Supporting Information

Metal-Free C-3 Alkylation of Imidazopyridines with Xanthates and Convenient Access to Alpidem and Zolpidem†

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A General information

All melting points (mp) were measured on a melting point apparatus with a microscope and a hot stage and were uncorrected. ^{1}H-NMR spectra were determined in $CDCl_3$ on a Bruker 400 spectrometer and chemical shifts were reported in parts per million from internal TMS (δ). Data for ^{1}H-NMR are recorded as follows: chemical shift (δ, ppm), multiplicity (integration, s=singlet, d=doublet, dd=doublets, t=triplet, q=quartet, m=multiplet or unresolved, coupling constants (s) in Hertz). ^{13}C-NMR spectra were obtained by using the same NMR spectrometers. High-resolution mass spectra (HRMS) was performed with 200-300 mesh silica gel using flash column techniques. All of the reagents obtained commercially were used directly unless otherwise noted.

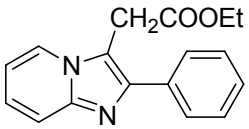
B Experiment procedure and characterization data for products

a General procedure for the synthesis of imidazopyridines 3

DLP (0.75 mmol, 2.5 equiv) was added to a solution of **1** (0.3 mmol, 1 equiv) and **2** (0.75 mmol, 2.5 equiv) in DCE (5 mL). The solution was stirred at 84^{o}C for 12h. Water (10 mL) was added to the solution and the mixture was extracted with DCM (2x10 mL). The combined organic phase was dried over Na_2SO_4. After removal of solvents with a rotary evaporater, the residue was purified on a silica gel column with petroleum ether and ethyl acetate as eluent to afford the desired product **3**.

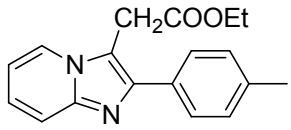
b Characterization data

Ethyl 2-(2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3a):



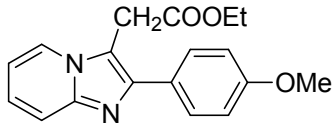
73% yield, white solid, mp = 128-130 ^{o}C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 (d, *J* = 6.8 Hz, 1H), 7.86 (d, *J* = 7.1 Hz, 2H), 7. 68 (d, *J* = 9.1 Hz, 1H), 7.50 (t, *J* = 7.1 Hz, 2H), 7.42-7.38 (m, 1H), 7.26-7.22 (m, 1H), 6.88 (t, *J* = 7.1 Hz, 1H), 4.24 (q, *J* = 7.1 Hz, 2H), 4.06 (s, 2H), 1.29 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.4, 145.1, 144.7, 134.1, 128.6, 128.6, 127.9, 124.5, 123.7, 117.6, 113.0, 112.4, 61.6, 30.9, 14.2. ^{1}H NMR and ^{13}C NMR data are consistent with those reported in the literature.[1]

Ethyl 2-(2-(p-tolyl)imidazo[1,2-*a*]pyridin-3-yl)acetate (3b):



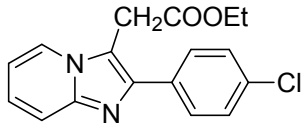
72% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.12 (d, *J* = 6.8 Hz, 1H), 7.74 (d, *J* = 7.6 Hz, 2H), 7.66 (d, *J* = 8.8 Hz, 1H), 7.29 (d, *J* = 8.1 Hz, 2H), 7.23-7.19 (t, *J* = 7.8 Hz, 1H), 6.85 (t, *J* = 6.6 Hz, 1H), 4.21 (q, *J* = 7.2 Hz, 2H), 4.03 (s, 2H), 2.41 (s, 3H), 1.27 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.5, 145.0, 144.6, 137.7, 131.1, 129.4, 128.5, 124.4, 123.7, 117.5, 112.7, 112.3, 61.6, 30.8, 21.3, 14.2. ^{1}H NMR and ^{13}C NMR data are consistent with those reported in the literature.[1]

Ethyl 2-(2-(4-methoxyphenyl)imidazo[1,2-*a*]pyridin-3-yl)acetate (3c):



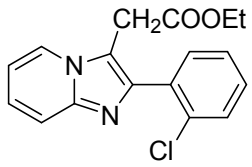
75% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (d, *J* = 6.8 Hz, 1H), 7.79 (d, *J* = 8.8 Hz, 2H), 7.66 (d, *J* = 8.8 Hz, 1H), 7.23 (t, *J* = 7.9 Hz, 1H), 7.03 (d, *J* = 8.8 Hz, 2H), 6.86 (t, *J* = 6.8 Hz, 1H), 4.23 (q, *J* = 7.1 Hz, 2H), 4.03 (s, 2H), 3.87 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.5, 159.5, 144.9, 144.5, 129.8, 126.6, 124.4, 123.6, 117.4, 114.1, 112.3, 112.3, 61.6, 55.3, 30.9, 14.2. HRMS (ESI): m/z calcd for $C_{18}H_{19}N_2O_3$ $[M+H]^+$: 311.1390; found: 311.1394.

Ethyl 2-(2-(4-chlorophenyl)imidazo[1,2-*a*]pyridin-3-yl)acetate (3d):



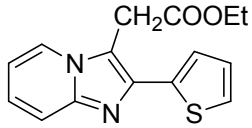
72% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 (d, *J* = 6.8 Hz, 1H), 7.80 (d, *J* = 8.7 Hz, 2H), 7.66 (d, *J* = 8.7 Hz, 1H), 7.45 (d, *J* = 8.1 Hz, 2H), 7.24 (t, *J* = 7.8 Hz, 1H), 6.88 (t, *J* = 6.8 Hz, 1H), 4.22 (q, *J* = 7.1 Hz, 2H), 4.01 (s, 2H), 1.28 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.2, 145.0, 143.4, 134.0, 132.5, 129.8, 128.8, 124.9, 123.8, 117.6, 113.1, 112.6, 61.8, 30.8, 14.2. ^{1}H NMR and ^{13}C NMR data are consistent with those reported in the literature.[1]

Ethyl 2-(2-(2-chlorophenyl)imidazo[1,2-*a*]pyridin-3-yl)acetate (3e):



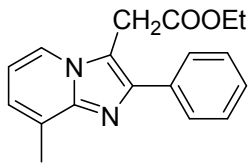
69% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (d, *J* = 6.8 Hz, 1H), 7.70 (d, *J* = 9.2 Hz, 1H), 7.58-7.54 (m, 1H), 7.50-7.47 (m, 1H), 7.36-7.33 (m, 2H), 7.24 (t, *J* = 7.8 Hz, 1H), 6.88 (t, *J* = 6.8 Hz, 1H), 4.14 (q, *J* = 7.1 Hz, 2H), 3.88 (s, 2H), 1.21 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.0, 144.9, 142.1, 133.7, 133.0, 132.8, 129.7, 129.7, 126.7, 124.6, 123.9, 117.7, 114.9, 112.5, 61.4, 30.4, 14.1. HRMS (ESI): m/z calcd for $C_{17}H_{16}ClN_2O_2$ $[M+H]^+$: 315.0895; found: 315.0900.

Ethyl 2-(2-(thiophen-2-yl)imidazo[1,2-*a*]pyridin-3-yl)acetate (3f):



70% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (d, *J* = 6.8 Hz, 1H), 7.65 (d, *J* = 9.2 Hz, 1H), 7.54 (d, *J* = 3.6 Hz, 1H), 7.41 (d, *J* = 5.1 Hz, 1H), 7.23 (t, *J* = 7.8 Hz, 1H), 7.16 (t, *J* = 4.4 Hz, 1H), 6.87 (t, *J* = 6.8 Hz, 1H), 4.21 (q, *J* = 7.1 Hz, 2H), 4.12 (s, 2H), 1.27 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.0, 145.0, 139.0, 137.1, 127.8, 126.1, 125.3, 124.8, 123.6, 117.4, 112.6, 112.3, 61.7, 30.8, 14.2. ^{1}H NMR and ^{13}C NMR data are consistent with those reported in the literature.[1]

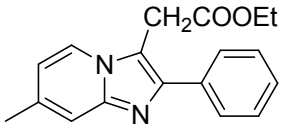
Ethyl 2-(8-methyl-2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3g):



81% yield, brown solid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, *J* = 6.8 Hz, 1H), 7.83 (dd, *J* = 6.8 Hz, 1.6 Hz, 2H), 7.49 (t, *J* = 7.6 Hz, 2H), 7.40 (t, *J* = 7.4 Hz, 1H), 7.04 (d, *J* = 6.8 Hz, 1H), 6.80 (t, *J* = 6.8 Hz, 1H), 4.23 (q, *J* = 7.1 Hz, 2H), 4.02 (s, 2H), 2.68 (s, 3H), 1.28 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.5, 145.3,

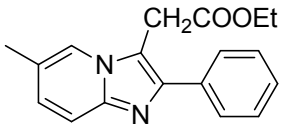
144.0, 134.0, 128.9, 128.6, 127.8, 127.5, 123.6, 121.5, 113.4, 112.6, 61.6, 30.9, 17.2, 14.1. HRMS (ESI): m/z calcd for $C_{18}H_{19}N_2O_2$ $[M+H]^+$: 295.1441; found: 295.1446.

Ethyl 2-(7-methyl-2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3h):



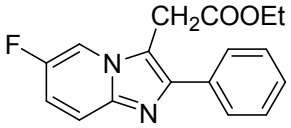
73% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (d, *J* = 6.8 Hz, 1H), 7.83 (d, *J* = 7.6 Hz, 2H), 7.50-7.44 (m, 3H), 7.38 (t, *J* = 7.2 Hz, 1H), 6.71 (d, *J* = 6.8 Hz, 1H), 4.23 (q, *J* = 7.1 Hz, 2H), 4.02 (s, 2H), 2.43 (s, 3H), 1.28 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.5, 145.4, 144.1, 135.6, 134.1, 128.6, 128.5, 127.8, 123.0, 115.9, 115.1, 112.4, 61.6, 30.8, 21.3, 14.2. HRMS (ESI): m/z calcd for $C_{18}H_{19}N_2O_2$ $[M+H]^+$: 295.1441; found: 295.1445.

Ethyl 2-(6-methyl-2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3i):



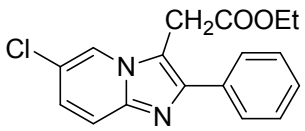
75% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (s, 1H), 7.84 (dd, *J* = 7.2 Hz, *J* = 1.2 Hz, 2H), 7.62 (d, *J* = 9.2 Hz, 1H), 7.50 (t, *J* = 7.4 Hz, 2H), 7.40 (t, *J* = 7.4 Hz, 1H), 7.11 (dd, *J* = 9.2 Hz, 1.2 Hz, 1H), 4.25 (q, *J* = 7.1 Hz, 2H), 4.04 (s, 2H), 2.40 (s, 3H), 1.31 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.5, 144.3, 144.1, 134.1, 128.6, 128.6, 127.8, 127.8, 122.2, 121.4, 116.9, 112.7, 61.6, 30.9, 18.5, 14.2. HRMS (ESI): m/z calcd for $C_{18}H_{19}N_2O_2$ $[M+H]^+$: 295.1441; found: 295.1447.

Ethyl 2-(6-fluoro-2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3j):



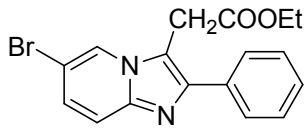
80% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (bs, 1H), 7.82 (d, *J* = 7.2 Hz, 2H), 7.66 (dd, *J* = 9.6 Hz, *J* = 7.2 Hz, 5.2 Hz, 1H), 7.50 (t, *J* = 7.6 Hz, 2H), 7.41 (t, *J* = 7.4 Hz, 1H), 7.17 (dt, *J* = 8.9 Hz, *J* = 2.4 Hz, 1H), 4.25 (q, *J* = 7.1 Hz, 2H), 4.02 (s, 2H), 1.31 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.1, 153.4 (d, $^1J_{FC}$ = 235.0 Hz, 1C), 146.0, 142.7, 133.7, 128.7, 128.5, 128.1, 118.0 (d, $^3J_{FC}$ = 9.1 Hz, 1C), 116.5 (d, $^2J_{FC}$ = 25.4 Hz, 1C), 114.5, 110.6 (d, $^2J_{FC}$ = 41.1 Hz, 1C), 61.8, 30.9, 14.2. HRMS (ESI): m/z calcd for $C_{17}H_{16}FN_2O_4$ $[M+H]^+$: 299.1190; found: 299.1194.

Ethyl 2-(6-chloro-2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3k):



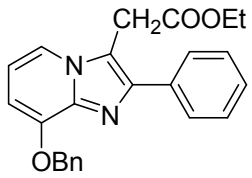
73% yield, yellow solid, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.22 (d, *J* = 0.8 Hz, 1H), 7.82 (d, *J* = 7.2 Hz, 2H), 7.68 (d, *J* = 9.6 Hz, 1H), 7.51 (t, *J* = 7.6 Hz, 2H), 7.45-7.40 (m, 1H), 7.23 (dd, *J* = 9.6 Hz, 1.9 Hz,1H), 4.27 (q, *J* = 7.1 Hz, 2H), 4.04 (s, 2H), 1.33 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.1, 145.5, 143.3, 133.4, 128.7, 128.6, 128.3, 126.1, 121.8, 120.8, 117.9, 113.7, 61.9, 30.8, 14.1. HRMS (ESI): m/z calcd for $C_{17}H_{16}ClN_2O_2$ $[M+H]^+$: 315.0895; found: 315.0900.

Ethyl 2-(6-bromo-2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3l):



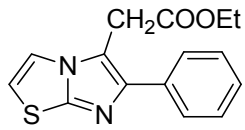
76% yield, yellow solid, mp = 110-112 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (s, 1H), 7.83 (d, *J* = 7.6 Hz, 2H), 7.60 (d, *J* = 9.2 Hz, 1H), 7.50 (t, *J* = 7.4 Hz, 2H), 7.44-7.40 (m, 1H), 7.30 (t, *J* = 8.8 Hz, 1H), 4.27 (q, *J* = 7.1 Hz, 2H), 4.04 (s, 2H), 1.33 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.0, 145.4, 143.4, 133.5, 128.7, 128.6, 128.2, 128.0, 124.0, 118.2, 113.5, 107.2, 61.8, 30.8, 14.2. HRMS (ESI): m/z calcd for $C_{17}H_{16}BrN_2O_2$ $[M+H]^+$: 359.0390; found: 359.0399.

Ethyl 2-(8-(benzyloxy)-2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3m):



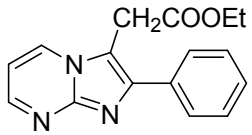
81% yield, brown viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, *J* = 7.2 Hz, 2H), 7.74 (d, *J* = 6.8 Hz, 1H), 7.54-7.46 (m, 4H), 7.41-7.30 (m, 4H), 6.71 (t, *J* = 7.2 Hz, 1H), 6.53 (d, *J* = 7.6 Hz, 1H), 5.38 (s, 2H), 4.23 (q, *J* = 7.1 Hz, 2H), 4.02 (s, 2H), 1.28 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.4, 147.9, 143.8, 139.4, 136.2, 133.8, 128.9, 128.7, 128.5, 128.1, 127.9, 127.4, 116.8, 114.2, 112.4, 103.2, 70.7, 61.7, 31.0, 14.2. HRMS (ESI): m/z calcd for $C_{24}H_{23}N_2O_3$ $[M+H]^+$: 387.1703; found: 387.1715.

Ethyl 2-(6-phenylimidazo[2,1-*b*]thiazol-5-yl)acetate (3n):



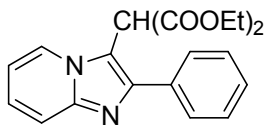
75%yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.74 (d, *J* = 7.6 Hz, 2H), 7.51 (d, *J* = 4.4 Hz, 1H), 7.46 (t, *J* = 7.6 Hz, 2H), 7.35 (t, *J* = 7.4 Hz, 1H), 6.84 (d, *J* = 4.4 Hz, 1H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.94 (s, 2H), 1.29 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.5, 149.1, 145.4, 134.2, 128.6, 127.8, 127.5, 118.0, 114.5, 112.4, 61.6, 31.6, 14.2. HRMS (ESI): m/z calcd for $C_{15}H_{15}N_2O_2S$ $[M+H]^+$: 287.0849; found: 287.0852.

Ethyl 2-(2-phenylimidazo[1,2-*a*]pyrimidin-3-yl)acetate (3o):



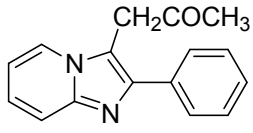
81% yield, yellow solid, mp = 114-116 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.56-8.54 (m, 1H), 8.51 (dd, *J* = 6.8 Hz, 1.6 Hz, 1H), 7.88 (d, *J* = 7.2 Hz, 2H), 7.49 (t, *J* = 7.6 Hz, 2H), 7.43-7.33 (m, 1H), 6.93 (dd, *J* = 6.8 Hz, 4.0 Hz, 1H), 4.22 (q, *J* = 7.1 Hz, 2H), 4.07 (s, 2H), 1.29 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.0, 158.5, 149.7, 148.1, 145.8, 131.6, 128.8, 128.7, 128.4, 111.5, 108.6, 61.9, 30.5, 14.2. HRMS (ESI): m/z calcd for $C_{16}H_{16}N_3O$ $[M+H]^+$: 282.1237; found: 282.1242.

Diethyl 2-(2-phenylimidazo[1,2-*a*]pyridin-3-yl)malonate (3p):



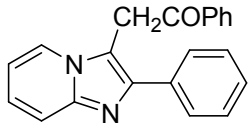
75% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.36 (d, *J* = 6.4 Hz, 1H), 7.77 (d, *J* = 7.6 Hz, 2H), 7.70 (d, *J* = 9.2 Hz, 1H), 7.51 (t, *J* = 6.8 Hz, 2H), 7.45-7.41 (m, 1H), 7.26 (t, *J* = 7.8 Hz, 1H), 6.84 (t, *J* = 6.8 Hz, 1H), 5.42 (s, 1H), 4.28-4.23 (m, 4H), 1.28-1.25 (m, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.6, 146.3, 145.8, 133.7, 129.1, 128.7, 128.3, 126.3, 125.3, 117.6, 112.1, 111.8, 62.5, 49.2, 14.0. HRMS (ESI): m/z calcd for $C_{20}H_{21}N_2O_4$ $[M+H]^+$: 353.1496; found: 353.1503.

1-(2-phenylimidazo[1,2-*a*]pyridin-3-yl)propan-2-one (3q):



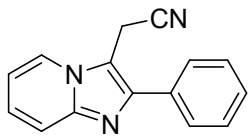
79% yield, yellow viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.86 (d, *J* = 6.8 Hz, 1H), 7.69 (d, *J* = 7.9 Hz, 3H), 7.48 (t, *J* = 7.6 Hz, 2H), 7.40 (t, *J* = 7.2 Hz, 1H), 7.23 (t, *J* = 7.8 Hz, 1H), 6.84 (t, *J* = 6.8 Hz, 1H), 4.15 (s, 2H), 2.20 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 204.0, 145.1, 144.5, 134.1, 128.8, 128.4, 128.0, 124.7, 123.4, 117.7, 113.5, 112.7, 39.6, 29.3. HRMS (ESI): m/z calcd for $C_{16}H_{15}N_2O$ $[M+H]^+$: 251.1179; found: 251.1180.

1-phenyl-2-(2-phenylimidazo[1,2-*a*]pyridin-3-yl)ethanone (3r):



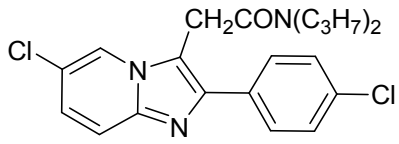
65% yield, brown viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (d, *J* = 7.6 Hz, 2H), 7.92 (d, *J* = 6.8 Hz, 1H), 7.76 (d, *J* = 9.2 Hz, 1H), 7.67 (d, *J* = 6.8 Hz, 2H), 7.61 (t, *J* = 7.4 Hz, 1H), 7.49-7.38 (m, 5H), 7.26-7.21 (m, 1H), 6.83 (t, *J* = 6.8 Hz, 1H), 4.74 (s, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 194.7, 145.1, 144.4, 135.6, 133.9, 129.9, 128.9, 128.8, 128.7, 128.6, 128.0, 124.7, 123.8, 117.5, 113.8, 112.6, 34.8. HRMS (ESI): m/z calcd for $C_{21}H_{17}N_2O$ $[M+H]^+$: 313.1335; found: 313.1335.

2-(2-phenylimidazo[1,2-a]pyridin-3-yl)acetonitrile (3s):



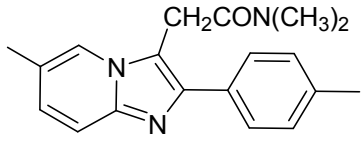
79% yield, brown viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (d, *J* = 6.8 Hz, 1H), 7.76 (d, *J* = 8.8 Hz, 1H), 7.72-7.69 (m, 2H), 7.53 (t, *J* = 7.4 Hz, 2H), 7.48-7.42 (m, 1H), 7.35 (dt, *J* = 8.0 Hz, 0.8Hz, 1H), 7.02 (dt, *J* = 6.8 Hz, 0.8Hz, 1H), 4.17 (s, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 145.4, 145.1, 133.0, 129.0, 128.6, 128.6, 125.5, 122.9, 118.0, 115.0, 113.5, 107.8, 13.9. HRMS (ESI): m/z calcd for $C_{15}H_{12}N_3$ $[M+H]^+$: 234.1026; found: 234.1026.

Alpidem (A):



81% yield, off white solid, mp = 137-139 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.26 (s, 1H), 7.59 (d, *J* = 8.8 Hz, 3H), 7.44 (d, *J* = 8.4 Hz, 2H), 7.18 (d, *J* = 9.6 Hz, 1H), 4.06 (s, 2H), 3.31 (t, *J* = 7.6 Hz, 2H), 3.15 (t, *J* = 7.8 Hz, 2H), 1.66-1.45 (m, 4H), 0.88 (t, *J* = 7.4 Hz, 3H), 0.78 (t, *J* = 7.3 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 167.2, 143.6, 143.5, 134.2, 132.5, 129.9, 128.9, 126.2, 122.6, 120.7, 117.6, 115.6, 49.9, 48.0, 30.0, 22.3, 20.9, 11.3, 11.0. ^{1}H NMR and ^{13}C NMR data are consistent with those reported in the literature.[2]

Zolpidem (B):



71% yield, off white solid, mp = 193-195 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (s, 1H), 7.55 (t, *J* = 7.8 Hz, 3H), 7.26 (d, *J* = 8.4 Hz, 2H), 7.05 (d, *J* = 8.8 Hz, 1H), 4.08 (s, 2H), 2.95 (s, 3H), 2.89 (s, 3H), 2.40 (s, 3H), 2.34 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 168.3, 144.1, 143.7, 137.5, 131.6, 129.4,

128.5, 127.7, 122.2, 121.9, 116.5, 113.7, 37.5, 35.9, 30.3, 21.3, 18.5. ^{1}H NMR and ^{13}C NMR data are consistent with those reported in the literature.[3]

References:

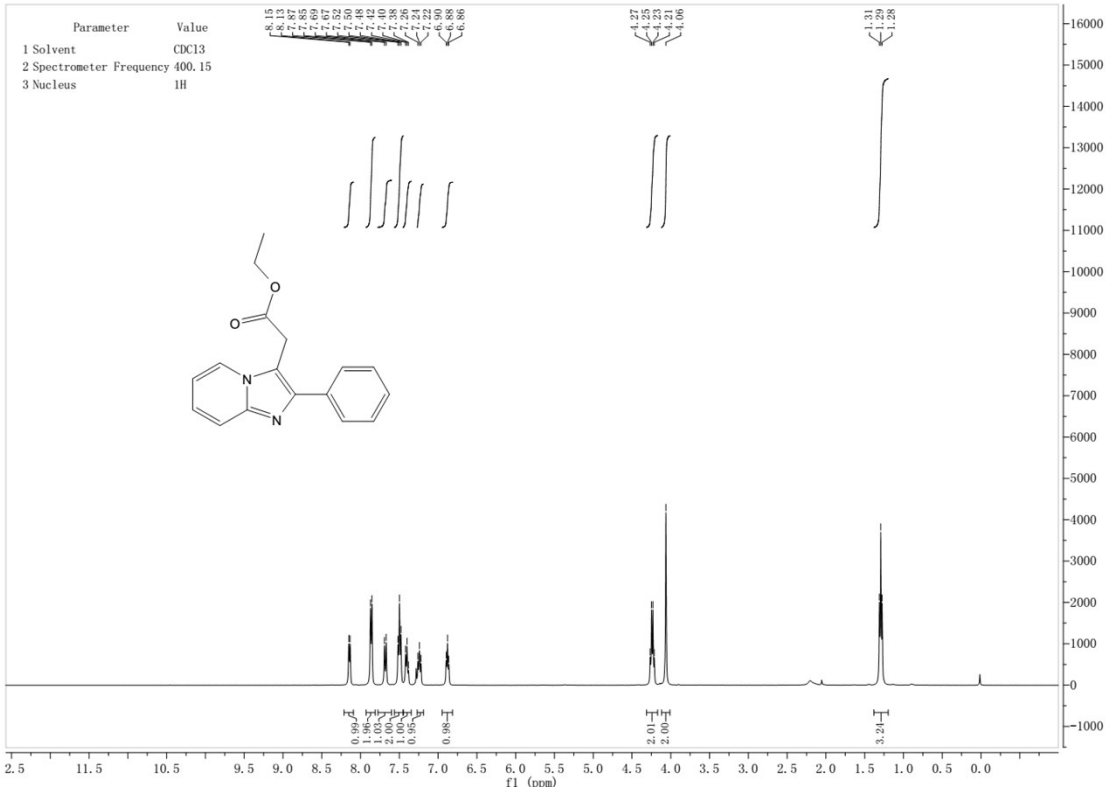
1 D. K. Nair, S. M. Mobin, I. N. N. Namboothiri, *Org. Lett.,* 2012, **14,** 4580.

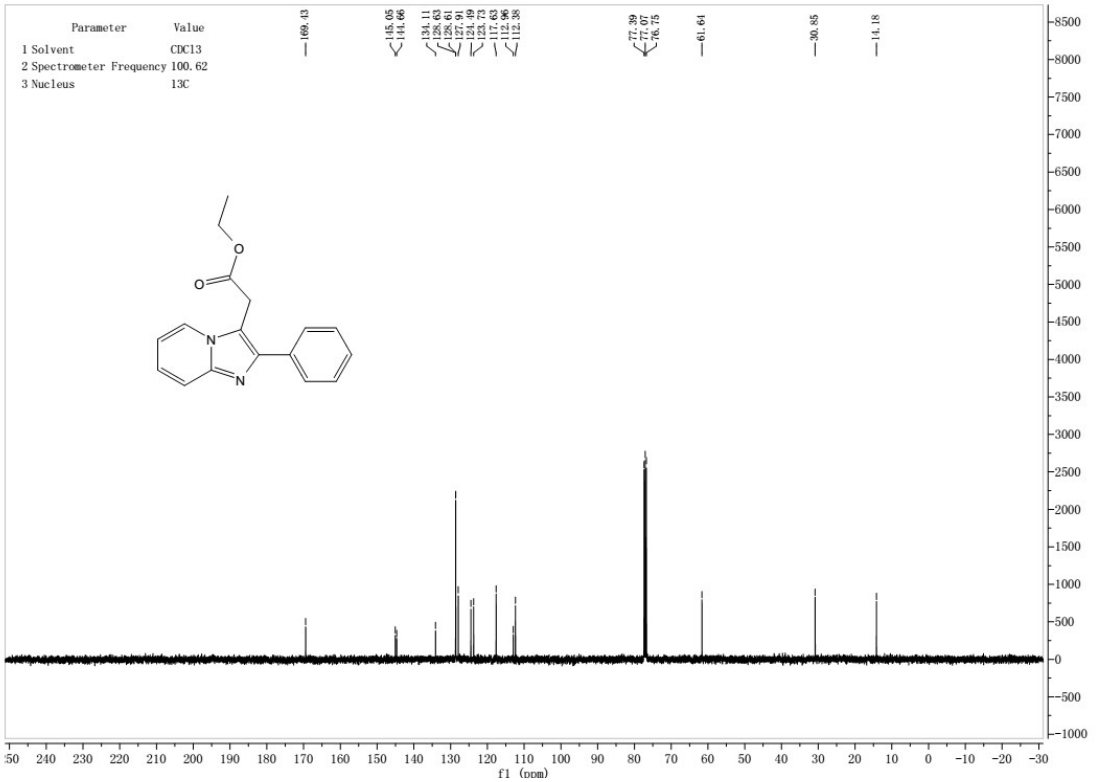
2 J. P. Kaplan, P. George, Assignee, Synthelabo S. A., *Eur. Pat. Appl.* 1982, 19820428.

3 a) A. Zaworska, J. Dzikowska, J. Cybulski, K. Bankowski, W. Szelejewski, Instytut Farmaceutyczny, *PL* 196300; b) R. Sridharan, S. B. Bhirud, V. L. A. Purushotham, Glenmark Pharmaceuticals Limited, *Indian Pat. Appl.* 2006, 20060728; c) R. Chinnapillai, R. R. Nallamaddi, V. R. Arava, V. Jasti, Suven Life Sciences Limited, *PCT Int. Appl.* 2009, 2009007995; d) R. Labriola, Quimica Sintetica, S.A., *PCT Int.* Appl. 2000, WO 2000008021.

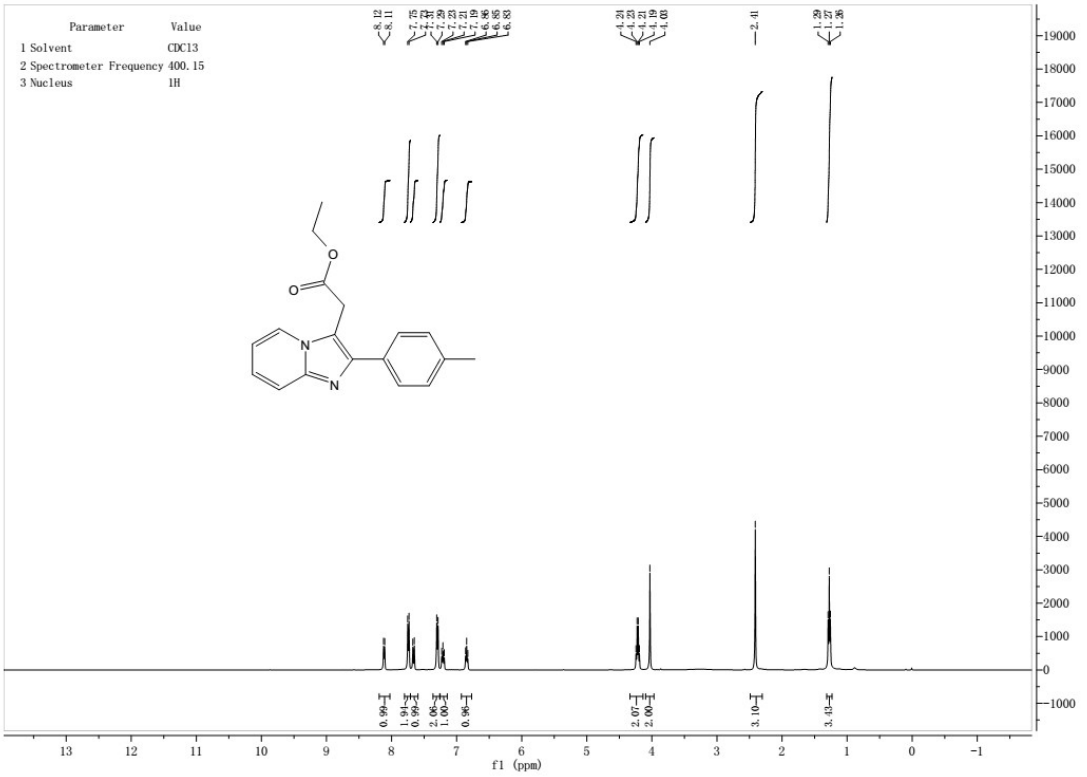
NMR Spectra:

3a





3b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3 Nucleus 1H
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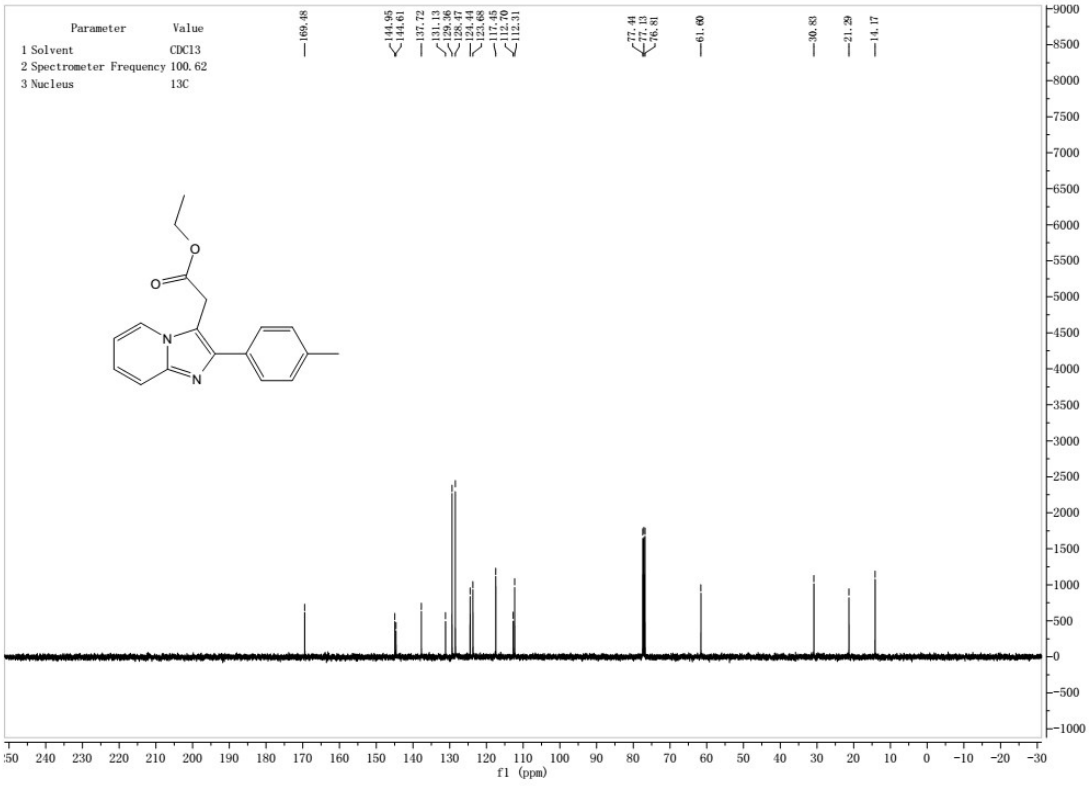
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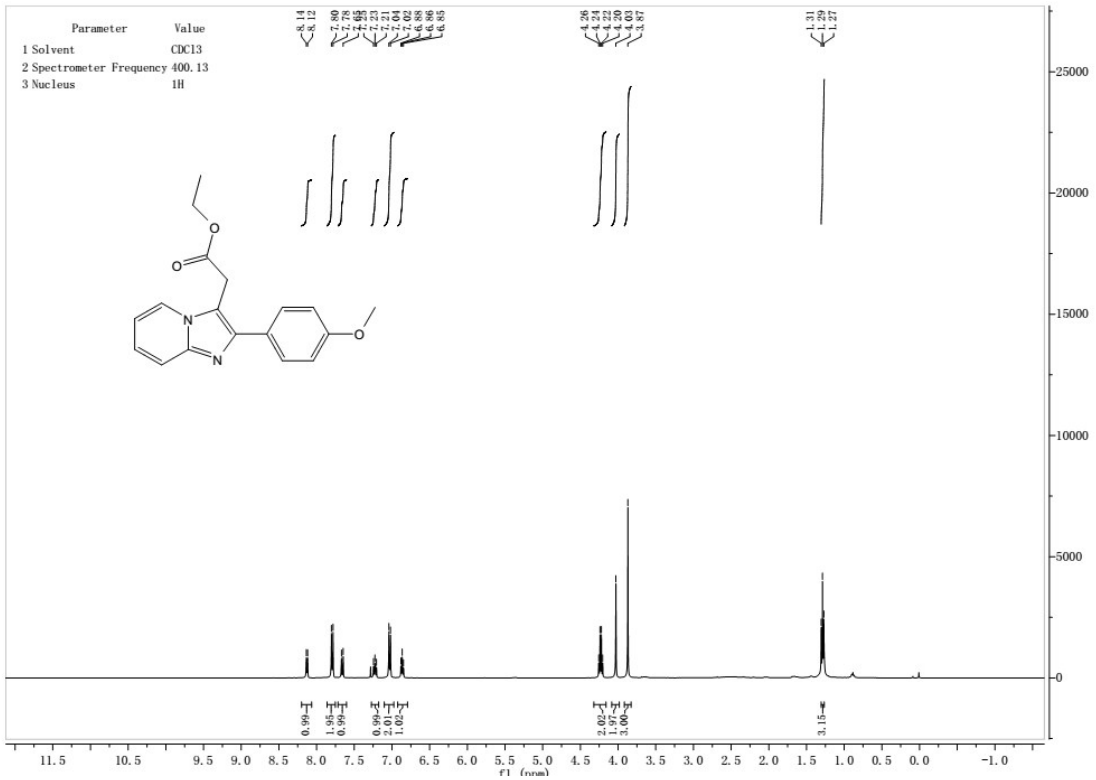
3 Nucleus 13C
f1 (ppm)

3c


Parameter Value
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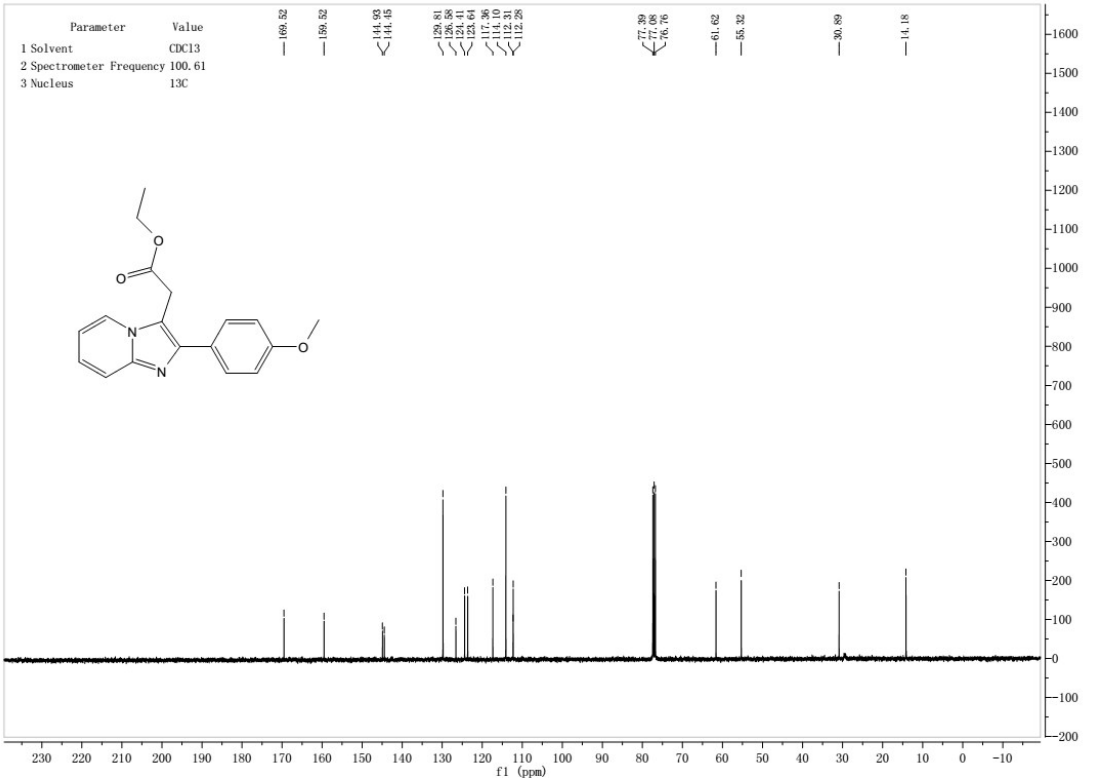
8.14
8.12
7.80
7.78
7.23
7.21
7.04
7.02
6.88
6.86
6.85
4.26
4.24
4.22
4.20
4.03
3.87
1.31
1.29
1.27
0.99
1.95
0.99
0.99
2.01
1.02
2.02
1.97
3.00
3.15
f1 (ppm)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129.81
126.58
124.41
123.64
117.36
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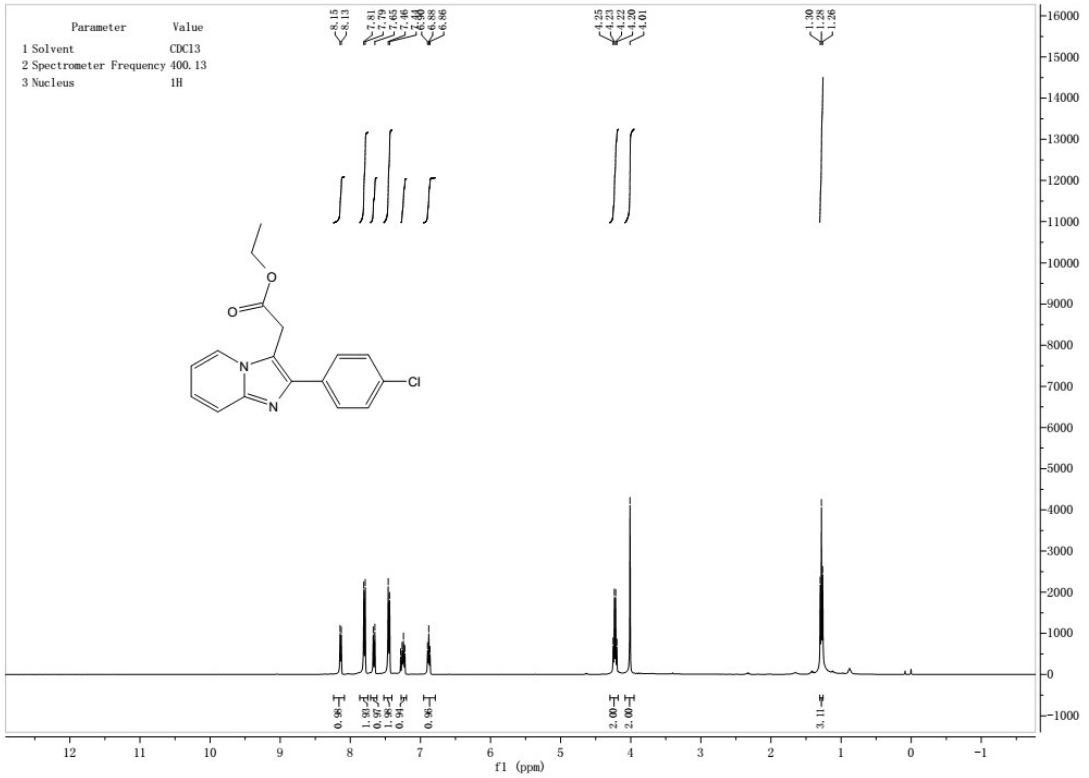
113.31
112.28
77.39
77.08
76.76
61.62
55.32
30.89
14.18
f1 (ppm)

3d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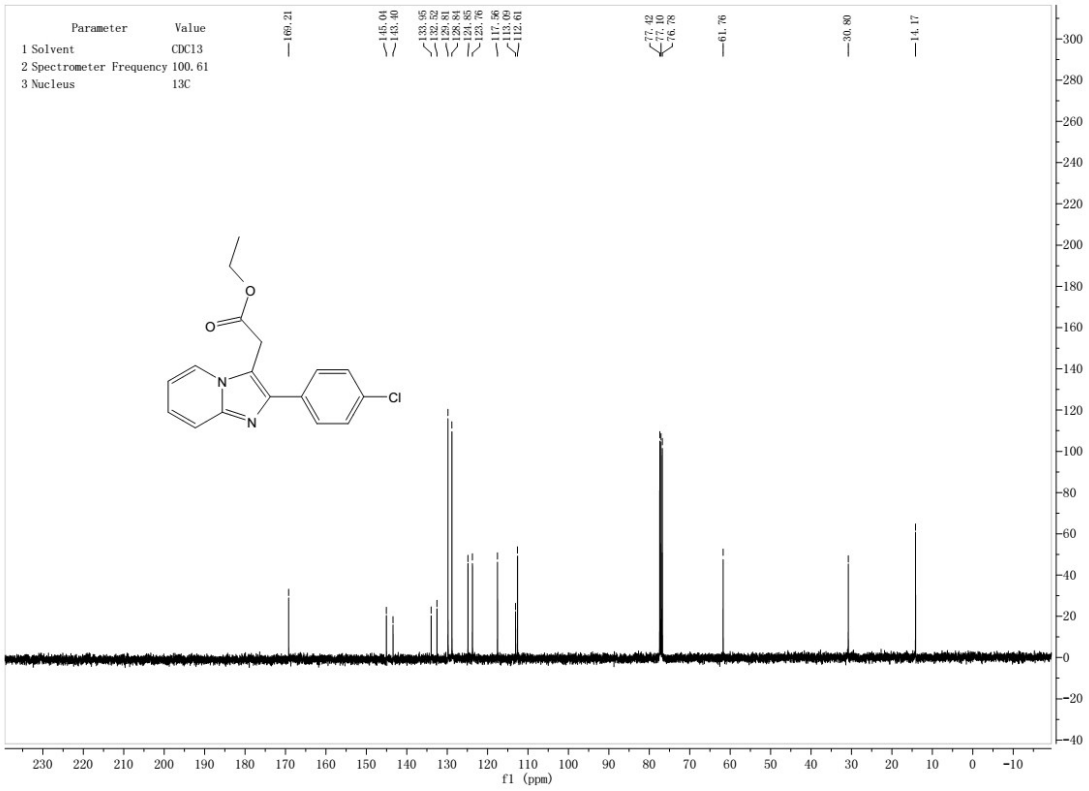
3 Nucleus 1H
f1 (ppm)


Parameter Value
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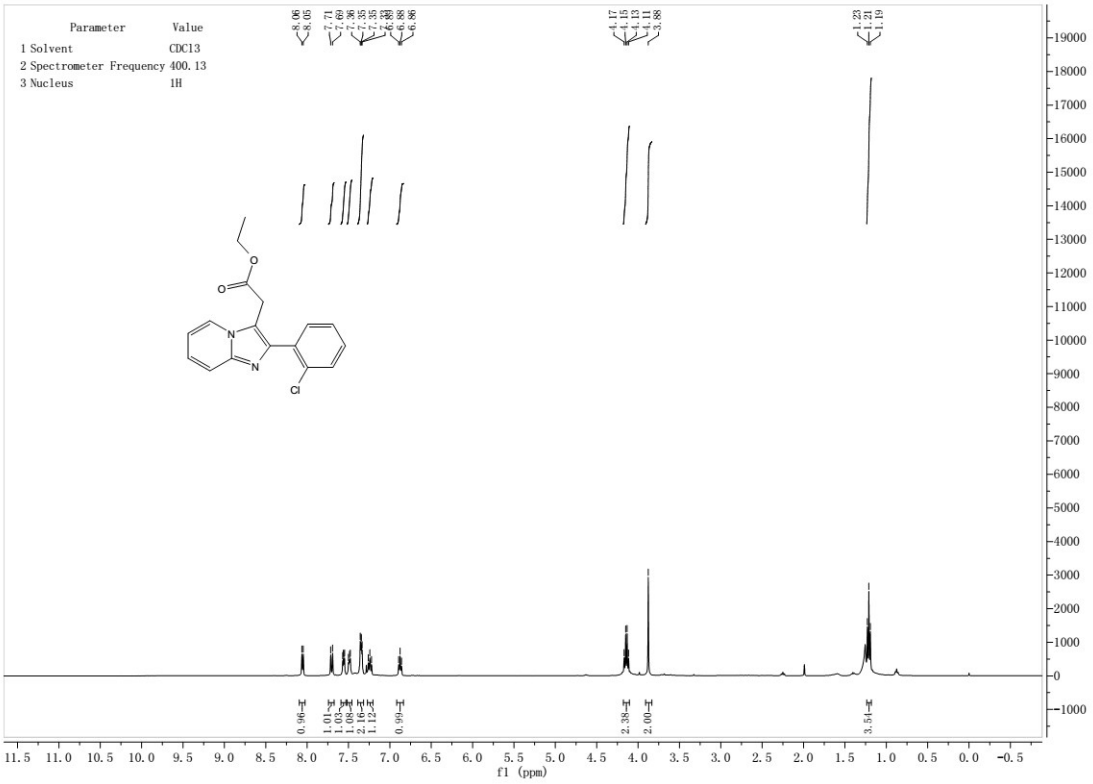
3 Nucleus 13C
f1 (ppm)

3e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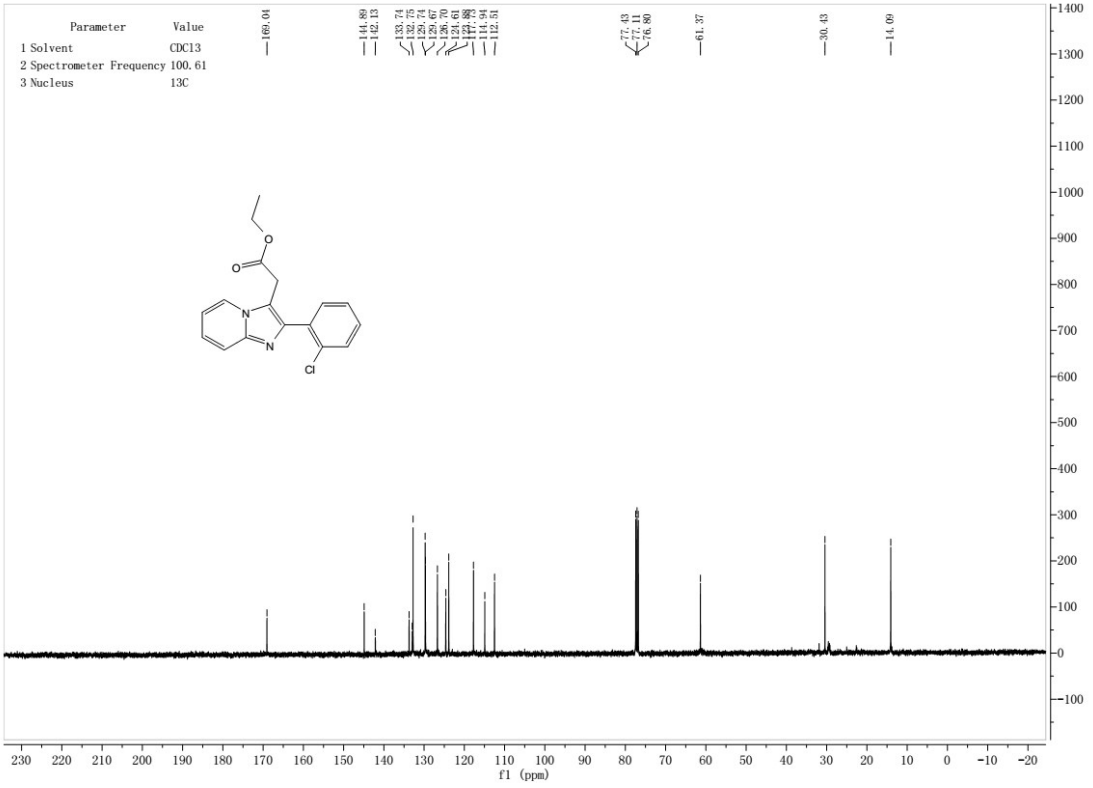
3 Nucleus 1H
f1 (ppm)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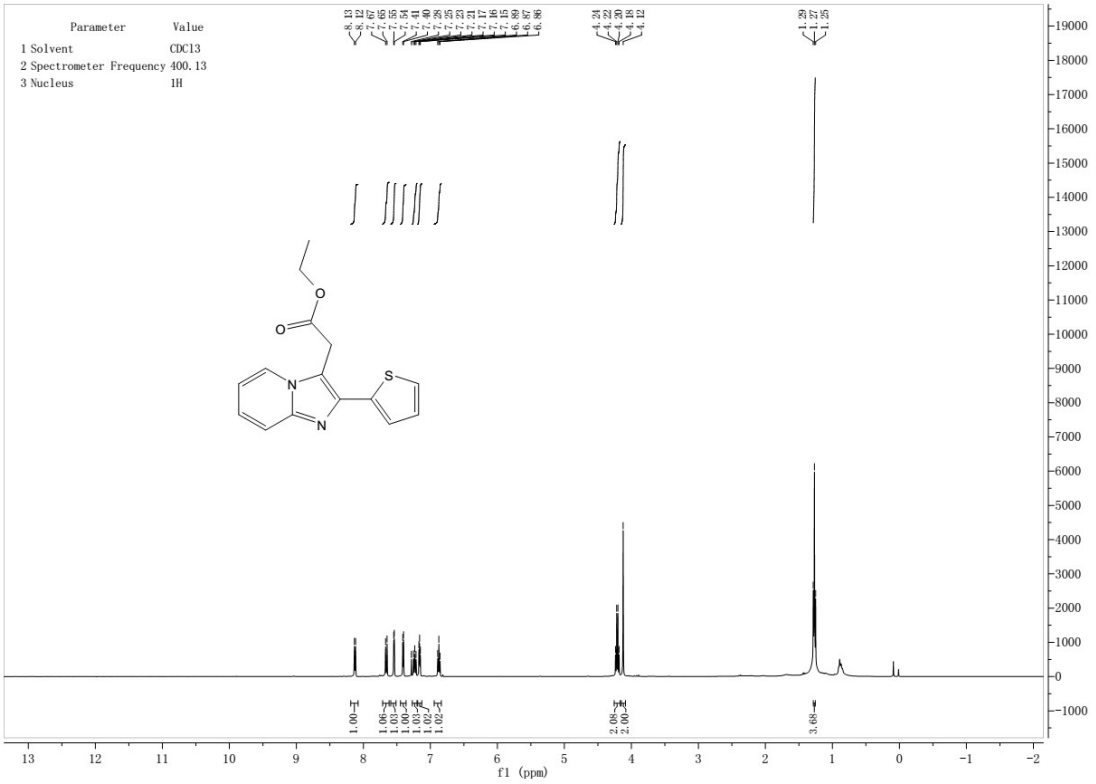
3 Nucleus 13C
f1 (ppm)

3f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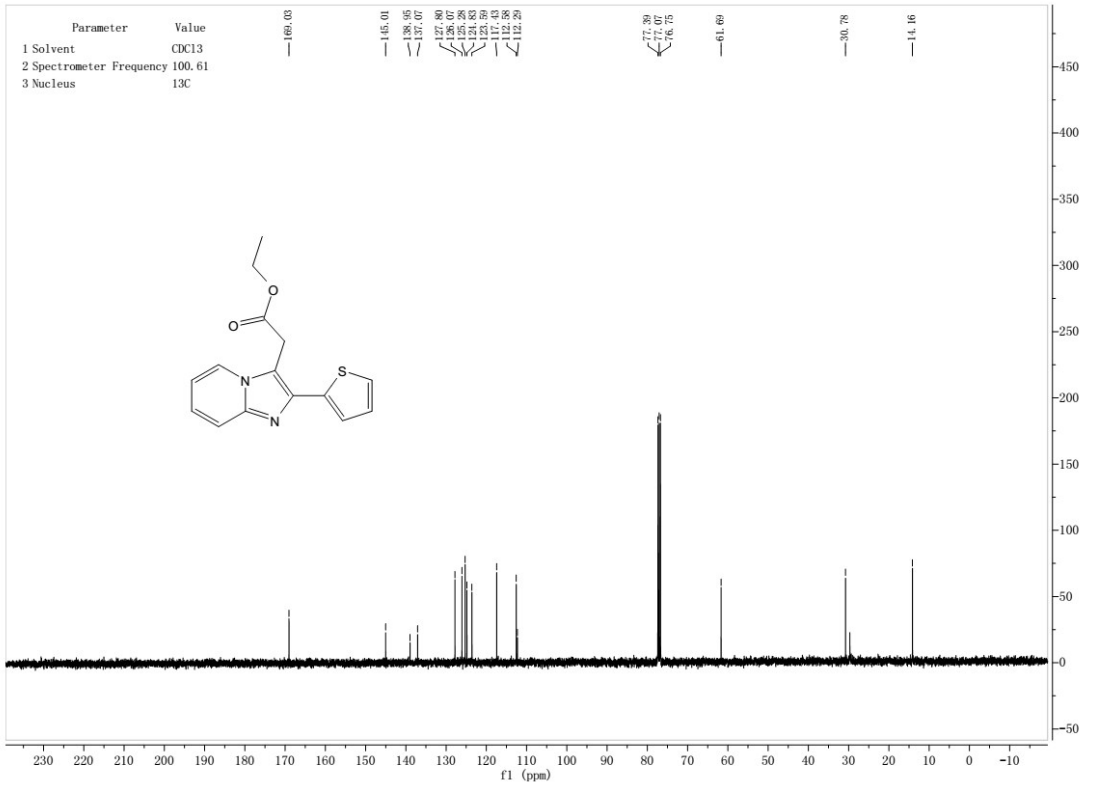
3 Nucleus 1H
f1 (ppm)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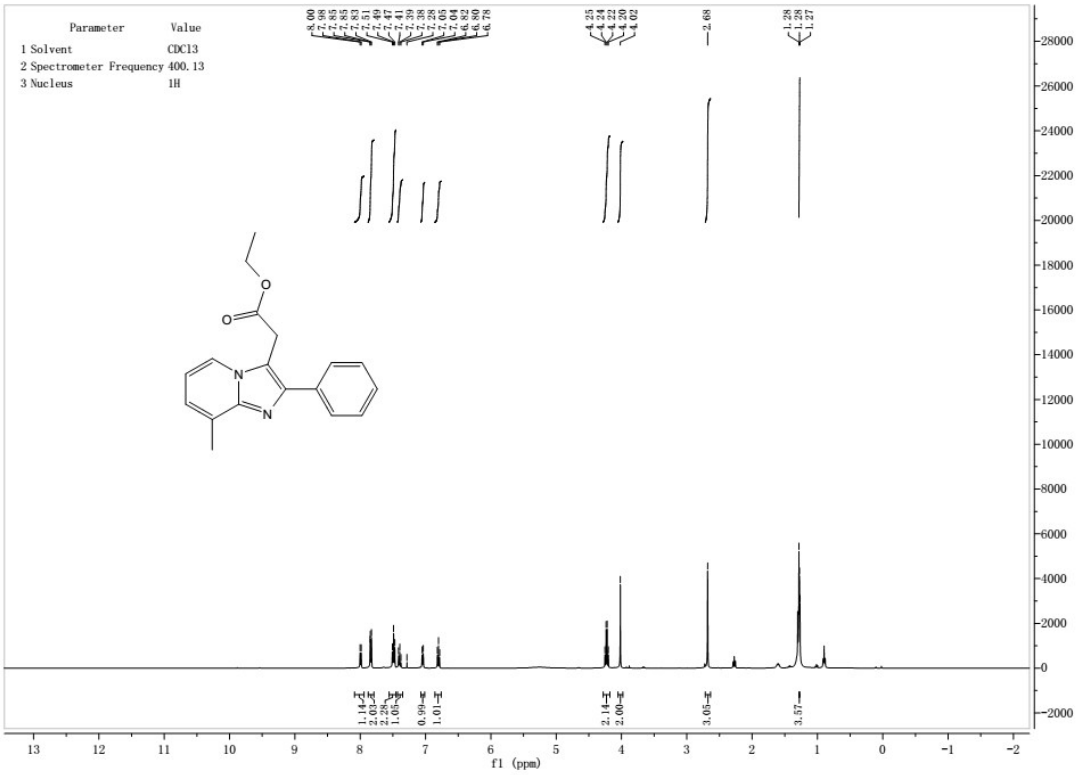
3 Nucleus 13C
f1 (ppm)

3g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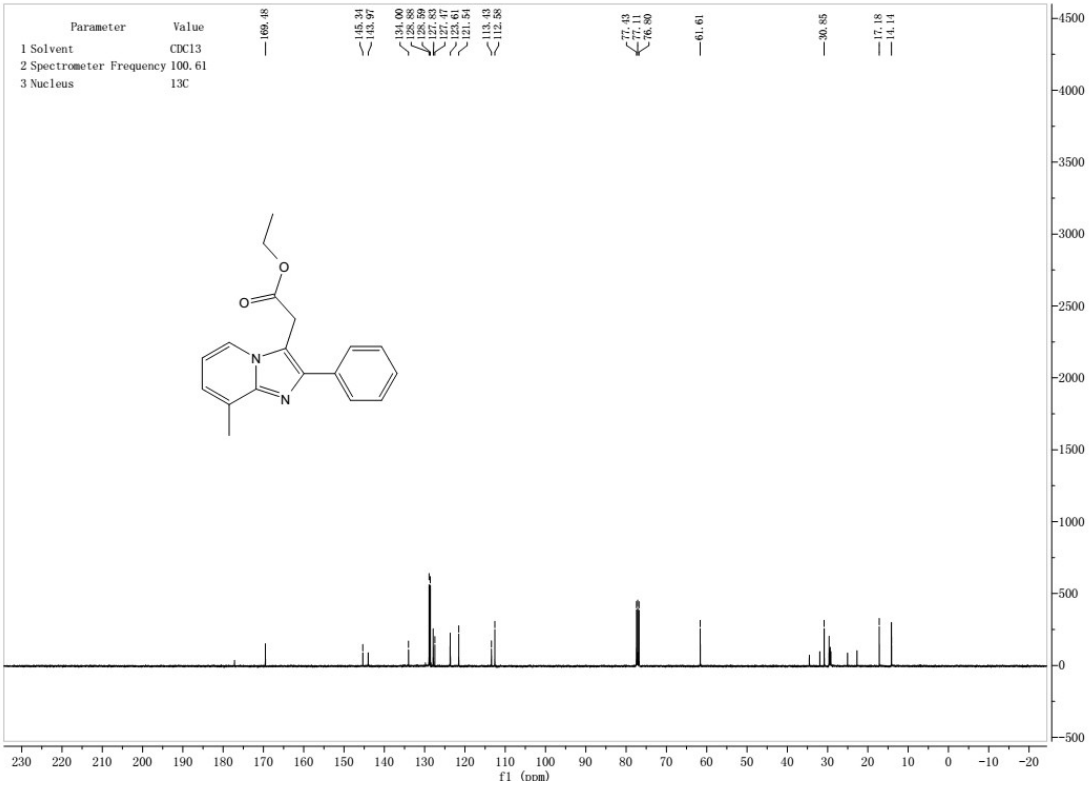
2 Spectrometer Frequency 400.13
3 Nucleus 1H
f1 (ppm)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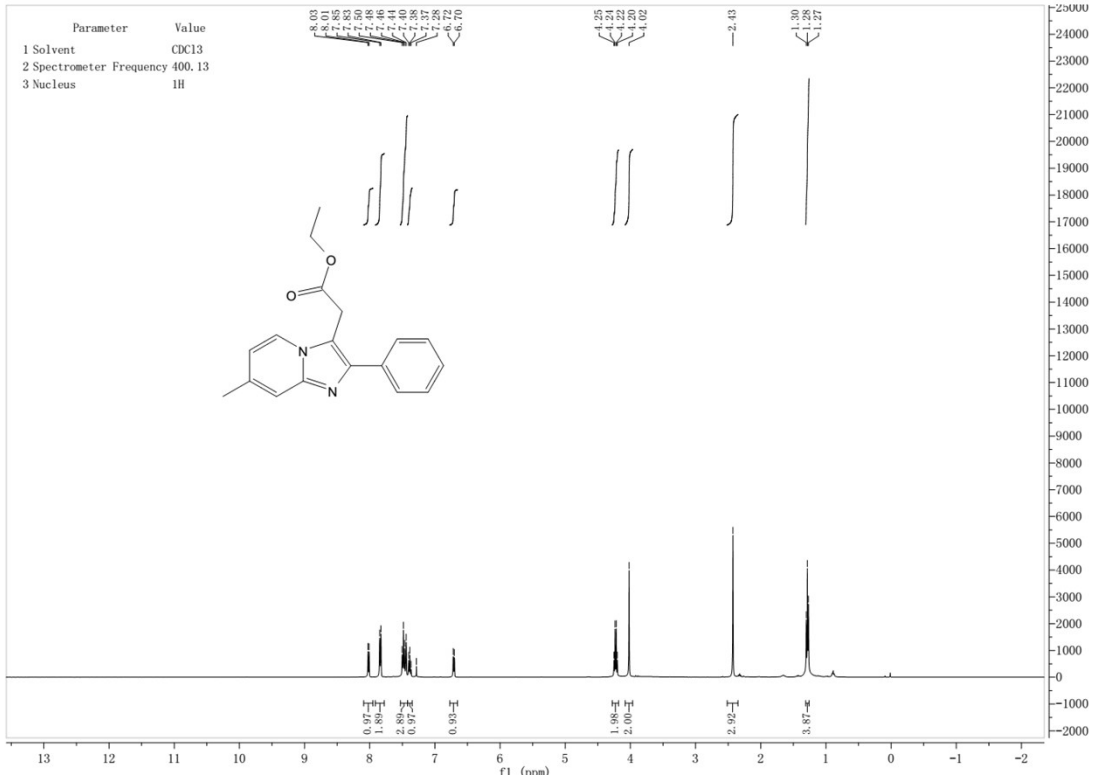
f1 (ppm)

3h


Parameter Value
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8.01
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7.40
7.38
7.37
7.28
6.72
6.70
4.25
4.24
4.22
4.20
4.02
2.43
1.30
1.28
1.27
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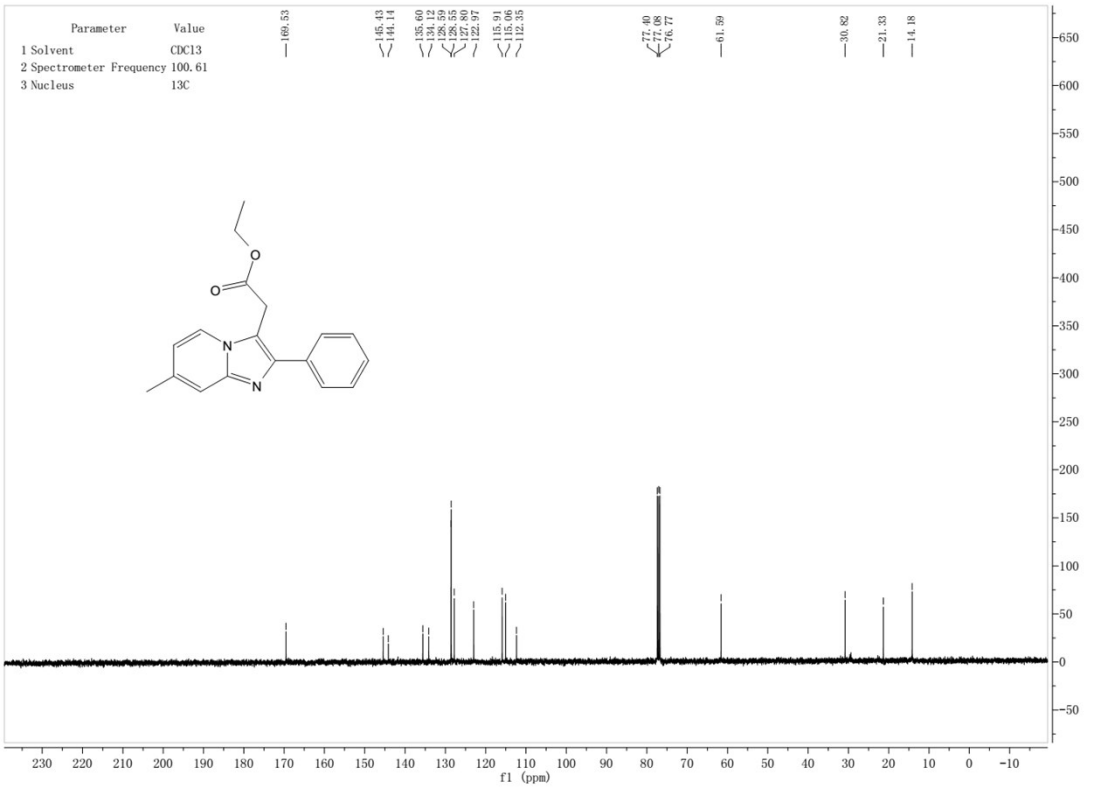
0.97
0.93
1.98
2.00
2.92
3.87
f1 (ppm)


Parameter Value
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2 Spectrometer Frequency 100.61
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144.14
135.60
134.12
128.59
128.55
127.80
122.97
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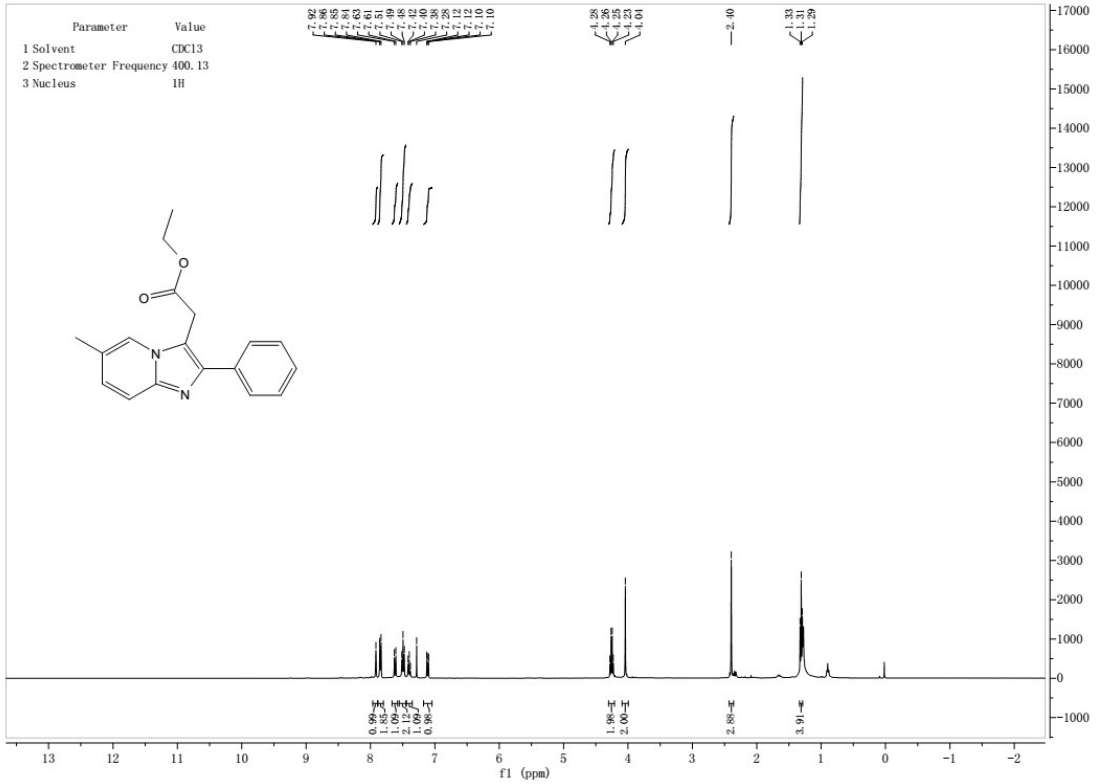
115.06
112.35
77.40
77.08
76.77
61.59
30.82
21.33
14.18
f1 (ppm)

3i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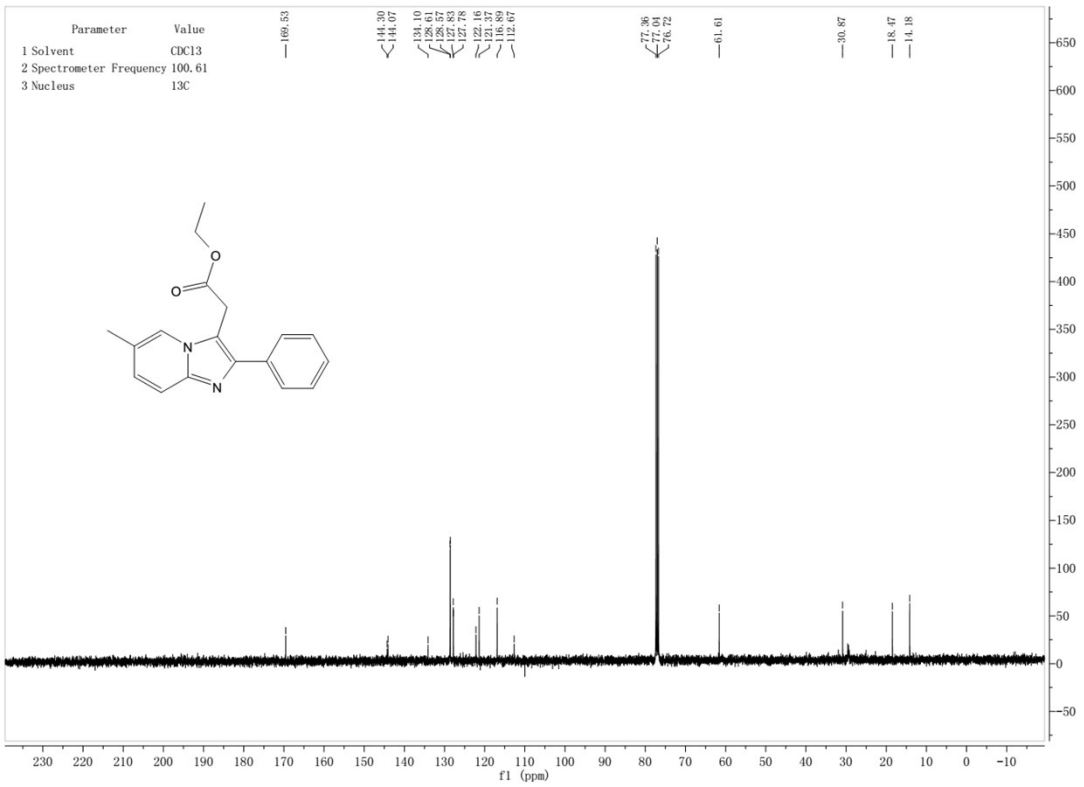
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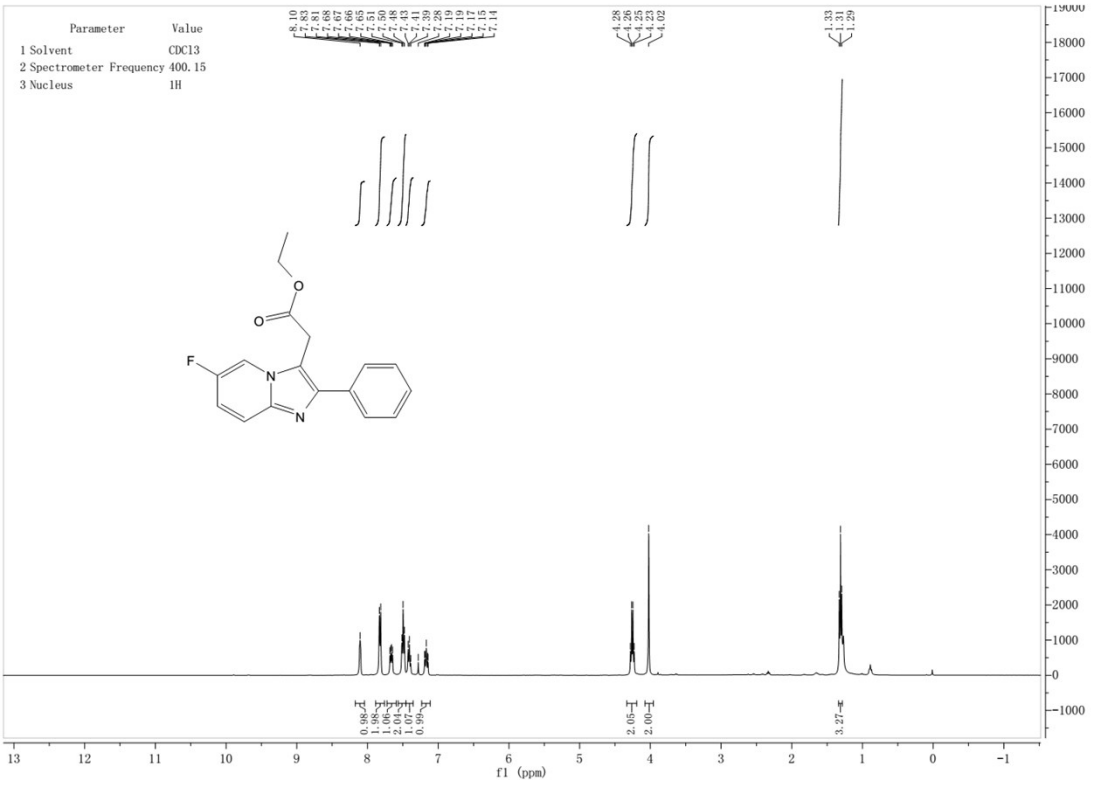
f1 (ppm)

3j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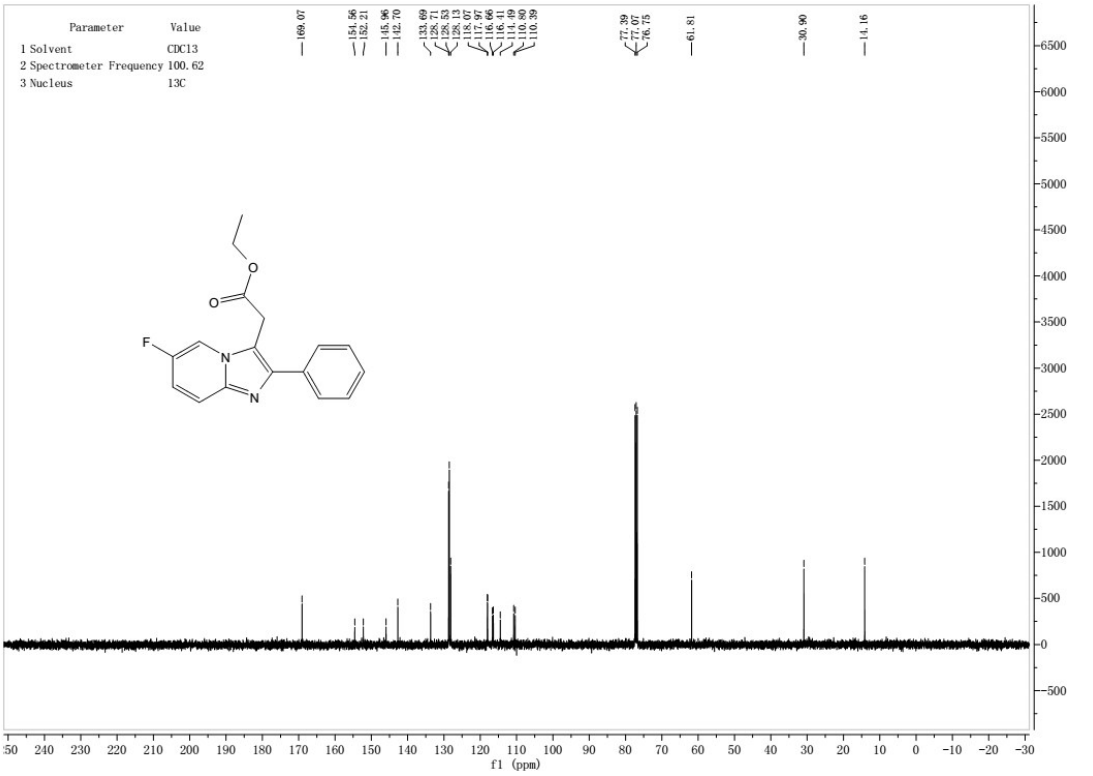
f1 (ppm)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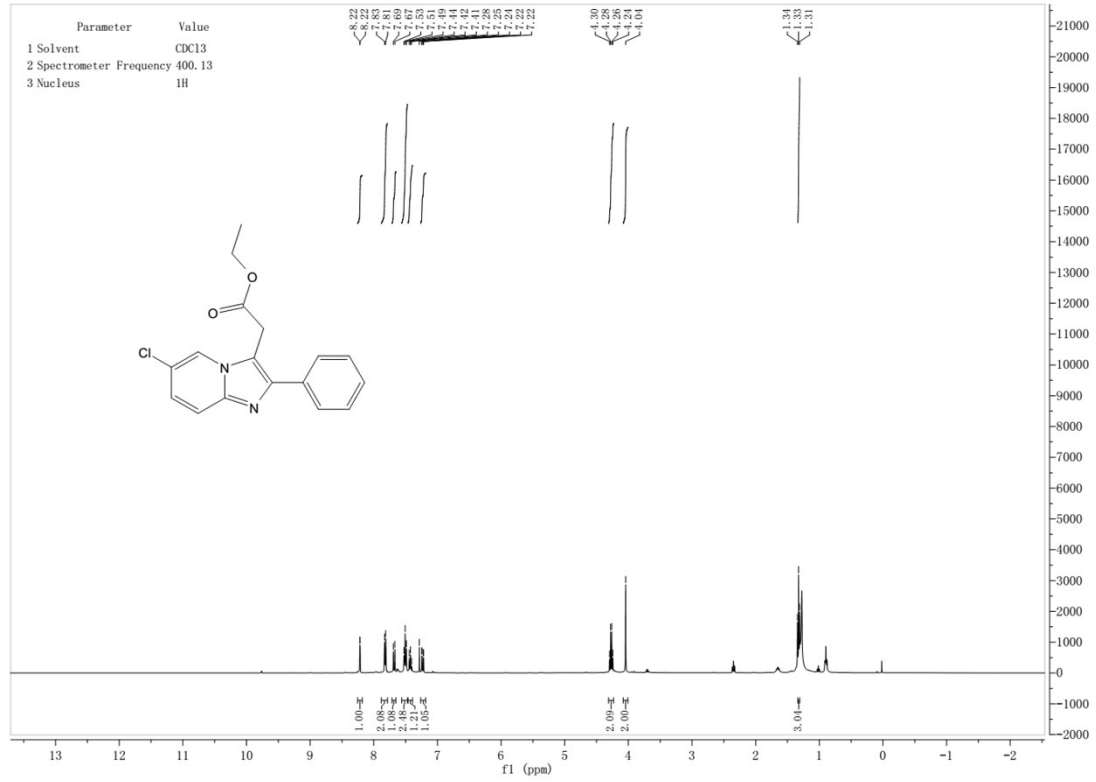
f1 (ppm)

3k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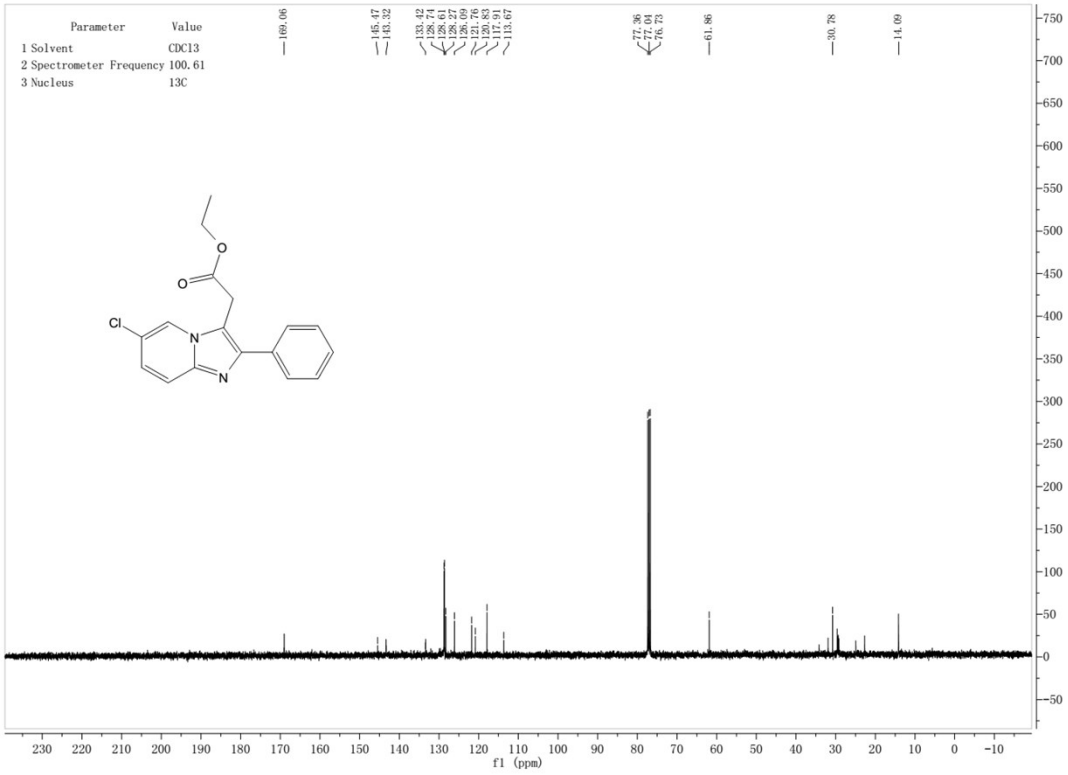
3 Nucleus 1H
f1 (ppm)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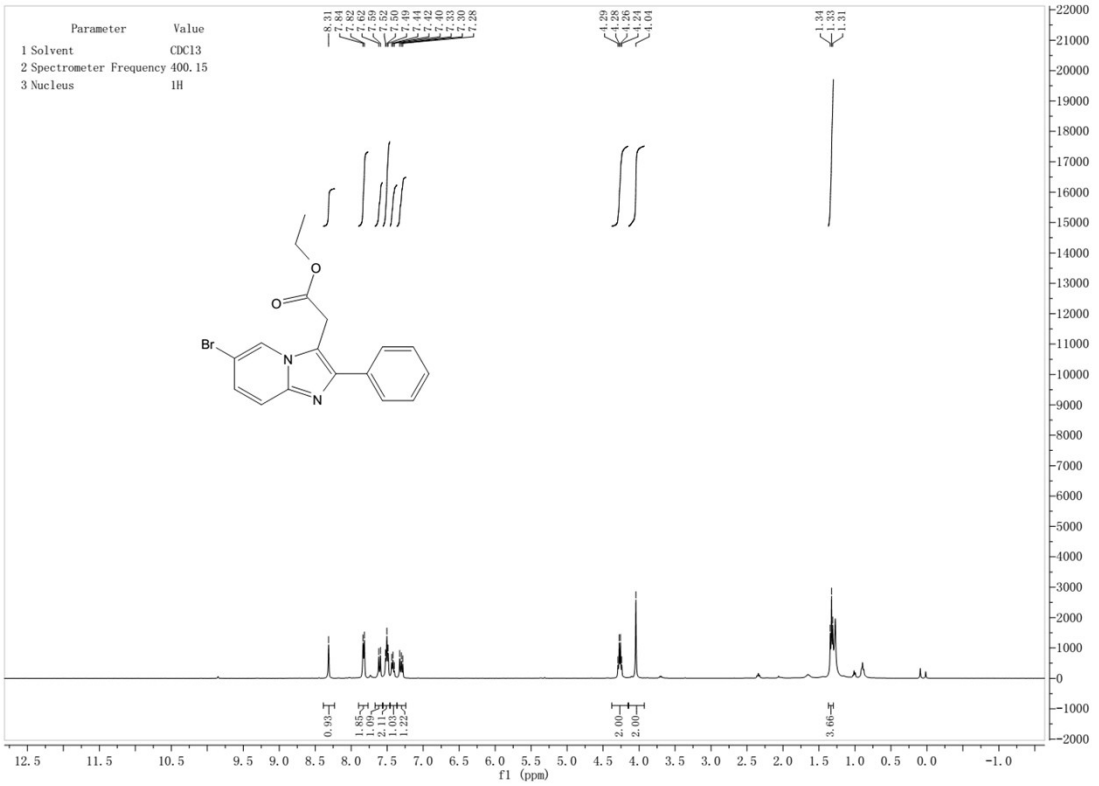
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7.50
7.49
7.44
7.42
7.40
7.33
7.30
7.28
4.29
4.28
4.26
4.24
4.04
1.34
1.33
1.31
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O
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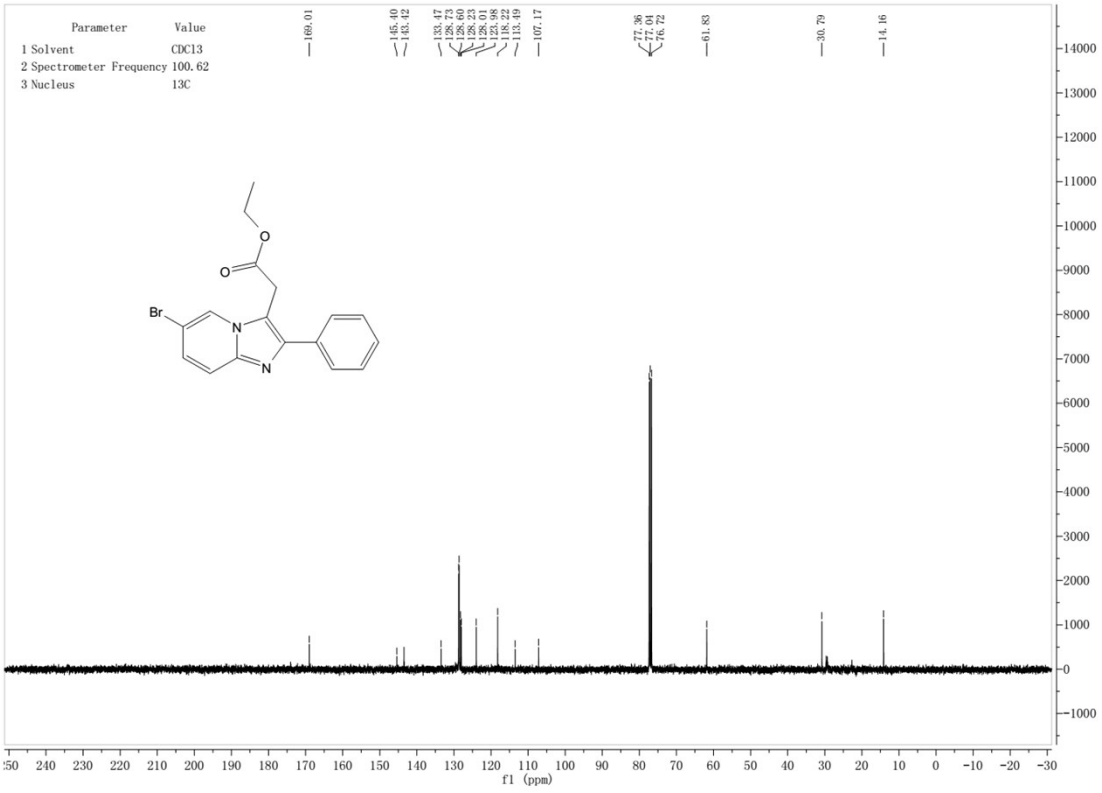
2.00
2.00
3.66
f1 (ppm)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128.60
128.23
126.01
125.96
118.22
113.49
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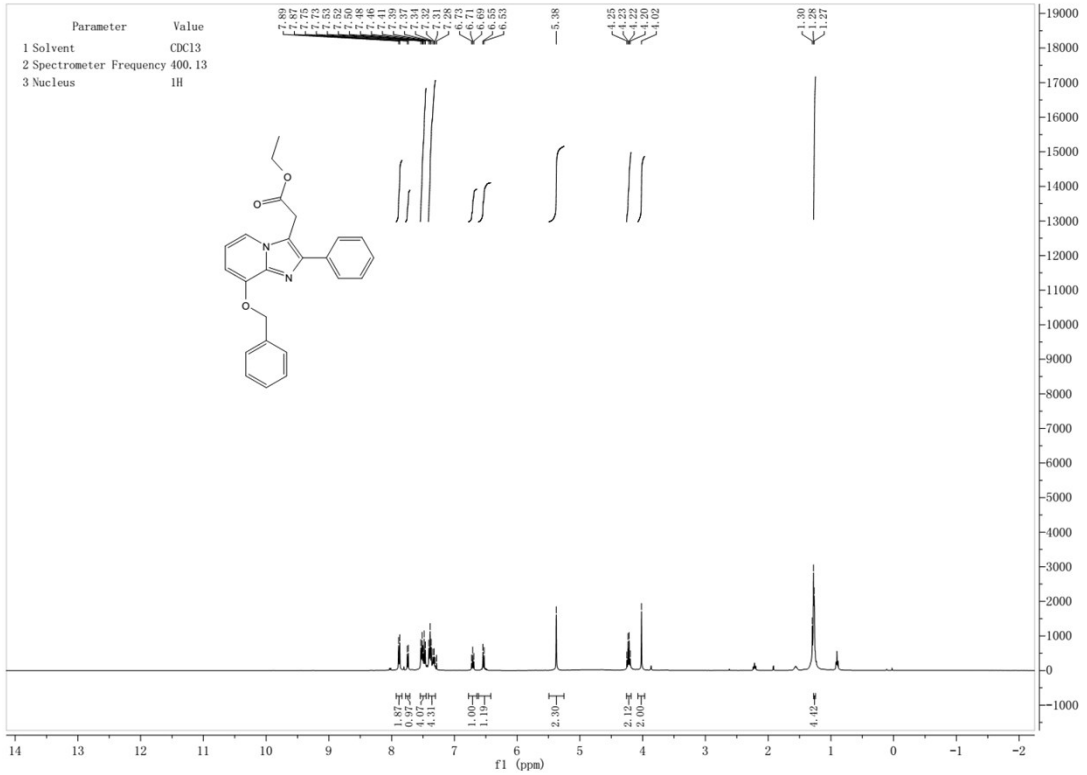
77.01
76.72
61.83
30.79
14.16
Br
N
N
O
O
f1 (ppm)

3m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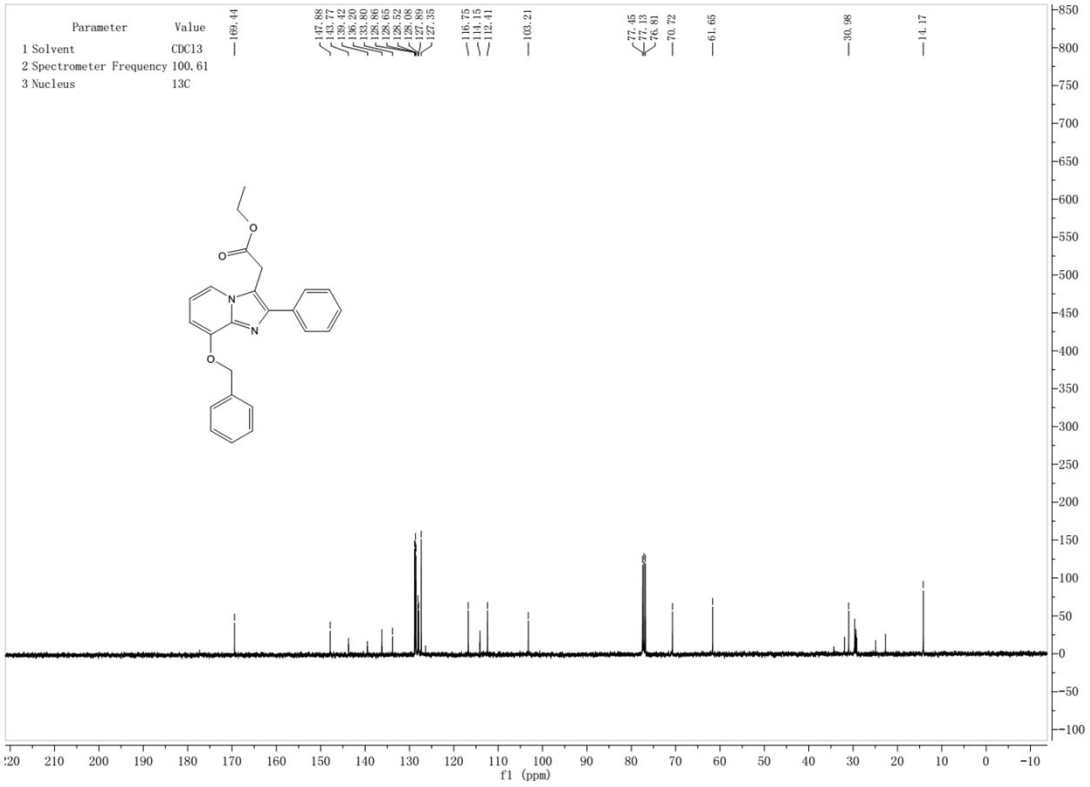
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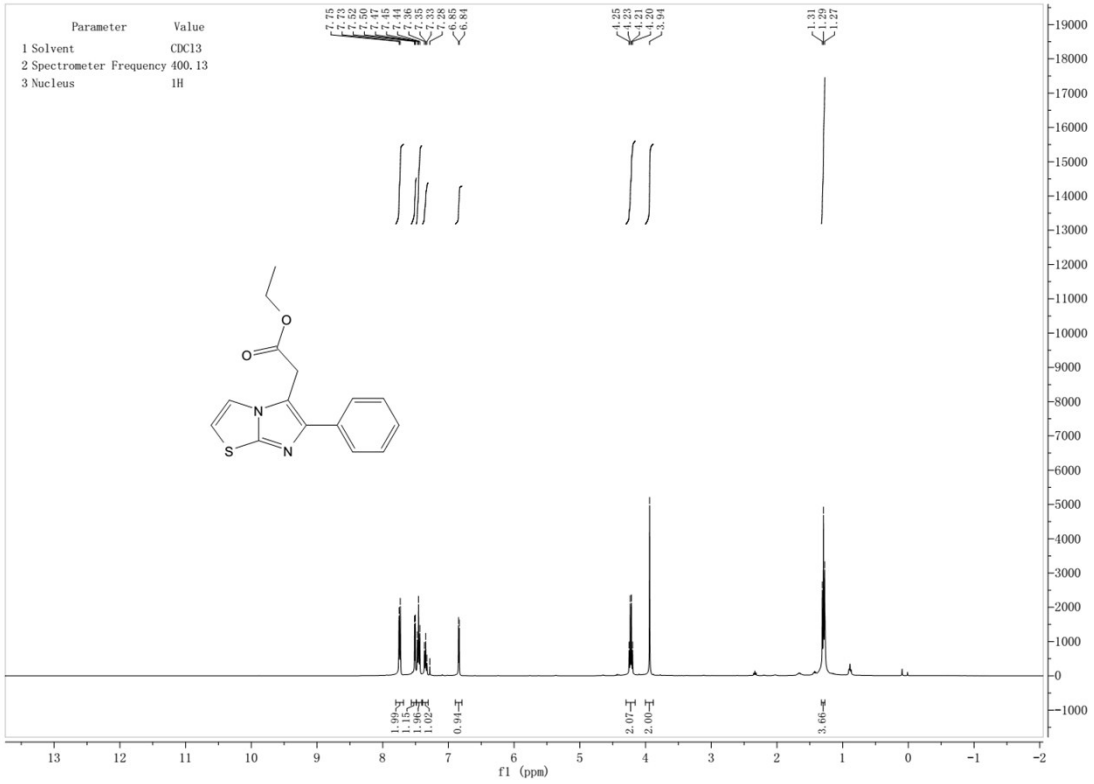
f1 (ppm)

3n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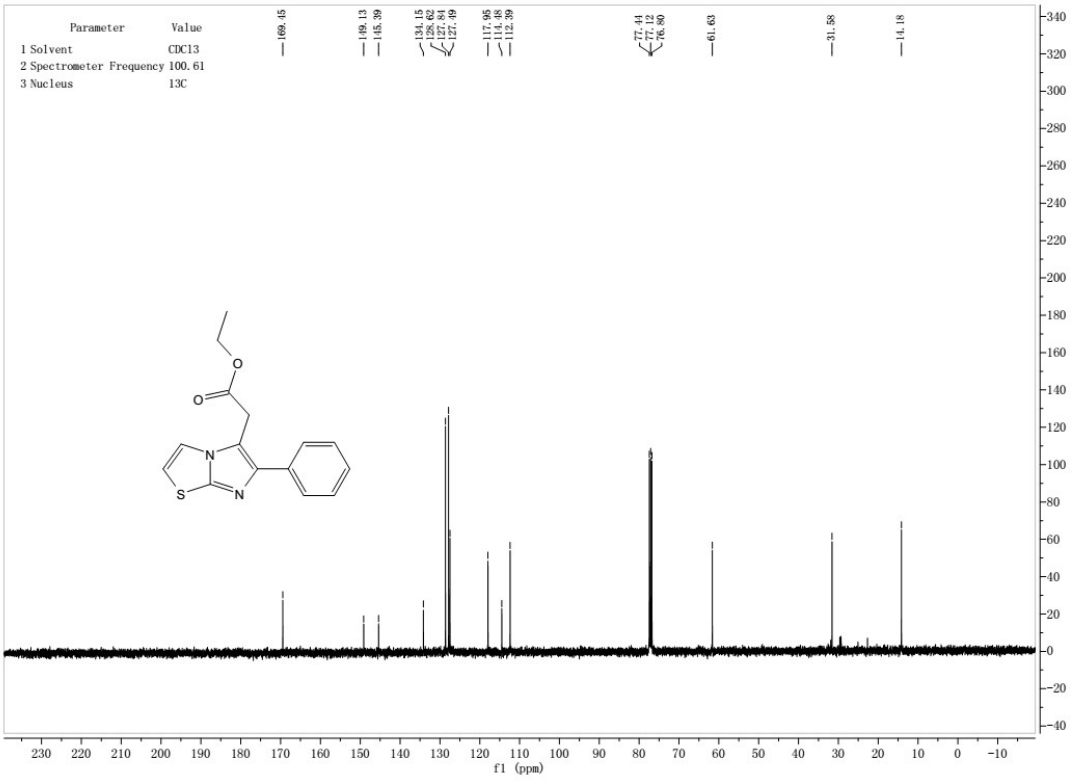
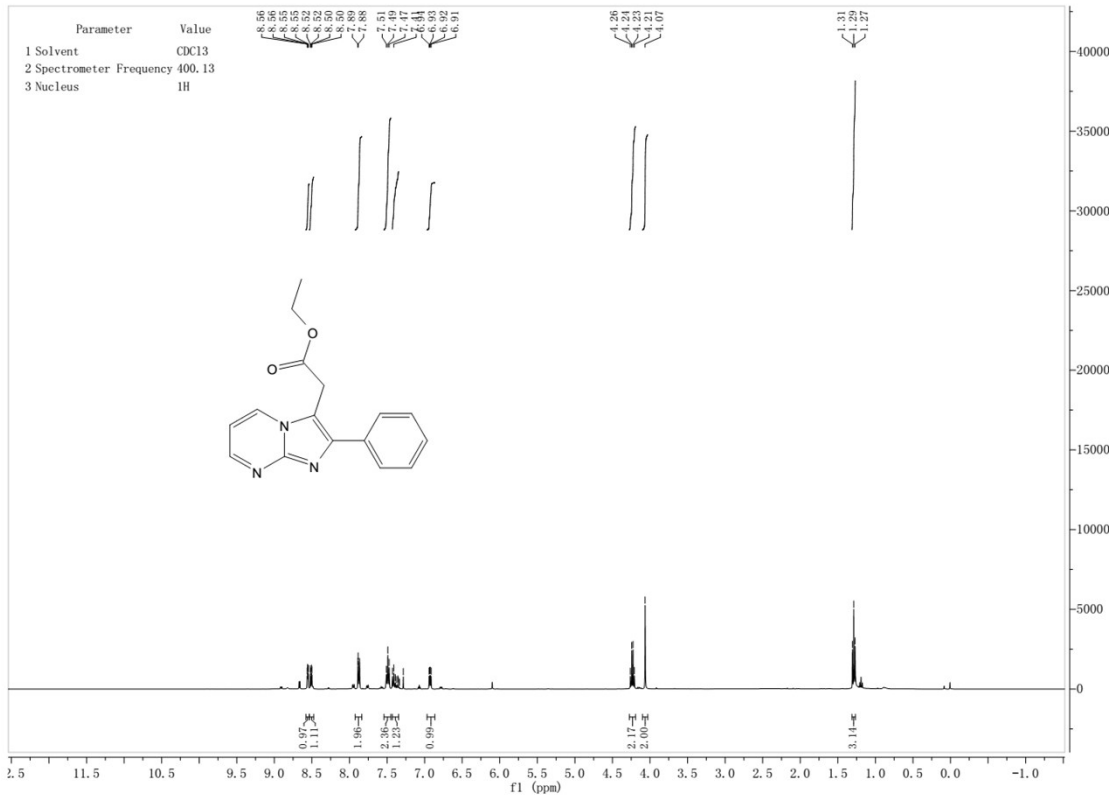
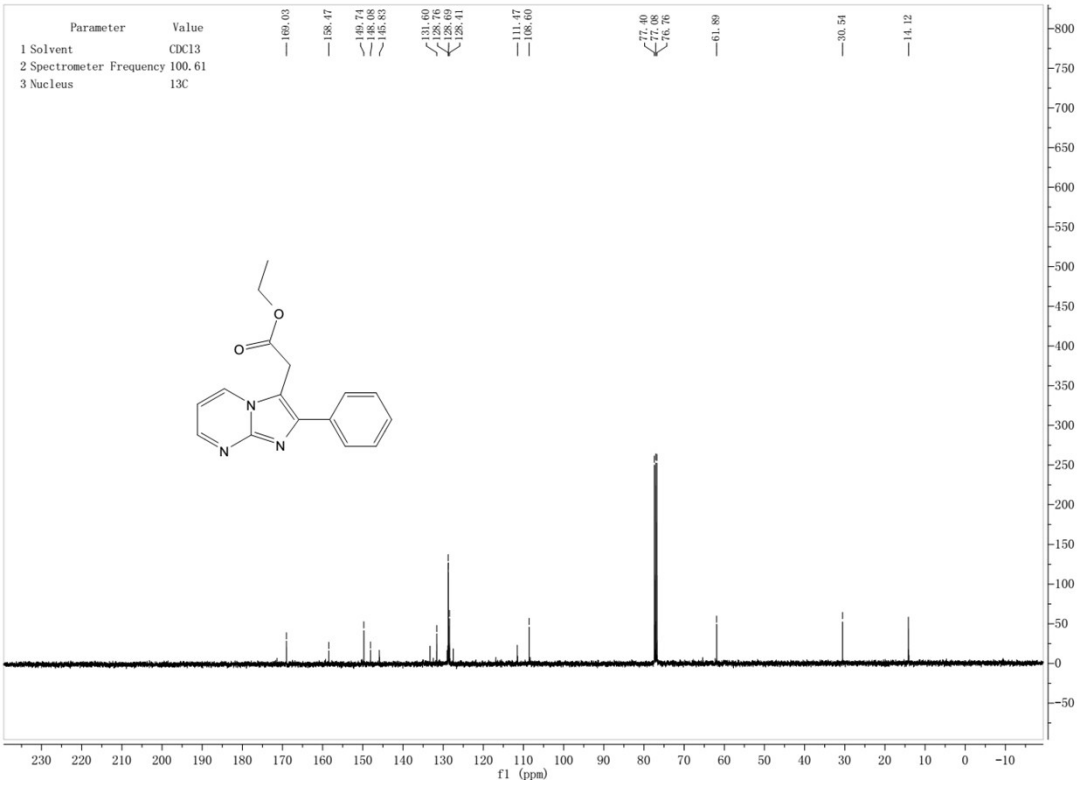
4.23
4.21
4.20
3.94
1.31
1.29
1.27
O
O
N
S
N
1.99
1.15
1.96
1.02
0.94
2.07
2.00
3.66
f1 (ppm)

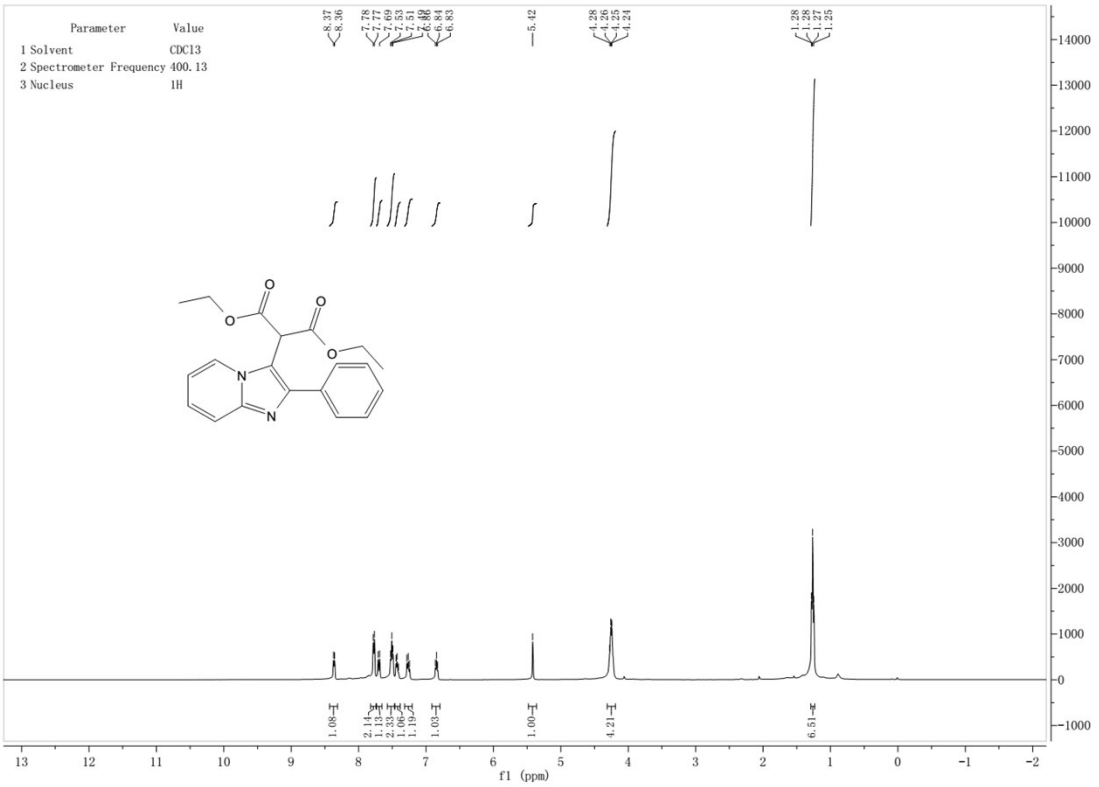

Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 100.61
3 Nucleus 13C
169.45
149.13
145.39
134.15
128.62
127.84
127.49
117.95
114.48
112.39
77.44
77.12
76.80
61.63
31.58
14.18
O
O
N
S
N
f1 (ppm)

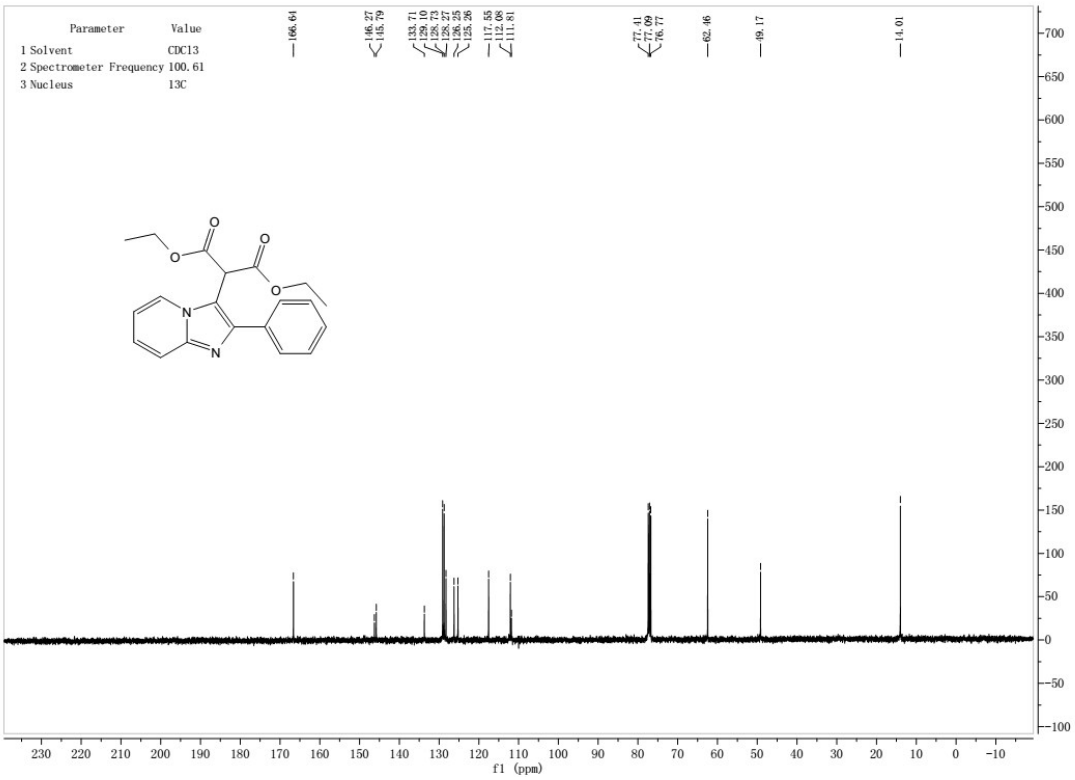
3o


Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 400.13
3 Nucleus 1H
f1 (ppm)

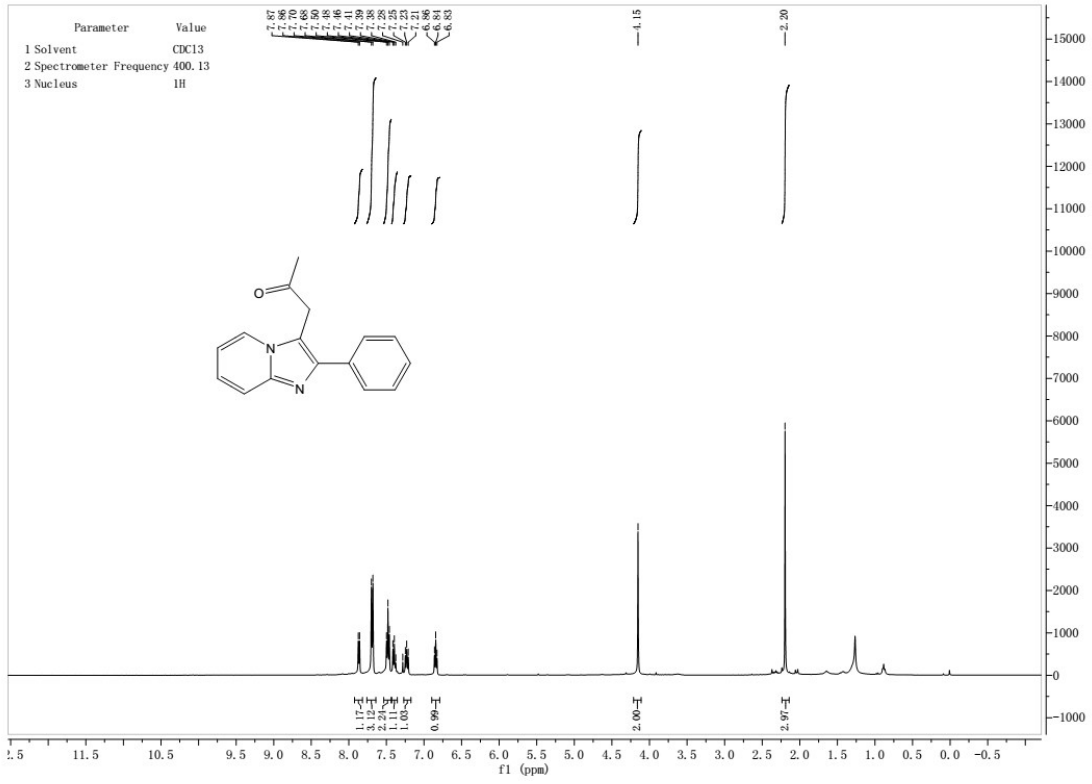

Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 100.61
3 Nucleus 13C
f1 (ppm)

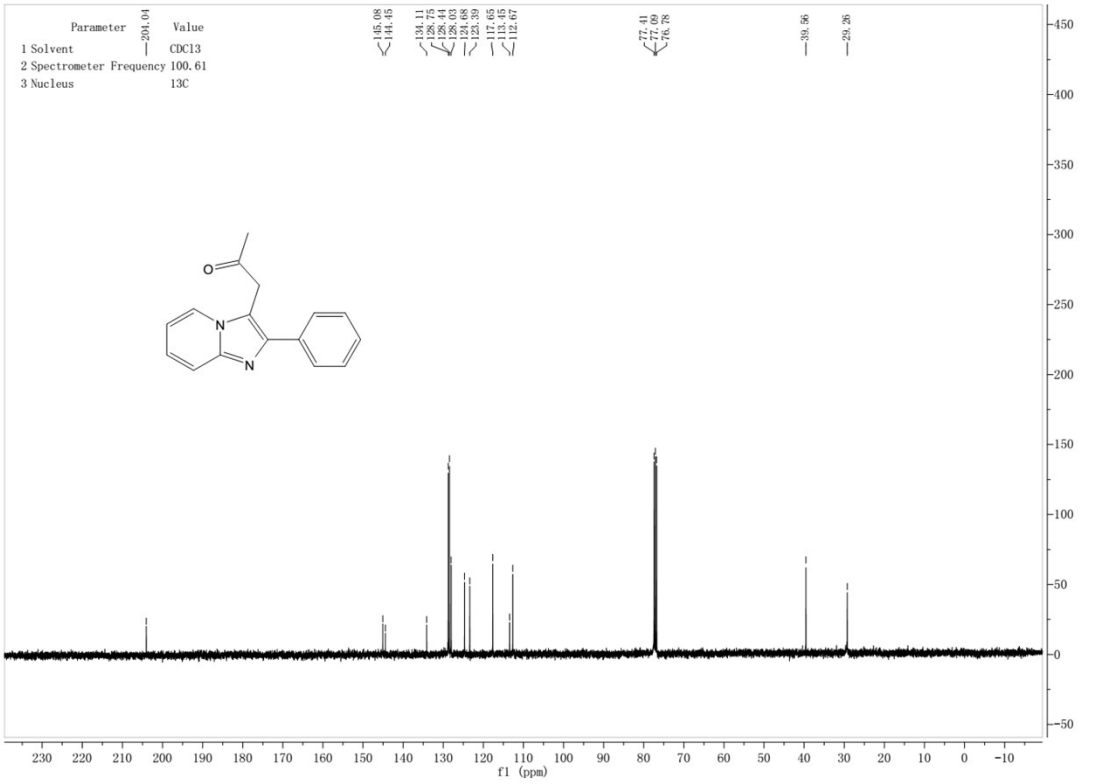
3p


Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 400.13
3 Nucleus 1H
f1 (ppm)

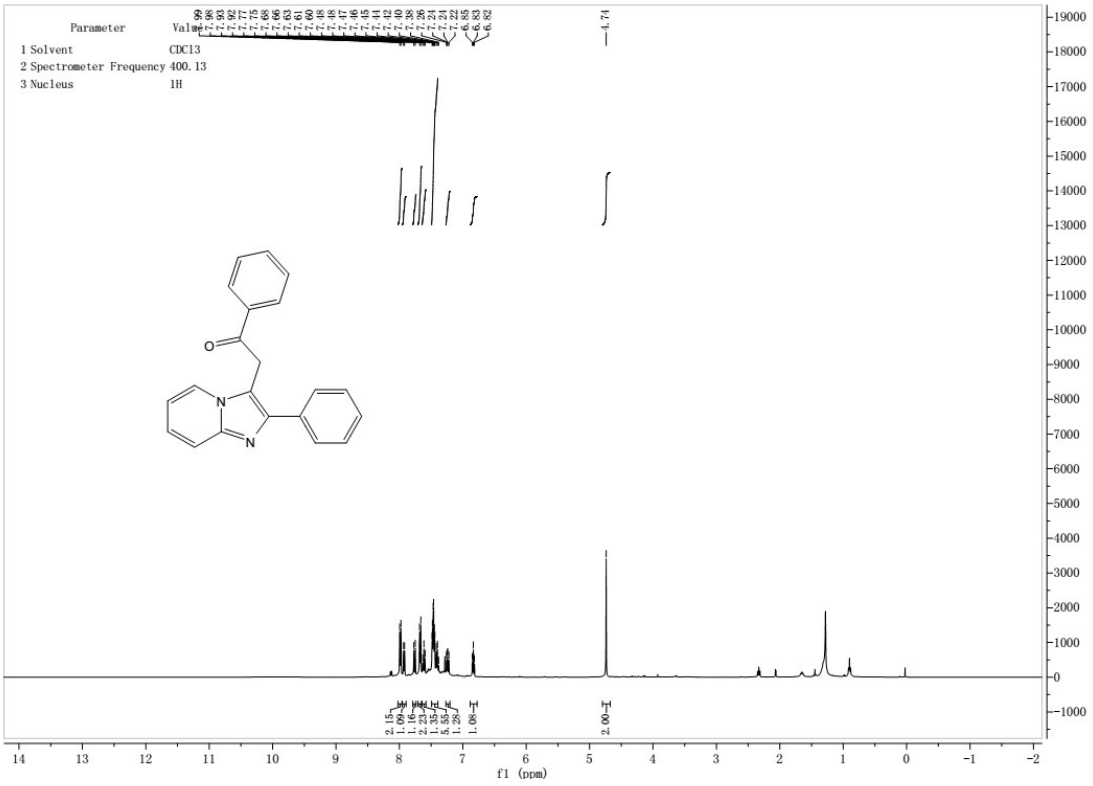

Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 100.61
3 Nucleus 13C
f1 (ppm)

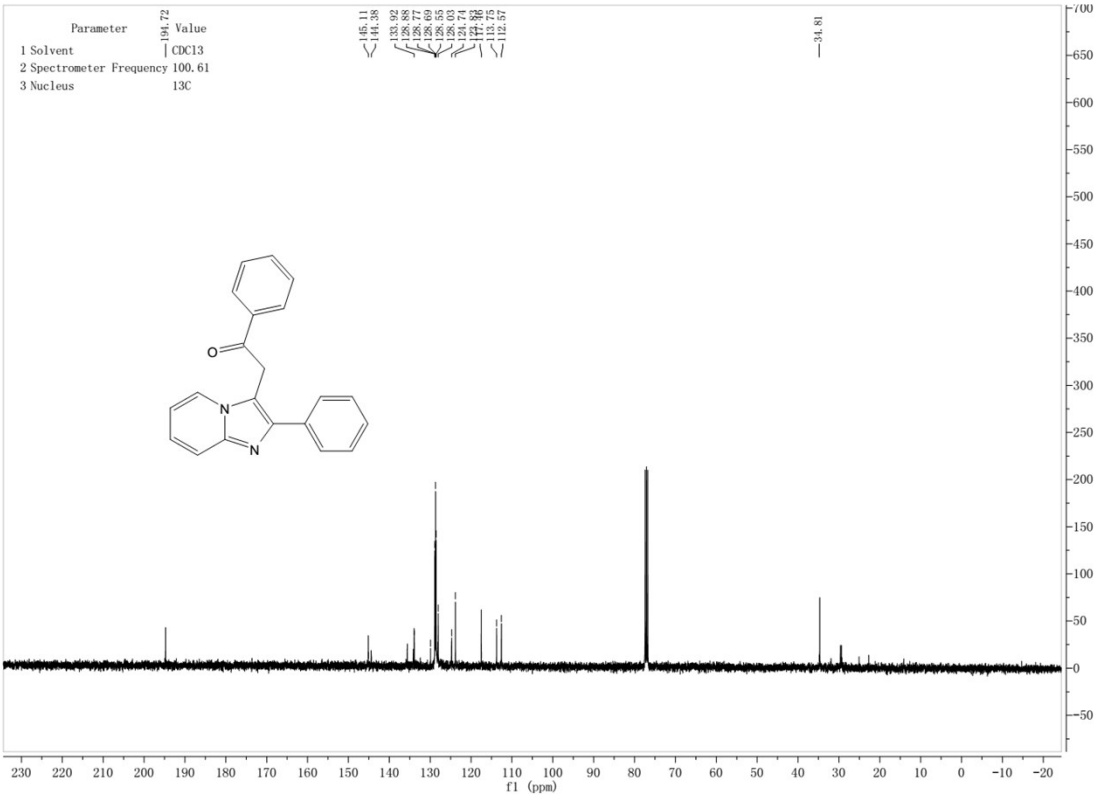
3q


Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 400.13
3 Nucleus 1H
7.87
7.86
7.70
7.68
7.59
7.58
7.46
7.41
7.39
7.38
7.25
7.23
7.21
6.86
6.84
6.83
4.15
2.20
1.17
3.12
2.34
2.11
1.03
0.99
2.00
2.97
f1 (ppm)

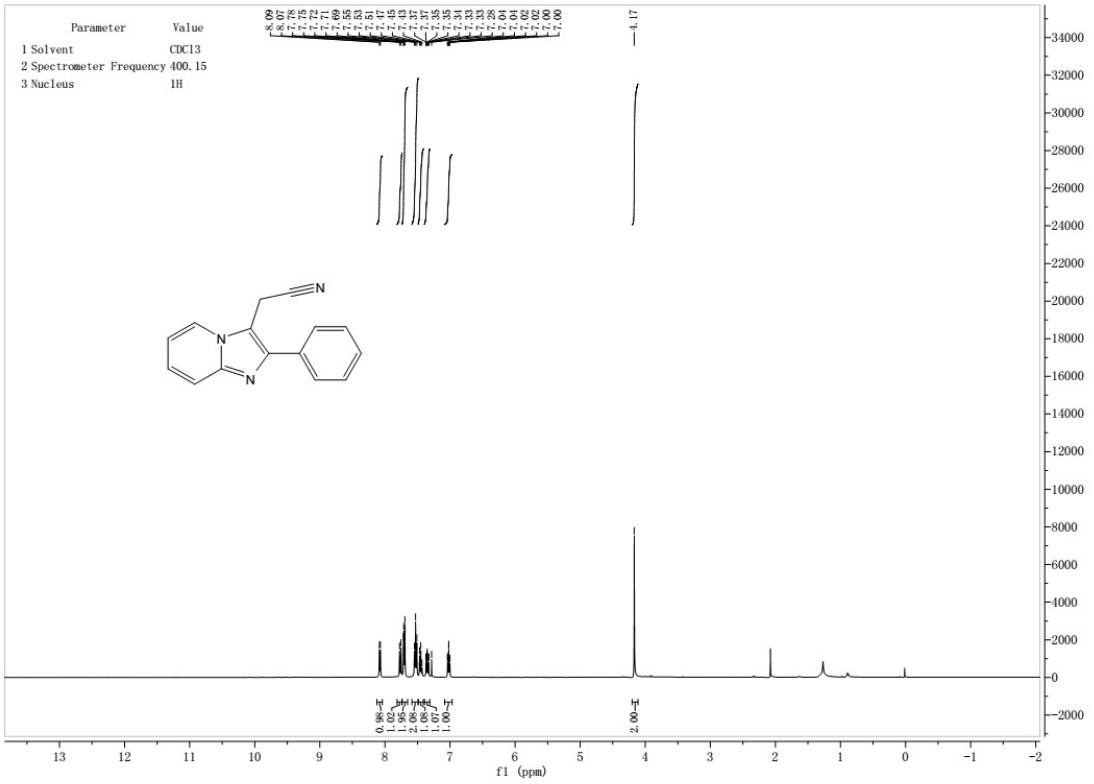

Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 100.61
3 Nucleus 13C
204.04
145.08
144.45
134.11
128.75
128.44
126.03
124.68
123.39
117.65
113.45
112.67
77.41
77.09
76.78
39.56
29.26
f1 (ppm)

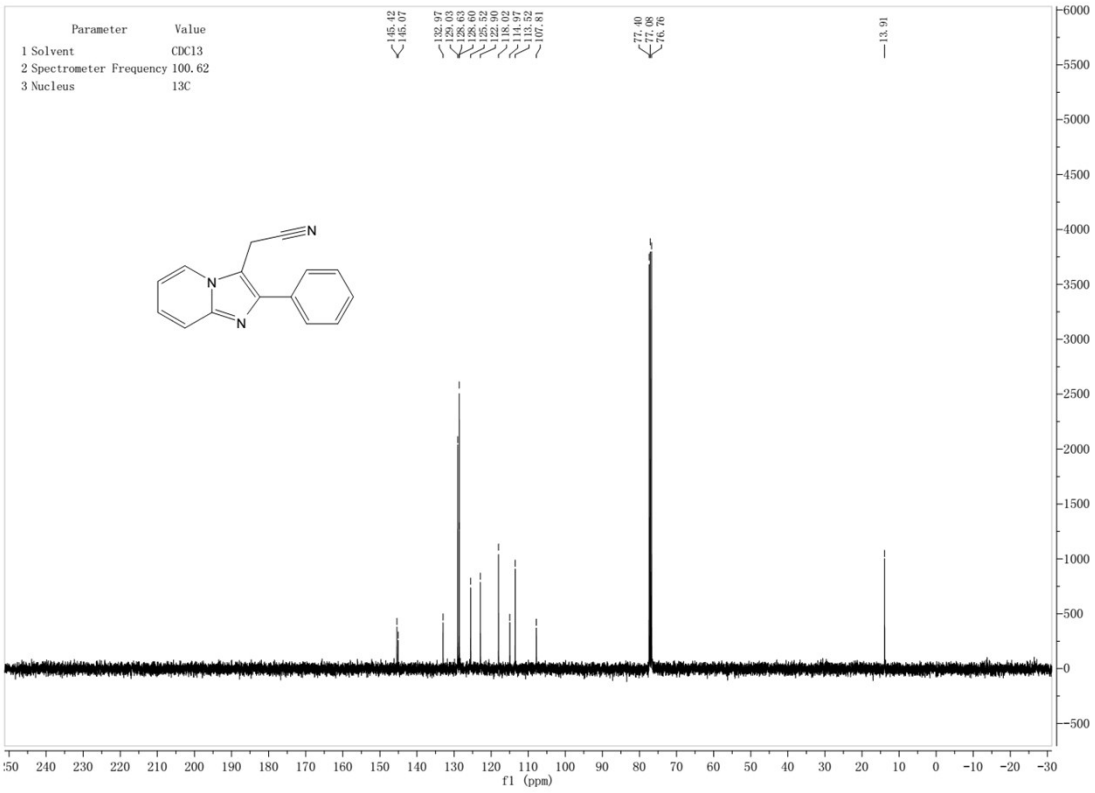
3r


Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 400.13
3 Nucleus 1H
4.74
2.15
1.09
1.16
2.24
1.35
5.55
1.28
1.08
2.00
f1 (ppm)

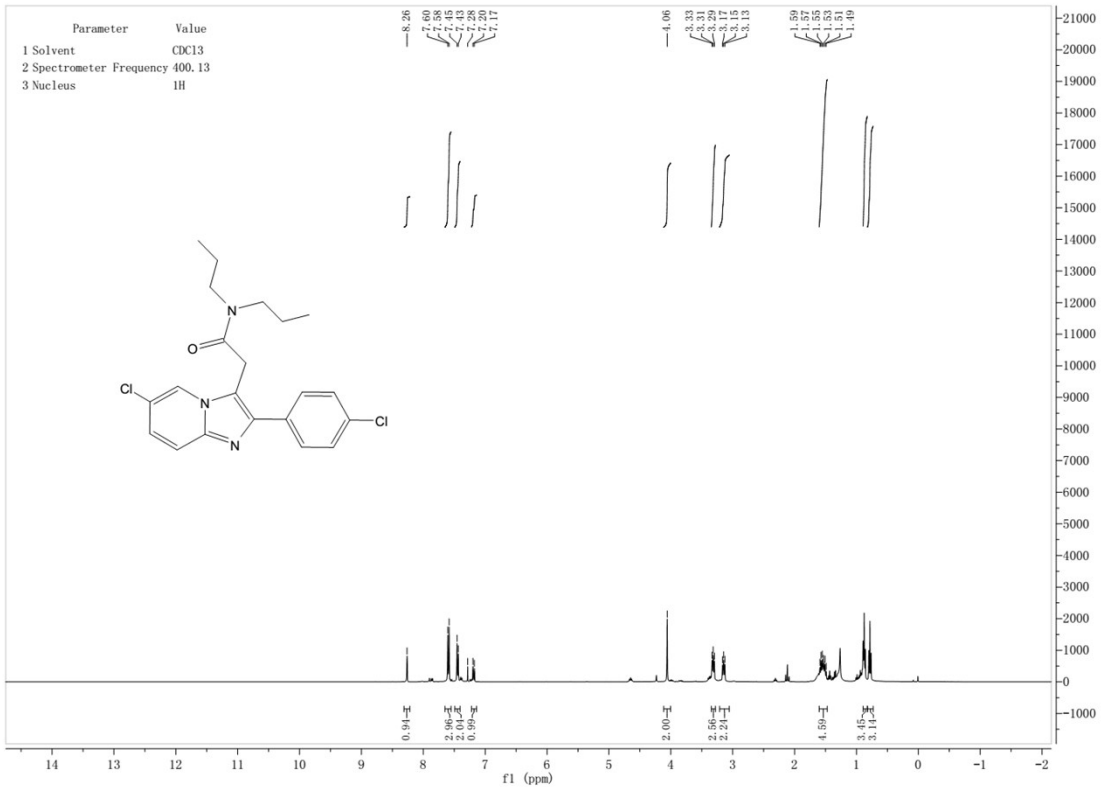

Parameter Value
194.72
1 Solvent CDCl3
2 Spectrometer Frequency 100.61
3 Nucleus 13C
145.11
144.38
133.92
128.88
128.77
128.69
128.55
128.03
124.74
117.88
113.75
112.57
34.81
f1 (ppm)

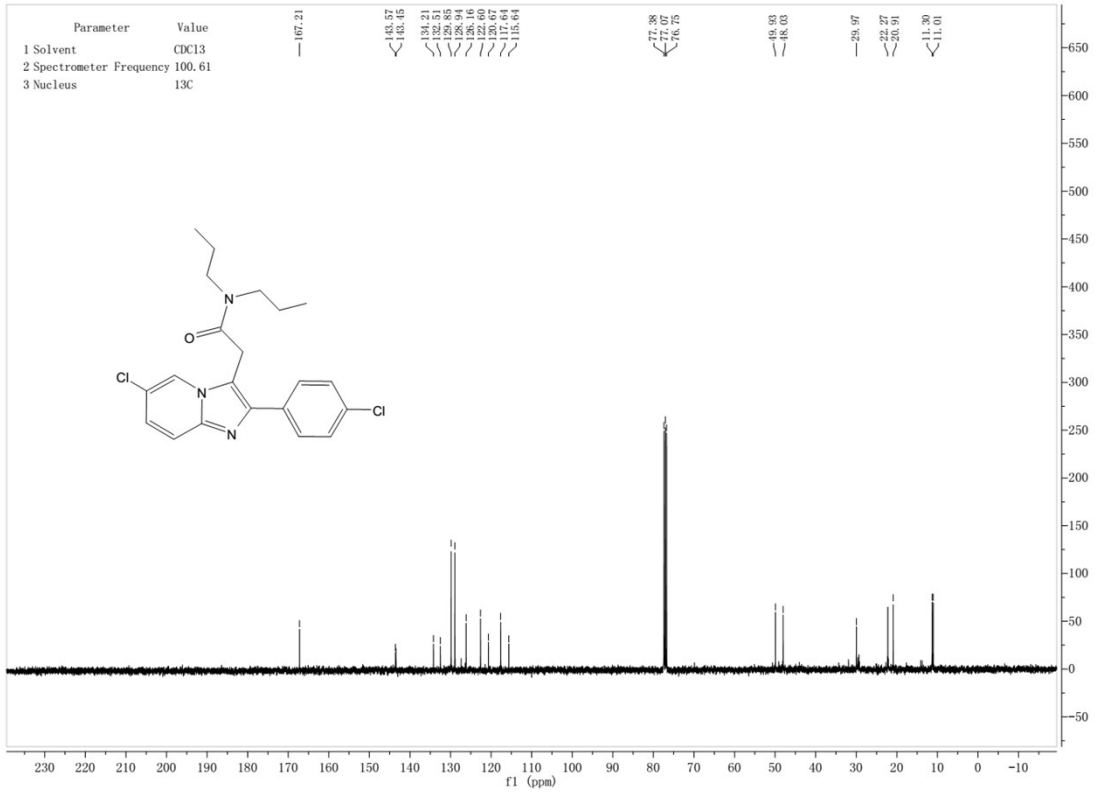
3s


Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 400.15
3 Nucleus 1H
8.09
8.07
7.78
7.75
7.72
7.71
7.69
7.55
7.53
7.51
7.47
7.45
7.43
7.37
7.37
7.35
7.34
7.33
7.28
7.04
7.04
7.02
7.00
7.00
4.17
0.98
1.02
1.95
1.68
2.00
1.08
1.07
1.00
2.00
f1 (ppm)

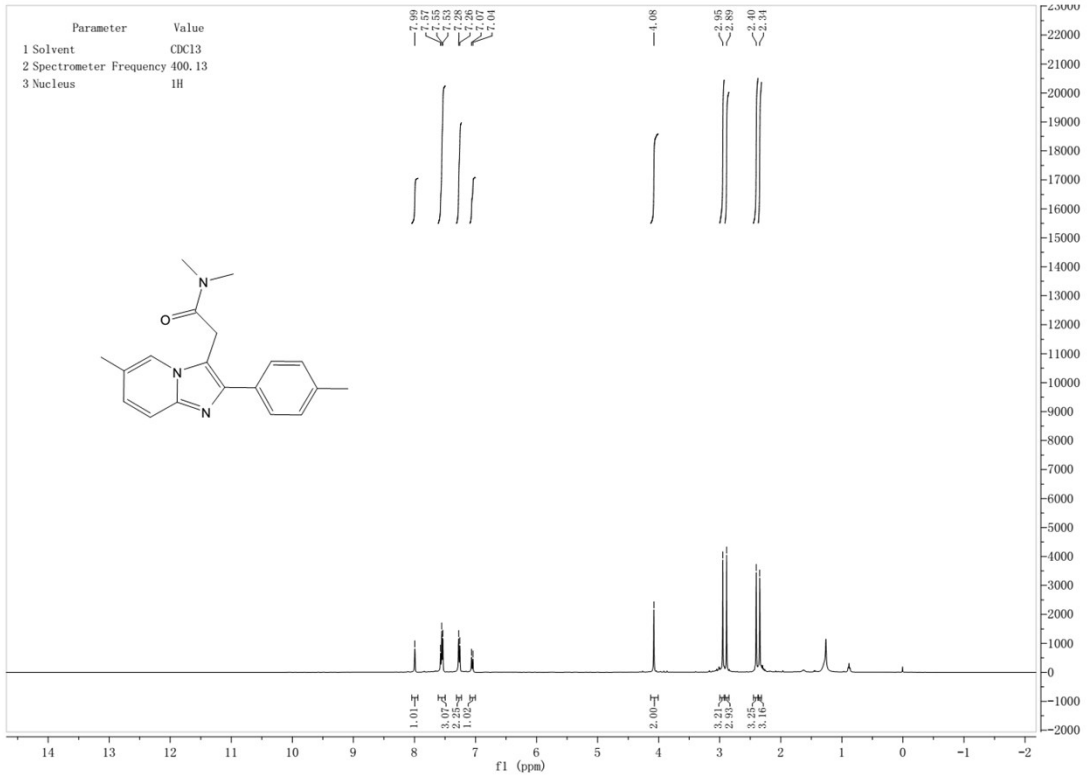

Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 100.62
3 Nucleus 13C
145.42
145.07
132.97
129.03
128.63
128.60
125.52
122.90
118.02
114.57
113.32
107.81
77.40
77.08
76.76
13.91
f1 (ppm)

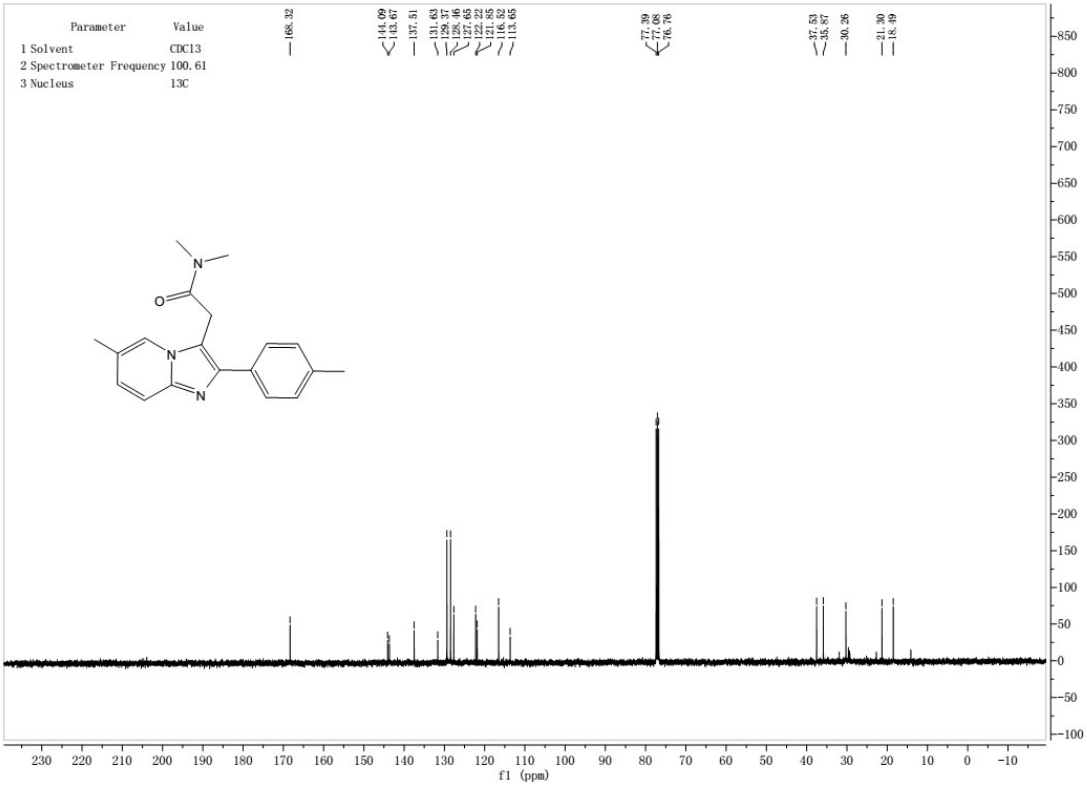
Alpidem (A):


Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 400.13
3 Nucleus 1H
8.26
7.60
7.58
7.45
7.43
7.28
7.20
7.17
4.06
3.33
3.31
3.29
3.17
3.15
3.13
1.59
1.57
1.55
1.53
1.51
1.49
0.94
2.96
2.01
0.99
2.00
2.56
2.24
4.59
3.45
3.14
f1 (ppm)


Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 100.61
3 Nucleus 13C
167.21
163.57
163.45
134.21
132.51
129.85
128.94
126.15
125.60
120.67
117.64
115.64
77.38
77.07
76.75
49.93
48.03
29.97
22.27
20.91
11.30
11.01
f1 (ppm)

Zolpidem(B):


Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 400.13
3 Nucleus 1H
7.99
7.57
7.55
7.53
7.28
7.26
7.07
7.04
4.08
2.95
2.89
2.40
2.34
1.01
3.07
2.05
1.02
2.00
3.21
2.93
3.25
3.16
f1 (ppm)


Parameter Value
1 Solvent CDCl3
2 Spectrometer Frequency 100.61
3 Nucleus 13C
168.32
144.09
143.67
137.51
131.63
129.37
128.46
125.65
122.22
121.85
116.52
113.65
77.39
77.08
76.76
37.53
35.87
30.26
21.30
18.49
f1 (ppm)