Supporting Information

Palladium Catalyzed unactivated β-methylene C(sp3)-H Bond Alkenylation of Aliphatic Amides

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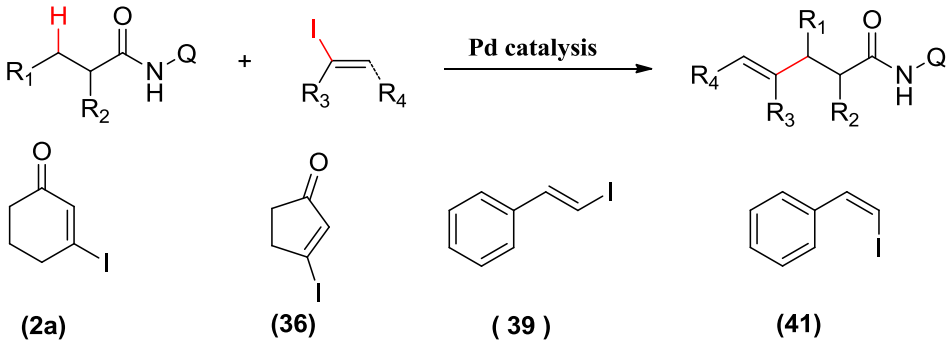
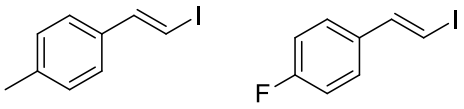
Materials and Methods

All commercial materials (Alfa Aesar, Aladdin, J&K Chemical LTD.) were used without further purification. All solvents were analytical grade. The ^{1}H-NMR and ^{13}C-NMR spectra were recorded on a Bruker 400 MHz spectrometer in $CDCl_3$ using TMS or solvent peak as a standard. All ^{13}C-NMR spectra were recorded with complete proton decoupling. Low-resolution mass spectral analyses were performed with a Waters AQUITY UPLC^{TM}/MS. All reactions were carried out in oven-dried sealed tube. Analytical TLC was performed on Yantai Chemical Industry Research Institute silica gel 60 F254 plates and flash column chromatography was performed on Qingdao Haiyang Chemical Co. Ltd silica gel 60 (200-300 mesh). The rotavapor was BUCHI's Rotavapor R-3. Amides were easily synthesized from acyl chlorides and 8-aminoquinoline.

I General procedure for Pd-catalyzed C-H alkenylation reactions

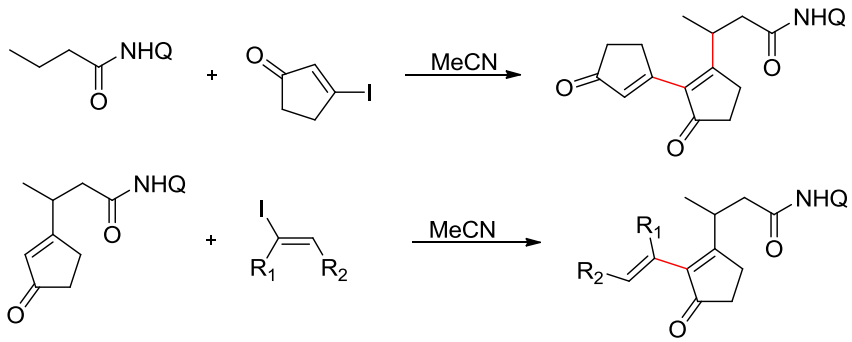


(2a) (36) (39) (41)



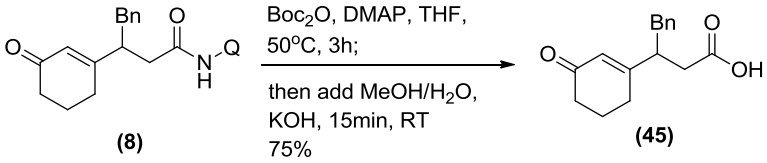
(46) (47)

To a 15ml sealed-tube were added amide (1.0 equiv), Ag_2CO_3 (1.0 equiv), $Pd(OAc)_2$ (0.01 equiv), and PhMe (2 ml). The tube was sealed and heated at 110^{o}C for 5-12 h. The reaction was monitored by TLC (Petroleum ether: Ethyl acetate = 4:1) and LC-MS. The reaction mixture was cooled to RT, dichloromethane was added to dilute the reaction mixture and saturated aqueous $NaHCO_3$ was added to wash the reaction mixture. Then the organic layer was dried over anhydrous Na_2SO_4 and concentrated on rotavapor under reduced pressure. Finally, the residue was purified by silica gel column chromatography to give the desired product.



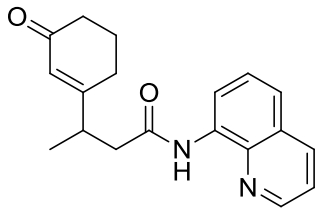
For sequential C(sp3)-H bond alkenylation and C(sp2)-H bond alkenylation, MeCN was used as solvent.

II General procedure for deprotection



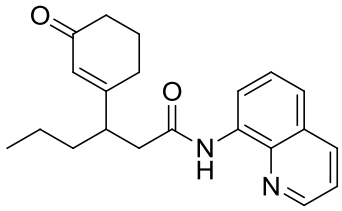
Compound **(8)** (150 mg, 0.39 mmol, 1 eq), Boc_2O (900 mg, 3.90 mmol, 10 eq), DMAP (95 mg, 0.78 mmol, 2 eq) were mixed with 3 mL of THF. The resulting mixture was heated at 50 ℃ for 3h. Then, KOH (224 mg, 4.00mmol, 10eq) in 3ml H_2O and 3ml MeOH was added to the reaction mixture at rt, stirred for 15min. The reaction mixture was neutralized with HCl, extract with EtOAc, dried over anhydrous Na_2SO_4 , concentrated on rotavapor under reduced pressure and purified by silica gel column chromatography to give the corresponding acid **(45)** (75 mg) in 75% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.92 (brs, 1H), 7.28-7.11 (m, 5H), 5.87 (s, 1H), 3.01-2.99 (m, 1H), 2.76-1.87 (m, 10H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 200.3, 176.8, 167.5, 138.4, 129.1, 128.7, 126.8, 126.4, 45.2, 40.2, 37.5, 28.7, 22.6; HRMS (ESI) calcd for $C_{16}H_{17}O_3$ $[M-H]^-$: 257.13, found 257.10

Data of products



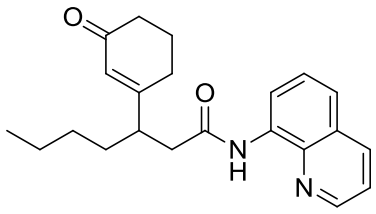
3-(3-Oxocyclohex-1-en-1-yl)-N-(quinolin-8-yl)butanamide **(3)**

Following the general procedure **I**, amide (42.8 mg, 0.2 mmol), vinyl iodide **(2a)** (66.6 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110°C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(3)** (50mg) were isolated in 82% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.80 (s, 1H), 8.78-8.77 (m, 1H), 8.73-8.71 (m, 1H), 8.16-8.13 (m, 1H), 7.54-7.43 (m, 3H), 5.99 (s, 1H), 3.05-2.96 (m, 1H), 2.77 (dd, *J* = 6.92 Hz, *J* = 14.76 Hz, 1H),2.59 (dd, *J* = 7.56 Hz, *J* = 14.76 Hz, 1H),2.43-2.40 (m, 2H), 2.37-2.33 (m, 2H), 2.02-1.95 (m, 2H),1.24 (d, *J* = 6.88 Hz, 3H);^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 200.0, 169.5, 169.2, 148.3, 138.4, 136.5, 134.3, 128.0, 127.4, 125.0, 121.8, 116.6, 43.4, 38.2, 37.6, 28.4, 23.0, 19.1; HRMS (ESI) calcd for $C_{19}H_{21}N_2O_2$ $[M+H]^+$: 309.15 found 309.45



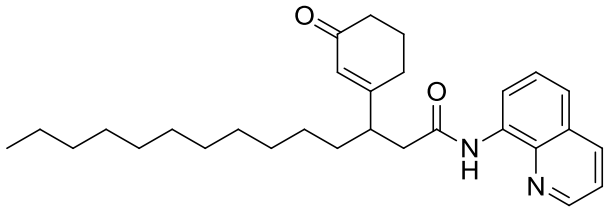
3-(3-Oxocyclohex-1-en-1-yl)-N-(quinolin-8-yl)hexanamide **(4)**

Following the general procedure **I**, amide (48.4 mg, 0.2 mmol), vinyl iodide **(2a)** (66.6 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(4)** (51.4mg) were isolated in 77% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.77 (s, 1H), 8.78-8.77 (m, 1H), 8.72-8.70 (m, 1H), 8.16-8.13 (m, 1H), 7.53-7.26 (m, 3H), 6.00 (s, 1H), 2.94-2.87 (m, 1H), 2.69 (d, *J* = 7.48, 1H), 2.40-2.37 (m, 2H), 2.35-2.32 (m, 2H), 2.00-1.93 (m, 2H), 1.60-1.53 (m, 2H), 1.34-1.30 (m, 2H), 0.91 (t, *J* = 7.24 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 200.0, 170.0, 168.0, 148.3, 138.4, 136.5, 134.3, 128.0, 127.5, 126.6, 121.8, 116.6, 44.0, 42.5, 37.7, 35.8, 28.2, 22.9, 20.6, 14.1; HRMS (ESI) calcd for $C_{21}H_{25}N_2O_2$ $[M+H]^+$: 337.18 found 337.49



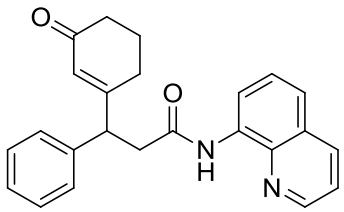
3-(3-Oxocyclohex-1-en-1-yl)-N-(quinolin-8-yl)heptanamide **(5)**

Following the general procedure **I**, amide (51.2 mg, 0.2 mmol), vinyl iodide **(2a)** (66.6 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(5)** (50.2 mg) were isolated in 72% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.77 (s, 1H), 8.78-8.76 (m, 1H), 8.71-8.69 (m, 1H), 8.15-8.12 (m, 1H), 7.51-7.42 (m, 3H), 2.90-2.70 (m, 1H), 2.69 (d,*J* = 6.64 Hz, 2H), 2.40-2.31 (m, 2H), 1.99-1.94 (m, 2H), 1.61-1.54 (m, 2H), 1.33-1.23 (m, 2H), 0.89 (t, *J* = 5.44 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 199.9, 159.6, 148.3, 138.4, 136.5, 134.3, 128.1, 127.5, 126.6, 121.8, 116.6, 44.2, 42.5, 37.7, 33.3, 29.6, 28.2, 22.9, 22.7, 14.0; HRMS (ESI) calcd for $C_{22}H_{27}N_2O_2$ $[M+H]^+$: 351.20 found 351.48



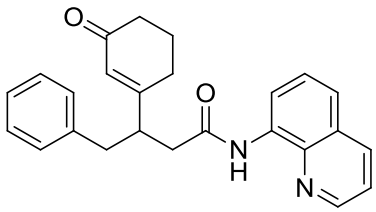
3-(3-Oxocyclohex-1-en-1-yl)-N-(quinolin-8-yl)tetradecanamide **(6)**

Following the general procedure **I**, amide (70.8 mg, 0.2 mmol), vinyl iodide **(2a)** (66.6 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(6)** (47.0 mg) were isolated in 53% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.77 (s, 1H), 8.78-8.69 (m, 2H), 8.14(d, *J* = 8.24 Hz, 1H), 7.51-7.42 (m, 3H), 6.00 (s, 1H), 2.90-2.75 (m, 1H), 2.69 (d, *J* = 6.68 Hz, 2H), 2.40-2.31 (m, 4H), 1.99-1.95 (m, 2H), 1.23 (s, 20H), 0.86(t, *J* = 6.52 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 200.0, 170.0, 168.1, 148.3, 136.5, 134.32, 128.1, 127.5, 126.6, 121.8, 116.7, 44.2, 42.6, 37.7, 33.7, 32.0, 30.0, 29.73, 29.70, 29.46, 28.2, 27.4, 22.9, 14.3; HRMS (ESI) calcd for $C_{29}H_{41}N_2O_2$ $[M+H]^+$: 449.31 found 449.61



3-(3-Oxocyclohex-1-en-1-yl)-3-phenyl-N-(quinolin-8-yl)propanamide **(7)**

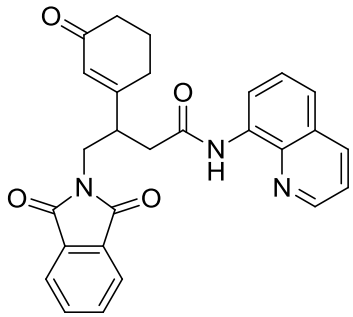
Following the general procedure **I**, amide (55.2 mg, 0.2 mmol), vinyl iodide **(2a)** (66.6 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(7)** (15.7 mg) were isolated in 22% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.75 (s, 1H), 8.76-8.75 (m, 1H), 8.68-8.66 (m, 1H), 8.14-8.12 (m, 1H), 7.49-7.21 (m, 8H), 6.15 (s, 1H), 4.22-4.18 (m, 1H), 3.18 (dd, *J* = 7.8 Hz, *J* = 15.2 Hz, 1H), 3.01 (dd,*J* = 7.24 Hz, *J* = 15.4 Hz, 1H), 2.38-2.21 (m, 4H), 1.97-1.85 (m, 2H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 200.0, 168.9, 166.5, 148.3, 140.5, 138.4, 136.4, 134.3, 129.1, 128.1, 128.0, 121.8, 121.7, 116.7, 48.9, 41.9, 37.6, 29.4, 22.9; HRMS (ESI) calcd for $C_{24}H_{23}N_2O_2$ $[M+H]^+$: 371.17 found 371.18



3-(3-Oxocyclohex-1-en-1-yl)-4-phenyl-N-(quinolin-8-yl)butanamide **(8)**

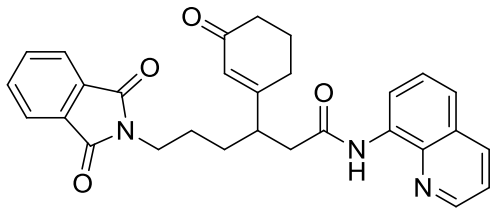
Following the general procedure **I**, amide (58 mg, 0.2 mmol), vinyl iodide **(2a)** (66.6 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate =

2:1). Finally, compound **(8)** (49.2 mg) were isolated in 65% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.77 (s, 1H), 8.79-8.78 (m, 1H), 8.70-8.68 (m, 1H), 8.17-8.14 (m, 1H), 7.52-7.44 (m, 3H), 7.30-7.18 (m, 5H), 5.98 (s, 1H), 3.23-3.19 (m, 1H), 2.93 (dd, *J* = 6.72 Hz, *J* = 13.5 Hz, 1H), 2.84 (dd, *J* = 8.32 Hz, *J* = 13.5 Hz, 1H), 2.78-2.76 (m, 2H), 2.45-2.38 (m, 1H), 2.39-2.26 (m, 2H), 2.22-2.15 (m, 1H), 1.90-1.84 (m, 2H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 199.8, 169.3, 167.8, 148.4, 138.7, 138.4, 136.5, 134.3, 129.2, 128.7, 128.1, 127.5, 126.8, 126.5, 121.8, 116.7, 45.5, 41.7, 40.6, 37.6, 29.6, 22.7; HRMS (ESI) calcd for $C_{25}H_{25}N_2O_2$ $[M+H]^+$:384.18 found 384.46



4-(1,3-Dioxoisoindolin-2-yl)-3-(3-oxocyclohex-1-en-1-yl)-N-(quinolin-8-yl)butanamide **(9)**

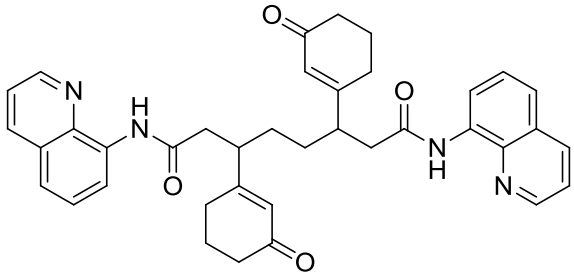
Following the general procedure **I**, amide (71.8 mg, 0.2 mmol), vinyl iodide **(2a)** (66.6 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(9)** (58.3 mg) were isolated in 64% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.83 (s, 1H), 8.81-8.80 (m, 1H), 8.60-8.57 (m, 1H), 8.15-8.13 (m, 1H), 7.76-7.74 (m, 2H), 7.66-7.64 (m, 2H), 7.48-7.44 (m, 3H), 5.92 (s, 1H), 3.93-3.91 (m, 2H), 3.47-3.43 (m, 1H), 2.86-2.83 (m, 2H), 2.60-2.57 (m, 2H), 2.35-2.32 (m, 2H), 2.05-1.99 (m, 2H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.6, 180.4, 168.4, 168.3, 148.4, 138.4, 136.5, 134.3, 134.1, 131.7, 131.3, 128.0, 127.4, 123.6, 121.9, 121.8, 116.6, 40.4, 39.6, 39.3, 35.4, 30.1, 29.9; HRMS (ESI) calcd for $C_{27}H_{24}N_3O_4$ $[M+H]^+$: 454.17 found 454.49



6-(1,3-Dioxoisoindolin-2-yl)-3-(3-oxocyclohex-1-en-1-yl)-N-(quinolin-8-yl)hexanamide **(10)**

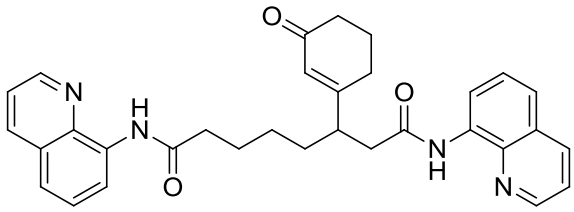
Following the general procedure **I**, amide (77.4 mg, 0.2 mmol), vinyl iodide **(2a)** (66.6 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The

residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(10)** (62.3 mg) were isolated in 65% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.75 (s, 1H), 8.78-8.66 (m, 1H), 8.66-8.64 (m,1H), 8.15-8.13 (m, 1H), 7.81-7.79 (m, 2H),7.70- 7.68 (m, 2H), 7.50-7.42 (m, 3H), 5.98 (s, 1H), 3.70-3.67 (t, 3H), 2.95-2.92 (m, 1H), 2.70 (d, *J* = 7 Hz, 2H),2.40-2.30 (m, 4H), 1.99-1.94 (m, 2H), 1.70-1.63 (m, 4H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 199.7, 169.1, 168.4, 167.1, 148.3, 138.3, 136.5, 134.2, 134.0, 132.1, 128.0, 127.4, 126.9, 123.3, 121.8, 116.6, 43.7, 42.3, 37.8, 37.7, 30.7, 28.1, 26..5, 22.8; HRMS (ESI) calcd for $C_{29}H28N_3O_4$ $[M+H]^+$: 482.20 found 482.47



3,6-Bis(3-oxocyclohex-1-en-1-yl)-N1,N8-di(quinolin-8-yl)octanediamide **(11a)**

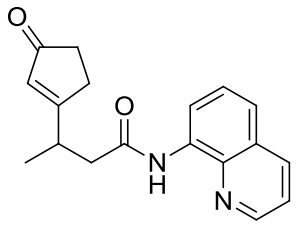
Following the general procedure **I**, amide (83.2 mg, 0.2 mmol), vinyl iodide **(2a)** (88.8 mg, 0.40 mmol), Ag_2CO_3 (110.3 mg, 0.4 mmol), $Pd(OAc)_2$ (8.96 mg, 0.04 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(11a)** (61.4 mg) were isolated in 50% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.76 (s, 2H), 8.76 (d, *J* = 4.2 Hz, 2H), 8.68-8.67 (m, 2H), 8.13 (d,*J* = 8.24 Hz, 2H), 7.49-7.42 (m, 6H), 5.96 (s, 2H), 2.89-2.88 (m, 2H), 2.70-2.88 (m, 4H), 2.36-2.27 (m, 8H), 1.97-1.90 (m, 4H), 1.59-1.53 (m, 4H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 199.6, 169.13, 169.10, 166.79, 166.77, 148.4, 138.4, 136.5, 134.2, 128.1, 127.5, 127.0, 121.9, 121.8, 116.7, 44.2, 44.0, 42.3, 42.2, 37.7, 31.0, 30.9, 28.0, 27.9, 22.9; HRMS (ESI) calcd for $C_{38}H_{39}N_4O_4$ $[M+H]^+$: 615.29 found 615.56



3-(3-Oxocyclohex-1-en-1-yl)-N1,N8-di(quinolin-8-yl)octanediamide **(11b)**

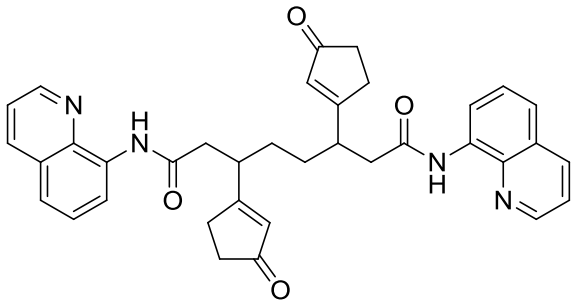
Following the general procedure **I**, amide (83.2 mg, 0.2 mmol), vinyl iodide **(2a)** (88.8 mg, 0.40 mmol), Ag_2CO_3 (110.3 mg, 0.4 mmol), $Pd(OAc)_2$ (8.96 mg, 0.04 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(11b)** (25 mg) were isolated in 24% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.79 (s, 1H), 9.77 (s, 1H), 8.79-8.68 (m, 4H), 8.14-8.12 (d, *J* = 8.24 Hz, 2H), 7.53-7.41 (m, 6H), 6.00 (s, 1H), 2.94-2.90 (m, 1H),2.72-2.69 (m,

2H),2.57-2.53 (m, 2H), 2.39-2.37 (m, 2H), 2.31-2.80 (m, 2H), 1.97-1.79 (m, 4H), 1.71-1.64 (m, 2H), 1.48-1.41 (m, 2H);^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 199.8, 171.5, 169.4, 167.6, 148.35, 148.28, 138.45, 138.40, 136.5, 134.6, 134.3, 128.1, 127.5, 127.46, 126.7, 121.8, 121.7, 121.5, 116.7, 116.6, 44.1, 42.4, 38.0, 37.7, 33.3, 28.1, 27.1, 25.6, 22.9; HRMS (ESI) calcd for $C_{32}H_{33}N_4O_3$ $[M+H]^+$: 521.25 found 521.62



3-(3-Oxocyclopent-1-en-1-yl)-N-(quinolin-8-yl)butanamide **(12)**

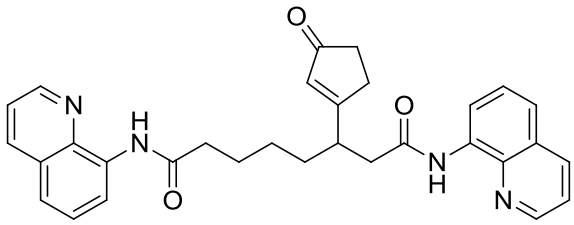
Following the general procedure **I**, amide (42.8 mg, 0.2 mmol), vinyl iodide **(36)** (62.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(12)** (44.1 mg) were isolated in 75% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.82 (s, 1H), 8.80-8.79 (m, 1H), 8.74-8.72 (m, 1H), 8.18-8.15(m, 1H), 7.53-7.44 (m, 3H), 6.06 (s, 1H), 3.28-3.26 (m, 1H), 2.87(dd, *J* = 6.8 Hz, *J* = 13.7, 1H), 2.72-2.66 (m, 3H), 2.43-2.41 (m, 2H), 1.32 (d, *J* = 6.92 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.9, 185.6, 169.3, 148.4, 138.4, 136.5, 134.3, 129.0, 128.1, 127.5, 121.9, 121.8, 116.7, 43.4, 35.3, 34.4, 30.0, 19.2; HRMS (ESI) calcd for $C_{18}H_{19}N_2O_2$ $[M+H]^+$: 295.14, found 295.41



3,6-Bis(3-Oxocyclopent-1-en-1-yl)-N1,N8-di(quinolin-8-yl)octanediamide **(13a)**

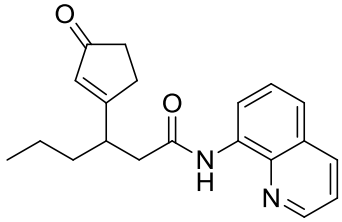
Following the general procedure **I**, amide (83.2 mg, 0.2 mmol), vinyl iodide **(36)** (83.2 mg, 0.40 mmol), Ag_2CO_3 (110.3 mg, 0.4 mmol), $Pd(OAc)_2$ (8.96 mg, 0.04 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(13a)** (60.9 mg) were isolated in 52% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.79 (s, 2H),8.77-8.76 (m,2H), 8.68-8.66 (m,1H), 8.15-8.13 (d, *J* = 8.28 Hz, 6H), 6.05 (s, 2H), 3.23-3.21 (m, 2H),2.80-2.75 (m, 4H), 2.65 (s, 4H), 2.37-2.35 (m, 4H), 1.72-1.68 (m, 4H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.4, 183.2, 168.91, 168.88, 148.41, 138.35, 138.34, 136.5, 134.1, 130.64, 130.62, 128.1, 127.4, 122.0, 121.9, 116.7, 42.0, 41.9, 39.7, 39.6, 35.2, 31.0, 30.9,

29.98, 29.93; HRMS (ESI) calcd for $C_{36}H_{35}N_4O_4$ $[M+H]^+$: 587.26, found 587.53



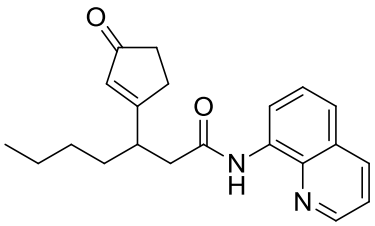
3-(3-Oxocyclopent-1-en-1-yl)-N1,N8-di(quinolin-8-yl)octanediamide **(13b)**

Following the general procedure **I**, amide (83.2 mg, 0.2 mmol), vinyl iodide **(36)** (83.2 mg, 0.40 mmol), Ag_2CO_3 (110.3 mg, 0.4 mmol), $Pd(OAc)_2$ (8.96 mg, 0.04 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(13b)** (19.2 mg) were isolated in 19% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.80 (s, 1H), 8.79-8.68 (m, 4H), 8.15-8.13 (m, 2H), 7.54-7.42 (m, 3H), 6.10 (s, 1H), 3.28-3.21 (m, 1H), 2.85-2.74 (m, 2H), 2.70-2.68 (m, 2H), 2.58-2.55 (m, 2H), 2.38-2.36 (m, 2H), 1.88-1.68 (m, 4H), 1.52-1.44 (m, 2H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.8, 184.2, 171.4, 171.4, 169.3, 148.4, 148.3, 138.5, 138.45, 138.40, 136.52, 136.50, 134.6, 130.4, 128.1, 127.54, 127.46, 121.89, 121.82, 121.7,121.6, 116.7, 116.6, 42.3, 39.8, 37.9, 35.3, 33.5, 30.0, 26.9, 25.6; HRMS (ESI) calcd for $C_{31}H_{31}N_4O_3$ $[M+H]^+$: 507.23, found 507.77



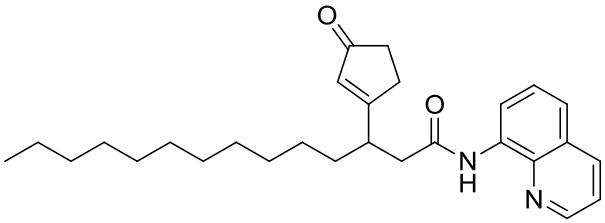
3-(3-oxocyclopent-1-en-1-yl)-N-(quinolin-8-yl)hexanamide **(14)**

Following the general procedure **I**, amide (51.2 mg, 0.2 mmol), vinyl iodide **(36)** (62.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(14)** (53.8 mg) were isolated in 80% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.79 (s, 1H), 8.80-8.78 (m, 1H), 8.71-8.69 (m, 1H), 8.17-8.15 (m, 1H), 7.52-7.44 (m, 3H), 6.07 (s, 1H), 3.30-3.10 (m, 1H), 2.80-2.77 (m, 2H), 2.71-2.69 (m, 2H), 2.41-3.39 (m, 2H), 1.68-1.64 (m, 2H), 1.34-1.28 (m, 4H), 0.89 (t, J = 6.8 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.8, 184.6, 169.4, 148.4, 138.4, 136.5, 134.2, 130.2, 128.0, 127.5, 121.9, 121.8, 116.7, 42.3, 39.6, 35.9, 35.2, 30.0, 20.4, 14.1; HRMS (ESI) calcd for $C_{21}H_{25}N_2O_2$ $[M+H]^+$: 337.18, found 337.49



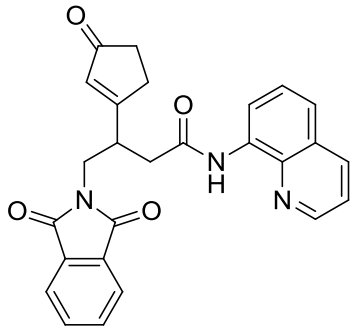
1 3-(3-Oxocyclopent-1-en-1-yl)-N-(quinolin-8-yl)heptanamide **(15)**

2 Following the general procedure **I**, amide (51.2 mg, 0.2 mmol), vinyl iodide **(36)** (62.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(15)** (53.8 mg) were isolated in 80% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.79 (s, 1H), 8.80-8.78 (m, 1H), 8.71-8.69 (m, 1H), 8.17-8.15 (m, 1H), 7.52-7.44 (m, 3H), 6.07 (s, 1H), 3.30-3.10 (m, 1H), 2.80-2.77 (m, 2H), 2.71-2.69 (m, 2H), 2.41-3.39 (m, 2H), 1.68-1.64 (m, 2H), 1.34-1.28 (m, 4H), 0.89 (t, *J* = 6.8 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.8, 184.6, 169.4, 148.4, 138.4, 136.5, 134.2, 130.2, 128.0, 127.5, 121.9, 121.8, 116.7, 42.3, 39.6, 35.9, 35.2, 30.0, 20.4, 14.1; HRMS (ESI) calcd for $C_{21}H_{25}N_2O_2$ $[M+H]^+$: 337.18, found 337.49



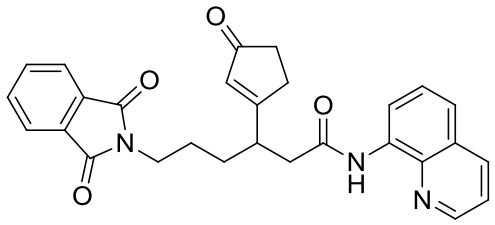
3-(3-Oxocyclopent-1-en-1-yl)-N-(quinolin-8-yl)tetradecanamide **(16)**

Following the general procedure **I**, amide (70.8 mg, 0.2 mmol), vinyl iodide **(36)** (62.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(16)** (65.1 mg) were isolated in 75% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.79 (s, 1H), 8.79-8.78 (m, 1H), 8.71-8.69 (m, 1H), 8.16-8.14 (m, 1H), 7.52-7.43 (m, 3H), 6.07 (s, 1H), 3.22-3.18 (m, 1H), 2.78-2.76 (m, 2H), 2.70-2.68 (m, 2H), 2.40-2.38 (m, 2H), 1.27 (s, 20H), 0.87 (t, *J* = 6.8Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 210.0, 184.8, 169.4, 148.4, 138.4, 136.6, 134.3, 130.3, 128.1, 127.5, 121.9, 121.8, 116.7, 42.3, 39.9, 35.3, 33.8, 32.0, 30.0, 29.73, 29.72, 29.69, 29.59, 22.8, 14.3; HRMS (ESI) calcd for $C_{28}H_{39}N_2O_2$ $[M+H]^+$:435.29, found 435.57



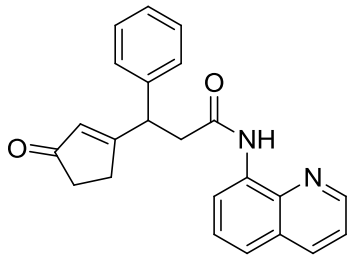
4-(1,3-Dioxoisoindolin-2-yl)-3-(3-oxocyclopent-1-en-1-yl)-N-(quinolin-8-yl)butanamide **(17)**

Following the general procedure **I**, amide (71.8 mg, 0.2 mmol), vinyl iodide **(36)** (62.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(17)** (63.2 mg) were isolated in 72% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.83 (s, 1H), 8.82-8.81 (m, 1H), 8.55 (d, *J* = 8.0 Hz, 1H), 8.24-8.16 (m, 1H), 7.75-7.73 (m, 2H), 7.65-7.63 (m, 2H), 7.49-7.41 (m, 5H), 6.04 (s, 1H), 4.00 (d, *J* = 8.0 Hz, 2H), 3.81-3.74 (m, 1H), 2.98-2,82 (m, 4H), 2.45-2.42 (m, 2H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.6, 180.4, 168.43, 168.38, 148.4, 138.4, 136.5, 134.3, 134.2, 131.8, 131.4, 128.0, 127.4, 123.6, 121.91, 121.86, 116.7, 40.4, 39.6, 39.3, 35.4, 30.1; HRMS (ESI) calcd for $C_{26}H_{22}N_3O_4$ $[M+H]^+$: 440.15, found 440.50



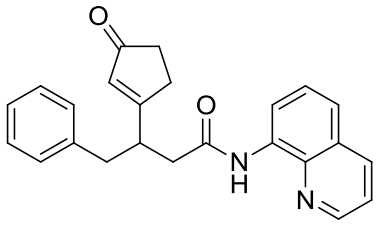
6-(1,3-Dioxoisoindolin-2-yl)-3-(3-oxocyclopent-1-en-1-yl)-N-(quinolin-8-yl)hexanamide **(18)**

Following the general procedure **I**, amide (77.4 mg, 0.2 mmol), vinyl iodide **(36)** (62.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(18)** (79.4 mg) were isolated in 85% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.78 (s, 1H), 8.79-8.64 (m, 2H), 8.15 (d, *J* = 7.6 Hz), 7.82-7.80 (m, 2H), 7.70-7.68 (m, 2H), 7.50-7.44 (m, 3H), 6.06 (s, 1H), 3.71-3.69 (m, 2H), 3.27-3.25 (m, 1H), 2.80-2.69 (m, 4H), 2.40-2.37 (m, 2H), 1.73 (s, 4H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 183.6, 169.0, 168.5, 148.4, 138.4, 136.5, 134.2, 134.1, 132.2, 130.6, 128.1, 127.5, 123.4, 121.9, 121.85, 116.7, 42.1, 39.4, 37.8, 35.3, 30.9, 30.1, 26.4; HRMS (ESI) calcd for $C_{28}H_{26}N_3O_4$ $[M+H]^+$: 468.18, found 468.48



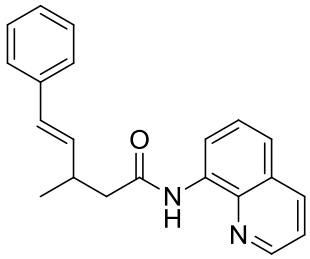
3-(3-Oxocyclopent-1-en-1-yl)-3-phenyl-N-(quinolin-8-yl)propanamide **(19)**

Following the general procedure **I**, amide (55.2 mg, 0.2 mmol), vinyl iodide **(36)** (62.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(19)** (22.8 mg) were isolated in 32% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.80 (s, 1H), 8.78-8,76 (m, 1H), 8.69-8.67 (m, 1H), 8.16-8.14 (m, 1H), 7.50-7.43 (m, 3H), 7.33-7.25 (m, 5H), 6.19 (s, 1H), 4.40 (t, *J* = 7.4 Hz, 1H), 3.27 (dd, *J* = 8 Hz, *J* = 15.3 Hz), 3.11 (dd, *J* = 6.96 Hz, *J*= 15.3 Hz, 1H), 3.09-2.60 (m, 2H), 2.45-2.30 (m, 2H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.8, 182.9, 148.3, 140.3, 138.4, 136.5, 134.2, 129.3, 129.2, 128.1, 127.70, 127.45, 121.9, 121.8, 116.7, 45.9, 42.8, 35.4, 30.8; HRMS (ESI) calcd for $C_{23}H_{21}N_2O_2$ $[M+H]^+$: 357.15, found 357.43



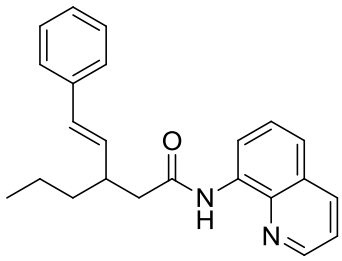
3-(3-Oxocyclopent-1-en-1-yl)-4-phenyl-N-(quinolin-8-yl)butanamide **(20)**

Following the general procedure **I**, amide (58 mg, 0.2 mmol), vinyl iodide **(36)** (62.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(20)** (53.4 mg) were isolated in 75% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.75 (s, 1H), 8.77-8.75 (m, 1H), 8.69-8.66 (m, 1H), 8.15-8.13 (m, 1H), 7.50-7.42 (m, 3H), 7.33-7.23 (m, 5H), 6.15 (s, 1H), 4.22-4.18 (m, 1H), 3.18 (dd, *J* = 4.24 Hz, *J* = 14.84 Hz, 1H), 3.01 (dd, *J* = 7.24 Hz , *J* = 15.2 Hz, 1H) 2.38-2.23 (m, 4H), 2.00-1.82 (m, 2H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 200.0, 168.9, 166.5, 148.3, 140.6, 136.5, 134.3, 129.1, 128.08, 128.05, 127.58, 127.46, 125.2, 121.8, 121.8, 116.7, 48.9, 42.0, 37.7, 29.4, 22.9; HRMS (ESI) calcd for $C_{24}H_{23}N_2O_2$ $[M+H]^+$: 371.17, found 371.47



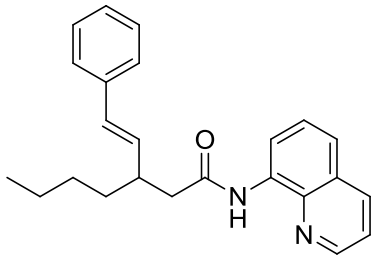
(*E*)-3-methyl-5-phenyl-N-(quinolin-8-yl)pent-4-enamide **(21)**

Following the general procedure **I**, amide (42.8 mg, 0.2 mmol), vinyl iodide **(39)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, compound **(21)** (57 mg) were isolated in 90% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.85 (s, 1H), 8.79 (d, *J* = 7.36 Hz, 1H), 8.70(d, *J* = 4.16 Hz,1H),8,13(d, *J* = 8.24 Hz, 1H), 7.55-7.48 (m, 3H), 7.43-7.40 (m, 2H), 7.43-7.40 (m, 1H), 7.35-7.16 (m, 5H), 6.51 (d, *J* = 15.92 Hz, 1H), 6.29 (dd, *J* = 7.36 Hz, *J* = 15.88 Hz, 1H), 3.11-3.04 (m, 1H), 2.71 (dd, *J* = 7.12 Hz, 14.36 Hz, 1H), 2.60 (dd, *J* = 7.2Hz, *J* = 14.34 Hz, 1H), 1.27 (d, *J* = 6.76 Hz, 3H);^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.5, 148.2, 138.5, 137.6, 134.6, 129.4, 128.6, 127.5, 127.2, 126.3, 121.7, 121.6, 116.7; HRMS (ESI) calcd for $C_{21}H_{21}N_2O$ $[M+H]^+$: 317.16, found 317.50



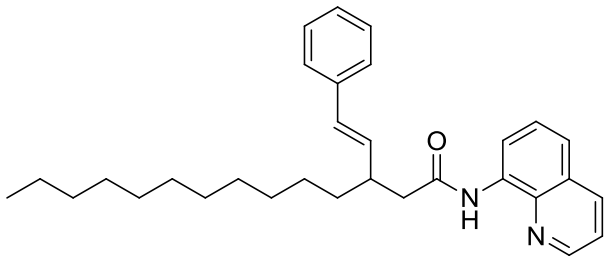
(*E*)-N-(quinolin-8-yl)-3-styrylhexanamide **(22)**

Following the general procedure **I**, amide (48.4 mg, 0.2 mmol), vinyl iodide **(39)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, compound **(22)** (55.9 mg) were isolated in 82% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.86 (s, 1H), 8.89 (d, *J* = 8.64 Hz, 1H), 8.68-8.66 (m, 1H), 8.15-8.12 (m, 1H), 7.56-7.39 (m, 3H), 7.34-7.17 (m, 5H), 6.51 (d, *J* = 15.84 Hz, 1H), 6.15 (dd, *J* = 8.72 Hz, *J* = 15.82 Hz, 1H), 2.96-2.87 (m, 1H), 2.72-2.62 (m, 2H), 1.51-1.33 (m, 4H), 0.93 (t, *J* = 7.24 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.6, 148.2, 138.5, 137.6, 136.4, 134.7, 133.2, 131.0, 128.5, 128.1, 127.5, 127.2, 126.3, 121.6, 121.5, 116.7, 44.6, 40.2, 37.4, 20.5, 14.2; HRMS (ESI) calcd for $C_{23}H_{25}N_2O$ $[M+H]^+$: 345.19, found 345.48



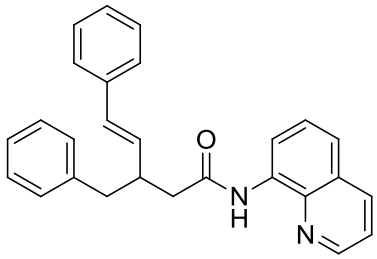
(*E*)-N-(quinolin-8-yl)-3-styrylheptanamide **(23)**

Following the general procedure **I**, amide (51.2 mg, 0.2 mmol), vinyl iodide **(39)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, compound **(23)** (68 mg) were isolated in 95% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.85 (s, 1H), 8.78 (d, *J* = 7.36 Hz, 1H), 8.68 (d, *J* = 4.08 Hz, 1H), 8.24 (d, *J* = 8.24 Hz, 1H), 7.55-7.47 (m, 2H), 7.35-7.18 (m, 5H), 6.53 (d, *J* = 15.82 Hz, 1H), 6.16 (dd,*J* = 8.68 Hz, *J* = 15.82 Hz, 1H), 2.93-2.88 (m, 1H), 2.74-2.63 (m, 2H), 1.68-1.31 (m, 6H), 0.89 (t, *J* = 6.8 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.6, 148.2, 138.5, 137.7, 136.4, 134.7, 133.3, 131.0, 128.5, 128.0, 127.5, 127.2, 126.3, 121.6, 121.5, 116.7, 44.6, 40.4, 35.0, 29.6, 22.8, 14.2; HRMS (ESI) calcd for $C_{24}H_{27}N_2O$ $[M+H]^+$: 359.40, found 359.19



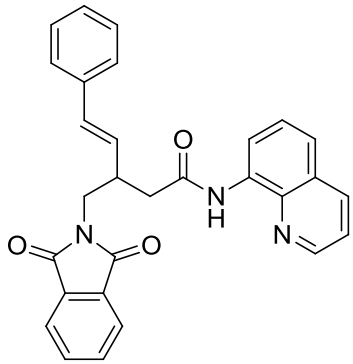
(*E*)-N-(quinolin-8-yl)-3-styryltetradecanamide **(24)**

Following the general procedure **I**, amide (70.8 mg, 0.2 mmol), vinyl iodide **(39)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, compound **(24)** (73 mg) were isolated in 80% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.84 (s, 1H), 8.78-8.76 (m, 1H), 8.68-8.66 (m, 1H), 8.14-8.12 (m, 1H), 7.54-7.47 (m, 2H), 7.43-7.39 (m, 1H), 7.34-7.16 (m, 5H), 2.91-2.84 (m, 1H), 2.72-2.61 (m, 2H), 1.23 (s, 20H), 0.87 (t, *J* = 6.56 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.6, 148.2, 138.5, 137.7, 136.4, 134.7, 133.3, 131.0, 128.5, 127.6, 127.2, 126.4, 121.7, 121.5, 116.7, 44.7, 40.5, 35.3, 32.1, 29.8, 29.7, 29.5, 27.4, 22.8, 14.3; HRMS (ESI) calcd for $C_{31}H_{41}N_2O$ $[M+H]^+$: 457.31, found 457.56



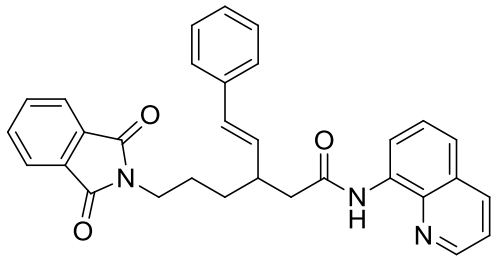
(*E*)-3-benzyl-5-phenyl-N-(quinolin-8-yl)pent-4-enamide **(25)**

Following the general procedure **I**, amide (58 mg, 0.2 mmol), vinyl iodide **(39)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, compound **(25)** (68.5 mg) were isolated in 90% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.82 (s, 1H), 8.75 (d, *J* = 7.24 Hz, 1H), 8.69(d, *J* = 4.12 Hz, 1H), 8.13 (d, *J* = 8.24 Hz,3H), 7.54-7.40 (m, 3H), 7.30-7.14 (m, 5H), 6.44 (d, *J* = 15.96 Hz, 1H), 6.23 (dd, *J* = 8.20 Hz, *J* = 15.92 Hz, 1H), 3.30-3.21 (m, 1H), 2.96-2.86 (m, 1H), 2.74 (dd, *J* = 5.72 Hz, *J* = 14.64 Hz, 1H), 2.65 (dd, *J* = 8.12 Hz, 14.62 Hz, 1H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.4, 148.2, 139.5, 137.6, 136.4, 132.4, 131.1, 129.7, 128.52, 128.47, 128.1, 127.6, 127.2, 126.4, 126.3, 121.7, 121.6, 116.7, 43.2, 41.6, 41.5; HRMS (ESI) calcd for $C_{27}H_{25}N_2O$ $[M+H]^+$: 393.19, found 393.11



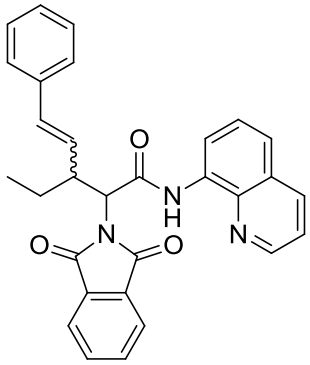
(*E*)-3-((1,3-dioxoisoindolin-2-yl)methyl)-5-phenyl-N-(quinolin-8-yl)pent-4-enamide **(26)**

Following the general procedure **I**, amide (71.8 mg, 0.2 mmol), vinyl iodide **(39)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 20:1). Finally, compound **(26)** (48.9 mg) were isolated in 53% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.84 (s, 1H), 8.70 (d, *J* = 4.08 Hz, 1H), 8.64-8.61 (m, 1H), 8.10 (d, *J* = 8.24 Hz, 1H), 7.73-7.71 (m, 2H), 7.60-7.58 (m, 2H), 7.44-7.39 (m, 3H), 7.28-7.16 (m, 5H), 6.56 (d, = 15.82 Hz, 1H), 6.20 (dd, *J* = 8.8 Hz, *J* = 15.82 Hz, 1H), 3.92 (d, *J* = 7.48 Hz, 2H), 2.84-2.72 (m, 2H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 169.2, 168.5, 148.2, 138.4, 137.1, 136.3, 134.4, 133.9, 132.9, 132.0, 129.3, 129.1, 128.5, 128.3, 127.9, 127.5, 127.4, 126.5, 125.4, 123.3, 121.6, 121.5, 116.6, 42.1, 41.6, 39.6; HRMS (ESI) calcd for $C_{29}H_{24}N_3O_3$ $[M+H]^+$: 462.17, found 462.18



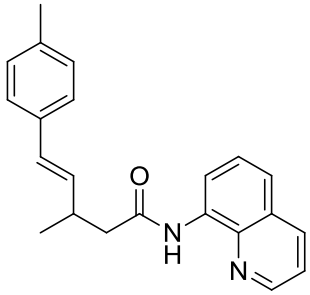
(*E*)-6-(1,3-dioxoisoindolin-2-yl)-N-(quinolin-8-yl)-3-styrylhexanamide **(27)**

Following the general procedure **I**, amide (77.4 mg, 0.2 mmol), vinyl iodide **(39)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 20:1). Finally, compound **(27)** (53.4 mg) were isolated in 85% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.81 (s, 1H), 8.72-8.70 (m, 1H), 8.68-8.67 (m, 1H), 8.13 (d, *J* = 8 Hz, 1H), 7.80-7.78 (m, 2H), 7.68-7.66 (m, 2H), 7.50-7.46 (m, 2H), 7.42-7.39 (m, 1H), 7.31-7.15 (m, 5H), 6.53 (d, = 16 Hz, 1H), 6.11 (dd, *J* = 8 Hz, *J* = 16 Hz, 1H), 3.71 (t, = 8 Hz, 2H), 2.93-2.89 (m, 1H), 2.72-2.62 (m, 2H), 1.75-1.68 (m, 2H), 1.49-1.39 (m, 2H),); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.2, 168.5, 148.2, 138.5, 137.4, 136.4, 134.6, 134.0, 132.3, 131.7, 128.5, 128.0, 127.5, 127.3, 126.4, 123.3, 121.7, 126.4, 123.3, 121.7, 116.7, 44.5, 40.2, 38.0, 32.3, 26.7; HRMS (ESI) calcd for $C_{31}H_{28}N_3O_3$ $[M+H]^+$: 490.21, found 490.52



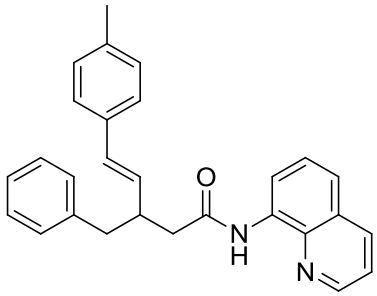
(*E*)-2-(1,3-dioxoisoindolin-2-yl)-3-ethyl-5-phenyl-N-(quinolin-8-yl)pent-4-enamide **(28)**

Following the general procedure **I**, amide (20 mg, 0.05 mmol), Ag_2CO_3 (15 mg, 0.05 mmol), $Pd(OAc)_2$ (1 mg), $(BnO)_2P(O)OH$ (5mg, 30%), and vinyl iodide **(39)** (23mg, 0.10mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 12 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1) . Finally, compound **(28)** (16 mg) were isolated in 67% (dr = 2.5:1) yield. HRMS (ESI) calcd for $C_{30}H_{26}N_3O_3$ $[M+H]^+$: 476.19, found 476.14



(*E*)-3-methyl-N-(quinolin-8-yl)-5-(*p*-tolyl)pent-4-enamide **(29)**

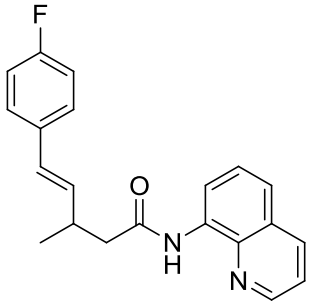
Following the general procedure **I**, amide (42.8 mg, 0.2 mmol), vinyl iodide **(46)** (73.2 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, compound **(29)** (47.5 mg) were isolated in 72% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.84 (s, 1H), 8.79 (d, *J* = 8 Hz, 1H), 8.72-8.70 (m, 1H), 8.15-8.13 (m, 1H), 7.55-7.48 (m, 2H), 7.44-7.41 (m, 1H), 7.23 (d, *J* = 8 Hz, 2H), 7.07 (d, *J* = 8 Hz, 2H), 6.48 (d, *J* = 16 Hz, 1H), 6.23 (dd, *J* = 8 Hz, *J* = 16 Hz, 1H), 3.09-3.02 (m, 1H), 2.71 (dd, *J* = 8 Hz, *J* = 16 Hz, 1H), 2.67 (dd, *J* = 8 Hz, *J* = 16 Hz, 1H), 2.31 (s, 3H), 1.26 (d, *J* = 8 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.6, 148.3, 138.6, 136.9, 136.5, 134.9, 134.7, 133.6, 129.3, 129.2, 128.1, 127.6, 126.2, 121.7, 121.6, 116.7, 45.9, 34.5, 21.3, 34.5, 21.3, 20.5; HRMS (ESI) calcd for $C_{22}H_{23}N_2O$ $[M+H]^+$: 331.17, found 331.44



(E)-3-benzyl-N-(quinolin-8-yl)-5-(p-tolyl)pent-4-enamide **(30)**

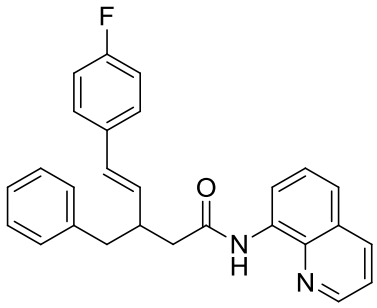
Following the general procedure **I**, amide (58 mg, 0.2 mmol), vinyl iodide **(46)** (73.2 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, compound **(30)** (44 mg) were isolated in 54% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.82 (s, 1H), 8.75 (d, *J* = 6.36 Hz, 1H), 8.69 (d, *J* = 3.04 Hz, 1H), 8.13 (d, *J* = 7.24 Hz, 1H),7.53-7.40 (m, 3H), 7.29-7.18 (m, 7H), 7.03 (d, *J* = 8 Hz, 2H), 6.40 (d, *J* = 15.96 Hz, 1H), 6.17 (dd, *J* = 8.28 Hz, *J* = 15.88 Hz, 1H), 3.28-3.19 (m, 1H), 2.95-2.85 (m, 2H), 2.73 (dd, *J* = 5.8 Hz, *J* = 14.66 Hz, 1H), 2.29 (s, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.4, 148.2, 139.6, 138.5, 137.0, 136.4, 134.8, 134.6, 131.3, 130.9, 129.7, 129.2, 128.4, 128.1, 127.5, 126.3, 121.7, 121.6, 116.7, 43.2, 41.7, 41.5, 21.3; HRMS (ESI) calcd for $C_{28}H_{27}N_2O$ $[M+H]^+$: 407.20, found

407.20



(*E*)-5-(4-fluorophenyl)-3-methyl-N-(quinolin-8-yl)pent-4-enamide **(31)**

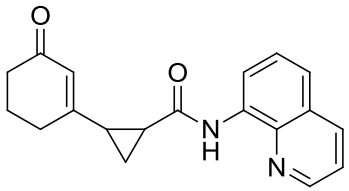
Following the general procedure **I**, amide (42.8 mg, 0.2 mmol), vinyl iodide **(47)** (74.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, compound **(31)** (50.1 mg) were isolated in 75% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.84 (s, 1H), 8.79 (d, *J* = 7.24 Hz, 1H), 8.70 (d, *J* = 2.92 Hz, 1H), 8.14 (d, *J* = 8.16 Hz,1H), 7.55-7.41 (m, 3H), 7.31-7.17 (m, 2H), 6.94 (t, *J* = 8.64 Hz, 2H), 6.46 (d, *J* = 15.92 Hz, 1H), 6.19 (dd, *J* = 7.4 Hz, *J* = 15.88 Hz, 1H), 3.10-3.03 (m, 1H), 2.69 (dd, *J* = 7.28 Hz, *J* = 14.32 Hz, 1H), 2.60 (dd, *J* = 7.32 Hz, *J* = 14.34 Hz, 1H), 1.26 (d, *J* = 7.6 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.5, 162.15 (d, *J* = 244Hz), 148.2, 138.5, 136.5, 134.6, 134.29, 134.27, 133.6 (d, *J* = 3Hz), 128.2, 128.1, 127.8 (d, *J* = 8Hz), 127.5, 121.7, 121.6, 116.7, 115.4 (d, *J* = 22Hz), 45.8, 34.5, 20.4; HRMS (ESI) calcd for $C_{21}H_{20}FN_2O$ $[M+H]^+$: 335.15, found 335.39



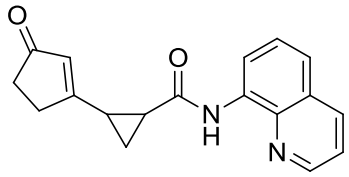
(*E*)-3-benzyl-5-(4-fluorophenyl)-N-(quinolin-8-yl)pent-4-enamide **(32)**

Following the general procedure **I**, amide (58 mg, 0.2 mmol), vinyl iodide **(47)** (74.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, compound **(32)** (42.6 mg) were isolated in 52% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.80 (s, 1H), 8.77-8.69 (m, 2H), 8.15-8.12 (m, 1H), 7.54-7.41 (m, 1H), 7.31-7.20 (m, 7H), 6.90 (t, *J* = 8.52 Hz, 2H), 6.39 (d, *J* = 15.88 Hz, 1H), 6.14 (dd, *J* = 8.28 Hz, *J* = 15.9 Hz, 1H), 3.26-3.21 (m, 1H), 2.96-2.86 (m, 2H), 2.76 (dd, *J* = 5.56 Hz, *J* = 14.72 Hz, 1H), 2.64 (dd, *J* = 8.28 Hz, *J* = 14.68 Hz, 1H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 170.8, 163.6 (d, *J* = 244Hz), 148.7, 139.9, 138.9, 136.9, 134.9

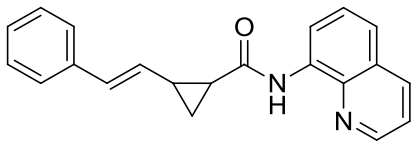
(d, *J* = 3Hz) , 132.6, 130.3, 130.0, 128.9, 128.5, 128.2 (d, *J* = 8Hz), 128.0, 126.8, 122.1, 122.05, 117.1, 115.8 (d, *J* = 22Hz), 43.5, 42.0, 41.95; HRMS (ESI) calcd for $C_{27}H_{24}FN_2O$ $[M+H]^+$: 411.18, found 411.19



2-(3-Oxocyclohex-1-en-1-yl)-N-(quinolin-8-yl)cyclopropanecarboxamide **(33)**
Following the general procedure **I**, amide (42.4 mg, 0.2 mmol), vinyl iodide **(2a)** (66.6 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(33)** (43.8 mg) were isolated in 72% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.92 (s, 1H), 8.77 (d, *J* = 3.36 Hz, 1H), 8.67-8.65 (q, 1H), 8.14 (d, *J* = 8.16 Hz, 1H), 7.49-7.42 (m, 3H), 6.09 (s, 1H), 2.49-2.38 (m, 1H), 2.31-2,18 (m, 5H), 1.91-1.85 (m, 2H), 1.73-1.68 (m, 1H), 1.35-1.30 (m, 1H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 119.6, 167.9, 161.1, 148.3, 138.3, 136.5, 134.5, 128.5, 128.0, 127.5, 121.8, 121.6, 116.5, 37.6, 30.1, 27.4, 24.8, 22.7, 11.0; HRMS (ESI) calcd for $C_{19}H_{19}N_2O_2$ $[M+H]^+$: 307.14 found 307.41

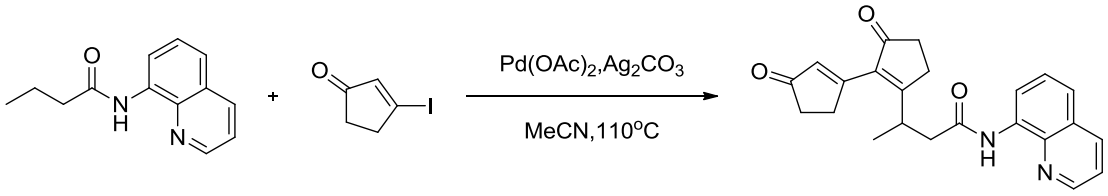


2-(3-Oxocyclopent-1-en-1-yl)-N-(quinolin-8-yl)cyclopropanecarboxamide **(34)**
Following the general procedure **I**, amide (42.4 mg, 0.2 mmol), vinyl iodide **(36)** (62.4 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 2:1). Finally, compound **(34)** (40.9 mg) were isolated in 70% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.99 (s, 1H), 8.80-8.79 (m, 1H), 8.66-8.64 (m, 1H), 8.17-8.14 (m, 1H), 7.50-7.44 (m, 3H), 6.10 (s, 1H), 2.80-2.74 (m, 1H), 2.58-2.54 (m, 1H), 2.47-2.42 (m, 1H), 2.34-2.24 (m, 3H), 1.83-1.76 (m, 1H), 1.50-1.45 (m, 1H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.8, 178.0, 167.2, 148.3, 138.3, 136.6, 134.4, 132.0, 128.1, 127.5, 121.8, 121.78, 116.7, 35.5, 31.8, 26.7, 23.1, 12.4; HRMS (ESI) calcd for $C_{18}H_{19}N_2O_2$ $[M+H]^+$: 293.12, found 293.37



(*E*)-N-(quinolin-8-yl)-2-styrylcyclopropanecarboxamide **(35)**

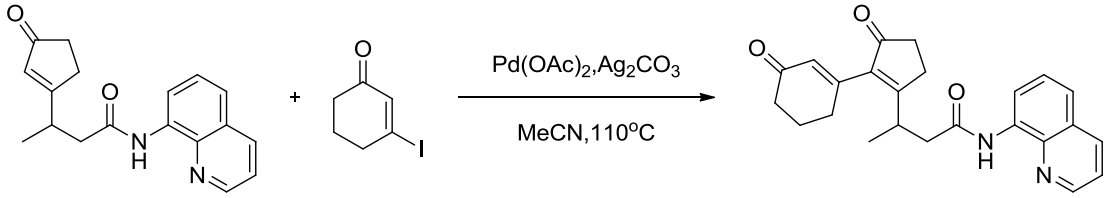
Following the general procedure **I**, amide (42.4 mg, 0.2 mmol), vinyl iodide **(39)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(35)** (42.7 mg) were isolated in 68% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 10.0 (s, 1H), 8.79-8.76 (m, 2H), 8.14(d, *J* = 8.2 Hz, 1H), 7.54-7.42 (m, 3H), 7.34-7.12 (m, 5H), 6.60 (d, *J* = 15.88 Hz, 1H), 6.40 (dd, *J* = 9.0 Hz, *J* = 15.88 Hz, 1H), 2.27-2.14 (m, 2H), 1.63-1.58 (m, 1H), 1.42-1.36 (m, 1H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 169.2, 148.2, 138.4, 137.6, 136.5, 134.9, 131.2, 128.5, 128.1, 127.6, 127.0, 126.2, 121.7, 121.4, 116.6, 25.4, 24.9, 14.2; HRMS (ESI) calcd for $C_{21}H_{19}N_2O$ $[M+H]^+$: 315.14, found 315.45



(37)

3-(3',5-dioxo-[1,1'-bi(cyclopentane)]-1,1'-dien-2-yl)-N-(quinolin-8-yl)butanamide**(37)**

Following the general procedure **I**, amide (42.8 mg, 0.2 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 8 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(37)** (56.3 mg) were isolated in 75% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.77 (s, 1H), 8.79-8.78 (m, 1H), 8.65 (t, *J* = 4.52Hz, 1H), 8.18-8.16 (m, 1H), 7.52-7.46 (m, 3H), 6.31 (s, 1H), 3.79-3.74 (m, 1H), 3.02 (dd, *J* = 7.12 Hz, *J* = 16.26 Hz, 1H), 2.82-2.70 (m, 5H), 2.53-2.50 (m, 2H), 2.41-2.32 (m, 2H) 1.33 (d, *J* = 6.96 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 209.7, 206.4, 180.6, 168.7, 168.5, 148.4, 138.2, 136.6, 136.3, 134.0, 132.9, 128.0, 127.4, 122.0, 121.9, 116.6, 43.1, 34.9, 34.6, 32.9, 31.7, 30.8, 25.8, 22.7, 19.6, 14.2; HRMS (ESI) calcd for $C_{23}H_{23}N_2O_3$ $[M+H]^+$: 375.16, found 375.13

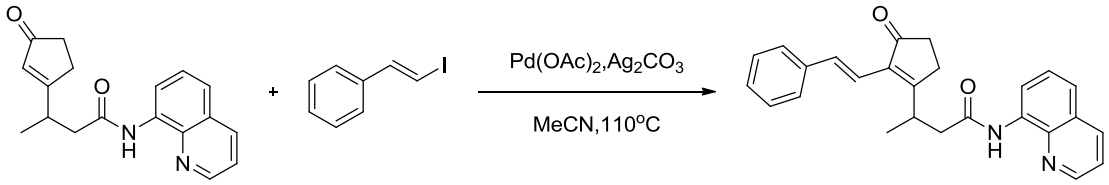


(38)

3-(3-Oxo-2-(3-oxocyclohex-1-en-1-yl)cyclopent-1-en-1-yl)-N-(quinolin-8-yl)butanamide**(38)**

Following the general procedure **I**, amide (58.8 mg, 0.2 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 12 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(37)** (52.9 mg) were isolated in 68% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.78 (s, 1H),

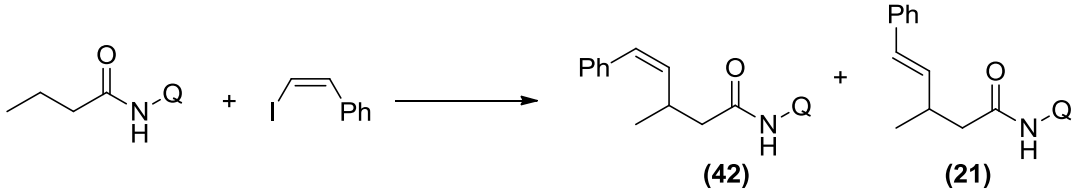
8.78 (d, *J* = 3.16 Hz, 1H), 8.67 (t, *J* = 4.2 Hz, 1H), 8.18 (d, *J* = 8.0 Hz, 1H), 7.53-7.47 (m, 3H), 5.89 (s, 1H), 3.67-3.61 (m, 1H), 2.78-2.53 (m, 4H), 2.49-2.38 (m, 3H), 2.36-2.25 (m, 3H) 1.97-1.31 (m, 2H), 1.30 (d, *J* = 6.8 Hz, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 206.8, 199.4, 177.5, 168.9, 156.1, 148.4, 141.1, 138.2, 136.8, 134.1, 129.1, 128.1, 127.6, 122.0, 121.9, 116.7, 43.3, 37.4, 34.7, 32.8, 28.9, 25.5, 22.7, 19.8; HRMS (ESI) calcd for $C_{24}H_{25}N_2O_3$ $[M+H]^+$: 389.18, found 389.70



(40)

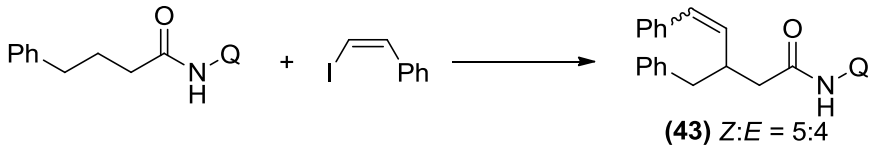
(E)-3-(3-oxo-2-styrylcyclopent-1-en-1-yl)-N-(quinolin-8-yl)butanamide **(40)**

Following the general procedure **I**, amide (58.8 mg, 0.2 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 12 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, compound **(40)** (52.9 mg) were isolated in 55% yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm) 9.82 (s, 1H), 8.76-8.71 (m, 2H), 8.16-8.14 (m, 1H), 7.74 (d, *J* = 16.2 Hz, 1H), 7.50-7.44 (m, 5H), 7.30-6.93 (m, 3H), 6.91 (d, *J* = 16.24 Hz, 1H), 3.91-3.86 (m, 1H), 2.86-2.75 (m, 2H), 2.69-2.67 (m, 2H), 2.50-2.48 (m, 2H), 1.35 (d, 3H); ^{13}C-NMR (100 MHz, $CDCl_3$) δ (ppm) 208.4, 176.2, 169.3, 148.4, 137.8, 136.6, 134.7, 134.2, 133.3, 128.6, 127.9, 127.5, 126.8, 121.9, 121.8, 117.1, 116.8, 43.3, 35.1, 32.1, 25.2, 19.0; HRMS (ESI) calcd for $C_{26}H_{25}N_2O_2$ $[M+H]^+$: 397.18, found 397.16



(42) **(21)**

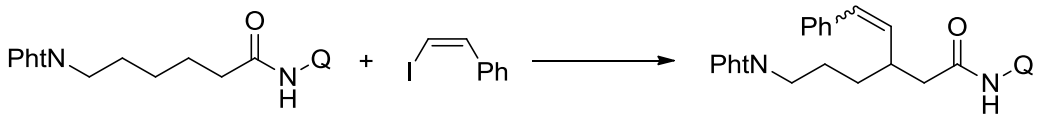
Following the general procedure **I**, amide (42.8 mg, 0.2 mmol), vinyl iodide **(41)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 12 h. The residue was purified by silical gel column chromatography (Toluene: Ethyl acetate = 100:1). Finally, a mixture of compound **(42)** and **(21)** (41.16 mg) were isolated in 70% yield with a ratio of 2:1. HRMS (ESI) calcd for $C_{21}H_{21}N_2O$ $[M+H]^+$: 317.16, found 317.67



(43) *Z*:*E* = 5:4

Following the general procedure **I**, amide (58 mg, 0.2 mmol), vinyl iodide **(41)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 12 h. The residue

was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, a mixture of compound **(43*Z*)** and **(43*E*)** (36.85 mg) were isolated in 47% yield with a ratio of 5:4. HRMS (ESI) calcd for $C_{27}H_{25}N_2O$ $[M+H]^+$: 393.19, found 393.16



(44) *Z*:*E* = 1:2

Following the general procedure **I**, amide (77.4 mg, 0.2 mmol), vinyl iodide **(41)** (69 mg, 0.30 mmol), Ag_2CO_3 (55.15 mg, 0.2 mmol), $Pd(OAc)_2$ (4.48 mg, 0.02 mmol) and 2 ml PhMe were used. The reaction mixture was stirred at 110^{o}C for 12 h. The residue was purified by silical gel column chromatography (Petroleum ether: Ethyl acetate = 1:1). Finally, a mixture of compound **(44*Z*)** and **(44*E*)** (48.24mg) were isolated in 62% yield with a ratio of 1:2. HRMS (ESI) calcd for $C_{31}H_{28}N_3O_3$ $[M+H]^+$: 490.21, found 490.17

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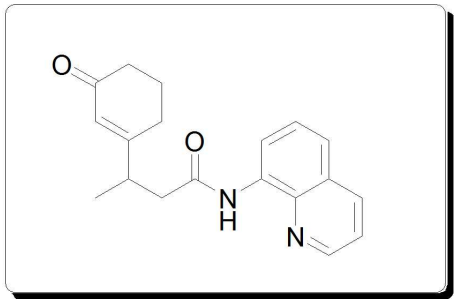

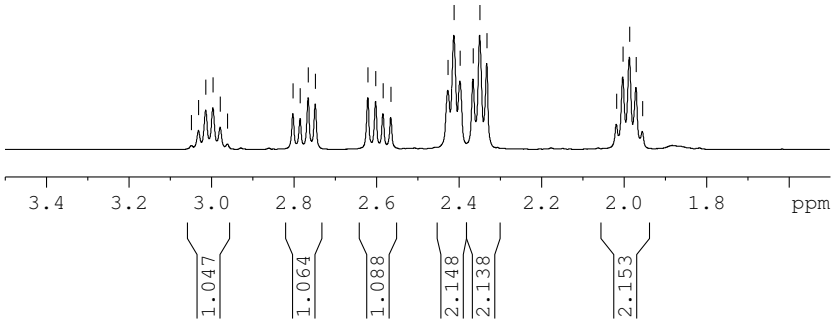

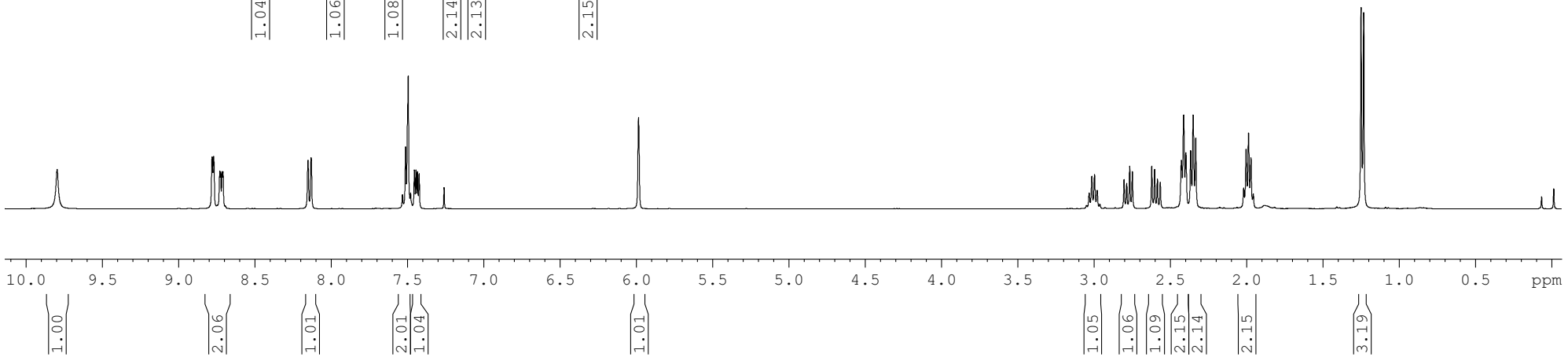

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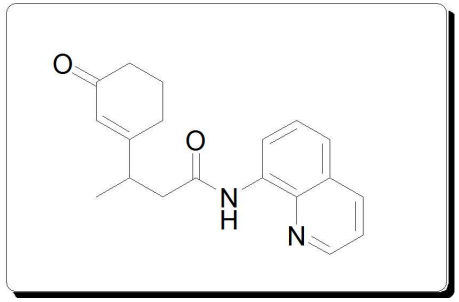

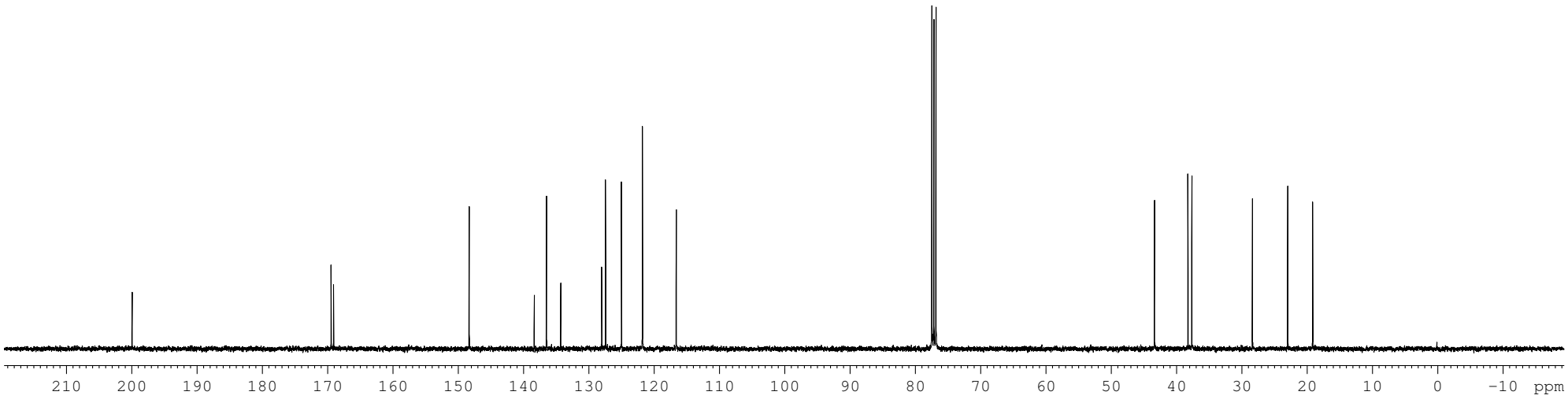

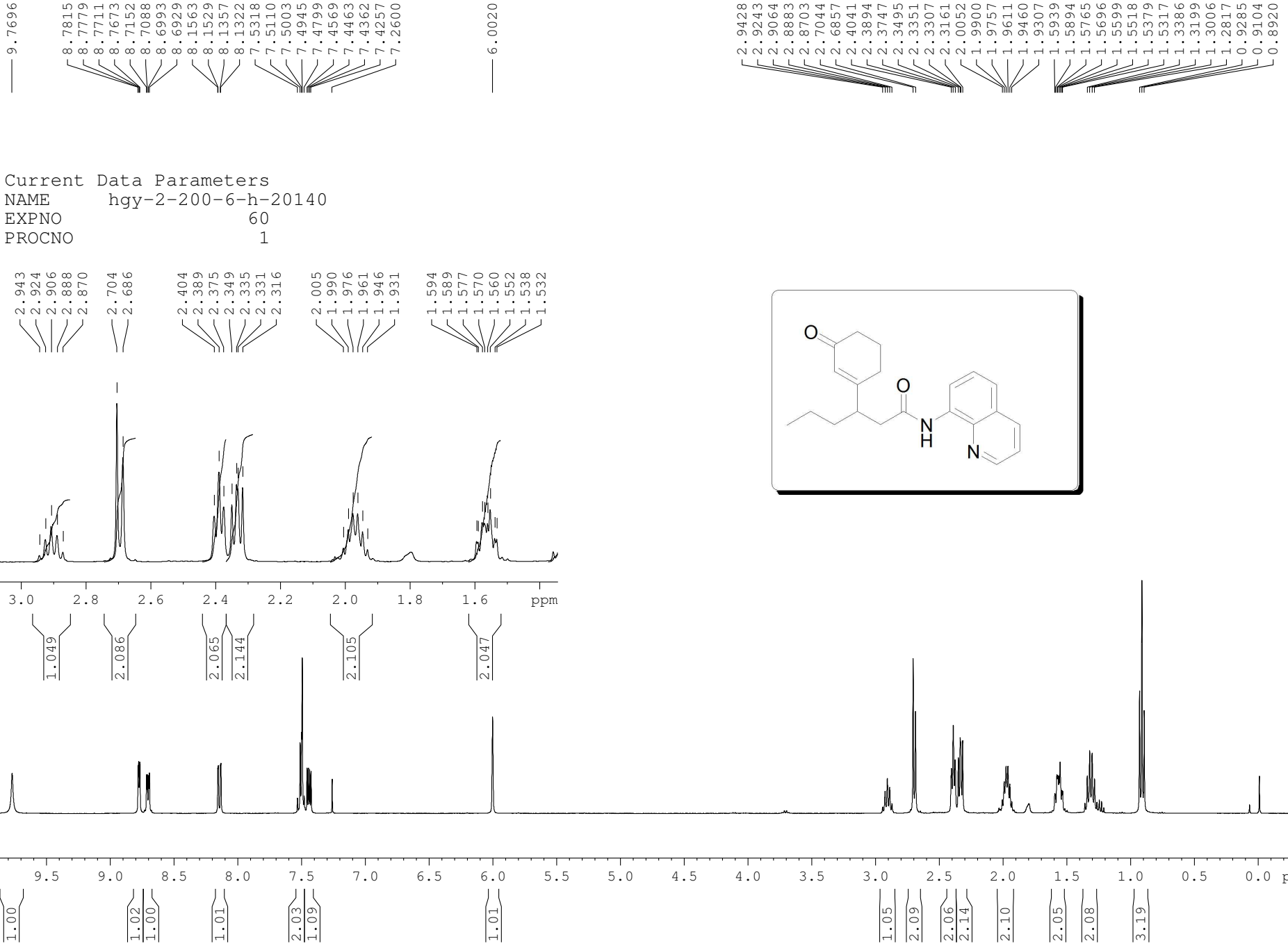
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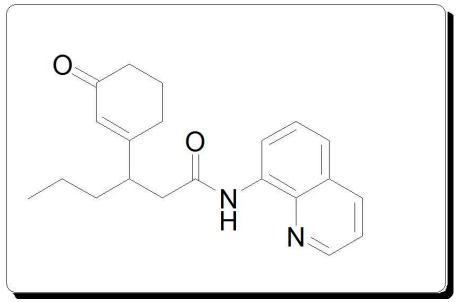

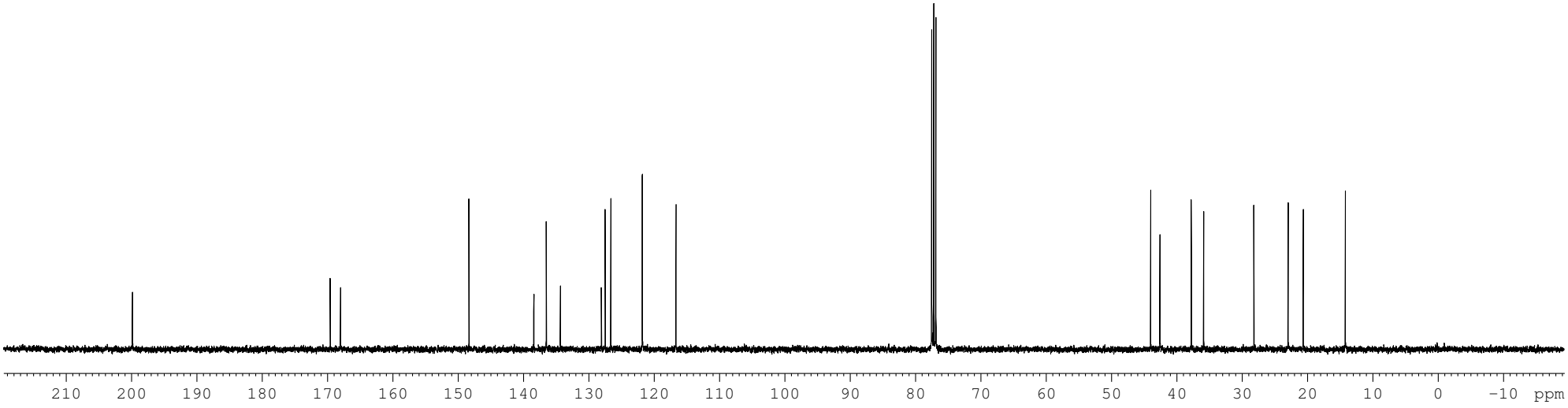

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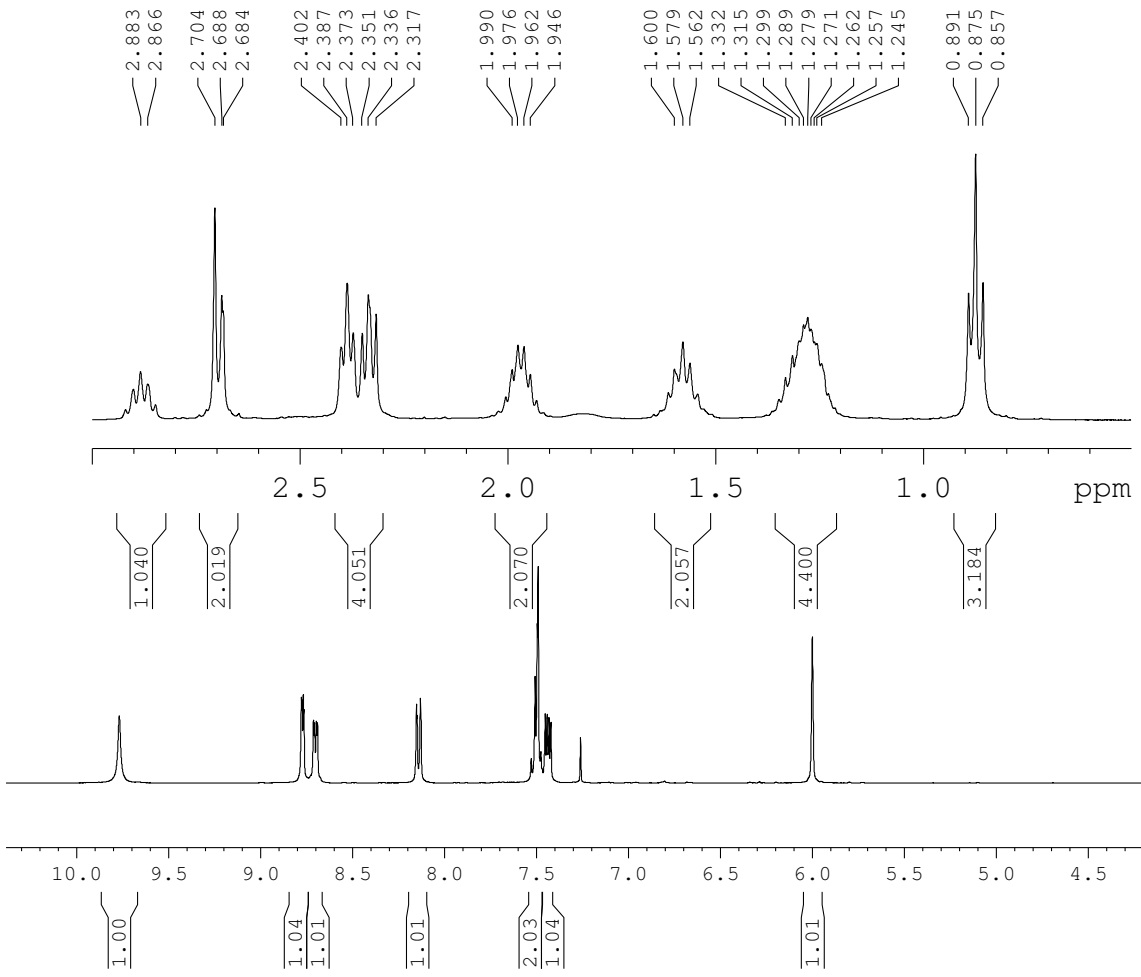

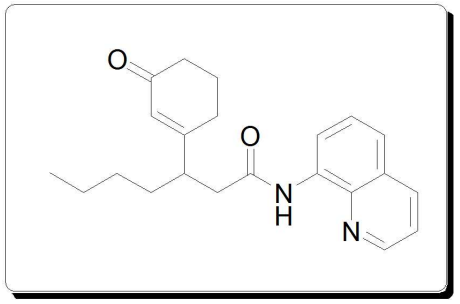

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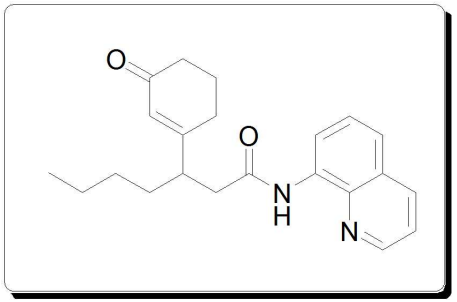

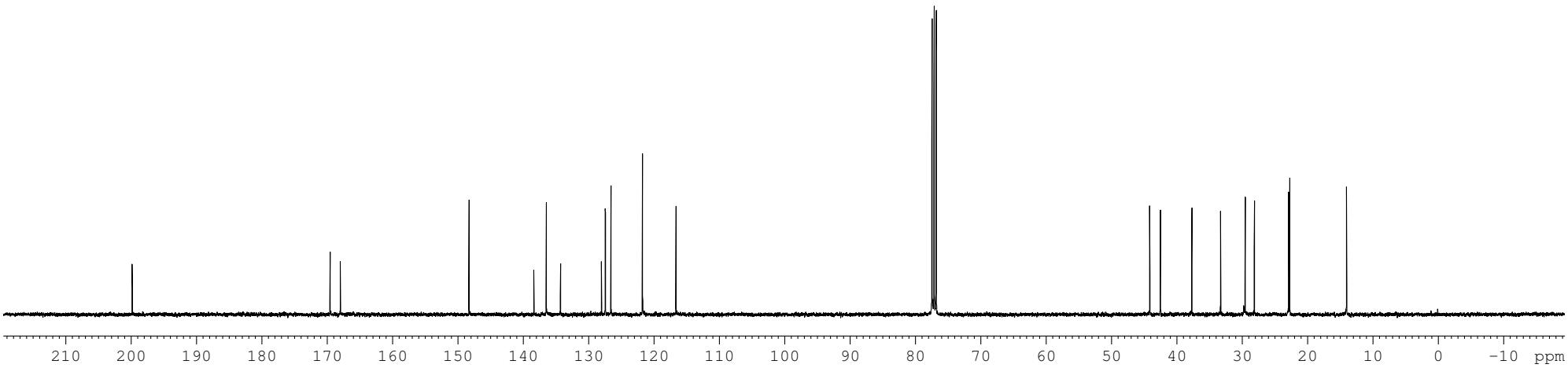

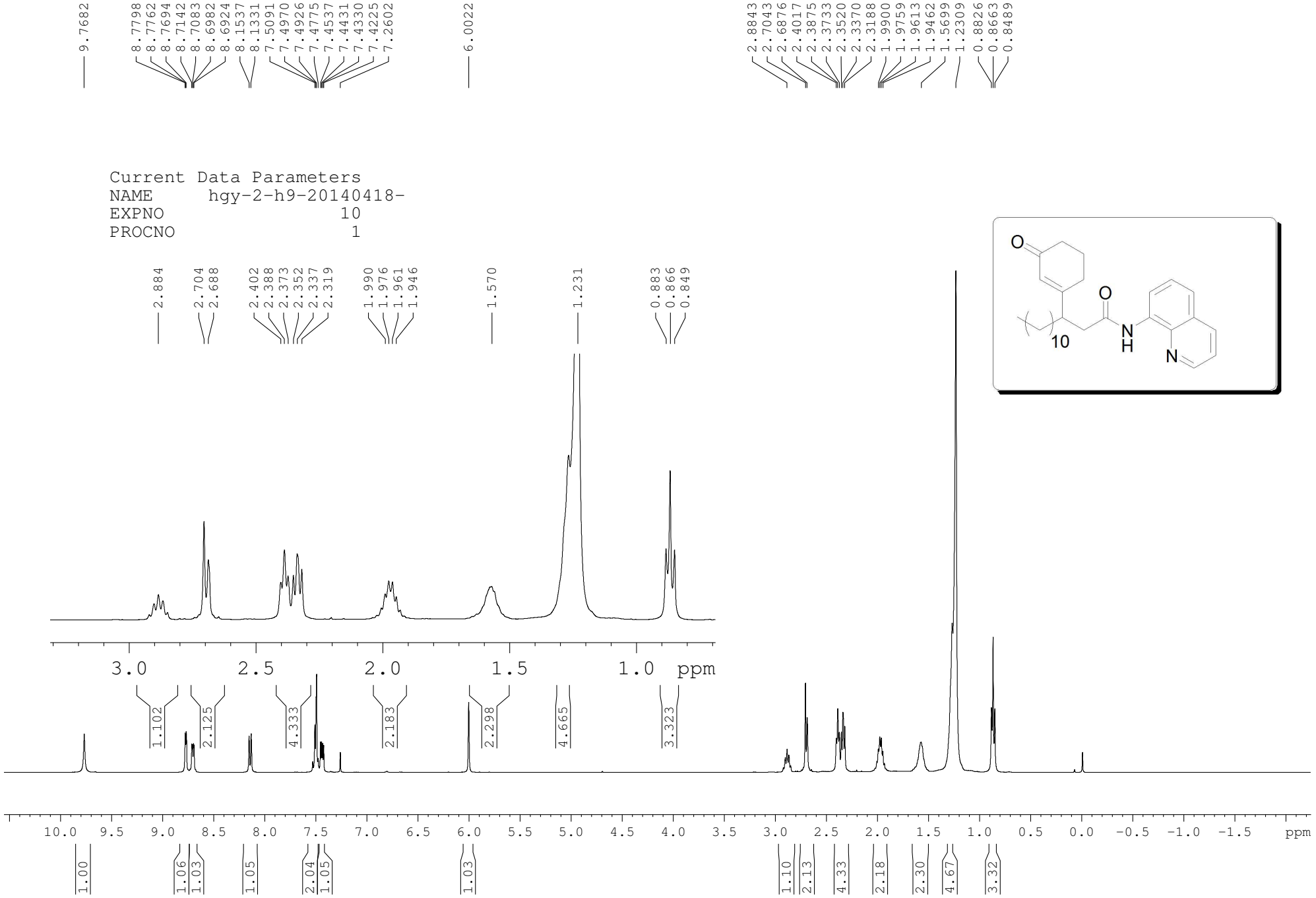
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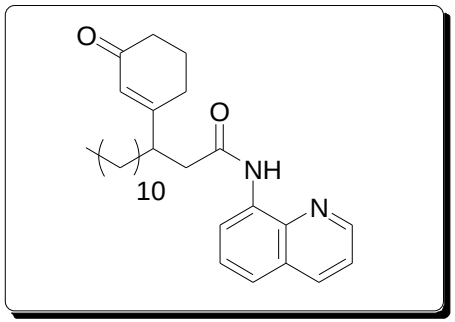
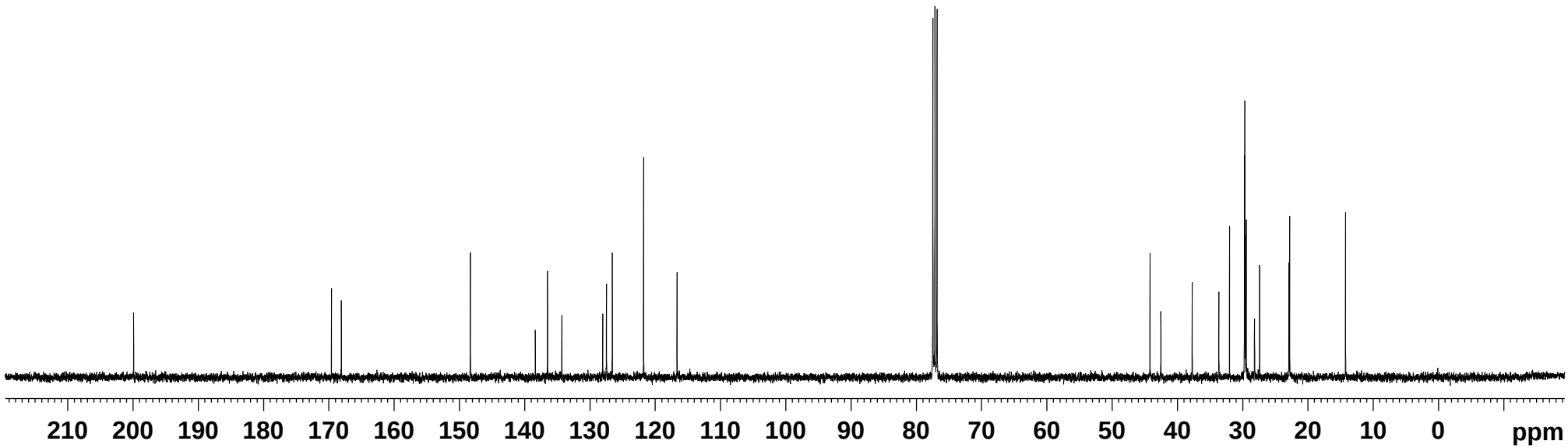
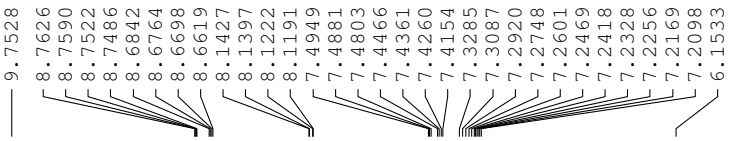
4.67
3.32

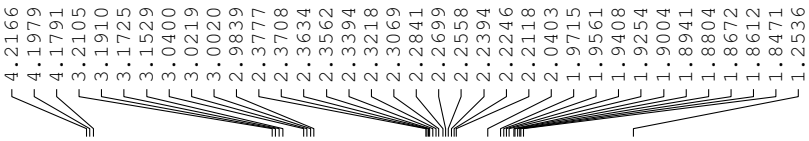
199.95
169.63
168.12
148.34
136.53
134.32
128.06
127.49
126.60
121.80
116.67
44.22
42.55
37.74
33.66
32.03
29.73
29.70
29.60
29.46
28.20
27.42
22.92
22.81
14.25

Current Data Parameters
NAME hgy-2-135-9-c-140528-
EXPNO 10
PROCNO 1

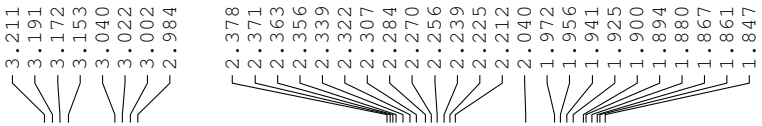


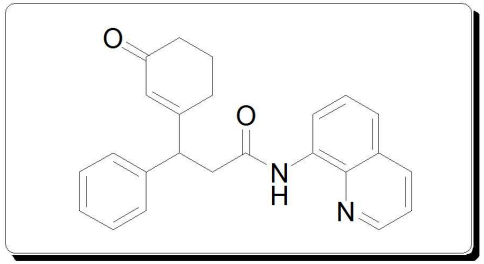


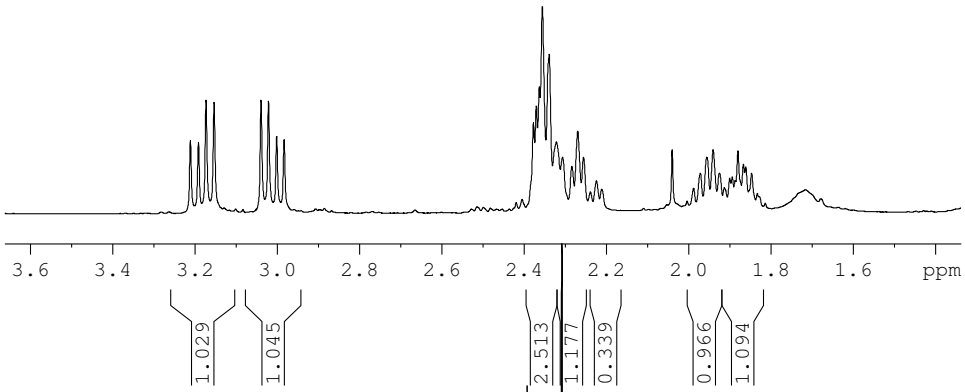


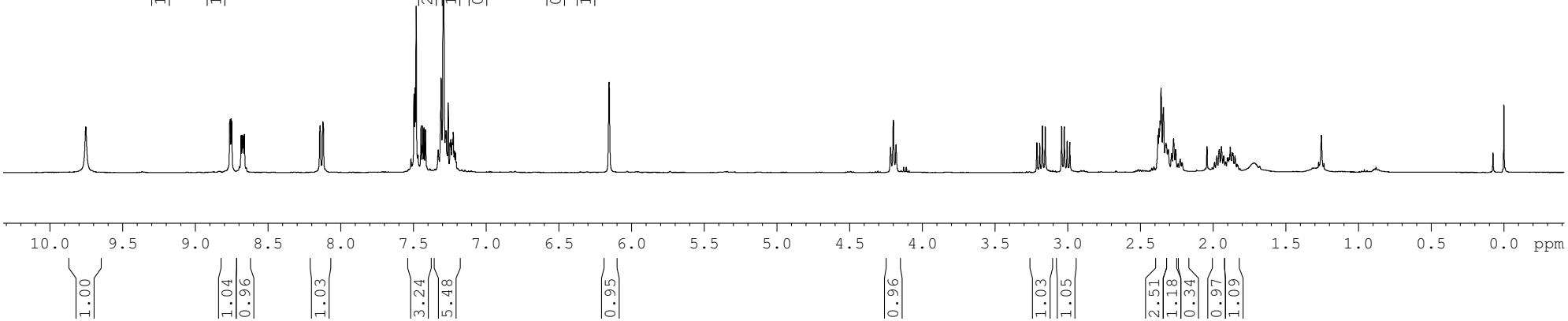


Current Data Parameters
NAME hgy-2-182-5-h-20140709-
EXPNO 50
PROCNO 1









199.98
168.86
166.47
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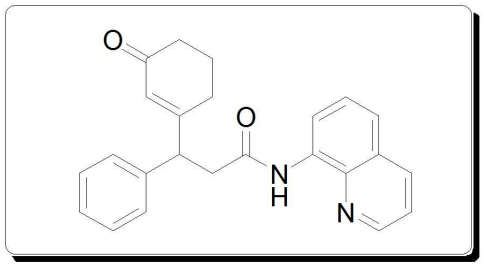
140.52
138.35
136.44
134.26
129.07
128.05
128.00
127.54
127.41
125.14
121.80
121.76
116.66
48.88
41.90
37.62
29.39
22.88

Current Data Parameters
NAME hgy-2-200-5-c-20140710-
EXPNO 50
PROCNO 1



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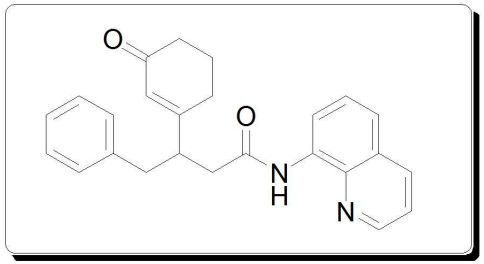
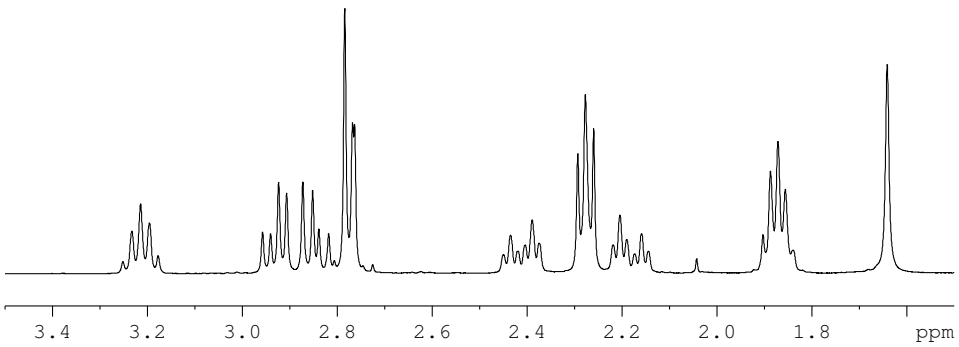
8.6985
8.6909
8.6838
8.6762
8.1667
8.1633
8.1461
8.1426
7.5169
7.5095
7.5020
7.4695
7.4590
7.4489
7.4383
7.2950
7.2764
7.2606
7.2158
7.1970
7.1765
5.9848

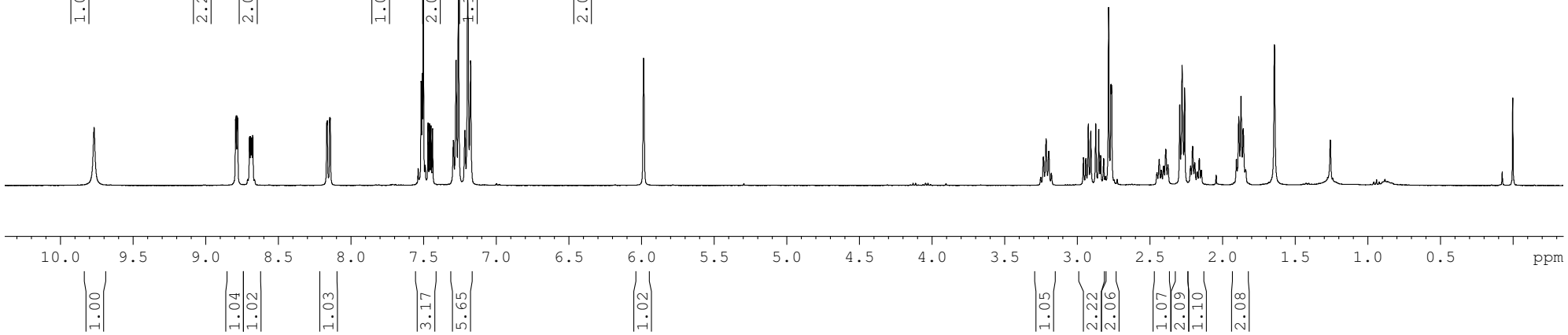
3.2324
3.2141
3.1952
2.9569
2.9401
2.9231
2.9062
2.8721
2.8513
2.8383
2.8176
2.7836
2.7674
2.7631
2.4501
2.4353
2.4198
2.4043
2.3899
2.3754
2.2937
2.2778
2.2603
2.2190
2.2048
2.1906
2.1737
2.1592
2.1450
1.9033
1.8876
1.8717
1.8564
1.8389
1.6416
1.2567

Current Data Parameters
NAME hgy-2-pp-8-c-20140715-
EXPNO 11
PROCNO 1

3.232
3.214
3.195
2.957
2.940
2.923
2.906
2.872
2.851
2.838
2.818
2.784
2.767
2.763
2.450
2.435
2.420
2.404
2.390
2.375
2.294
2.278
2.260
2.219
2.205
2.191
2.174
2.159
2.145
1.903
1.888
1.872
1.856
1.839
1.642







199.76
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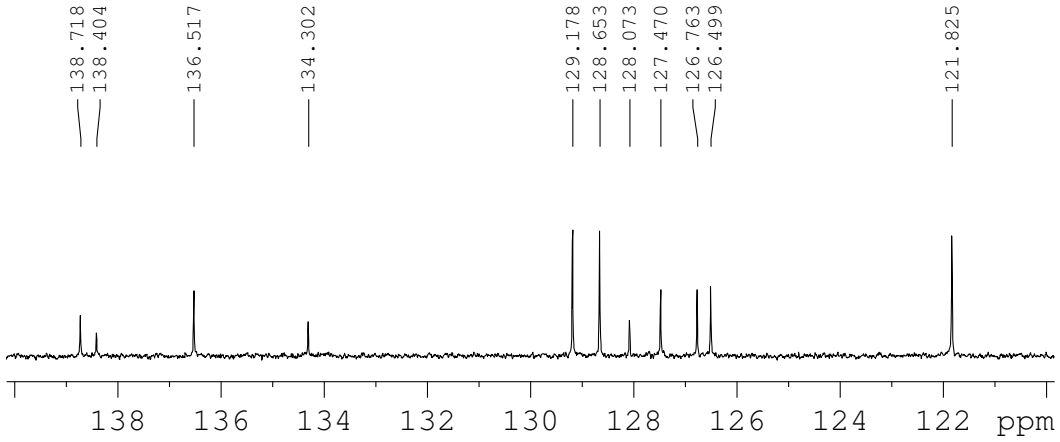
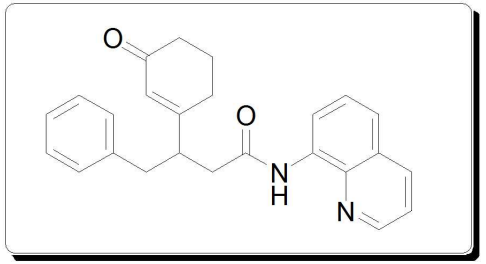
167.75
148.36
138.72
138.40
136.52
134.30
129.18
128.65
128.07
127.47
126.76
126.50
121.83
116.68
45.51
41.67
40.55
37.58
29.55
22.71

Current Data Parameters
NAME hgy-2-pp-8-c-20140715-
EXPNO 10
PROCNO 1





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8.7142
8.7083
8.6982
8.6924
8.1537
8.1331
7.5091
7.4970
7.4926
7.4775
7.4537
7.4431
7.4330
7.4225
7.2602
6.0022
2.8843
2.7043
2.6876
2.4017
2.3875
2.3733
2.3520
2.3370
2.3188
1.9900
1.9759
1.9613
1.9462
1.5699
1.2309
0.8826
0.8663
0.8489

Current Data Parameters
NAME hgy-2-h9-20140418-
EXPNO 10
PROCNO 1

2.884
2.704
2.688
2.402
2.388
2.373
2.352
2.337
2.319
1.990
1.976
1.961
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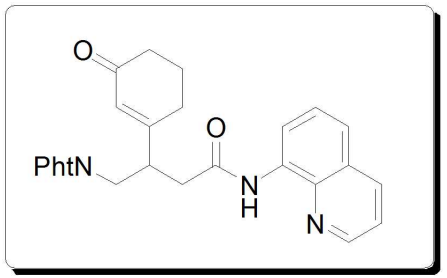
1.570
1.231
0.883
0.866
0.849



3.0 2.5 2.0 1.5 1.0 ppm

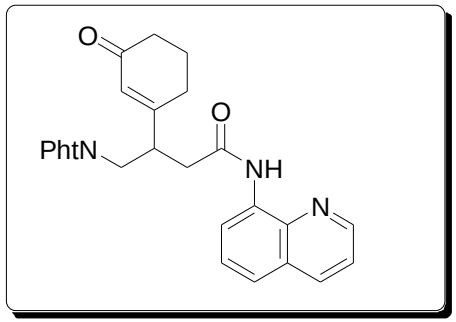
1.102 2.125 4.333 2.183 2.298 4.665 3.323

10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

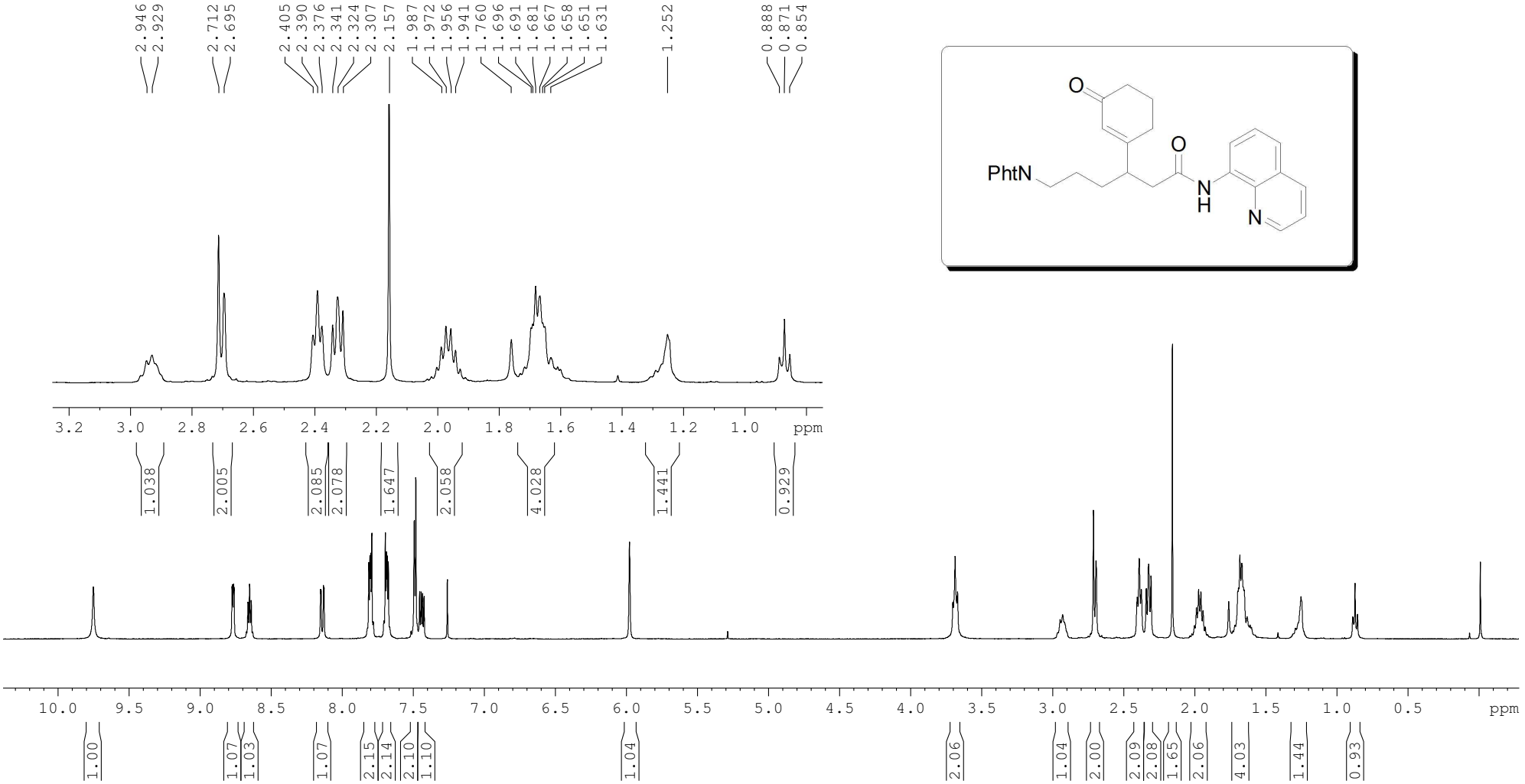
1.00 1.06 1.03 1.05 2.04 1.05 1.03 1.10 2.13 4.33 2.18 2.30 4.67 3.32

209.59
180.44
168.42
168.36
148.42
138.36
136.49
134.30
134.13
131.77
131.33
128.01
127.40
123.58
121.90
121.85
116.63
40.40
39.59
39.29
35.39
30.08
29.85

Current Data Parameters
NAME hgy-2-135-1-c-140528-
EXPNO 20
PROCNO 1



Current Data Parameters
NAME hgy-2-h-5-20140416-
EXPNO 50
PROCNO 1



199.68
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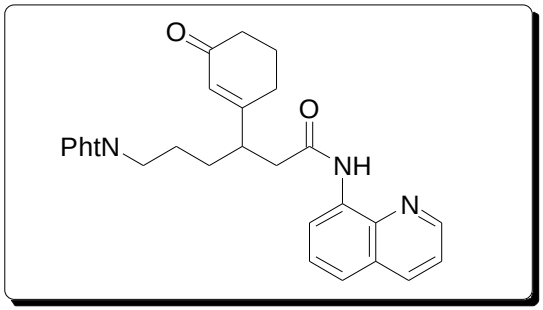
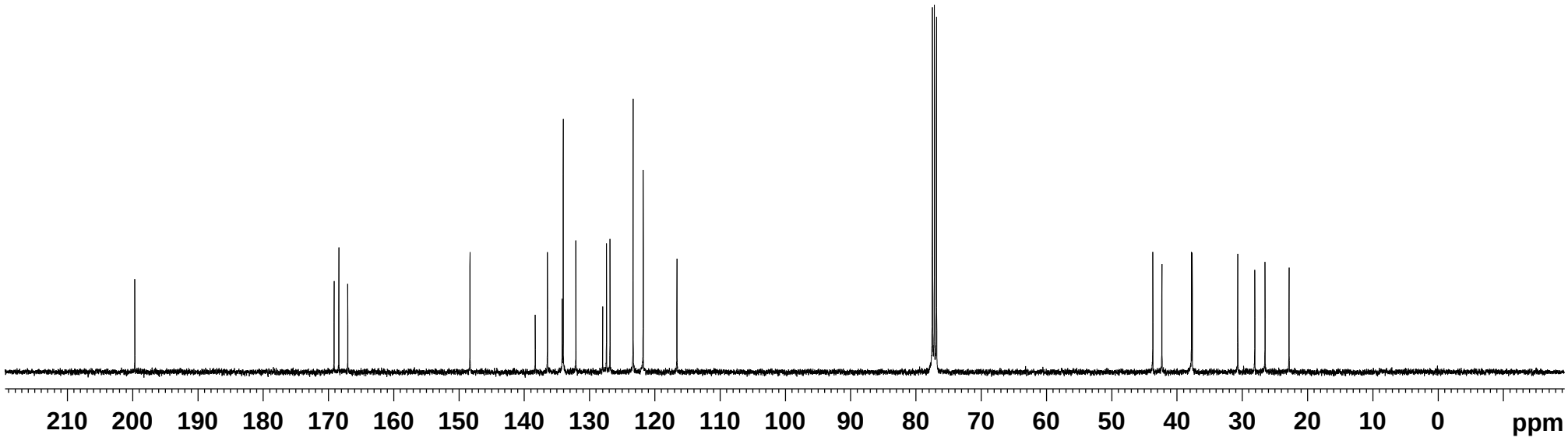
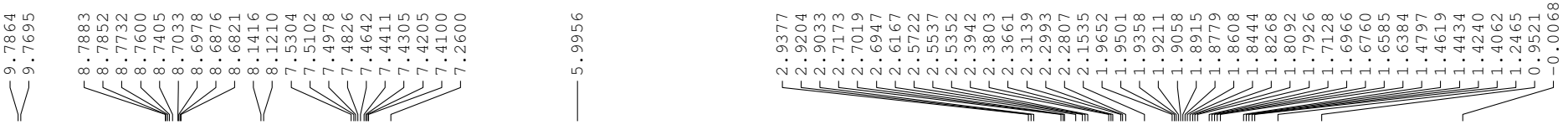
168.42
167.05
148.32
138.32
136.45
134.20
134.04
132.10
127.99
127.40
126.87
123.33
121.78
116.61
43.70
42.31
37.77
37.65
30.68
28.07
26.50
22.82

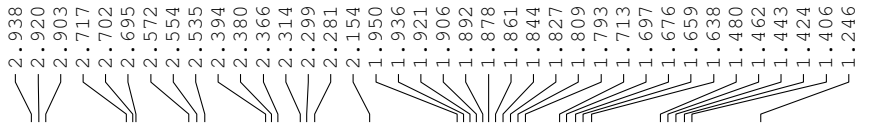
Current Data Parameters
NAME hgy-2-135-5-c-140528-
EXPNO 10
PROCNO 1

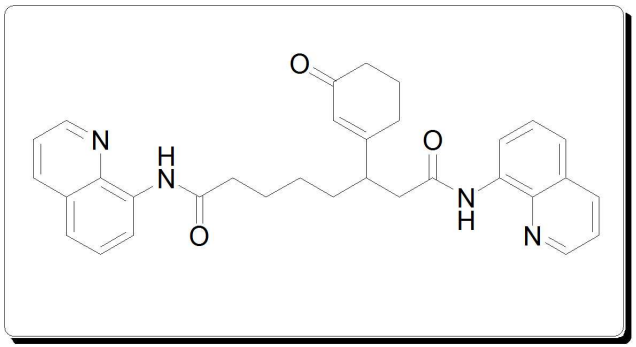


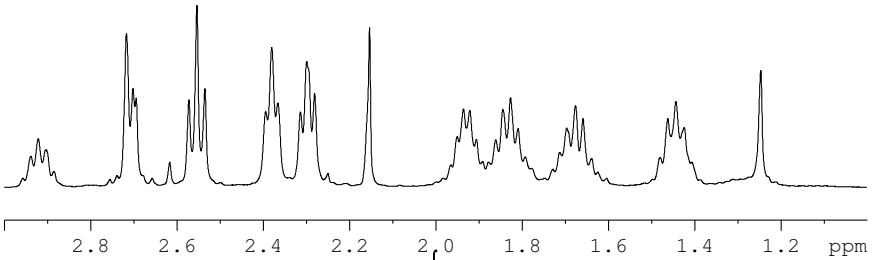


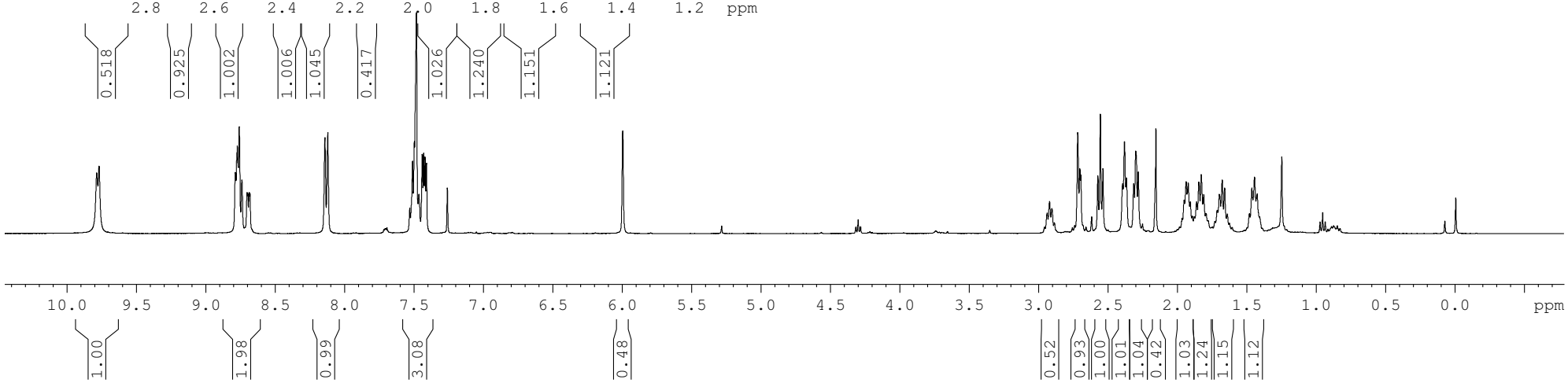


Current Data Parameters
NAME hgy-2-115-1-1h--20140520
EXPNO 62
PROCNO 1





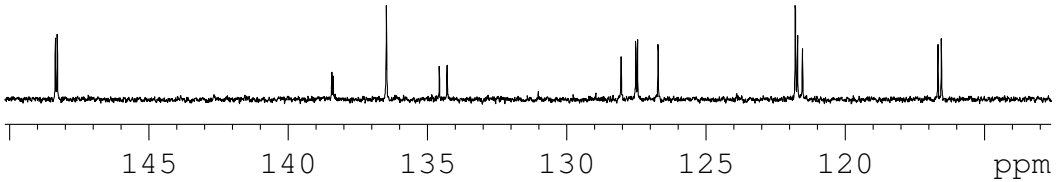


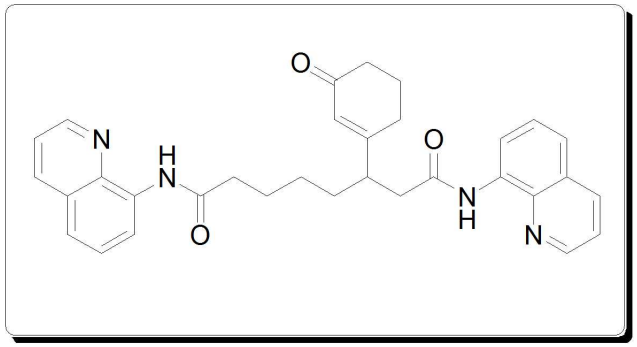


199.78
171.48
169.44
167.63
148.35
148.28
138.45
138.40
136.48
134.58
134.30
128.05
127.53
127.46
126.73
121.80
121.72
121.54
116.68
116.55
77.48
77.16
76.85
44.11
42.44
37.97
37.70
33.33
28.08
27.07
25.63
22.88

Current Data Parameters
NAME hgy-2-6p-m1-c-20140714-
EXPNO 10
PROCNO 1

148.349
148.282
138.445
138.398
136.483
134.582
134.304
128.052
127.529
127.464
126.727
121.798
121.720
121.544
116.675
116.552

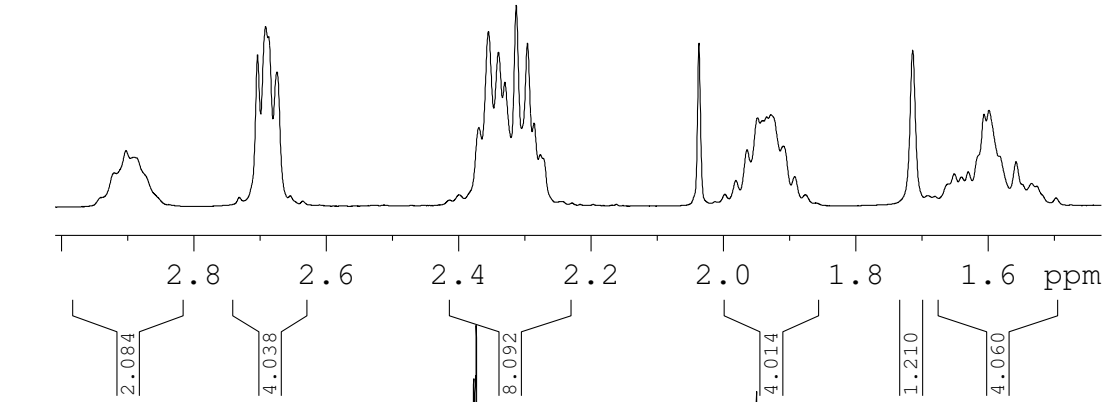


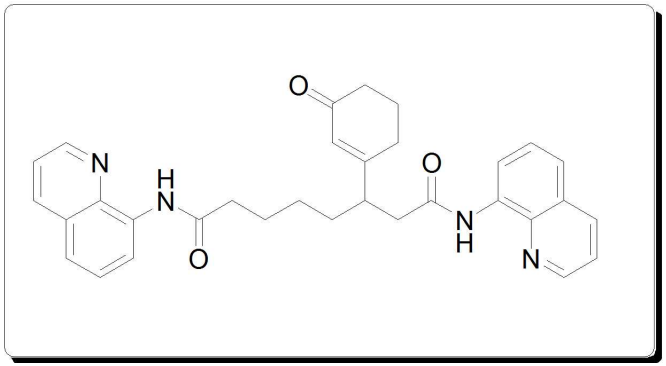


9.7685
8.7762 8.7657 8.6821 8.6735 8.6603
8.1546 8.1340
7.5022 7.4975 7.4931 7.4887 7.4575 7.4470 7.4369 7.4263 7.2602
5.9676
4.1414 4.1235 4.1057 4.0878 2.9202 2.9023 2.8917 2.7036 2.6913 2.6868 2.6741 2.3692 2.3546 2.3395 2.3297 2.3126 2.2957 2.2857 2.2763 2.0366 1.9806 1.9638 1.9478 1.9408 1.9350 1.9286 1.9095 1.8926 1.7143 1.6513 1.6406 1.6304 1.6065 1.5989 1.5582 1.5345 1.2691 1.2512 1.2335

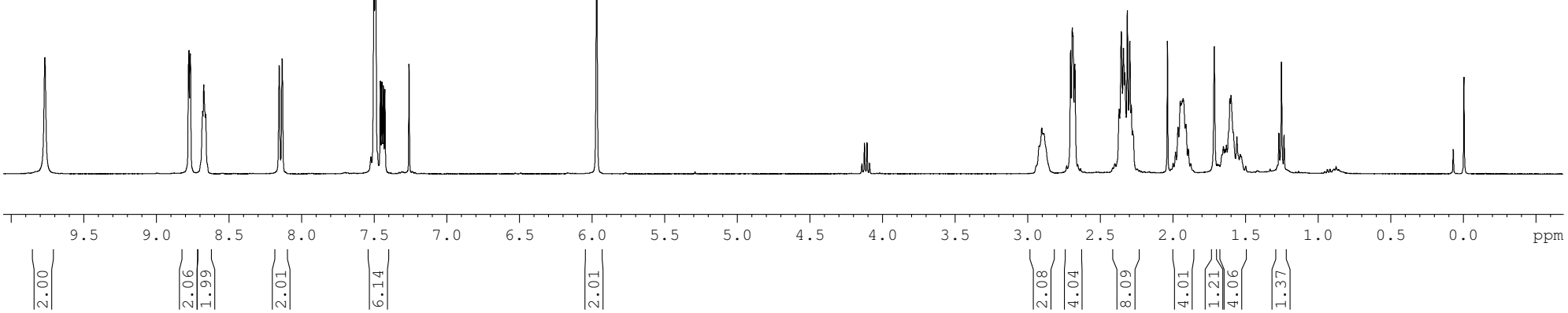
Current Data Parameters
NAME hgy-2-pp-4-c-20140715-
EXPNO 11
PROCNO 1

2.920 2.902 2.892
2.704 2.691 2.687 2.674
2.369 2.355 2.340 2.330 2.313 2.296 2.286 2.276
2.037 1.981 1.964 1.948 1.941 1.935 1.929 1.910 1.893
1.714 1.651 1.641 1.630 1.607 1.599 1.558 1.535





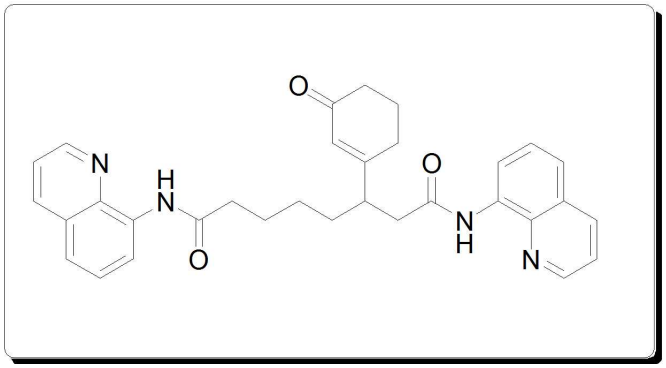
2.084 4.038 8.092 4.014 1.210 4.060



2.00 2.06 1.99 2.01 6.14 2.01 2.08 4.04 8.09 4.01 1.21 4.06 1.37

199.55
169.13
169.10
166.79
166.77
148.39
138.38
136.53
134.21
128.07
127.46
126.97
121.91
121.84
116.70
44.16
44.03
42.34
42.16
37.69
31.03
30.85
28.02
27.93
22.89

Current Data Parameters
NAME hgy-2-pp-4-c-20140715-
EXPNO 10
PROCNO 1



9.8248

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8.7861
8.7431
8.7364
8.7279
8.7211
8.1753
8.1722
8.1547
8.1516
7.5319
7.5228
7.5164
7.5025
7.4749
7.4644
7.4543
7.4437
7.2600

6.0555

3.2802
3.2627
2.8941
2.8771
2.8569
2.8398
2.7237
2.7169
2.7051
2.6994
2.6797
2.6610
2.4302
2.4253
2.4181
2.4129
2.4065

1.3319
1.3146

Current Data Parameters
NAME hgy-2-h-8-20140416-
EXPNO 30
PROCNO 1

3.280
3.263

2.894
2.877
2.857
2.840
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2.680
2.661

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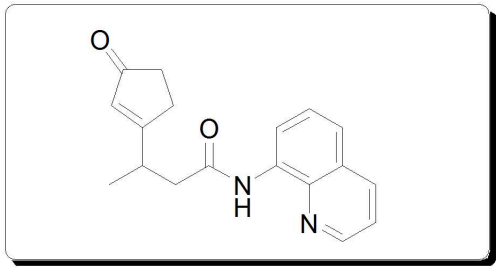
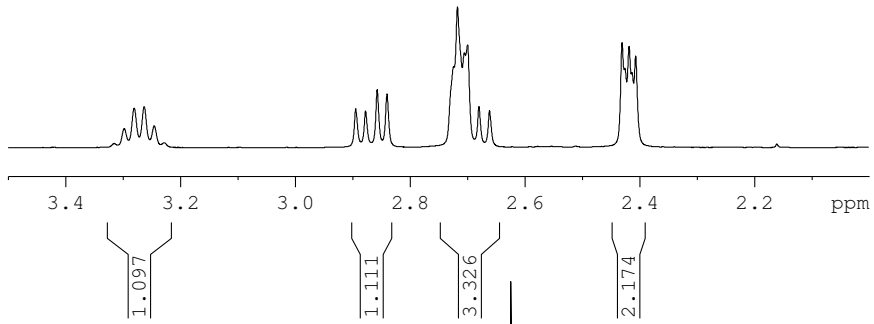
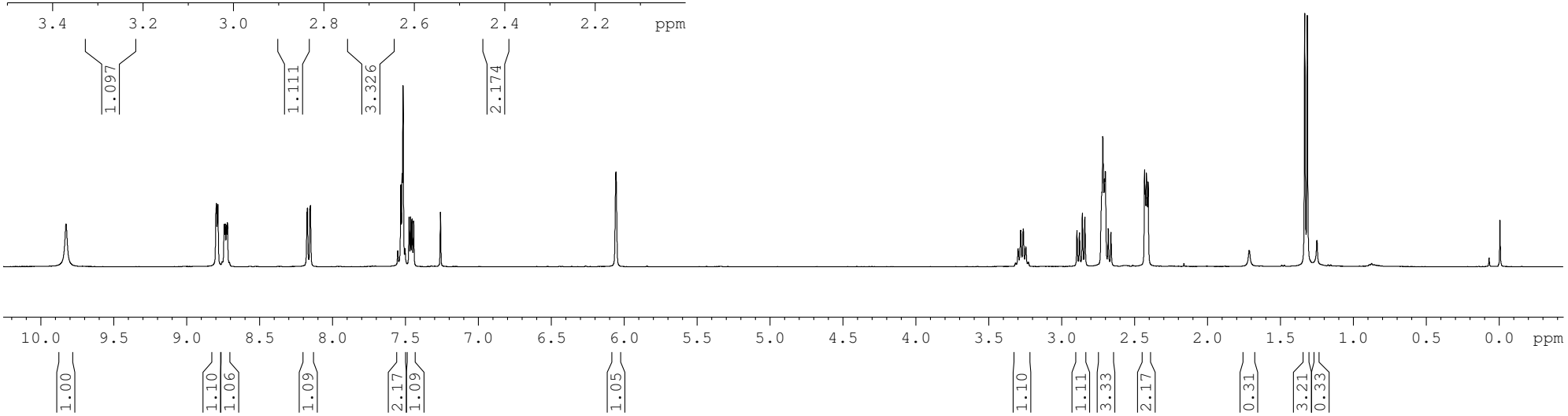
2.413
2.406







209.90
185.56
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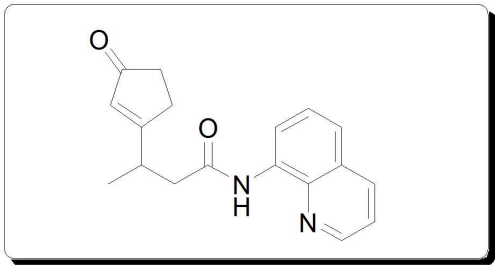
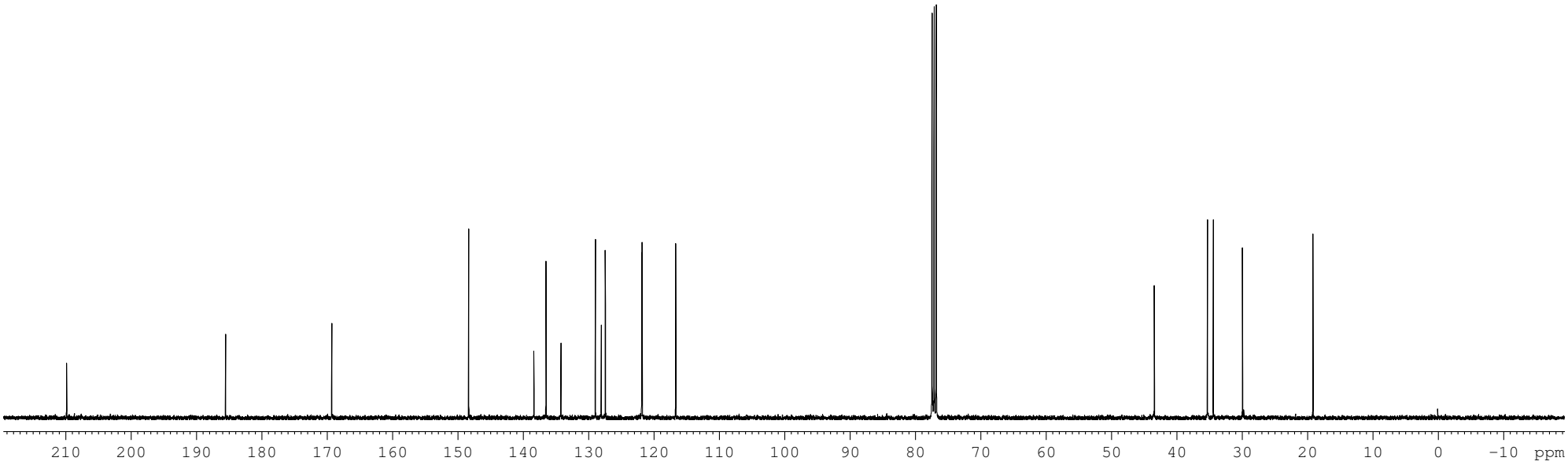
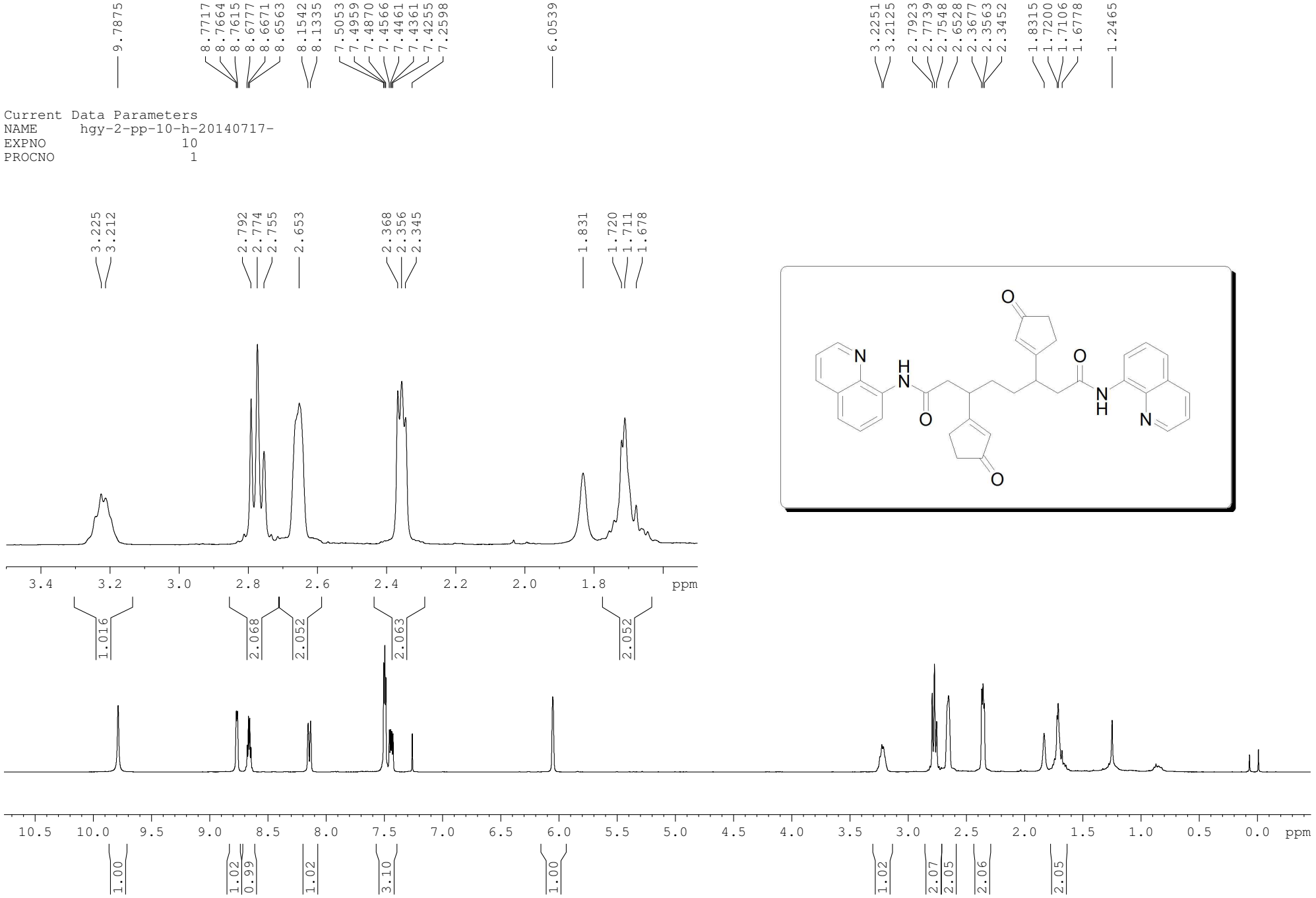
148.37
138.39
136.54
134.25
128.99
128.07
127.46
121.90
121.82
116.69
77.48
77.16
76.84
43.47
35.34
34.44
29.98
19.19

Current Data Parameters
NAME HGY-2-5P-4-C-20140731-
EXPNO 10
PROCNO 1



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7.4566
7.4461
7.4361
7.4255
7.2598
6.0539
3.2251
3.2125
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2.6528
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2.3452
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1.7106
1.6778
1.2465
Current Data Parameters
NAME hgy-2-pp-10-h-20140717-
EXPNO 10
PROCNO 1
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2.356
2.345
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1.711
1.678
O
N
H
N
O
O
N
H
N
O
3.4
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3.0
2.8
2.6
2.4
2.2
2.0
1.8
ppm
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2.063
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6.0
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4.0
3.5
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1.5
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ppm
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3.10
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2.07
2.05
2.06
2.05

209.41
183.26
168.91
168.88
148.41
138.35
138.34
136.56
134.10
134.08
130.64
130.62
128.06
127.44
122.01
121.86
116.74
42.04
41.86
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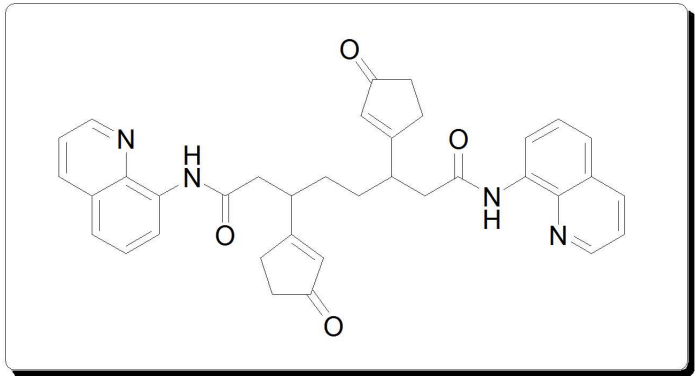
29.93

Current Data Parameters
NAME hgy-2-pp-10-c-2014071
EXPNO 10



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3.2221
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2.7958
2.7768
2.7594
2.7392
2.7005
2.6930
2.6820
2.5842
2.5657
2.5473
2.3789
2.3738
2.3672
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1.8829
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1.7349
1.7172
1.7015
1.6828
1.5180
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1.4792
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1.4404

Current Data Parameters
NAME hgy-2-pp-1-h-20140717-
EXPNO 10
PROCNO 1

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3.222
3.205
2.848
2.832
2.810
2.796
2.777
2.759
2.739
2.700
2.693
2.682
2.584
2.566
2.547
2.379
2.374
2.367
2.362
2.356
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1.871
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1.844
1.834
1.826
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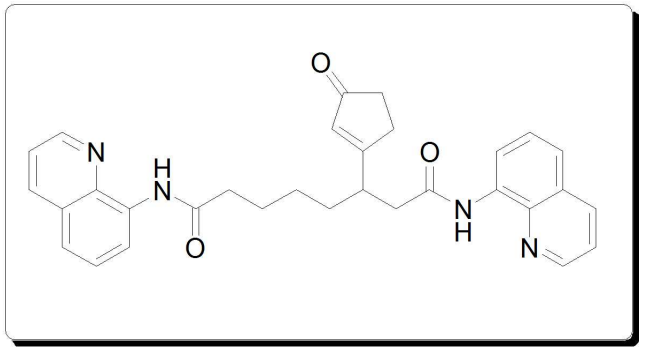

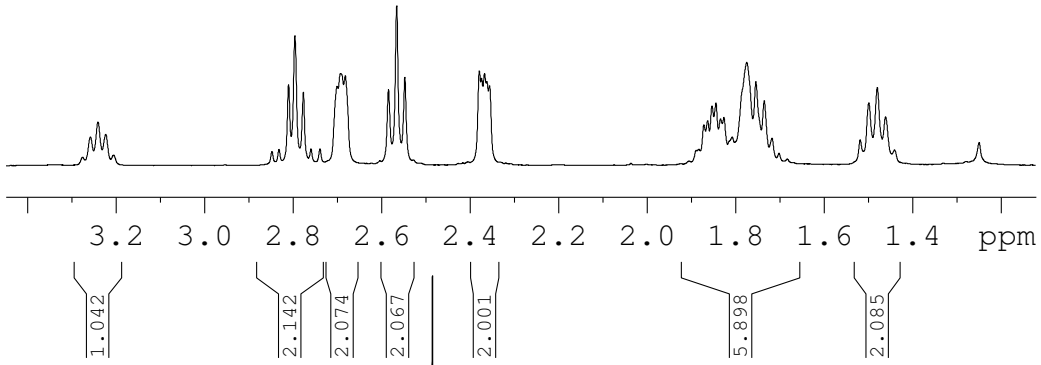

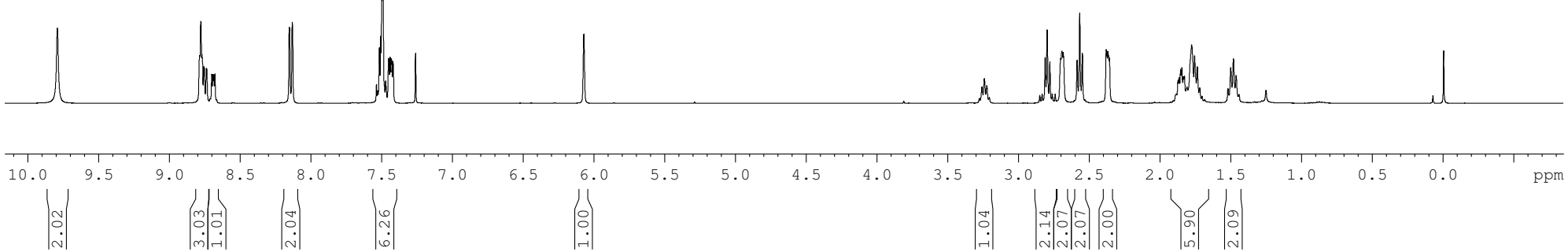

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138.40
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134.24
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127.54
127.46
121.89
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121.72
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116.59
77.48
77.16
76.85
42.18
39.75
37.91
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33.47
29.99
26.86
25.59

Current Data Parameters
NAME hgy-2-pp-1-c-20140717-
EXPNO 21
PROCNO 1

148.384
148.274
138.452
138.399
136.521
136.500
134.564
134.236
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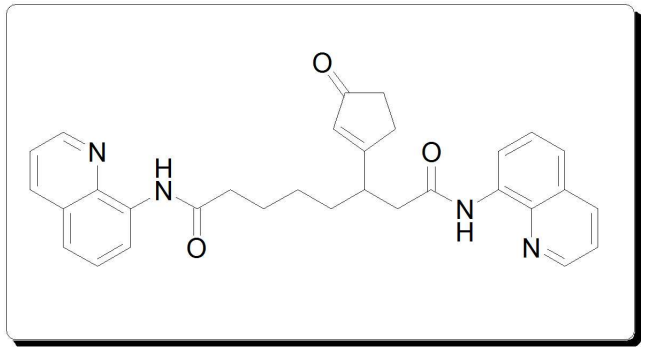
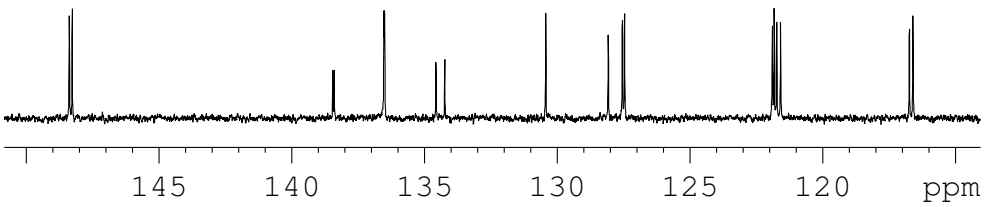
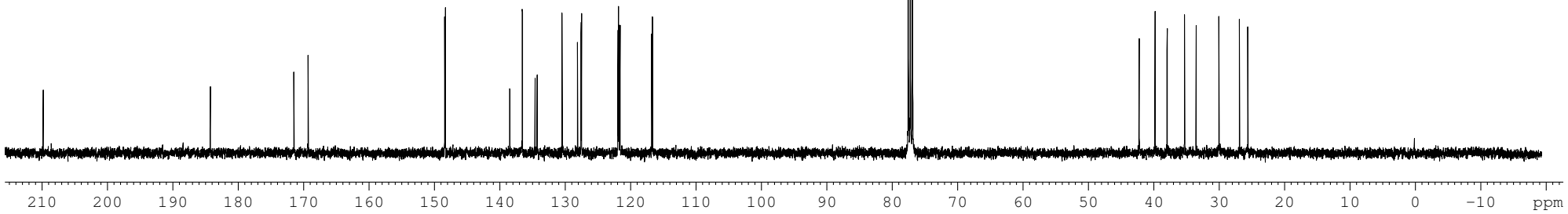
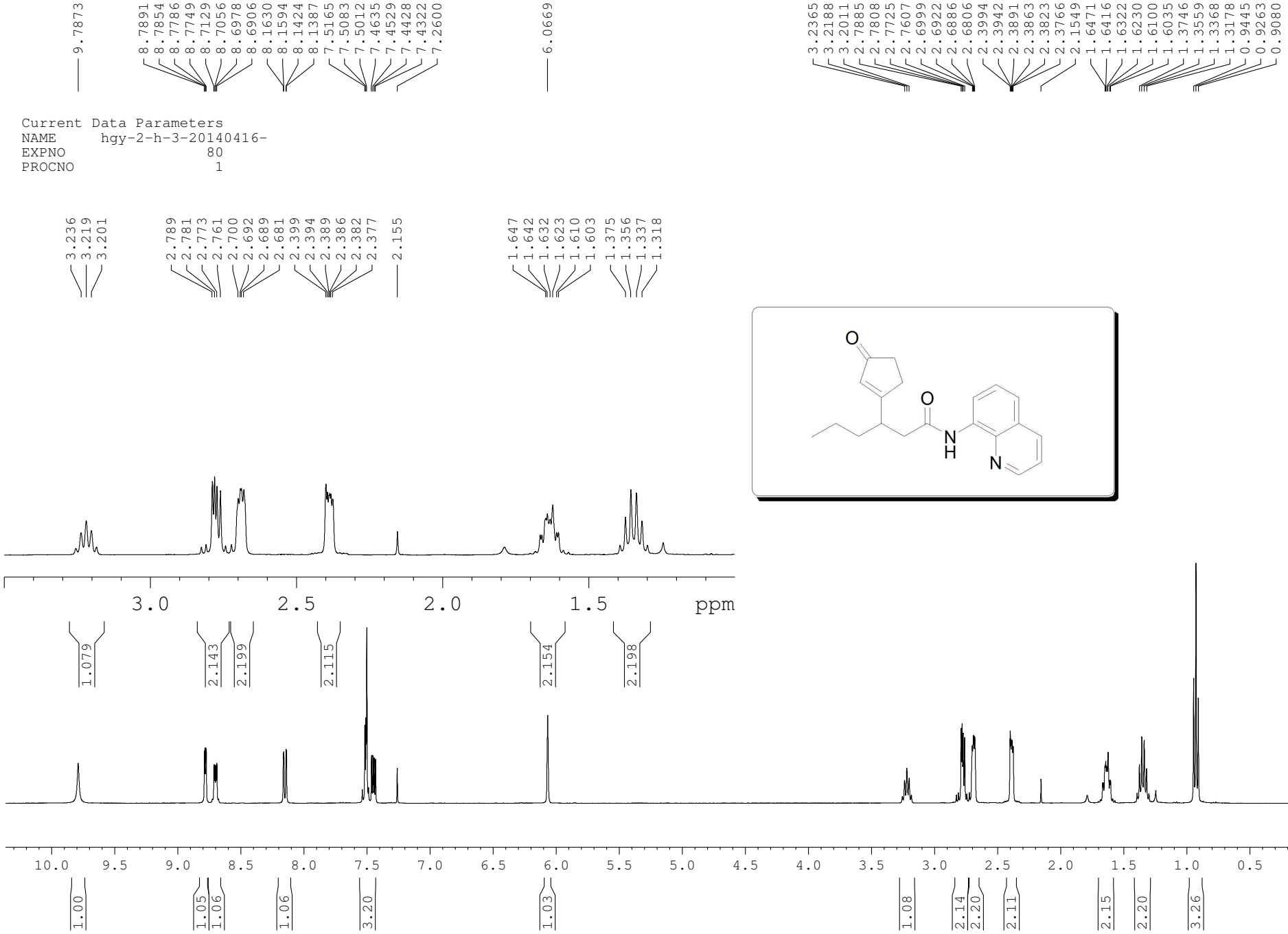
121.820
121.722
121.578
116.726
116.587





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8.6906
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8.1594
8.1424
8.1387
7.5165
7.5083
7.5012
7.4635
7.4529
7.4428
7.4322
7.2600
6.0669
3.2365
3.2188
3.2011
2.7885
2.7808
2.7725
2.7607
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2.6922
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2.6806
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2.3942
2.3891
2.3863
2.3823
2.3766
2.1549
1.6471
1.6416
1.6322
1.6230
1.6100
1.6035
1.3746
1.3559
1.3368
1.3178
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0.9080
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NAME hgy-2-h-3-20140416-
EXPNO 80
PROCNO 1
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3.201
2.789
2.781
2.773
2.761
2.700
2.692
2.689
2.681
2.399
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2.389
2.386
2.382
2.377
2.155
1.647
1.642
1.632
1.623
1.610
1.603
1.375
1.356
1.337
1.318
O
O
N
H
N
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2.5
2.0
1.5
ppm
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2.199
2.115
2.154
2.198
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8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
ppm
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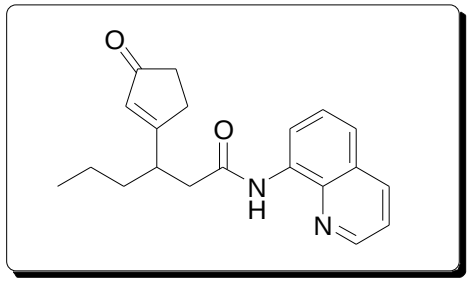
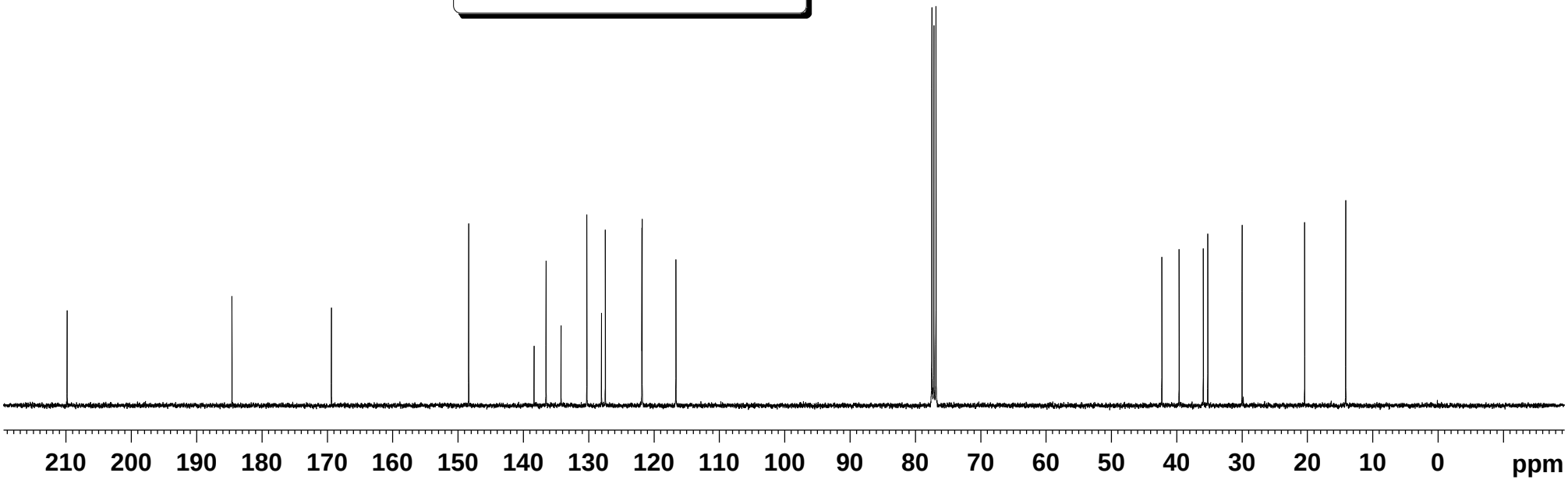
1.05
1.06
1.06
3.20
1.03
1.08
2.14
2.20
2.11
2.15
2.20
3.26

209.84
184.61
169.38
148.36
138.37
136.53
134.24
130.29
128.05
127.46
121.86
121.82
116.65
42.27
39.62
35.93
35.24
29.99
20.41
14.12

Current Data Parameters
NAME hgy-2-135-3-c-140528-
EXPNO 10
PROCNO 1





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8.7812
8.7160
8.7087
8.7011
8.6938
8.1716
8.1680
8.1510
8.1473
7.5239
7.5159
7.5087
7.4717
7.4612
7.4511
7.4405
7.2599
6.0731
3.2053
2.7982
2.7892
2.7825
2.7691
2.7055
2.6976
2.6943
2.6861
2.4089
2.4041
2.3991
2.3960
2.3921
2.3872
1.6803
1.6756
1.6615
1.6443
1.3363
1.3200
1.3105
1.3026
1.2833
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0.8902
0.8724
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Current Data Parameters
NAME hgy-2-h-2-20140416-
EXPNO 80
PROCNO 1

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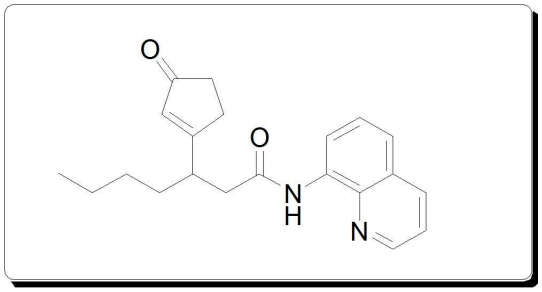
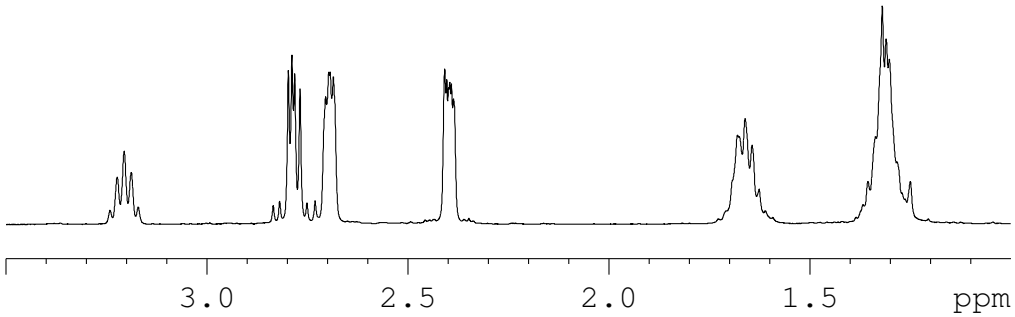
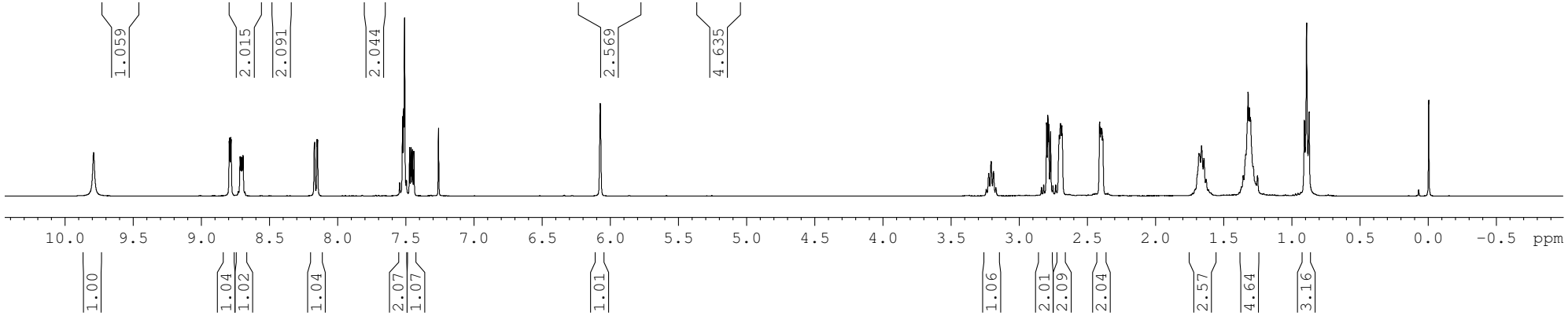
2.783
2.769
2.705
2.698
2.694
2.686
2.409
2.404
2.399
2.396
2.392
2.387
1.680
1.676
1.662
1.644
1.336
1.320
1.311
1.303
1.283







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121.84
116.69
42.30
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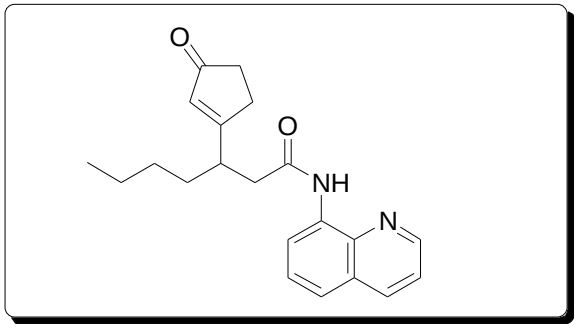
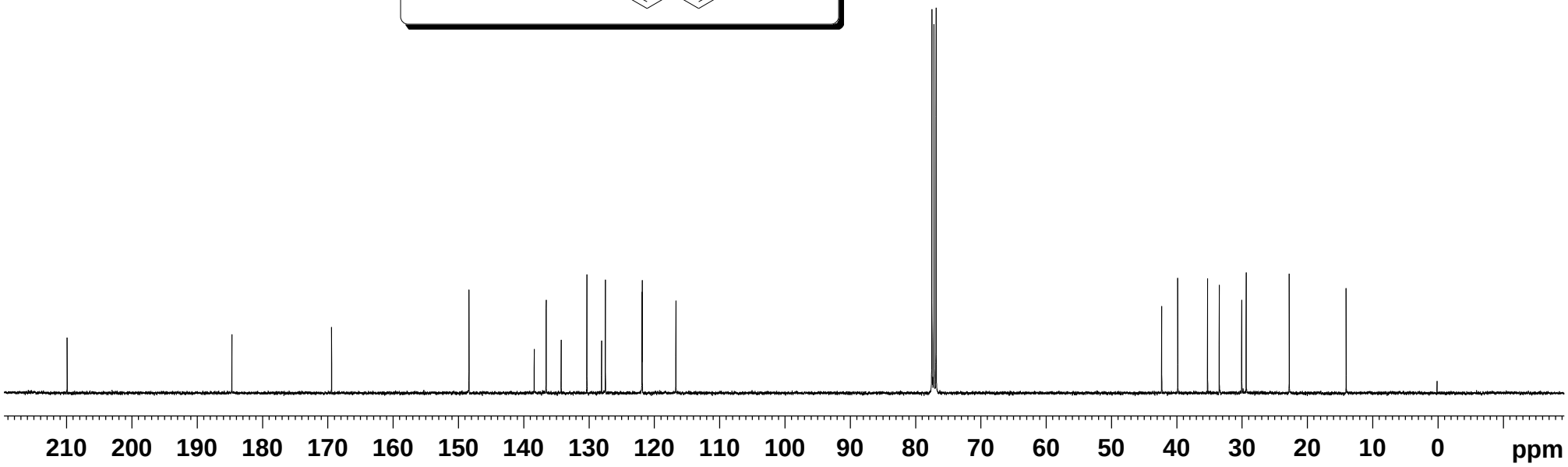
Current Data Parameters
NAME hgy-2-135-2-c-140528-
EXPNO 10
PROCNO 1





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8.7917
8.7849
8.7812
8.7160
8.7087
8.7011
8.6938
8.1716
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8.1510
8.1473
7.5239
7.5159
7.5087
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7.4612
7.4511
7.4405
7.2599
6.0731
3.2053
2.7982
2.7892
2.7825
2.7691
2.7055
2.6976
2.6943
2.6861
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2.4041
2.3991
2.3960
2.3921
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1.6756
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1.3200
1.3105
1.3026
1.2833
0.9070
0.8902
0.8724

Current Data Parameters
NAME hgy-2-h-2-20140416-
EXPNO 80
PROCNO 1

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2.404
2.399
2.396
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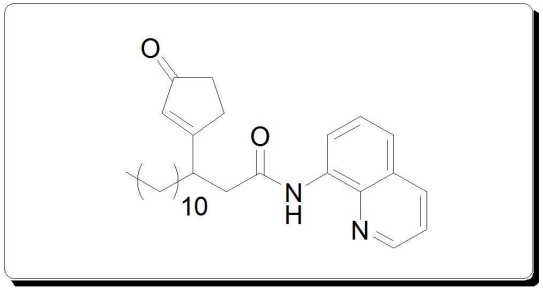
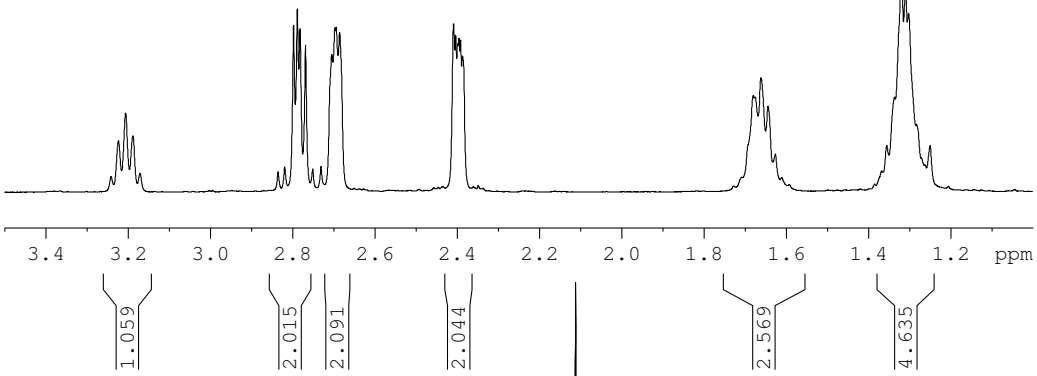
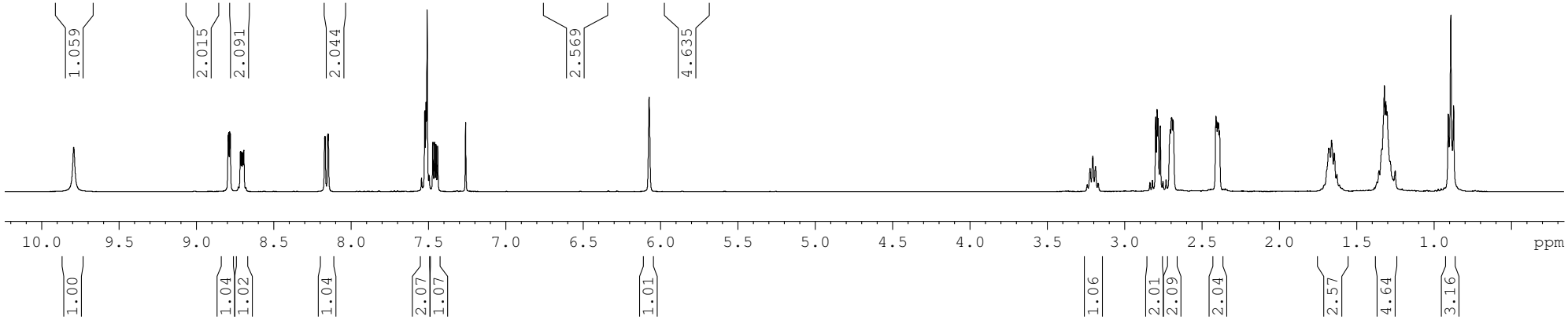
1.303
1.283







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32.02
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29.73
29.72
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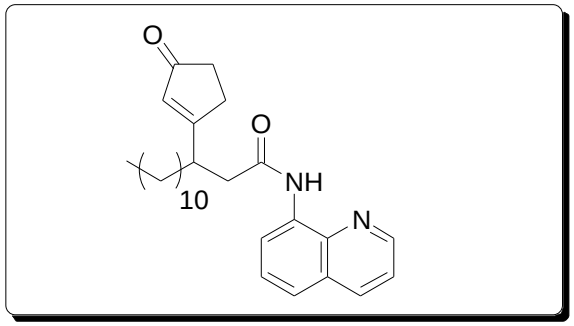
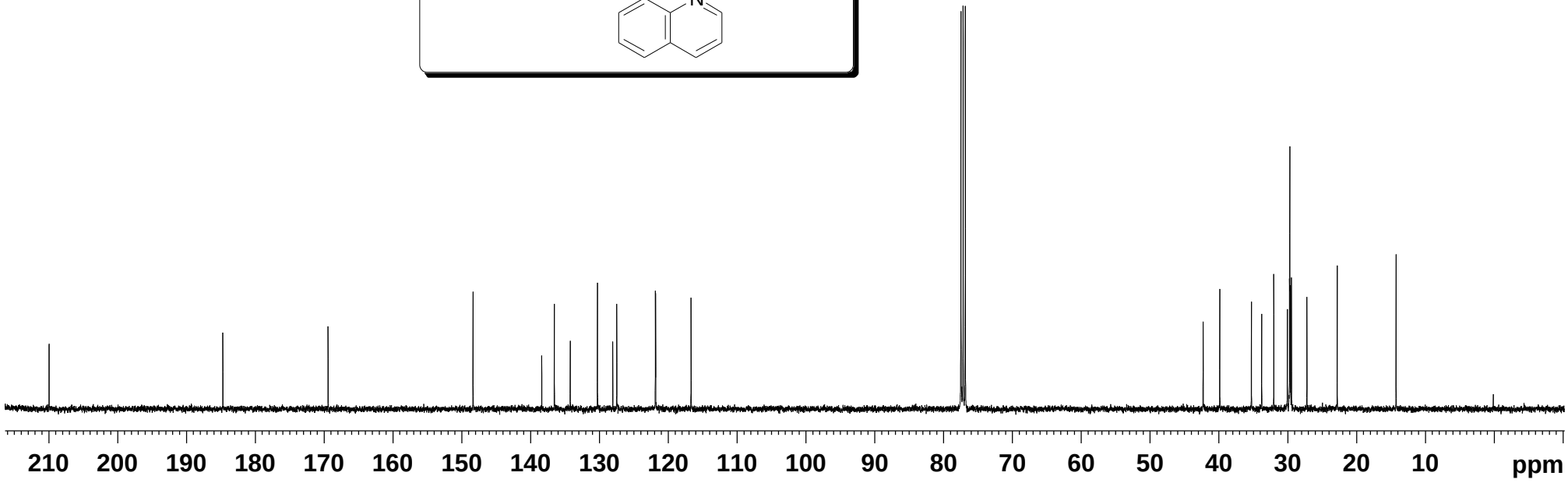
22.81
14.25

Current Data Parameters
NAME hgy-2-135-13-c-140528-
EXPNO 10
PROCNO 1





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8.7849
8.7812
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8.7087
8.7011
8.6938
8.1716
8.1680
8.1510
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7.5239
7.5159
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7.4612
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7.4405
7.2599
6.0731
3.2053
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1.2833
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Current Data Parameters
NAME hgy-2-h-2-20140416-
EXPNO 80
PROCNO 1

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2.399
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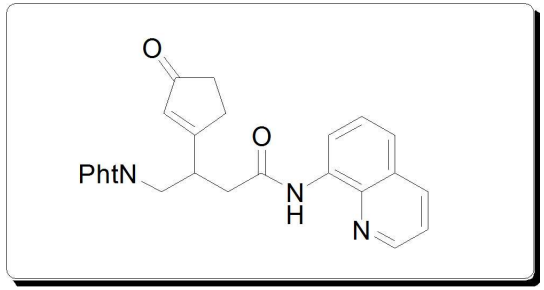

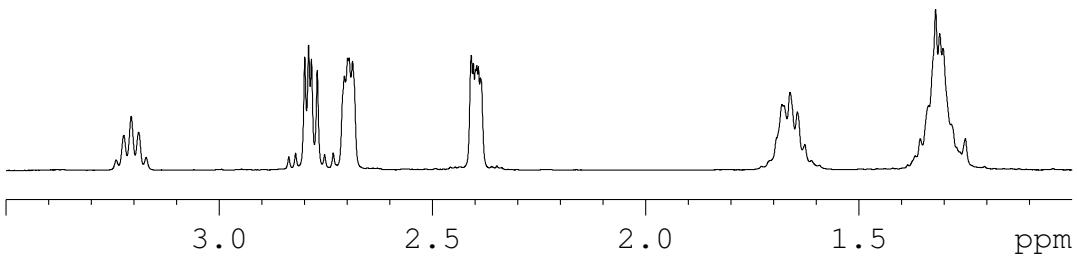

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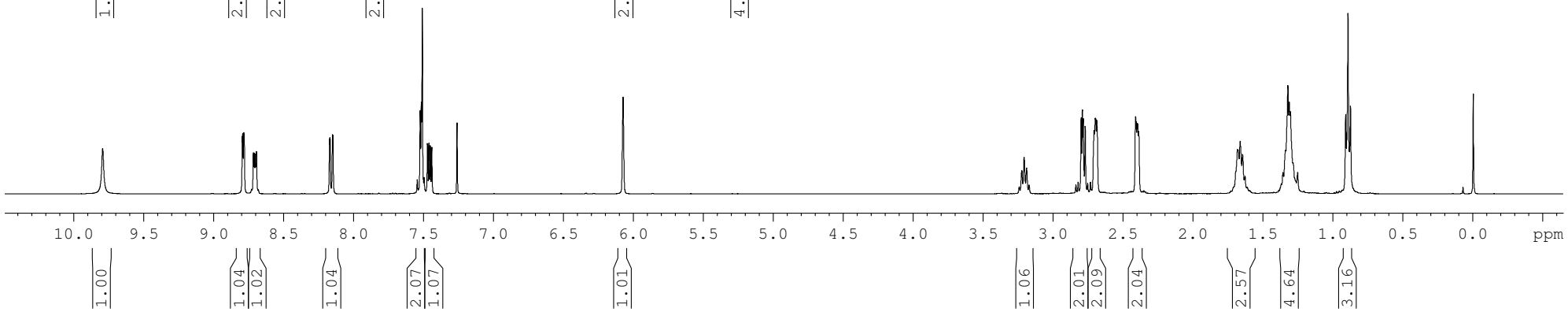

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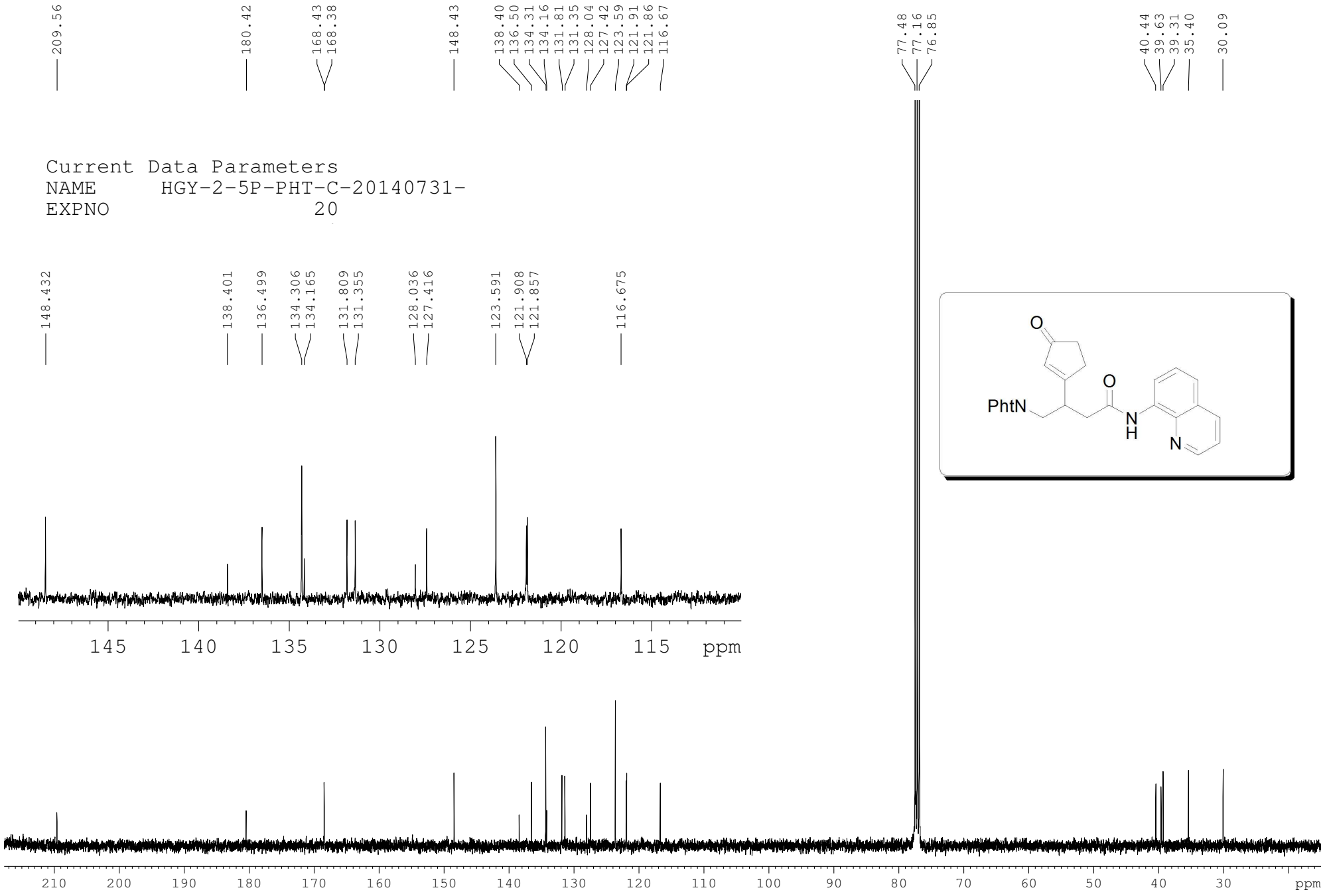
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123.59
121.91
121.86
116.67
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77.16
76.85
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39.63
39.31
35.40
30.09
Current Data Parameters
NAME HGY-2-5P-PHT-C-20140731-
EXPNO 20
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H
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130
125
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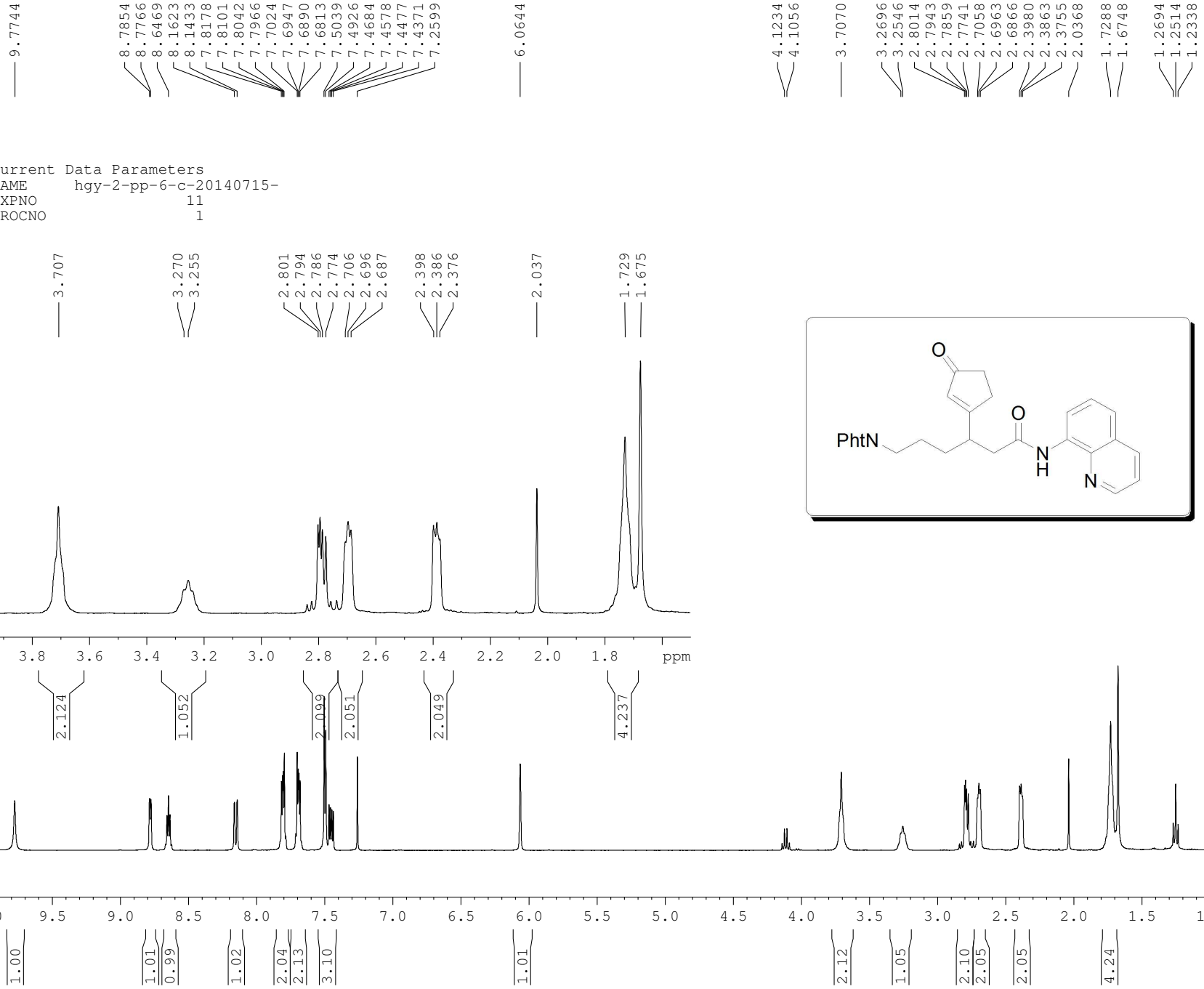
50
40
30
ppm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7.4371
7.2599
6.0644
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2.376
2.037
1.729
1.675
O
O
PhtN
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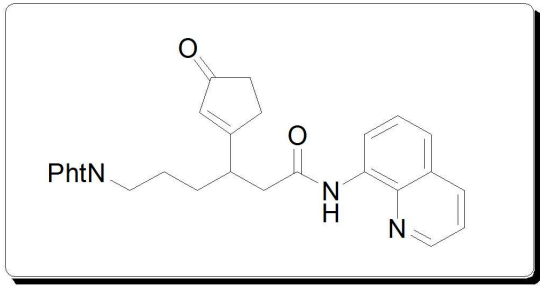
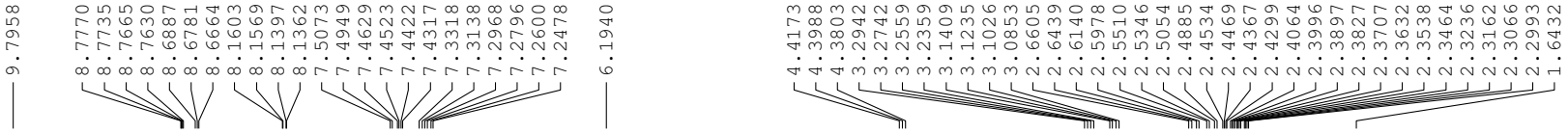
H
N
ppm
2.124
1.052
2.099
2.051
2.049
4.237
1.00
1.01
0.99
1.02
2.04
2.13
3.10
1.01
2.12
1.05
2.10
2.05
2.05
4.24

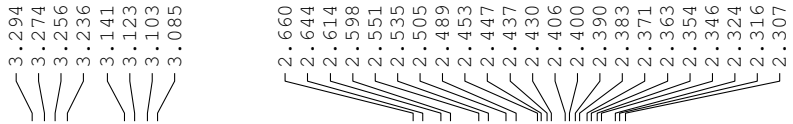
209.63
183.61
169.00
168.47
148.41
138.40
136.53
134.20
134.11
132.16
130.61
128.07
127.46
123.40
121.91
121.85
116.72
42.10
39.35
37.76
35.27
30.90
30.08
26.36

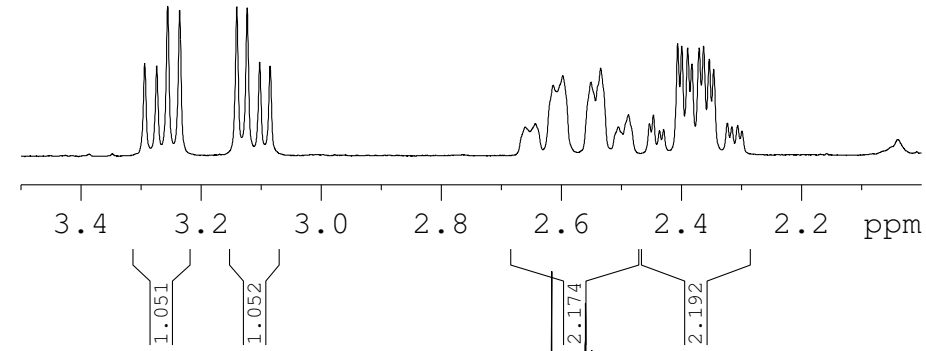
Current Data Parameters
NAME hgy-2-pp-6-c-20140715-
EXPNO 10
PROCNO 1

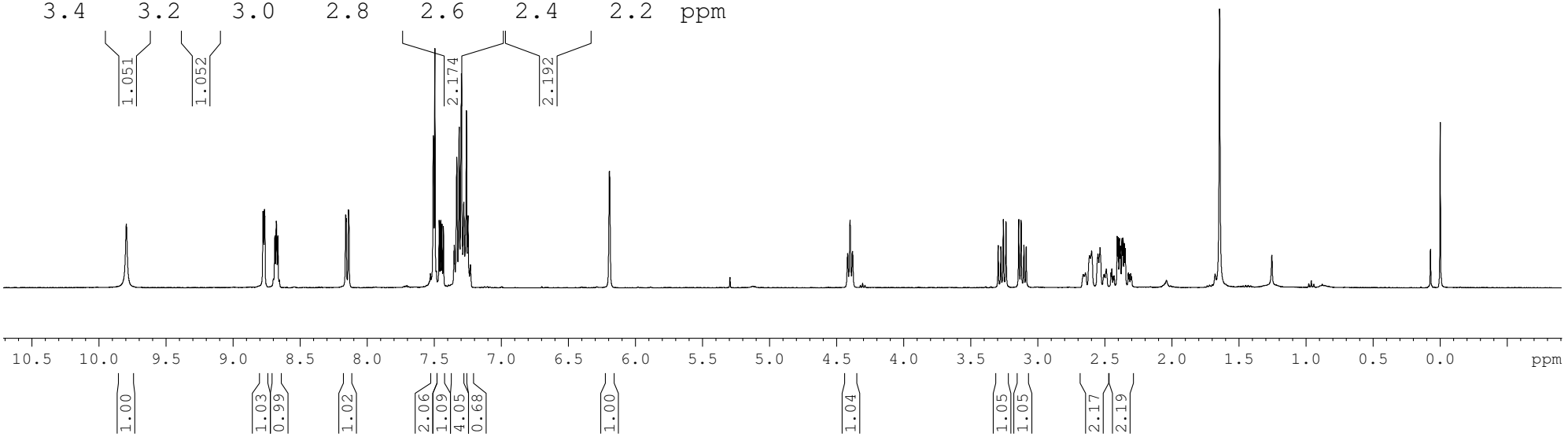


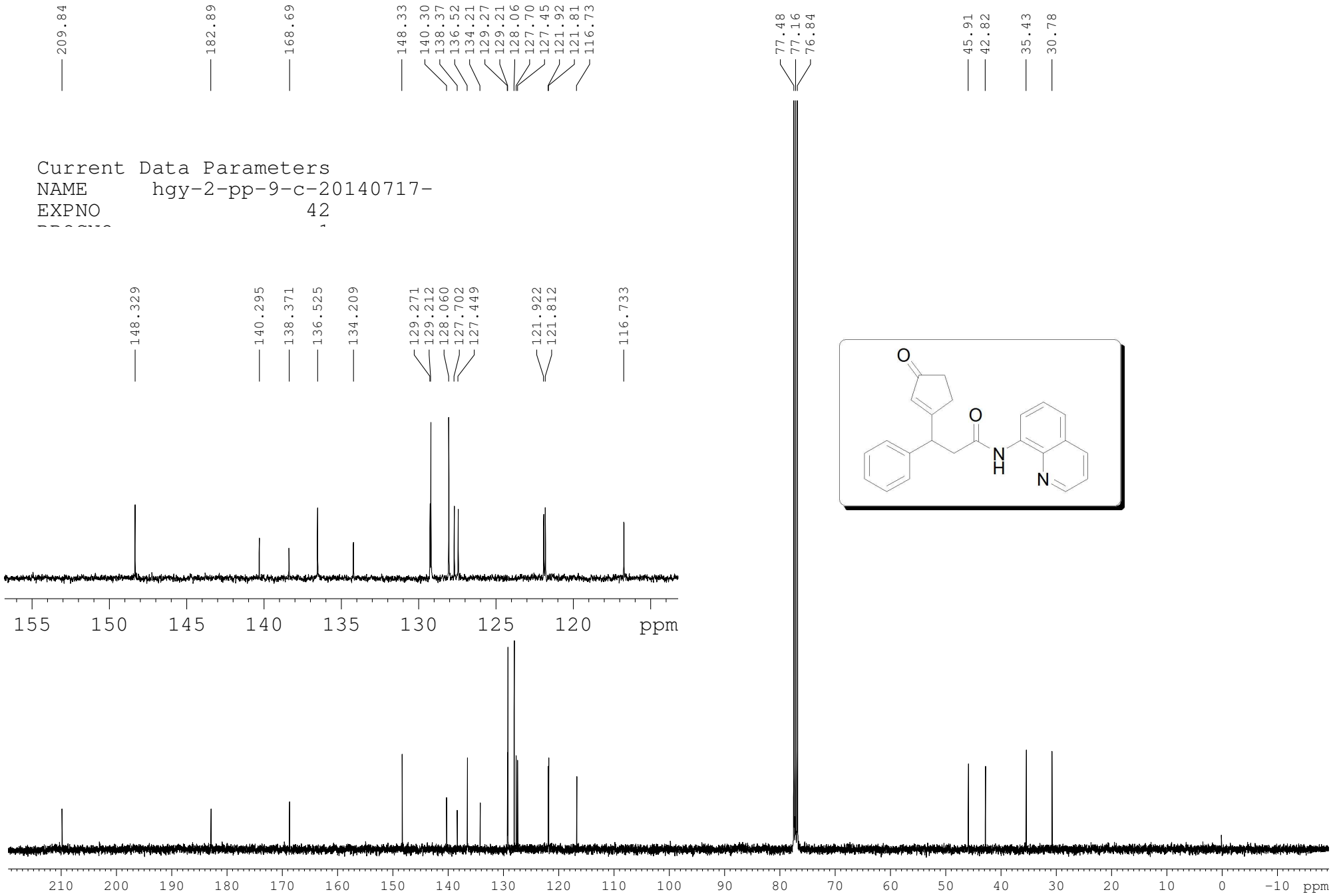


Current Data Parameters
NAME hgy-2-pp-9-h-20140717-
EXPNO 40
PROCNO 1

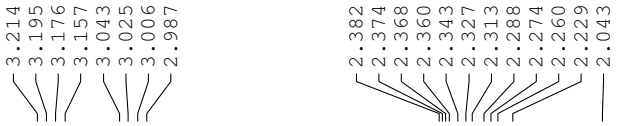


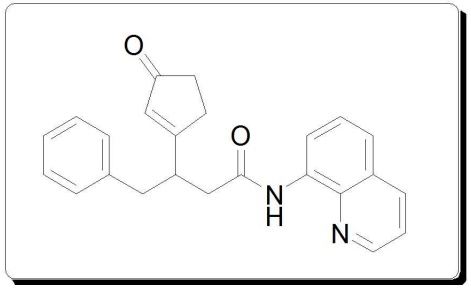


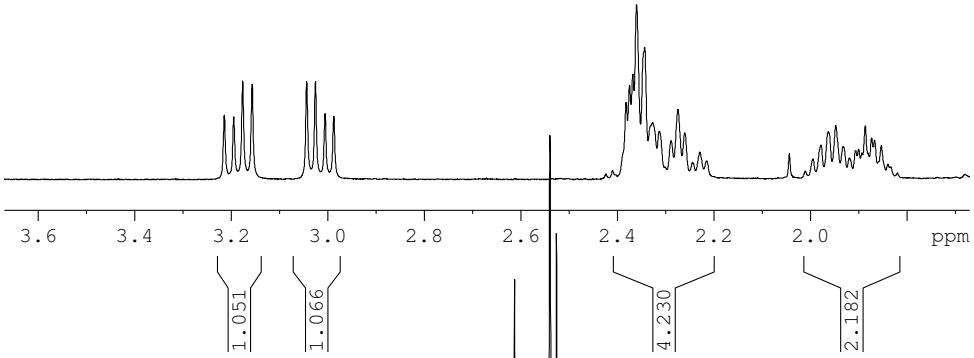


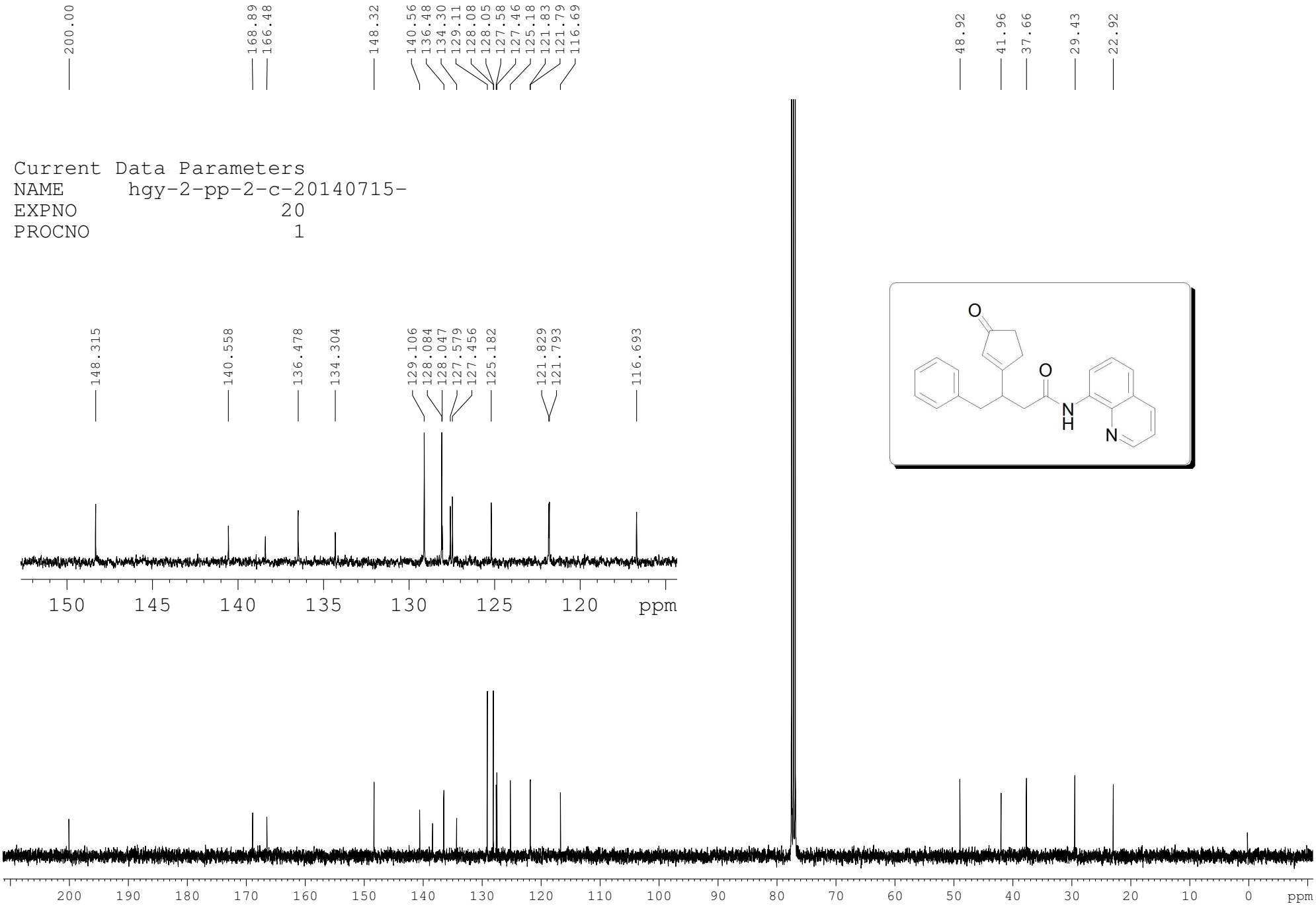

209.84
182.89
168.69
148.33
140.30
138.37
136.52
134.21
129.27
129.21
128.06
127.70
127.45
121.92
121.81
116.73
77.48
77.16
76.84
45.91
42.82
35.43
30.78
Current Data Parameters
NAME hgy-2-pp-9-c-20140717-
EXPNO 42
148.329
140.295
138.371
136.525
134.209
129.271
129.212
128.060
127.702
127.449
121.922
121.812
116.733
O
O
N
H
N
155 150 145 140 135 130 125 120 ppm
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 ppm

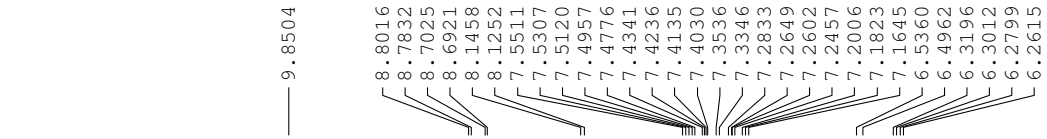
Current Data Parameters
NAME hgy-2-5p-bending-h-20140715-
EXPNO 10
PROCNO 1



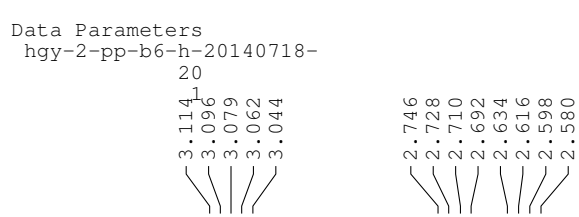


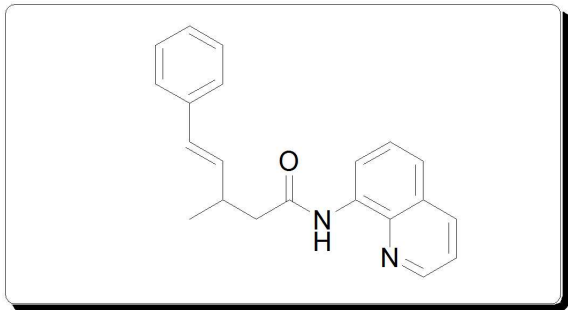


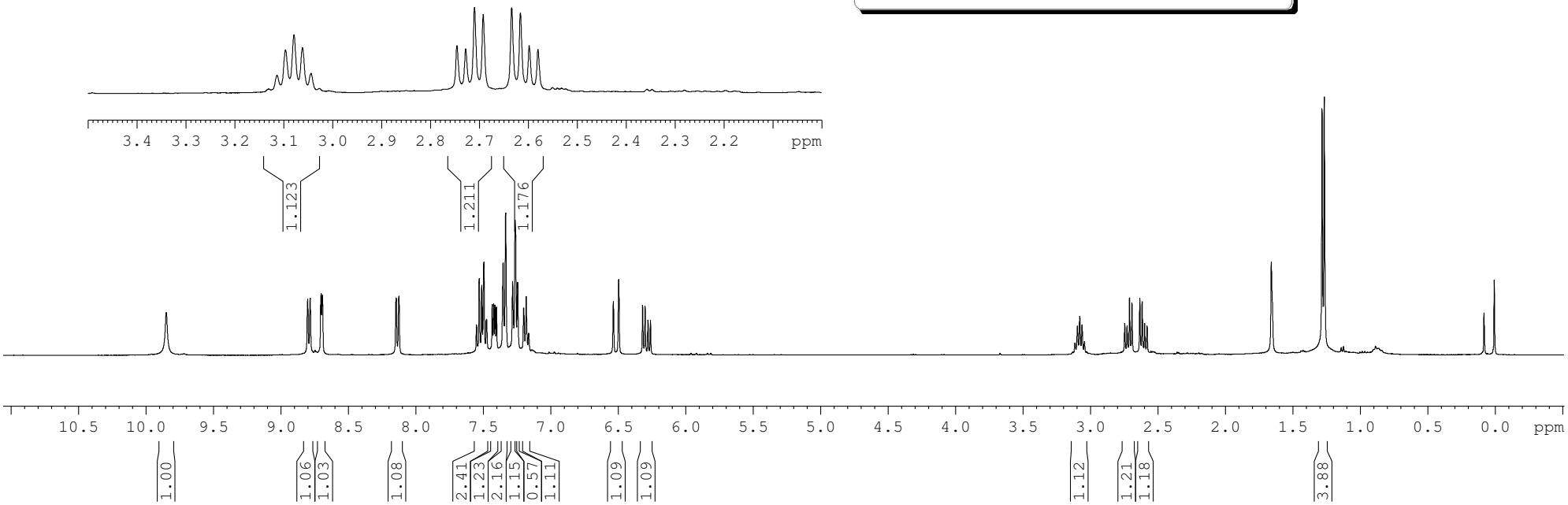

200.00
168.89
166.48
148.32
140.56
136.48
134.30
129.11
128.08
128.05
127.58
127.46
125.18
121.83
121.79
116.69
48.92
41.96
37.66
29.43
22.92
Current Data Parameters
NAME hgy-2-pp-2-c-20140715-
EXPNO 20
PROCNO 1
148.315
140.558
136.478
134.304
129.106
128.084
128.047
127.579
127.456
125.182
121.829
121.793
116.693
150
145
140
135
130
125
120
ppm
O
O
N
H
N
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

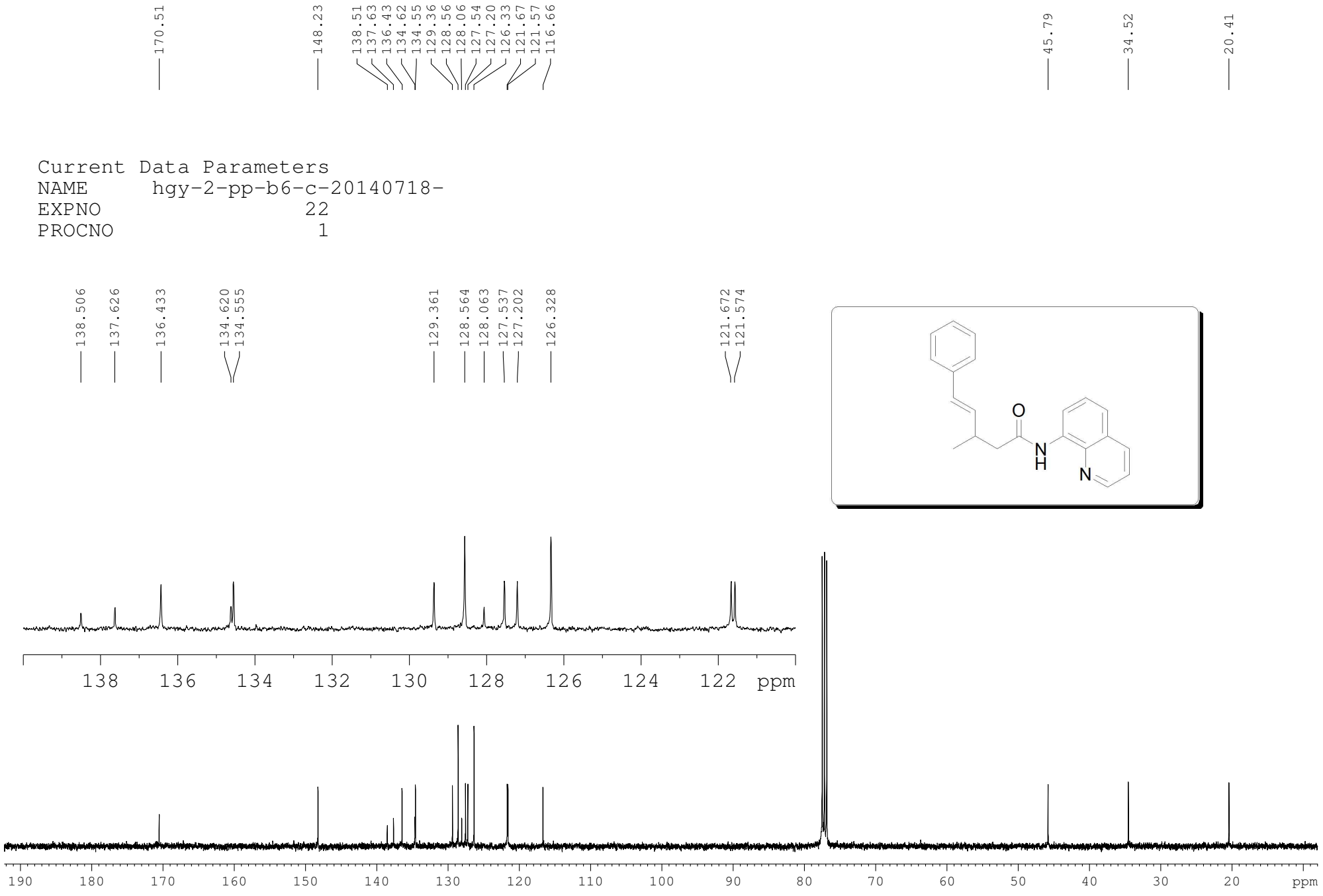


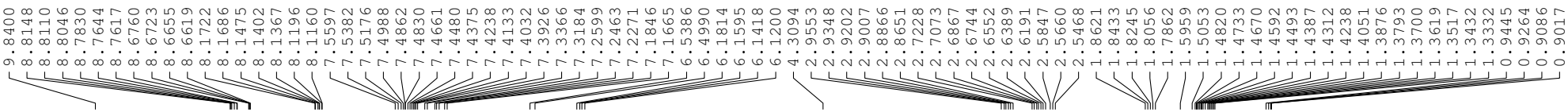
Current Data Parameters
NAME hgy-2-pp-b6-h-20140718-
EXPNO 20
PROCNO 1



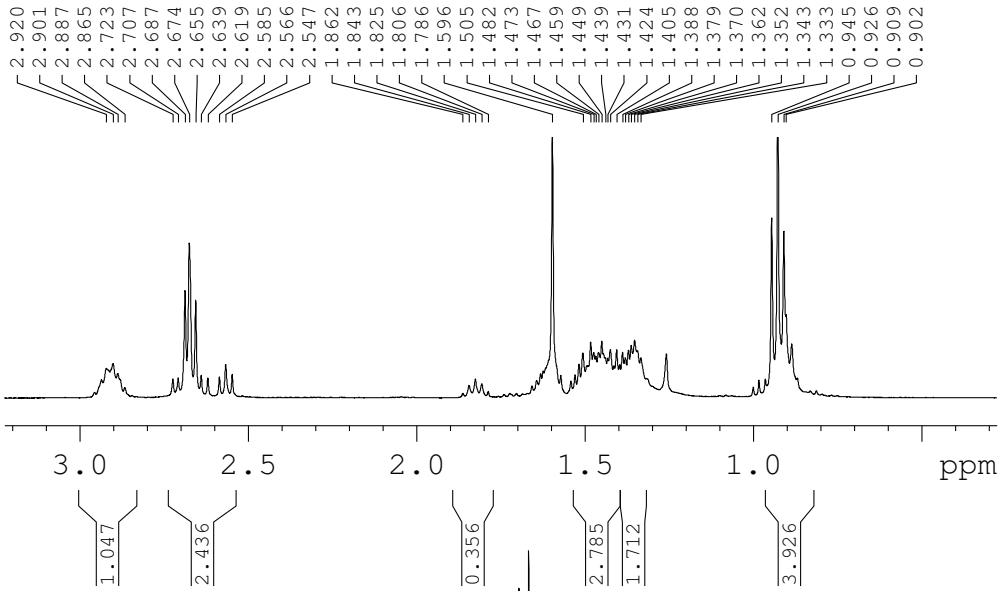


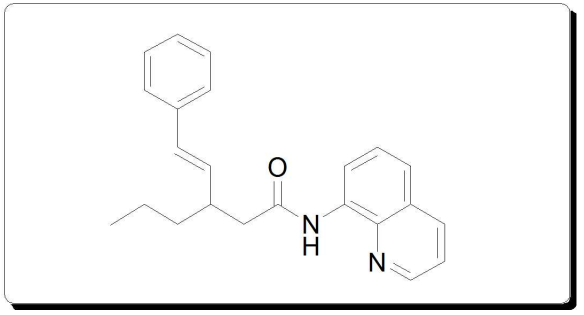


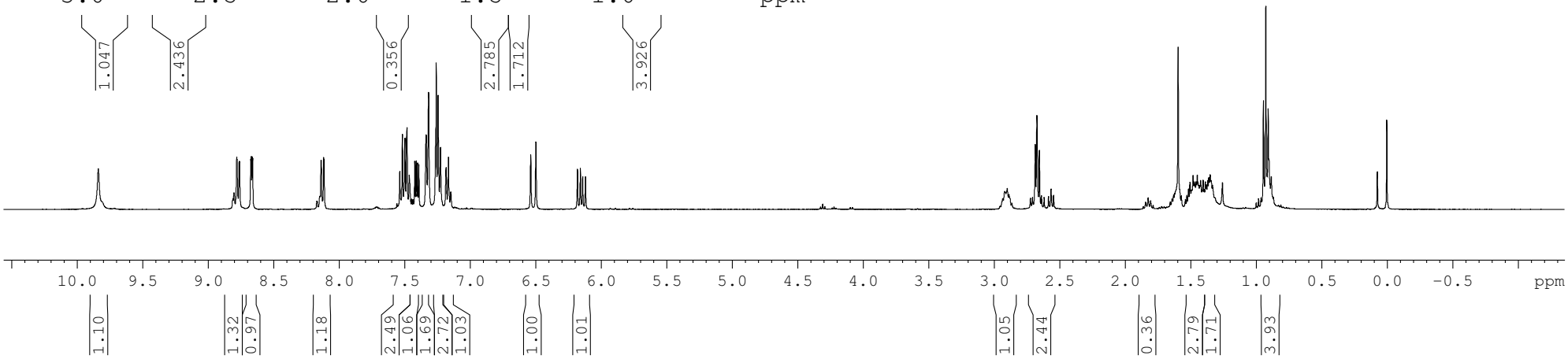

170.51
148.23
138.51
137.63
136.43
134.62
134.55
129.36
128.56
128.06
127.54
127.20
126.33
121.67
121.57
116.66
45.79
34.52
20.41
Current Data Parameters
NAME hgy-2-pp-b6-c-20140718-
EXPNO 22
PROCNO 1
138.506
137.626
136.433
134.620
134.555
129.361
128.564
128.063
127.537
127.202
126.328
121.672
121.574
O
N
H
N
138
136
134
132
130
128
126
124
122
ppm
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ppm

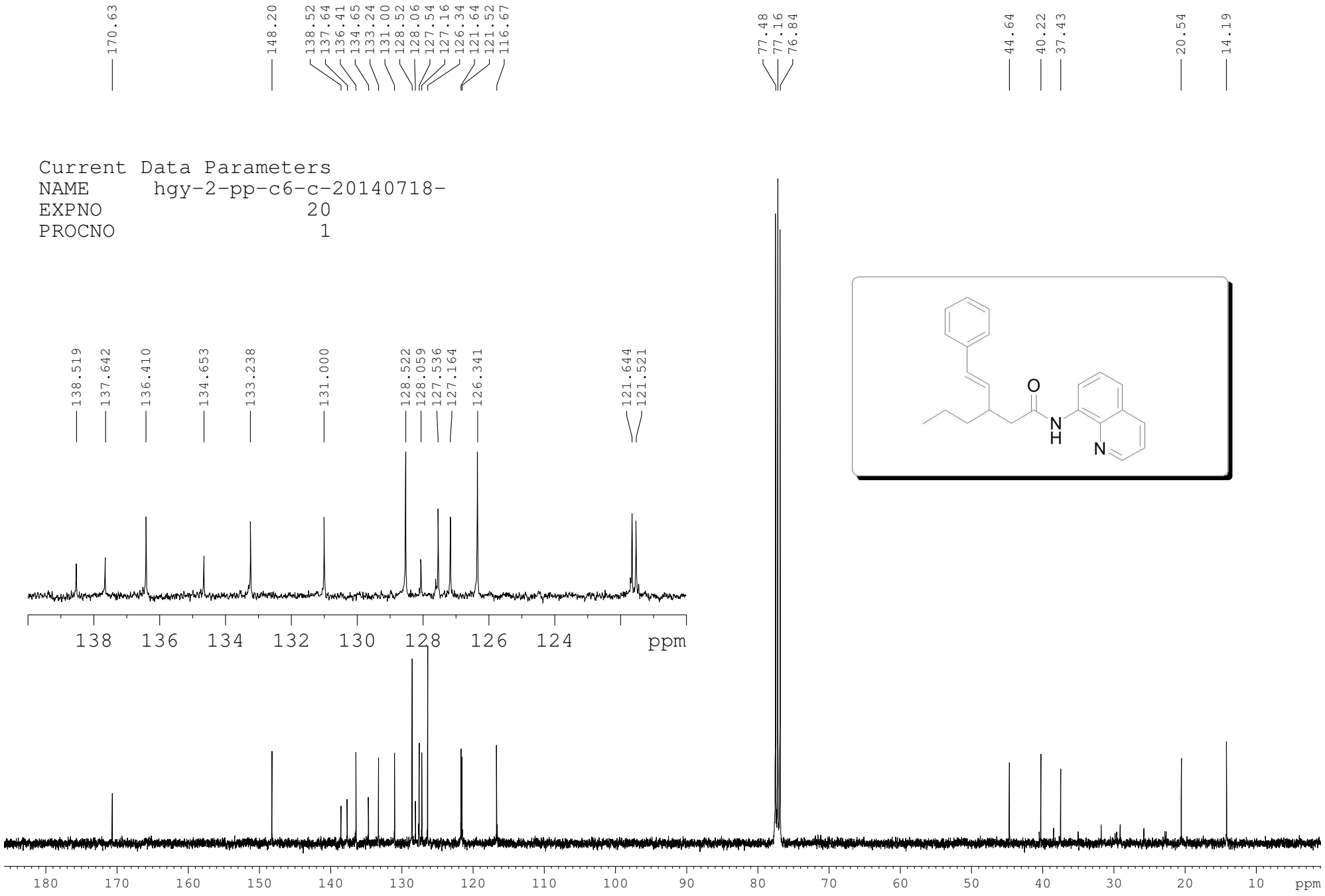


Current Data Parameters
NAME hgy-2-pv-6-h-20140714-
EXPNO 10
PROCNO 1








170.63
148.20
138.52
137.64
136.41
134.65
133.24
131.00
128.52
128.06
127.54
127.16
126.34
121.64
121.52
116.67
77.48
77.16
76.84
44.64
40.22
37.43
20.54
14.19
Current Data Parameters
NAME hgy-2-pp-c6-c-20140718-
EXPNO 20
PROCNO 1
138.519
137.642
136.410
134.653
133.238
131.000
128.522
128.059
127.536
127.164
126.341
121.644
121.521
O
N
H
N
138 136 134 132 130 128 126 124 ppm
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

9.8516

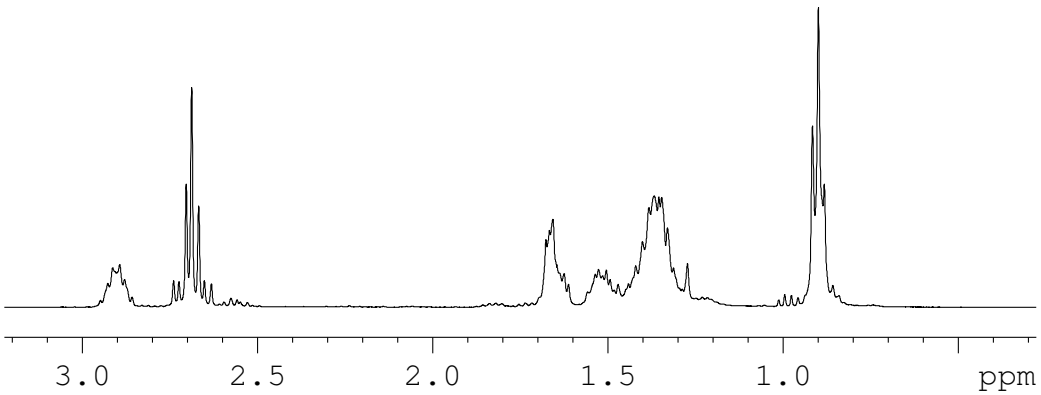
8.7945
8.7761
8.6836
8.6734
8.1425
8.1219
7.5464
7.5262
7.5072
7.4909
7.4710
7.4291
7.4186
7.4085
7.3981
7.3533
7.3342
7.2786
7.2678
7.2601
7.2410
7.1976
7.1796
6.5505
6.5109
6.1993
6.1775
6.1597
6.1380

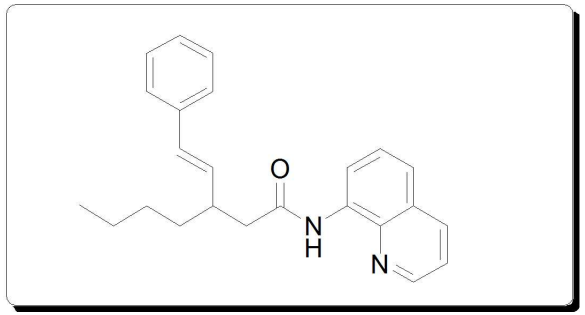
2.9266
2.9126
2.8924
2.8787
2.7388
2.7235
2.7028
2.6872
2.6672
2.6510
2.6310
1.6762
1.6661
1.6563
1.6259
1.6132
1.5370
1.5274
1.5162
1.5053
1.4946
1.4214
1.4023
1.3835
1.3683
1.3552
1.3472
1.3306
1.3135
1.2737
0.9168
0.8998
0.8831

Current Data Parameters
NAME HGY-2-300-2-H-20140820-
EXPNO 20
PROCNO 1

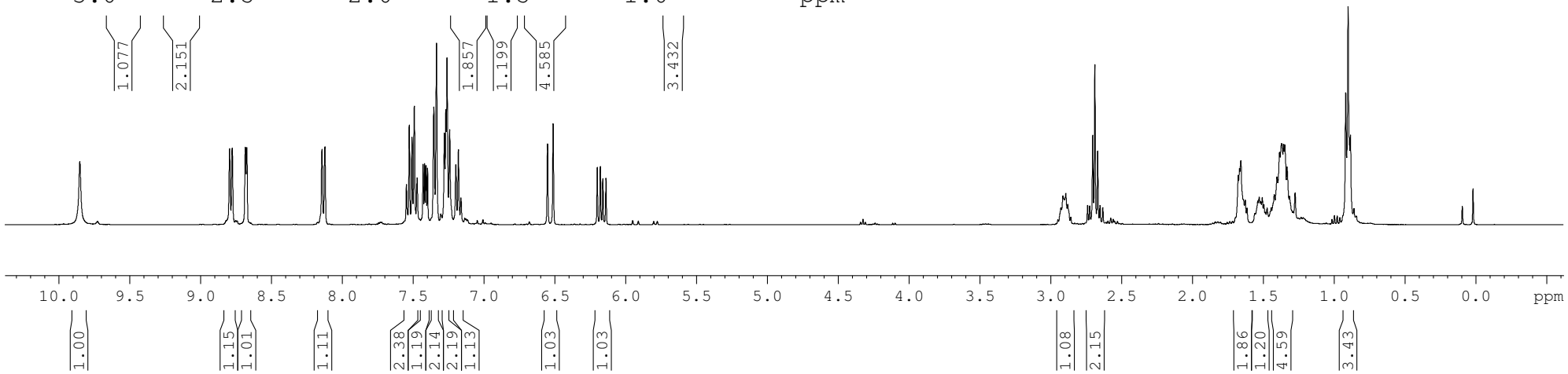
2.927
2.913
2.892
2.879
2.739
2.724
2.703
2.687
2.667
2.651
2.631

1.676
1.666
1.656
1.626
1.613
1.537
1.527
1.516
1.505
1.495
1.421
1.402
1.384
1.368
1.355
1.347
1.331
1.313
1.274
0.917
0.900
0.883

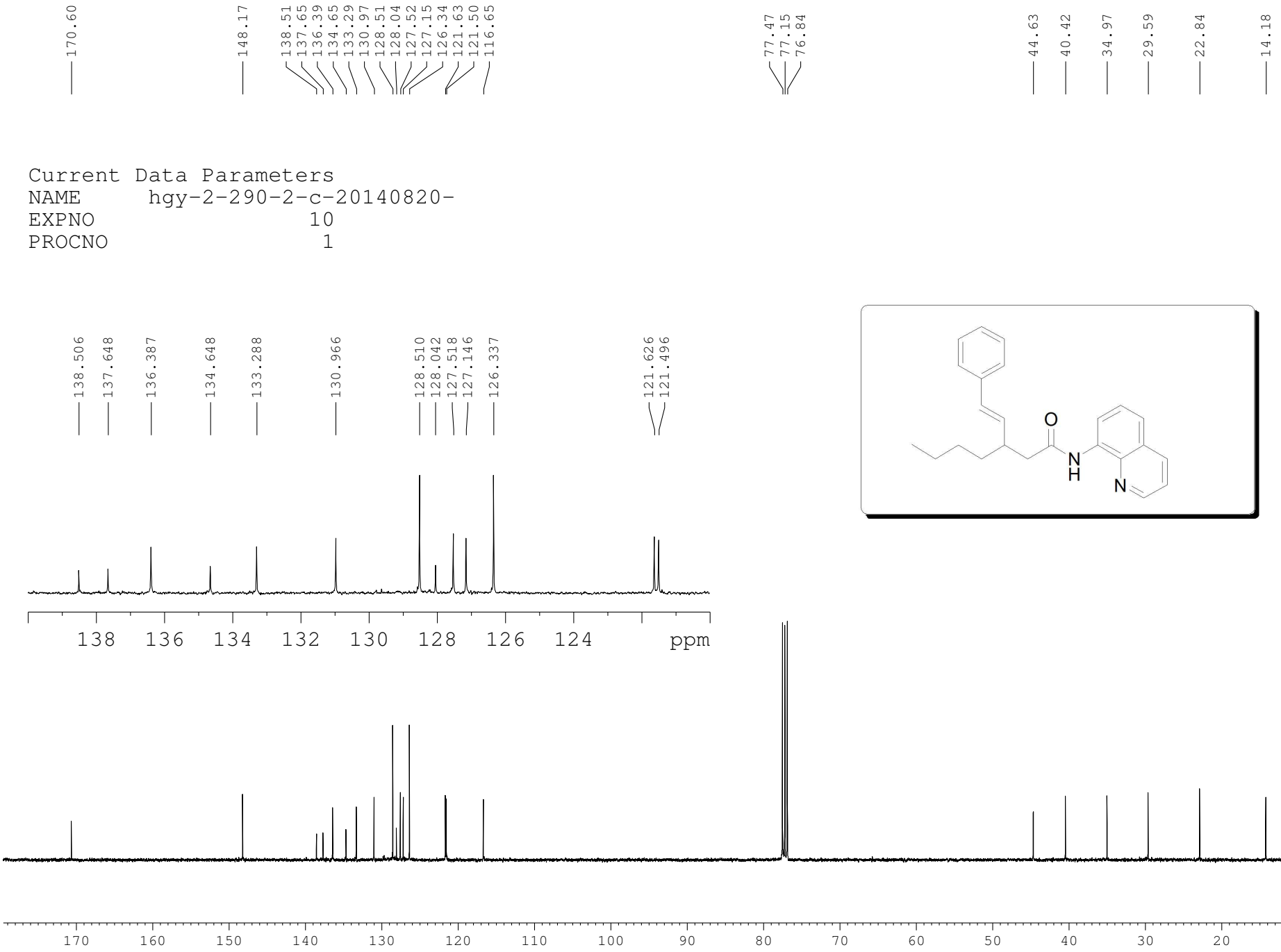


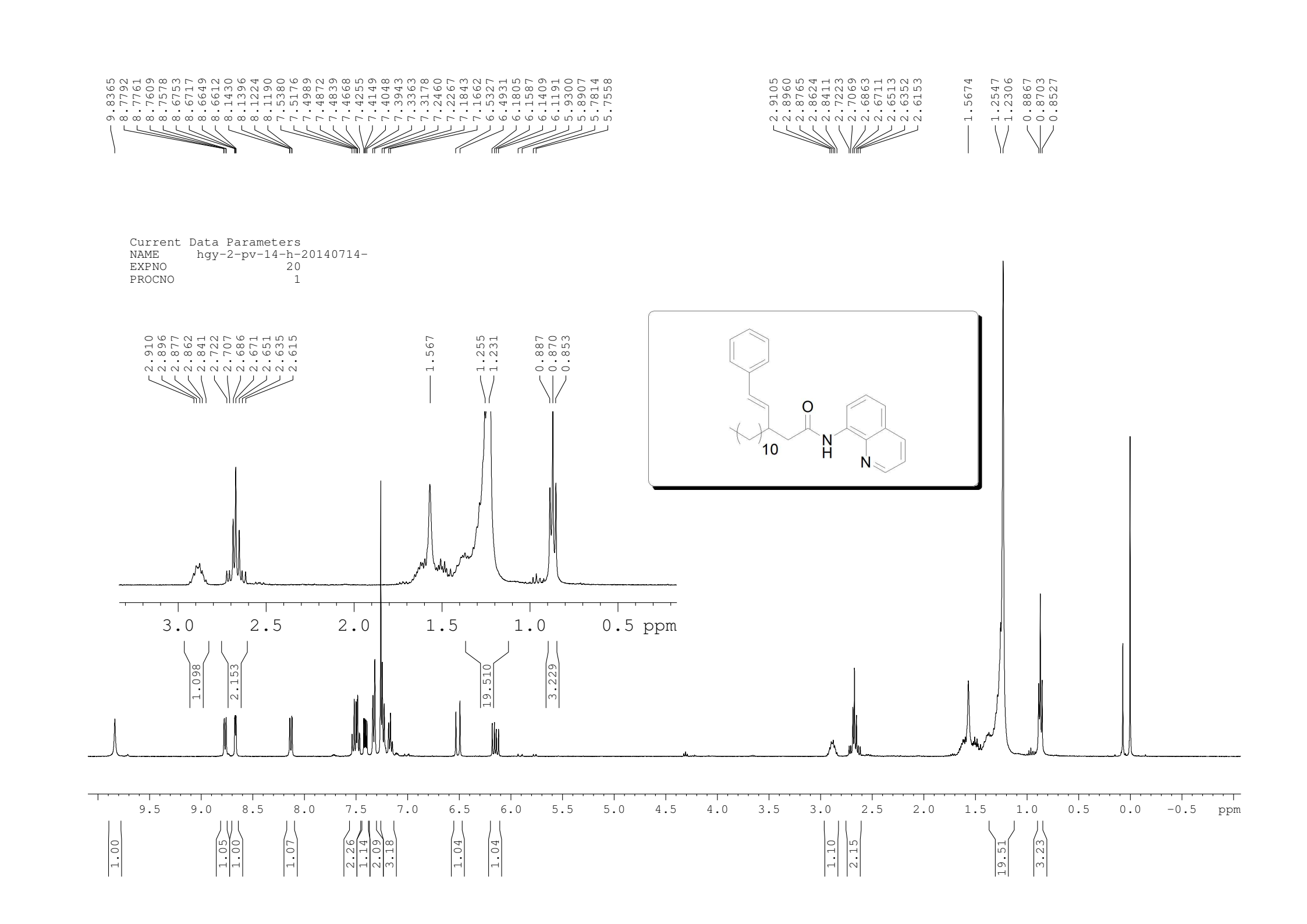


1.077
2.151
1.857
1.199
4.585
3.432



1.00
1.15
1.01
1.11
2.38
1.19
2.14
2.19
1.13
1.03
1.03
1.08
2.15
1.86
1.20
4.59
3.43

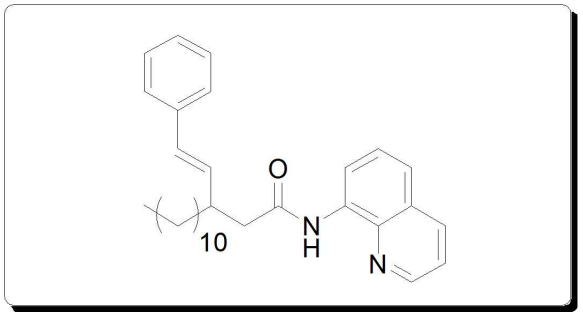

170.60
148.17
138.51
137.65
136.39
134.65
133.29
130.97
128.51
128.04
127.52
127.15
126.34
121.63
121.50
116.65
77.47
77.15
76.84
44.63
40.42
34.97
29.59
22.84
14.18
Current Data Parameters
NAME hgy-2-290-2-c-20140820-
EXPNO 10
PROCNO 1
138.506
137.648
136.387
134.648
133.288
130.966
128.510
128.042
127.518
127.146
126.337
121.626
121.496
O
N
H
N
138
136
134
132
130
128
126
124
ppm
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm


9.8365
8.7792
8.7761
8.7609
8.7578
8.6753
8.6717
8.6649
8.6612
8.1430
8.1396
8.1224
8.1190
7.5380
7.5176
7.4989
7.4872
7.4839
7.4668
7.4255
7.4149
7.4048
7.3943
7.3363
7.3178
7.2460
7.2267
7.1843
7.1662
6.5327
6.4931
6.1805
6.1587
6.1409
6.1191
5.9300
5.8907
5.7814
5.7558
2.9105
2.8960
2.8765
2.8624
2.8411
2.7223
2.7069
2.6863
2.6711
2.6513
2.6352
2.6153
1.5674
1.2547
1.2306
0.8867
0.8703
0.8527
Current Data Parameters
NAME hgy-2-pv-14-h-20140714-
EXPNO 20
PROCNO 1
2.910
2.896
2.877
2.862
2.841
2.722
2.707
2.686
2.671
2.651
2.635
2.615
1.567
1.255
1.231
0.887
0.870
0.853
O
N
H
10
N
3.0
2.5
2.0
1.5
1.0
0.5 ppm
1.098
2.153
19.510
3.229
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
ppm
1.00
1.05
1.00
1.07
2.26
1.14
2.09
3.18
1.04
1.04
1.10
2.15
19.51
3.23

148.20
138.53
137.68
136.43
134.66
133.32
130.98
128.53
128.07
127.55
127.16
126.36
121.65
121.52
116.69
44.66
40.46
35.29
32.06
29.79
29.74
29.49
27.40
22.83
14.25

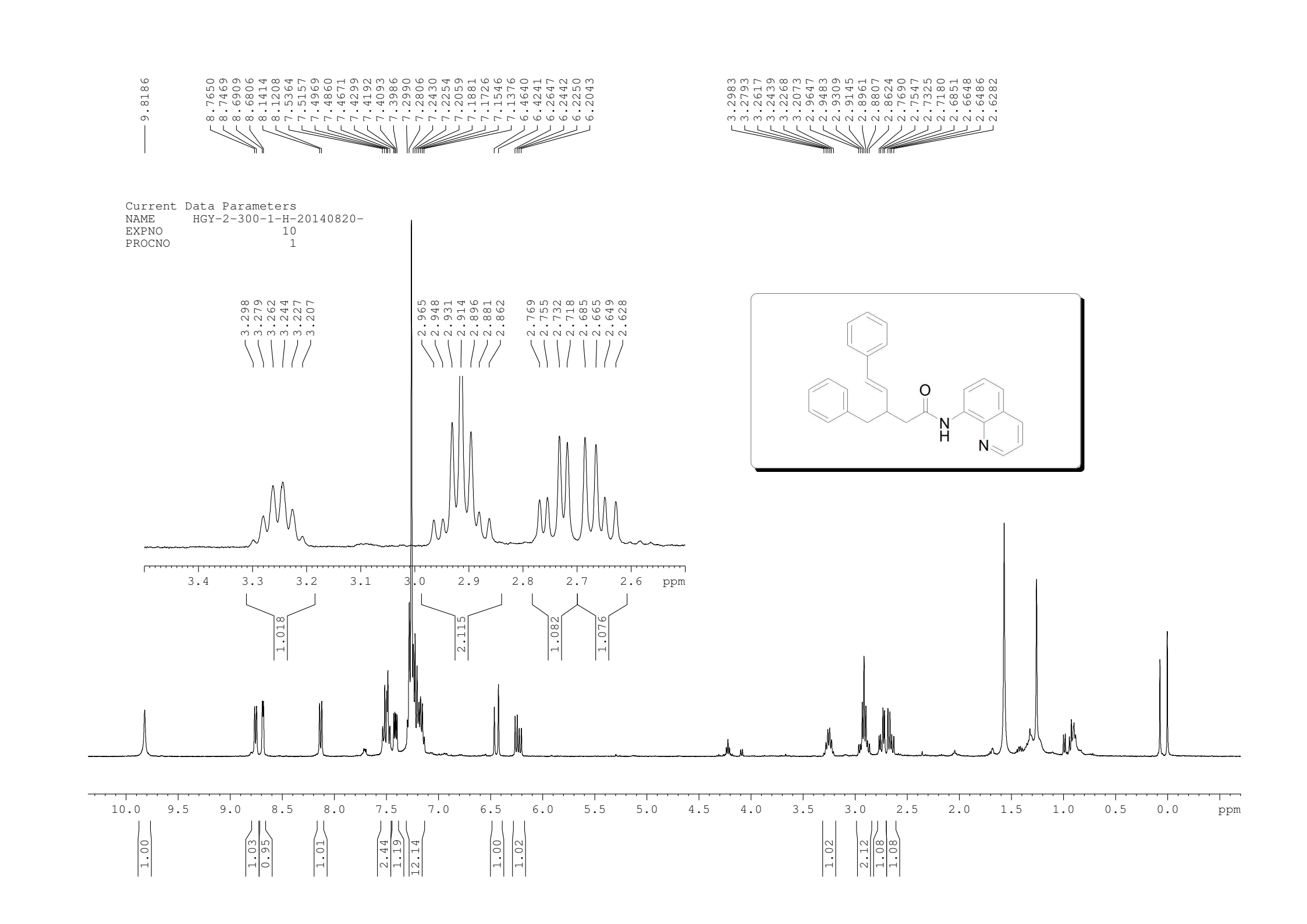
Current Data Parameters
NAME hgy-2-pp-c14-c-201407
EXPNO 20
PROCNO 1

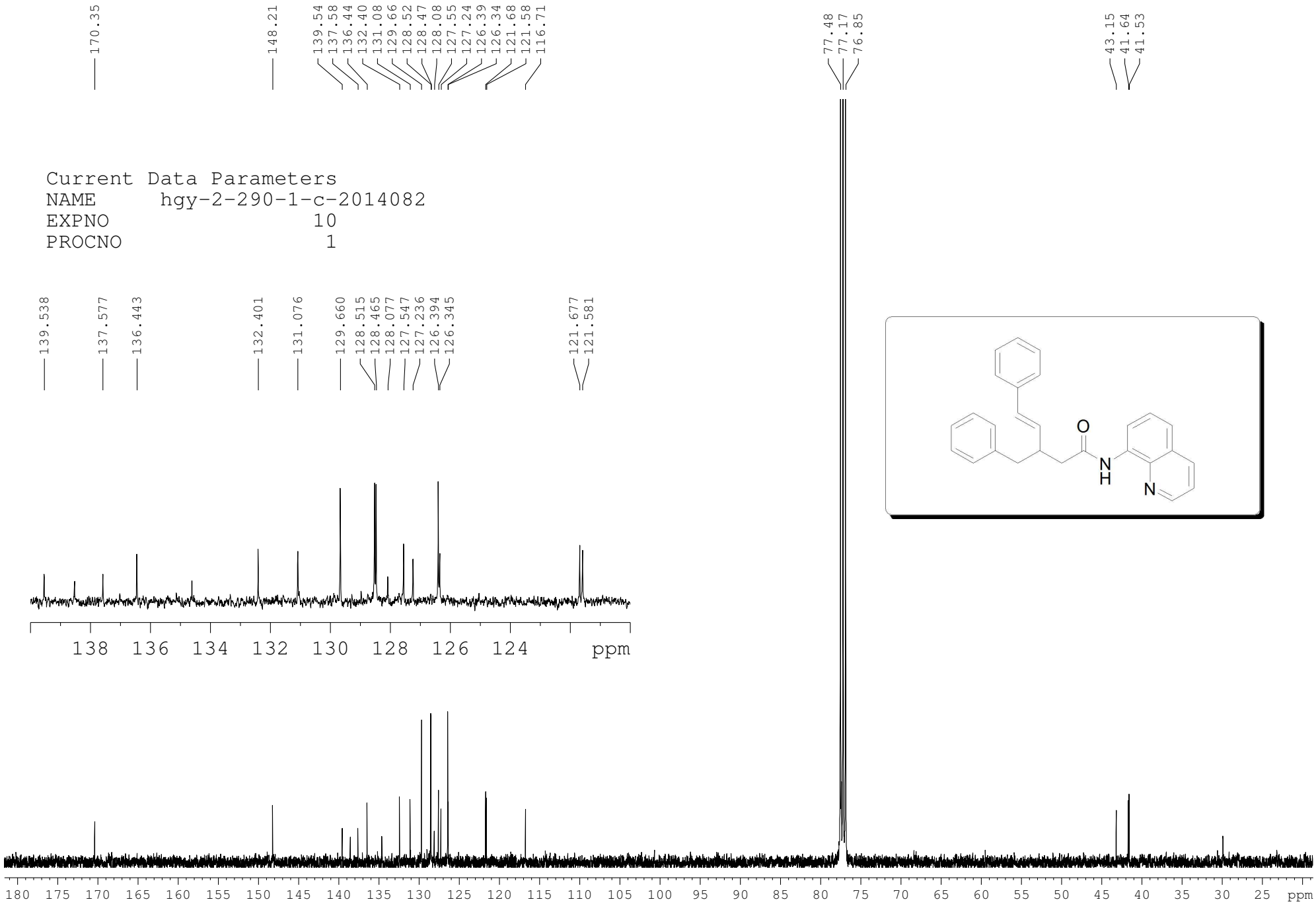
138.529
137.680
136.428
134.660
133.318
130.978
128.525
128.073
127.551
127.156
126.357
121.646
121.525
116.690

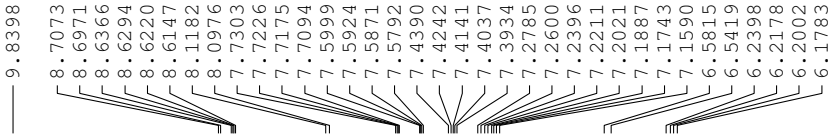


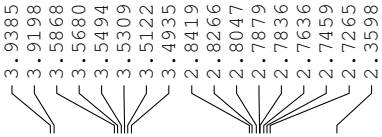
135 130 125 120 115 ppm

150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 ppm

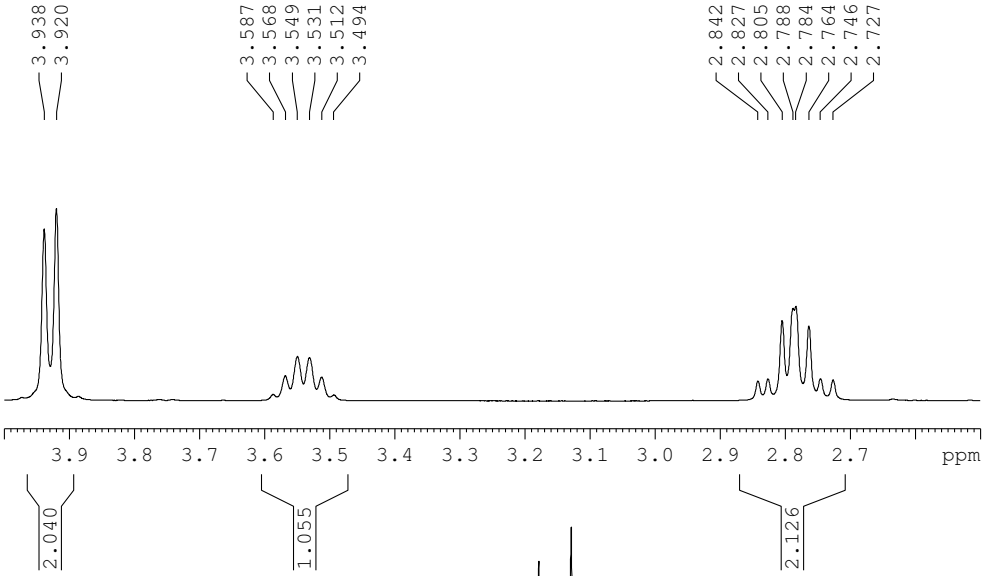

9.8186
8.7650
8.7469
8.6909
8.6806
8.1414
8.1208
7.5364
7.5157
7.4969
7.4860
7.4671
7.4299
7.4192
7.4093
7.3986
7.2990
7.2806
7.2430
7.2254
7.2059
7.1881
7.1726
7.1546
7.1376
6.4640
6.4241
6.2647
6.2442
6.2250
6.2043
3.2983
3.2793
3.2617
3.2439
3.2268
3.2073
2.9647
2.9483
2.9309
2.9145
2.8961
2.8807
2.8624
2.7690
2.7547
2.7325
2.7180
2.6851
2.6648
2.6486
2.6282
Current Data Parameters
NAME HGY-2-300-1-H-20140820-
EXPNO 10
PROCNO 1
3.298
3.279
3.262
3.244
3.227
3.207
2.965
2.948
2.931
2.914
2.896
2.881
2.862
2.769
2.755
2.732
2.718
2.685
2.665
2.649
2.628
O
N
H
N
3.4
3.3
3.2
3.1
3.0
2.9
2.8
2.7
2.6
ppm
1.018
2.115
1.082
1.076
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
ppm
1.00
1.03
0.95
1.01
2.44
1.19
12.14
1.00
1.02
1.02
2.12
1.08
1.08

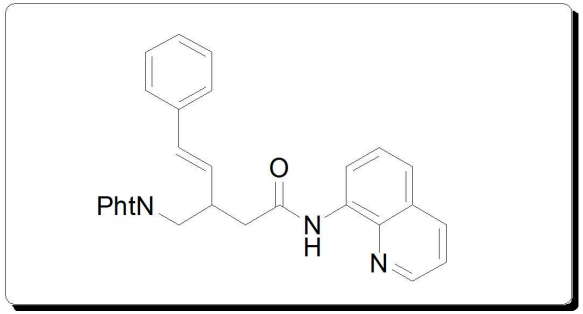

170.35
148.21
139.54
137.58
136.44
132.40
131.08
129.66
128.52
128.47
128.08
127.55
127.24
126.39
126.34
121.68
121.58
116.71
77.48
77.17
76.85
43.15
41.64
41.53
Current Data Parameters
NAME hgy-2-290-1-c-2014082
EXPNO 10
PROCNO 1
139.538
137.577
136.443
132.401
131.076
129.660
128.515
128.465
128.077
127.547
127.236
126.394
126.345
121.677
121.581
O
N
H
N
138 136 134 132 130 128 126 124 ppm
180 175 170 165 160 155 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 ppm

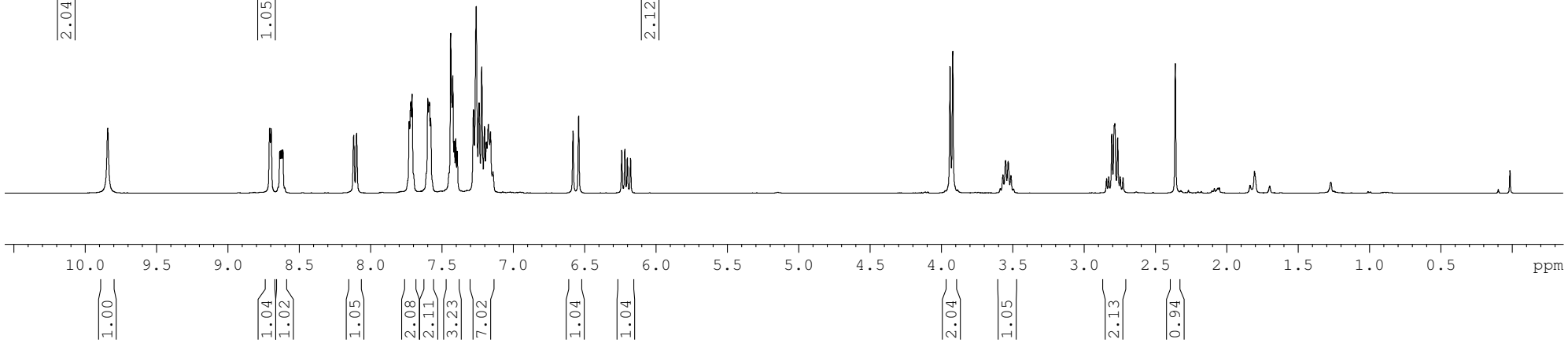




Current Data Parameters
NAME hgy-2-294-1-h-
EXPNO 11
PROCNO 1



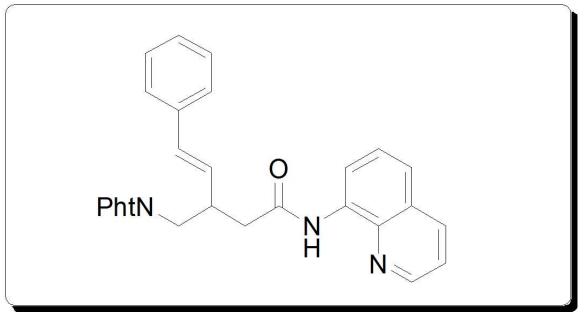


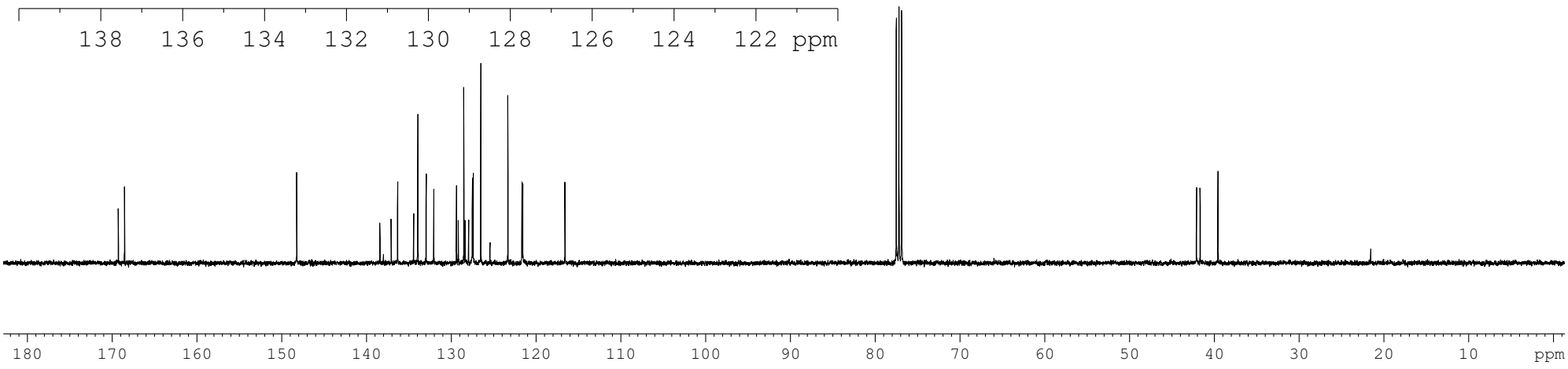


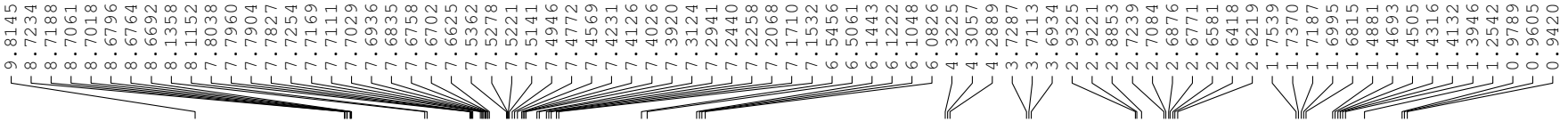
169.24
168.50
148.20
138.38
137.05
136.30
134.40
133.91
132.93
132.02
129.34
129.14
128.48
128.33
127.92
127.48
127.38
126.48
125.41
123.28
121.63
121.52
116.56
77.47
77.16
76.84
42.06
41.63
39.57

Current Data Parameters
NAME hgy-2-294-1-c-
EXPNO 13
PROCNO 1

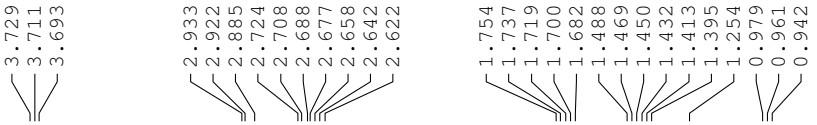
138.382
137.052
136.297
134.401
133.907
132.929
132.022
129.342
129.138
128.482
128.330
127.916
127.482
127.379
126.483
125.405
123.283
121.625
121.517

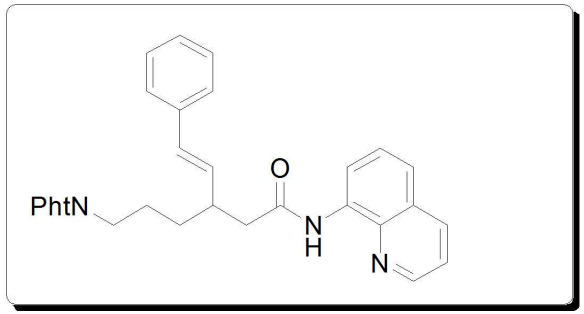


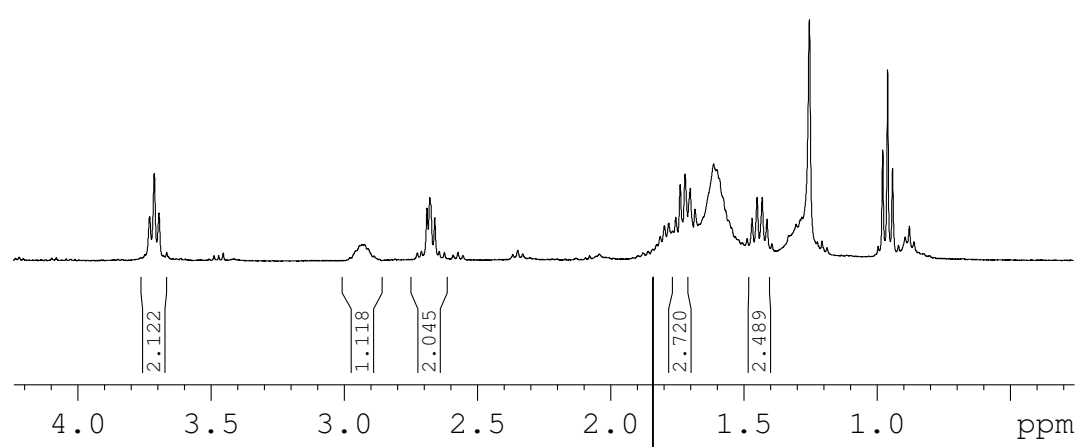


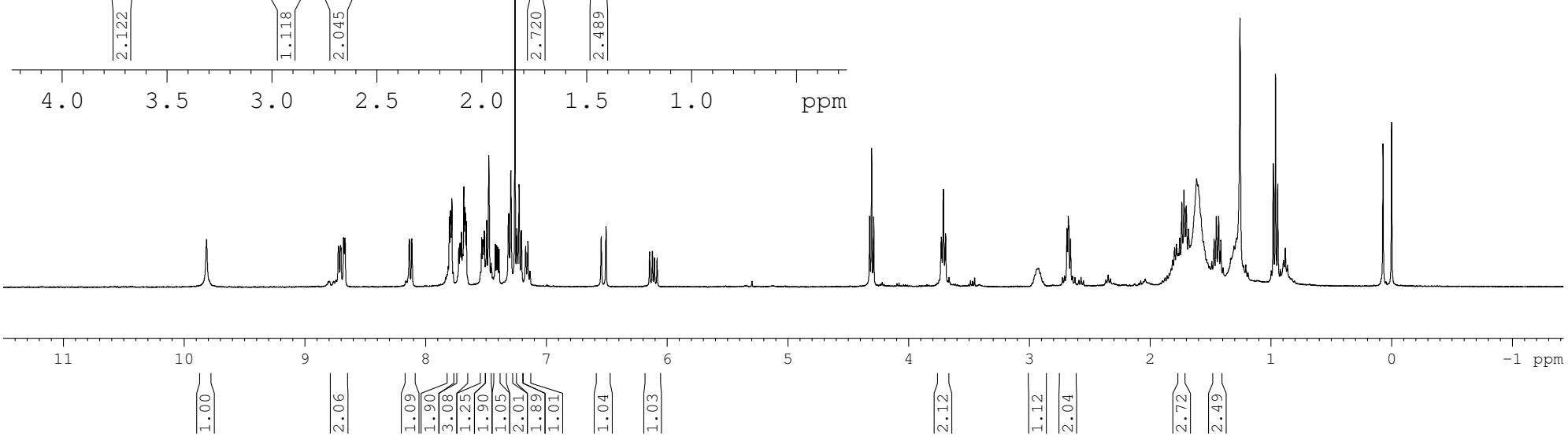


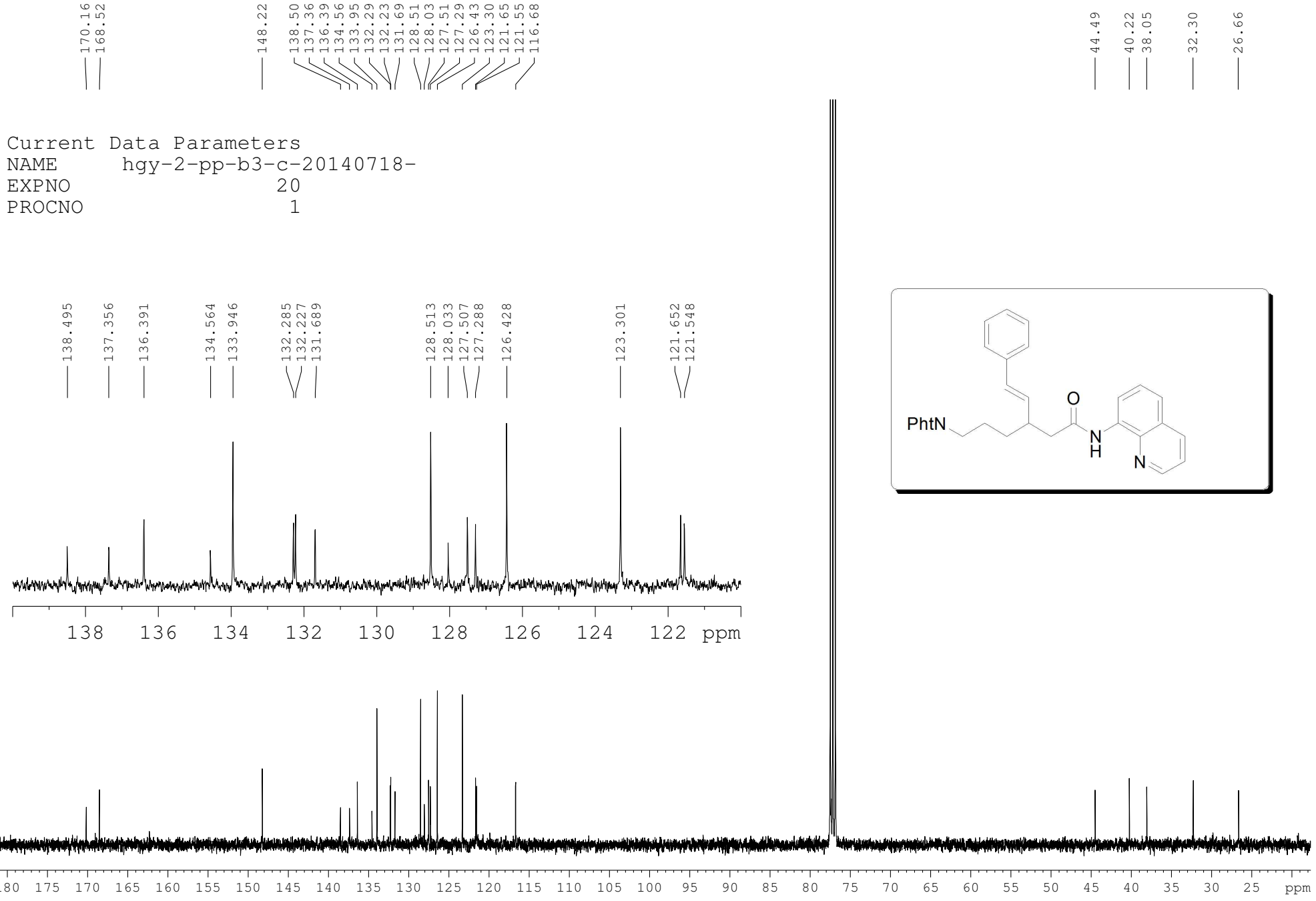
Current Data Parameters
NAME hgy-2-phen-ch3-h-20140804-
EXPNO 40
PROCNO 1

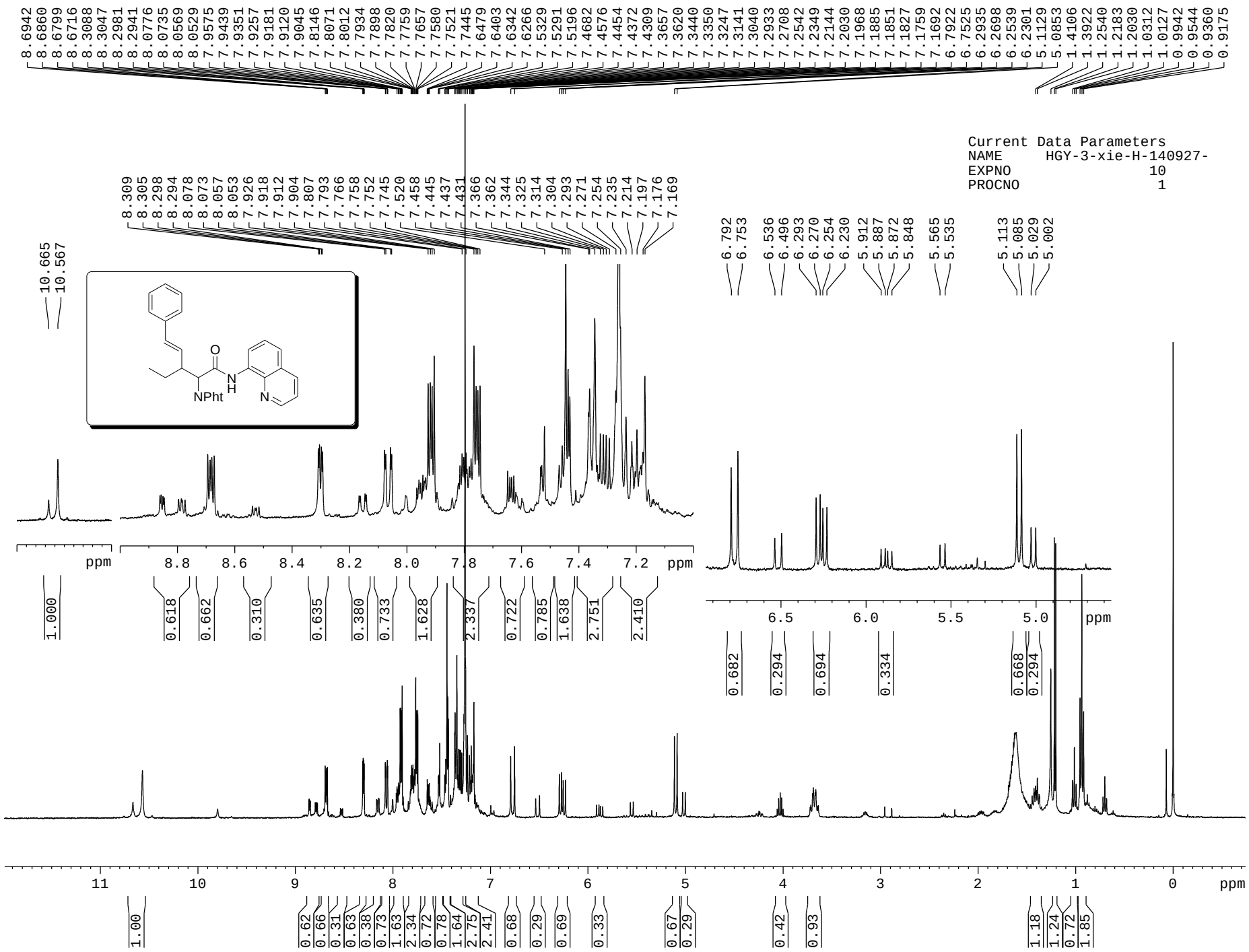


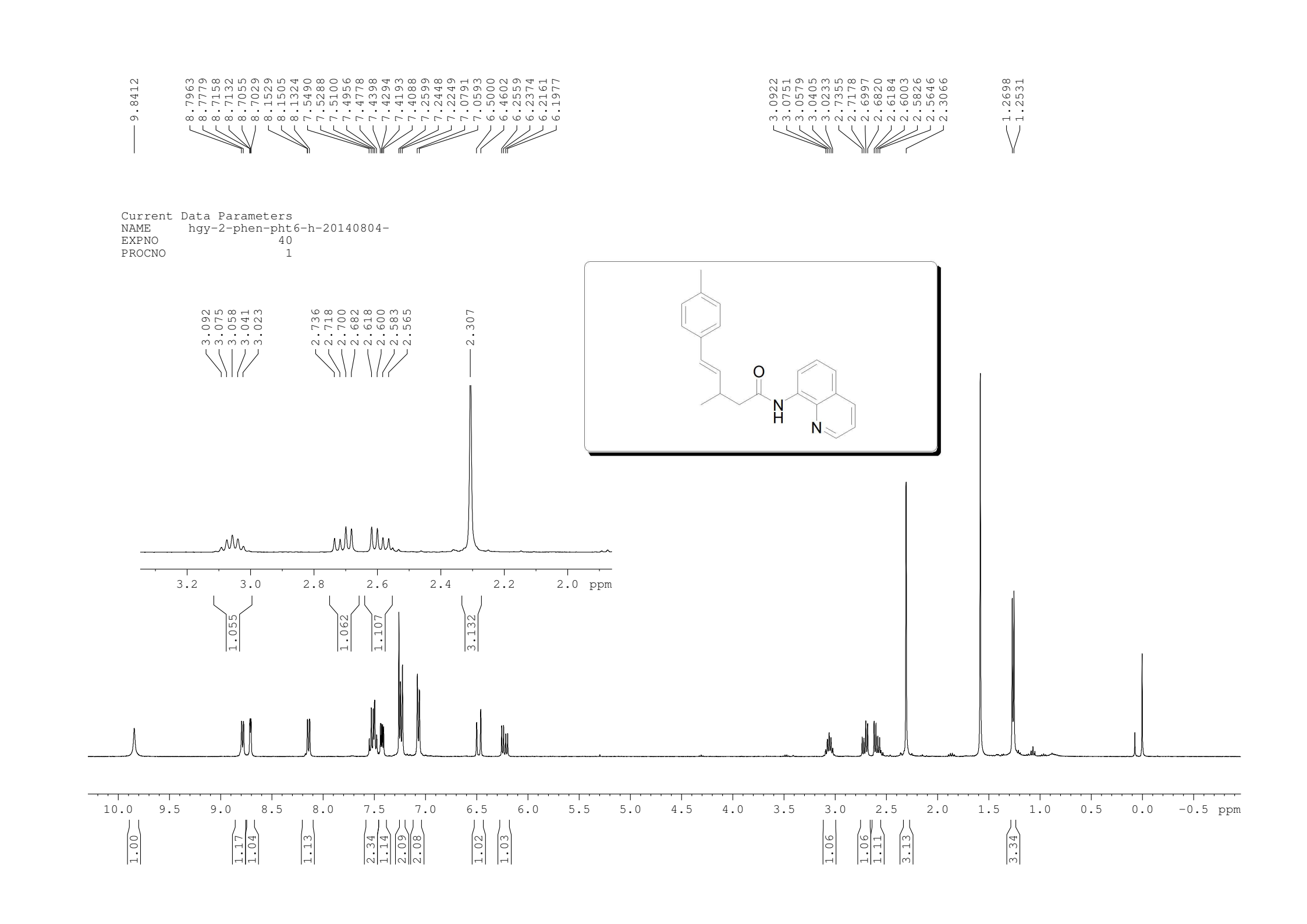


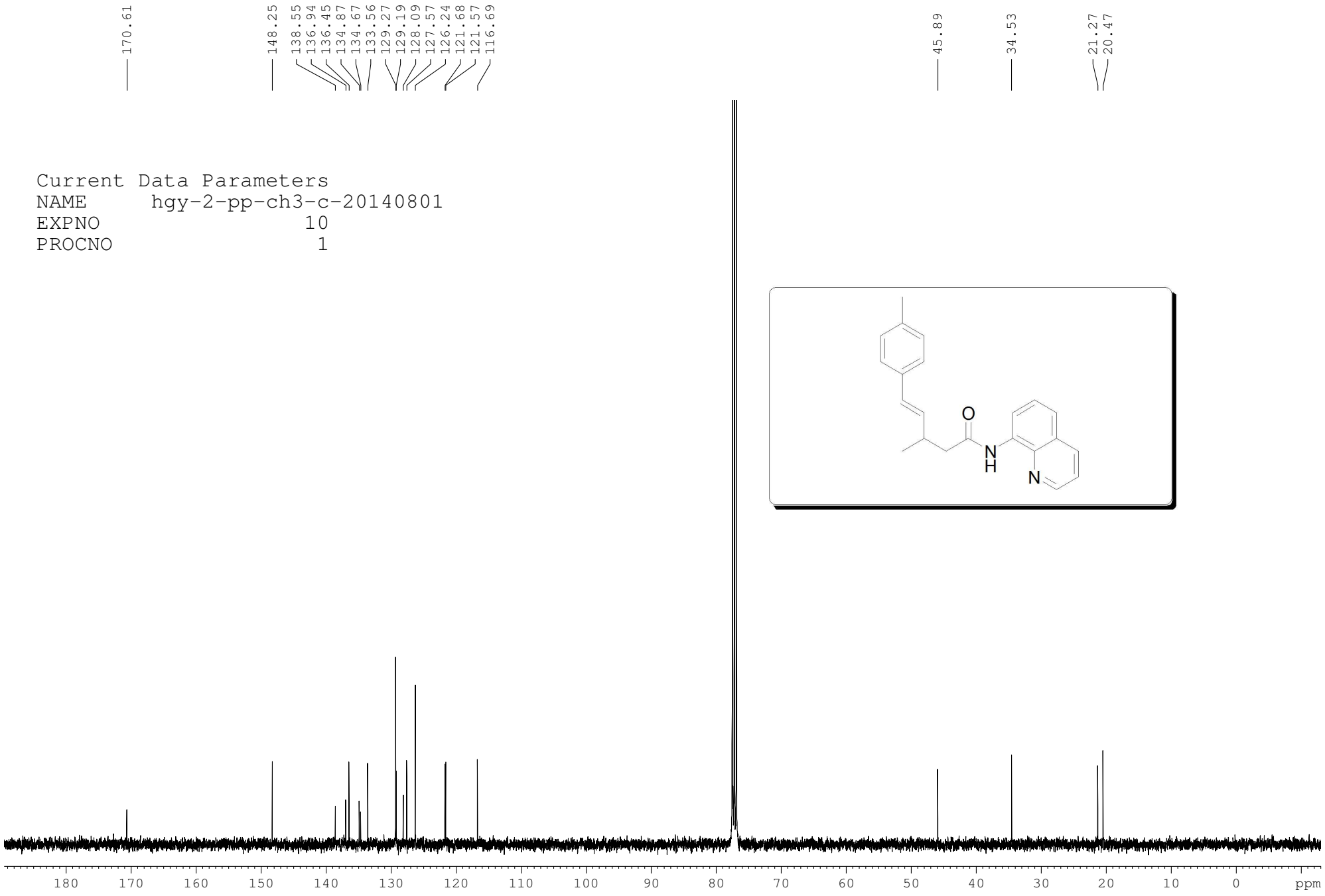


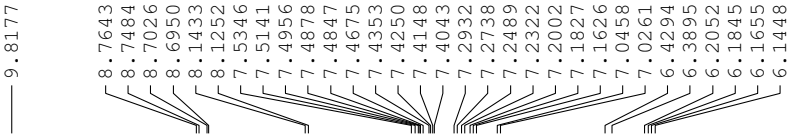


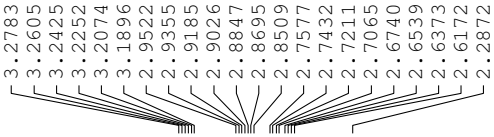

170.16
168.52
148.22
138.50
137.36
136.39
134.56
133.95
132.29
132.23
131.69
128.51
128.03
127.51
127.29
126.43
123.30
121.65
121.55
116.68
44.49
40.22
38.05
32.30
26.66
Current Data Parameters
NAME hgy-2-pp-b3-c-20140718-
EXPNO 20
PROCNO 1
138.495
137.356
136.391
134.564
133.946
132.285
132.227
131.689
128.513
128.033
127.507
127.288
126.428
123.301
121.652
121.548
138 136 134 132 130 128 126 124 122 ppm
PhtN
O
N
H
N
180 175 170 165 160 155 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 ppm


Current Data Parameters
NAME HGY-3-xie-H-140927-
EXPNO 10
PROCNO 1
NPht
O
N
H
N
ppm

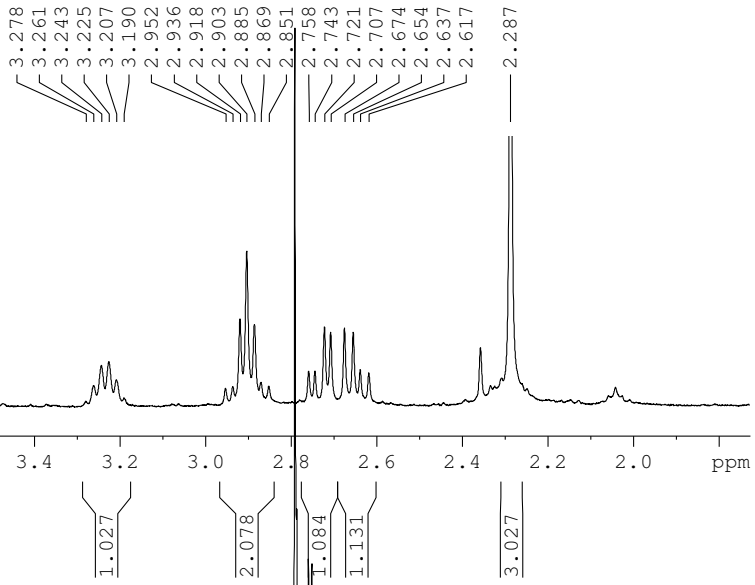

9.8412
8.7963
8.7779
8.7158
8.7132
8.7055
8.7029
8.1529
8.1505
8.1324
7.5490
7.5288
7.5100
7.4956
7.4778
7.4398
7.4294
7.4193
7.4088
7.2599
7.2448
7.2249
7.0791
7.0593
6.5000
6.4602
6.2559
6.2374
6.2161
6.1977
3.0922
3.0751
3.0579
3.0405
3.0233
2.7355
2.7178
2.6997
2.6820
2.6184
2.6003
2.5826
2.5646
2.3066
1.2698
1.2531
Current Data Parameters
NAME hgy-2-phen-pht6-h-20140804-
EXPNO 40
PROCNO 1
3.092
3.075
3.058
3.041
3.023
2.736
2.718
2.700
2.682
2.618
2.600
2.583
2.565
2.307
O
N
H
N
3.2
3.0
2.8
2.6
2.4
2.2
2.0 ppm
1.055
1.062
1.107
3.132
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5 ppm
1.00
1.17
1.04
1.13
2.34
1.14
2.09
2.08
1.02
1.03
1.06
1.06
1.11
3.13
3.34

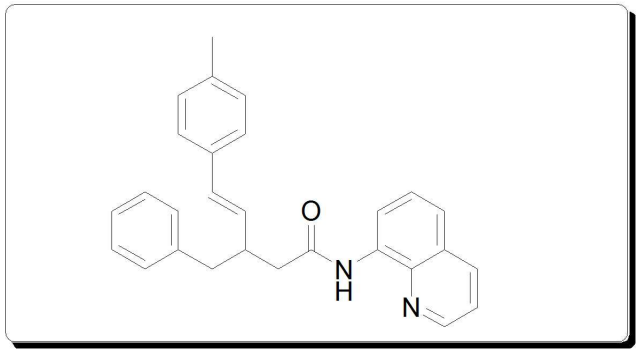

170.61
148.25
138.55
136.94
136.45
134.87
134.67
133.56
129.27
129.19
128.09
127.57
126.24
121.68
121.57
116.69
45.89
34.53
21.27
20.47
Current Data Parameters
NAME hgy-2-pp-ch3-c-20140801
EXPNO 10
PROCNO 1
O
N
H
N
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

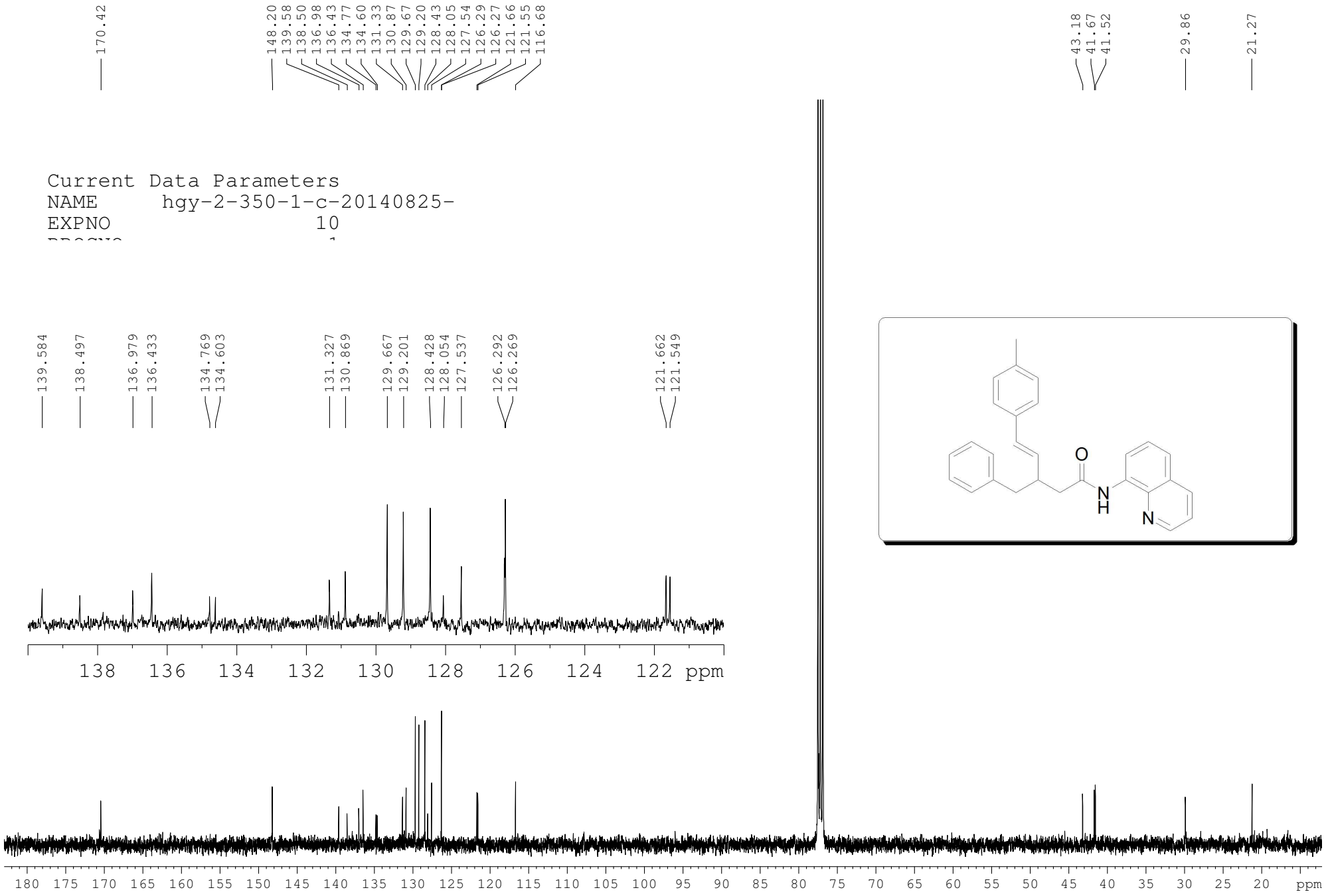


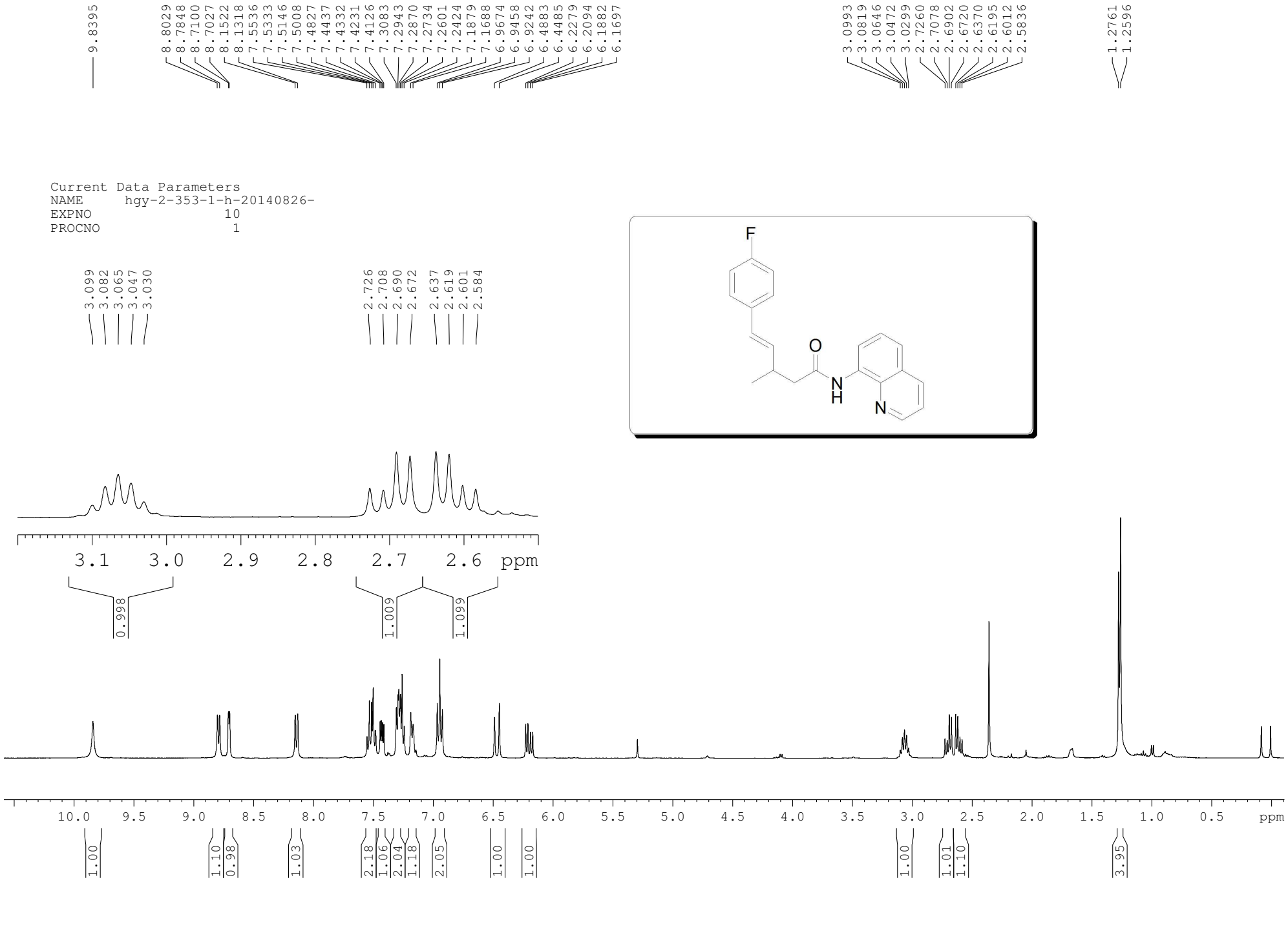


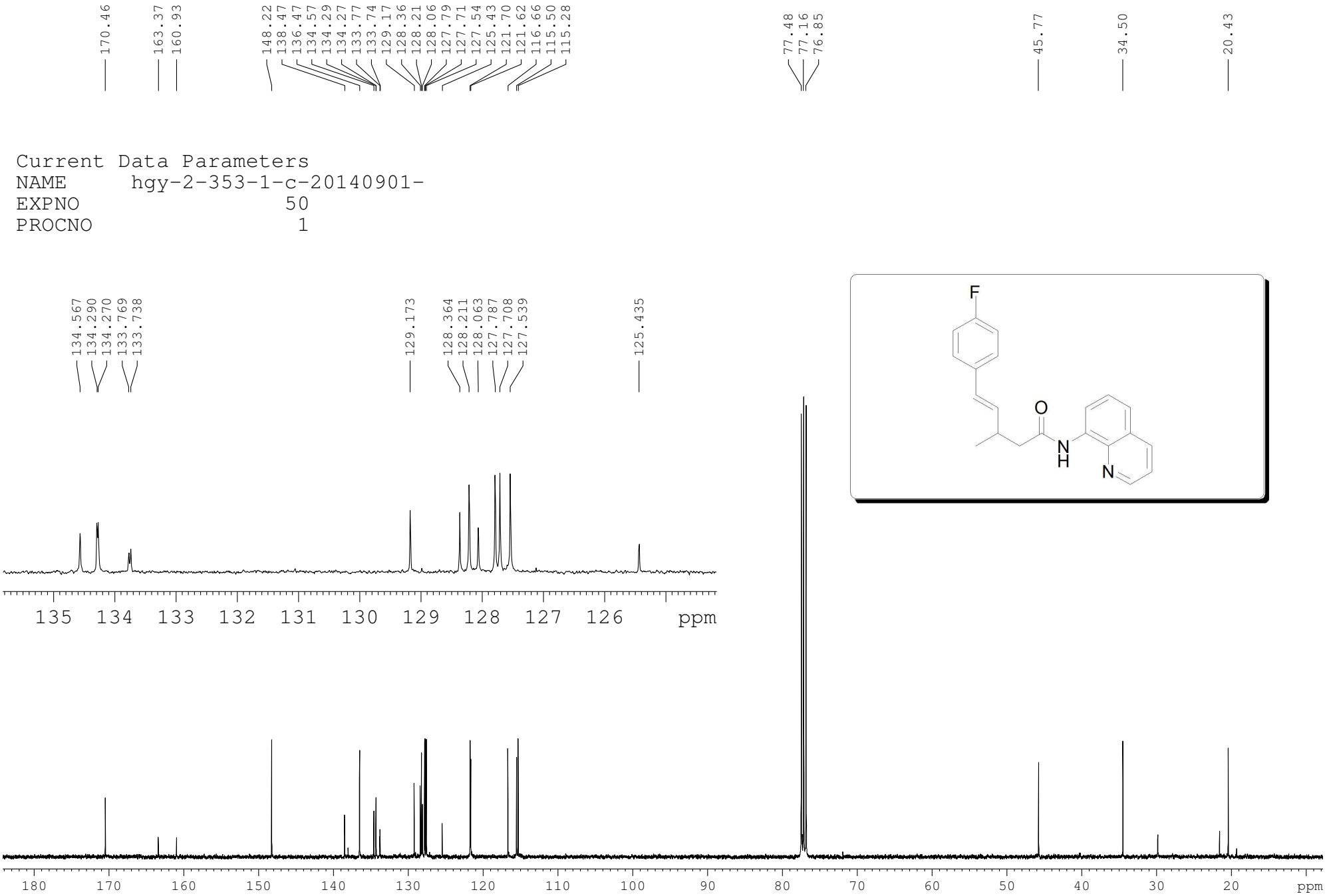
Current Data Parameters
NAME hgy-2-350-1--h20140825-
EXPNO 10
PROCNO 1

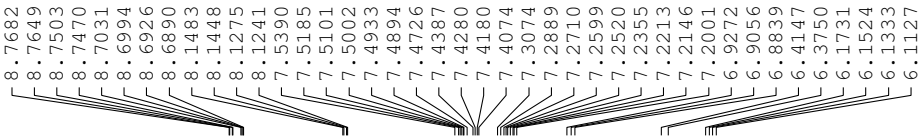


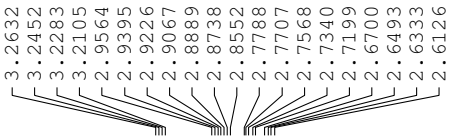



170.42
148.20
139.58
138.50
136.98
136.43
134.77
134.60
131.33
130.87
129.67
129.20
128.43
128.05
127.54
126.29
126.27
121.66
121.55
116.68
43.18
41.67
41.52
29.86
21.27
Current Data Parameters
NAME hgy-2-350-1-c-20140825-
EXPNO 10
139.584
138.497
136.979
136.433
134.769
134.603
131.327
130.869
129.667
129.201
128.428
128.054
127.537
126.292
126.269
121.662
121.549
O
N
H
N
138 136 134 132 130 128 126 124 122 ppm
180 175 170 165 160 155 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 ppm

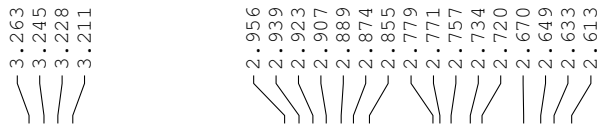

9.8395
8.8029
8.7848
8.7100
8.7027
8.1522
8.1318
7.5536
7.5333
7.5146
7.5008
7.4827
7.4437
7.4332
7.4231
7.4126
7.3083
7.2943
7.2870
7.2734
7.2601
7.2424
7.1879
7.1688
6.9674
6.9458
6.9242
6.4883
6.4485
6.2279
6.2094
6.1882
6.1697
3.0993
3.0819
3.0646
3.0472
3.0299
2.7260
2.7078
2.6902
2.6720
2.6370
2.6195
2.6012
2.5836
1.2761
1.2596
Current Data Parameters
NAME hgy-2-353-1-h-20140826-
EXPNO 10
PROCNO 1
3.099
3.082
3.065
3.047
3.030
2.726
2.708
2.690
2.672
2.637
2.619
2.601
2.584
F
O
N
H
N
3.1
3.0
2.9
2.8
2.7
2.6
ppm
0.998
1.009
1.099
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm
1.00
1.10
0.98
1.03
2.18
1.06
2.04
1.18
2.05
1.00
1.00
1.00
1.01
1.10
3.95

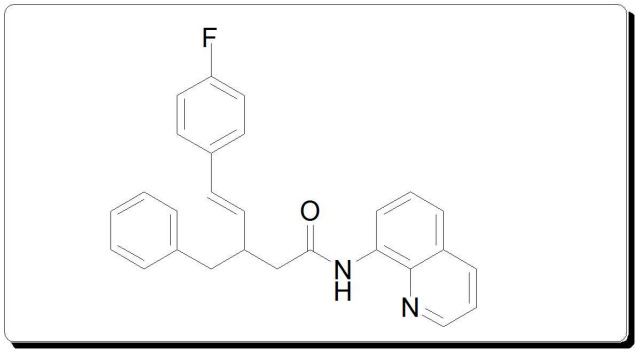

170.46
163.37
160.93
148.22
138.47
136.47
134.57
134.29
134.27
133.77
133.74
129.17
128.36
128.21
128.06
127.79
127.71
127.54
125.43
121.70
121.62
116.66
115.50
115.28
77.48
77.16
76.85
45.77
34.50
20.43
Current Data Parameters
NAME hgy-2-353-1-c-20140901-
EXPNO 50
PROCNO 1
134.567
134.290
134.270
133.769
133.738
129.173
128.364
128.211
128.063
127.787
127.708
127.539
125.435
F
O
N
H
N
135 134 133 132 131 130 129 128 127 126 ppm
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm

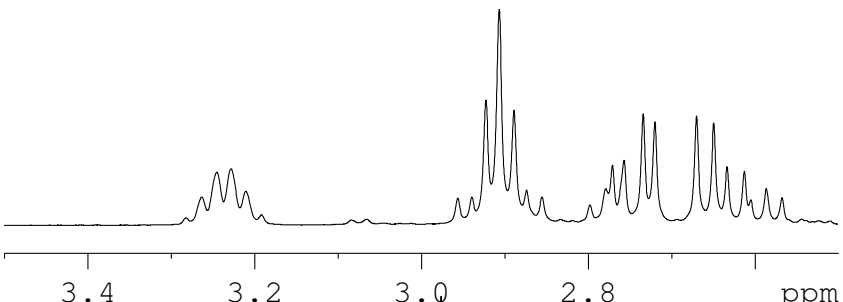


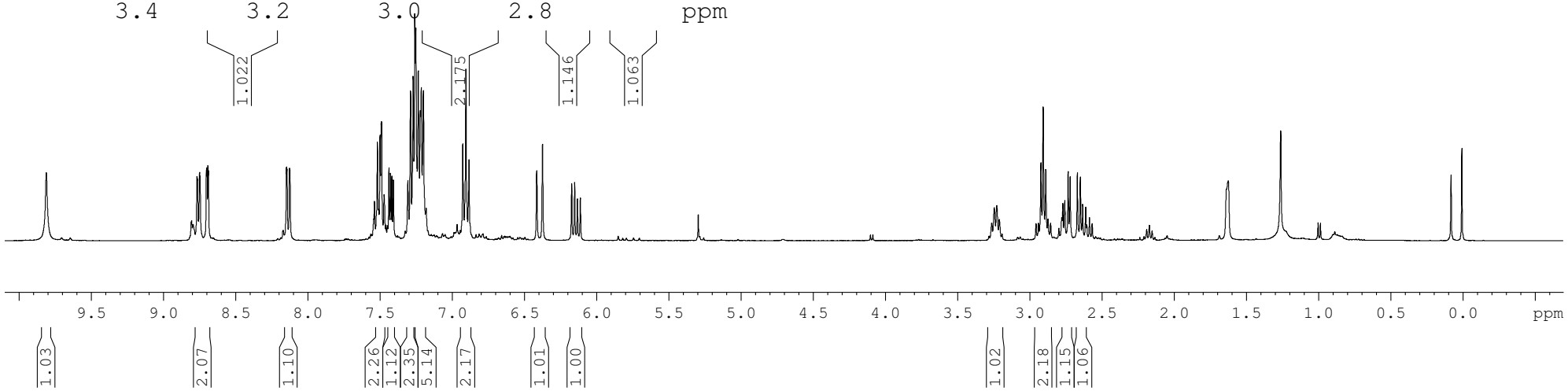


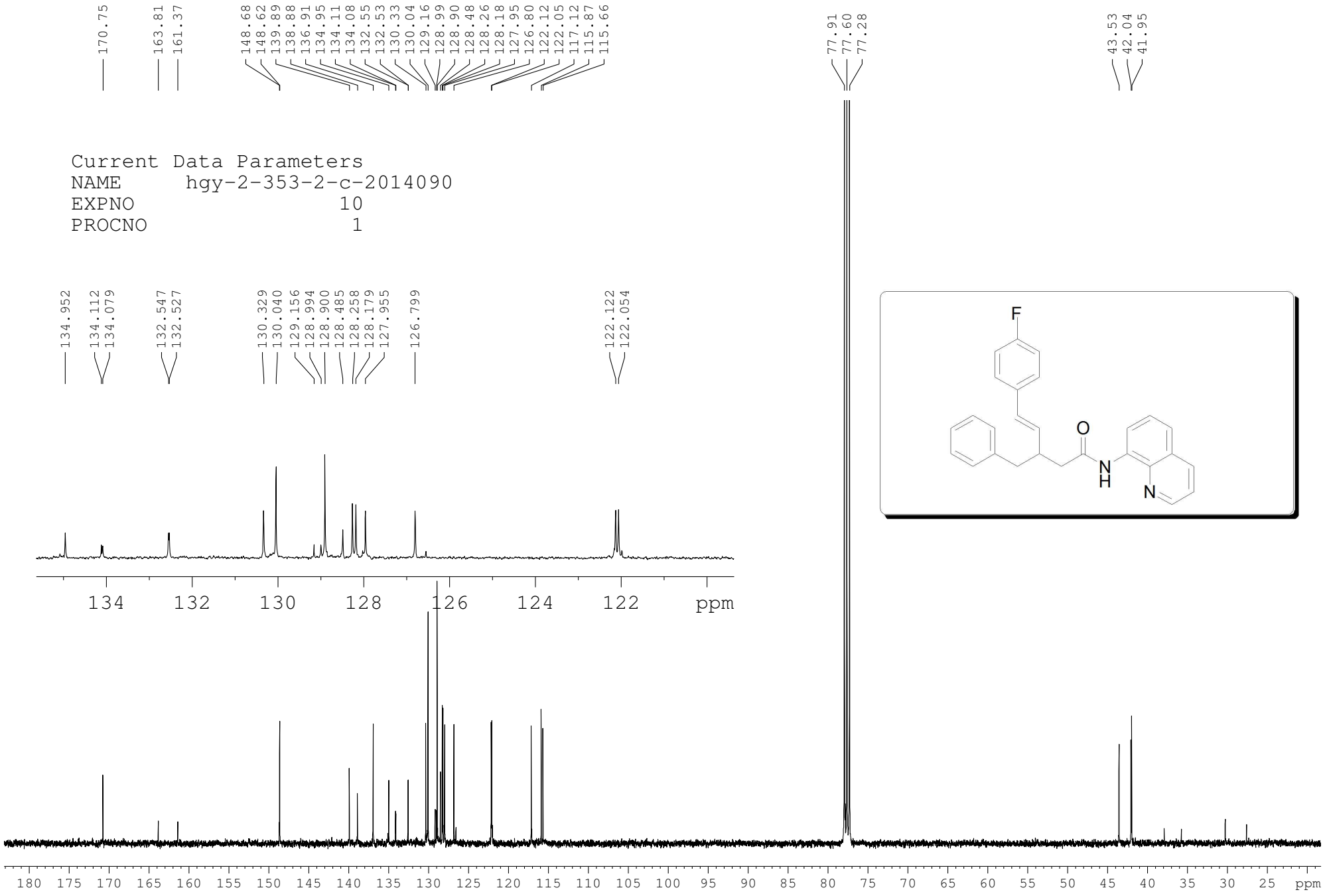
Current Data Parameters
NAME hgy-2-305-2-h-20140826-
EXPNO 20
PROCNO 1







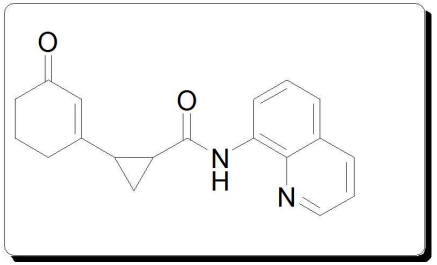


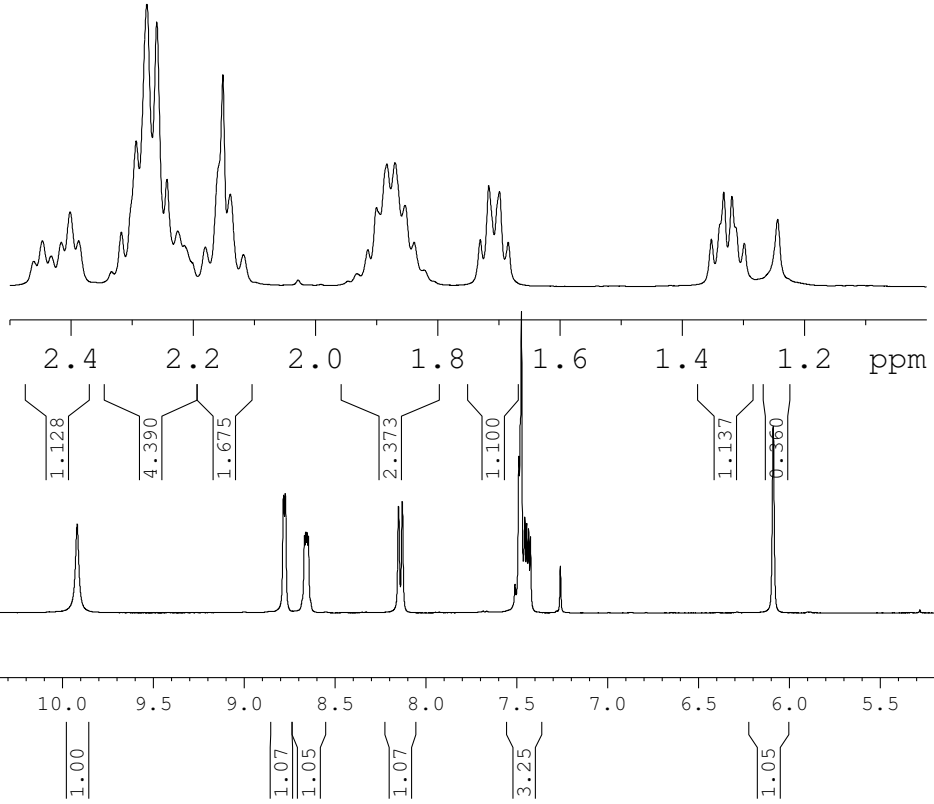

170.75
163.81
161.37
148.68
148.62
139.89
138.88
136.91
134.95
134.11
134.08
132.55
132.53
130.33
130.04
129.16
128.99
128.90
128.48
128.26
128.18
127.95
126.80
122.12
122.05
117.12
115.87
115.66
77.91
77.60
77.28
43.53
42.04
41.95
Current Data Parameters
NAME hgy-2-353-2-c-2014090
EXPNO 10
PROCNO 1
134.952
134.112
134.079
132.547
132.527
130.329
130.040
129.156
128.994
128.900
128.485
128.258
128.179
127.955
126.799
122.122
122.054
134
132
130
128
126
124
122
ppm
F
O
N
H
N
180 175 170 165 160 155 150 145 140 135 130 125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 ppm

9.9168
8.7830
8.7746
8.6685
8.6613
8.6542
8.6470
8.1511
8.1307
7.4887
7.4807
7.4742
7.4559
7.4452
7.4351
7.4246
6.0886
2.4464
2.4318
2.4154
2.4010
2.3871
2.3171
2.2929
2.2753
2.2591
2.2425
2.2248
2.2142
2.1805
2.1518
2.1398
1.9145
1.9005
1.8834
1.8700
1.8537
1.8388
1.7306
1.7166
1.6991
1.6848
1.3523
1.3320
1.3186
1.2984
1.2438

Current Data Parameters
NAME HGY-2-H12-20140421-
EXPNO 10
PROCNO 1

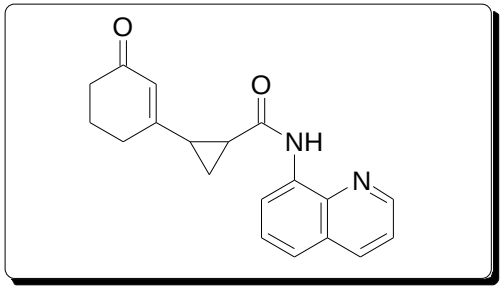
2.415
2.401
2.387
2.317
2.293
2.275
2.259
2.243
2.225
2.214
2.180
2.152
2.140
1.915
1.901
1.883
1.870
1.854
1.839
1.731
1.717
1.699
1.685
1.352
1.332
1.319
1.298
1.244

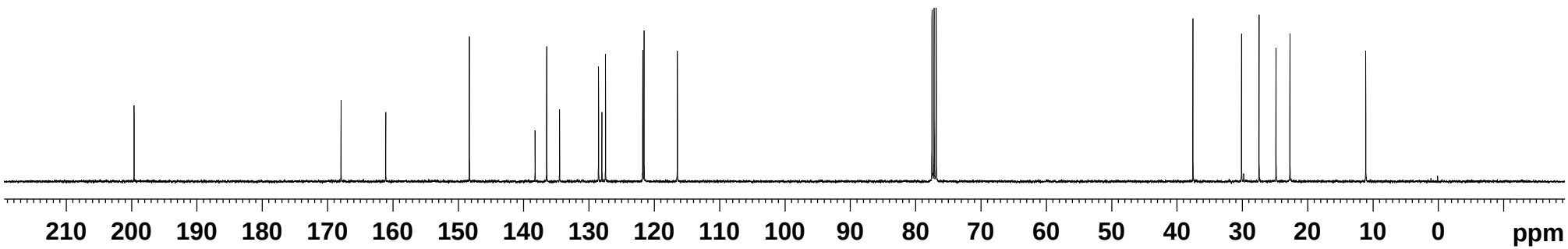




199.62
167.94
161.11
148.30
138.25
136.46
134.49
128.53
128.01
127.46
121.76
121.56
116.46
37.55
30.10
27.43
24.83
22.69
11.09

Current Data Parameters
NAME hgy-2-135-12-c-140528-
EXPNO 10
PROCNO 1





9.9866

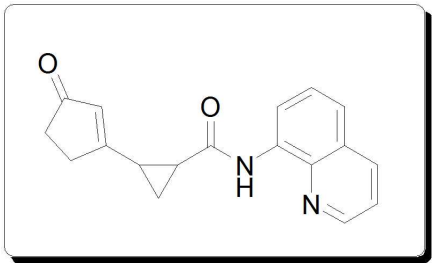
8.8044
8.8010
8.7940
8.7906
8.6590
8.6471
8.6367
8.1654
8.1620
8.1447
8.1414
7.5011
7.4977
7.4882
7.4676
7.4570
7.4469
7.4364
7.2600

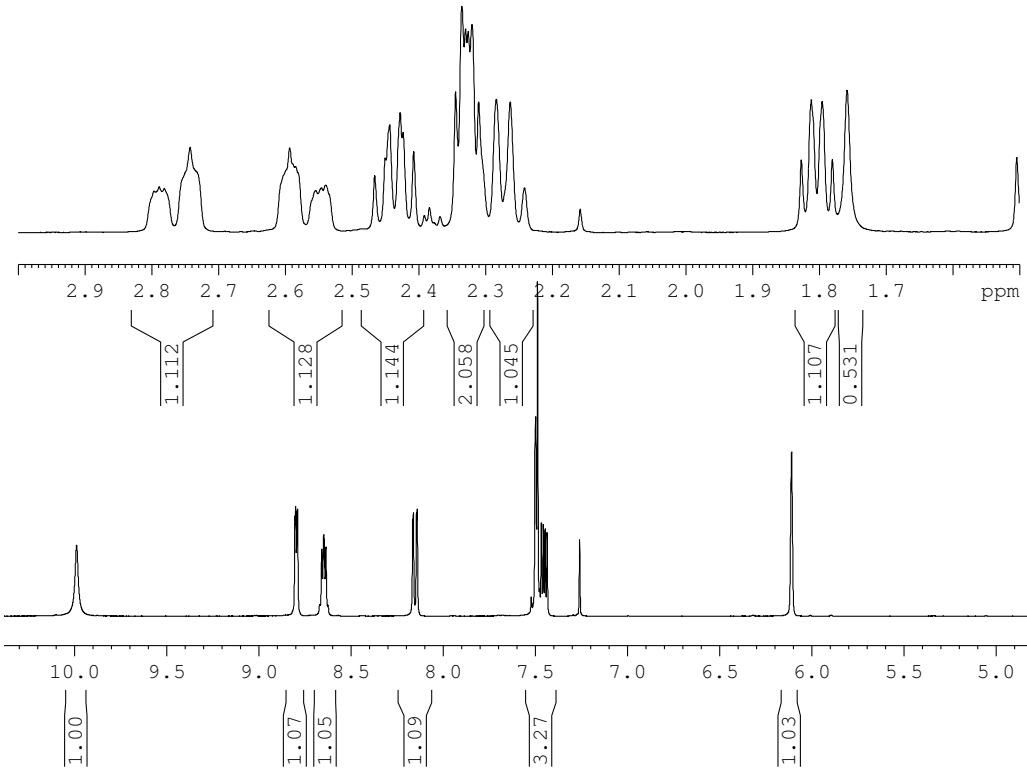
2.7965
2.7888
2.7811
2.7423
2.5931
2.5843
2.5543
2.5456
2.5391
2.4657
2.4500
2.4434
2.4277
2.4232
2.4073
2.3446
2.3352
2.3297
2.3257
2.3200
2.3100
2.2836
2.2629
2.2414
1.8267
1.8118
1.7955
1.7802
1.7582
1.5039
1.4910
1.4834
1.4706
1.4630
1.4501
1.2488

Current Data Parameters
NAME hgy-2-h11-20140418-
EXPNO 40
PROCNO 1

2.797
2.789
2.781
2.742
2.593
2.584
2.554
2.546
2.539
2.466
2.450
2.443
2.428
2.423
2.407
2.345
2.335
2.330
2.326
2.320
2.310
2.284
2.263
2.241

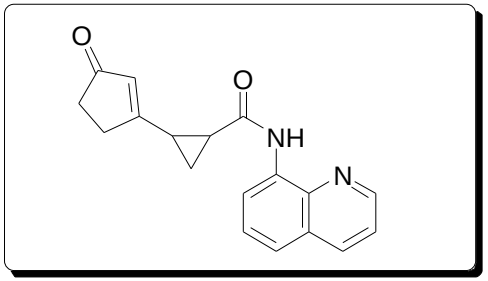
1.827
1.812
1.796
1.780
1.758

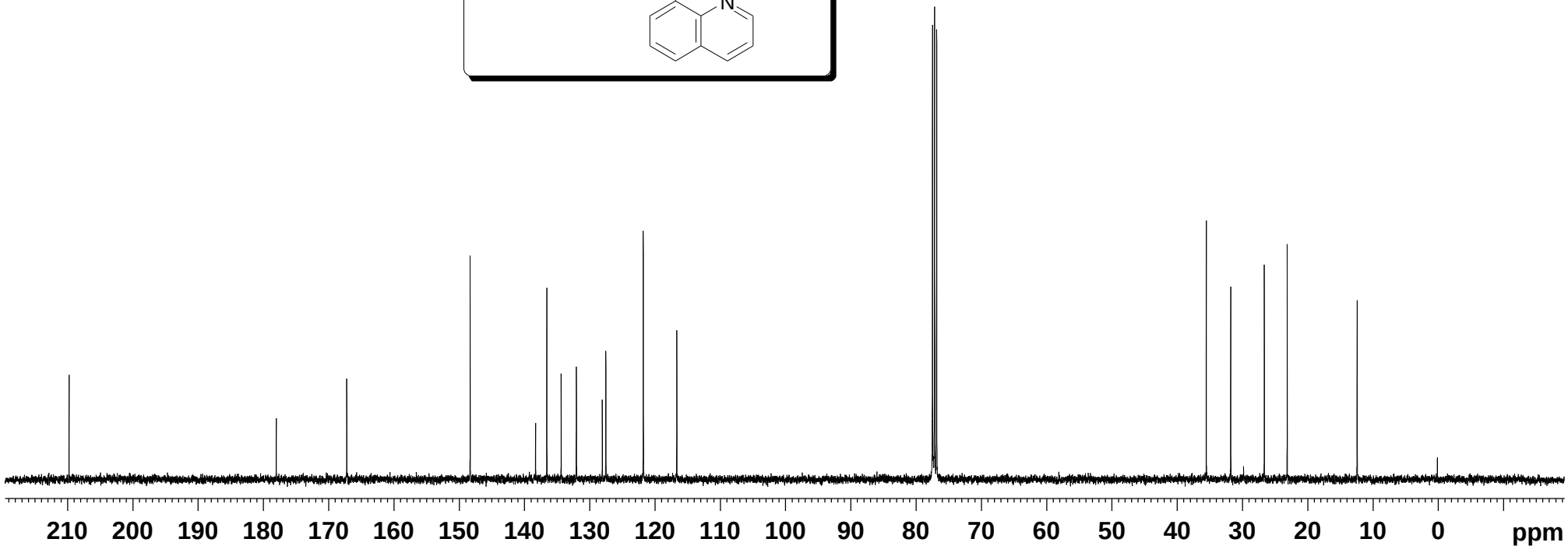


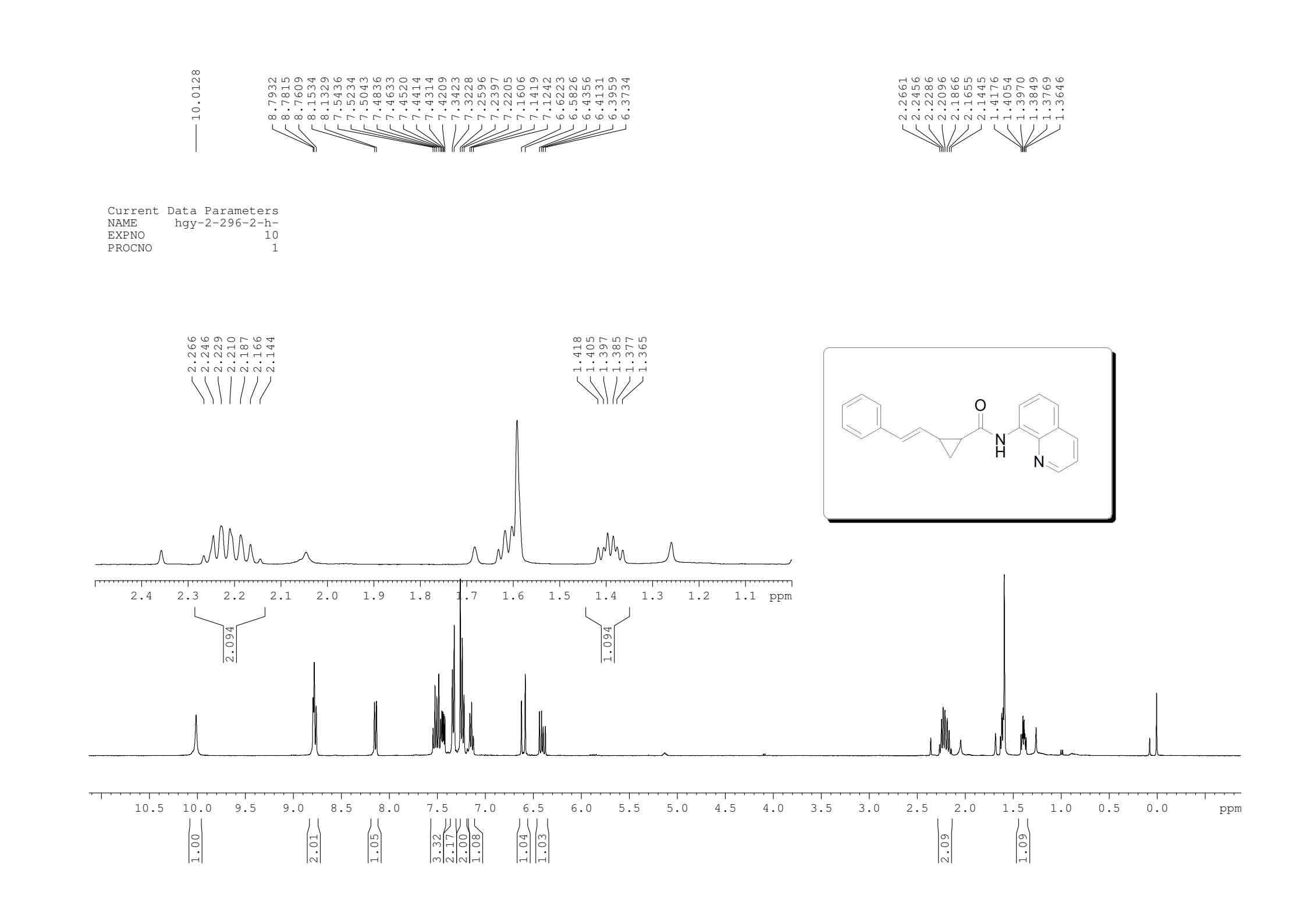


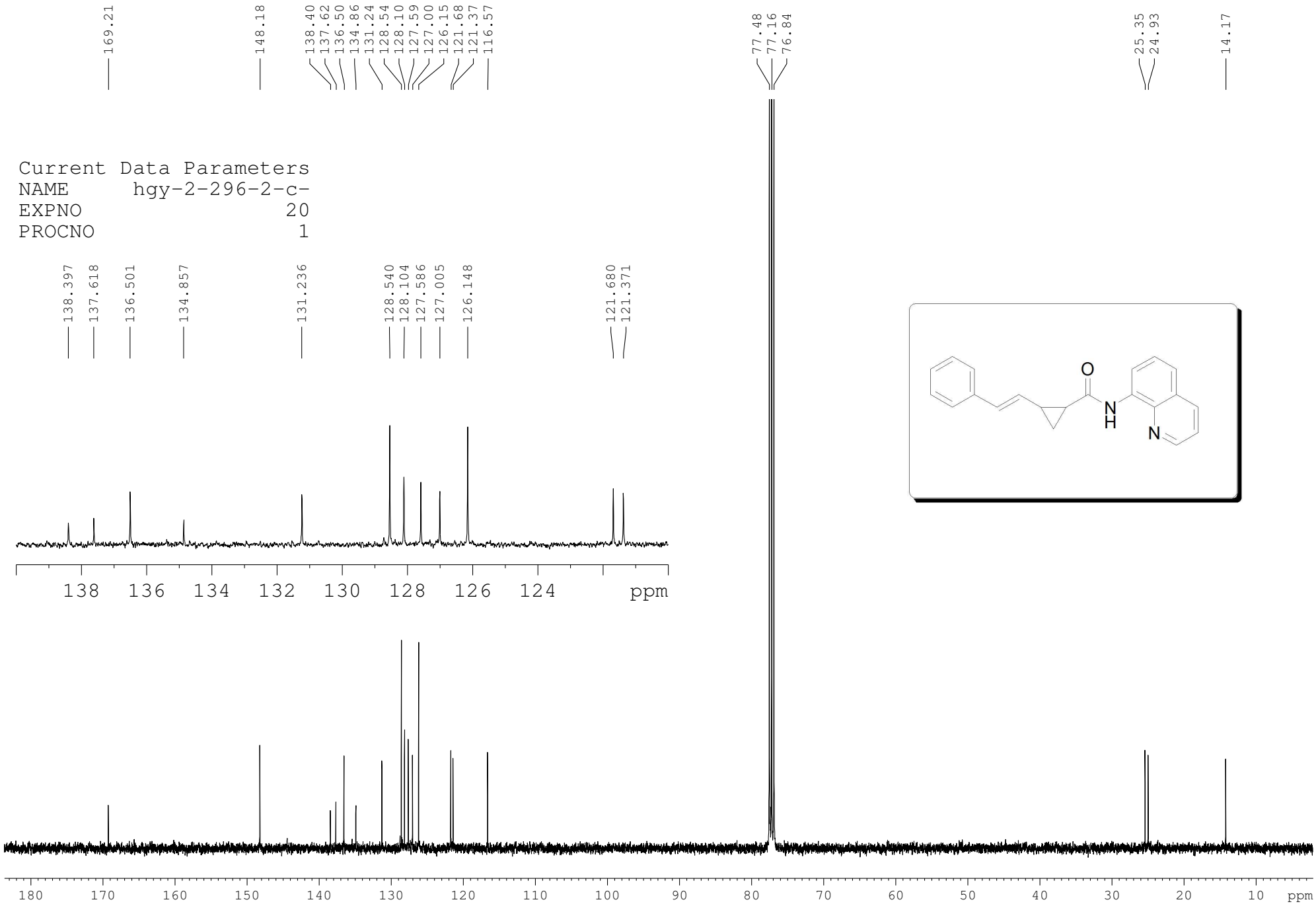
209.79
178.02
167.24
148.33
138.30
136.58
134.39
132.07
128.08
127.54
121.81
121.78
116.67
35.53
31.79
26.65
23.14
12.41

Current Data Parameters
NAME hgy-2-135-11-c-140528-
EXPNO 10
PROCNO 1






10.0128
8.7932
8.7815
8.7609
8.1534
8.1329
7.5436
7.5234
7.5043
7.4836
7.4633
7.4520
7.4414
7.4314
7.4209
7.3423
7.3228
7.2596
7.2397
7.2205
7.1606
7.1419
7.1242
6.6223
6.5826
6.4356
6.4131
6.3959
6.3734
2.2661
2.2456
2.2286
2.2096
2.1866
2.1655
2.1445
1.4176
1.4054
1.3970
1.3849
1.3769
1.3646
Current Data Parameters
NAME hgy-2-296-2-h-
EXPNO 10
PROCNO 1
2.266
2.246
2.229
2.210
2.187
2.166
2.144
1.418
1.405
1.397
1.385
1.377
1.365
O
N
H
N
2.4 2.3 2.2 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.3 1.2 1.1 ppm
2.094
1.094
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
1.00
2.01
1.05
3.32
2.17
2.00
1.08
1.04
1.03
2.09
1.09


169.21
148.18
138.40
137.62
136.50
134.86
131.24
128.54
128.10
127.59
127.00
126.15
121.68
121.37
116.57
77.48
77.16
76.84
25.35
24.93
14.17
Current Data Parameters
NAME hgy-2-296-2-c-
EXPNO 20
PROCNO 1
138.397
137.618
136.501
134.857
131.236
128.540
128.104
127.586
127.005
126.148
121.680
121.371
138 136 134 132 130 128 126 124 ppm
O
N
H
N
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

9.7714

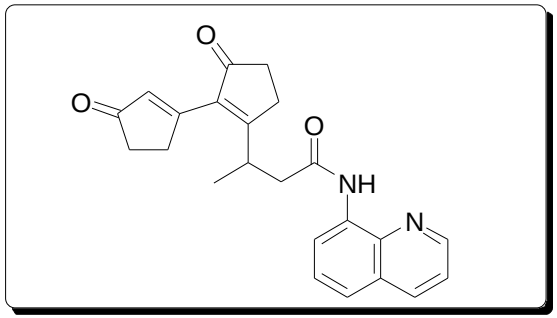
8.7904 8.7866 8.7799 8.7761 8.6692 8.6579 8.6468 8.1842 8.1805 8.1635 8.1598 7.5233 7.5123 7.4886 7.4779 7.4679 7.4573 7.2600

6.3051

3.7935 3.7755 3.7574 3.7394 3.0575 3.0397 3.0105 3.0054 2.9975 2.9928 2.8206 2.8011 2.7866 2.7816 2.7707 2.7572 2.7230 2.7189 2.7101 2.7058 2.5318 2.5267 2.5151 2.5083 2.5016 2.4076 2.4019 2.3897 2.3840 2.3602 2.3544 2.3423 2.3366 2.2555 2.2498 2.2377 2.2319 2.2082 2.2023 2.1903 2.1845 1.3427 1.3253 1.2580 0.8934 0.8768

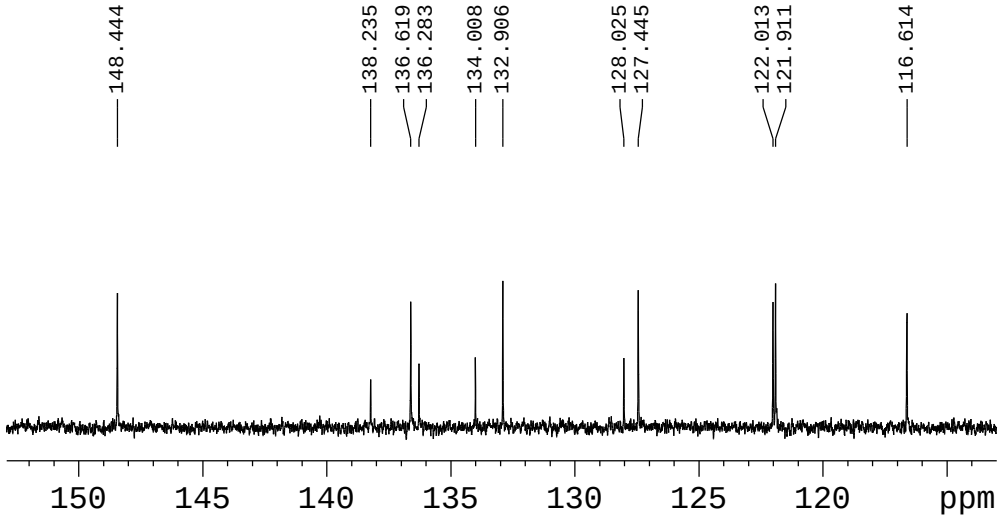
Current Data Parameters
NAME hgy-2-75-a2-140420-
EXPNO 10
PROCNO 1

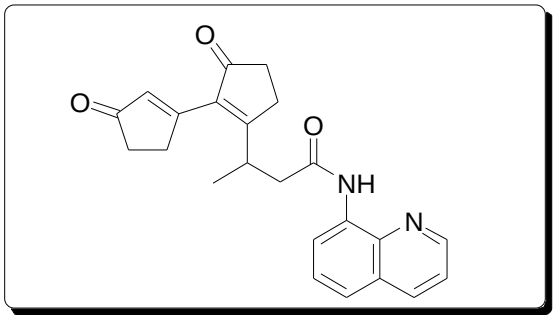
3.058 3.040 3.011 3.005 2.998 2.993 2.821 2.801 2.787 2.782 2.771 2.757 2.723 2.719 2.710 2.706 2.532 2.527 2.515 2.508 2.502 2.408 2.402 2.390 2.384 2.360 2.354 2.342 2.337 2.256 2.250 2.238 2.232 2.208 2.202 2.190 2.184

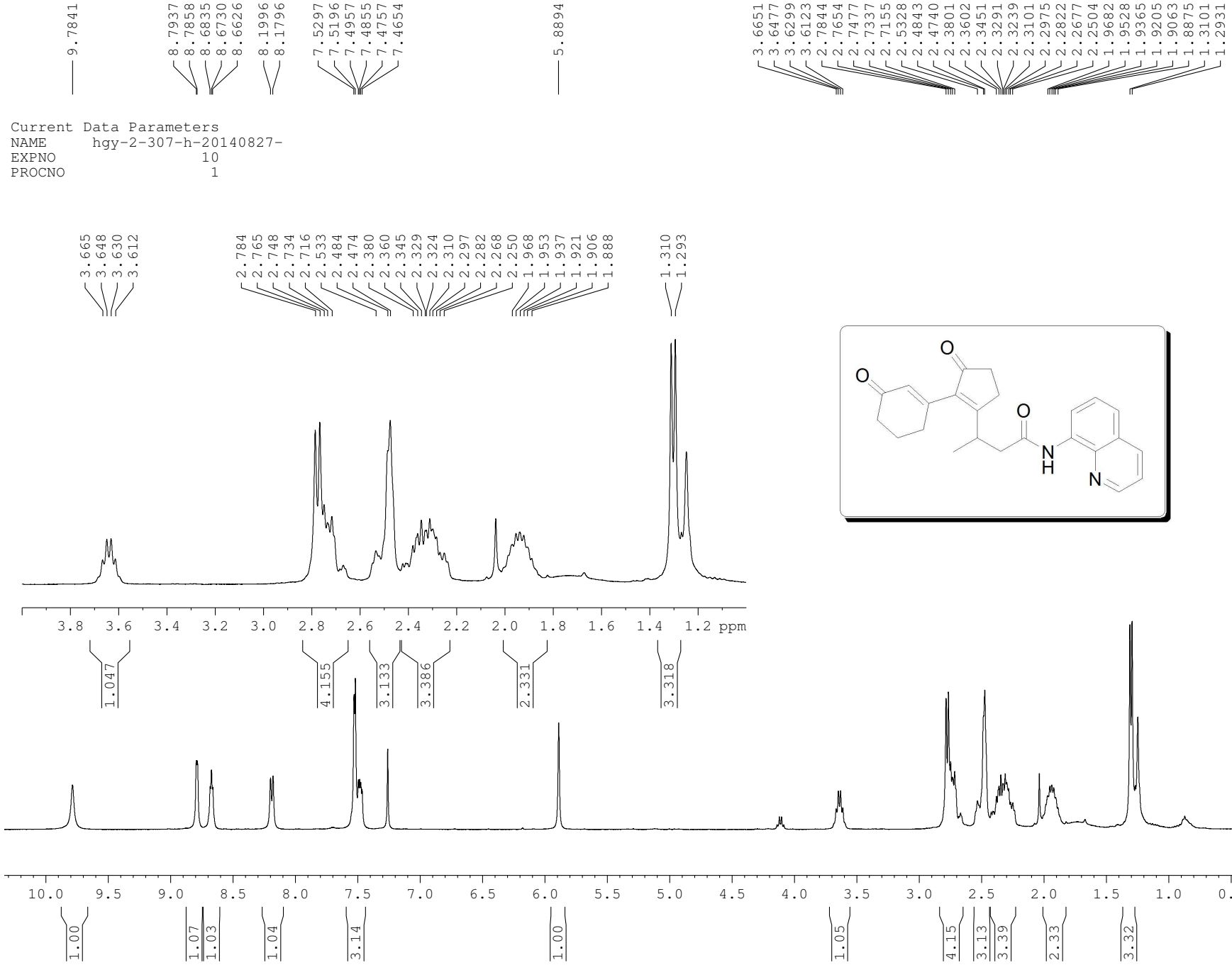


209.73
206.44
180.62
168.66
168.50
148.44
138.23
136.62
136.28
134.01
132.91
128.03
127.44
122.01
121.91
116.61
43.12
34.85
34.64
32.87
31.66
30.83
25.81
22.73
19.64
14.21

Current Data Parameters
NAME hgy-2-75-c-140426-
EXPNO 10
PROCNO 1



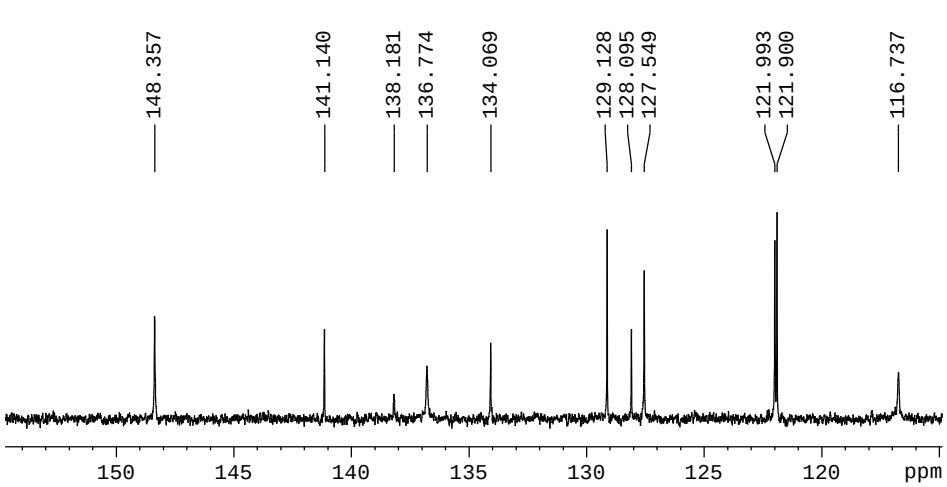


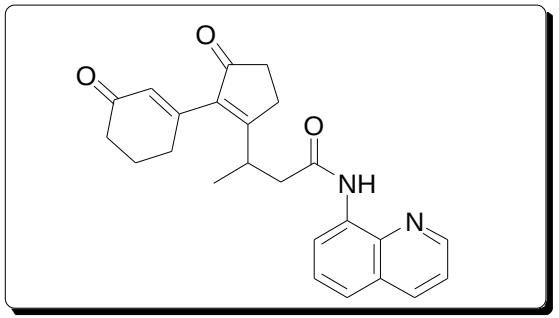

9.7841
8.7937
8.7858
8.6835
8.6730
8.6626
8.1996
8.1796
7.5297
7.5196
7.4957
7.4855
7.4757
7.4654
5.8894
3.6651
3.6477
3.6299
3.6123
2.7844
2.7654
2.7477
2.7337
2.7155
2.5328
2.4843
2.4740
2.3801
2.3602
2.3451
2.3291
2.3239
2.3101
2.2975
2.2822
2.2677
2.2504
1.9682
1.9528
1.9365
1.9205
1.9063
1.8875
1.3101
1.2931
Current Data Parameters
NAME hgy-2-307-h-20140827-
EXPNO 10
PROCNO 1
3.665
3.648
3.630
3.612
2.784
2.765
2.748
2.734
2.716
2.533
2.484
2.474
2.380
2.360
2.345
2.329
2.324
2.310
2.297
2.282
2.268
2.250
1.968
1.953
1.937
1.921
1.906
1.888
1.310
1.293
O
O
O
N
H
N
3.8 3.6 3.4 3.2 3.0 2.8 2.6 2.4 2.2 2.0 1.8 1.6 1.4 1.2 ppm
1.047
4.155
3.133
3.386
2.331
3.318
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 ppm
1.00
1.07
1.03
1.04
3.14
1.00
1.05
4.15
3.13
3.39
2.33
3.32

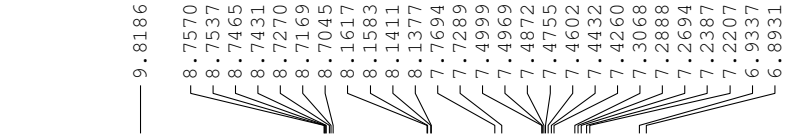
206.79
199.43
177.51
168.85
156.11
148.36
141.14
138.18
136.77
134.07
129.13
128.09
127.55
121.99
121.90
116.74
77.48
77.16
76.84
43.34
37.45
34.68
32.77
28.93
25.54
22.66
19.83

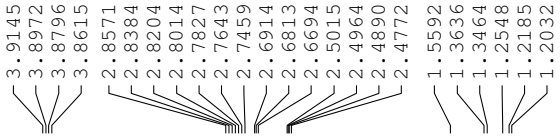
Current Data Parameters
NAME hgy-2-351-1-h-140901-
EXPNO 10
PROCNO 1

148.357
141.140
138.181
136.774
134.069
129.128
128.095
127.549
121.993
121.900
116.737

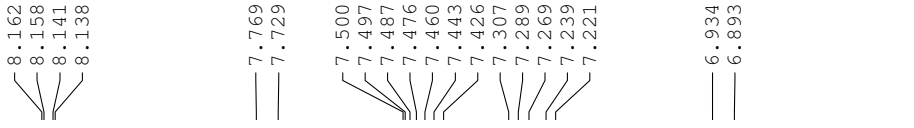


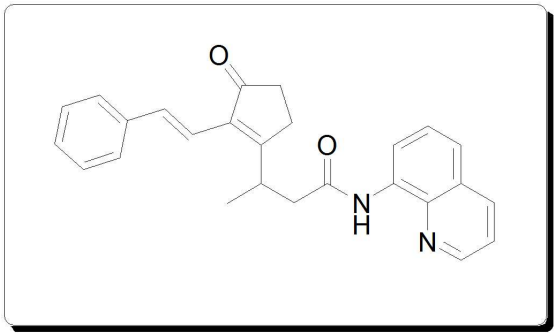


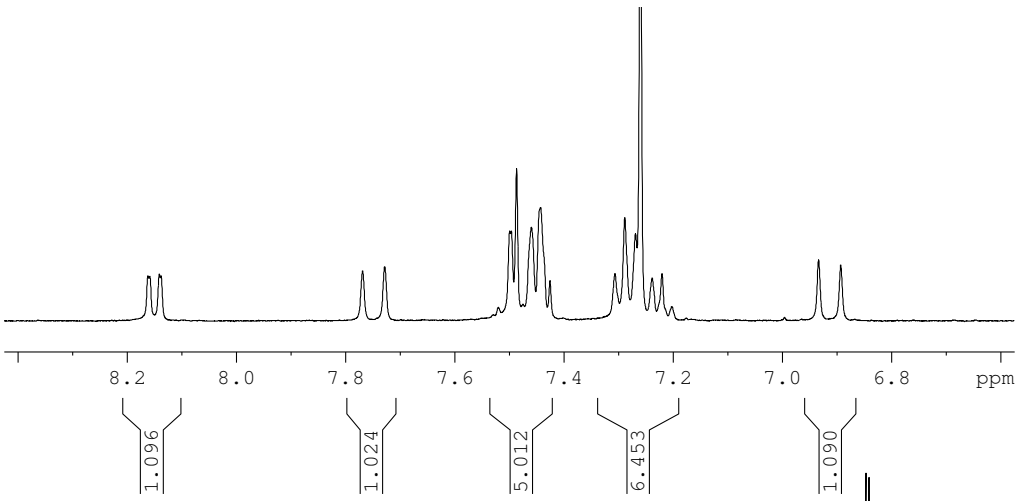




Current Data Parameters
NAME hgy-3-18-h-20140915-
EXPNO 10
PROCNO 1



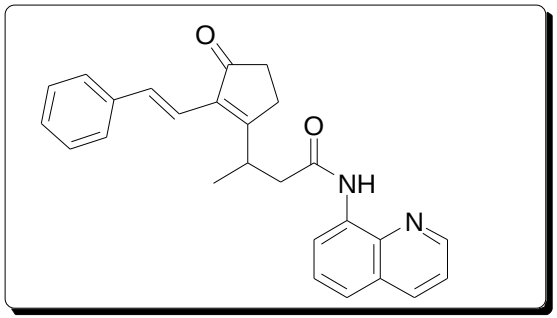


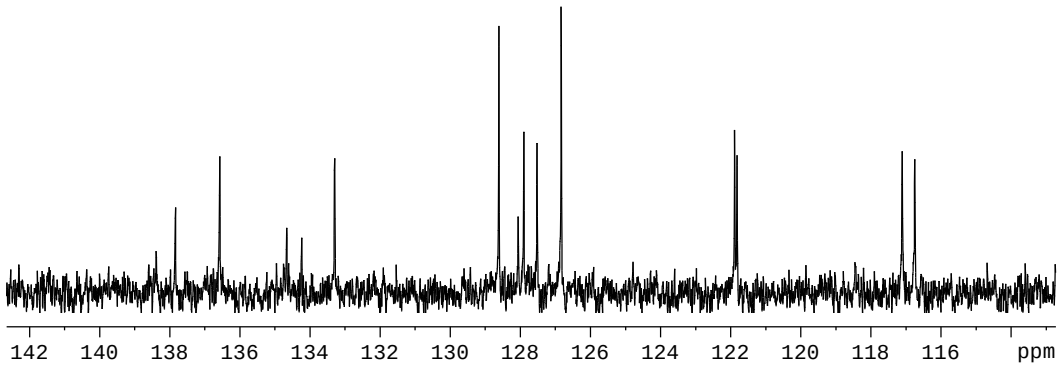


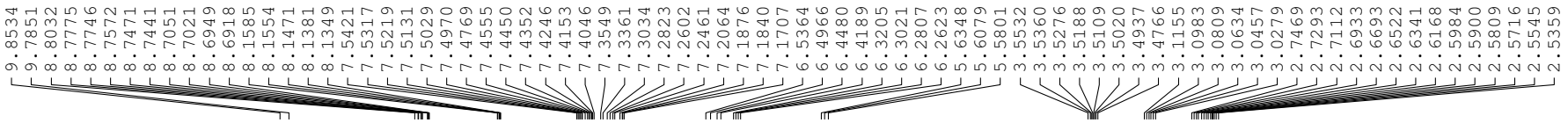
208.40
176.22
169.27
148.36
137.84
136.58
134.67
134.24
133.30
128.61
128.06
127.90
127.52
126.84
121.89
121.82
117.11
116.75
43.29
35.07
32.12
25.24
19.01

Current Data Parameters
NAME hgy-3-18-1-c-140915-
EXPNO 10
PROCNO 1

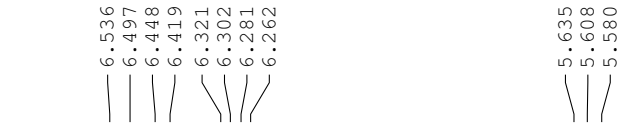
137.843
136.580
134.667
134.239
133.301
128.614
128.062
127.903
127.524
126.836
121.888
121.819
117.105
116.748

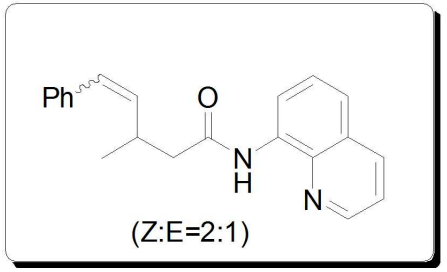


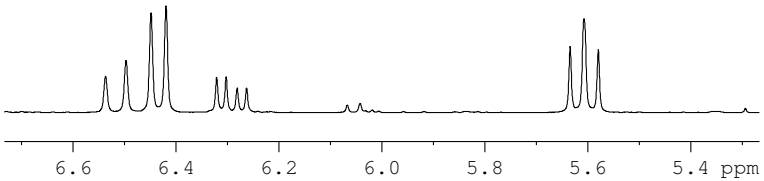


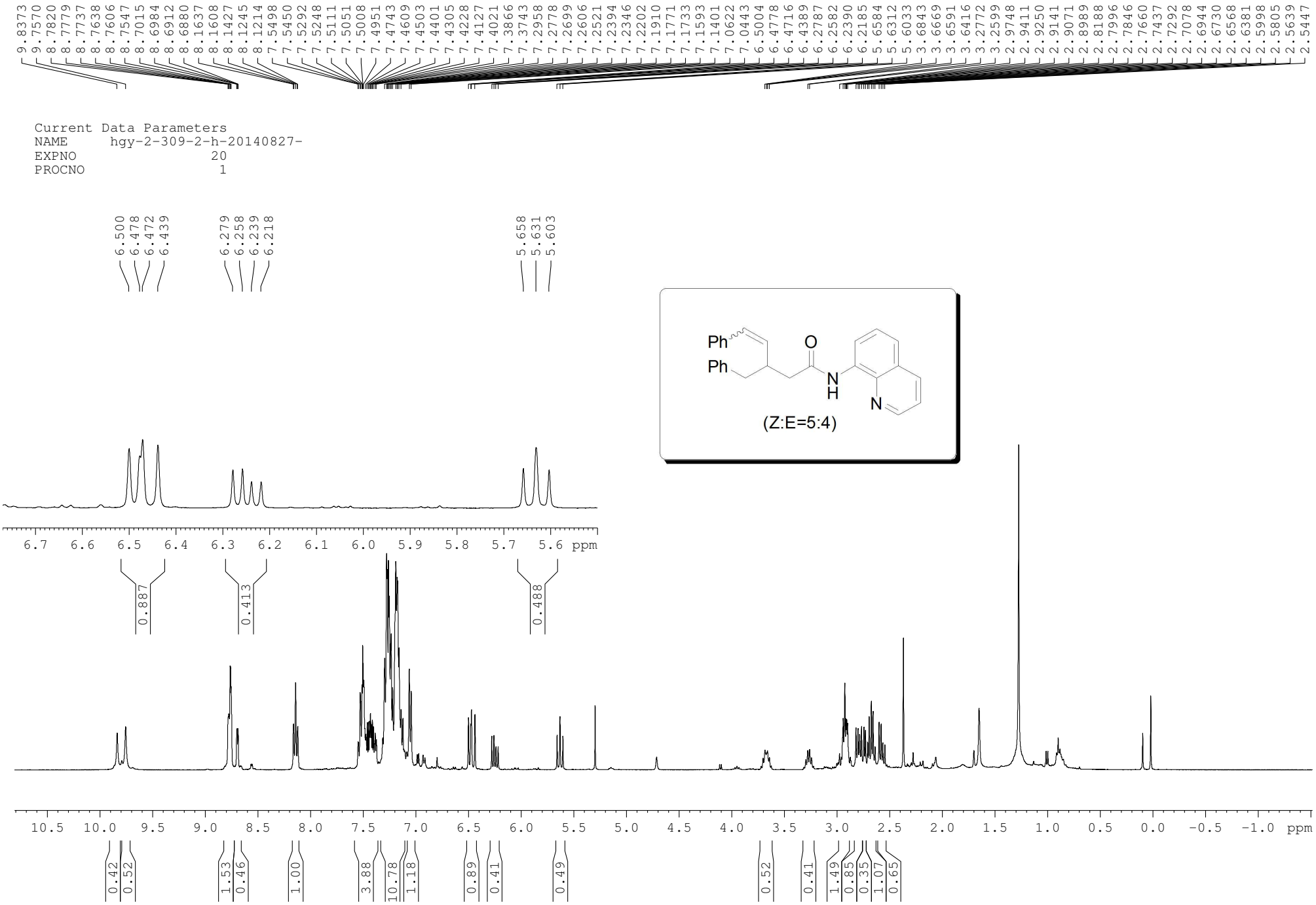


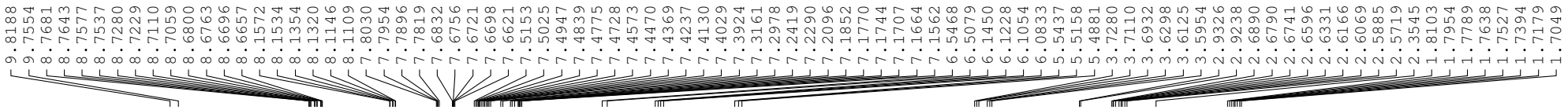
Current Data Parameters
NAME hgy-2-309-1-h-20140827-
EXPNO 10
PROCNO 1



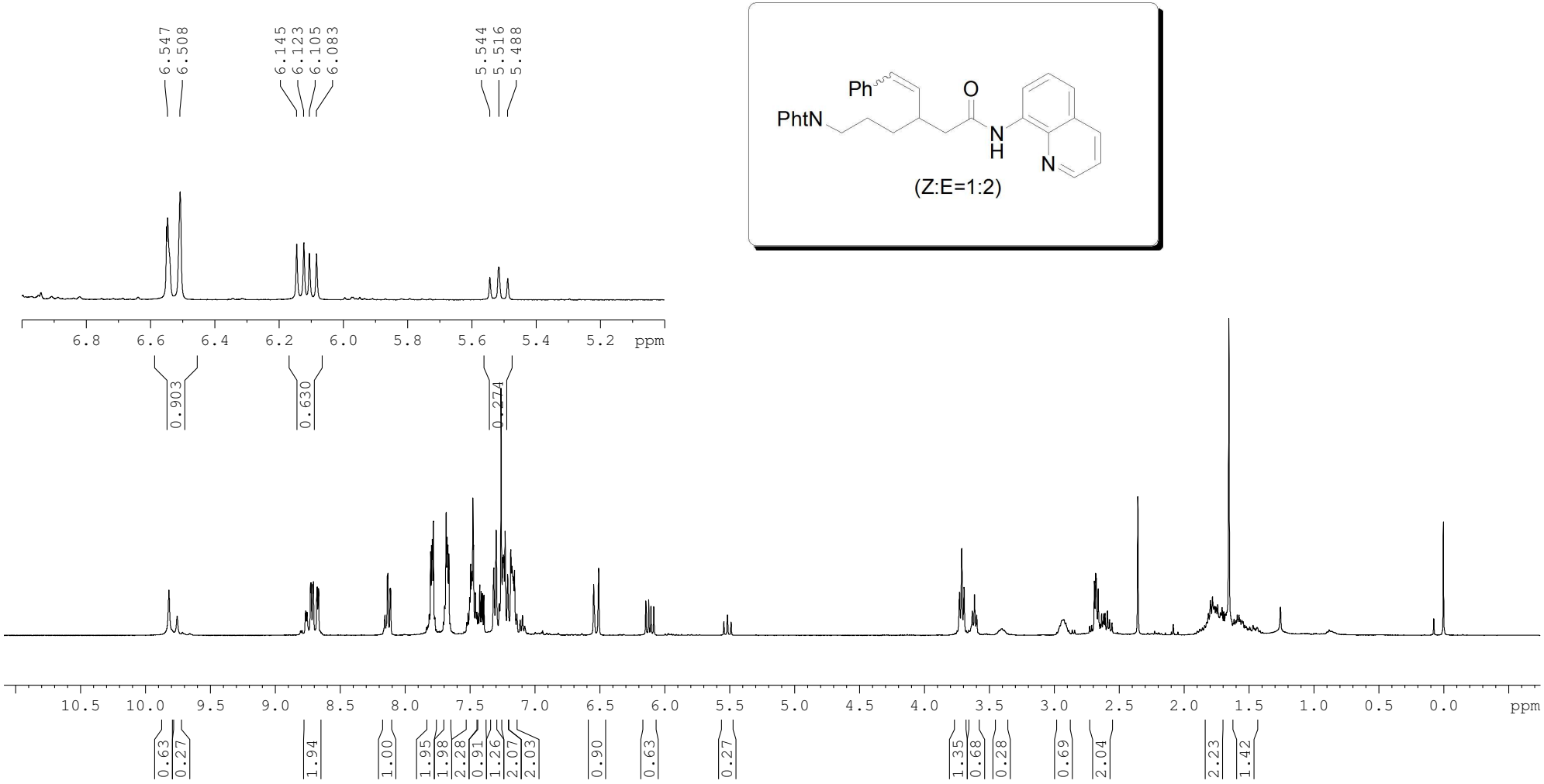


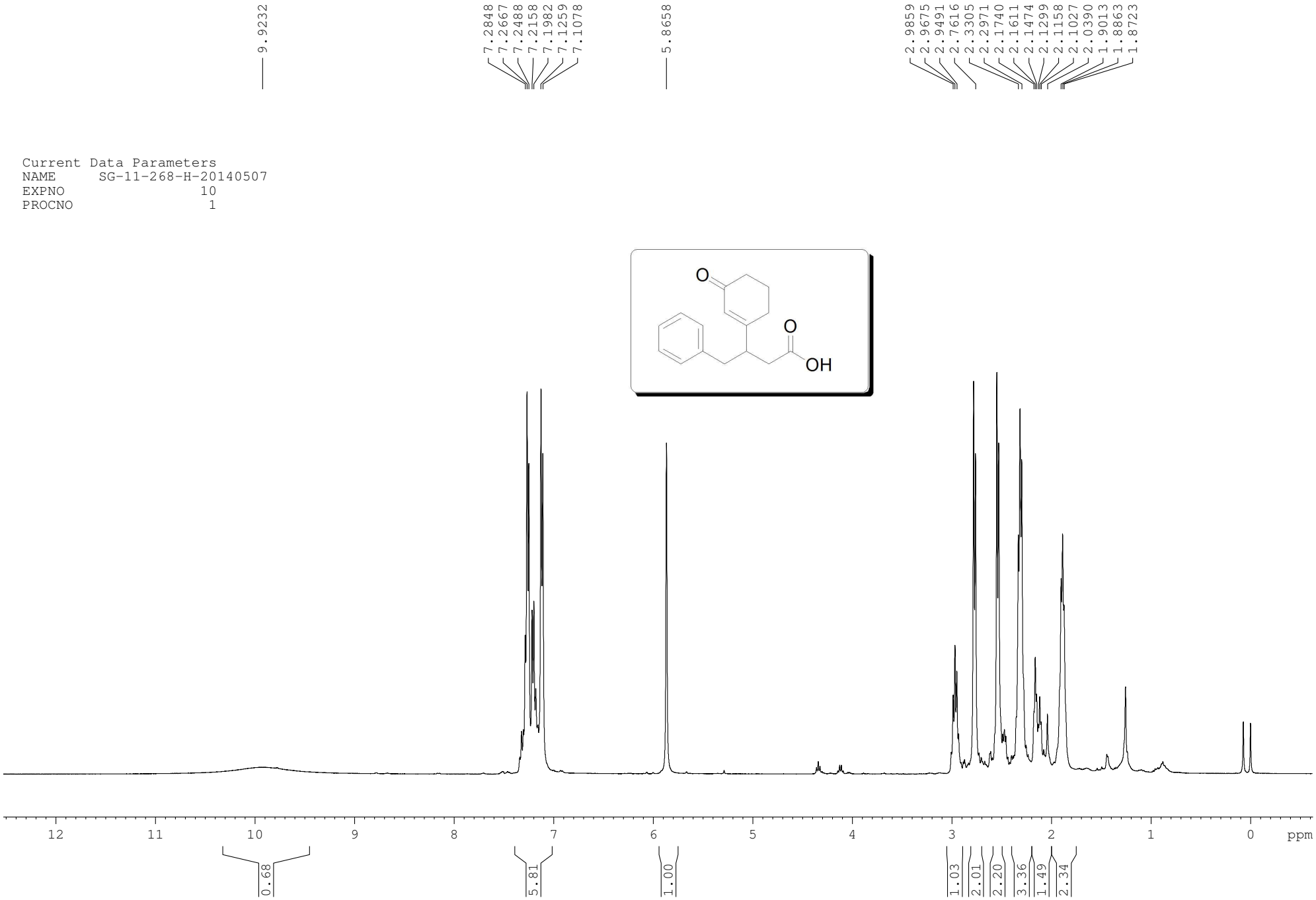



9.8373 9.7570 8.7820 8.7779 8.7737 8.7638 8.7606 8.7547 8.7015 8.6984 8.6912 8.6880 8.1637 8.1608 8.1427 8.1245 8.1214 7.5498 7.5450 7.5292 7.5248 7.5111 7.5051 7.5008 7.4951 7.4743 7.4609 7.4503 7.4401 7.4305 7.4228 7.4127 7.4021 7.3866 7.3743 7.2958 7.2778 7.2699 7.2606 7.2521 7.2394 7.2346 7.2202 7.1910 7.1771 7.1733 7.1593 7.1401 7.0622 7.0443 6.5004 6.4778 6.4716 6.4389 6.2787 6.2582 6.2390 6.2185 5.6584 5.6312 5.6033 3.6843 3.6669 3.6591 3.6416 3.2772 3.2599 2.9748 2.9411 2.9250 2.9141 2.9071 2.8989 2.8188 2.7996 2.7846 2.7660 2.7437 2.7292 2.7078 2.6944 2.6730 2.6568 2.6381 2.5998 2.5805 2.5639 2.5447
Current Data Parameters
NAME hgy-2-309-2-h-20140827-
EXPNO 20
PROCNO 1
6.500 6.478 6.472 6.439 6.279 6.258 6.239 6.218 5.658 5.631 5.603
Ph Ph O N H N
(Z:E=5:4)
6.7 6.6 6.5 6.4 6.3 6.2 6.1 6.0 5.9 5.8 5.7 5.6 ppm
0.887 0.413 0.488
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 ppm
0.42 0.52 1.53 0.46 1.00 3.88 10.78 1.18 0.89 0.41 0.49 0.52 0.41 1.49 0.85 0.35 1.07 0.65



Current Data Parameters
NAME hgy-2-313-1-h-20140828-
EXPNO 10
PROCNO 1




9.9232
7.2848
7.2667
7.2488
7.2158
7.1982
7.1259
7.1078
5.8658
2.9859
2.9675
2.9491
2.7616
2.3305
2.2971
2.1740
2.1611
2.1474
2.1299
2.1158
2.1027
2.0390
1.9013
1.8863
1.8723
Current Data Parameters
NAME SG-11-268-H-20140507
EXPNO 10
PROCNO 1
O
O
OH
12
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.68
5.81
1.00
1.03
2.01
2.20
3.36
1.49
2.34

200.29
176.76
167.52
138.38
129.05
128.67
126.84
126.35
77.48
77.16
76.85
45.16
40.16
37.45
28.70
22.64

Current Data Parameters
NAME SG-11-268-C-20140508
EXPNO 20
PROCNO 1