SUPPORTING INFORMATION

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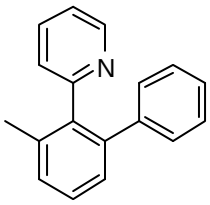
General Information

All manipulations were carried out under Oxygen atmosphere. Toluene was distilled from sodium/benzophenone. $[Ru(cymene)Cl_2]_2$ was prepared according to the literature[1]. Column chromatography was generally performed on silica gel (300-400 mesh) and reactions were monitored by thin layer chromatography (TLC) using UV light to visualize the course of the reactions. The ^1H NMR (400MHz) and ^{13}C NMR (100MHz) data were recorded on Varian 400M spectrometers using $CDCl_3$ as solvent at room temperature. The chemical shifts (δ) are reported in ppm and coupling constants (*J*) in Hz. ^1H NMR spectra was recorded with tetramethylsilane (δ= 0.00 ppm) as internal reference; ^{13}C NMR spectra was recorded with $CDCl_3$ (δ = 77.00 ppm) as internal reference. IR, MS and HRMS were performed by the State-authorized Analytical Center in Soochow University.

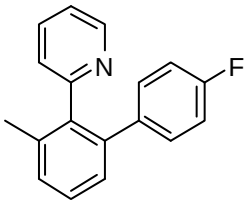
General procedures for products

2-o-tolylpyridine (0.2 mmol, 1.0 equiv), arylboronic (0.5 mmol, 2.5 equiv), $BiBr_3$ (0.04 mmol, 20.0 mmol%), $KHCO_3$ (0.6 mmol, 3.0 equiv) and $[Ru(cymene)Cl_2]_2$ (0.01 mmol, 5.0 mmol%) were added to an oven-dried Schlenck tube under air. The septum-sealed tube was evacuated and refilled with O_2 thrice. Toluene (2.0 mL) was added via syringe, the reaction mixture was heated in an oil bath at 115 ^oC for 24 h. It was then removal of the organic solvent in vacuum and followed by flash silica gel column chromatographic purification afforded product with Petroleum/Ethyl acetate mixtures.

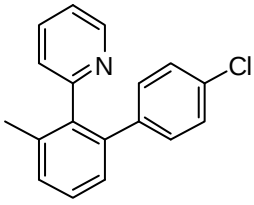
Compound characterizations



2-(3-methylbiphenyl-2-yl)pyridine (3a) [2]. Yield: 78%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 2.18 (s, 3H), 6.85 (d, 1H, *J* = 7.8 Hz), 7..01-7.12 (m, 6 H),7.25-7.28 (m, 2 H), 7.31-7.35 (m, 1H), 7.36-7.40 (m, 1H), 8.60 (d, 1H, *J* = 4.8 Hz); ^{13}C NMR ($CDCl_3$, 75 MHz): δ 20.4, 121.1, 125.4, 126.0, 127.4, 127.9, 129.2, 129.4, 135.5, 136.5, 139.1, 141.0, 141.4, 148.6, 159.3; MS ($C_{18}H_{15}N$): 245; IR (KBr, cm^{-1}): ν 1052, 1420, 1460, 1593.

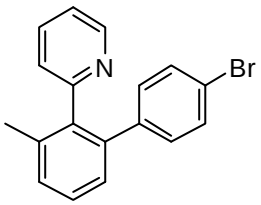


2-(4'-fluoro-3-methylbiphenyl-2-yl)pyridine (3b). Yield: 76%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 2.17 (s, 3H), 6.81 (t, 2H), 6.87 (d, 1H, *J* = 7.8 Hz), 7.01-7.05 (m, 2H), 7.08-7.12 (m, 1H), 7.23 (d, 1H, *J* = 7.4 Hz), 7.29 (d, 1H, *J* = 7.3 Hz), 7.35 (t, 1H, *J* = 7.5 Hz), 7.44-7.49 (m, 1H), 8.62 (d, 1H, *J* = 4.9 Hz); ^{13}C NMR ($CDCl_3$, 75 MHz): δ 20.4, 114.3, 114.6, 121.3, 125.5, 127.4, 128.0, 129.4, 131.0, 131.1, 135.8, 136.7, 137.47, 137.5, 139.2, 140.1, 148.8, 159.3, 159.8, 163.0; MS ($C_{18}H_{14}FN$): 263; IR (KBr, cm^{-1}): ν 1159, 1221, 1459, 1590, 1585.

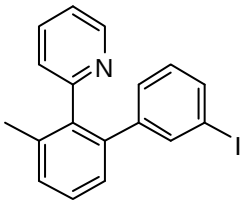


2-(4'-chloro-3-methylbiphenyl-2-yl)pyridine (3c). Yield: 83%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 2.17 (s, 3H), 6.88 (d, 1H, *J* = 7.8 Hz), 7.00 (d, 2H, *J* = 8.3 Hz), 7.07-7.15 (m, 3H), 7.22 (d, 1H, *J* = 7.4 Hz), 7.29 (d, 1H, *J* = 7.2 Hz), 7.35 (t, 1H, *J* =

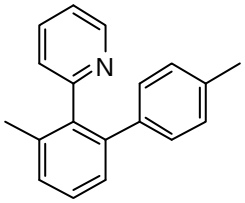
7.5 Hz), 7.44-7.51 (m, 1H), 8.62 (d, 1H, *J* = 4.1 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 20.4, 121.4, 125.5, 127.3, 127.7, 128.1, 129.6, 130.8, 132.3, 135.9, 136.8, 139.1, 139.9, 140.0, 148.8, 159.1; MS ($C_{18}H_{14}ClN$): 279 (M^+, ^{35}Cl), 281 (M^+, ^{37}Cl); IR (KBr, cm^{-1}): ν 1051,1091, 1458, 1493, 1593.



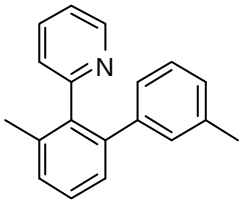
2-(4'-bromo-3-methylbiphenyl-2-yl)pyridine (3d). Yield: 84%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 2.17 (s, 3H), 6.87 (d, 1H, *J* = 7.8 Hz), 6.91-6.97 (m, 2H), 7.07-7.11 (m, 1H), 7.20-7.25 (m, 3Hz), 7.28-7.36 (m, 2H), 7.43-7.47 (m, 1H), 8.61 (d, 1H, *J* = 4.1 Hz); ^{13}C NMR ($CDCl_3$, 75 MHz): δ 20.4, 120.4, 121.4, 125.4, 127.2, 128.0, 129.6, 130.6, 131.1, 135.8, 136.7, 139.0, 139.7, 140.4, 148.8, 159.0; MS ($C_{18}H_{14}BrN$): 323 (M^+, ^{79}Br), 325 (M^+, ^{81}Br); IR (KBr, cm^{-1}): ν 1011, 1081, 1422, 1458, 1585.



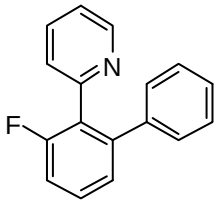
2-(3'-iodo-3-methylbiphenyl-2-yl)pyridine (3e). Yield: 81%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 2.20(s, 3H), 6.85 (t, 1H, *J* = 7.8 Hz), 6.96 (d, 1H, *J* = 7.9 Hz), 7.01 (d, 1H, *J* = 7.8 Hz), 7.20-7.25 (m, 2H) , 7.32 (d, 1H, *J* = 7.4 Hz) , 7.38 (t, 1H, *J* = 7.6 Hz), 7.45 (d, 1H, *J* = 7.9 Hz), 7.49 (s, 1H), 7.60 (t, 1H, *J* = 7.7 Hz), 8.68 (d, 1H, *J* = 4.7 Hz) ; ^{13}C NMR ($CDCl_3$, 100 MHz): δ 20.4, 93.5, 121.4, 125.4, 127.2, 128.1, 128.7, 129.1, 129.8, 135.1, 135.8, 136.7, 138.4, 139.1, 139.5, 143.6, 148.9, 159.0; MS ($C_{18}H_{14}IN$): 371; IR (KBr, cm^{-1}): ν 994, 1456, 1562, 1587.



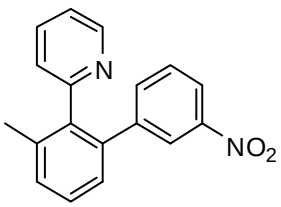
2-(3,4'-dimethylbiphenyl-2-yl)pyridine (3f). Yield: 63%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 2.17 (s, 3H), 2.24 (s, 3H), 6.88 (d, 1H, *J* = 7.8Hz), 6.92-6.97 (q, 4H), 7.06-7.09 (m, 1H), 7.25-7.27 (m, 2H), 7.32-7.35 (m, 1H), 7.41-7.45 (m, 1H), 8.63 (d, 1H, *J* = 4.8 Hz); ^{13}C NMR ($CDCl_3$, 75 MHz): δ 20.4, 21.0, 121.2, 125.5, 127.6, 127.9, 128.3, 129.1, 129.4, 135.7, 136.6, 138.6, 139.2, 141.0, 148.7, 159.6; MS ($C_{19}H_{17}N$): 259; IR (KBr, cm^{-1}): ν 1050, 1245, 1459, 1511, 1594.



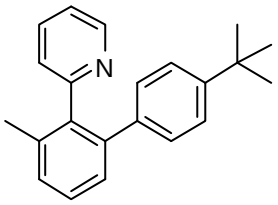
2-(3,3'-dimethylbiphenyl-2-yl)pyridine (3g). Yield: 67%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 2.18 (s, 3H), 2.19 (s, 3H), 6.84 (d, 1H, *J* = 7.4 Hz), 6.88-6.93 (m, 3H), 7.00 (t, 1H, *J* = 7.8 Hz), 7.07-7.10 (m, 1Hz), 7.26-7.29 (m, 2H), 7.33-7.37 (m, 1H), 7.43-7.47 (m, 1H), 8.63(d, 1H, *J* = 4.2 Hz); ^{13}C NMR ($CDCl_3$, 75 MHz): δ 20.4, 21.2, 121.2, 125.5, 126.6, 126.9, 127.3, 127.5, 127.9, 129.2, 130.4, 135.7, 136.6, 137.0, 139.2, 141.2, 141.4, 148.6, 159.6; MS ($C_{19}H_{17}N$): 259; IR (KBr, cm^{-1}): ν 1459, 1586.



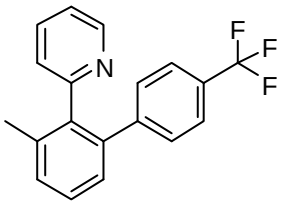
2-(3-fluorobiphenyl-2-yl)pyridine (3h). Yield: 80%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 7.05-7.13 (m, 4H), 7.14-7.18 (m, 4H), 7.24 (d, 1H, *J* = 7.6 Hz), 7.38-7.44 (m, 1H), 7.47-7.52 (m, lH), 8.58 (d, 1H, *J* = 4.7 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 114.5, 114.8, 121.9, 125.75, 125.8, 126.1, 126.8, 127.8, 129.4, 129.5, 129.6, 135.7, 139.8, 139.9, 143.25, 143.3, 149.1, 154.1, 159.0, 161.5; MS ($C_{17}H_{12}FN$): 249; IR (KBr, cm^{-1}): ν 1235, 1423, 1460, 1586, 1611.



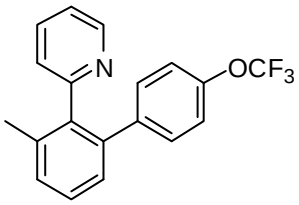
2-(3-methyl-3'-nitrobiphenyl-2-yl)pyridine (3i). Yield: 92%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.20 (s, 3H), 6.96 (d, 1H, *J* = 7.8 Hz), 7.11-7.14 (m, 1H), 7.29 (d, 2H, *J* = 7.6 Hz), 7.35-7.42 (m, 3H), 7.49-7.53 (m, 1H), 7.96-7.99 (m, 1H), 8.00 (s, 1H), 8.60 (d, 1H, *J* = 4.9 Hz); ^{13}C NMR ($CDCl_3$, 75 MHz): δ 20.3, 121.1, 121.7, 124.2, 125.4, 127.2, 128.3, 128.4, 130.3, 135.5, 136.0, 136.9, 138.6, 139.3, 143.1, 147.5, 149.1, 158.5; MS ($C_{18}H_{14}N_2O_2$): 290; IR (KBr, cm^{-1}): ν 1351, 1459, 1531, 1585.



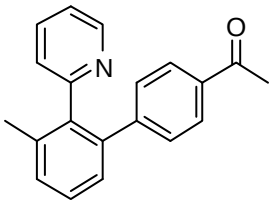
2-(4'-tert-butyl-3-methylbiphenyl-2-yl)pyridine (3j). Yield: 77.9%; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 1.24 (s, 9H), 2.17 (s, 3H), 6.86 (d, 1H, *J* = 7.8 Hz), 6.99 (d, 2H, *J* = 8.3 Hz), 7.05-7.08 (m, 1H), 7.14 (d, 2H, *J* = 8.3 Hz), 7.25-7.28 (m, 2H), 7.32-7.35 (m, 1H), 7.39-7.43 (m, 1H), 8.63 (d, 1H, *J* = 4.9 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 20.5, 31.2, 34.2, 121.2, 124.4, 125.6, 127.6, 127.9, 129.1, 129.2, 135.6, 136.6, 138.5, 139.2, 141.0, 148.7, 148.9, 159.6; MS ($C_{22}H_{23}N$): 301; IR (KBr, cm^{-1}): ν 1051, 1461, 1594.



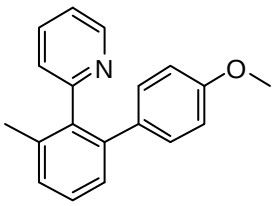
2-(3-methyl-4'-(trifluoromethyl)biphenyl-2-yl)pyridine (3k). Yield: 87%; ^{1}HNMR ($CDCl_3$, 400 MHz): δ 2.19 (s, 3H), 6.89 (d, 1H, *J* = 7.8 Hz), 7.09-7.12 (m, 1H), 7.19 (d, 2H, *J* = 8.1 Hz), 7.25 (d, 1H, *J* = 7.3 Hz), 7.32-7.40 (m, 4 H), 7.44-7.48 (m, 1H), 8.62 (d, 1H, *J* = 4.9 Hz); ^{13}C NMR ($CDCl_3$, 100MHz): δ 20.4, 121.6, 124.46, 124.5, 125.6, 127.4, 128.2, 129.8, 130.1, 136.1, 136.9, 139.0, 139.8, 145.3, 148.8, 158.7; MS ($C_{19}H_{14}F_3N$): 313; IR (KBr, cm^{-1}): ν 1064, 1125, 1165, 1326, 1460, 1586, 1681.



2-(3-methyl-4'-(trifluoromethoxy)biphenyl-2-yl)pyridine (3l). Yield: 83%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.18 (s, 3H), 6.86 (d, 1H, *J* = 7.8 Hz), 6.97 (d, 2H, *J* = 8.6 Hz), 7.05-7.10 (m, 3H), 7.23 (d, 1H, *J* = 7.4 Hz), 7.29-7.36 (m, 2H), 7.41-7.45 (m, 1H), 8.61 (d, 1H, *J* = 4.9 Hz); ^{13}C NMR ($CDCl_3$, 75 MHz): δ 20.3, 119.9, 121.4, 125.4, 127.3, 128.0, 129.7, 130.8, 135.7, 136.7, 139.2, 139.7, 140.2, 147.56, 147.58, 148.8, 159.0; MS ($C_{19}H_{14}F_3NO$): 329; IR (KBr, cm^{-1}): ν 1164, 1223, 1260, 1461, 1510, 1587.

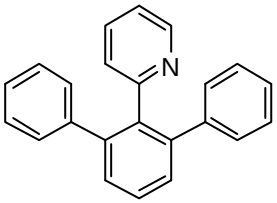


1-(3'-methyl-2'-(pyridin-2-yl)biphenyl-4-yl)ethanone (3m). Yield: 77%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.19 (s, 3H), 2.53 (s, 3H), 6.90 (d, 1H, *J* = 7.8 Hz), 7.10-7.13 (m, 1H), 7.17 (d, 2H, *J* = 8.2 Hz), 7.27 (d, 1H, *J* = 3.3 Hz), 7.32-7.40 (m, 2H), 7.45-7.49 (m, 1H), 7.74 (d, 2H, *J* = 8.2 Hz), 8.62 (d, 1H, *J* = 4.8 Hz); ^{13}C NMR ($CDCl_3$, 75 MHz): δ 20.4, 26.5, 121.5, 125.5, 127.3, 127.7, 128.1, 129.7, 130.0, 134.8, 135.9, 136.9, 139.1, 140.0, 146.7, 148.9, 159.0, 197.9; MS ($C_{20}H_{17}NO$): 287; IR (KBr, cm^{-1}): ν 1267, 1605, 1682.

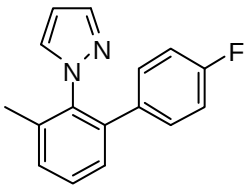


2-(4'-methoxy-3-methylbiphenyl-2-yl)pyridine (3n)[3]**.** Yield: 51%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.17 (s, 3H), 3.72 (s, 3H), 6.68 (d, 2H, *J* = 8.4 Hz), 6.89 (d, 1H,

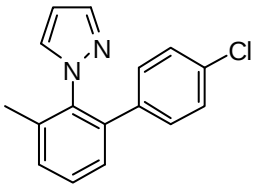
J = 7.8 Hz), 6.99 (d, 2H, *J* = 8.4 Hz), 7.08-7.11 (m, 1H), 7.27 (d, 2H, *J* = 5.7 Hz), 7.34 (t, 1H, *J* = 7.53 Hz), 7.45-7.48 (m, 1H), 8.64（d, 1H, *J* = 4.8 Hz）; ^{13}C NMR ($CDCl_3$, 75 MHz): δ 20.5, 55.0, 113.0, 121.2, 125.5, 127.5, 128.0, 129.0, 130.6, 134.0, 135.8, 136.6, 139.2, 140.7, 148.8, 158.0, 159.7; MS ($C_{19}H_{17}NO$): 275 ; IR (KBr, cm^{-1}): ν 1159, 1224, 1423, 1454, 1510, 1605.



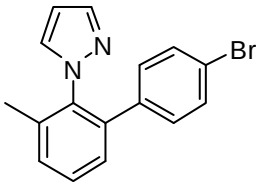
2-(2,6-diphenylphenyl)pyridine (3o)[4]**.** Yield: 76%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 6.88 (d, 1H, *J* = 7.8 Hz), 6.90-6.93 (m, 1H), 7.09-7.16 (m, 10H), 7.28-7.32 (m, 1H), 7.46 (d, 2H, , *J* = 7.1 Hz), 7.51-7.55 (m, 1H), 8.31 (d, 1H, , *J* = 4.8 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 120.8, 126.2, 126.7, 127.6, 128.1, 129.4, 129.5, 134.8, 138.4, 141.5, 141.7, 148.4, 158.8; MS ($C_{23}H_{17}N$): 307; IR (KBr, cm^{-1}): ν 1417, 1589.



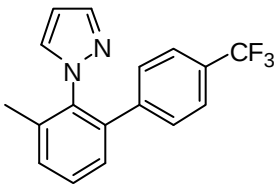
1-(4'-fluoro-3-methylbiphenyl-2-yl)-1H-pyrazole (5a). Yield: 65%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.12 (s, 3H), 6.22 (t, 1H, *J* = 2.0 Hz), 6.90 (t, 2H, *J* = 8.7 Hz), 7.04-7.07 (m, 2H), 7.09 (d, 1H, *J* = 2.2 Hz), 7.29 (d, 1H, *J* = 7.8 Hz), 7.32 (d, 1H, , *J* = 7.4 Hz), 7.41 (t, 1H, *J* = 7.6 Hz), 7.65(d, 1H, *J* = 1.4 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 17.6, 106.0, 114.8, 115.0, 128.0, 129.0, 129.8, 129.9, 130.0, 131.4, 134.56, 134.6, 137.0, 137.8, 138.9, 139.7, 160.8, 163.3; MS ($C_{16}H_{13}FN_2$): 252; IR (KBr, cm^{-1}): ν 1046, 1161, 1125, 1420, 1472, 1512, 1606.



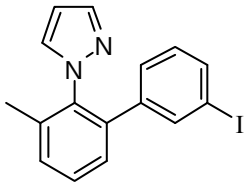
1-(4'-chloro-3-methylbiphenyl-2-yl)-1H-pyrazole (5b). Yield: 72%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.12 (s, 3H), 6.23 (t, 1H, *J* = 2.0 Hz), 7.02 (d, 2H, *J* = 8.4 Hz), 7.10 (d, 1H, *J* = 2.2 Hz), 7.18 (d, 2H, *J* = 8.4 Hz), 7.28 (d, 1H, *J* = 7.6 Hz), 7.33 (d, 1H, , *J* = 7.6 Hz), 7.41 (t, 1H, *J* = 7.6 Hz), 7.65(d, 1H, *J* = 1.5 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 17.6, 106.2, 127.9, 128.2, 129.1, 129.5, 130.3, 131.4, 133.3, 137.05, 137.1, 137.7, 138.6, 139.8; MS ($C_{16}H_{13}ClN_2$): 268 (M^+, ^{35}Cl), 270 (M^+, ^{37}Cl); IR (KBr, cm^{-1}): ν 1090, 1466, 1518, 1601.



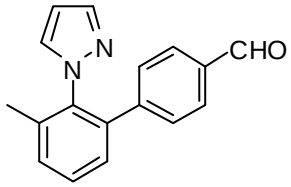
1-(4'-bromo-3-methylbiphenyl-2-yl)-1H-pyrazole (5c). Yield: 70%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.12 (s, 3H), 6.23 (t, 1H, *J* = 1.7 Hz), 6.94-7.19 (m, 3H), 7.27-7.35 (m, 4H), 7.41 (t, 1H, *J* = 7.6 Hz), 7.65 (d, 1H, *J* = 1.7 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 17.6, 106.2, 121.6, 127.8, 128.2, 129.1, 129.5, 129.8, 130.3, 131.2, 131.4, 137.1, 137.6, 138.7, 139.8; MS ($C_{16}H_{13}BrN_2$): 312 (M^+, ^{79}Br), 314 (M^+, ^{81}Br); IR (KBr, cm^{-1}): ν 1011, 1467, 1517, 1599.



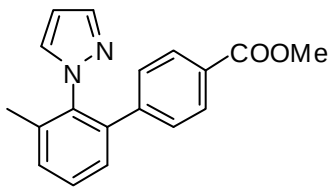
1-(3-methyl-4'-(trifluoromethyl)biphenyl-2-yl)-1H-pyrazole (5d). Yield: 76%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.14 (s, 3H), 6.22 (t, 1H, *J* = 1.9 Hz), 7.09 (d, 1H, *J* = 2.1 Hz), 7.20 (d, 2H, *J* = 8.1 Hz), 7.31 (d, 1H, *J* = 7.4 Hz), 7.37 (d, 1H, *J* = 7.5 Hz), 7.42-7.47 (m, 3H), 7.65 (d, 1H, *J* = 1.1 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 17.6, 106.3, 124.8, 124.85, 124.88, 124.9, 127.9, 128.5, 129.2, 130.7, 131.4, 137.2, 137.7, 138.4, 139.8, 142.2; MS ($C_{17}H_{13}F_3N_2$): 302; IR (KBr, cm^{-1}): ν 1064, 1126, 1166, 1400, 1619.



1-(3'-iodo-3-methylbiphenyl-2-yl)-1H-pyrazole (5e). Yield: 60%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.14 (s, 3H), 6.24 (t, 1H, *J* = 1.9 Hz), 6.93 (t, 1H, *J* = 7.8 Hz), 7.02 (d, 1H, *J* = 7.8 Hz), 7.11 (d, 1H, *J* = 1.9 Hz), 7.29 (d, 1H, *J* = 7.3 Hz), 7.34 (d, 1H, *J* = 7.3 Hz), 7.41 (t, 1H, *J* = 7.8 Hz), 7.48 (s, 1H), 7.54 (d, 1H, *J* = 7.8 Hz), 7.67 (d, 1H, *J* = 1.2 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 17.7, 93.8, 106.1, 127.3, 127.9, 129.1, 129.6, 130.5, 131.5, 136.1, 137.0, 137.7, 138.4, 139.8, 140.6; MS ($C_{16}H_{13}IN_2$): 360; IR (KBr, cm^{-1}): ν 1042, 1459, 1517, 1587, 1607.

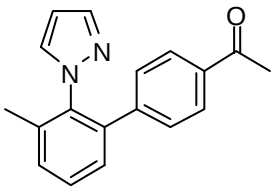


3'-methyl-2'-(1H-pyrazol-1-yl)biphenyl-4-carbaldehyde (5f). Yield: 55%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.15 (s, 3H), 6.21 (t, 1H, *J* = 2.1 Hz), 7.11 (d, 1H, *J* = 2.1 Hz), 7.26 (d, 2H, *J* = 7.9 Hz), 7.34 (d, 1H, *J* = 7.5 Hz), 7.39 (d, 1H, *J* = 7.0 Hz), 7.46 (t, 1H, *J* = 7.6 Hz), 7.65 (d, 1H, *J* = 1.5 Hz), 7.73 (d, 2H, *J* = 8.3 Hz), 9.96 (s, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 17.6, 106.3, 127.9, 128.9, 129.2, 129.4, 130.9, 131.4, 134.9, 137.2, 137.7, 138.6, 139.9, 145.0, 191.9; MS ($C_{17}H_{14}N_2O$): 262; IR (KBr, cm^{-1}): ν 1210, 1473, 1606, 1700.



methyl 3'-methyl-2'-(1H-pyrazol-1-yl)biphenyl-4-carboxylate (5g). Yield:

60%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.14 (s, 3H), 3.88 (s, 3H), 6.19 (t, 1H, *J* = 1.8 Hz), 7.11 (d, 1H, *J* = 2.0 Hz), 7.16 (d, 2H, *J* = 8.3 Hz), 7.33 (d, 1H, *J* = 7.6 Hz), 7.36 (d, 1H, *J* = 7.1 Hz), 7.43 (t, 1H, *J* = 7.6 Hz), 7.64 (d, 1H, *J* = 1.2 Hz), 7.88 (d, 2H, *J* = 8.3 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 17.7, 52.1, 106.2, 127.9, 128.2, 128.7, 129.1, 129.3, 130.7, 131.4, 137.1, 137.7, 138.8, 139.8, 143.4, 166.9; MS ($C_{18}H_{16}N_2O_2$): 292; IR (KBr, cm^{-1}): ν 1278, 1474, 1610, 1724.



1-(3'-methyl-2'-(1H-pyrazol-1-yl)biphenyl-4-yl)ethanone (5h). Yield: 68%; ^{1}H NMR ($CDCl_3$, 400MHz): δ 2.14 (s, 3H), 2.56 (s, 3H), 6.21 (t, 1H, *J* = 2.1 Hz), 7.10 (d, 1H, *J* = 2.1 Hz), 7.18 (d, 2H, *J* = 8.4 Hz), 7.33 (d, 1H, *J* = 7.5 Hz), 7.37 (d, 1H, *J* = 6.9 Hz), 7.46 (t, 1H, *J* = 7.6 Hz), 7.65 (d, 1H, *J* = 1.2 Hz), 7.80 (d, 2H, *J* = 8.4 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 17.6, 26.6, 106.2, 127.9, 128.0, 128.4, 129.1, 130.7, 131.4, 135.5, 137.1, 137.6, 138.6, 139.8, 143.5, 197.7; MS ($C_{18}H_{16}N_2O$): 276; IR (KBr, cm^{-1}): ν 1267, 1473, 1517, 1606, 1862.

References:

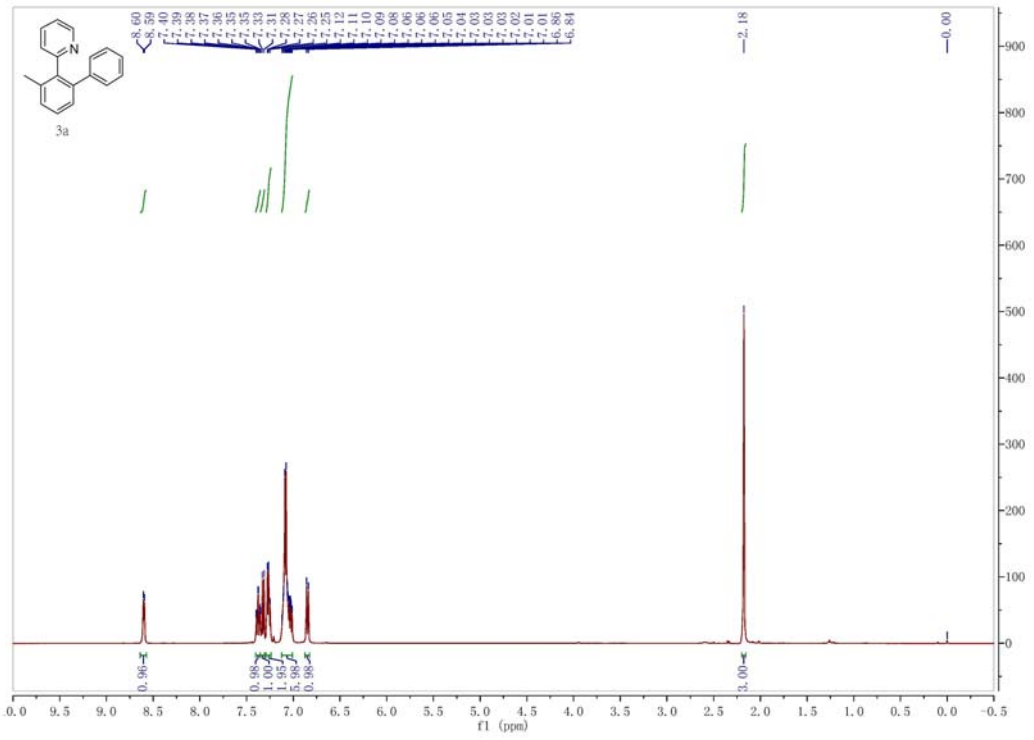
[1]. Bennett, M. A.; Huang, T.-N.; Matheson, T. W.; Smith, A. K. *Inorgan. Synth.* **1982**, *21*, 74.

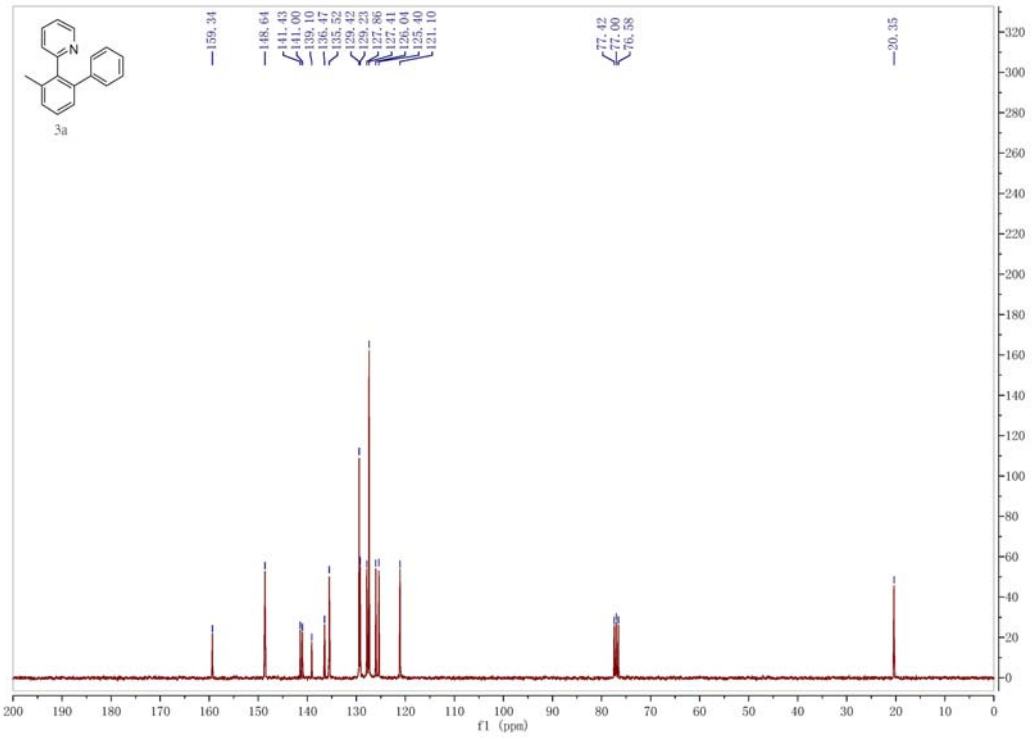
[2]. Oi, S.; Fukita, S.; Inoue, Y. *Chem.Commun.* **1998**, *22*, 2439.

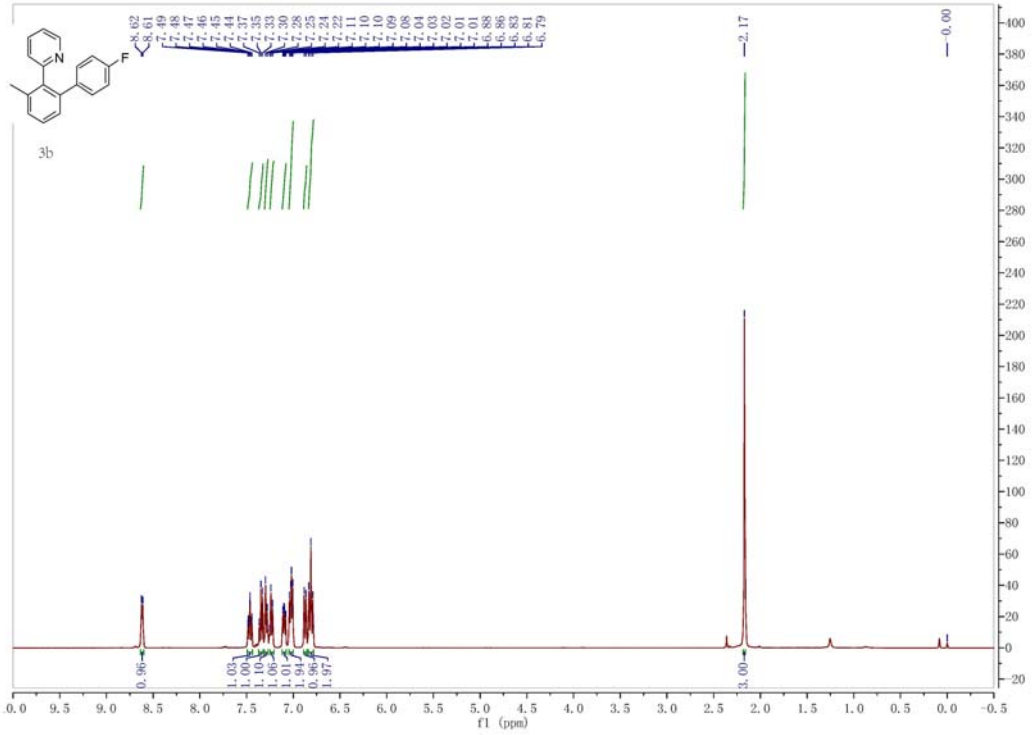
[3]. Ackermamnn, L.; Vicente, R.; Althammer, A. *Org. Lett.* **2008**, *10*, 2299.

[4]. Oi, S.; Fukita, S.; Hirata, N.; Watanuki, N.; Miyano, S.; Inoue, Y. *Org. Lett.* **2001**, *3*, 2579.

Spectroscopic Data for Products



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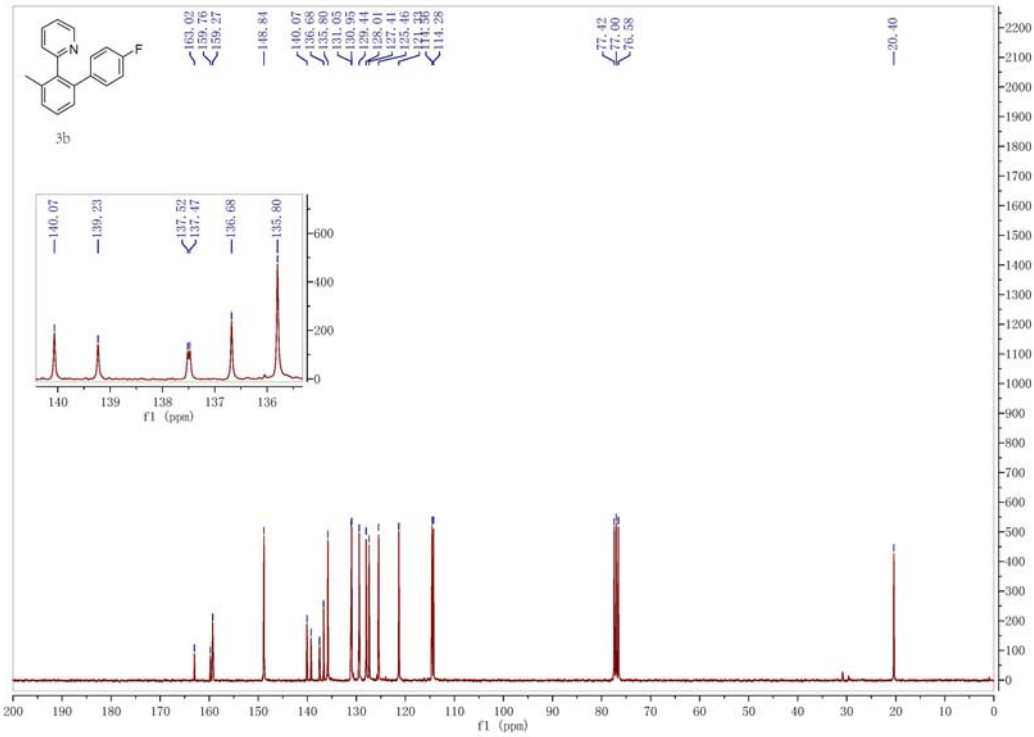
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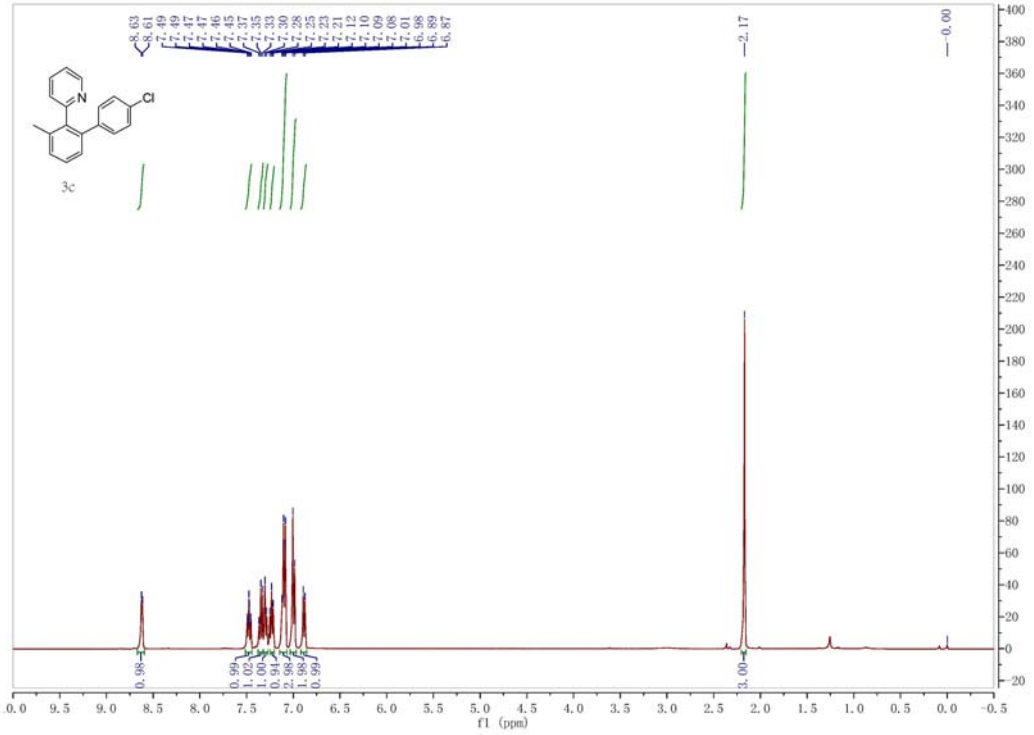
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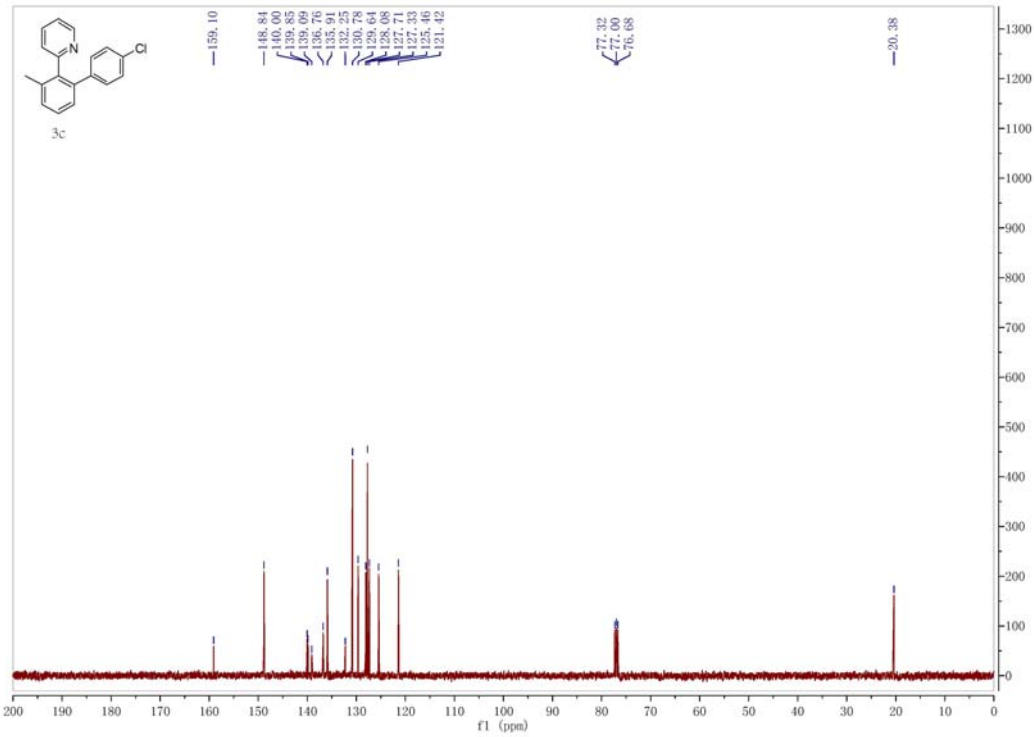
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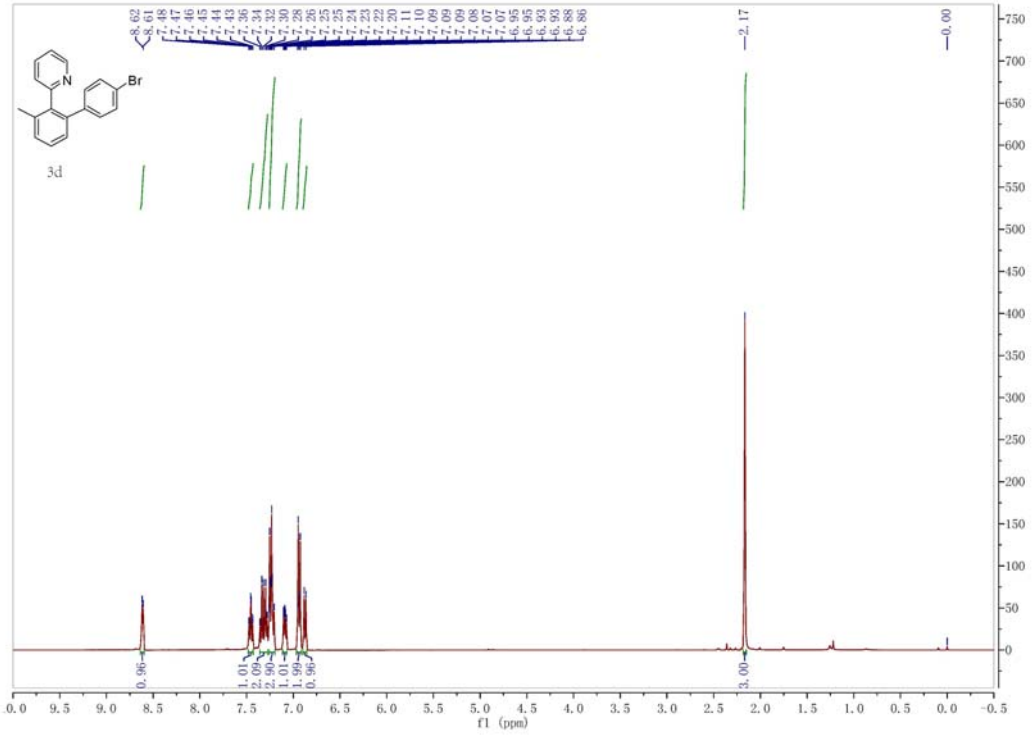
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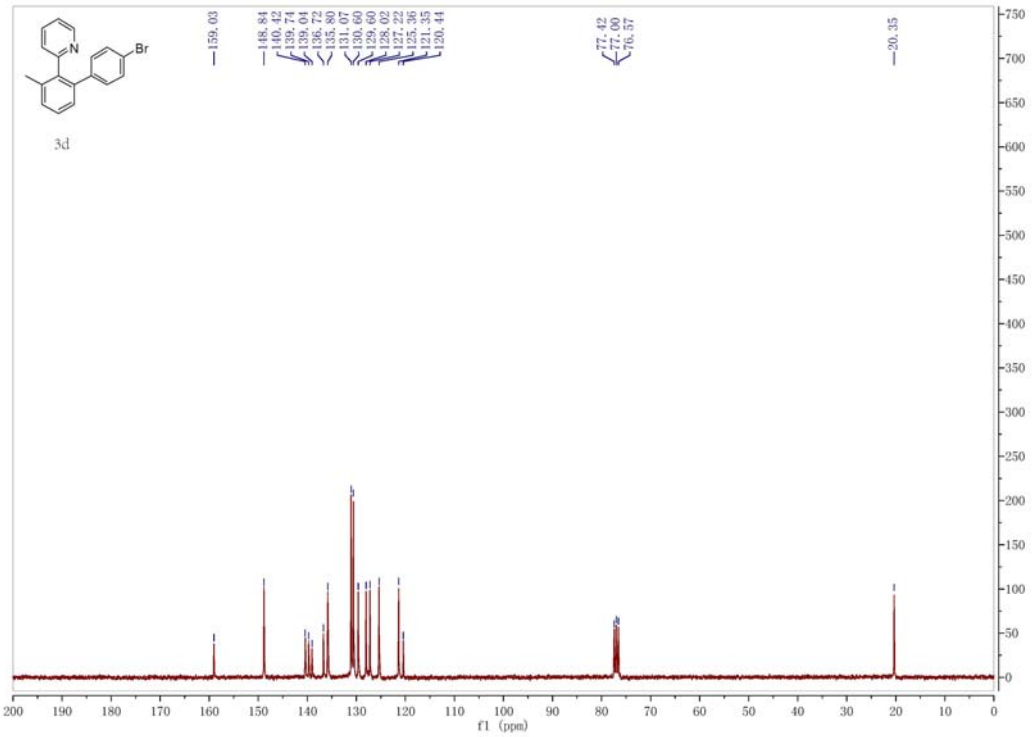
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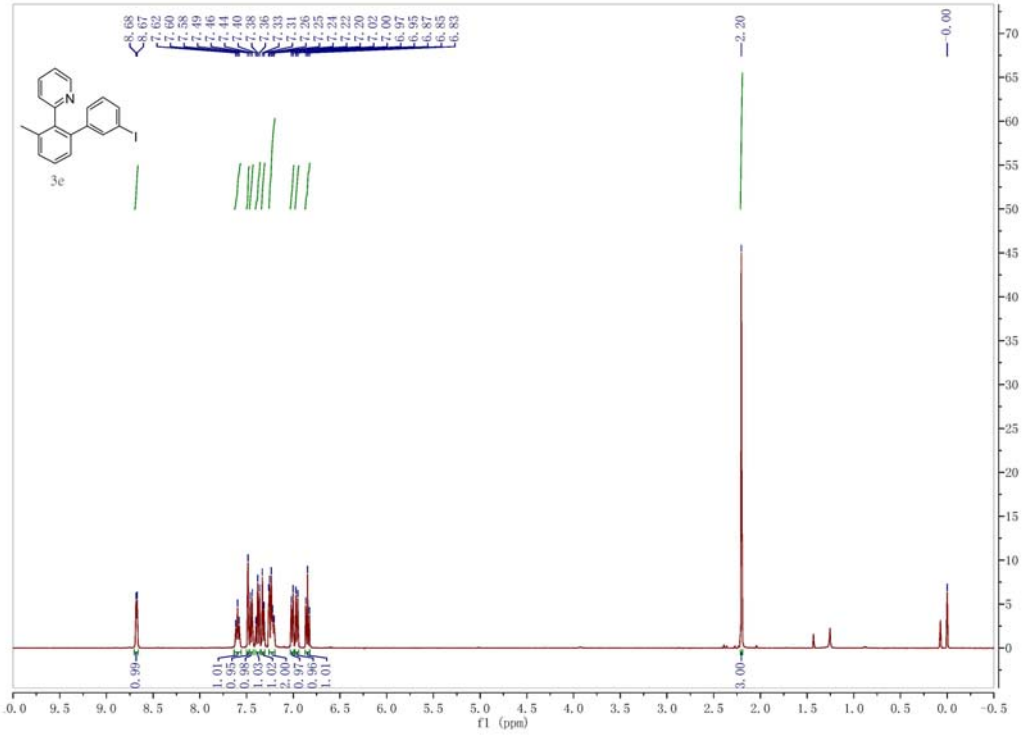
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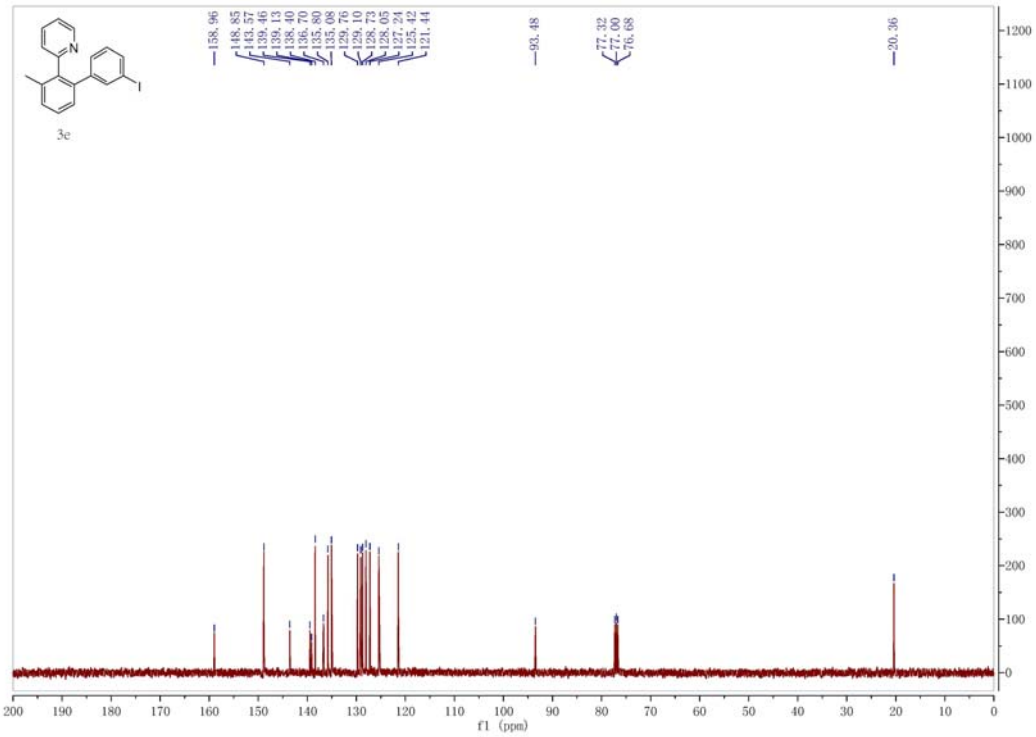
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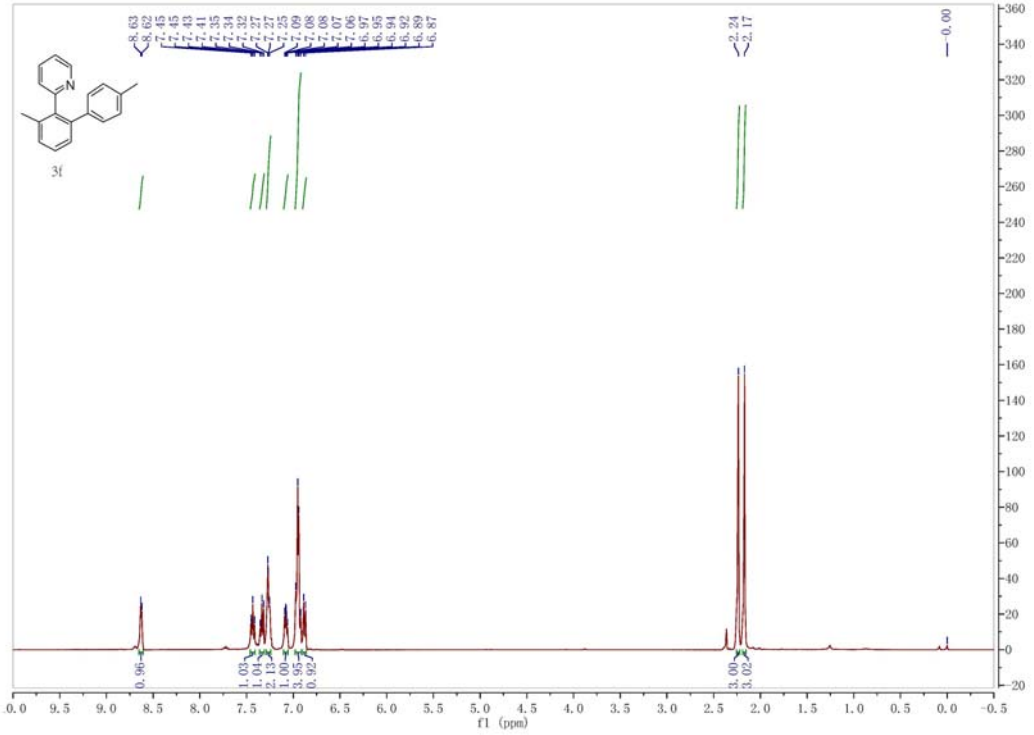
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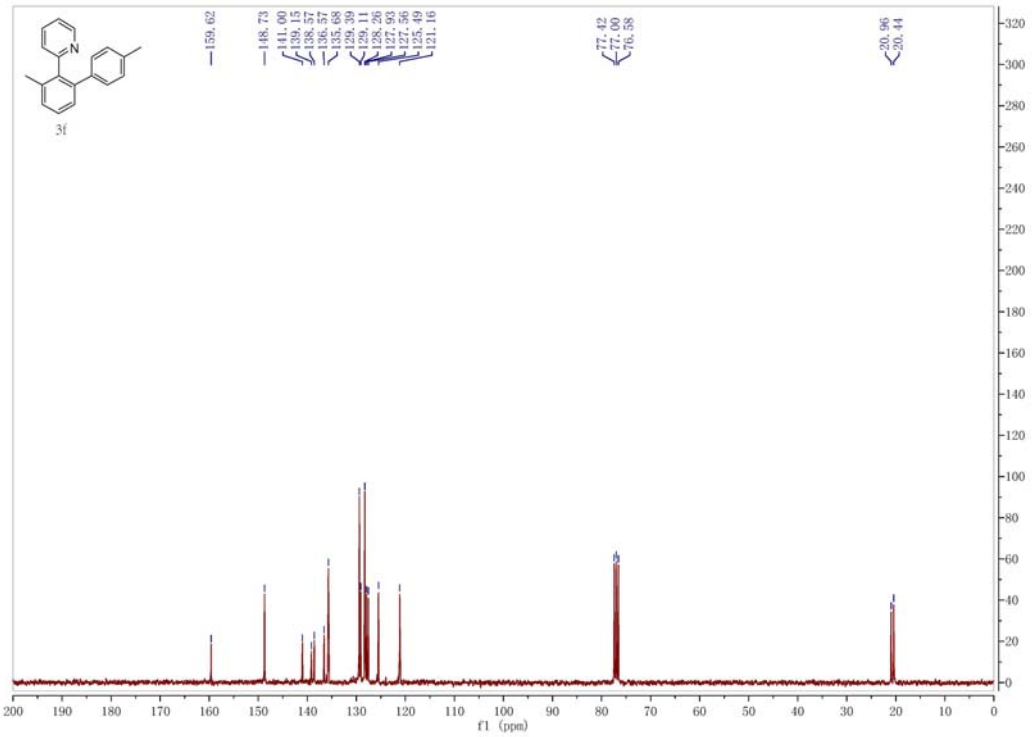
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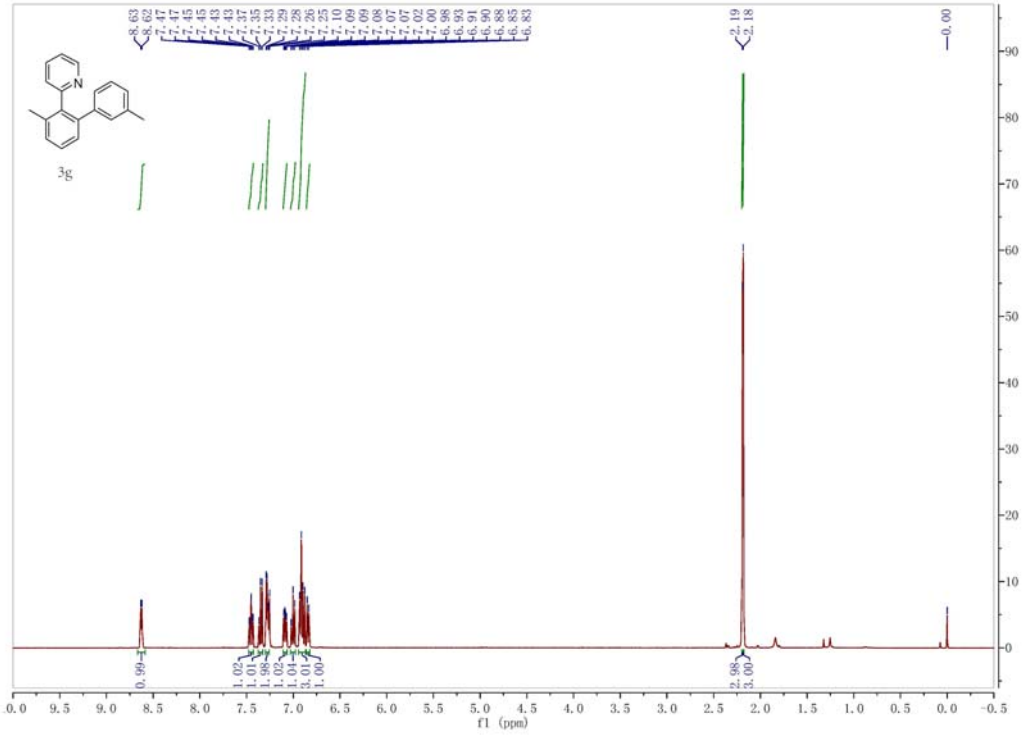
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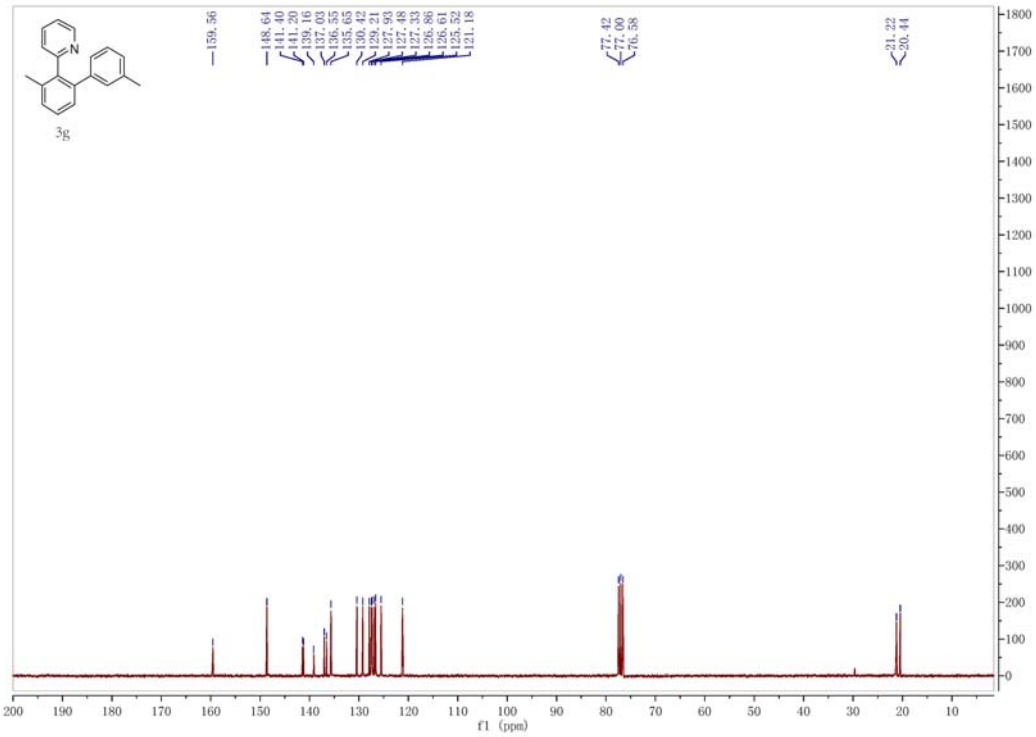
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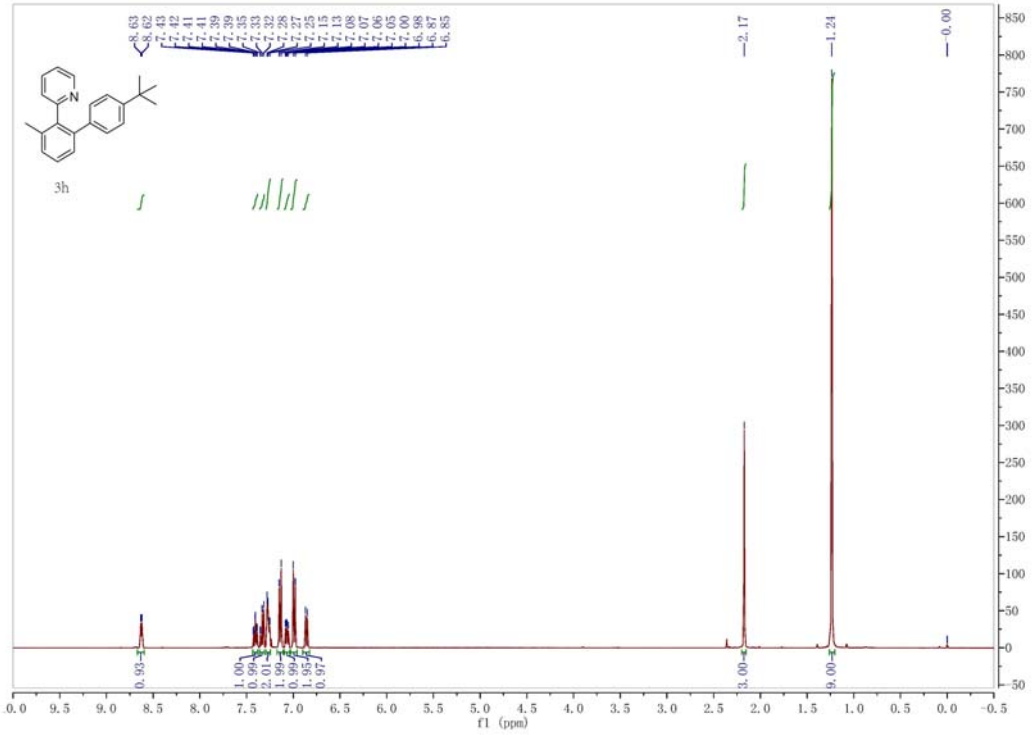
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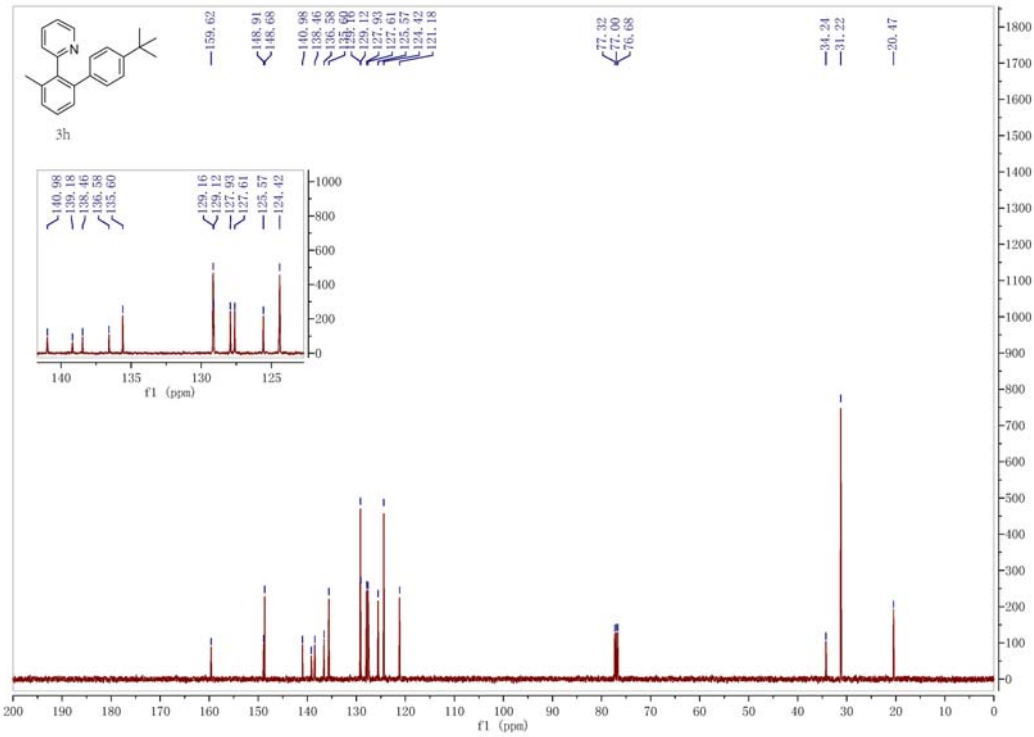
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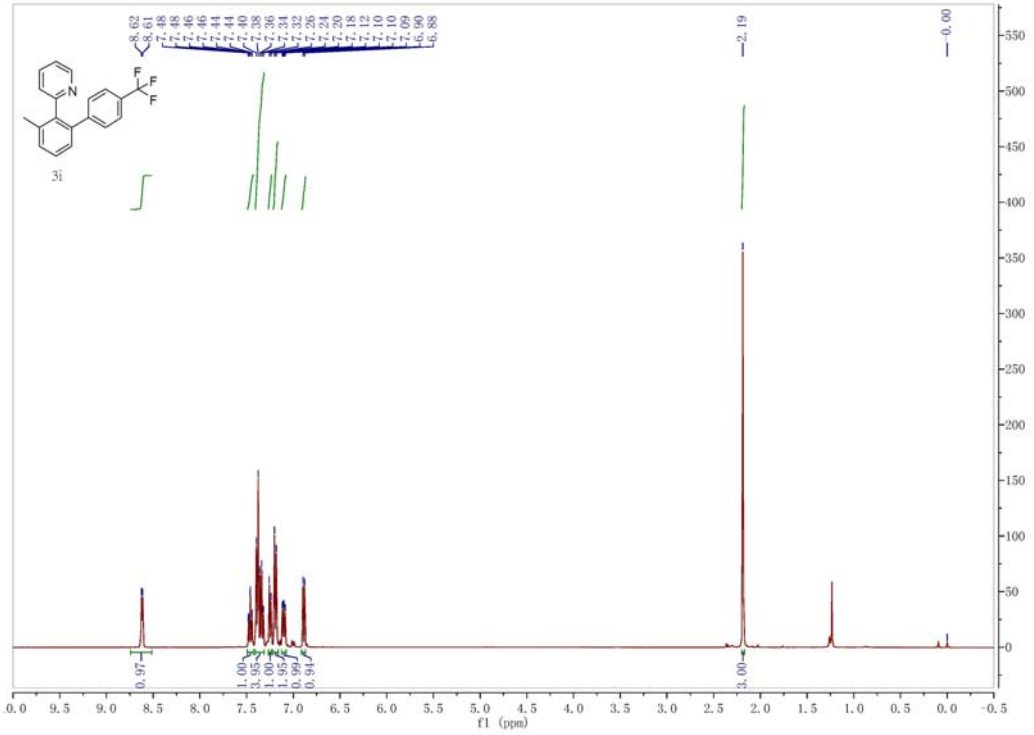
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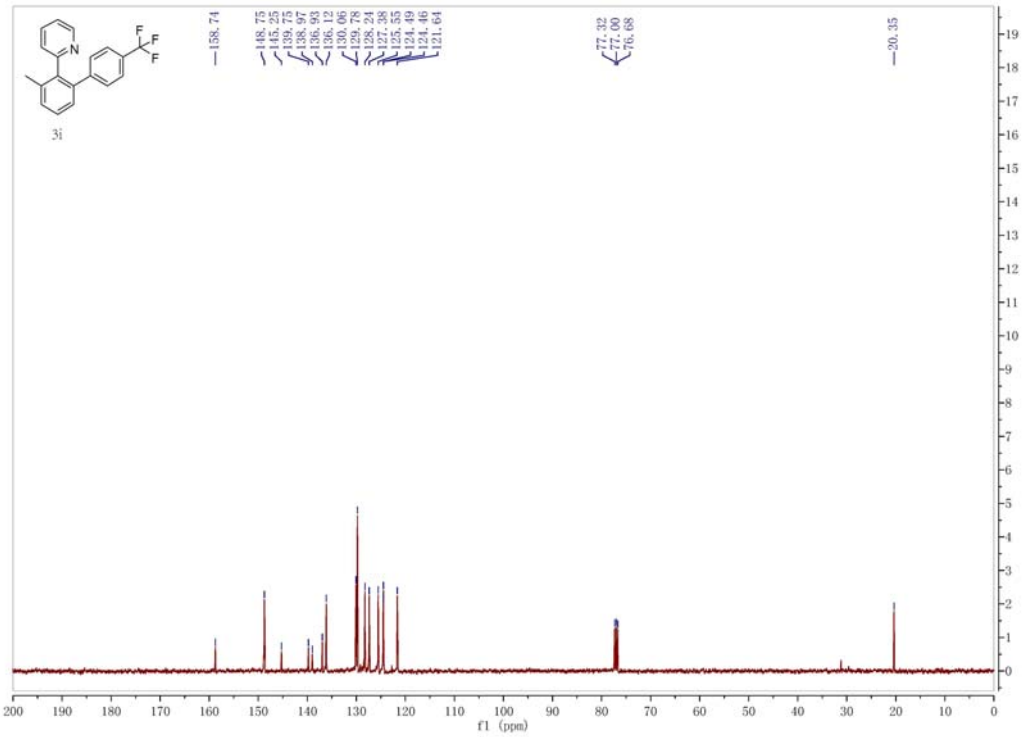
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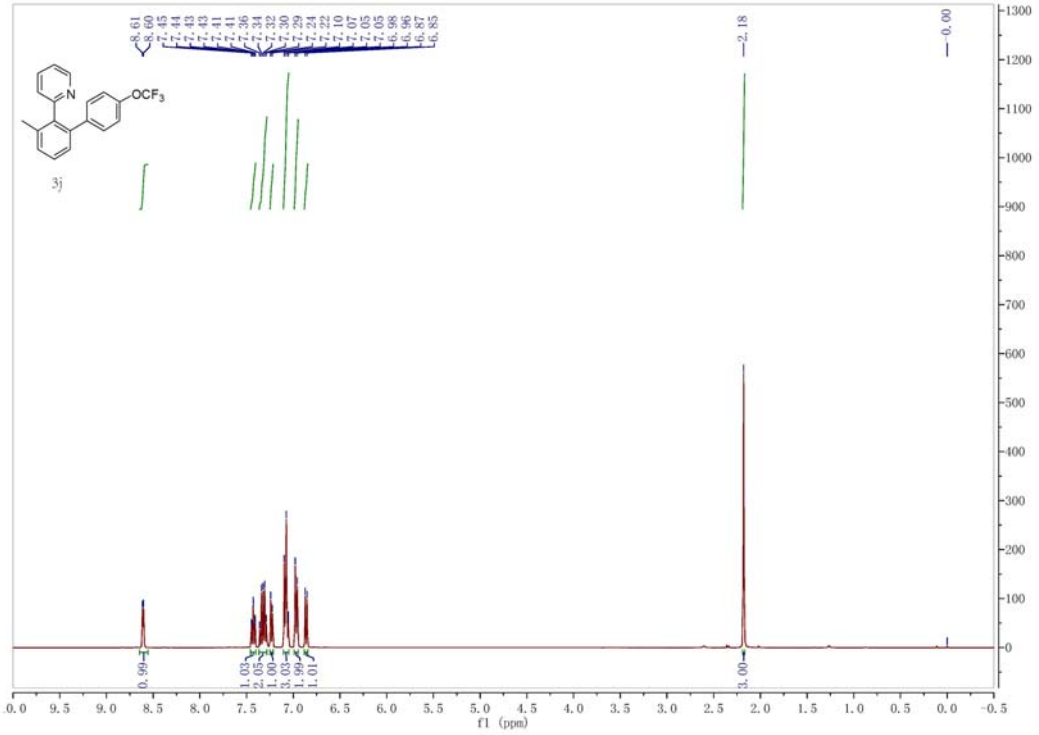
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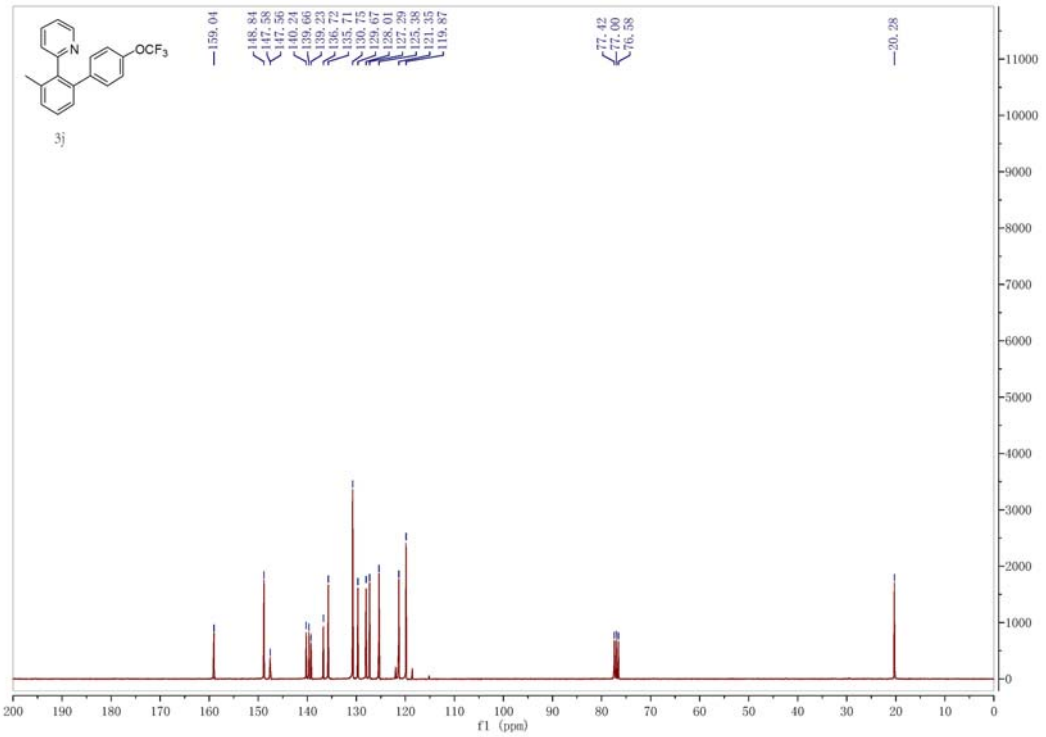
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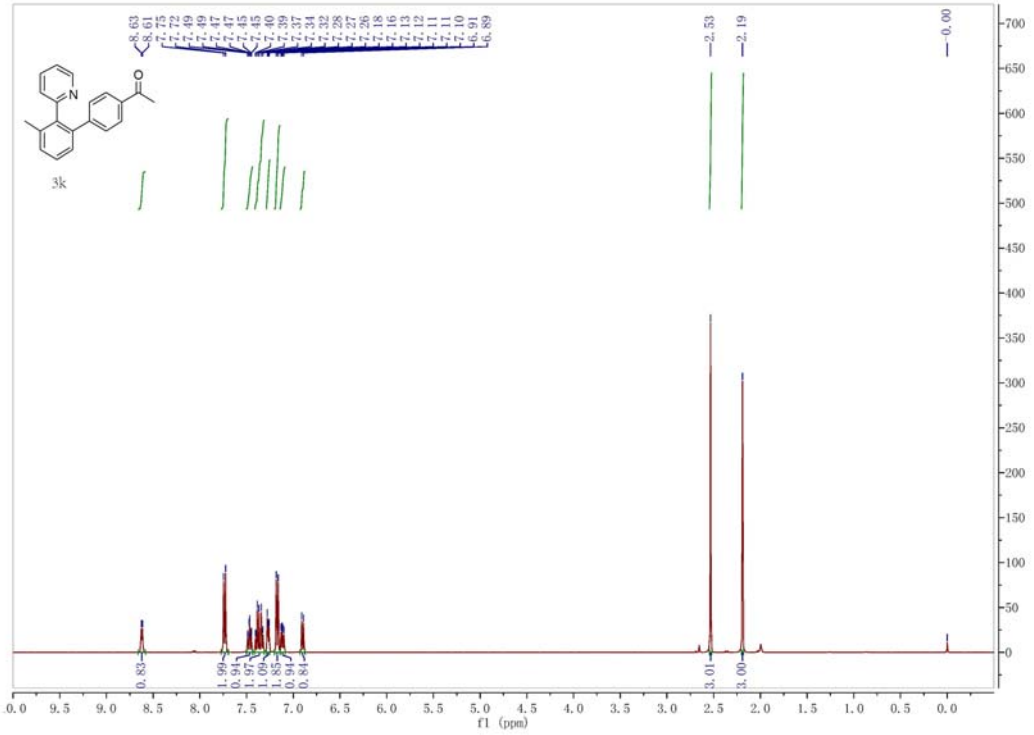
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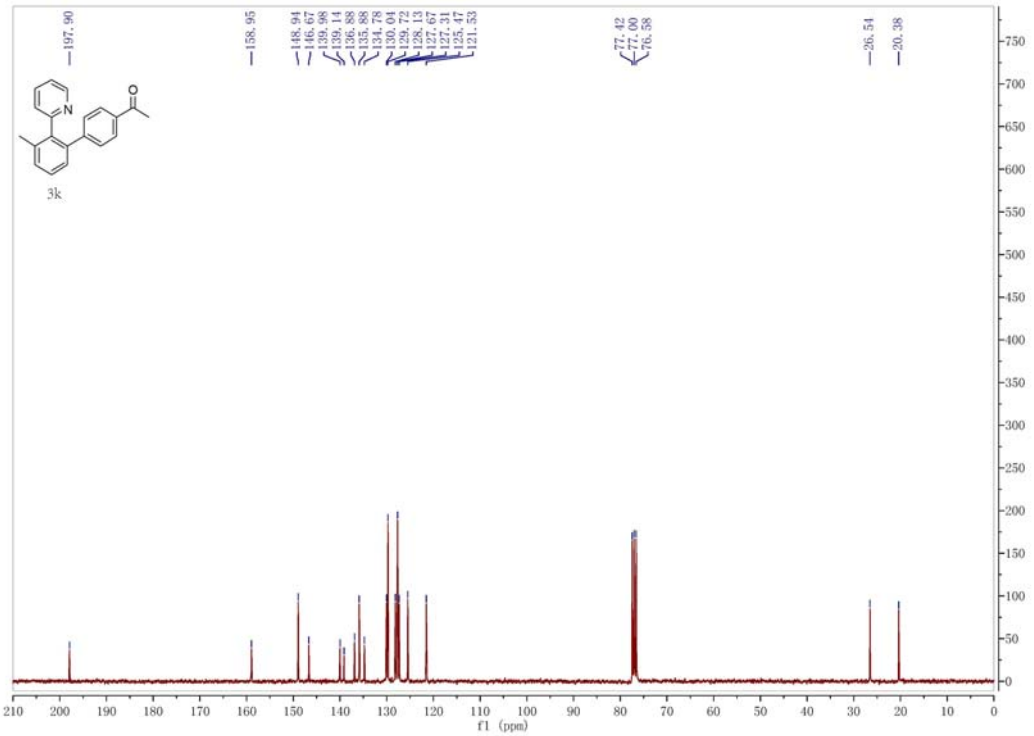
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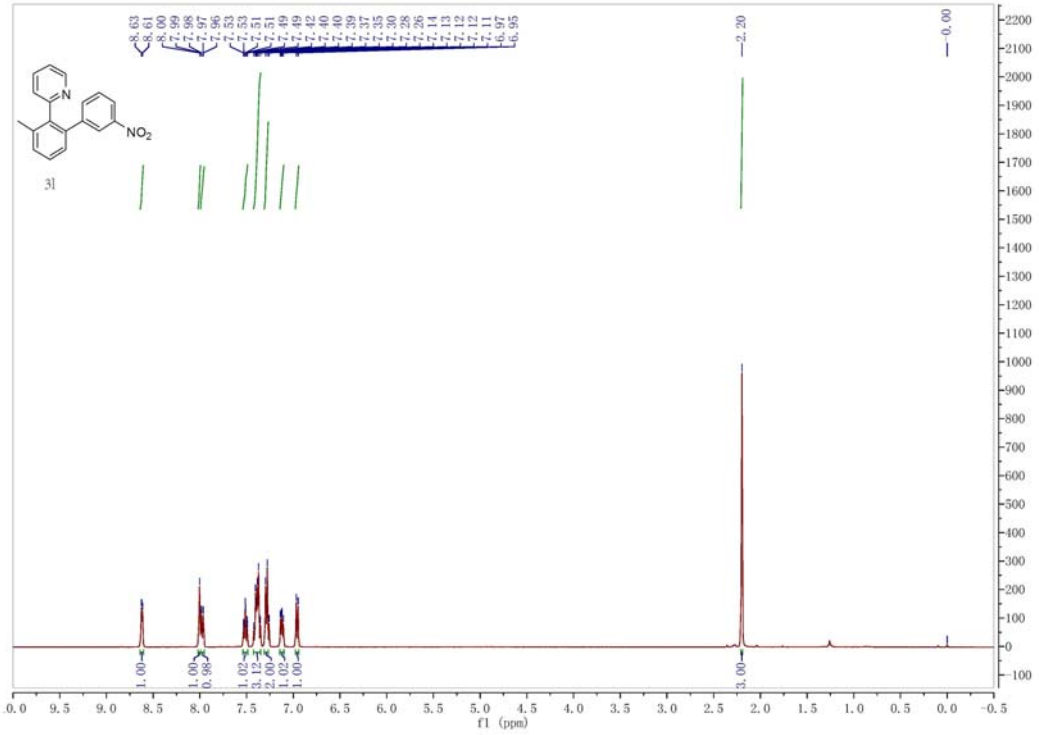
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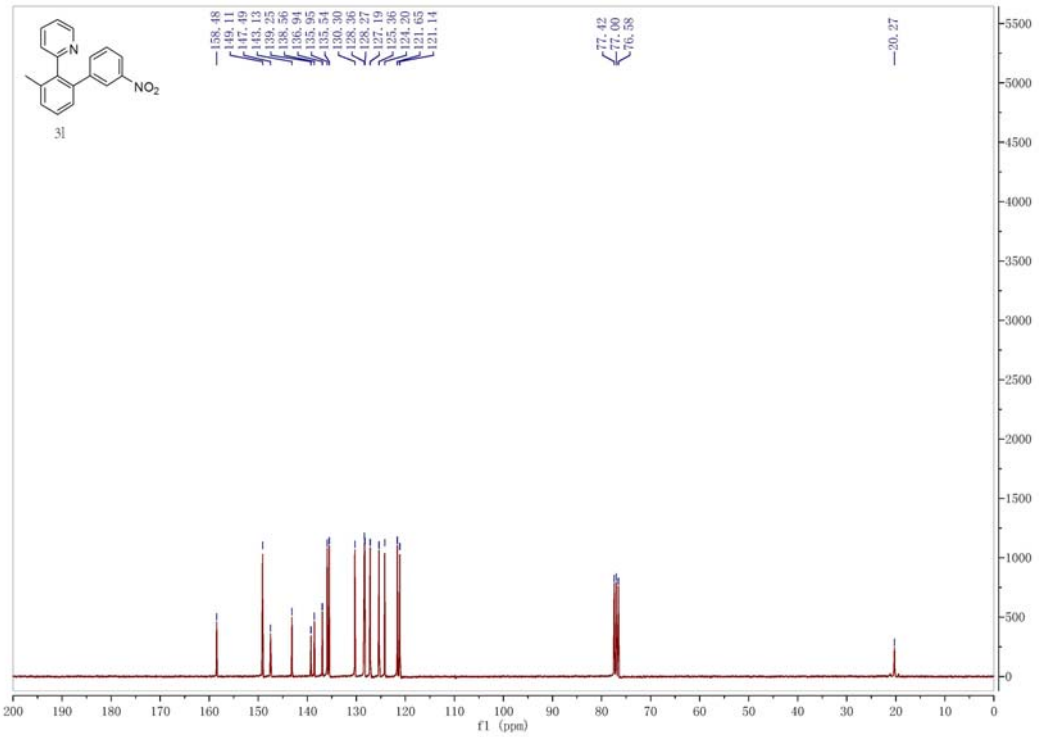
7.11
6.97
6.95
2.20
0.00
NO2
3l
1.00
1.00
0.99
1.02
3.12
2.00
1.02
1.00
3.00
f1 (ppm)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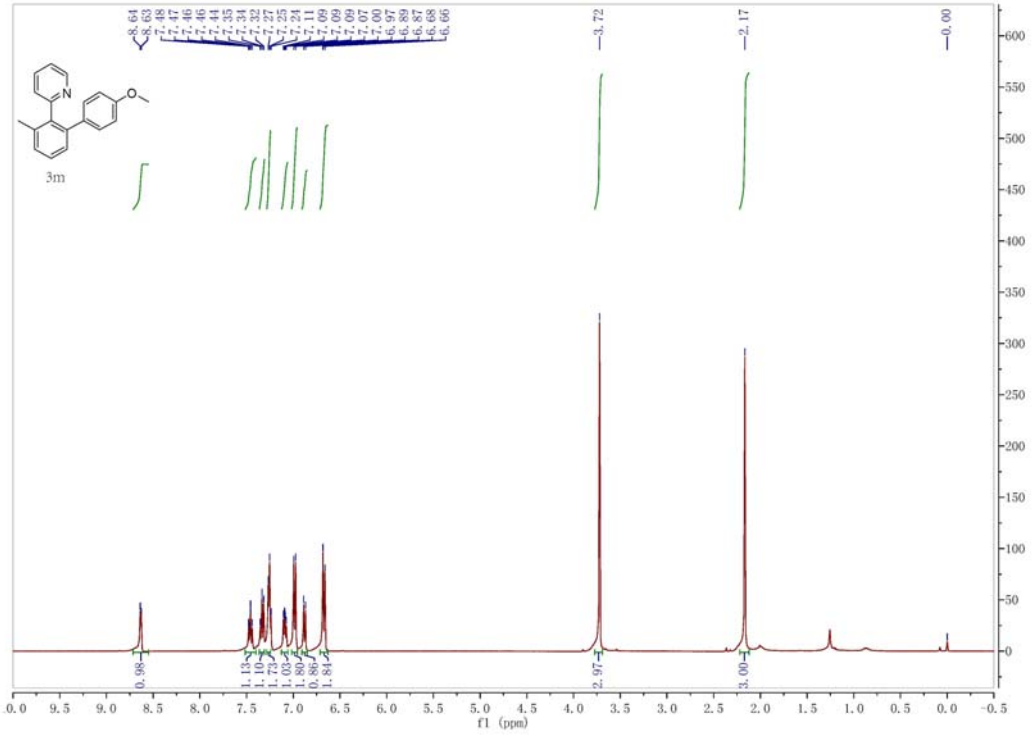
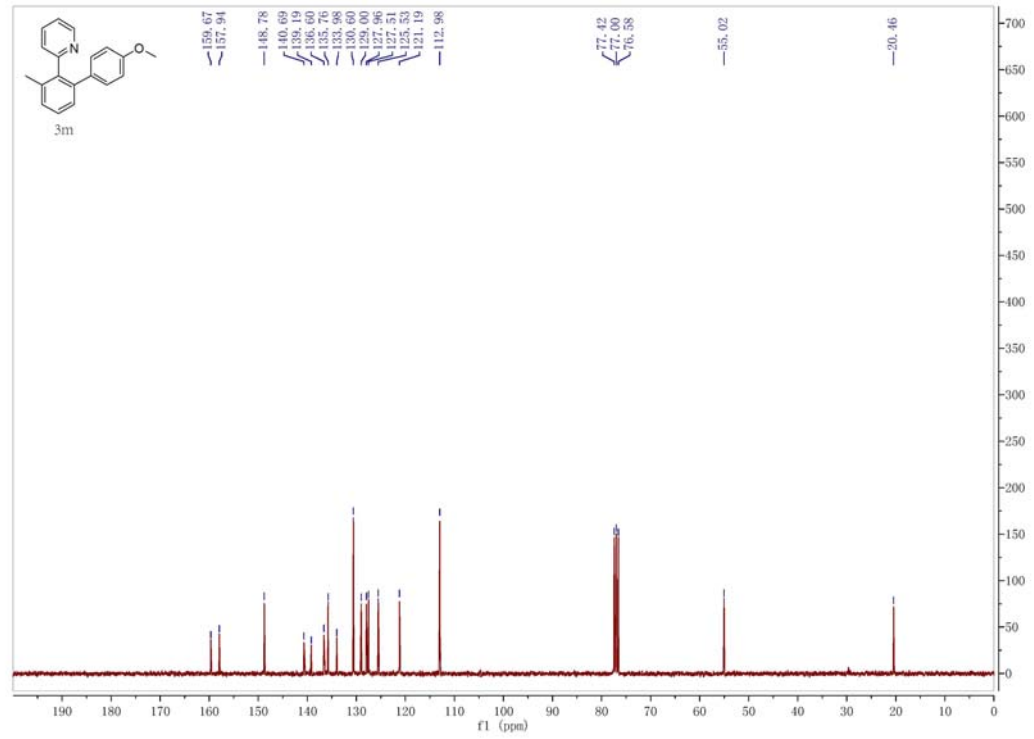
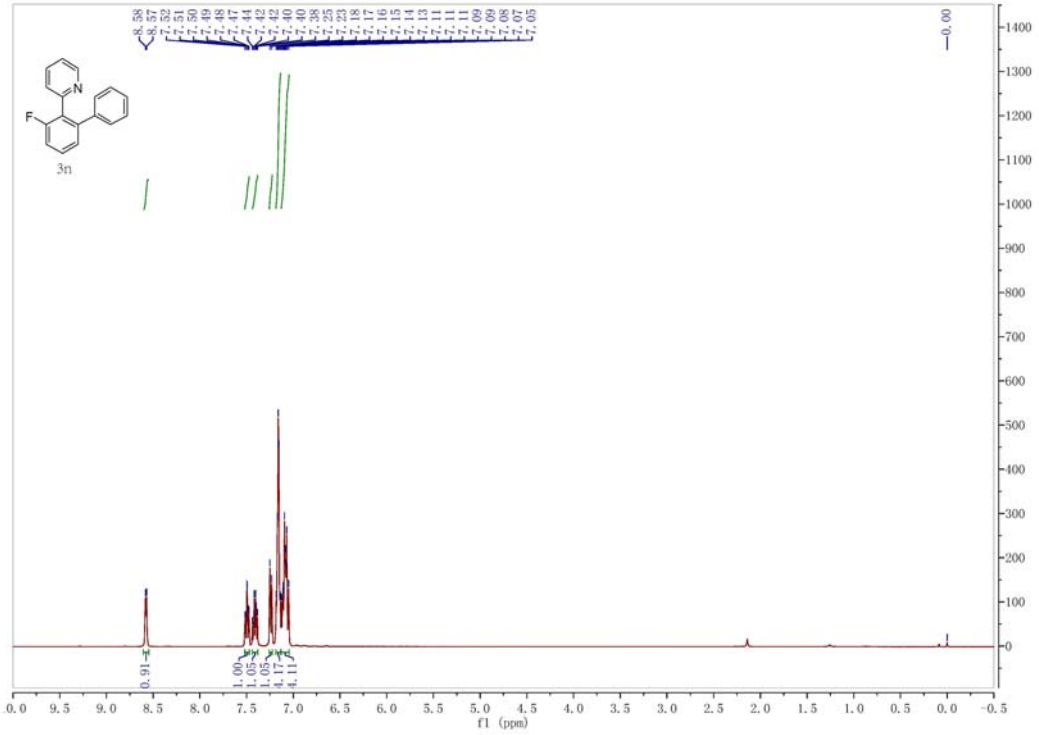
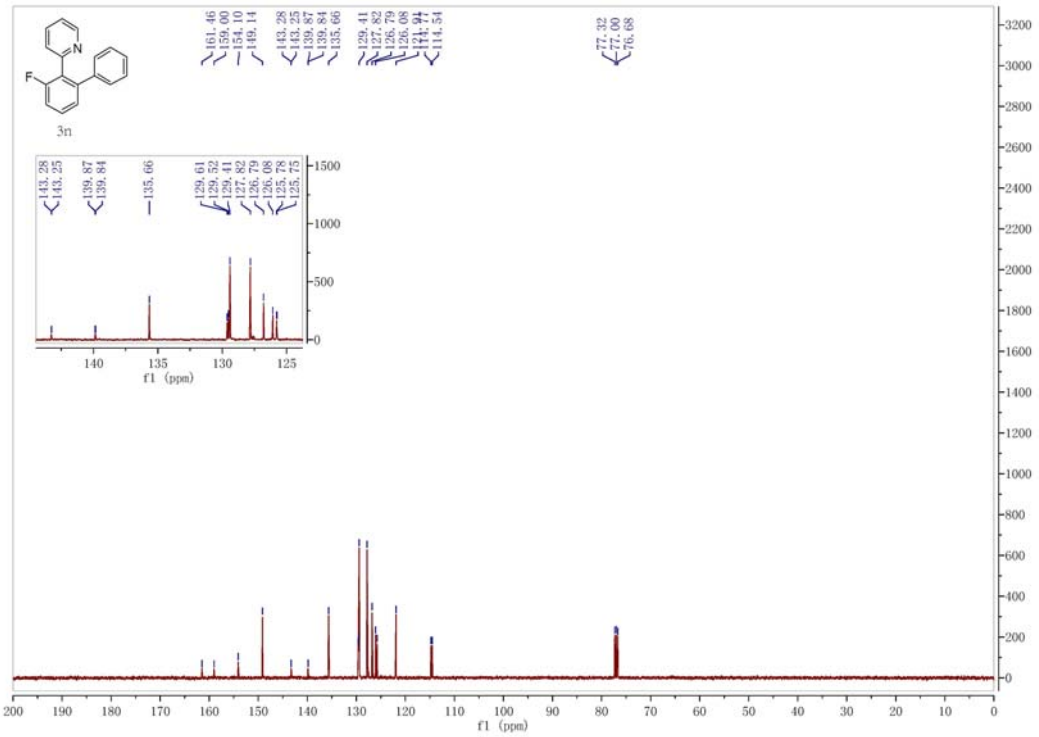
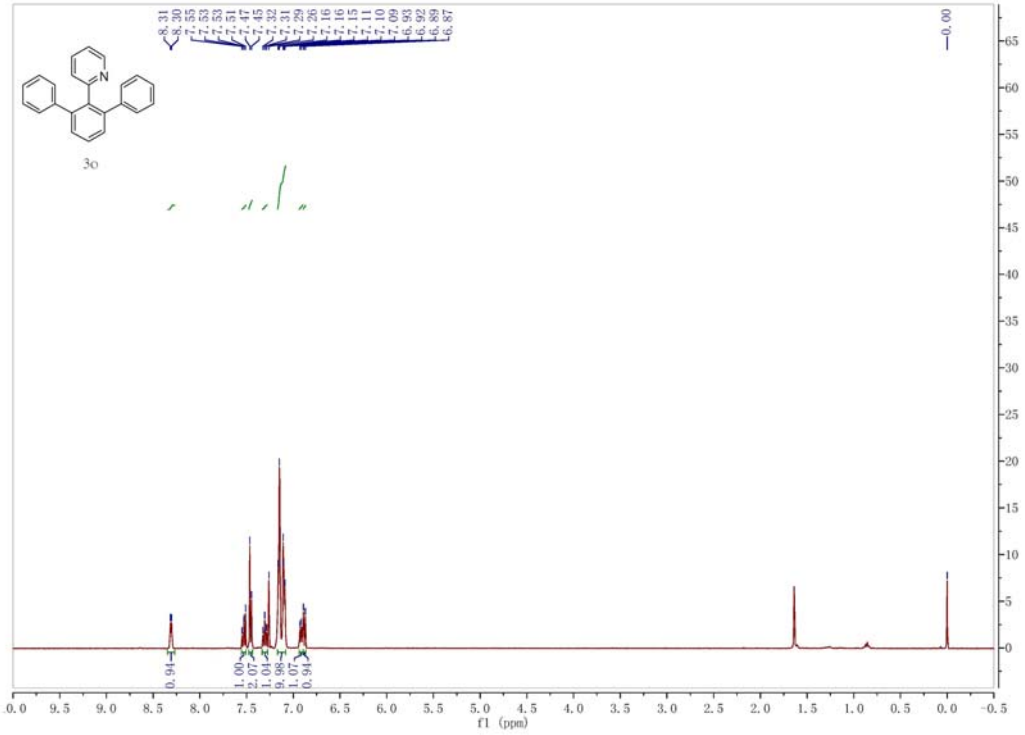
149.11
147.49
143.13
139.25
138.56
136.94
135.95
135.54
130.30
128.36
128.27
127.19
125.36
124.20
121.65
121.14
77.42
77.00
76.58
20.27
NO2
3l
f1 (ppm)

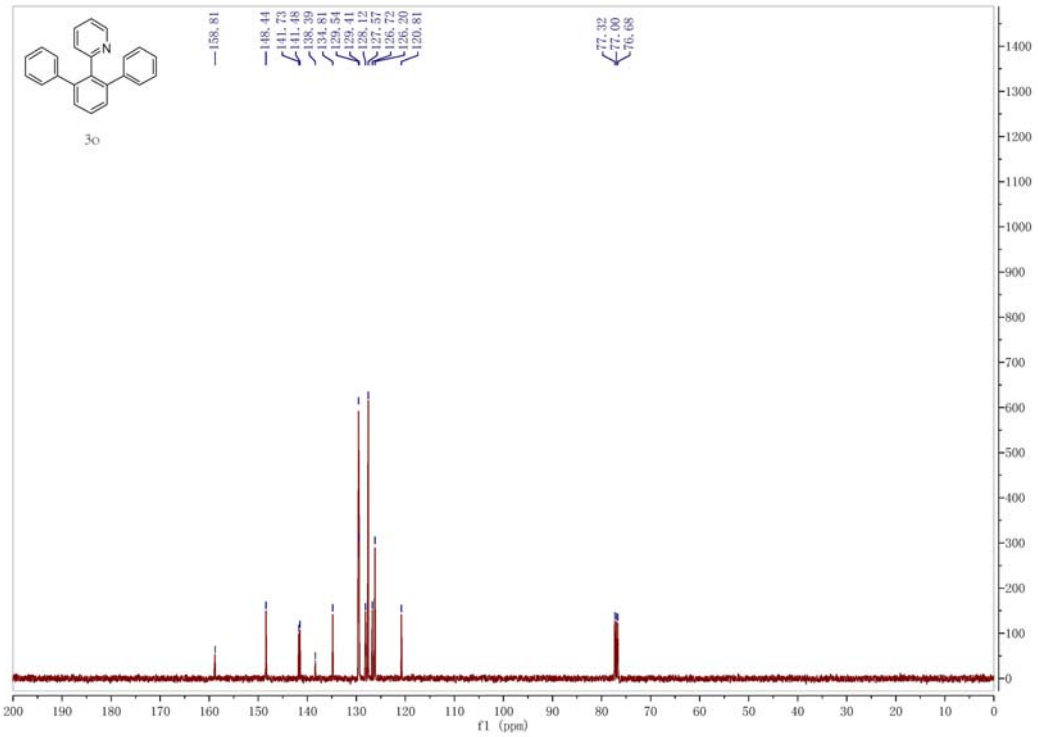

8.64
8.63
7.48
7.47
7.46
7.46
7.44
7.35
7.34
7.32
7.27
7.25
7.24
7.11
7.09
7.09
7.07
7.00
6.97
6.89
6.87
6.68
6.66
3.72
2.17
0.00
3m
0.98
1.13
1.10
1.73
1.03
1.80
0.86
1.84
2.97
3.00
f1 (ppm)

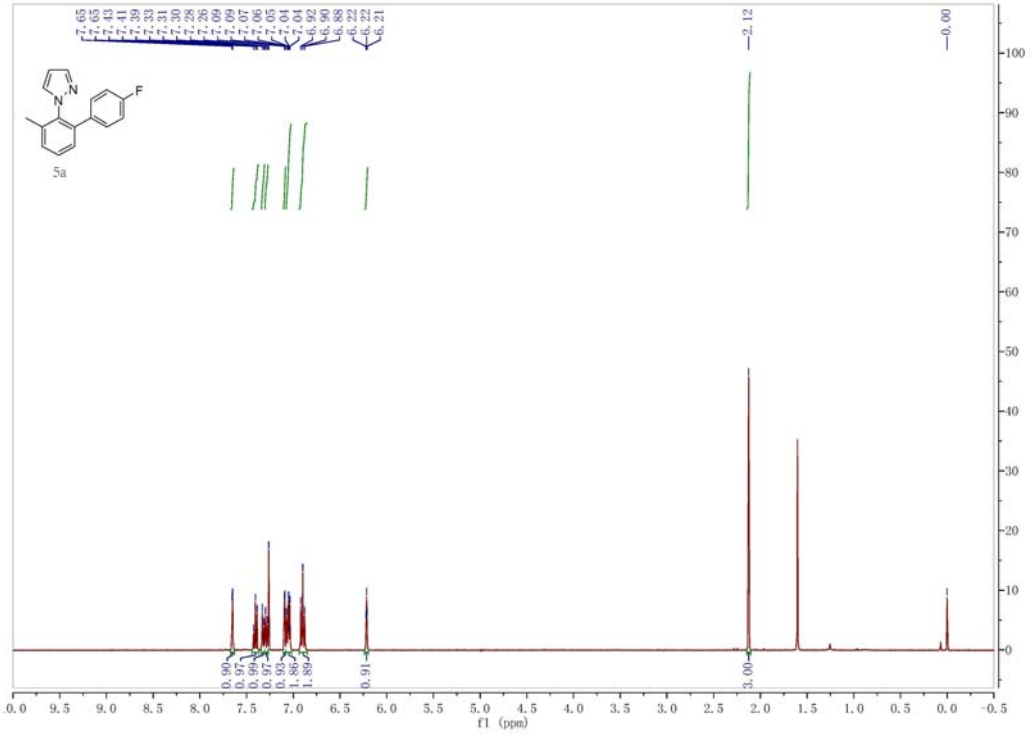

159.67
157.94
148.78
140.69
139.19
136.60
135.76
133.98
130.60
129.00
127.96
127.51
125.53
121.19
112.98
77.42
77.00
76.58
55.02
20.46
3m
f1 (ppm)

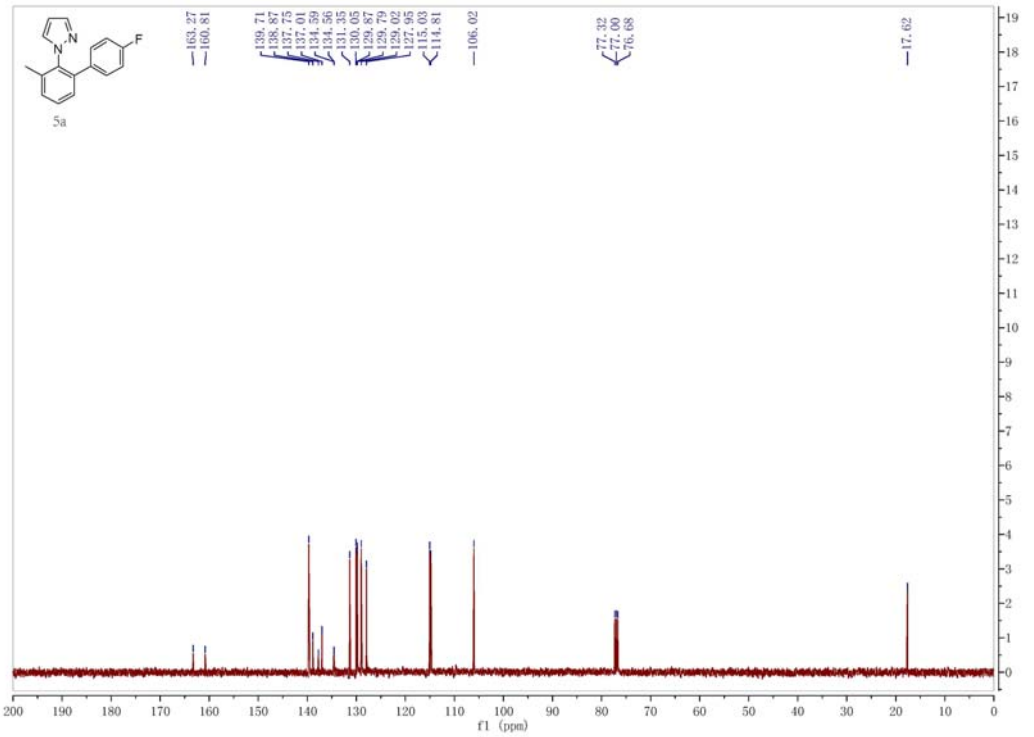

3n
f1 (ppm)

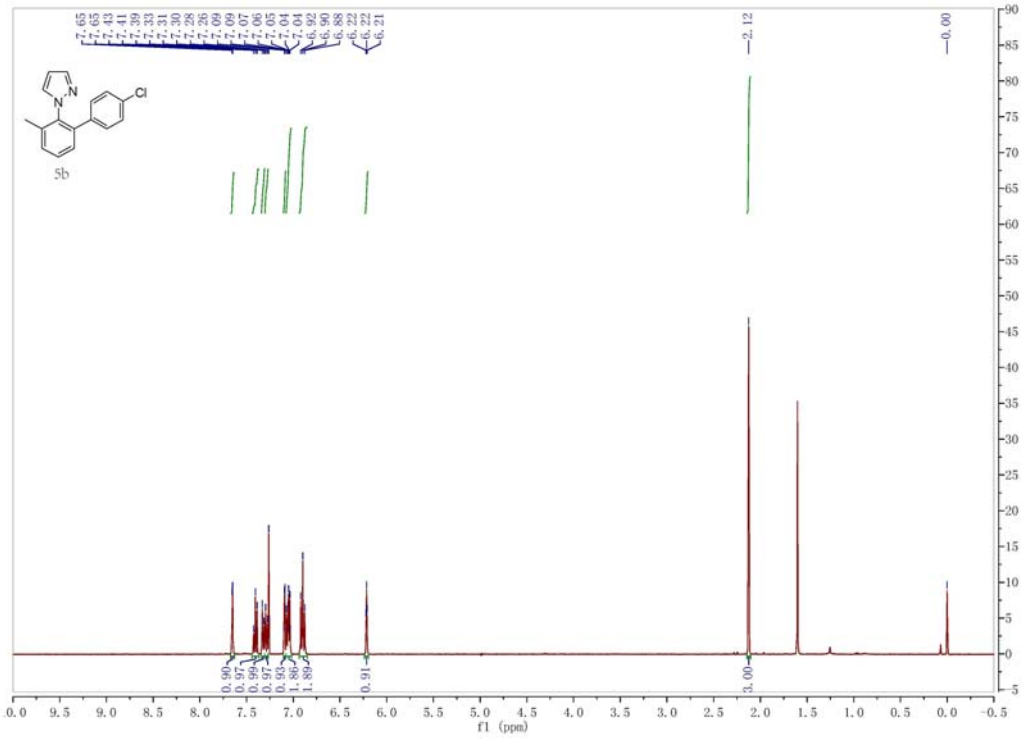

3n
f1 (ppm)
f1 (ppm)

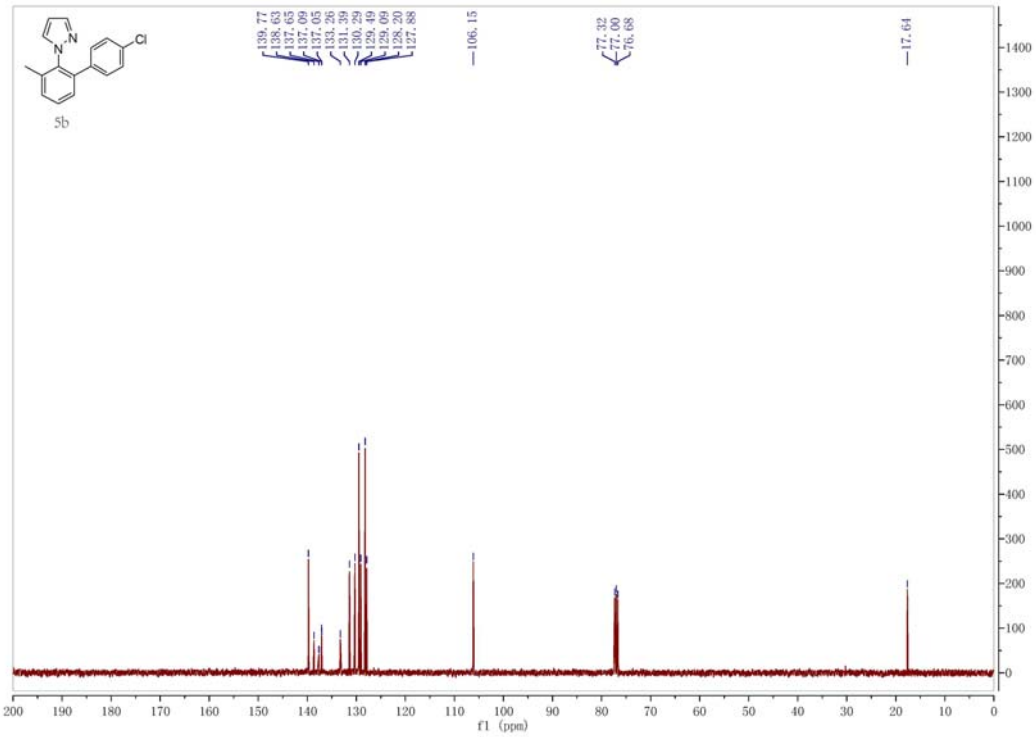

3o
8.31
8.30
7.55
7.53
7.53
7.51
7.47
7.45
7.32
7.31
7.29
7.26
7.16
7.16
7.15
7.11
7.10
7.09
6.93
6.92
6.89
6.87
0.00
0.94
1.00
2.07
1.04
9.98
1.07
0.94
f1 (ppm)

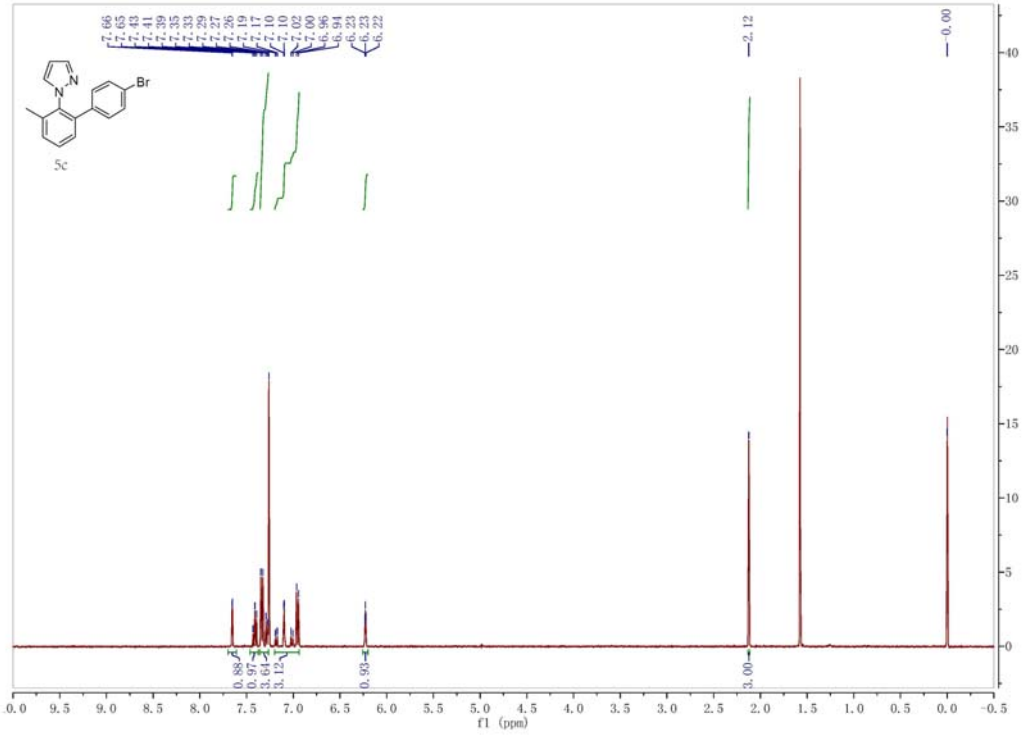

3o
158.81
148.44
141.73
141.48
138.39
134.81
129.54
129.41
128.12
127.57
126.72
126.20
120.81
77.32
77.00
76.68
f1 (ppm)

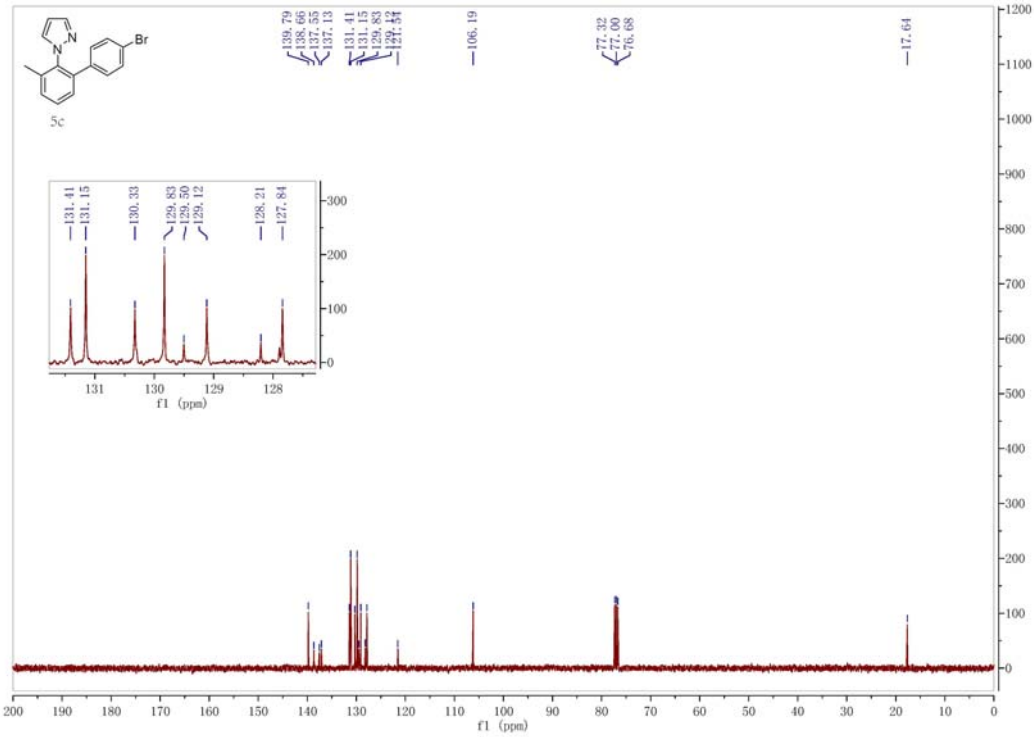

7.65
7.63
7.43
7.41
7.39
7.33
7.31
7.30
7.28
7.26
7.09
7.07
7.06
7.05
7.04
7.04
6.92
6.90
6.88
6.22
6.22
6.21
2.12
0.00
5a
F
0.90
0.97
0.99
0.97
0.93
1.86
1.89
0.91
3.00
f1 (ppm)


163.27
160.81
139.71
138.87
137.75
137.01
134.59
134.56
131.35
130.05
129.87
129.79
129.02
127.95
115.03
114.81
106.02
77.32
77.00
76.68
17.62
5a
F
f1 (ppm)


7.65
7.63
7.43
7.41
7.39
7.33
7.31
7.30
7.28
7.26
7.09
7.07
7.06
7.05
7.04
7.04
6.92
6.90
6.88
6.22
6.22
6.21
2.12
0.00
Cl
5b
0.90
0.97
0.99
0.97
0.93
1.86
1.89
0.91
3.00
f1 (ppm)


139.77
138.63
137.65
137.09
137.05
133.26
131.39
130.29
129.49
129.09
128.20
127.88
106.15
77.32
77.00
76.68
17.64
Cl
5b
f1 (ppm)


7.66
7.65
7.43
7.41
7.39
7.35
7.33
7.29
7.27
7.26
7.19
7.17
7.10
7.02
7.00
6.96
6.94
6.23
6.22
2.12
0.00
Br
5c
0.88
0.97
3.64
3.12
0.93
3.00
f1 (ppm)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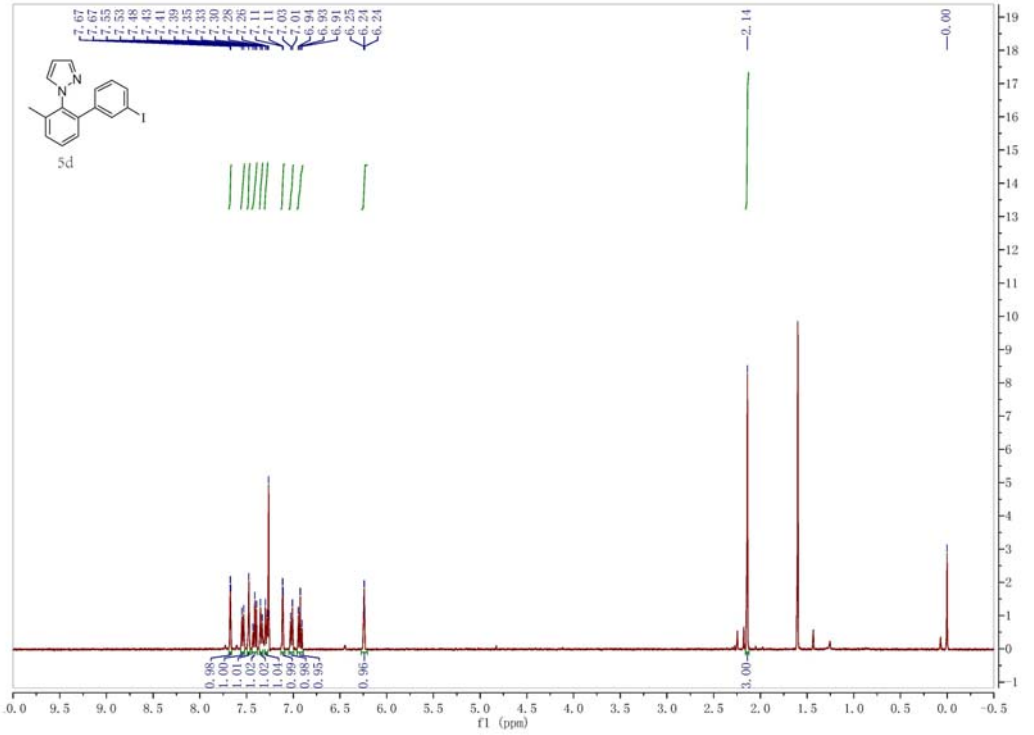
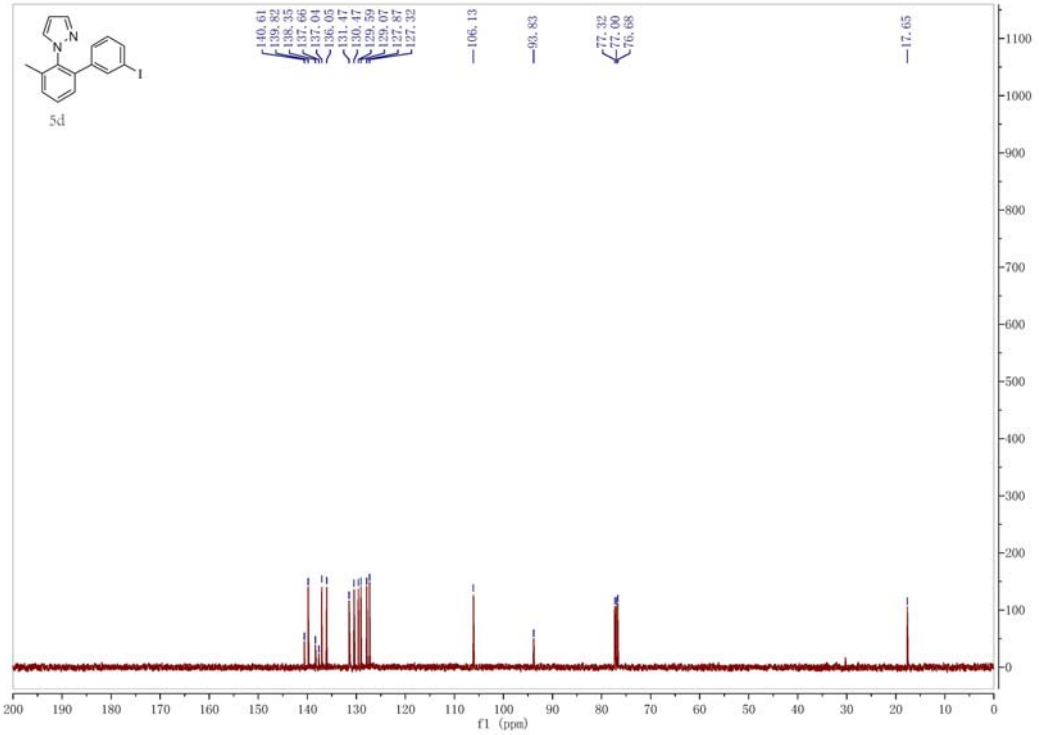
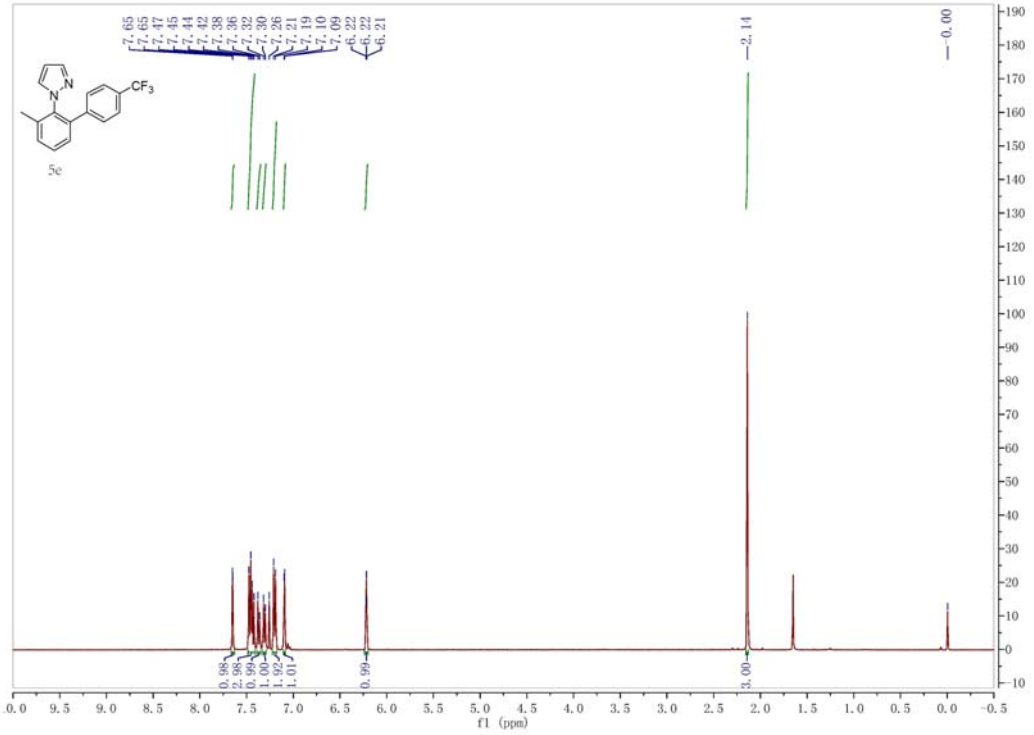
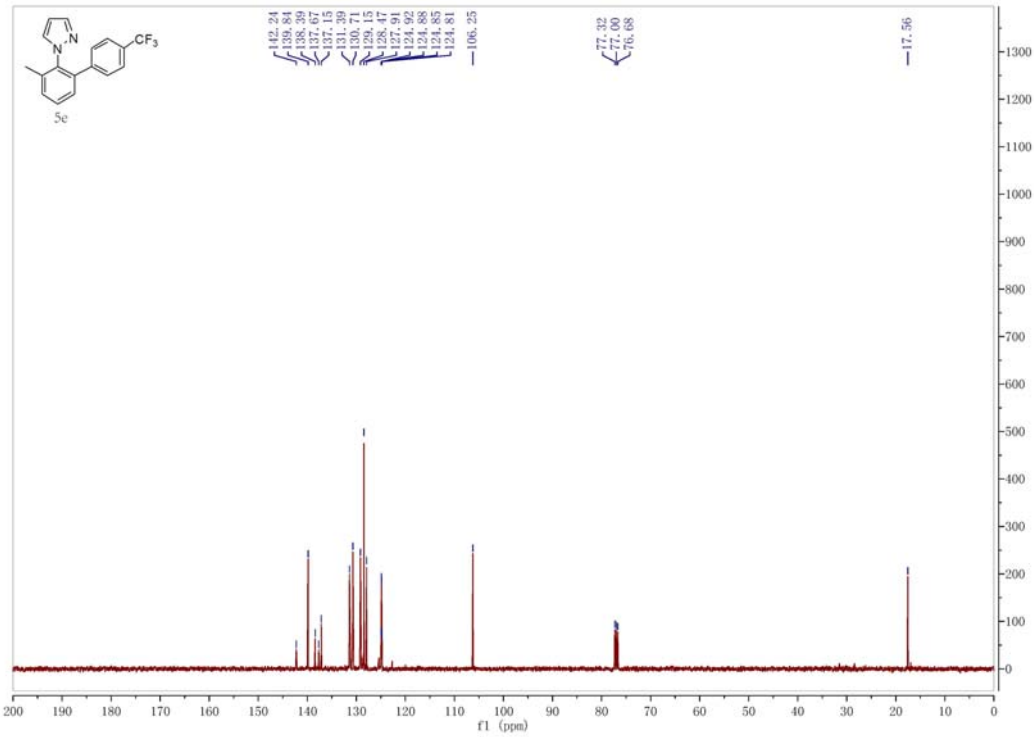
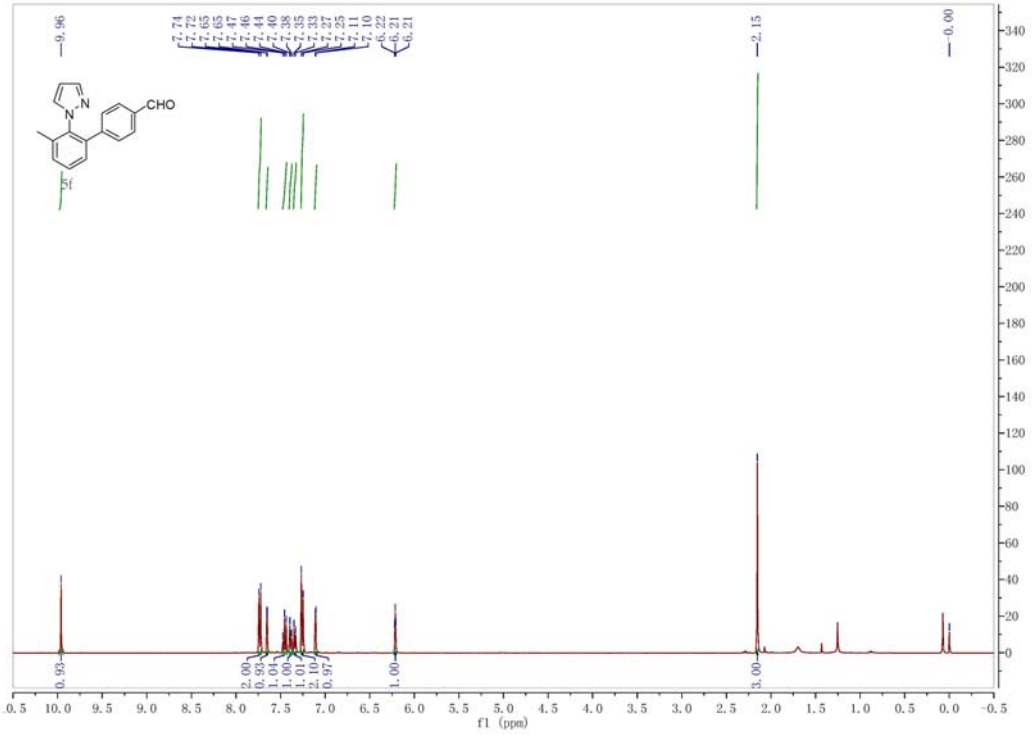
138.66
137.55
137.13
131.41
131.15
129.83
129.50
127.54
106.19
77.32
77.00
76.68
17.64
Br
5c
131.41
131.15
130.33
129.83
129.50
129.12
128.21
127.84
f1 (ppm)

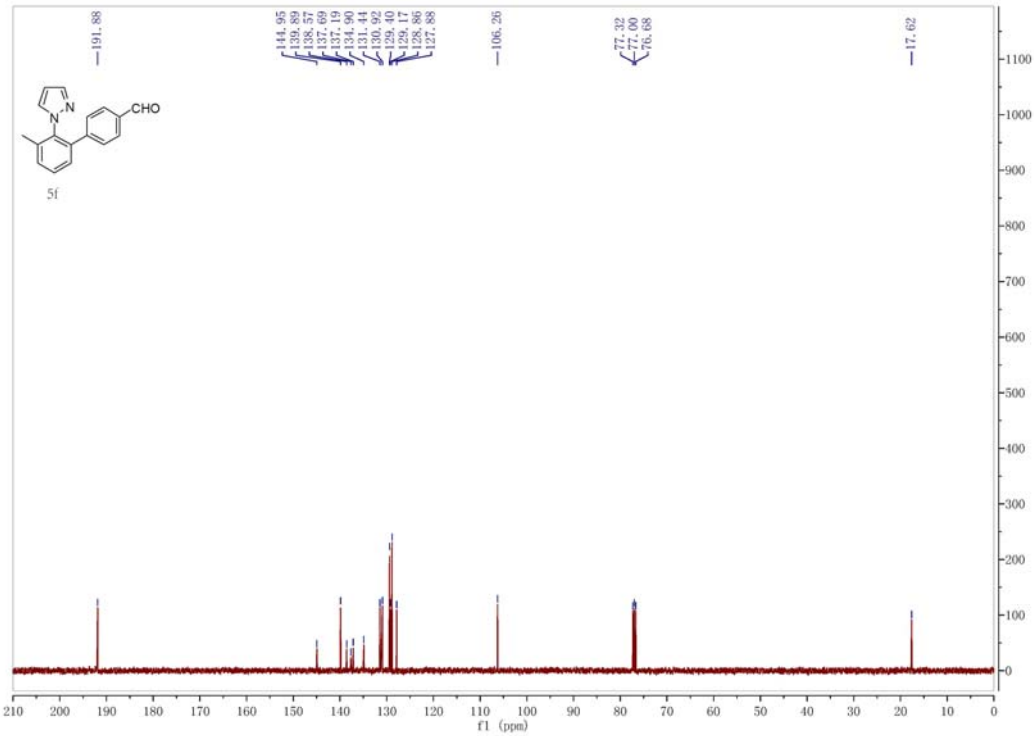

5d
f1 (ppm)


5d
f1 (ppm)


7.65
7.65
7.47
7.45
7.44
7.42
7.38
7.36
7.32
7.30
7.26
7.21
7.19
7.10
7.09
6.22
6.22
6.21
2.14
0.00
CF3
5e
0.98
2.98
0.99
1.00
1.92
1.01
0.99
3.00
f1 (ppm)


142.24
139.84
138.39
137.67
137.15
131.39
130.71
129.15
128.47
127.91
124.92
124.88
124.85
124.81
106.25
77.32
77.00
76.68
17.56
CF3
5e
f1 (ppm)


9.96
7.74
7.72
7.65
7.65
7.47
7.46
7.44
7.40
7.38
7.35
7.33
7.27
7.25
7.11
7.10
6.22
6.21
6.21
2.15
0.00
CHO
5f
0.93
2.00
0.93
1.04
1.00
1.01
2.10
0.97
1.00
3.00
f1 (ppm)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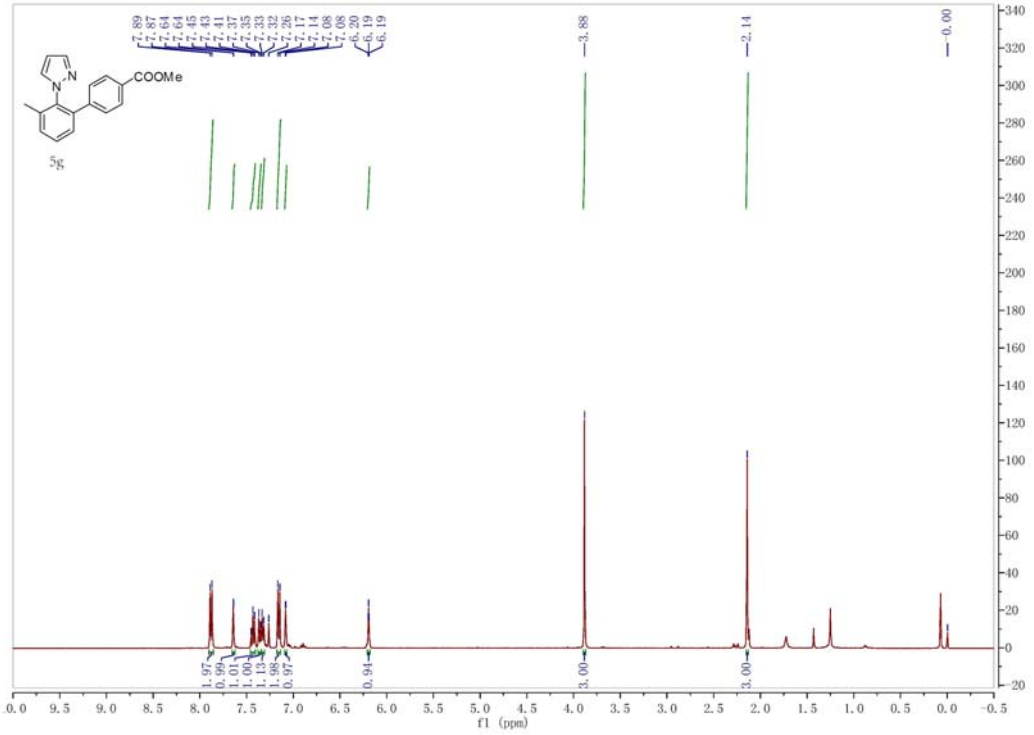
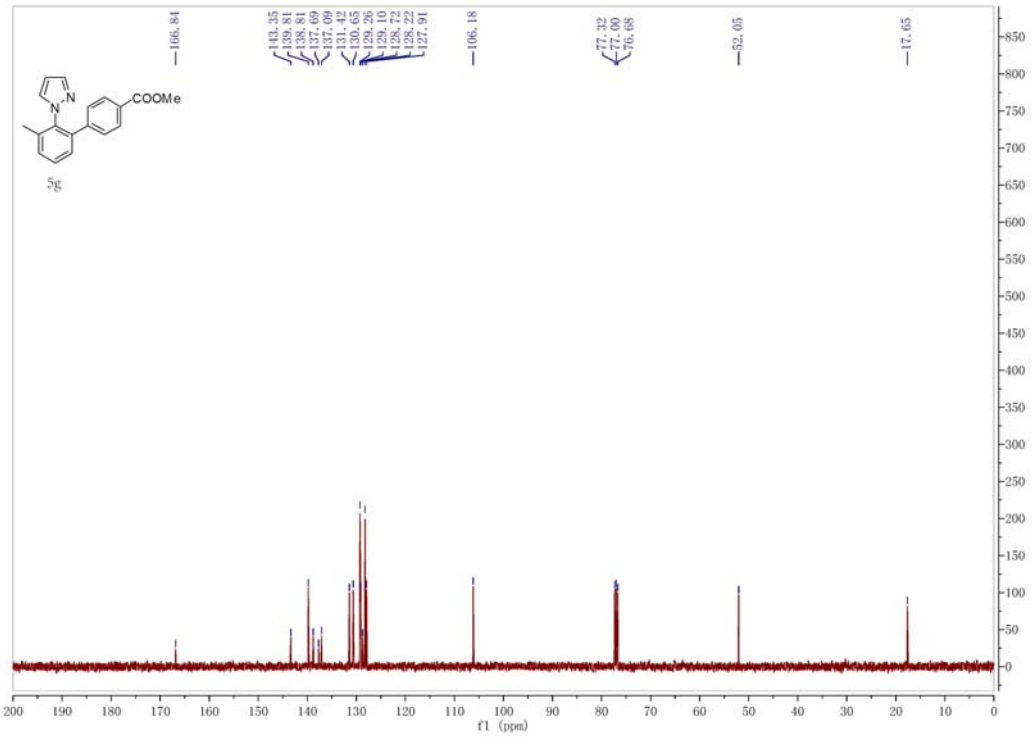
144.95
139.89
138.57
137.69
137.19
134.90
131.44
130.92
129.40
129.17
128.86
127.88
106.26
77.32
77.00
76.68
17.62
CHO
5f
f1 (ppm)


7.89
7.87
7.64
7.45
7.43
7.41
7.37
7.35
7.33
7.32
7.26
7.17
7.14
7.08
7.08
6.20
6.19
6.19
3.88
2.14
0.00
COOMe
5g
1.97
0.99
1.01
1.00
1.13
1.98
0.97
0.94
3.00
3.00
f1 (ppm)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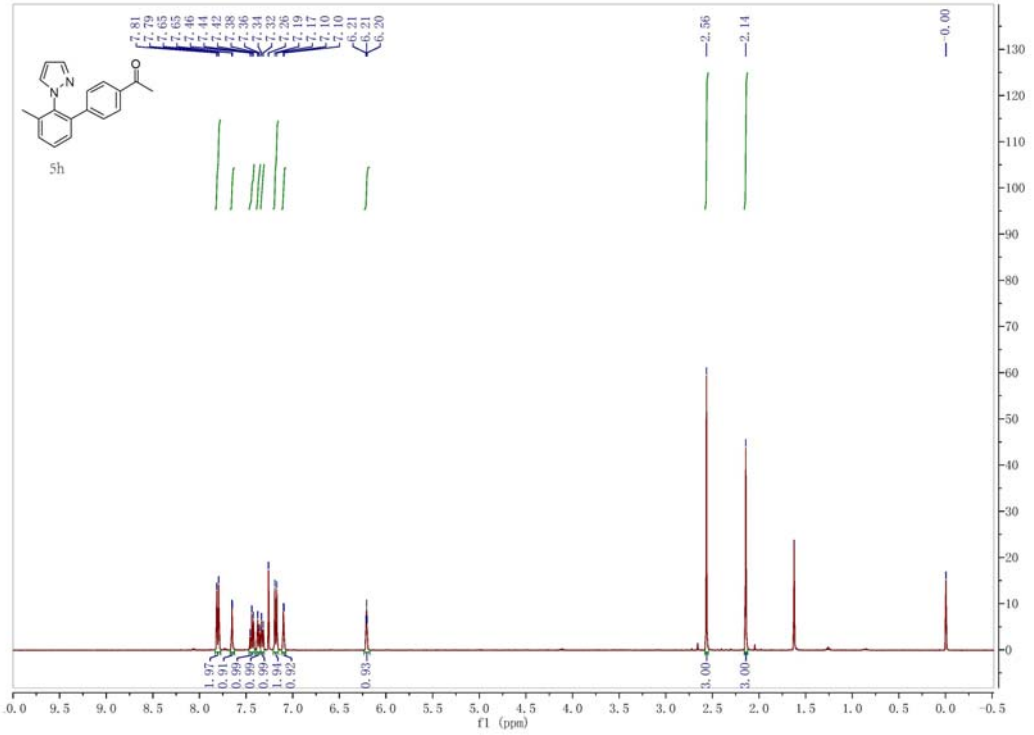
143.35
139.81
138.81
137.69
137.09
131.42
130.65
129.26
129.10
128.72
128.22
127.91
106.18
77.32
77.00
76.68
52.05
17.65
COOMe
5g
f1 (ppm)


7.81
7.79
7.65
7.46
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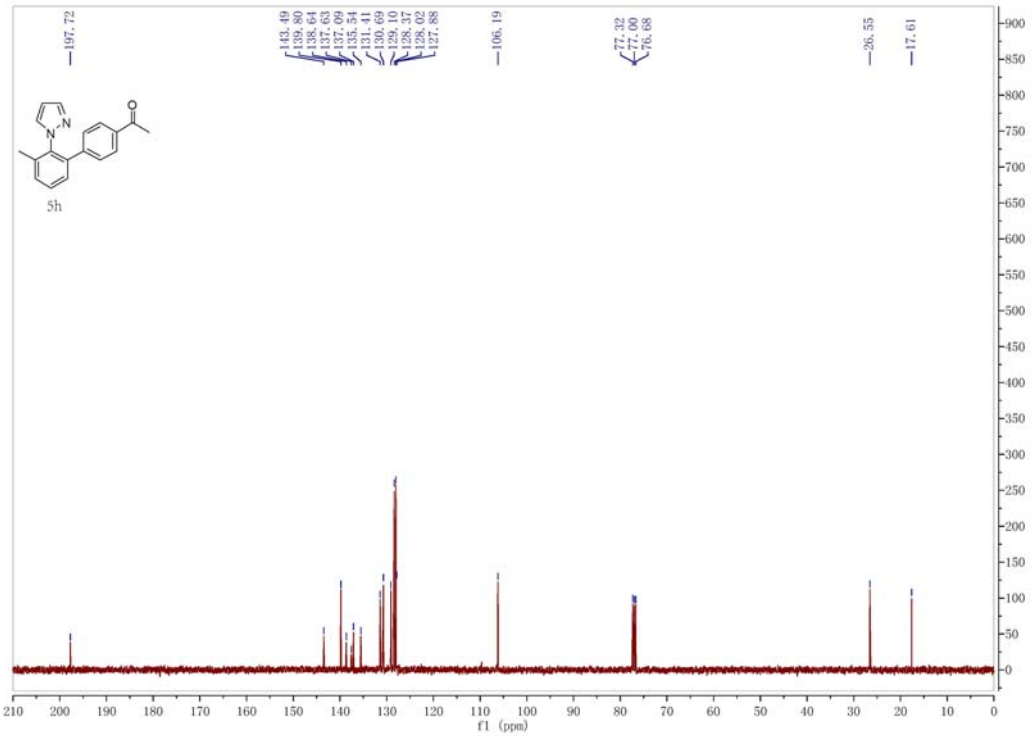
7.42
7.38
7.36
7.34
7.32
7.26
7.19
7.17
7.10
6.21
6.21
6.20
2.56
2.14
0.00
5h
1.97
0.91
0.99
0.99
0.99
1.94
0.92
0.93
3.00
3.00
f1 (ppm)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143.49
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137.63
137.09
135.54
131.41
130.69
129.10
128.37
128.02
127.88
106.19
77.32
77.00
76.68
26.55
17.61
5h
f1 (ppm)