

## Catalytic enantioselective synthesis of cyclopropanes featuring vicinal all-carbon quaternary stereocenters with a CH<sub>2</sub>F group; study of influence of C-F···H-N interactions on reactivity

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<sup>d</sup>State Key Laboratory of Organometallic Chemistry, Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences, Shanghai 200032, P R China.

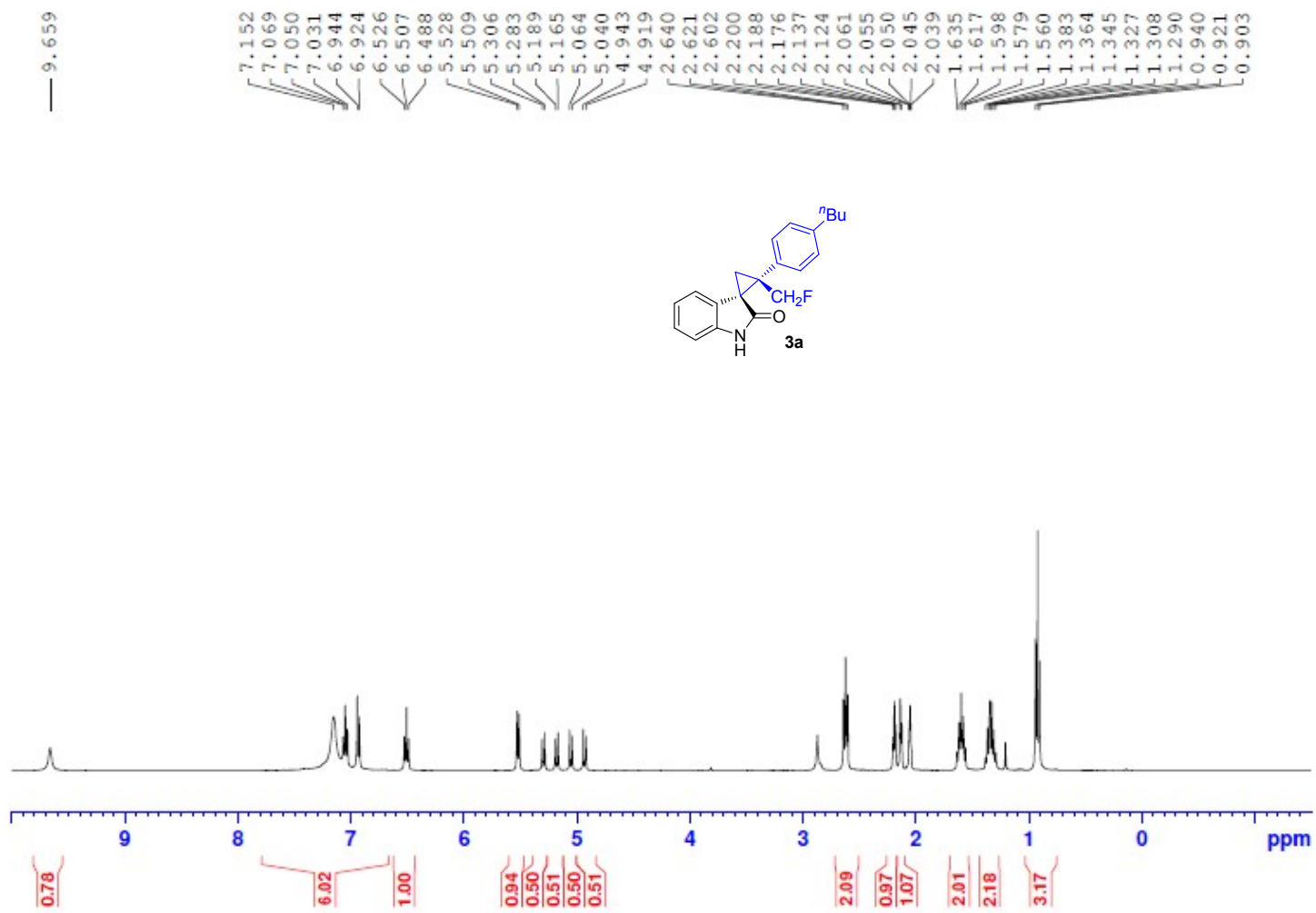
<sup>‡</sup>*These authors contributed equally to this article.*

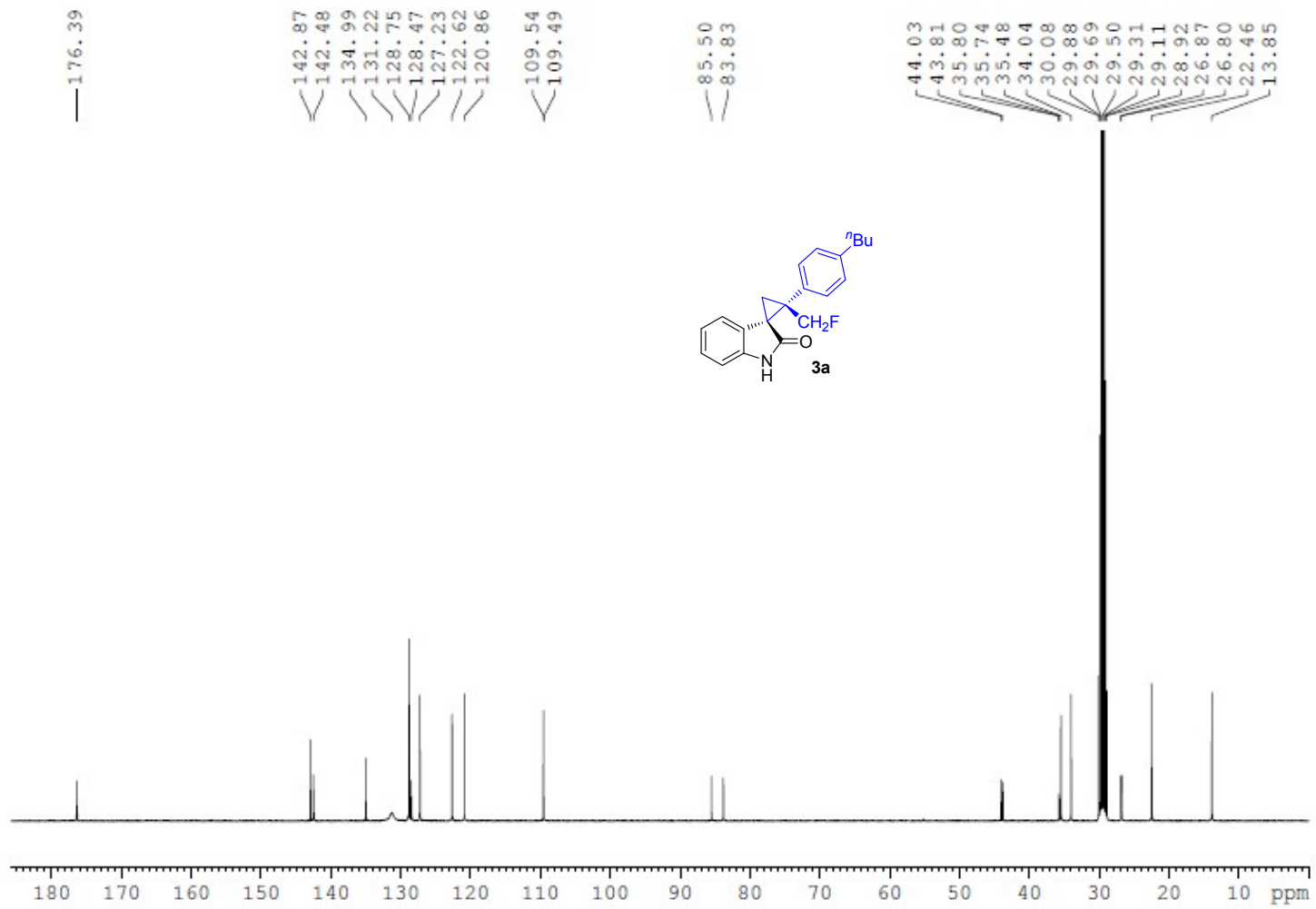
### Supporting Information (Part B)

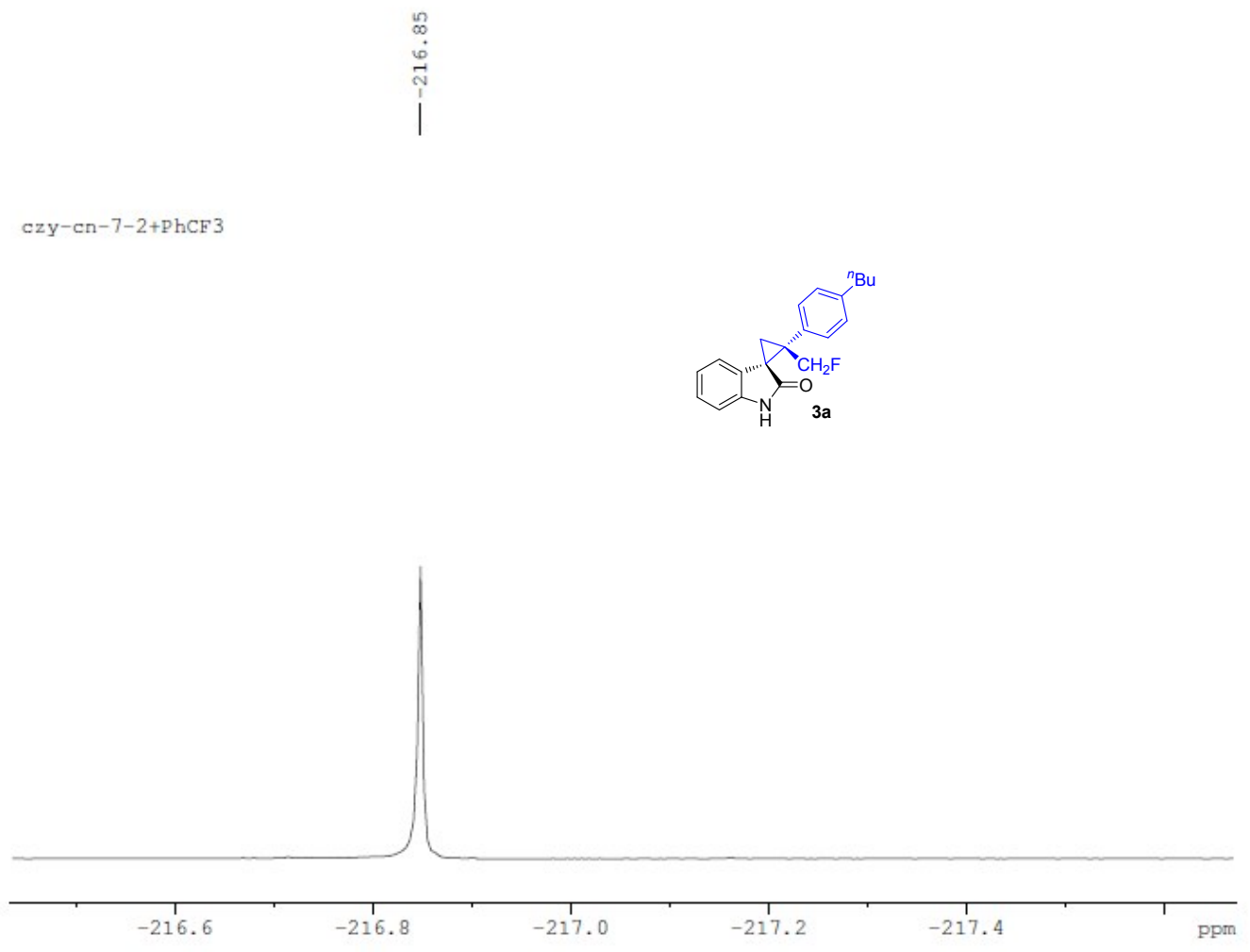
<sup>1</sup>H, <sup>13</sup>C and <sup>19</sup>F NMR Spectra of **3a-3q**, **4**, **7a-7e**

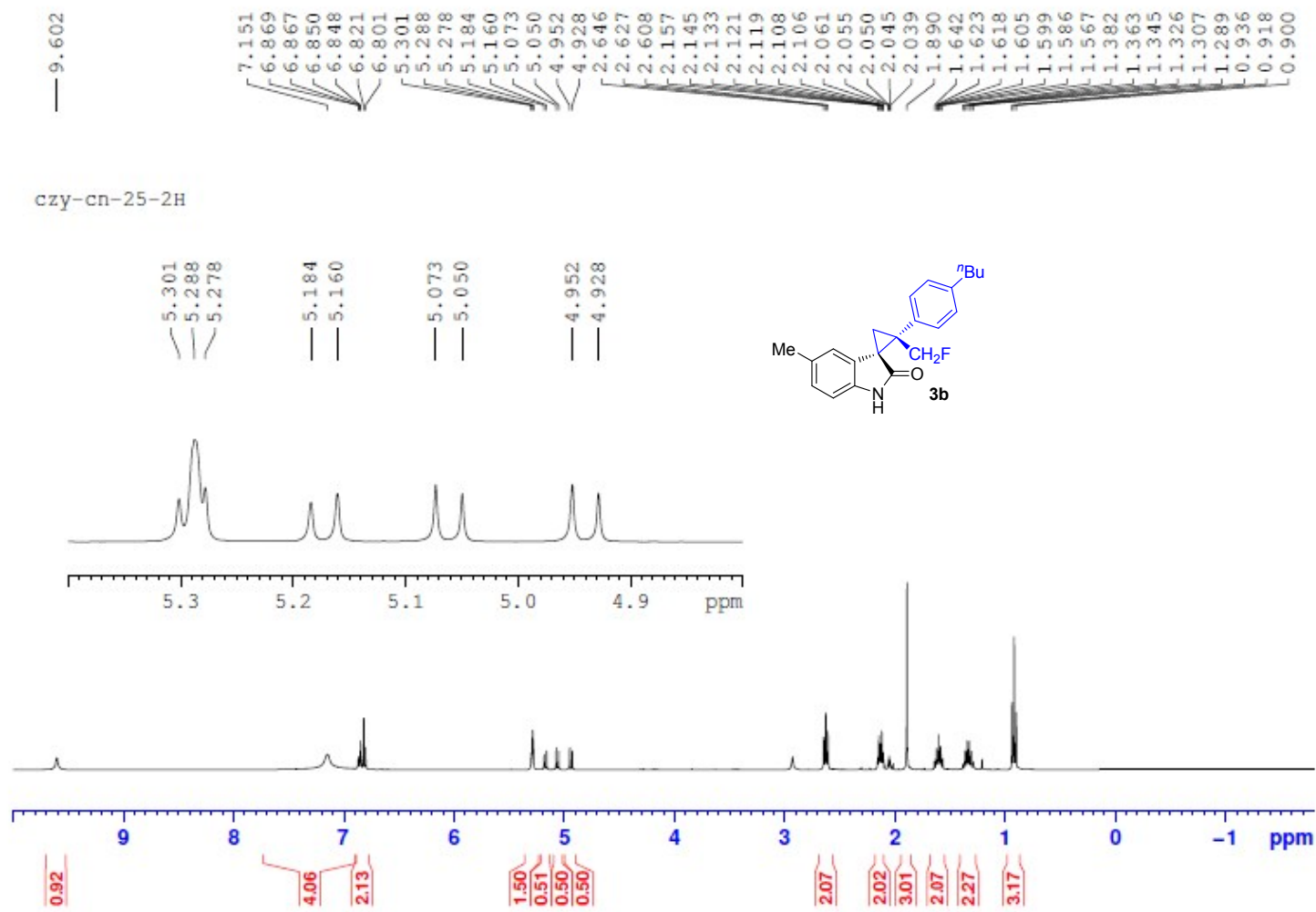
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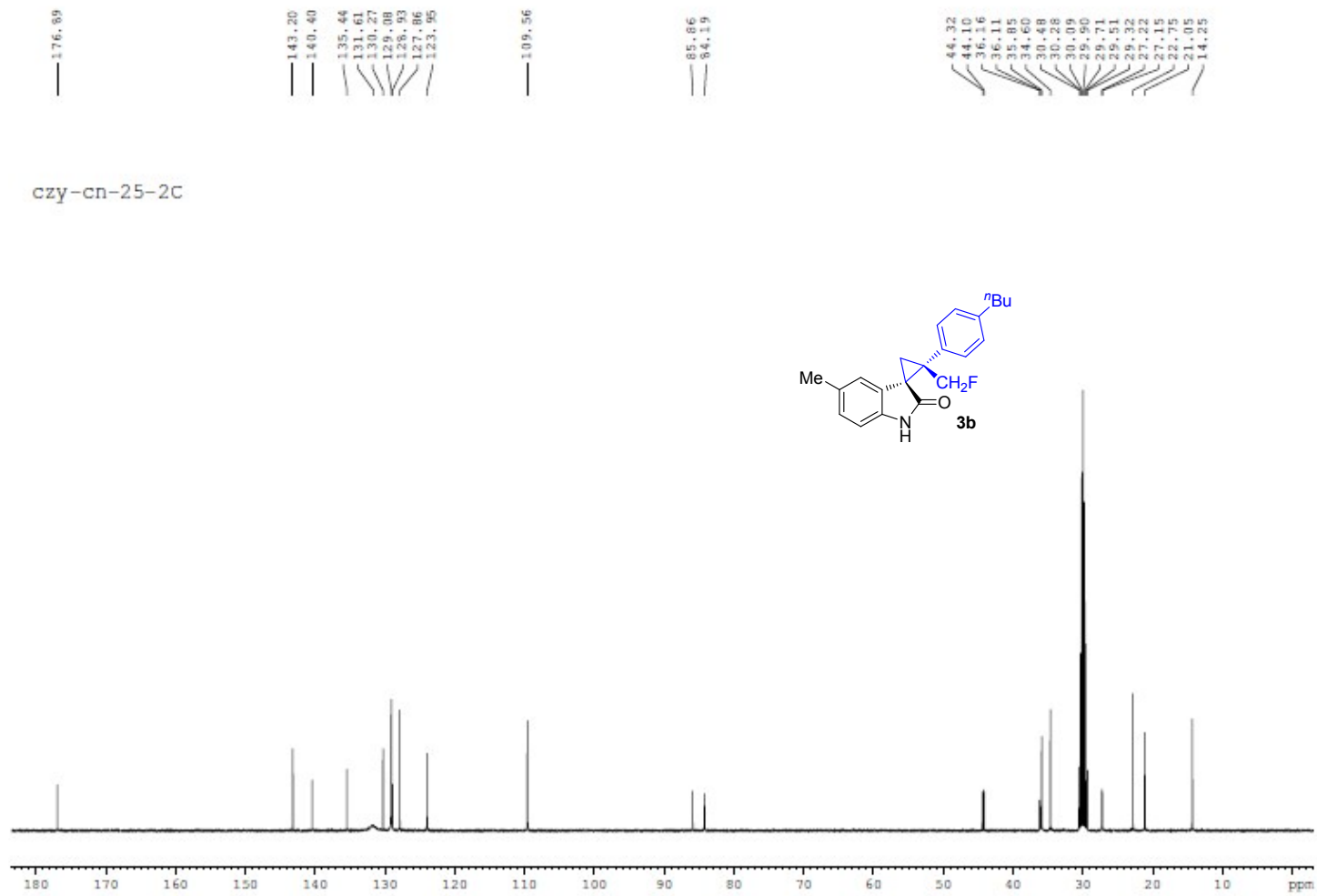
<sup>1</sup>H, <sup>13</sup>C, <sup>19</sup>F NMR spectra were obtained using a Bruker DPX-400 or 500 spectrometer. Chemical shifts of <sup>1</sup>H NMR and <sup>13</sup>C NMR spectra are reported in ppm from tetramethylsilane with the solvent resonance as the internal standard while PhCF<sub>3</sub> (δ -63.2 ppm) was used as external standard for <sup>19</sup>F NMR spectra. The following abbreviations were used to designate chemical shift multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad.



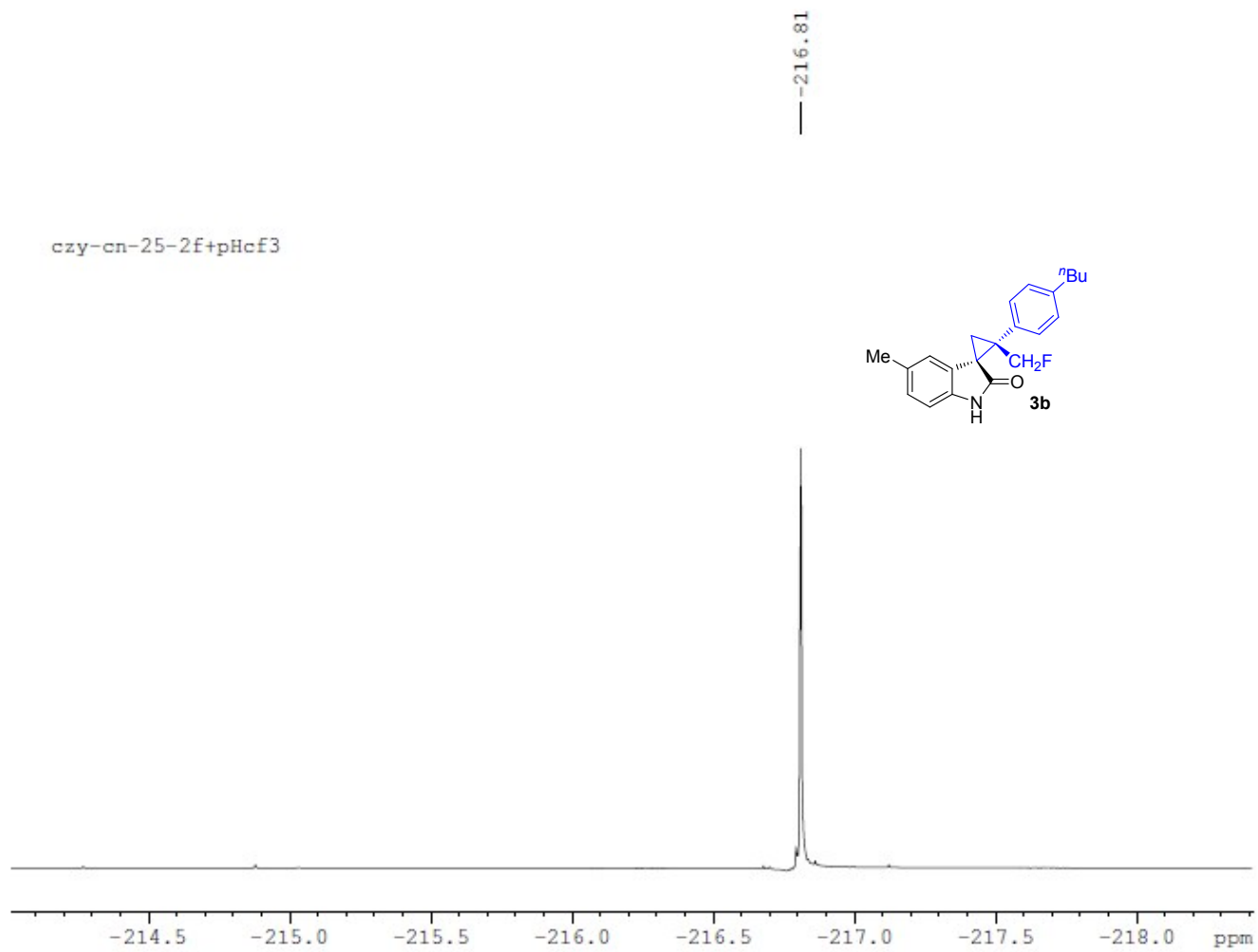


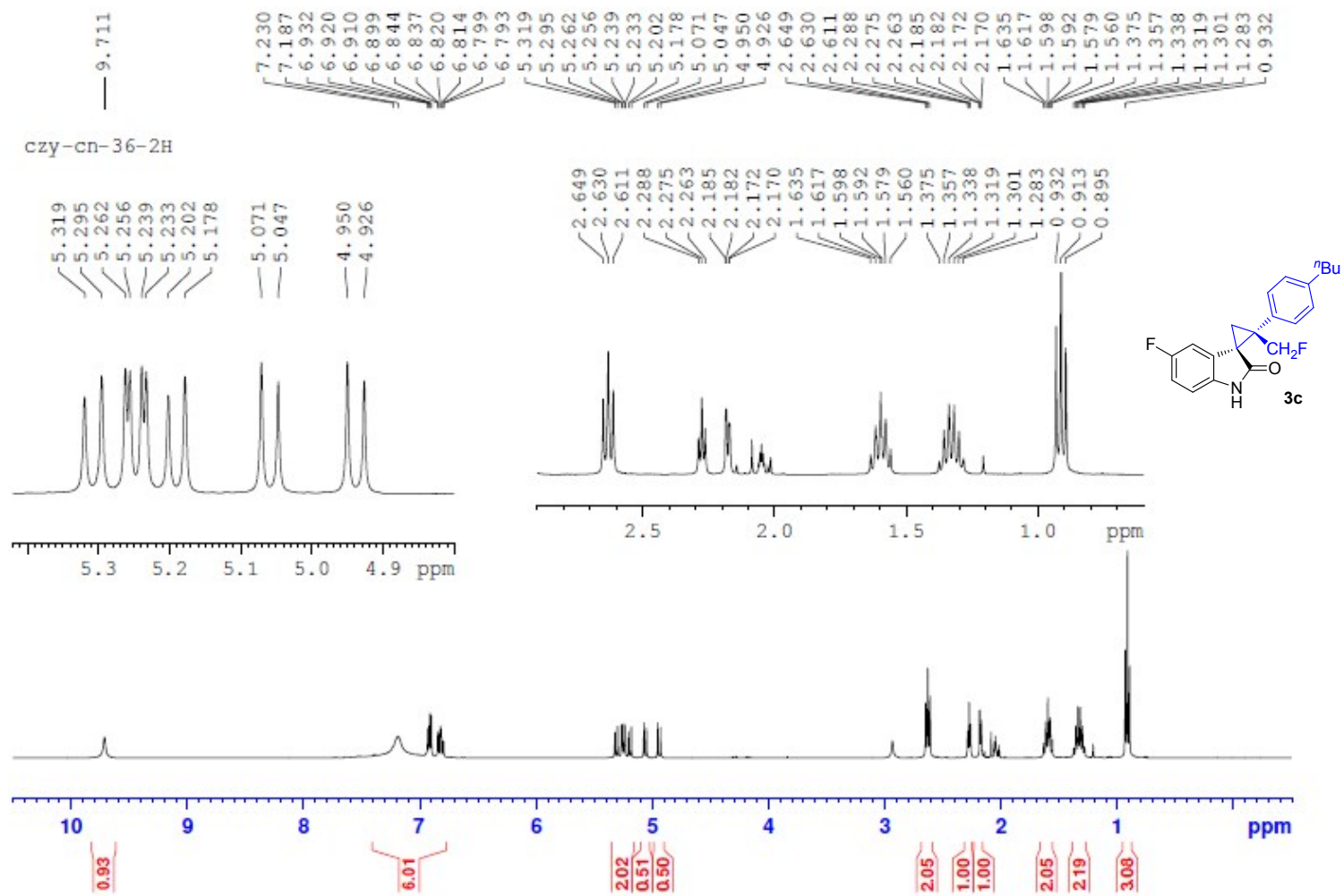




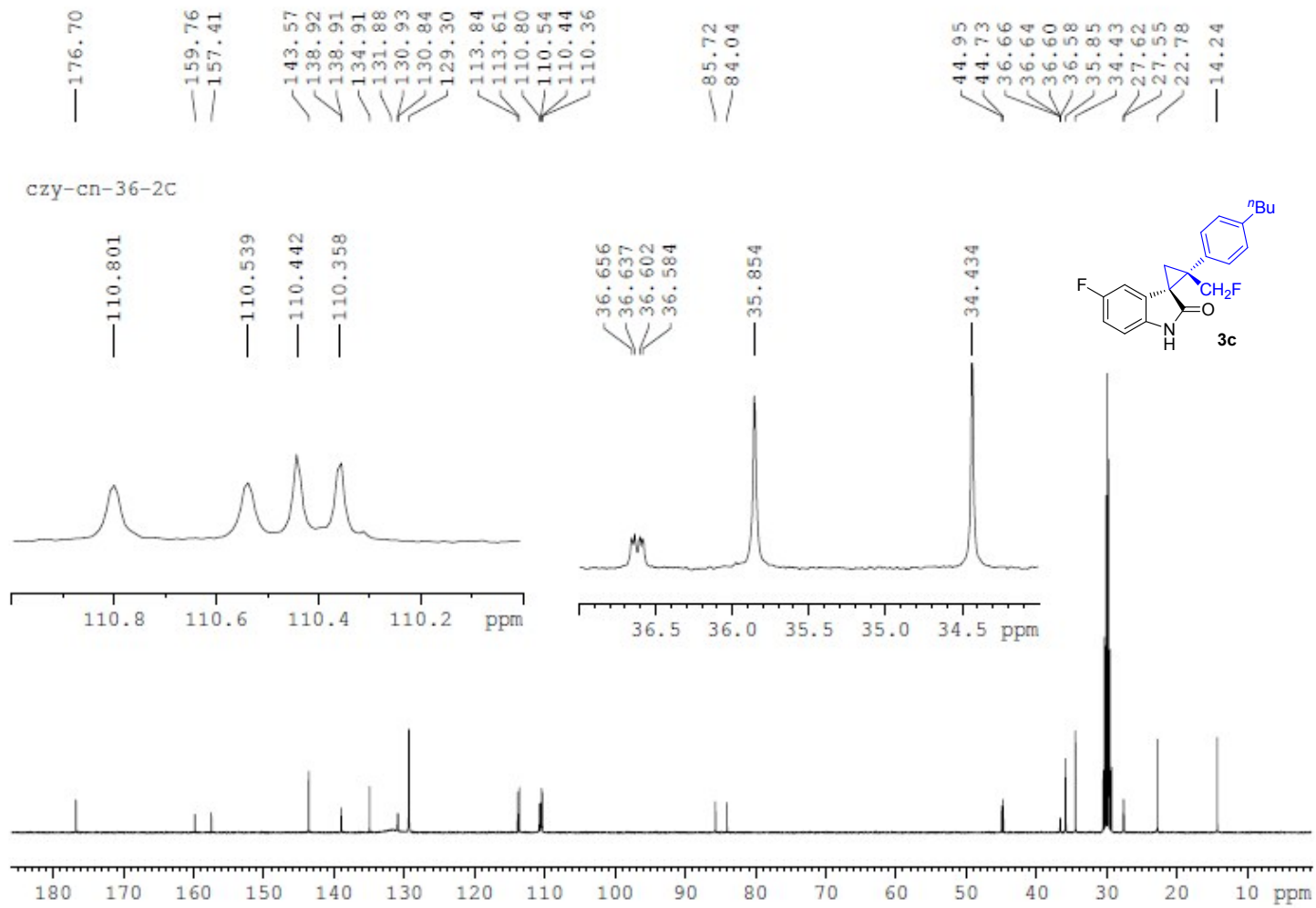


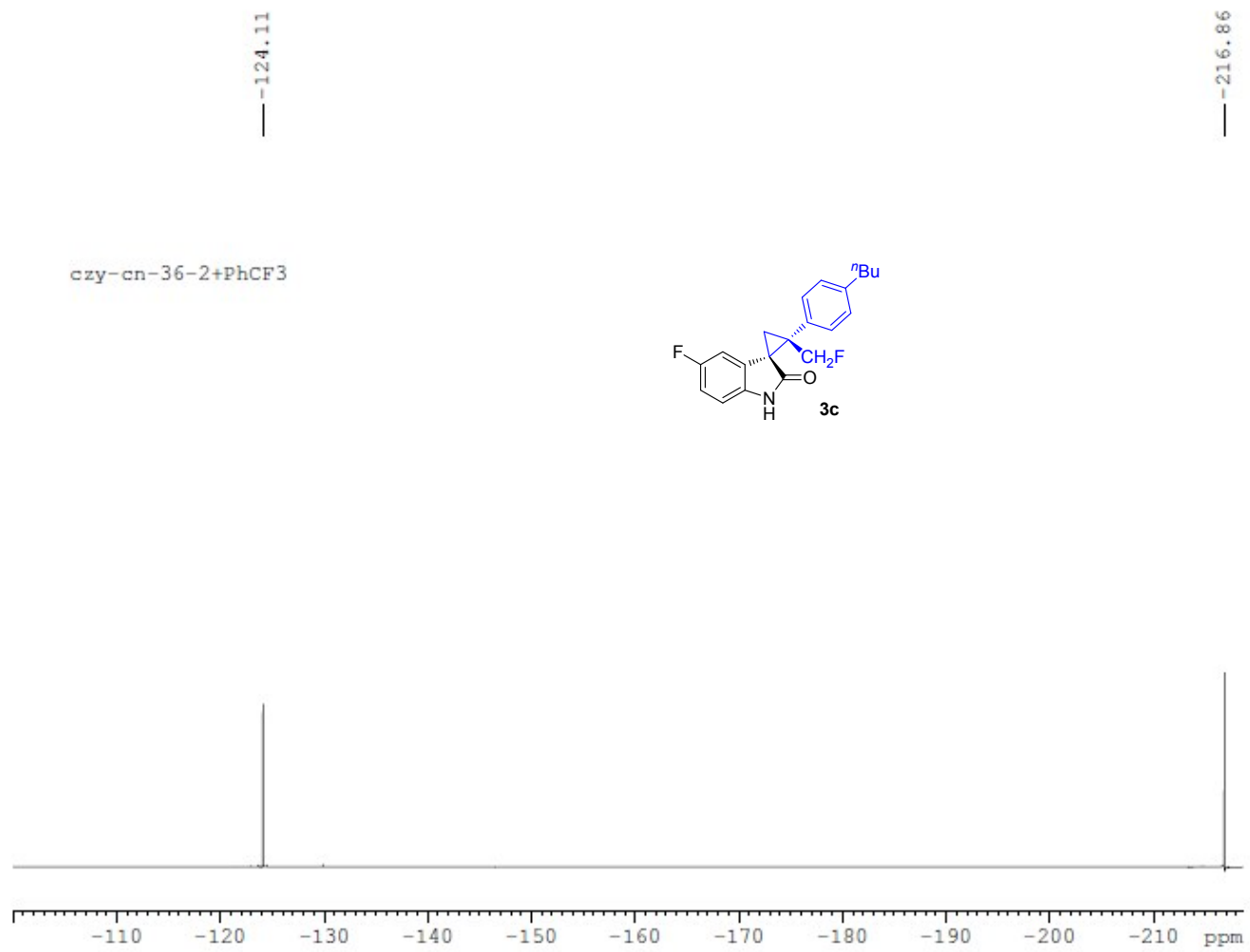
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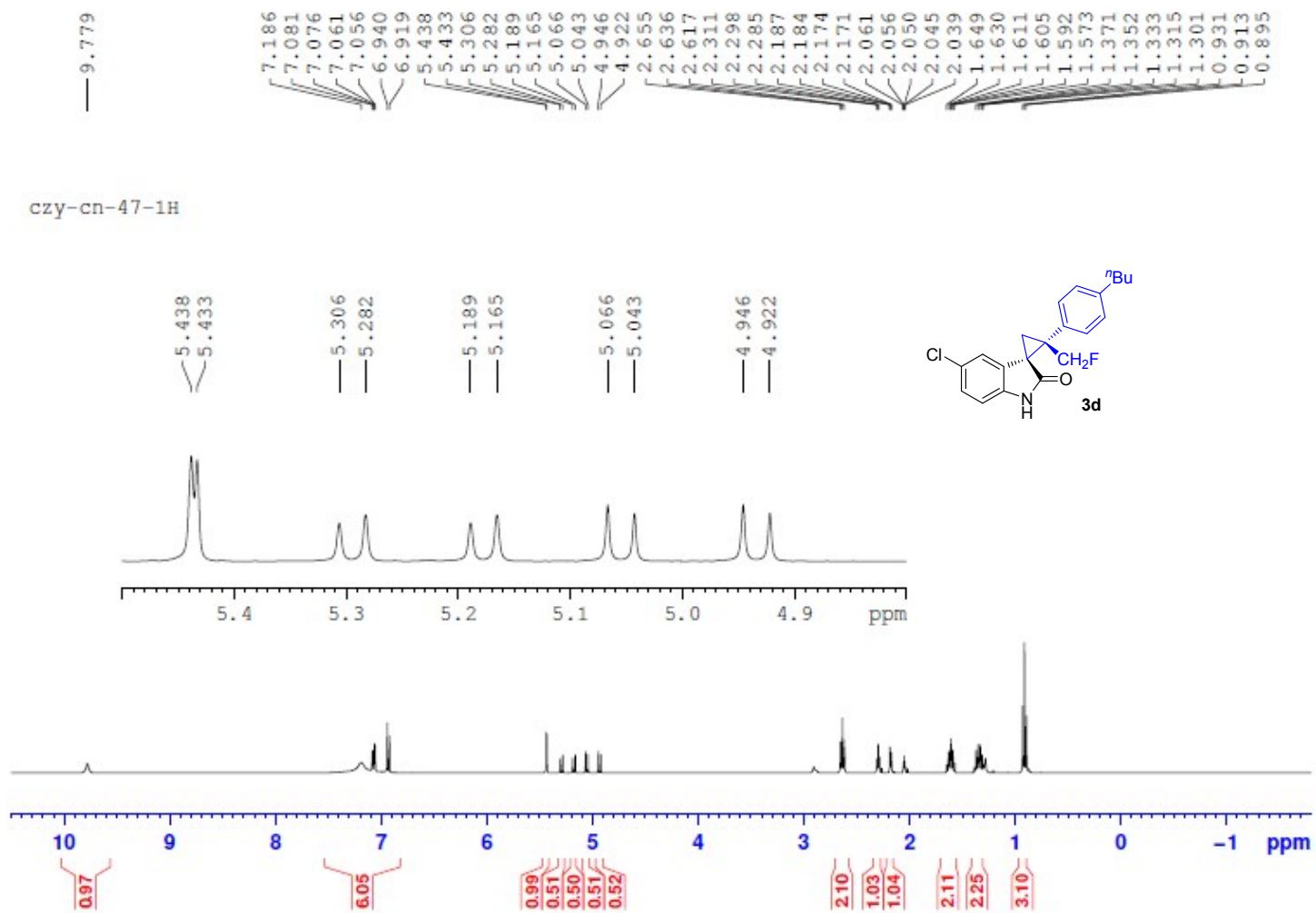


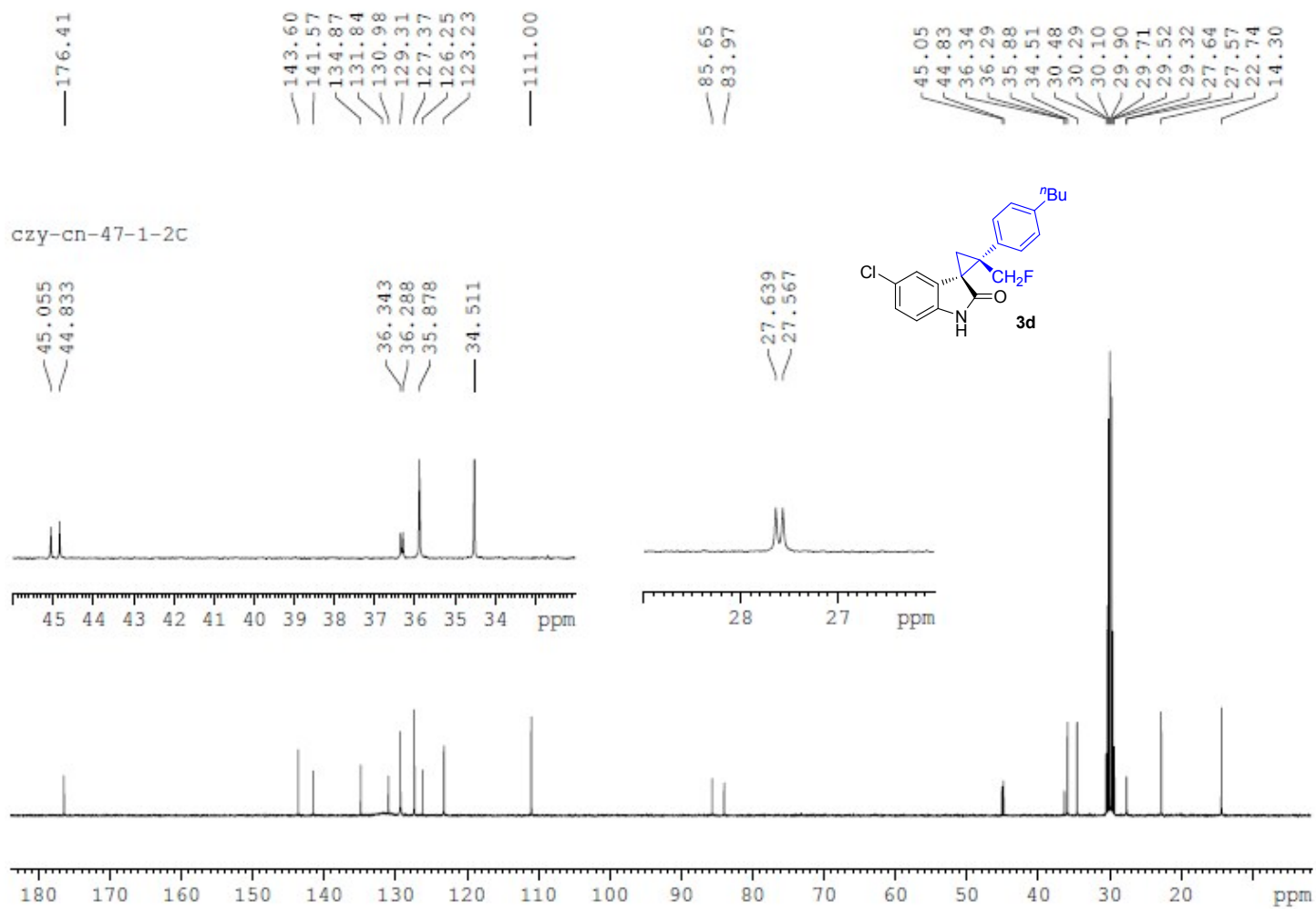




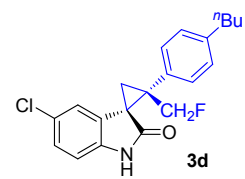




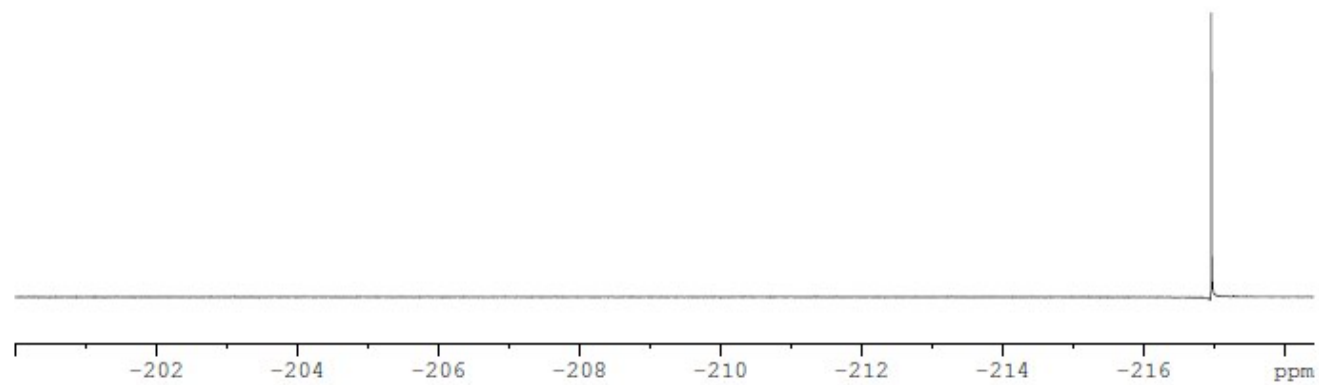


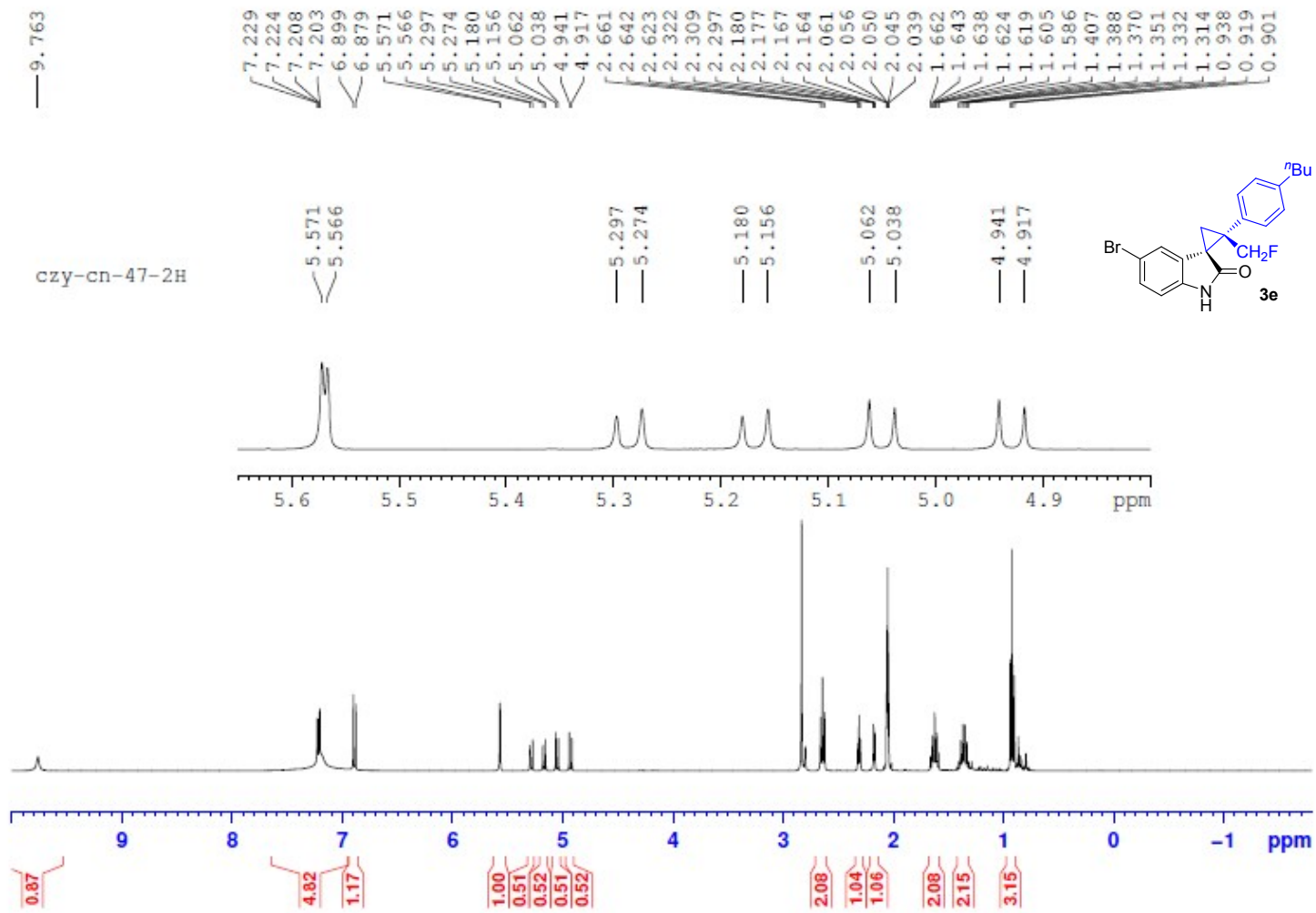


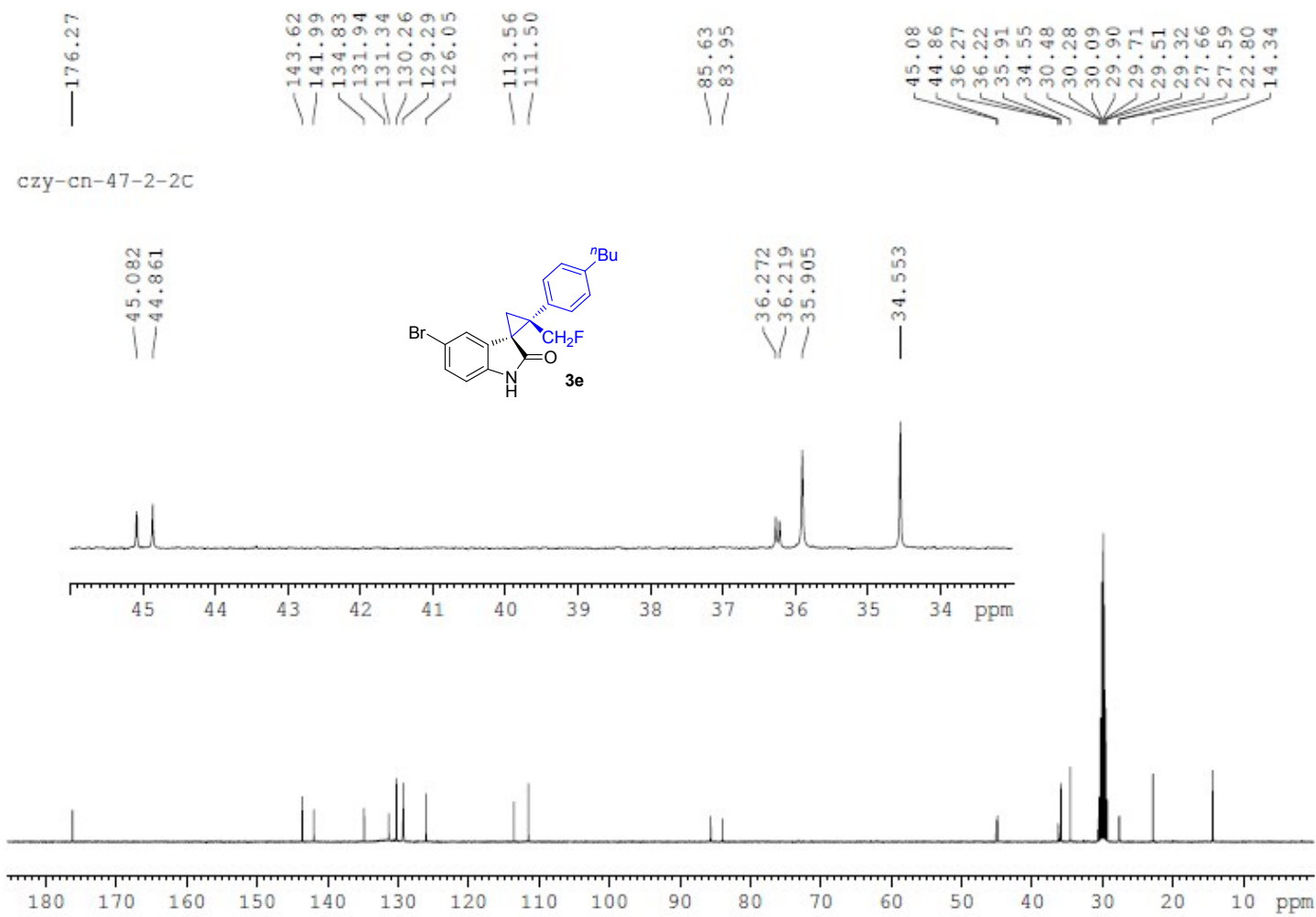
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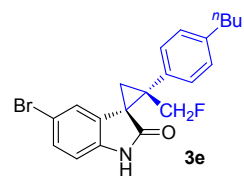
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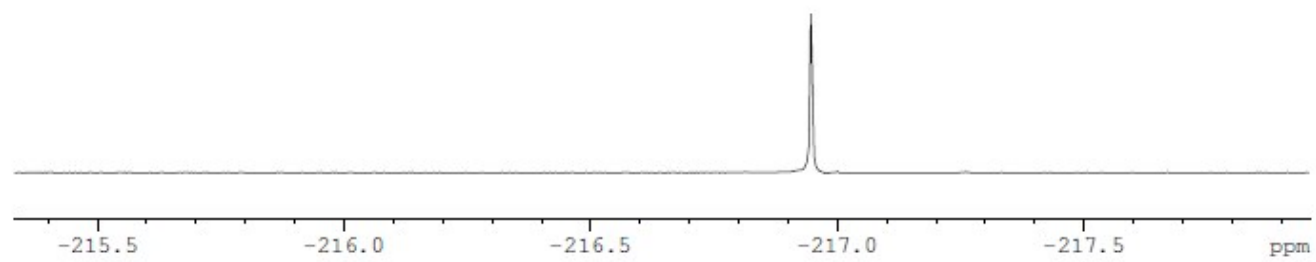




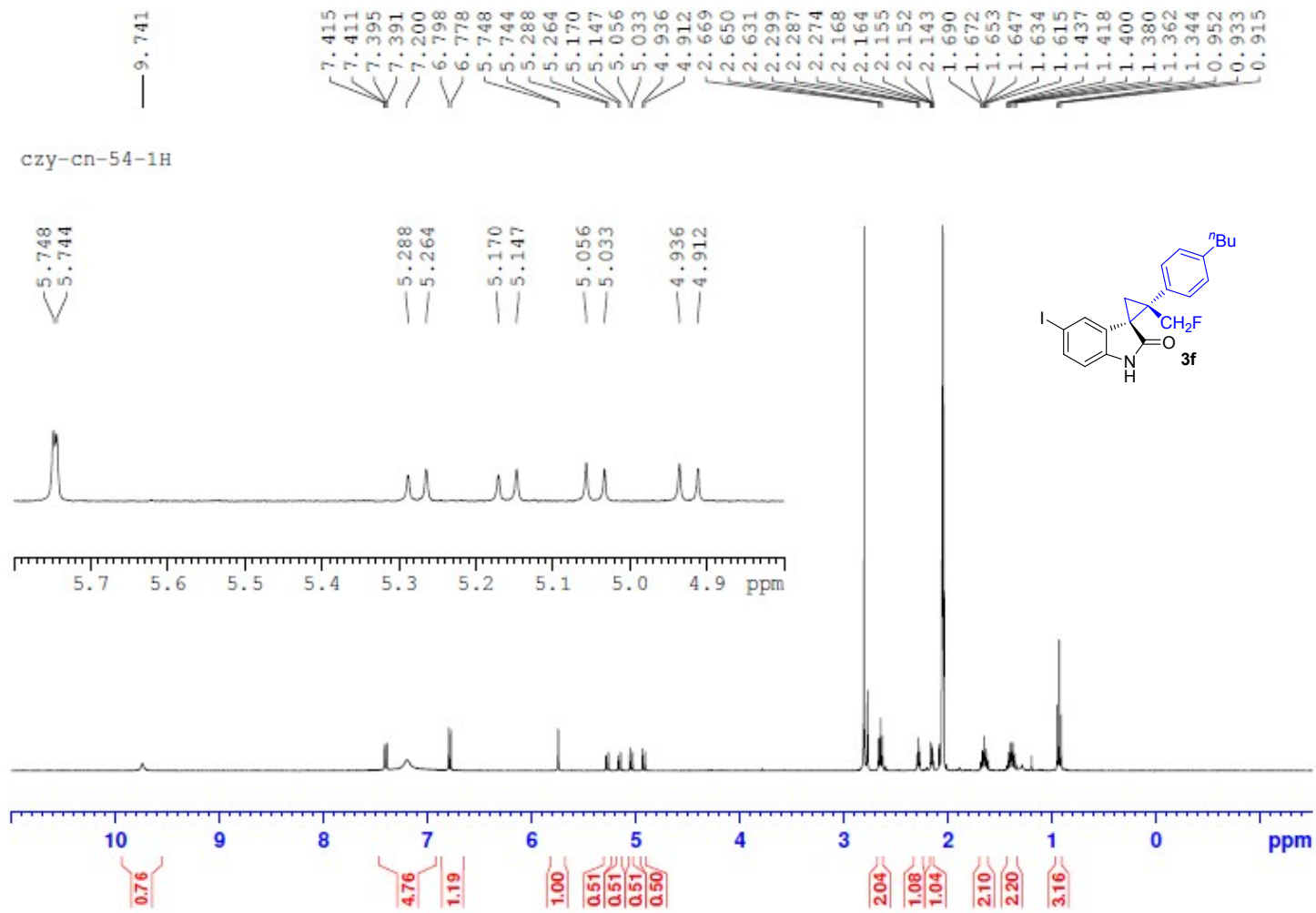
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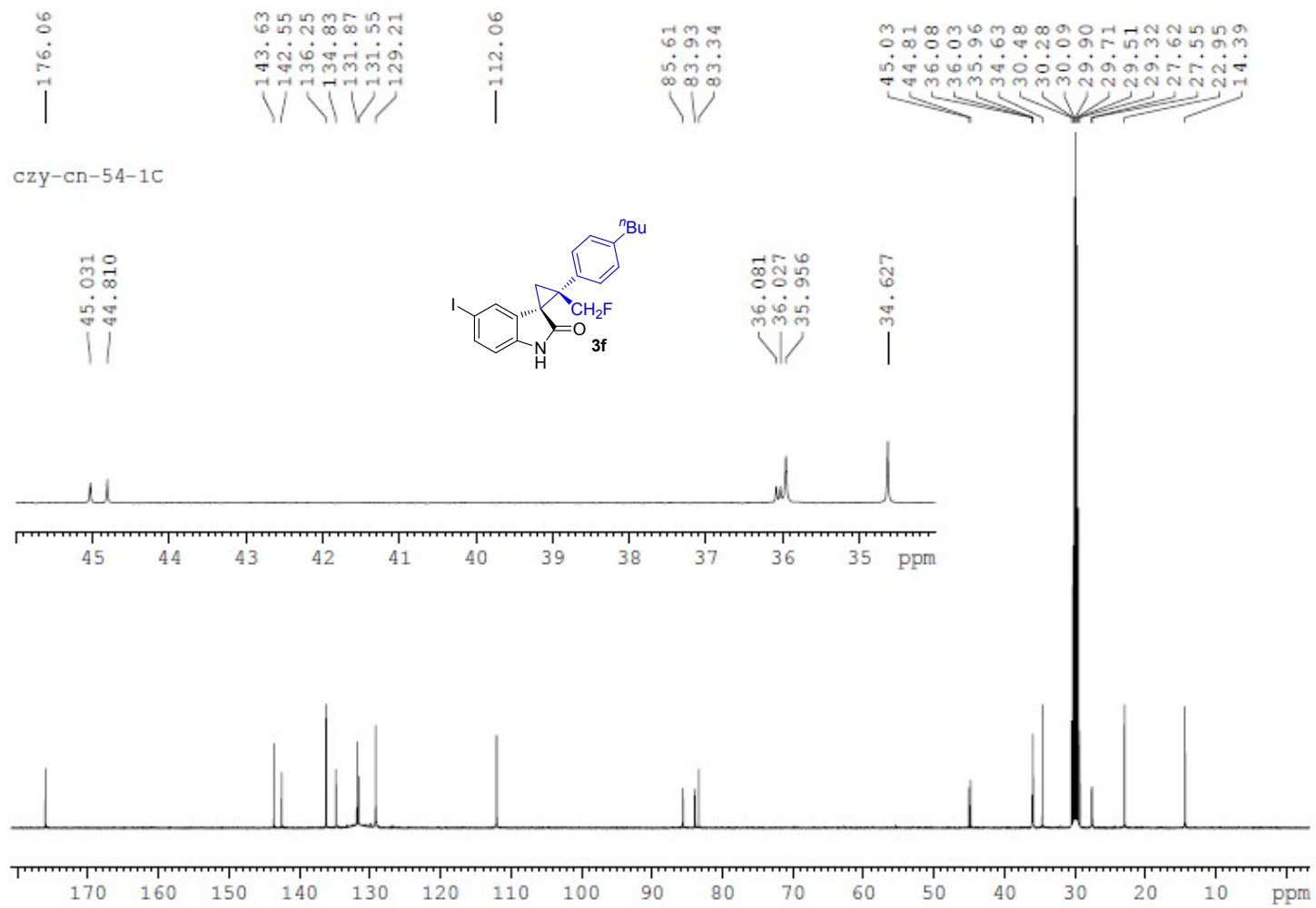


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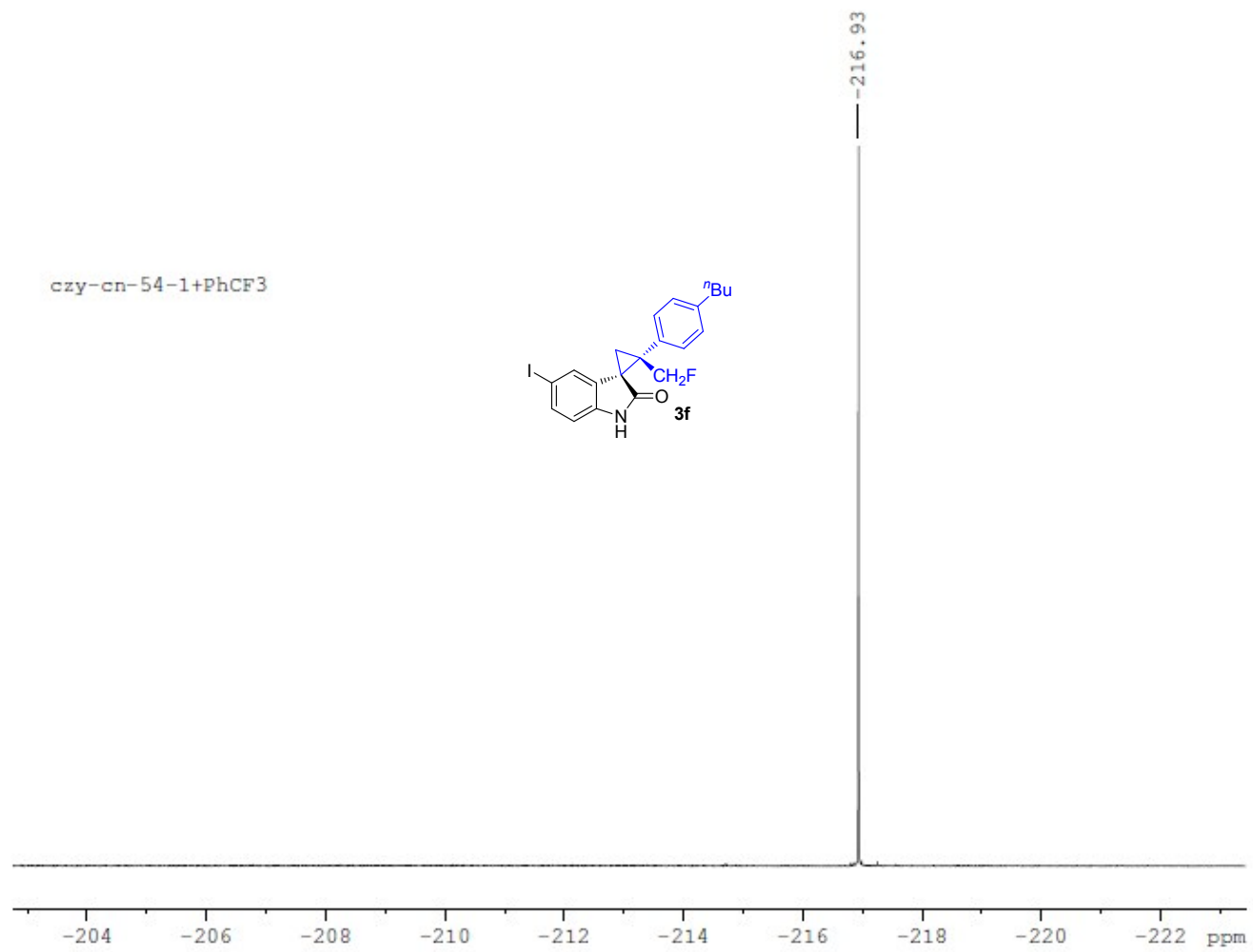
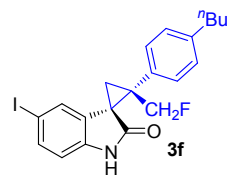


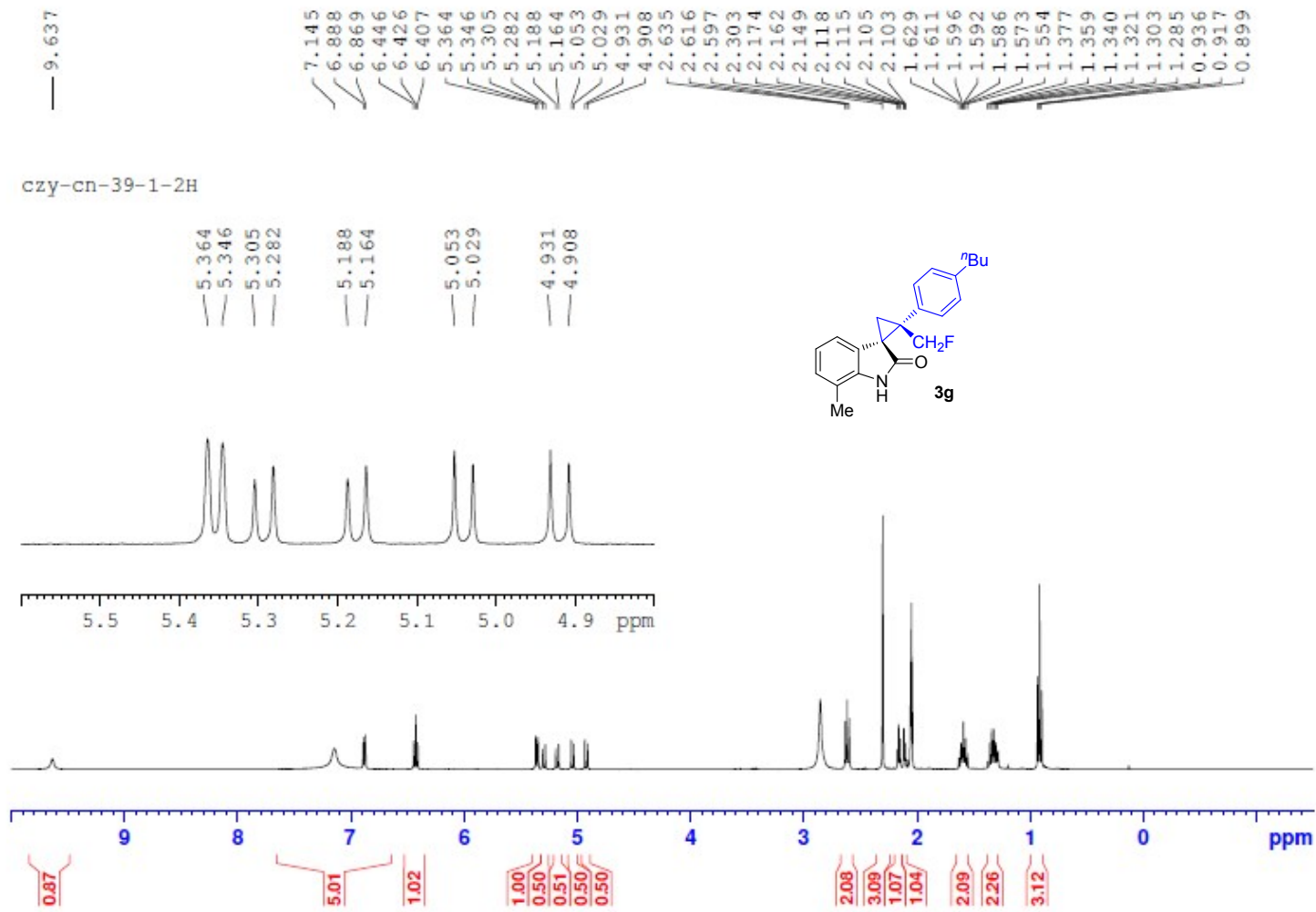


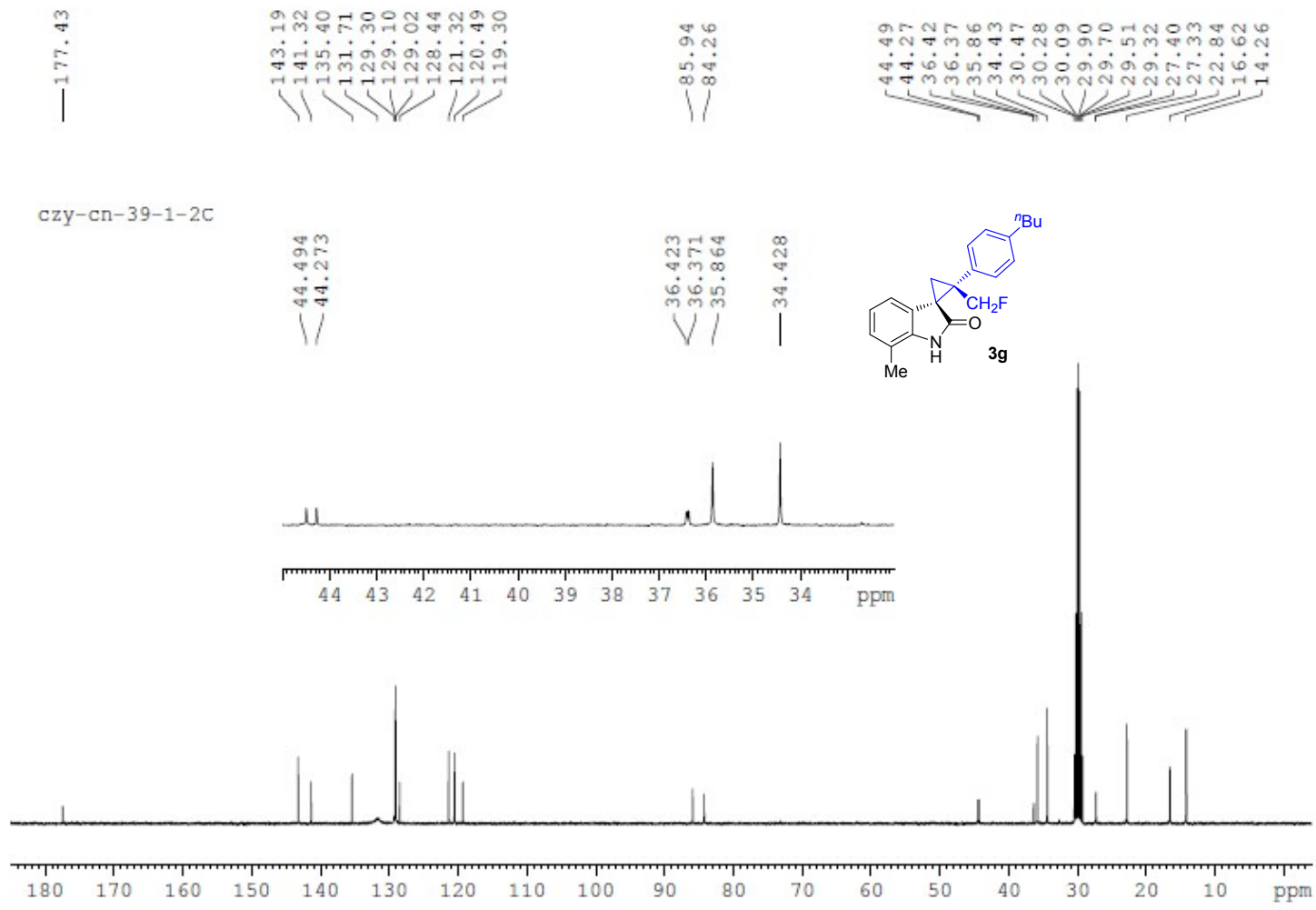


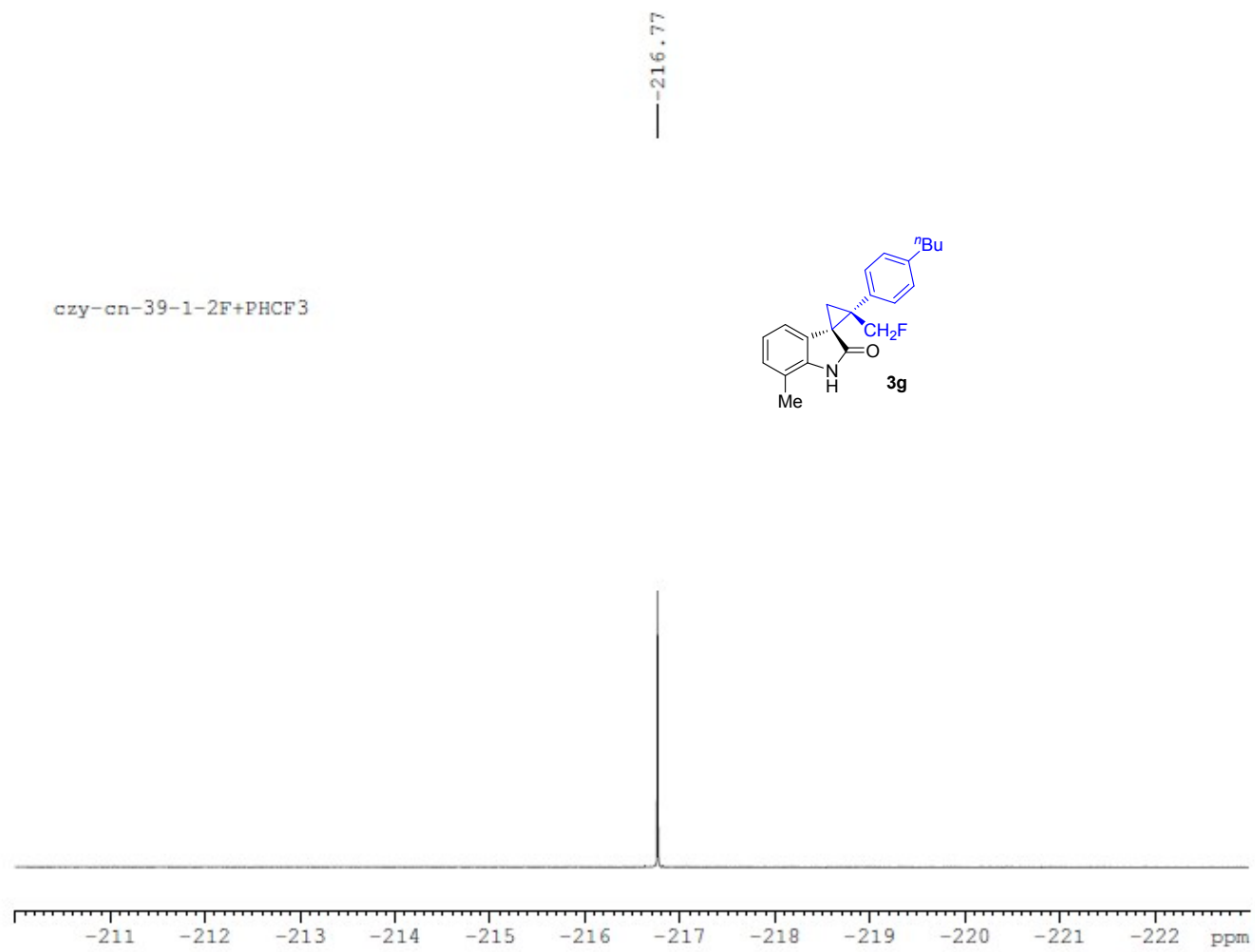


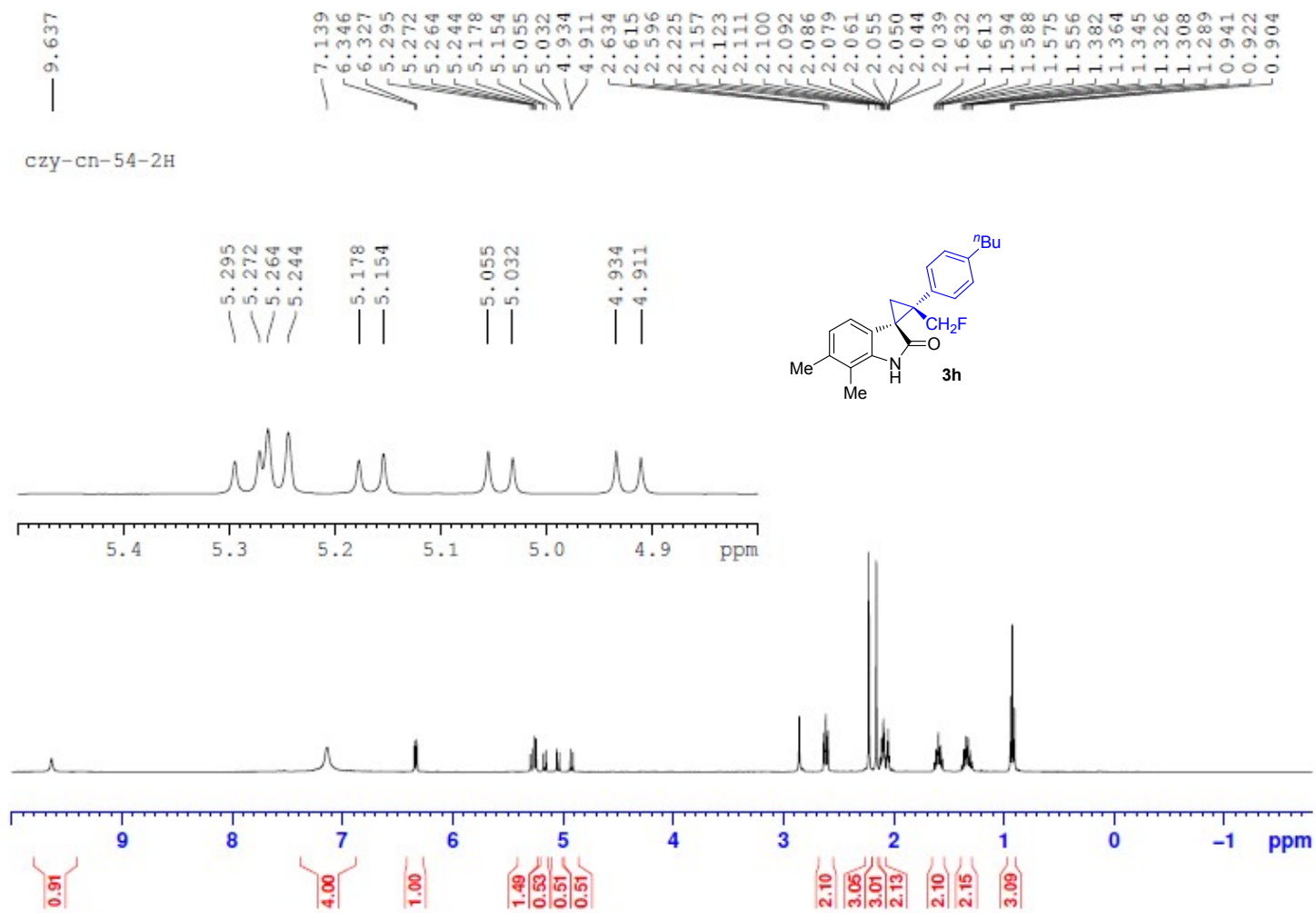
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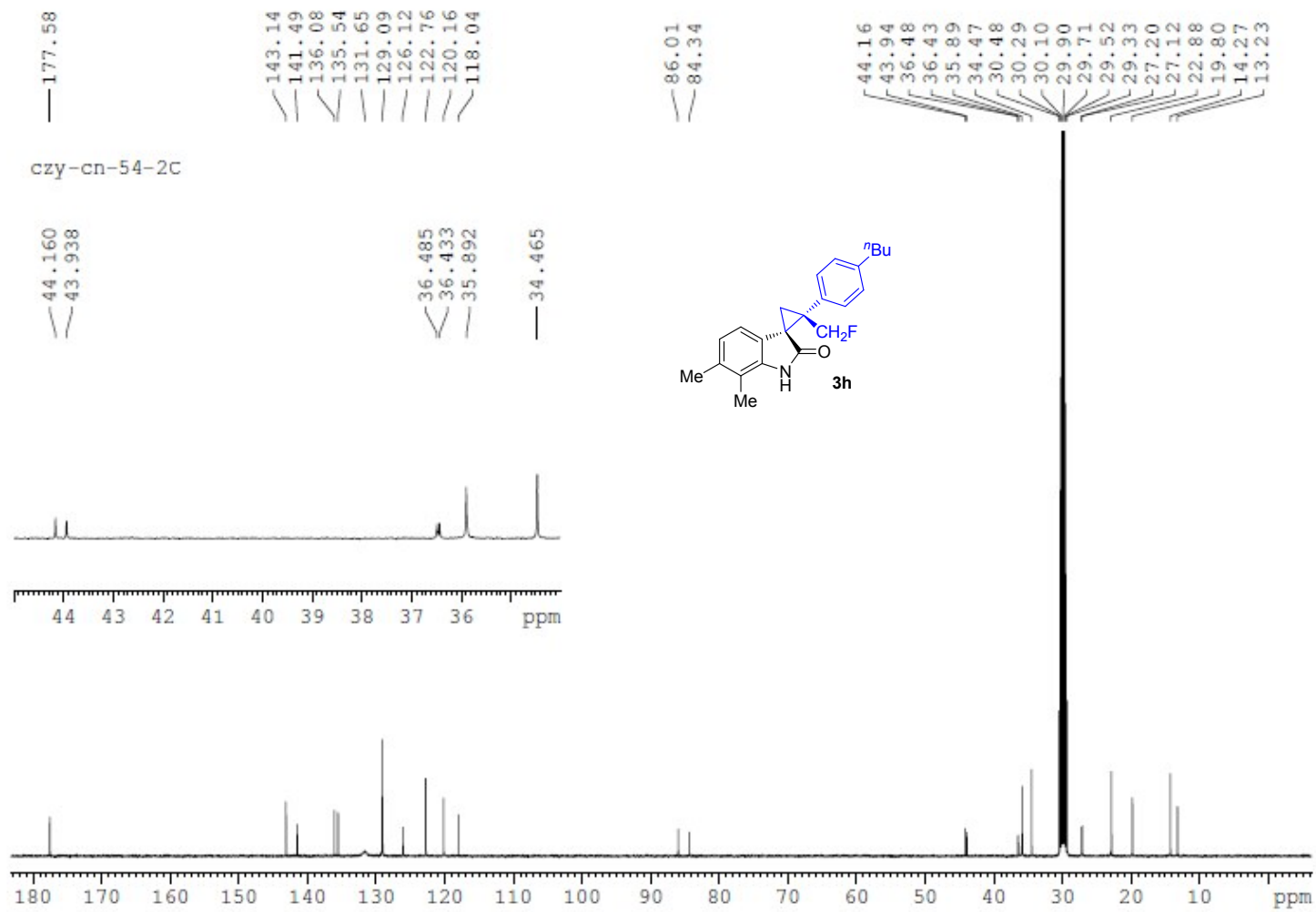






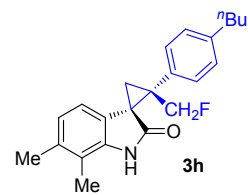




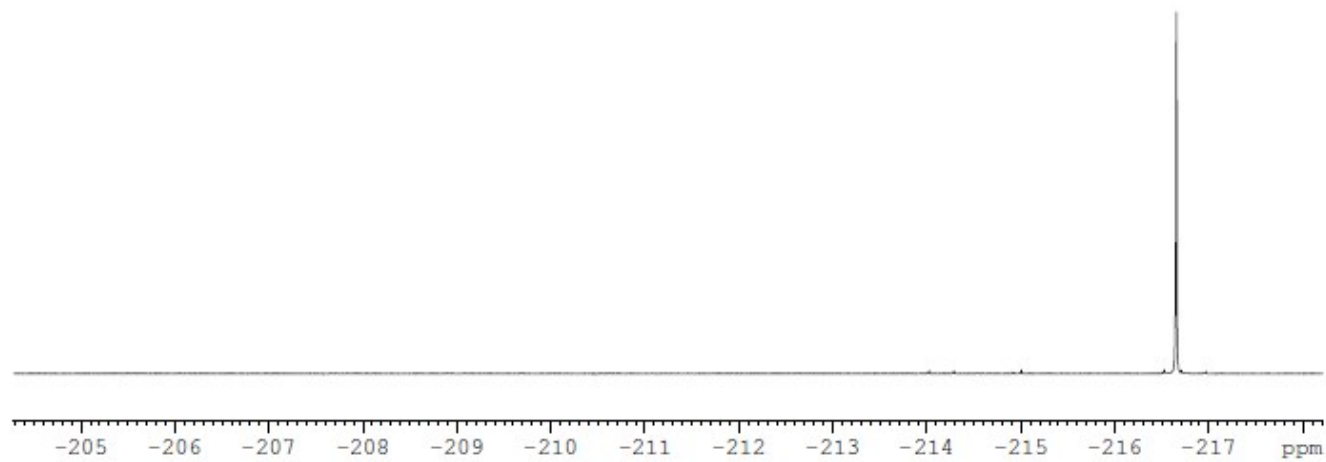


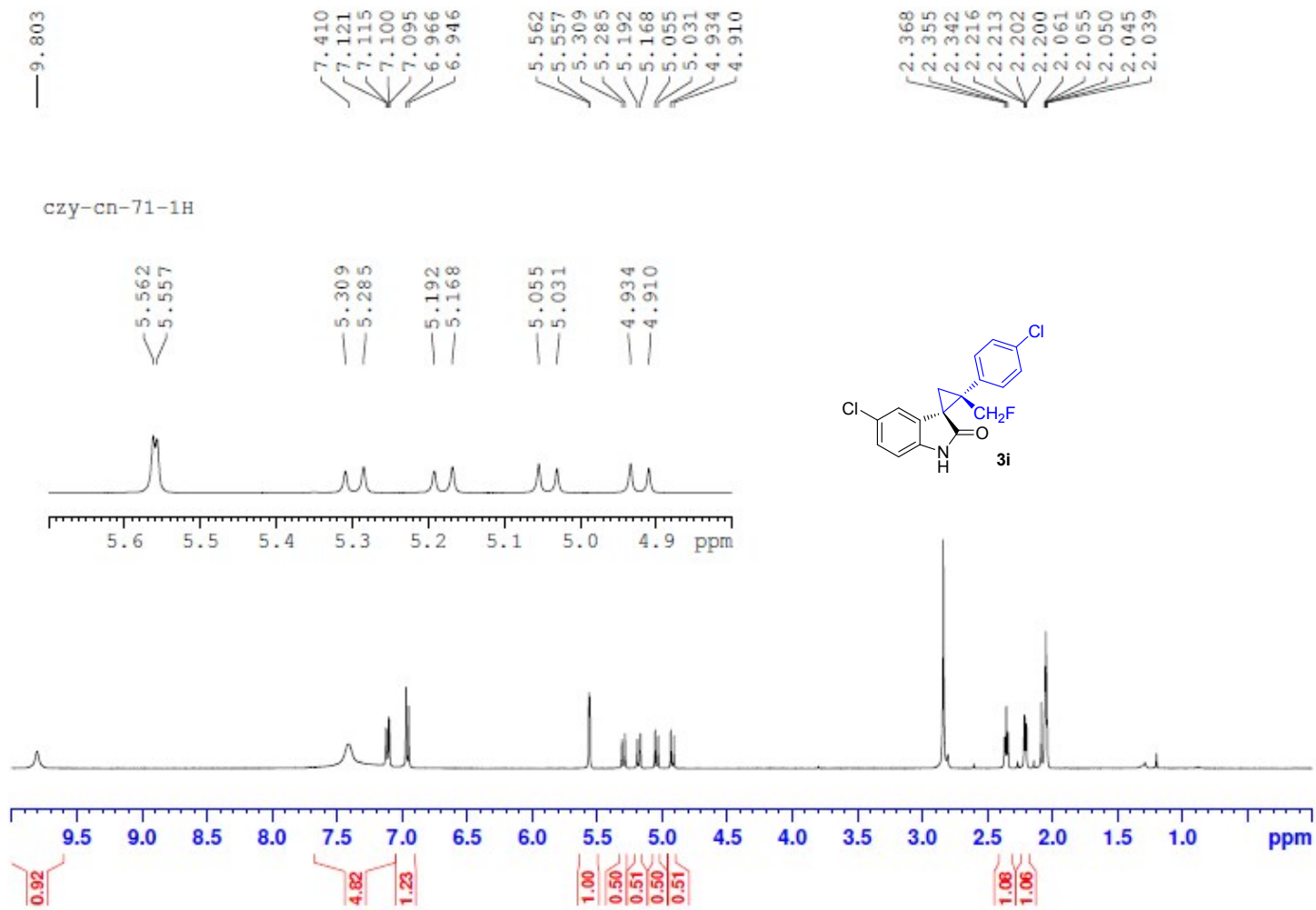


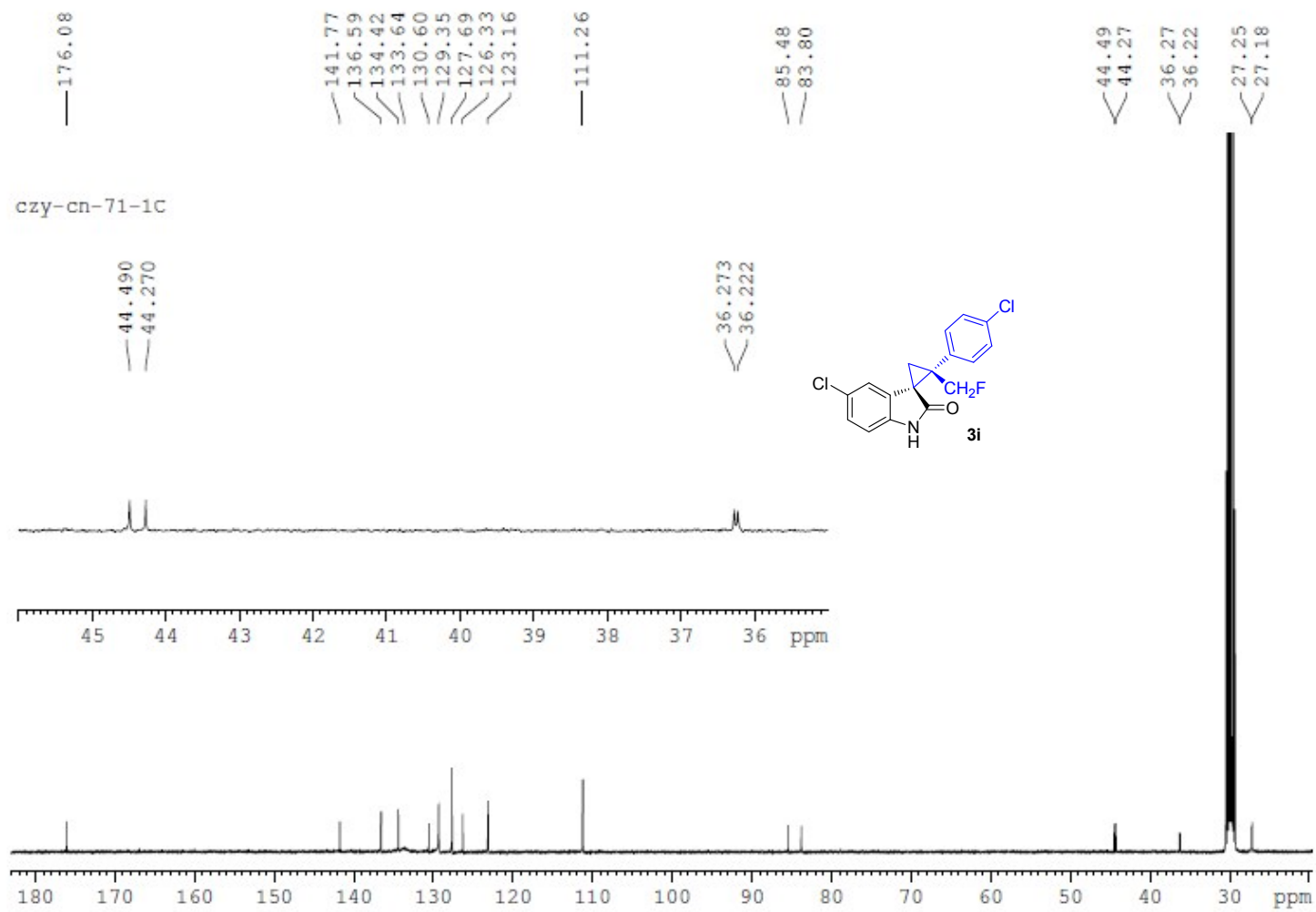
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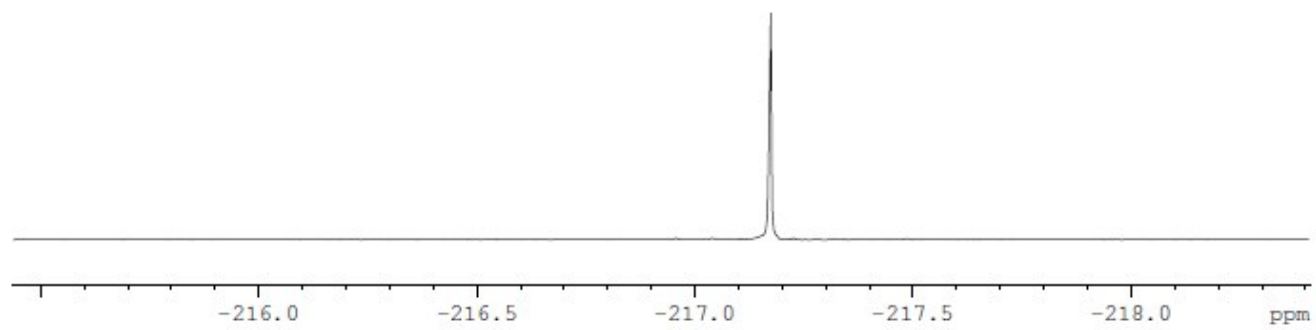
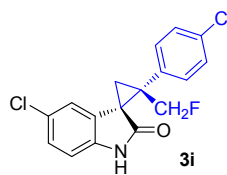


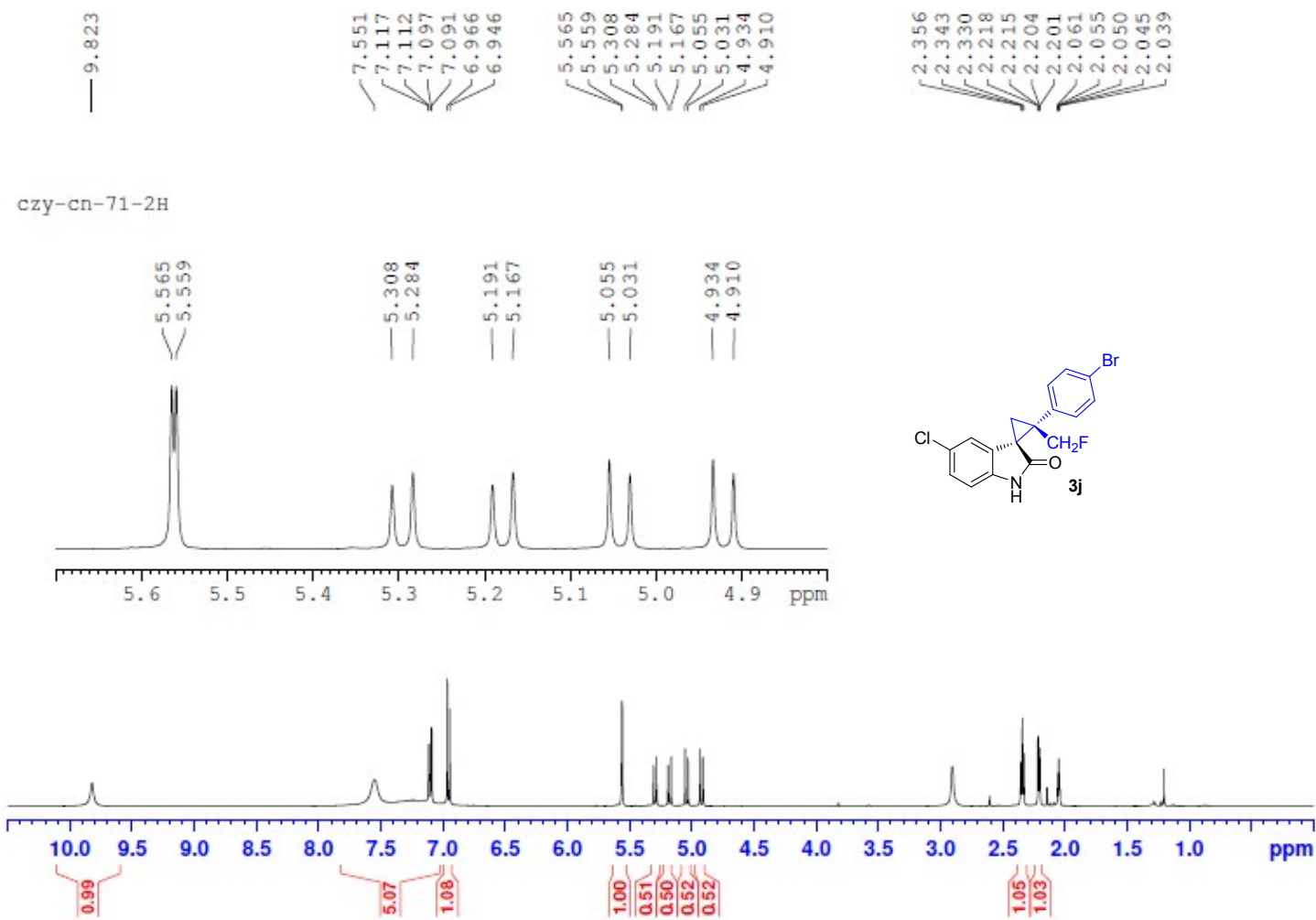




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-217.17





— 176.09

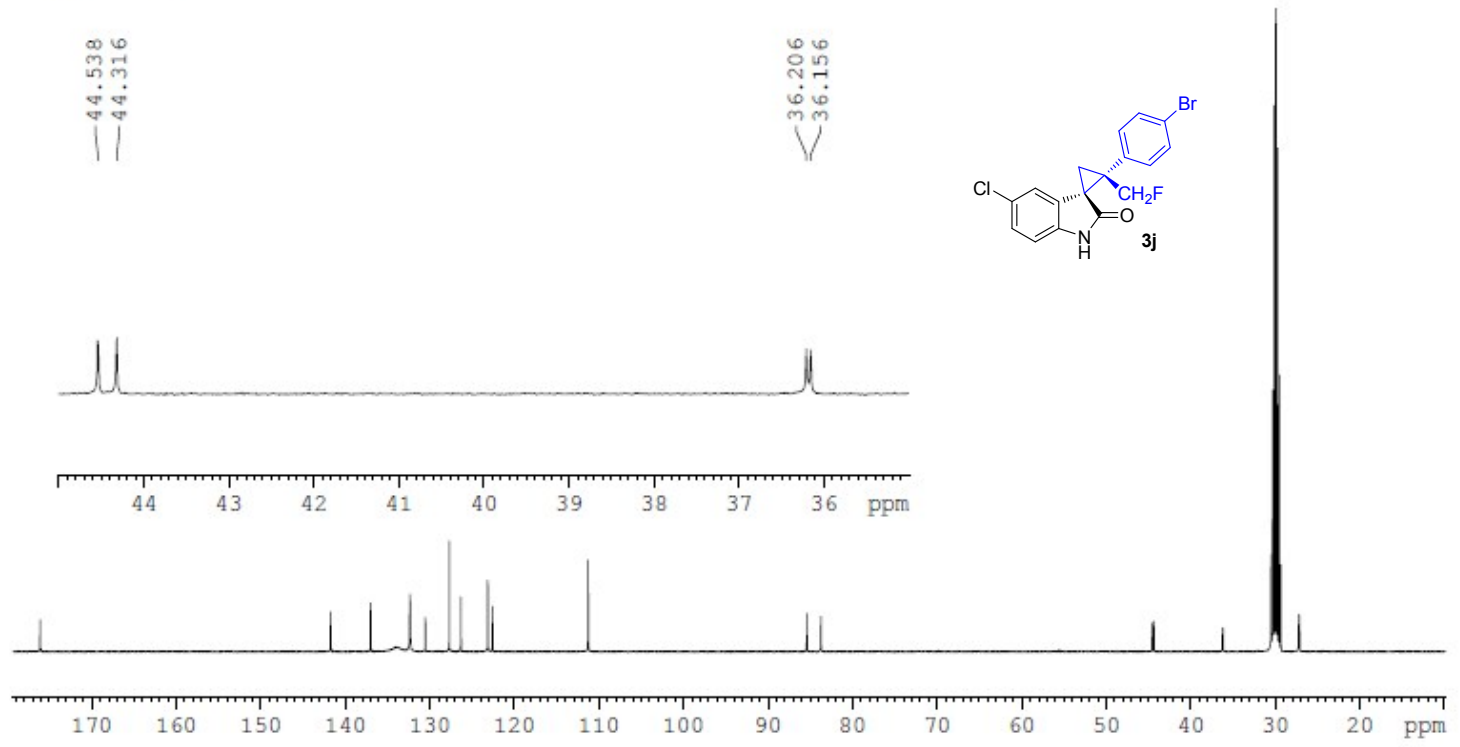
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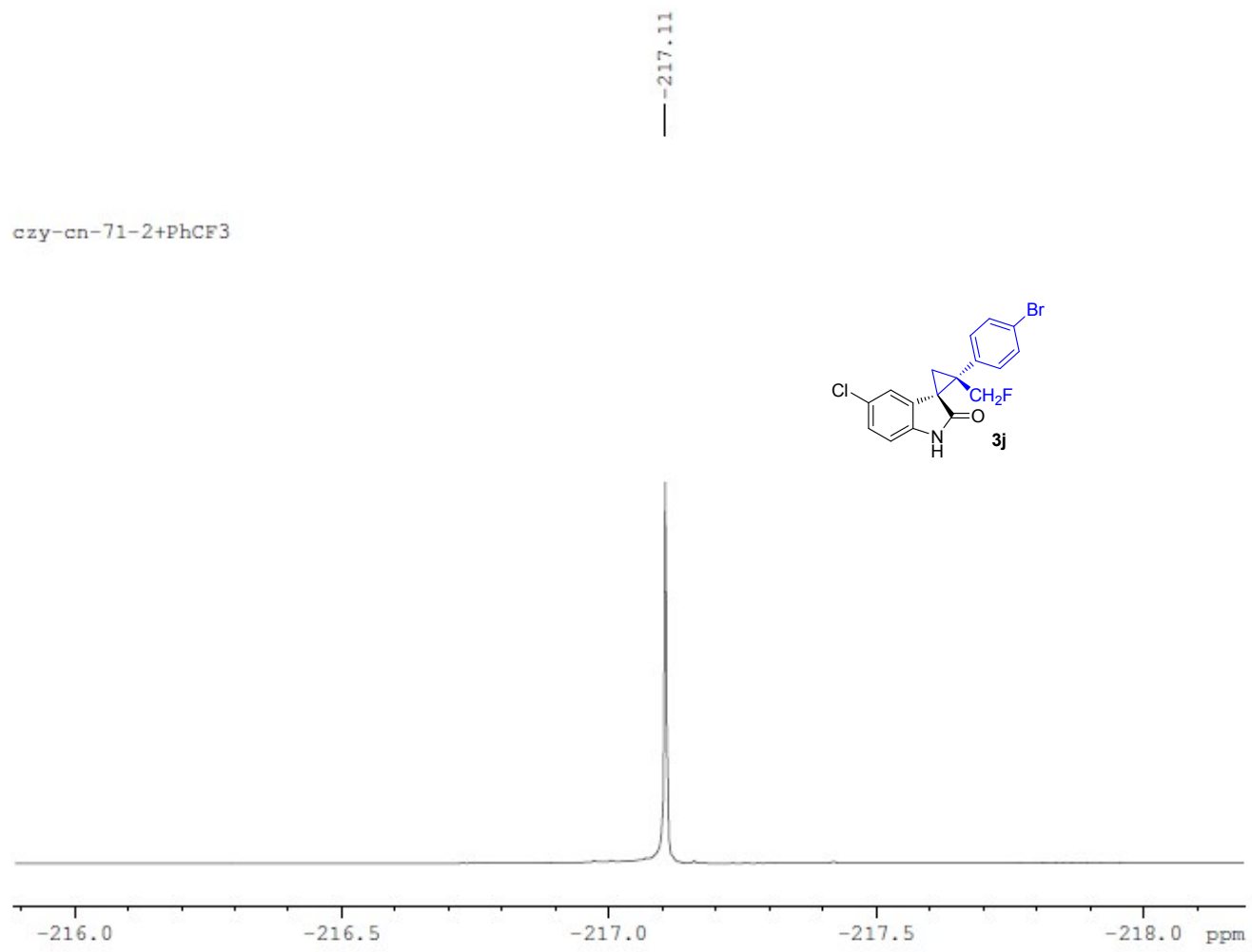
— 111.25

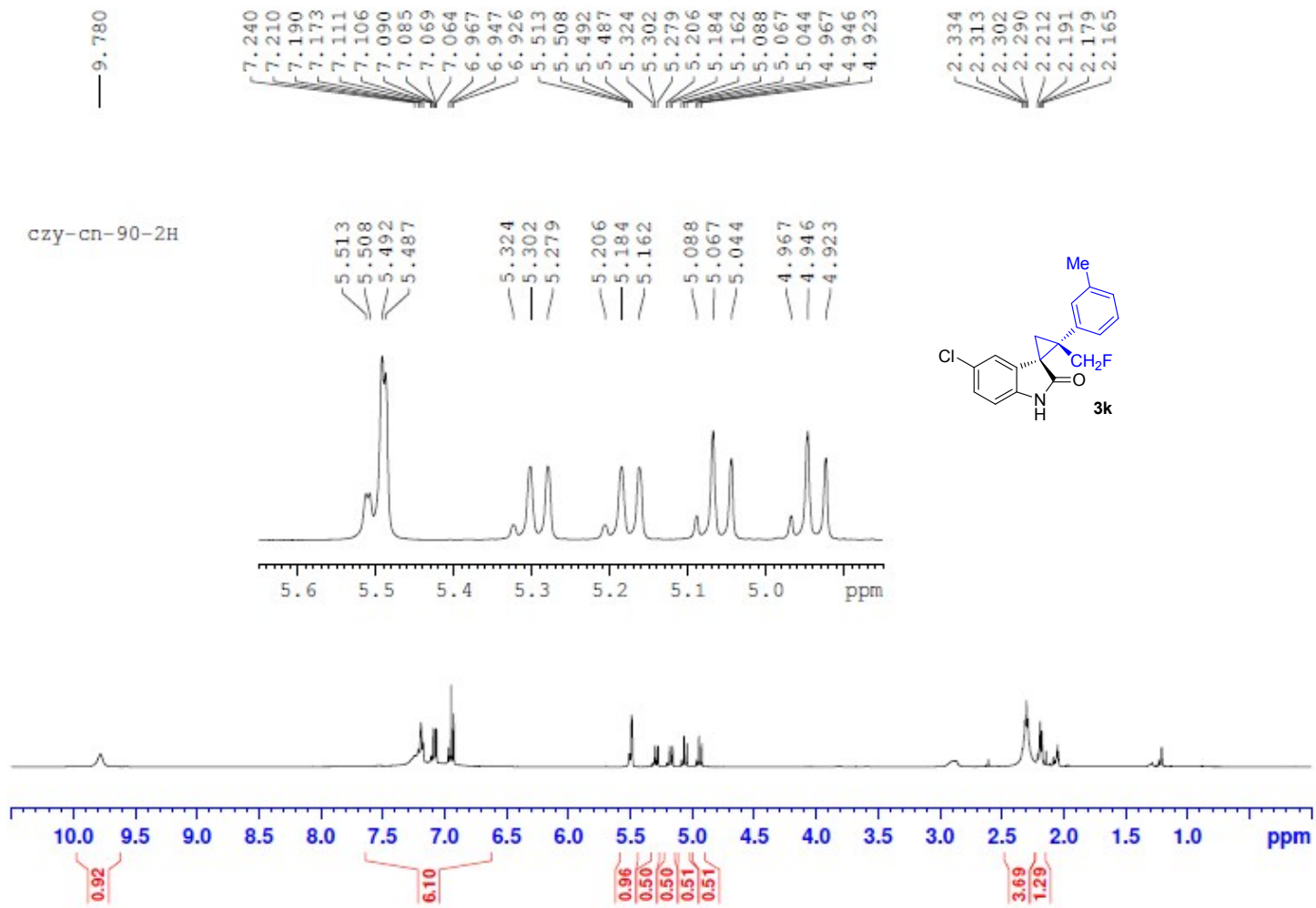
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27.19  
27.12

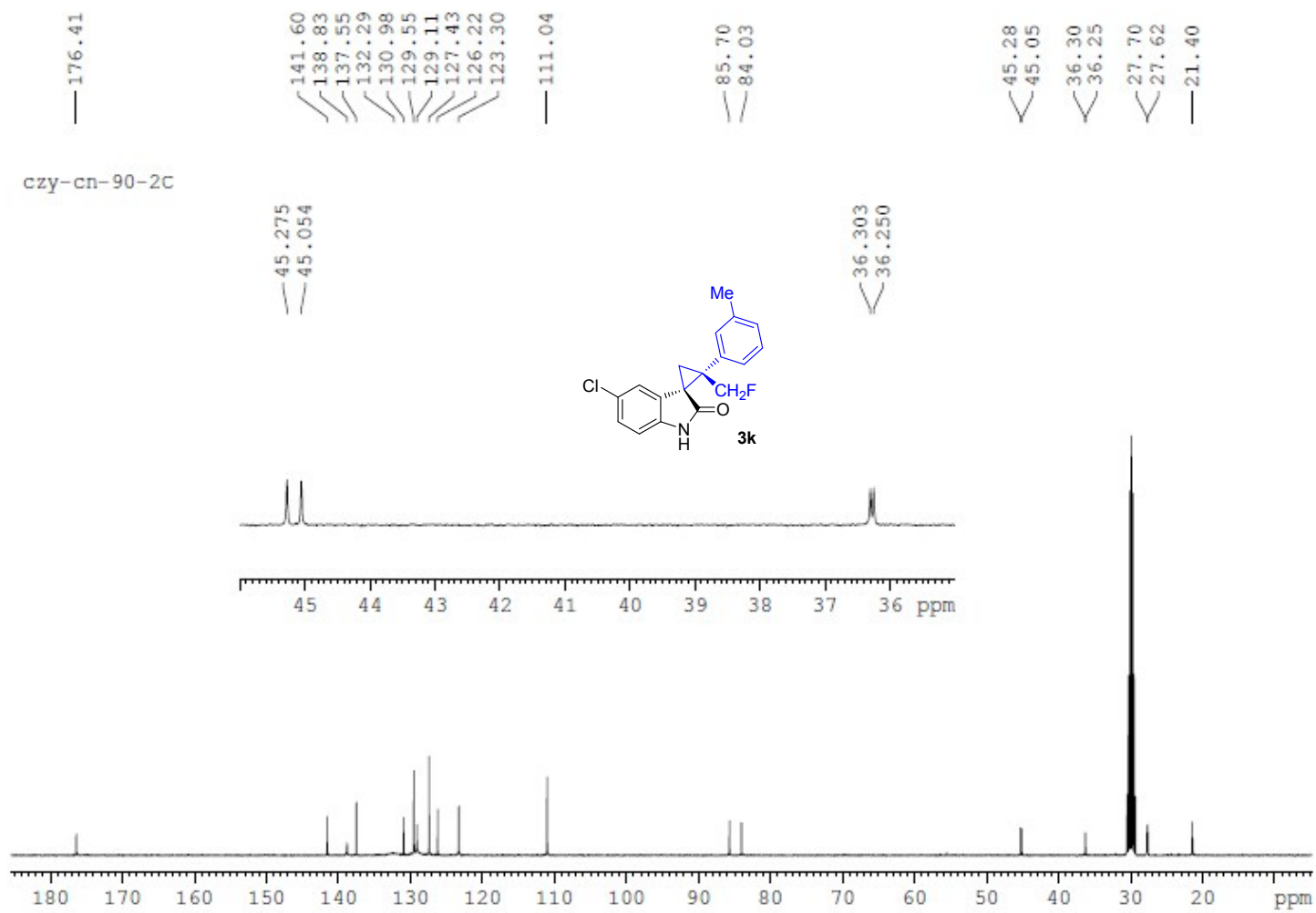
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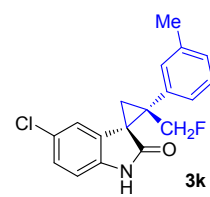




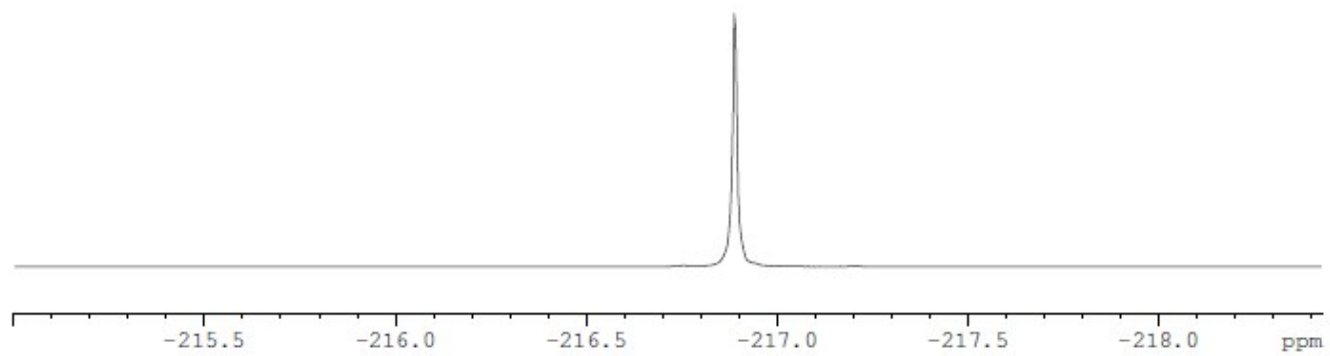


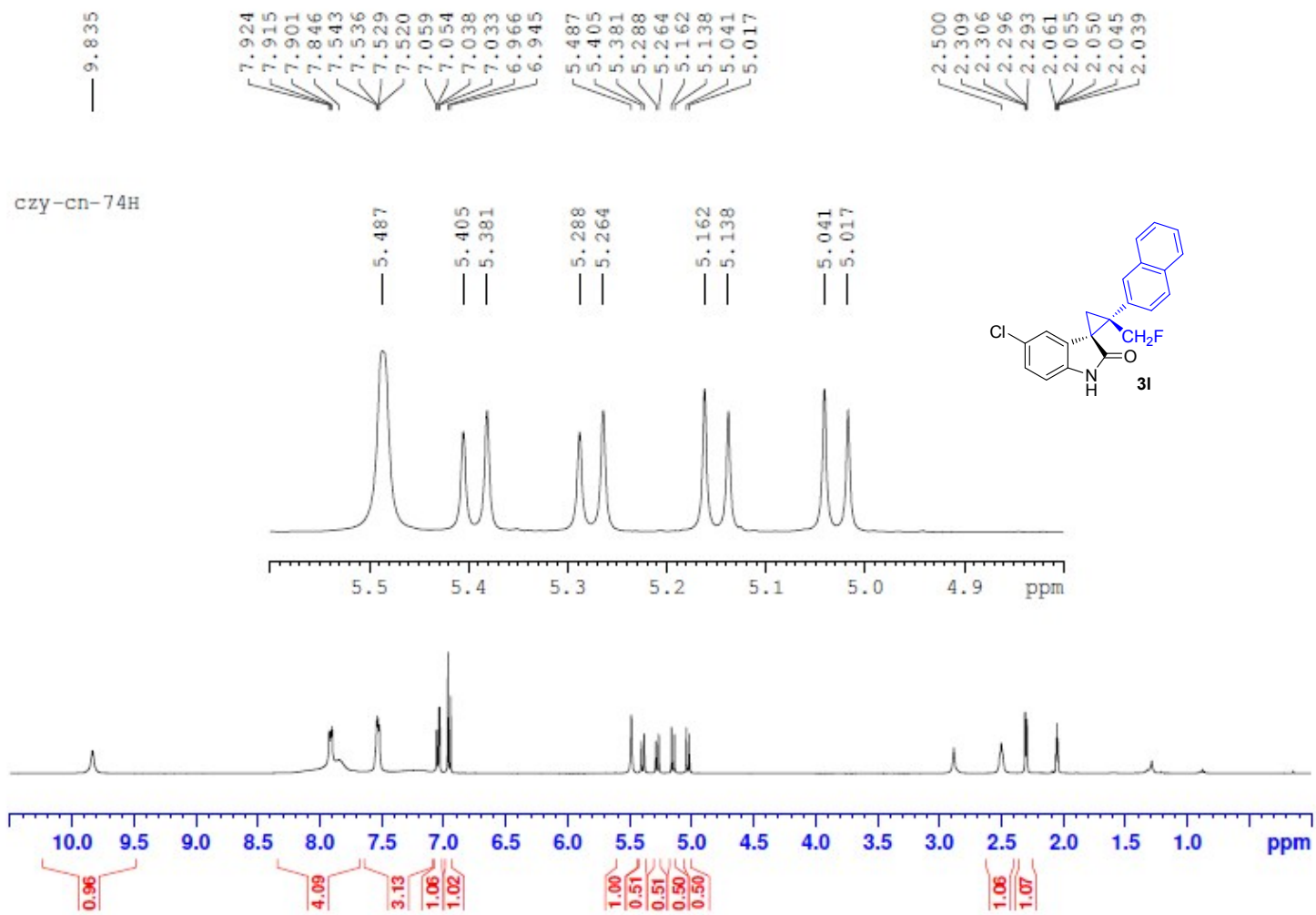


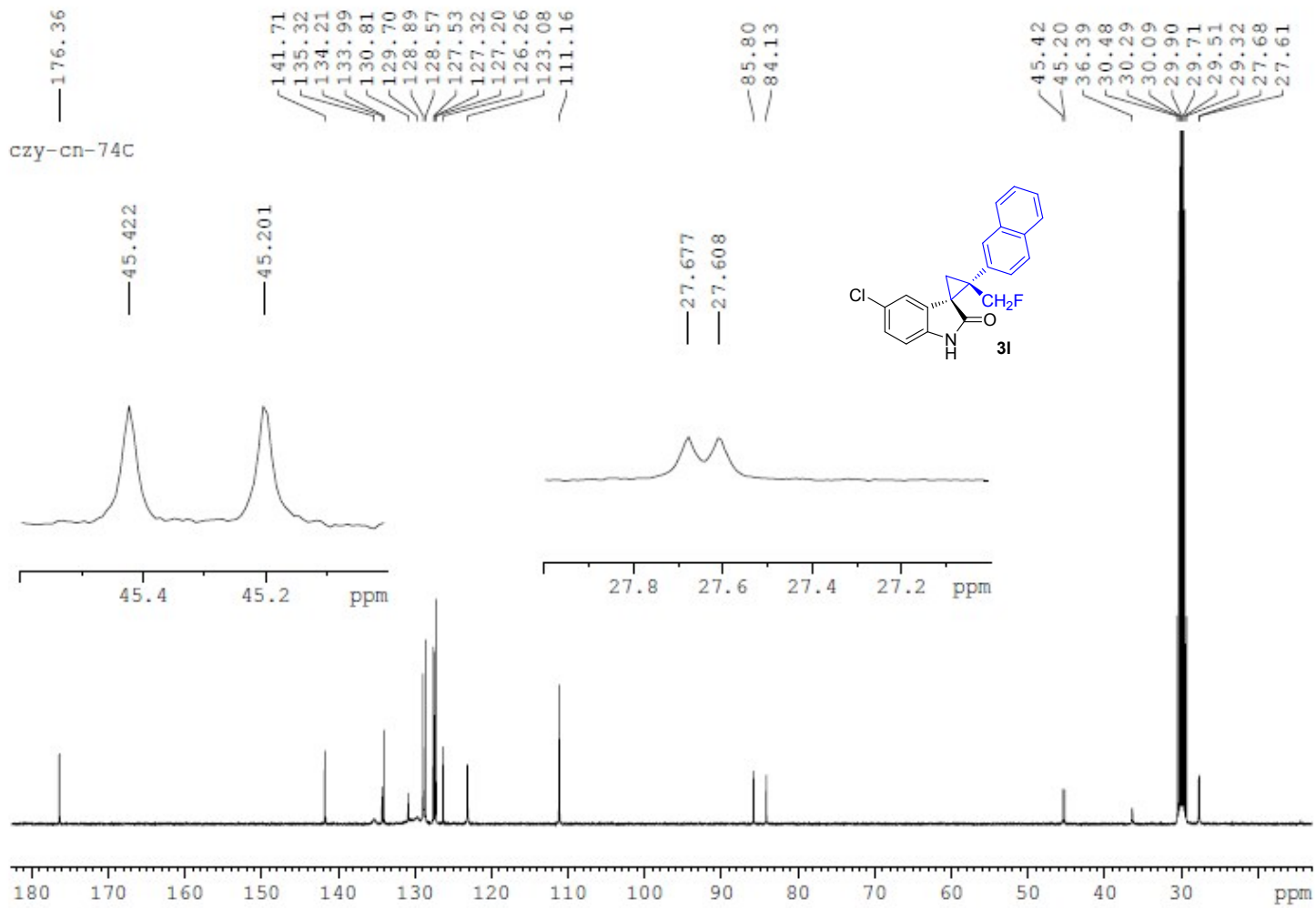
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-216.89

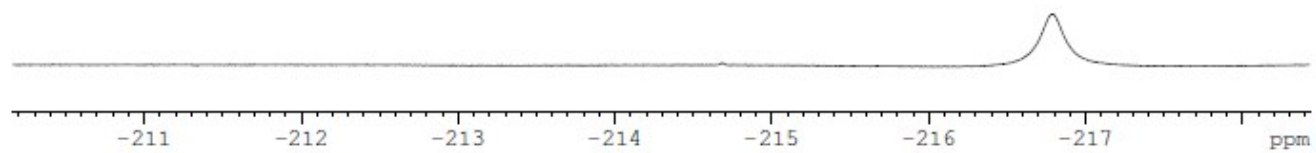
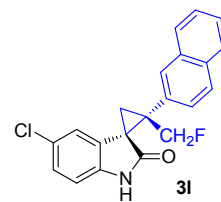


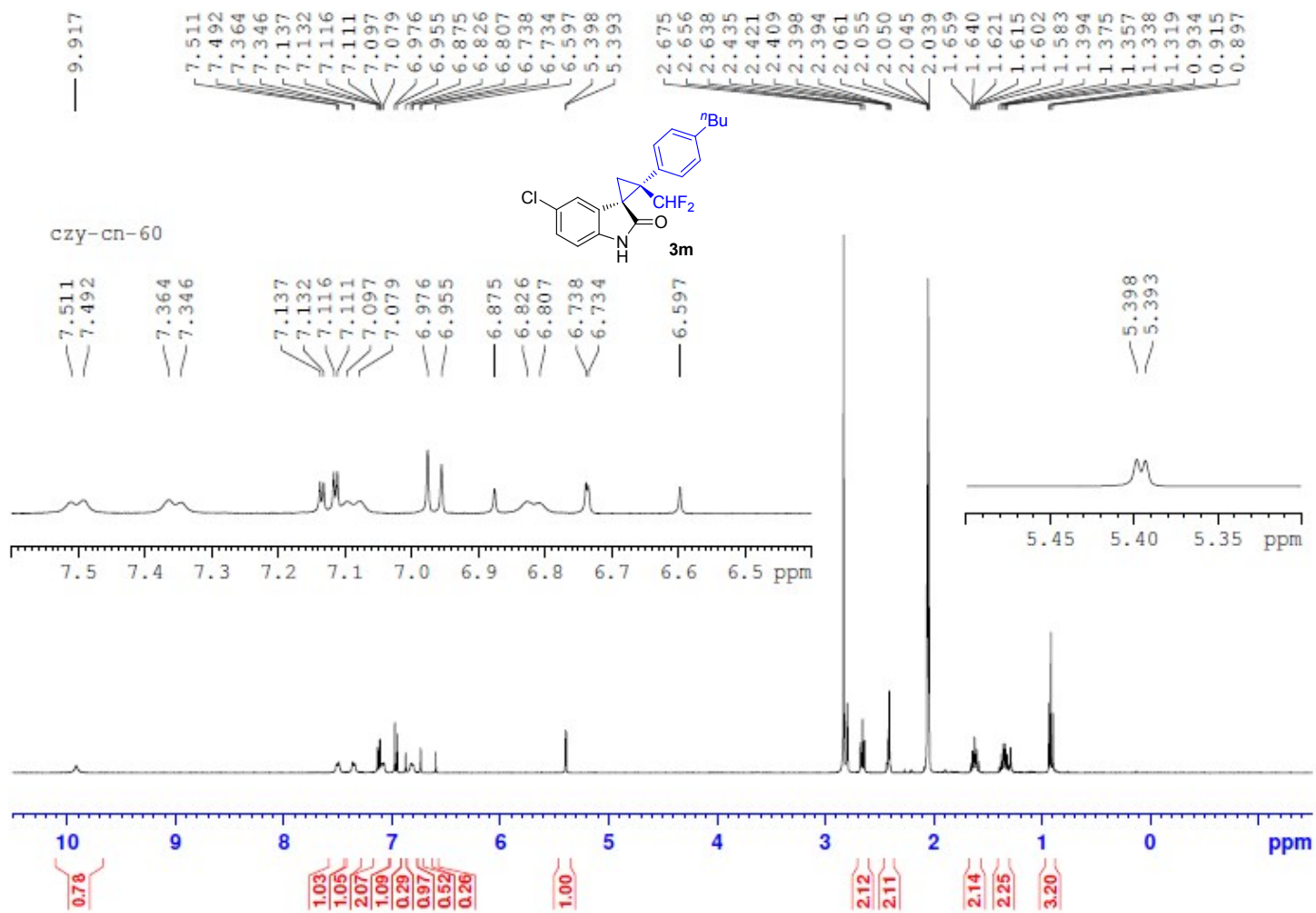




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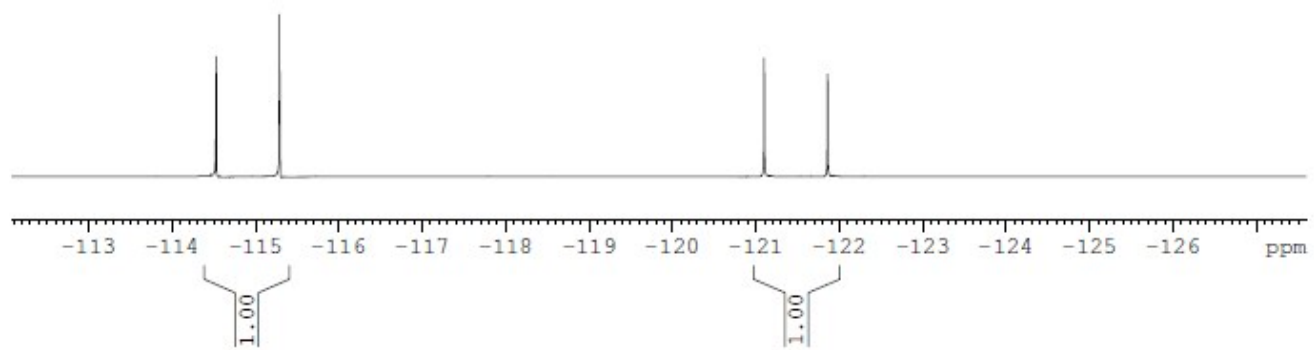
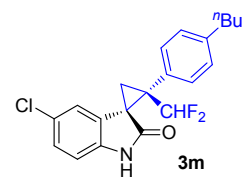


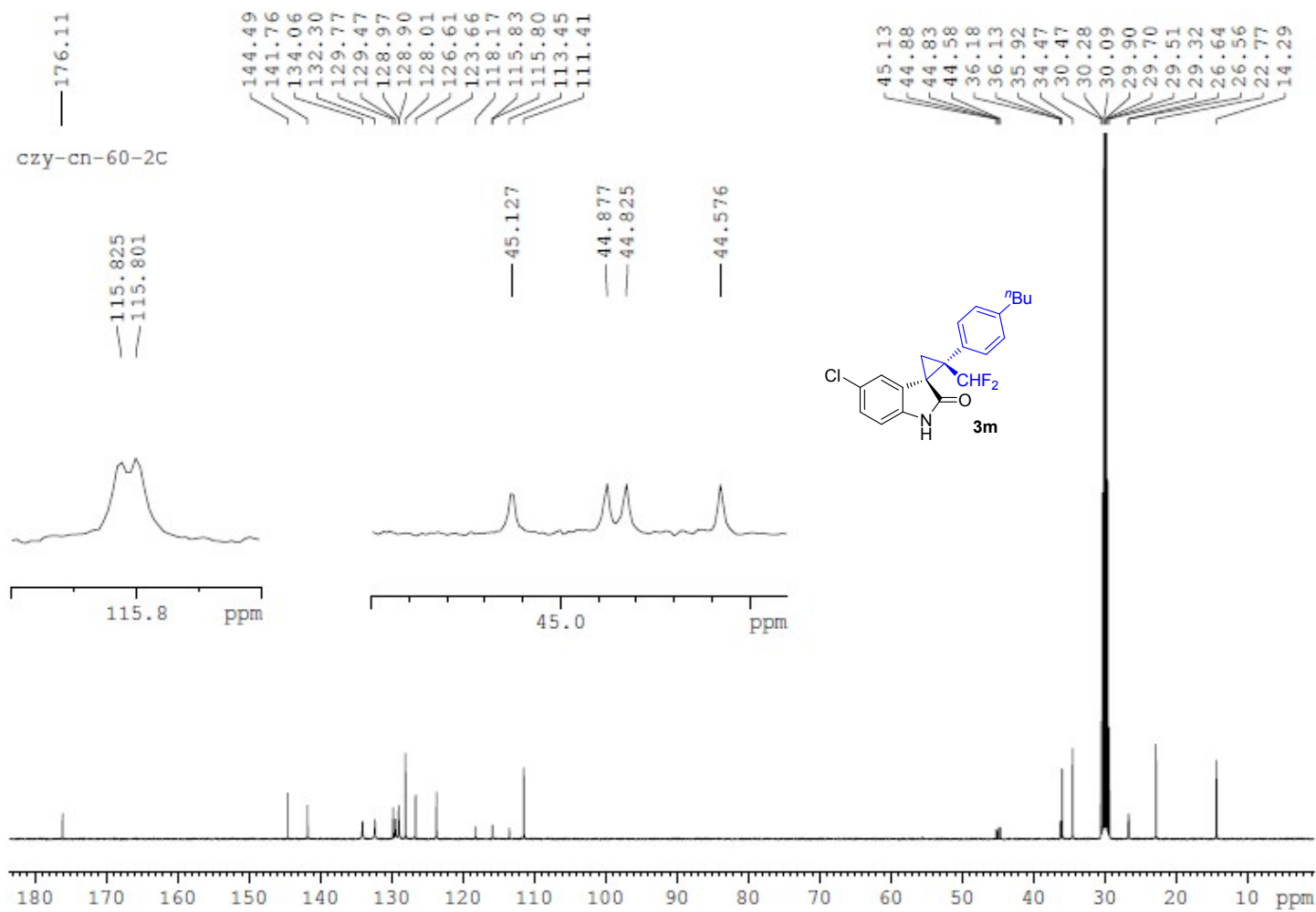


--114.53  
--115.29

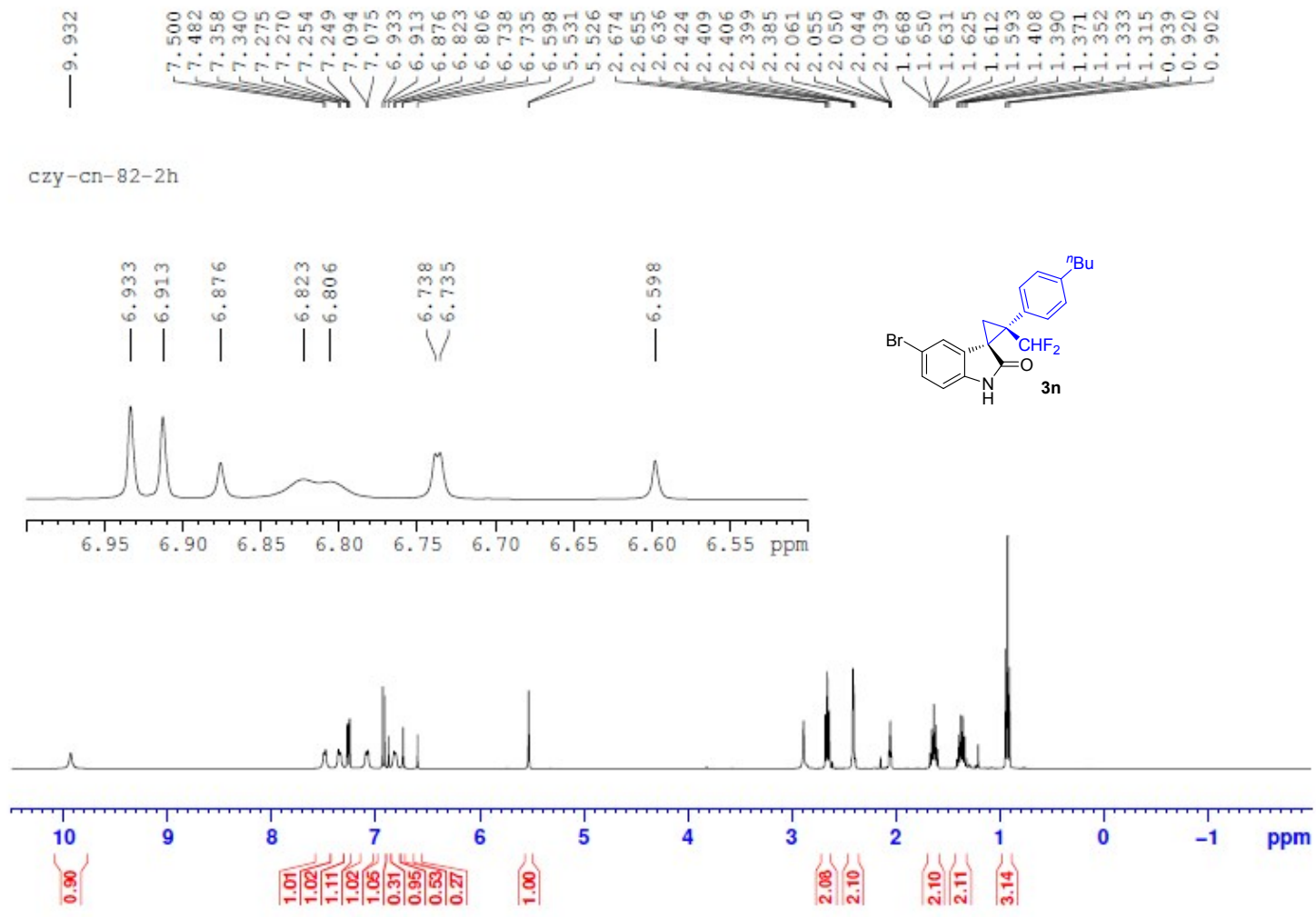
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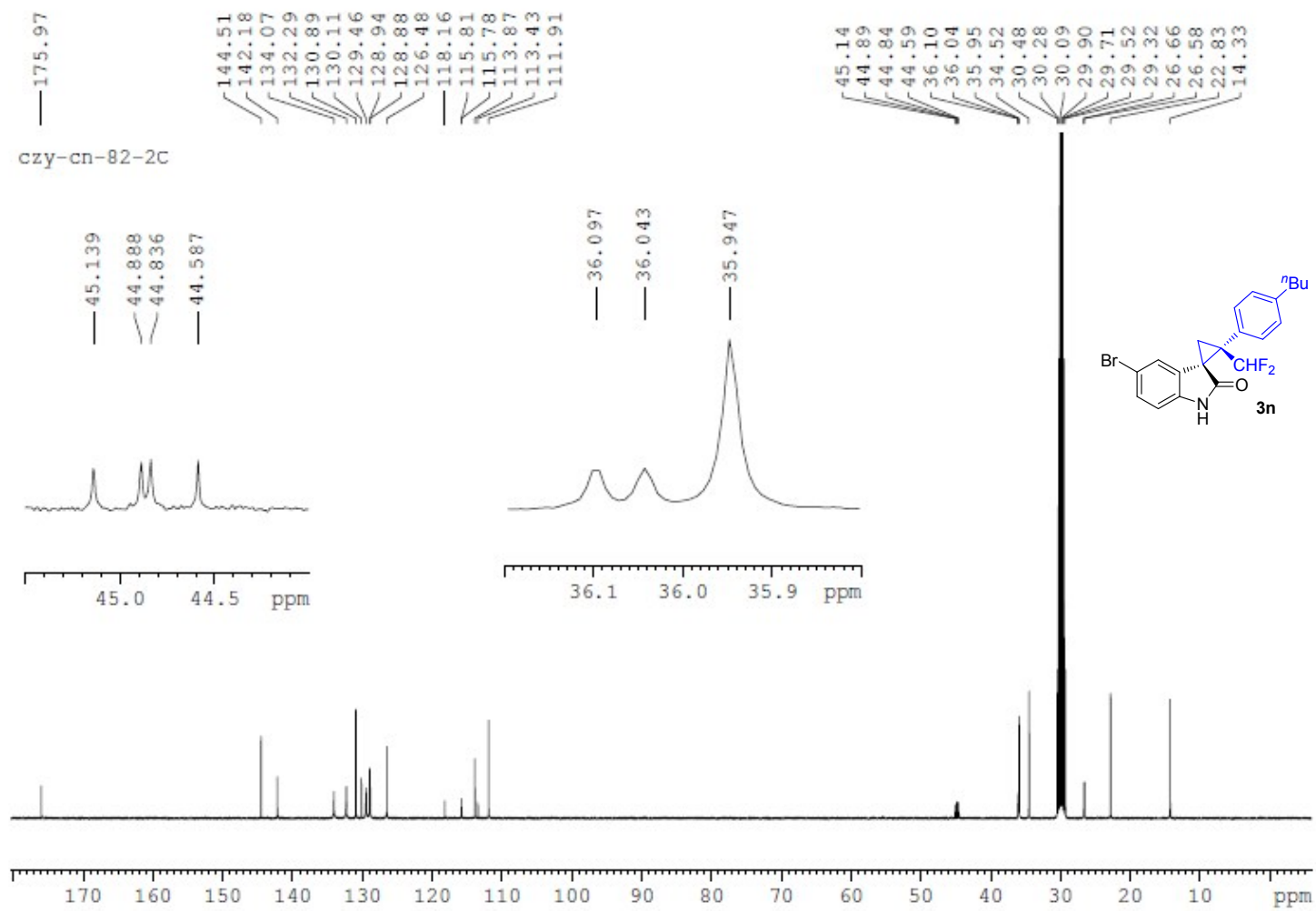
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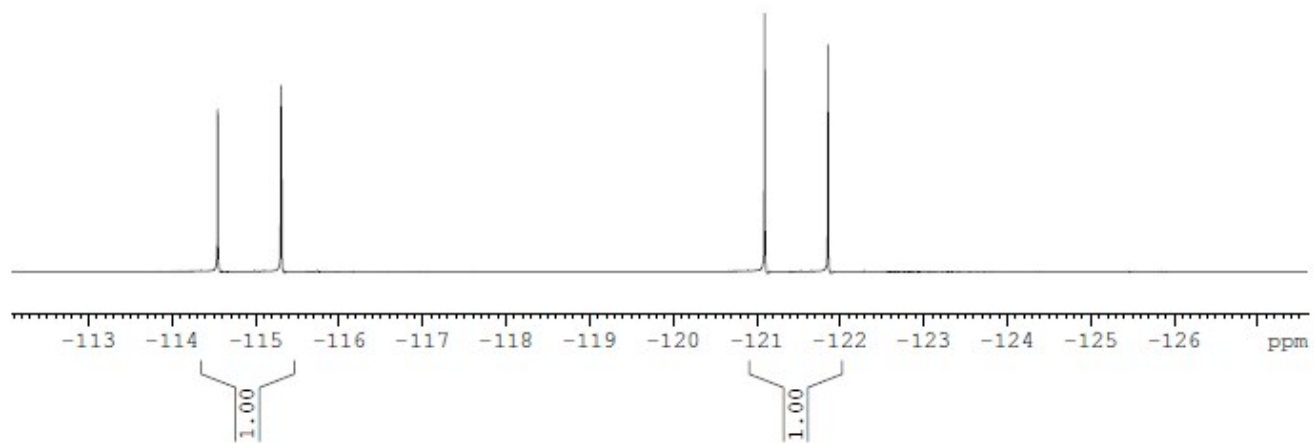
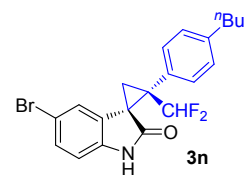


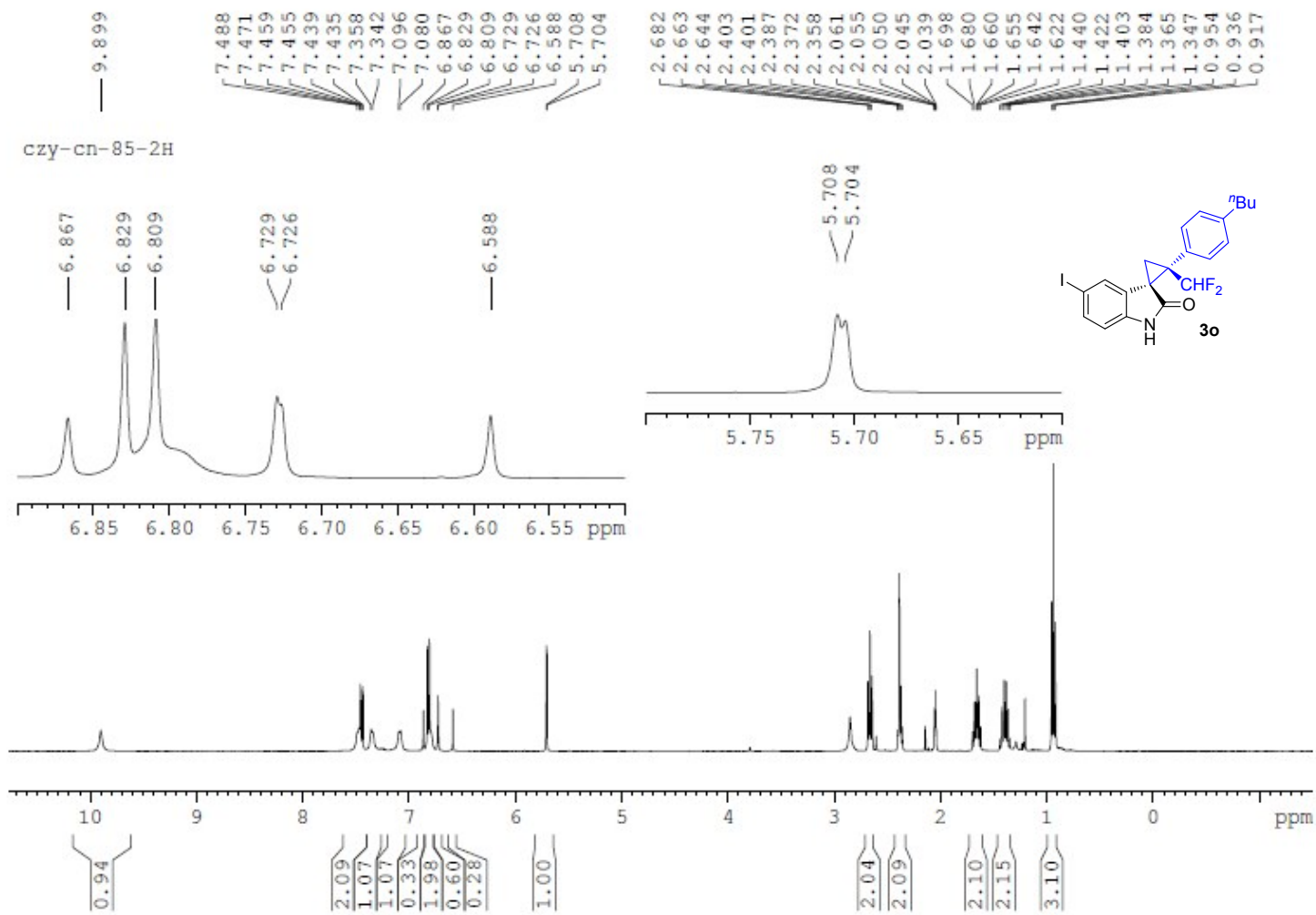


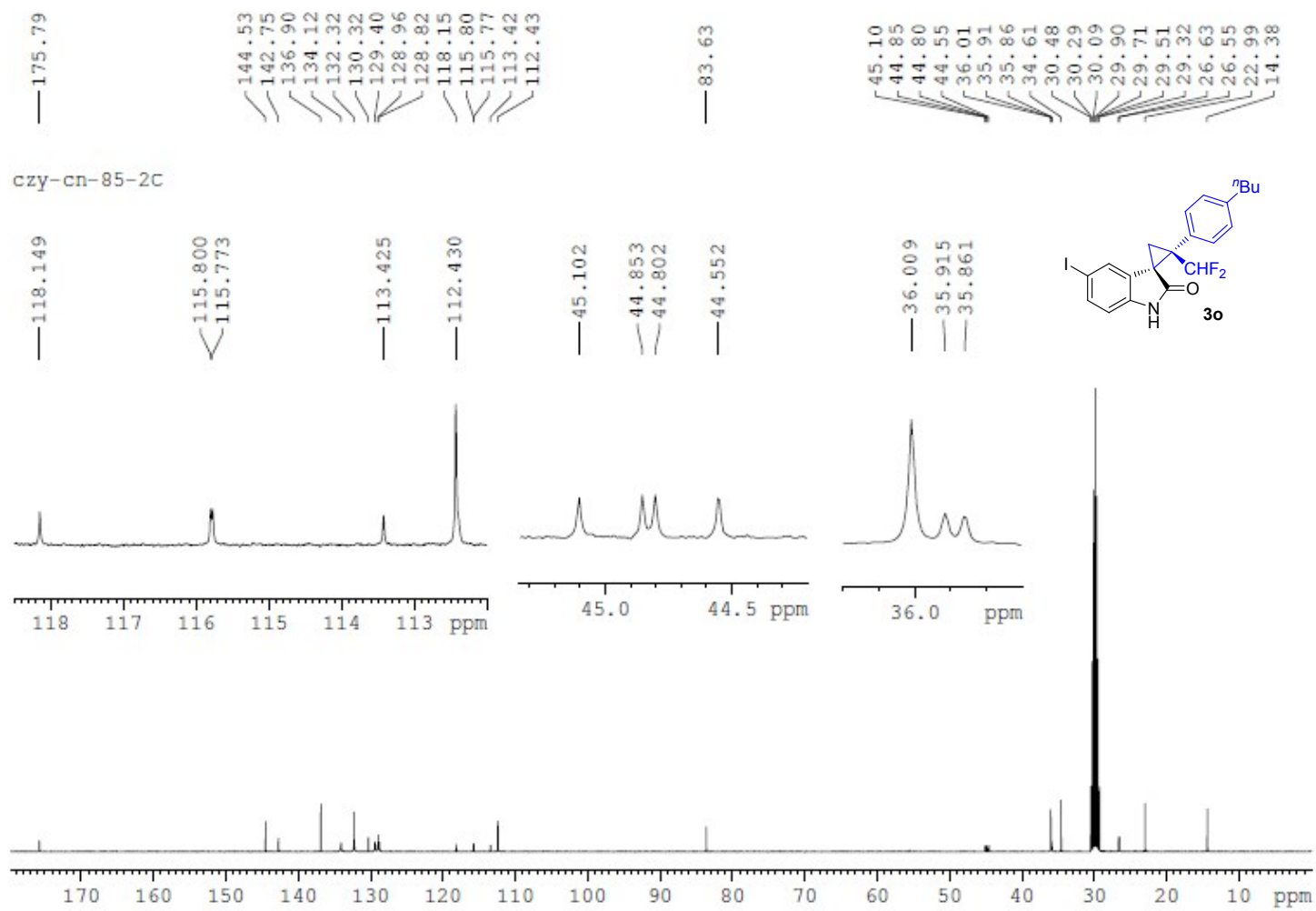
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-121.09  
-121.85

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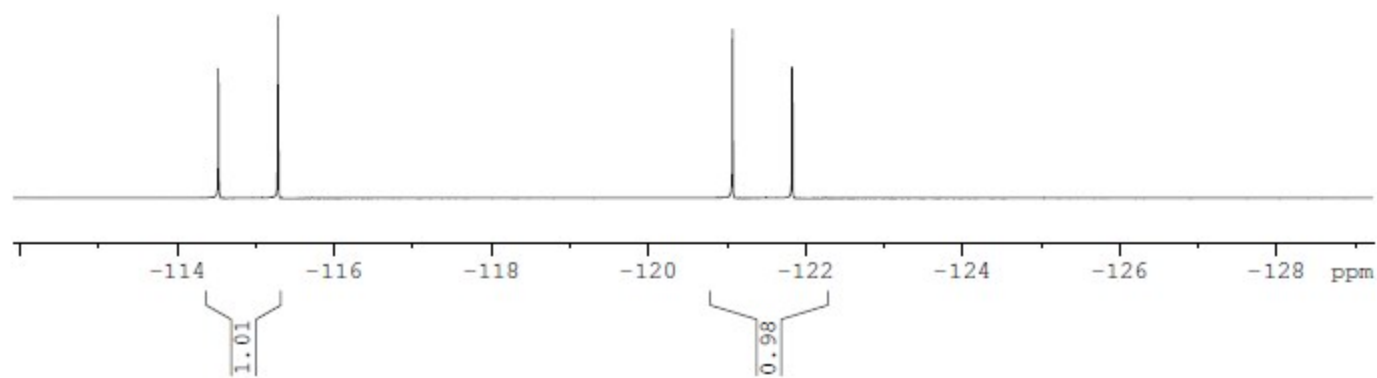
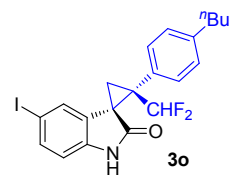


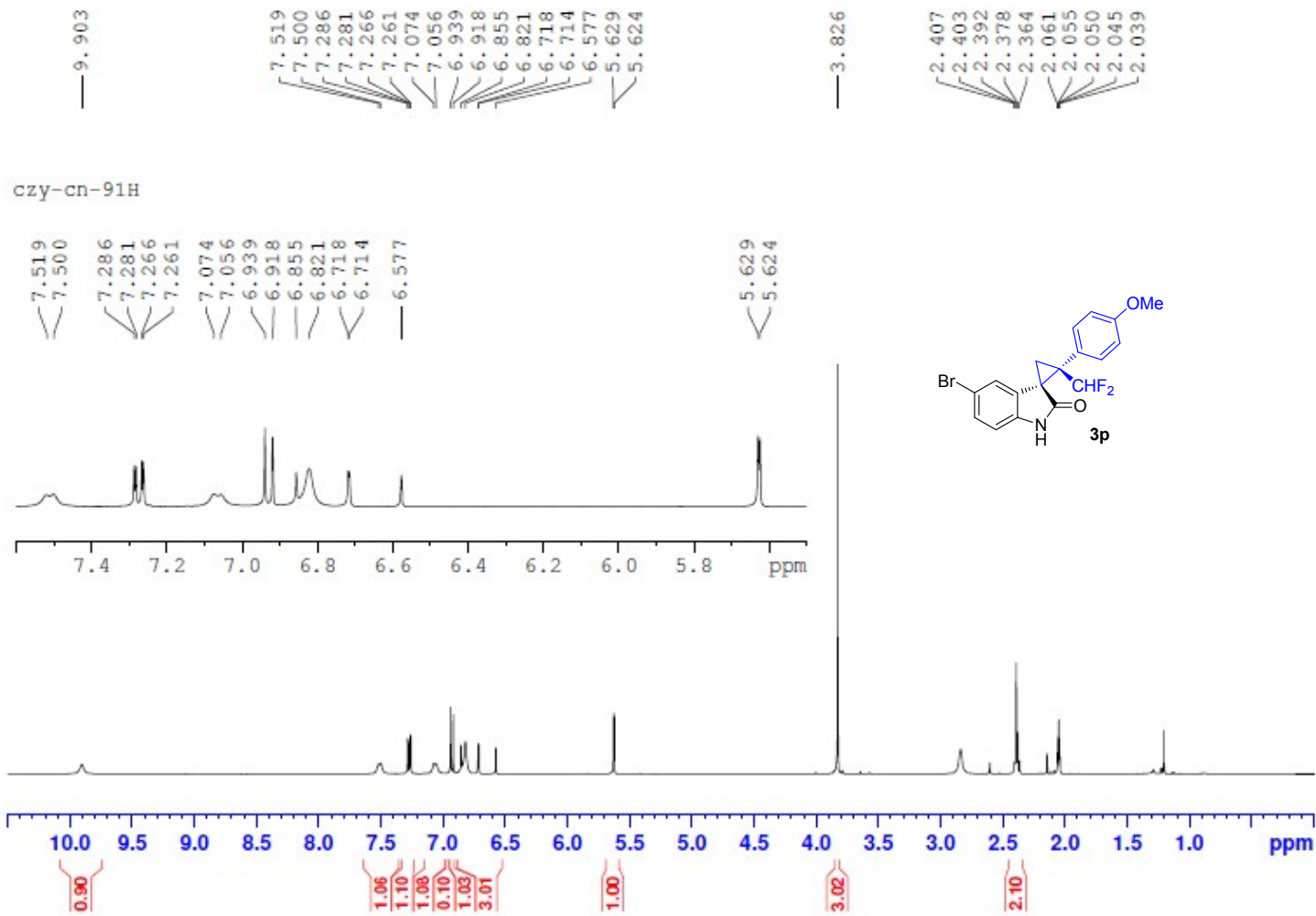


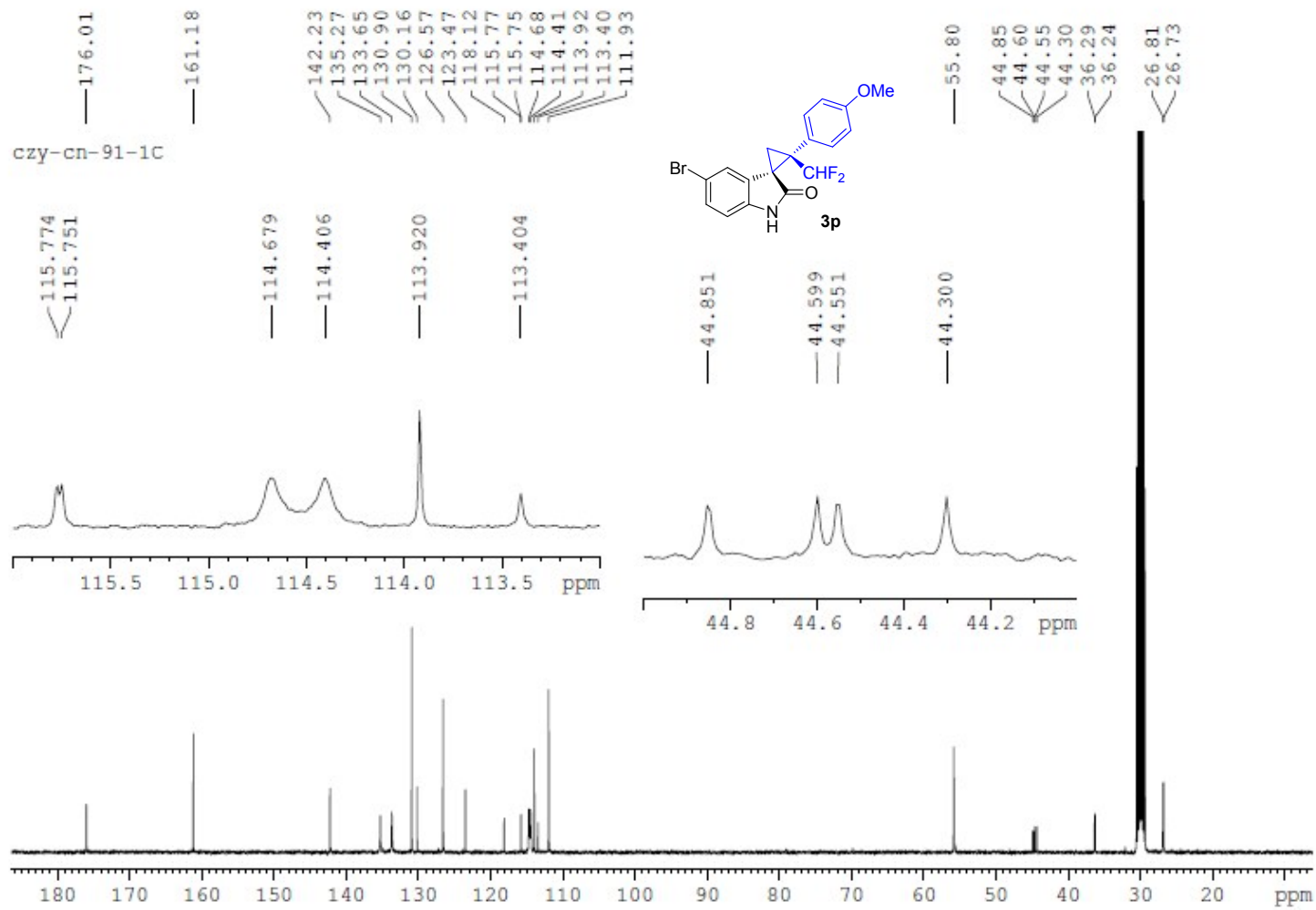
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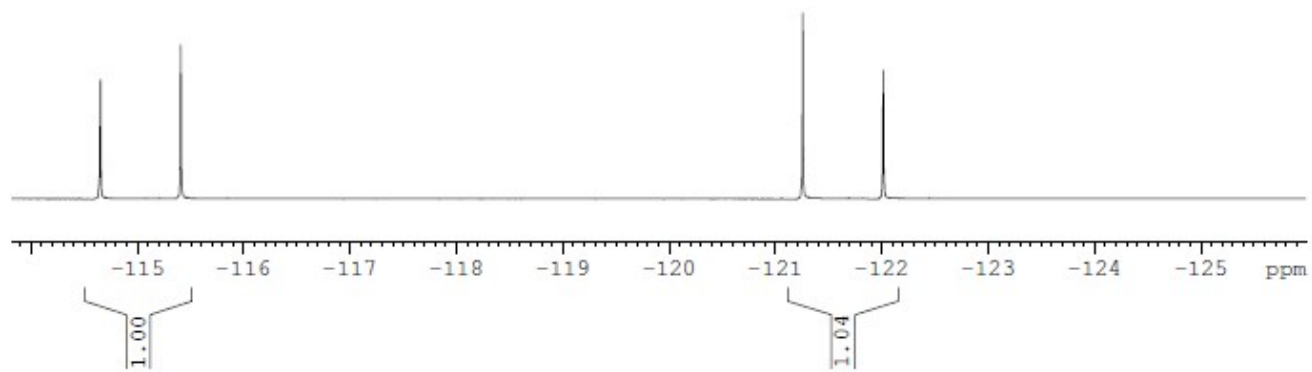
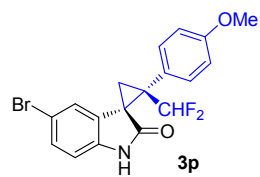
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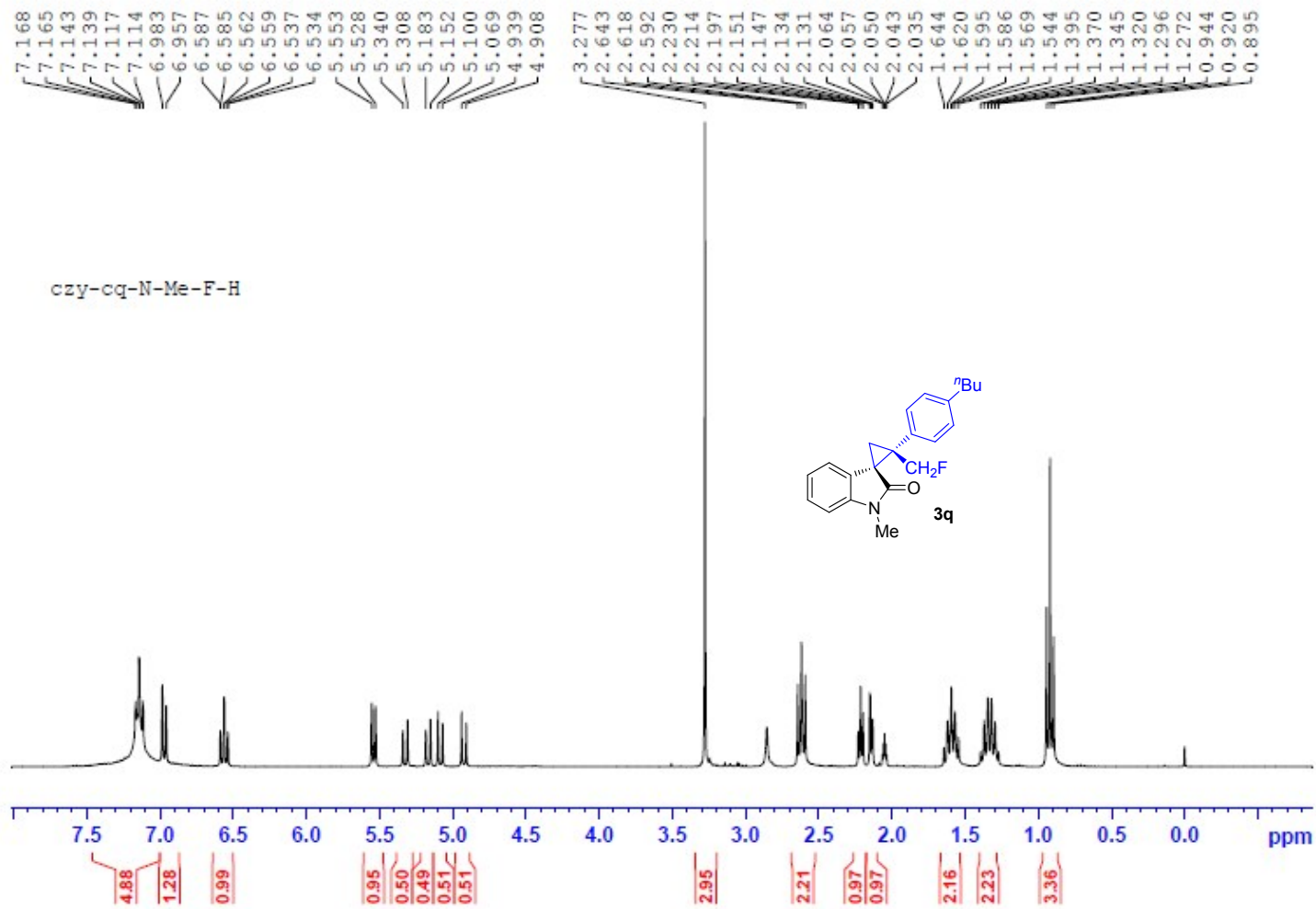
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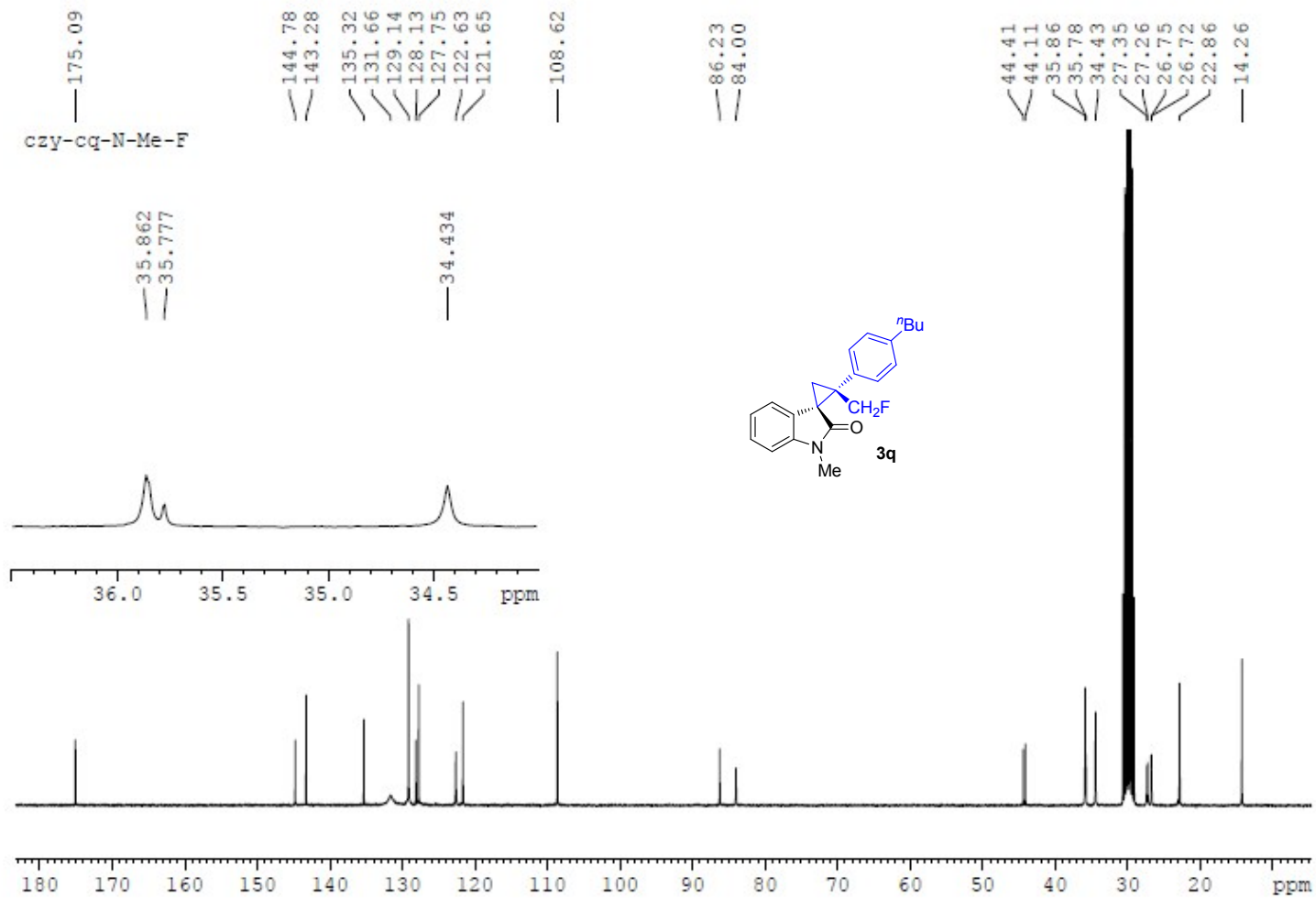
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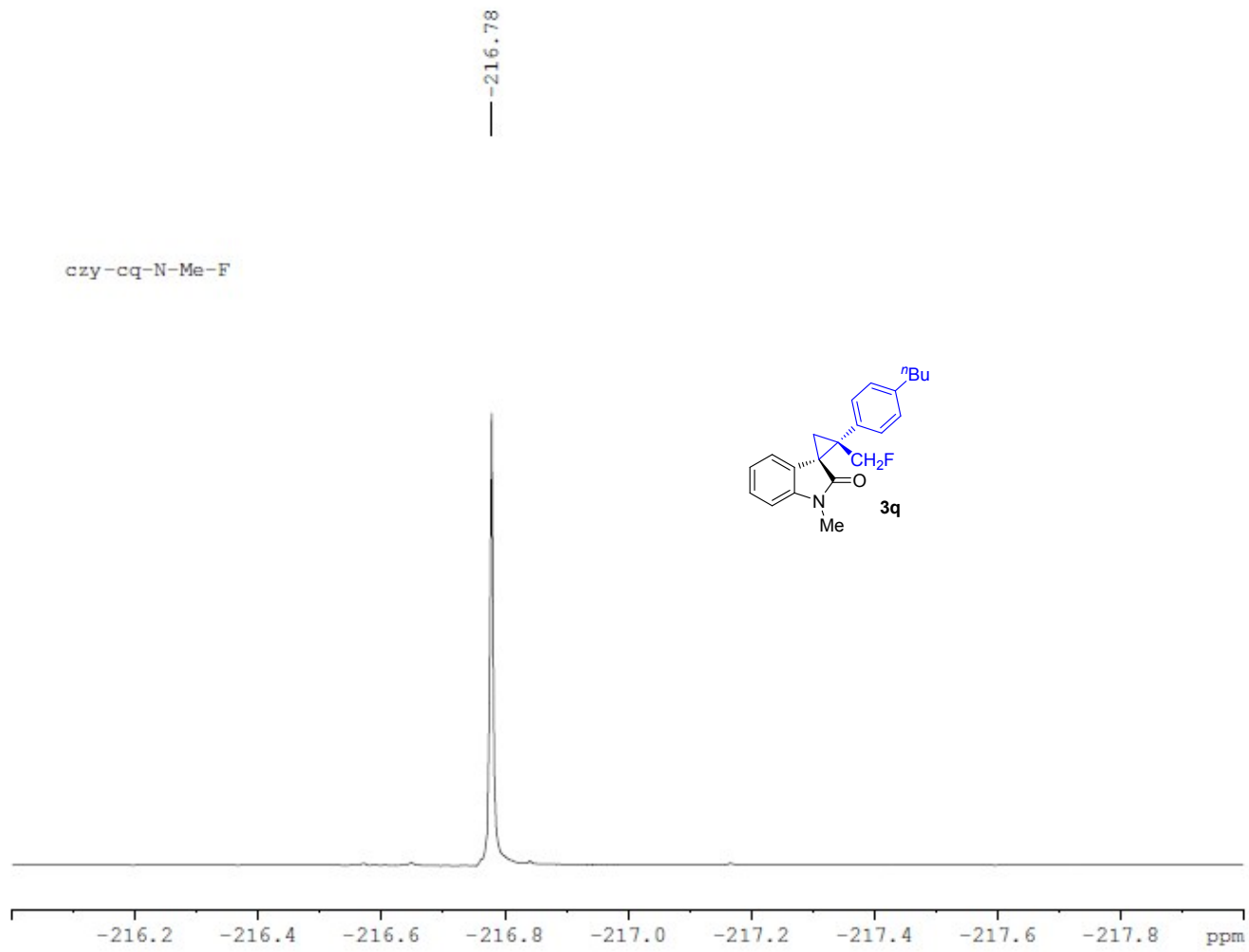
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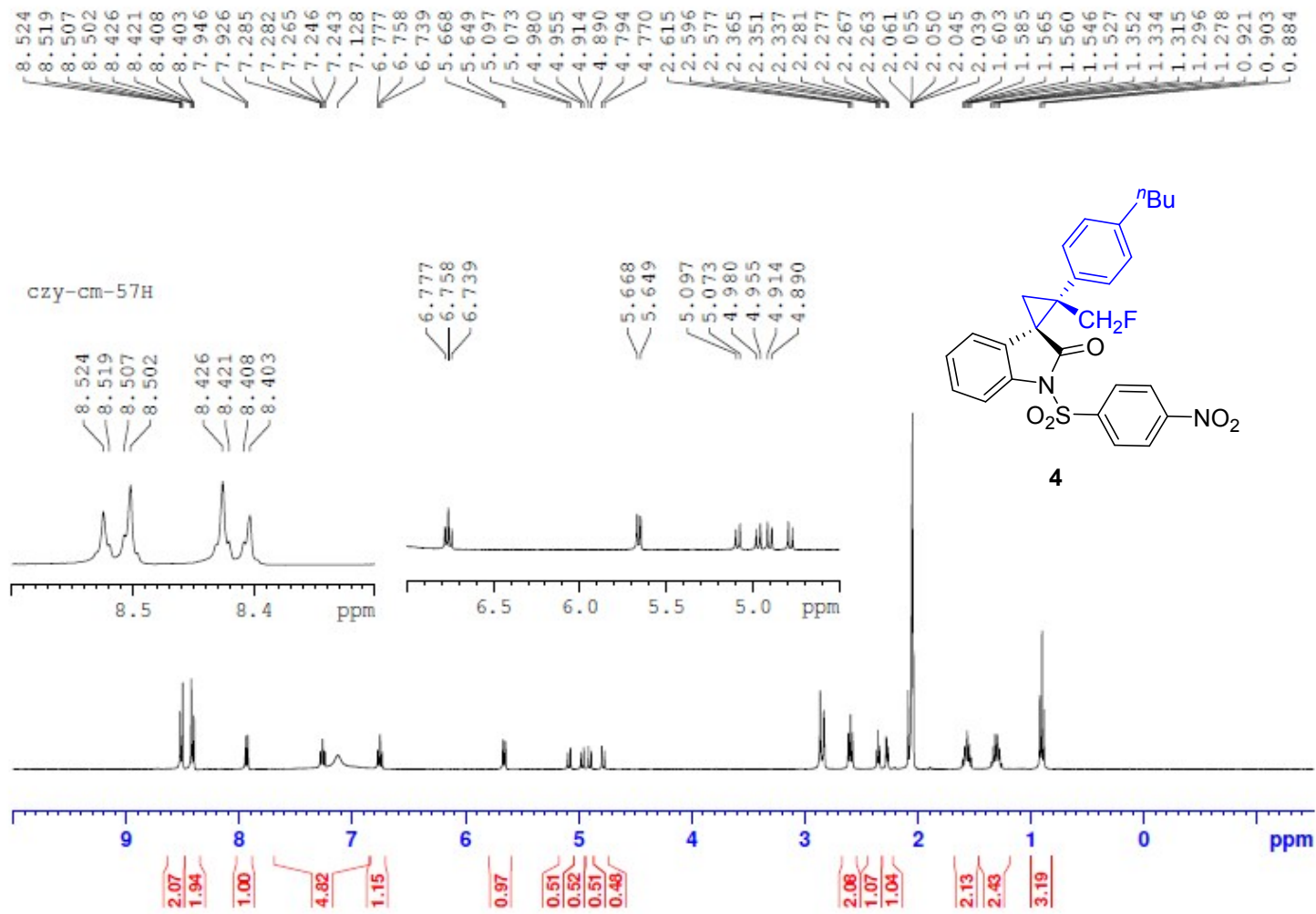
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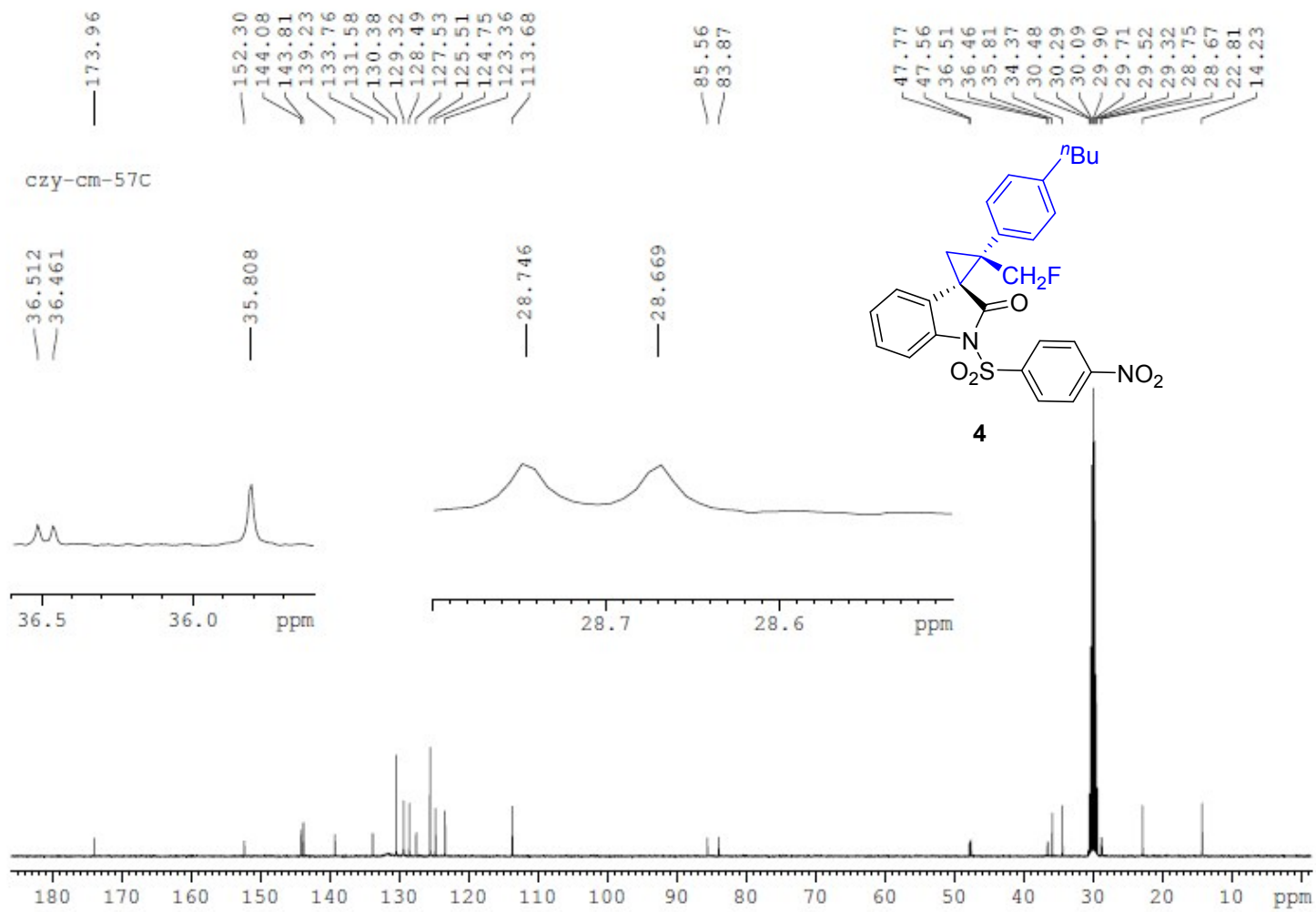






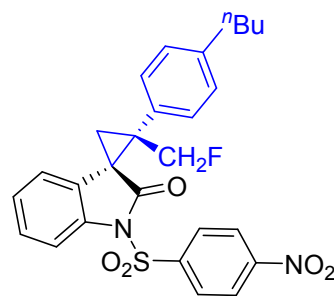




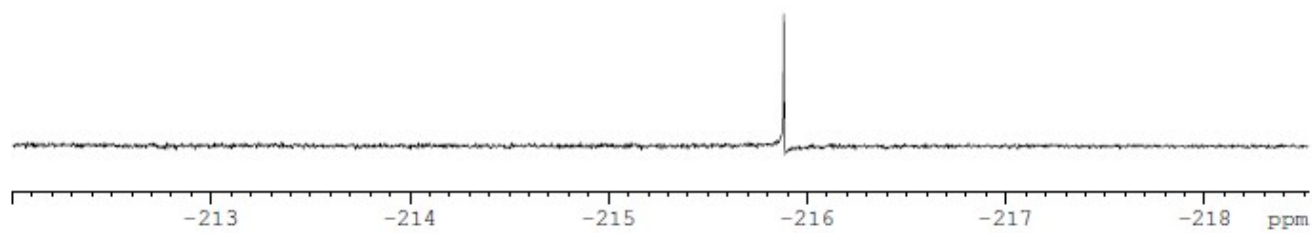


czy-cm-57F

-215.88



4

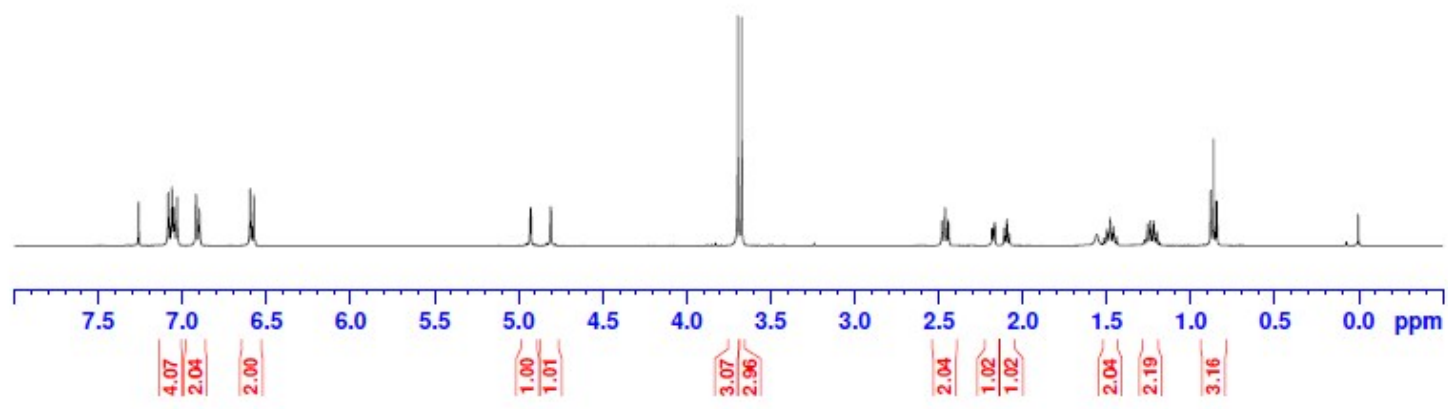
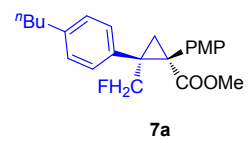


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7.079  
7.067  
7.062  
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6.596  
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6.574

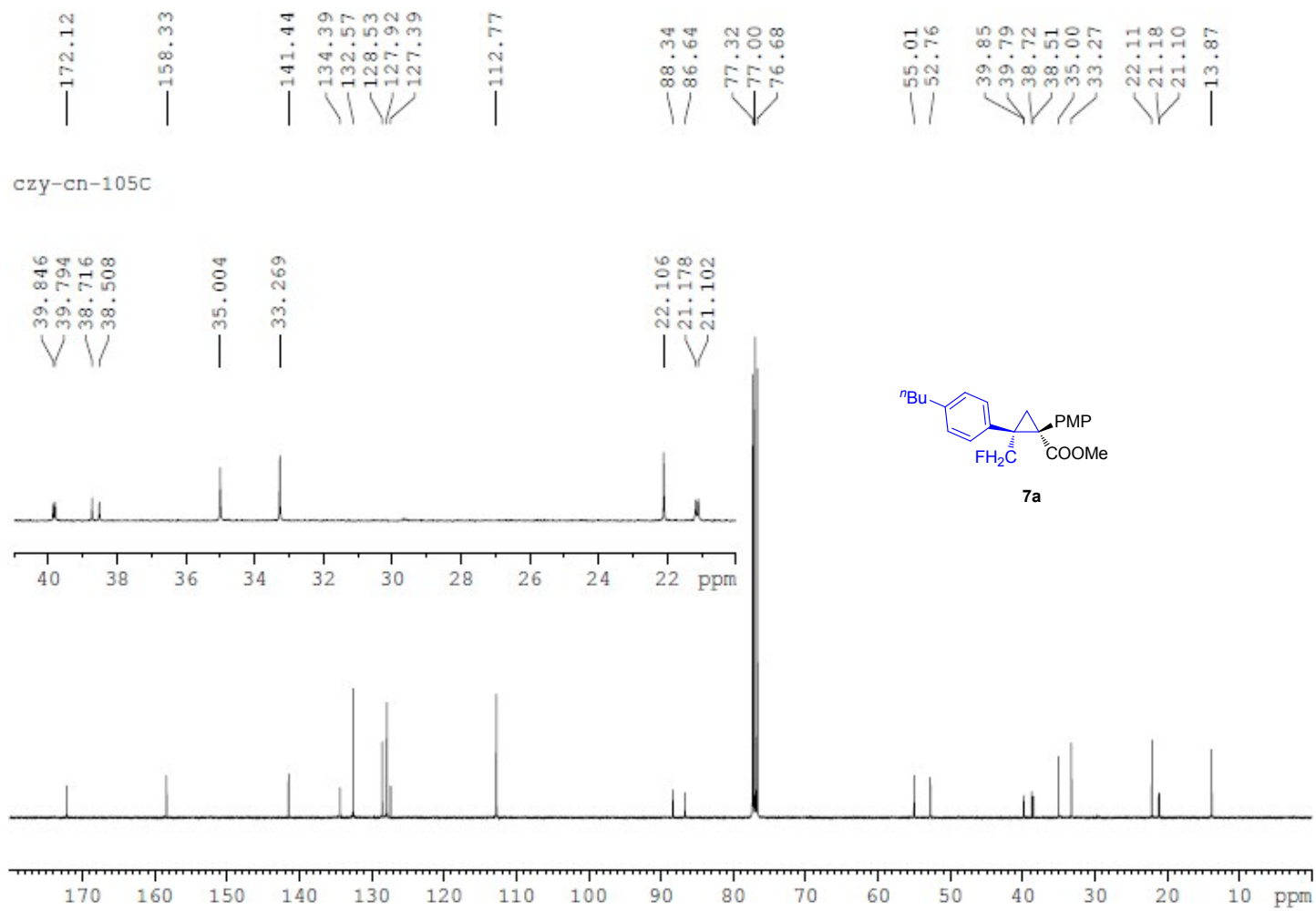
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2.180  
2.169  
2.166  
2.111  
2.095  
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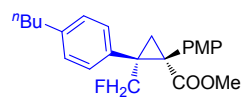
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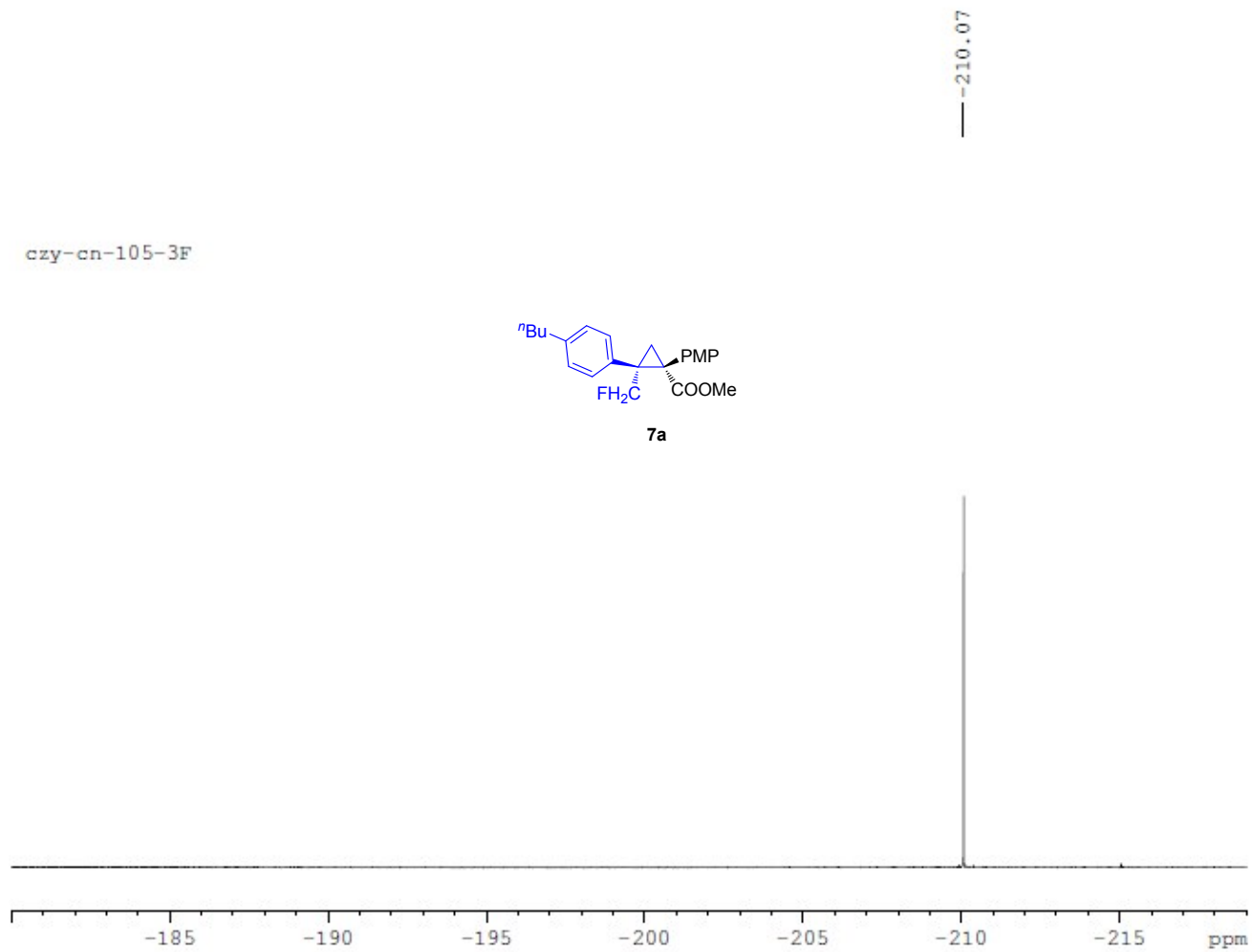




czy-cn-105-3F



7a



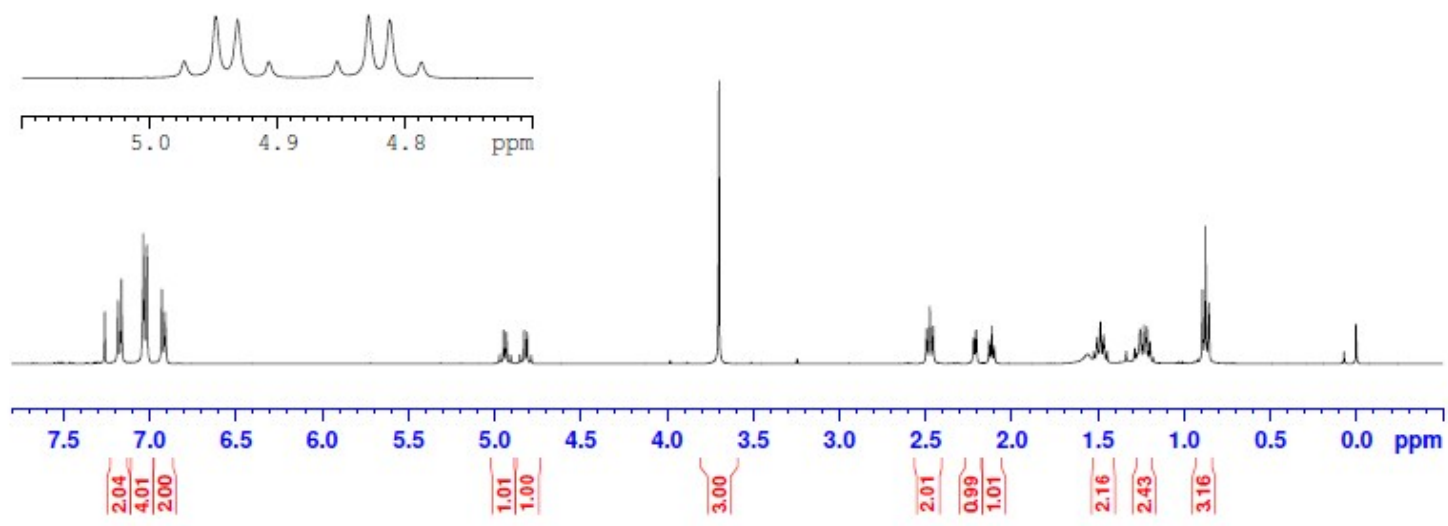
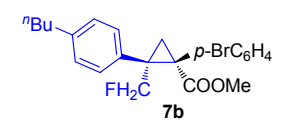
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4.907  
4.854  
4.829  
4.812  
4.788

3.700  
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2.476  
2.457  
2.221  
2.207  
2.132  
2.117  
2.102  
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1.506  
1.487  
1.468  
1.449  
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1.273  
1.258  
1.236  
1.217  
1.199  
1.181  
0.876  
0.858

czy-cn-110-1H

4.973  
4.949  
4.932  
4.907  
4.854  
4.829  
4.812  
4.788



171.33

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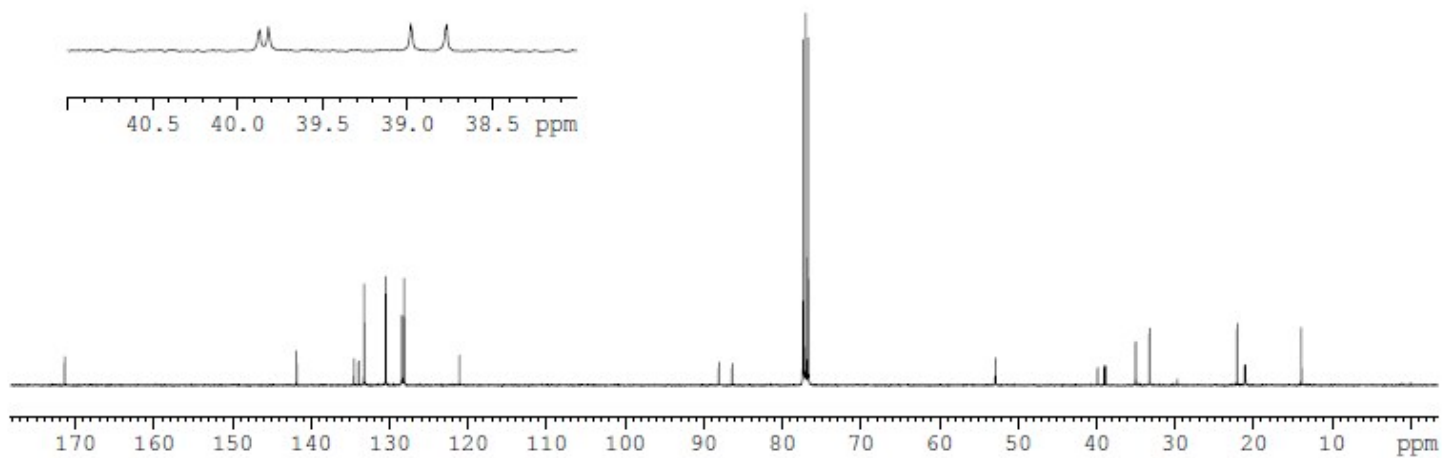
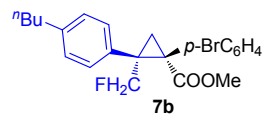
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52.86  
39.87  
39.82  
38.98  
38.77  
34.99  
33.22  
22.06  
21.09  
21.01  
13.90

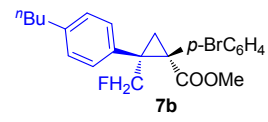
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39.869  
39.816

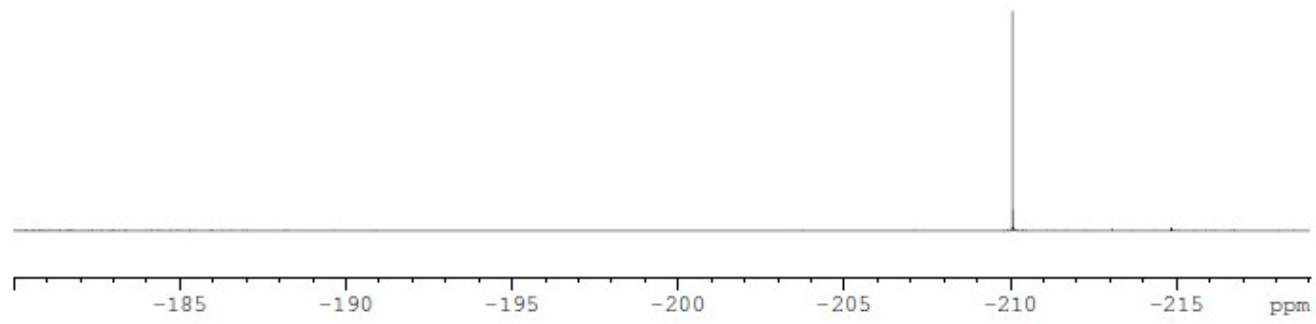
38.977  
38.768

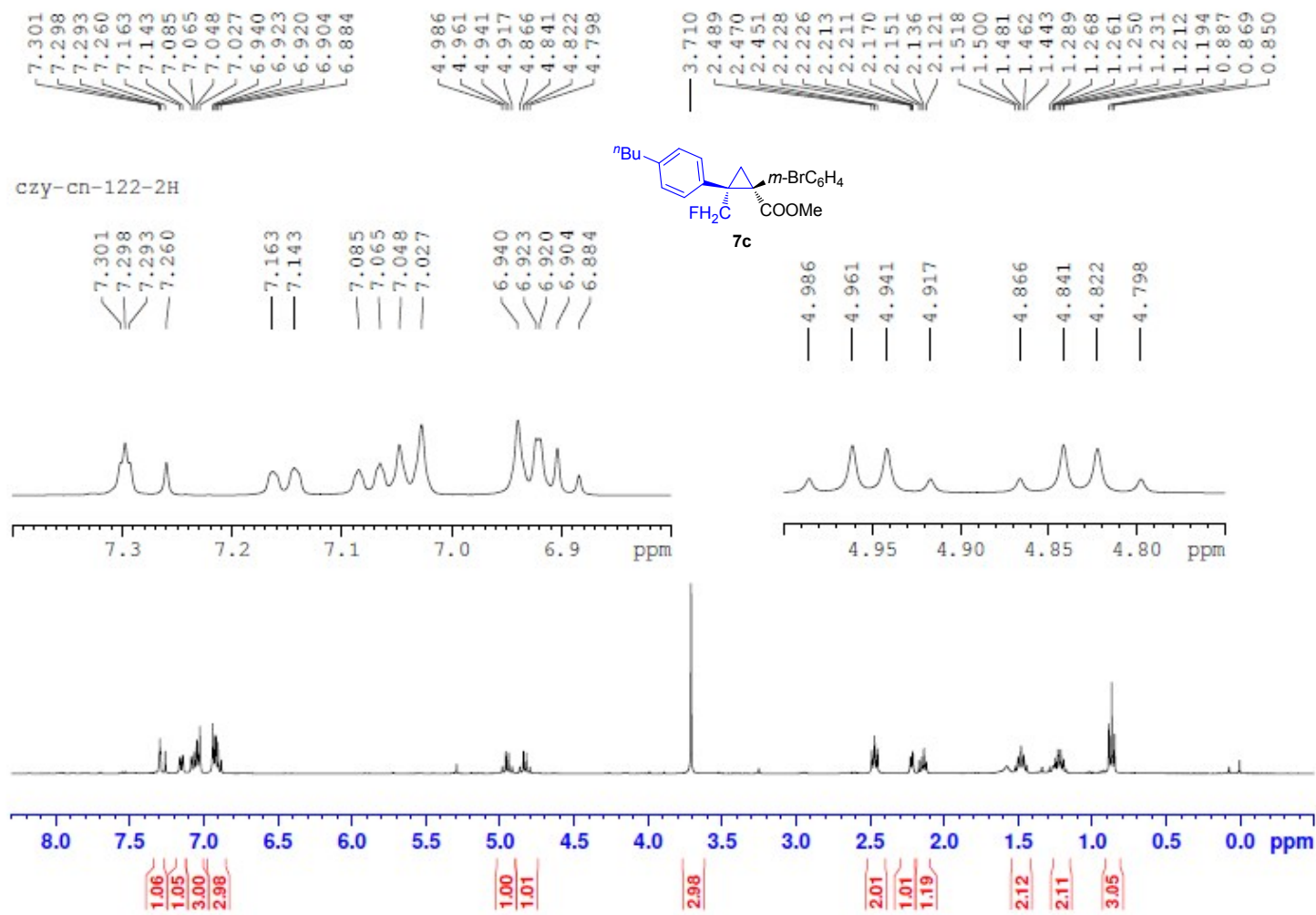


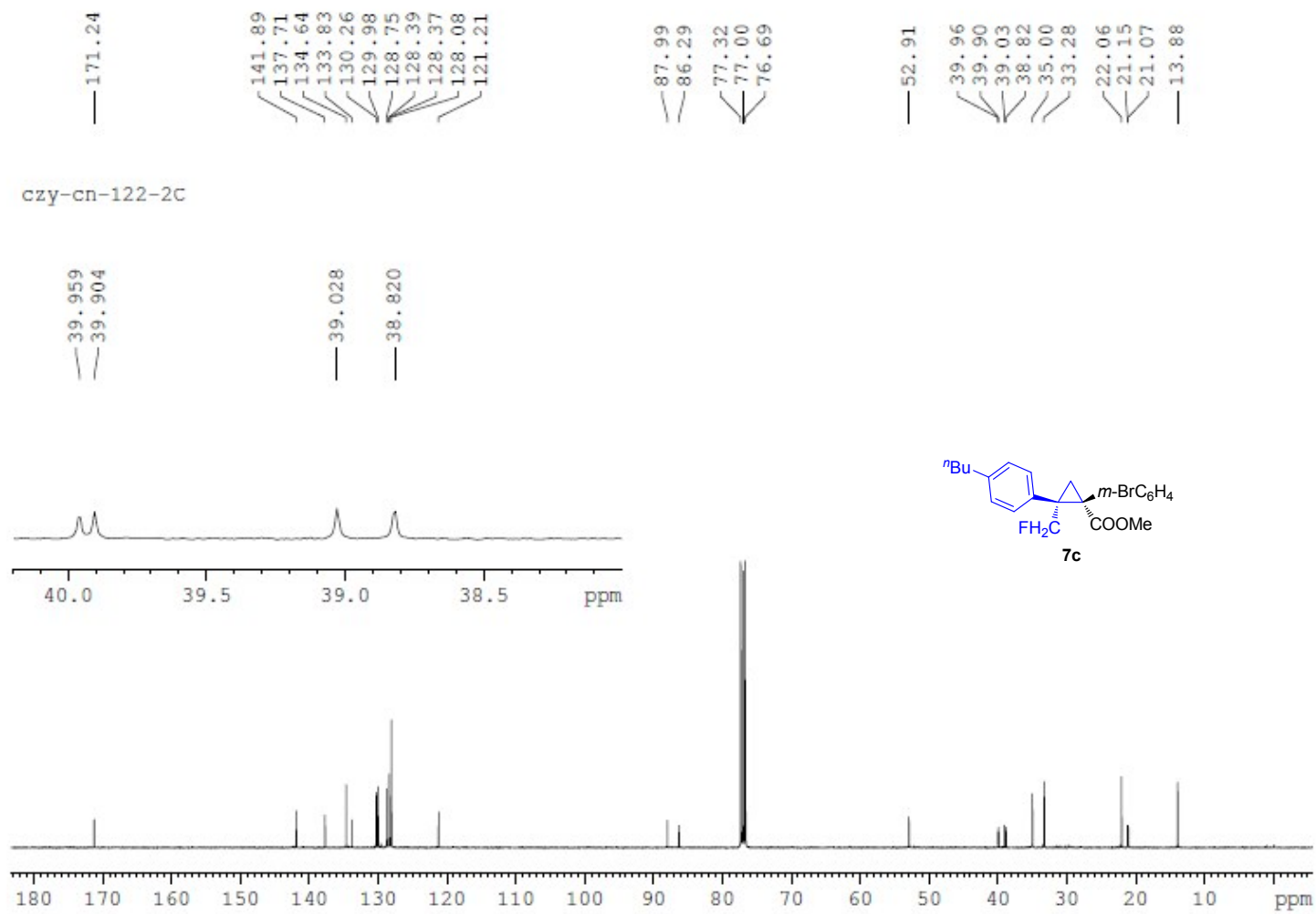
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-210.06

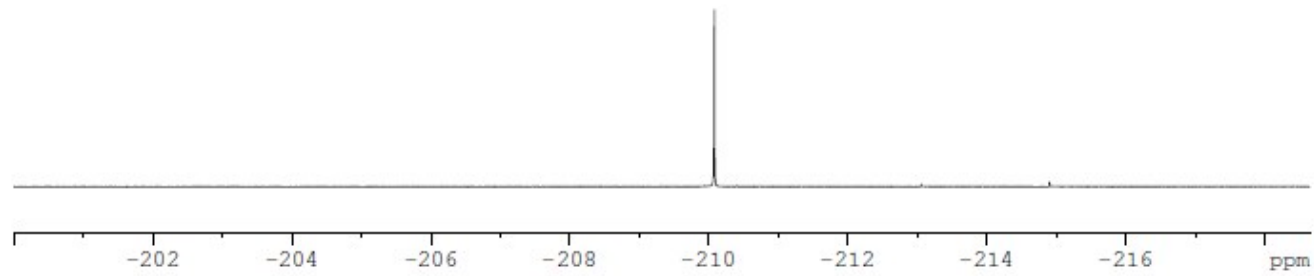
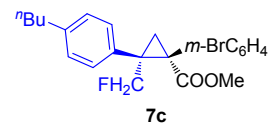






czy-cn-122-2F

-210.08





7.198  
7.177  
7.147  
7.130  
7.110  
7.093  
7.063  
7.042

4.978  
4.953  
4.947  
4.922  
4.858  
4.833  
4.828  
4.802

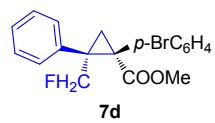
3.708

2.250  
2.235  
2.166  
2.151  
2.136

czy-cn-146H

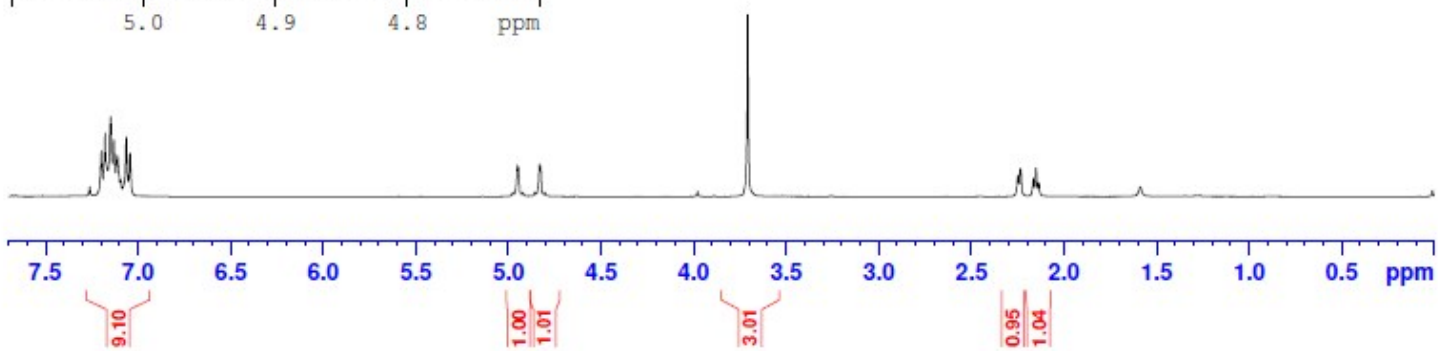
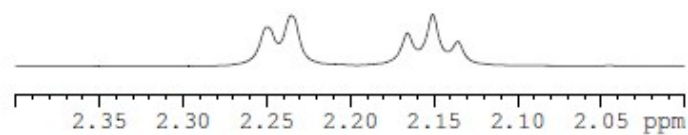
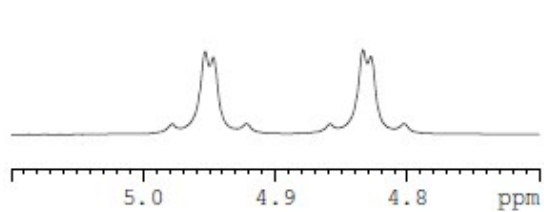
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4.953  
4.947  
4.922

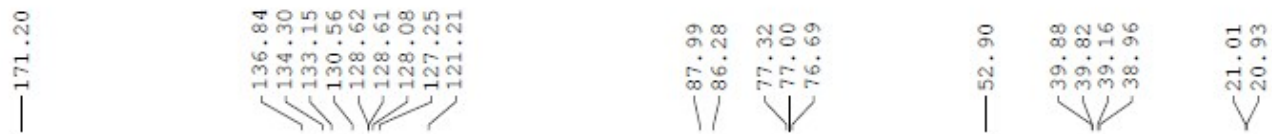
4.858  
4.833  
4.828  
4.802



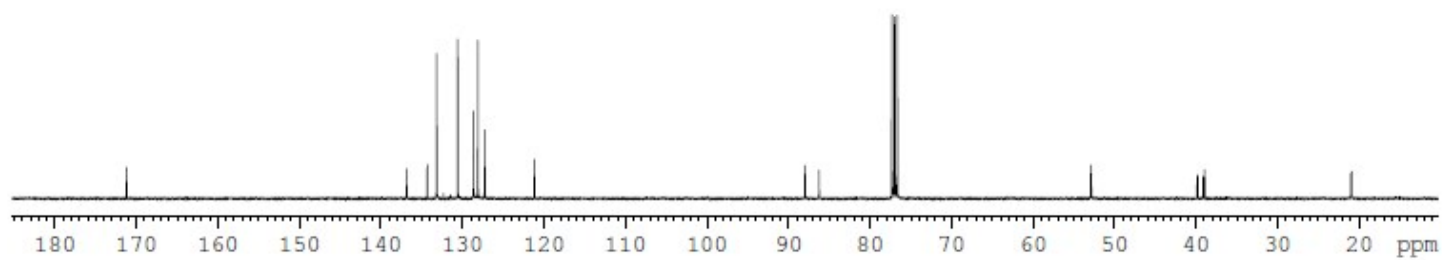
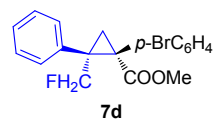
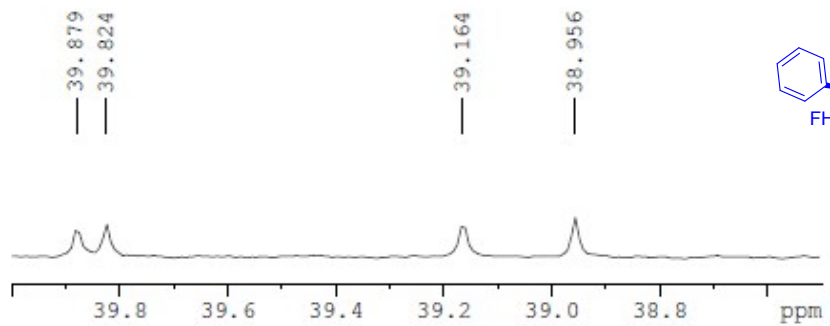
2.250  
2.235

2.166  
2.151  
2.136

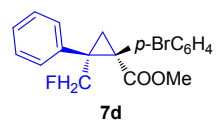




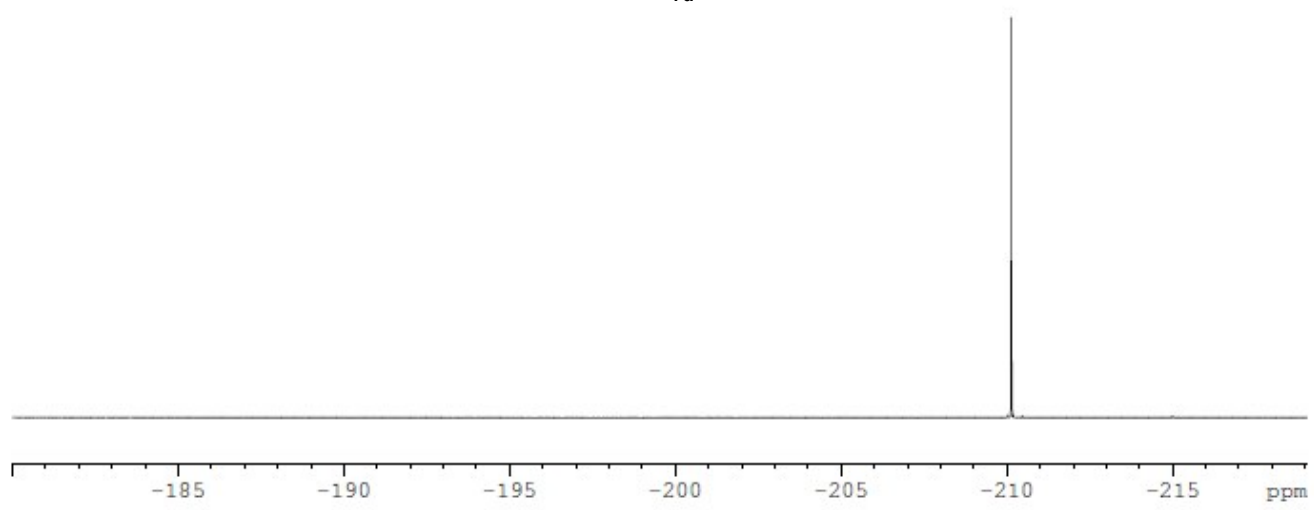
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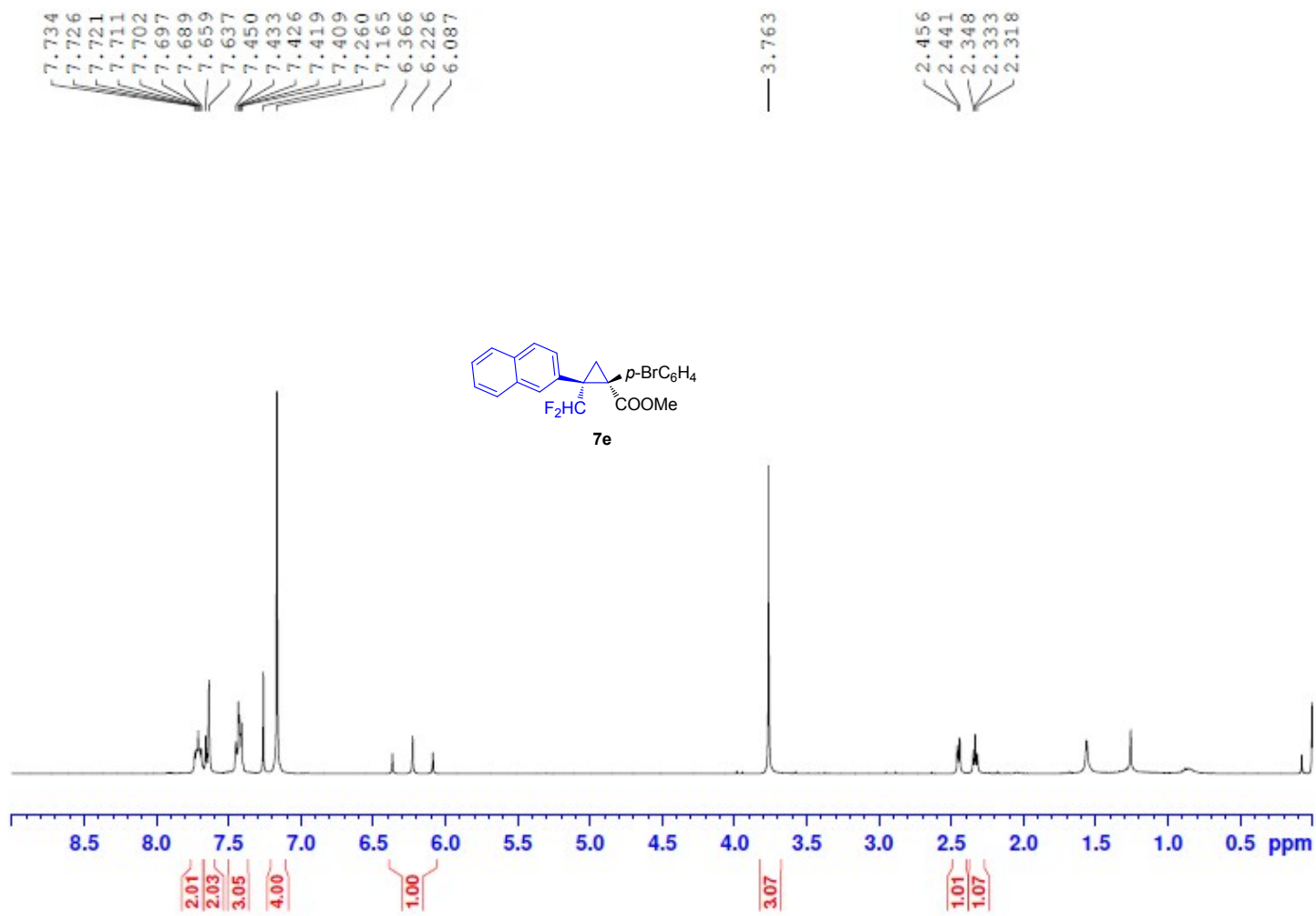


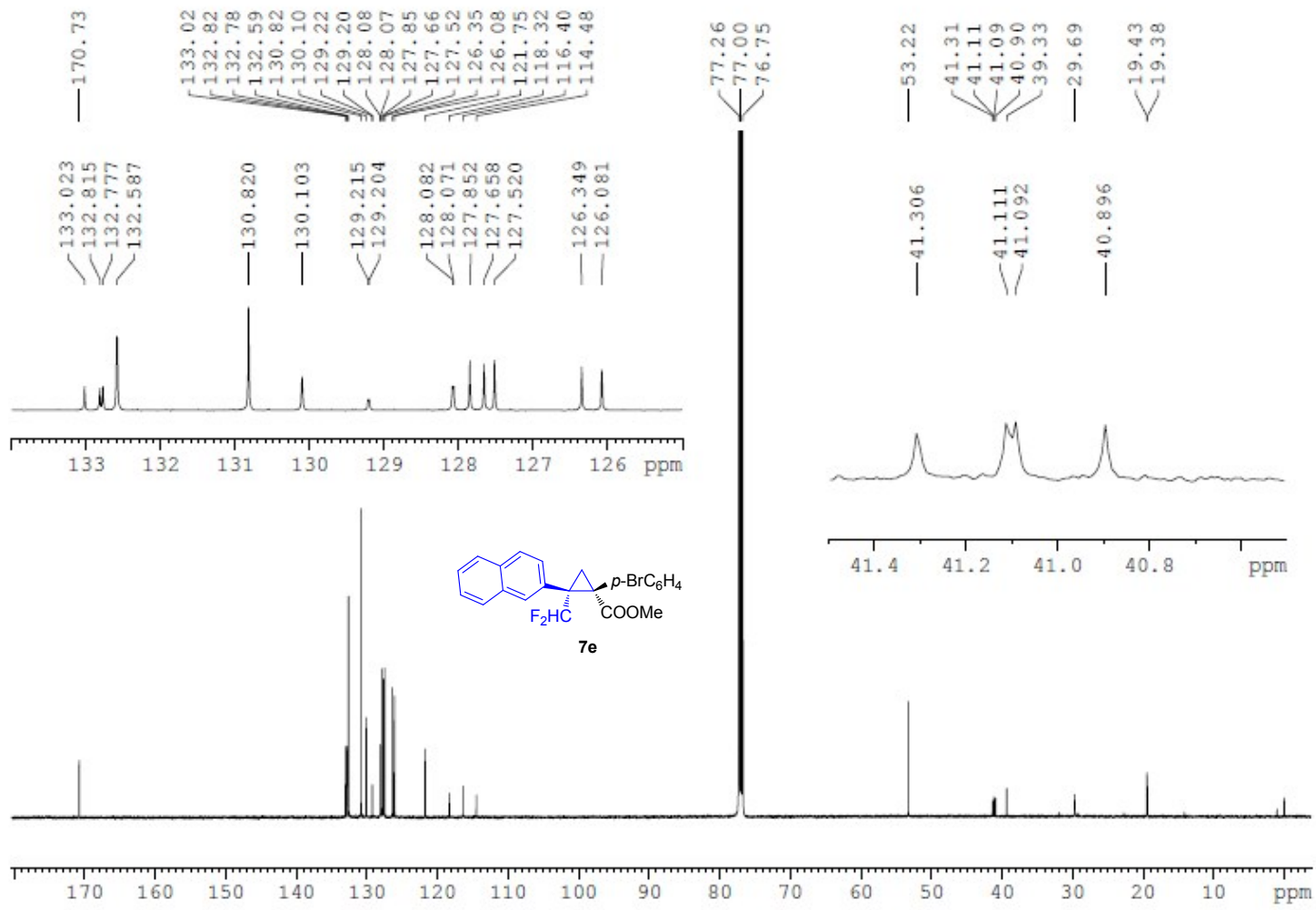
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-210.14







— -111.26  
— -112.02

— -117.31  
— -118.07

