-Supporting Information-

Palladium Catalyzed 8-Aminoimidazo[1,2-*a*]pyridine (AIP) Directed Selective *β*-C(sp^2)-H Arylation

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Experimental

General Considerations:

Unless stated otherwise, all reagents such as various iodobenzene, carboxylic acids, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride, imidazo[1,2-*a*]pyridine-8-amine and solvents were used as received from commercial suppliers. NMR spectra were recorded on 400 MHz spectrometer at 298 K with calibration done on the basis of solvent residual peak. Products were purified using Combiflash column chromatography on silica gel (230-400 mesh). Ethyl acetate and hexane were used as eluents. Progress of reaction was monitored using silica gel TLC.

Preparation of various 8-AIP substituted Amides (A)(1a-1i):

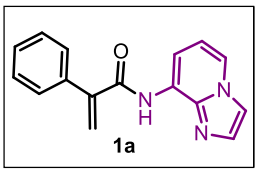
To the stirred mixture of carboxylic acid (2 mmol, 1 equiv) and 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (3 mmol, 1.5 equiv) in pyridine (5 ml) at 25° C was added imidazo[1,2-*a*]pyridin-8-amine (2 mmol, 1 equiv) and mixture was stirred at 40° C for 15 h. The reaction mixture was concentrated under reduced pressure and the residue was taken up in ethyl acetate. The organic layer was washed with water, dried over anhydrous sodium sulphate, filtered and concentrated under reduced pressure. The crude product was then purified by Combiflash chromatography using silica gel column by using ethyl acetate/hexane as an eluent.

General procedure for the Pd (II) catalyzed arylation of acrylamide in Toluene (B) (3a-3s/3aa-3ah):

A screw cap vial was charged with an appropriate acrylamide (0.2 mmol, 1 equiv) in dry toluene (4 ml), iodo compound (0.4 mmol, 2 equiv) and K_2CO_3 (0.5 mmol, 2.5 equiv) at room temperature followed by the addition of $Pd(OAc)_2$ (10 mol %, 0.1 equiv) under aerobic condition. The resulting suspension was heated at 100° C in an oil bath for 18 h. After completion, the reaction mixture was cooled to room temperature and filtered through celite bed and the bed was washed with dichloromethane. The filtrate was concentrated under reduced pressure and residue was purified by Combiflash column chromatography (silica gel) using hexane/ethyl acetate mixture as an eluent to afford the corresponding arylated product.

Physical Characteristics and spectral data of compounds

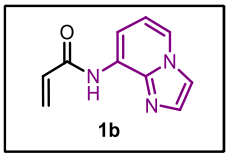
N-(imidazo[1,2-a]pyridin-8-yl)-2-phenylacrylamide (1a): Following the general procedure A, **1a** was obtained after purification by Combiflash column chromatography using silica gel column (20-30% ethyl acetate/hexane)



1a

as a off white solid; melting point: 106−108° C; yield = 87% (458.1 mg); R_f = 0.4 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 5.92 (s, 1H), 6.09 (s, 1H), 6.90 (t, *J* = 7.1 Hz, 1H), 7.41-7.54 (m, 6H), 7.98 (d, *J* = 5.2 Hz, 2H), 8.31 (d, *J* = 6.6 Hz, 1H), 9.34 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 110.9, 112.1, 114.5, 121.6, 122.2, 126.5, 127.6, 128.5, 128.6, 131.8, 136.1,138.7, 144.4, 166.2; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{16}H_{13}N_3ONa$ 286.0956, found 286.0954.

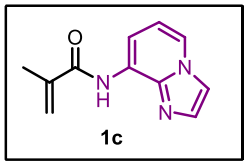
N-(imidazo[1,2- a]pyridin-8-yl)acrylamides (1b): Following the general procedure A, **1b** was obtained after purification by Combiflash column chromatography using silica gel column (20-30% ethyl acetate/hexane) as a



1b

grey solid; melting point: 101−103° C; yield = 83% (311.0 mg); R_f = 0.35 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 5.77 (dd, *J* = 10.2 Hz, 1.6 Hz, 1H), 6.29 (dd, *J* = 17.0 Hz, 1.6 Hz, 1H), 6.85-6.96 (m, 2H), 7.57 (s, 1H), 7.98 (s, 1H), 8.07 (d, *J* = 7.5 Hz, 1H), 8.29 (d, *J* = 6.7 Hz, 1H), 10.26 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 111.2, 112.1, 114.4, 121.8, 127.2, 127.3, 128.1 131.5, 131.6, 164.2; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{10}H_9N_3ONa$ 210.0643, found 210.0639.

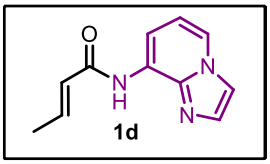
N-(imidazo[1,2-a]pyridin-8-yl)methacrylamide (1c): Following the general procedure A, **1c** was obtained after



1c

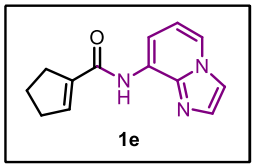
purification by Combiflash column chromatography using silica gel column (20-30% ethyl acetate/hexane) as a off white solid; melting point: 105−107° C; yield = 86% (346.1 mg); R_f = 0.35 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 2.04 (s, 3H), 5.61 (s, 1H), 5.96 (s, 1H), 6.89 (t, *J* = 7.1 Hz, 1H), 7.56 (s, 1H), 7.88 (d, *J* = 7.4 Hz, 1H), 7.99 (s, 1H), 8.30 (d, *J* = 6.7 Hz, 1H), 9.26 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 18.2, 110.8, 112.1, 114.5, 121.3, 121.9, 126.6, 131.7, 138.9, 139.4, 166.2; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{11}H_{11}N_3ONa$ 224.0800, found 224.0795.

(E)-N-(imidazo[1,2-a]pyridin-8-yl)but-2-enamide (1d): Following the general procedure A, **1d** was obtained



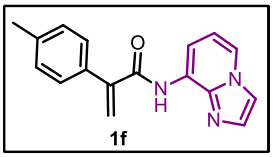
after purification by Combiflash column chromatography using silica gel column (20-30% ethyl acetate/hexane) as a off white solid; melting point: 95−97° C; yield = 82% (330.0 mg); R_f = 0.3 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 1.86-1.88 (m, 3H), 6.61 (dd, *J* = 15.2 Hz, 1.1 Hz, 1H), 6.80-6.89 (m, 2H), 7.56 (s, 1H), 7.97 (s, 1H), 8.04 (d, *J* = 7.5 Hz, 1H), 8.26 (d, *J* = 6.6 Hz, 1H), 9.97 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 17.4, 110.8, 112.1, 114.2, 121.3, 125.6, 127.3, 131.4, 138.5, 140.5, 164.4; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{11}H_{11}N_3ONa$ 224.0800, found 224.0796.

N-(imidazo[1,2-a]pyridin-8-yl)cyclopent-1-ene-1-carboxamide (1e): Following the general procedure A, **1e**



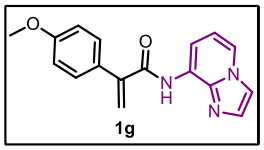
was obtained after purification by Combiflash column chromatography using silica gel column (20-30% ethyl acetate/hexane) as a light brown solid; melting point: 102−104° C; yield = 84% (382.0 mg); R_f = 0.3 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 1.93-2.00 (m, 2H), 2.45 (m, 1H), 2.53 (m, 1H), 2.63-2.65 (m, 2H), 6.81 (s, 1H), 6.88 (t, *J* = 7.1 Hz, 1H), 7.56 (s, 1H), 7.88 (d, *J* = 7.3 Hz, 1H), 7.99 (s, 1H), 8.29 (d, *J* = 6.6 Hz, 1H), 9.08 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 23.2, 31.4, 33.4, 110.1, 113.2, 113.6, 120.1, 127.4, 131.6, 139.1, 139.4, 140.0, 164.1; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{13}H_{13}N_3ONa$ 250.0956, found 250.0954.

N-(imidazo[1,2-a]pyridin-8-yl)-2-(p-tolyl)acrylamides (1f): Following the general procedure A, **1f** was obtained after purification by Combiflash column chromatography using silica gel column (20-30% ethyl acetate/hexane)

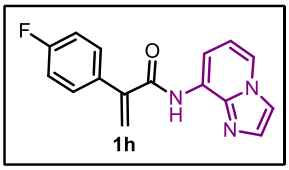


as a off white solid; melting point: 114−116° C; yield = 87% (482.5 mg); R_f = 0.4 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 2.35 (s, 3H), 5.87 (s, 1H), 6.04 (s, 1H), 6.90 (t, *J* = 7.1 Hz, 1H), 7.26 (d, *J* = 7.8 Hz, 2H), 7.42 (d, *J* = 7.9 Hz, 2H), 7.50 (s, 1H), 7.98 (d, *J* = 8.4 Hz, 2H), 8.31 (d, *J* = 6.6 Hz, 1H), 9.28 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ: 21.2, 110.3, 113.0, 113.6, 120.5, 121.7, 127.4, 127.9, 129.5, 132.1, 133.2, 138.7, 139.3, 145.1, 166.7; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{17}H_{15}N_3ONa$ 300.1113, found 300.1111.

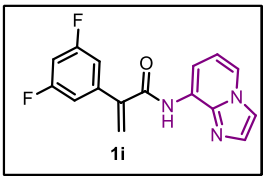
N-(imidazo[1,2-a]pyridin-8-yl)-2-(4-methoxyphenyl)acrylamides (1g)*:* Following the general procedure A, **1g** was obtained after purification by Combiflash column chromatography using silica gel column (20-30% ethyl acetate/hexane) as a off white solid; melting point: 121−123° C; yield = 81% (475.1 mg); R_f = 0.3 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 3.80 (s, 3H), 5.83 (s, 1H), 5.98 (s, 1H), 6.91 (t, *J* = 7.1 Hz, 1H), 7.01 (d, *J* = 8.7 Hz, 2H), 7.47 (d, *J* = 8.7 Hz, 2H), 7.50 (s, 1H), 7.97 (s, 1H), 7.98 (d, *J* = 5.4 Hz, 1H), 8.31 (d, *J* = 6.8 Hz, 1H), 9.27 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ: 55.3, 110.9, 113.2, 113.6, 114.1, 120.6, 120.8, 127.3, 128.5, 129.2, 131.5, 138.9, 144.5, 160.0, 167.2; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{17}H_{15}N_3O_2Na$ 316.1062, found 316.1058.



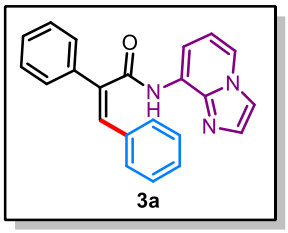
2-(4-fluorophenyl)-N-(imidazo[1,2-a]pyridin-8-yl)acrylamide (1h): Following the general procedure A, **1h** was obtained after purification by Combiflash column chromatography using silica gel column (20-30% ethyl acetate/hexane) as a off white solid; melting point: 125−127° C; yield = 77% (433.2 mg); R_f = 0.4 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 5.93 (s, 1H), 6.07 (s, 1H), 6.90 (t, *J* = 7.0 Hz, 1H), 7.28 (t, *J* = 8.8 Hz, 2H), 7.52 (s, 1H), 7.57-7.60 (m, 2H), 7.95 (d, *J* = 7.5 Hz, 1H), 7.98 (s, 1H), 8.32 (d, *J* = 6.9 Hz, 1H), 9.41 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ: 110.4, 113.0, 113.7, 115.8 (d, $J_{C\text{-}F}$ = 21.5 Hz,), 120.6, 122.0, 127.3, 129.8 (d, $J_{C\text{-}F}$ = 8.3 Hz), 132.2, (t, $J_{C\text{-}F}$ = 3.7 Hz), 139.3, 144.3, 162.1, 164.5, 166.4; ^{19}F NMR (100 MHz, $CDCl_3$, ppm) δ: -112.6; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{16}H_{12}FN_3ONa$ 304.0862, found 304.0858.



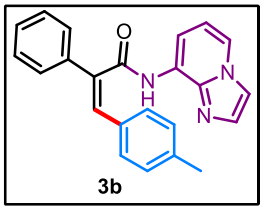
2-(3,5-difluorophenyl)-N-(imidazo[1,2-a]pyridin-8-yl)acrylamide (1i): Following the general procedure A, **1i** was obtained after purification by Combiflash column chromatography using silica gel column (20-30% ethyl acetate/hexane) as a off white solid; melting point: 128−130° C; yield = 79% (473.0 mg); R_f = 0.4 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.14 (d, *J* = 3.2 Hz, 2H), 6.91 (t, *J* = 7.1 Hz, 1H), 7.29-7.33 (m, 3H), 7.55 (s, 1H), 7.89 (d, *J* = 7.3 Hz, 1H), 7.99 (s, 1H), 8.35 (d, *J* = 6.7 Hz, 1H), 9.67 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm) δ: 103.8 (t, $J_{C\text{-}F}$ = 25.8 Hz), 110.8 (d, $J_{C\text{-}F}$ = 18.9 Hz), 110.8 (d, $J_{C\text{-}F}$ = 18.9 Hz), 112.0, 112.2, 114.5, 122.6, 122.9, 126.5, 131.9, 139.0, 139.6 (t, $J_{C\text{-}F}$ = 10.0 Hz), 142.2, 162.3 (d, $J_{C\text{-}F}$ = 244.3 Hz), 162.2 (d, $J_{C\text{-}F}$ = 244.5 Hz), 165.8; ^{19}F NMR (100 MHz, DMSO-d_6, ppm) δ: -109.6 (2F); HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{16}H_{11}F_2N_3ONa$ 322.0768, found 322.0766.



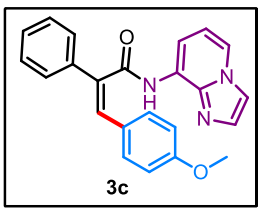
N-(imidazo[1,2-a]pyridin-8-yl)-2,3-diphenylacrylamide (3a) *:* Following the general procedure B, **3a** was obtained after purification by Combiflash column chromatography using silica gel column (10-30% ethyl acetate/hexane) as a off white solid; melting point: 133−135° C; yield = 84% (57.0 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.93 (t, *J* = 7.1 Hz, 1H), 7.18 (s, 1H), 7.23-7.26 (m, 1H), 7.31-7.38 (m, 3H), 7.41-7.47 (m, 3H), 7.58 (d, *J* = 7.68 Hz, 2H), 7.63 (d, *J* = 7.7 Hz, 2H), 7.96-7.99 (m, 2H), 8.34 (d, *J* = 6.7 Hz, 1H), 10.23 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 112.0, 112.3, 114.3, 122.5, 125.9, 126.7, 127.9, 128.3, 128.4, 128.6, 131.8, 135.5, 137.1, 137.2, 138.8, 168.5; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{22}H_{17}N_3ONa$ 362.1269, found 362.1263.



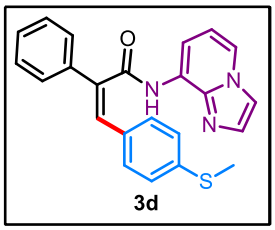
N-(imidazo[1,2-a]pyridin-8-yl)-2-phenyl-3-(p-tolyl)acrylamide (3b) *:* Following the general procedure B, **3b** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a off white solid; melting point: 135−137° C; yield = 88% (62.2 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 2.25 (s, 3H), 6.93 (t, *J* = 7.0 Hz, 1H), 7.13-7.14 (m, 3H), 7.34-7.36 (m, 1H), 7.40-7.47 (m, 5H), 7.61 (d, *J* = 7.5 Hz, 2H), 7.96 (s, 1H), 7.99 (d, *J* = 7.5 Hz, 1H), 8.34 (d, *J* = 6.6 Hz, 1H), 10.12 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 21.2, 110.5, 113.0, 113.5, 120.6, 126.3, 127.5, 128.2, 128.5, 128.7, 129.3, 130.2, 131.9, 132.3, 136.7, 137.1, 138.4, 138.9, 169.0; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{23}H_{19}N_3ONa$ 376.1426, found 376.1425.



N-(imidazo[1,2-a]pyridin-8-yl)-3-(4-methoxyphenyl)-2-phenylacrylamide (3c) *:* Following the general procedure B, **3c** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 138−140° C; yield = 87% (64.3 mg); R_f = 0.4 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 3.72 (s, 3H), 6.89-6.95 (m, 3H), 7.11 (s, 1H), 7.30-7.35 (m, 1H), 7.41 (t, *J* = 7.8 Hz, 2H), 7.48 (s, 1H), 7.53 (d, *J* = 8.7 Hz, 2H), 7.60 (d, *J* = 7.7 Hz, 2H), 7.97 (s, 1H), 8.01 (d, *J* = 7.4 Hz, 1H), 8.34 (d, *J* = 6.7 Hz, 1H), 10.09 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 55.2, 110.4, 113.0, 113.6, 114.0, 120.6, 126.2, 127.5, 127.8, 128.1, 128.7, 129.8, 130.1, 130.3, 131.9, 135.7, 137.2, 138.9, 159.7, 169.1; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{23}H_{19}N_3O_2Na$ 392.1375, found 392.1375.

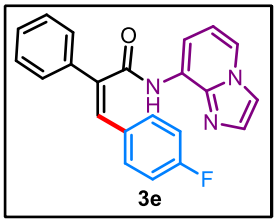


N-(imidazo[1,2-a]pyridin-8-yl)-3-(4-(methylthio)phenyl)-2-phenylacrylamide (3d) *:* Following the general procedure B, **3d** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 145−147° C; yield = 82% (63.2 mg); R_f = 0.6 (ethyl acetate/hexane (50/50); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 2.43 (s, 3H), 6.93 (t, *J* = 7.1 Hz, 1H), 7.13 (s, 1H), 7.21 (d, *J* = 8.3 Hz, 2H), 7.34-7.36 (m, 1H), 7.42 (t, *J* = 7.6 Hz, 2H), 7.48 (s, 1H), 7.52 (d, *J* = 8.2 Hz, 2H), 7.62 (d, *J* = 7.6 Hz, 2H), 7.97-7.99 (m, 2H), 8.35 (d, *J* = 6.7 Hz, 1H), 10.22 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 14.7, 109.9, 112.5, 113.1, 120.2, 125.6, 125.7, 126.9, 127.8, 128.2, 128.4, 128.9, 131.3, 131.4, 136.4, 136.5, 138.4, 138.7, 168.3; HRMS (ESI) m/z $[M+H]^+$ calcd for $C_{23}H_{20}N_3OS$ 386.1327, found 386.1328.



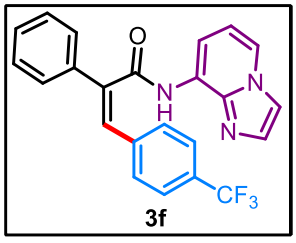
3d

3-(4-fluorophenyl)-N-(imidazo[1,2-a]pyridin-8-yl)-2-phenylacrylamide (3e) *:* Following the general procedure B, **3e** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a off white solid; melting point: 128−130° C; yield = 71% (50.8 mg); R_f = 0.6 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.93 (t, *J* = 7.1 Hz, 1H), 7.18 (t, *J* = 8.7 Hz, 3H), 7.34-7.38 (m, 1H), 7.43 (t, *J* = 7.5 Hz, 2H), 7.49 (s, 1H), 7.62-7.64 (m, 4H), 7.94-7.97 (m, 2H), 8.35 (d, *J* = 6.7 Hz, 1H), 10.27 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 110.1, 112.6, 113.1, 115.0, 115.2, 120.3, 125.8, 126.8, 128.0, 128.3, 128.4, 129.8, 129.8, 130.8, 130.9, 131.2, 136.2, 137.1, 138.2, 160.8, 163.2, 168.1; ^{19}F NMR (100 MHz, DMSO-d_6, ppm): δ -112.5; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{22}H_{16}FN_3ONa$ 380.1175, found 380.1171.



3e

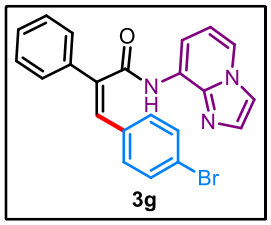
N-(imidazo[1,2-a]pyridin-8-yl)-2-phenyl-3-(4-(trifluoromethyl)phenyl)acrylamide (3f) : Following the general procedure B, **3f** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a off white solid; melting point: 122−124° C; yield = 66% (53.8 mg); R_f = 0.6 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.92 (t, *J* = 7.0 Hz, 1H), 7.27 (s, 1H), 7.39-7.52 (m, 4H), 7.66-7.72 (m, 4H), 7.79 (d, *J* = 8.0 Hz, 2H), 7.92 (d, *J* = 7.6 Hz, 1H), 7.97 (s, 1H), 8.36 (d, *J* = 6.6 Hz, 1H), 10.49 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 110.4, 110.8, 113.1, 113.7, 121.0, 125.3, 125.6 (q, J_{C-F} = 4.14 Hz), 126.5, 127.1, 128.0, 128.4,



3f

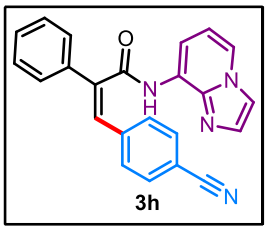
128.7, 128.8, 128.9, 128.9, 129.0, 129.7, 129.8, 130.1, 130.5, 131.9, 132.0, 136.3, 138.8 (d, $J_{C\text{-}F}$ = 8.6 Hz), 139.9, 168.1; ^{19}F NMR (100 MHz, $CDCl_3$, ppm): δ -62.7 (3F); HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{23}H_{16}F_3N_3ONa$ 430.1143, found 430.1141.

3-(4-bromophenyl)-N-(imidazo[1,2-a]pyridin-8-yl)-2-phenylacrylamide (3g) *:* Following the general procedure B, **3g** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a light brown solid; melting point: 157−159° C; yield = 54% (45.1 mg); R_f = 0.6 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.92 (t, *J* = 7.1 Hz, 1H), 7.16 (s, 1H), 7.35-7.38 (m, 1H), 7.44 (t, *J* = 7.5 Hz, 2H), 7.49 (s, 1H), 7.54-7.56 (m, 4H), 7.64 (d, *J* = 7.6 Hz, 2H), 7.93 (d, *J* = 7.4 Hz, 1H), 7.97 (s, 1H), 8.35 (d, *J* = 6.7 Hz, 1H), 10.36 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 110.6, 113.0, 113.7, 120.9, 122.5, 126.3, 127.2, 128.7, 128.7, 128.8, 130.0, 131.7, 131.9, 134.1, 136.5, 138.4, 138.8, 168.4; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{22}H_{16}BrN_3ONa$ 440.0374, found 440.0372.



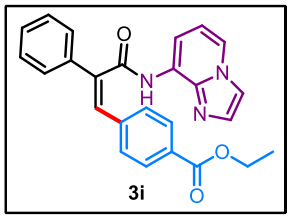
3g

3-(4-cyanophenyl)-N-(imidazo[1,2-a]pyridin-8-yl)-2-phenylacrylamide (3h) *:* Following the general procedure B, **3h** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a off white solid; melting point: 162−164° C; yield = 68% (49.6 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.92 (t, *J* = 7.1Hz, 1H), 7.26 (s, 1H), 7.39-7.41 (m, 1H), 7.46 (t, *J* = 7.4 Hz, 2H), 7.50 (s, 1H), 7.67 (d, *J* = 7.5 Hz, 2H), 7.75 (d, *J* = 8.3 Hz, 2H), 7.81 (d, *J* = 8.24 Hz, 2H), 7.91 (d, *J* = 7.4 Hz, 1H), 7.97 (s, 1H), 8.36 (d, *J* = 6.6 Hz, 1H), 10.56 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 109.9, 111.9, 113.3, 114.3, 118.7, 122.9, 126.1, 126.2, 126.5, 128.6, 128.7, 129.0, 131.9, 132.3, 136.6, 139.1, 140.2, 140.4, 168.0; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{23}H_{16}N_4ONa$ 387.1222, found 387.1220.



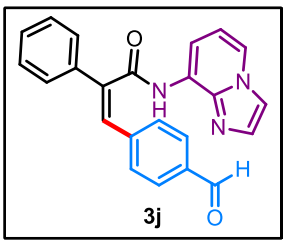
3h

Ethyl (Z)-4-(3-(imidazo[1,2-a]pyridin-8-ylamino)-3-oxo-2-phenylprop-1-en-1-yl)benzoate (3i) *:* Following the general procedure B, **3i** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a off white solid; melting point: 130−132° C; yield = 73% (60.1 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 1.26 (t, *J* = 7.5 Hz, 3H), 4.25 (q,

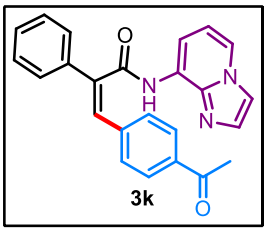


J = 7.1 Hz, 2H), 6.90 (t, *J* = 7.1 Hz, 1H), 7.23 (s, 1H), 7.34-7.37 (m, 1H), 7.40-7.45 (m, 3H), 7.64-7.70 (m, 4H), 7.88 (d, *J* = 8.3 Hz, 2H), 7.93 (d, *J* = 7.5 Hz, 1H), 7.94 (s, 1H), 8.33 (d, *J* = 6.6 Hz, 1H), 10.43 (s, 1H), ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 14.0, 60.6, 112.0, 113.1, 114.3, 122.8, 126.2, 126.6, 126.7, 128.4, 128.5, 128.6, 128.8, 129.1, 131.9, 136.7, 139.0, 139.4, 140.3, 165.2, 168.2; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{25}H_{21}N_3O_3Na$ 434.1481, found 434.1477.

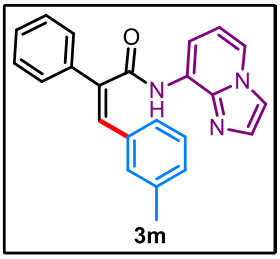
3-(4-formylphenyl)-N-(imidazo[1,2-a]pyridin-8-yl)-2-phenylacrylamide (3j) *:* Following the general procedure B, **3j** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 132−134° C; yield = 79% (58.0 mg); R_f = 0.4 (ethyl acetate/hexane (50/50); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 7.07 (s, 1H), 7.34 (s, 1H), 7.39-7.48 (m, 3H), 7.65-7.69 (m, 3H), 7.79 (d, *J* = 8.2 Hz, 2H), 7.87 (d, *J* = 8.2 Hz, 2H), 8.07 (s, 2H), 8.45 (d, *J* = 6.3 Hz, 1H), 9.94 (s, 1H), 10.64 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 113.9, 114.8, 121.1, 126.7, 126.9, 128.8, 128.9, 129.0, 129.1, 129.9, 135.5, 136.3, 140.2, 141.6, 168.7, 191.6; HRMS (ESI) m/z $[M+H]^+$ calcd for $C_{23}H_{18}N_3O_2$ 368.1399, found 368.1398.



3-(4-acetylphenyl)-N-(imidazo[1,2-a]pyridin-8-yl)-2-phenylacrylamide (3k) *:* Following the general procedure B, **3k** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 135−137° C; yield = 78% (59.5 mg); R_f = 0.4 (ethyl acetate/hexane (50/50); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 2.53 (s, 3H), 6.94 (t, *J* = 7.1 Hz, 1H), 7.26 (s, 1H), 7.37-7.39 (m, 1H), 7.40-7.49 (m, 3H), 7.67 (d, *J* = 7.6 Hz, 2H), 7.72 (d, *J* = 8.3 Hz, 2H), 7.91 (d, *J* = 8.3 Hz, 2H), 7.96-7.97 (m, 2H), 8.36 (d, *J* = 6.7 Hz, 1H), 10.47 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 26.5, 110.6, 113.0, 113.7, 120.9, 126.5, 127.2, 128.6, 128.9, 128.9, 131.9, 136.4, 138.8, 139.8, 139.9, 168.2, 197.4; HRMS (ESI) m/z $[M+H]^+$ calcd for $C_{24}H_{20}N_3O_2$ 382.1555, found 382.1559.

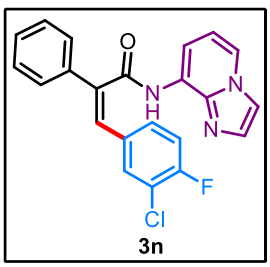


N-(imidazo[1,2-a]pyridin-8-yl)-2-phenyl-3-(m-tolyl)acrylamide (3m) *:* Following the general procedure B, **3m** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a off white solid; melting point: 132−134° C; yield = 83% (58.7 mg); R_f = 0.5 (ethyl

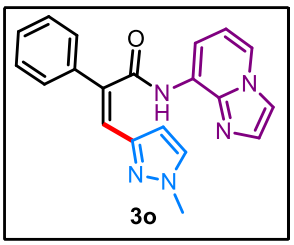


acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 2.21 (s, 3H), 6.93 (t, *J* = 7.2 Hz, 1H), 7.06 (d, *J* = 7.6 Hz, 1H), 7.13 (s, 1H), 7.20 (t, *J* = 7.6 Hz, 1H), 7.35-7.38 (m, 2H), 7.41-7.45 (m, 3H), 7.48 (s, 1H), 7.63 (d, *J* = 7.4 Hz, 2H), 7.93-7.97 (m, 2H), 8.34 (d, *J* = 6.7 Hz, 1H), 10.18 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 21.3, 110.5, 113.0, 113.5, 120.7, 125.5, 126.3, 127.5, 128.3, 128.4, 128.7, 129.1, 129.5, 130.3, 131.9, 135.1, 136.9, 137.5, 138.0, 138.9, 168.9; HRMS (ESI) m/z $[M+H]^+$ calcd for $C_{23}H_{20}N_3O$ 354.1606, found 354.1609.

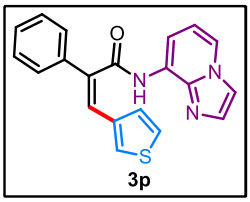
3-(3-chloro-4-fluorophenyl)-N-(imidazo[1,2-a]pyridin-8-yl)-2-phenylacrylamide (3n) *:* Following the general procedure B, **3n** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a off white solid; melting point: 126−128° C; yield = 73% (57.2 mg); R_f = 0.6 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.93 (t, *J* = 7.1 Hz, 1H), 7.18 (s, 1H), 7.37-7.40 (m, 2H), 7.42-7.46 (m, 2H), 7.50 (s, 1H), 7.57-7.60 (m, 1H), 7.64 (d, *J* = 7.3 Hz, 2H), 7.77-7.78 (m, 1H), 7.88 (d, *J* = 7.4 Hz, 1H), 7.97 (s, 1H), 8.36 (d, *J* = 6.7 Hz, 1H), 10.47 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 110.8, 113.0, 113.7, 116.8 (d, J_{CF} = 21.4 Hz), 120.9, 121.2 (d, $J_{C\text{-}F}$ = 18.0 Hz), 126.4, 127.1, 127.5, 128.0, 128.2 (d, $J_{C\text{-}F}$ = 7.2 Hz), 128.8, 128.9, 130.9, 131.9, 132.5 (d, $J_{C\text{-}F}$ = 4.3 Hz), 136.3, 138.9 (d, $J_{C\text{-}F}$ = 11.5 Hz), 157.8 (d, $J_{C\text{-}F}$ = 249.7 Hz), 168.1; ^{19}F NMR (100 MHz, DMSO-d_6, ppm): δ -119.9; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{22}H_{15}ClFN_3ONa$ 414.0785, found 414.0781.



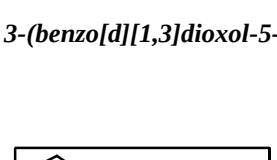
N-(imidazo[1,2-a]pyridin-8-yl)-3-(1-methyl-1H-pyrazol-4-yl)-2-phenylacrylamide (3o) *:* Following the general procedure B, **3o** was obtained after purification by Combiflash column chromatography using silica gel column (10-50% ethyl acetate/hexane) as a light yellow solid; melting point: 186−188° C; yield = 66% (45.3 mg); R_f = 0.3 (ethyl acetate/hexane (40/60);); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 3.79 (s, 3H), 6.98 (m, 1H), 7.04 (s, 1H), 7.31-7.32 (m, 1H), 7.40 (t, *J* = 7.5 Hz, 2H), 7.55 (d, *J* = 6.8 Hz, 4H), 7.99-8.01 (m, 3H), 8.39 (d, *J* = 6.6 Hz, 1H), 10.05 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 38.5, 112.3, 113.1, 114.4, 117.2, 118.9, 122.8, 125.3, 126.7, 127.3, 128.6, 130.8, 131.5, 133.2, 136.9, 138.3, 138.9, 168.8; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{20}H_{17}N_5ONa$ 366.1331, found 366.1325.



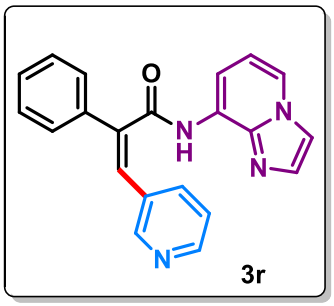
N-(imidazo[1,2-a]pyridin-8-yl)-2-phenyl-3-(thiophen-3-yl)acrylamide (3p) : Following the general procedure B, **3p** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a grey solid; melting point: 168−170° C; yield = 71% (49.0 mg); R_f = 0.6 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.95 (t, *J* = 7.0 Hz, 1H), 7.21 (s, 1H), 7.28 (d, *J* = 4.8 Hz, 1H), 7.32-7.35 (m, 1H), 7.42 (t, *J* = 7.7 Hz, 2H), 7.50-7.52 (m, 2H), 7.60 (d, *J* = 7.4 Hz, 2H), 7.72 (s, 1H), 7.98 (s, 1H), 8.04 (d, *J* = 7.4 Hz, 1H), 8.36 (d, *J* = 6.6 Hz, 1H), 10.29 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 112.1, 112.4, 114.4, 121.8, 122.6, 125.6 , 126.3, 126.7, 126.8, 127.8, 128.6, 131.8, 135.3, 136.8, 137.1, 138.9, 168.8; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{20}H_{15}N_3OSNa$ 368.0834, found 368.0829.



3-(benzo[d][1,3]dioxol-5-yl)-N-(imidazo[1,2-a]pyridin-8-yl)-2-phenylacrylamide (3q) *:* Following the general procedure B, **3q** was obtained after purification by Combiflash column chromatography using silica gel column (10-40% ethyl acetate/hexane) as a off white solid; melting point: 162−164° C; yield = 73% (56.0 mg); R_f = 0.3 (ethyl acetate/hexane (40/60);); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 5.98 (s, 2H), 6.89-6.95 (m, 2H), 7.09-7.12 (m, 3H), 7.33-7.35 (m, 1H), 7.41 (t, *J* = 7.5 Hz, 2H), 7.49 (s, 1H), 7.59 (d, *J* = 7.7 Hz, 2H), 7.97 (s, 1H), 7.98 (d, *J* = 6.9 Hz, 1H), 8.35 (d, *J* = 6.7 Hz, 1H), 10.18 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 101.1, 107.5, 108.3, 112.1, 112.2, 114.3, 122.6, 123.5, 125.7, 126.7, 127.6, 127.7, 128.6, 129.6, 131.8, 135.5, 137.2, 138.8, 147.1, 147.4, 168.7; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{23}H_{17}N_3O_3Na$ 406.1168, found 406.1162.

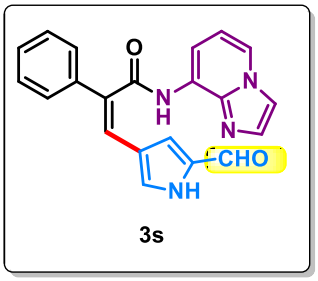


(Z)-N-(imidazo[1,2-a]pyridine-8-yl)-2-phenyl-3-(pyridine-3-yl)acrylamide (3r) : Following the general procedure B, **3r** was obtained after purification by Combiflash column chromatography using silica gel column (40-50% ethyl acetate/hexane) as yellow solid; melting point: 77−79 °C; yield = 63% (42.8 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.93 (t, *J* = 7.1Hz, 1H), 7.22 (s, 1H), 7.34-7.40 (m, 2H), 7.41-7.49 (m, 3H), 7.65-7.67 (m, 2H), 7.95-7.97 (m, 3H), 8.35-8.37 (m, 1H), 8.42 (d, *J* = 4.1Hz,



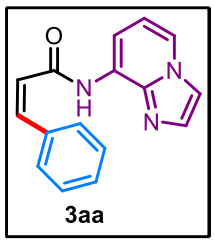
1H), 8.75 (s, 1H), 10.52 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 112.0, 113.0, 114.3, 122.8, 123.4, 124.5, 126.1, 126.5, 128.3, 128.6, 131.5, 131.8, 134.7, 136.7, 138.9, 139.2, 148.5, 149.5, 168.2; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{21}H_{16}N_4ONa$ 363.1221, found 363.1216.

(Z)-3-(5-formyl-1H-pyrrol-3-yl)N-(imidazo[1,2-a]pyridine-8-yl)-2-phenylacrylamide (3s) : Following the general procedure B, **3s** was obtained after purification by Combiflash column chromatography using silica gel column (50-60% ethyl acetate/hexane) as light brown solid; melting point: 255−257° C; yield = 52% (37.0 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.96 (t, *J* = 7.1Hz, 1H), 7.09 (s, 1H), 7.16 (s, 1H), 7.30 (t, *J* = 7.2Hz, 1H), 7.40 (t, *J* = 8.0Hz, 2H), 7.46 (s, 1H), 7.50 (s, 1H), 7.54-7.56 (m, 2H), 7.98 (s, 1H), 8.05 (d, *J* = 7.4Hz, 1H), 8.36 (d, *J* = 6.7Hz, 1H), 9.41 (s, 1H), 10.06 (s, 1H), 12.26 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 112.2, 112.3, 114.4, 118.8, 121.0, 121.4, 122.6, 125.3, 126.8, 127.3, 128.0, 128.6, 131.7, 133.2, 137.0, 138.9, 168.9, 179.6; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{21}H_{16}N_4O_2Na$ 379.1170, found 379.1169.



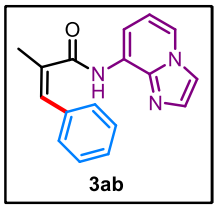
3s

N-(imidazo[1,2-a]pyridin-8-yl)-3-phenylacrylamide (3aa) : Following the general procedure B, **3aa** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 104−106° C; yield = 72% (37.9 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.55 (d, *J* = 12.8 Hz, 1H), 6.86 (d, *J* = 7.1 Hz, 1H), 6.91 (d, *J* = 12.7 Hz, 1H), 7.29-7.37 (m, 3H), 7.57 (s, 1H), 7.72 (d, *J* = 7.0 Hz, 2H), 7.98-8.01 (m, 2H), 8.29 (d, *J* = 6.6 Hz, 1H), 10.11 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 110.8, 113.2, 113.6, 120.4, 122.9, 127.4, 128.2, 128.9, 129.5, 131.5, 134.7, 138.9, 140.4, 165.3; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{16}H_{13}N_3ONa$ 286.0956, found 286.0955.



3aa

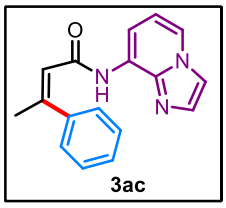
N-(imidazo[1,2-a]pyridin-8-yl)-2-methyl-3-phenylacrylamide (3ab) : Following the general procedure B, **3ab** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a grey white solid; melting point: 107−109° C; yield = 69% (38.3 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 2.14 (s, 3H), 6.58 (s, 1H), 6.87 (t, *J* = 6.9 Hz, 1H), 7.16 (t, *J* = 7.2 Hz, 1H), 7.24 (t, *J* = 7.5 Hz,



3ab

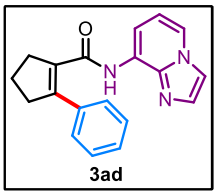
2H), 7.34 (d, *J* = 7.3 Hz, 2H), 7.45 (s, 1H), 7.93 (s, 2H), 8.27 (d, *J* = 6.6 Hz, 1H), 9.52 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 21.9, 110.0, 112.1, 114.3, 122.0, 126.7, 127.4, 127.7 (2C), 128.3 (2C), 128.6, 131.7, 134.2, 135.6, 138.5, 169.7; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{17}H_{15}N_3ONa$ 300.1113, found 300.1111.

N-(imidazo[1,2-a]pyridin-8-yl)-3-phenylbut-2-enamide (3ac) *:* Following the general procedure B, **3ac** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 111−113° C; yield = 59% (32.7 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 2.16 (s, 3H), 6.52 (s, 1H), 6.76 (t, *J* = 7.2 Hz, 1H), 7.24-7.33 (m, 5H), 7.52 (s, 1H), 7.83 (d, *J* = 7.5 Hz, 1H), 7.94 (s, 1H), 8.20 (d, *J* = 6.4 Hz, 1H), 9.60 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 26.9, 110.1, 113.1, 113.4, 120.0, 121.0, 127.1, 127.5 128.1, 128.3, 131.7, 139.1, 140.1, 151.9, 165.0; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{17}H_{15}N_3ONa$ 300.1113, found 300.1111.



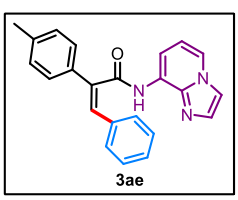
3ac

N-(imidazo[1,2-a]pyridin-8-yl)-2-phenylcyclopent-1-ene-1-carboxamide (3ad) *:* Following the general procedure B, **3ad** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 132−134° C; yield = 41% (24.8 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 1.99-2.02 (m, 2H), 2.88 (t, *J* = 7.48 Hz, 4H), 6.83 (t, *J* = 7.1 Hz, 1H), 7.22-7.32 (m, 3H), 7.40-7.42 (m, 3H), 7.91 (s, 2H), 8.23 (d, *J* = 6.7 Hz, 1H), 9.14 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 21.5, 35.8, 37.9, 110.0, 112.1, 114.3, 121.6, 126.7, 127.2, 127.8, 128.2, 131.5, 133.1, 135.7, 138.3, 144.7, 166.4; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{19}H_{17}N_3ONa$ 326.1269, found 326.1265.



3ad

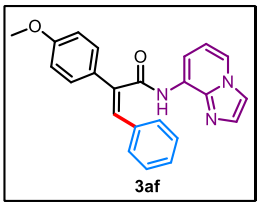
N-(imidazo[1,2-a]pyridin-8-yl)-3-phenyl-2-(p-tolyl)acrylamide (3ae) *:* Following the general procedure B, **3ae** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 136−138° C; yield = 68% (48.1 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 2.33 (s, 3H), 6.92 (t, *J* = 7.1 Hz, 1H), 7.13 (s, 1H), 7.21-7.25 (m, 3H), 7.32 (t, *J* = 7.6 Hz, 2H), 7.47 (s, 1H), 7.52 (d, *J* = 8.1 Hz, 2H), 7.56 (d, *J* = 7.6 Hz, 2H), 7.96 (s, 1H), 7.97 (d, *J* = 8.4 Hz, 1H), 8.33 (d, *J* = 6.7 Hz, 1H), 10.09 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 21.2,



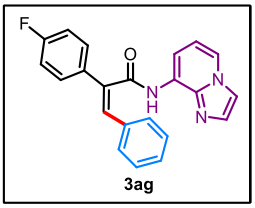
3ae

110.4, 113.0, 113.6, 120.6, 126.2, 127.5, 128.2, 128.4, 128.5, 129.2, 129.5, 131.9, 134.1, 135.3, 137.6, 138.4, 138.9, 168.9; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{23}H_{19}N_3ONa$ 376.1426, found 376.1427.

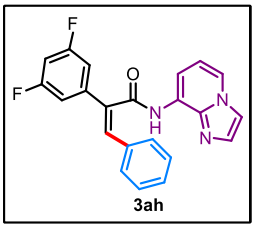
N-(imidazo[1,2-a]pyridin-8-yl)-2-(4-methoxyphenyl)-3-phenylacrylamide (3af) *:* Following the general procedure B, **3af** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 177−179° C; yield = 71% (52.4 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 3.78 (s, 3H), 6.92 (t, *J* = 7.1 Hz, 1H), 7.00 (d, *J* = 8.8 Hz, 2H), 7.07 (s, 1H), 7.20-7.24 (m, 1H), 7.31 (t, *J* = 7.6 Hz, 2H), 7.47 (s, 1H), 7.56 (t, *J* = 7.30 Hz, 4H), 7.95-7.97 (m, 2H), 8.33 (d, *J* = 6.6 Hz, 1H), 10.05 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 55.3, 110.8, 113.1, 113.6, 114.2, 120.7, 127.5, 127.7, 128.0, 128.3, 128.4, 128.5, 129.5, 131.7, 135.5, 137.3, 138.9, 159.9, 169.1; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{23}H_{19}N_3O_2Na$ 392.1375, found 392.1375.



2-(4-fluorophenyl)-N-(imidazo[1,2-a]pyridin-8-yl)-3-phenylacrylamide (3ag) *:* Following the general procedure B, **3ag** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 131−133° C; yield = 76% (54.3 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 7.27-7.36 (m, 7H), 7.56 (d, *J* = 7.2 Hz, 2H), 7.67-7.71 (m, 2H), 7.90 (s, 1H), 8.22-8.26 (m, 2H), 8.56-8.57 (m, 1H), 10.70 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 114.1, 115.6 (d, $J_{C\text{-}F}$ = 41.48 Hz), 116.6, 116.9, 121.2, 125.1, 128.1, 128.4, 128.6, 128.7 (d, $J_{C\text{-}F}$ = 8.1 Hz), 130.5, 131.3, 133.2 (d, $J_{C\text{-}F}$ = 3.06 Hz), 134.9, 135.6, 136.4, 162.8 (d, $J_{C\text{-}F}$ = 246.35 Hz), 169.7; ^{19}F NMR (100 MHz, $CDCl_3$, ppm): δ -113.5; HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{22}H_{16}FN_3ONa$ 380.1175, found 380.1169.



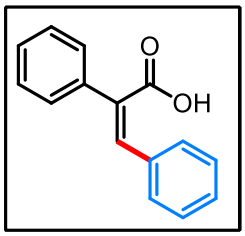
2-(3,5-difluorophenyl)-N-(imidazo[1,2-a]pyridin-8-yl)-3-phenylacrylamide (3ah) *:* Following the general procedure B, **3ah** was obtained after purification by Combiflash column chromatography using silica gel column (20-40% ethyl acetate/hexane) as a off white solid; melting point: 136−138° C; yield = 64% (48.0 mg); R_f = 0.5 (ethyl acetate/hexane (40/60); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 6.93 (t, *J* = 7.1 Hz, 1H), 7.25-7.30 (m, 2H), 7.34-7.39 (m, 5H), 7.50 (s, 1H), 7.60 (d, *J* = 7.5 Hz, 2H), 7.88 (d, *J* = 7.4 Hz, 1H), 7.98 (s, 1H), 8.37 (d



(d, J = 6.7 Hz, 1H), 10.55 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 103.7 (t, $J_{C\text{-}F}$ = 25.3 Hz), 109.2 (d, $J_{C\text{-}F}$ = 7.5 Hz) 109.4 (d, $J_{C\text{-}F}$ = 7.5 Hz), 110.7, 113.0, 113.6, 121.0, 127.1, 128.7 (d, $J_{C\text{-}F}$ = 3.6 Hz), 129.0, 132.0, 134.3, 135.6, 138.8, 140.1 (t, $J_{C\text{-}F}$ = 9.6 Hz), 163.1 (d, $J_{C\text{-}F}$ = 247.0 Hz), 163.3 (d, $J_{C\text{-}F}$ = 247.0 Hz), 167.6; ^{19}F NMR (100 MHz, $CDCl_3$, ppm): δ -109.07 (2F); HRMS (ESI) m/z $[M+Na]^+$ calcd for $C_{22}H_{15}F_2N_3ONa$ 398.1081, found 398.1083.

Experimental Procedure for Synthesis of *N*-(imidazo[1,2-*a*]pyridin-8-yl)-2,3-diphenylacrylamide (3a) in gram scale: An oven dried 250 ml round bottomed flask fitted with teflon coated magnetic stir bar, reflux condenser, rubber septum with nitrogen balloon was charged with N-(imidazo[1,2-*a*]pyridin-8-yl)-2-phenylacrylamide (**1a**) (1 g, 3.8 mmol, 1 equiv) in dry toluene (75 ml), iodobenzene (1.55 g, 0.85 ml, 7.6 mmol, 2 equiv) and K_2CO_3 (1.31 g, 9.5 mmol, 2.5 equiv) at room temperature followed by the addition of $Pd(OAc)_2$ (85 mg, 0.38 mmol, 0.1 equiv). The resulting suspension was heated at 100° C in an oil bath for 18 h under air. After completion, the reaction mixture was cooled to room temperature and filtered through celite bed and bed was washed with dichloromethane. The filtrate was concentrated under reduced pressure and residue was purified by Combiflash column chromatography using 40 gm RediSep normal phase silica flash column and 10-30% ethyl acetate/hexane as eluent to afford *N*-(imidazo[1,2-*a*]pyridin-8-yl)-2,3-diphenylacrylamide (**3a**, 993 mg, 77%) as off white solid.

Experimental Procedure for Removal of Directing Group (8-AIP): To the stirred suspension of arylated product **3a** (0.5 mmol, 1 equiv) in ethanol (3 ml) and water (3 ml) was added lithium hydroxide monohydrate (1.5 mmol, 3 equiv) and the reaction mixture was heated at 100° C for 24 h. After completion, reaction mixture



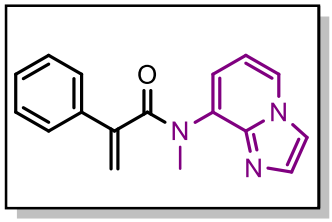
was concentrated under reduced pressure and 10 ml water was added to the residue. This was extracted with ethyl acetate (3x10 ml). This organic layer was dried under reduced pressure to obtain imidazo[1,2-*a*]pyridin-8-amine in 78% yield. Aqueous layer was acidified with 2(N) HCl and extracted with ethyl acetate (3x10 ml). This combined organic layer was concentrated under reduced pressure to obtain 2,3-diphenylacrylic acid in 89% yield.

2,3-diphenyl acrylic acid: Yield = 100 mg; ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 7.03-7.05 (m, 2H), 7.16-7.25 (m, 5H), 7.35-7.38 (m, 3H), 7.75 (s, 1H), 12.69 (s, 1H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 127.5, 128.2, 128.4, 128.9, 129.3, 130.1, 133.2, 134.3, 136.2, 138.9, 168.2.

Experimental procedure for the preparation of N-(imidazo[1,2-*a*]pyridine-8-yl)-*N*-methyl-2-phenylacrylamide (4):

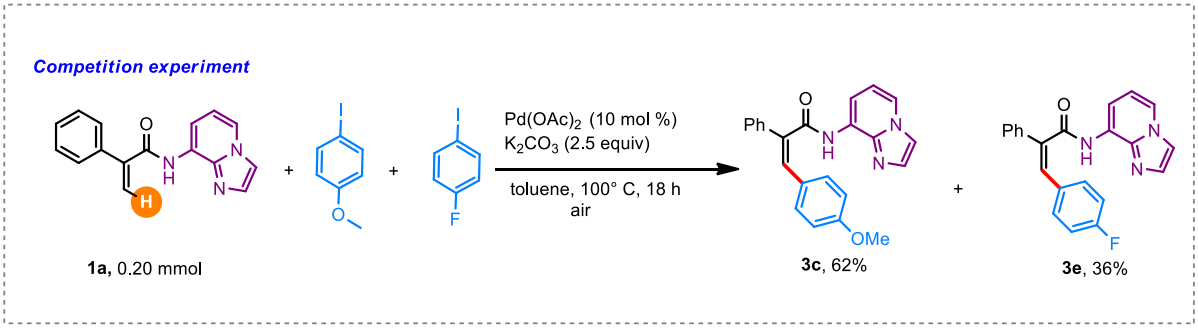
In 25 ml round bottomed flask, **1a** (1 mmol, 263 mg) was dissolved in dry DMF (5 ml) and 1.5 equiv of NaH was added into the reaction mixture. Afterwards, 2.5 equiv of MeI was added dropwise into the reaction mixture at 0° C and then stirred at room temperature for 2 hr. After the completion of the reaction via TLC chromatography, 20 ml water was added and the product was extracted with ethyl acetate (4 X 10 ml). Organic layer was dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The crude product was then purified using column chromatography using 50% ethylacetate/hexane as eluent.

N-(imidazo[1,2-*a*]pyridine-8-yl)-*N*-methyl-2-phenylacrylamide (6) :



Grey solid; melting point: 88−90° C; yield = 80% (221.6 mg); ^{1}H NMR (400 MHz, DMSO-d_6, ppm): δ 3.37 (s, 3H), 5.27 (s, 1H), 5.48 (s, 1H), 6.73 (s, 1H), 6.99 (s, 1H), 7.22-7.33 (m, 5H), 7.56 (s, 1H), 7.92 (s, 1H), 8.42 (d, *J* = 6.6 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 35.3, 110.9, 112.7, 117.3, 122.6, 124.8, 125.7, 127.3, 127.6, 132.2, 132.9, 135.8, 141.4, 145.1, 170.2.

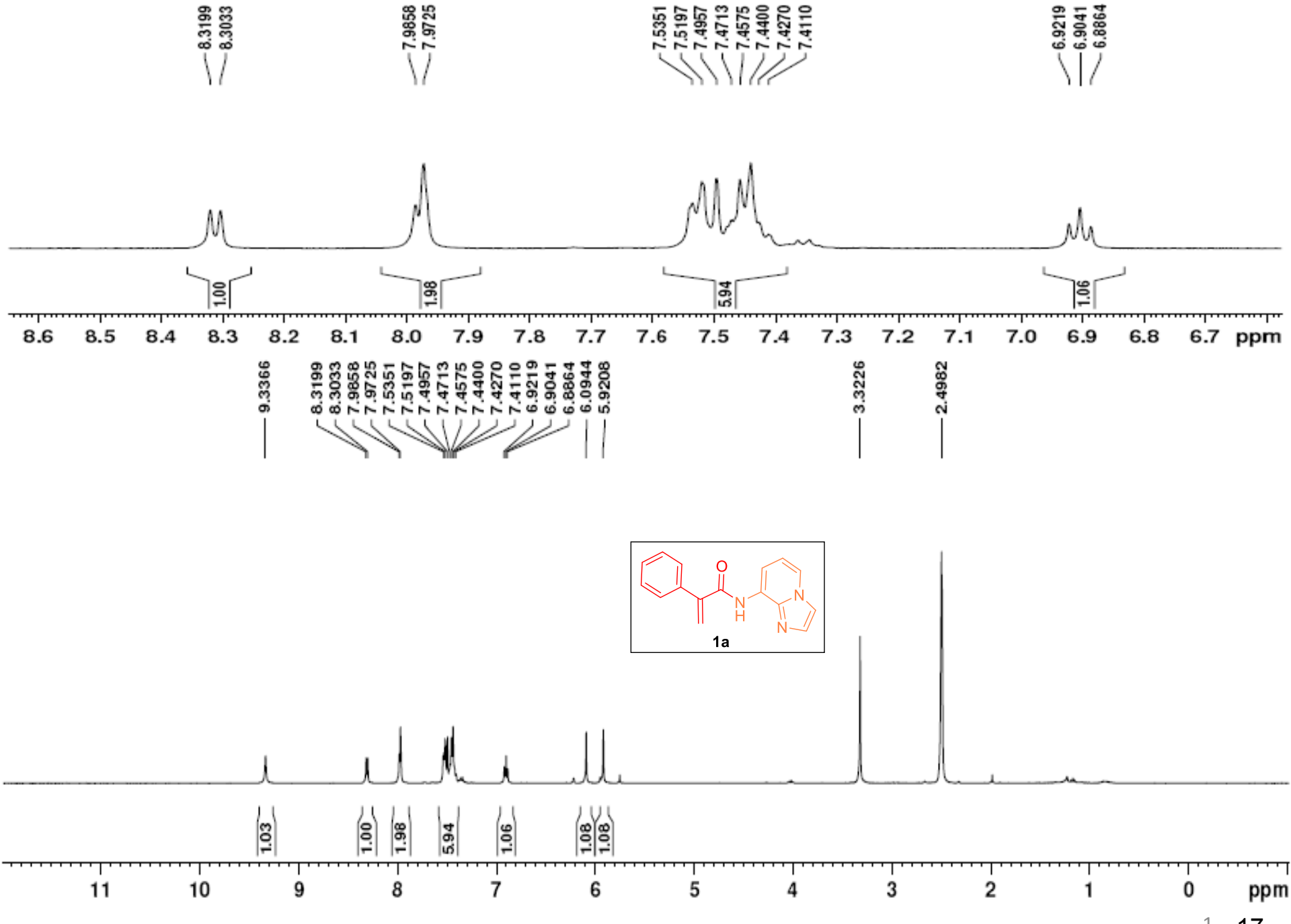
Experimental Procedure for Competition experiment:



A screw cap vial was charged with **1a** (0.2 mmol, 1 equiv) in dry toluene (4 ml), 4-iodoanisole and 4-iodofluoro benzene compound (0.4 mmol, 2 equiv) and K_2CO_3 (0.5 mmol, 2.5 equiv) at room temperature followed by the addition of $Pd(OAc)_2$ (10 mol %, 0.1 equiv). The resulting suspension was heated at 100° C in an oil bath for 18 h under aerobic condition. After completion, the reaction mixture was cooled to room temperature and filtered through celite bed and bed was washed with dichloromethane. The filtrate was concentrated under reduced pressure and residue was purified by Combiflash column chromatography (silica gel) using hexane/ethyl acetate mixture as an eluent to afford the corresponding **3c (**62%**,** 45.8 mg**)** and **3e (**36%**,** 25.7 mg**)** arylated products.

Experimental Procedure for Radical quenching experiment:

A screw cap vial was charged with **1a** (0.2 mmol, 1 equiv) in dry toluene (4 ml), iodobenzene compound (0.4 mmol, 2 equiv) K_2CO_3 (0.5 mmol, 2.5 equiv) and radical scavengers (BHT/$Ph_2C{=}CH_2$) at room temperature followed by the addition of $Pd(OAc)_2$ (10 mol %, 0.1 equiv). The resulting suspension was heated at 100° C in an oil bath for 18 h under aerobic condition. After completion, the reaction mixture was cooled to room temperature and filtered through celite bed and bed was washed with dichloromethane. The filtrate was concentrated under reduced pressure and residue was purified by Combiflash column chromatography (silica gel) using hexane/ethyl acetate mixture as an eluent to afford the corresponding **3a** in (76%, 51.7 mg) and (74%, 50.3 mg) yields respectively.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O
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H
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N
1a
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1.06
1.08
1.08
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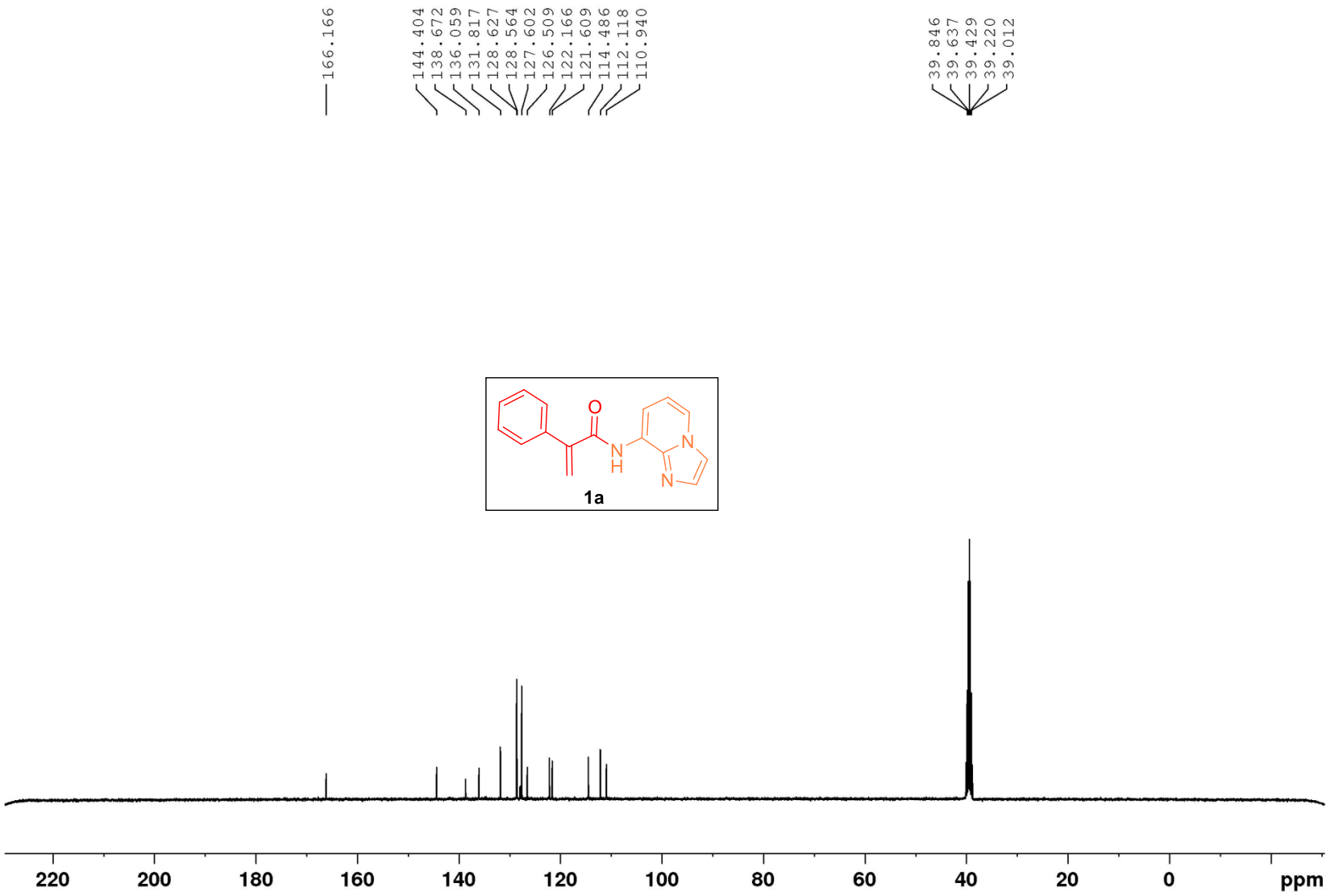
^{1}H NMR of **1a**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110.940
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39.637
39.429
39.220
39.012
O
N
H
N
N
1a
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200
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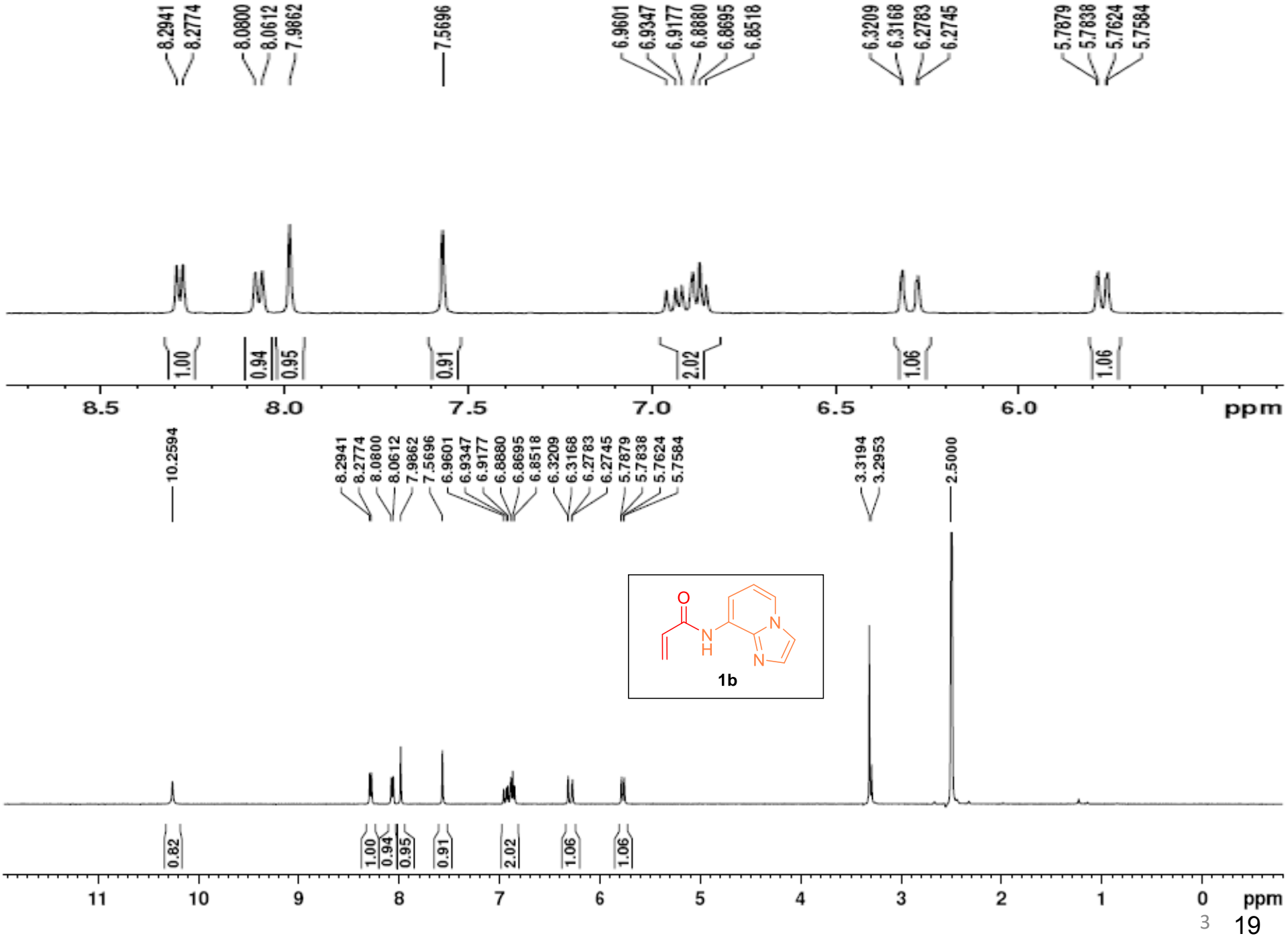
ppm

^{13}C NMR of **1a**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1.06
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7.0
6.5
6.0
ppm
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10
9
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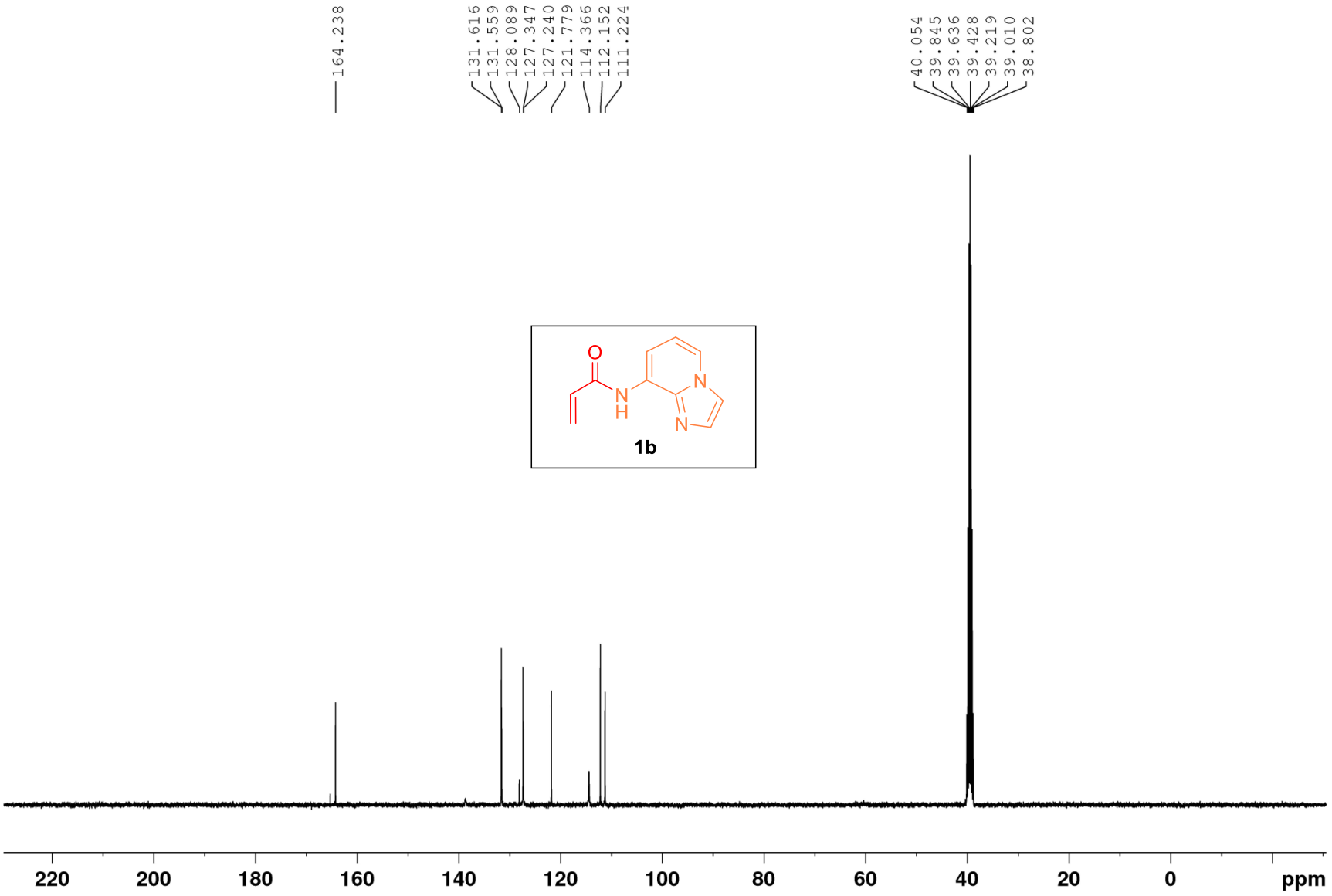
H
N
N
1b

[1]H NMR of **1b**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38.802
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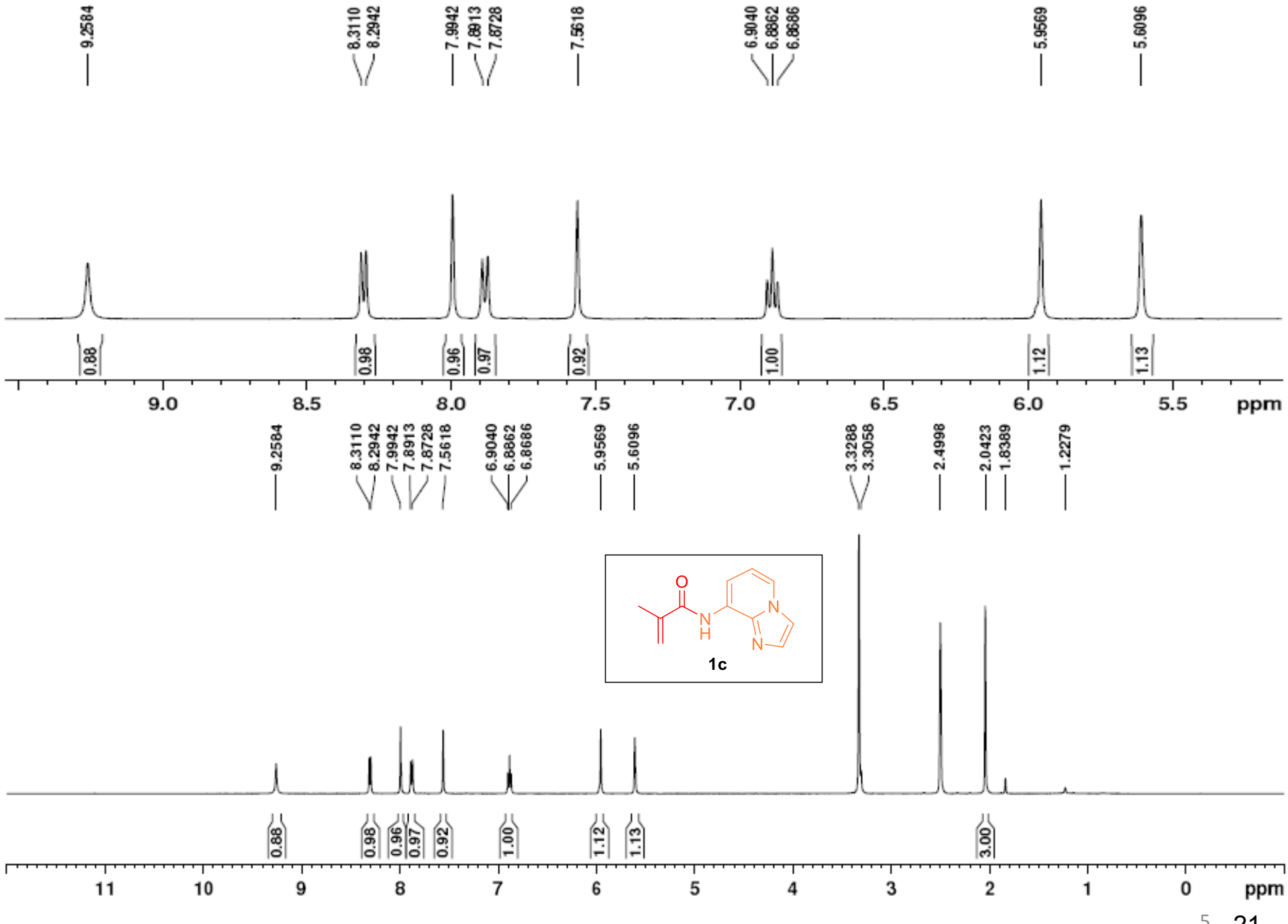
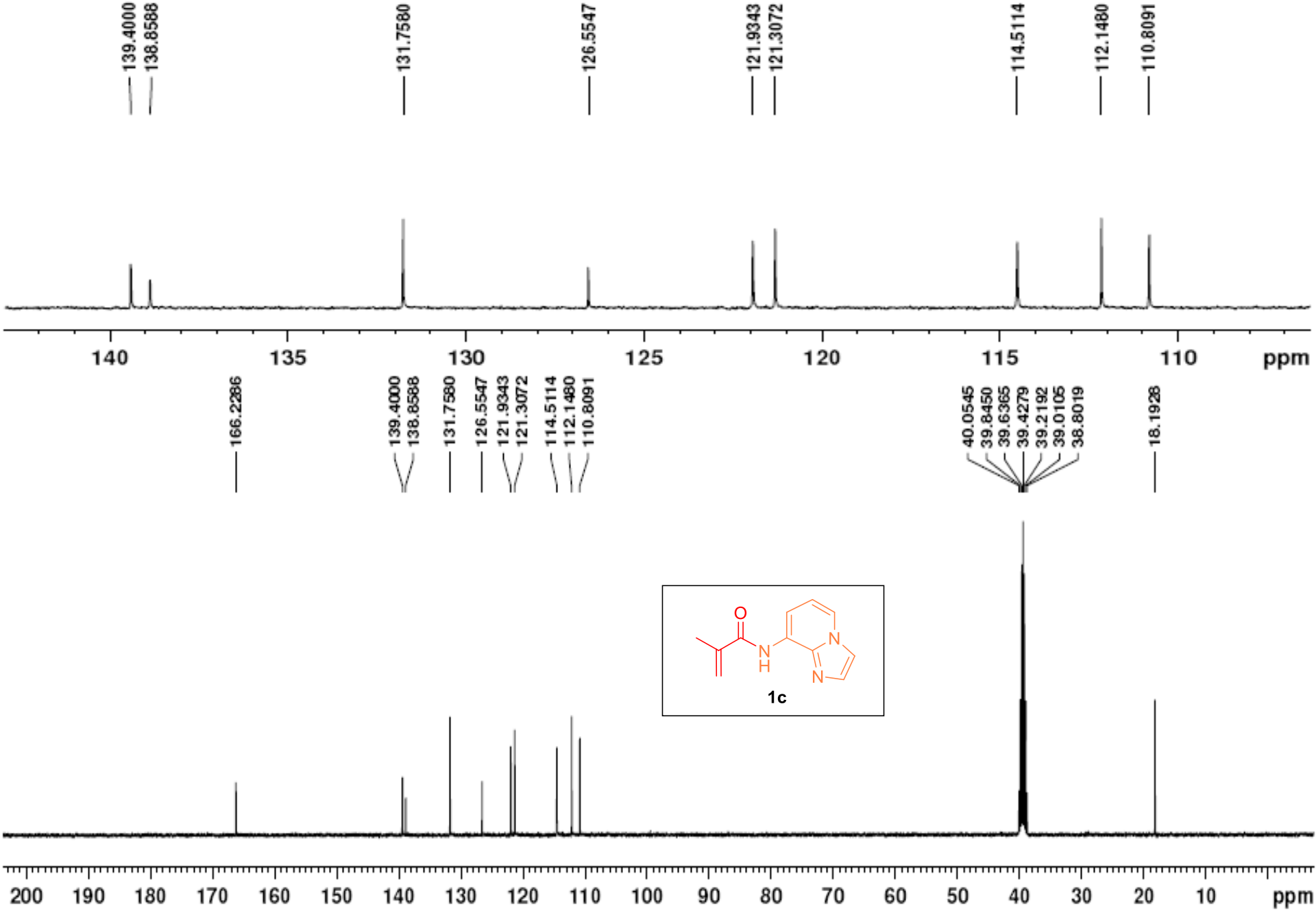
N
H
N
N
1b
220
200
180
160
140
120
100
80
60
40
20
0
ppm

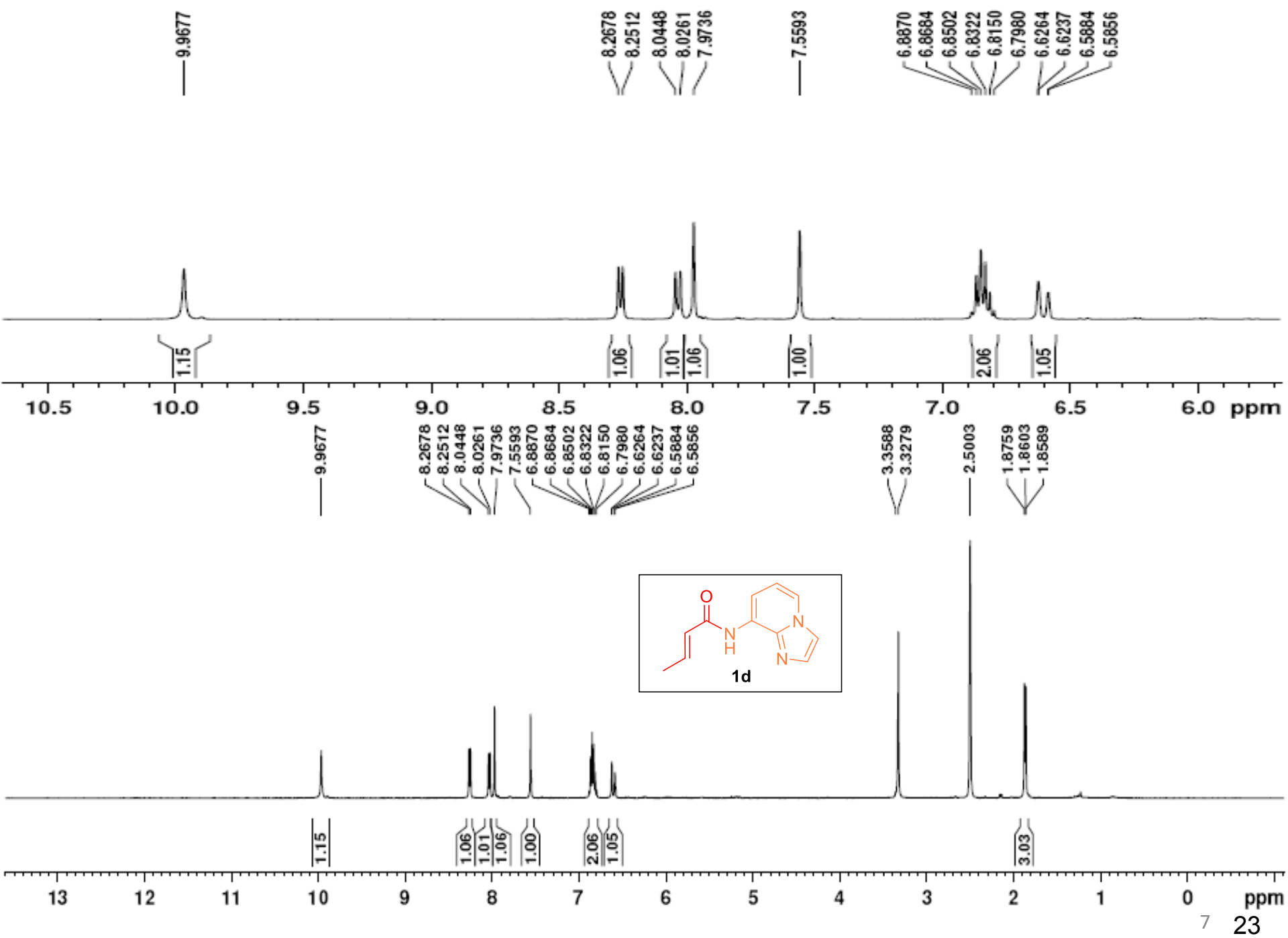
^{13}C NMR of **1b**


9.2584
8.3110
8.2942
7.9942
7.8913
7.8728
7.5618
6.9040
6.8862
6.8686
5.9569
5.6096
0.88
0.98
0.96
0.97
0.92
1.00
1.12
1.13
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
ppm
3.3288
3.3058
2.4998
2.0423
1.8389
1.2279
3.00
11
10
9
8
7
6
5
4
3
2
1
0
O
N
H
N
N
1c

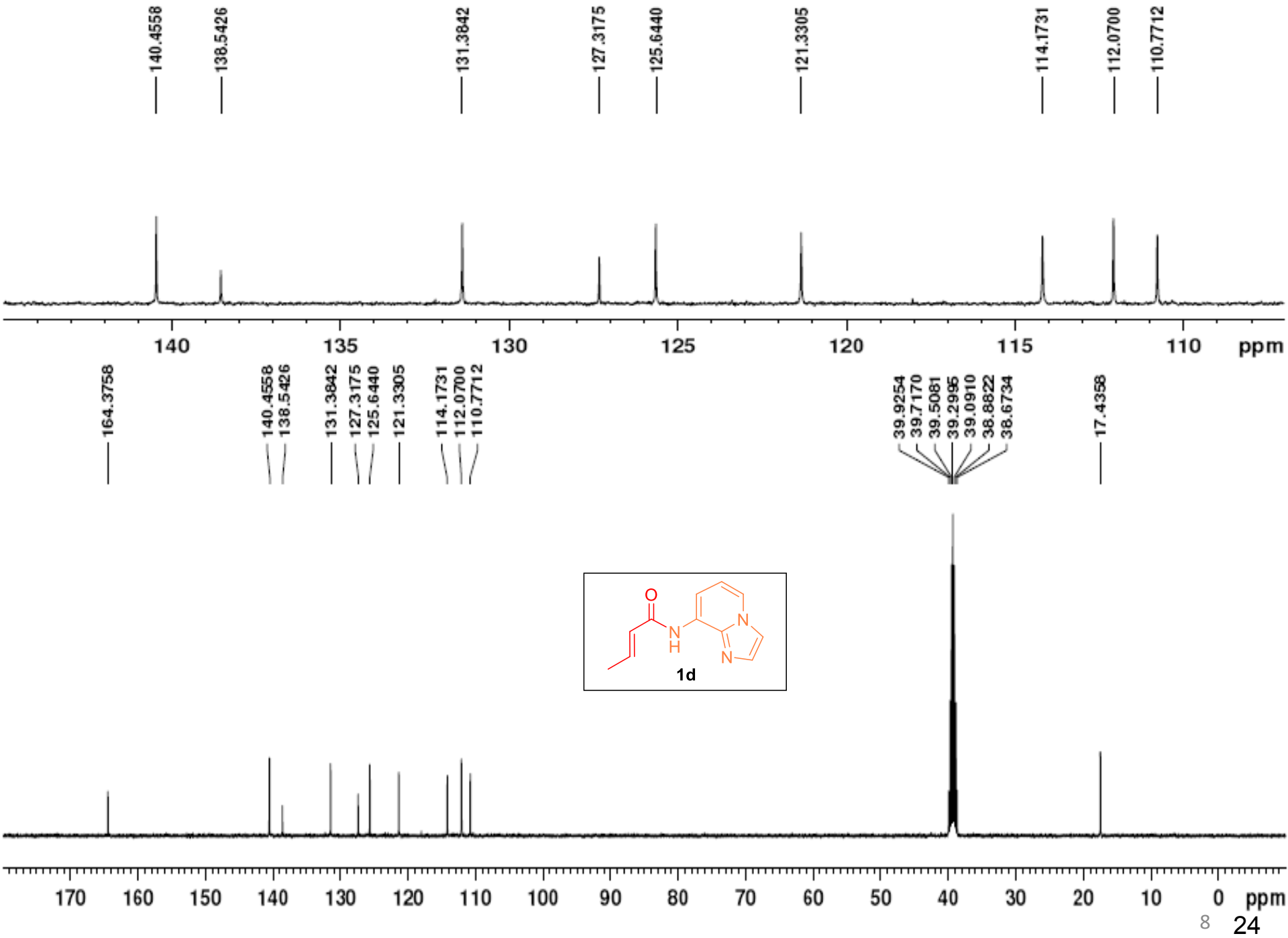
[1]H NMR of **1c**


139.4000
138.8588
131.7580
126.5547
121.9343
121.3072
114.5114
112.1480
110.8091
140
135
130
125
120
115
110
ppm
166.2286
139.4000
138.8588
131.7580
126.5547
121.9343
121.3072
114.5114
112.1480
110.8091
40.0545
39.8450
39.6365
39.4279
39.2192
39.0105
38.8019
18.1928
O
N
H
N
N
1c
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

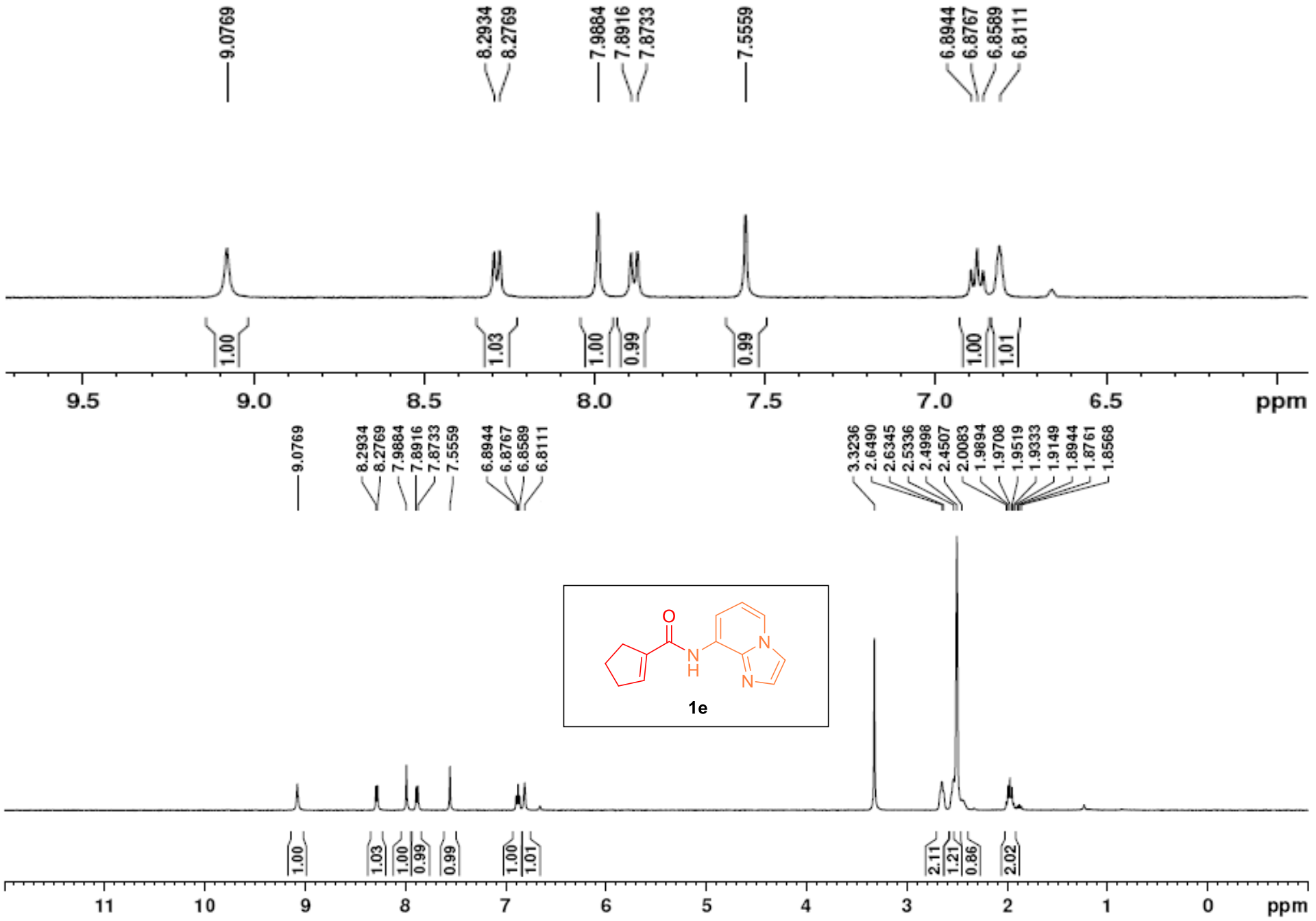
^{13}C NMR of **1c**


9.9677
8.2678
8.2512
8.0448
8.0261
7.9736
7.5593
6.8870
6.8684
6.8502
6.8322
6.8150
6.7980
6.6264
6.6237
6.5884
6.5856
1.15
1.06
1.01
1.06
1.00
2.06
1.05
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0 ppm
3.3588
3.3279
2.5003
1.8759
1.8603
1.8589
O
N
H
N
N
1d
3.03
13
12
11
10
9
8
7
6
5
4
3
2
1
0
ppm

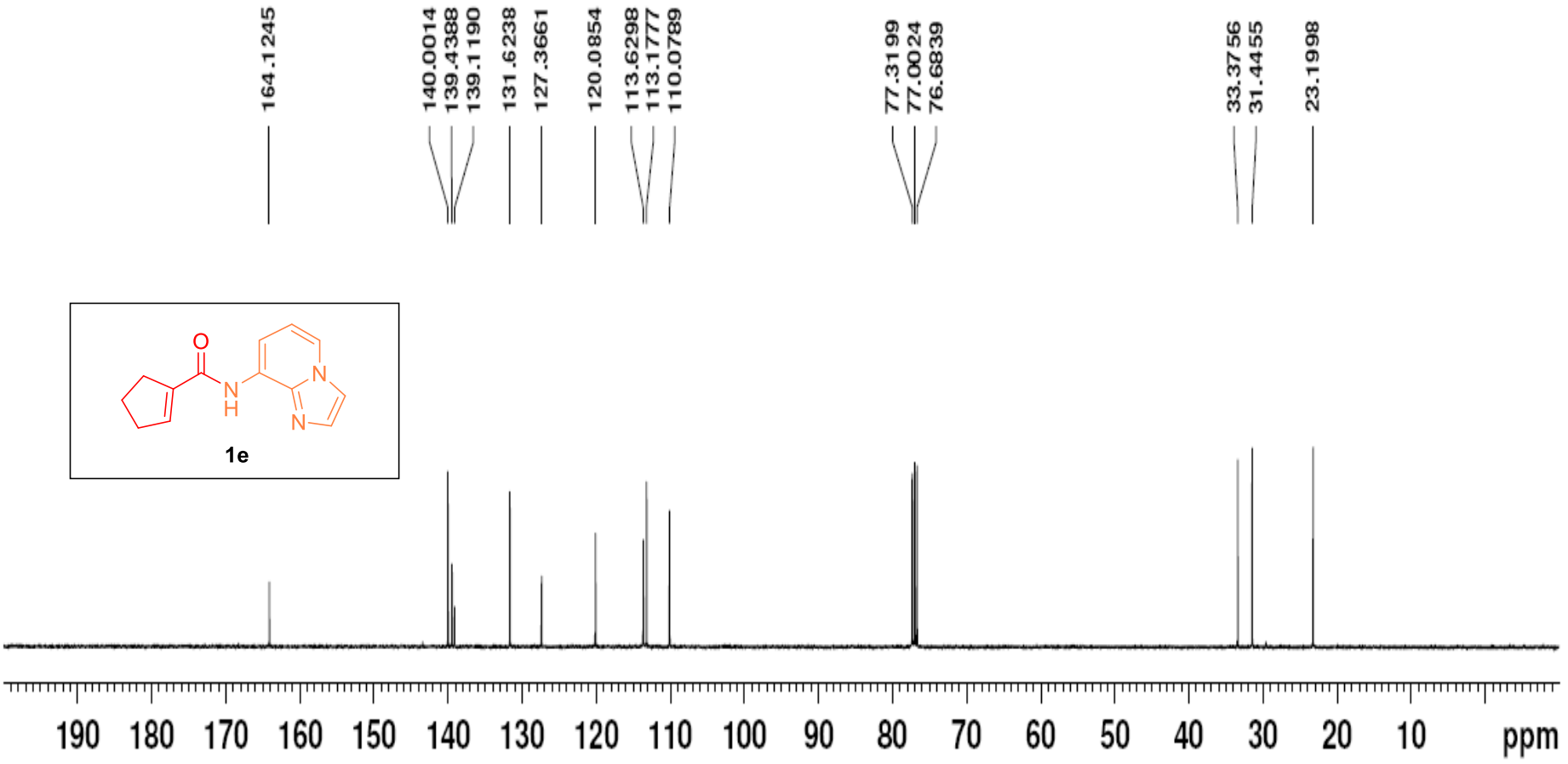
^{1}H NMR of **1d**


140.4558
138.5426
131.3842
127.3175
125.6440
121.3305
114.1731
112.0700
110.7712
140
135
130
125
120
115
110
ppm
164.3758
140.4558
138.5426
131.3842
127.3175
125.6440
121.3305
114.1731
112.0700
110.7712
39.9254
39.7170
39.5081
39.2995
39.0910
38.8822
38.6734
17.4358
O
N
H
N
N
1d
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

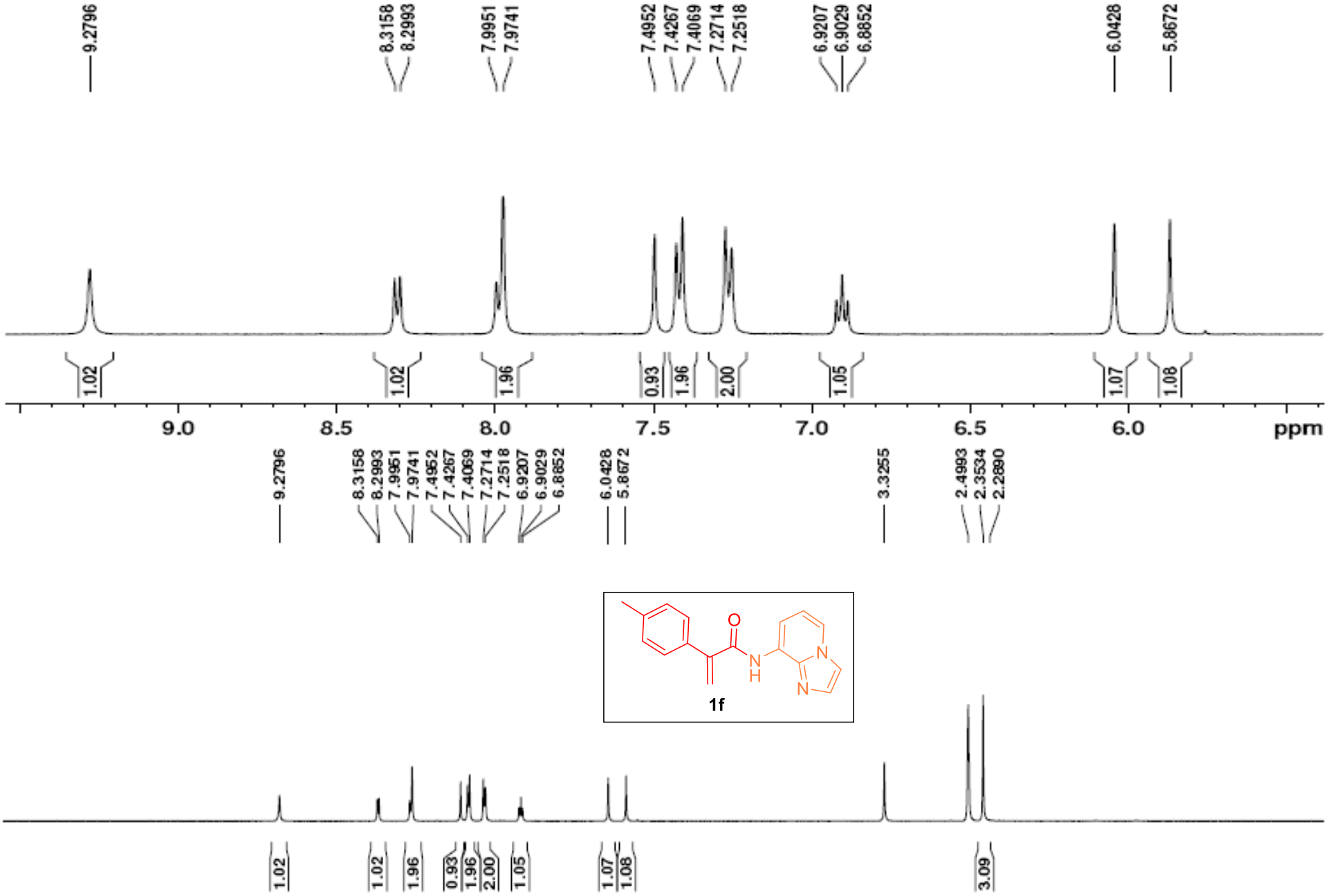
^{13}C NMR of **1d**


9.0769
8.2934
8.2769
7.9884
7.8916
7.8733
7.5559
6.8944
6.8767
6.8589
6.8111
1.00
1.03
1.00
0.99
0.99
1.00
1.01
9.5
9.0
8.5
8.0
7.5
7.0
6.5
ppm
3.3236
2.6490
2.6345
2.5336
2.4998
2.4507
2.0083
1.9894
1.9708
1.9519
1.9333
1.9149
1.8944
1.8761
1.8568
O
N
H
N
1e
2.11
1.21
0.86
2.02
11
10
9
8
7
6
5
4
3
2
1
0
ppm

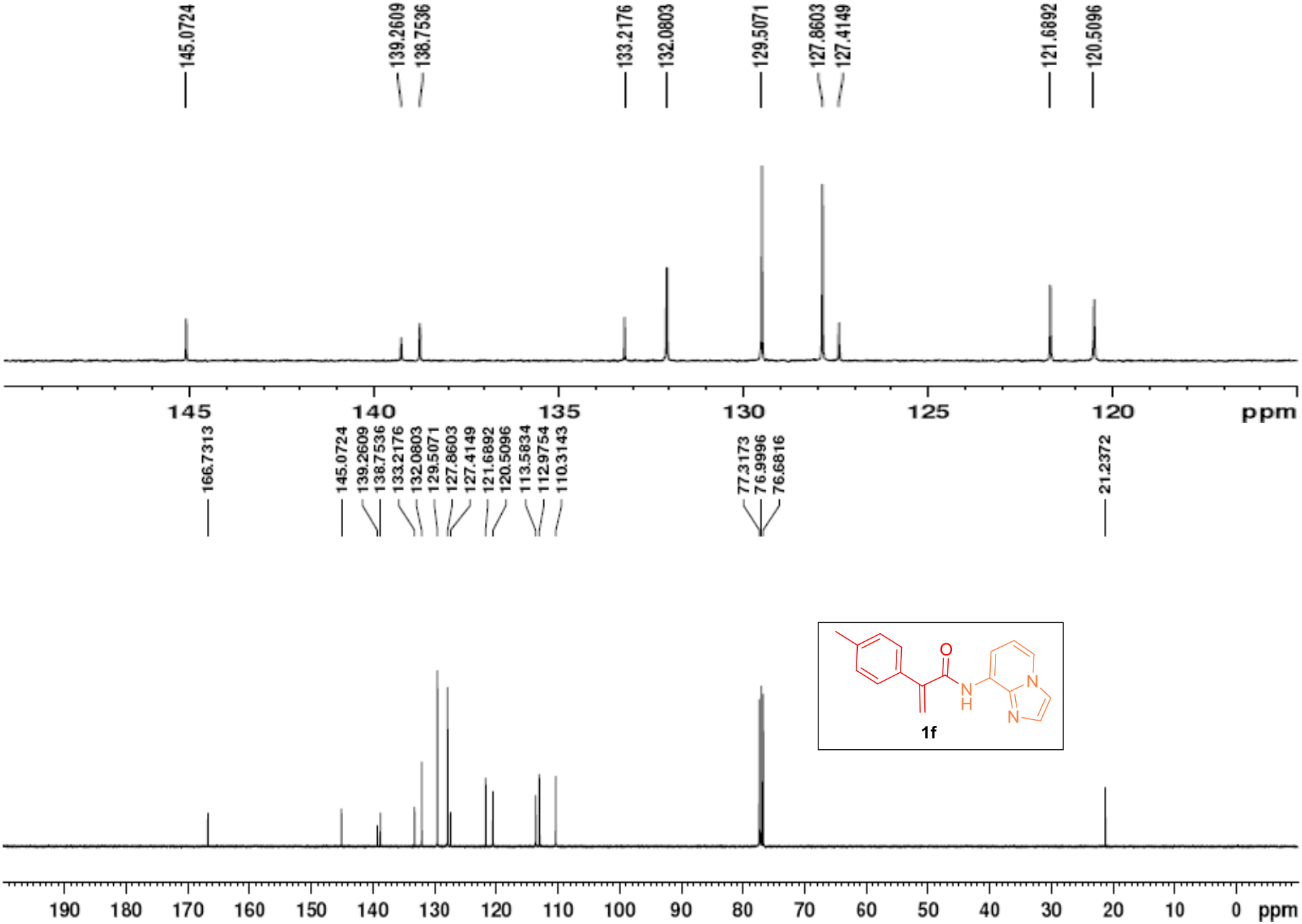
^{1}H NMR of **1e**


164.1245
140.0014
139.4388
139.1190
131.6238
127.3661
120.0854
113.6298
113.1777
110.0789
77.3199
77.0024
76.6839
33.3756
31.4455
23.1998
O
N
H
N
N
1e
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

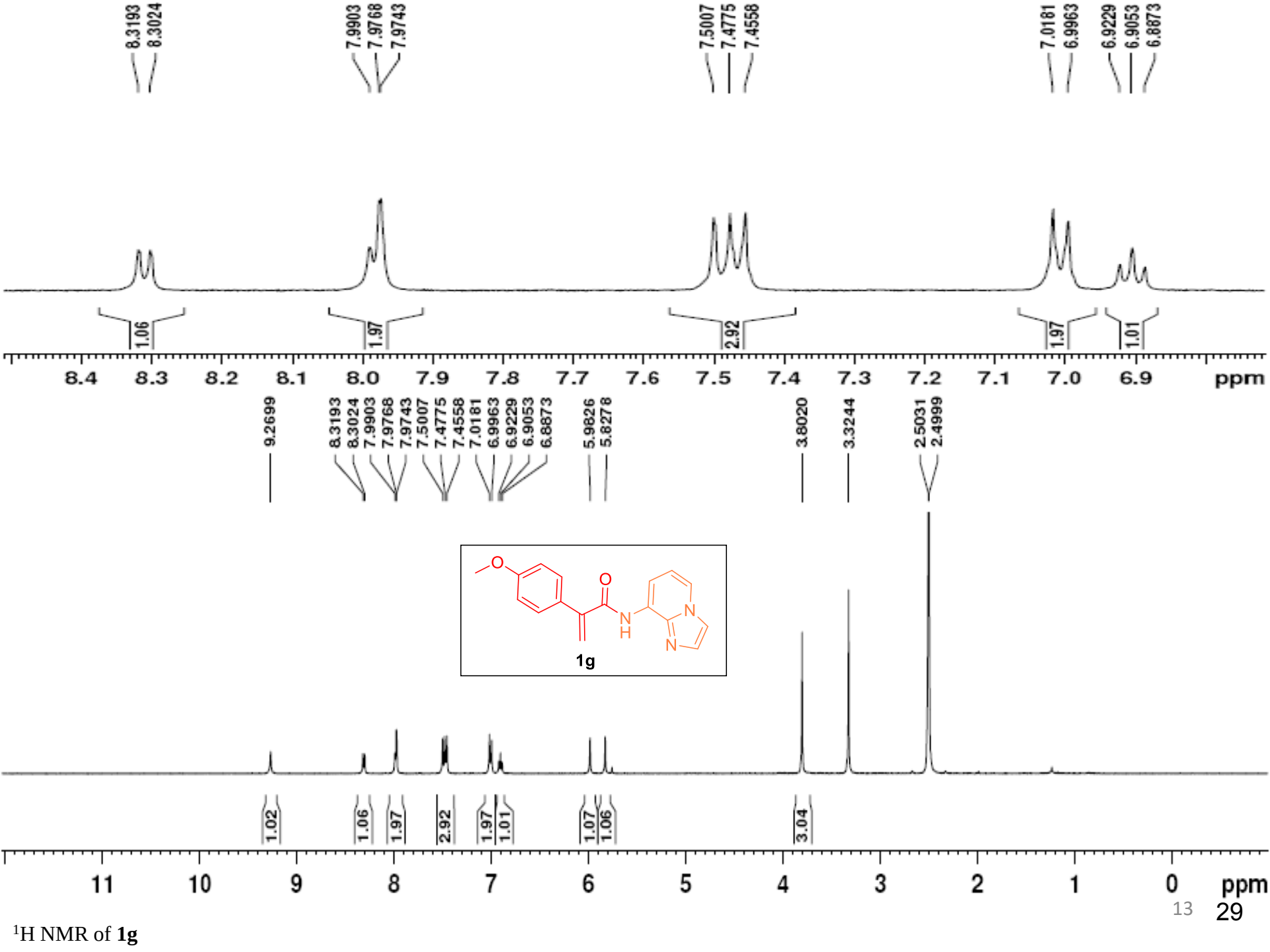
^{13}C NMR of **1e**


9.2796
8.3158
8.2993
7.9951
7.9741
7.4952
7.4267
7.4069
7.2714
7.2518
6.9207
6.9029
6.8852
6.0428
5.8672
1.02
1.02
1.96
0.93
1.96
2.00
1.05
1.07
1.08
9.0
8.5
8.0
7.5
7.0
6.5
6.0
ppm
9.2796
8.3158
8.2993
7.9951
7.9741
7.4952
7.4267
7.4069
7.2714
7.2518
6.9207
6.9029
6.8852
6.0428
5.8672
3.3255
2.4993
2.3534
2.2890
O
N
H
N
N
1f
1.02
1.02
1.96
0.93
1.96
2.00
1.05
1.07
1.08
3.09
11
10
9
8
7
6
5
4
3
2
1
0
ppm

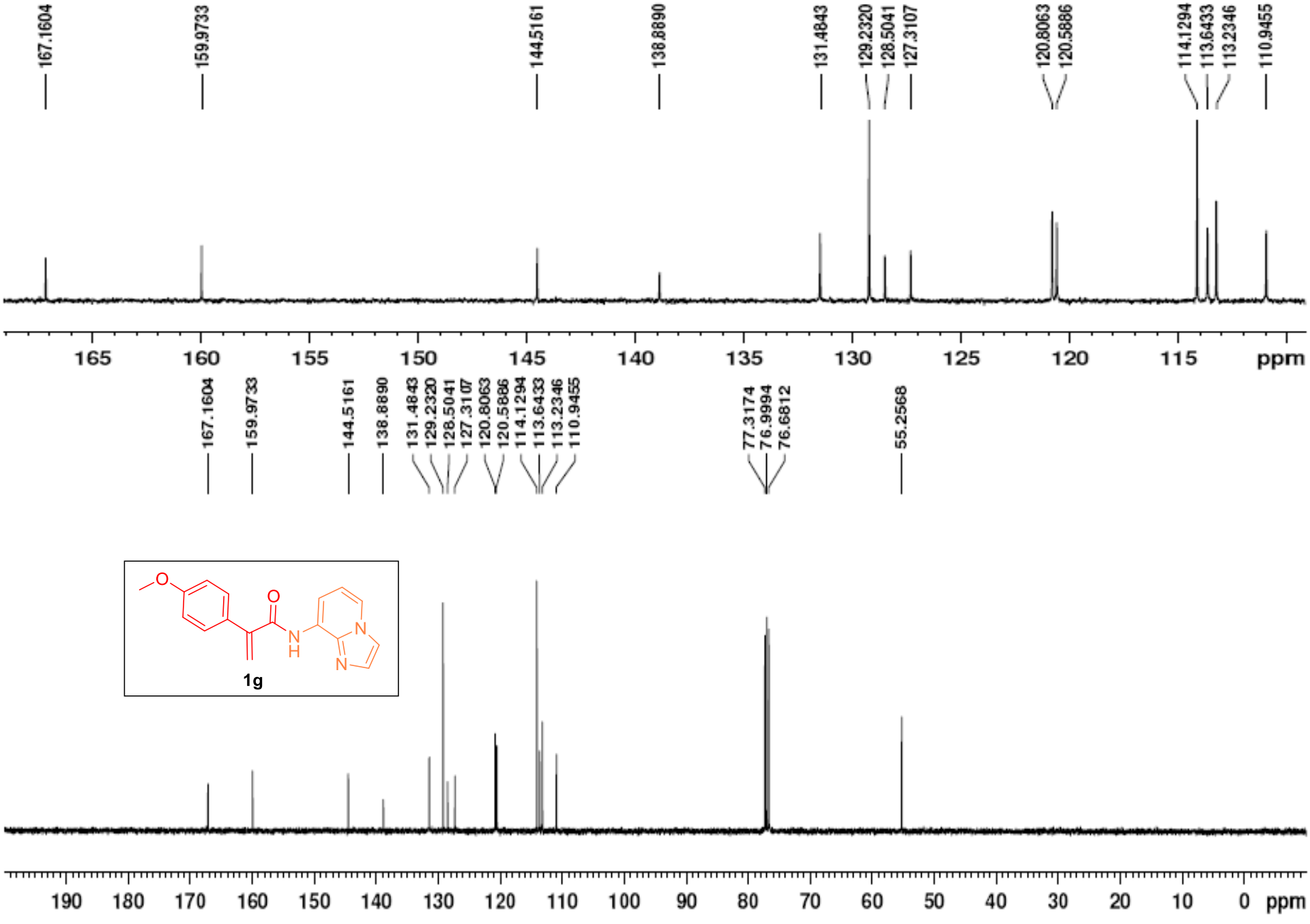
^{1}H NMR of **1f**


145.0724
139.2609
138.7536
133.2176
132.0803
129.5071
127.8603
127.4149
121.6892
120.5096
145
140
135
130
125
120
ppm
166.7313
145.0724
139.2609
138.7536
133.2176
132.0803
129.5071
127.8603
127.4149
121.6892
120.5096
113.5834
112.9754
110.3143
77.3173
76.9996
76.6816
21.2372
O
N
H
N
N
1f
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

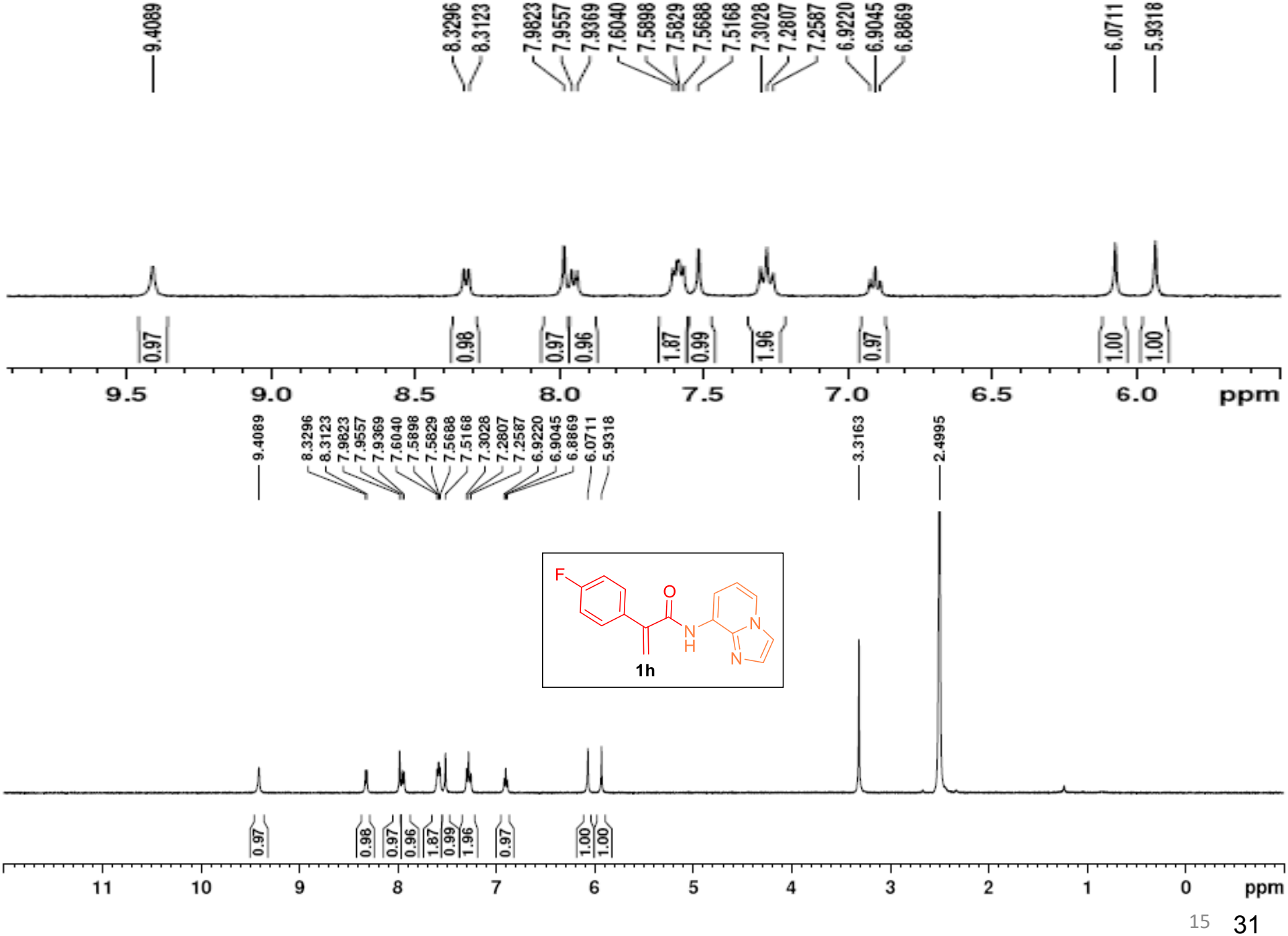
^{13}C NMR of **1f**


8.3193
8.3024
7.9903
7.9768
7.9743
7.5007
7.4775
7.4558
7.0181
6.9963
6.9229
6.9053
6.8873
1.06
1.97
2.92
1.97
1.01
ppm
9.2699
5.9826
5.8278
3.8020
3.3244
2.5031
2.4999
1.02
1.07
1.06
3.04
1g

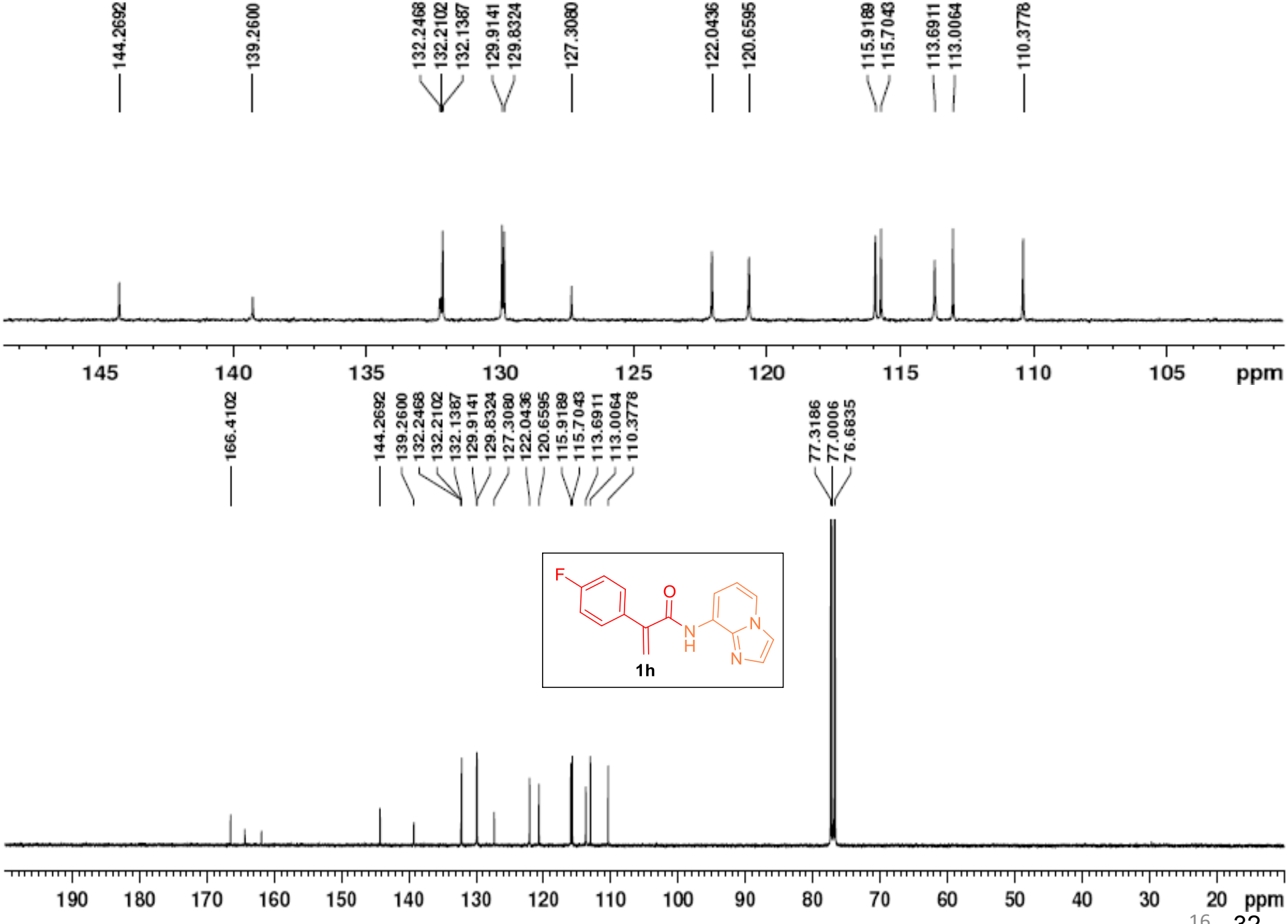
^{1}H NMR of **1g**


167.1604
159.9733
144.5161
138.8890
131.4843
129.2320
128.5041
127.3107
120.8063
120.5886
114.1294
113.6433
113.2346
110.9455
165
160
155
150
145
140
135
130
125
120
115
ppm
167.1604
159.9733
144.5161
138.8890
131.4843
129.2320
128.5041
127.3107
120.8063
120.5886
114.1294
113.6433
113.2346
110.9455
77.3174
76.9994
76.6812
55.2568
O
O
N
H
N
N
1g
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

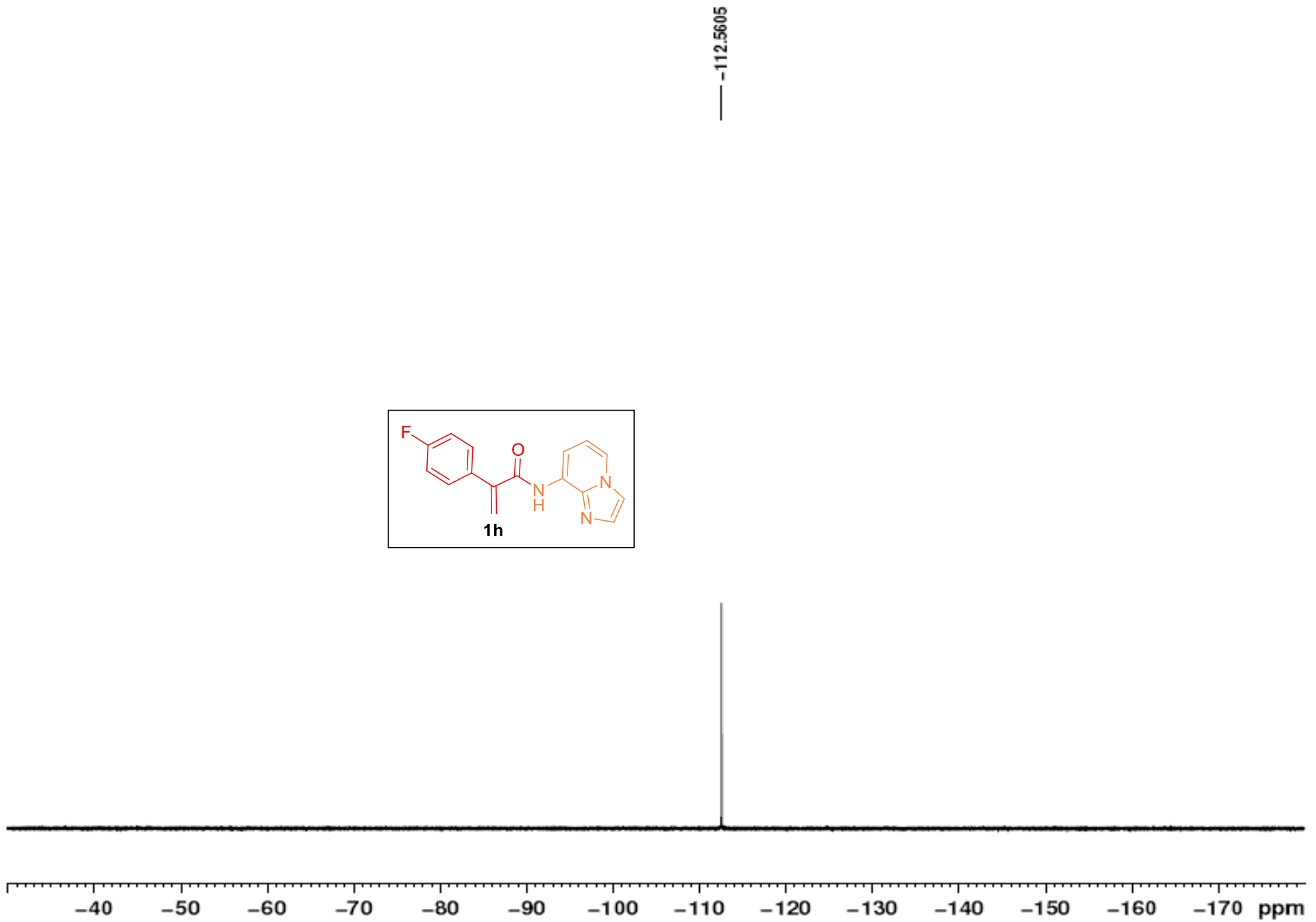
^{13}C NMR of **1g**


9.4089
8.3296
8.3123
7.9823
7.9557
7.9369
7.6040
7.5898
7.5829
7.5688
7.5168
7.3028
7.2807
7.2587
6.9220
6.9045
6.8869
6.0711
5.9318
3.3163
2.4995
0.97
0.98
0.97
0.96
1.87
0.99
1.96
0.97
1.00
1.00
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
ppm
F
O
N
H
N
N
1h
11
10
9
8
7
6
5
4
3
2
1
0
ppm

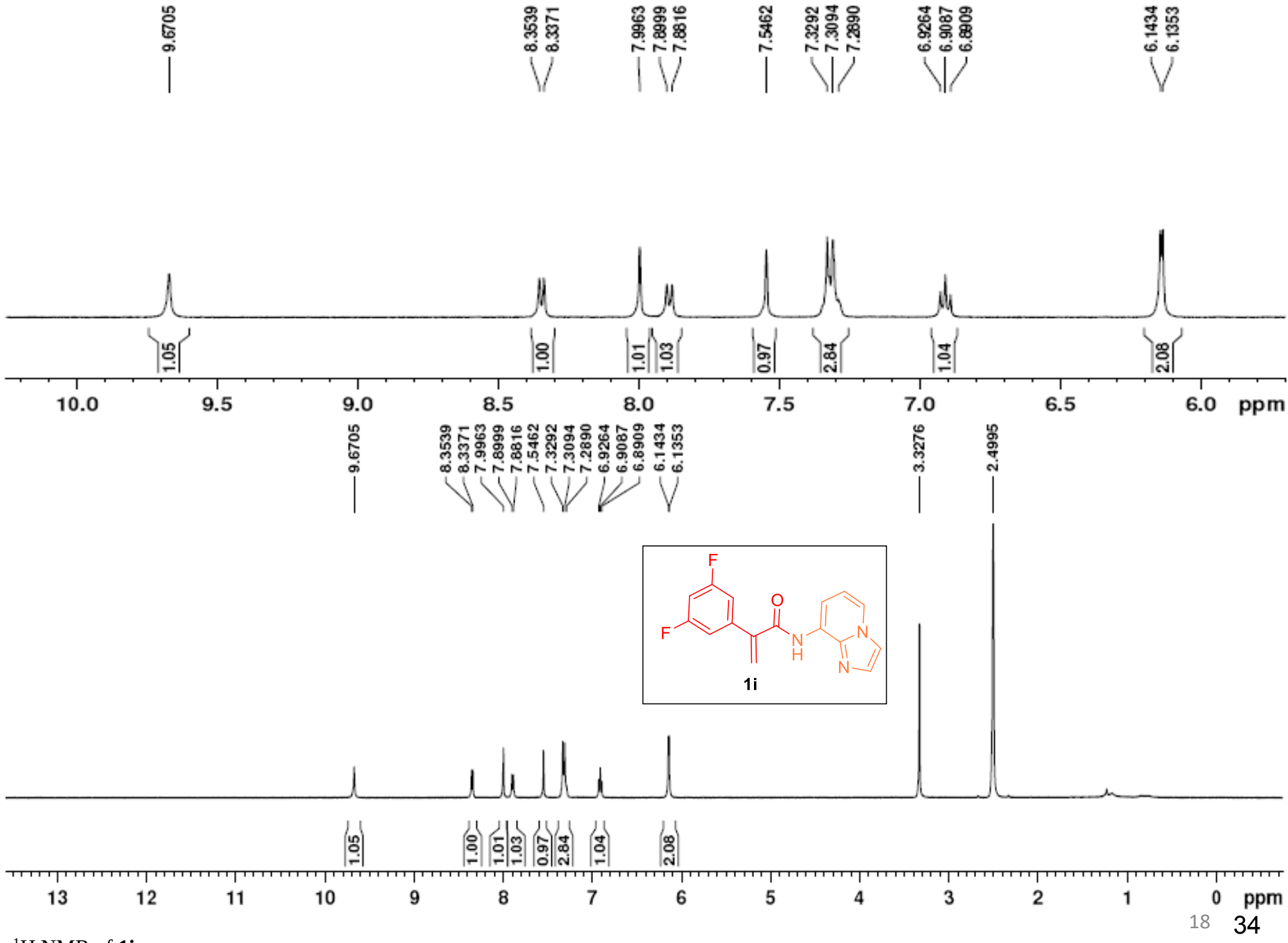
^{1}H NMR of **1h**


144.2692
139.2600
132.2468
132.2102
132.1387
129.9141
129.8324
127.3080
122.0436
120.6595
115.9189
115.7043
113.6911
113.0064
110.3778
145
140
135
130
125
120
115
110
105
ppm
166.4102
144.2692
139.2600
132.2468
132.2102
132.1387
129.9141
129.8324
127.3080
122.0436
120.6595
115.9189
115.7043
113.6911
113.0064
110.3778
77.3186
77.0006
76.6835
F
O
N
H
N
N
1h
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ppm

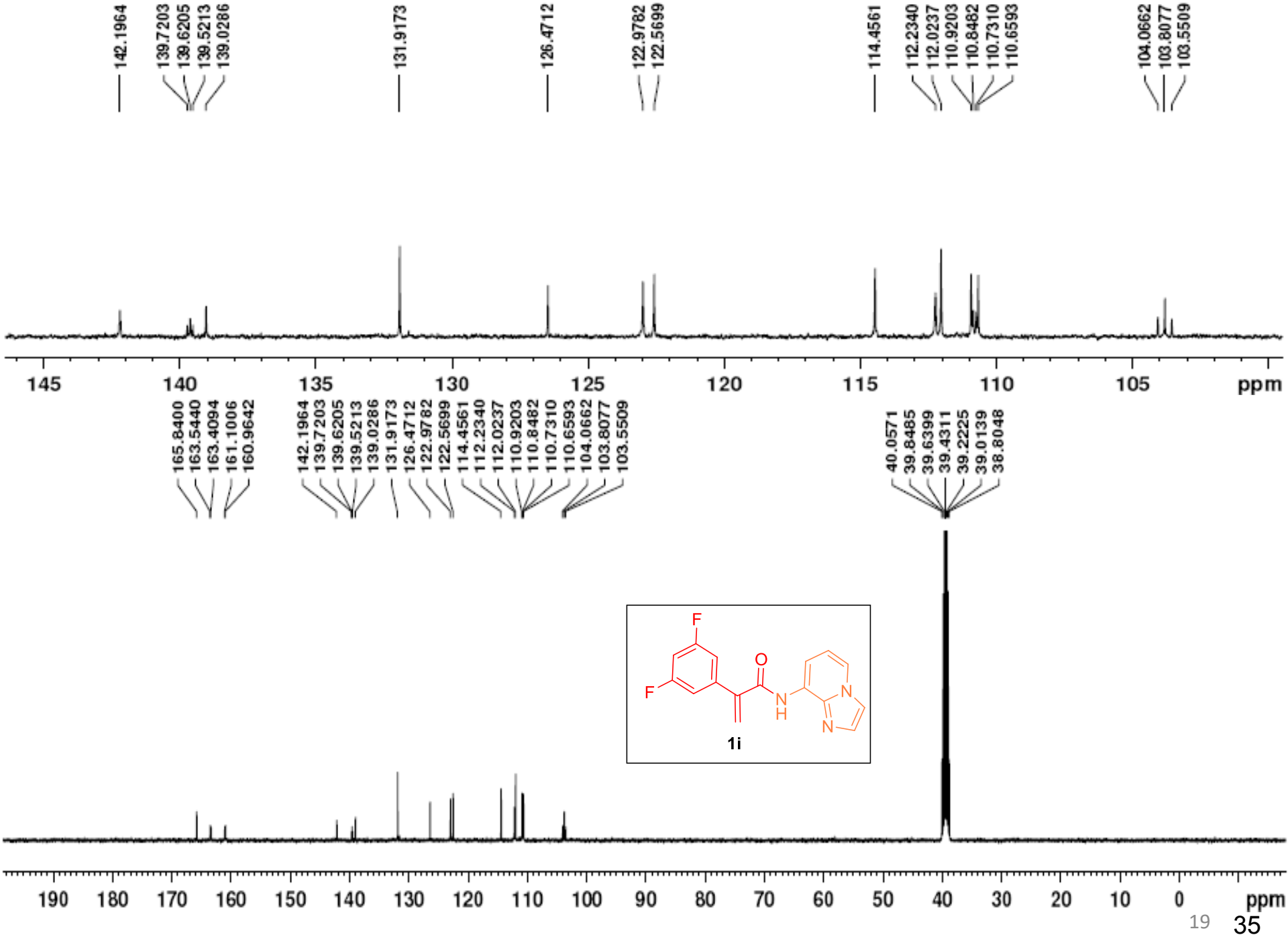
^{13}C NMR of **1h**


−112.5605
F
O
N
H
N
N
1h
−40
−50
−60
−70
−80
−90
−100
−110
−120
−130
−140
−150
−160
−170
ppm

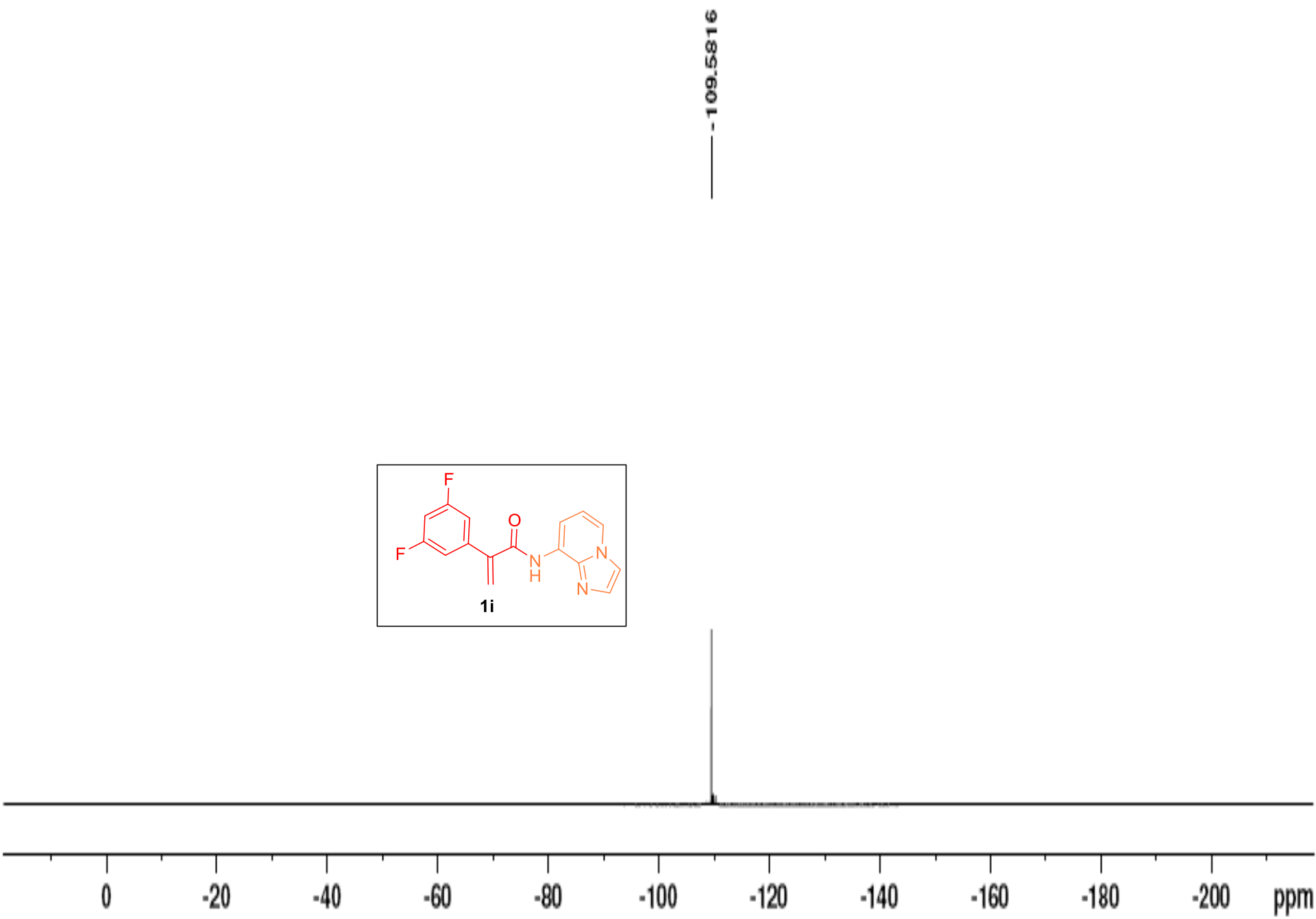
^{19}F NMR of **1h**


9.6705
8.3539
8.3371
7.9963
7.8999
7.8816
7.5462
7.3292
7.3094
7.2890
6.9264
6.9087
6.8909
6.1434
6.1353
1.05
1.00
1.01
1.03
0.97
2.84
1.04
2.08
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
ppm
3.3276
2.4995
F
F
O
N
H
N
N
1i
13
12
11
10
9
8
7
6
5
4
3
2
1
0
ppm

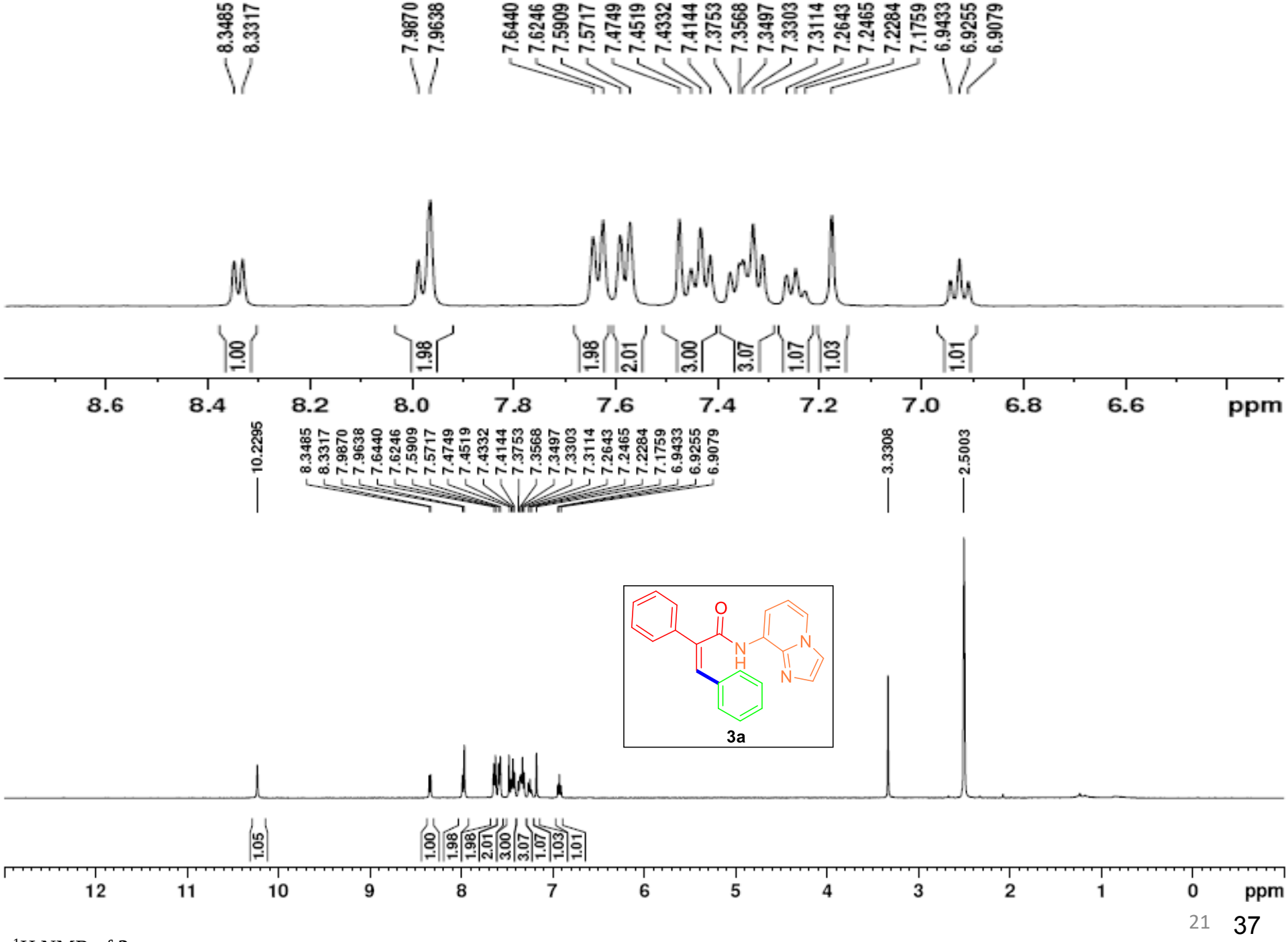
^{1}H NMR of **1i**


142.1964
139.7203
139.6205
139.5213
139.0286
131.9173
126.4712
122.9782
122.5699
114.4561
112.2340
112.0237
110.9203
110.8482
110.7310
110.6593
104.0662
103.8077
103.5509
145
140
135
130
125
120
115
110
105
ppm
165.8400
163.5440
163.4094
161.1006
160.9642
142.1964
139.7203
139.6205
139.5213
139.0286
131.9173
126.4712
122.9782
122.5699
114.4561
112.2340
112.0237
110.9203
110.8482
110.7310
110.6593
104.0662
103.8077
103.5509
40.0571
39.8485
39.6399
39.4311
39.2225
39.0139
38.8048
F
F
O
N
H
N
N
1i
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

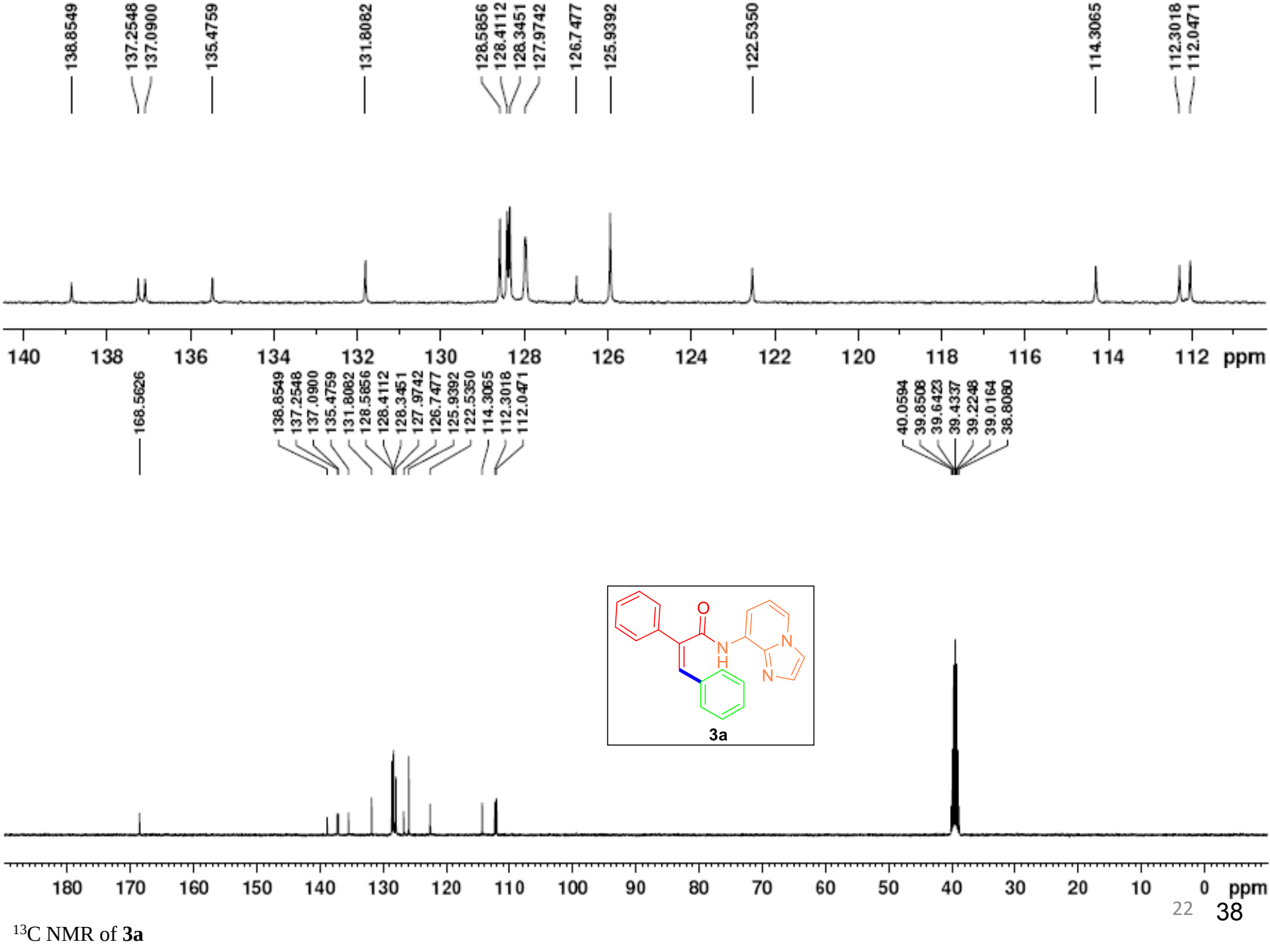
^{13}C NMR of **1i**



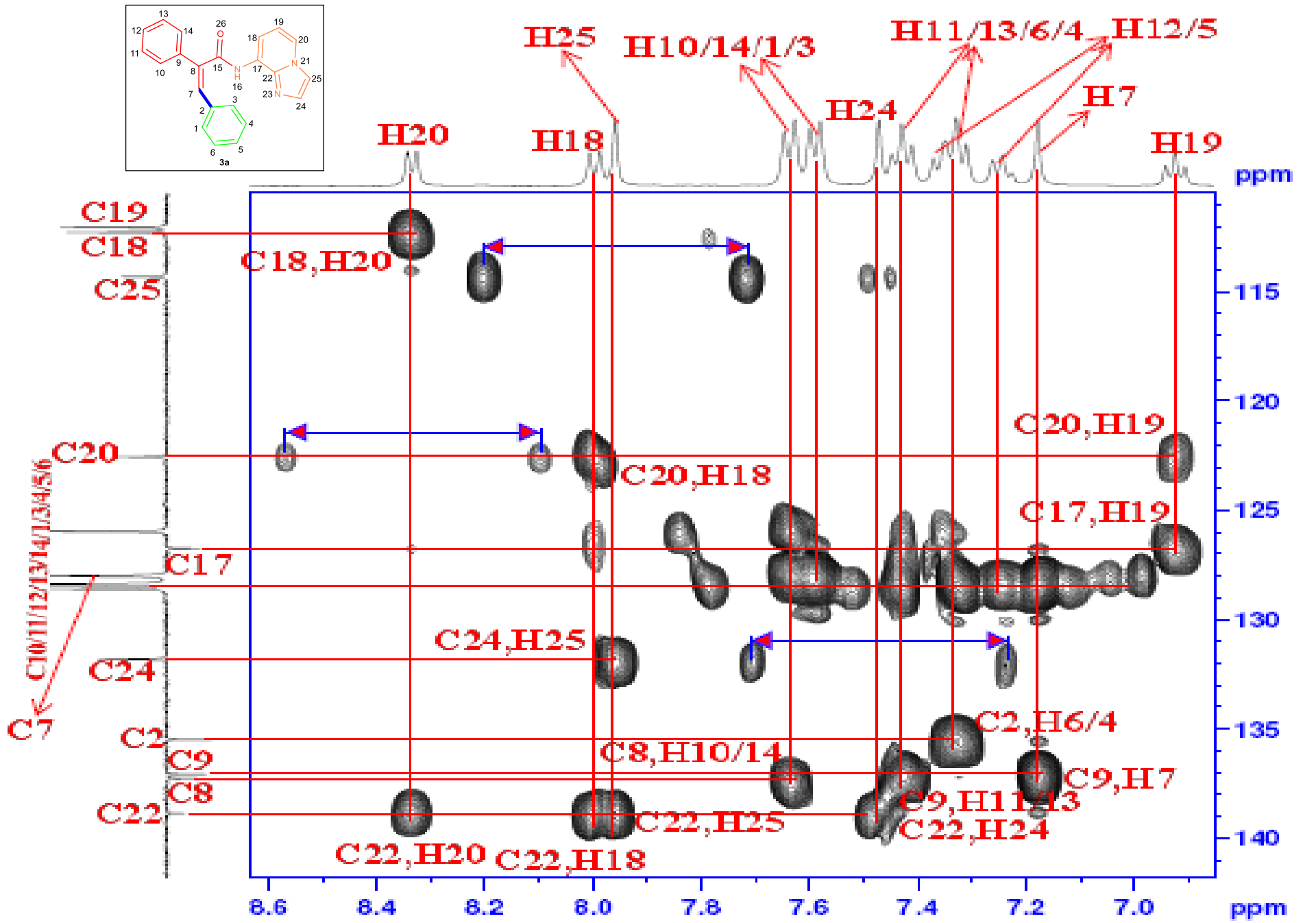
^{19}F NMR of **1i**

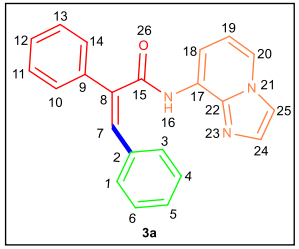

8.3485
8.3317
7.9870
7.9638
7.6440
7.6246
7.5909
7.5717
7.4749
7.4519
7.4332
7.4144
7.3753
7.3568
7.3497
7.3303
7.3114
7.2643
7.2465
7.2284
7.1759
6.9433
6.9255
6.9079
1.00
1.98
1.98
2.01
3.00
3.07
1.07
1.03
1.01
8.6
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
ppm
10.2295
3.3308
2.5003
1.05
12
11
10
9
8
7
6
5
4
3
2
1
0
ppm
O
N
H
N
N
3a

[1]H NMR of **3a**

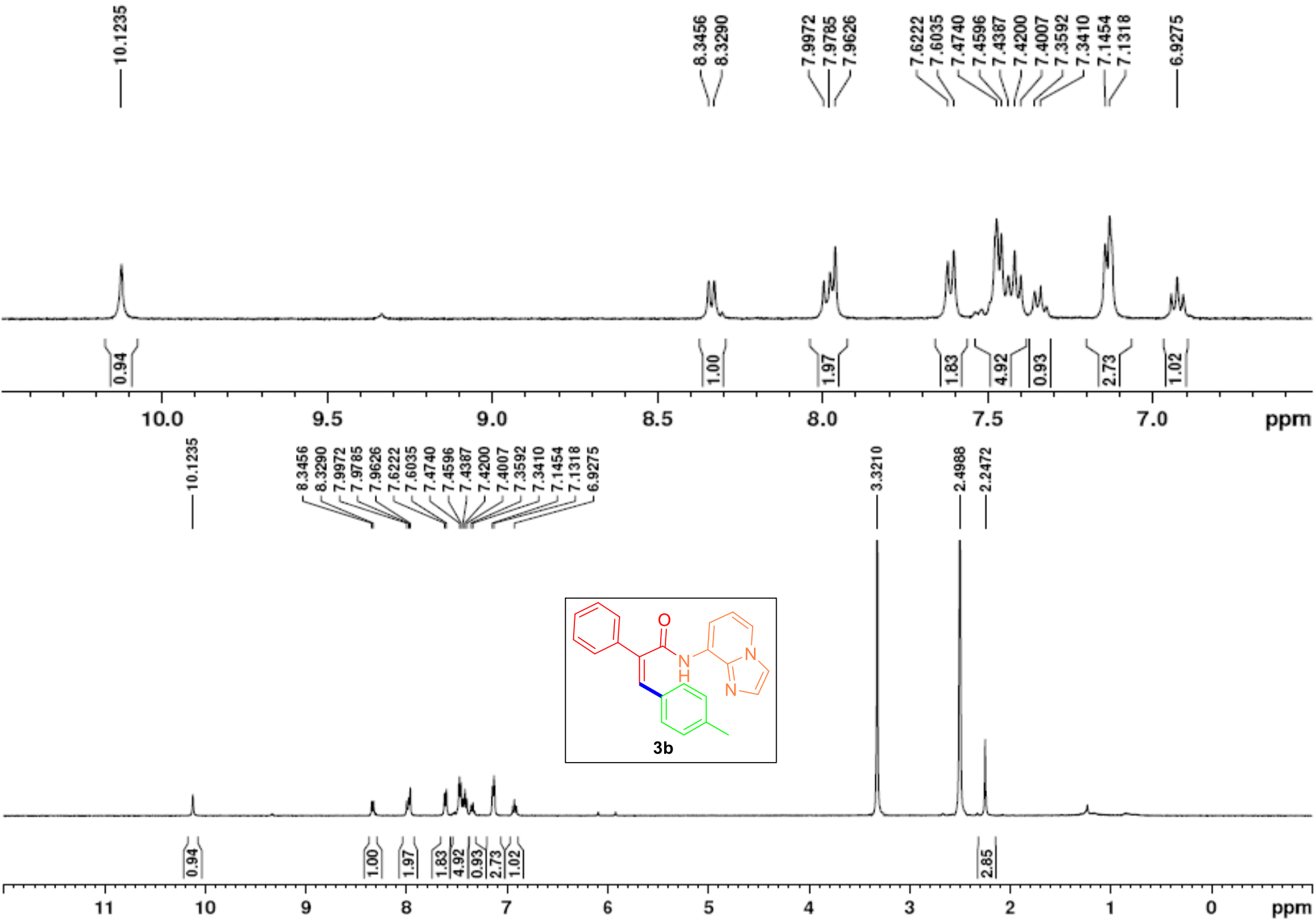

138.8549
137.2548
137.0900
135.4759
131.8082
128.5856
128.4112
128.3451
127.9742
126.7477
125.9392
122.5350
114.3065
112.3018
112.0471
140
138
136
134
132
130
128
126
124
122
120
118
116
114
112
ppm
168.5626
138.8549
137.2548
137.0900
135.4759
131.8082
128.5856
128.4112
128.3451
127.9742
126.7477
125.9392
122.5350
114.3065
112.3018
112.0471
40.0594
39.8508
39.6423
39.4337
39.2248
39.0164
38.8080
O
N
H
N
N
3a
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

^{13}C NMR of **3a**

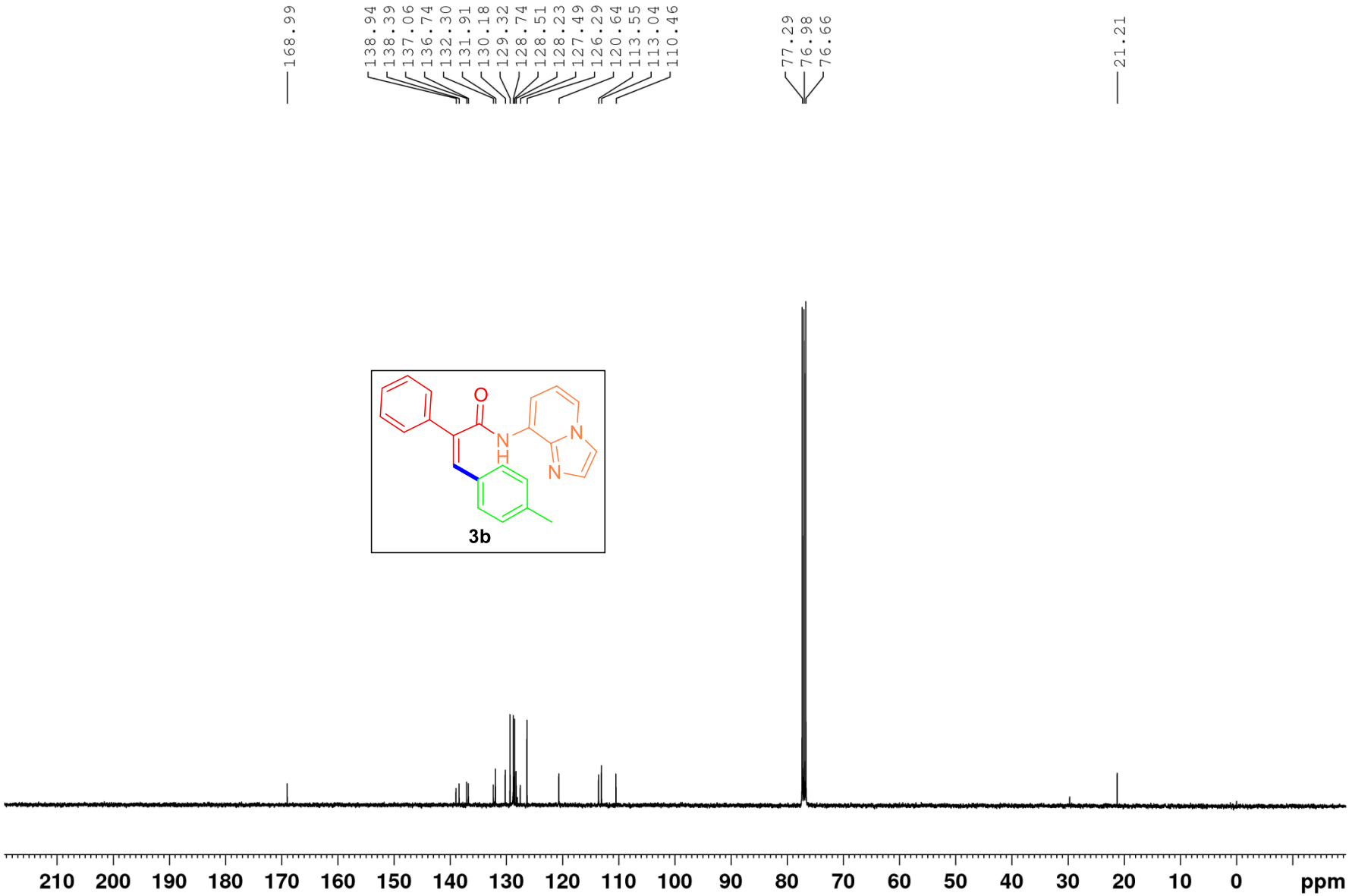

3a
H25
H10/14/1/3
H11/13/6/4
H12/5
H24
H7
H20
H18
H19
ppm
C19
C18
C25
C18,H20
C20
C20,H19
C20,H18
C17,H19
C17
C10/11/12/13/14/1/3/4/5/6
C7
C24
C24,H25
C2
C2,H6/4
C9
C8,H10/14
C9,H7
C8
C9,H11/13
C22
C22,H25
C22,H24
C22,H20
C22,H18
115
120
125
130
135
140
8.6
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
ppm


3a

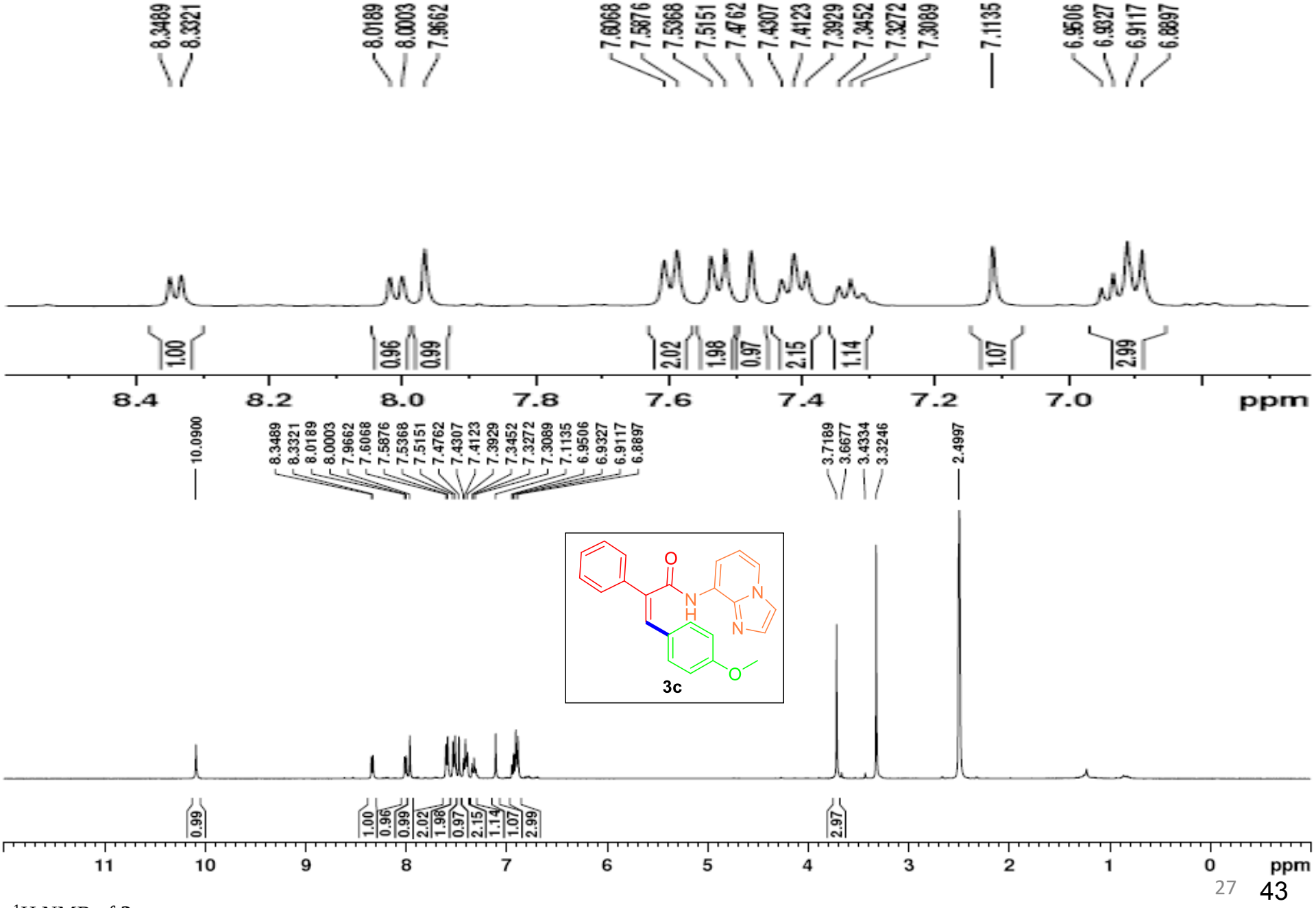
H20
H18
H25
H10/14/1/3
H24
H11/13/6/4
H12/5
H7
H19
ppm
C19
C18
C25
C20
C10/11/12/13/14/1/3/4/5/6
C24
C7
112
114
116
118
120
122
124
126
128
130
132
8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9
ppm


10.1235
8.3456
8.3290
7.9972
7.9785
7.9626
7.6222
7.6035
7.4740
7.4596
7.4387
7.4200
7.4007
7.3592
7.3410
7.1454
7.1318
6.9275
0.94
1.00
1.97
1.83
4.92
0.93
2.73
1.02
10.0
9.5
9.0
8.5
8.0
7.5
7.0
ppm
10.1235
8.3456
8.3290
7.9972
7.9785
7.9626
7.6222
7.6035
7.4740
7.4596
7.4387
7.4200
7.4007
7.3592
7.3410
7.1454
7.1318
6.9275
3.3210
2.4988
2.2472
O
N
H
N
N
3b
0.94
1.00
1.97
1.83
4.92
0.93
2.73
1.02
2.85
11
10
9
8
7
6
5
4
3
2
1
0
ppm

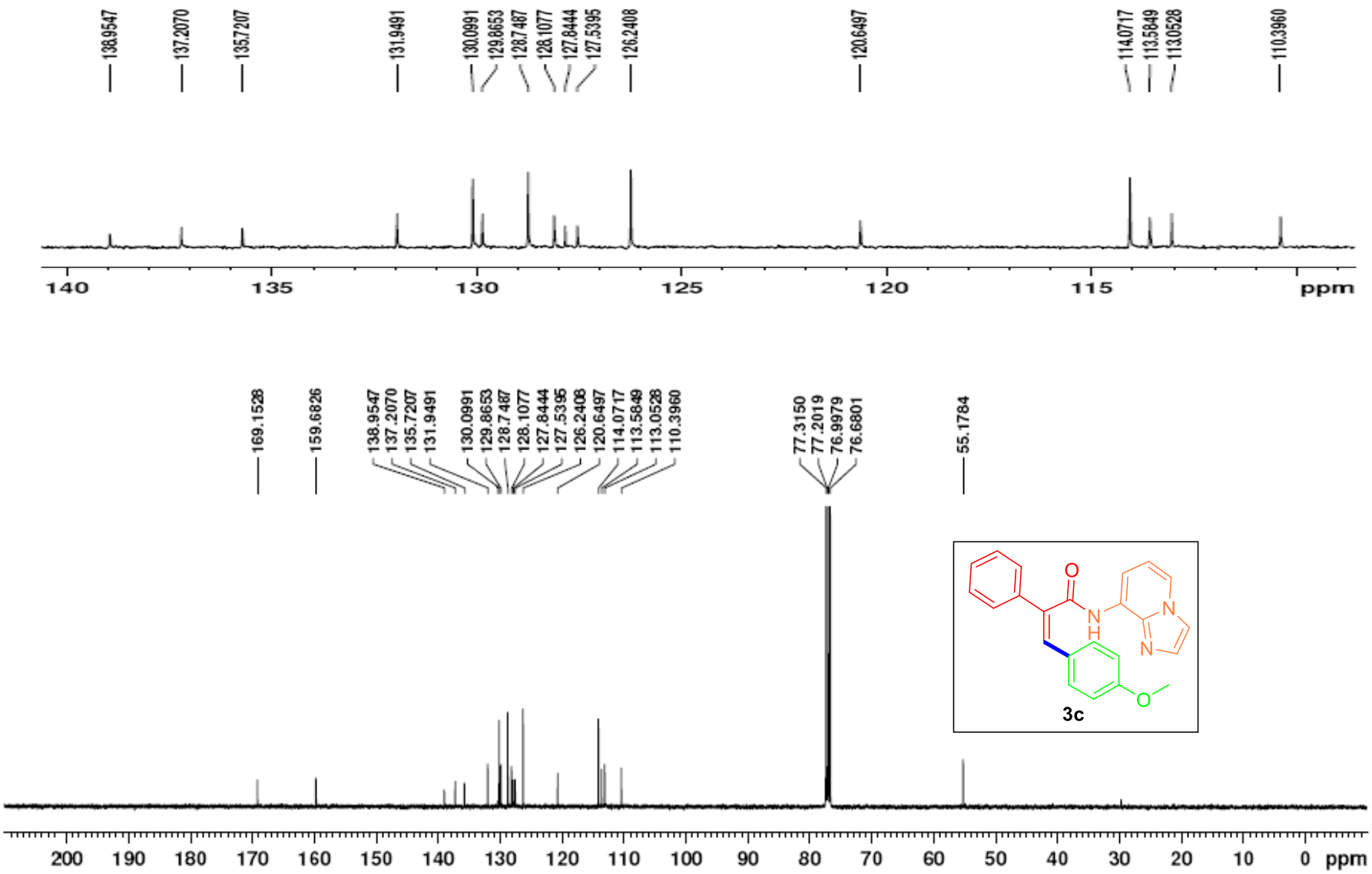
^{1}H NMR of **3b**


168.99
138.94
138.39
137.06
136.74
132.30
131.91
130.18
129.32
128.74
128.51
128.23
127.49
126.29
120.64
113.55
113.04
110.46
77.29
76.98
76.66
21.21
O
N
H
N
N
3b
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

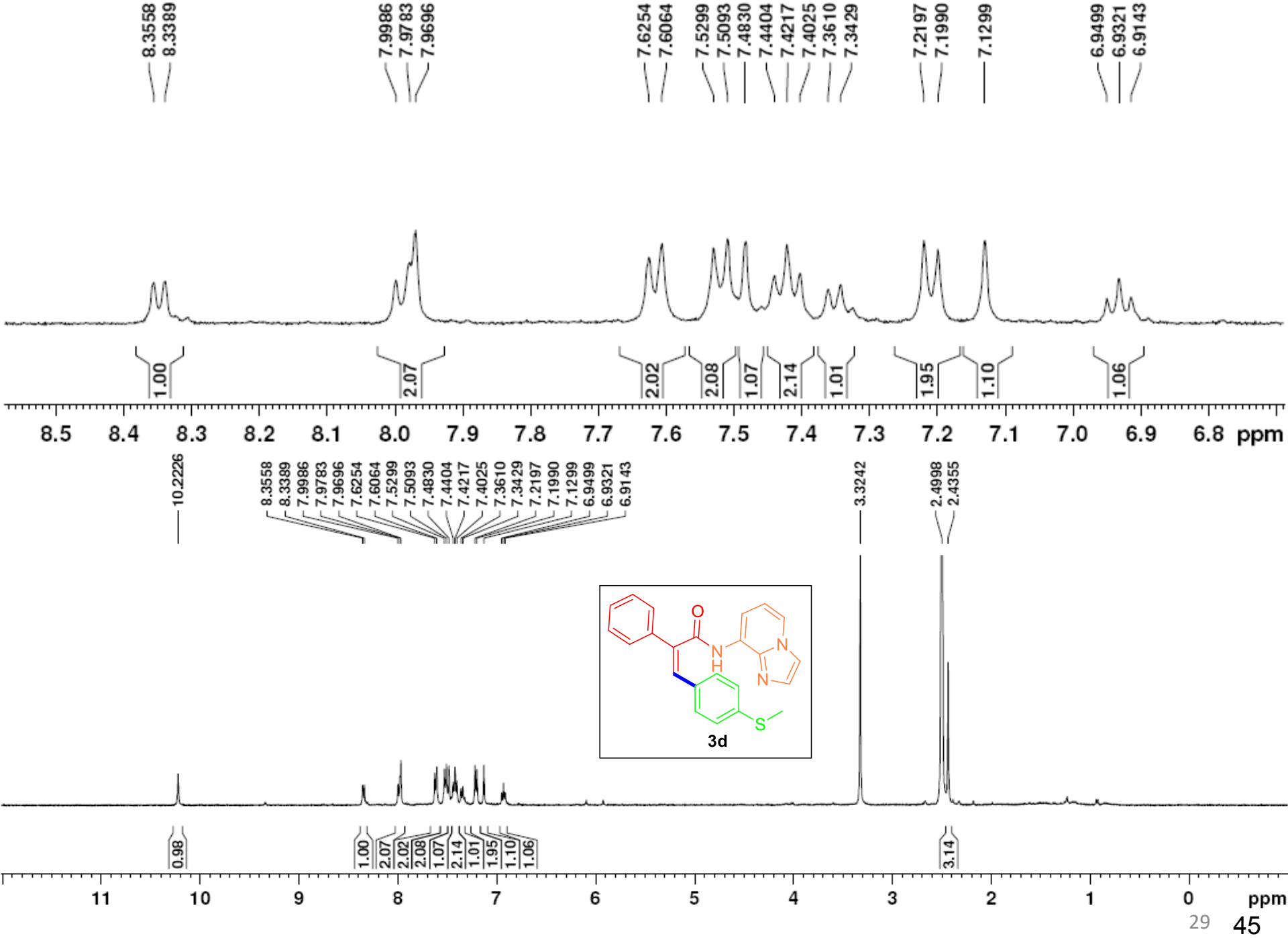
^{13}C NMR of **3b**


8.3489
8.3321
8.0189
8.0003
7.9662
7.6068
7.5876
7.5368
7.5151
7.4762
7.4307
7.4123
7.3929
7.3452
7.3272
7.3089
7.1135
6.9506
6.9327
6.9117
6.8897
1.00
0.96
0.99
2.02
1.98
0.97
2.15
1.14
1.07
2.99
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
ppm
10.0900
3.7189
3.6677
3.4334
3.3246
2.4997
O
N
H
N
O
3c
0.99
2.97
11
10
9
8
7
6
5
4
3
2
1
0
ppm

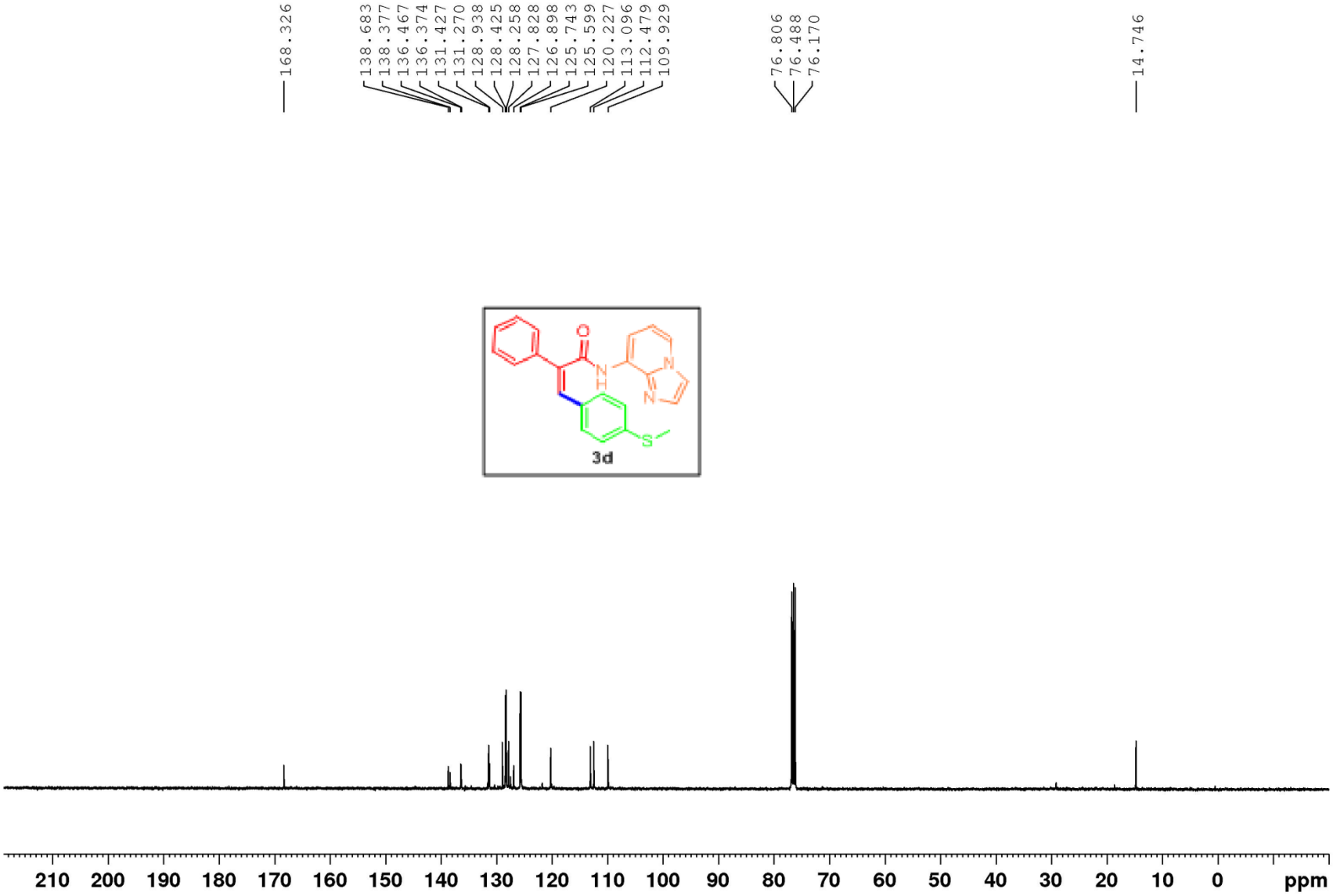
^{1}H NMR of **3c**


138.9547
137.2070
135.7207
131.9491
130.0991
129.8653
128.7487
128.1077
127.8444
127.5395
126.2408
120.6497
114.0717
113.5849
113.0528
110.3960
140
135
130
125
120
115
ppm
169.1528
159.6826
138.9547
137.2070
135.7207
131.9491
130.0991
129.8653
128.7487
128.1077
127.8444
127.5395
126.2408
120.6497
114.0717
113.5849
113.0528
110.3960
77.3150
77.2019
76.9979
76.6801
55.1784
O
N
H
N
N
O
3c
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

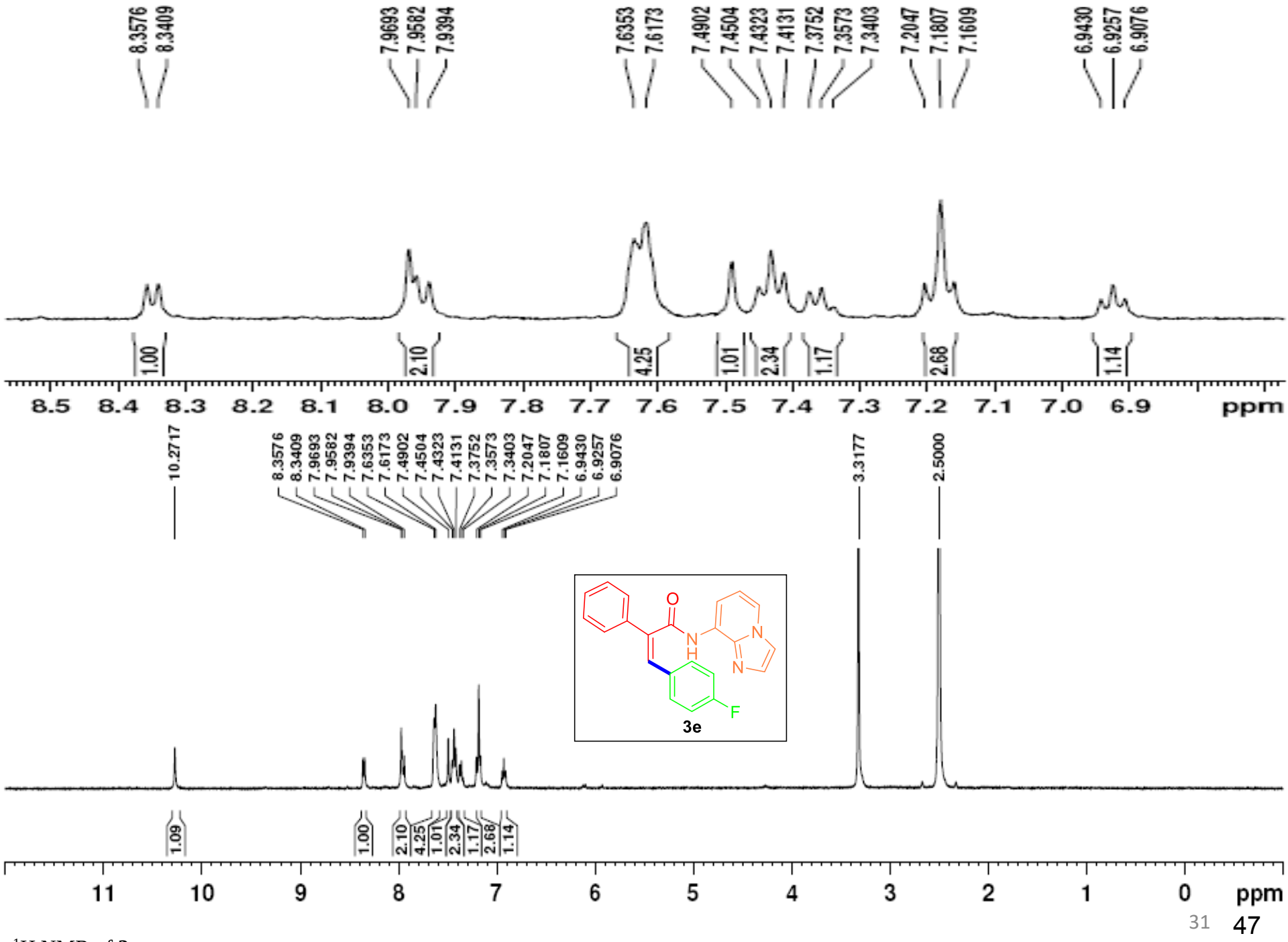
^{13}C NMR of **3c**


8.3558
8.3389
7.9986
7.9783
7.9696
7.6254
7.6064
7.5299
7.5093
7.4830
7.4404
7.4217
7.4025
7.3610
7.3429
7.2197
7.1990
7.1299
6.9499
6.9321
6.9143
1.00
2.07
2.02
2.08
1.07
2.14
1.01
1.95
1.10
1.06
8.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 ppm
10.2226
3.3242
2.4998
2.4355
O
N
H
N
N
S
3d
0.98
3.14
11 10 9 8 7 6 5 4 3 2 1 0 ppm

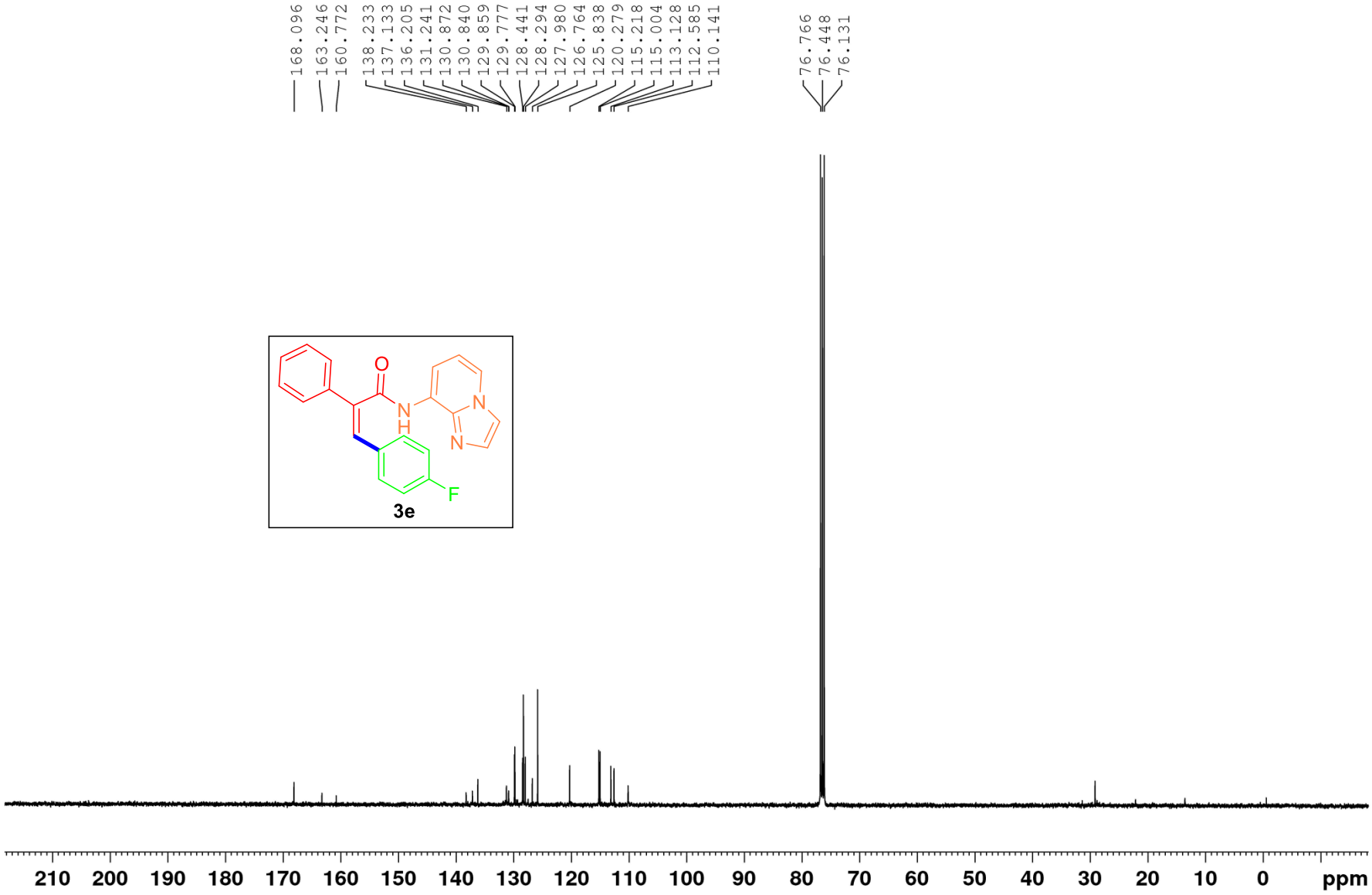
^{1}H NMR of **3d**


168.326
138.683
138.377
136.467
136.374
131.427
131.270
128.938
128.425
128.258
127.828
126.898
125.743
125.599
120.227
113.096
112.479
109.929
76.806
76.488
76.170
14.746
O
N
H
N
N
S
3d
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

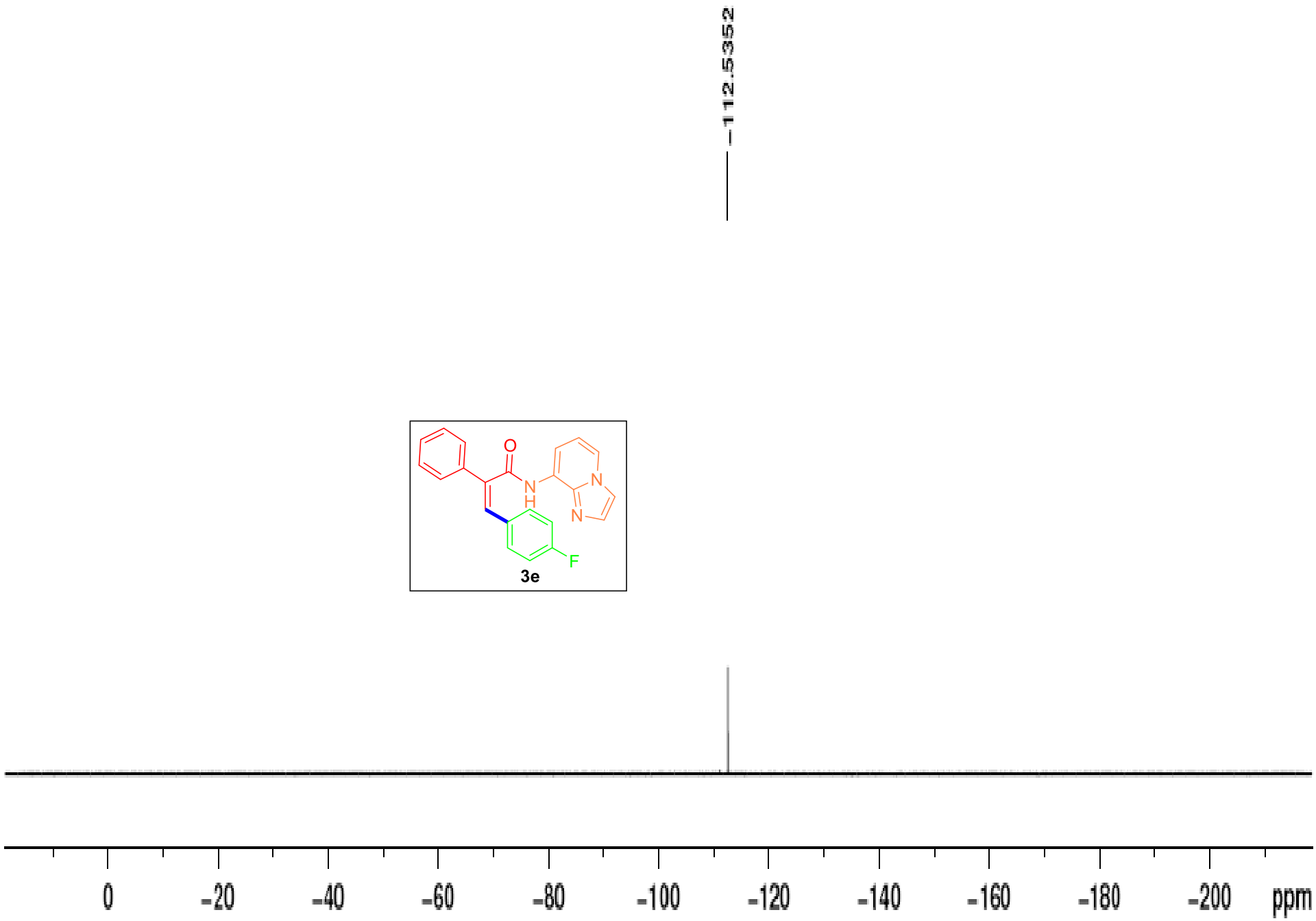
^{13}C NMR of **3d**


8.3576
8.3409
7.9693
7.9562
7.9394
7.6353
7.6173
7.4902
7.4504
7.4323
7.4131
7.3752
7.3573
7.3403
7.2047
7.1807
7.1609
6.9430
6.9257
6.9076
1.00
2.10
4.25
1.01
2.34
1.17
2.68
1.14
8.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 ppm
10.2717
3.3177
2.5000
1.09
1.00
2.10
4.25
1.01
2.34
1.17
2.66
1.14
11 10 9 8 7 6 5 4 3 2 1 0 ppm
O
N
H
N
N
F
3e

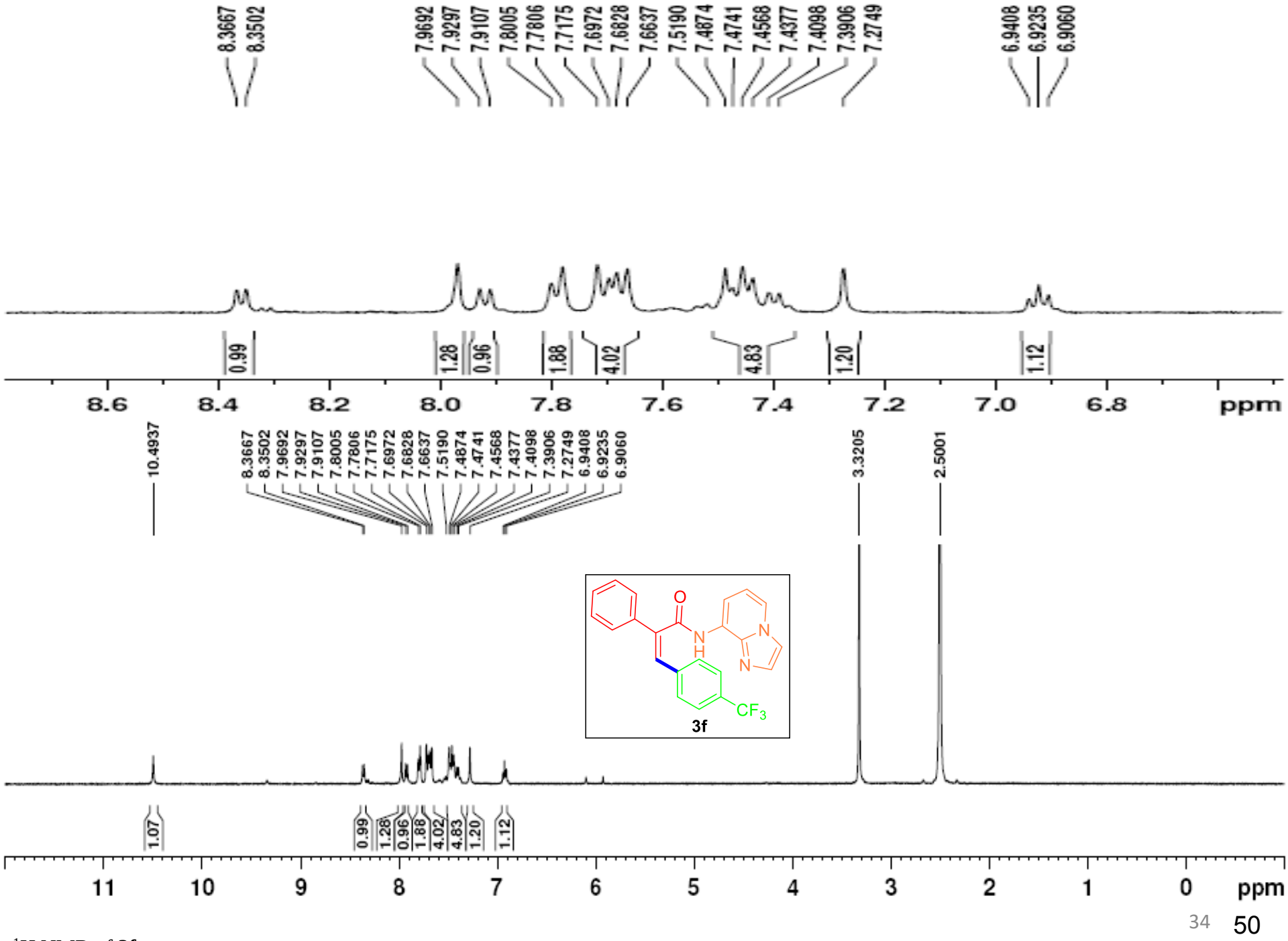
^{1}H NMR of **3e**


168.096
163.246
160.772
138.233
137.133
136.205
131.241
130.872
130.840
129.859
129.777
128.441
128.294
127.980
126.764
125.838
120.279
115.218
115.004
113.128
112.585
110.141
76.766
76.448
76.131
O
N
H
N
N
F
3e
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

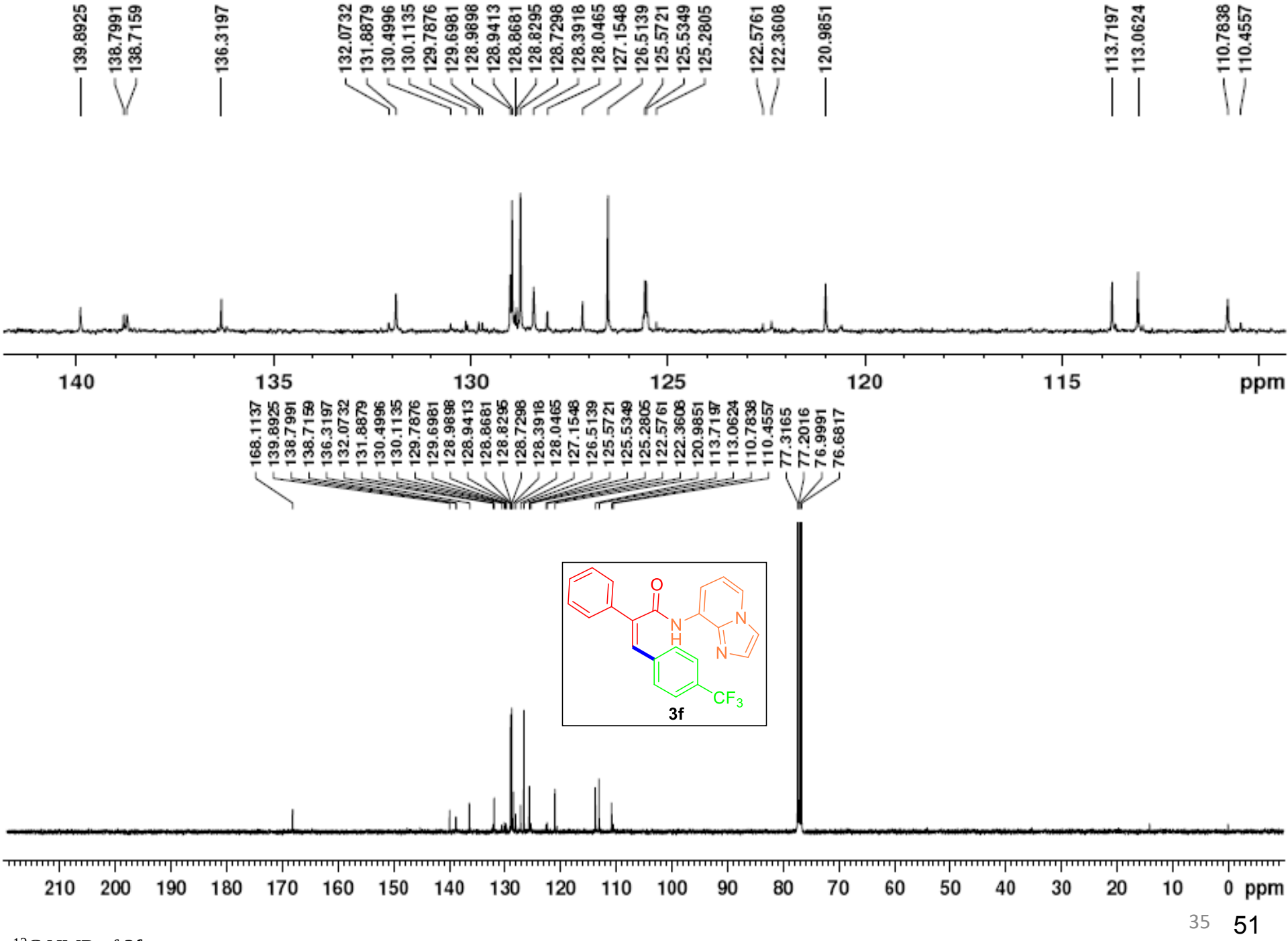
^{13}C NMR of **3e**



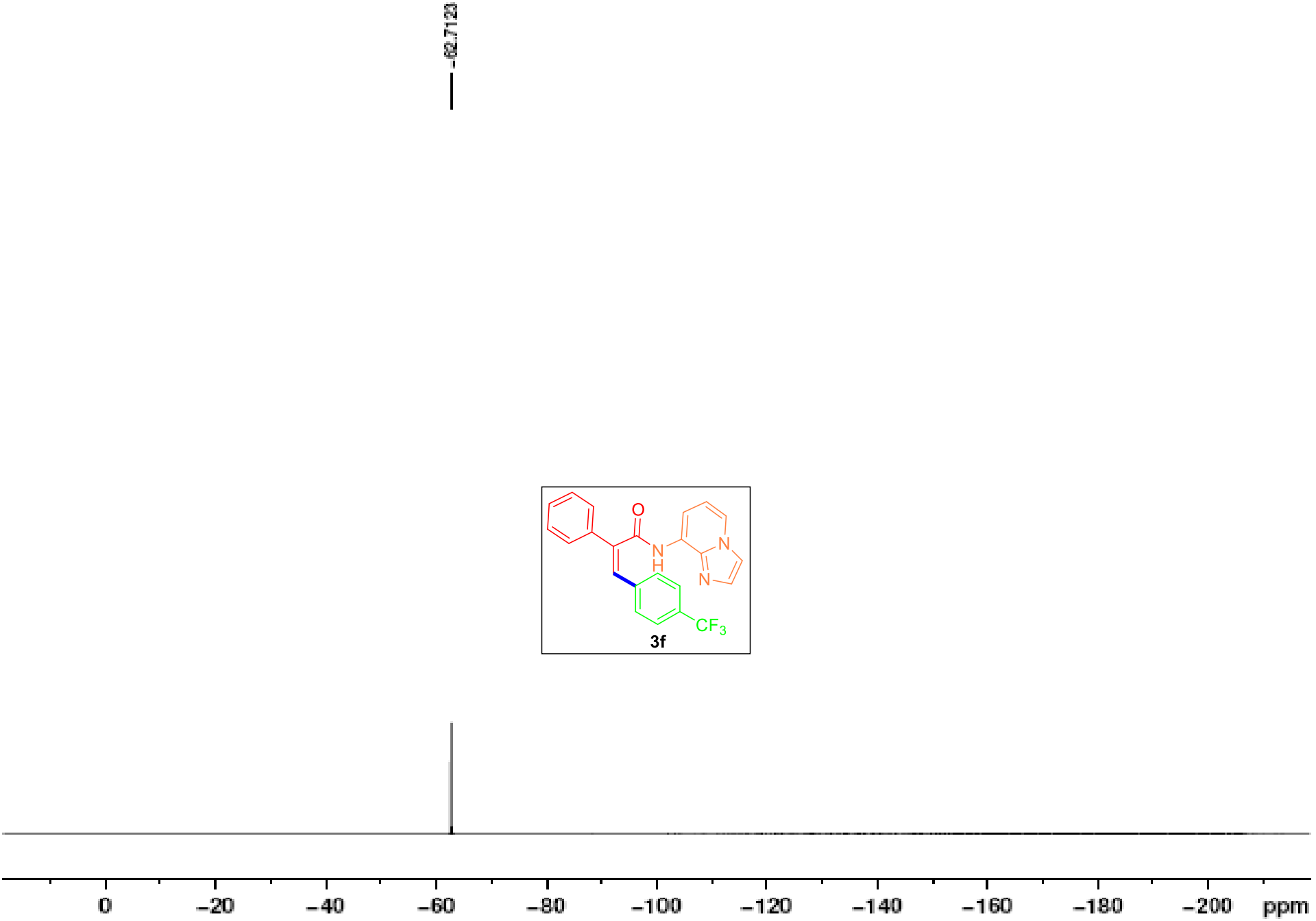
^{19}F NMR of **3e**


8.3667
8.3502
7.9692
7.9297
7.9107
7.8005
7.7806
7.7175
7.6972
7.6828
7.6637
7.5190
7.4874
7.4741
7.4568
7.4377
7.4098
7.3906
7.2749
6.9408
6.9235
6.9060
0.99
1.28
0.96
1.88
4.02
4.83
1.20
1.12
8.6
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
ppm
10.4937
3.3205
2.5001
1.07
11
10
9
8
7
6
5
4
3
2
1
0
O
N
H
N
N
CF3
3f

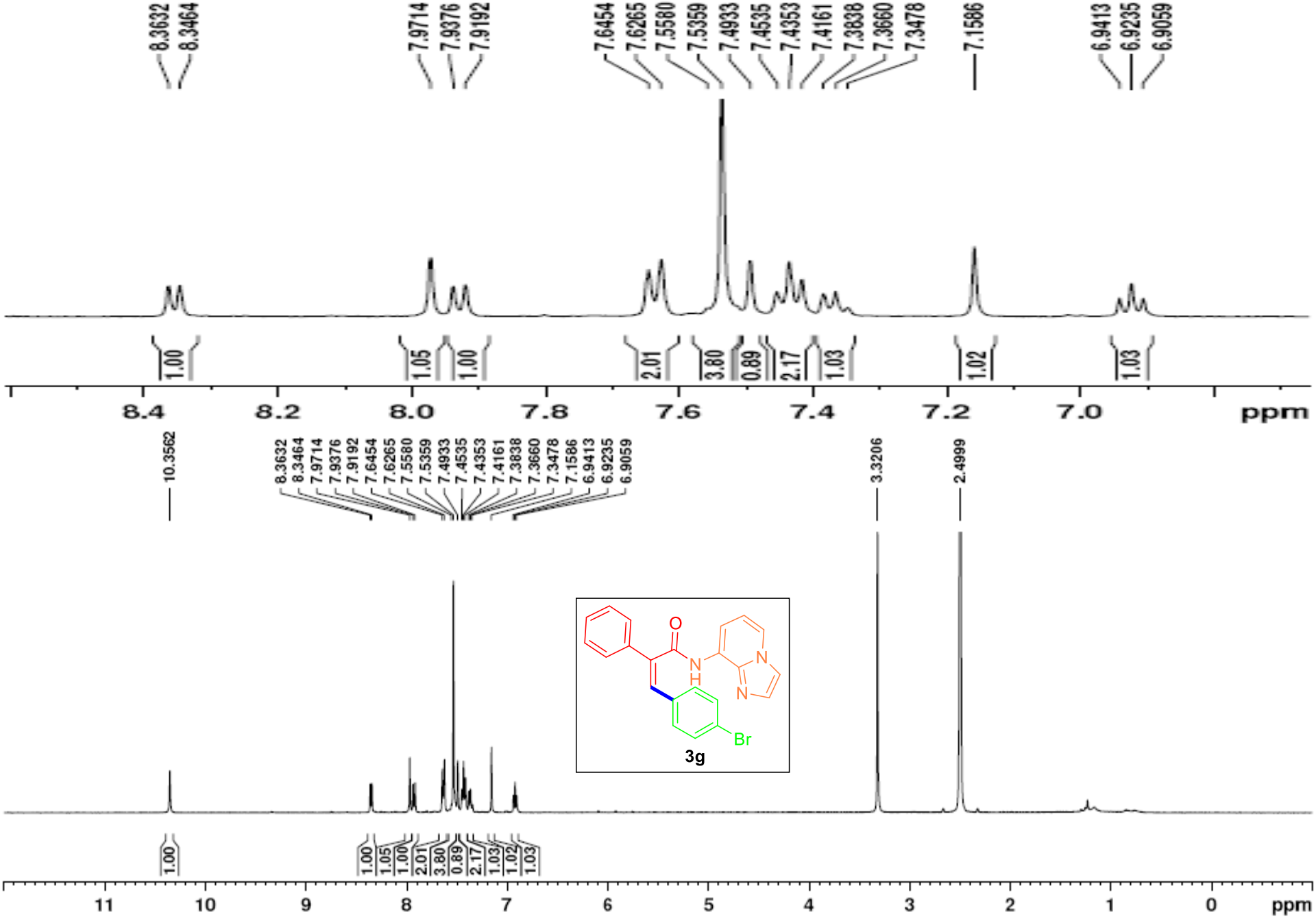
[1]H NMR of **3f**


139.8925
138.7991
138.7159
136.3197
132.0732
131.8879
130.4996
130.1135
129.7876
129.6981
128.9698
128.9413
128.8681
128.8295
128.7298
128.3918
128.0465
127.1548
126.5139
125.5721
125.5349
125.2805
122.5761
122.3608
120.9851
113.7197
113.0624
110.7838
110.4557
140
135
130
125
120
115
ppm
168.1137
139.8925
138.7991
138.7159
136.3197
132.0732
131.8879
130.4996
130.1135
129.7876
129.6981
128.9698
128.9413
128.8681
128.8295
128.7298
128.3918
128.0465
127.1548
126.5139
125.5721
125.5349
125.2805
122.5761
122.3608
120.9851
113.7197
113.0624
110.7838
110.4557
77.3165
77.2016
76.9991
76.6817
O
N
H
N
N
CF3
3f
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0 ppm

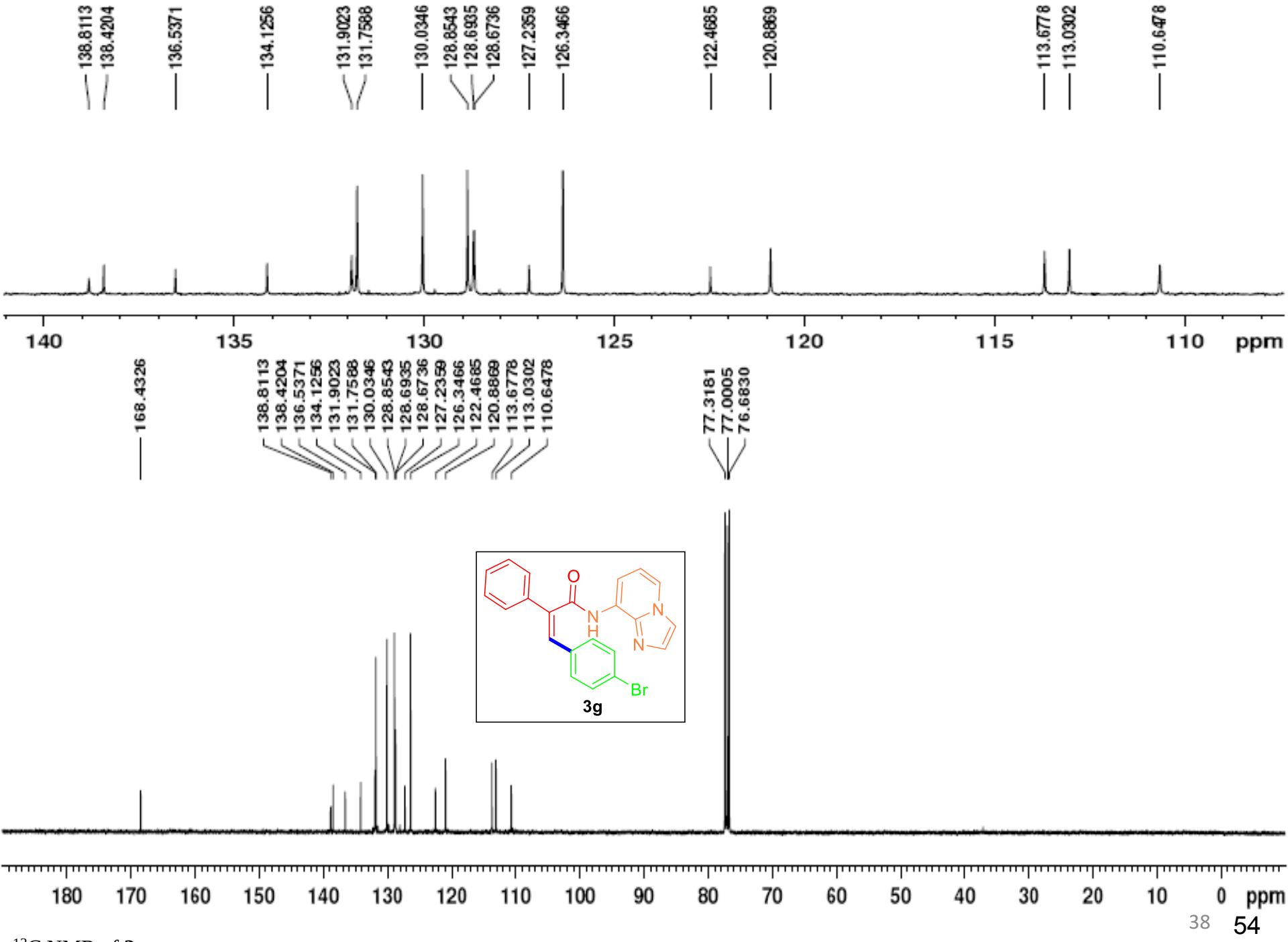
^{13}C NMR of **3f**



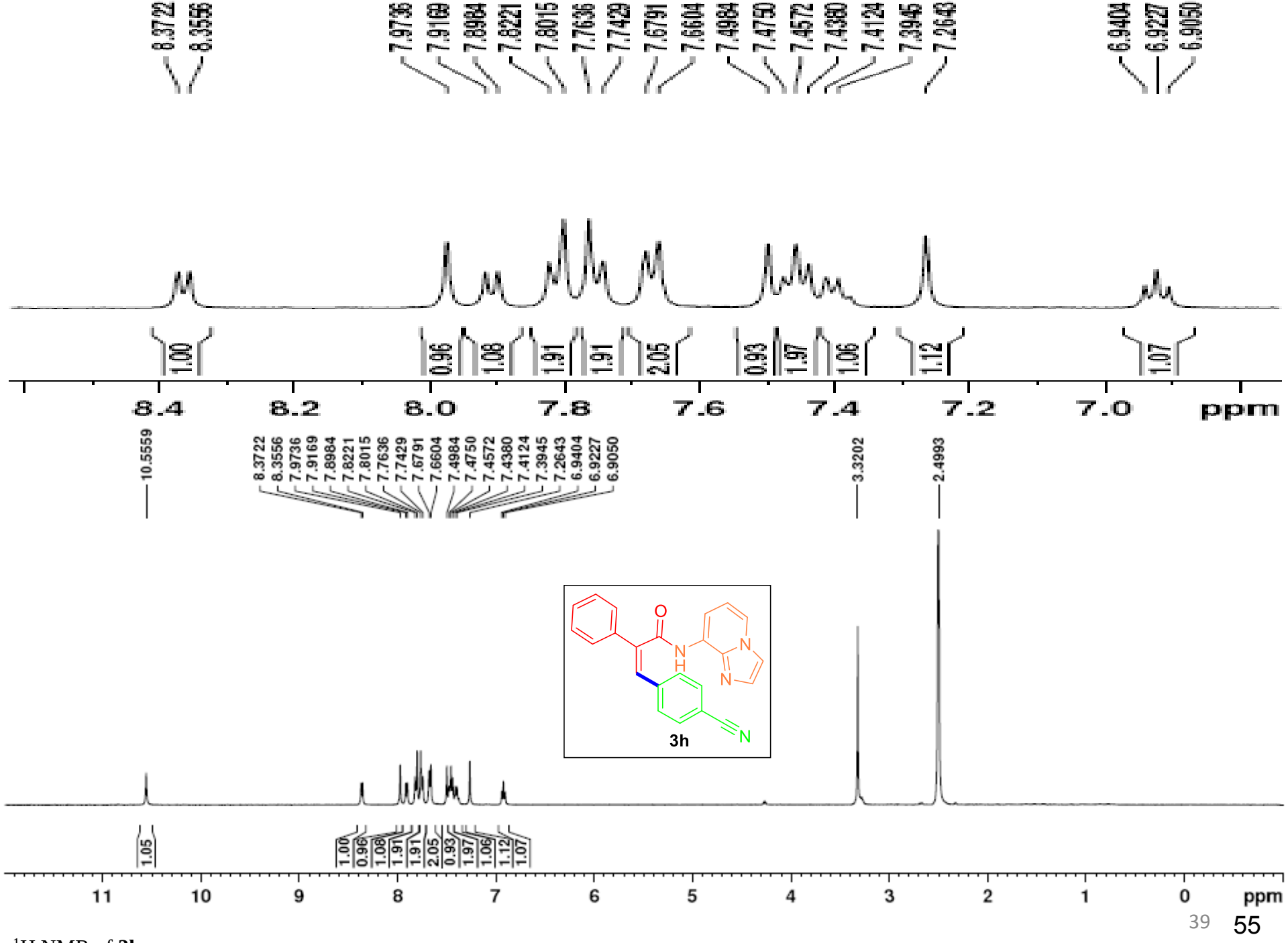
^{19}F NMR of **3f**


8.3632
8.3464
7.9714
7.9376
7.9192
7.6454
7.6265
7.5580
7.5359
7.4933
7.4535
7.4353
7.4161
7.3838
7.3660
7.3478
7.1586
6.9413
6.9235
6.9059
1.00
1.05
1.00
2.01
3.80
0.89
2.17
1.03
1.02
1.03
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
ppm
10.3562
3.3206
2.4999
O
N
H
N
N
Br
3g
11
10
9
8
7
6
5
4
3
2
1
0
ppm

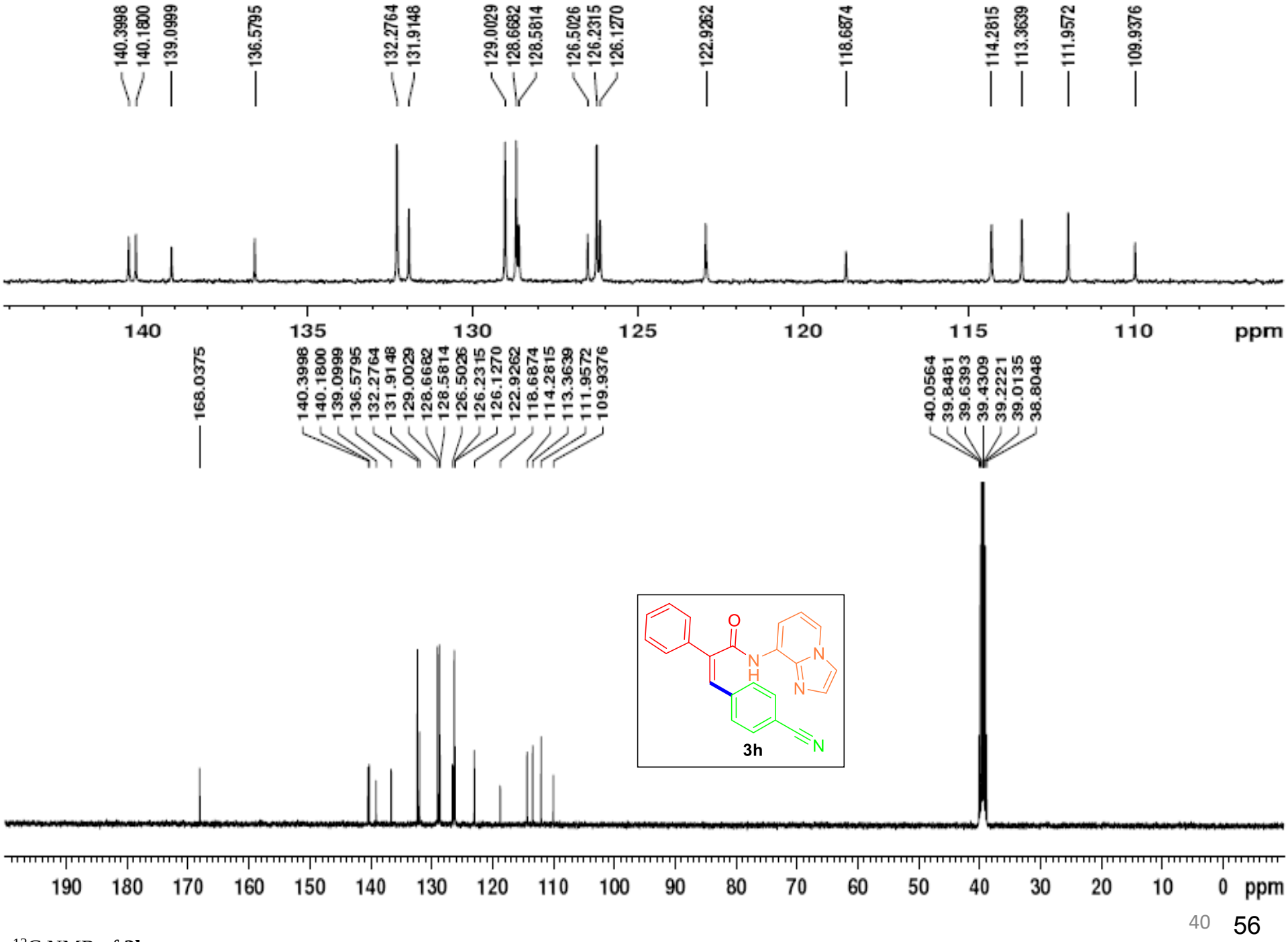
^{1}H NMR of **3g**


138.8113
138.4204
136.5371
134.1256
131.9023
131.7588
130.0346
128.8543
128.6935
128.6736
127.2359
126.3466
122.4685
120.8869
113.6778
113.0302
110.6478
140
135
130
125
120
115
110
ppm
168.4326
138.8113
138.4204
136.5371
134.1256
131.9023
131.7588
130.0346
128.8543
128.6935
128.6736
127.2359
126.3466
122.4685
120.8869
113.6778
113.0302
110.6478
77.3181
77.0005
76.6830
O
N
H
N
N
Br
3g
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

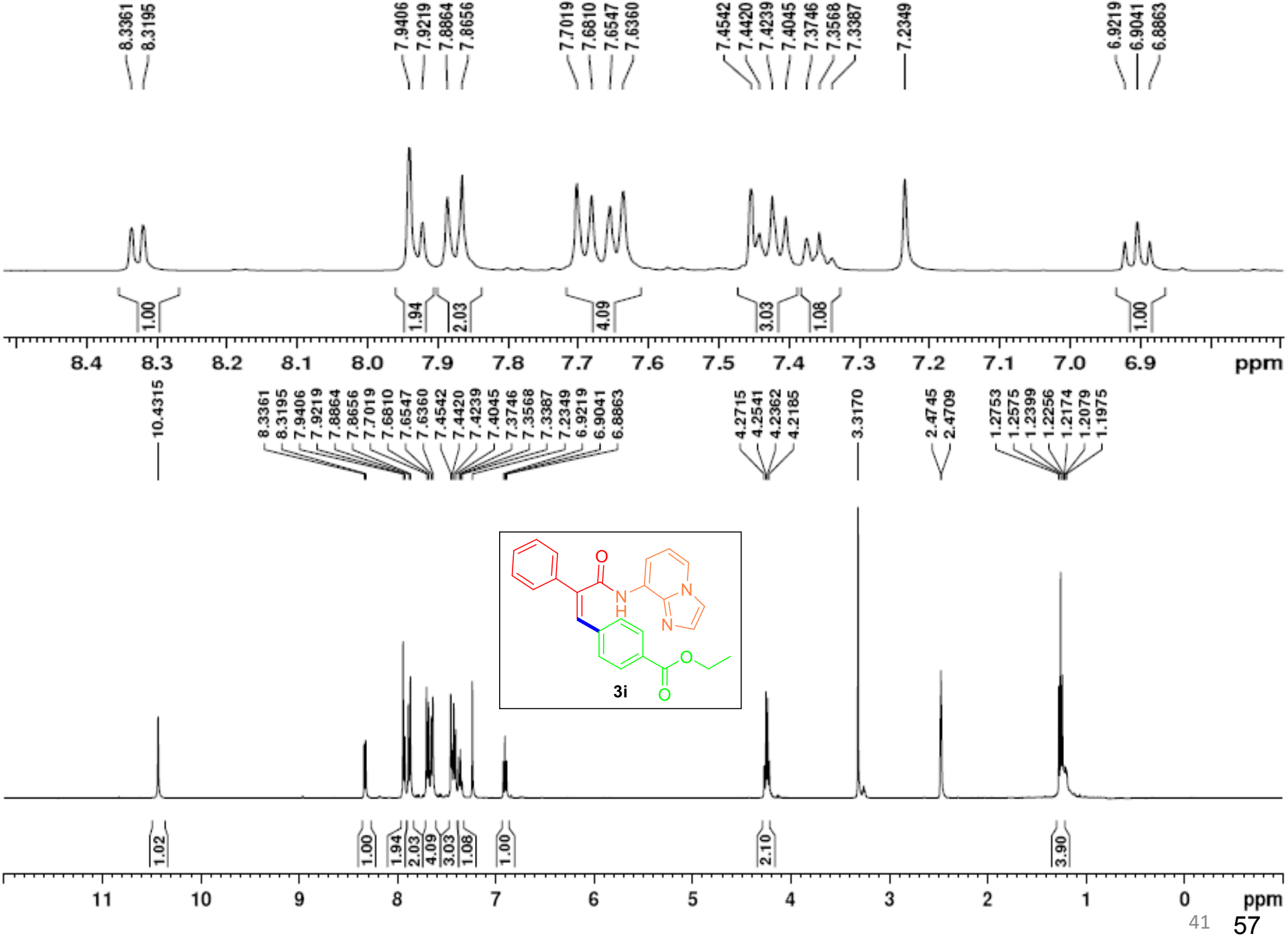
^{13}C NMR of **3g**


8.3722
8.3556
7.9736
7.9169
7.8984
7.8221
7.8015
7.7636
7.7429
7.6791
7.6604
7.4984
7.4750
7.4572
7.4380
7.4124
7.3945
7.2643
6.9404
6.9227
6.9050
1.00
0.96
1.08
1.91
1.91
2.05
0.93
1.97
1.06
1.12
1.07
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
ppm
10.5559
3.3202
2.4993
O
N
H
N
N
N
3h
1.05
11
10
9
8
7
6
5
4
3
2
1
0
ppm

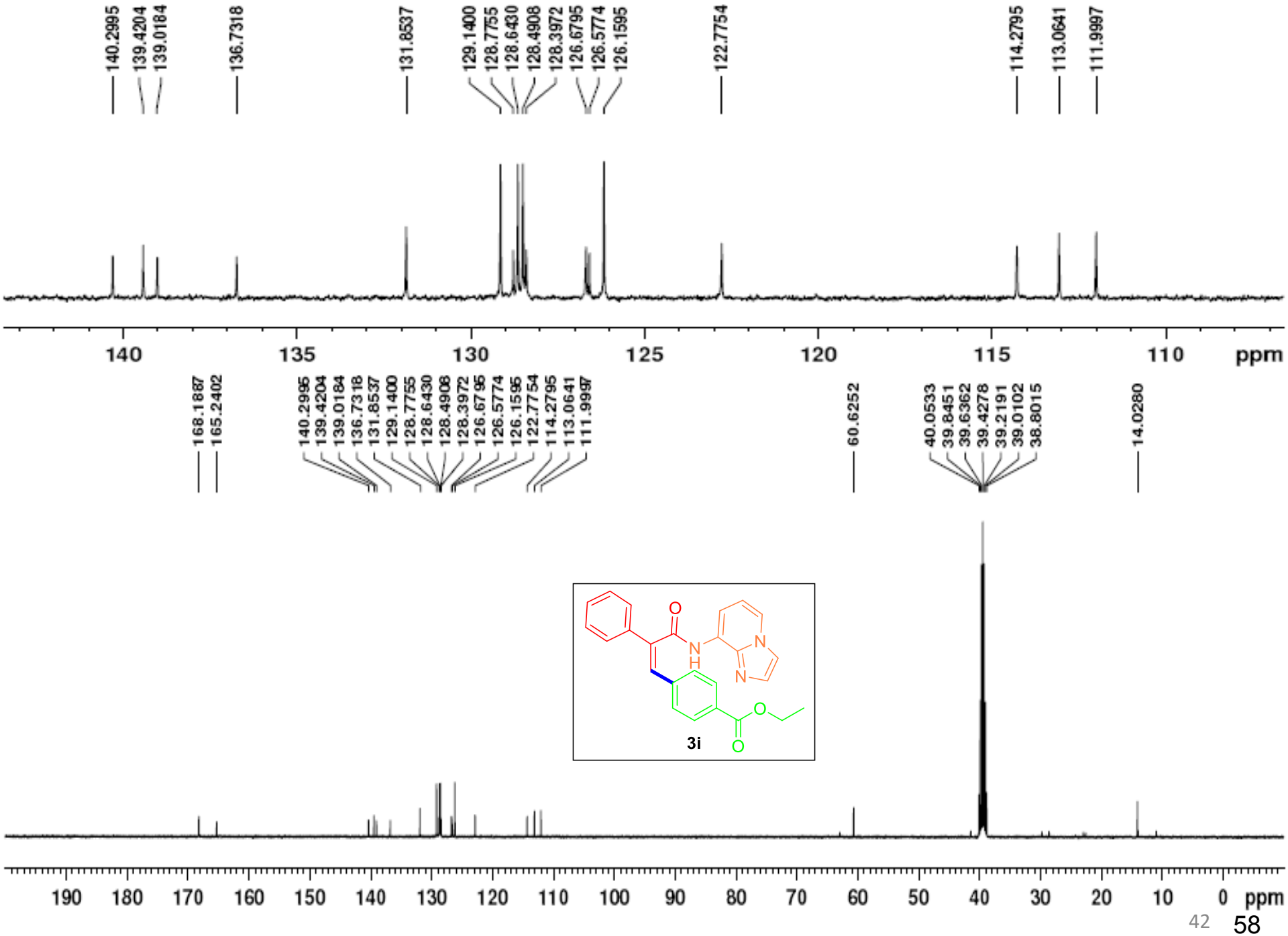
^{1}H NMR of **3h**


140.3998
140.1800
139.0999
136.5795
132.2764
131.9148
129.0029
128.6682
128.5814
126.5026
126.2315
126.1270
122.9262
118.6874
114.2815
113.3639
111.9572
109.9376
140
135
130
125
120
115
110
ppm
168.0375
140.3998
140.1800
139.0999
136.5795
132.2764
131.9148
129.0029
128.6682
128.5814
126.5026
126.2315
126.1270
122.9262
118.6874
114.2815
113.3639
111.9572
109.9376
40.0564
39.8481
39.6393
39.4309
39.2221
39.0135
38.8048
O
N
H
N
N
N
3h
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

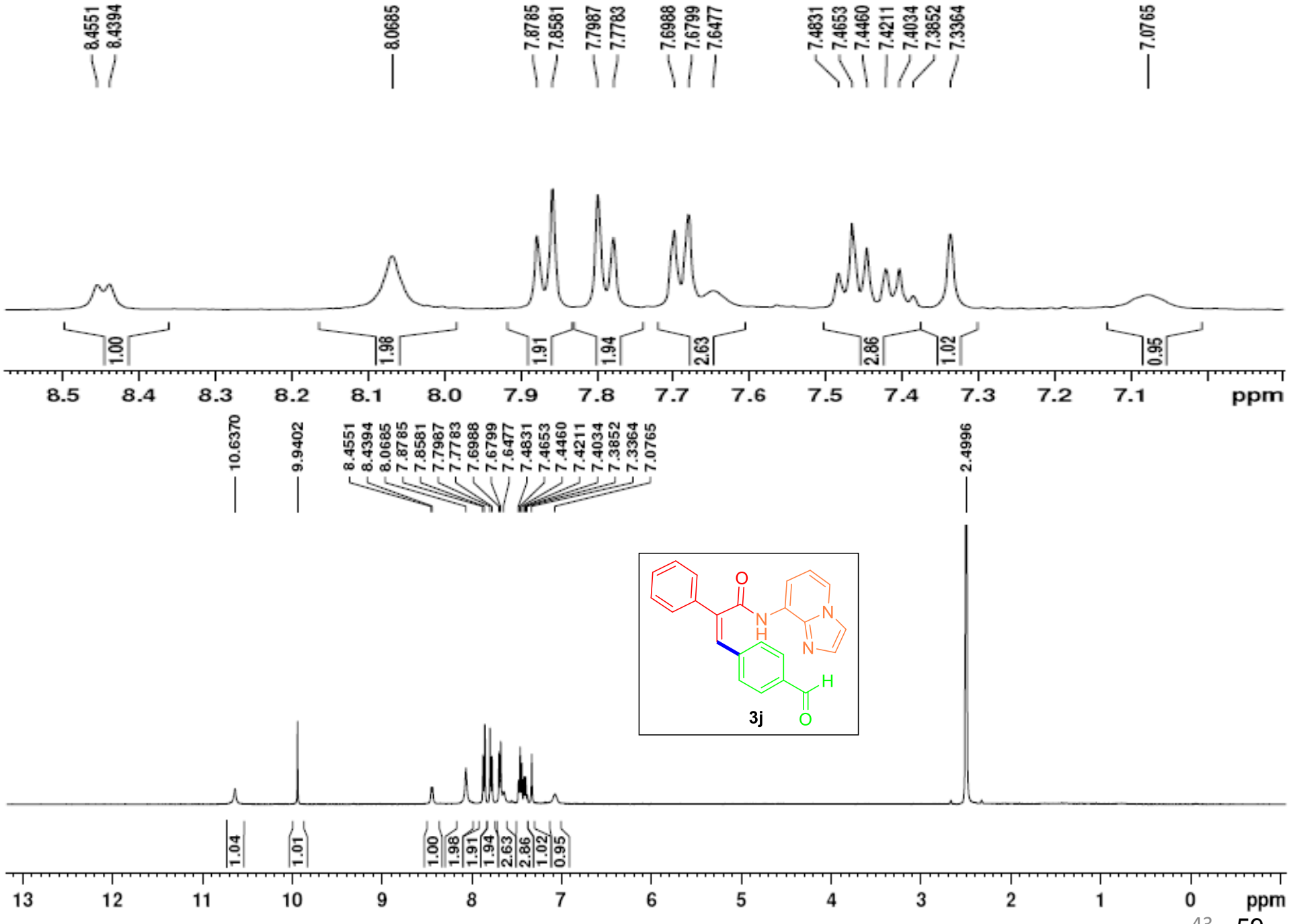
^{13}C NMR of **3h**


8.3361
8.3195
7.9406
7.9219
7.8864
7.8656
7.7019
7.6810
7.6547
7.6360
7.4542
7.4420
7.4239
7.4045
7.3746
7.3568
7.3387
7.2349
6.9219
6.9041
6.8863
1.00
1.94
2.03
4.09
3.03
1.08
1.00
8.4
8.3
8.2
8.1
8.0
7.9
7.8
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7.0
6.9
ppm
10.4315
4.2715
4.2541
4.2362
4.2185
3.3170
2.4745
2.4709
1.2753
1.2575
1.2399
1.2256
1.2174
1.2079
1.1975
O
N
H
N
N
O
O
3i
1.02
1.00
1.94
2.03
4.09
3.03
1.08
1.00
2.10
3.90
11
10
9
8
7
6
5
4
3
2
1
0
ppm

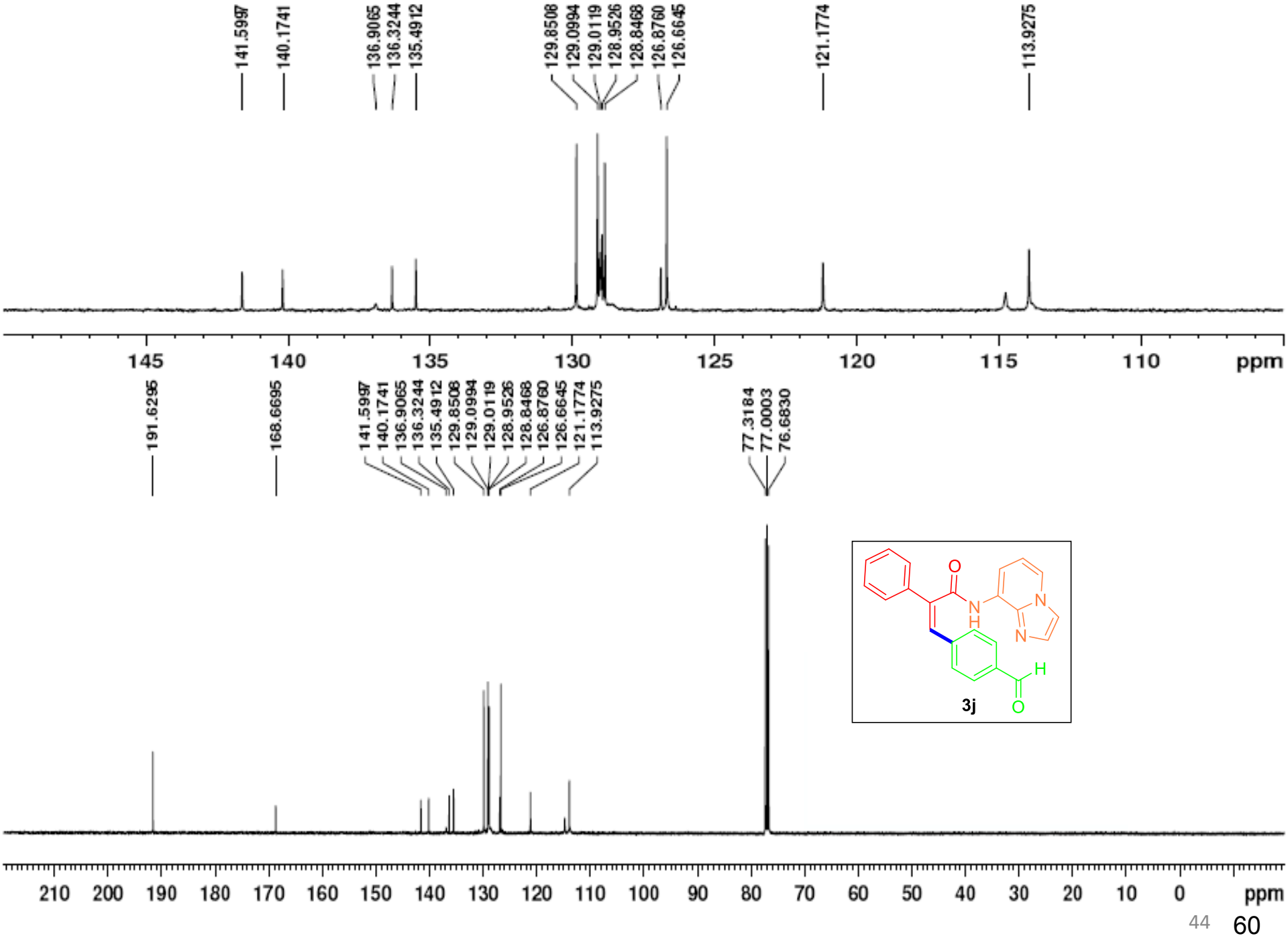
^{1}H NMR of **3i**


140.2995
139.4204
139.0184
136.7318
131.8537
129.1400
128.7755
128.6430
128.4908
128.3972
126.6795
126.5774
126.1595
122.7754
114.2795
113.0641
111.9997
140
135
130
125
120
115
110
ppm
168.1887
165.2402
140.2995
139.4204
139.0184
136.7318
131.8537
129.1400
128.7755
128.6430
128.4908
128.3972
126.6795
126.5774
126.1595
122.7754
114.2795
113.0641
111.9997
60.6252
40.0533
39.8451
39.6362
39.4278
39.2191
39.0102
38.8015
14.0280
O
N
H
N
N
O
O
3i
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

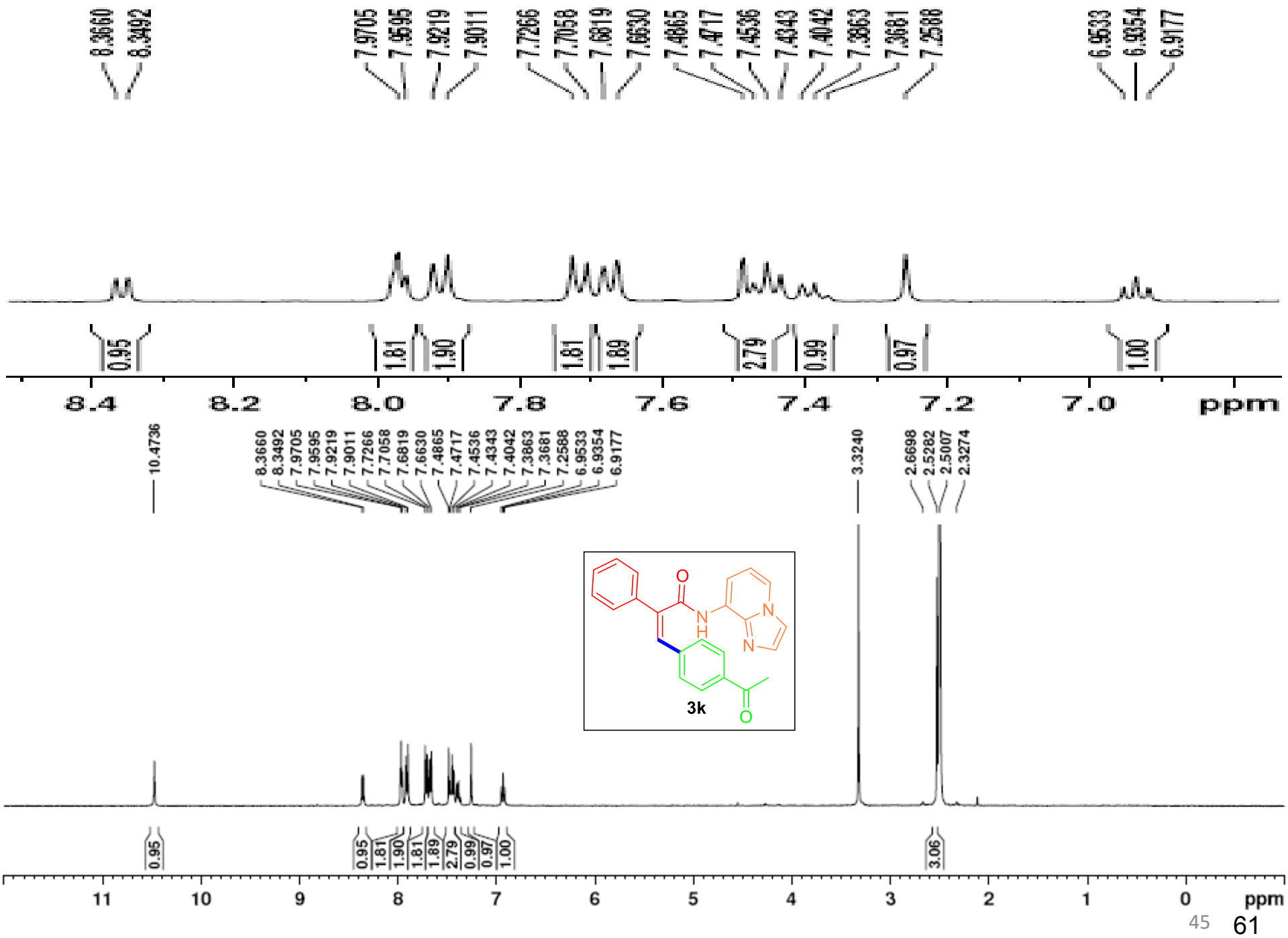
^{13}C NMR of **3i**


8.4551
8.4394
8.0685
7.8785
7.8581
7.7987
7.7763
7.6988
7.6799
7.6477
7.4831
7.4653
7.4460
7.4211
7.4034
7.3852
7.3364
7.0765
1.00
1.96
1.91
1.94
2.63
2.86
1.02
0.95
ppm
10.6370
9.9402
2.4996
1.04
1.01
3j

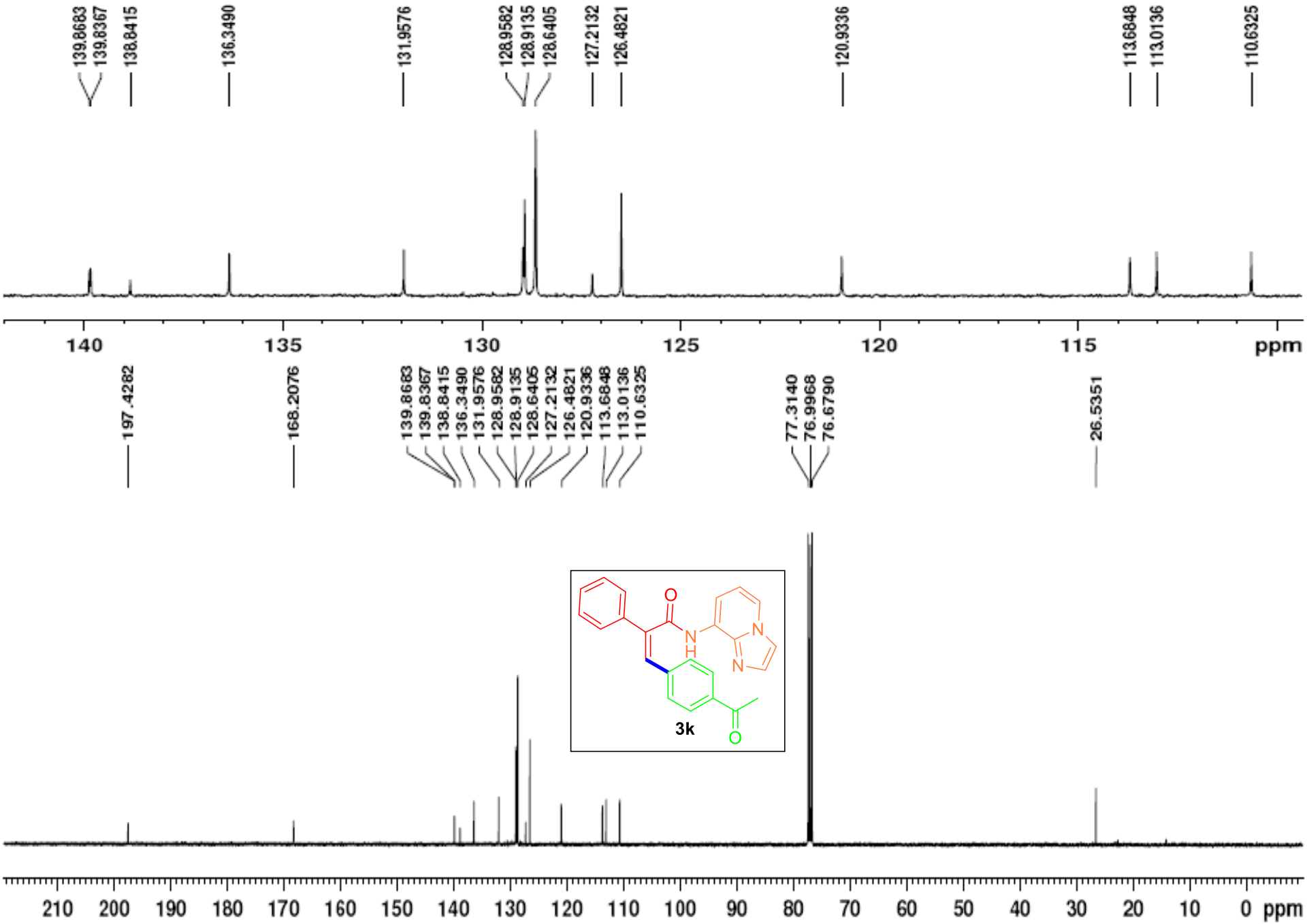
^{1}H NMR of **3j**


141.5997
140.1741
136.9065
136.3244
135.4912
129.8508
129.0994
129.0119
128.9526
128.8468
126.8760
126.6645
121.1774
113.9275
145
140
135
130
125
120
115
110
ppm
191.6295
168.6695
141.5997
140.1741
136.9065
136.3244
135.4912
129.8508
129.0994
129.0119
128.9526
128.8468
126.8760
126.6645
121.1774
113.9275
77.3184
77.0003
76.6830
O
N
H
N
N
H
O
3j
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

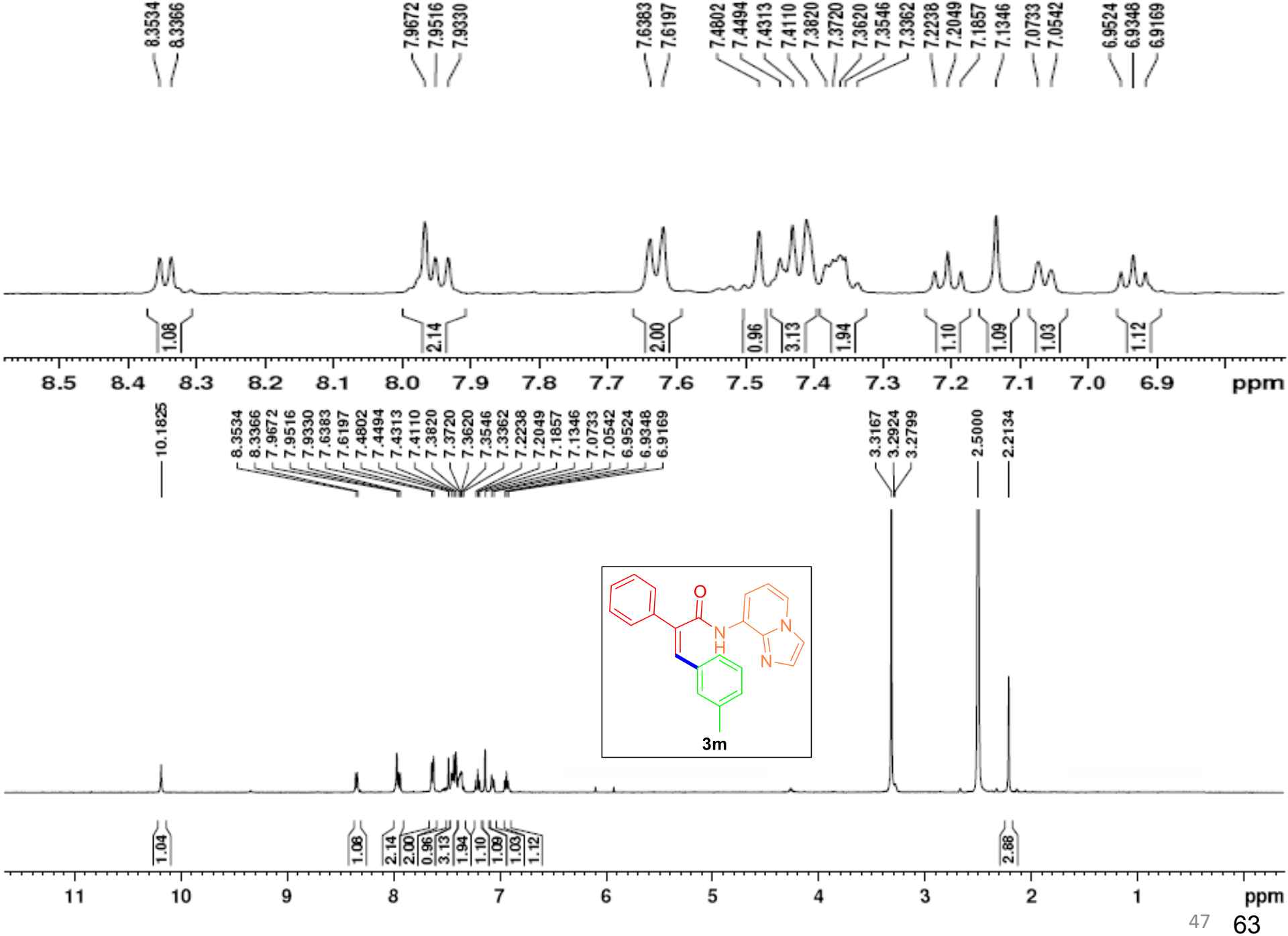
^{13}C NMR of **3j**


8.3660
8.3492
7.9705
7.9595
7.9219
7.9011
7.7266
7.7058
7.6819
7.6630
7.4865
7.4717
7.4536
7.4343
7.4042
7.3863
7.3681
7.2588
6.9533
6.9354
6.9177
0.95
1.81
1.90
1.81
1.89
2.79
0.99
0.97
1.00
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
ppm
10.4736
3.3240
2.6698
2.5282
2.5007
2.3274
3k
3.06
11
10
9
8
7
6
5
4
3
2
1
0
ppm

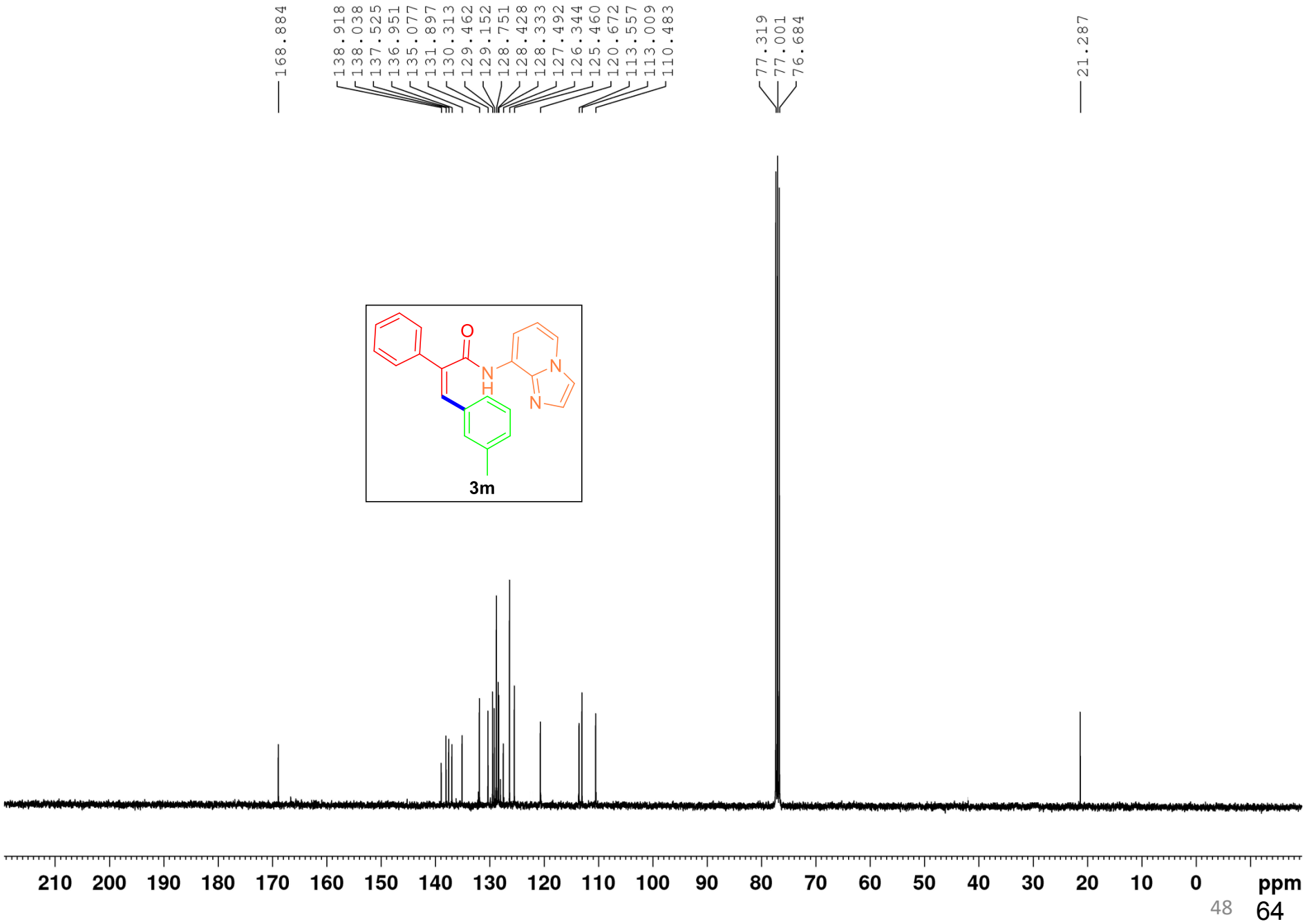
^{1}H NMR of **3k**


139.8663
139.8367
138.8415
136.3490
131.9576
128.9582
128.9135
128.6405
127.2132
126.4821
120.9336
113.6848
113.0136
110.6325
140
135
130
125
120
115
ppm
197.4282
168.2076
139.8663
139.8367
138.8415
136.3490
131.9576
128.9582
128.9135
128.6405
127.2132
126.4821
120.9336
113.6848
113.0136
110.6325
77.3140
76.9968
76.6790
26.5351
O
N
H
N
N
O
3k
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0 ppm

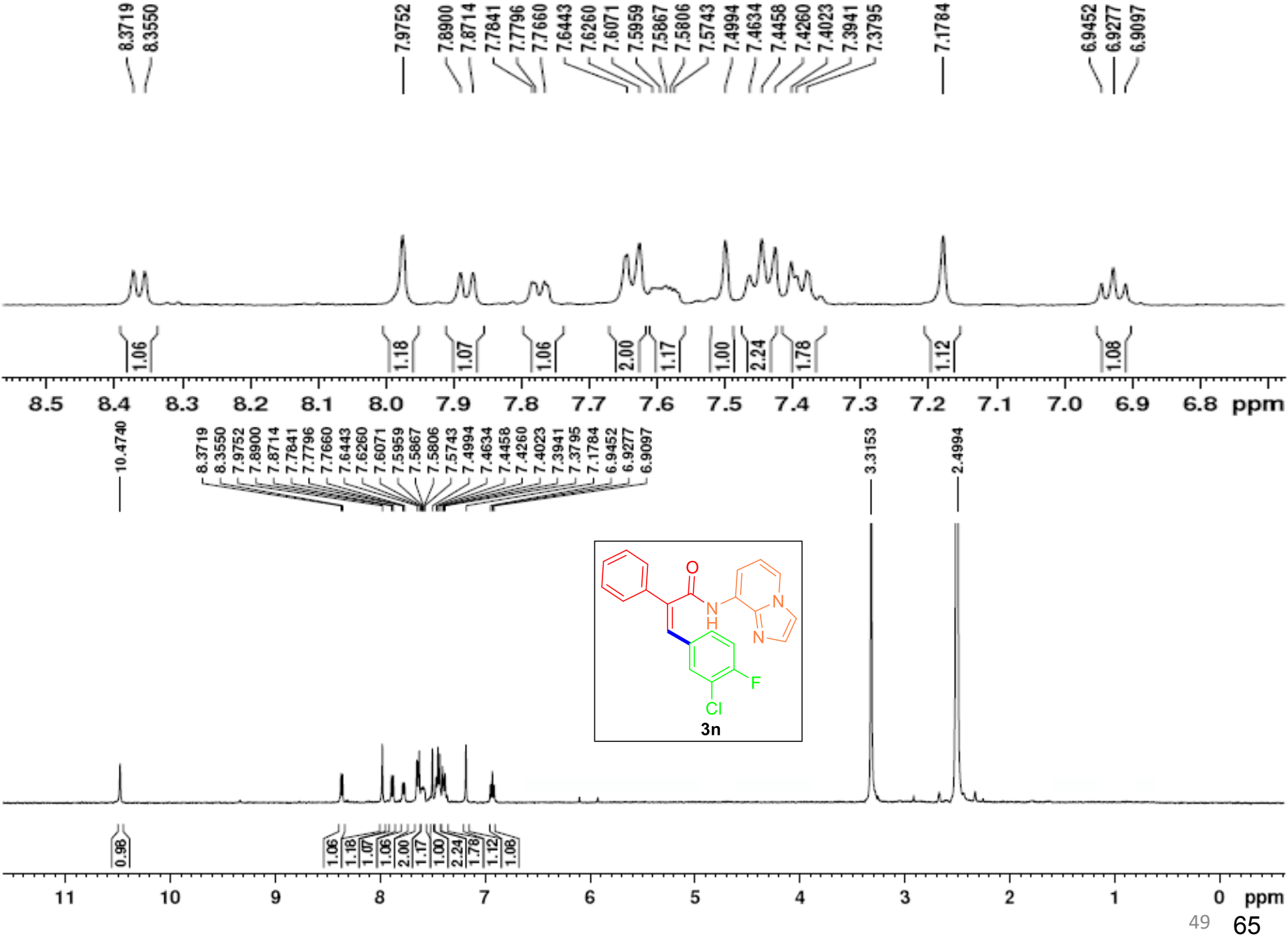
^{13}C NMR of **3k**


8.3534
8.3366
7.9672
7.9516
7.9330
7.6383
7.6197
7.4802
7.4494
7.4313
7.4110
7.3820
7.3720
7.3620
7.3546
7.3362
7.2238
7.2049
7.1857
7.1346
7.0733
7.0542
6.9524
6.9348
6.9169
1.08
2.14
2.00
0.96
3.13
1.94
1.10
1.09
1.03
1.12
8.5
8.4
8.3
8.2
8.1
8.0
7.9
7.8
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7.0
6.9
ppm
10.1825
3.3167
3.2924
3.2799
2.5000
2.2134
O
N
H
N
N
3m
1.04
2.66
11
10
9
8
7
6
5
4
3
2
1
ppm

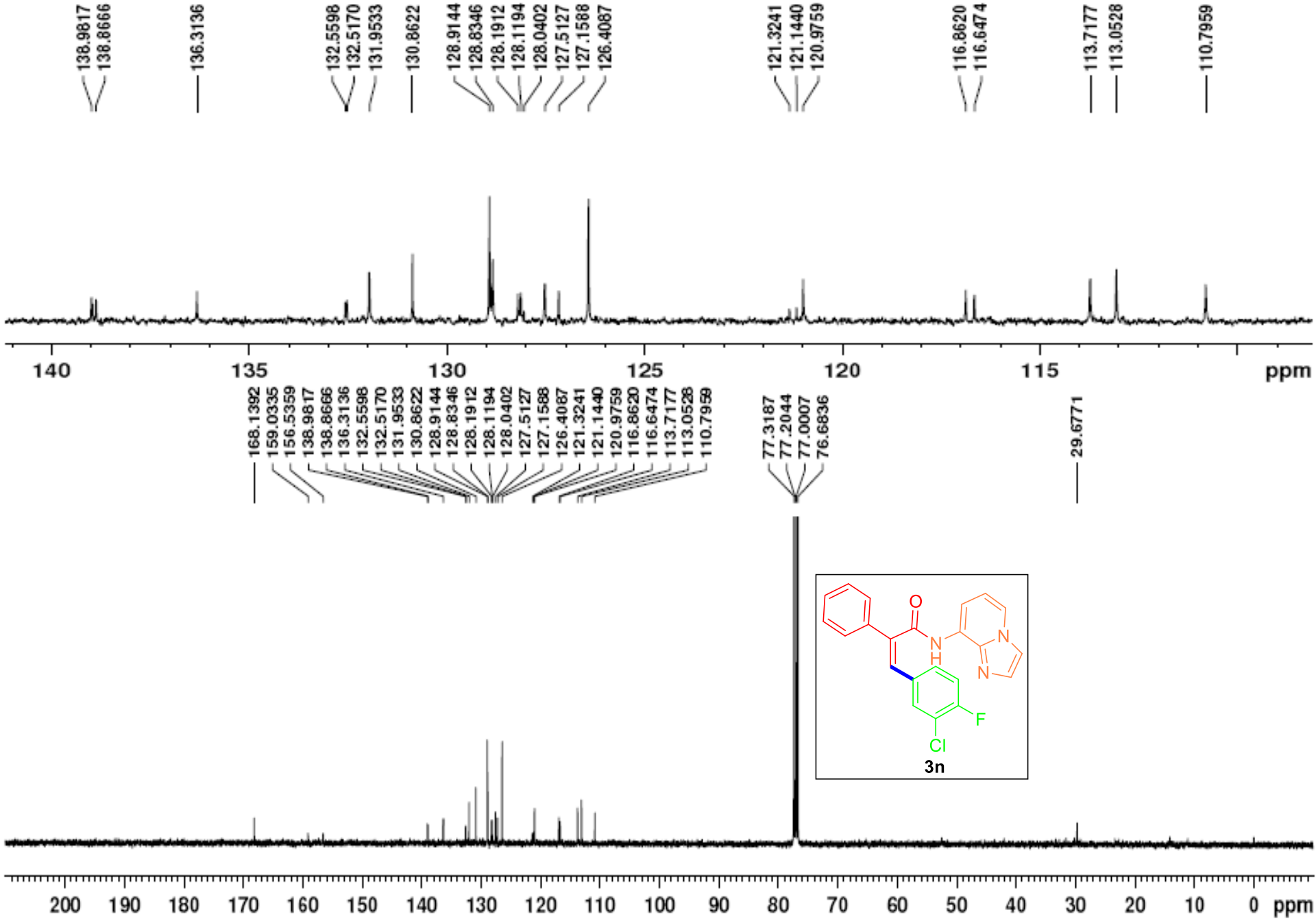
^{1}H NMR of **3m**


168.884
138.918
138.038
137.525
136.951
135.077
131.897
130.313
129.462
129.152
128.751
128.428
128.333
127.492
126.344
125.460
120.672
113.557
113.009
110.483
77.319
77.001
76.684
21.287
O
N
H
N
N
3m
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

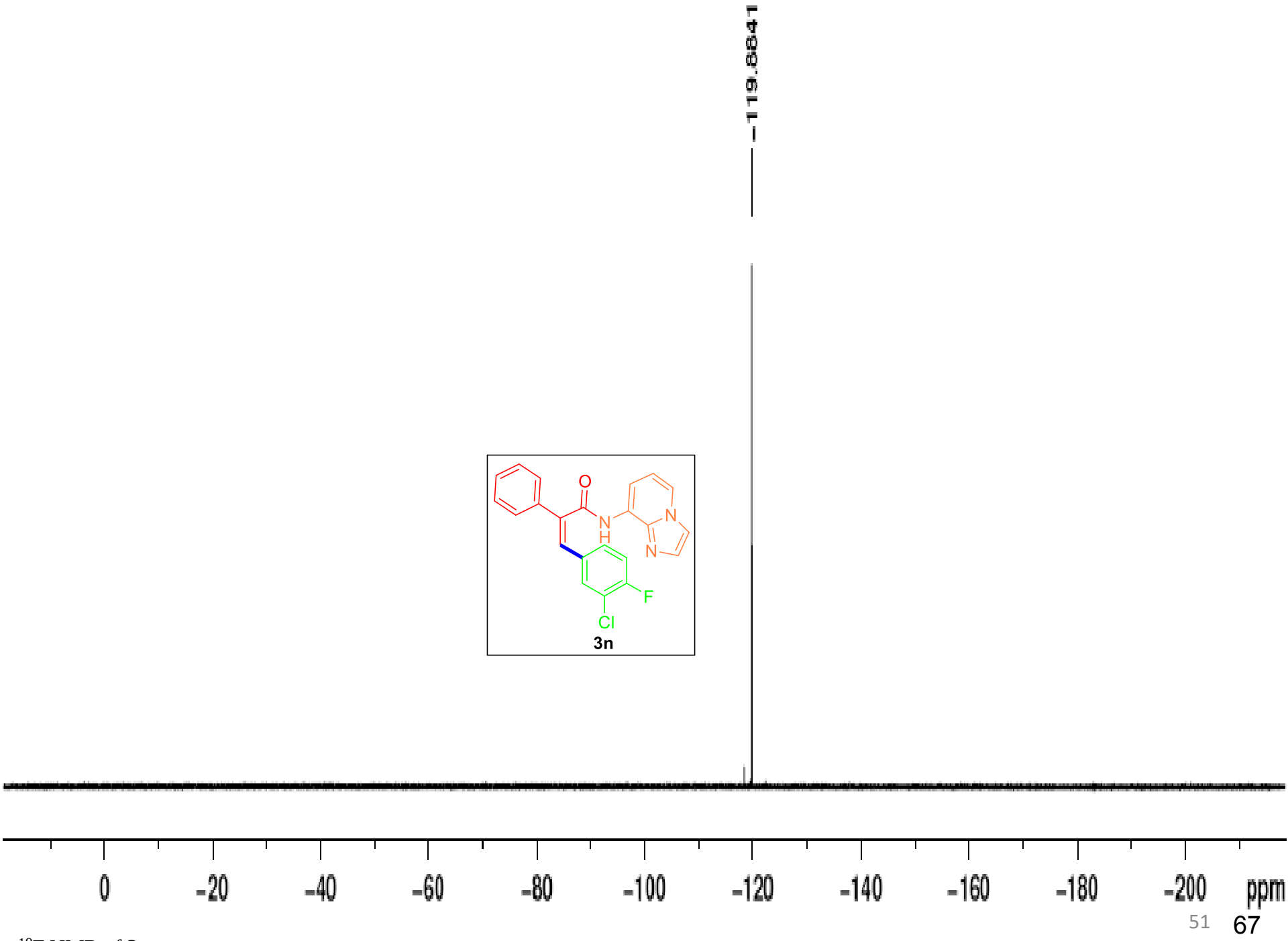
^{13}C NMR of **3m**


8.3719
8.3550
7.9752
7.8900
7.8714
7.7841
7.7796
7.7660
7.6443
7.6260
7.6071
7.5959
7.5867
7.5806
7.5743
7.4994
7.4634
7.4458
7.4260
7.4023
7.3941
7.3795
7.1784
6.9452
6.9277
6.9097
1.06
1.18
1.07
1.06
2.00
1.17
1.00
2.24
1.78
1.12
1.08
8.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 ppm
10.4740
3.3153
2.4994
0.98
11 10 9 8 7 6 5 4 3 2 1 0 ppm
O
N
H
N
N
F
Cl
3n

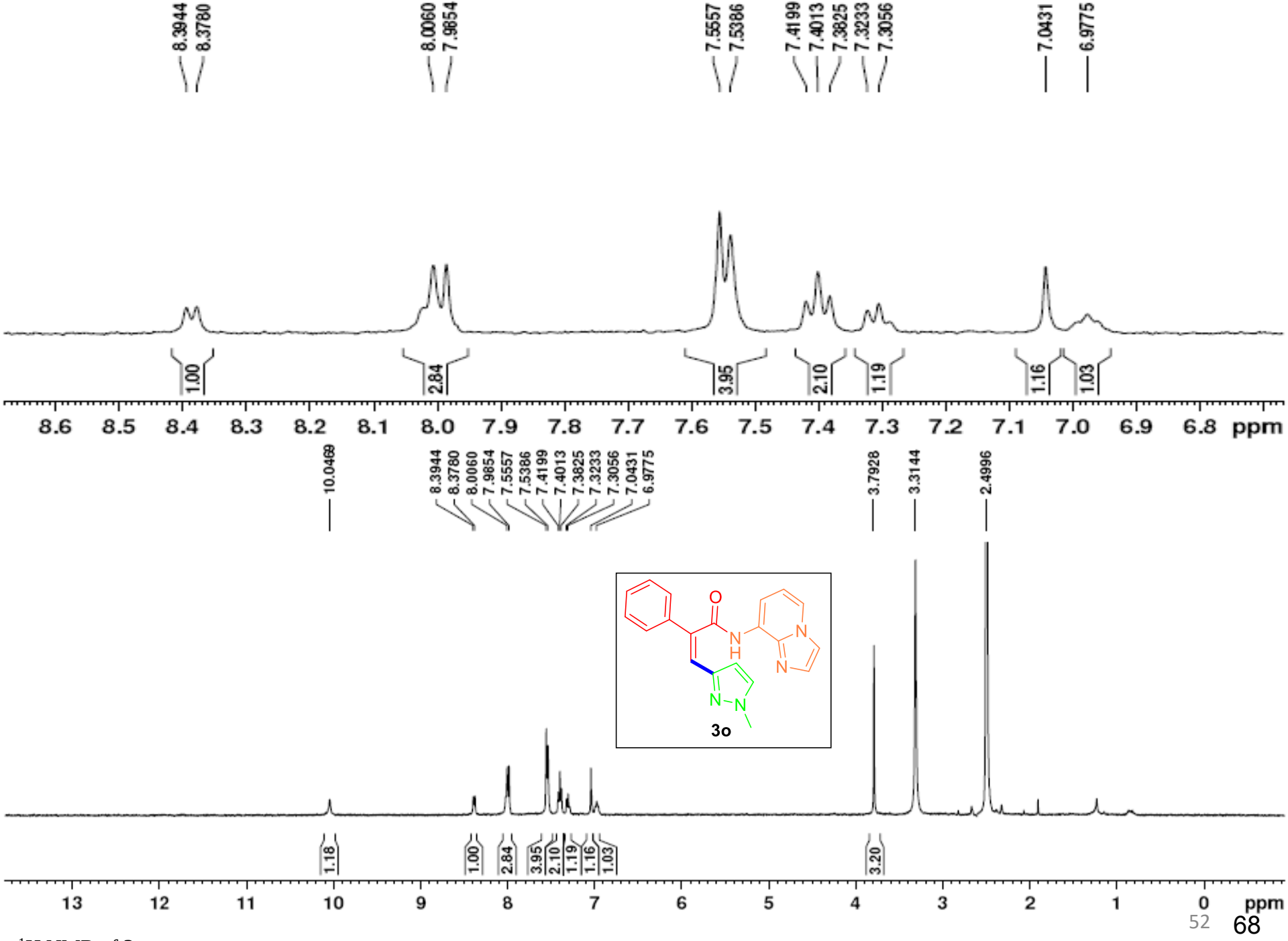
^{1}H NMR of **3n**


138.9817
138.8666
136.3136
132.5598
132.5170
131.9533
130.8622
128.9144
128.8346
128.1912
128.1194
128.0402
127.5127
127.1588
126.4087
121.3241
121.1440
120.9759
116.8620
116.6474
113.7177
113.0528
110.7959
140
135
130
125
120
115
ppm
168.1392
159.0335
156.5359
138.9817
138.8666
136.3136
132.5598
132.5170
131.9533
130.8622
128.9144
128.8346
128.1912
128.1194
128.0402
127.5127
127.1588
126.4087
121.3241
121.1440
120.9759
116.8620
116.6474
113.7177
113.0528
110.7959
77.3187
77.2044
77.0007
76.6836
29.6771
O
N
H
N
N
F
Cl
3n
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

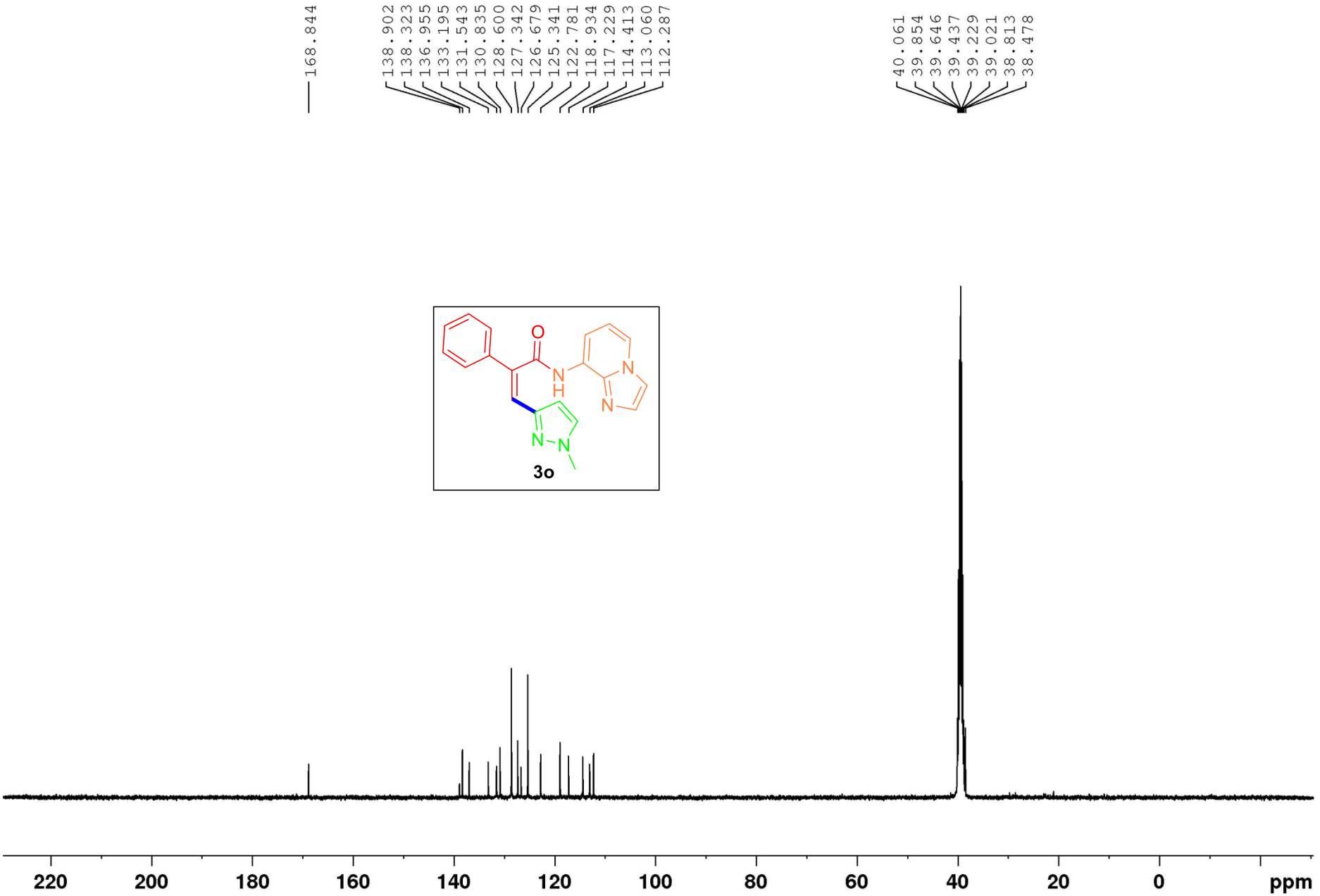
^{13}C NMR of **3n**



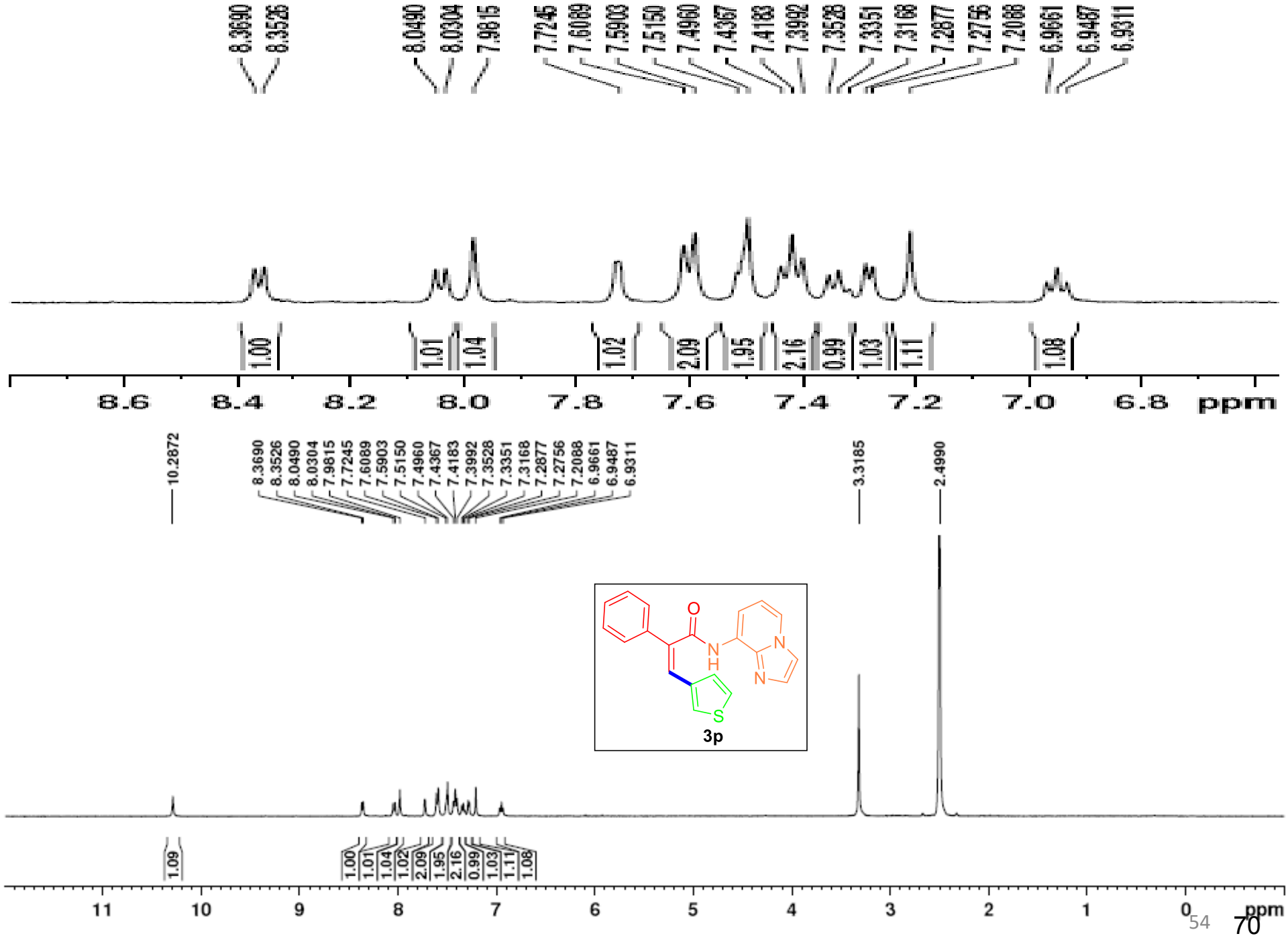
^{19}F NMR of **3n**


8.3944
8.3780
8.0060
7.9654
7.5557
7.5386
7.4199
7.4013
7.3825
7.3233
7.3056
7.0431
6.9775
1.00
2.84
3.95
2.10
1.19
1.16
1.03
8.6 8.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 ppm
10.0469
3.7928
3.3144
2.4996
O
N
H
N
N
N
N
3o
1.18
1.00
2.84
3.95
2.10
1.19
1.16
1.03
3.20
13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

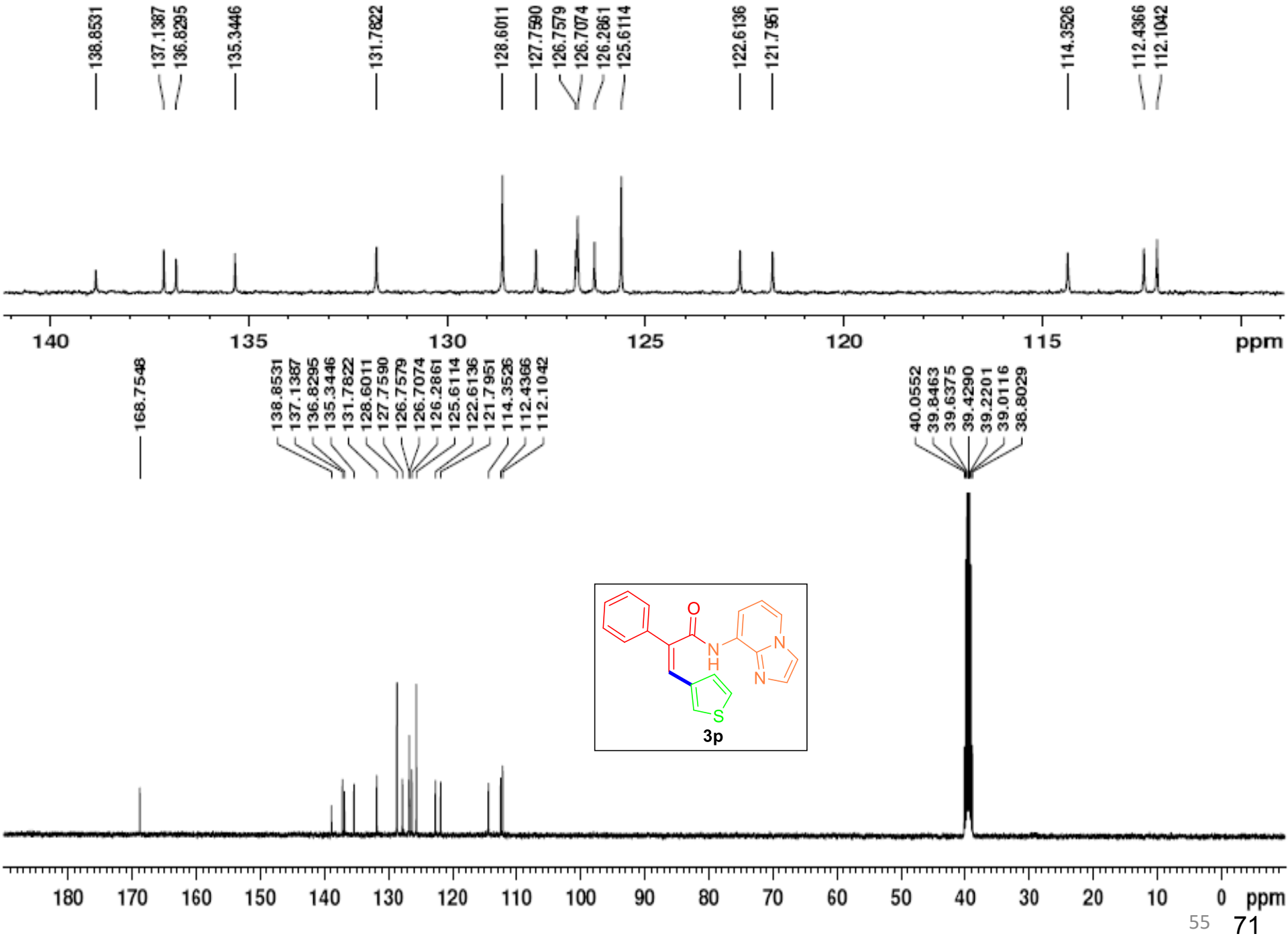
[1]H NMR of **3o**


168.844
138.902
138.323
136.955
133.195
131.543
130.835
128.600
127.342
126.679
125.341
122.781
118.934
117.229
114.413
113.060
112.287
40.061
39.854
39.646
39.437
39.229
39.021
38.813
38.478
O
N
H
N
N
N
N
3o
220
200
180
160
140
120
100
80
60
40
20
0
ppm

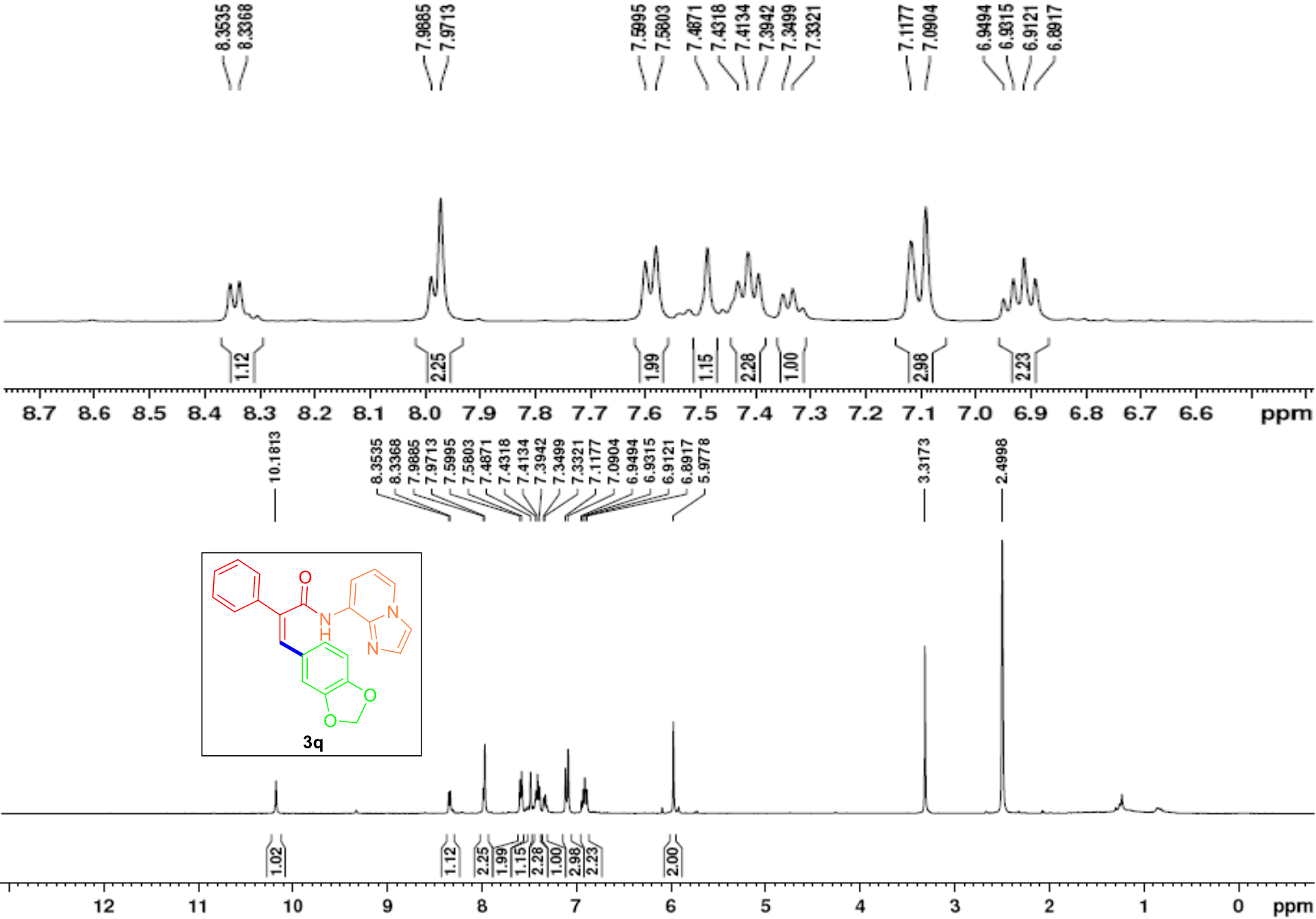
^{13}C NMR of **3o**


8.3690
8.3526
8.0490
8.0304
7.9815
7.7245
7.6089
7.5903
7.5150
7.4960
7.4367
7.4183
7.3992
7.3528
7.3351
7.3168
7.2877
7.2756
7.2088
6.9661
6.9487
6.9311
1.00
1.01
1.04
1.02
2.09
1.95
2.16
0.99
1.03
1.11
1.08
8.6
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
ppm
10.2872
3.3185
2.4990
1.09
11
10
9
8
7
6
5
4
3
2
1
0
ppm
O
N
H
N
N
S
3p

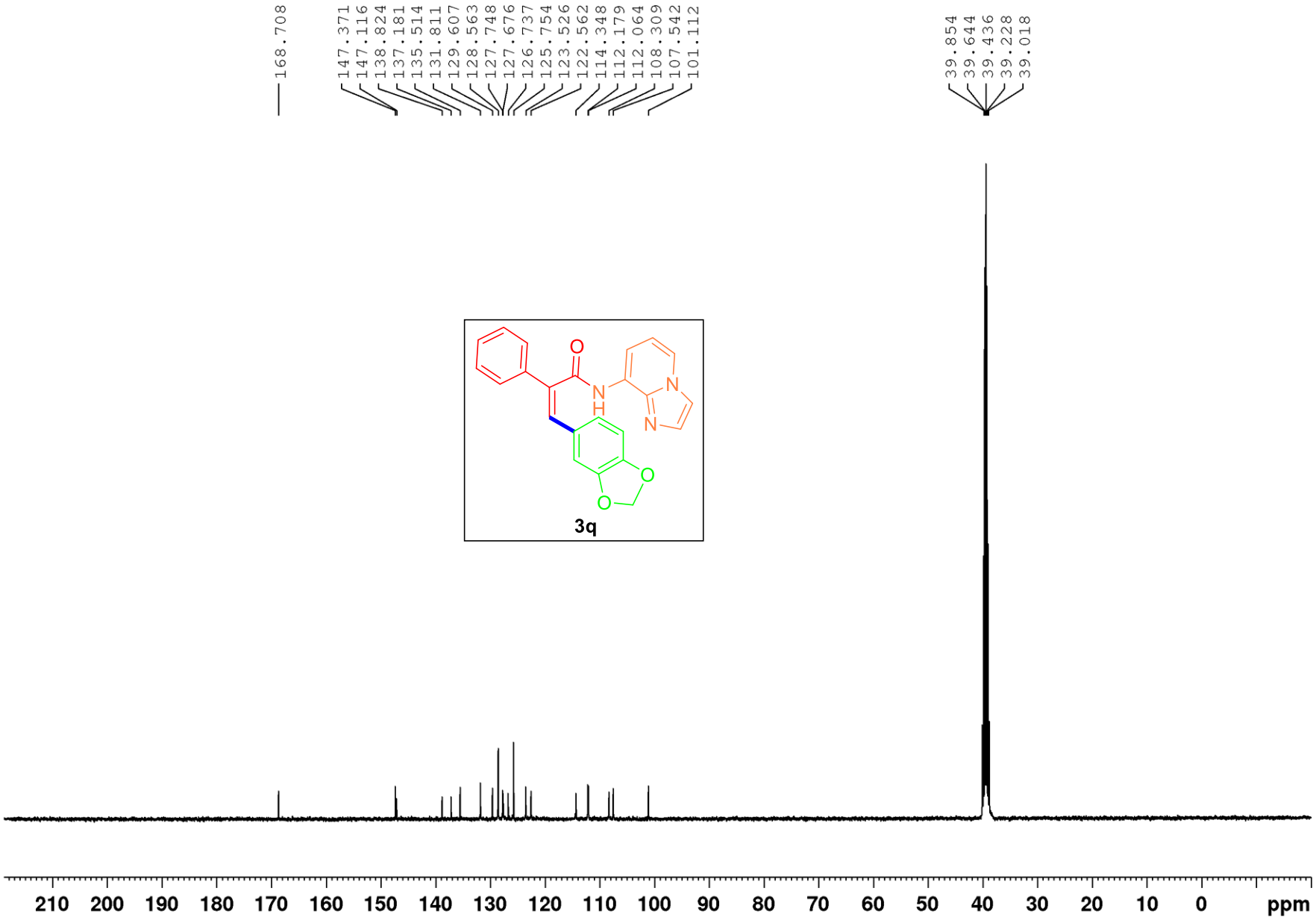
^{1}H NMR of **3p**


138.8531
137.1387
136.8295
135.3446
131.7822
128.6011
127.7590
126.7579
126.7074
126.2861
125.6114
122.6136
121.7951
114.3526
112.4366
112.1042
140
135
130
125
120
115
ppm
168.7548
138.8531
137.1387
136.8295
135.3446
131.7822
128.6011
127.7590
126.7579
126.7074
126.2861
125.6114
122.6136
121.7951
114.3526
112.4366
112.1042
40.0552
39.8463
39.6375
39.4290
39.2201
39.0116
38.8029
O
N
H
N
N
S
3p
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

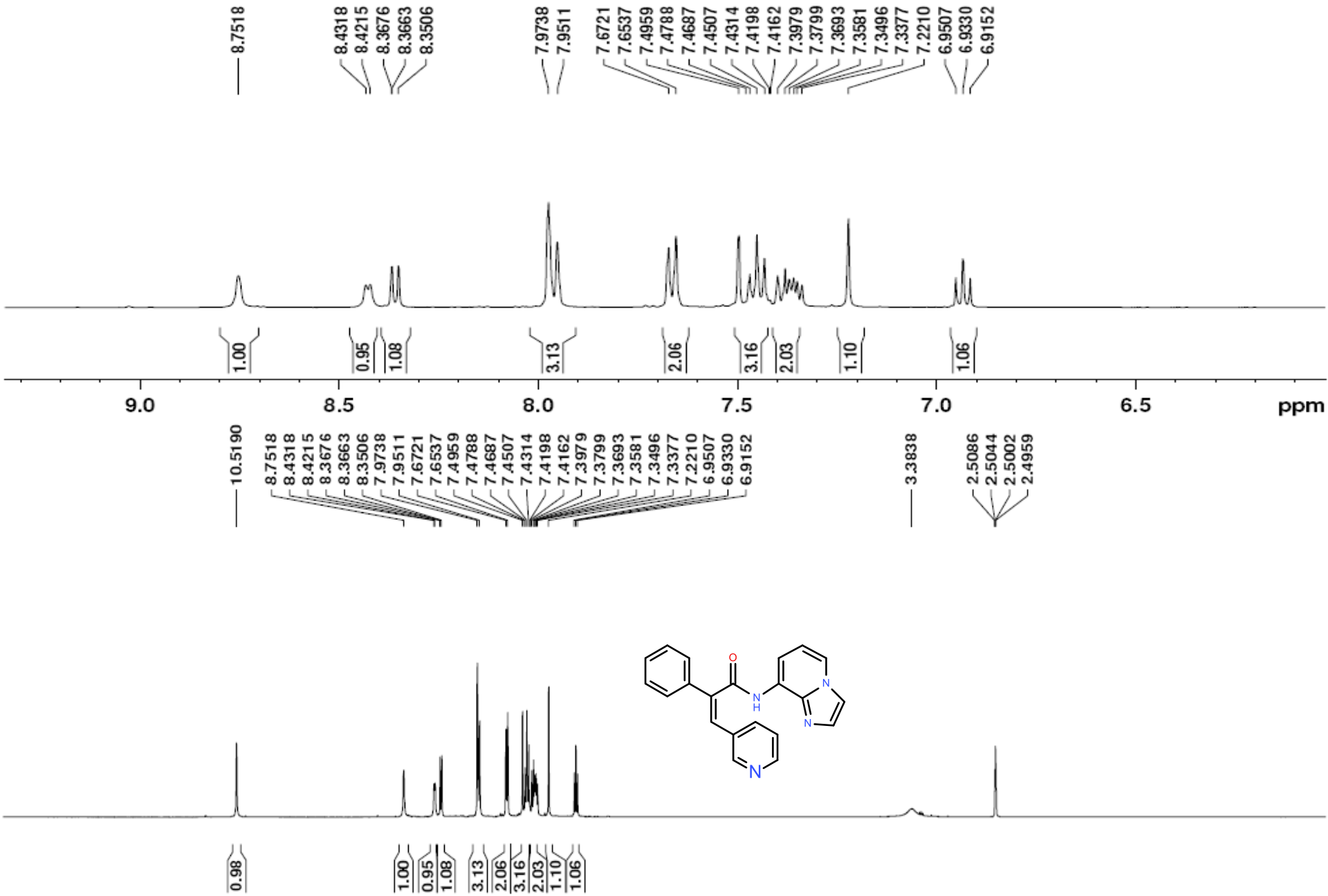
^{13}C NMR of **3p**


8.3535
8.3368
7.9885
7.9713
7.5995
7.5803
7.4871
7.4318
7.4134
7.3942
7.3499
7.3321
7.1177
7.0904
6.9494
6.9315
6.9121
6.8917
1.12
2.25
1.99
1.15
2.28
1.00
2.98
2.23
8.7 8.6 8.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 6.7 6.6 ppm
10.1813
8.3535
8.3368
7.9885
7.9713
7.5995
7.5803
7.4871
7.4318
7.4134
7.3942
7.3499
7.3321
7.1177
7.0904
6.9494
6.9315
6.9121
6.8917
5.9778
3.3173
2.4998
O
N
H
N
N
O
O
3q
1.02
1.12
2.25
1.99
1.15
2.28
1.00
2.98
2.23
2.00
12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

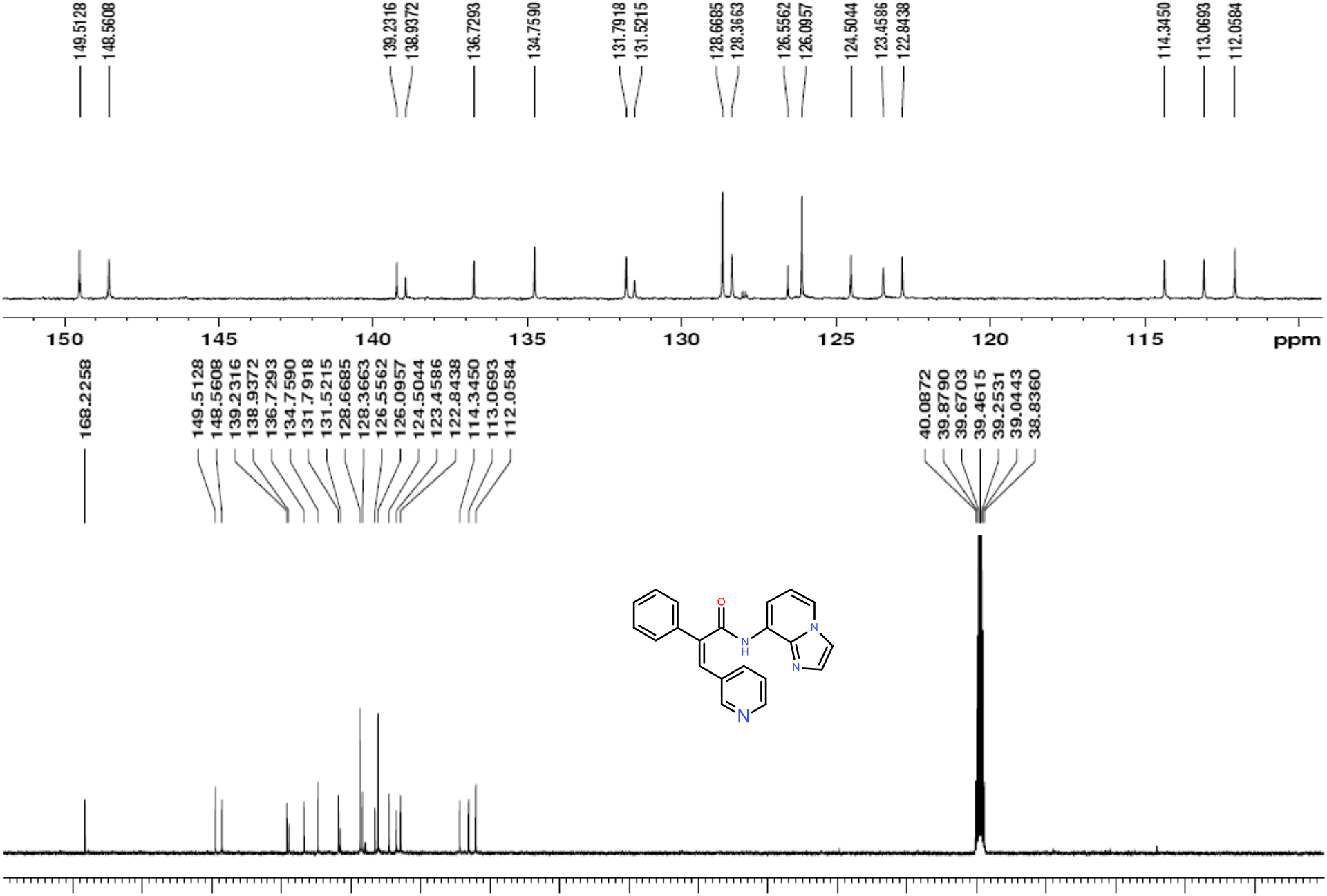
^{1}H NMR of **3q**


168.708
147.371
147.116
138.824
137.181
135.514
131.811
129.607
128.563
127.748
127.676
126.737
125.754
123.526
122.562
114.348
112.179
112.064
108.309
107.542
101.112
39.854
39.644
39.436
39.228
39.018
O
N
H
N
N
O
O
3q
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

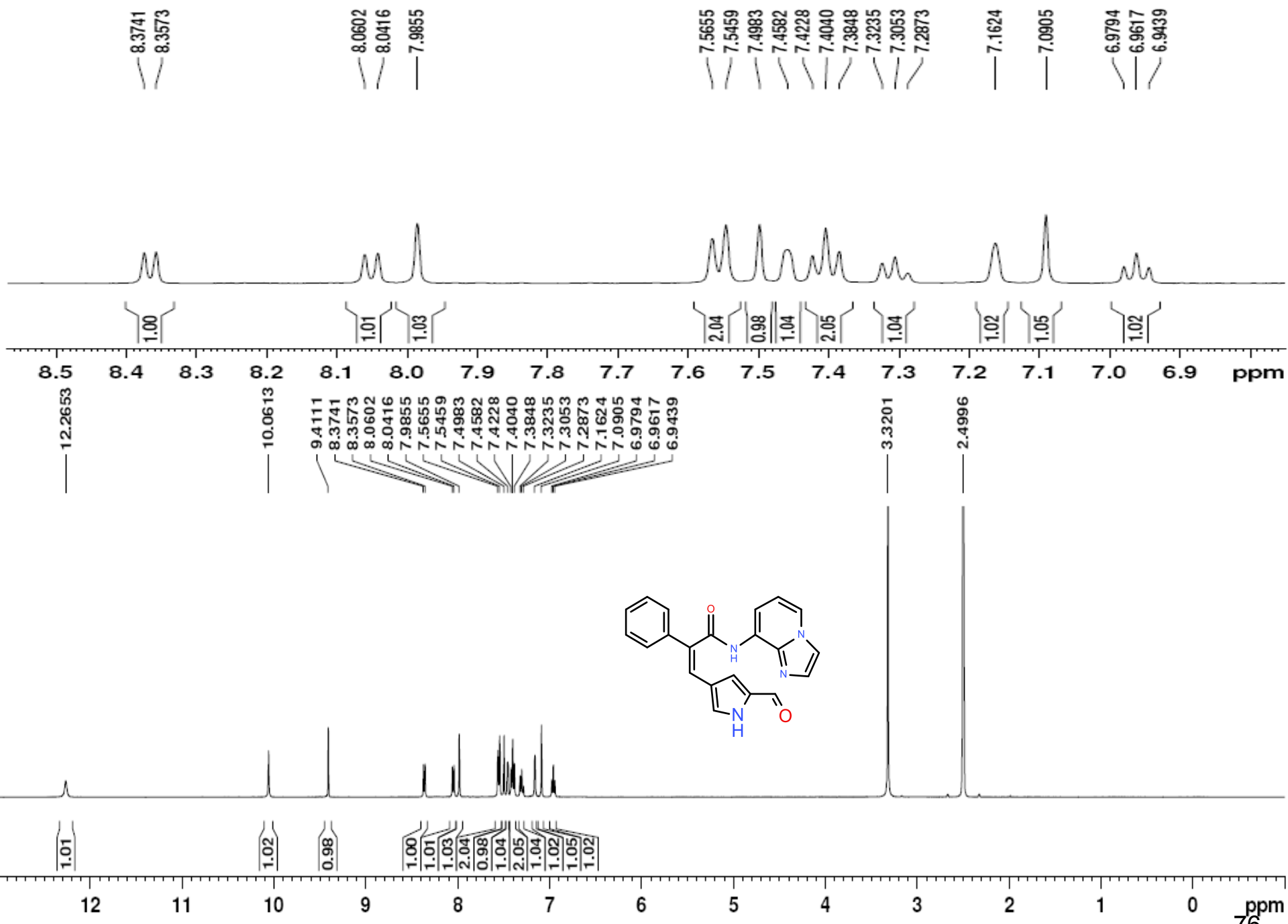
^{13}C NMR of **3q**


8.7518
8.4318
8.4215
8.3676
8.3663
8.3506
7.9738
7.9511
7.6721
7.6537
7.4959
7.4788
7.4687
7.4507
7.4314
7.4198
7.4162
7.3979
7.3799
7.3693
7.3581
7.3496
7.3377
7.2210
6.9507
6.9330
6.9152
1.00
0.95
1.08
3.13
2.06
3.16
2.03
1.10
1.06
9.0
8.5
8.0
7.5
7.0
6.5
ppm
10.5190
3.3838
2.5086
2.5044
2.5002
2.4959
0.98
12
11
10
9
8
7
6
5
4
3
2
1
0

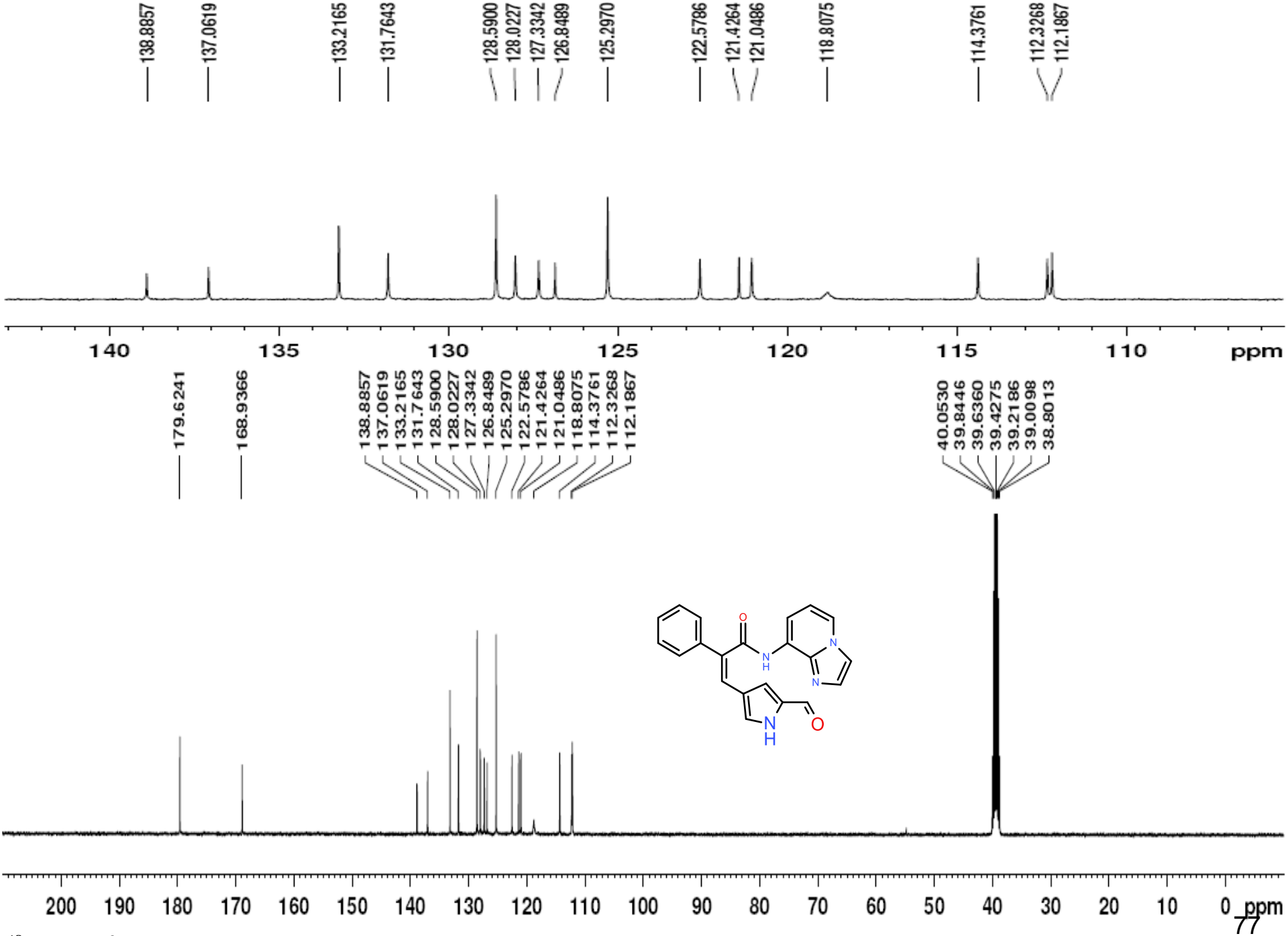
[1]H NMR of **3r**


149.5128
148.5608
139.2316
138.9372
136.7293
134.7590
131.7918
131.5215
128.6685
128.3663
126.5562
126.0957
124.5044
123.4586
122.8438
114.3450
113.0693
112.0584
150
145
140
135
130
125
120
115
ppm
168.2258
149.5128
148.5608
139.2316
138.9372
136.7293
134.7590
131.7918
131.5215
128.6685
128.3663
126.5562
126.0957
124.5044
123.4586
122.8438
114.3450
113.0693
112.0584
40.0872
39.8790
39.6703
39.4615
39.2531
39.0443
38.8360
O
N
H
N
N
N
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

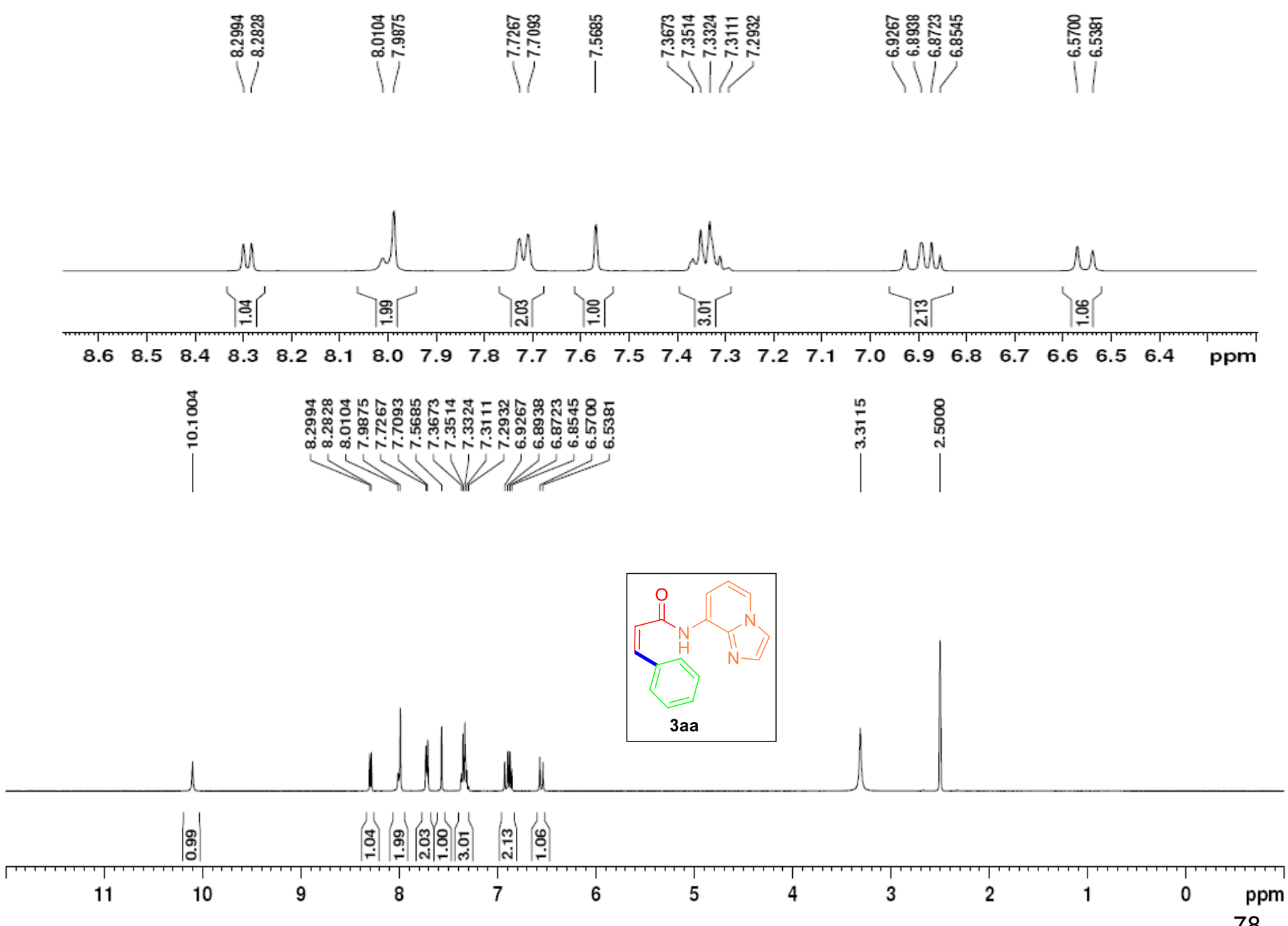
^{13}C NMR of **3r**


8.3741
8.3573
8.0602
8.0416
7.9855
7.5655
7.5459
7.4983
7.4582
7.4228
7.4040
7.3848
7.3235
7.3053
7.2873
7.1624
7.0905
6.9794
6.9617
6.9439
1.00
1.01
1.03
2.04
0.98
1.04
2.05
1.04
1.02
1.05
1.02
8.5
8.4
8.3
8.2
8.1
8.0
7.9
7.8
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7.0
6.9
ppm
12.2653
10.0613
9.4111
3.3201
2.4996
O
N
H
N
N
H
O
1.01
1.02
0.98
1.00
1.01
1.03
2.04
0.98
1.04
2.05
1.04
1.02
1.05
1.02
12
11
10
9
8
7
6
5
4
3
2
1
0
ppm

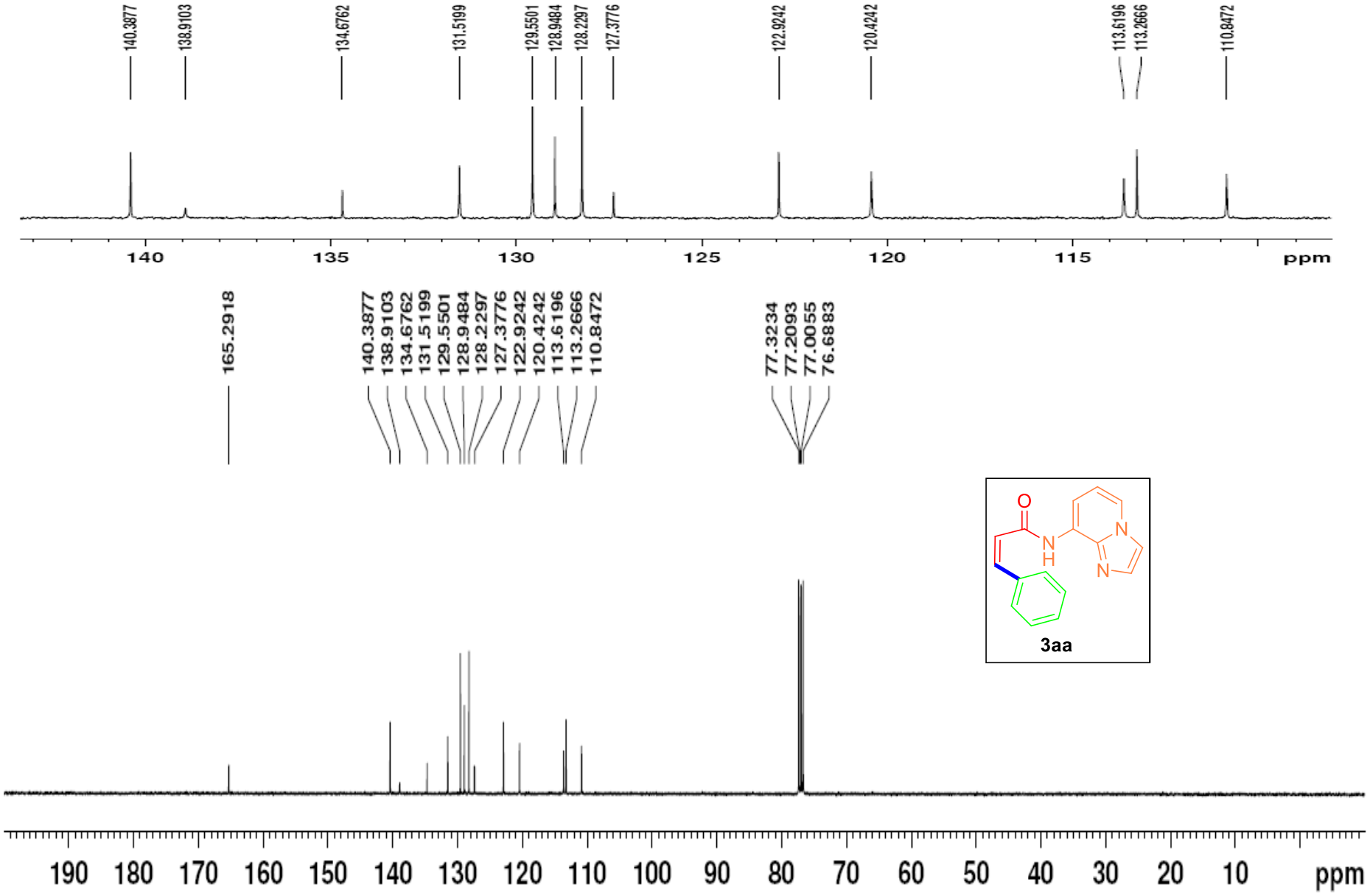
[1]H NMR of **3s**


138.8857
137.0619
133.2165
131.7643
128.5900
128.0227
127.3342
126.8489
125.2970
122.5786
121.4264
121.0486
118.8075
114.3761
112.3268
112.1867
140
135
130
125
120
115
110
ppm
179.6241
168.9366
138.8857
137.0619
133.2165
131.7643
128.5900
128.0227
127.3342
126.8489
125.2970
122.5786
121.4264
121.0486
118.8075
114.3761
112.3268
112.1867
40.0530
39.8446
39.6360
39.4275
39.2186
39.0098
38.8013
O
N
H
N
N
N
H
O
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0 ppm

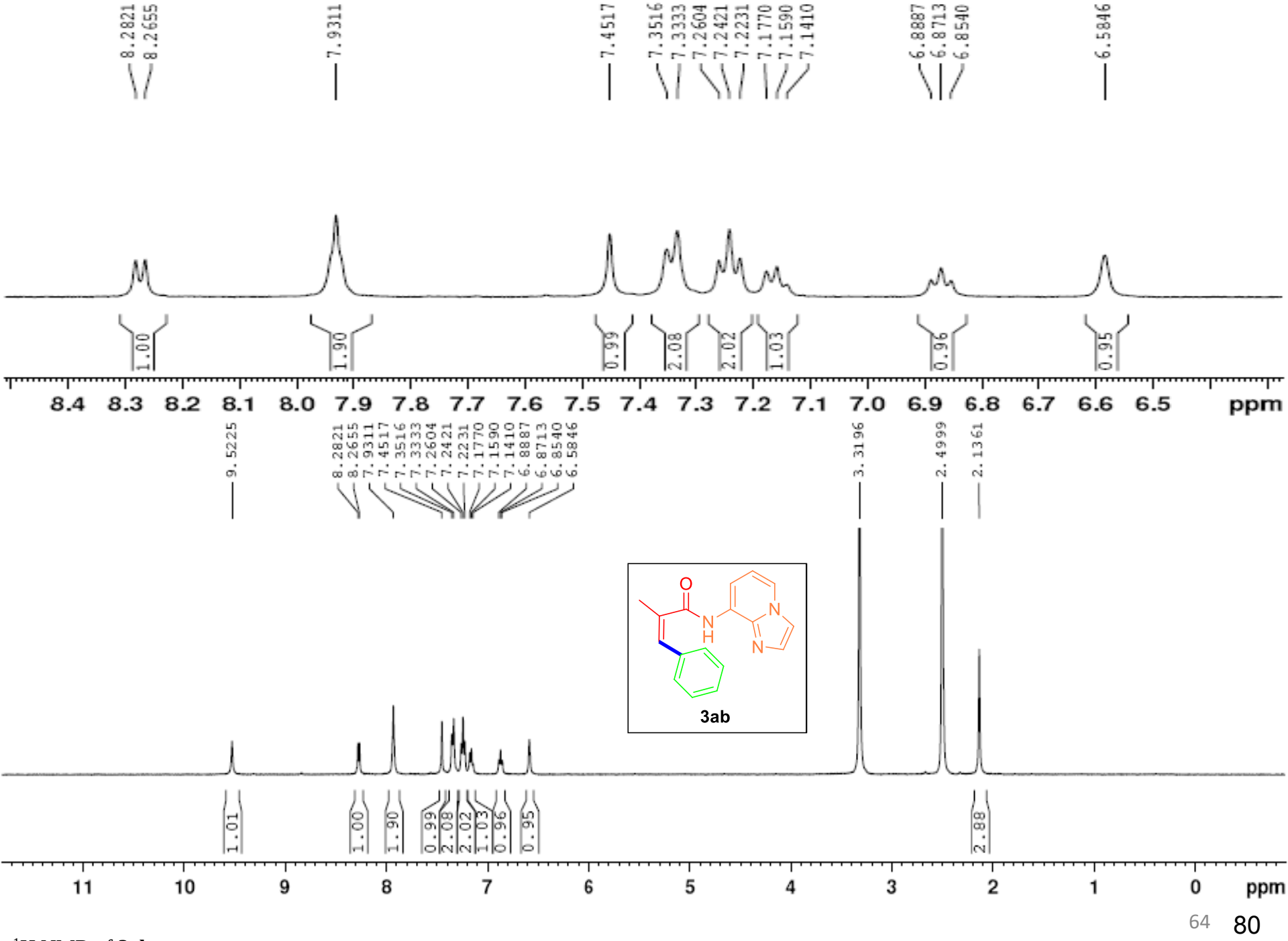
^{13}C NMR of **3s**


8.2994
8.2828
8.0104
7.9875
7.7267
7.7093
7.5685
7.3673
7.3514
7.3324
7.3111
7.2932
6.9267
6.8938
6.8723
6.8545
6.5700
6.5381
1.04
1.99
2.03
1.00
3.01
2.13
1.06
ppm
10.1004
3.3115
2.5000
0.99
O
N
H
N
N
3aa

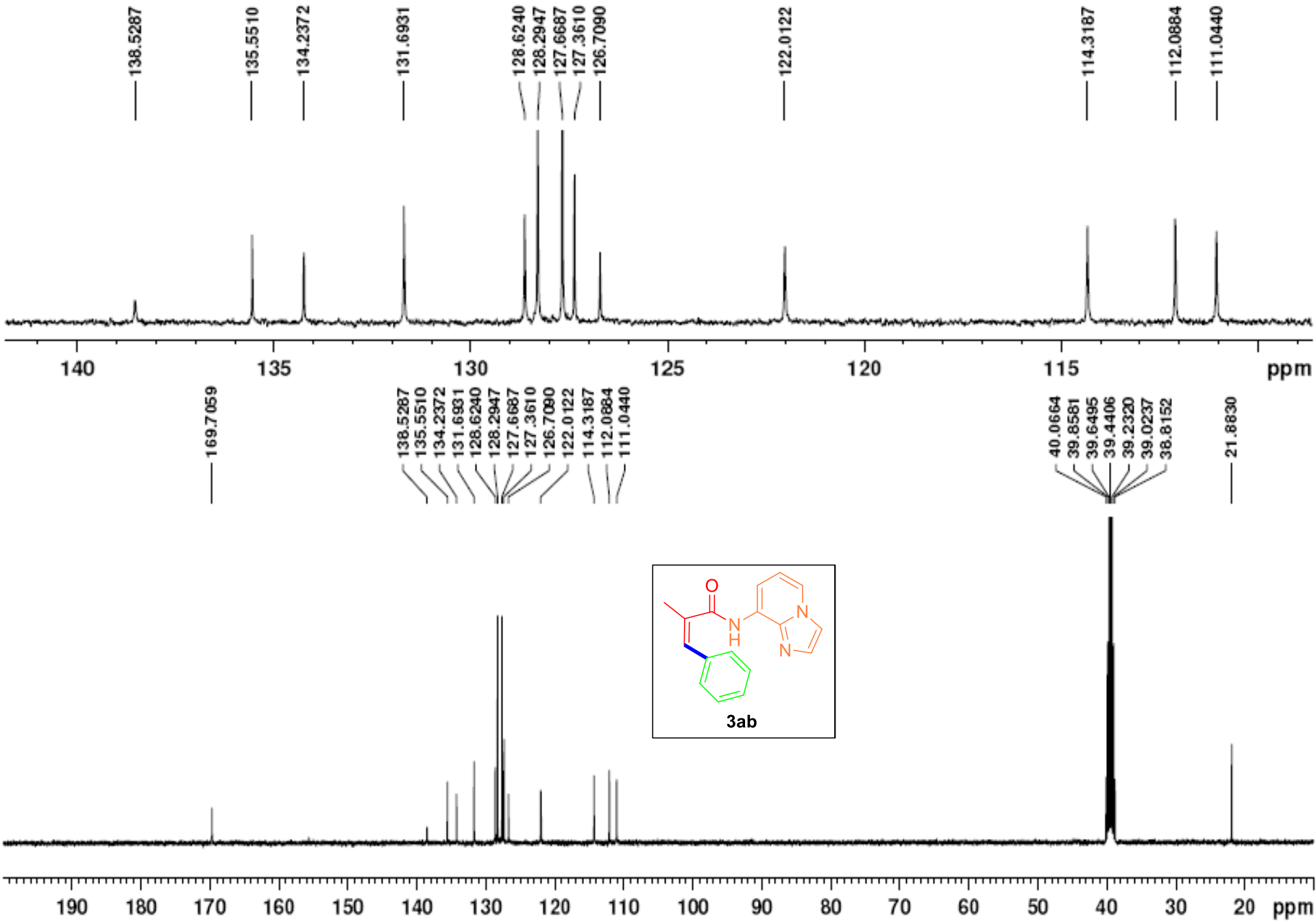
^{1}H NMR of **3aa**



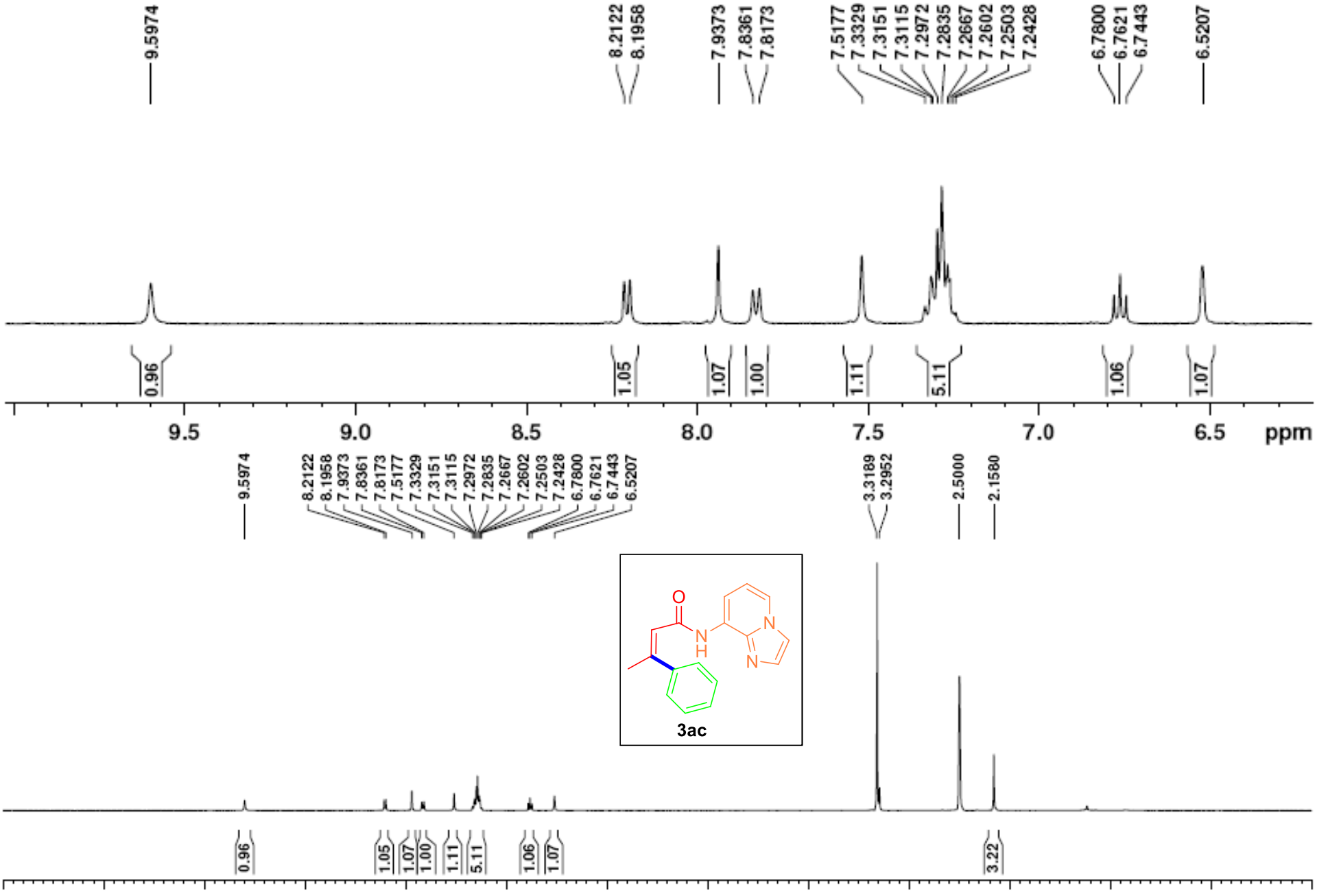
^{13}C NMR of **3aa**


8.2821
8.2655
7.9311
7.4517
7.3516
7.3333
7.2604
7.2421
7.2231
7.1770
7.1590
7.1410
6.8887
6.8713
6.8540
6.5846
1.00
1.90
0.99
2.08
2.02
1.03
0.96
0.95
8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 6.7 6.6 6.5 ppm
9.5225
8.2821
8.2655
7.9311
7.4517
7.3516
7.3333
7.2604
7.2421
7.2231
7.1770
7.1590
7.1410
6.8887
6.8713
6.8540
6.5846
3.3196
2.4999
2.1361
O
N
H
N
N
3ab
1.01
1.00
1.90
0.99
2.08
2.02
1.03
0.96
0.95
2.88
11 10 9 8 7 6 5 4 3 2 1 0 ppm

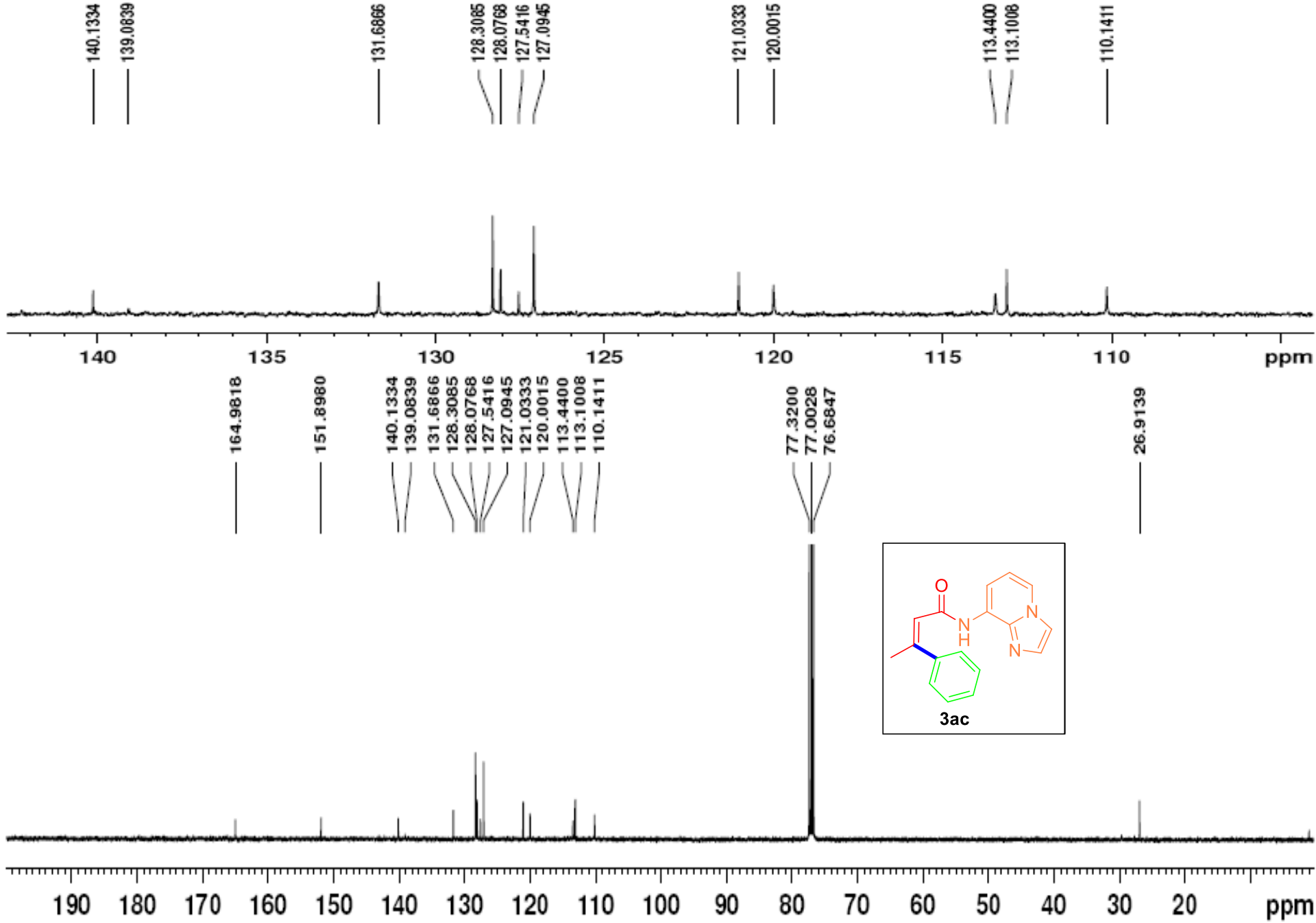
^{1}H NMR of **3ab**



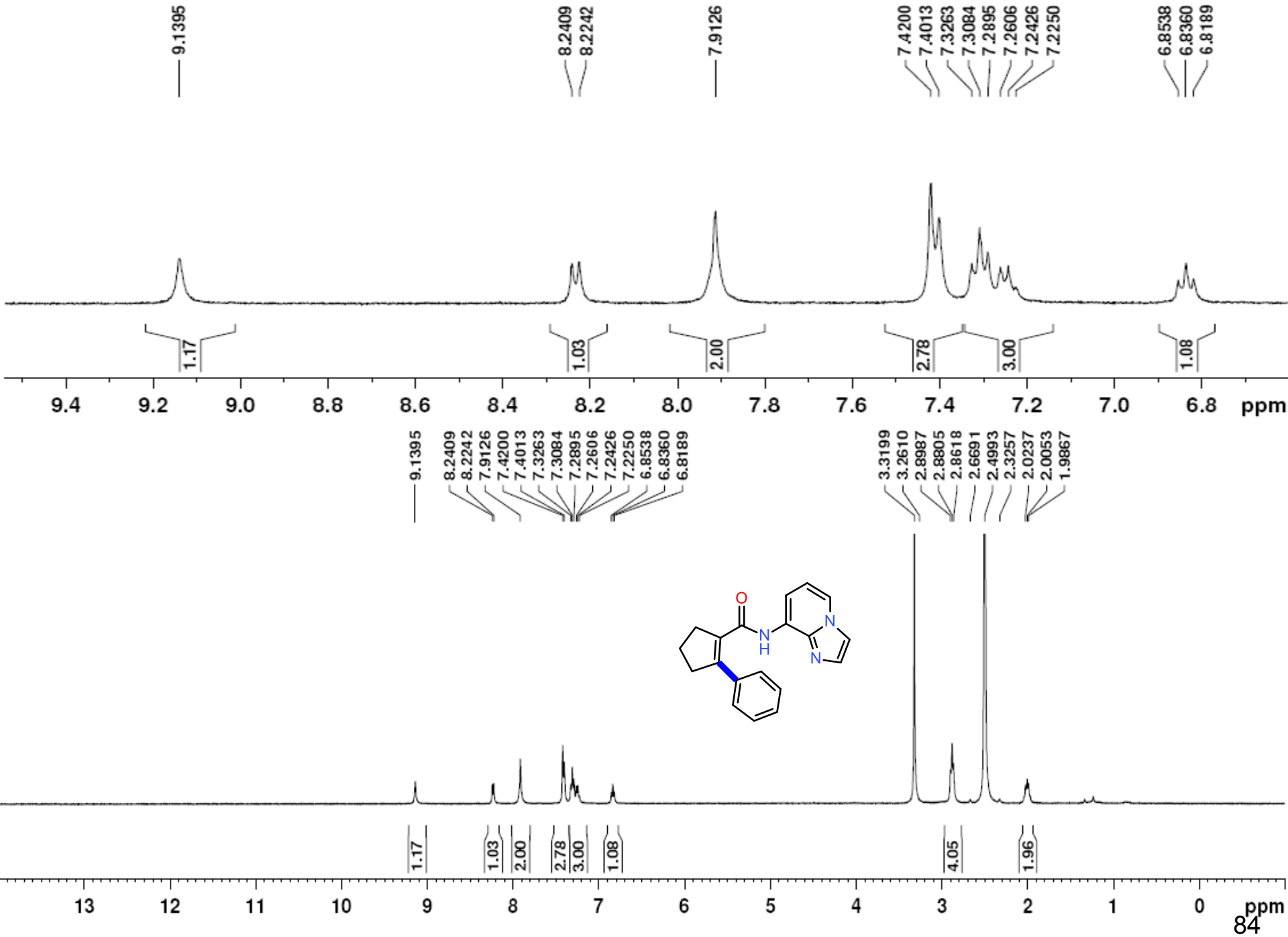
^{13}C NMR of **3ab**

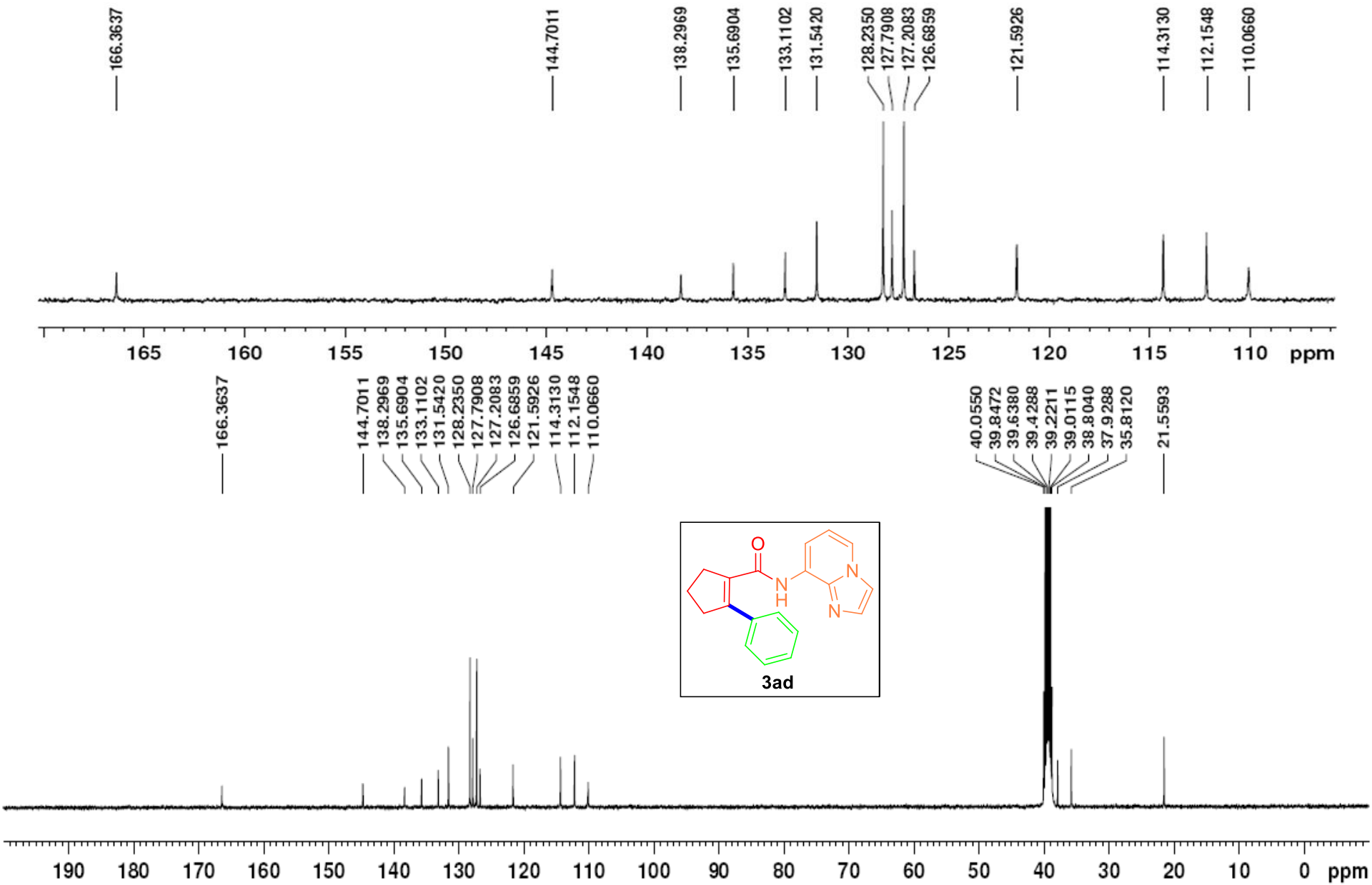

9.5974
8.2122
8.1958
7.9373
7.8361
7.8173
7.5177
7.3329
7.3151
7.3115
7.2972
7.2835
7.2667
7.2602
7.2503
7.2428
6.7800
6.7621
6.7443
6.5207
0.96
1.05
1.07
1.00
1.11
5.11
1.06
1.07
9.5
9.0
8.5
8.0
7.5
7.0
6.5
ppm
3.3189
3.2952
2.5000
2.1580
3.22
11
10
9
8
7
6
5
4
3
2
1
0
O
N
H
N
N
3ac

^{1}H NMR of **3ac**

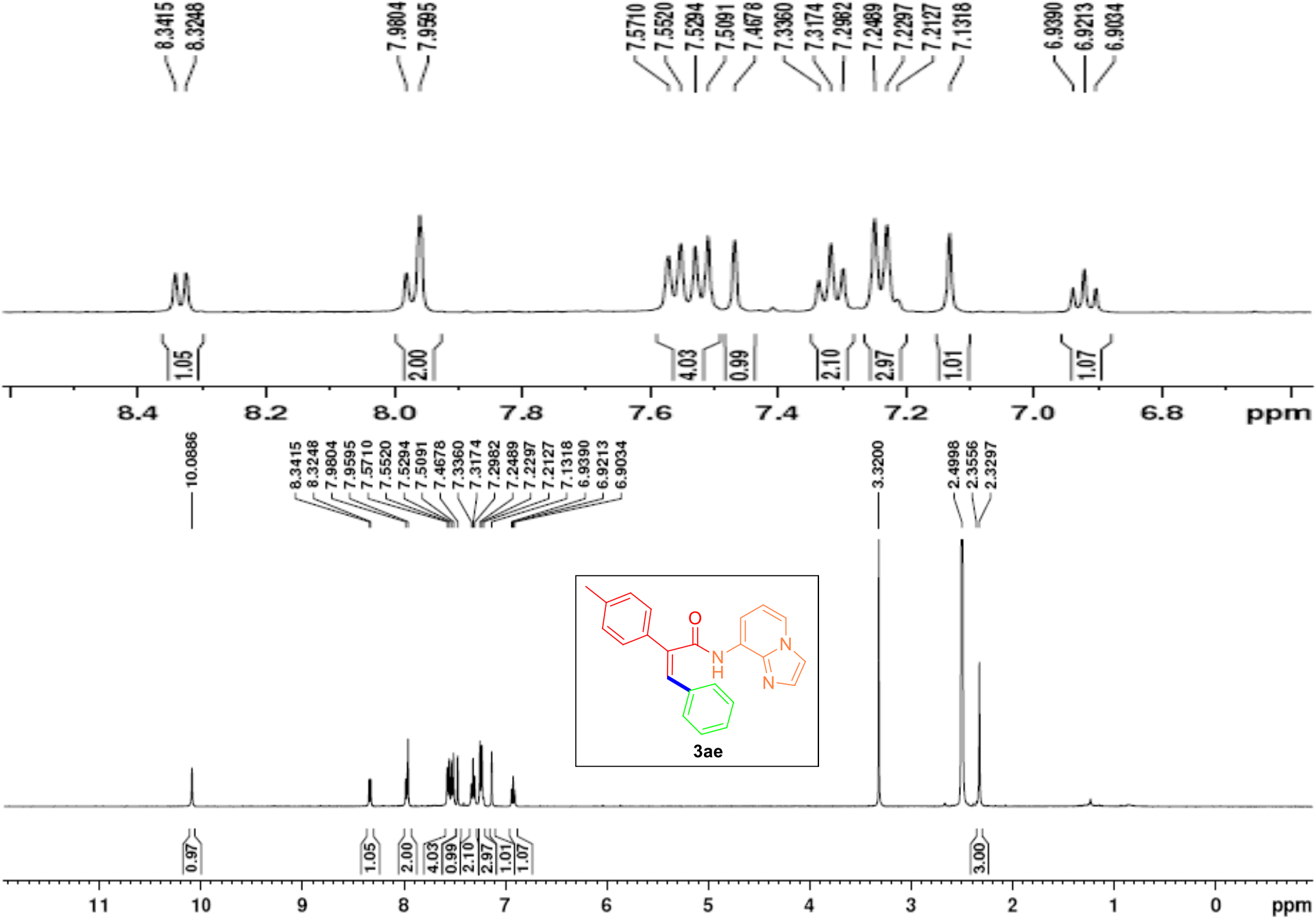


^{13}C NMR of **3ac**

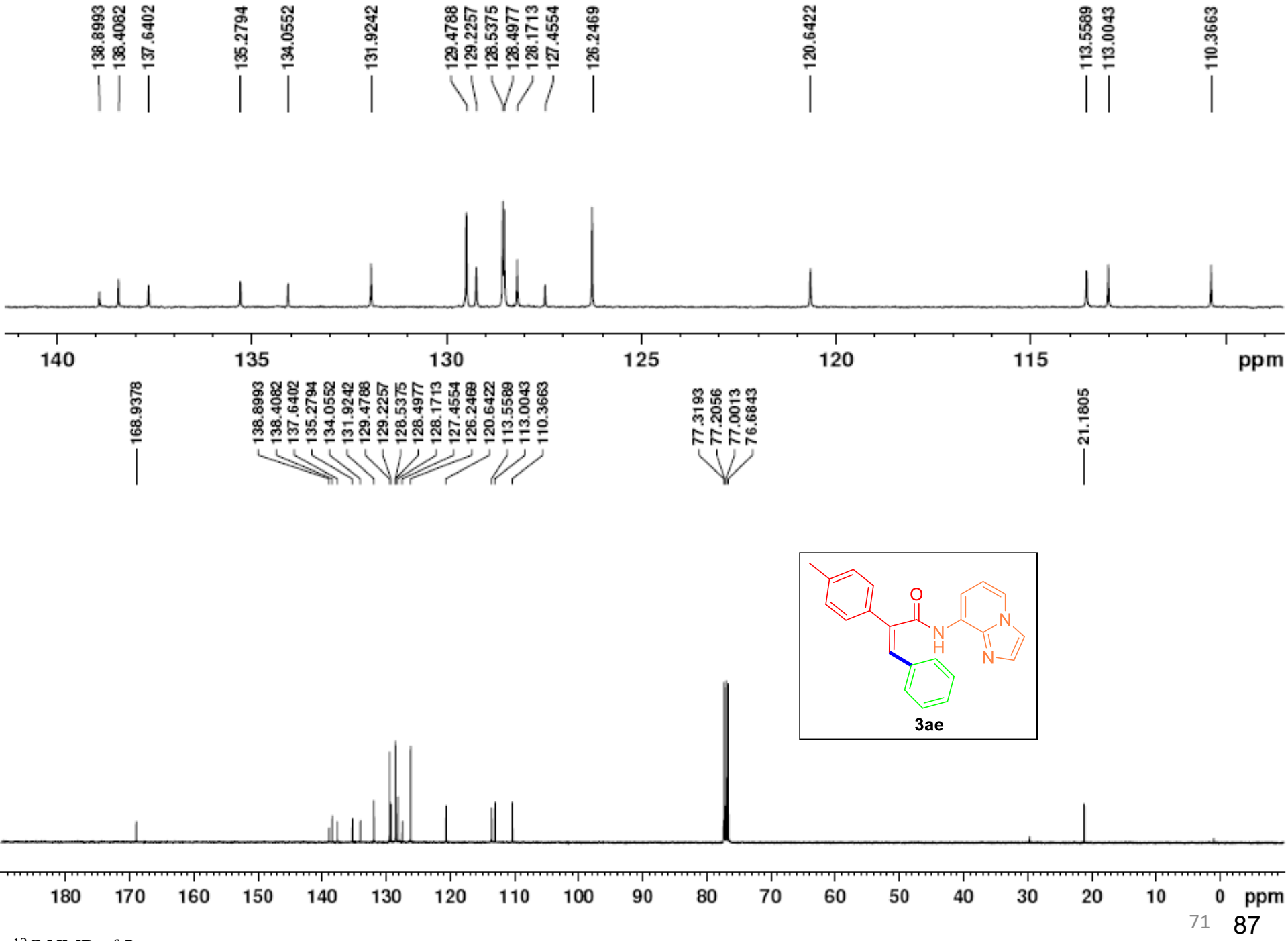

9.1395
8.2409
8.2242
7.9126
7.4200
7.4013
7.3263
7.3084
7.2895
7.2606
7.2426
7.2250
6.8538
6.8360
6.8189
1.17
1.03
2.00
2.78
3.00
1.08
9.4
9.2
9.0
8.8
8.6
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
ppm
3.3199
3.2610
2.8987
2.8805
2.8618
2.6691
2.4993
2.3257
2.0237
2.0053
1.9867
O
N
H
N
N
4.05
1.96
13
12
11
10
9
8
7
6
5
4
3
2
1
0
ppm



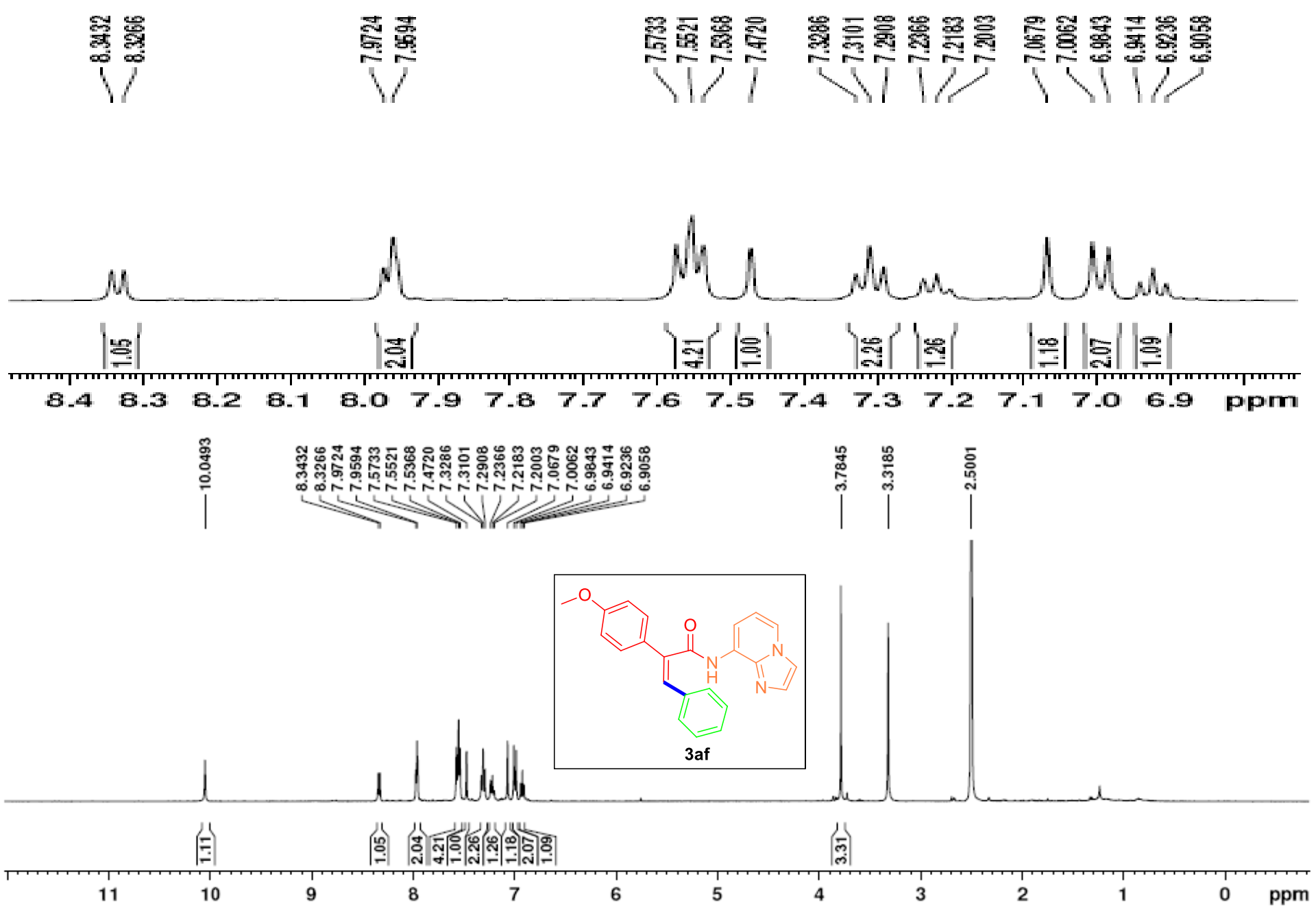
^{13}C NMR of **3ad**


8.3415
8.3248
7.9804
7.9595
7.5710
7.5520
7.5294
7.5091
7.4678
7.3360
7.3174
7.2982
7.2489
7.2297
7.2127
7.1318
6.9390
6.9213
6.9034
1.05
2.00
4.03
0.99
2.10
2.97
1.01
1.07
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
ppm
10.0886
3.3200
2.4998
2.3556
2.3297
0.97
3.00
11
10
9
8
7
6
5
4
3
2
1
0
ppm
O
N
H
N
N
3ae

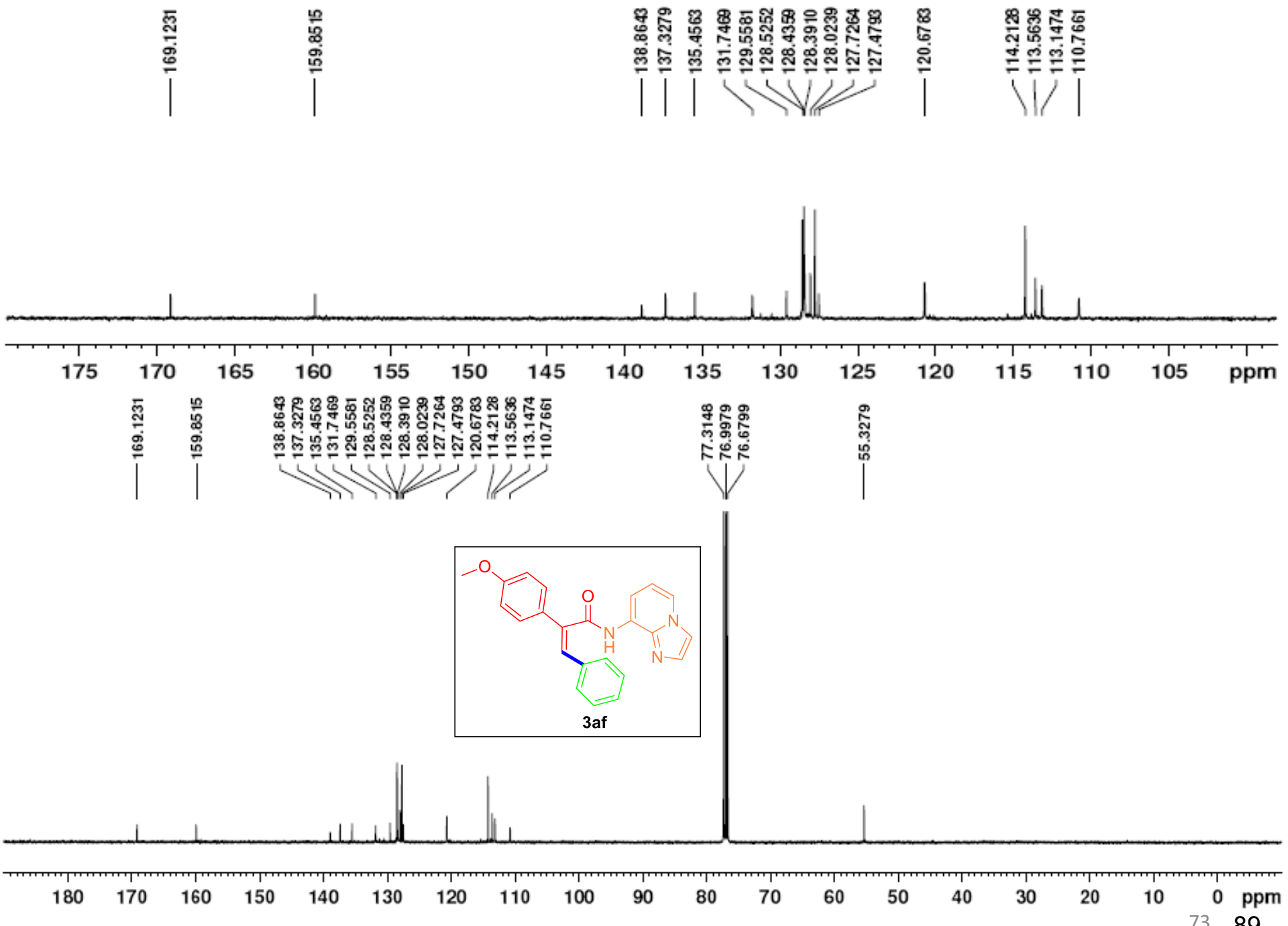
[1]H NMR of **3ae**



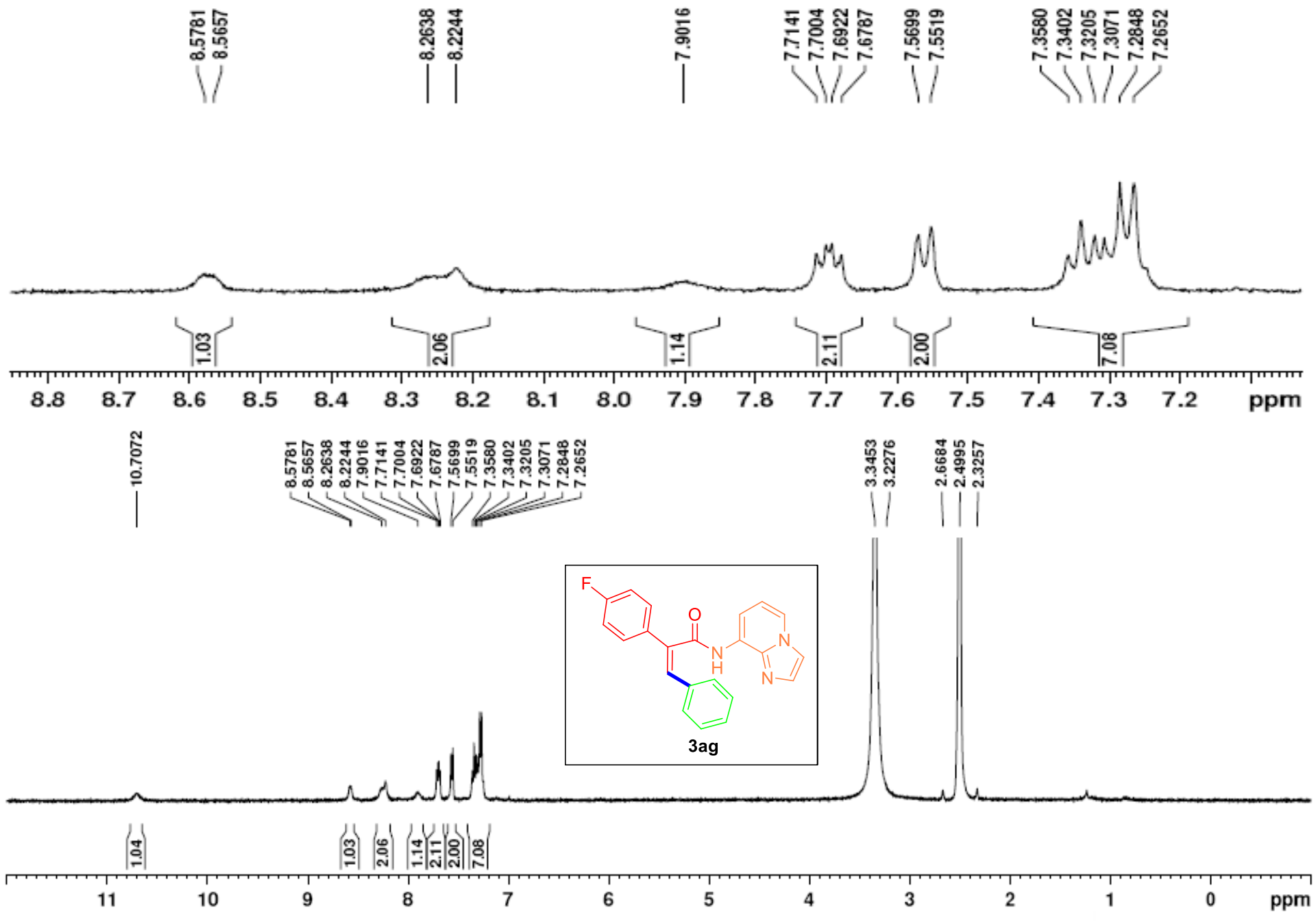
^{13}C NMR of **3ae**


8.3432
8.3266
7.9724
7.9594
7.5733
7.5521
7.5368
7.4720
7.3286
7.3101
7.2908
7.2366
7.2183
7.2003
7.0679
7.0062
6.9843
6.9414
6.9236
6.9058
1.05
2.04
4.21
1.00
2.26
1.26
1.18
2.07
1.09
8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 ppm
10.0493
3.7845
3.3185
2.5001
1.11
3.31
11 10 9 8 7 6 5 4 3 2 1 0 ppm
O
N
H
N
N
3af

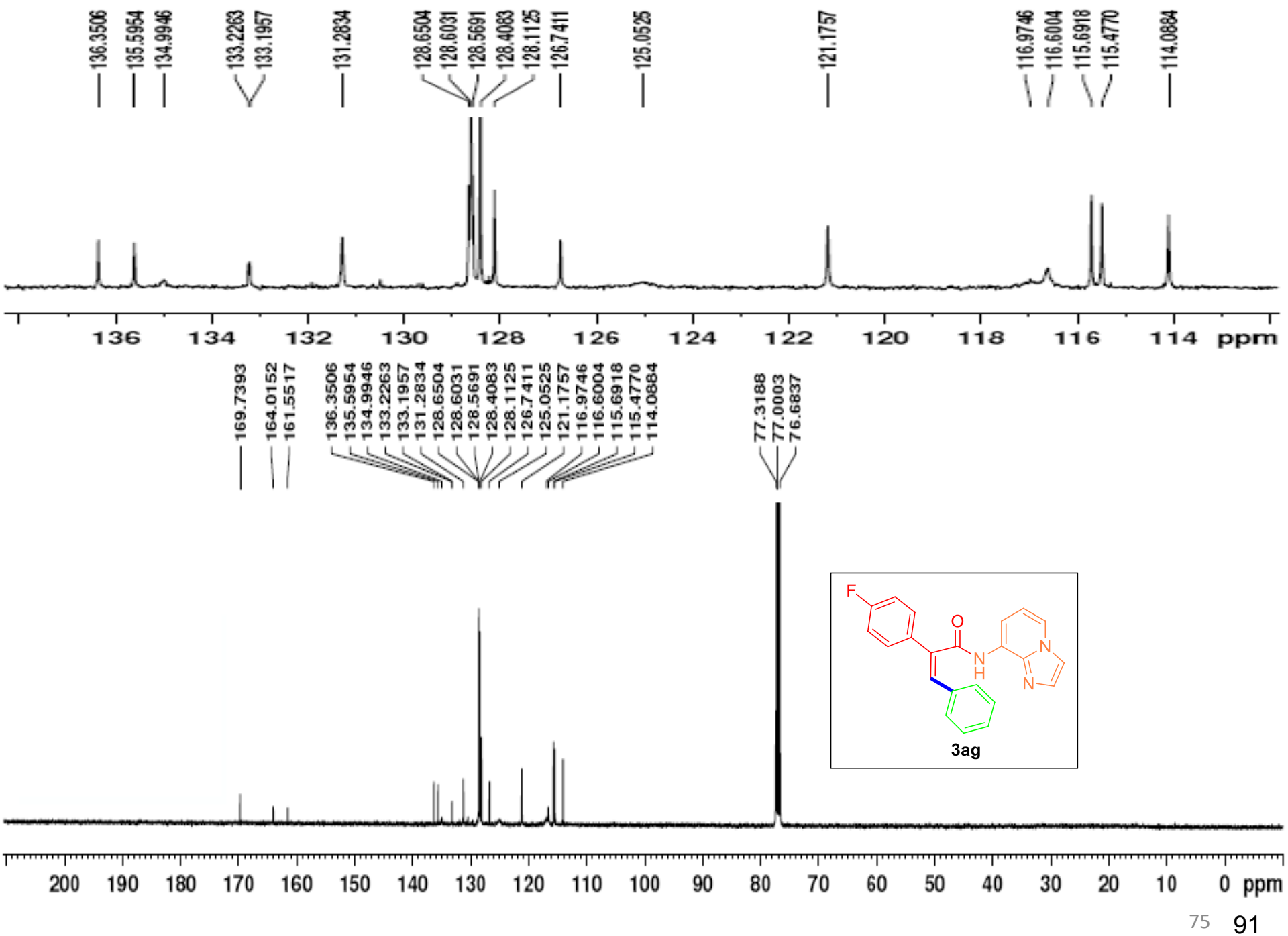
^{1}H NMR of **3af**



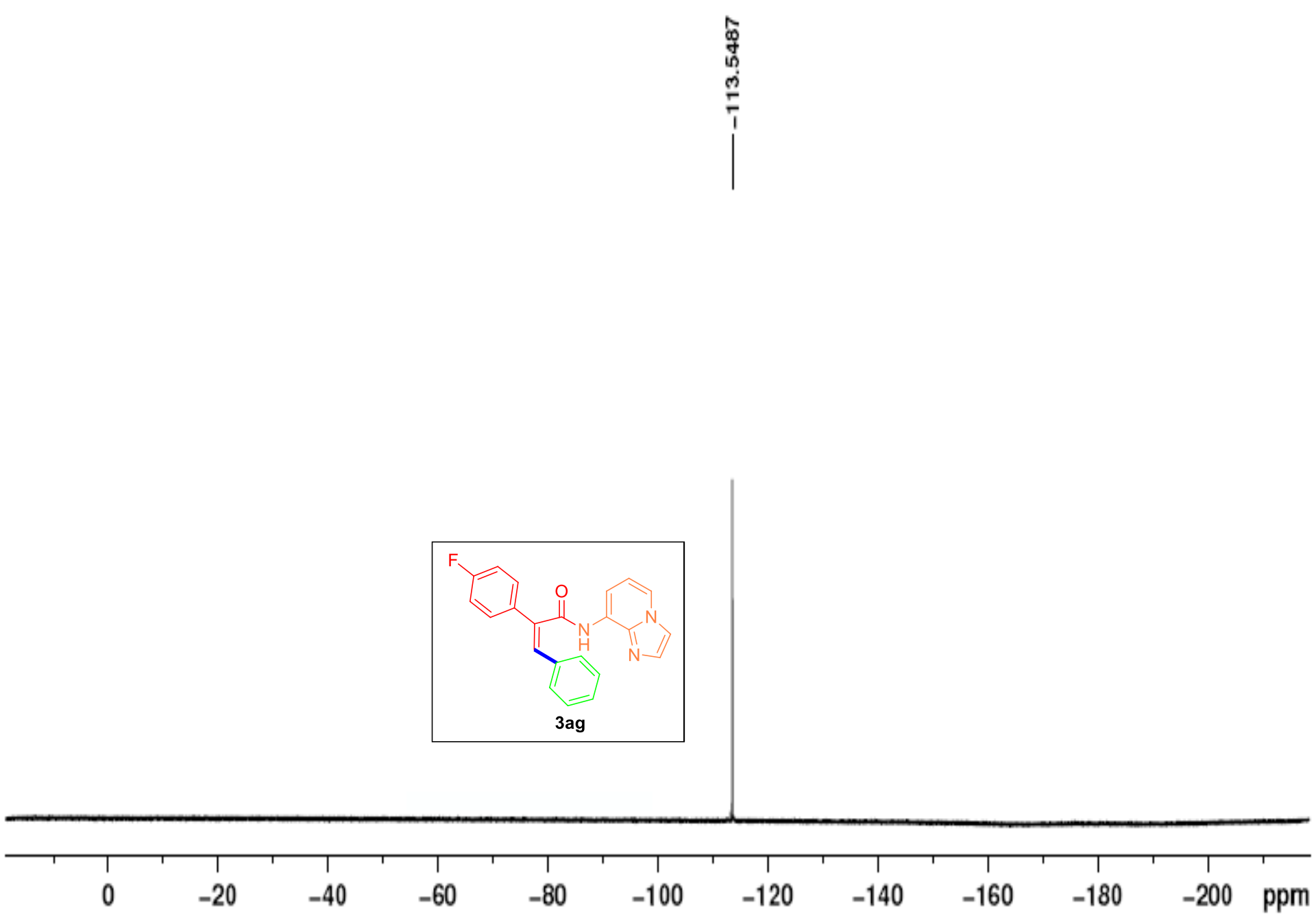
^{13}C NMR of **3af**


8.5781
8.5657
8.2638
8.2244
7.9016
7.7141
7.7004
7.6922
7.6787
7.5699
7.5519
7.3580
7.3402
7.3205
7.3071
7.2848
7.2652
1.03
2.06
1.14
2.11
2.00
7.08
ppm
10.7072
3.3453
3.2276
2.6684
2.4995
2.3257
F
O
N
H
N
N
3ag

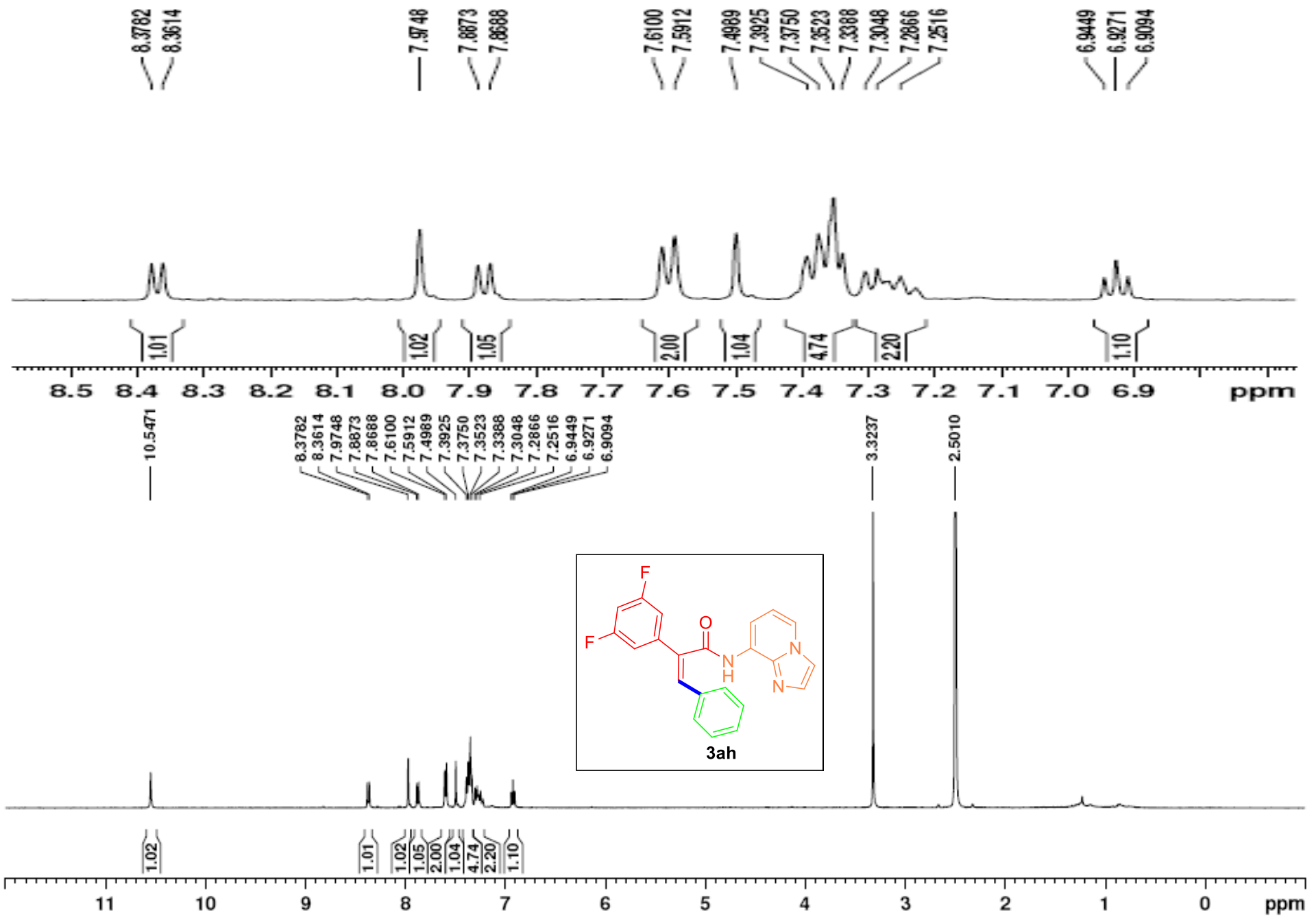
[1]H NMR of **3ag**



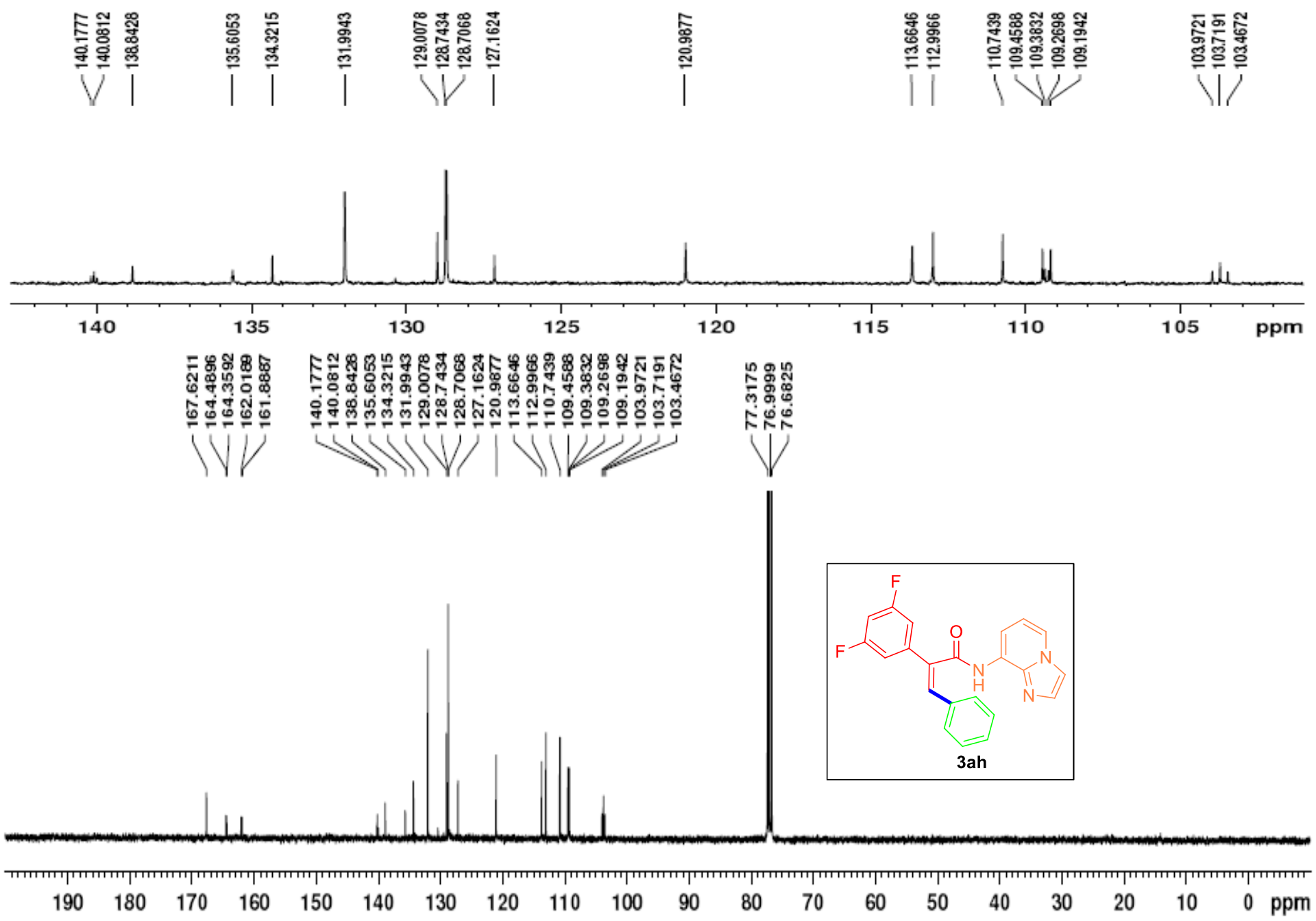
^{13}C NMR of **3aa**



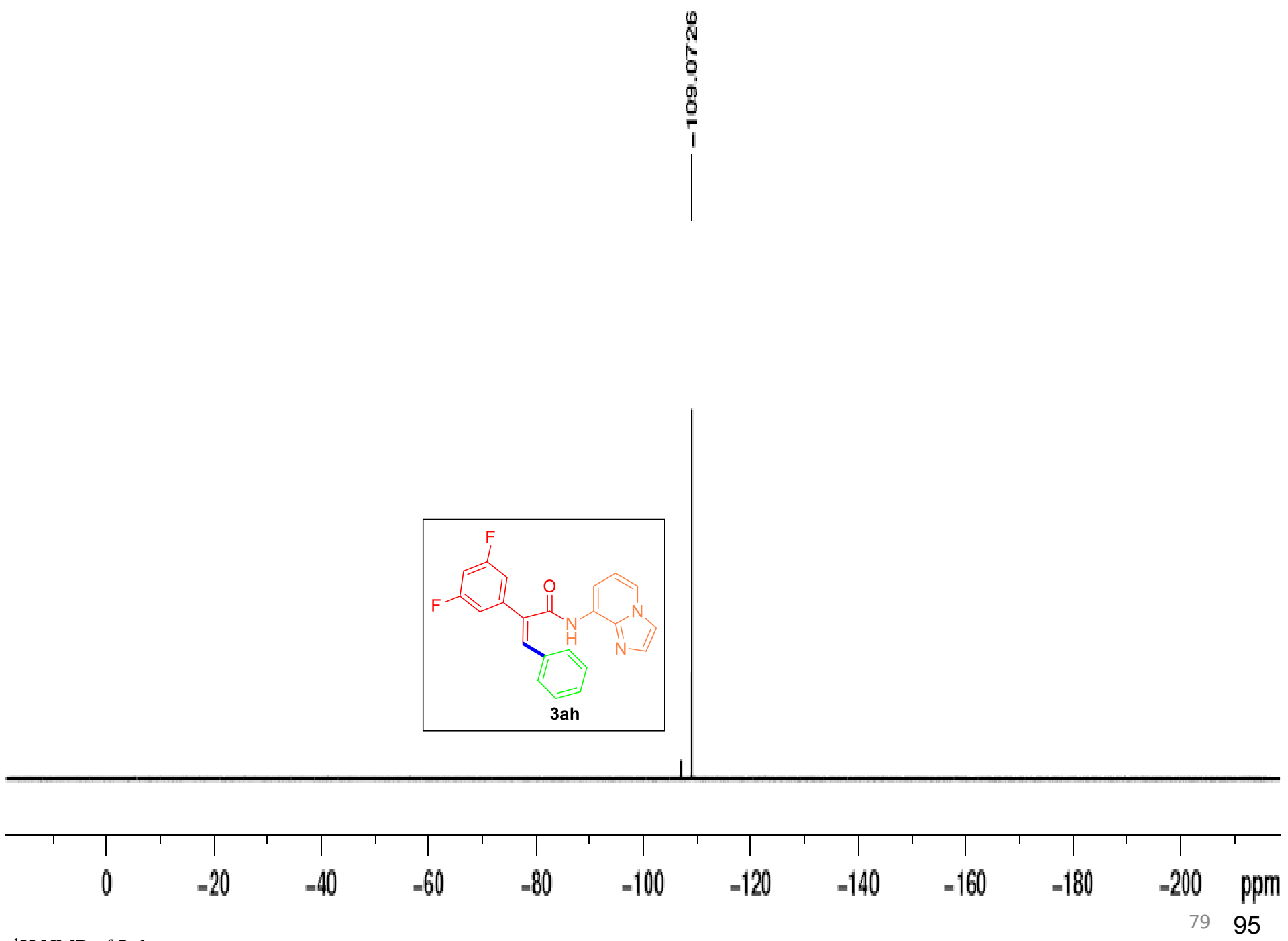
^{19}F NMR of **3ag**


8.3782
8.3614
7.9748
7.8873
7.8688
7.6100
7.5912
7.4989
7.3925
7.3750
7.3523
7.3388
7.3048
7.2866
7.2516
6.9449
6.9271
6.9094
1.01
1.02
1.05
2.00
1.04
4.74
2.20
1.10
ppm
10.5471
3.3237
2.5010
F
F
O
N
H
N
N
3ah

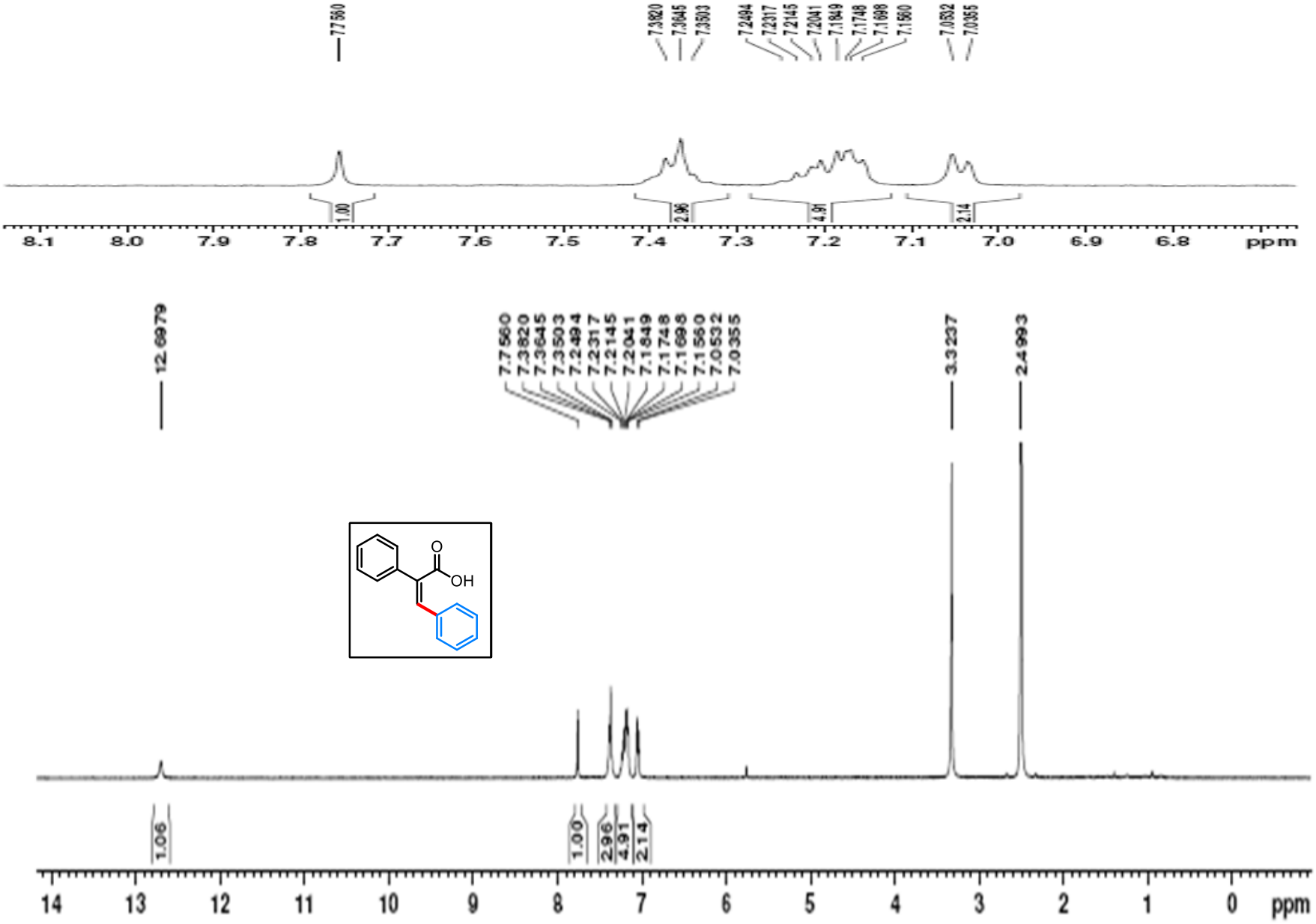
^{1}H NMR of **3ah**



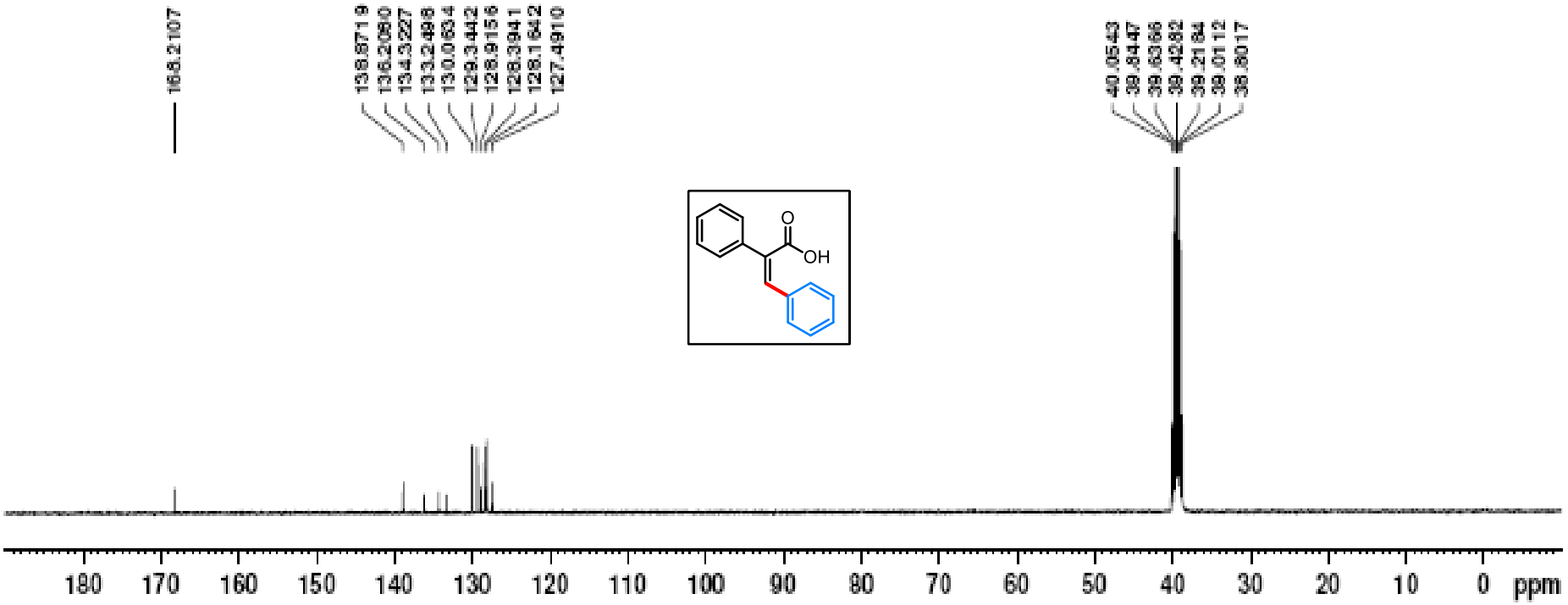
^{13}C NMR of **3ah**



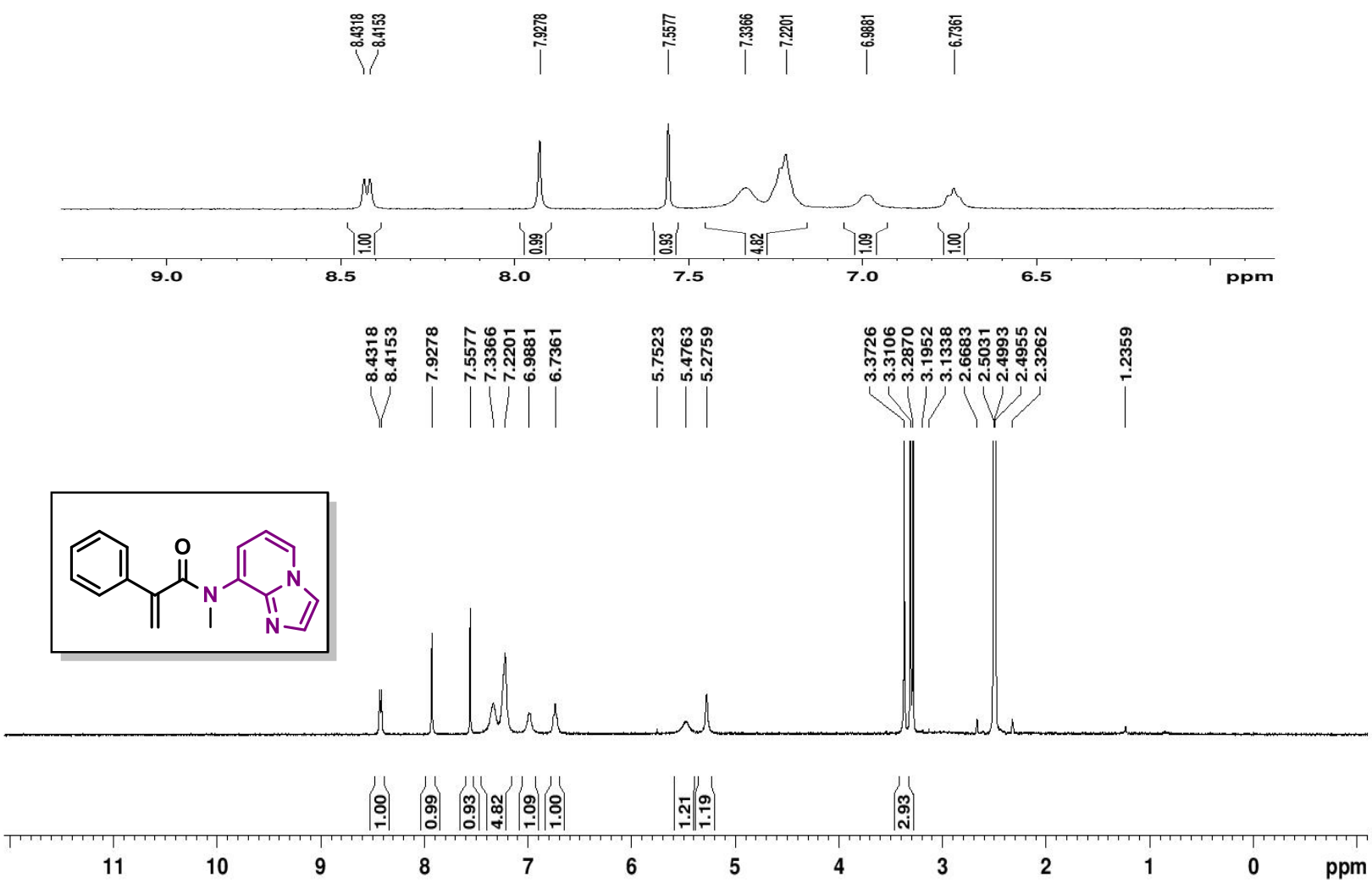
^{1}H NMR of **3ah**



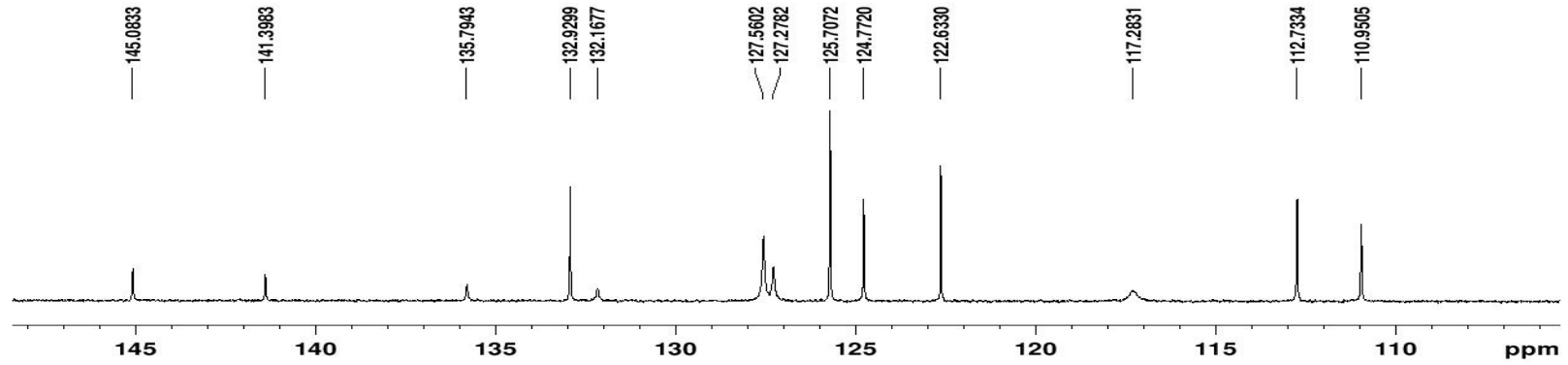
[1]H NMR of 2,3-diphenyl acrylic acid

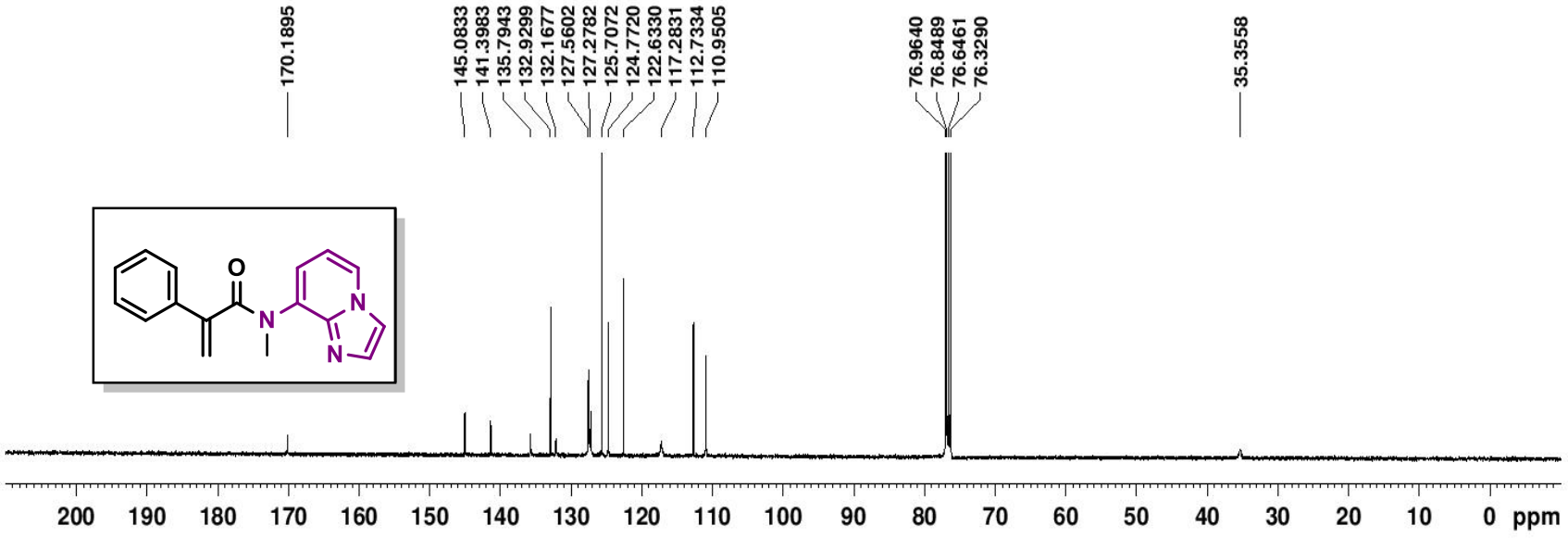


^{13}C NMR of 2,3-diphenyl acrylic acid


8.4318
8.4153
7.9278
7.5577
7.3366
7.2201
6.9881
6.7361
1.00
0.99
0.93
4.82
1.09
1.00
9.0
8.5
8.0
7.5
7.0
6.5
ppm
5.7523
5.4763
5.2759
3.3726
3.3106
3.2870
3.1952
3.1338
2.6683
2.5031
2.4993
2.4955
2.3262
1.2359
1.21
1.19
2.93
11
10
9
8
7
6
5
4
3
2
1
0

^{1}H NMR of **6**


145.0833
141.3983
135.7943
132.9299
132.1677
127.5602
127.2782
125.7072
124.7720
122.6330
117.2831
112.7334
110.9505
145
140
135
130
125
120
115
110
ppm


170.1895
145.0833
141.3983
135.7943
132.9299
132.1677
127.5602
127.2782
125.7072
124.7720
122.6330
117.2831
112.7334
110.9505
76.9640
76.8489
76.6461
76.3290
35.3558
O
N
N
N
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

^{1}H NMR of **6**