

Supplementary Information

Synthesis of 4-Chalcogenyl Pyrazoles via Electrophilic Chalcogenation/Cyclization of α,β -Alkynic Hydrazones

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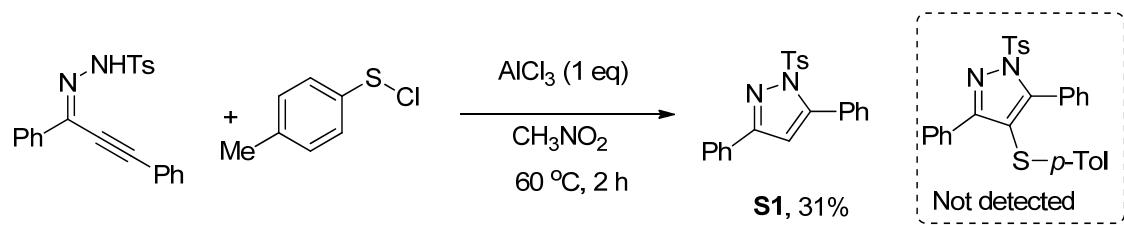
^b Taiyuan University of Technology, Taiyuan, 030024

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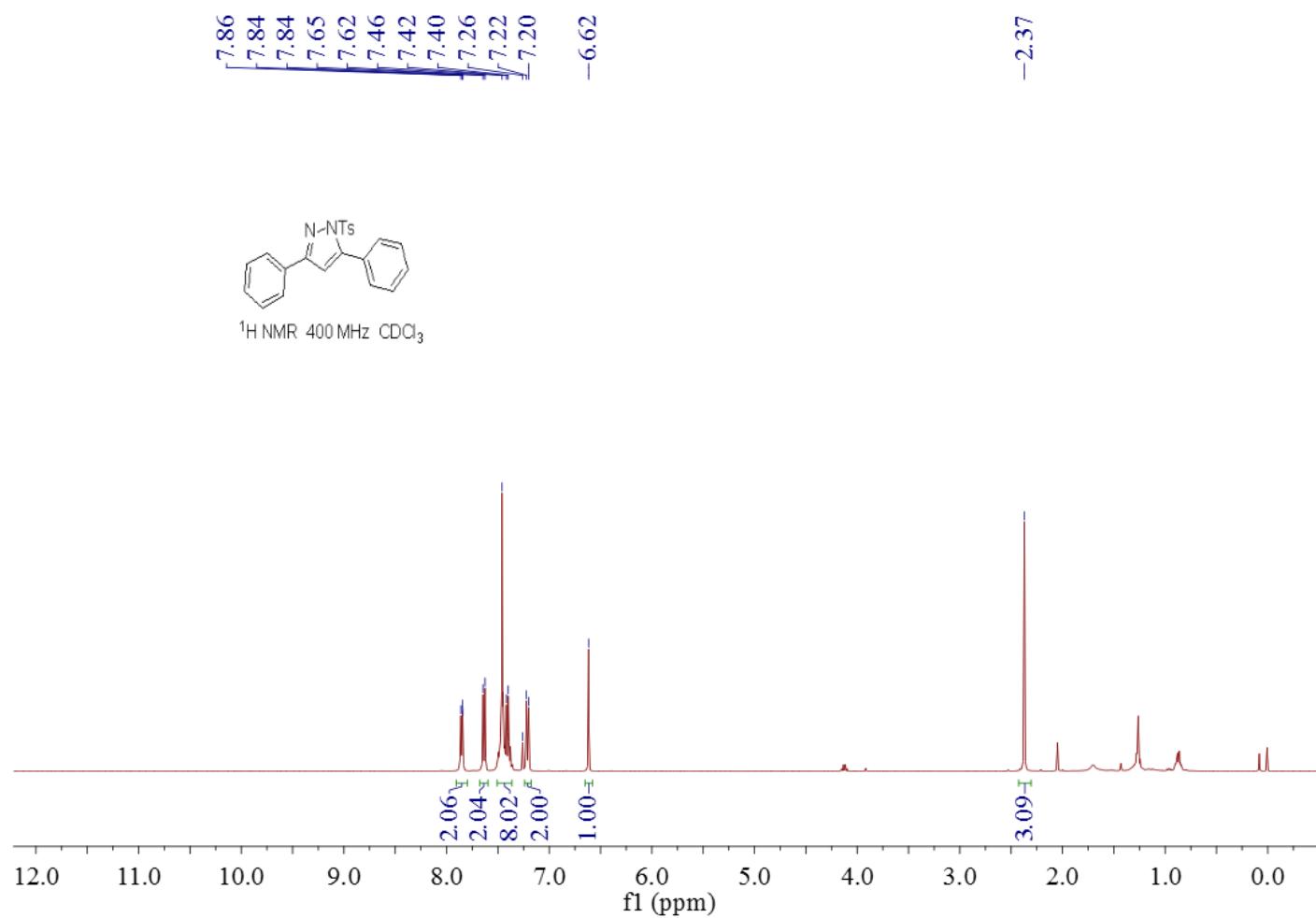
Cyclization of N-sulfonyl hydrazones.....S2

Copies of NMR spectra.....S3

Cyclization of N-sulfonyl hydrazones

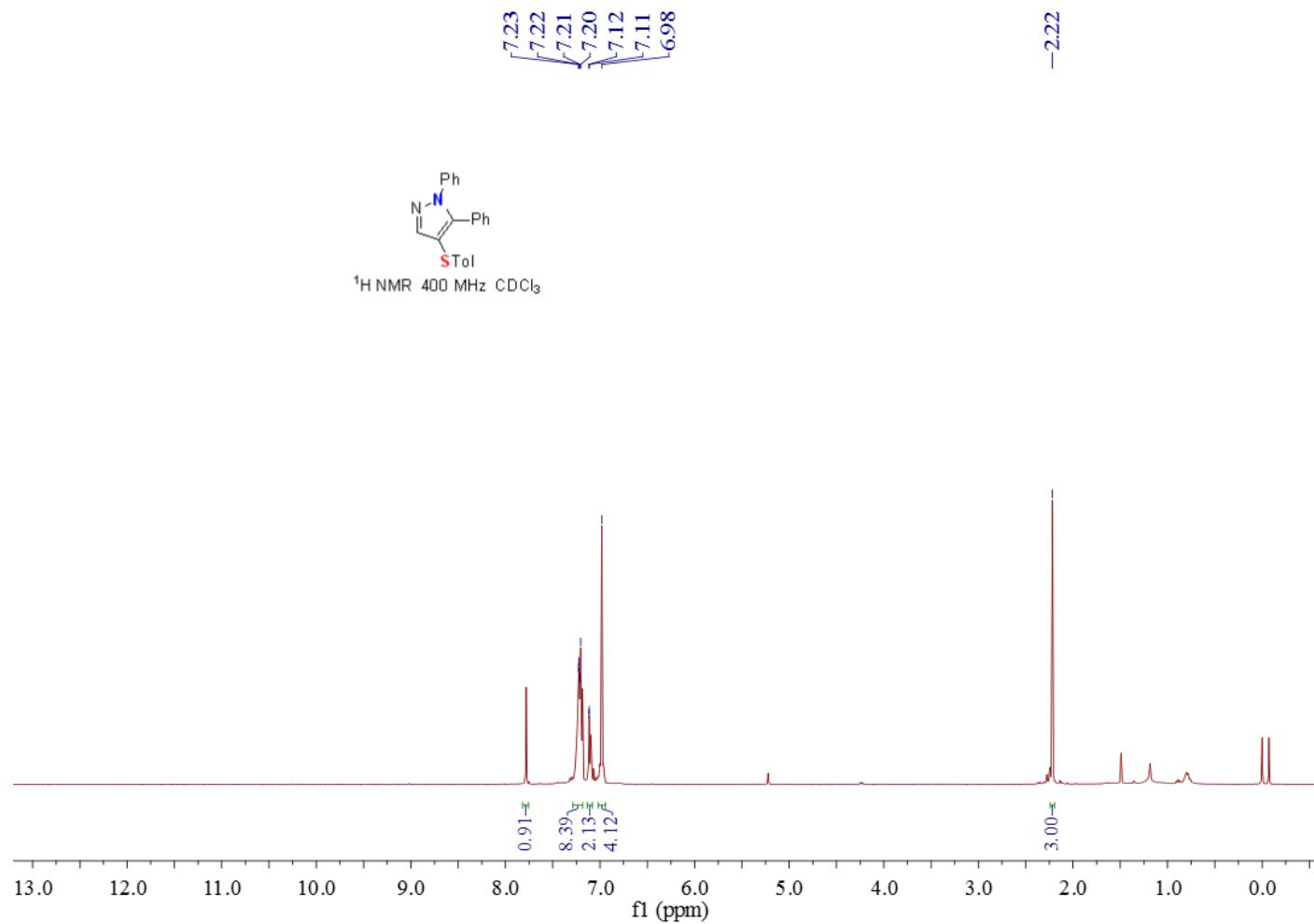


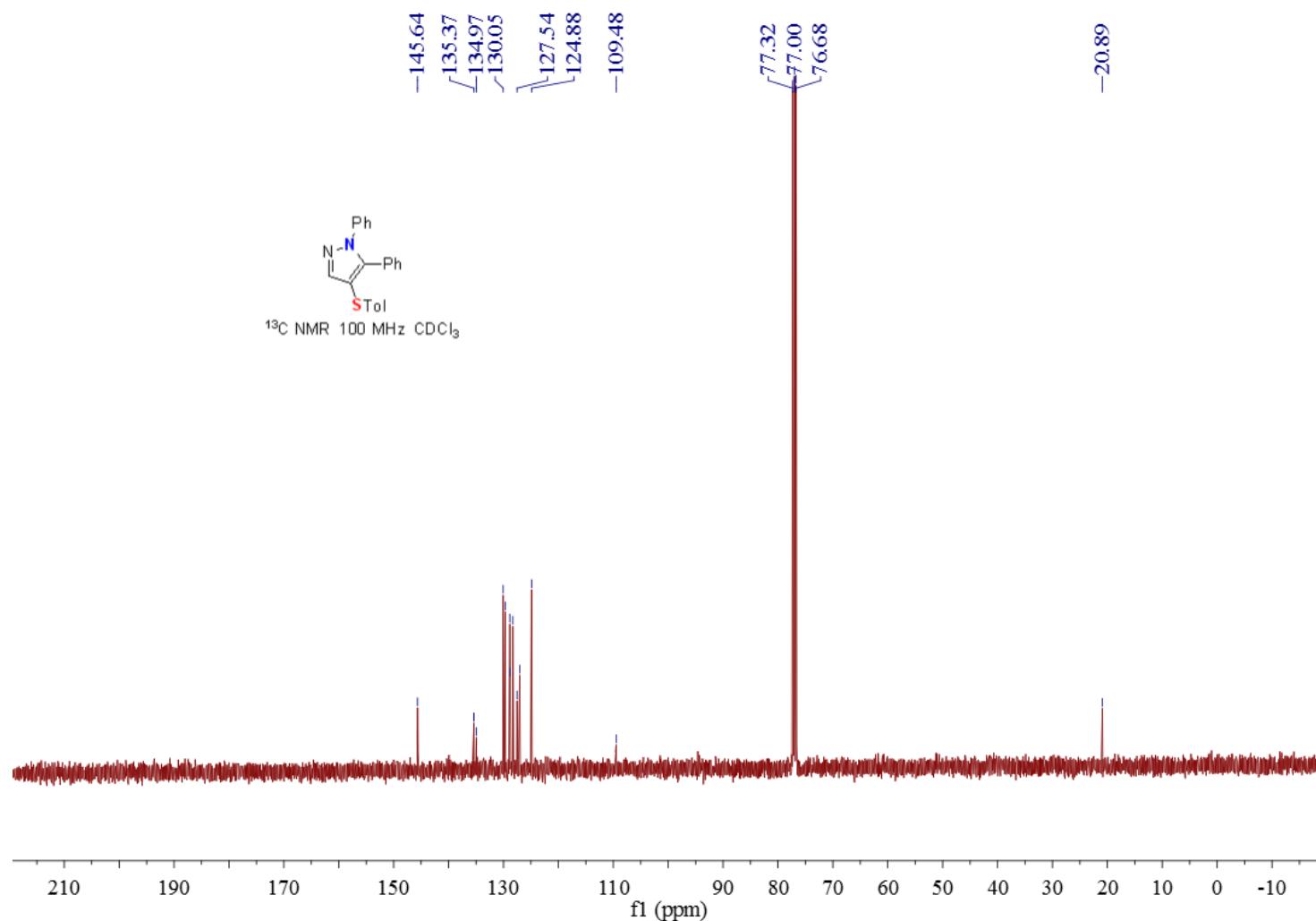
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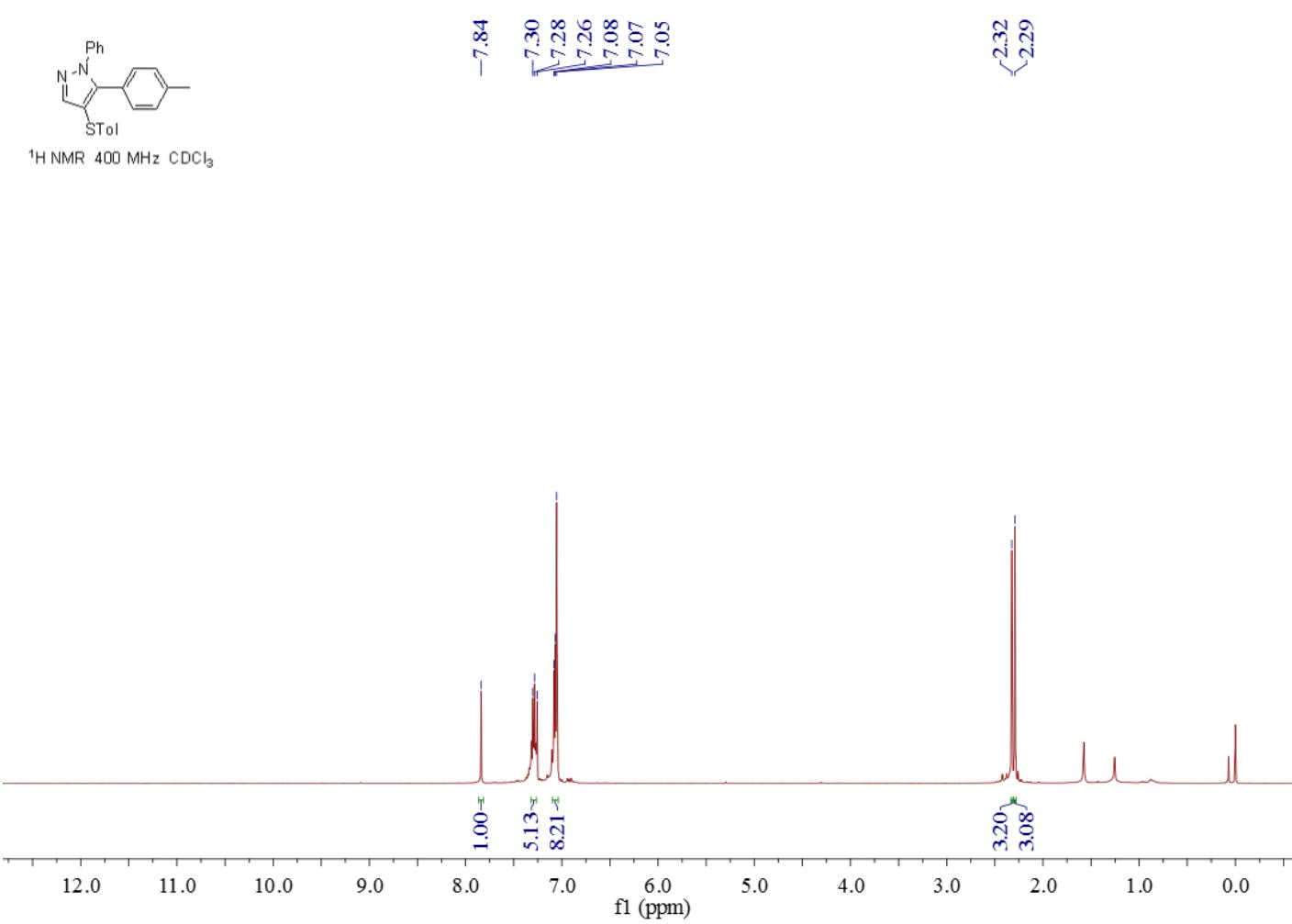
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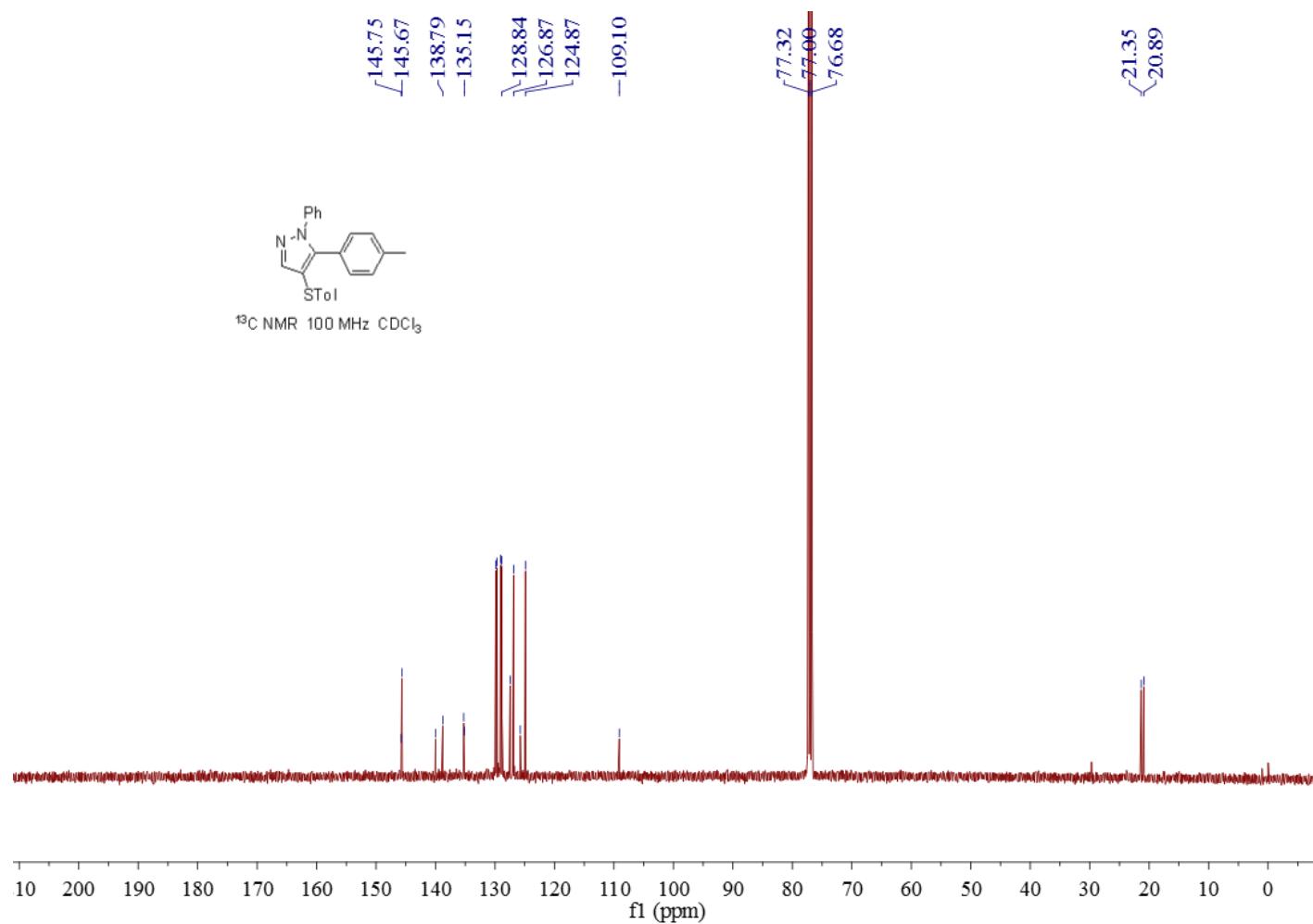
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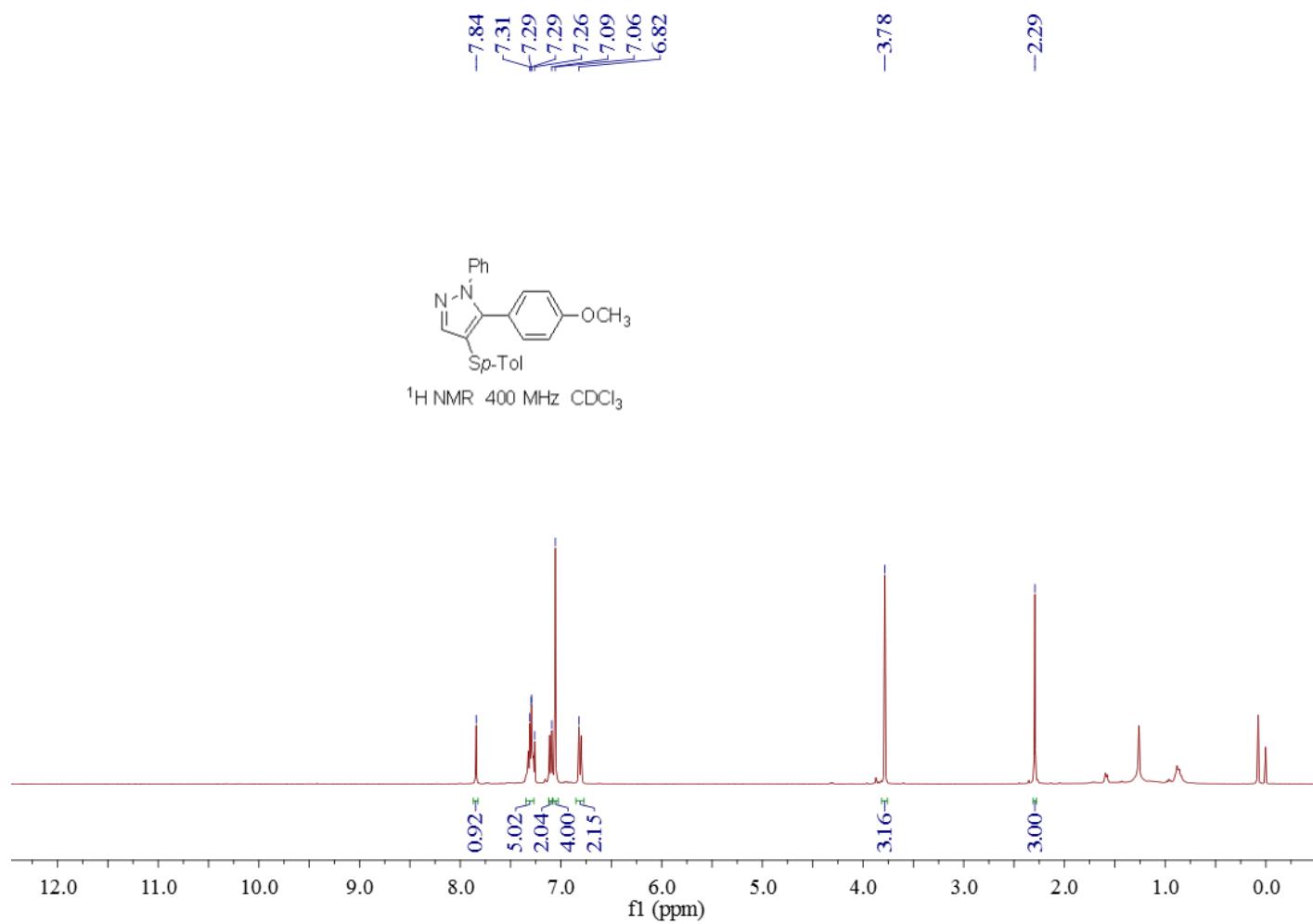


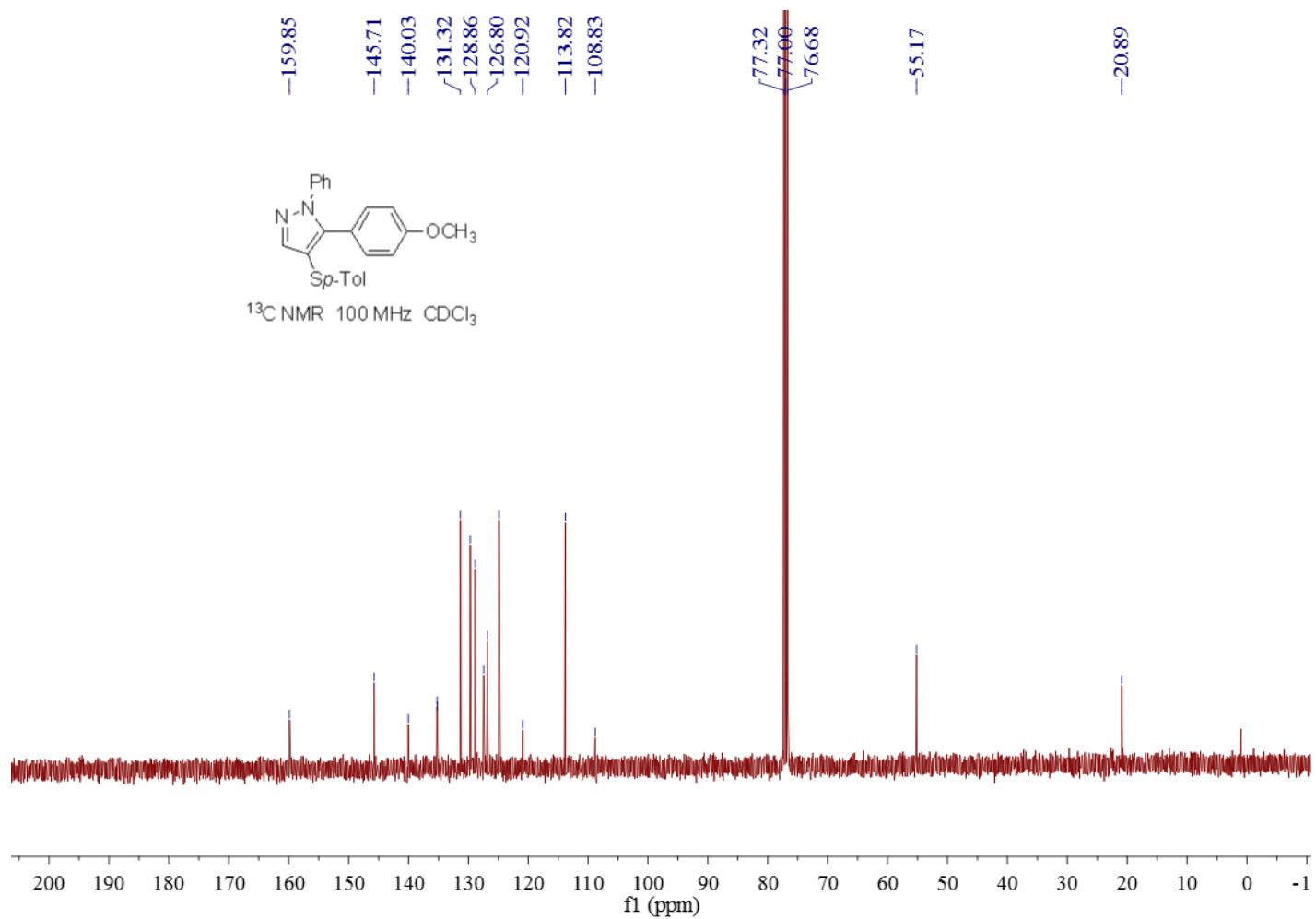
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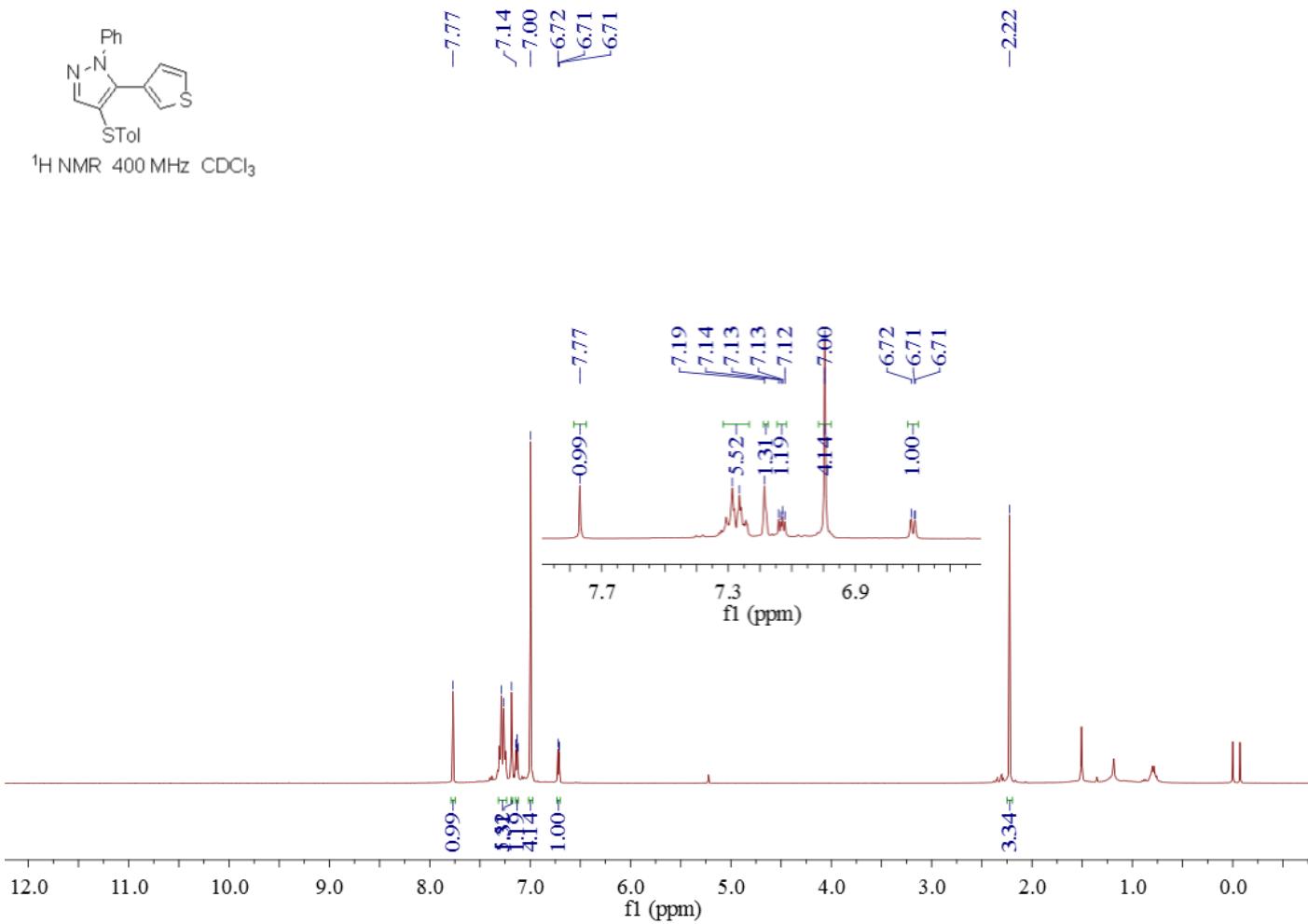


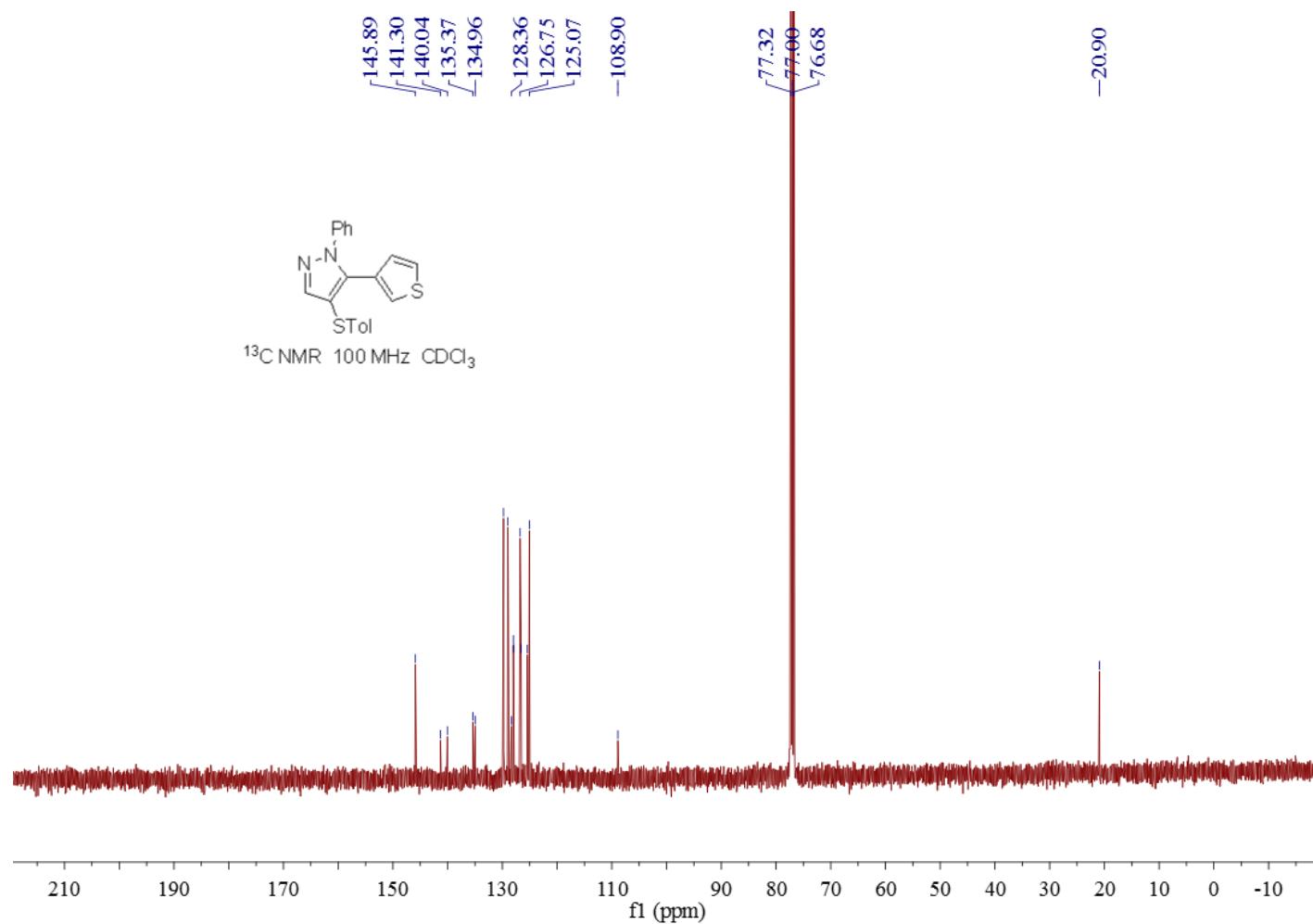
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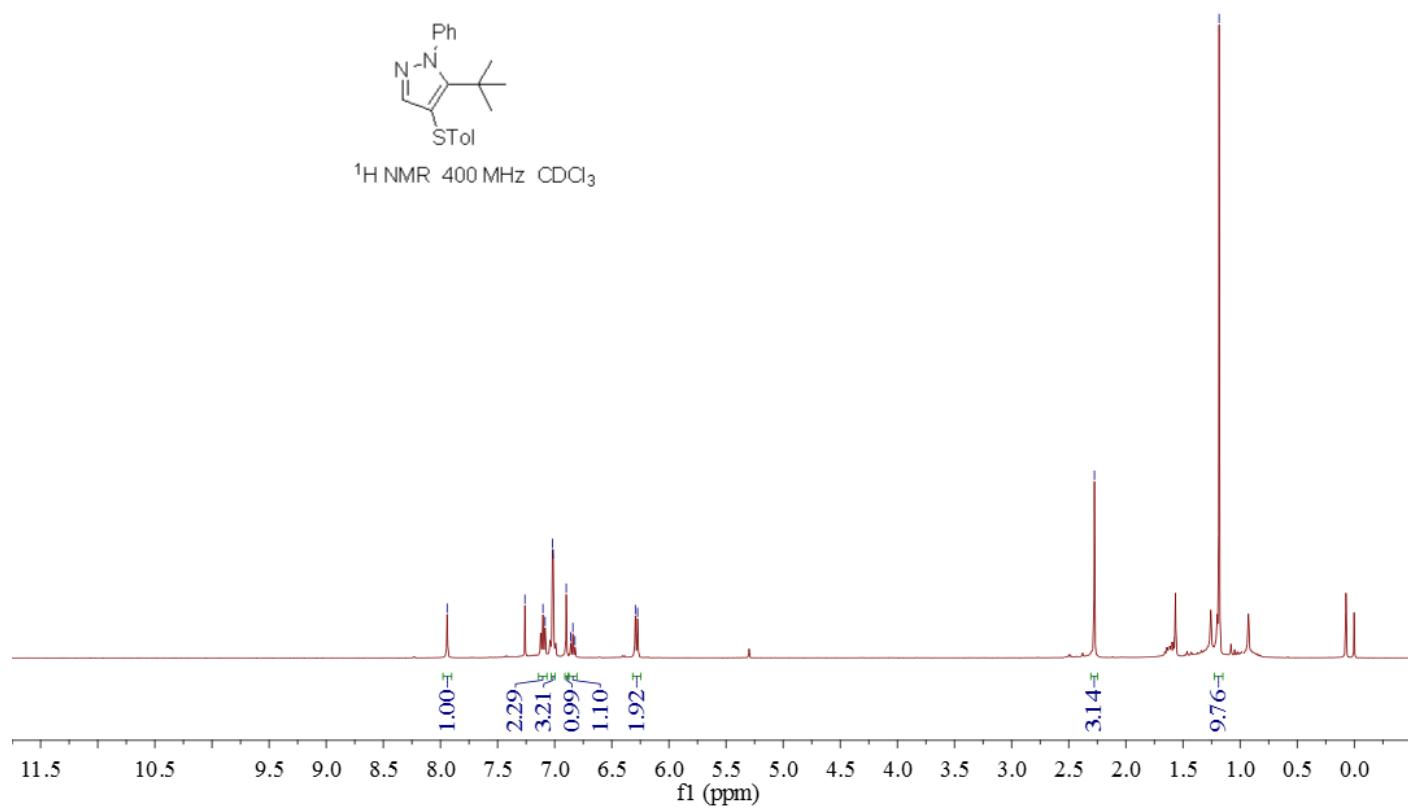
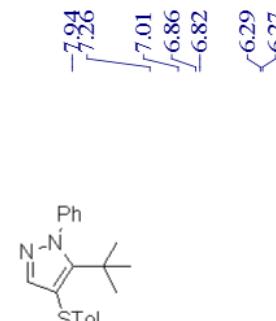


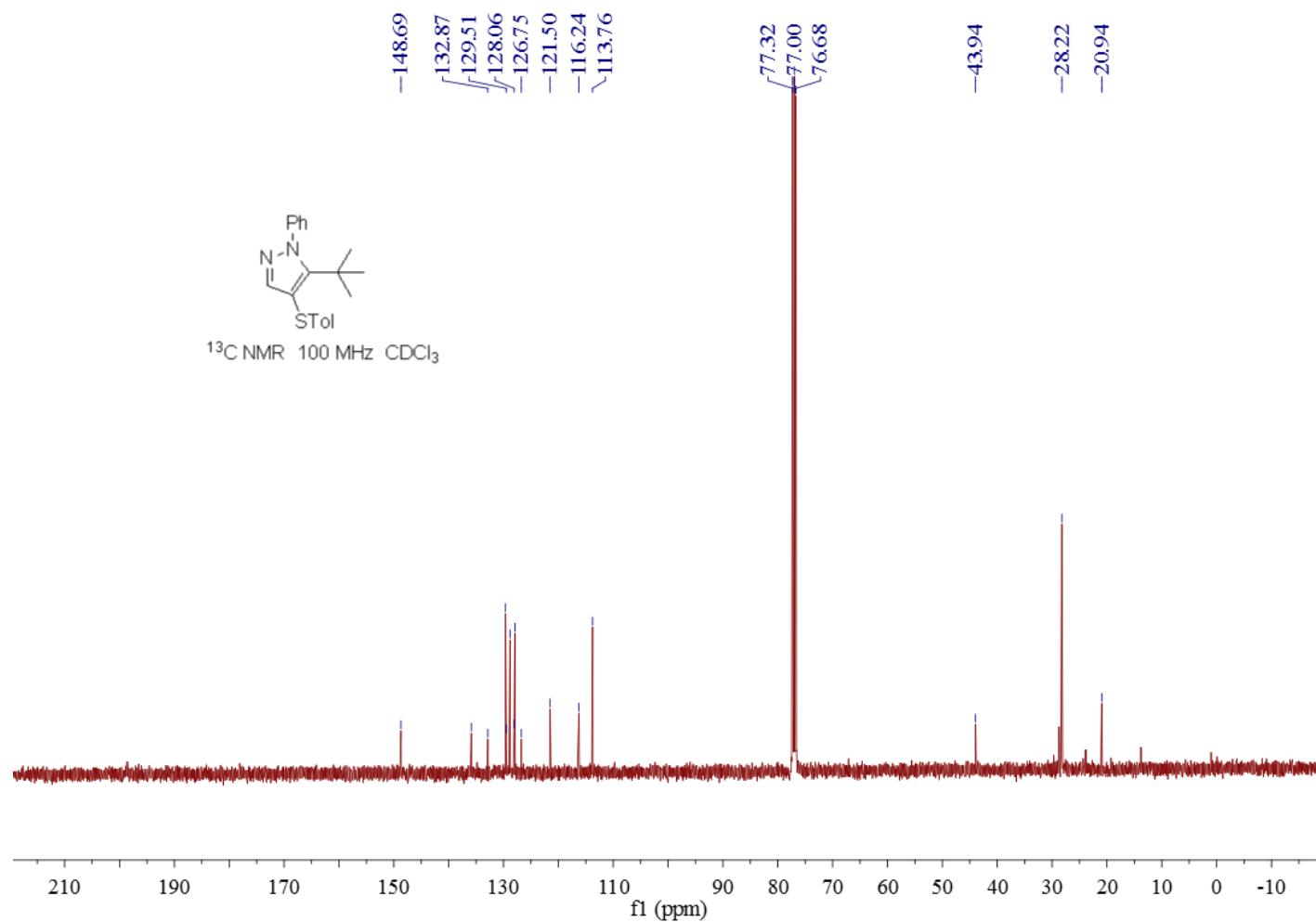
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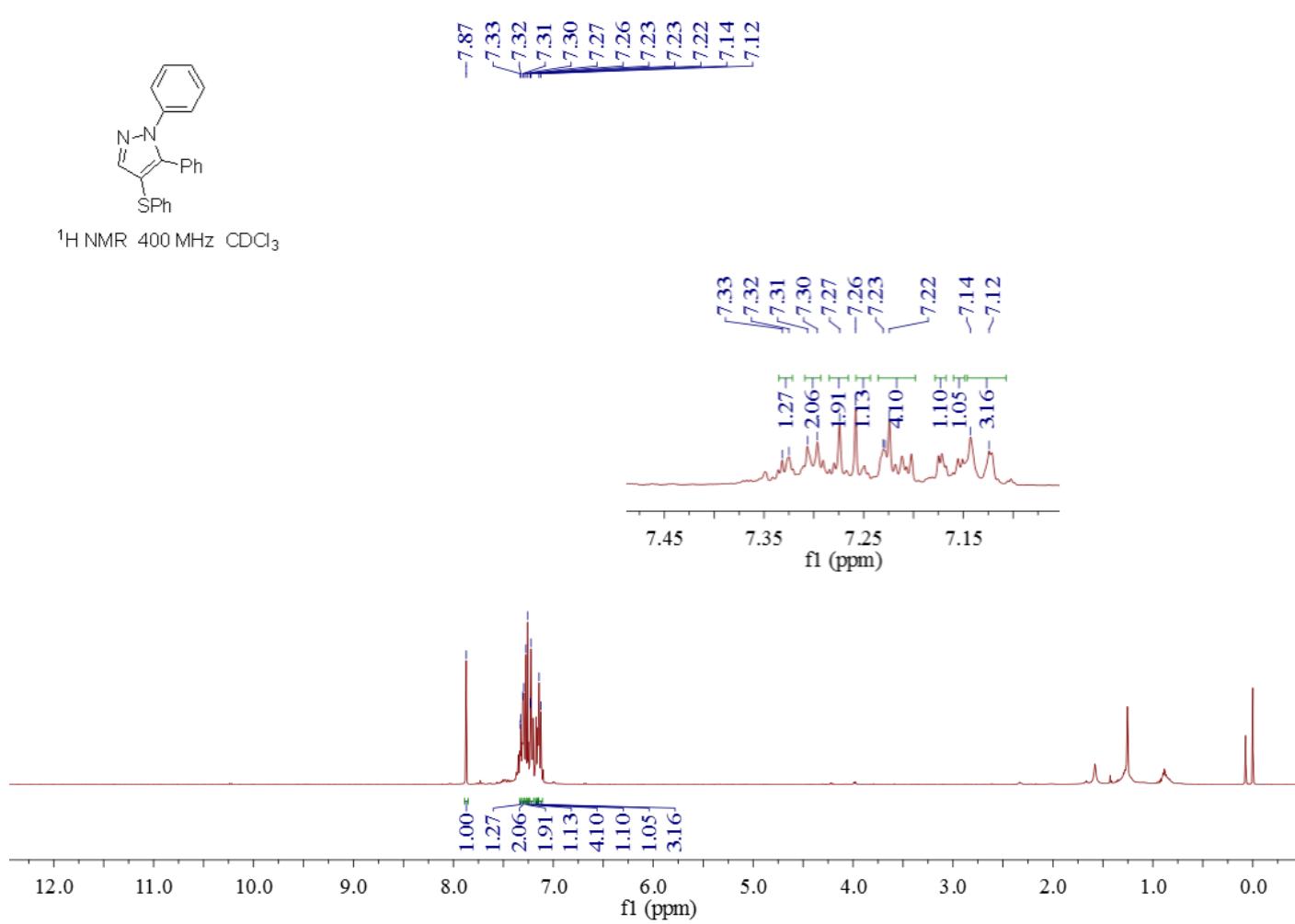


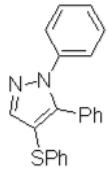
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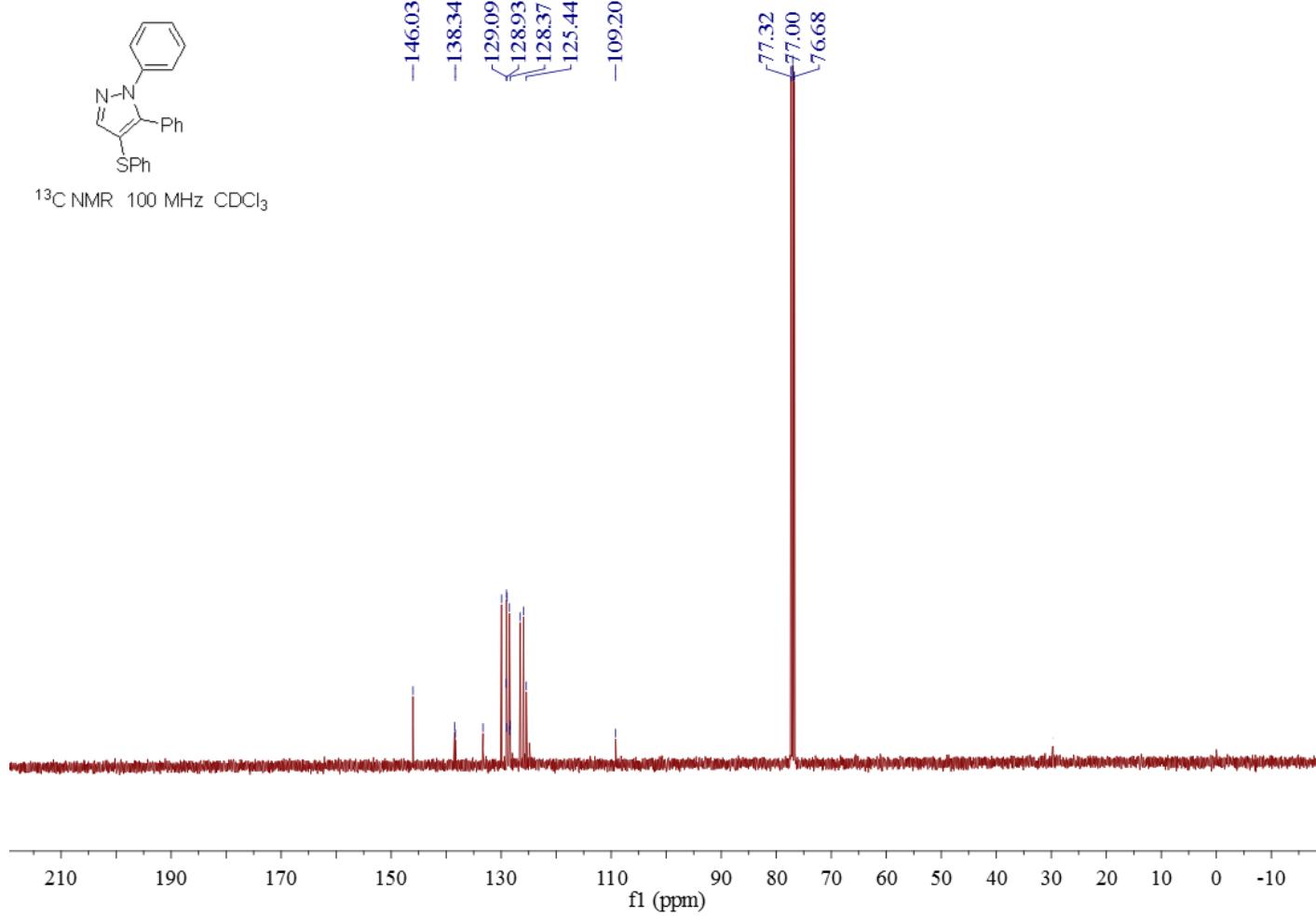


3f

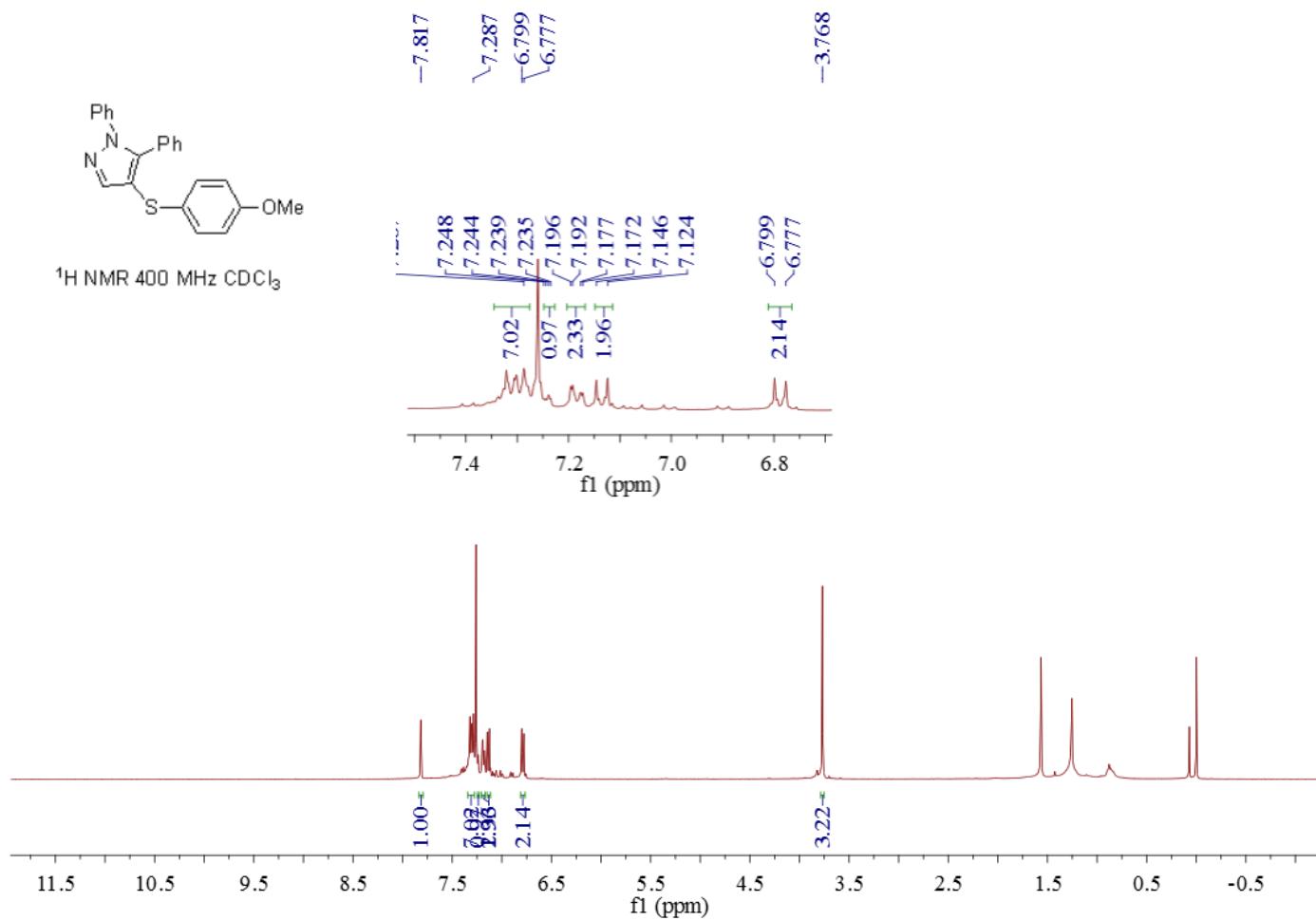


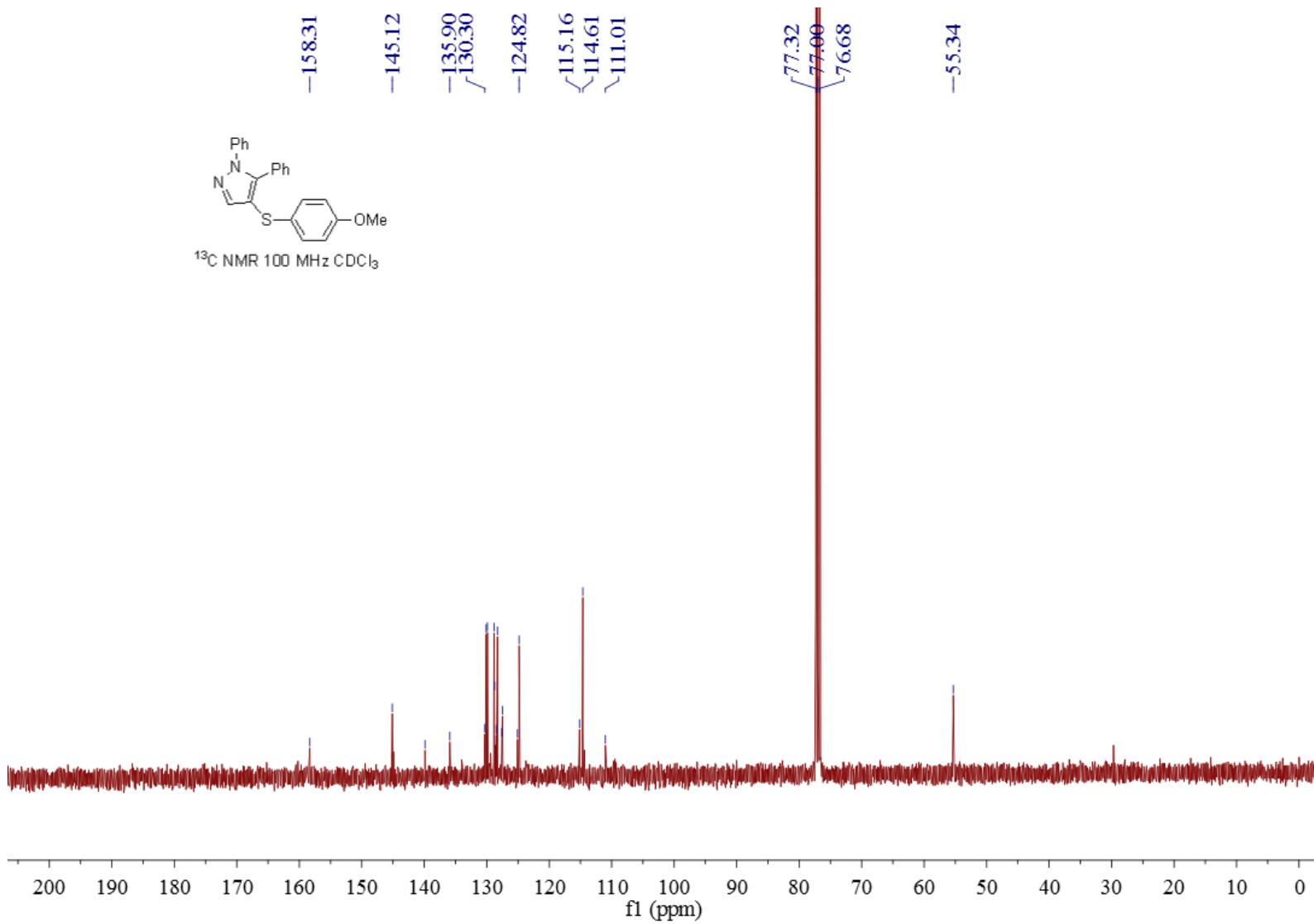


^{13}C NMR 100 MHz CDCl_3

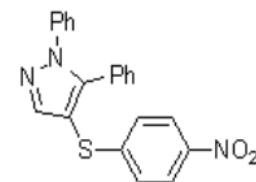


3g

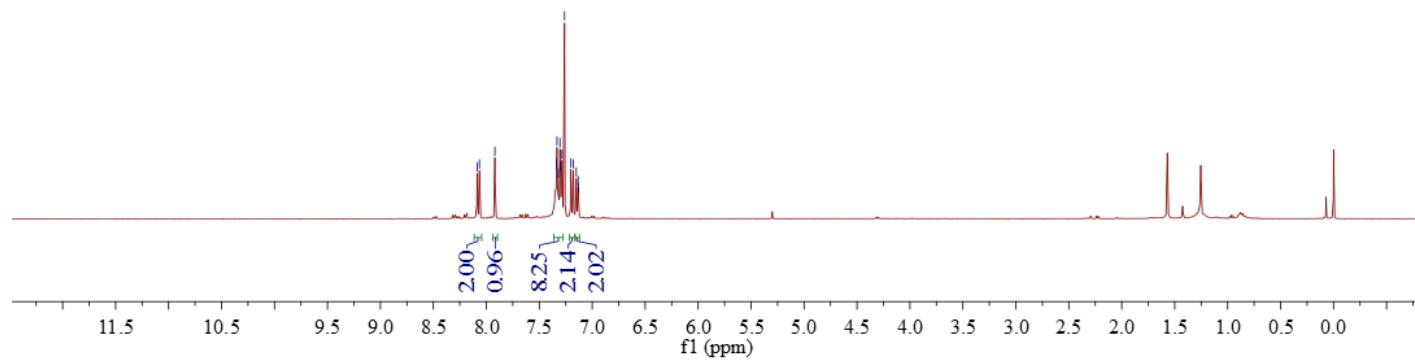


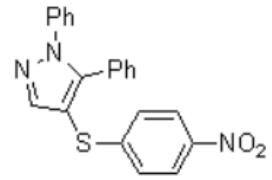


3h

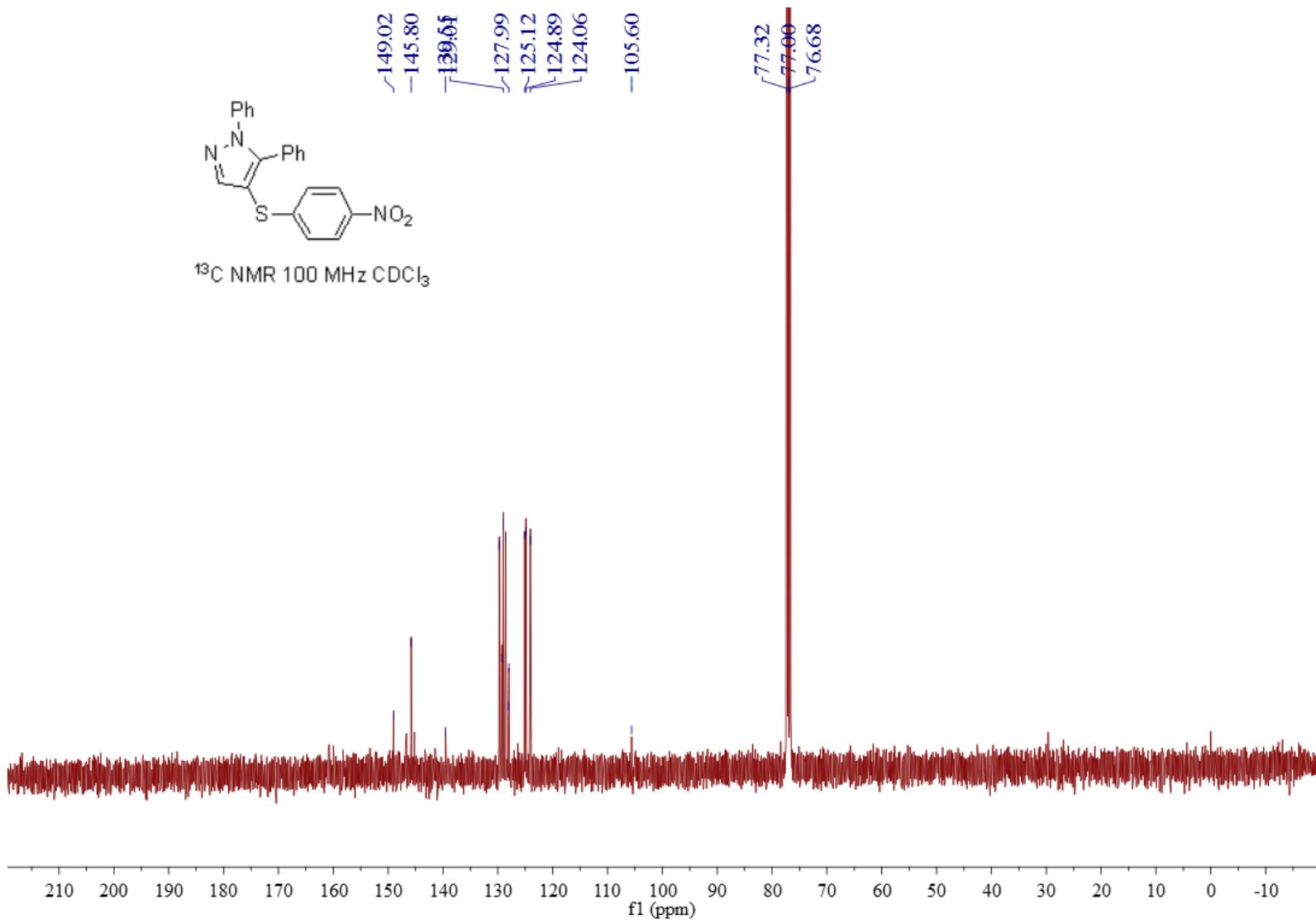


^1H NMR 400 MHz CDCl_3

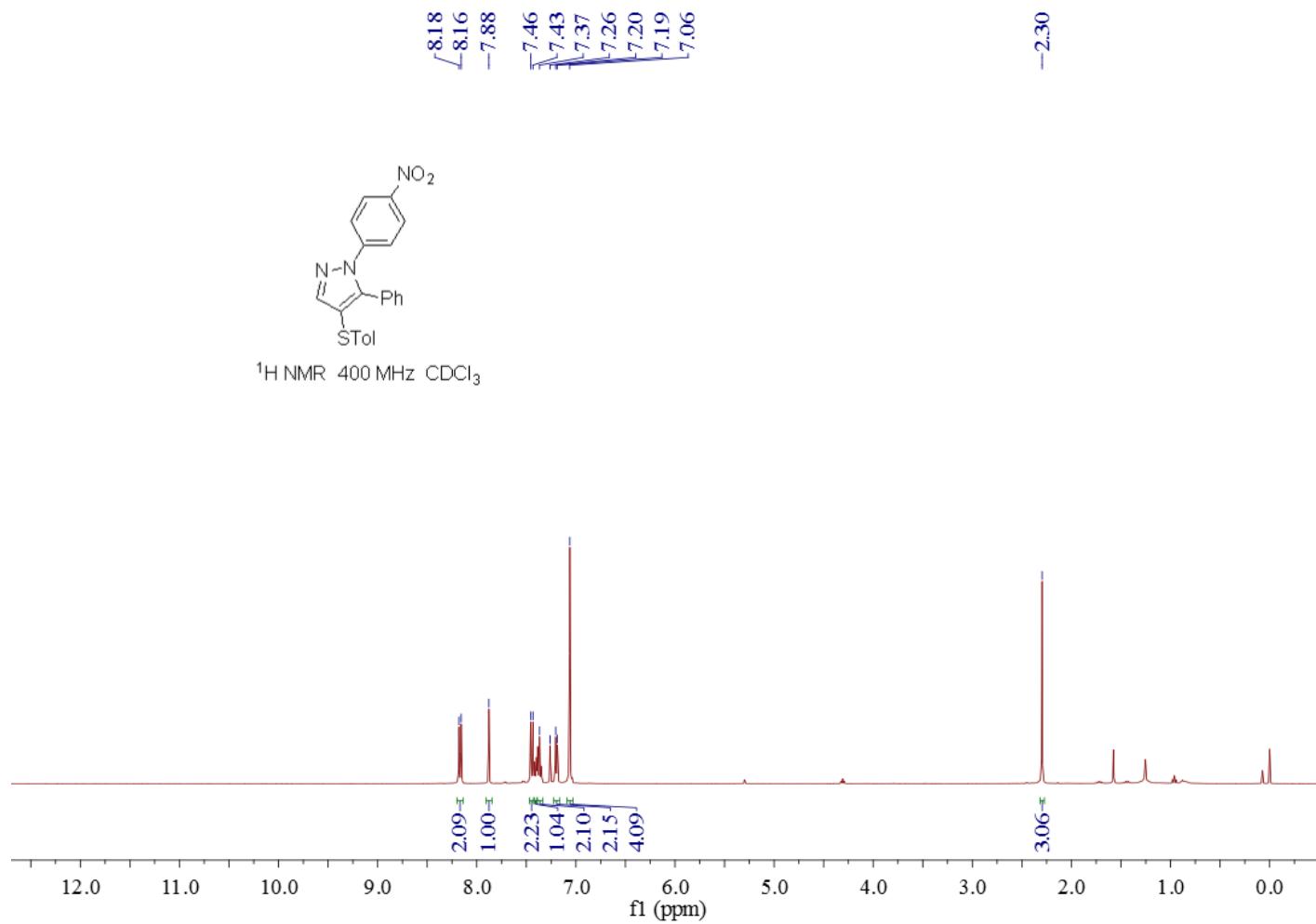


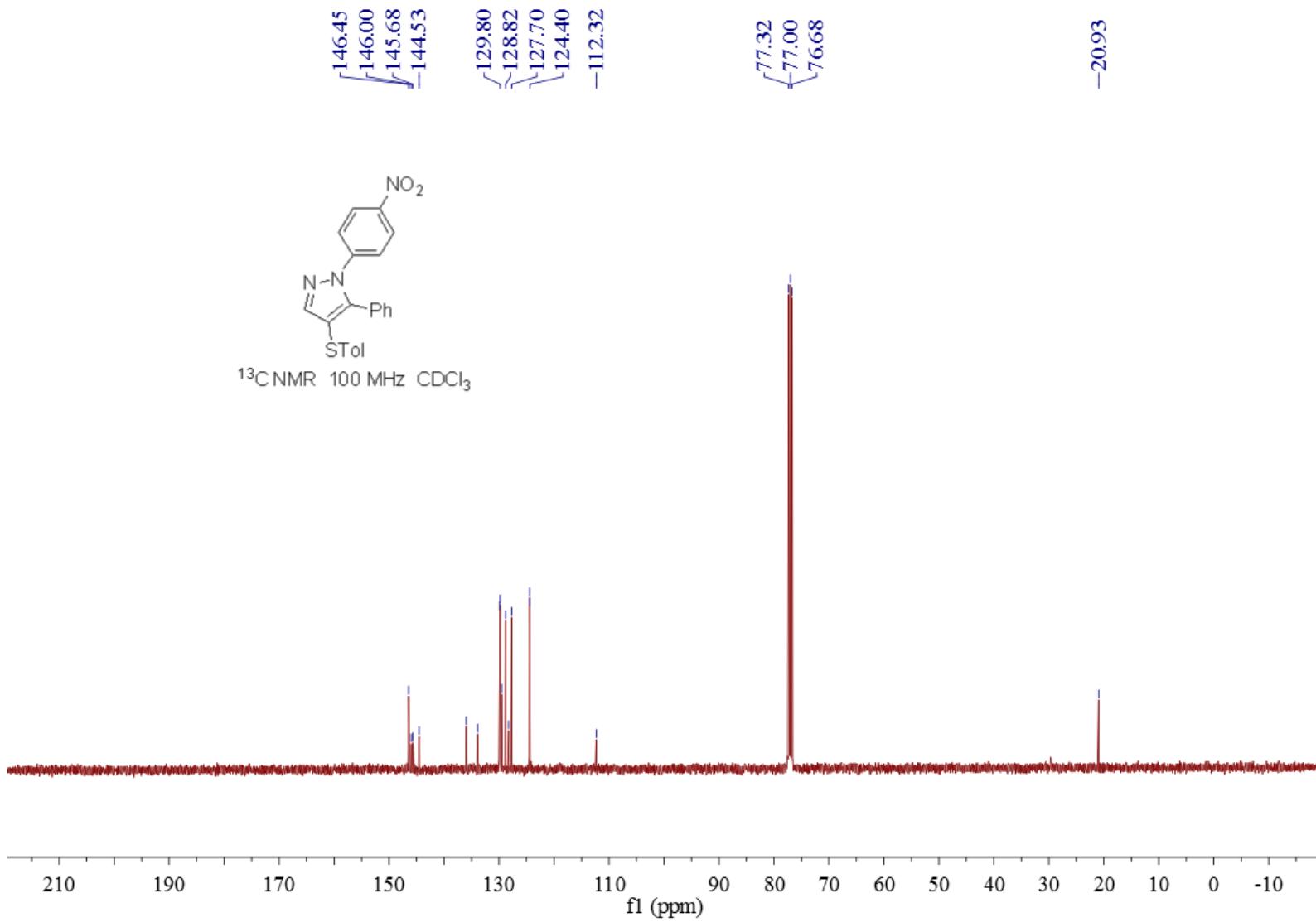


¹³C NMR 100 MHz CDCl₃



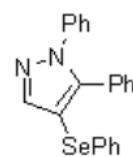
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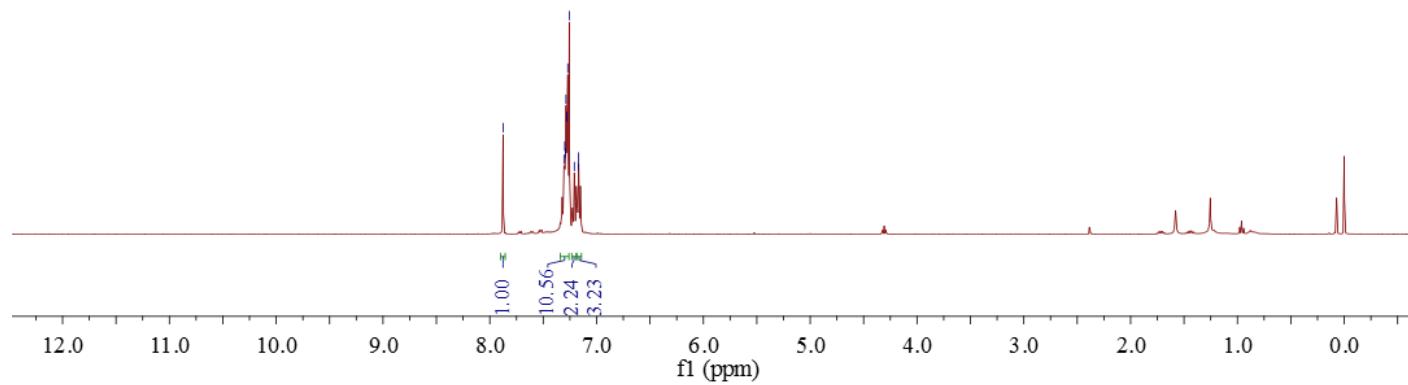


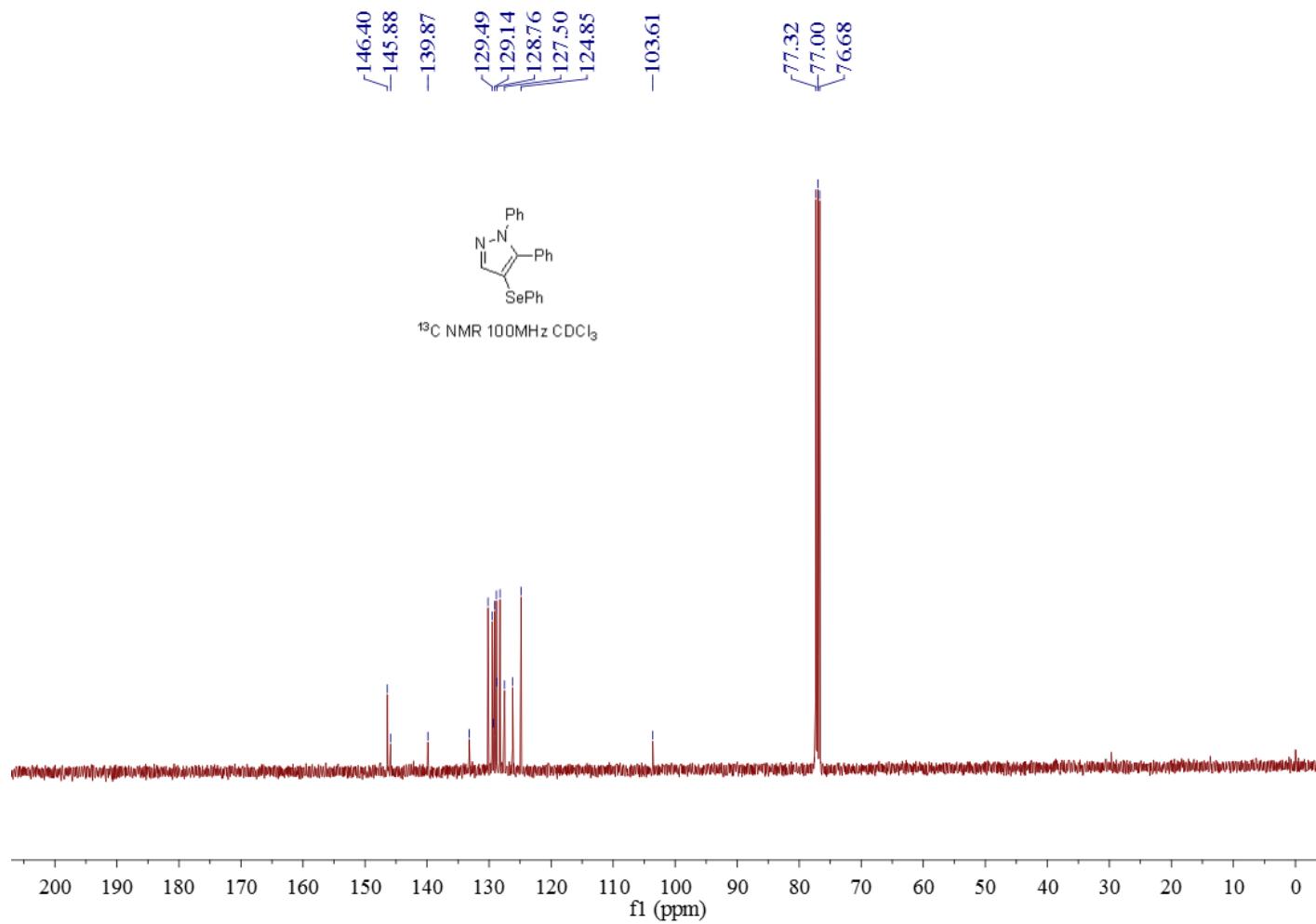
3j

7.88
7.31
7.30
7.29
7.28
7.28
7.27
7.26
7.21
7.17
7.17

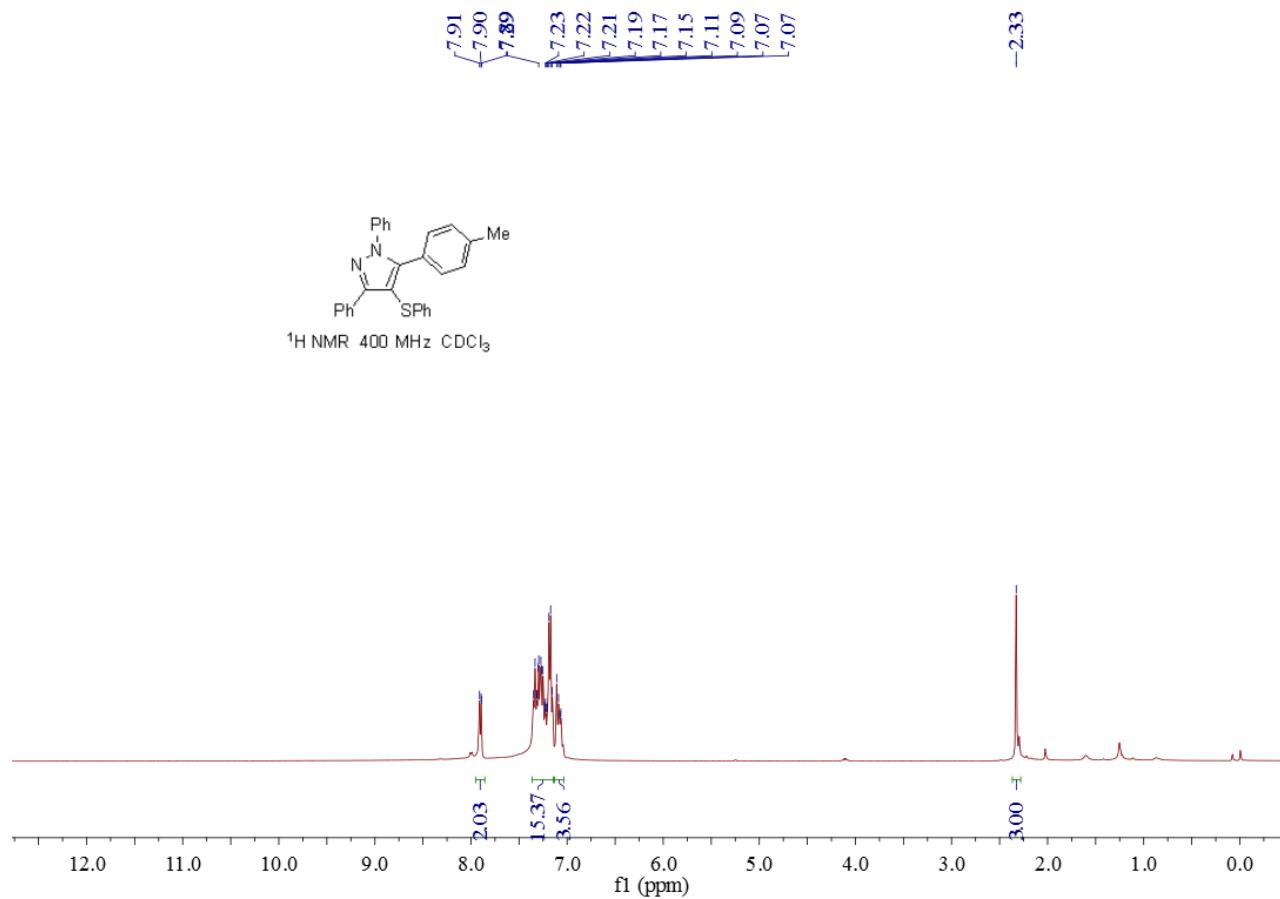


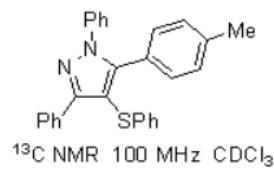
¹H NMR 400 MHz CDCl₃



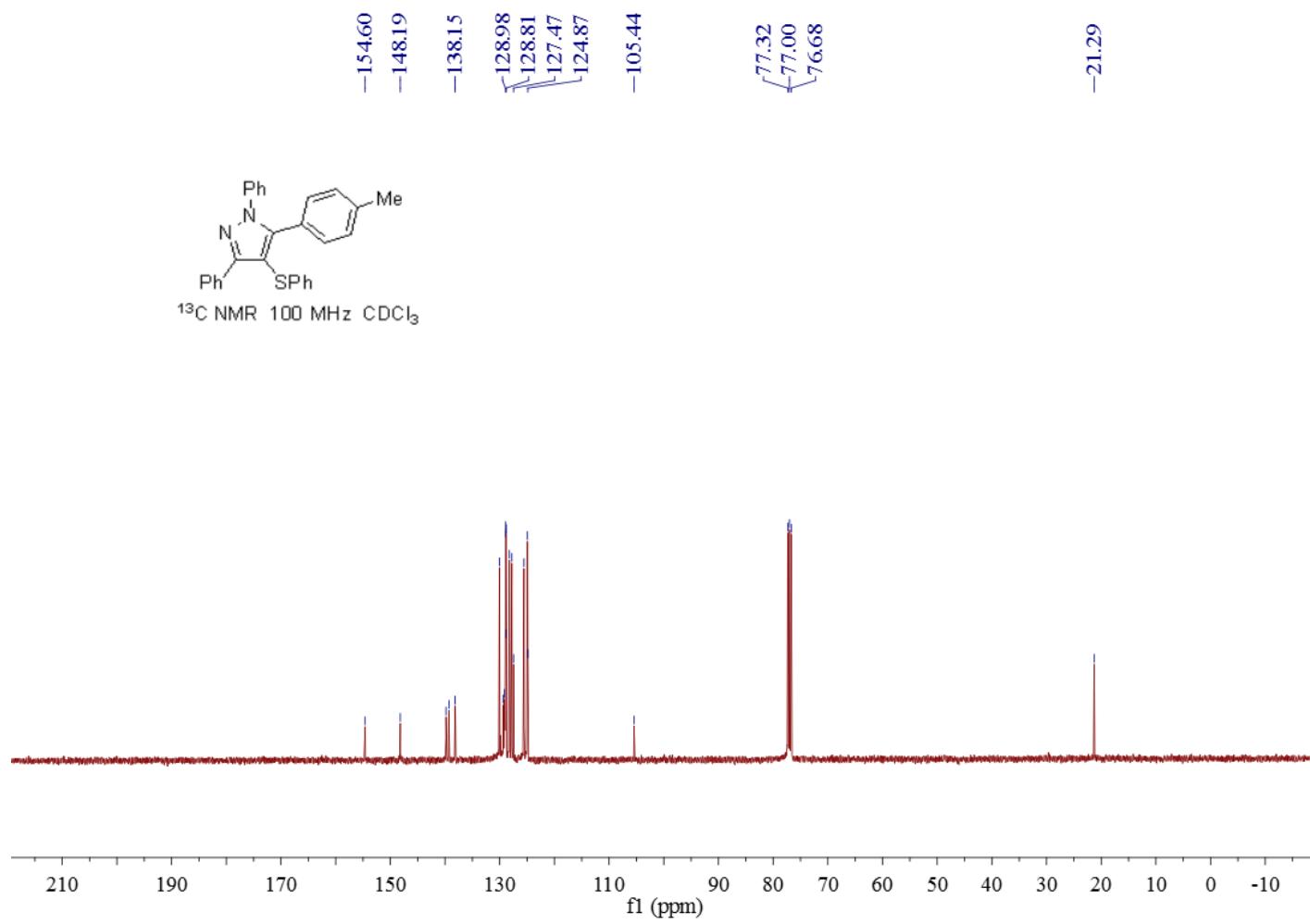


7a

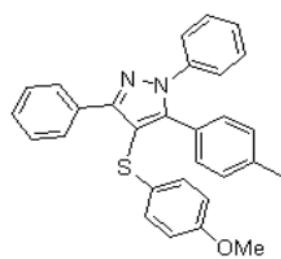




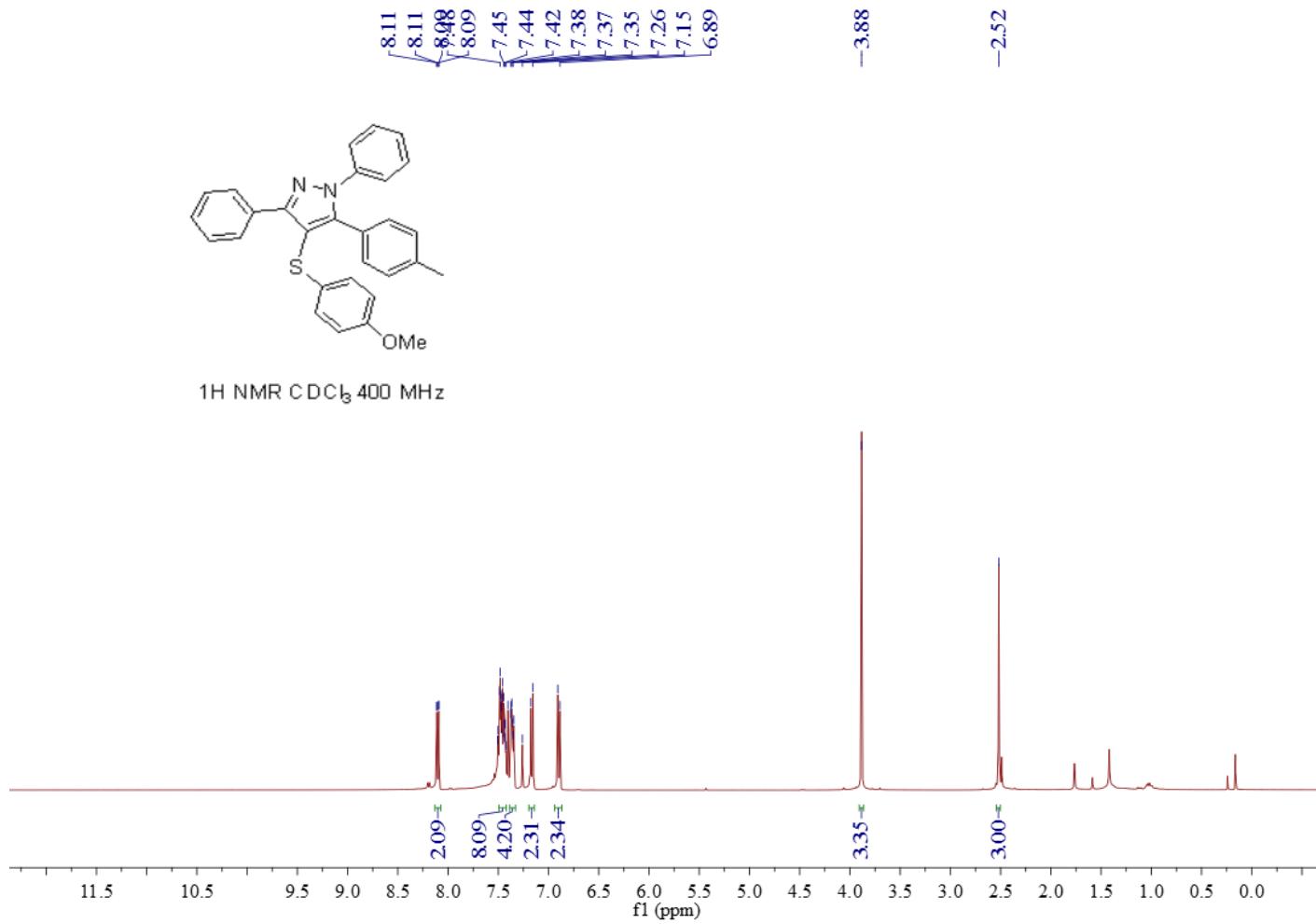
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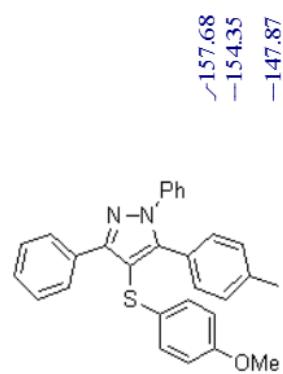


7b

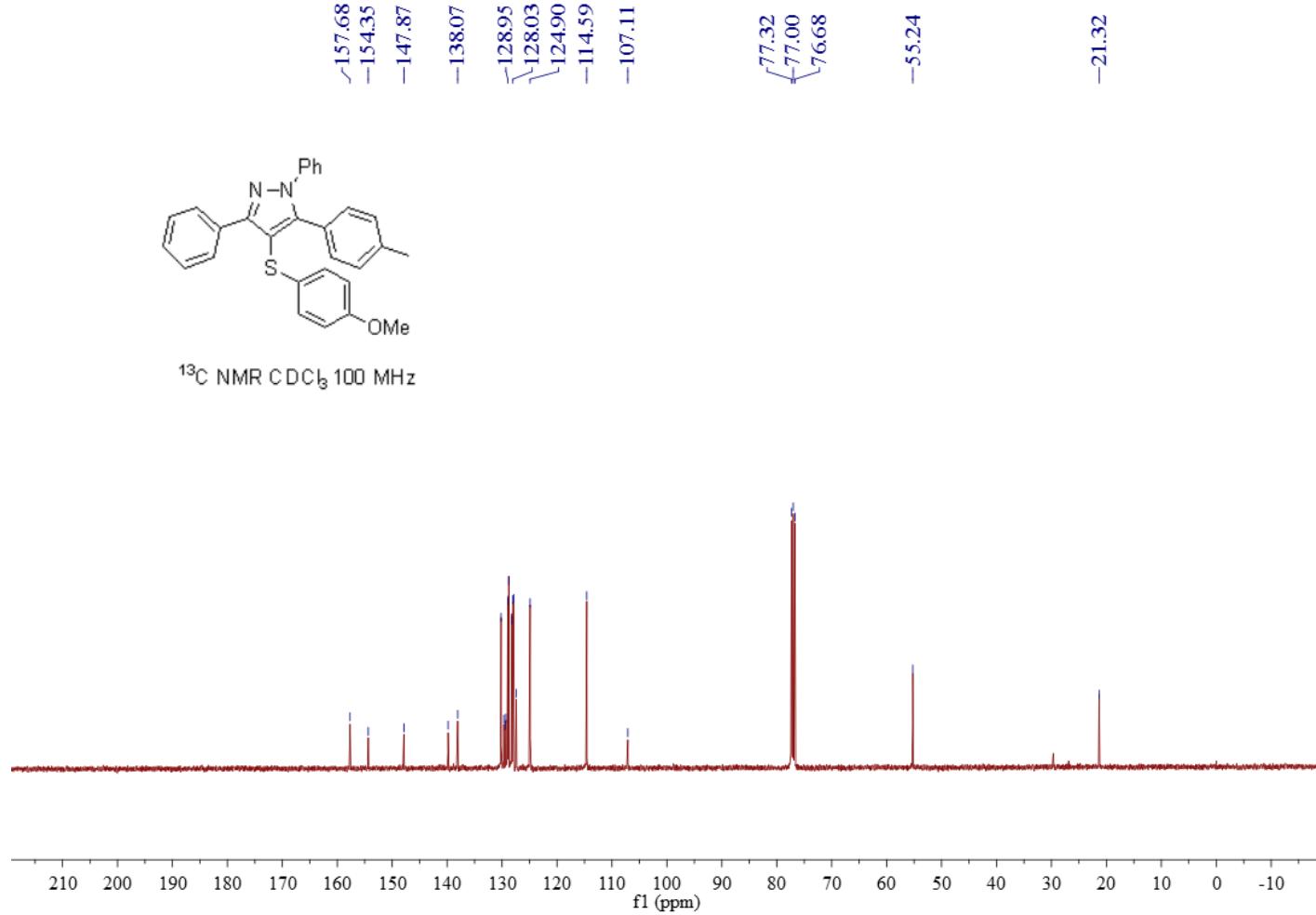


¹H NMR CDCl₃ 400 MHz

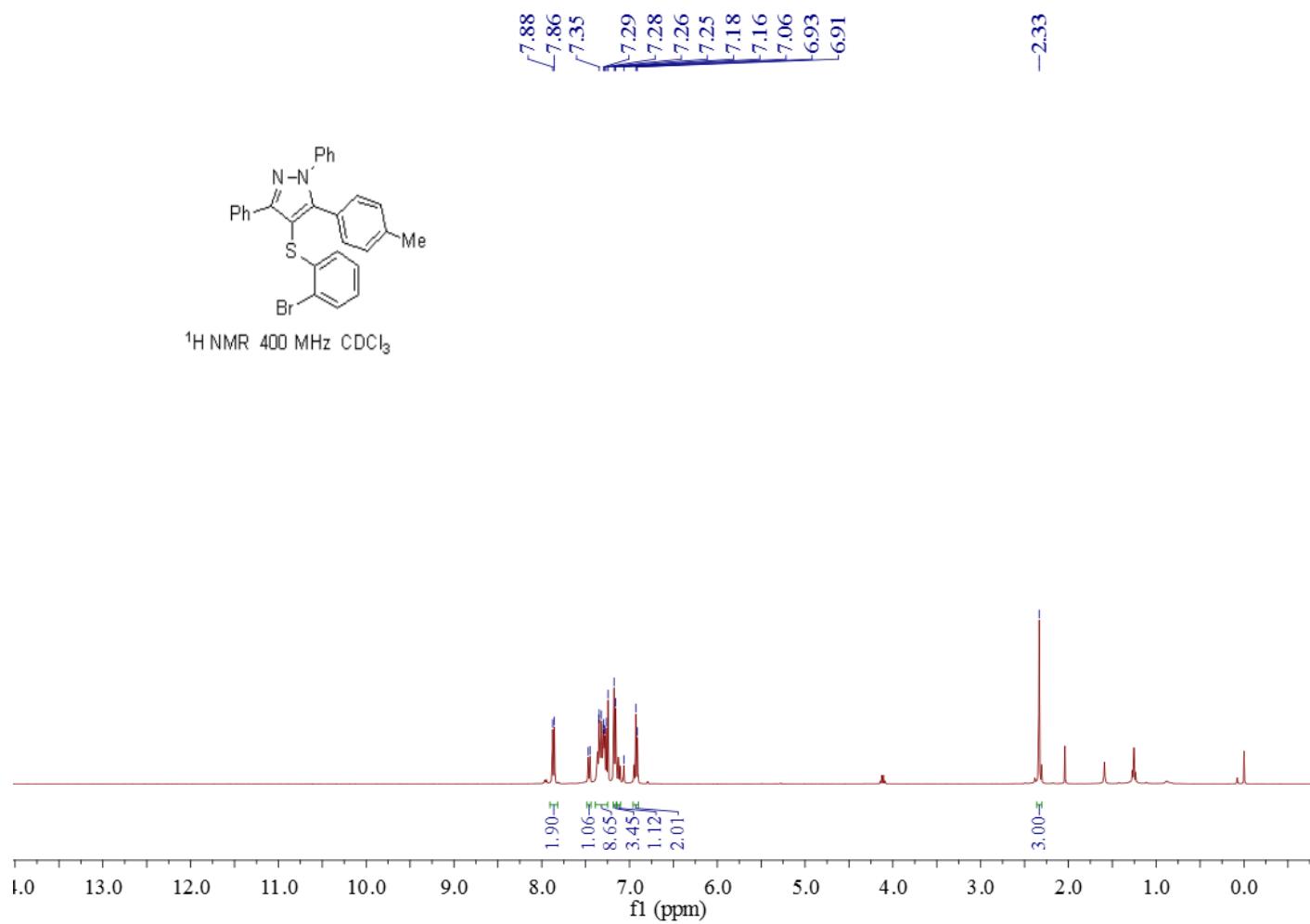


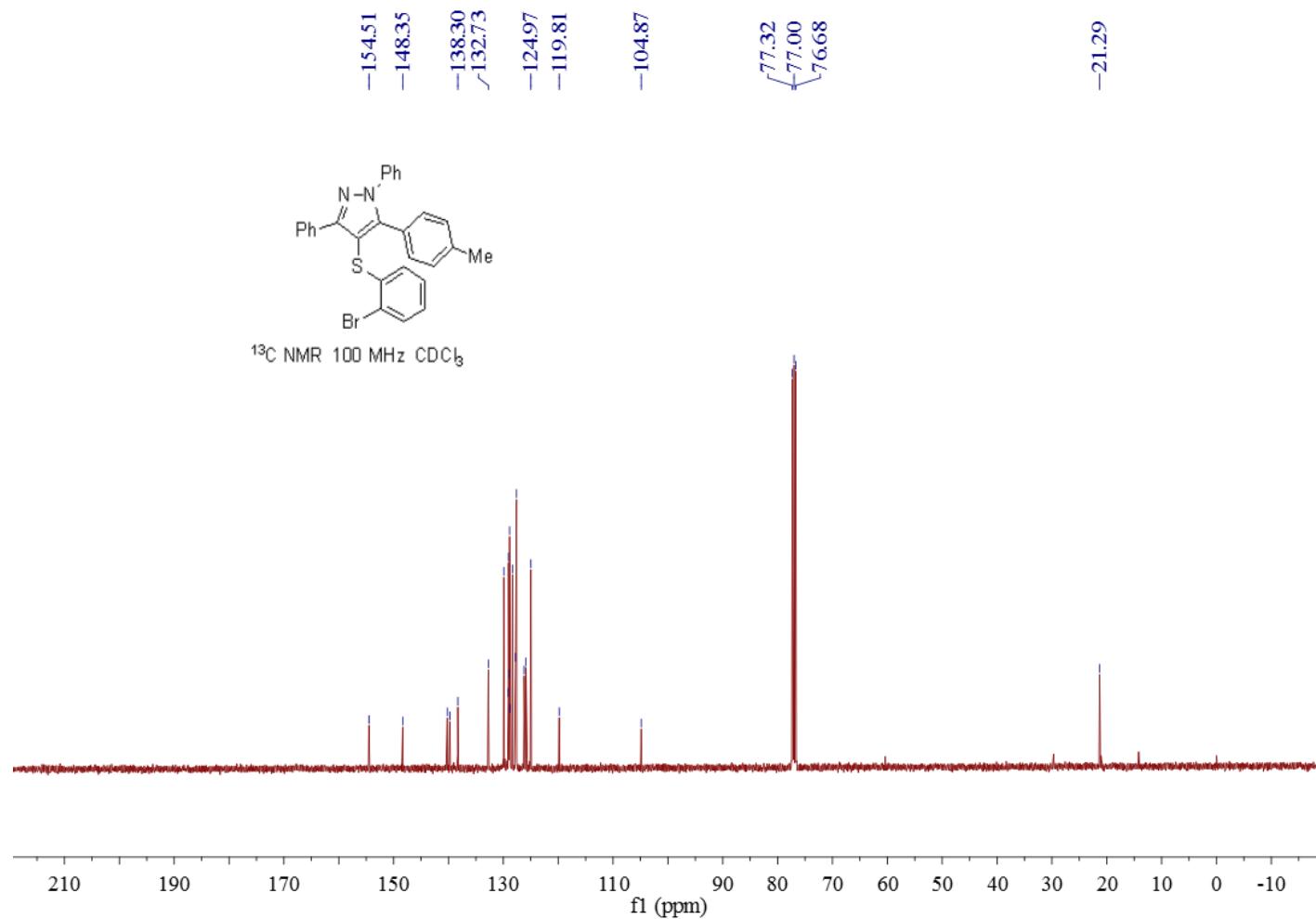


^{13}C NMR CDCl_3 100 MHz

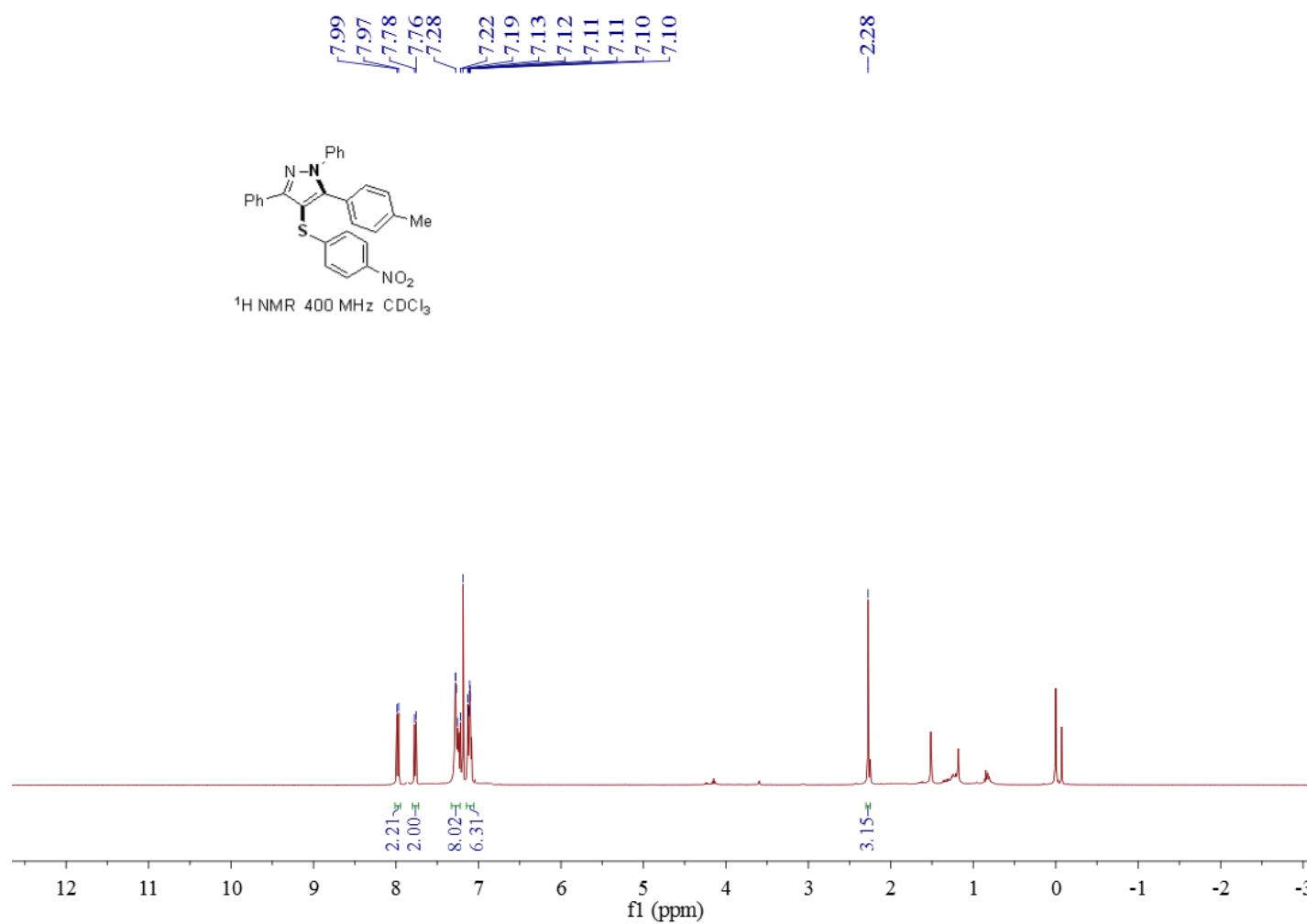


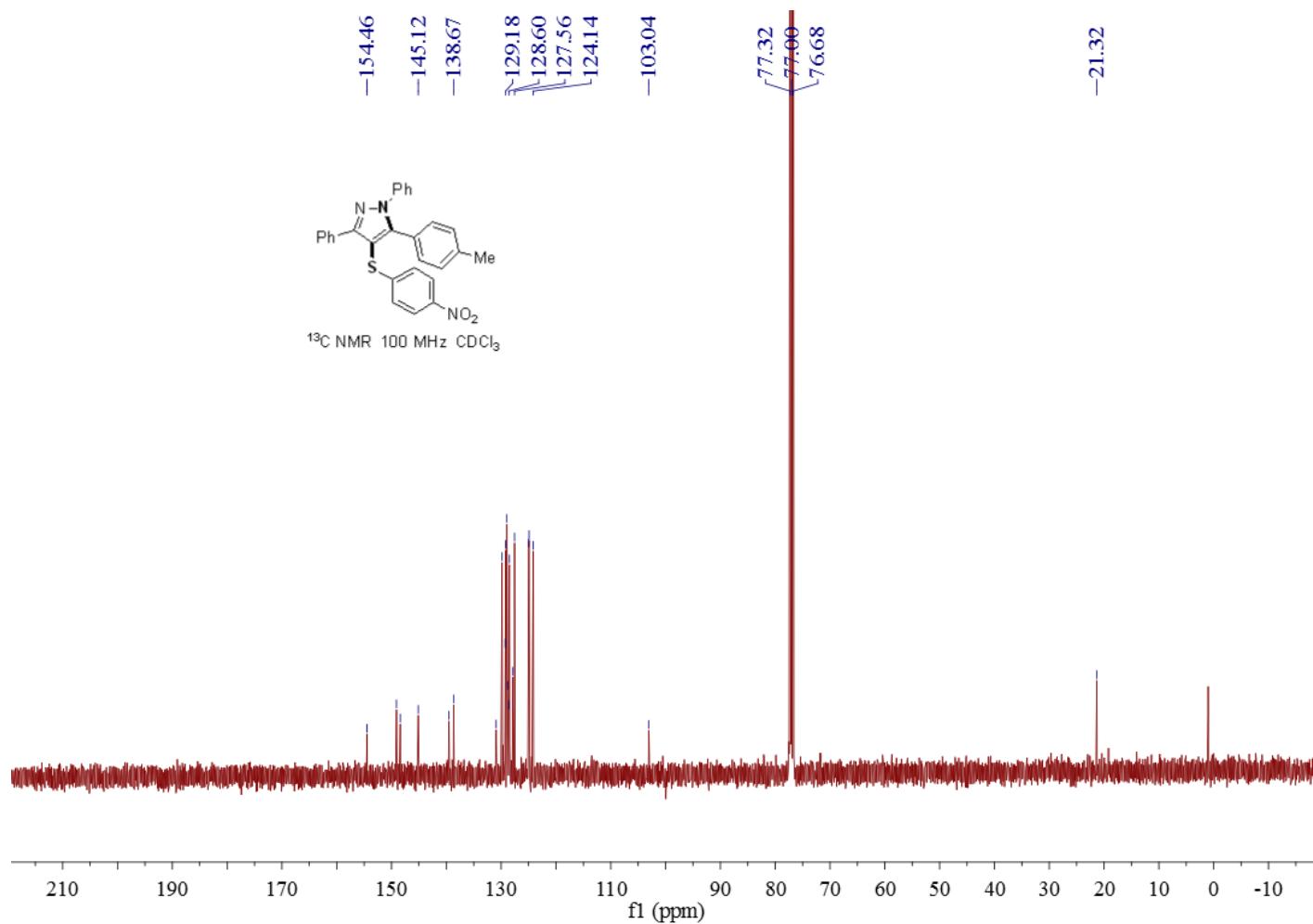
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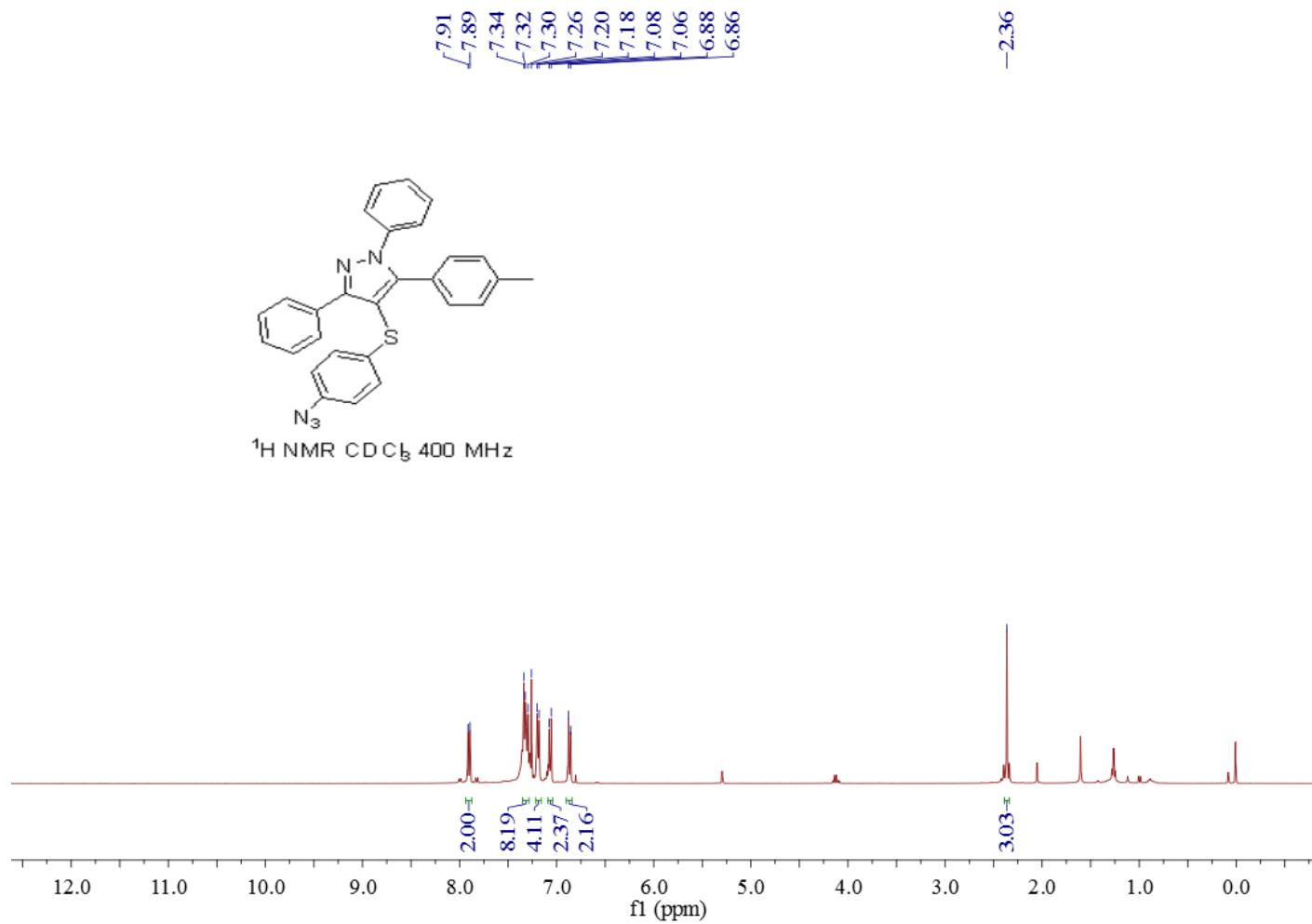


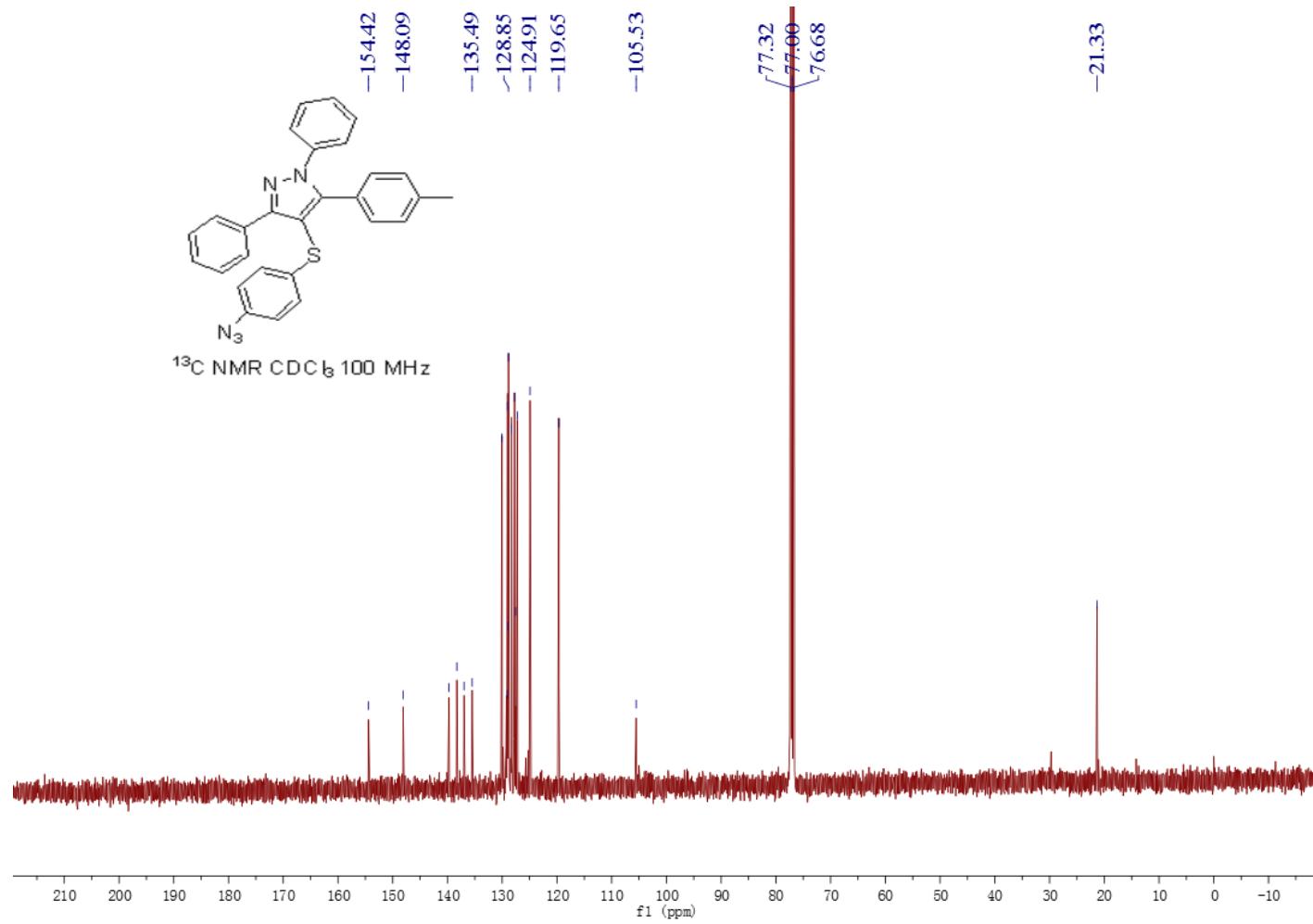
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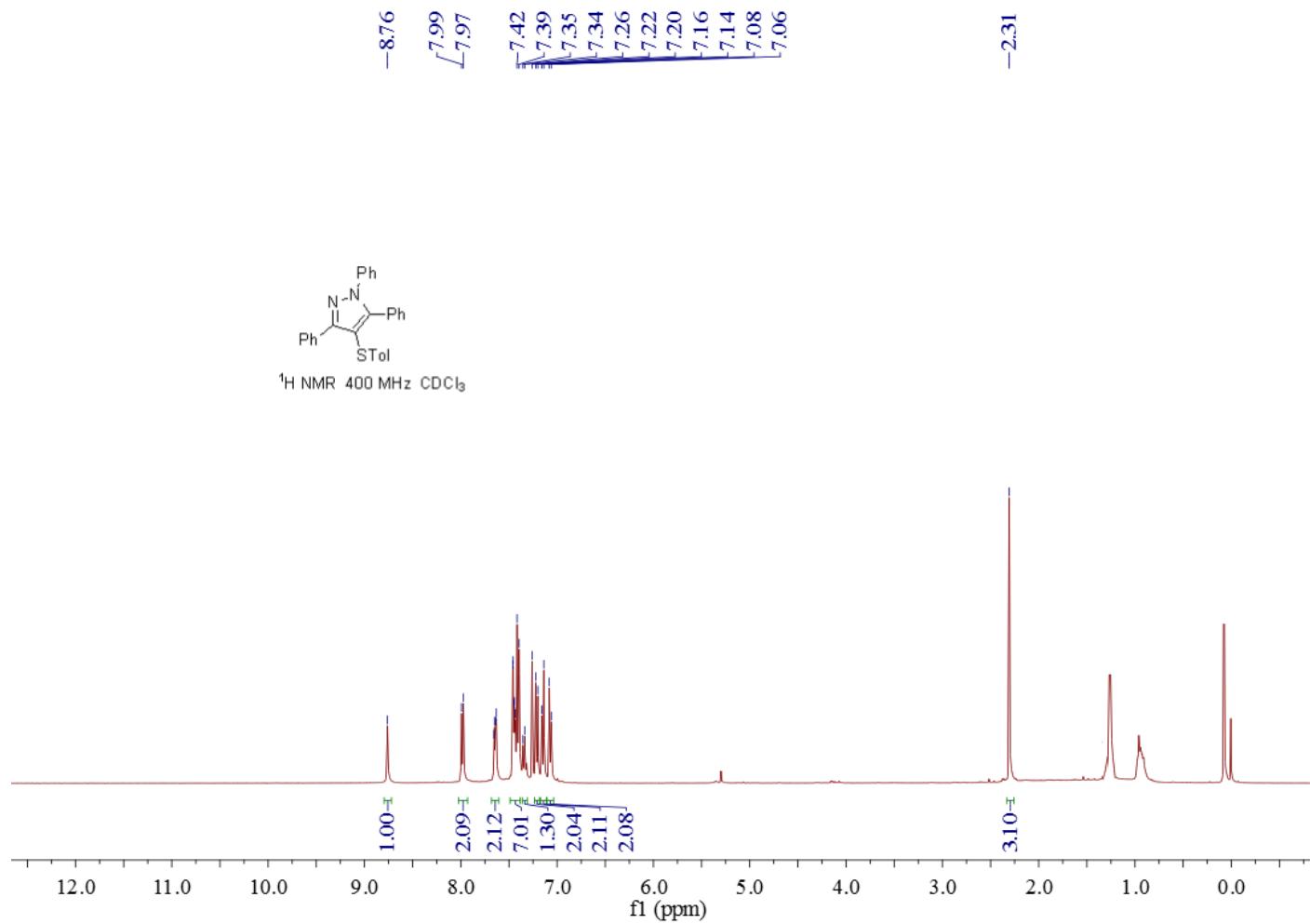


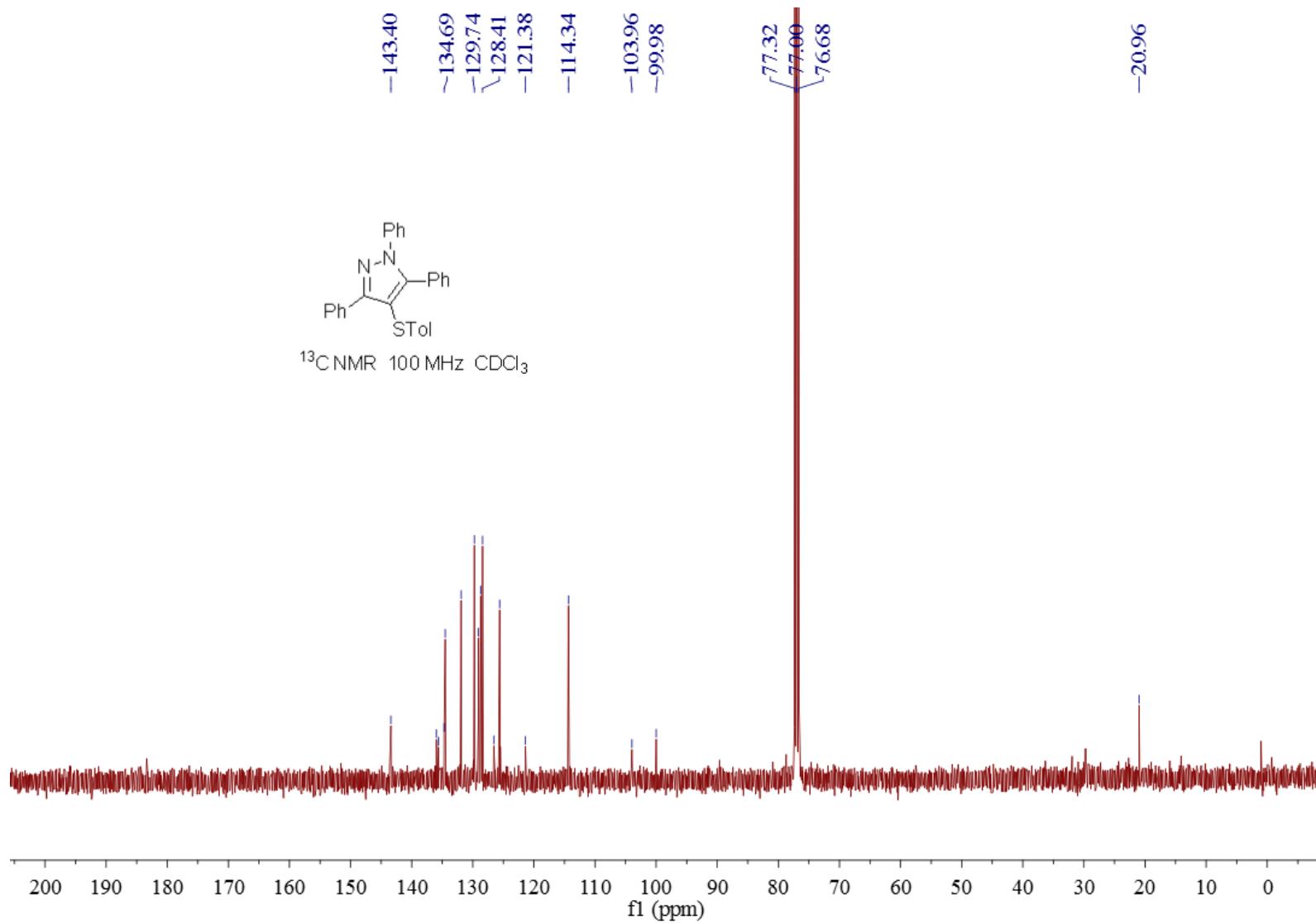
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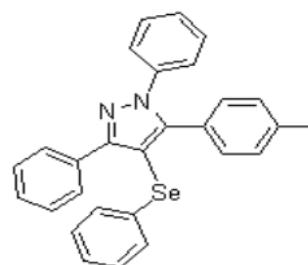


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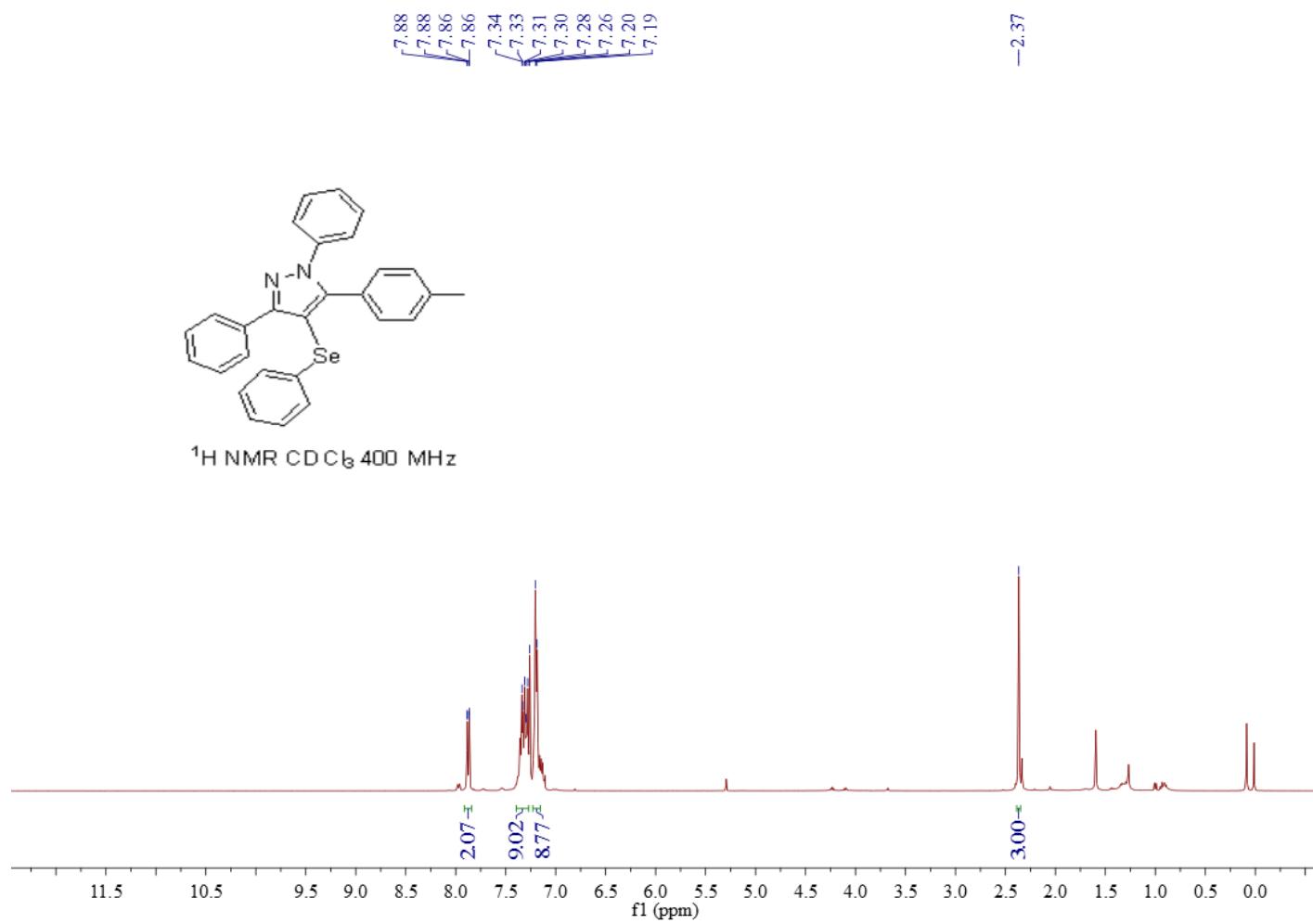


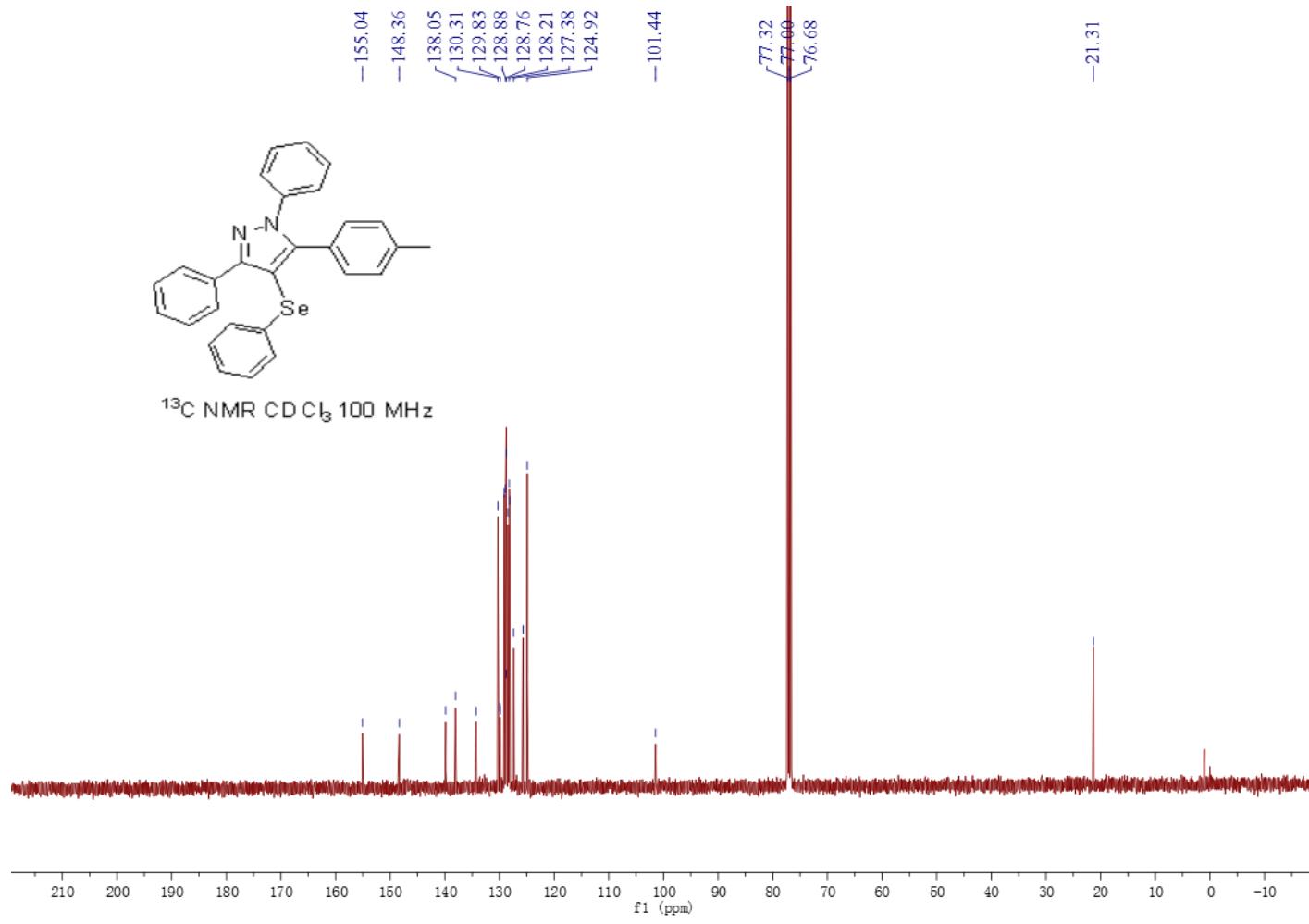


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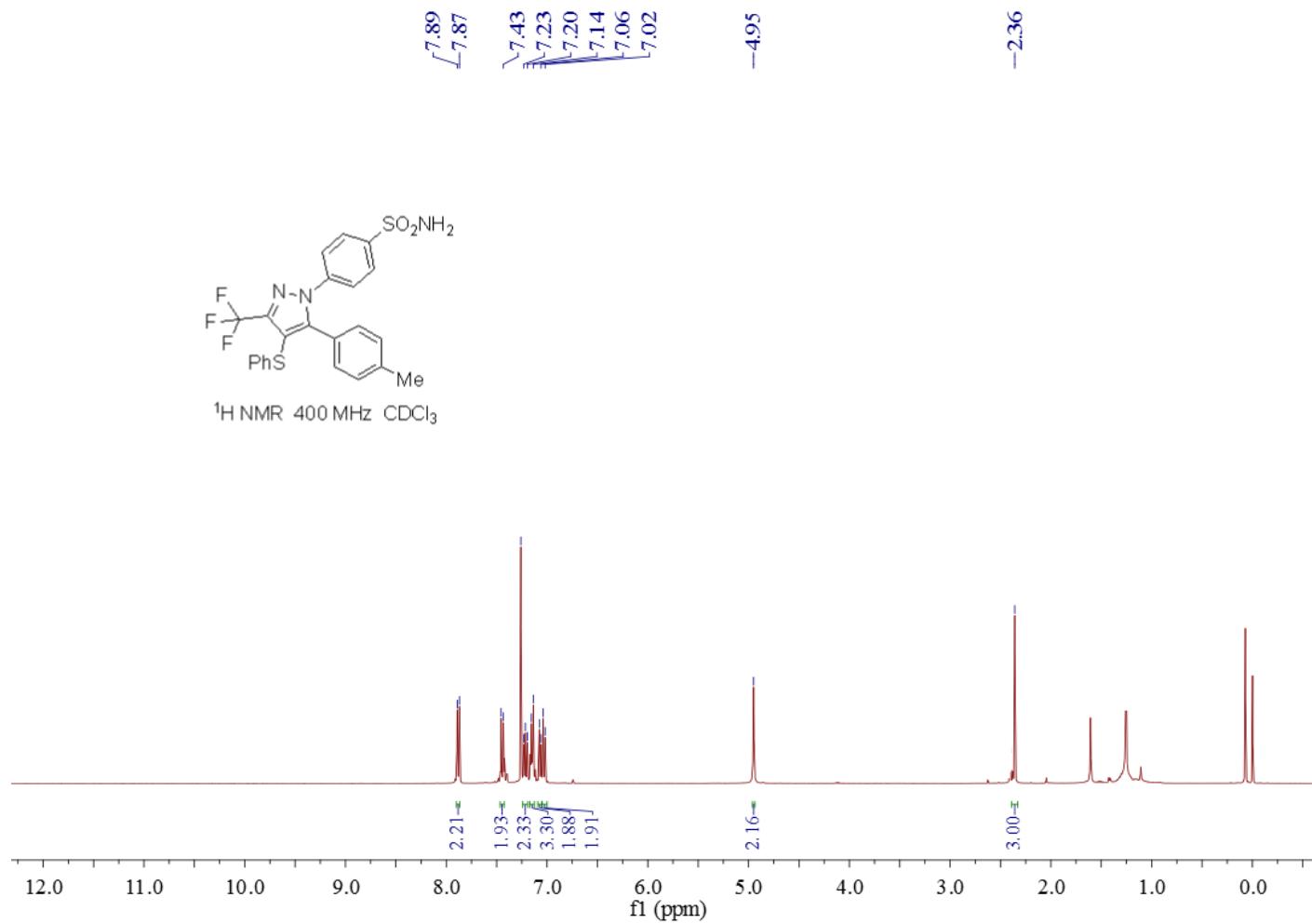


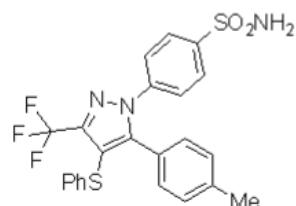
¹H NMR CDCl₃ 400 MHz





9





^{13}C NMR 100 MHz CDCl_3

-149.45
-141.33
-136.97
-129.60
-127.23
-124.09
-108.79
77.32
77.00
76.68
-21.43

