Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information

Photochemical Regioselective C–H Arylation of imidazo[1, 2-*a*]pyridine derivatives using Chlorophyll as biocatalyst and Diazonium Salts

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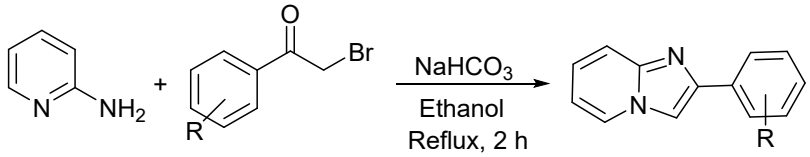
1. General remarks

All chemicals were purchased from Merck and Fluka companies. All yields refer to isolated products. ^{1}HNMR and ^{13}CNMR spectra were recorded on a Brucker, Rheinstetten, Germany NMR spectrometer (at 400 MHz) using tetramethylsilane (TMS) as internal standard. Melting points were determined in a capillary tube and are not corrected. The progress of the reaction was followed with TLC using silica gel SILG/UV 254 and 365 plates. All products are known compounds and their structures were deduced by ^{1}H and ^{13}C NMR spectroscopy.

2. General experimental details

2-1. Synthesis of imidazo[1, 2-*a*]pyridine derivatives[1]

A suspension of 2-aminopyridine (1.0 mmol), phenacylbromide (1 equiv.) and $NaHCO_3$ (2.5 equiv.) in ethanol (10 mL) was stirred at reflux condition for 2 h. The solution was evaporated and then 10 ml CH_2Cl_2 was added, the organic phase was washed with H_2O (3 × 10 mL), dried over anhydrous $MgSO_4$ and concentrated in vacuum to give imidazo[1,2-*a*]pyridine derivatives as light brown solids.



2-2. General procedure for the preparation of aryl diazonium tetra fluoroborates[2]

The appropriate aniline (10 mmol) was dissolved in a mixture of 4 mL of distilled water and 3.4 mL of 50% hydro fluoro boric acid. After cooling the reaction mixture to 0°C, using ice bath and the sodium nitrite (0.69 g in 1.5 mL) was added dropwise in 5 min interval of time. The resulting mixture was stirred for 40 min and the precipitate was collected by filtration and re-dissolved in minimum amount of acetone. Diethyl ether was added until precipitation of diazonium

[1] (a) S. A. Laufer, D. R. J. Hauser and A. J. Liedtke, *Synthesis* 2008, 253. (b) G. Kumar and G. R. N. Chinna, *J. Heterocycl. Chem*., 2021, **58**, 250.
[2] P. Hanson, J. R. Jones, A. B. Taylor, P. H. Walton and A. W. Timms, *J. Chem. Soc. Perkin Trans. 2*., 2002, **2**, 1135.

tetrafluoroborate, which is filtered, washed three times with diethyl ether and dried under vacuum.

2.3. General procedure for the extraction of spinach[3]

Fresh or frozen spinach (0.5 grams) was combined with 0.5 grams of anhydrous magnesium sulfate and 1.0 gram of sand. The mixture was ground in a mortar and pestle until a light green powder was obtained (5–10 minutes). The light green solid was transferred to a small test tube containing 2.0 mL of acetone. This heterogeneous mixture was agitated to ensure complete mixing of the acetone and the solid. This mixture was allowed to stand for 10 minutes and the green acetone solution was removed by pipette and transferred to a micro centrifuge tube. After centrifugation, the supernatant (green liquid) is poured in the plate for dry. After evaporate of solvent oil product is obtain.

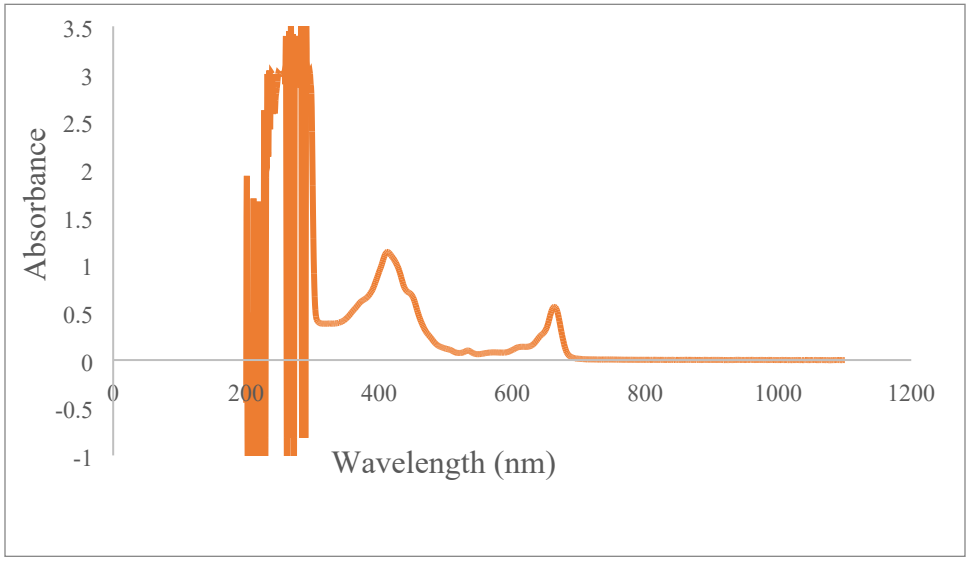


Figure 1. UV Visible Absorption Spectrum of mixture of chlorophyll in Acetone.

2.4. General procedure for the reaction of aryl diazonium salts and imidazo[1, 2-*a*]pyridine derivatives

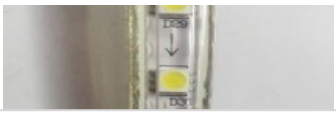
In a 10 mL Pyrex tube with magnetic stirring bar the oil of chlorophyll (50 mg), aryl diazonium tetra fluoro borate (1 equiv.) and imidazo[1, 2-*a*]pyridine derivatives (3 equiv.) were dissolved in

[3] H. T. Quach, R. L. Steeper and G. W. Griffin, *J. Chem. Educ.*, 2004, **81**, 385.

DMSO (0.4 mL) and the resulting mixture was stirred. The Pyrex tube was irradiated using 5 W white LED. After 16 h of irradiation the reaction mixture was transferred to separating funnel, diluted with diethyl ether and washed with 15 mL of water. The aqueous layer was washed three times with diethyl ether. The combined organic layers were dried over $MgSO_4$, filtered and concentrated in vacuum. Purification of the crude product was achieved by flash column chromatography using n-hexane/ethyl acetate as eluent.

Figure 2. photocatalytic system

3. Emission spectra of White LED



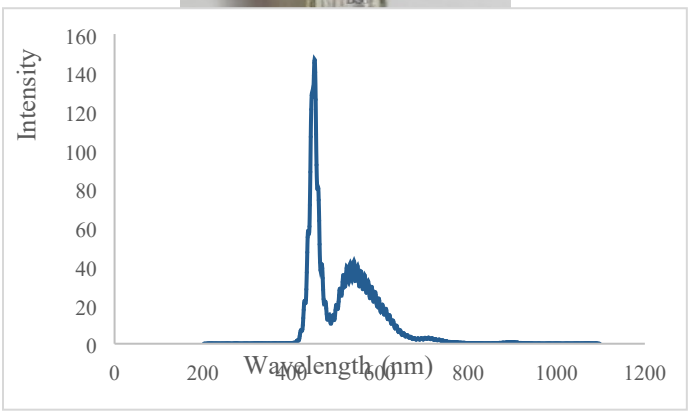
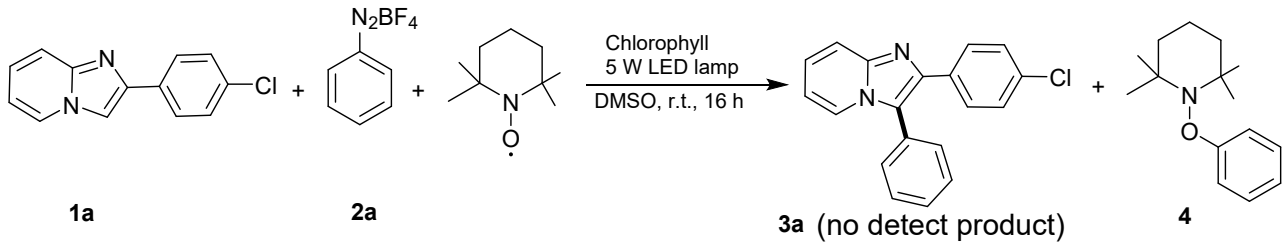


Figure 3. White LED and the emission spectrum of white LED

4. Radical trapping experiment



In a 10 mL the Pyrex tube with magnetic stirring bar the oil of chlorophyll (50 mg), aryl diazonium tetra fluoro borate (1 equiv.) and 2-(4-chlorophenyl)imidazo[1,2-a]pyridine (3 equiv.) were dissolved in DMSO (0.4 mL) and 2,2,6,6-tetramethylpiperidinyl-1-oxyl (TEMPO) (2.0 equiv.). Then the resulting mixture was irradiated using white LED for 16 h. While no desired product **3a** was found, the TEMPO-phenyl adduct **4** was detected.

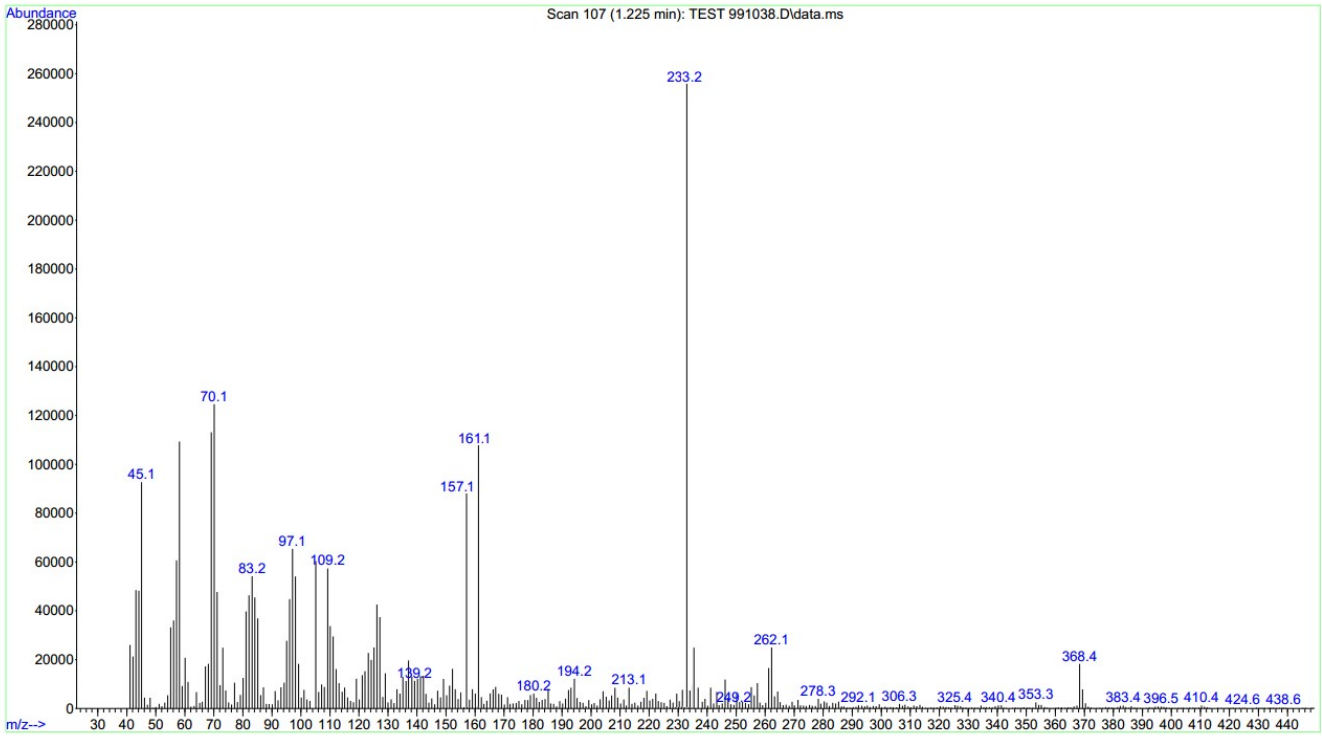


Figure 4. MS of TEMPO-Phenyl adduct

5. Compounds characterization data

5.1. 2-(4-chlorophenyl)-3-phenylimidazo[1,2-*a*]pyridine (3a)[4]

White crystal, Yield 60% (18 mg); m.p. 138-140 ºC; IR KBr: 3058, 2926, 1347, 1108, 871, 740 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 7.92 (d, J = 6.8 Hz, 1H), 7.67 (d, J = 7.6 Hz, 1H), 7.59 (d, J = 7.6 Hz, 2H), 7.53 – 7.46 (m, 4H), 7.41(d, J = 6.7 Hz, 2H), 7.25 – 7.17(m, 3H), 6.73 (t, J = 6.8 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.8, 141.1, 133.5, 132.6, 130.7, 129.7, 129.5, 129.3, 129.2, 128.6, 125.2, 123.4, 121.3, 117.5, 112.6 ppm; MS: *m/z* (%) = 306 [M+2$^+$, 37.5%], 304 [M$^+$, 100%]; Anal. calcd. for $C_{19}H_{13}ClN_2$: C, 74.88; H, 4.30; N, 9.19. Found: C, 74.63; H, 4.49; N, 9.31.

5.2. 2-(4-chlorophenyl)-3-(*p*-tolyl)imidazo[1,2-*a*]pyridine (3b)[5]

White crystal, Yield 71% (22 mg); m.p.: 146-147 °C; IR KBr: 3061, 2932, 1362, 1088, 879, 745 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 7.67 (d, J = 7.6 Hz, 1H), 7.58 (d, J = 7.4 Hz, 2H), 7.54 (d, J = 6.8 Hz, 1H), 7.46 – 7.40 (m, 2H), 7.35 (t, J = 6.9 Hz, 1H), 7.29 (d, J = 7.6 Hz, 1H), 7.22 – 7.18 (m, 3H), 6.71 (t, J = 6.8 Hz, 1H), 2.03 (s, 3H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.9, 141.0, 139.1, 133.3, 132.9, 131.8, 131.2, 129.9, 128.9, 128.6, 128.4, 127.1, 124.8, 123.5, 120.5, 117.5, 112.5, 19.4 ppm; MS: *m/z* (%) = 320 [M+2$^+$, 37.5%], 318 [M$^+$, 100%]; Anal. calcd. for $C_{20}H_{15}ClN_2$: C, 75.35; H, 4.74; N, 8.79. Found: C, 75.52; H, 4.53; N, 8.93.

5.3. 2-(4-chlorophenyl)-3-(4-methoxyphenyl)imidazo[1,2-*a*]pyridine (3c)[5]

White crystal, Yield 82% (27 mg); m.p. 115-117 ºC; IR KBr: 3066, 2942, 1353, 1118, 873, 740 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 7.97 (d, J = 7.0 Hz, 1H), 7.66 – 7.61 (m, 3H), 7.43-7.37 (m, 4H), 7.33-7.19 (m,1H), 7.16 (d, J = 7.6 Hz, 2H), 6.89 (t, J = 6.8 Hz, 1H), 3.86 (s, 3H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 160.2, 144.3, 140.1, 133.7, 132.5, 132.4, 129.3, 128.8, 125.7, 124.3, 121.3, 121.2, 117.3, 115.7, 113.1, 55.7 ppm; MS: *m/z* (%) = 336 [M+2$^+$, 37.5%], 334 [M$^+$, 100%]; Anal. calcd. for $C_{20}H_{15}ClN_2O$: C, 71.75; H, 4.52; N, 8.37. Found: C, 71.89; H, 4.77; N, 8.11.

5.4. 2-(4-chlorophenyl)-3-(3,4-dimethylphenyl)imidazo[1,2-*a*]pyridine (3d)

Yellow solid, Yield 76% (25 mg); m.p. 102-104 ºC; IR KBr: 3056, 2969, 1341, 1071, 804, 736 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 7.90 (d, J = 6.9 Hz, 1H), 7.65 (d, J = 7.6 Hz, 2H), 7.50 (d, J = 6.9 Hz, 1H), 7.41 (d, J = 2.1 Hz, 1H), 7.36 (dd, J = 6.9, 2.1 Hz, 1H), 7.28 – 7.22 (m, 3H), 7.04-7.02 (m, 2H), 6.82 (t, J = 6.9, Hz, 1H), 2.30 (s, 3H), 2.27 (s, 3H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.6, 140.9, 137.6, 136.7, 135.4, 134.3, 132.2, 131.8, 131.1, 130.5, 129.3, 128.7, 127.5, 123.7, 119.1, 117.5, 112.4, 20.1, 19.9 ppm; MS: *m/z* (%) = 334 [M+2$^+$, 37.5%], 332 [M$^+$, 100%]; Anal. calcd. for $C_{21}H_{17}ClN_2$: C, 75.78; H, 5.15; N, 8.42. Found: C, 70.53; H, 5.39; N, 8.66.

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[4] M. Khoshneviszadeh, M. Soheilizad, M. Fardpour and M. Mahdavi, *Monatshefte fur Chemie*., 2017, **148**, 1817.
[5] R. Afshari, S. Emad Hooshmand, M. Atharnezhad and A. Shaabani, *Polyhedron*., 2020, **175**, 114238.

5.5. 2-(4-chlorophenyl)-3-(4-fluorophenyl)imidazo[1,2-*a*]pyridine (3e)
White crystal; Yield: 64% (20 mg); m.p. 124-126 °C; IR KBr: 3050, 2962, 1384, 1220, 1086, 1013, 814, 749 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 7.86 (d, J = 7.0 Hz, 1H), 7.65 (d, J = 7.6 Hz, 1H), 7.56 (d, J = 7.4 Hz, 2H), 7.41 – 7.38 (m, 2H), 7.25 – 7.20 (m, 5H), 6.74 (t, J = 6.8 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 163.5 ($^1J_{C-F}$=239 Hz), 144.9, 141.5, 133.5, 132.7 ($^3J_{C-F}$=9 Hz), 132.6, 129.3, 128.6, 125.6 ($^4J_{C-F}$=2 Hz), 125.1, 123.2, 120.1, 117.7, 117.1 ($^2J_{C-F}$=21 Hz), 112.7 ppm; ^{19}F NMR (376 MHz, DMSO-d_6) δ -114.22; MS: *m/z* (%) = 324 [M+2$^+$, 37.5%], 322 [M$^+$, 100%]; Anal. calcd. for $C_{19}H_{12}ClFN_2$: C, 70.70; H, 3.75; N, 8.68. Found: C, 70.88; H, 3.54; N, 8.49.

5.6. 2-(4-chlorophenyl)-3-(4-nitrophenyl)imidazo[1,2-*a*]pyridine (3f)[6]
Orange solid, Yield 48% (16 mg); m.p. 158-160 ºC. IR KBr: 3044, 2973, 1553, 1348, 1096, 810, 753 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6): δ 8.38 (d, J = 7.6 Hz, 2H), 8.01 (d, J = 7.4 Hz, 1H), 7.71 (d, J= 7.6 Hz, 1H), 7.64 (d, J= 7.6 Hz, 2H), 7.52 (d, J= 7.6 Hz, 2H), 7.31–7.23 (m, 3H), 6.78 (t, J= 6.8 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6): δ 147.7, 145.8, 143.3, 136.5, 134.3, 132.1, 131.1, 129.8, 128.9, 125.9, 124.9, 122.9, 118.9, 118.1, 113.6 ppm; MS: *m/z* (%) = 351 [M+2$^+$, 37.5%], 349 [M$^+$, 100%]; Anal. calcd. for $C_{19}H_{12}ClN_3O_2$: C, 65.24; H, 3.46; N, 12.01. Found: C, 65.63; H, 3.21; N, 11.86.

5.7. 2-(4-chlorophenyl)-3-(4-hydroxy)imidazo[1,2-*a*]pyridine (3g)
White solid, Yield 81% (26 mg); m.p. 147-149 ºC. IR KBr: 3351, 2967, 1341, 1221, 761 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 9.73 (s, 1H), 7.95 (d, J = 7.4 Hz, 1H), 7.66 (d, J = 7.4 Hz, 2H), 7.60 (d, J = 7.6 Hz, 2H), 7.39 (d, J = 7.7 Hz, 2H), 7.35 (d, J = 7.6 Hz, 2H), 7.29 (t, J= 6.8 Hz, 1H), 7.01 (d, J = 7.7 Hz, 2H), 6.91 (t, J= 6.8 Hz, 1H); ^{13}C NMR (100 MHz, DMSO) δ 158.47, 144.04, 139.82, 134.05, 132.80, 132.49, 131.98, 129.10, 125.44, 123.70, 122.03, 121.08, 117.57, 116.22, 113.85 ppm; MS: *m/z* (%) = 322 [M+2$^+$, 36.8%], 320 [M$^+$, 100%]; Anal. calcd. for $C_{19}H_{13}ClN_2O$: C, 71.14; H, 4.09; N, 8.73. Found: C, 71.37; H, 3.87; N, 8.95.

5.8. 2-(4-chlorophenyl)-7-methyl-3-phenylimidazo[1,2-*a*]pyridine (3h)
White solid, Yield 74% (23 mg); m.p. 127-129 ºC. IR KBr: 2929, 1728, 1289, 1080, 699 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 7.84 (dd, J = 7.6, 1.8 Hz, 1H), 7.60 (d, J = 7.6 Hz, 2H), 7.55 – 7.49 (m, 3H), 7.44-7.42 (m, 3H), 7.25 (d, J = 7.7 Hz, 2H), 6.58 (dd, J = 7.4, 1.8 Hz, 1H), 2.42 (s, 3H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 145.29, 140.92, 135.93, 133.18, 132.89, 130.66, 129.77, 129.61, 129.22, 128.92, 128.44, 122.56, 120.69, 115.88, 115.06, 21.33 ppm; MS: *m/z* (%) = 320 [M+2$^+$, 37.3%], 318 [M$^+$, 100%]; Anal. calcd. for $C_{20}H_{15}ClN_2$: C, 75.35; H, 4.74; N, 8.79. Found: C, 75.17; H, 4.58; N, 8.66.

5.9. 6-chloro-2-(4-chlorophenyl)-3-phenylimidazo[1,2-*a*]pyridine (3i)[8]
White solid, Yield 72% (20 mg); m.p. 187-189 ºC. IR KBr: 2937, 1276, 1125, 731 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 7.98 (d, J = 1.8 Hz, 1H), 7.65 (d, J = 7.6 Hz, 1H), 7.60-7.58 (m, 4H), 7.45 (dd, J = 7.6, 1.8 Hz, 2H), 7.27 (d, J = 7.6 Hz, 3H), 7.21 (dd, J = 7.5, 1.8 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.21, 137.38, 136.48, 133.70, 132.22, 130.57, 129.88, 129.50, 129.22, 128.95, 128.57, 126.28, 121.17, 120.83, 117.94 ppm; MS: *m/z* (%) = 342 [M+4$^+$, 11.2%], 340 [M+2$^+$, 67.1%], 338 [M$^+$, 100%]; Anal. calcd. for $C_{19}H_{12}Cl_2N_2$: C, 67.27; H, 3.57; N, 8.26. Found: C, 67.43; H, 3.84; N, 8.03.

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[6] H. Zali-Boeini, N. Norastehfar and H. Amiri Rudbari, *RSC Adv*., 2016, **6**, 81943.

5.10. 2-(4-chlorophenyl)-6-methyl-3-phenylimidazo[1,2-*a*]pyridine (3j)[8]
White solid, Yield 70% (22 mg); m.p. 148-150 ºC. IR KBr: 2925, 1476, 1087, 700 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 7.70 (s, 1H), 7.58 – 7.52 (m, 5H), 7.51 (d, J = 7.4 Hz, 1H), 7.41 (d, J = 7.6 Hz, 2H), 7.22 (d, J = 7.6 Hz, 2H), 7.05 (d, J = 7.7 Hz, 1H), 2.25 (s, 3H); ^{13}C NMR (100 MHz, cdcl$_3$) δ 143.93, 141.12, 136.18, 133.13, 132.90, 130.74, 129.85, 129.60, 129.12, 128.95, 128.42, 128.00, 122.08, 120.87, 116.83, 18.33 ppm; MS: *m/z* (%) = 320 [M+2$^+$, 37.1%], 318 [M$^+$, 100%]; Anal. calcd. for $C_{20}H_{15}ClN_2$: C, 75.35; H, 4.74; N, 8.79. Found: C, 75.61; H, 4.98; N, 9.03.

5.11. 2-(4-chlorophenyl)-3-phenylimidazo[1,2-*a*]pyrimidine (3k)[7]
White crystal, Yield 68% (20 mg); m.p. 141-143 ºC; IR KBr: 3035, 2929, 1326, 1048, 821, 729 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 8.59 (d, J = 4.0 Hz, 1H), 8.47 (d, J = 6.8 Hz, 1H), 7.62 – 7.52 (m, 7H), 7.38 (d, J = 7.6 Hz, 1H), 7.04 (t, J = 5.4 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 151.3, 147.7, 141.2, 133.0, 132.8, 131.0, 130.2, 129.9, 129.6, 128.9, 128.5, 119.9, 109.8 ppm; MS: *m/z* (%) = 307 [M+2$^+$, 37.5%], 305 [M$^+$, 100%]; Anal. calcd. for $C_{18}H_{12}ClN_3$: C, 70.71; H, 3.96; N, 13.74. Found: C, 70.95; H, 4.21; N, 13.58.

5.12. 2-(4-bromophenyl)-3-phenylimidazo[1,2-*a*]pyridine (3l)[8]
White crystal, Yield 58% (18 mg); m.p. 155-157 ºC; IR KBr: 3044, 2936, 1349, 1057, 661 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 8.01 (d, J = 6.9 Hz, 1H), 7.67 (d, J = 7.6 Hz, 1H), 7.63 – 7.49 (m, 9H), 7.35-7.31 (m, 1H), 6.91 (t, J = 6.8 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.5, 140.5, 133.9, 131.7, 131.0, 130.2, 129.7, 129.7, 129.4, 125.9, 124.2, 121.4, 121.2, 117.4, 113.3 ppm; MS: *m/z* (%) = 350 [M+2$^+$, 49.7%], 348 [M$^+$, 50.3%]; Anal. calcd. for $C_{19}H_{13}BrN_2$: C, 65.35; H, 3.75; N, 8.02 Found: C, 65.69; H, 3.51; N, 8.22.

5.13. 3-phenyl-2-(*p*-tolyl)imidazo[1,2-*a*]pyridine (3m)[8]
White crystal; Yield: 74% (21 mg); m.p. 100-102 °C. IR KBr: 3060, 2948, 1365, 1189, cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 8.00 (d, J = 6.9 Hz, 1H), 7.65 (d, J = 7.6 Hz, 1H), 7.59 – 7.46 (m, 7H), 7.31-7.29 (m, 1H), 7.08 (d, J = 7.6 Hz, 2H), 6.86 (t, J = 6.8, 1H), 2.26 (s, 3H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.4, 141.8, 137.1, 131.8, 131.0, 130.0, 129.9, 129.4, 129.3, 127.8, 125.4, 124.0, 120.7, 117.2, 113.0, 21.2 ppm; MS: *m/z* (%) = 284 [M$^+$, 100%]; Anal. calcd. for $C_{20}H_{16}N_2$: C, 84.48; H, 5.67; N, 9.85 Found: C, 84.31; H, 5.89; N, 10.10.

5.14. 2-([1,1'-biphenyl]-4-yl)-3-phenylimidazo[1,2-*a*]pyridine (3n)
White crystal; Yield: 80% (27 mg); m.p. 148-150 °C. IR KBr: 3055, 2927, 13415, 1067, cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 8.01 (d, J = 6.9 Hz, 1H), 7.71 – 7.54 (m, 12H), 7.45 (t, J = 7.6 Hz, 2H), 7.37 – 7.31 (m, 2H), 6.91 (t, J = 6.8 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.5, 141.2, 139.9, 139.4, 133.7, 131.2, 130.2, 129.8, 129.6, 129.3, 128.3, 127.9, 126.9, 126.9, 125.7, 124.1, 121.3, 117.3, 113.2 ppm; MS: *m/z* (%) = 346 [M$^+$, 100%]; Anal. calcd. for $C_{25}H_{18}N_2$: C, 86.68; H, 5.24; N, 8.09 Found: C, 86.89; H, 5.43; N, 8.28.

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[7] H. P. L. Steenackers, D. S. Ermolatev, B. Savaliya, A. De Weerdt, D. De Coster, A. Shah, E. V. Van Der Eycken, D. E. De Vos, J. Vanderleyden and S. C. J. De Keersmaecker, *J. Med. Chem*., 2011, **54**, 472.
[8] R. Kumar, C. Ravi, D. Rawat and S. Adimurthy, *Eur. J. Org. Chem*., 2018, **2018**, 1665.

5.15. 2,3-diphenylimidazo[1,2-*a*]pyridine (3o)[4]

White crystal; Yield: 56% (15 mg); m.p. 136-138 °C. IR KBr: 3069, 2932, 1355, 1196 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 8.02 (d, J = 6.9 Hz, 1H), 7.68 (d, J = 7.6 Hz, 1H), 7.64 – 7.42 (m, 7H), 7.38 – 7.18 (m, 4H), 6.90 (td, J = 6.8, 1.2 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.41, 141.63, 134.61, 131.15, 130.14, 129.82, 129.56, 128.75, 127.90, 125.72, 124.20, 121.17, 117.35, 113.22 ppm; MS: *m/z* (%) = 270 [M^+, 100%]; Anal. calcd. for $C_{19}H_{14}N_2$: C, 84.42; H, 5.22; N, 10.36 Found: C, 84.68; H, 5.46; N, 10.65.

5.16. 2-(naphthalen-2-yl)-3-phenylimidazo[1,2-*a*]pyridine (3p)[9]

White crystal; Yield: 79% (22 mg); m.p. 127-128 °C. IR KBr: 3058, 2953, 1367, 1127 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 8.22 (s, 1H), 8.08 (d, J = 6.9 Hz, 1H), 7.86-7.84 (m, 1H), 7.80 – 7.77 (m, 2H), 7.71 (d, J = 6.9 Hz, 1H), 7.64 – 7.53 (m, 6H), 7.50 – 7.45 (m, 2H), 7.37-7.33 (m, 1H), 6.92 (td, J = 6.8, 1.2, Hz 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.6, 141.6, 133.3, 132.6, 132.2, 131.2, 130.1, 129.7, 129.6, 128.4, 128.0, 127.9, 126.8, 126.7, 126.5, 125.9, 125.8, 124.2, 121.6, 117.3, 113.2 ppm; MS: *m/z* (%) = 320 [M^+, 100%]; Anal. calcd. for $C_{23}H_{16}N_2$: C, 86.22; H, 5.03; N, 8.74 Found: C, 86.49; H, 5.41; N, 8.66.

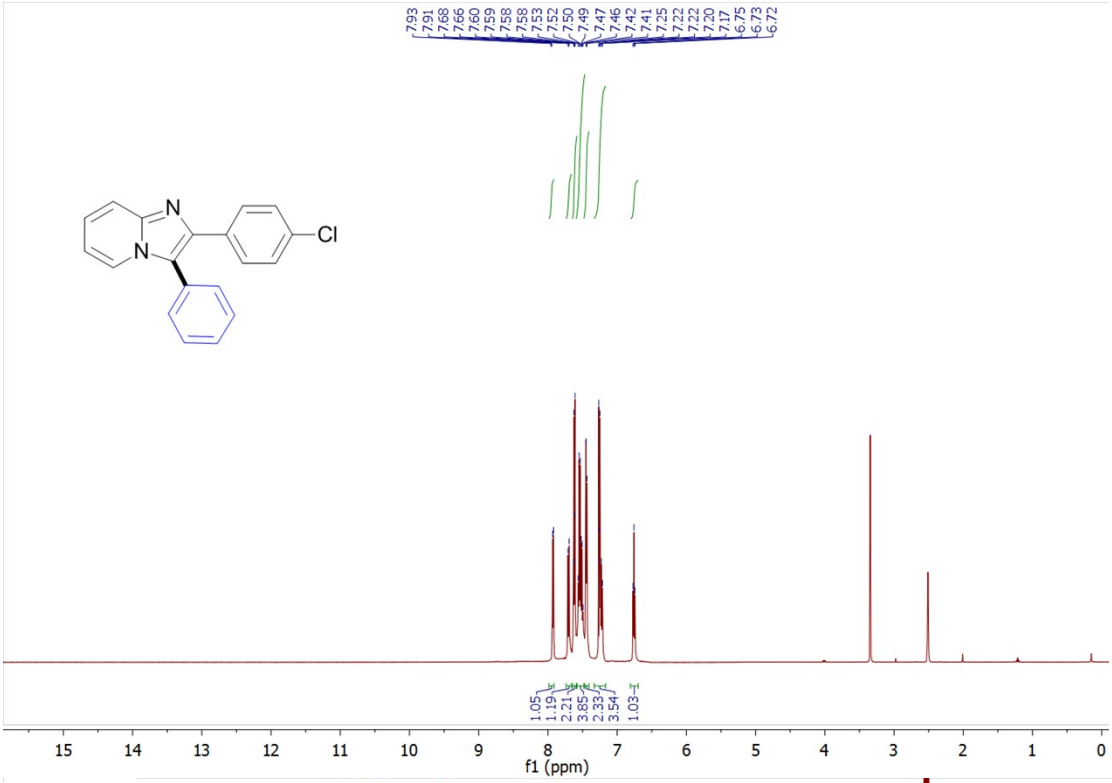
5.17. 3-(4-bromophenyl)-2-phenylimidazo[1,2-*a*]pyridine (3q)

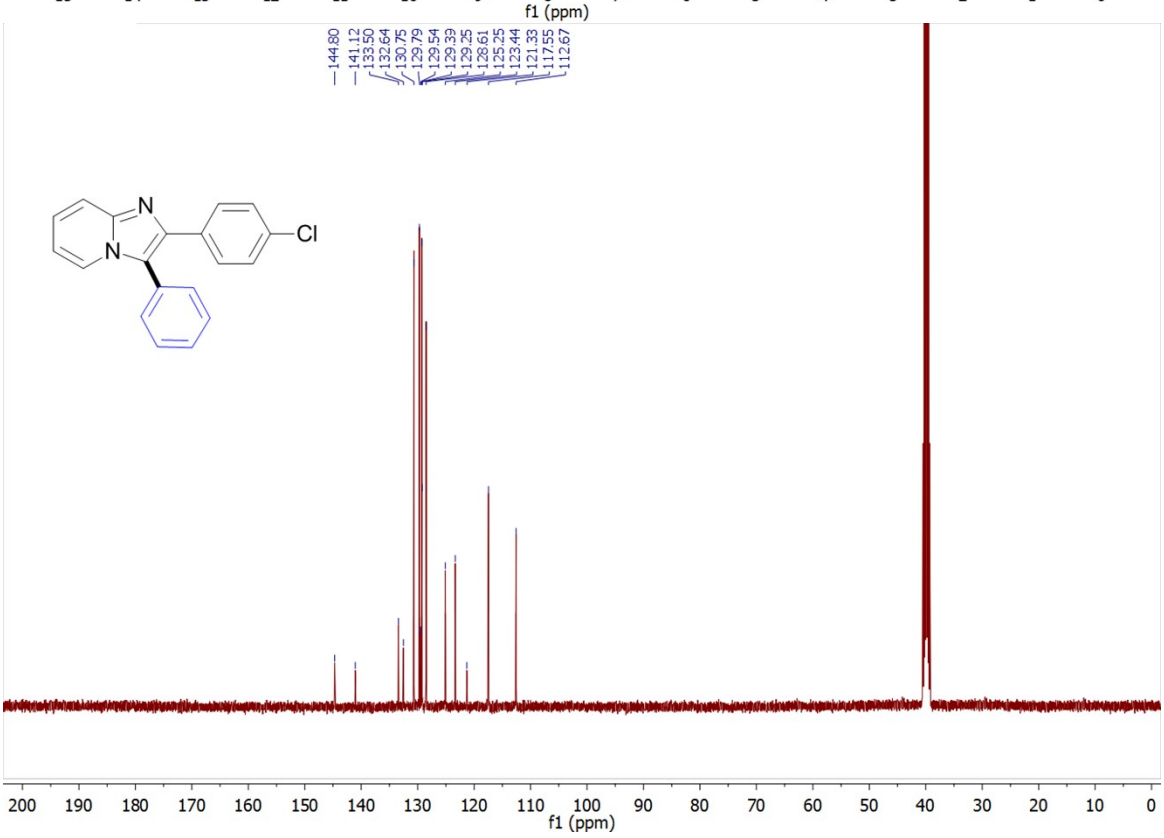
White crystal; Yield: 54% (18 mg); m.p. 156-158 °C. IR KBr: 3046, 2922, 1346, 1067, 737, 695 cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6) δ 7.91 (d, J = 6.9 Hz, 1H), 7.64 (d, J = 7.6 Hz, 1H), 7.52 – 7.47 (m, 5H), 7.42 – 7.37 (m, 4H), 7.20 -7.17 (m, 1H), 6.71 (td, J = 6.8, 1.2 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 144.9, 141.3, 133.3, 131.5, 130.7, 130.2, 129.7, 129.6, 129.2, 124.9, 123.4, 121.5, 121.3, 117.6, 112.5 ppm; MS: *m/z* (%) = 350 [M^++2, 50%], 348 [M^+, 50%]; Anal. calcd. for $C_{19}H_{13}BrN_2$: C, 65.35; H, 3.75; N, 8.02 Found: C, 65.60; H, 3.54; N, 7.82.

[9] S. Jana, S. Samanta, A. K. Bagdi, V. Z. Shirinian and A. Hajra, *RSC Adv*., (2018, 8, 12360.

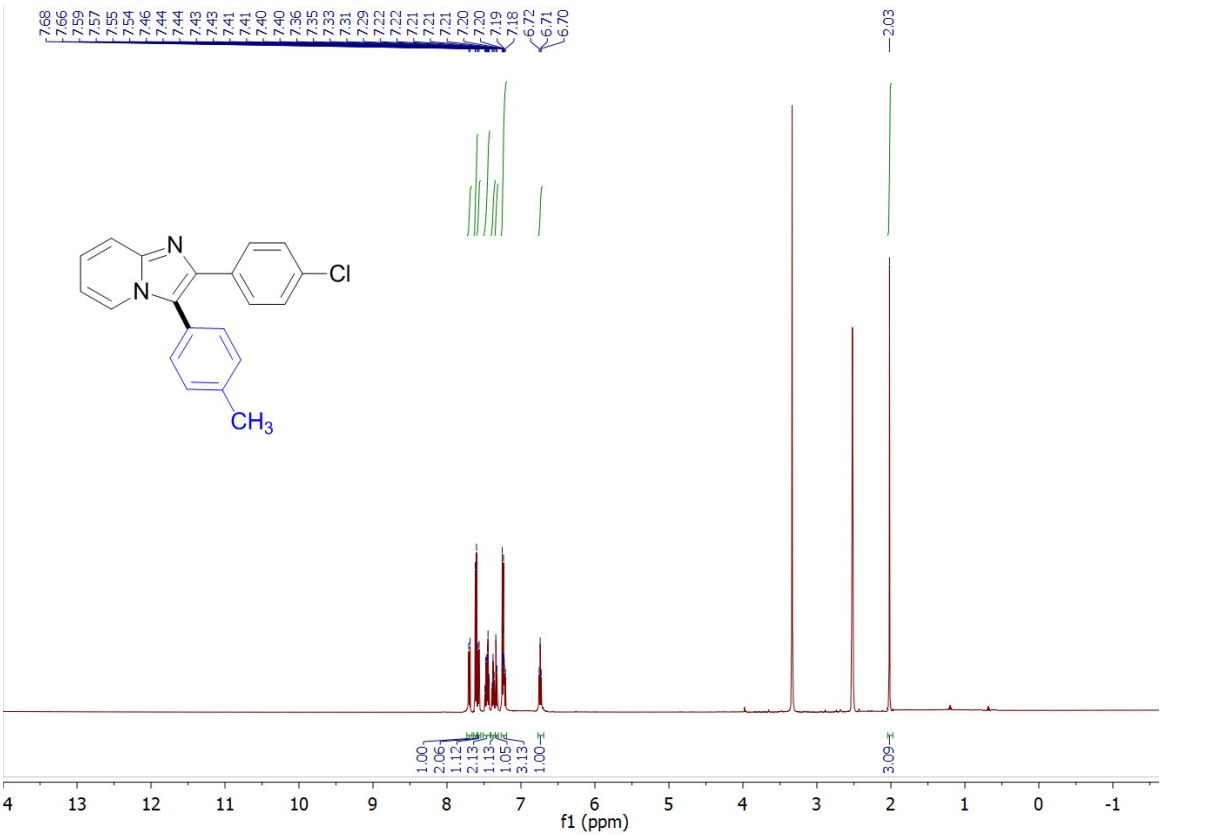
6. Copies of ^{1}H NMR and ^{13}C NMR spectra

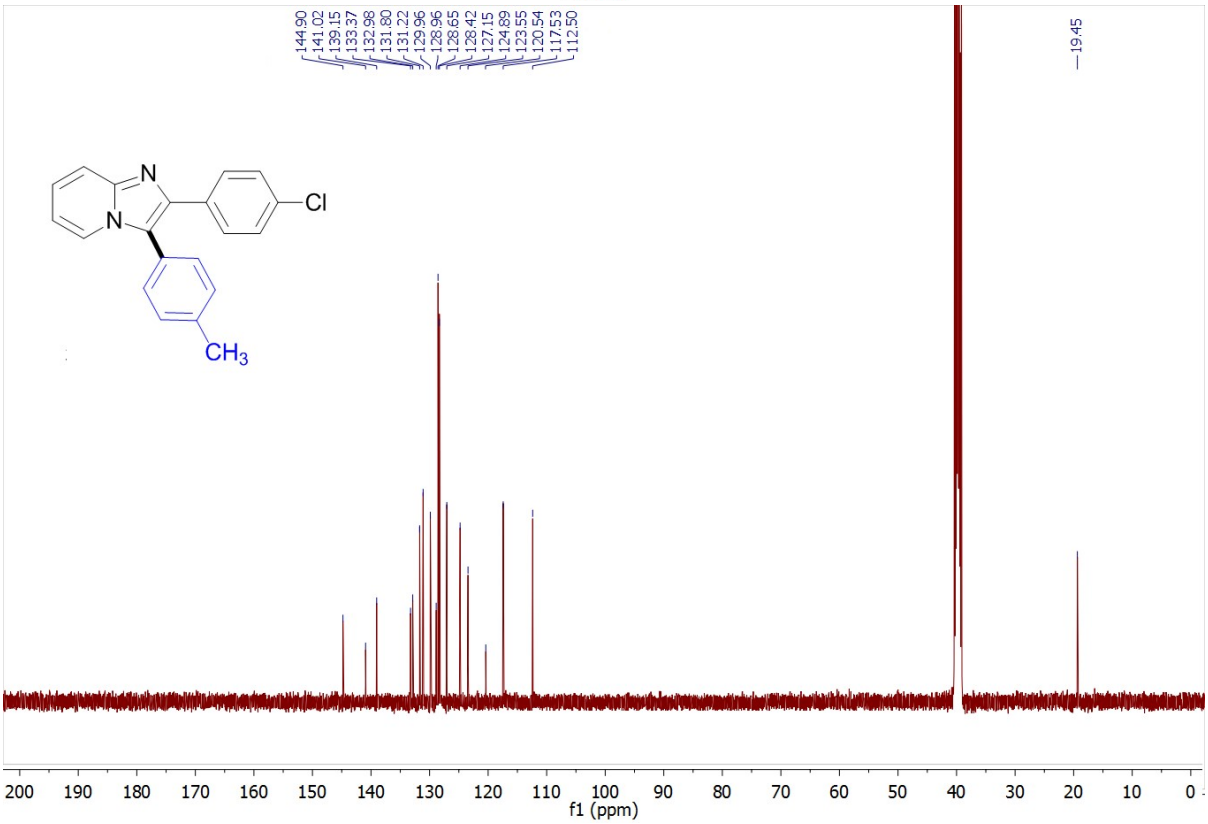
2-(4-chlorophenyl)-3-phenylimidazo[1,2-*a*]pyridine (3a)



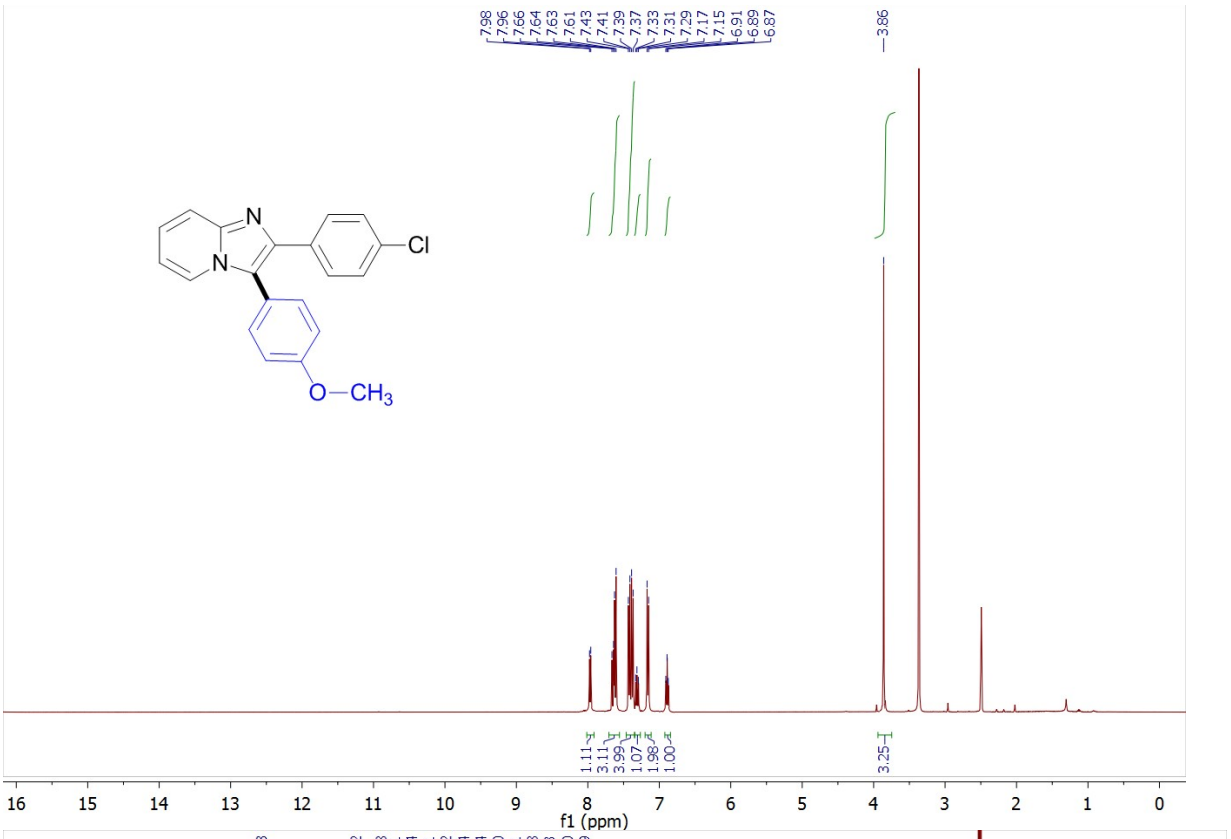


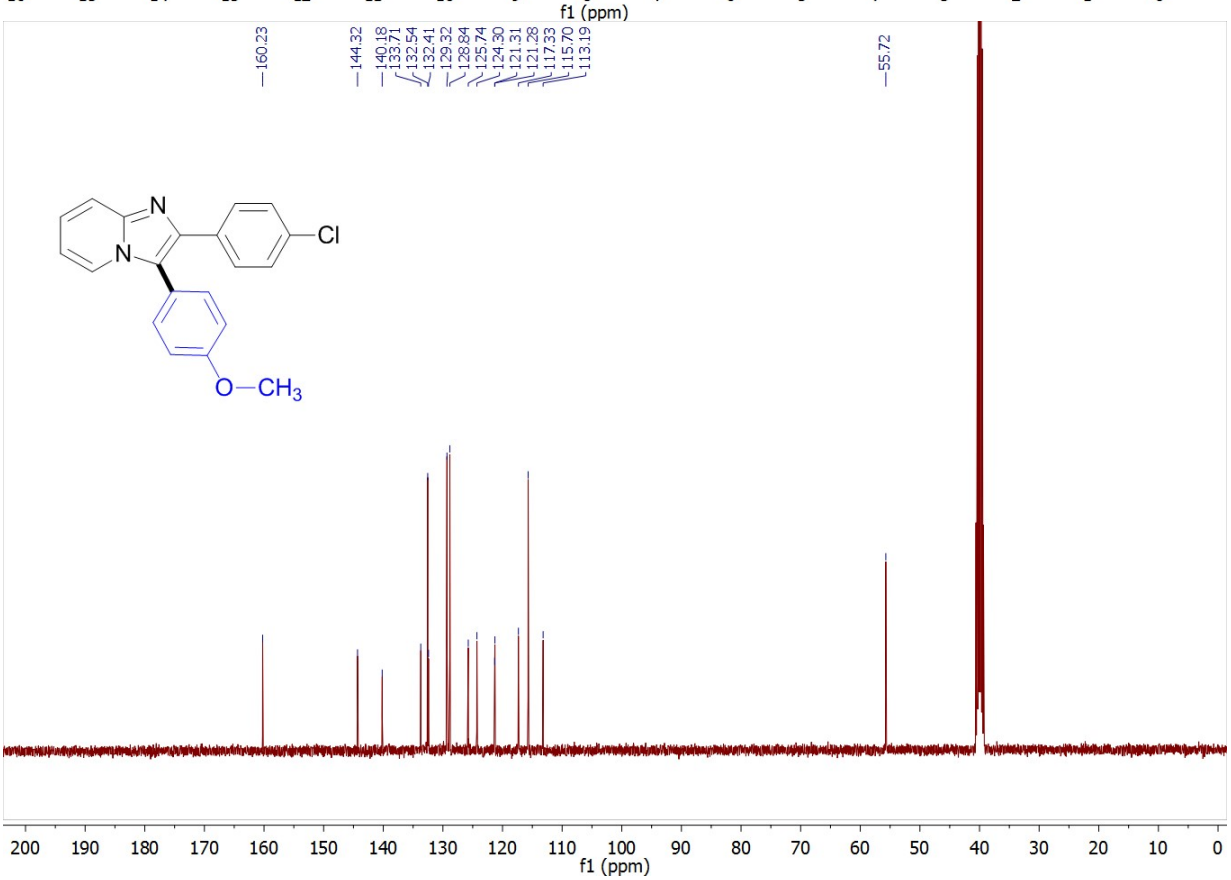
2-(4-chlorophenyl)-3-(*p*-tolyl)imidazo[1,2-*a*]pyridine (3b)



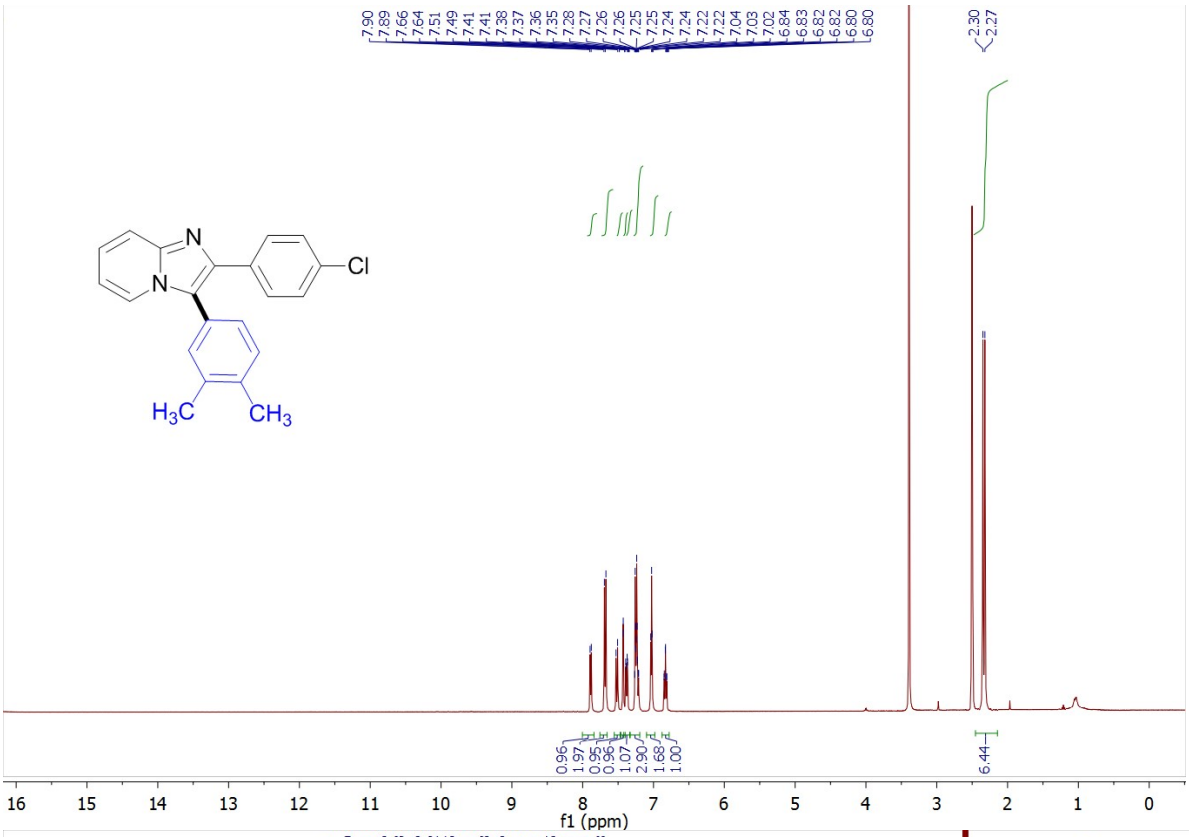


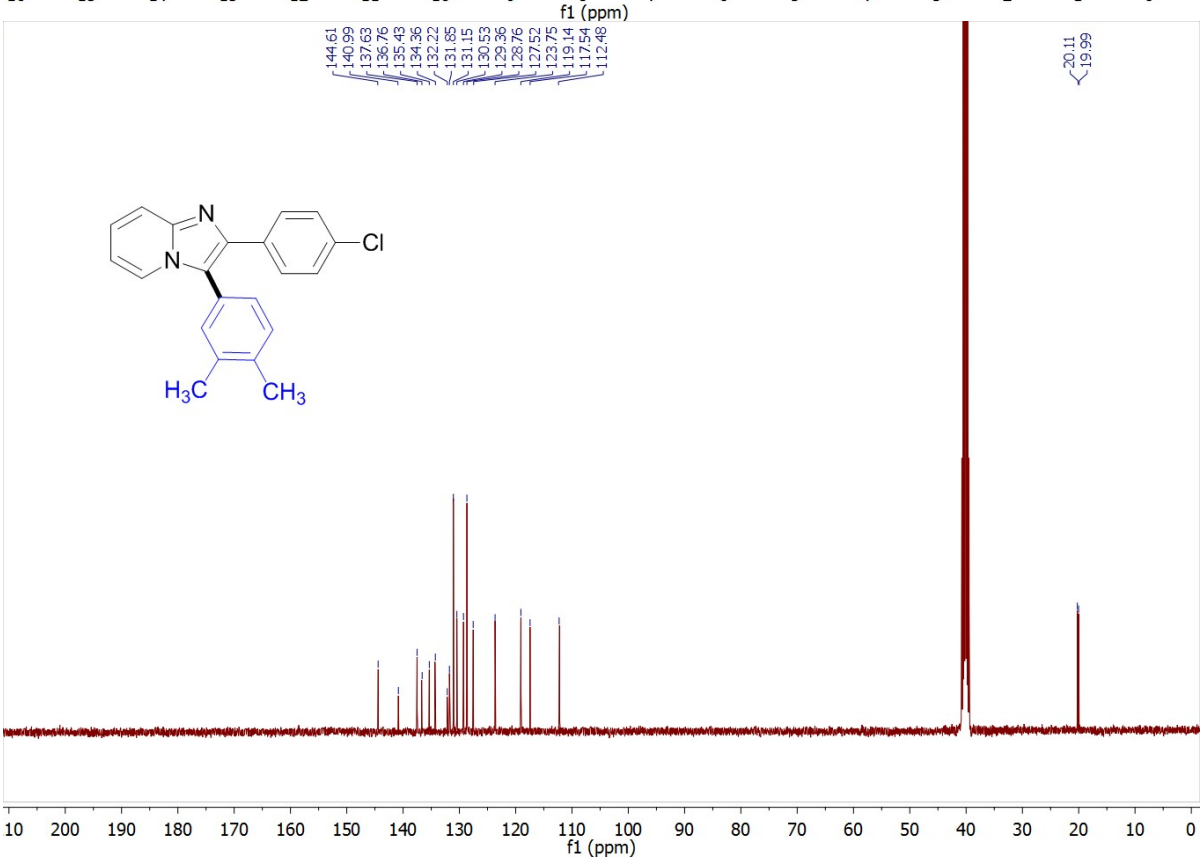
2-(4-chlorophenyl)-3-(4-methoxyphenyl)imidazo[1,2-*a*]pyridine (3c)



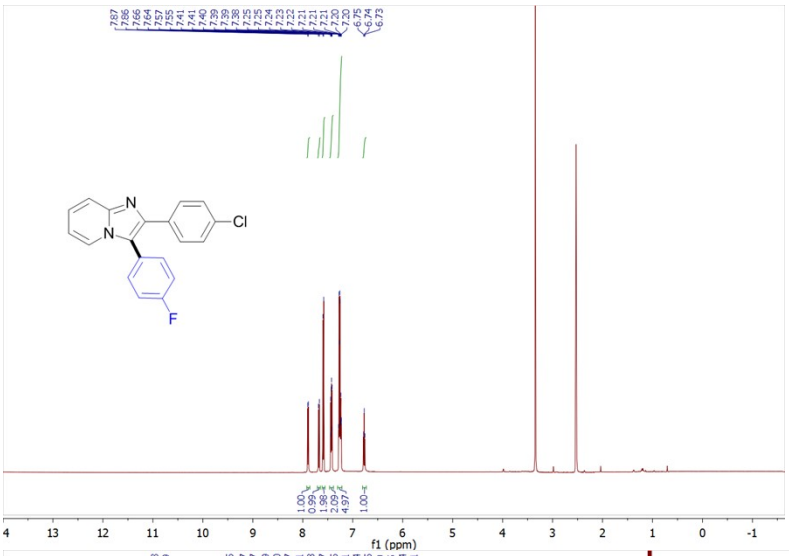


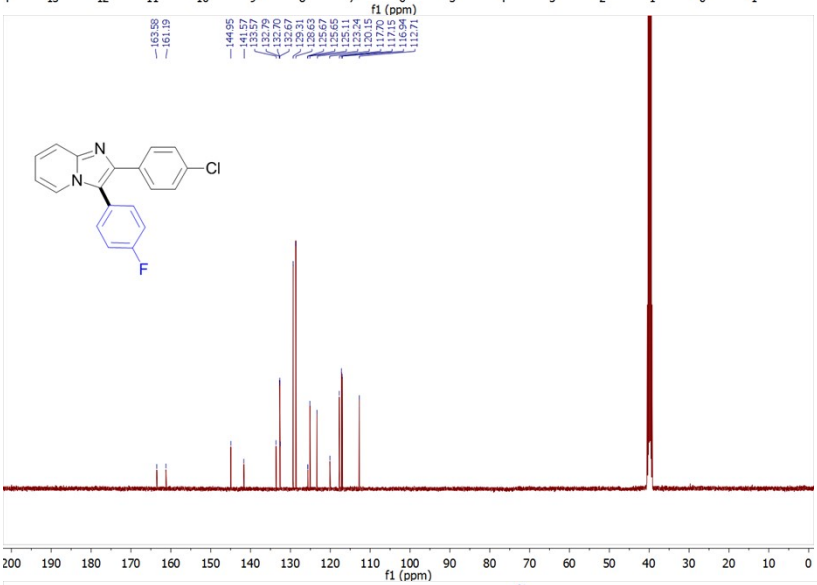
2-(4-chlorophenyl)-3-(3,4-dimethylphenyl)imidazo[1,2-*a*]pyridine (3d)

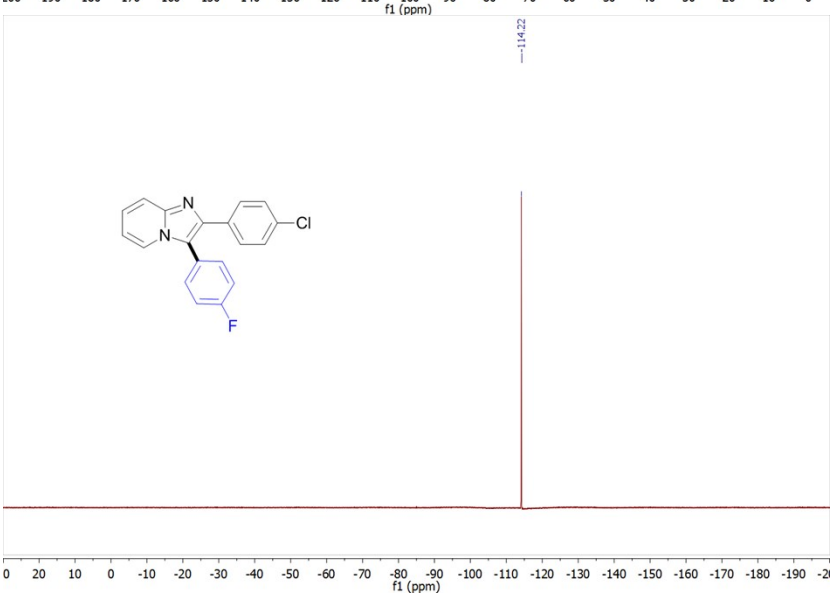




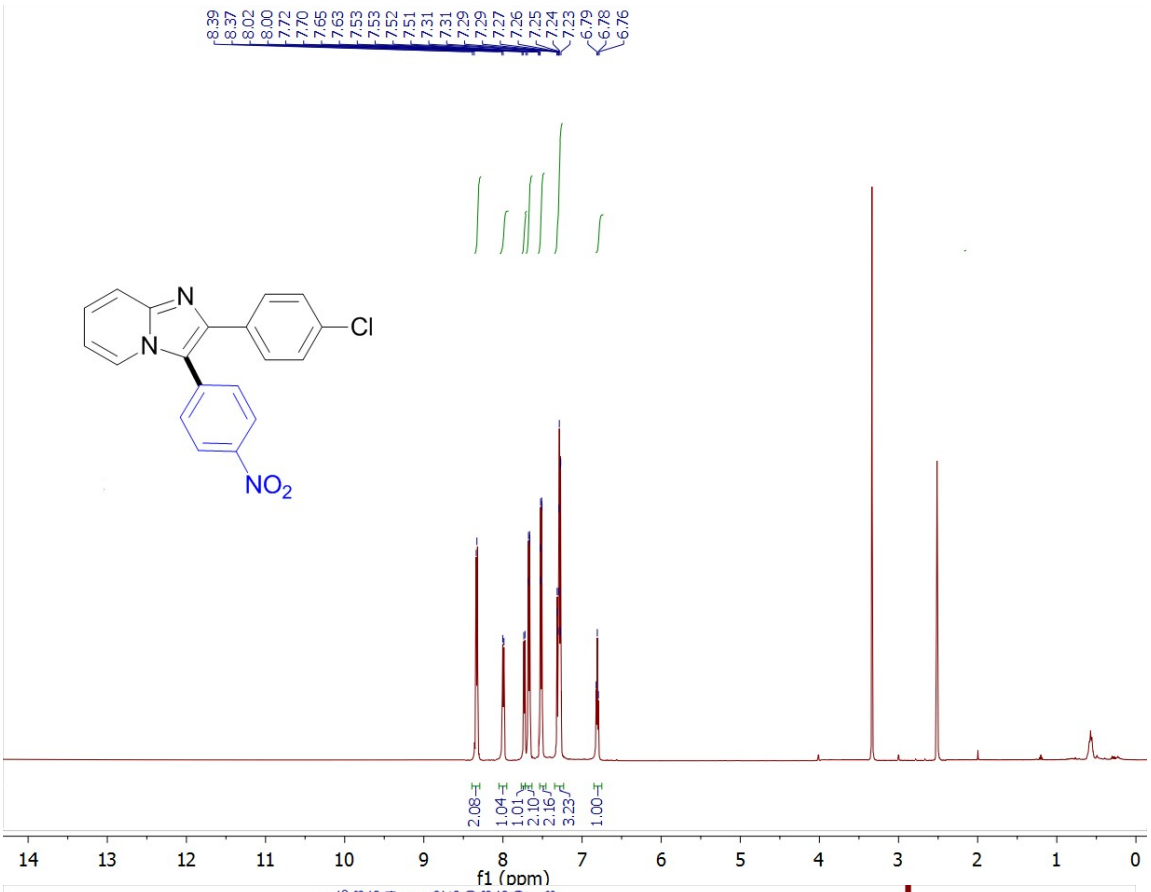
2-(4-chlorophenyl)-3-(4-fluorophenyl)imidazo[1,2-*a*]pyridine (3e)

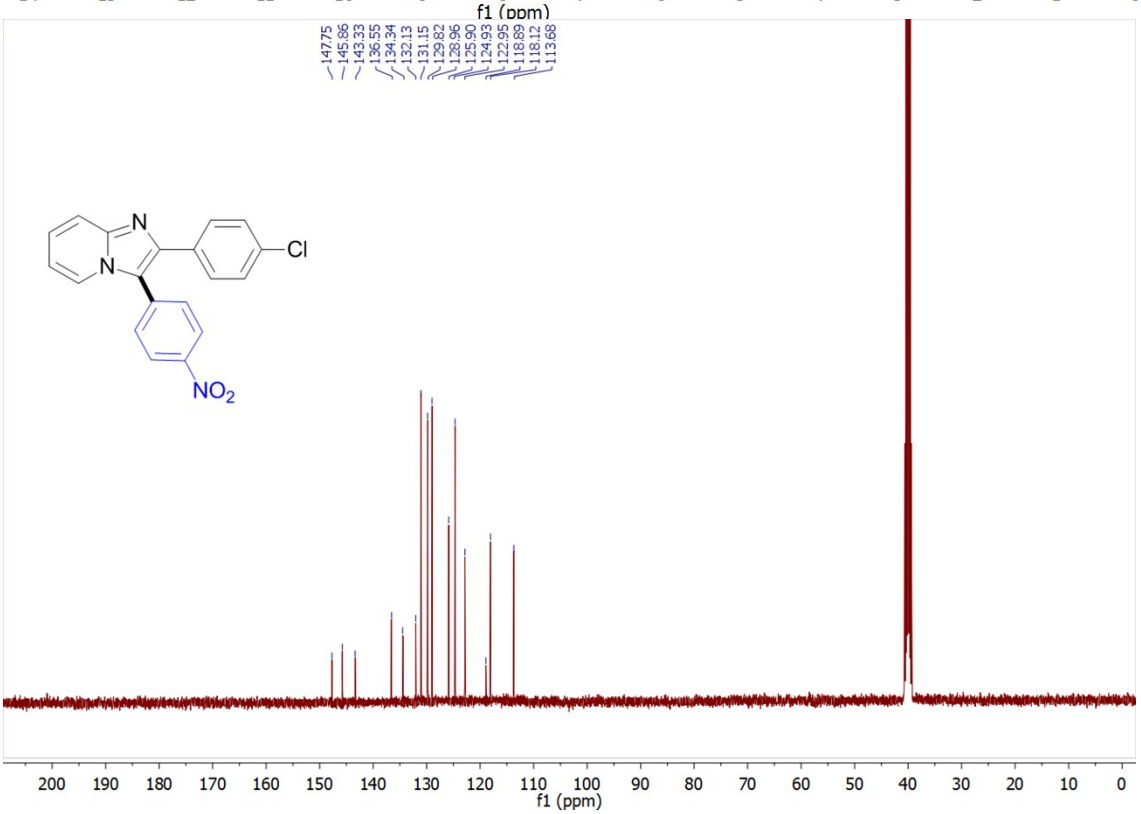




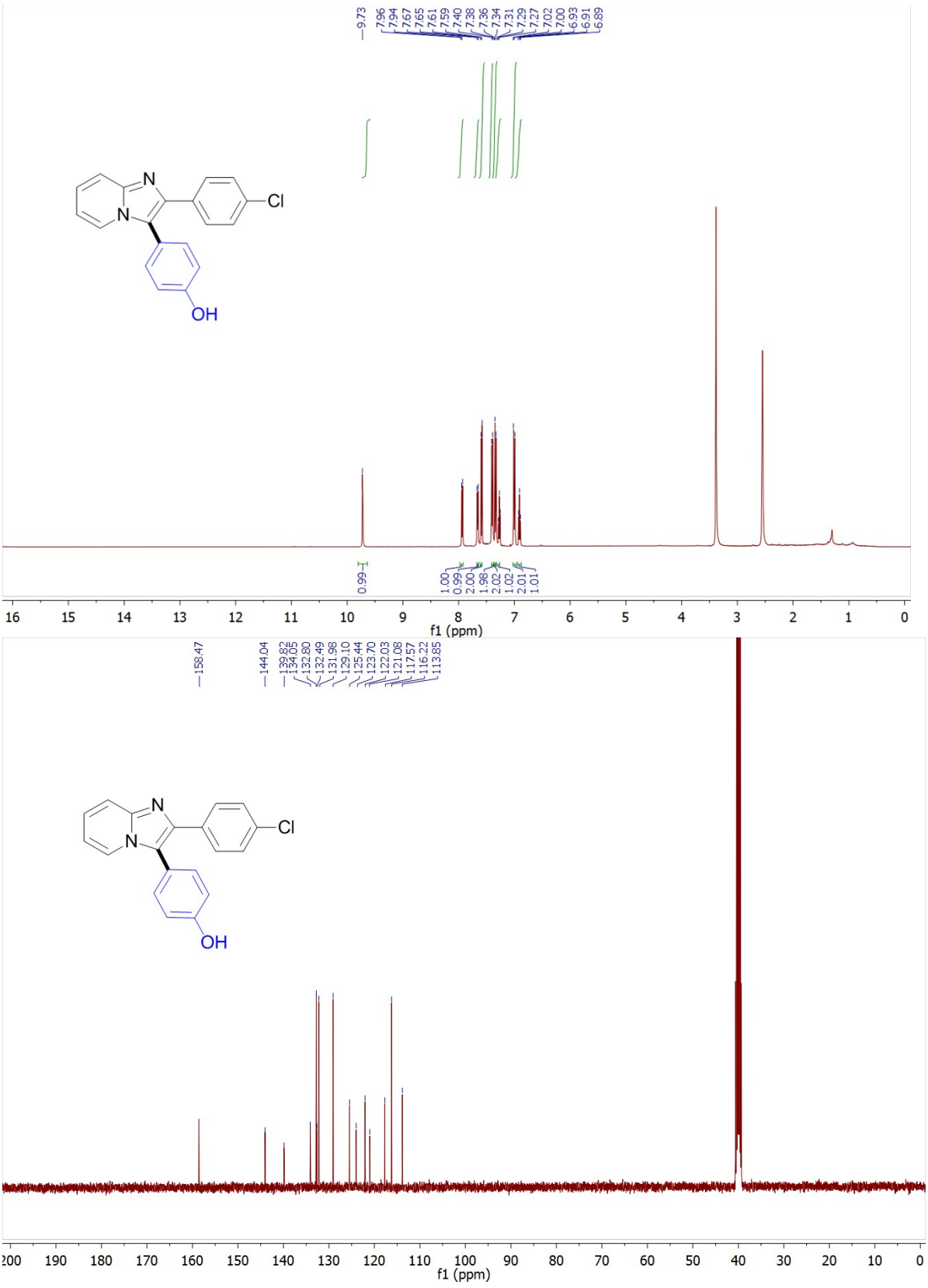


2-(4-chlorophenyl)-3-(4-nitrophenyl)imidazo[1,2-*a*]pyridine (3f)

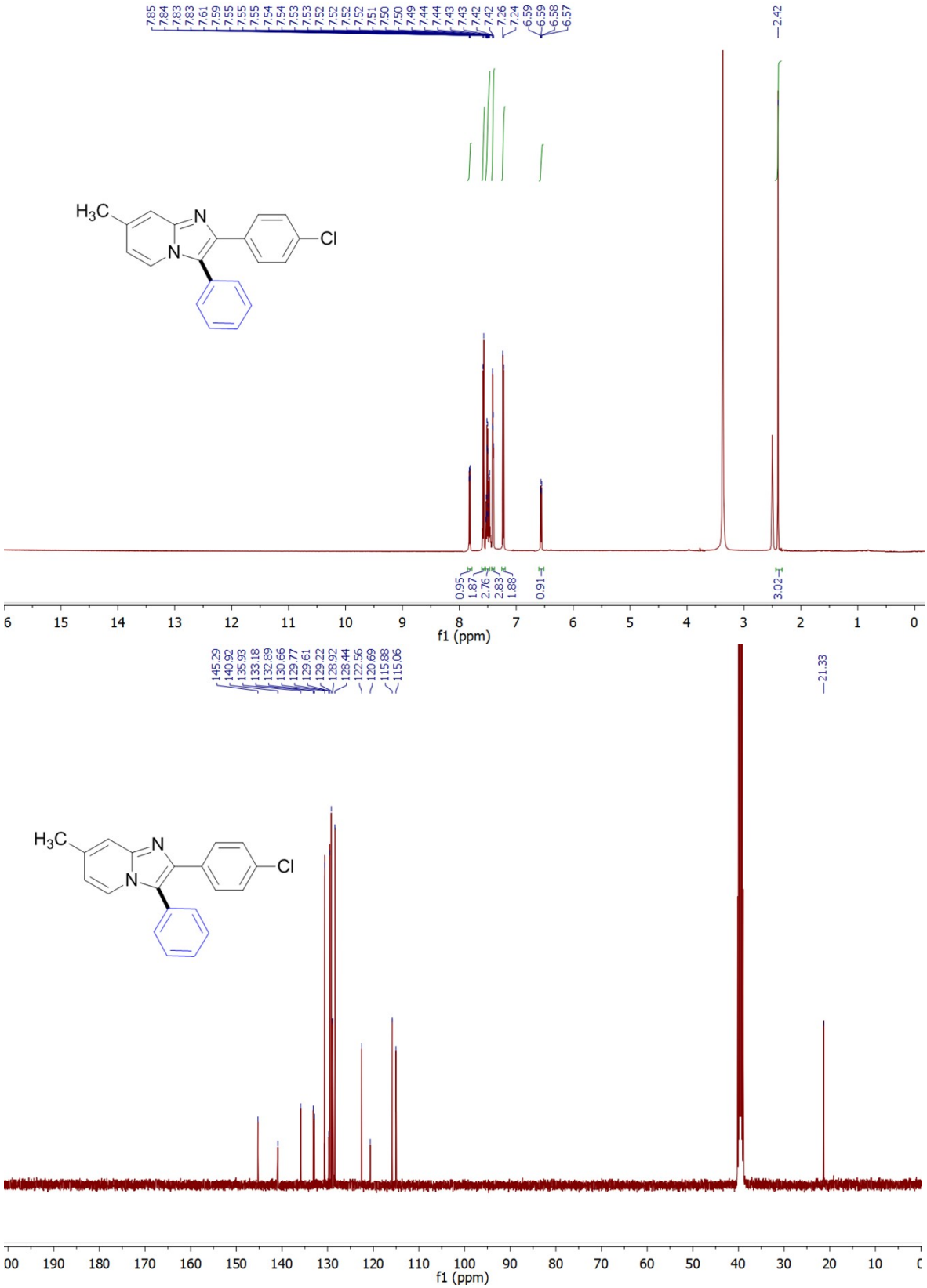




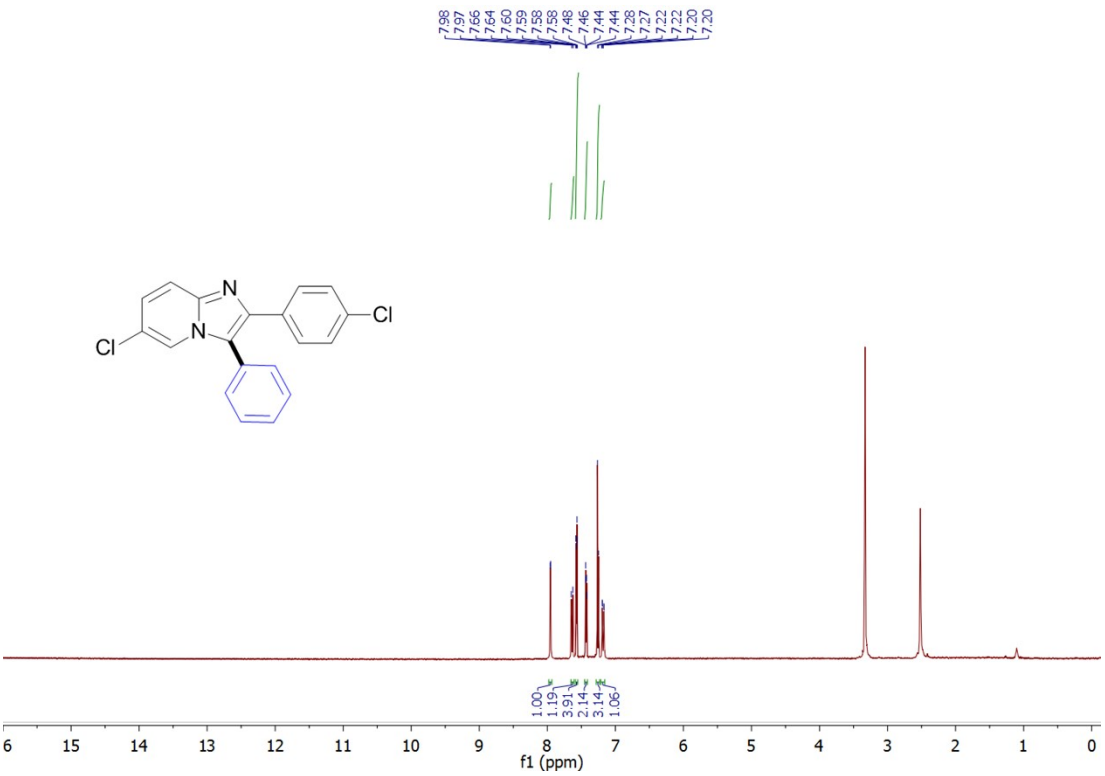
2-(4-chlorophenyl)-3-(4-hydroxy)imidazo[1,2-*a*]pyridine (3g)

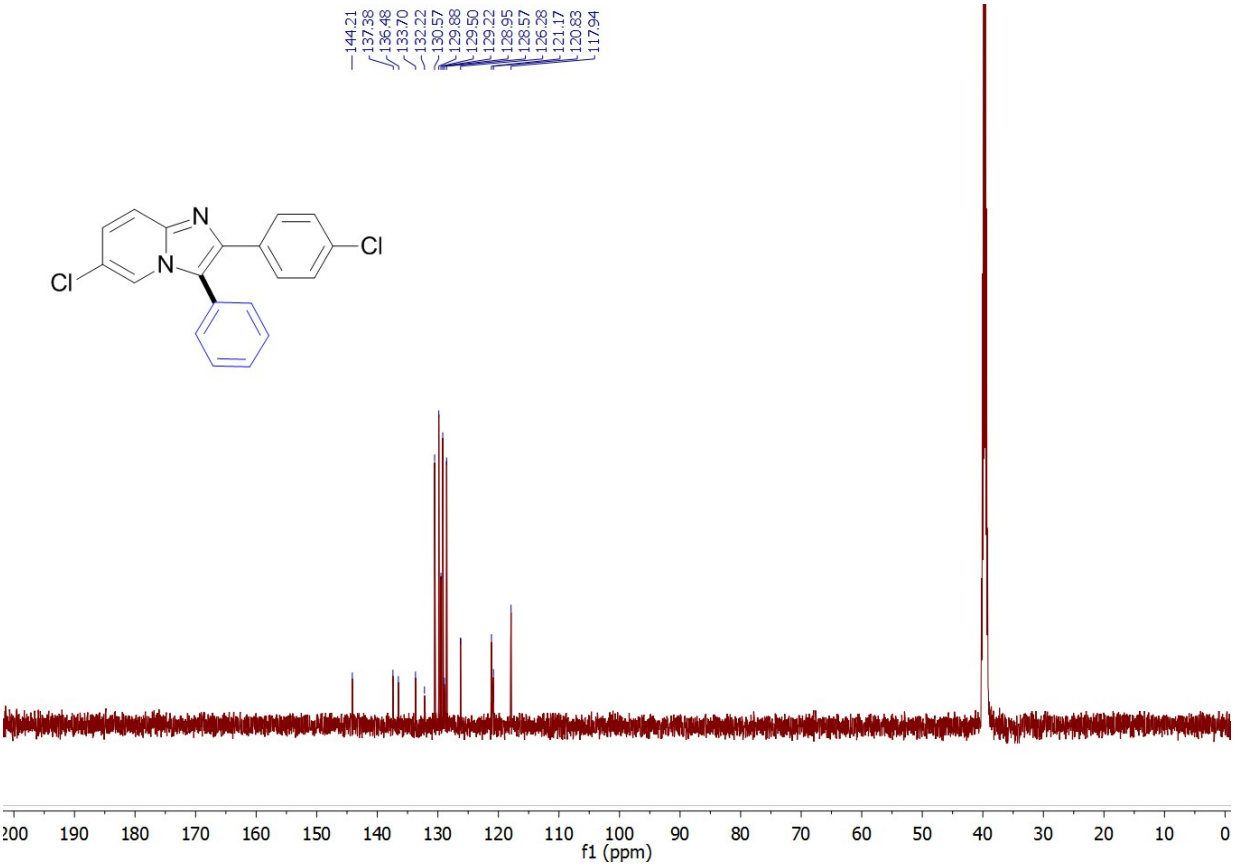


2-(4-chlorophenyl)-7-methyl-3-phenylimidazo[1,2-*a*]pyridine (3h)

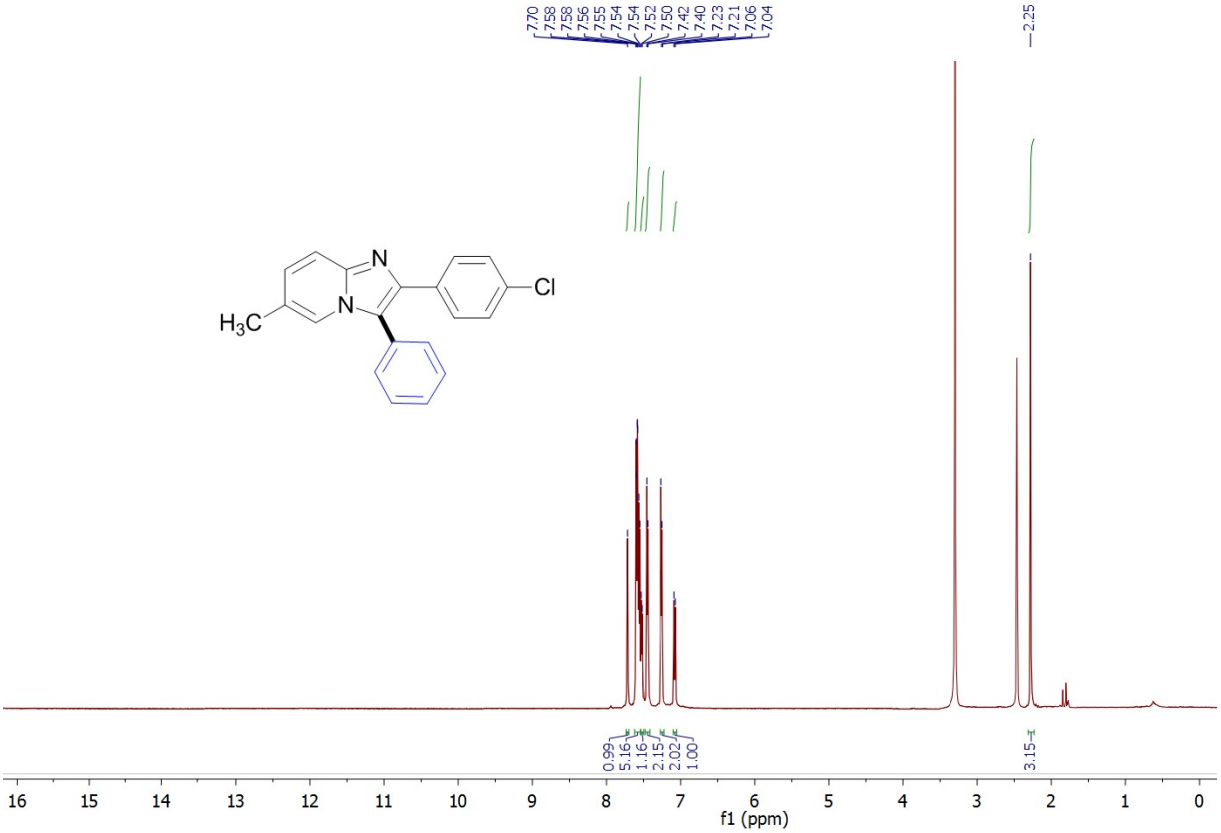


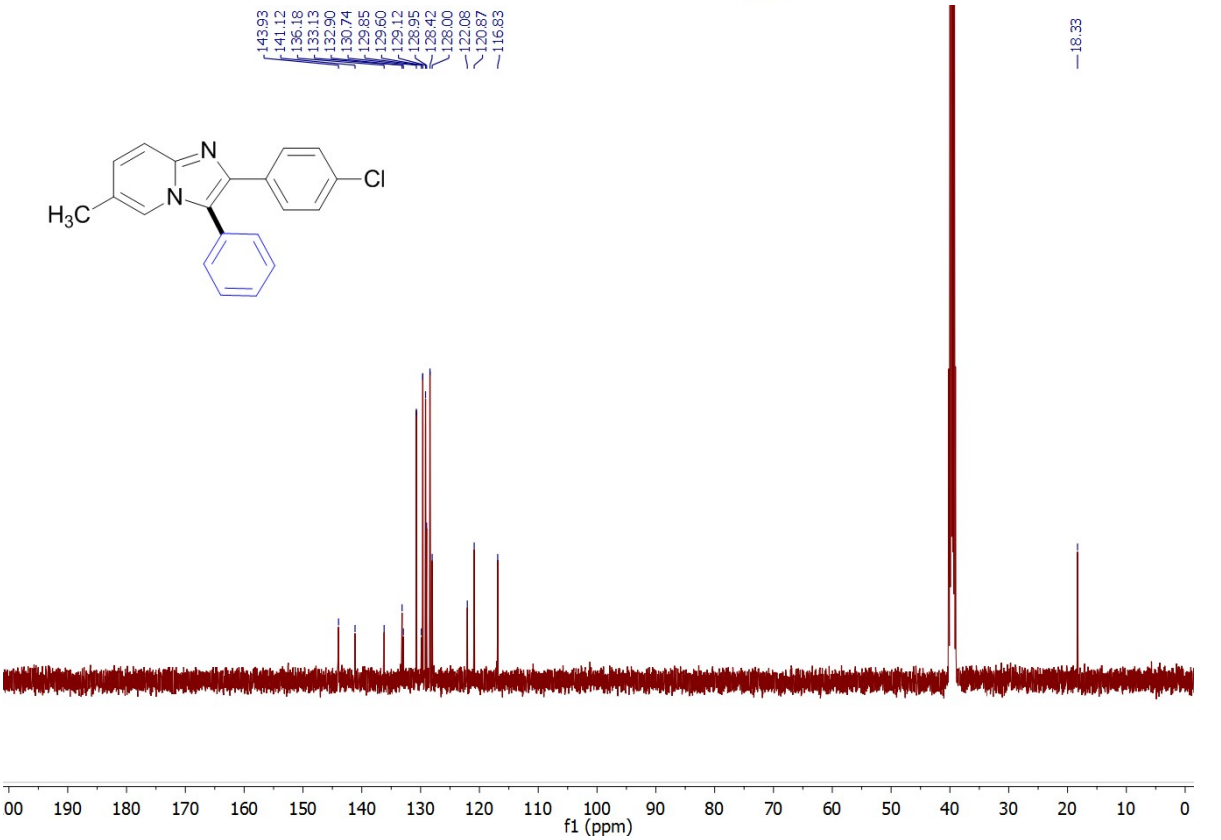
6-chloro-2-(4-chlorophenyl)-3-phenylimidazo[1,2-*a*]pyridine (3i)



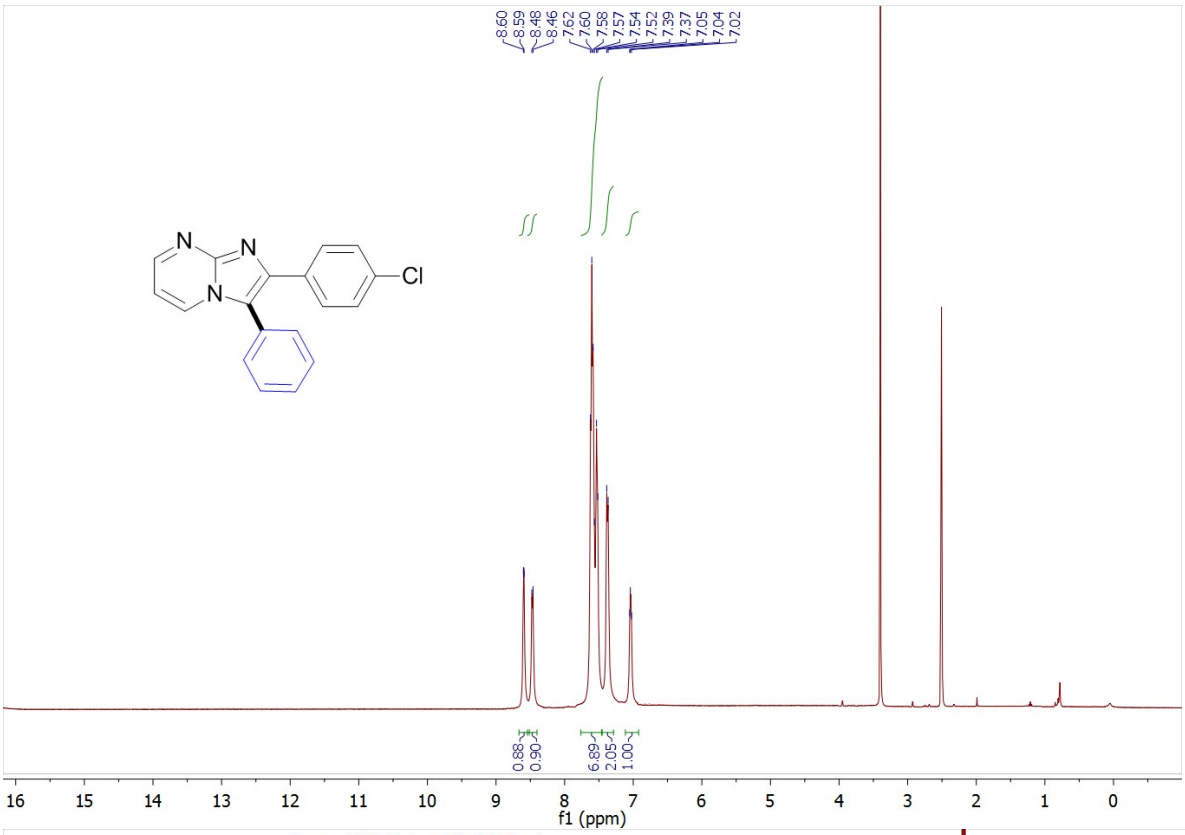


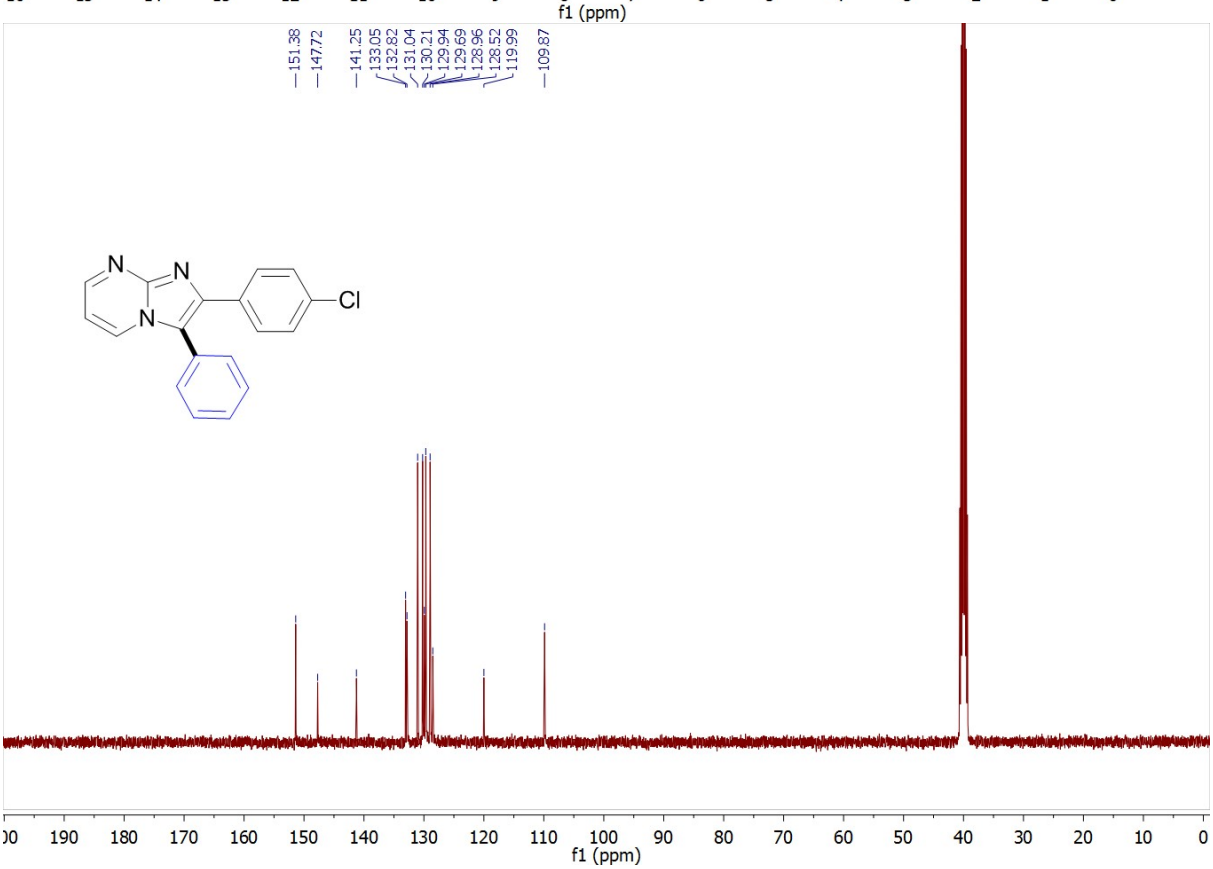
2-(4-chlorophenyl)-6-methyl-3-phenylimidazo[1,2-*a*]pyridine (3j)



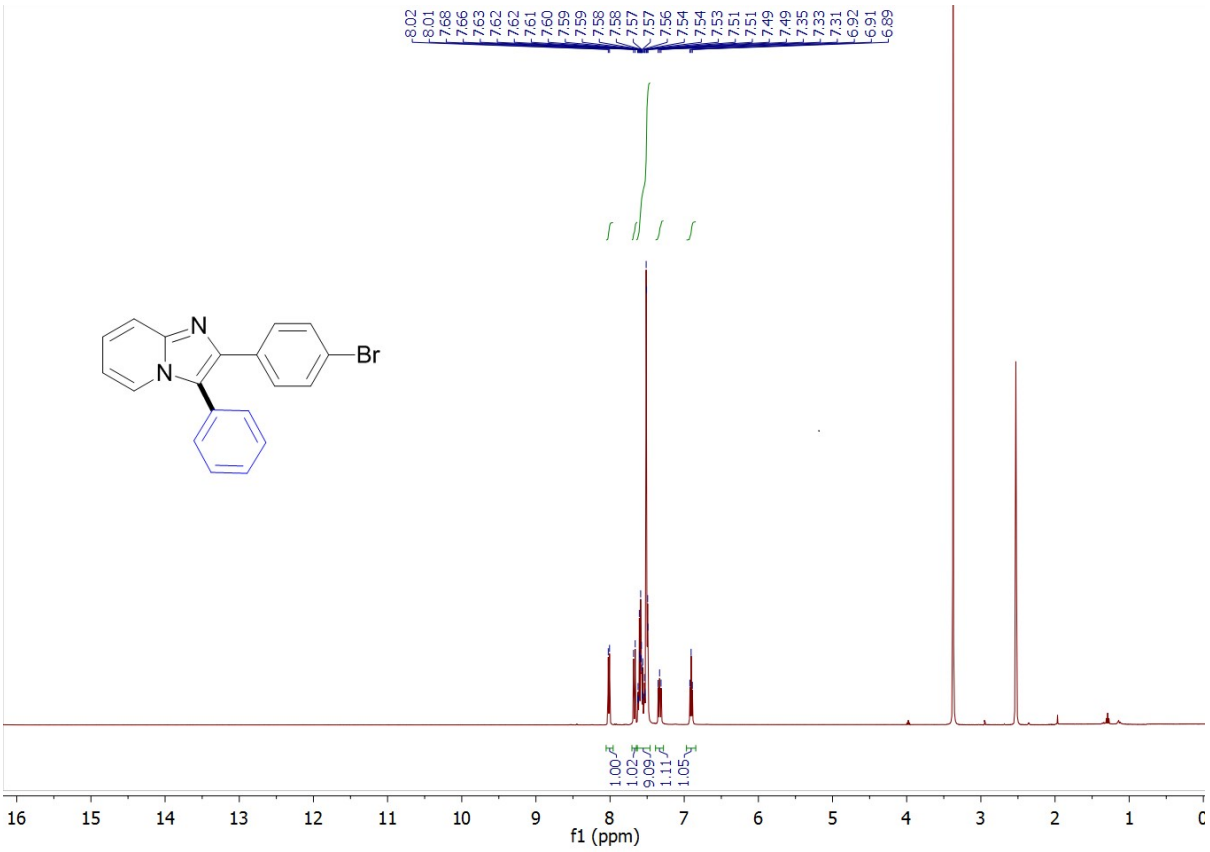


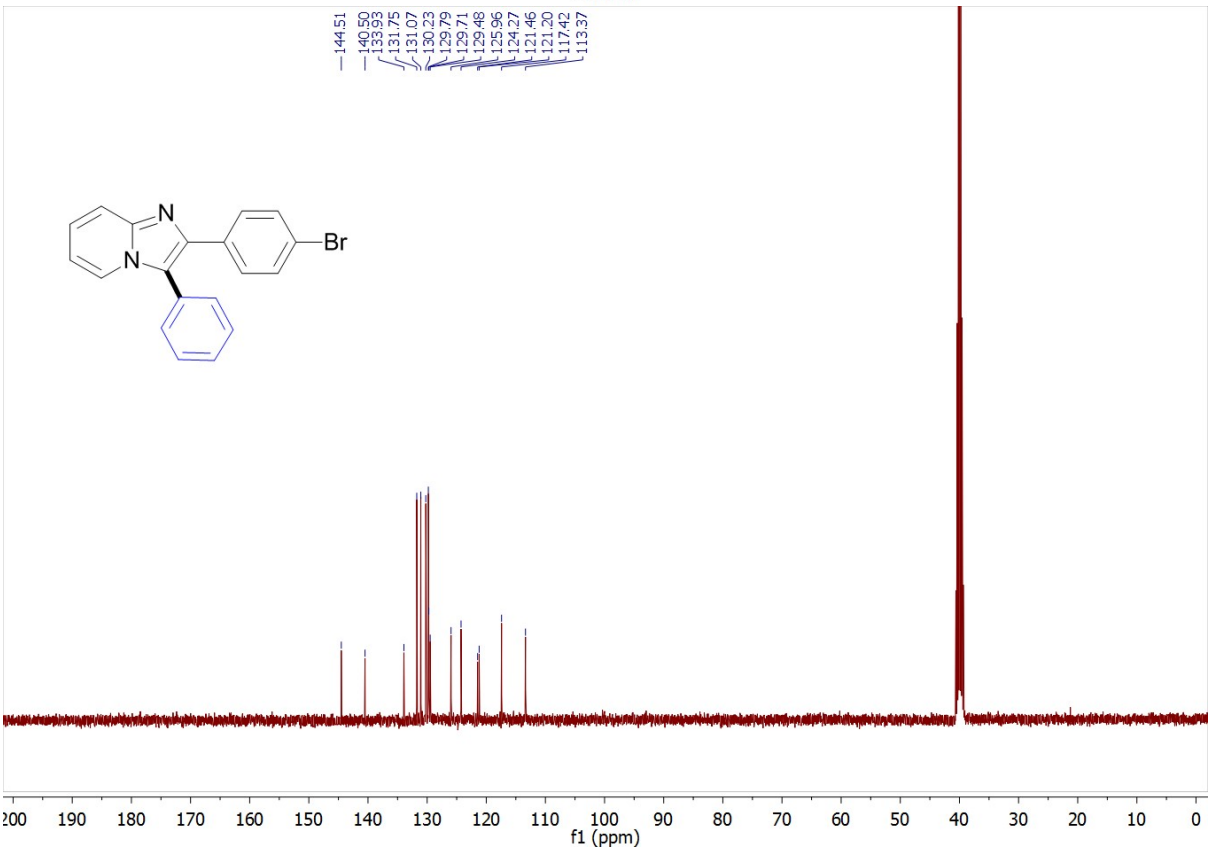
2-(4-chlorophenyl)-3-phenylimidazo[1,2-*a*]pyrimidine (3k)



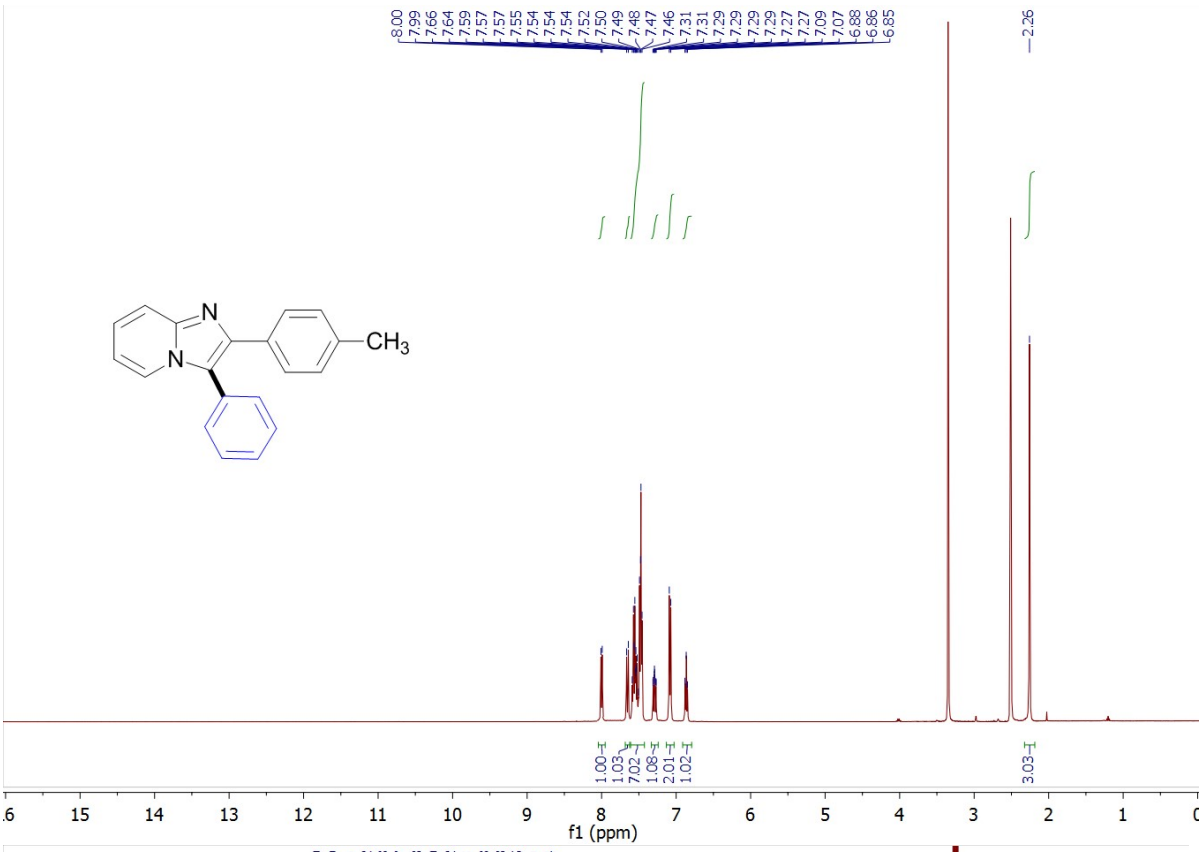


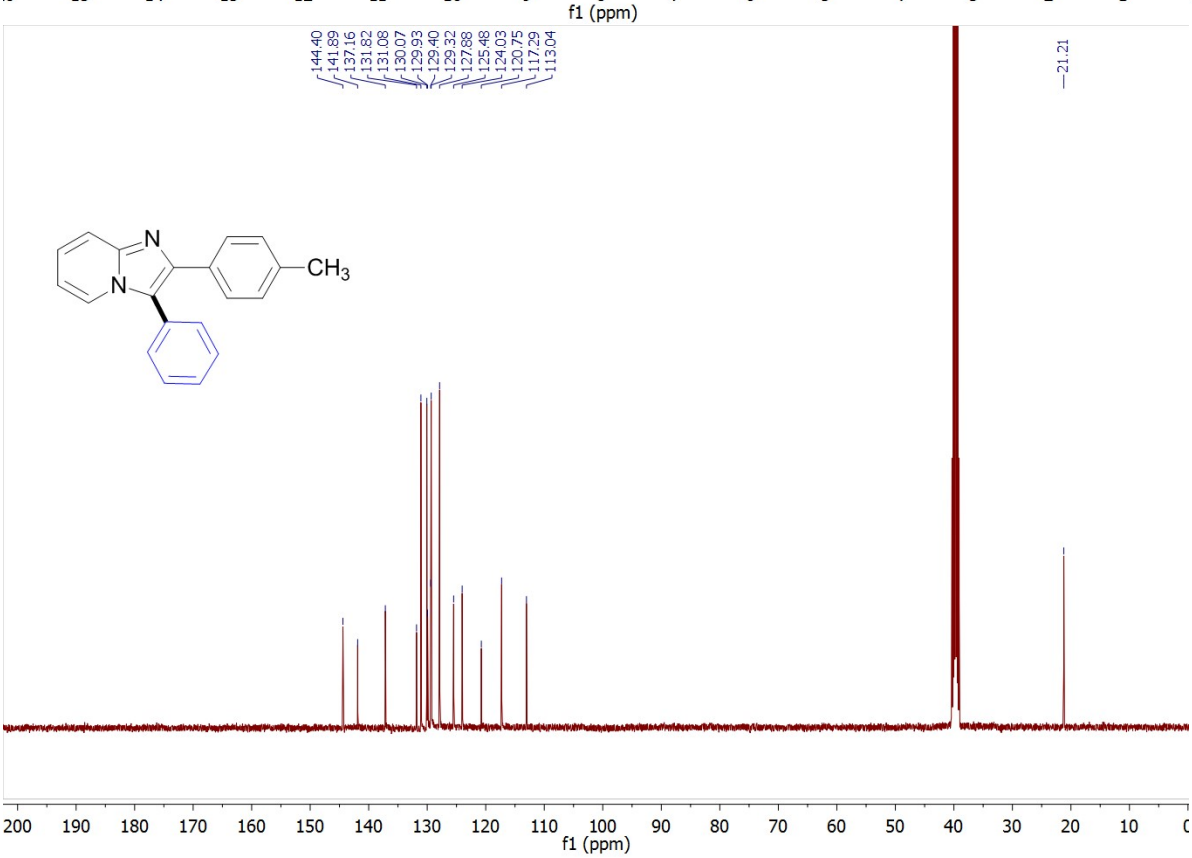
2-(4-bromophenyl)-3-phenylimidazo[1,2-*a*]pyridine (3l)



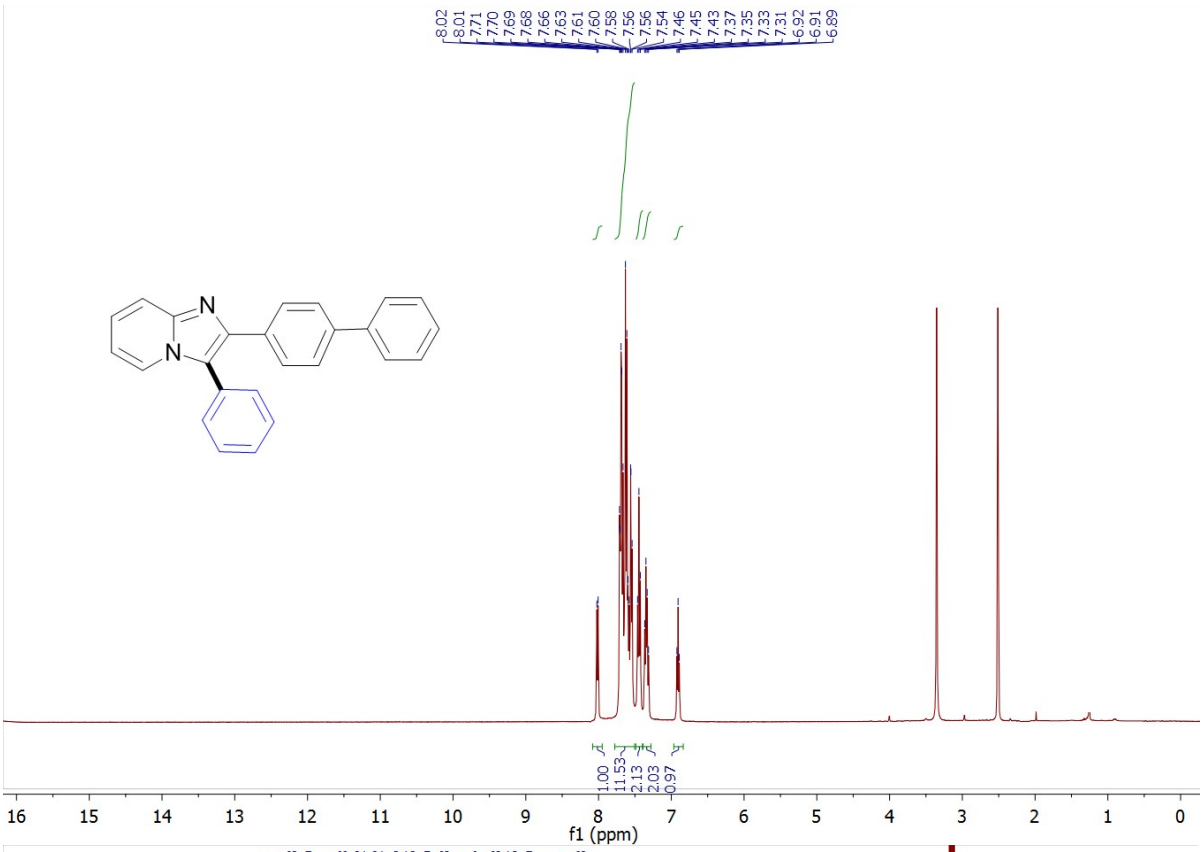


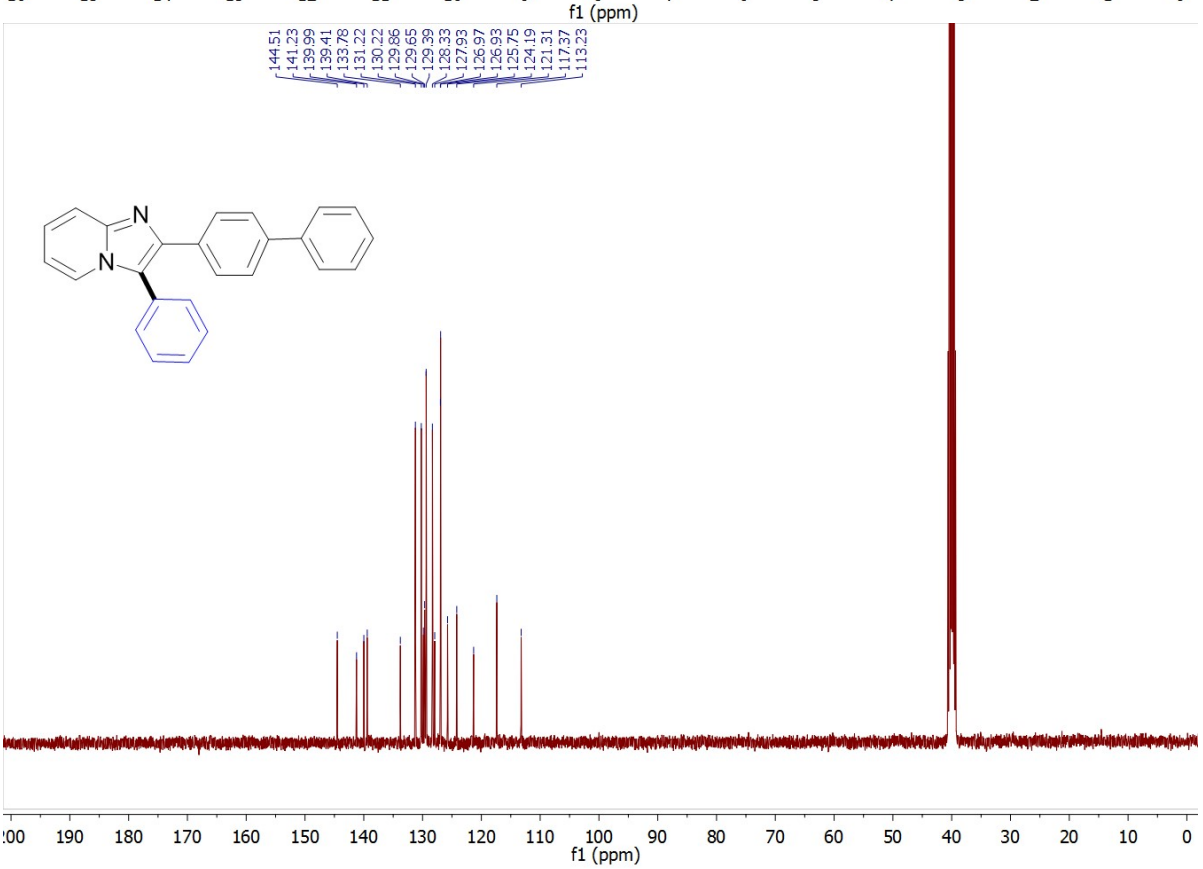
3-phenyl-2-(*p*-tolyl)imidazo[1,2-*a*]pyridine (3m)



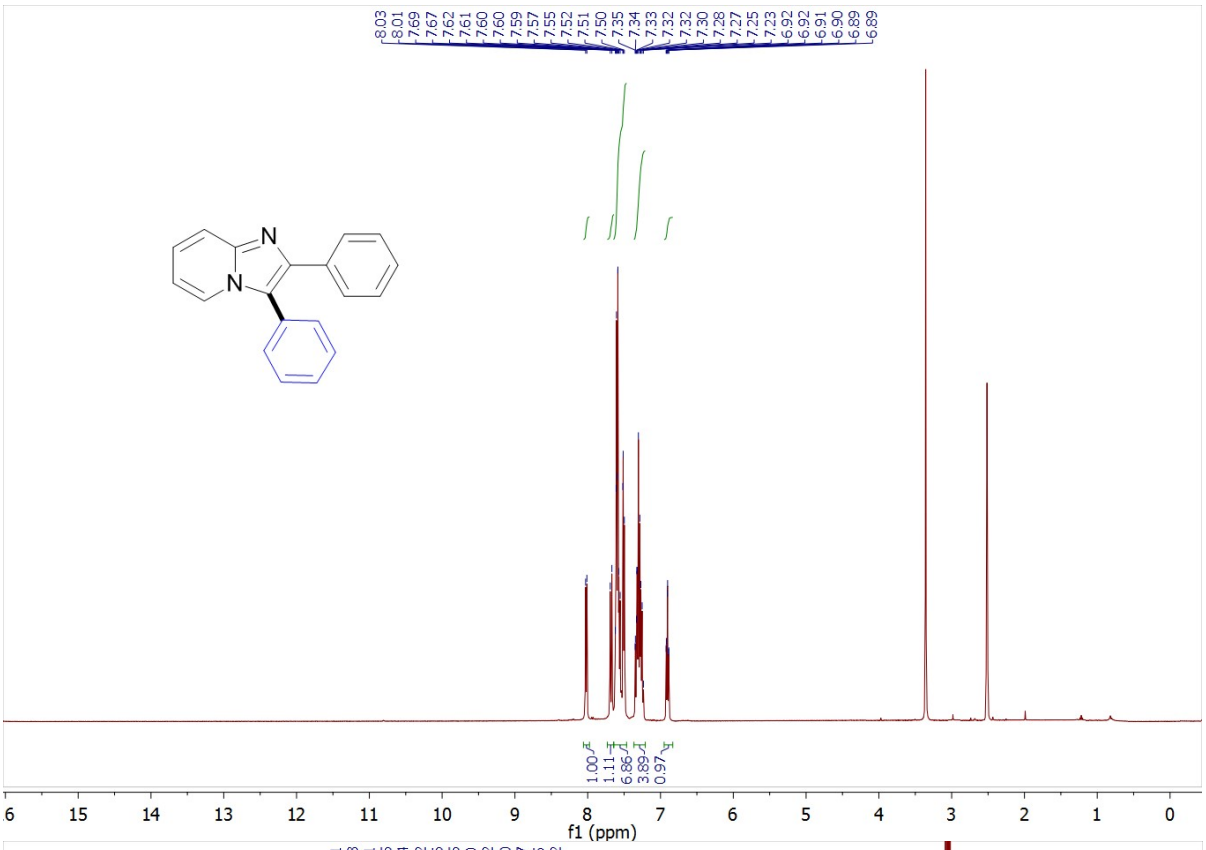


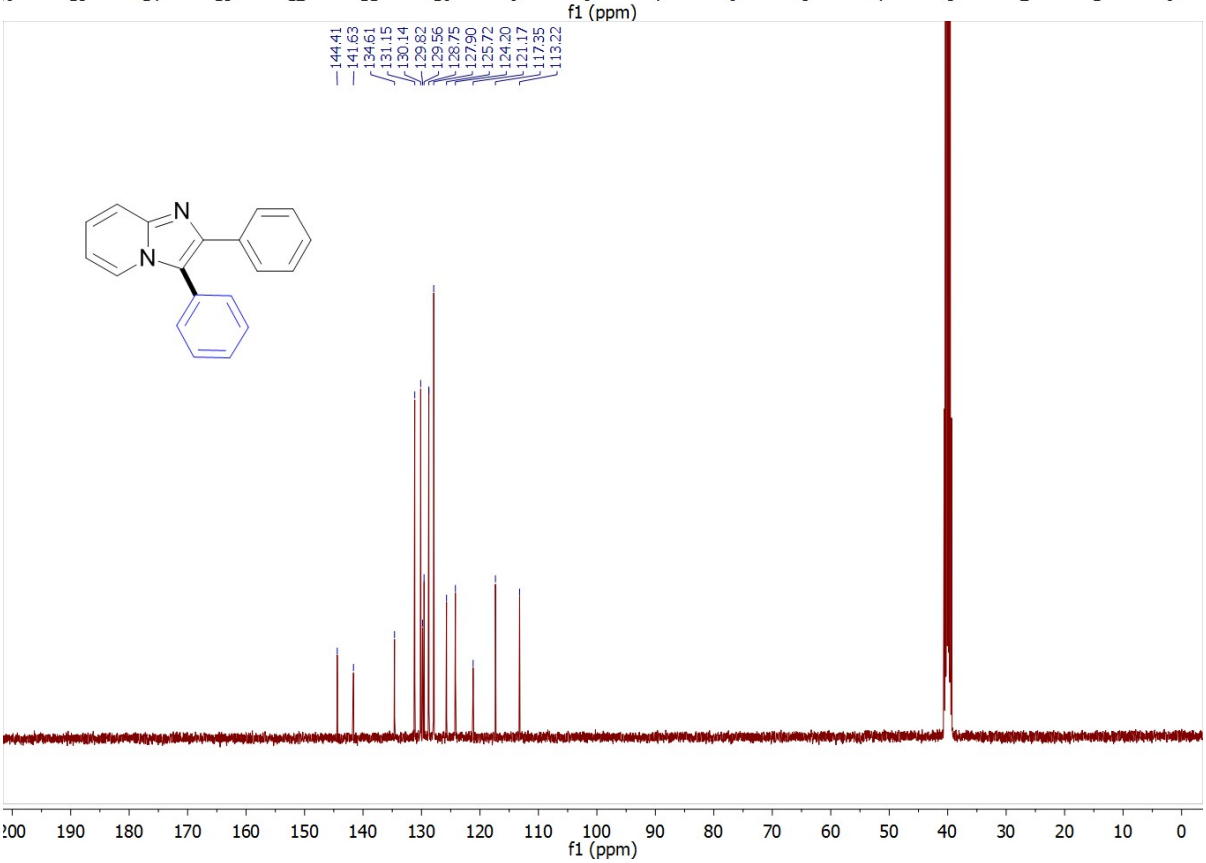
2-([1,1'-biphenyl]-4-yl)-3-phenylimidazo[1,2-*a*]pyridine (3n)



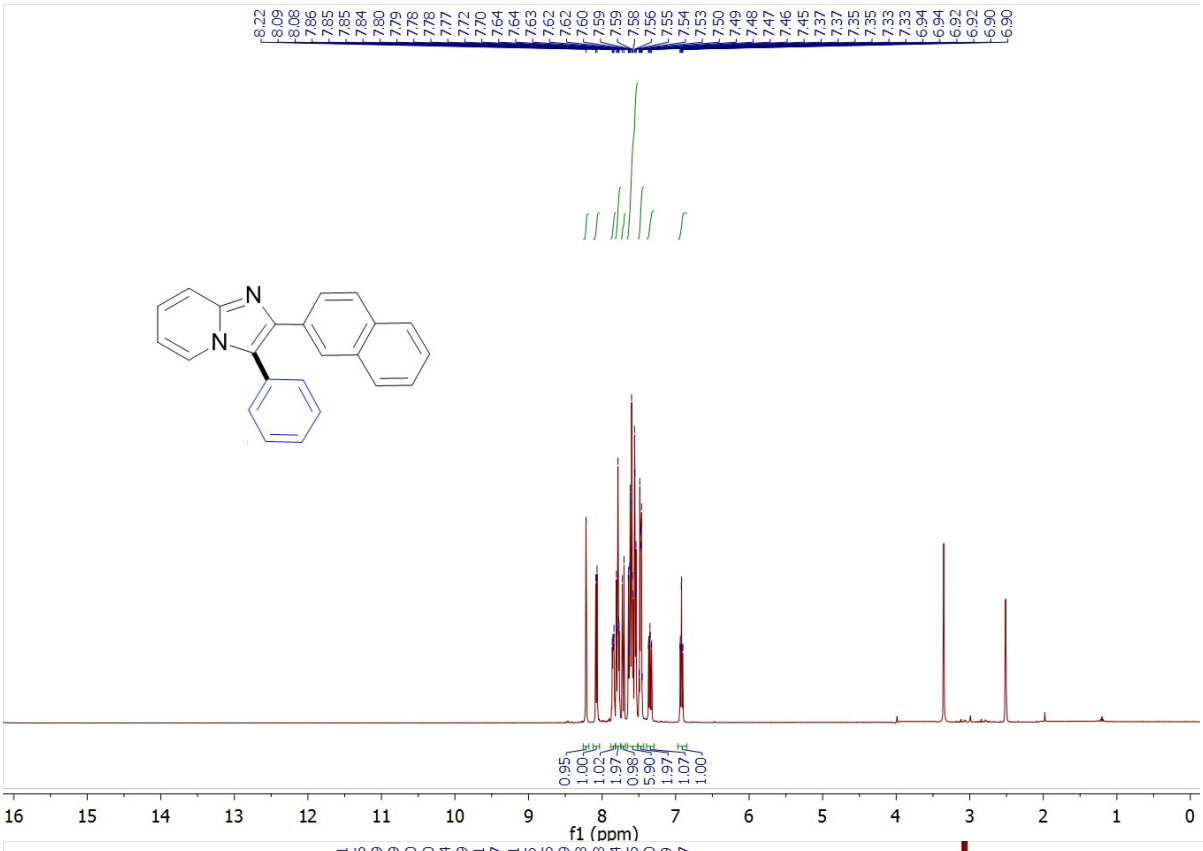


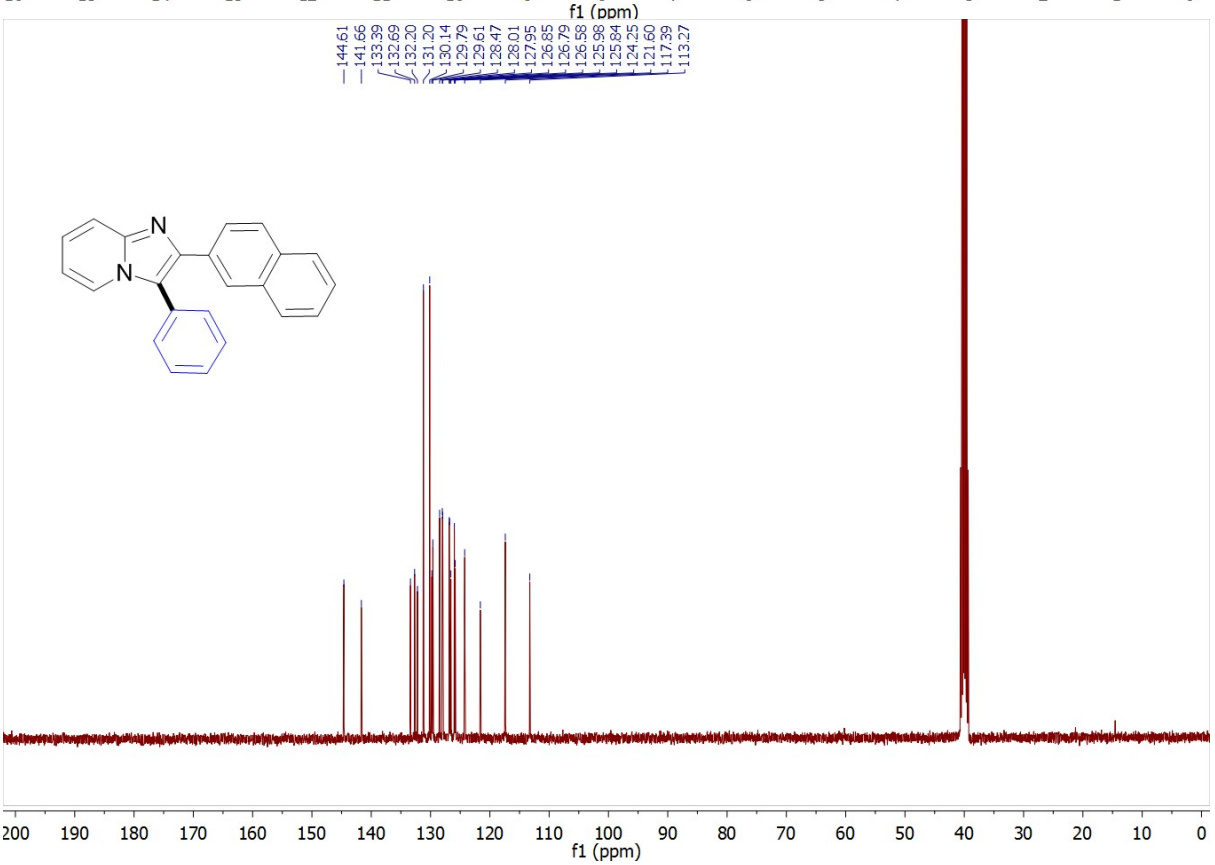
2,3-diphenylimidazo[1,2-*a*]pyridine (3o)



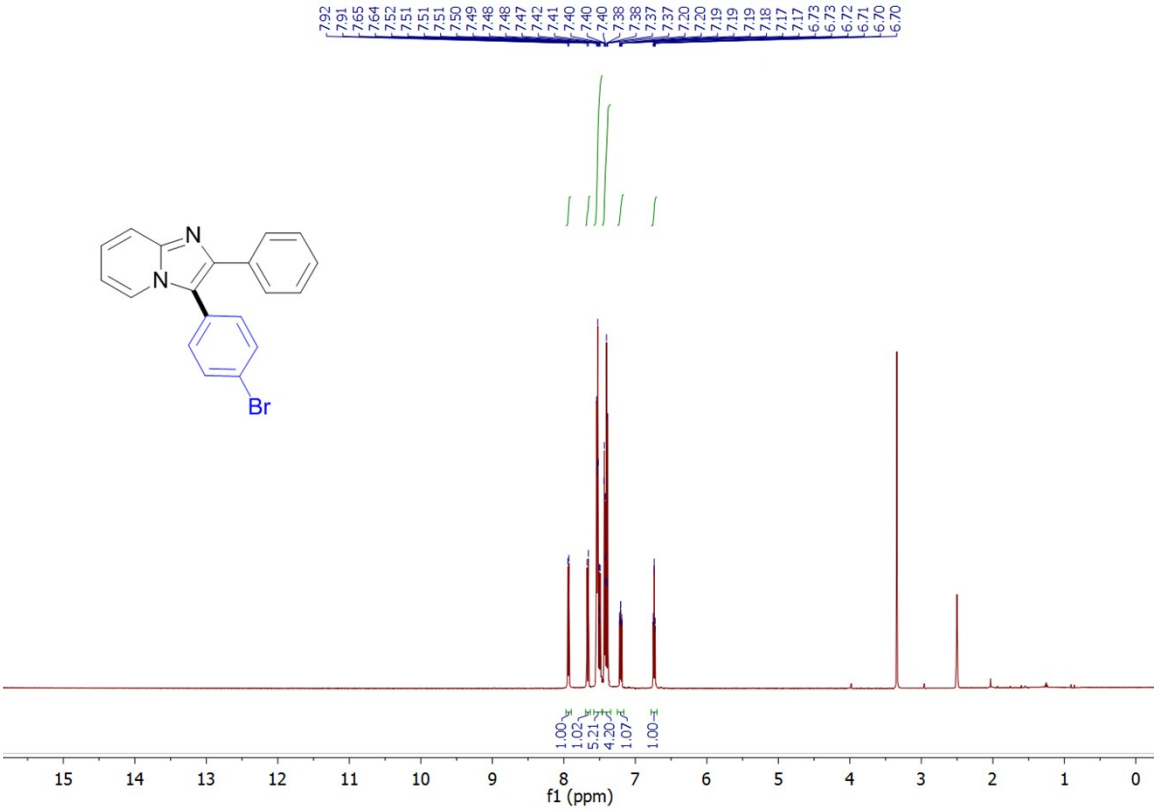


2-(naphthalen-2-yl)-3-phenylimidazo[1,2-*a*]pyridine (3p)





3-(4-bromophenyl)-2-phenylimidazo[1,2-*a*]pyridine (3q)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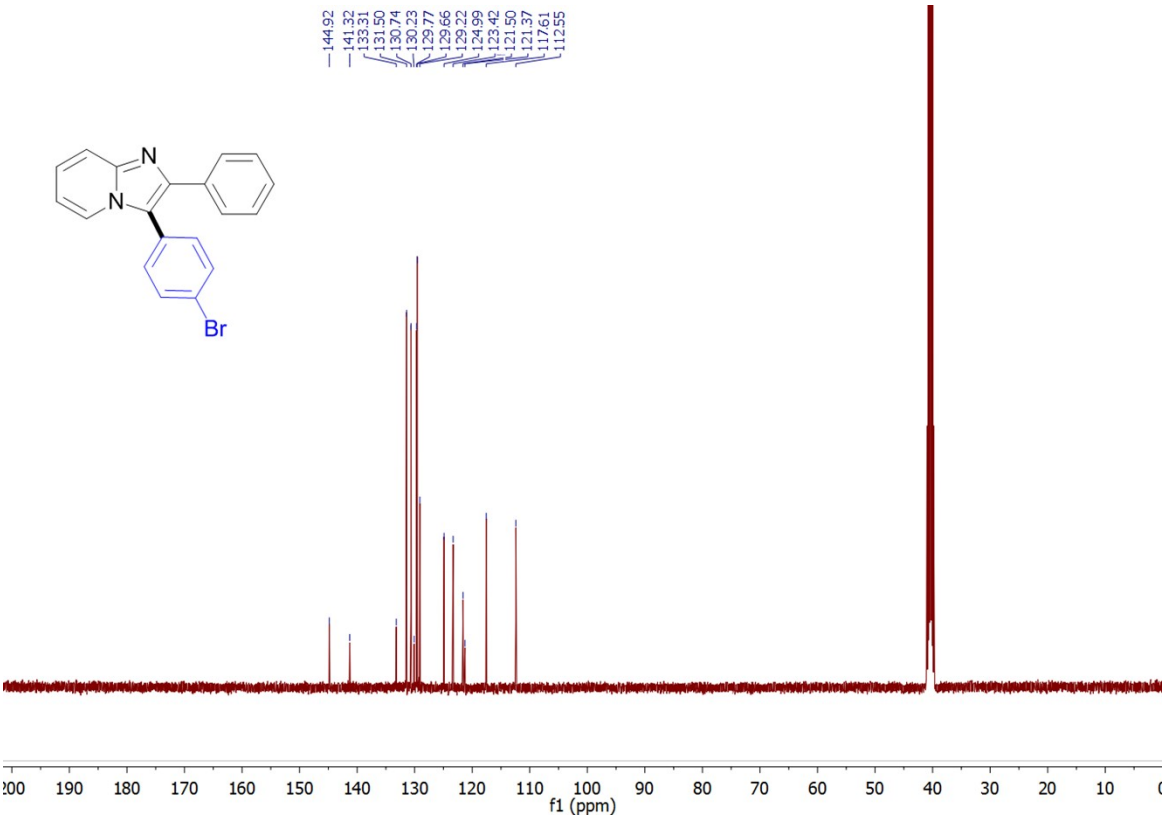
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100
90
80
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60
50
40
30
20
10
f1 (ppm)