

## Supporting information

### An Efficient Au (I) Catalyst for Double Hydroarylation of Alkynes with Heteroarenes

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#### Copies of the $^1\text{H}$ and $^{13}\text{C}$ NMR spectra for compounds 4aa, 3aa–3ag and 3ba-3ia

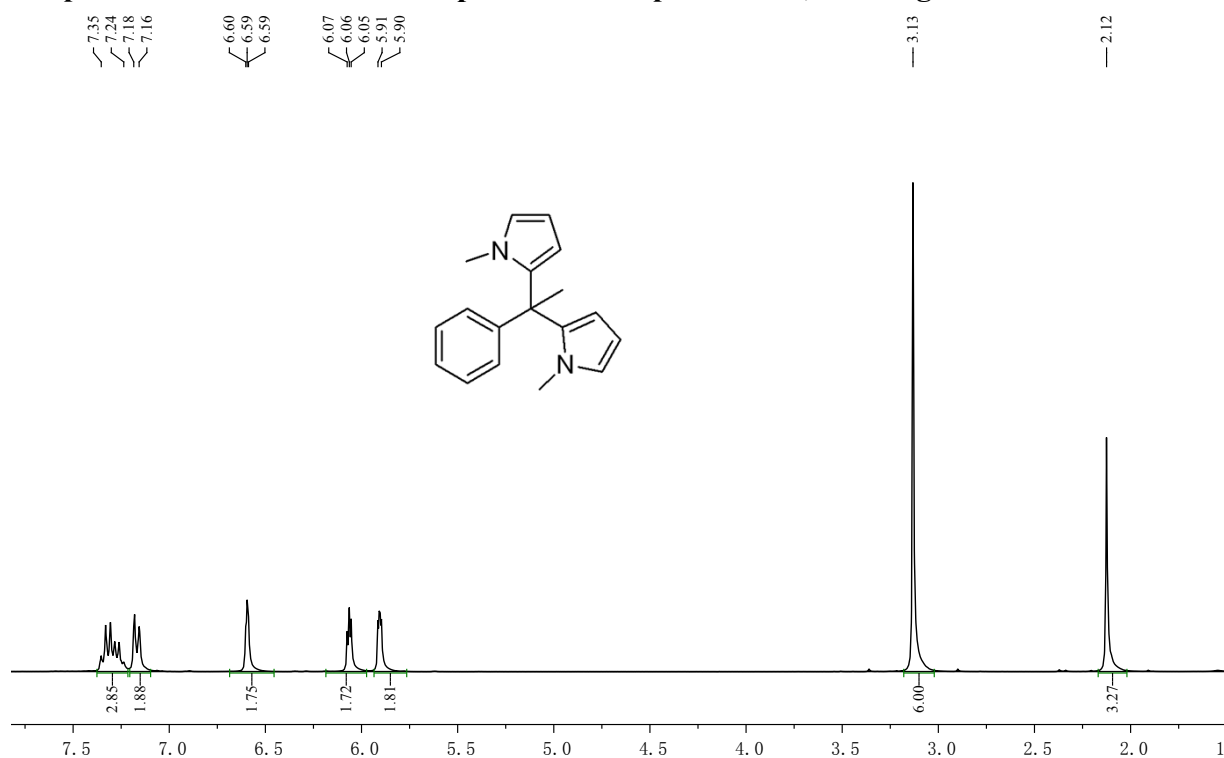


Figure S1.  $^1\text{H}$  NMR spectra (300 MHz) of 3aa

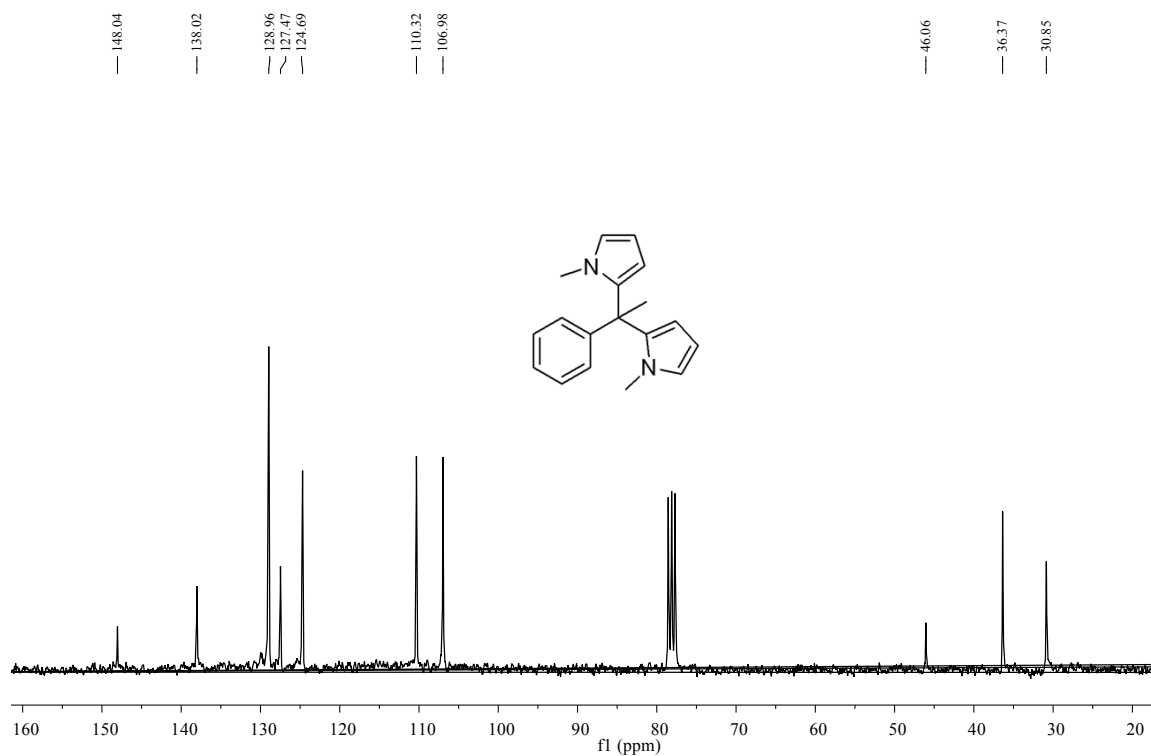


Figure S2. <sup>13</sup>C NMR spectra (300 MHz) of 3aa

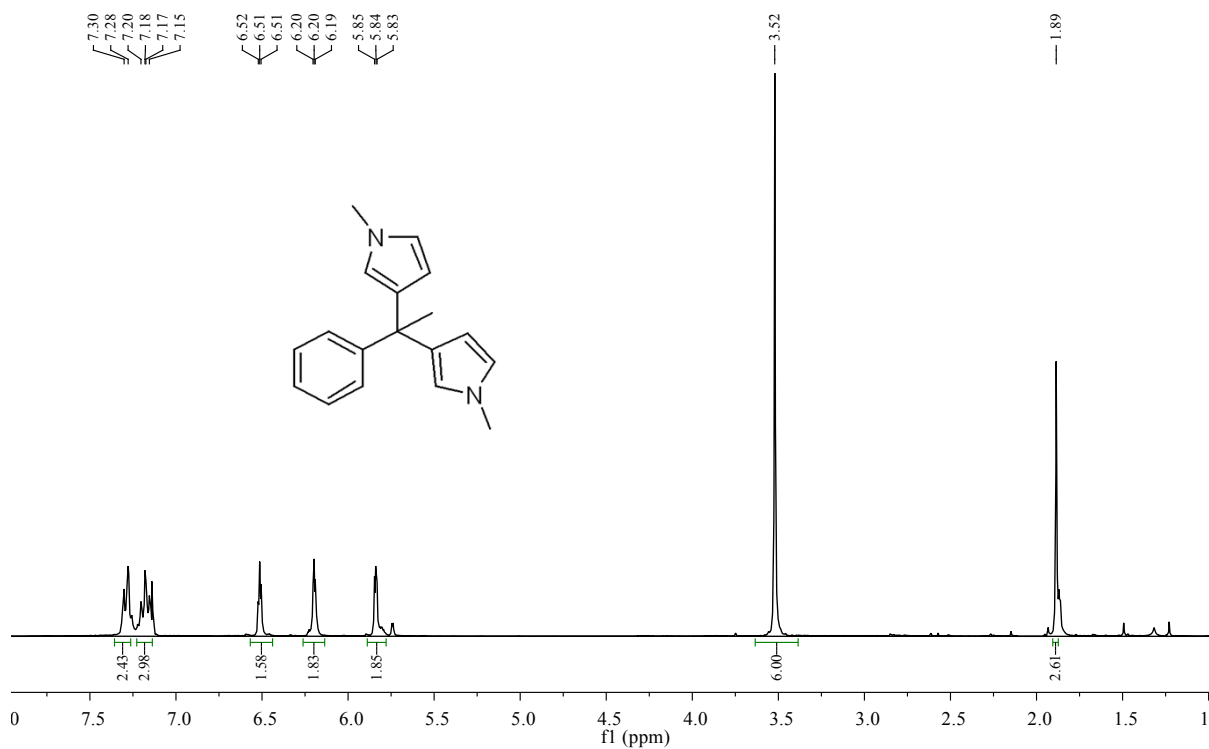


Figure S3. <sup>1</sup>H NMR spectra (300 MHz) of 4aa

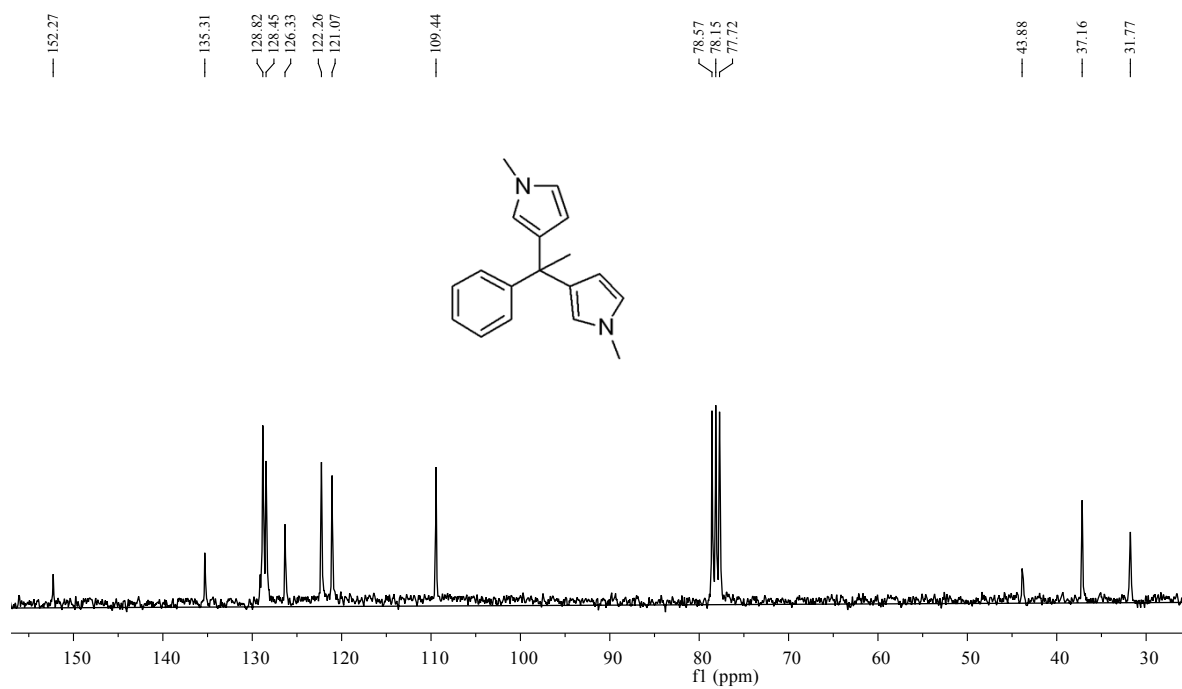


Figure S4. <sup>13</sup>C NMR spectra (300 MHz) of 4aa

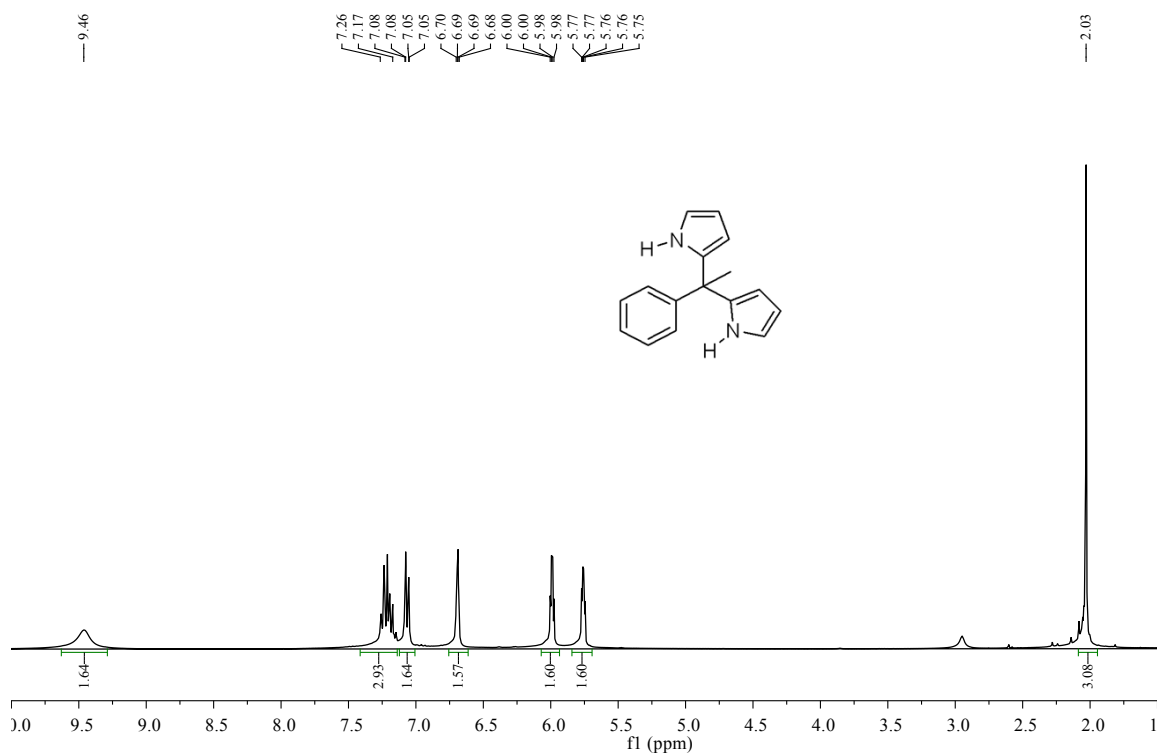


Figure S5. <sup>1</sup>H NMR spectra (300 MHz) of 3ab

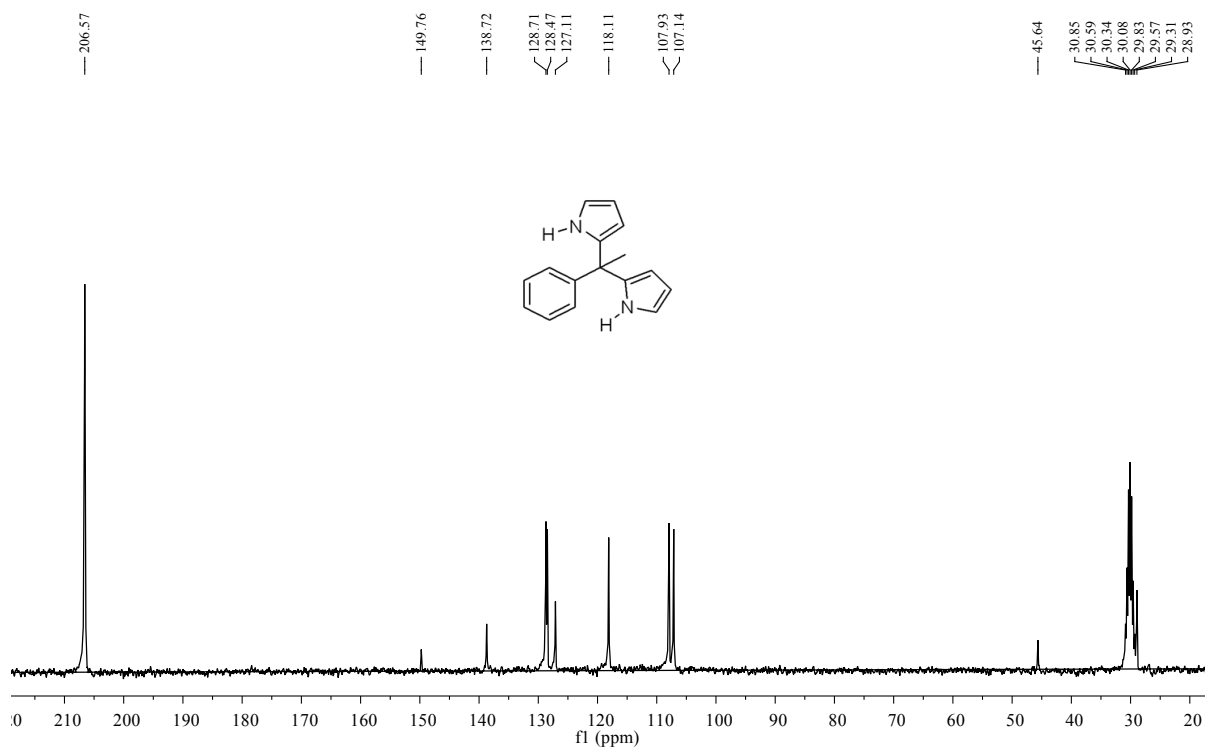


Figure S6. <sup>13</sup>C NMR spectra (300 MHz) of 3ab

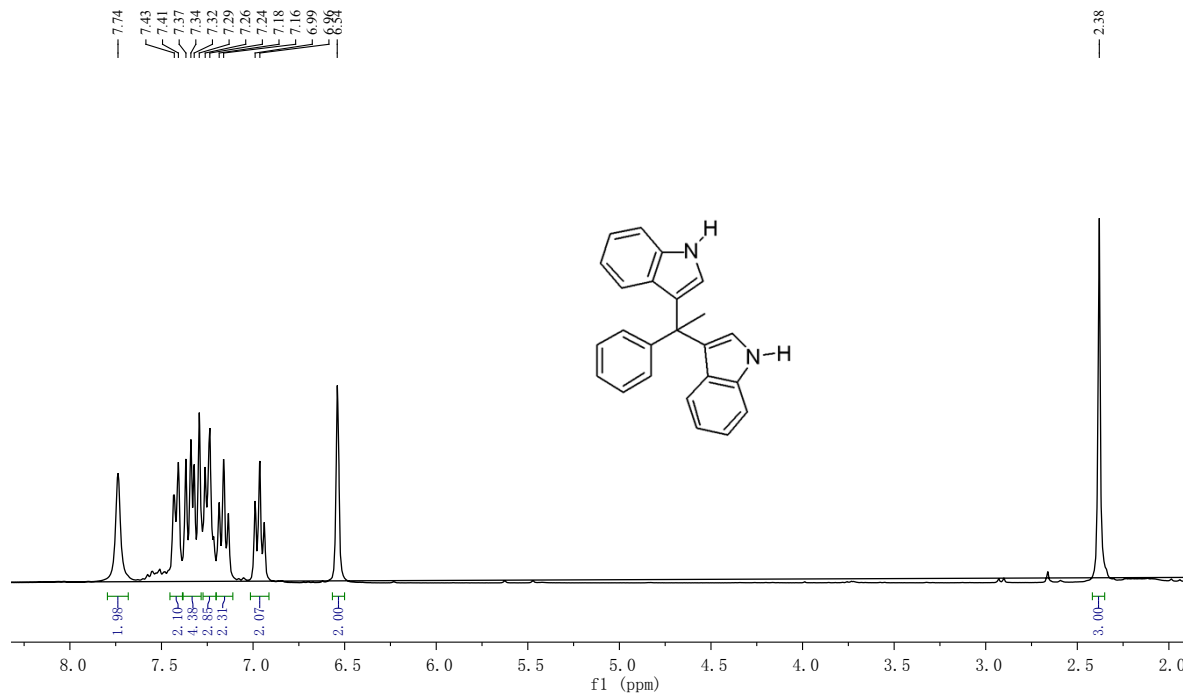
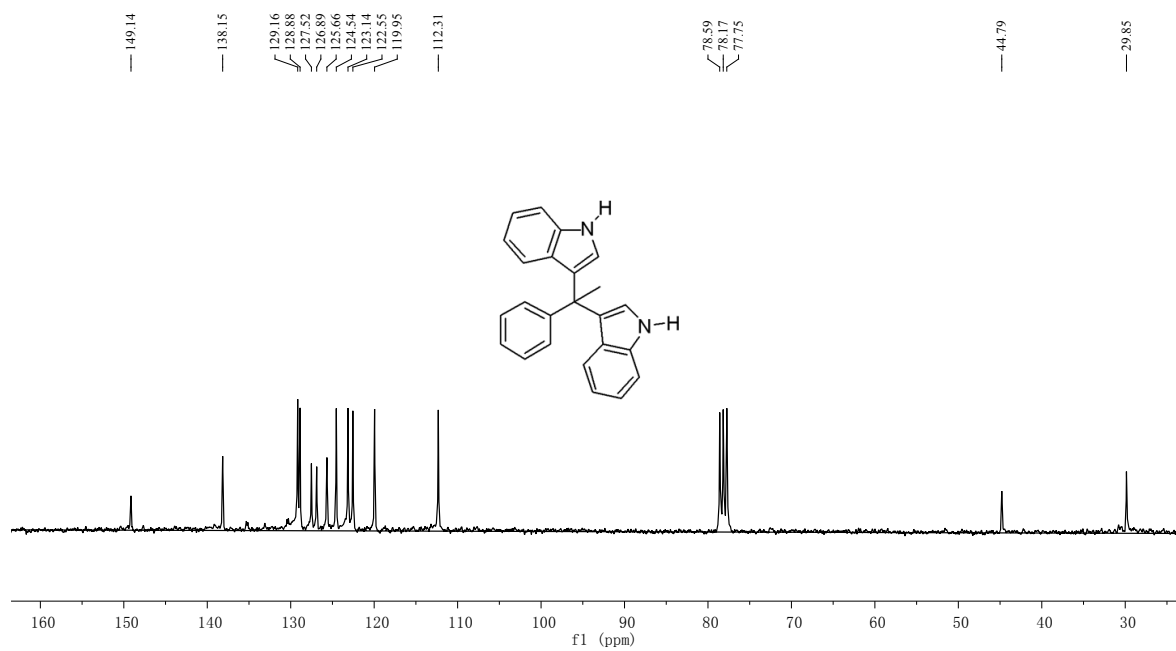
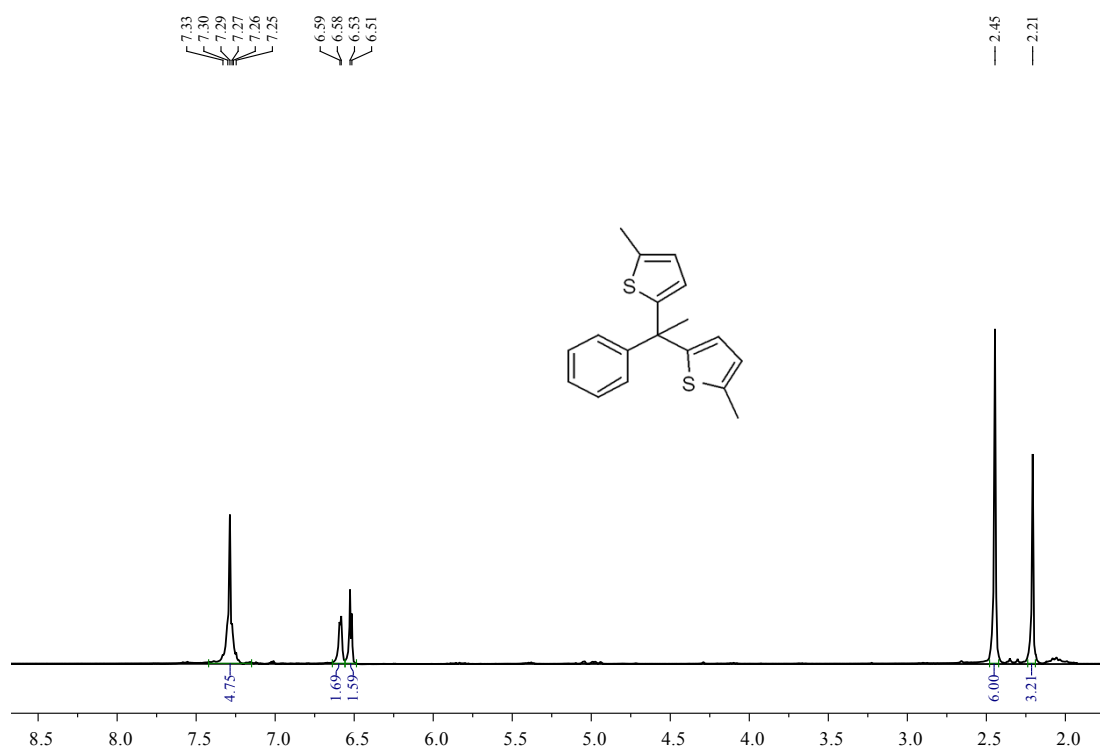


Figure S7. <sup>1</sup>H NMR spectra (300 MHz) of 3ae



**Figure S8.** <sup>13</sup>C NMR spectra (300 MHz) of **3ae**



**Figure S9.** <sup>1</sup>H NMR spectra (300 MHz) of **3af**

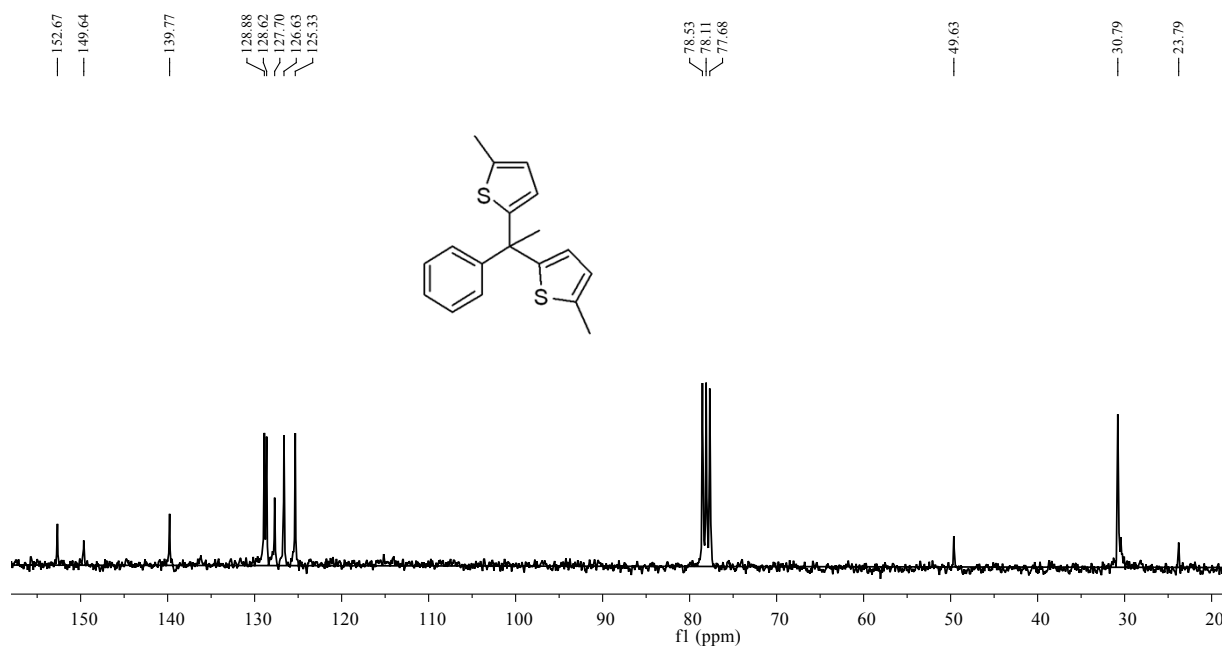


Figure S10.  $^{13}\text{C}$  NMR spectra (300 MHz) of **3af**

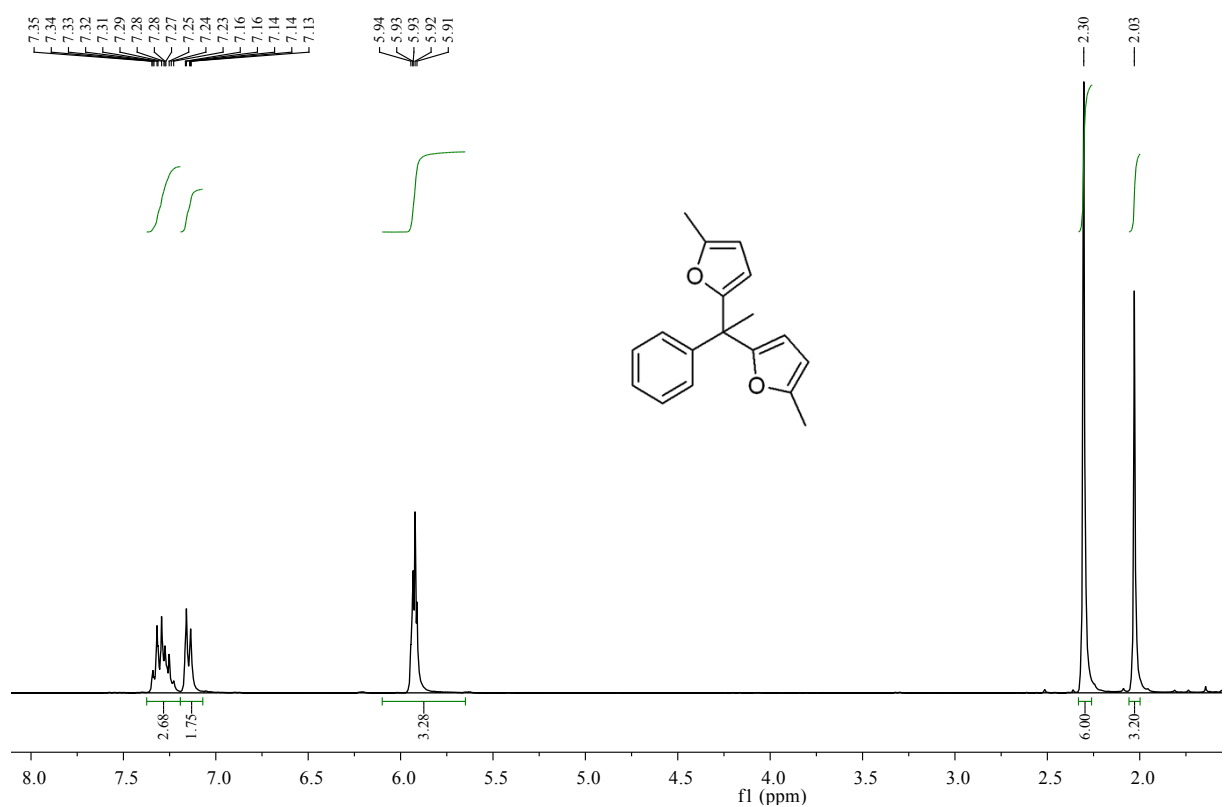
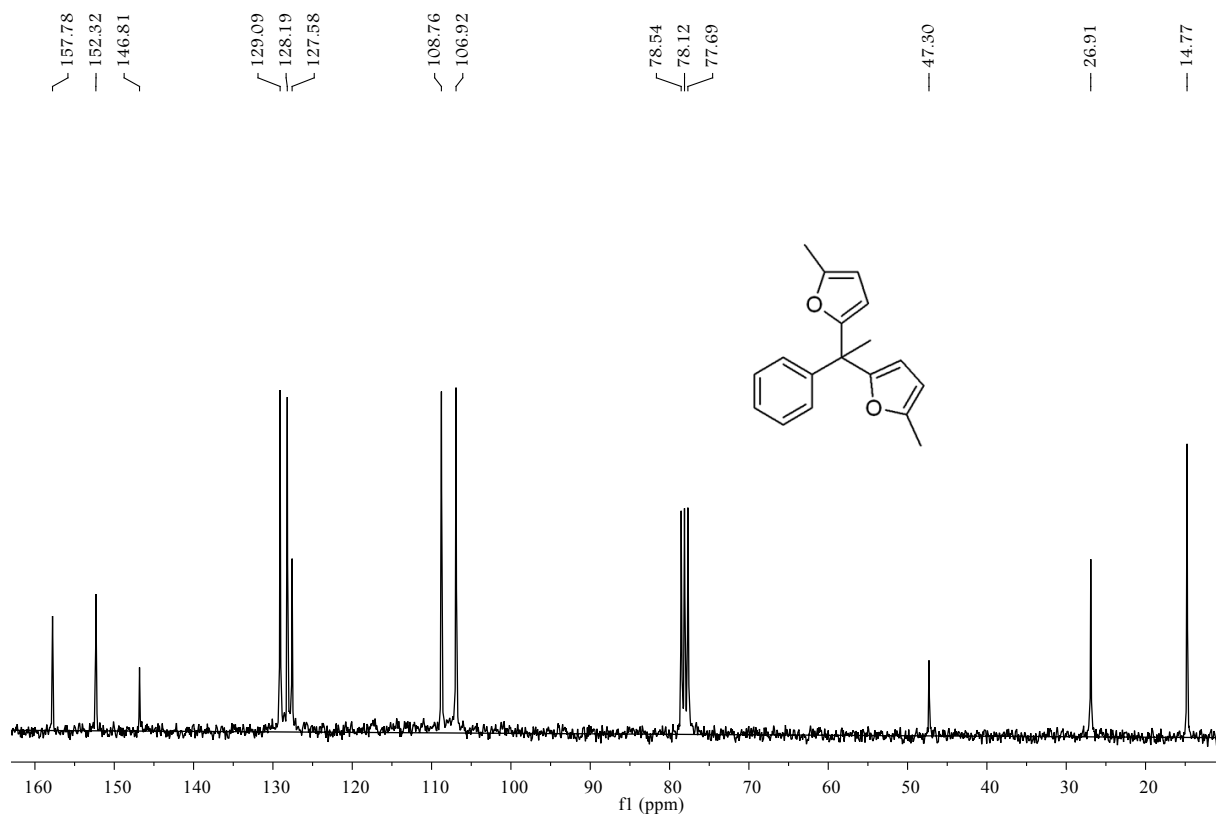
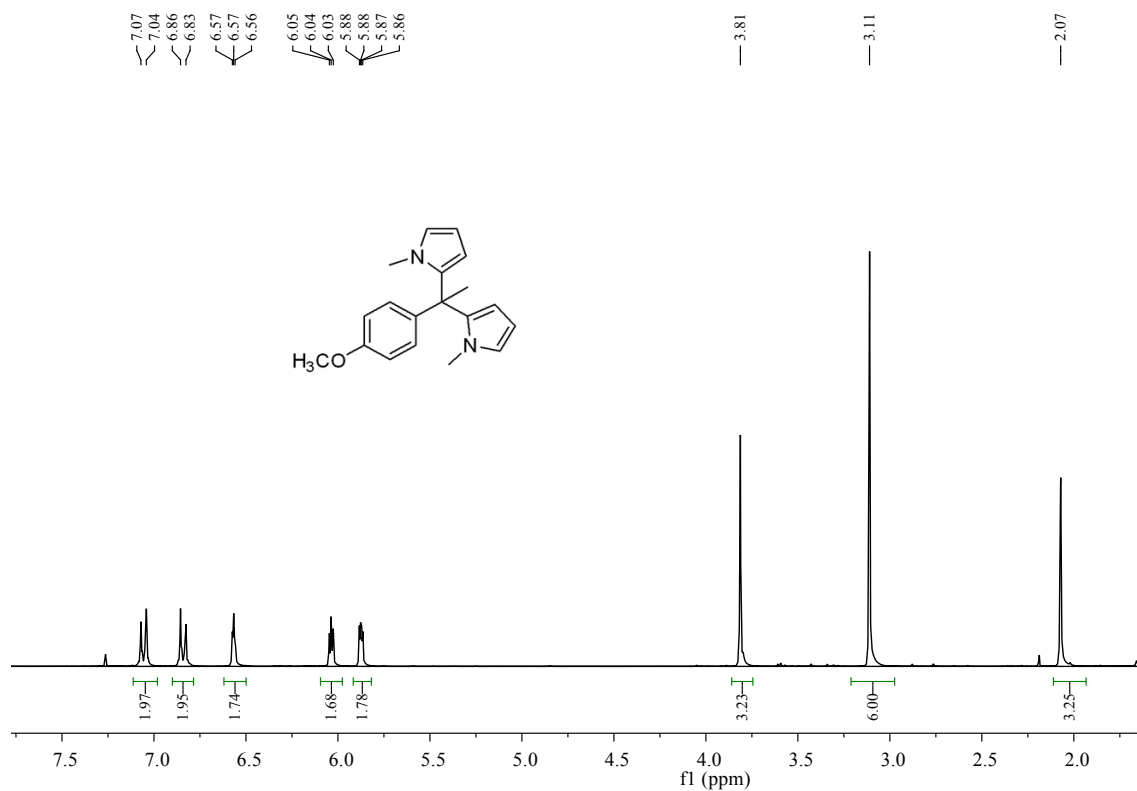


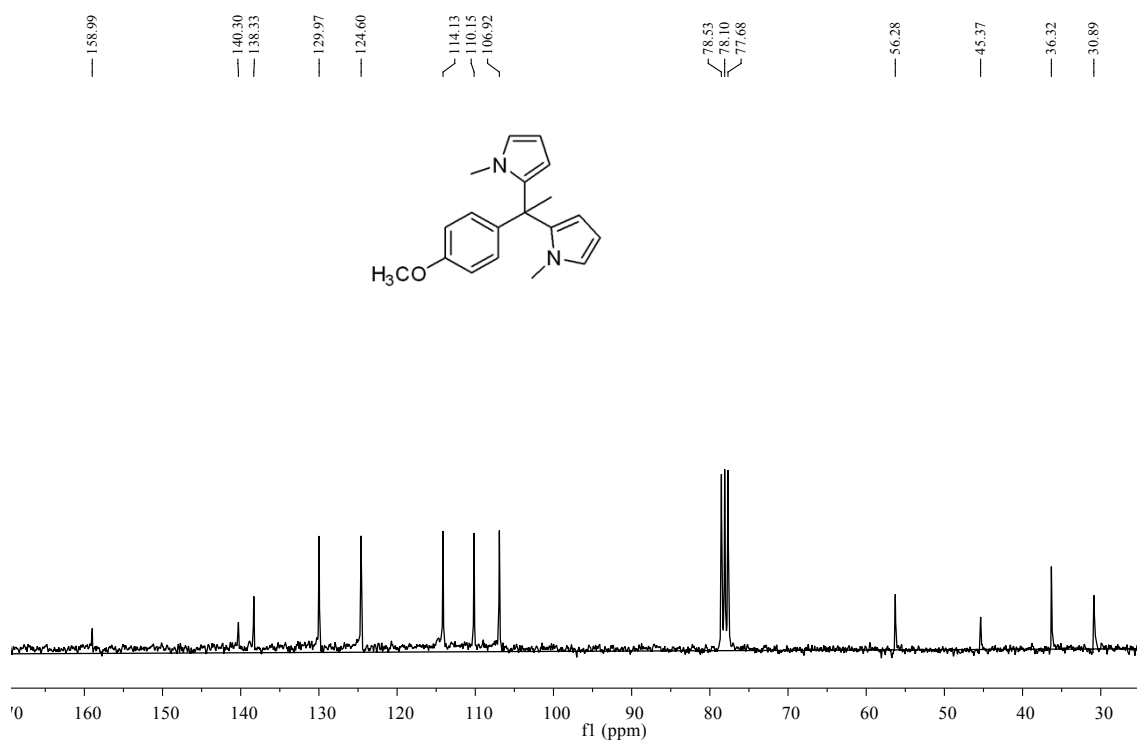
Figure S11.  $^1\text{H}$  NMR spectra (300 MHz) of **3ag**



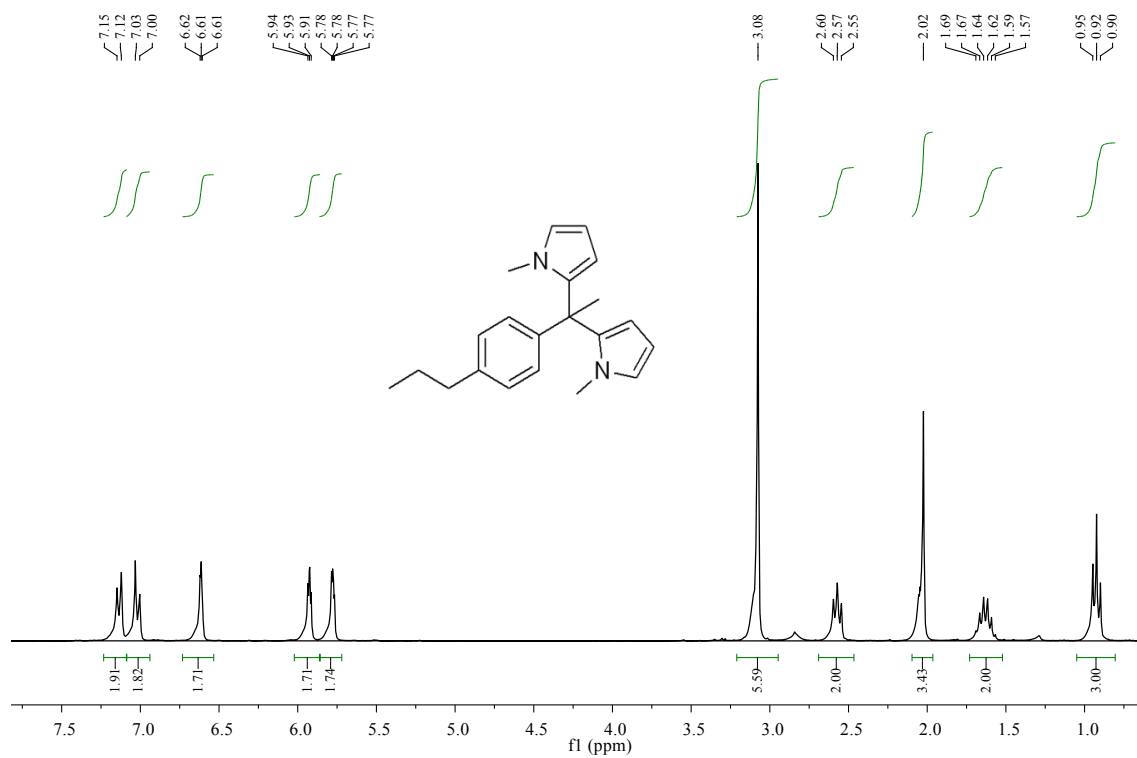
**Figure S12.**  $^{13}\text{C}$  NMR spectra (300 MHz) of **3ag**



**Figure S13.**  $^1\text{H}$  NMR spectra (300 MHz) of **3ba**



**Figure S14.** <sup>13</sup>C NMR spectra (300 MHz) of **3ba**



**Figure S15.** <sup>1</sup>H NMR spectra (300 MHz) of **3ca**



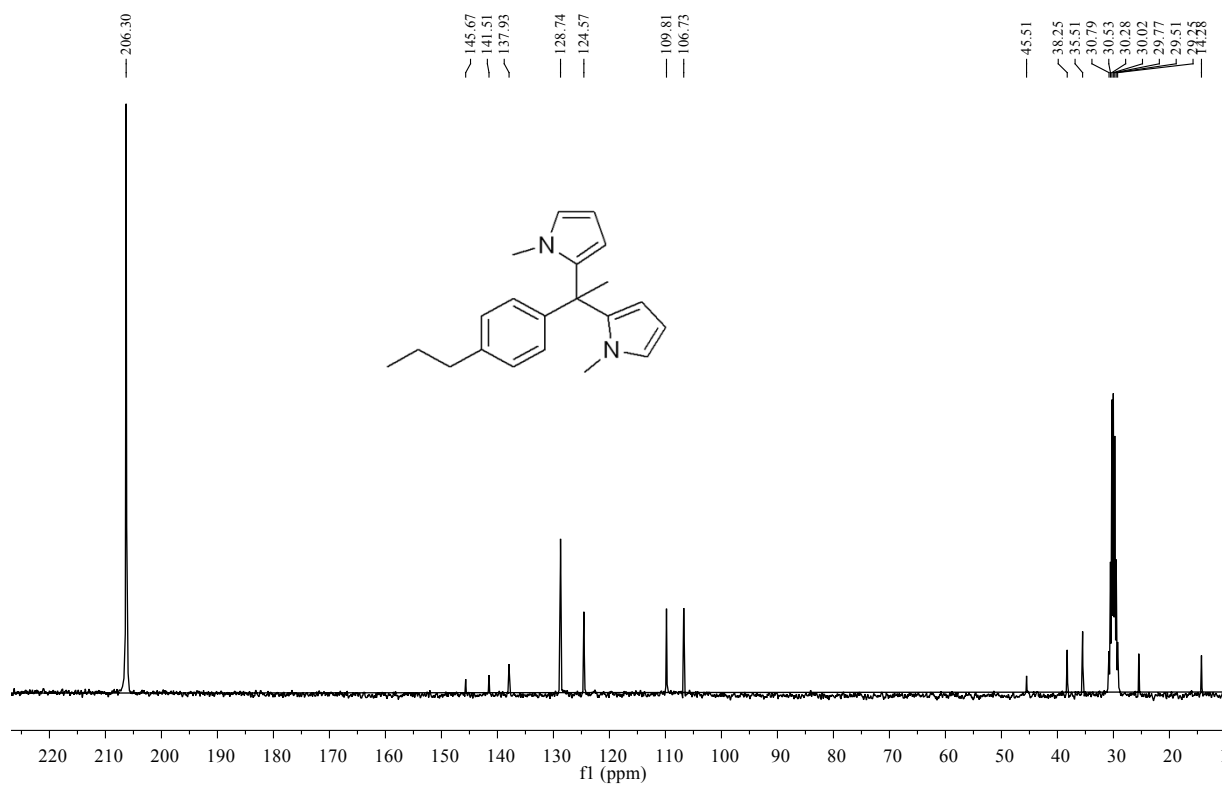


Figure S16. <sup>13</sup>C NMR spectra (300 MHz) of 3ca

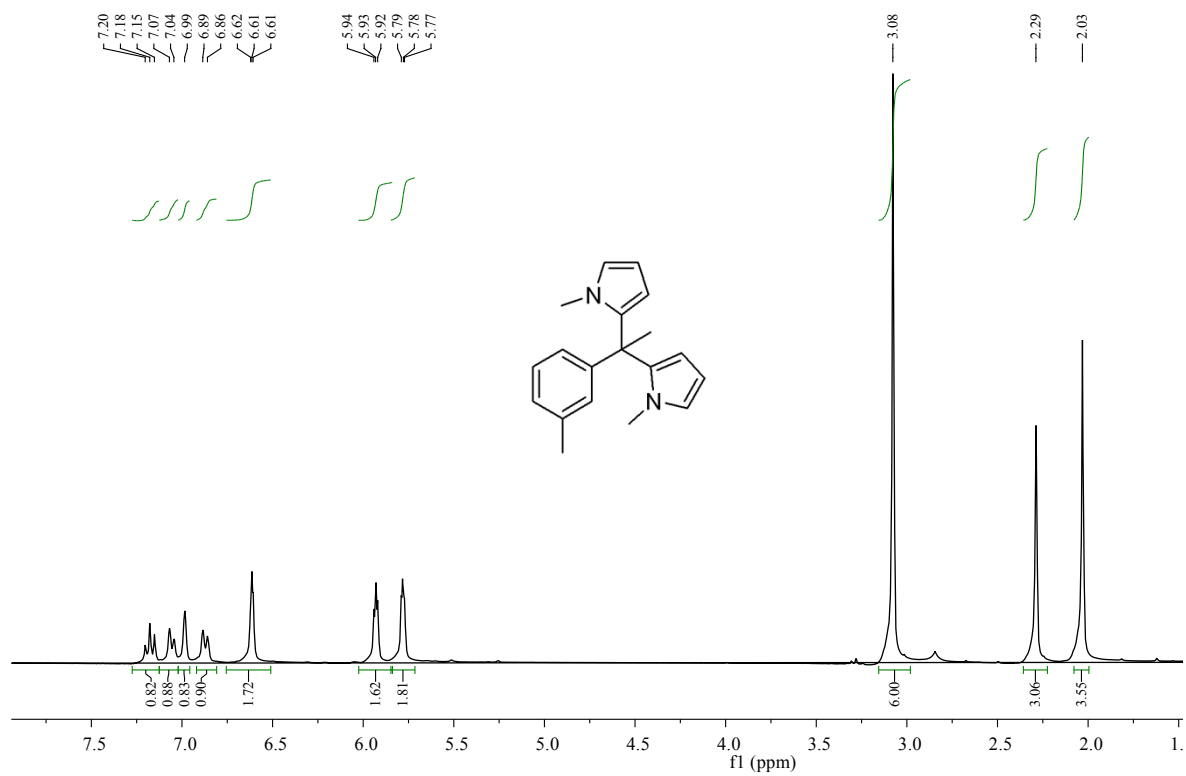


Figure S17. <sup>1</sup>H NMR spectra (300 MHz) of 3da

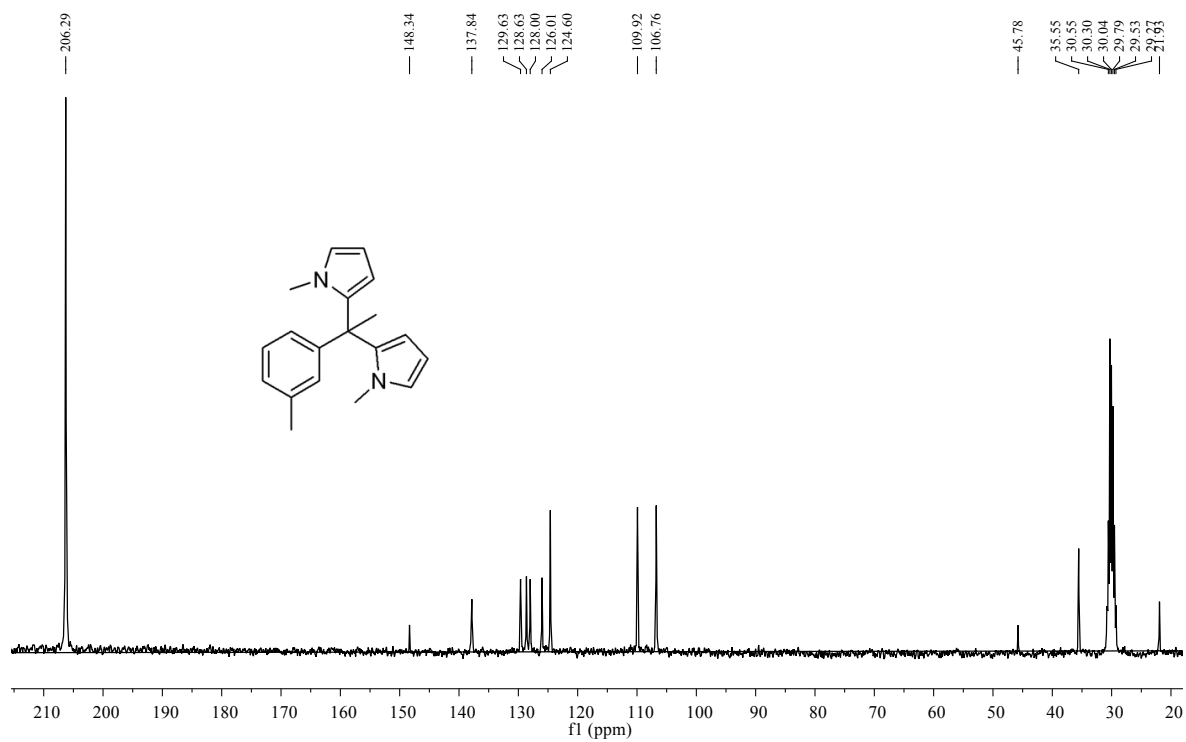


Figure S18.  $^{13}\text{C}$  NMR spectra (300 MHz) of 3da

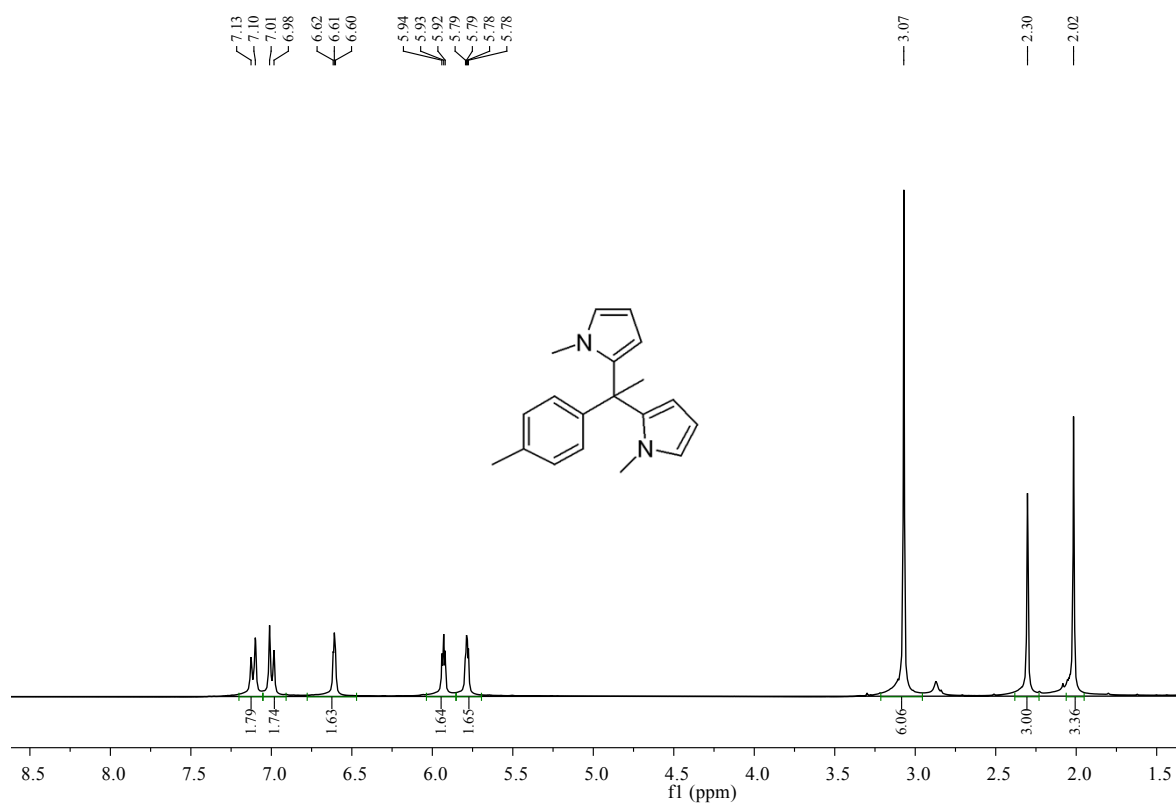


Figure S19.  $^1\text{H}$  NMR spectra (300 MHz) of 3ea

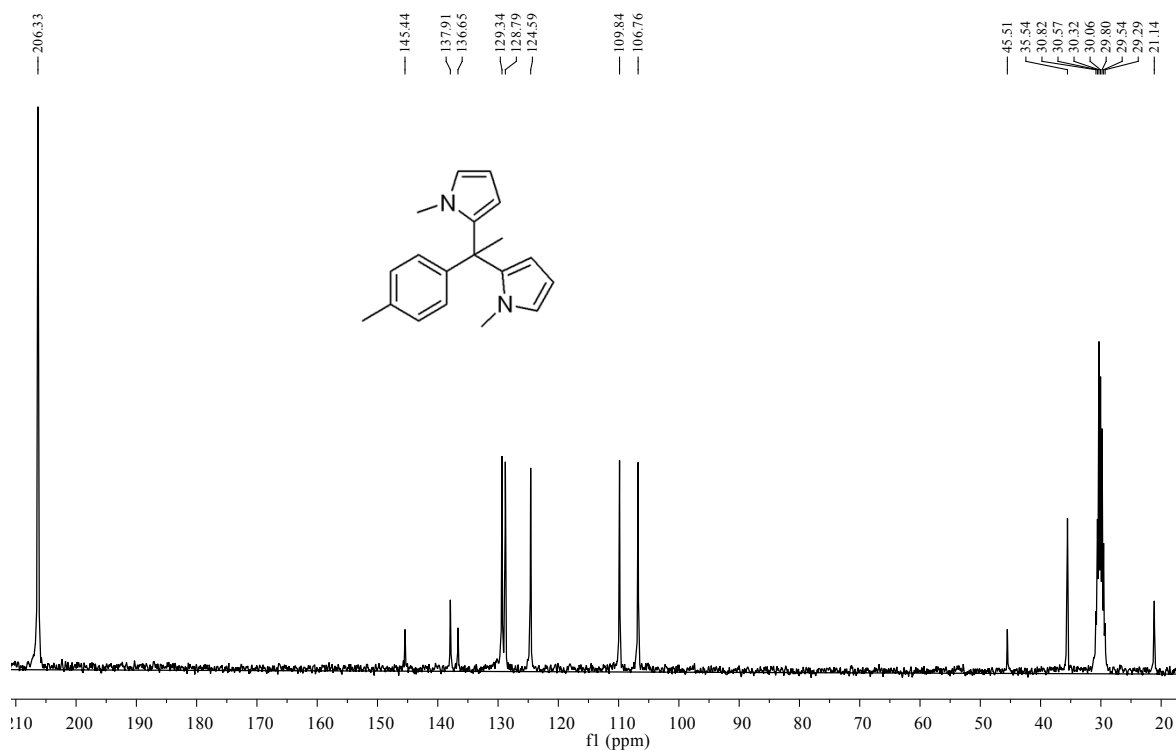


Figure S20. <sup>13</sup>C NMR spectra (300 MHz) of 3ea

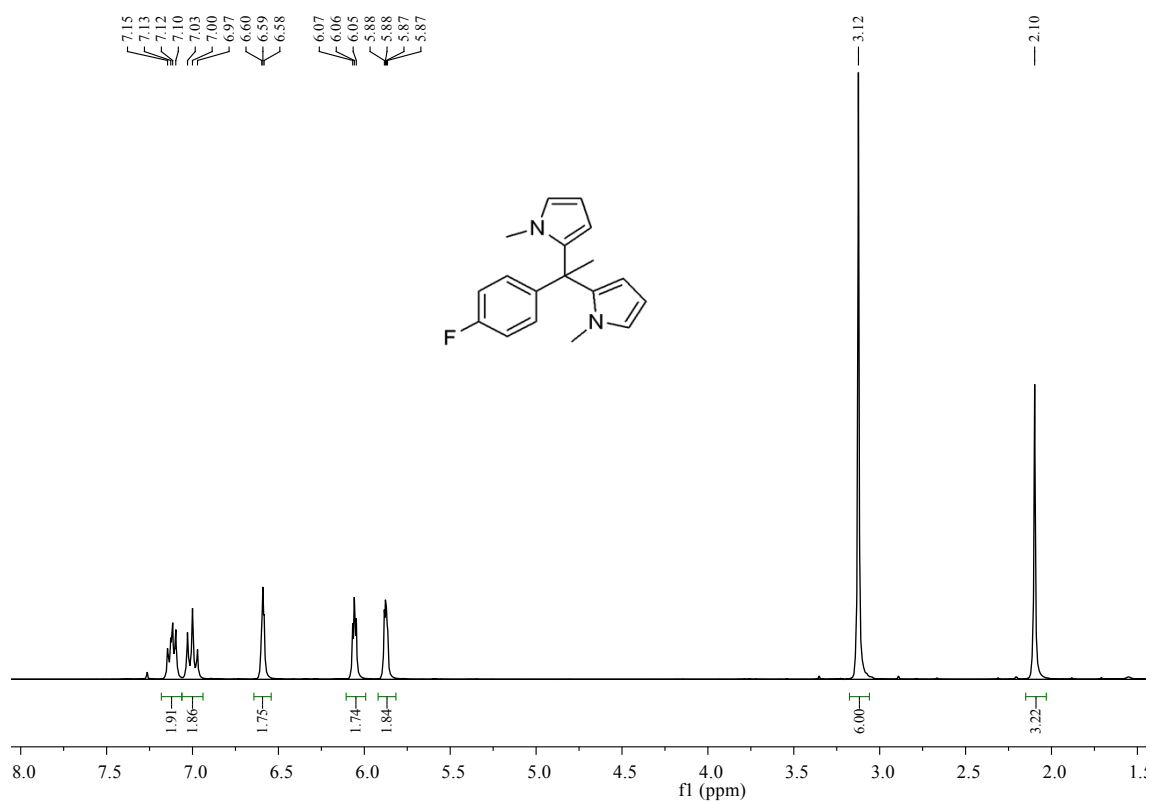
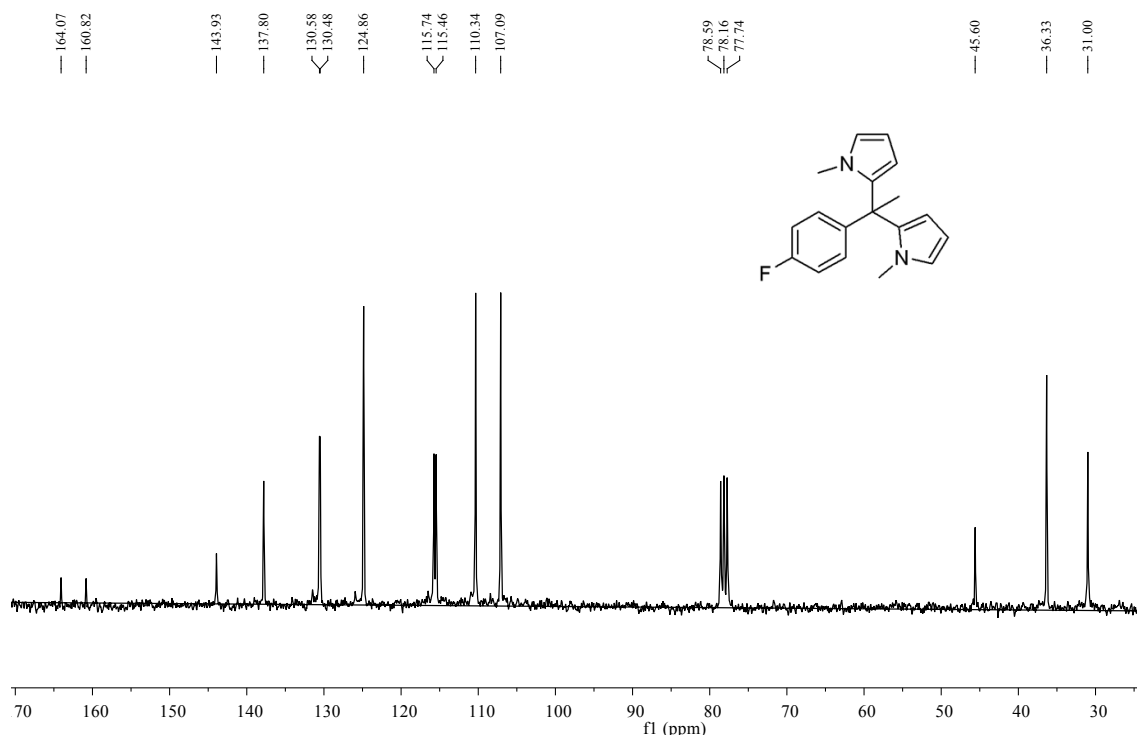
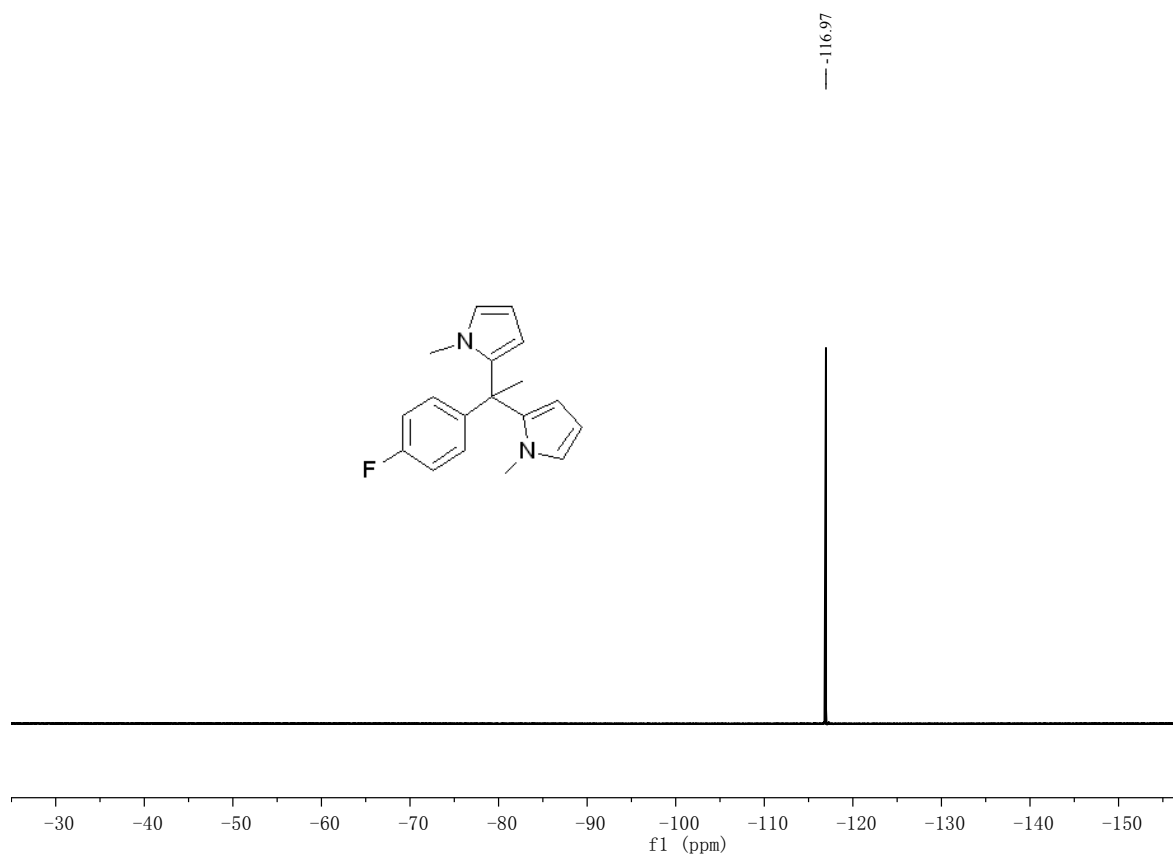


Figure S21. <sup>1</sup>H NMR spectra (300 MHz) of 3fa



**Figure S22.** <sup>13</sup>C NMR spectra (300 MHz) of **3fa**



**Figure S23.** <sup>19</sup>F NMR spectra (500 MHz) of **3fa**

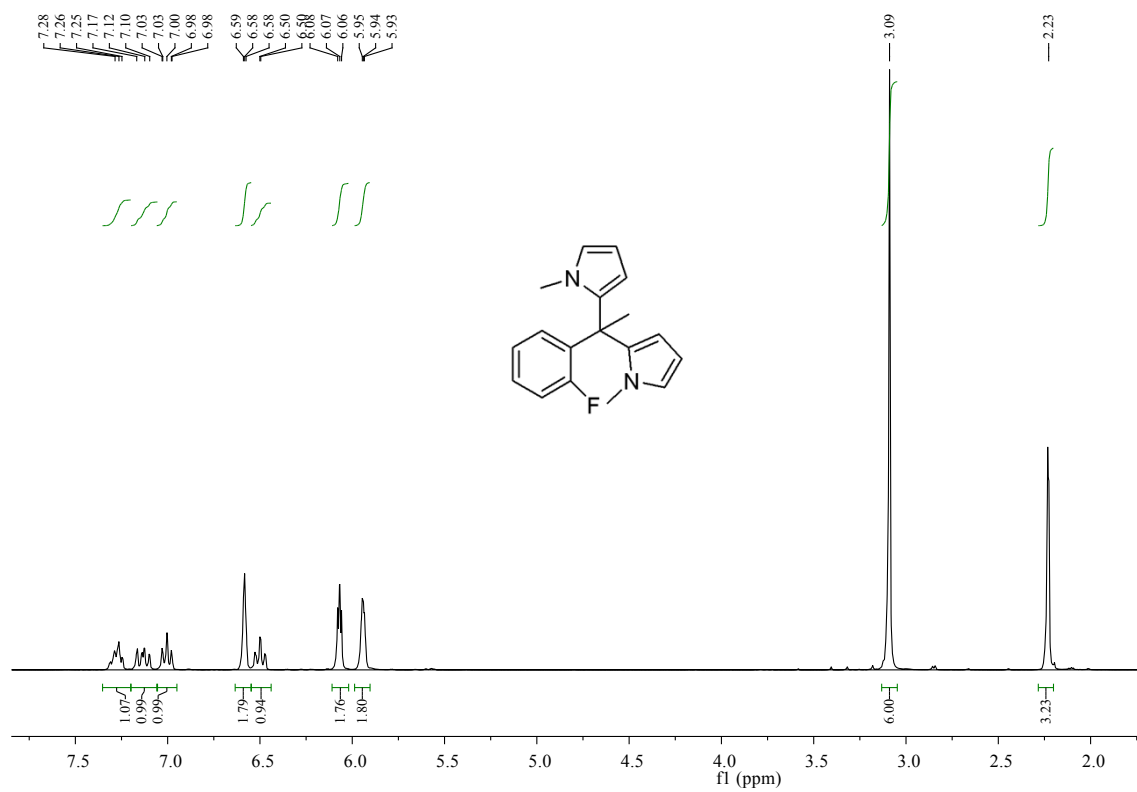


Figure S24. <sup>1</sup>H NMR spectra (300 MHz) of 3ga

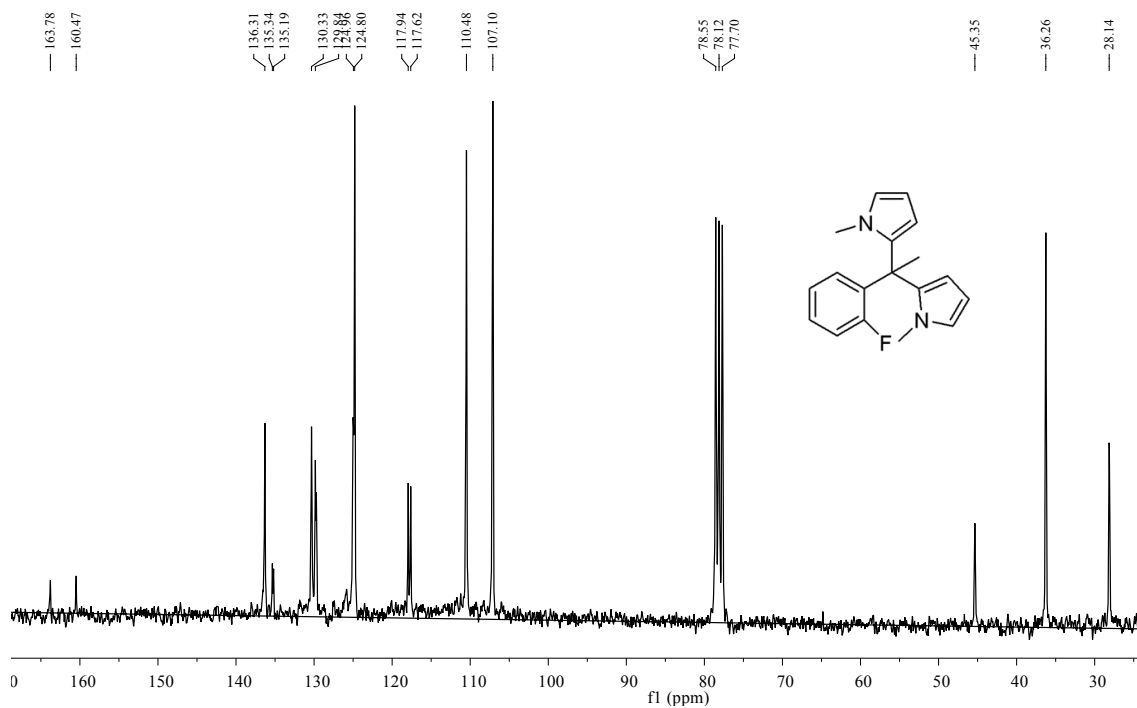


Figure S25. <sup>13</sup>C NMR spectra (300 MHz) of 3ga

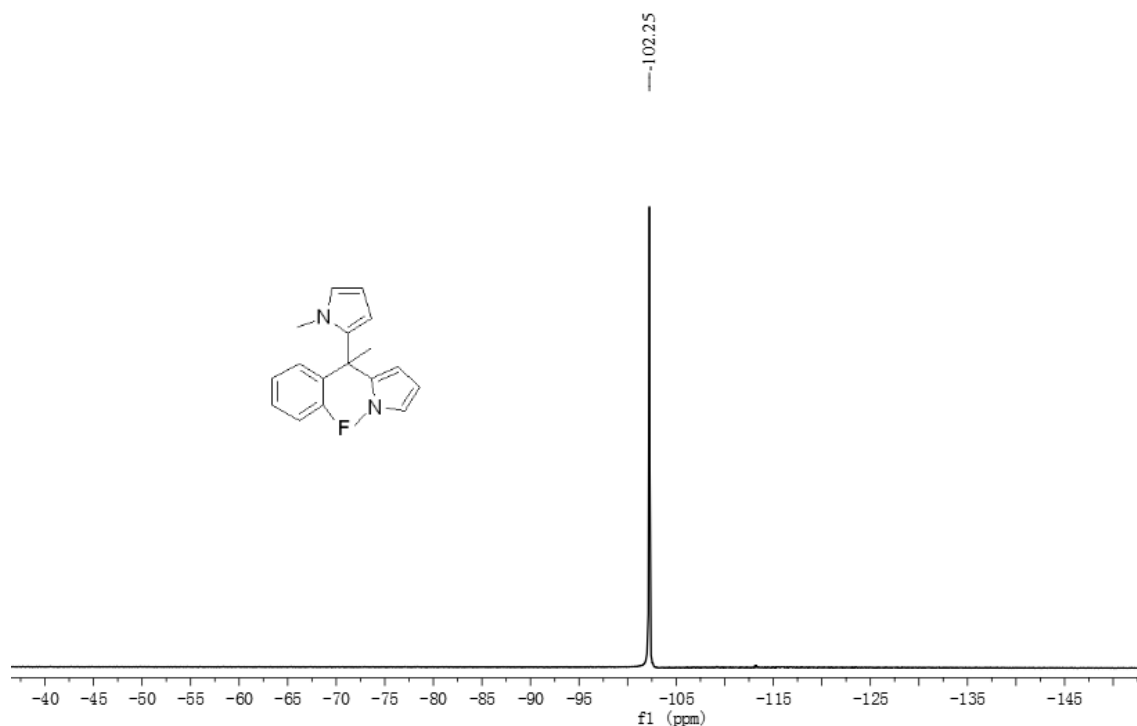


Figure S26.  $^{19}\text{F}$  NMR spectra (500 MHz) of 3ga

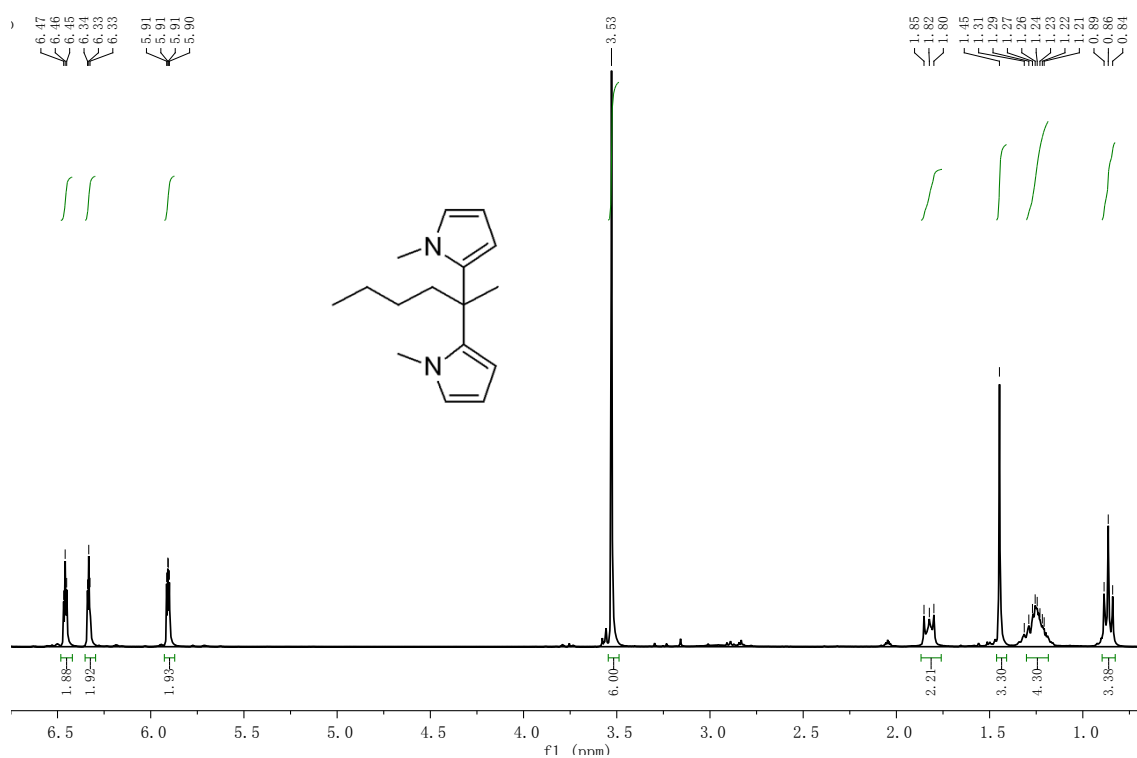


Figure S27.  $^1\text{H}$  NMR spectra (300 MHz) of 3ha

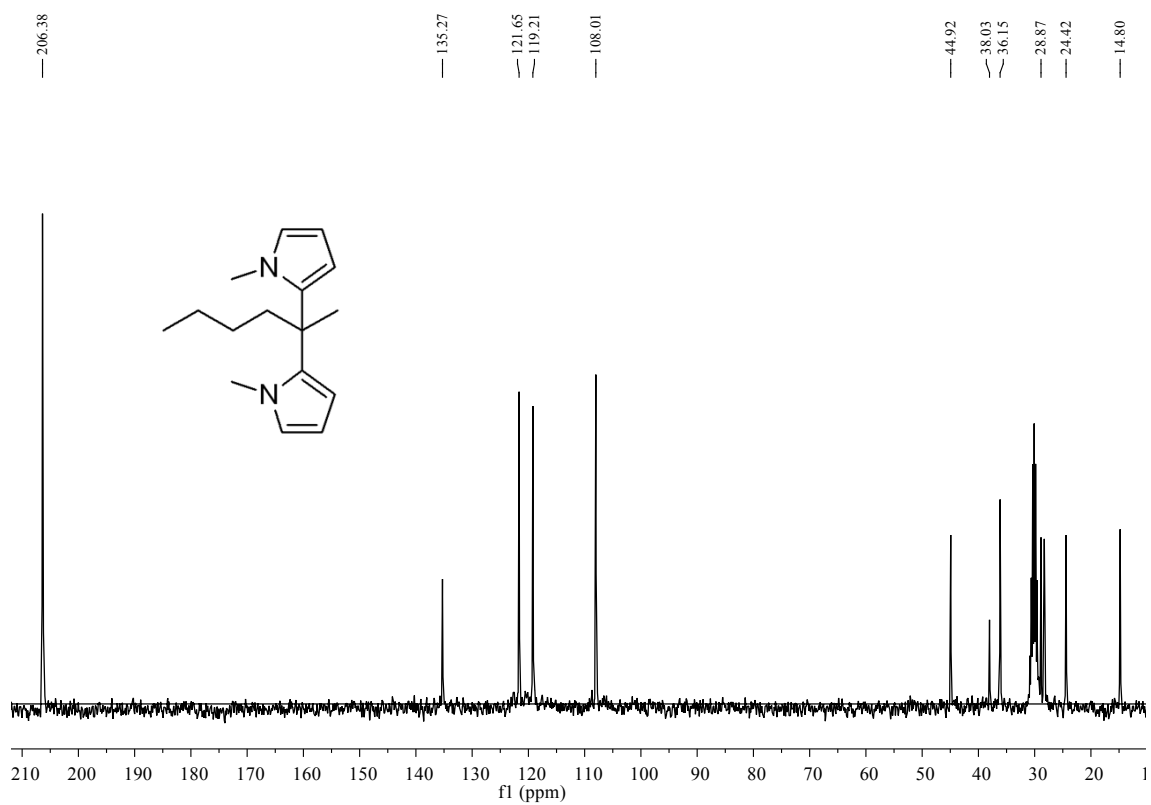


Figure S28. <sup>13</sup>C NMR spectra (300 MHz) of 3ha

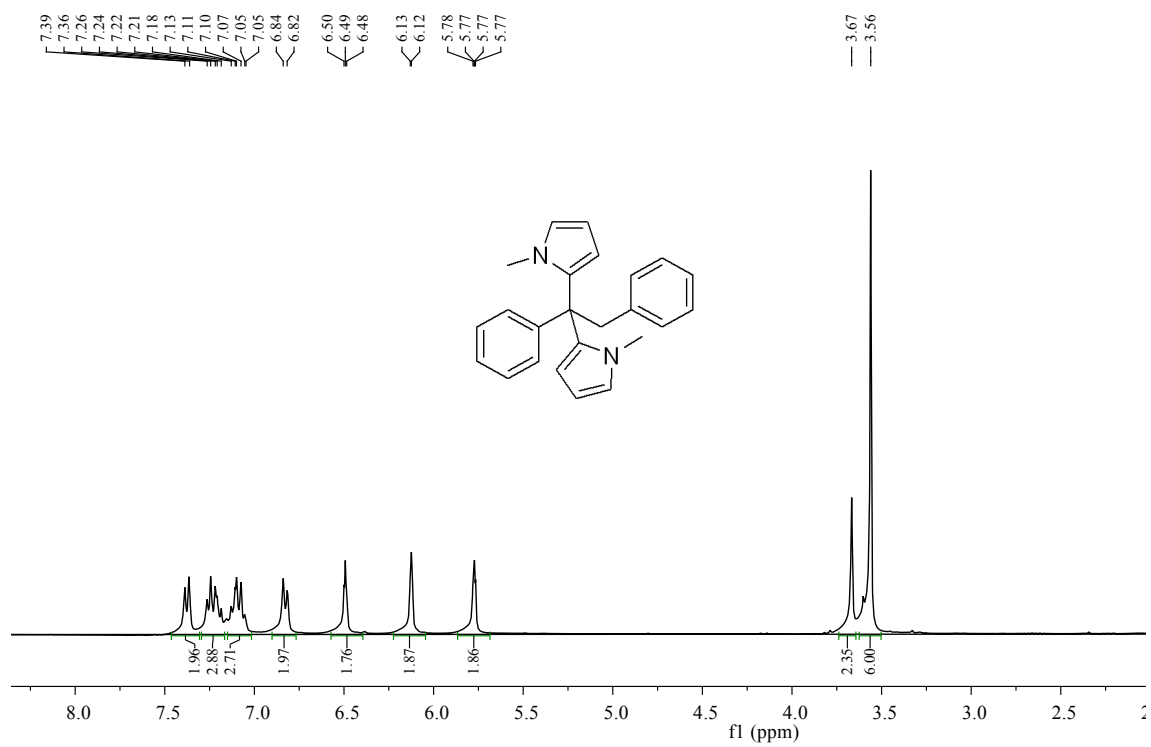
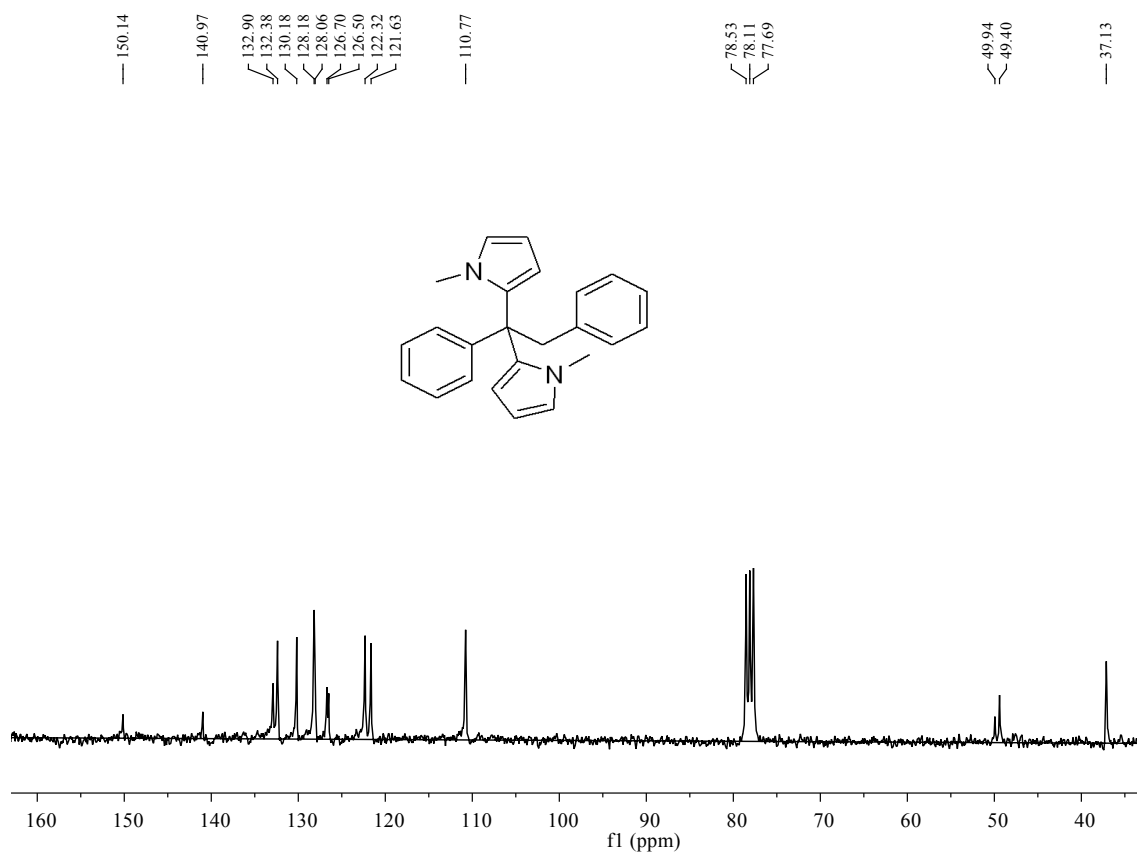
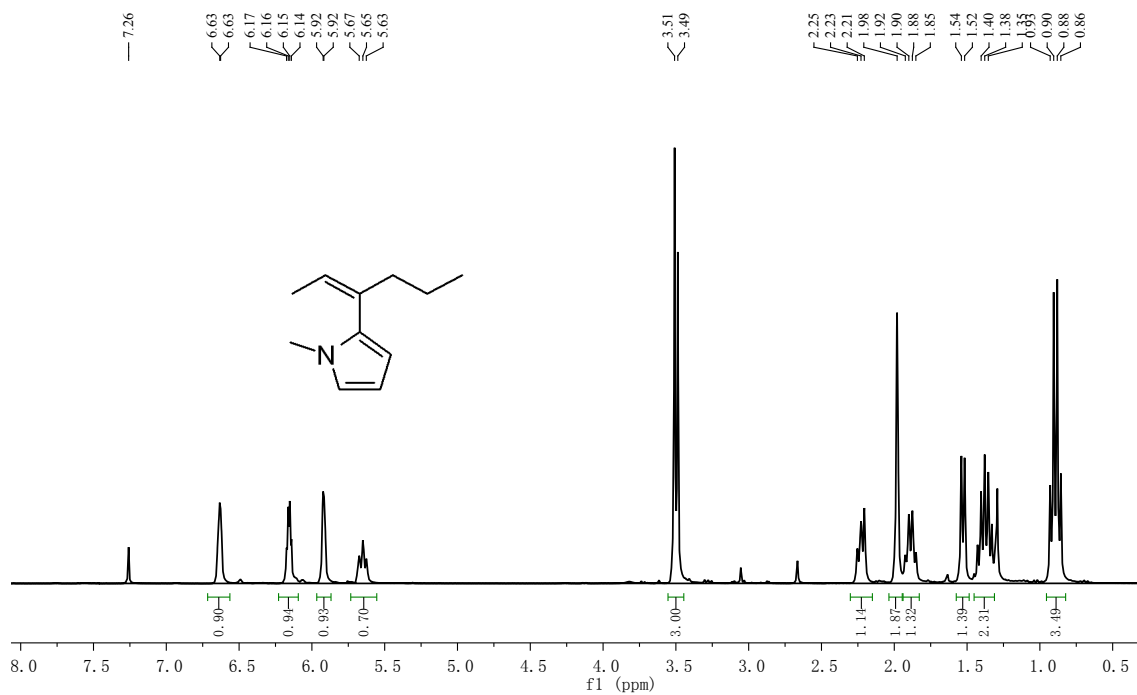


Figure S29. <sup>1</sup>H NMR spectra (300 MHz) of 3ia



**Figure S30.**  $^{13}\text{C}$  NMR spectra (300 MHz) of **3ia**



**Figure S31.**  $^1\text{H}$  NMR spectra (300 MHz) of **3ja**



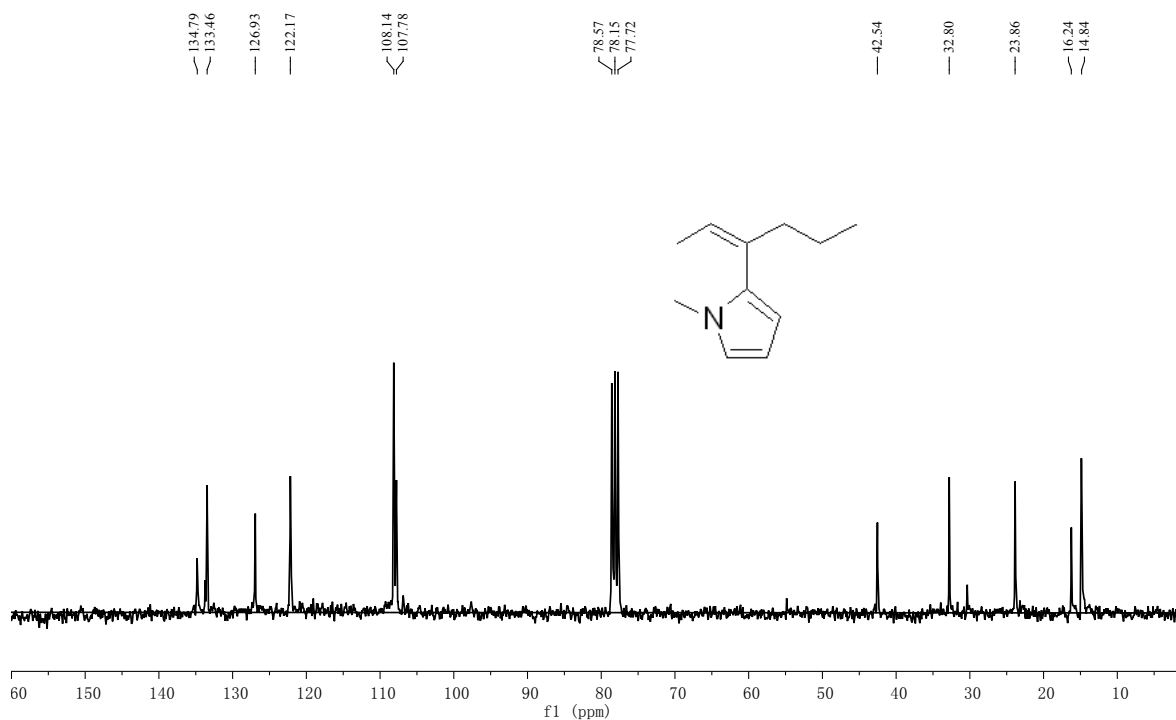


Figure S32. <sup>13</sup>C NMR spectra (300 MHz) of 3ja

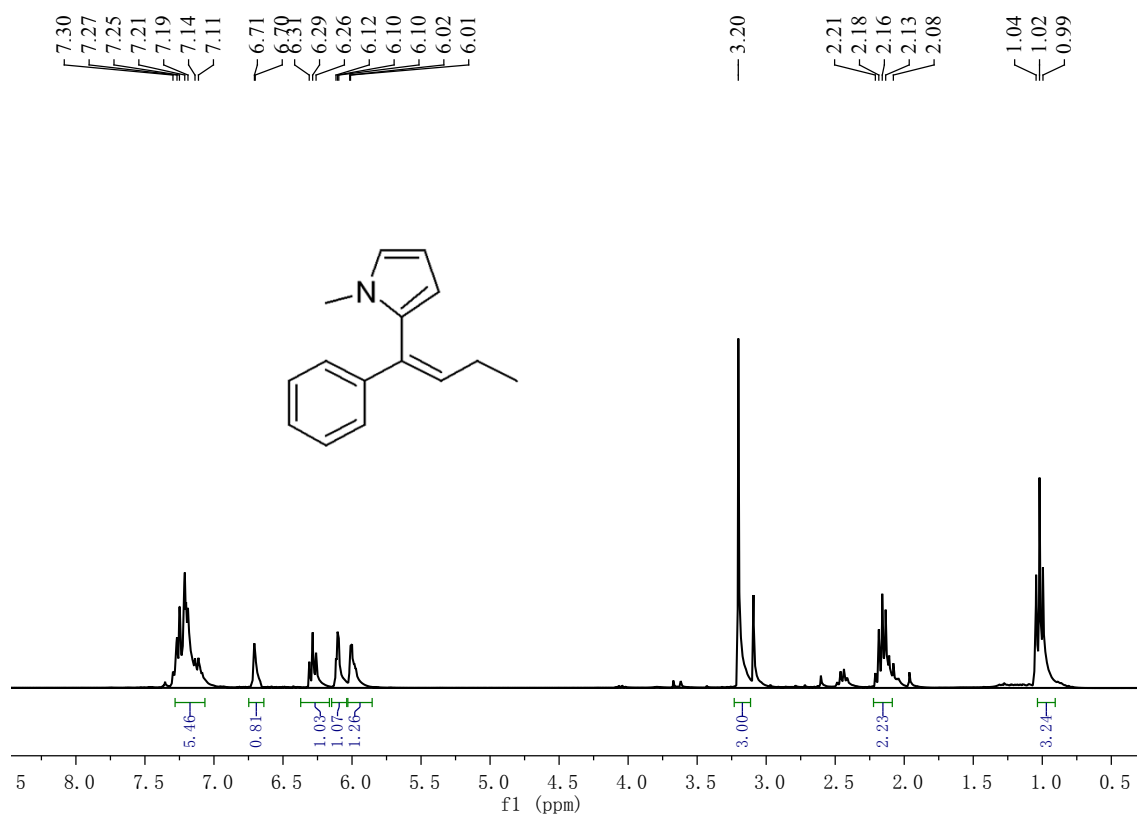
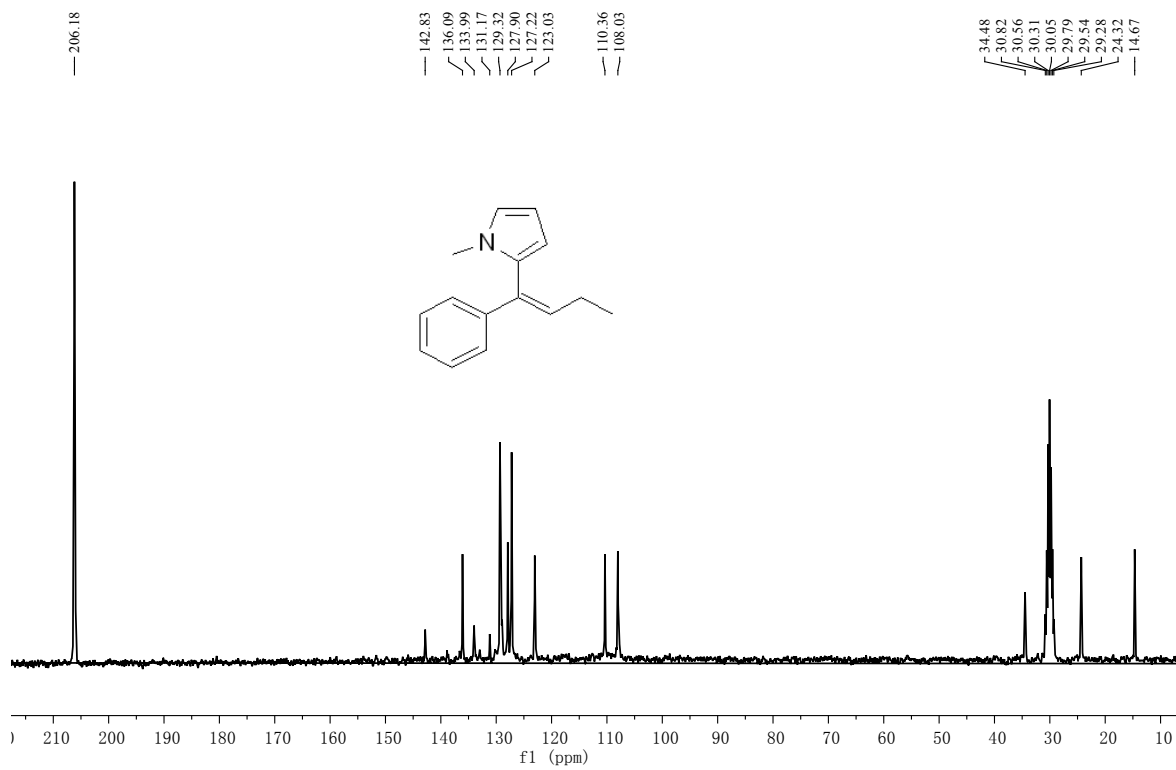


Figure S33. <sup>1</sup>H NMR spectra (300 MHz) of 3ka



**Figure S34.** <sup>13</sup>C NMR spectra (300 MHz) of **3ka**