

Synthesis of Fused Imidazo[1,2-*a*]pyridines Derivatives through Cascade C(sp²)-H Functionalizations

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I. General Experimental Information

Reagents and solvents were purchased from commercial suppliers and used without further purification. Melting points were recorded with a micro melting point apparatus and uncorrected. The ^1H NMR spectra were recorded at 400 MHz or 600 MHz. The ^{13}C NMR spectra were recorded at 100 MHz or 150 MHz. The ^{19}F NMR spectra were recorded at 376 MHz or 565 MHz. Chemical shifts were expressed in parts per million (δ), and were reported as s (singlet), d (doublet), t (triplet), q (quartet), dd (doublet of doublet), m (multiplet), etc. The coupling constants J were given in Hz. High resolution mass spectra (HRMS) were obtained *via* ESI mode by using a MicrOTOF mass spectrometer. The conversion of starting materials was monitored by thin layer chromatography (TLC) using silica gel plates (silica gel 60 F254 0.25 mm), and components were visualized by observation under UV light (254 and 365 nm).

I. Mechanistic Investigations

1. Deuterium labeling experiments

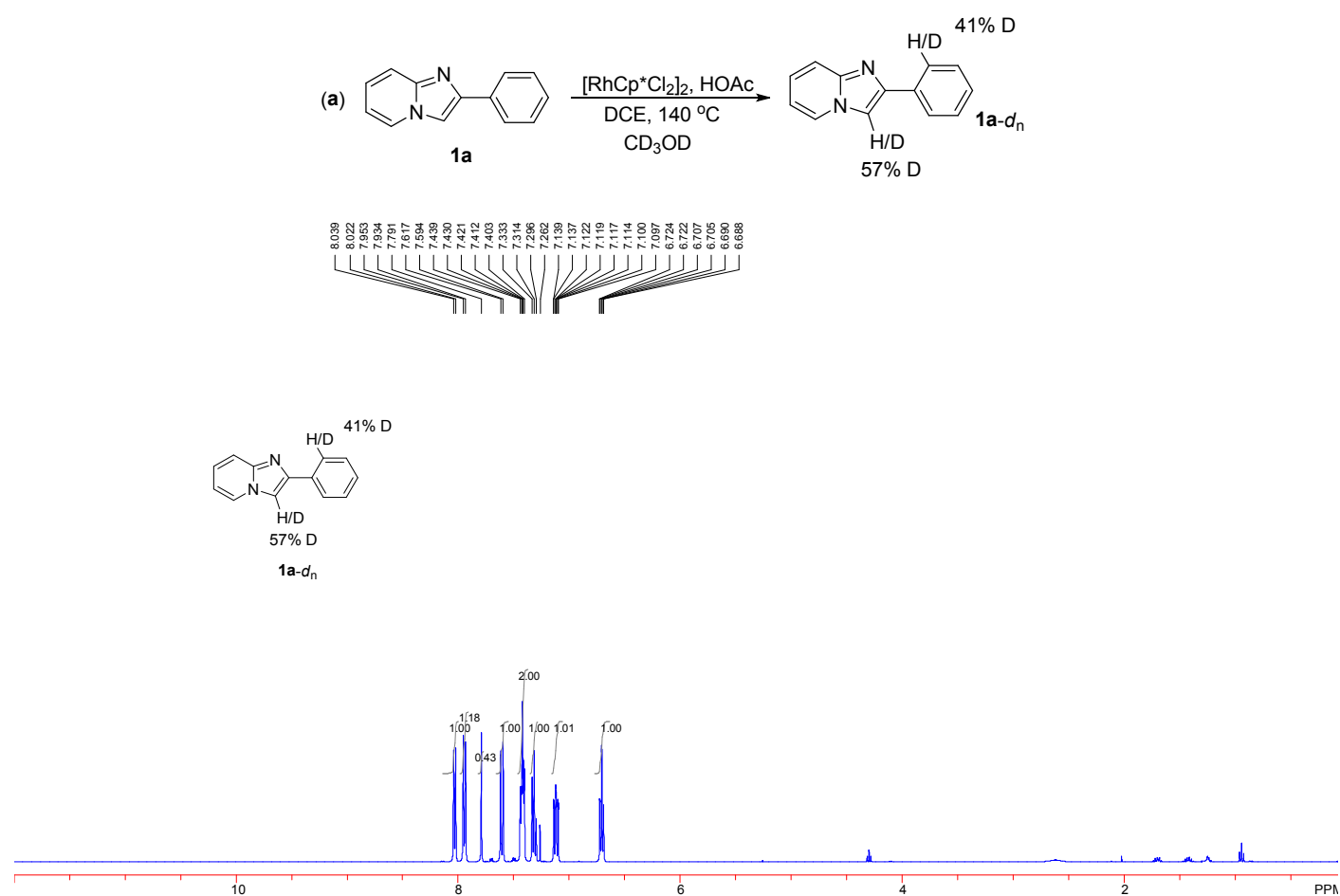


Figure S1. Copies of ^1H NMR spectra of the reaction mixture to **1a-d_n**

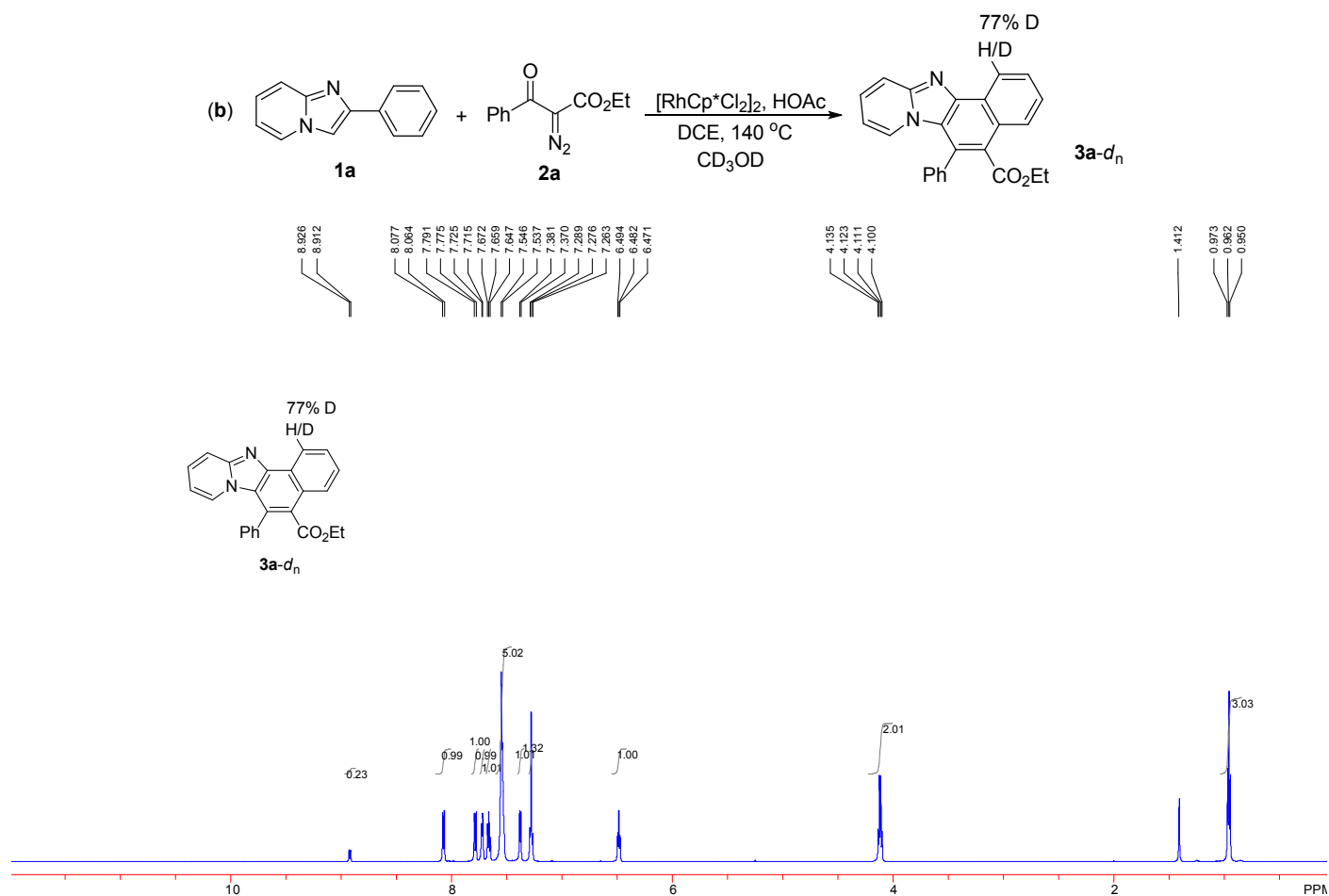


Figure S2. Copies of ^1H NMR spectra of the reaction mixture to **3a-d_n**

2. Kinetic Isotope Effect (KIE) Study

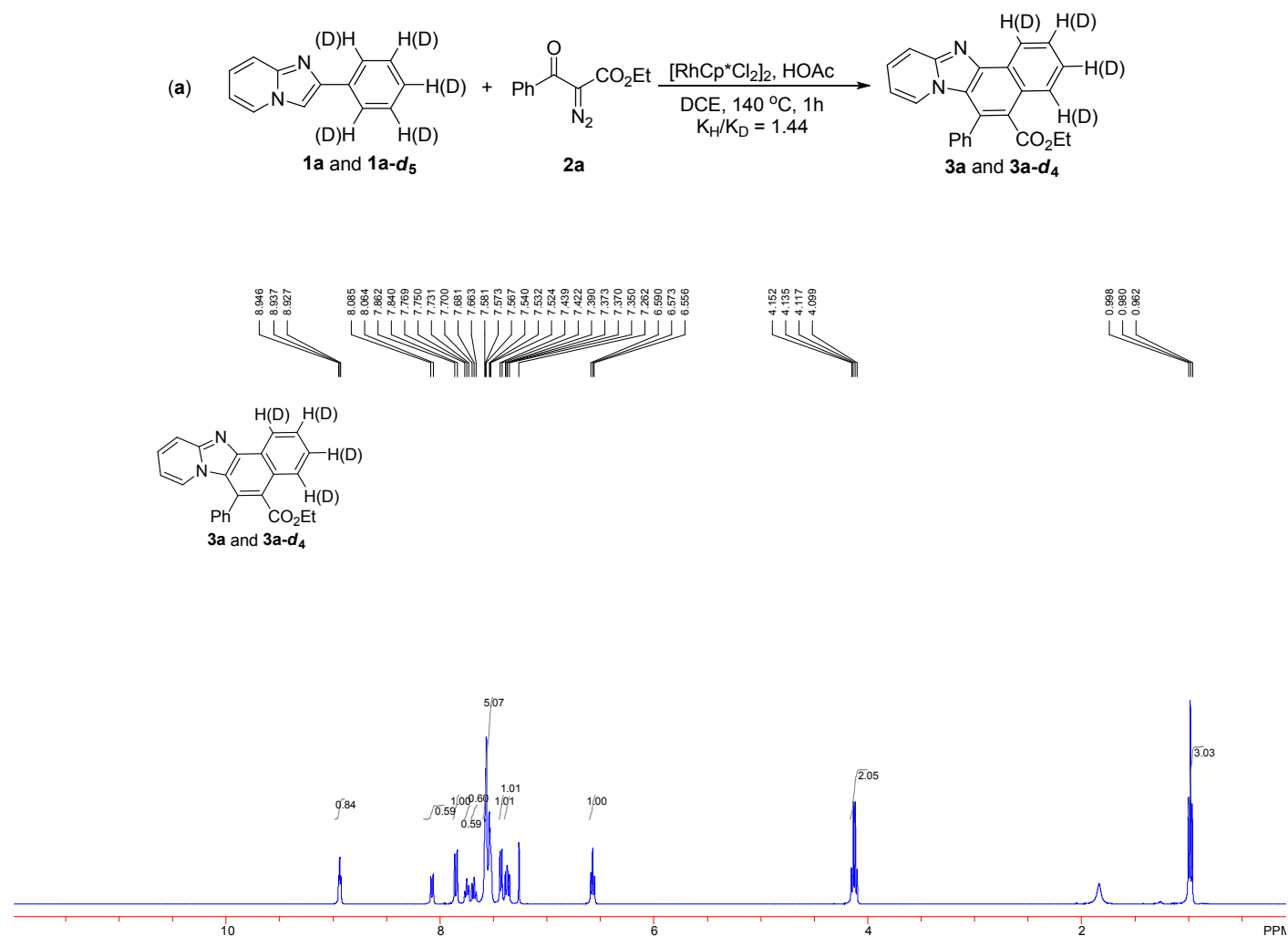


Figure S3. Copies of ¹H NMR spectra of the reaction mixture to **3a** and **3a-d_n**

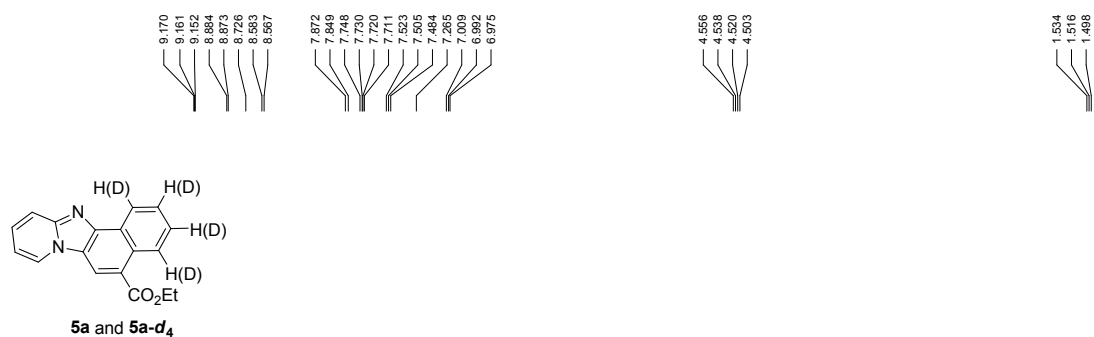
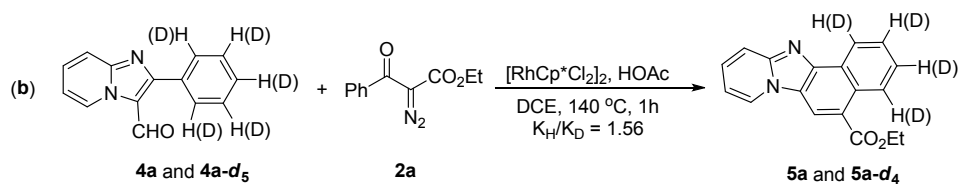


Figure S4. Copies of ¹H NMR spectra of the reaction mixture to **5a** and **5a-d_n**

3. Copies of GC-MS spectra of the reaction mixture to 5a

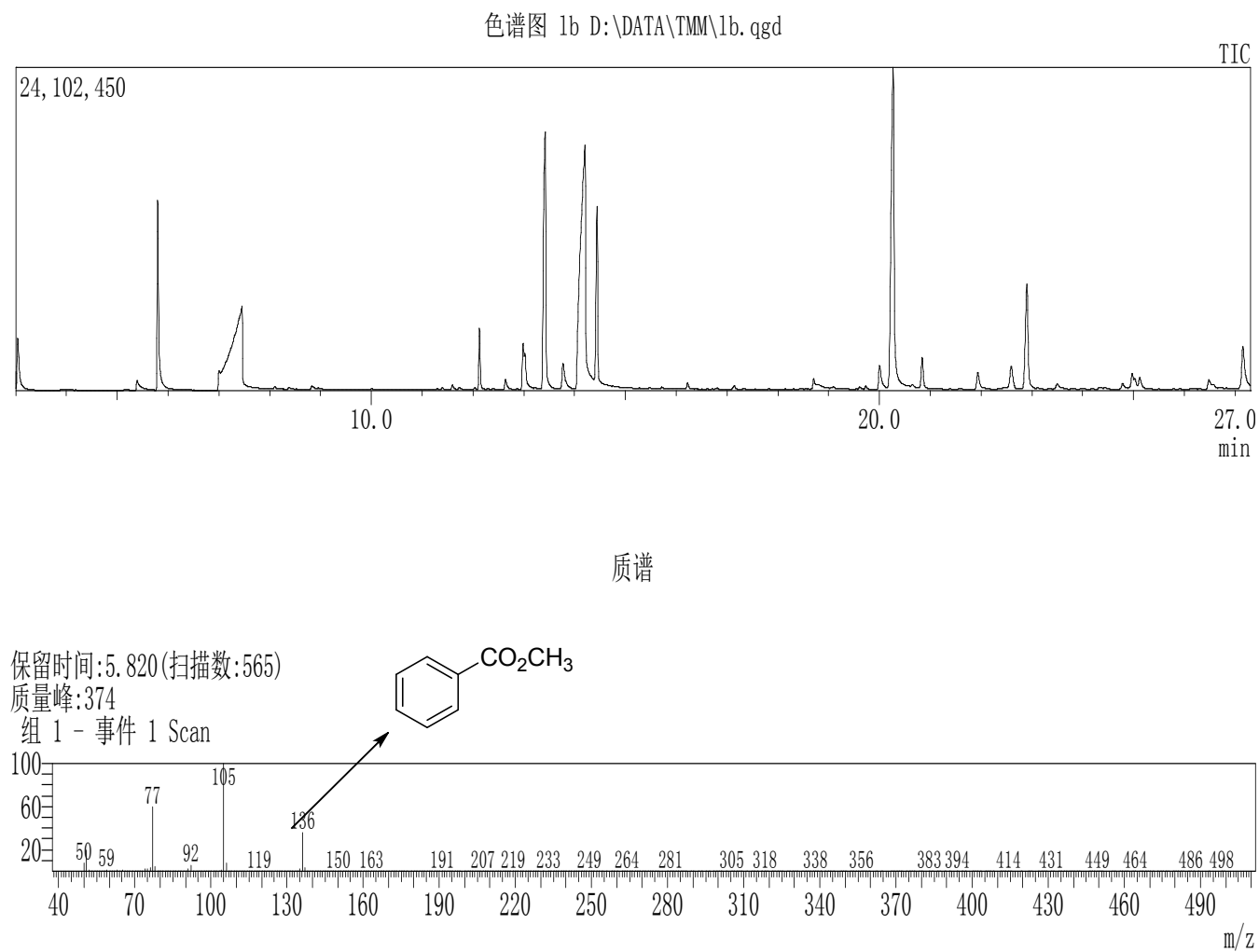
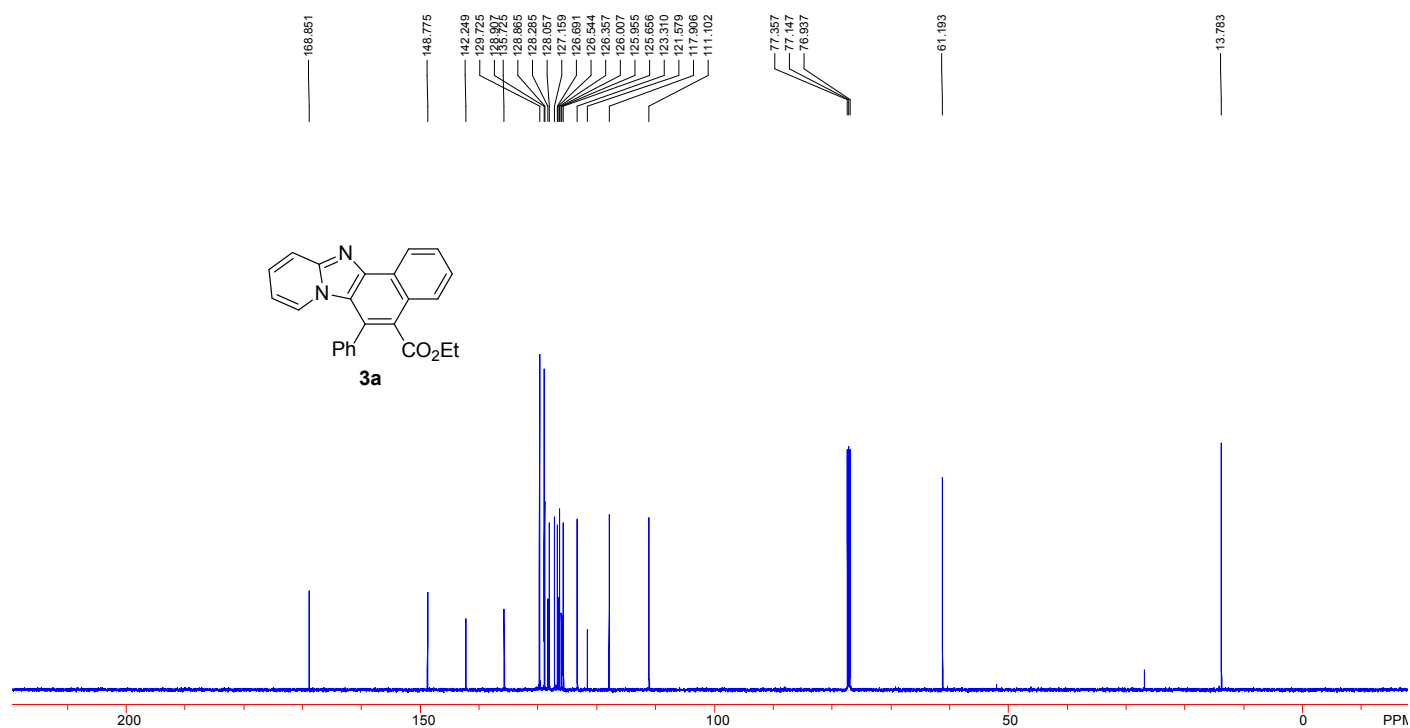
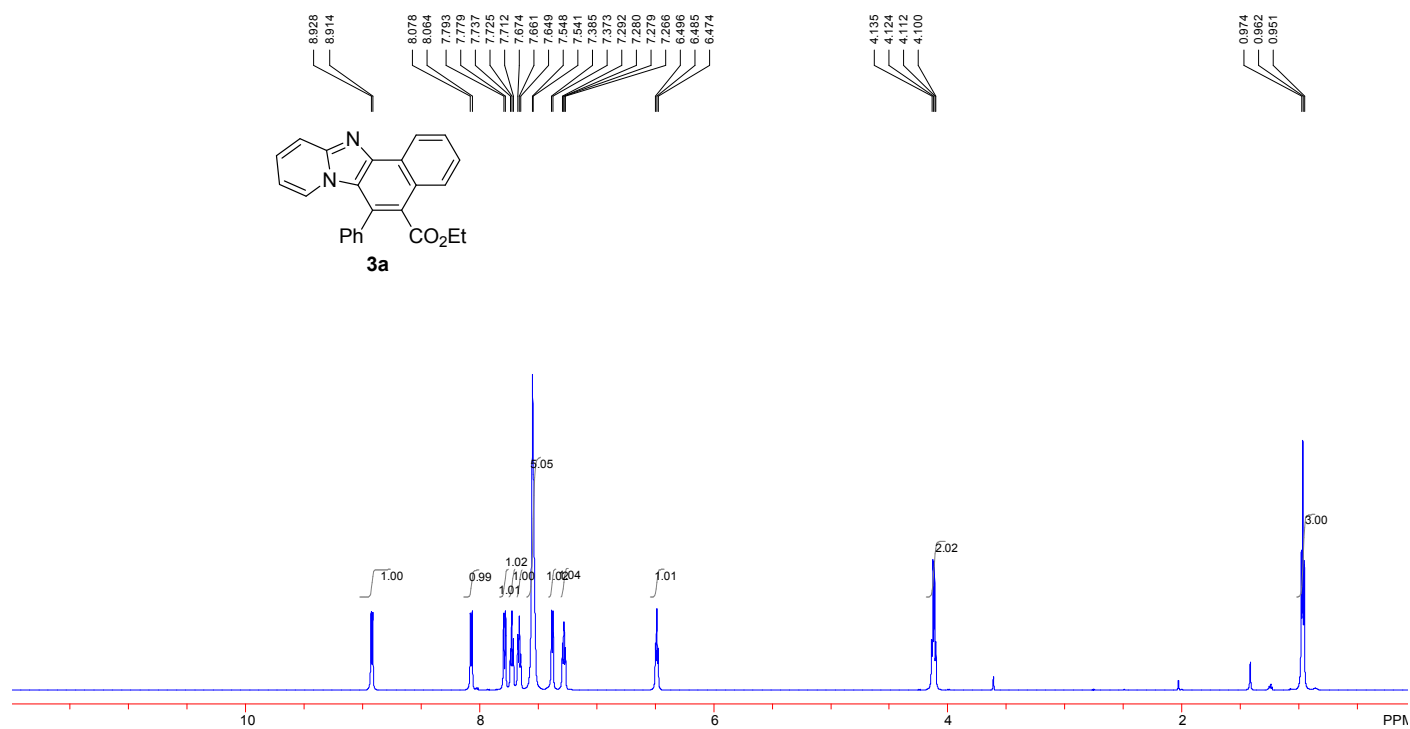
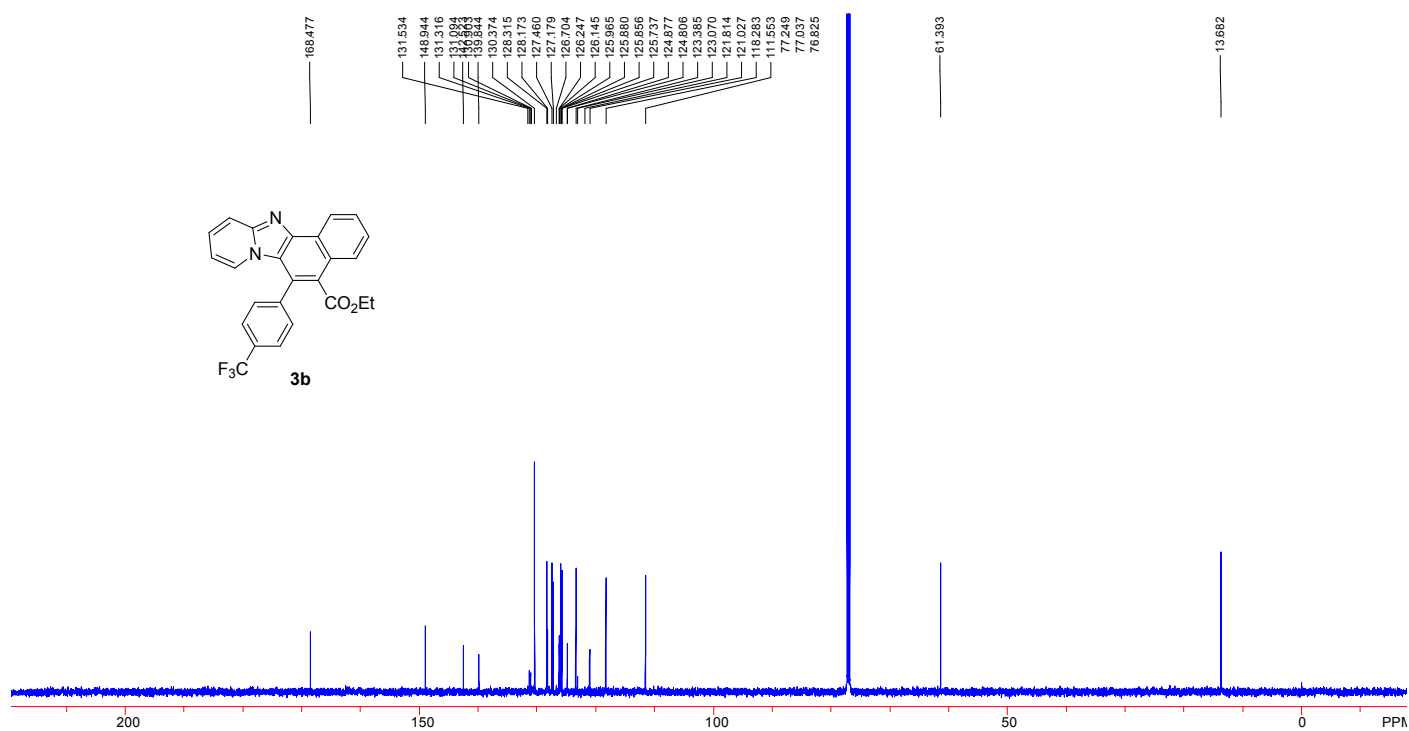
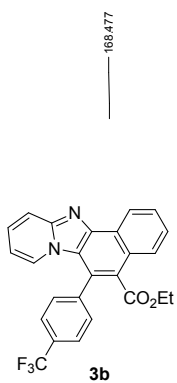
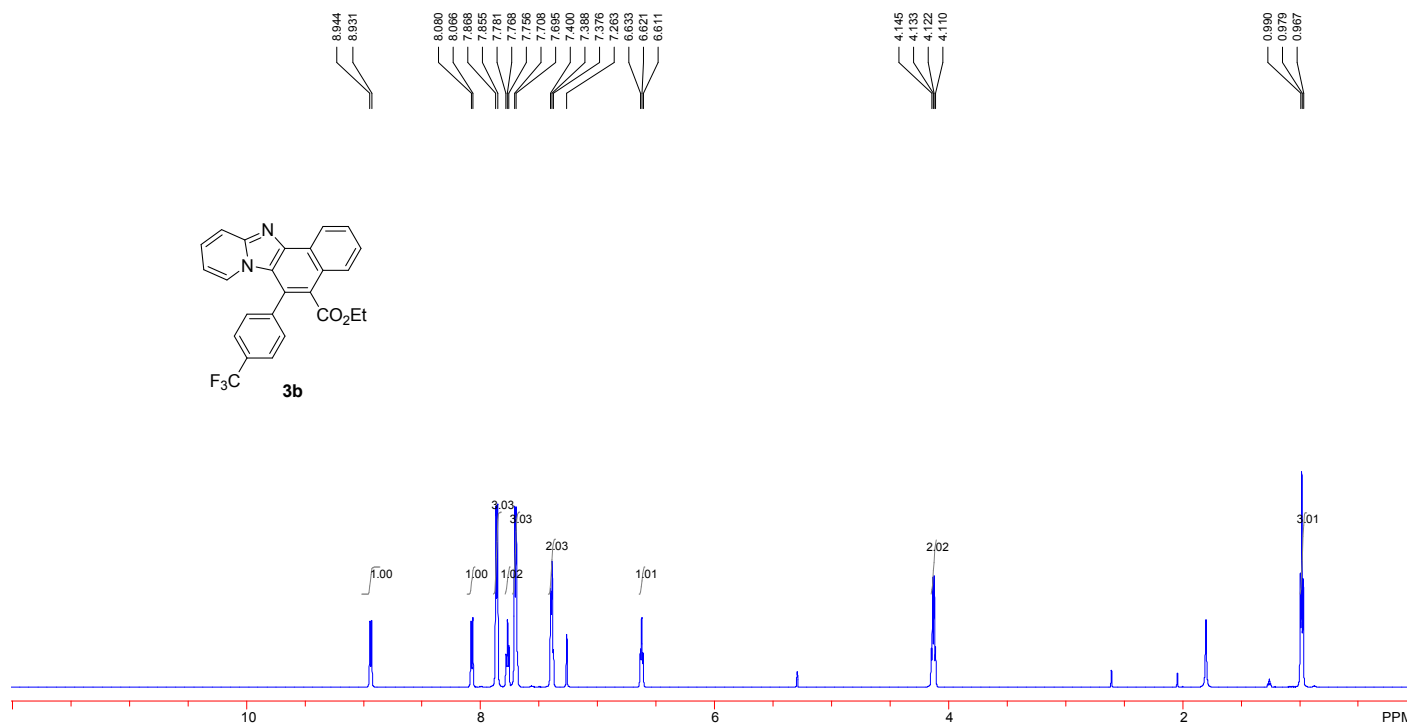
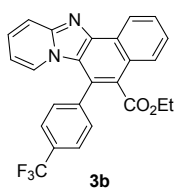
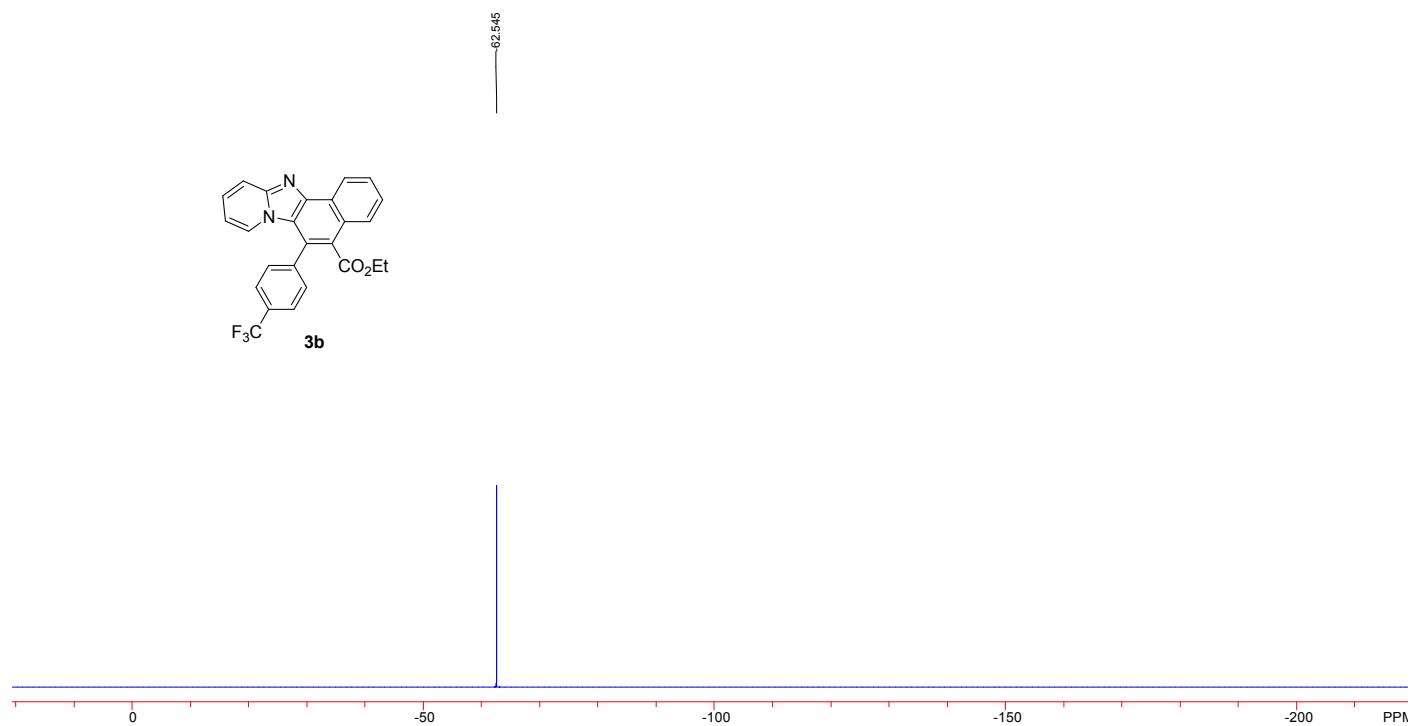
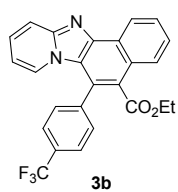


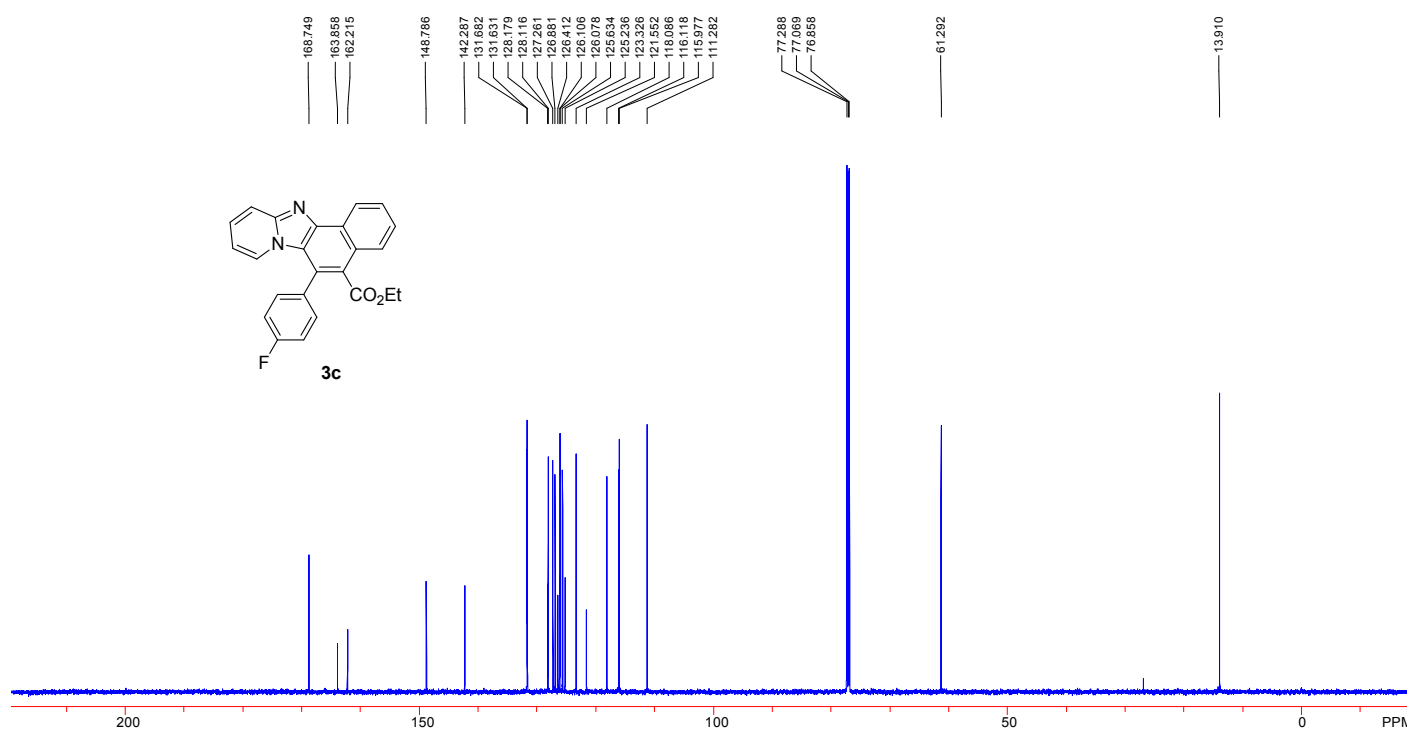
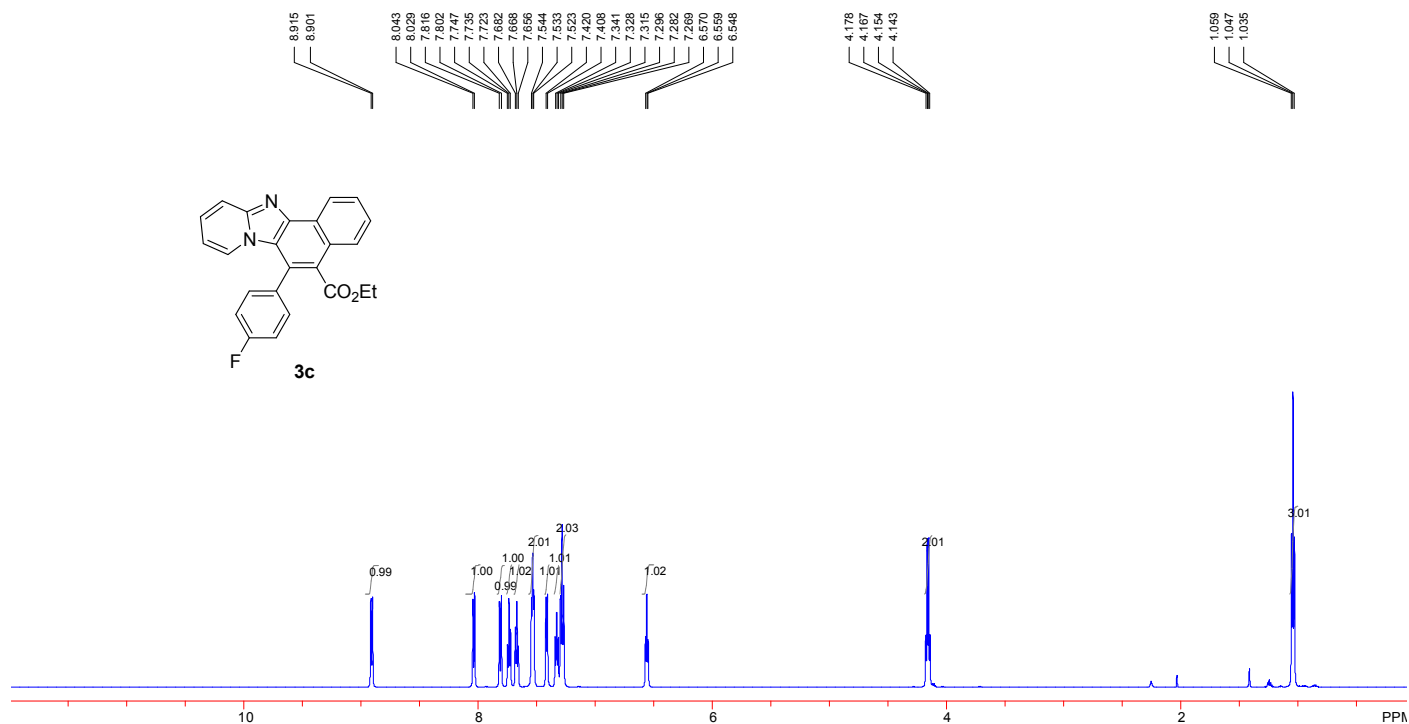
Figure S5. Copies of GC-MS spectra of the reaction mixture to **5a**

II. Copies of ^1H , ^{13}C and ^{19}F NMR spectra of 3a-3ee

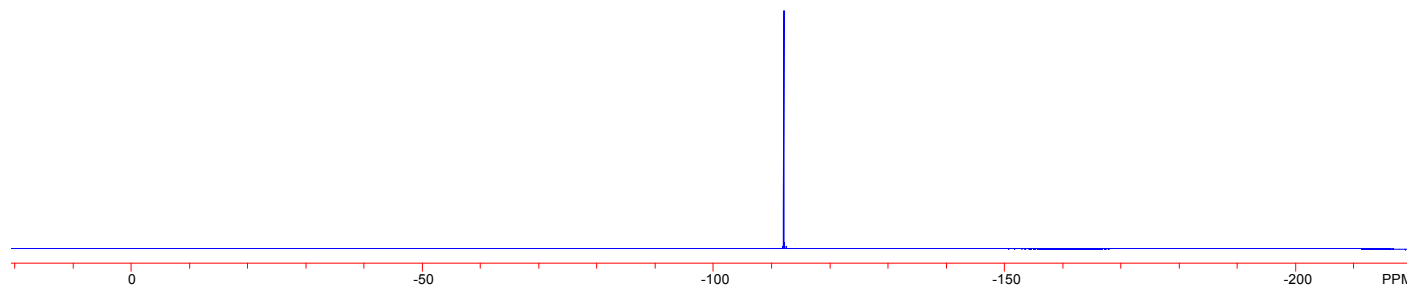
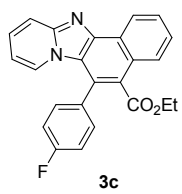


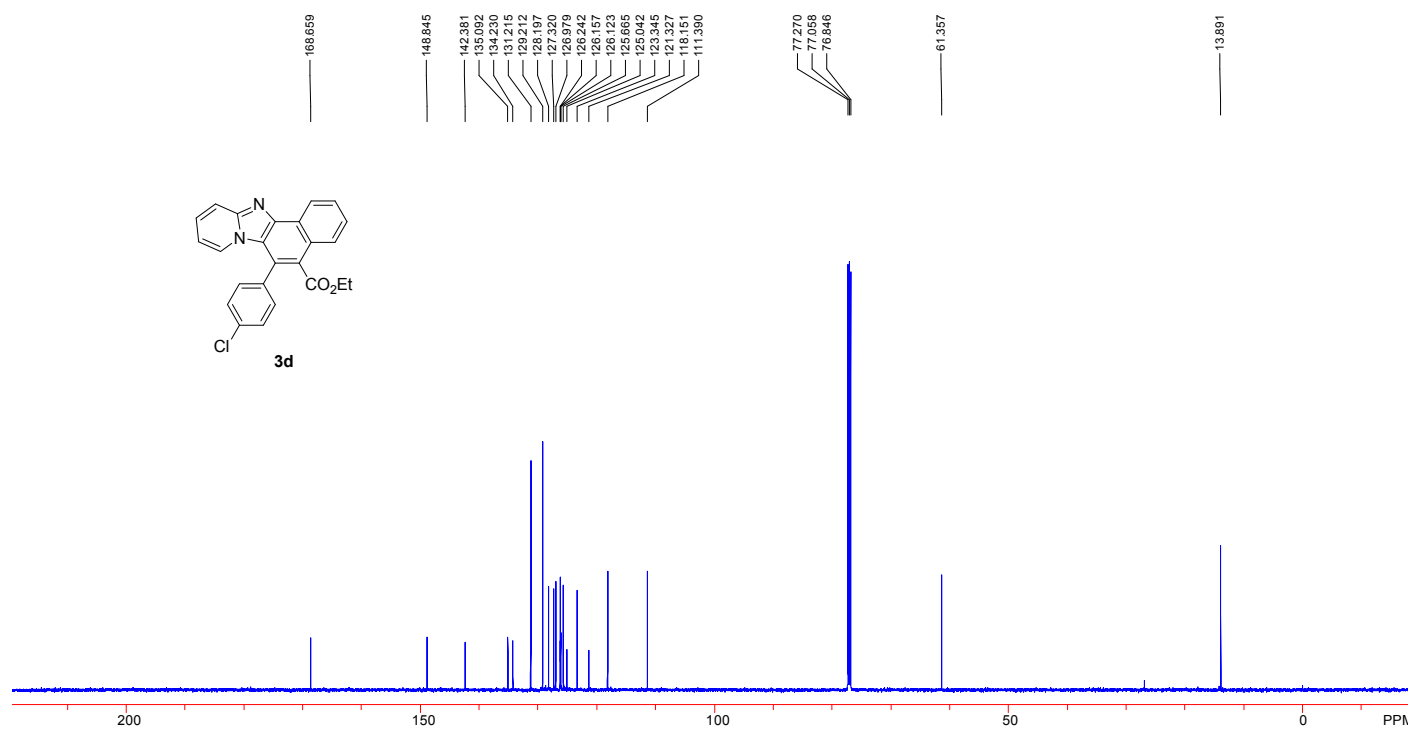
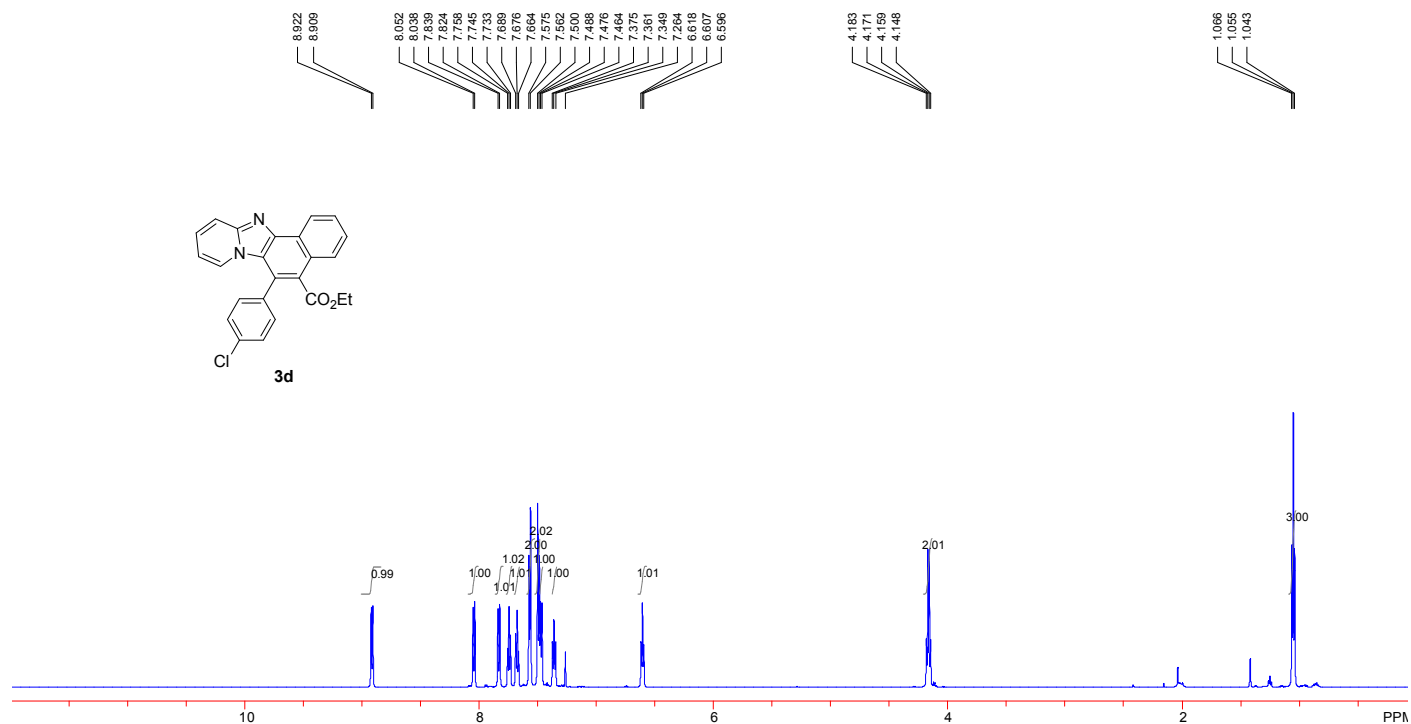


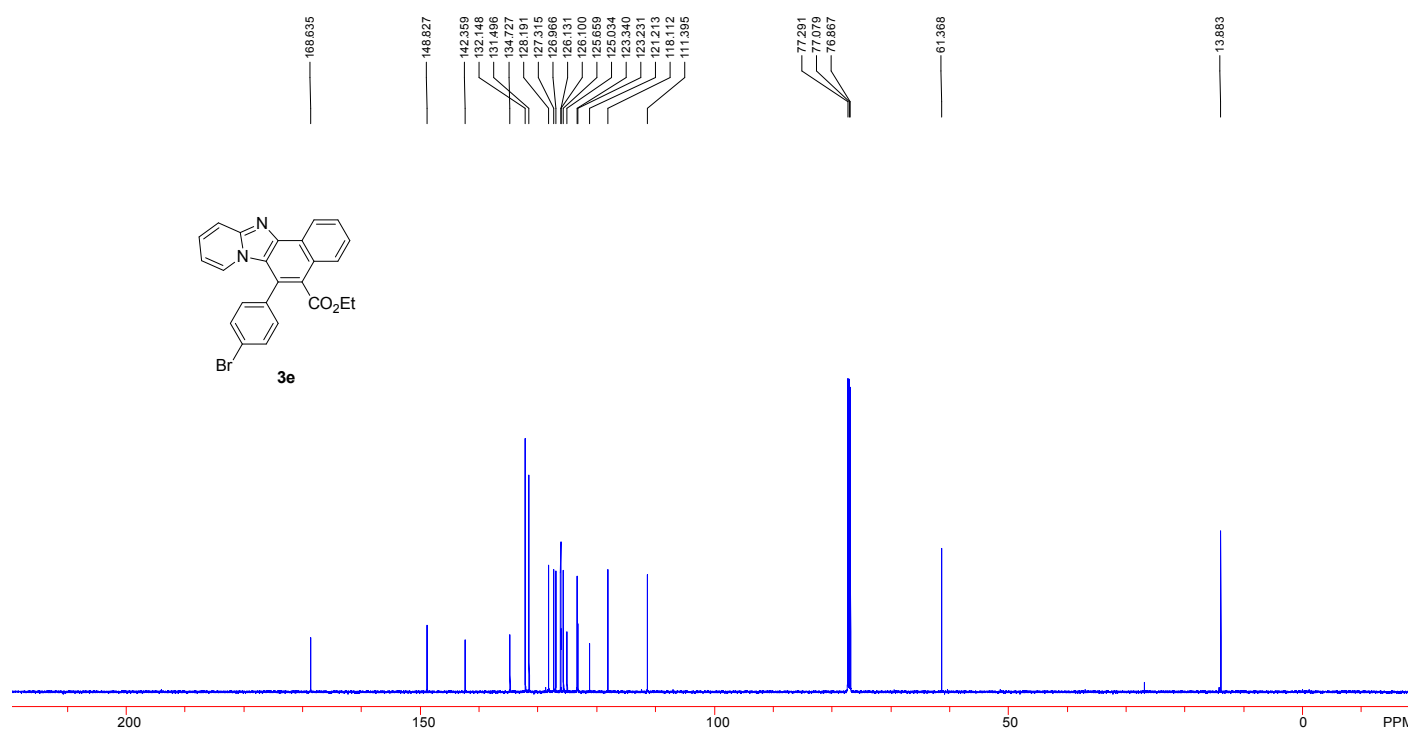
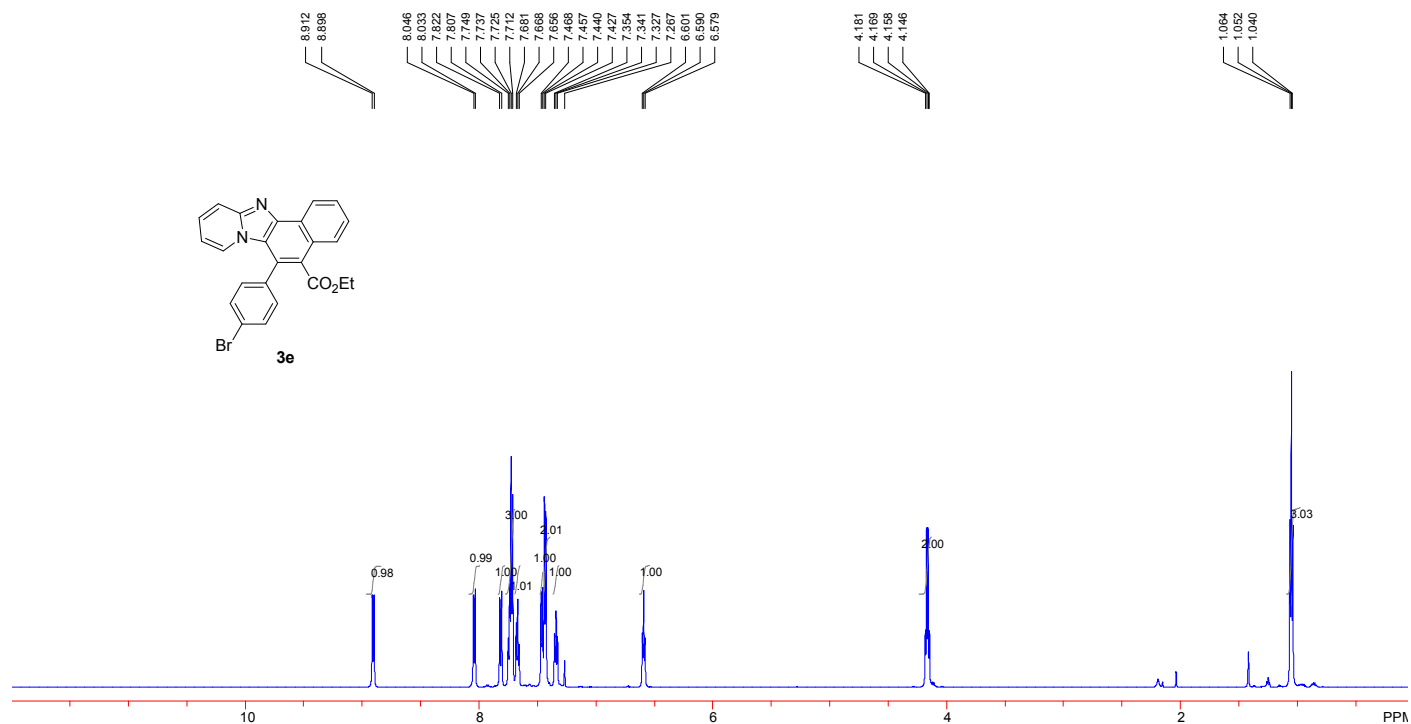


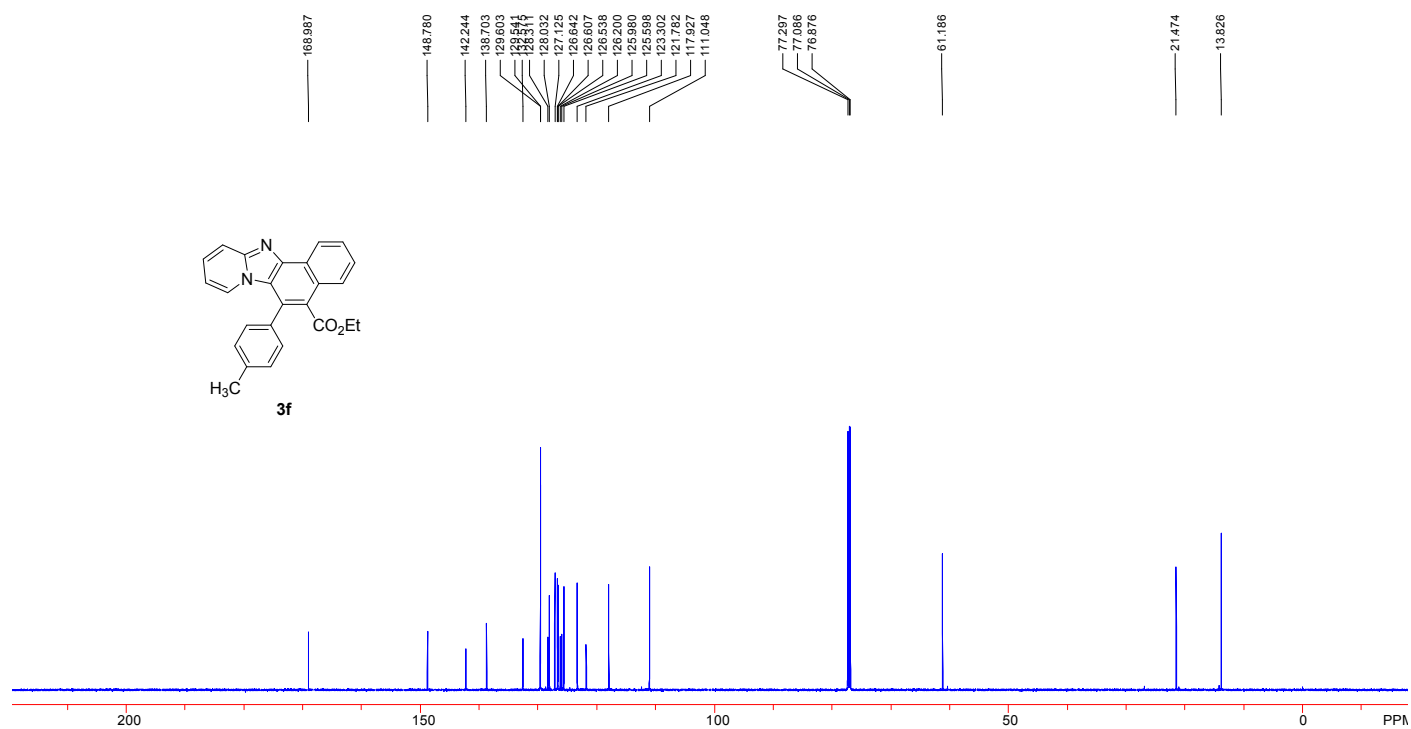
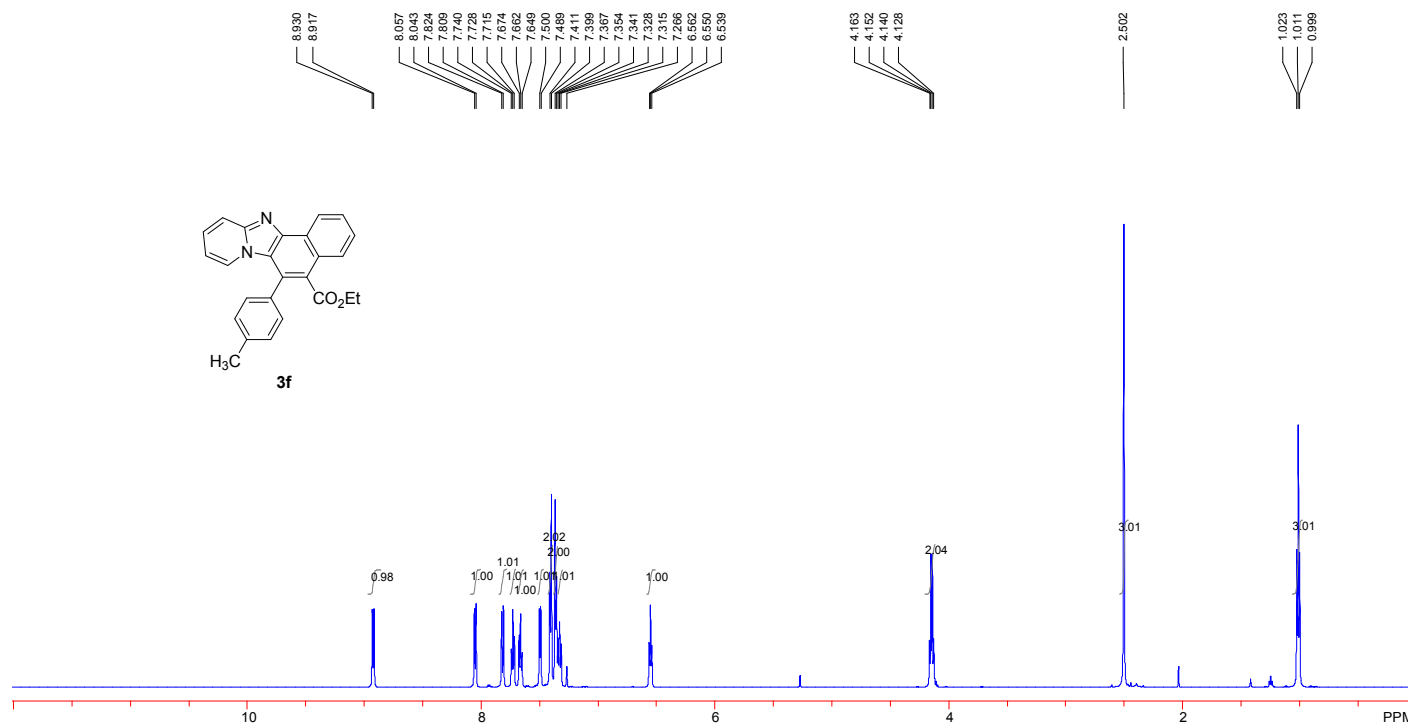


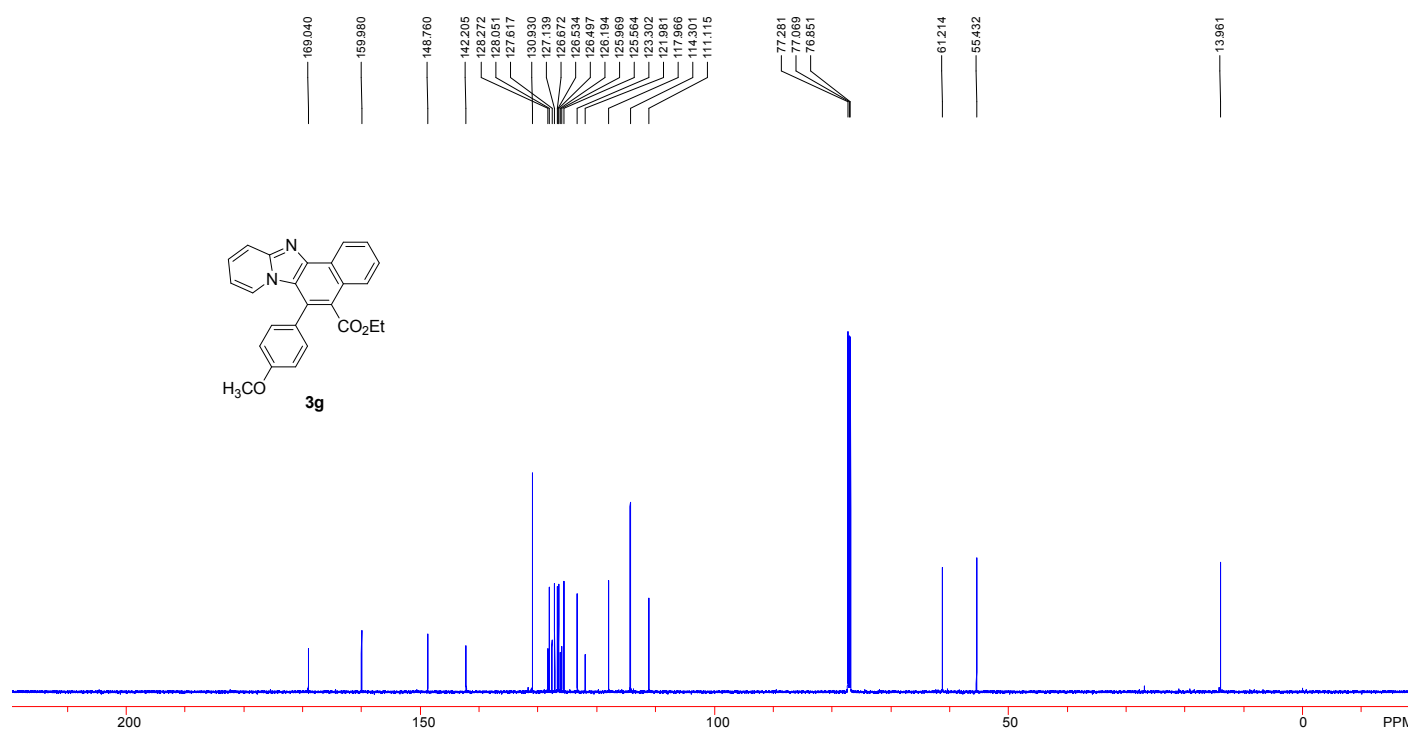
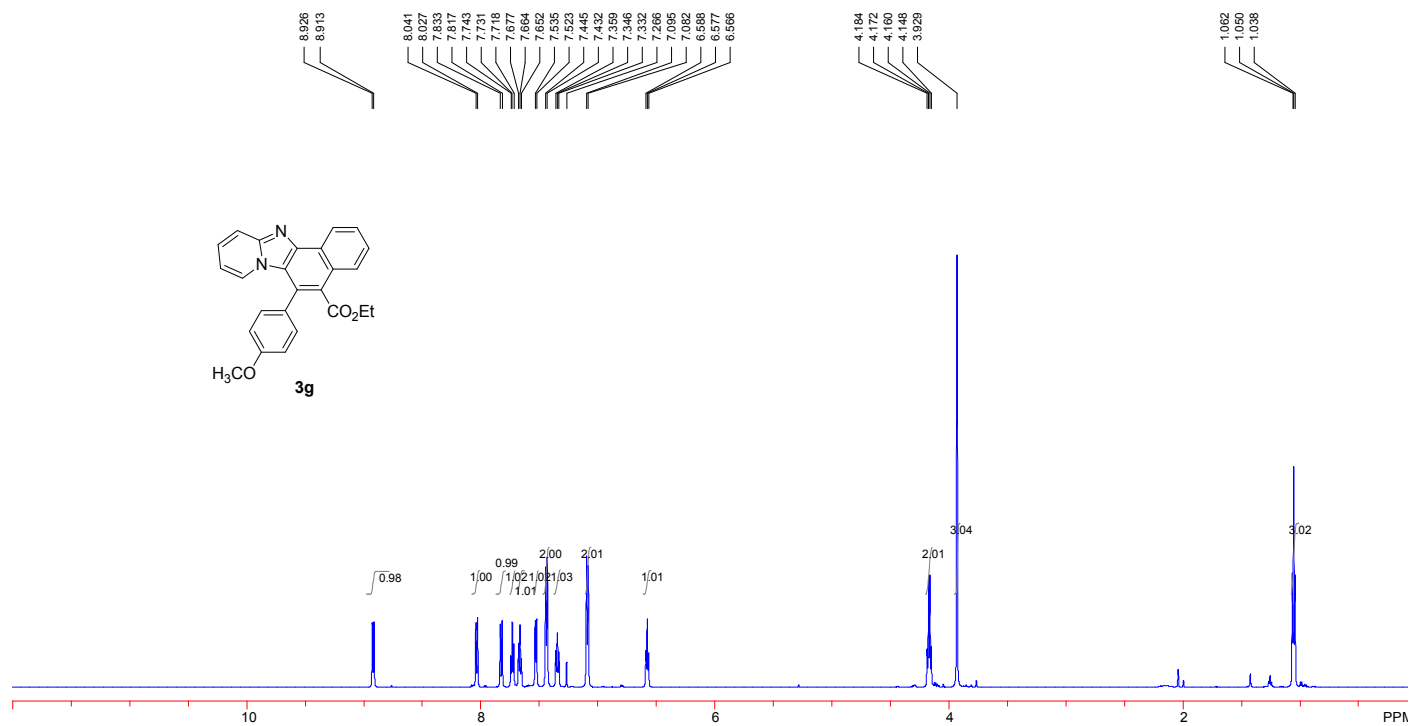
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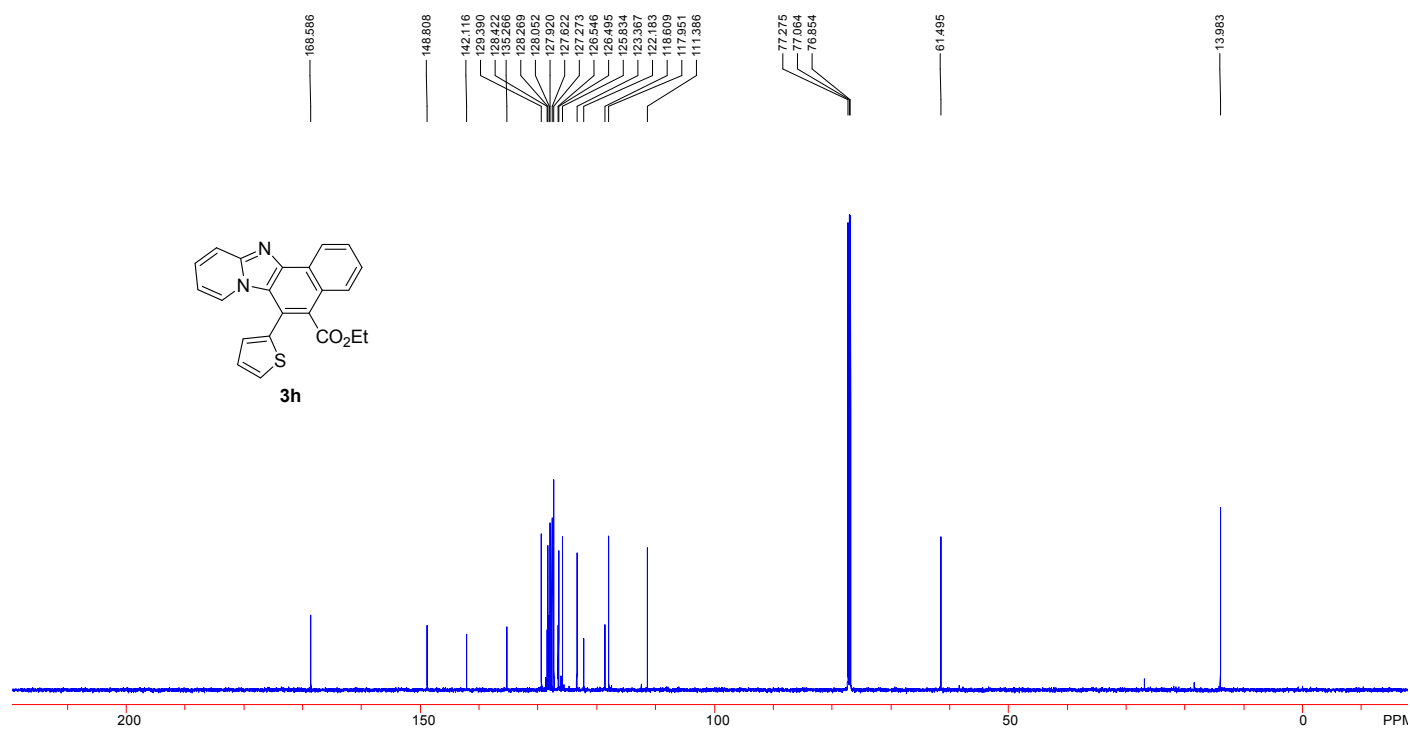
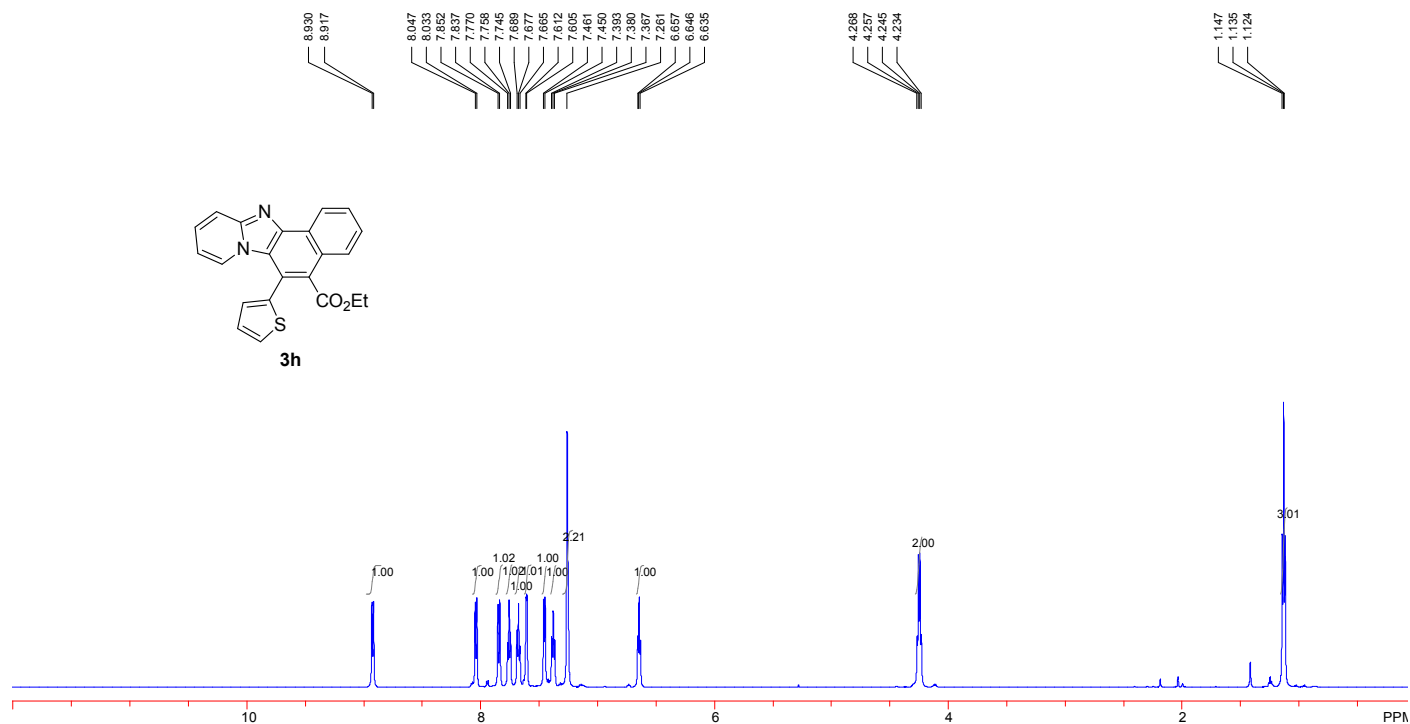


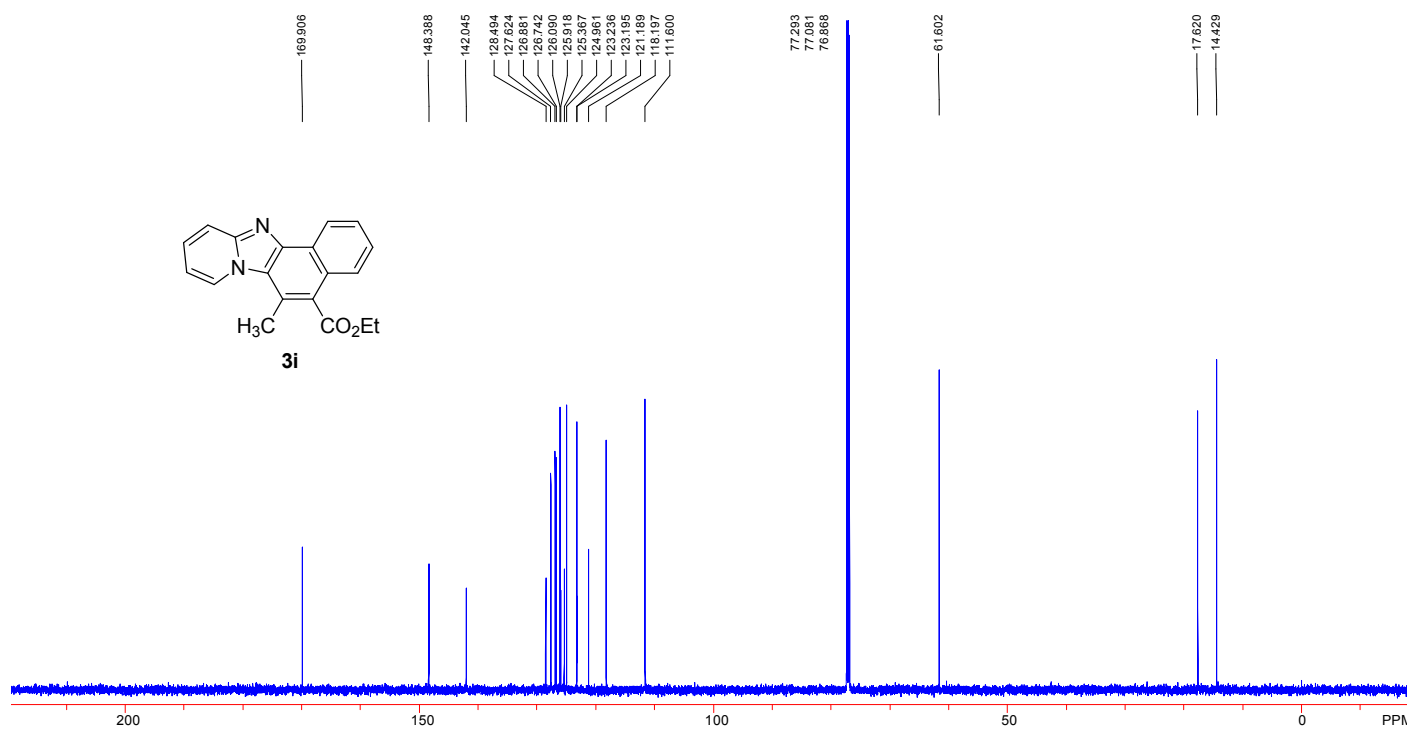
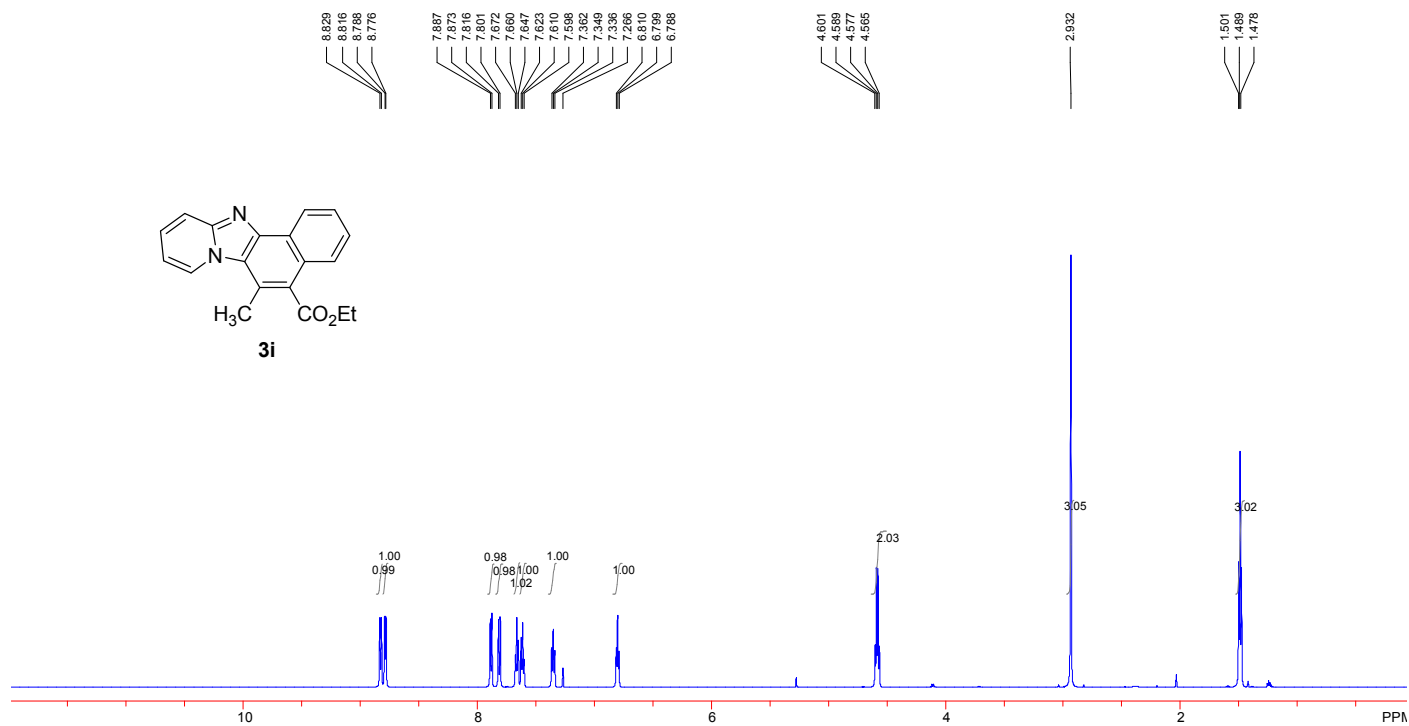


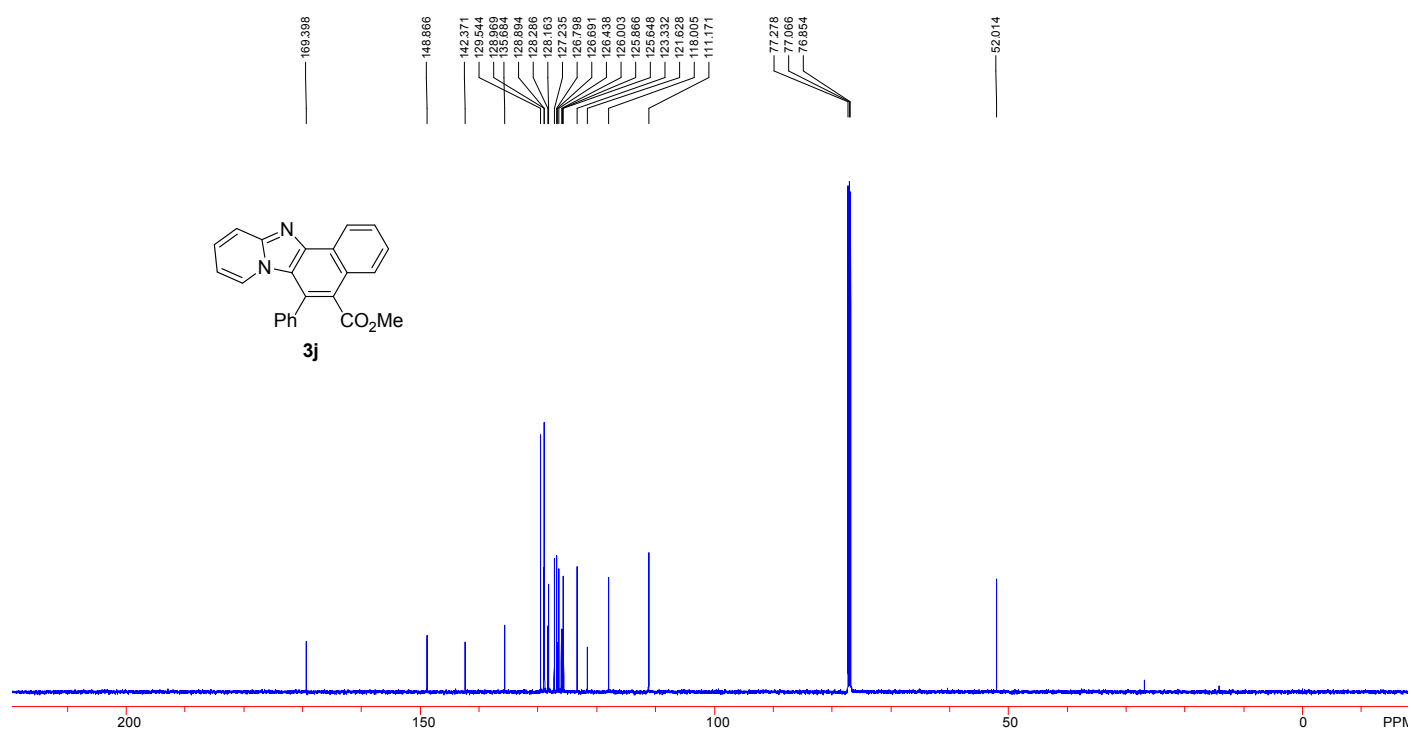
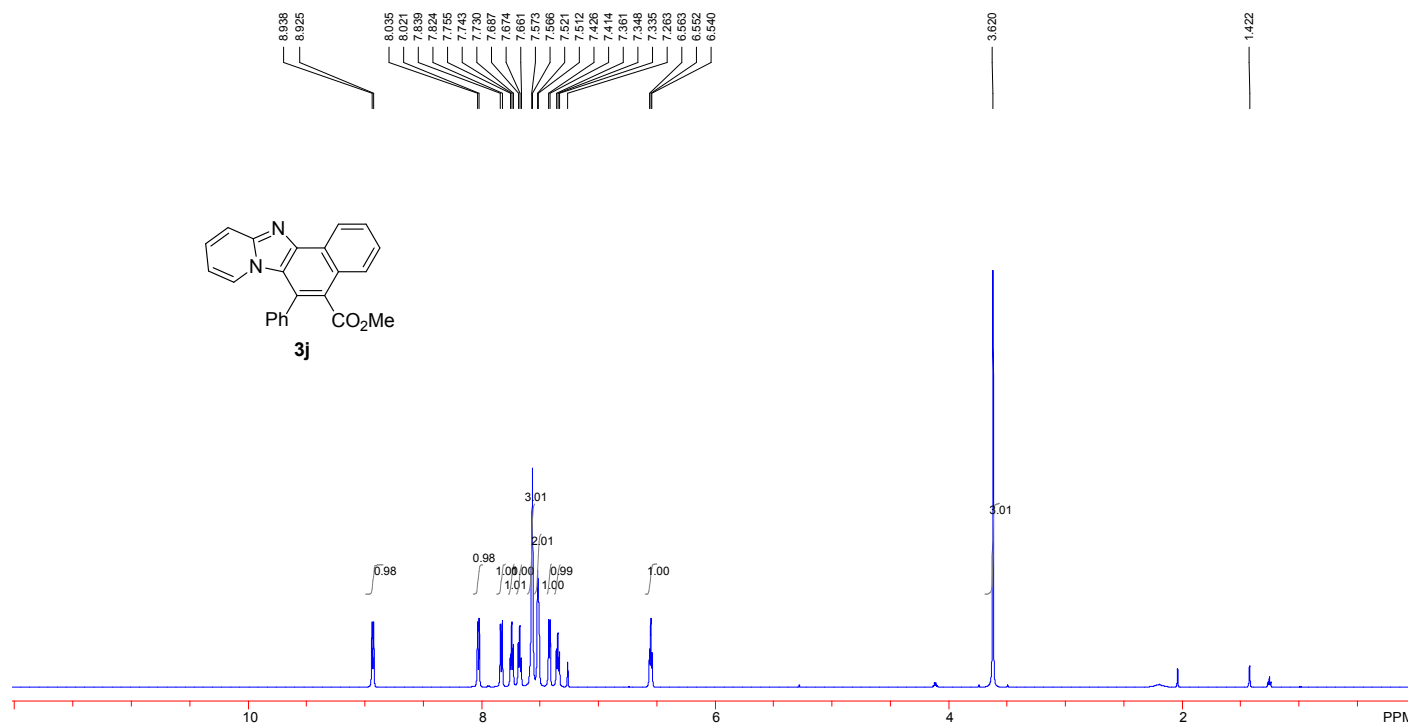


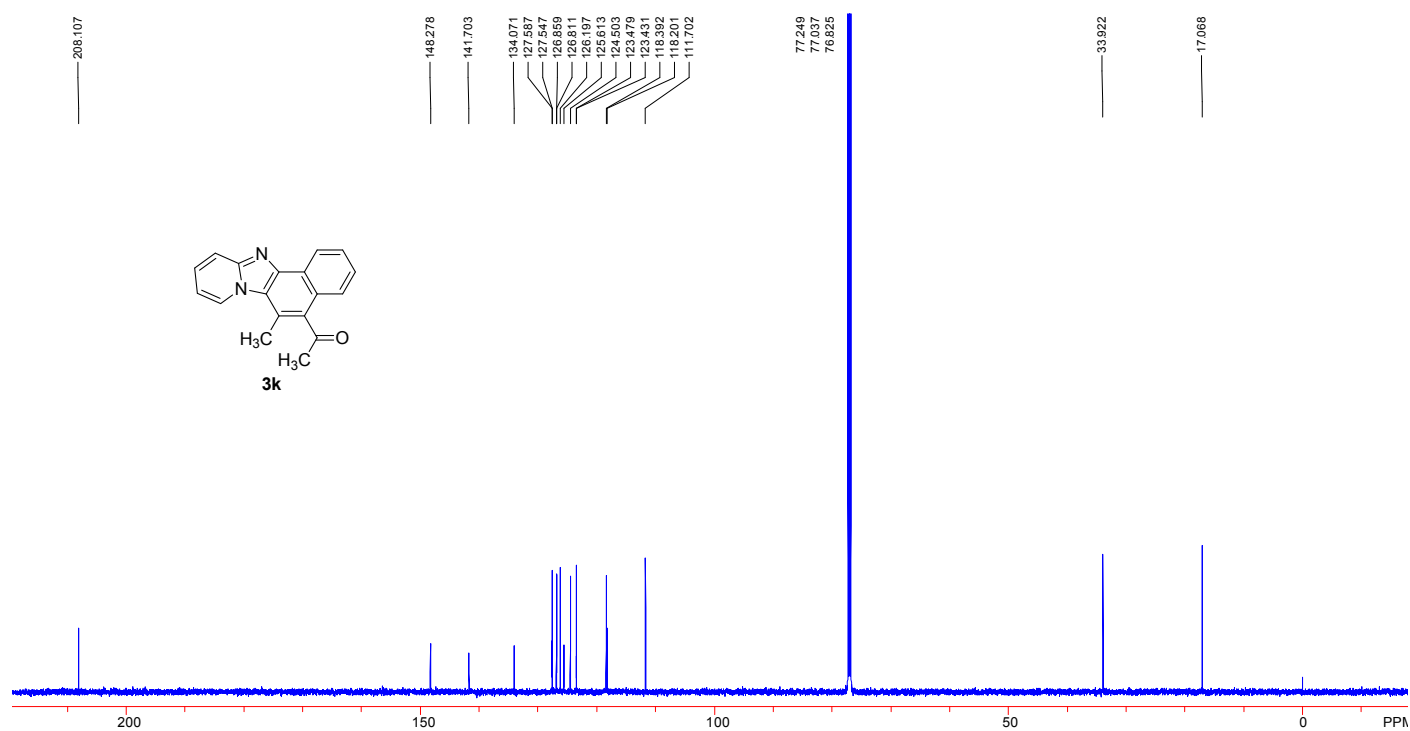
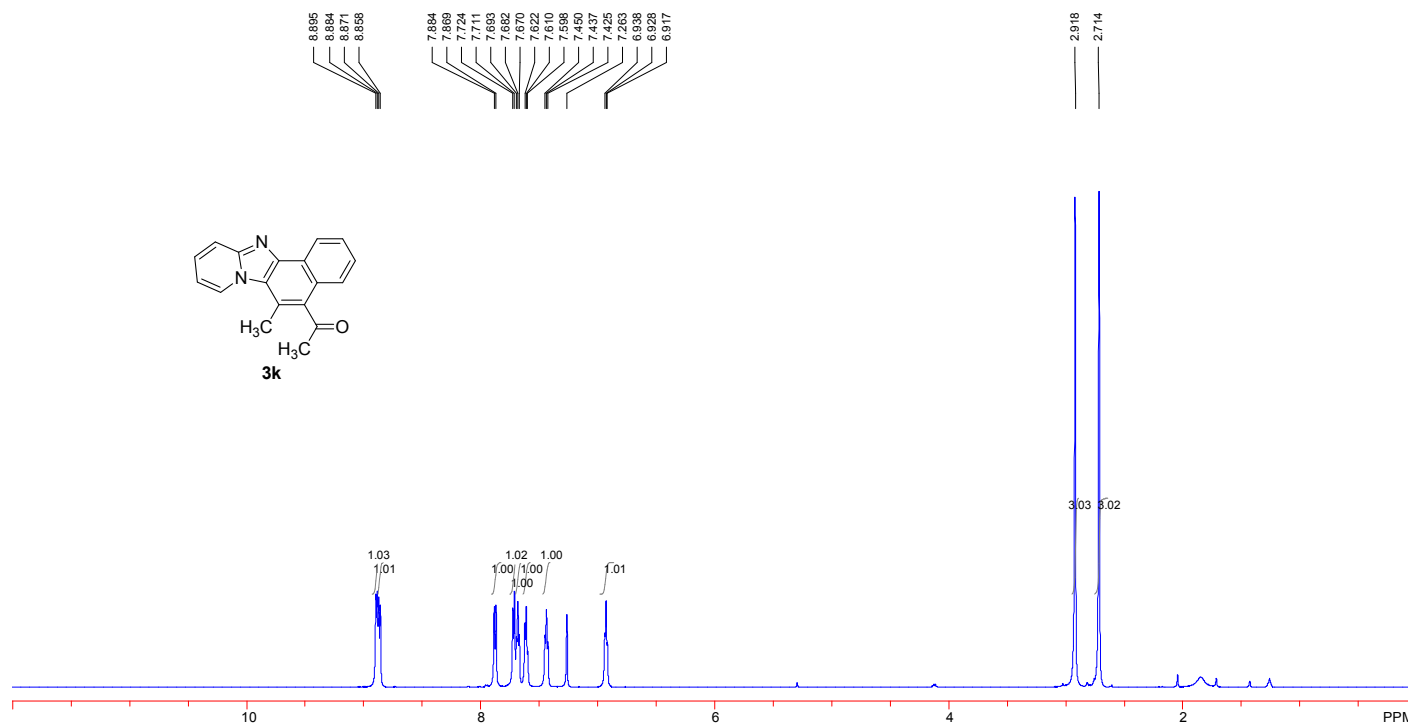


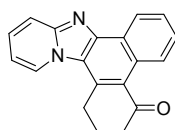




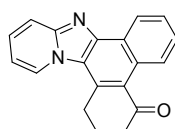
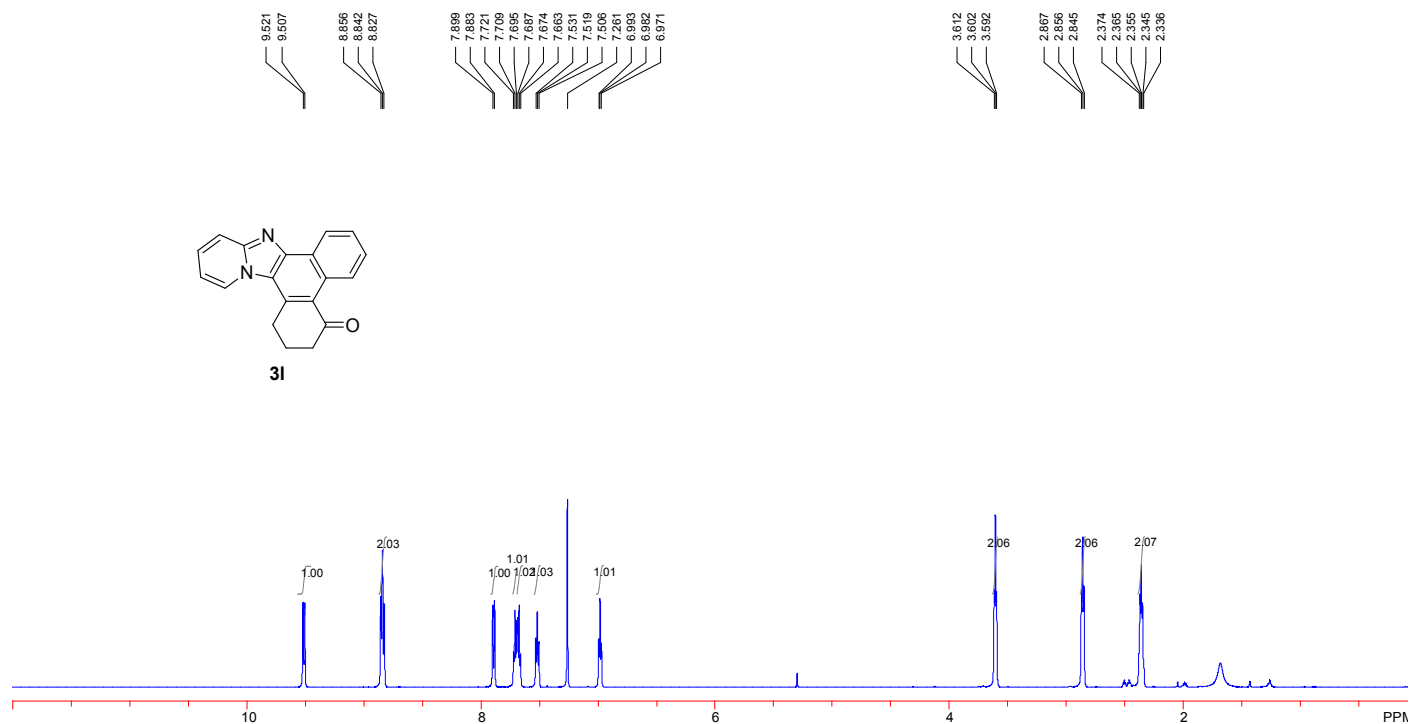




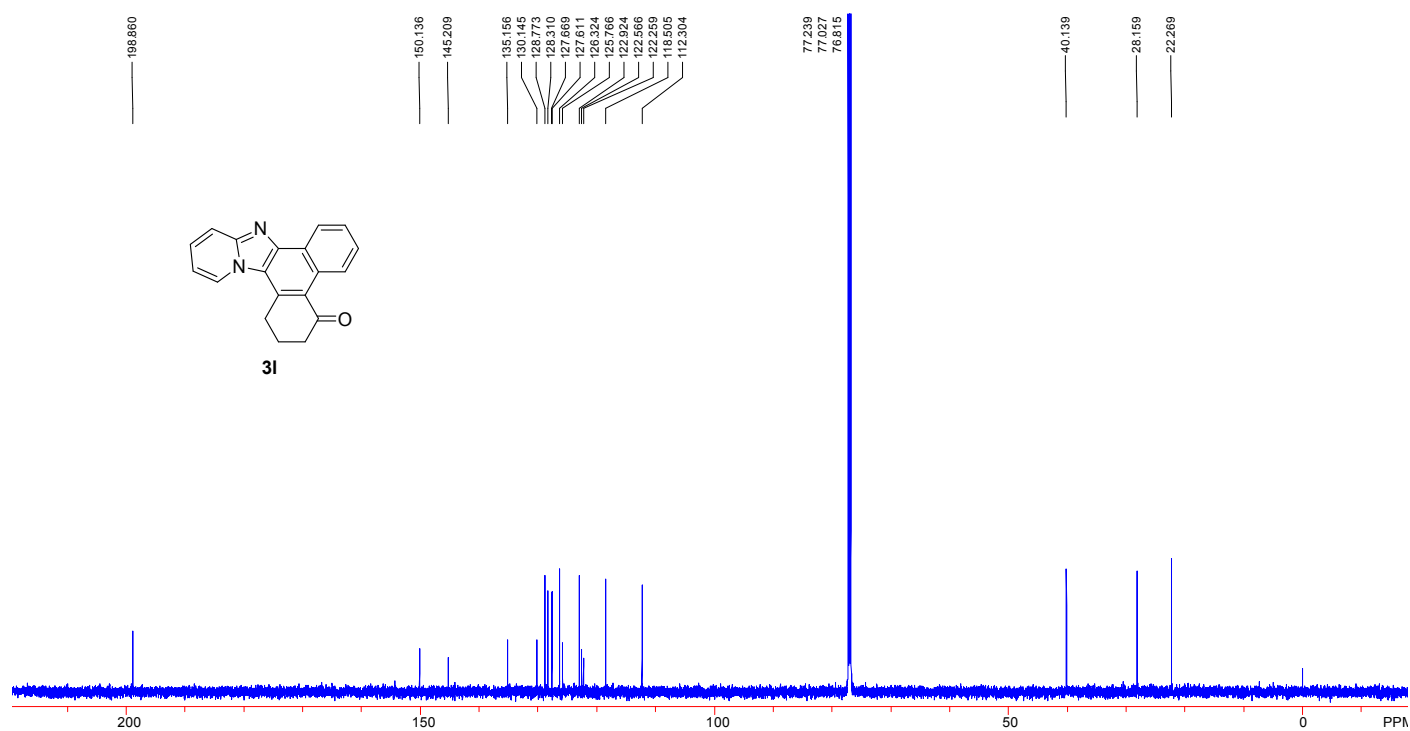


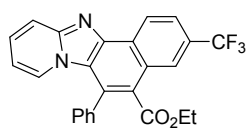


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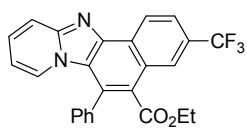
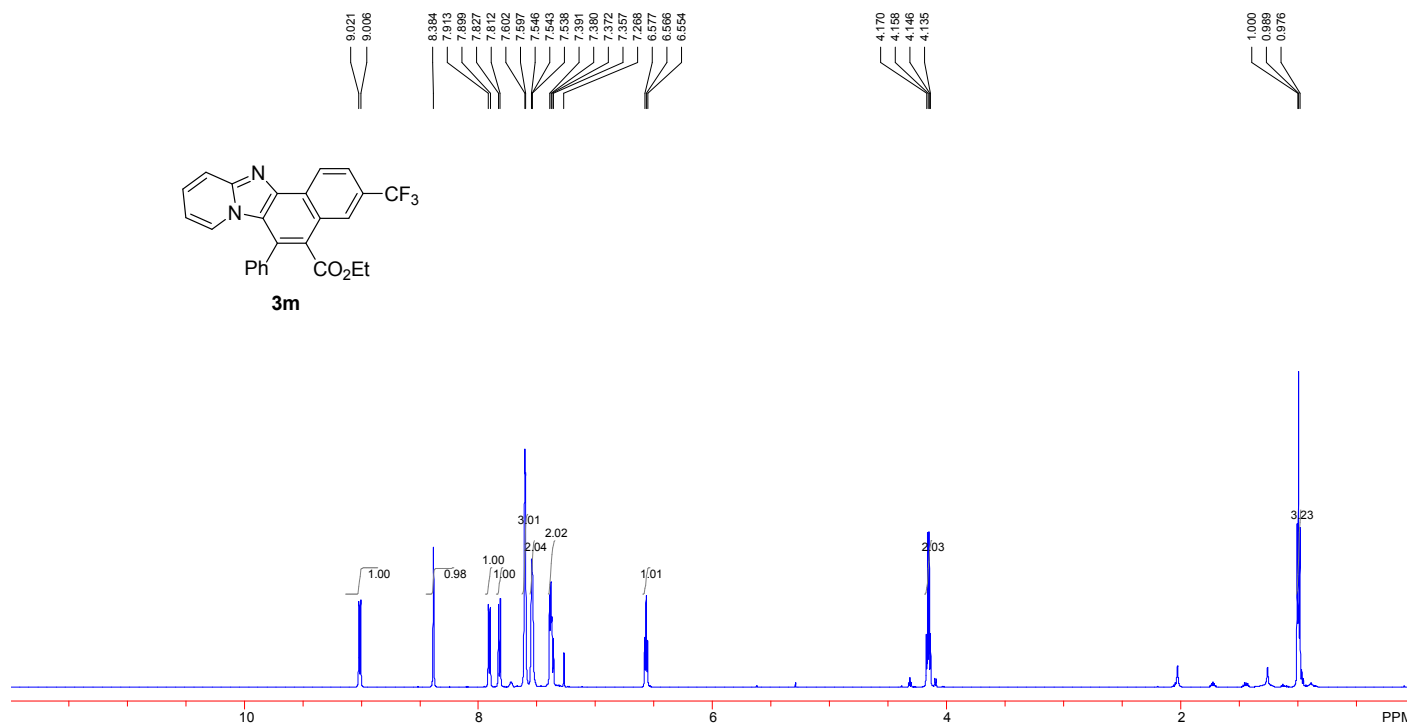


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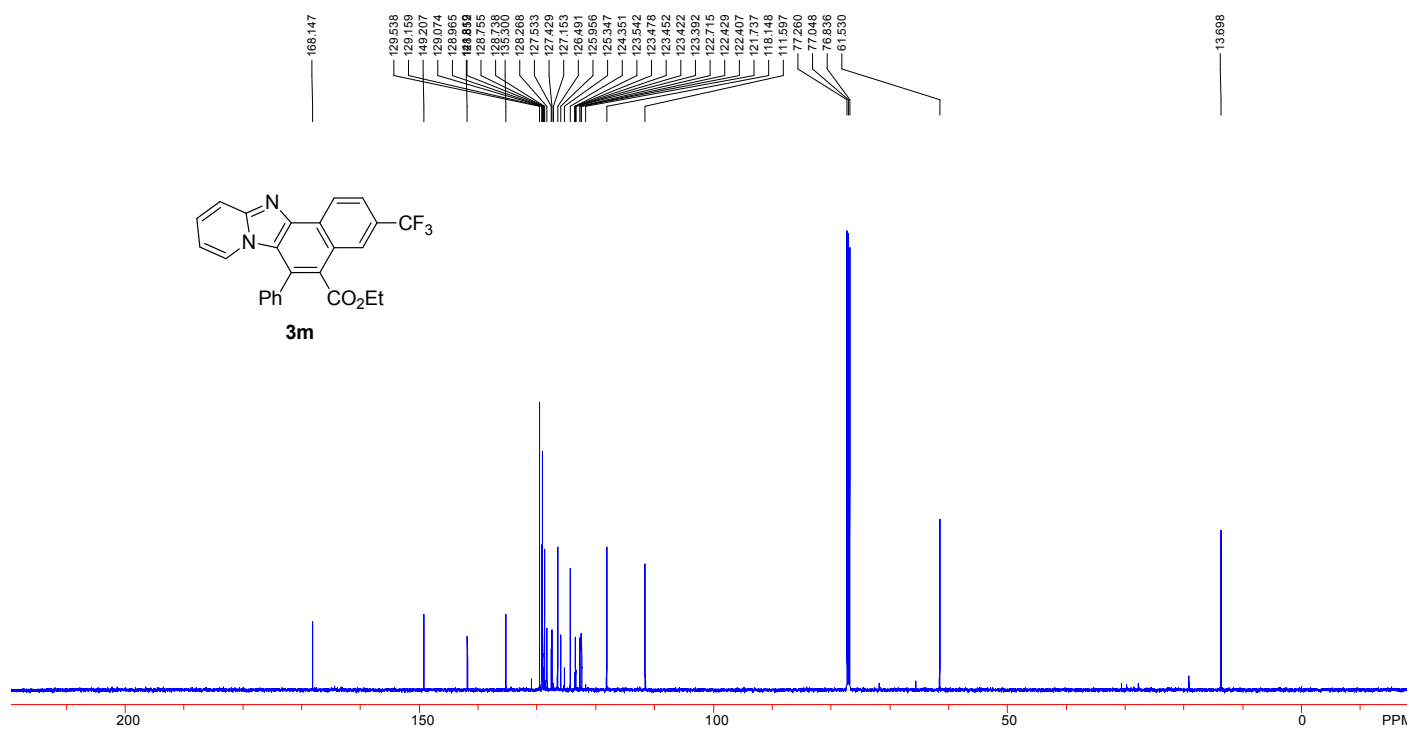


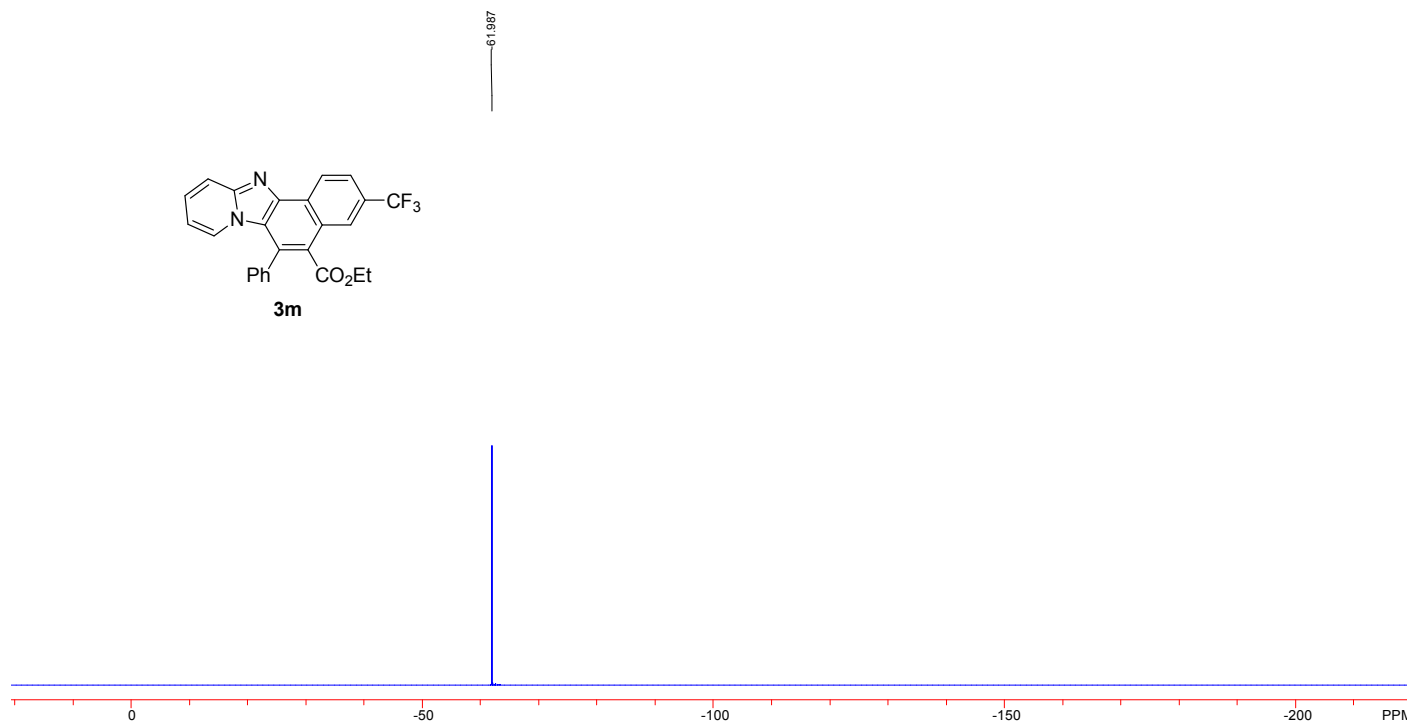
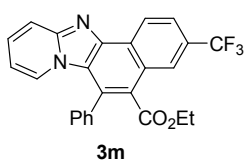


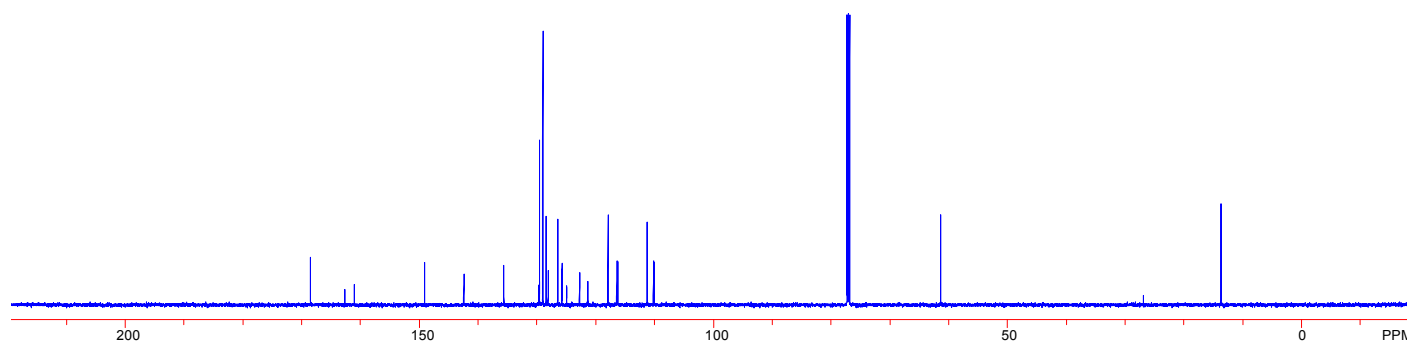
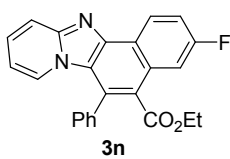
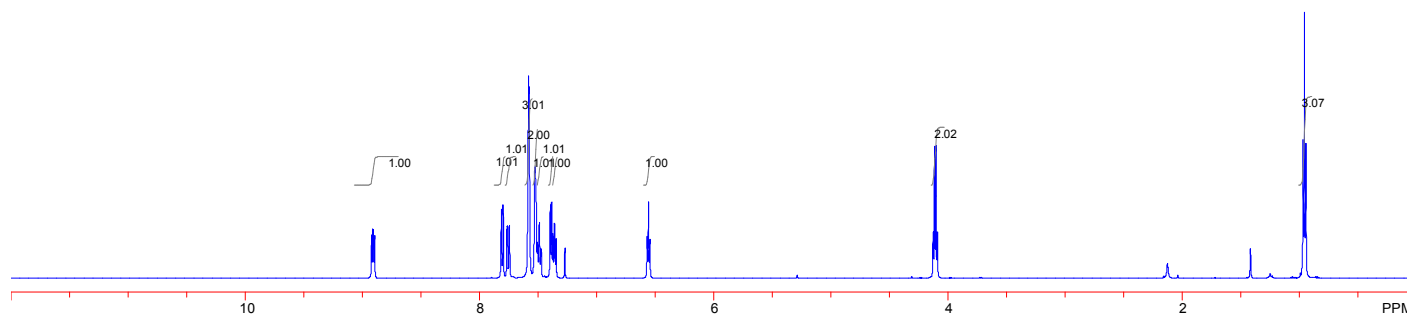
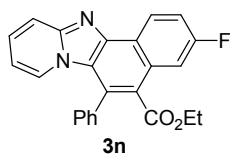
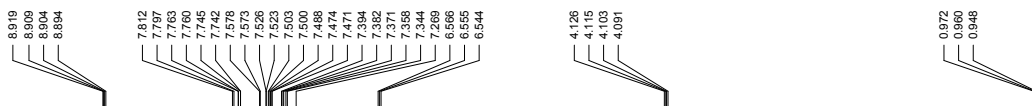
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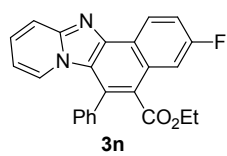


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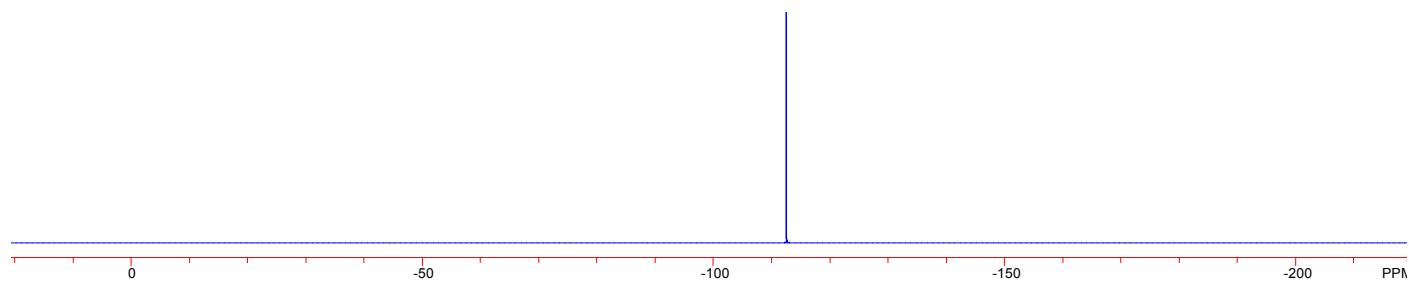


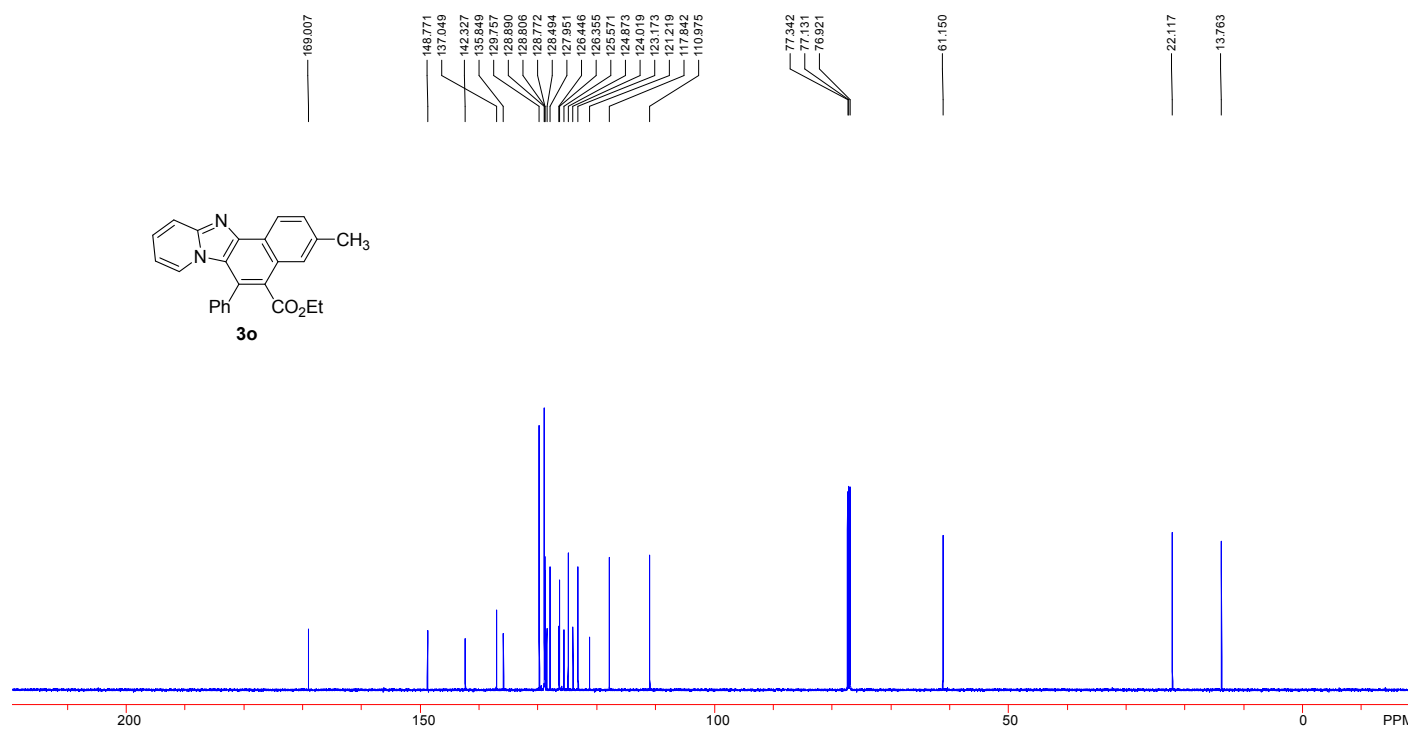
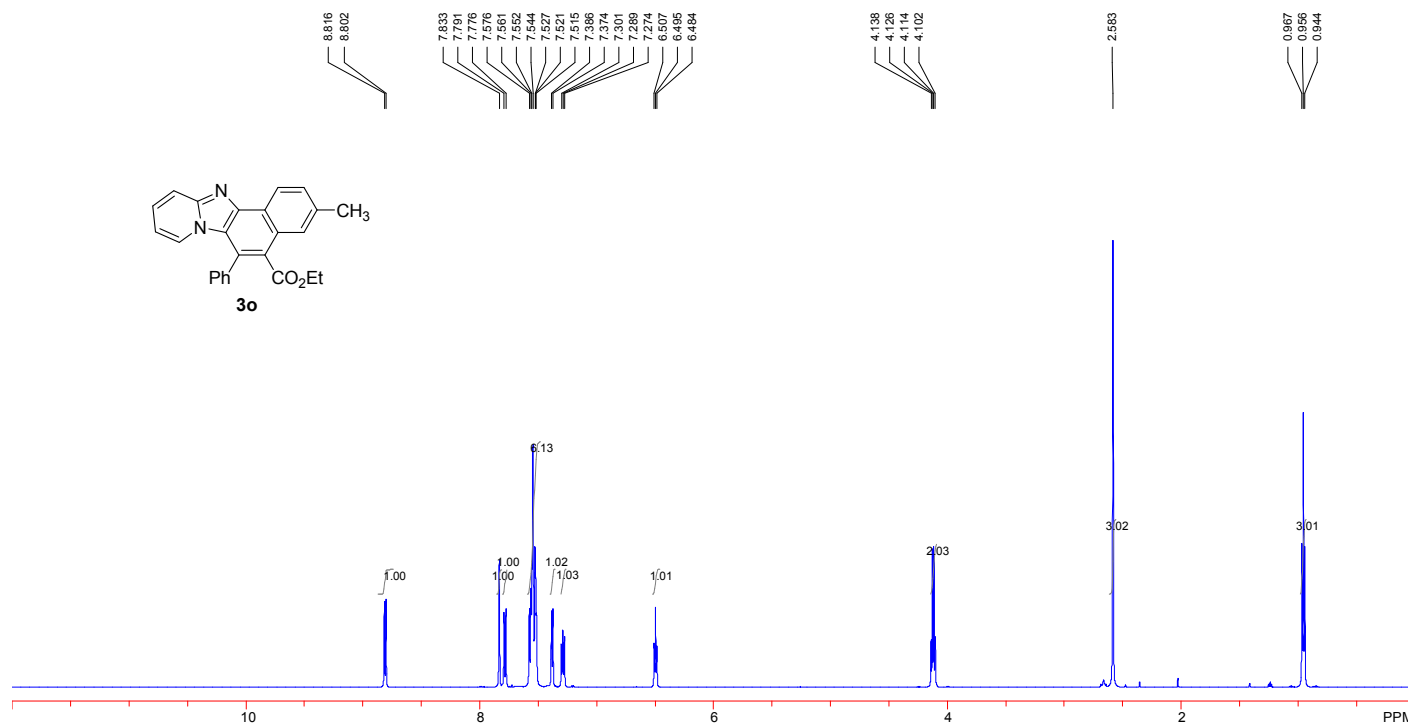


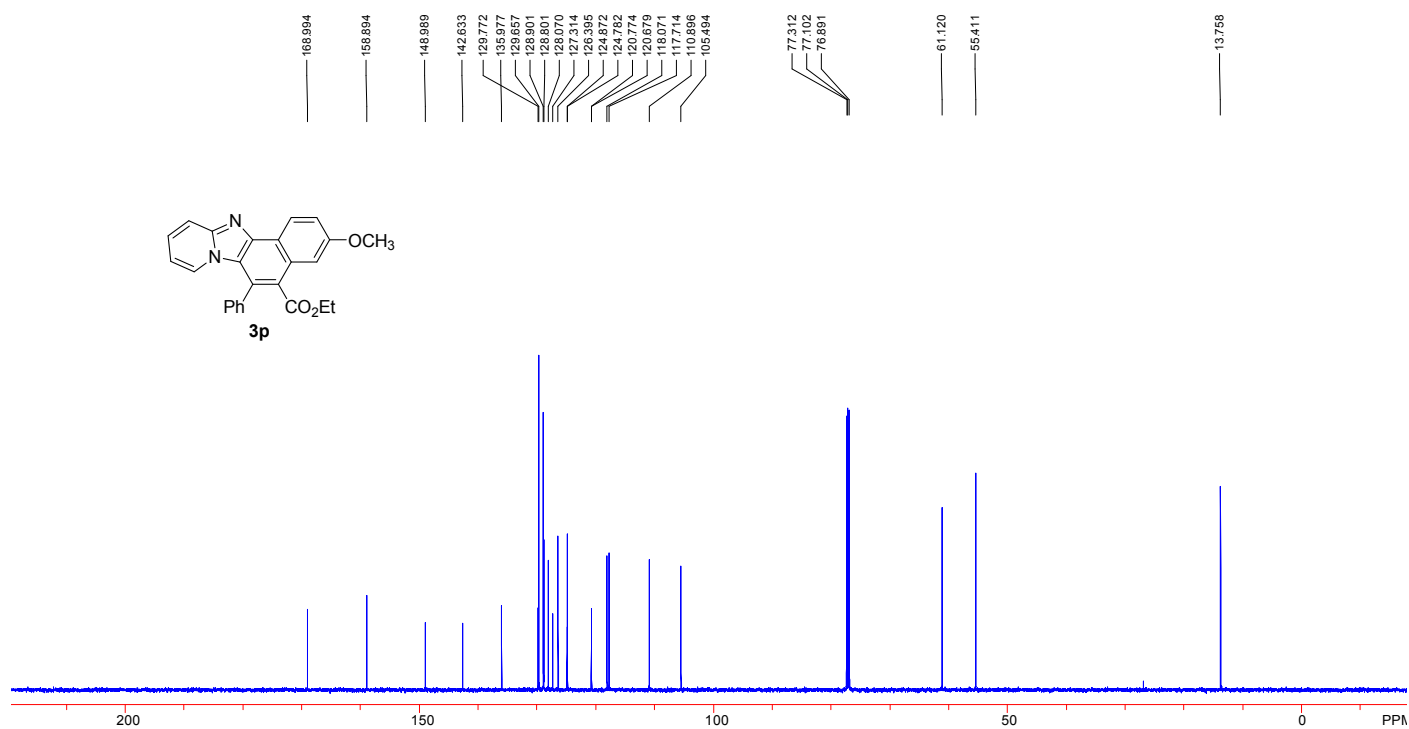
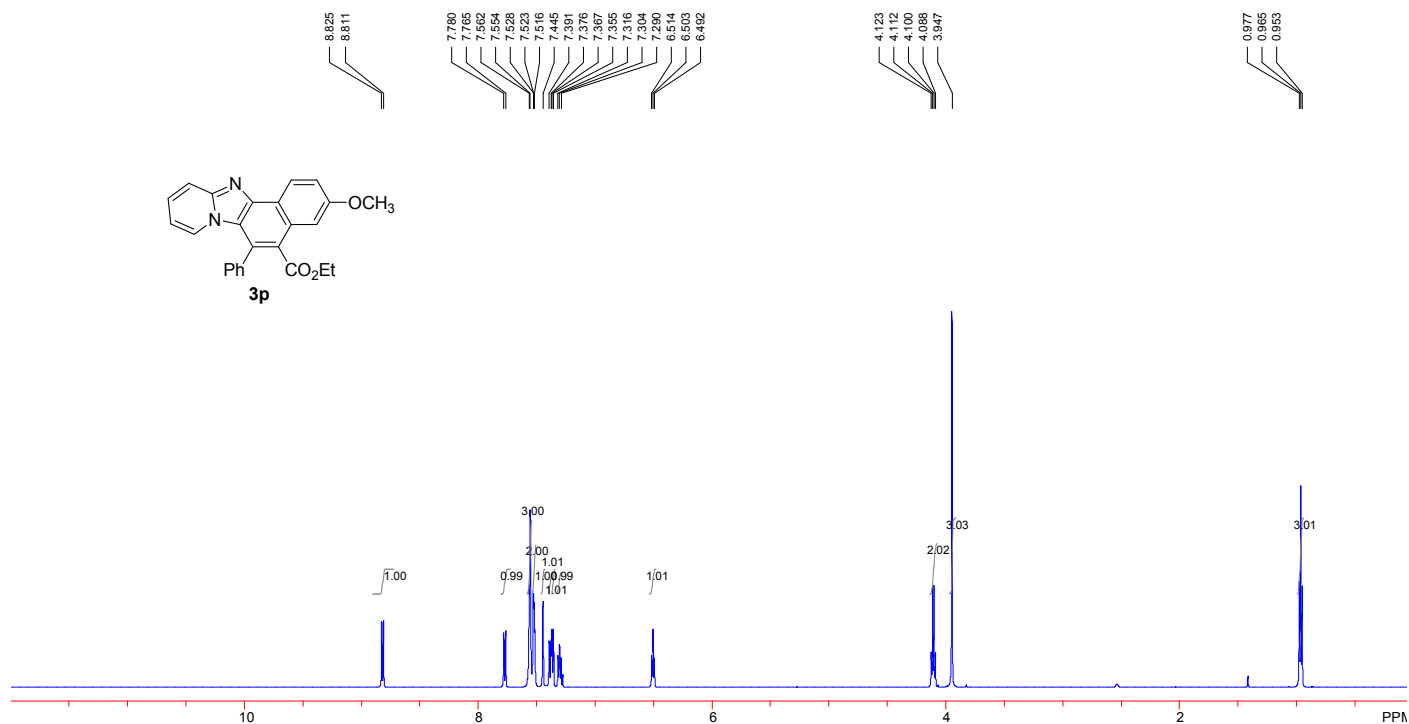


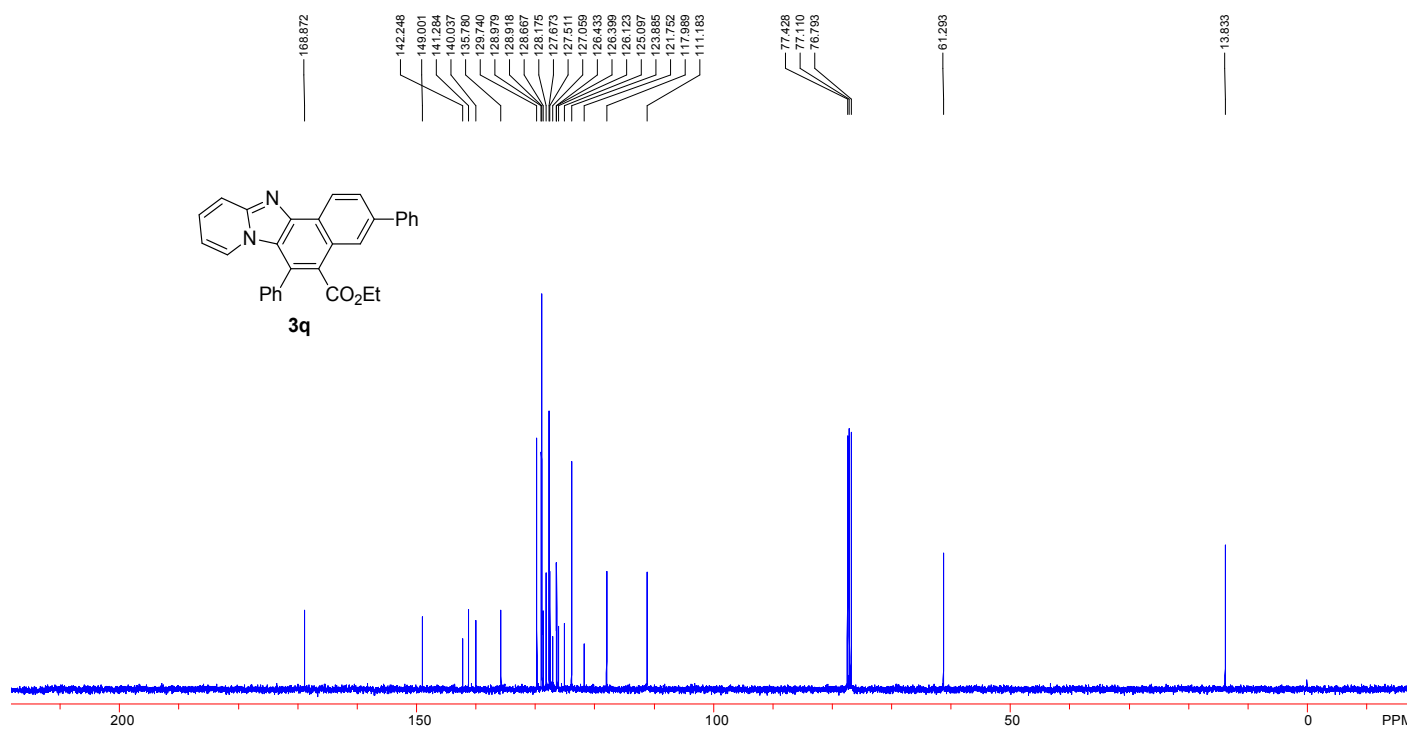
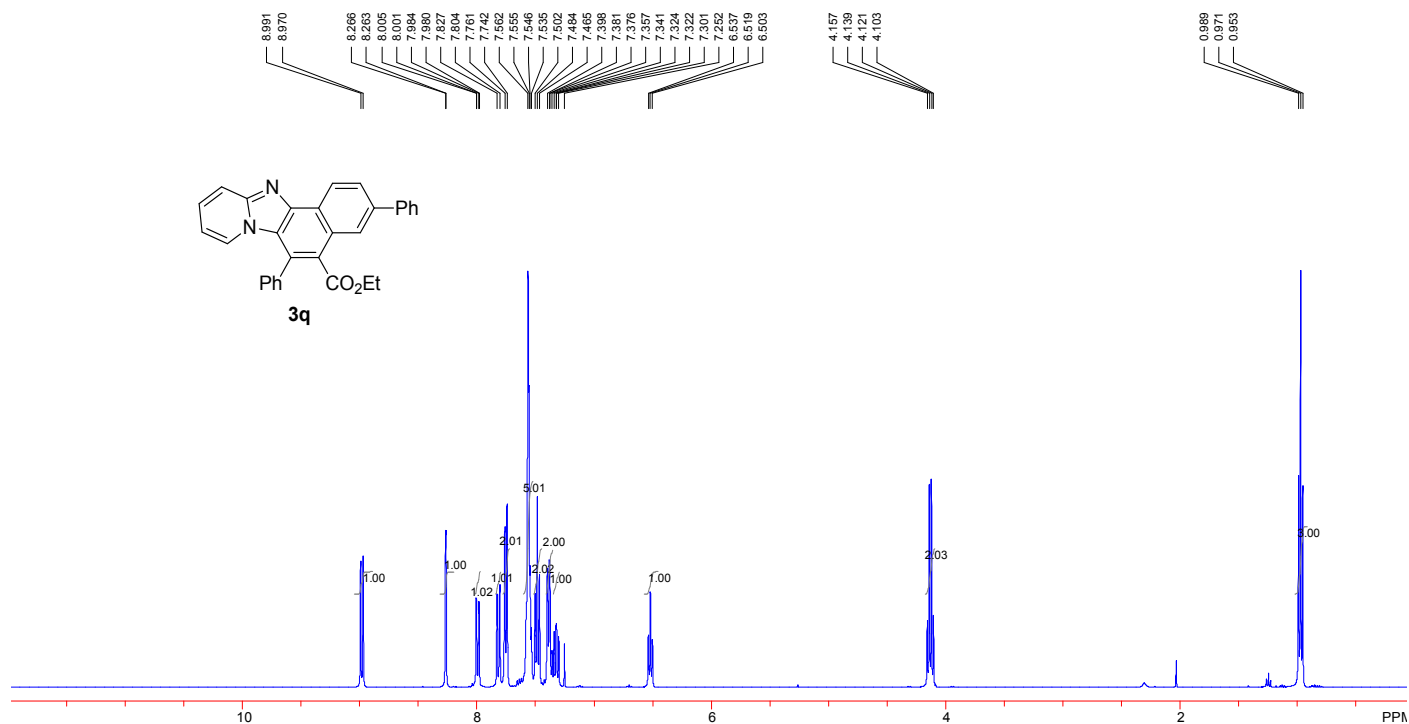


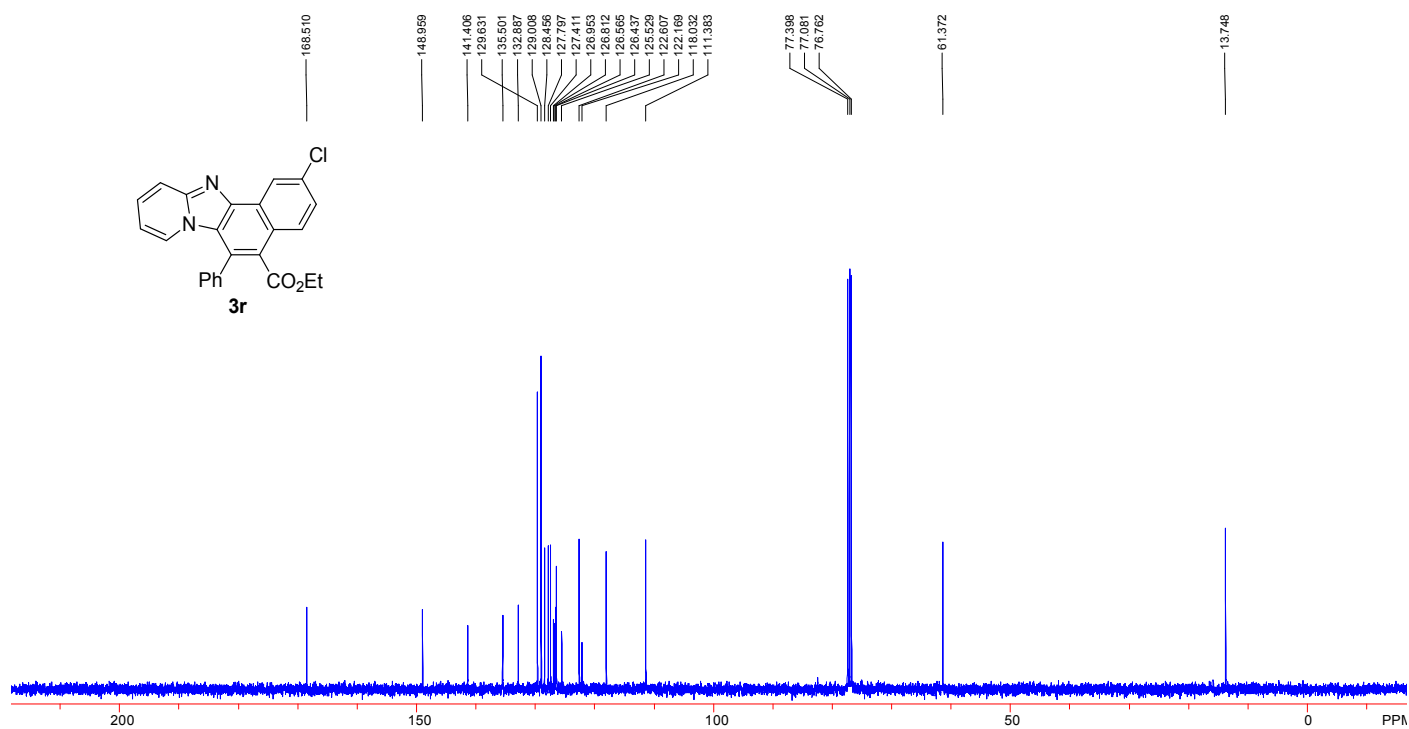
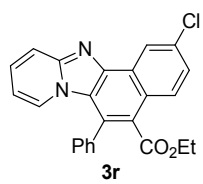
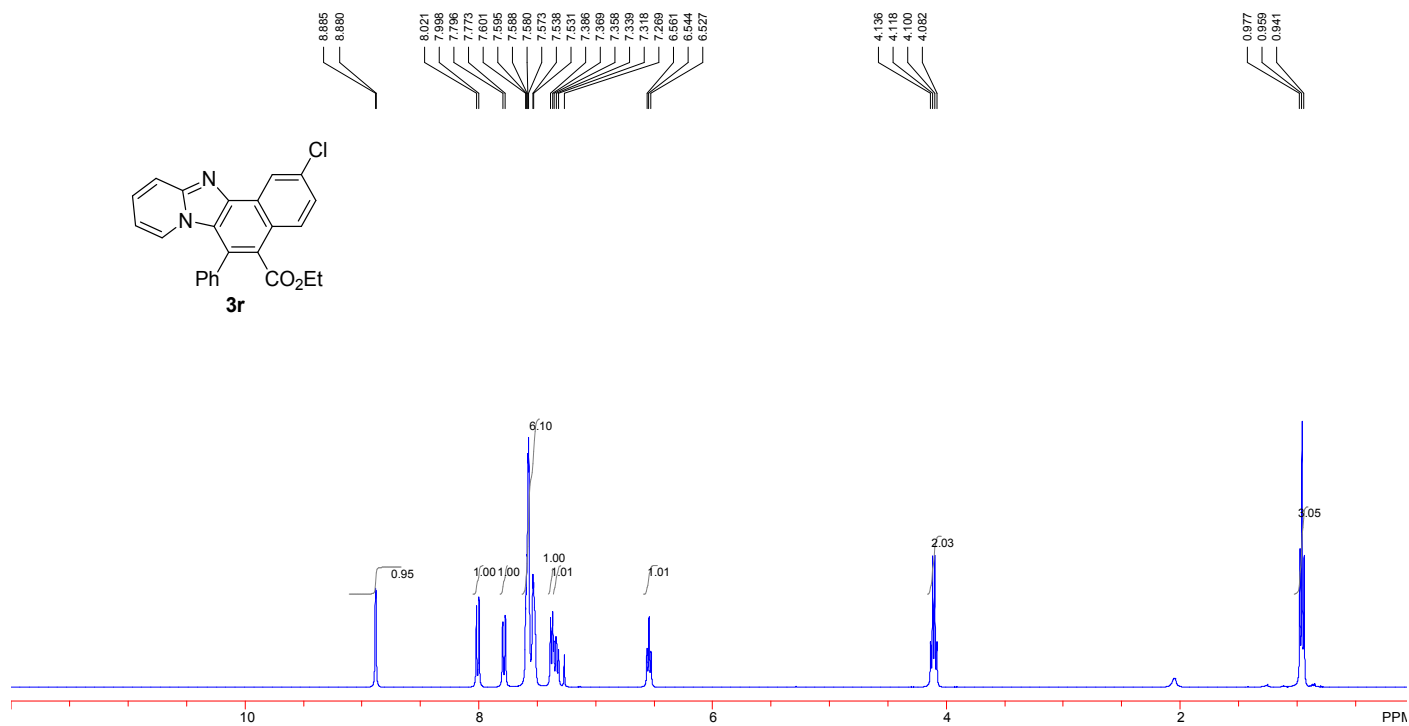
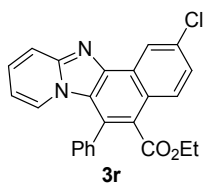
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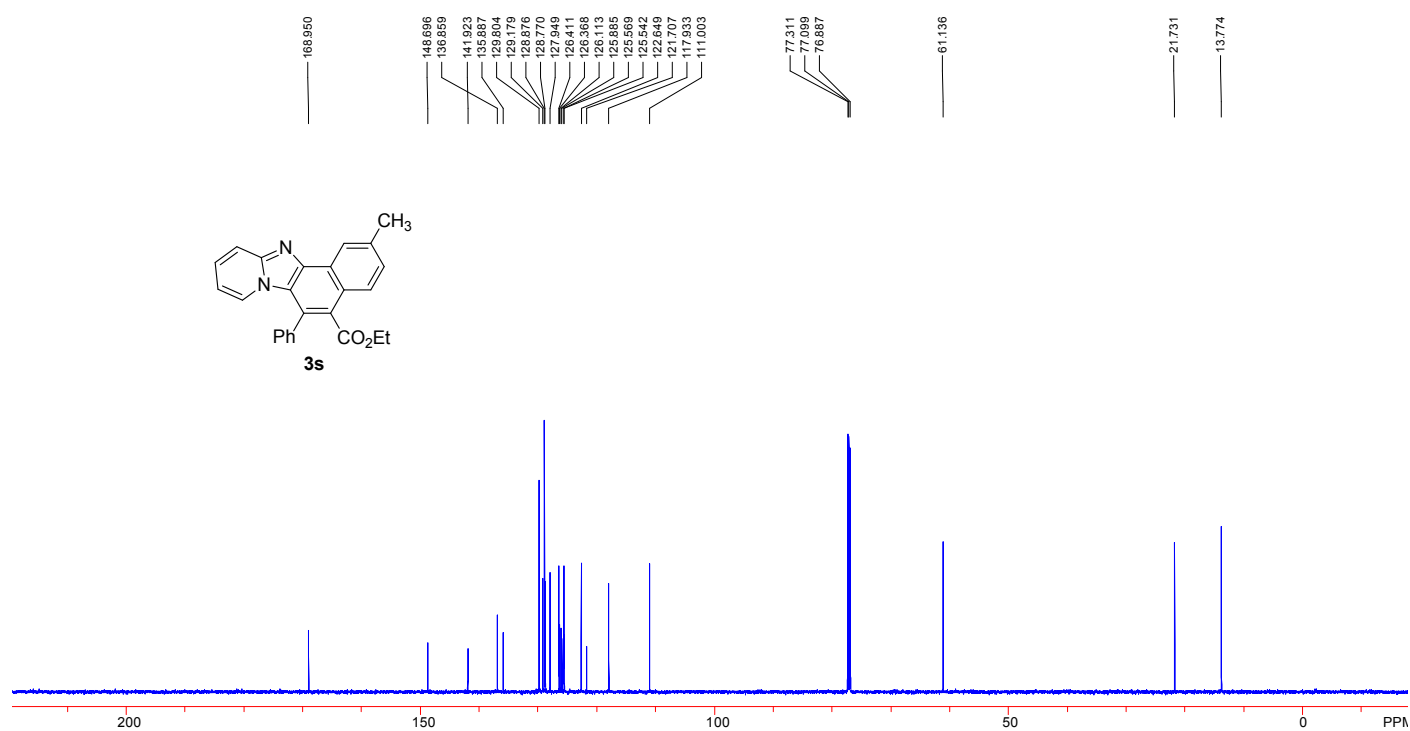
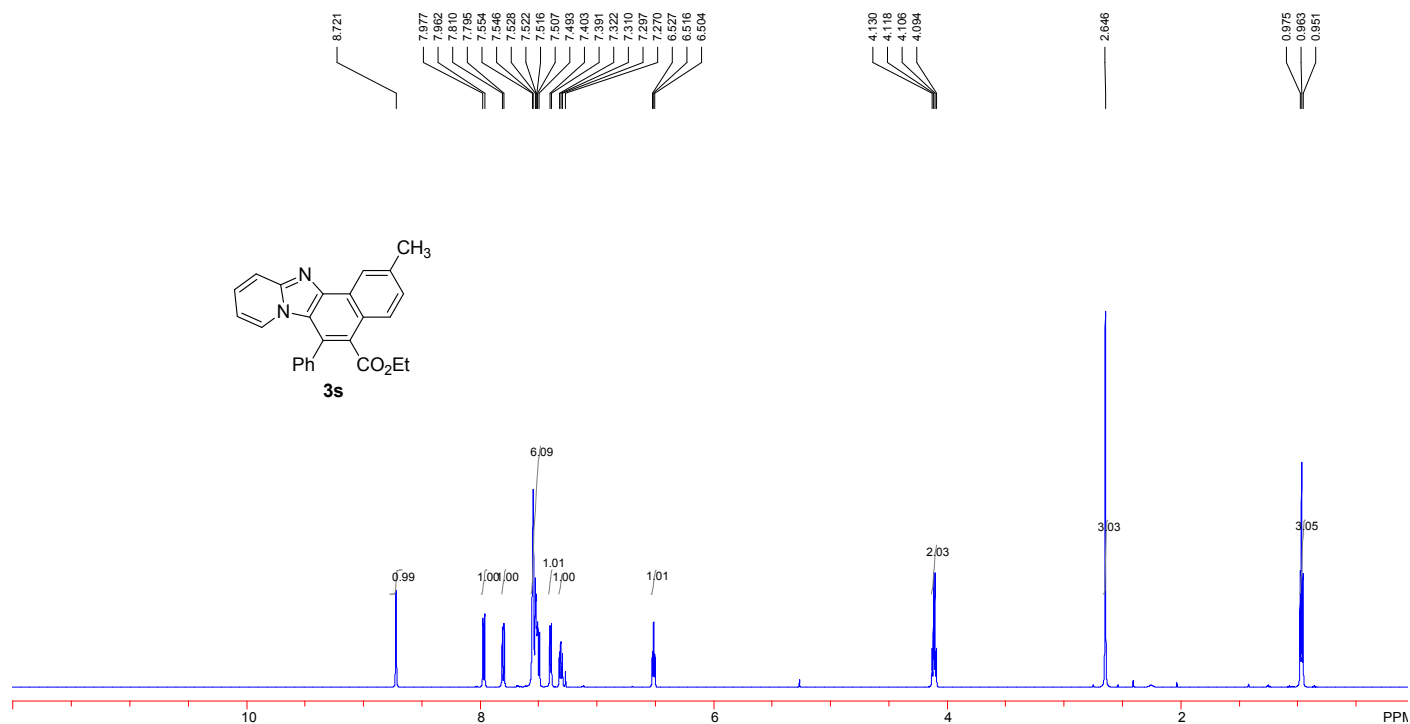


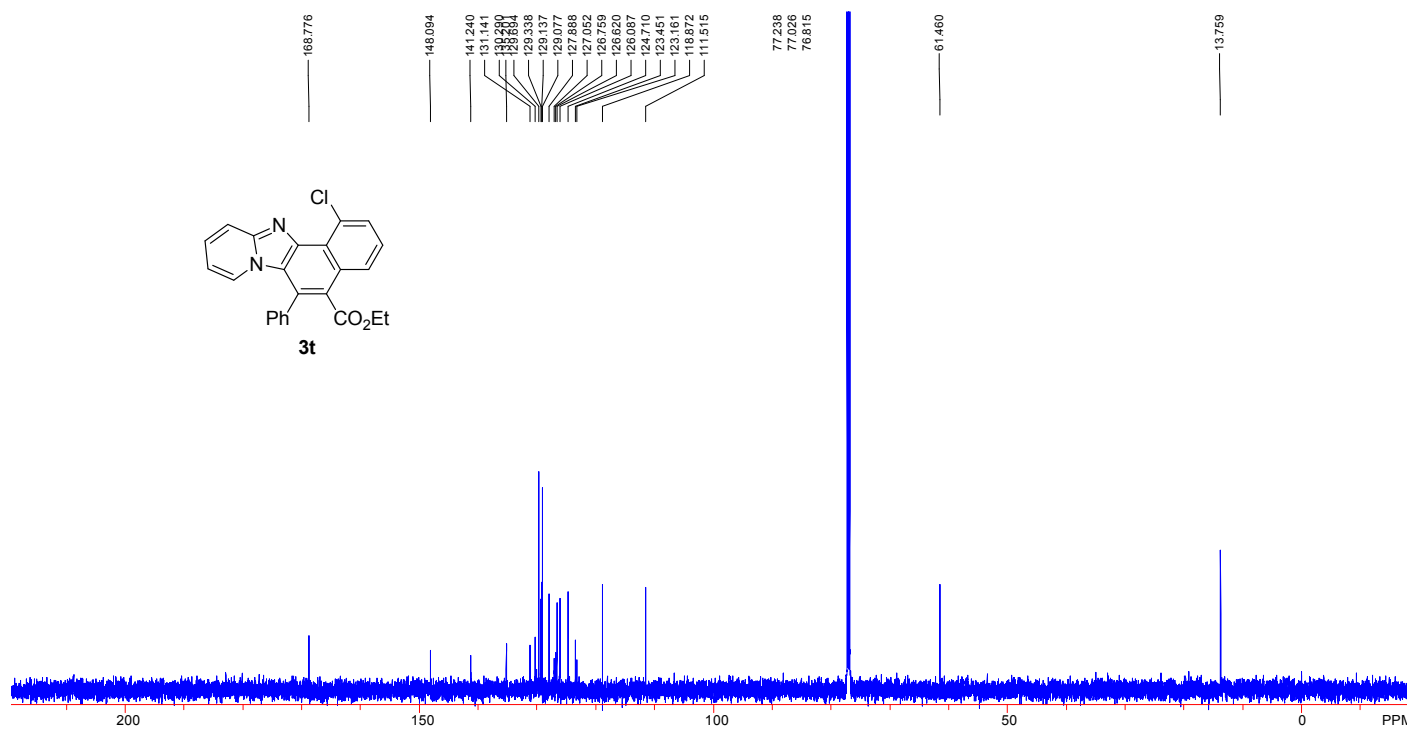
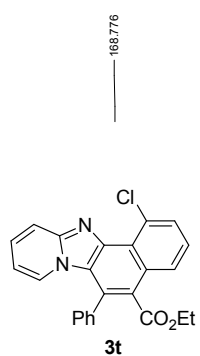
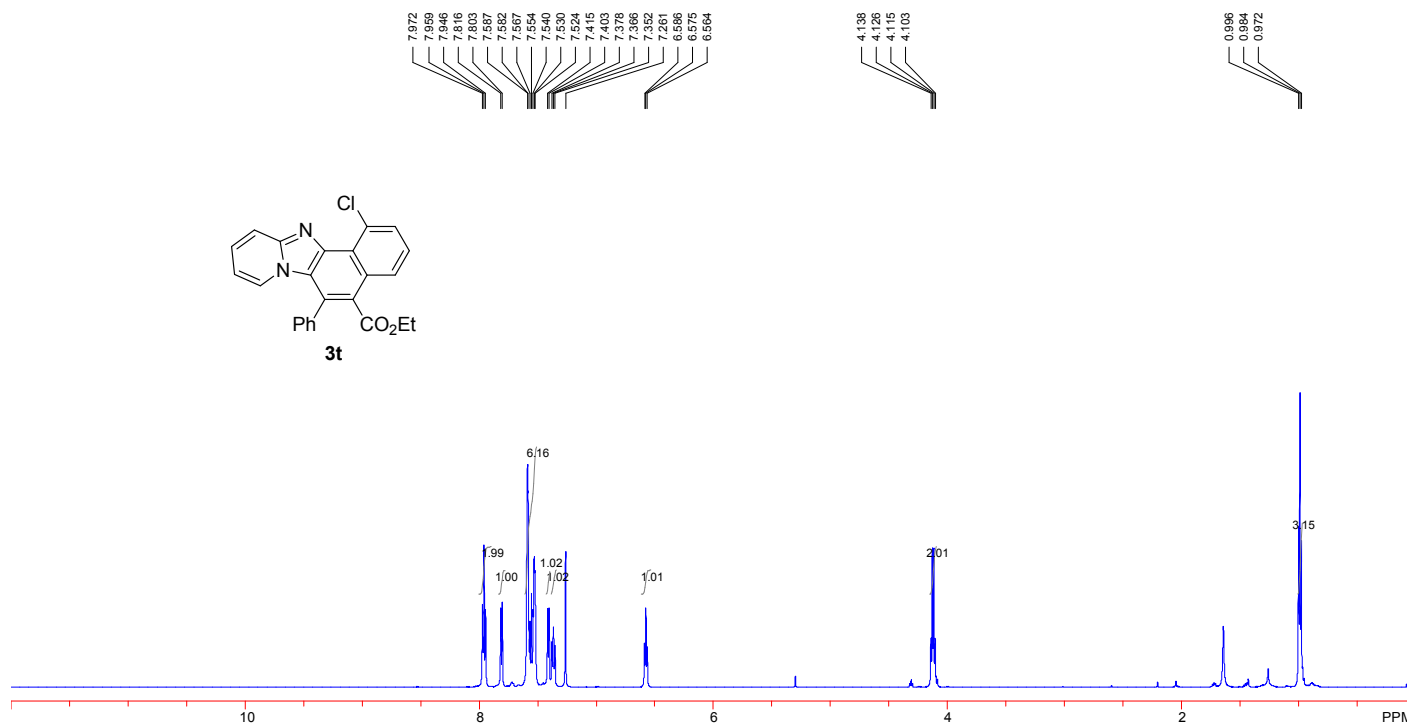
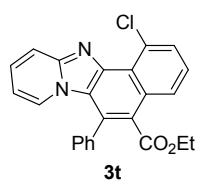


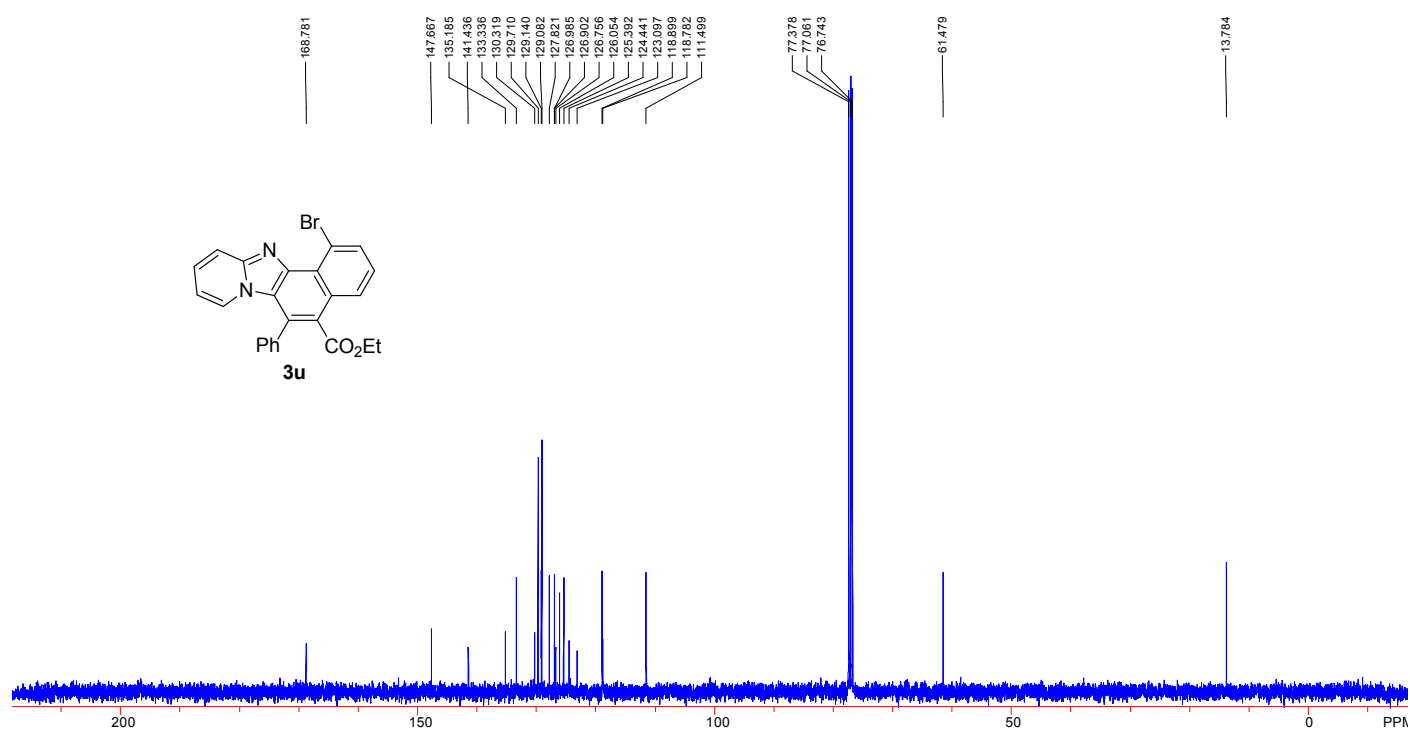
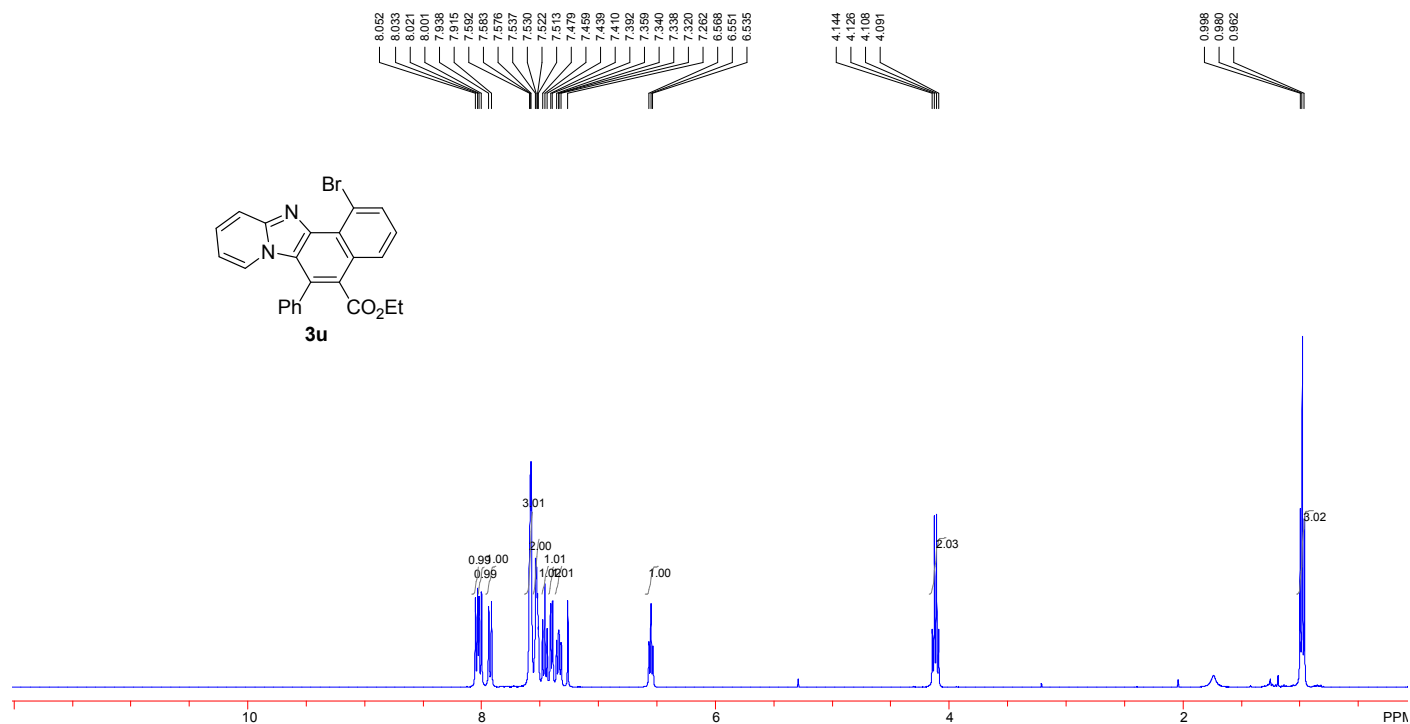


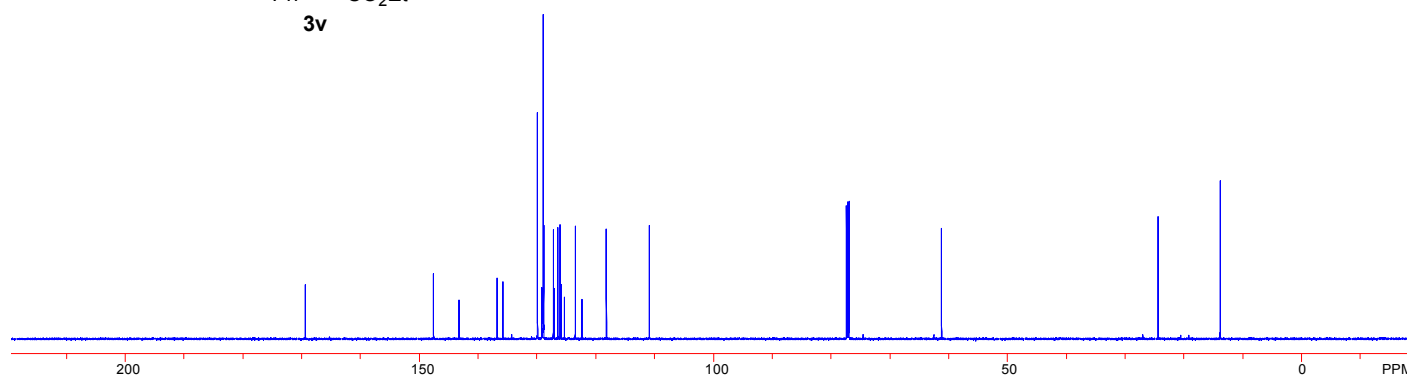
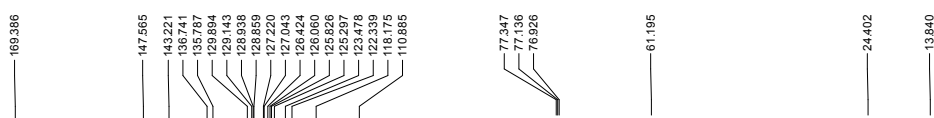
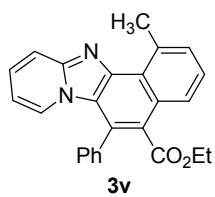
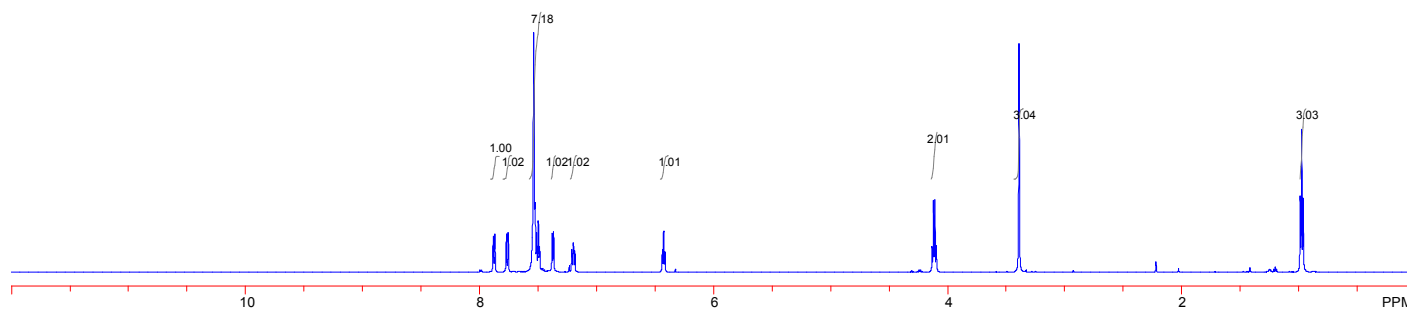
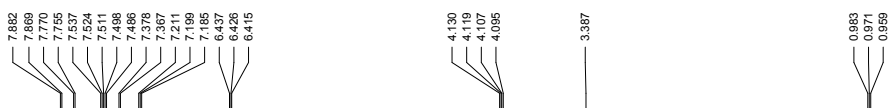
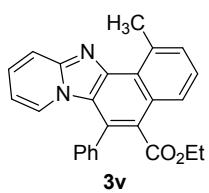


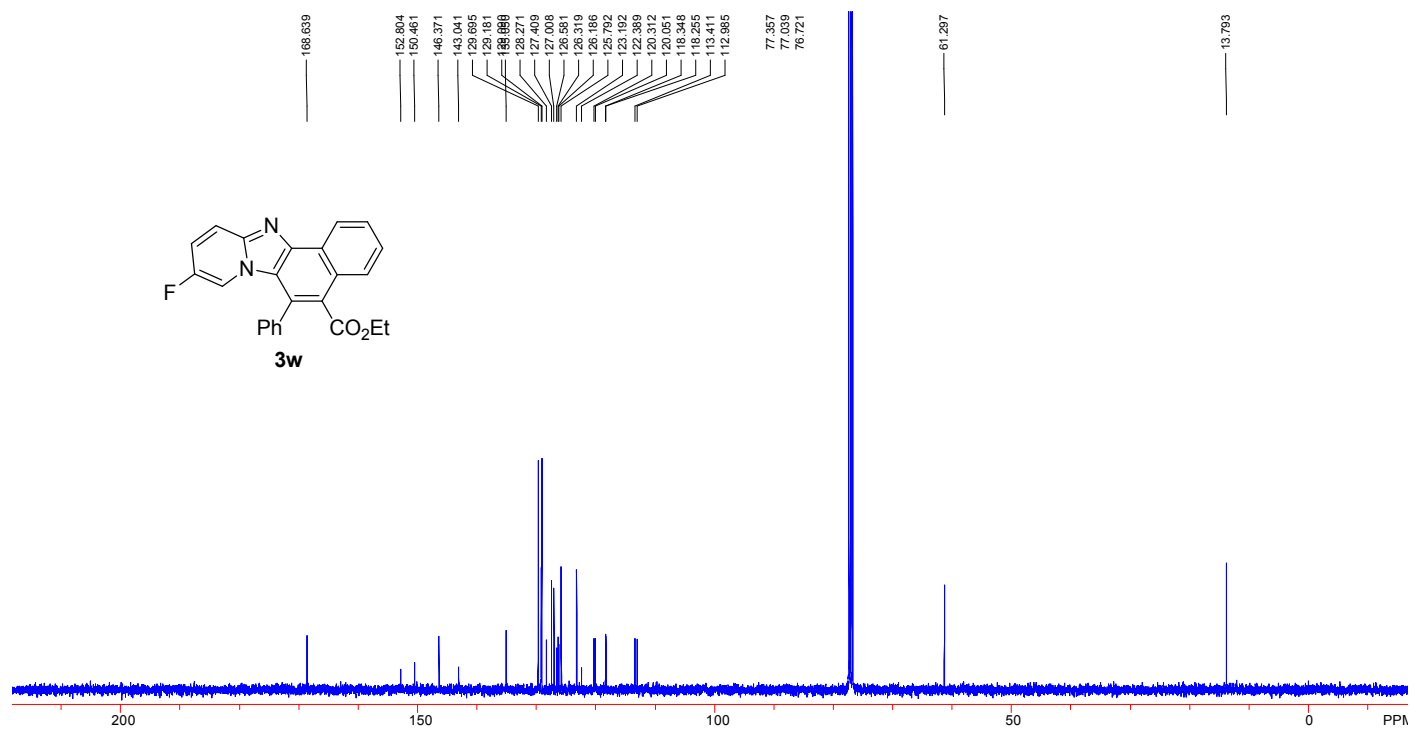
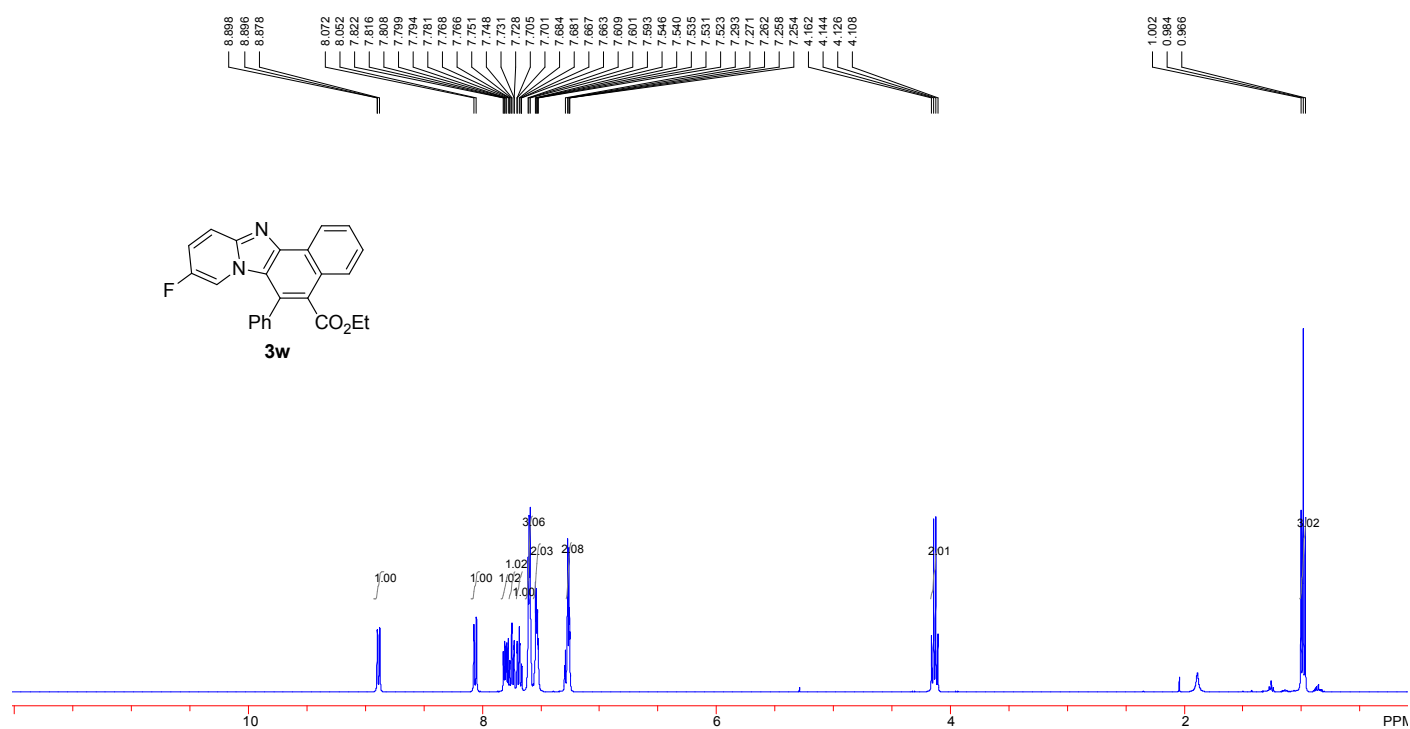


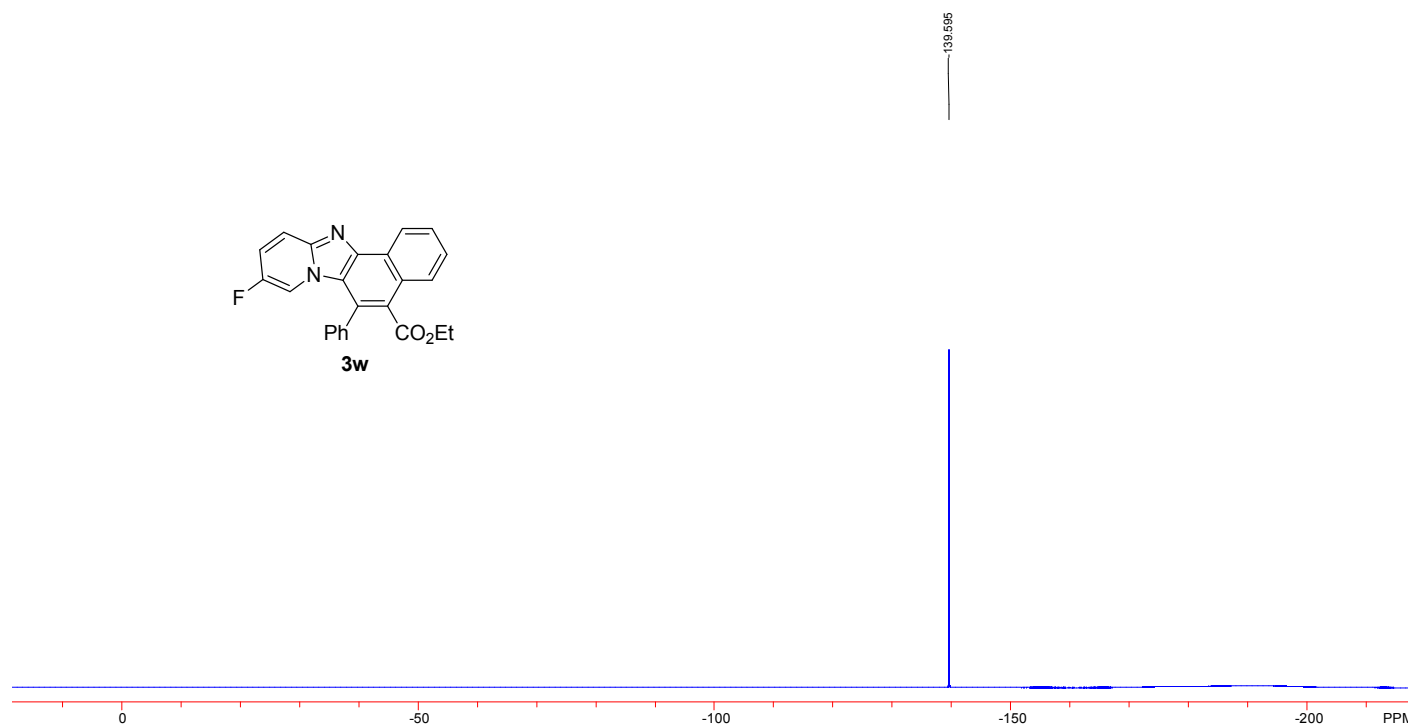
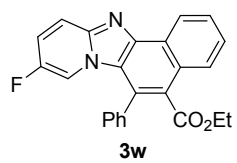


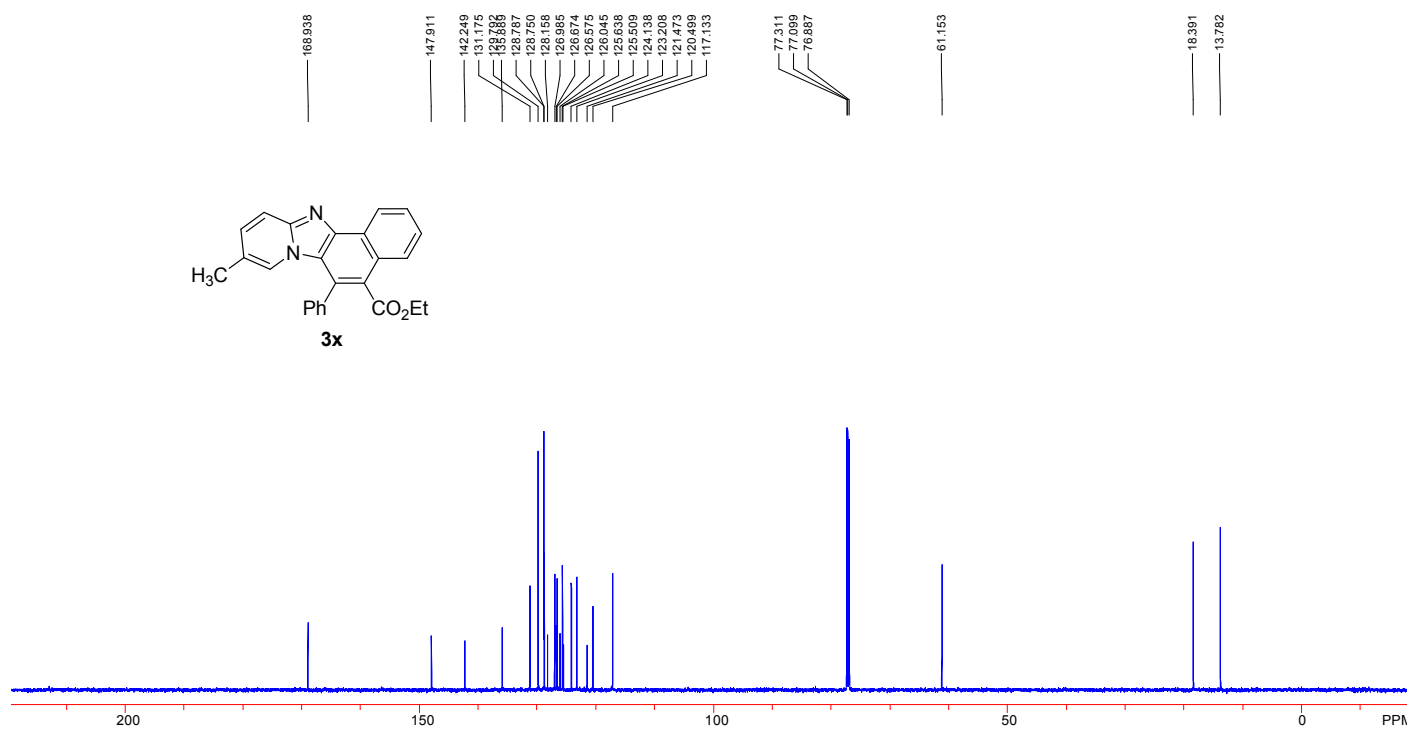
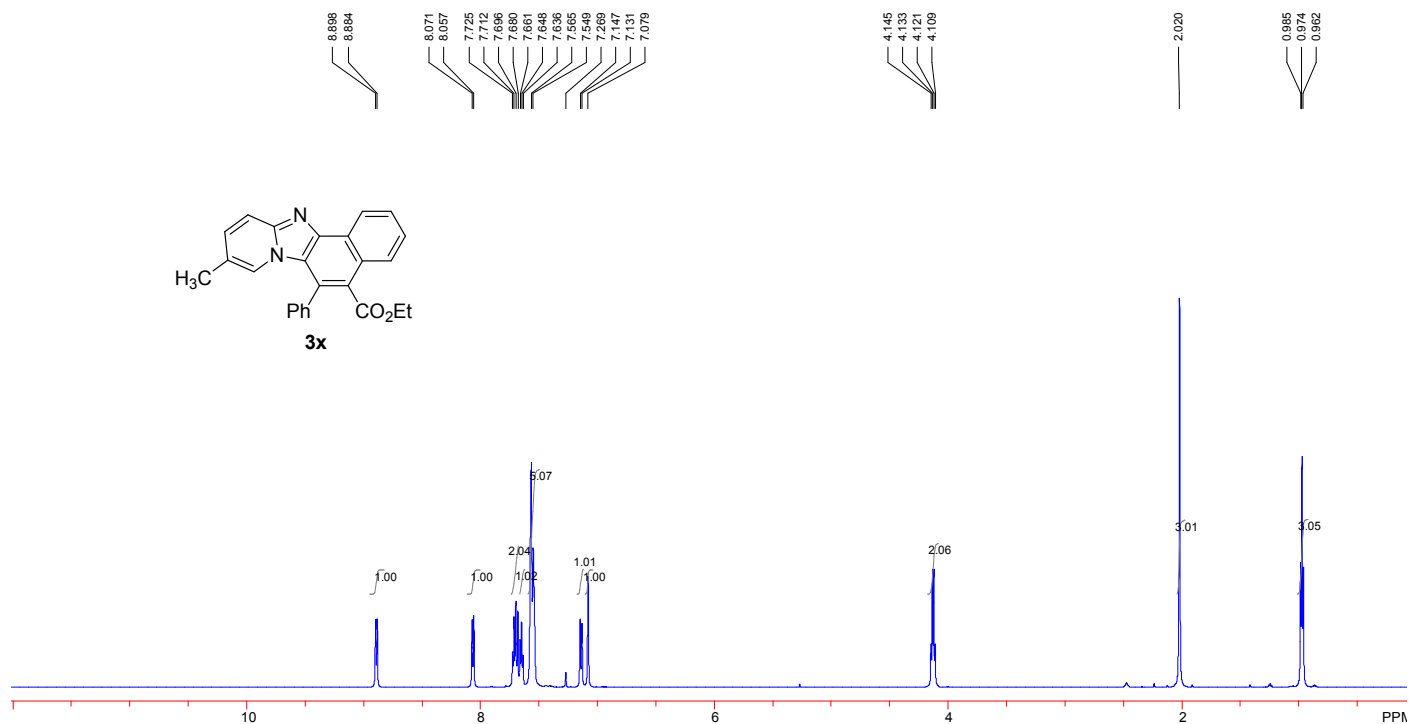


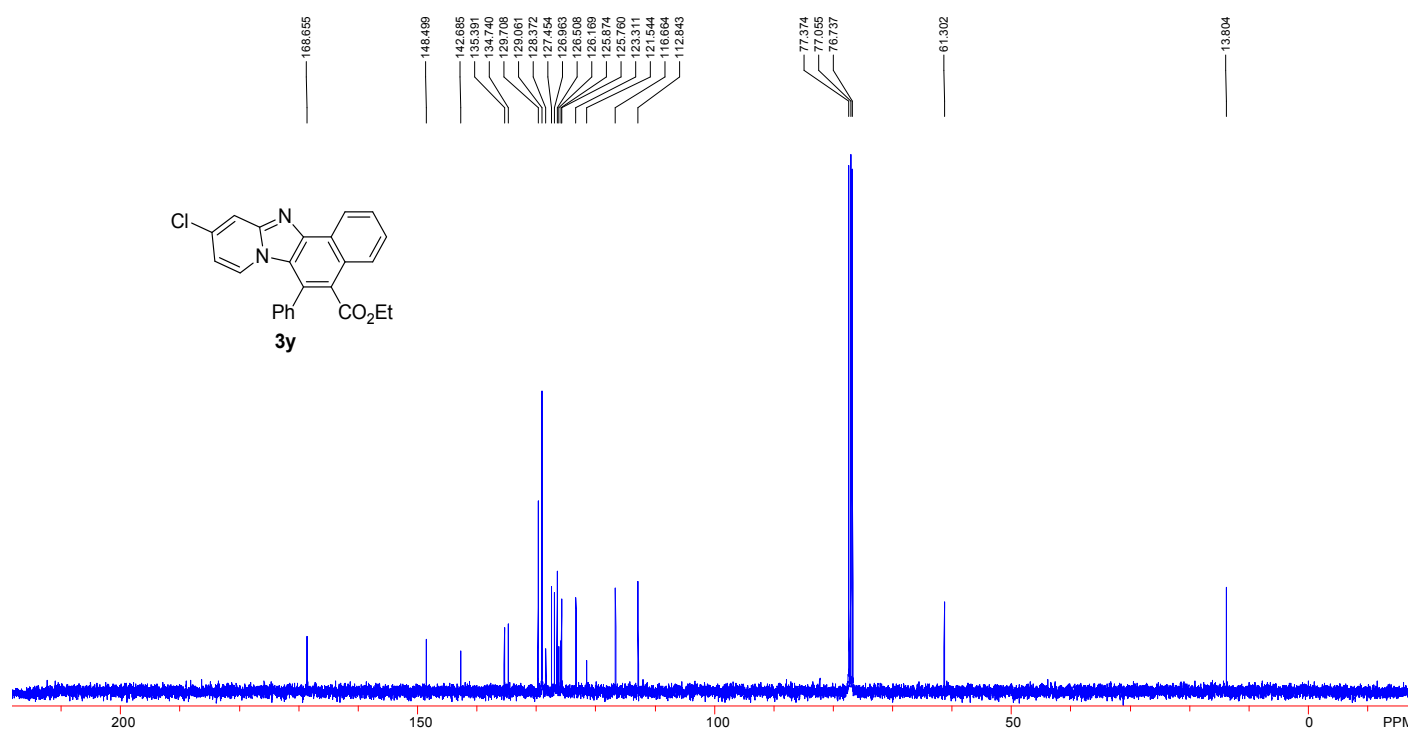
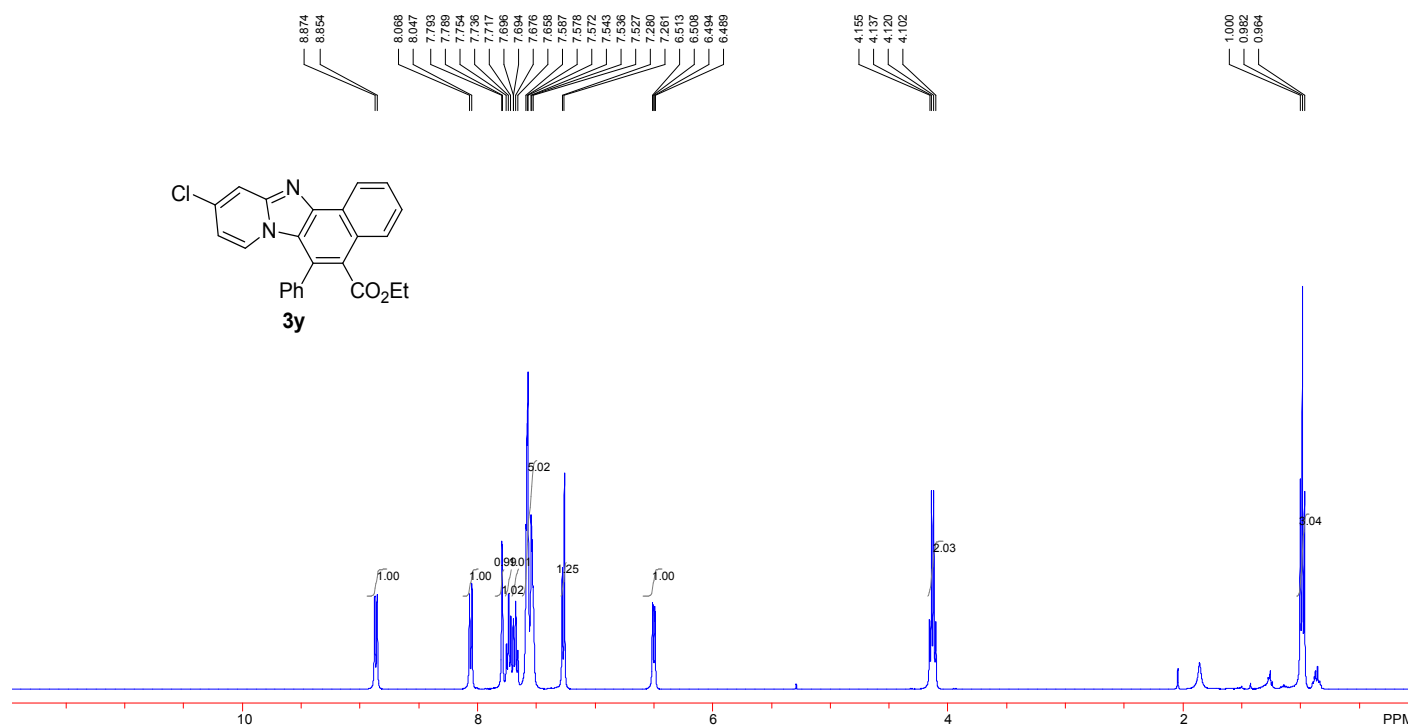


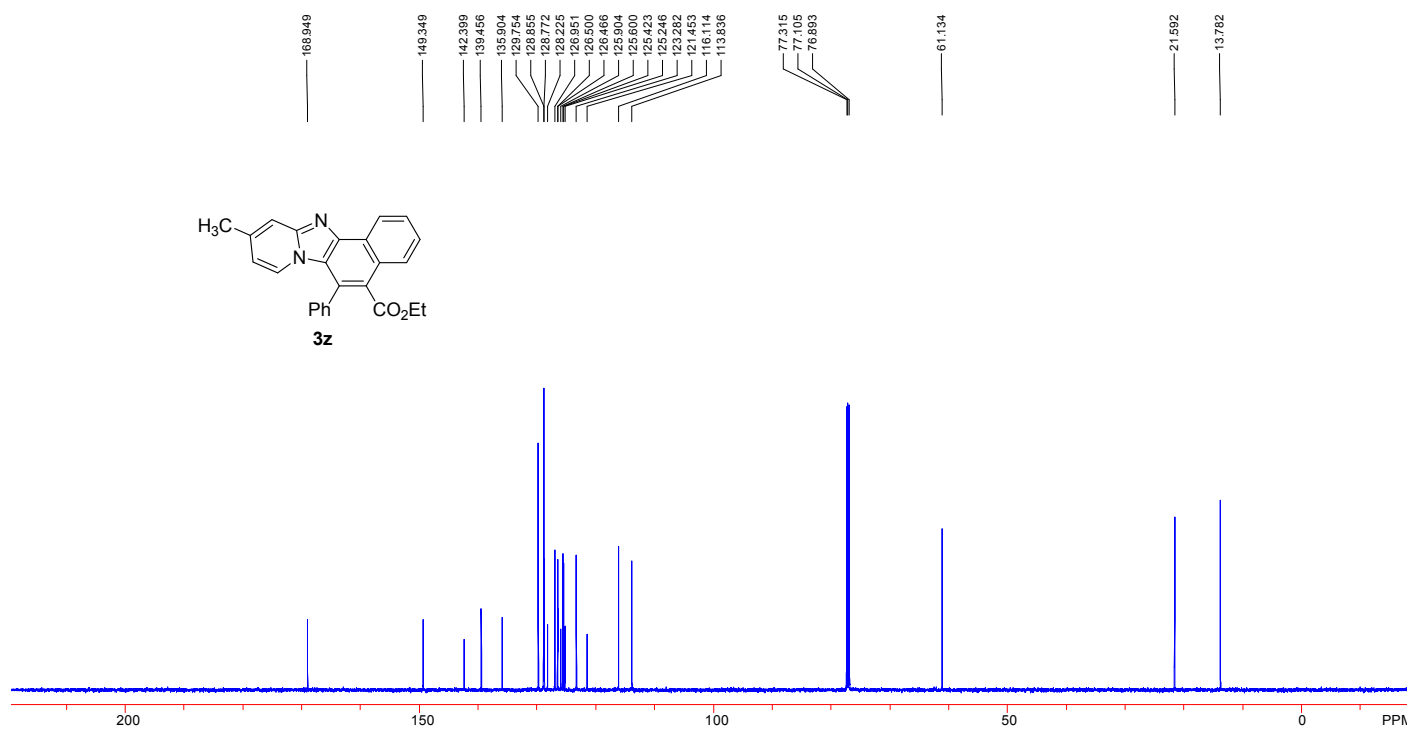
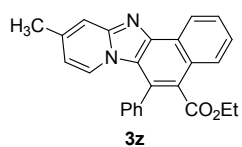
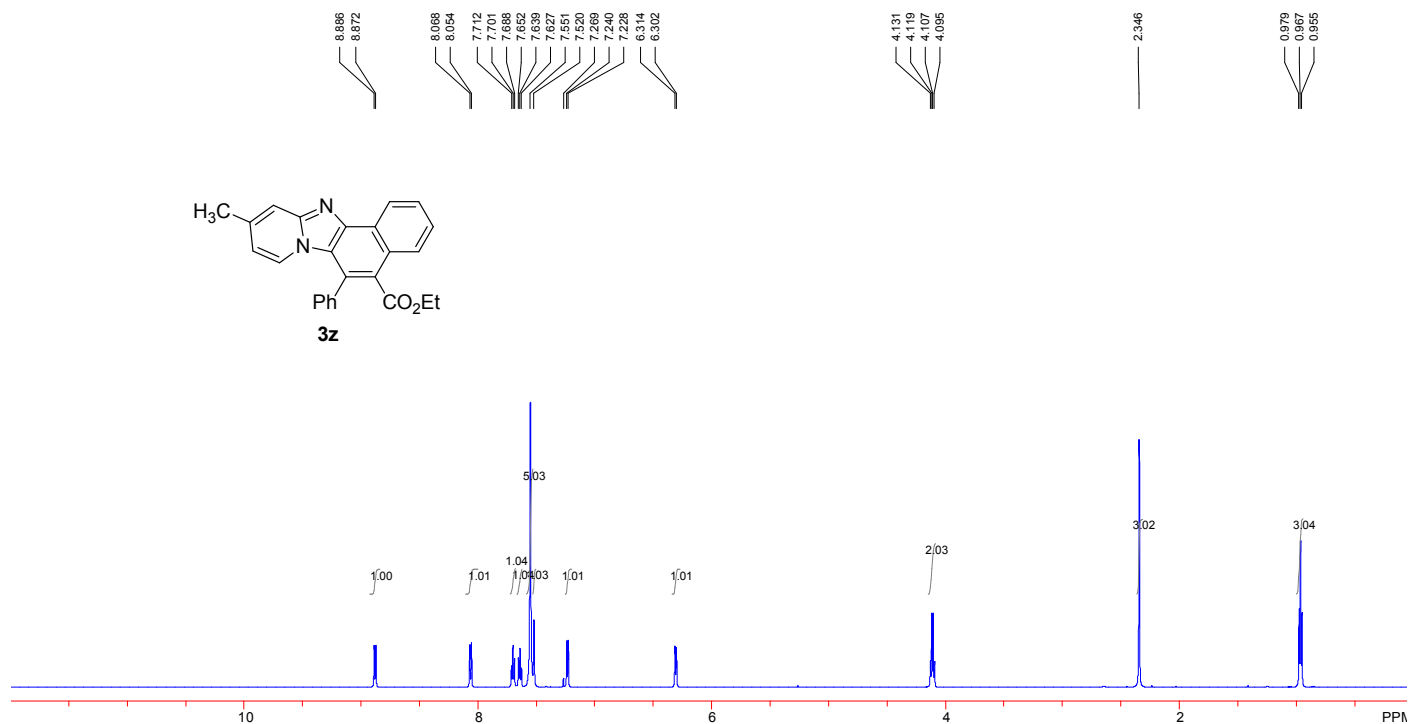
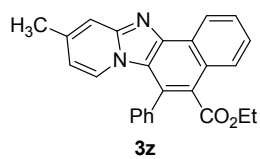


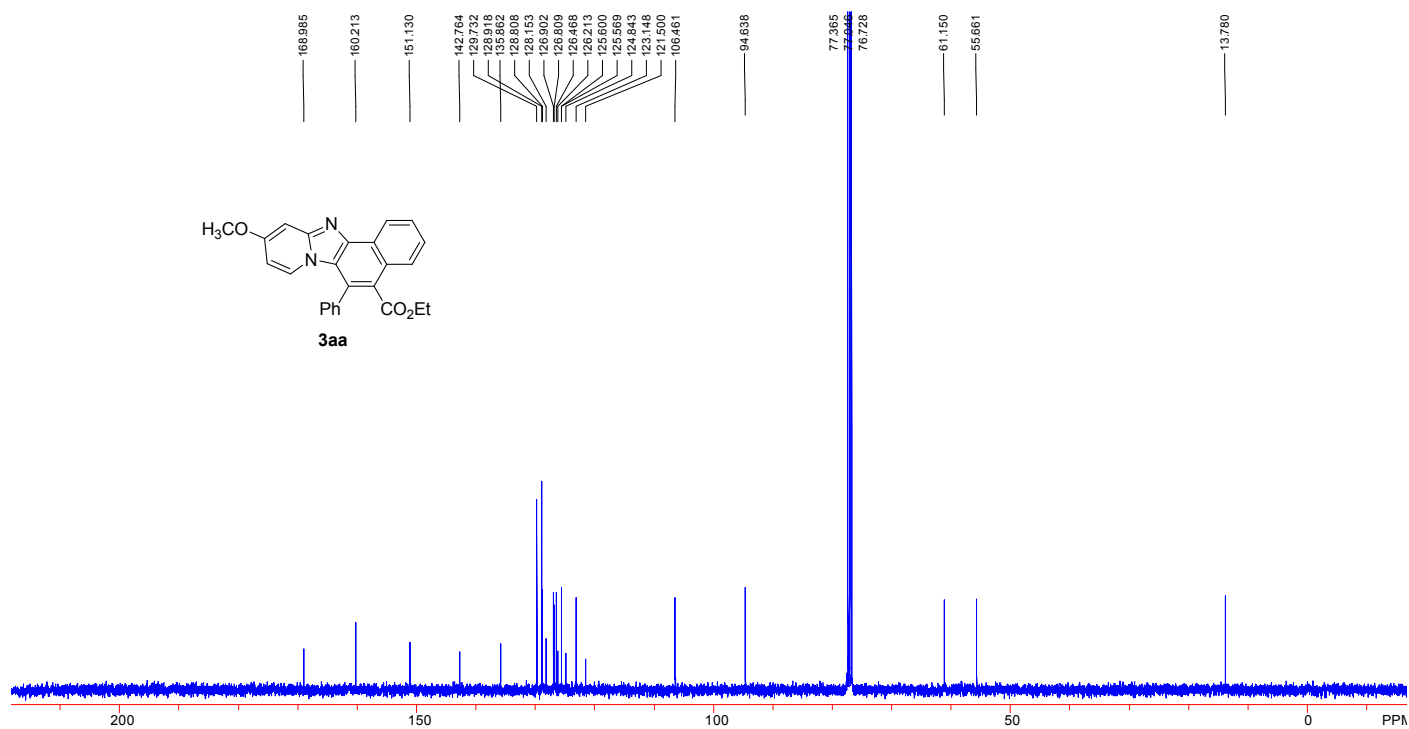
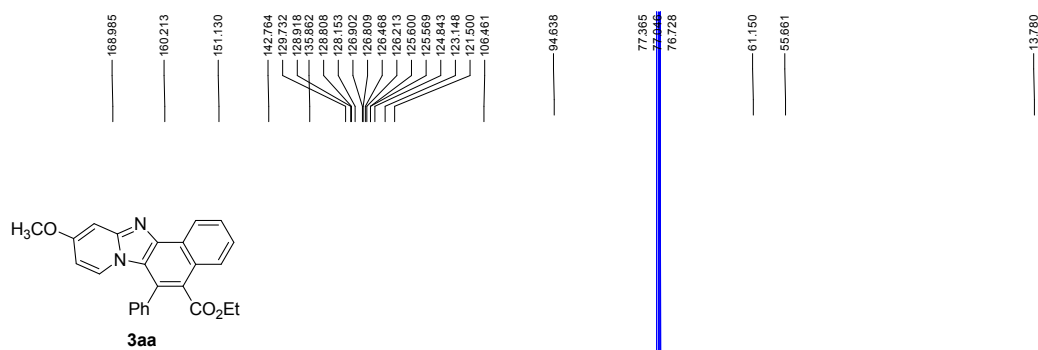
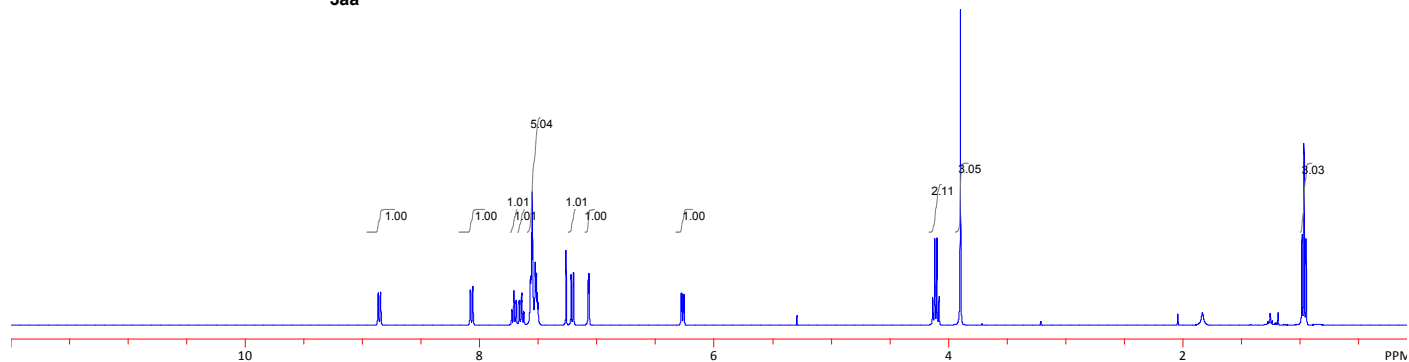
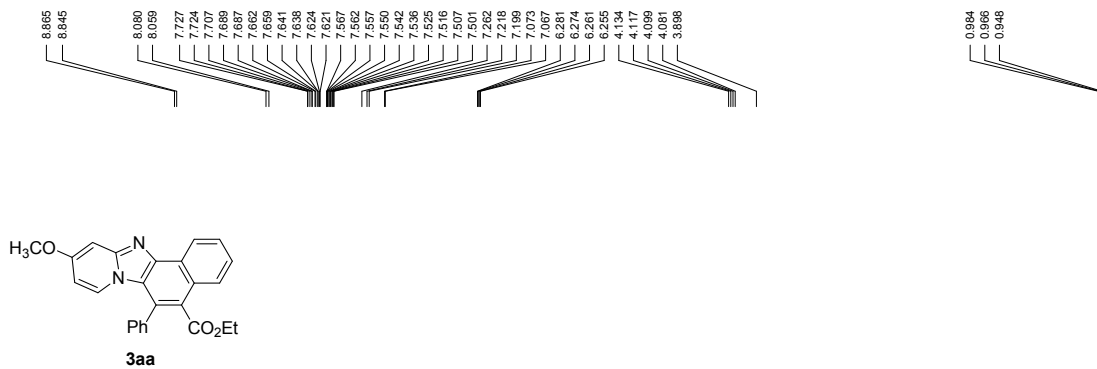


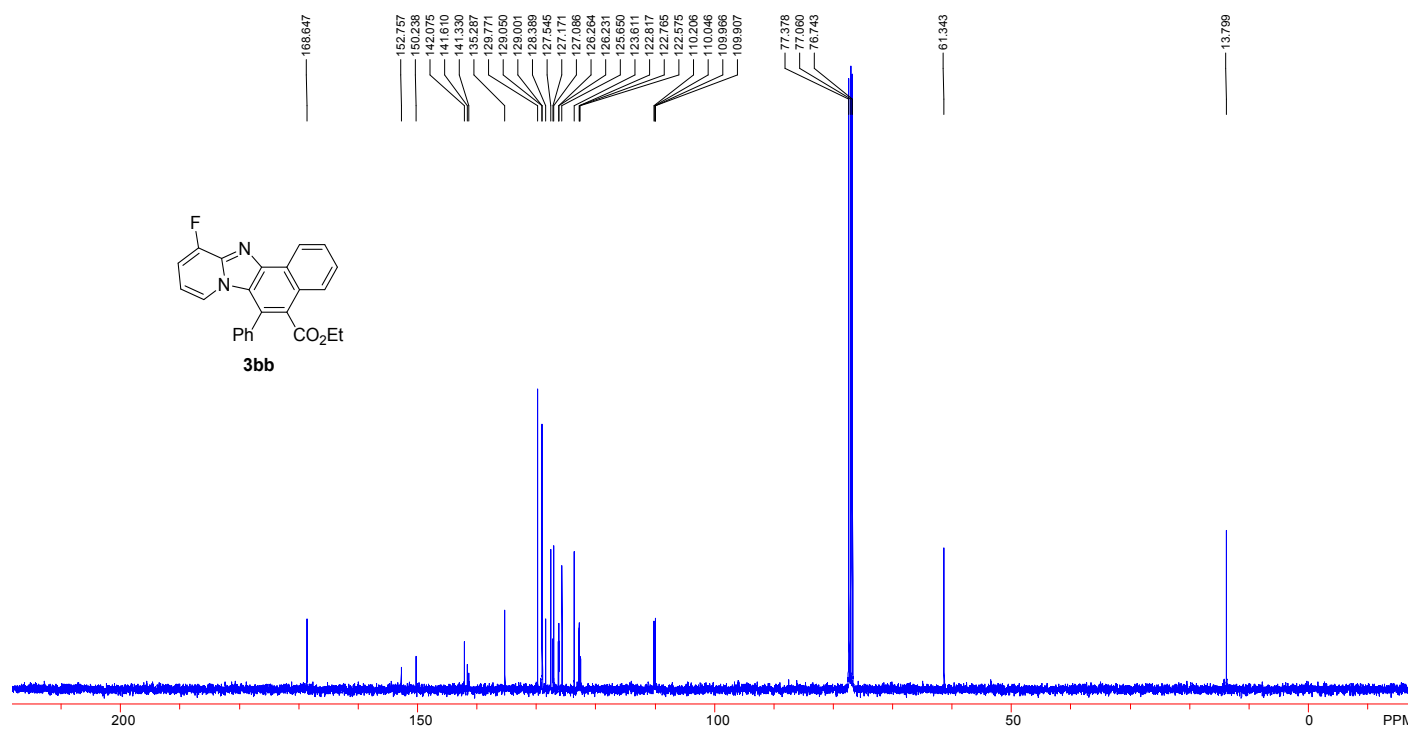
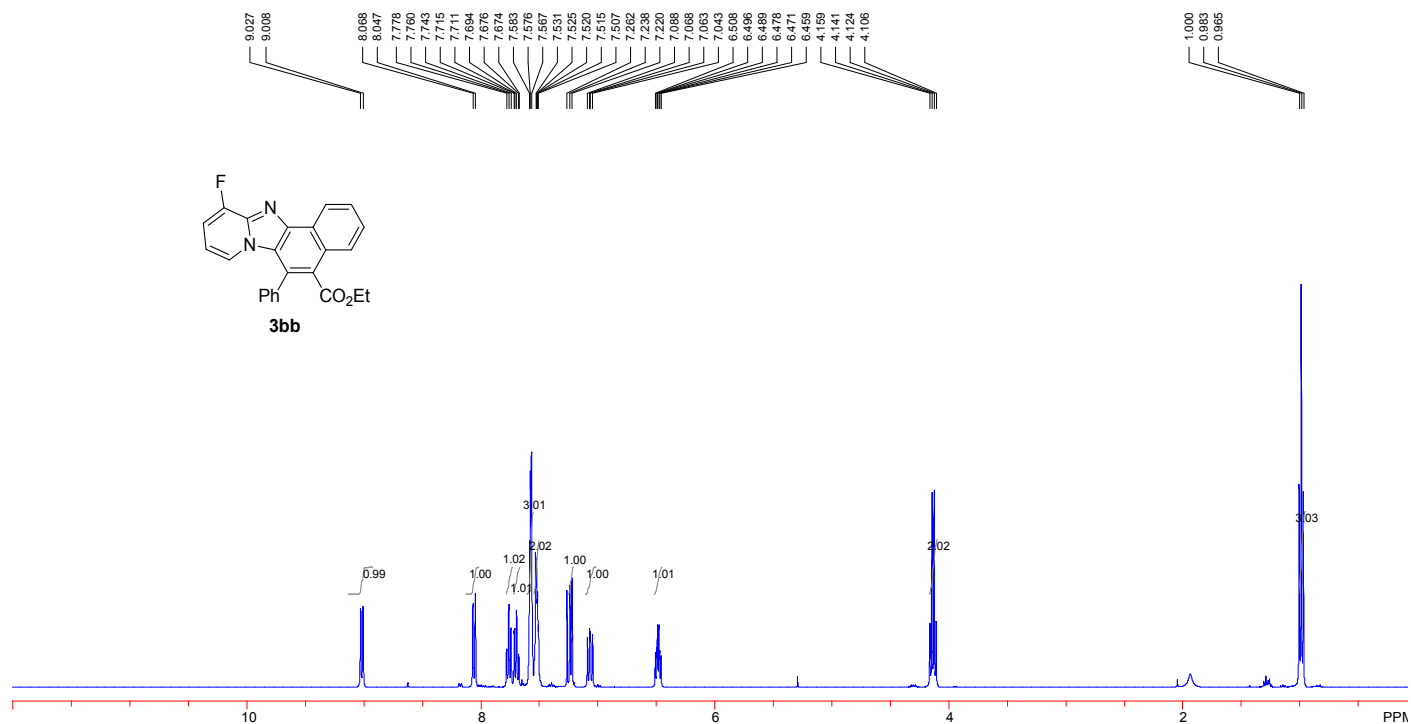


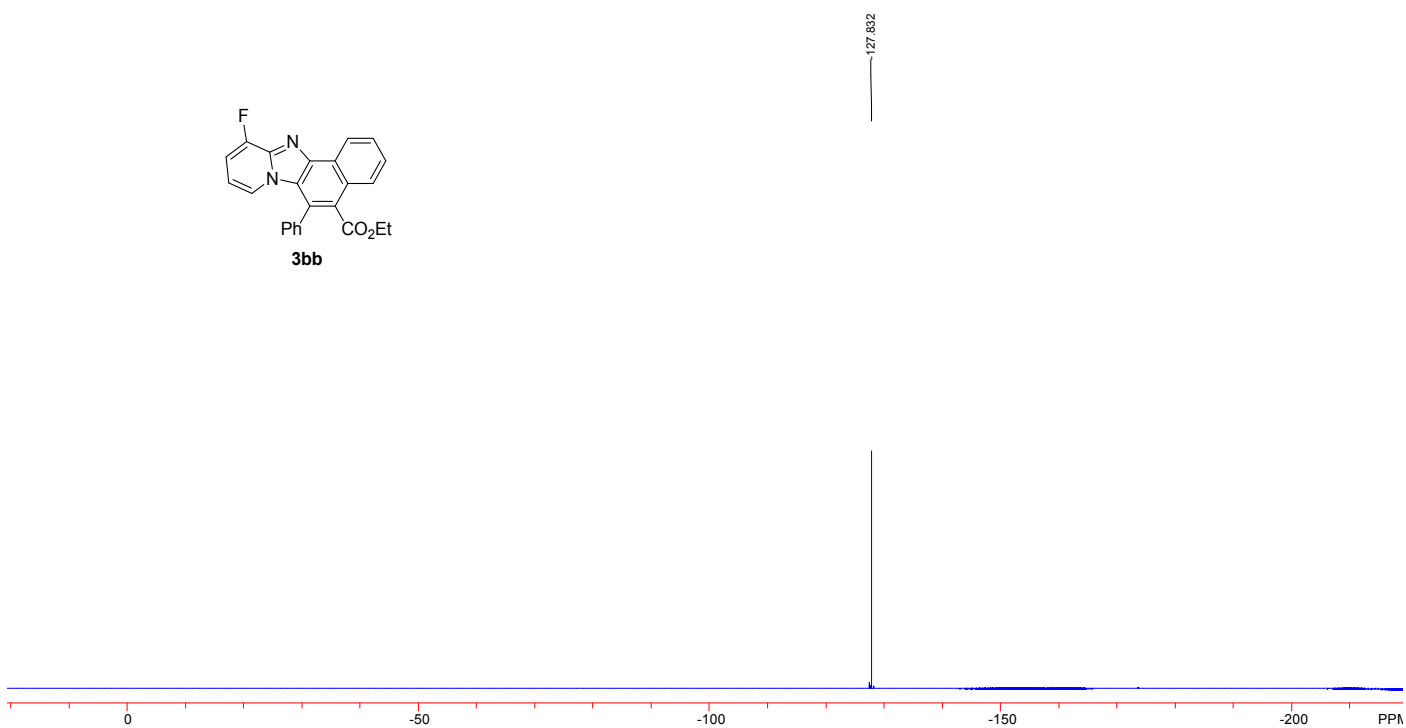
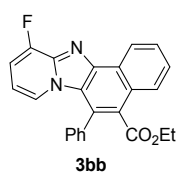


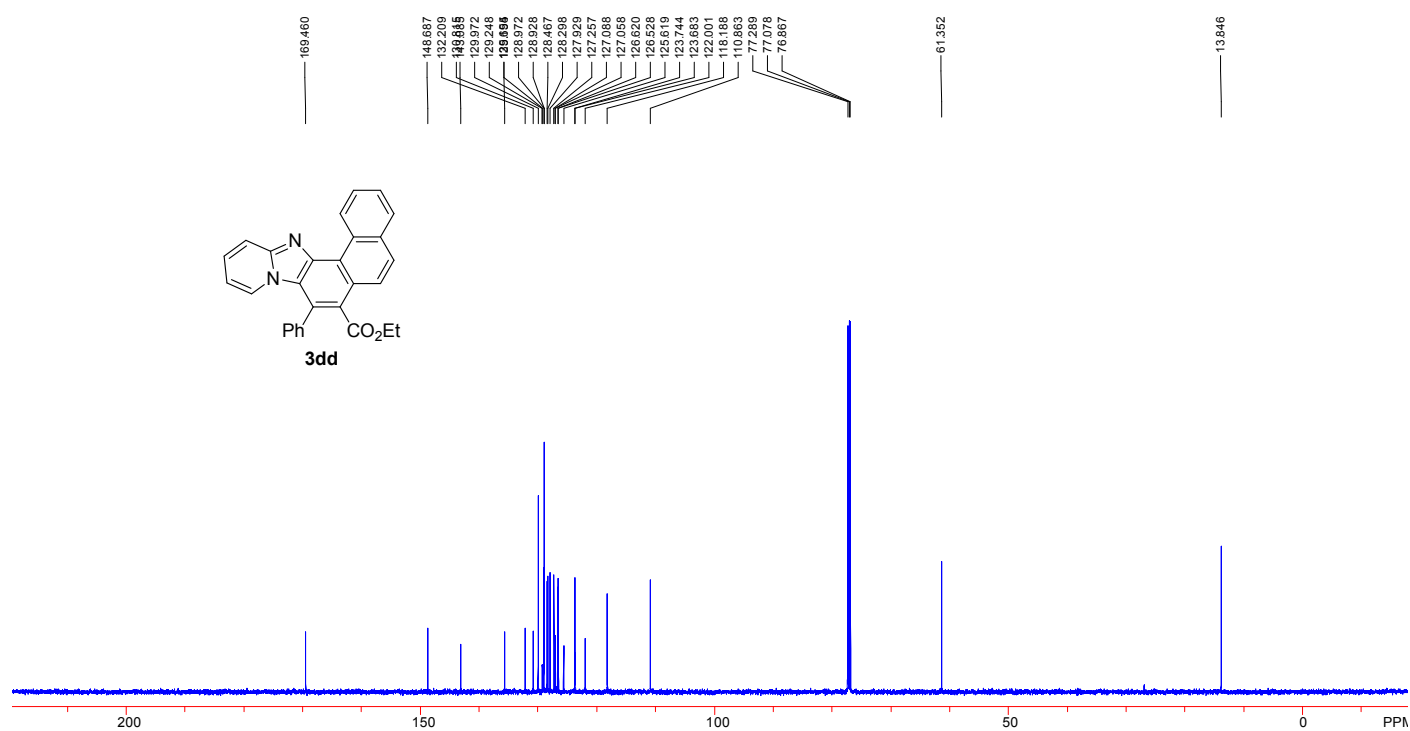
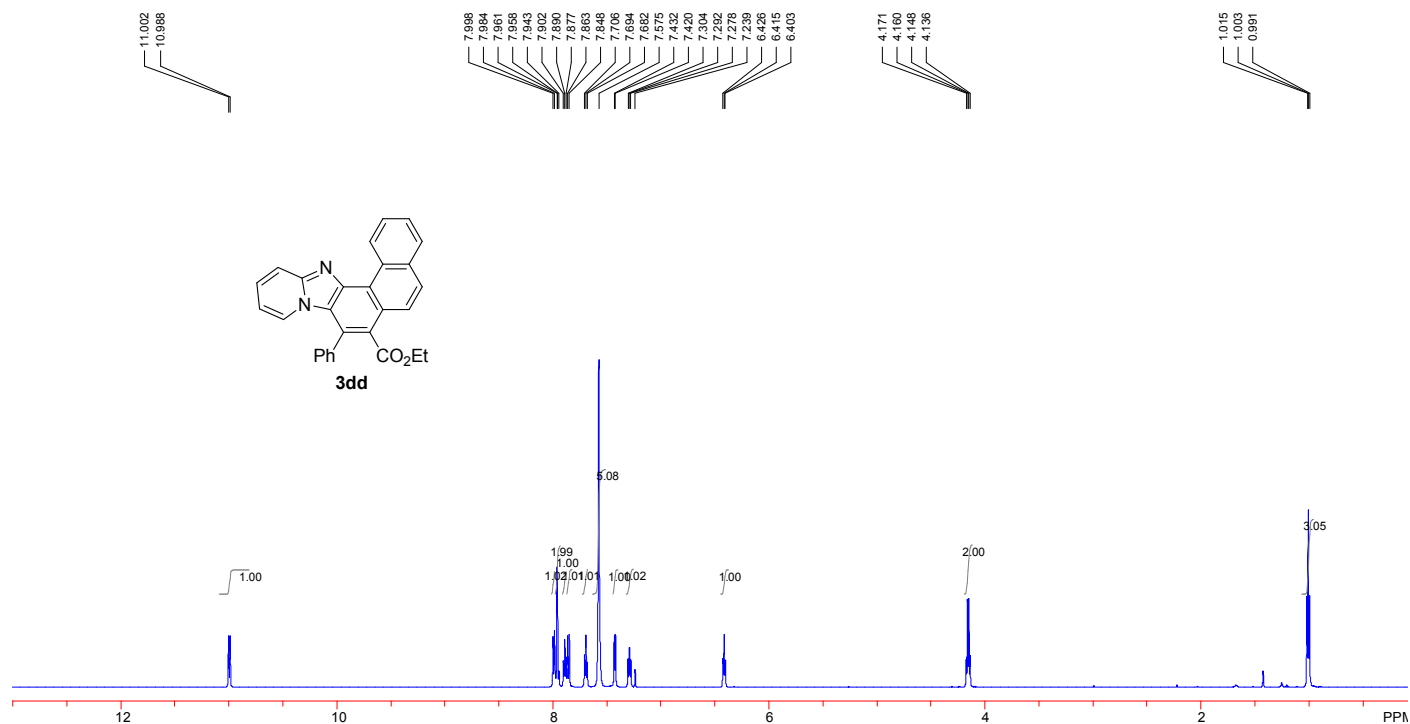


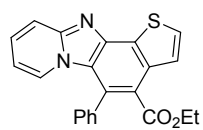




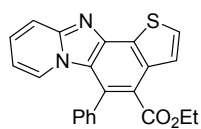
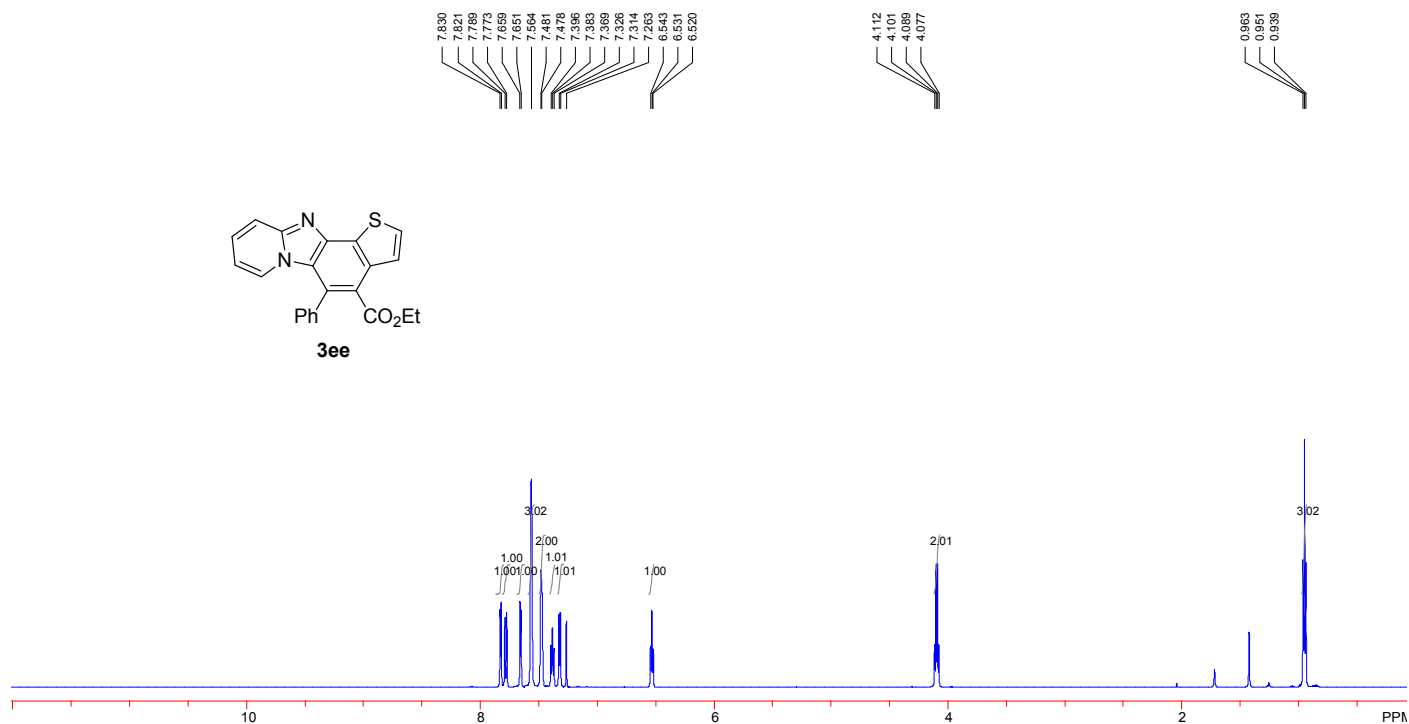




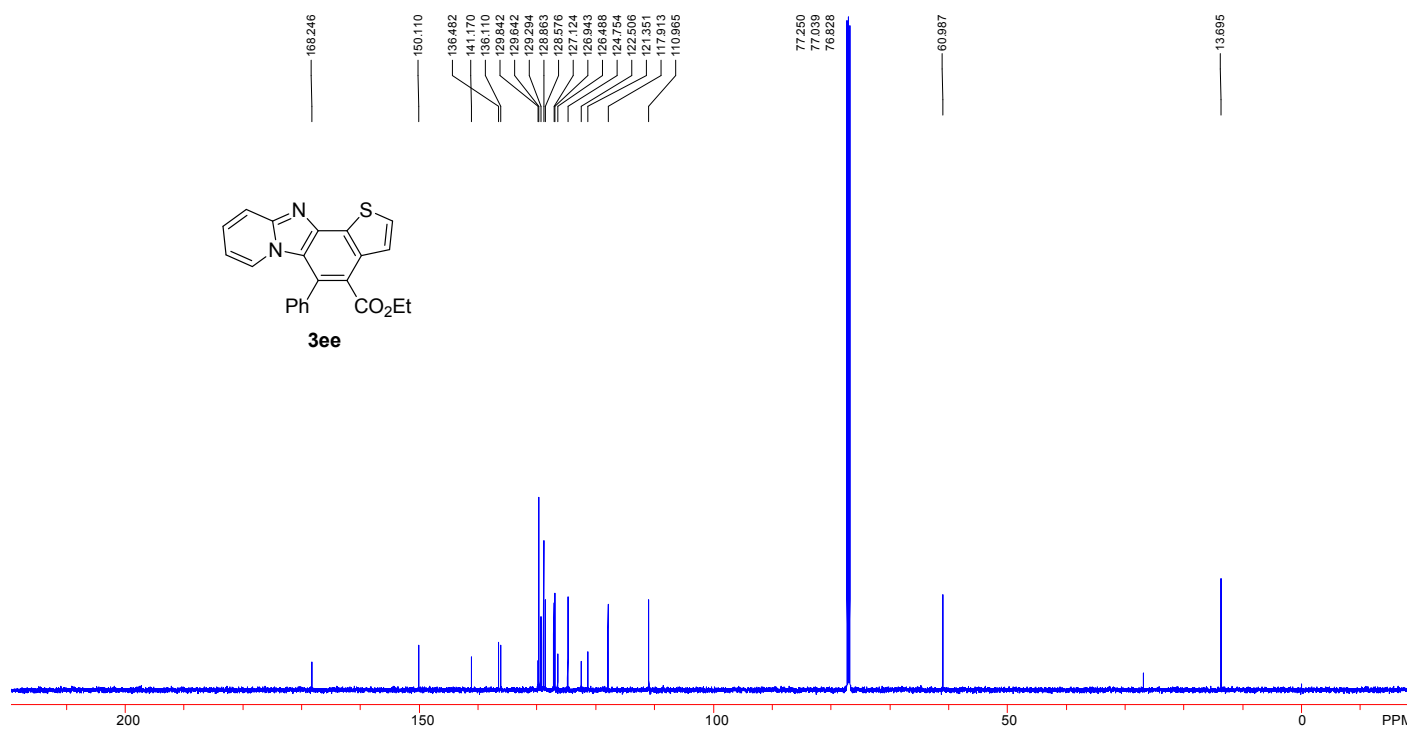




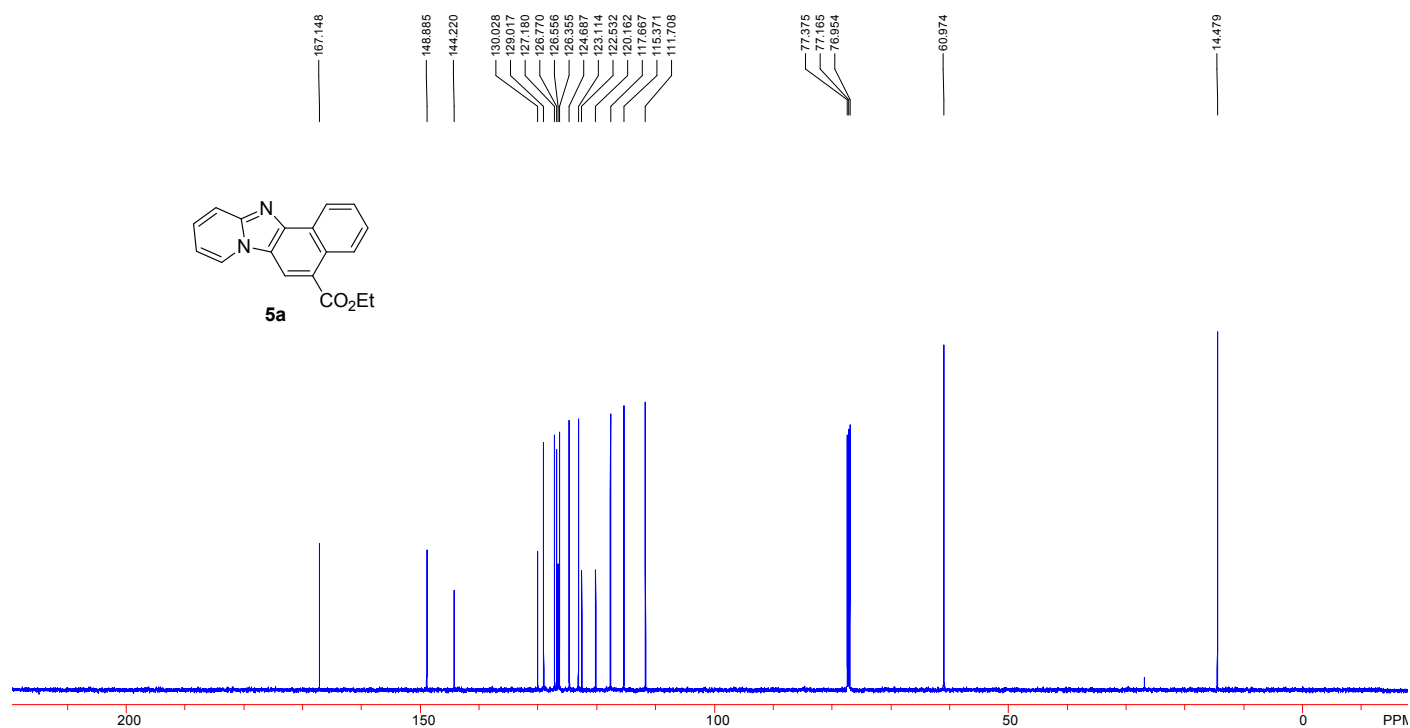
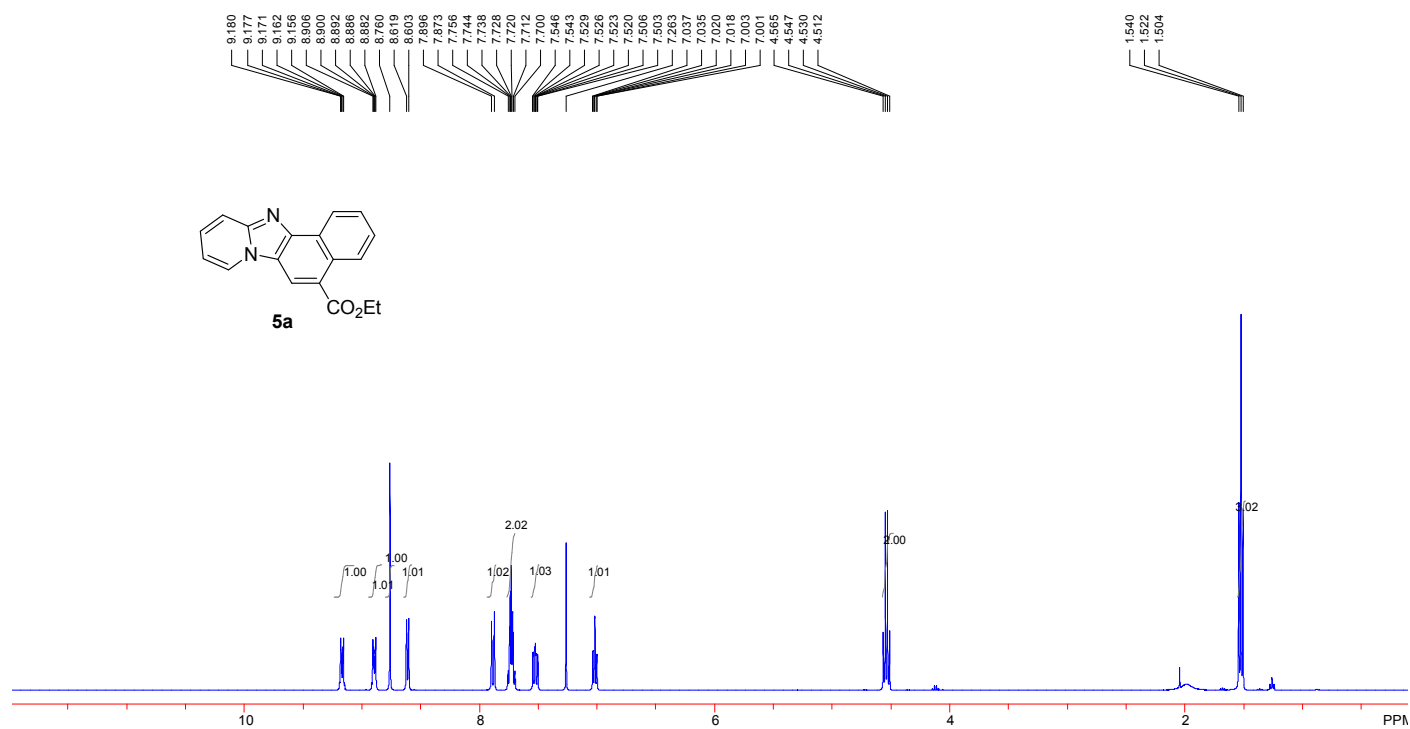
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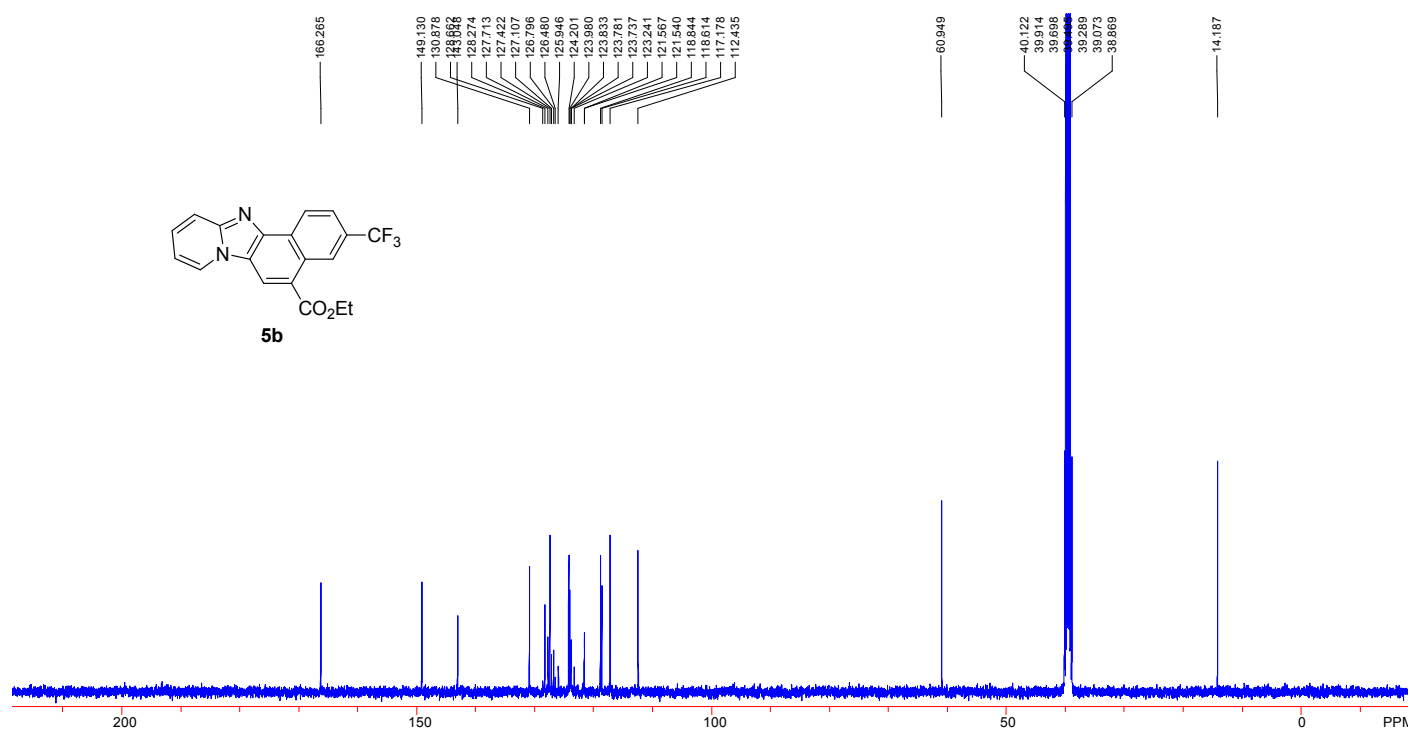
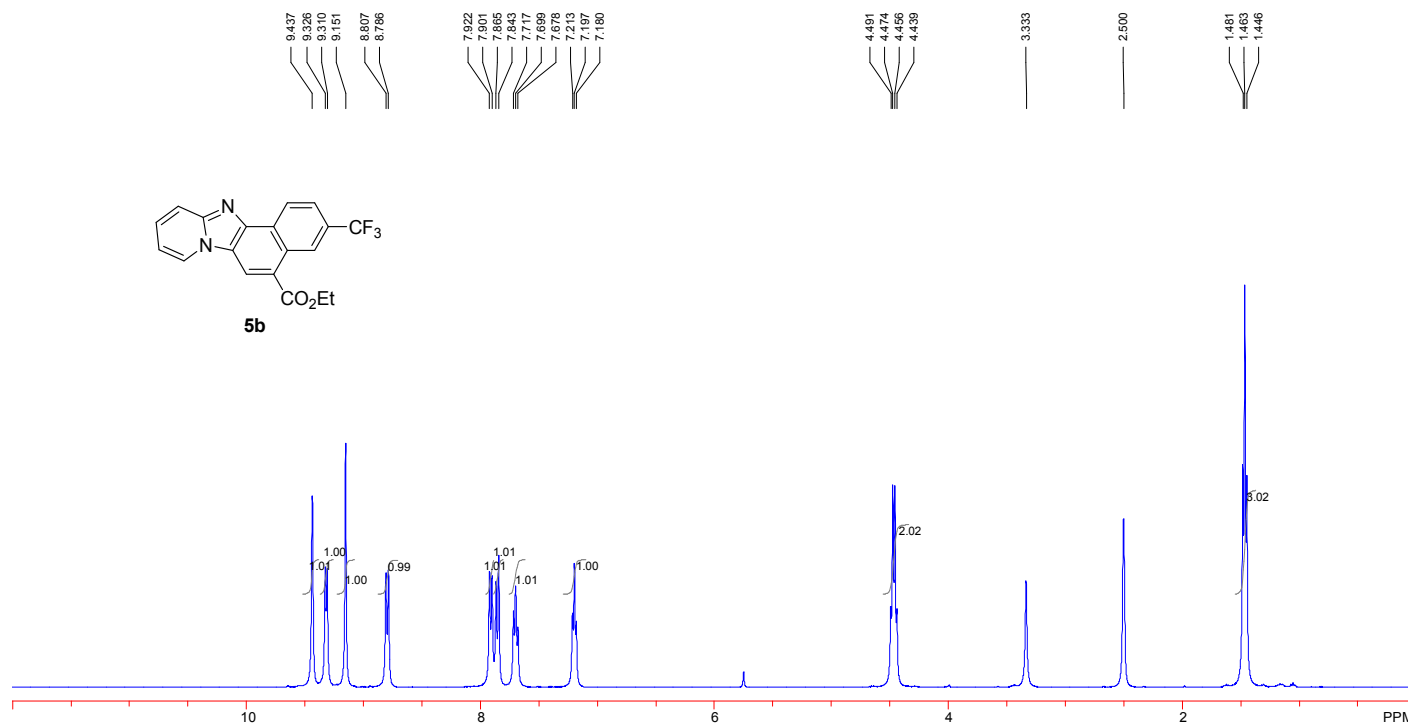


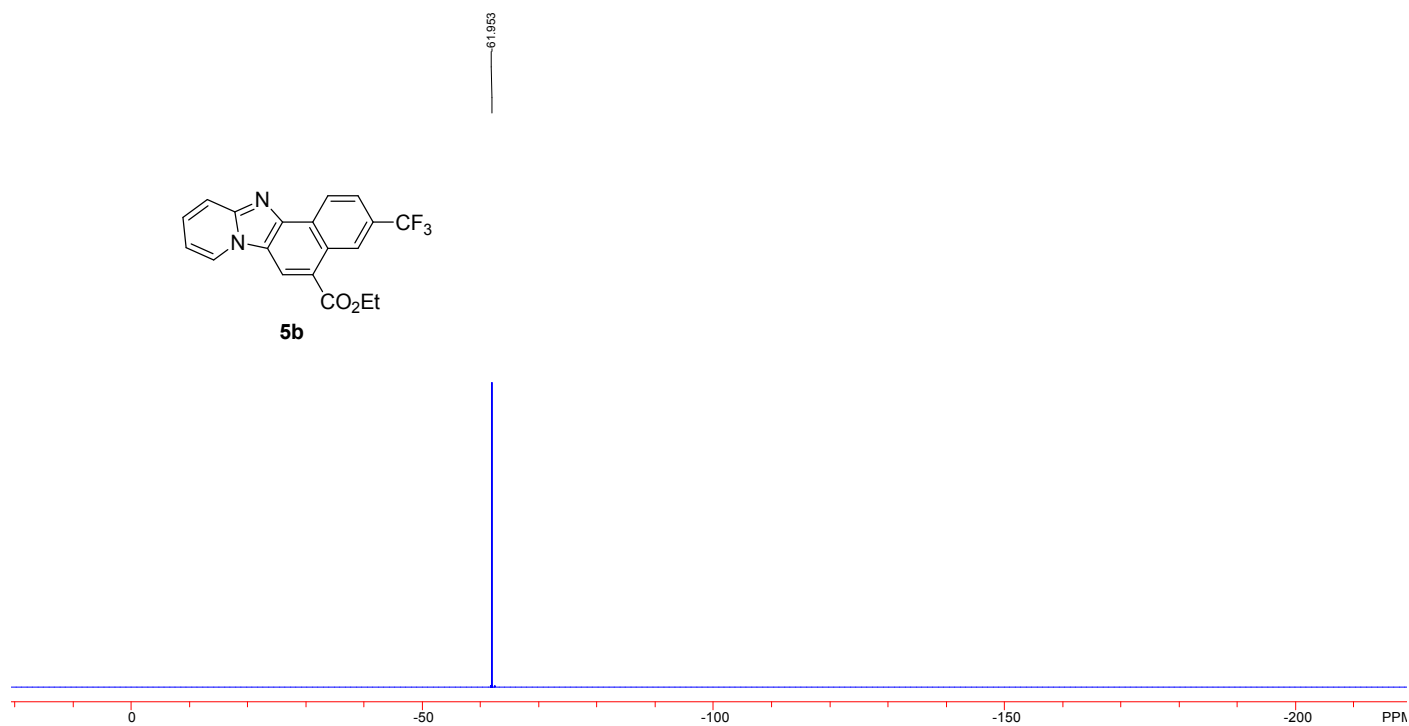
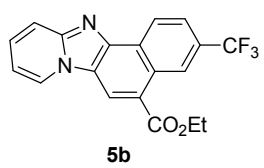
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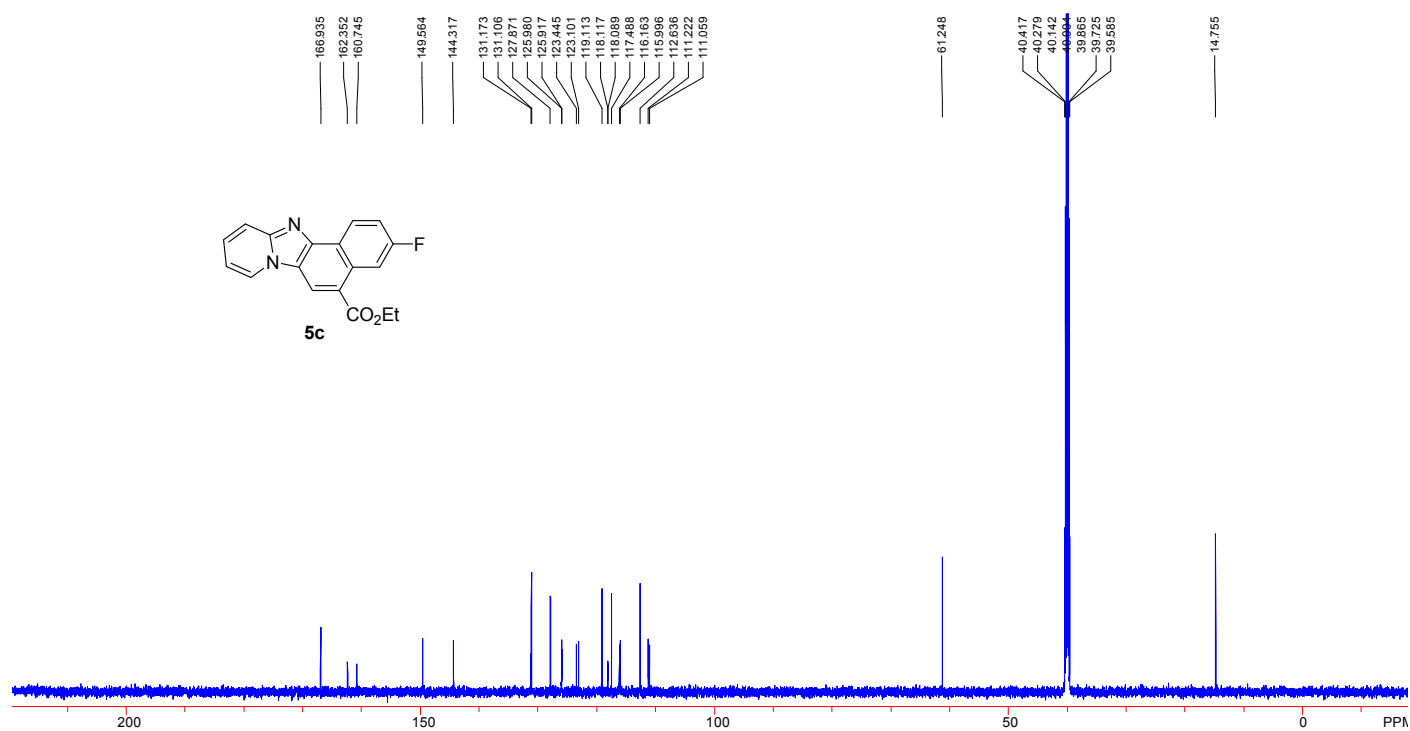
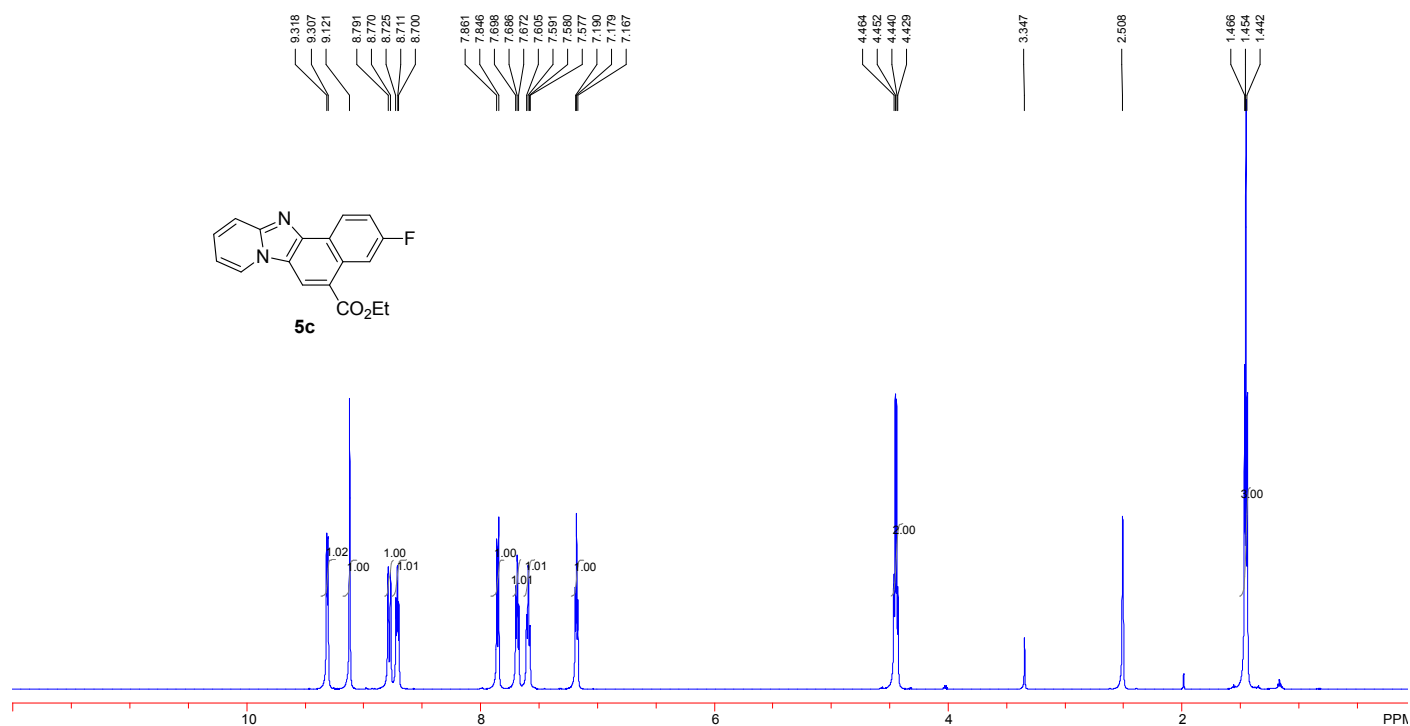


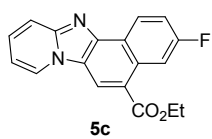
III. Copies of ^1H , ^{13}C and ^{19}F NMR spectra of 5a-5v



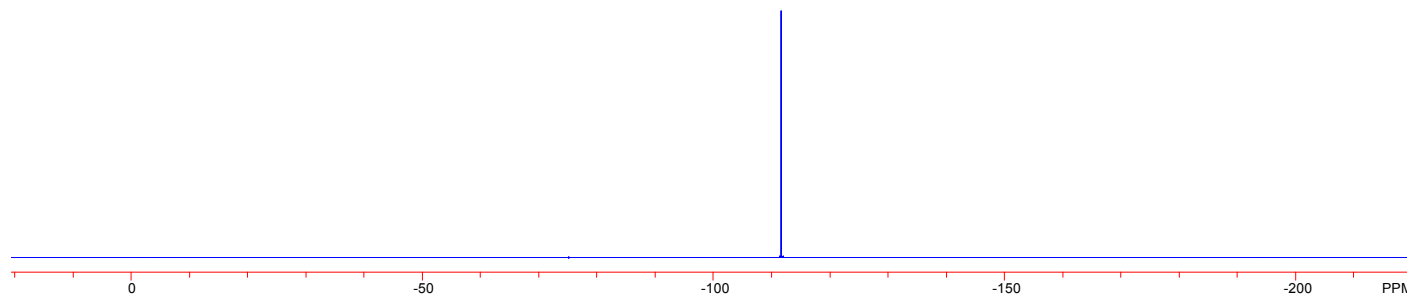


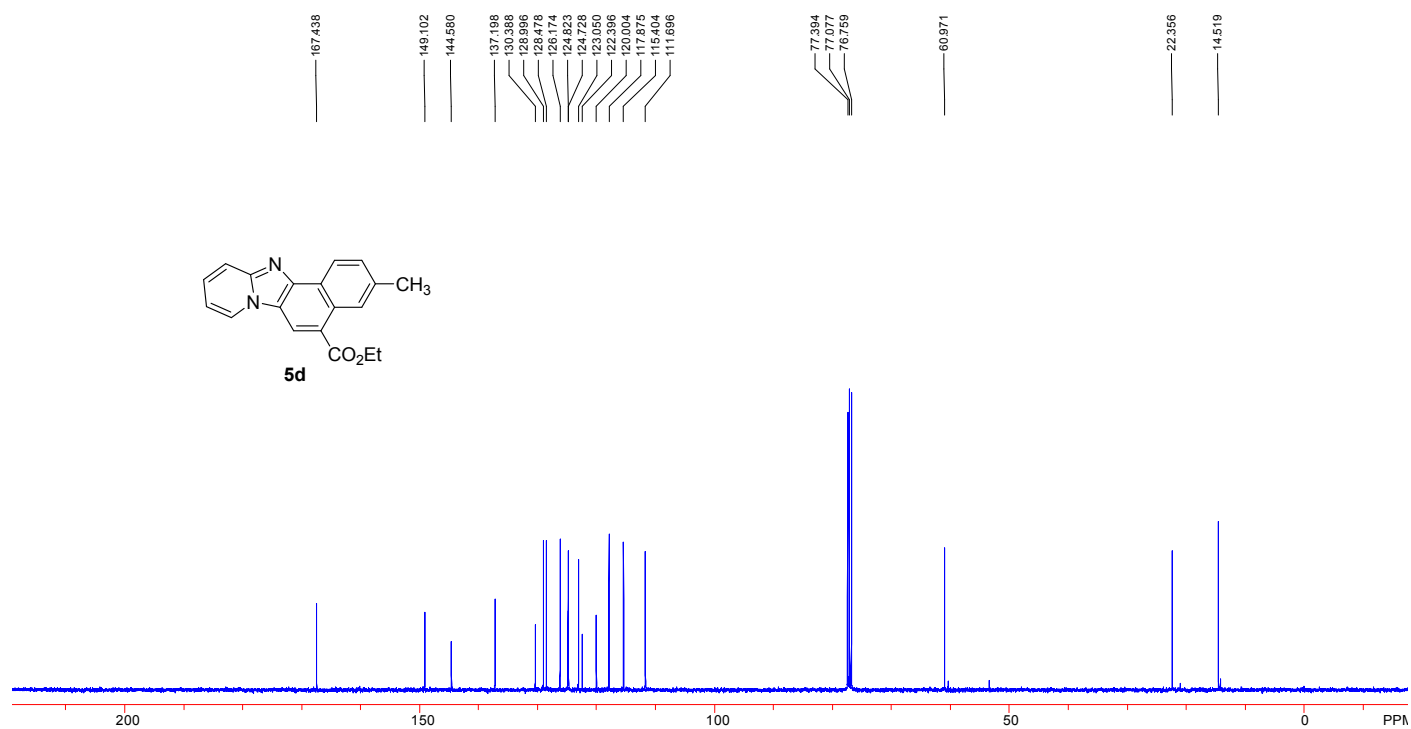
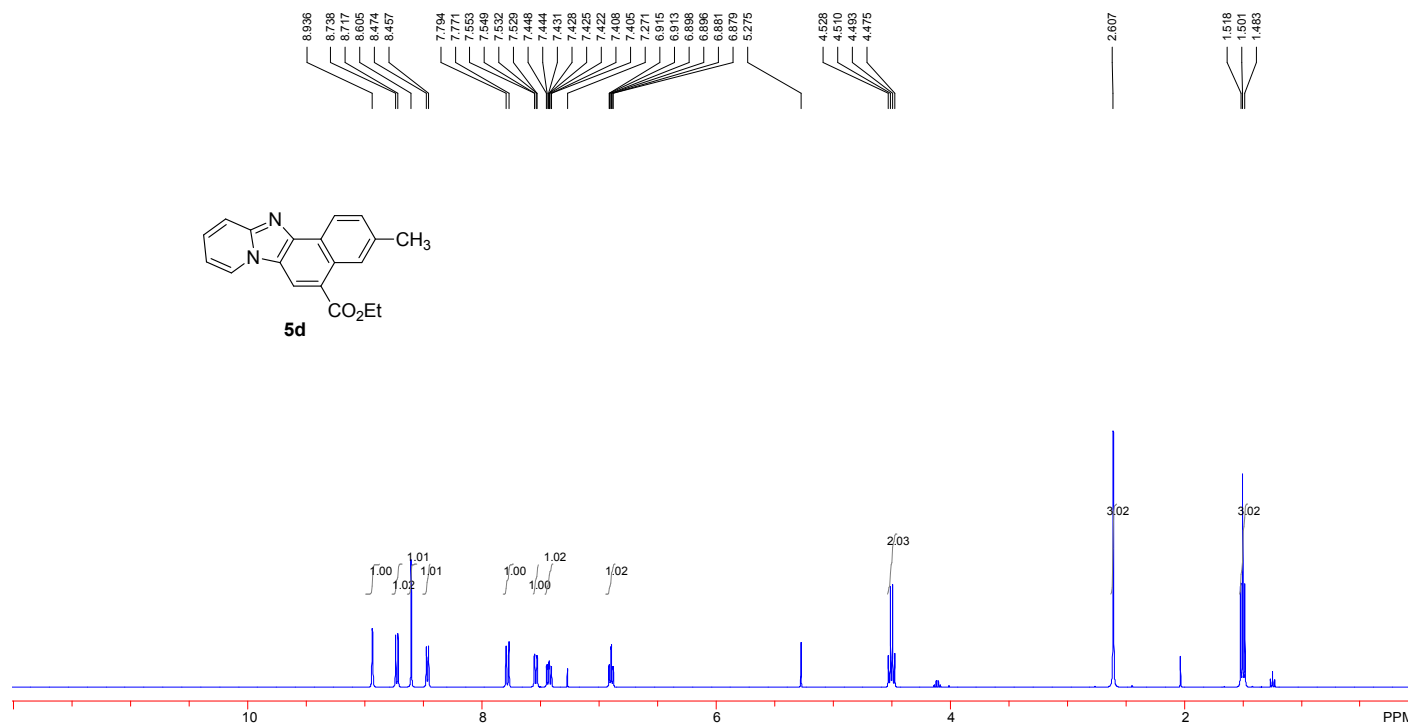


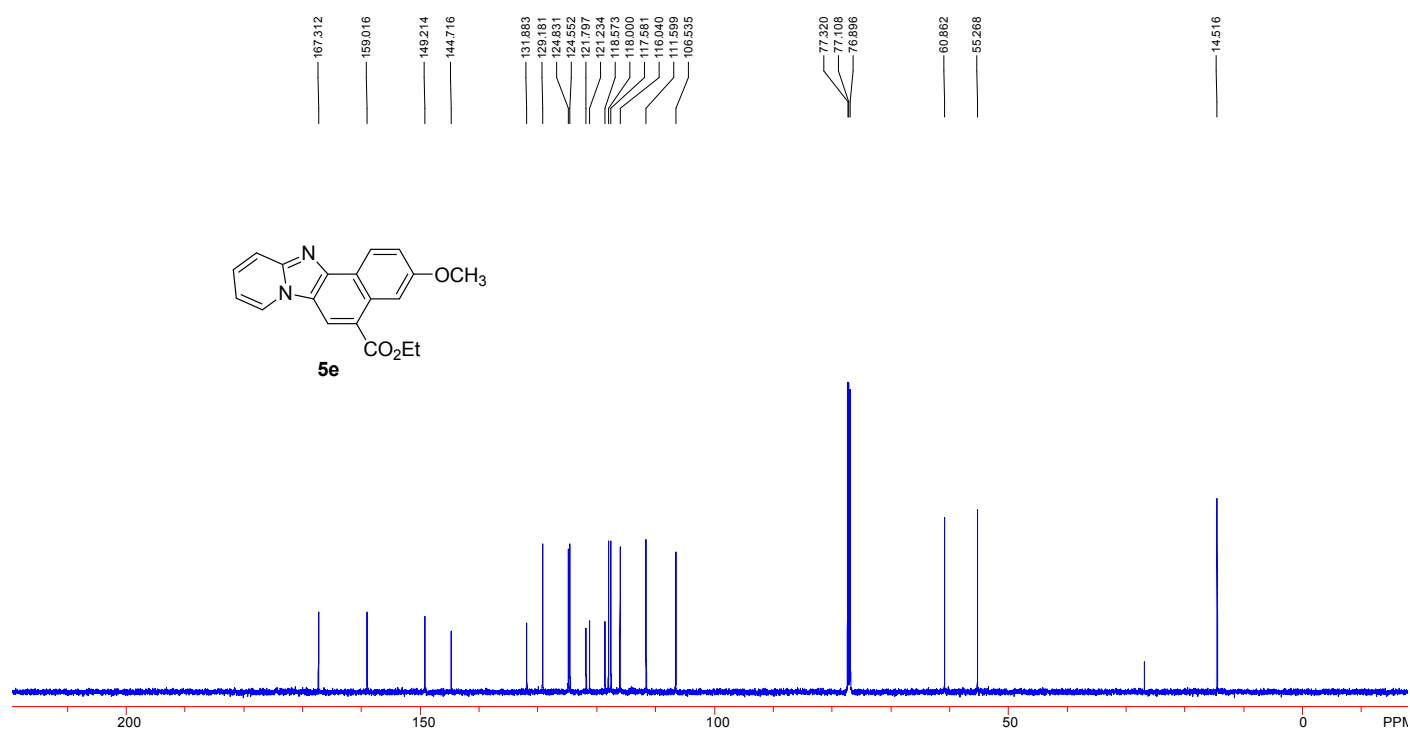
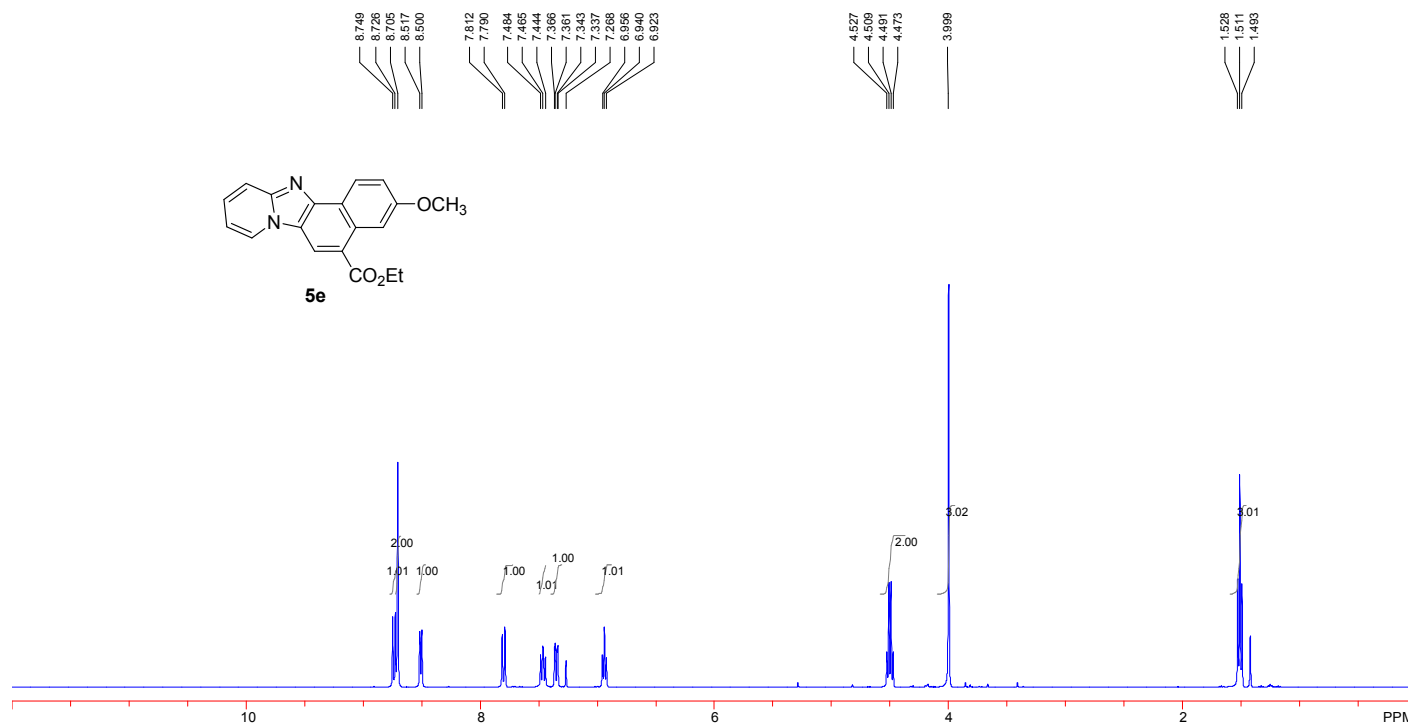


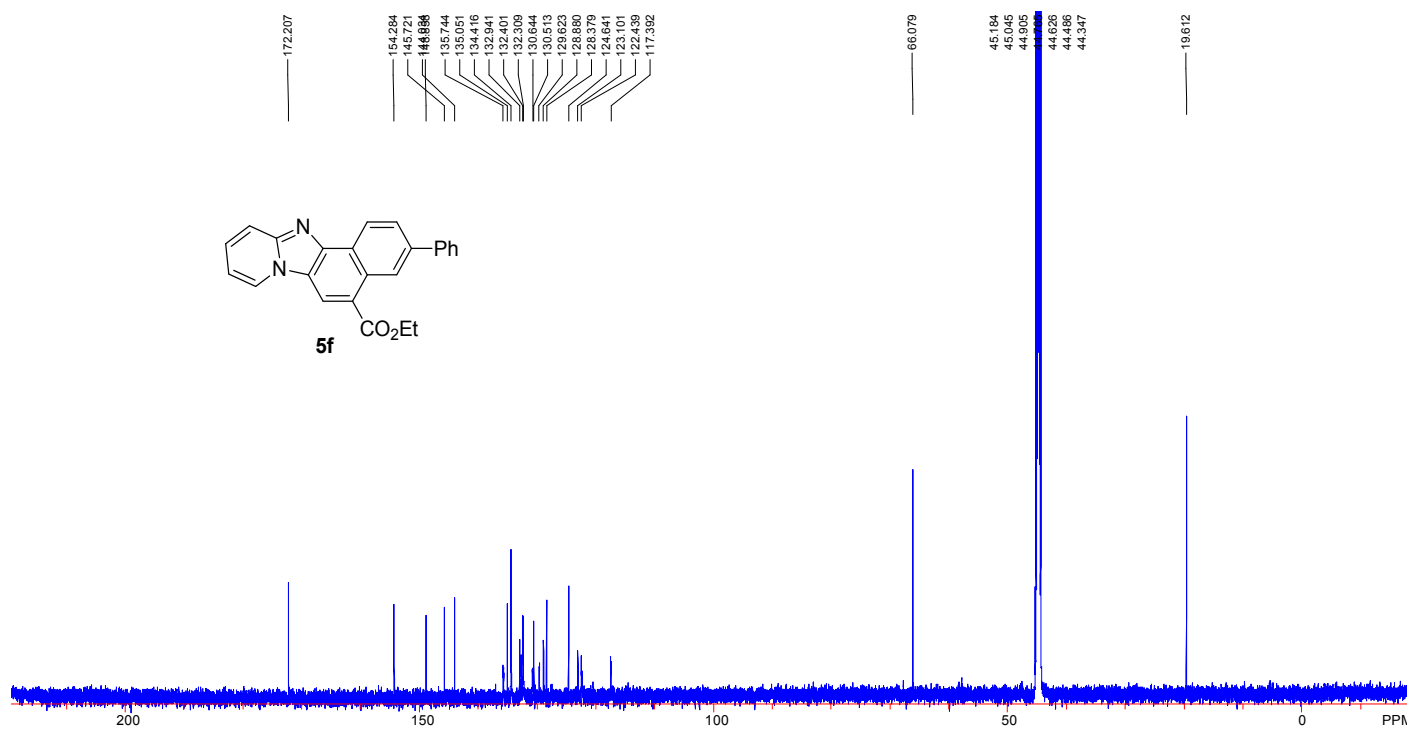
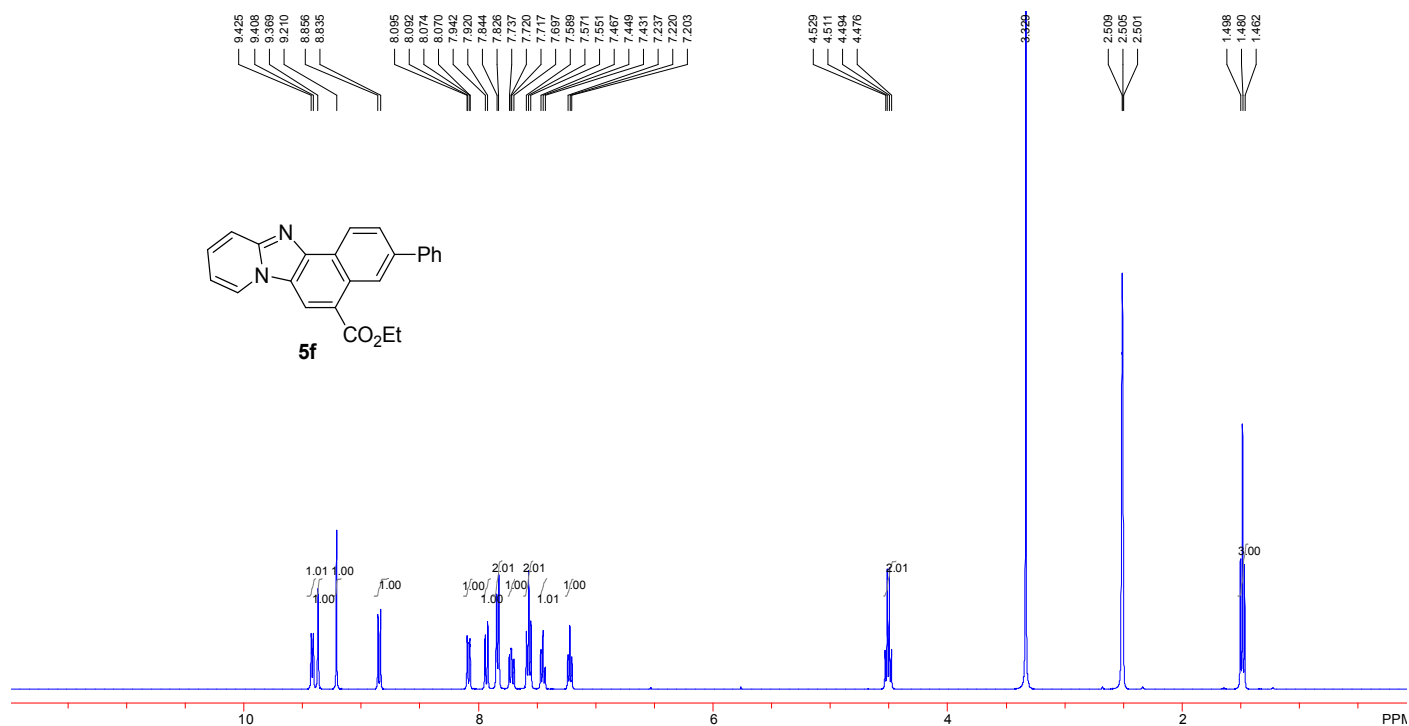


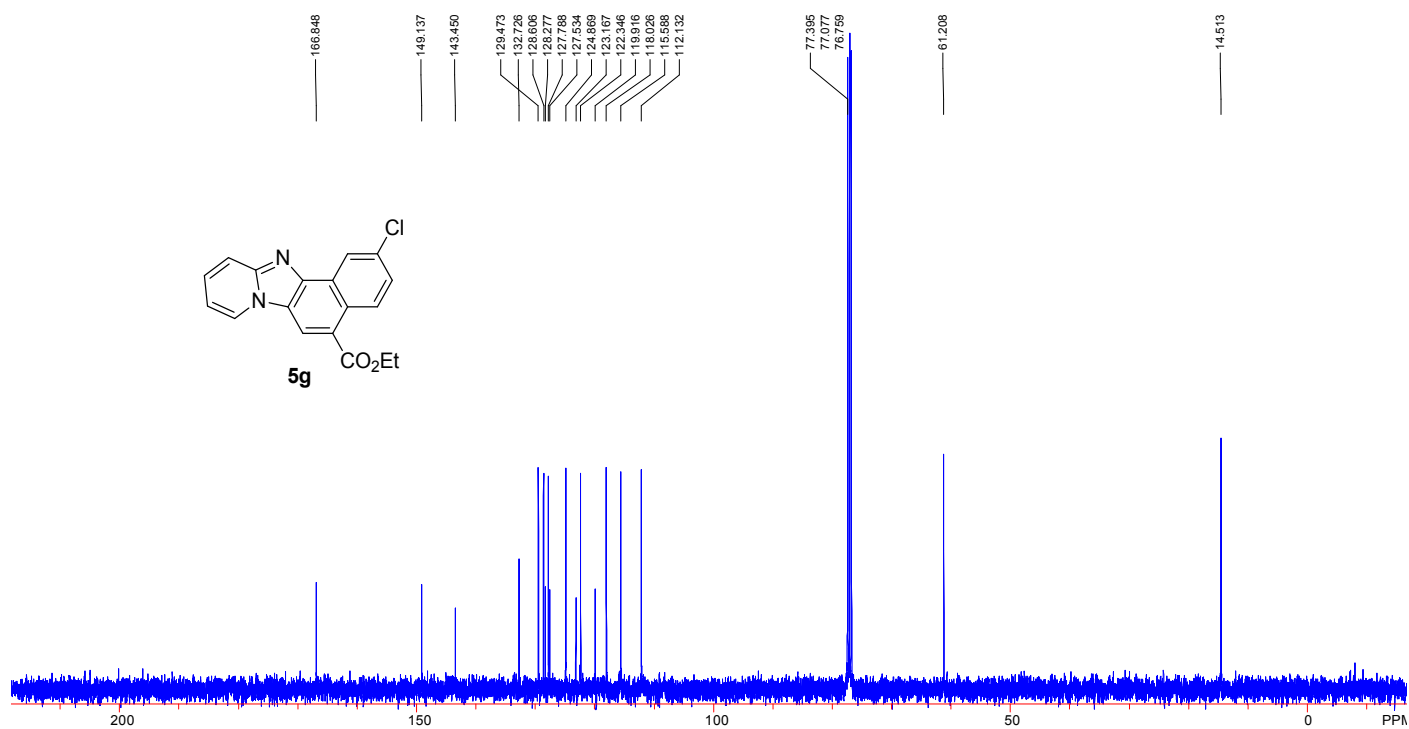
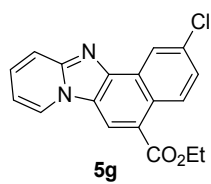
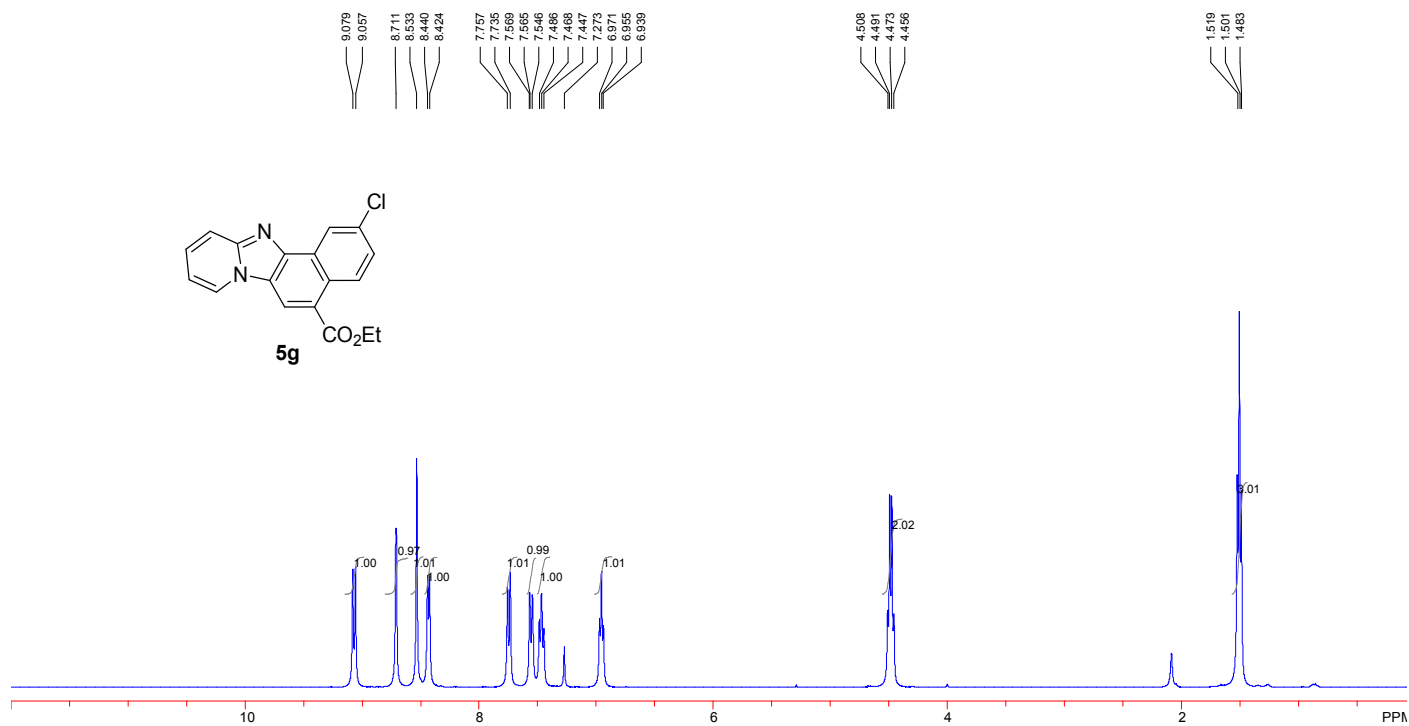
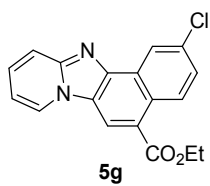
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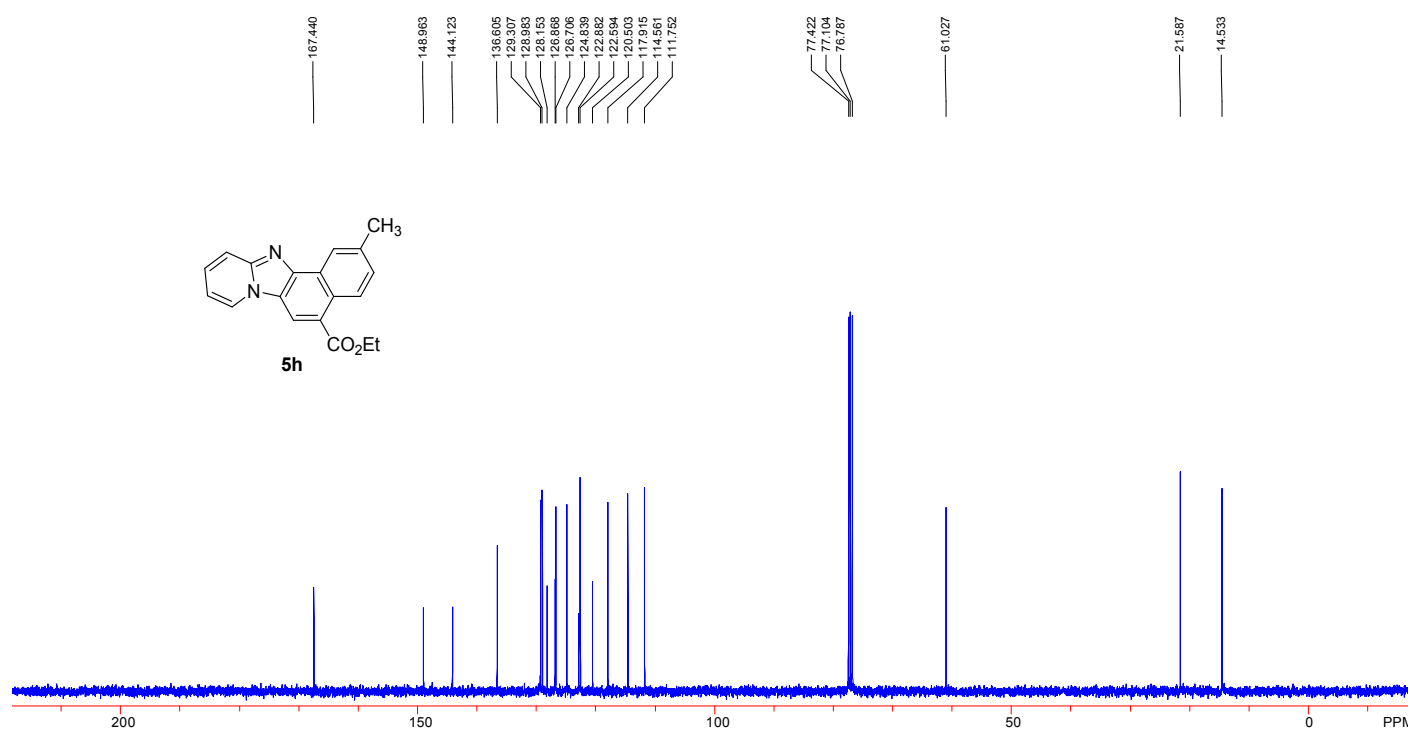
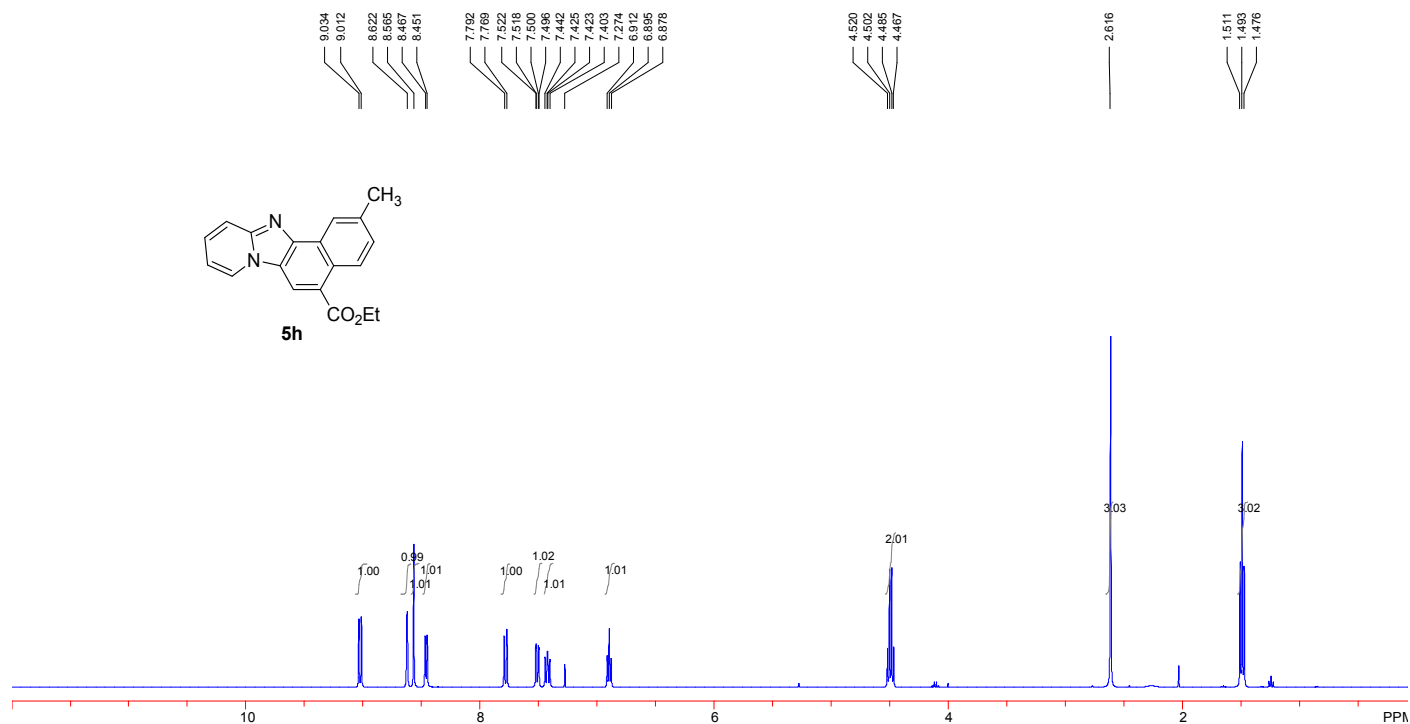


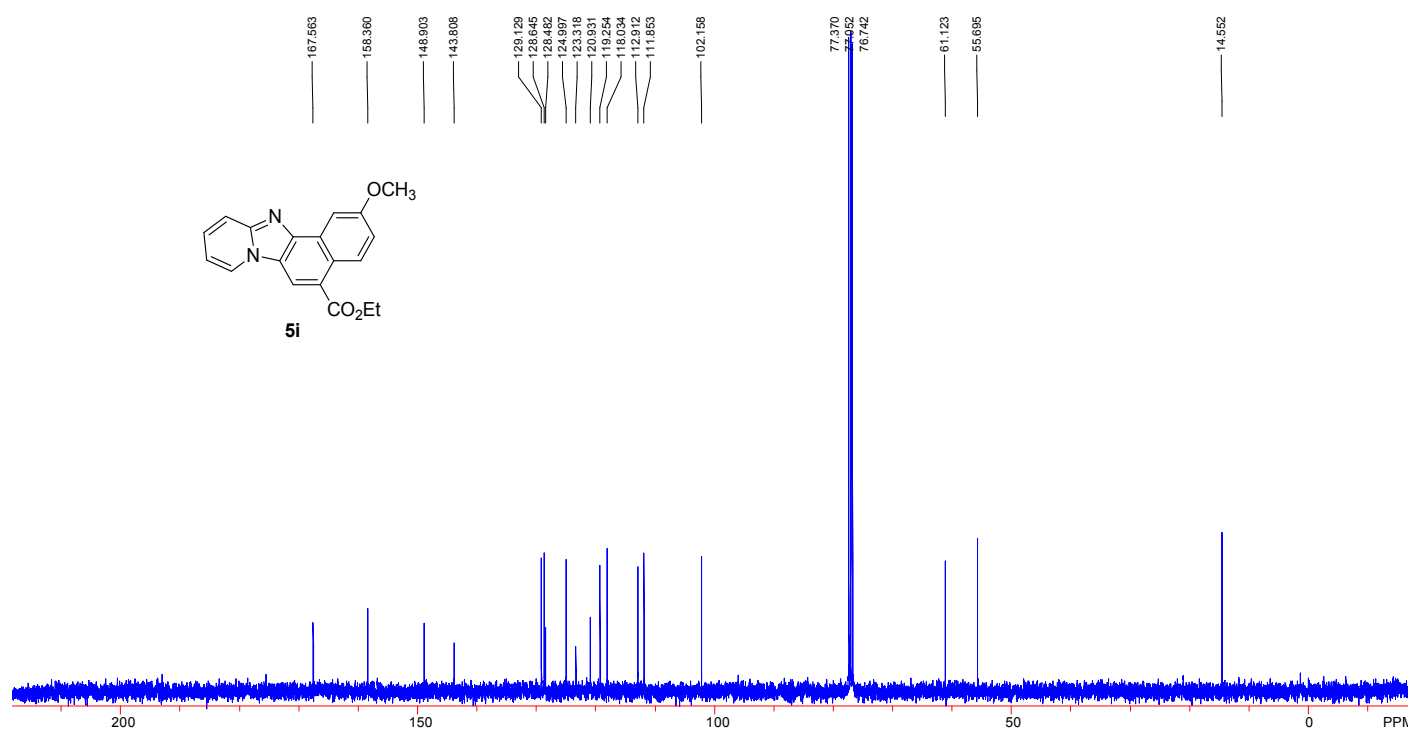
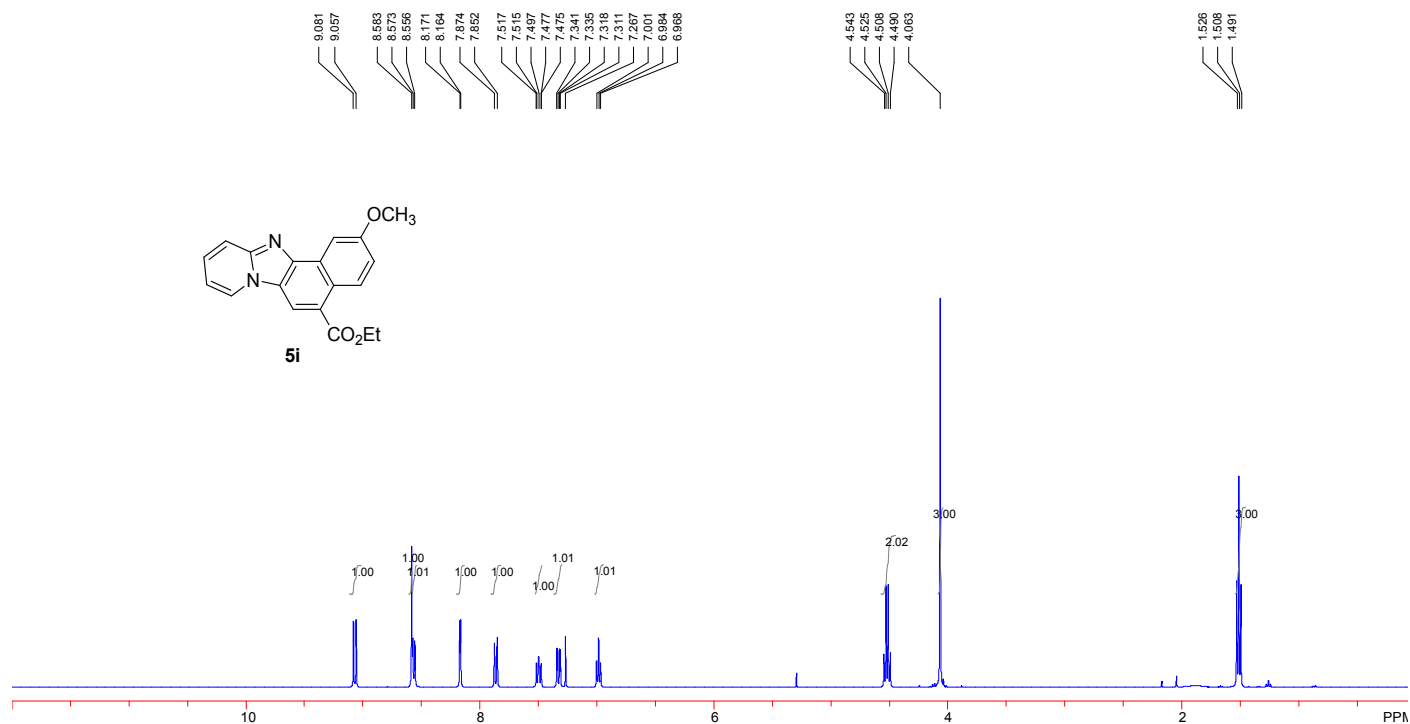


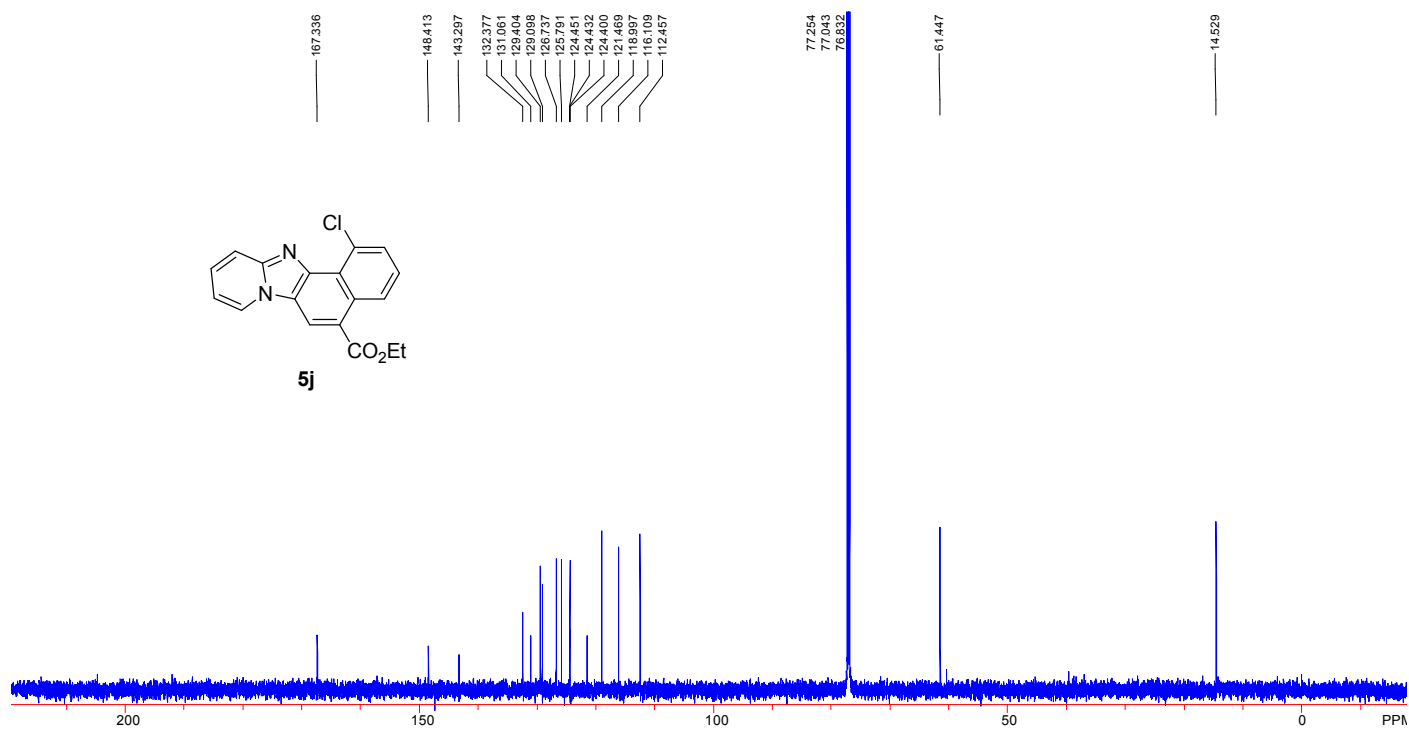
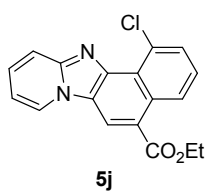
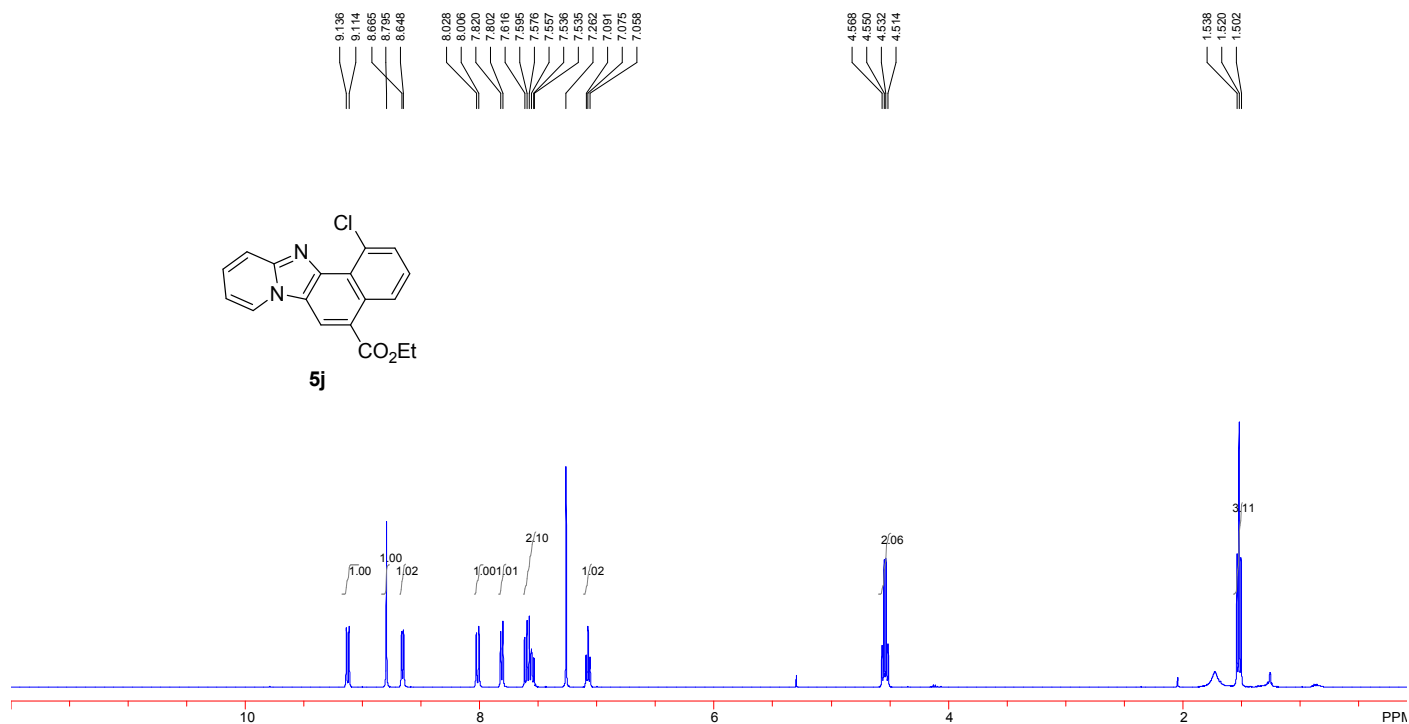
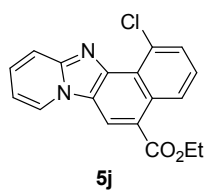


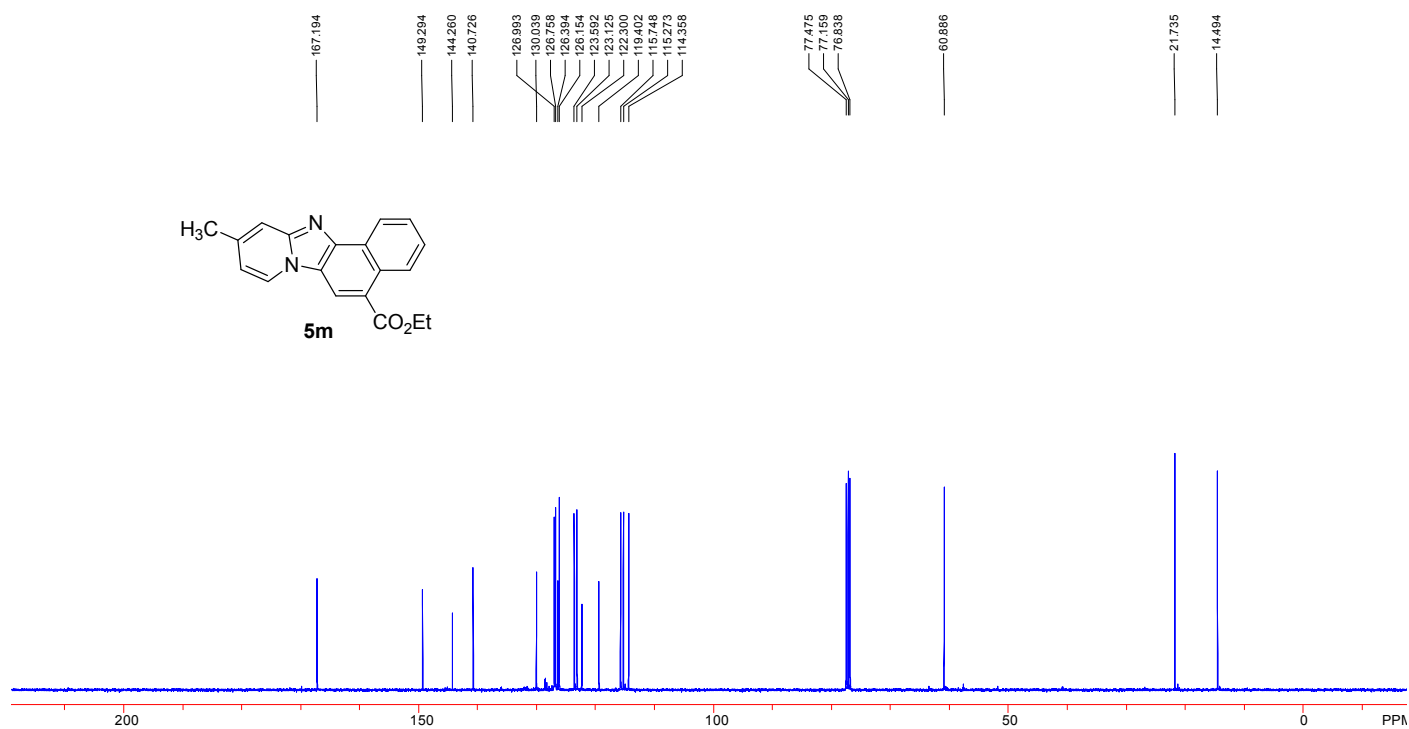
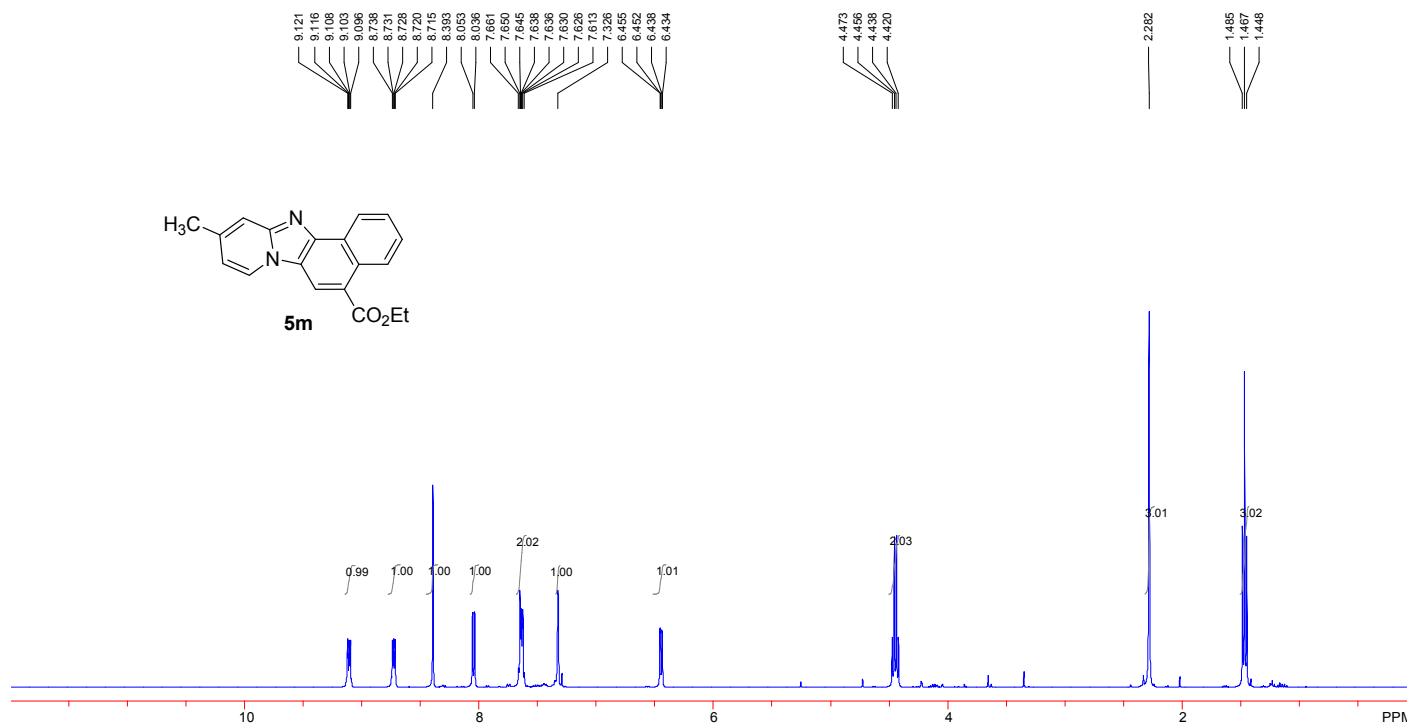


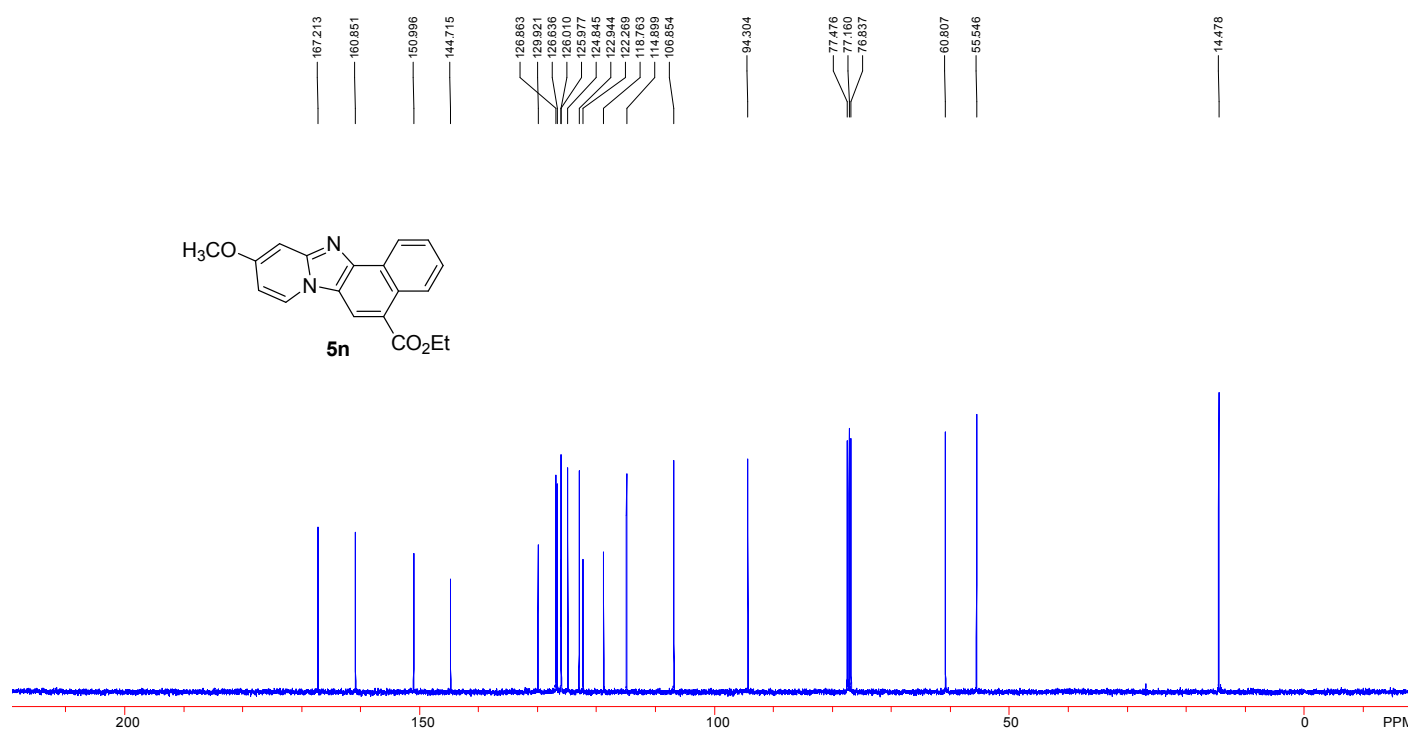
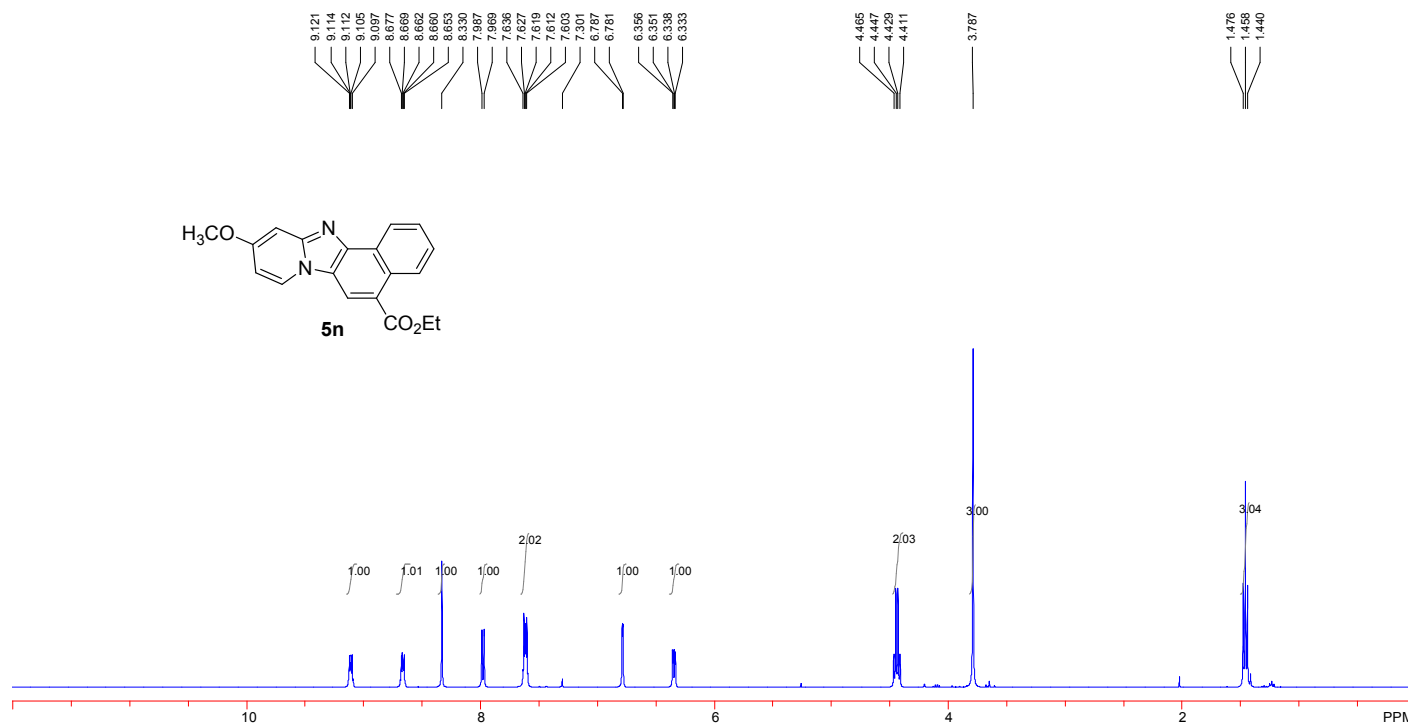


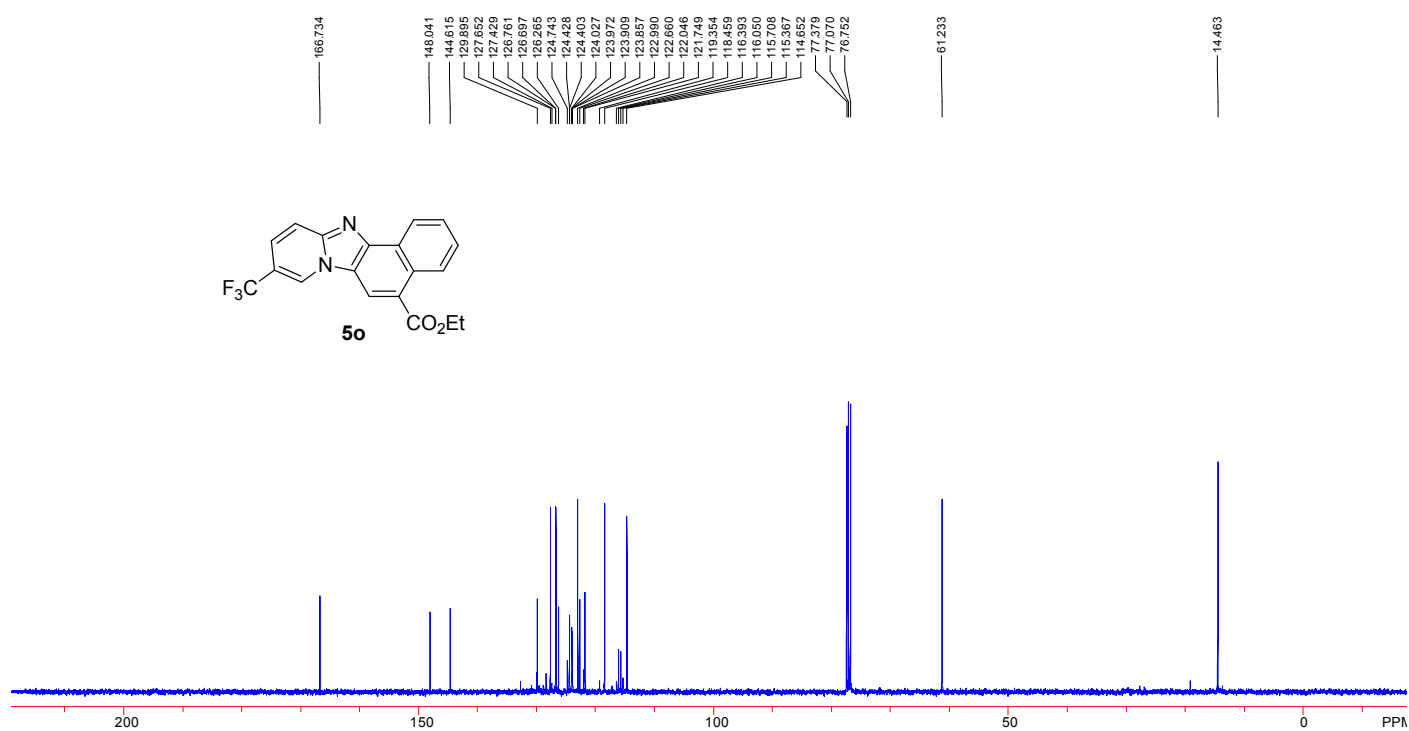
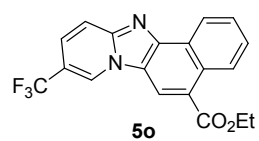
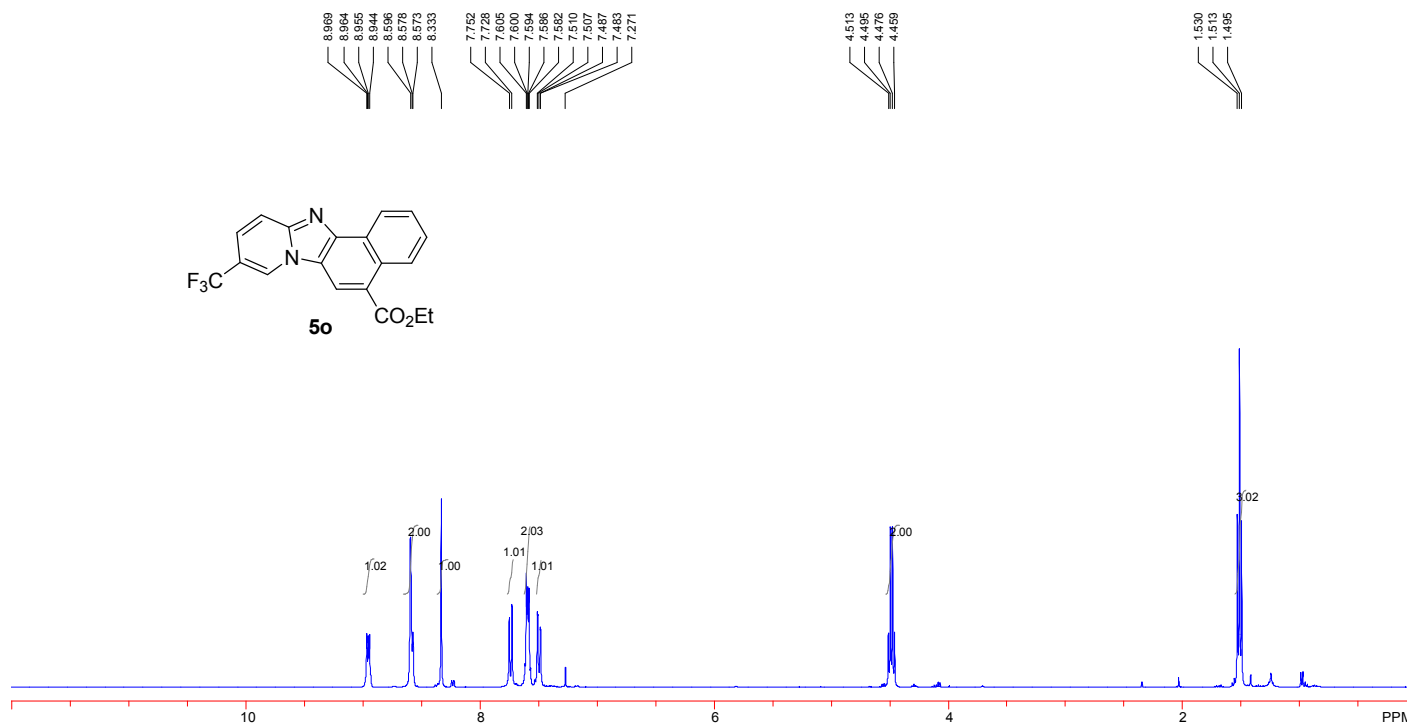
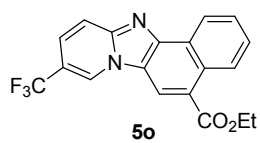


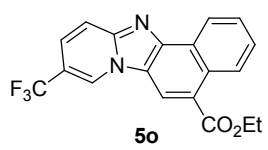




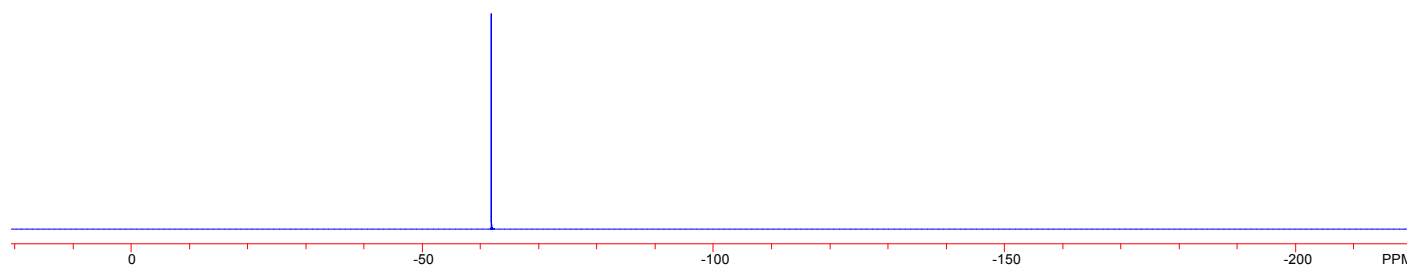


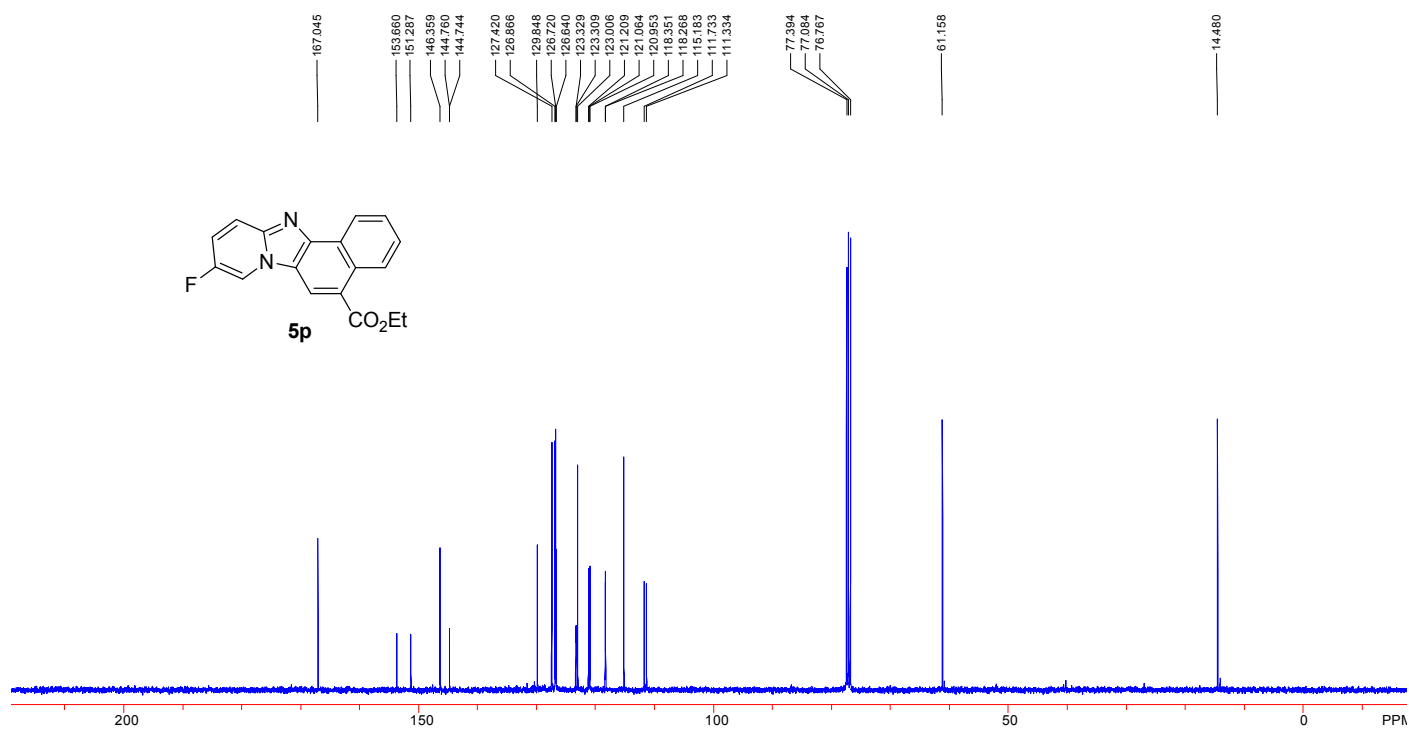
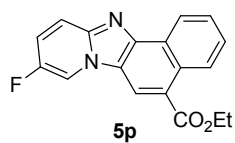
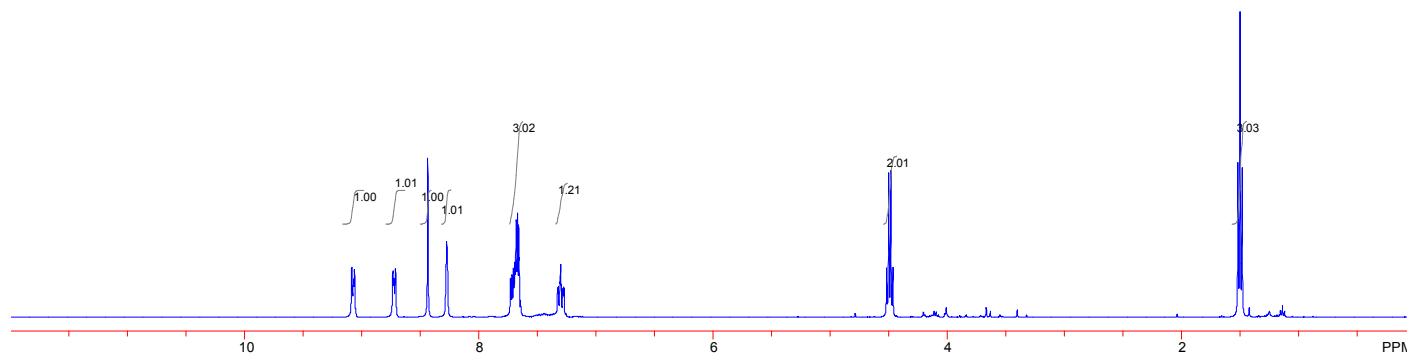
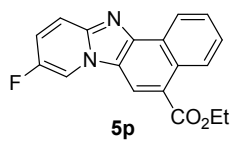


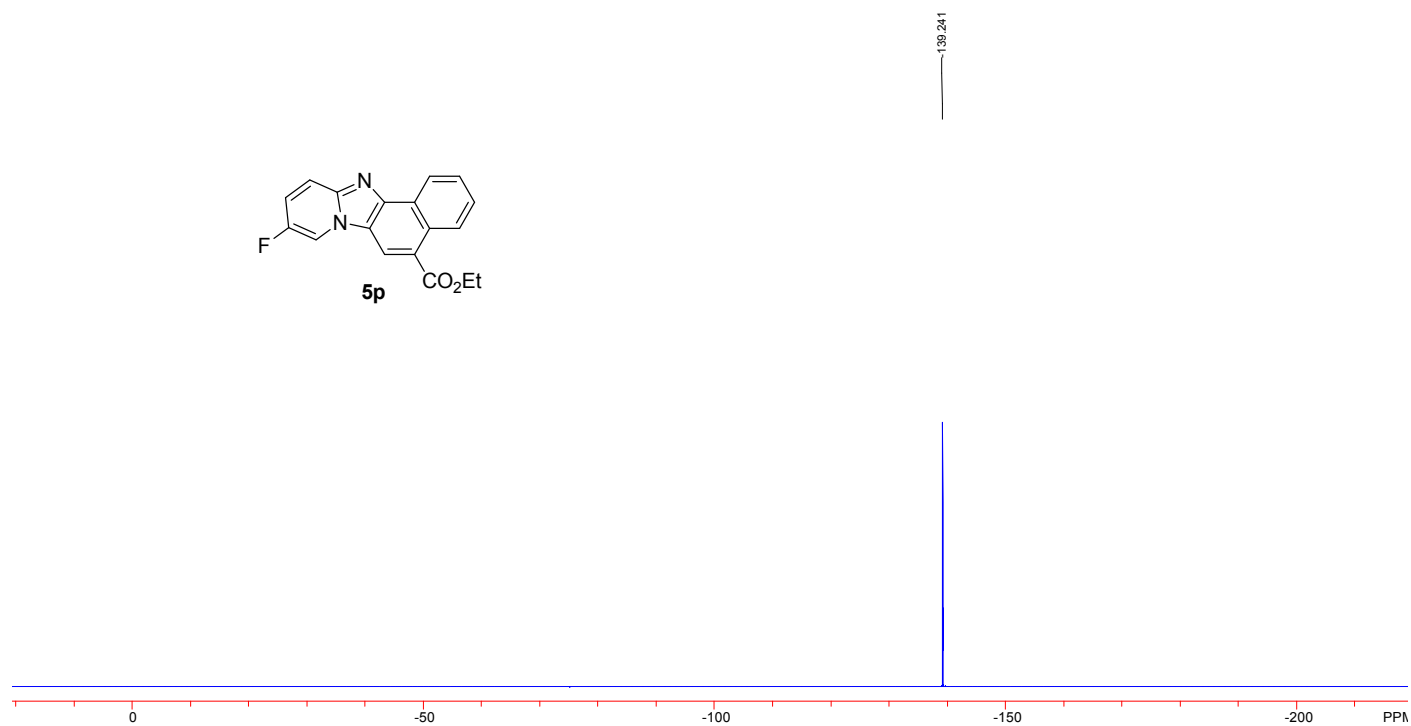
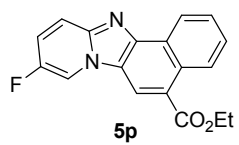


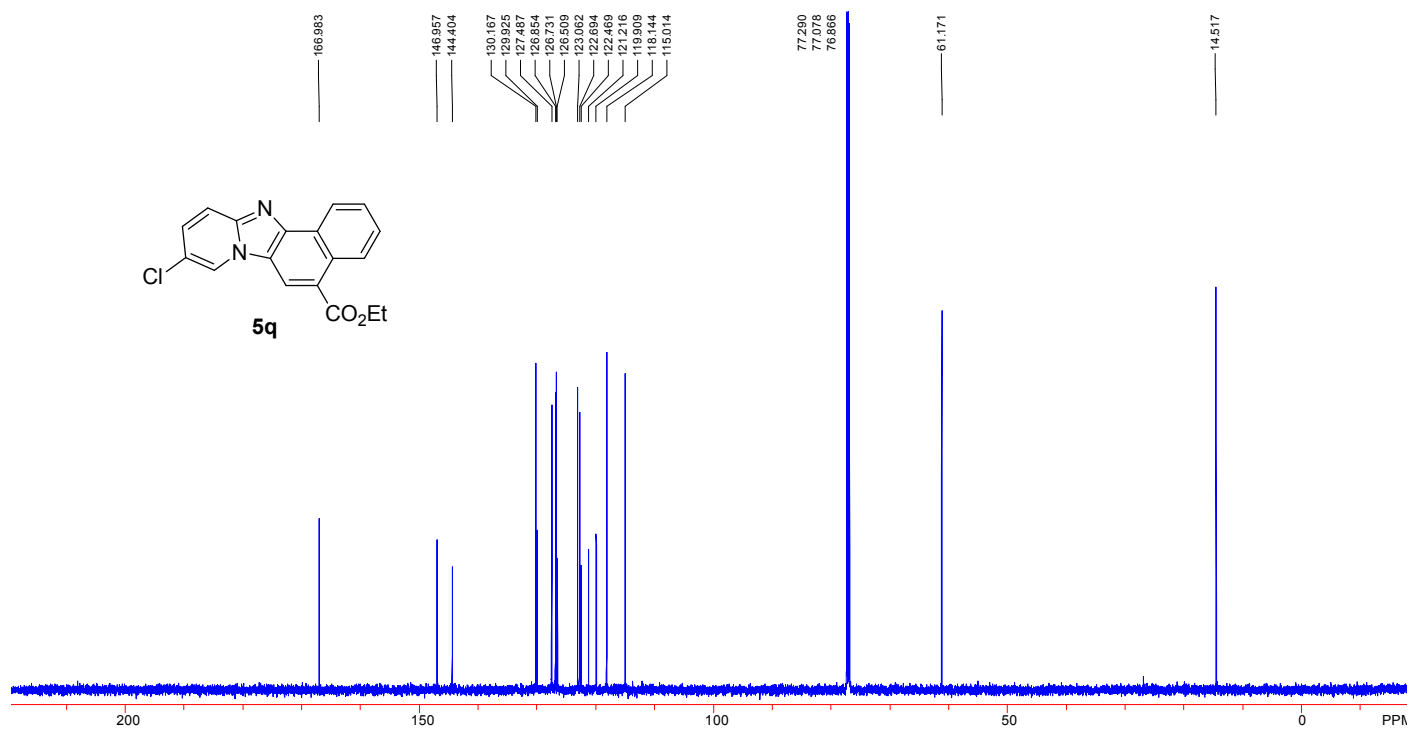
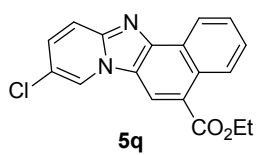
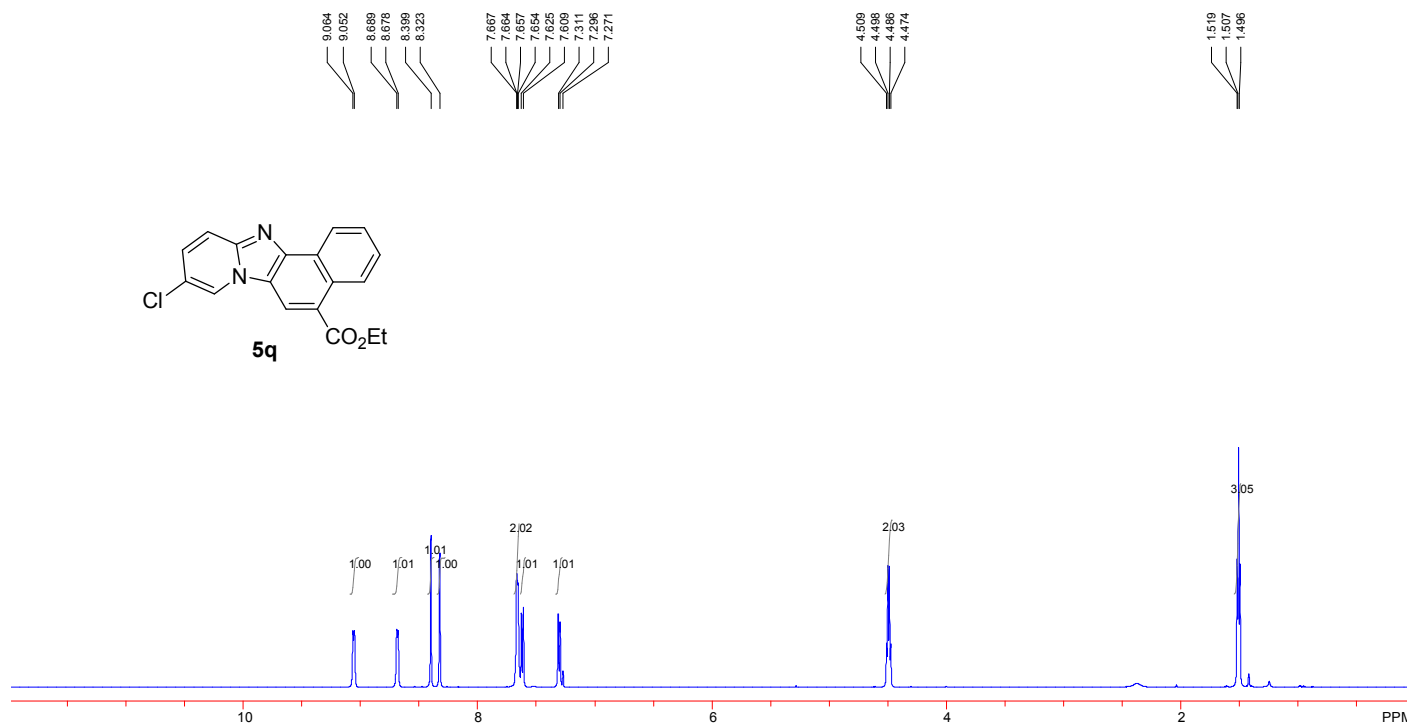
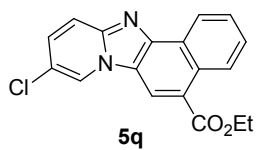


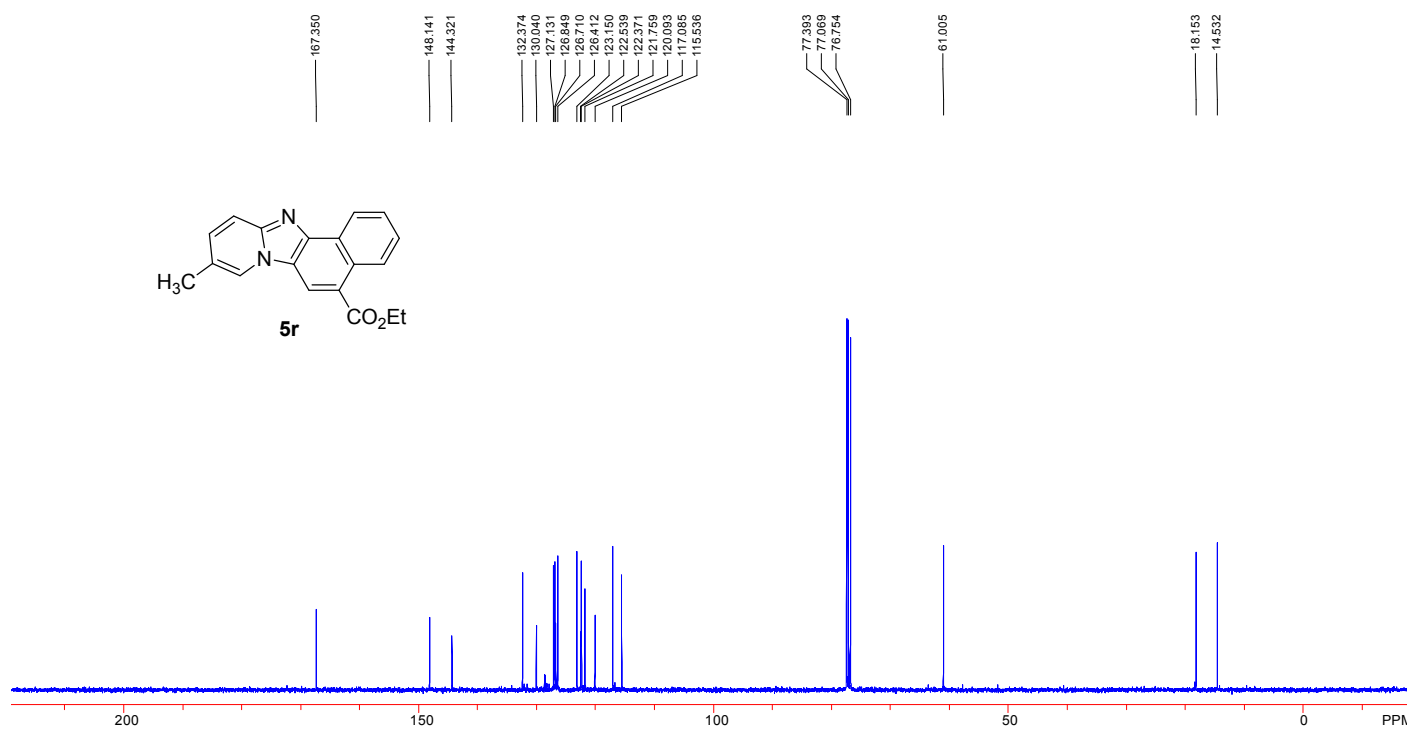
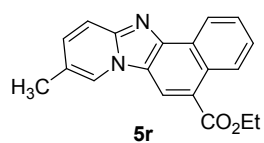
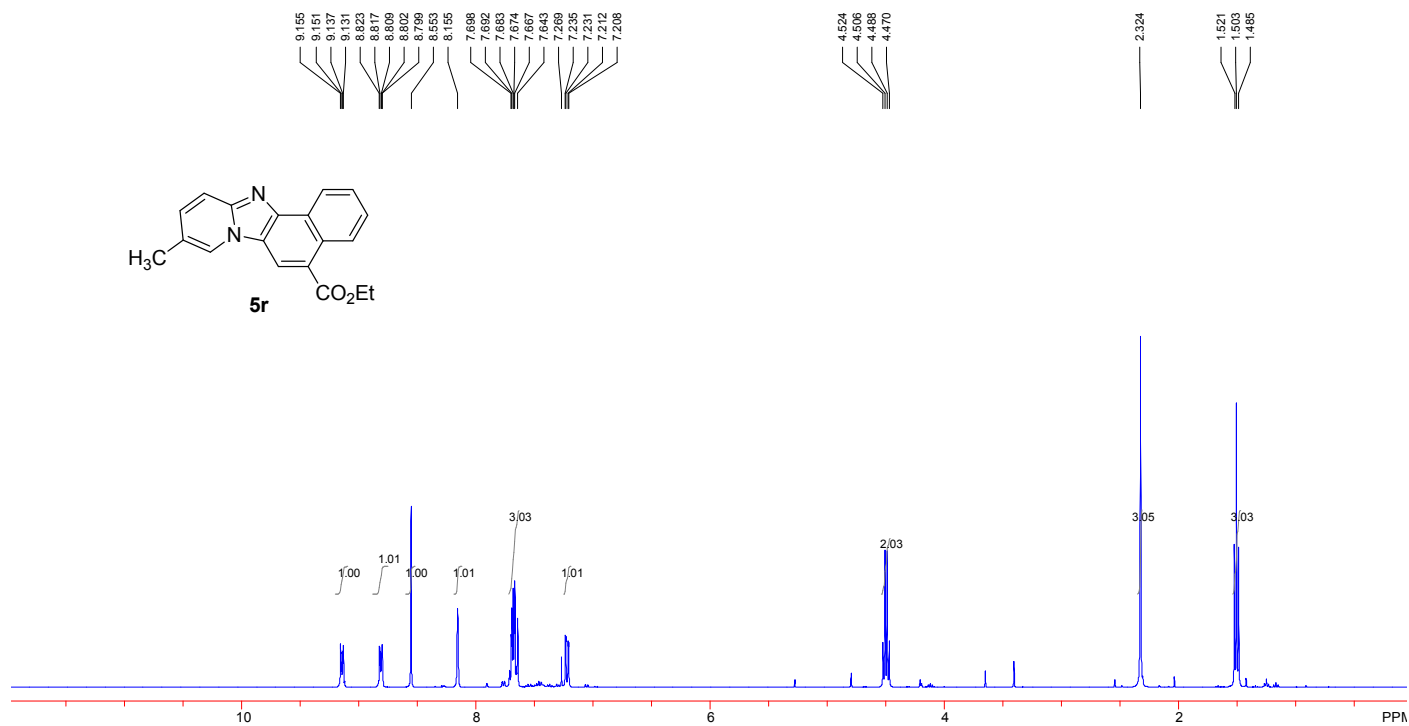
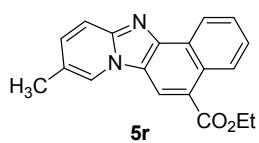
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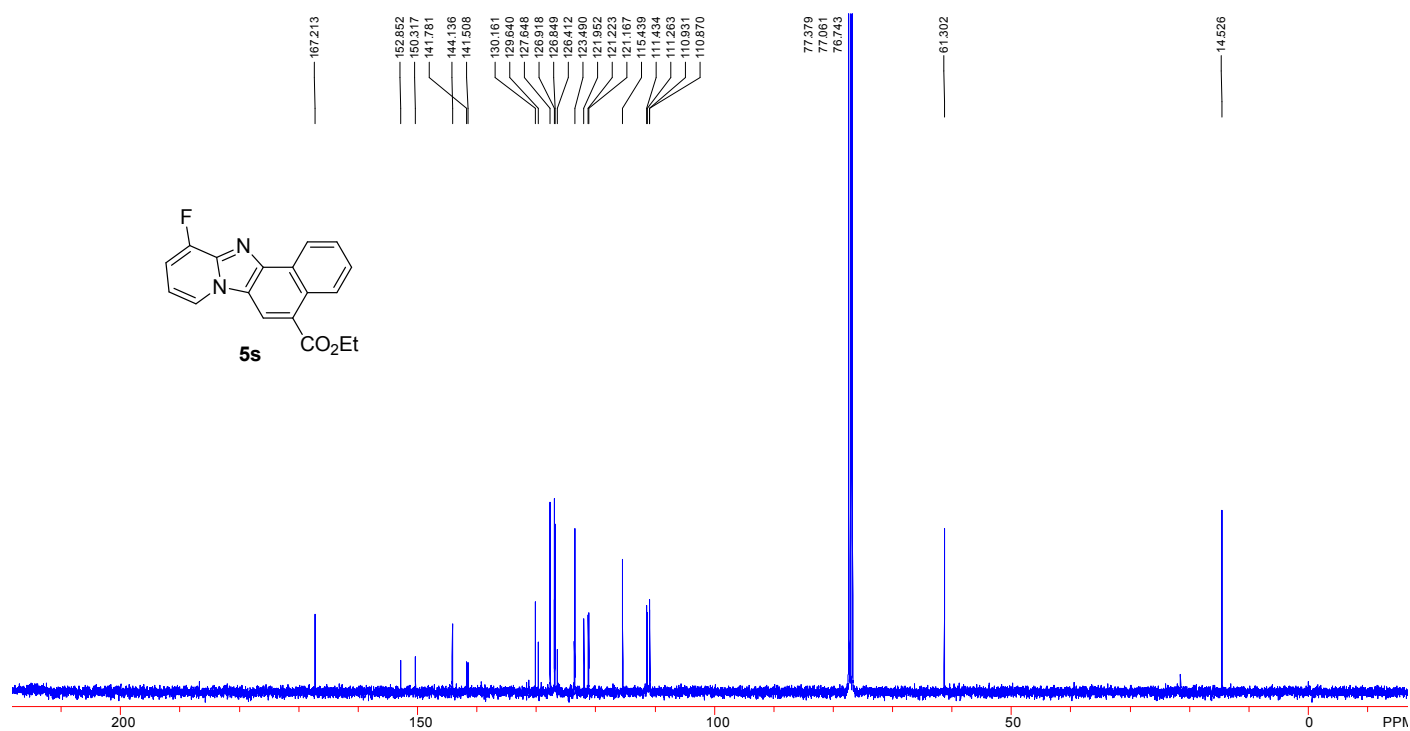
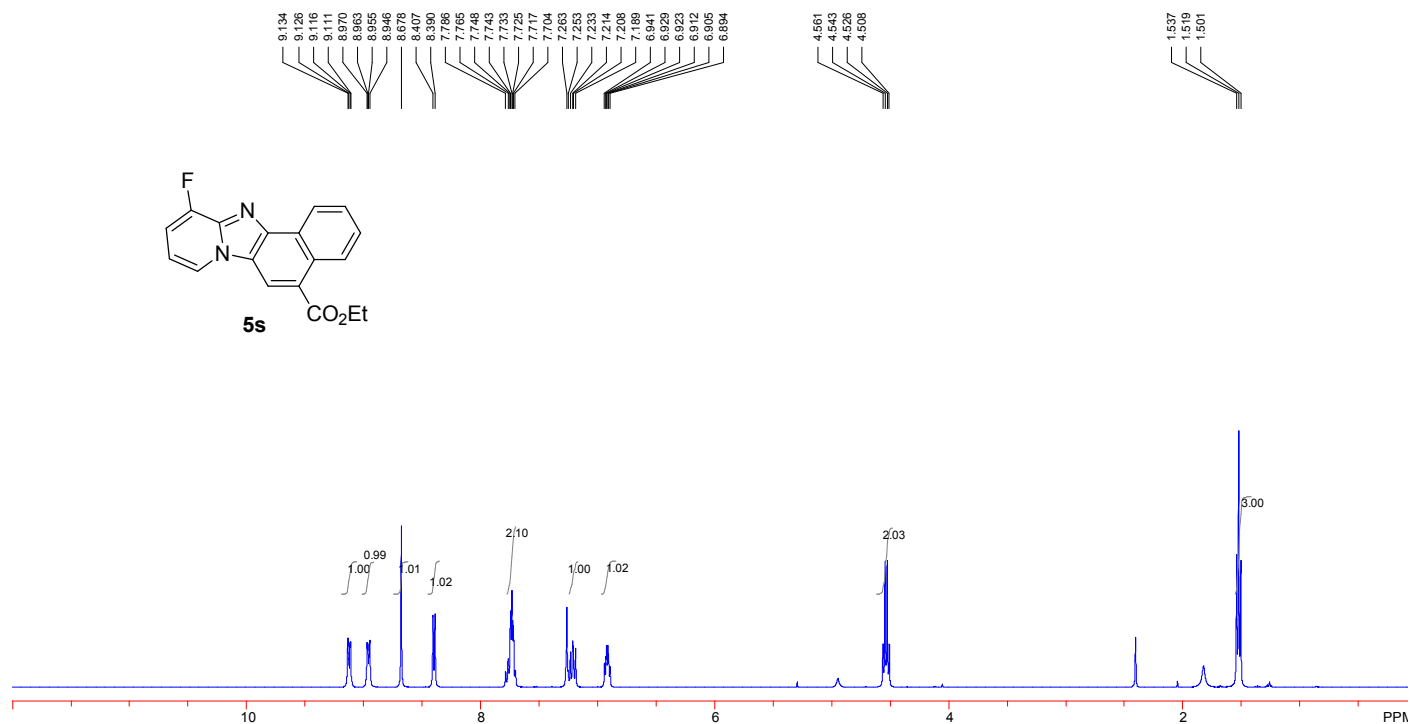


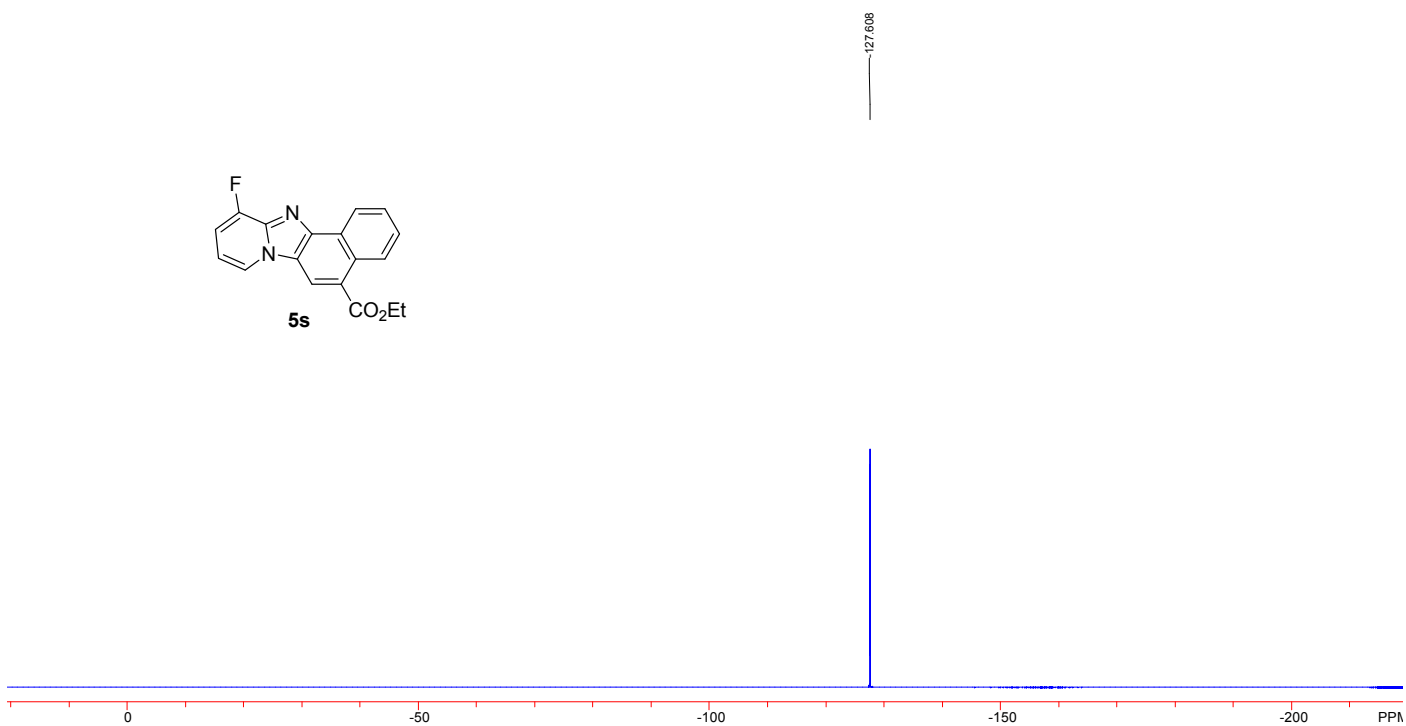
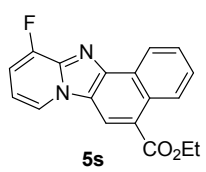


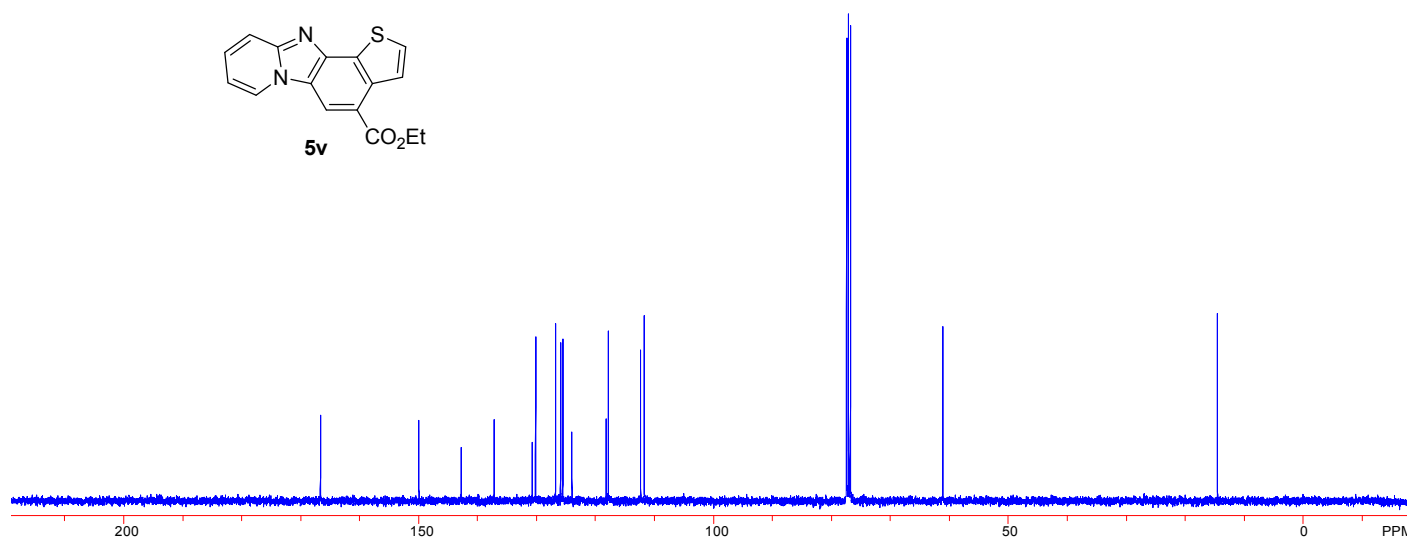
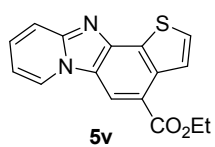
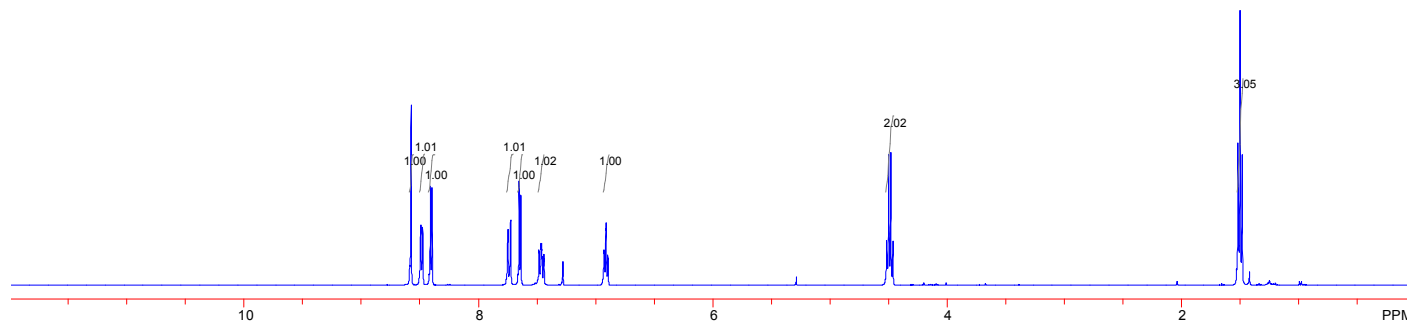
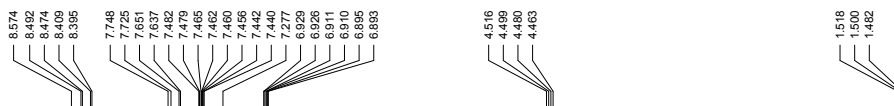
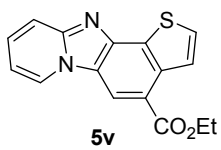


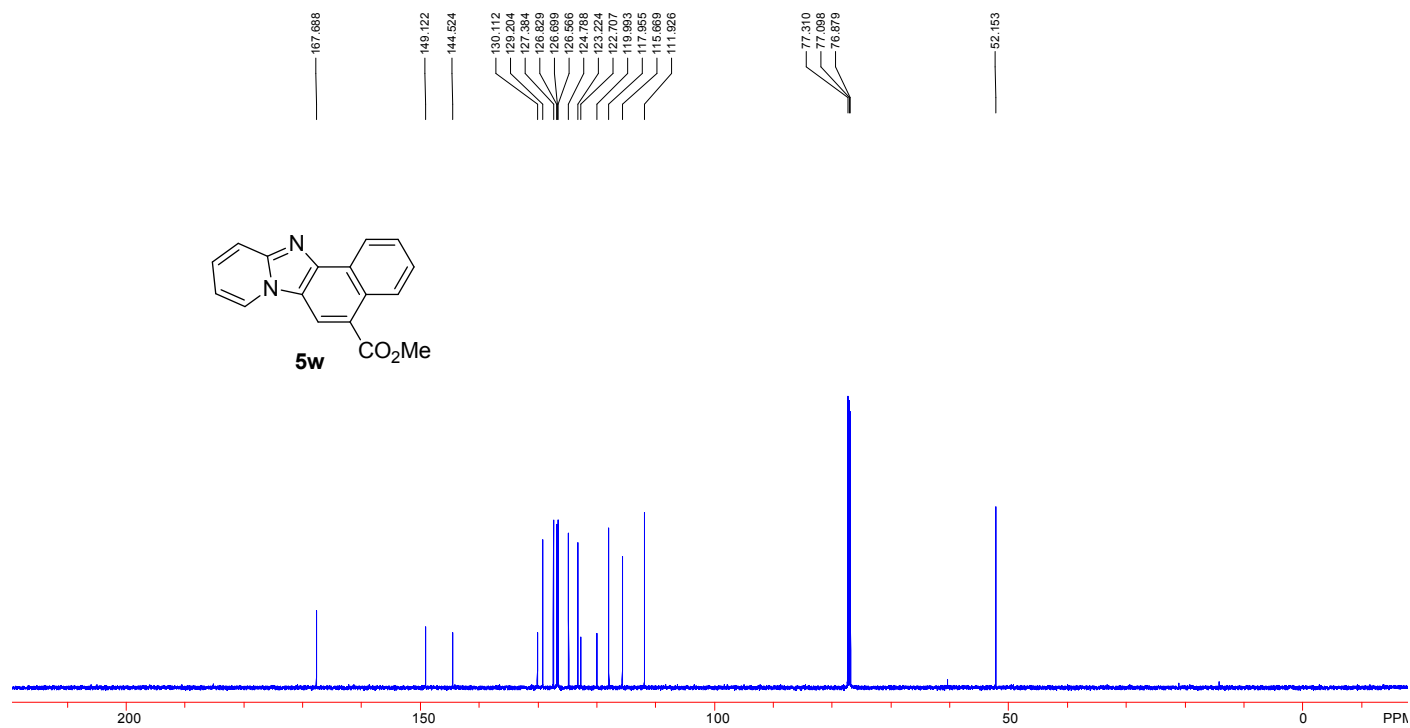
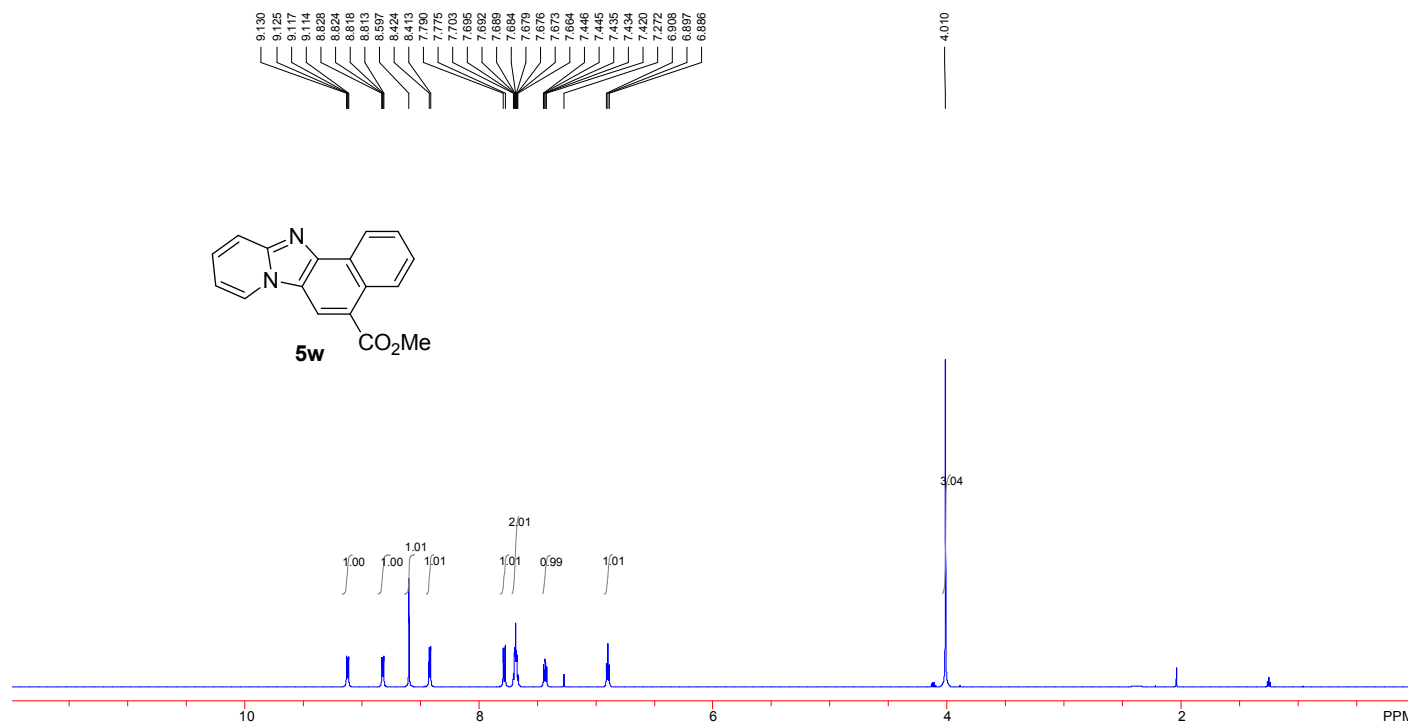












VI. Copies of ^1H and ^{13}C NMR spectra of intermediate VI

