Electronic Supplementary Information for:

A Radical Addition/Cyclization of Diverse Ethers to 2-Isocyanobiaryls under Mildly Basic Aqueous Conditions

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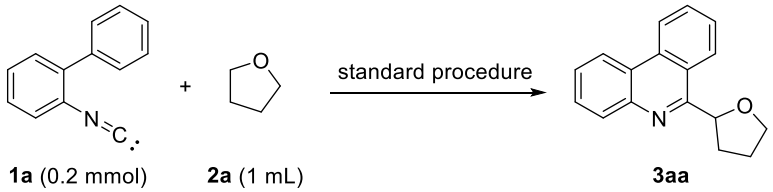
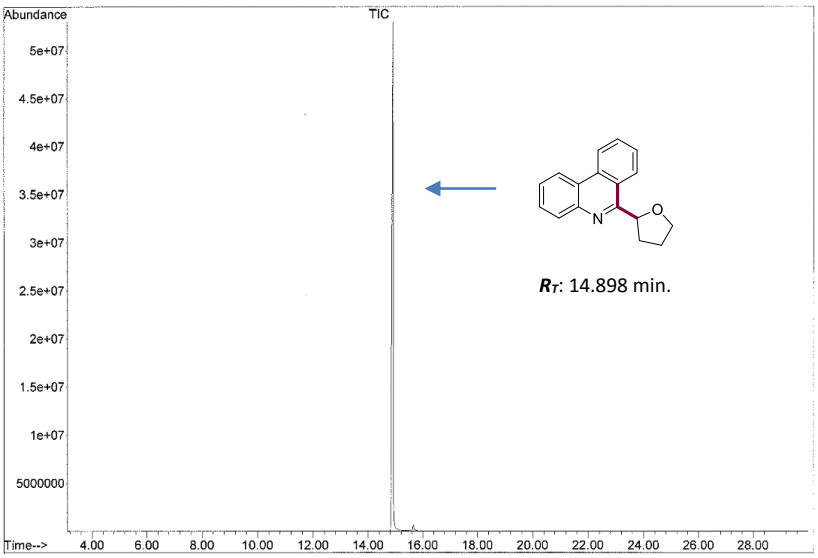
Free Radical Capture Experiments

✓ Standard procedure

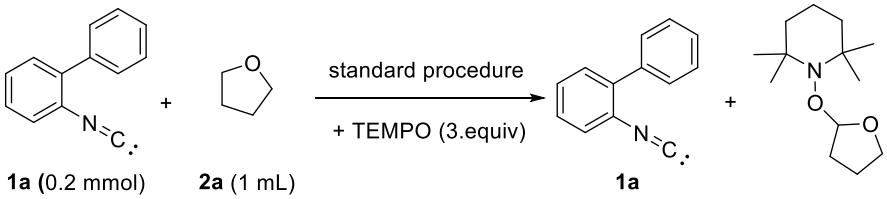


1a (0.2 mmol) **2a** (1 mL) **3aa**

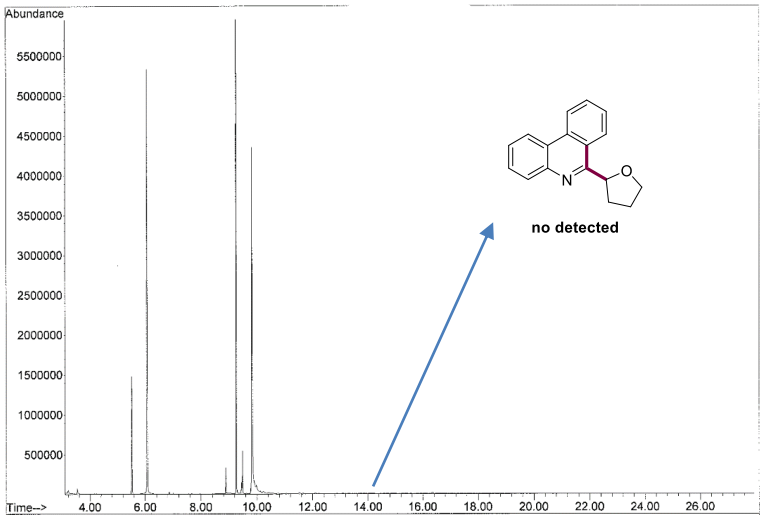
GC-MS of compound **3aa**



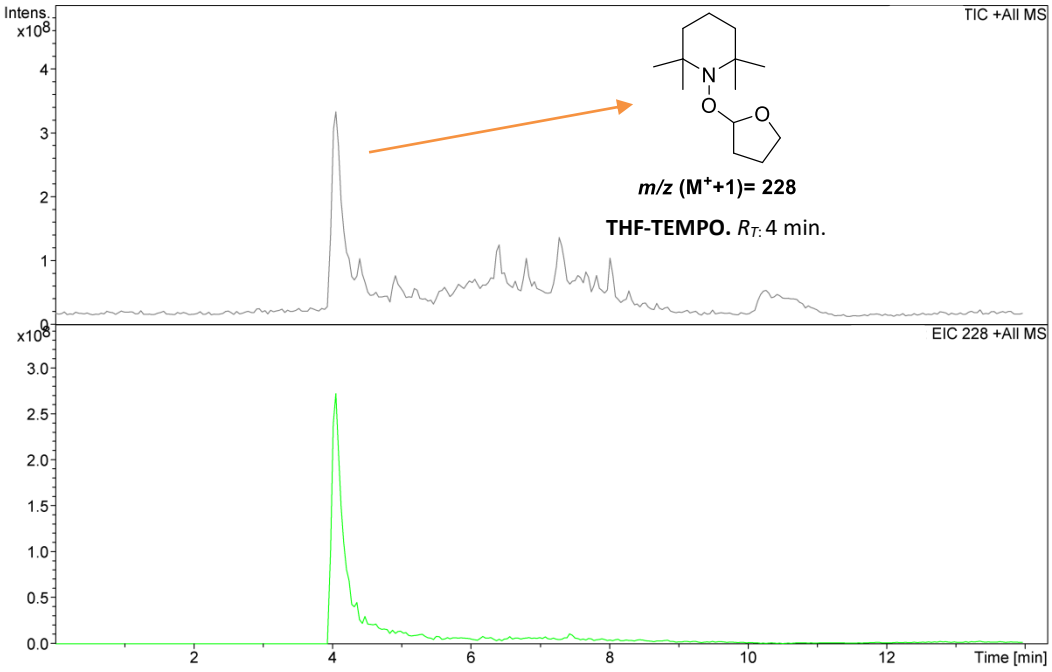
✓ Standard procedure + TEMPO (3 equiv.)

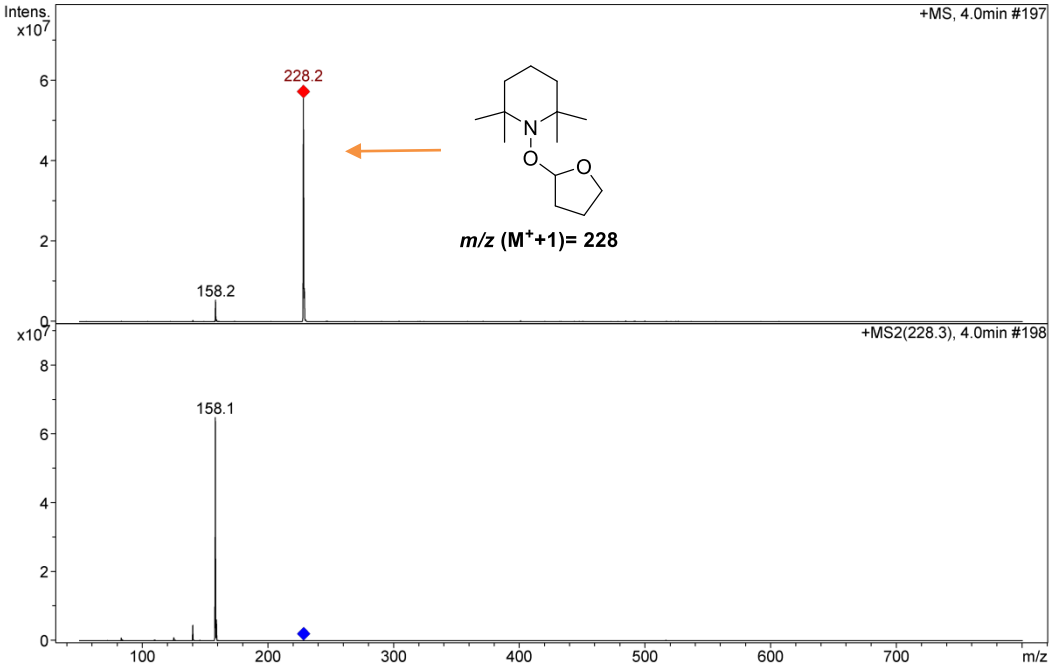


1a (0.2 mmol) **2a** (1 mL) **1a**



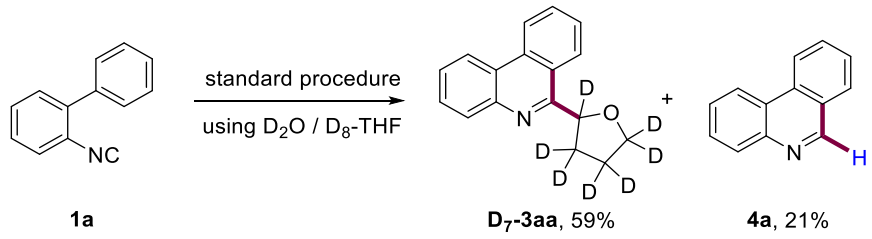
✓ ESI-MASS (positive mode).



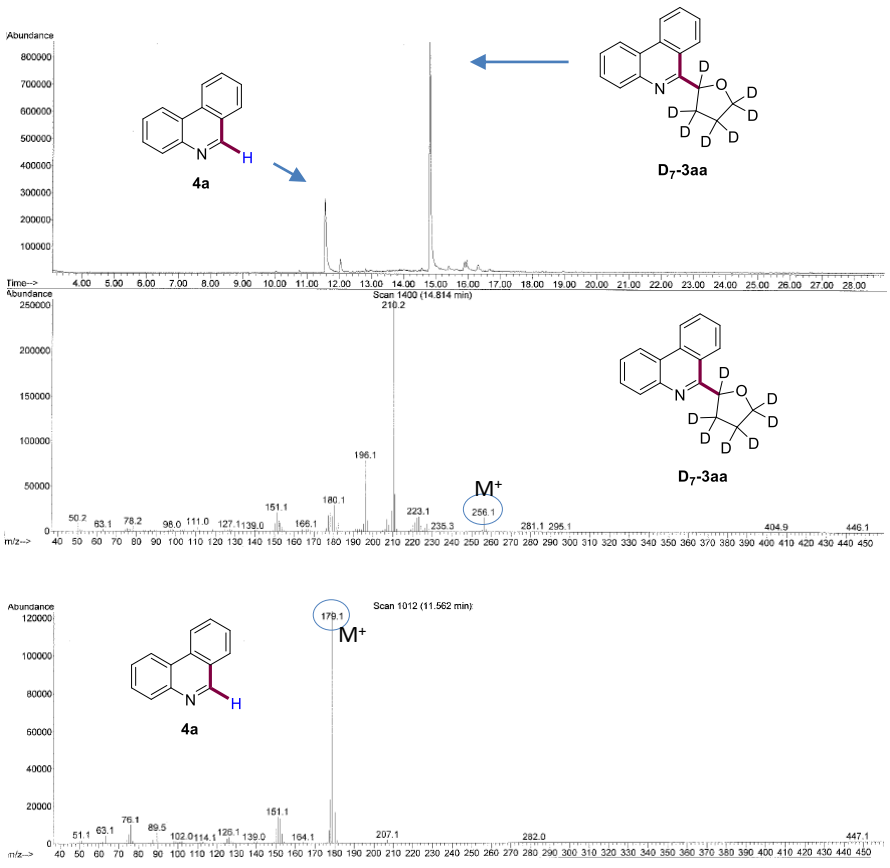


Experiments to Identify the Source of Hydrogen in 4a

Into a pressure tube were added K_2CO_3 (54 mg, 0.30 mmol) and D_2O (0.5 mL). Then, were sequentially added 2-isocyanobiaryl **1a** (54 mg, 0.30 mmol), THF-D_8 (1.5 mL) and *tert*-butyl peroxibenzoate (TBPB) (128 µL, 0.70 mmol). The reaction mixture was stirred under Ar atmosphere for 14 h at 110 ºC. After this time, a saturated solution of $NaHCO_3$ (5 mL) and EtOAc (10 mL) were added and the reaction mixture was extracted with EtOAc (3 x 15 mL). The organic layers were combined and washed with brine (5 mL), dried over $MgSO_4$, and concentrated under reduced pressure. The residue was purified by flash chromatography (Hex/EtOAc, 95:5 to 93:7) to afford product **D$_7$-3aa** as a white solid (45 mg, 59 %) and compound **4a** as a yellow solid (11 mg, 21 %).

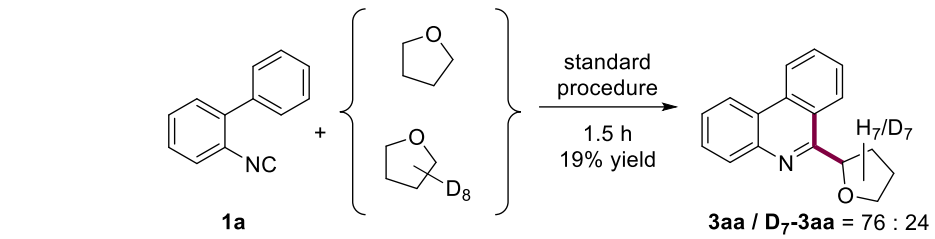


Analyzing the GC-MS of the crude reaction mixture, it was possible to confirm that compound **4a** was not deuterated.



Competition Experiments of 1a with an Equimolar Mixture of THF/D$_8$-THF to Examine the Intermolecular Kinetic Isotopic Effect (KIE).

In a pressure tube, the mixture of **1a** (0.30 mmol), **THF/D$_8$-THF** (1:1, 1.5 mL) was treated under standard conditions for 1.5 h. The reaction mixture was quenched with $NaHCO_3$ (5 mL) and was extracted with EtOAc (3 x 15 mL). The organic layers were combined and washed with brine (5 mL), dried over $MgSO_4$ and concentrated under reduce pressure. The residue was purified by flash column chromatography on silica gel (95:5 to 93:7, hexane/EtOAc) to separate the excess of **1a**, and the mixture of products **3aa**/**D$_7$-3aa** was collected (combined yield: 19%). Using ^{1}H-NMR, it was found a 76:24 ratio of **3aa**/**D$_7$-3aa**, as shown in **Figure S1**.



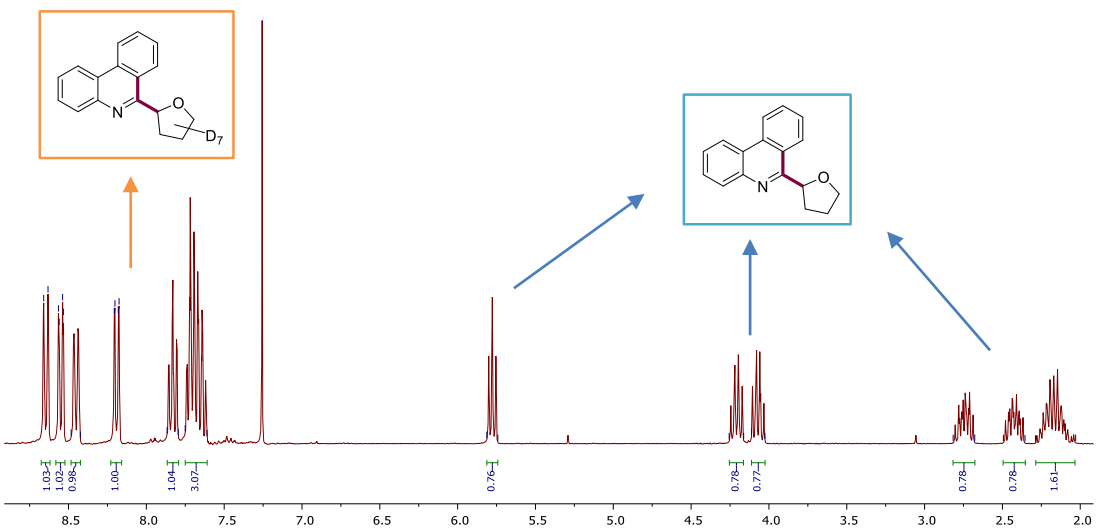
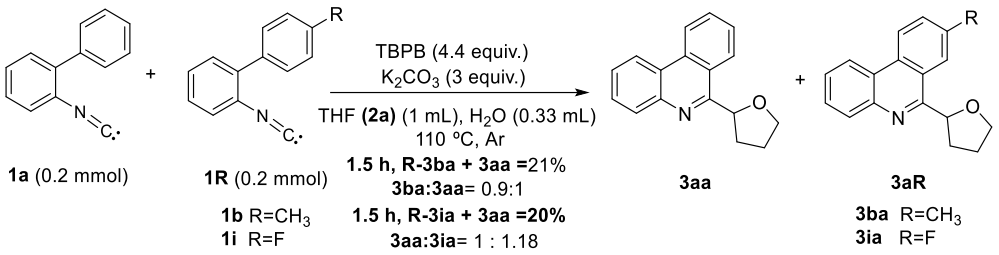
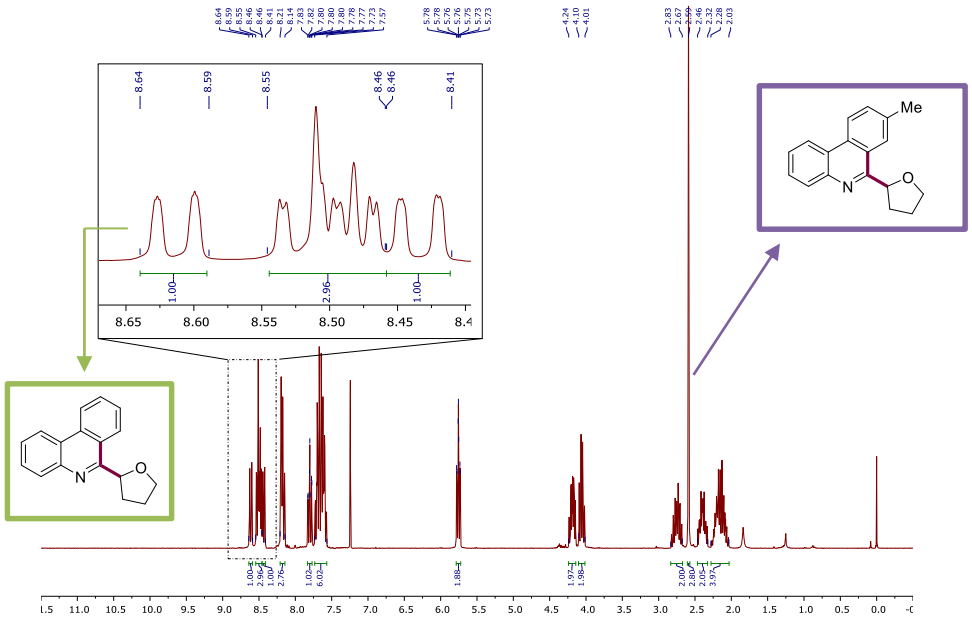


Figure S1. ^{1}H-NMR (300 MHz, $CDCl_3$) of the mixture **3aa/ D$_7$-3aa** isolated as describe above.

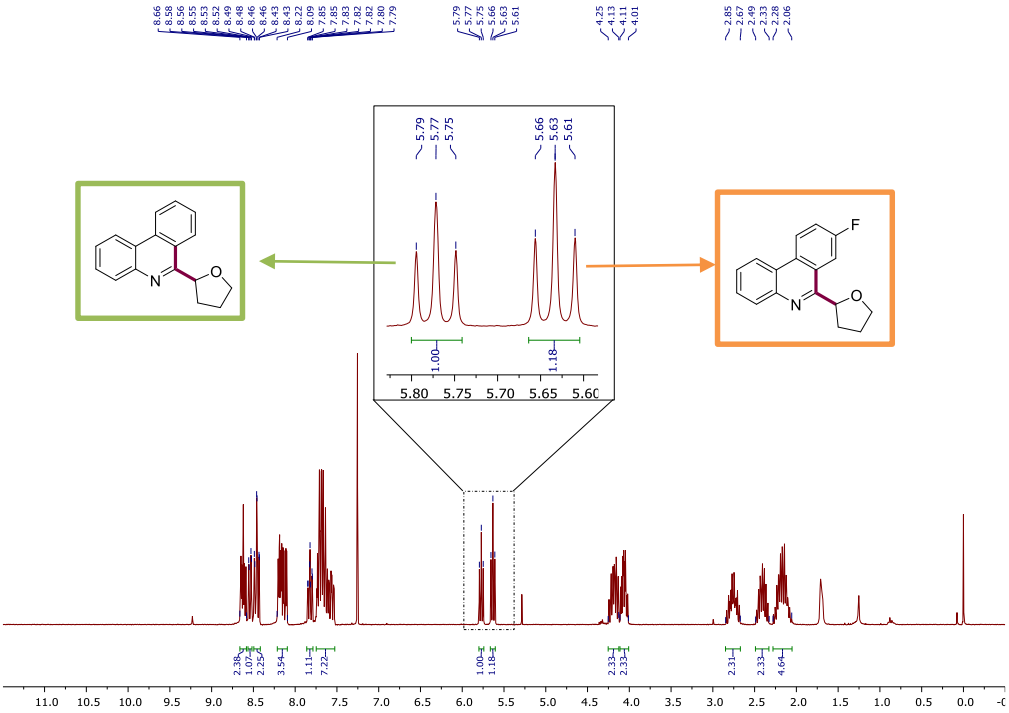
Competition Experiments of THF with an Equimolar Mixture of 1a/1b or 1a/1i

✓ Substrates **1a** and **1b**

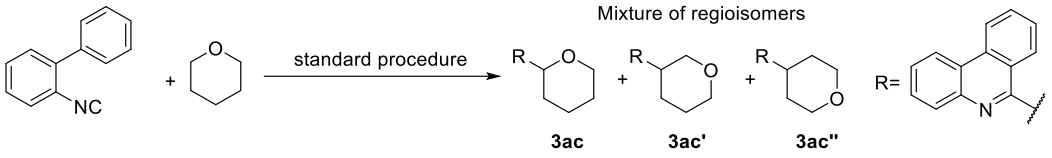




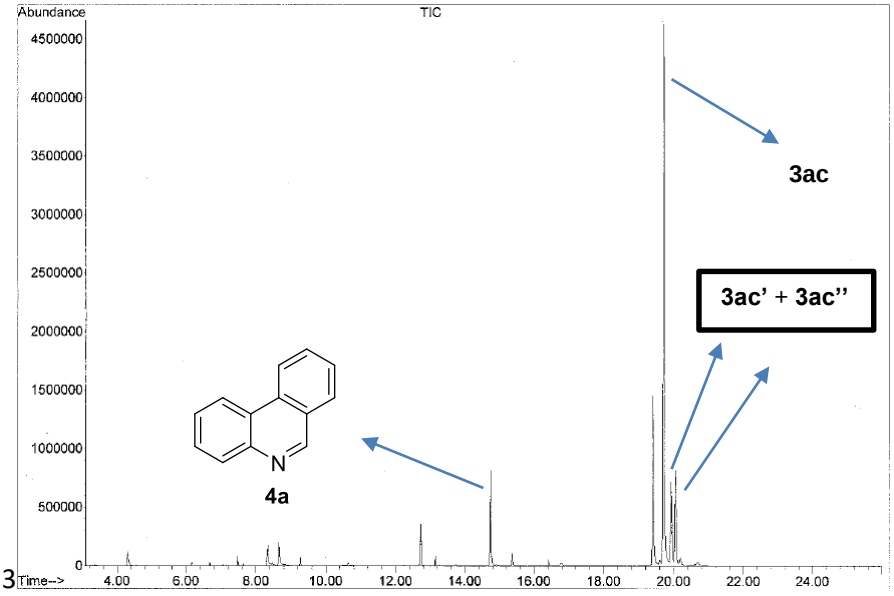
✓ Substrates **1a** and **1i**



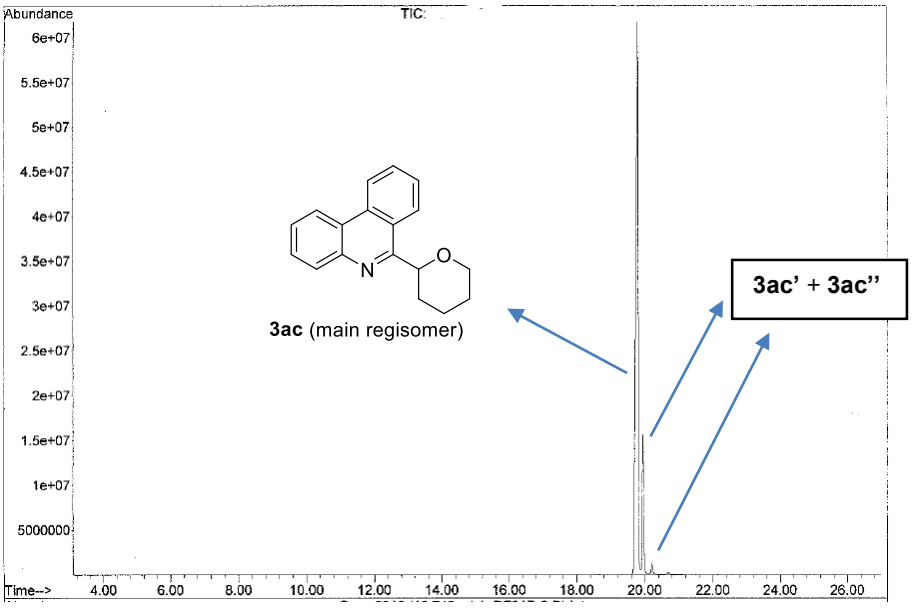
Detection of regioisomers upon formation of 3ac by GC-MS



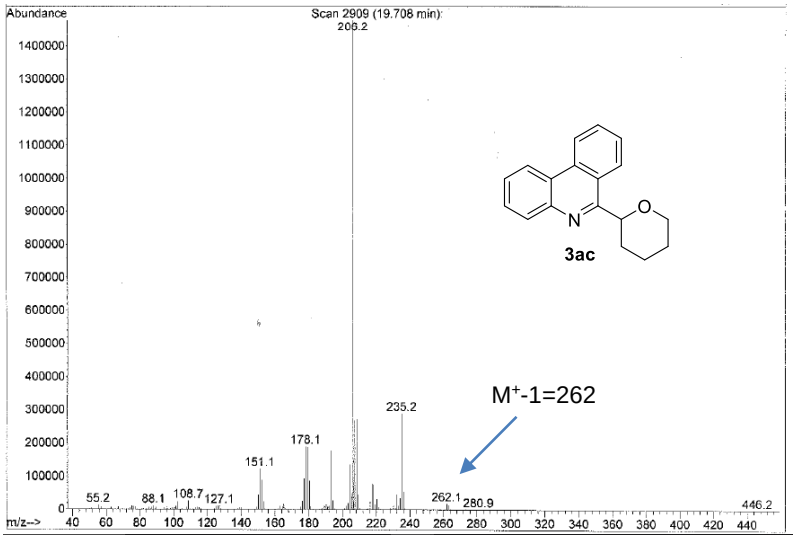
GC (MS) of crude reaction mixture:

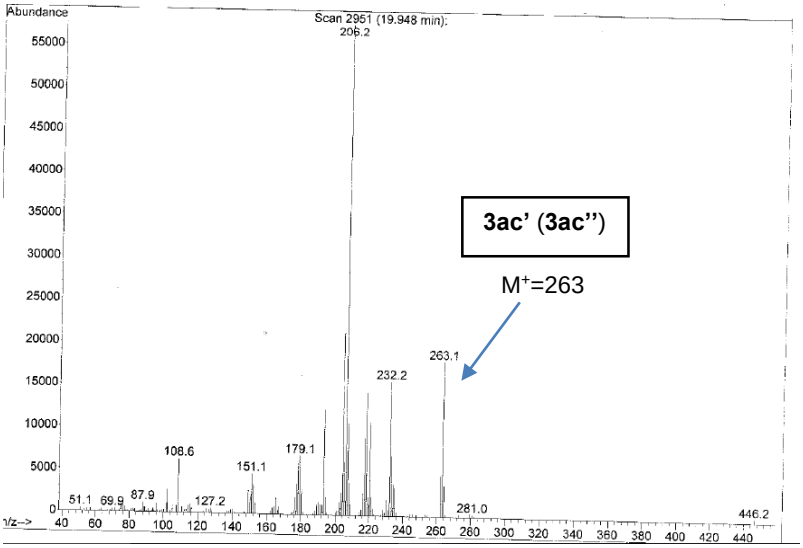


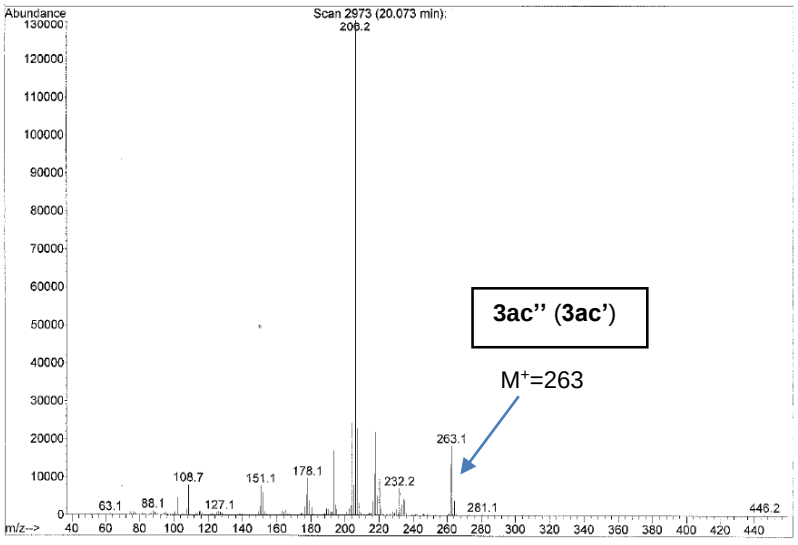
GC (MS) of **3ac** after column purification:



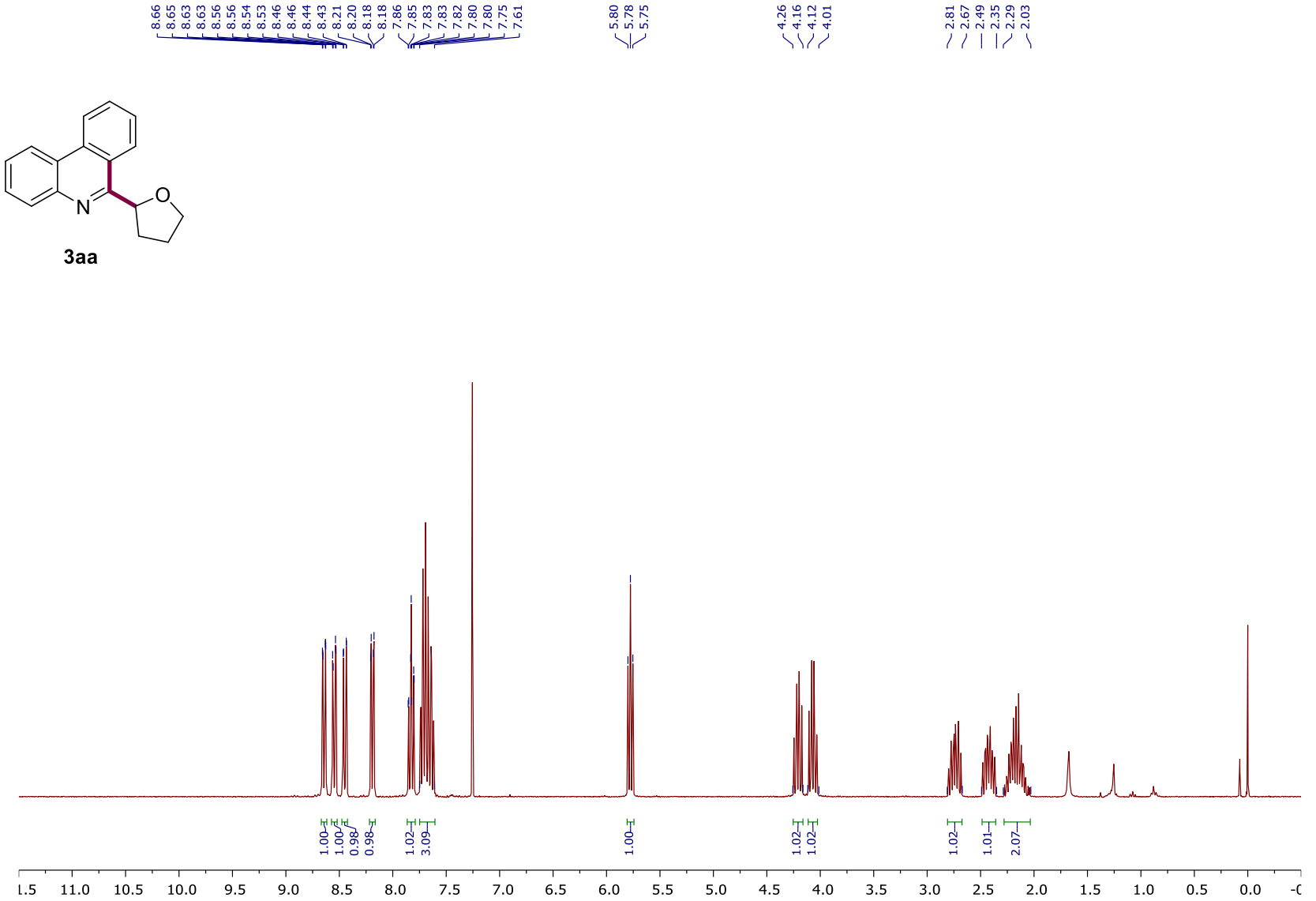
MS for selected GC peaks in the formation of **3ac** (**3ac** and regioisomers):





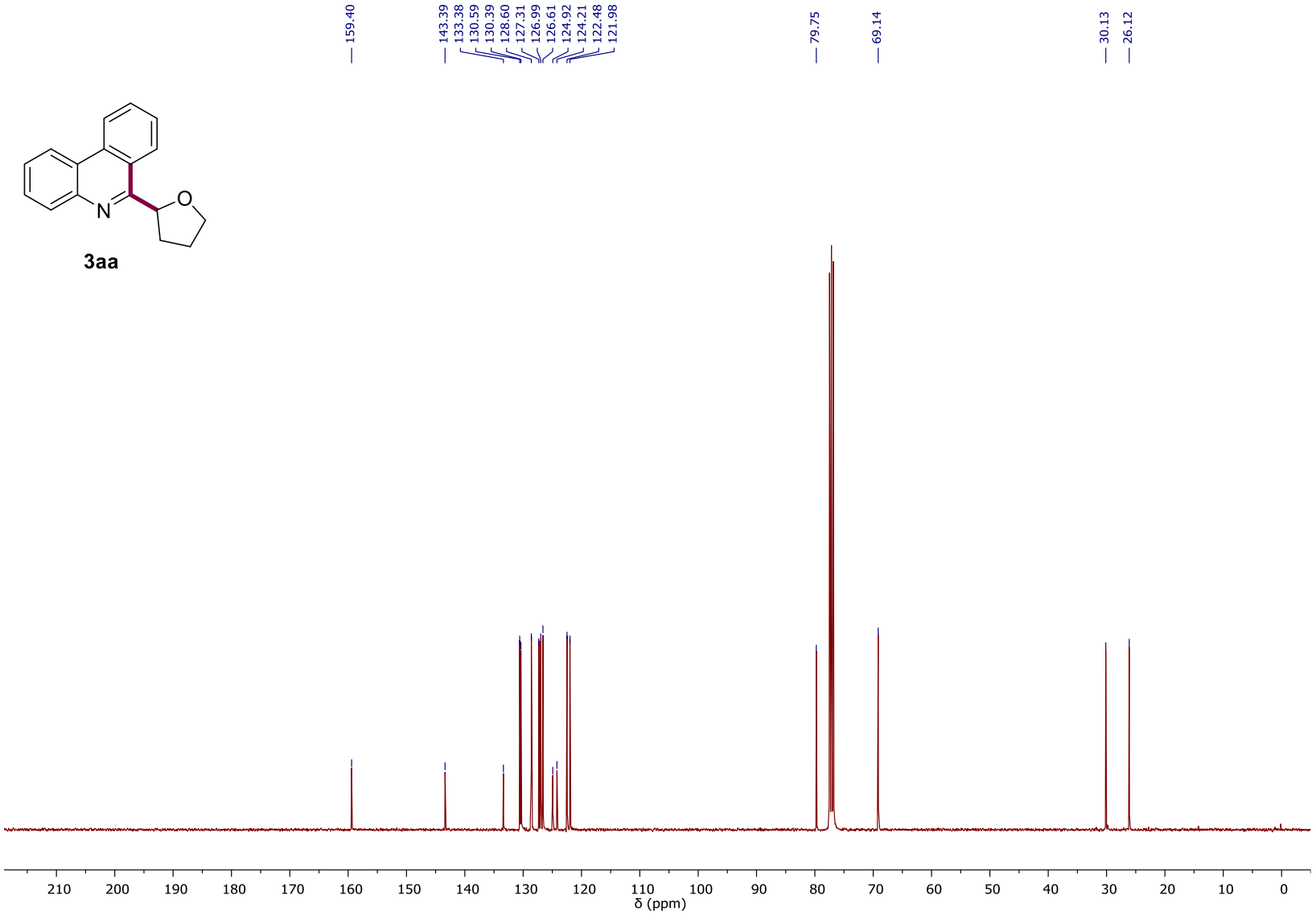


^{1}H-NMR (300 MHz, $CDCl_3$)

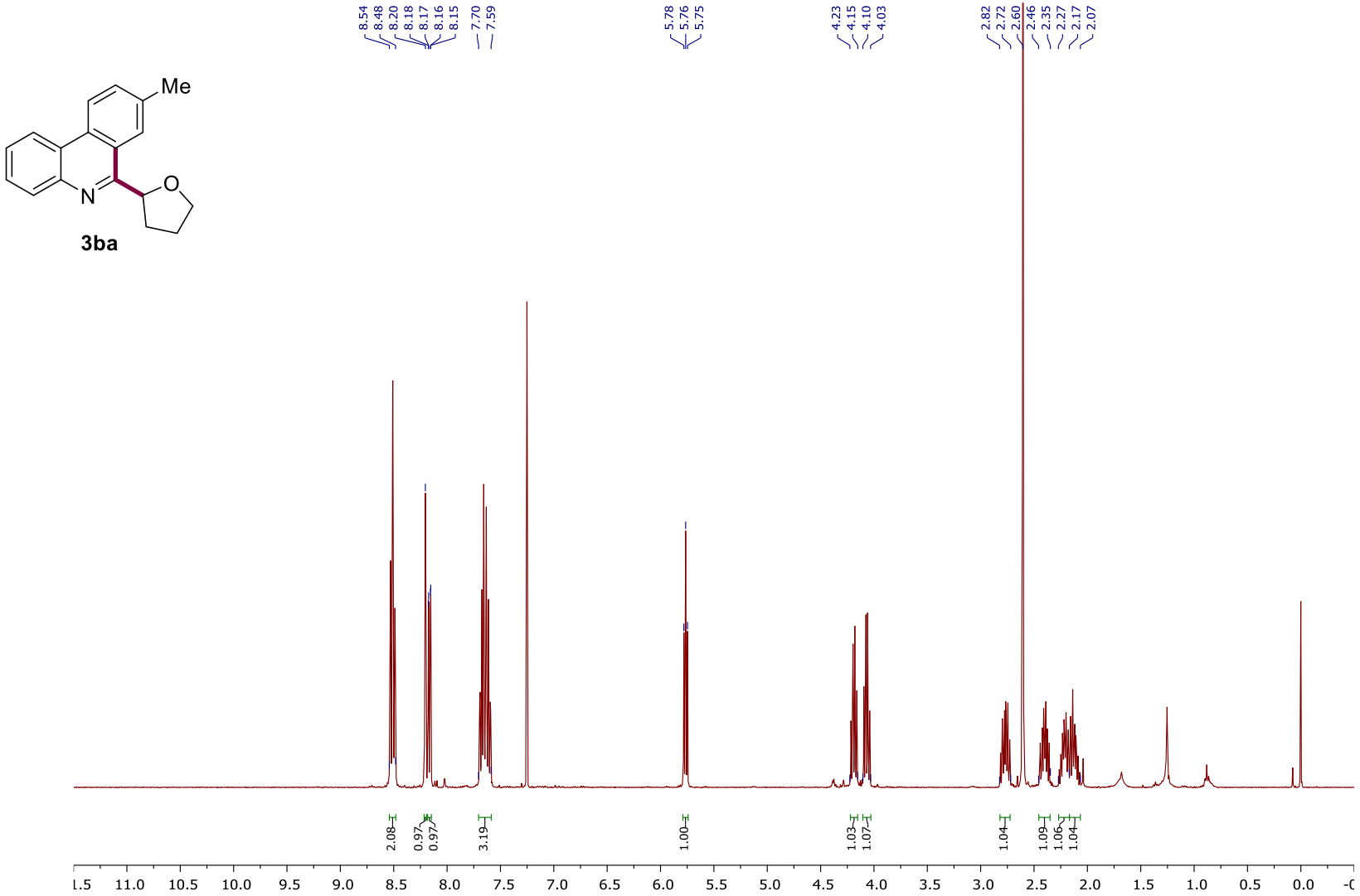


3aa

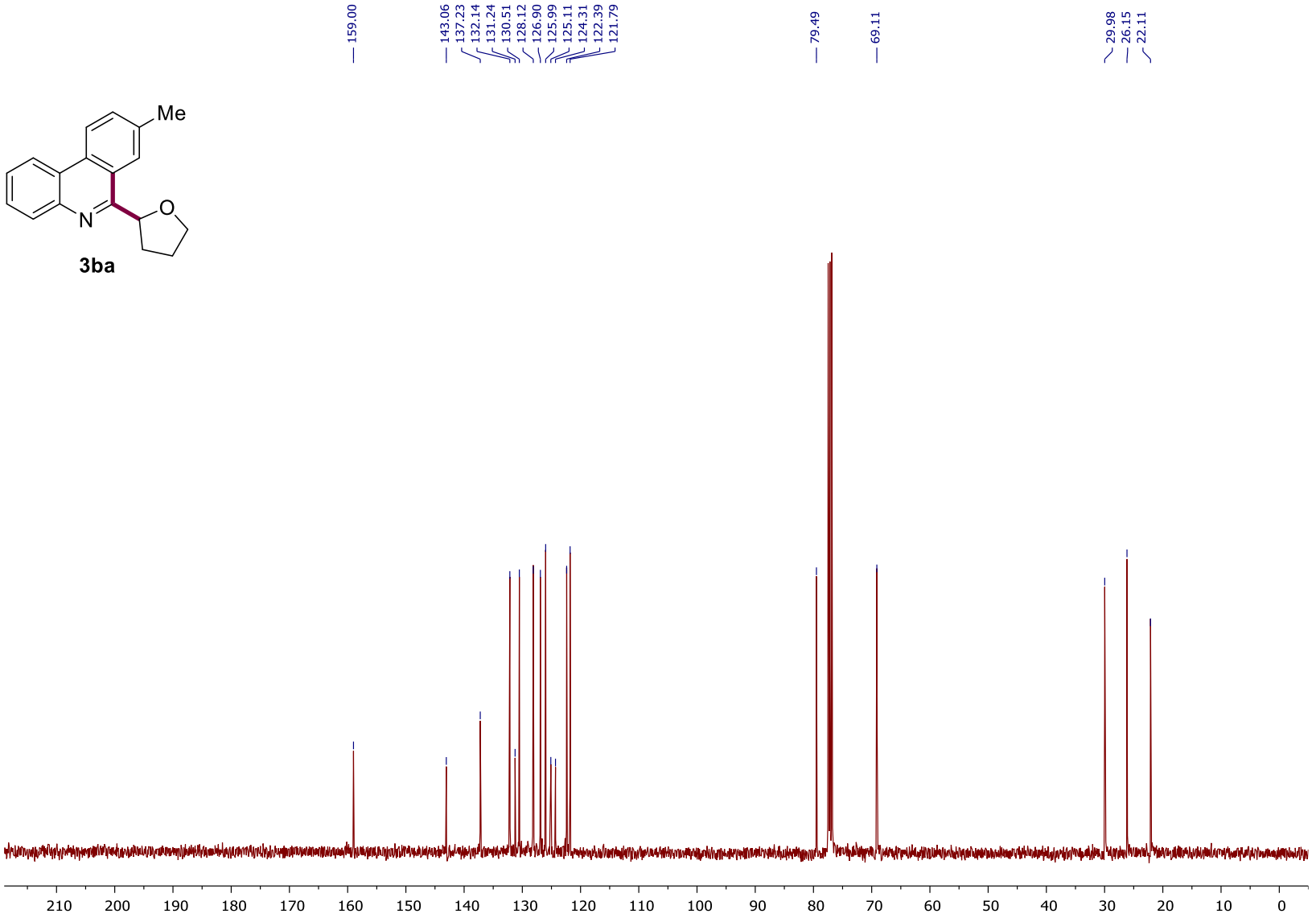
^{13}C-NMR (101 MHz, $CDCl_3$)



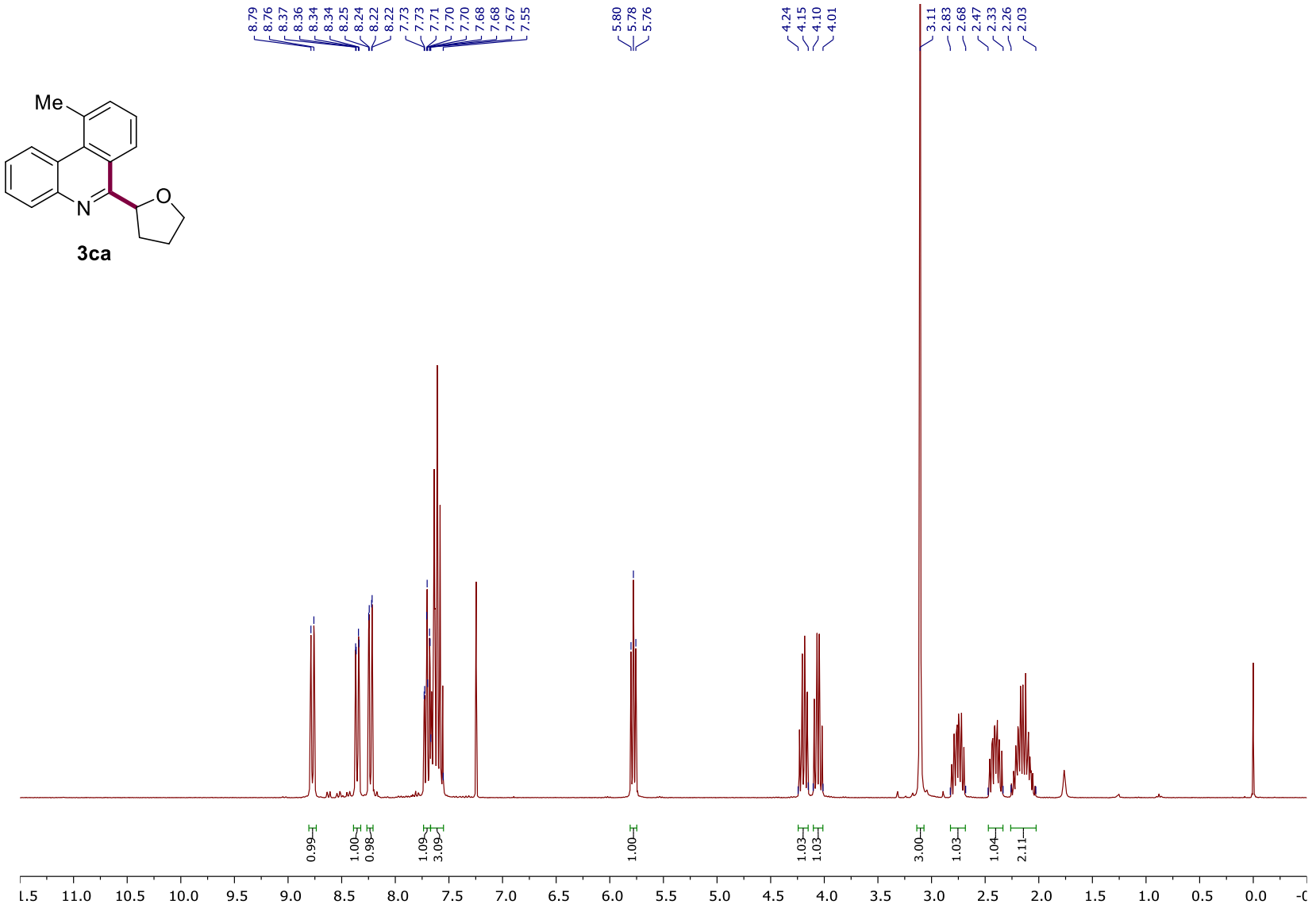
^{1}H-NMR (400 MHz, $CDCl_3$)



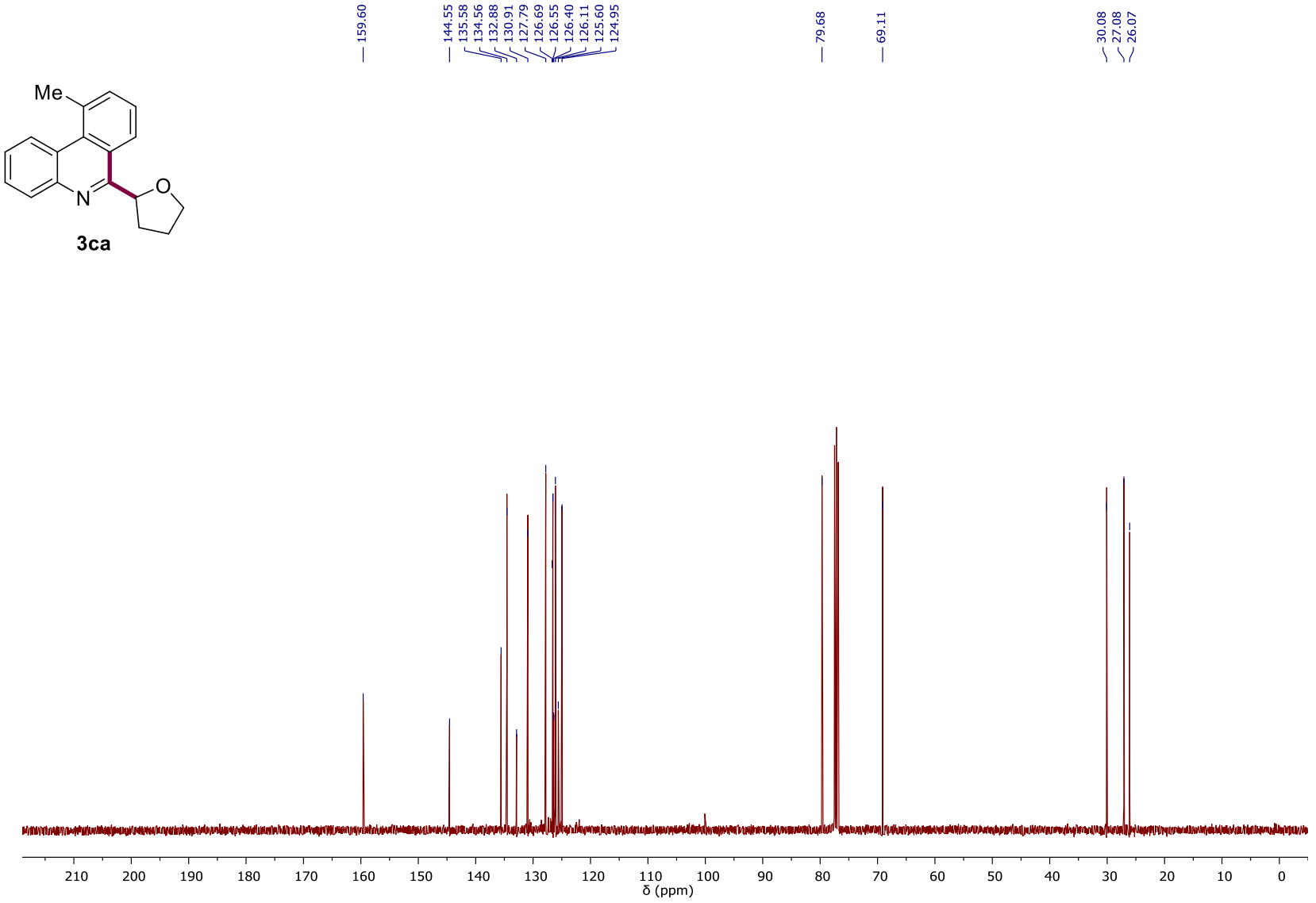
^{13}C-NMR (101 MHz, $CDCl_3$)



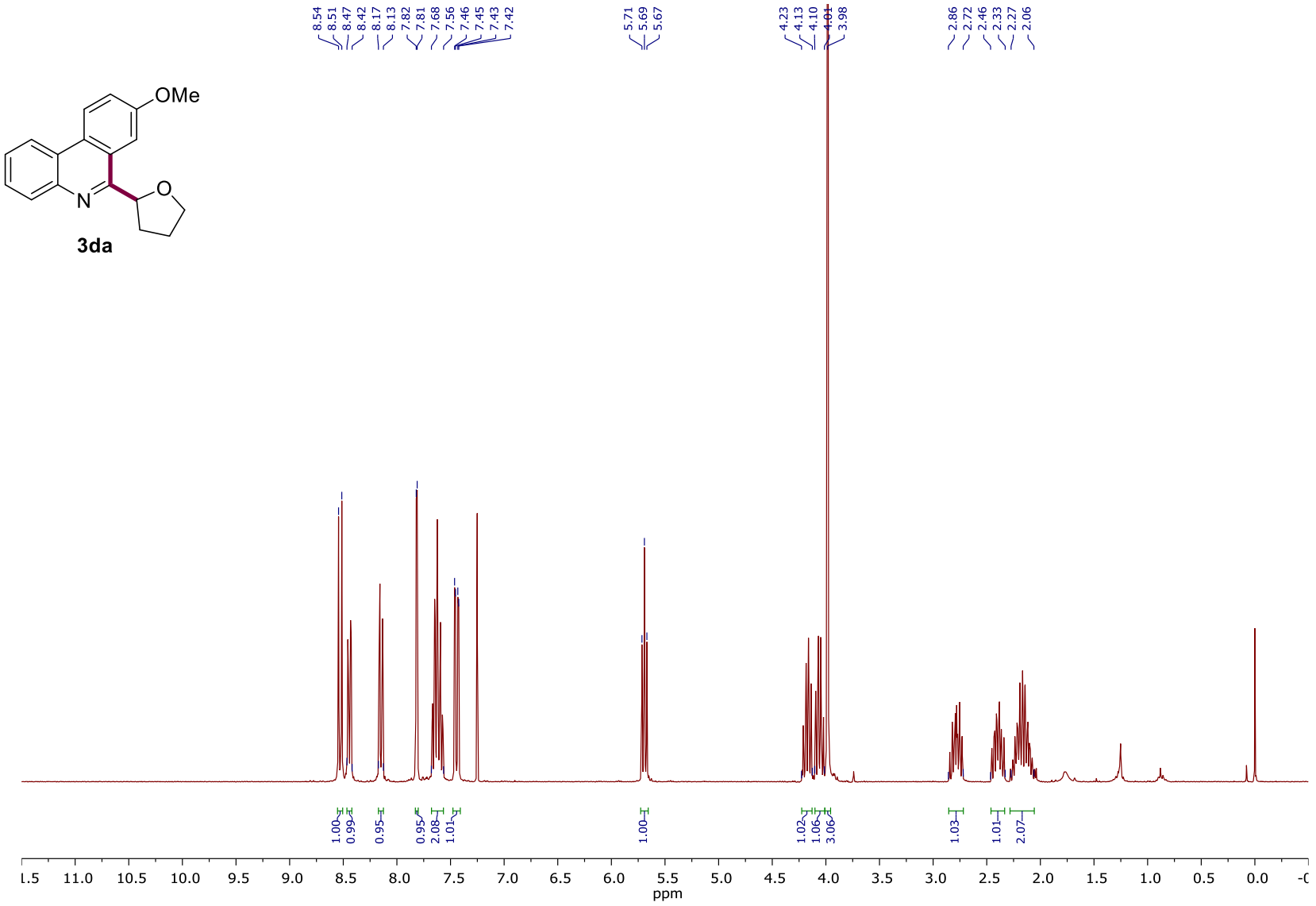
^{1}H-NMR (400 MHz, $CDCl_3$)



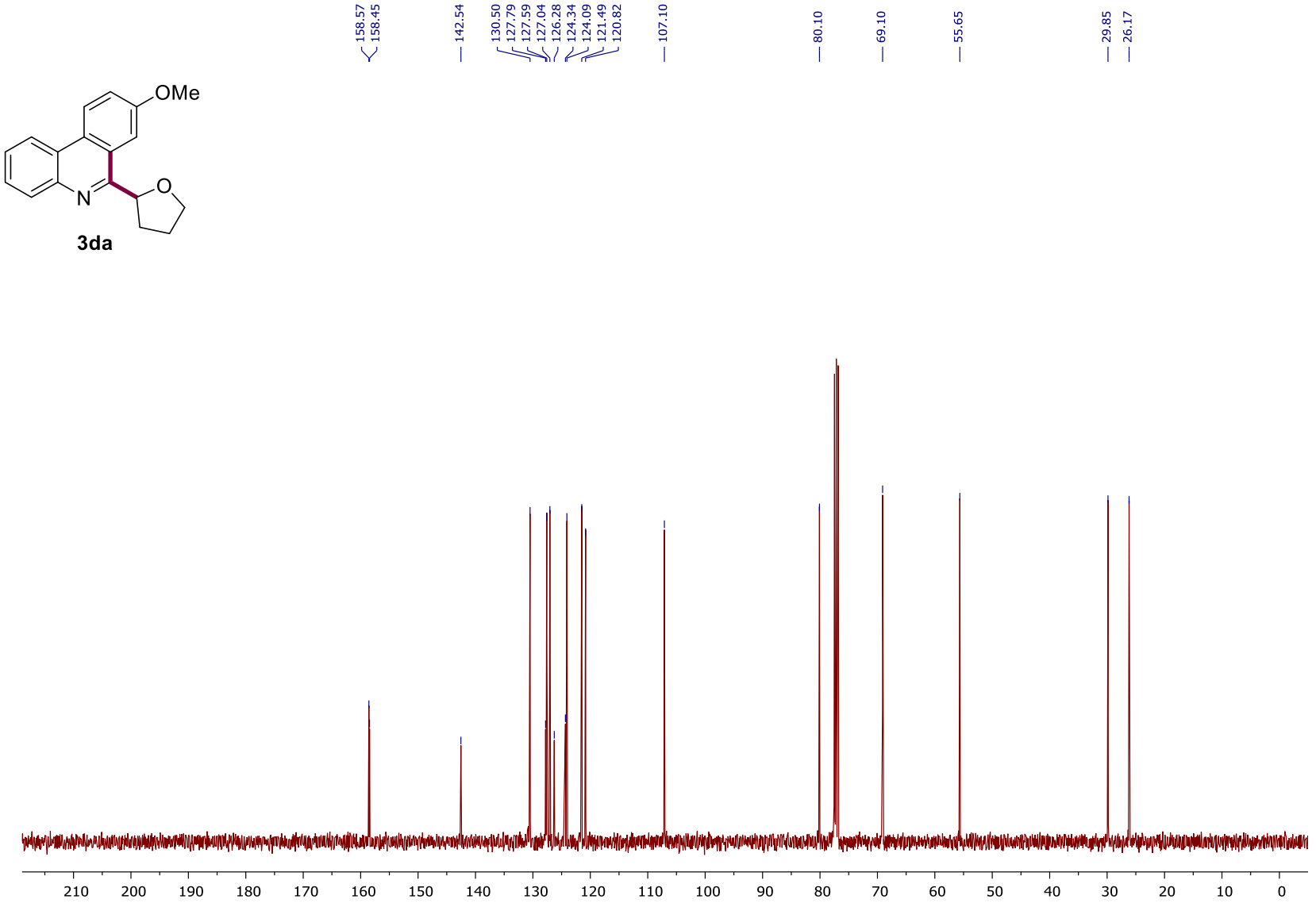
^{13}C-NMR (101 MHz, $CDCl_3$)



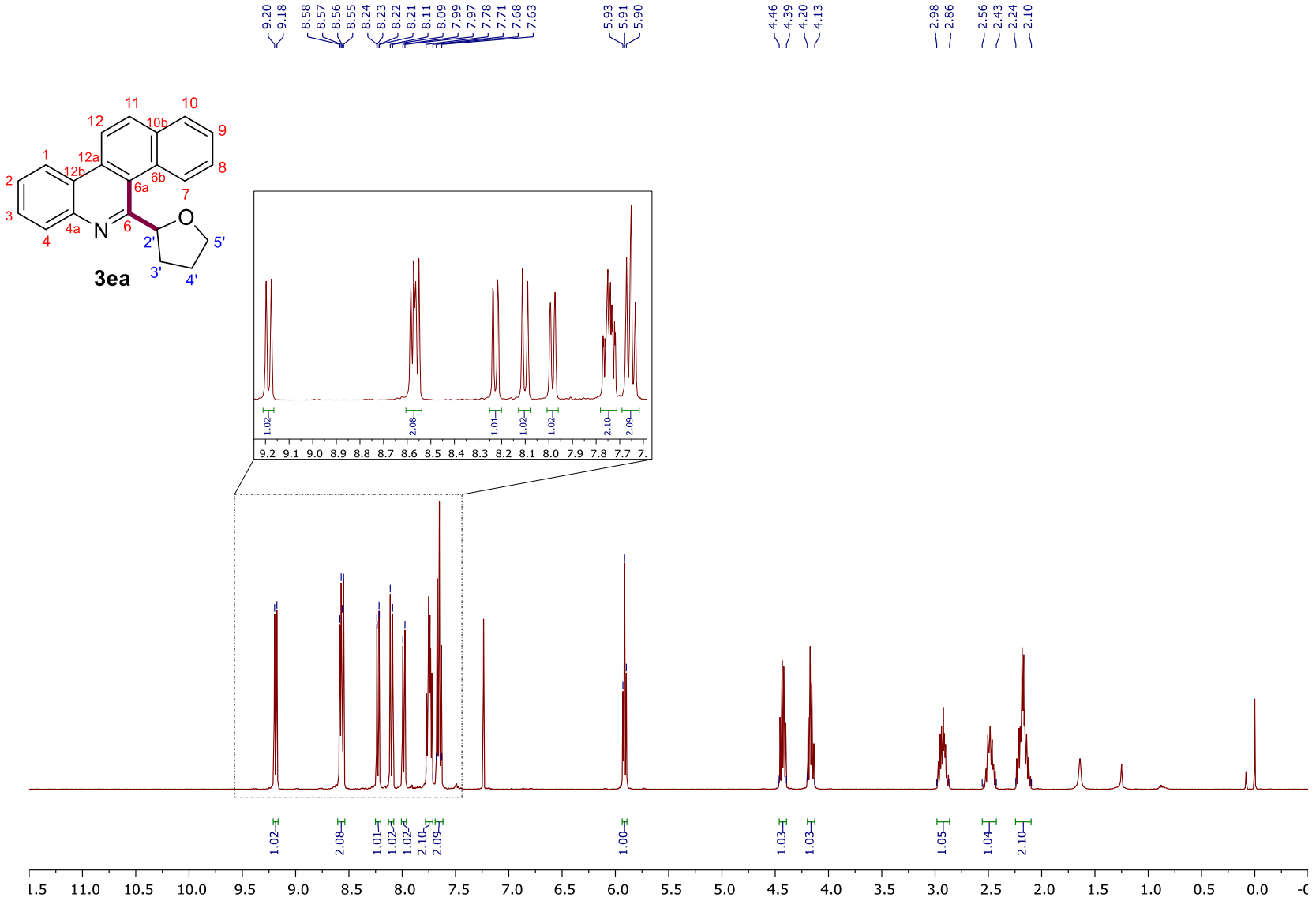
^{1}H-NMR (300 MHz, $CDCl_3$)



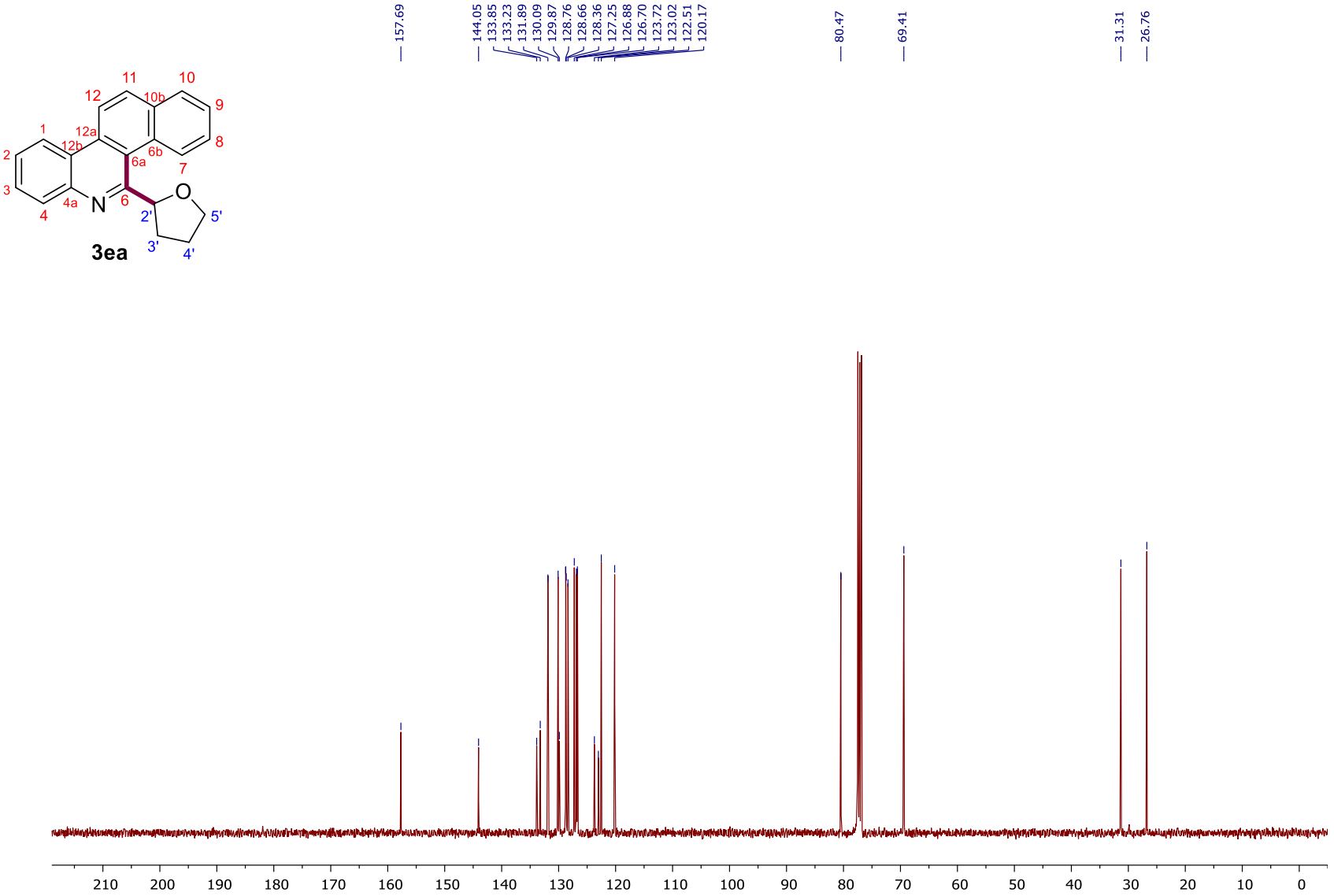
^{13}C-NMR (101 MHz, $CDCl_3$)



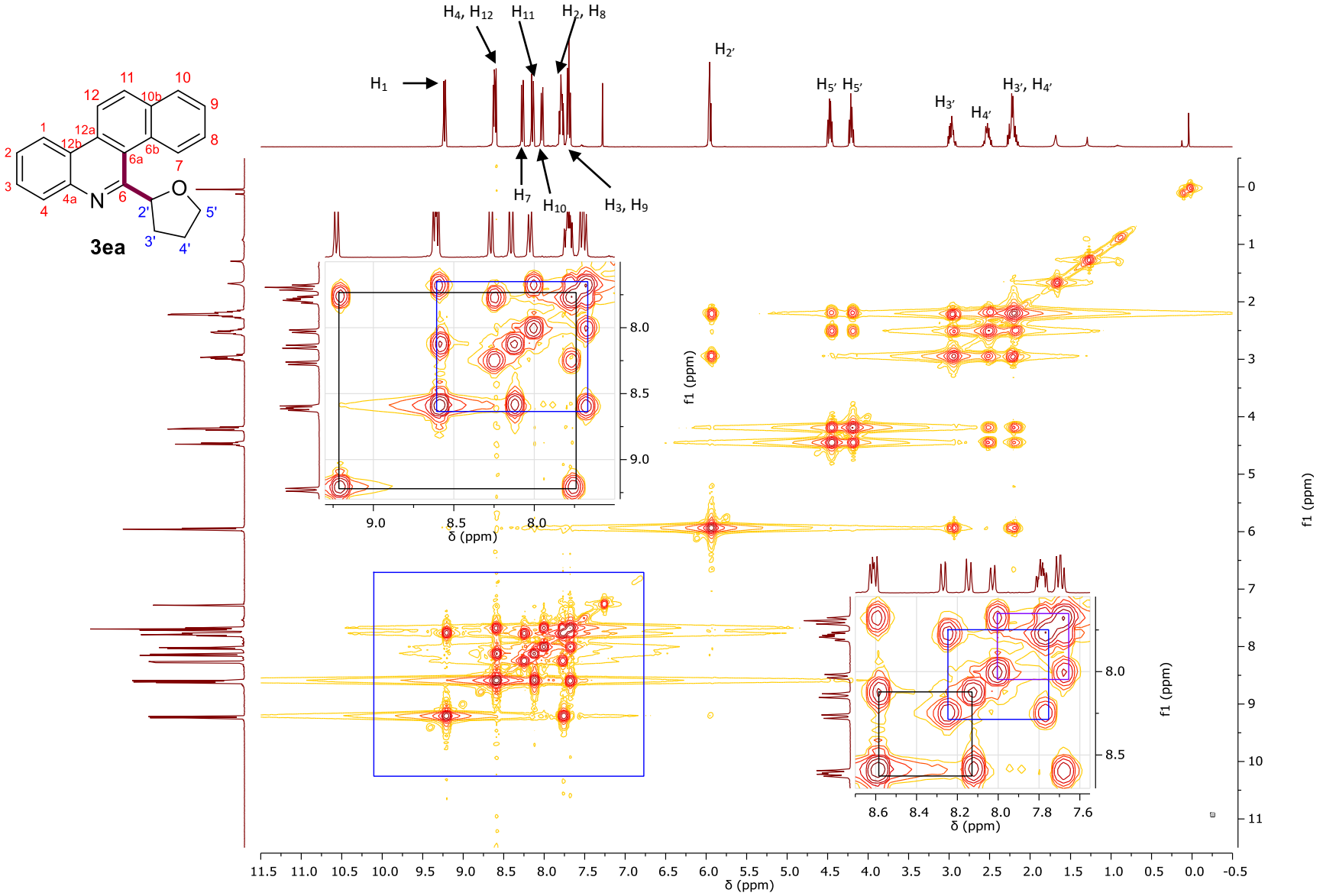
^{1}H-NMR (400 MHz, $CDCl_3$)



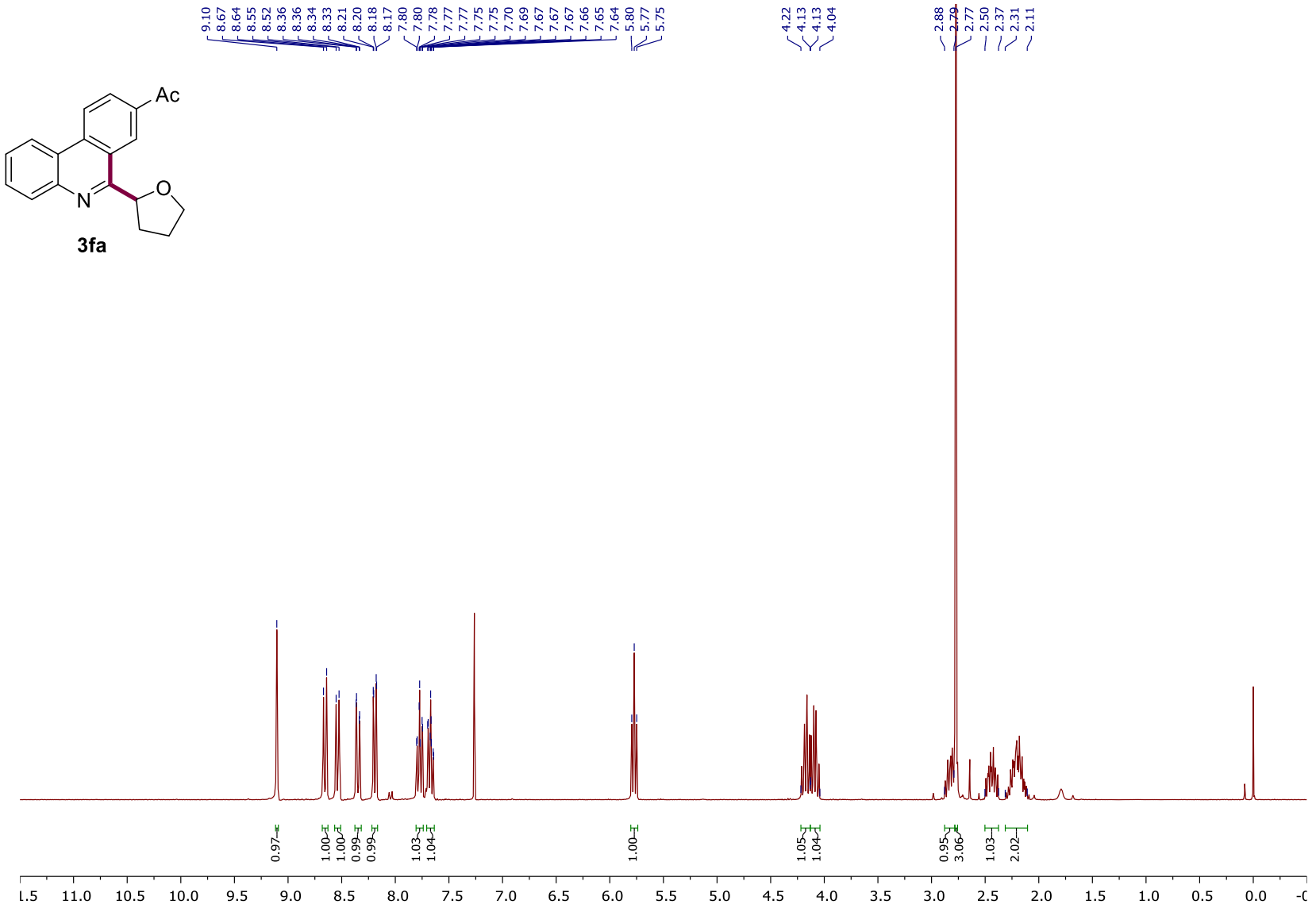
^{13}C-NMR (101 MHz, $CDCl_3$)



^{1}H,^{1}H-COSY of compound **3ea**



^{1}H-NMR (300 MHz, $CDCl_3$)



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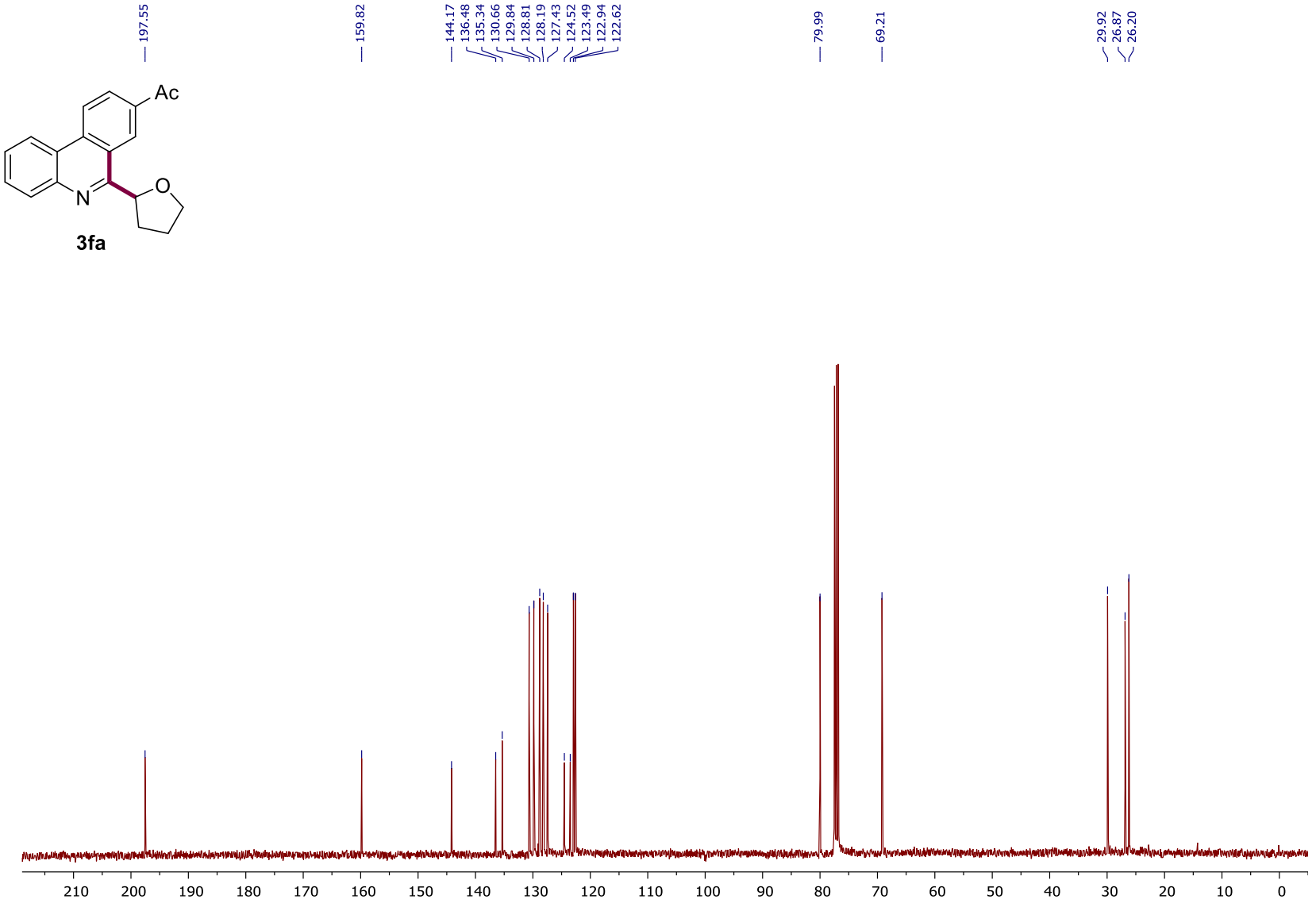

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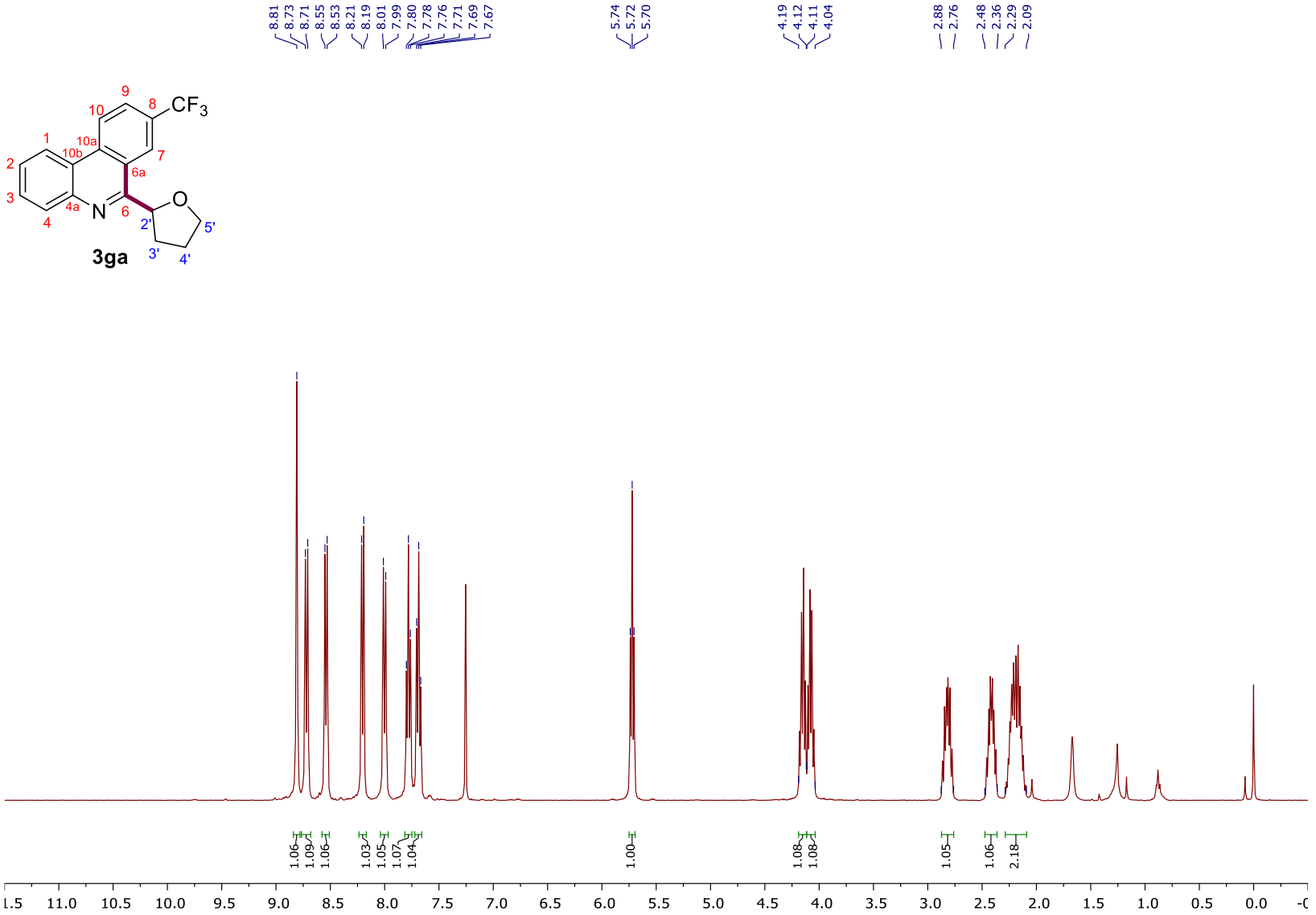

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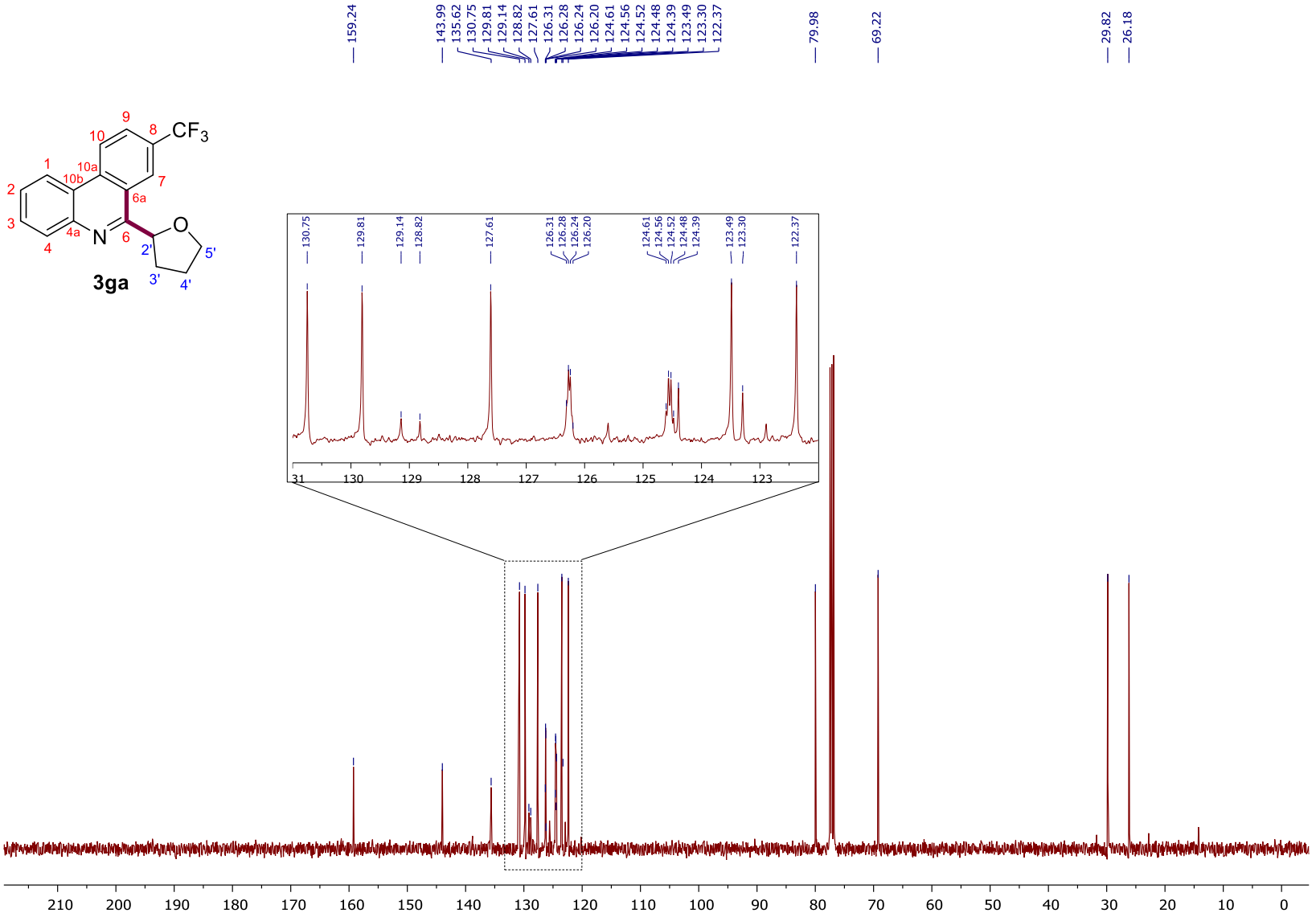
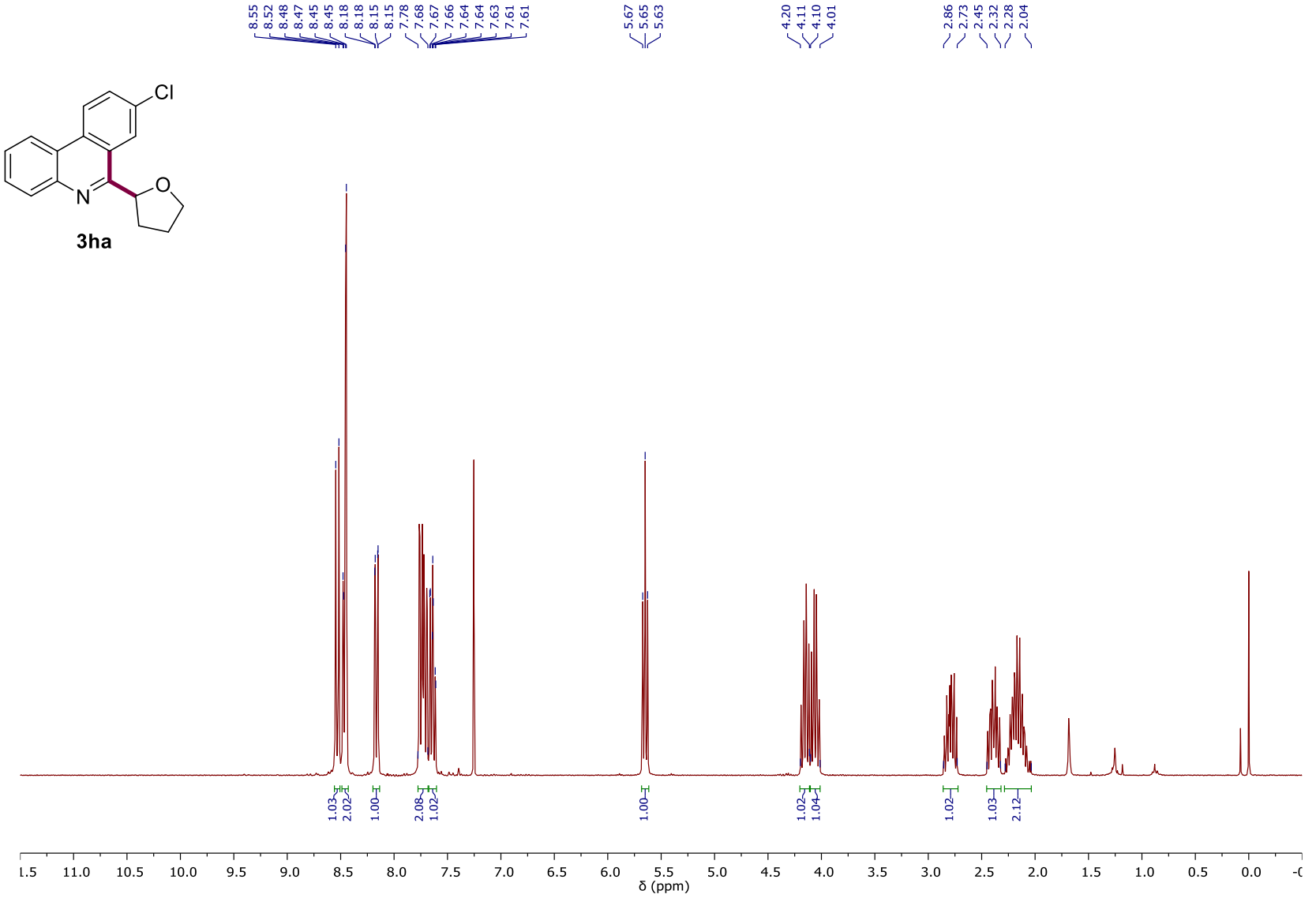


^{1}H-NMR (300 MHz, $CDCl_3$)



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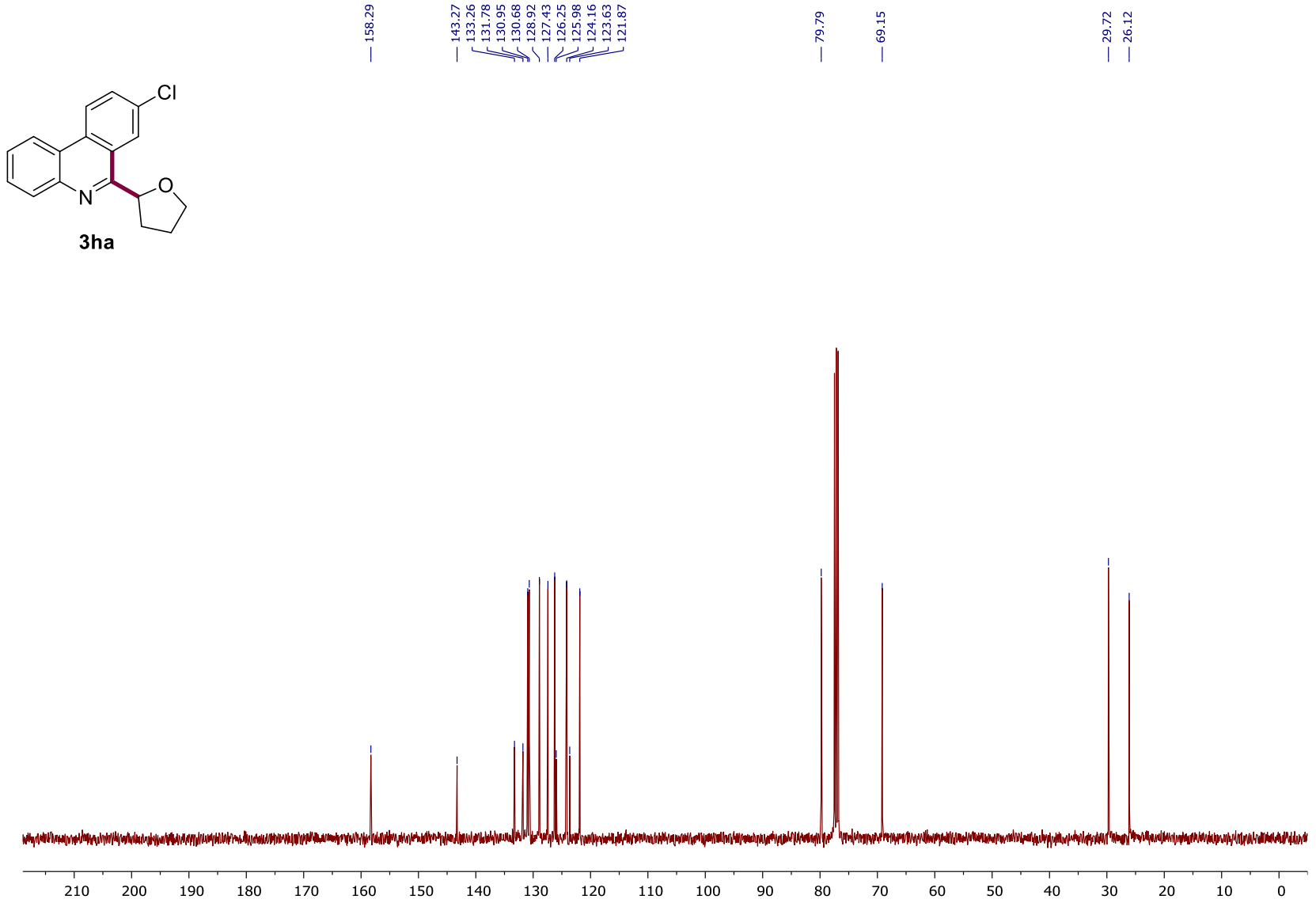
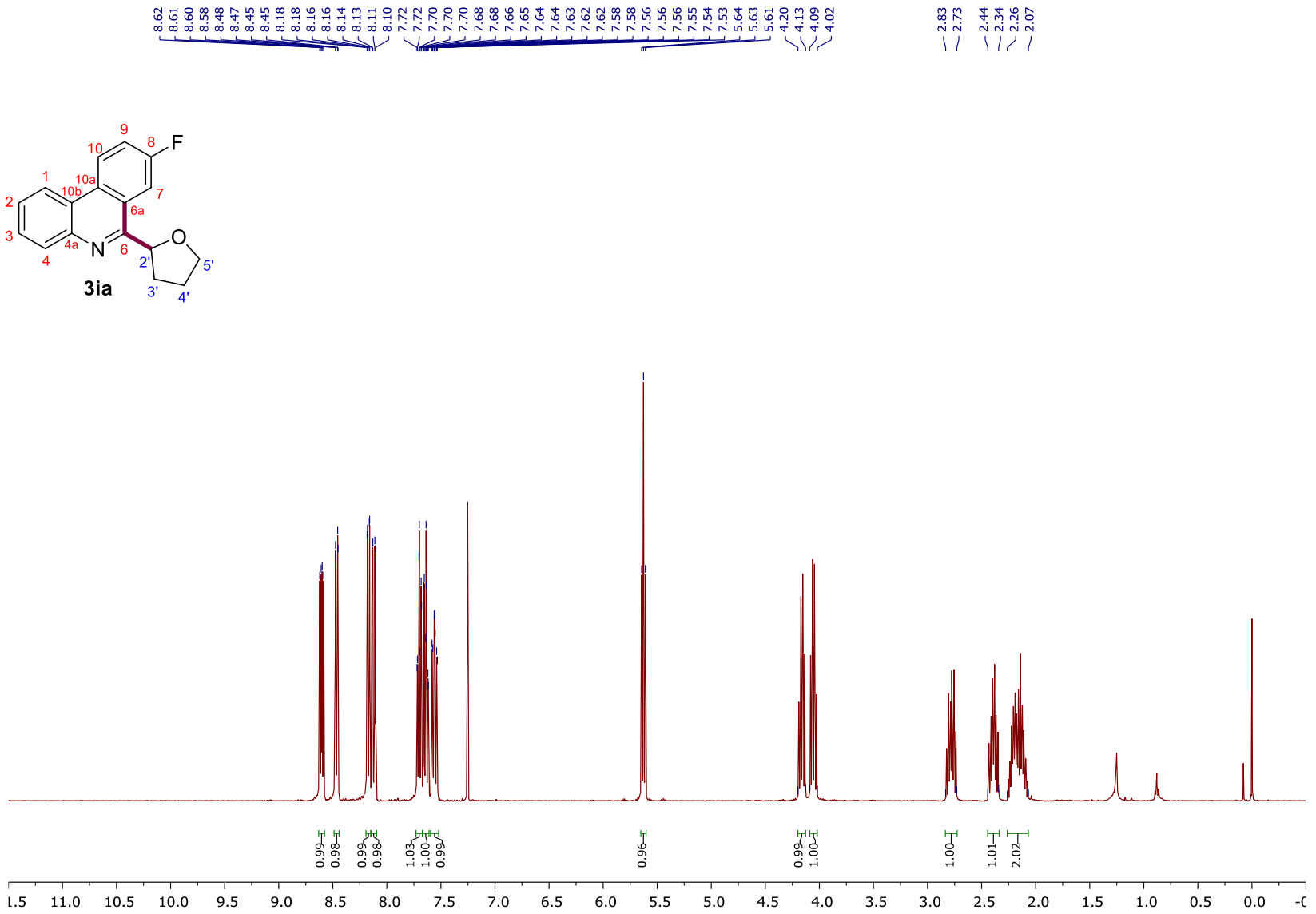
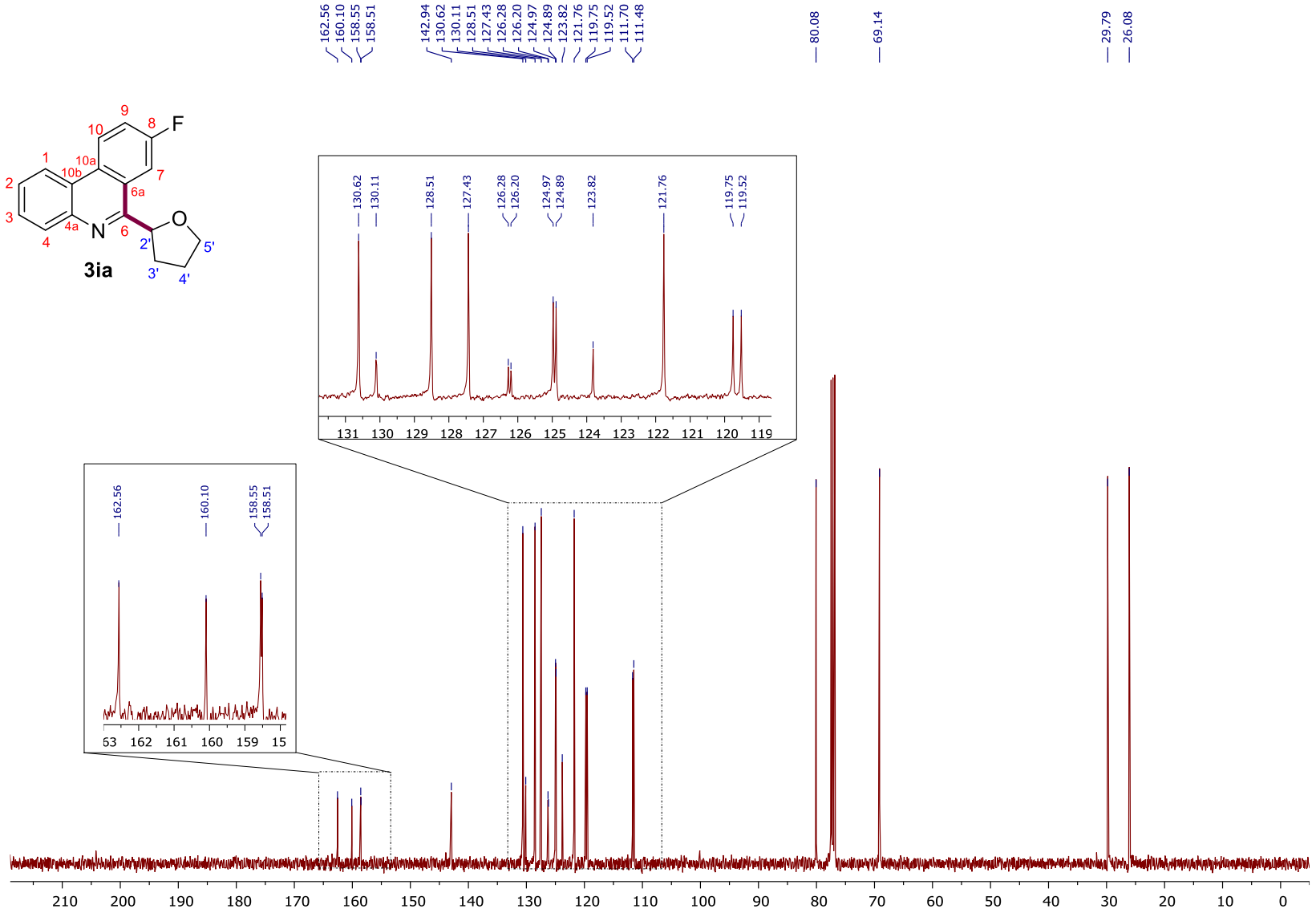


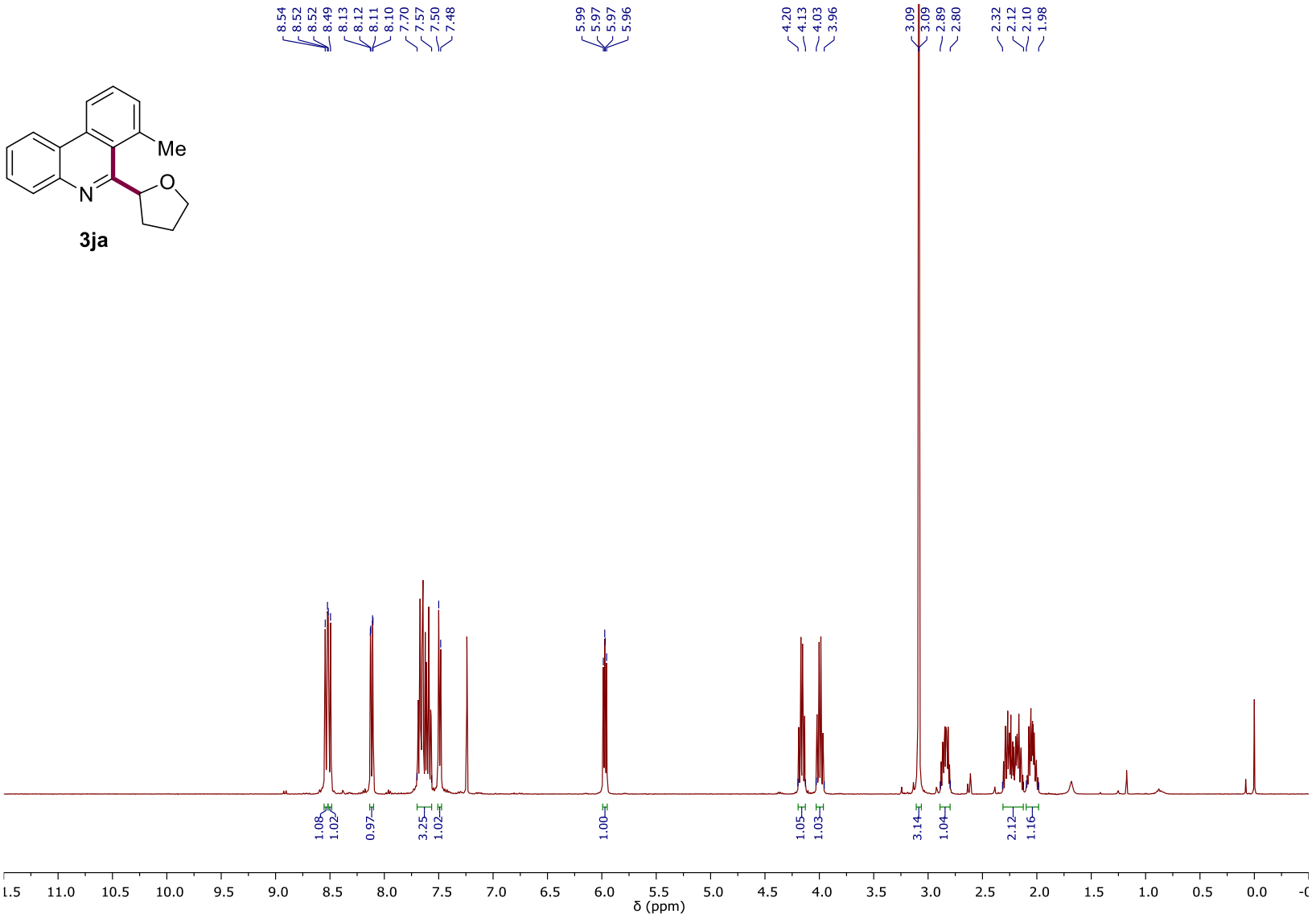
^{1}H-NMR (400 MHz, $CDCl_3$)



^{13}C-NMR (101 MHz, $CDCl_3$)



^{1}H-NMR (400 MHz, $CDCl_3$)



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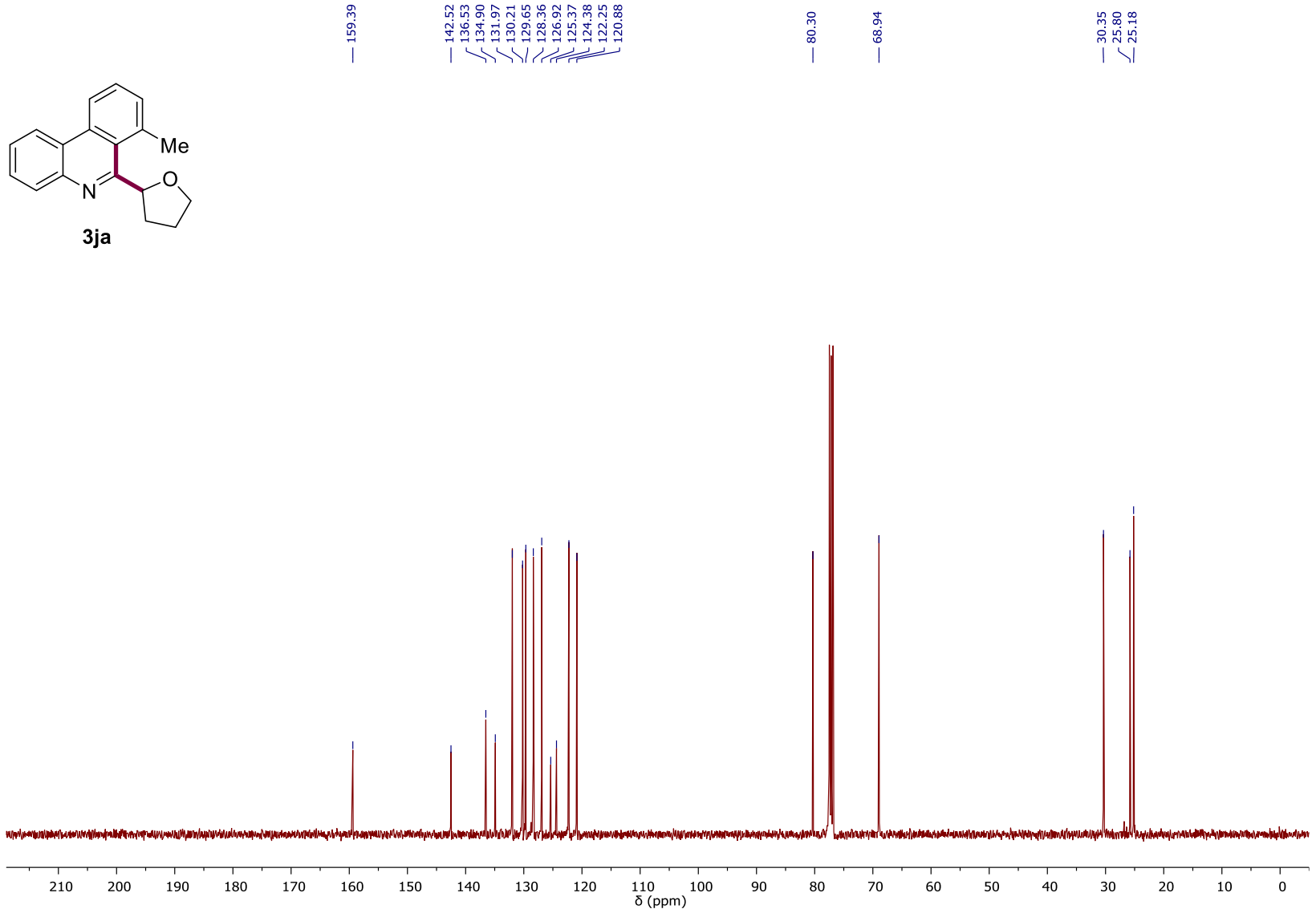
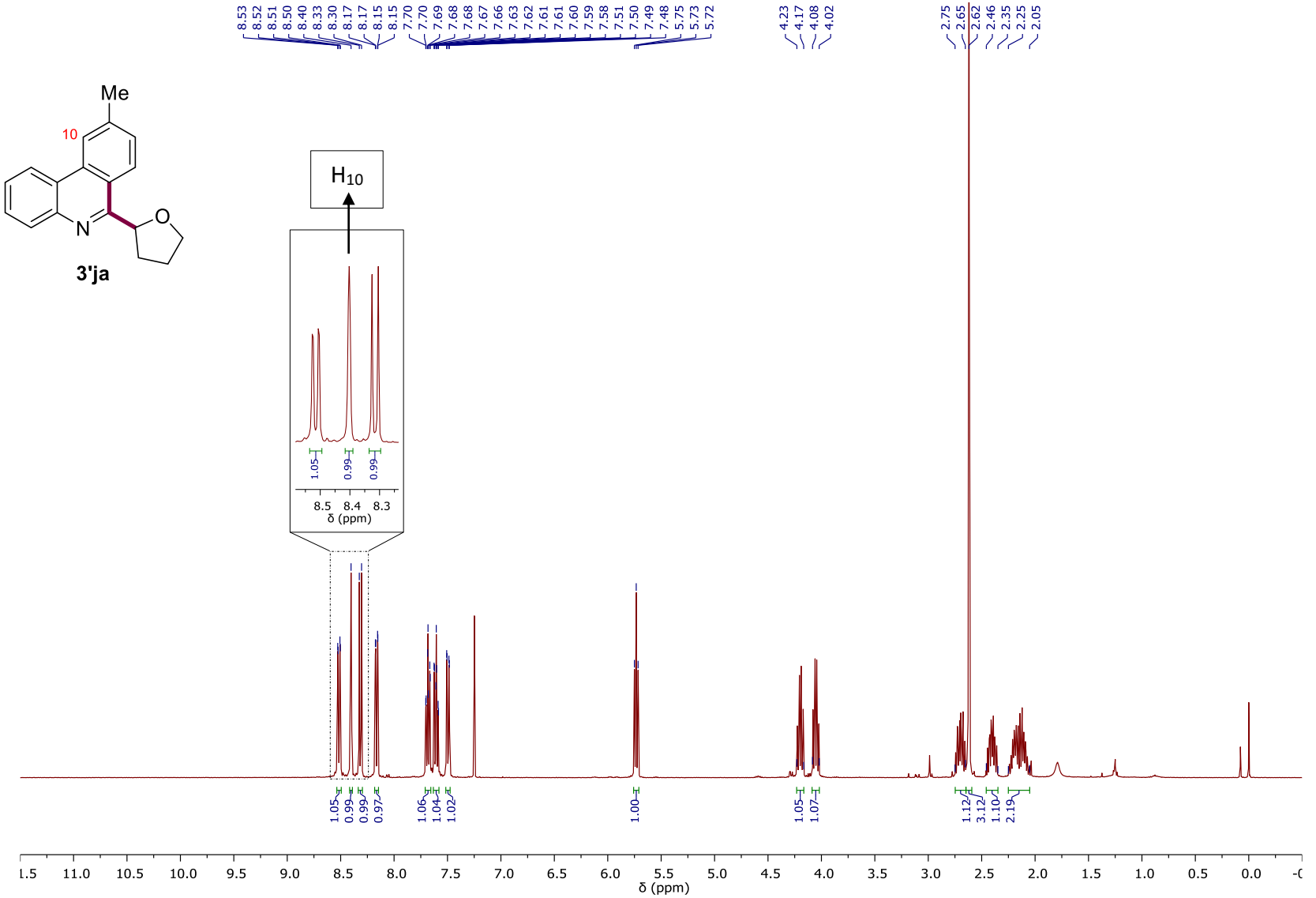
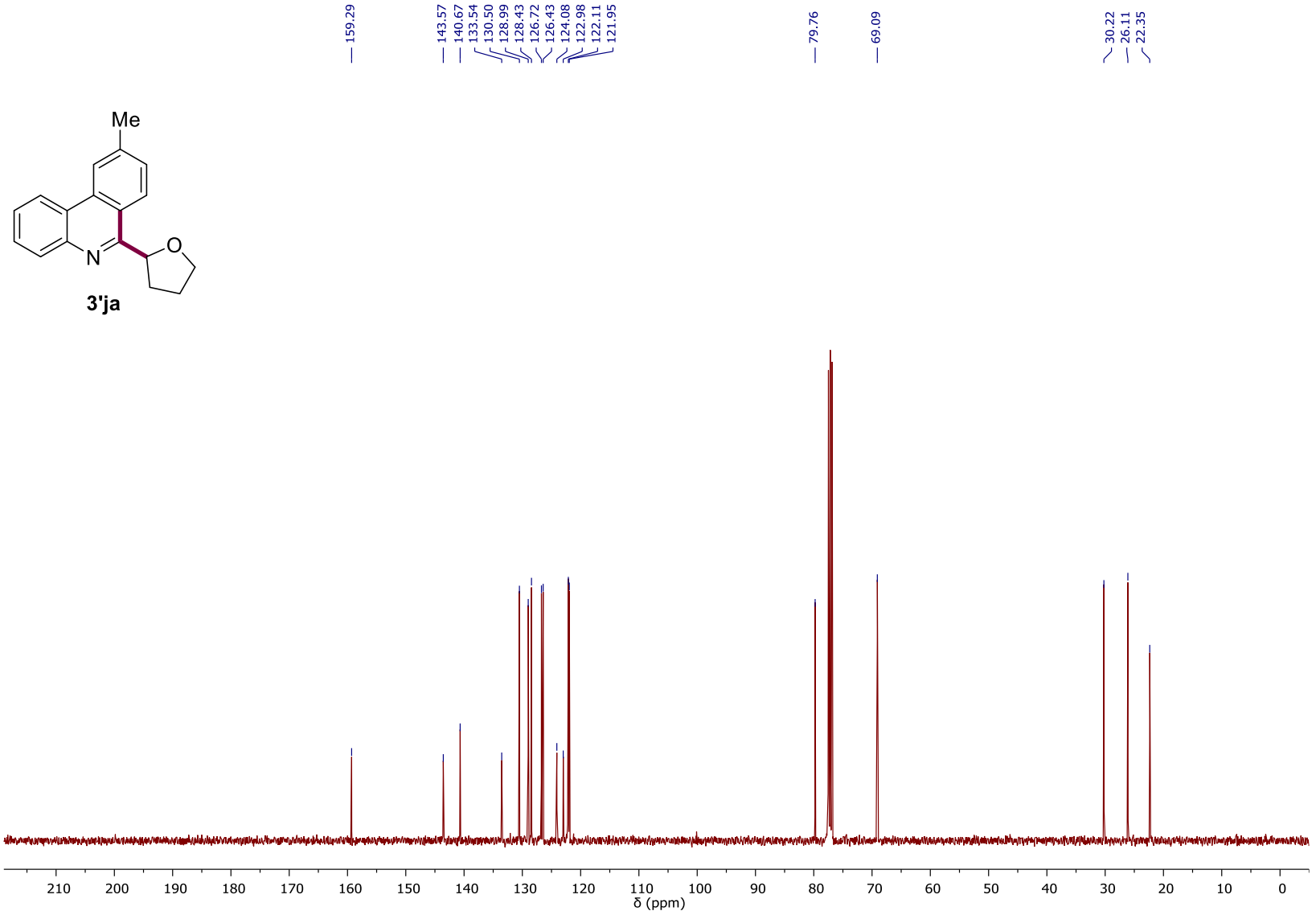


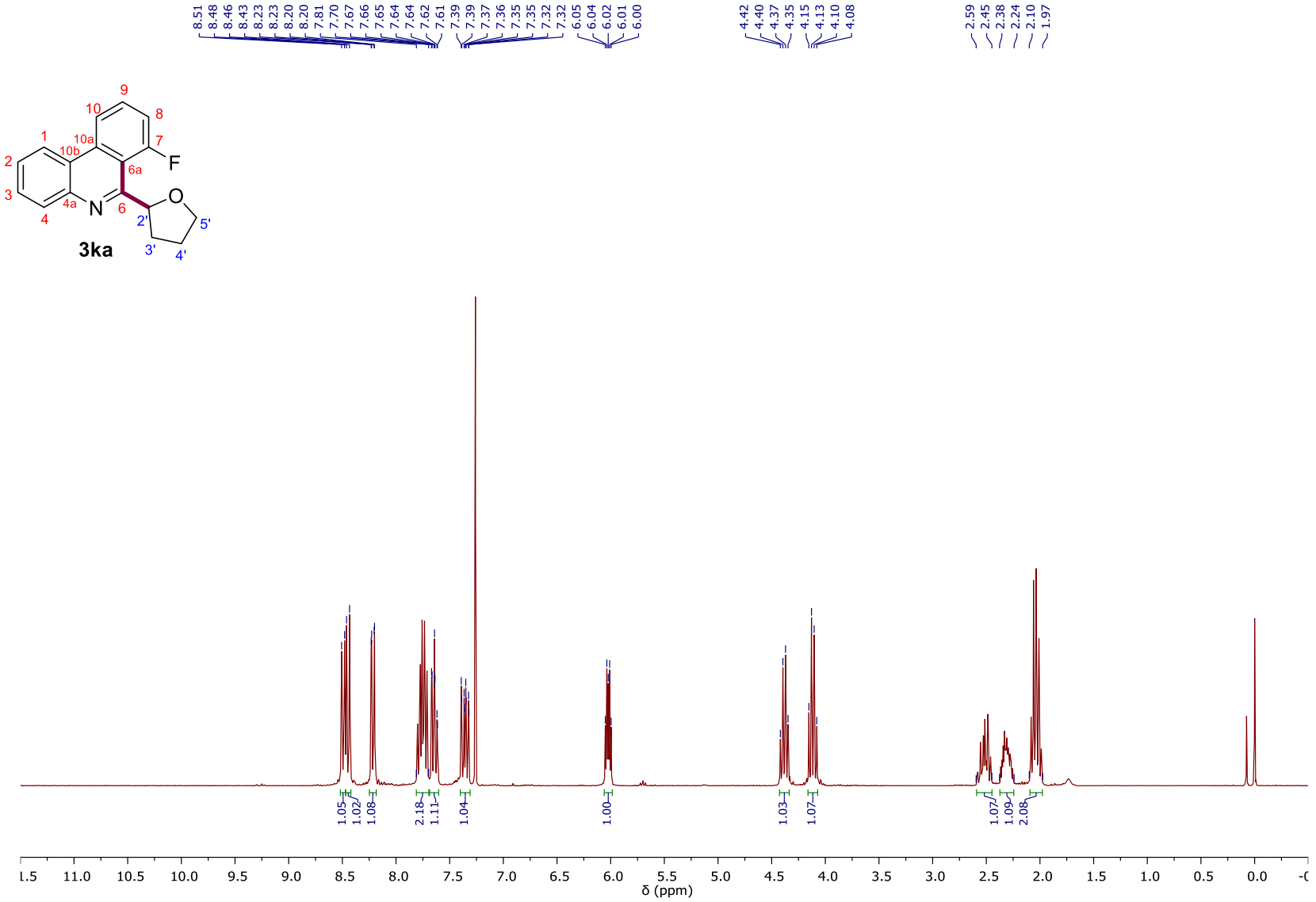
^{1}H-NMR (400 MHz, $CDCl_3$)



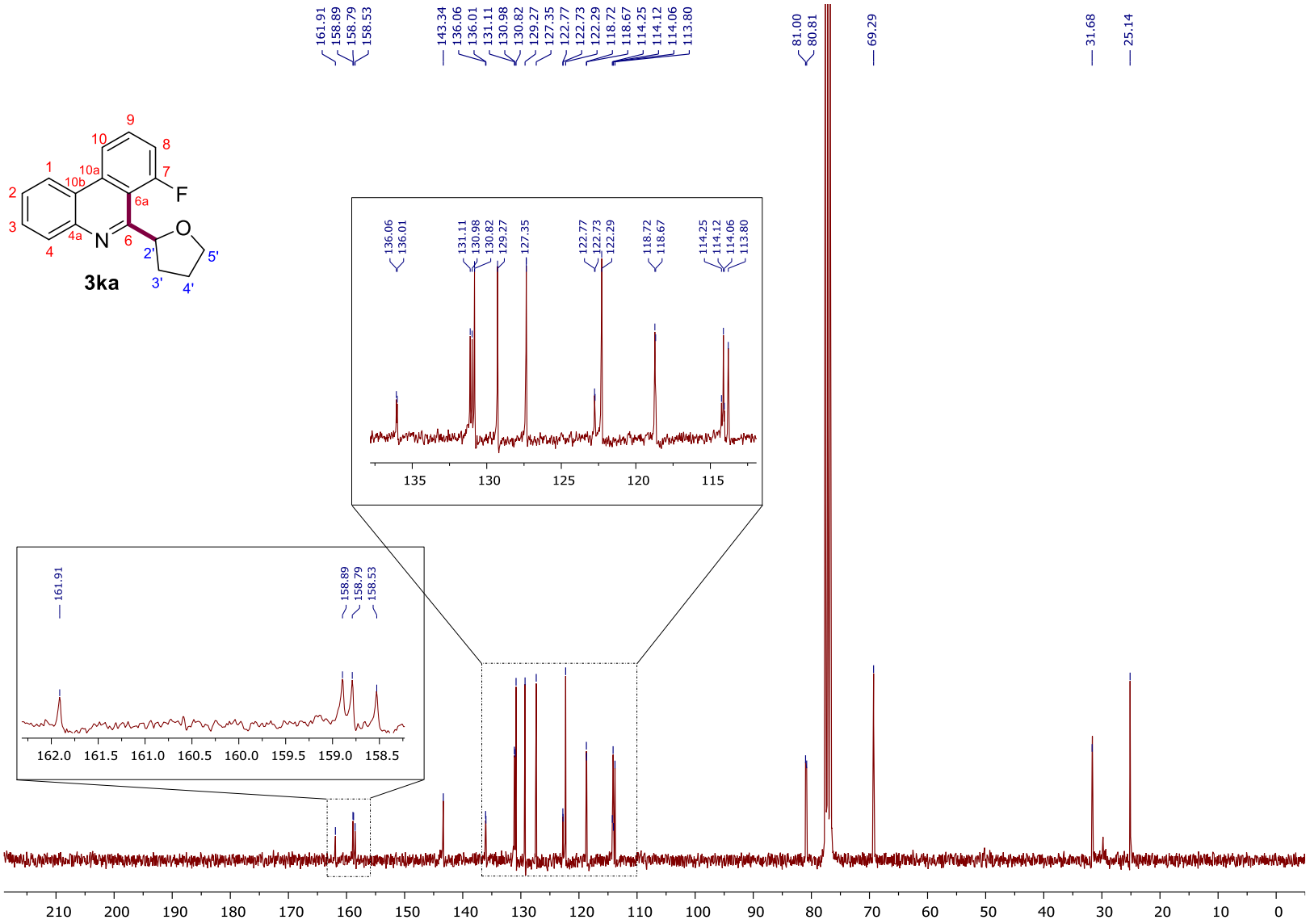
^{13}C-NMR (101 MHz, $CDCl_3$)



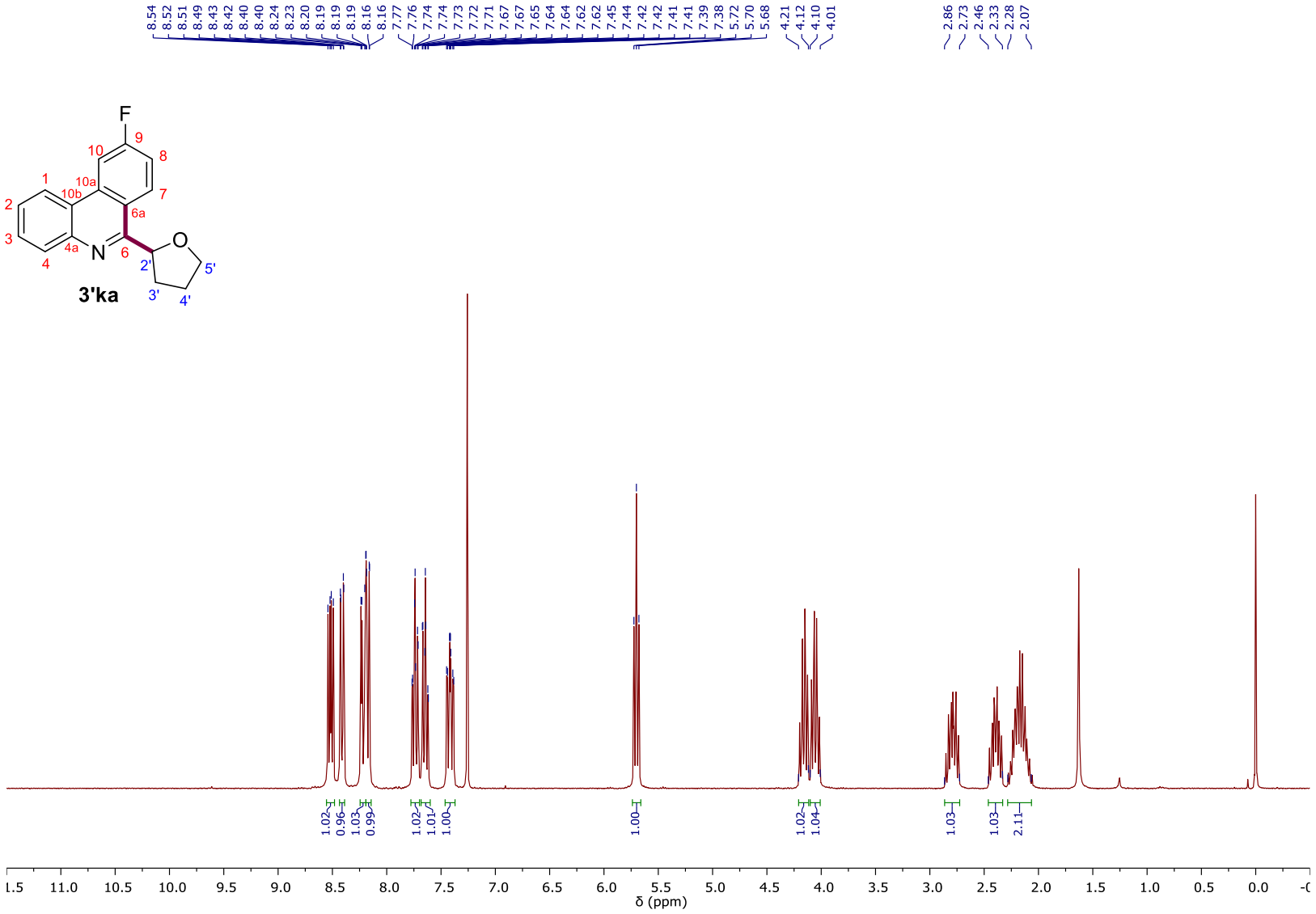
^{1}H-NMR (300 MHz, $CDCl_3$)



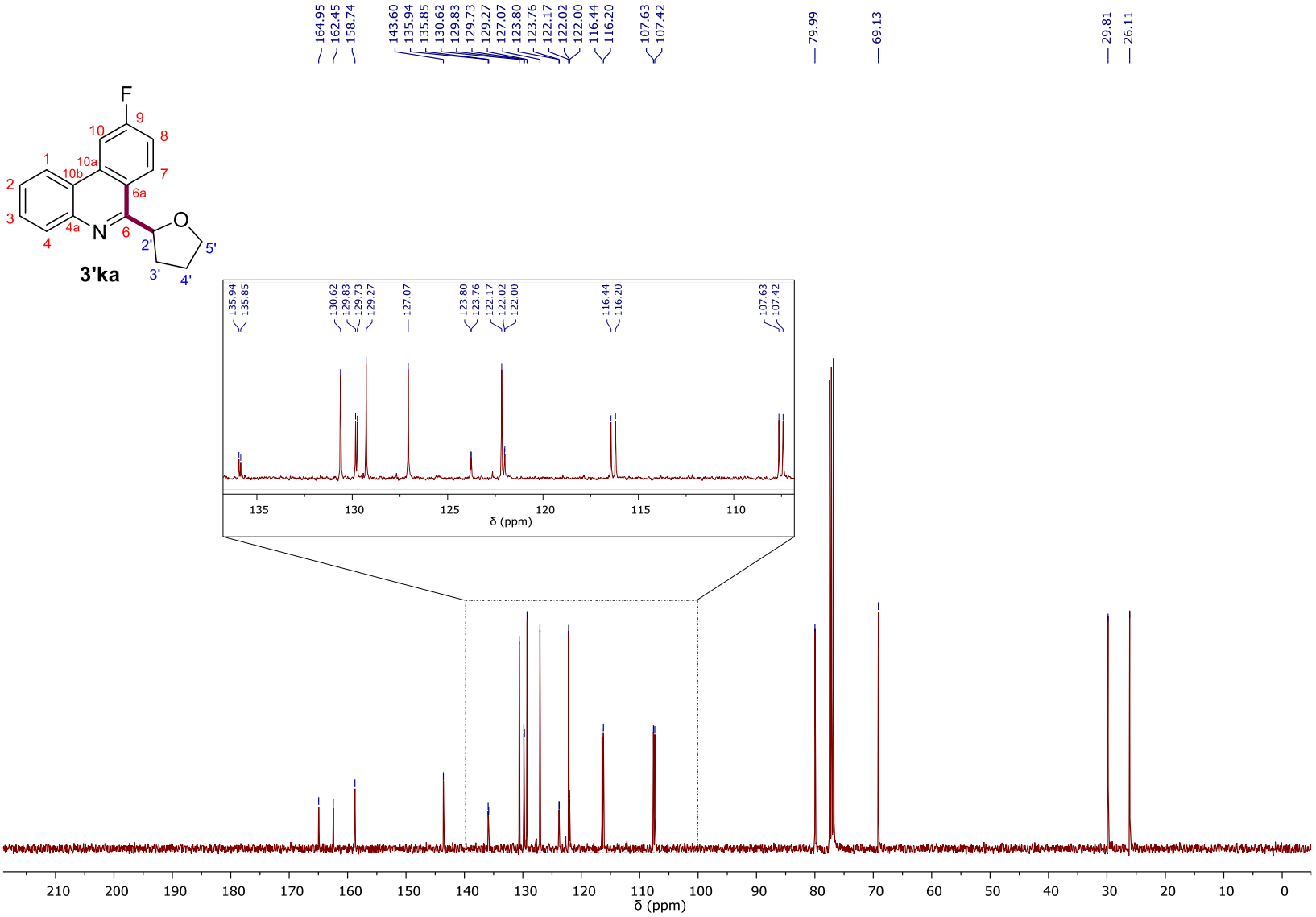
^{13}C-NMR (75 MHz, $CDCl_3$)



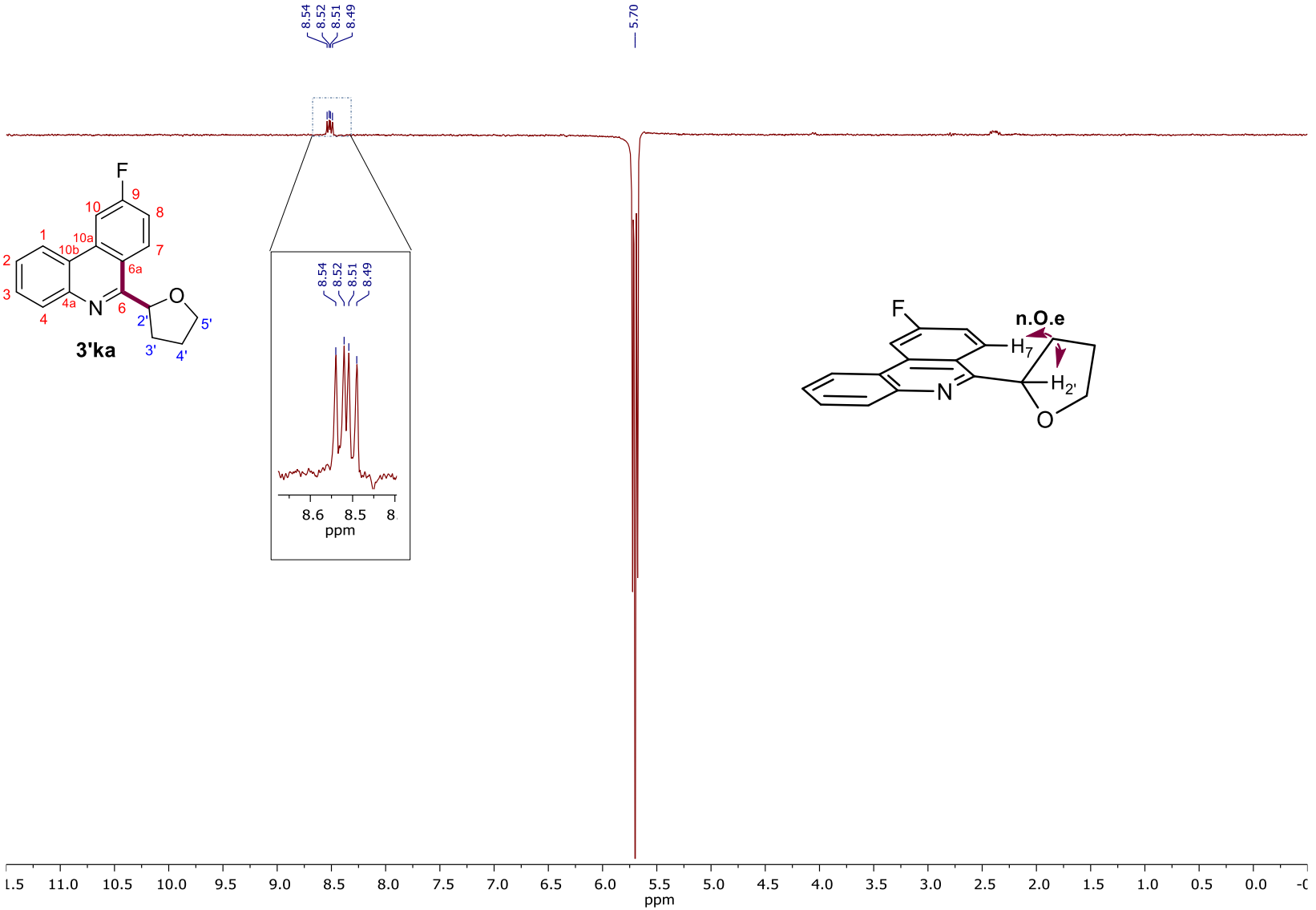
^{1}H-NMR (300 MHz, $CDCl_3$)



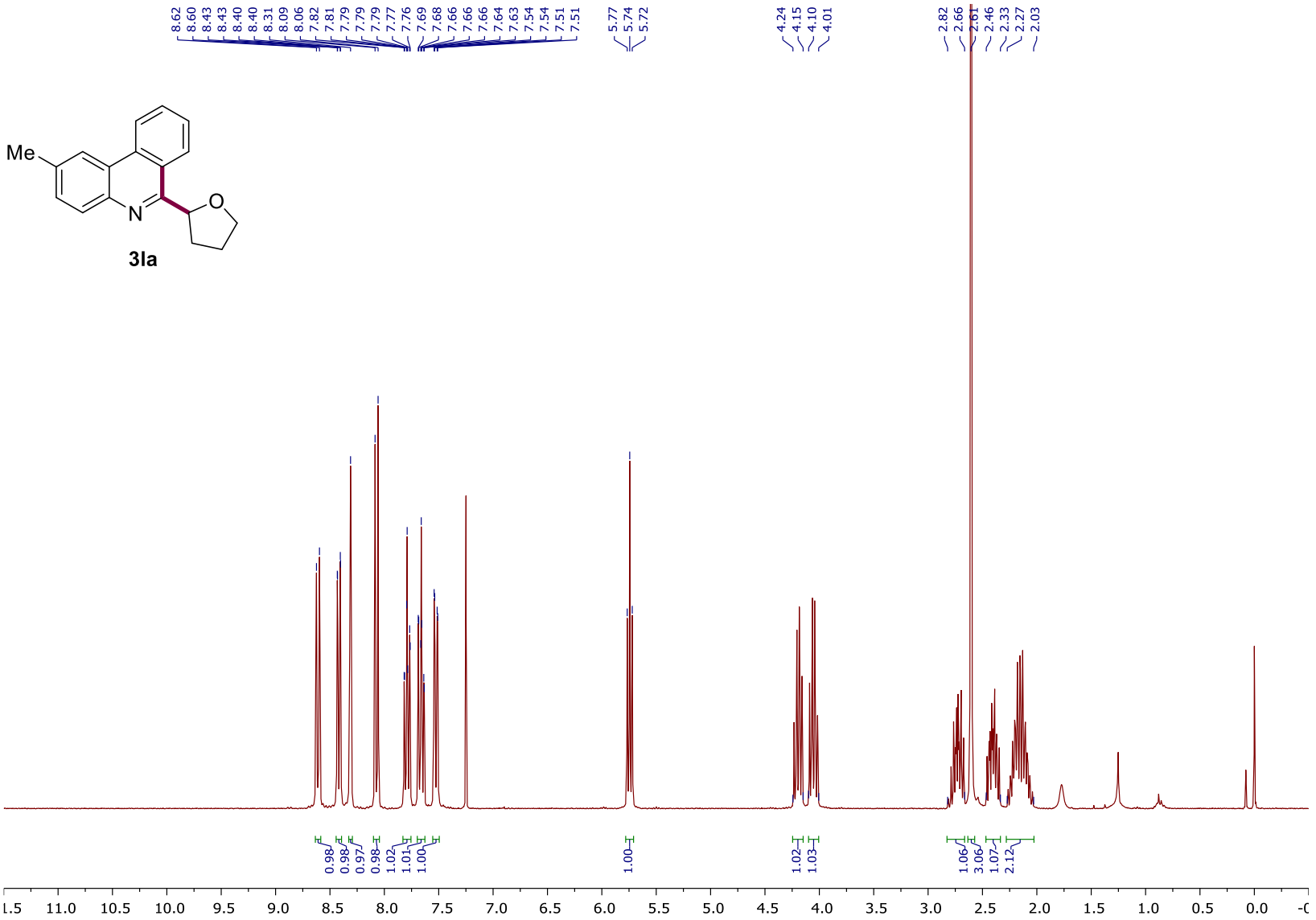
^{13}C-NMR (101 MHz, $CDCl_3$)



Differential nOe when H-2’ is irradiated (300 MHz, $CDCl_3$)

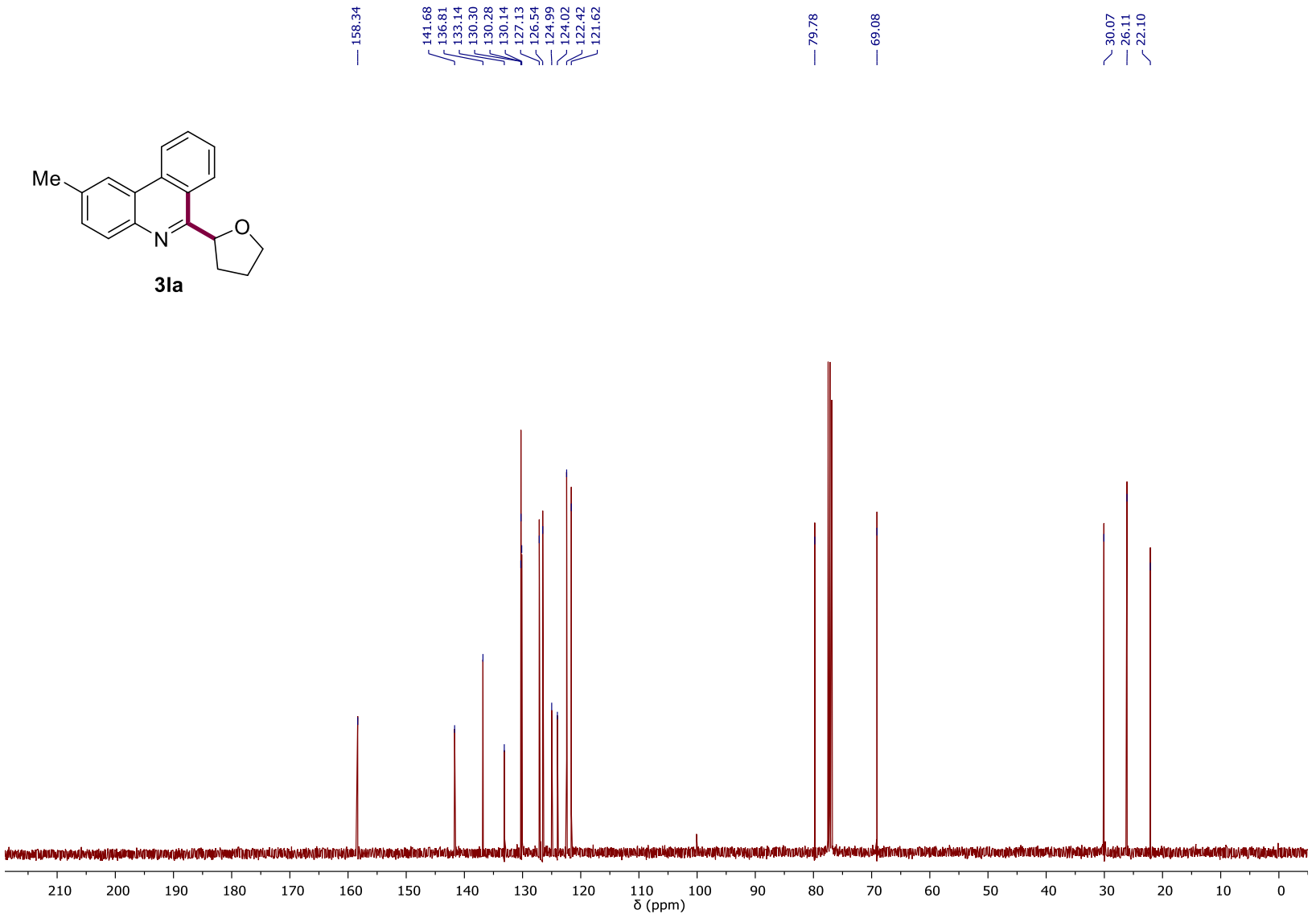


^{1}H-NMR (300 MHz, $CDCl_3$)

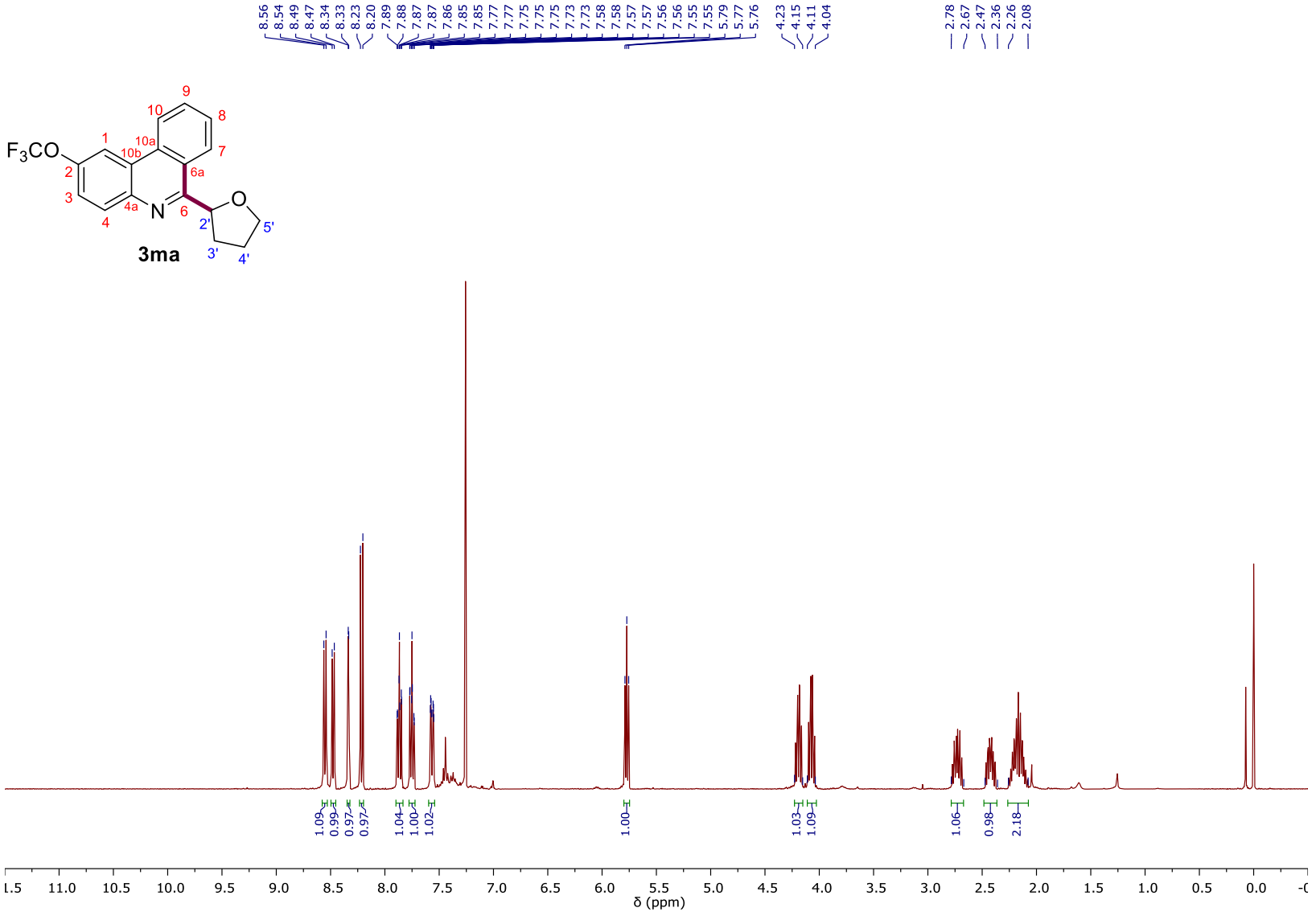


3la

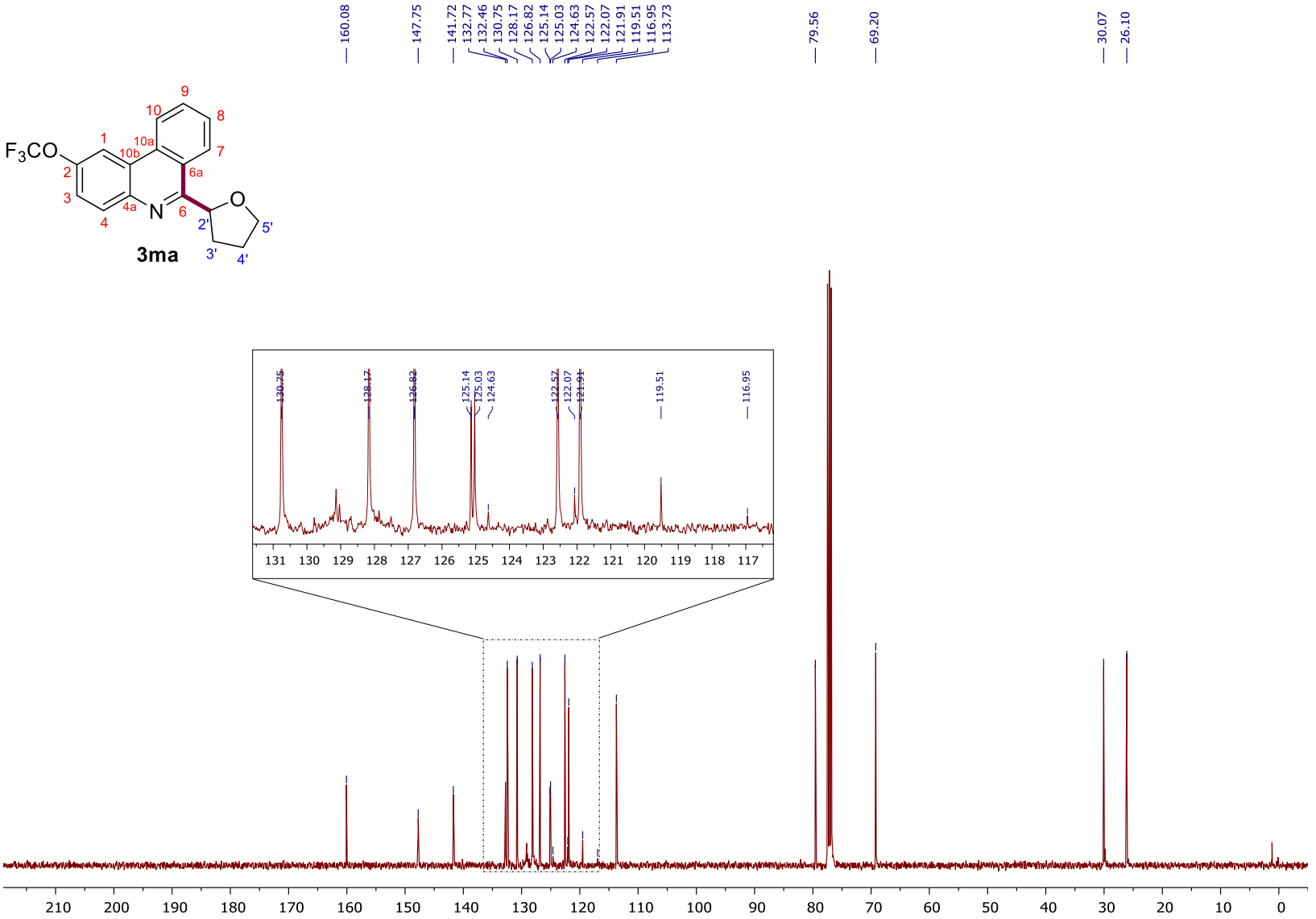
^{13}C-NMR (101 MHz, $CDCl_3$)



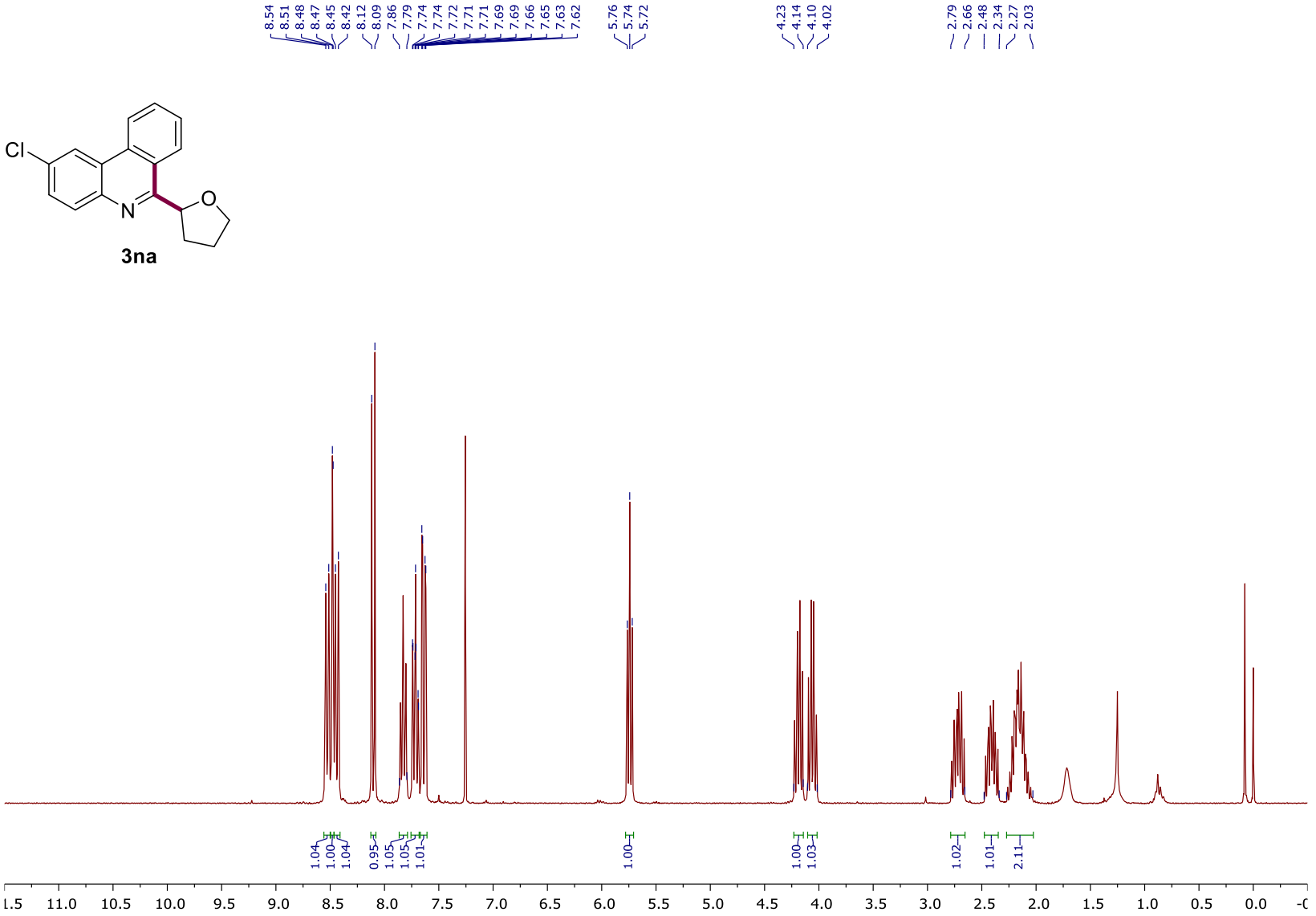
^{1}H-NMR (400 MHz, $CDCl_3$)



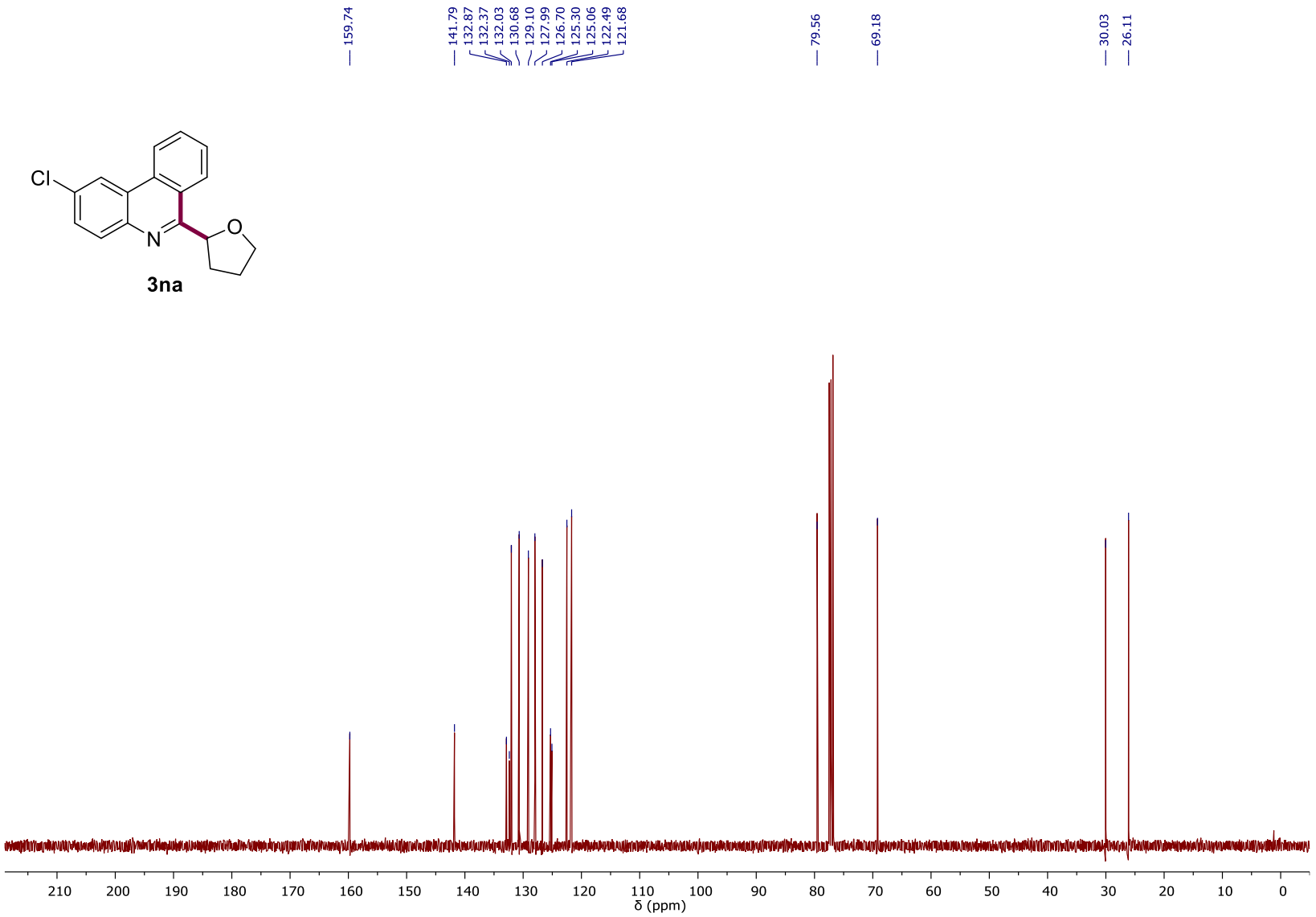
^{13}C-NMR (101 MHz, $CDCl_3$)



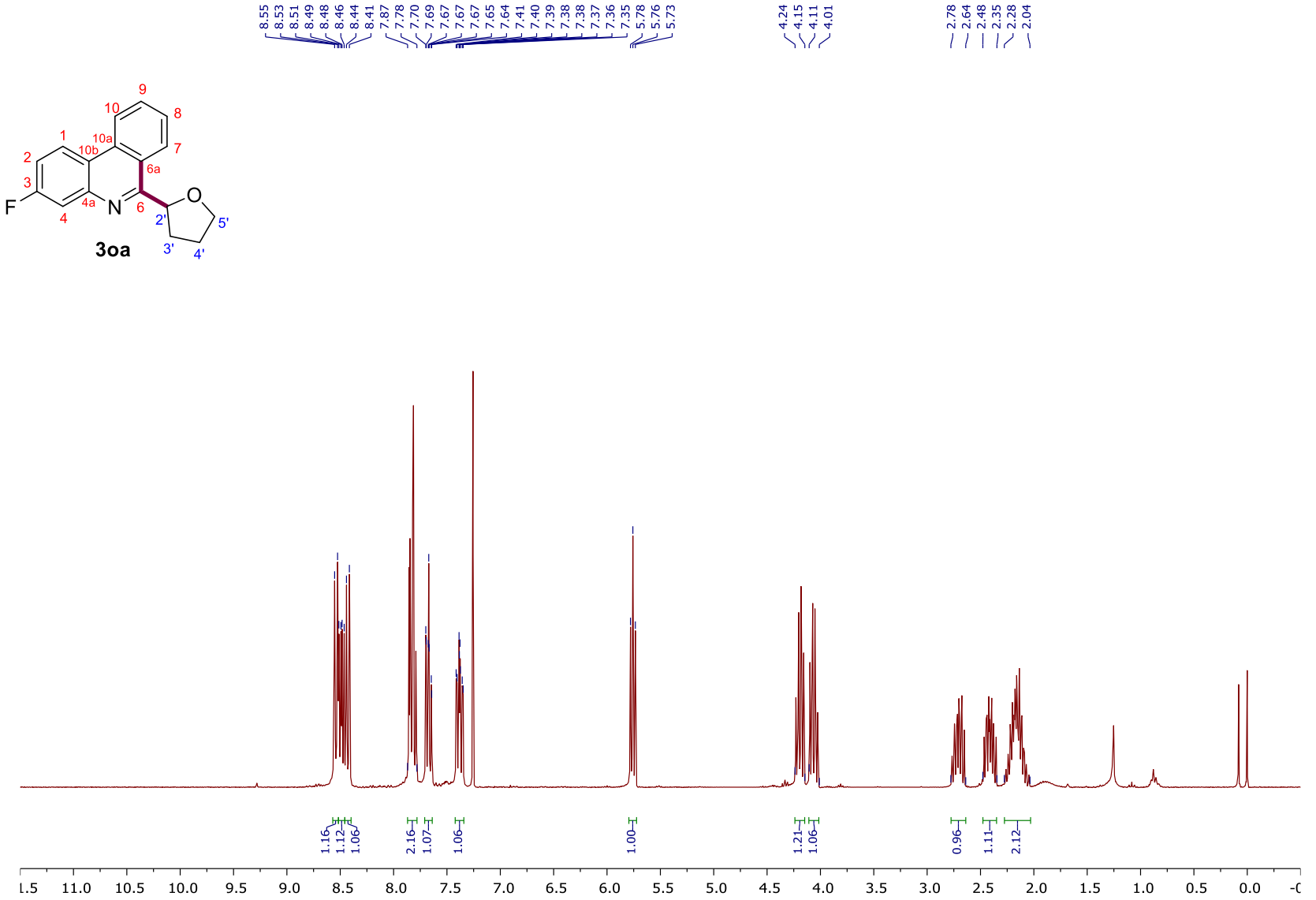
^{1}H-NMR (300 MHz, $CDCl_3$)



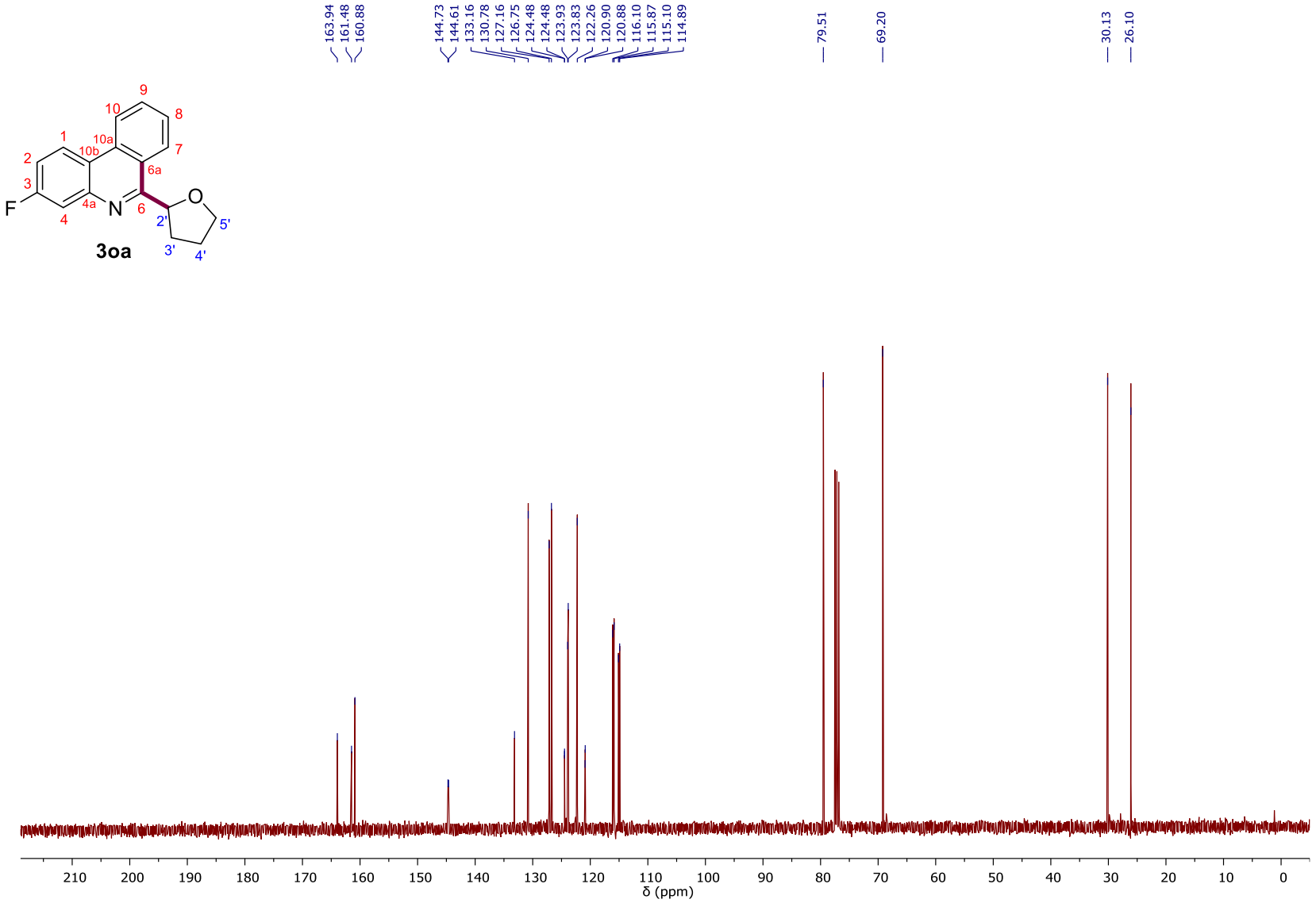
^{13}C-NMR (101 MHz, $CDCl_3$)



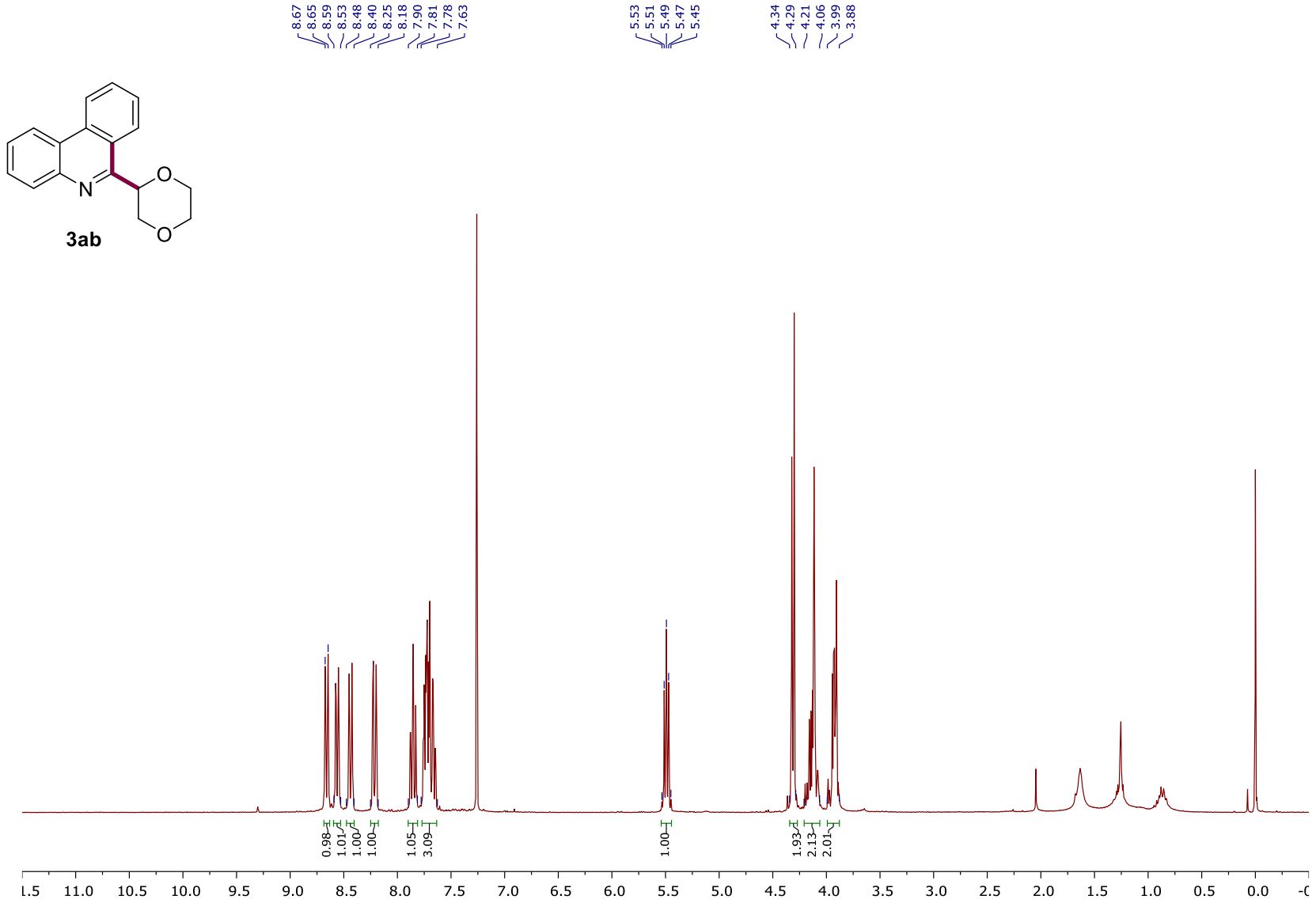
^{1}H-NMR (300 MHz, $CDCl_3$)



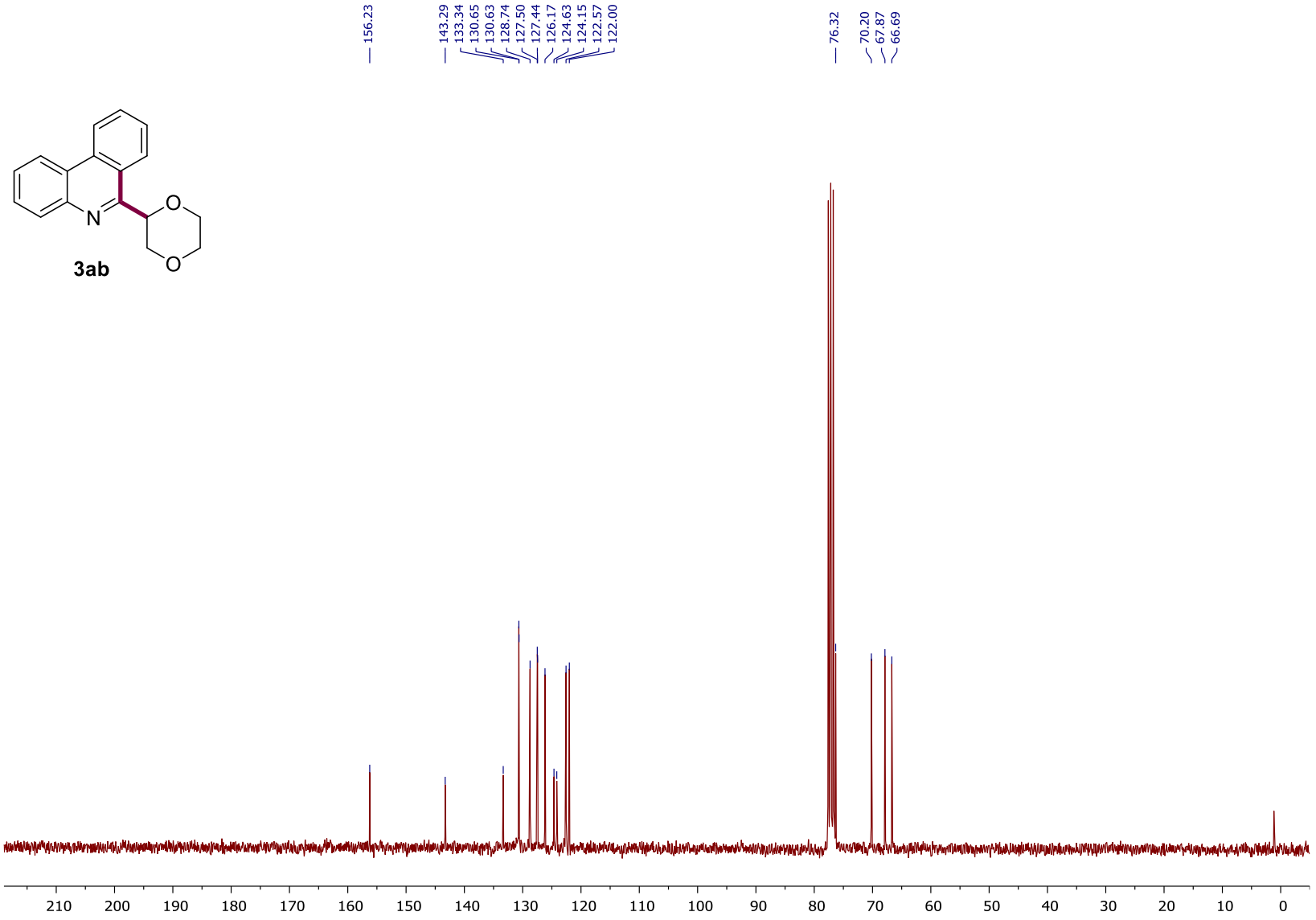
^{13}C-NMR (101 MHz, $CDCl_3$)



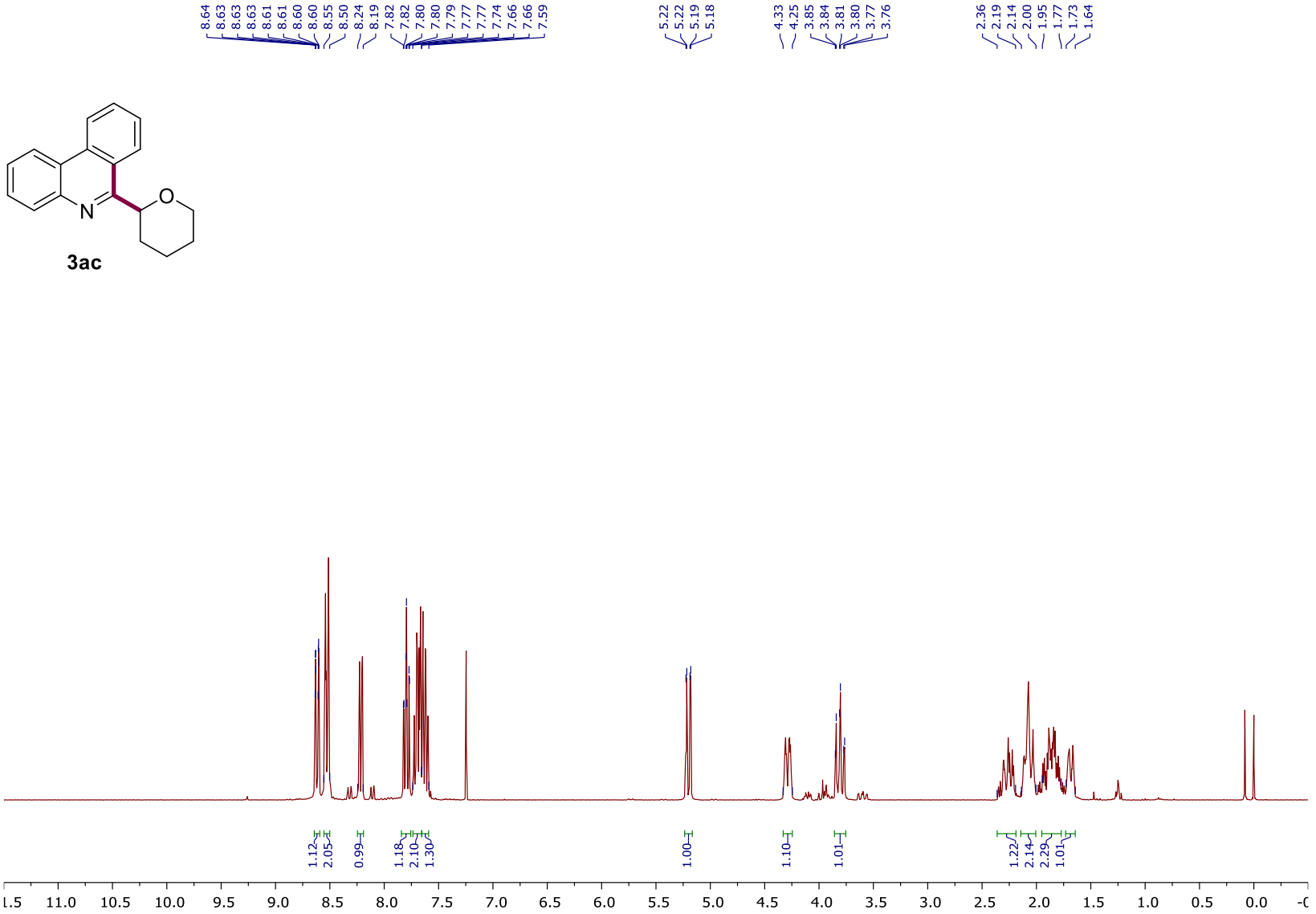
^{1}H-NMR (300 MHz, $CDCl_3$)



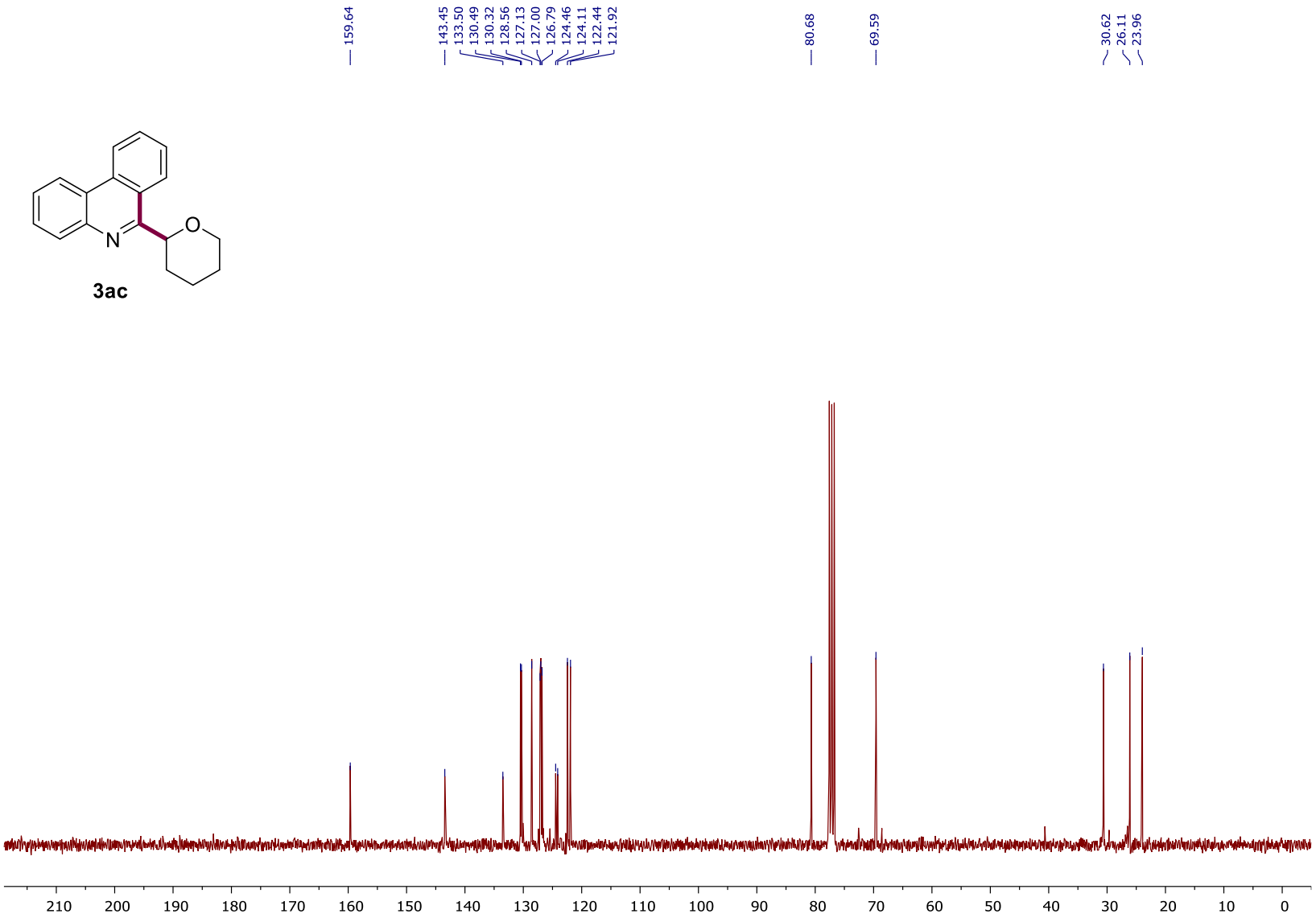
^{13}C-NMR (75 MHz, $CDCl_3$)



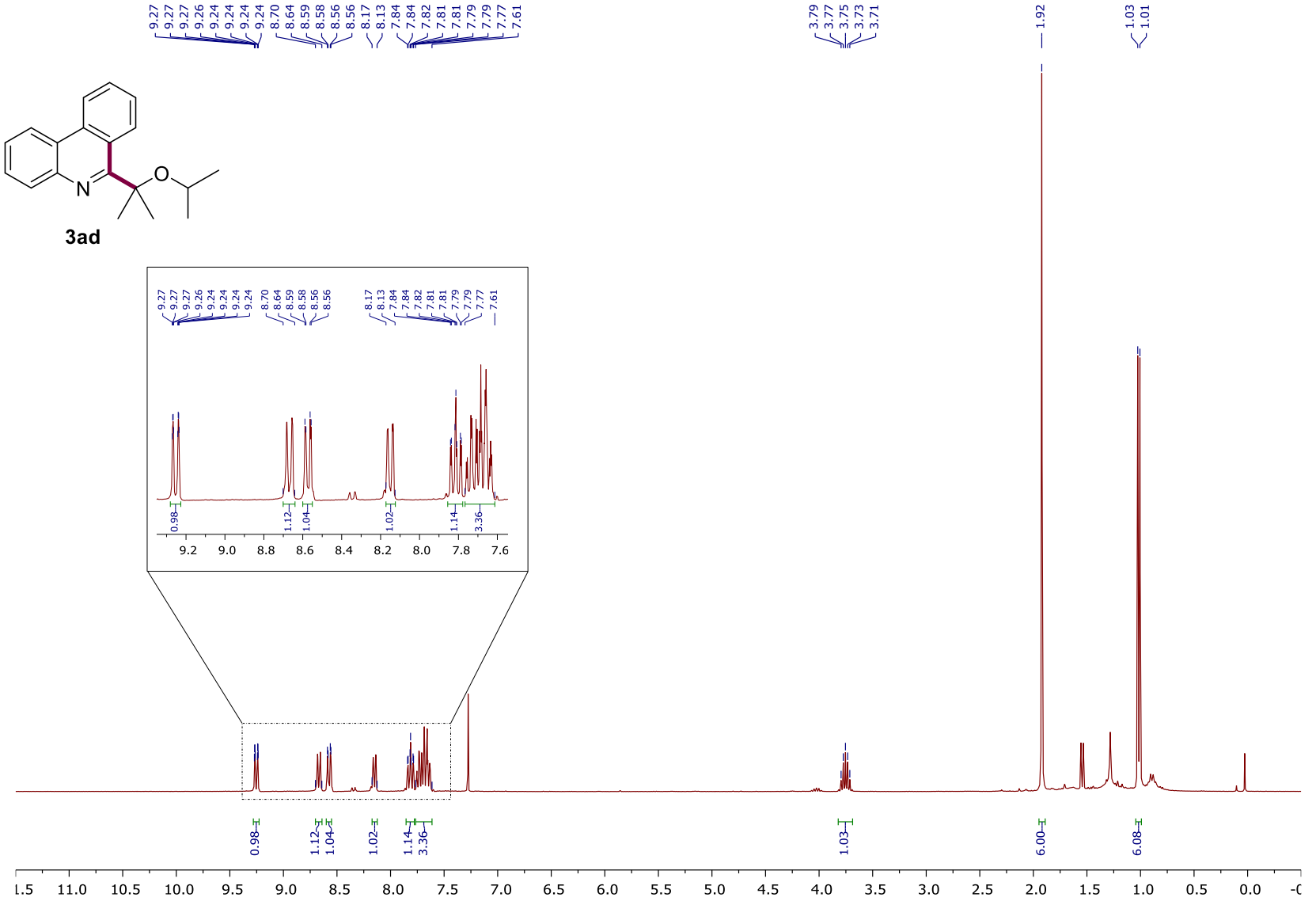
^{1}H-NMR (300 MHz, $CDCl_3$)



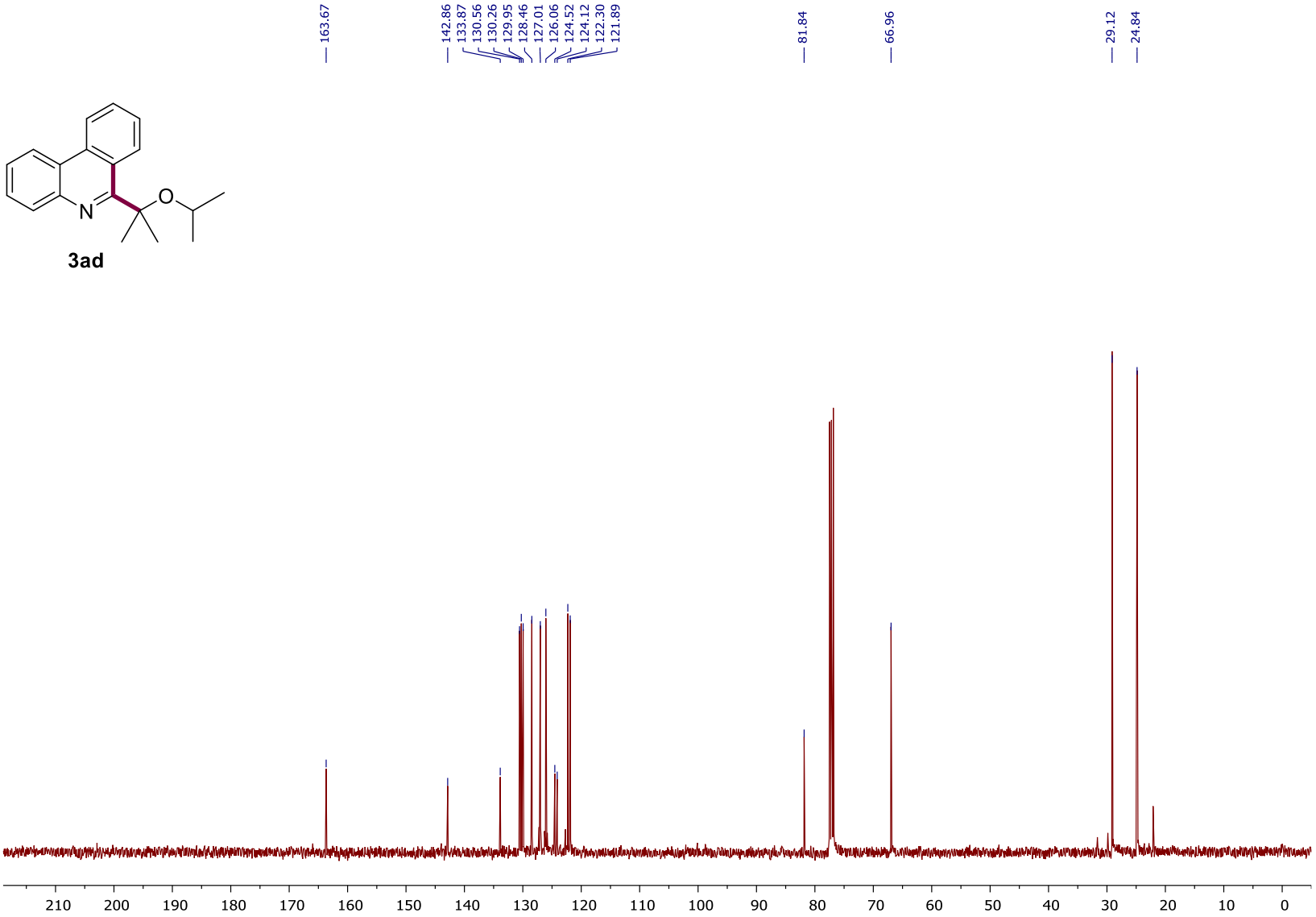
^{13}C-NMR (75 MHz, $CDCl_3$)



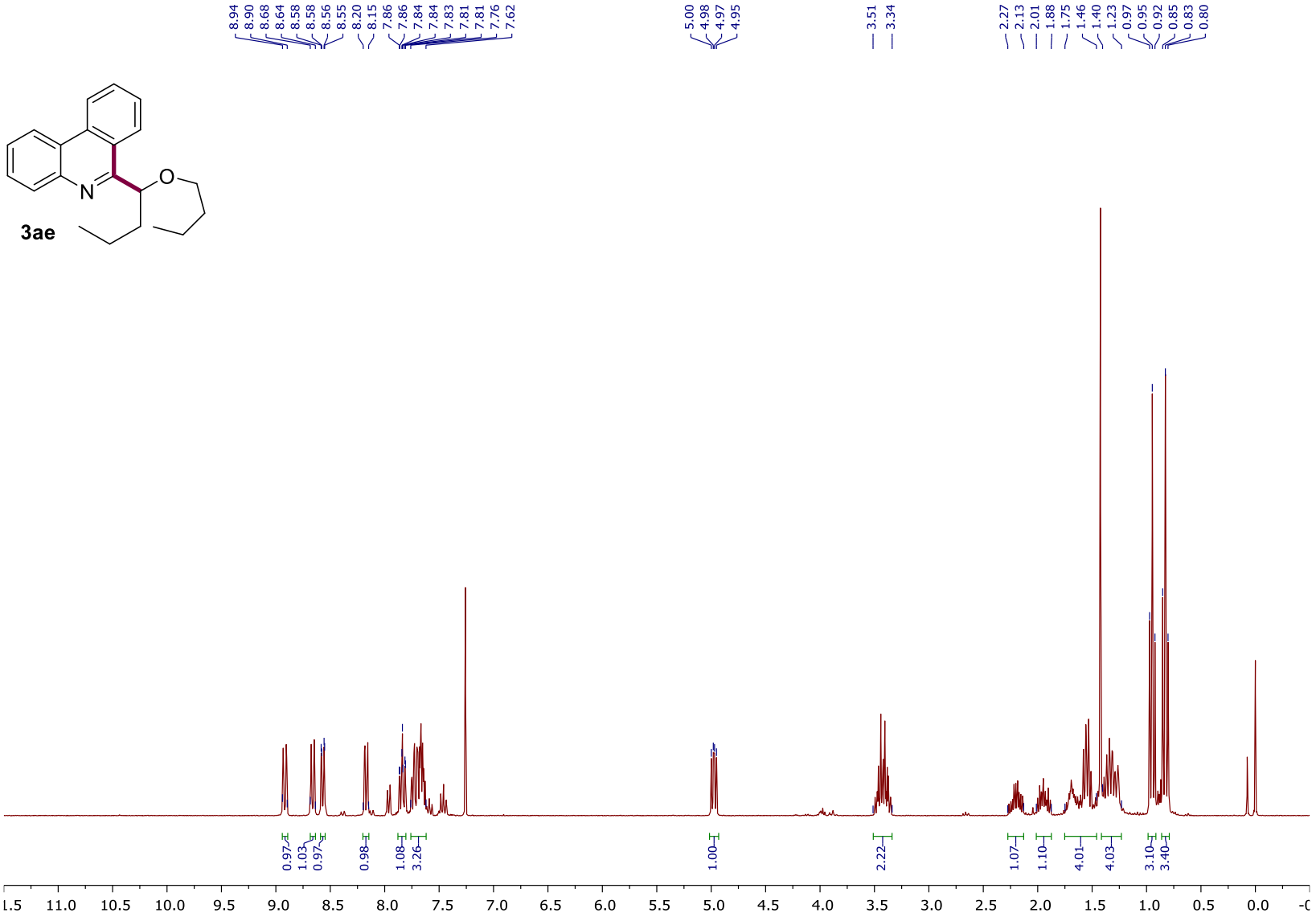
^{1}H-NMR (300 MHz, $CDCl_3$)



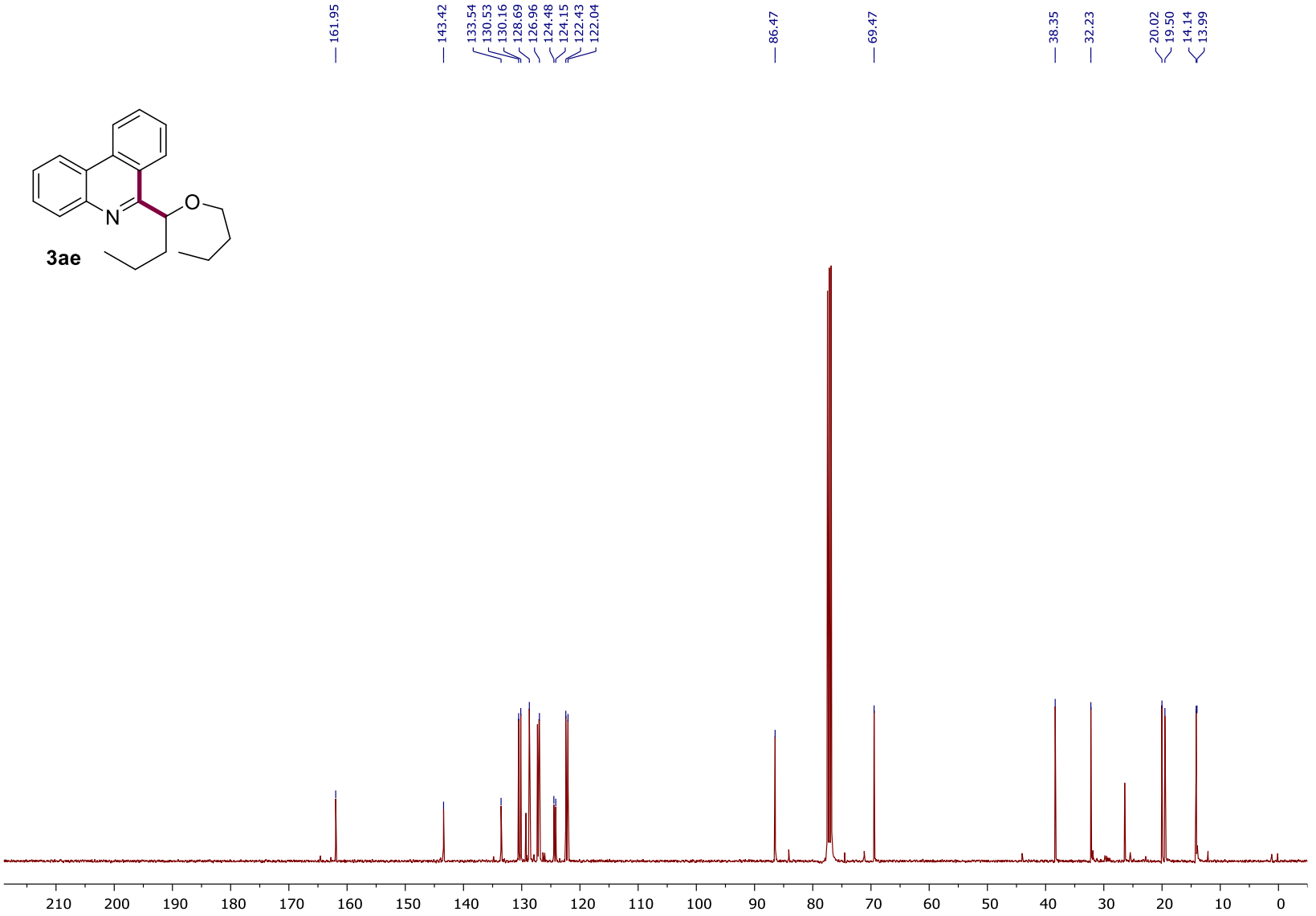
^{13}C-NMR (101 MHz, $CDCl_3$)



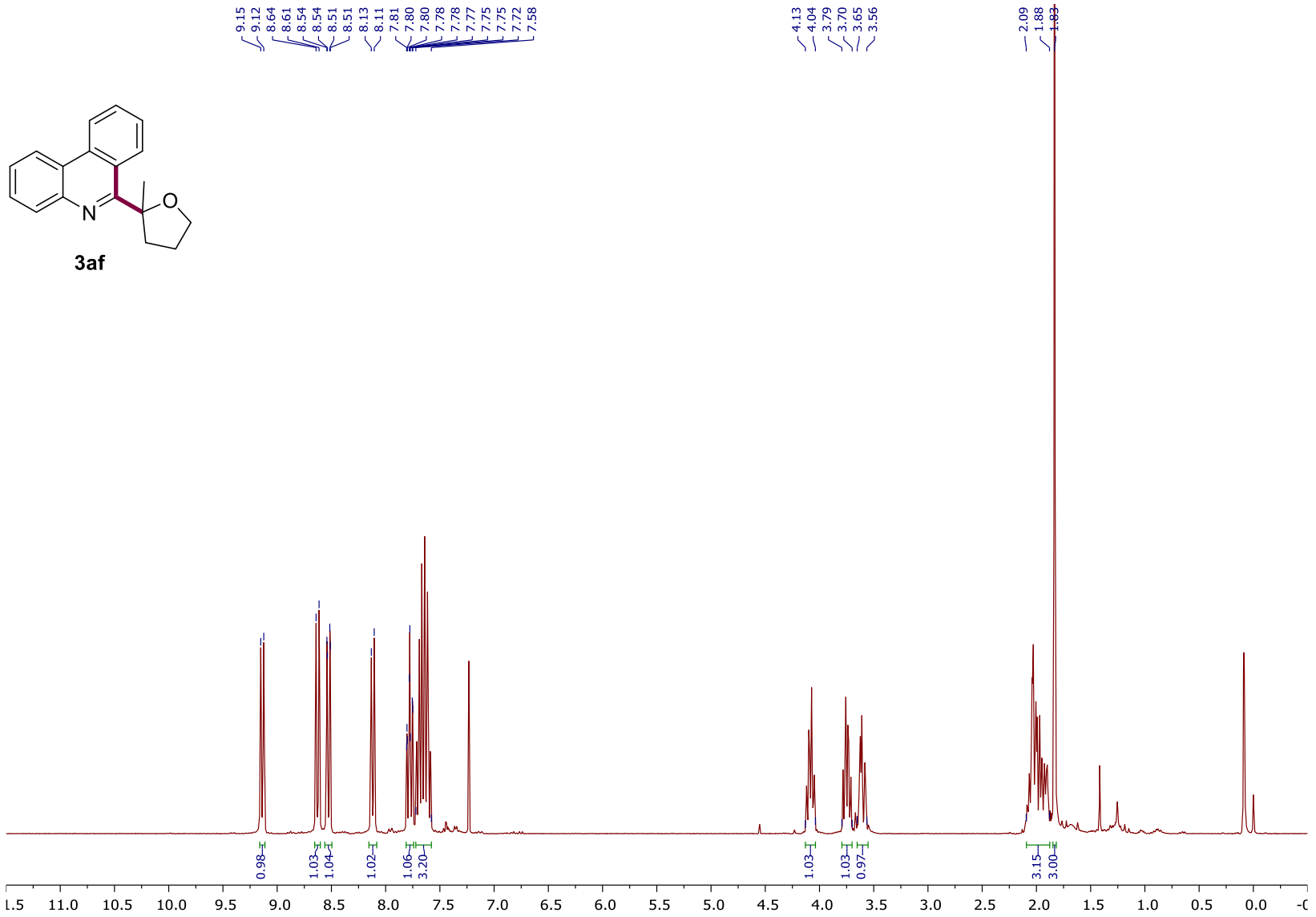
^{1}H-NMR (300 MHz, $CDCl_3$)



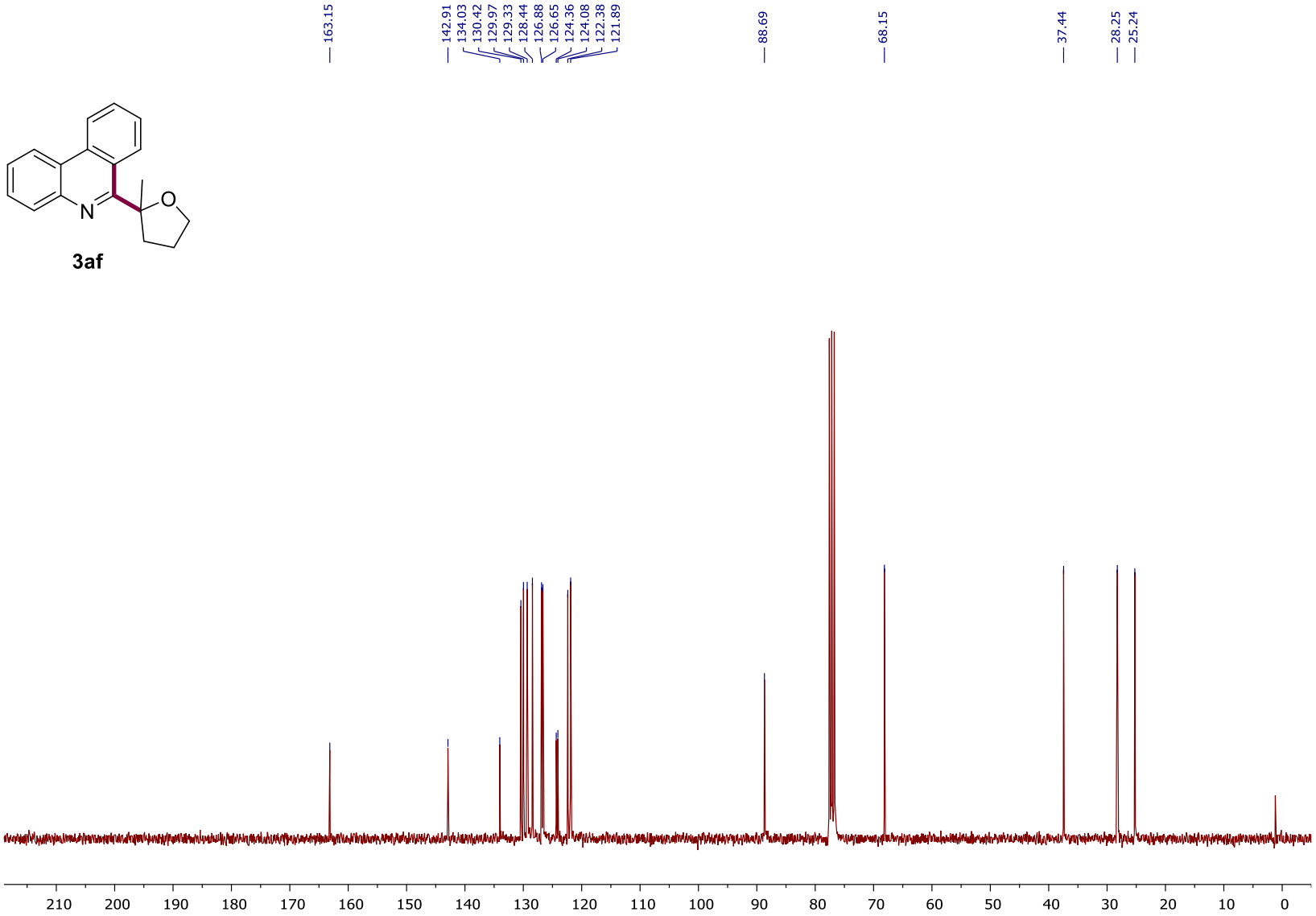
^{13}C-NMR (101 MHz, $CDCl_3$)



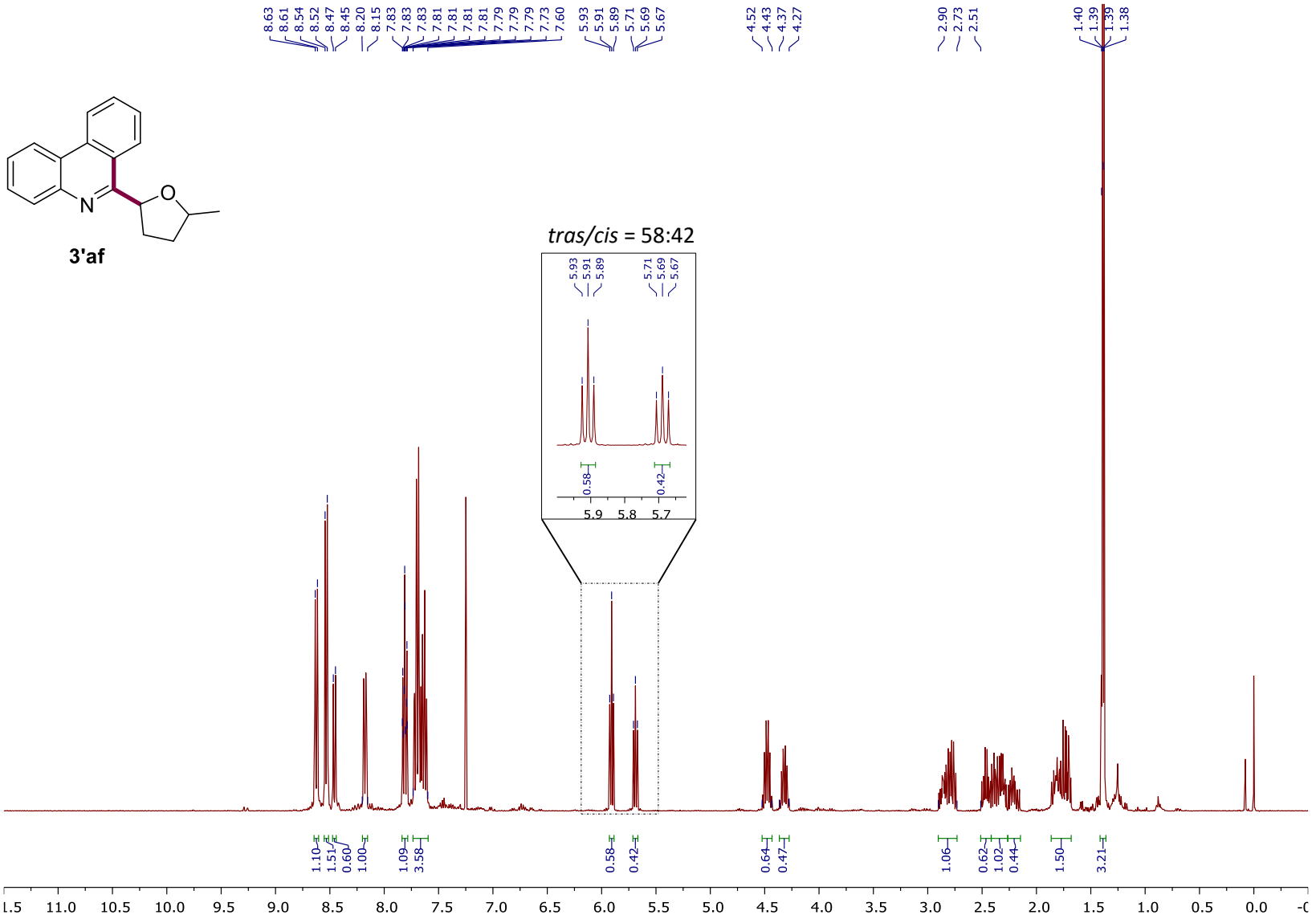
^{1}H-NMR (300 MHz, $CDCl_3$)



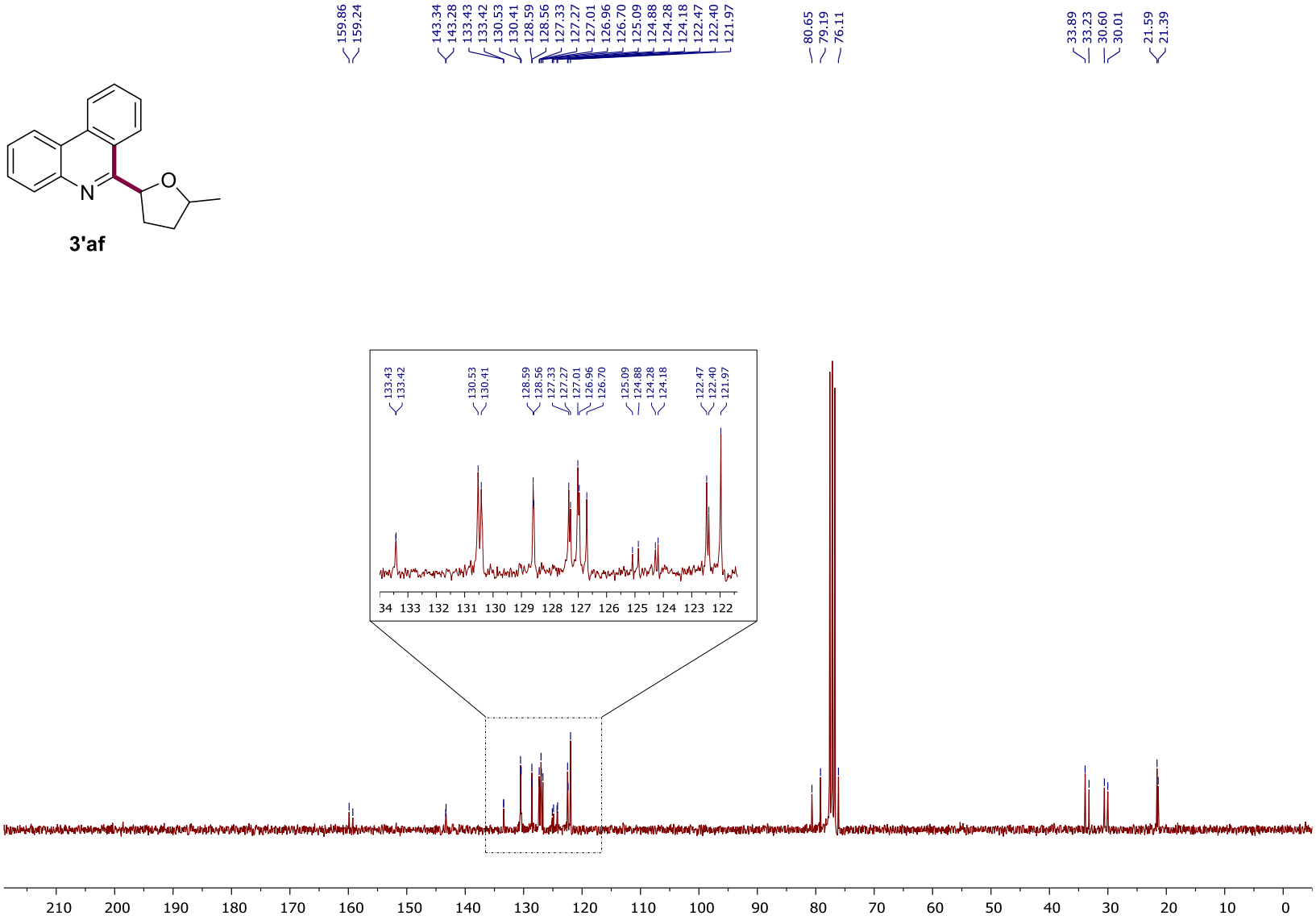
^{13}C-NMR (75 MHz, $CDCl_3$)



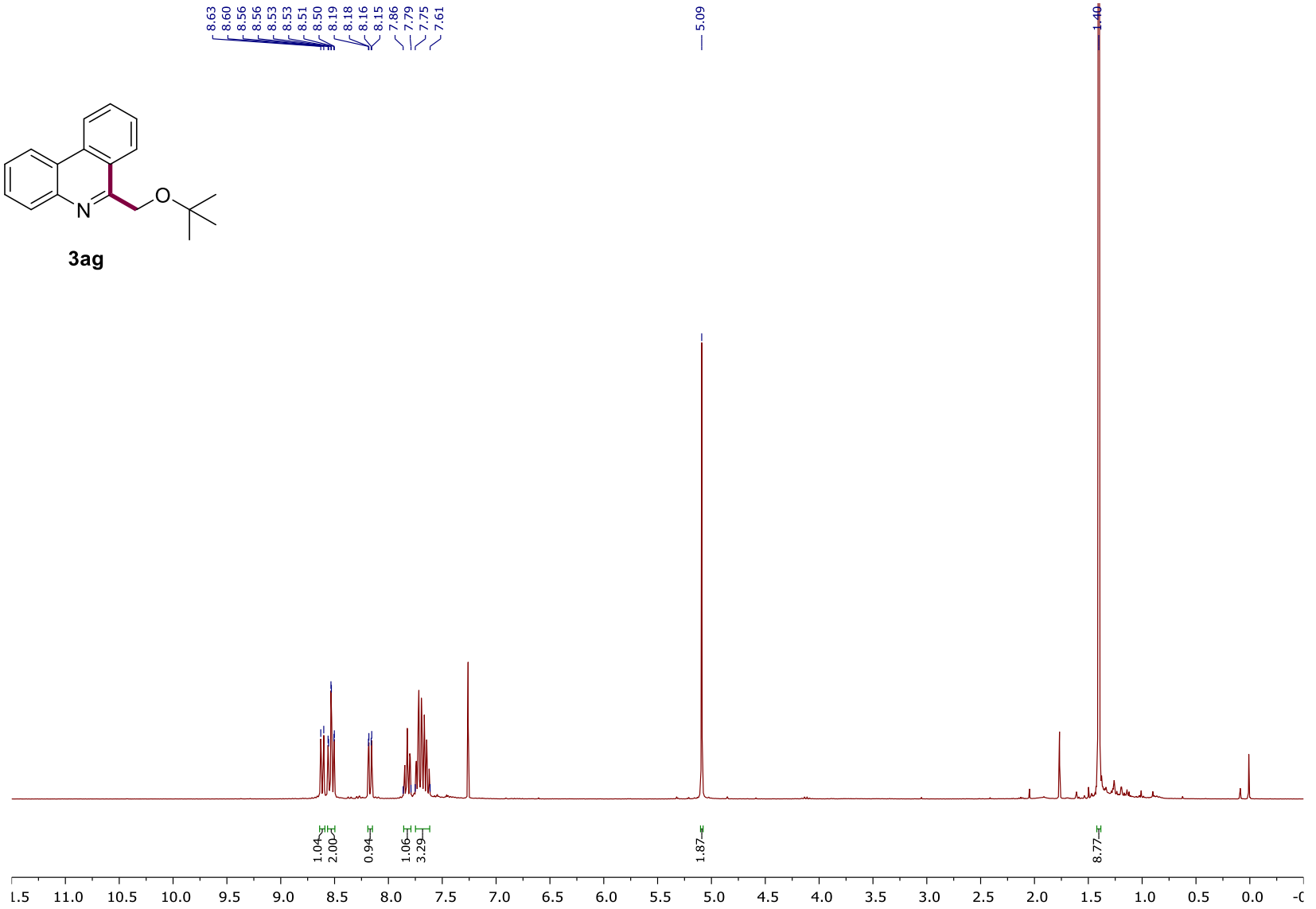
^{1}H-NMR (400 MHz, $CDCl_3$)



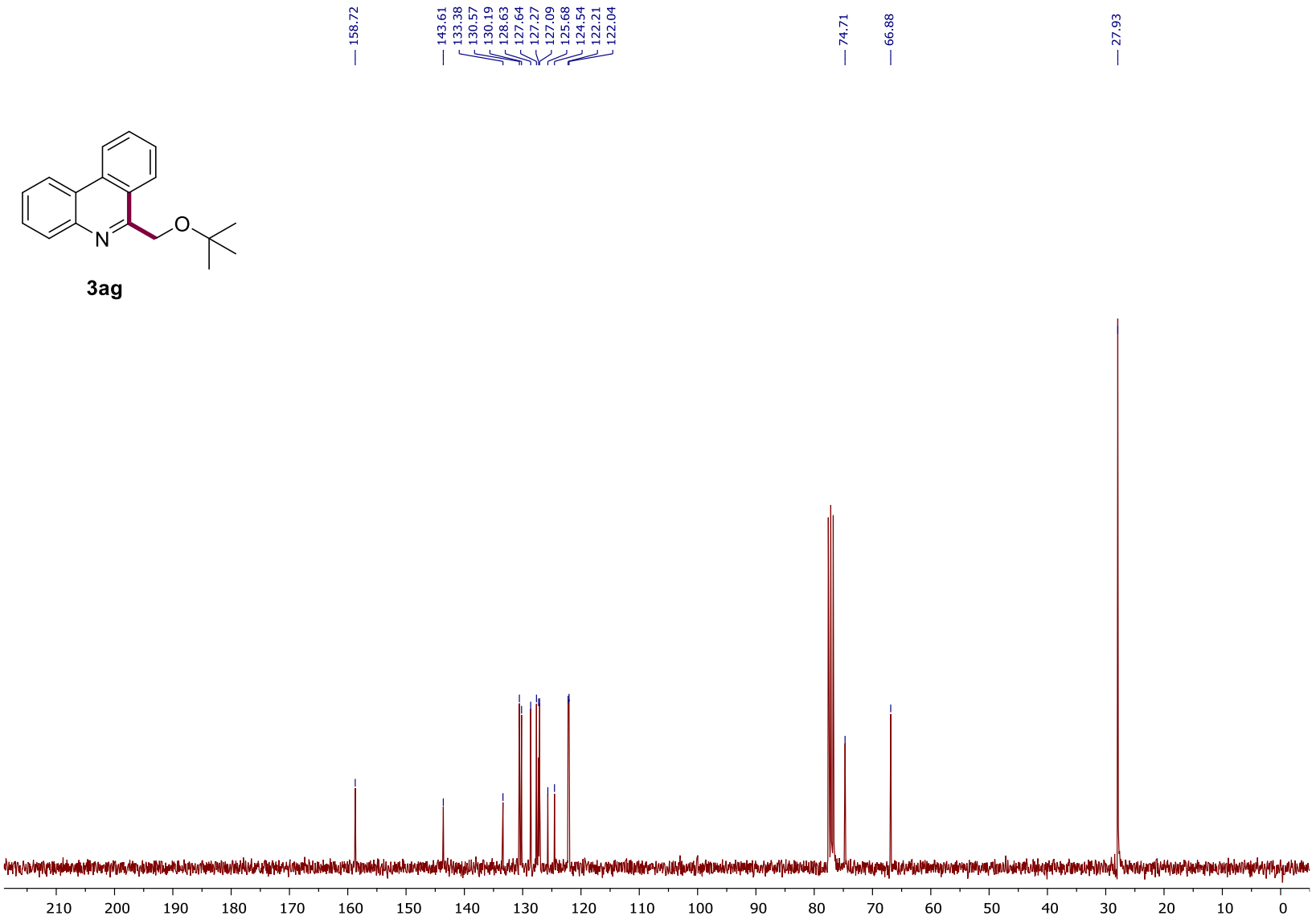
^{13}C-NMR (75 MHz, $CDCl_3$)



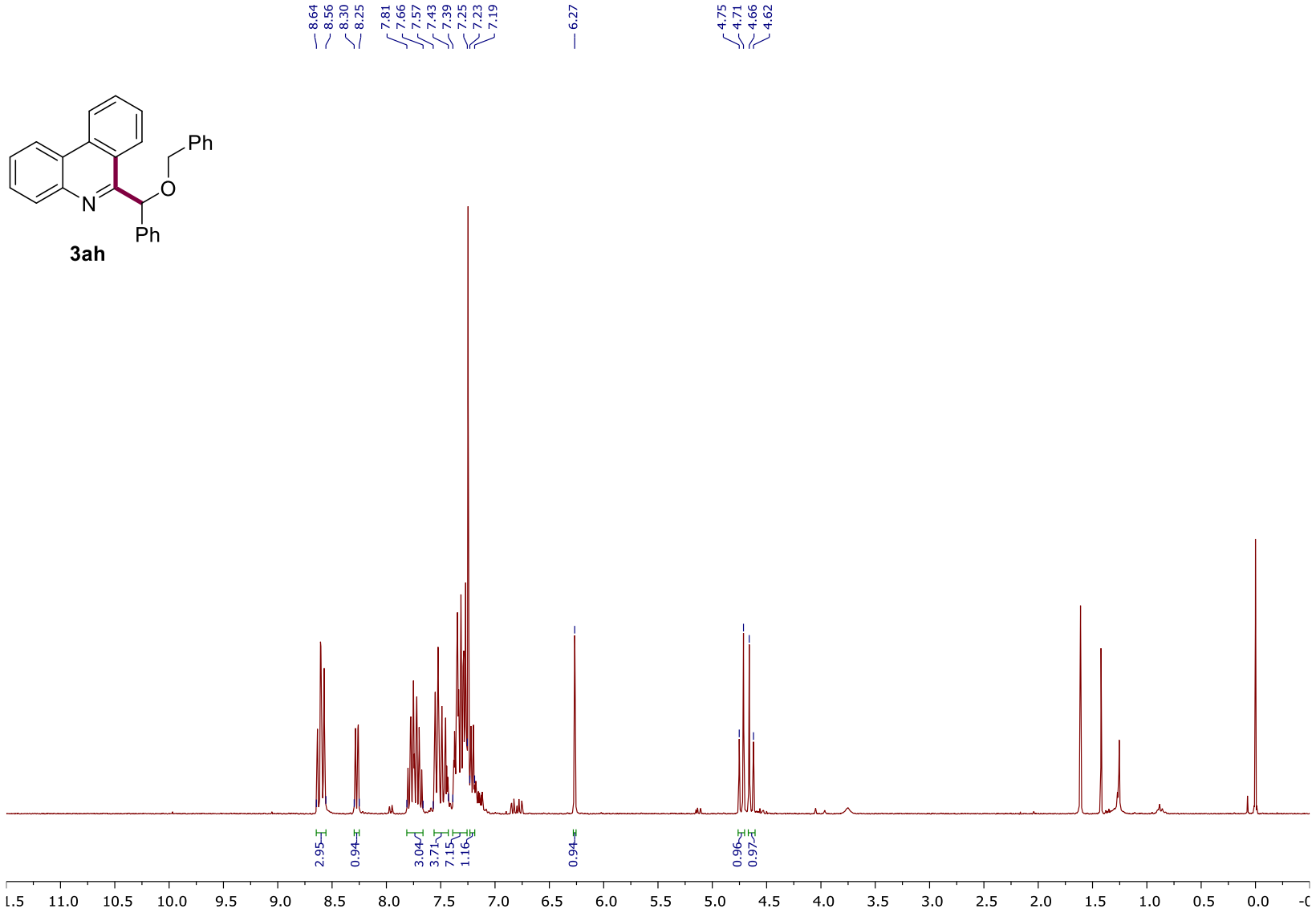
^{1}H-NMR (300 MHz, $CDCl_3$)



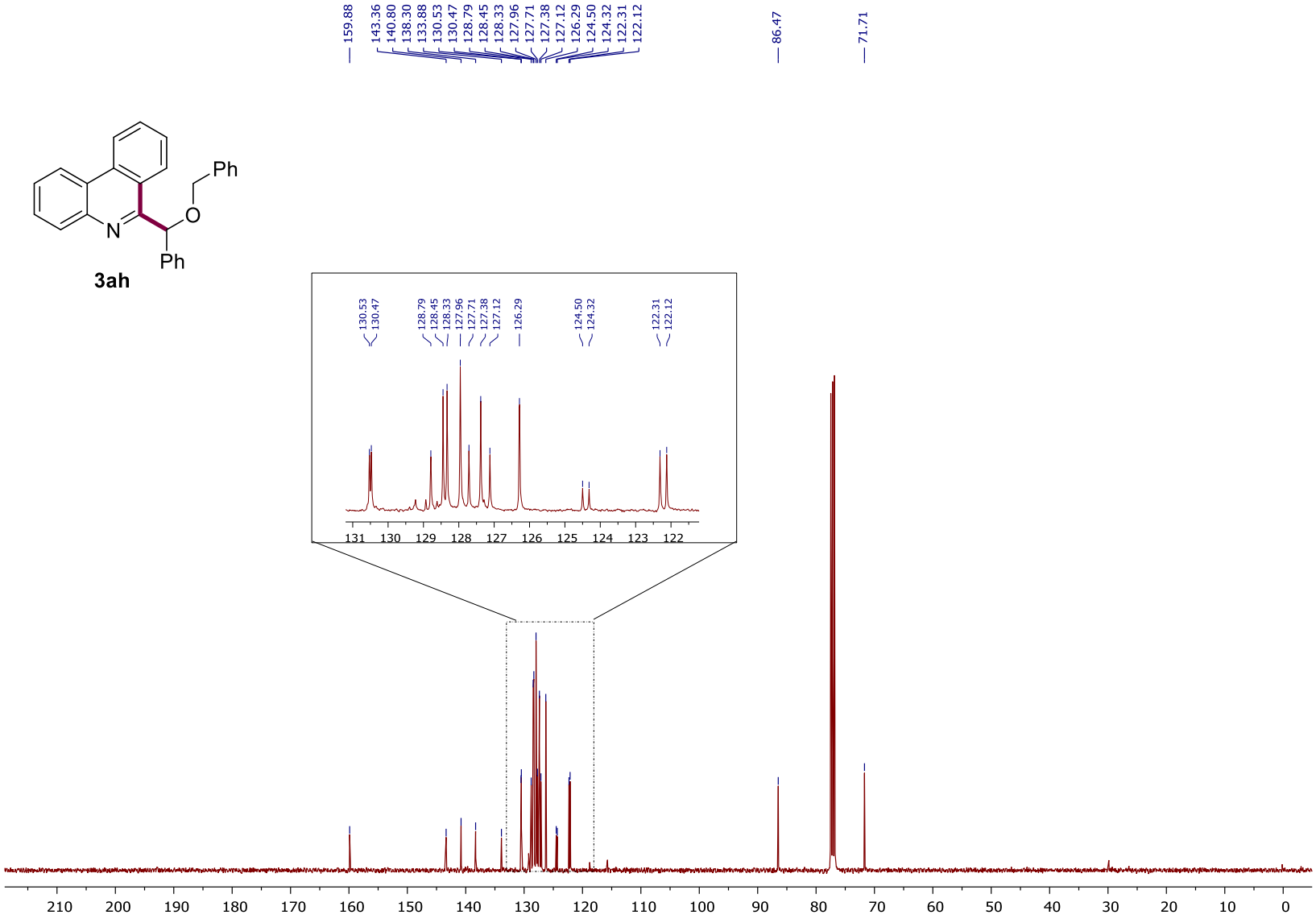
^{13}C-NMR (75 MHz, $CDCl_3$)



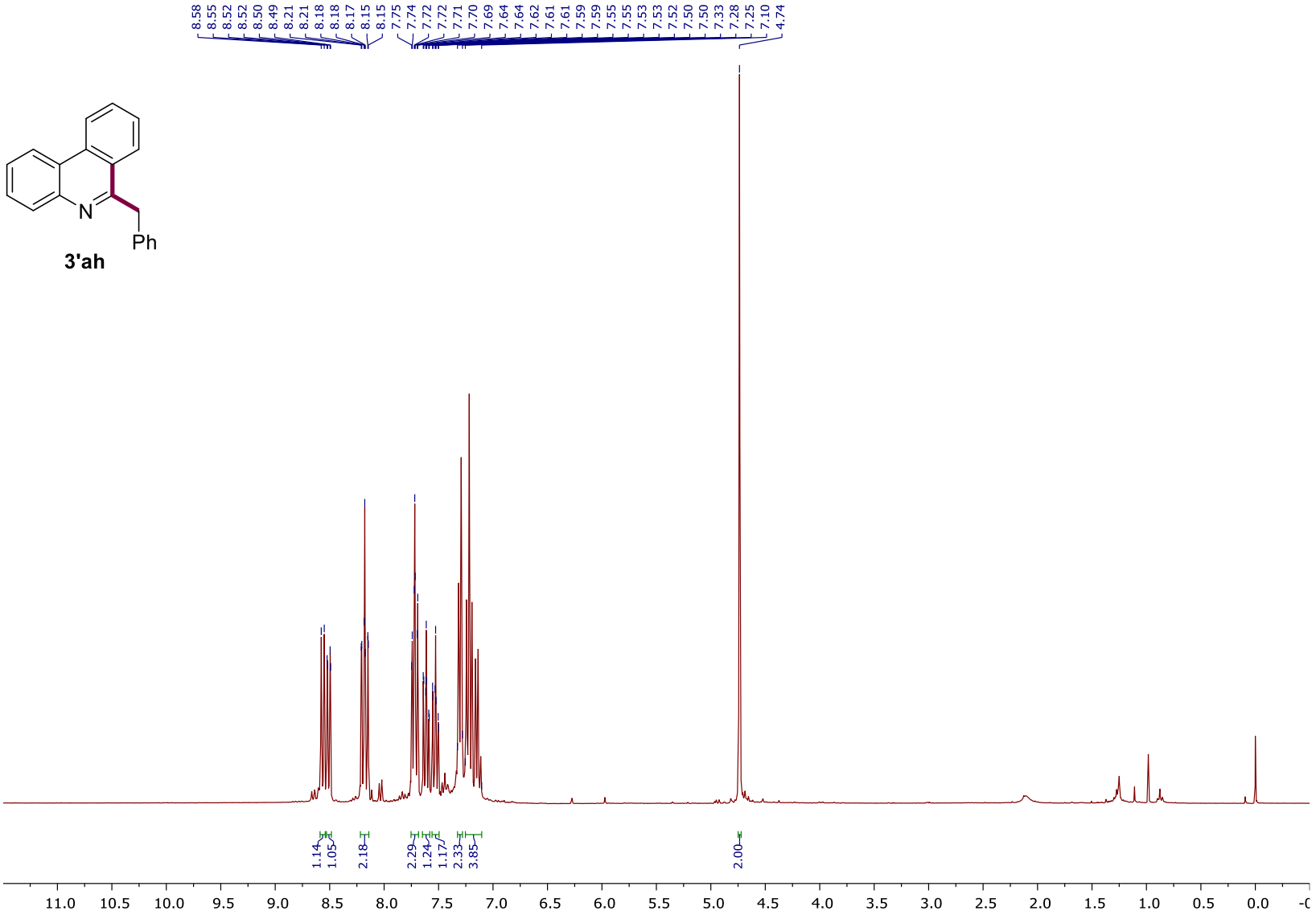
^{1}H-NMR (300 MHz, $CDCl_3$)



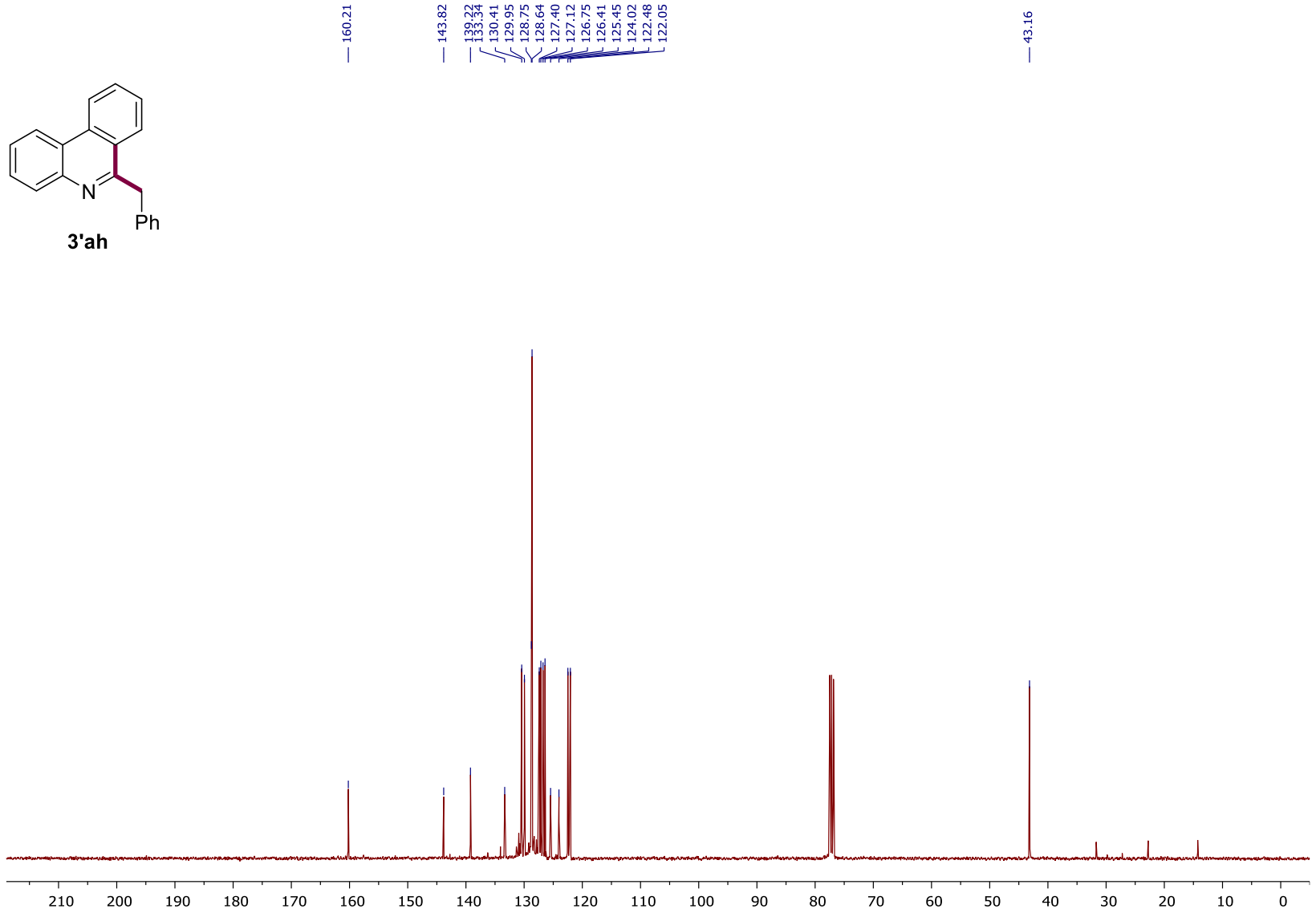
^{13}C-NMR (101 MHz, $CDCl_3$)



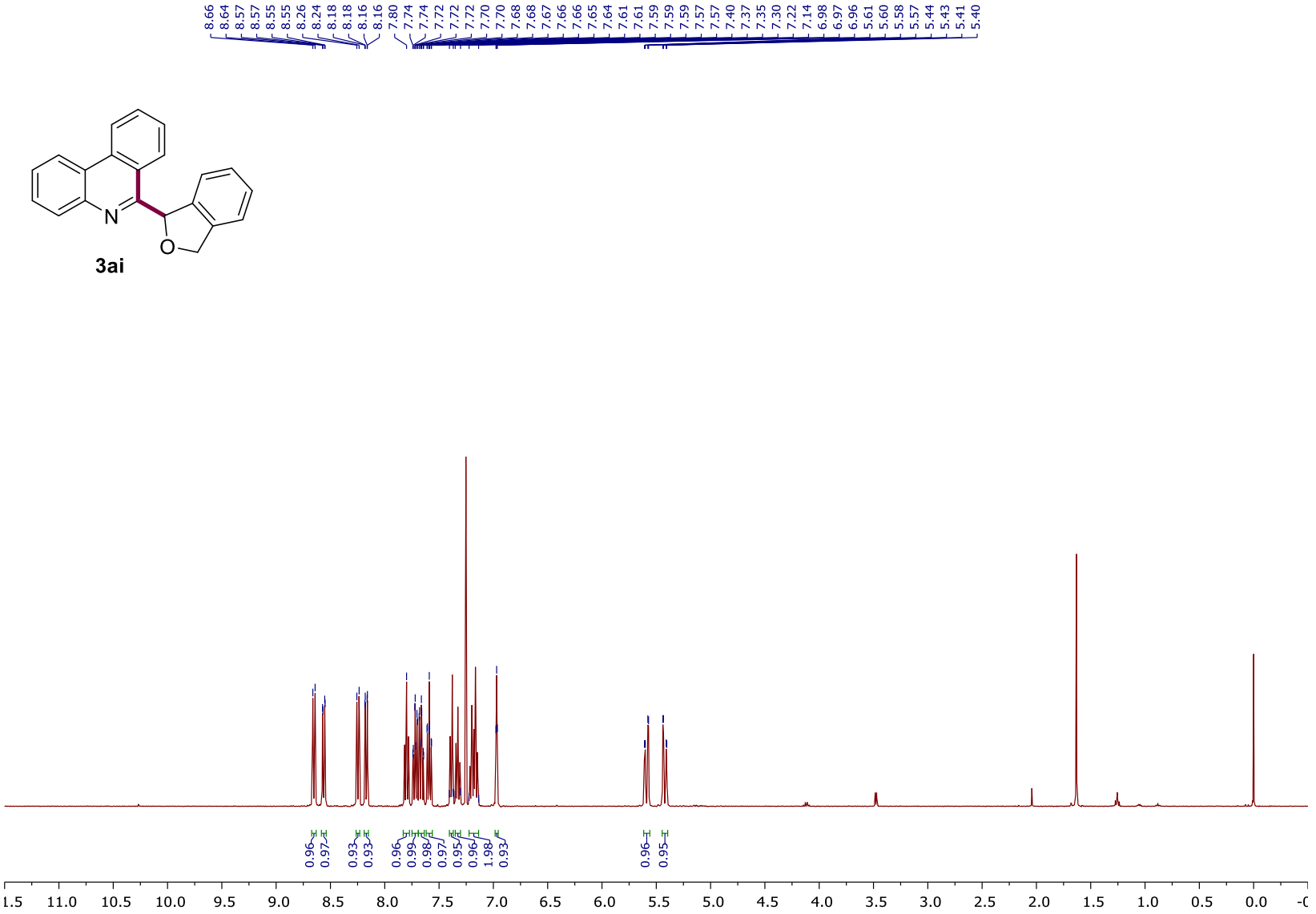
^{1}H-NMR (300 MHz, $CDCl_3$)



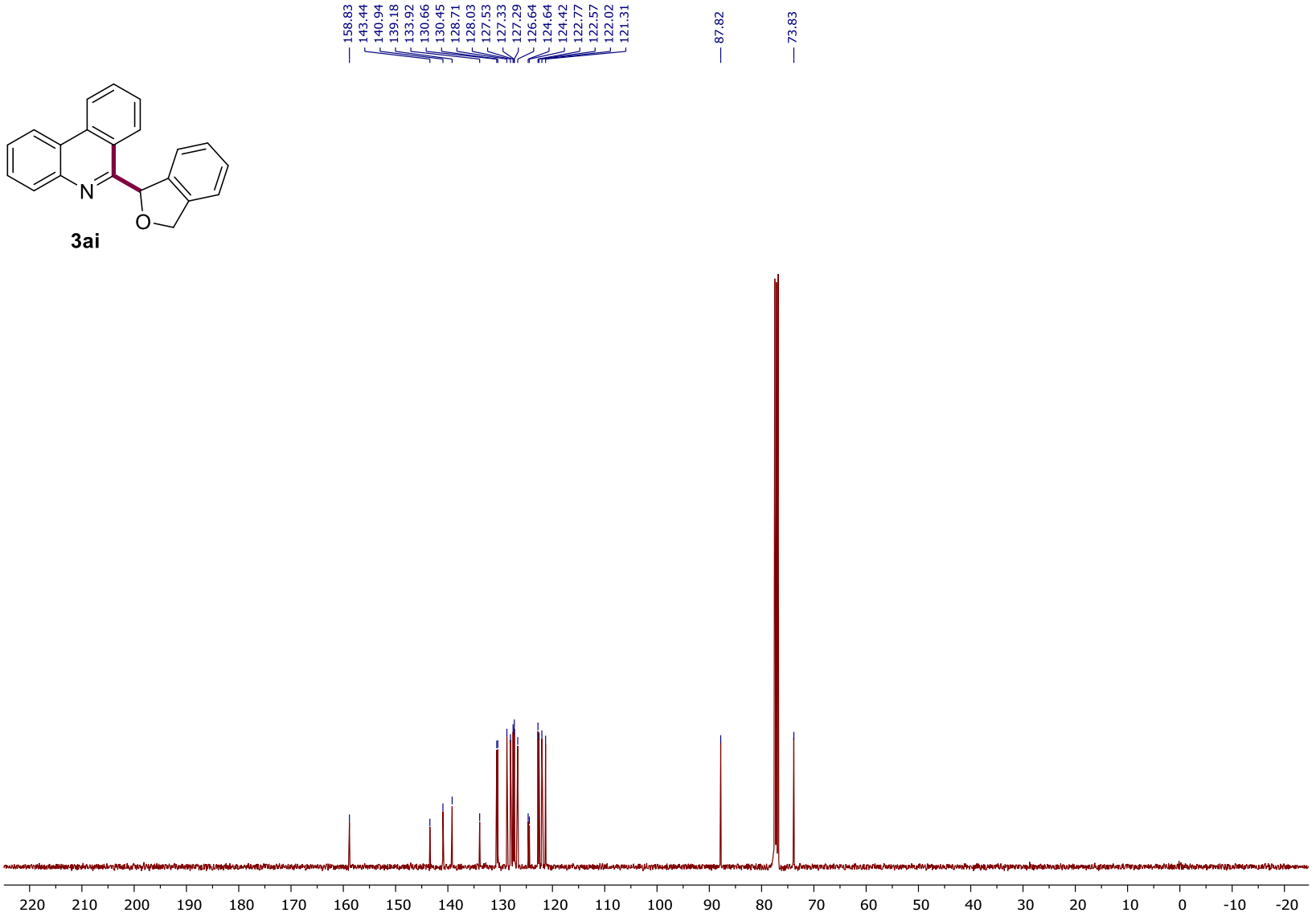
^{13}C-NMR (101 MHz, $CDCl_3$)



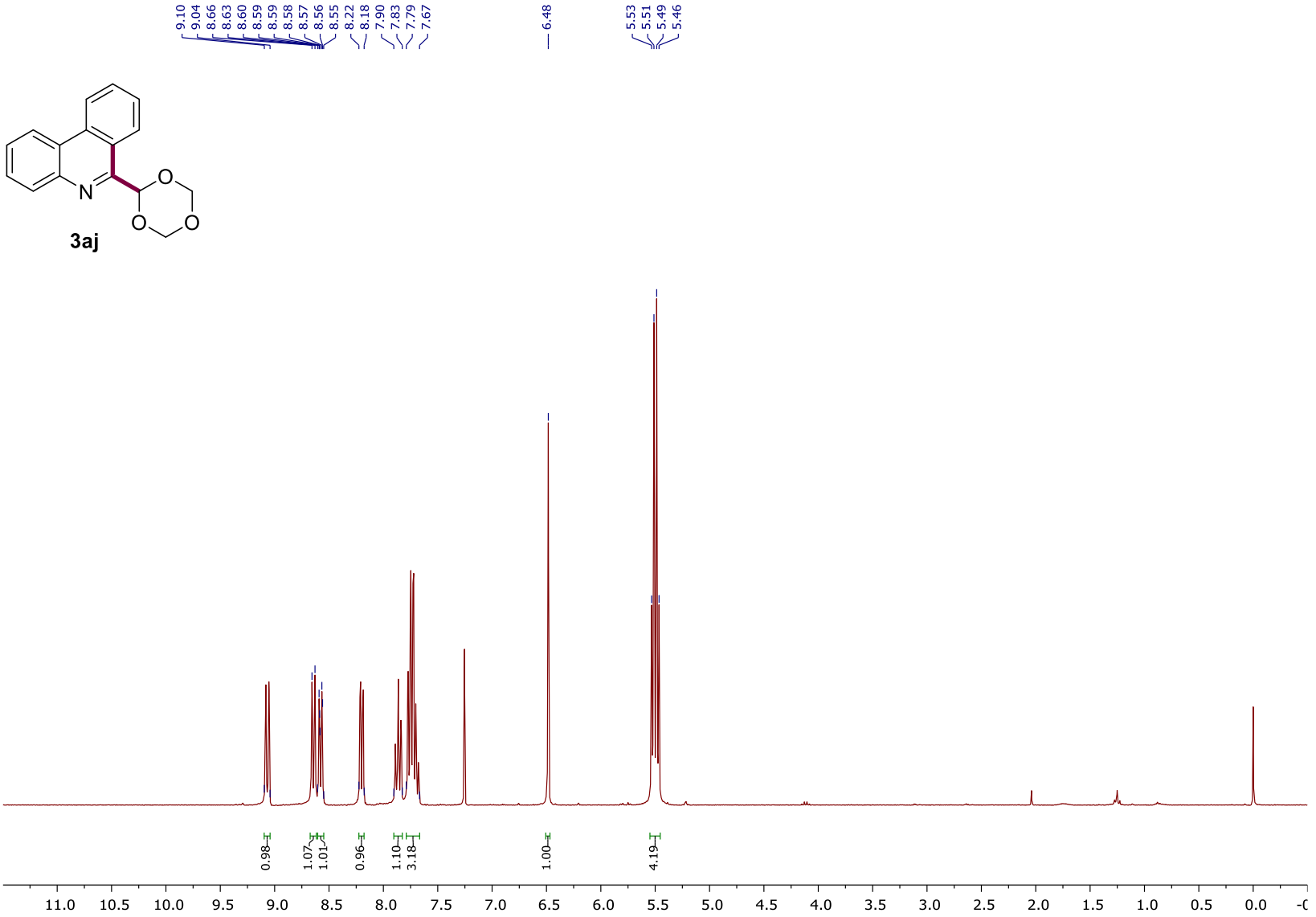
^{1}H-NMR (400 MHz, $CDCl_3$)



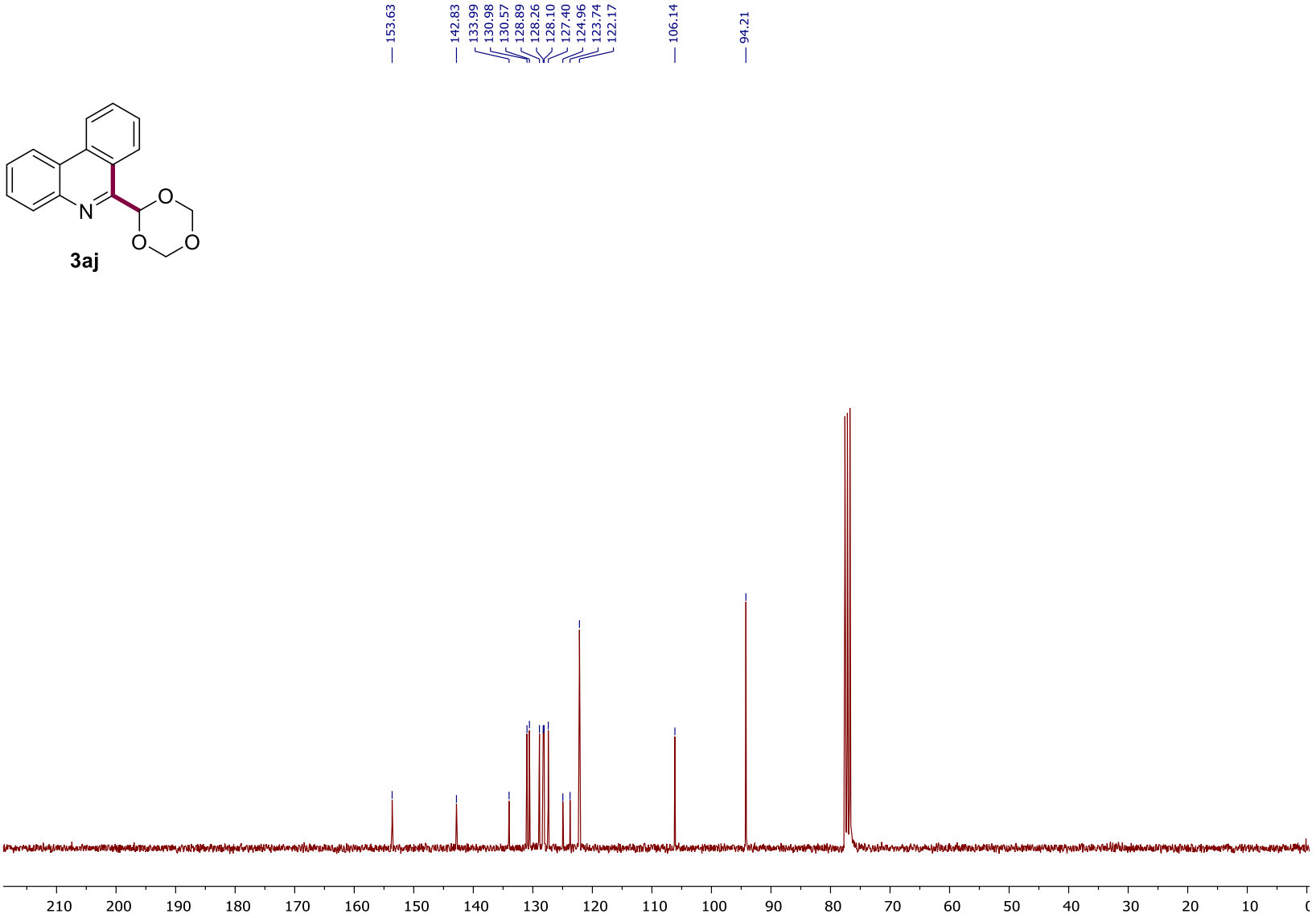
^{13}C-NMR (101 MHz, $CDCl_3$)



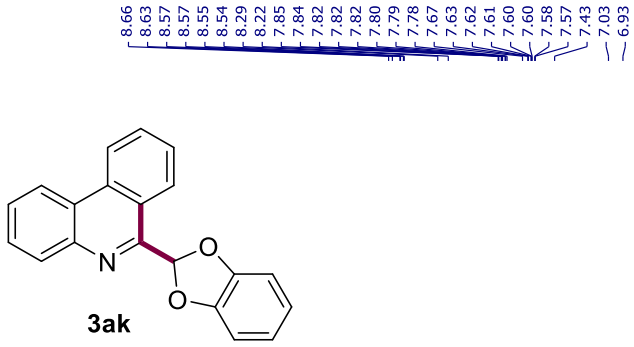
^{1}H-NMR (300 MHz, $CDCl_3$)

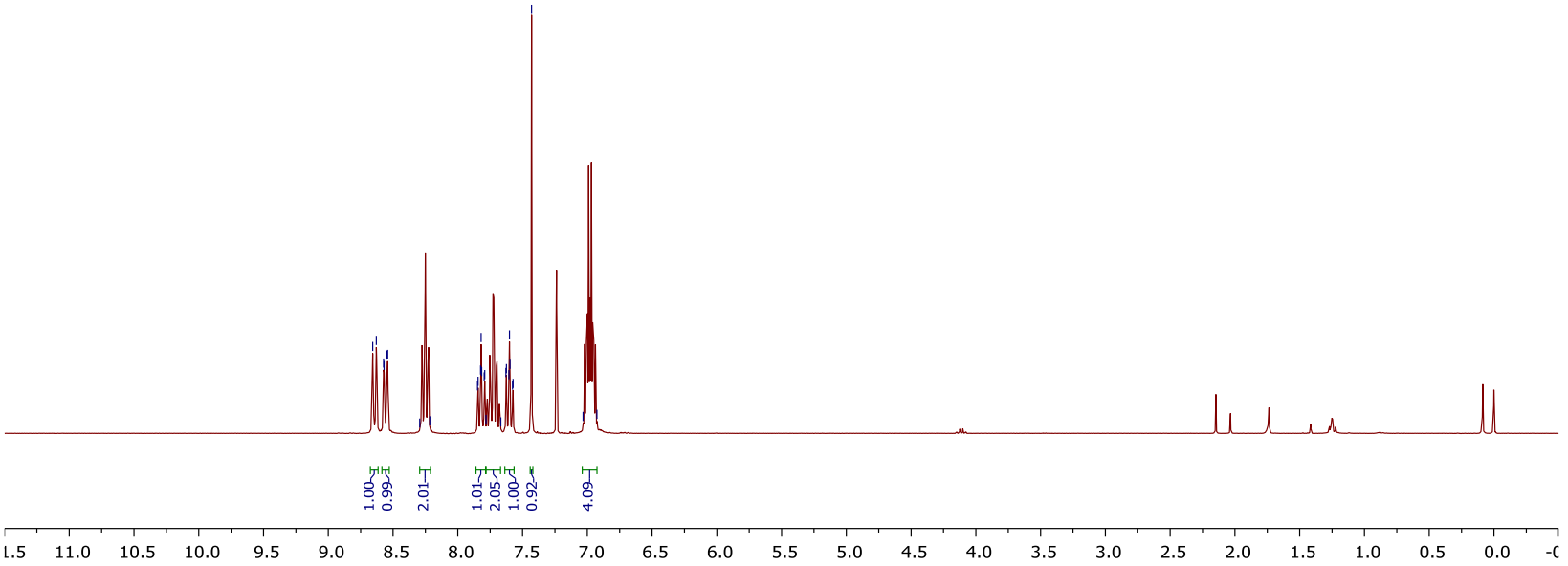


^{13}C-NMR (75 MHz, $CDCl_3$)

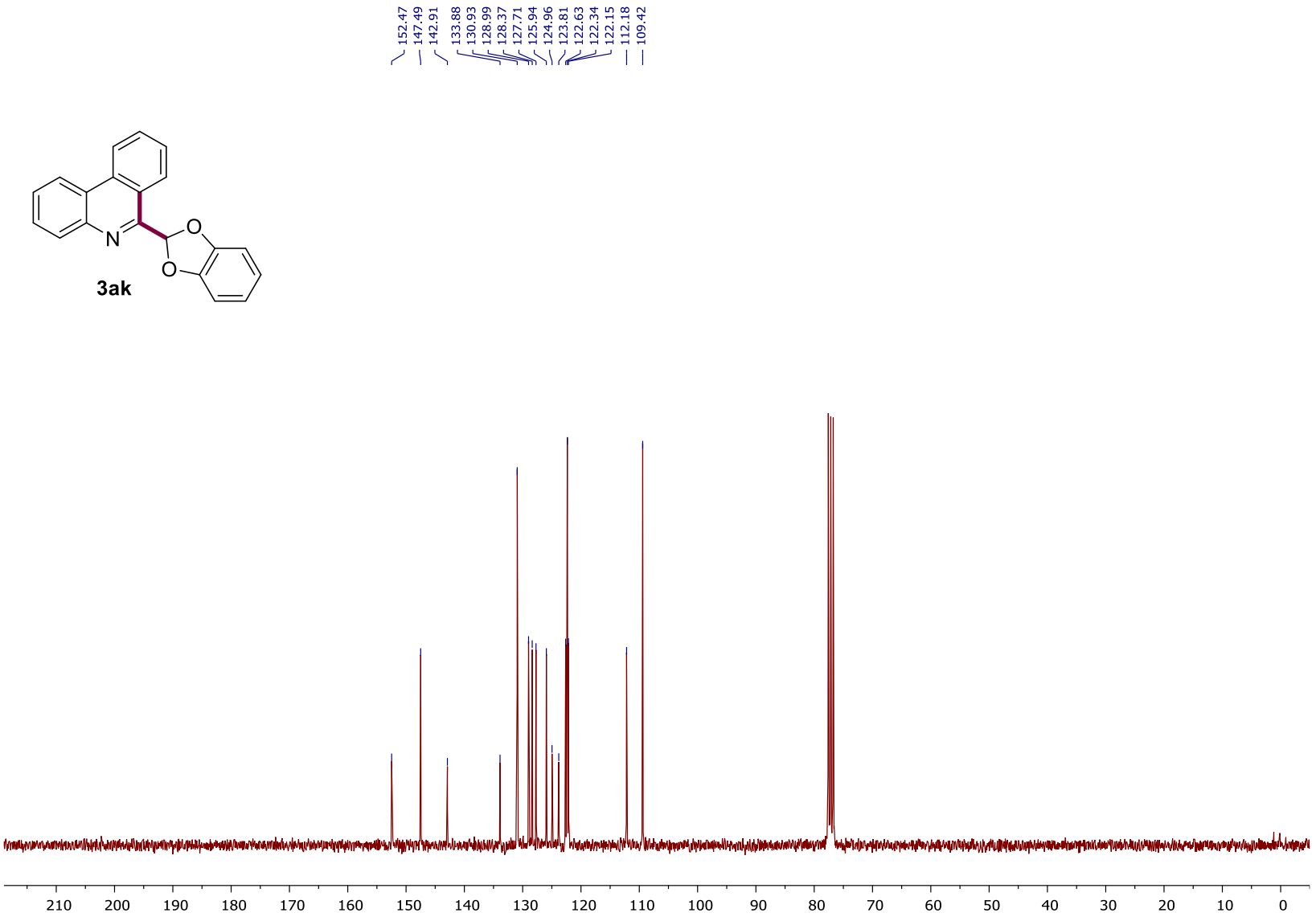


^{1}H-NMR (300 MHz, $CDCl_3$)

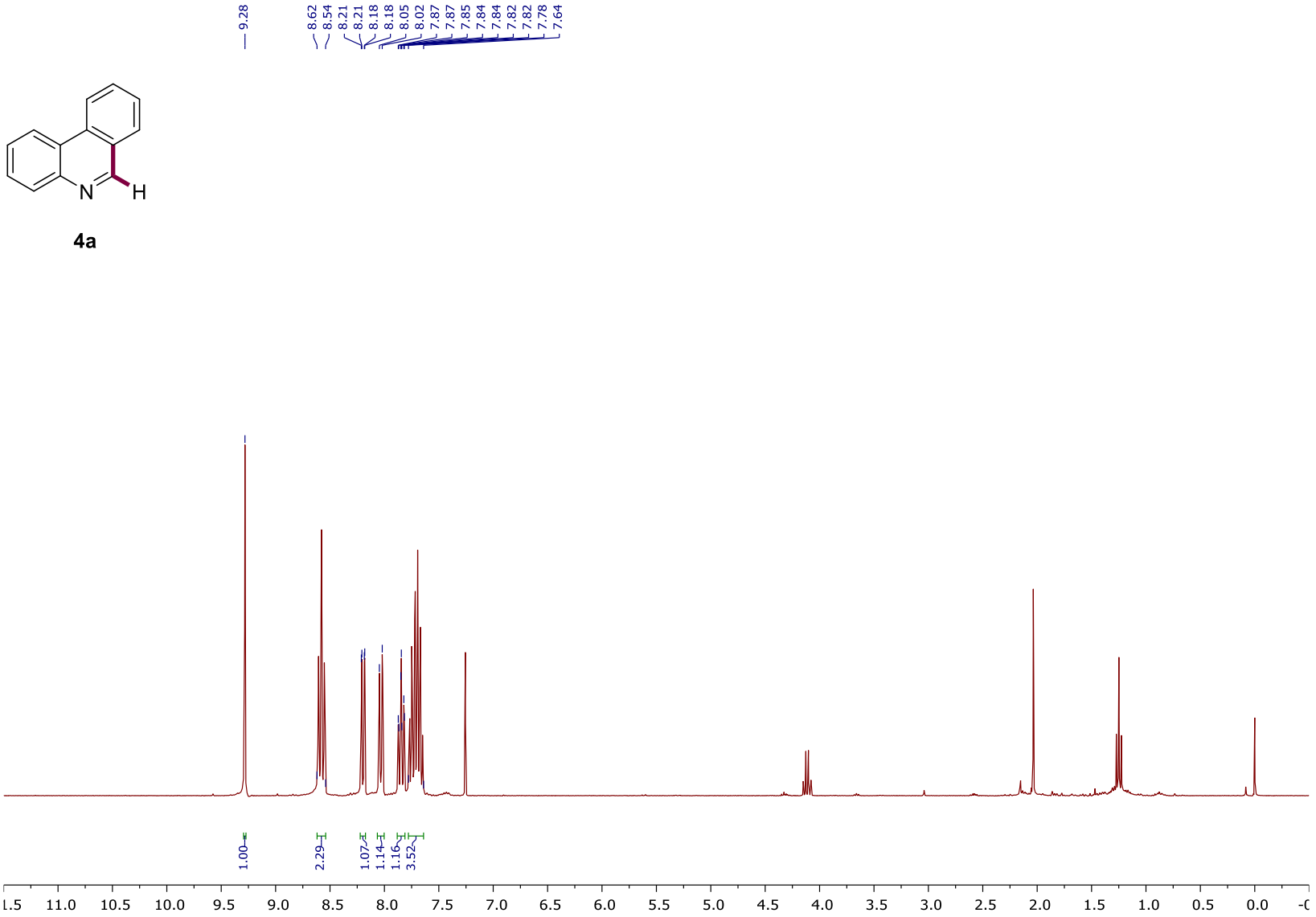




^{13}C-NMR (75 MHz, $CDCl_3$)

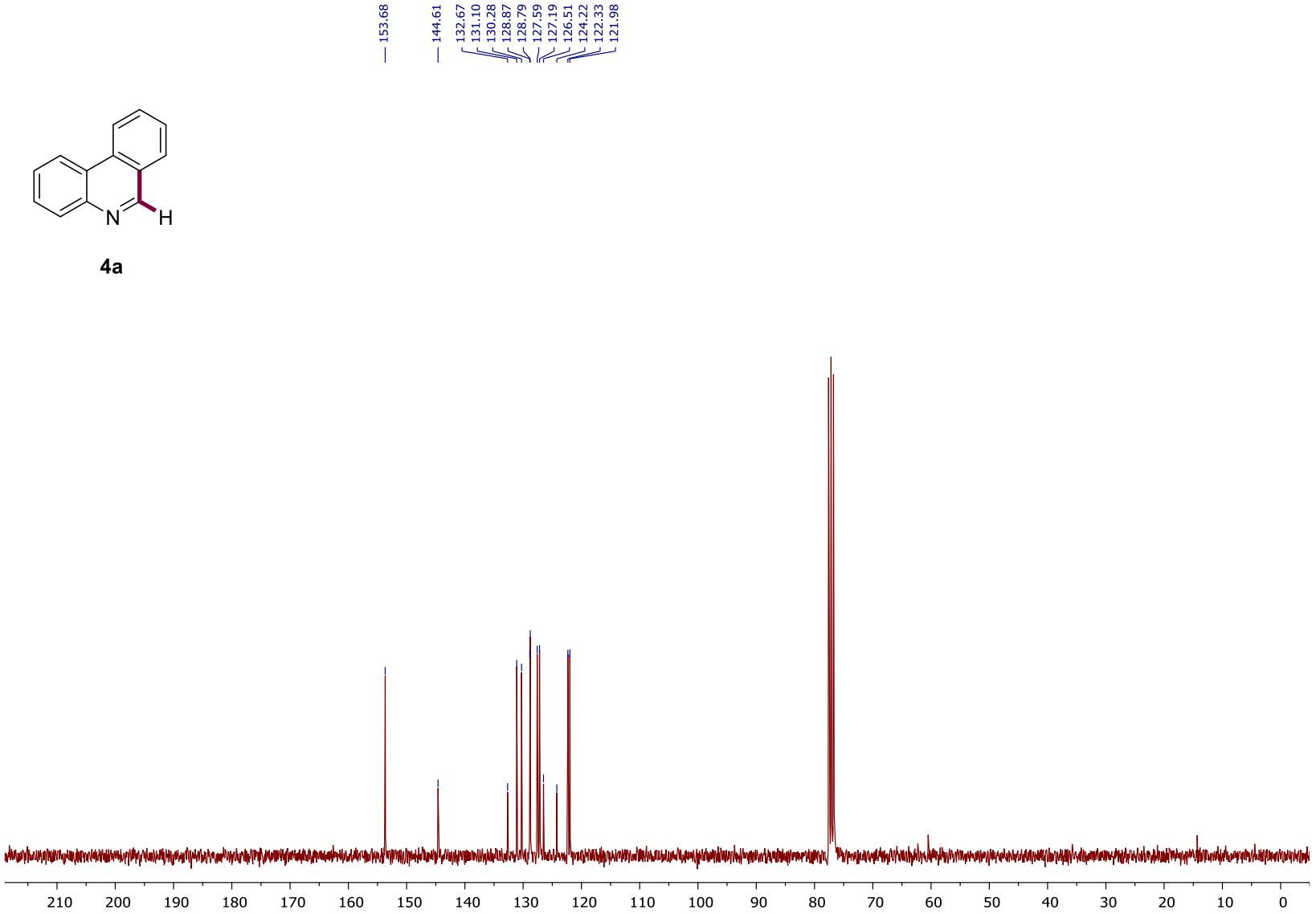


^{1}H-NMR (300 MHz, $CDCl_3$)



4a

^{13}C-NMR (75 MHz, $CDCl_3$)



4a