

**Electrochemical C-H Halogenations of Enaminones and Electron  
Rich Arenes with Sodium Halide (NaX) as Halogen Source for the  
Synthesis of 3-Halochromones and Haloarenes**

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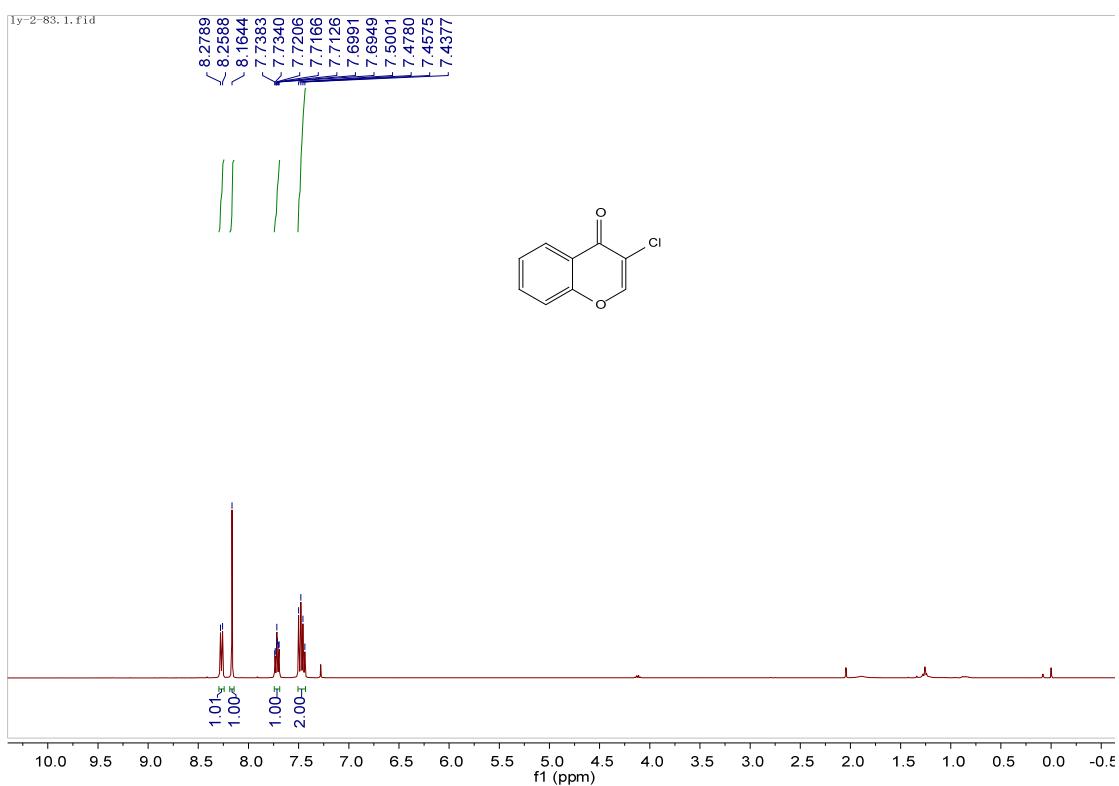
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Nanchang 330022, P. R. China

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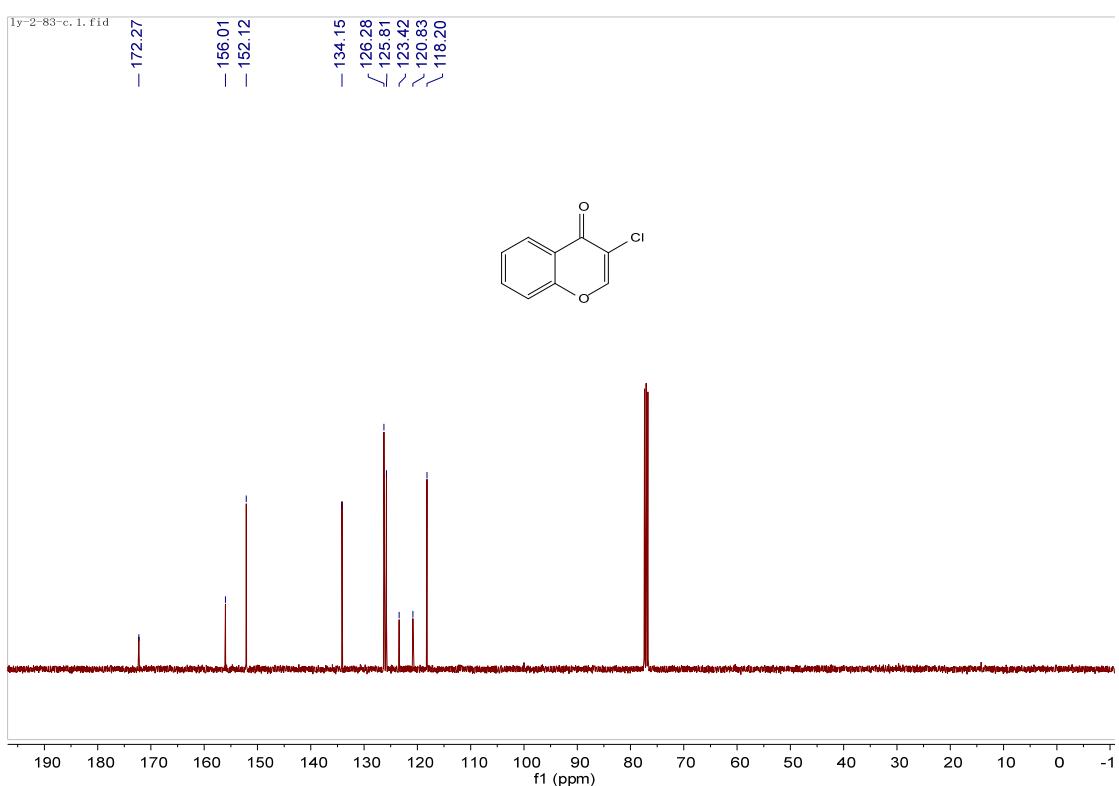
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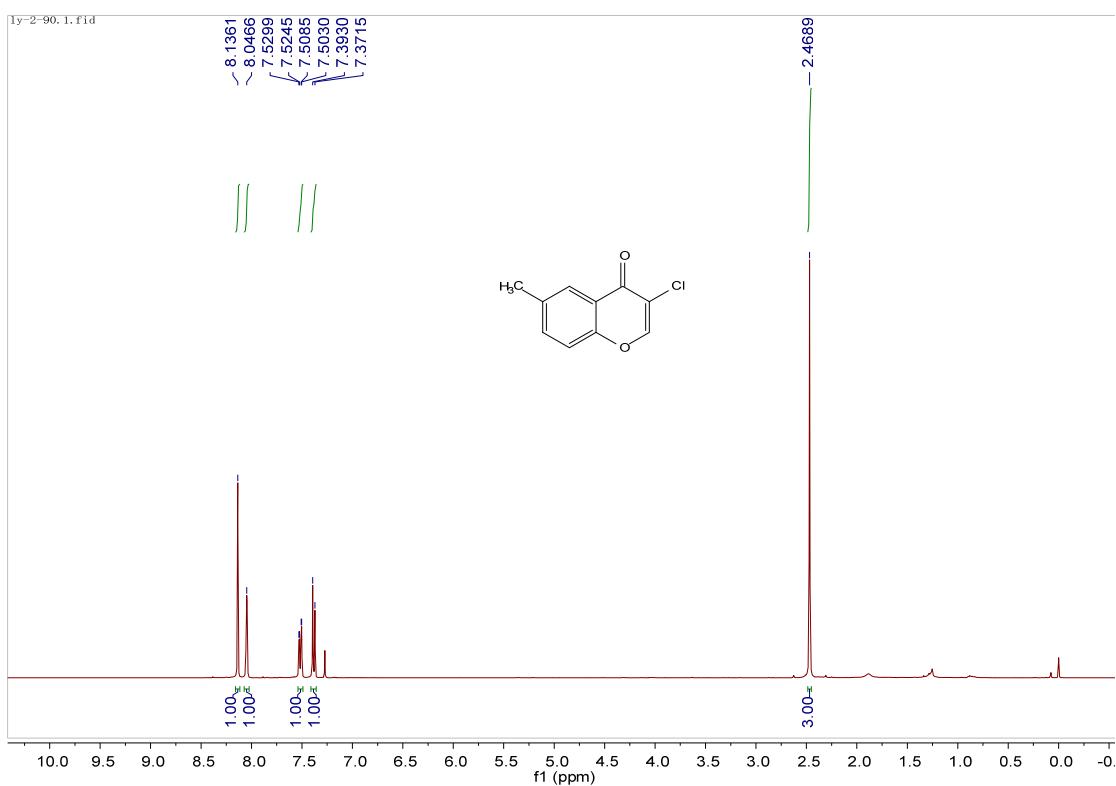
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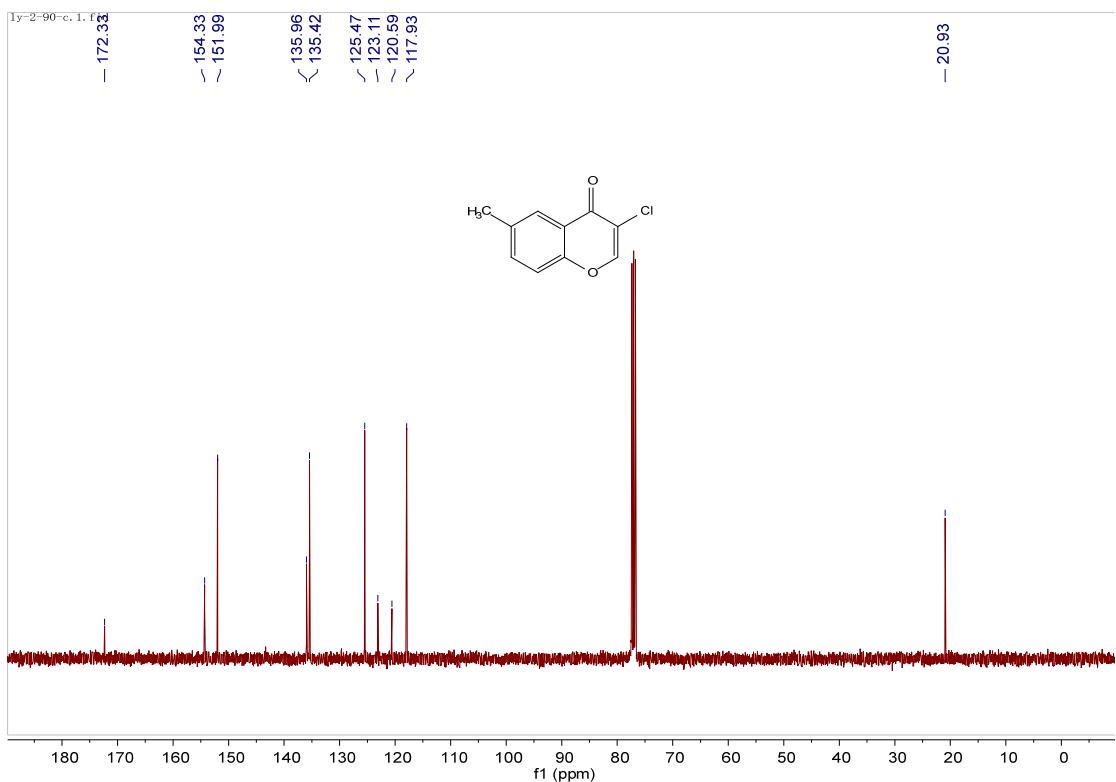
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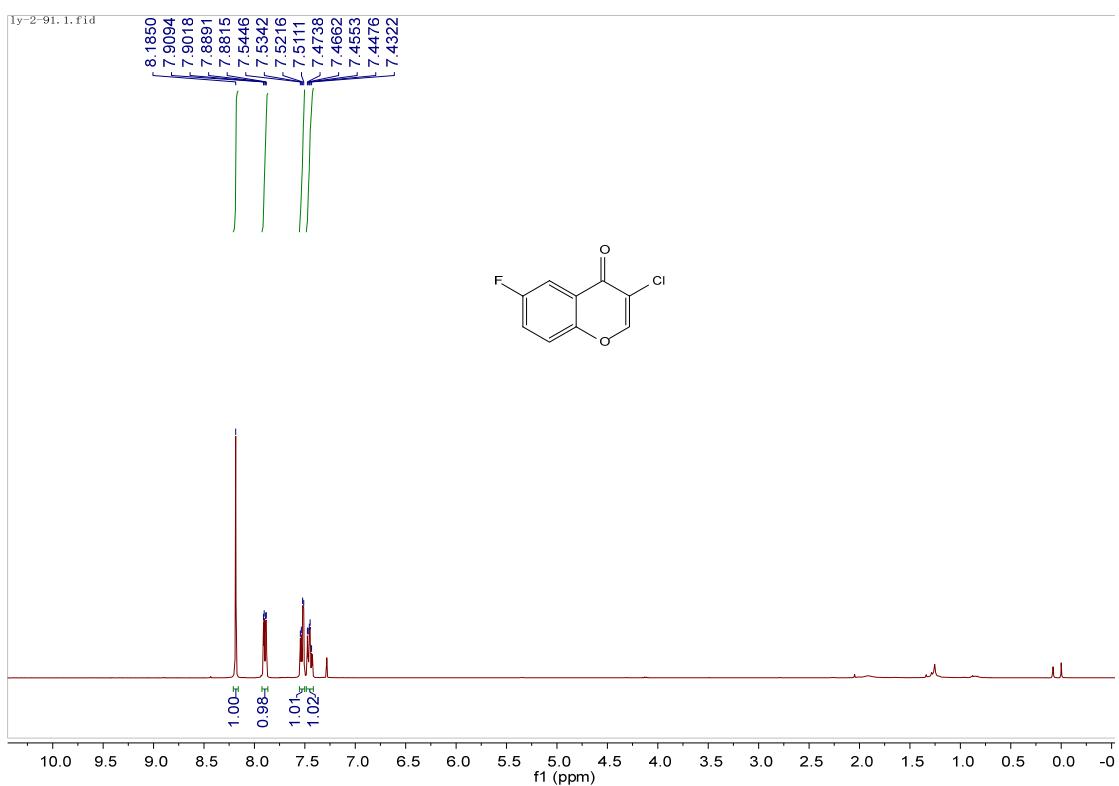
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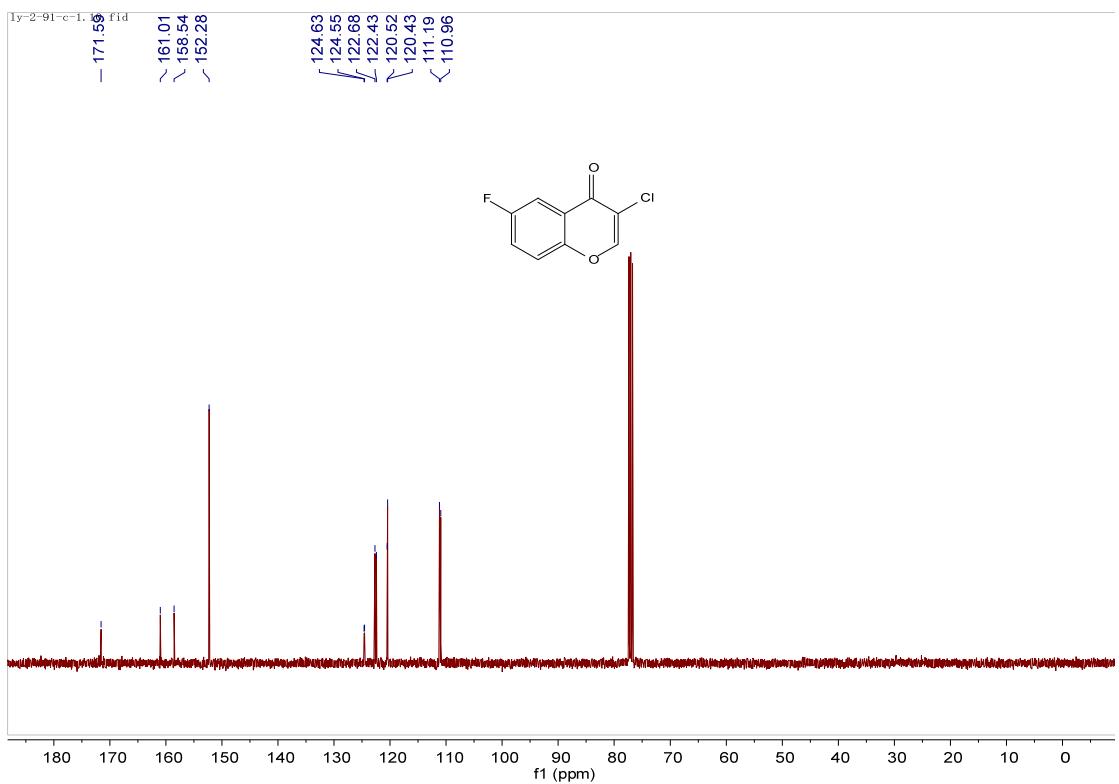
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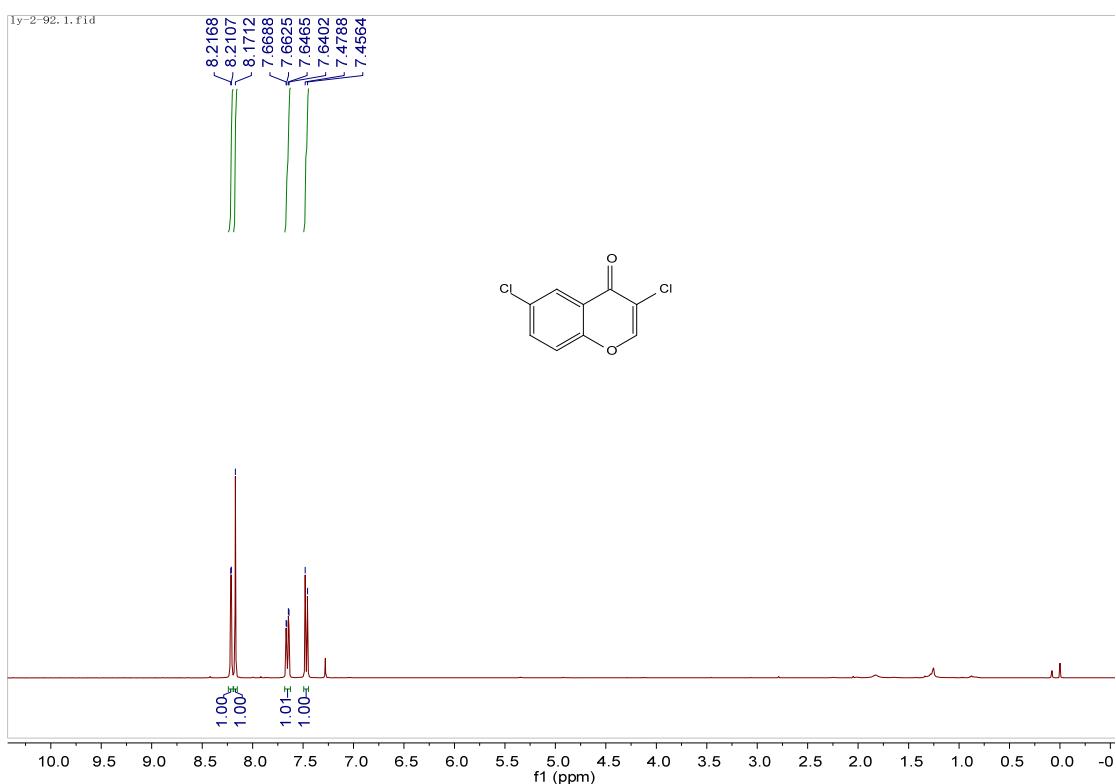
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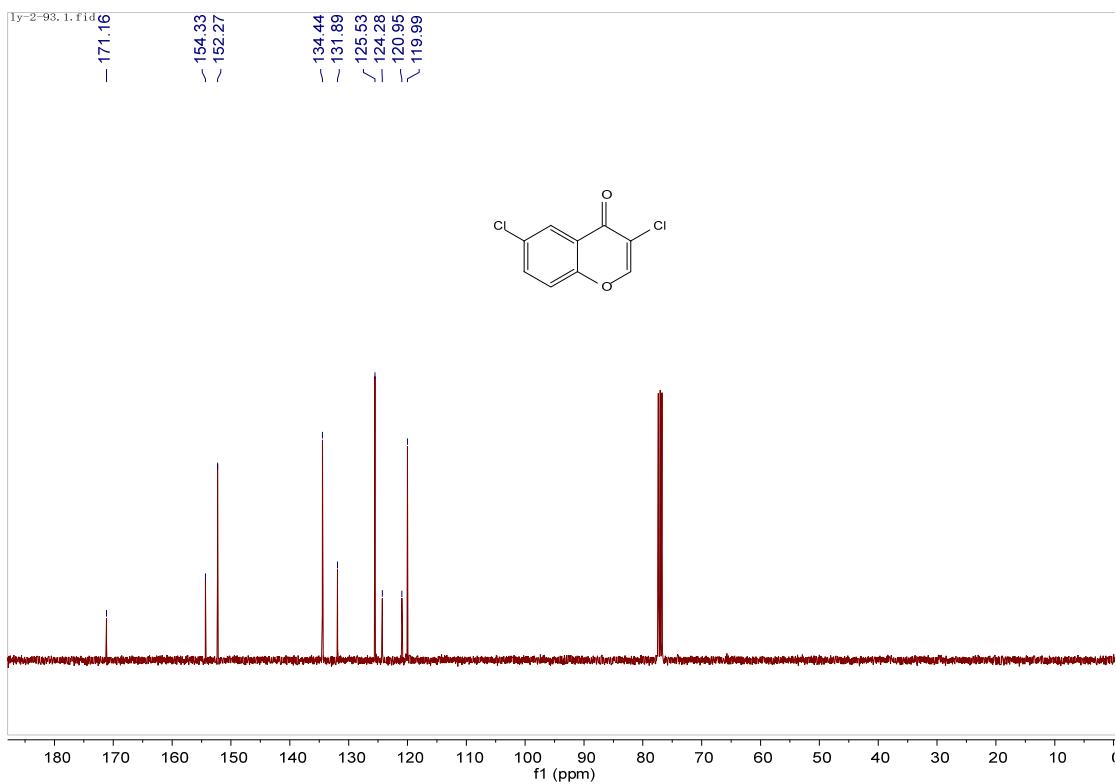
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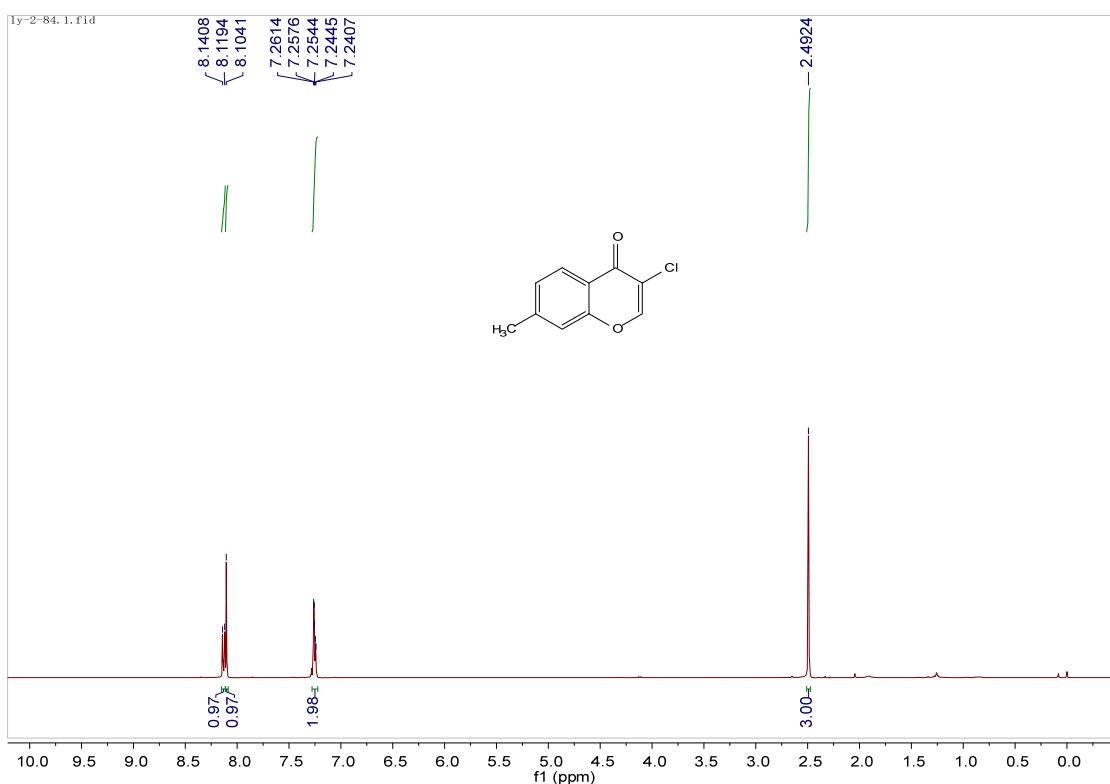
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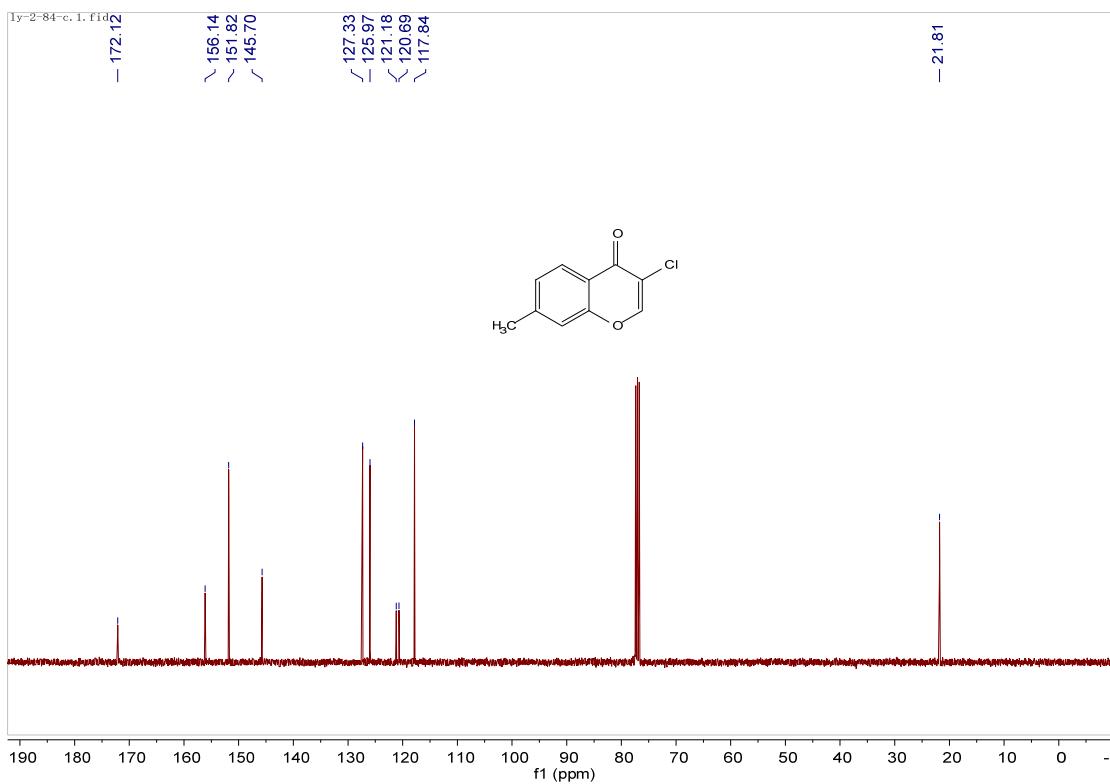
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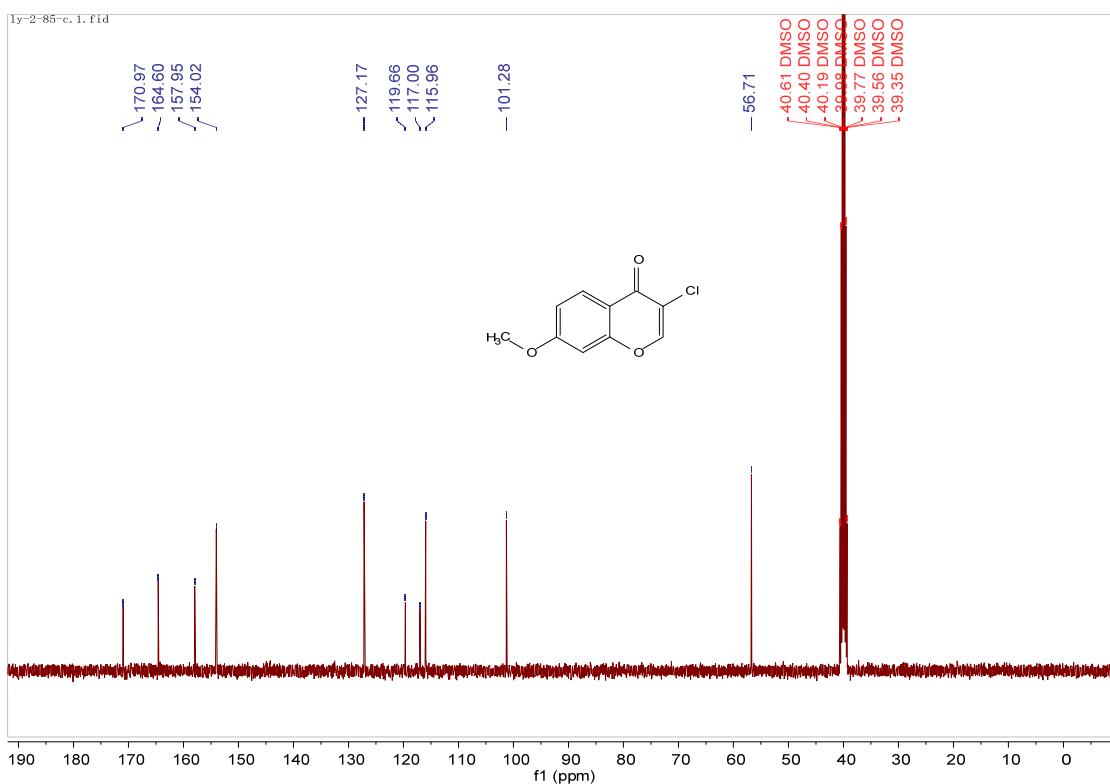
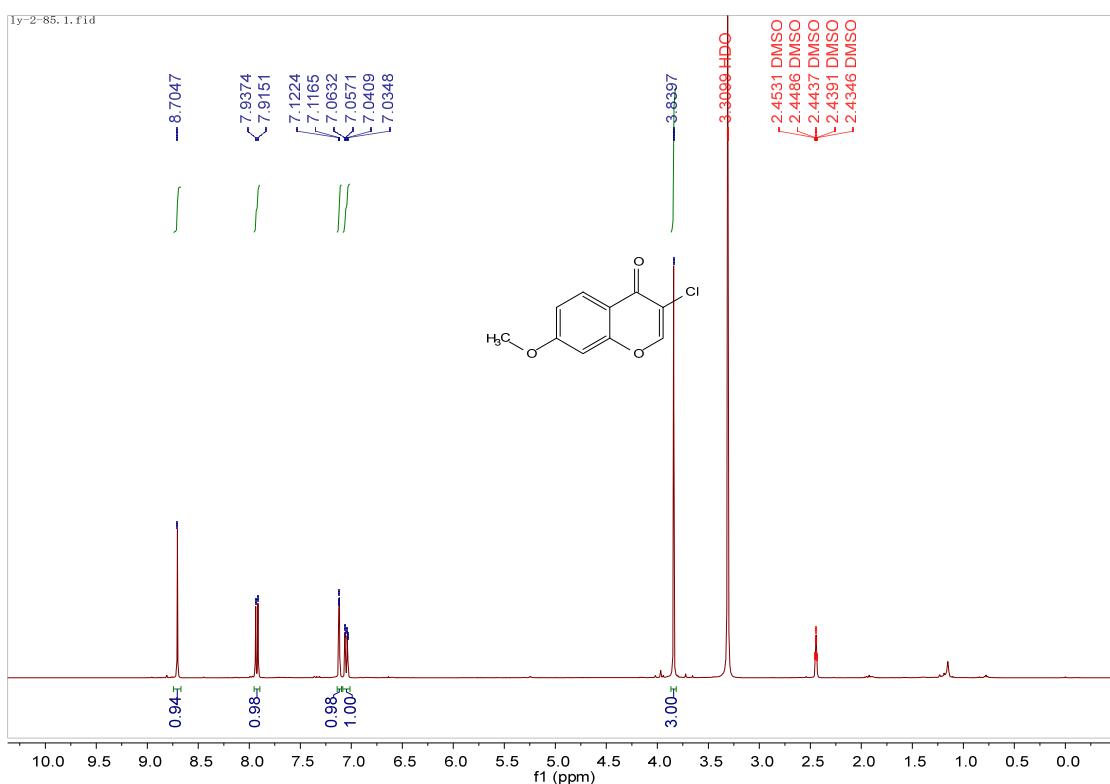
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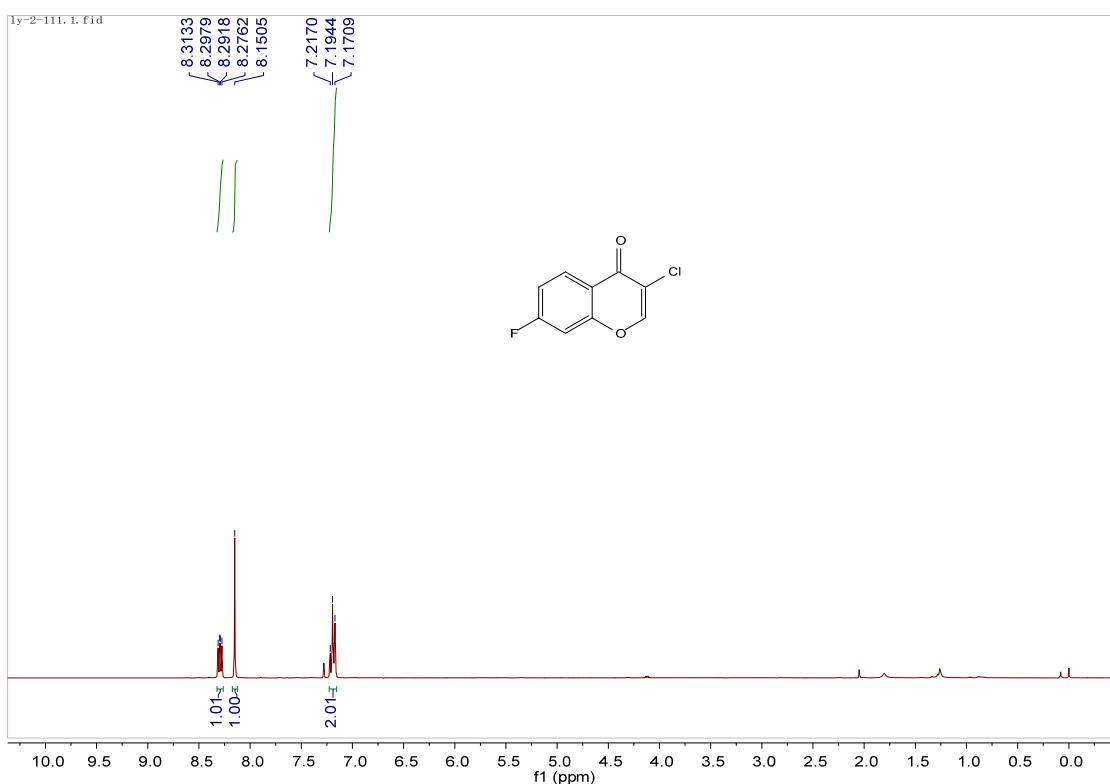


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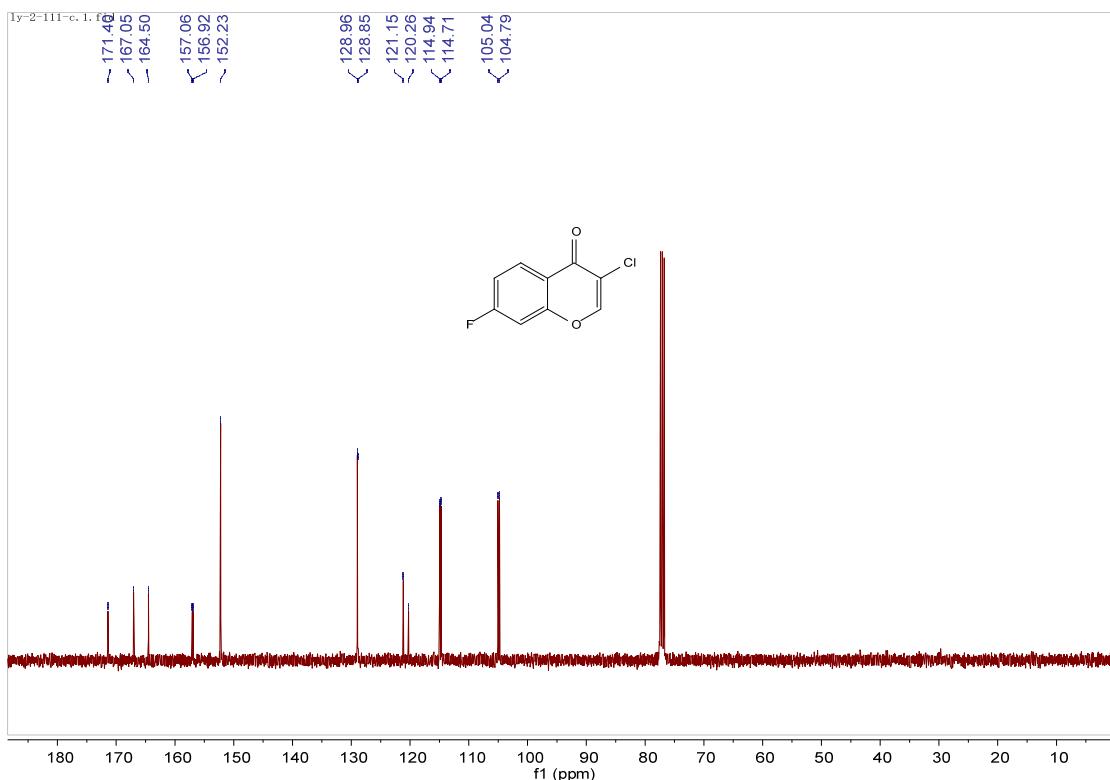


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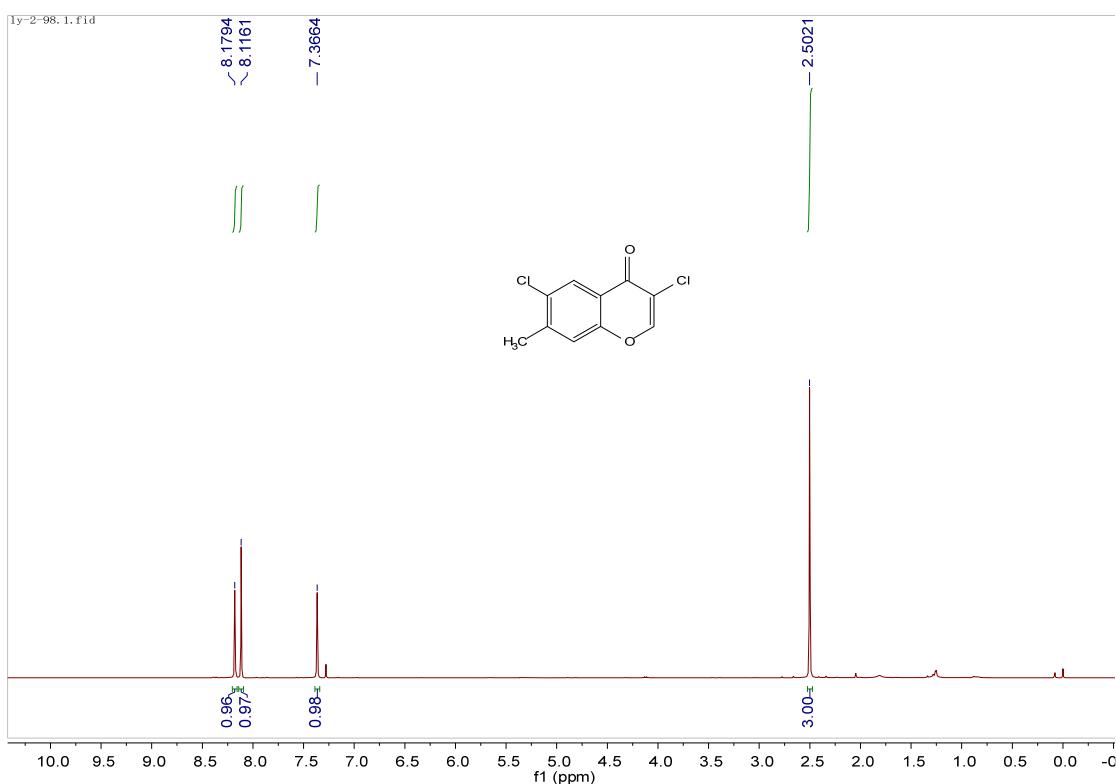




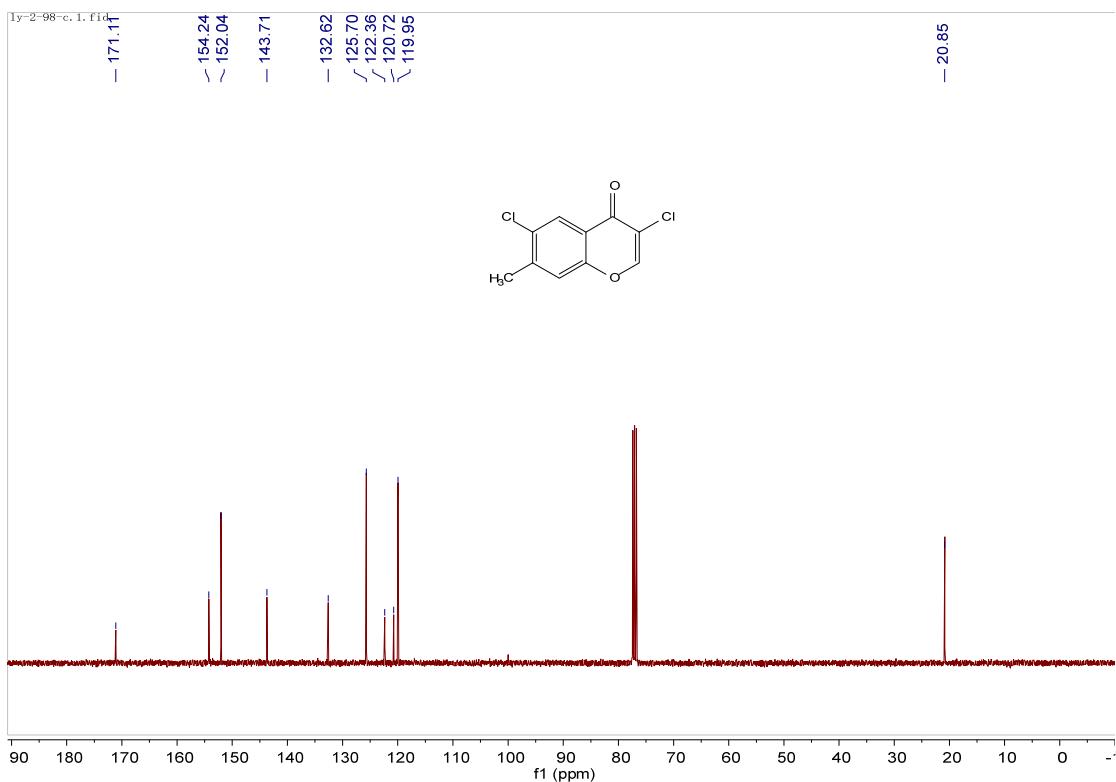
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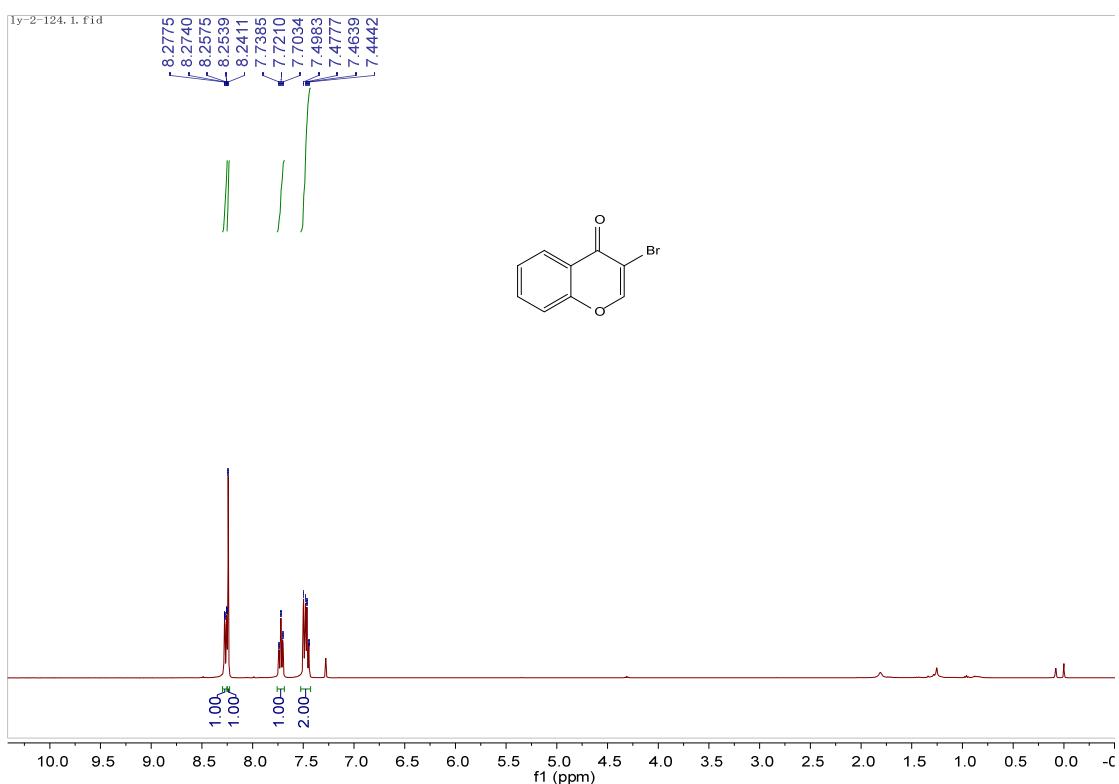
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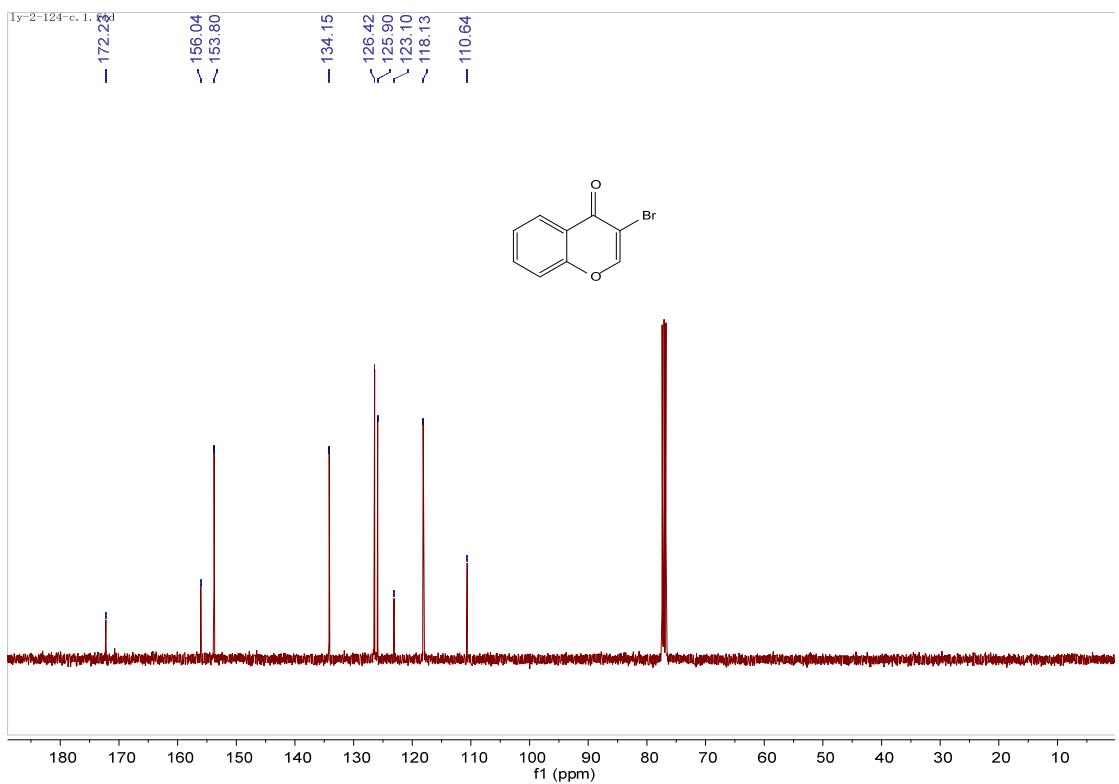
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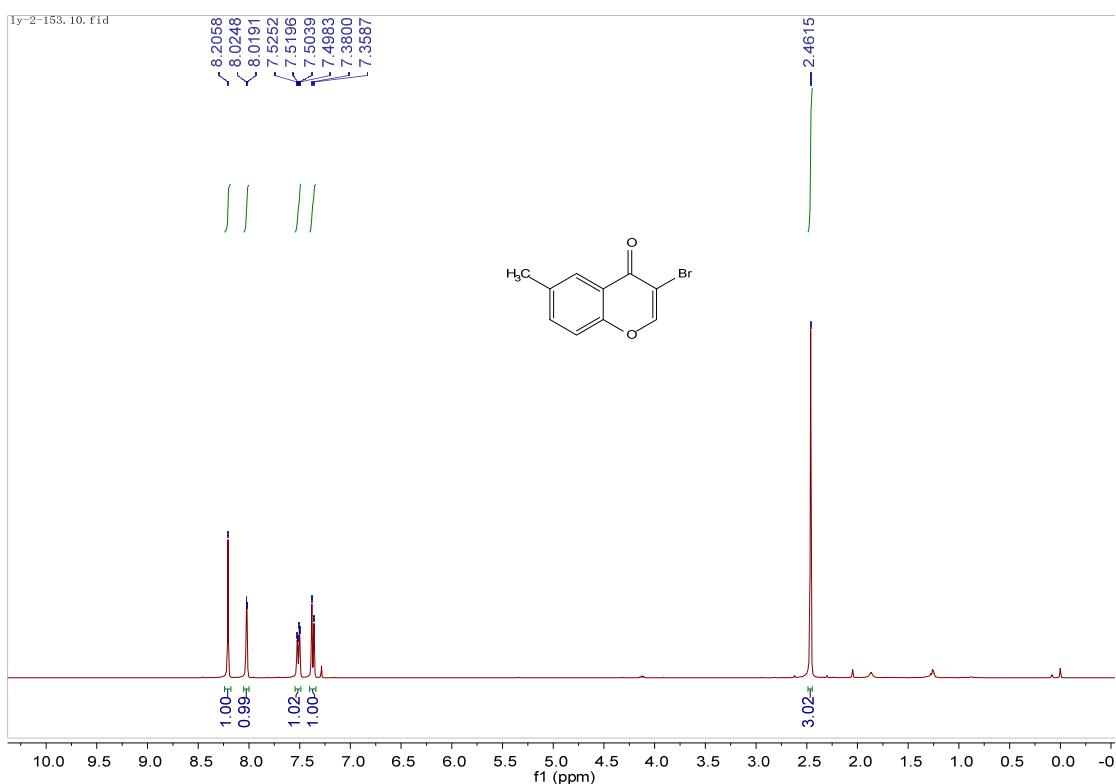
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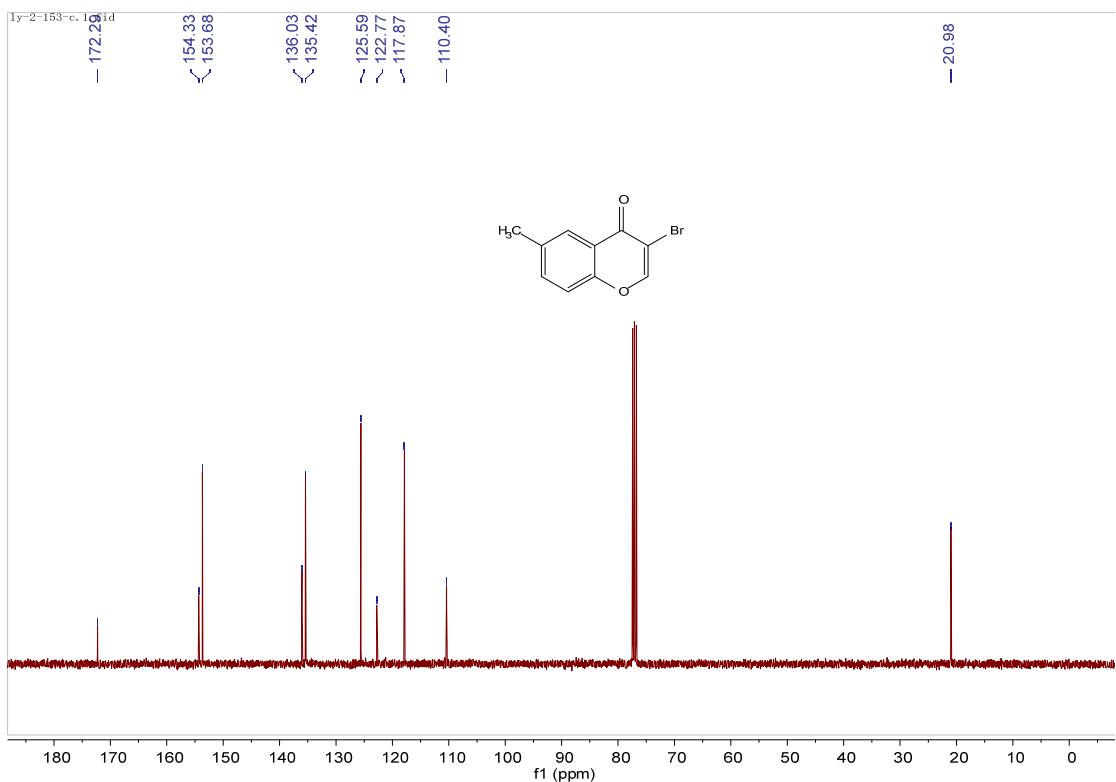
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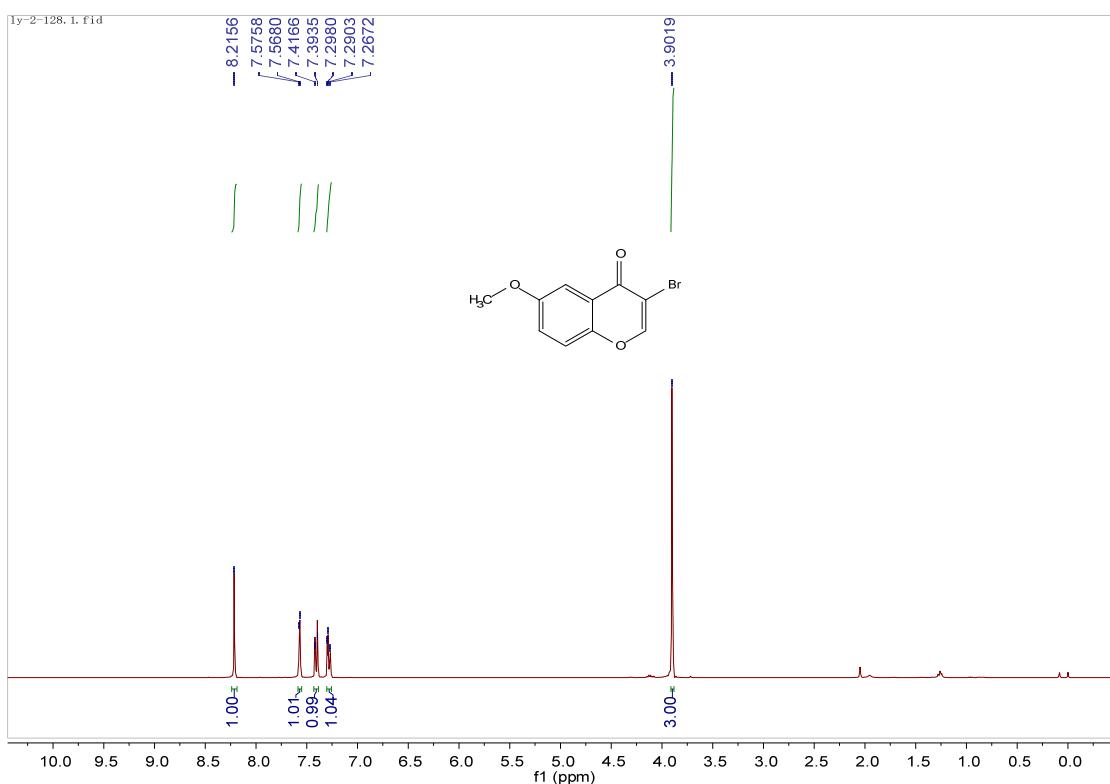
$^{13}\text{C}\{^1\text{H}\}$  NMR spectrum of 3i ( $\text{CDCl}_3$ , 100 MHz)



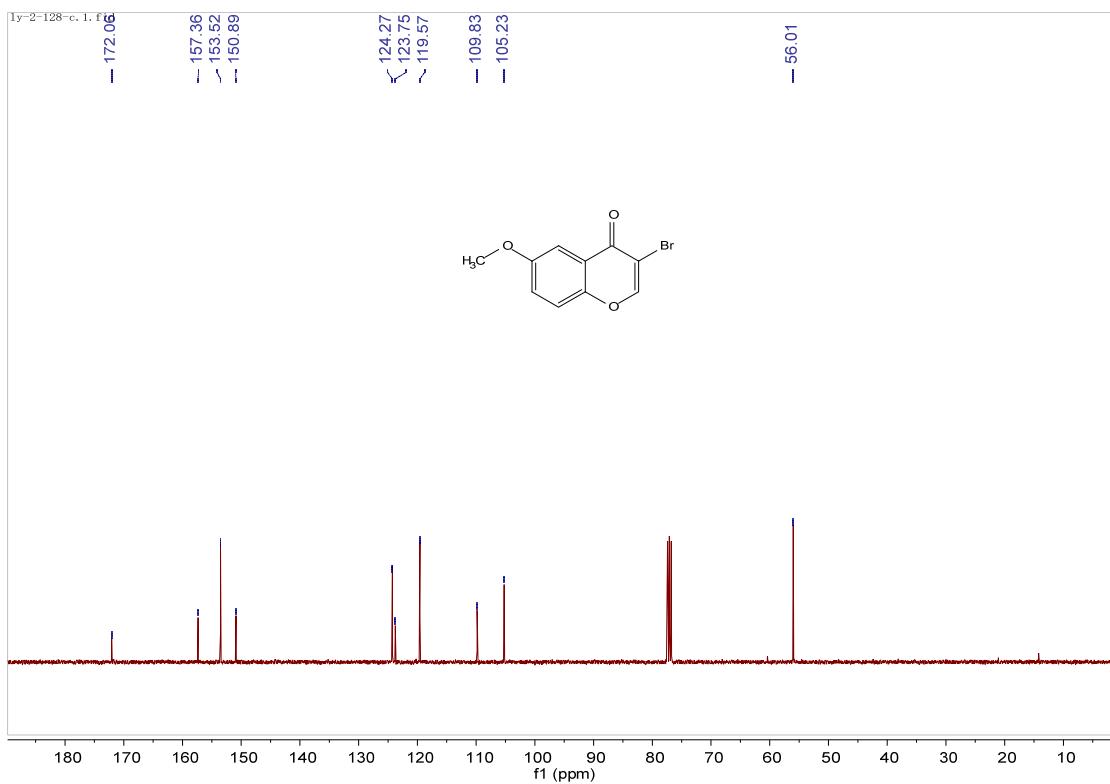
**$^1\text{H}$  NMR spectrum of 3j ( $\text{CDCl}_3$ , 400 MHz)**



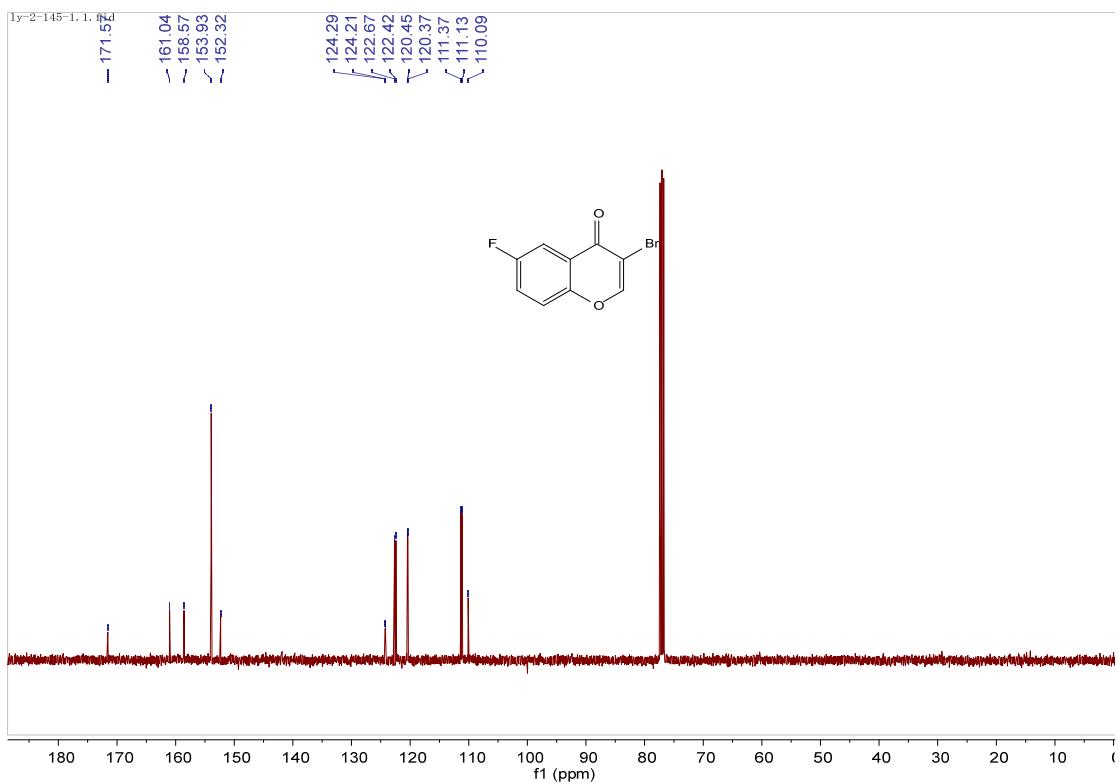
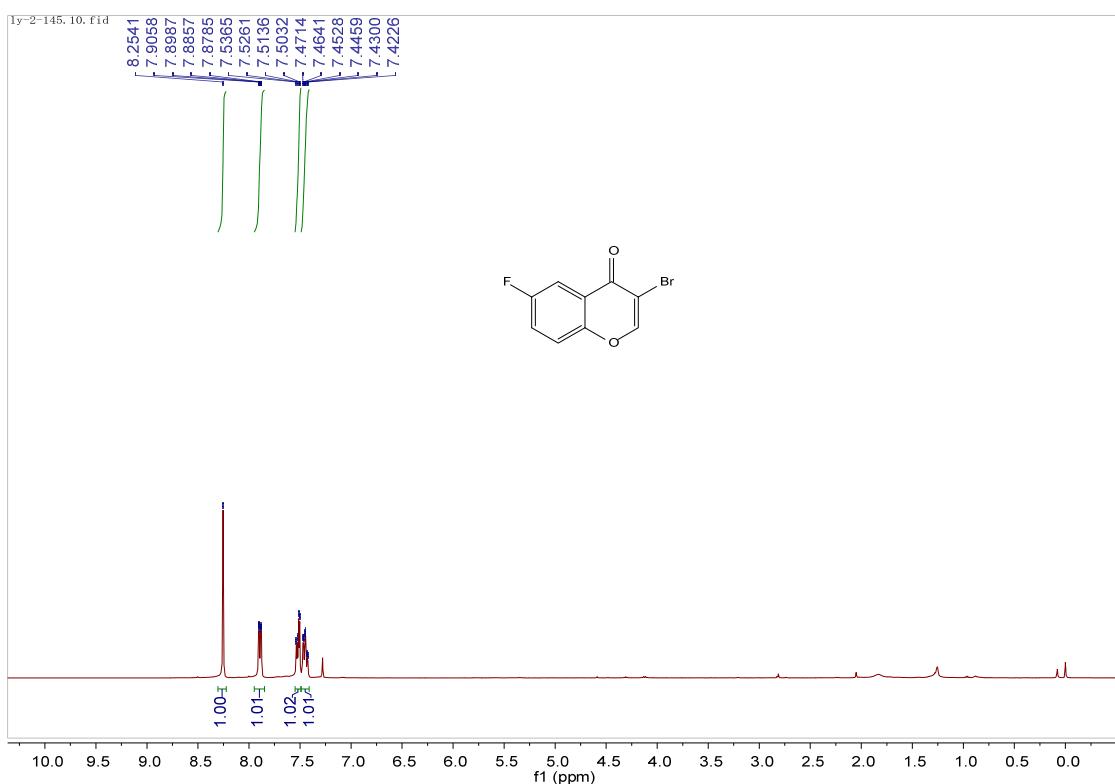
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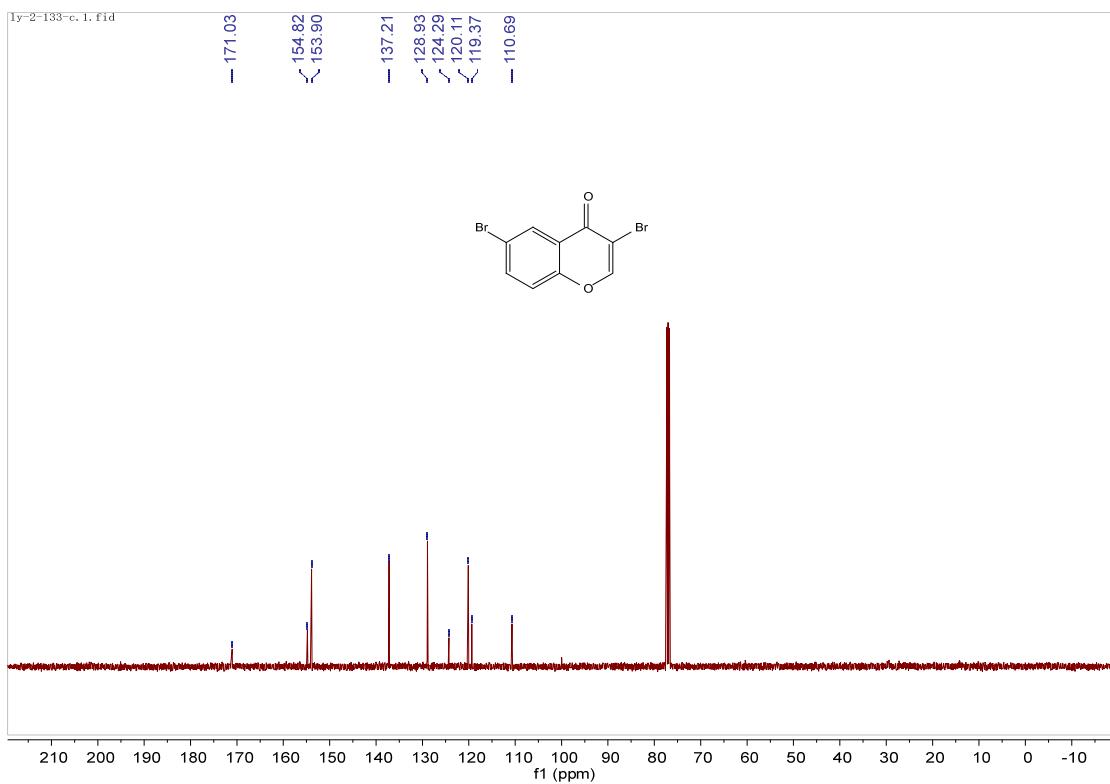
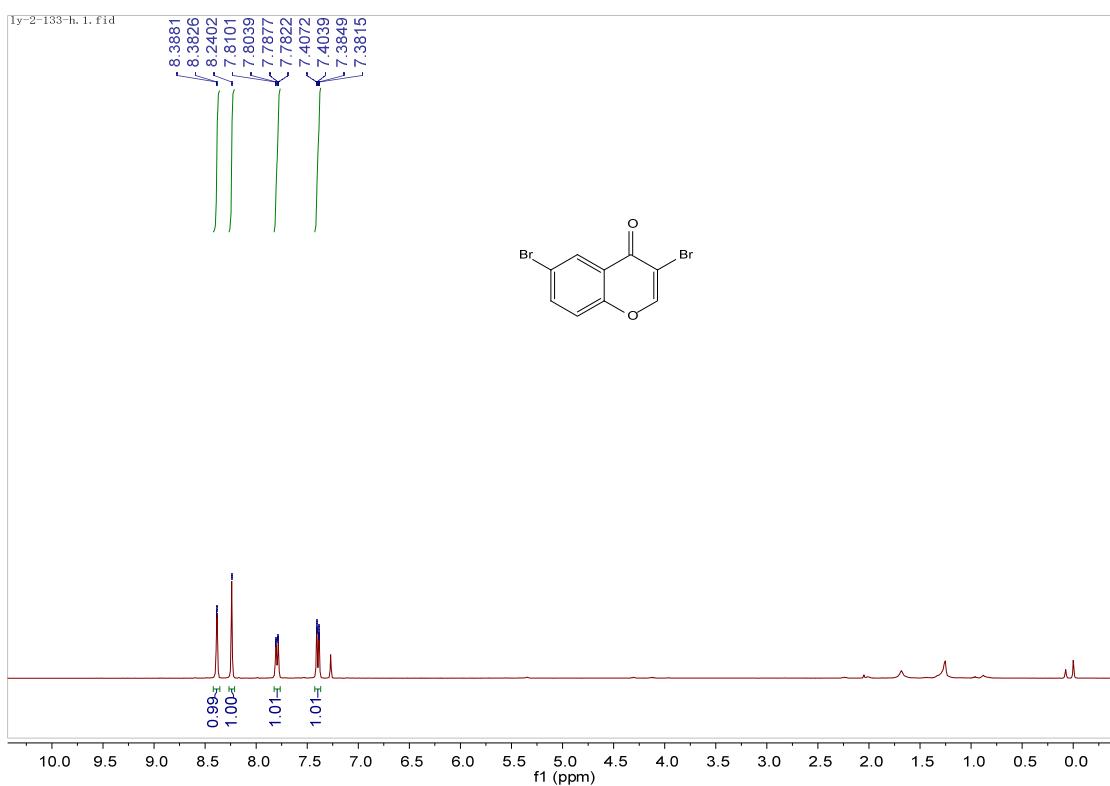


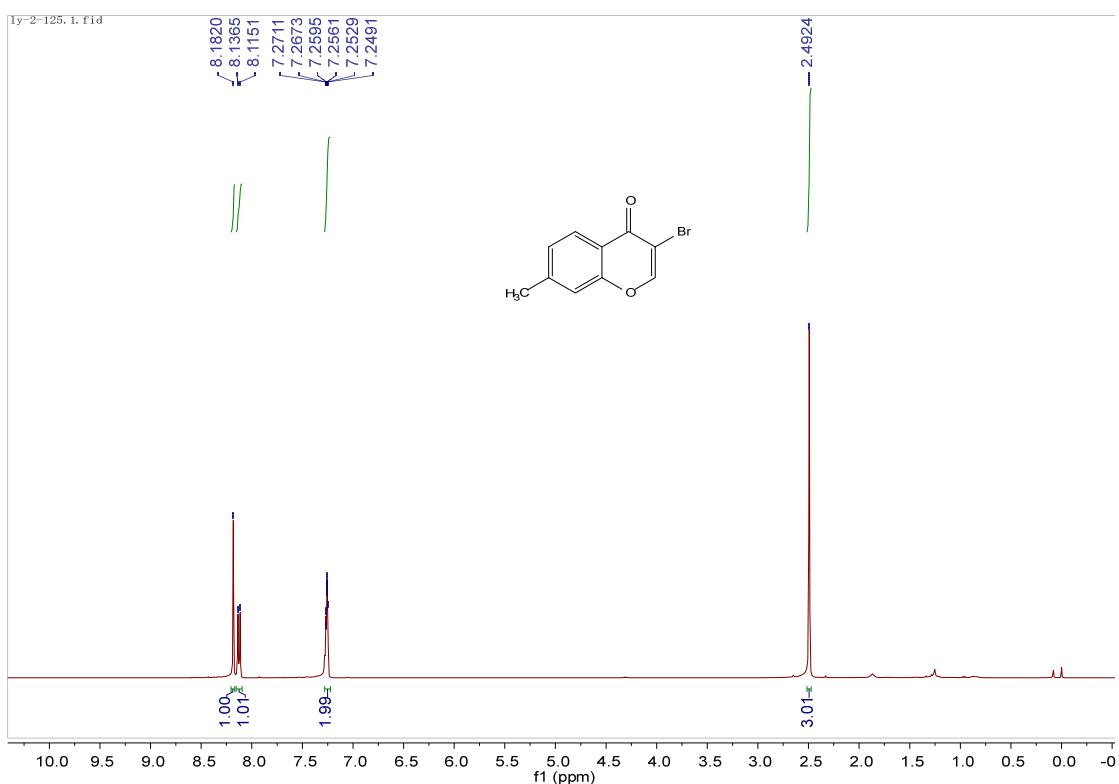
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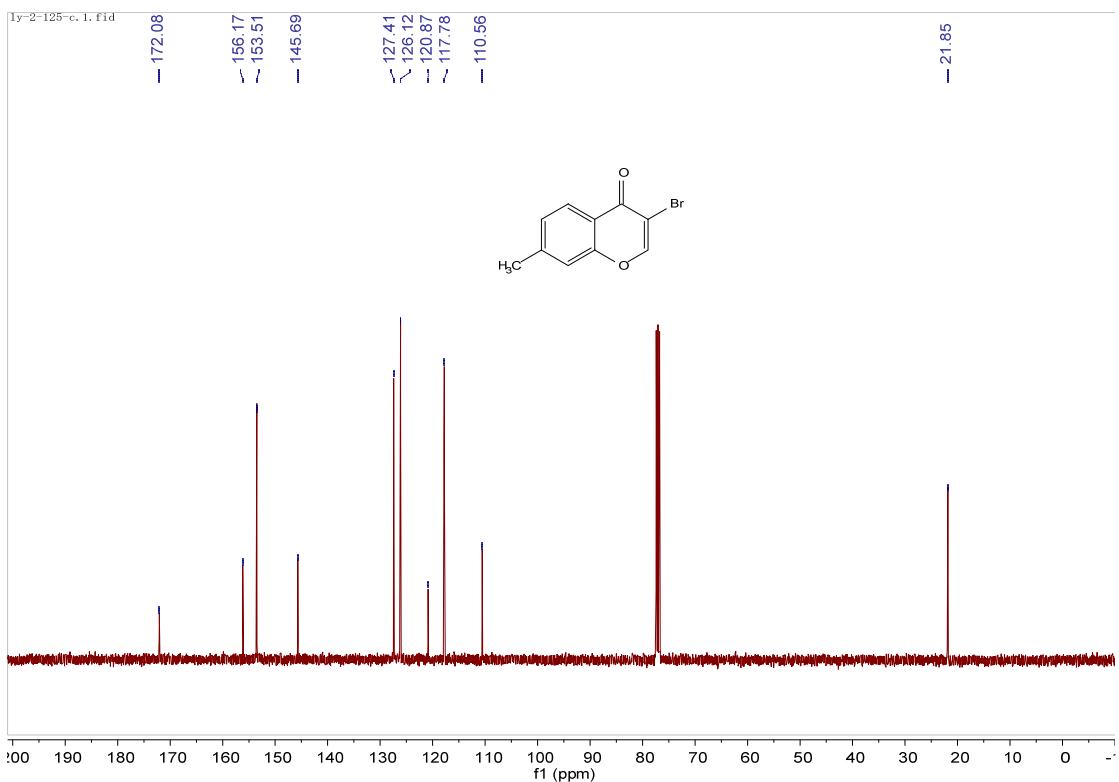
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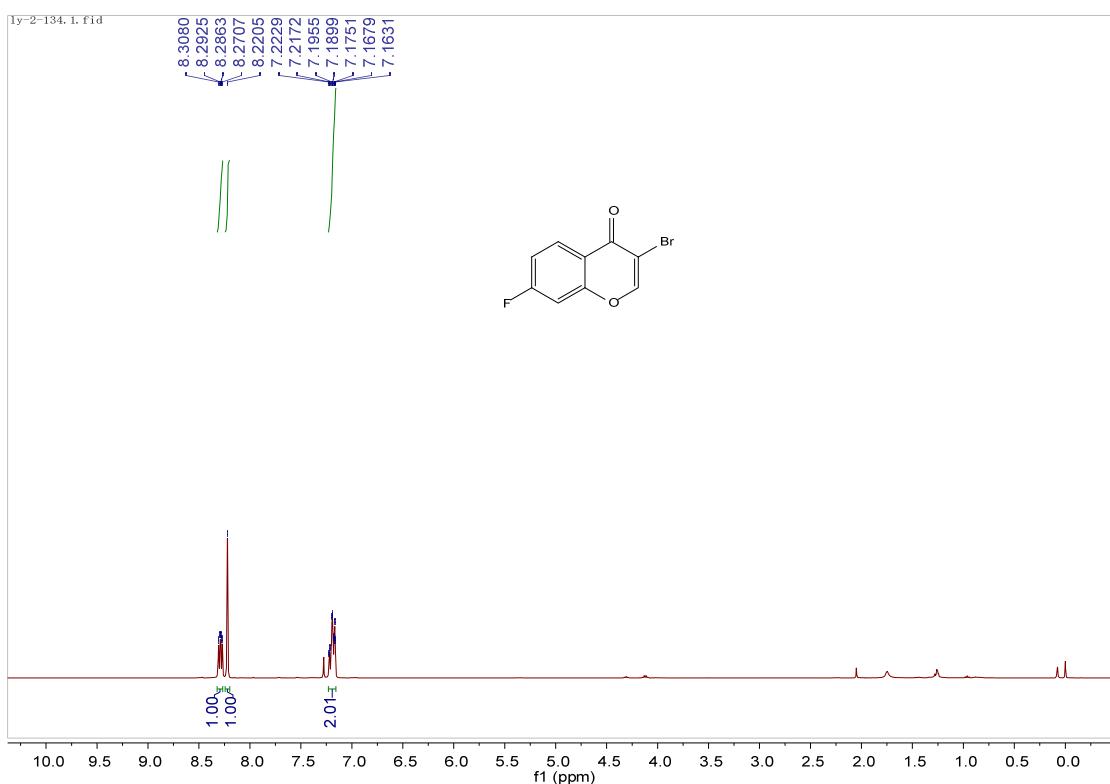




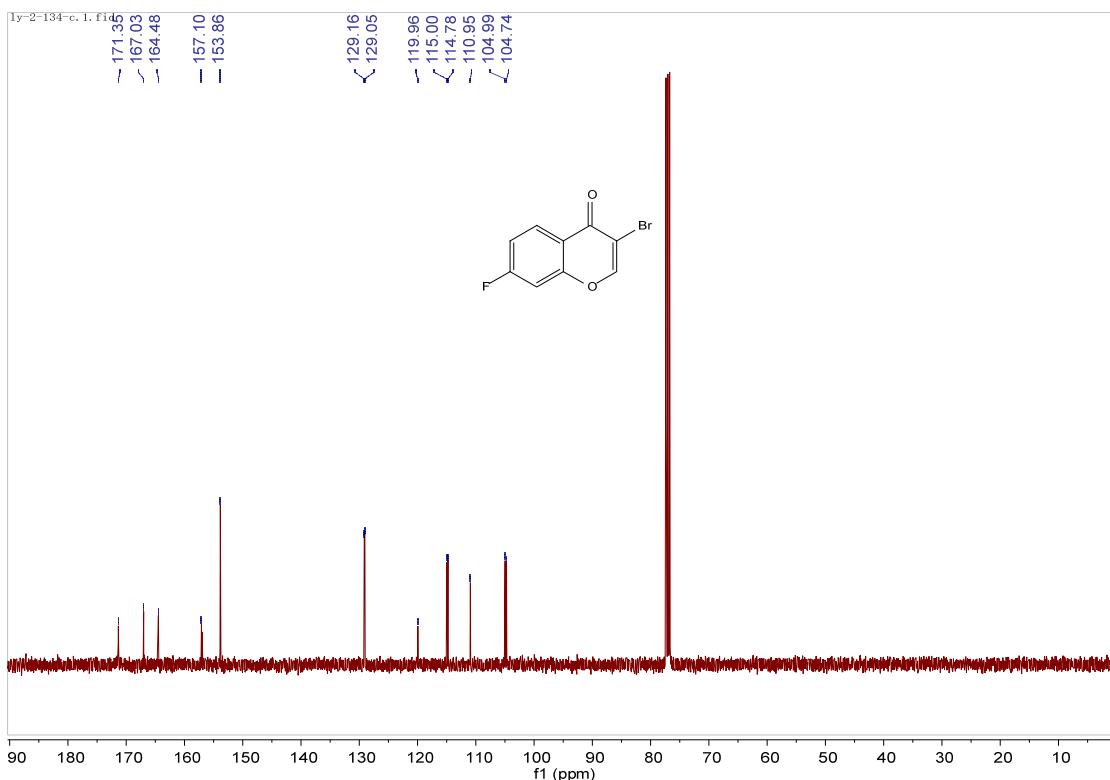
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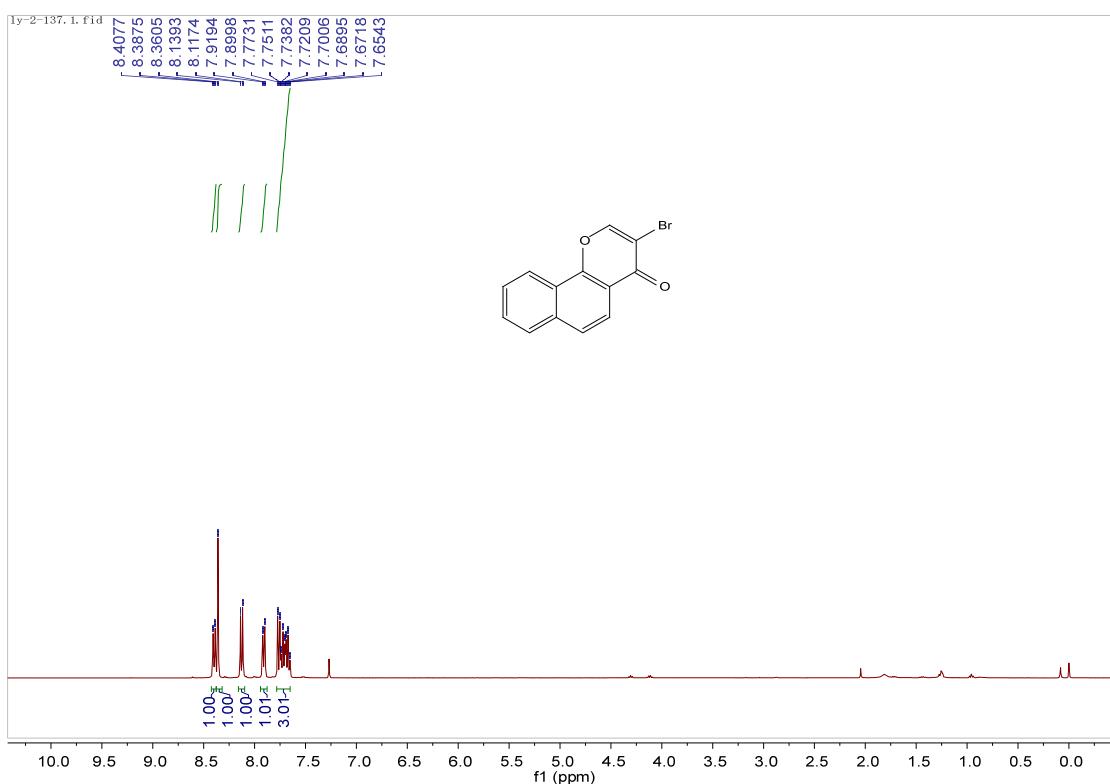
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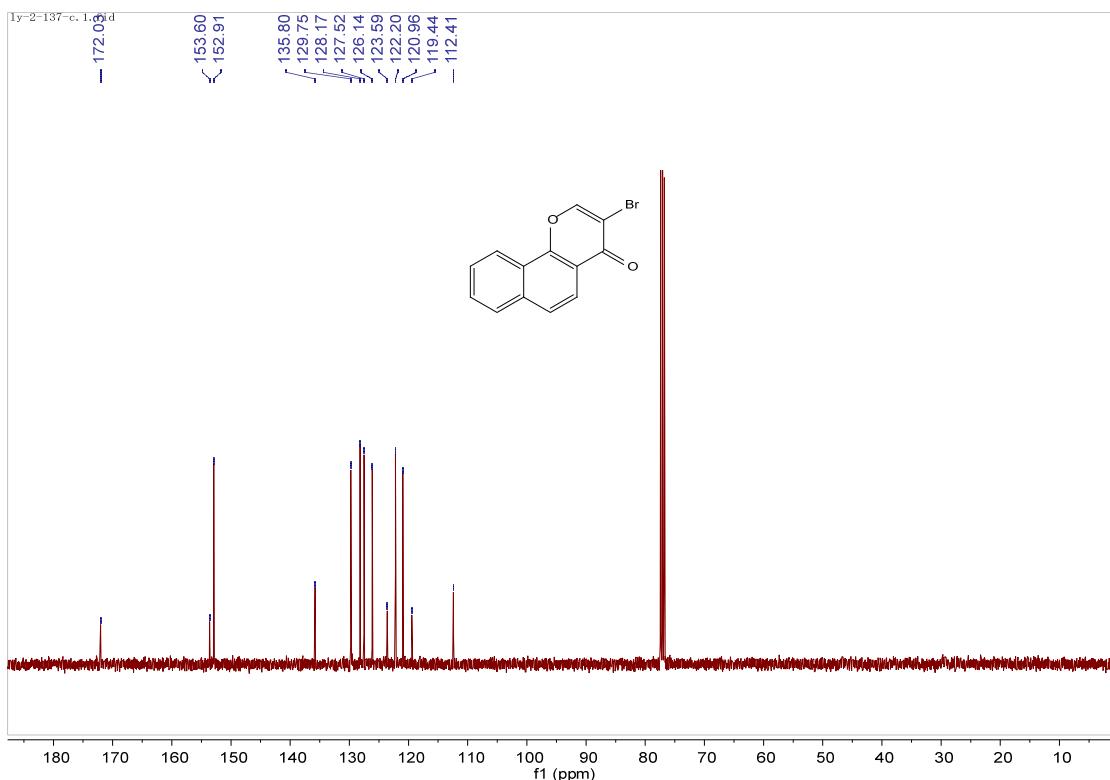
**$^1\text{H}$  NMR spectrum of 3o ( $\text{CDCl}_3$ , 400 MHz)**



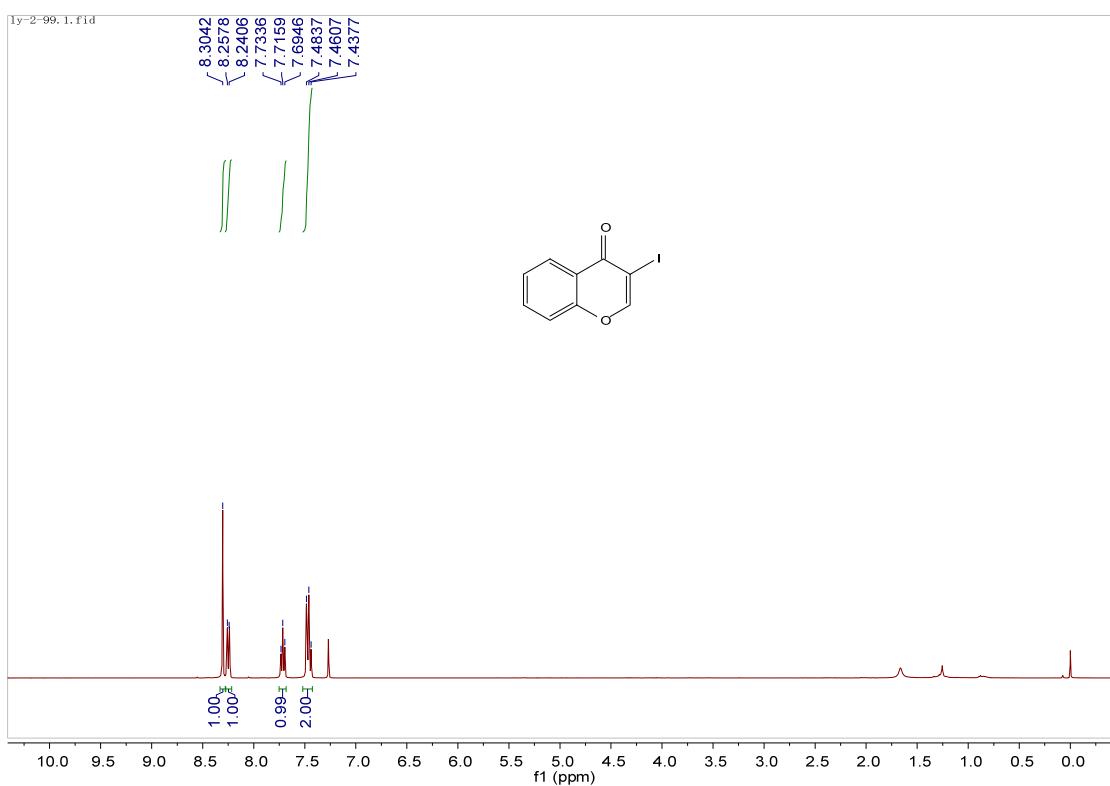
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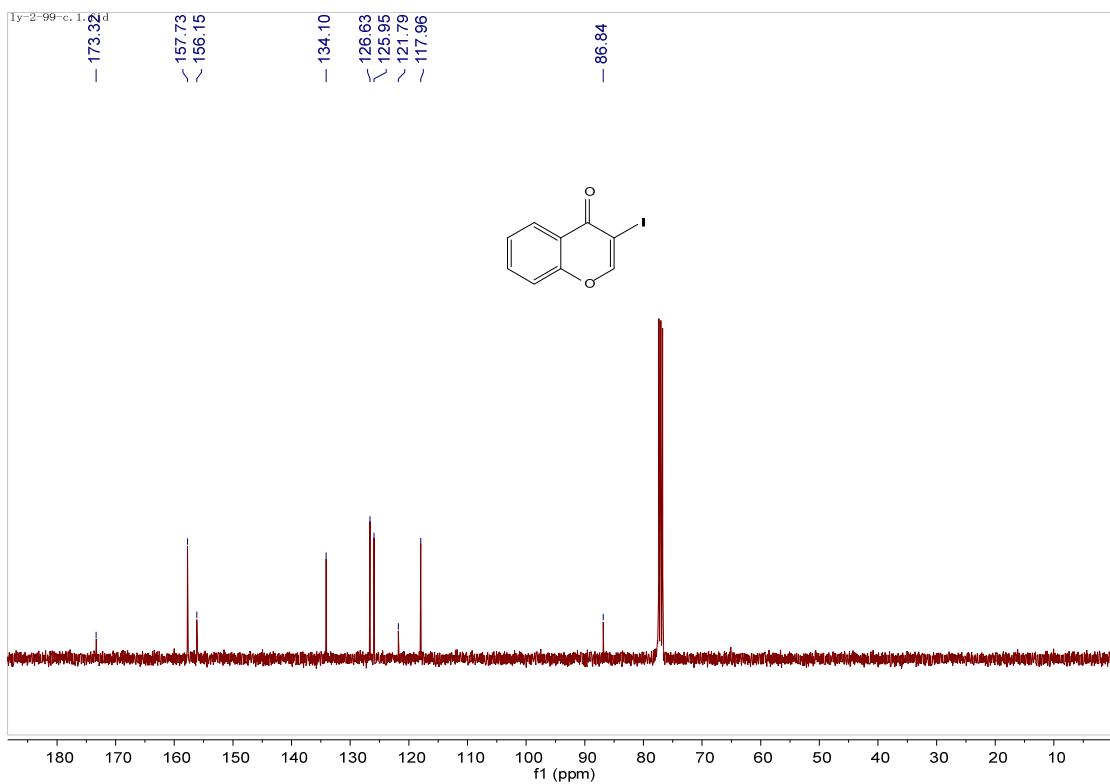
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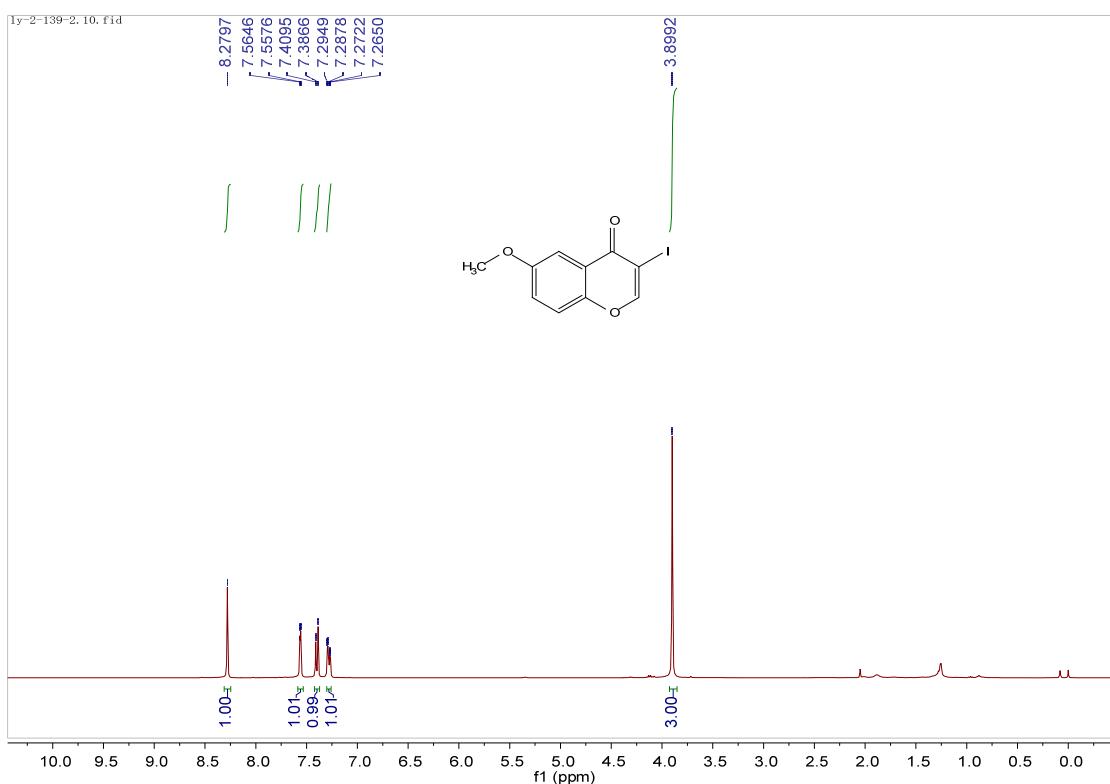
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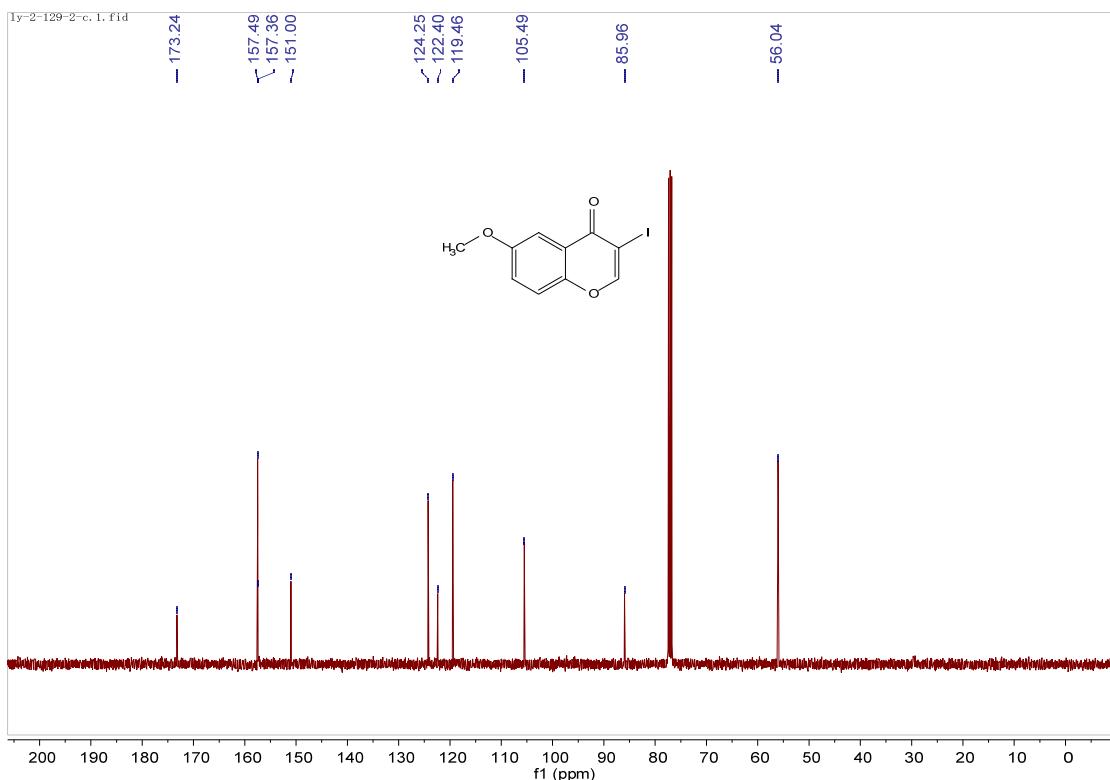
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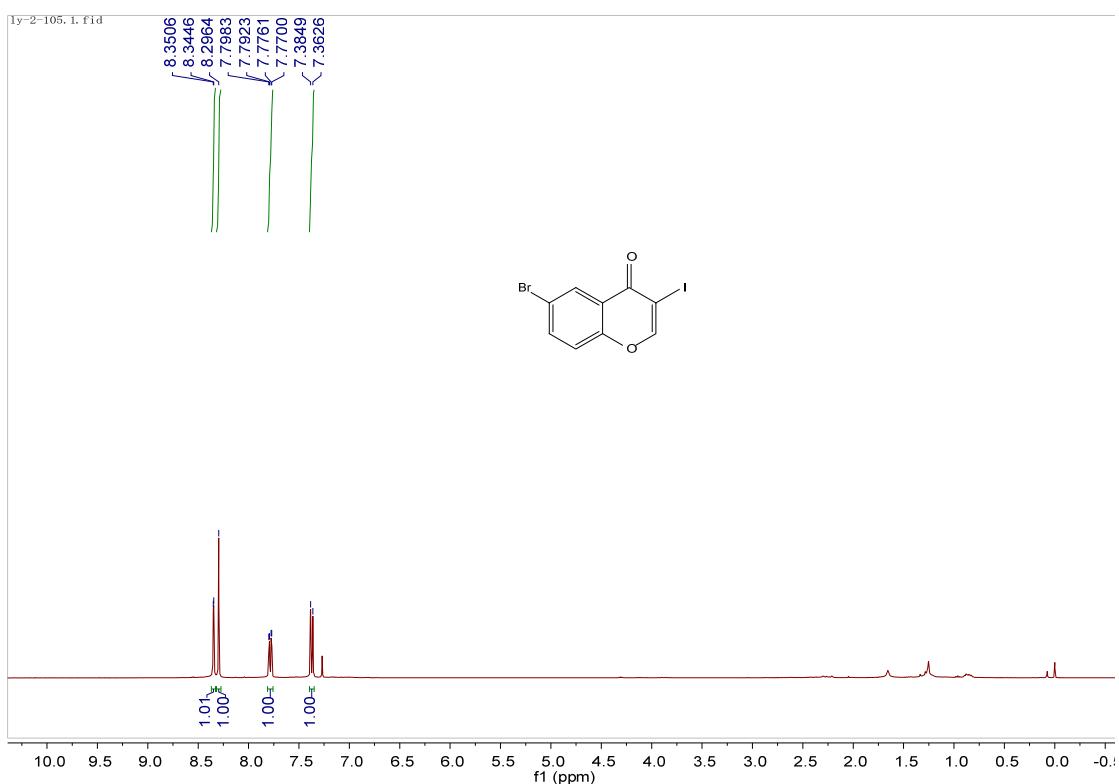
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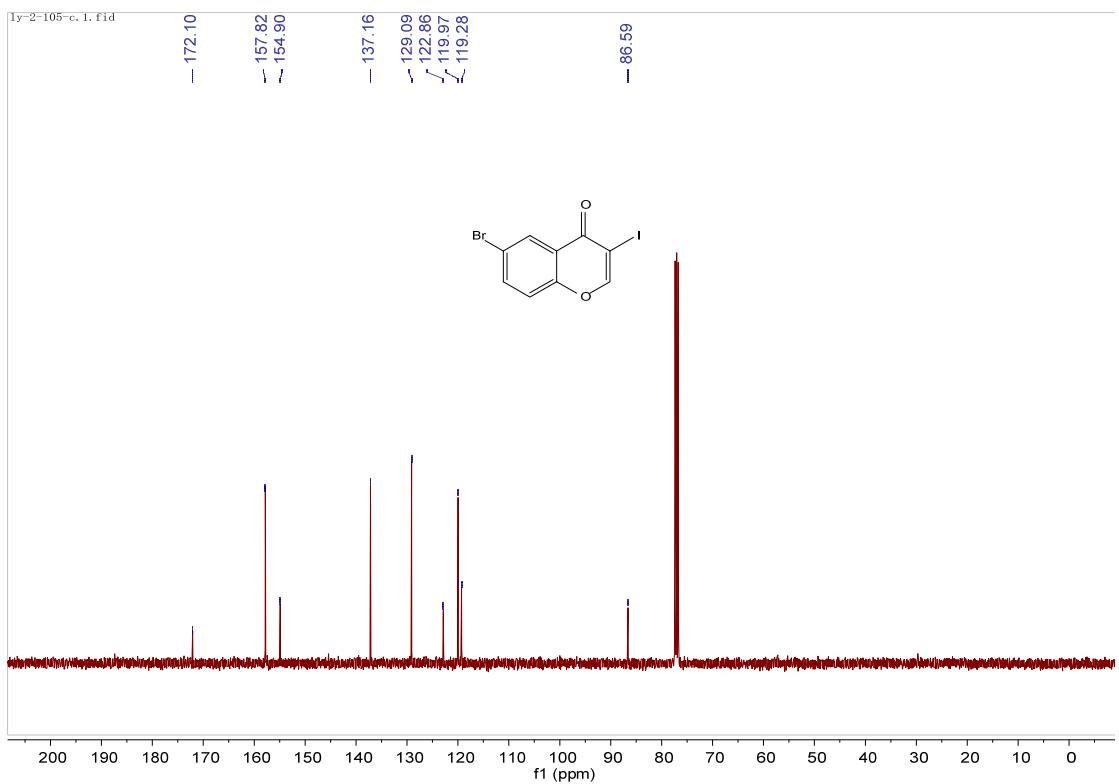
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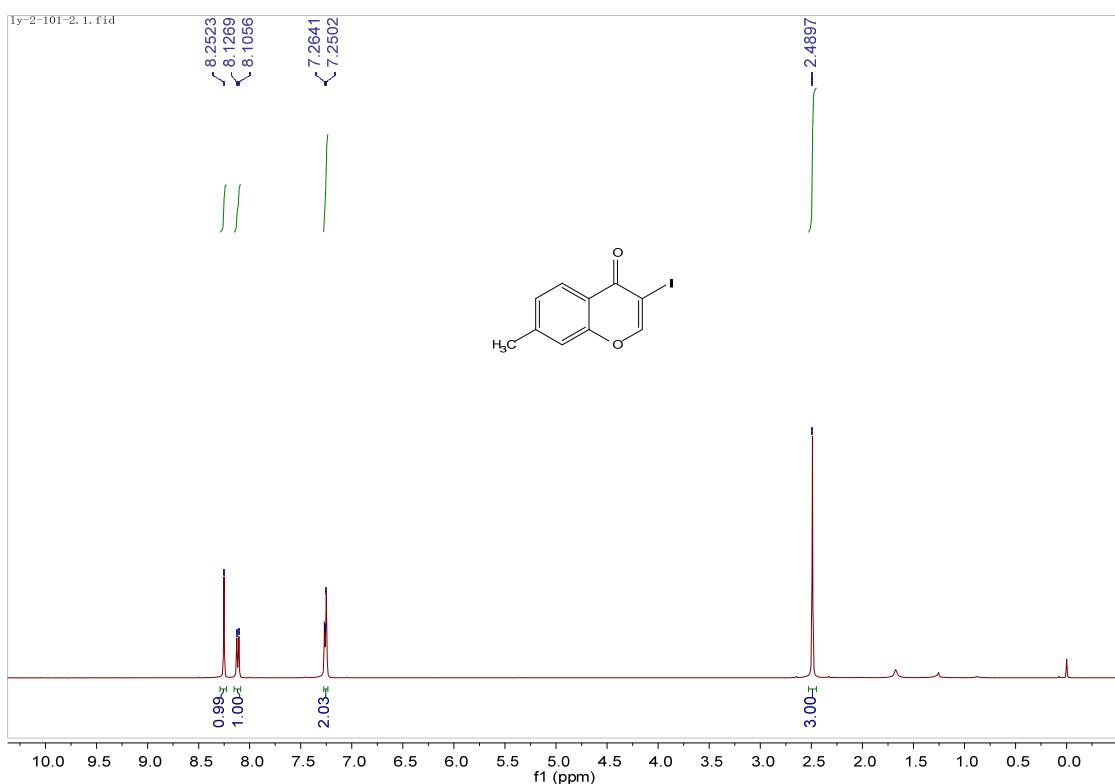
**$^{13}\text{C}\{^1\text{H}\}$  NMR spectrum of 3r ( $\text{CDCl}_3$ , 100 MHz)**



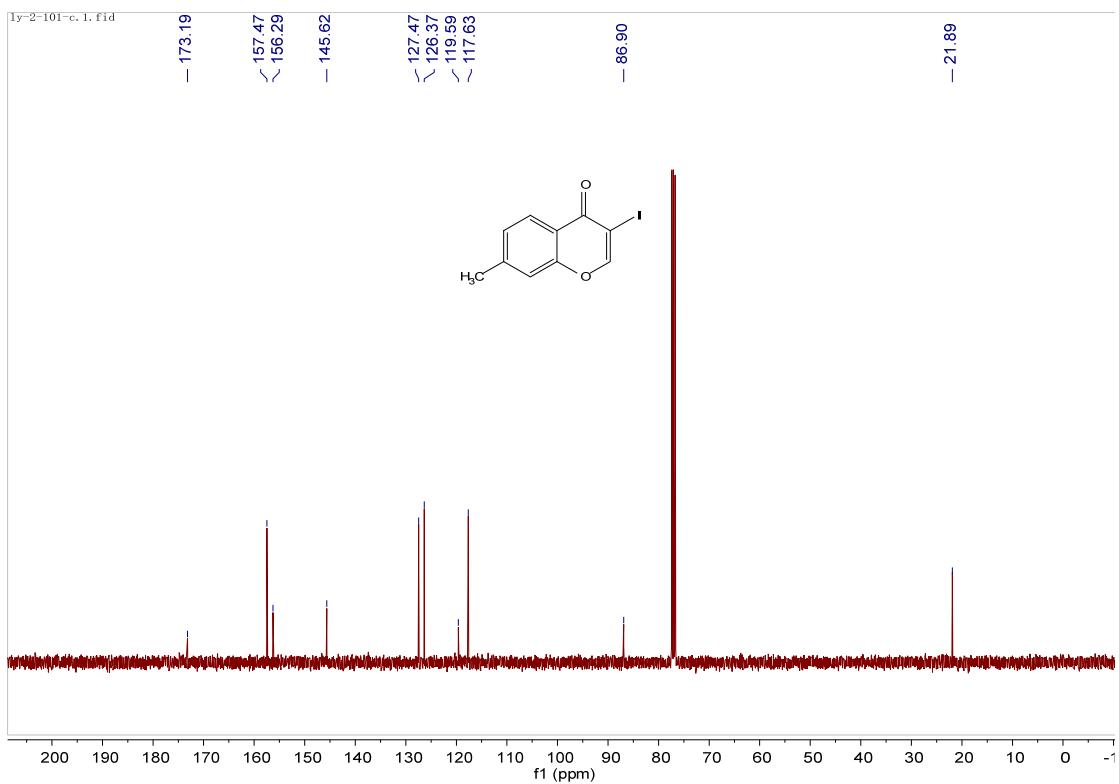
$^1\text{H}$  NMR spectrum of 3s ( $\text{CDCl}_3$ , 400 MHz)



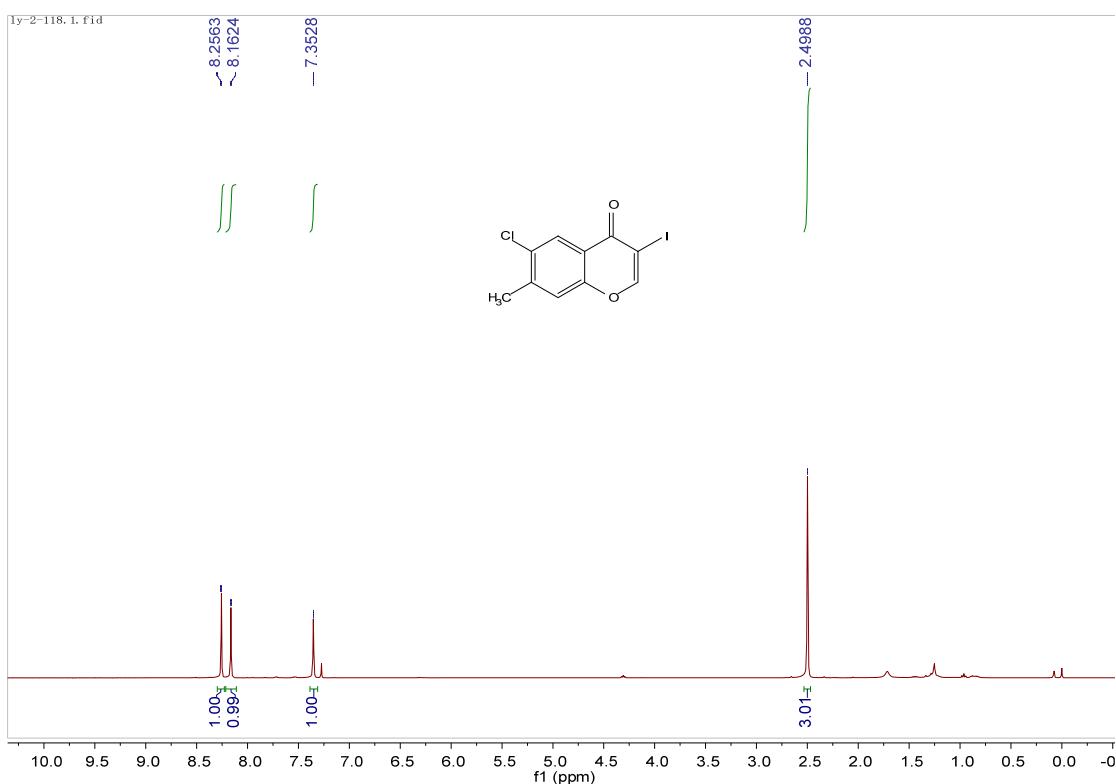
$^{13}\text{C}\{^1\text{H}\}$  NMR spectrum of 3s ( $\text{CDCl}_3$ , 100 MHz)



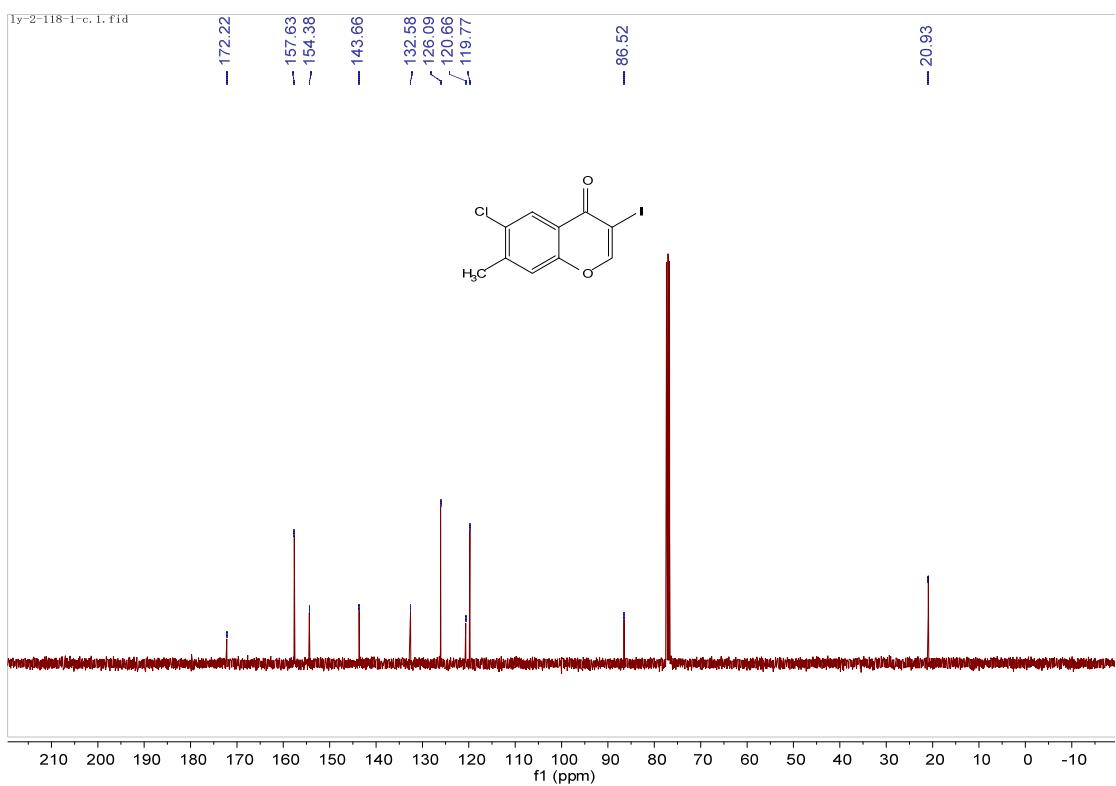
$^1\text{H}$  NMR spectrum of 3t ( $\text{CDCl}_3$ , 400 MHz)



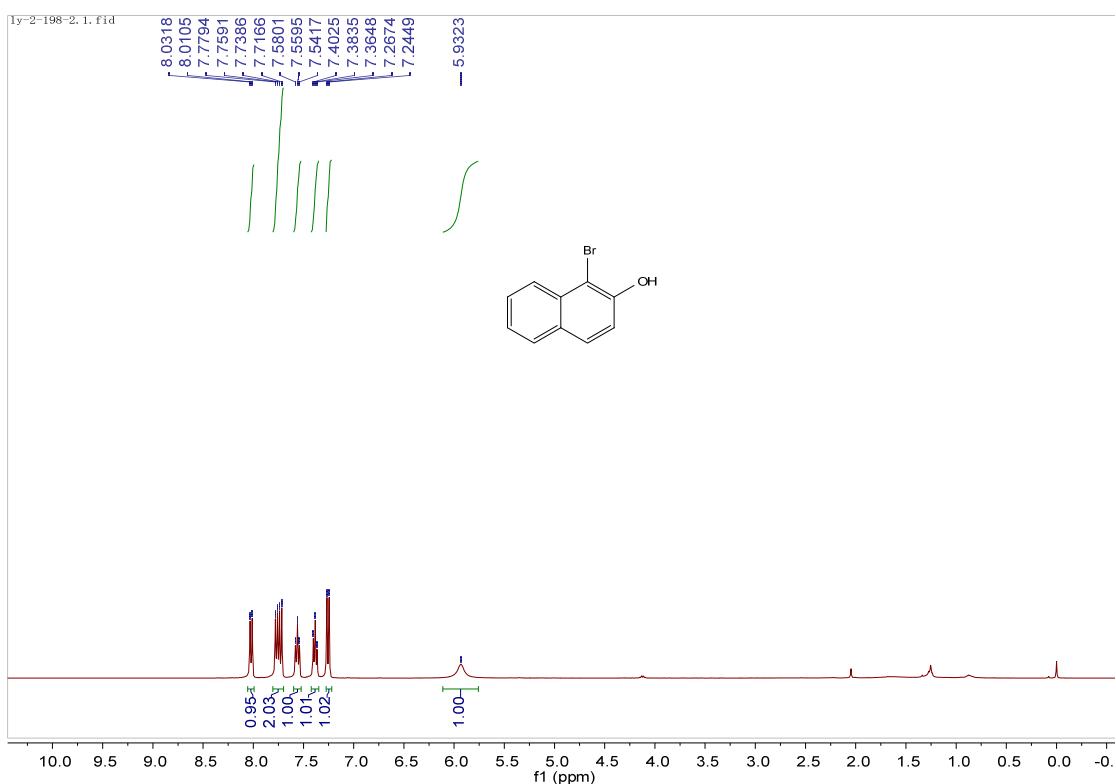
$^{13}\text{C}\{^1\text{H}\}$  NMR spectrum of 3t ( $\text{CDCl}_3$ , 100 MHz)



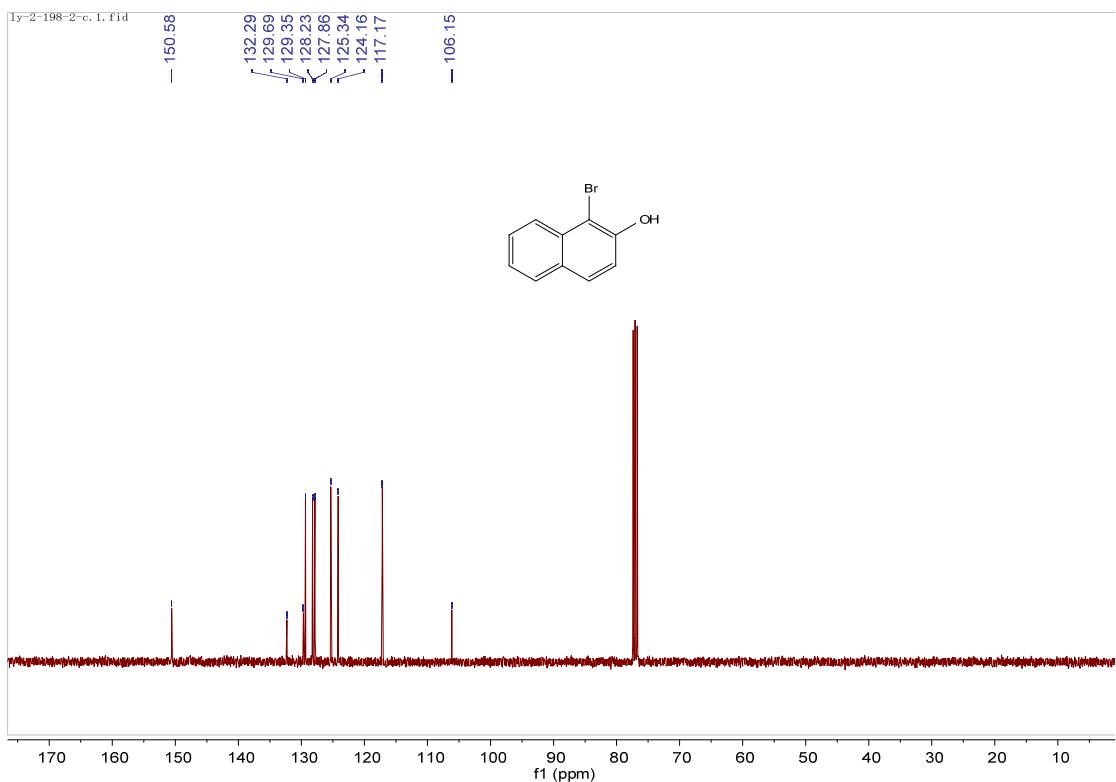
**$^1\text{H}$  NMR spectrum of 3u ( $\text{CDCl}_3$ , 400 MHz)**



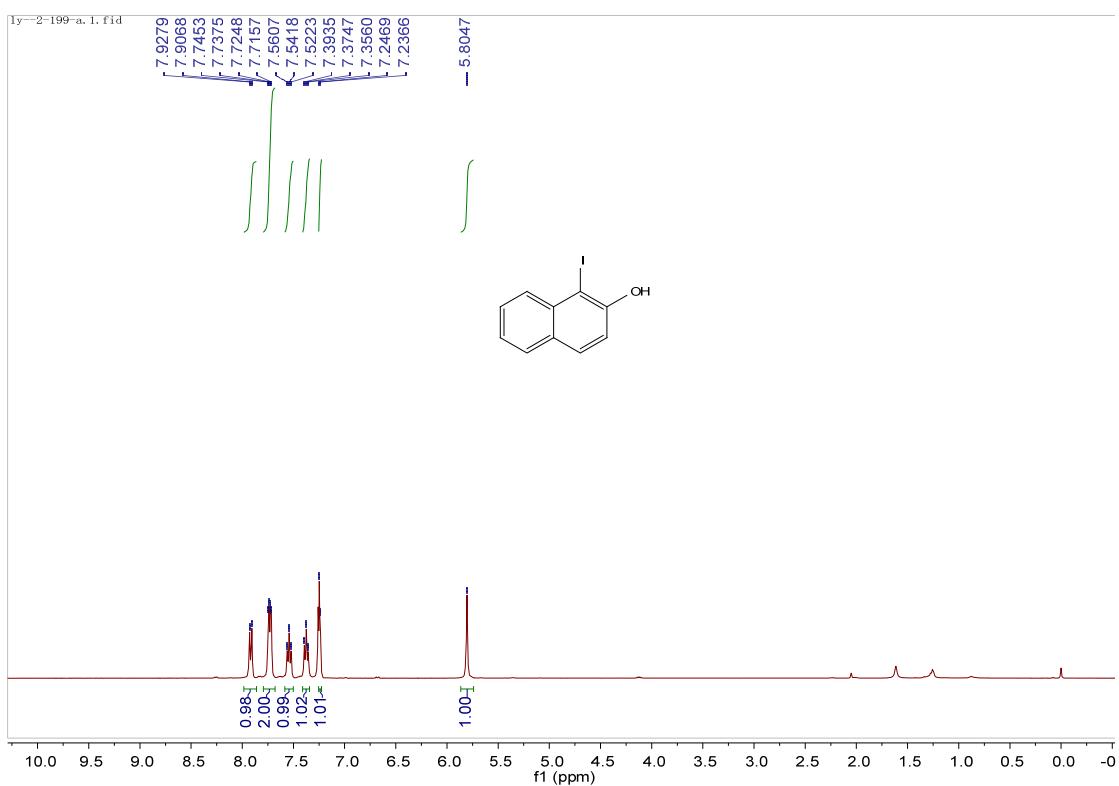
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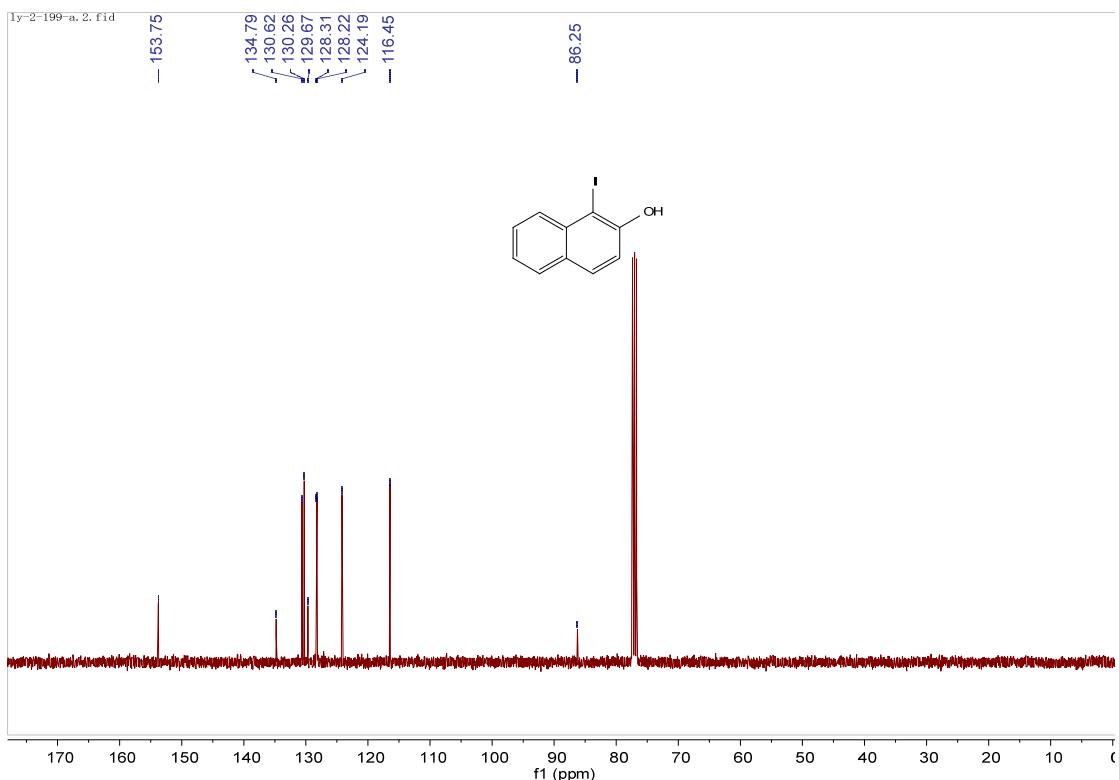
**$^1\text{H}$  NMR spectrum of 5a ( $\text{CDCl}_3$ , 400 MHz)**



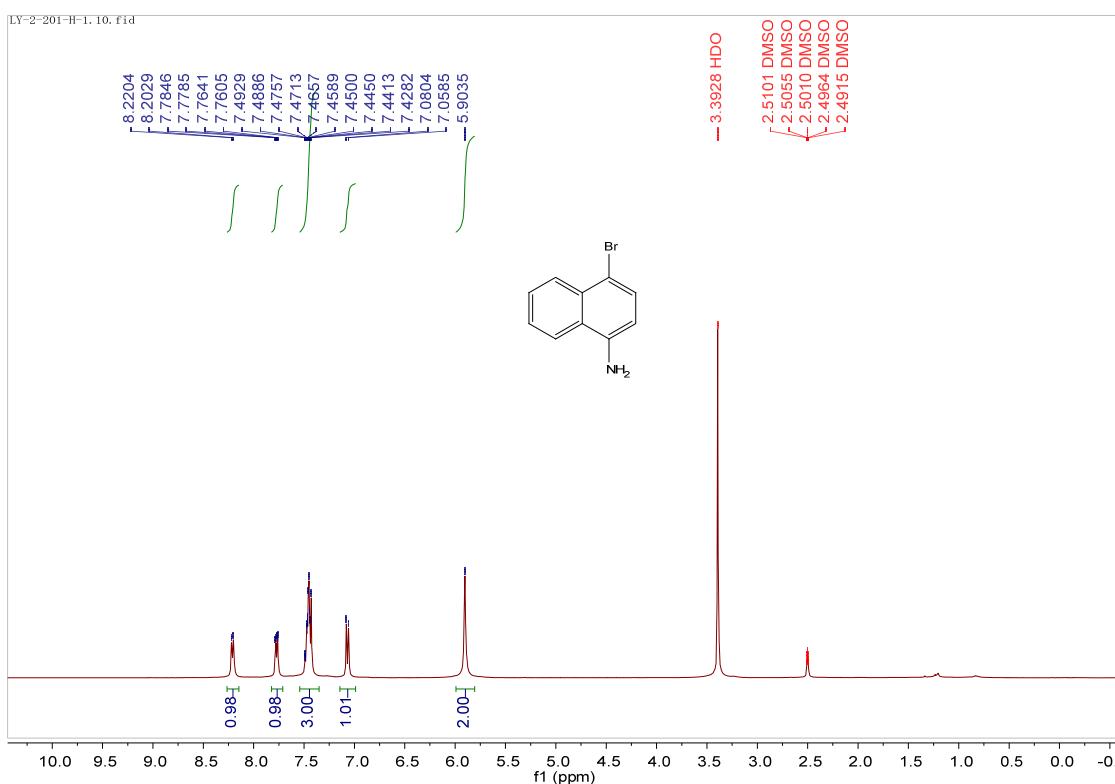
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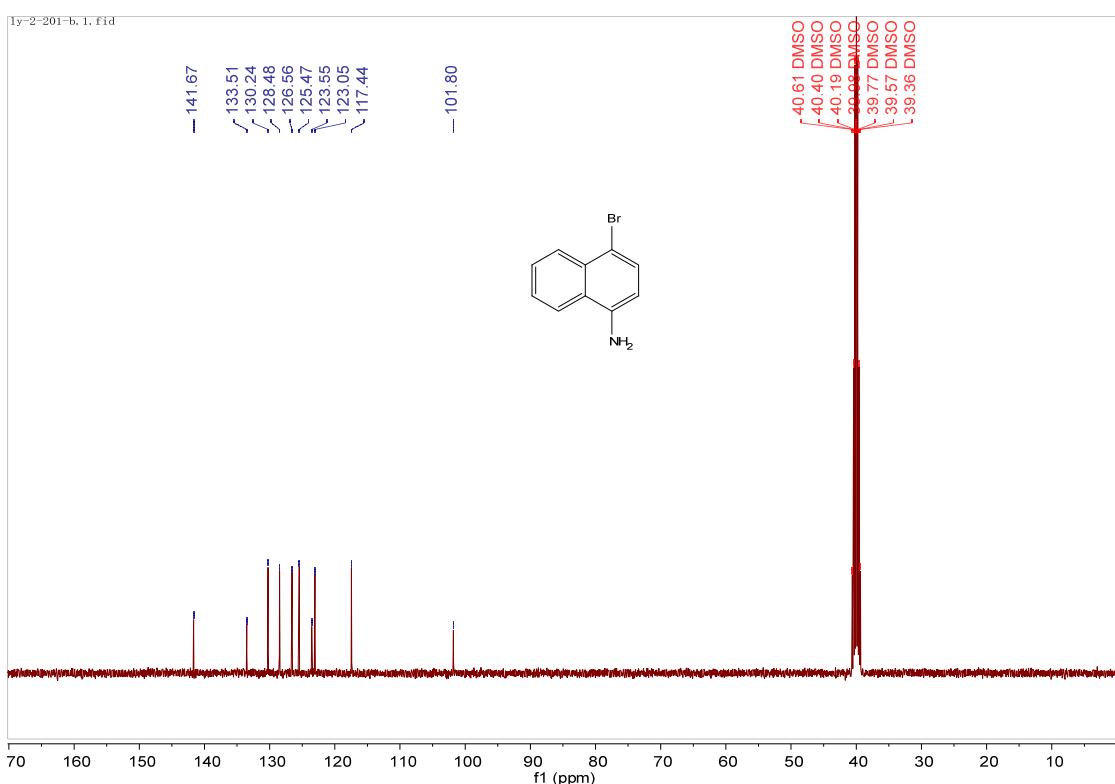
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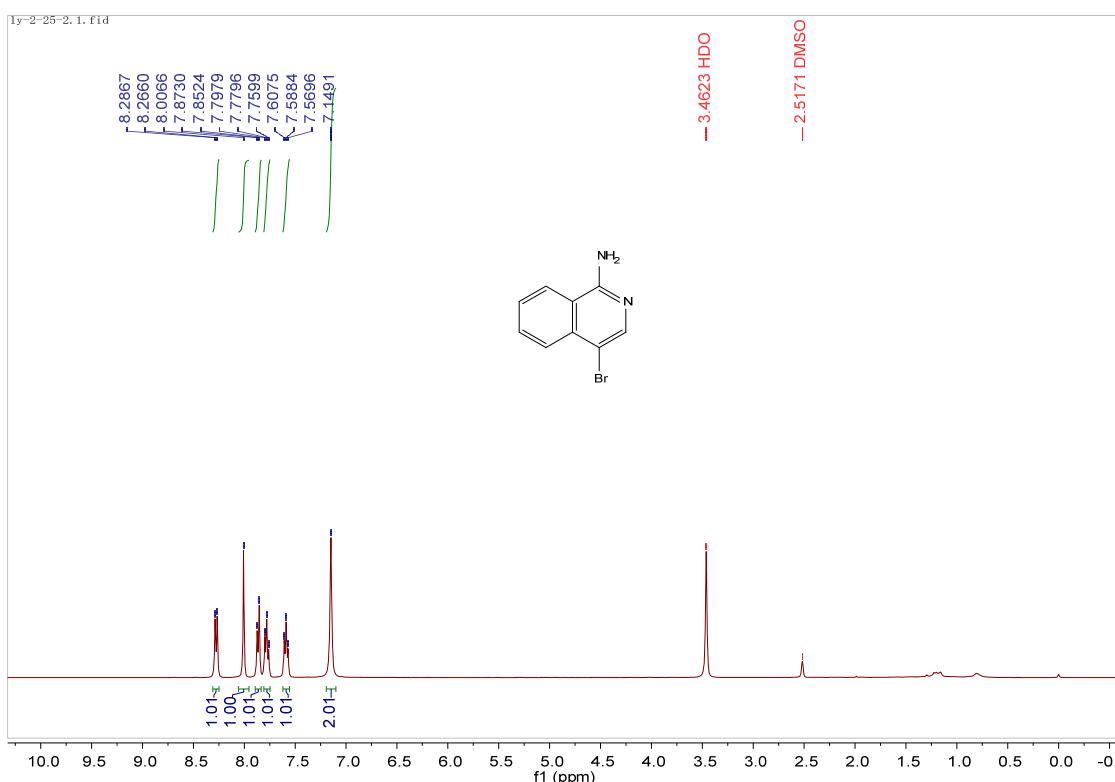
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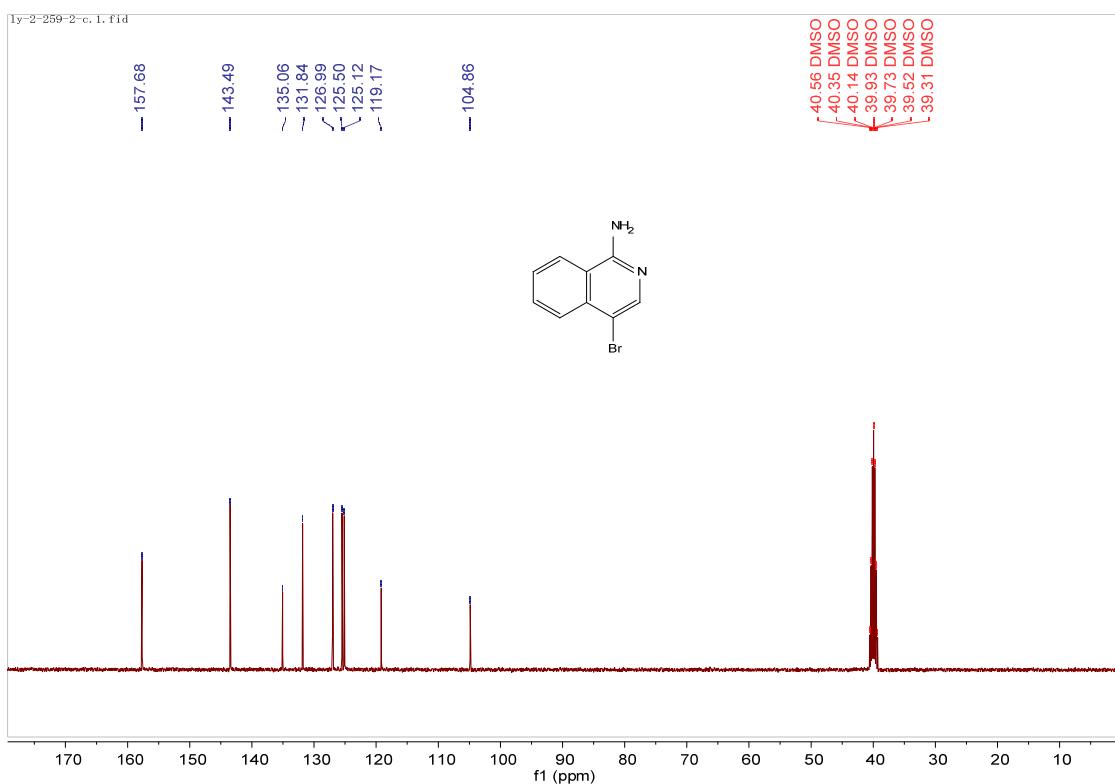
**$^1\text{H}$  NMR spectrum of 5c (DMSO- $d_6$ , 400 MHz)**



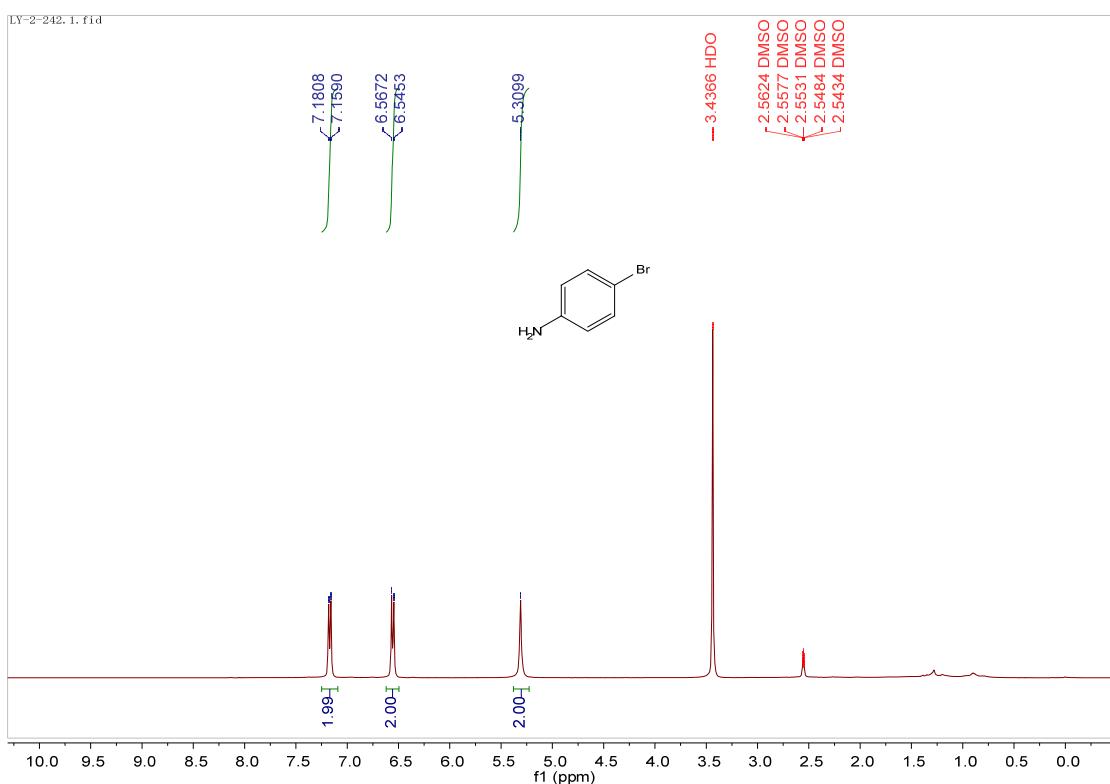
**$^{13}\text{C}\{^1\text{H}\}$  NMR spectrum of 5c (DMSO- $d_6$ , 100 MHz)**



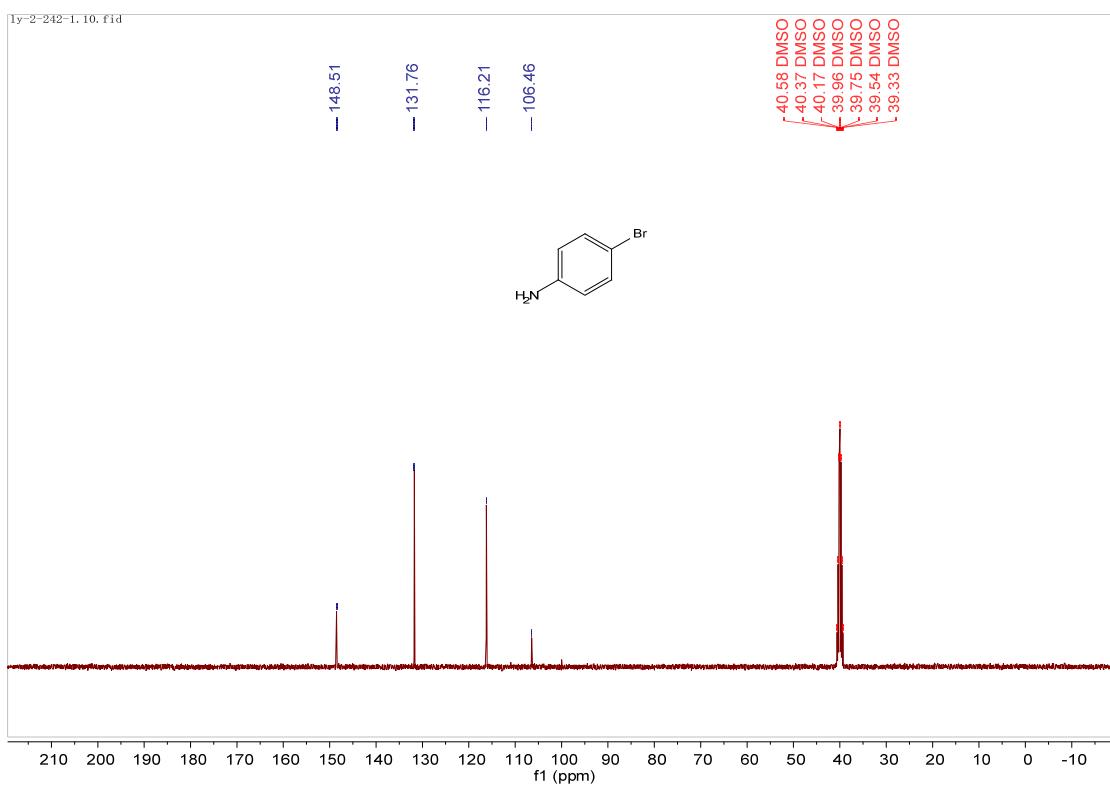
$^1\text{H}$  NMR spectrum of 5d (DMSO- $d_6$ , 400 MHz)



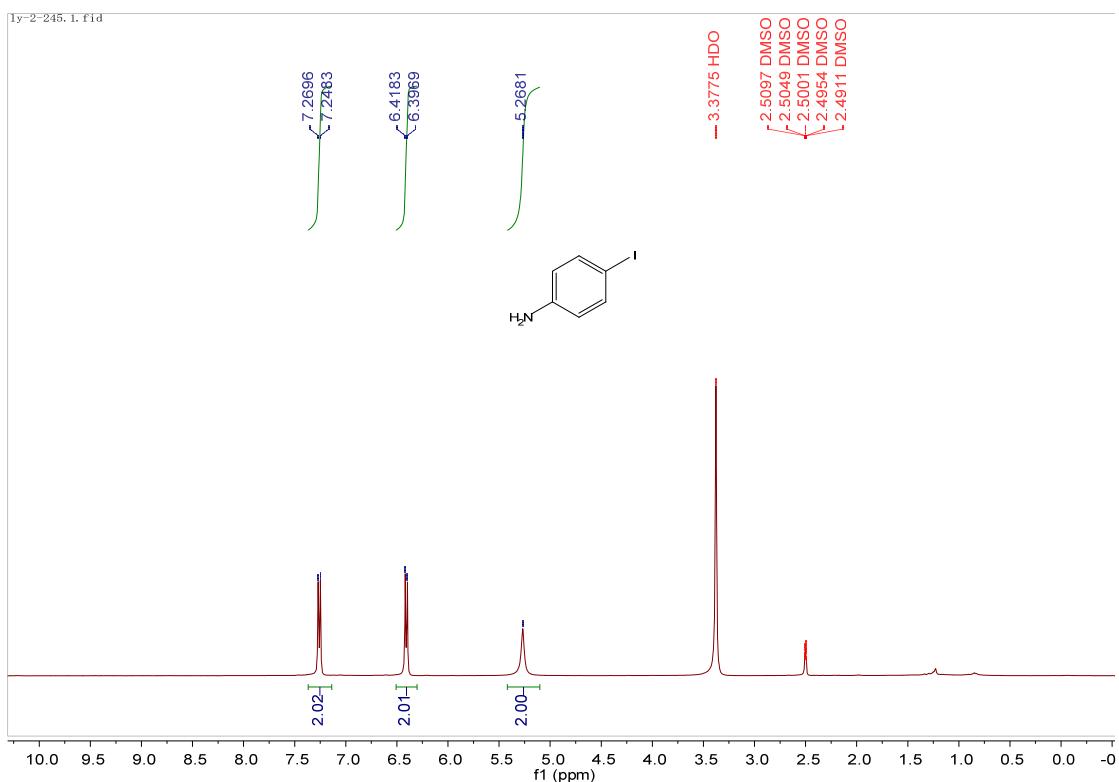
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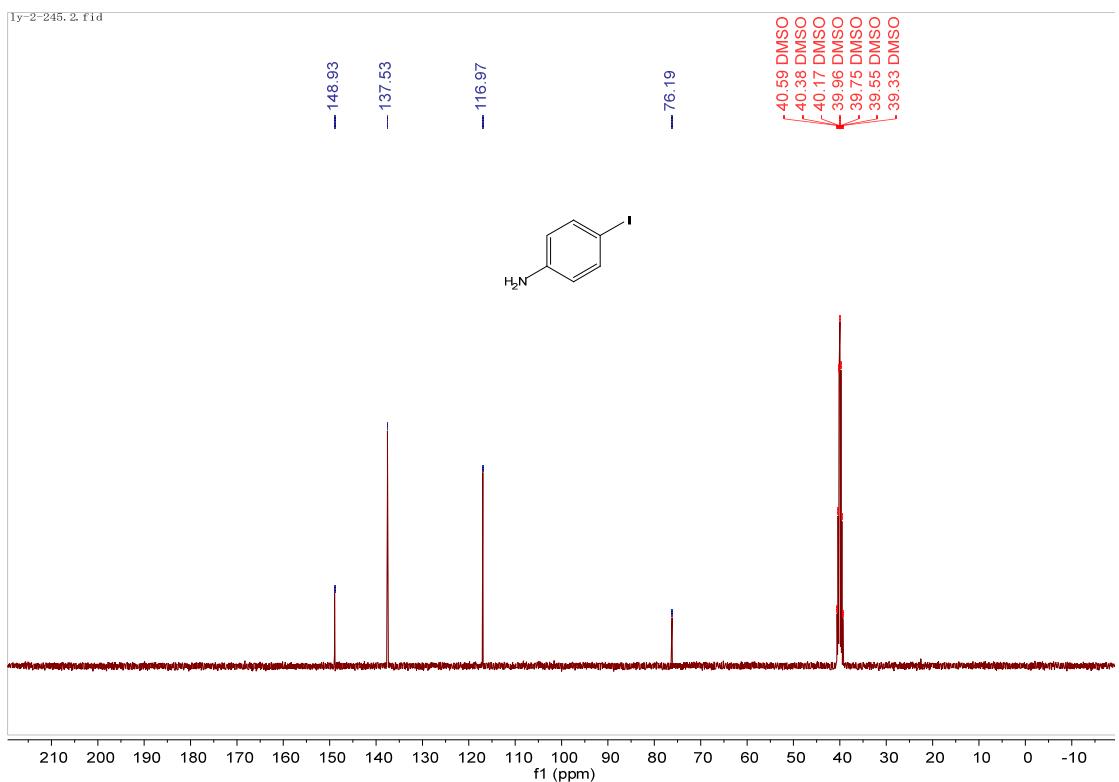
$^1\text{H}$  NMR spectrum of **5e** (DMSO- $d_6$ , 400 MHz)



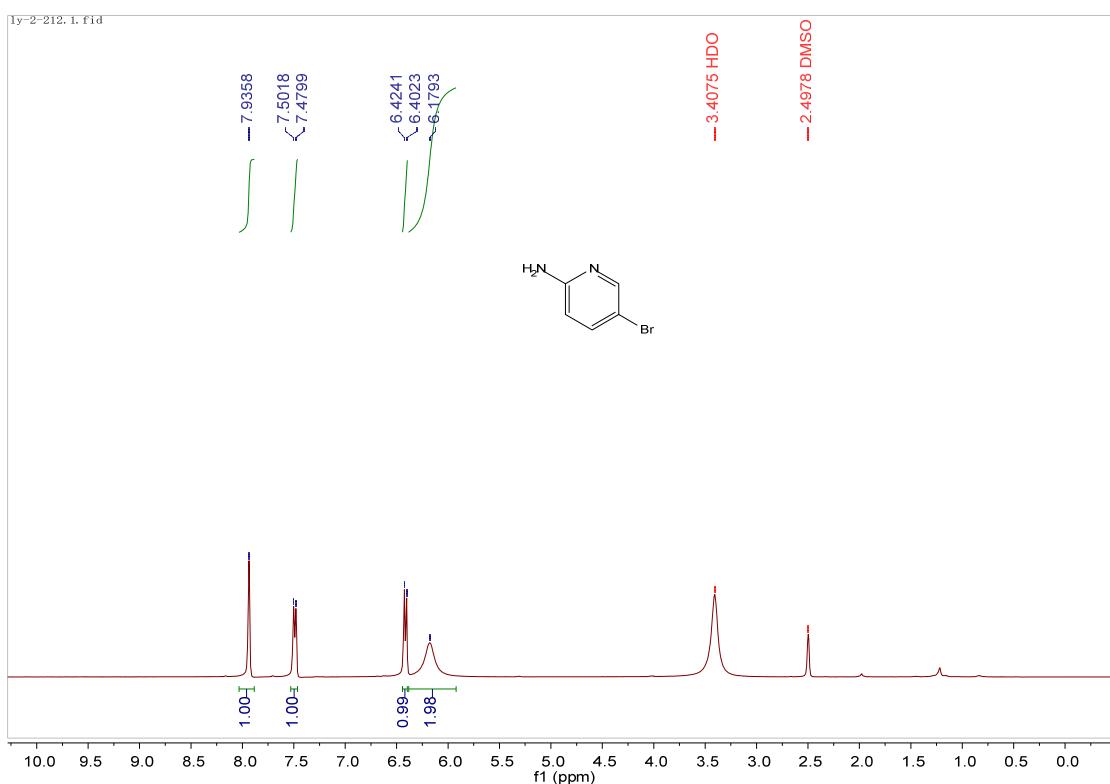
$^{13}\text{C}\{^1\text{H}\}$  NMR spectrum of **5e** (DMSO- $d_6$ , 100 MHz)



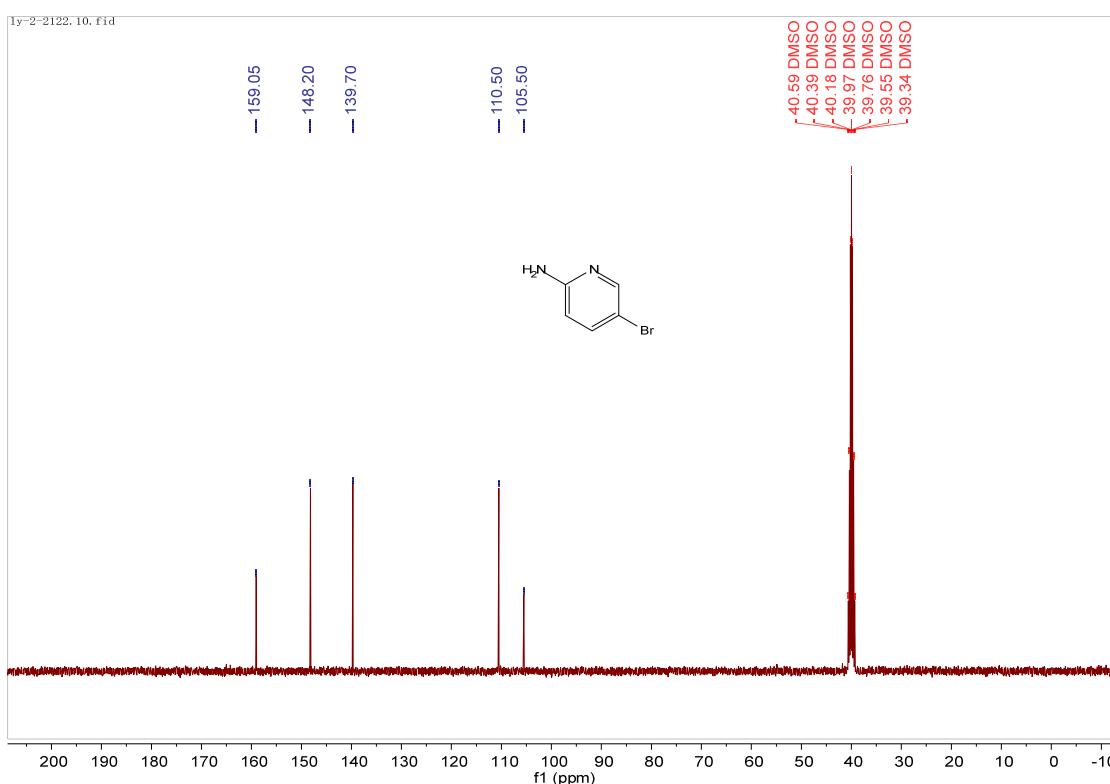
**$^1\text{H}$  NMR spectrum of 5f (DMSO- $d_6$ , 400 MHz)**



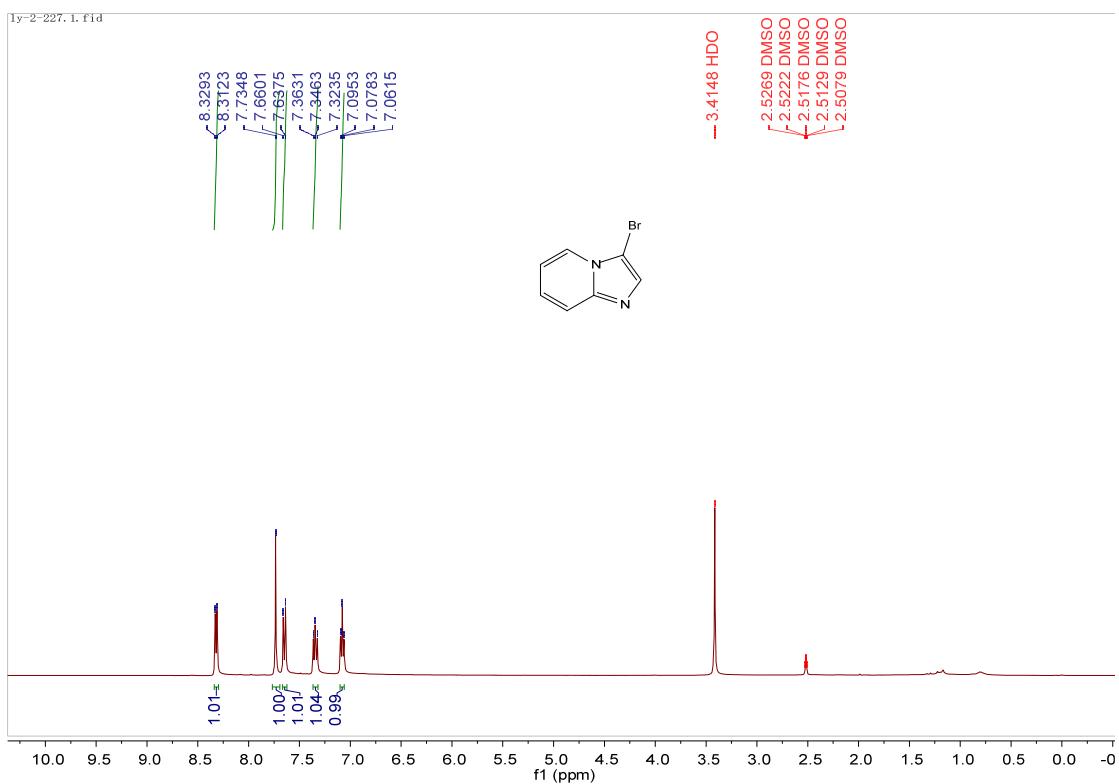
**$^{13}\text{C}\{^1\text{H}\}$  NMR spectrum of 5f (DMSO- $d_6$ , 100 MHz)**



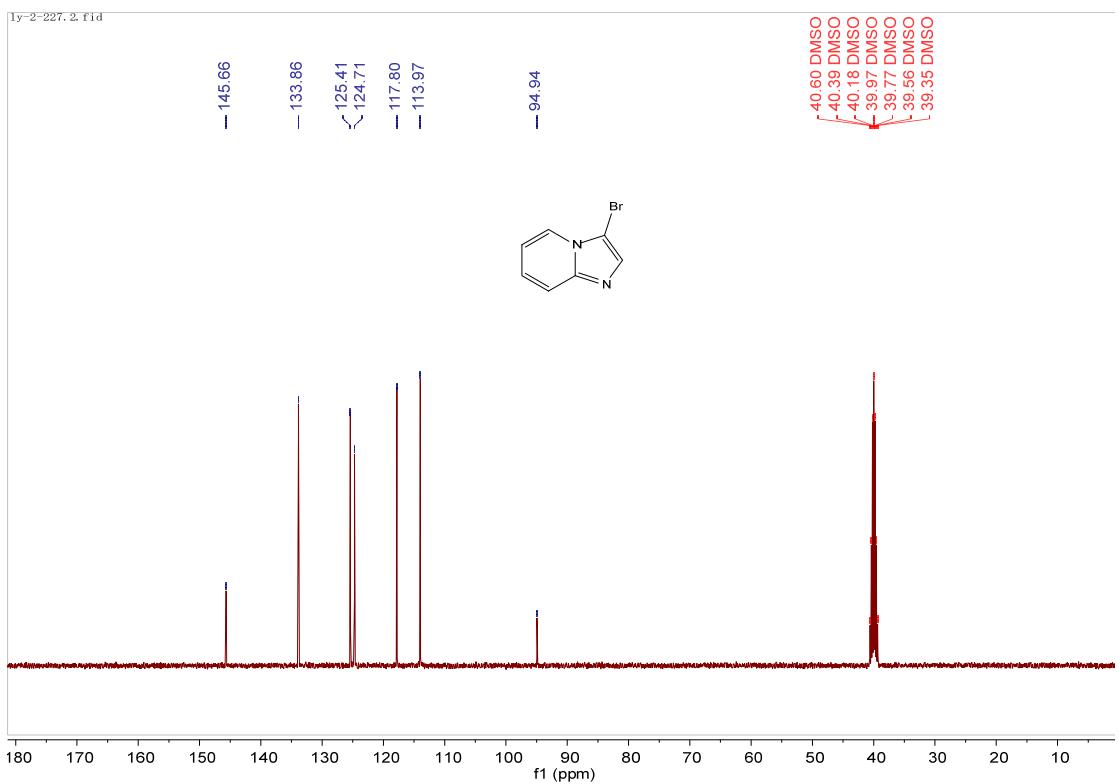
<sup>1</sup>H NMR spectrum of 5g (DMSO-*d*<sub>6</sub>, 400 MHz)



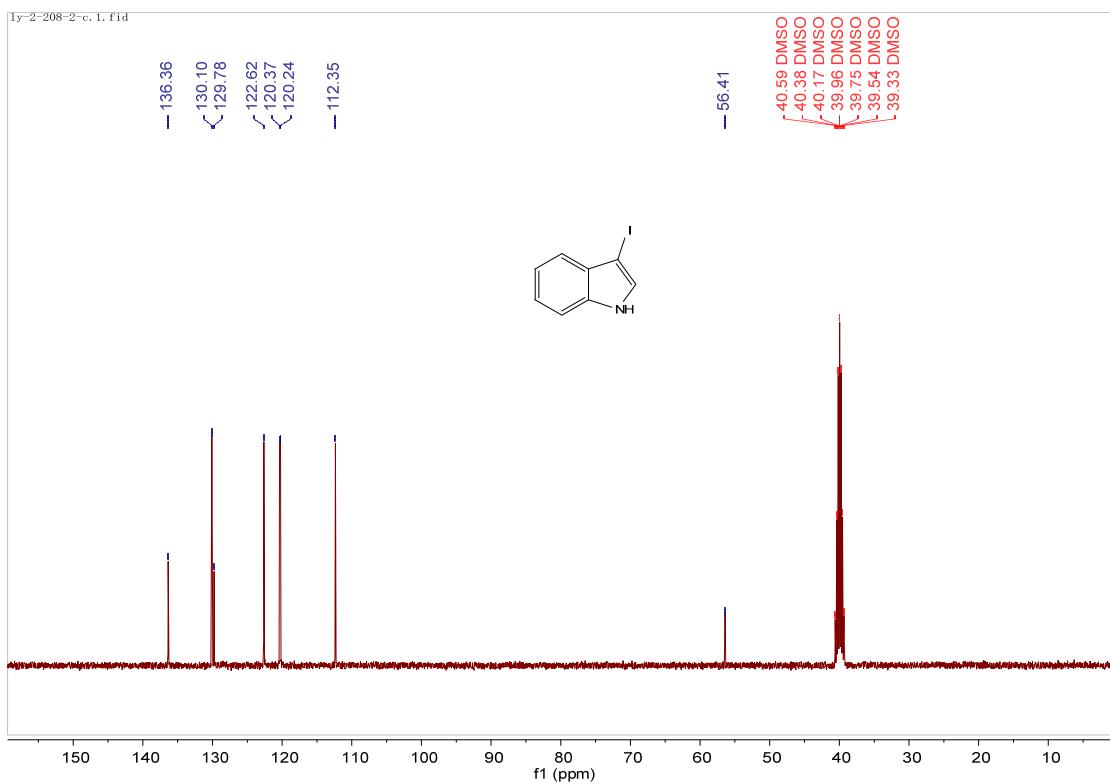
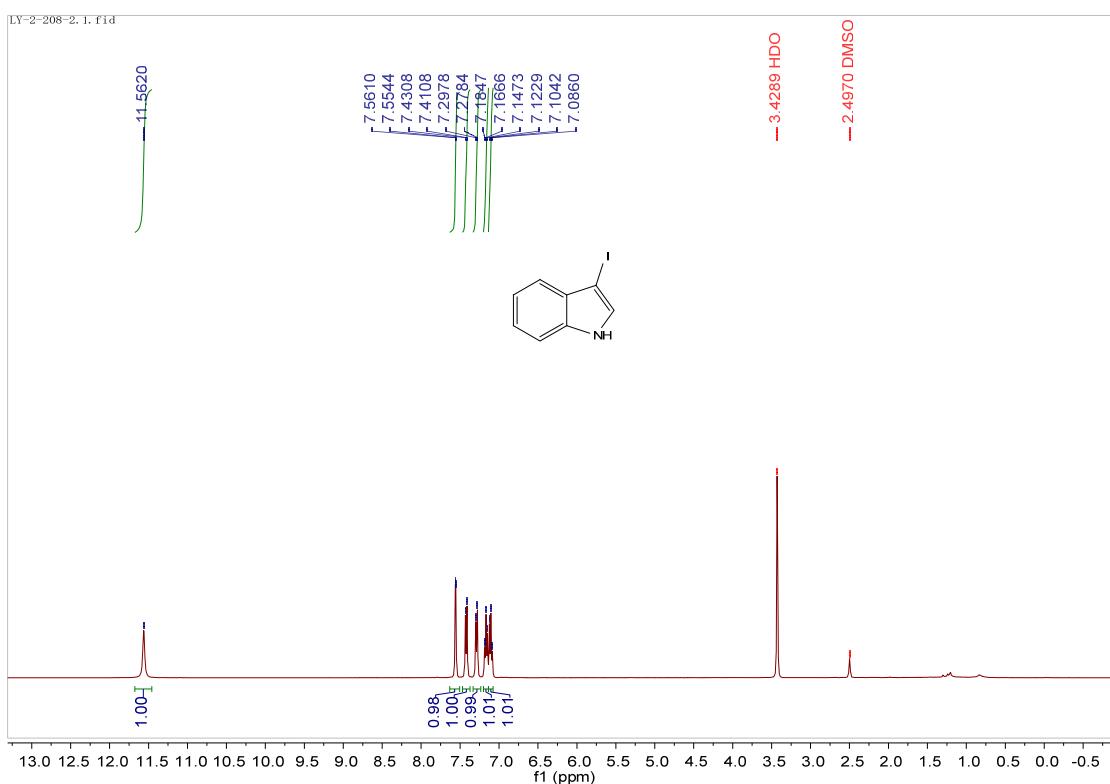
<sup>13</sup>C{<sup>1</sup>H} NMR spectrum of 5g (DMSO-*d*<sub>6</sub>, 100 MHz)



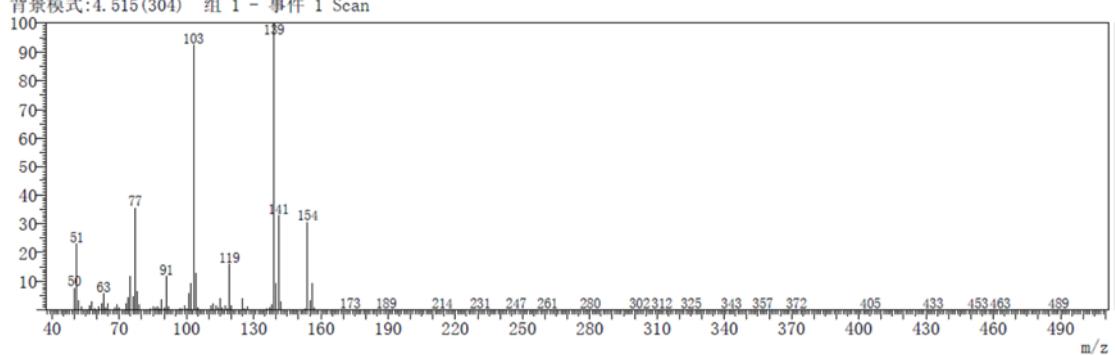
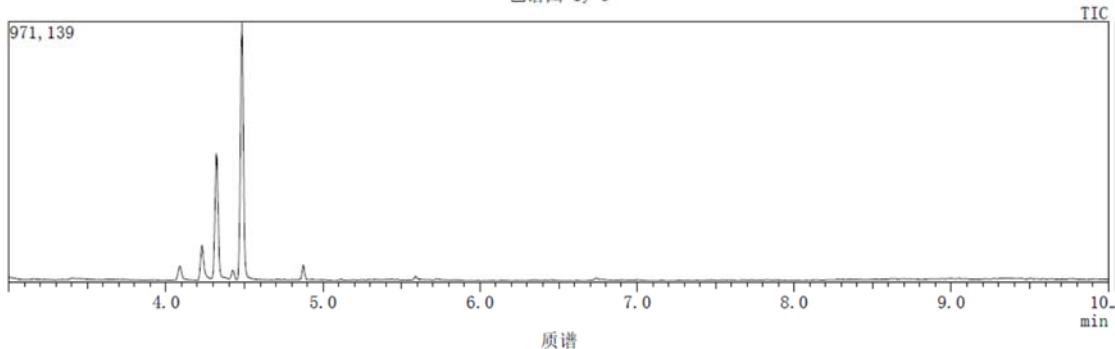
<sup>1</sup>H NMR spectrum of 5h (DMSO-*d*<sub>6</sub>, 400 MHz)



<sup>13</sup>C{<sup>1</sup>H} NMR spectrum of 5h (DMSO-*d*<sub>6</sub>, 100 MHz)

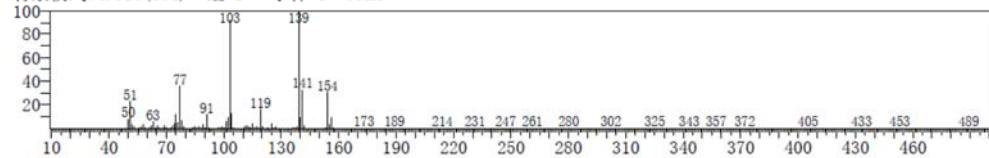


色谱图 1y-6

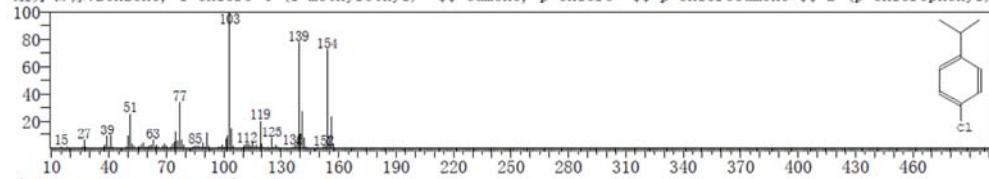


谱库

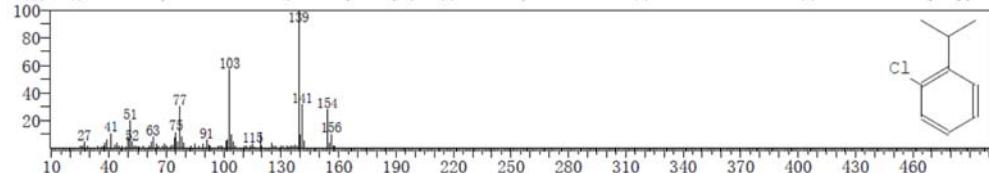
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原始模式:单个 4.485(298) 基峰:139.05(188898)  
背景模式:4.515(304) 组 1 - 事件 1 Scan



命中#:1 输入:18423 谱库:NIST17-1.lib  
SI:93 分子式:C9H11Cl CAS:2621-46-7 摩尔质量:154 保留指数:1108  
组分名称:Benzene, 1-chloro-4-(1-methylethyl)- ## Cumene, p-chloro- ## p-Chlorocumene ## 2-(p-Chlorophenyl)



命中#:2 输入:11834 谱库:NIST17s.lib  
SI:93 分子式:C9H11Cl CAS:2077-13-6 摩尔质量:154 保留指数:1108  
组分名称:Benzene, 1-chloro-2-(1-methylethyl)- ## Cumene, o-chloro- ## o-Chlorocumene ## 2-Chloroisopropylb



GC-MS spectrum for the reaction mixture using cumene and NaCl