

## Supporting Information

### Efficient Microwave-assisted One-pot Three-component Synthesis of 2,3-Disubstituted Benzofurans under Sonogashira Conditions

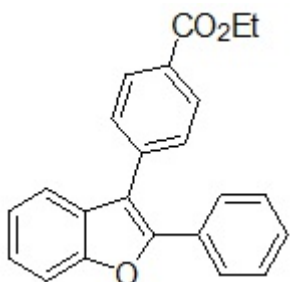
Nataliya A. Markina, Yu Chen, and Richard C. Larock

*Department of Chemistry, Iowa State University, Ames, IA, 50011*

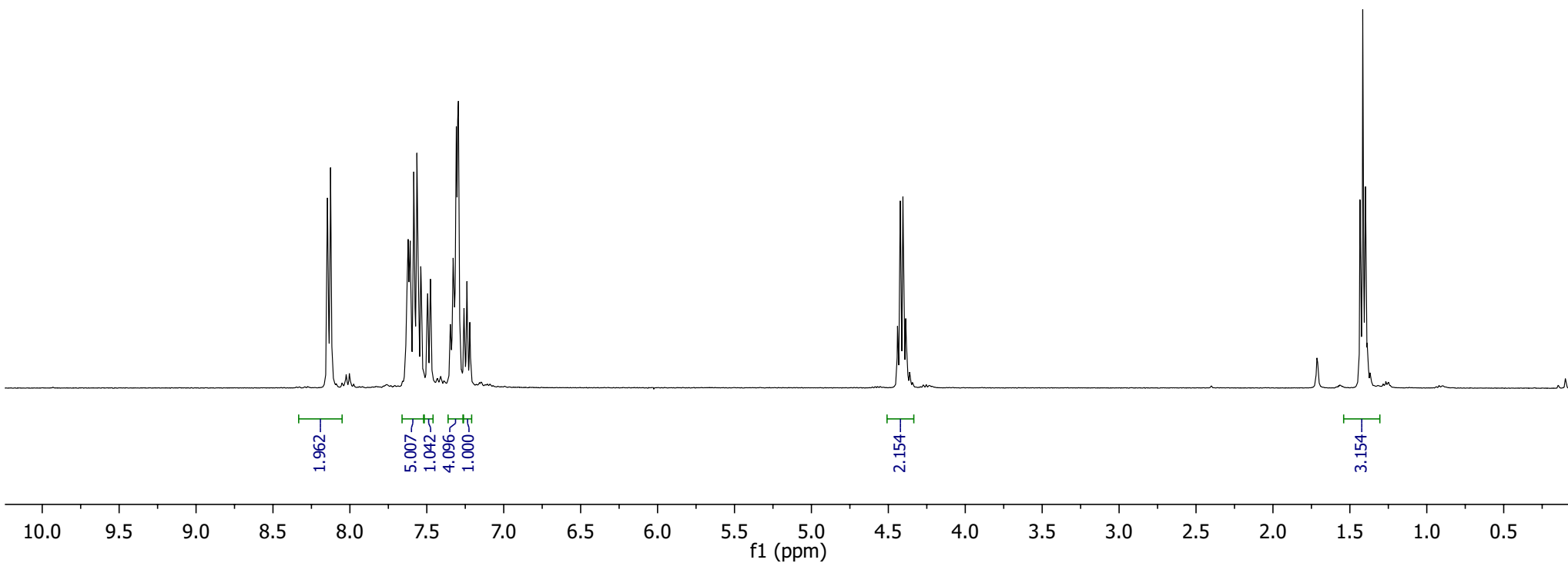
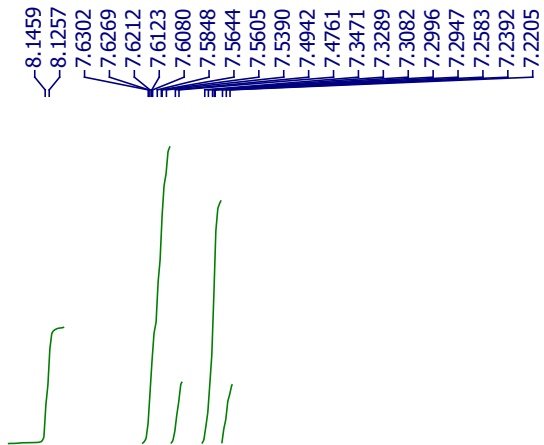
*larock@iastate.edu*

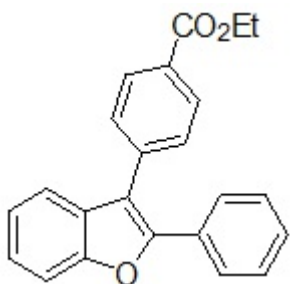
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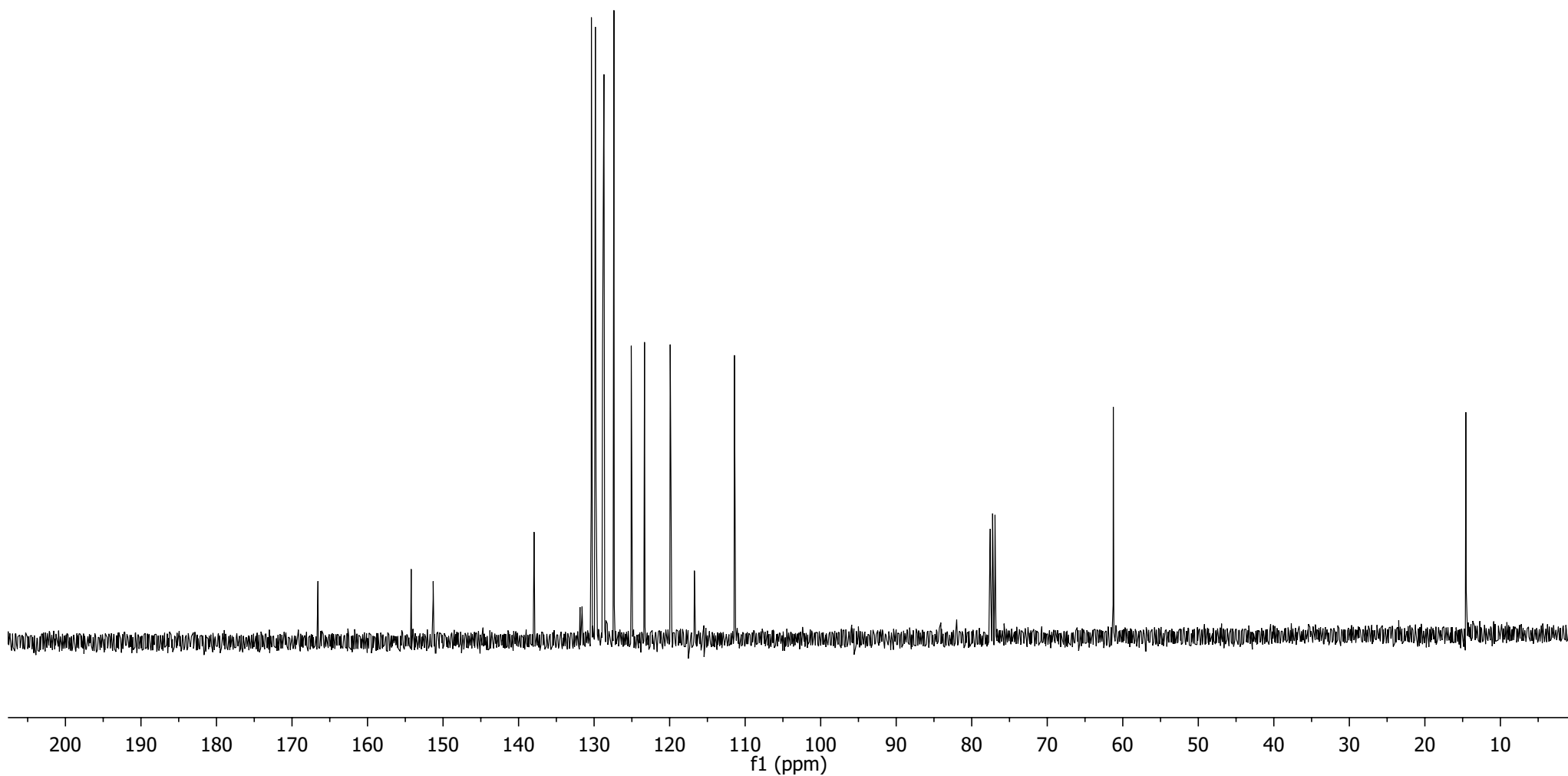
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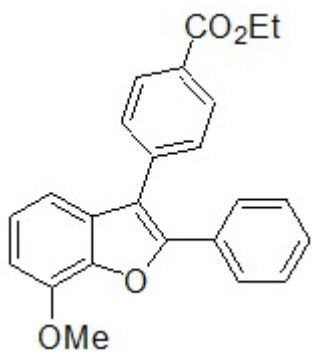
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— 128.6982  
— 127.3755  
— 125.0822  
— 123.3259  
— 119.9260  
— 111.4226

— 77.5508 CDCl<sub>3</sub>  
— 77.2331 CDCl<sub>3</sub>  
— 76.9149 CDCl<sub>3</sub>

— 61.2543

— 14.5776



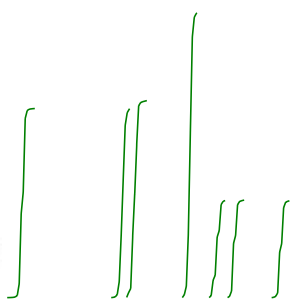


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7.1701  
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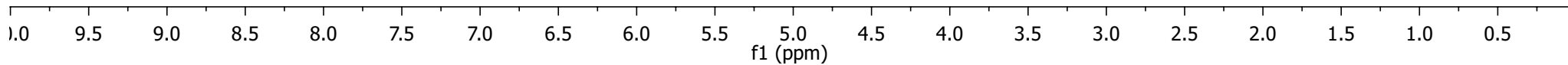
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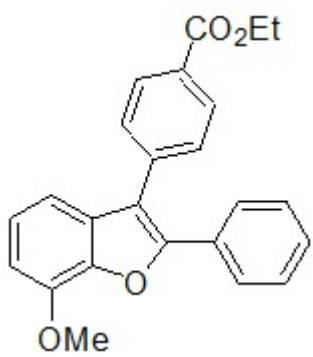


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1.00  
1.01  
1.00

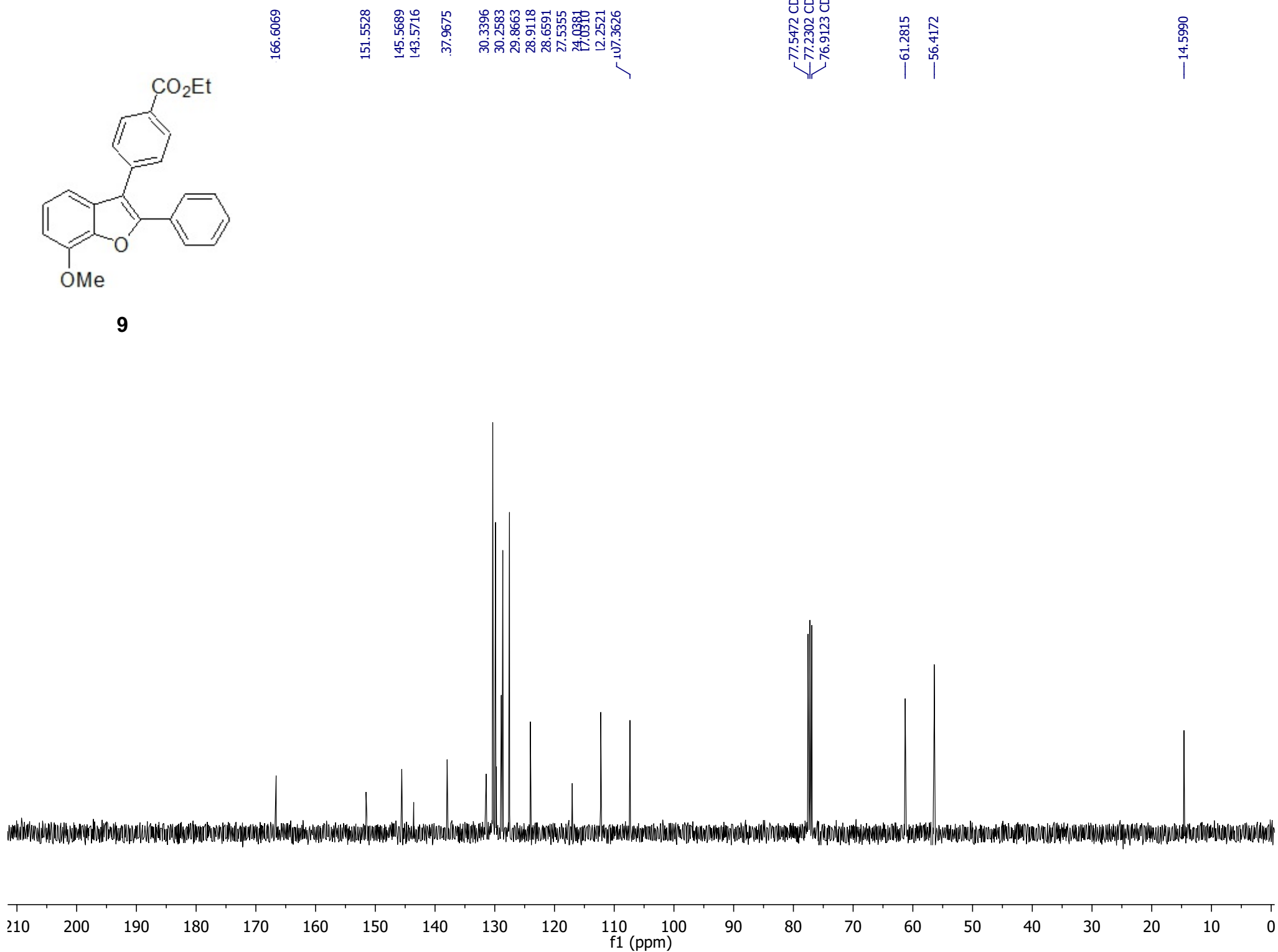
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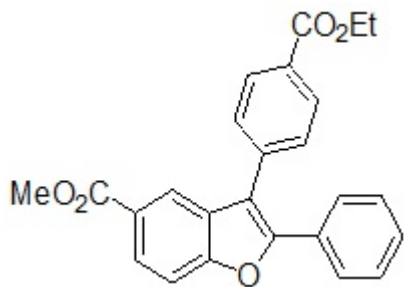
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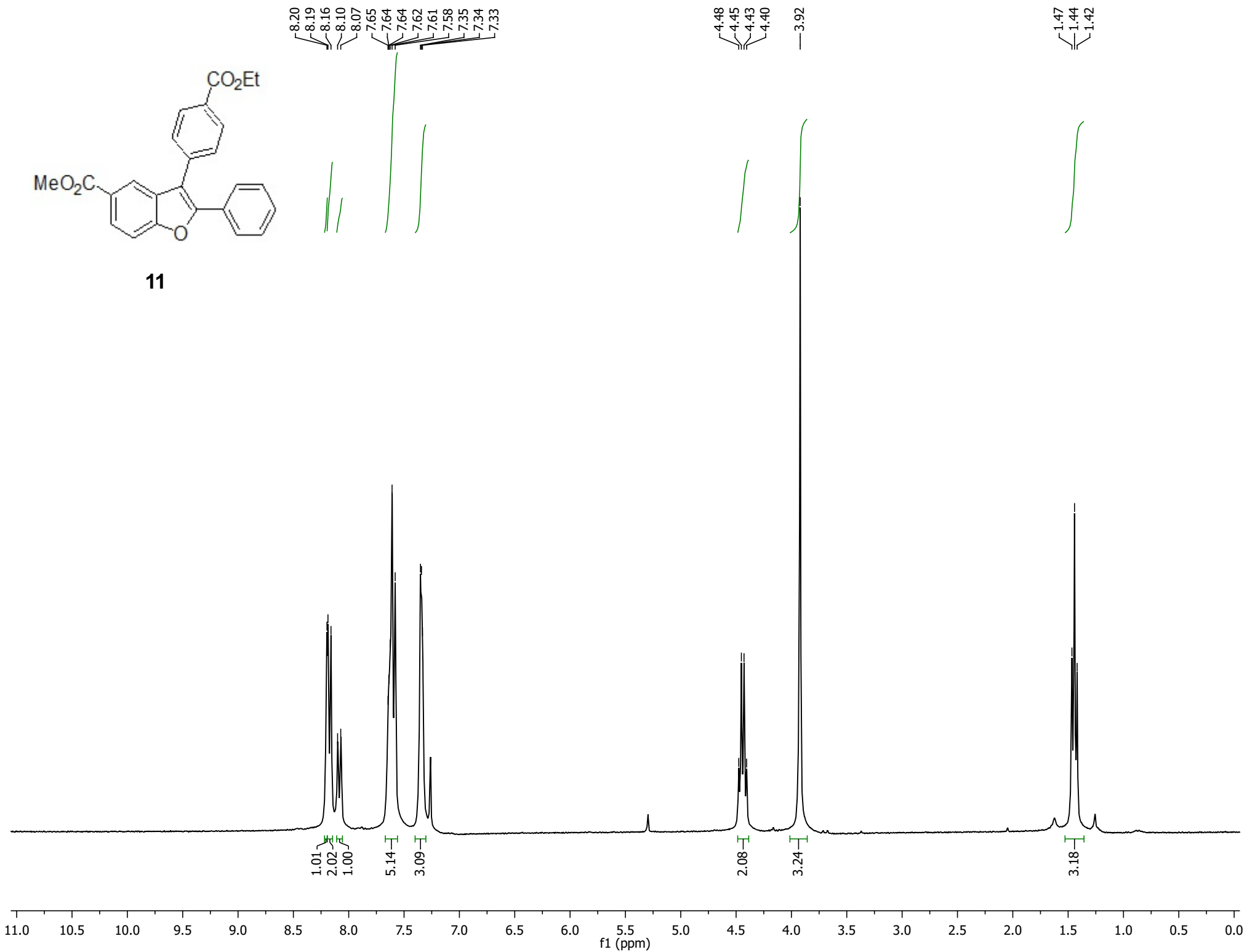


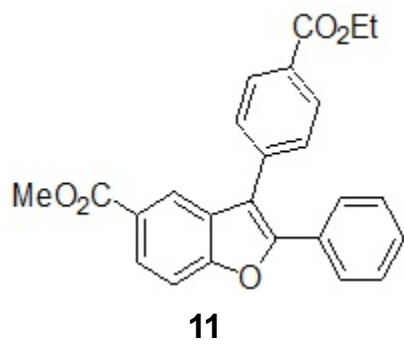
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156.80  
152.69

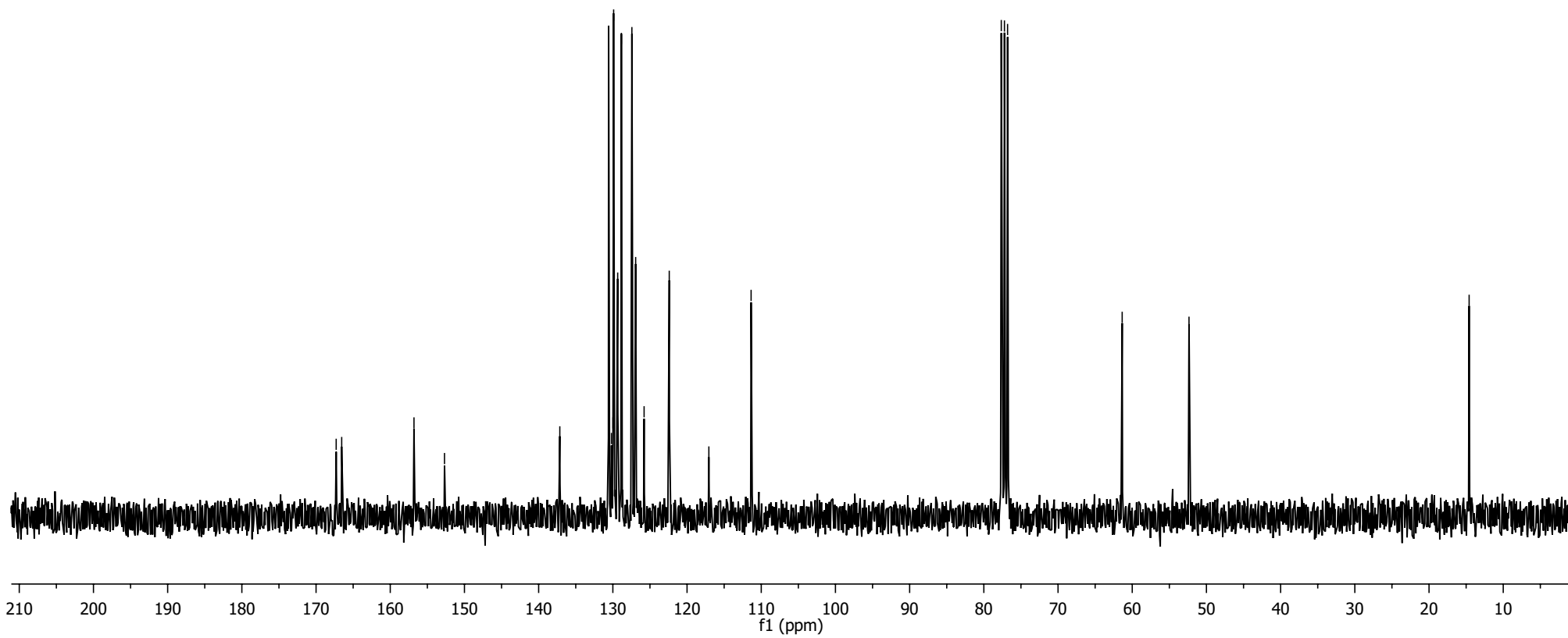
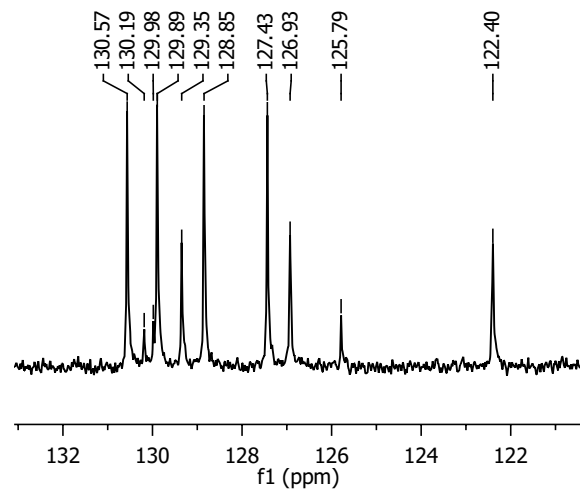
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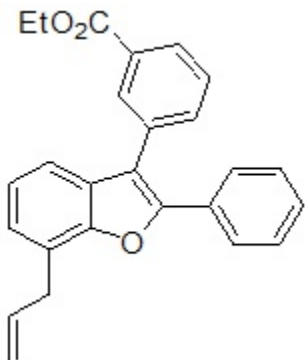
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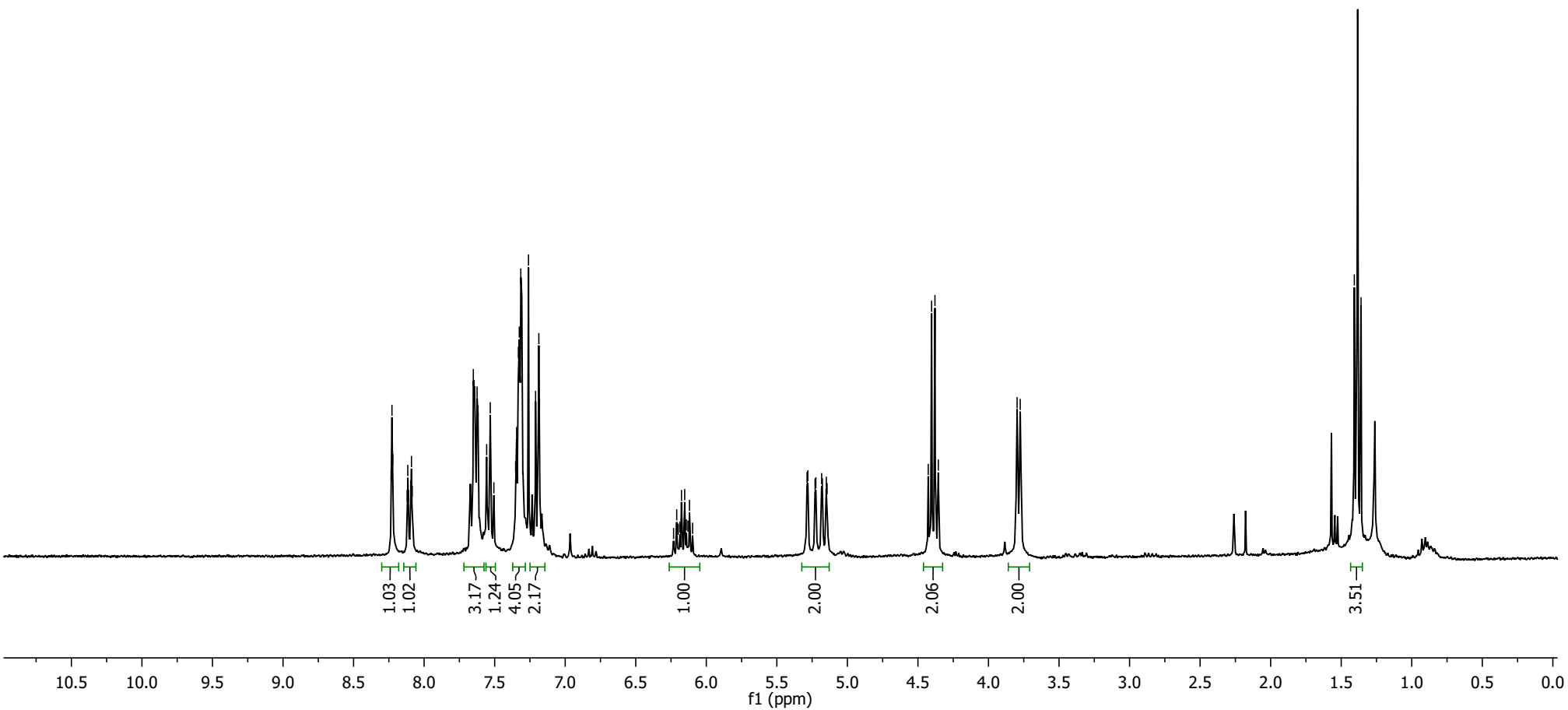
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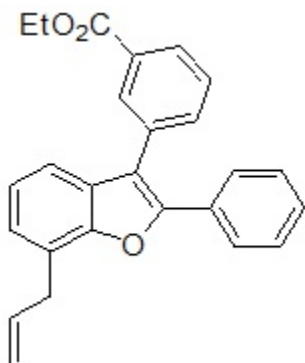


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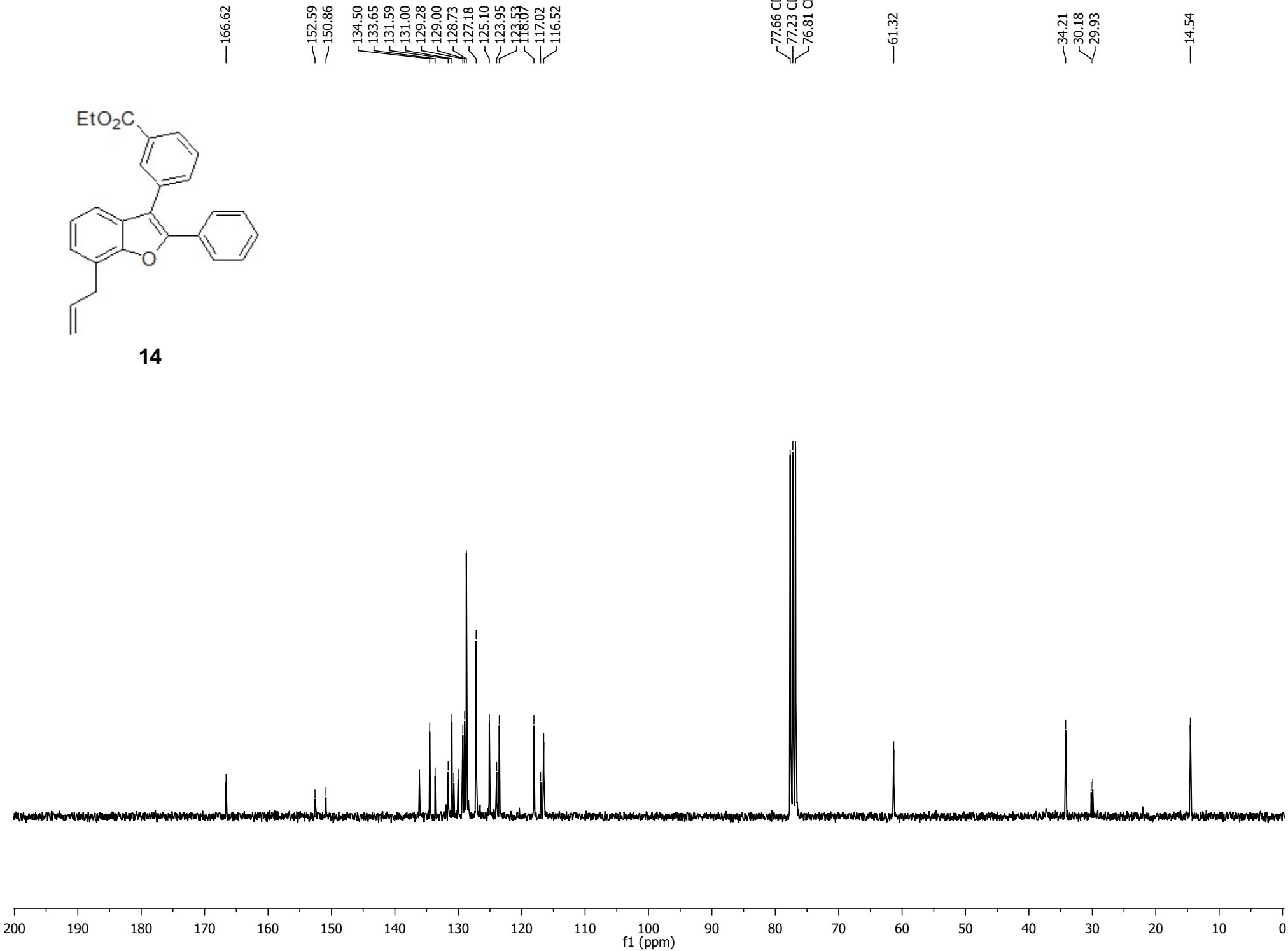
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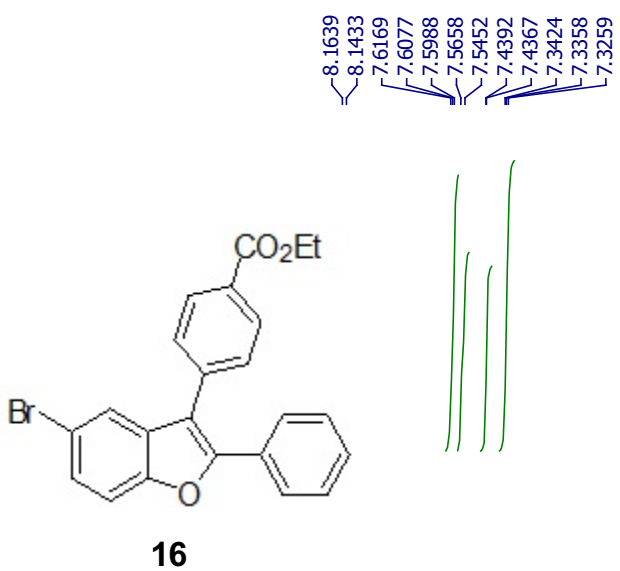






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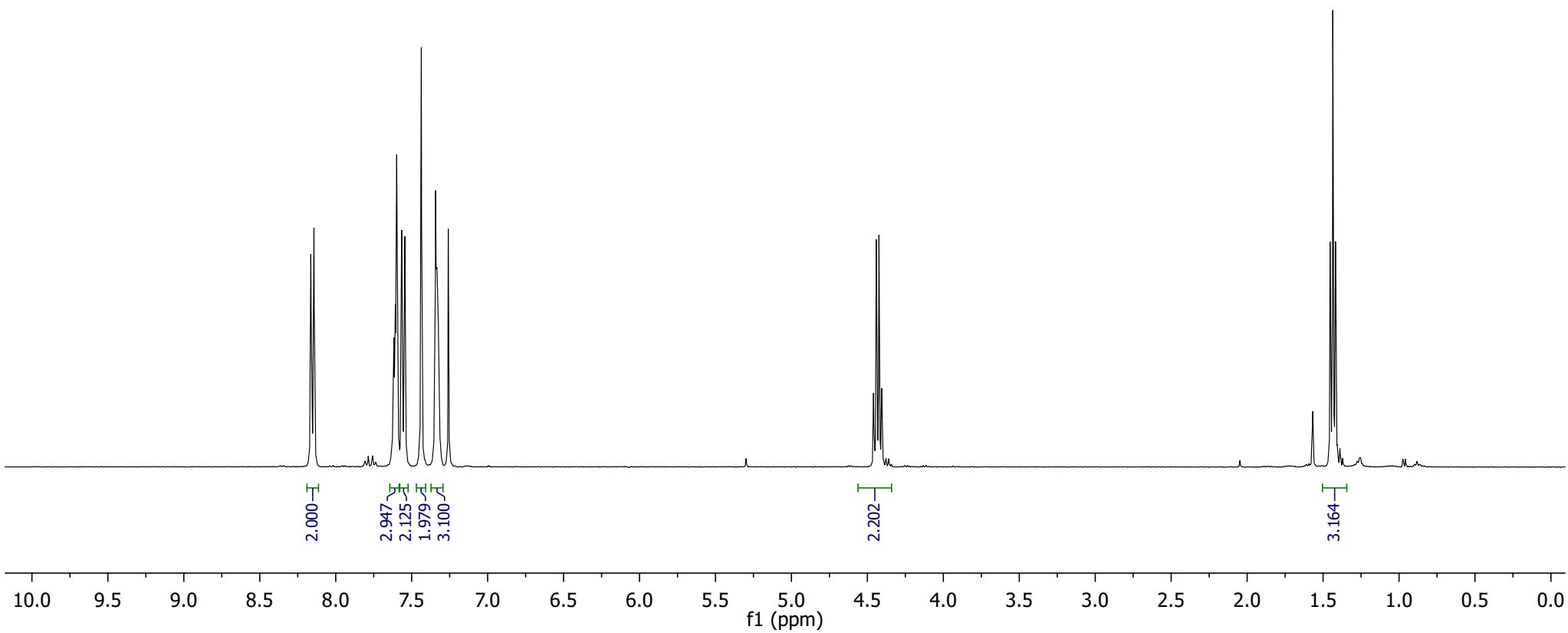
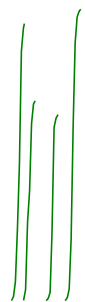


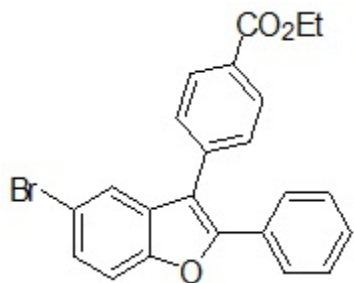
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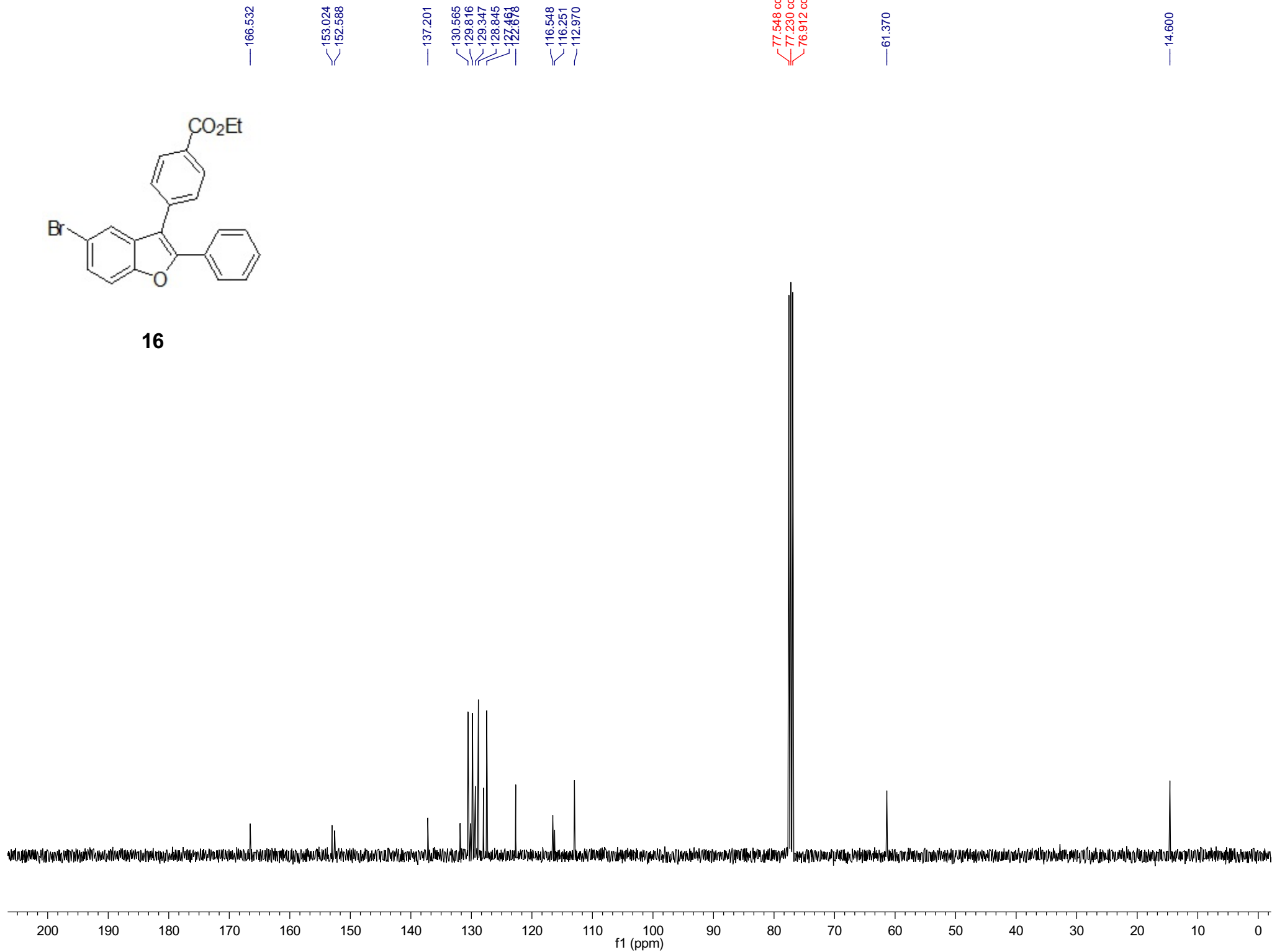
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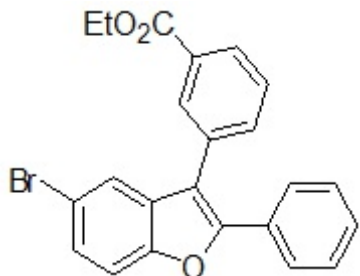
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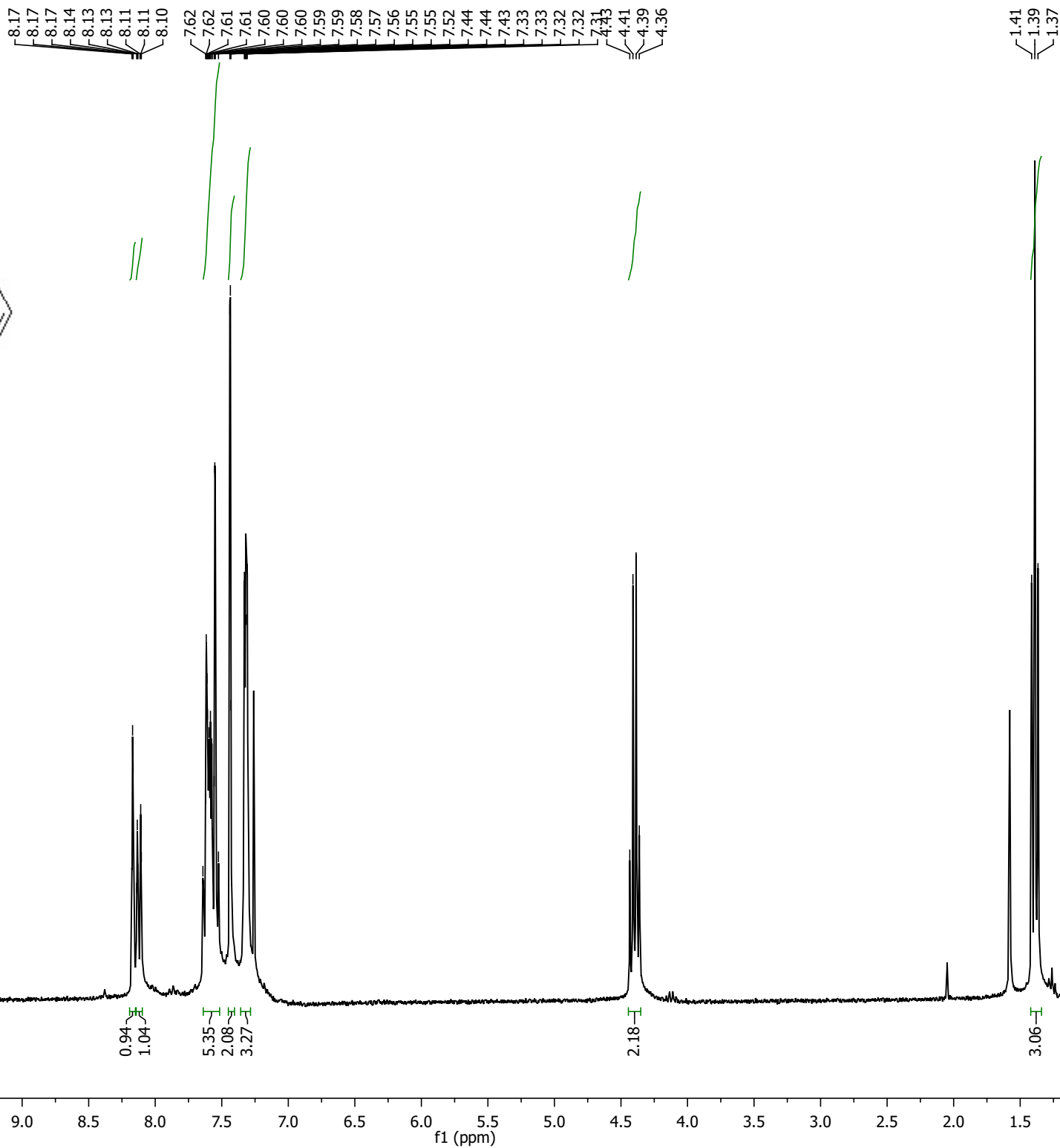


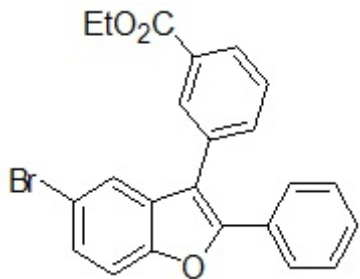
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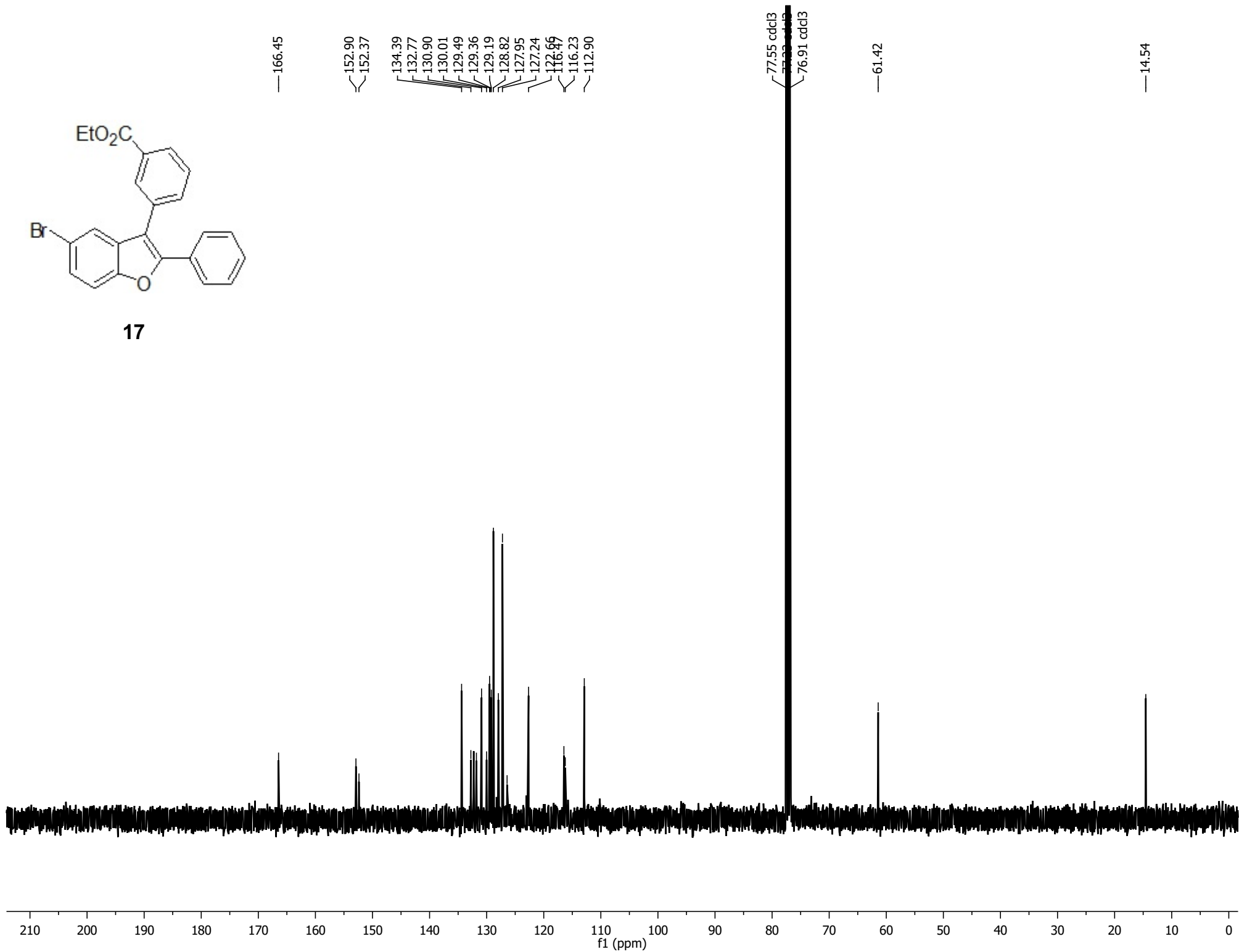


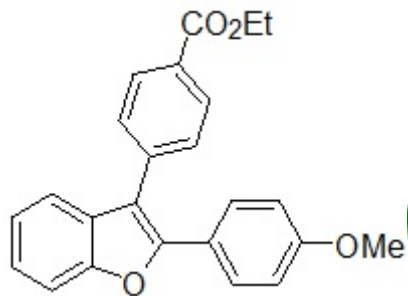
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17





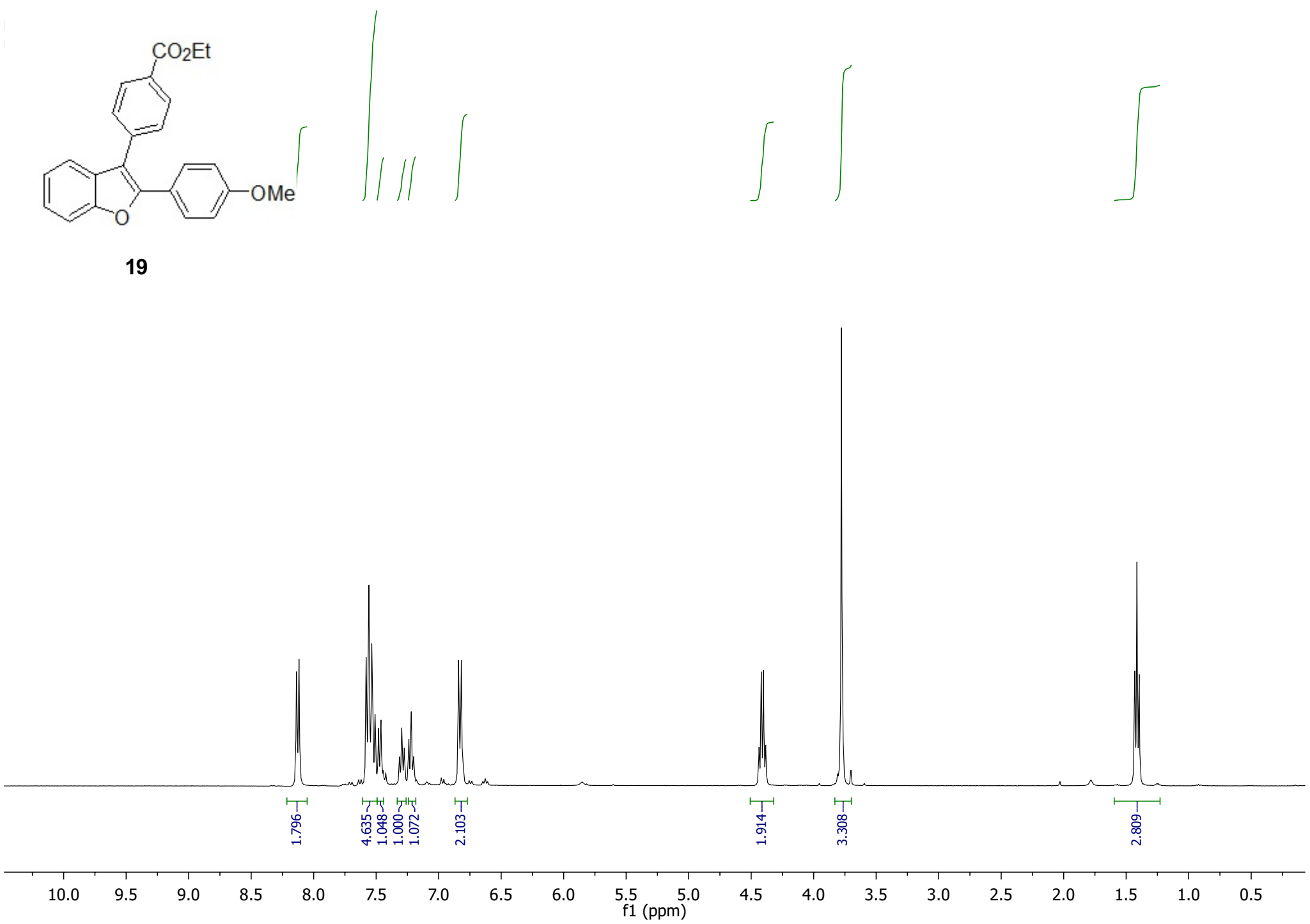
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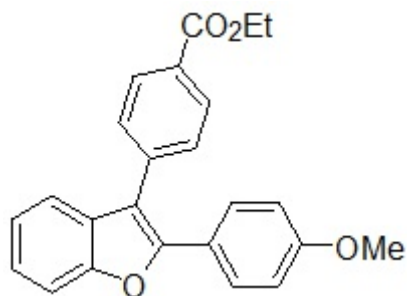
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6.8188

4.4371  
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4.4016  
4.3838

3.7780

1.4315  
1.4137  
1.3959





19

— 166.5728

— 160.1133

— 154.0505

— 151.5385

— 138.2204

— 134.1355

— 130.3021

— 129.7872

— 129.5138

— 128.8536

— 124.6206

— 123.2009

— 122.9151

— 119.5923

— 115.2160

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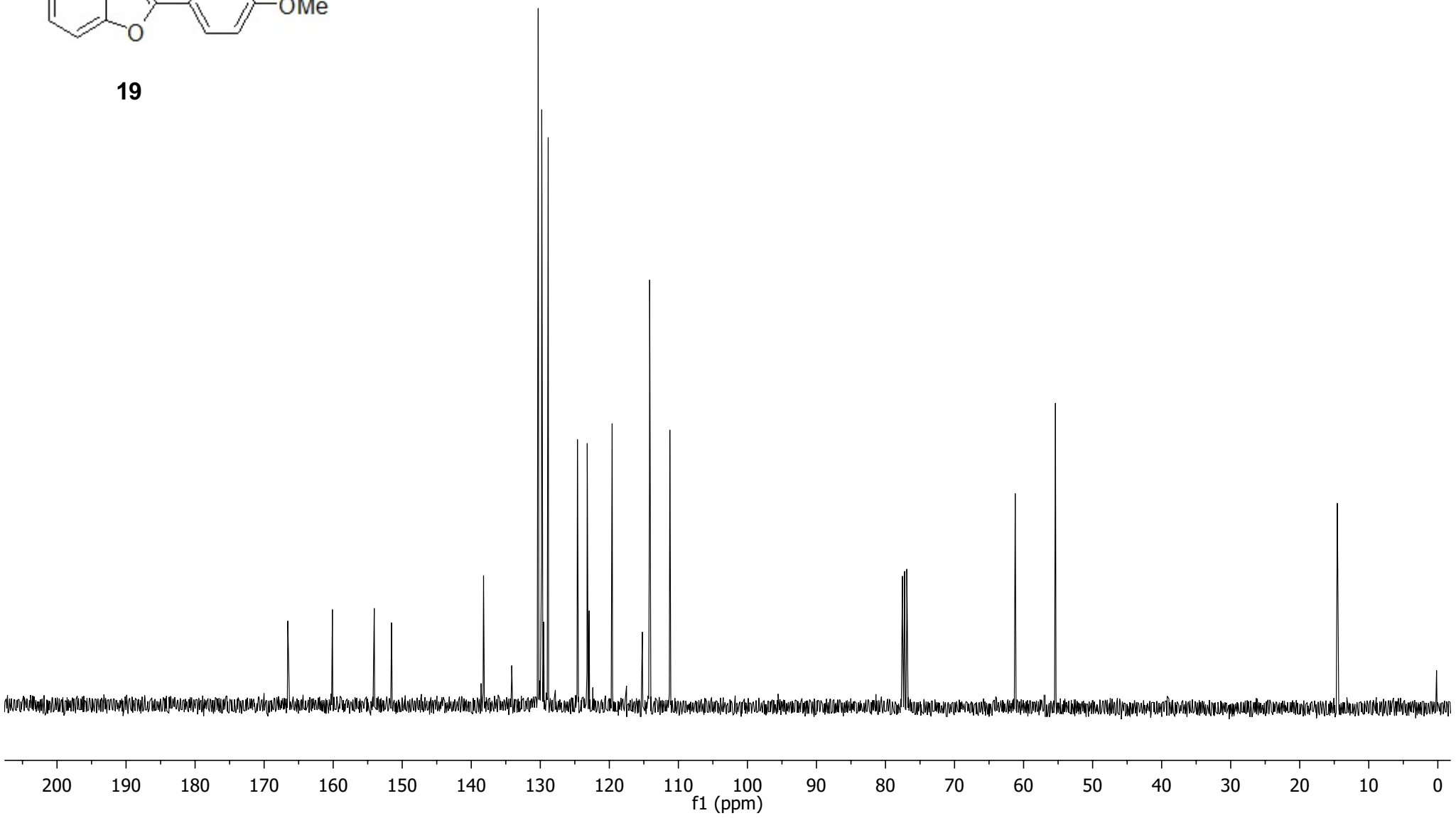
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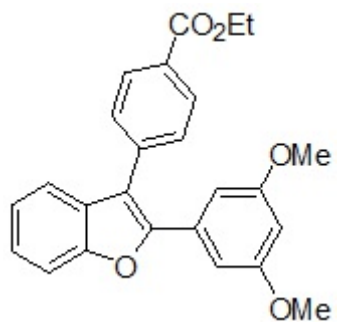
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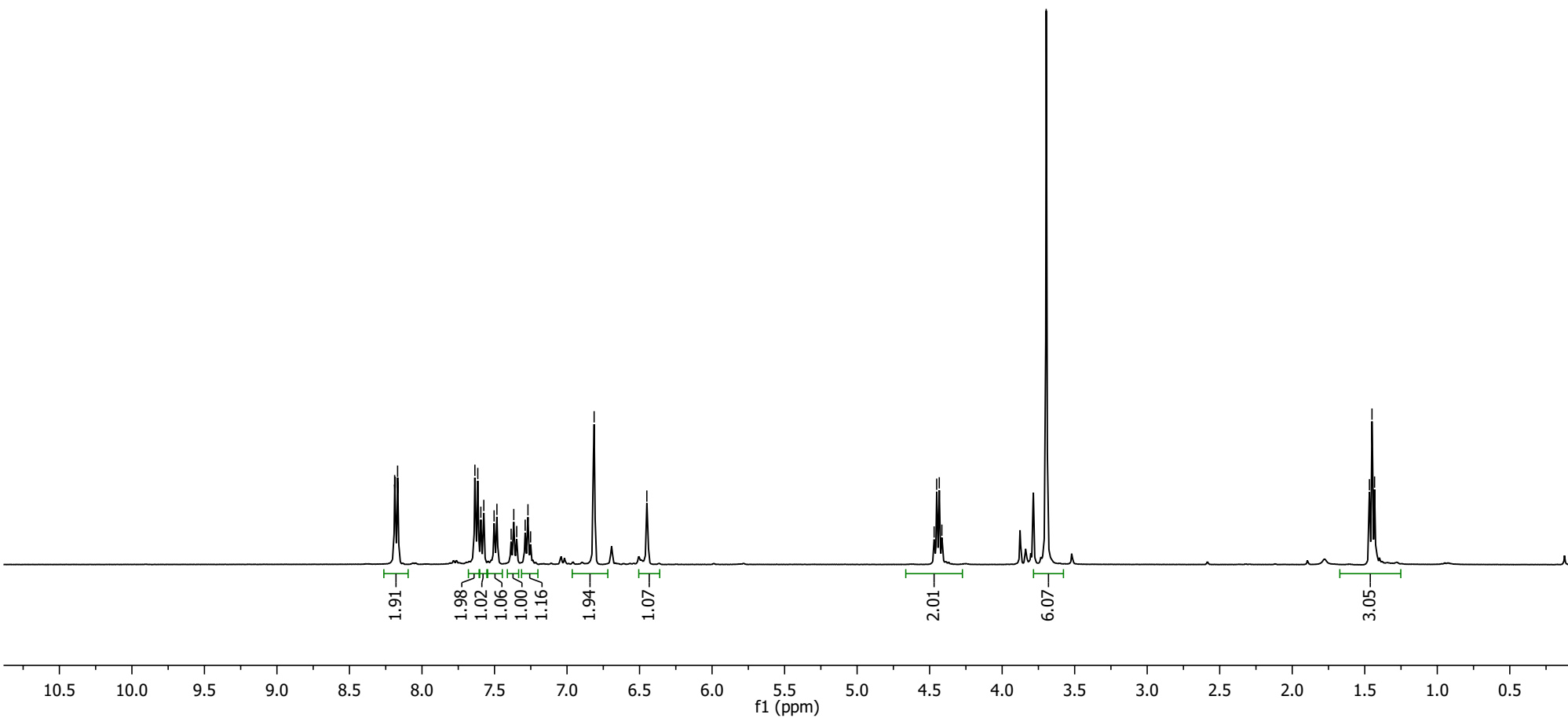
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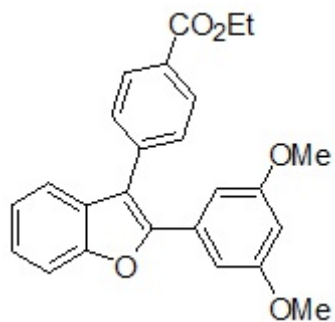
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1.47  
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1.43







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— 160.83

— 154.04

— 150.96

— 137.92

— 131.93

— 130.26

— 129.99

— 129.75

— 125.20

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— 105.22

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— 101.56

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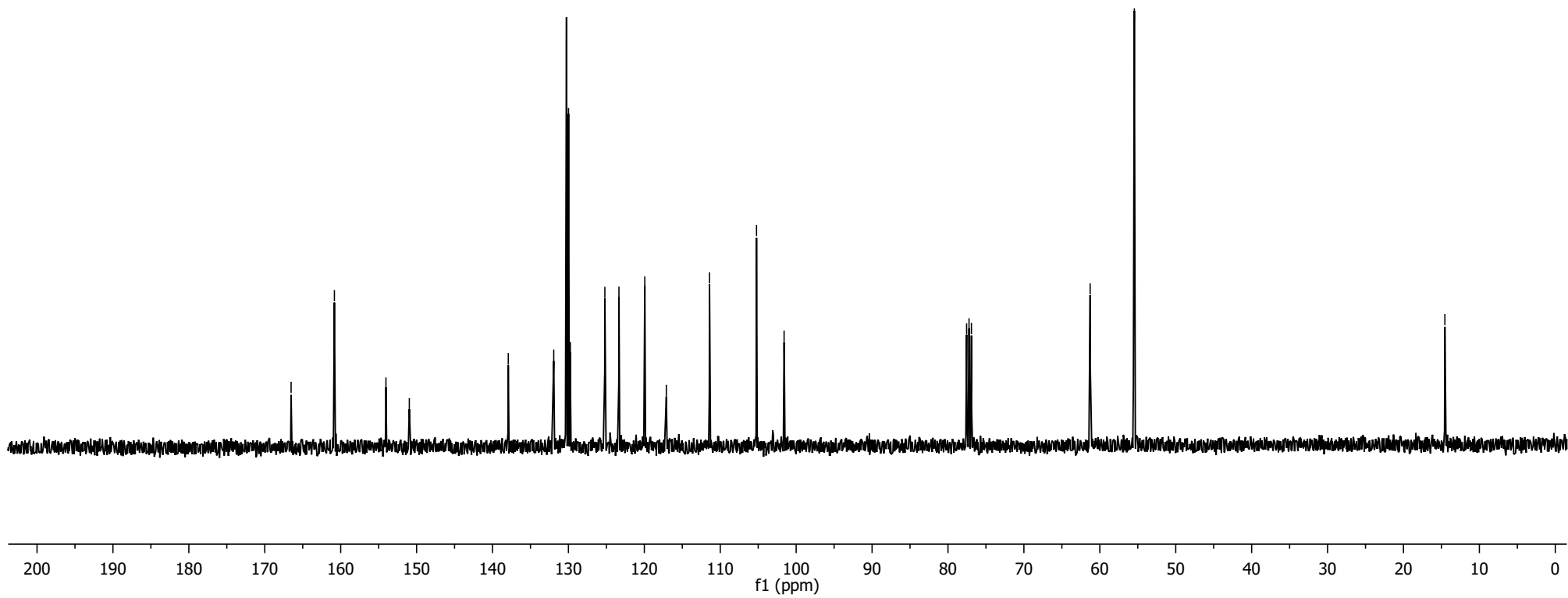
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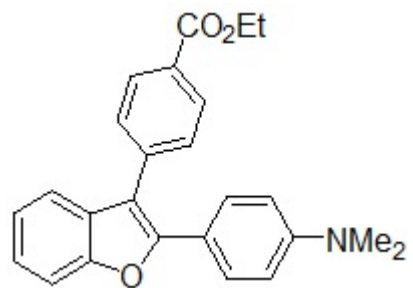
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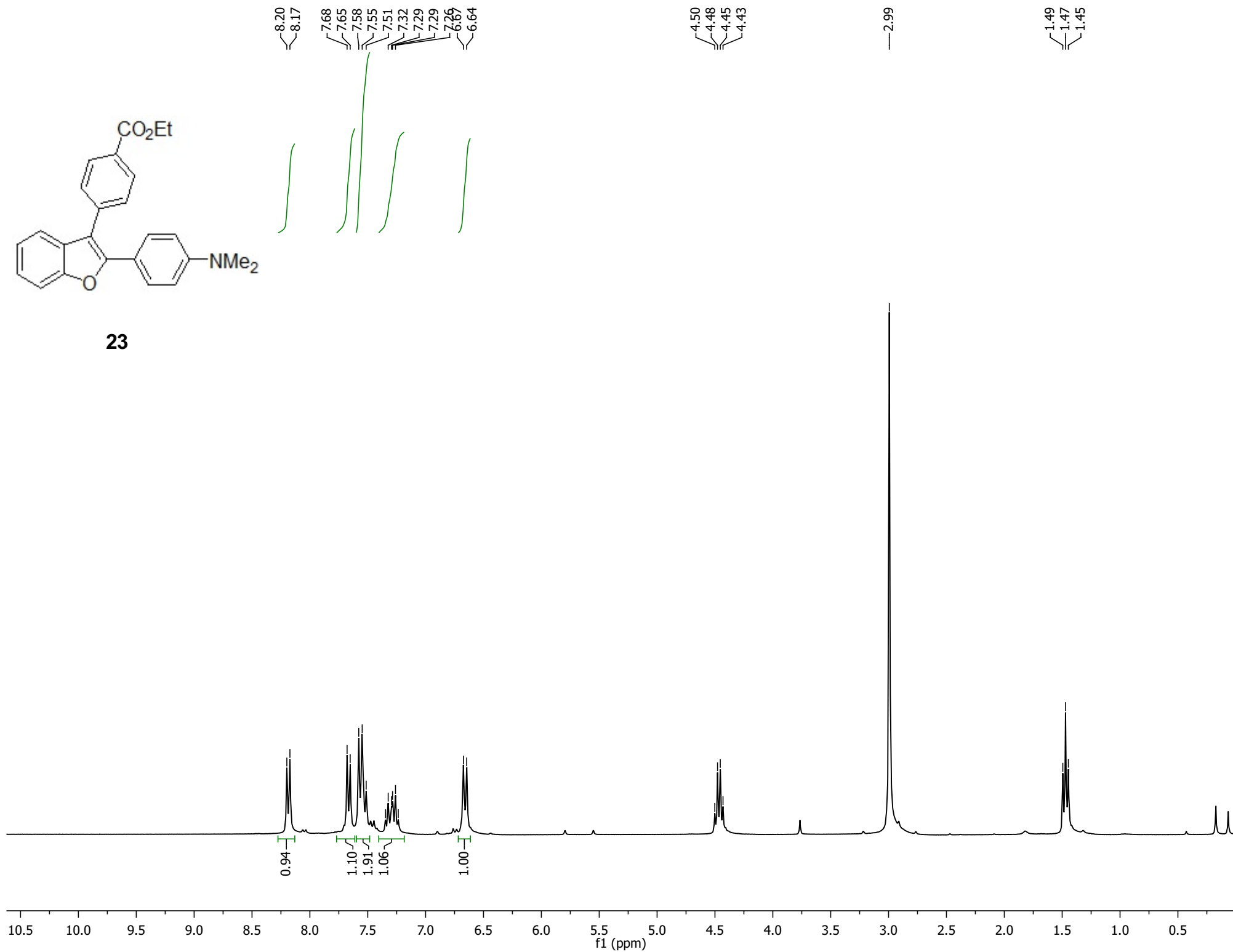
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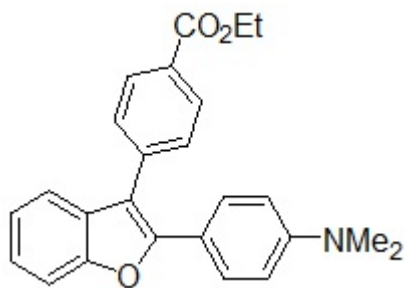
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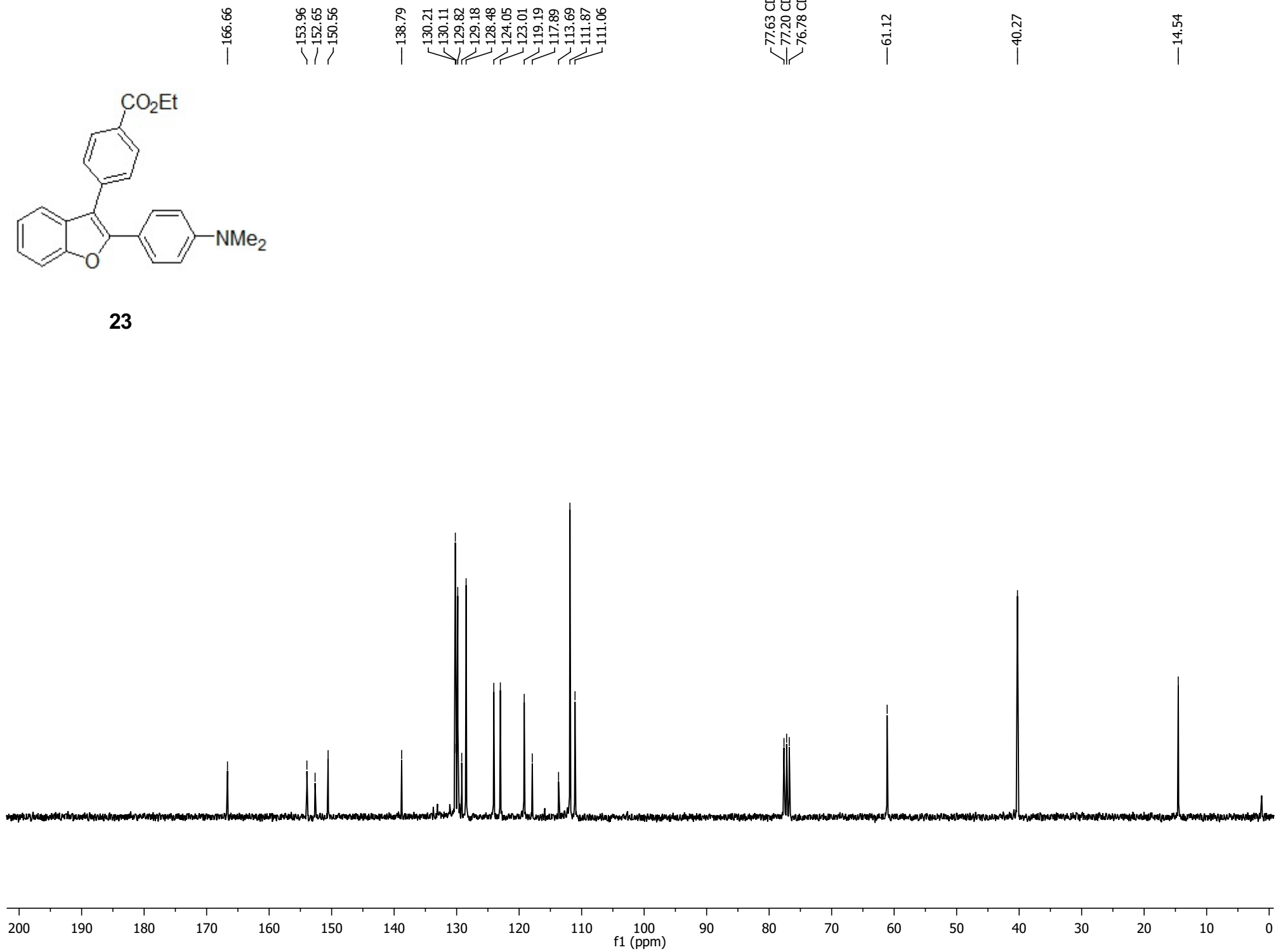


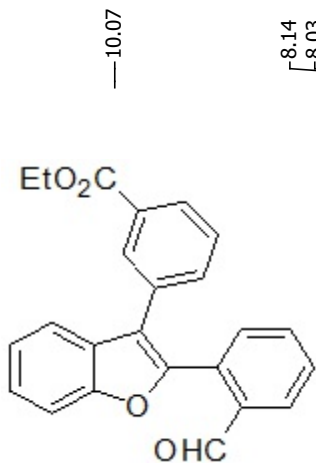
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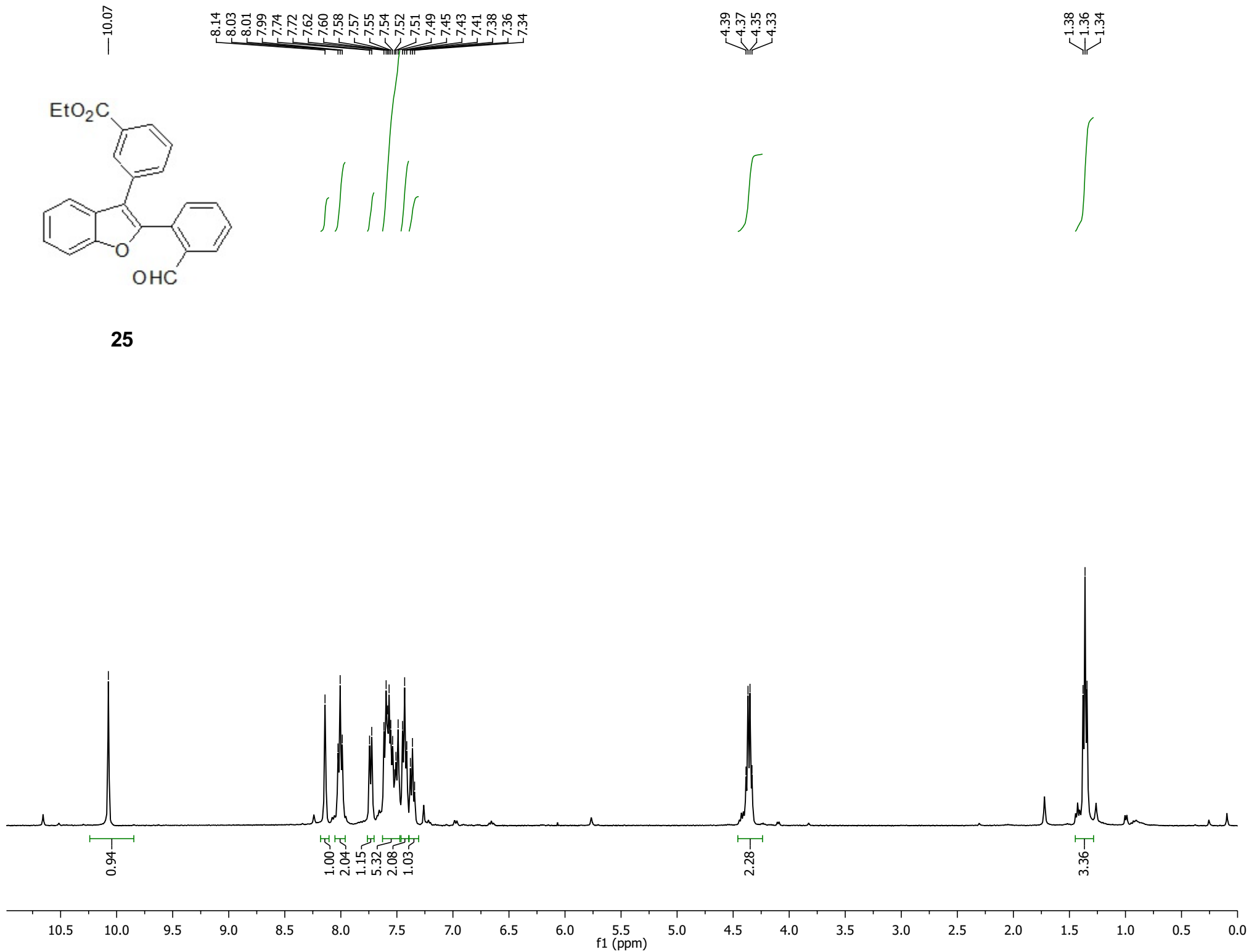


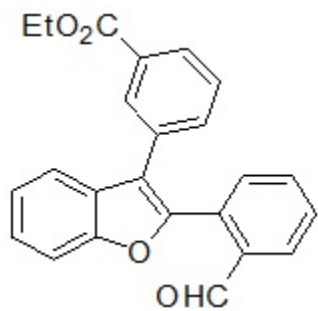
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25





25

—191.01

—166.24

—155.09

—148.62

133.80

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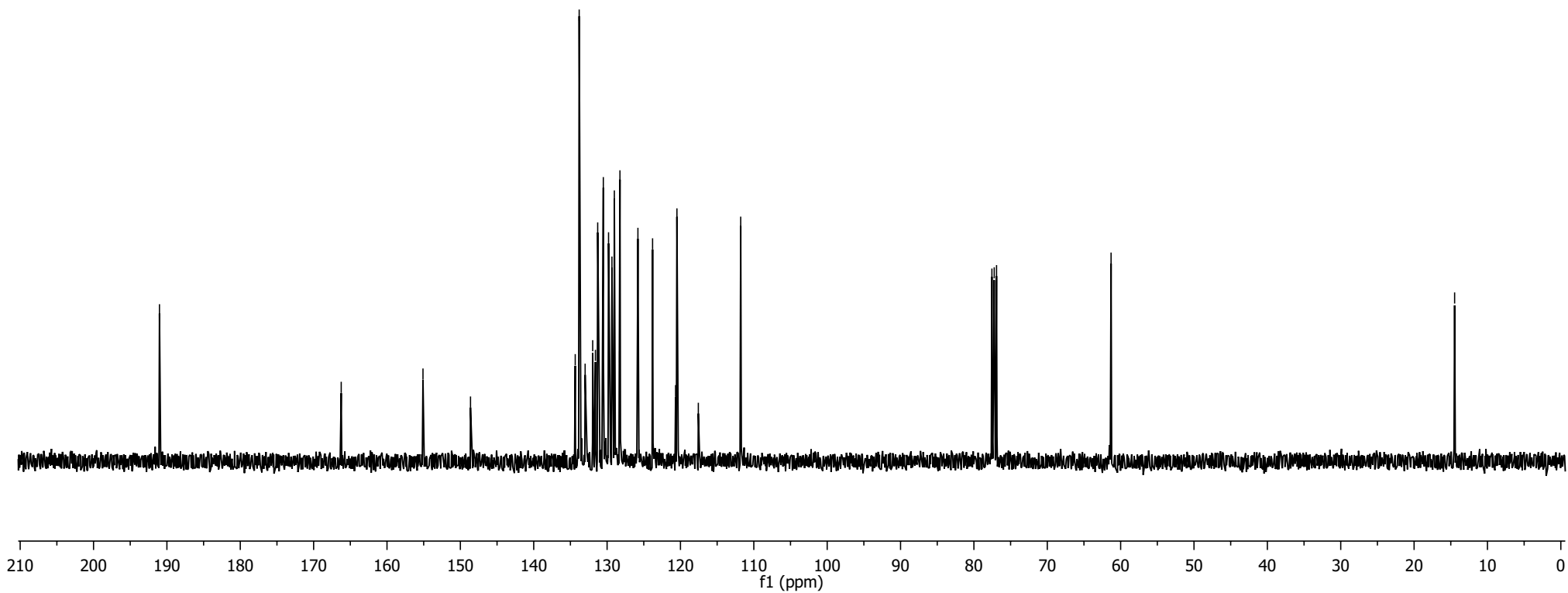
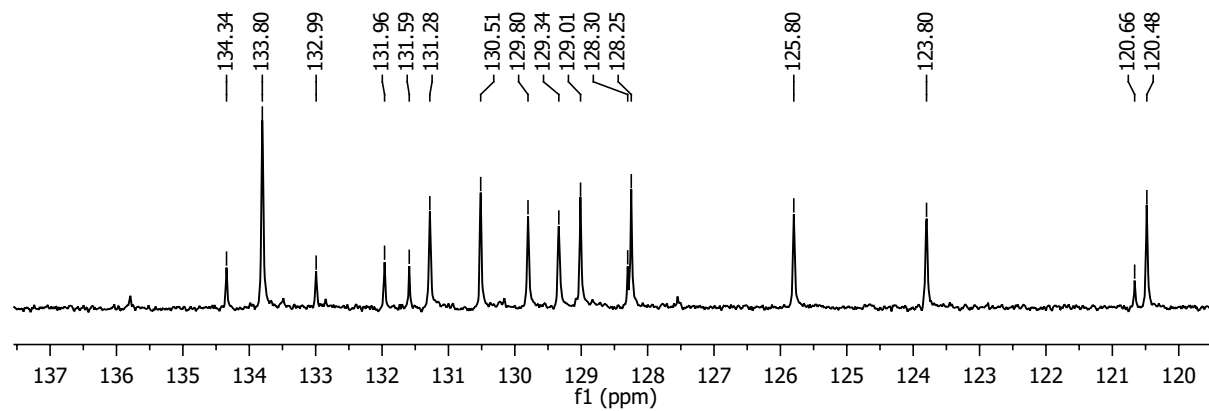
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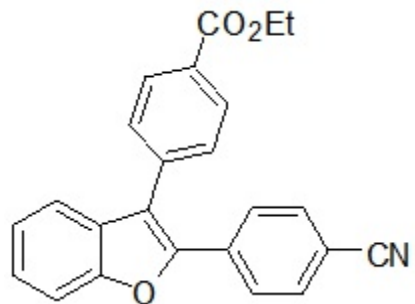
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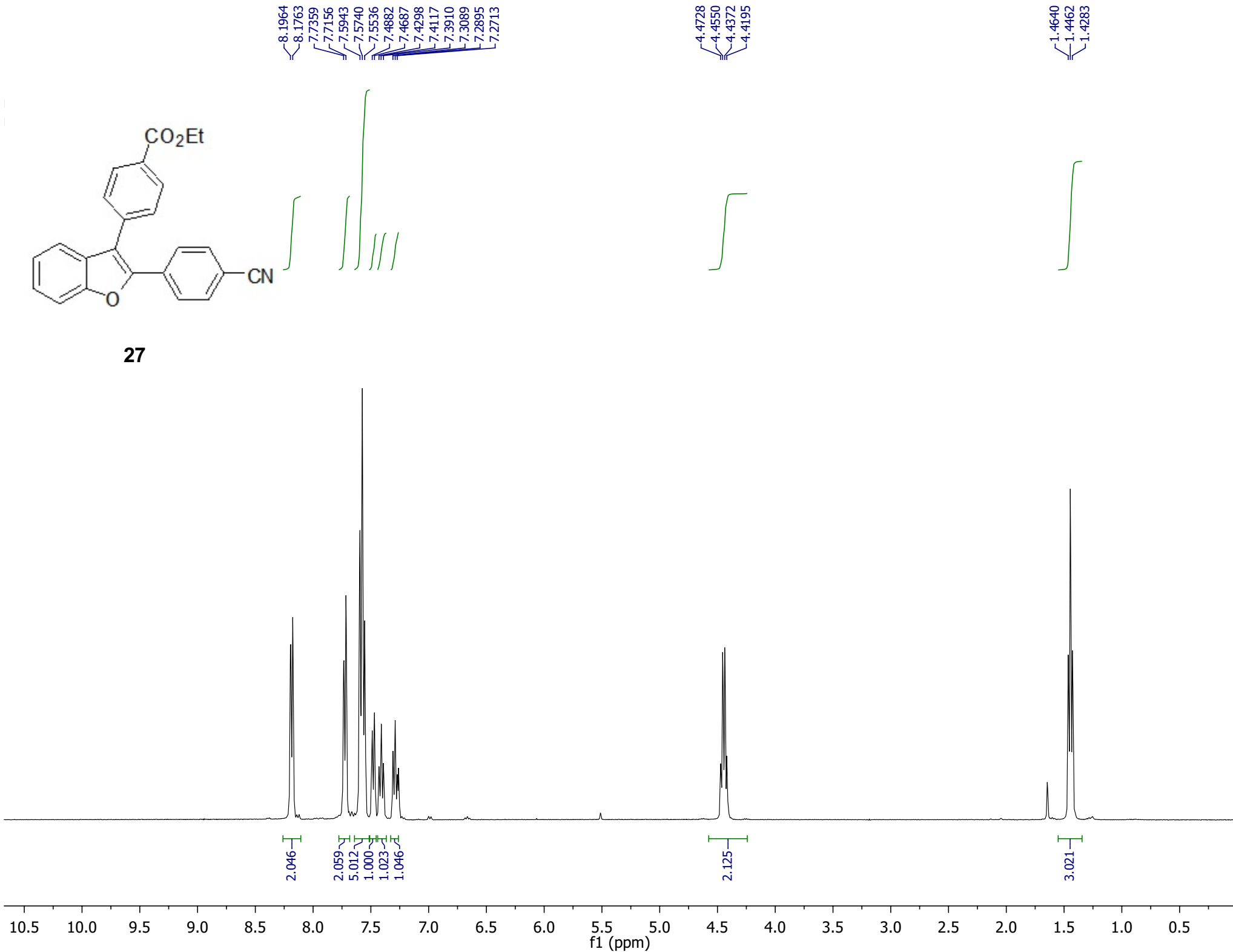
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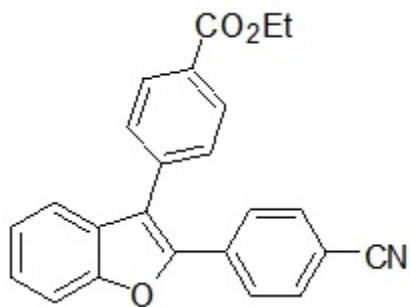
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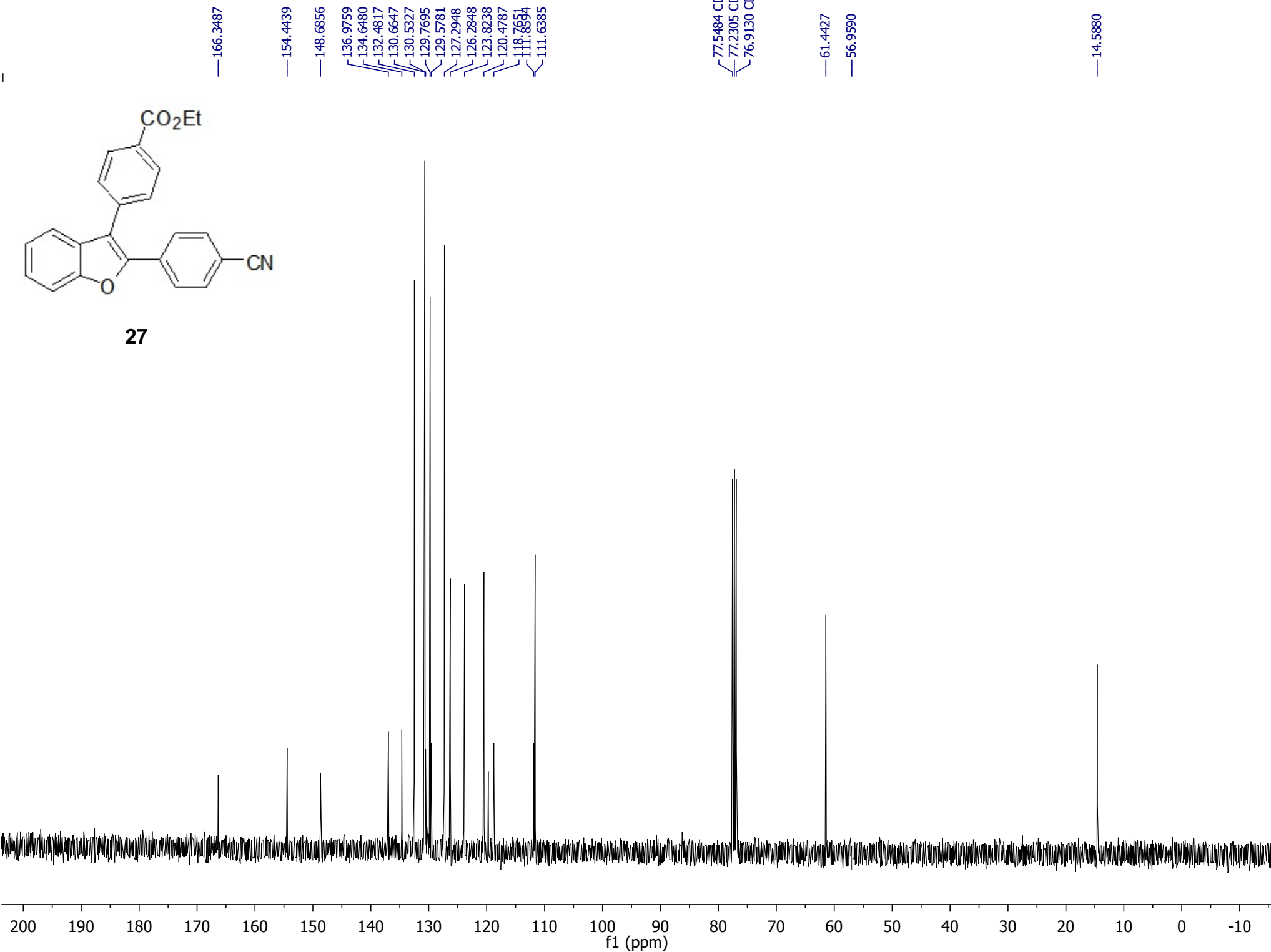


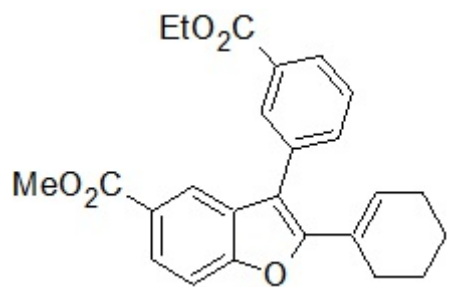
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27





29

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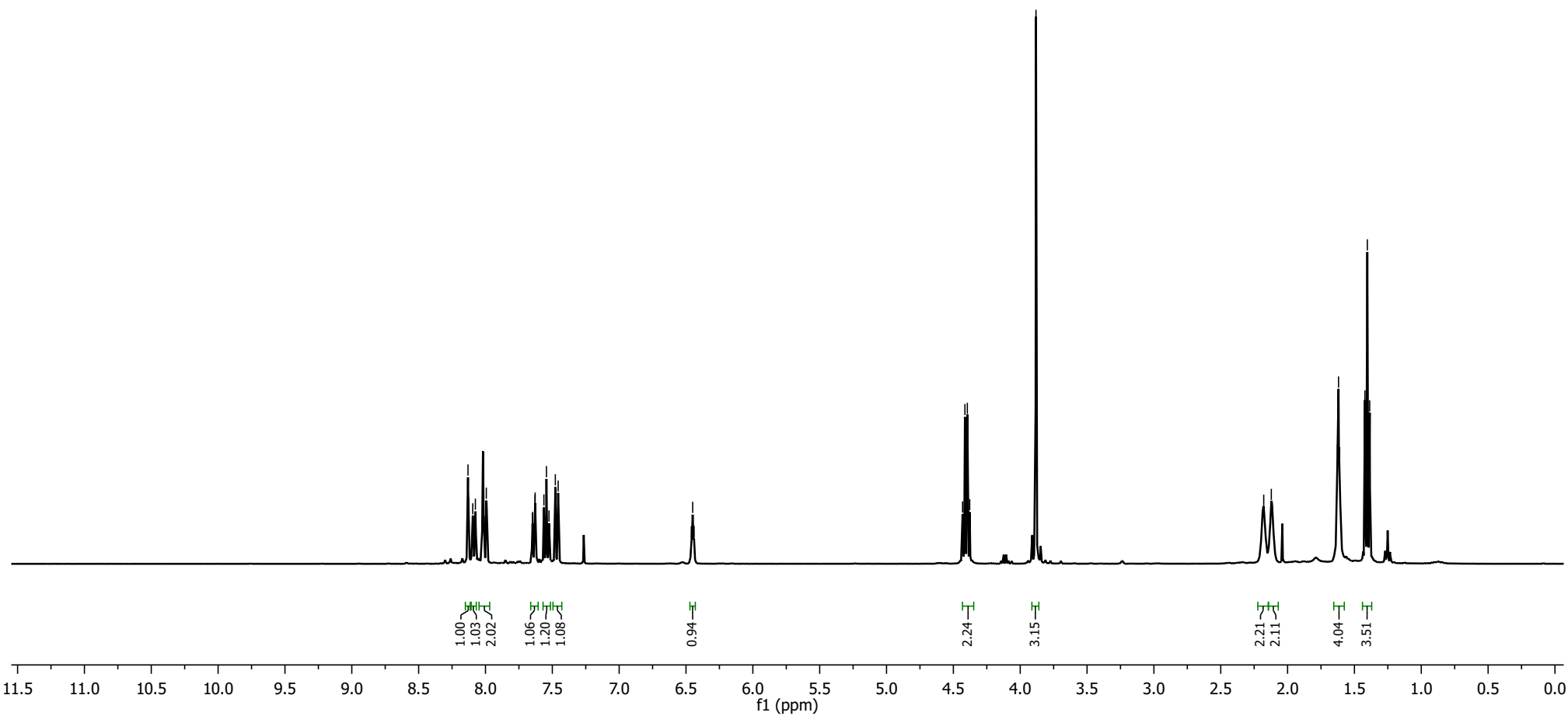
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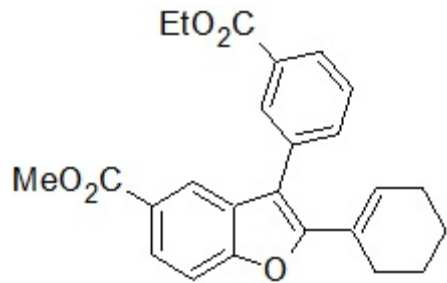
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133.20  
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131.10  
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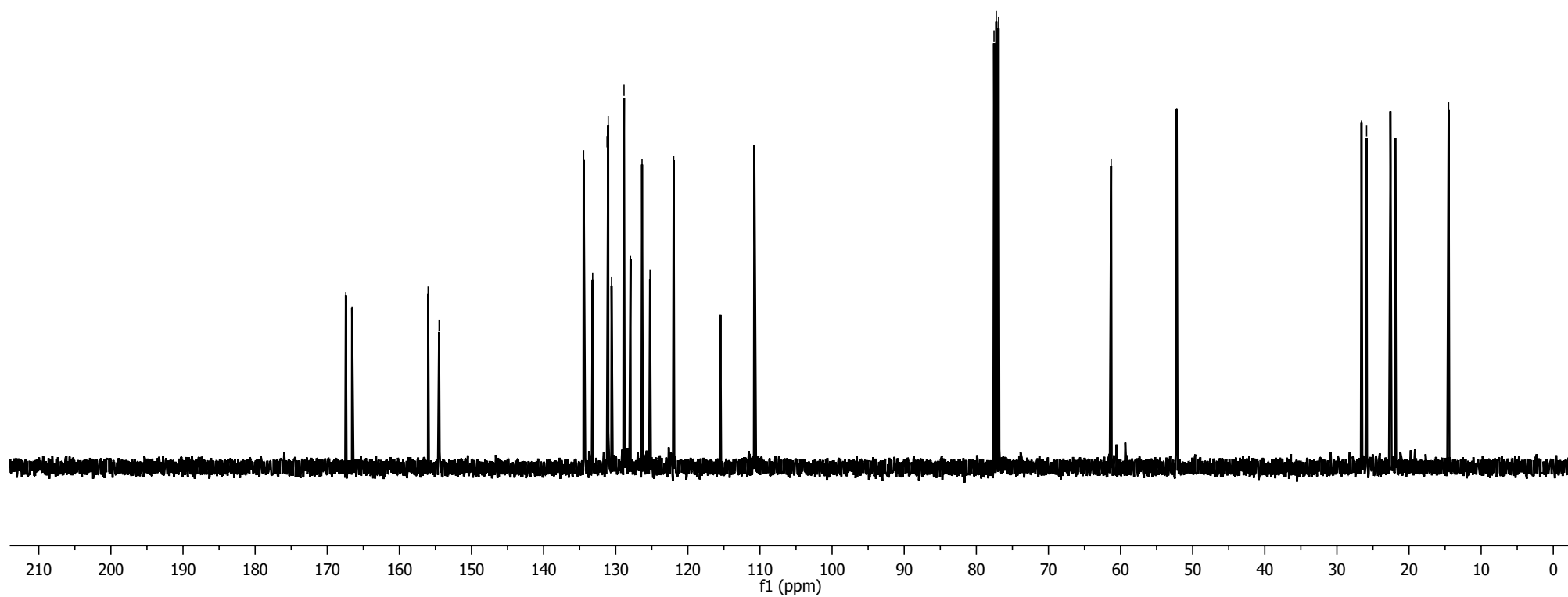
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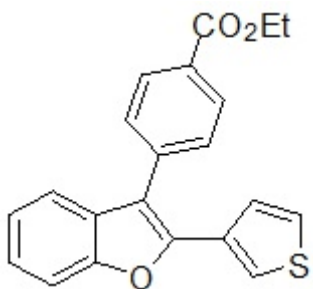
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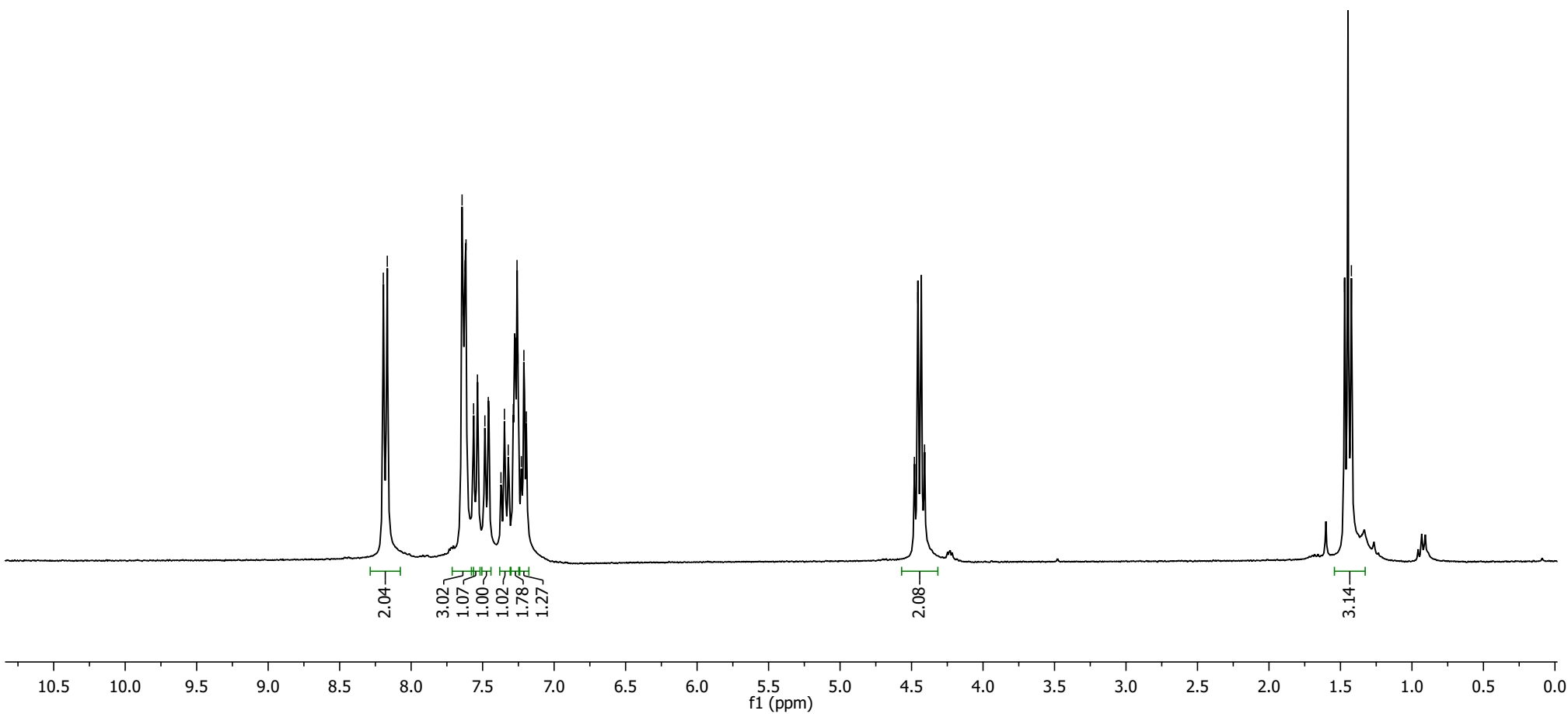


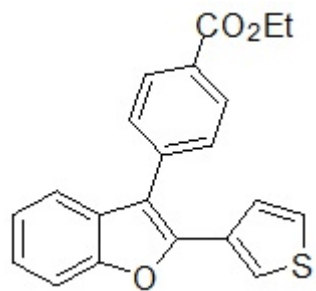
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7.37  
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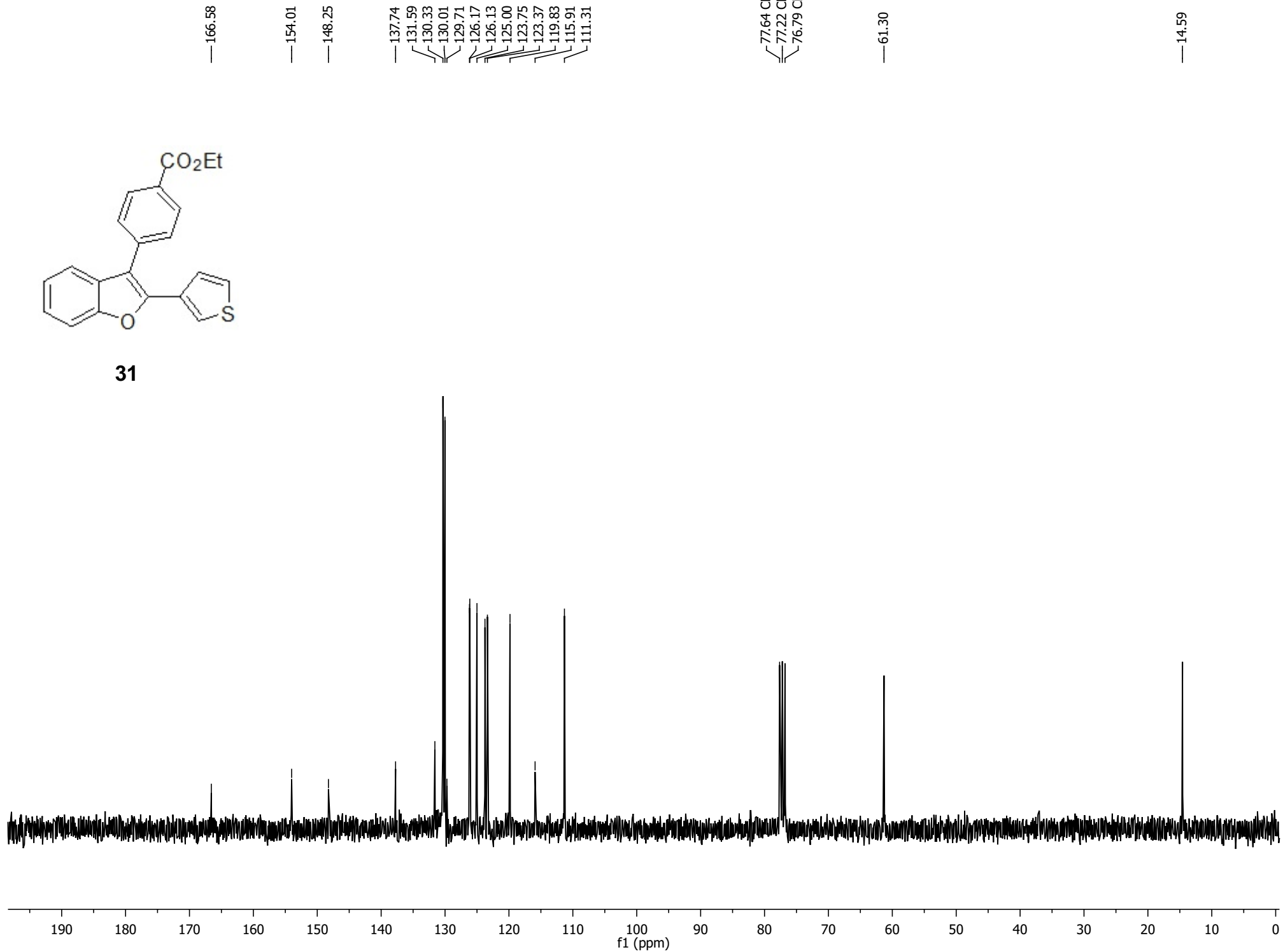
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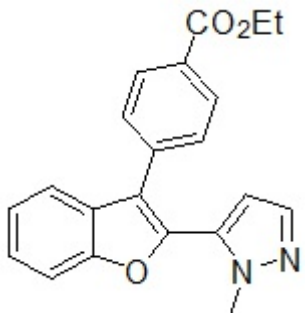
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1.42





31





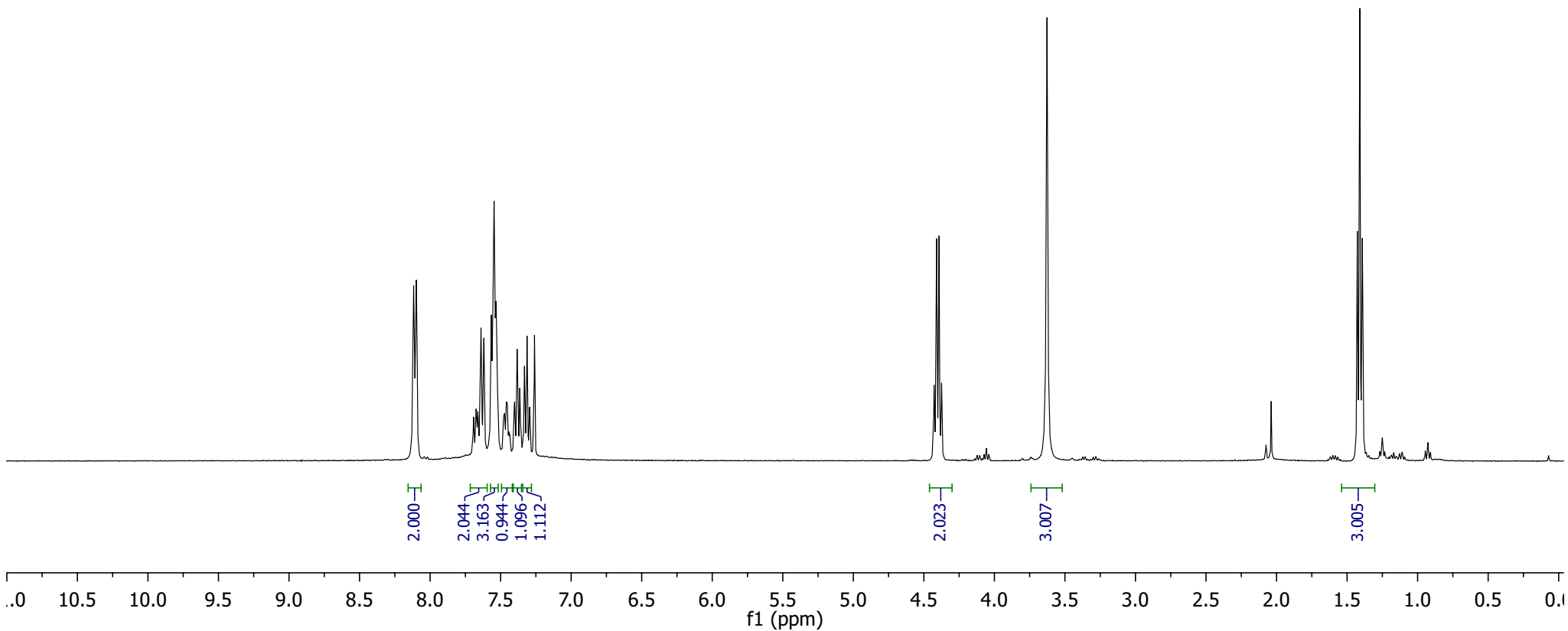
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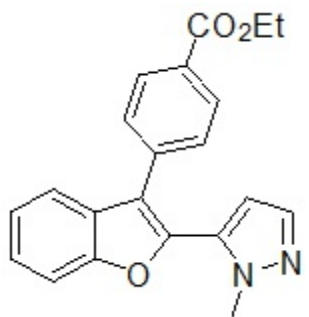
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33

— 166.3695

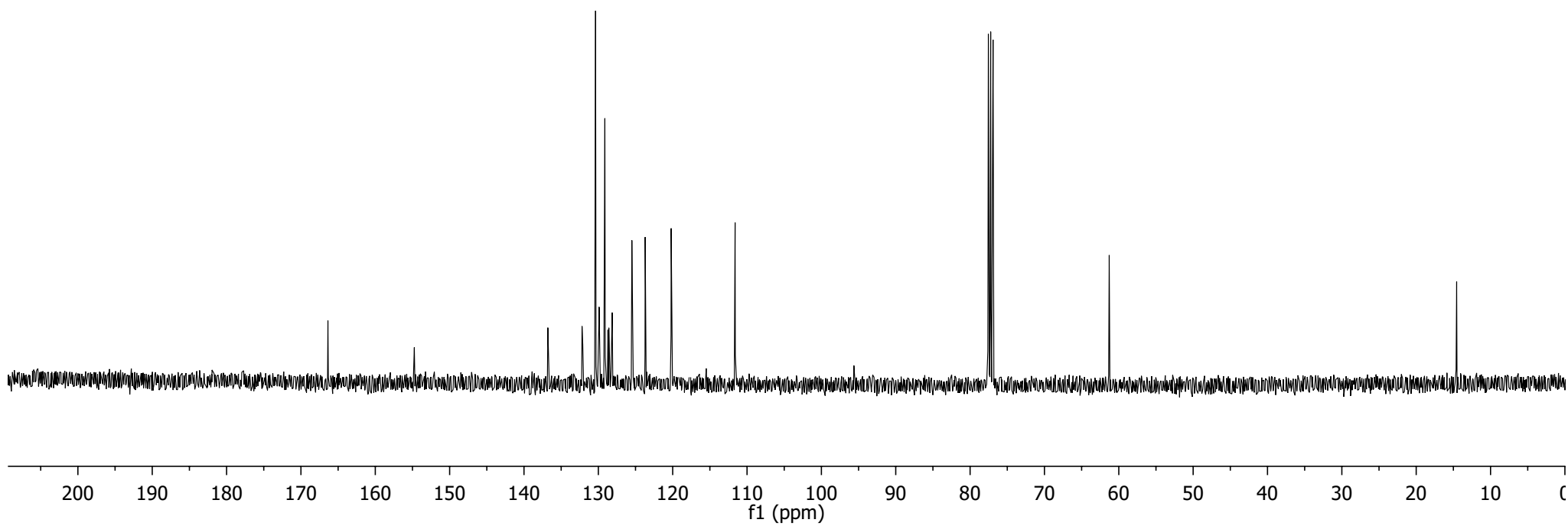
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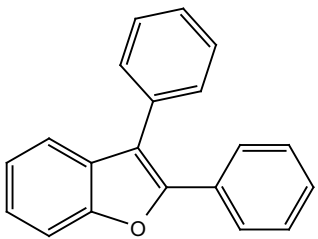
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77.2284 CDCl3  
76.9107 CDCl3

— 61.2870

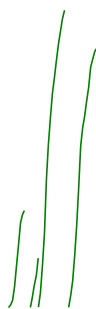
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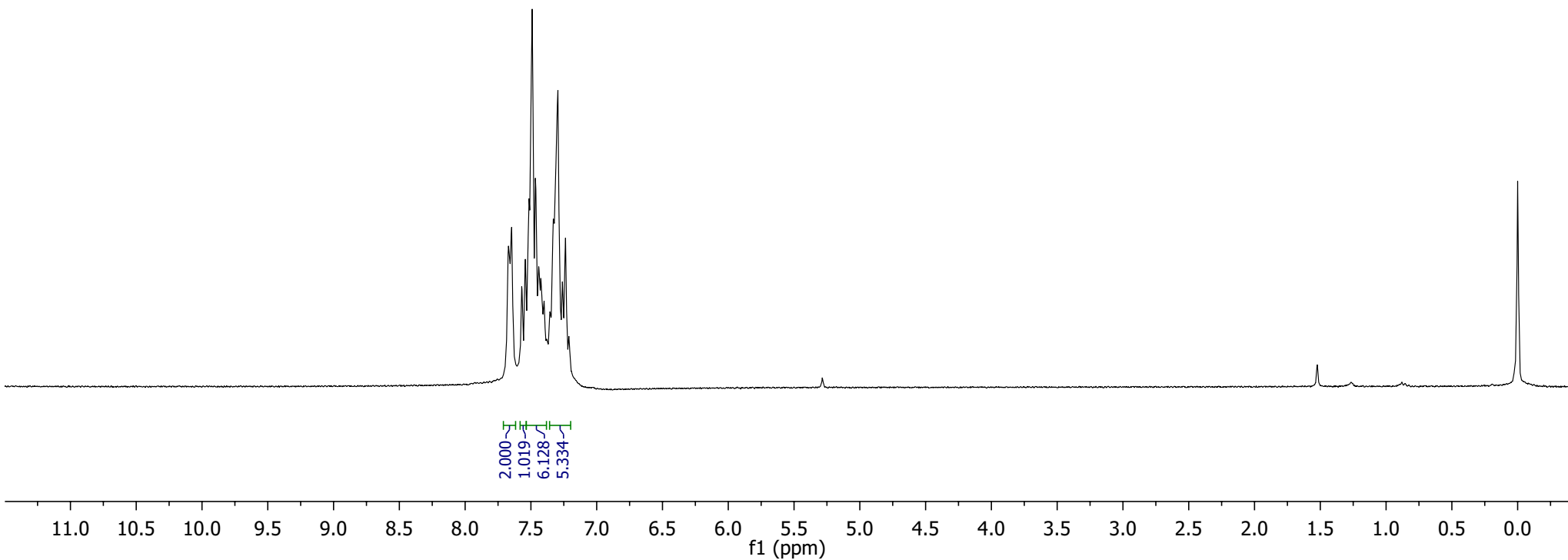
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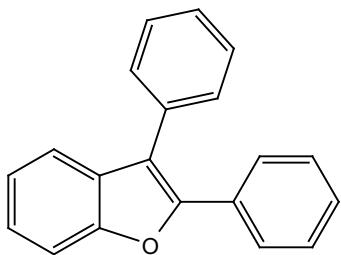
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2.000  
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0.0001

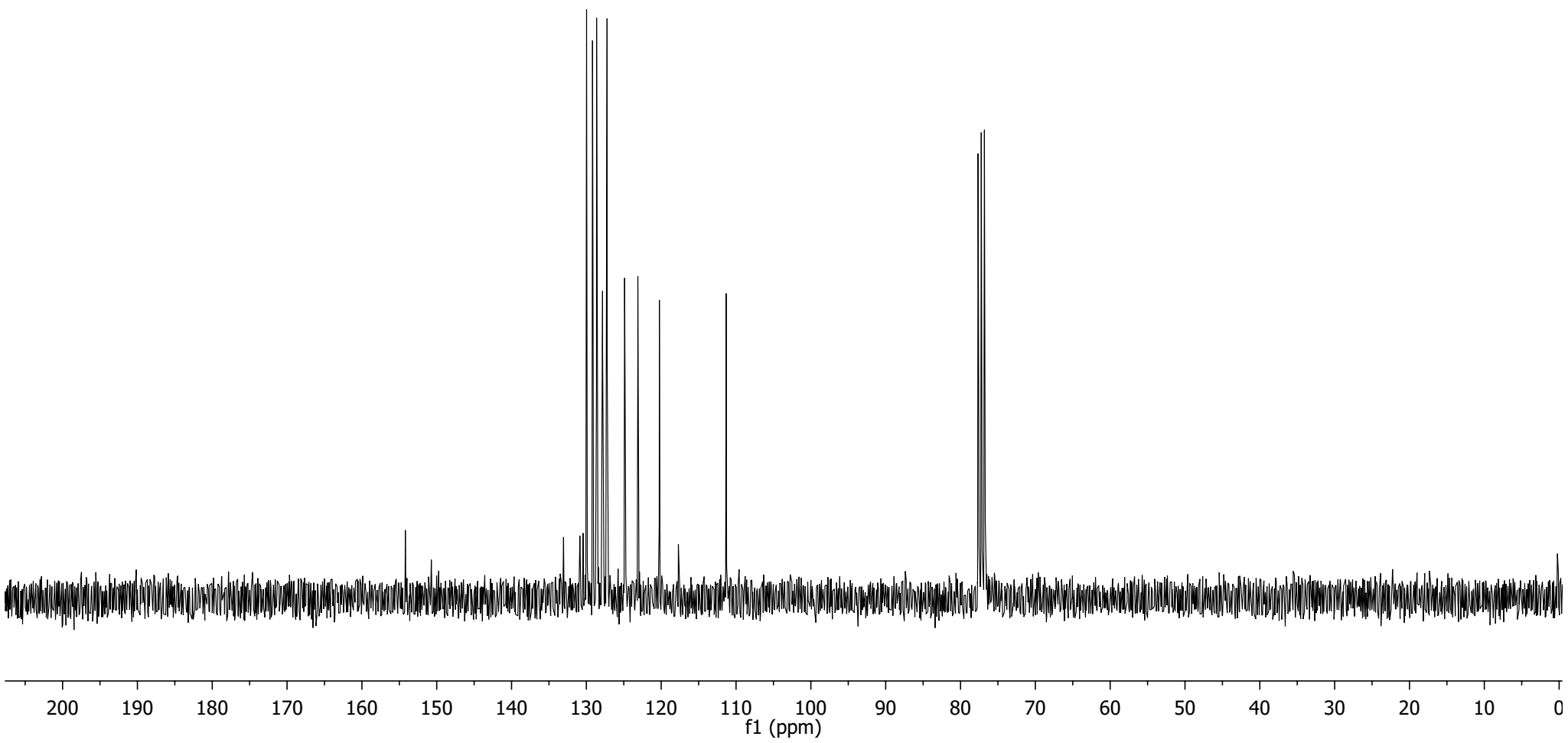


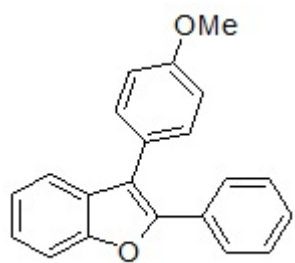


34

154.1920  
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123.1218  
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117.7034  
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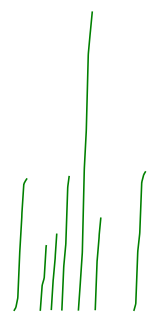
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76.8064 CDC13



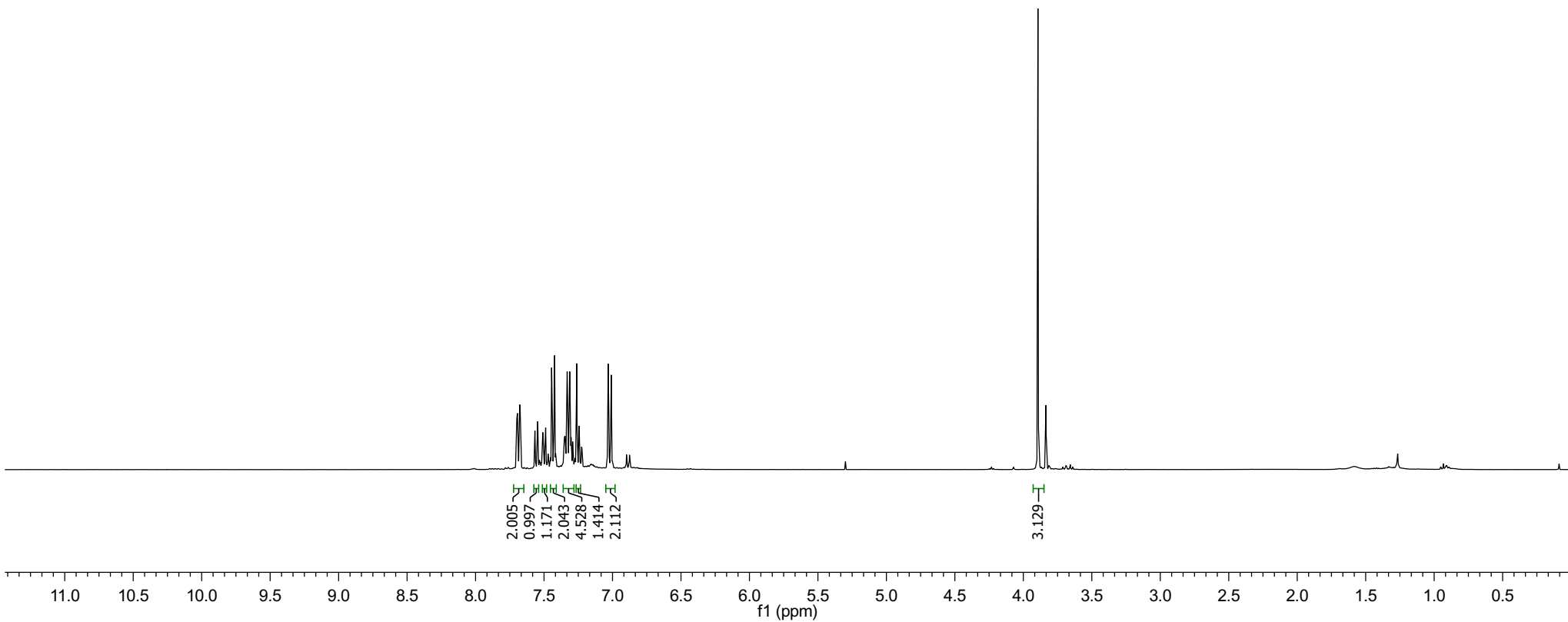


36

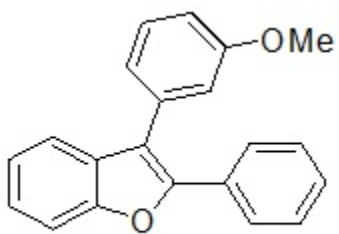
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7.566  
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7.510  
7.488  
7.452  
7.445  
7.439  
7.428  
7.423  
7.416  
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7.347  
7.337  
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7.327  
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7.316  
7.312  
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7.303  
7.291  
7.289  
7.260  
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7.026  
7.014  
7.009  
7.002



3.893

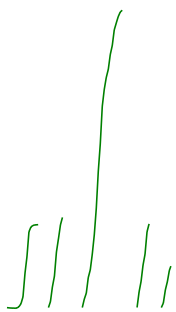






38

7.7599  
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7.1541  
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6.9910

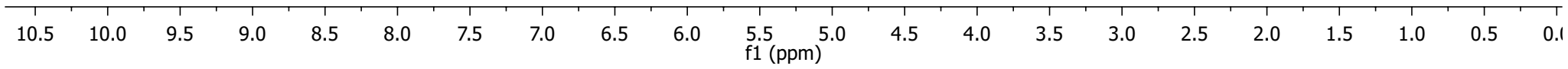


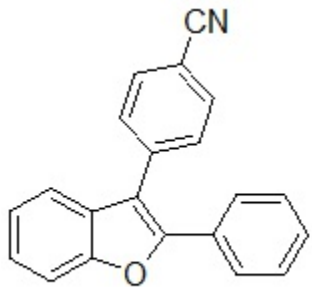
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2.017  
1.000

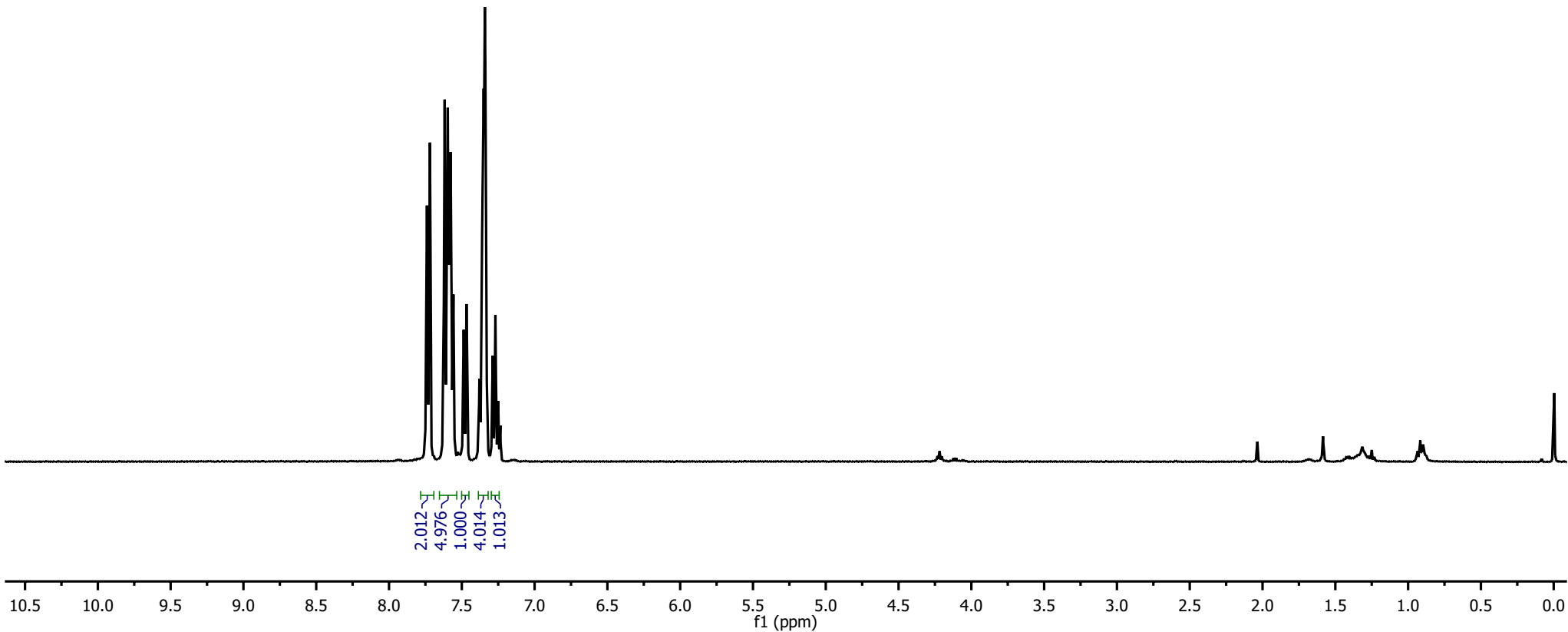
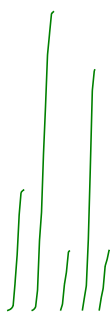
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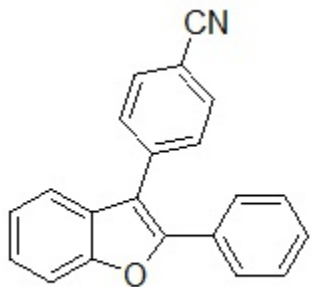




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7.74  
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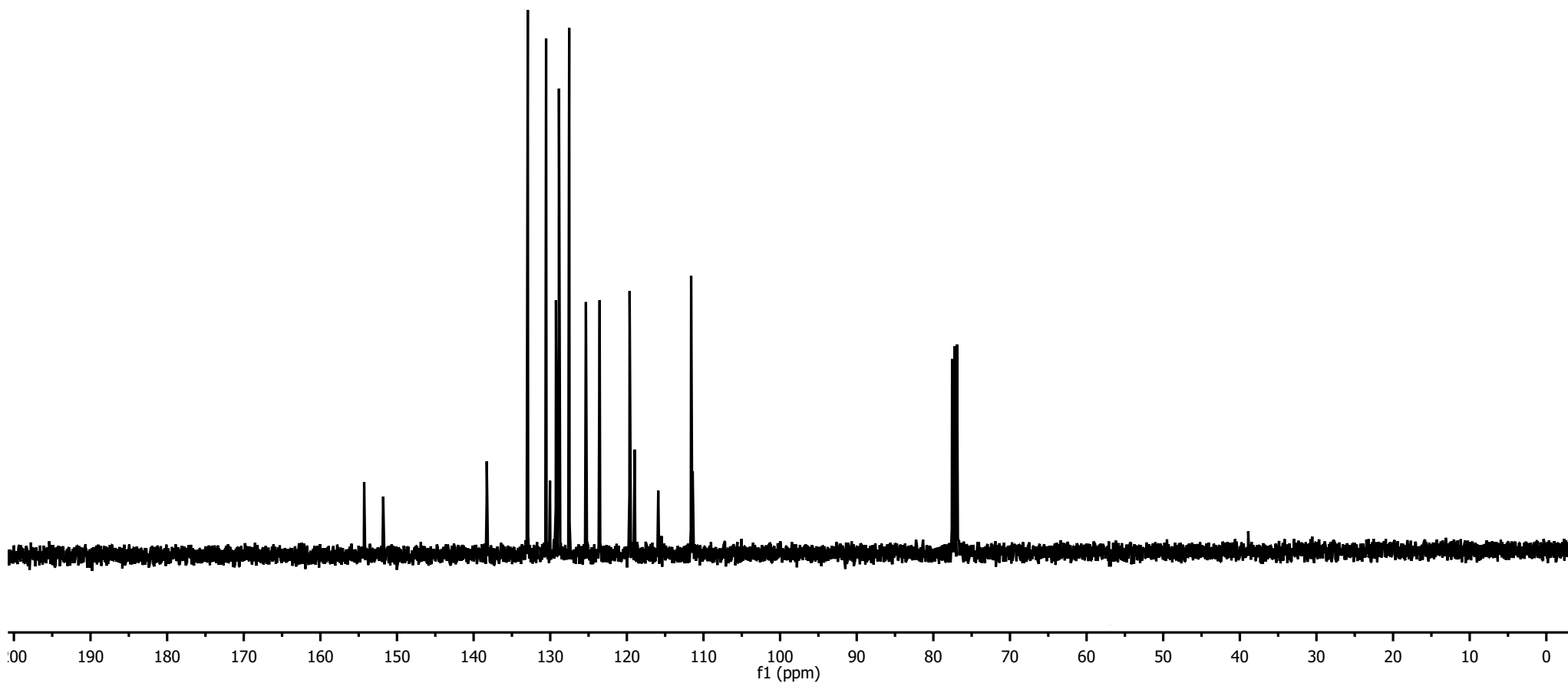


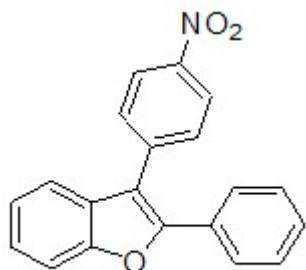
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111.41

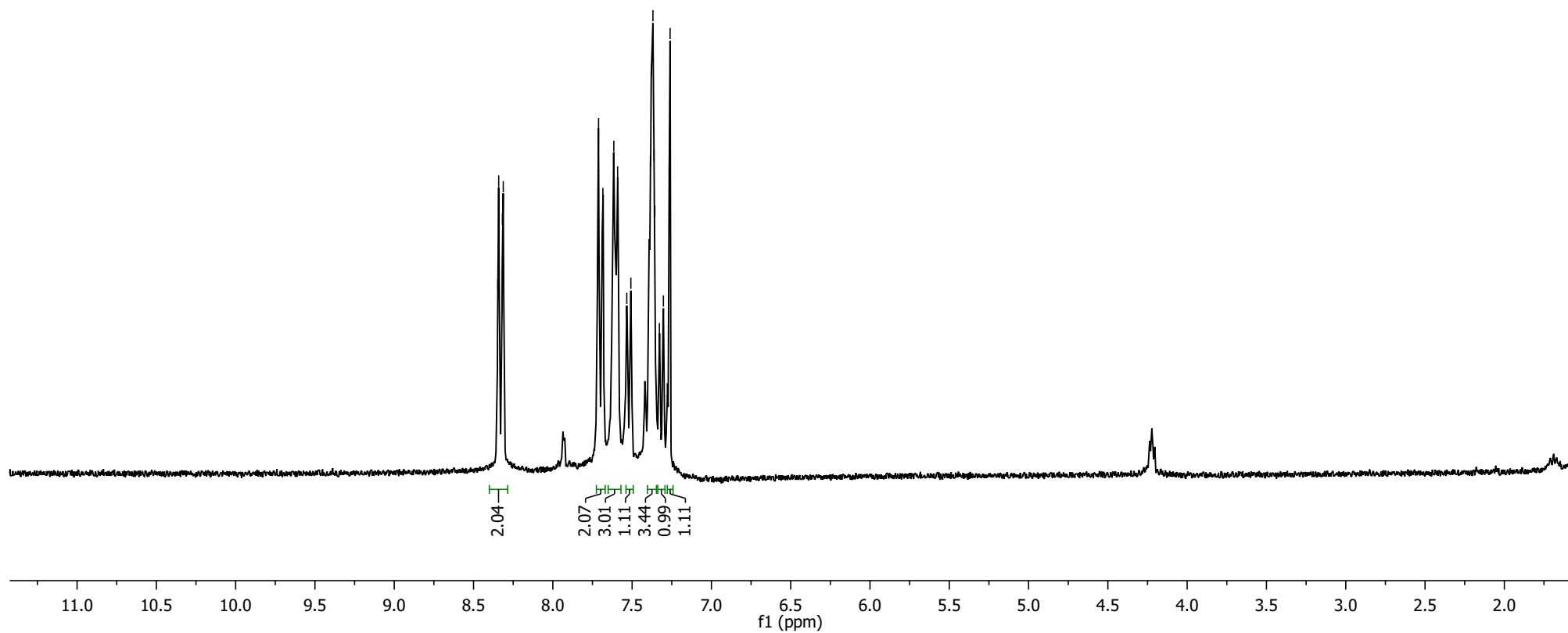
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76.91 CDCl3

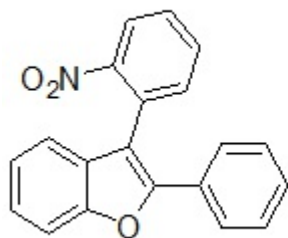




42

8.35  
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7.62  
7.59  
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7.39  
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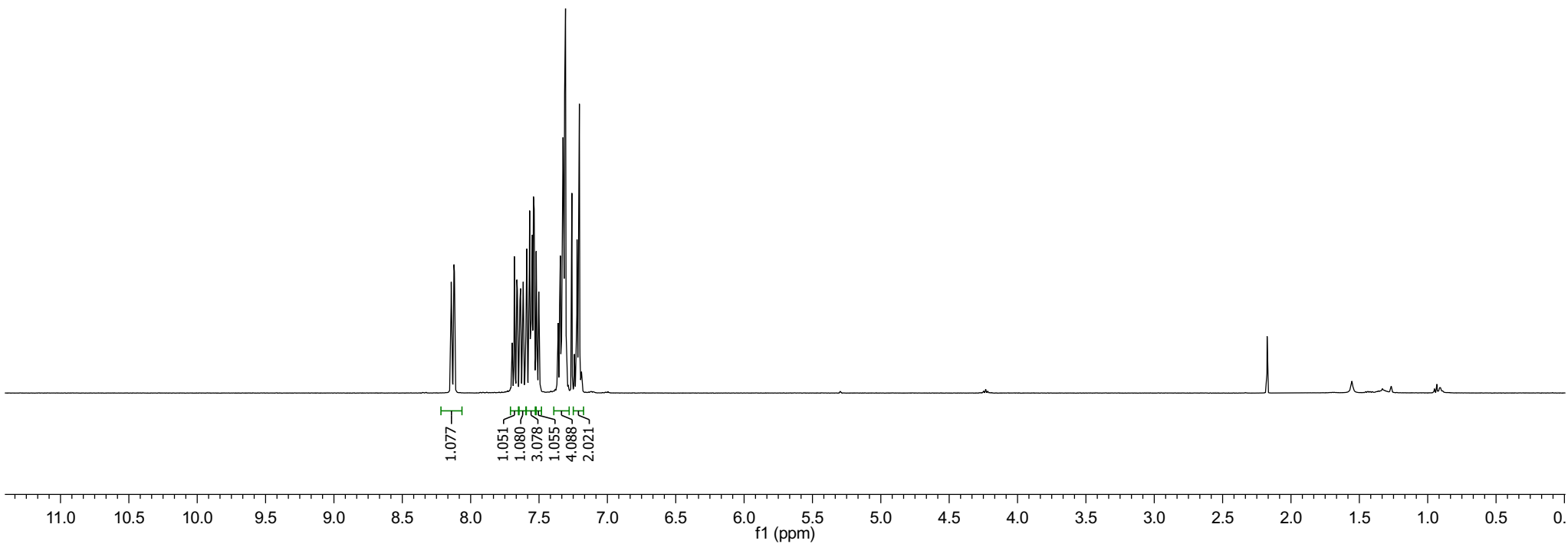


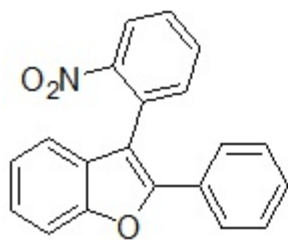


44

8.142  
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7.699  
7.696  
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7.677  
7.662  
7.658  
7.640  
7.635  
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7.616  
7.601  
7.597  
7.592  
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7.569  
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7.551  
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7.205

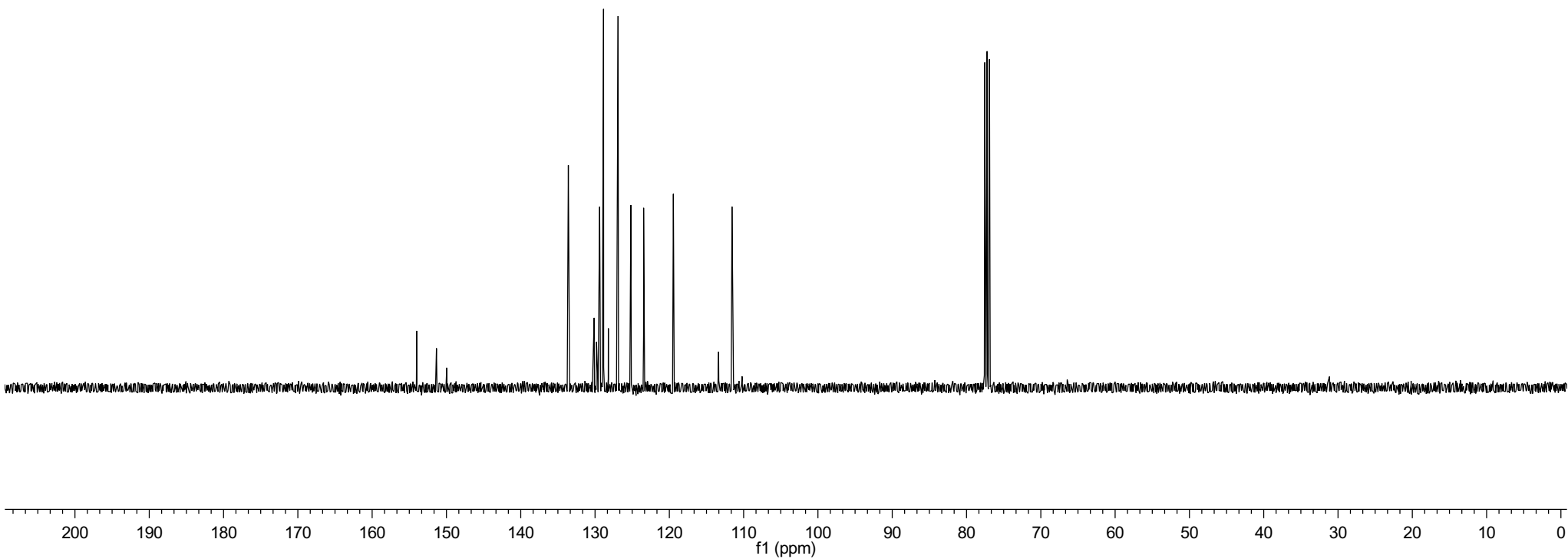
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└└└└└└

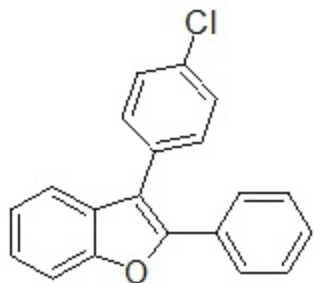




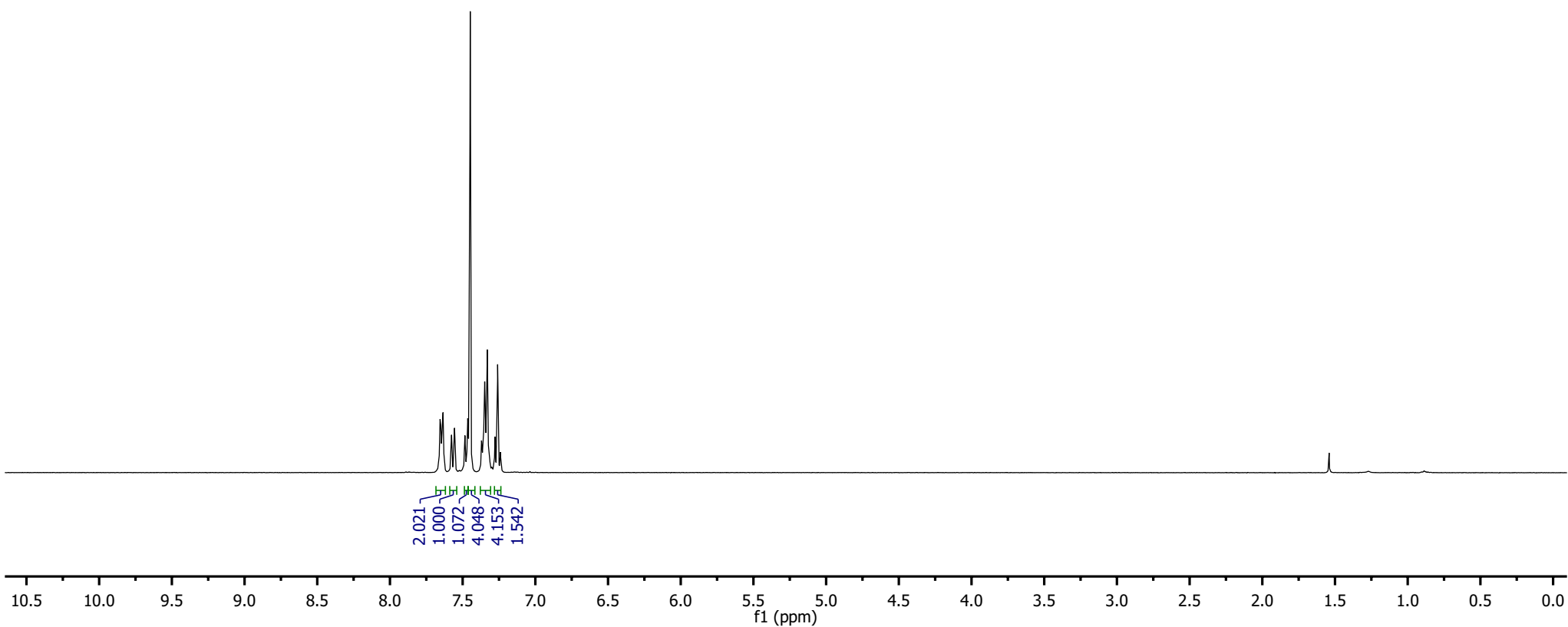
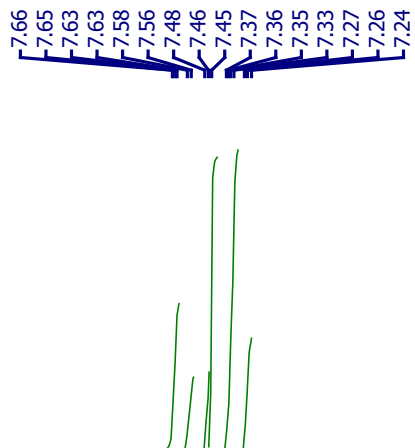
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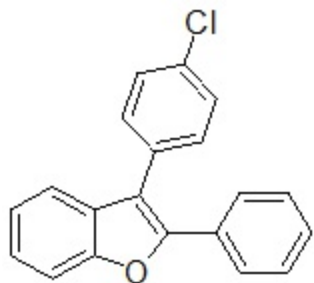
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128.964  
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126.900  
125.217  
125.178  
123.463  
119.458  
113.369  
111.566





46

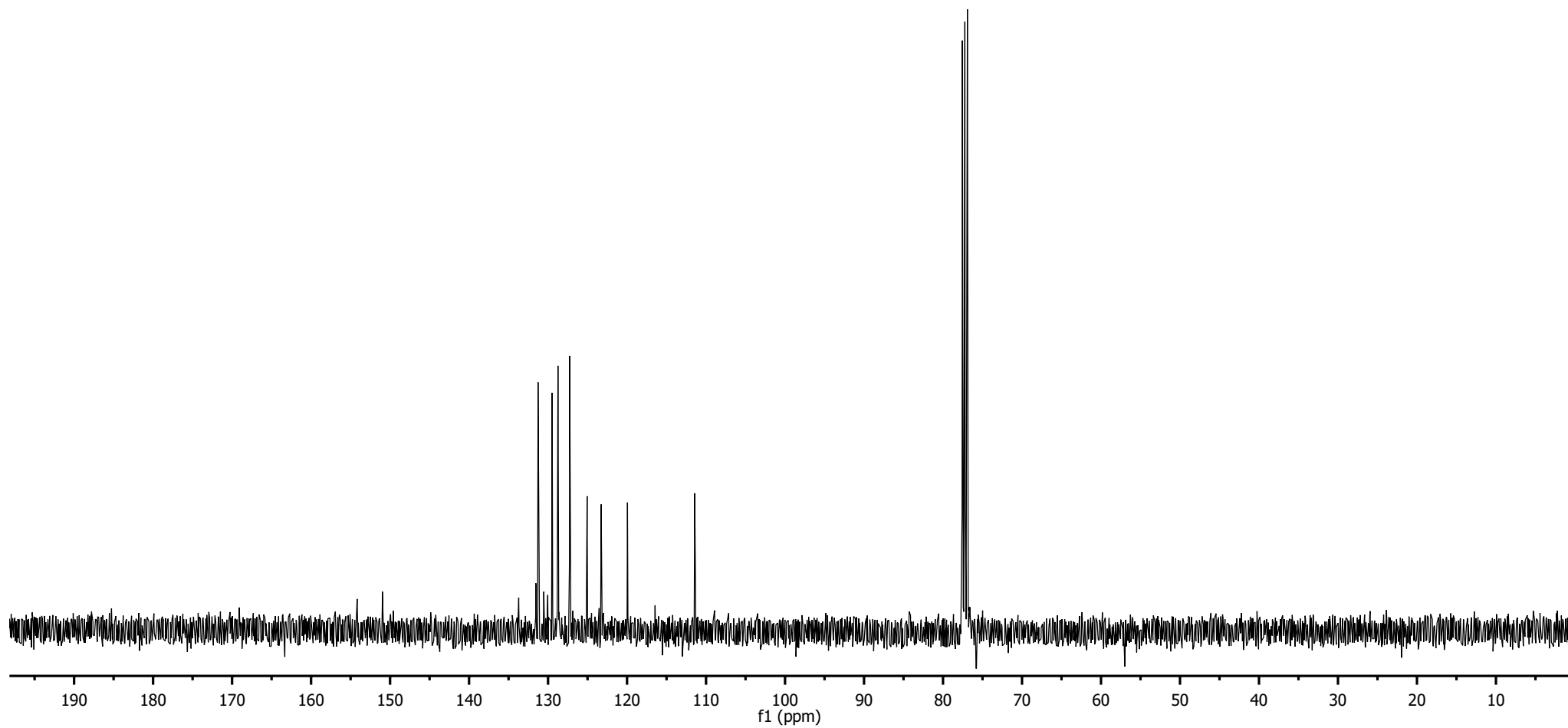




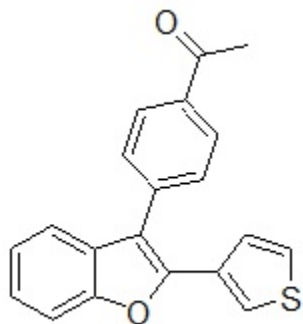
46

150.97  
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111.43

77.55 CDCl3  
77.23 CDCl3  
76.91 CDCl3



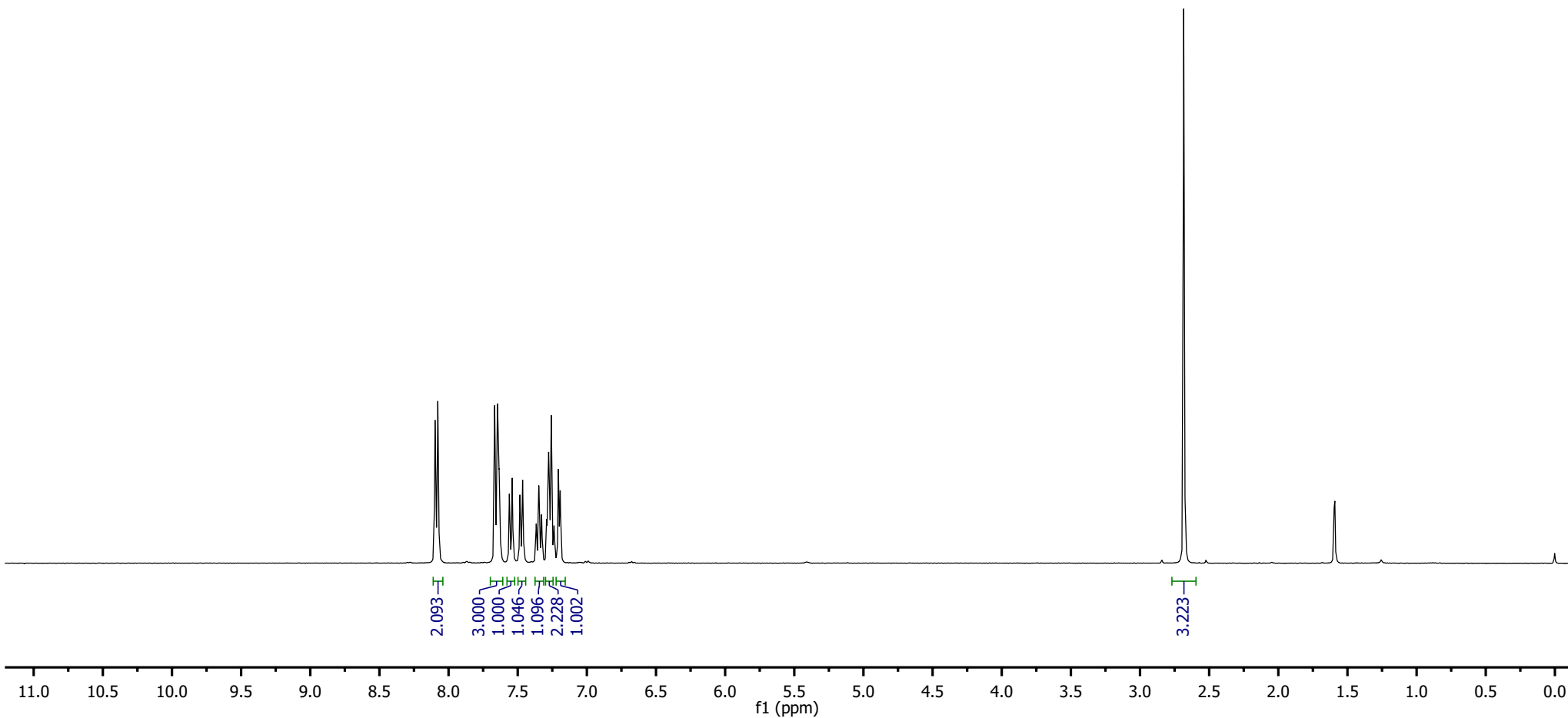
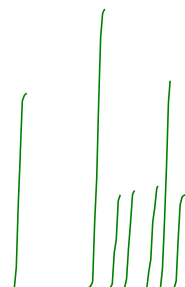


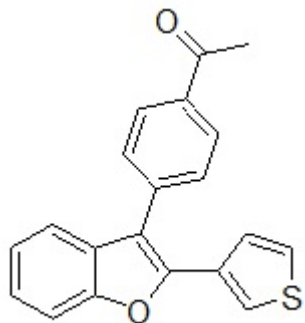


48

8.10  
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7.63  
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7.54  
7.48  
7.46  
7.37  
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7.27  
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7.24  
7.21  
7.19

2.68





48

197.88

154.02

148.32

138.11

136.50

131.55

130.23

129.62

129.14

126.25

126.13

125.06

123.87

123.41

119.81

115.79

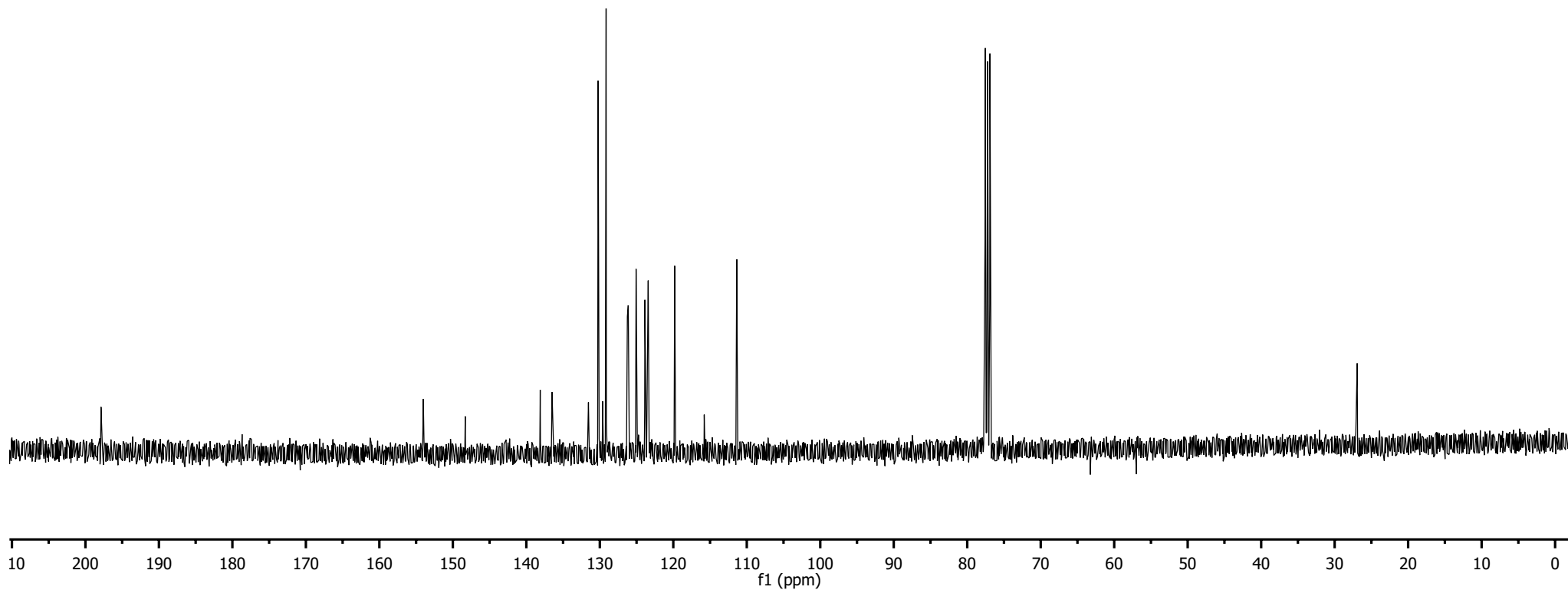
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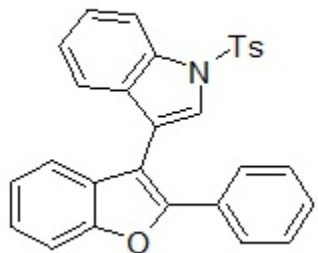
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77.23 CDCl3

76.91 CDCl3

26.93





50

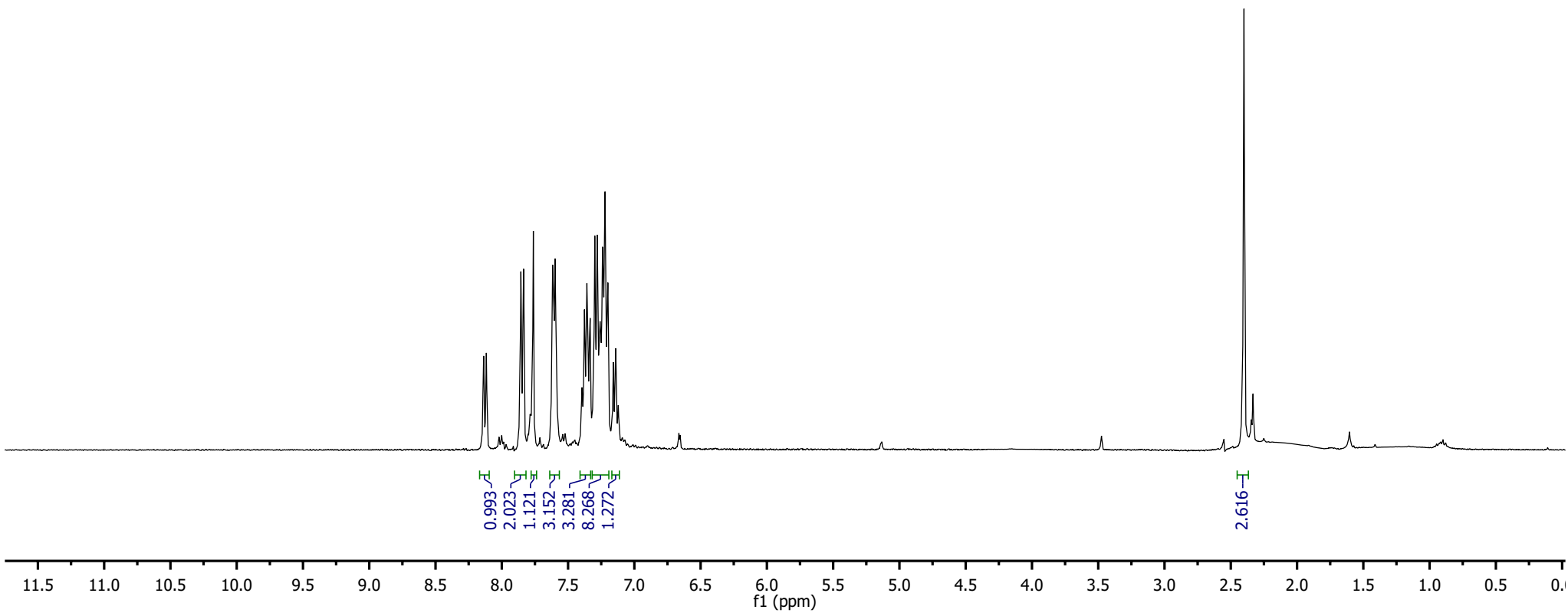
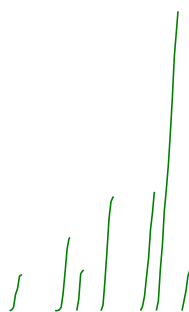
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7.36  
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7.30  
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7.14  
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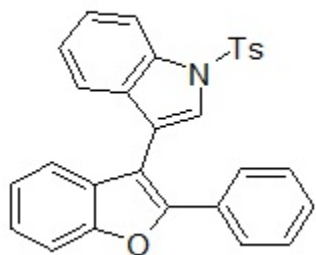
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4.11

2.40

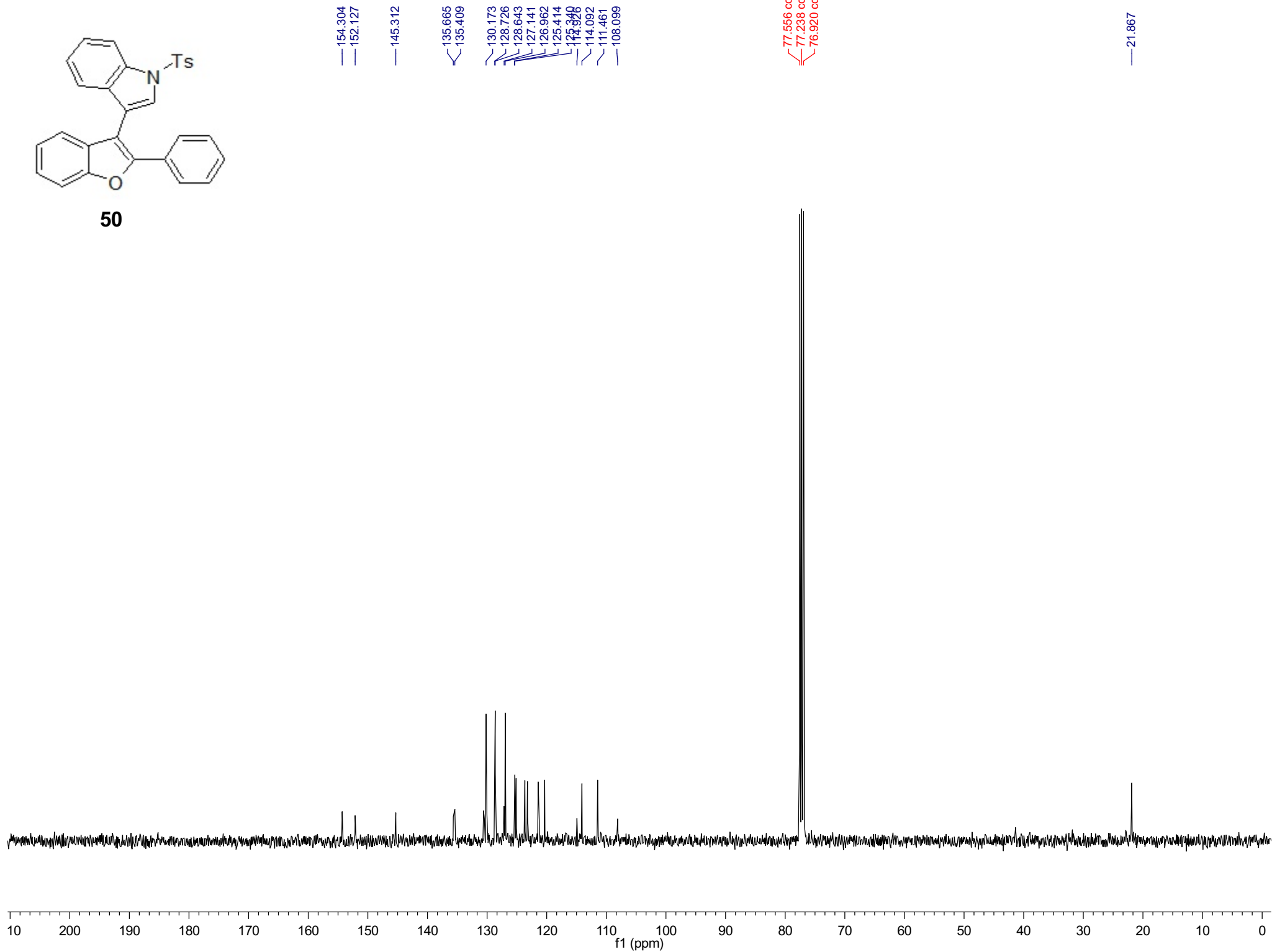
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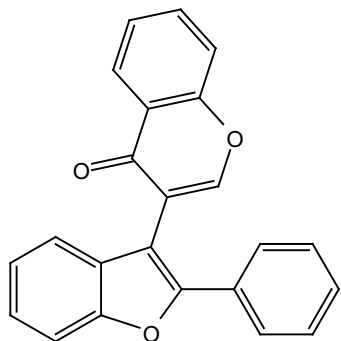
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1.26



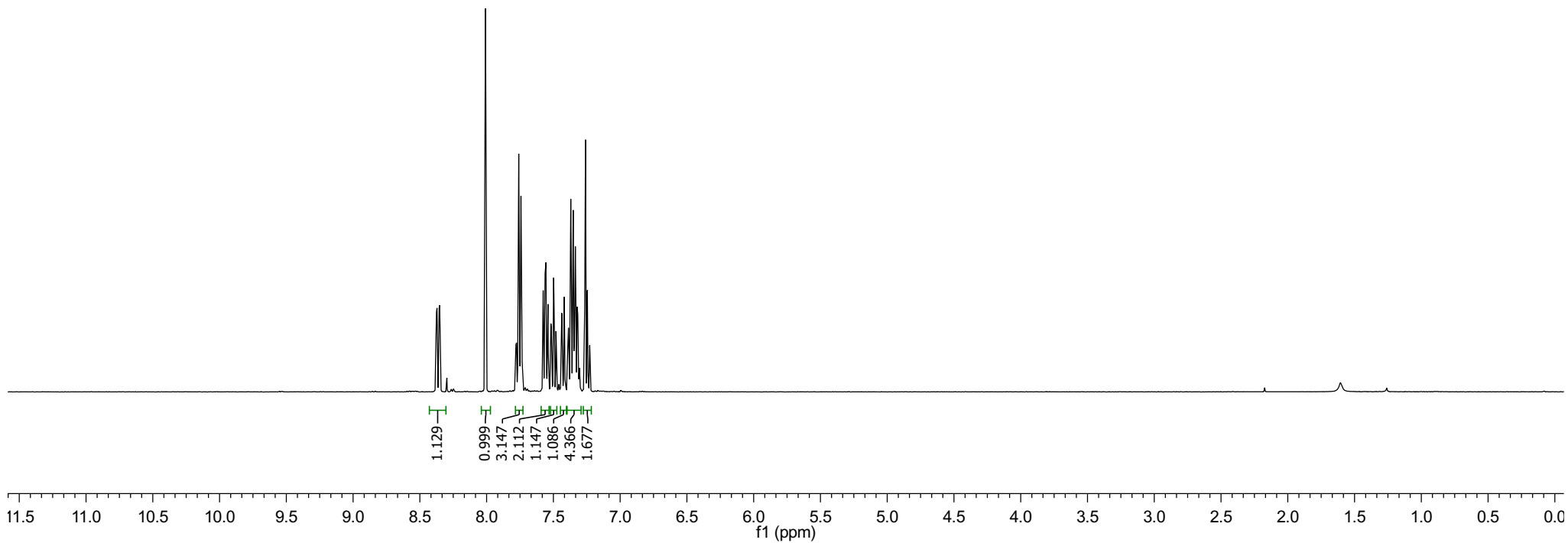
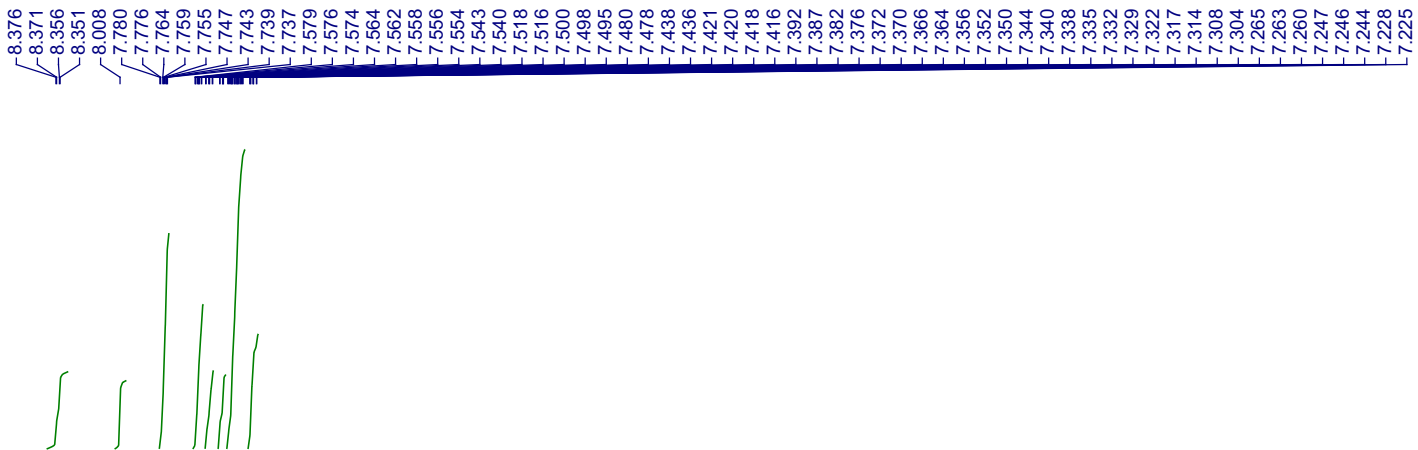


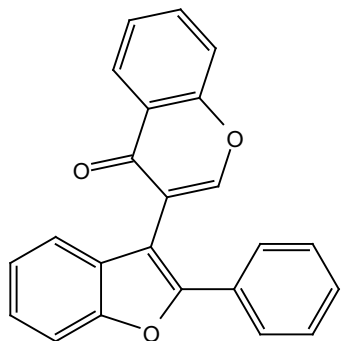
50





52





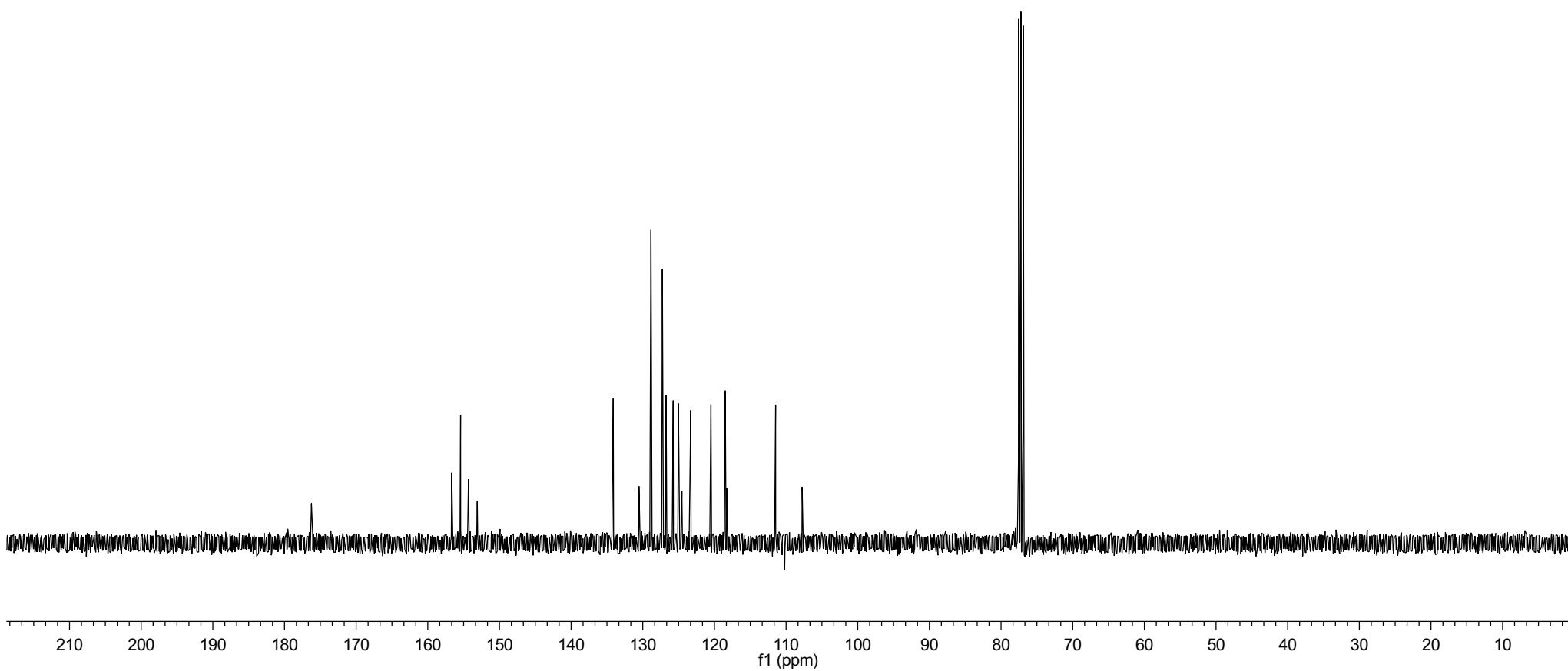
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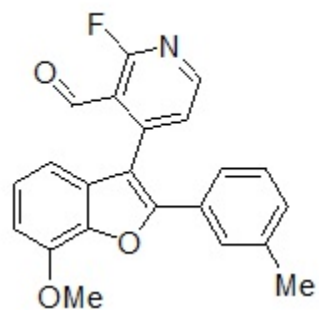
176.237

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153.091

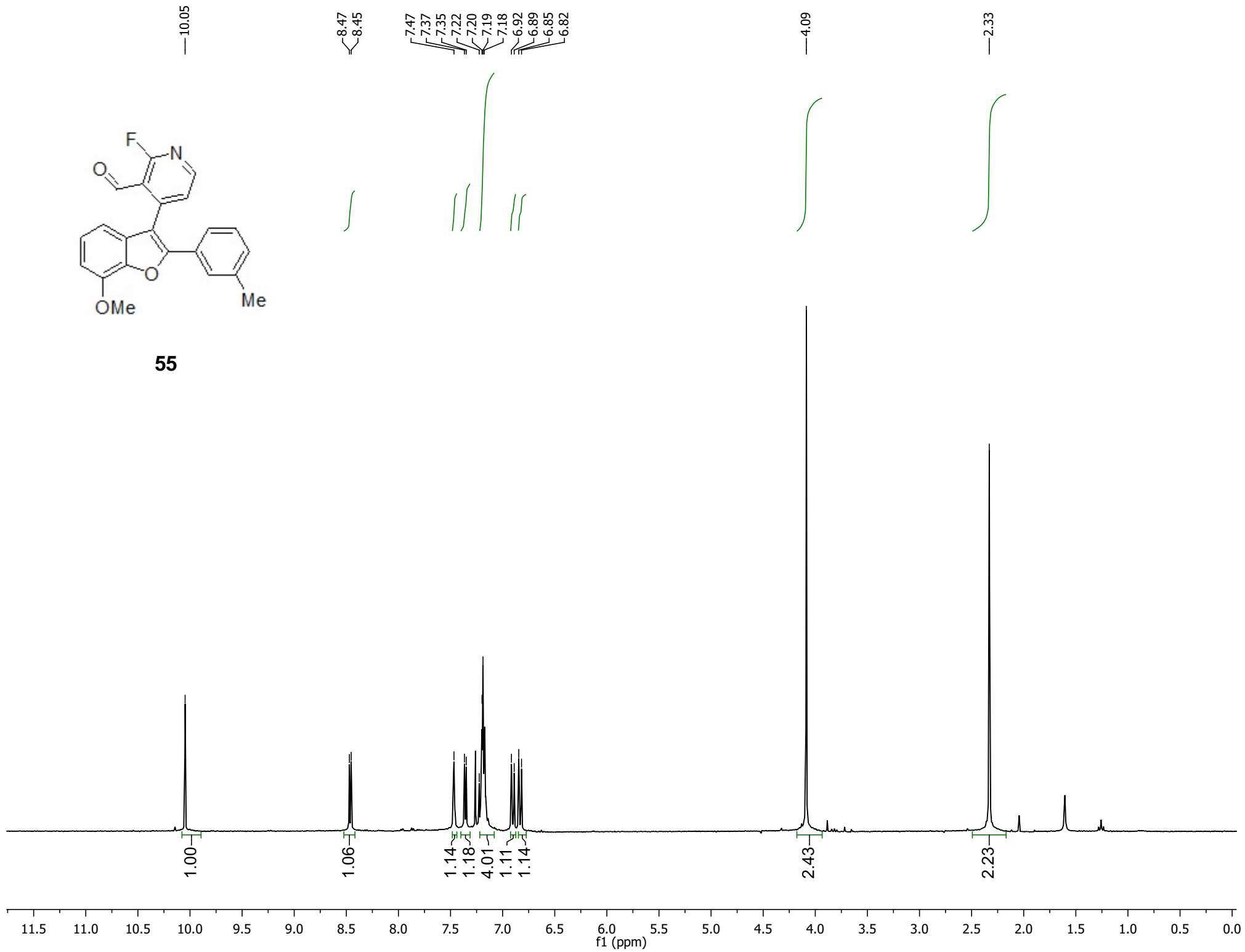
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125.031  
124.543  
123.300  
120.483  
118.486  
118.273  
117.462  
107.758

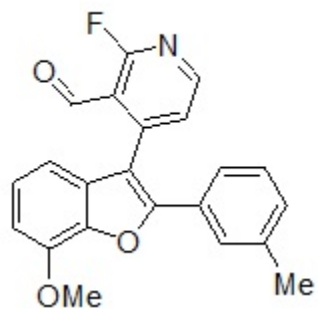
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77.230 cdcl3  
76.913 cdcl3



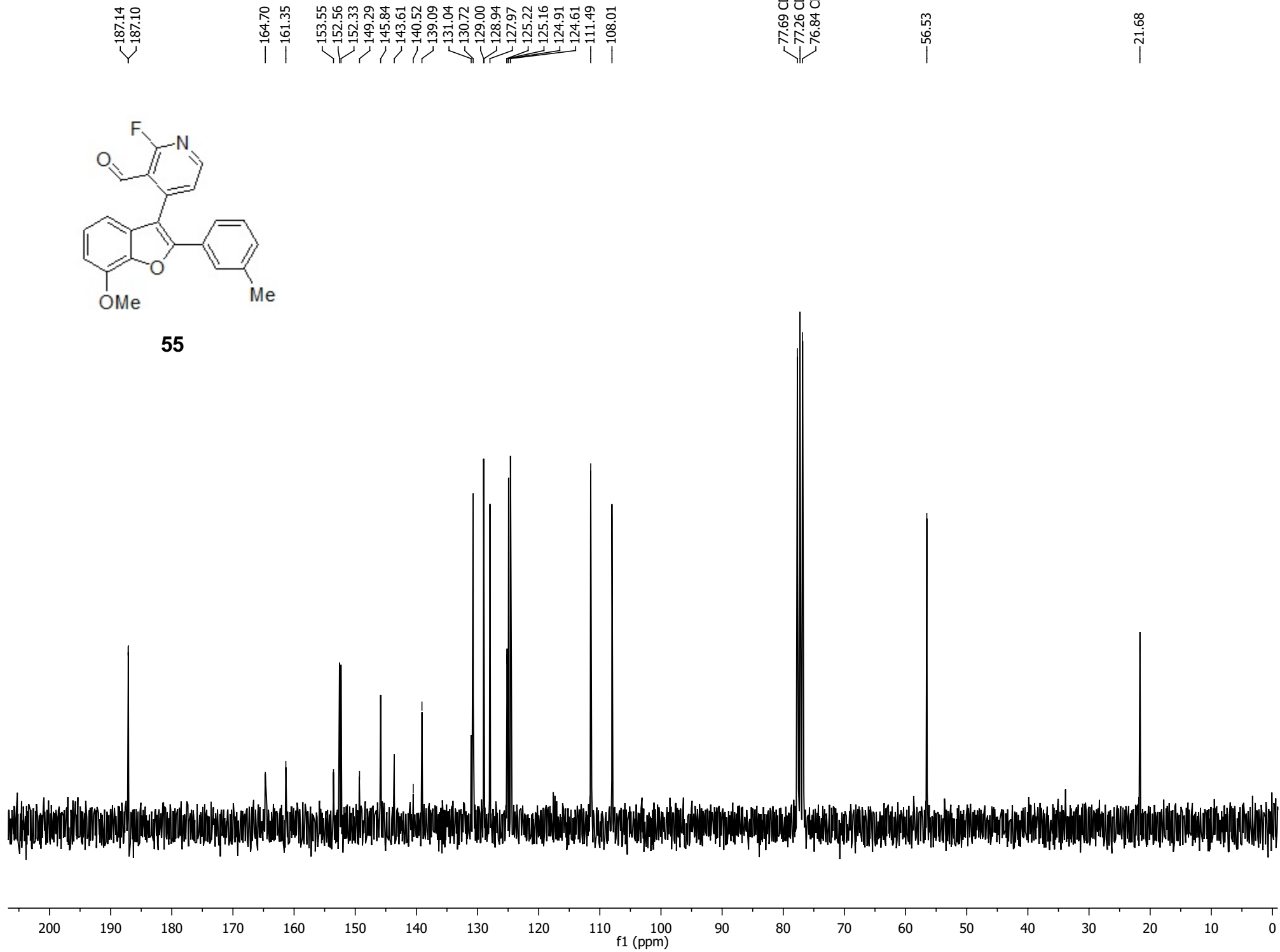


55

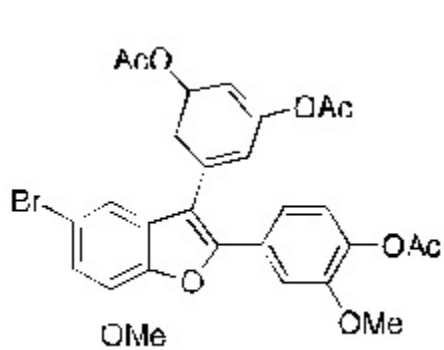




55







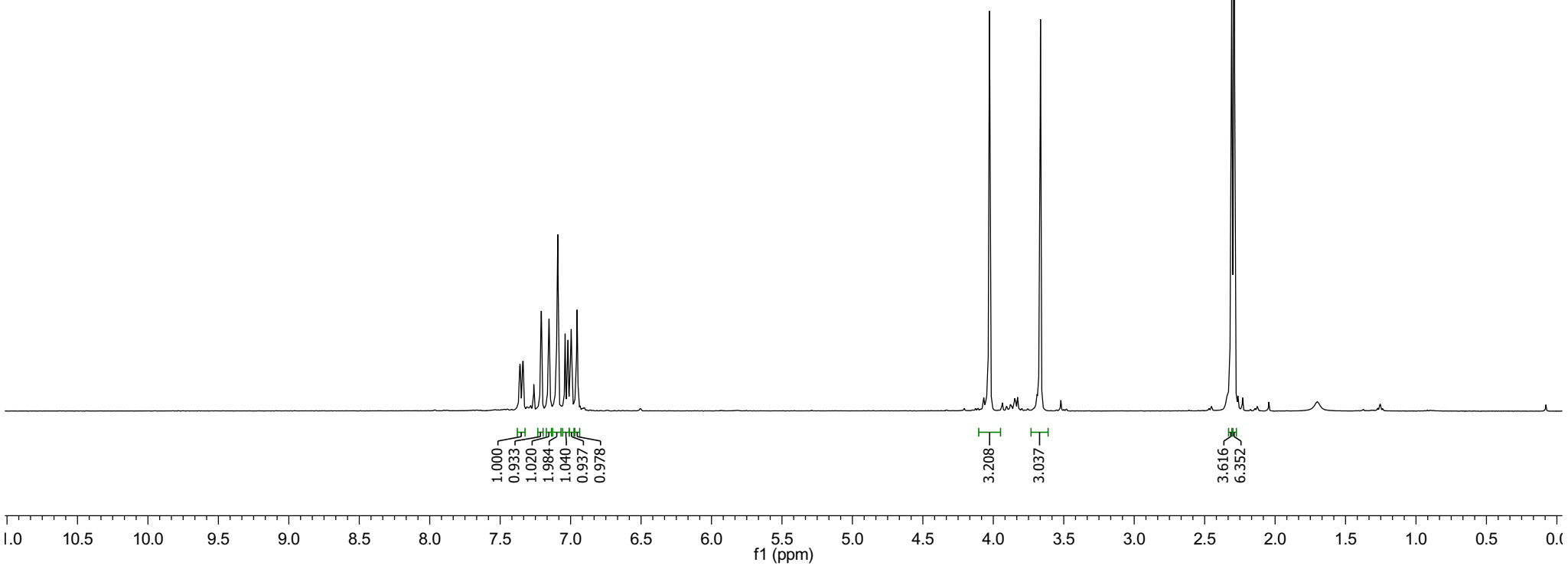
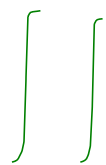
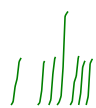
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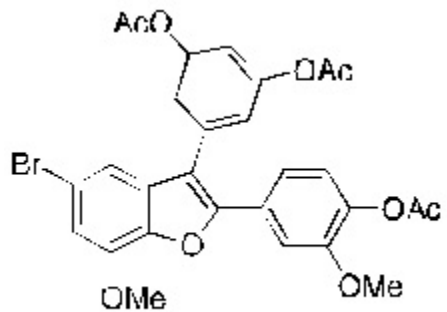
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7.039  
7.018  
6.996  
6.954

4.028

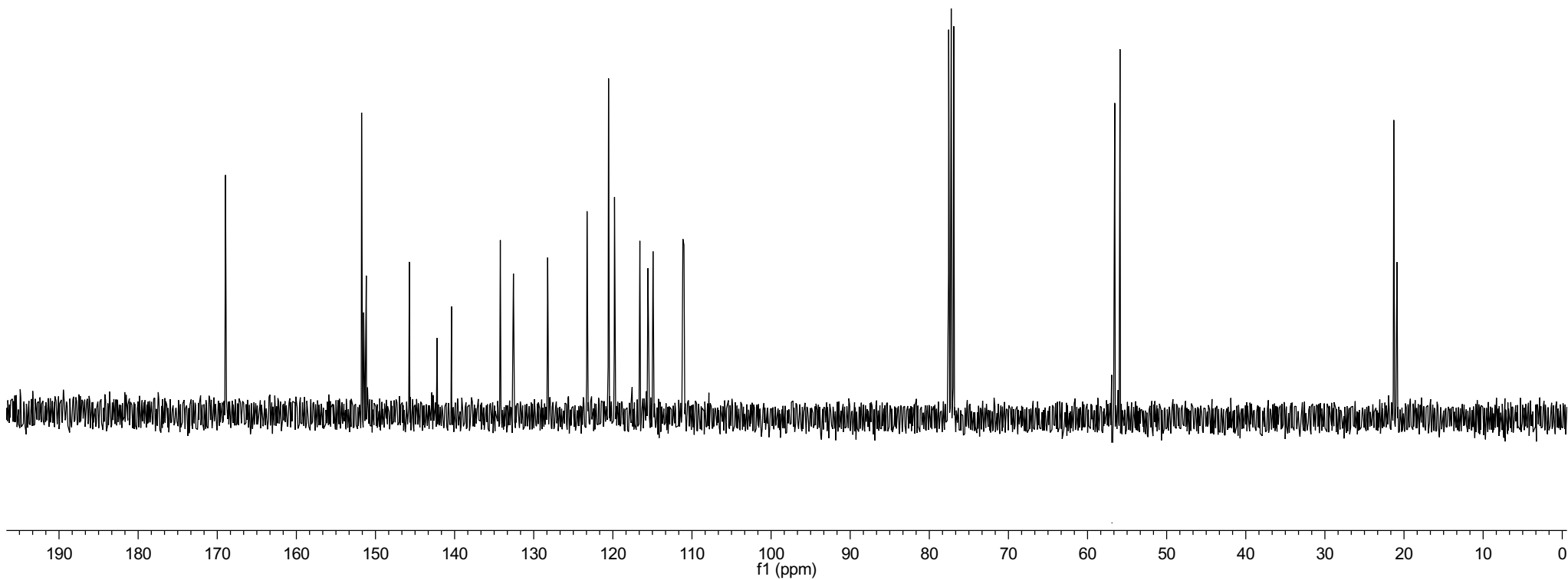
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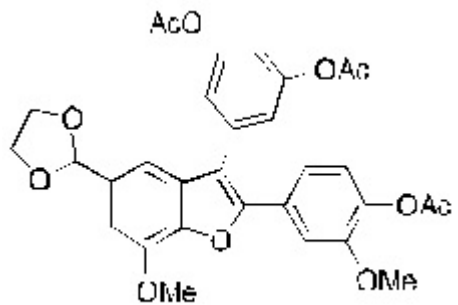
2.308  
2.291





59





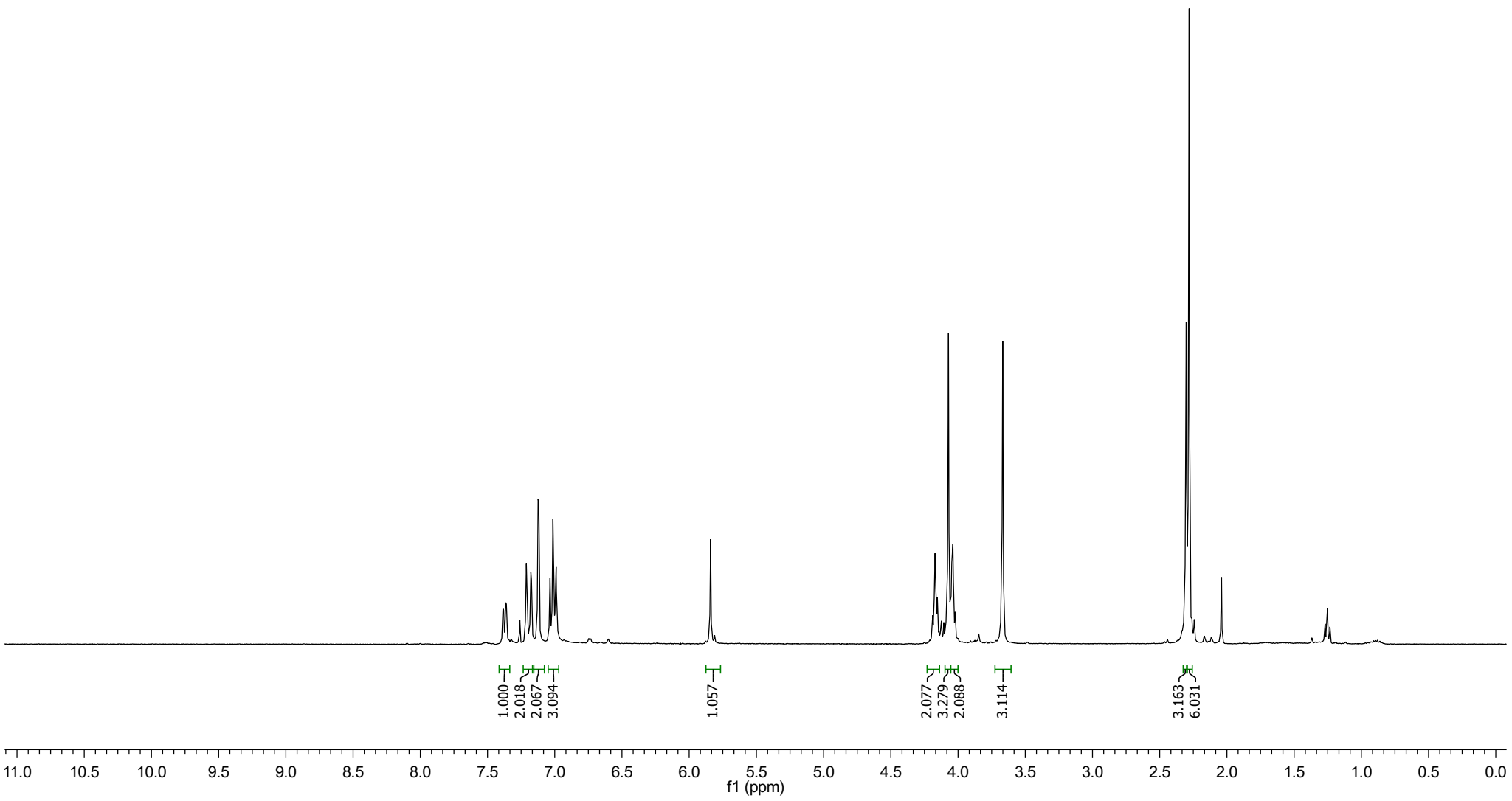
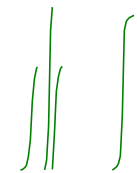
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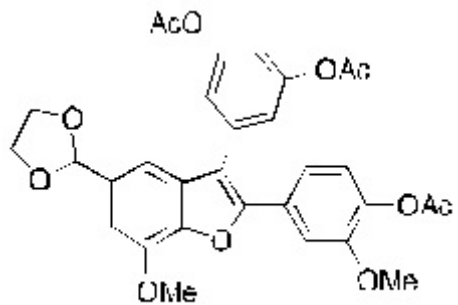
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7.124  
7.118  
7.037  
7.014  
7.009  
6.995  
6.989  
6.984

5.840

4.189  
4.175  
4.171  
4.166  
4.162  
4.154  
4.071  
4.056  
4.047  
4.042  
4.039  
4.037  
4.021  
3.668

2.303  
2.281





61

168.986  
168.943

151.698  
151.126

145.425  
143.776  
140.200

134.759  
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131.193  
128.615

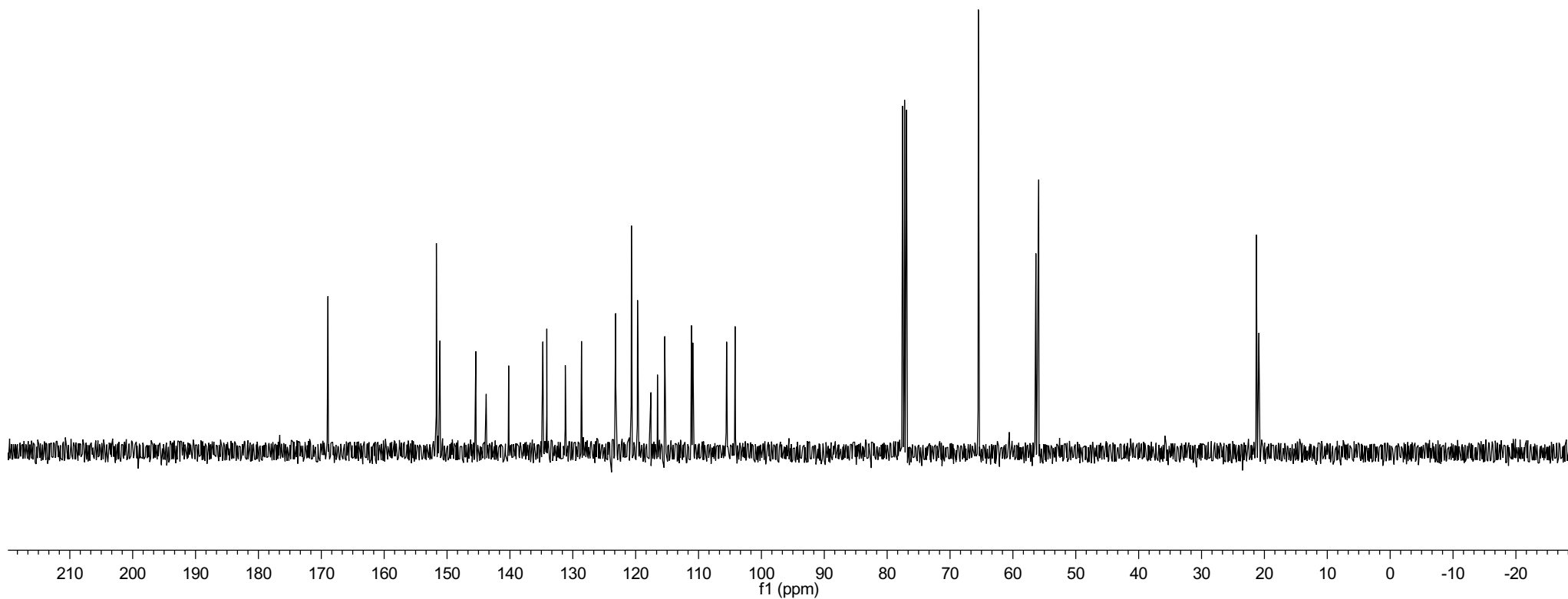
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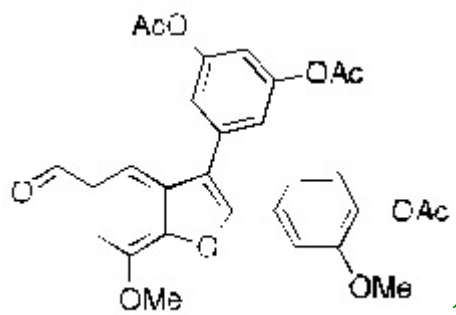
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77.230 CDCl<sub>3</sub>  
76.913 CDCl<sub>3</sub>

65.498

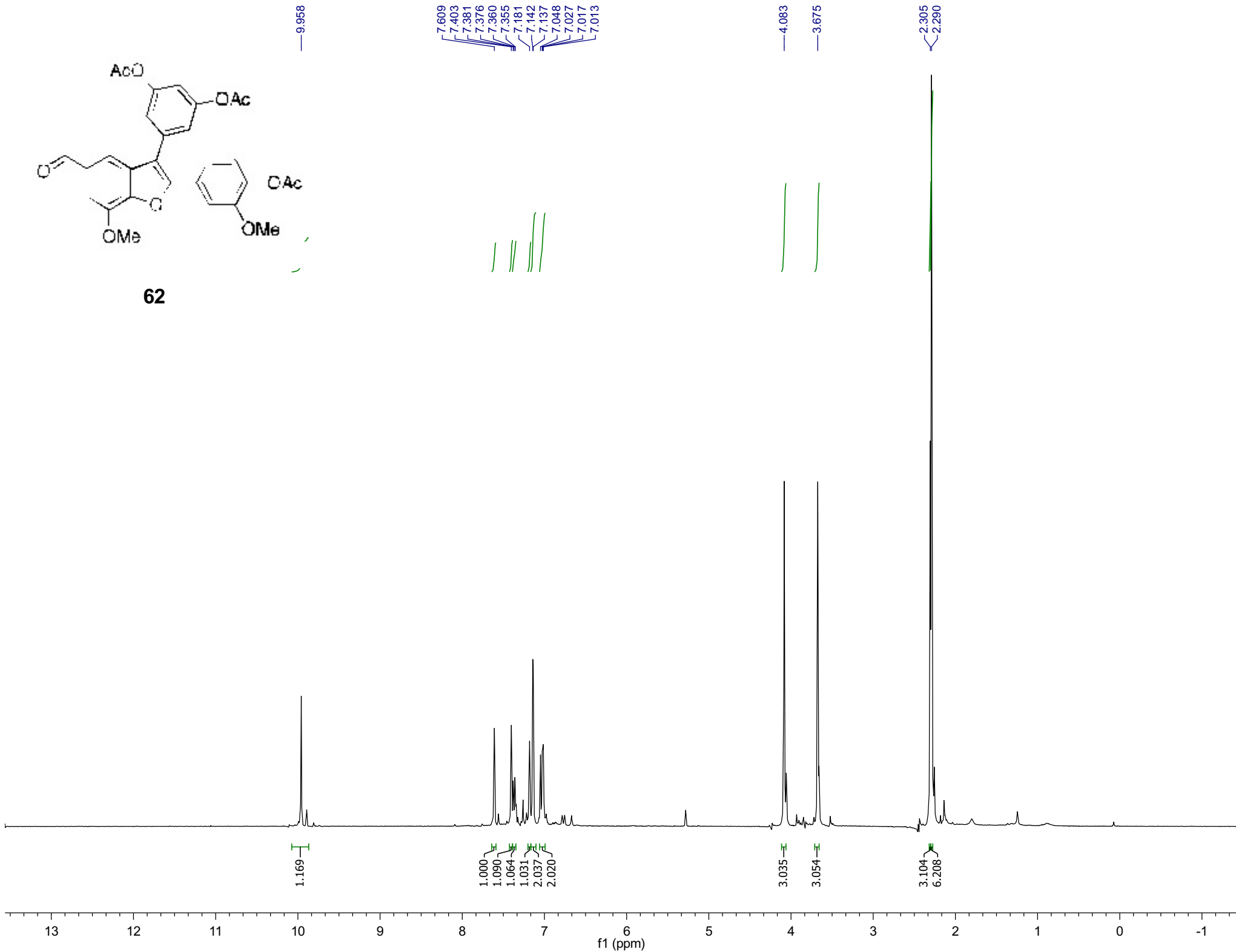
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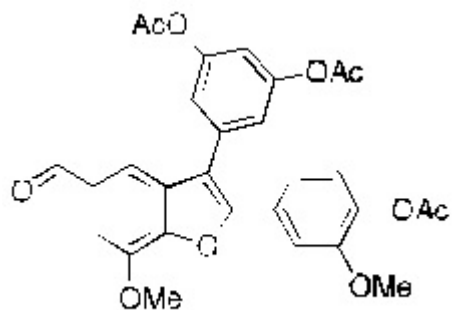
21.276  
20.871





62





62

191.848  
191.839

168.965

152.150  
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151.267  
146.836  
146.220  
140.599

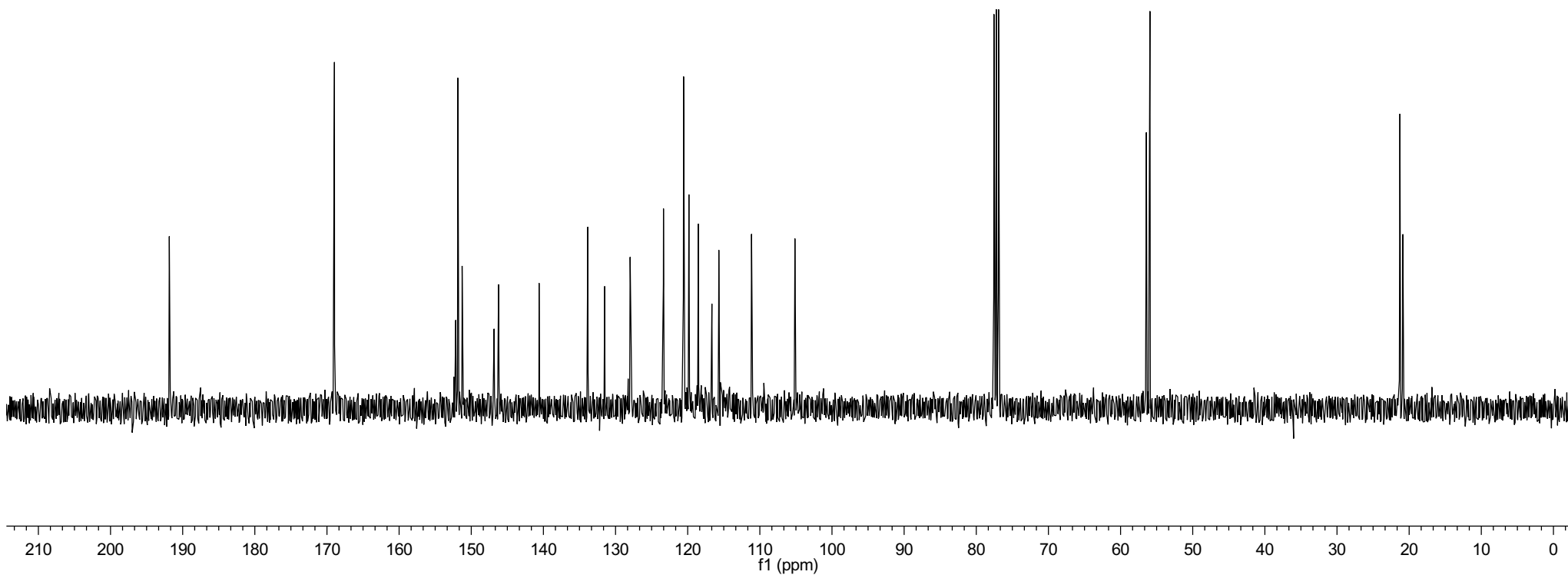
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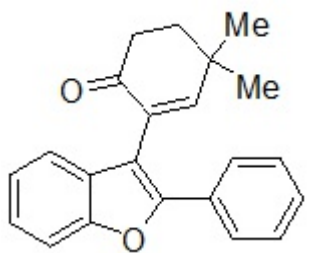
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76.914 CDCl<sub>3</sub>

56.426  
55.928

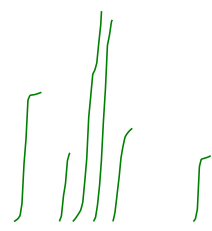
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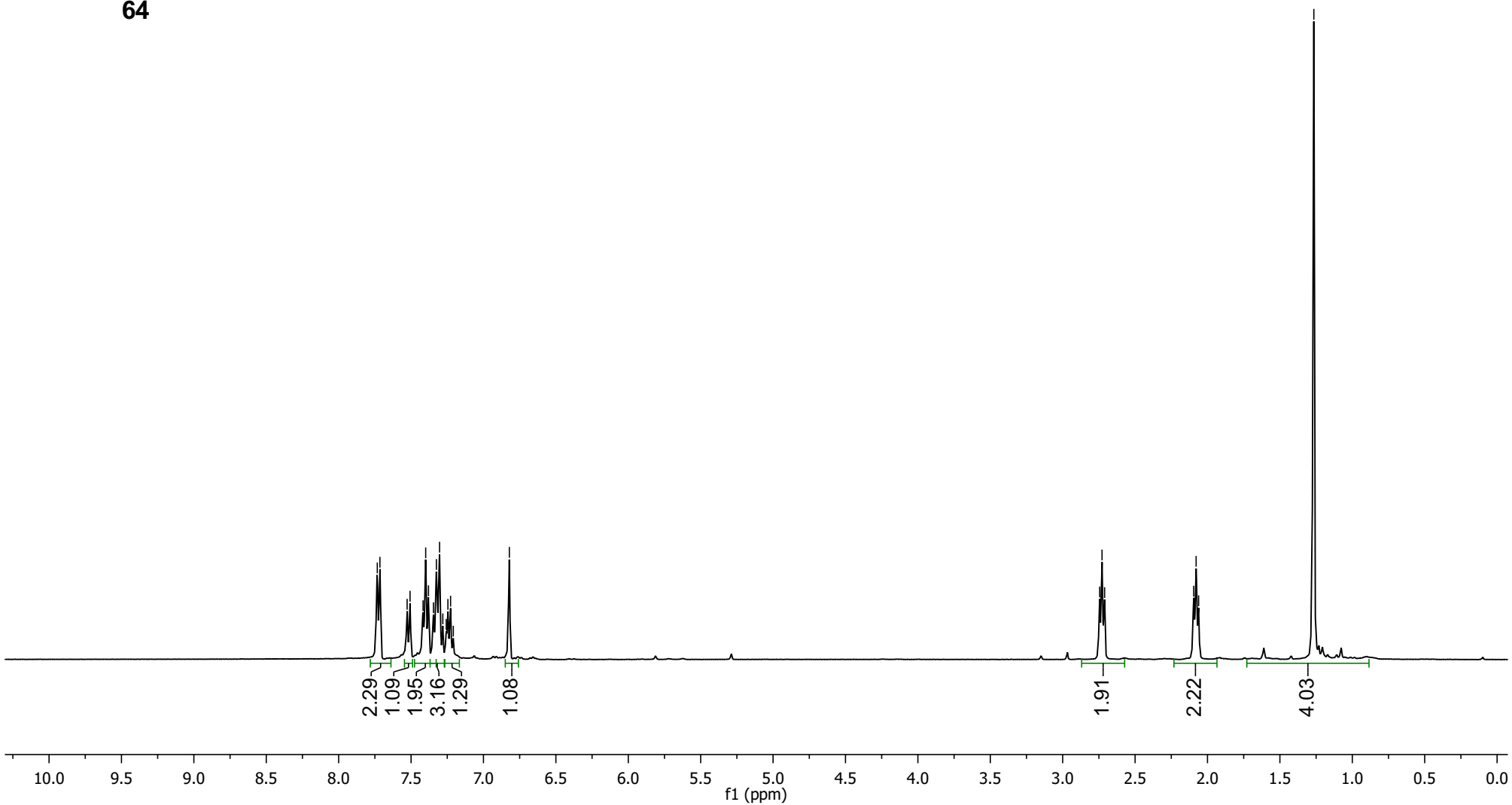
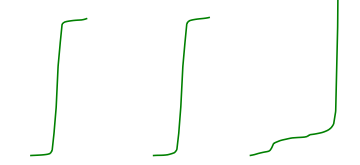


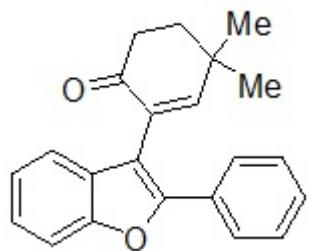
64

7.73  
7.72  
7.53  
7.51  
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7.38  
7.35  
7.33  
7.30  
7.28  
7.26  
7.25  
7.23  
7.21  
6.82



2.74  
2.73  
2.71  
2.10  
2.08  
2.06  
1.27





64

—197.21

—160.74

—154.03

—151.95

130.91

130.26

130.17

128.56

127.04

124.70

122.94

120.14

115.48

112.48

111.31

77.55 CDCl<sub>3</sub>

77.23 CDCl<sub>3</sub>

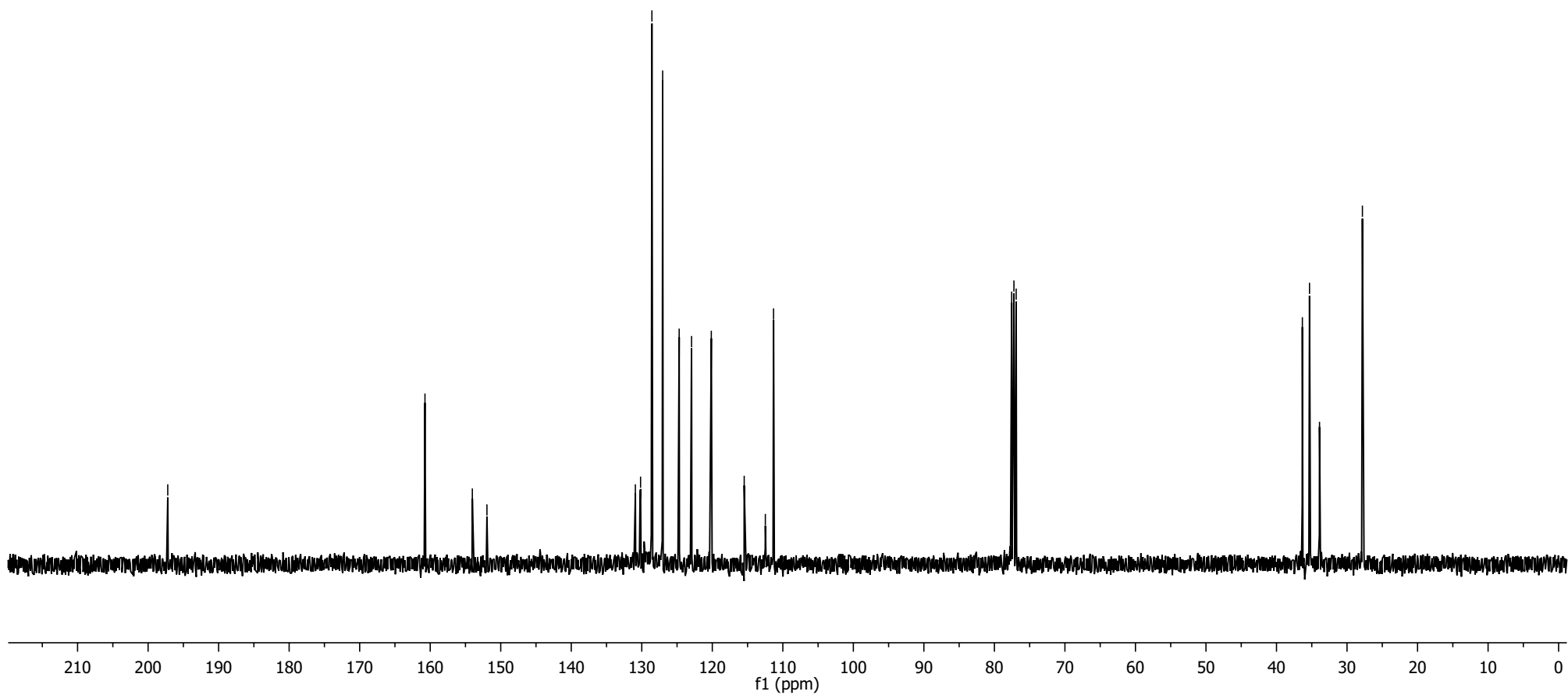
76.91 CDCl<sub>3</sub>

36.33

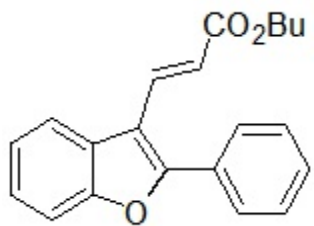
35.32

33.90

—27.82





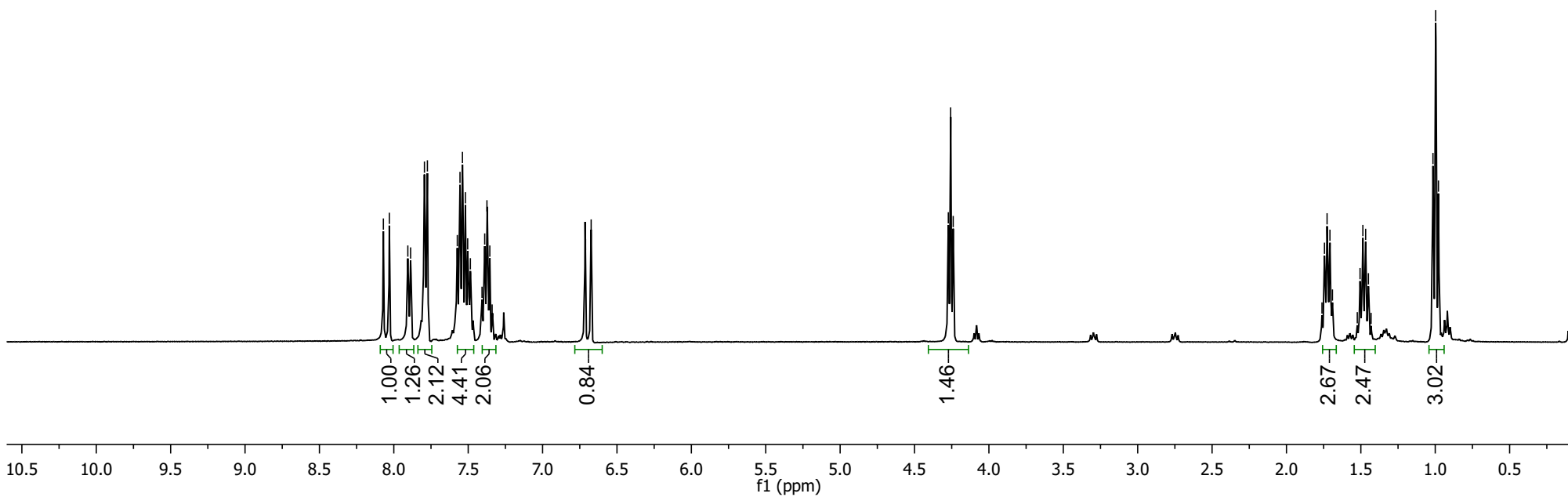
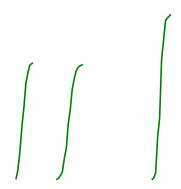
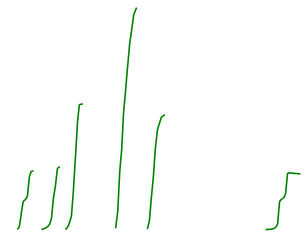


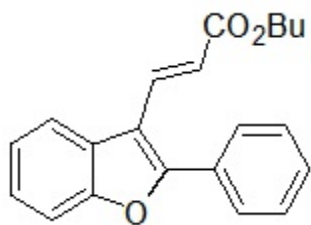
67

8.07  
8.03  
7.91  
7.89  
7.79  
7.77  
7.57  
7.56  
7.54  
7.52  
7.50  
7.49  
7.41  
7.39  
7.37  
7.35  
7.34  
6.71  
6.67

4.27  
4.26  
4.24

1.76  
1.74  
1.73  
1.71  
1.69  
1.52  
1.51  
1.49  
1.47  
1.45  
1.43  
1.02  
1.00  
0.98





67

—167.56  
—157.70  
—154.65

—136.04  
—129.88  
—129.08  
—128.72  
—126.92  
—125.47  
—123.92  
—121.20  
—119.39  
—115.48  
—112.84  
—111.76

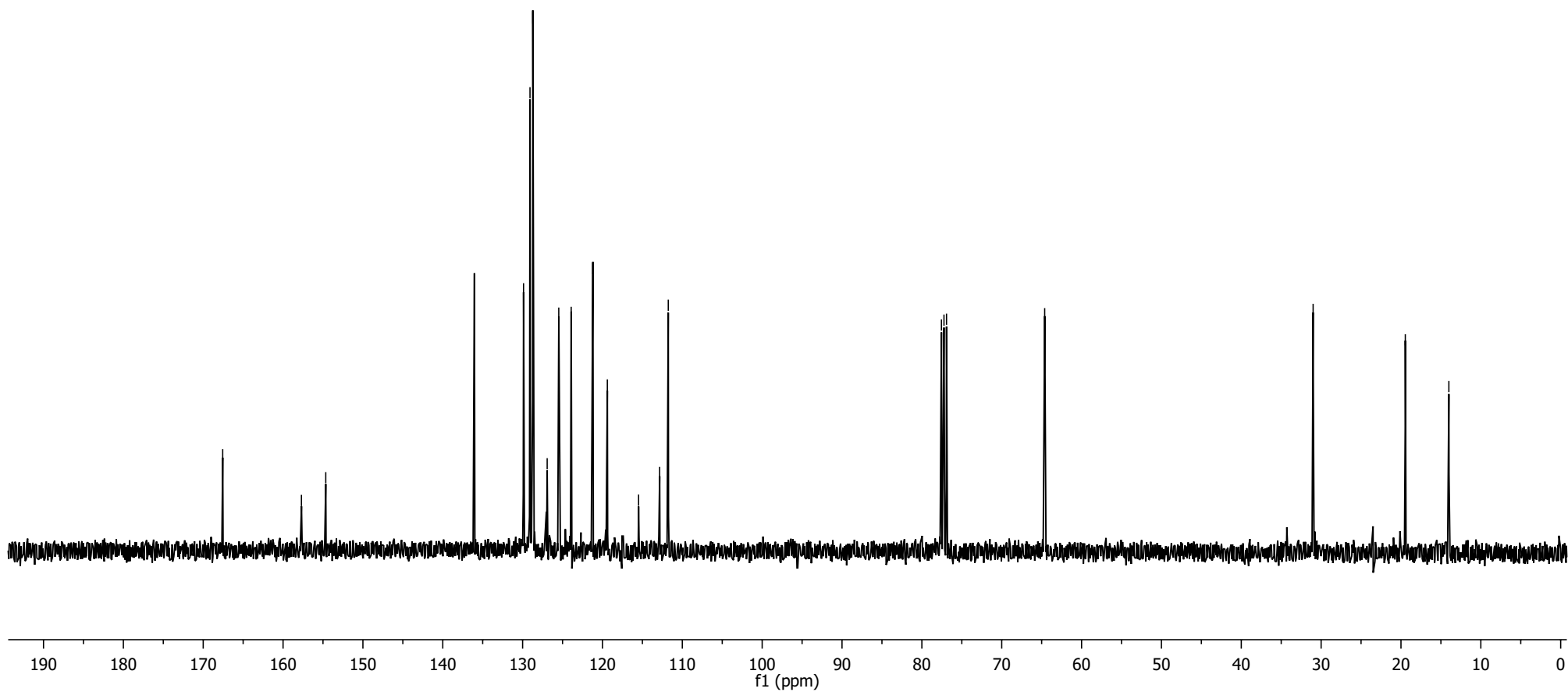
—77.55 CDCl<sub>3</sub>  
—77.23 CDCl<sub>3</sub>  
—76.91 CDCl<sub>3</sub>

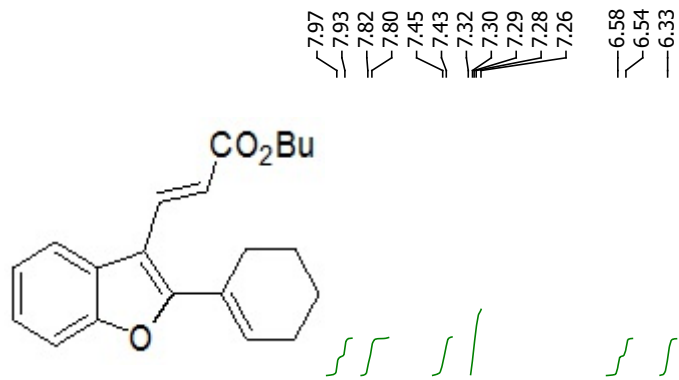
—64.62

—31.00

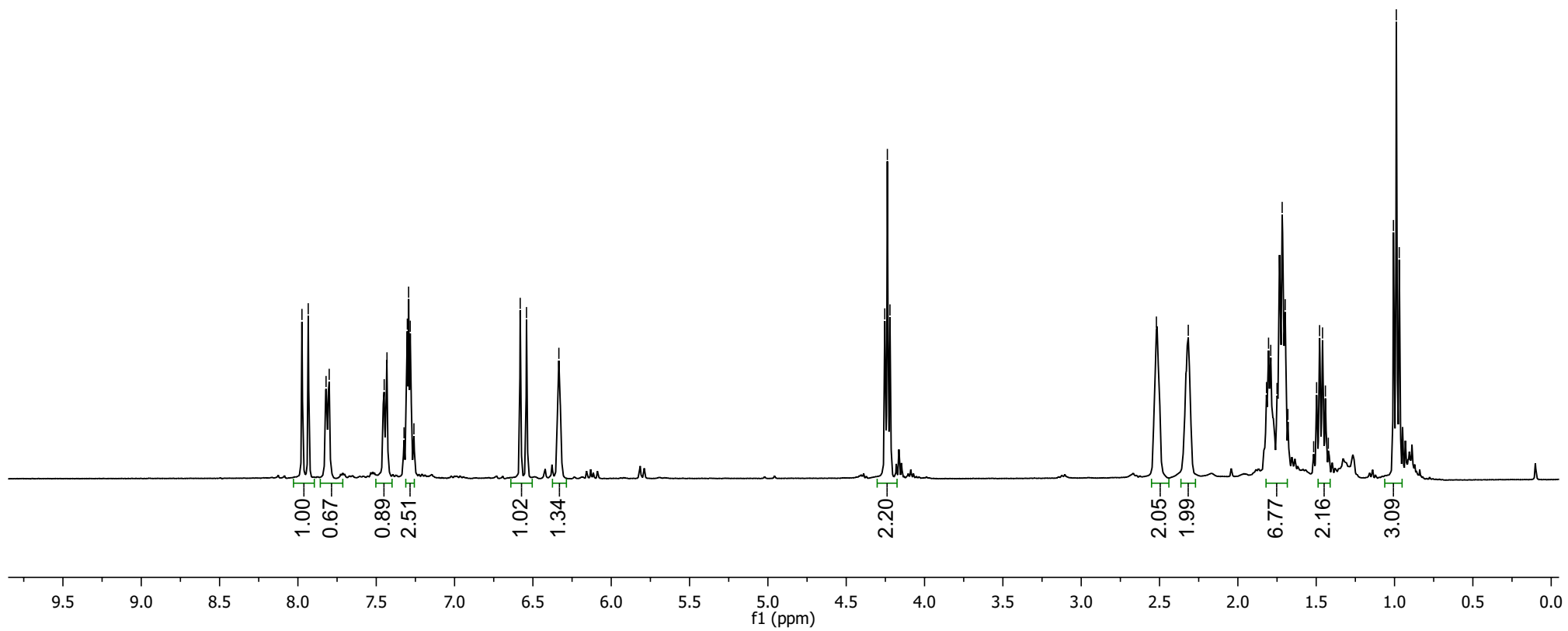
—19.46

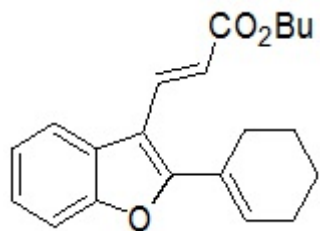
—14.00





68





68

—167.86

—160.55

—153.96

—136.69

—134.90

—128.38

—126.75

—124.93

—123.55

—120.91

—117.56

—111.75

—111.39

77.55 CDCl<sub>3</sub>

77.23 CDCl<sub>3</sub>

76.91 CDCl<sub>3</sub>

—64.42

—31.02

—26.60

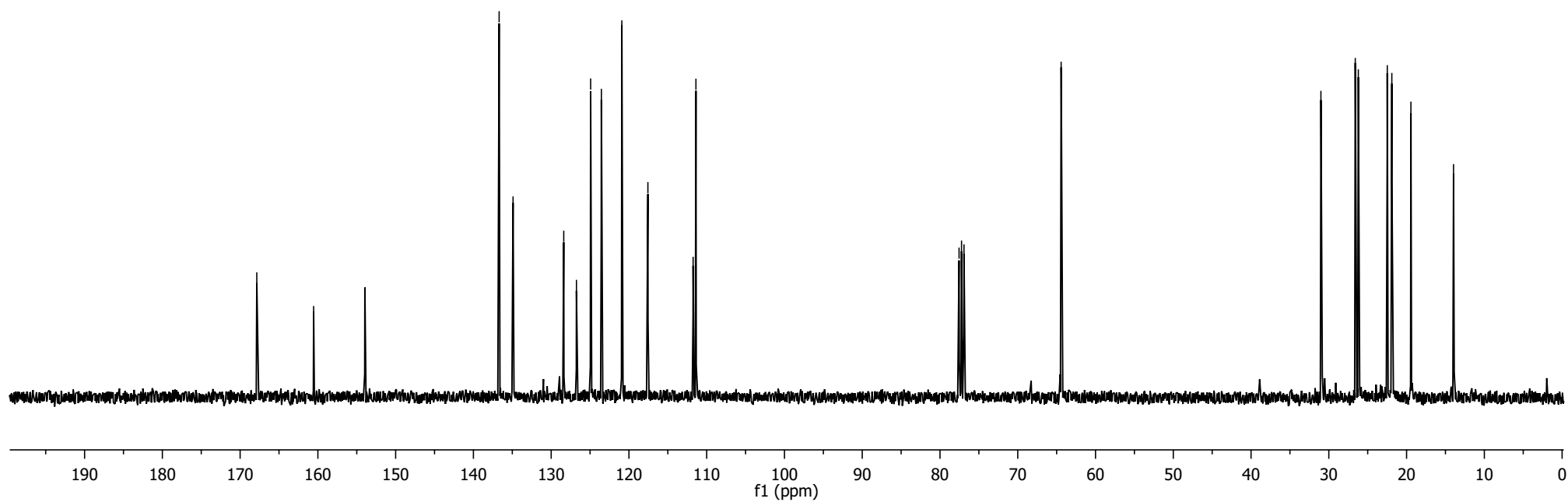
—26.21

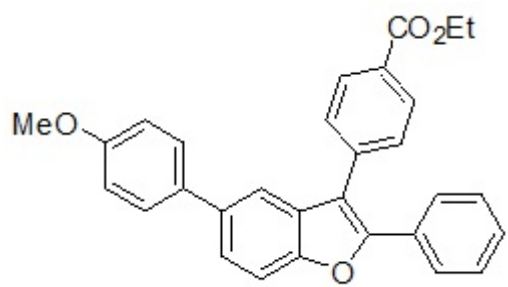
—22.48

—21.90

—19.44

—13.96



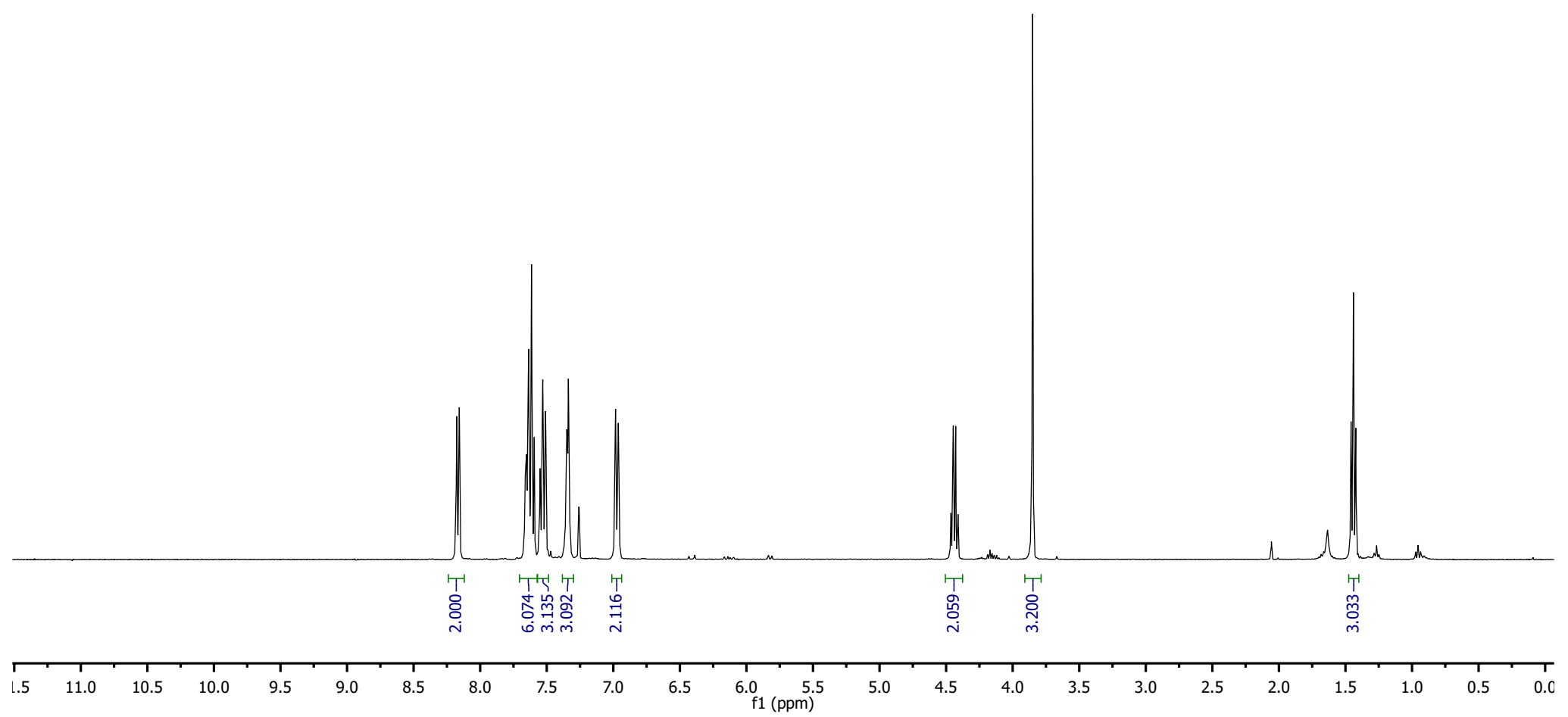
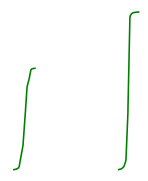


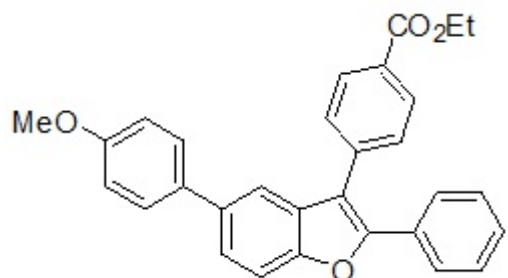
69

8.18  
8.16  
7.64  
7.61  
7.53  
7.51  
7.34  
7.33  
6.98  
6.96

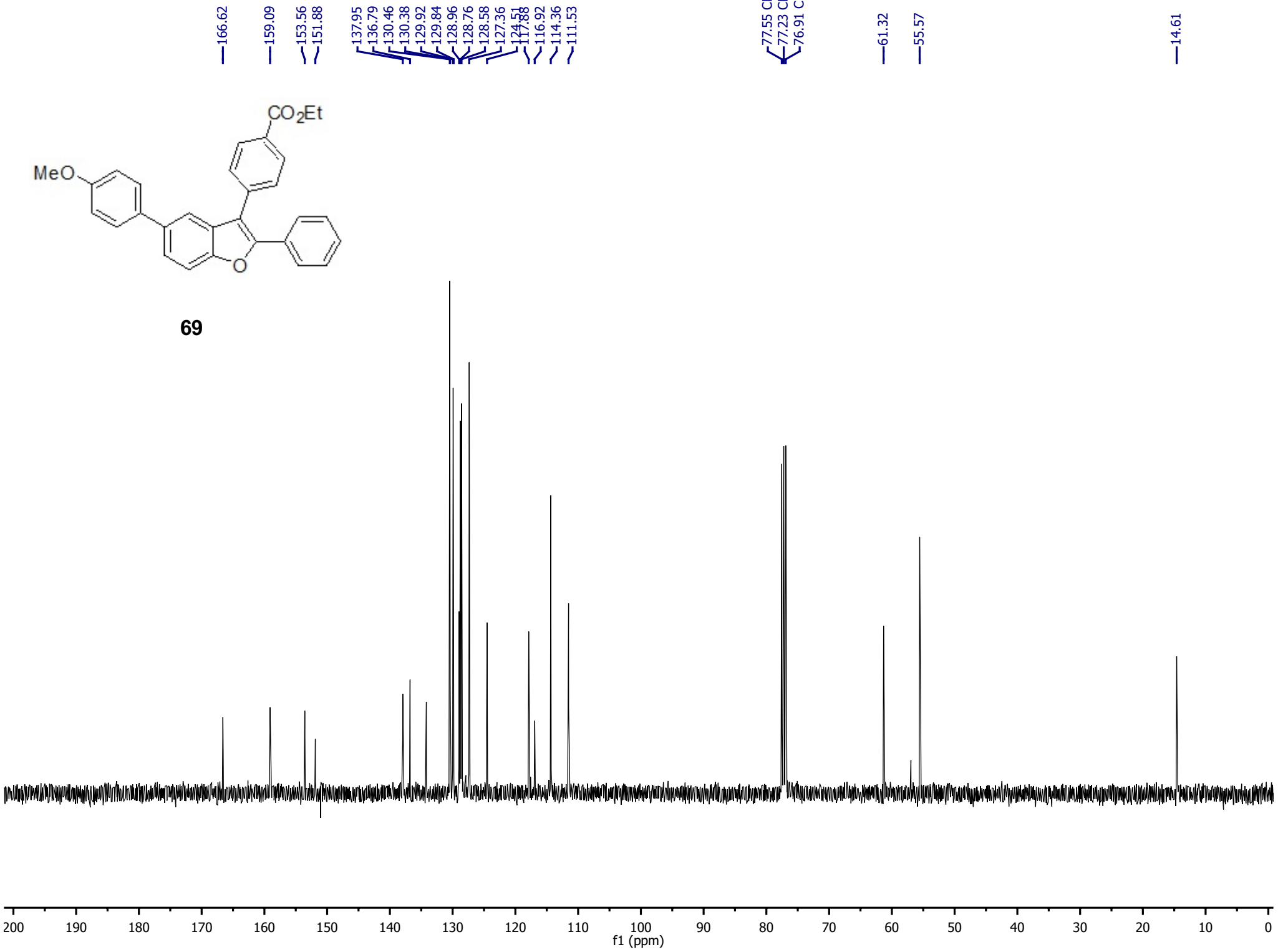
4.46  
4.45  
4.43  
4.41  
3.85  
3.85

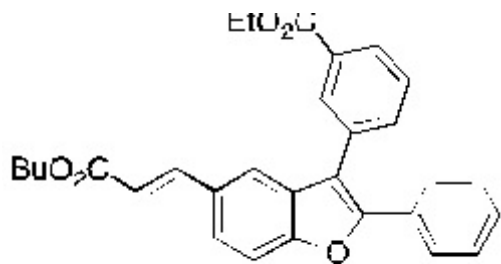
1.46  
1.44  
1.44  
1.42



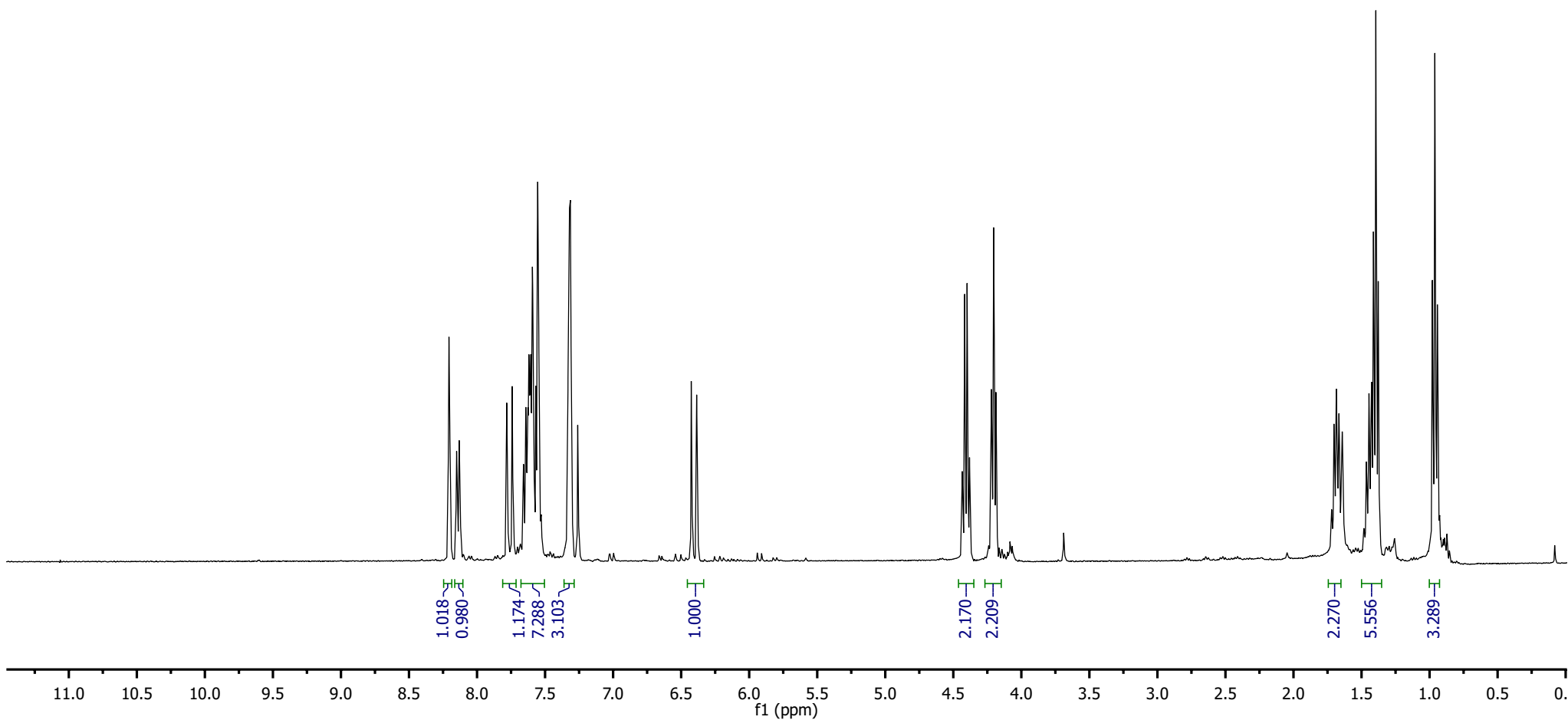
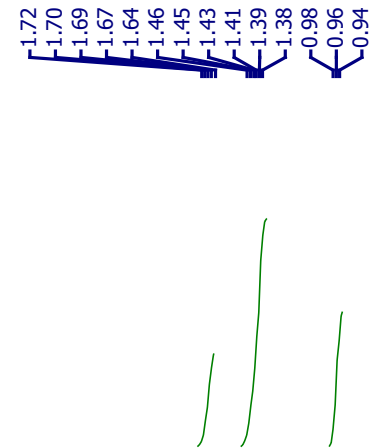
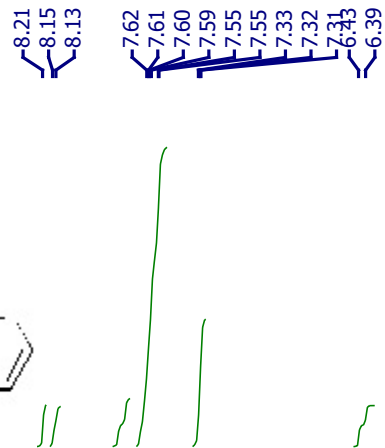


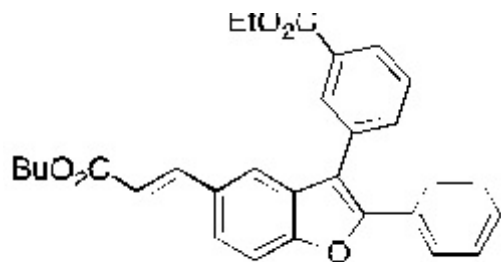
69





70





70

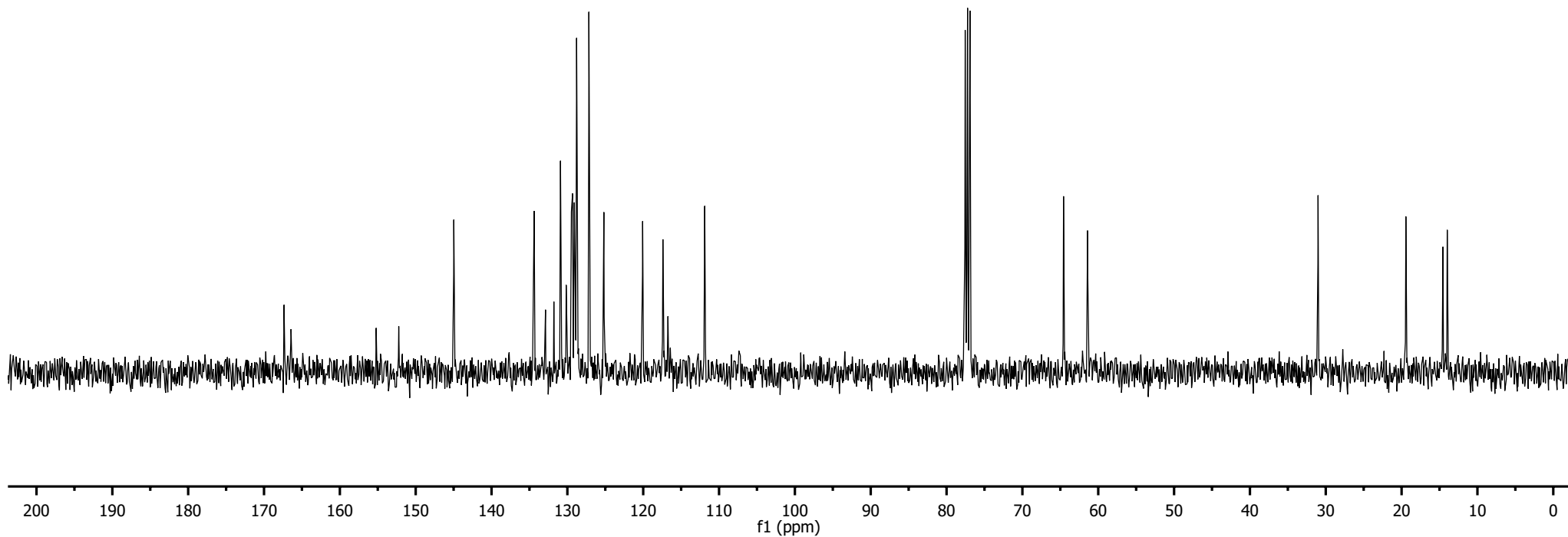
167.36  
166.44  
155.22  
152.24  
144.98  
134.38  
132.89  
131.78  
130.91  
130.16  
130.07  
129.48  
129.32  
129.09  
128.79  
127.17  
125.19  
120.08  
117.42  
116.74  
111.89

77.55 CDCl3  
77.23 CDCl3  
76.91 CDCl3

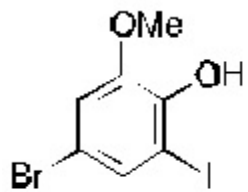
64.57  
61.41

31.01

19.43  
14.54  
13.98







56

7.429  
7.422

6.947  
6.940

6.040

3.883



1.000

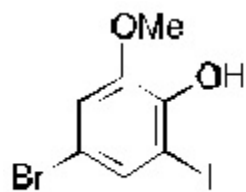
1.131

1.073

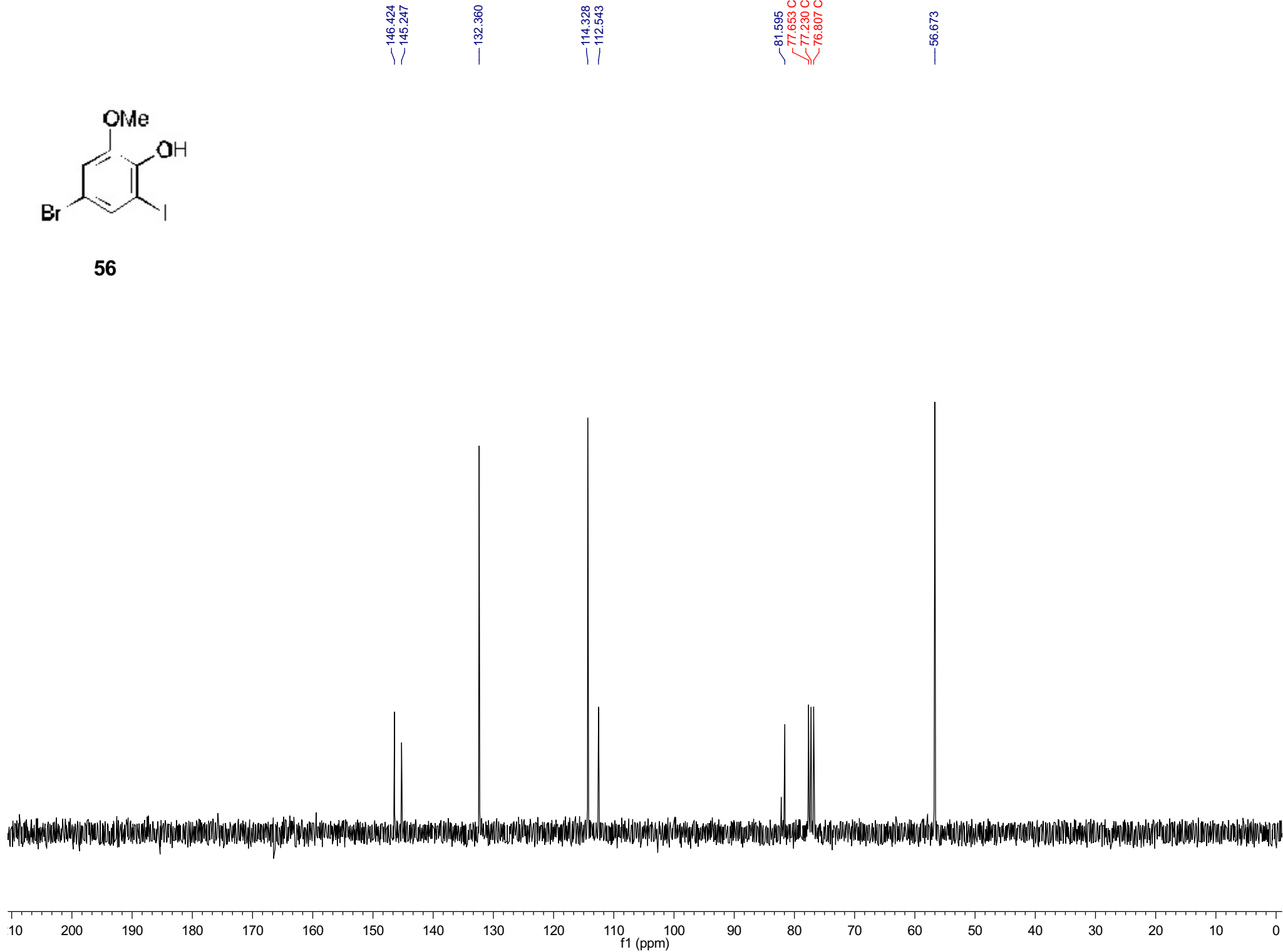
3.342

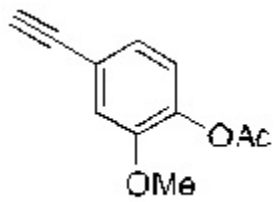
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5

f1 (ppm)



56





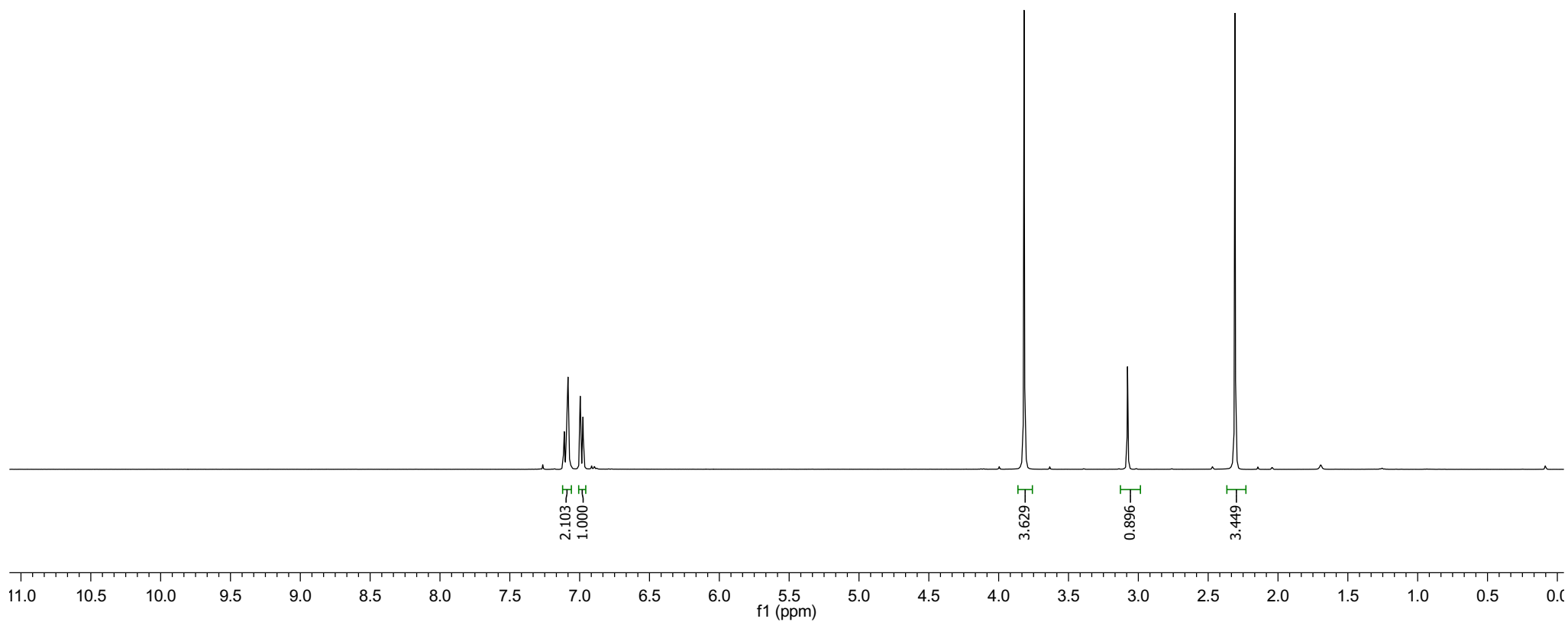
57

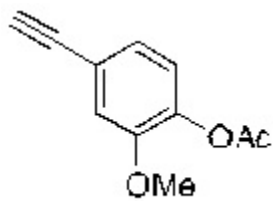
7.114  
7.110  
7.094  
7.090  
7.084  
7.079  
6.996  
6.976

3.818

3.078

2.308





57

168.843

150.956

140.524

125.060

123.030

120.804

116.030

83.177

77.652 CDCl<sub>3</sub>

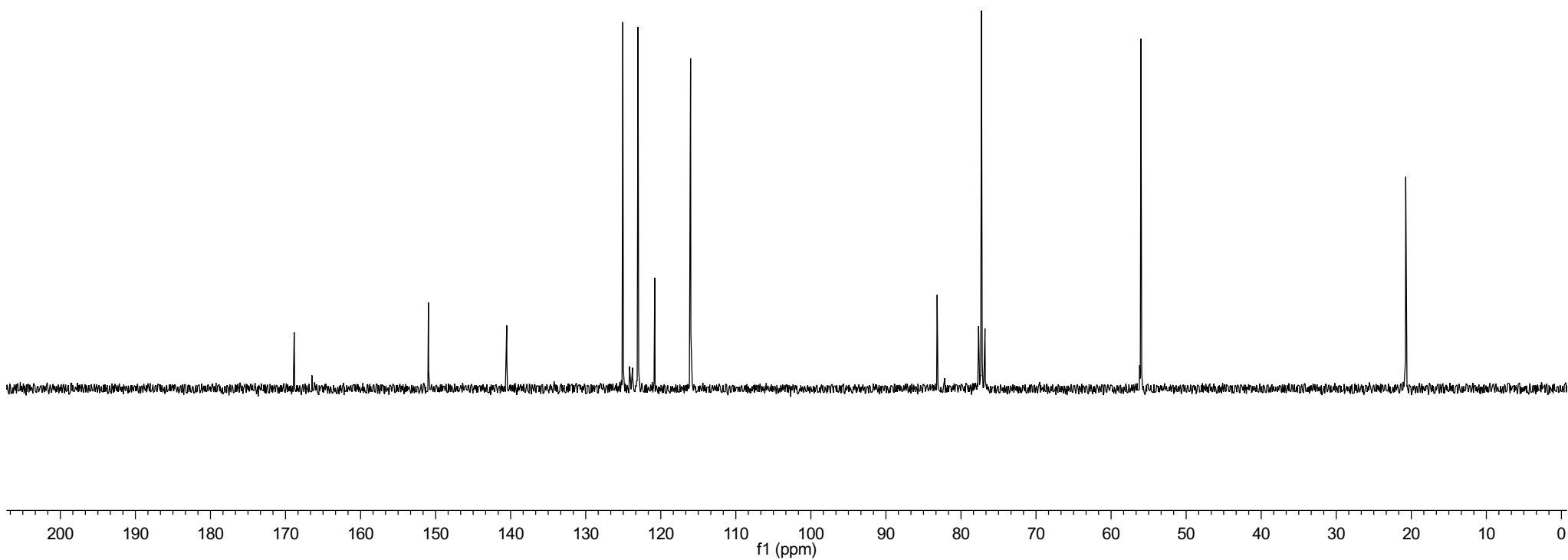
77.269 CDCl<sub>3</sub>

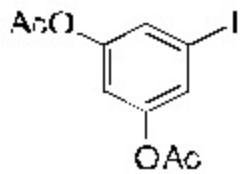
77.226 CDCl<sub>3</sub>

76.803 CDCl<sub>3</sub>

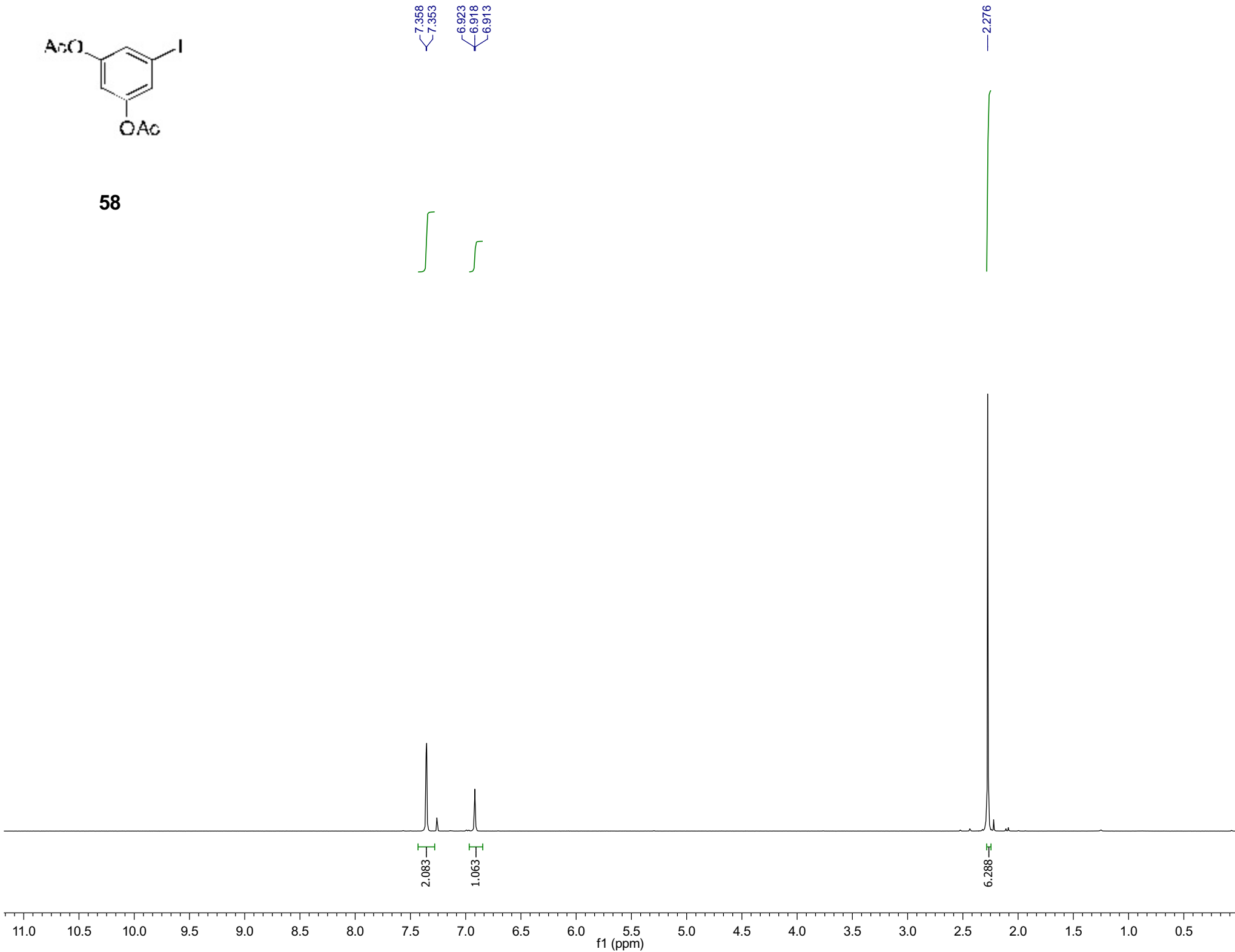
56.023

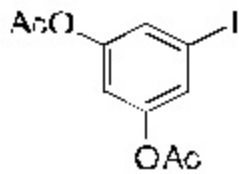
20.745





58





58

168.774

151.278

128.414

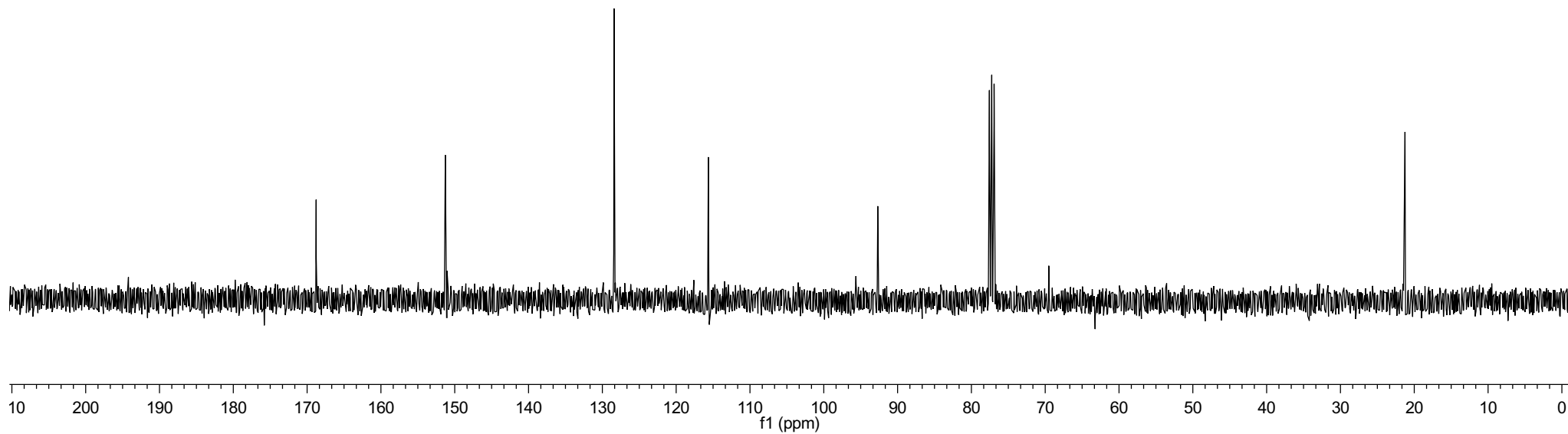
115.643

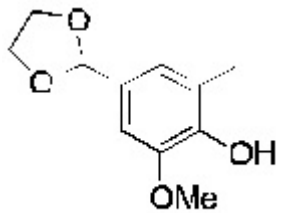
92.689

77.562 CDCl<sub>3</sub>  
77.245 CDCl<sub>3</sub>  
76.927 CDCl<sub>3</sub>

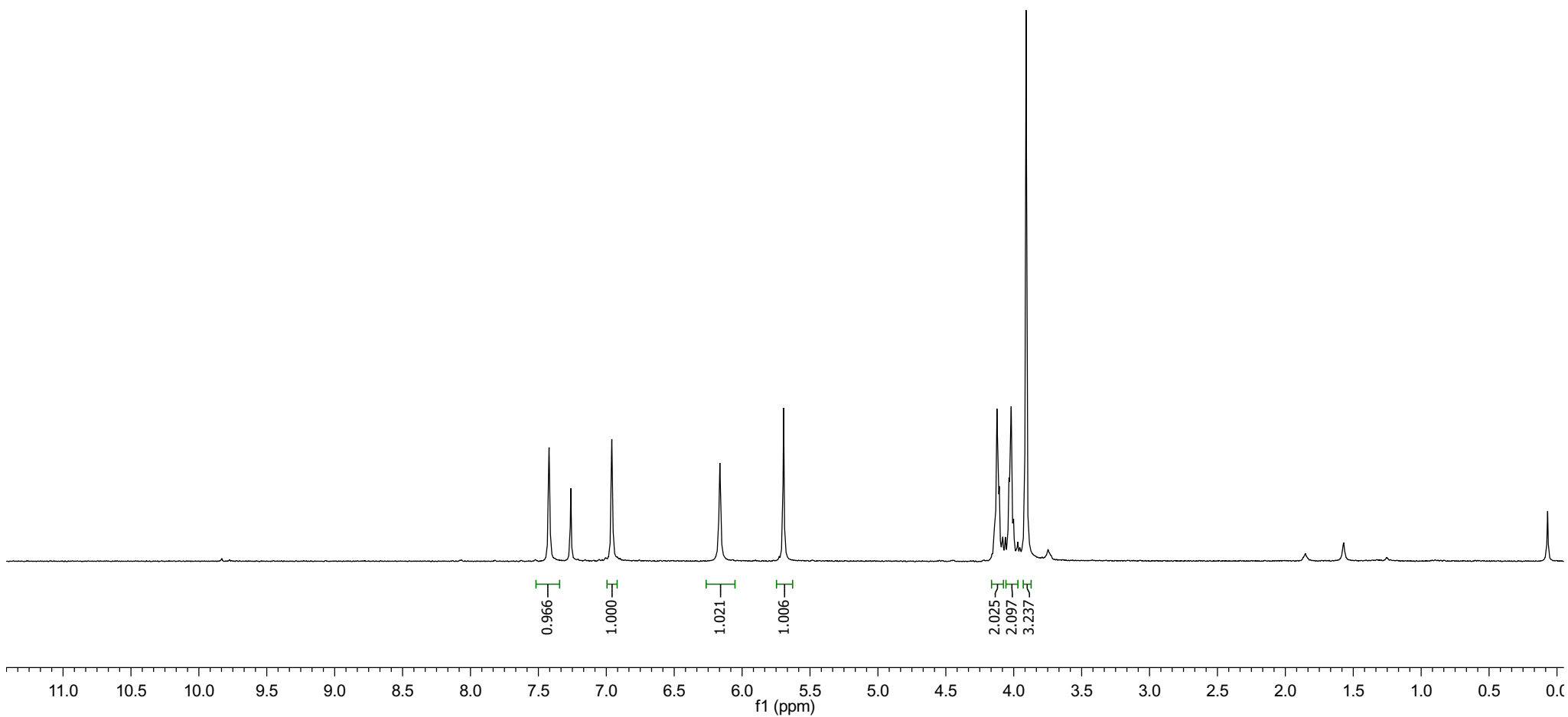
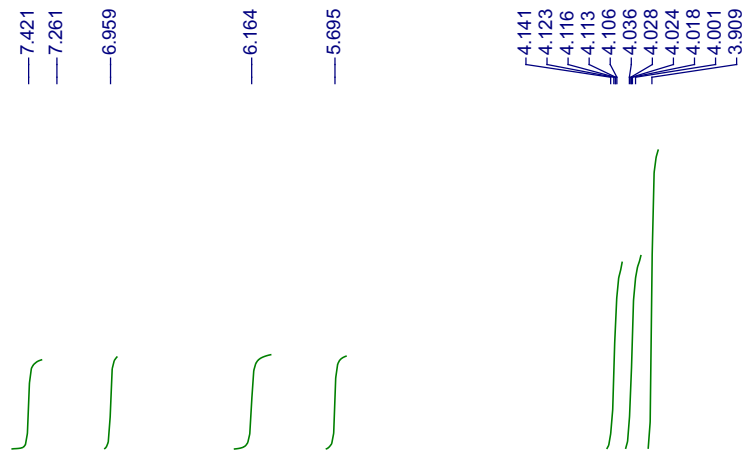
69.515

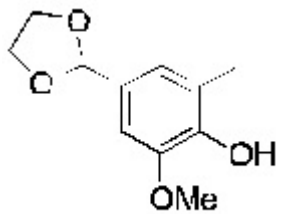
21.256





60





60

