Electronic Supplementary Material (ESI) for ChemComm.

Supporting Information

Palladium-Catalyzed Direct Intermolecular Silylation of Remote Unactivated C(sp^3)–H bonds with Disilanes

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Contents

1. General information

Solvents: Dichloromethane was distilled from CaH_2, and toluene was distilled from Na before use. Other solvents used in this manuscript were purchased in anhydrous form.

Reagents: All commercial materials were used as received unless otherwise noted. $Pd(OAc)_2$ (99.9%, Acros), 1,4-benzoquinone (BQ) (99%, Acros), hexamethyldisilane (HMDS) (98%, Energy), 4Å MS (Energy, activated) were used in the Pd-catalyzed silylation reactions.

Reactions: All reactions were performed in oven-dried glassware under an atmosphere of argon unless otherwise noted. All yields reported were averages of at least two experimental runs.

Chromatography: Thin layer chromatography (TLC) was carried out on silica gel 60 F254 pre-coated glass plates. Visualization was detected by irradiation with UV light (254 nm), or by treatment with a solution of phosphomolybdic acid in ethanol followed by heating. Flash chromatography was carried out on 200 – 300 mesh silica gel, eluting with a mixture of petroleum ether (b.p. 60 – 90 °C) and ethyl acetate.

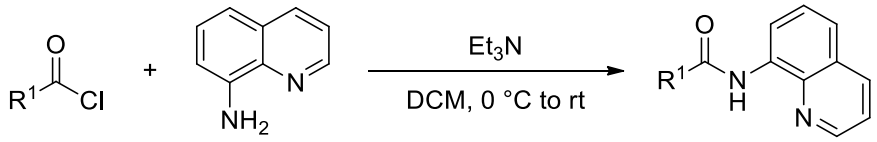
NMR Spectroscope: ^1H NMR and ^{13}C NMR spectra were recorded on a Bruker AVANCE III HD 400 spectrometer, operating at 400 MHz and 100 MHz respectively. Chemical shifts (δ) were given in parts per million (ppm), and referenced relative to residual solvent $CHCl_3$ (7.26 ppm) in $CDCl_3$, or tetramethylsilane (0.00 ppm) as an internal standard for ^1H NMR spectra and deuterated solvent $CDCl_3$ (77.0 ppm) for ^{13}C NMR spectra. Coupling constants (*J*) were reported in hertz (Hz). The following abbreviations are used to indicate the multiplicity of the signals: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, and associated combinations, e.g. dd = doublet of doublets.

Mass Spectrometry: High resolution mass spectra (HRMS) were obtained on a Bruker Daltonics SolariX 7.0 Tesla Fourier Transform Ion Cyclotron Resonance (FT-ICR) Mass Spectrometer using the electrospray ionization (ESI) technique.

Melting Points: Melting points (m.p.) were measured on a WRS-1B digital melting point apparatus (Shanghai Precision & Scientific Instrument Co., Ltd) and were uncorrected.

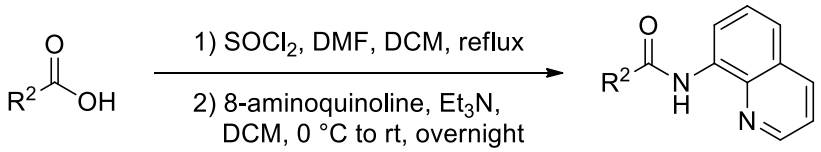
2. Preparation of substrates

General procedure A:



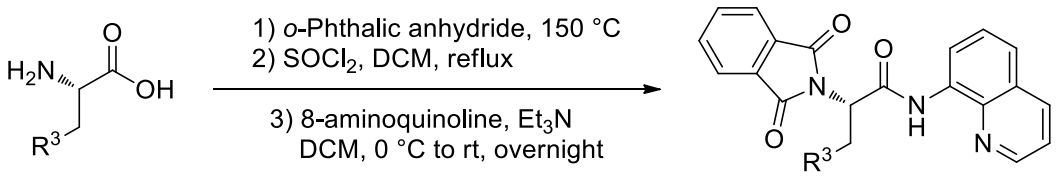
According to literature procedure [1], to a solution of 8-aminoquinoline (10 mmol, 1.0 equiv) in dry DCM at 0 °C was added acyl chloride (11 mmol, 1.1 equiv) and Et_3N (12 mmol, 1.2 equiv). Then the reaction mixture was stirred overnight at room temperature. Saturated $NaHCO_3$ solution was added and the mixture was extracted with DCM (20 mL × 3). The combined organic layers were washed with water and brine, dried over anhydrous Na_2SO_4, filtered, and concentrated *in vacuo*. The resulting residue was purified by flash column chromatography to give the corresponding amide.

General procedure B:



According to literature procedure [2], a solution of acid (10 mmol, 1.0 equiv), $SOCl_2$ (11 mmol, 1.1 equiv) and DMF (3 drops) in DCM (20 mL) was heated to reflux for 5 hours, and the reaction mixture was concentrated *in vacuo*. And the residue was dissolved in DCM (20 mL), 8-aminoquinoline (9 mmol, 0.9 equiv) and Et_3N (13 mmol, 1.3 equiv) was added at 0 °C, and then stirred overnight at room temperature. Saturated $NaHCO_3$ solution was added and the mixture was extracted with DCM (20 mL × 3). The combined organic layers were washed with water and brine, dried over anhydrous Na_2SO_4, filtered, and concentrated *in vacuo*. The resulting residue was purified by flash column chromatography to give the corresponding amide.

General procedure C:



According to literature procedure [2], a mixture of amino-acid (10 mmol, 1.0 equiv) and *o*-phthalic anhydride (11 mmol, 1.1 equiv) was heated at 150 °C for 2 h. After cooling to room temperature, the resulting water and the unreacted *o*-phthalic anhydride were washed off by acetone (2 mL) and DCM (2 ml), the resulting solid was then dissolved in dry DCM (20 mL), $SOCl_2$ (13 mmol, 1.3 eq) was added and stirred overnight at 55 °C. After the reaction, DCM and excess of $SOCl_2$ were removed *in vacuo*. The crude acyl chloride was dissolved in dry DCM (20 mL), 8-aminoquinoline (9.2 mmol, 0.92 equiv) and Et_3N (13 mmol, 1.3 equiv) were added and stirred overnight at room temperature. Saturated $NaHCO_3$ solution was added and the mixture was extracted with DCM (20 mL × 3). The combined organic layers were washed with water and brine, dried over anhydrous Na_2SO_4, and concentrated *in vacuo*. The resulting residue was purified by flash column chromatography to give the corresponding amide.

All these amides used are known compounds and were list as follows.

1) Table S1: Amides **1a**[1], **1b**[3], **1c**[1], **1d**[4], **1e**[5], **1f**[6], **1g**[7], **1j**[1], **1l**[7], **1m**[2], **1n**[8], **1o**[2], **1p**[2], **1q**[3] and **1r**[1] were prepared according to the general procedure A.

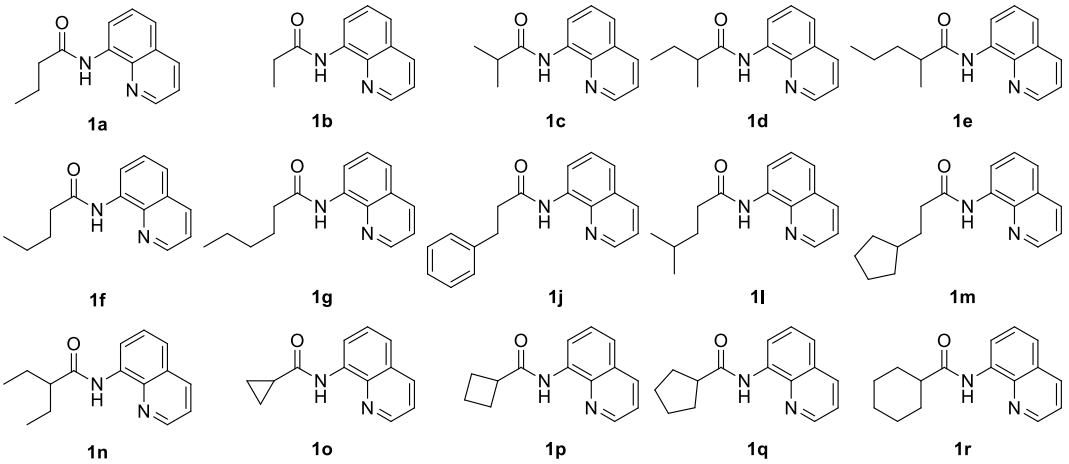
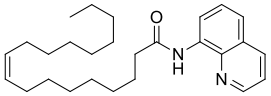


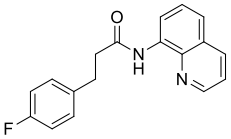
Table S1 Amides prepared according to the general procedure A

2) Table S2: Amides **1i**[3], **1k**[6], **1s**[9], **1t**[10], **1w**[11] were prepared according to the

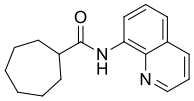
general procedure B.



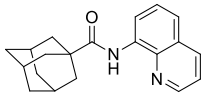
1i



1k



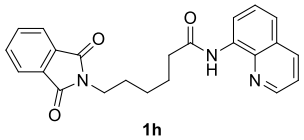
1s



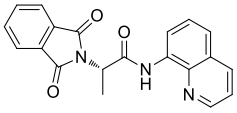
1t

Table S2 Amides prepared according to the general procedure B

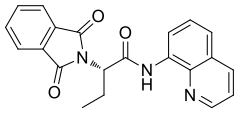
3) Table S3: Amide **1h**[2], **9a**[12], **9b**[12], **9c**[12], **9d**[12], **9e**[12] and **9f**[12] were prepared according to the general procedure C.



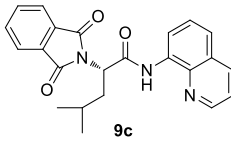
1h



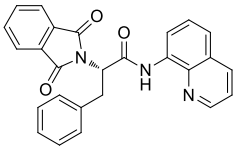
9a



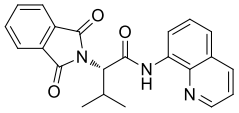
9b



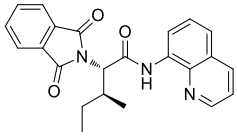
9c



9d



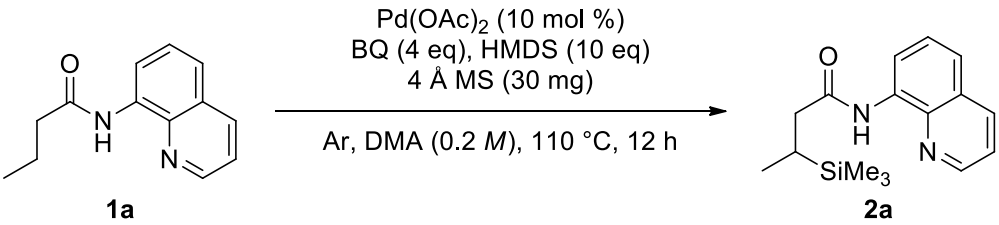
9e



9f

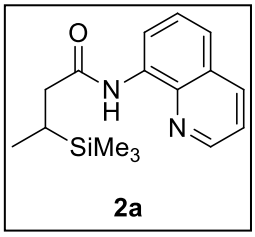
Table S3 Amides prepared according to the general procedure C

3. Experimental details and characterization data



1a **2a**

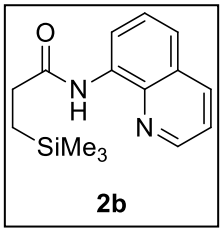
Typical procedure for Pd-catalyzed silylation reaction: A mixture of amide **1a** (42.9 mg, 0.2 mmol), $Pd(OAc)_2$ (4.5 mg, 0.02 mmol, 10 mol %), BQ (86.5 mg, 0.4 mmol, 2 equiv), 4Å MS (30 mg) and HMDS (400 µL, 2.0 mmol, 10 equiv) in DMA (1 mL) in 10-mL glass vial (purged with Ar, sealed with PTFE cap) was heated at 110 °C for 12 hours. The reaction mixture was cooled to room temperature, poured into water (20 mL). The aqueous layer was extracted with Et_2O (20 mL × 3), washed with saturated Na_2CO_3 solution (5 mL × 2). And the combined organic layers were dried over anhydrous Na_2SO_4, filtered, and concentrated *in vacuo*. The resulting residue was purified by flash column chromatography to give the corresponding silylated product **2a**.



2a

2a (colorless oil, 32.1 mg, 56%) was isolated as a colorless oil following the typical procedure starting from **1a**.

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.82 (s, 1H), 8.83 – 8.79 (m, 2H), 8.12 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.54 – 7.45 (m, 2H), 7.42 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.66 (dd, *J* = 14.7, 4.1 Hz, 1H), 2.26 (dd, *J* = 14.7, 11.3 Hz, 1H), 1.45 – 1.36 (m, 1H), 1.06 (d, *J* = 7.3 Hz, 3H), 0.04 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.3, 148.2, 138.5, 136.4, 134.6, 128.0, 127.5, 121.6, 121.4, 116.5, 40.8, 17.4, 14.5, -3.3. HRMS (ESI) *m/z* calculated for $C_{16}H_{23}N_2OSi$ [M+H$^+$] 287.1574, found 287.1574.

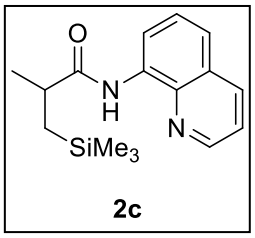


2b

2b (colorless oil, 24.0 mg, 44%) was isolated following the typical procedure starting from **1b**.

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.86 (s, 1H), 8.81 – 8.78 (m, 2H), 8.14 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.54 – 7.45 (m, 2H), 7.43 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.56 – 2.52 (m, 2H), 1.06 – 1.02 (m, 2H), 0.07 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 173.0, 148.1, 138.3, 136.3, 134.6, 127.9, 127.4, 121.5, 121.2, 116.3, 32.7, 12.2, -1.9.

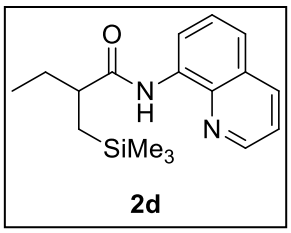
HRMS (ESI) *m/z* calculated for $C_{15}H_{21}N_2OSi$ [M+H$^+$] 273.1418, found 273.1417.



2c

2c (colorless oil, 43.0 mg, 75%) was isolated following the typical procedure starting from **1c.**

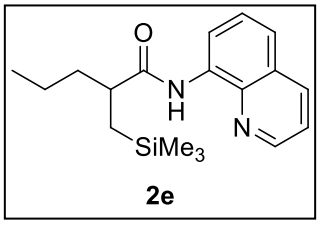
^{1}H NMR (400 MHz, $CDCl_3$) δ 9.89 (s, 1H), 8.81 – 8.78 (m, 2H), 8.13 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.54 – 7.46 (m, 2H), 7.43 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.77 – 2.68 (m, 1H), 1.37 (d, *J* = 6.9 Hz, 3H), 1.20 (dd, *J* = 14.7, 7.0 Hz, 1H), 0.88 (dd, *J* = 14.7, 7.7 Hz, 1H), 0.06 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 176.2, 148.1, 138.4, 136.3, 134.6, 127.9, 127.4, 121.5, 121.2, 116.3, 39.2, 22.3, 21.3, -1.0. HRMS (ESI) *m/z* calculated for $C_{16}H_{23}N_2OSi$ [M+H$^+$] 287.1574, found 287.1574.



2d

2d (colorless oil, 46.9 mg, 78%) was isolated following the typical procedure starting from **1d**.

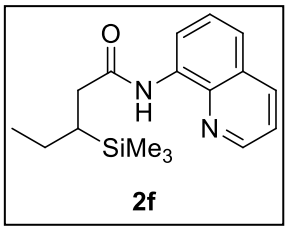
^{1}H NMR (400 MHz, $CDCl_3$) δ 9.86 (s, 1H), 8.82 – 8.80 (m, 2H), 8.14 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.55 – 7.47 (m, 2H), 7.44 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.52 – 2.45 (m, 1H), 1.90 – 1.79 (m, 1H), 1.70 – 1.60 (m, 1H), 1.14 (dd, *J* = 14.7, 8.9 Hz, 1H), 1.00 (t, *J* = 7.4 Hz, 3H), 0.88 (dd, *J* = 14.7, 5.9 Hz, 1H), 0.03 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 175.4, 148.1, 138.4, 136.3, 134.5, 127.9, 127.4, 121.5, 121.2, 116.4, 46.7, 29.5, 20.6, 12.0, -1.1. HRMS (ESI) *m/z* calculated for $C_{17}H_{25}N_2OSi$ [M+H$^+$] 301.1731, found 301.1730.



2e

2e (colorless oil, 49.7 mg, 79%) was isolated following the typical procedure starting from **1e**.

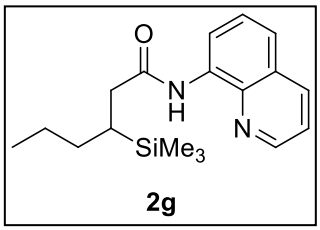
^{1}H NMR (400 MHz, $CDCl_3$) δ 9.87 (s, 1H), 8.82 – 8.80 (m, 2H), 8.13 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.54 – 7.41 (m, 2H), 7.43 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.61 – 2.54 (m, 1H), 1.87 – 1.78 (m, 1H), 1.60 – 1.51 (m, 1H), 1.46 – 1.37 (m, 2H), 1.14 (dd, *J* = 14.7, 8.8 Hz, 1H), 0.93 (t, *J* = 7.3 Hz, 3H), 0.88 (dd, *J* = 14.8, 6.0 Hz, 1H), 0.04 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 175.5, 148.1, 138.4, 136.2, 134.5, 127.9, 127.4, 121.5, 121.2, 116.4, 44.9, 38.7, 20.9, 20.7, 14.1, -1.1. HRMS (ESI) *m/z* calculated for $C_{18}H_{27}N_2OSi$ [M+H$^+$] 315.1887, found 315.1886.



2f

2f (colorless oil, 22.9 mg, 38%) was isolated following the typical procedure starting from **1f**.

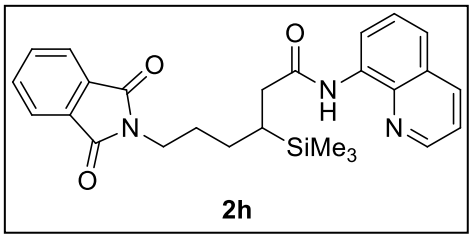
^{1}H NMR (400 MHz, $CDCl_3$) δ 9.84 (s, 1H), 8.81 – 8.79 (m, 2H), 8.13 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.54 – 7.46 (m, 2H), 7.43 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.60 (dd, *J* = 15.1, 5.2 Hz, 1H), 2.47 (dd, *J* = 15.1, 9.3 Hz, 1H), 1.68 – 1.57 (m, 1H), 1.53 – 1.42 (m, 1H), 1.38 – 1.30 (m, 1H), 1.00 (t, *J* = 7.4 Hz, 3H), 0.07 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.3, 148.0, 138.3, 136.3, 134.5, 127.9, 127.4, 121.5, 121.2, 116.3, 38.5, 24.5, 23.2, 13.7, -2.4. HRMS (ESI) *m/z* calculated for $C_{17}H_{25}N_2OSi$ [M+H$^+$] 301.1731, found 301.1730.



2g

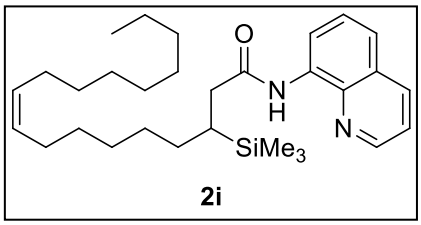
2g (colorless oil, 28.3 mg, 45%) was isolated following the typical procedure starting from **1g**.

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.83 (s, 1H), 8.81 – 8.78 (m, 2H), 8.14 (dd, *J* = 8.3, 1.5 Hz, 1H), 7.55 – 7.46 (m, 2H), 7.43 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.61 (dd, *J* = 15.1, 4.7 Hz, 1H), 2.45 (dd, *J* = 15.1, 8.5 Hz, 1H), 1.53 – 1.34 (m, 5H), 0.87 (t, *J* = 6.7 Hz, 3H), 0.06 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.3, 148.0, 138.3, 136.3, 134.6, 127.9, 127.4, 121.5, 121.2, 116.3, 38.9, 32.8, 22.6, 22.2, 14.4, -2.5. HRMS (ESI) *m/z* calculated for $C_{18}H_{27}N_2OSi$ [M+H$^+$] 315.1887, found 315.1886.



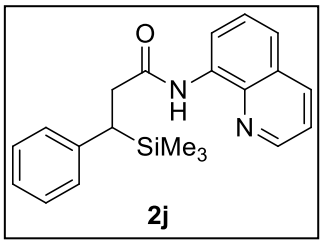
2h

2h (white solid, 44.1 mg, 48%) was isolated following the typical procedure starting from **1h**. m.p. = 98.7 – 99.9 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.76 (s, 1H), 8.78 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.68 (dd, *J* = 6.6, 2.4 Hz, 1H), 8.11 (dd, *J* = 8.3, 1.7 Hz, 1H), 7.73 – 7.68 (m, 2H), 7.62 – 7.57 (m, 2H), 7.48 – 7.40 (m, 3H), 3.70 – 3.59 (m, 2H), 2.59 (dd, *J* = 15.2, 5.1 Hz, 1H), 2.45 (dd, *J* = 15.2, 8.6 Hz, 1H), 1.86 – 1.71 (m, 2H), 1.64 – 1.56 (m, 1H), 1.52 – 1.37 (m, 2H), 0.04 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 171.7, 168.2, 148.0, 138.2, 136.2, 134.3, 133.6, 131.9, 127.8, 127.3, 122.9, 121.5, 121.2, 116.3, 38.5, 38.0, 27.9, 27.6, 22.1, -2.5. HRMS (ESI) *m/z* calculated for $C_{26}H_{30}N_3O_3Si$ [M+H$^+$] 460.2051, found 460.2046.



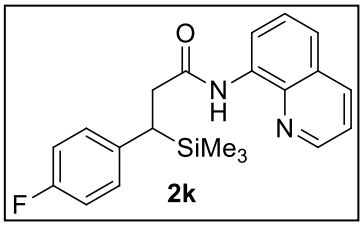
2i

2i (colorless oil, 38.4 mg, 40%) was isolated following the typical procedure starting from **1i**. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.83 (s, 1H), 8.82 – 8.79 (m, 2H), 8.15 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.55 – 7.47 (m, 2H), 7.45 (dd, *J* = 8.3, 4.2 Hz, 1H), 5.33 – 5.24 (m, 2H), 2.62 (dd, *J* = 15.0, 4.9 Hz, 1H), 2.46 (dd, *J* = 15.0, 8.6 Hz, 1H), 1.98 – 1.89 (m, 3H), 1.58 – 1.51 (m, 1H), 1.45 – 1.34 (m, 4H), 1.30 – 1.17 (m, 17H), 0.87 (t, *J* = 6.8 Hz, 3H), 0.06 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.3, 148.0, 138.2, 136.3, 134.6, 129.8, 129.7, 127.9, 127.5, 121.5, 121.2, 116.3, 38.9, 31.9, 30.4, 29.7, 29.6, 29.6, 29.5, 29.3, 29.0, 27.2, 22.8, 22.7, 14.1, -2.4. HRMS (ESI) *m/z* calculated for $C_{30}H_{49}N_2OSi$ [M+H$^+$] 481.3609, found 481.3605.



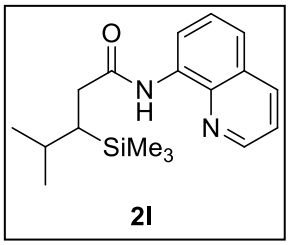
2j

2j (white solid, 36.9 mg, 53%) was isolated following the typical procedure starting from **1j**. m.p. = 85.6 – 87.0 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.81 (s, 1H), 8.74 (dd, *J* = 4.2, 1.4 Hz, 1H), 8.68 (dd, *J* = 7.1, 1.7 Hz, 1H), 8.09 (dd, *J* = 8.3, 1.4 Hz, 1H), 7.47 – 7.38 (m, 3H), 7.24 – 7.18 (m, 4H), 7.07 (t, *J* = 7.1 Hz, 1H), 3.08 (dd, *J* = 15.7, 11.4 Hz, 1H), 2.97 (dd, *J* = 15.7, 4.3 Hz, 1H), 2.84 (dd, *J* = 11.3, 4.3 Hz, 1H), 0.03 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 171.0, 147.9, 142.2, 138.2, 136.2, 134.4, 128.3, 127.8, 127.4, 127.3, 124.8, 121.4, 121.2, 116.3, 38.4, 32.8, -3.0. HRMS (ESI) *m/z* calculated for $C_{21}H_{25}N_2OSi$ [M+H$^+$] 349.1730, found 349.1729.



2k

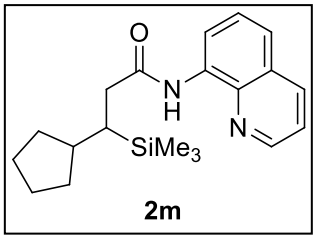
2k (pale yellow oil, 38.8 mg, 53%) was isolated following the typical procedure starting from **1k**. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.77 (s, 1H), 8.73 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.67 (dd, *J* = 7.0, 2.0 Hz, 1H), 8.08 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.48 – 7.38 (m, 3H), 7.16 – 7.11 (m, 2H), 6.96 – 6.90 (m, 2H), 3.04 – 2.92 (m, 2H), 2.81 (dd, *J* = 11.2, 4.6 Hz, 1H), 0.02 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.8, 160.6 (d, *J* = 241.0 Hz), 147.9, 138.2, 137.8, 136.2, 134.3, 128.6 (d, *J* = 7.6 Hz), 127.8, 127.2, 121.4, 121.3, 116.3, 115.1 (d, *J* = 21.0 Hz), 38.5, 32.0, -3.1. HRMS (ESI) *m/z* calculated for $C_{21}H_{24}FN_2OSi$ [M+H$^+$] 367.1636, found 367.1634.



2l

2l (colorless oil, 18.9 mg, 30%) was isolated following the typical procedure starting from **1l**.

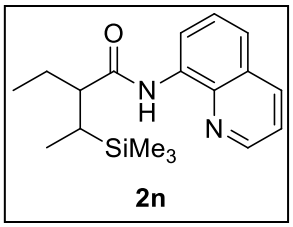
^{1}H NMR (400 MHz, $CDCl_3$) δ 9.85 (s, 1H), 8.81 (dd, *J* = 4.2, 1.6 Hz, 1H), 8.79 (d, *J* = 7.4, 1.4 Hz, 1H), 8.15 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.54 – 7.47 (m, 2H), 7.44 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.63 – 2.51 (m, 2H), 2.10 – 1.98 (m, 1H), 1.49 – 1.44 (m, 1H), 1.03 (d, *J* = 6.9 Hz, 3H), 0.98 (d, *J* = 6.9 Hz, 3H), 0.10 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.6, 148.1, 138.3, 136.3, 134.6, 127.9, 127.4, 121.5, 121.2, 116.3, 35.7, 30.0, 29.0, 22.4, 21.4, -1.0. HRMS (ESI) *m/z* calculated for $C_{18}H_{27}N_2OSi$ [M+H$^+$] 315.1893, found 315.1895.



2m

2m (colorless oil, 22.5 mg, 33%) was isolated following the typical procedure starting from **1m**.

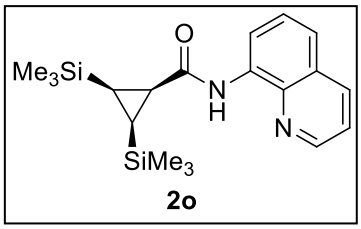
^{1}H NMR (400 MHz, $CDCl_3$) δ 9.82 (s, 1H), 8.81 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.78 (dd, *J* = 7.5, 1.5 Hz, 1H), 8.14 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.55 – 7.42 (m, 2H), 7.44 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.61 (dd, *J* = 6.3, 1.5 Hz, 2H), 2.05 – 1.94 (m, 1H), 1.87 – 1.78 (m, 2H), 1.66 – 1.54 (m, 2H), 1.53 – 1.42 (m, 3H), 1.30 – 1.18 (m, 2H), 0.09 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.5, 148.1, 138.3, 136.3, 134.7, 127.9, 127.4, 121.5, 121.1, 116.3, 42.0, 37.4, 32.7, 31.6, 27.1, 25.2, 24.8, -1.3. HRMS (ESI) *m/z* calculated for $C_{20}H_{29}N_2OSi$ [M+H$^+$] 341.2044, found 341.2042.



2n

2n (ratio = 1:1, colorless oil, 32.1 mg, 51%) was isolated following the typical procedure starting from **1n**.

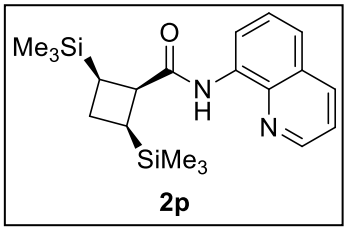
^{1}H NMR (400 MHz, $CDCl_3$) δ 9.85 (s, 1H), 9.83 (s, 1H), 8.86 – 8.81 (m, 4 H), 8.16 – 8.13 (m, 2 H), 7.55 – 7.51 (m, 2 H), 7.50 – 7.46 (m, 2H), 7.46 – 7.42 (m, 2H), 2.47 – 2.42 (m, 1H), 2.40 – 2.35 (m, 1H), 1.94 – 1.83 (m, 2H), 1.75 – 1.68 (m, 1H), 1.67 – 1.58 (m, 1H), 1.28 – 1.14 (m, 2H), 1.09 – 1.05 (m, 6 H), 1.01 – 0.97 (m, 6H), 0.07 (s, 9H), 0.05 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 174.7, 174.5, 148.1, 138.4, 138.4, 136.3, 134.6, 134.4, 127.9, 127.9, 127.4, 121.5, 121.2, 121.1, 116.4, 116.3, 53.7, 52.4, 25.8, 23.9, 23.7, 23.2, 12.9, 12.5, 11.9, -1.9, -2.1. HRMS (ESI) *m/z* calculated for $C_{18}H_{27}N_2OSi$ [M+H$^+$] 315.1887, found 315.1886.



2o

2o (white solid, 32.2 mg, 45%) was isolated following the typical procedure starting from **1o**.

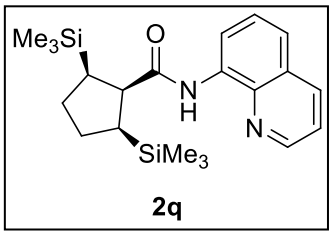
m.p. = 91.4 – 93.1 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.94 (s, 1H), 8.82 (dd, *J* = 4.2, 1.6 Hz, 1H), 8.72 (dd, *J* = 7.5, 1.0 Hz, 1H), 8.15 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.54 – 7.43 (m, 3H), 2.38 (t, *J* = 9.2 Hz, 1H), 0.44 (d, *J* = 9.2 Hz, 2H), 0.16 (s, 18H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 171.0, 148.0, 138.2, 136.3, 134.9, 128.0, 127.5, 121.5, 120.8, 116.2, 25.9, 13.0, 0.8. HRMS (ESI) *m/z* calculated for $C_{19}H_{29}N_2OSi_2$ [M+H$^+$] 357.1811, found 357.1813.



2p

2p (white solid, 38.6 mg, 52%) was isolated following the typical procedure starting from **1p**.

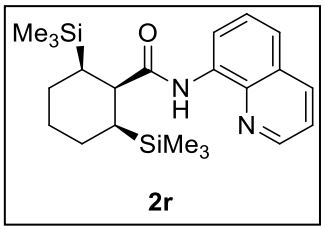
m.p. = 114.6 – 116.3 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.58 (s, 1H), 8.85 (dd, *J* = 7.6, 1.3 Hz, 1H), 8.77 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.14 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.56 – 7.52 (m, 1H), 7.46 (dd, *J* = 8.2, 1.3 Hz ,1H), 7.42 (dd, *J* = 8.2, 4.2 Hz, 1H), 3.54 – 3.49 (m, 1H), 2.46 – 2.34 (m, 3H), 2.11 – 2.05 (m, 1H), 0.00 (s, 18H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 173.9, 147.9, 138.3, 136.2, 134.9, 128.0, 127.6, 121.5, 120.8, 116.1, 45.9, 28.8, 23.9, -1.9. HRMS (ESI) *m/z* calculated for $C_{20}H_{31}N_2OSi_2$ [M+H$^+$] 371.1969, found 371.1967.



2q

2q (white solid, 40.8 mg, 53%) was isolated following the typical procedure starting from **1q**.

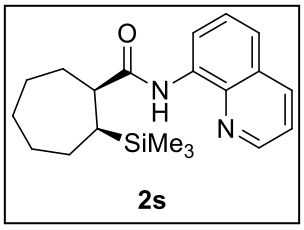
m.p. = 89.8 – 90.2 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.84 (s, 1H), 8.80 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.76 (dd, *J* = 7.3, 1.6 Hz, 1H), 8.14 (dd, *J* = 8.3, 1.7 Hz, 1H), 7.53 – 7.42 (m, 3H), 3.11 (t, *J* = 6.2 Hz, 1H), 2.18 – 2.08 (m, 2H), 2.03 – 1.95 (m, 2H), 1.28 – 1.21 (m, 2H), 0.00 (s, 18H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 174.2, 148.2, 138.5, 136.4, 134.8, 128.1, 127.7, 121.6, 121.2, 116.4, 52.7, 36.3, 27.3, -1.6. HRMS (ESI) *m/z* calculated for $C_{21}H_{33}N_2OSi_2$ [M+H$^+$] 385.2126, found 385.2124.



2r

2r (white solid, 40.7 mg, 51%) was isolated following the typical procedure starting from **1r**.

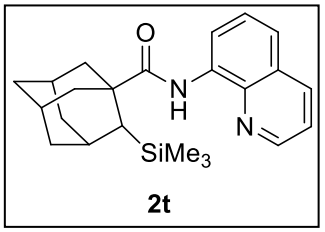
m.p. = 107.9 – 110.0 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.94 (s, 1H), 8.81 (dd, *J* = 4.2, 1.6 Hz, 1H), 8.77 (dd, *J* = 7.4, 1.5 Hz, 1H), 8.14 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.54 – 7.46 (m, 2H), 7.43 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.83 (t, *J* = 4.1 Hz, 1H), 2.26 – 2.15 (m, 2H), 2.05 – 2.00 (m, 1H), 1.64 – 1.60 (m, 2H), 1.39 – 1.26 (m, 1H), 0.96 – 0.90 (m, 2H), -0.03 (s, 18H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 173.5, 148.1, 138.4, 136.2, 134.6, 127.9, 127.5, 121.5, 121.0, 116.3, 43.4, 32.1, 29.2, 22.2, -2.7. HRMS (ESI) *m/z* calculated for $C_{22}H_{35}N_2OSi_2$ [M+H$^+$] 399.2282, found 399.2279.



2s

2s (white solid, 43.6 mg, 64%) was isolated following the typical procedure starting from **1s**, except for using BQ (2 equiv) and HMDS (5 equiv).

m.p. = 103.4 – 105.1 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.87 (s, 1H), 8.81 – 8.78 (m, 2H), 8.14 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.54 – 7.46 (m, 2H), 7.44 (dd, *J* = 8.3, 4.2 Hz, 1H), 2.91 (dt, *J* = 9.6, 5.8 Hz, 1H), 2.20 – 2.13 (m, 1H), 2.03 – 1.90 (m, 3H), 1.88 – 1.81 (m, 2H), 1.74 – 1.68 (m, 1H), 1.57 – 1.38 (m, 2H), 1.33 – 1.22 (m, 1H), 1.08 (ddd, *J* = 9.6, 5.6, 2.1 Hz, 1H), 0.01 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 175.5, 148.0, 138.4, 136.3, 134.7, 127.9, 127.5, 121.5, 121.1, 116.3, 47.4, 32.7, 31.7, 30.7, 30.5, 25.6, 25.1, -2.0. HRMS (ESI) *m/z* calculated for $C_{20}H_{29}N_2OSi$ [M+H$^+$] 341.2044, found 341.2042.

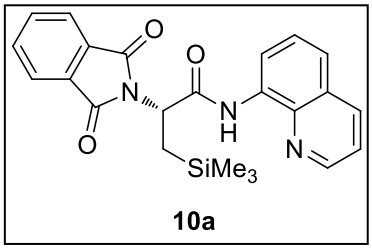


2t

2t (white solid, 9.8 mg, 13%) was isolated following the typical procedure starting from **1t**.

m.p. = 103.7 – 105.2 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.26 (s, 1H), 8.85 – 8.82 (m, 2H), 8.14 (dd, *J* = 8.2, 1.4 Hz, 1H), 7.55 – 7.43 (m, 3H), 2.44 (d, *J* = 11.2 Hz, 1H), 2.46 – 2.42 (m, 1H), 2.33 – 2.29 (m, 1H), 2.22 – 2.19 (m, 2H), 2.17 – 2.14 (m, 1H), 2.05 – 2.00 (m, 1H), 1.95 – 1.81 (m, 4H), 1.79 – 1.64 (m, 3H), 1.61 – 1.60 (m, 1H), 0.00 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 176.1,

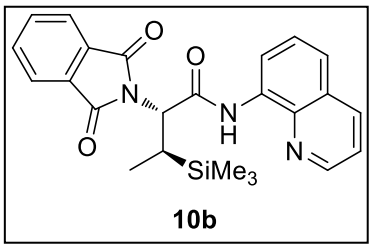
148.1, 138.8, 136.2, 134.6, 127.9, 127.5, 121.5, 121.1, 116.3, 44.4, 43.7, 39.7, 38.7, 36.8, 35.7, 34.1, 30.2, 28.6, 28.0, 0.2. HRMS (ESI) *m/z* calculated for $C_{23}H_{31}N_2OSi$ [M+H$^+$] 379.2200, found 379.2198.



10a

10a (white solid, 73.4 mg, 88%) was isolated following the typical procedure starting from **9a**.

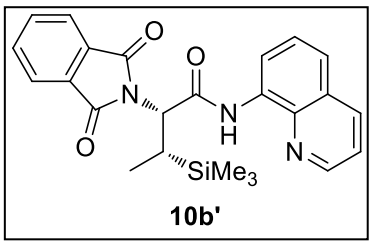
m.p. = 107.1 – 108.7 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.47 (s, 1H), 8.74 – 8.69 (m, 2H), 8.13 (dd, *J* = 8.3, 1.7 Hz, 1H), 7.92 – 7.86 (m, 2H), 7.76 – 7.72 (m, 2H), 7.52 – 7.48 (m, 2H), 7.42 (dd, *J* = 8.3, 4.2 Hz, 1H), 5.23 (dd, *J* = 12.0, 5.0 Hz, 1H), 2.08 (dd, *J* = 14.5, 12.0 Hz, 1H), 1.66 (dd, *J* = 14.5, 5.0 Hz, 1H), 0.05 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.2, 168.0, 148.3, 138.5, 136.2, 134.2, 133.9, 131.8, 127.8, 127.2, 123.5, 121.8, 121.5, 116.5, 52.2, 17.1, -1.5. HRMS (ESI) *m/z* calculated for $C_{23}H_{24}N_3O_3Si$ [M+H$^+$] 418.1581, found 418.1577.



10b

Mixture of **10b** (***major***) and **10b'** (d.r. = 5:1, white solid, 69.9 mg, 81%) were isolated following the typical procedure starting from **9b**.

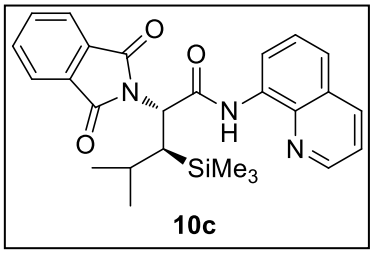
m.p. = 142.6 – 146.6 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 8.88 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.78 – 8.72 (m, 1H), 8.13 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.90 – 7.85 (m, 2H), 7.74 – 7.69 (m, 2H), 7.52 – 7.47 (m, 2H), 7.44 (dd, *J* = 8.3, 4.2 Hz, 1H), 5.00 (d, *J* = 12.2 Hz, 1H), 2.44 – 2.34 (m, 1H), 0.99 (d, *J* = 7.4 Hz, 3H), 0.08 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.3, 167.3, 148.5, 138.7, 136.1, 134.3, 134.2, 131.5, 127.9, 127.2, 123.5, 121.9, 121.5, 117.0, 60.5, 19.8, 12.4, -2.6. HRMS (ESI) *m/z* calculated for $C_{24}H_{26}N_3O_3Si$ [M+H$^+$] 432.1738, found 432.1734.



10b'

^{1}H NMR (400 MHz, $CDCl_3$) δ 10.73 (s, 1H), 8.92 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.78 – 8.72 (m, 1H), 8.13 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.90 – 7.85 (m, 2H), 7.74-7.69 (m, 2H), 7.52 – 7.47 (m, 2H), 7.44 (dd, *J* = 8.3, 4.2 Hz, 1H), 4.96 (d, *J* = 12.2 Hz, 1H), 2.63 – 2.54 (m, 1H), 1.19 (d, *J* = 7.4 Hz, 3H), -0.02 (s, 9H). ^{13}C NMR (100

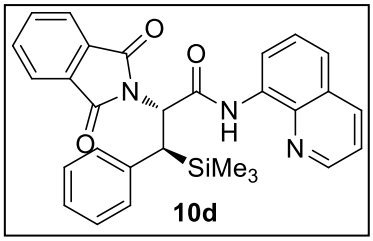
MHz, $CDCl_3$) δ 168.0, 167.5, 148.5, 138.8, 136.1, 134.4, 134.2, 131.7, 127.9, 127.2, 123.6, 121.9, 121.5, 116.9, 59.9, 19.5, 13.0, -2.6.



10c

10c (pale yellow oil, 29.5 mg, 32%) isolated following the typical procedure starting from **9c**.

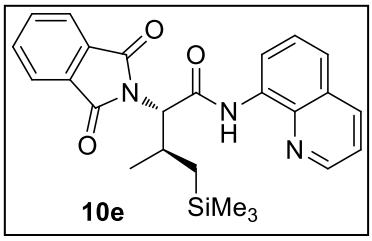
^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 8.90 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.75 – 8.71 (m, 1H), 8.12 (dd, *J* = 8.3, 1.6 Hz, 1H), 7.91 – 7.85 (m, 2H), 7.73 – 7.69 (m, 2H), 7.51 – 7.47 (m, 2H), 7.44 (dd, *J* = 8.3, 4.2 Hz, 1H), 5.25 (d, *J* = 12.5 Hz, 1H), 2.52 (dd, *J* = 12.5, 2.1 Hz, 1H), 2.01 – 1.94 (m, 1H), 1.10 (d, *J* = 7.1 Hz, 3H), 0.96 (d, *J* = 7.1 Hz, 3H), 0.15 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.4, 167.6, 148.5, 138.8, 136.1, 134.4, 134.2, 131.7, 127.9, 127.2, 123.6, 121.9, 121.6, 117.2, 58.5, 32.3, 28.2, 22.0, 21.0, 0.6. HRMS (ESI) *m/z* calculated for $C_{26}H_{30}N_3O_3Si$ [M+H$^+$] 460.2051, found 460.2045.



10d

10d (white solid, 22.9 mg, 23%) isolated following the typical procedure starting from **9d**.

m.p. = 172.1 – 173.2 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.94 (s, 1H), 8.93 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.82 – 8.78 (m, 1H), 8.14 (dd, *J* = 8.3, 1.7 Hz, 1H), 7.70 – 7.66 (m, 2H), 7.57 – 7.54 (m, 2H), 7.53 – 7.50 (m, 2H), 7.45 (dd, *J* = 8.3, 4.2 Hz, 1H), 7.14 – 7.10 (m, 4H), 6.99 – 6.92 (m, 1H), 5.61 (d, *J* = 13.5 Hz, 1H), 3.90 (d, *J* = 13.5 Hz, 1H), 0.02 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.1, 167.1, 148.6, 139.5, 138.8, 136.1, 134.4, 133.9, 131.2, 128.2, 127.9, 127.2, 125.4, 123.2, 122.1, 121.6, 117.3, 59.1, 36.4, -2.1. HRMS (ESI) *m/z* calculated for $C_{29}H_{28}N_3O_3Si$ [M+H$^+$] 494.1894, found 494.1888.

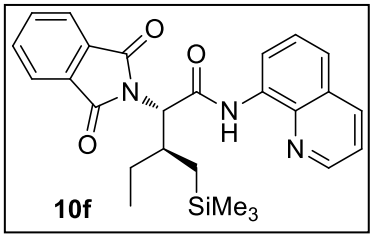


10e

10e (white solid, 40.2 mg, 45%) was isolated following the typical procedure starting from **9e**.

m.p. = 113.0 – 114.3 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.63 (s, 1H), 8.83 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.77 – 8.73 (m, 1H), 8.11 (dd, *J* = 8.3, 1.7 Hz, 1H), 7.88 – 7.81 (m, 2H), 7.72 – 7.68 (m, 2H), 7.51 –

7.47 (m, 2H), 7.42 (dd, *J* = 8.3, 4.2 Hz, 1H), 4.72 (d, *J* = 10.6 Hz, 1H), 3.26 – 3.15 (m, 1H), 1.03 (dd, *J* = 14.4, 1.1 Hz, 1H), 0.98 (d, *J* = 6.6 Hz, 3H), 0.58 (dd, *J* = 14.4, 11.5 Hz, 1H), 0.04 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.1, 166.7, 148.4, 138.6, 136.0, 134.2, 134.1, 131.5, 127.8, 127.1, 123.5, 121.9, 121.6, 116.9, 64.6, 28.7, 22.0, 18.8, -0.7. HRMS (ESI) *m/z* calculated for $C_{25}H_{28}N_3O_3Si$ [M+H$^+$] 446.1894, found 446.1889.

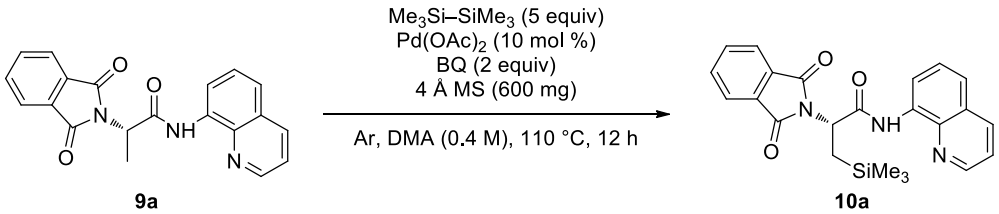


10f

10f (white solid, 41.4 mg, 45%) was isolated following the typical procedure starting from **9f**.

m.p. = 135.6 – 137.3 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.67 (s, 1H), 8.87 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.77 – 8.72 (m, 1H), 8.12 (dd, *J* = 8.3, 1.7 Hz, 1H), 7.88 – 7.83 (m, 2H), 7.72 – 7.68 (m, 2H), 7.50 – 7.46 (m, 2H), 7.44 (dd, *J* = 8.3, 4.2 Hz, 1H), 4.89 (d, *J* = 11.2 Hz, 1H), 3.35 – 3.27 (m, 1H), 1.64 – 1.54 (m, 1H), 1.46 – 1.36 (m, 1H), 0.86 – 0.82 (m, 5H), 0.04 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.1, 167.1, 148.5, 138.7, 136.1, 134.2, 134.2, 131.5, 127.8, 127.1, 123.5, 121.9, 121.6, 117.0, 61.6, 32.9, 23.6, 17.0, 8.0, -0.8. HRMS (ESI) *m/z* calculated for $C_{26}H_{30}N_3O_3Si$ [M+H$^+$] 460.2050, found 460.2045.

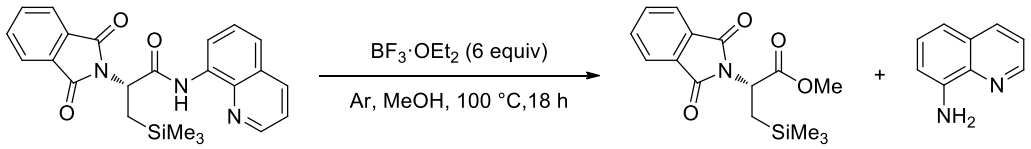
4. Gram-scale reaction



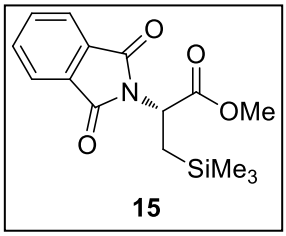
9a **10a**

A mixture of amide **9a** (1.38 g, 4.0 mmol), $Pd(OAc)_2$ (89.8 mg, 0.4 mmol, 10 mol %), BQ (864.8 mg, 8.0 mmol, 2 equiv), 4Å MS (600 mg) and HMDS (4.0 mL, 20 mmol, 10 equiv) in DMA (10 mL) in 75-mL glass vial (purged with Ar, sealed with PTFE cap) was heated at 110 °C for 12 hours. The reaction mixture was cooled to RT, and filtered through Celite®. And the filtrate cake was washed with Et_2O (100 mL). The filtrate was poured into water (50 mL). The aqueous layer was extracted with Et_2O (100 mL × 3), washed with saturated Na_2CO_3 solution (30 mL × 3). And the combined organic layers were dried over anhydrous Na_2SO_4, filtered, and concentrated *in vacuo*. The resulting residue was purified by flash column chromatography to give the corresponding silylated product **10a** (pale yellow solid, 1.34 g, 80%).

5. Removal of the auxiliary



A mixture of compound **10a** (83.5 g, 0.2 mmol) and $BF_3{\cdot}Et_2O$ (150 µL, 1.2 mmol, 6 equiv) in MeOH (2 mL) in 10-mL glass vial (purged with Ar, sealed with PTFE cap) was heated at 100 °C for 18 hours. The reaction mixture was cooled to RT, diluted with DCM (3 mL), and Et_3N (280 µL, 2.0 mmol, 10 equiv) was added. Then the mixture was concentrated *in vacuo*. The resulting residue was purified by flash column chromatography to give the corresponding carboxylic ester 1**5** (pale yellow oil, 78.4 mg, 86%) and 8-aminoquinoline (brown solid, 40.9 mg, 95%).



^{1}H NMR (400 MHz, $CDCl_3$) δ 7.87 – 7. 28 (m, 2H), 7.74 – 7.70 (m, 2H), 4.94 (dd, *J* = 11.7, 4.8 Hz, 1H), 3.69 (s, 3H), 1.70 (dd, *J* = 15.1, 11.7 Hz, 1H), 1.52 (dd, *J* = 15.1, 4.8 Hz, 1H), -0.05 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 171.0, 167.5, 134.1, 131.8, 123.4, 52.7, 49.1, 17.0, -1.7. HRMS (ESI) *m/z* calculated for $C_{15}H_{20}NO_4Si$ [M+H$^+$] 306.1156, found 306.1156.

6. References

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7. X-Ray crystallographic analysis of 2j, 2p and 10f

A colorless block shaped crystal of **2j** ($C_{21}H_{24}N_2OSi$) was used for the X-ray crystallographic analysis. The X-ray intensity data were measured at 173(2) K, on a Bruker D8 VENTURE diffractometer with helios mx multilayer monochrmator Cu-K_α radiation (λ = 1.54178 Å). The X-ray crystallographic files, in CIF format, are available from the Cambridge Crystallographic Data Centre on quoting the deposition numbers CCDC 1508602 for **2j**. Copies of the data can be obtained free of charge from the Director, CCDC, 12 Union Road, Cambridge CB2 IEZ, UK (Fax: +44-1223-336033; E-mail: deposit@ccdc.cam.ac.uk or www: http://www. ccdc.cam.ac.uk).

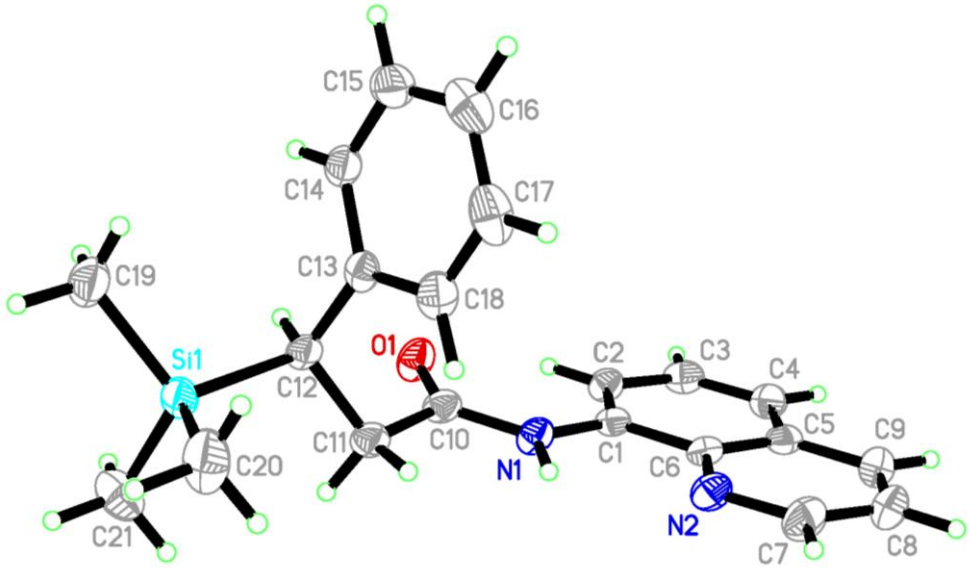


Figure 1 X-Ray Structure of **2j**

Table S4 Crystal data and structure refinement for **2j**

Empirical formula	$C_{21}H_{24}N_2OSi$	
Formula weight	348.51	
Temperature	173(2) K	
Wavelength	1.54178 Å	
Crystal habit	Colorless block	
Crystal system, space group,	Triclinic, P -1	
Unit cell dimensions	a = 10.0800(3) Å	alpha = 88.653(2)°
	b = 11.8813(4) Å	beta = 86.499(2)°

	c = 16.5509(6) Å gamma = 89.381(2)°
Volume	1977.86(11) $Å^3$
Z, Calculated density	4, 1.170 g/cm^3
Absorption coefficient	1.117 mm^{-1}
F(000)	800
Crystal size	0.200 x 0.200 x 0.200 mm^3
Diffractometer	Bruker APEX-II CCD
Radiation type	CuK_α
Data collection method	phi and omega scans
Theta range for data collection	4.54 to 68.38°
Limiting indices	$-11 \leq h \leq 11$, $-13 \leq k \leq 13$, $-19 \leq l \leq 19$
Reflections collected	9858
Data/restraints/parameters	6044/0/457
Goodness-of-fit	1.033
Final R indices [I > 2 sigma(I)]	R1 = 0.0536, wR2 = 0.1413
R indices (all data)	R1 = 0.0715, wR2 = 0.1518

A colorless block shaped crystal of **2p** ($C_{20}H_{30}N_2OSi_2$) was used for the X-ray crystallographic analysis. The X-ray intensity data were measured at 173(2) K, on a Bruker D8 VENTURE diffractometer with helios mx multilayer monochrmator Cu-K_α radiation (λ = 1.54178 Å). The X-ray crystallographic files, in CIF format, are available from the Cambridge Crystallographic Data Centre on quoting the deposition numbers CCDC 1508603 for **2p**. Copies of the data can be obtained free of charge from the Director, CCDC, 12 Union Road, Cambridge CB2 IEZ, UK (Fax: +44-1223-336033; E-mail: deposit@ccdc.cam.ac.uk or www: http://www. ccdc.cam.ac.uk).

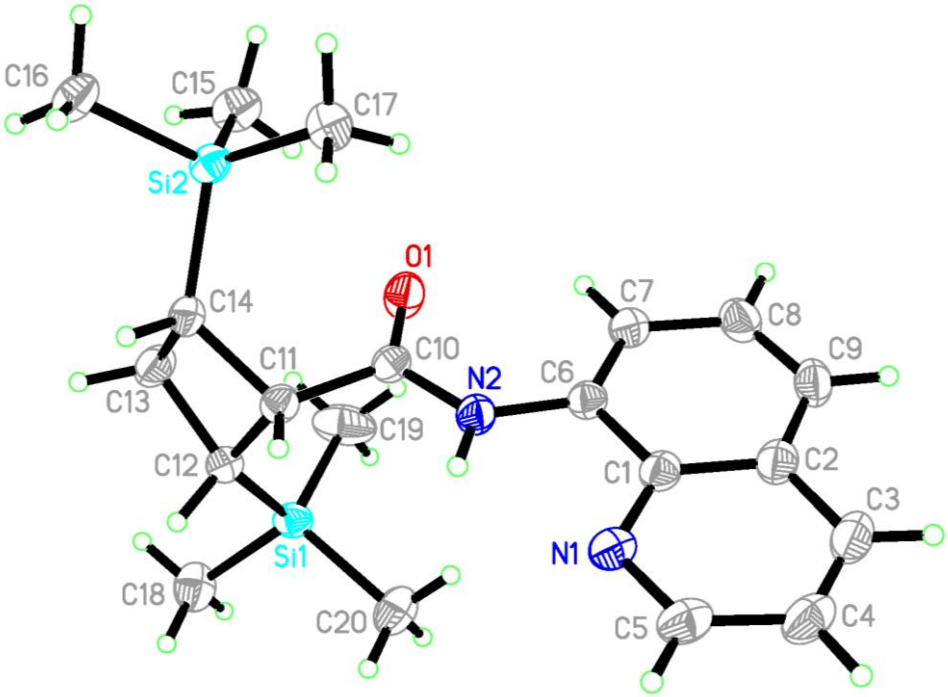


Figure 2 X-Ray Structure of **2p**

Table S5 Crystal data and structure refinement for **2p**

Empirical formula	$C_{20}H_{30}N_2OSi_2$	
Formula weight	370.64	
Temperature	173(2) K	
Wavelength	1.54178 Å	
Crystal habit	Colorless block	
Crystal system, space group,	Monoclinic, P 21/c	
Unit cell dimensions	a = 17.5738(8) Å	alpha = 90°

	b = 10.3894(4) Å	beta = 100.934(2)°
	c = 12.0069(5) Å	gamma = 90°
Volume	2152.44(16) $Å^3$	
Z, Calculated density	4, 1.144 g/cm^3	
Absorption coefficient	1.562 mm^{-1}	
F(000)	800	
Crystal size	0.250 x 0.220 x 0.200 mm^3	
Diffractometer	Bruker APEX-II CCD	
Radiation type	CuK_α	
Data collection method	phi and omega scans	
Theta range for data collection	2.56 to 68.22°	
Limiting indices	$-21 \leq h \leq 18, -12 \leq k \leq 12, -12 \leq l \leq 14$	
Reflections collected	17400	
Data/restraints/parameters	3834/0/232	
Goodness-of-fit	1.006	
Final R indices [I > 2 sigma(I)]	R1 = 0.0427, wR2 = 0.1225	
R indices (all data)	R1 = 0.0495, wR2 = 0.1337	

A colorless block shaped crystal of **10f** ($C_{26}H_{29}N_3O_3Si$) was used for the X-ray crystallographic analysis. The X-ray intensity data were measured at 173(2) K, on a Bruker D8 VENTURE diffractometer with helios mx multilayer monochrmator Cu-K_α radiation (λ = 1.54178 Å). The X-ray crystallographic files, in CIF format, are available from the Cambridge Crystallographic Data Centre on quoting the deposition numbers CCDC 1508604 for **10f**. Copies of the data can be obtained free of charge from the Director, CCDC, 12 Union Road, Cambridge CB2 IEZ, UK (Fax: +44-1223-336033; E-mail: deposit@ccdc.cam.ac.uk or www: http://www. ccdc.cam.ac.uk).

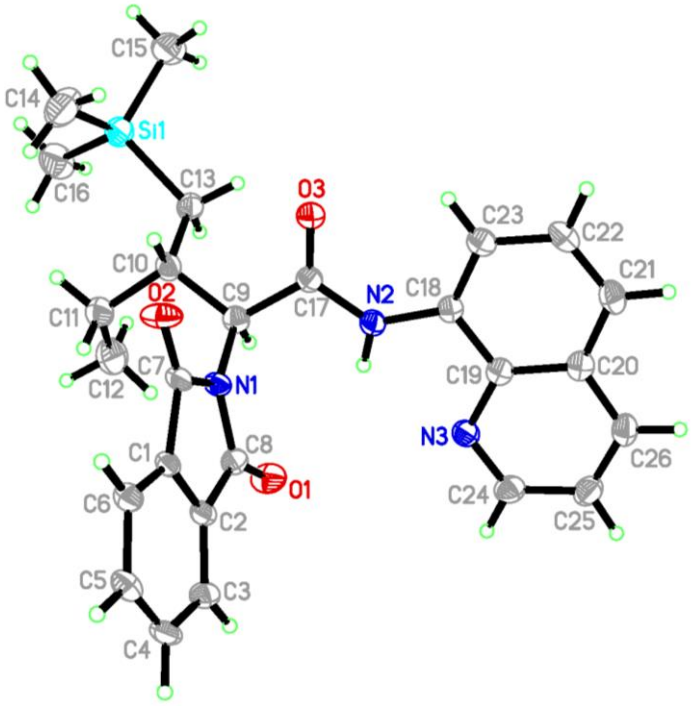


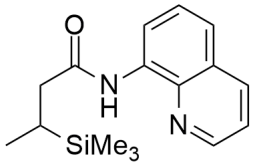
Figure 3 X-Ray Structure of **10f**

Table S6 Crystal data and structure refinement for **10f**

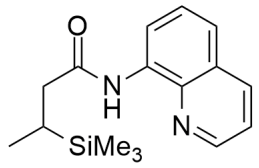
Empirical formula	$C_{26}H_{29}N_3O_3Si$	
Formula weight	459.61	
Temperature	173(2) K	
Wavelength	1.54178 Å	
Crystal habit	Colorless block	
Crystal system, space group,	Monoclinic, C 2	
Unit cell dimensions	a = 40.8407(9) Å	alpha = 90°

	b = 11.7200(3) Å	beta = 102.7310(10)°
	c = 10.6590(2) Å	gamma = 90°
Volume	4976.53(19) $Å^3$	
Z, Calculated density	8, 1.227 g/cm^3	
Absorption coefficient	1.086 mm^{-1}	
F(000)	1952	
Crystal size	0.200 x 0.200 x 0.200 mm^3	
Diffractometer	Bruker APEX-II CCD	
Radiation type	CuK_α	
Data collection method	phi and omega scans	
Theta range for data collection	3.93 to 68.28°	
Limiting indices	$-46 \leq h \leq 49$, $-14 \leq k \leq 14$, $-11 \leq l \leq 12$	
Reflections collected	25688	
Data/restraints/parameters	8653/1/ 603	
Goodness-of-fit	1.050	
Final R indices [I > 2 sigma(I)]	R1 = 0.0448, wR2 = 0.1094	
R indices (all data)	R1 = 0.0521, wR2 = 0.1130	

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



2a


O
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H
N
SiMe3

2a

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136.42
134.63
128.01
127.52
121.63
121.38
116.46
77.48
77.16
76.84
40.76
17.39
14.48
-3.33
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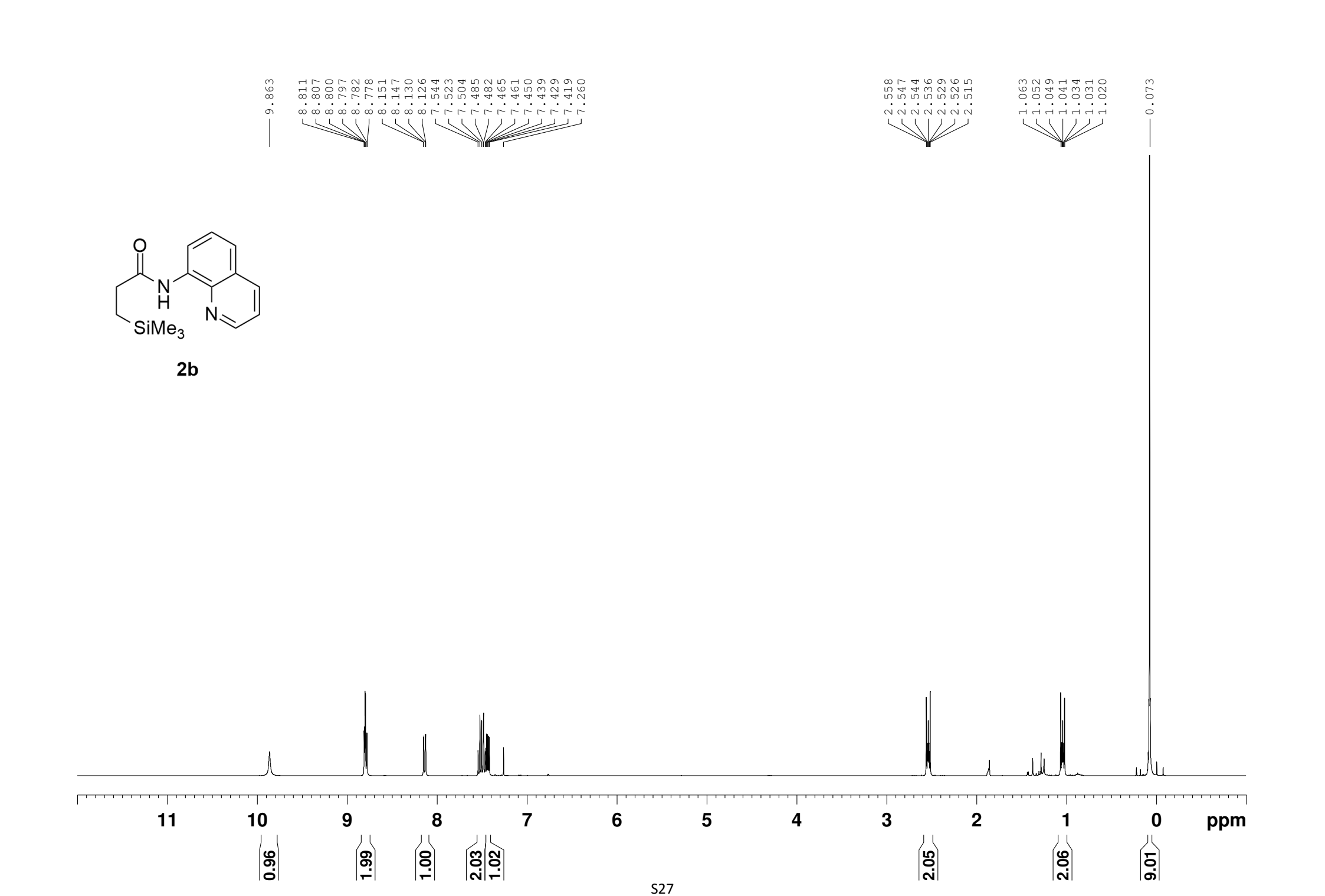
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7.523
7.504
7.485
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7.465
7.461
7.450
7.439
7.429
7.419
7.260
2.558
2.547
2.544
2.536
2.529
2.526
2.515
1.063
1.052
1.049
1.041
1.034
1.031
1.020
0.073
O
N
H
N
SiMe3
2b
11
10
9
8
7
6
5
4
3
2
1
0
ppm
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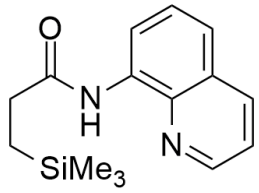
1.00
2.03
1.02
2.05
2.06
9.01


O
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H
N
SiMe3

2b

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136.31
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127.89
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121.49
121.23
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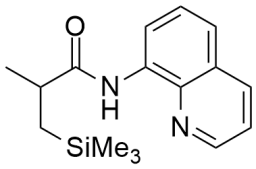
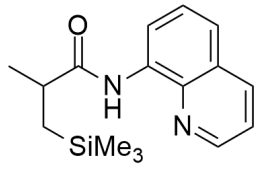


2c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H
N
SiMe3

2c

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127.39
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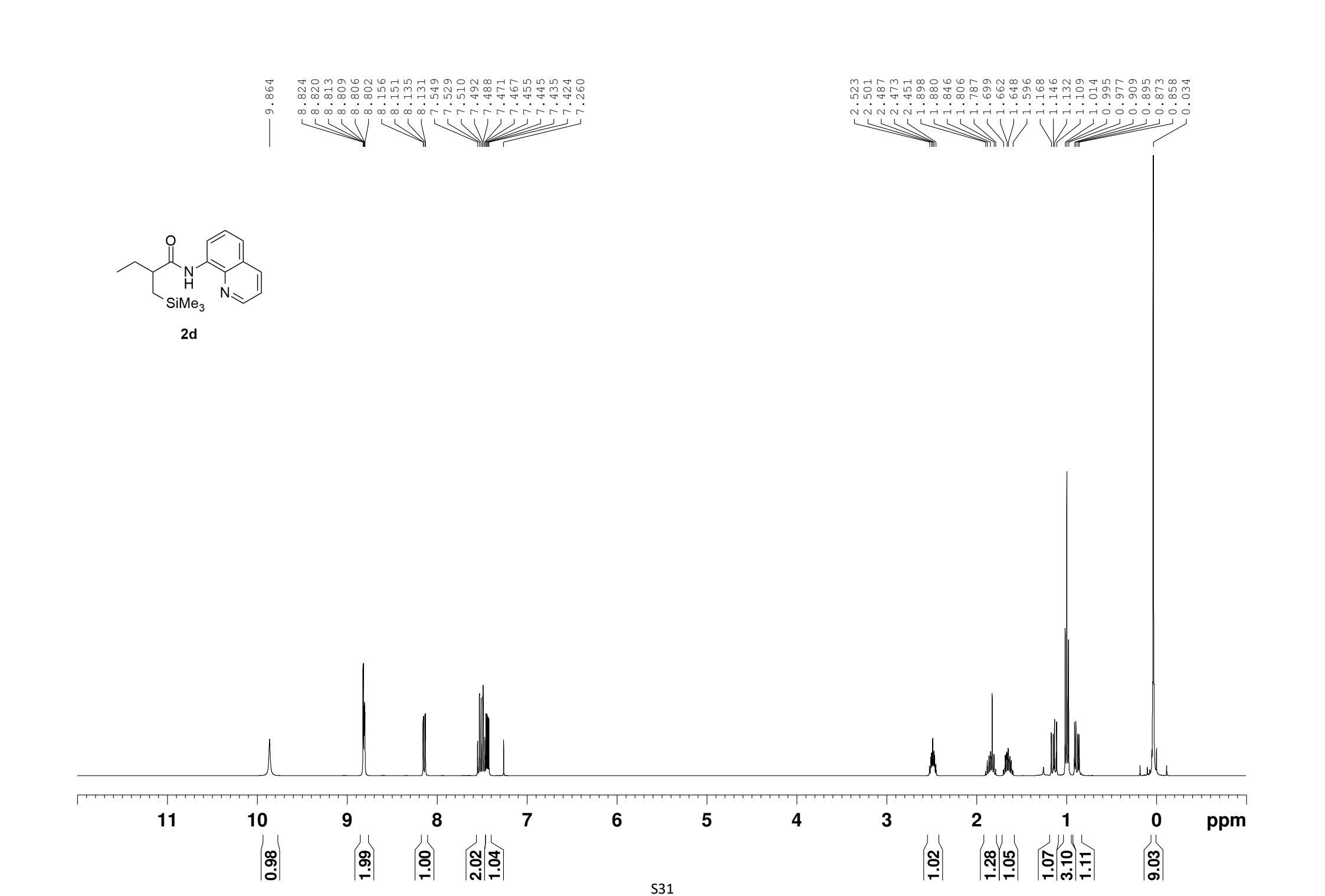
121.19
116.34
77.32
77.00
76.68
39.16
22.29
21.27
1.04
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm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0.858
0.034
O
N
H
N
SiMe3
2d
11
10
9
8
7
6
5
4
3
2
1
0
ppm
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1.05
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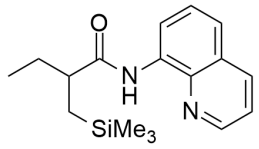
3.10
1.11
9.03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N
H
N
SiMe3

2d

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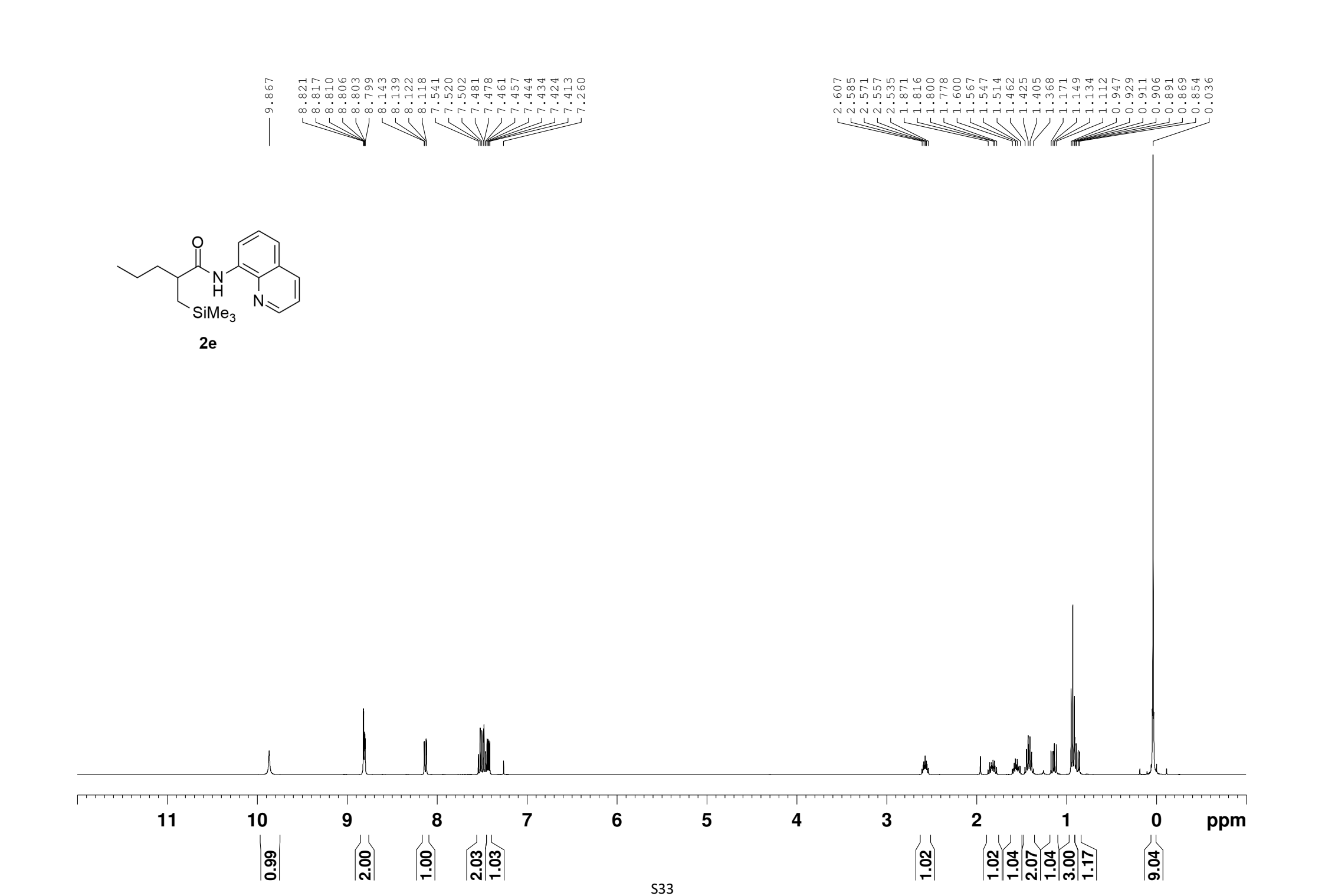
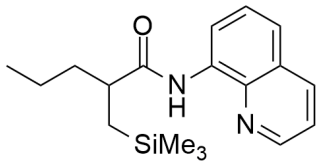
136.27
134.54
127.90
127.43
121.49
121.21
116.40
77.32
77.00
76.68
46.71
29.50
20.55
12.01
-1.14
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

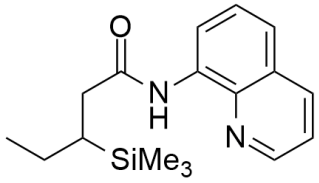

9.867
8.821
8.817
8.810
8.806
8.803
8.799
8.143
8.139
8.122
8.118
7.541
7.520
7.502
7.481
7.478
7.461
7.457
7.444
7.434
7.424
7.413
7.260
2.607
2.585
2.571
2.557
2.535
1.871
1.816
1.800
1.778
1.600
1.567
1.547
1.514
1.462
1.425
1.405
1.368
1.171
1.149
1.134
1.112
0.947
0.929
0.911
0.906
0.891
0.869
0.854
0.036
O
N
H
N
SiMe3
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.99
2.00
1.00
2.03
1.03
1.02
1.02
1.04
2.07
1.04
3.00
1.17
9.04

2e

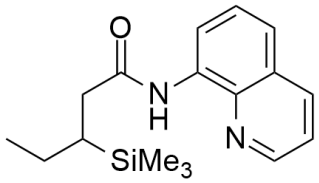

O
N
H
N
SiMe3

2e

175.47
148.11
138.39
136.24
134.50
127.87
127.39
121.47
121.19
116.35
77.32
77.00
76.68
44.87
38.72
20.87
20.71
14.05
-1.14
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

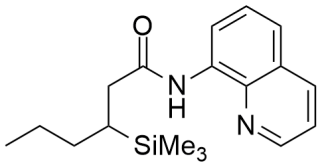


2f

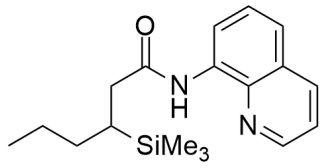

O
N
H
N
SiMe3

2f

172.33
148.04
138.27
136.27
134.54
127.87
127.39
121.48
121.19
116.29
77.32
77.00
76.68
38.48
24.52
23.16
13.65
-2.37
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

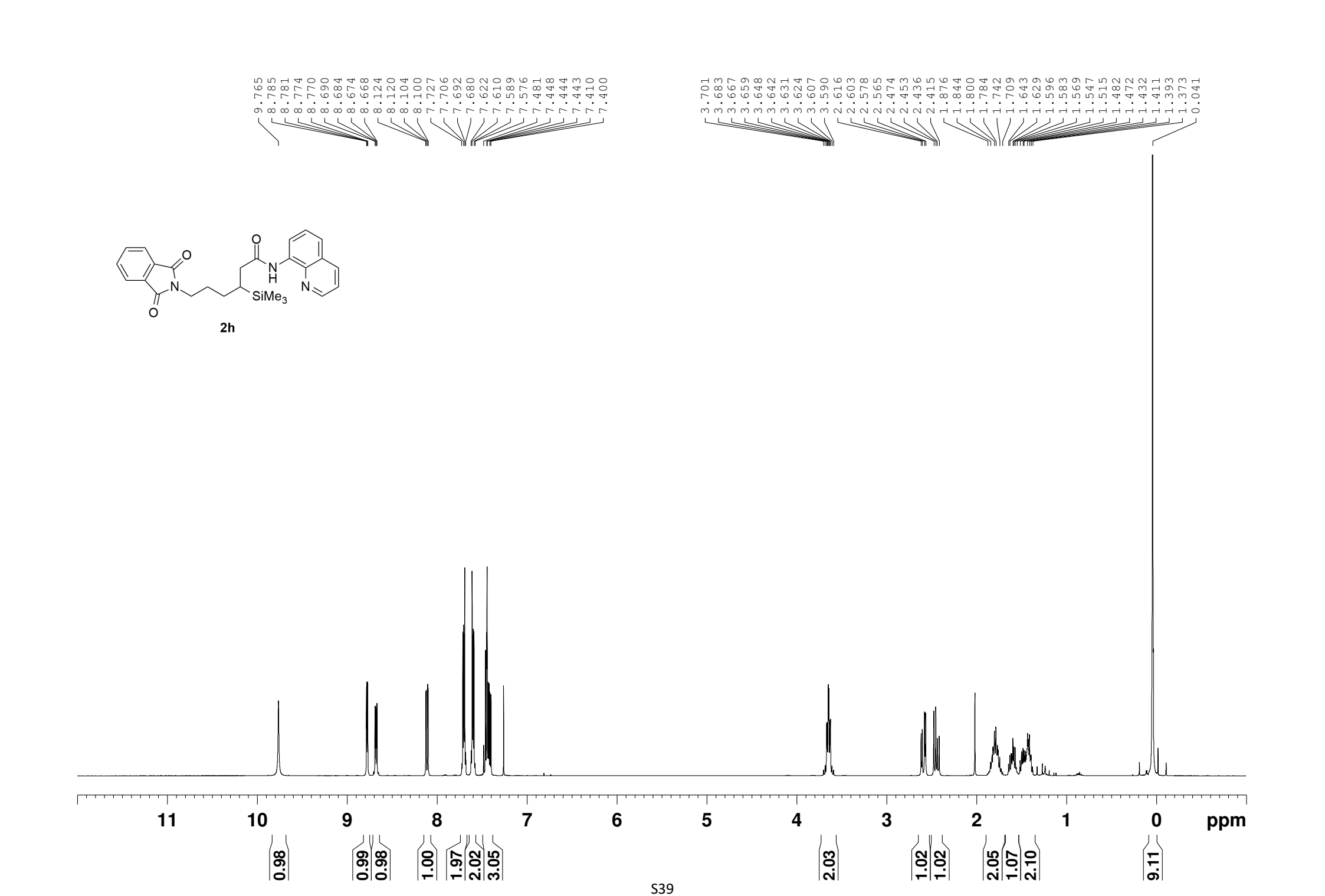


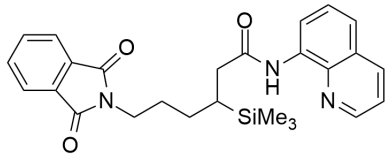
2g


O
N
H
N
SiMe3

2g

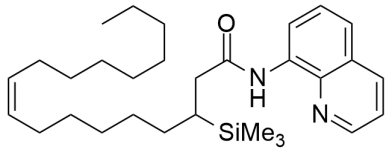
172.34
148.04
138.29
136.28
134.57
127.89
127.41
121.49
121.18
116.30
77.32
77.00
76.68
38.93
32.83
22.56
22.17
14.41
-2.46
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm


9.765
8.785
8.781
8.774
8.770
8.690
8.684
8.674
8.668
8.124
8.120
8.104
8.100
7.727
7.706
7.692
7.680
7.622
7.610
7.589
7.576
7.481
7.448
7.444
7.443
7.410
7.400
3.701
3.683
3.667
3.659
3.648
3.642
3.631
3.624
3.607
3.590
2.616
2.603
2.578
2.565
2.474
2.453
2.436
2.415
1.876
1.844
1.800
1.784
1.742
1.709
1.643
1.629
1.596
1.583
1.569
1.547
1.515
1.482
1.472
1.432
1.411
1.393
1.373
0.041
O
O
N
O
N
H
N
SiMe3
2h
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.98
0.99
0.98
1.00
1.97
2.02
3.05
2.03
1.02
1.02
2.05
1.07
2.10
9.11


O
O
N
O
N
H
N
SiMe3

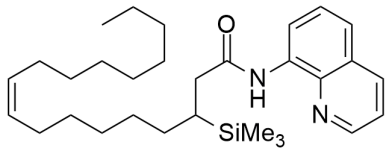
2h

171.72
168.22
148.03
138.19
136.19
134.37
133.60
131.94
127.79
127.30
122.92
121.46
121.17
116.28
77.32
77.00
76.68
38.51
38.04
27.85
27.55
22.11
-2.49
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm


O
N
H
N
SiMe3

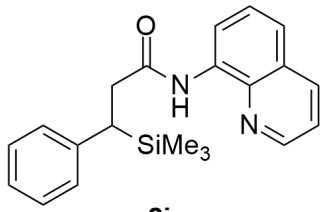
2i

9.830
8.816
8.811
8.805
8.788
8.785
8.164
8.160
8.143
8.140
7.553
7.533
7.514
7.497
7.493
7.476
7.472
7.461
7.450
7.440
7.430
7.260
5.332
5.316
5.305
5.290
5.282
5.268
5.255
5.240
2.631
2.619
2.594
2.582
2.492
2.470
2.454
2.433
1.961
1.946
1.890
1.718
1.716
1.556
1.542
1.535
1.515
1.407
1.395
1.386
1.373
1.360
1.340
1.283
1.274
1.245
1.173
0.888
0.871
0.854
0.064
0.001
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.97
1.99
1.00
2.04
1.02
1.75
1.02
1.02
3.67
1.10
4.28
17.49
3.16
9.02

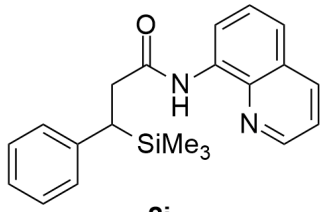

O
N
H
N
SiMe3

2i

172.32
148.04
138.32
136.30
134.58
129.84
129.74
127.91
127.45
121.50
121.19
116.33
77.32
77.00
76.68
38.94
31.87
30.43
29.72
29.63
29.61
29.49
29.28
28.95
27.15
22.79
22.65
14.09
-2.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

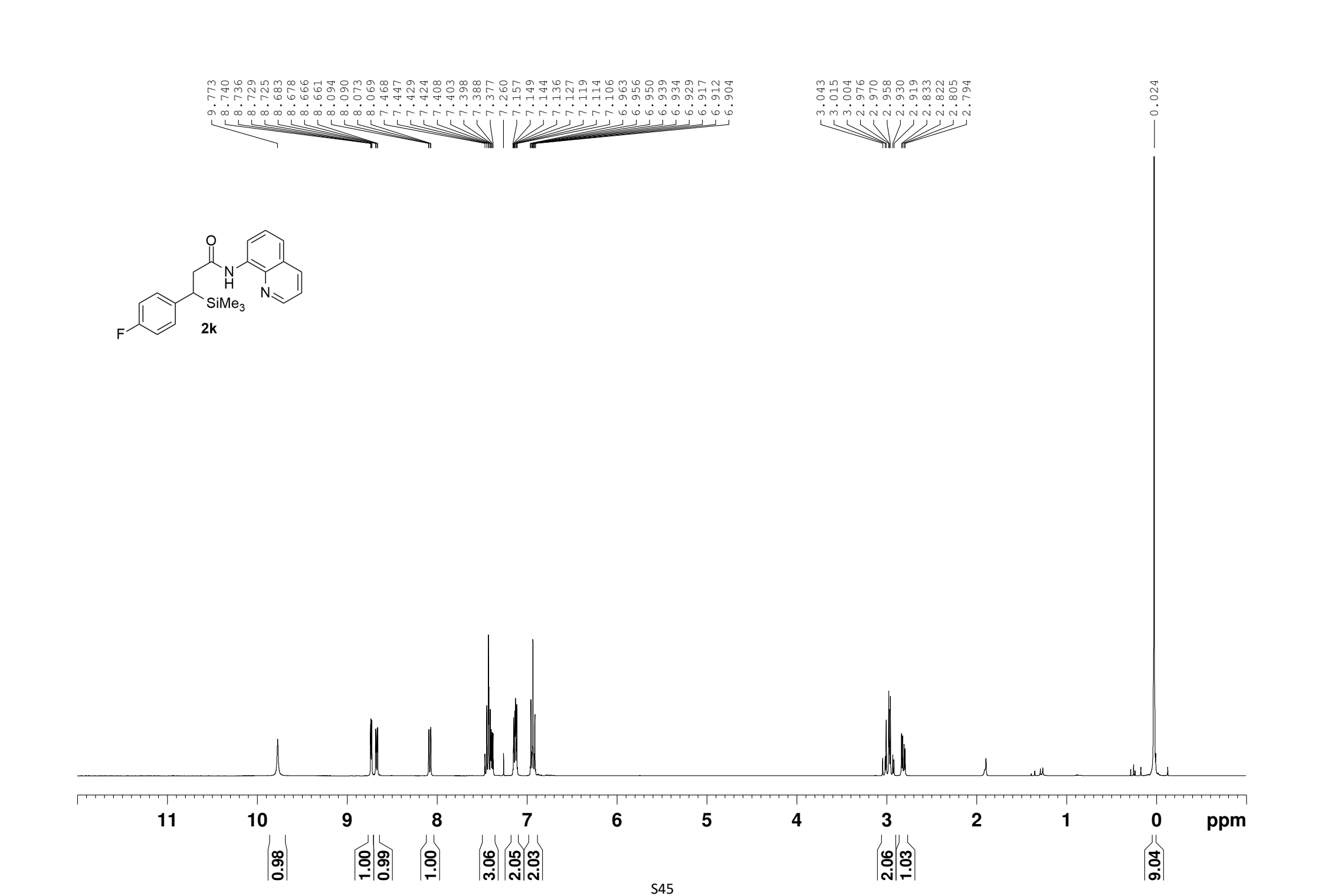


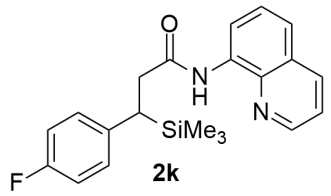
2j


O
N
H
N
SiMe3

2j

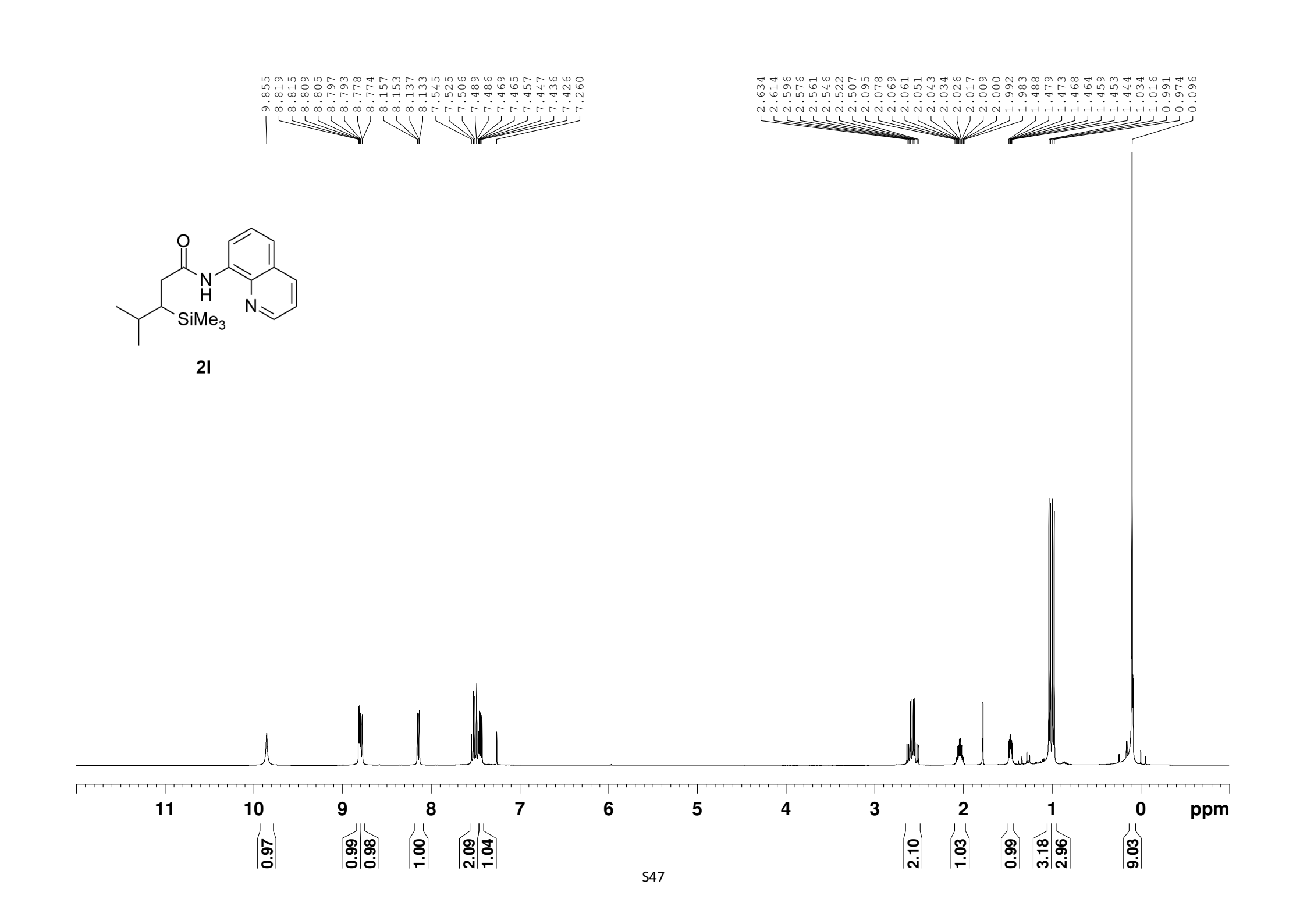
171.04
147.87
142.21
138.24
136.16
134.41
128.30
127.77
127.44
127.29
124.84
121.42
121.19
116.33
77.32
77.00
76.68
38.35
32.79
-3.00
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm


9.773
8.740
8.736
8.729
8.725
8.683
8.678
8.666
8.661
8.094
8.090
8.073
8.069
7.468
7.447
7.429
7.424
7.408
7.403
7.398
7.388
7.377
7.260
7.157
7.149
7.144
7.136
7.127
7.119
7.114
7.106
6.963
6.956
6.950
6.939
6.934
6.929
6.917
6.912
6.904
3.043
3.015
3.004
2.976
2.970
2.958
2.930
2.919
2.833
2.822
2.805
2.794
0.024
O
N
H
N
SiMe3
F
2k
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.98
1.00
0.99
1.00
3.06
2.05
2.03
2.06
1.03
9.04

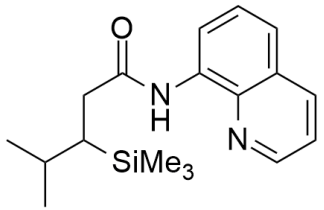

O
N
H
N
SiMe3
F

2k

170.78
161.82
159.41
147.87
138.17
137.83
136.17
134.29
128.60
128.52
127.76
127.24
121.44
121.27
116.30
115.21
115.00
77.32
77.00
76.68
38.46
32.02
-3.11
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

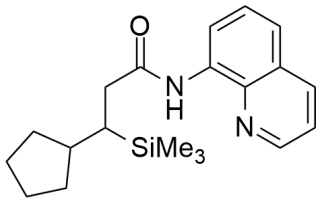

9.855
8.819
8.815
8.809
8.805
8.797
8.793
8.778
8.774
8.157
8.153
8.137
8.133
7.545
7.525
7.506
7.489
7.486
7.469
7.465
7.457
7.447
7.436
7.426
7.260
2.634
2.614
2.596
2.576
2.561
2.546
2.522
2.507
2.095
2.078
2.069
2.061
2.051
2.043
2.034
2.026
2.017
2.009
2.000
1.992
1.983
1.488
1.479
1.473
1.468
1.464
1.459
1.453
1.444
1.034
1.016
0.991
0.974
0.096
O
N
H
N
SiMe3
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.97
0.99
0.98
1.00
2.09
1.04
2.10
1.03
0.99
3.18
2.96
9.03

2l

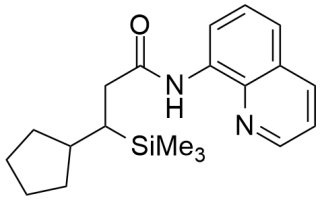

O
N
H
N
SiMe3

2l

172.58
148.08
138.30
136.30
134.60
127.91
127.43
121.51
121.19
116.29
77.32
77.00
76.68
35.69
30.03
29.03
22.37
21.35
-1.00
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

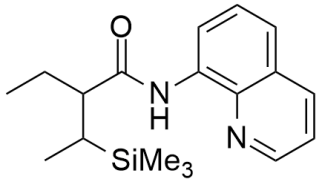


2m

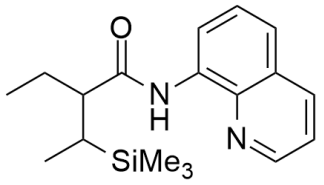

O
N
H
N
SiMe3

2m

172.50
148.05
138.30
136.30
134.65
127.91
127.44
121.50
121.14
116.27
77.32
77.00
76.68
42.02
37.42
32.68
31.56
27.06
25.19
24.84
-1.28
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

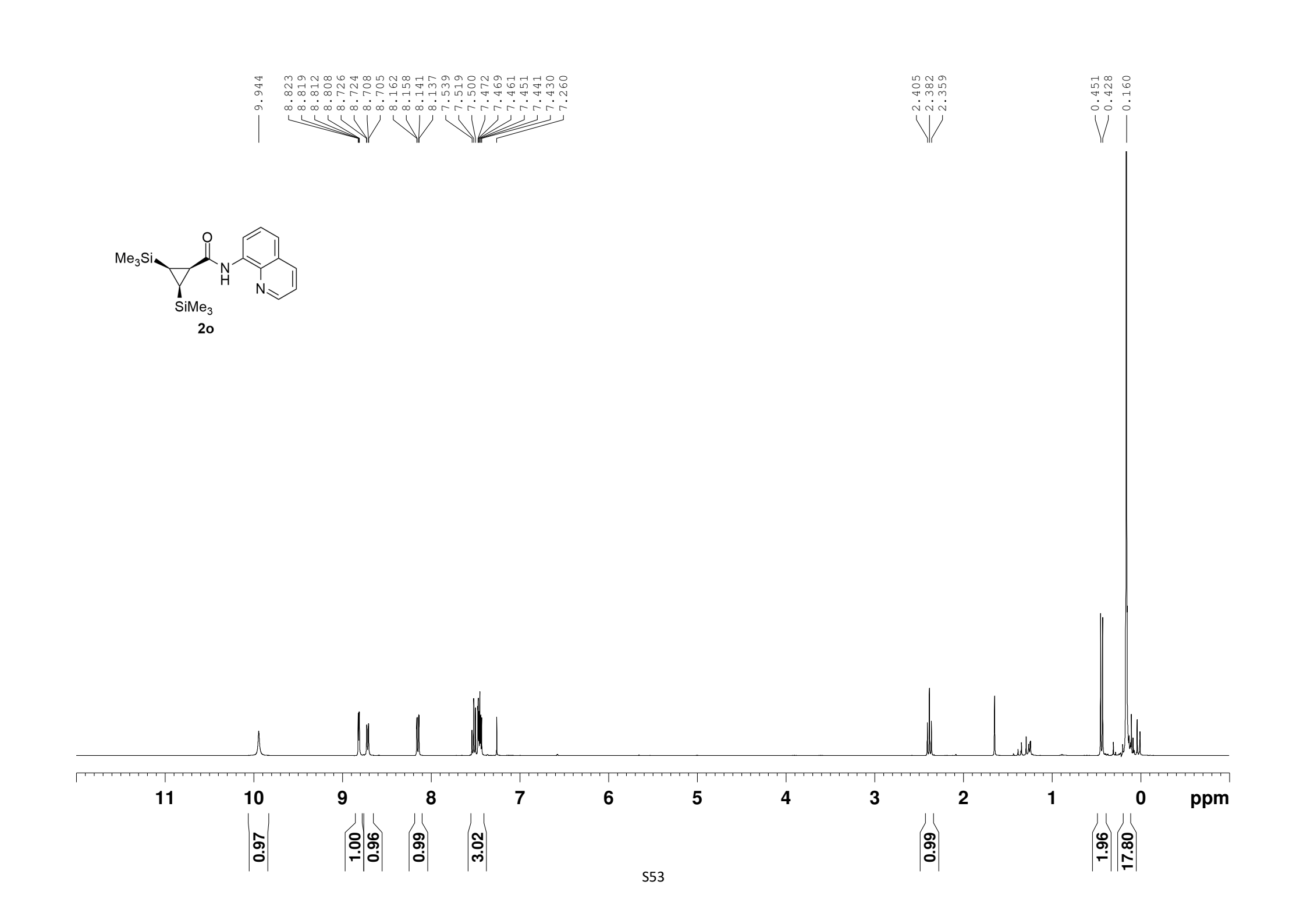


2n


O
N
H
N
SiMe3

2n

174.68
174.50
148.12
138.43
138.41
136.27
134.63
134.37
127.92
127.91
127.43
121.49
121.24
121.12
116.40
116.32
77.32
77.00
76.68
53.70
52.37
25.83
23.91
23.76
23.21
12.86
12.49
11.85
-1.85
-2.14
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm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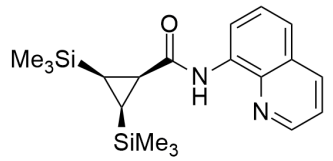
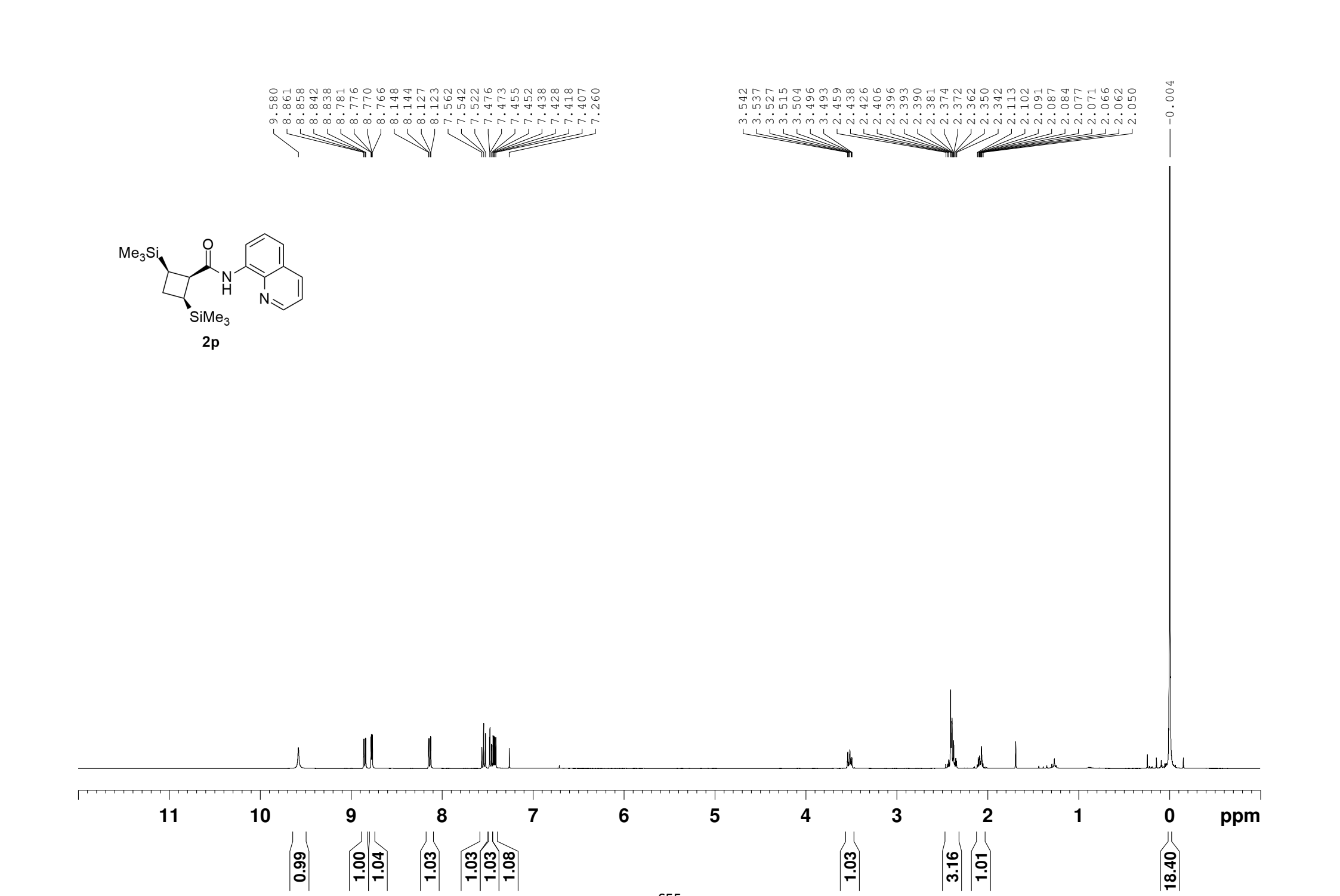
8.823
8.819
8.812
8.808
8.726
8.724
8.708
8.705
8.162
8.158
8.141
8.137
7.539
7.519
7.500
7.472
7.469
7.461
7.451
7.441
7.430
7.260
2.405
2.382
2.359
0.451
0.428
0.160
Me3Si
SiMe3
O
N
H
N
2o
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.97
1.00
0.96
0.99
3.02
0.99
1.96
17.80


Me3Si
O
N
H
N
SiMe3

2o

170.95
147.99
138.21
136.28
134.94
127.97
127.54
121.48
120.76
116.15
77.32
77.00
76.68
25.87
12.99
0.76
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm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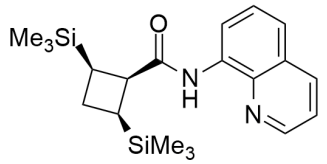
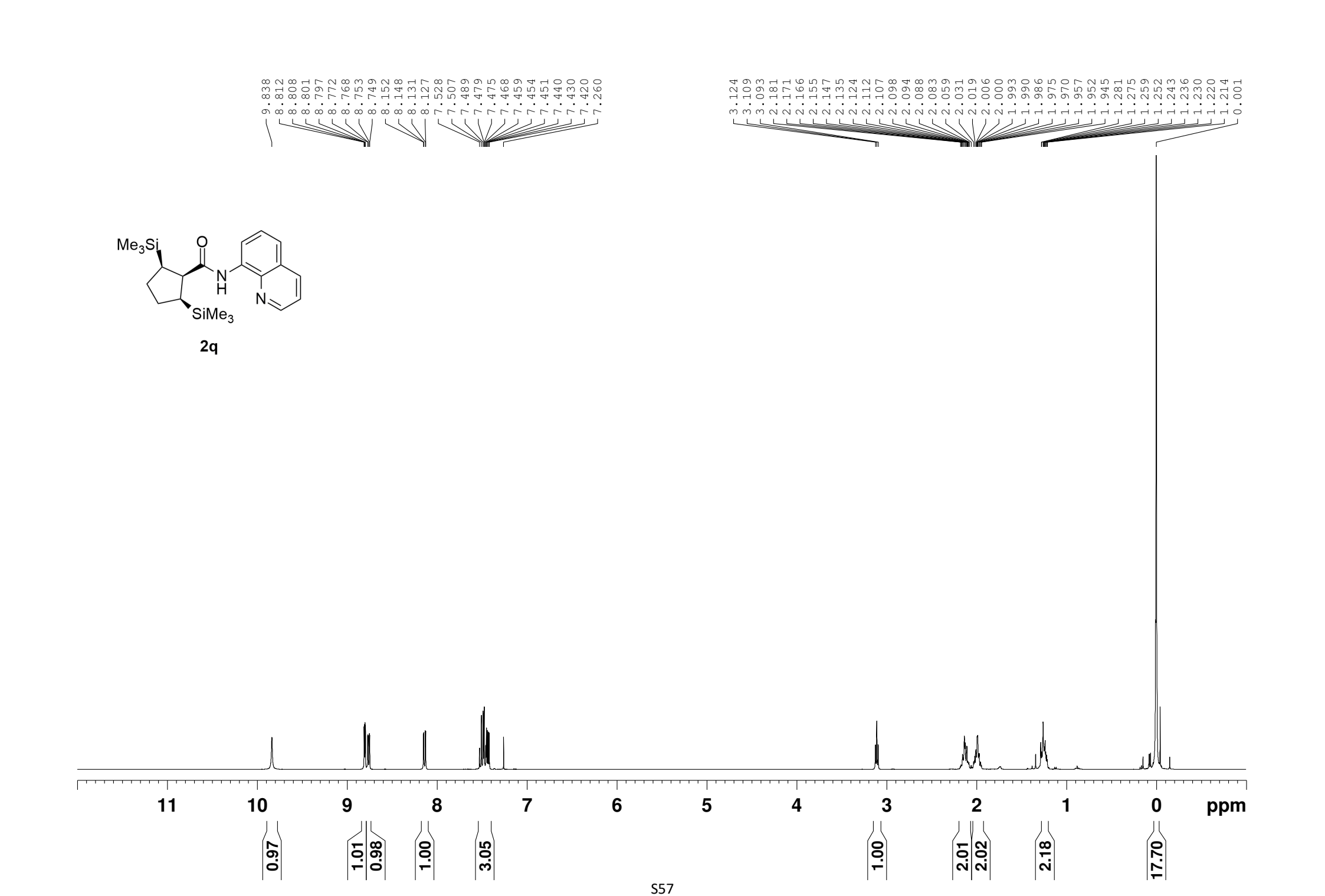
8.861
8.858
8.842
8.838
8.781
8.776
8.770
8.766
8.148
8.144
8.127
8.123
7.562
7.542
7.522
7.476
7.473
7.455
7.452
7.438
7.428
7.418
7.407
7.260
3.542
3.537
3.527
3.515
3.504
3.496
3.493
2.459
2.438
2.426
2.406
2.396
2.393
2.390
2.381
2.374
2.372
2.362
2.350
2.342
2.113
2.102
2.091
2.087
2.084
2.077
2.071
2.066
2.062
2.050
-0.004
Me3Si
O
N
H
N
SiMe3
2p
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.99
1.00
1.04
1.03
1.03
1.03
1.08
1.03
3.16
1.01
18.40


Me3Si
O
N
H
N
SiMe3

2p

173.87
147.92
138.25
136.24
134.87
127.96
127.56
121.46
120.82
116.13
77.32
77.00
76.68
45.92
28.79
23.94
-1.91
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm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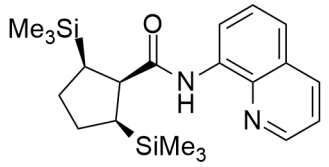
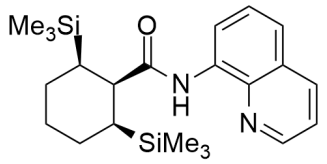
8.812
8.808
8.801
8.797
8.772
8.768
8.753
8.749
8.152
8.148
8.131
8.127
7.528
7.507
7.489
7.479
7.475
7.468
7.459
7.454
7.451
7.440
7.430
7.420
7.260
3.124
3.109
3.093
2.181
2.171
2.166
2.155
2.147
2.135
2.124
2.112
2.107
2.098
2.094
2.088
2.083
2.059
2.031
2.019
2.006
2.000
1.993
1.990
1.986
1.975
1.970
1.957
1.952
1.945
1.281
1.275
1.259
1.252
1.243
1.236
1.230
1.220
1.214
0.001
Me3Si
O
N
H
N
SiMe3
2q
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.97
1.01
0.98
1.00
3.05
1.00
2.01
2.02
2.18
17.70

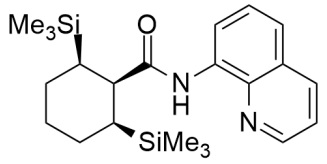

Me3Si
O
N
H
N
SiMe3

2q

174.16
148.24
138.50
136.37
134.81
128.07
127.65
121.64
121.18
116.36
77.48
77.16
76.84
52.66
36.28
27.30
-1.63
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

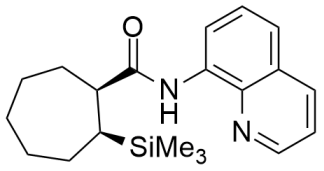


2r

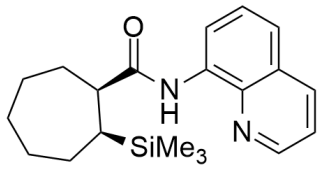

Me3Si
O
N
H
N
SiMe3

2r

173.50
148.14
138.41
136.17
134.61
127.90
127.51
121.49
121.03
116.26
77.32
77.00
76.68
43.43
32.07
29.19
22.17
-2.73
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

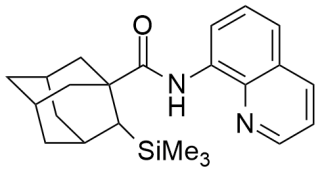


2s

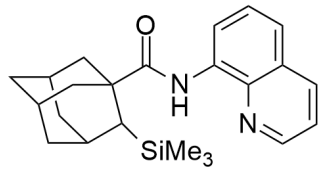

O
N
H
SiMe3
N

2s

175.50
148.04
138.40
136.27
134.72
127.92
127.48
121.48
121.05
116.28
77.32
77.00
76.68
47.37
32.65
31.67
30.66
30.54
25.62
25.12
2.00
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

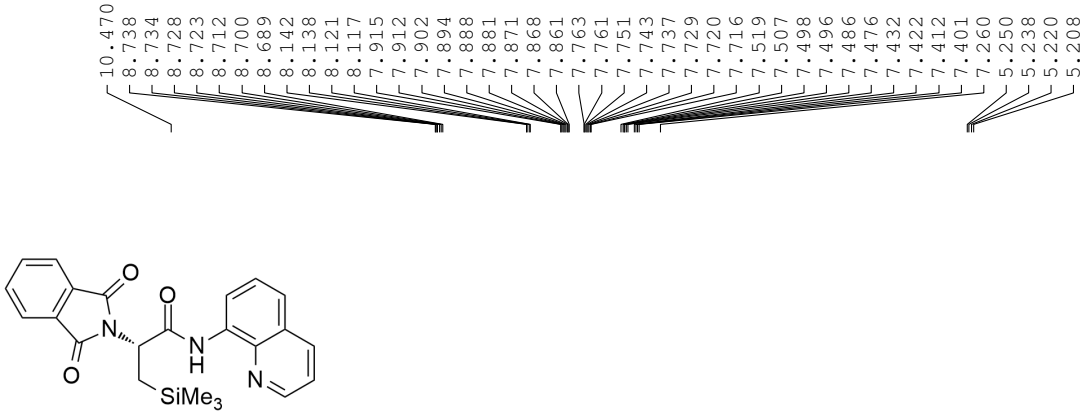


2t


O
N
H
N
SiMe3

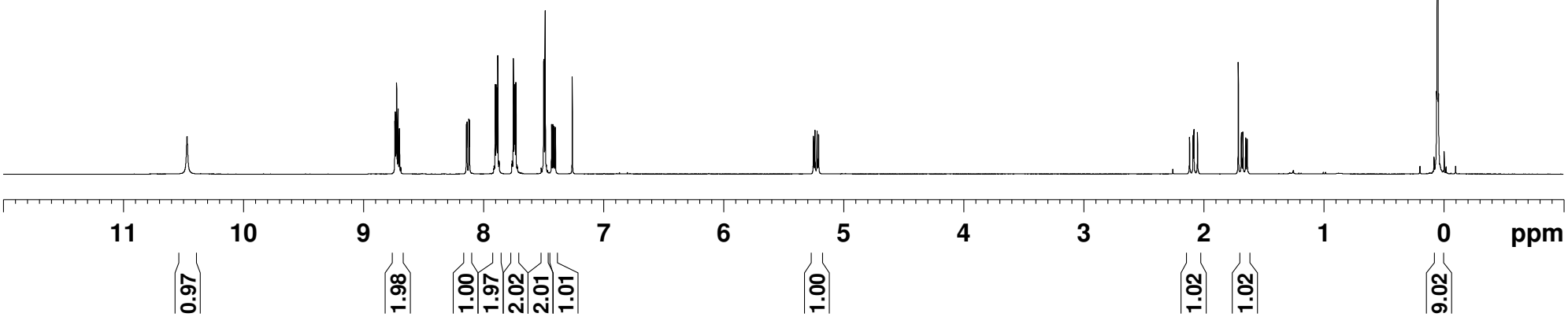
2t

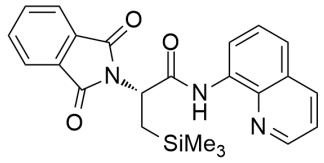
176.14
148.14
138.78
136.23
134.60
127.91
127.48
121.45
121.05
116.32
77.32
77.00
76.68
44.41
43.73
39.69
38.69
36.77
35.70
34.06
30.16
28.56
28.04
0.24
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm


10.470
8.738
8.734
8.728
8.723
8.712
8.700
8.689
8.142
8.138
8.121
8.117
7.915
7.912
7.902
7.894
7.888
7.881
7.871
7.868
7.861
7.763
7.761
7.751
7.743
7.737
7.729
7.720
7.716
7.519
7.507
7.498
7.496
7.486
7.476
7.432
7.422
7.412
7.401
7.260
5.250
5.238
5.220
5.208
2.117
2.087
2.080
2.050
1.685
1.673
1.649
1.636
0.050

O
O
N
O
N
H
N
O
SiMe3

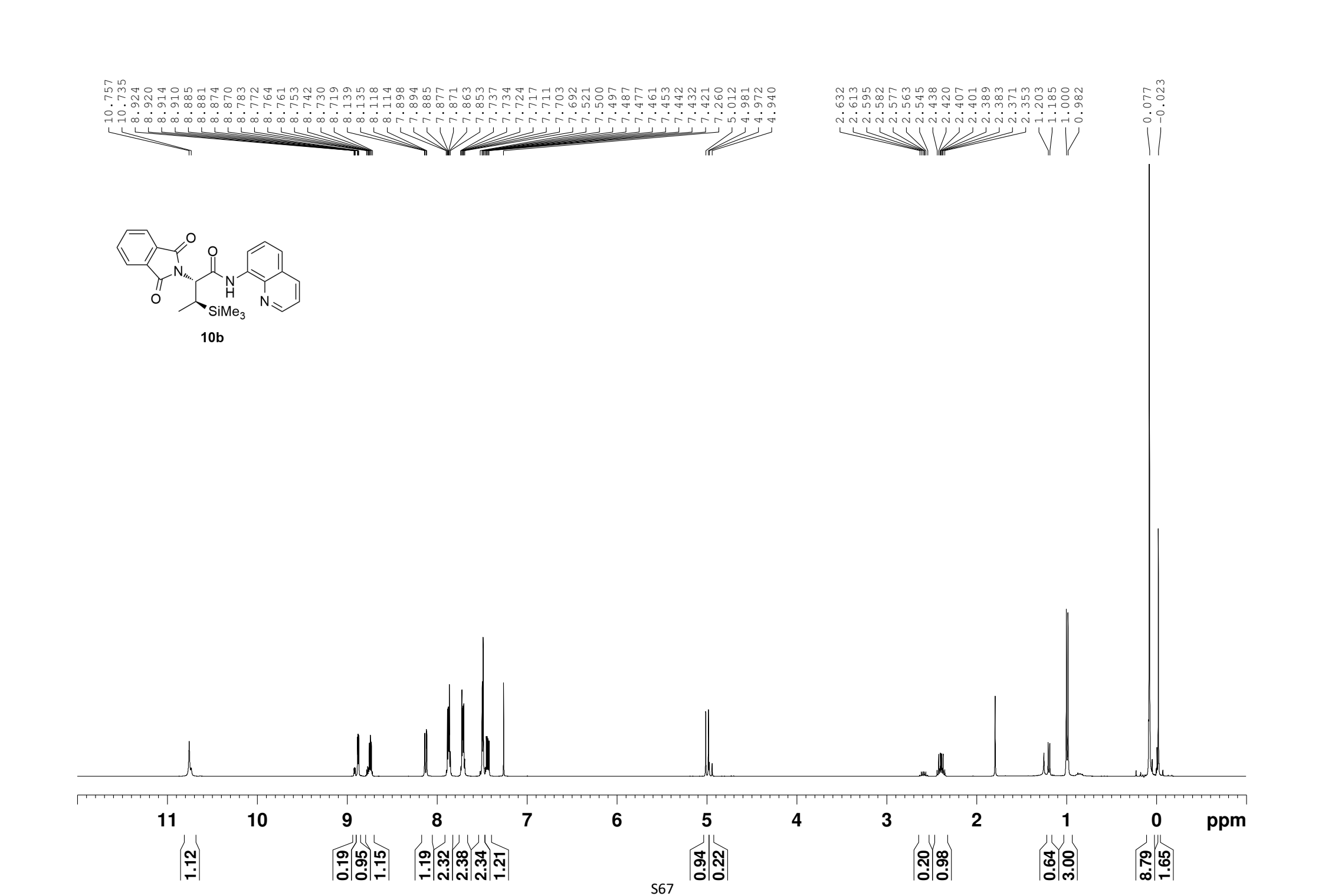
10a

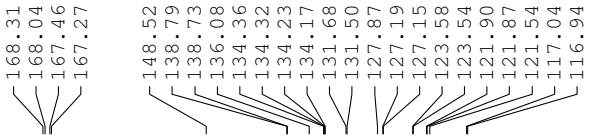

11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.97
1.98
1.00
1.97
2.02
2.01
1.01
1.00
1.02
1.02
9.02

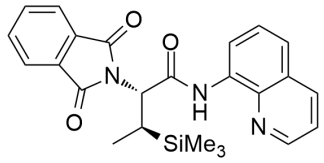

O
O
N
O
N
H
N
SiMe3

10a

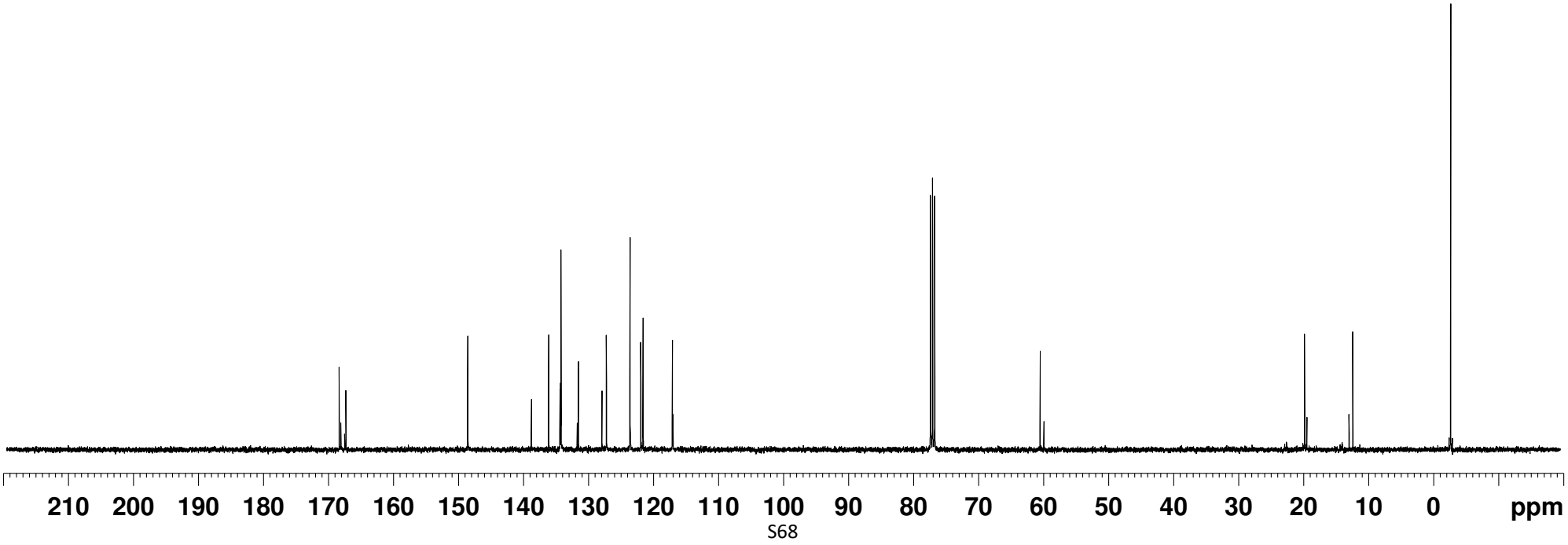
168.19
167.97
148.28
138.50
136.18
134.15
133.94
131.84
127.78
127.18
123.48
121.79
121.53
116.50
77.32
77.00
76.68
52.17
17.09
-1.52
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

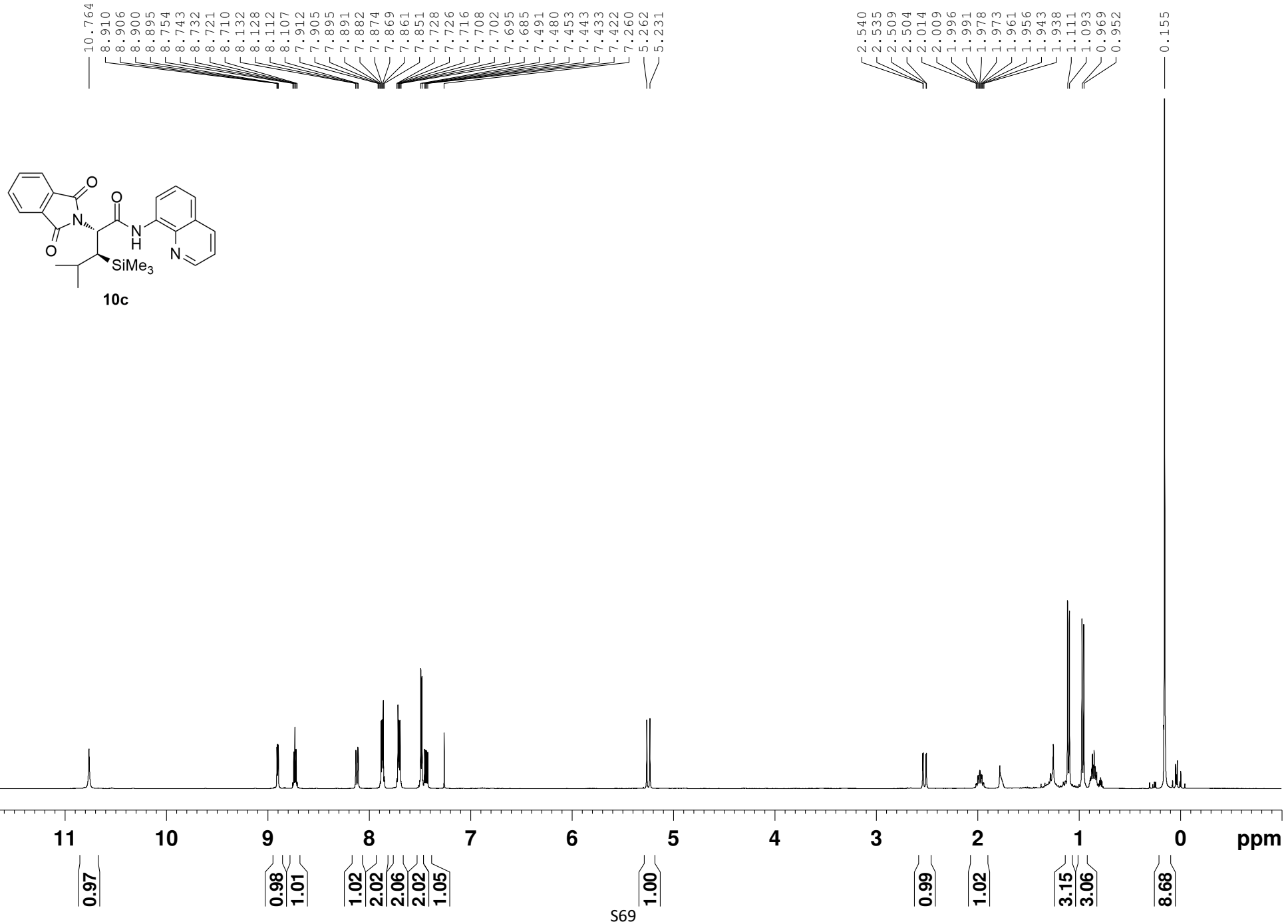

10.757
10.735
8.924
8.920
8.914
8.910
8.885
8.881
8.874
8.870
8.783
8.772
8.764
8.761
8.753
8.742
8.730
8.719
8.139
8.135
8.118
8.114
7.898
7.894
7.885
7.877
7.871
7.863
7.853
7.737
7.734
7.724
7.717
7.711
7.703
7.692
7.521
7.500
7.497
7.487
7.477
7.461
7.453
7.442
7.432
7.421
7.260
5.012
4.981
4.972
4.940
2.632
2.613
2.595
2.582
2.577
2.563
2.545
2.438
2.420
2.407
2.401
2.389
2.383
2.371
2.353
1.203
1.185
1.000
0.982
0.077
-0.023
O
O
N
O
N
H
O
N
SiMe3
10b
11
10
9
8
7
6
5
4
3
2
1
0
ppm
1.12
0.19
0.95
1.15
1.19
2.32
2.38
2.34
1.21
0.94
0.22
0.20
0.98
0.64
3.00
8.79
1.65

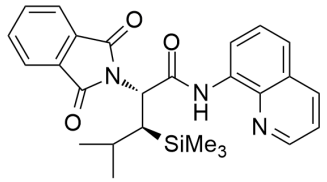

168.31
168.04
167.46
167.27
148.52
138.79
138.73
136.08
134.36
134.32
134.23
134.17
131.68
131.50
127.87
127.19
127.15
123.58
123.54
121.90
121.87
121.54
117.04
116.94
77.32
77.00
76.68
60.45
59.88
19.83
19.48
12.98
12.41
-2.64


O
O
N
O
N
H
N
SiMe3

10b

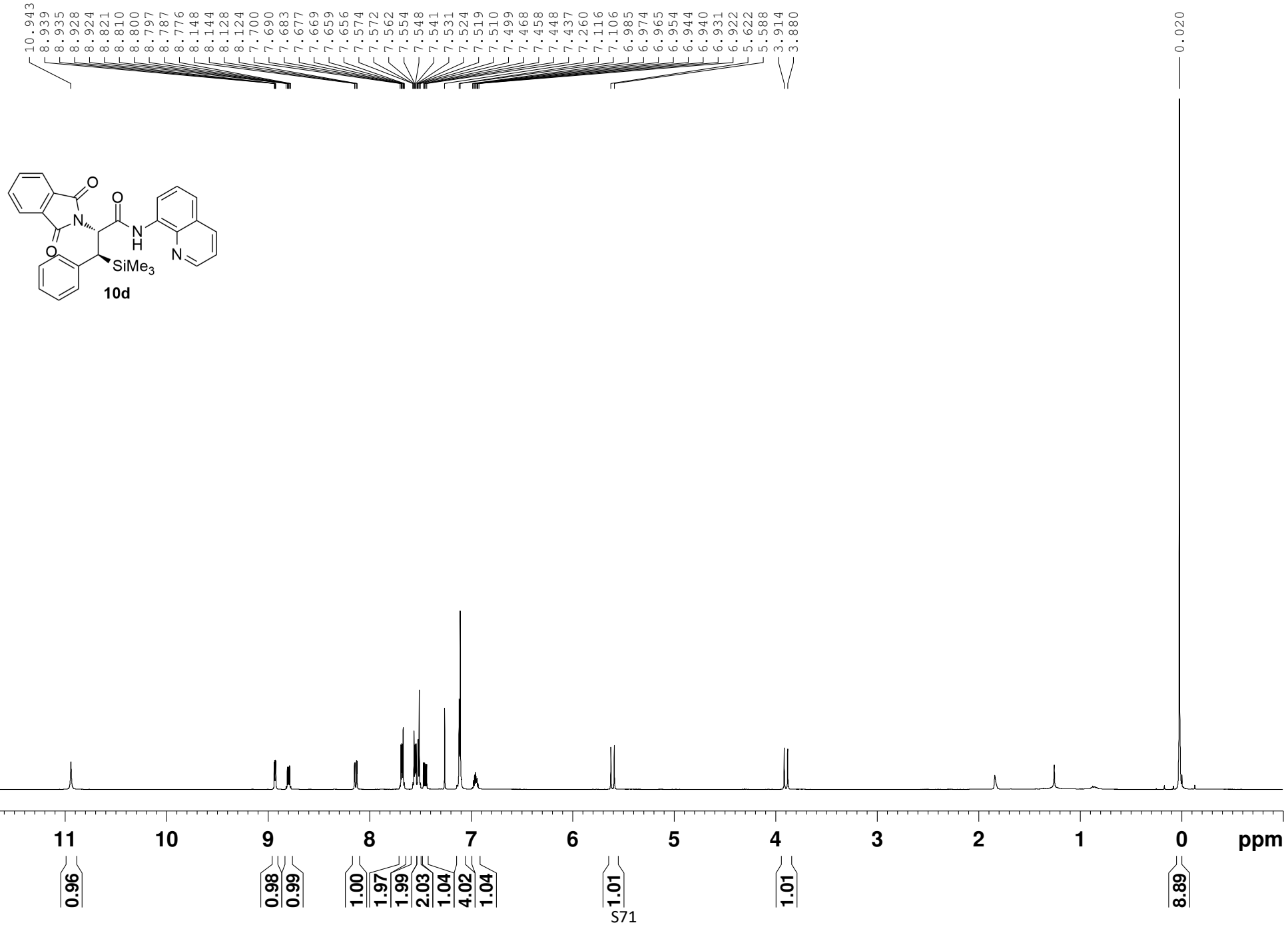

210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

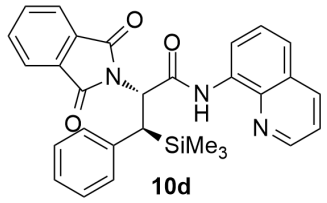

10.764
8.910
8.906
8.900
8.895
8.754
8.743
8.732
8.721
8.710
8.132
8.128
8.112
8.107
7.912
7.905
7.895
7.891
7.882
7.874
7.869
7.861
7.851
7.728
7.726
7.716
7.708
7.702
7.695
7.685
7.491
7.480
7.453
7.443
7.433
7.422
7.260
5.262
5.231
2.540
2.535
2.509
2.504
2.014
2.009
1.996
1.991
1.978
1.973
1.961
1.956
1.943
1.938
1.111
1.093
0.969
0.952
0.155
SiMe3
10c
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.97
0.98
1.01
1.02
2.02
2.06
2.02
1.05
1.00
0.99
1.02
3.15
3.06
8.68


O
O
N
O
N
H
O
N
SiMe3

10c

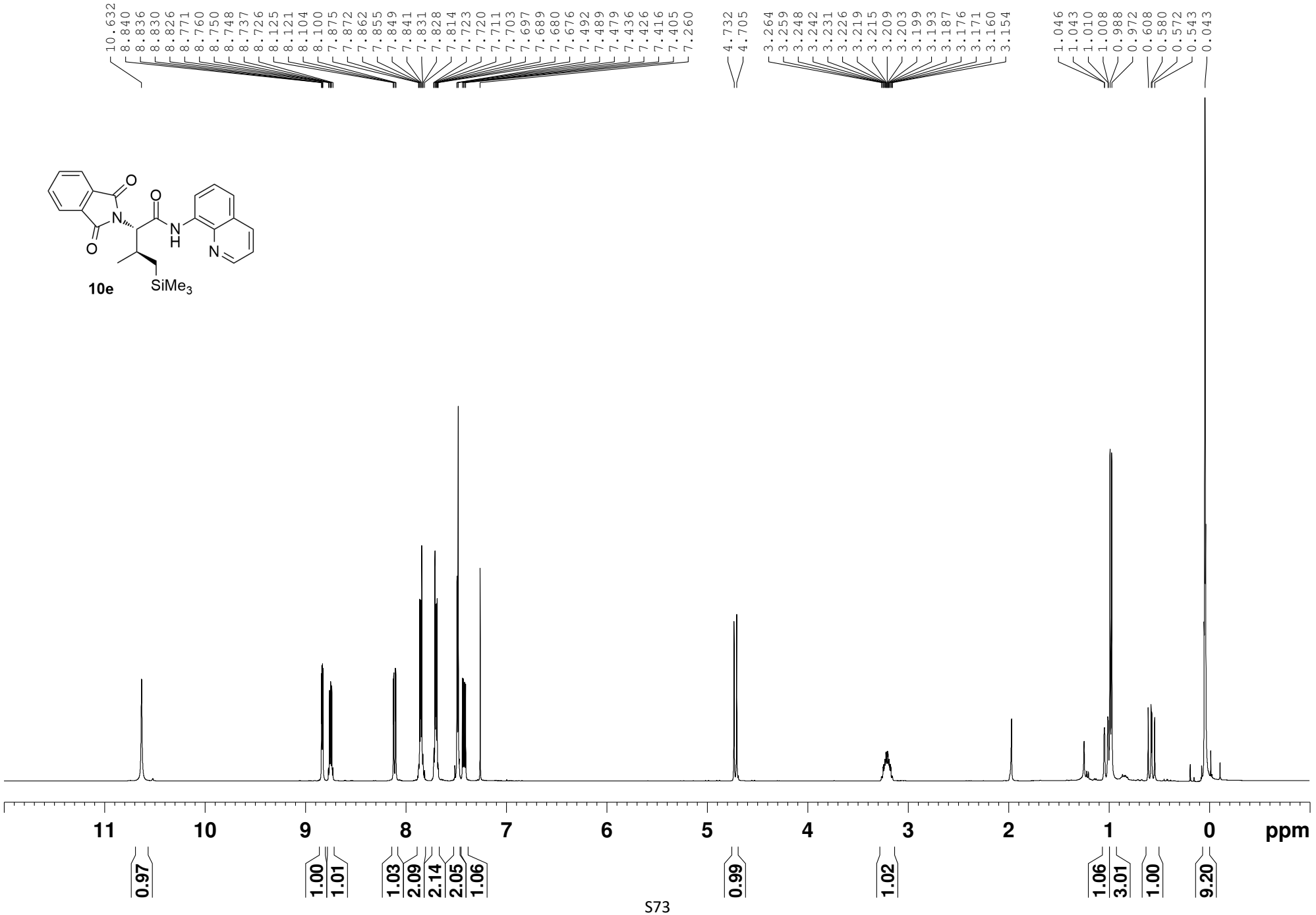
168.39
167.64
148.54
138.75
136.05
134.44
134.17
131.66
127.88
127.18
123.58
121.93
121.56
117.18
77.32
77.00
76.68
58.54
32.32
28.21
22.03
21.01
0.61
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

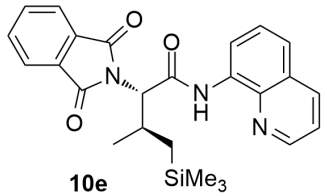

10.943
8.939
8.935
8.928
8.924
8.821
8.810
8.800
8.797
8.787
8.776
8.148
8.144
8.128
8.124
7.700
7.690
7.683
7.677
7.669
7.659
7.656
7.574
7.572
7.562
7.554
7.548
7.541
7.531
7.524
7.519
7.510
7.499
7.468
7.458
7.448
7.437
7.260
7.116
7.106
6.985
6.974
6.965
6.954
6.944
6.940
6.931
6.922
5.622
5.588
3.914
3.880
0.020
O
O
N
O
N
H
N
O
SiMe3
10d
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.96
0.98
0.99
1.00
1.97
1.99
2.03
1.04
4.02
1.04
1.01
1.01
8.89


O
O
N
O
N
H
N
O
SiMe3

10d

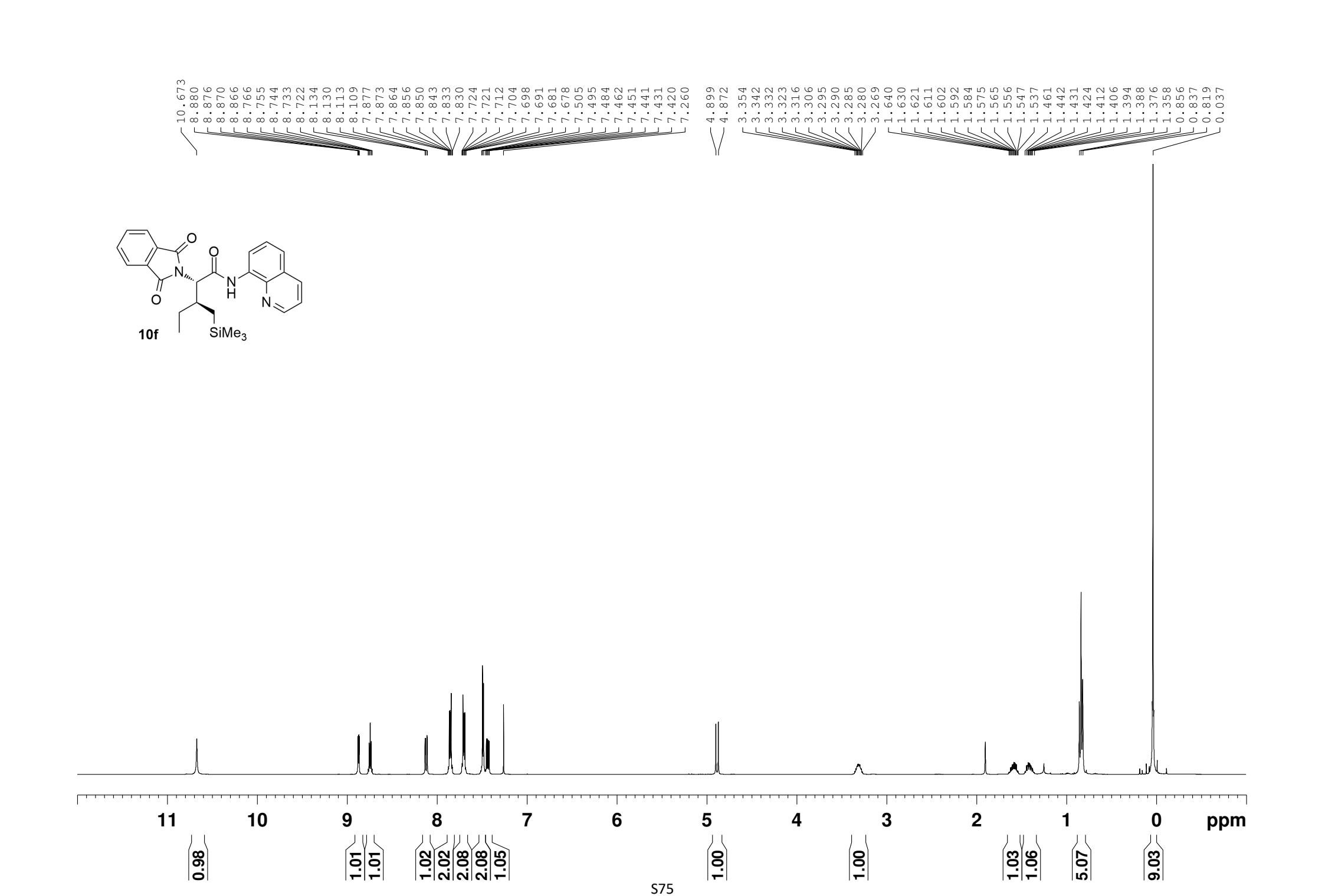
168.09
167.14
148.63
139.47
138.78
136.09
134.41
133.87
131.16
128.19
127.88
127.18
125.37
123.23
122.10
121.59
117.27
77.32
77.00
76.68
59.14
36.35
-2.06
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

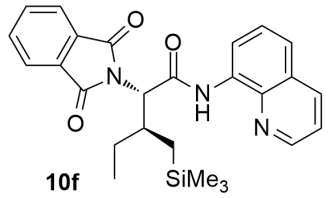

10.632
8.840
8.836
8.830
8.826
8.771
8.760
8.750
8.748
8.737
8.726
8.125
8.121
8.104
8.100
7.875
7.872
7.862
7.855
7.849
7.841
7.831
7.828
7.814
7.723
7.720
7.711
7.703
7.697
7.689
7.680
7.676
7.492
7.489
7.479
7.436
7.426
7.416
7.405
7.260
4.732
4.705
3.264
3.259
3.248
3.242
3.231
3.226
3.219
3.215
3.209
3.203
3.199
3.193
3.187
3.176
3.171
3.160
3.154
1.046
1.043
1.010
1.008
0.988
0.972
0.608
0.580
0.572
0.543
0.043
O
O
N
O
N
H
N
O
10e
SiMe3
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.97
1.00
1.01
1.03
2.09
2.14
2.05
1.06
0.99
1.02
1.06
3.01
1.00
9.20


O
O
N
O
N
H
N
SiMe3

10e

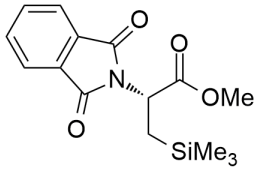
168.05
166.73
148.42
138.64
136.04
134.18
134.14
131.47
127.81
127.11
123.52
121.89
121.56
116.89
77.32
77.00
76.68
64.55
28.74
22.03
18.79
-0.72
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm


10.673
8.880
8.876
8.870
8.866
8.766
8.755
8.744
8.733
8.722
8.134
8.130
8.113
8.109
7.877
7.873
7.864
7.856
7.850
7.843
7.833
7.830
7.724
7.721
7.712
7.704
7.698
7.691
7.681
7.678
7.505
7.495
7.484
7.462
7.451
7.441
7.431
7.420
7.260
4.899
4.872
3.354
3.342
3.332
3.323
3.316
3.306
3.295
3.290
3.285
3.280
3.269
1.640
1.630
1.621
1.611
1.602
1.592
1.584
1.575
1.565
1.556
1.547
1.537
1.461
1.442
1.431
1.424
1.412
1.406
1.394
1.388
1.376
1.358
0.856
0.837
0.819
0.037
O
O
N
O
N
H
N
O
10f
SiMe3
11
10
9
8
7
6
5
4
3
2
1
0
ppm
0.98
1.01
1.01
1.02
2.02
2.08
2.08
1.05
1.00
1.00
1.03
1.06
5.07
9.03


O
O
N
O
N
H
N
SiMe3

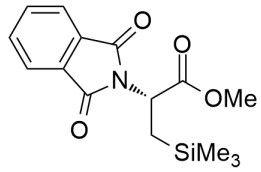
10f

168.11
167.06
148.48
138.72
136.05
134.24
134.18
131.54
127.84
127.12
123.54
121.91
121.58
116.99
77.32
77.00
76.68
61.55
32.90
23.59
17.02
7.99
-0.75
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm


O
O
N
O
OMe
SiMe3

15

7.866
7.862
7.853
7.845
7.839
7.832
7.822
7.819
7.742
7.739
7.729
7.722
7.716
7.708
7.699
7.695
7.260
4.962
4.950
4.933
4.921
3.691
1.734
1.705
1.696
1.667
1.549
1.537
1.511
1.499
-0.054
11
10
9
8
7
6
5
4
3
2
1
0
ppm
2.01
2.07
1.00
3.11
1.04
1.04
9.28


O
O
N
O
OMe
SiMe3

15

171.04
167.52
134.14
131.78
123.43
77.32
77.00
76.68
52.73
49.11
17.01
-1.66
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm