

Supporting Information

I₂/Amine Synergistic Catalysis Enables 2,2'-Bipyridine Synthesis from Oxime Esters and Enals

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^aKey Laboratory of Applied Chemistry of Chongqing Municipality, School of Chemistry and Chemical Engineering, Southwest University, Chongqing 400715, China

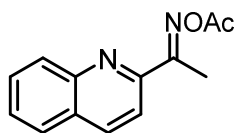
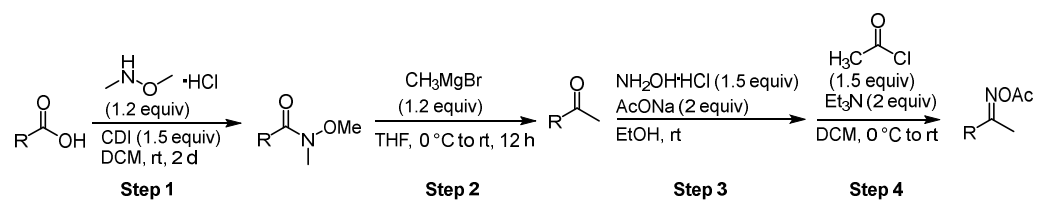
^bChongqing DEPU Foreign Language School, Chongqing 401320, China

[‡]These authors contributed equally to this work.

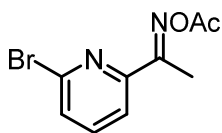
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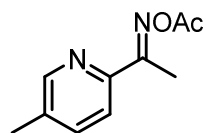
Preparation of Oxime Esters



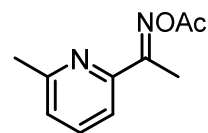
S1



S2



S3

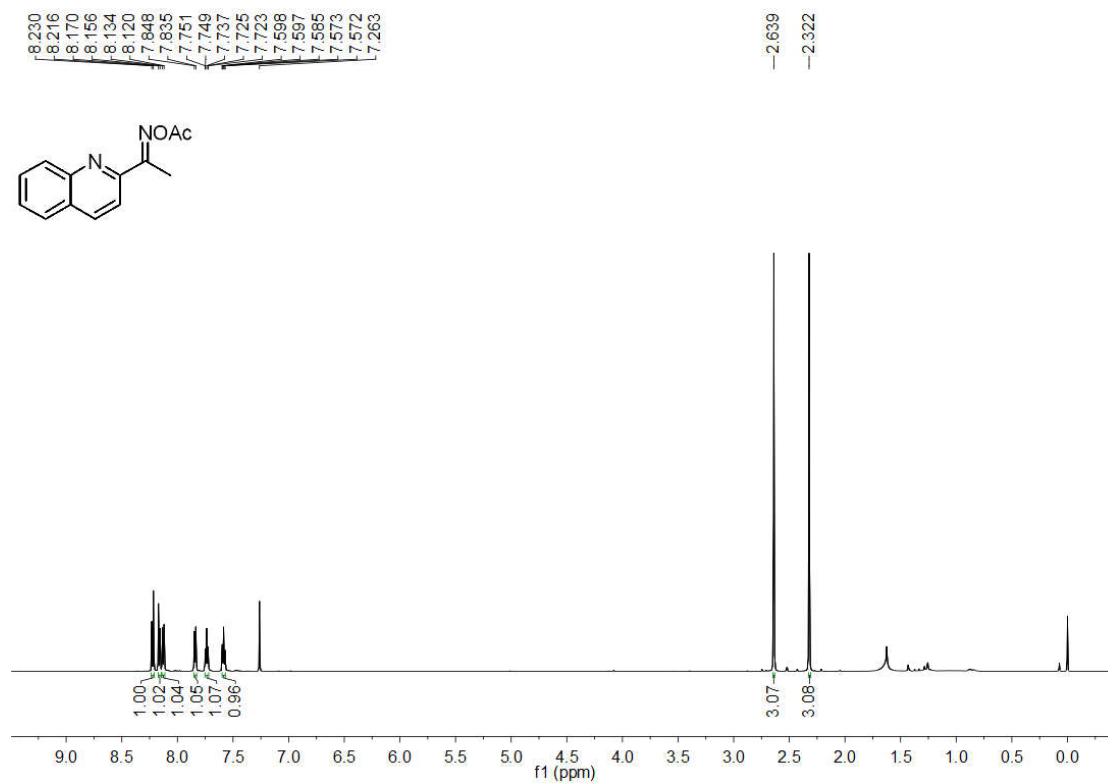


S4

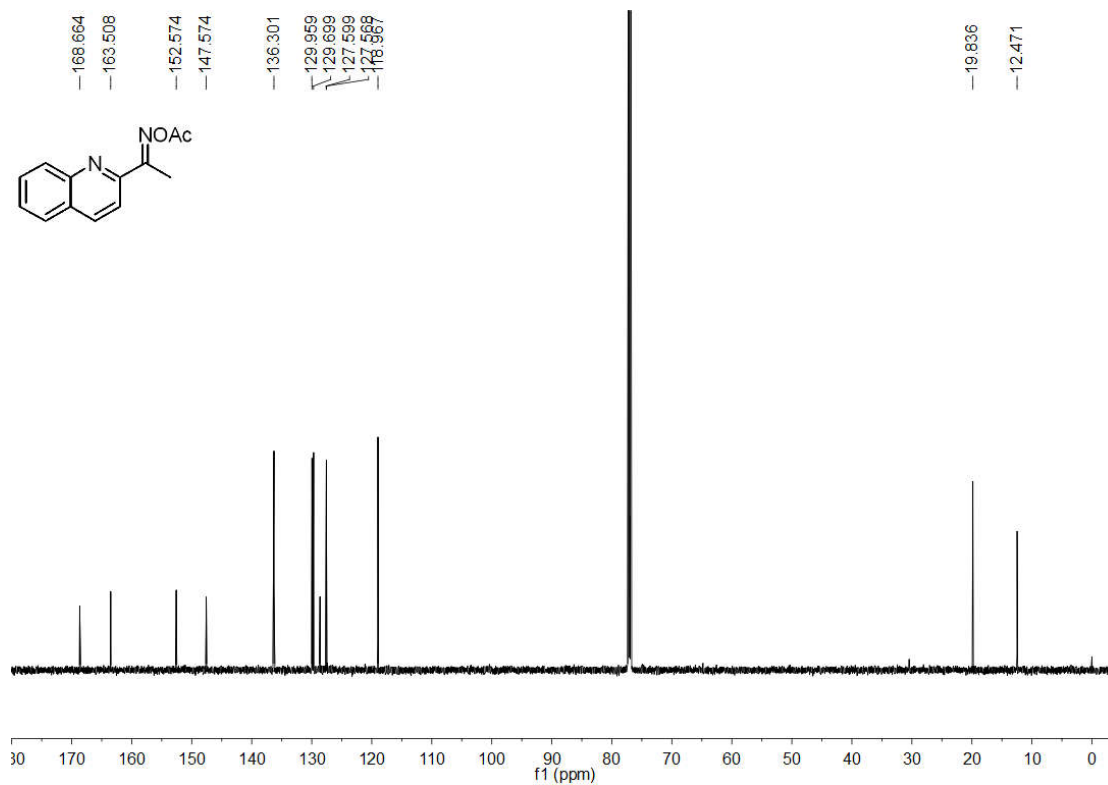
These four compounds are newly synthesized oxime esters.

^1H , ^{13}C , and ^{19}F NMR Spectra

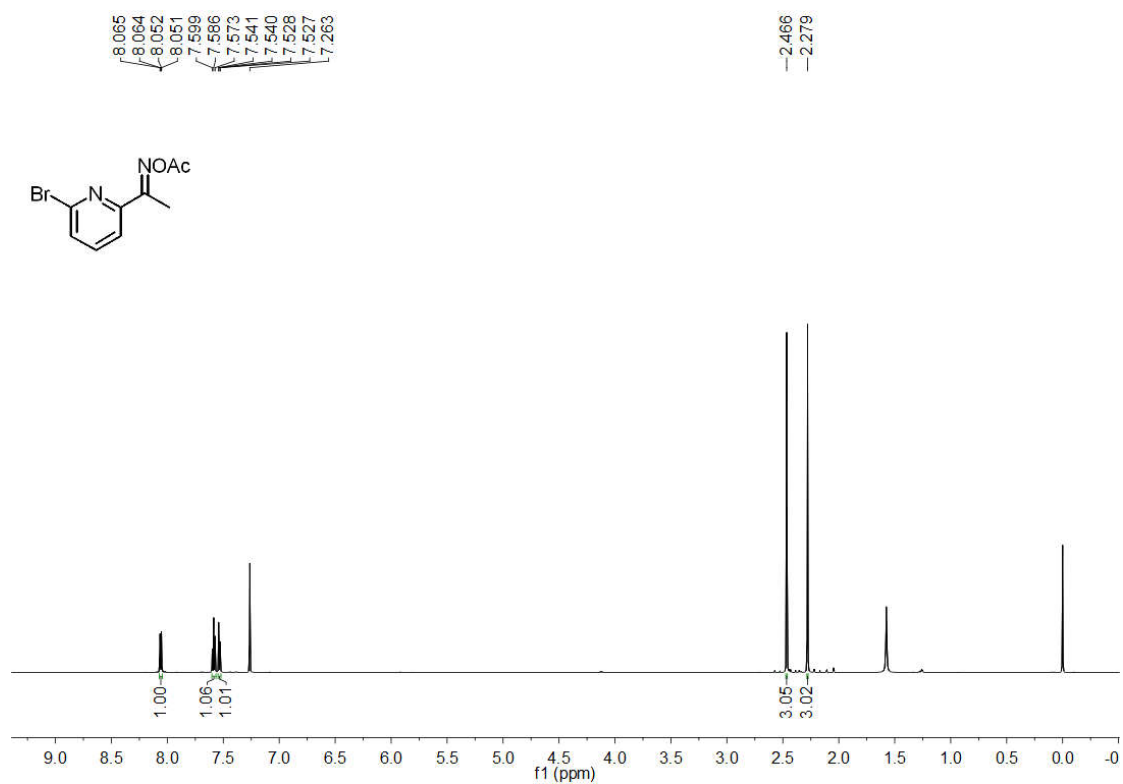
^1H NMR Spectrum of (S1) (600 MHz, CDCl_3)



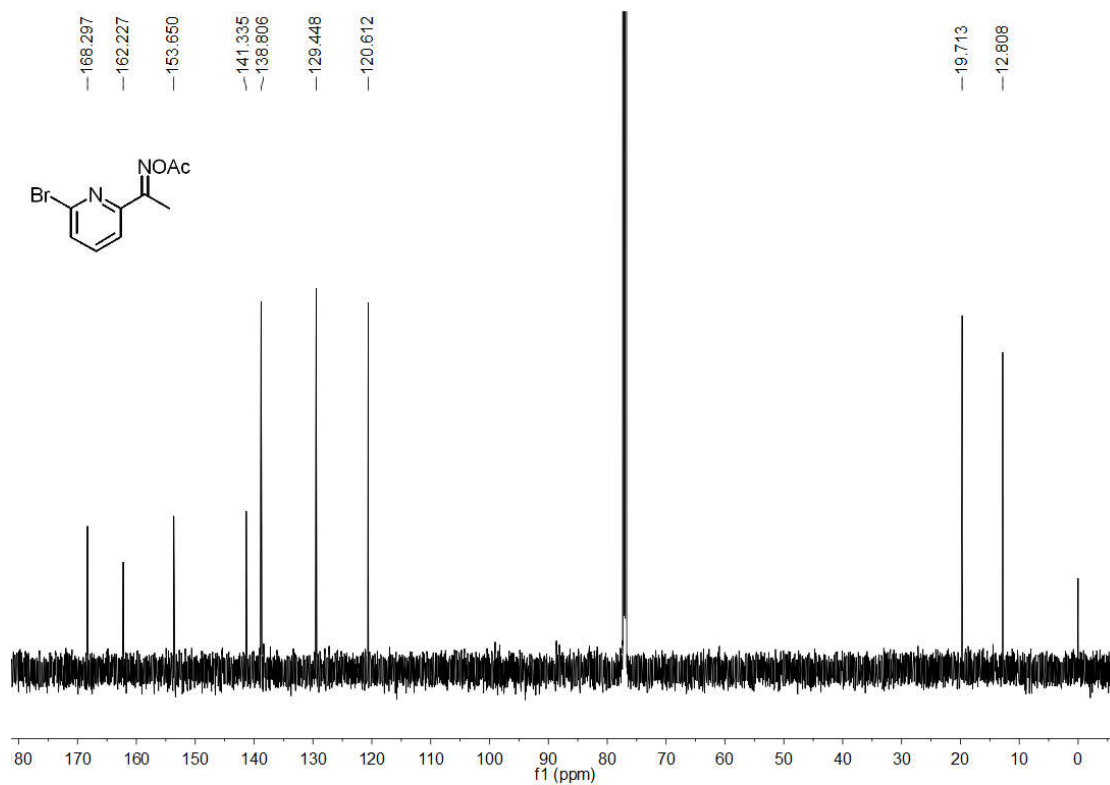
^{13}C NMR Spectrum of (S1) (151 MHz, CDCl_3)



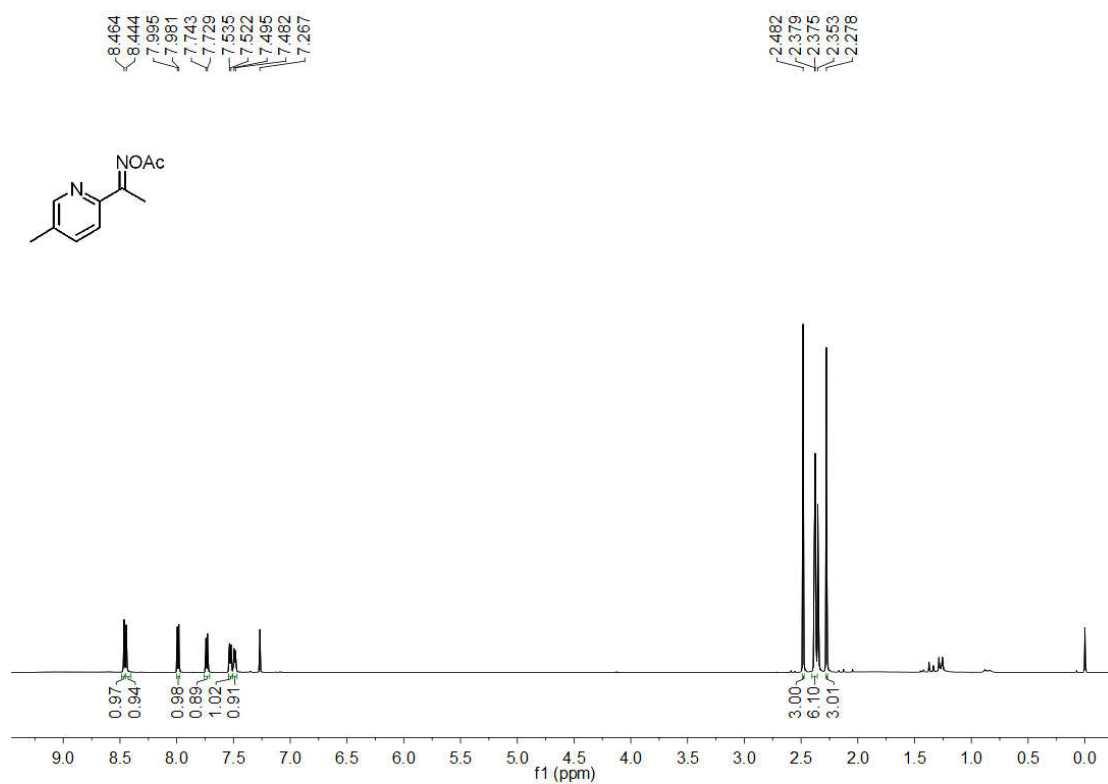
¹H NMR Spectrum of (S2) (600 MHz, CDCl₃)



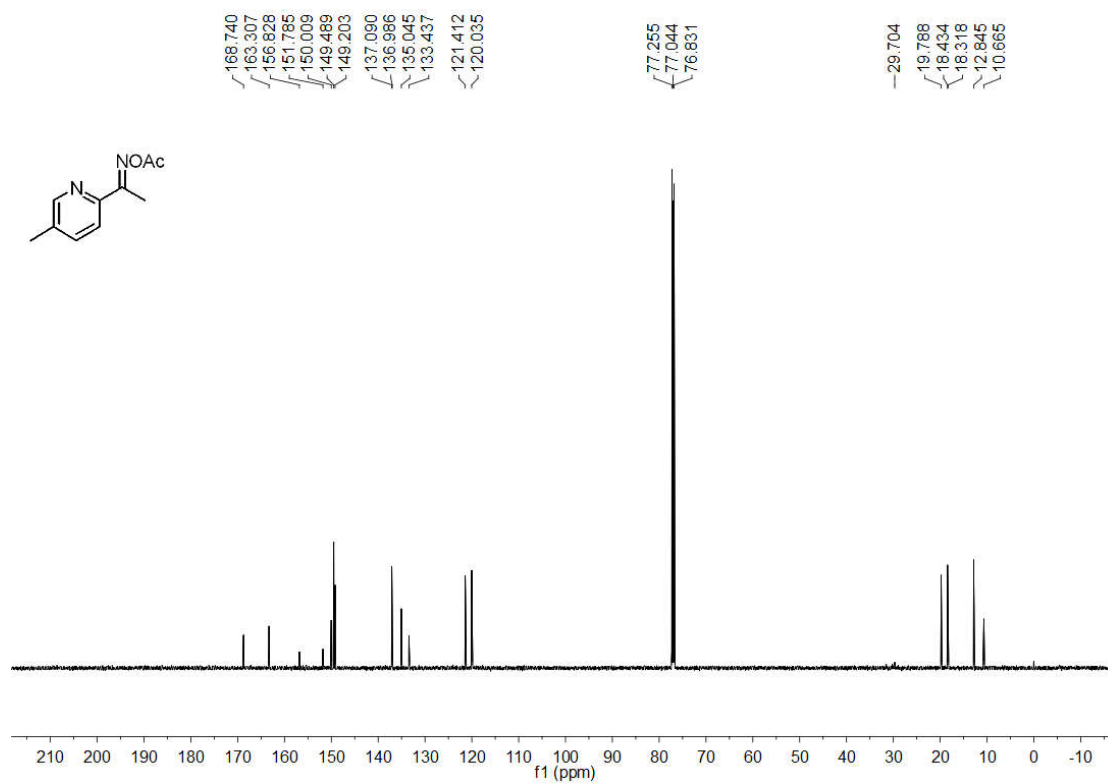
¹³C NMR Spectrum of (S2) (151 MHz, CDCl₃)



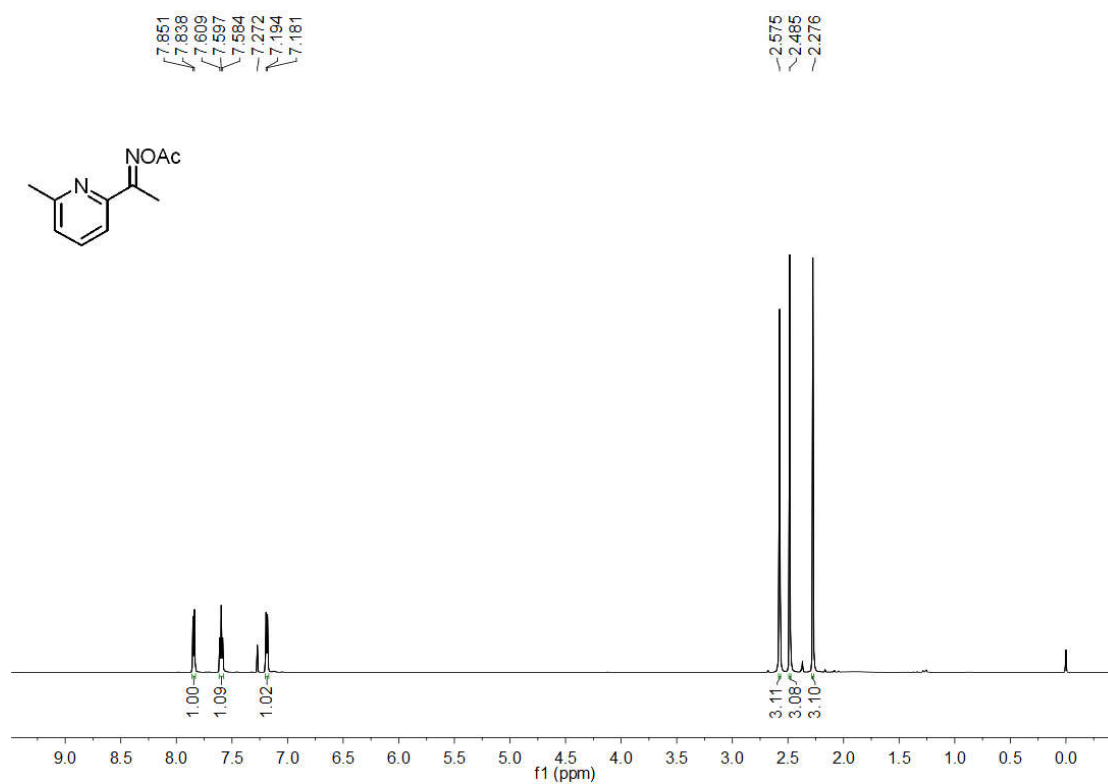
¹H NMR Spectrum of (S3) (600 MHz, CDCl₃)



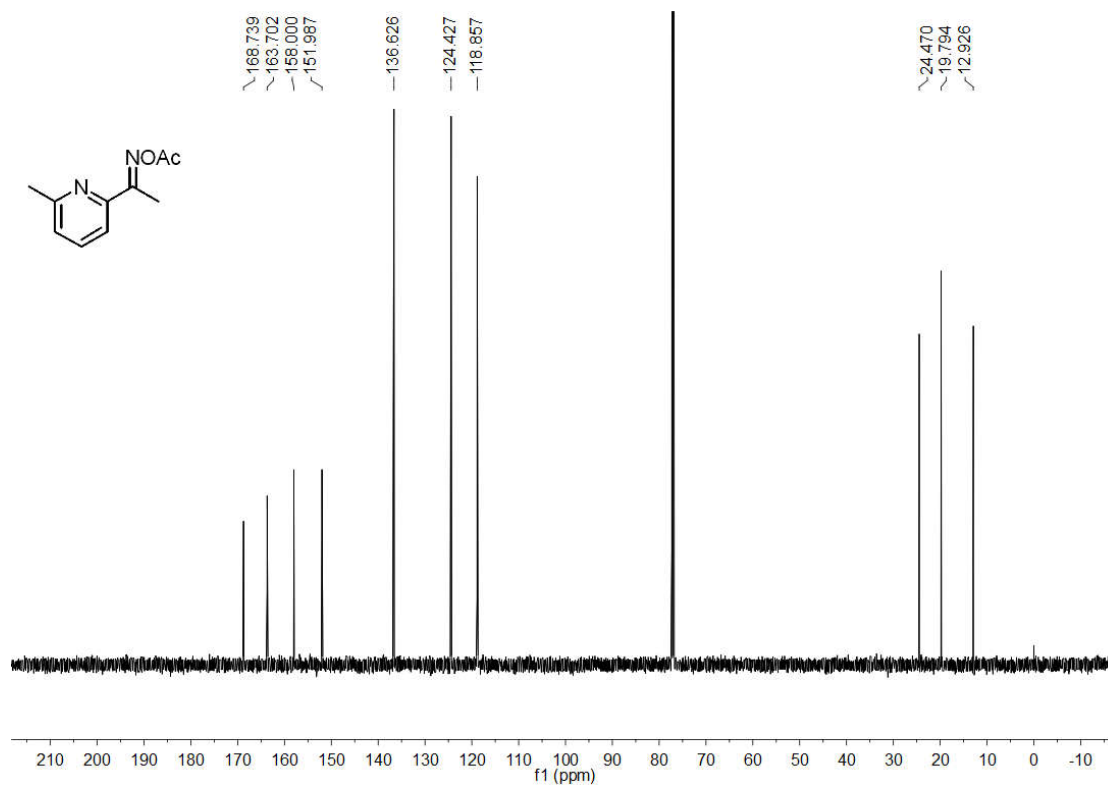
¹³C NMR Spectrum of (S3) (151 MHz, CDCl₃)



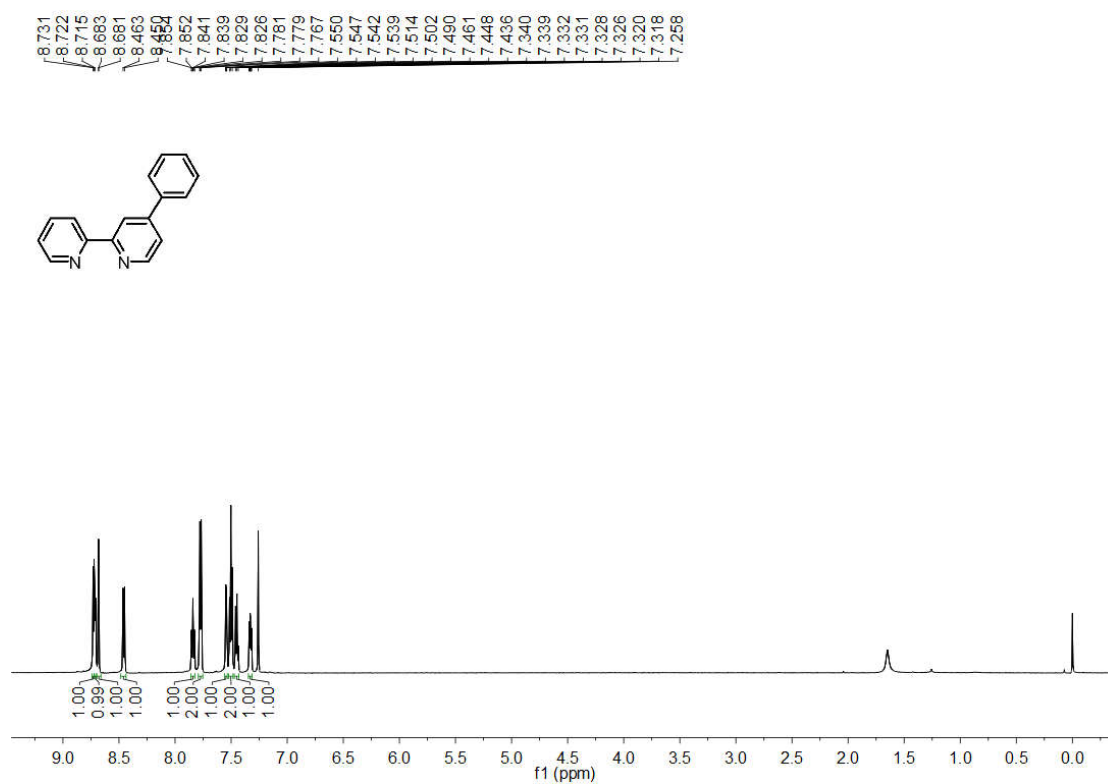
¹H NMR Spectrum of (S4) (600 MHz, CDCl₃)



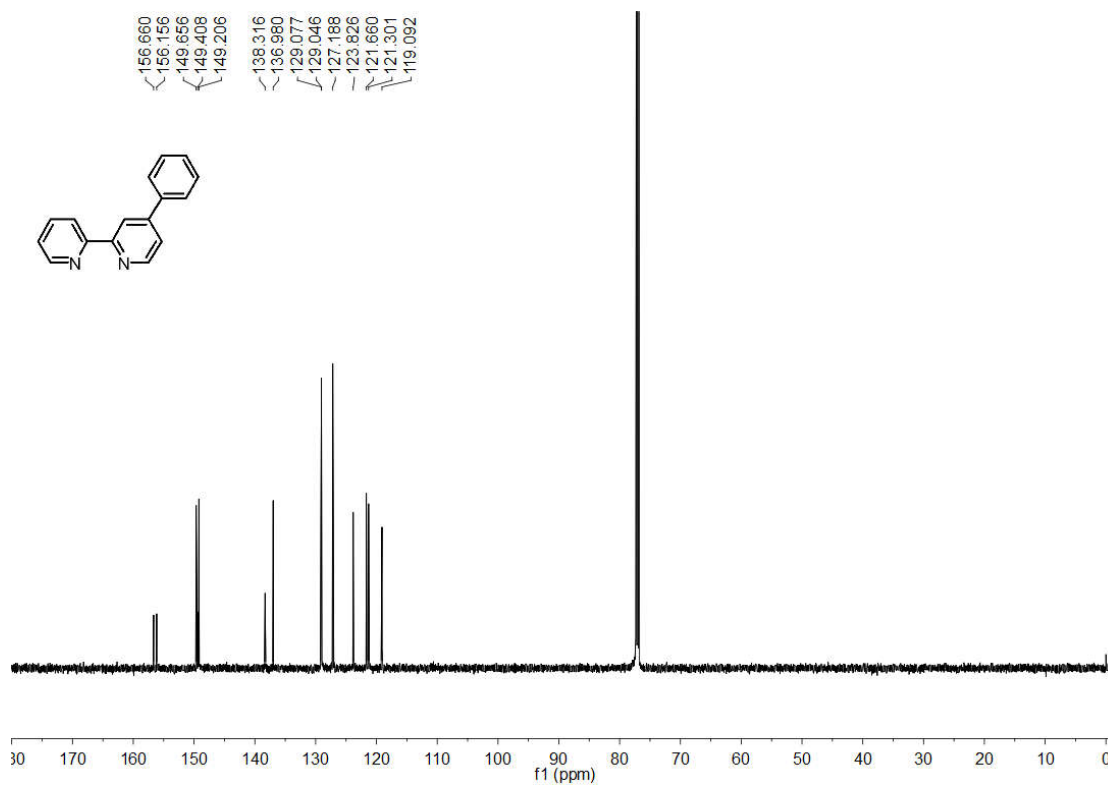
¹³C NMR Spectrum of (S4) (151 MHz, CDCl₃)



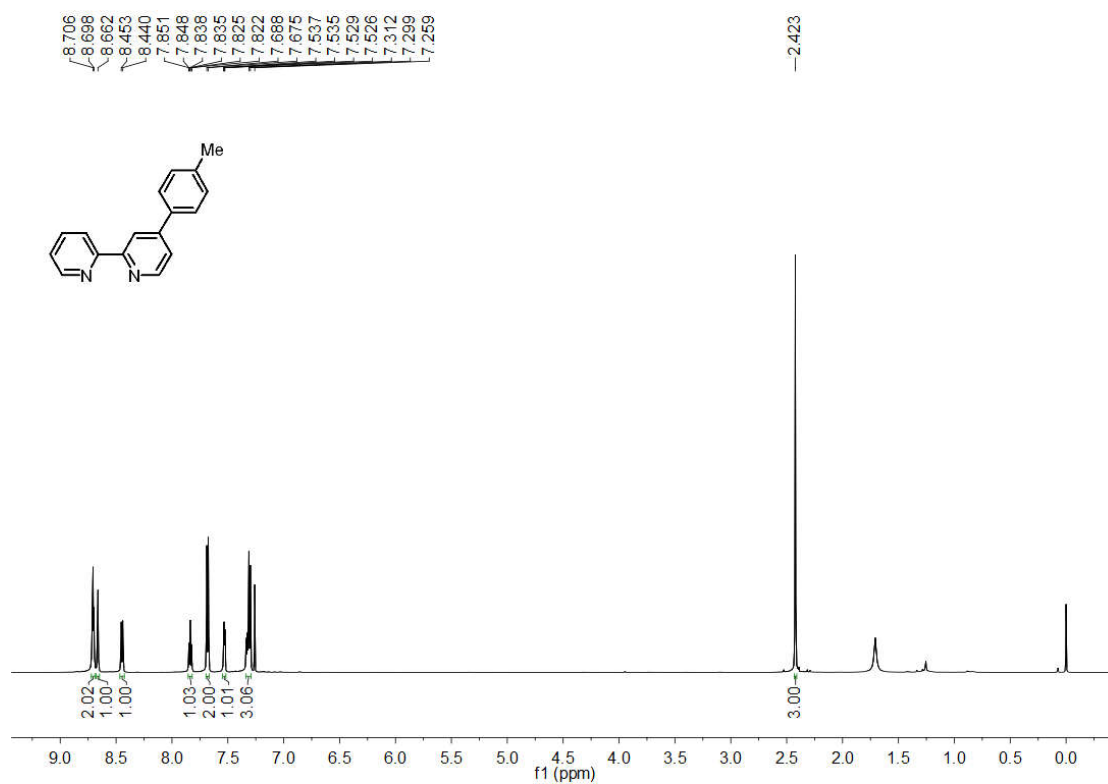
¹H NMR Spectrum of 3a (600 MHz, CDCl₃)



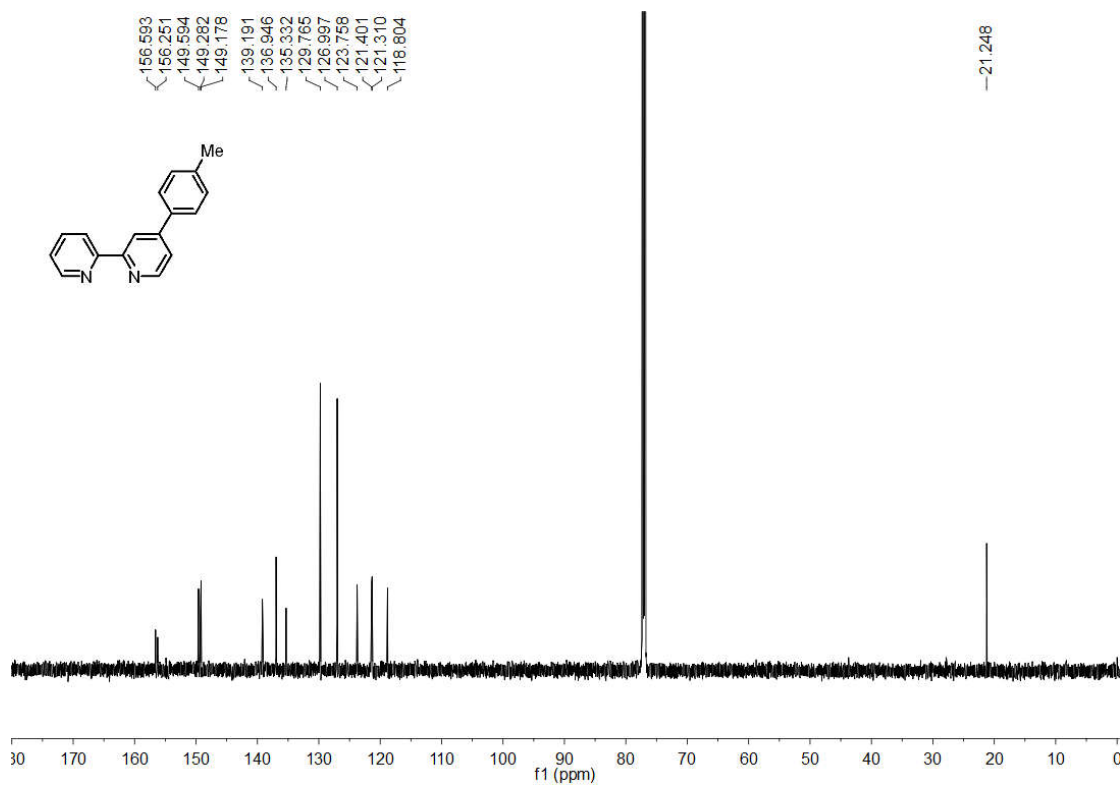
¹³C NMR Spectrum of 3a (151 MHz, CDCl₃)



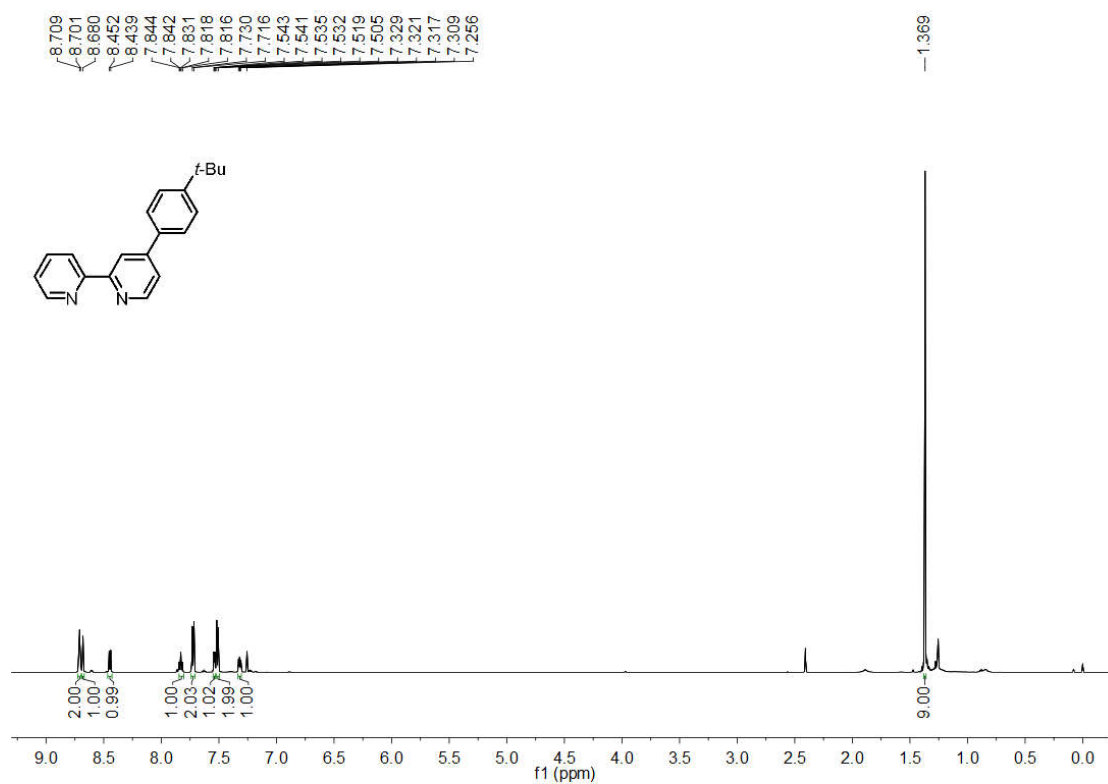
¹H NMR Spectrum of 3b (600 MHz, CDCl₃)



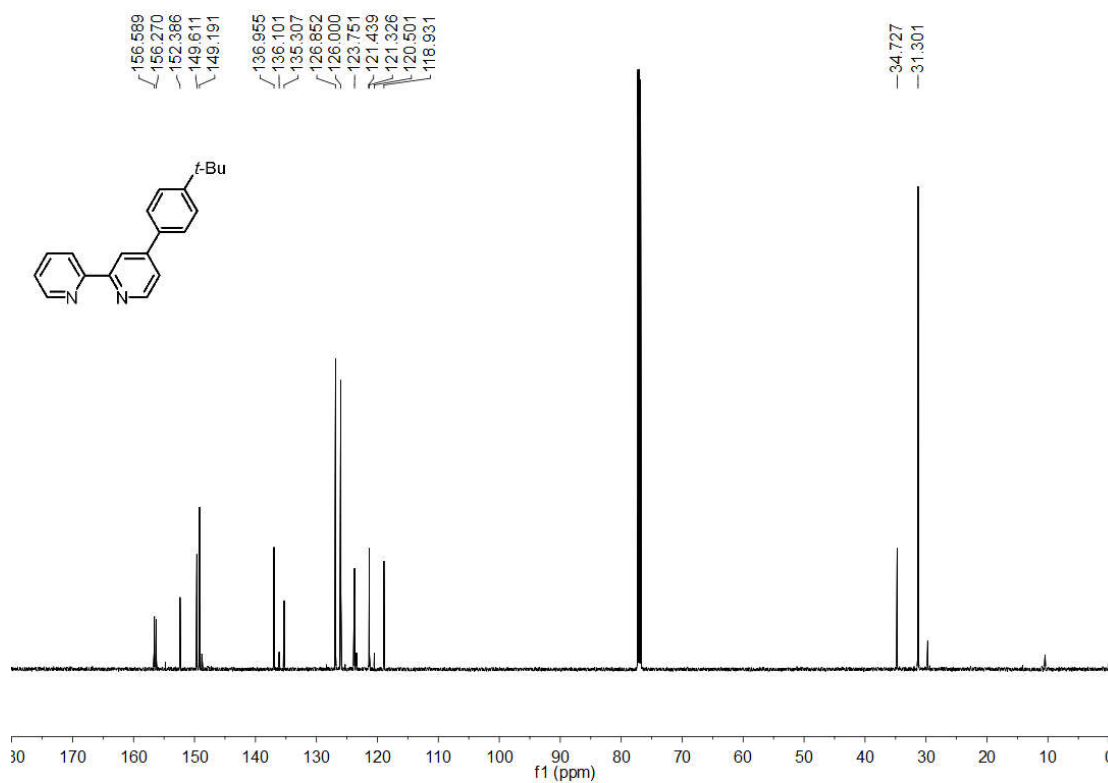
¹³C NMR Spectrum of 3a (151 MHz, CDCl₃)



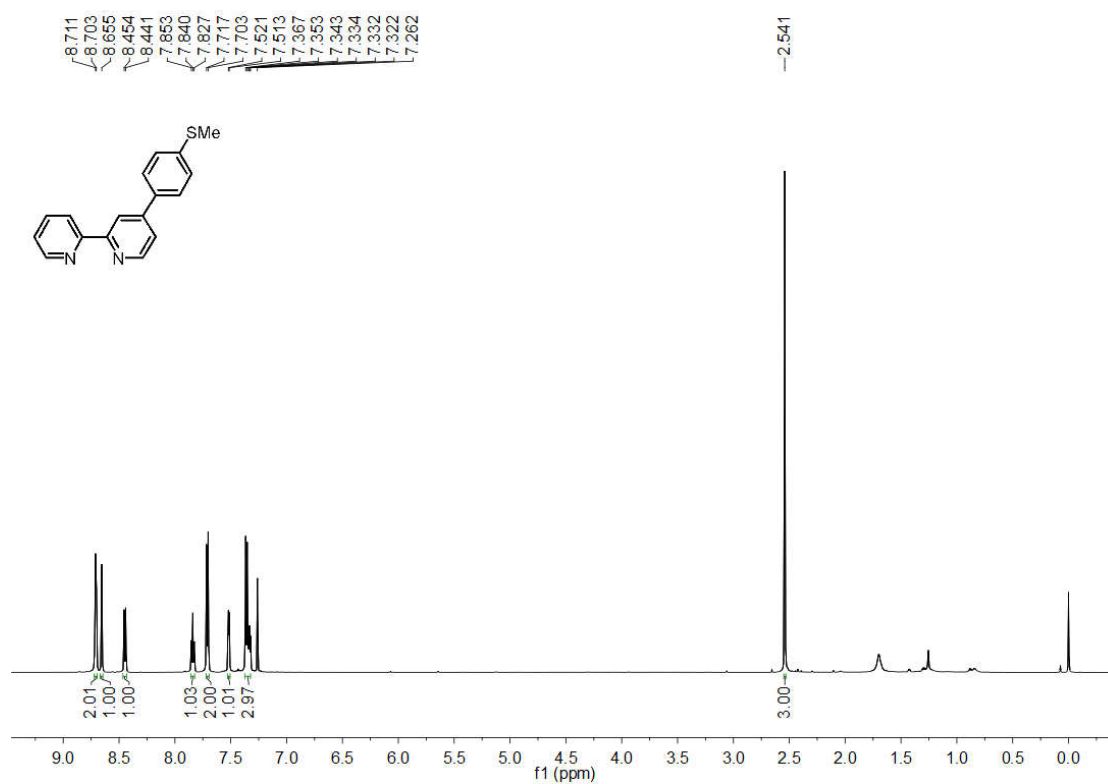
¹H NMR Spectrum of 3c (600 MHz, CDCl₃)



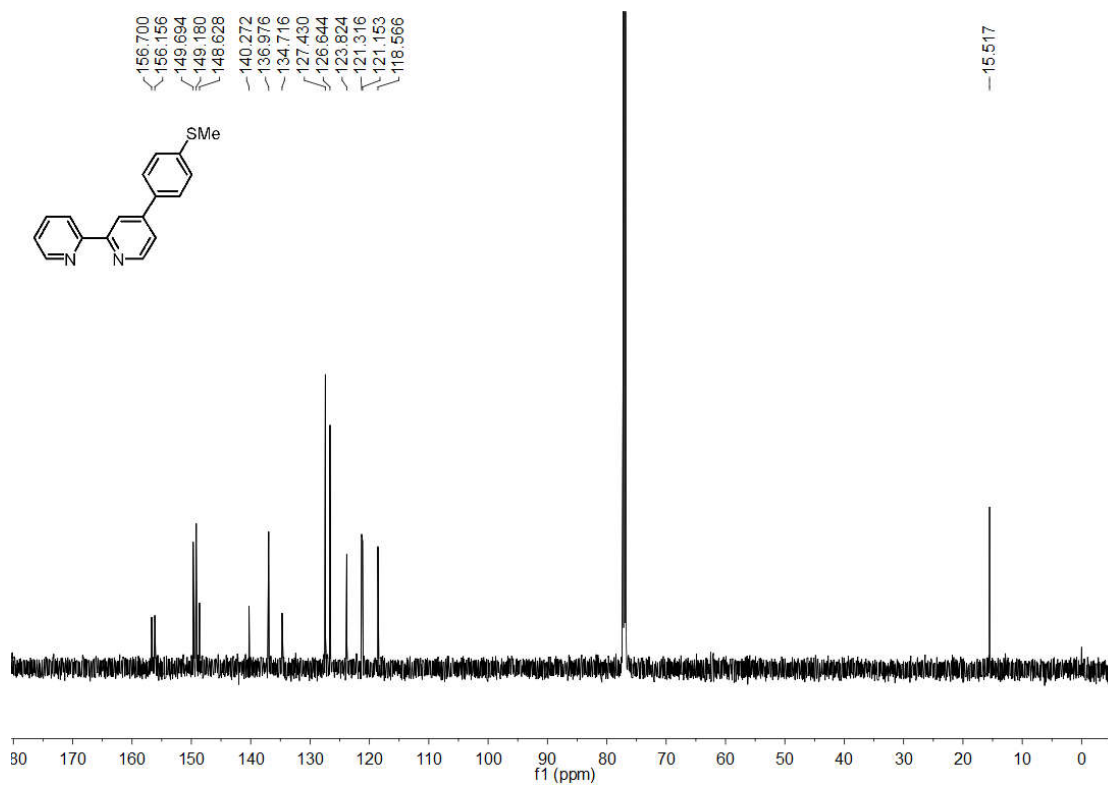
¹³C NMR Spectrum of 3c (151 MHz, CDCl₃)



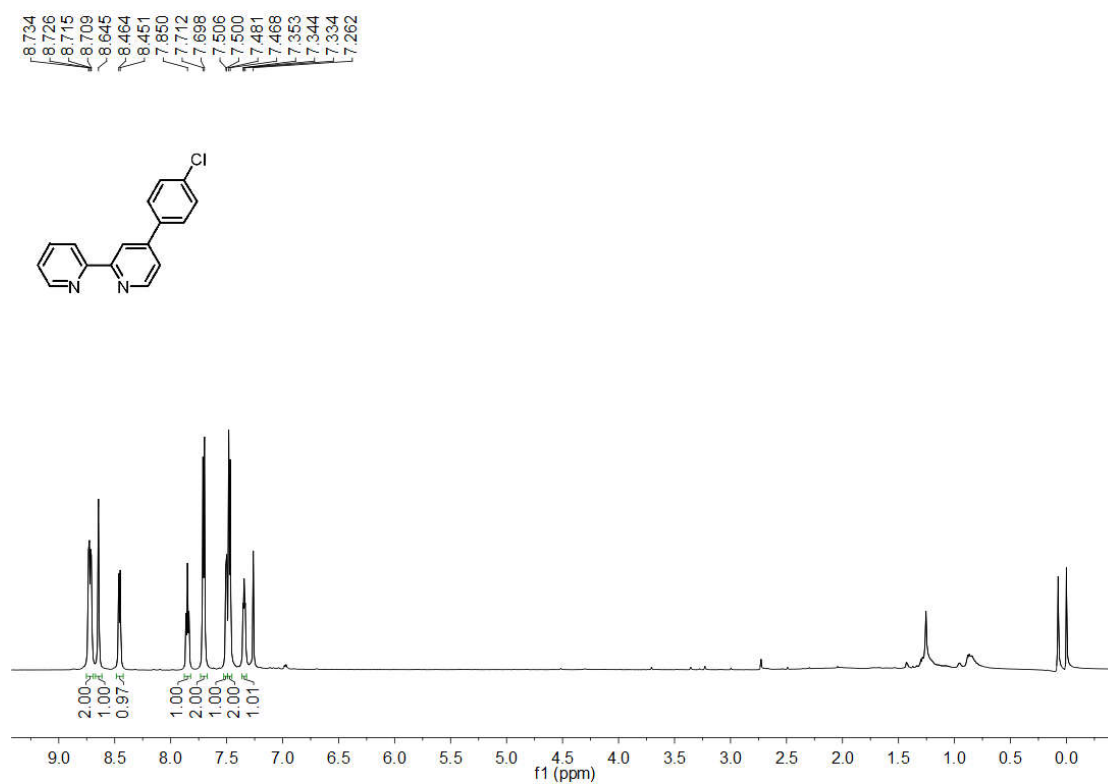
¹H NMR Spectrum of 3d (600 MHz, CDCl₃)



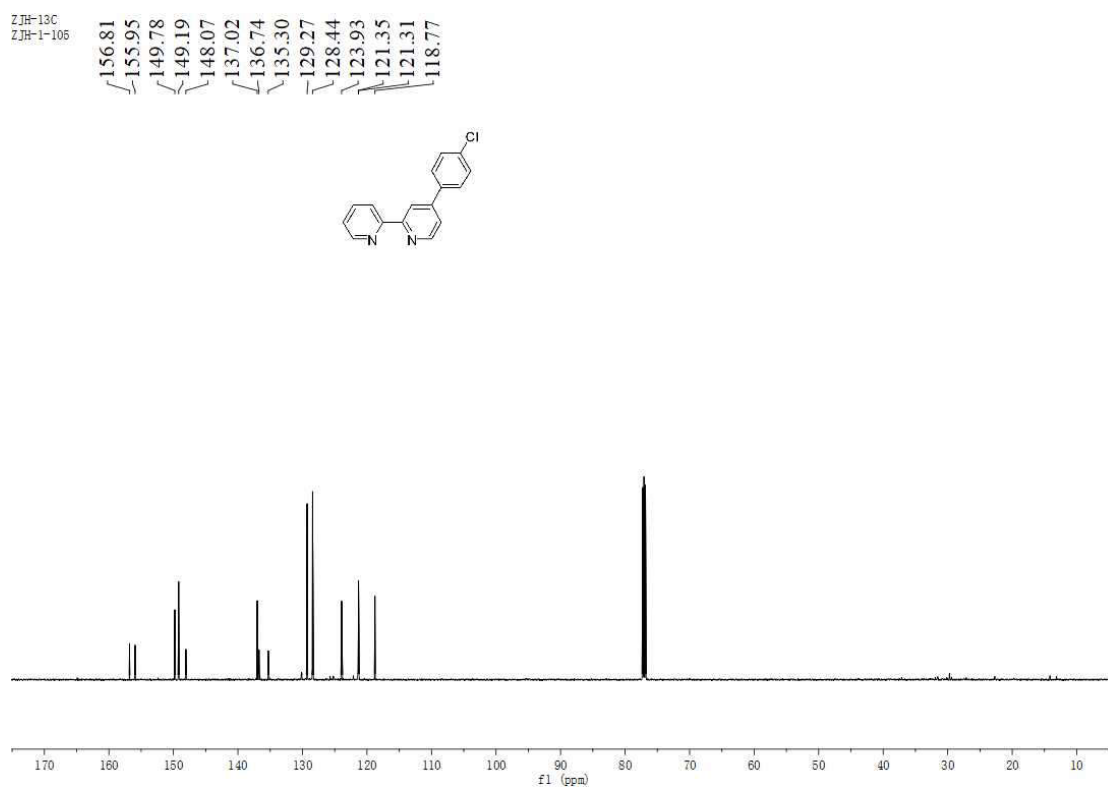
¹³C NMR Spectrum of 3d (151 MHz, CDCl₃)



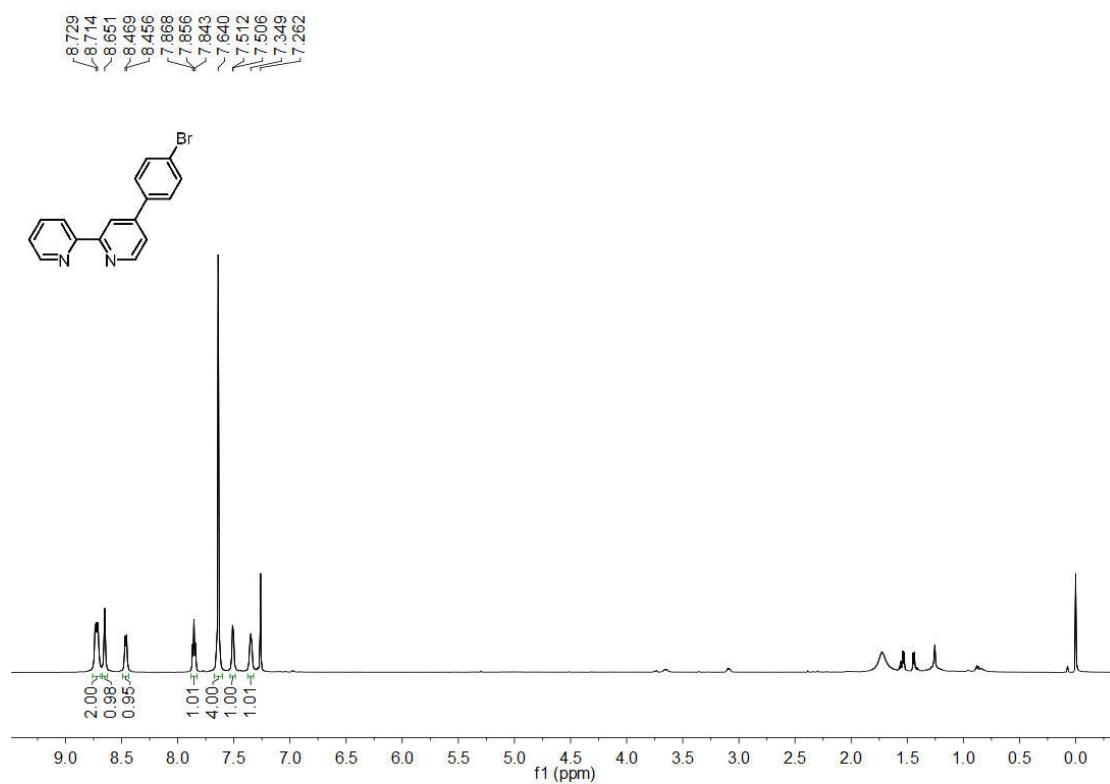
¹H NMR Spectrum of 3e (600 MHz, CDCl₃)



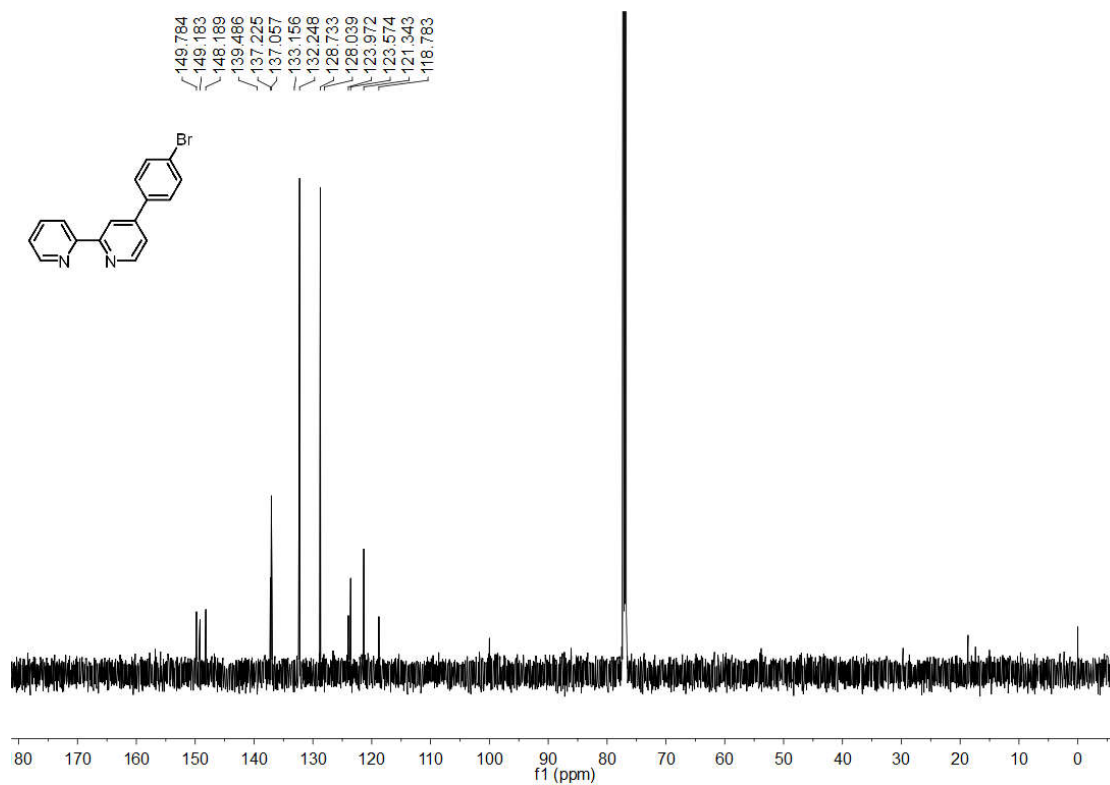
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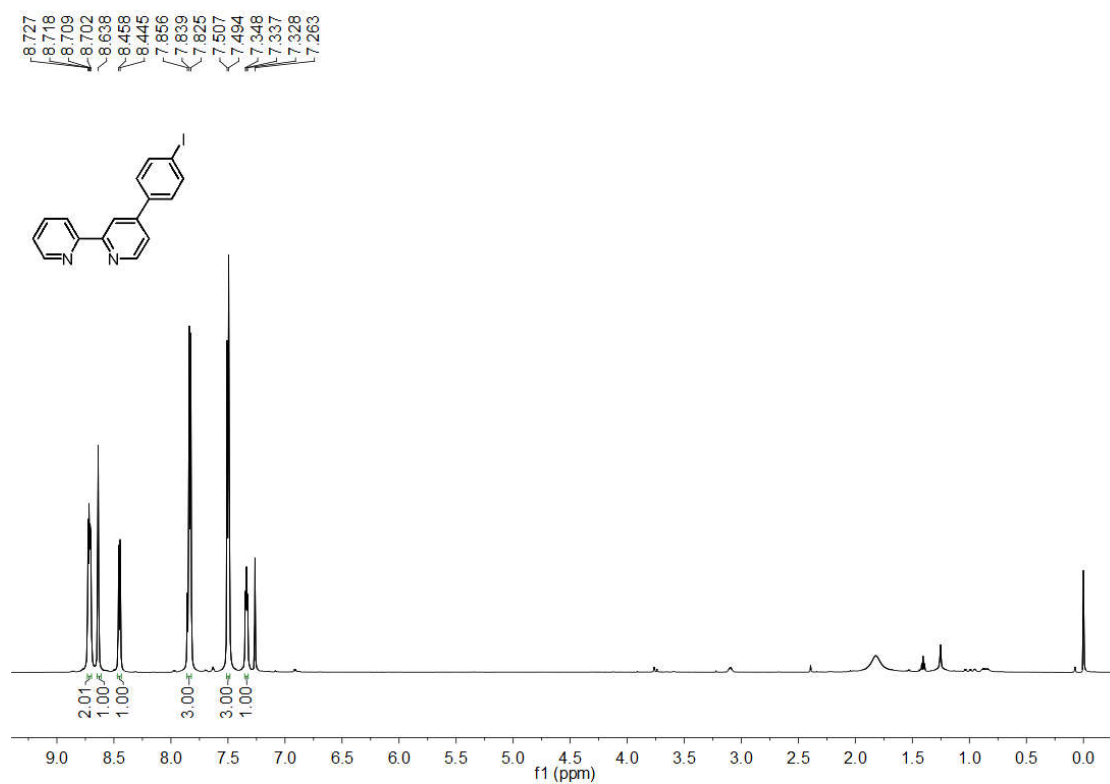
¹H NMR Spectrum of 3f (600 MHz, CDCl₃)



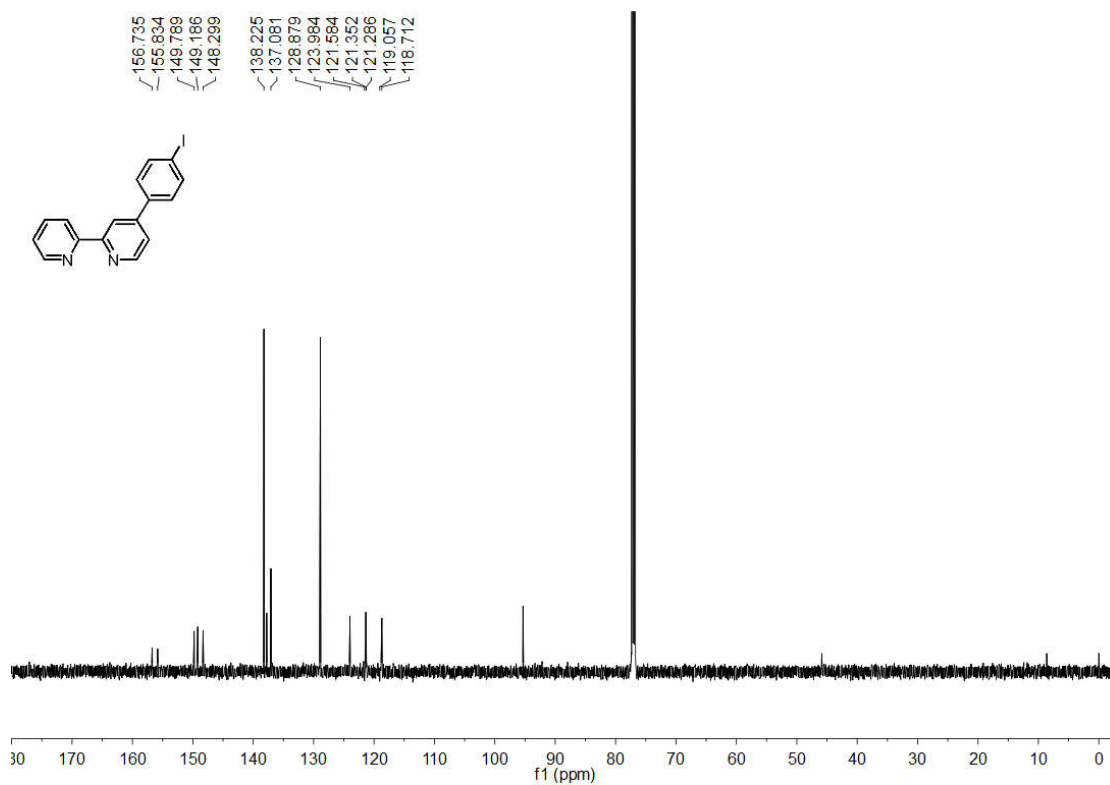
¹³C NMR Spectrum of 3f (151 MHz, CDCl₃)



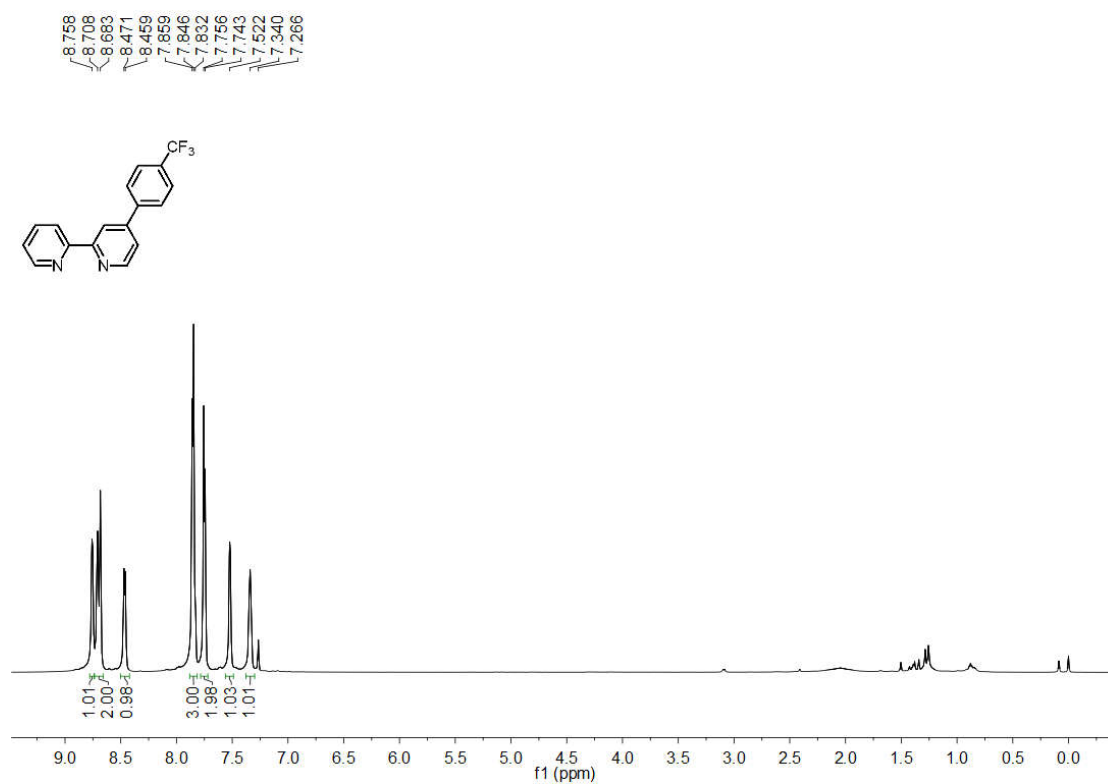
¹H NMR Spectrum of 3g (600 MHz, CDCl₃)



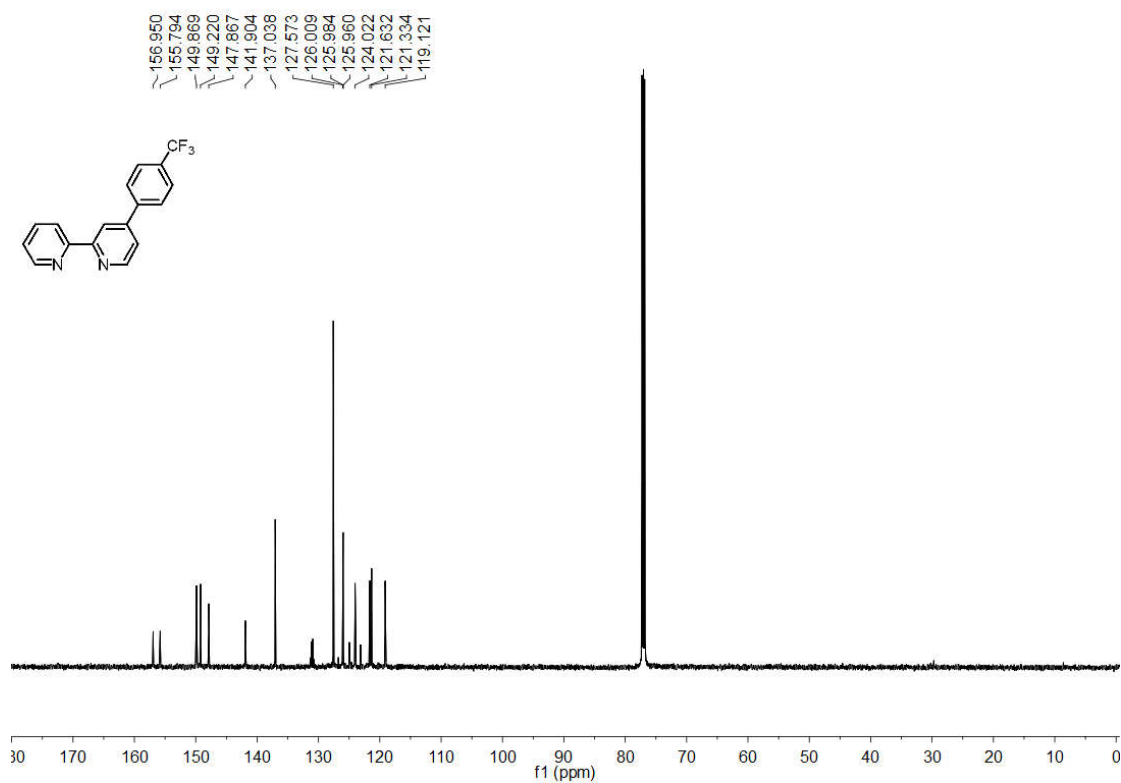
¹³C NMR Spectrum of 3g (151 MHz, CDCl₃)



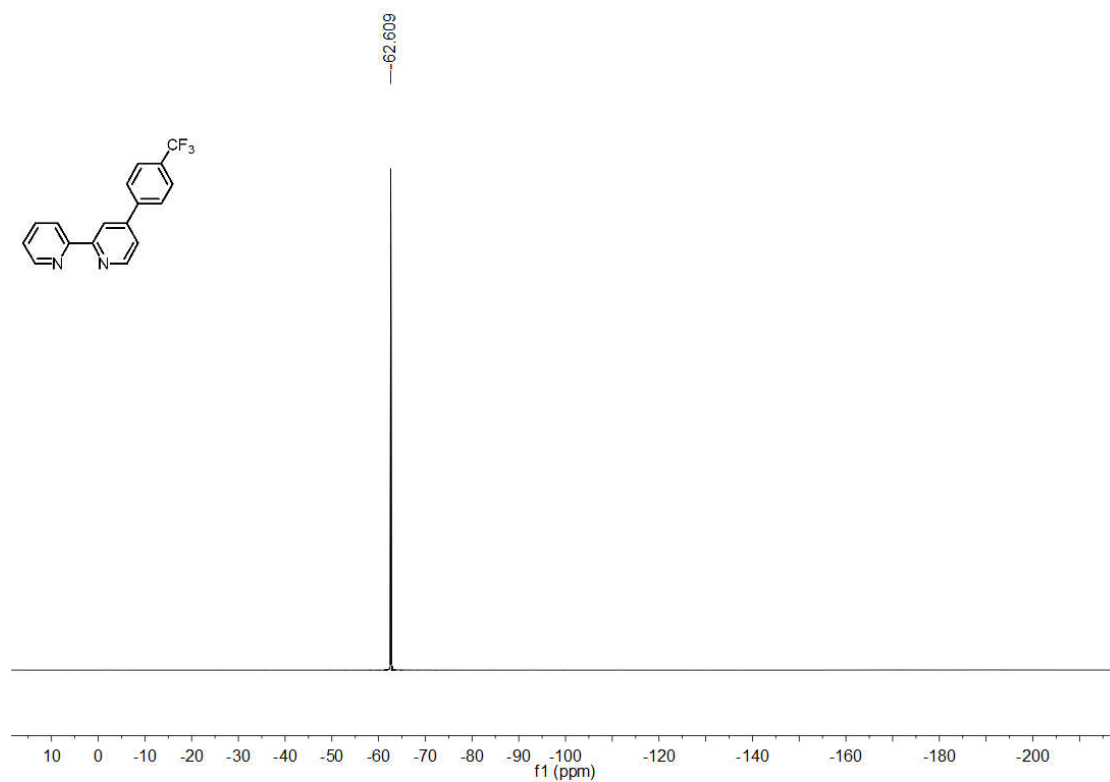
¹H NMR Spectrum of 3h (600 MHz, CDCl₃)



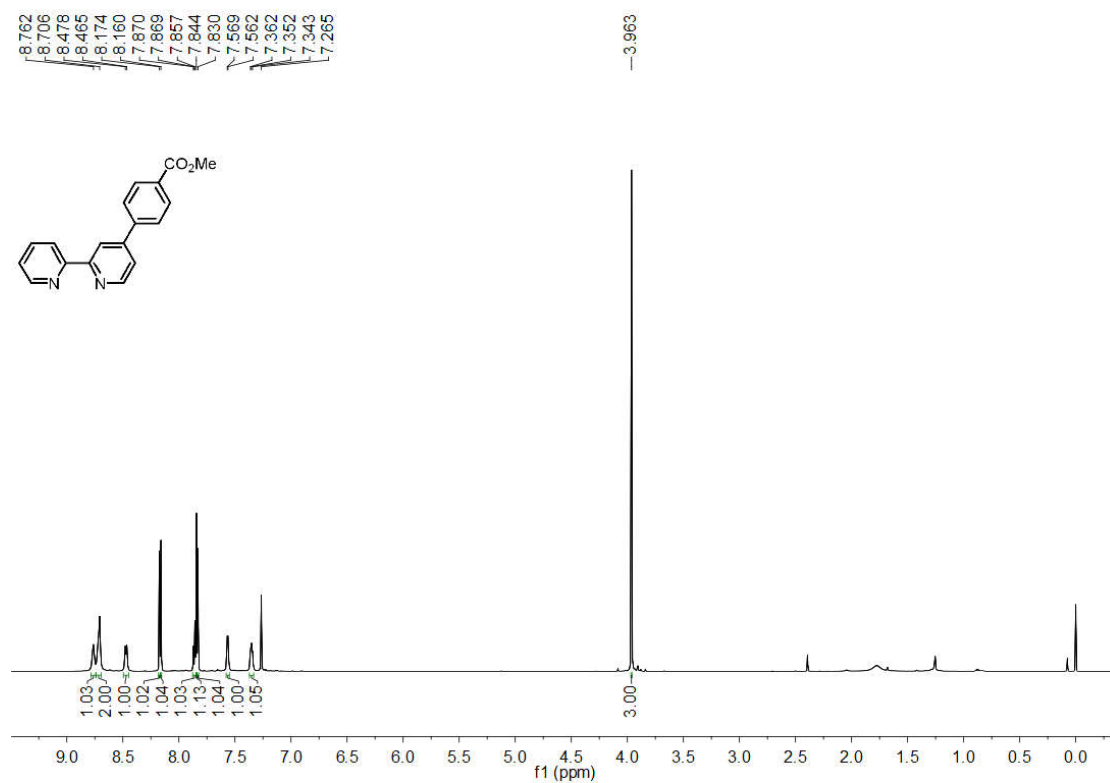
¹³C NMR Spectrum of 3h (151 MHz, CDCl₃)



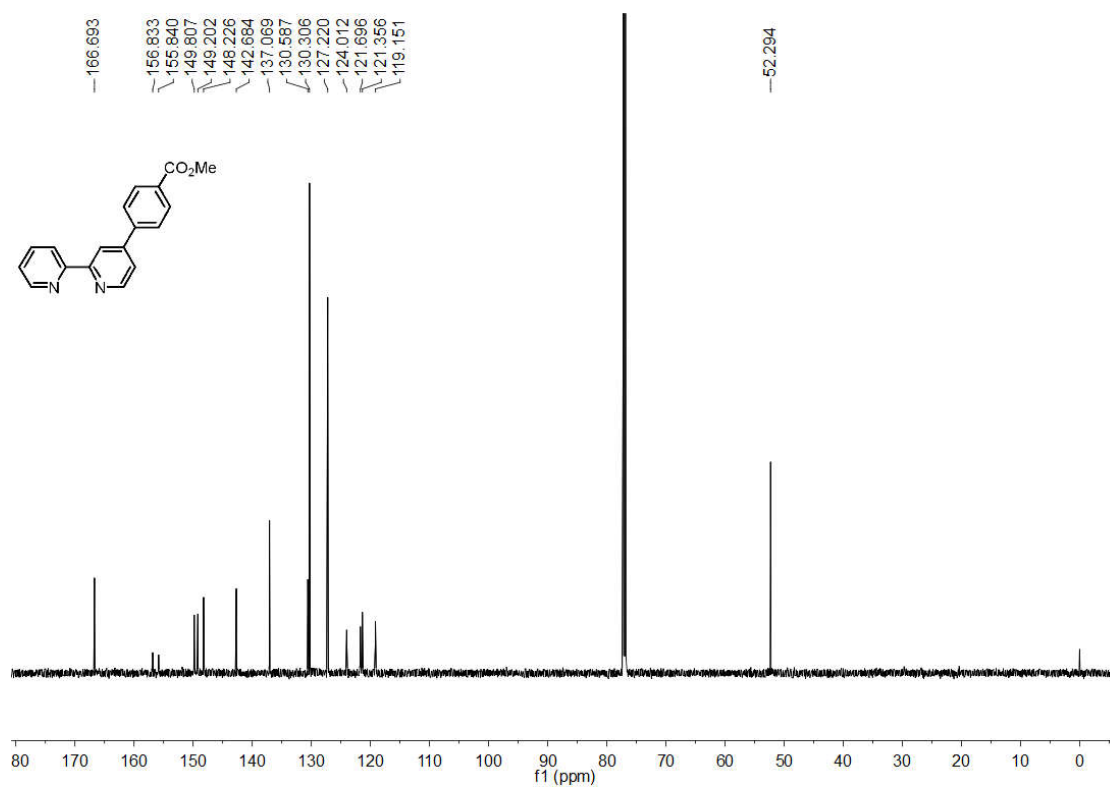
^{19}F NMR Spectrum of 3h (565 MHz, CDCl_3)



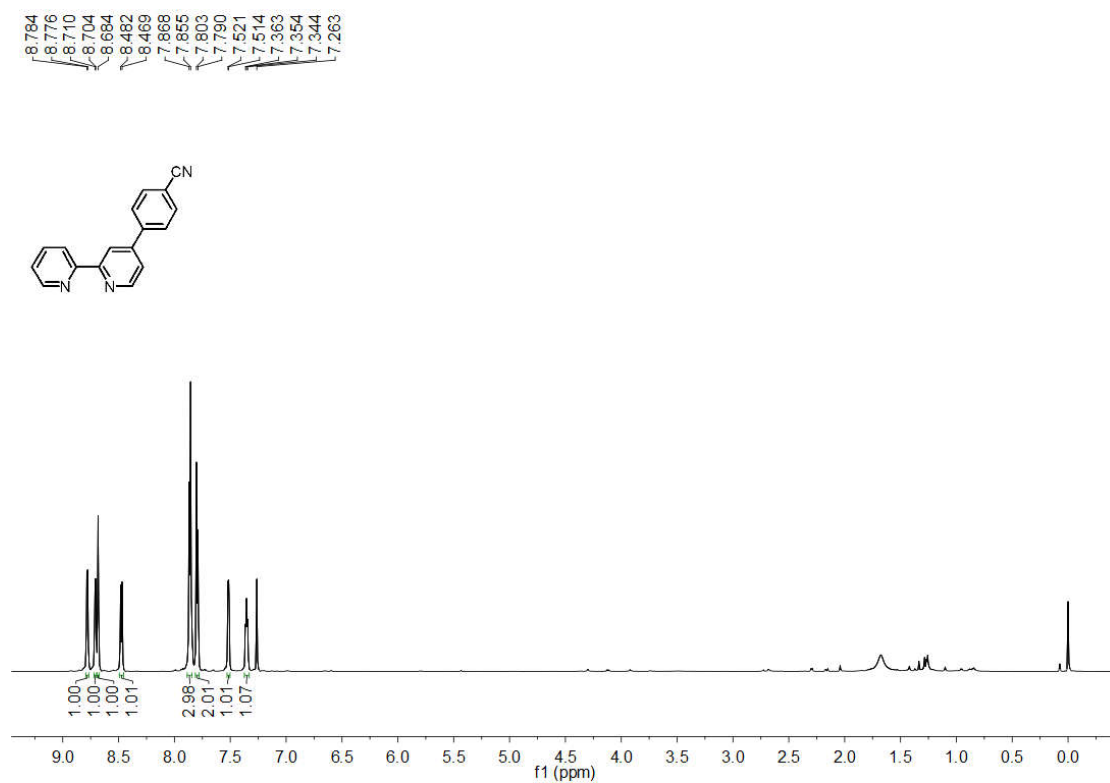
^1H NMR Spectrum of 3i (600 MHz, CDCl_3)



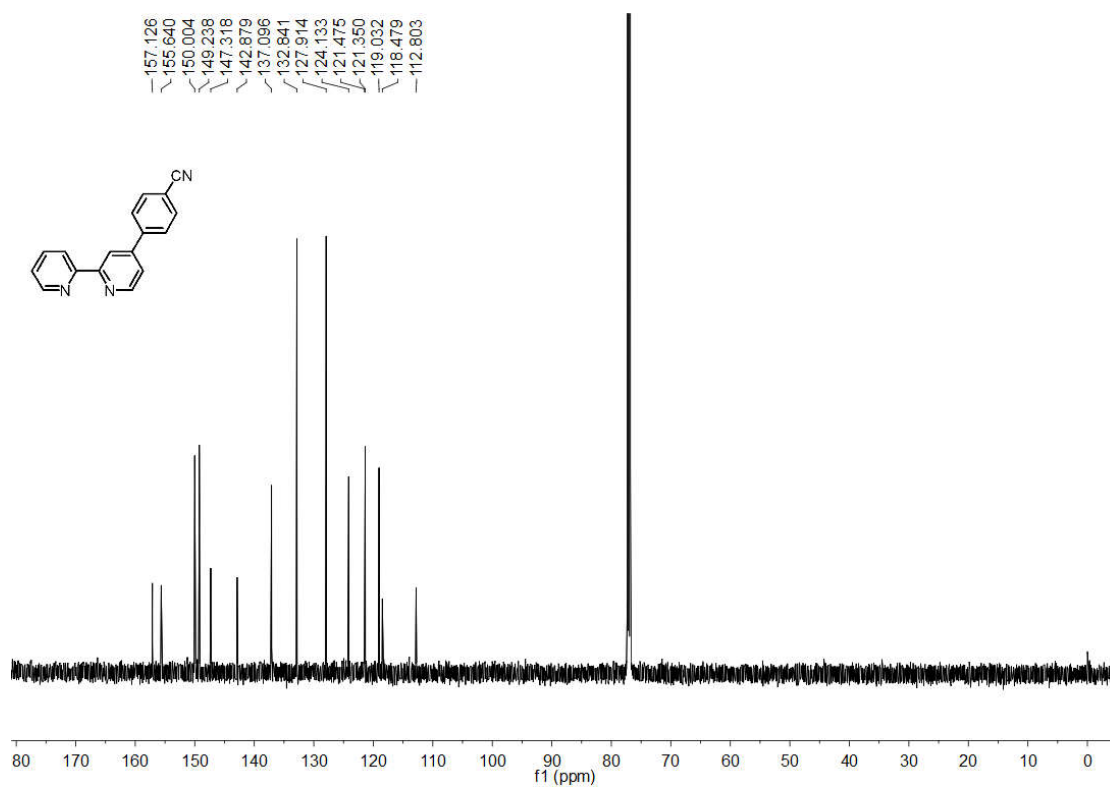
^{13}C NMR Spectrum of 3i (151 MHz, CDCl_3)



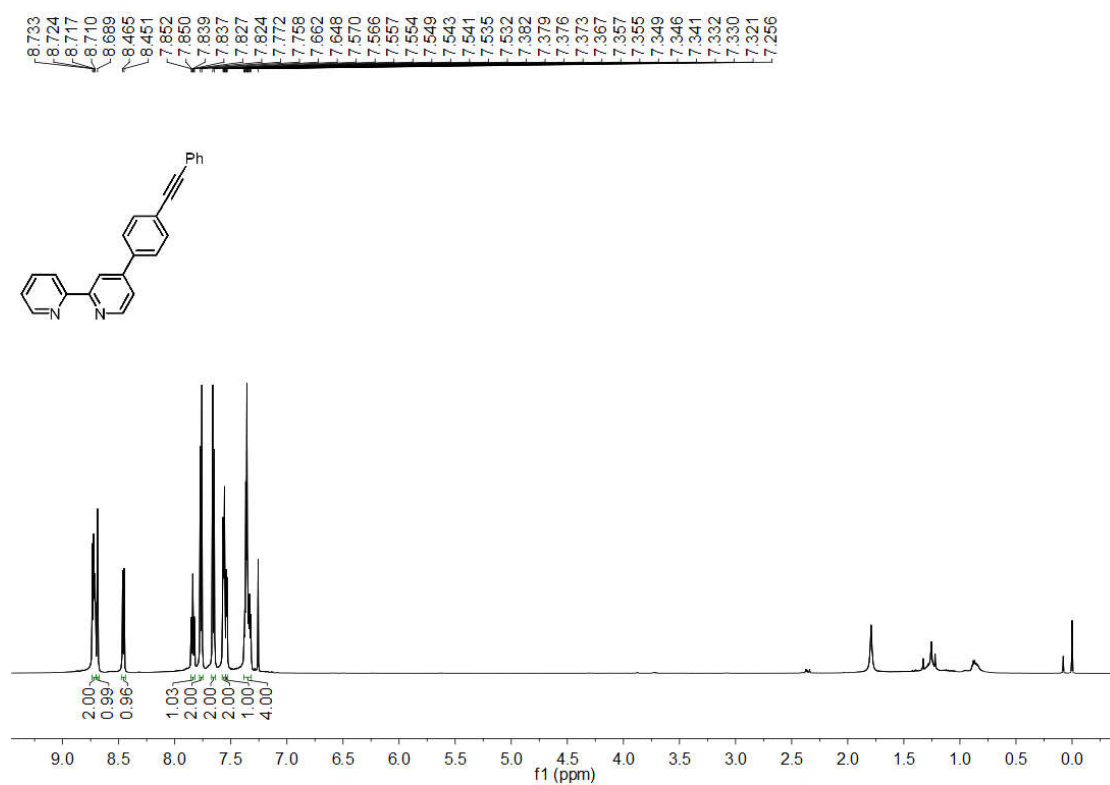
^1H NMR Spectrum of 3j (600 MHz, CDCl_3)



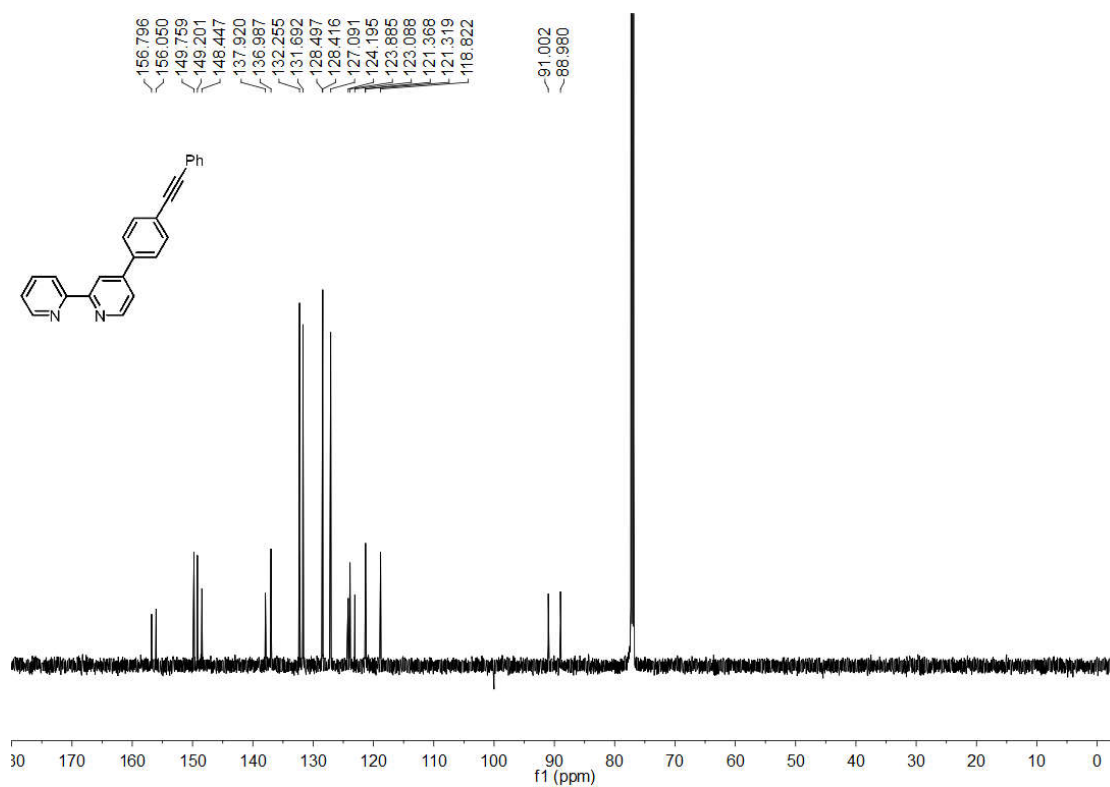
^{13}C NMR Spectrum of 3j (151 MHz, CDCl_3)



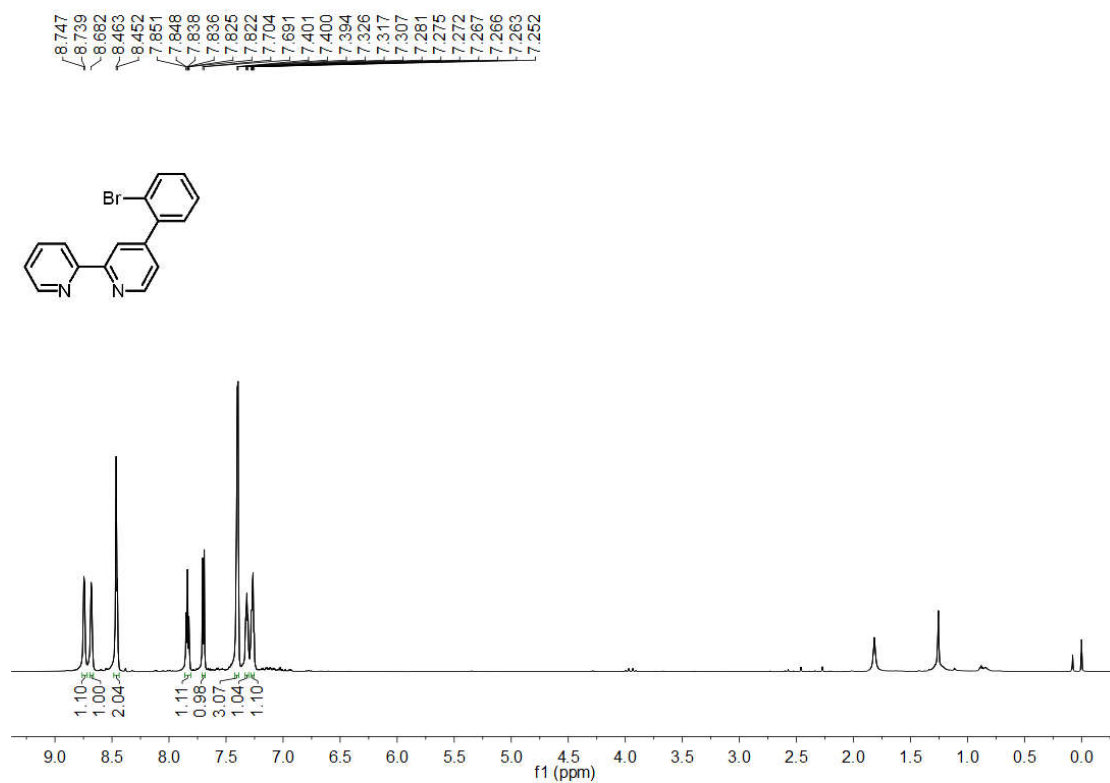
^1H NMR Spectrum of 3k (600 MHz, CDCl_3)



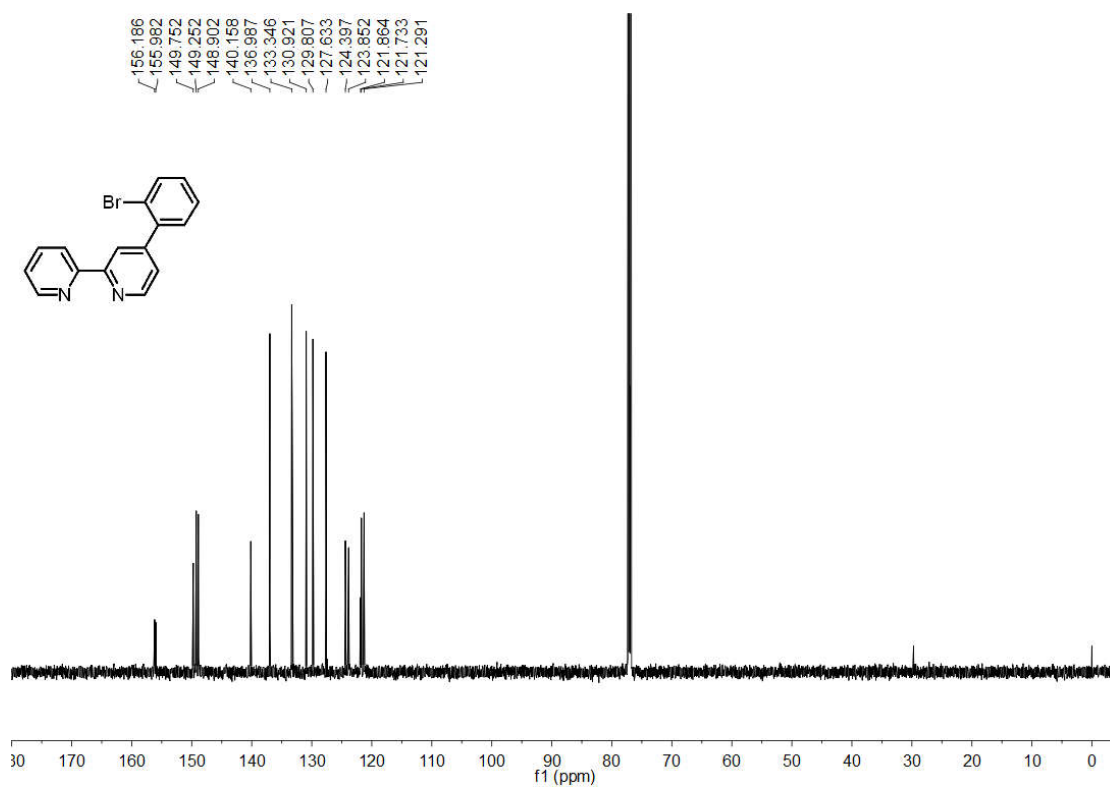
^{13}C NMR Spectrum of 3k (151 MHz, CDCl_3)



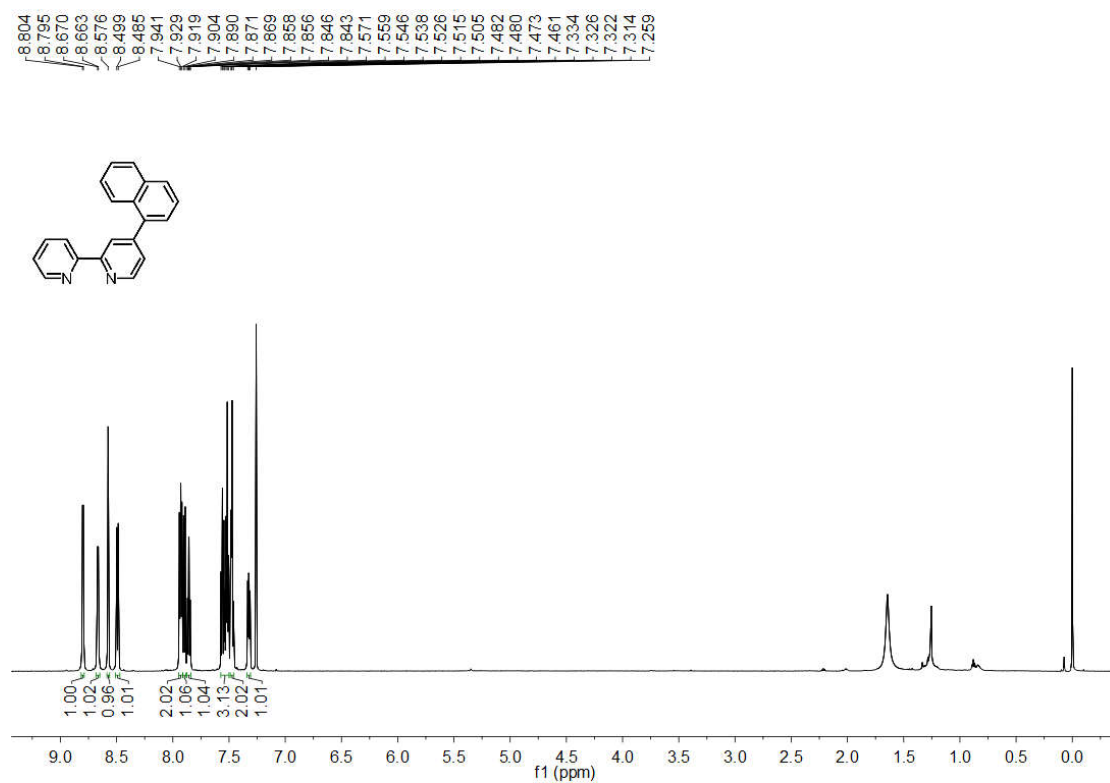
^1H NMR Spectrum of 3l (600 MHz, CDCl_3)



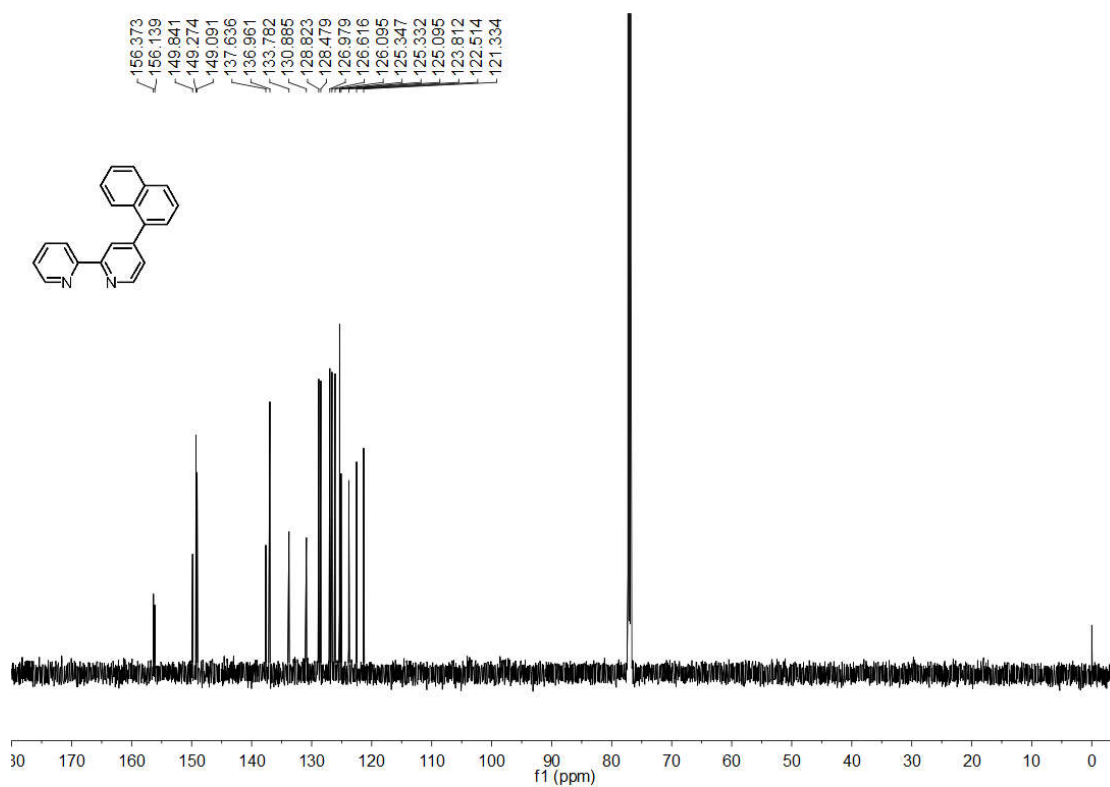
^{13}C NMR Spectrum of 3l (151 MHz, CDCl_3)



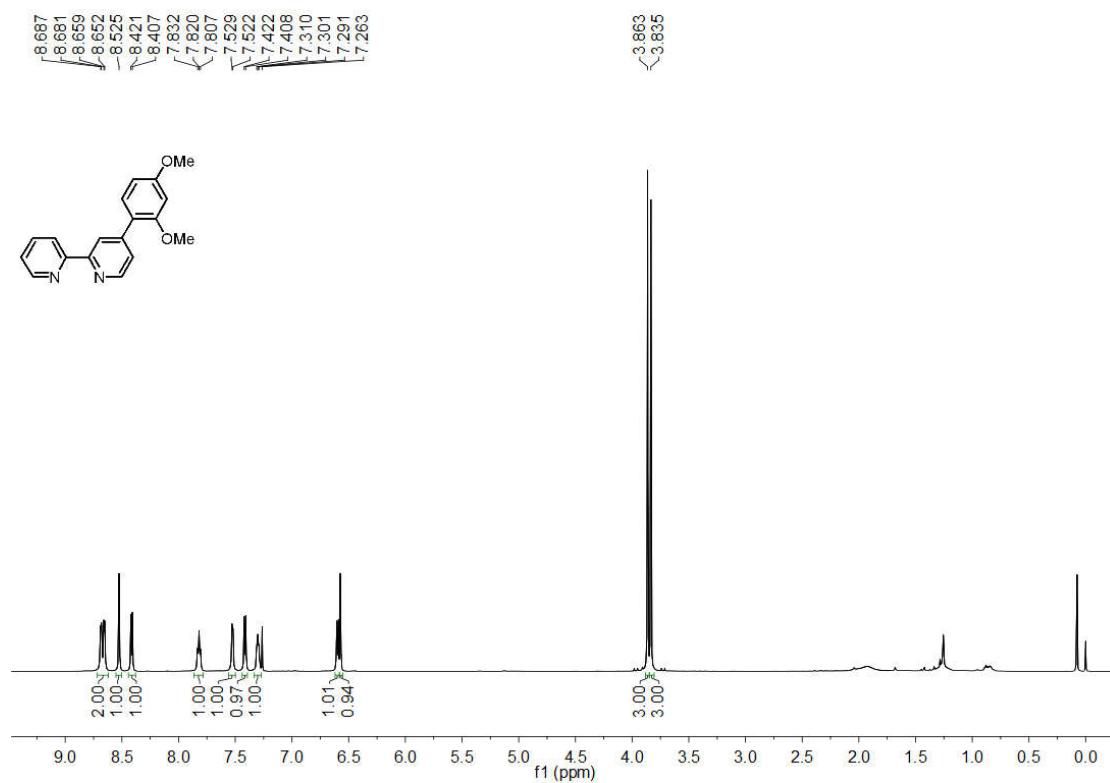
^1H NMR Spectrum of 3m (600 MHz, CDCl_3)



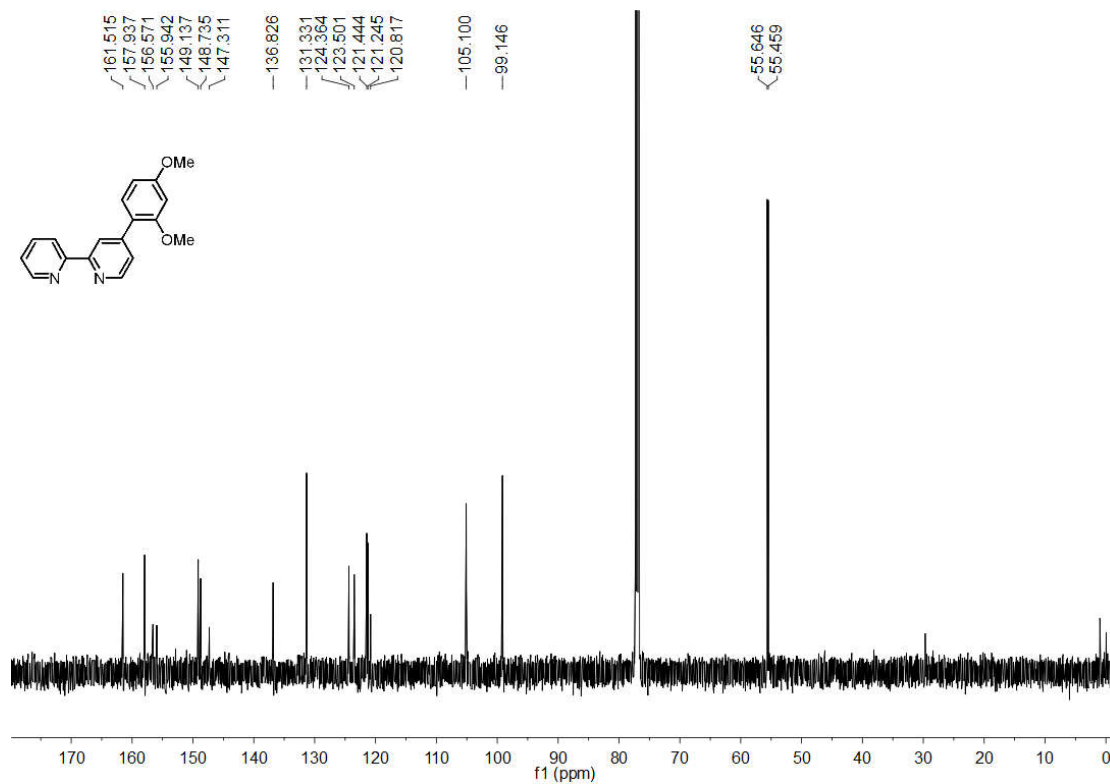
^{13}C NMR Spectrum of 3m (151 MHz, CDCl_3)



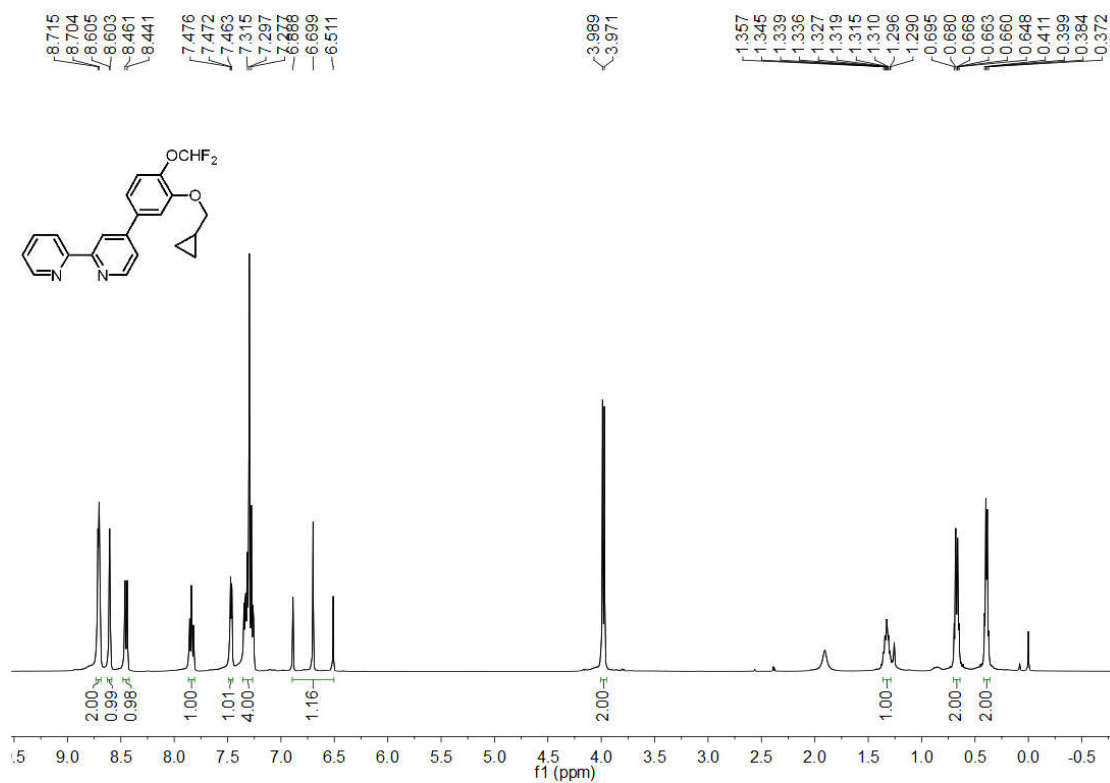
^1H NMR Spectrum of 3n (600 MHz, CDCl_3)



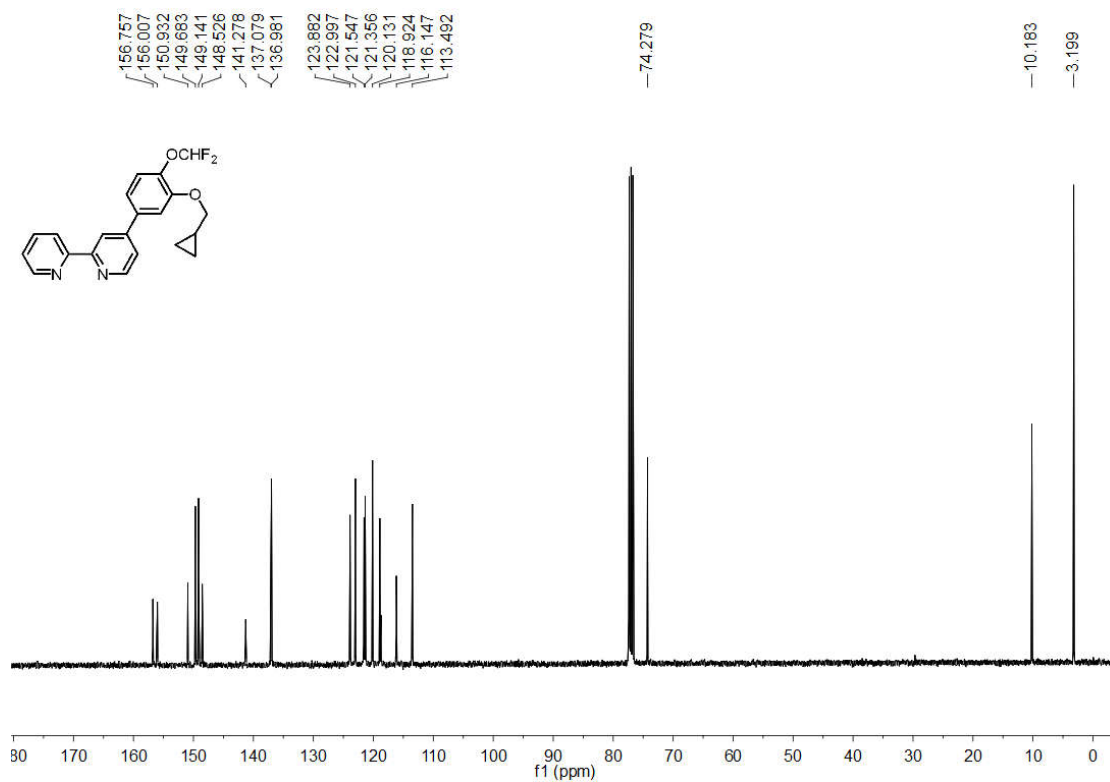
^{13}C NMR Spectrum of 3n (151 MHz, CDCl_3)



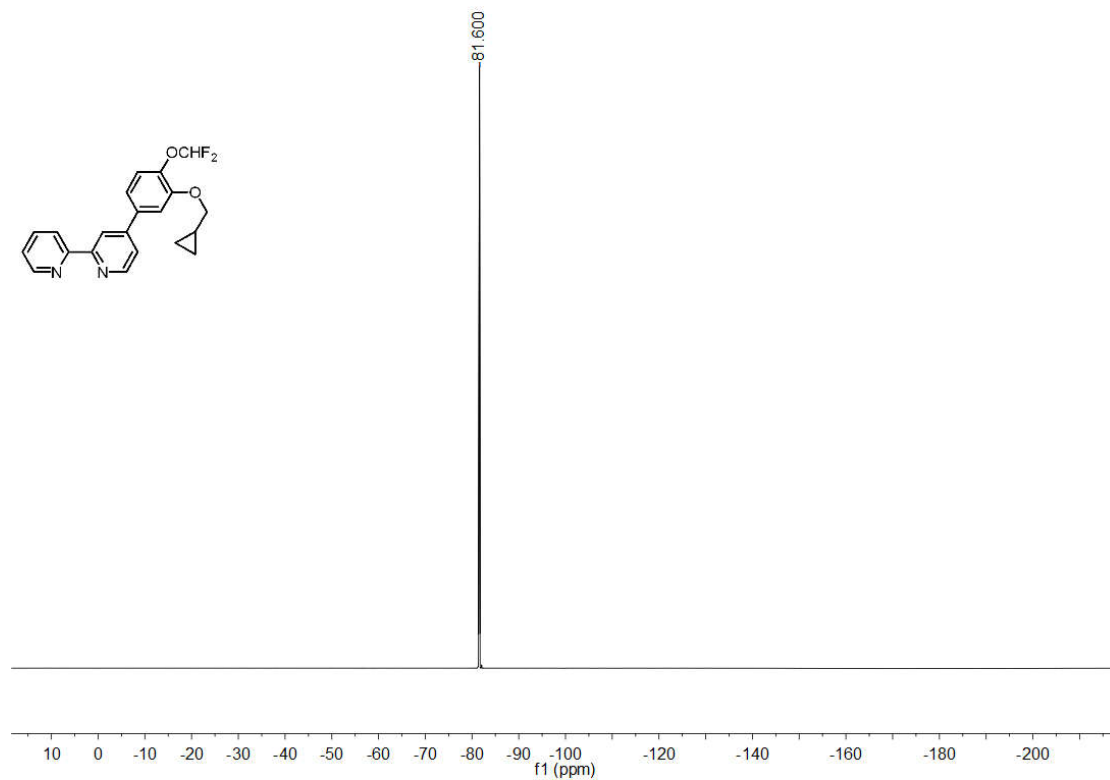
^1H NMR Spectrum of 3o (400 MHz, CDCl_3)



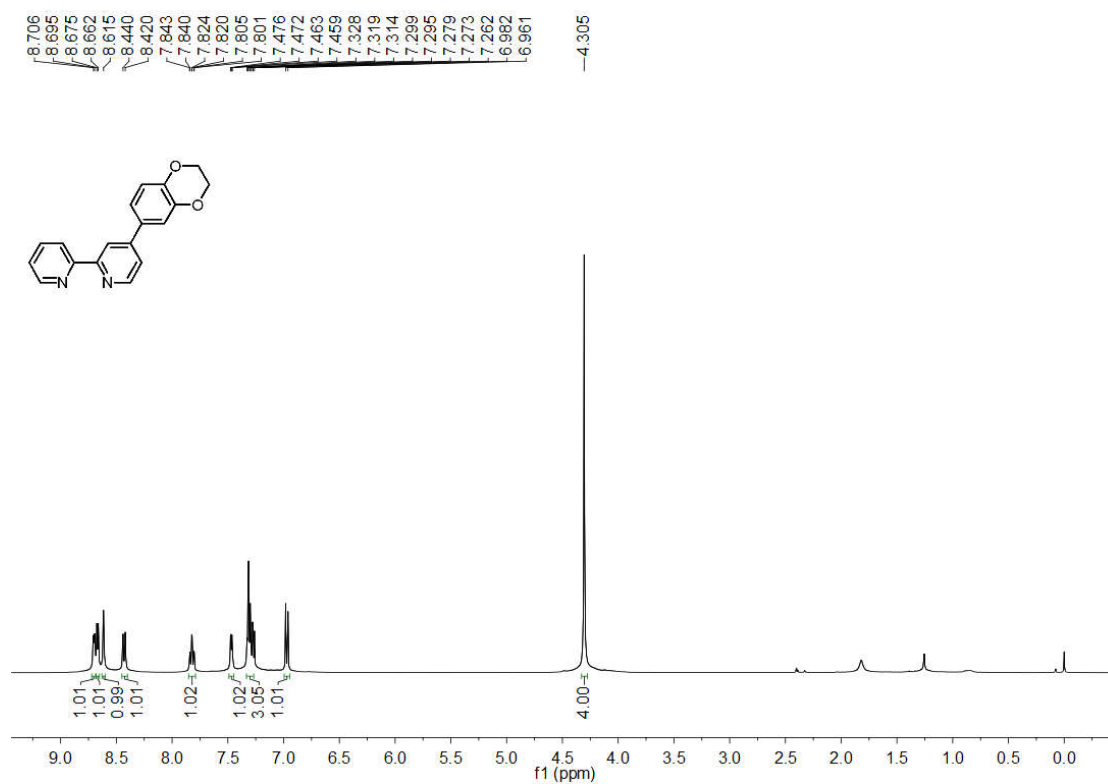
^{13}C NMR Spectrum of **3o (101 MHz, CDCl_3)**



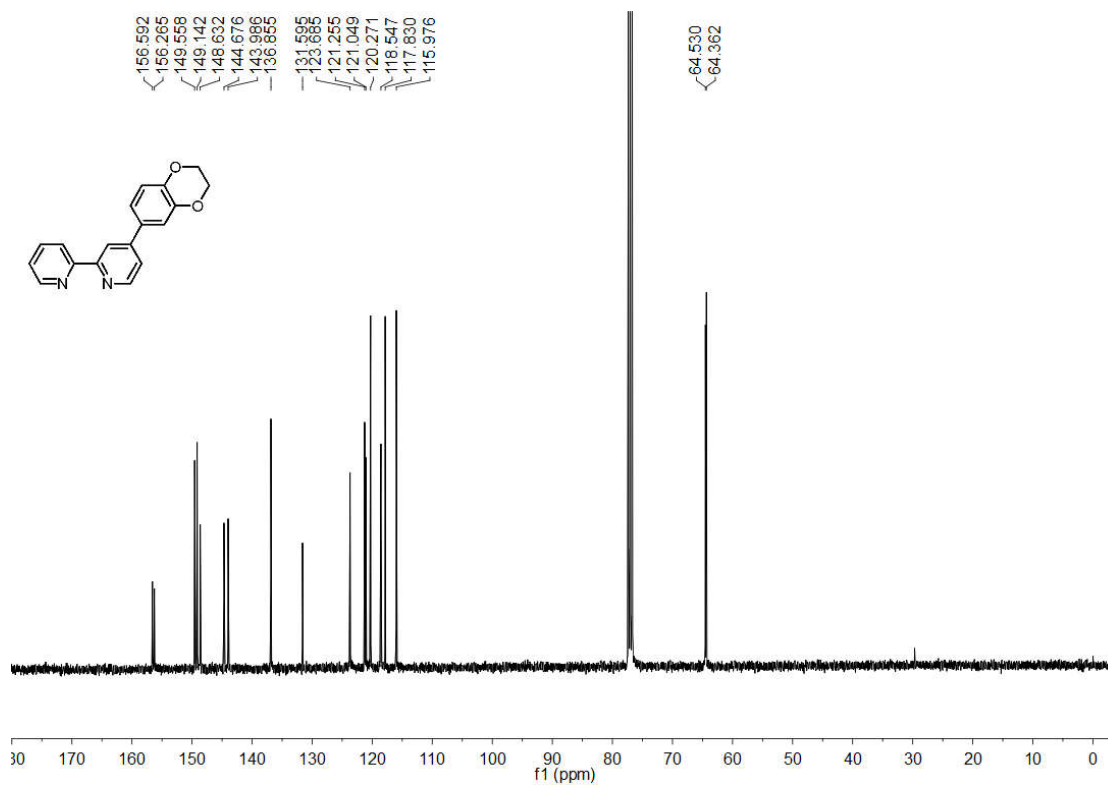
^{19}F NMR Spectrum of **3o (376 MHz, CDCl_3)**



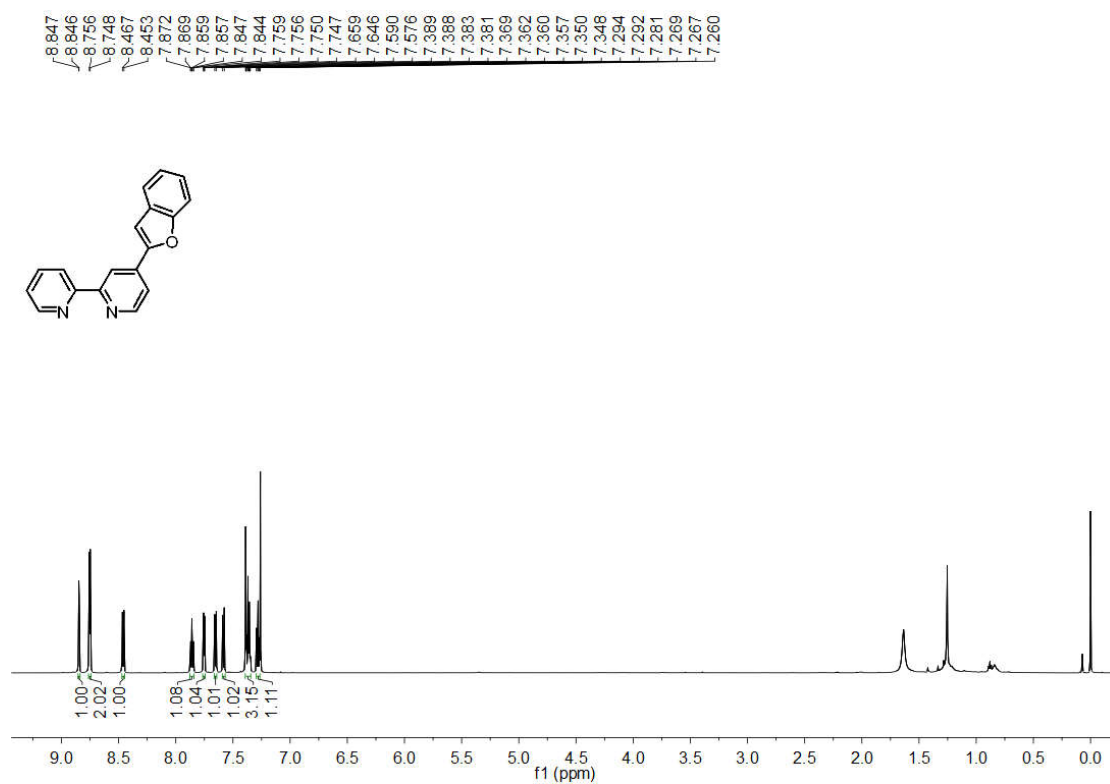
¹H NMR Spectrum of 3p (400 MHz, CDCl₃)



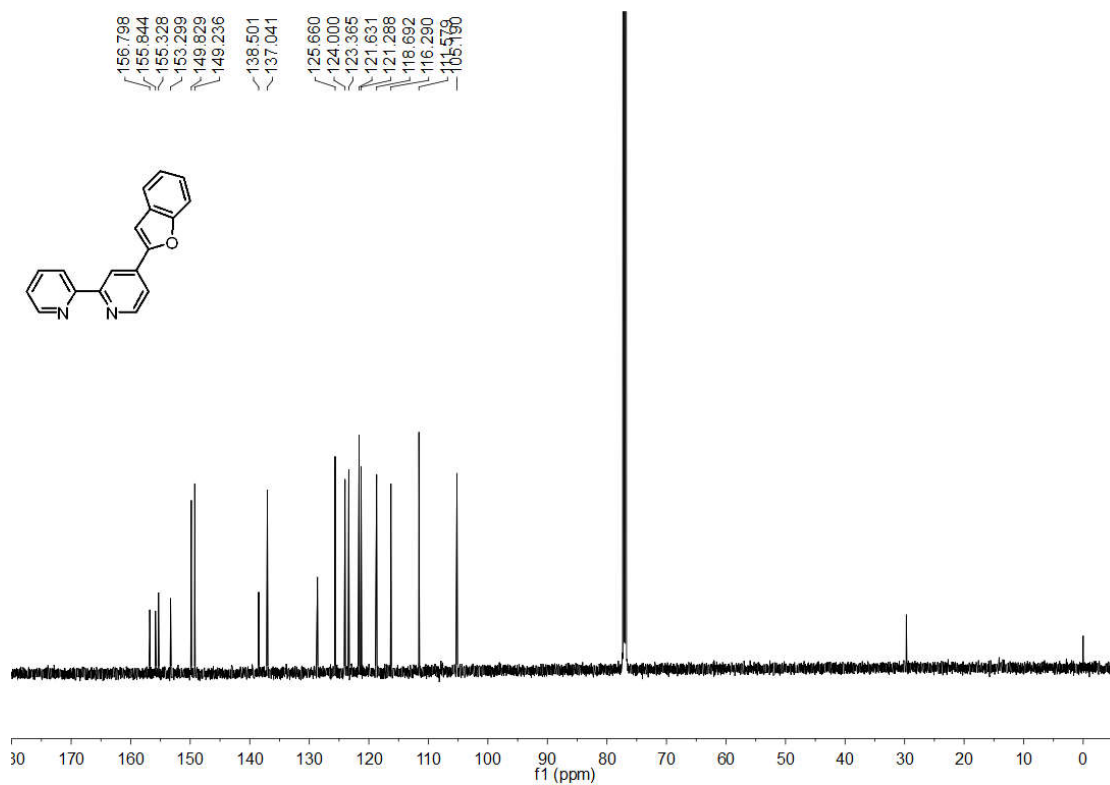
¹³C NMR Spectrum of 3p (101 MHz, CDCl₃)



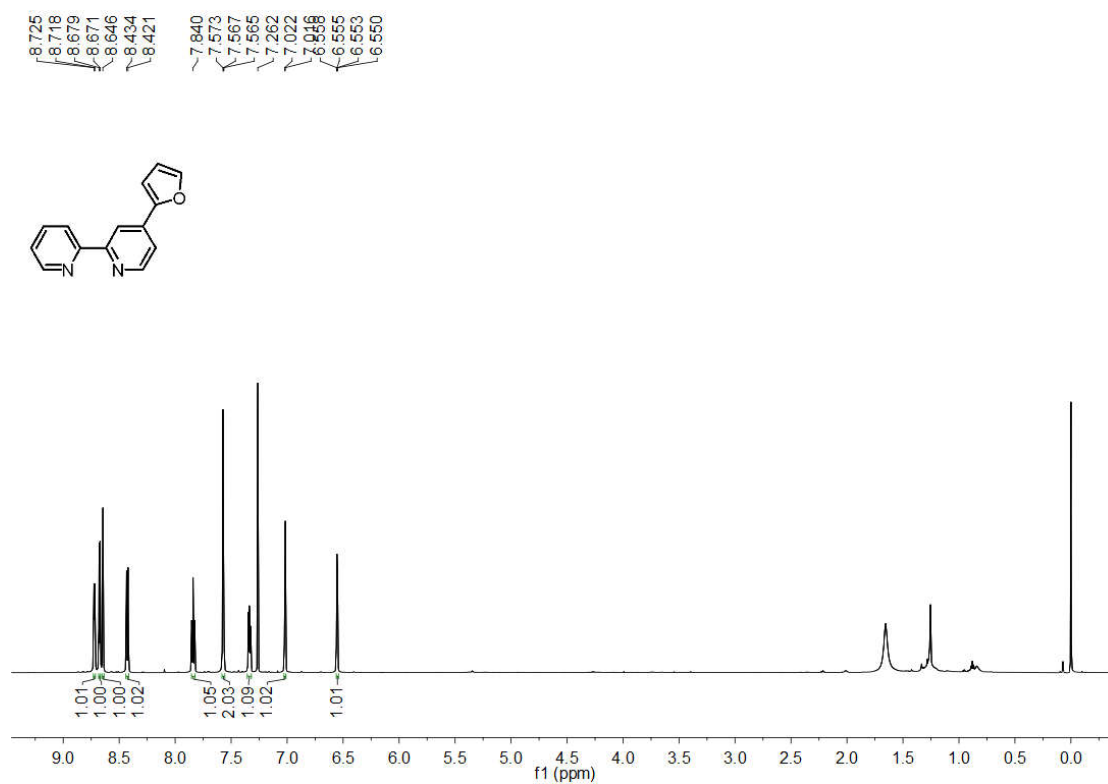
¹H NMR Spectrum of 3q (600 MHz, CDCl₃)



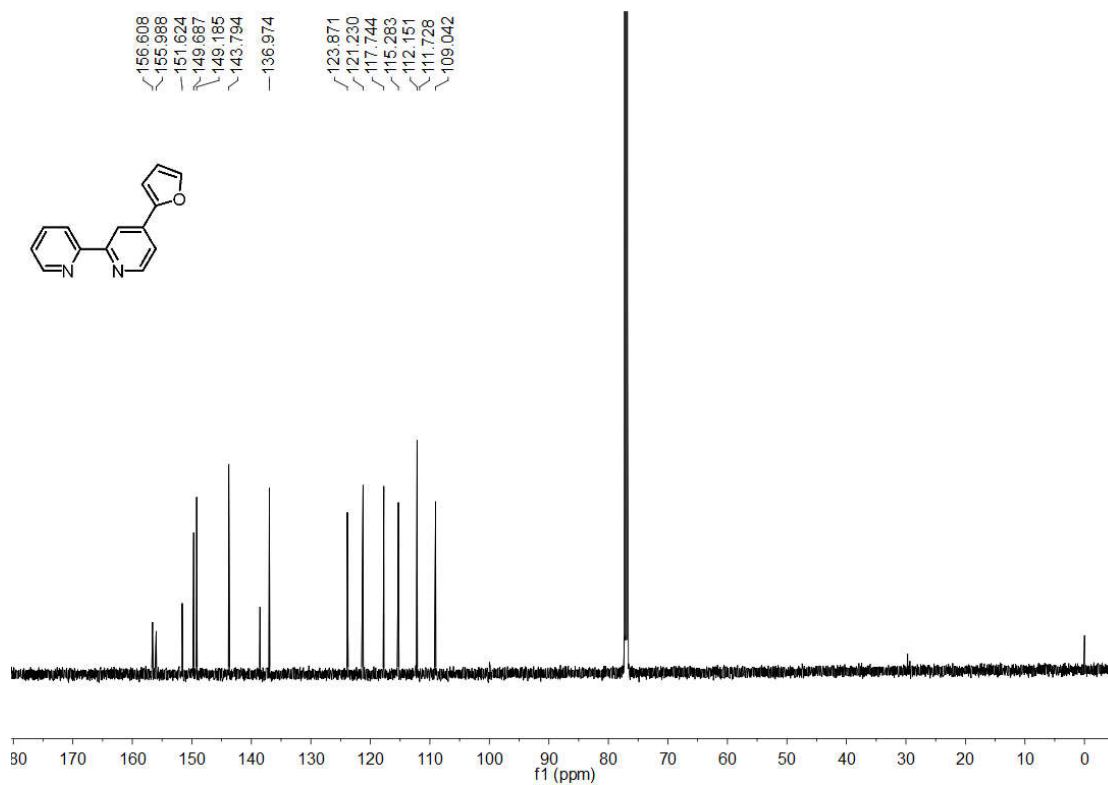
¹³C NMR Spectrum of 3q (151 MHz, CDCl₃)



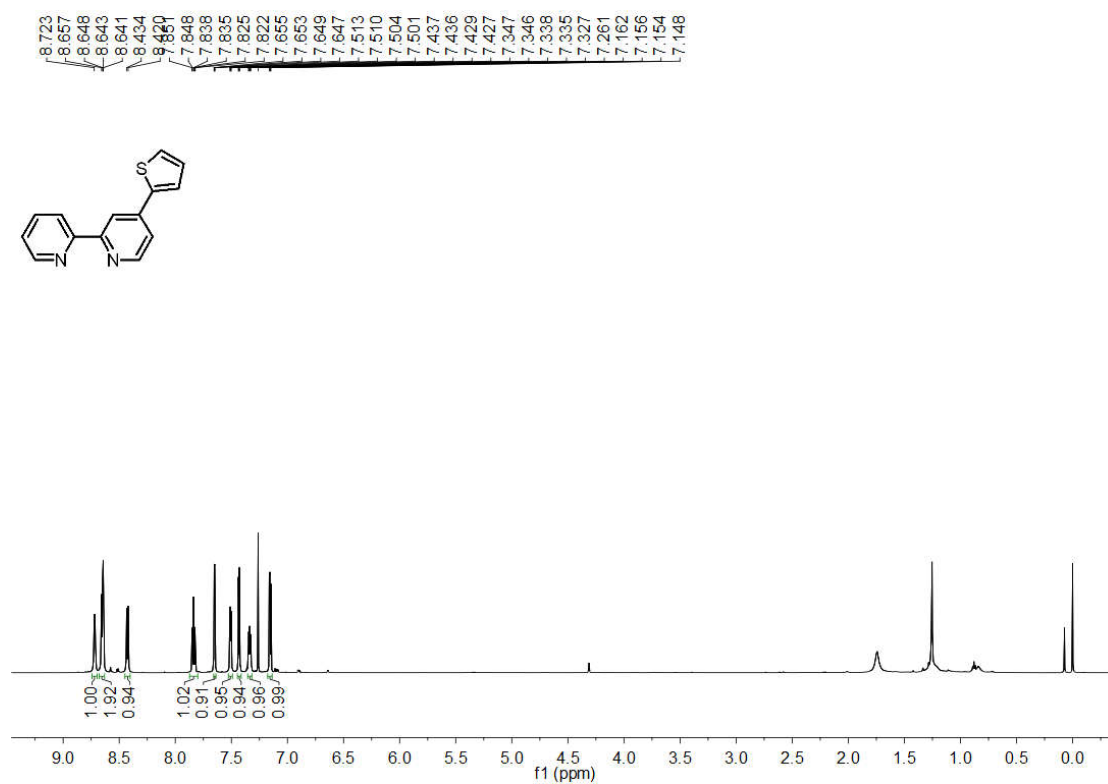
¹H NMR Spectrum of 3r (600 MHz, CDCl₃)



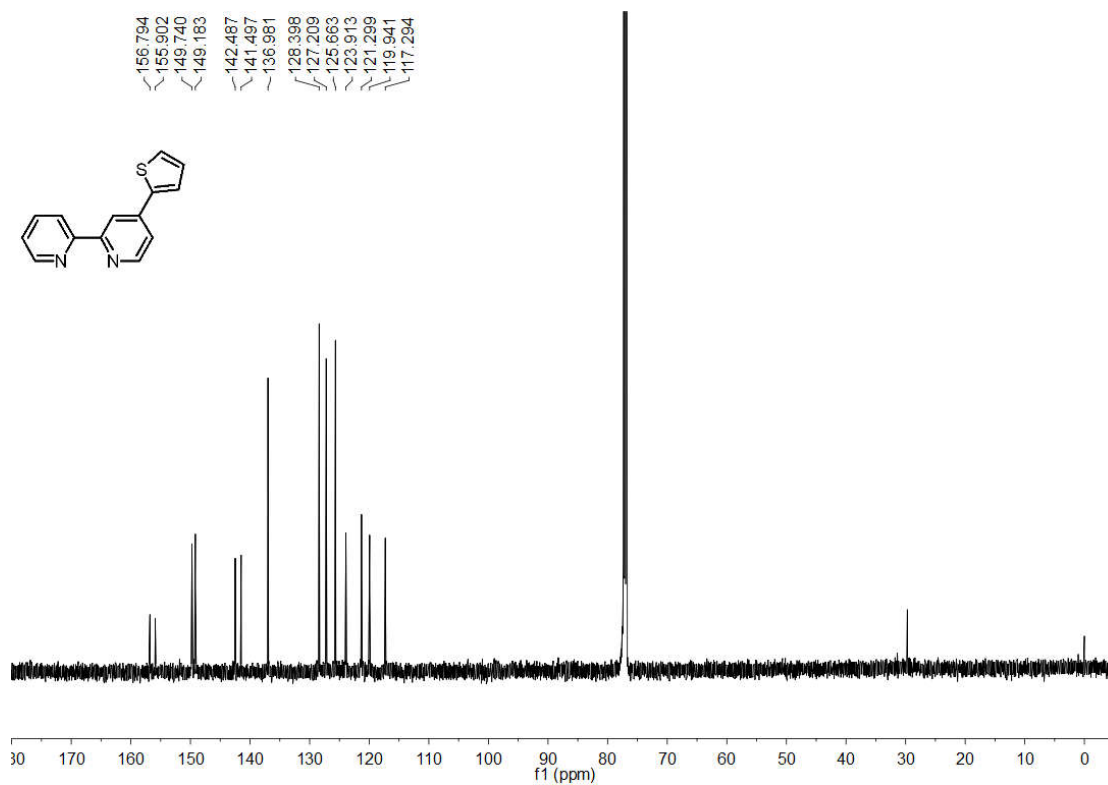
¹³C NMR Spectrum of 3r (151 MHz, CDCl₃)



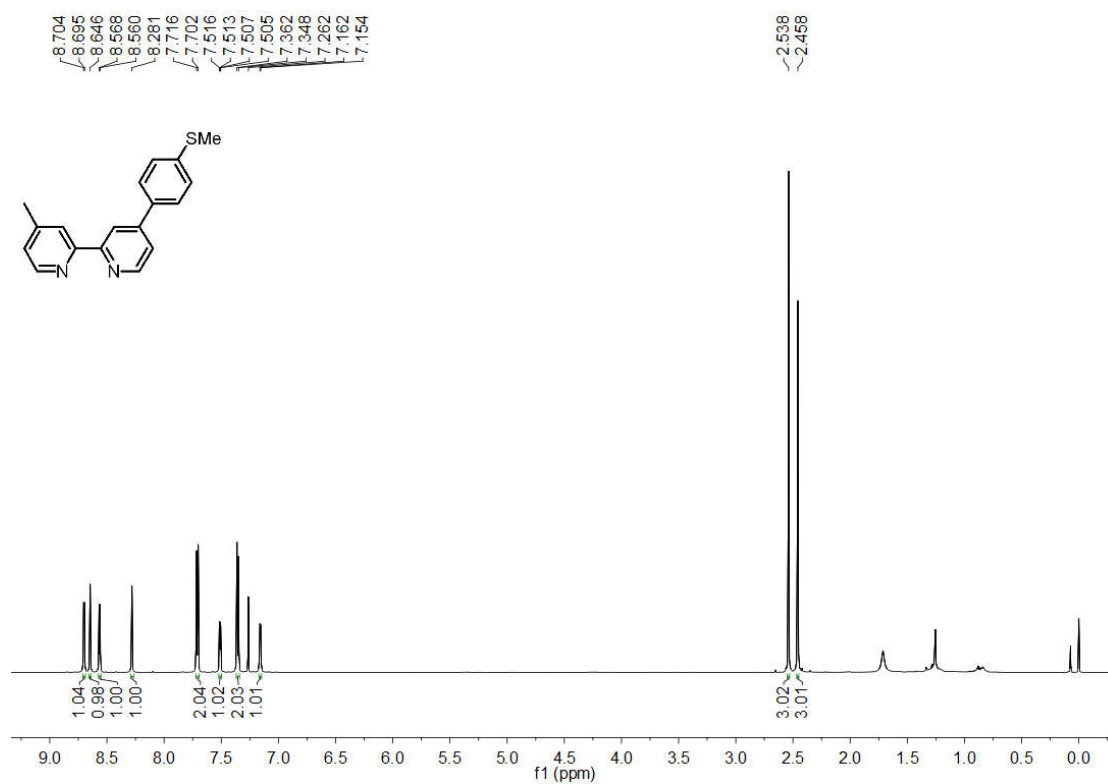
¹H NMR Spectrum of 3s (600 MHz, CDCl₃)



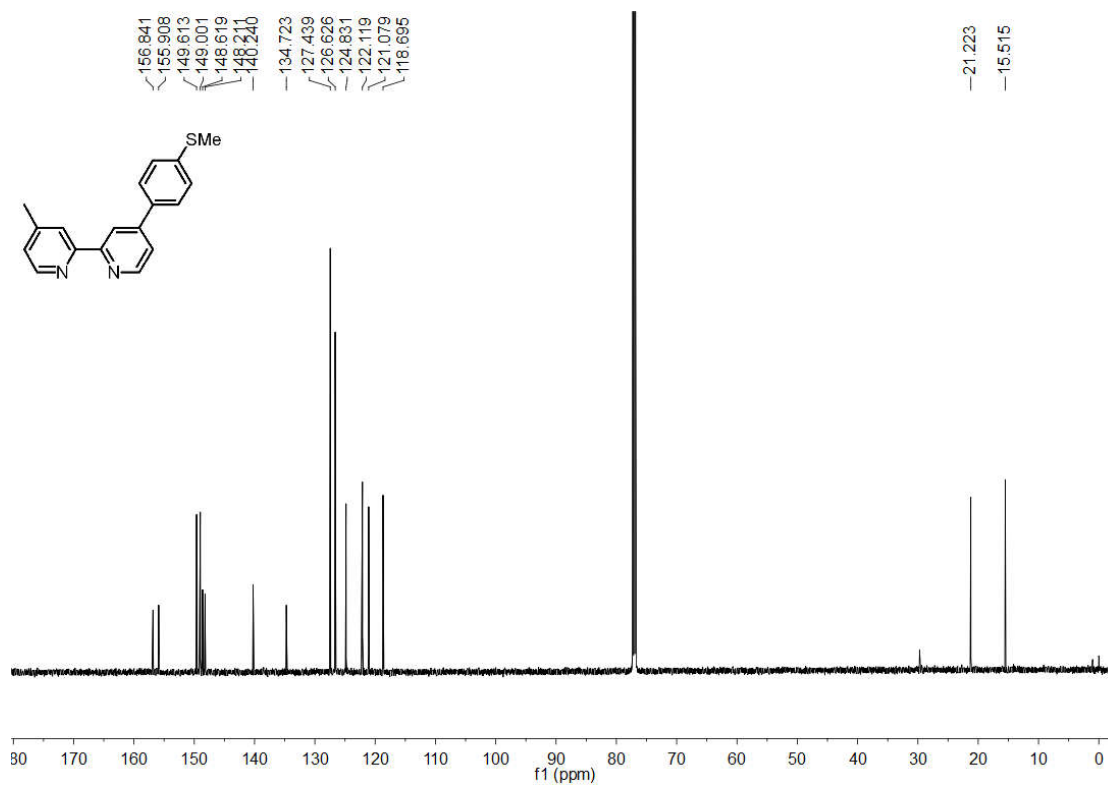
¹³C NMR Spectrum of 3s (151 MHz, CDCl₃)



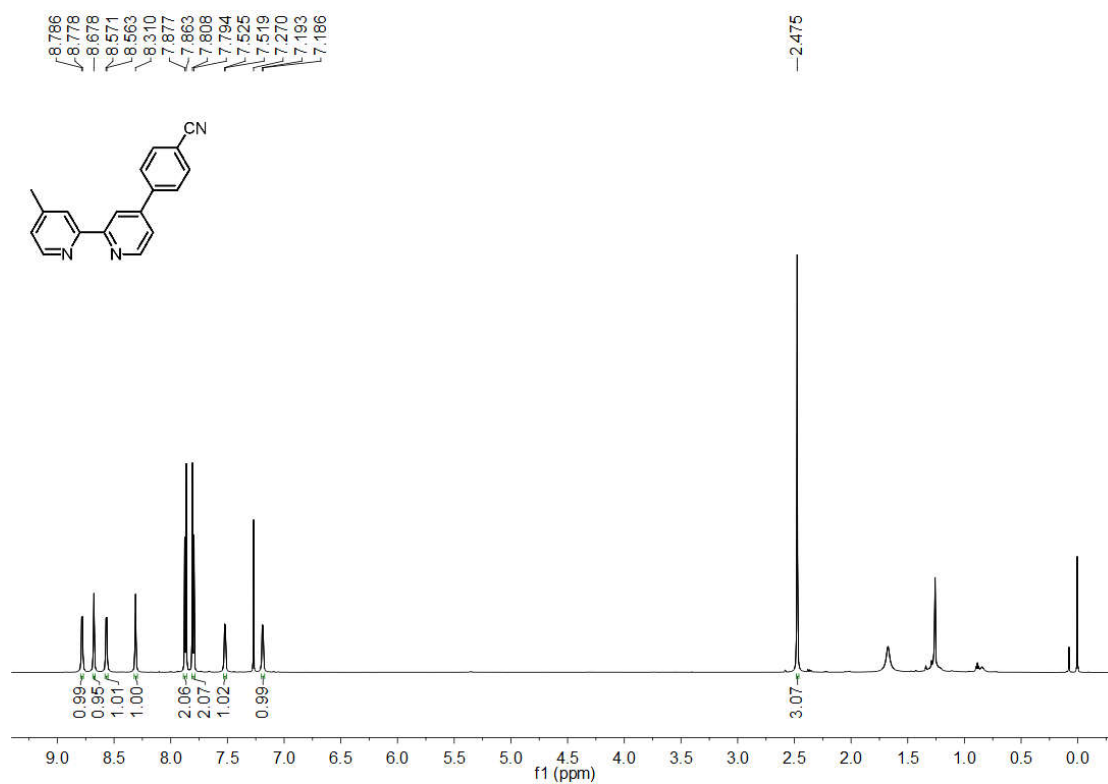
¹H NMR Spectrum of 3t (600 MHz, CDCl₃)



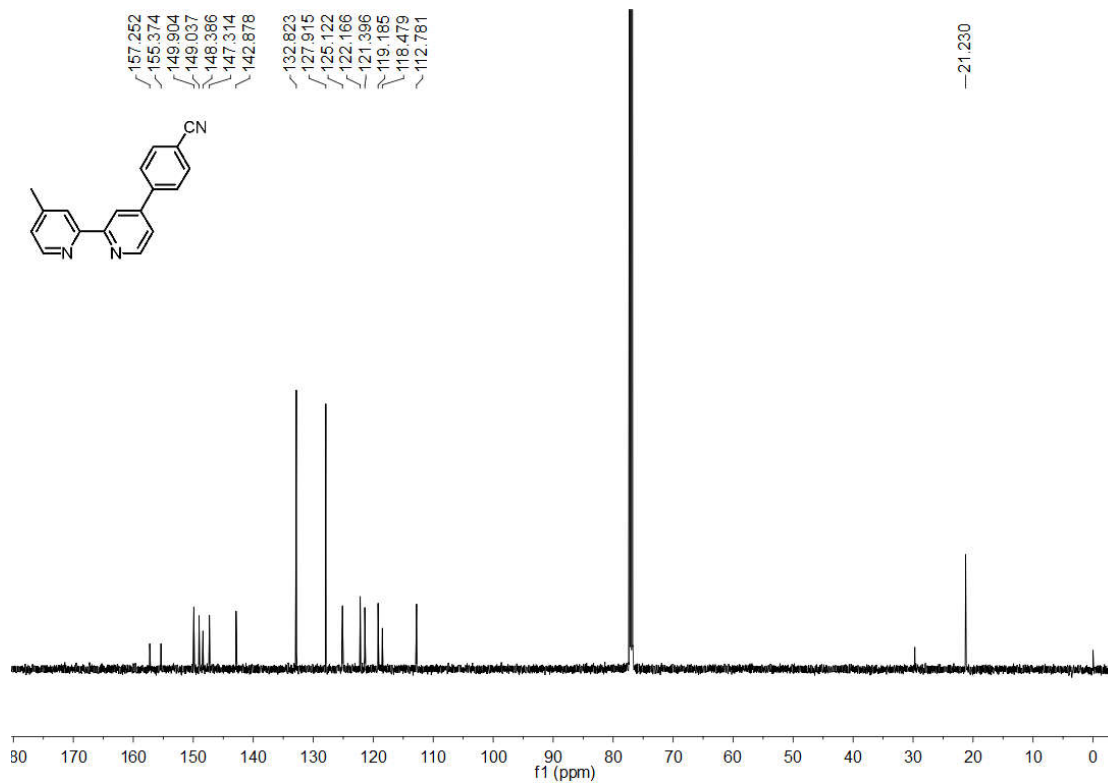
¹³C NMR Spectrum of 3t (151 MHz, CDCl₃)



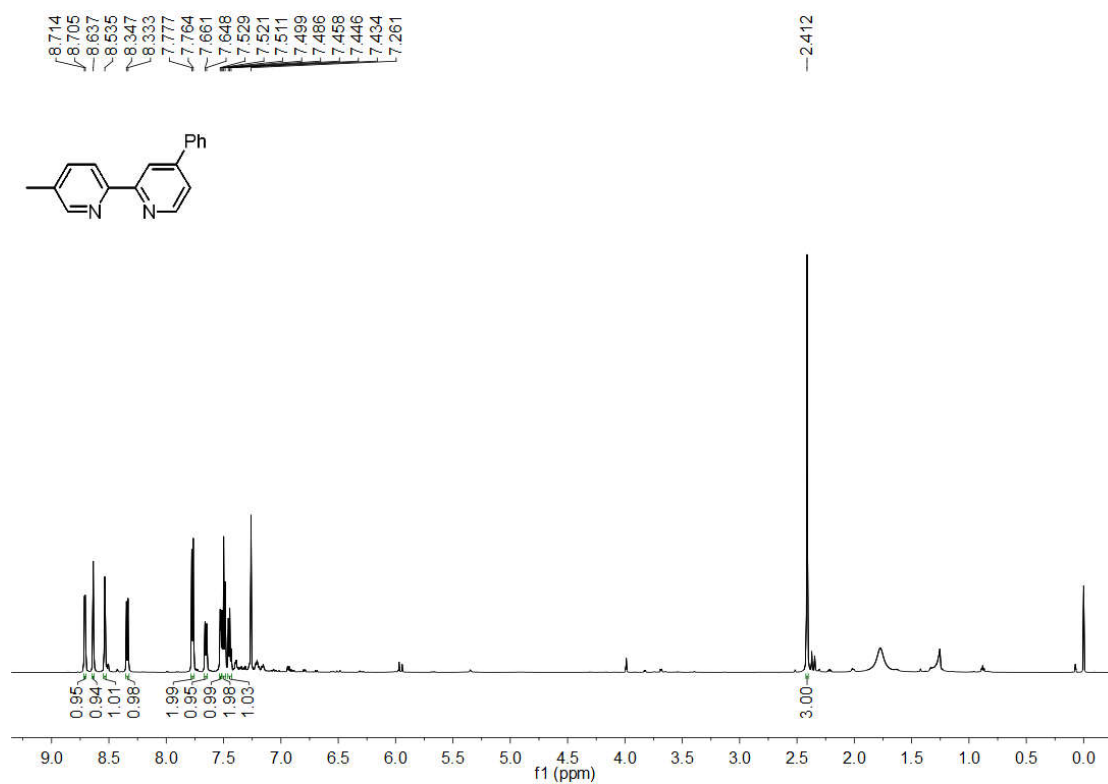
¹H NMR Spectrum of 3u (600 MHz, CDCl₃)



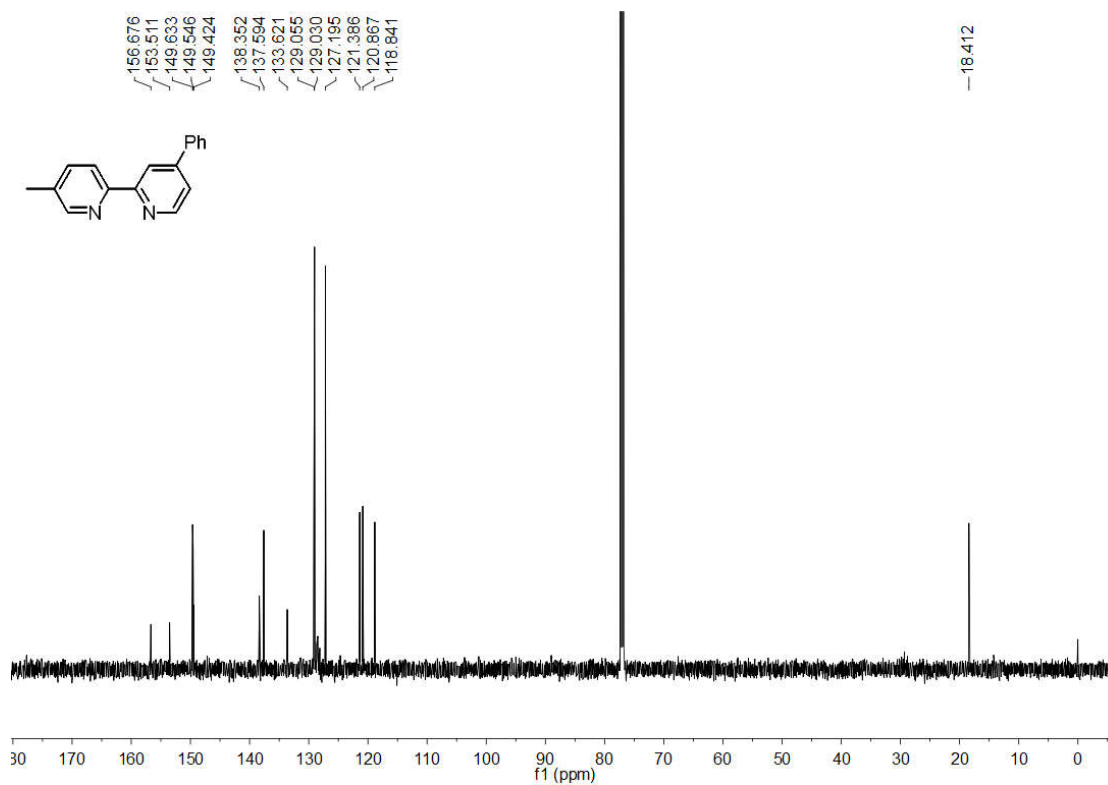
¹³C NMR Spectrum of 3u (151 MHz, CDCl₃)



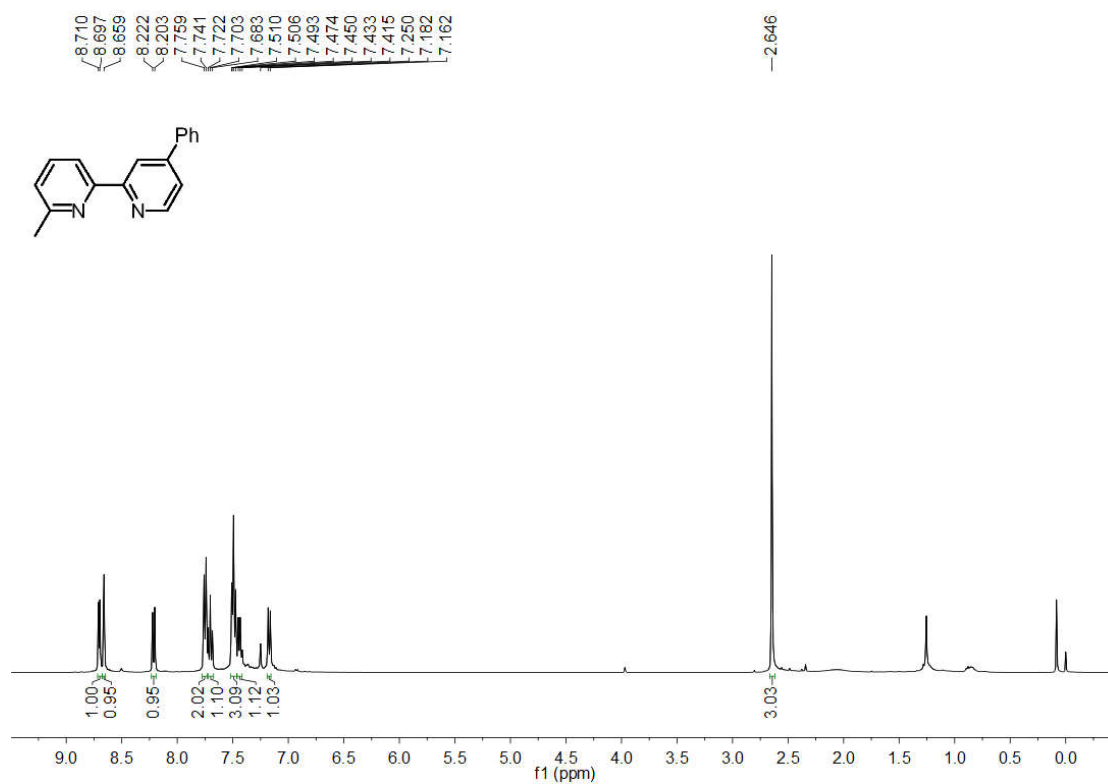
¹H NMR Spectrum of 3v (600 MHz, CDCl₃)



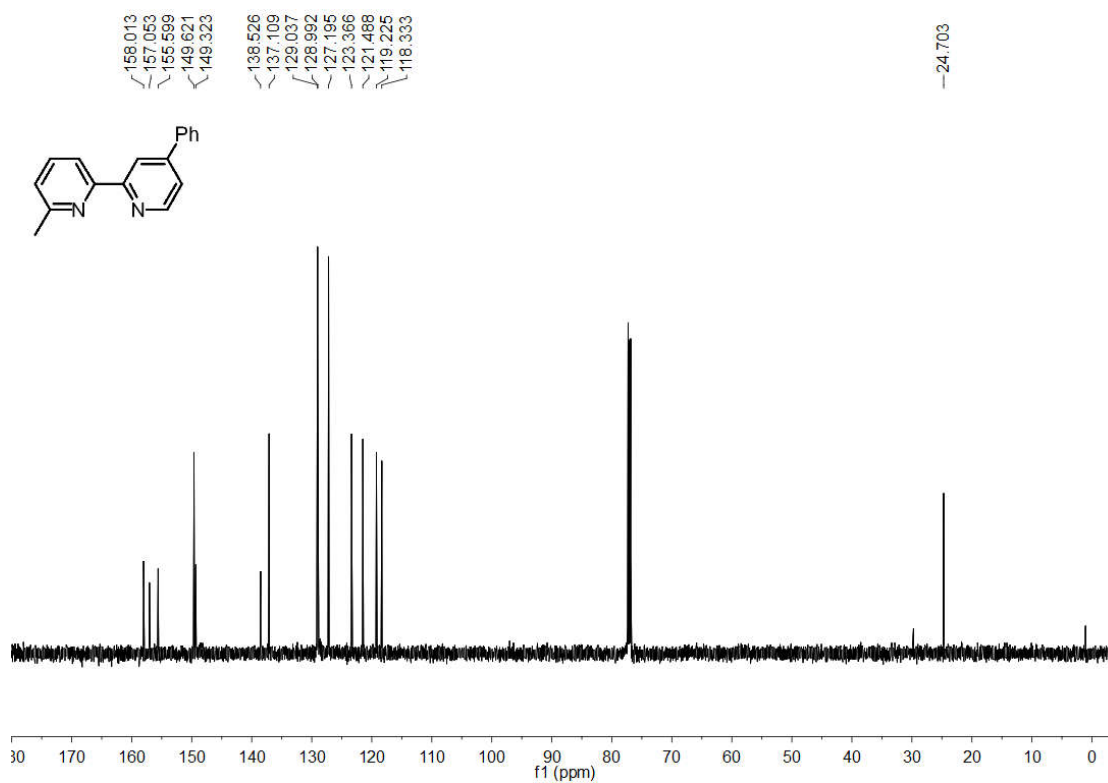
¹³C NMR Spectrum of 3v (151 MHz, CDCl₃)



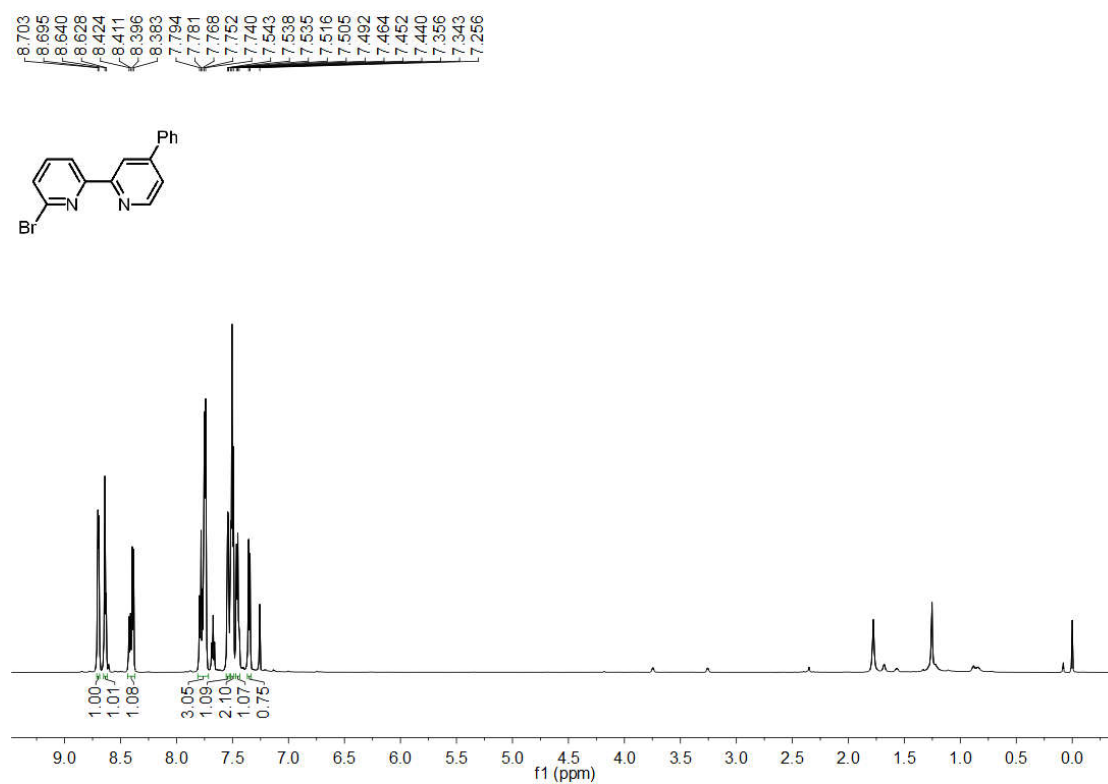
¹H NMR Spectrum of 3w (600 MHz, CDCl₃)



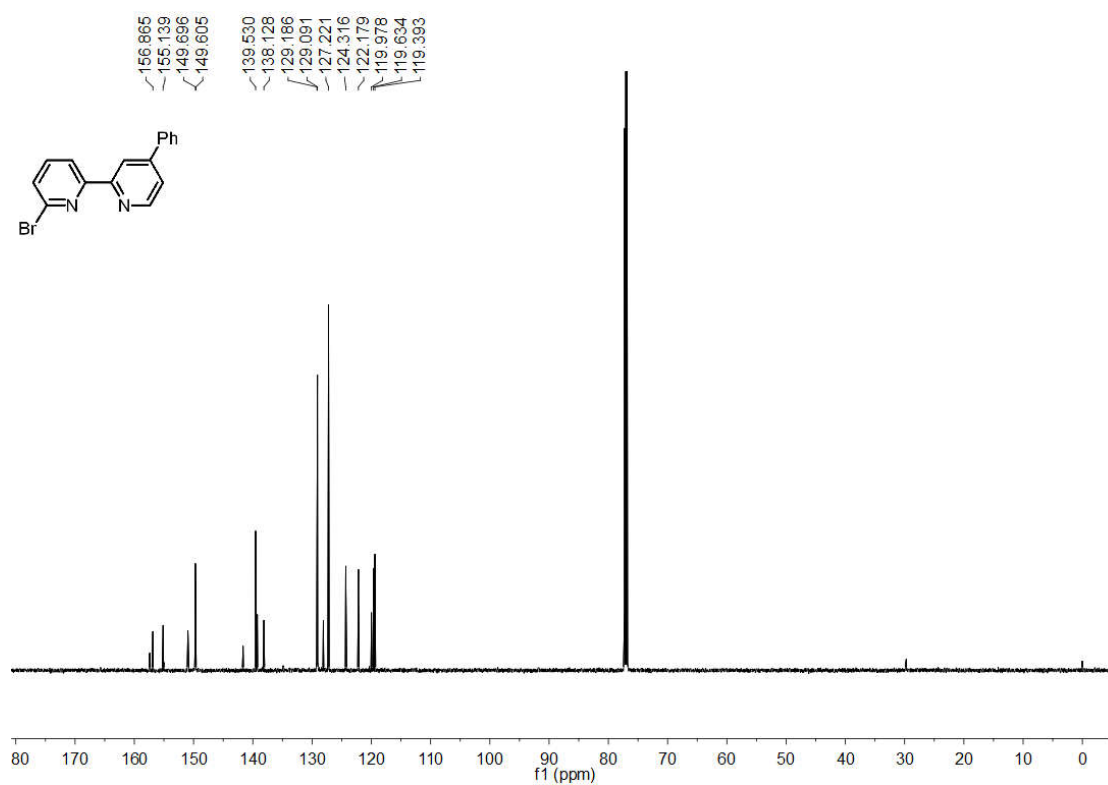
¹³C NMR Spectrum of 3w (151 MHz, CDCl₃)



¹H NMR Spectrum of 3x (600 MHz, CDCl₃)



¹³C NMR Spectrum of 3x (151 MHz, CDCl₃)



Chemical structure of 2-phenylisoquinoline (Ph-IQ) is shown above the spectrum. The spectrum displays peaks corresponding to the structure, with chemical shifts (ppm) and integrations listed below the x-axis.

Chemical structure: c1ccc(cc1)-c2cnc3ccccc23

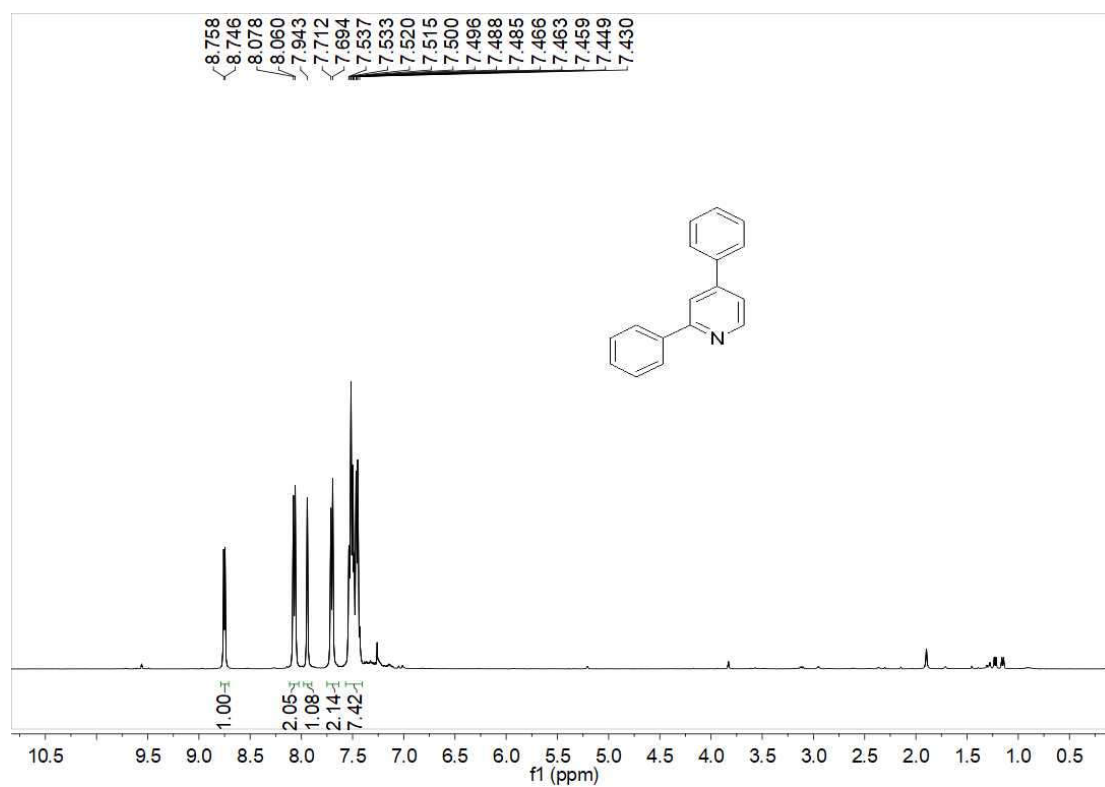
Peak list (ppm): 8.913, 8.783, 8.775, 8.612, 8.598, 8.309, 8.294, 8.207, 7.857, 7.818, 7.806, 7.756, 7.744, 7.732, 7.587, 7.581, 7.579, 7.573, 7.560, 7.546, 7.533, 7.520, 7.483, 7.470, 7.458, 7.254.

Integration values: 1.00, 0.99, 0.96, 1.00, 0.99, 1.00, 2.06, 1.06, 1.04, 2.98, 1.02.

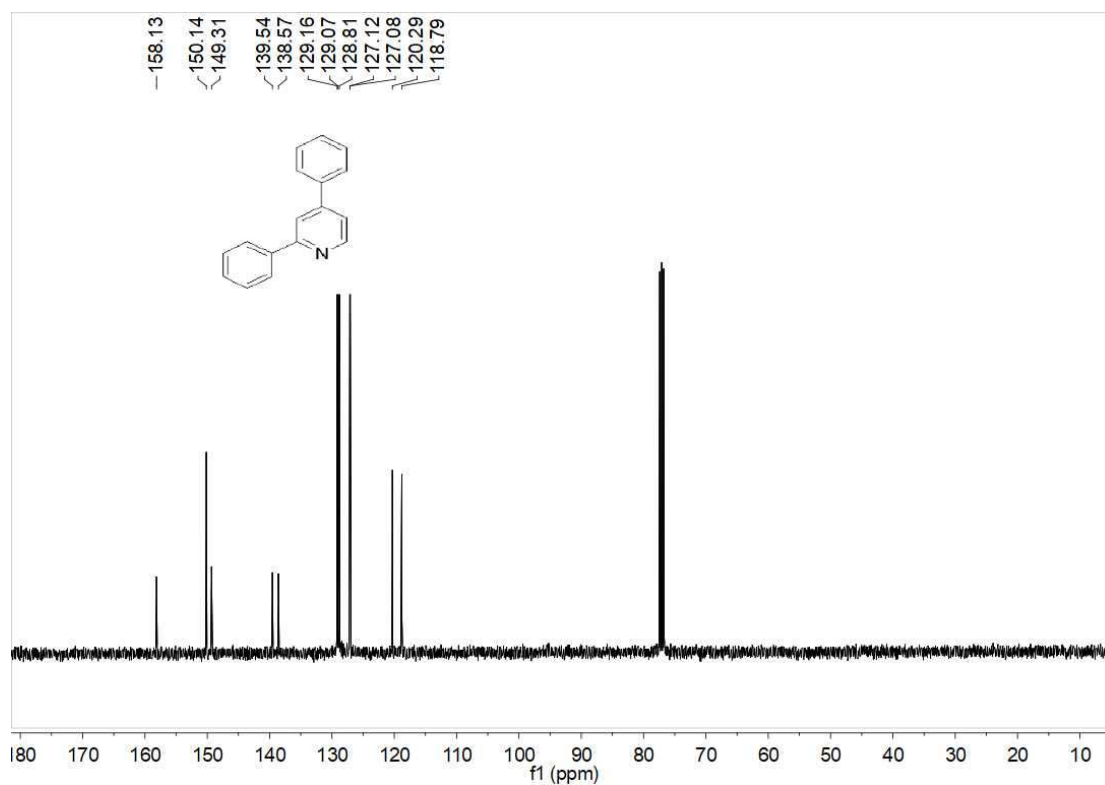
c1ccc(cc1)-c2ccncc2-c3ccc4ccccc4n3

156.883
 156.199
 149.648
 149.439
 147.969
 138.432
 136.857
 129.874
 129.602
 129.102
 128.329
 127.665
 127.244
 126.812
 122.009
 119.841
 119.169

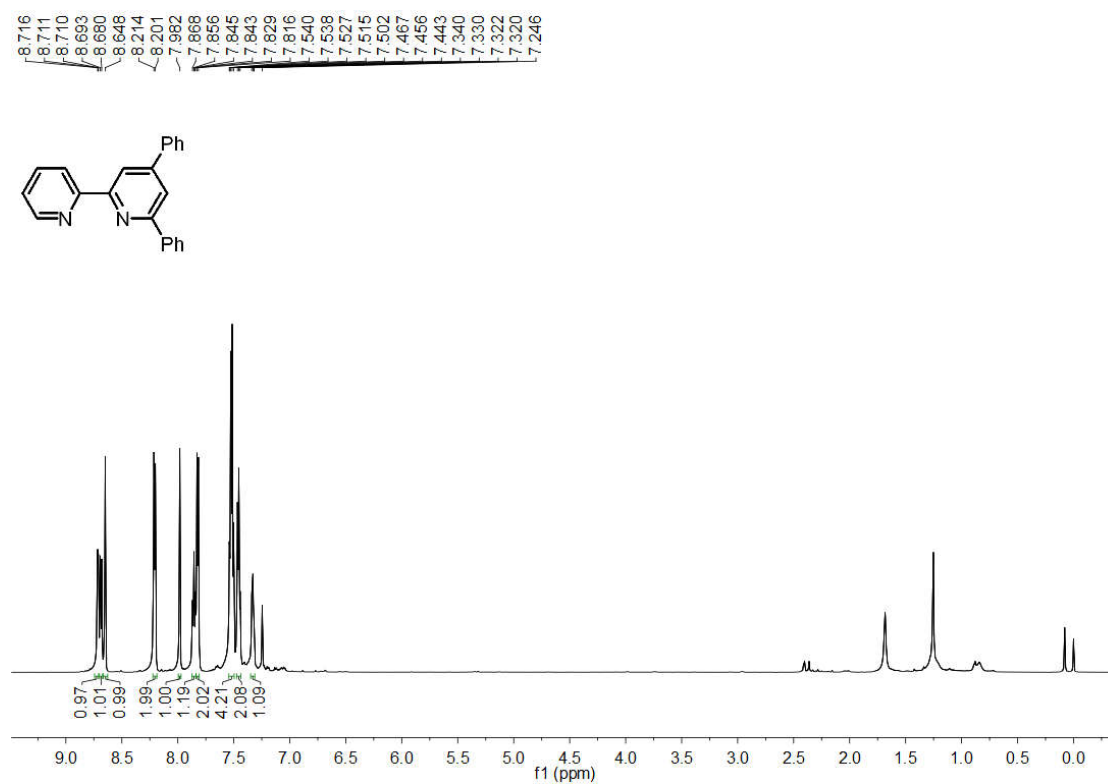
¹H NMR Spectrum of 3z (600 MHz, CDCl₃)



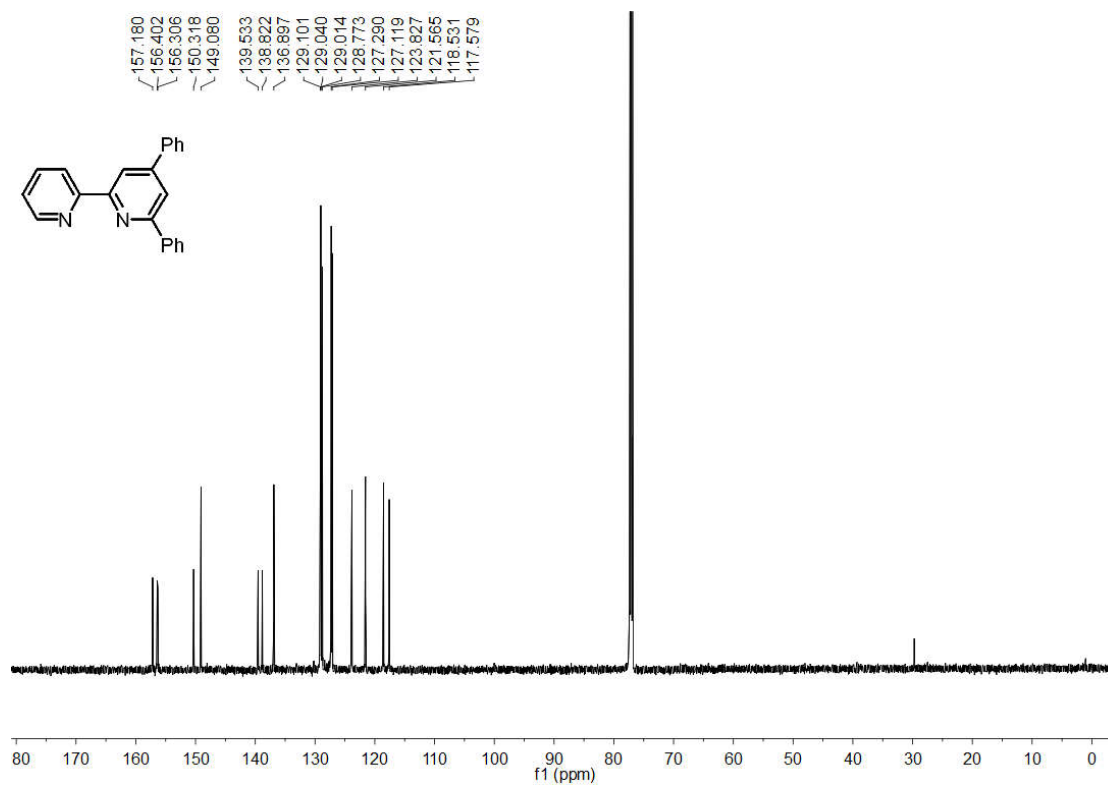
¹³C NMR Spectrum of 3z (151 MHz, CDCl₃)



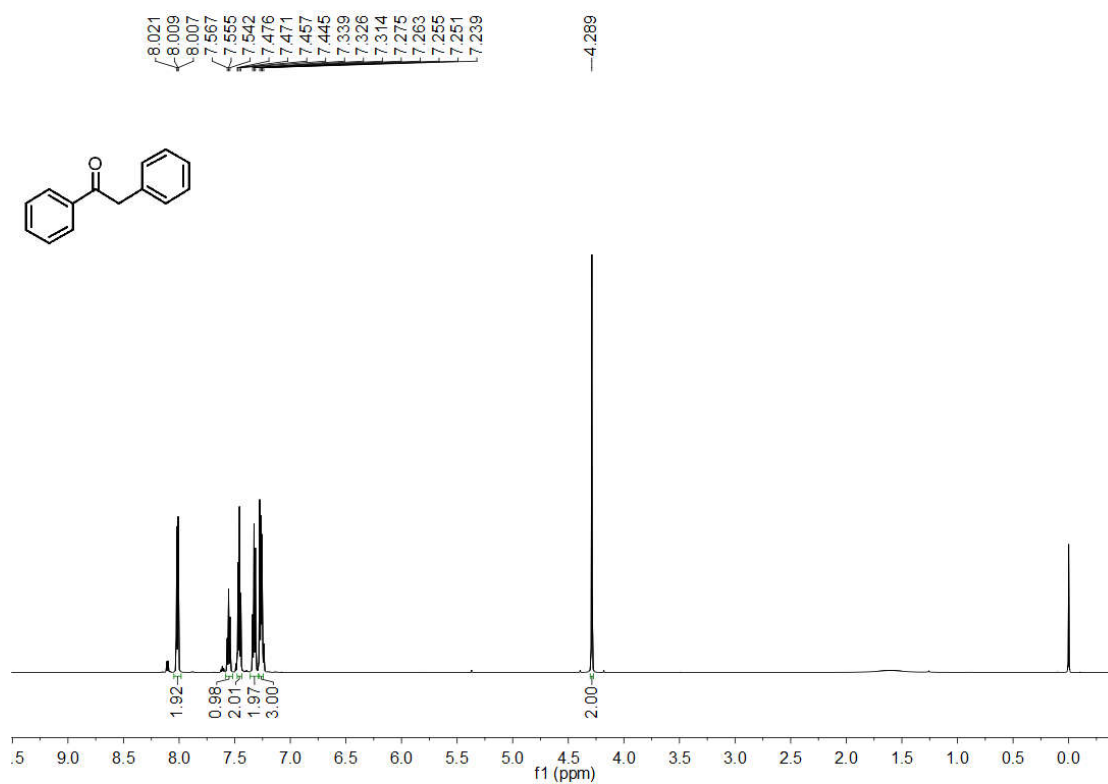
¹H NMR Spectrum of 5 (600 MHz, CDCl₃)



¹³C NMR Spectrum of 5 (151 MHz, CDCl₃)



¹H NMR Spectrum of 9 (600 MHz, CDCl₃)



¹³C NMR Spectrum of 9 (151 MHz, CDCl₃)

