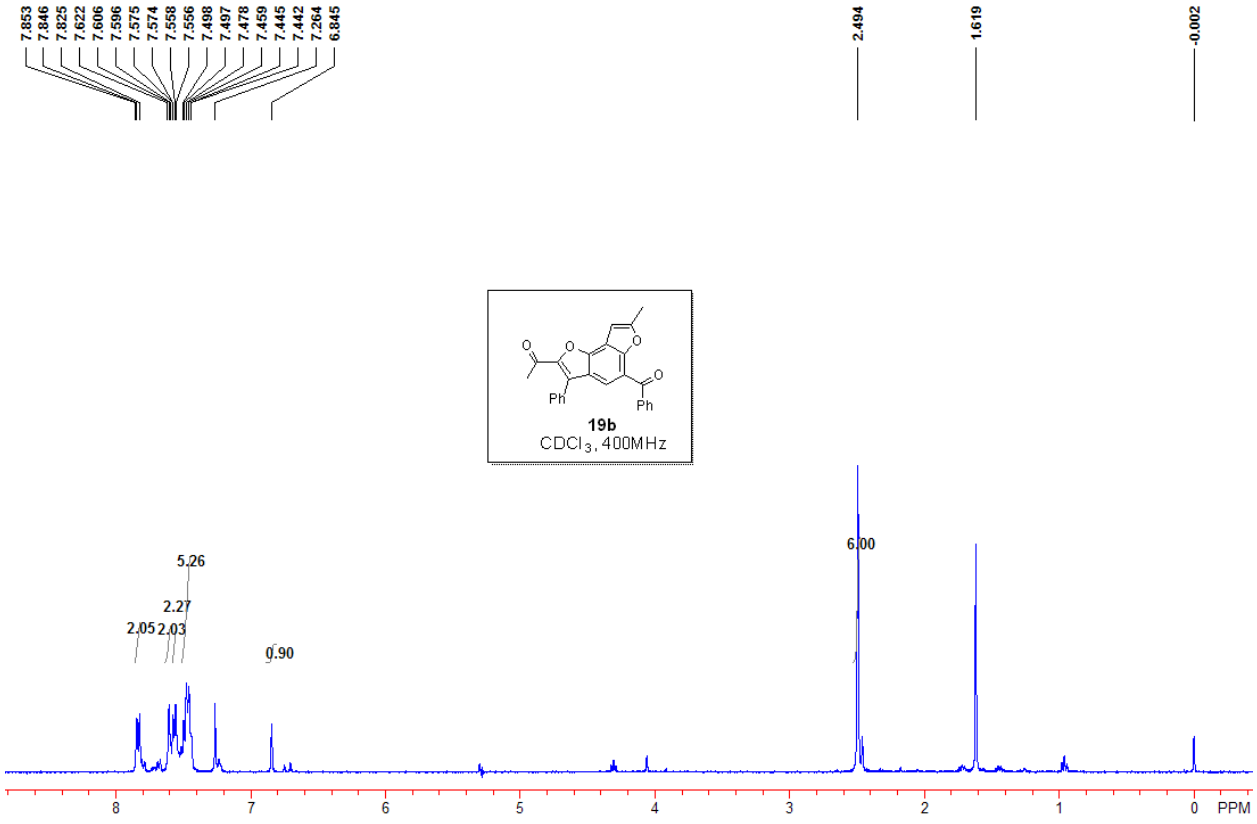
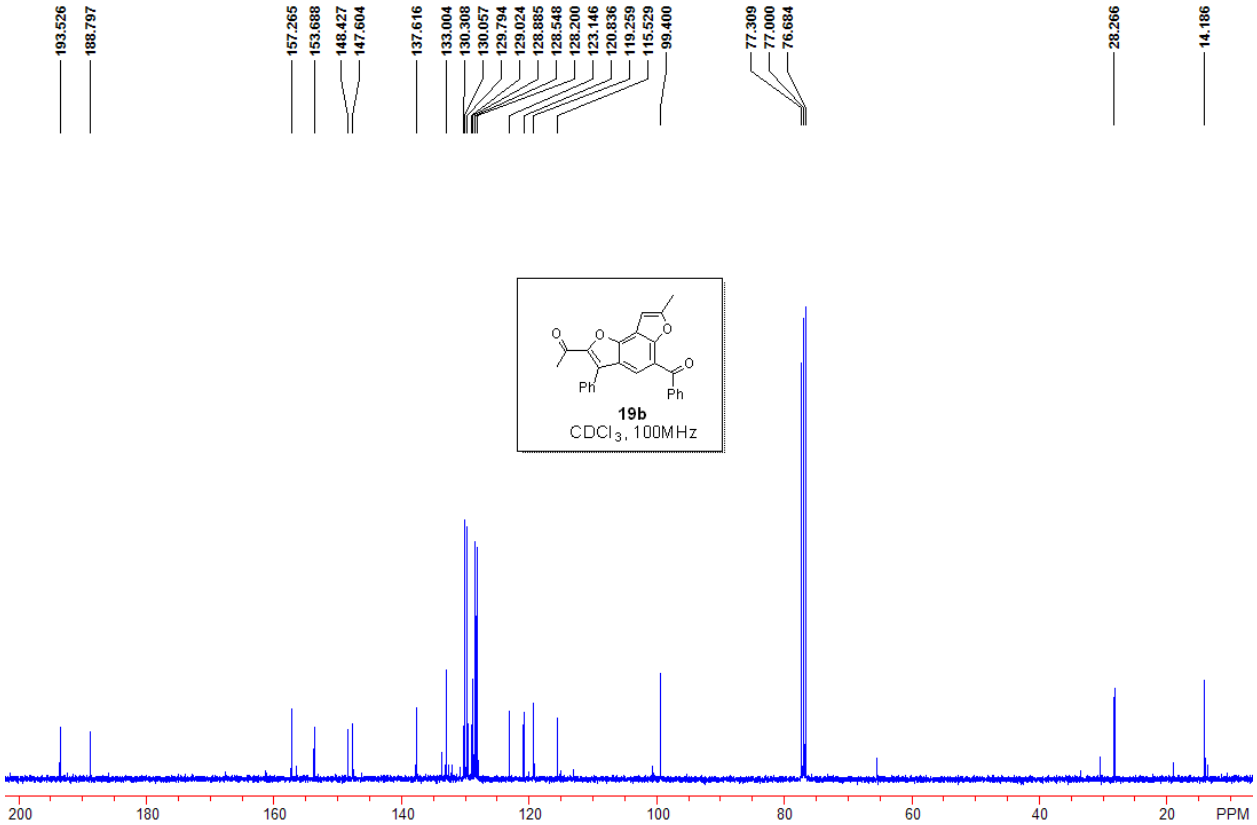
157.187
153.468
148.811
140.405
137.810
132.984
130.471
130.309
130.135
129.984
128.586
128.238
128.170
122.839
120.760
118.883
115.670
99.573
77.315
77.000
76.685
61.336
29.684
14.050
EtOOC
O
Ph
Ph
19a
CDCl3, 100MHz
200
150
100
50
0
PPM


7.853
7.846
7.825
7.622
7.606
7.596
7.575
7.574
7.558
7.556
7.498
7.497
7.478
7.459
7.445
7.442
7.264
6.845
2.494
1.619
-0.002
19b
CDCl3, 400MHz
5.26
2.27
2.05
2.03
0.90
6.00
PPM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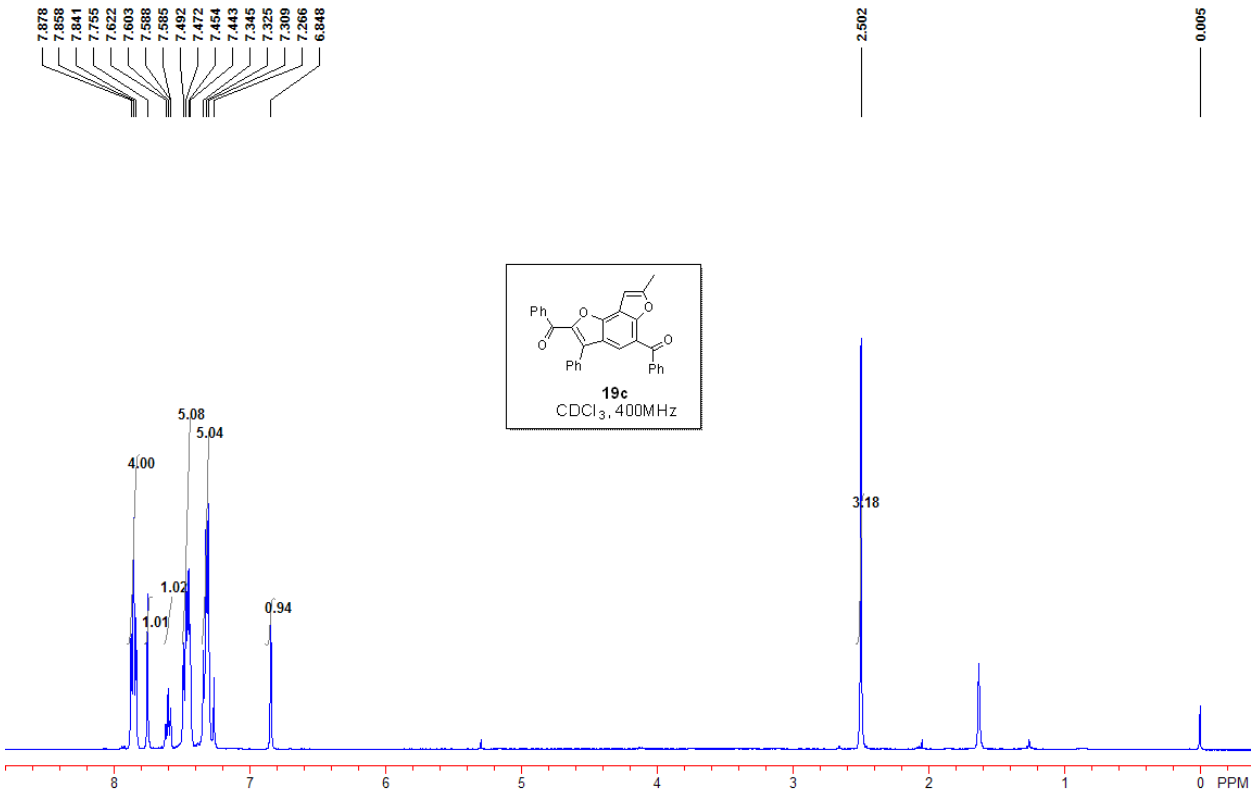
188.797
157.265
153.688
148.427
147.604
137.616
133.004
130.308
130.057
129.794
129.024
128.885
128.548
128.200
123.146
120.836
119.259
115.529
99.400
77.309
77.000
76.684
28.266
14.186
19b
CDCl3, 100MHz
PPM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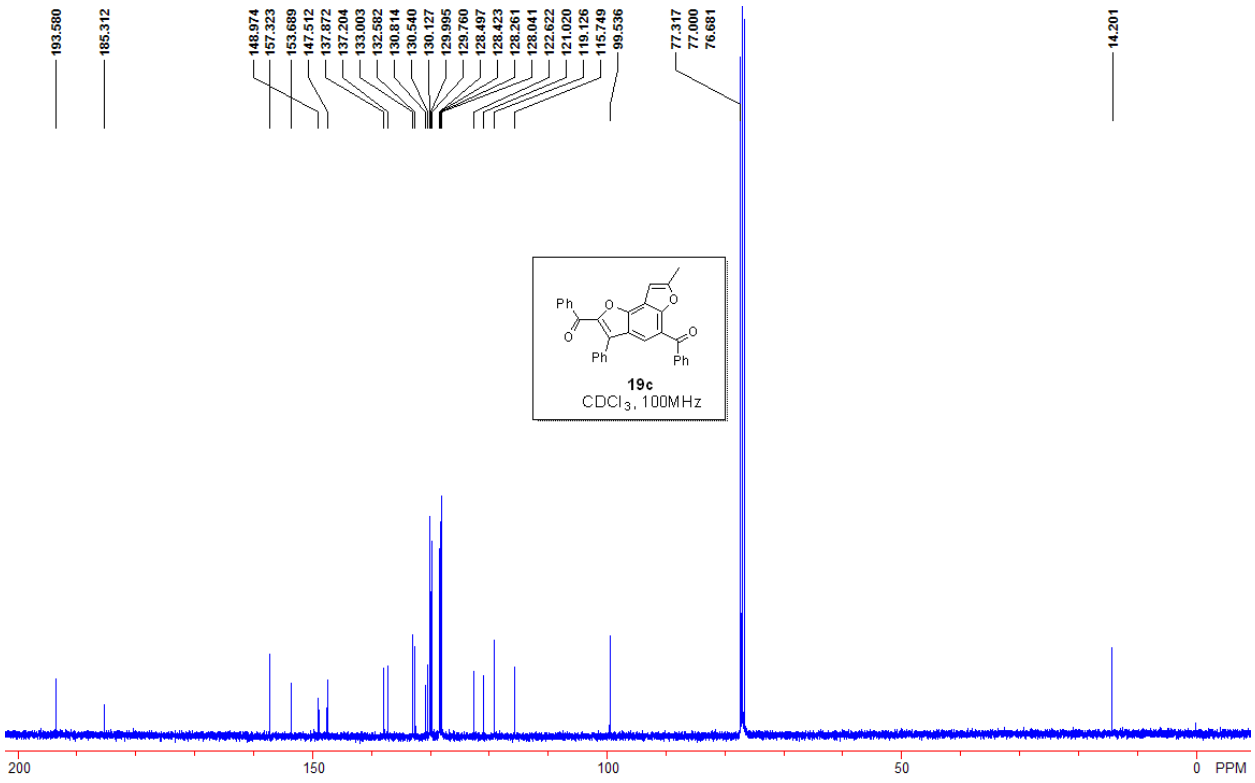
7.858
7.841
7.755
7.622
7.603
7.588
7.585
7.492
7.472
7.454
7.443
7.345
7.325
7.309
7.266
6.848
2.502
0.005
Ph
O
O
Ph
O
Ph
19c
CDCl3, 400MHz
5.08
5.04
4.00
1.02
1.01
0.94
3.18
8
7
6
5
4
3
2
1
0
PPM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185.312
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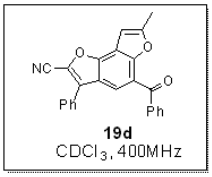
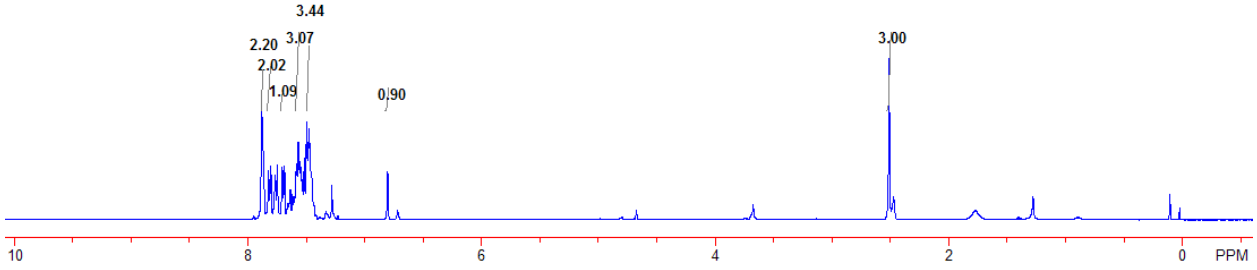
157.323
153.689
147.512
137.872
137.204
133.003
132.582
130.814
130.540
130.127
129.995
129.760
128.497
128.423
128.261
128.041
122.622
121.020
119.126
115.749
99.536
77.317
77.000
76.681
14.201
Ph
O
O
Ph
O
Ph
19c
CDCl3, 100MHz
200
150
100
50
0
PPM


7.879
7.875
7.872
7.865
7.822
7.804
7.766
7.748
7.705
7.598
7.583
7.568
7.566
7.551
7.543
7.497
7.477
7.468
7.455
7.280
6.804
2.509
0.102


NC
O
O
Ph
O
Ph
19d
CDCl3, 400MHz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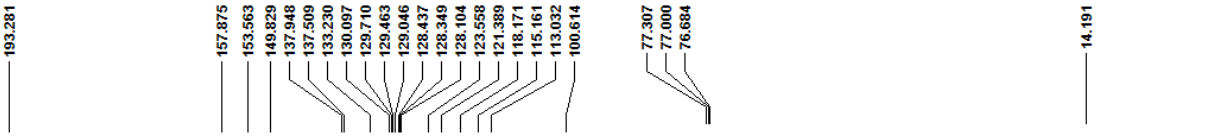
2.20
3.07
2.02
1.09
0.90
3.00
10
8
6
4
2
0
PPM


193.281
157.875
153.563
149.829
137.948
137.509
133.230
130.097
129.710
129.463
129.046
128.437
128.349
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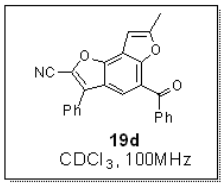
123.558
121.389
118.171
115.161
113.032
100.614
77.307
77.000
76.684
14.191


NC
O
O
Ph
O
Ph
19d
CDCl3, 100MHz

150
100
50
0
PPM