

Supporting Information

# Organocatalytic Stereoselective Synthesis of Fluorinated 3,3'-Linked Bisoxindoles

Max Moskowitz, Kaluvu Balaraman and Christian Wolf\*

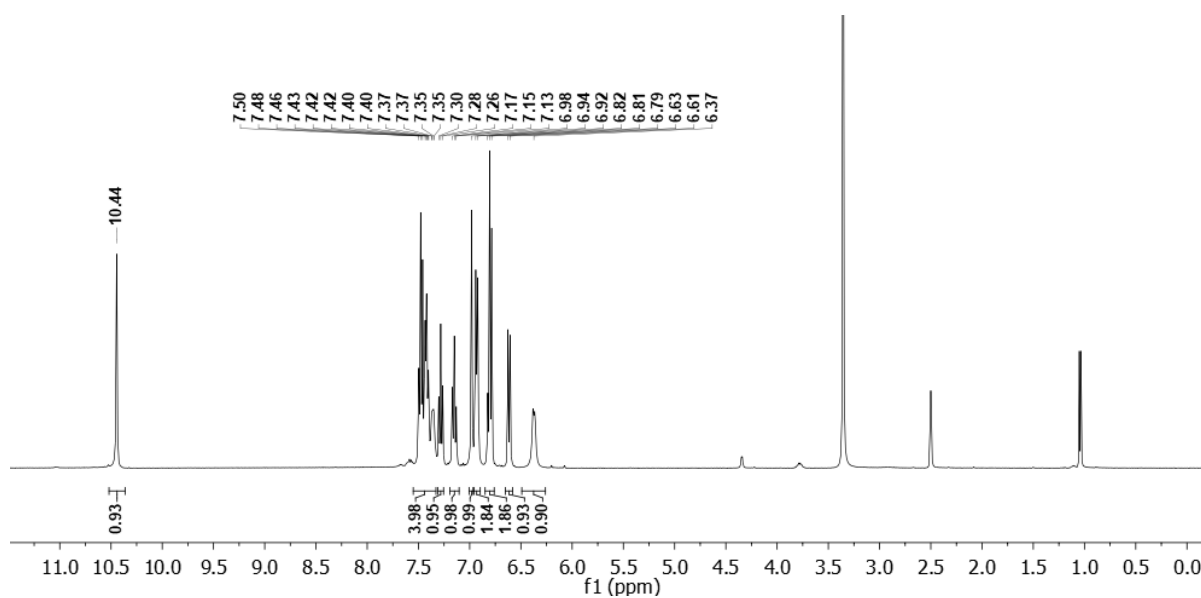
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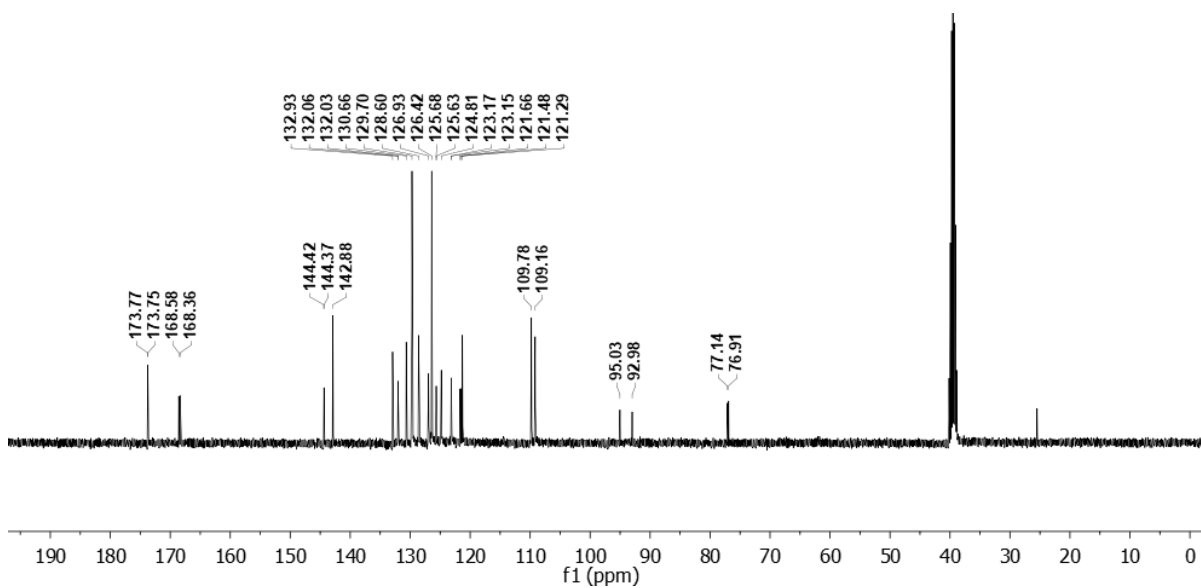
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## 1. $^1\text{H}$ , $^{13}\text{C}$ and $^{19}\text{F}$ NMR Spectra

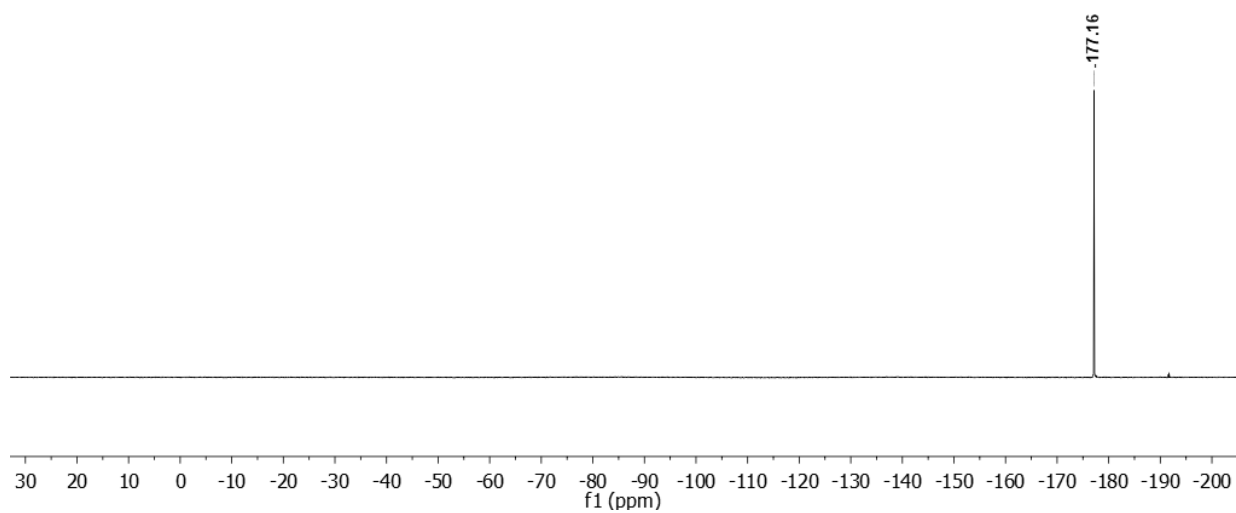
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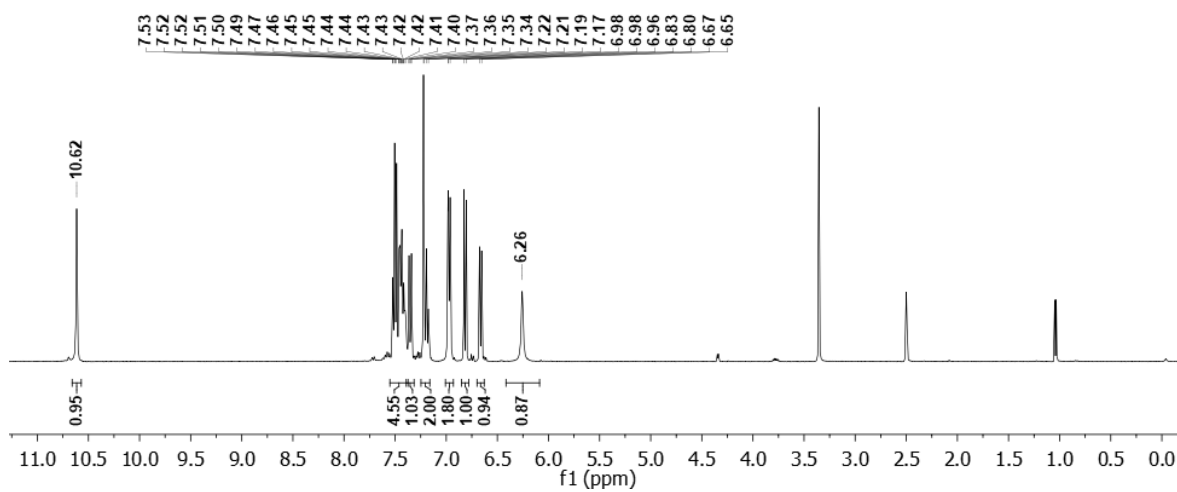
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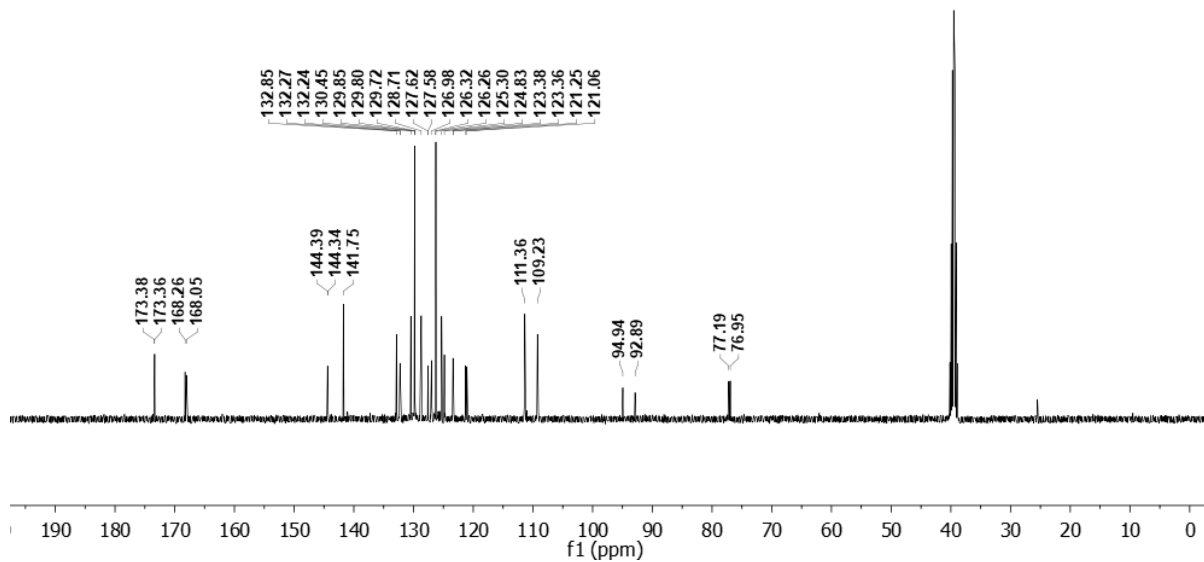
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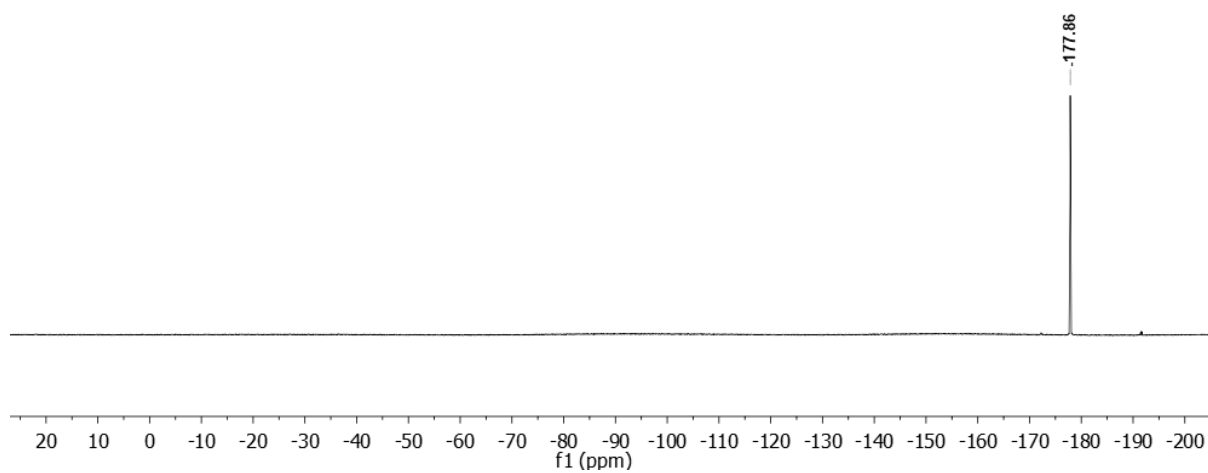
**<sup>1</sup>H NMR Spectrum of 5'-chloro-3-fluoro-3'-hydroxy-1-phenyl-[3,3'-biindoline]-2,2'-dione (4).**



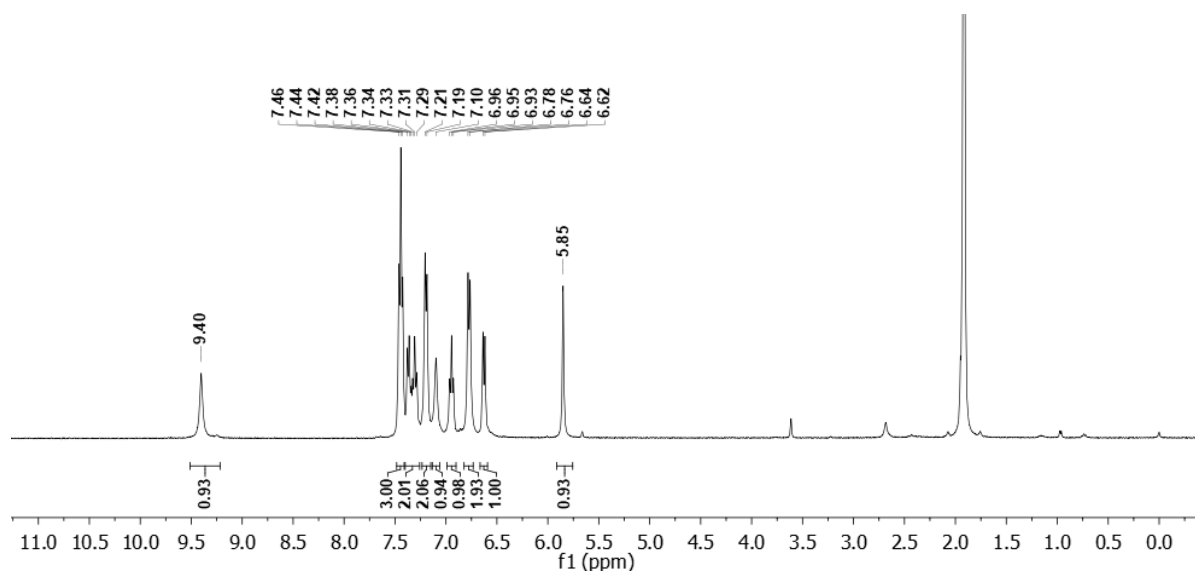
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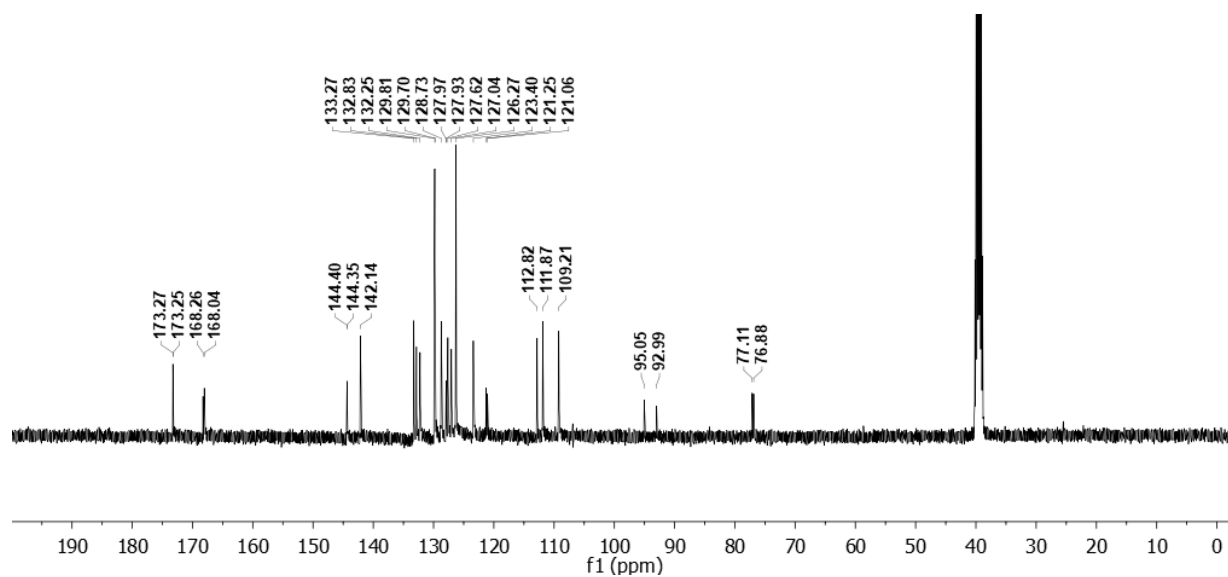
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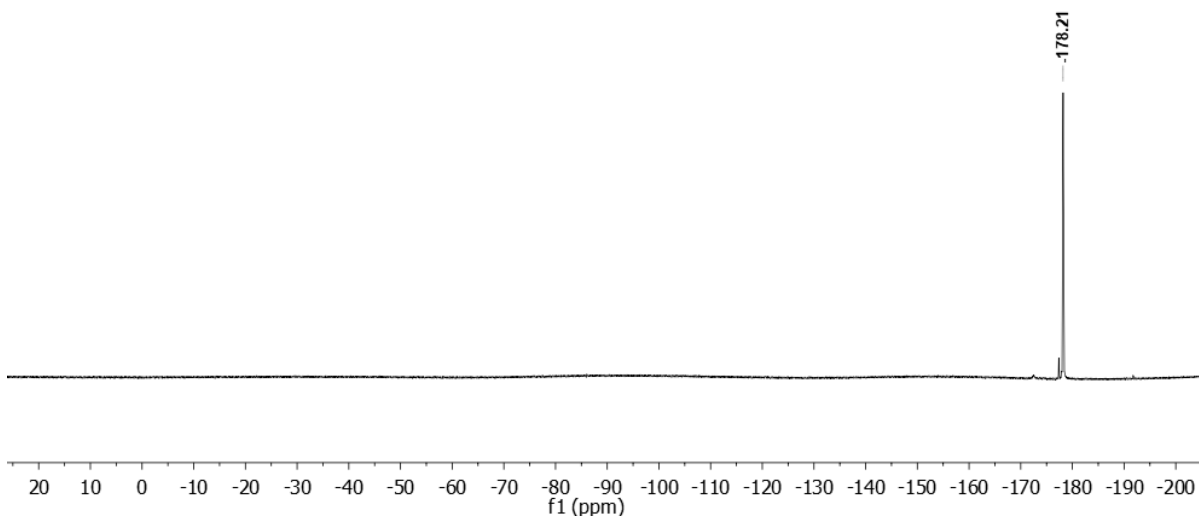
**<sup>1</sup>H NMR Spectrum of 5'-bromo-3-fluoro-3'-hydroxy-1-phenyl-[3,3'-biindoline]-2,2'-dione (5).**



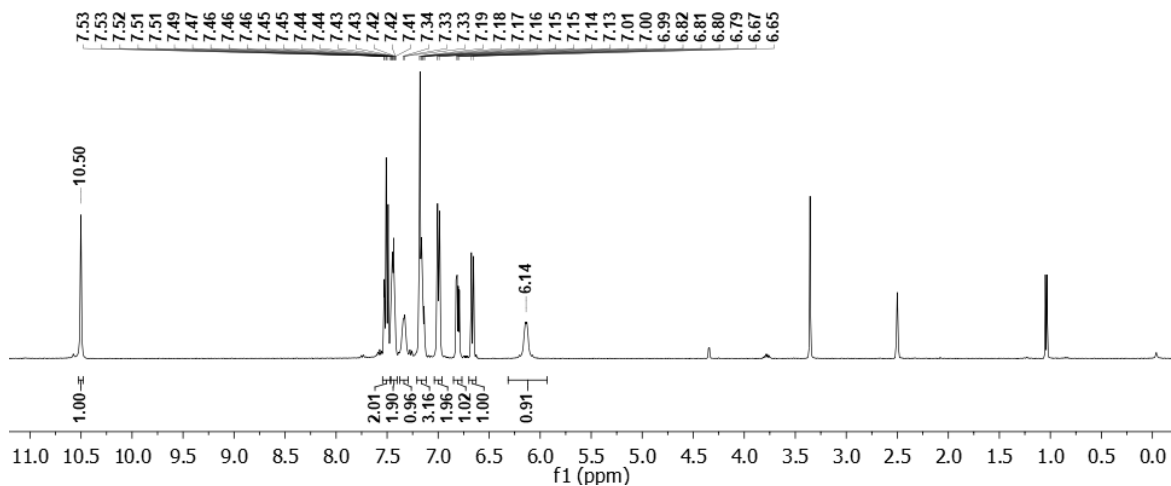
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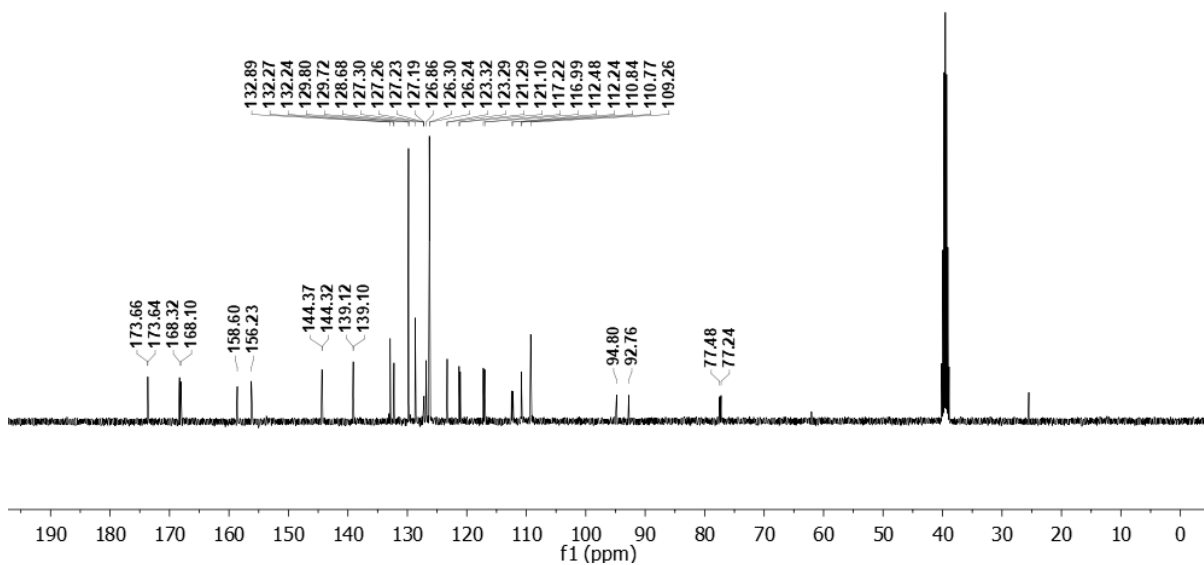
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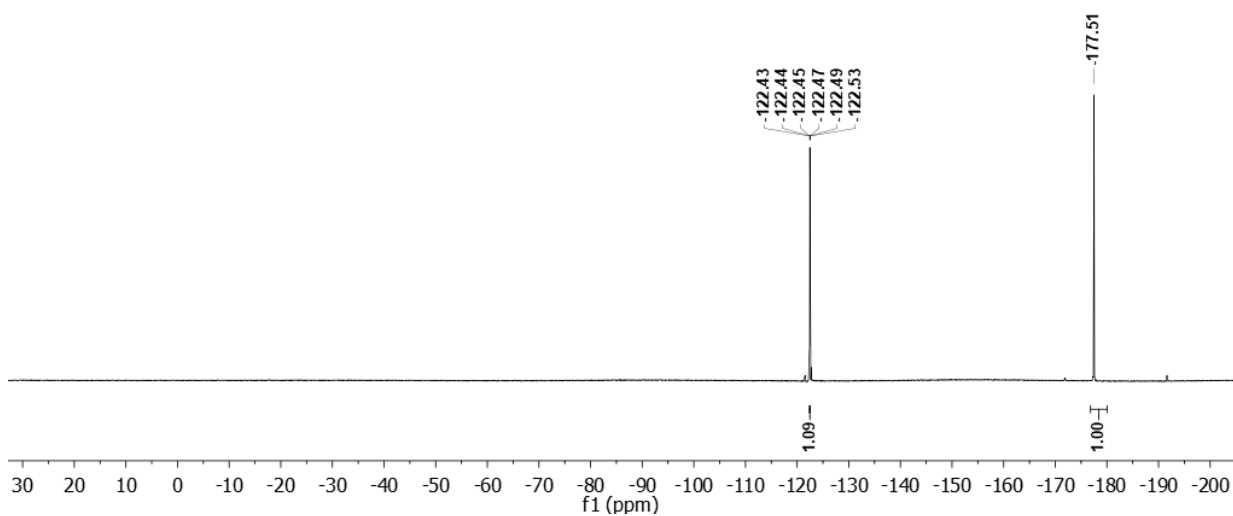
**<sup>1</sup>H NMR Spectrum of 3,5'-difluoro-3'-hydroxy-1-phenyl-[3,3'-biindoline]-2,2'-dione (6).**



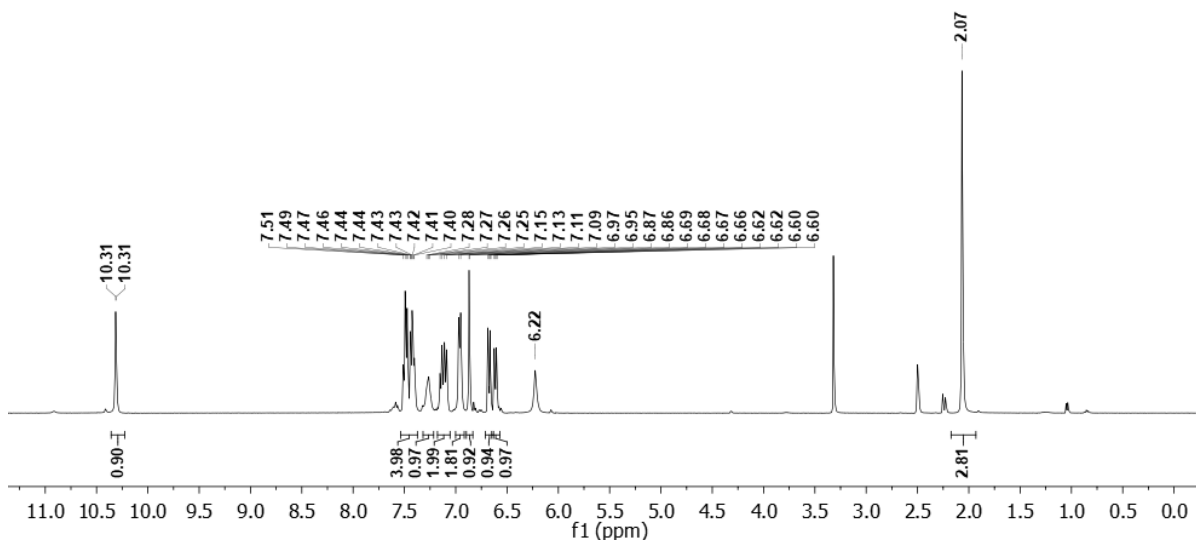
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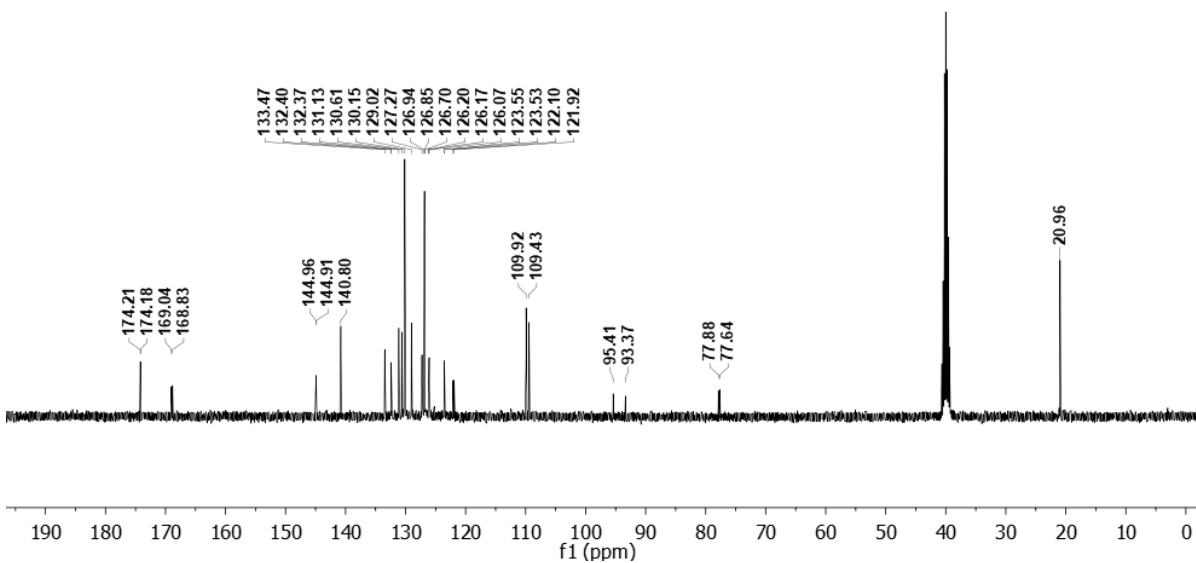
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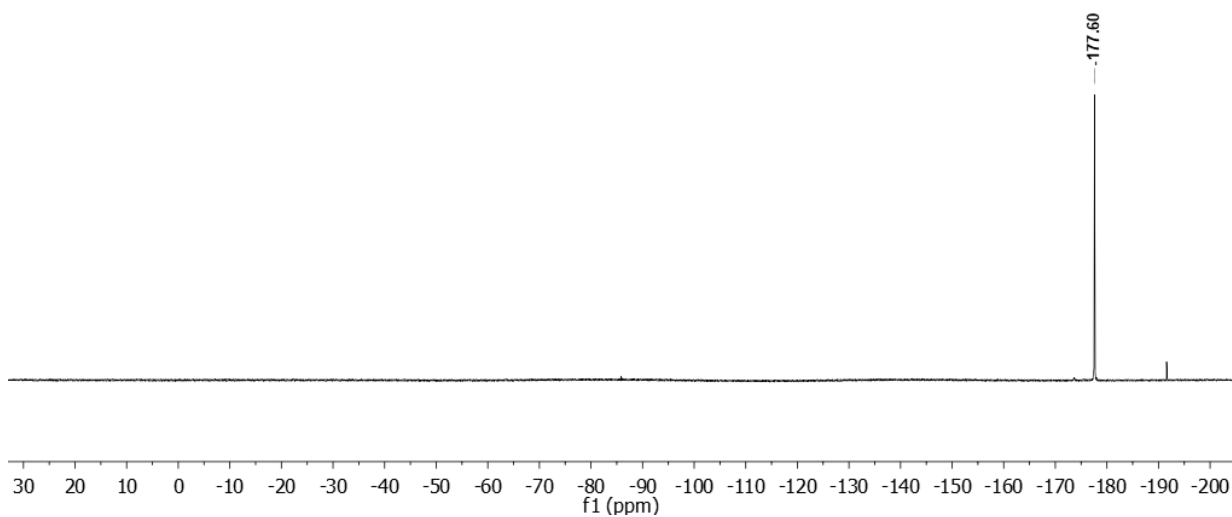


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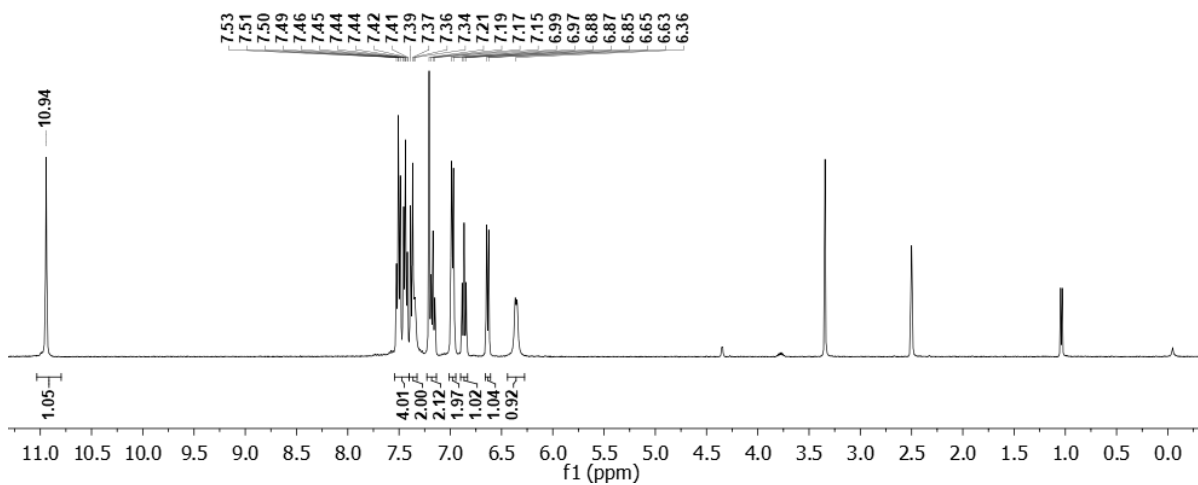




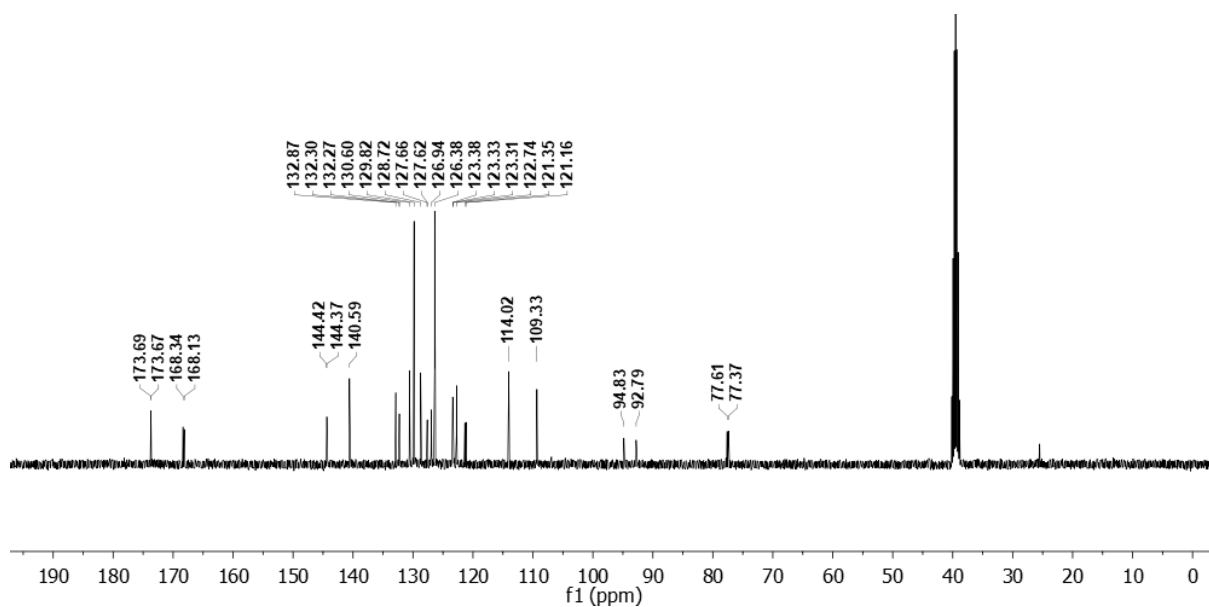
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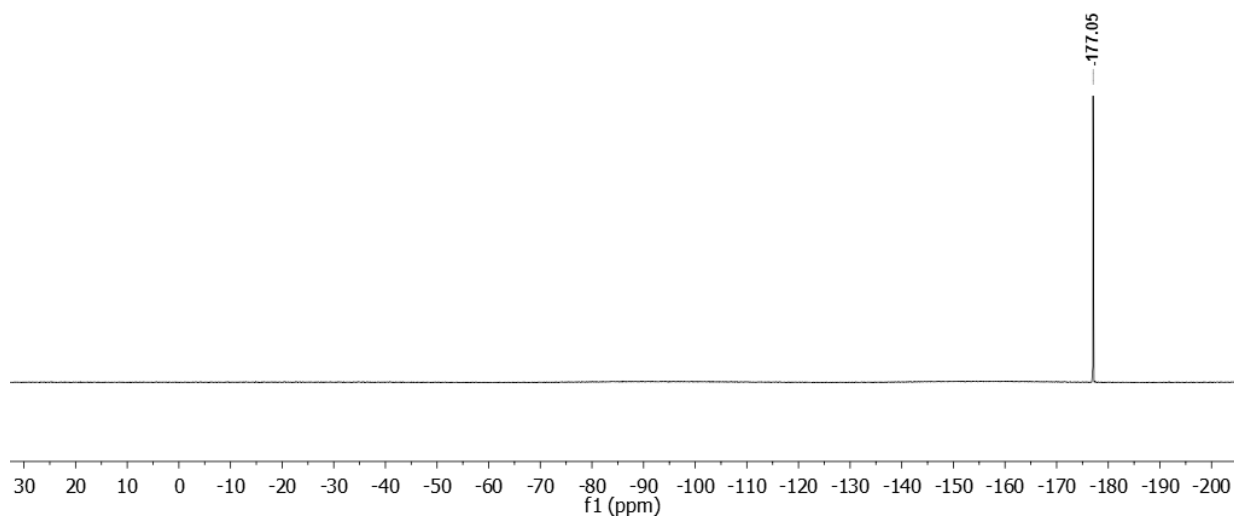
**<sup>1</sup>H NMR Spectrum of 7'-chloro-3-fluoro-3'-hydroxy-1-phenyl-[3,3'-biindoline]-2,2'-dione (8).**



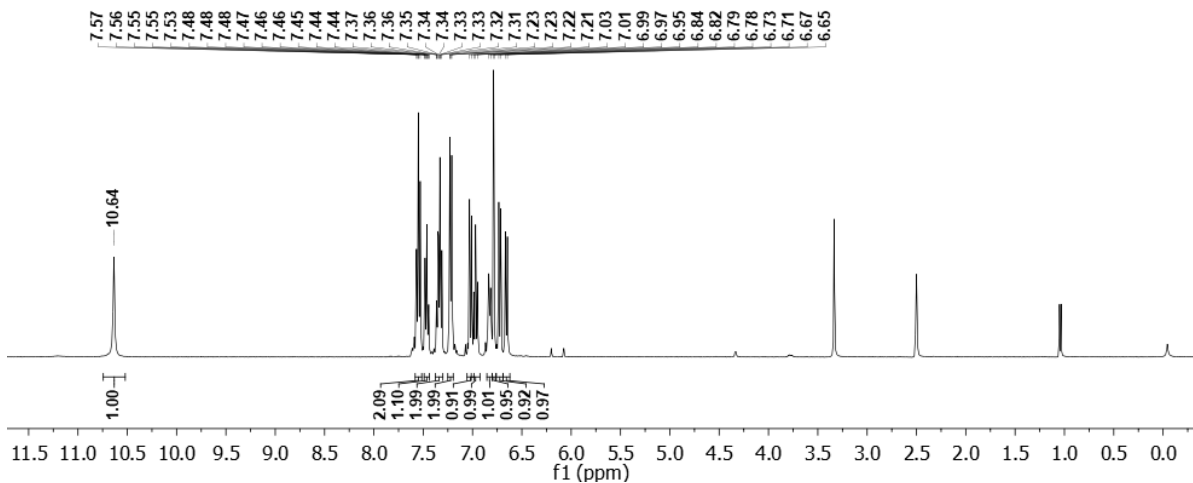
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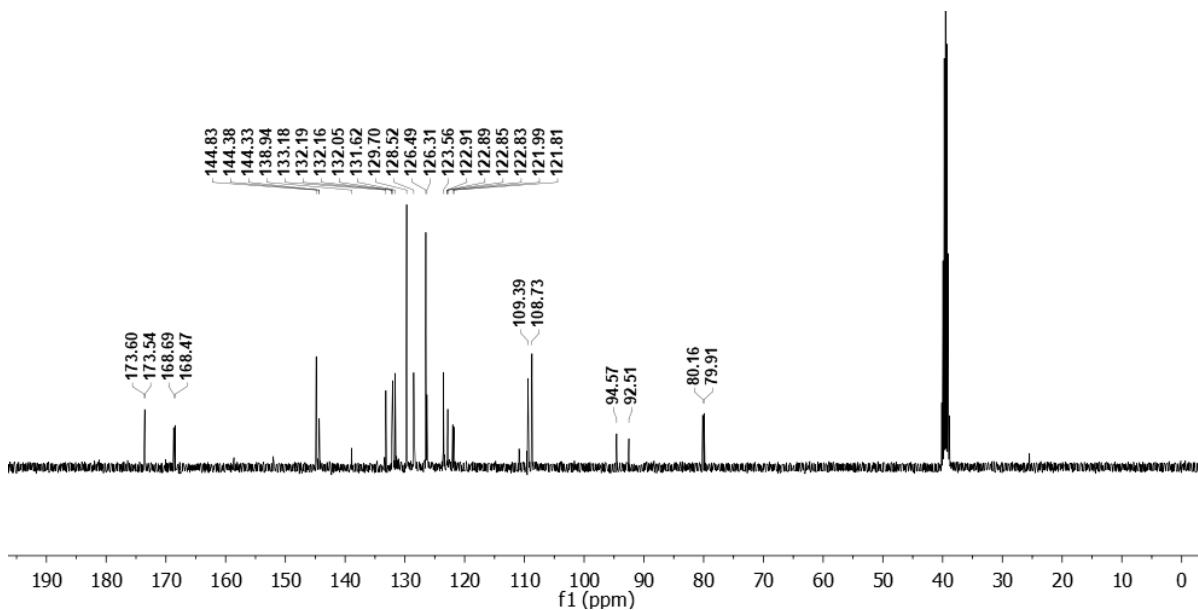
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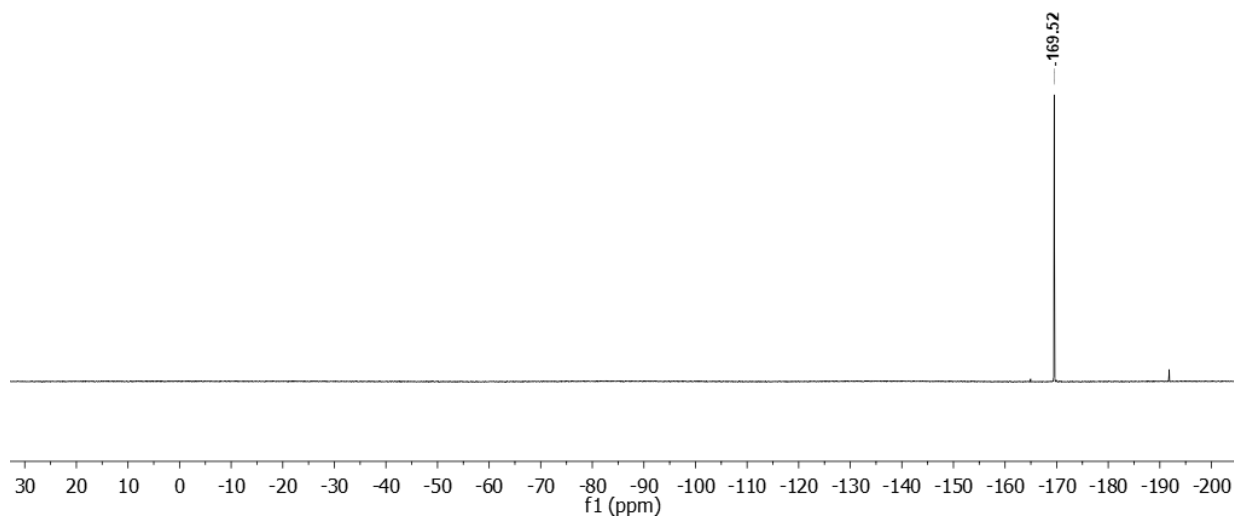
**<sup>1</sup>H NMR Spectrum of 4'-chloro-3-fluoro-3'-hydroxy-1-phenyl-[3,3'-biindoline]-2,2'-dione (9).**



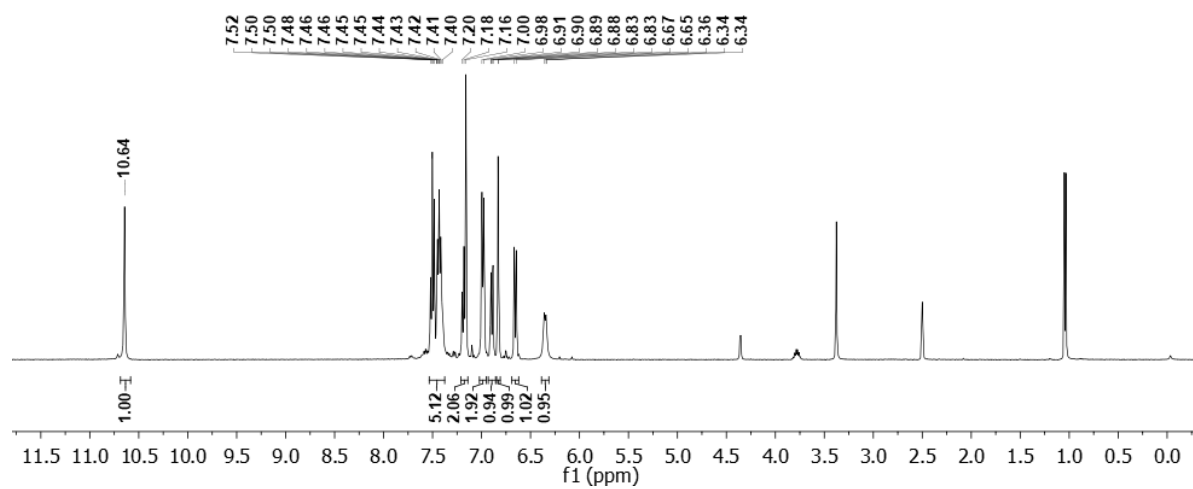
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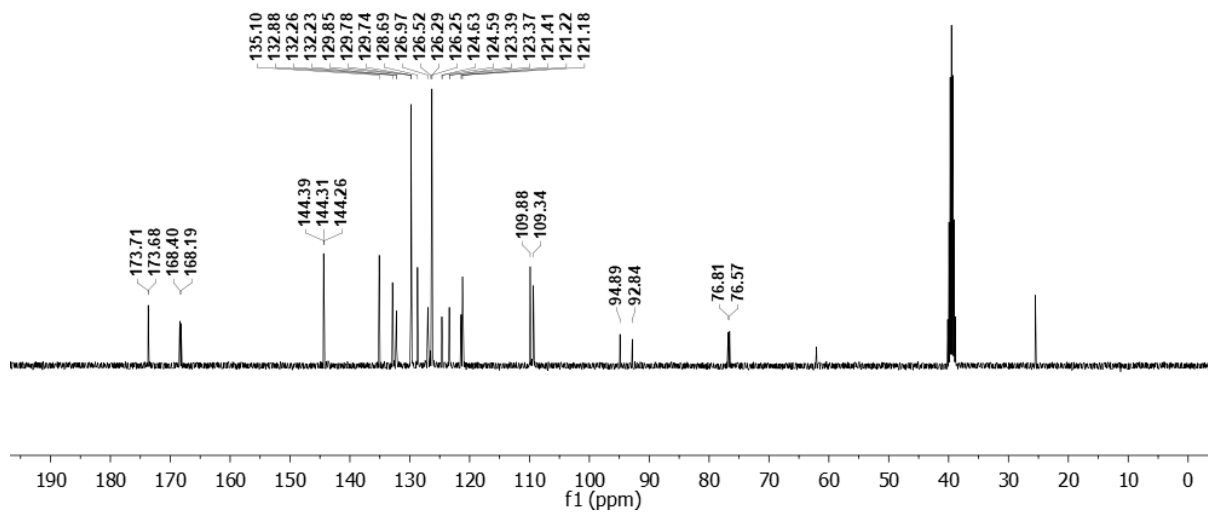
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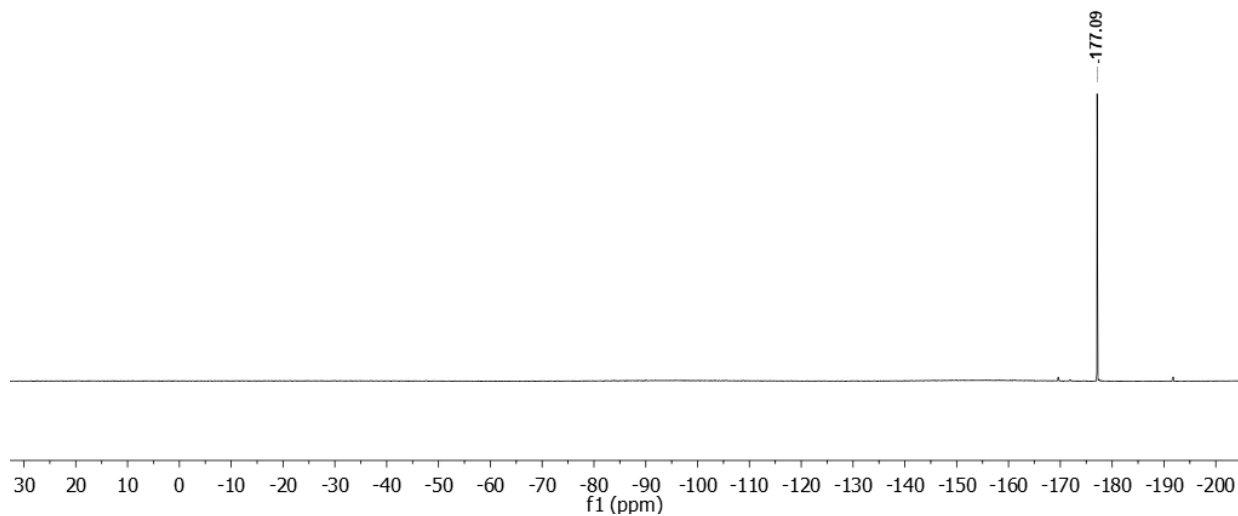
**<sup>1</sup>H NMR Spectrum of 6'-chloro-3-fluoro-3'-hydroxy-1-phenyl-[3,3'-biindoline]-2,2'-dione (10).**



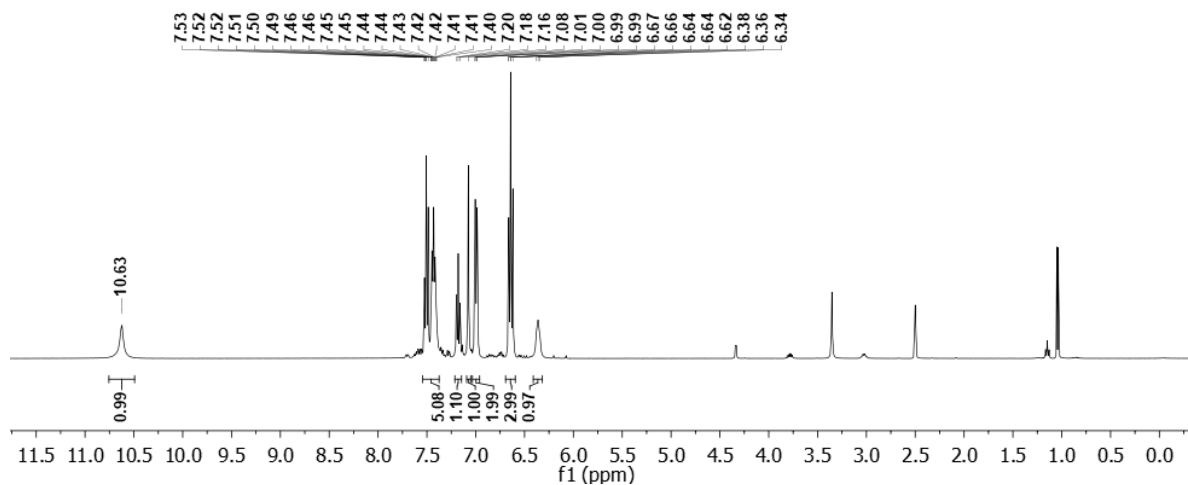
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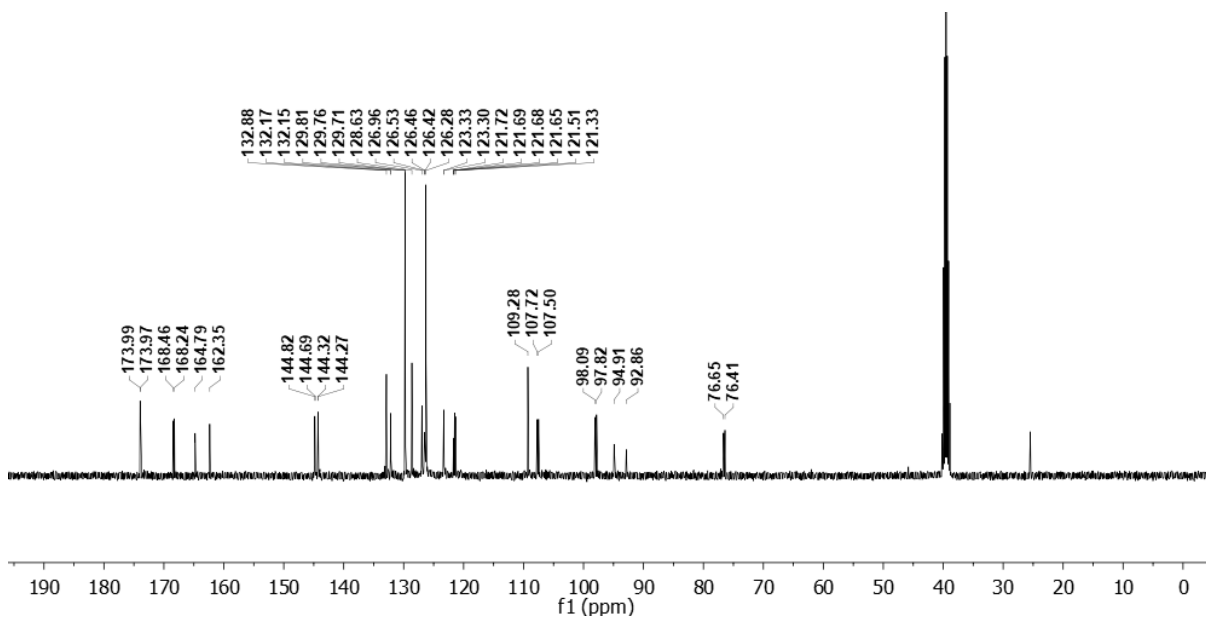
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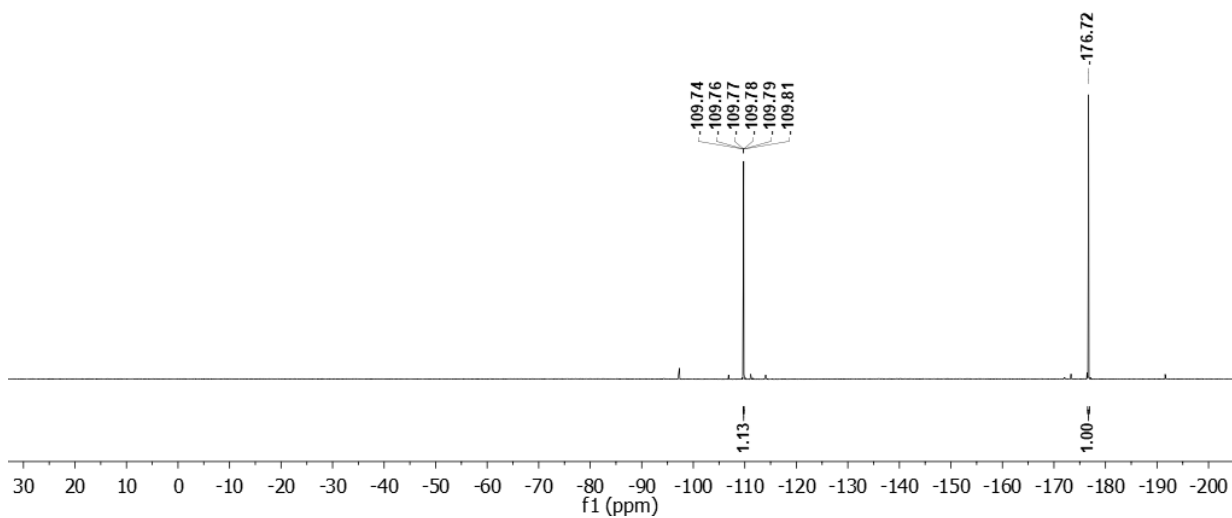
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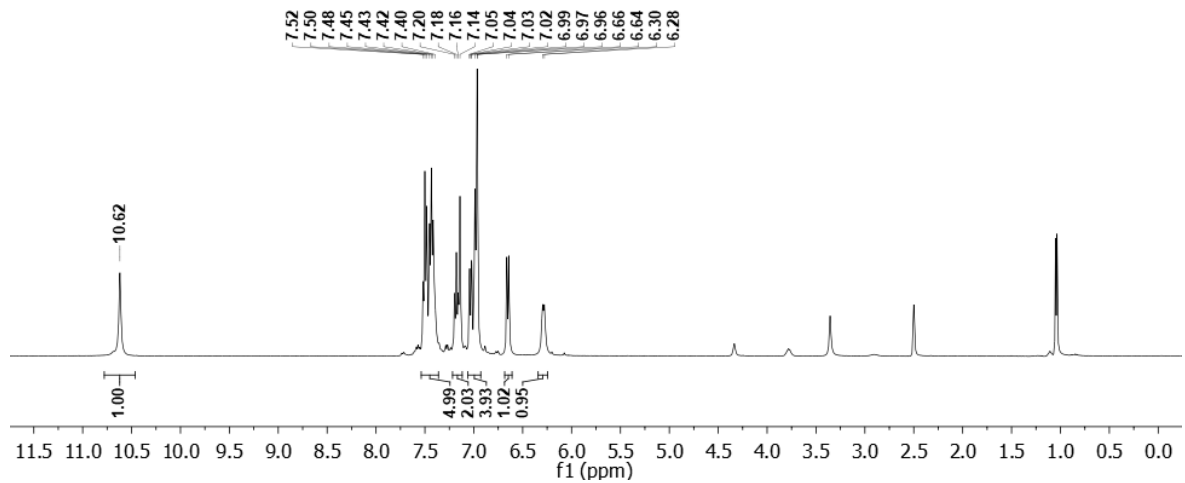
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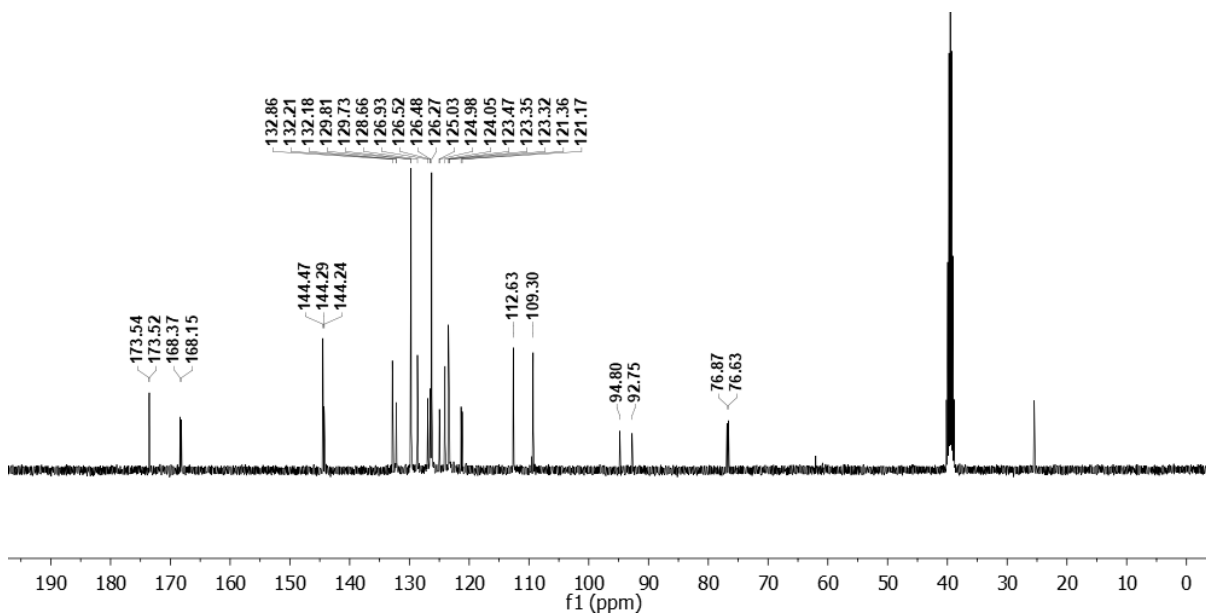
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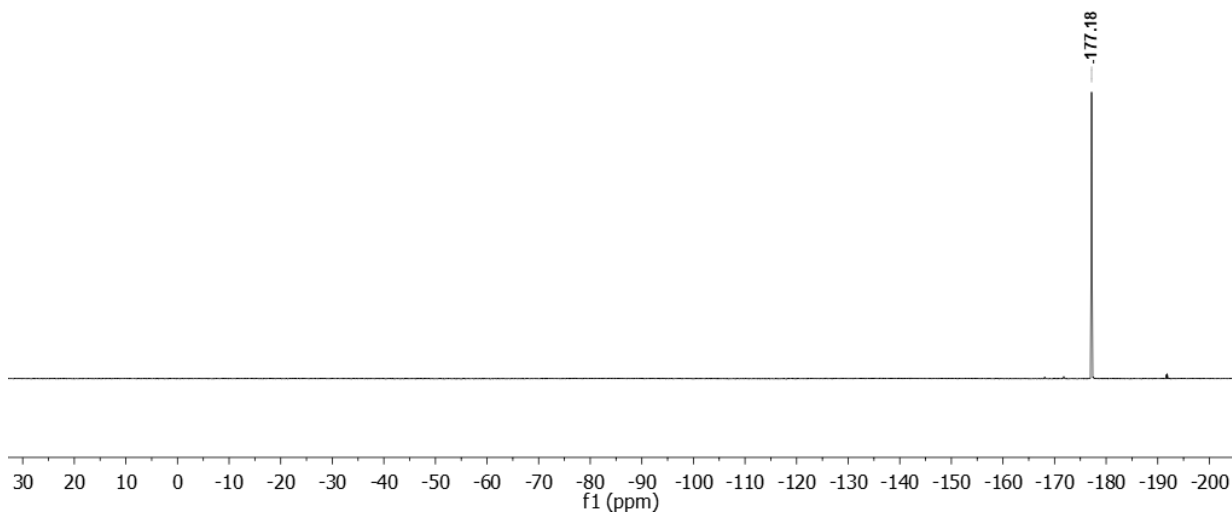
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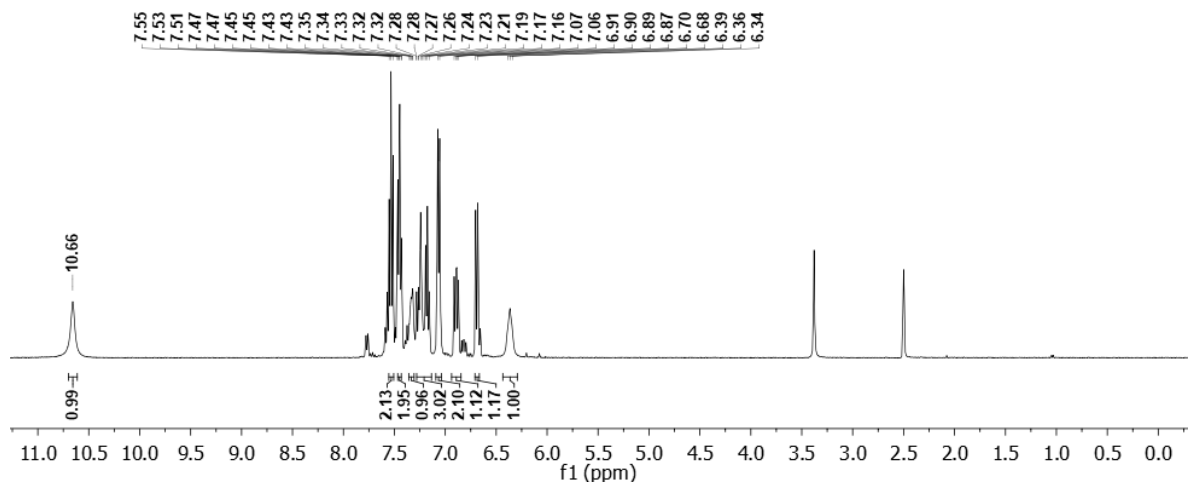


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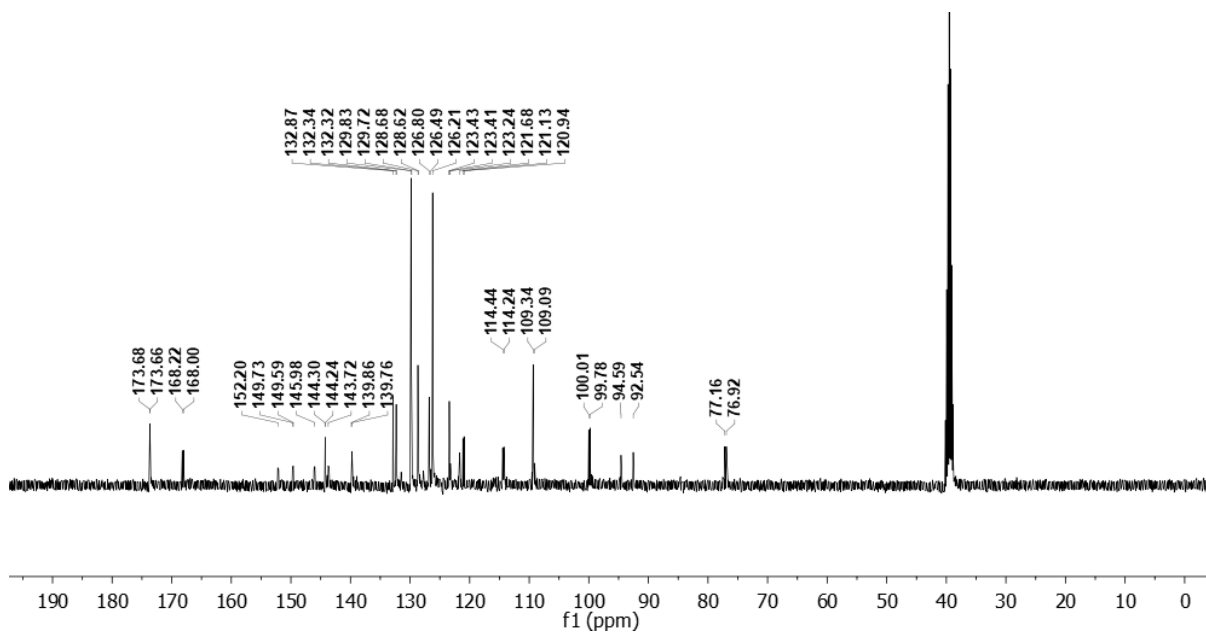




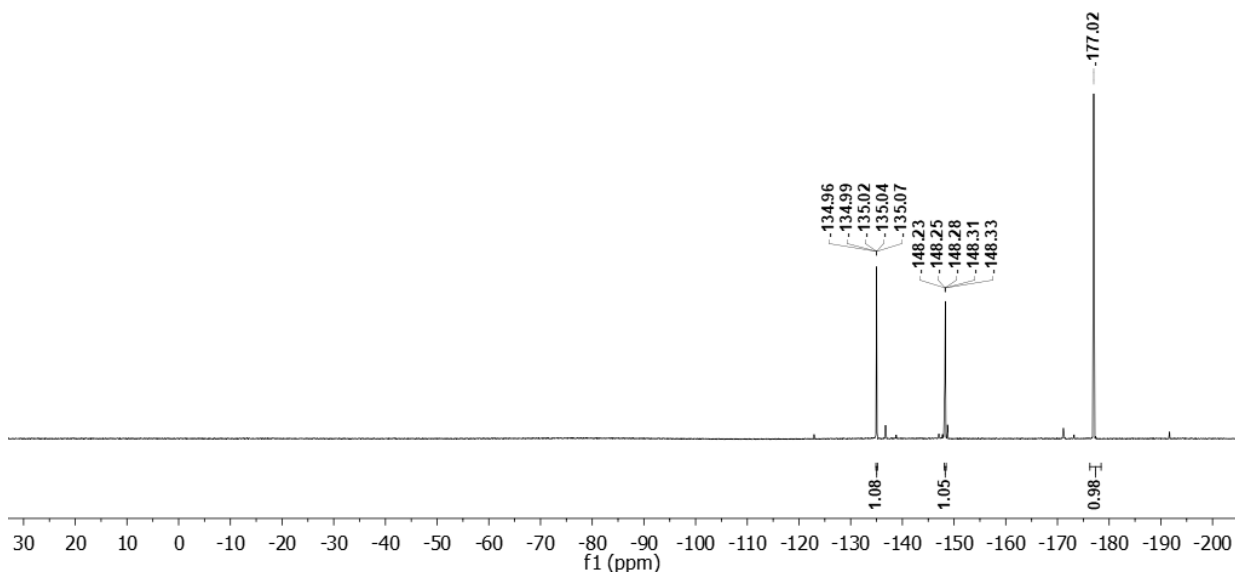
**<sup>1</sup>H NMR Spectrum of 3,5',6'-trifluoro-3'-hydroxy-1-phenyl-[3,3'-biindoline]-2,2'-dione (13).**



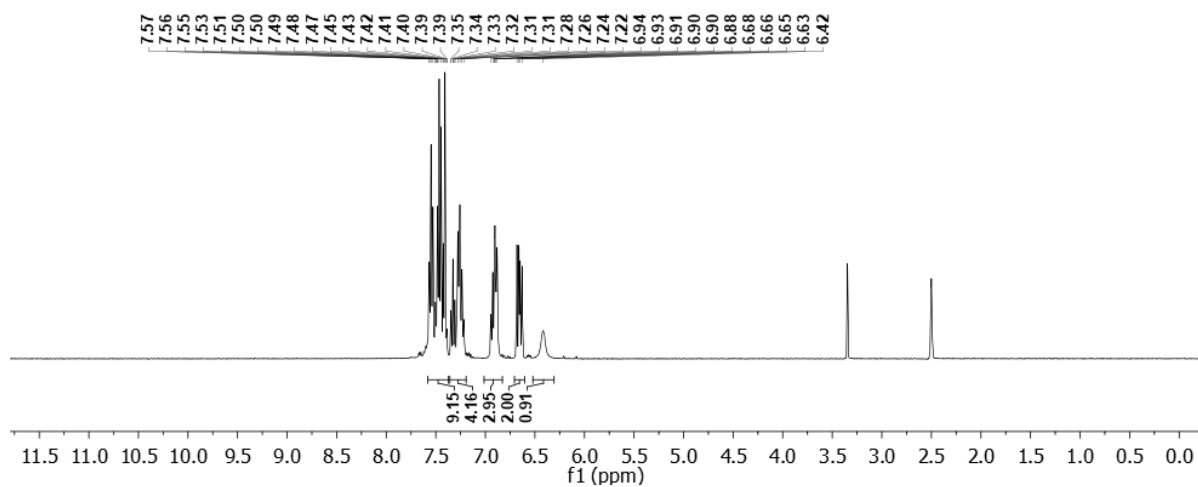
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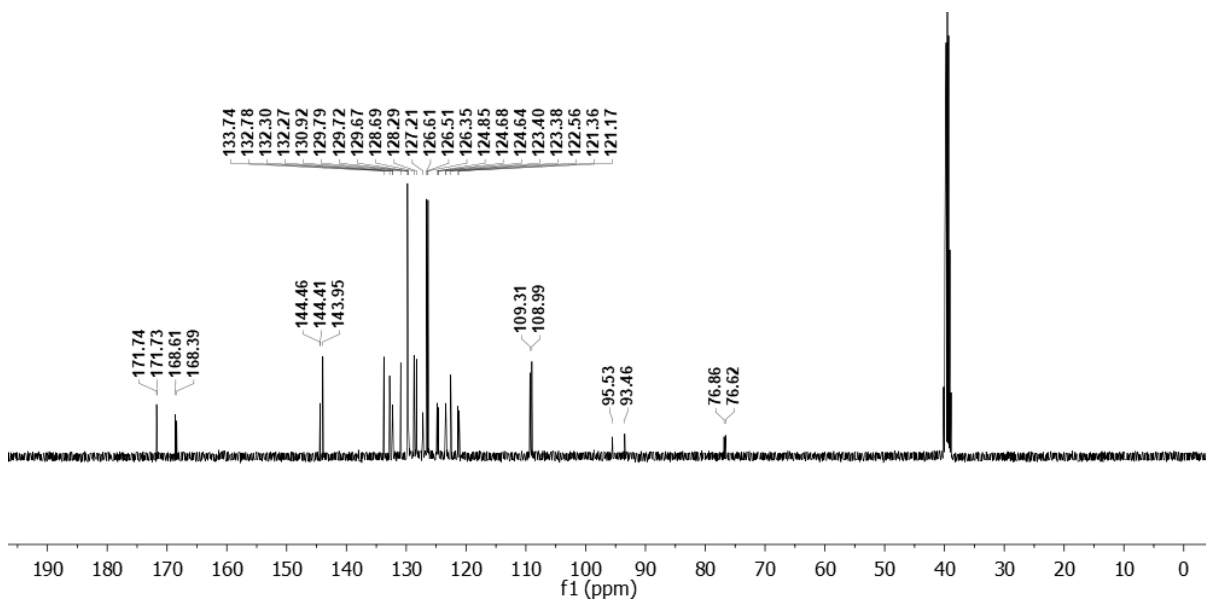
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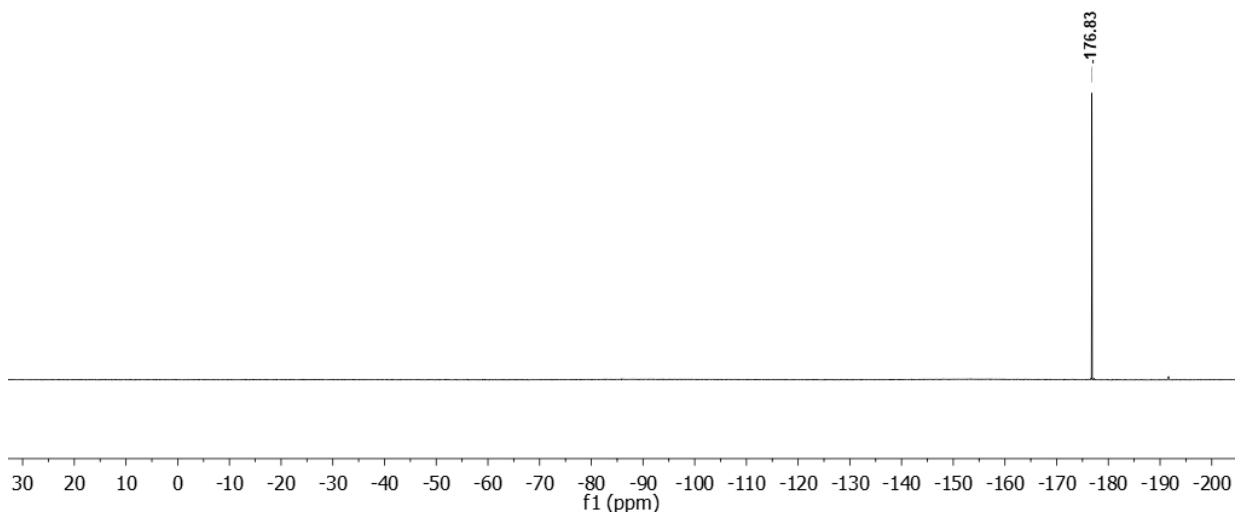
**<sup>1</sup>H NMR Spectrum of 3-fluoro-3'-hydroxy-1,1'-diphenyl-[3,3'-biindoline]-2,2'-dione (14).**



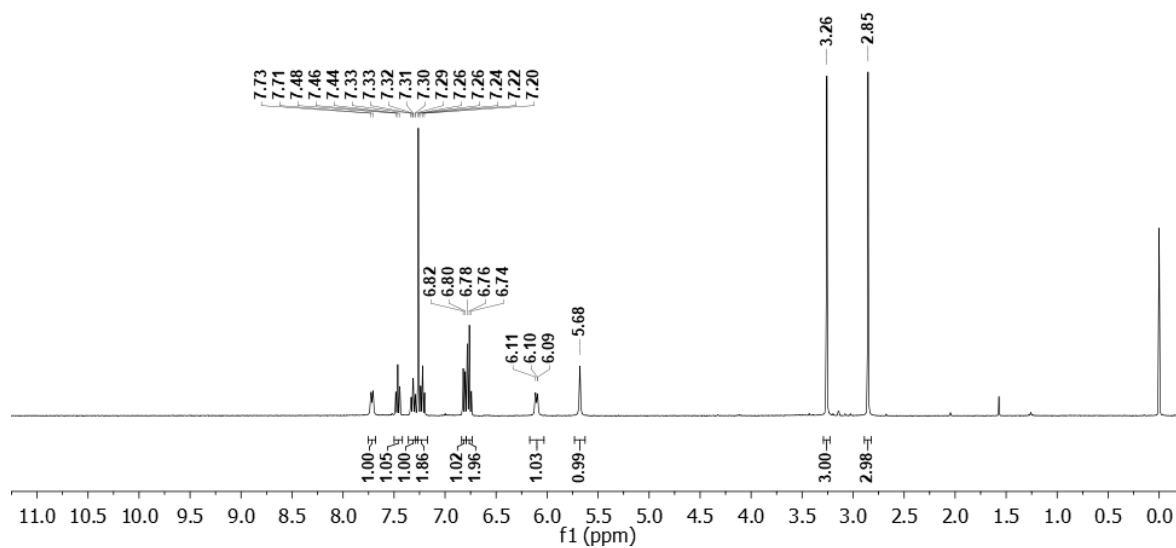
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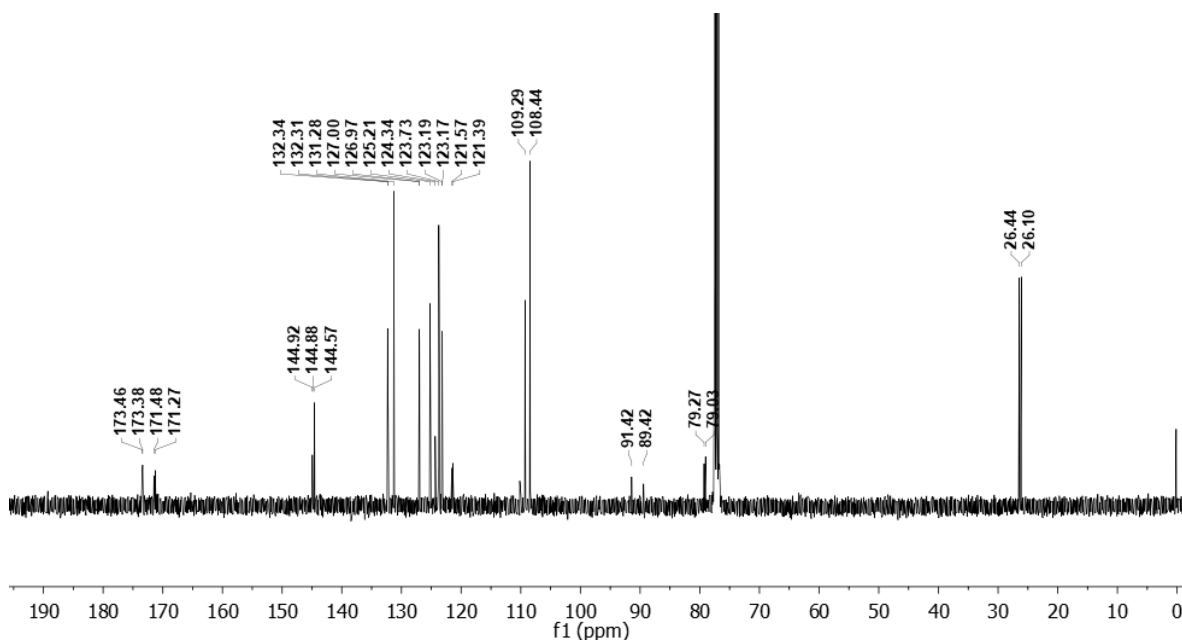
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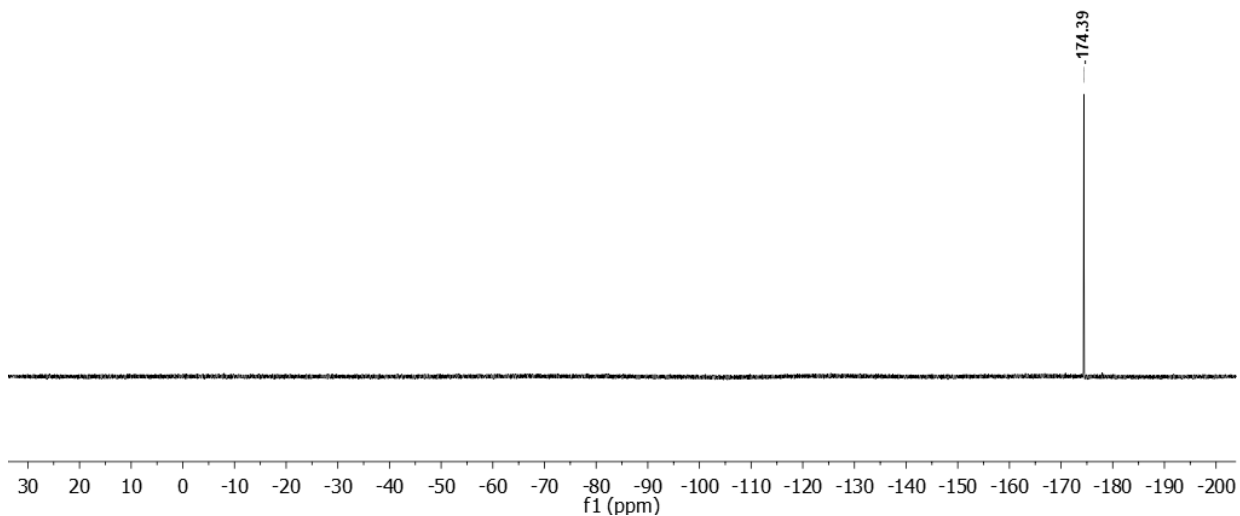
**<sup>1</sup>H NMR Spectrum of 3-fluoro-3'-hydroxy-1,1'-dimethyl-[3,3'-biindoline]-2,2'-dione (15).**



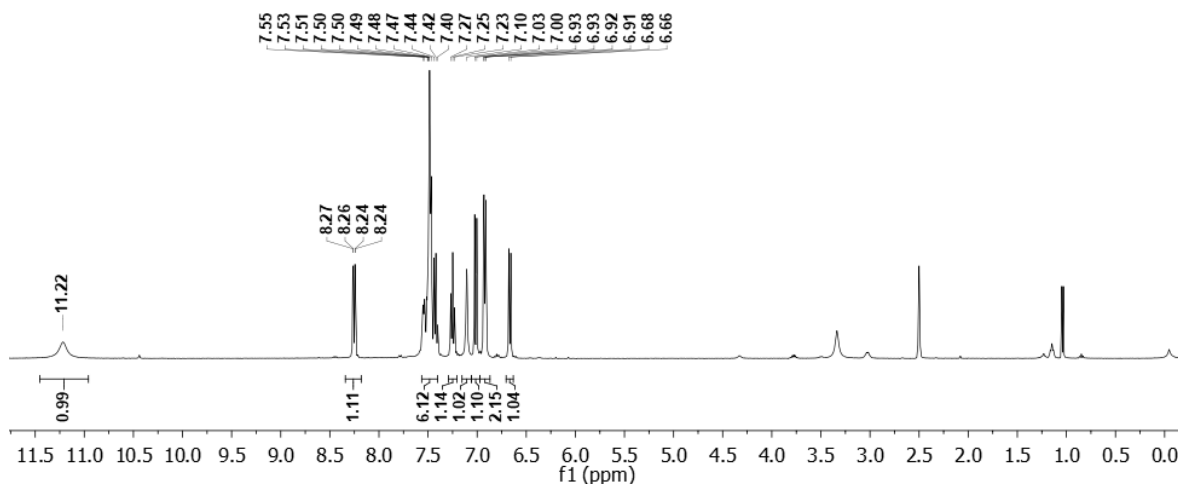
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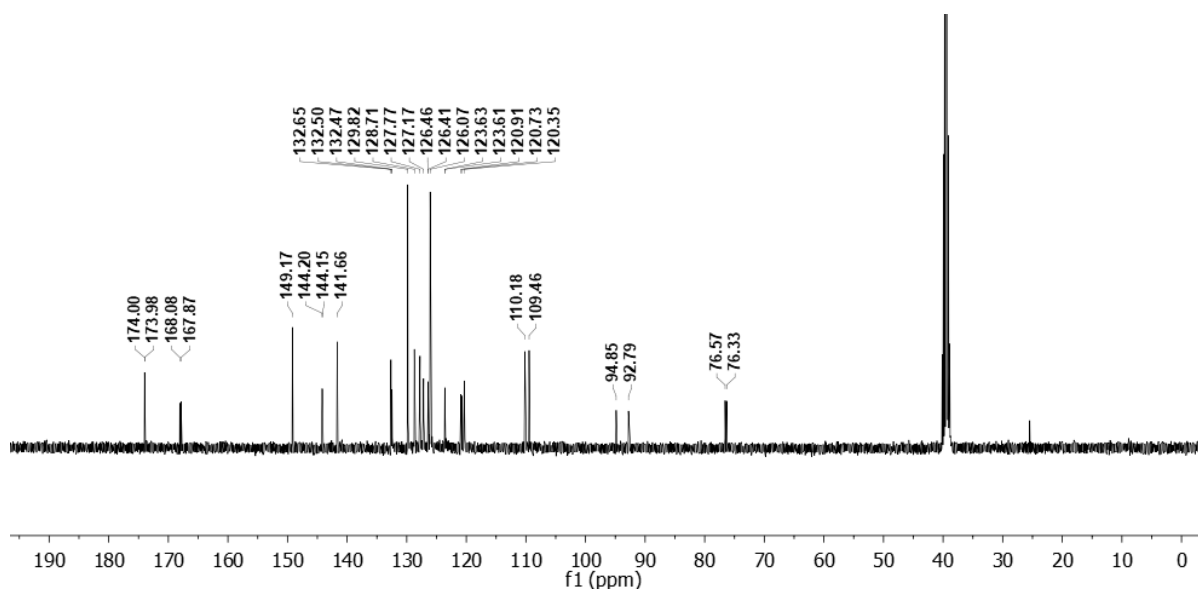
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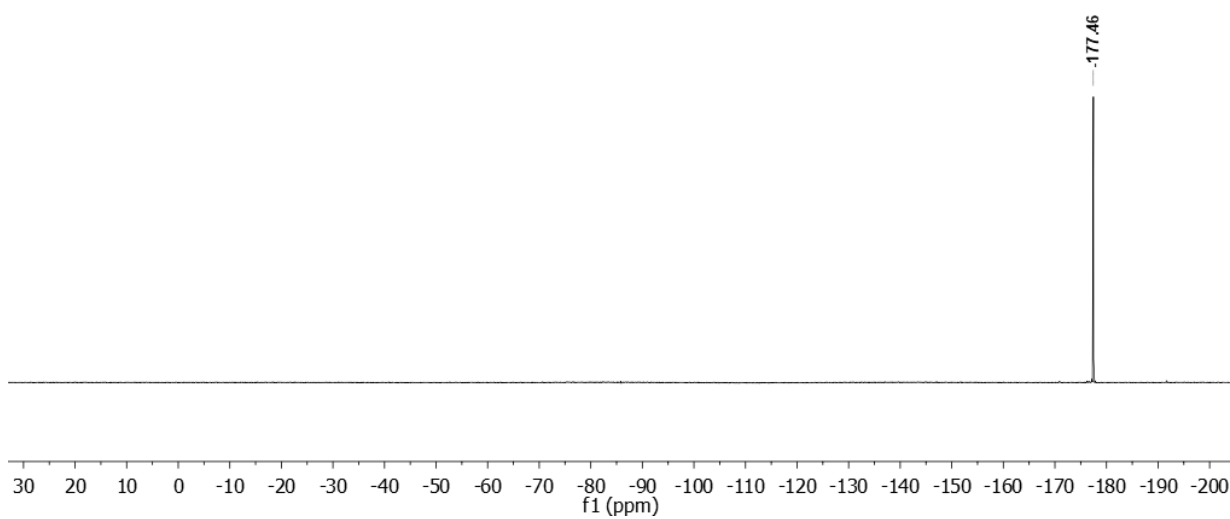
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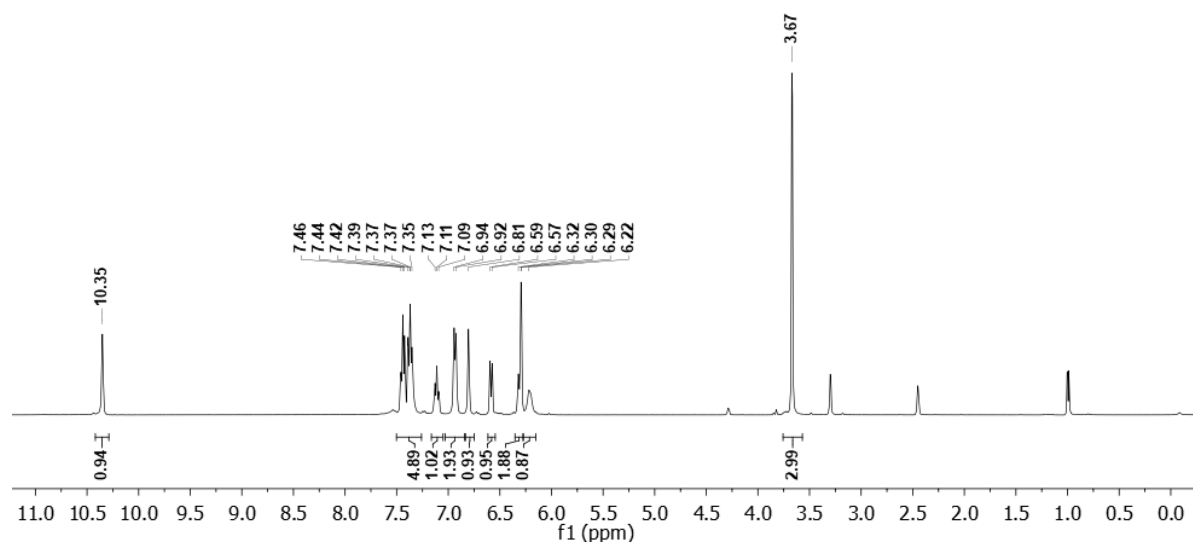
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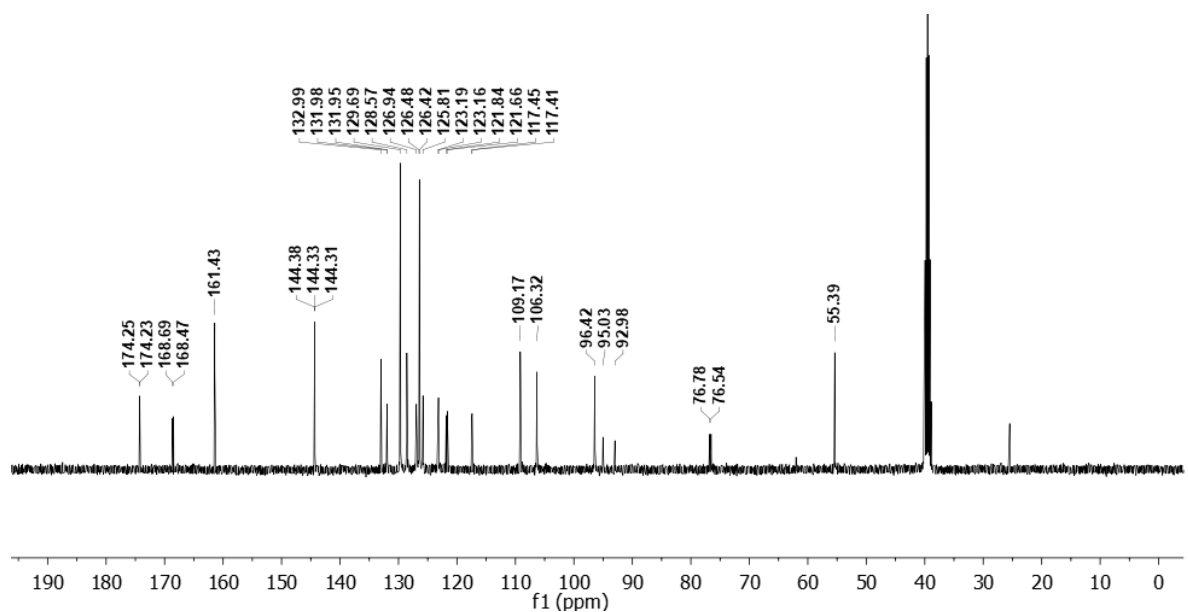
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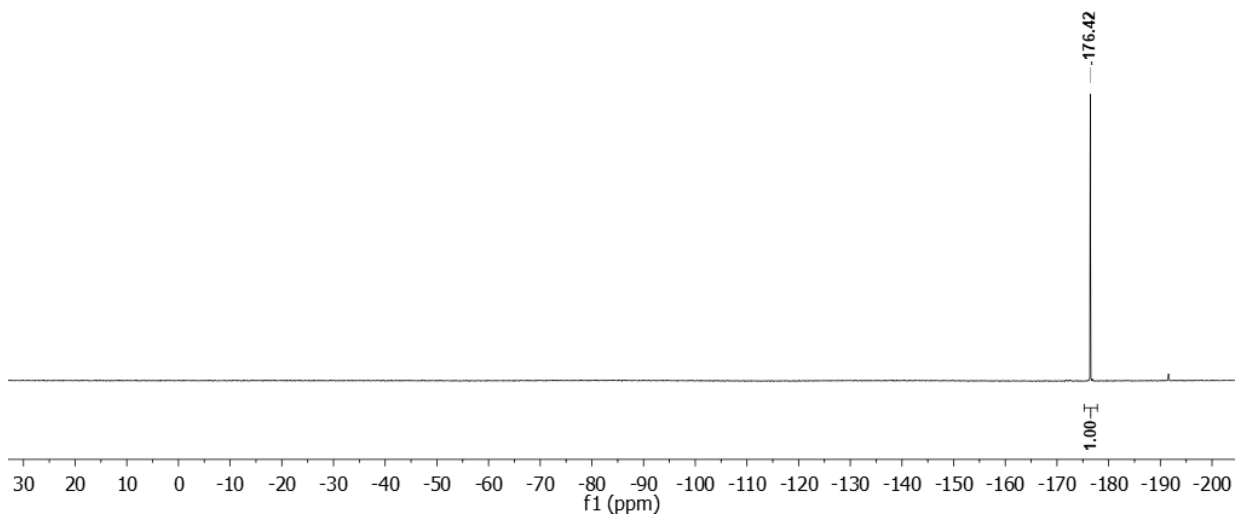
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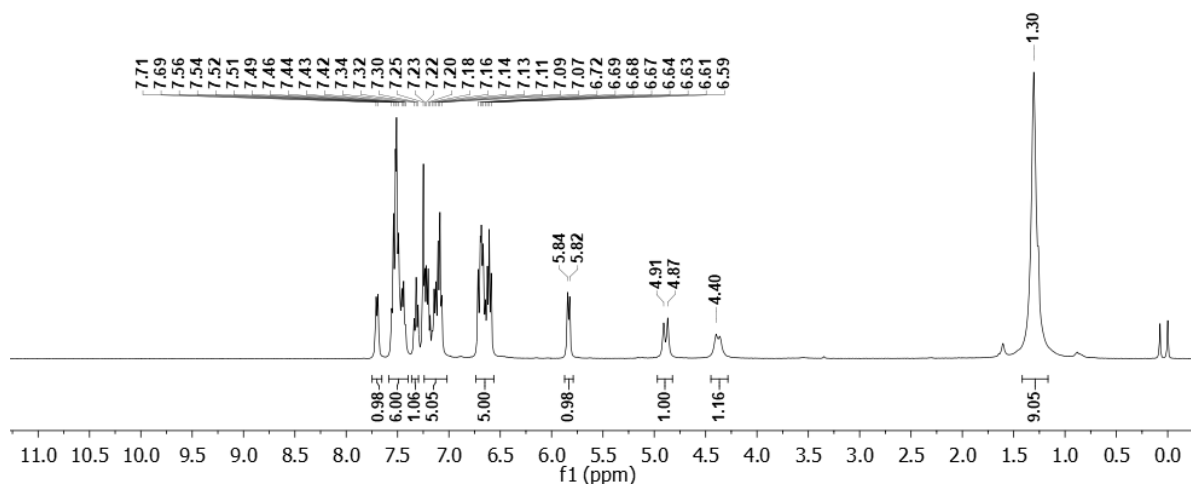
**<sup>13</sup>C NMR Spectrum of 3-fluoro-3'-hydroxy-6'-methoxy-1-phenyl-[3,3'-biindoline]-2,2'-dione (17).**



**<sup>19</sup>F NMR Spectrum of 3-fluoro-3'-hydroxy-6'-methoxy-1-phenyl-[3,3'-biindoline]-2,2'-dione (17).**

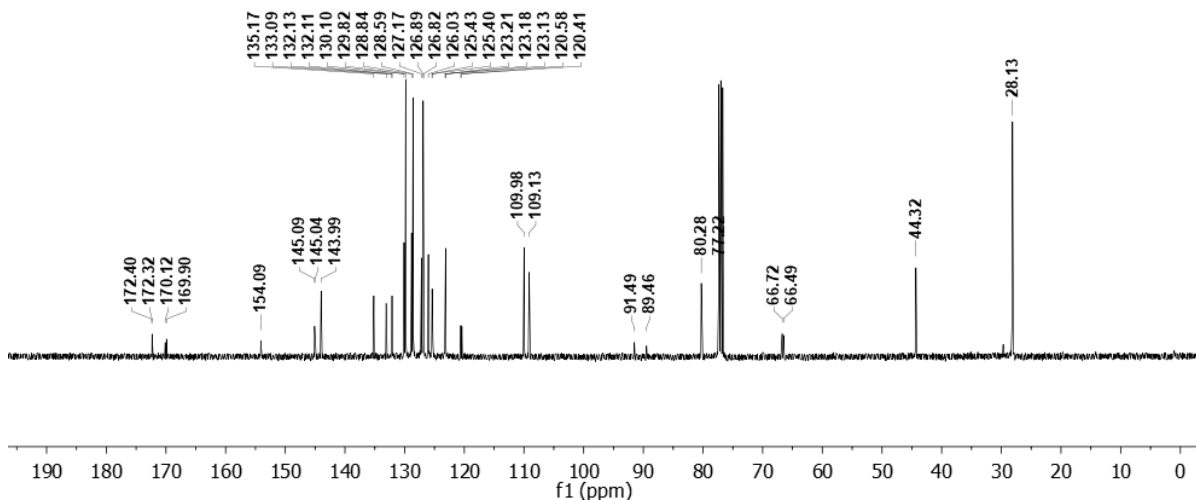


**<sup>1</sup>H NMR Spectrum of *tert*-butyl (1'-benzyl-3-fluoro-2,2'-dioxo-1-phenyl-[3,3'-biindolin]-3'-yl)carbamate (19).**

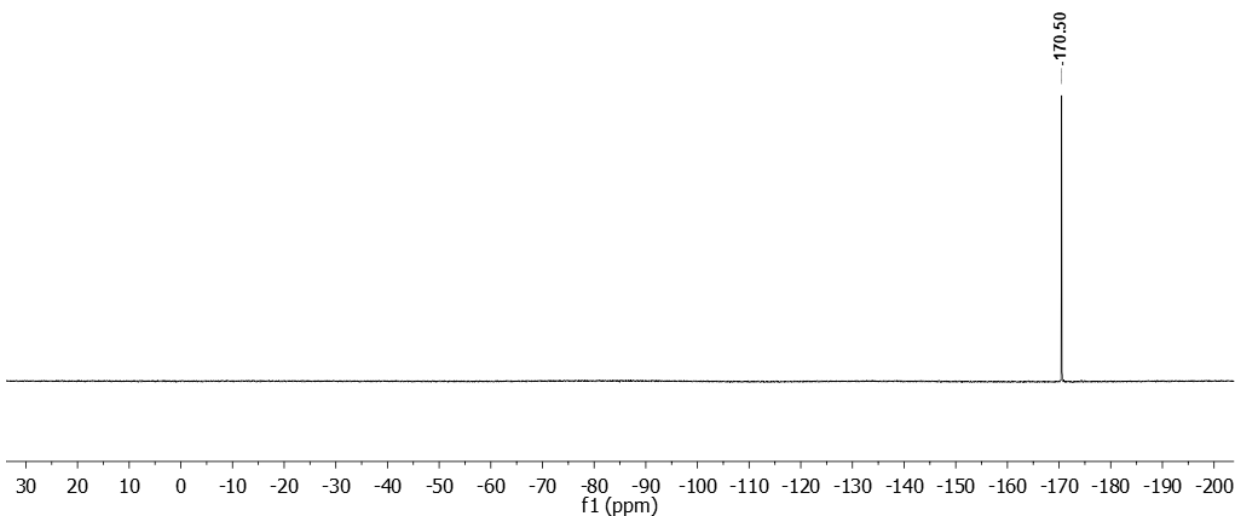




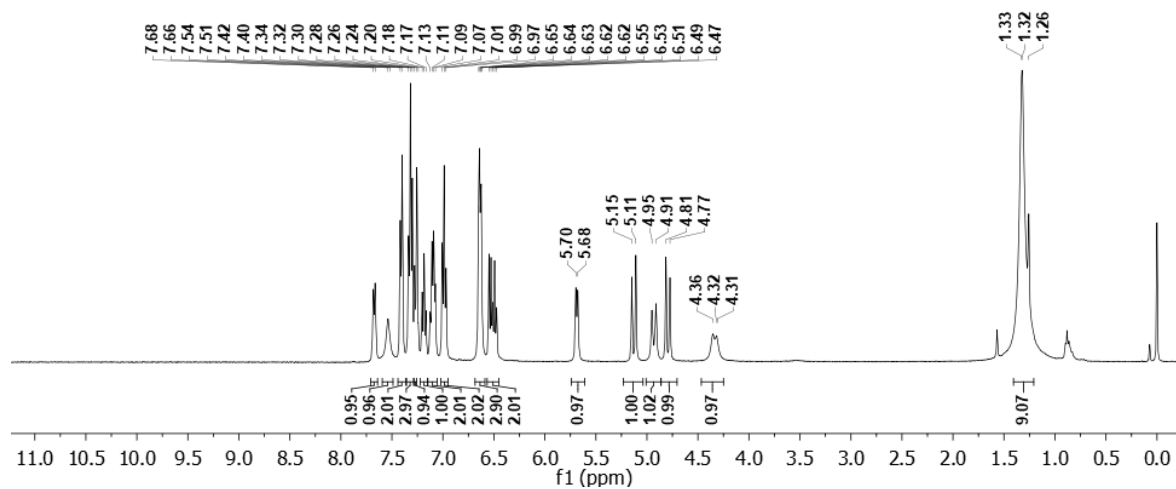
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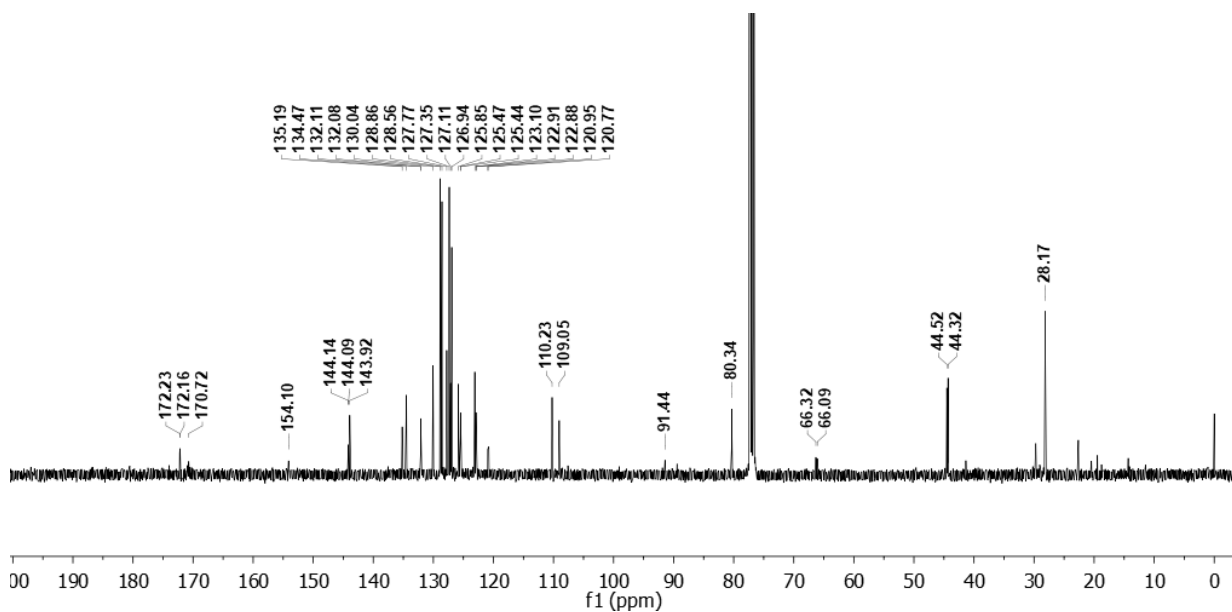
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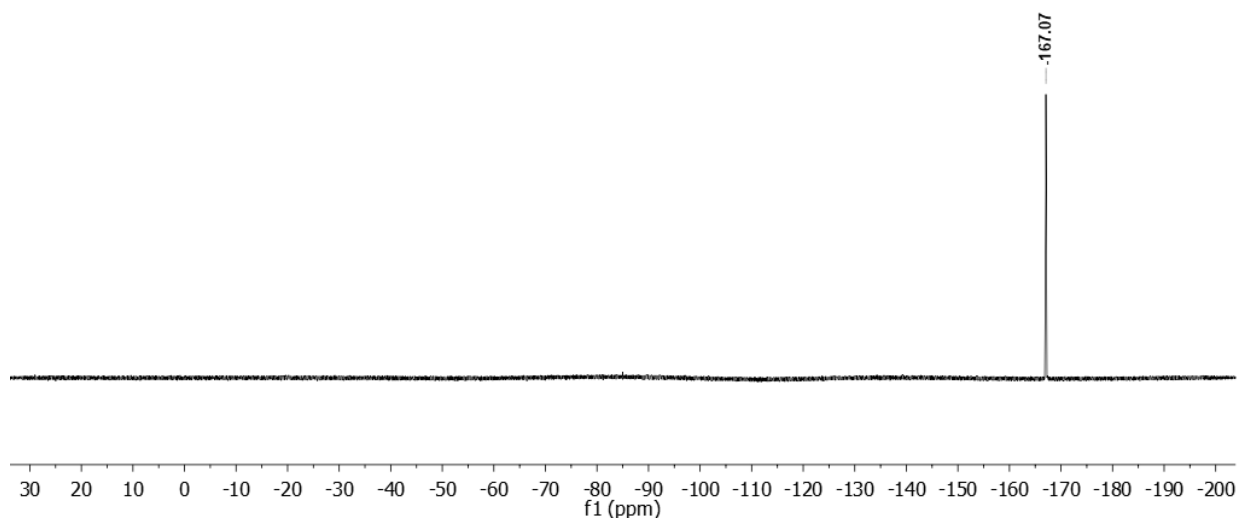
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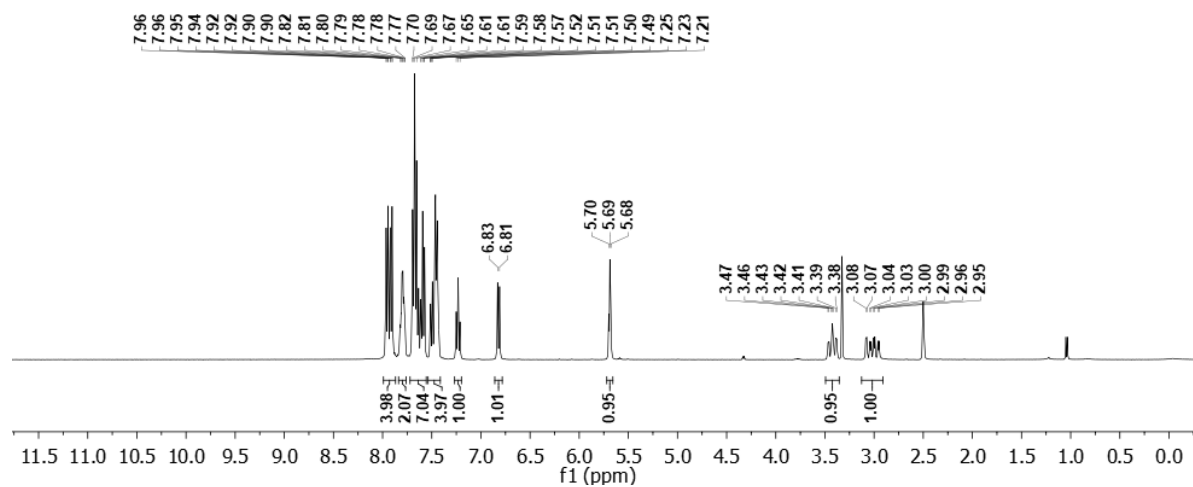
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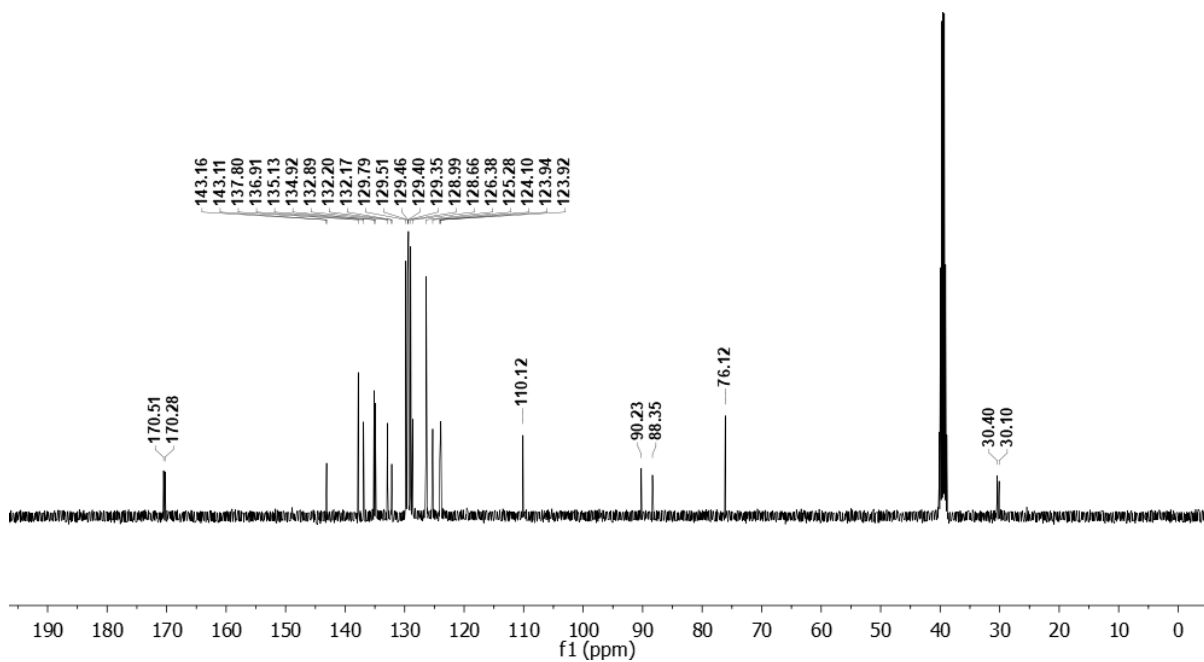
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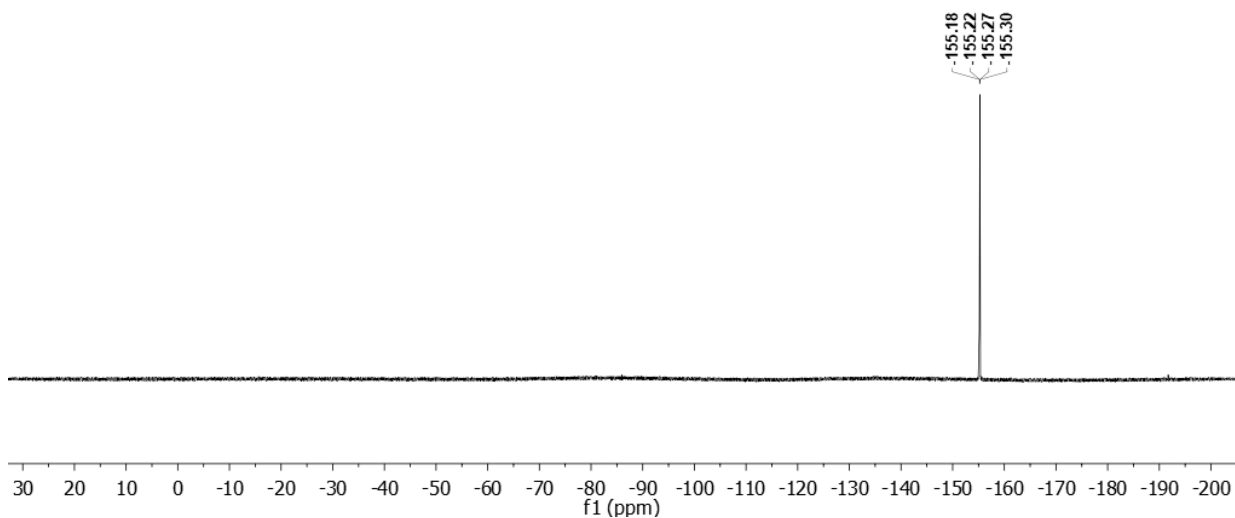
**<sup>1</sup>H NMR Spectrum of 3-(2,2-bis(phenylsulfonyl)ethyl)-3-fluoro-1-phenylindolin-2-one (23).**



**<sup>13</sup>C NMR Spectrum of 3-(2,2-bis(phenylsulfonyl)ethyl)-3-fluoro-1-phenylindolin-2-one (23).**

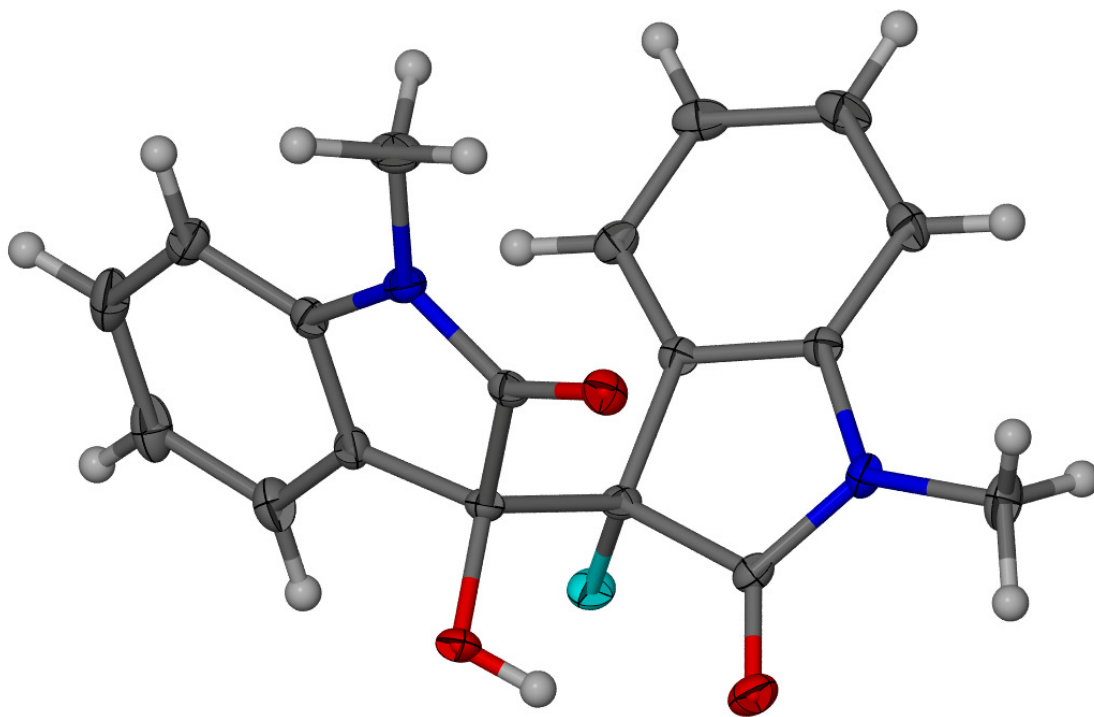


**<sup>19</sup>F NMR Spectrum of 3-(2,2-bis(phenylsulfonyl)ethyl)-3-fluoro-1-phenylindolin-2-one (23).**



## 2. Crystallographic Analysis

A single crystal of **15** was obtained by slow evaporation of a solution of the product in a mixture of ethyl acetate and hexanes. Single crystal X-ray analysis was performed at 100 K using a Siemens platform diffractometer with graphite monochromated Mo-K $\alpha$  radiation ( $\lambda = 0.71073$  Å). Data were integrated and corrected using the APEX 3 program. The structures were solved by direct methods and refined with full-matrix least-square analysis using SHELX-97-2 software. Non-hydrogen atoms were refined with anisotropic displacement parameters. Crystal data: C<sub>18</sub>H<sub>15</sub>FN<sub>2</sub>O<sub>3</sub>,  $M = 326.32$ , colorless block, 0.3 x 0.2 x 0.2 mm<sup>3</sup>, triclinic, space group  $P-1$ ,  $a = 7.8941(5)$ ,  $b = 8.26666(5)$ ,  $c = 11.9759(8)$  Å,  $V = 748.38(8)$  Å<sup>3</sup>,  $Z = 2$ .



X-ray structure (50% ellipsoid probability) of (3*S*,3'*S*)-3-fluoro-3'-hydroxy-1,1'-dimethyl-3,3'-biindoline-2,2'-dione, **15**.

## 3. References

1. a) Xie, C.; Zhang, L.; Sha, W.; Soloshonok, V. A.; Han, J.; Pan, Y. *Org. Lett.* **2016**, *18*, 3270-3273. b) Balaraman, K., Wolf, C., *Angew. Chem. Int. Ed.* **2017**, *56*, 1390-1395.