Electronic Supplementary Material (ESI) for Chemical Science.
This journal is © The Royal Society of Chemistry 2022

Supporting Information for:

Intramolecular Photochemical [2+1]-Cycloadditions of Nucleophilic Siloxy Carbenes

Amanda Bunyamin[a], Carol Hua[a,b], Anastasios Polyzos[a,c], Daniel L. Priebbenow[a,d]*

a School of Chemistry, The University of Melbourne, Parkville, 3010, Victoria (Australia)
b School of Life and Environmental Sciences, Deakin University, Waurn Ponds, 3216, Victoria (Australia)
c CSIRO Manufacturing, Research Way, Clayton, 3168, Victoria (Australia)
d Department of Medicinal Chemistry, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville, 3052, Victoria (Australia)

E-mail: daniel.priebbenow@unimelb.edu.au

Table of Contents:

GENERAL EXPERIMENTAL

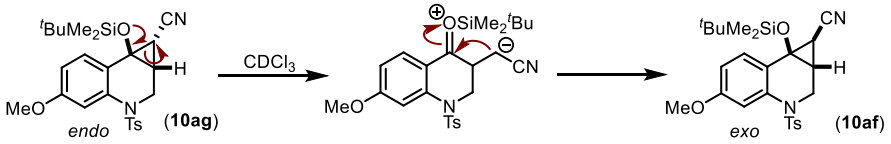
Unless otherwise stated, reagents and solvents were purchased from commercial sources and used without further purification. Analytical Thin Layer Chromatography (TLC) was carried out using aluminium-backed Merck Kieselgel KG60 F254 silica plates. The plates were visualized by irradiation with short-wave ultraviolet light. Flash chromatography was performed on SiliaFlashR P60 R12030B 40-63 micron silica gel. High-resolution mass spectrometry (HRMS) was performed with an Agilent 6546 LC-QToF coupled to an Agilent 1290 Infinity LC. All data were acquired, and reference mass corrected via a dual-spray electrospray ionization (ESI) source.

^{1}H NMR and ^{13}C NMR spectra were recorded on Agilent DD2 (500 MHz) or a Bruker (400 MHz). Chemical shifts are expressed in parts per million (PPM) and are referenced to the internal solvent peaks. Solvents used for NMR studies were purchased from Cambridge Isotope Laboratories. Each proton resonance was assigned according to the following convention: chemical shift (δ), multiplicity, coupling constant (*J* Hz) number of protons. Each carbon resonance was assigned according to the following convention: chemical shift (δ), multiplicity and coupling constants (*J* Hz). Multiplicity is quoted as br (broad), s (singlet), d (doublet), t (triplet), q (quartet), and m (multiplet).

All light promoted reactions were performed using a 427 nm PR160L (40 W) Kessil LED light (www.kessil.com). The vials were placed on a square metal frame fitted with PC cooling fans and heat sinks for temperature control. The frame was placed on top of a stir plate to enable the reaction mixture to be stirred.

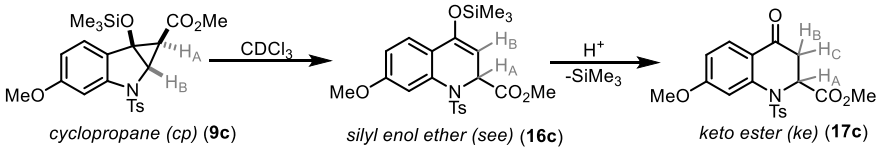
NMR Analysis (Isomerization/Rearrangement)

Table S1. The isomerization of the *endo* isomer to the *exo* isomer was observed via ^{1}H NMR analysis over time



Entry	Time (hours)	Ratio (Endo/Exo)
1	0	9:1
2	48	3:1
3	72	2:1
4	96	1:1
5	120	2:3
6	240	1:8
7	336	1:13

Table S2. The rearrangement of cyclopropane **9c** to silyl enol ether **16c** and subsequent hydrolysis to afford **17c** was observed via ^{1}H NMR analysis over time



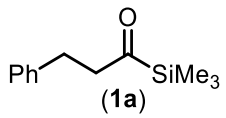
cyclopropane (cp) (**9c**)
H_A δ = 0.8 ppm
H_B δ = 4.68 ppm

silyl enol ether (see) (**16c**)
H_A δ = 4.82 ppm
H_B δ = 5.58 ppm

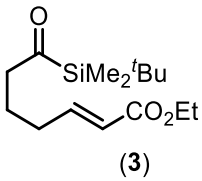
keto ester (ke) (**17c**)
H_A δ = 5.45 ppm
H_{B+C} δ = 2.96/2.55 ppm

Entry	Time (hours)	Ratio (9c/16c/17c)
1	0	1:0:0
2	24	4:1:0
3	120	2:5:3
4	144	1:3:3
5	168	1:3:4
6	240	1:5:15
7	336	1:5:30

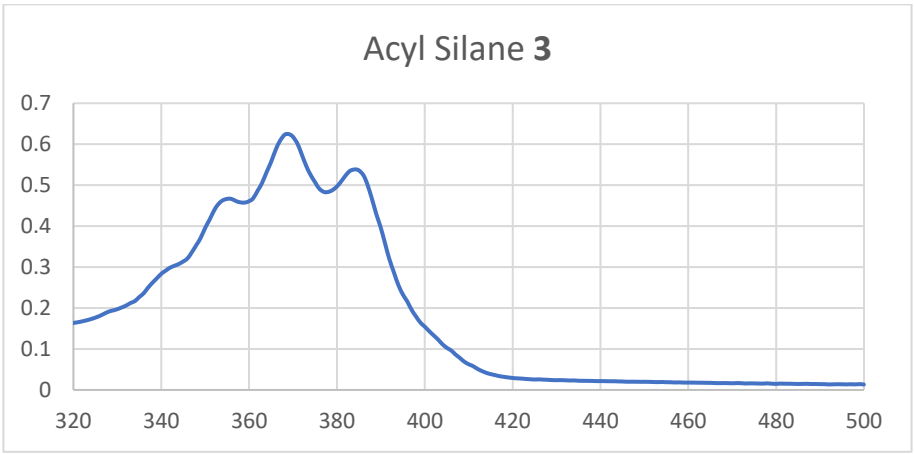
UV-Visible Absorption Analysis

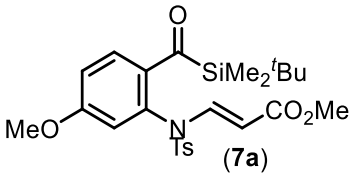


(**1a**)

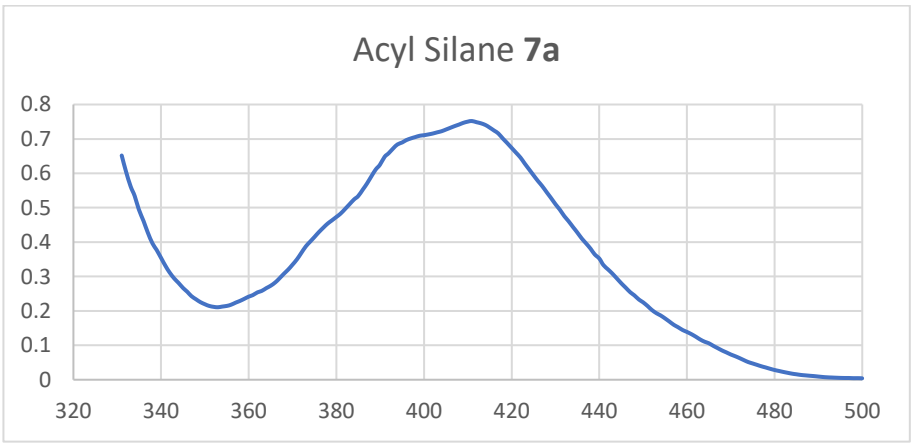


(**3**)





(**7a**)



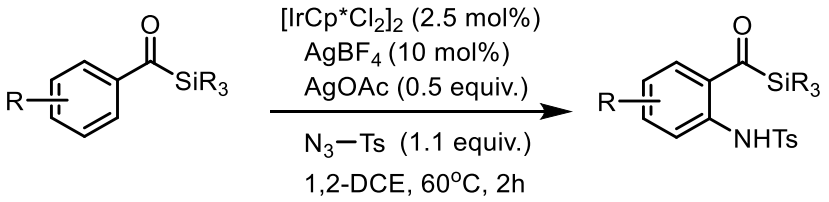
SPECIFIC EXPERIMENTAL DETAILS:

3-Phenyl-1-(trimethylsilyl)-1-propanone (**1a**),[1] and 1-(*tert*-butyldimethylsilyl)-5-hexen-1-one (**1b**)[2] were prepared using established methods and the measured spectroscopic data compared well with that previously reported.

The following acyl silanes were prepared using established methods and the measured spectroscopic data compared well with that previously reported:

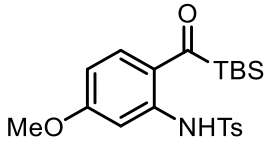
- *N*-(5-Methoxy-2-[(trimethylsilyl)carbonyl]phenyl)-4-methylbenzenesulfonamide (**1c**)[3];
- 4-Methyl-*N*-(2-[(trimethylsilyl)carbonyl]phenyl)benzenesulfonamide (**1d**)[3];
- 4-Methyl-*N*-(5-methyl-2-[(trimethylsilyl)carbonyl]phenyl)benzenesulfonamide (**1e**)[3].

Representative procedure for synthesis of *ortho*-sulfonamido acyl silanes



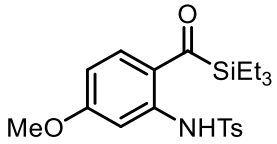
Adapted from literature method.[3] $[IrCp^*Cl_2]_2$ (0.0125 mmol, 2.5 mol%), $AgBF_4$ (0.05 mmol, 10 mol%), AgOAc (0.25 mmol, 0.5 equiv.) and anhydrous 1,2-DCE (1.0 mL) were added to an oven-dried, nitrogen flushed vial. Aroyl silane (0.5 mmol, 1 equiv.) was then added, followed by sulfonyl azide (0.55 mmol, 1.1 equiv.), and the reaction stirred at 60°C for 6h. After this time, the reaction mixture was cooled to room temperature. The solvent was removed in vacuo and the product was purified via column chromatography (eluting with 15% EtOAc/hexane).

***N*-(5-Methoxy-2-[(*tert*-butyldimethylsilyl)carbonyl]phenyl)-4-methylbenzenesulfonamide (1f)**



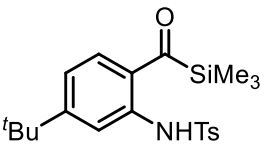
Isolated as a pale yellow solid (176 mg, 84%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 12.14 (s, 1H), 7.72 (d, *J* = 8.3 Hz, 3H), 7.26 – 7.12 (m, 3H), 6.57 (d, *J* = 8.8 Hz, 1H), 3.82 (s, 3H), 2.35 (s, 3H), 0.88 (s, 9H), 0.30 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 236.2, 163.7, 143.8, 140.6, 136.81, 136.79, 129.6, 127.2, 122.6, 108.7, 103.2, 55.6, 26.8, 21.5, 17.1, -4.2. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{21}H_{30}NO_4SSi$ 420.1659; Found 420.1661. **M.P.** 149.2 – 150.8 °C.

***N*-(5-Methoxy-2-[(triethylsilyl)carbonyl]phenyl)-4-methylbenzenesulfonamide (1g)**



Isolated as a yellow oil (200 mg, 95%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 12.13 (s, 1H), 7.72 (d, *J* = 8.3 Hz, 2H), 7.69 (d, *J* = 8.8 Hz, 1H), 7.20 (d, *J* = 8.0 Hz, 2H), 7.16 (d, *J* = 2.5 Hz, 1H), 6.59 (dd, *J* = 8.8, 2.5 Hz, 1H), 3.82 (s, 3H), 2.35 (s, 3H), 0.92 (t, *J* = 7.7 Hz, 9H), 0.83 (dd, *J* = 11.2, 4.8 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) 236.6, 163.7, 143.7, 140.3, 136.7, 135.9, 129.6, 127.2, 122.3, 109.0, 103.2, 55.6, 21.5, 7.4, 4.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{21}H_{30}NO_4SSi$ 420.1659; Found 420.1660.

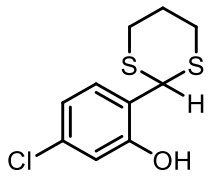
4-Methyl-*N*-(5-*tert*-butyl-2-[(trimethylsilyl)carbonyl]phenyl)benzenesulfonamide (1h)



Isolated as a yellow oil (155 mg, 77%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 11.63 (s, 1H), 7.73 (d, *J* = 3.5 Hz, 1H), 7.71 (d, *J* = 3.5 Hz, 1H), 7.65 (d, *J* = 1.7 Hz, 1H), 7.20 (d, *J* = 8.0 Hz, 2H), 7.11 (dd, *J* = 8.2, 1.8 Hz, 1H), 2.34 (s, 3H), 1.27 (s, 9H), 0.30 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) 238.8, 158.2, 143.7, 137.6, 136.6, 133.9, 130.3, 129.5, 127.5, 127.4, 124.7, 119.6, 116.3, 35.5, 30.8, 21.5, -1.2. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{21}H_{30}NO_3SSi$ 404.1710; Found 404.1713.

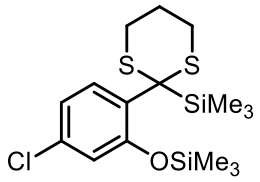
Representative procedure for *ortho*-hydroxy acyl silanes synthesis:

4-chloro-2-(1,3-dithian-2-yl)phenol



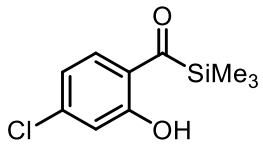
Method adapted from a literature procedure.[4] To a solution of 4-chlorosalicylaldehyde (30 mmol, 1.0 equiv.) and 1,3-propanedithiol (27.5 mmol, 0.9 equiv.) in CH_2Cl_2 (100 mL), $BF_3{\cdot}OEt_2$ (3 mmol, 0.1 equiv.) was added dropwise. The mixture was stirred at room temperature for 24 hours. After this time, the mixture was quenched with aqueous saturated K_2CO_3, and extracted with CH_2Cl_2 (3 × 25 mL). The combined organic phases were collected, washed with H_2O and brine, and dried over $MgSO_4$. The solvent was removed *in vacuo* to afford the title compound as a colourless oil (4954 mg, 73%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.20 (d, *J* = 2.5 Hz, 1H), 6.87 (dd, *J* = 8.7, 2.5 Hz, 1H), 6.83 (d, *J* = 8.7 Hz, 1H), 6.52 (s, 1H), 5.34 (s, 1H), 3.07 (t, *J* = 13.2 Hz, 2H), 2.94 (dd, *J* = 11.0, 3.5 Hz, 2H), 2.23 – 2.18 (m, 1H), 1.99 – 1.90 (m, 1H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 155.3, 135.5, 130.1, 122.2, 120.9, 117.8, 46.9, 31.5, 24.7.

(2-(4-chloro-2-((trimethylsilyl)oxy)phenyl)-1,3-dithan-2-yl)trimethylsilane



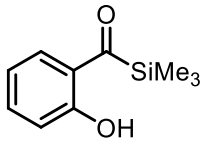
Method adapted from a literature procedure.[4] *n*-BuLi (2.5M, 15 mmol, 3.0 equiv.) was added dropwise to a solution of 4-chloro-2-(1,3-dithian-2-yl)phenol (5.0 mmol, 1.0 equiv.) in anhydrous THF (100 mL) at -41°C. After stirring at this temperature for 2 hours, trimethylsilyl chloride (5.0 mmol, 3.0 equiv.) was added dropwise at -41°C. The solution was then allowed to slowly warm to room temperature, and the reaction stirred for another 2 hours. After this time, the reaction was quenched using saturated aqueous NH_4Cl and extracted with EtOAc (3 × 25 mL). The organic phases were combined, dried over $MgSO_4$ and the solvent removed *in vacuo*, to afford the title compound as a colourless oil (1838 mg, 94%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.7 Hz, 1H), 6.94 (dd, *J* = 8.7, 2.2 Hz, 1H), 6.78 (d, *J* = 2.2 Hz, 1H), 2.78 – 2.71 (m, 2H), 2.46 (dt, *J* = 14.2, 3.7 Hz, 2H), 1.99 (dt, *J* = 13.3, 3.4 Hz, 1H), 1.88 – 1.83 (m, 1H), 0.32 (s, 9H), 0.09 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 154.6, 134.6, 132.0, 128.4, 120.6, 119.8, 44.8, 25.9, 24.9, 0.9, -2.1.

(4-chloro-2-hydroxyphenyl)(trimethylsilyl)methanone (1i)



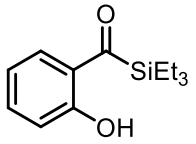
Method adapted from a literature procedure[5]. $CaCO_3$ (30 mmol, 6.0 equiv.) and I_2 (40 mmol, 8.0 equiv.) was added sequentially to a solution of (2-(4-chloro-2-((trimethylsilyl)oxy)phenyl)-1,3-dithan-2-yl)trimethylsilane (5 mmol, 1.0 equiv.) in THF (50 mL). After the mixture was stirred for 20 mins at room temperature, distilled H_2O (0.5 mL) was added. The mixture was left to stir for 2 hours, before being quenched with saturated $Na_2S_2O_3$ (100 mL) solution and left to stir for another 10 minutes. The reaction mixture was then filtered through a plug of silica gel and extracted with with EtOAc (3 × 30 mL). The combined organic phases were washed with brine, dried over $MgSO_4$ and the solvent removed *in vacuo*. The residue was purified by flash chromatography on silica eluting with 40-80% toluene/*n*-hexane to afford the title compound as a yellow oil (410 mg, 36%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 12.88 (s, 1H), 7.70 (d, *J* = 8.4 Hz, 1H), 6.97 (d, *J* = 2.0 Hz, 1H), 6.91 (dd, *J* = 8.4, 2.0 Hz, 1H), 0.40 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.8, 161.7, 141.5, 133.5, 123.5, 119.4, 118.7, -1.4. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{10}H_{14}ClO_2Si$ 229.0446; Found 229.0447.

(2-hydroxyphenyl)(trimethylsilyl)methanone (1j)



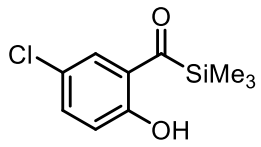
The representative procedure outlined above was followed to afford the title compound as a yellow oil (233 mg, 24%). The measured spectroscopic data matched that previously reported.[4] **^{1}H NMR** (500 MHz, $CDCl_3$) δ 12.71 (s, 1H), 7.80 (d, *J* = 7.8 Hz, 1H), 7.44 (t, *J* = 7.8 Hz, 1H), 6.95 (dd, *J* = 14.0, 7.7 Hz, 2H), 0.41 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 240.7, 160.8, 135.7, 132.6, 125.1, 118.8, 118.6, -1.3.

(2-hydroxyphenyl)(triethylsilyl)methanone (1k)



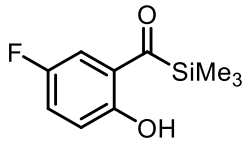
The representative procedure outlined above was followed to afford the title compound as a yellow oil (620 mg, 52%). The measured spectroscopic data matched that previously reported.[4] **^{1}H NMR** (500 MHz, $CDCl_3$) δ 12.78 (s, 1H), 7.78 (dd, *J* = 7.8, 1.5 Hz, 1H), 7.43 (ddd, *J* = 8.6, 7.3, 1.6 Hz, 1H), 6.97 – 6.91 (m, 2H), 1.01 (t, *J* = 7.6 Hz, 9H), 0.96 – 0.90 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 240.9, 160.6, 135.7, 132.3, 126.1, 118.8, 118.5, 7.4, 3.8.

(5-chloro-2-hydroxyphenyl)(trimethylsilyl)methanone (1l)



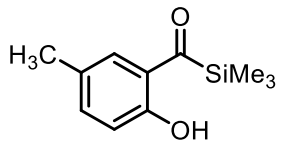
The representative procedure outlined above was followed to afford the title compound as a yellow oil (252 mg, 22%). The measured spectroscopic data matched that previously reported.[4] **^{1}H NMR** (500 MHz, $CDCl_3$) δ 12.58 (s, 1H), 7.73 (d, *J* = 2.0 Hz, 1H), 7.37 (dd, *J* = 8.8, 2.0 Hz, 1H), 6.92 (d, *J* = 8.9 Hz, 1H), 0.42 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 240.1, 159.3, 135.6, 131.6, 125.2, 123.4, 120.3, -1.4.

(5-fluoro-2-hydroxyphenyl)(trimethylsilyl)methanone (1m)



The representative procedure outlined above was followed to afford the title compound as a yellow oil (212 mg, 20%). The measured spectroscopic data matched that previously reported.[4] **^{1}H NMR** (500 MHz, $CDCl_3$) δ 12.42 (s, 1H), 7.45 (dd, *J* = 8.6, 3.0 Hz, 1H), 7.18 (dd, *J* = 8.3, 2.6 Hz, 1H), 6.94 (dd, *J* = 9.2, 4.5 Hz, 1H), 0.42 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 240.0, 156.9, 155.8 (d, $^1J_{CF}$ = 237.5 Hz), 124.0 (d, $^3J_{CF}$ = 7 Hz), 123.4 (d, $^2J_{CF}$ = 23.75 Hz), 119.9 (d, $^3J_{CF}$ = 7 Hz), 117.2(d, $^2J_{CF}$ = 23.75 Hz), -1.4.

(2-hydroxy-5-methylphenyl)(trimethylsilyl)methanone (1n)



The representative procedure outlined above was followed to afford the title compound as a yellow oil (240 mg, 23%). The measured spectroscopic data matched that previously reported.[4] **^{1}H NMR** (500 MHz, $CDCl_3$) δ 12.52 (s, 1H), 7.59 – 7.54 (m, 1H), 7.24 (dd, *J* = 8.5, 2.1 Hz, 1H), 6.86 (d, *J* = 8.5 Hz, 1H), 2.33 (s, 3H), 0.41 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 240.4, 158.7, 136.7, 132.4, 127.8, 124.8, 118.3, 20.6, -1.2.

Methyl propiolate (**5a**) and ethyl propiolate (**5b**) were acquired from commercial sources. Benzyl propiolate (**5c**) was prepared using established methods from propiolic acid and the measured spectroscopic data compared well with that previously reported.[6]

Methyl-4-bromocrotonate (**6a**) and ethyl-4-bromocrotonate (**6b**) were acquired from commercial sources. Additional 4-bromocrotonates were prepared using established methods from 4-bromocrotonic acid and the measured spectroscopic data compared well with that previously reported for: isopropyl-4-bromocrotonate (**6c**)[7]; benzyl-4-bromocrotonate (**6d**)[7]; cyclohexyl-4-bromocrotonate (**6e**)[7]; phenylethyl-4-bromocrotonate (**6f**)[8]

The following alkyl halides were prepared using established methods and the measured spectroscopic data compared well with that previously reported: (*E*)-4-bromo-1-(1-pyrrolidinyl)-2-buten-1-one (**6g**)[9]; 4-bromobut-2-enenitrile (**6h**)[10]; (*E*)-3-bromo-1-diethoxyphosphorylprop-1-ene (**6i**)[11]; ethyl (*E*)-4-bromo-2-methyl-2-butenoate (**6j**)[12]; ethyl (*E*)-4-bromo-3-methyl-2-butenoate (**6k**)[13]; (2-bromoethylidene)cyclohexane (**6l**)[14].

General Procedure A:

To a solution of tosyl amido acyl silane (0.3 mmol) in dichloromethane (2.0 mL) at 0 °C was added DABCO (10 mol%) and the propiolate (0.33 mmol). After stirring at room temperature for 16h, the solution was loaded directly onto a silica gel column and the product purified using the solvent system specified to afford acyl silanes **7**.

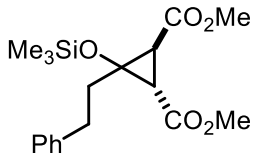
General Procedure B:

To a solution of *ortho*-hydroxy or *ortho*-sulfonamido acyl silane (0.3 mmol) in acetone (2.0 mL) was added Cs_2CO_3 (0.45 mmol) and the appropriate bromocrotonate (0.45 mmol). After stirring at room temperature for 16h, the solution was loaded directly onto a silica gel column and the product purified using the solvent system specified to afford acyl silane **8**.

General Procedure C:

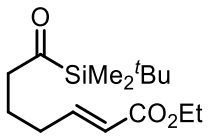
To an oven dried vial containing a stirrer bar and approximately 250 mg of activated 4Å molecular sieves was added the acyl silane (0.2 mmol) and diethyl ether (1.5 mL). The vial was sealed and irradiated with 427 nm light (Kessil PR160L) at ambient temperature for 10 minutes (colour change from bright yellow to clear indicated consumption of the acyl silane). After this time, the volatiles were removed *in vacuo* and the product purified by column chromatography using the solvent system specified to afford the cyclopropanes **9** or **10**.

trans-dimethyl 3-phenethyl-3-((trimethylsilyl)oxy)cyclopropane-1,2-dicarboxylate (2)



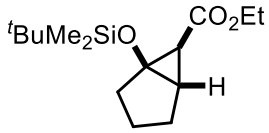
A vial containing acyl silane **1a** (0.2 mmol) and dimethyl fumarate (0.3 mmol) in diethyl ether (2.0 mL) was irradiated with blue LEDs (427 nm, 40W) for 12 hours. After this time, the solvent was removed and the product purified by column chromatography (10% EtOAc/n-hexanes) to afford the title compound as a clear oil (59 mg, 84%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.31 (t, *J* = 7.4 Hz, 2H), 7.22 (t, *J* = 7.0 Hz, 3H), 3.73 (s, 3H), 3.72 (s, 3H), 2.94 – 2.79 (m, 2H), 2.74 (d, *J* = 6.7 Hz, 1H), 2.33 (d, *J* = 6.7 Hz, 1H), 2.03 (pd, *J* = 14.4, 6.3 Hz, 2H), 0.26 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.1, 167.3, 140.5, 127.61, 127.59, 125.1, 66.6, 51.3, 51.1, 35.3, 33.0, 32.7, 31.3. 0.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{18}H_{26}O_5Si$ 351.1622; Found 351.1621.

(*E*)-ethyl 7-(*tert*-butyldimethylsilyl)-7-oxohept-2-enoate (3)



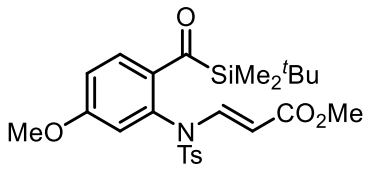
To a degassed solution of 1-(*tert*-butyldimethylsilyl)-5-hexen-1-one (**1b**, 1.0 mmol) in CH_2Cl_2 (40 mL) was added Grubbs Catalyst 2nd Generation (42 mg, 5 mol%) and ethyl acrylate (2.0 mmol). After heating at 40 °C for 16h, the solvent was removed *in vacuo* and the product purified by column chromatography (10% EtOAc/*n*-hexanes) to afford the title compound as a clear oil (205 mg, 72%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.80 – 6.67 (m, 1H), 5.63 (dd, *J* = 15.6, 1.1 Hz, 1H), 4.00 (q, *J* = 7.1 Hz, 2H), 2.44 (t, *J* = 7.0 Hz, 2H), 1.99 (q, *J* = 7.2 Hz, 2H), 1.57 – 1.46 (m, 2H), 1.10 (t, *J* = 7.1 Hz, 3H), 0.75 (s, 9H), -0.00 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 246.7, 166.5, 148.4, 121.8, 60.1, 49.1, 31.5, 26.4, 20.2, 16.5, 14.2, -7.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{29}O_3Si$ 285.1880; Found 285.1881.

Ethyl 1-((*tert*-butyldimethylsilyl)oxy)bicyclo[3.1.0]hexane-6-carboxylate (4)



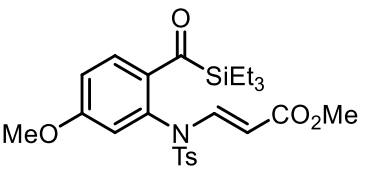
A vial containing acyl silane **3** (0.2 mmol) in diethyl ether (2.0 mL) was irradiated with blue LEDs (427 nm, 40W) for 12 hours. After this time, the solvent was removed and the product purified by column chromatography (using 10% EtOAc in *n*-hexanes) to afford the title compound as a clear oil (44 mg, 79%) **^{1}H NMR** (400 MHz, $CDCl_3$) δ 4.16 – 4.06 (m, 2H), 2.15 – 2.04 (m, 2H), 2.03 – 1.88 (m, 2H), 1.70 – 1.60 (m, 3H), 1.26 (t, *J* = 7.1 Hz, 3H), 1.15 – 1.00 (m, 1H), 0.86 (s, 9H), 0.12 (s, 3H), 0.09 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 170.1, 72.0, 60.2, 34.8, 31.6, 28.4, 26.3, 25.7, 20.6, 17.8, 14.4, -3.8, -3.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{29}O_3Si$ 285.1880; Found 285.1883.

(*E*)-methyl 3-(*N*-(2-((*tert*-butyldimethylsilyl)carbonyl)-5-methoxyphenyl)-4-methylphenylsulfonamido)acrylate (7a)



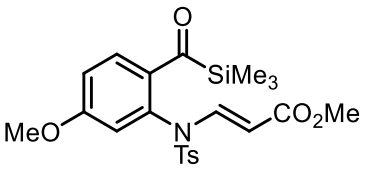
Prepared according to General Procedure A using acyl silane **1f** and methyl propiolate to afford the title compound (purified by column chromatography using 15% EtOAc in *n*-hexanes) as a yellow oil (131 mg, 87%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.02 (d, *J* = 13.7 Hz, 1H), 7.45 (d, *J* = 8.6 Hz, 1H), 7.33 (d, *J* = 8.0 Hz, 2H), 7.04 (d, *J* = 7.9 Hz, 2H), 6.78 (d, *J* = 8.6 Hz, 1H), 5.87 (s, 1H), 4.36 (d, *J* = 13.7 Hz, 1H), 3.44 (s, 3H), 3.41 (s, 3H), 2.18 (s, 3H), 0.74 (s, 9H), 0.03 (s, 3H), 0.00 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 234.8, 167.4, 161.3, 144.8, 144.2, 136.0, 135.3, 131.7, 129.8, 127.9, 116.7, 114.3, 99.7, 55.5, 51.2, 26.8, 21.6, 17.1, -4.8, -5.2. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{34}NO_6SSi$ 504.1871; Found 504.1877.

(*E*)-methyl 3-(*N*-(2-((triethylsilyl)carbonyl)-5-methoxyphenyl)-4-methylphenylsulfonamido)acrylate (7b)



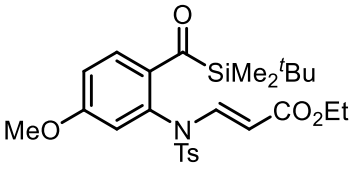
Prepared according to General Procedure A using acyl silane **1g** and methyl propiolate to afford the title compound (purified by column chromatography using 15% EtOAc in *n*-hexanes) as a yellow oil (147 mg, 97%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 8.27 (d, *J* = 13.7 Hz, 1H), 7.73 (d, *J* = 8.6 Hz, 1H), 7.58 (d, *J* = 8.3 Hz, 2H), 7.31 – 7.23 (m, 2H), 7.03 (dd, *J* = 8.6, 2.6 Hz, 1H), 6.18 (d, *J* = 2.5 Hz, 1H), 4.54 (d, *J* = 13.7 Hz, 1H), 3.70 (s, 3H), 3.65 (s, 3H), 2.42 (s, 3H), 0.95 (s, 9H), 0.84 – 0.77 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 233.6, 167.5, 161.6, 144.7, 144.2, 135.3, 132.6, 131.5, 129.7, 127.9, 117.0, 114.5, 99.4, 55.6, 51.2, 21.6, 7.4, 3.6. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{34}NO_6SSi$ 504.1871; Found 504.1874.

(*E*)-methyl 3-(*N*-(2-((trimethylsilyl)carbonyl)-5-methoxyphenyl)-4-methylphenylsulfonamido)acrylate (7c)



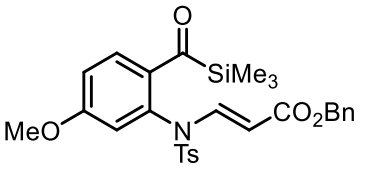
Prepared according to General Procedure A using acyl silane **1c** and methyl propiolate to afford the title compound (purified by column chromatography using 15% EtOAc in *n*-hexanes) as a yellow oil (97 mg, 70%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.31 (d, *J* = 13.6 Hz, 1H), 7.71 (d, *J* = 8.5 Hz, 1H), 7.56 (d, *J* = 7.7 Hz, 2H), 7.28 (d, *J* = 7.9 Hz, 2H), 7.04 (d, *J* = 8.6 Hz, 1H), 6.26 (s, 1H), 4.57 (d, *J* = 13.7 Hz, 1H), 3.72 (s, 3H), 3.67 (s, 3H), 2.43 (s, 3H), 0.26 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 235.4, 169.1, 163.3, 146.3, 145.8, 136.7, 134.1, 133.2, 131.3, 129.5, 118.9, 116.2, 101.0, 57.2, 52.8, 23.2, 0.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{22}H_{28}NO_6SSi$ 462.1401; Found 462.1407.

(*E*)-ethyl 3-(*N*-(2-((*tert*-butyldimethylsilyl)carbonyl)-5-methoxyphenyl)-4-methylphenylsulfonamido)acrylate (7d)



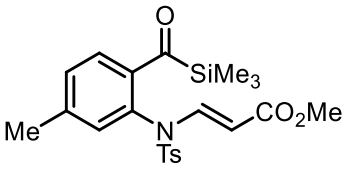
Prepared according to General Procedure A using acyl silane **1f** and ethyl propiolate to afford the title compound (purified by column chromatography using 15% EtOAc in *n*-hexanes) as a yellow oil (120 mg, 77%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.26 (d, *J* = 13.7 Hz, 1H), 7.70 (d, *J* = 8.6 Hz, 1H), 7.59 (d, *J* = 8.0 Hz, 2H), 7.30 (d, *J* = 8.4 Hz, 2H), 7.03 (d, *J* = 8.6 Hz, 1H), 6.13 (s, 1H), 4.62 (d, *J* = 13.7 Hz, 1H), 4.14 (q, *J* = 7.1 Hz, 2H), 3.69 (s, 3H), 2.44 (s, 3H), 1.25 (t, *J* = 7.2 Hz, 3H), 1.00 (s, 9H), 0.29 (s, 3H), 0.26 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 234.9, 167.1, 161.3, 144.7, 144.0, 136.1, 135.4, 131.8, 129.8, 127.9, 116.7, 114.3, 100.2, 59.9, 55.5, 26.8, 21.6, 17.1, 14.4, -4.8, -5.2. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{26}H_{36}NO_6SSi$ 518.2027; Found 518.2031.

(*E*)-benzyl 3-(*N*-(2-((trimethylsilyl)carbonyl)-5-methoxyphenyl)-4-methylphenylsulfonamido)acrylate (7e)



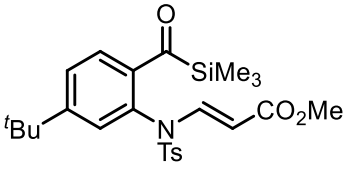
Prepared according to General Procedure A using acyl silane **1c** and benzyl propiolate to afford the title compound (purified by column chromatography using 15% EtOAc in *n*-hexanes) as a yellow oil (144 mg, 89%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.14 (d, *J* = 13.7 Hz, 1H), 7.49 (d, *J* = 8.6 Hz, 1H), 7.34 (d, *J* = 8.3 Hz, 2H), 7.12 (d, *J* = 4.5 Hz, 4H), 7.05 (d, *J* = 8.1 Hz, 3H), 6.81 (dd, *J* = 8.6, 2.6 Hz, 1H), 6.03 (d, *J* = 2.5 Hz, 1H), 4.90 (s, 2H), 4.41 (d, *J* = 13.7 Hz, 1H), 3.49 (s, 3H), 2.20 (s, 3H), 0.04 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 235.5, 168.5, 163.3, 146.4, 146.1, 137.8, 136.7, 136.1, 134.0, 133.2, 131.3, 130.1, 129.9, 129.7, 129.6, 118.8, 116.2, 100.9, 67.5, 57.2, 23.2, 0.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{28}H_{32}NO_6SSi$ 538.1714; Found 538.1716.

(*E*)-methyl 3-(*N*-(2-((trimethylsilyl)carbonyl)-5-methylphenyl)-4-methylphenylsulfonamido)acrylate (7f)



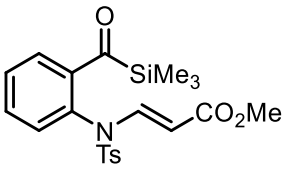
Prepared according to General Procedure A using acyl silane **1e** and methyl propiolate to afford the title compound (purified by column chromatography using 15% EtOAc in *n*-hexanes) as a yellow oil (95 mg, 71%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 8.29 (d, *J* = 13.7 Hz, 1H), 7.58 (d, *J* = 7.8 Hz, 1H), 7.52 (d, *J* = 8.3 Hz, 2H), 7.32 (d, *J* = 7.8 Hz, 1H), 7.26 (d, *J* = 8.1 Hz, 2H), 6.45 (s, 1H), 4.56 (d, *J* = 13.7 Hz, 1H), 3.66 (s, 3H), 2.42 (s, 3H), 2.25 (s, 3H), 0.26 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 236. 2, 167.5, 144.7, 144.4, 142.4, 139.8, 135.0, 131.9, 130.2, 130.0, 129.73, 129.69, 127.9, 99.6, 51.2, 21.6, 21.1, -1.74. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{22}H_{28}NO_5SSi$ 446.1452; Found 446.1455.

(*E*)-methyl 3-(*N*-(5-(*tert*-butyl)-2-((*tert*-butyldimethylsilyl)carbonyl)phenyl)-4-methylphenylsulfonamido)acrylate (7g)



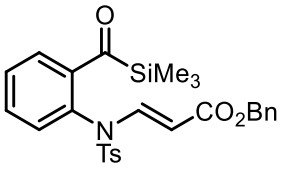
Prepared according to General Procedure A using acyl silane **1h** and methyl propiolate to afford the title compound (purified by column chromatography using 15% EtOAc in *n*-hexanes) as a yellow oil (98 mg, 67%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 8.34 (d, *J* = 13.7 Hz, 1H), 7.62 (d, *J* = 8.1 Hz, 1H), 7.50 (dd, *J* = 8.2, 3.0 Hz, 3H), 7.28 – 7.24 (m, 2H), 6.47 (d, *J* = 1.8 Hz, 1H), 4.58 (d, *J* = 13.7 Hz, 1H), 3.67 (s, 3H), 2.42 (s, 3H), 1.13 (s, 9H), 0.30 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 236.6, 167.6, 155.2, 144.7, 144.5, 135.0, 129.7, 129.6, 129.5, 128.4, 127.9, 126.3, 99.5, 51.2, 34.8, 30.7, 21.6, -1.7. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{34}NO_5SSi$ 488.1921; Found 488.1928.

(*E*)-methyl 3-(*N*-(2-((*tert*-butyldimethylsilyl)carbonyl)phenyl)-4-methylphenylsulfonamido)acrylate (7h)



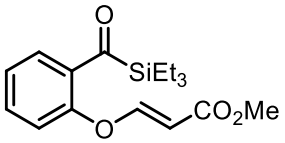
Prepared according to General Procedure A using acyl silane **1d** and methyl propiolate to afford the title compound (purified by column chromatography using 15% EtOAc in *n*-hexanes) as a yellow oil (122 mg, 94%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 8.29 (d, *J* = 13.8 Hz, 1H), 7.64 (dd, *J* = 7.6, 1.2 Hz, 1H), 7.56 – 7.46 (m, 3H), 7.33 (td, *J* = 7.9, 1.5 Hz, 1H), 7.26 (d, *J* = 8.3 Hz, 2H), 6.58 (d, *J* = 7.9 Hz, 1H), 4.59 (d, *J* = 13.8 Hz, 1H), 3.67 (s, 3H), 2.43 (s, 3H), 0.31 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 237.5, 167.5, 144.8, 144.4, 143.5, 134.9, 131.2, 131.0, 129.8, 129.6, 129.2, 127.8, 100.0, 51.2, 21.7, -1.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{21}H_{26}NO_5SSi$ 432.1295; Found 432.1296.

(*E*)-benzyl 3-(*N*-(2-((*tert*-butyldimethylsilyl)carbonyl)phenyl)-4-methylphenylsulfonamido)acrylate (7i)



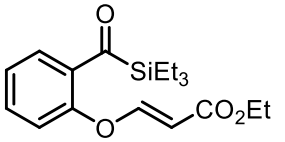
Prepared according to General Procedure A using acyl silane **1d** and benzyl propiolate to afford the title compound (purified by column chromatography using 15% EtOAc in *n*-hexanes) as a yellow oil (143 mg, 94%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 8.36 (d, *J* = 13.7 Hz, 1H), 7.68 – 7.61 (m, 1H), 7.55 – 7.50 (m, 3H), 7.34 (d, *J* = 4.4 Hz, 5H), 7.31 – 7.25 (m, 3H), 6.59 (d, *J* = 7.7 Hz, 1H), 5.12 (s, 2H), 4.66 (d, *J* = 13.7 Hz, 1H), 2.43 (s, 3H), 0.31 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 237.6, 166.9, 144.7, 131.2, 130.9, 129.9, 129.8, 129.6, 129.1, 128.5, 128.3, 128.1, 127.8, 99.9, 65.9, 21.7, -1.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{27}H_{30}NO_5SSi$ 508.1608; Found 508.1611.

(*E*)-methyl 3-(2-((triethylsilyl)carbonyl)phenoxy)acrylate (7j)



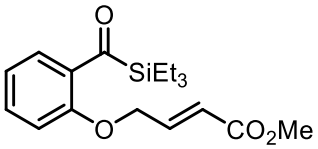
The reaction was conducted according to General Procedure A using acyl silane **1k** and methyl propiolate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (91 mg, 95%). **^{1}H NMR** (500 MHz, CDCl3) δ = 7.78 (d, *J* = 12.2 Hz, 1H), 7.47 (td, *J* = 8.3, 1.7 Hz, 1H), 7.32 (dd, *J* = 7.6, 1.7 Hz, 1H), 7.23 (t, *J* = 7.5 Hz, 1H), 7.05 (d, *J* = 8.2 Hz, 1H), 5.64 (d, *J* = 12.2 Hz, 1H), 3.75 (s, 3H), 0.92 (t, *J* = 7.8 Hz, 9H), 0.82 – 0.77 (m, 6H). **^{13}C NMR** (125 MHz, CDCl3): δ = 239.1, 167.1, 157.7, 153.6, 136.2, 132.6, 127.2, 125.3, 116.9, 103.8, 51.5, 7.3, 2.7. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{17}H_{25}O_4Si$ 321.1517; Found 321.1516

(*E*)-ethyl 3-(2-((triethylsilyl)carbonyl)phenoxy)acrylate (7k)



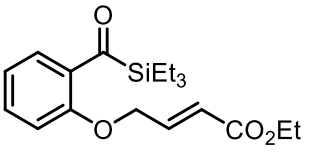
The reaction was conducted according to General Procedure A using acyl silane **1k** and ethyl propiolate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (76 mg, 76%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.78 (d, *J* = 12.2 Hz, 1H), 7.48 (t, *J* = 7.8 Hz, 1H), 7.33 (d, *J* = 7.5 Hz, 1H), 7.24 (t, *J* = 7.4 Hz, 1H), 7.07 (d, *J* = 8.2 Hz, 1H), 5.64 (d, *J* = 12.2 Hz, 1H), 4.22 (q, *J* = 7.1 Hz, 2H), 1.31 (t, *J* = 7.1 Hz, 3H), 0.94 (t, *J* = 7.7 Hz, 9H), 0.81 (dd, *J* = 15.7, 7.8 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 164.2, 155.1, 151.2, 133.9, 130.1, 124.8, 122.8, 114.5, 101.8, 57.9, 11.9, 4.9, 0.3. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{18}H_{26}O_4Si$ 335.1673; Found 335.1674.

(*E*)-methyl 4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enoate (8a)



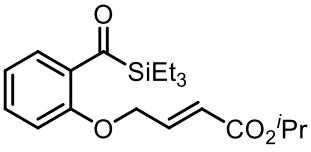
Prepared according to General Procedure B using acyl silane **1k** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (60 mg, 60%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.40 – 7.33 (m, 1H), 7.27 (dd, *J* = 6.3, 2.8 Hz, 1H), 7.09 (d, *J* = 15.8 Hz, 1H), 7.01 (t, *J* = 7.4 Hz, 1H), 6.83 (d, *J* = 8.3 Hz, 1H), 6.10 (d, *J* = 15.8 Hz, 1H), 4.81 (dd, *J* = 4.4, 1.7 Hz, 2H), 3.75 (s, 3H), 0.93 (t, *J* = 7.8 Hz, 9H), 0.79 (q, *J* = 7.8 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.7, 166.2, 156.3, 142.0, 135.4, 132.4, 126.9, 122.7, 121.7, 112.0, 67.0, 51.8, 7.4, 2.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{18}H_{26}O_4Si$ 335.1673; Found 335.1675.

(*E*)-ethyl 4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enoate (8b)



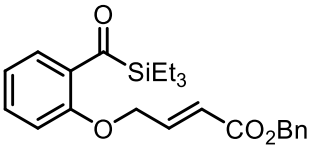
Prepared according to General Procedure B using acyl silane **1k** and ethyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (87 mg, 83%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.38 (dd, *J* = 11.1, 4.5 Hz, 1H), 7.28 – 7.26 (m, 1H), 7.08 (dt, *J* = 15.8, 4.5 Hz, 1H), 7.01 (t, *J* = 7.1 Hz, 1H), 6.83 (d, *J* = 8.3 Hz, 1H), 6.09 (dd, *J* = 15.8, 1.2 Hz, 1H), 4.83 – 4.79 (m, 2H), 4.21 (d, *J* = 7.1 Hz, 2H), 1.29 (t, *J* = 7.1 Hz, 3H), 0.93 (t, *J* = 7.9 Hz, 9H), 0.79 (q, *J* = 7.7 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.7, 165.7, 156.3, 141.6, 135.4, 132.5, 126.8, 123.1, 121.6, 111.9, 67.0, 60.7, 14.2, 7.5, 2.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{19}H_{29}O_4Si$ 349.1830; Found 349.1833.

***(E)*-isopropyl 4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enoate (8c)**



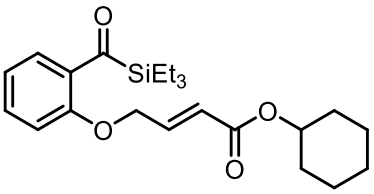
Prepared according to General Procedure B using using acyl silane **1k** and isopropyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (41 mg, 38%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.42 – 7.37 (m, 1H), 7.26 (d, *J* = 1.7 Hz, 1H), 7.04 (dd, *J* = 18.6, 11.7 Hz, 2H), 6.84 (d, *J* = 8.3 Hz, 1H), 6.07 (d, *J* = 15.8 Hz, 1H), 5.11 – 5.04 (m, 1H), 4.81 (dd, *J* = 4.6, 1.8 Hz, 2H), 1.27 (s, 3H), 1.26 (s, 3H), 0.94 (t, *J* = 7.8 Hz, 9H), 0.83 – 0.76 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.8, 165.2, 156.4, 141.2, 135.4, 132.5, 126.8, 123.7, 121.6, 111.9, 68.1, 67.0, 21.8, 7.4, 2.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{31}O_4Si$ 363.1986; Found 363.1990

(*E*)-benzyl 4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enoate (8d)



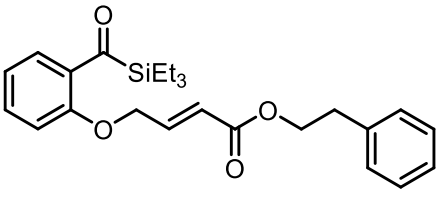
Prepared according to General Procedure B using using acyl silane **1k** and benzyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (59 mg, 48%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.37 (d, *J* = 4.3 Hz, 5H), 7.28 – 7.26 (m, 1H), 7.13 (dt, *J* = 15.8, 4.6 Hz, 1H), 7.01 (td, *J* = 7.5, 0.7 Hz, 1H), 6.83 (d, *J* = 8.3 Hz, 1H), 6.15 (dt, *J* = 15.8, 1.8 Hz, 1H), 5.20 (s, 2H), 4.81 (dd, *J* = 4.5, 1.9 Hz, 2H), 0.93 (t, *J* = 7.8 Hz, 10H), 0.83 – 0.76 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.7, 165.4, 156.3, 142.3, 135.7, 135.4, 132.5, 128.6, 128.5, 128.3, 128.2, 126.8, 122.8, 121.7, 111.9, 67.0, 66.5, 7.5, 2.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{24}H_{31}O_4Si$ 411.1986; Found 411.1990

(*E*)-cyclohexyl 4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enoate (8e)



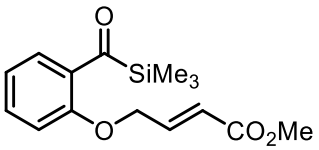
Prepared according to General Procedure B using using acyl silane **1k** and cyclohexyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (91 mg, 75%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.36 (dd, *J* = 1.7, 0.9 Hz, 1H), 7.24 (dd, *J* = 7.5, 1.7 Hz, 1H), 7.05 (d, *J* = 15.8 Hz, 1H), 6.99 (d, *J* = 0.7 Hz, 1H), 6.83 (d, *J* = 8.3 Hz, 1H), 6.07 (d, *J* = 15.8 Hz, 1H), 4.84 – 4.77 (m, 3H), 1.84 (dd, *J* = 9.3, 3.9 Hz, 2H), 1.71 (dd, *J* = 9.0, 3.7 Hz, 2H), 1.60 – 1.34 (m, 6H), 0.92 (t, *J* = 7.8 Hz, 9H), 0.78 (d, *J* = 8.1 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.8, 165.1, 156.4, 141.1, 135.4, 132.4, 126.7, 123.8, 121.6, 111.8, 73.0, 67.0, 31.6, 25.3, 23.7, 7.4, 2.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{23}H_{35}O_4Si$ 403.2299; Found 403.2299.

(*E*)-phenethyl 4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enoate (8f)



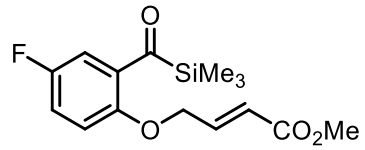
Prepared according to General Procedure B using using acyl silane **1k** and phenethyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (70 mg, 55%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.40 – 7.35 (m, 1H), 7.29 (dd, *J* = 10.2, 4.4 Hz, 3H), 7.23 (t, *J* = 7.9 Hz, 3H), 7.11 – 6.99 (m, 2H), 6.83 (d, *J* = 8.3 Hz, 1H), 6.09 (dd, *J* = 15.8, 1.8 Hz, 1H), 4.80 (dd, *J* = 4.5, 1.8 Hz, 2H), 4.37 (t, *J* = 7.1 Hz, 2H), 2.97 (t, *J* = 7.1 Hz, 2H), 0.93 (t, *J* = 7.8 Hz, 9H), 0.79 (q, *J* = 7.8 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.7, 165.6, 156.3, 141.9, 137.7, 135.4, 132.5, 128.9, 128.5, 126.8, 126.6, 122.9, 121.7, 111.9, 67.0, 65.2, 35.1, 7.5, 2.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{33}O_4Si$ 425.2143; Found 425.2144

(*E*)-methyl 4-(2-((trimethylsilyl)carbonyl)phenoxy)but-2-enoate (8g)



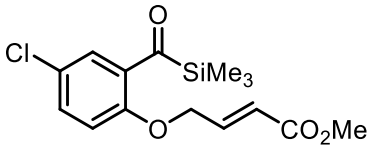
Prepared according to General Procedure B using using acyl silane **1j** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (75 mg, 85%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.42 – 7.36 (m, 2H), 7.10 (dt, *J* = 15.7, 4.5 Hz, 1H), 7.02 (t, *J* = 7.5 Hz, 1H), 6.84 (d, *J* = 8.3 Hz, 1H), 6.09 (d, *J* = 15.8 Hz, 1H), 4.83 (dd, *J* = 4.4, 1.6 Hz, 2H), 3.73 (s, 3H), 0.23 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 240.7, 168.2, 159.1, 144.1, 135.9, 135.2, 129.5, 125.1, 123.9, 114.1, 69.1, 54.0, 0.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{21}O_4Si$ 293.1204; Found 293.1205.

(*E*)-phenethyl 4-(4-fluoro-2-((trimethylsilyl)carbonyl)phenoxy)but-2-enoate (8h)



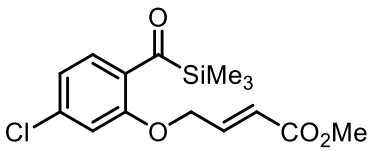
Prepared according to General Procedure B using acyl silane **1m** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (34 mg, 36%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.07 – 7.03 (m, 2H), 6.79 (dd, *J* = 8.8, 3.8 Hz, 1H), 6.07 (dt, *J* = 15.8, 1.9 Hz, 1H), 4.80 (dd, *J* = 4.6, 1.9 Hz, 2H), 3.74 (s, 3H), 2.02 (s, 1H), 0.22 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 239.4, 168.2, 161.0 (d, $^1J_{CF}$ = 240 Hz), 155.2, 143.8, 136.9 (d, $^3J_{CF}$ = 4 Hz), 125.3, 121.3 (d, $^2J_{CF}$ = 24 Hz), 116.0 (d, $^2J_{CF}$ = 24 Hz), 115.6 (d, $^3J_{CF}$ = 7 Hz), 69.9, 54.1, 0.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{20}FO_4Si$ 311.1109; Found 311.1110.

(*E*)-phenethyl 4-(4-chloro-2-((trimethylsilyl)carbonyl)phenoxy)but-2-enoate (8i)



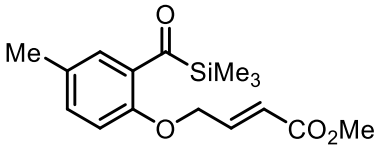
Prepared according to General Procedure B using acyl silane **1l** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (54 mg, 55%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.33 (d, *J* = 8.7 Hz, 1H), 7.29 (d, *J* = 2.6 Hz, 1H), 7.06 (d, *J* = 15.8 Hz, 1H), 6.78 (d, *J* = 8.8 Hz, 1H), 6.07 (dt, *J* = 15.8, 1.8 Hz, 1H), 4.81 (dd, *J* = 4.6, 1.8 Hz, 2H), 3.75 (s, 3H), 0.23 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 237.2, 165.9, 155.3, 141.2, 134.7, 132.3, 127.2, 127.1, 123.1, 113.4, 67.3, 51.9, -2.3. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{20}ClO_4Si$ 327.0814; Found 327.0812.

(*E*)-phenethyl 4-(5-chloro-2-((trimethylsilyl)carbonyl)phenoxy)but-2-enoate (8j)



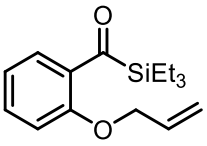
Prepared according to General Procedure B using acyl silane **1i** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (59 mg, 60%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.31 (d, *J* = 8.2 Hz, 1H), 7.07 (dt, *J* = 15.8, 4.7 Hz, 1H), 7.00 (dd, *J* = 8.2, 1.7 Hz, 1H), 6.83 (d, *J* = 1.7 Hz, 1H), 6.08 (d, *J* = 15.8 Hz, 1H), 4.82 (dd, *J* = 4.7, 1.9 Hz, 2H), 3.75 (s, 3H), 0.22 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.1, 168.1, 159.6, 143.1, 141.0, 134.2, 130.8, 125.5, 124.3, 114.8, 69.5, 54.1, 0.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{20}ClO_4Si$ 327.0814; Found 327.0811.

(*E*)-phenethyl 4-(5-methyl-2-((trimethylsilyl)carbonyl)phenoxy)but-2-enoate (8k)



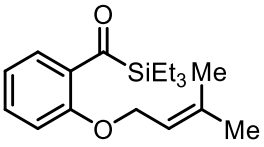
Prepared according to General Procedure B using acyl silane **1n** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (70 mg, 76%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.19 (dd, *J* = 8.4, 1.9 Hz, 1H), 7.14 (d, *J* = 1.9 Hz, 1H), 7.08 (dt, *J* = 15.8, 4.6 Hz, 1H), 6.73 (d, *J* = 8.4 Hz, 1H), 6.07 (dt, *J* = 15.8, 1.9 Hz, 1H), 4.79 (dd, *J* = 4.6, 1.9 Hz, 2H), 3.74 (s, 3H), 2.28 (s, 3H), 0.22 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 238.9, 166.1, 154.9, 142.1, 133.5, 133.4, 131.1, 127.5, 122.7, 111.8, 67.0, 51.8, 20.3, -2.2. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{16}H_{23}O_4Si$ 307.1360; Found 307.1363.

(2-(allyloxy)phenyl)(triethylsilyl)methanone (8l)



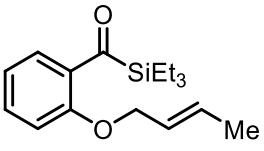
Prepared according to General Procedure B using acyl silane **1k** and allyl bromide to afford the title compound (purified by column chromatography using 5% EtOAc in *n*-hexanes) as a yellow oil (75 mg, 90%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.37 (dd, *J* = 1.7, 1.0 Hz, 1H), 7.25 (dd, *J* = 7.5, 1.7 Hz, 1H), 6.97 (d, *J* = 0.7 Hz, 1H), 6.90 (d, *J* = 8.3 Hz, 1H), 6.11 – 6.01 (m, 1H), 5.39 (dd, *J* = 17.3, 1.4 Hz, 1H), 5.32 (dd, *J* = 10.5, 1.2 Hz, 1H), 4.65 (dt, *J* = 5.6, 1.3 Hz, 2H), 0.92 (t, *J* = 7.8 Hz, 9H), 0.83 – 0.76 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.8, 157.2, 135.3, 132.7, 132.5, 126.5, 121.0, 118.7, 111.8, 69.2, 7.5, 2.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{16}H_{25}O_2Si$ 277.1546; Found 277.1618

(2-((3-methylbut-2-en-1-yl)oxy)phenyl)(triethylsilyl)methanone (8m)



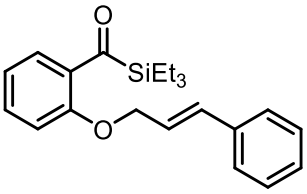
Prepared according to General Procedure B using acyl silane **1k** and 3,3-dimethyl allyl bromide to afford the title compound (purified by column chromatography using 5% EtOAc in *n*-hexanes) as a yellow oil (79 mg, 87%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.37 (s, 1H), 7.24 (dd, *J* = 7.5, 1.4 Hz, 1H), 6.93 (dd, *J* = 24.8, 7.9 Hz, 2H), 5.49 (s, 1H), 4.61 (d, *J* = 6.9 Hz, 2H), 1.79 (s, 3H), 1.75 (s, 3H), 0.91 (t, *J* = 7.7 Hz, 9H), 0.83 – 0.76 (m, 1H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.8, 157.7, 138.5, 135.4, 132.5, 126.4, 120.7, 119.2, 111.5, 64.7, 25.8, 18.1, 7.5, 2.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{18}H_{29}O_2Si$ 305.1931; Found 305.1932.

(*E*)-(2-(but-2-en-1-yloxy)phenyl)(triethylsilyl)methanone (8n)



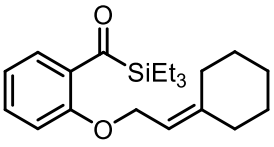
Prepared according to General Procedure B using acyl silane **1k** and crotyl bromide to afford the title compound (purified by column chromatography using 5% EtOAc in *n*-hexanes) as a yellow oil (81 mg, 93%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.38 – 7.33 (m, 1H), 7.26 – 7.23 (m, 1H), 6.98 – 6.89 (m, 2H), 5.91 – 5.76 (m, 1H), 5.73 (dd, *J* = 15.3, 1.6 Hz, 1H), 4.70 (d, *J* = 6.4 Hz, 0.4H), 4.56 (d, *J* = 6.3 Hz, 1.6H), 1.76 (dd, *J* = 6.5, 1.2 Hz, 3H), 0.92 (t, *J* = 7.8 Hz, 9H), 0.81 (dd, *J* = 11.4, 4.6 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.7, 157.5, 135.3, 132.5, 131.4, 129.0, 126.5, 125.5, 125.0, 120.9, 120.8, 111.7, 111.5, 68.8, 17.8, 7.5, 2.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{17}H_{27}O_2Si$ 291.1775; Found 291.1775.

(*E*)-(2-(cinnamyloxy)phenyl)(triethylsilyl)methanone (8o)



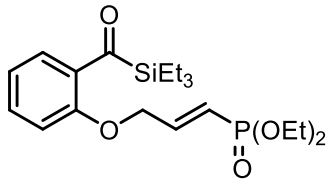
Prepared according to General Procedure B using acyl silane **1k** and cinnamyl bromide to afford the title compound (purified by column chromatography using 5% EtOAc in *n*-hexanes) as a yellow oil (85 mg, 80%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.42 – 7.37 (m, 3H), 7.34 (t, *J* = 7.5 Hz, 2H), 7.30 – 7.26 (m, 2H), 7.01 – 6.96 (m, 2H), 6.72 (d, *J* = 16.0 Hz, 1H), 6.42 (dt, *J* = 16.0, 6.1 Hz, 1H), 4.81 (dd, *J* = 6.1, 1.2 Hz, 2H), 0.93 (t, *J* = 7.8 Hz, 9H), 0.84 – 0.81 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.8, 157.3, 136.1, 135.4, 134.0, 132.6, 128.7, 128.2, 126.6, 123.6, 121.1, 111.8, 68.9, 7.5, 2.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{22}H_{29}O_2Si$ 353.1931; Found 353.1931.

(2-(2-cyclohexylideneethoxy)phenyl)(triethylsilyl)methanone (8p)



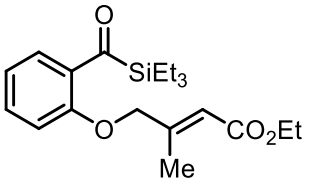
Prepared according to General Procedure B using acyl silane **1k** and (2-bromoethylidene)cyclohexane to afford the title compound (purified by column chromatography using 5% EtOAc in *n*-hexanes) as a yellow oil (87 mg, 84%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.37 (td, *J* = 8.4, 1.8 Hz, 1H), 7.24 (dd, *J* = 7.5, 1.7 Hz, 1H), 6.96 – 6.90 (m, 2H), 5.43 (t, *J* = 7.0 Hz, 1H), 4.63 (d, *J* = 7.0 Hz, 2H), 2.25 (d, *J* = 5.8 Hz, 2H), 2.15 (s, 2H), 1.58 (s, 6H), 0.92 (t, *J* = 7.8 Hz, 9H), 0.82 – 0.79 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.9, 157.8, 146.2, 135.4, 132.5, 126.4, 120.7, 115.8, 111.5, 64.0, 37.1, 29.1, 28.2, 27.5, 26.6, 7.5, 2.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{13}H_{33}O_2Si$ 345.2244; Found 345.2245.

(*E*)-diethyl (3-(2-((triethylsilyl)carbonyl)phenoxy)prop-1-en-1-yl)phosphonate (8q)



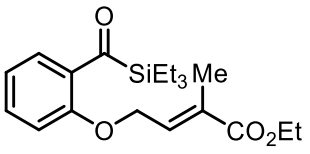
The reaction was conducted according to General Procedure B using acyl silane **1k** and (*E*)-3-bromo-1-diethoxyphosphorylprop-1-ene to afford the title compound (purified by column chromatography using 80% EtOAc in *n*-hexanes) as a yellow oil (110 mg, 89%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.36 (t, *J* = 7.8 Hz, 1H), 7.25 (d, *J* = 7.5 Hz, 1H), 7.00 (t, *J* = 7.4 Hz, 1H), 6.90 (dd, *J* = 21.6, 17.8 Hz, 1H), 6.82 (d, *J* = 8.3 Hz, 1H), 5.99 (t, *J* = 18.1 Hz, 1H), 4.79 (s, 2H), 4.14 – 4.01 (m, 4H), 1.29 (t, *J* = 7.1 Hz, 6H), 0.92 (t, *J* = 7.8 Hz, 9H), 0.78 (q, *J* = 7.9 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.7, 156.0, 145.9 (d, $^2J_{CP}$ = 6 Hz), 135.3, 132.3, 126.8, 121.6, 120.2, 118.3, 112.0, 67.9 (d, $^1J_{CP}$ = 24 Hz), 61.9 (d, $^2J_{CP}$ = 6 Hz), 16.3 (d, $^2J_{CP}$ = 6 Hz), 7.4, 2.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{34}O_5PSi$ 413.1908; Found 413.1909.

(*E*)-ethyl 3-methyl-4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enoate (8s)



Prepared according to General Procedure B using acyl silane **1k** and ethyl (*E*)-4-bromo-3-methyl-2-butenoate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (57 mg, 52%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.39 – 7.32 (m, 1H), 7.26 (dd, *J* = 7.6, 1.7 Hz, 1H), 7.02 (t, *J* = 7.4 Hz, 1H), 6.79 (d, *J* = 8.3 Hz, 1H), 5.93 (d, *J* = 1.3 Hz, 1H), 4.62 (s, 2H), 4.16 (q, *J* = 7.1 Hz, 2H), 2.20 (s, 3H), 1.27 (t, *J* = 7.1 Hz, 3H), 0.94 (t, *J* = 7.8 Hz, 9H), 0.79 (dt, *J* = 8.8, 4.5 Hz, 5H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.9, 166.2, 156.4, 152.0, 135.5, 132.4, 126.7, 121.7, 116.3, 112.3, 72.1, 59.9, 15.5, 14.2, 7.4, 2.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{30}O_4Si$ 363.1986; Found 363.1990.

(*E*)-ethyl 2-methyl-4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enoate (8t)

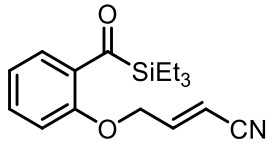


Prepared according to General Procedure B using acyl silane **1k** and ethyl (*E*)-4-bromo-2-methyl-2-butenoate to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a yellow oil (74 mg, 68%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.45 – 7.36 (m, 1H), 7.29 – 7.23 (m, 1H), 7.02 (t, *J* = 7.4 Hz, 1H), 6.94 (td, *J* = 5.9, 1.2 Hz, 1H), 6.86 (d, *J* = 8.3 Hz, 1H), 4.83 (d, *J* = 5.8 Hz, 2H), 4.23 (q, *J* = 7.1 Hz, 2H), 1.96 (d, *J* = 0.9 Hz, 3H), 1.31 (t, *J* = 7.1 Hz, 3H), 0.94 (t, *J* = 7.8 Hz, 9H), 0.81 (dd, *J* = 11.4, 4.3 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.9, 167.0, 156.7, 135.5, 135.4, 132.5, 130.5, 126.7, 121.5, 111.4, 64.8, 61.0, 14.2, 13.0, 7.4, 2.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{30}O_4Si$ 363.1986; Found 363.1989.

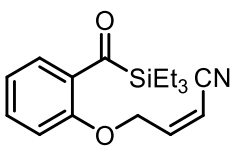
(*E*)-4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enenitrile (8u)
(*Z*)-4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enenitrile (8v)

Prepared according to General Procedure B using acyl silane **1k** and 4-bromobut-2-enenitrile to afford the title compounds (purified by column chromatography using 20% Et_2O in *n*-hexanes) with (*Z*)-4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enenitrile (**8v**) eluting first, collected as a yellow oil (30 mg, 33%) and (*E*)-4-(2-((triethylsilyl)carbonyl)phenoxy)but-2-enenitrile (**8u**) eluting second, collected as a yellow oil (45 mg, 50%).

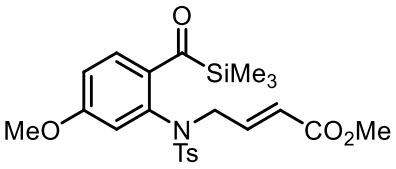
(*E*)-isomer (8u): **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.38 (d, *J* = 8.4 Hz, 1H), 7.31 (dd, *J* = 7.5, 1.7 Hz, 1H), 7.06 (t, *J* = 7.4 Hz, 1H), 6.86 (dt, *J* = 16.3, 3.9 Hz, 1H), 6.81 (d, *J* = 8.3 Hz, 1H), 5.76 (dt, *J* = 16.3, 2.2 Hz, 1H), 4.77 (dd, *J* = 3.9, 2.2 Hz, 2H), 0.94 (t, *J* = 7.8 Hz, 9H), 0.79 (t, *J* = 7.9 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.8, 155.0, 148.1, 135.3, 132.3, 127.6, 122.0, 116.6, 112.2, 101.7, 66.9, 7.4, 2.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{17}H_{24}NO_2Si$ 302.1571; Found 302.1570.



(*Z*)-isomer (8v): **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.43 – 7.39 (m, 1H), 7.24 (dd, *J* = 7.5, 1.7 Hz, 1H), 7.04 (td, *J* = 7.5, 0.5 Hz, 1H), 6.89 (d, *J* = 8.3 Hz, 1H), 6.72 (dt, *J* = 11.4, 6.1 Hz, 1H), 5.62 (dt, *J* = 11.2, 1.7 Hz, 1H), 4.97 (dd, *J* = 6.1, 1.7 Hz, 2H), 0.93 (t, *J* = 7.7 Hz, 9H), 0.80 – 0.75 (m, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 240.1, 155.7, 148.5, 135.8, 132.4, 127.0, 122.1, 114.5, 111.6, 102.3, 66.0, 7.4, 2.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{17}H_{24}NO_2Si$ 302.1571; Found 302.1572.

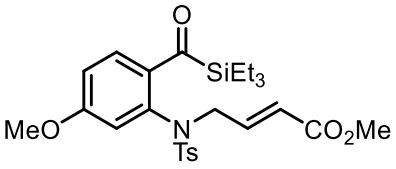


(*E*)-methyl 4-(*N*-(5-methoxy-2-((trimethylsilyl)carbonyl)phenyl)-4-methylphenylsulfonamido)but-2-enoate (8w)



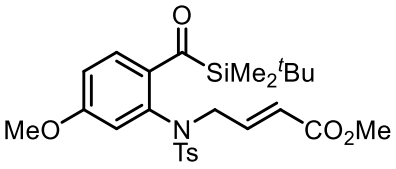
Prepared according to General Procedure B using acyl silane **1c** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 20% EtOAc in *n*-hexanes) as a yellow oil (127 mg, 89%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.56 (d, *J* = 8.6 Hz, 1H), 7.46 (d, *J* = 8.2 Hz, 2H), 7.19 (d, *J* = 8.0 Hz, 2H), 7.00 – 6.87 (m, 2H), 6.57 (d, *J* = 2.5 Hz, 1H), 5.90 (d, *J* = 15.7 Hz, 1H), 4.40 (brs, 2H), 3.76 (s, 3H), 3.68 (s, 3H), 2.38 (s, 3H), 0.23 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 235.6, 166.3, 161.3, 143.4, 143.3, 136.5, 135.6, 135.2, 129.4, 127.6, 123.3, 118.1, 113.0, 55.6, 53.3, 51.6, 21.5, -1.6. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{23}H_{30}NO_6SSi$ 476.1558; Found 476.1566.

(*E*)-methyl 4-(*N*-(5-methoxy-2-((triethylsilyl)carbonyl)phenyl)-4-methylphenylsulfonamido)but-2-enoate (8x)



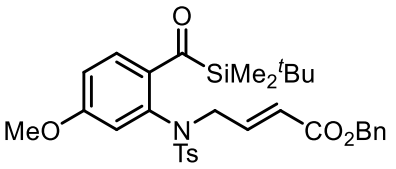
Prepared according to General Procedure B using acyl silane **1g** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 20% EtOAc in *n*-hexanes) as a yellow oil (113 mg, 73%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.60 (d, *J* = 8.6 Hz, 1H), 7.50 (d, *J* = 8.3 Hz, 2H), 7.20 (d, *J* = 8.0 Hz, 2H), 6.91 (ddd, *J* = 17.2, 9.6, 4.5 Hz, 2H), 6.56 (d, *J* = 2.5 Hz, 1H), 5.85 (d, *J* = 15.7 Hz, 1H), 4.48(brs, 2H), 3.76 (s, 3H), 3.68 (s, 3H), 2.38 (s, 3H), 0.94 (t, *J* = 7.8 Hz, 9H), 0.77 (q, *J* = 7.8 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 235.2, 166.2, 161.3, 143.4, 143.3, 136.8, 135.8, 135.6, 132.6, 129.4, 127.6, 123.3, 118.1, 113.0, 55.6, 53.3, 51.6, 21.5, 7.5, 3.7. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{26}H_{36}NO_6SSi$ 518.2027; Found 518.2033.

(*E*)-methyl 4-(*N*-(5-methoxy-2-((tert-butyldimethylsilyl)carbonyl)phenyl)-4-methylphenylsulfonamido)but-2-enoate (8y)



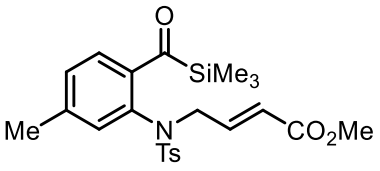
Prepared according to General Procedure B using acyl silane **1f** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 20% EtOAc in *n*-hexanes) as a yellow oil (101 mg, 65%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.56 (d, *J* = 8.5 Hz, 1H), 7.51 (d, *J* = 7.8 Hz, 2H), 7.22 (d, *J* = 7.9 Hz, 2H), 6.90 (dd, *J* = 15.9, 6.9 Hz, 2H), 6.48 (s, 1H), 5.85 (d, *J* = 15.7 Hz, 1H), 4.42 (brs, 2H), 3.74 (s, 3H), 3.68 (s, 3H), 2.40 (s, 3H), 0.99 (s, 9H), 0.23 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 236.5, 166.2, 161.0, 143.5, 143.1, 136.8, 135.8, 132.0, 129.4, 127.7, 123.5, 117.6, 112.7, 55.5, 53.2, 51.6, 27.0, 21.5, 17.2, -5.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{26}H_{36}NO_6SSi$ 518.2027; Found 518.2032.

(*E*)-benzyl 4-(*N*-(2-((tert-butyldimethylsilyl)carbonyl)-5-methoxyphenyl)-4-methylphenylsulfonamido)but-2-enoate (8aa)



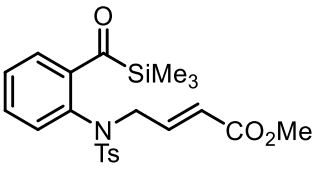
Prepared according to General Procedure B using acyl silane **1f** and benzyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 20% EtOAc in *n*-hexanes) as a yellow oil (126 mg, 71%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.57 (d, *J* = 8.6 Hz, 1H), 7.51 (d, *J* = 7.7 Hz, 2H), 7.35 (brm, 3H), 7.20 (d, *J* = 7.9 Hz, 2H), 7.02 – 6.90 (m, 2H), 6.47 (s, 1H), 5.90 (d, *J* = 15.7 Hz, 1H), 5.13 (s, 2H), 4.32 (brs, 2H), 3.71 (s, 3H), 2.38 (s, 3H), 1.00 (s, 9H), 0.24 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 236.5, 165.5, 161.0, 143.54, 143.48, 136.9, 136.8, 135.9, 135.8, 132.0, 129.4, 128.5, 128.2, 128.1, 127.7, 123.6, 117.6, 112.9, 66.2, 55.5, 53.3, 27.0, 21.5, 17.2, -5.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{32}H_{40}NO_6SSi$ 594.2340; Found 594.2343.

(*E*)-methyl 4-(4-methyl-*N*-(5-methyl-2-((trimethylsilyl)carbonyl)phenyl)phenylsulfonamido)but-2-enoate (8ab)



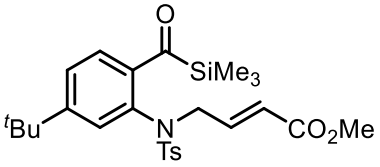
Prepared according to General Procedure B using acyl silane **1e** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 20% EtOAc in *n*-hexanes) as a yellow oil (130 mg, 94%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.44 (t, *J* = 8.4 Hz, 3H), 7.21 (d, *J* = 8.0 Hz, 3H), 6.95 (dt, *J* = 15.7, 6.3 Hz, 1H), 6.75 (s, 1H), 5.93 (d, *J* = 15.7 Hz, 1H), 4.38 (brs, 2H), 3.68 (s, 3H), 2.39 (s, 3H), 2.28 (s, 3H), 0.26 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 238.3, 166.3, 143.5, 143.3, 141.6, 140.7, 136.2, 131.7, 129.41, 129.38, 128.7, 127.6, 123.3, 53.2, 51.6, 21.5, 21.3, -1.7. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{23}H_{30}NO_5SSi$ 460.1608; Found 460.1614.

(*E*)-methyl 4-(4-methyl-*N*-(2-((trimethylsilyl)carbonyl)phenyl)phenylsulfonamido)but-2-enoate (8ac)



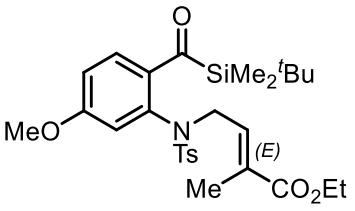
Prepared according to General Procedure B using acyl silane **1d** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 20% EtOAc in *n*-hexanes) as a yellow oil (119 mg, 89%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.48 (dd, *J* = 7.6, 1.4 Hz, 1H), 7.43 (d, *J* = 8.3 Hz, 2H), 7.40 (td, *J* = 7.5, 1.0 Hz, 1H), 7.30 – 7.27 (m, 1H), 7.21 (d, *J* = 8.0 Hz, 2H), 6.96 – 6.89 (m, 1H), 6.81 (dd, *J* = 7.9, 0.6 Hz, 1H), 5.89 (dt, *J* = 15.7, 1.4 Hz, 1H), 4.39 (d, *J* = 5.9 Hz, 2H), 3.67 (s, 3H), 2.40 (s, 3H), 0.30 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 239.5, 166.2, 144.5, 143.6, 142.9, 136.0, 133.7, 130.5, 130.4, 129.5, 128.4, 128.0, 127.6, 123.5, 53.0, 51.6, 21.6, -1.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{22}H_{38}NO_5SSi$ 446.1452; Found 446.1460.

(*E*)-methyl 4-(*N*-(5-(*tert*-butyl)-2-((trimethylsilyl)carbonyl)phenyl)-4-methylphenylsulfonamido)but-2-enoate (8ad)



Prepared according to General Procedure B using acyl silane **1h** and methyl-(4)-bromocrotonate to afford the title compound (purified by column chromatography using 20% EtOAc in *n*-hexanes) as a yellow oil (112 mg, 74%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.47 – 7.40 (m, 3H), 7.39 (dd, *J* = 8.0, 1.8 Hz, 1H), 7.22 (d, *J* = 8.0 Hz, 2H), 6.96 (dt, *J* = 15.7, 6.5 Hz, 1H), 6.72 (d, *J* = 1.7 Hz, 1H), 5.87 (d, *J* = 15.7 Hz, 1H), 4.43 (brs, 2H), 3.68 (s, 3H), 2.40 (s, 3H), 1.16 (s, 9H), 0.30 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 238.8, 166.2, 154.2, 143.4, 143.1, 141.4, 136.3, 133.3, 129.4, 128.8, 128.7, 127.6, 124.7, 123.6, 53.1, 51.6, 34.7, 30.8, 21.5, -1.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{26}H_{36}NO_5SSi$ 502.2078; Found 502.2082.

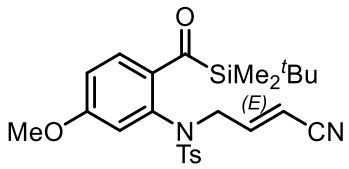
(*E*)-methyl 4-(*N*-(2-((*tert*-butyldimethylsilyl)carbonyl)-5-methoxyphenyl)-4-methylphenylsulfonamido)-2-methylbut-2-enoate (8ae)



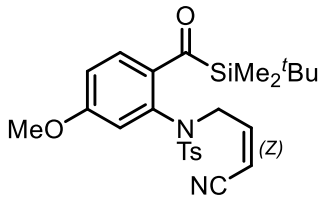
Prepared according to General Procedure B using acyl silane **1f** and ethyl (*E*)-4-bromo-2-methyl-2-butenoate to afford the title compound (purified by column chromatography using 20% EtOAc in *n*-hexanes) as a yellow oil (108 mg, 66%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.54 (dd, *J* = 8.3, 6.2 Hz, 3H), 7.22 (d, *J* = 8.0 Hz, 2H), 6.92 (dd, *J* = 8.6, 2.5 Hz, 1H), 6.78 (td, *J* = 6.7, 1.3 Hz, 1H), 6.47 (d, *J* = 2.5 Hz, 1H), 4.46 (brs, 2H), 4.12 (q, *J* = 7.1 Hz, 2H), 3.72 (s, 3H), 2.40 (s, 3H), 1.69 (d, *J* = 0.8 Hz, 3H), 1.24 (d, *J* = 7.1 Hz, 3H), 1.00 (s, 9H), 0.24 (s, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 234.3, 164.8, 158.3, 140.7, 134.6, 133.5, 129.0, 127.6, 126.8, 125.1, 114.8, 110.3, 58.1, 52.9, 47.8, 24.4, 19.0, 14.6, 11.6, 9.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{28}H_{40}NO_6SSi$ 546.2340; Found 546.2434.

(*E*)-*N*-(2-((*tert*-butyldimethylsilyl)carbonyl)-5-methoxyphenyl)-*N*-(3-cyanoallyl)-4-methylbenzenesulfonamide (8af)
(*Z*)-*N*-(2-((*tert*-butyldimethylsilyl)carbonyl)-5-methoxyphenyl)-*N*-(3-cyanoallyl)-4-methylbenzenesulfonamide (8ag)

Prepared according to General Procedure B using acyl silane **1f** and 4-bromobut-2-enenitrile to afford the title compounds (purified by column chromatography using 20% Et_2O in *n*-hexanes) with (*Z*)-*N*-(2-((*tert*-butyldimethylsilyl)carbonyl)-5-methoxyphenyl)-*N*-(3-cyanoallyl)-4-methylbenzenesulfonamide (**8ag**) eluting first, collected as a yellow oil (39 mg, 27%) and (*E*)-*N*-(2-((*tert*-butyldimethylsilyl)carbonyl)-5-methoxyphenyl)-*N*-(3-cyanoallyl)-4-methylbenzenesulfonamide (**8af**) eluting second, collected as a yellow oil (70 mg, 48%).

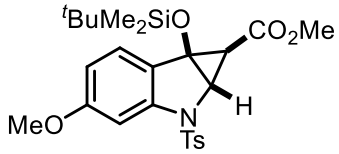


(*E*)-isomer (8af): ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.56 (d, *J* = 8.6 Hz, 1H), 7.46 (d, *J* = 8.2 Hz, 2H), 7.23 (d, *J* = 8.1 Hz, 2H), 6.93 (dd, *J* = 8.6, 2.5 Hz, 1H), 6.75 (dt, *J* = 16.4, 6.0 Hz, 1H), 6.38 (d, *J* = 2.5 Hz, 1H), 5.59 (d, *J* = 16.4 Hz, 1H), 4.33 (brs, 2H), 3.75 (s, 3H), 2.40 (s, 3H), 0.99 (s, 9H), 0.23 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 234.3, 158.5, 147.1, 141.4, 134.1, 133.2, 129.3, 127.0, 125.1, 114.20, 114.16, 109.9, 99.9, 53.0, 50.6, 24.4, 19.0, 14.6. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{33}N_2O_4SSi$ 485.1925; Found 485.1929



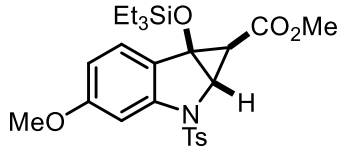
(*Z*)-isomer (8ag): ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.48 (dd, *J* = 16.2, 8.4 Hz, 3H), 7.28 (d, *J* = 8.0 Hz, 2H), 7.04 (dt, *J* = 11.1, 6.7 Hz, 1H), 6.91 (dd, *J* = 8.6, 2.5 Hz, 1H), 6.25 (d, *J* = 2.4 Hz, 1H), 5.34 (dt, *J* = 11.0, 1.6 Hz, 2H), 4.60 – 4.20 (brm, 2H), 3.68 (s, 3H), 2.43 (s, 3H), 1.03 (s, 9H), 0.28 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 235.9, 158.1, 147.6, 141.4, 133.0, 132.3, 127.4, 127.1, 125.2, 112.6, 111.8, 110.7, 98.6, 52.9, 48.8, 24.4, 19.0, 14.6. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{33}N_2O_4SSi$ 485.1925; Found 485.1928.

methyl 6b-((*tert*-butyldimethylsilyl)oxy)-4-methoxy-2-tosyl-1,1a,2,6b-tetrahydrocyclopropa[*b*]indole-1-carboxylate (9a)



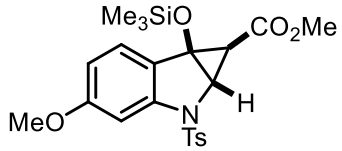
Prepared according to General Procedure C using **7a** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a colourless solid (90 mg, 89%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.71 (d, *J* = 8.3 Hz, 2H), 7.29 (d, *J* = 2.2 Hz, 1H), 7.24 (dd, *J* = 8.2, 4.0 Hz, 3H), 6.62 (dd, *J* = 8.4, 2.3 Hz, 1H), 4.71 (d, *J* = 2.6 Hz, 1H), 3.84 (s, 3H), 3.69 (s, 3H), 2.38 (s, 3H), 0.84 (s, 10H), -0.05 (s, 3H), -0.27 (s, 3H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.1, 160.7, 144.8, 139.5, 134.3, 129.9, 127.2, 125.8, 124.1, 109.9, 100.8, 66.7, 55.7, 51.9, 49.3, 29.6, 25.4, 21.6, 17.8, -4.1. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{34}NO_6SSi$ 504.1871; Found 504.1875. **M.P.** 114.6 – 116.9 °C

methyl 6b-((triethylsilyl)oxy)-4-methoxy-2-tosyl-1,1a,2,6b-tetrahydrocyclopropa[*b*]indole-1-carboxylate (9b)



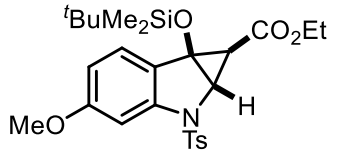
Prepared according to General Procedure C using **7b** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (87 mg, 86%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.70 (d, *J* = 8.2 Hz, 2H), 7.29 (d, *J* = 2.1 Hz, 1H), 7.24 (dd, *J* = 8.2, 3.7 Hz, 3H), 6.61 (dd, *J* = 8.4, 2.2 Hz, 1H), 4.68 (d, *J* = 2.6 Hz, 1H), 3.83 (s, 3H), 3.69 (s, 3H), 2.37 (s, 3H), 0.81 (t, *J* = 8.0 Hz, 10H), 0.48 – 0.37 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.2, 160.7, 144.8, 139.5, 134.3, 129.8, 127.2, 125.8, 124.0, 109.8, 100.7, 66.6, 55.7, 51.9, 49.6, 29.7, 21.6, 6.5, 4.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{34}NO_6SSi$ 504.1871; Found 504.1873.

methyl 6b-((trimethylsilyl)oxy)-4-methoxy-2-tosyl-1,1a,2,6b-tetrahydrocyclopropa[*b*]indole-1-carboxylate (9c)



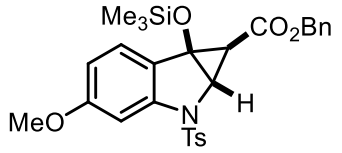
Prepared according to General Procedure C using **7c** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (90 mg, 97%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.71 (d, *J* = 8.3 Hz, 2H), 7.29 (d, *J* = 2.2 Hz, 1H), 7.24 (dd, *J* = 8.2, 3.4 Hz, 3H), 6.62 (dd, *J* = 8.4, 2.3 Hz, 1H), 4.72 (d, *J* = 2.6 Hz, 1H), 3.83 (s, 3H), 3.70 (s, 3H), 2.37 (s, 3H), 0.82 (d, *J* = 2.6 Hz, 1H), -0.02 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.3, 160.7, 144.9, 139.5, 134.3, 129.9, 127.2, 125.6, 124.0, 109.9, 100.8, 66.8, 55.7, 51.9, 49.4, 29.3, 21.6, 0.4. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{22}H_{28}NO_6SSi$ 462.1401; Found 462.1405.

ethyl 6b-((*tert*-butyldimethylsilyl)oxy)-4-methoxy-2-tosyl-1,1a,2,6b-tetrahydrocyclopropa[*b*]indole-1-carboxylate (9d)



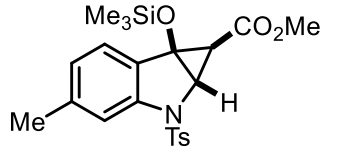
Prepared according to General Procedure C using **7d** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (94 mg, 91%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.70 (d, *J* = 8.3 Hz, 2H), 7.30 (d, *J* = 2.2 Hz, 1H), 7.23 (d, *J* = 8.3 Hz, 3H), 6.62 (dd, *J* = 8.4, 2.3 Hz, 1H), 4.68 (d, *J* = 2.6 Hz, 1H), 4.15 (q, *J* = 7.1 Hz, 2H), 3.84 (s, 3H), 2.38 (s, 3H), 1.26 (t, *J* = 7.1 Hz, 3H), 0.84 (s, 9H), 0.77 (d, *J* = 2.6 Hz, 1H), -0.04 (s, 3H), -0.27 (s, 3H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 167.7, 160.6, 144.8, 139.5, 134.3, 129.9, 127.3, 125.9, 124.1, 109.9, 100.8, 66.8, 60.8, 55.7, 49.2, 29.7, 25.6, 25.4, 21.6, 17.9, 14.4, -4.1, -4.7. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{26}H_{36}NO_6SSi$ 518.2027; Found 518.2033.

benzyl 6b-((trimethylsilyl)oxy)-4-methoxy-2-tosyl-1,1a,2,6b-tetrahydrocyclopropa[*b*]indole-1-carboxylate (9e)



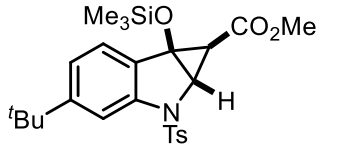
Prepared according to General Procedure C using **7e** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (100 mg, 93%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.64 (d, *J* = 8.3 Hz, 2H), 7.40 – 7.35 (m, 5H), 7.31 (d, *J* = 2.2 Hz, 1H), 7.23 (d, *J* = 8.4 Hz, 1H), 7.06 (d, *J* = 8.0 Hz, 2H), 6.62 (dd, *J* = 8.4, 2.3 Hz, 1H), 5.29 (d, *J* = 12.2 Hz, 1H), 5.00 (d, *J* = 12.2 Hz, 1H), 4.71 (d, *J* = 2.6 Hz, 1H), 3.83 (s, 3H), 2.27 (s, 3H), 0.70 (d, *J* = 2.6 Hz, 1H), 0.00 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 167.3, 160.4, 144.4, 139.2, 135.6, 133.6, 129.5, 128.2, 128.02, 127.96, 126.8, 125.3, 109.6, 100.5, 66.7, 66.1, 55.3, 49.1, 29.0, 21.1, 0.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{28}H_{32}NO_6SSi$ 538.1714; Found 538.1716.

methyl 4-methyl-2-tosyl-6b-((trimethylsilyl)oxy)-1,1a,2,6b-tetrahydrocyclopropa[*b*]indole-1-carboxylate (9f)



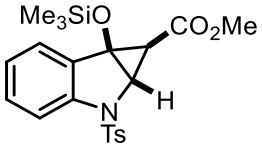
Prepared according to General Procedure C using **7f** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (82 mg, 93%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.70 (d, *J* = 8.3 Hz, 2H), 7.53 (s, 1H), 7.23 (d, *J* = 7.9 Hz, 3H), 6.88 (d, *J* = 7.7 Hz, 1H), 4.72 (d, *J* = 2.5 Hz, 1H), 3.70 (s, 3H), 2.38 (s, 3H), 2.37 (s, 3H), 0.80 (d, *J* = 2.5 Hz, 1H), -0.02 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.3, 144.8, 139.3, 138.3, 134.3, 130.6, 129.9, 127.2, 124.6, 123.1, 115.4, 67.0, 51.9, 49.2, 29.1, 21.9, 21.6 0.4. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{22}H_{28}NO_5SSi$ 446.1452; Found 446.1453. **M.P.** 125.8 – 128.1 °C

methyl 4-(*tert*-butyl)-2-tosyl-6b-((trimethylsilyl)oxy)-1,1a,2,6b-tetrahydrocyclopropa[*b*]indole-1-carboxylate (9g)



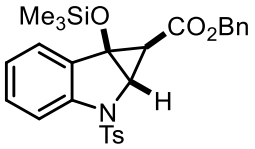
Prepared according to General Procedure C using **7g** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (79 mg, 81%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.74 (d, *J* = 1.3 Hz, 1H), 7.69 (d, *J* = 8.3 Hz, 2H), 7.26 (d, *J* = 8.0 Hz, 1H), 7.22 (d, *J* = 8.0 Hz, 2H), 7.10 (d, *J* = 1.6 Hz, 1H), 4.76 (d, *J* = 2.5 Hz, 1H), 3.71 (s, 3H), 2.36 (s, 3H), 1.34 (s, 9H), 0.86 (d, *J* = 2.5 Hz, 1H), 0.00 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.4, 152.7, 144.7, 138.1, 134.2, 130.5, 129.8, 127.3, 122.8, 120.8, 112.2, 66.9, 51.9, 49.3, 35.1, 31.4, 29.0, 21.6, 0.4. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{34}NO_5SSi$ 488.1921; Found 488.1919.

methyl 2-tosyl-6b-((trimethylsilyl)oxy)-1,1a,2,6b-tetrahydrocyclopropa[*b*]indole-1-carboxylate (9h)



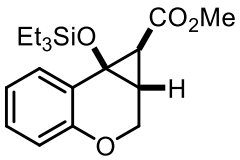
Prepared according to General Procedure C using **7h** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (79 mg, 91%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.71 (dd, *J* = 8.0, 6.0 Hz, 3H), 7.37 (d, *J* = 7.6 Hz, 1H), 7.29 (t, *J* = 7.8 Hz, 1H), 7.23 (d, *J* = 8.3 Hz, 2H), 7.08 (t, *J* = 7.5 Hz, 1H), 4.76 (d, *J* = 2.5 Hz, 1H), 3.71 (s, 3H), 2.37 (s, 3H), 0.81 (d, *J* = 2.5 Hz, 1H), -0.02 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.3, 144.8, 138.1, 134.2, 133.3, 129.9, 129.0, 127.2, 123.7, 123.5, 114.9, 67.0, 51.9, 49.0, 28.7, 21.6, 0.3. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{21}H_{26}NO_5SSi$ 432.1295; Found 432.1299.

benzyl 2-tosyl-6b-((trimethylsilyl)oxy)-1,1a,2,6b-tetrahydrocyclopropa[*b*]indole-1-carboxylate (9i)



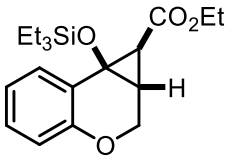
Prepared according to General Procedure C using **7i** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (93 mg, 92%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.73 (d, *J* = 8.2 Hz, 1H), 7.63 (d, *J* = 8.3 Hz, 2H), 7.42 – 7.35 (m, 5H), 7.31 – 7.26 (m, 1H), 7.08 (td, *J* = 7.6, 0.8 Hz, 1H), 7.04 (d, *J* = 8.0 Hz, 2H), 5.30 (d, *J* = 12.2 Hz, 1H), 5.01 (d, *J* = 12.2 Hz, 1H), 4.75 (d, *J* = 2.5 Hz, 1H), 2.26 (s, 3H), 0.69 (d, *J* = 2.5 Hz, 1H), -0.01 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 167.7, 144.7, 138.1, 135.9, 133.9, 133.4, 129.9, 129.0, 128.6, 128.41, 128.36, 127.2, 123.7, 123.5, 115.0, 67.3, 66.6, 49.0, 28.7, 21.5, 0.4. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{27}H_{30}NO_5SSi$ 508.1608; Found 508.1612.

methyl 7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10a)



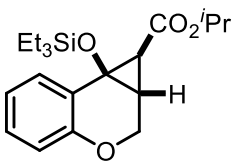
Prepared according to General Procedure C using **8a** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (54 mg, 81%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.59 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.13 (td, *J* = 8.0, 1.6 Hz, 1H), 6.98 (td, *J* = 7.6, 1.1 Hz, 1H), 6.80 (dd, *J* = 8.1, 0.9 Hz, 1H), 4.27 (dd, *J* = 10.8, 1.6 Hz, 1H), 3.97 (d, *J* = 10.8 Hz, 1H), 3.70 (s, 3H), 2.67 – 2.63 (m, 1H), 2.21 (d, *J* = 5.8 Hz, 1H), 0.94 (t, *J* = 7.9 Hz, 9H), 0.67 (dt, *J* = 15.6, 7.8 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.6, 150.9, 127.8, 127.6, 125.6, 121.5, 117.0, 60.9, 58.4, 51.9, 51.9, 31.7, 31.6, 6.8, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{18}H_{27}O_4Si$ 335.1673; Found 335.1672.

ethyl 7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10b)



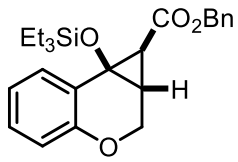
Prepared according to General Procedure C using **8b** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (63 mg, 91%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.60 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.13 (d, *J* = 1.1 Hz, 1H), 6.99 (d, *J* = 1.0 Hz, 1H), 6.80 (dd, *J* = 8.1, 0.9 Hz, 1H), 4.28 (dd, *J* = 10.8, 1.6 Hz, 1H), 4.16 (qd, *J* = 7.1, 3.6 Hz, 2H), 3.98 (d, *J* = 10.7 Hz, 1H), 2.64 (dt, *J* = 5.8, 1.5 Hz, 1H), 2.20 (d, *J* = 5.8 Hz, 1H), 1.26 (t, *J* = 7.1 Hz, 3H), 0.97 – 0.90 (m, 9H), 0.73 – 0.60 (m, 6H).**^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.1, 151.0, 127.8, 125.6, 121.5, 117.0, 60.9, 60.8, 58.4, 31.8, 31.5, 14.3, 6.8, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{19}H_{28}O_4Si$ 349.1830; Found 349.1827.

isopropyl 7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10c)



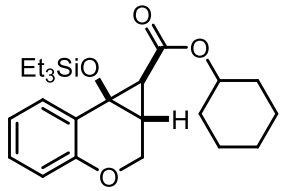
Prepared according to General Procedure C using **8c** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (60 mg, 83%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.60 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.16 – 7.09 (m, 1H), 7.00 (dd, *J* = 7.5, 1.1 Hz, 1H), 6.80 (dd, *J* = 8.1, 1.0 Hz, 1H), 5.05 – 4.99 (m, 1H), 4.28 (dd, *J* = 10.7, 1.6 Hz, 1H), 3.97 (dd, *J* = 10.7, 0.6 Hz, 1H), 2.63 (d, *J* = 5.8 Hz, 1H), 2.17 (d, *J* = 5.8 Hz, 1H), 1.24 (dd, *J* = 6.3, 1.9 Hz, 6H), 0.94 (t, *J* = 7.9 Hz, 9H), 0.67 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 167.6, 151.0, 127.9, 127.7, 125.6, 121.4, 116.9, 68.2, 60.9, 58.3, 32.1, 31.3, 22.1, 21.9, 6.8, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{31}O_4Si$ 363.1986; Found 363.1985

benzyl 7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10d)



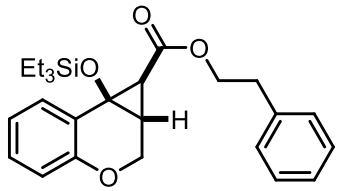
Prepared according to General Procedure C using **8d** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (67 mg, 82%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.62 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.39 – 7.30 (m, 6H), 7.14 (d, *J* = 1.2 Hz, 1H), 7.01 (dd, *J* = 7.5, 1.0 Hz, 1H), 6.82 (d, *J* = 8.0 Hz, 1H), 5.19 (d, *J* = 8.7 Hz, 2H), 4.29 (dd, *J* = 10.8, 1.6 Hz, 1H), 4.00 (d, *J* = 10.7 Hz, 1H), 2.69 (d, *J* = 5.8 Hz, 1H), 2.30 (d, *J* = 5.8 Hz, 1H), 0.95 (dd, *J* = 9.8, 6.1 Hz, 9H), 0.74 – 0.63 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.0, 150.9, 136.1, 128.6, 128.5, 128.0, 127.8, 127.6, 125.6, 121.5, 117.0, 66.5, 60.9, 58.6, 31.8, 31.8, 6.8, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{24}H_{31}O_4Si$ 411.1986; Found 411.1984.

cyclohexyl 7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10e)



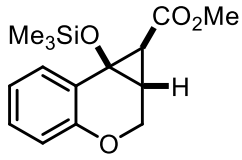
Prepared according to General Procedure C using **8e** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (66 mg, 82%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.61 (dd, *J* = 7.7, 1.5 Hz, 1H), 7.13 (td, *J* = 8.0, 1.6 Hz, 1H), 6.99 (td, *J* = 7.6, 0.9 Hz, 1H), 6.80 (dd, *J* = 8.0, 0.7 Hz, 1H), 4.78 (dd, *J* = 8.6, 4.4 Hz, 1H), 4.28 (dd, *J* = 10.7, 1.5 Hz, 1H), 3.97 (d, *J* = 10.6 Hz, 1H), 2.63 (d, *J* = 5.8 Hz, 1H), 2.19 (d, *J* = 5.8 Hz, 1H), 1.86 (d, *J* = 7.0 Hz, 2H), 1.73 – 1.68 (m, 2H), 1.55 – 1.31 (m, 6H), 0.94 (t, *J* = 7.9 Hz, 9H), 0.72 – 0.63 (m, 1H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 167.6, 151.0, 128.0, 127.7, 125.6, 121.4, 117.0, 73.1, 60.9, 58.2, 32.1, 31.8, 31.7, 31.4, 25.4, 23.79, 23.76, 6.8, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{23}H_{35}O_4Si$ 403.2299; Found 403.2300

phenethyl 7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10f)



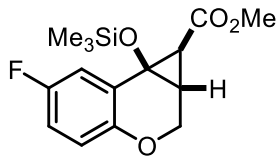
Prepared according to General Procedure C using **8f** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (66 mg, 78%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.61 (dd, *J* = 7.7, 1.5 Hz, 1H), 7.31 – 7.28 (m, 2H), 7.23 (d, *J* = 7.3 Hz, 3H), 7.14 (td, *J* = 8.0, 1.6 Hz, 1H), 7.01 (d, *J* = 6.8 Hz, 1H), 6.81 (d, *J* = 8.0 Hz, 1H), 4.38 (dd, *J* = 6.7, 4.0 Hz, 1H), 4.30 – 4.24 (m, 2H), 3.98 (d, *J* = 10.7 Hz, 1H), 2.95 (td, *J* = 7.1, 2.5 Hz, 2H), 2.64 (d, *J* = 5.8 Hz, 1H), 2.21 (d, *J* = 5.8 Hz, 1H), 0.94 (t, *J* = 7.9 Hz, 9H), 0.72 – 0.63 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.0, 150.9, 137.9, 129.0, 128.4, 127.8, 126.5, 125.6, 121.5, 117.0, 65.4, 60.9, 58.5, 42.4, 35.2, 31.8, 31.6, 6.8, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{32}O_4Si$ 425.2143; Found 425.2143

methyl 7b-((trimethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10g)



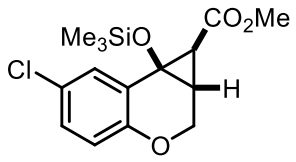
Prepared according to General Procedure C using **8g** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (46 mg, 78%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.57 (dd, *J* = 7.7, 1.3 Hz, 1H), 7.14 (td, *J* = 8.0, 1.5 Hz, 1H), 7.00 (t, *J* = 7.1 Hz, 1H), 6.81 (d, *J* = 8.0 Hz, 1H), 4.29 (dd, *J* = 10.8, 1.4 Hz, 1H), 3.95 (d, *J* = 10.7 Hz, 1H), 3.71 (s, 3H), 2.68 (d, *J* = 5.7 Hz, 1H), 2.25 (d, *J* = 5.7 Hz, 1H), 0.18 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.6, 151.0, 127.8, 127.6, 125.6, 121.7, 117.1, 60.9, 58.7, 52.0, 51.9, 31.8, 31.1, 1.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{21}O_4Si$ 293.1204; Found 293.1202.

methyl 6-fluoro-7b-((trimethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10h)



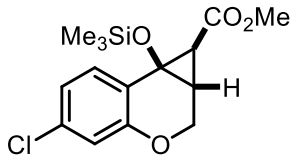
Prepared according to General Procedure C using **8h** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (43 mg, 69%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.24 (dd, *J* = 6.3, 2.6 Hz, 1H), 6.82 – 6.68 (m, 2H), 4.25 (d, *J* = 10.7 Hz, 1H), 3.87 (d, *J* = 10.6 Hz, 1H), 3.69 (d, *J* = 2.6 Hz, 3H), 2.64 (d, *J* = 5.6 Hz, 1H), 2.24 – 2.18 (dd, *J* = 5.6, 2.2 Hz, 1H), 0.16 (d, *J* = 2.6 Hz, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.3, 158.7 (d, $^1J_{CF}$ = 237.5 Hz), 146.9, 129.3 (d, $^3J_{CF}$ = 7.5 Hz), 118.2 (d, $^3J_{CF}$ = 7.5 Hz), 114.4 (d, $^2J_{CF}$ = 22.5 Hz), 112.2 (d, $^2J_{CF}$ = 25 Hz), 61.0, 58.5, 52.0, 31.4, 30.9, 0.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{20}FO_4Si$ 311.1109; Found 311.1111.

methyl 6-chloro-7b-((trimethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10i)



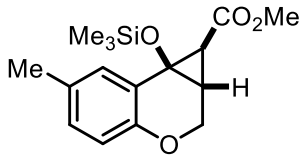
Prepared according to General Procedure C using **8i** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (53 mg, 82%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.53 (d, *J* = 2.6 Hz, 1H), 7.09 (dd, *J* = 8.6, 2.6 Hz, 1H), 6.75 (d, *J* = 8.6 Hz, 1H), 4.29 (d, *J* = 10.8 Hz, 1H), 3.93 (d, *J* = 10.9 Hz, 1H), 3.72 (s, 3H), 2.68 (d, *J* = 5.7 Hz, 1H), 2.23 (d, *J* = 5.7 Hz, 1H), 0.19 (s, 9H).**^{13}C NMR** (125 MHz, $CDCl_3$) δ 167.2, 148.6, 128.3, 126.8, 125.8, 124.5, 117.5, 60.1, 57.3, 51.0, 30.4, 30.2, 0.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{20}ClO_4Si$ 327.0814; Found 327.0813.

methyl 5-chloro-7b-((trimethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10j)



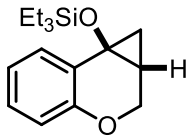
Prepared according to General Procedure C using **8j** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (58 mg, 89%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.44 (dd, *J* = 8.3, 1.5 Hz, 1H), 6.93 (dd, *J* = 8.3, 1.9 Hz, 1H), 6.79 (d, *J* = 1.8 Hz, 1H), 4.26 (d, *J* = 10.9 Hz, 1H), 3.91 (d, *J* = 10.8 Hz, 1H), 3.67 (d, *J* = 1.5 Hz, 3H), 2.63 (dd, *J* = 5.7, 1.4 Hz, 1H), 2.18 – 2.14 (m, 1H), 0.13 (d, *J* = 1.6 Hz, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 167.3, 150.6, 132.0, 125.6, 125.3, 121.0, 116.5, 60.3, 57.4, 51.0, 30.4, 30.2 0.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{20}ClO_4Si$ 327.0814; Found 327.0811.

methyl 6-methyl-7b-((trimethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10k)



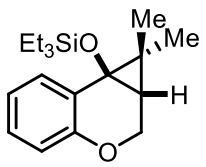
Prepared according to General Procedure C using **8k** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a colourless solid (47 mg, 77%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.38 (d, *J* = 1.8 Hz, 1H), 6.93 (dd, *J* = 8.2, 1.6 Hz, 1H), 6.70 (d, *J* = 8.2 Hz, 1H), 4.26 (dd, *J* = 10.7, 1.6 Hz, 1H), 3.92 (d, *J* = 10.7 Hz, 1H), 3.71 (s, 3H), 2.65 (d, *J* = 5.7 Hz, 1H), 2.30 (s, 3H), 2.24 (d, *J* = 5.7 Hz, 1H), 0.18 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.6, 148.8, 131.0, 128.3, 127.2, 125.9, 116.8, 60.9, 58.8, 51.9, 31.7, 31.1, 20.9, 1.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{16}H_{23}O_4Si$ 307.1360; Found 307.1358.

triethyl((1,1a,2,7b-tetrahydrocyclopropa[*c*]chromen-7b-yl)oxy)silane (10l)



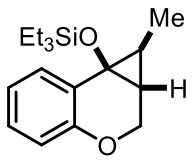
Prepared according to General Procedure C using **8l** (reaction time 2 hours) to afford the title compound (purified by column chromatography using 30% PhMe in *n*-hexanes) as a clear oil (39 mg, 70%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.58 (d, *J* = 7.6 Hz, 1H), 7.09 (t, *J* = 7.6 Hz, 1H), 6.98 (t, *J* = 7.4 Hz, 1H), 6.80 (d, *J* = 8.0 Hz, 1H), 4.21 (d, *J* = 10.5 Hz, 1H), 3.91 (d, *J* = 10.5 Hz, 1H), 1.97 – 1.85 (m, 1H), 1.33 (dd, *J* = 9.6, 5.7 Hz, 1H), 1.16 (t, *J* = 5.7 Hz, 1H), 0.96 (t, *J* = 7.9 Hz, 9H), 0.66 (q, *J* = 7.8 Hz, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.7, 130.1, 126.7, 125.2, 121.5, 116.7, 62.1, 53.0, 26.8, 18.1, 6.9, 5.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{16}H_{25}O_2Si$ 277.1618; Found 277.1619.

((1,1-dimethyl-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromen-7b-yl)oxy)triethylsilane (10m)



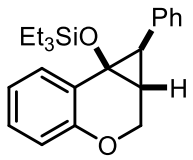
Prepared according to General Procedure C using **8m** (reaction time 2 hours) to afford the title compound (purified by column chromatography using 30% PhMe in *n*-hexanes) as a clear oil (45 mg, 72%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.52 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.09 (ddd, *J* = 8.1, 7.4, 1.7 Hz, 1H), 6.93 (td, *J* = 7.6, 1.2 Hz, 1H), 6.75 (dd, *J* = 8.1, 1.0 Hz, 1H), 4.31 (dd, *J* = 11.3, 4.3 Hz, 1H), 4.24 (dd, *J* = 11.3, 1.9 Hz, 1H), 1.30 (s, 3H), 1.27 (dd, *J* = 4.3, 1.9 Hz, 1H), 0.89 (t, *J* = 7.9 Hz, 9H), 0.87 (s, 3H), 0.59 – 0.54 (m, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 151.2, 127.4, 127.2, 125.9, 120.7, 116.2, 61.8, 58.2, 31.8, 28.2, 22.2, 16.3, 6.8, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{18}H_{29}O_2Si$ 305.1931; Found 305.1932.

triethyl((1-methyl-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromen-7b-yl)oxy)silane (10n)



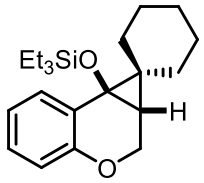
Prepared according to General Procedure C using **8n** (reaction time 2 hours) to afford the title compound (purified by column chromatography using 30% PhMe in *n*-hexanes) as a clear oil (48 mg, 82%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.55 (d, *J* = 7.6 Hz, 1H), 7.07 (t, *J* = 7.6 Hz, 1H), 6.95 (t, *J* = 7.5 Hz, 1H), 6.79 (d, *J* = 8.0 Hz, 1H), 4.24 (d, *J* = 10.4 Hz, 1H), 3.88 (d, *J* = 10.4 Hz, 1H), 1.40 (d, *J* = 5.1 Hz, 1H), 1.24 (d, *J* = 5.7 Hz, 3H), 1.19 (dd, *J* = 11.2, 5.5 Hz, 1H), 0.95 (t, *J* = 7.9 Hz, 9H), 0.64 (q, *J* = 8.0 Hz, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.6, 130.8, 126.4, 125.0, 121.2, 116.7, 61.7, 55.7, 32.7, 22.6, 11.5, 6.9, 5.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{17}H_{27}O_2Si$ 291.1775; Found 291.1776.

triethyl((1-phenyl-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromen-7b-yl)oxy)silane (10o)



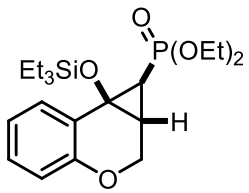
Prepared according to General Procedure C using **8n** to afford the title compound (purified by column chromatography using 30% PhMe in *n*-hexanes) as a clear oil (63 mg, 89%). **^{1}H NMR** (400 MHz, $CDCl_3$) 7.51 (d, *J* = 7.6 Hz, 1H), 7.23 – 7.17 (m, 4H), 7.13 (d, *J* = 6.9 Hz, 1H), 7.05 (t, *J* = 7.7 Hz, 1H), 6.92 (t, *J* = 7.5 Hz, 1H), 6.79 (d, *J* = 8.0 Hz, 1H), 4.32 (d, *J* = 10.5 Hz, 1H), 3.99 (d, *J* = 10.5 Hz, 1H), 2.38 (d, *J* = 6.3 Hz, 1H), 2.14 (d, *J* = 6.3 Hz, 1H), 0.71 (t, *J* = 7.9 Hz, 9H), 0.45 (dt, *J* = 10.1, 4.9 Hz, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.9, 136.4, 130.1, 129.4, 127.9, 127.0, 126.2, 125.2, 121.4, 116.9, 61.7, 56.9, 33.1, 31.6, 6.7, 5.7. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{22}H_{29}O_2Si$ 353.1931; Found 353.1934.

((2',7b'-dihydro-1a'*H*-spiro[cyclohexane-1,1'-cyclopropa[*c*]chromene]-7b'-yl)oxy)triethylsilane (10p)



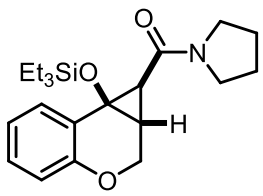
Prepared according to General Procedure C using **8p** (reaction time 2 hours) to afford the title compound (purified by column chromatography using 30% PhMe in *n*-hexanes) as a clear oil (52 mg, 75%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.52 (d, *J* = 7.6 Hz, 1H), 7.08 (t, *J* = 7.7 Hz, 1H), 6.92 (t, *J* = 7.5 Hz, 1H), 6.73 (d, *J* = 8.1 Hz, 1H), 4.36 (dd, *J* = 11.4, 4.7 Hz, 1H), 4.22 (d, *J* = 11.4 Hz, 1H), 1.68 – 1.42(m, 6H), 1.34 – 1.10 (m, 5H), 0.87 (t, *J* = 7.9 Hz, 9H), 0.53 (dd, *J* = 15.7, 7.8 Hz, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 151.5, 127.7, 127.3, 125.7, 120.6, 116.2, 62.3, 58.4, 35.0, 32.7, 31.1, 26.9, 26.4, 26.0, 25.6, 6.8, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{21}H_{33}O_2Si$ 345.2244; Found 345.2245.

diethyl (7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromen-1-yl)phosphonate (10q)



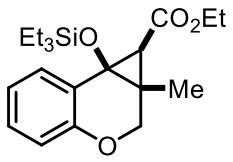
Prepared according to General Procedure C using **8q** to afford the title compound (purified by column chromatography using 60% EtOAc in *n*-hexanes) as a clear oil (69 mg, 83%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.57 (d, *J* = 7.6 Hz, 1H), 7.12 (t, *J* = 7.6 Hz, 1H), 6.98 (t, *J* = 7.5 Hz, 1H), 6.80 (d, *J* = 8.0 Hz, 1H), 4.27 (d, *J* = 10.9 Hz, 1H), 4.22 – 4.05 (m, 4H), 4.00 (d, *J* = 11.0 Hz, 1H), 2.58 (dd, *J* = 19.1, 6.5 Hz, 1H), 1.42 (d, *J* = 6.7 Hz, 1H), 1.31 (td, *J* = 6.9, 3.4 Hz, 6H), 0.94 (t, *J* = 7.9 Hz, 9H), 0.85 – 0.57 (m, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.6 128.1, 127.8, 125.4, 121.6, 117.1, 62.1 (d, J_{CP} = 6 Hz), 61.0 (d, J_{CP} = 6 Hz), 56.0 (d, J_{CP} = 6 Hz), 31.6 (d, J_{CP} = 5 Hz), 24.1, 22.3, 16.5 (d, J_{CP} = 7 Hz), 16.4 (d, J_{CP} = 7 Hz), 6.8, 5.6. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{34}O_5PSi$ 413.1908; Found 413.1904.

pyrrolidin-1-yl(7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromen-1-yl)methanone (10r)



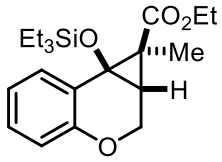
Acyl silane **1k** was reacted with (*E*)-4-bromo-1-(1-pyrrolidinyl)-2-buten-1-one according to General Procedure B. Purification by column chromatography (2% MeOH in CH_2Cl_2) afforded acyl silane **8r** which was then subject to reaction according to General Procedure C to afford the title compound (purified by column chromatography using 60% EtOAc in *n*-hexanes) as a pale yellow solid (58 mg, 77%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.56 (d, *J* = 7.6 Hz, 1H), 7.13 (t, *J* = 7.7 Hz, 1H), 6.99 (t, *J* = 7.5 Hz, 1H), 6.82 (d, *J* = 8.0 Hz, 1H), 4.31 (d, *J* = 10.7 Hz, 1H), 3.97 (d, *J* = 10.7 Hz, 1H), 3.58 – 3.38 (m, 3H), 3.32 – 3.19 (m, 1H), 2.67 (d, *J* = 5.6 Hz, 1H), 2.16 (d, *J* = 5.8 Hz, 1H), 1.87 – 1.80 (m, 4H), 0.90 (t, *J* = 7.9 Hz, 9H), 0.62 (dt, *J* = 9.3, 4.6 Hz, 6H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.7, 151.1, 128.6, 127.4, 124.9, 121.5, 117.1, 61.4, 56.3, 46.6, 45.7, 33.8, 29.5, 25.9, 24.7, 6.8, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{21}H_{32}NO_3Si$ 374.2146; Found 374.2150. **M.P.** 116.4 – 118.1 °C

ethyl 1a-methyl-7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10s)



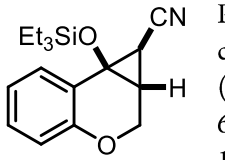
Prepared according to General Procedure C using **8s** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (57 mg, 79%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.54 (dd, *J* = 7.7, 1.5 Hz, 1H), 7.12 (dd, *J* = 7.7, 1.3 Hz, 1H), 7.00 (dd, *J* = 7.5, 0.8 Hz, 1H), 6.81 (d, *J* = 8.0 Hz, 1H), 4.15 – 4.09 (m, 3H), 3.69 (d, *J* = 10.7 Hz, 1H), 2.17 (s, 1H), 1.56 (s, 3H), 1.23 (t, *J* = 7.1 Hz, 3H), 0.97 (dd, *J* = 10.6, 5.3 Hz, 9H), 0.72 (ddd, *J* = 10.6, 7.9, 1.9 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 167.8, 151.2, 128.7, 127.5, 125.3, 121.5, 117.0, 67.5, 62.5, 60.1, 35.3, 32.2, 14.3, 10.3, 6.9, 6.3. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{31}O_4Si$ 363.1986; Found 363.1985.

ethyl 1-methyl-7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carboxylate (10t)



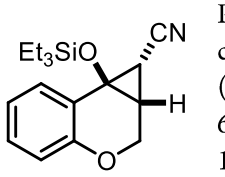
Prepared according to General Procedure C using **8t** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (67 mg, 92%). **^{1}H NMR** (500 MHz, CDCl3) δ 7.56 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.15 (td, *J* = 8.2, 1.6 Hz, 1H), 6.96 (td, *J* = 7.7, 0.8 Hz, 1H), 6.76 (d, *J* = 8.1 Hz, 1H), 4.40 (dd, *J* = 11.7, 4.3 Hz, 1H), 4.28 (dd, *J* = 11.7, 1.6 Hz, 1H), 4.25 – 4.12 (m, 2H), 2.61 (dd, *J* = 4.2, 1.6 Hz, 1H), 1.29 (t, *J* = 7.1 Hz, 3H), 1.11 (s, 3H), 0.87 (t, *J* = 7.9 Hz, 9H), 0.57 – 0.52 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 171.0, 151.4, 128.5, 127.6, 122.8, 121.0, 116.4, 61.0, 61.0, 58.9, 37.7, 29.5, 14.4, 10.8, 6.7, 5.3. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{31}O_4Si$ 363.1986; Found 363.1986.

7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carbonitrile (10u)



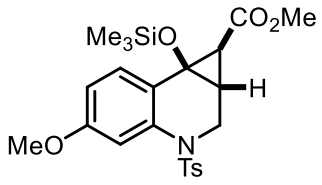
Prepared according to General Procedure C using **8u** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (57 mg, 95%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.63 (d, *J* = 7.7 Hz, 1H), 7.18 (t, *J* = 7.7 Hz, 1H), 7.04 (t, *J* = 7.5 Hz, 1H), 6.82 (d, *J* = 8.1 Hz, 1H), 4.32 (d, *J* = 11.2 Hz, 1H), 3.95 (d, *J* = 11.2 Hz, 1H), 2.42 (d, *J* = 5.5 Hz, 1H), 1.95 (d, *J* = 5.6 Hz, 1H), 0.99 (t, *J* = 7.9 Hz, 9H), 0.70 (q, *J* = 7.7 Hz, 6H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.7, 128.7, 125.7, 125.5, 122.2, 117,5, 117.2, 60.6, 56.5, 33.5, 14.6, 6.7, 5.6. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{17}H_{24}NO_2Si$ 302.1571; Found 302.1570.

7b-((triethylsilyl)oxy)-1,1a,2,7b-tetrahydrocyclopropa[*c*]chromene-1-carbonitrile (10v)



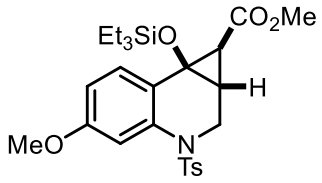
Prepared according to General Procedure C using **8v** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (50 mg, 83%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.61 (d, *J* = 7.7 Hz, 1H), 7.23 (t, *J* = 7.7 Hz, 1H), 7.05 (t, *J* = 7.5 Hz, 1H), 6.91 (d, *J* = 8.1 Hz, 1H), 4.42 (d, *J* = 11.7 Hz, 1H), 4.30 (d, *J* = 11.7 Hz, 1H), 2.28 (d, *J* = 9.4 Hz, 1H), 2.18 (d, *J* = 9.4 Hz, 1H), 0.92 (t, *J* = 7.9 Hz, 9H), 0.61 (q, *J* = 7.9 Hz, 6H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 151.2, 129.3, 126.5, 122.3, 122.0, 117.3, 116.3, 61.1, 57.4, 30.7, 18.4, 6.7, 5.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{17}H_{24}NO_2Si$ 302.1571; Found 302.1575.

methyl 5-methoxy-3-tosyl-7b-((trimethylsilyl)oxy)-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carboxylate (10w)



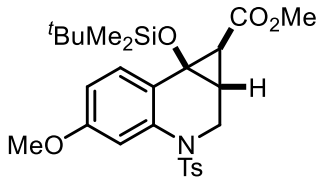
Prepared according to General Procedure C using **8w** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a pale yellow solid (83 mg, 87%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.64 (d, *J* = 8.3 Hz, 2H), 7.50 (d, *J* = 8.7 Hz, 1H), 7.29 (d, *J* = 8.0 Hz, 2H), 7.12 (d, *J* = 2.5 Hz, 1H), 6.72 (dd, *J* = 8.7, 2.5 Hz, 1H), 4.51 (dd, *J* = 13.5, 2.4 Hz, 1H), 3.76 (s, 3H), 3.64 (s, 3H), 3.31 (d, *J* = 13.5 Hz, 1H), 2.64 (ddd, *J* = 5.5, 2.2, 1.7 Hz, 1H), 2.41 (s, 3H), 1.40 (d, *J* = 5.6 Hz, 1H), 0.10 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 168.1, 158.5, 144.1, 137.3, 133.2, 130.0, 126.80, 126.78, 124.5, 110.8, 108.6, 59.0, 55.4, 51.8, 41.2, 33.0, 31.1, 21.5, 0.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{23}H_{30}NO_6SSi$ 476.1558; Found 476.1561. **M.P.** 126.1 – 127.8 °C

methyl 5-methoxy-3-tosyl-7b-((triethylsilyl)oxy)-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carboxylate (10x)



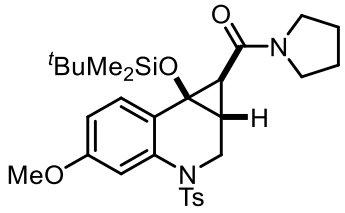
Prepared according to General Procedure C using **8x** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (92 mg, 89%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.62 (d, *J* = 8.3 Hz, 2H), 7.53 (d, *J* = 8.7 Hz, 1H), 7.28 (d, *J* = 8.0 Hz, 2H), 7.14 (d, *J* = 2.5 Hz, 1H), 6.71 (dd, *J* = 8.7, 2.5 Hz, 1H), 4.50 (dd, *J* = 13.6, 2.4 Hz, 1H), 3.77 (s, 3H), 3.62 (s, 3H), 3.33 (d, *J* = 13.6 Hz, 1H), 2.61 (dt, *J* = 5.6, 1.9 Hz, 1H), 2.40 (s, 3H), 1.29 (d, *J* = 5.7 Hz, 1H), 0.87 (t, *J* = 7.9 Hz, 9H), 0.66 – 0.53 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.1, 158.5, 144.1, 137.3, 133.0, 130.0, 126.80, 126.78, 124.6, 110.8, 108.6, 58.7, 55.4, 51.8, 41.2, 33.0, 31.6, 21.5, 6.7, 5.4. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{26}H_{36}NO_6SSi$ 518.2027; Found 518.2029.

methyl 5-methoxy-3-tosyl-7b-((tert-butyldimethylsilyl)oxy)-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carboxylate (10y)



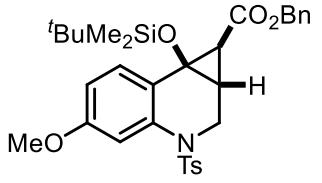
Prepared according to General Procedure C using **8y** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (91 mg, 88%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.63 (d, *J* = 8.3 Hz, 2H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.32 – 7.24 (m, 2H), 7.16 (d, *J* = 2.5 Hz, 1H), 6.71 (dd, *J* = 8.7, 2.5 Hz, 1H), 4.52 (dd, *J* = 13.7, 2.5 Hz, 1H), 3.77 (s, 3H), 3.63 (s, 3H), 3.36 (d, *J* = 13.6 Hz, 1H), 2.67 (dt, *J* = 5.7, 2.0 Hz, 1H), 2.41 (s, 3H), 1.27 (d, *J* = 5.7 Hz, 1H), 0.91 (s, 9H), 0.10 (s, 3H), -0.07 (s, 3H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.1, 158.4, 144.2, 137.2, 133.1, 130.0, 127.1, 126.8, 124.3, 110.6, 108.6, 58.6, 55.4, 51.8, 41.3, 32.4, 31.7, 25.7, 21.5, 18.1, -3.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{26}H_{36}NO_6SSi$ 518.2027; Found 518.2032.

(7b-((*tert*-butyldimethylsilyl)oxy)-5-methoxy-3-tosyl-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinolin-1-yl)(pyrrolidin-1-yl)methanone (10z)



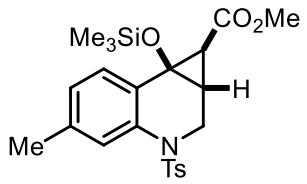
Acyl silane **1f** was reacted with (*E*)-4-bromo-1-(1-pyrrolidinyl)-2-buten-1-one according to General Procedure B. Purification by column chromatography (2% MeOH in CH_2Cl_2) afforded acyl silane **8z** which was then subject to reaction according to General Procedure C to afford the title compound (purified by column chromatography using 60% EtOAc in *n*-hexanes) as a pale yellow amorphous solid (81 mg, 73%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.64 (d, *J* = 8.3 Hz, 2H), 7.51 (d, *J* = 8.7 Hz, 1H), 7.27 (d, *J* = 8.3 Hz, 2H), 7.15 (d, *J* = 2.5 Hz, 1H), 6.72 (dd, *J* = 8.7, 2.5 Hz, 1H), 4.56 (dd, *J* = 13.6, 2.3 Hz, 1H), 3.77 (s, 3H), 3.40 (t, *J* = 6.5 Hz, 2H), 3.31 (dd, *J* = 13.5, 0.9 Hz, 1H), 3.20 – 3.16 (m, 1H), 2.87 – 2.81 (m, 1H), 2.67 (dt, *J* = 5.7, 1.9 Hz, 1H), 2.38 (s, 3H), 1.82 – 1.79 (m, 4H), 1.26 (d, *J* = 5.7 Hz, 1H), 0.87 (s, 9H), 0.05 (s, 3H), -0.07 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.1, 158.2, 143.8, 137.8, 133.2, 129.8, 127.0, 126.2, 125.4, 110.9, 108.9, 56.3, 55.4, 46.3, 45.6, 41.7, 33.9, 30.5, 25.9, 25.7, 24.7, 21.5, 18.0, -3.5, -3.6. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{29}H_{41}N_2O_5SSi$ 557.2500; Found 557.2502.

benzyl 7b-((*tert*-butyldimethylsilyl)oxy)-5-methoxy-3-tosyl-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carboxylate (10aa)



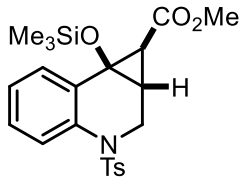
Prepared according to General Procedure C using **8aa** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (100 mg, 84%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.48 (t, *J* = 8.2 Hz, 3H), 7.34 – 7.15 (m, 5H), 7.15 – 7.03 (m, 3H), 6.61 (d, *J* = 8.7 Hz, 1H), 4.98 (s, 2H), 4.45 (d, *J* = 13.7 Hz, 1H), 3.67 (s, 3H), 3.28 (d, *J* = 13.7 Hz, 1H), 2.61 (d, *J* = 4.8 Hz, 1H), 2.14 (s, 3H), 1.23 (d, *J* = 5.6 Hz, 1H), 0.81 (s, 9H), -0.00 (s, 3H), -0.17 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 167.5, 158.5, 144.2, 137.1, 136.1, 133.2, 129.9, 128.5, 128.12, 128.08, 127.3, 126.8, 124.4, 110.7, 108.6, 66.4, 58.8, 55.4, 41.3, 32.6, 31.9, 25.8, 21.4, 18.1, -3.4, -3.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{32}H_{40}NO_6SSi$ 594.2340; Found 594.2347.

methyl 5-methyl-3-tosyl-7b-((trimethylsilyl)oxy)-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carboxylate (10ab)



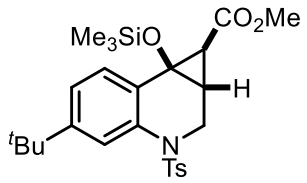
Prepared according to General Procedure C using **8ab** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (85 mg, 93%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.63 (d, *J* = 8.3 Hz, 2H), 7.49 (d, *J* = 7.9 Hz, 1H), 7.34 (s, 1H), 7.28 (d, *J* = 8.0 Hz, 2H), 6.97 (dd, *J* = 7.9, 0.8 Hz, 1H), 4.47 (dd, *J* = 13.5, 2.4 Hz, 1H), 3.63 (s, 3H), 3.28 (d, *J* = 13.5 Hz, 1H), 2.65 (ddd, *J* = 5.6, 2.2, 1.6 Hz, 1H), 2.41 (s, 3H), 2.30 (s, 3H), 1.47 (d, *J* = 5.6 Hz, 1H), 0.09 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.2, 144.0, 137.5, 137.0, 132.1, 129.9, 129.3, 126.7, 125.84, 125.77, 123.5, 59.0, 51.9, 41.0, 33.4, 31.1, 21.5, 21.3, 0.9. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{23}H_{30}NO_5SSi$ 460.1608; Found 460.1611. **M.P.** 128.2 – 130.7 °C

methyl 3-tosyl-7b-((trimethylsilyl)oxy)-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carboxylate (10ac)



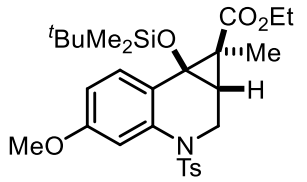
Prepared according to General Procedure C using **8ac** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (80 mg, 90%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.67 – 7.60 (m, 3H), 7.50 (dd, *J* = 7.9, 1.4 Hz, 1H), 7.29 (d, *J* = 8.0 Hz, 2H), 7.17 (pd, *J* = 7.4, 1.7 Hz, 2H), 4.51 (dd, *J* = 13.5, 2.4 Hz, 1H), 3.65 (s, 3H), 3.30 (d, *J* = 13.5 Hz, 1H), 2.70 (ddd, *J* = 5.6, 2.2, 1.5 Hz, 1H), 2.41 (s, 3H), 1.54 (d, *J* = 5.6 Hz, 1H), 0.11 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.1, 144.1, 137.5, 132.3, 132.2, 130.0, 127.1, 126.7, 126.0, 124.9, 122.9, 58.9, 51.9, 40.9, 33.6, 31.2, 21.5, 0.9. **HRMS** (*m/z*) $[M+H]^+$ **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{22}H_{28}NO_5SSi$ 446.1452; Found 446.1453. **M.P.** 125.1 – 127.6 °C

methyl 5-(*tert*-butyl)-3-tosyl-7b-((trimethylsilyl)oxy)-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carboxylate (10ad)



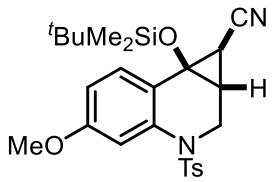
Prepared according to General Procedure C using **8ad** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (97 mg, 97%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.67 (d, *J* = 8.3 Hz, 2H), 7.52 (d, *J* = 8.2 Hz, 1H), 7.45 (d, *J* = 1.8 Hz, 1H), 7.30 (d, *J* = 8.1 Hz, 2H), 7.16 (dd, *J* = 8.2, 1.9 Hz, 1H), 4.56 (dd, *J* = 13.4, 2.5 Hz, 1H), 3.65 (s, 3H), 3.31 (d, *J* = 13.3 Hz, 1H), 2.69 (ddd, *J* = 5.5, 2.2, 1.5 Hz, 1H), 2.42 (s, 3H), 1.65 (d, *J* = 5.6 Hz, 1H), 1.26 (s, 9H), 0.11 (s, 9H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 168.2, 150.2, 144.0, 137.8, 131.9, 129.9, 126.9, 125.5, 121.8, 119.7, 59.1, 51.9, 41.0, 34.7, 33.5, 31.2, 31.0, 21.5, 1.0. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{26}H_{36}NO_5SSi$ 502.2078; Found 502.2082. **M.P.** 194.1 – 197.8 °C

ethyl 7b-((*tert*-butyldimethylsilyl)oxy)-5-methoxy-1-methyl-3-tosyl-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carboxylate (10ae)



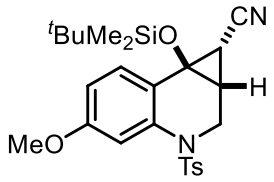
Prepared according to General Procedure C using **8ae** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (88 mg, 81%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.80 (d, *J* = 8.3 Hz, 2H), 7.41 (d, *J* = 8.6 Hz, 1H), 7.33 (d, *J* = 8.1 Hz, 2H), 6.89 (d, *J* = 2.5 Hz, 1H), 6.67 (dd, *J* = 8.6, 2.5 Hz, 1H), 4.56 (dd, *J* = 14.1, 9.0 Hz, 1H), 4.23 – 4.10(m, 2H), 3.74 (s, 3H), 3.44 (dd, *J* = 14.0, 5.2 Hz, 1H), 2.74 (dd, *J* = 9.0, 5.1 Hz, 1H), 2.42 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H), 0.95 (s, 3H), 0.80 (s, 9H), 0.08 (s, 3H), -0.31 (s, 3H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 171.2, 159.0, 143.8, 138.3, 137.5, 130.5, 130.0, 126.9, 120.8, 110.5, 107.1, 61.0, 60.4, 55.2, 44.0, 35.3, 25.6, 25.0, 21.5, 17.8, 14.3, 11.7, -4.2, -4.3. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{28}H_{40}NO_6SSi$ 546.2340; Found 546.2344.

7b-((*tert*-butyldimethylsilyl)oxy)-5-methoxy-3-tosyl-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carbonitrile (10af)



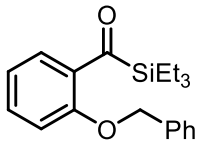
Prepared according to General Procedure C using **8af** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (86 mg, 89%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.62 (d, *J* = 8.3 Hz, 2H), 7.58 (d, *J* = 8.7 Hz, 1H), 7.31 (d, *J* = 8.1 Hz, 2H), 7.12 (d, *J* = 2.5 Hz, 1H), 6.75 (dd, *J* = 8.7, 2.5 Hz, 1H), 4.55 (dd, *J* = 14.0, 2.4 Hz, 1H), 3.77 (s, 3H), 3.35 (dd, *J* = 13.9, 0.7 Hz, 1H), 2.42 (s, 4H), 1.04 (d, *J* = 5.6 Hz, 1H), 0.96 (s, 9H), 0.06 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 159.1, 144.7, 137.0, 133.1 130.2, 127.3, 126.8, 121.9, 117.1, 111.1, 108.8, 56.8, 55.4, 41.2, 34.6, 25.7, 21.6, 18.2, 14.8, -3.3, -3.5. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{33}N_2O_4Si$ 485.1925; Found 485.1926.

7b-((*tert*-butyldimethylsilyl)oxy)-5-methoxy-3-tosyl-1a,2,3,7b-tetrahydro-1*H*-cyclopropa[*c*]quinoline-1-carbonitrile (10ag)



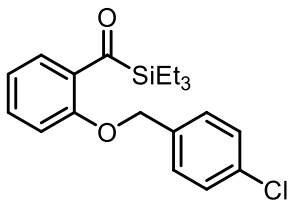
Prepared according to General Procedure C using **8ag** to afford the title compound (purified by column chromatography using 10% EtOAc in *n*-hexanes) as a clear oil (78 mg, 81%). **^{1}H NMR** (400 MHz, $CDCl_3$) 7.75 (d, *J* = 8.3 Hz, 2H), 7.51 (d, *J* = 8.6 Hz, 1H), 7.32 (d, *J* = 8.0 Hz, 3H), 6.86 (d, *J* = 2.5 Hz, 1H), 6.78 (dd, *J* = 8.7, 2.6 Hz, 1H), 4.76 (dd, *J* = 14.8, 8.8 Hz, 1H), 3.75 (s, 3H), 2.42 (s, 4H), 2.16 (td, *J* = 8.9, 6.0 Hz, 1H), 2.02 (d, *J* = 9.0 Hz, 1H), 0.81 (s, 9H), 0.10 (s, 3H), -0.12 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 159.7, 144.0, 137.9, 137.7, 130.4, 130.1, 126.9, 126.8, 119.5, 112.2, 108.4, 58.4, 55.3, 46.6, 25.4, 23.4, 21.6, 19.4, 17.6, -3.9, -4.1. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{25}H_{33}N_2O_4Si$ 485.1925; Found 485.1929.

(2-(benzyloxy)phenyl)(triethylsilyl)methanone (11a)



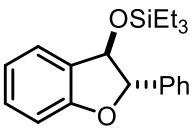
Prepared according to General Method B using acyl silane **1k** and benzyl bromide to afford the title compound (purified by column chromatography using 5% EtOAc in *n*-hexanes) as a yellow oil (75 mg, 77%). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.40 – 7.32 (m, 6H), 7.25 (dd, *J* = 7.6, 1.8 Hz, 1H), 7.01 – 6.92 (m, 2H), 5.16 (s, 2H), 0.86 (t, *J* = 7.9 Hz, 9H), 0.71 – 0.65 (m, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 240.4, 157.3, 136.0, 135.7, 132.4, 128.6, 128.3, 128.0, 126.5, 121.2, 112.0, 70.4, 7.4, 2.7. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{27}O_2Si$ 327.1775; Found 327.1772.

(2-((4-chlorobenzyl)oxy)phenyl)(triethylsilyl)methanone (11b)



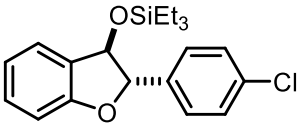
Prepared according to General Method B using acyl silane **1k** and 4-chlorobenzyl bromide to afford the title compound (purified by column chromatography using 5% EtOAc in *n*-hexanes) as a yellow oil (95 mg, 88%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.36 – 7.31 (m, 5H), 7.23 (dd, *J* = 7.5, 1.6 Hz, 1H), 6.99 (t, *J* = 7.4 Hz, 1H), 6.89 (d, *J* = 8.3 Hz, 1H), 5.11 (s, 2H), 0.86 (t, *J* = 7.8 Hz, 9H), 0.68 (q, *J* = 7.7 Hz, 6H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 240.4, 156.8, 135.9, 134.7, 134.2, 132.3, 129.2, 128.8, 126.6, 121.4, 112.1, 69.7, 7.4, 2.8. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{26}ClO_2Si$ 361.1385; Found 361.1387.

triethyl((2-phenyl-2,3-dihydrobenzofuran-3-yl)oxy)silane (12a)



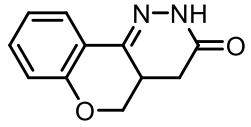
Prepared according to General Method C using acyl silane **11a** (reaction time 6 hours) to afford the title compound (purified by column chromatography using 5% EtOAc in *n*-hexanes) as a colourless oil (58 mg, 89%, 10:1 *trans*/*cis*). **^{1}H NMR** ($CDCl_3$, 500 MHz) δ 7.28 – 7.16 (m, 7H), 6.89 – 6.95 (m, 2H), 5.33 (d, *J* = 4.0 Hz, 1H), 5.22 (d, *J* = 3.9 Hz, 1H), 0.89 (t, *J* = 7.9 Hz, 9H), 0.68 – 0.53 (m, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 160.2, 139.6, 130.3, 128.7, 128.3, 128.2, 125.9, 125.6, 121.1, 110.4, 92.3, 80.7, 6.8, 5.1. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{20}H_{27}O_2Si$ 327.1775; Found 327.1774.

((2-(4-chlorophenyl)-2,3-dihydrobenzofuran-3-yl)oxy)triethylsilane (12b)



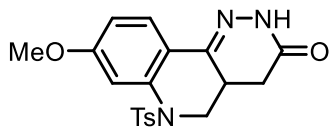
Prepared according to General Method C using acyl silane **11b** (reaction time 6 hours) to afford the title compound (purified by column chromatography using 5% EtOAc in *n*-hexanes) as a colourless oil (46 mg, 64%, 10:1 *trans*/*cis*). **^{1}H NMR** ($CDCl_3$, 400 MHz) δ 7.31 – 7.16 (m, 6H), 6.90 (d, *J* = 7.4 Hz, 1H), 6.86 (d, *J* = 8.8 Hz, 1H), 5.29 (d, *J* = 3.9 Hz, 1H), 5.17 (d, *J* = 3.9 Hz, 1H), 0.88 (t, *J* = 7.9 Hz, 9H), 0.68 – 0.53 (m, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 160.2, 139.6, 130.3, 128.7, 128.3, 128.2, 125.9, 125.6, 121.1, 110.4, 92.3, 80.7, 6.8, 5.1. **HRMS** (*m*/*z*) $[M+H]^+$ Calcd. for $C_{20}H_{26}ClO_2Si$ 361.1385; Found 361.1386.

4a,5-dihydro-2*H*-chromeno[4,3-*c*]pyridazin-3(4*H*)-one (14)



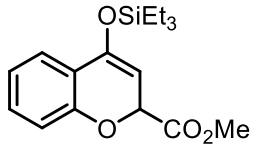
To a solution of cyclopropane **10g** (0.2 mmol) in methanol (2 mL) was added hydrazine monohydrate (0.5 mmol). The solution was heated to 60 °C for 48 h, after which time, the solvent was removed and the product purified by column chromatography (60% EtOAc in *n*-hexanes) to afford the title compound as a pale yellow solid (37 mg, 92%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.60 (s, 1H), 7.92 (d, *J* = 7.9 Hz, 1H), 7.31 (t, *J* = 7.7 Hz, 1H), 7.01 (t, *J* = 7.6 Hz, 1H), 6.92 (d, *J* = 8.3 Hz, 1H), 4.42 (dd, *J* = 10.8, 5.7 Hz, 1H), 3.91 (t, *J* = 11.6 Hz, 1H), 3.36 (tt, *J* = 13.0, 6.4 Hz, 1H), 2.60 (dd, *J* = 16.7, 7.0 Hz, 1H), 2.27 (t, *J* = 16.0 Hz, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.9, 157.1, 145.2, 132.0, 124.4, 122.2, 118.2, 117.8, 69.2, 32.8, 28.2. **HRMS** (*m*/*z*) $[M+H]^+$ Calcd. for $C_{11}H_{11}N_2O_2$ 203.0815; Found 203.0814. **M.P.** 209.1 – 210.8 °C

8-methoxy-6-tosyl-4,4a,5,6-tetrahydropyridazino[4,3-*c*]quinolin-3(2*H*)-one (15)



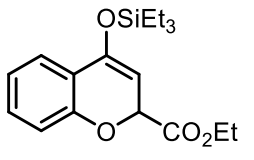
To a solution of cyclopropane **10w** (0.1 mmol) in methanol (2 mL) was added hydrazine monohydrate (0.25 mmol). The solution was heated to 60 °C for 48 h, after which time, the solvent was removed and the product purified by column chromatography (60% EtOAc in *n*-hexanes) to afford the title compound as a pale yellow amorphous solid (26 mg, 69%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.27 (s, 1H), 7.87 (d, *J* = 8.9 Hz, 1H), 7.52 (d, *J* = 7.8 Hz, 2H), 7.30 (s, 1H), 7.23 (d, *J* = 7.9 Hz, 2H), 6.81 (d, *J* = 8.9 Hz, 1H), 4.45 (dd, *J* = 14.2, 5.2 Hz, 1H), 3.87 (s, 3H), 3.31 (t, *J* = 13.3 Hz, 1H), 2.70 – 2.53 (m, 1H), 2.45 (dd, *J* = 16.5, 6.3 Hz, 1H), 2.39 (s, 3H), 2.09 (t, *J* = 16.1 Hz, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.1, 161.7, 146.2, 144.6, 139.5, 136.8, 130.1, 126.9, 126.0, 117.0, 114.1, 109.5, 55.7, 49.8, 31.6, 29.6, 21.6. **HRMS** (*m*/*z*) $[M+H]^+$ Calcd. for $C_{19}H_{20}N_3O_4S$ 386.1169; Found 386.1170.

methyl 4-((triethylsilyl)oxy)-2*H*-chromene-2-carboxylate (16a)



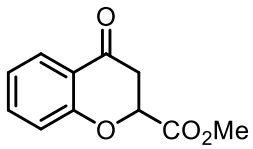
Prepared according to General Method C using acyl silane **7j** to directly afford the title compound as a colourless oil (63 mg, 99%). **^{1}H NMR** (500 MHz, CDCl3): δ = 7.37 (d, *J* = 7.6 Hz, 1H), 7.18 (t, *J* = 7.8 Hz, 1H), 6.91 (t, *J* = 8.1 Hz, 2H), 5.42 (d, *J* = 4.6 Hz, 1H), 4.97 (d, *J* = 4.6 Hz, 1H), 3.74 (s, 3H), 1.01 (t, *J* = 7.9 Hz, 9H), 0.77 (q, *J* = 8.0 Hz, 6H). **^{13}C NMR** ($CDCl_3$, 100 MHz) δ 170.8, 154.4, 146.8, 130.2, 122.6, 121.3, 120.4, 115.6, 95.8, 73.9, 52.3, 6.6, 5.0.

ethyl 4-((triethylsilyl)oxy)-2*H*-chromene-2-carboxylate (16b)



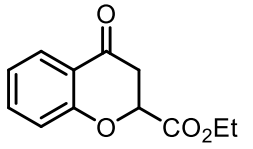
Prepared according to General Method C using acyl silane **7k** to directly afford the title compound as a colourless oil (66 mg, 99%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.37 (d, *J* = 7.4 Hz, 1H), 7.18 (t, *J* = 7.7 Hz, 1H), 6.91 (t, *J* = 6.7 Hz, 2H), 5.38 (d, *J* = 4.7 Hz, 1H), 4.97 (d, *J* = 4.7 Hz, 1H), 4.22 – 4.16 (m, 2H), 1.25 (t, *J* = 7.1 Hz, 3H), 1.01 (t, *J* = 7.9 Hz, 9H), 0.78 (q, *J* = 7.9 Hz, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 170.3, 154.5, 146.7, 130.2, 122.6, 121.2, 120.4, 115.6, 95.8, 73.8, 61.3, 14.1, 6.6, 5.0.

methyl 4-oxochroman-2-carboxylate (17a)



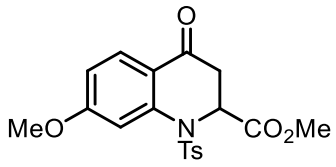
Hydrolysis of **16a** occurred when subject to silica gel column chromatography (eluting with 30% EtOAc in *n*-hexanes) to afford the title compound as a colourless oil (36 mg, 87%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.88 (d, *J* = 7.9 Hz, 1H), 7.52 (t, *J* = 7.8 Hz, 1H), 7.08 (dd, *J* = 17.3, 8.2 Hz, 2H), 5.10 (t, *J* = 7.1 Hz, 1H), 3.82 (s, 3H), 3.06 (d, *J* = 7.0 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 189.5, 169.1, 160.1, 136.5, 127.0, 122.2, 120.9, 118.1, 75.2, 52.9, 39.6. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{11}H_{11}O_4$ 207.0652; Found 207.0650.

ethyl 4-oxochroman-2-carboxylate (17a)



Hydrolysis of **16b** occurred when subject to silica gel column chromatography (eluting with 30% EtOAc in *n*-hexanes) to afford the title compound as a colourless oil (36 mg, 82%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.82 (d, *J* = 7.8 Hz, 1H), 7.45 (t, *J* = 7.8 Hz, 1H), 7.07 – 6.94 (m, 2H), 5.01 (t, *J* = 7.1 Hz, 1H), 4.20 (q, *J* = 7.1 Hz, 2H), 2.99 (d, *J* = 6.7 Hz, 2H), 1.22 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 189.7, 168.7, 160.2, 136.5, 127.0, 122.1, 121.0, 118.5, 75.2, 62.1, 39.6, 14.1. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{12}H_{13}O_4$ 221.0808; Found 221.0805.

methyl 7-methoxy-4-oxo-1-tosyl-1,2,3,4-tetrahydroquinoline-2-carboxylate (17c)



A solution of cyclopropane **9c** in deuterated chloroform was left in a sealed NMR tube for 2 weeks. After this time, the solvent was removed, and the product purified by column chromatography (eluting with 50% EtOAc in *n*-hexanes) to afford the title compound as a colourless oil. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.94 (d, *J* = 8.8 Hz, 1H), 7.71 (d, *J* = 7.8 Hz, 2H), 7.44 (s, 1H), 7.35 (d, *J* = 8.1 Hz, 2H), 6.85 (d, *J* = 8.8 Hz, 1H), 5.55 (d, *J* = 6.4 Hz, 1H), 3.98 (s, 3H), 3.75 (s, 3H), 3.06 (d, *J* = 17.9 Hz, 1H), 2.63 (dd, *J* = 17.9, 6.5 Hz, 1H), 2.49 (s, 3H). **^{13}C NMR** (125 MHz, $CDCl_3$) δ 189.1, 169.6, 164.9, 144.9, 142.6, 136.2, 130.1, 129.7, 127.1, 118.7, 112.9, 108.5, 57.9, 55.8, 53.2, 38.1, 21.6. **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{19}H_{20}NO_6S$ 390.1006; Found 390.1005

X-RAY CRYSTALLOGRAPHY PROCEDURES AND DATA

9a: A colourless plate like crystal was mounted on a XtaLAB Synergy, Dualflex, HyPix diffractometer employing monochromated CuKa radiation generated from a micro-focus sealed X-ray tube. Cell constants were obtained from a least squares refinement against 9675 reflections located between 153.98 and 7.05° 2θ. Data were collected at 100(2) Kelvin with ω scans to 154.94° 2θ. The structure was solved in the triclinic space group *P*-1 (#02) by direct methods using the program SHELXT[15] and refined using a full matrix least-squares procedure based on F^2 (SHELXL),[16] within the Olex2[17] GUI program. The non-hydrogen atoms in the asymmetric unit were modelled with anisotropic displacement parameters. A riding atom model with group displacement parameters was used for the hydrogen atoms.

10k: A colourless crystal was directly transferred from the mother liquor to paratone-N protective oil before being mounted on a XtaLAB Synergy, Dualflex, HyPix diffractometer employing mirror monochromated CuKα radiation generated from a micro-focus sealed X-ray tube. Data was collected at 150.0(2) K. Data reduction and absorption correction was carried out using the CrysAlisPro software. All structures were solved using direct methods with SHELXT[15], and refined with SHELXL[16] within the Olex2 graphical interface.[17] All non-hydrogen atoms in the asymmetric unit were modelled with anisotropic displacement parameters. A riding atom model was used for all hydrogen atoms.

10w: Single crystal X-ray diffraction data was collected on the MX1 beamline at the Australian Synchrotron.[18] In general, single crystals were transferred directly from the mother liquor into immersion oil and placed under a stream of nitrogen at 100 K. Crystal structures were solved by direct methods using the program SHELXT[15] and refined using a full matrix least-squares procedure based on F^2 (SHEXL),[16] within the Olex2[17] GUI program. All non-hydrogen atoms in the asymmetric unit were modelled with anisotropic displacement parameters. A riding atom model was used for all hydrogen atoms.

10ab: Single crystal X-ray diffraction data was collected on the MX2 beamline at the Australian Synchrotron.[19] A colourless crystal was transferred directly from the mother liquor into immersion oil and placed under a stream of nitrogen at 100 K. Crystal structures were solved by direct methods using the program SHELXT[15] and refined using a full matrix least-squares procedure based on F^2 (SHEXL),[16] within the Olex2 GUI program.[17] In structures containing disordered solvent molecules that could not be satisfactorily modelled, the solvent mask routine within the Olex2 GUI was used.[17]

X-Ray Crystallography Data for Compound 9a

The deposition number for **9a** at the Cambridge Crystallographic Data Centre is CCDC 2121946

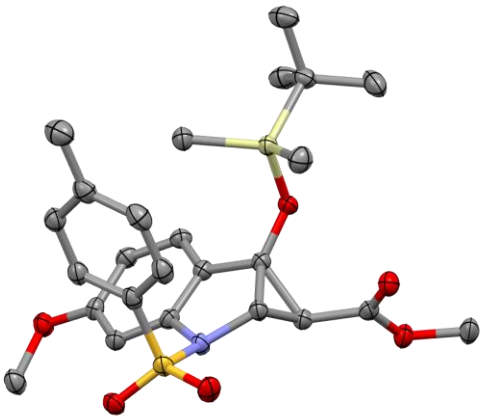


Figure S1. Ortep drawing of compound **9a** with 50% ellipsoids (hydrogen atoms removed for clarity).

Table S3 Crystal data and structure refinement for 9a.

Identification code	CH_DP287_auto
Empirical formula	$C_{25}H_{33}NO_6SSi$
Formula weight	503.67
Temperature/K	100(2)
Crystal system	triclinic
Space group	P-1
a/Å	9.1233(2)
b/Å	11.1747(2)
c/Å	13.3729(3)
α/°	92.8956(18)
β/°	109.796(2)
γ/°	90.2891(18)
Volume/Å^3	1280.81(5)
Z	2
ρ_{calc}g/cm^3	1.306
μ/mm^{-1}	1.906
F(000)	536.0
Crystal size/mm^3	0.1 × 0.08 × 0.05
Radiation	CuKα (λ = 1.54184)
2Θ range for data collection/°	7.036 to 154.94
Index ranges	-11 ≤ h ≤ 11, -14 ≤ k ≤ 10, -16 ≤ l ≤ 16
Reflections collected	15471
Independent reflections	5207 [R_{int} = 0.0391, R_{sigma} = 0.0471]
Data/restraints/parameters	5207/0/315
Goodness-of-fit on F^2	1.083
Final R indexes [I>=2σ (I)]	R_1 = 0.0383, wR_2 = 0.0978
Final R indexes [all data]	R_1 = 0.0445, wR_2 = 0.1017
Largest diff. peak/hole / e Å^{-3}	0.38/-0.40

X-Ray Crystallography Data for Compound 10k

The deposition number for **10k** at the Cambridge Crystallographic Data Centre is CCDC 2121948

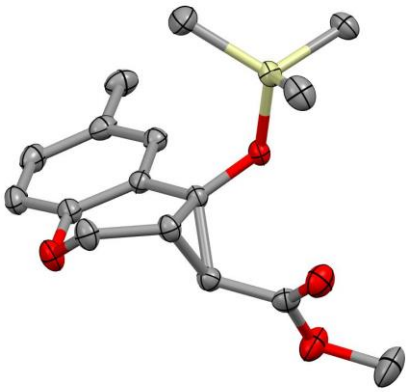


Figure S2. Ortep drawing of compound **10k** with 50% ellipsoids (hydrogen atoms removed for clarity).

Table S4 Crystal data and structure refinement for 10k

Identification code	CH-AB-60x
Empirical formula	$C_{16}H_{22}O_4Si$
Formula weight	306.42
Temperature/K	150(2)
Crystal system	monoclinic
Space group	$P2_1/c$
a/Å	8.69050(10)
b/Å	16.32960(10)
c/Å	11.48420(10)
α/°	90
β/°	98.1680(10)
γ/°	90
Volume/Å^3	1613.22(3)
Z	4
ρ_{calc}g/cm^3	1.262
μ/mm^{-1}	1.398
F(000)	656.0
Crystal size/mm^3	0.2 × 0.2 × 0.05
Radiation	CuKα (λ = 1.54178)
2Θ range for data collection/°	9.48 to 154.946
Index ranges	-9 ≤ h ≤ 10, -20 ≤ k ≤ 20, -14 ≤ l ≤ 14
Reflections collected	54369
Independent reflections	3403 [R_{int} = 0.0478, R_{sigma} = 0.0172]
Data/restraints/parameters	3403/0/195
Goodness-of-fit on F^2	1.087
Final R indexes [I>=2σ (I)]	R_1 = 0.0331, wR_2 = 0.0899
Final R indexes [all data]	R_1 = 0.0342, wR_2 = 0.0906
Largest diff. peak/hole / e Å^{-3}	0.28/-0.29

X-Ray Crystallography Data for Compound 10w

The deposition number for **10w** at the Cambridge Crystallographic Data Centre is CCDC 2121947

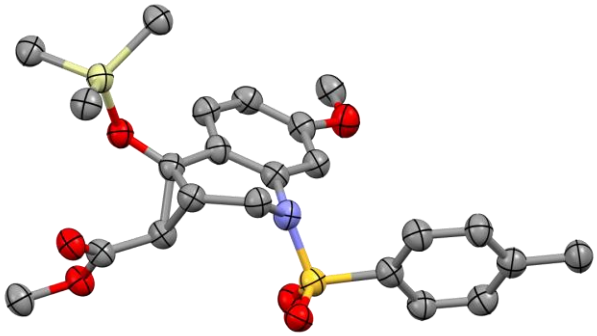


Figure S3. Ortep drawing of compound **10w** with 50% ellipsoids (hydrogen atoms removed for clarity).

Table S5 Crystal data and structure refinement for 10w.

Identification code	DP-337x
Empirical formula	$C_{23}H_{29}NO_6SSi$
Formula weight	475.62
Temperature/K	100(2)
Crystal system	monoclinic
Space group	C2/c
a/Å	45.775(9)
b/Å	5.7030(11)
c/Å	18.310(4)
α/°	90
β/°	99.58(3)
γ/°	90
Volume/Å^3	4713.3(17)
Z	8
ρ_{calc}g/cm^3	1.341
μ/mm^{-1}	0.227
F(000)	2016.0
Crystal size/mm^3	0.05 × 0.02 × 0.02
Radiation	Synchrotron (λ = 0.71073)
2Θ range for data collection/°	1.804 to 58.558
Index ranges	-59 ≤ h ≤ 59, -7 ≤ k ≤ 7, -21 ≤ l ≤ 21
Reflections collected	28866
Independent reflections	5024 [R_{int} = 0.0749, R_{sigma} = 0.0456]
Data/restraints/parameters	5024/0/295
Goodness-of-fit on F^2	1.085
Final R indexes [I>=2σ (I)]	R_1 = 0.1241, wR_2 = 0.3823
Final R indexes [all data]	R_1 = 0.1642, wR_2 = 0.4207
Largest diff. peak/hole / e Å^{-3}	1.15/-1.19

X-Ray Crystallography Data for Compound 10ab

The deposition number for **10ab** at the Cambridge Crystallographic Data Centre is CCDC 2121949

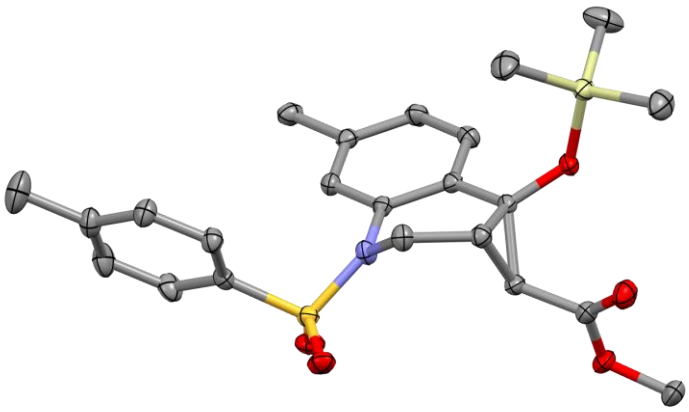


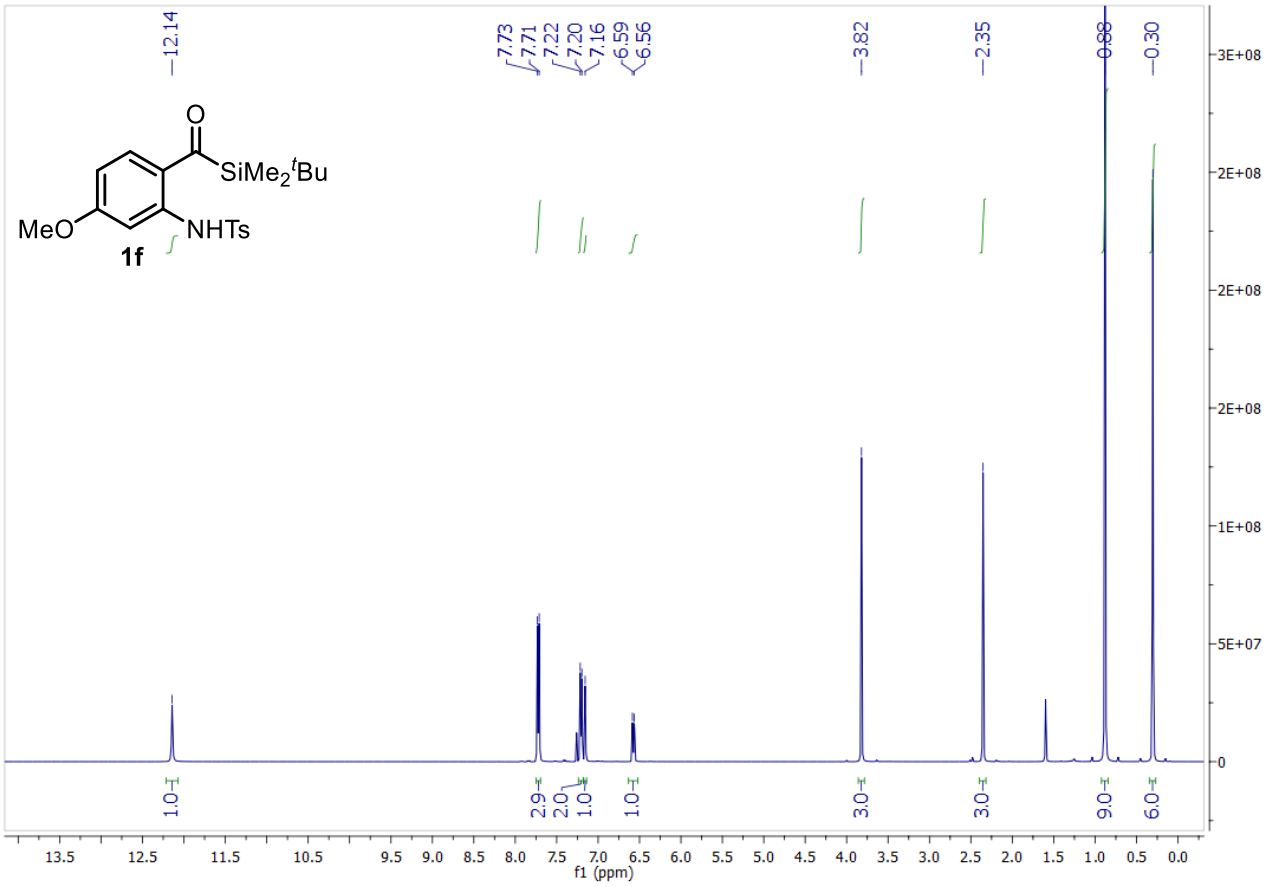
Figure S4. Ortep drawing of compound **10ab** with 50% ellipsoids (hydrogen atoms removed for clarity).

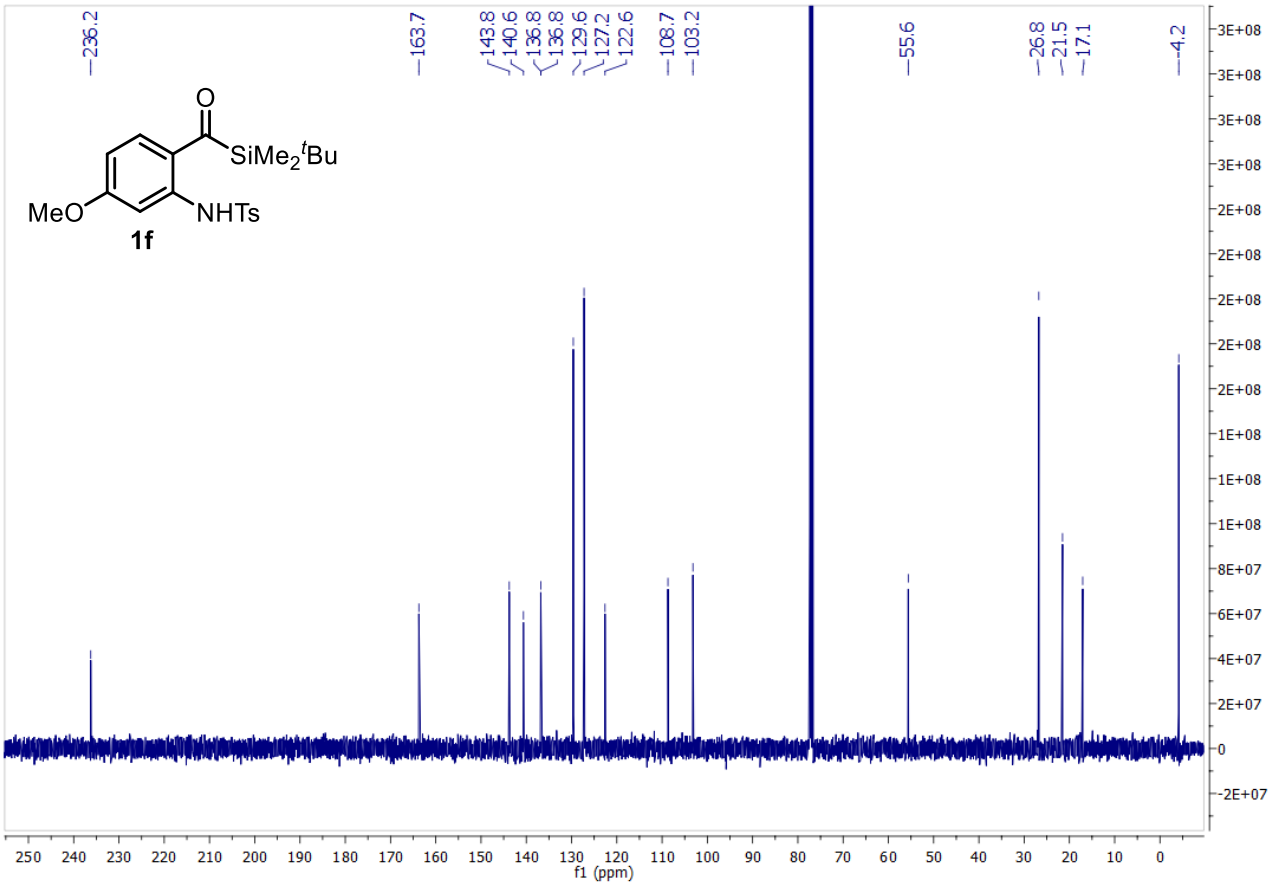
Table S6 Crystal data and structure refinement for 10ab.

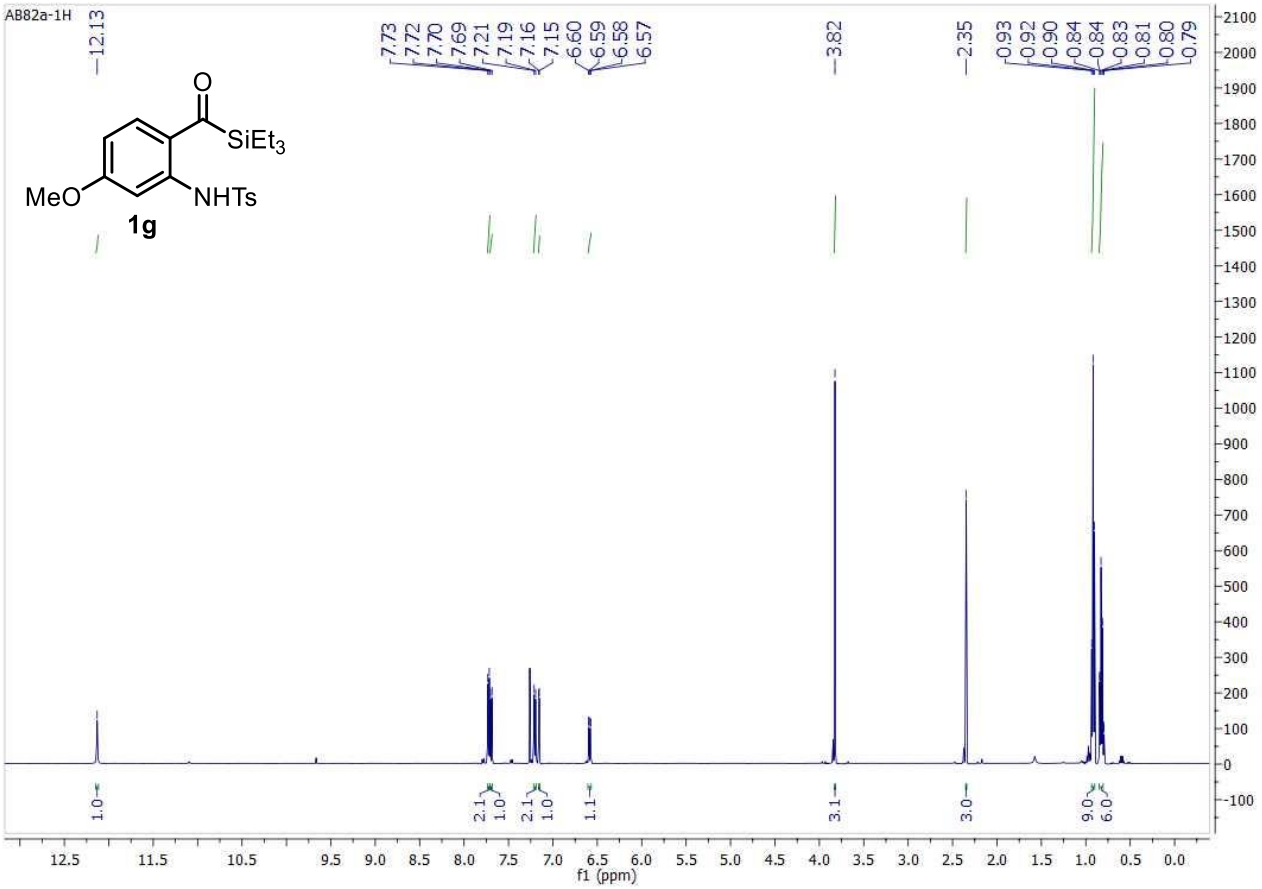
Identification code	DP-339x
Empirical formula	$C_{23}H_{29}NO_5SSi$
Formula weight	459.62
Temperature/K	100(2)
Crystal system	monoclinic
Space group	$P2_1$
a/Å	8.9200(18)
b/Å	18.338(4)
c/Å	14.723(3)
α/°	90
β/°	99.61(3)
γ/°	90
Volume/Å^3	2374.5(8)
Z	4
ρ_{calc}g/cm^3	1.286
μ/mm^{-1}	0.220
F(000)	976.0
Crystal size/mm^3	0.2 × 0.15 × 0.1
Radiation	Synchrotron (λ = 0.71073)
2Θ range for data collection/°	3.578 to 64.176
Index ranges	-11 ≤ h ≤ 11, -21 ≤ k ≤ 21, -19 ≤ l ≤ 19
Reflections collected	36729
Independent reflections	12315 [R_{int} = 0.0702, R_{sigma} = 0.0688]
Data/restraints/parameters	12315/1/571
Goodness-of-fit on F^2	1.072
Final R indexes [I>=2σ (I)]	R_1 = 0.0465, wR_2 = 0.1244
Final R indexes [all data]	R_1 = 0.0500, wR_2 = 0.1310
Largest diff. peak/hole / e Å^{-3}	0.49/-0.54
Flack parameter	-0.02(3)

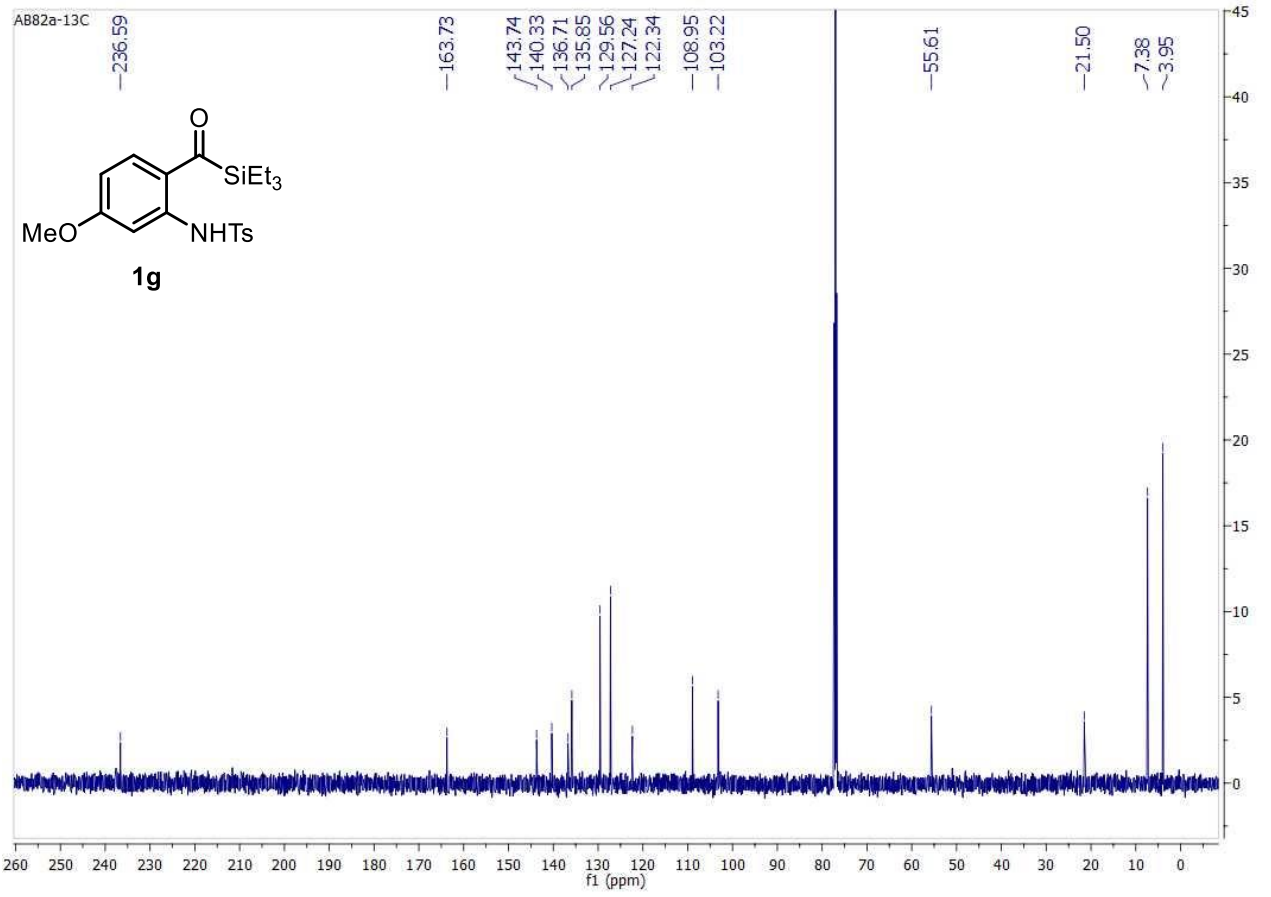
REFERENCES

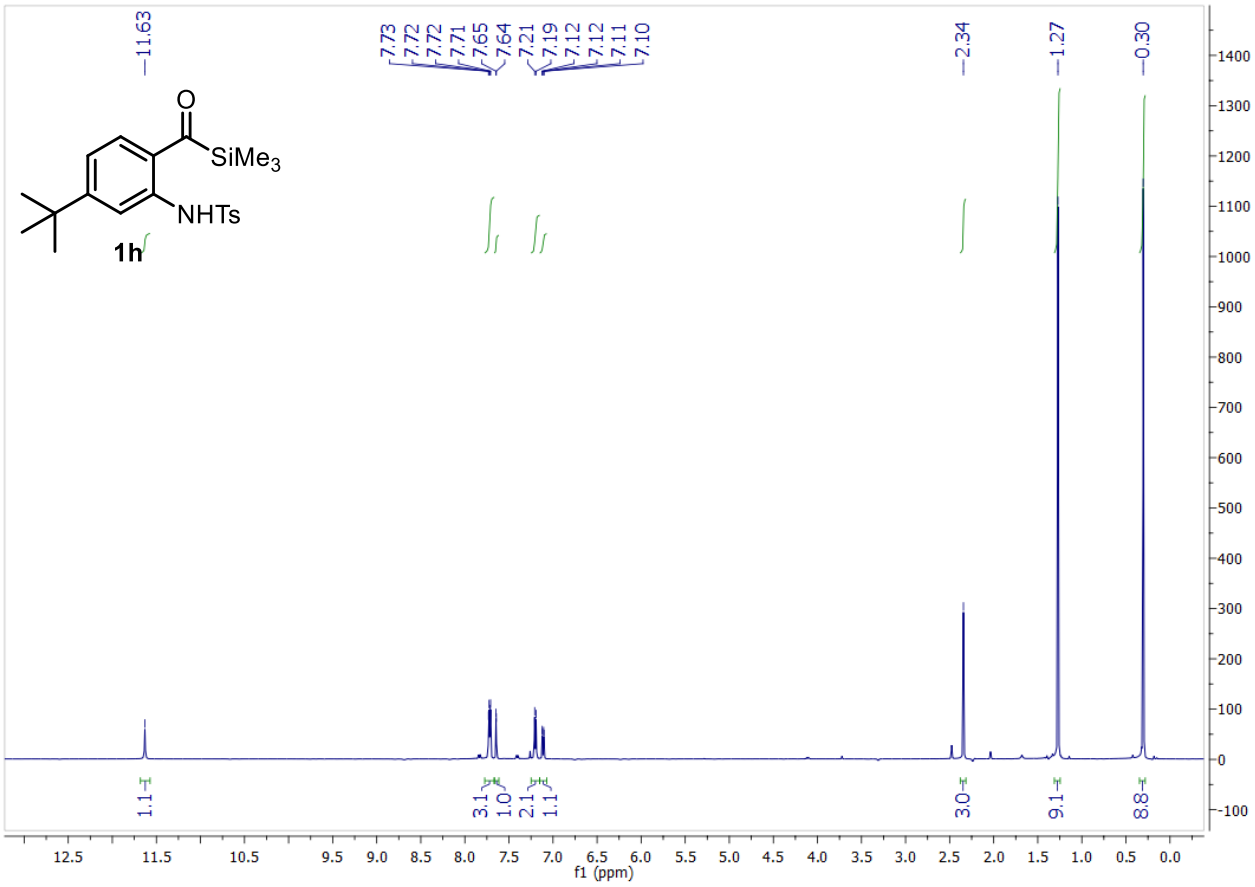
1. L. Capaldo, R. Riccardi, D. Ravelli and M. Fagnoni, *ACS Catalysis*, 2018, **8**, 304-309.
2. A. Matsumoto, K. Asano and S. Matsubara, *Chemistry – An Asian Journal*, 2019, **14**, 116-120.
3. P. Becker, R. Pirwerdjan and C. Bolm, *Angew. Chem., Int. Ed.*, 2015, **54**, 15493-15496.
4. H. J. Zhang, P. Becker, H. Huang, R. Pirwerdjan, F. F. Pan and C. Bolm, *Advanced Synthesis & Catalysis*, 2012, **354**, 2157-2161.
5. C.-J. Yu, R. Li and P. Gu, *Tetrahedron Letters*, 2016, **57**, 3568-3570.
6. S. Meunier, J.-M. Siaugue, M. Sawicki, F. Calbour, S. Dézard, F. Taran and C. Mioskowski, *Journal of Combinatorial Chemistry*, 2003, **5**, 201-204.
7. A. D. Gammack Yamagata, S. Datta, K. E. Jackson, L. Stegbauer, R. S. Paton and D. J. Dixon, *Angewandte Chemie International Edition*, 2015, **54**, 4899-4903.
8. X. Zhuang, X. Shi, R. Zhu, B. Sun, W. Su and C. Jin, *Organic Chemistry Frontiers*, 2021, **8**, 736-742.
9. C. Bai, S. Ren, S. Wu, M. Zhu, G. Luo and H. Xiang, *European Journal of Medicinal Chemistry*, 2021, **221**, 113543.
10. T. Kovacevic, M. Mesic, A. Avdagic and M. Zegarac, *Tetrahedron Letters*, 2018, **59**, 4180-4182.
11. E. R. Jackson, G. San Jose, R. C. Brothers, E. K. Edelstein, Z. Sheldon, A. Haymond, C. Johny, H. I. Boshoff, R. D. Couch and C. S. Dowd, *Bioorganic & Medicinal Chemistry Letters*, 2014, **24**, 649-653.
12. R. K. Duke, M. Chebib, D. E. Hibbs, K. N. Mewett and G. A. R. Johnston, *Tetrahedron: Asymmetry*, 2004, **15**, 1745-1751.
13. R. Riclea and J. S. Dickschat, *Chemistry – A European Journal*, 2011, **17**, 11930-11934.
14. K. F. Chin, X. Ye, Y. Li, R. Lee, A. M. Kabylda, D. Leow, X. Zhang, E. C. Xia Ang and C.-H. Tan, *ACS Catalysis*, 2020, **10**, 2684-2691.
15. G. Sheldrick, *Acta Crystallographica Section A*, 2015, **71**, 3-8.
16. G. Sheldrick, *Acta Crystallographica Section C*, 2015, **71**, 3-8.
17. O. V. Dolomanov, L. J. Bourhis, R. J. Gildea, J. A. K. Howard and H. Puschmann, *Journal of Applied Crystallography*, 2009, **42**, 339-341.
18. N. P. Cowieson, D. Aragao, M. Clift, D. J. Ericsson, C. Gee, S. J. Harrop, N. Mudie, S. Panjikar, J. R. Price, A. Riboldi-Tunnicliffe, R. Williamson and T. Caradoc-Davies, *Journal of Synchrotron Radiation*, 2015, **22**, 187-190.
19. D. Aragao, J. Aishima, H. Cherukuvada, R. Clarken, M. Clift, N. P. Cowieson, D. J. Ericsson, C. L. Gee, S. Macedo, N. Mudie, S. Panjikar, J. R. Price, A. Riboldi-Tunnicliffe, R. Rostan, R. Williamson and T. T. Caradoc-Davies, *Journal of Synchrotron Radiation*, 2018, **25**, 885-891.

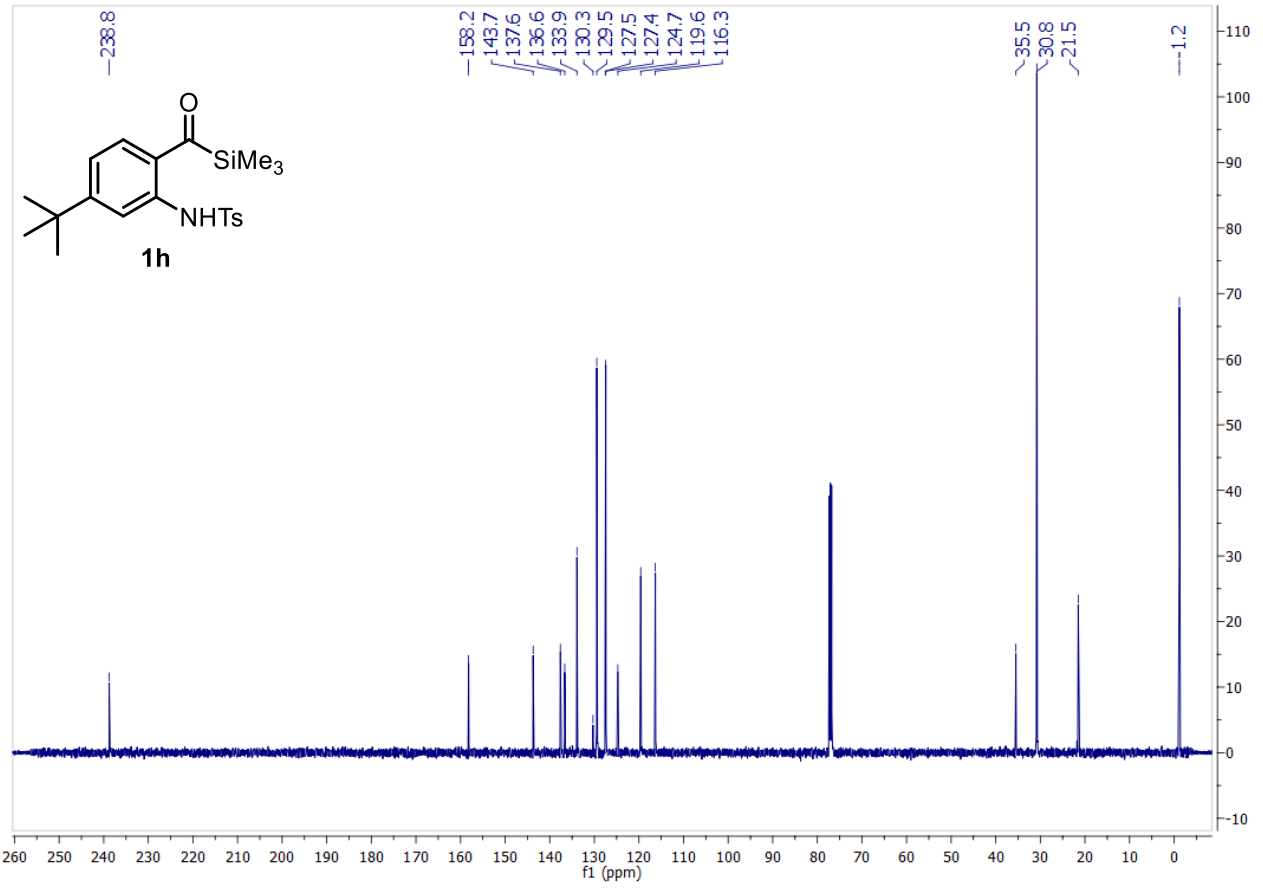

12.14
7.73
7.71
7.22
7.20
7.16
6.59
6.56
3.82
2.35
0.88
0.30
O
SiMe2tBu
MeO
NHTs
1f
1.0
2.9
2.0
1.0
1.0
3.0
3.0
9.0
6.0
f1 (ppm)

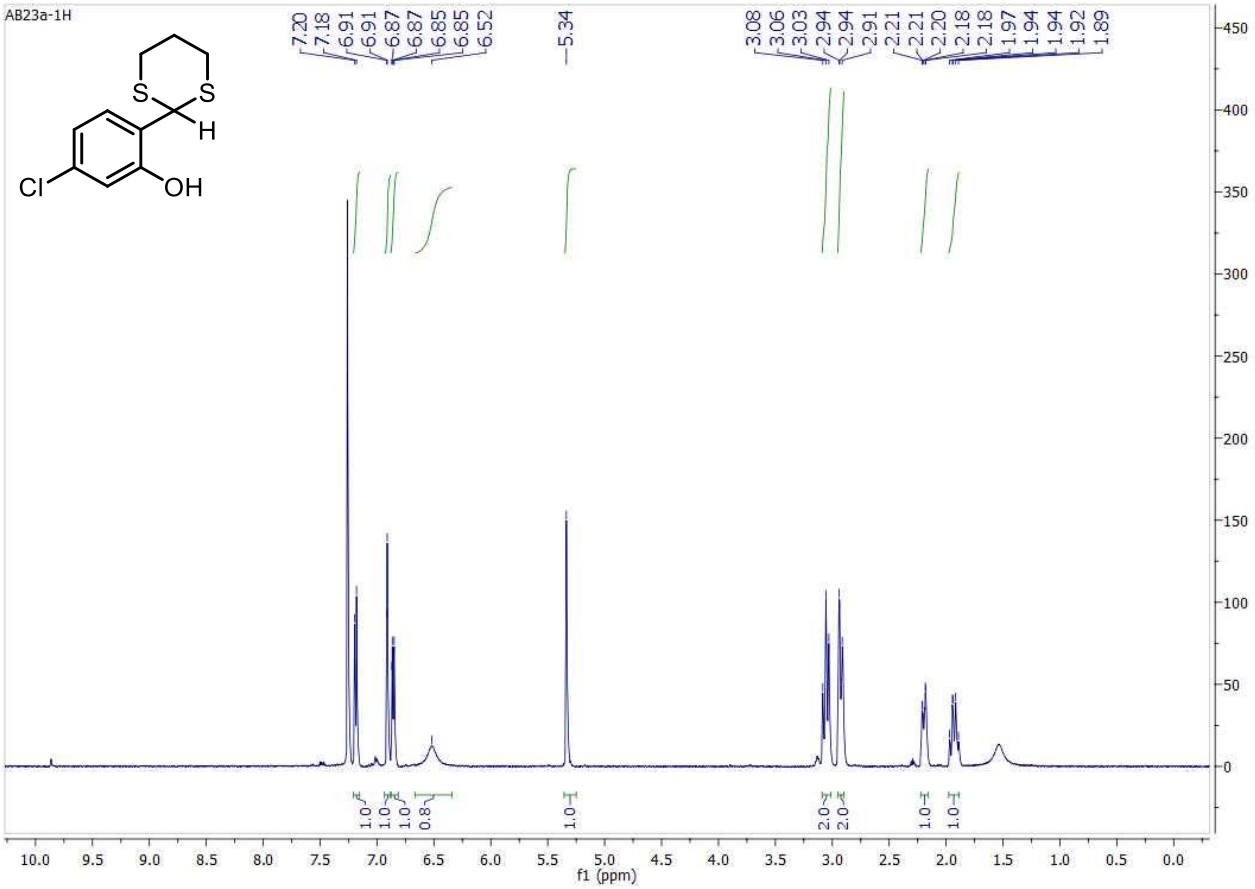

236.2
163.7
143.8
140.6
136.8
136.8
129.6
127.2
122.6
108.7
103.2
55.6
26.8
21.5
17.1
4.2
O
SiMe2tBu
MeO
NHTs
1f
f1 (ppm)

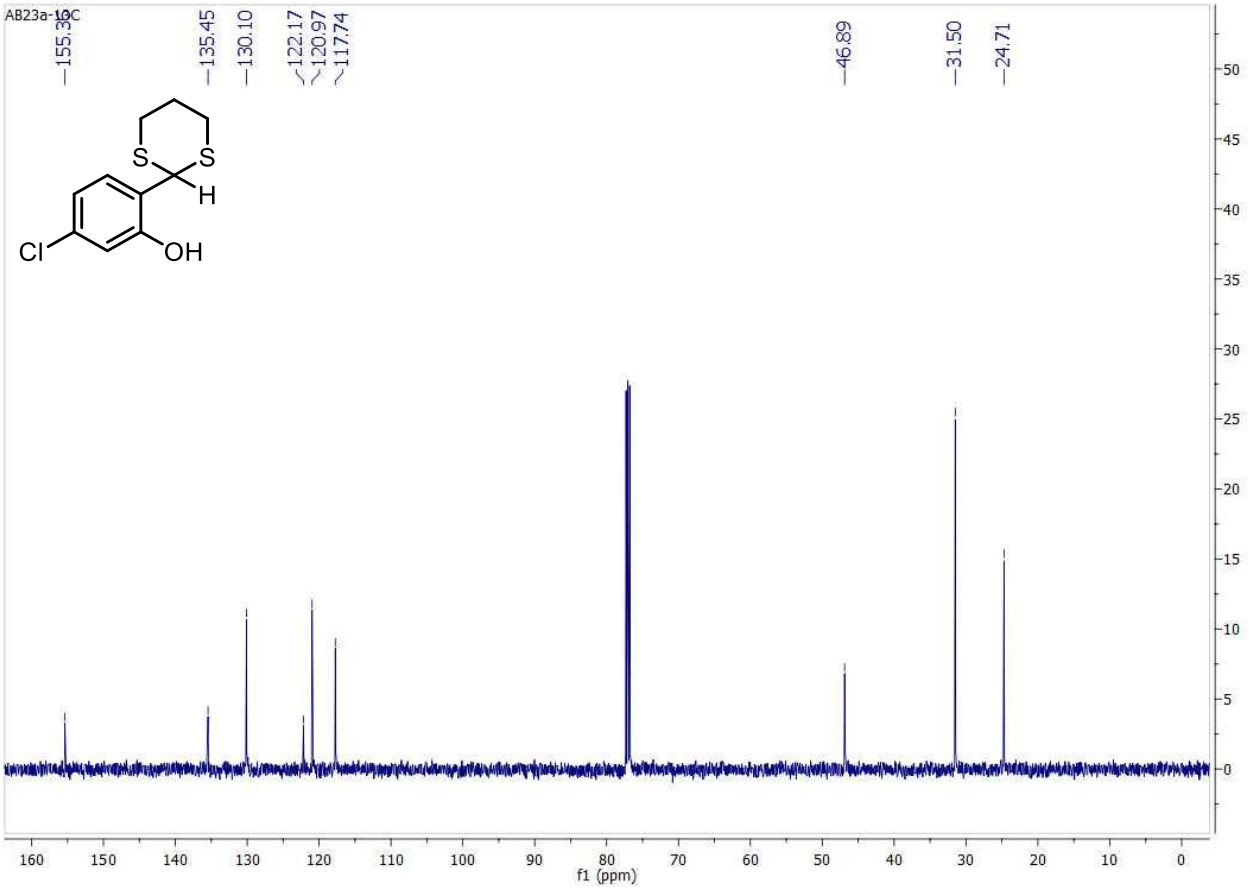

AB82a-1H
12.13
7.73
7.72
7.70
7.69
7.21
7.19
7.16
7.15
6.60
6.59
6.58
6.57
3.82
2.35
0.93
0.92
0.90
0.84
0.84
0.83
0.81
0.80
0.79
O
SiEt3
MeO
NHTs
1g
1.0
2.1
1.0
2.1
1.0
1.1
3.1
3.0
9.0
6.0
f1 (ppm)

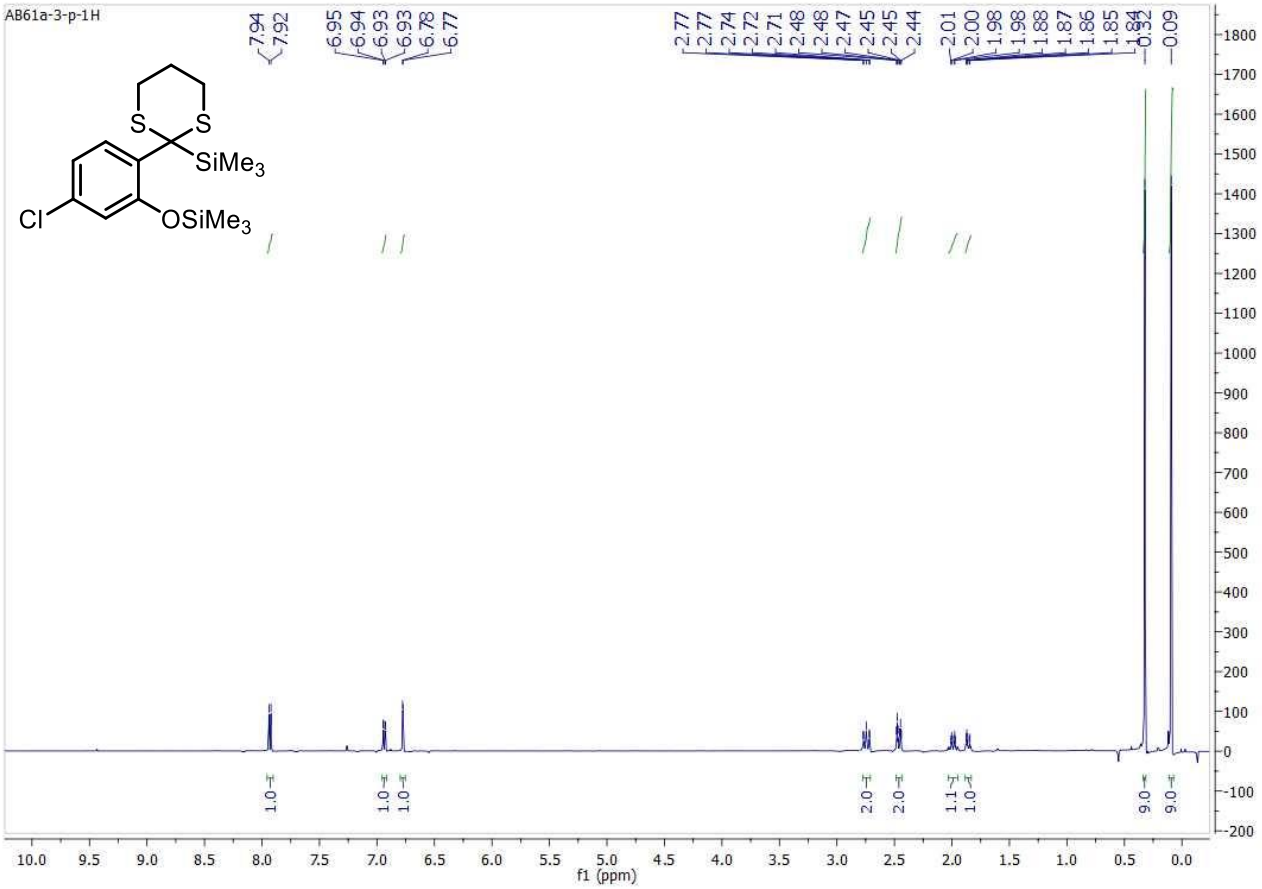

AB82a-13C
236.59
163.73
143.74
140.33
136.71
135.85
129.56
127.24
122.34
108.95
103.22
55.61
21.50
7.38
3.95
O
SiEt3
MeO
NHTs
1g
f1 (ppm)

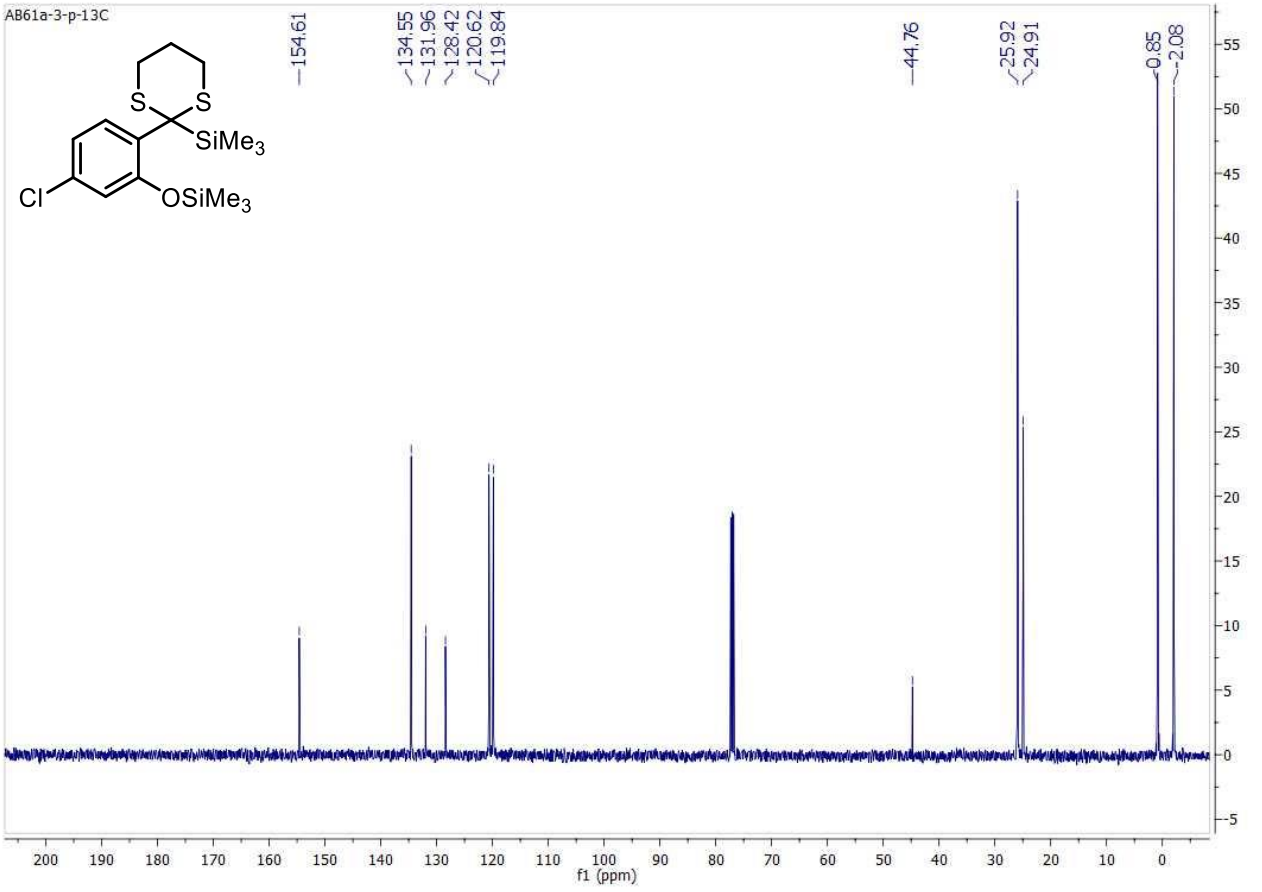

11.63
7.73
7.72
7.72
7.71
7.65
7.64
7.21
7.19
7.12
7.12
7.11
7.10
2.34
1.27
0.30
O
SiMe3
NHTs
1h
1.1
3.1
1.0
2.1
1.1
3.0
9.1
8.8
f1 (ppm)

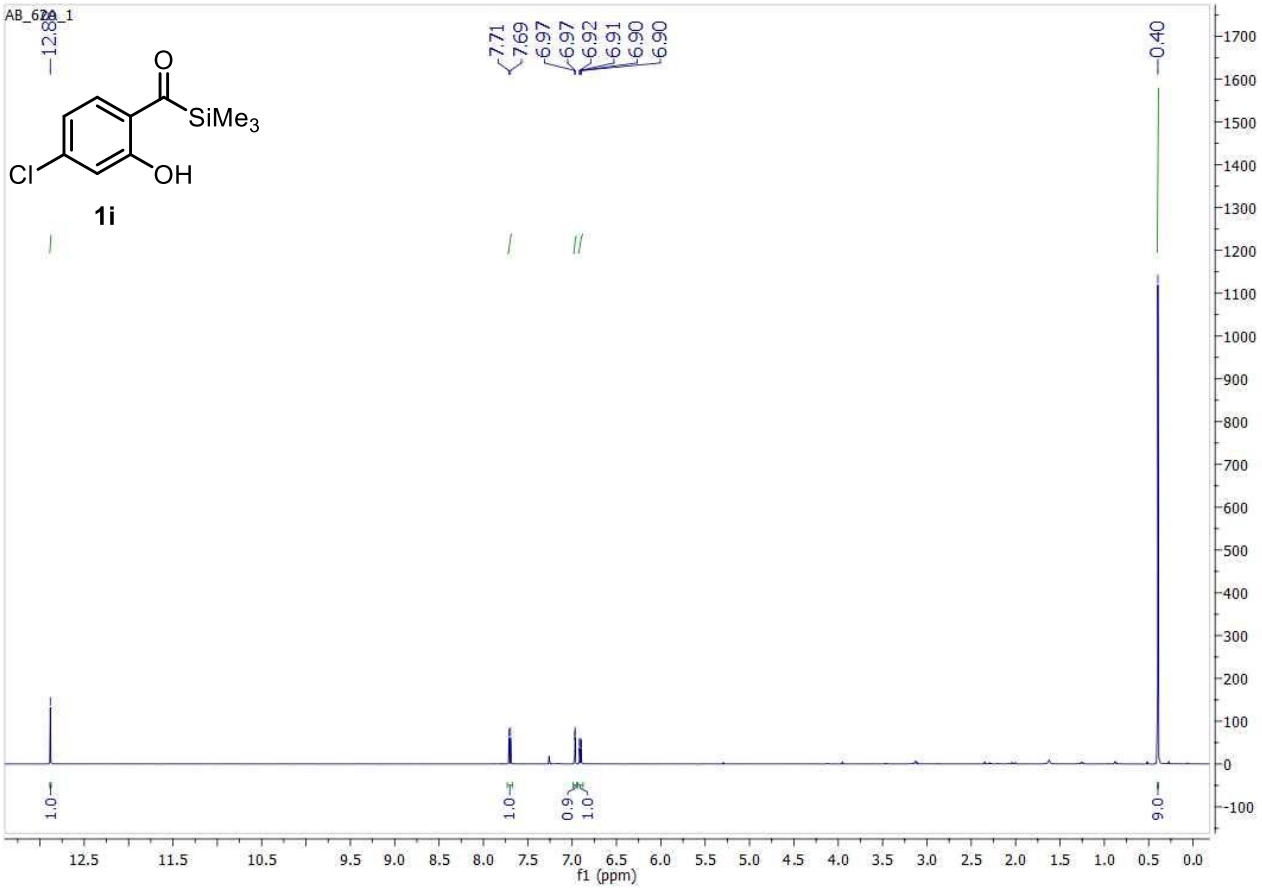

238.8
158.2
143.7
137.6
136.6
133.9
130.3
129.5
127.5
127.4
124.7
119.6
116.3
35.5
30.8
21.5
1.2
O
SiMe3
NHTs
1h
f1 (ppm)

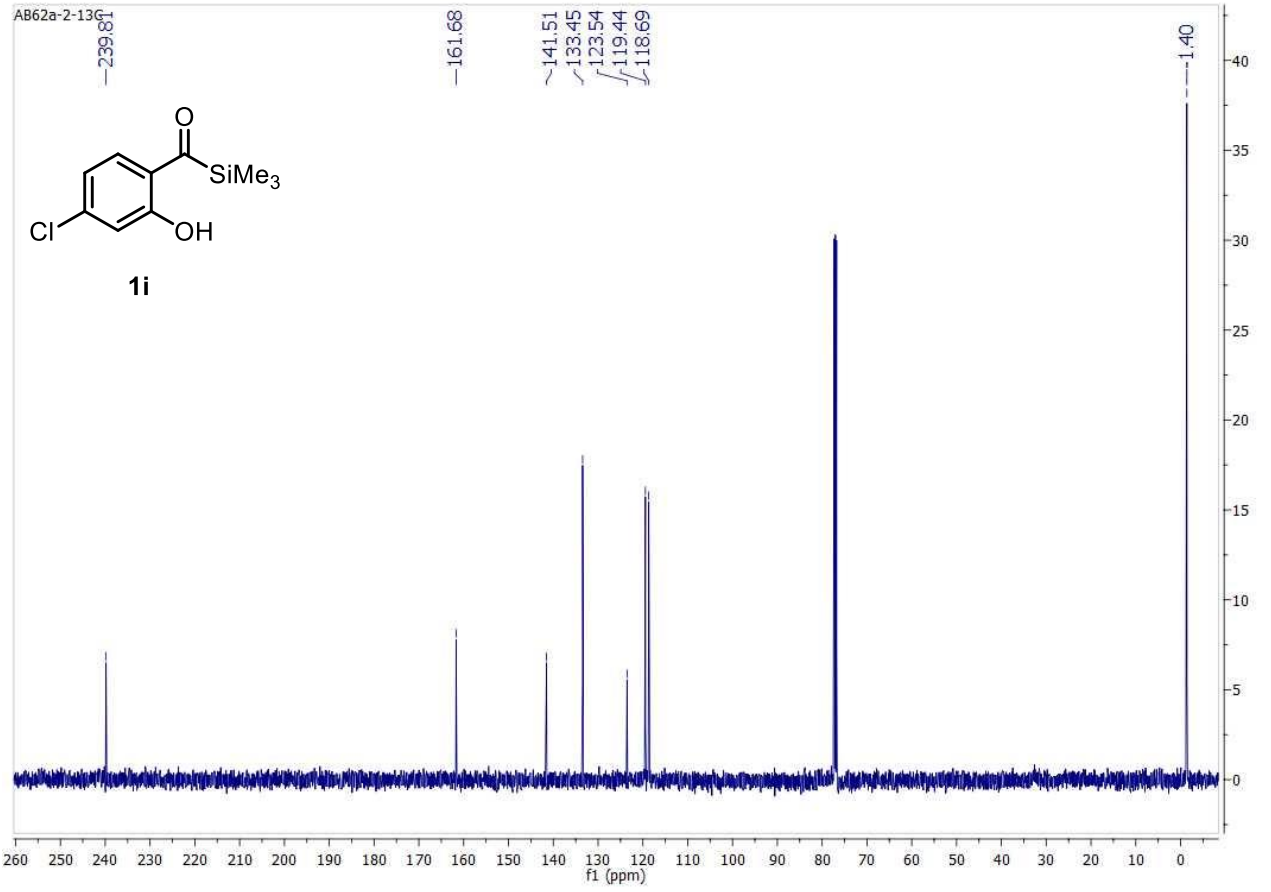

AB23a-1H
7.20
7.18
6.91
6.91
6.87
6.87
6.85
6.85
6.52
5.34
3.08
3.06
3.03
2.94
2.94
2.91
2.21
2.21
2.20
2.18
2.18
1.97
1.94
1.94
1.92
1.89
S
S
H
Cl
OH
1.0
1.0
1.0
0.8
1.0
2.0
2.0
1.0
1.0
f1 (ppm)

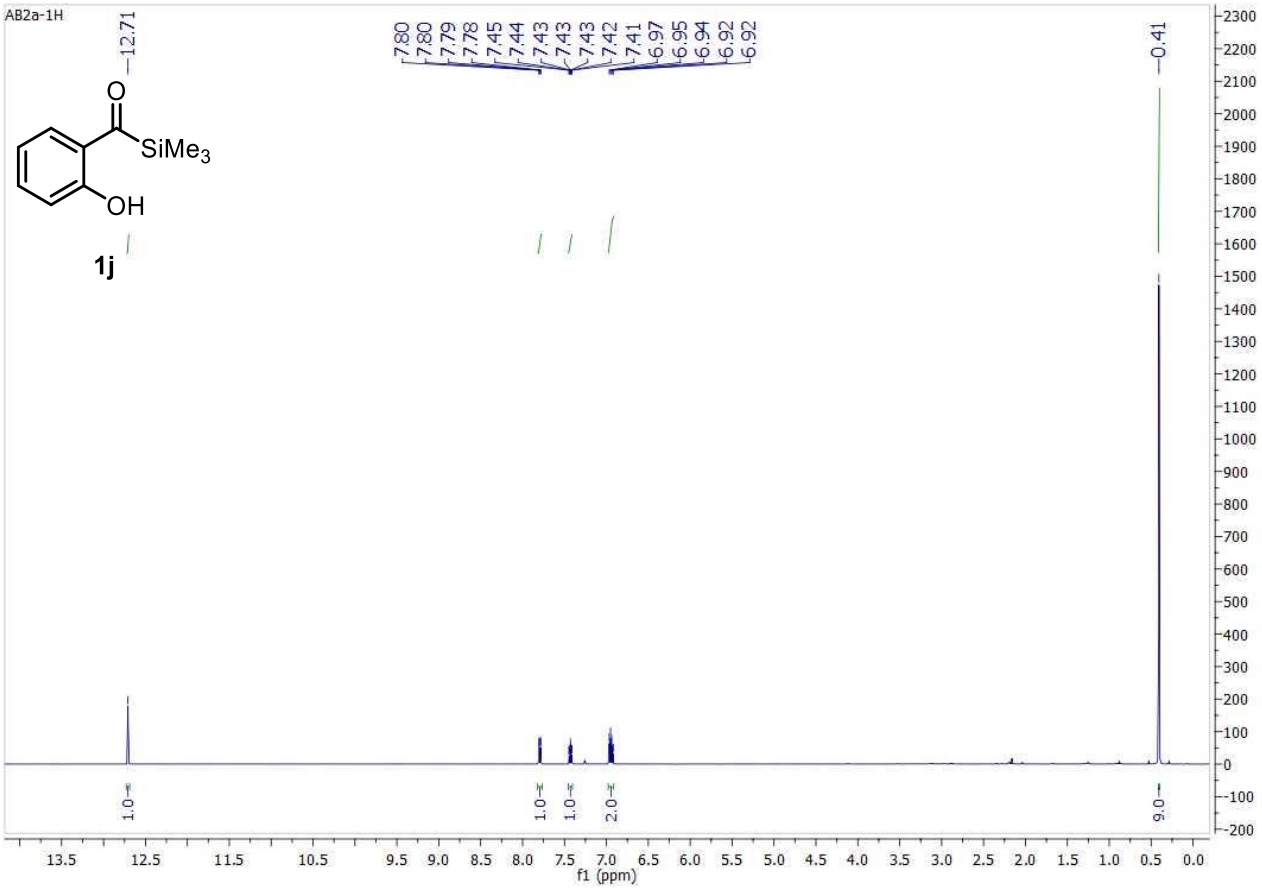

AB23a-13C
155.39
135.45
130.10
122.17
120.97
117.74
46.89
31.50
24.71
S
S
H
Cl
OH
f1 (ppm)

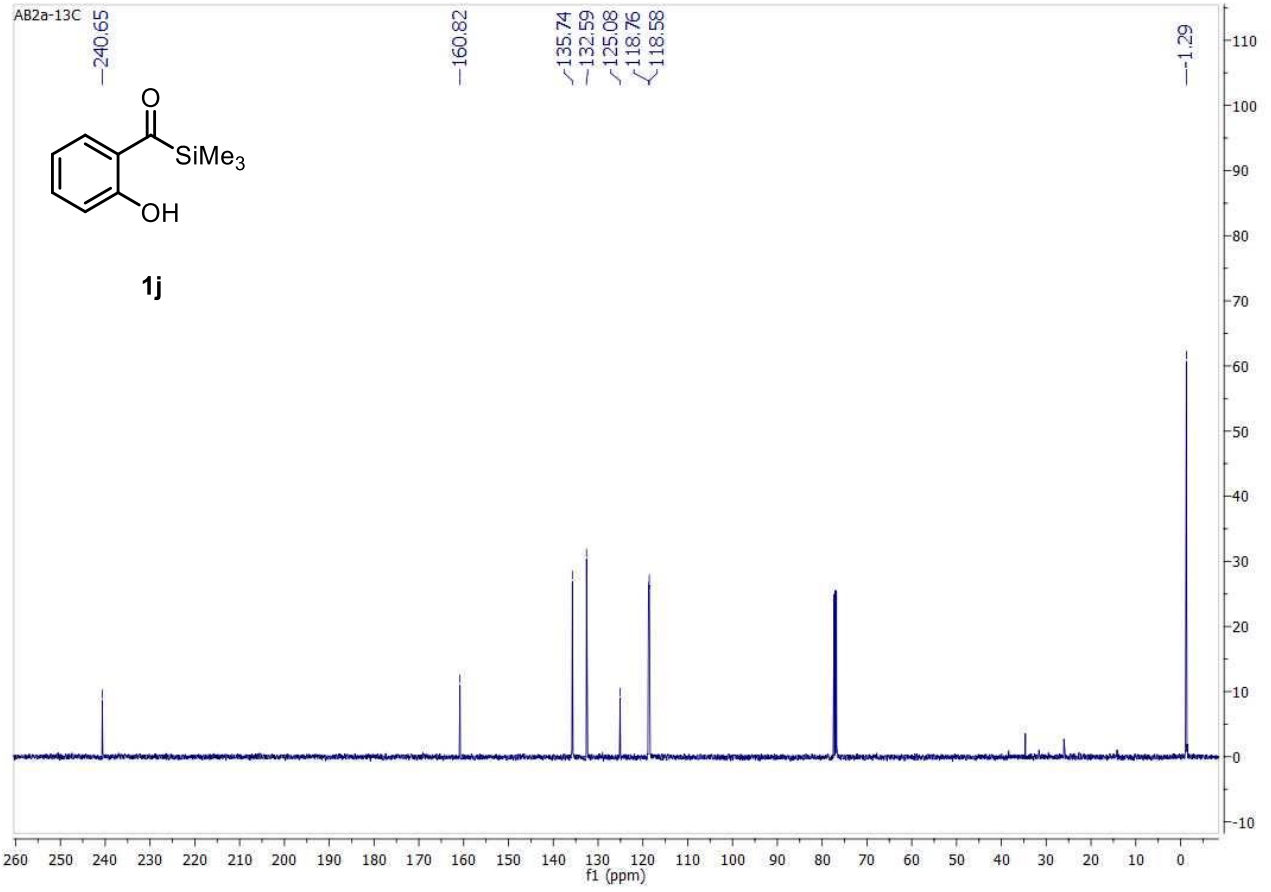

AB61a-3-p-1H
7.94
7.92
6.95
6.94
6.93
6.93
6.78
6.77
2.77
2.77
2.74
2.72
2.71
2.48
2.48
2.47
2.45
2.45
2.44
2.01
2.00
1.98
1.88
1.87
1.86
1.85
0.32
0.09
S
S
SiMe3
Cl
OSiMe3
1.0
1.0
1.0
2.0
2.0
1.1
1.0
9.0
9.0
f1 (ppm)

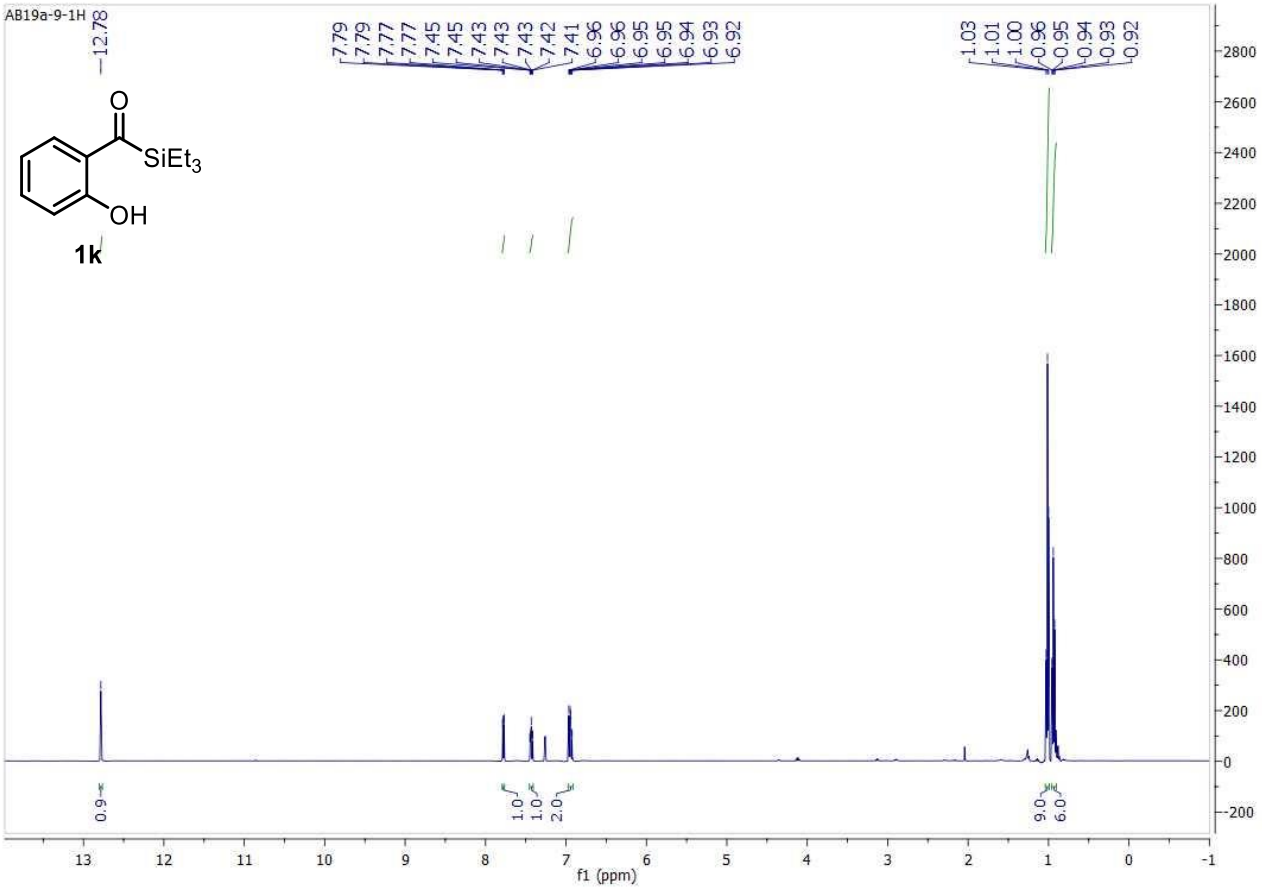

AB61a-3-p-13C
154.61
134.55
131.96
128.42
120.62
119.84
44.76
25.92
24.91
0.85
2.08
S
S
SiMe3
Cl
OSiMe3
f1 (ppm)

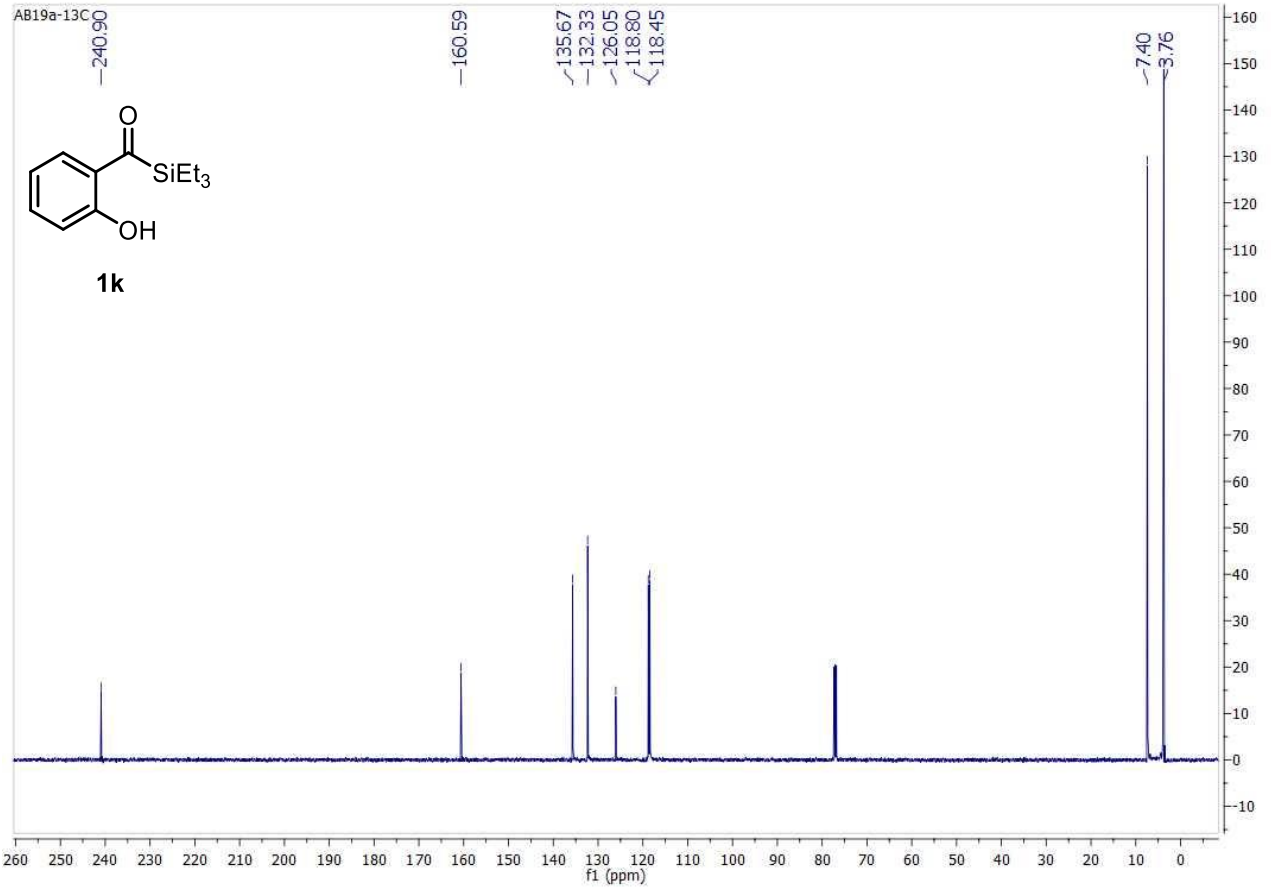

AB_62a_1
12.88
7.71
7.69
6.97
6.97
6.92
6.91
6.90
6.90
0.40
O
SiMe3
Cl
OH
1i
1.0
1.0
0.9
1.0
9.0
f1 (ppm)

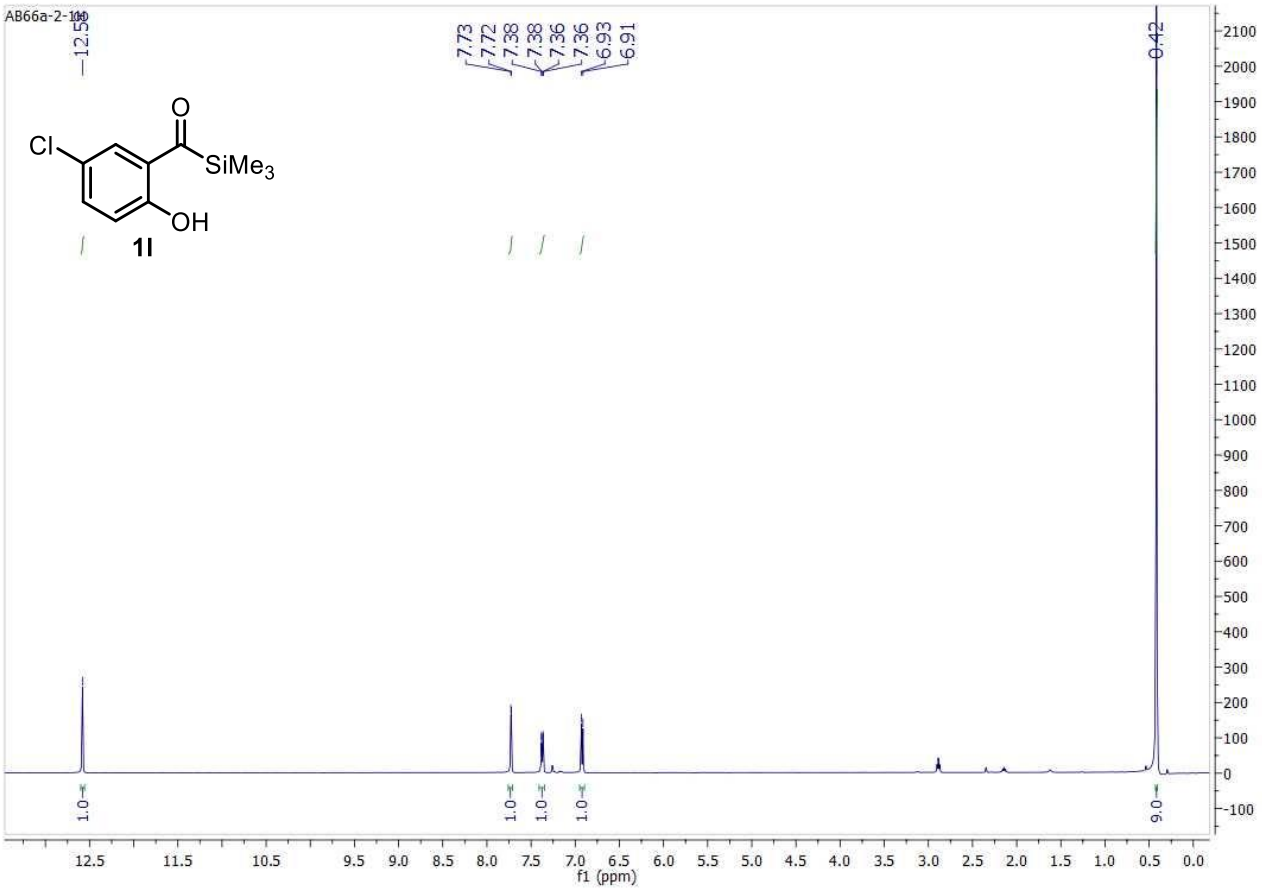

AB62a-2-13C
239.81
161.68
141.51
133.45
123.54
119.44
118.69
1.40
O
SiMe3
Cl
OH
1i
f1 (ppm)

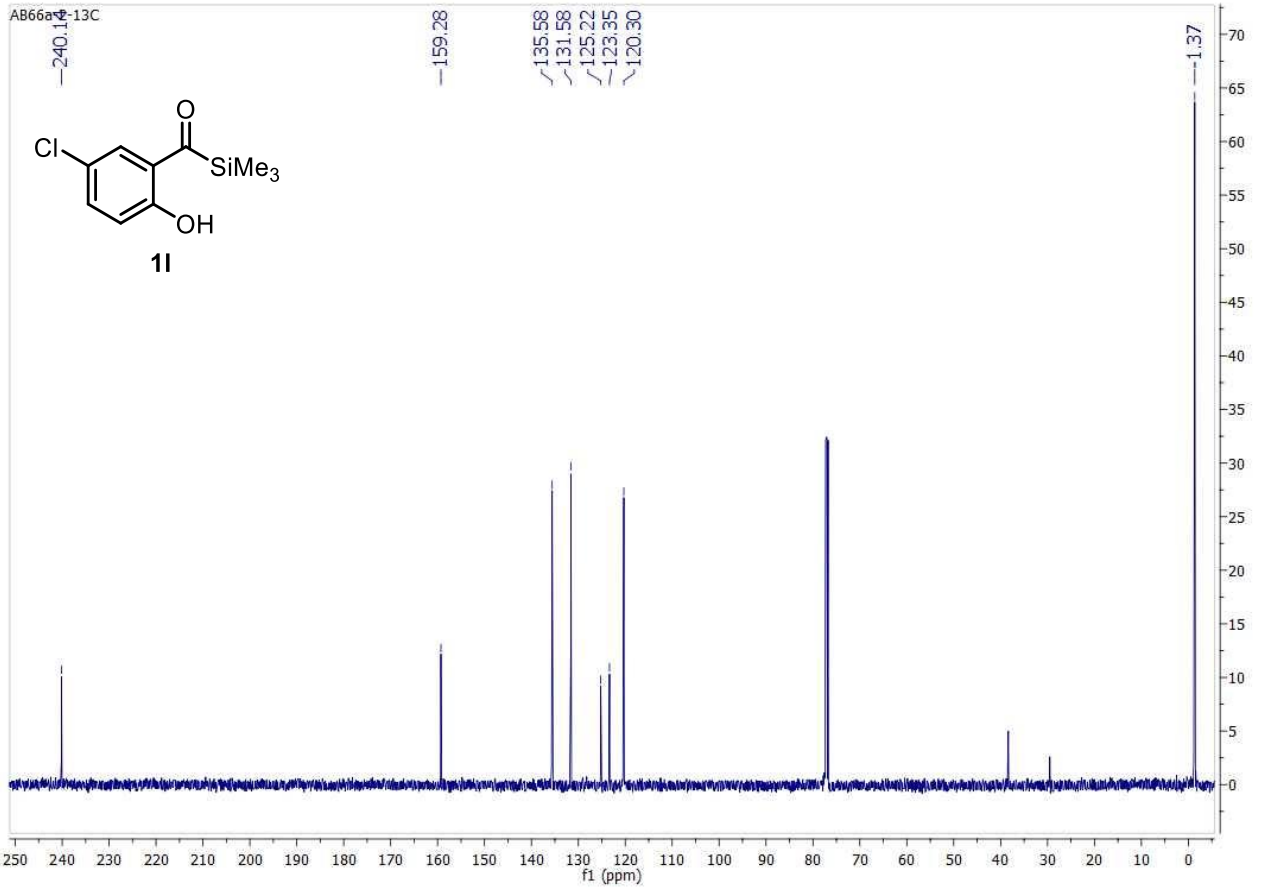

AB2a-1H
12.71
7.80
7.80
7.79
7.78
7.45
7.44
7.43
7.43
7.43
7.42
7.41
6.97
6.95
6.94
6.92
6.92
0.41
SiMe3
OH
1j
1.0
1.0
1.0
2.0
9.0
f1 (ppm)

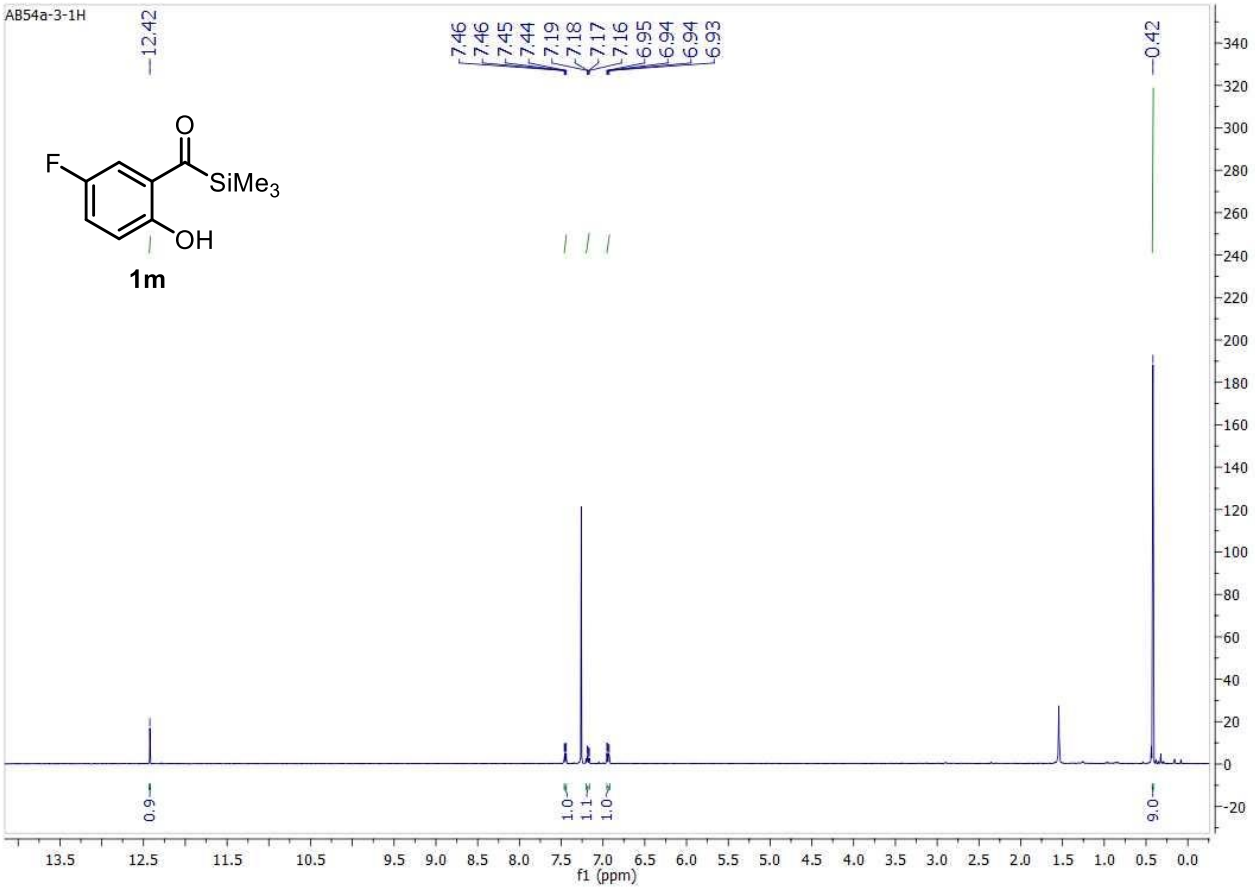

AB2a-13C
240.65
160.82
135.74
132.59
125.08
118.76
118.58
1.29
SiMe3
OH
1j
f1 (ppm)

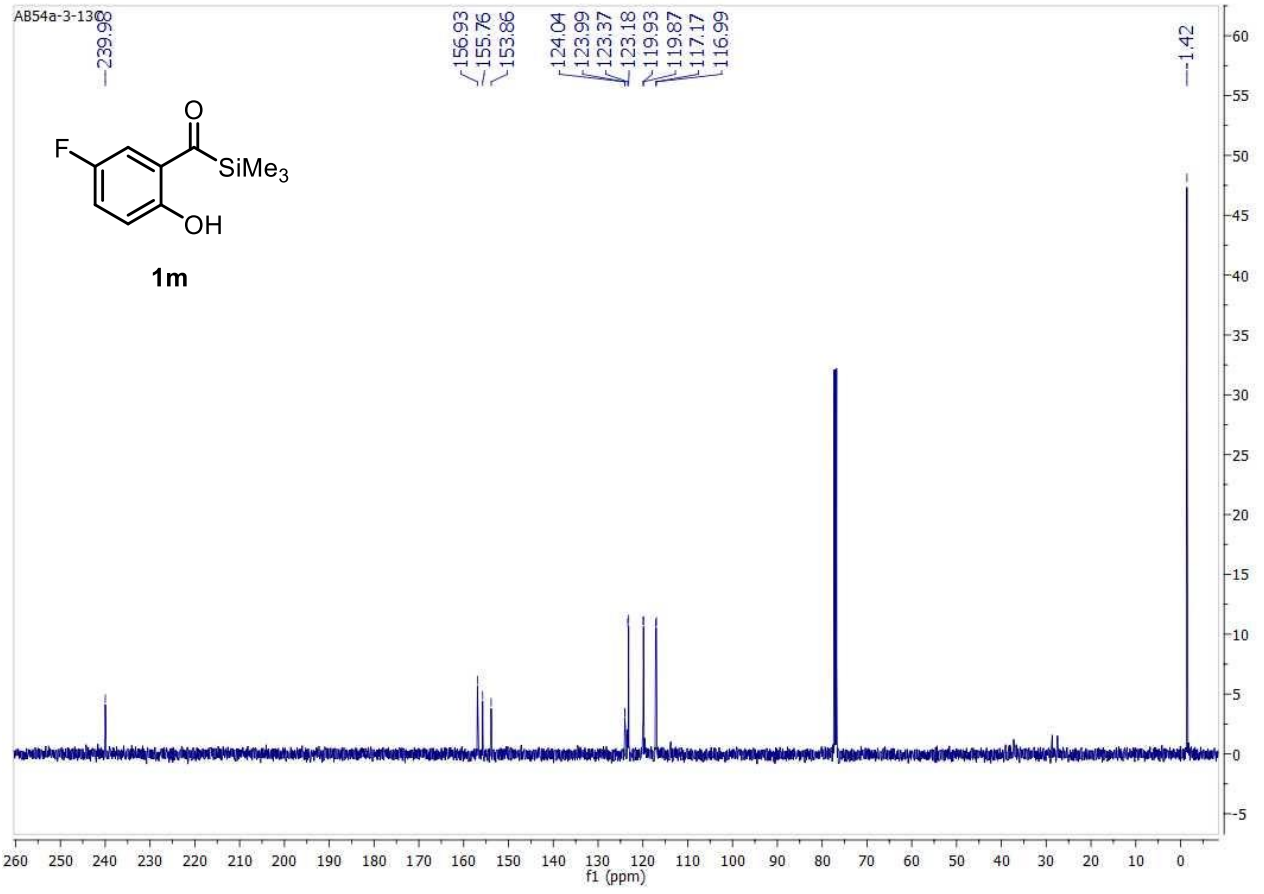

AB19a-9-1H
12.78
7.79
7.79
7.77
7.77
7.45
7.45
7.43
7.43
7.43
7.42
7.41
6.96
6.96
6.95
6.95
6.94
6.93
6.92
1.03
1.01
1.00
0.96
0.95
0.94
0.93
0.92
O
SiEt3
OH
1k
0.9
1.0
1.0
2.0
9.0
6.0
f1 (ppm)

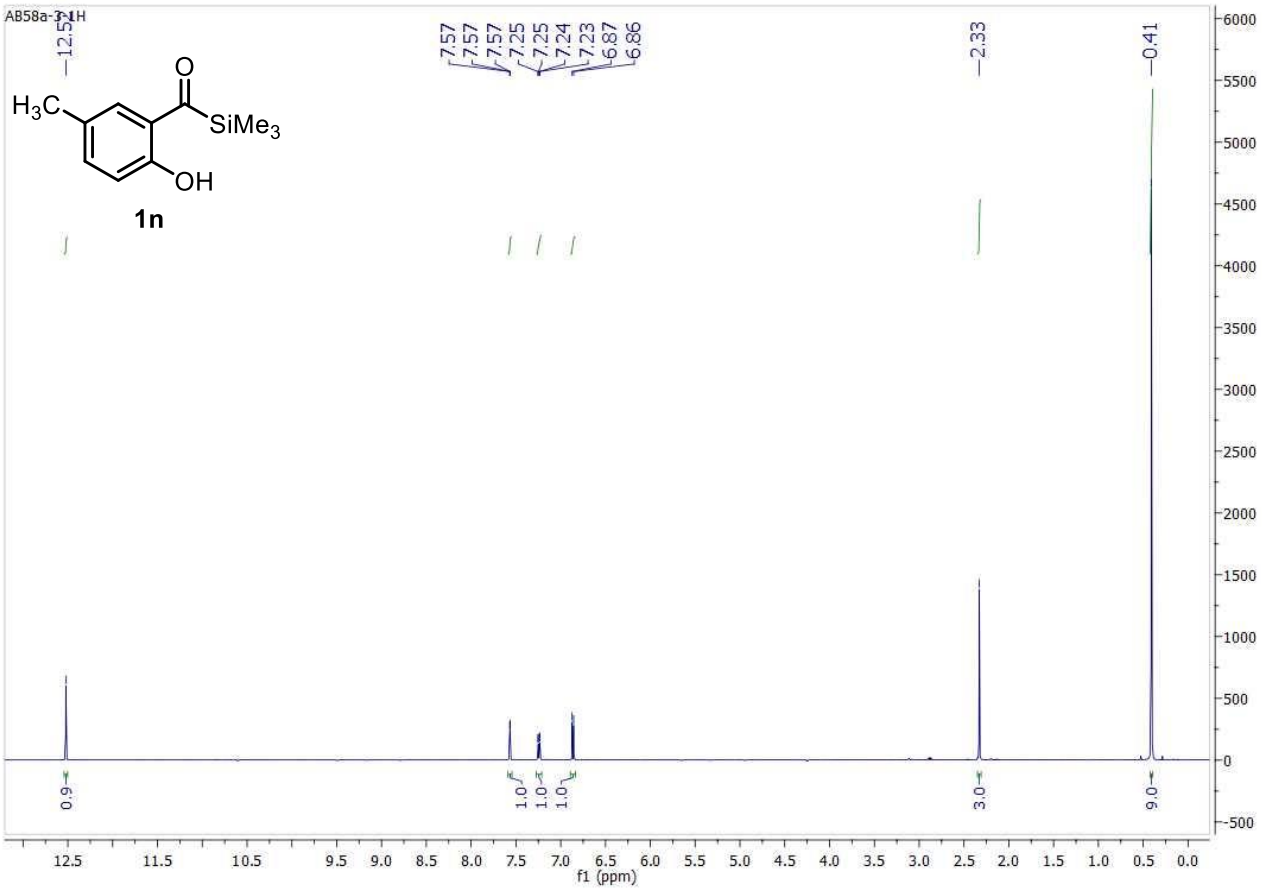

AB19a-13C
240.90
160.59
135.67
132.33
126.05
118.80
118.45
7.40
3.76
O
SiEt3
OH
1k
f1 (ppm)

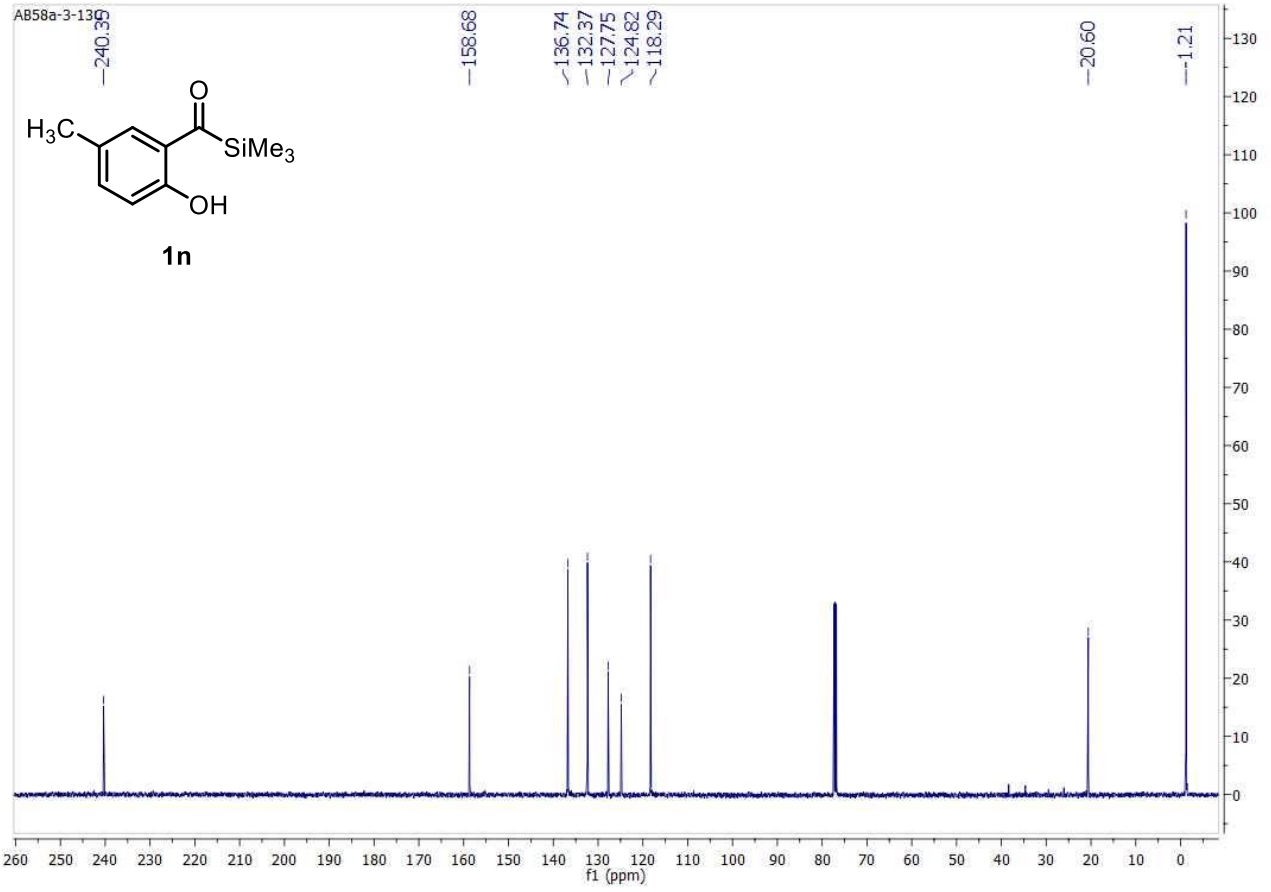

12.54
7.73
7.72
7.38
7.38
7.36
7.36
6.93
6.91
0.42
Cl
O
SiMe3
OH
1l
1.0
1.0
1.0
1.0
9.0
f1 (ppm)

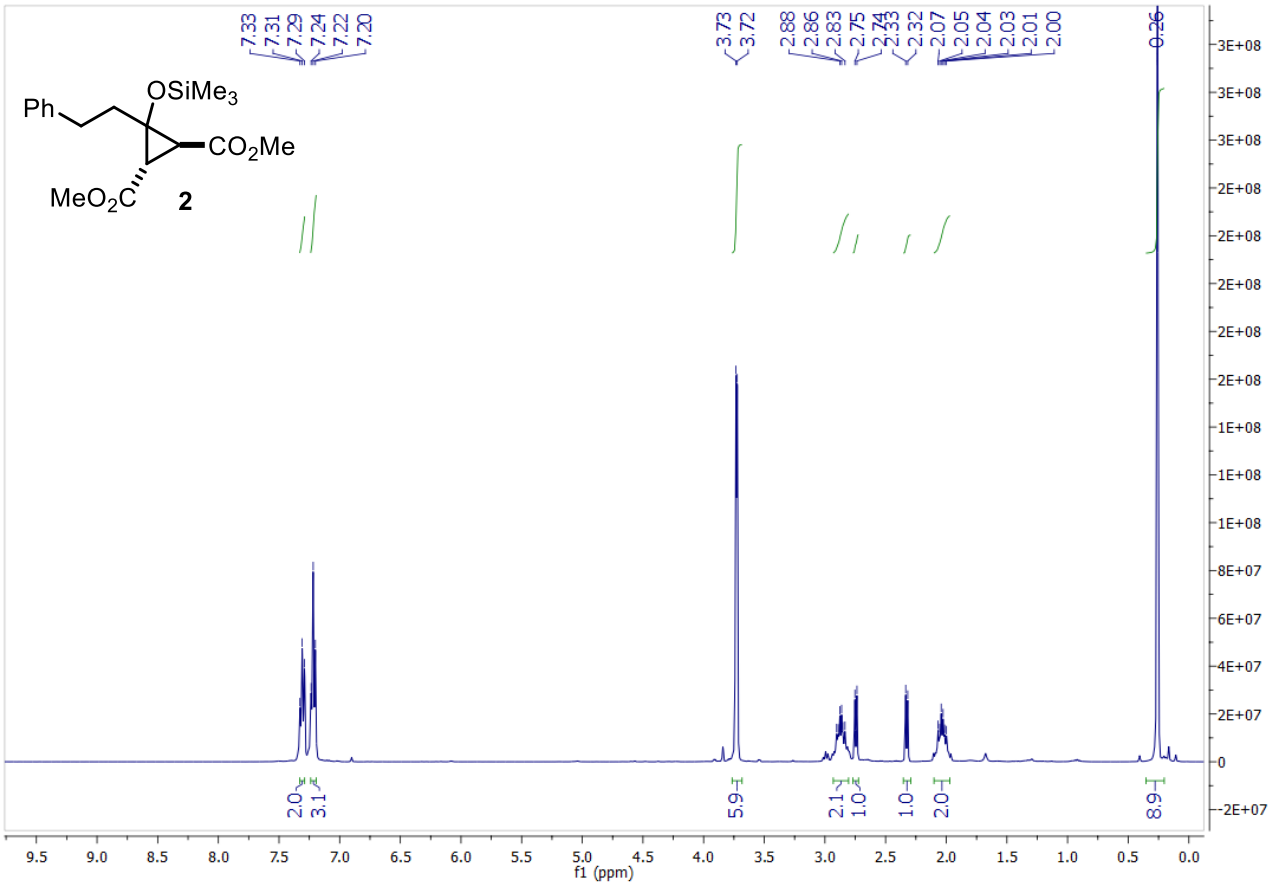

240.14
159.28
135.58
131.58
125.22
123.35
120.30
1.37
Cl
O
SiMe3
OH
1l
f1 (ppm)

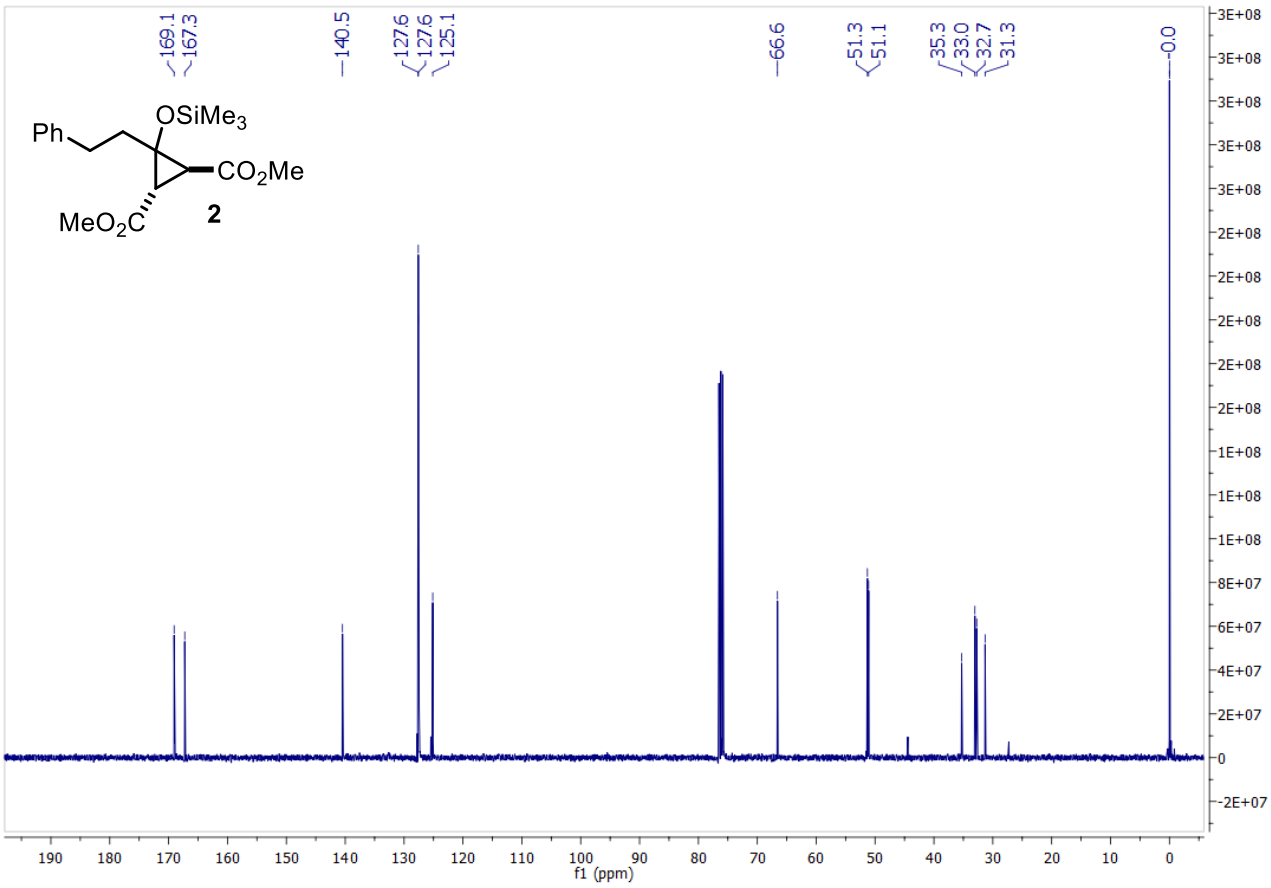

AB54a-3-1H
12.42
7.46
7.46
7.45
7.44
7.19
7.18
7.17
7.16
6.95
6.94
6.94
6.93
0.42
O
F
SiMe3
OH
1m
0.9
1.0
1.1
1.0
9.0
f1 (ppm)

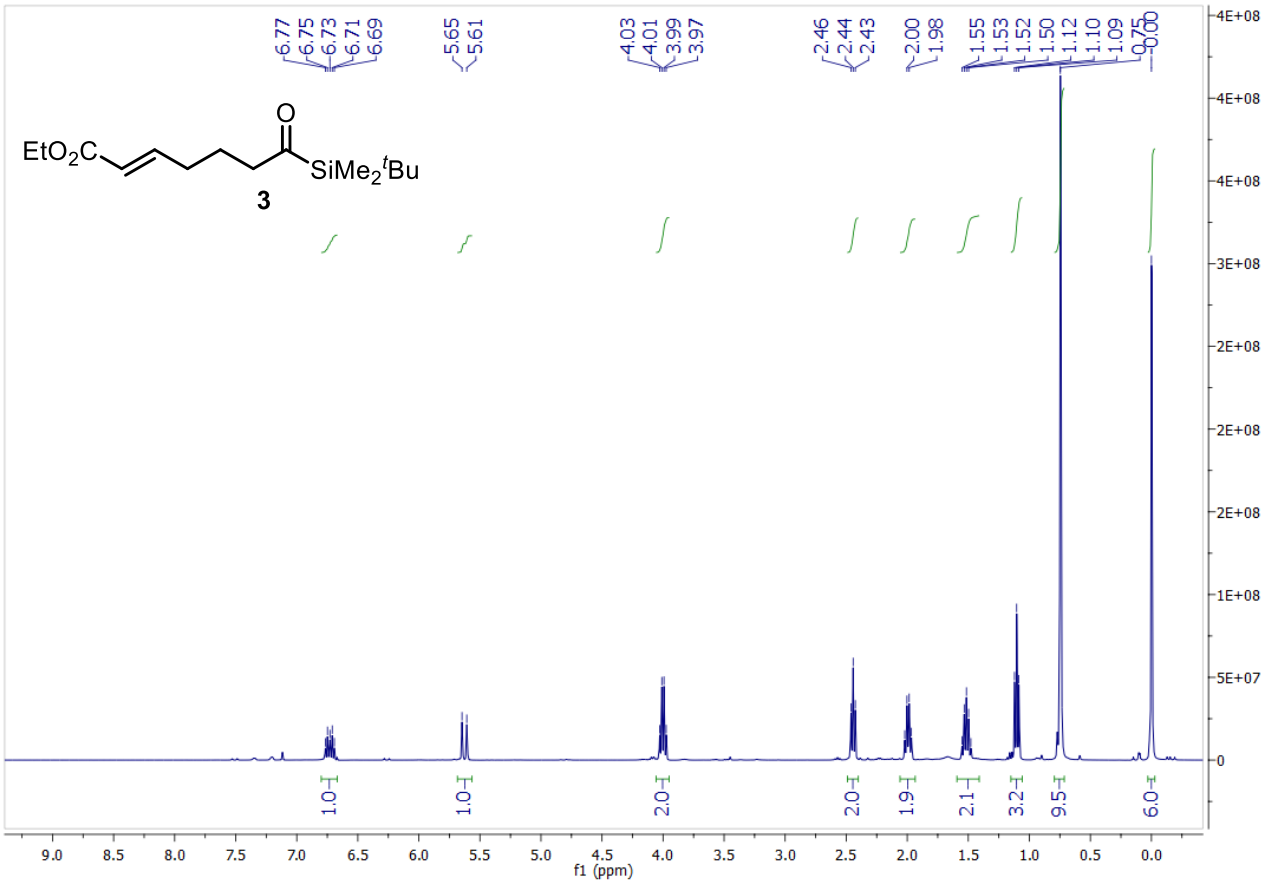

AB54a-3-13C
239.98
156.93
155.76
153.86
124.04
123.99
123.37
123.18
119.93
119.87
117.17
116.99
1.42
O
F
SiMe3
OH
1m
f1 (ppm)

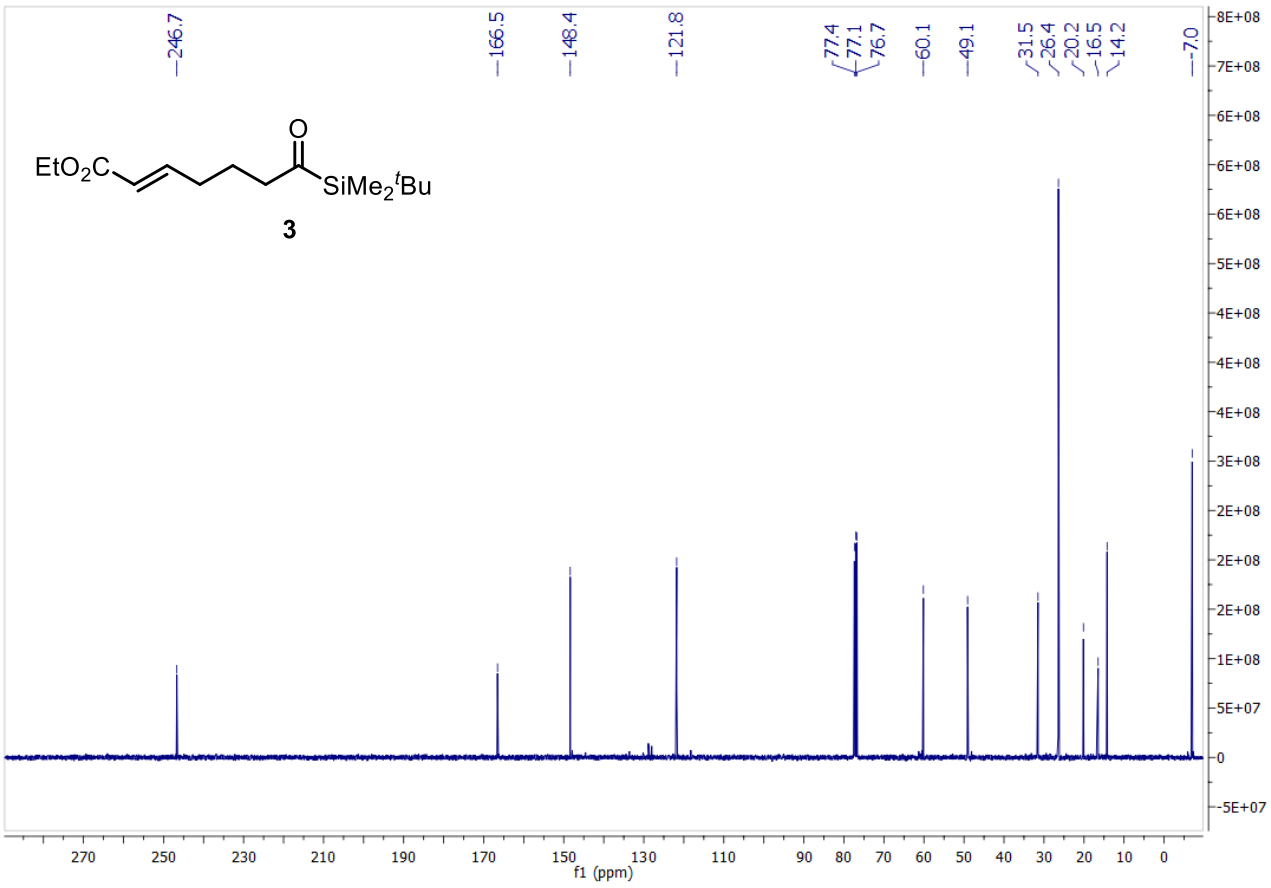

AB58a-3-1H
12.54
7.57
7.57
7.57
7.25
7.25
7.24
7.23
6.87
6.86
2.33
0.41
O
H3C
SiMe3
OH
1n
0.9
1.0
1.0
1.0
3.0
9.0
f1 (ppm)

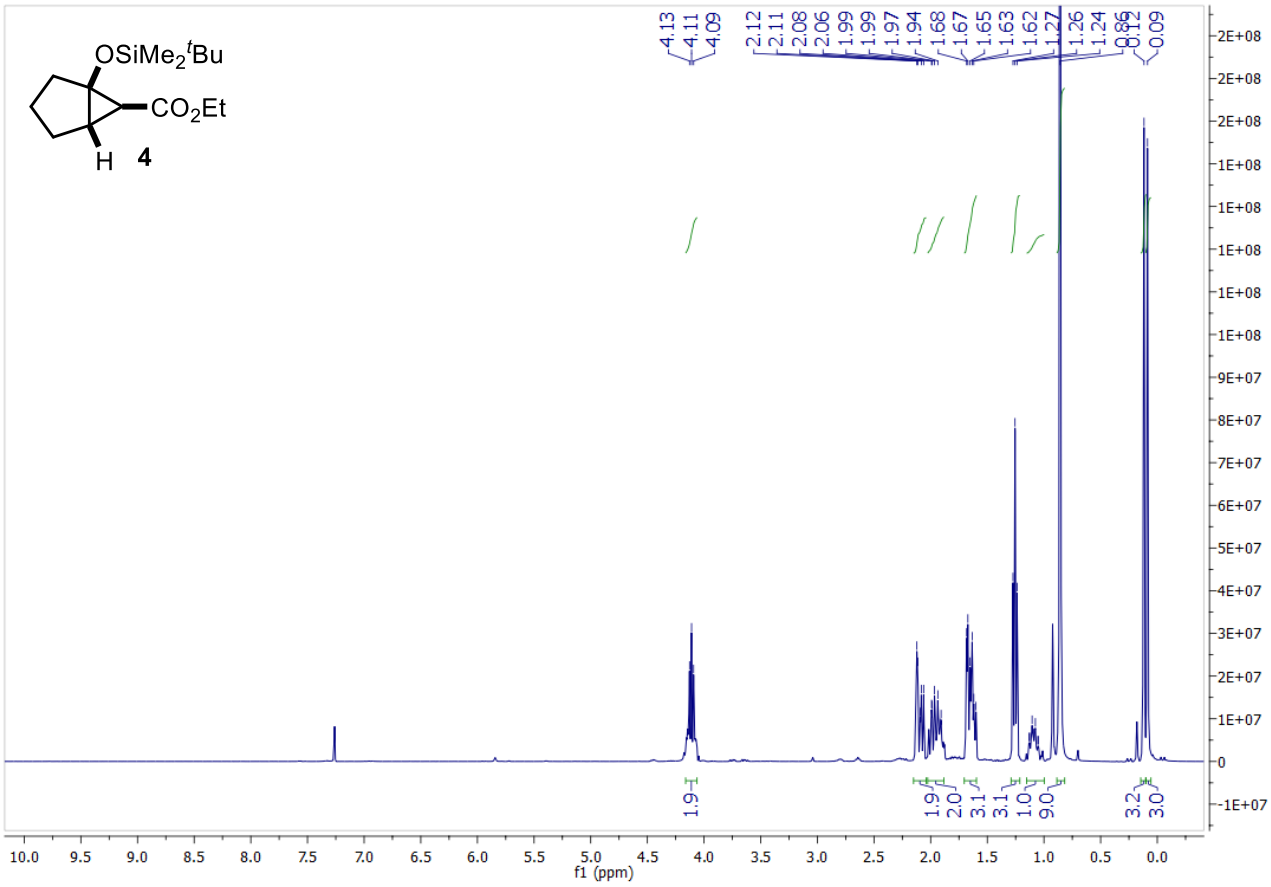

AB58a-3-13C
240.39
158.68
136.74
132.37
127.75
124.82
118.29
20.60
1.21
O
H3C
SiMe3
OH
1n
f1 (ppm)

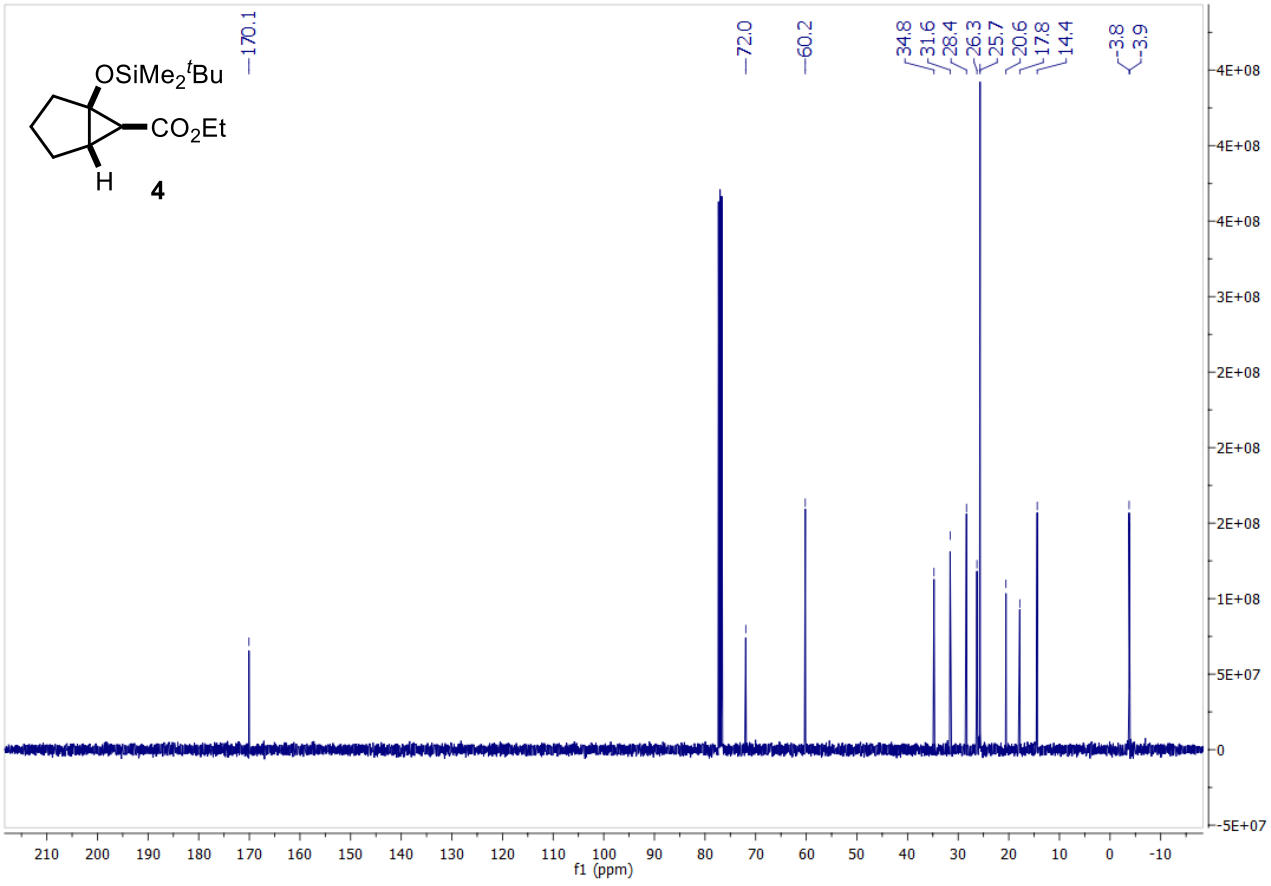

7.33
7.31
7.29
7.24
7.22
7.20
3.73
3.72
2.88
2.86
2.83
2.75
2.74
2.33
2.32
2.07
2.05
2.04
2.03
2.01
2.00
0.26
OSiMe3
Ph
CO2Me
MeO2C
2
2.0
3.1
5.9
2.1
1.0
1.0
2.0
8.9
f1 (ppm)

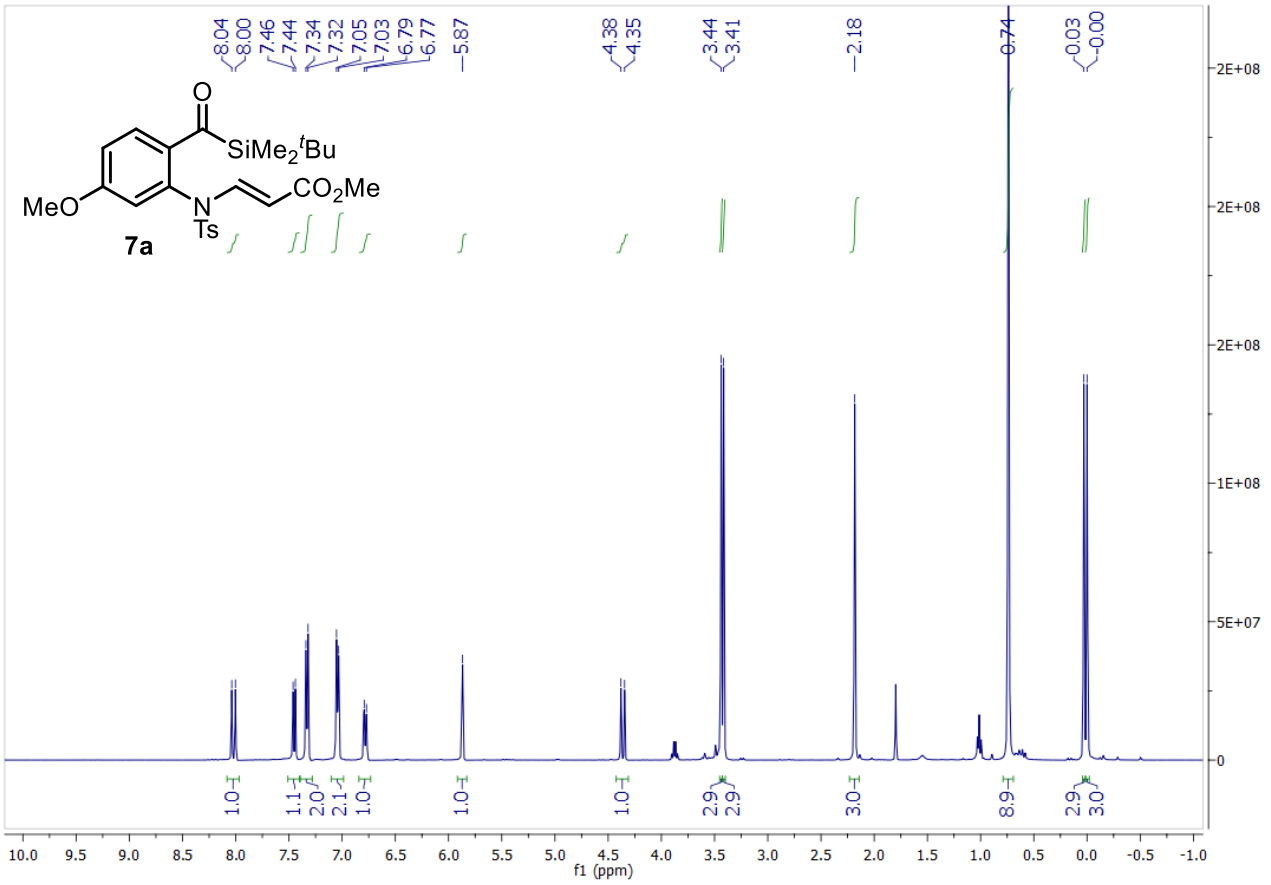

169.1
167.3
140.5
127.6
127.6
125.1
66.6
51.3
51.1
35.3
33.0
32.7
31.3
0.0
OSiMe3
Ph
CO2Me
MeO2C
2
f1 (ppm)

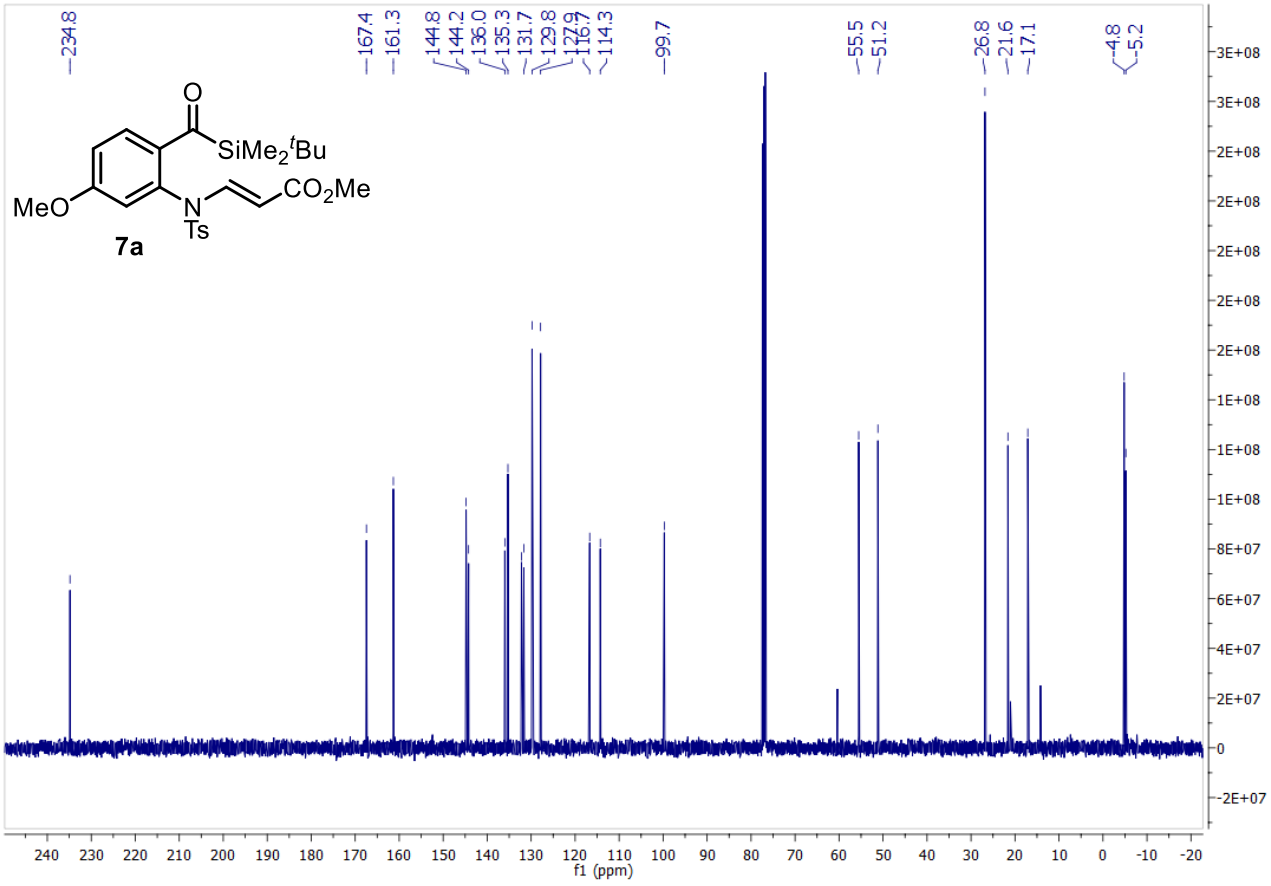

6.77
6.75
6.73
6.71
6.69
5.65
5.61
4.03
4.01
3.99
3.97
2.46
2.44
2.43
2.00
1.98
1.55
1.53
1.52
1.50
1.12
1.10
1.09
0.75
0.00
O
EtO2C
SiMe2tBu
3
1.0
1.0
2.0
2.0
1.9
2.1
3.2
9.5
6.0
f1 (ppm)

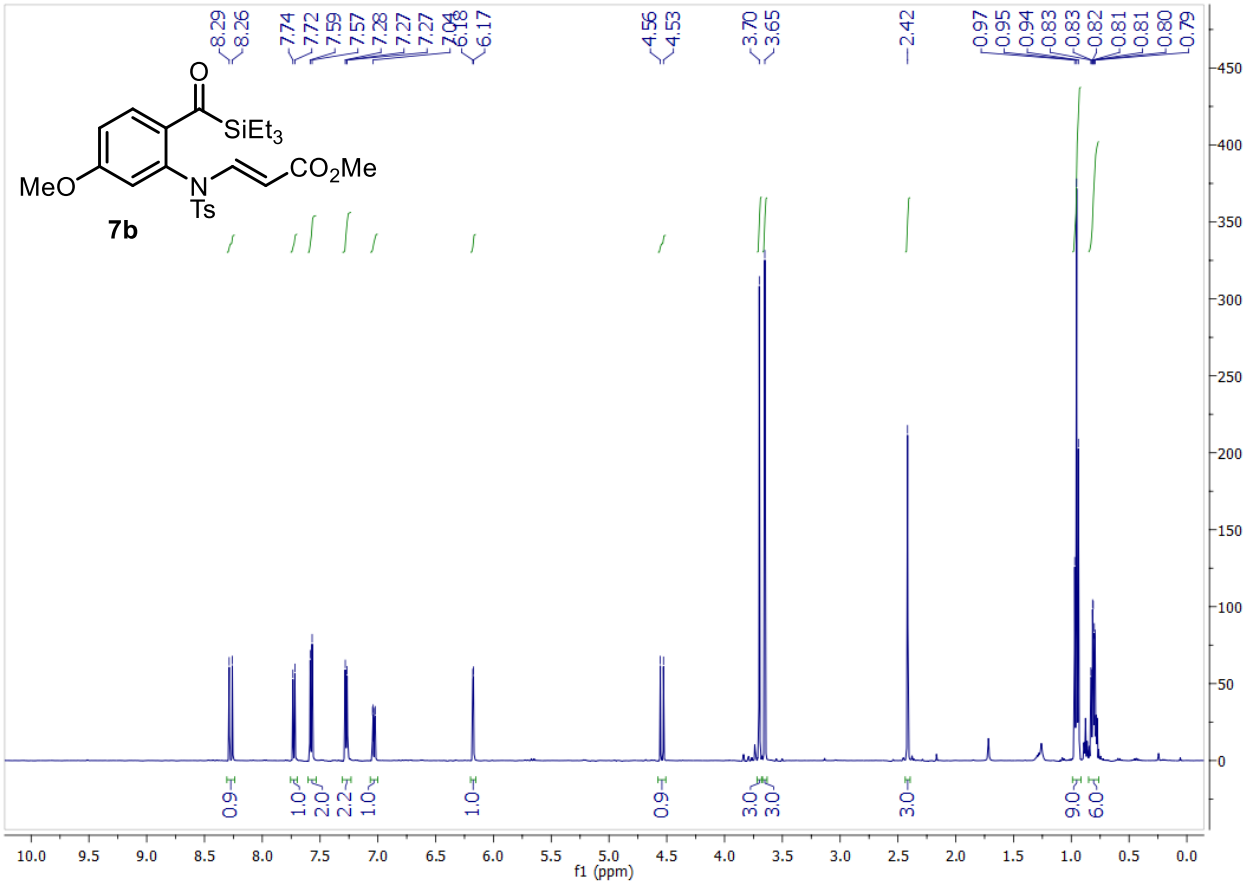

246.7
166.5
148.4
121.8
77.4
77.1
76.7
60.1
49.1
31.5
26.4
20.2
16.5
14.2
-7.0
O
EtO2C
SiMe2tBu
3
f1 (ppm)

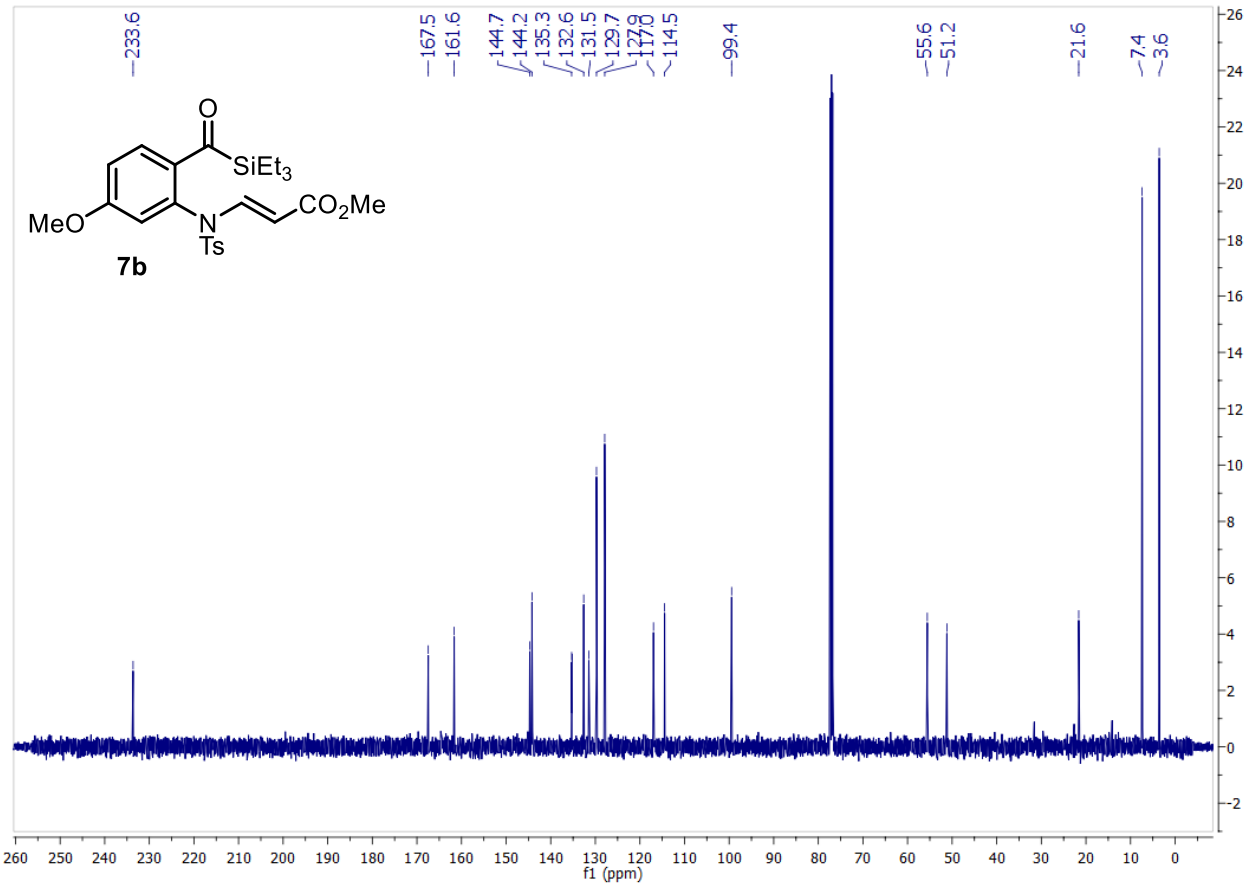

OSiMe2tBu
CO2Et
H
4
f1 (ppm)

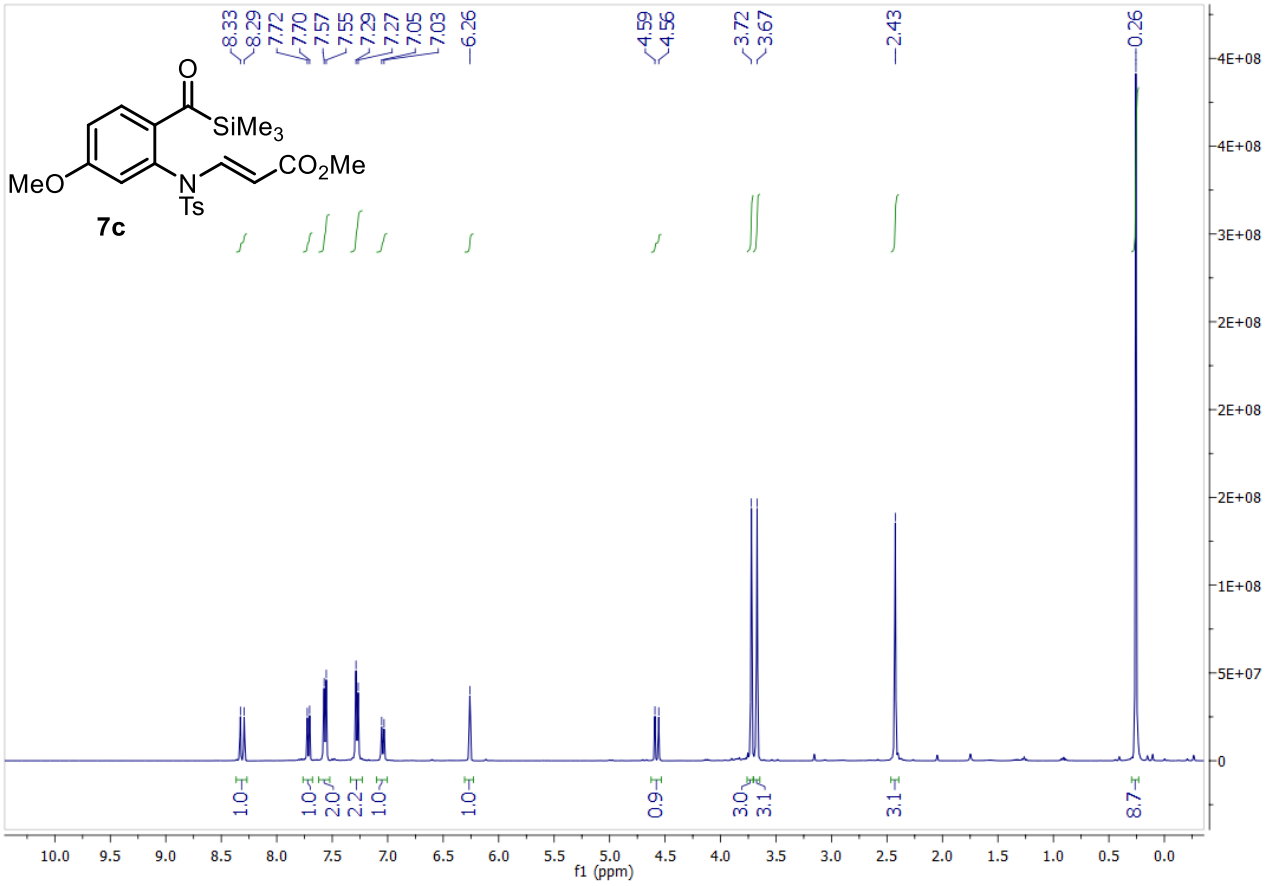

OSiMe2tBu
CO2Et
H
4
f1 (ppm)

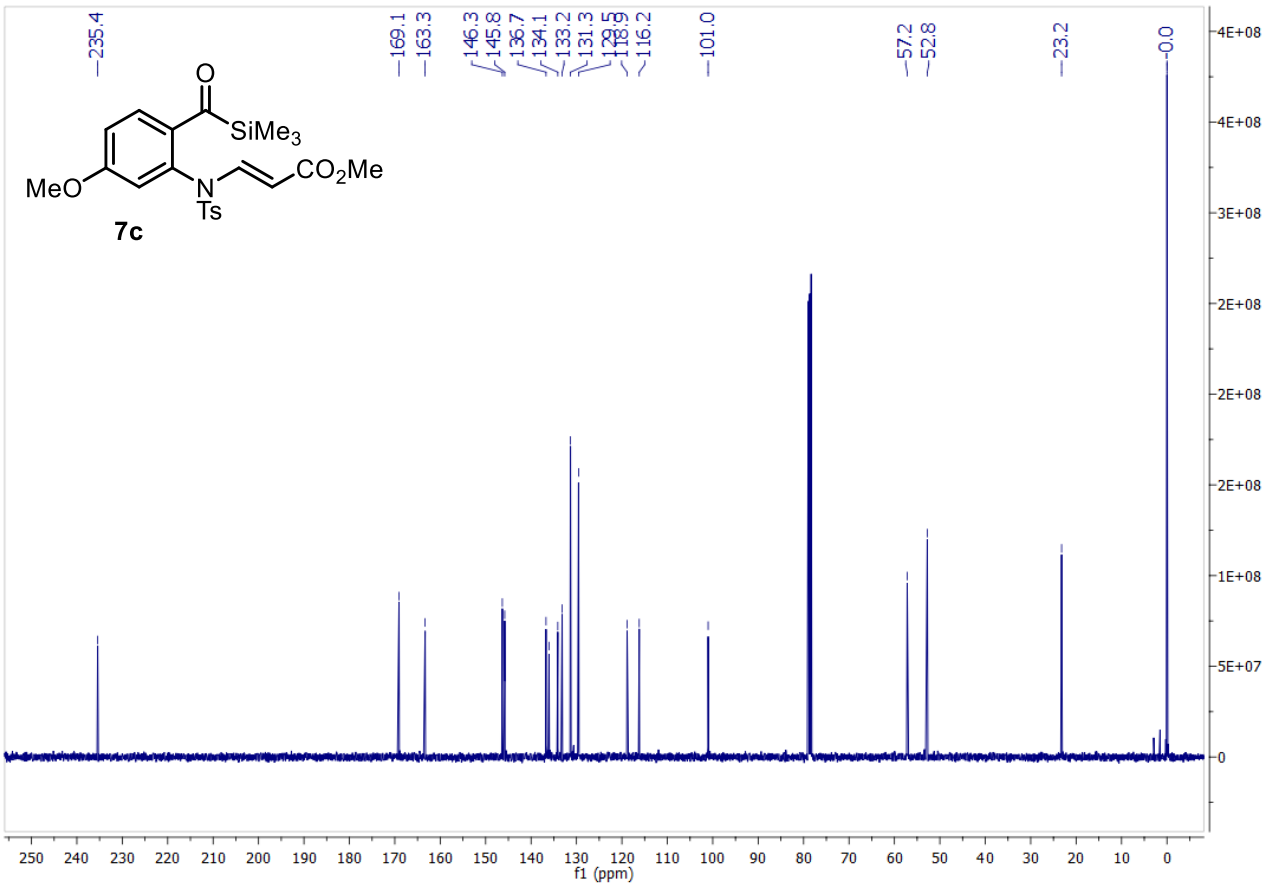

8.04
8.00
7.46
7.44
7.34
7.32
7.05
7.03
6.79
6.77
5.87
4.38
4.35
3.44
3.41
2.18
0.74
0.03
0.00
O
SiMe2tBu
MeO
N
CO2Me
Ts
7a
1.0
1.1
2.0
2.1
1.0
1.0
1.0
2.9
2.9
3.0
8.9
2.9
3.0
f1 (ppm)

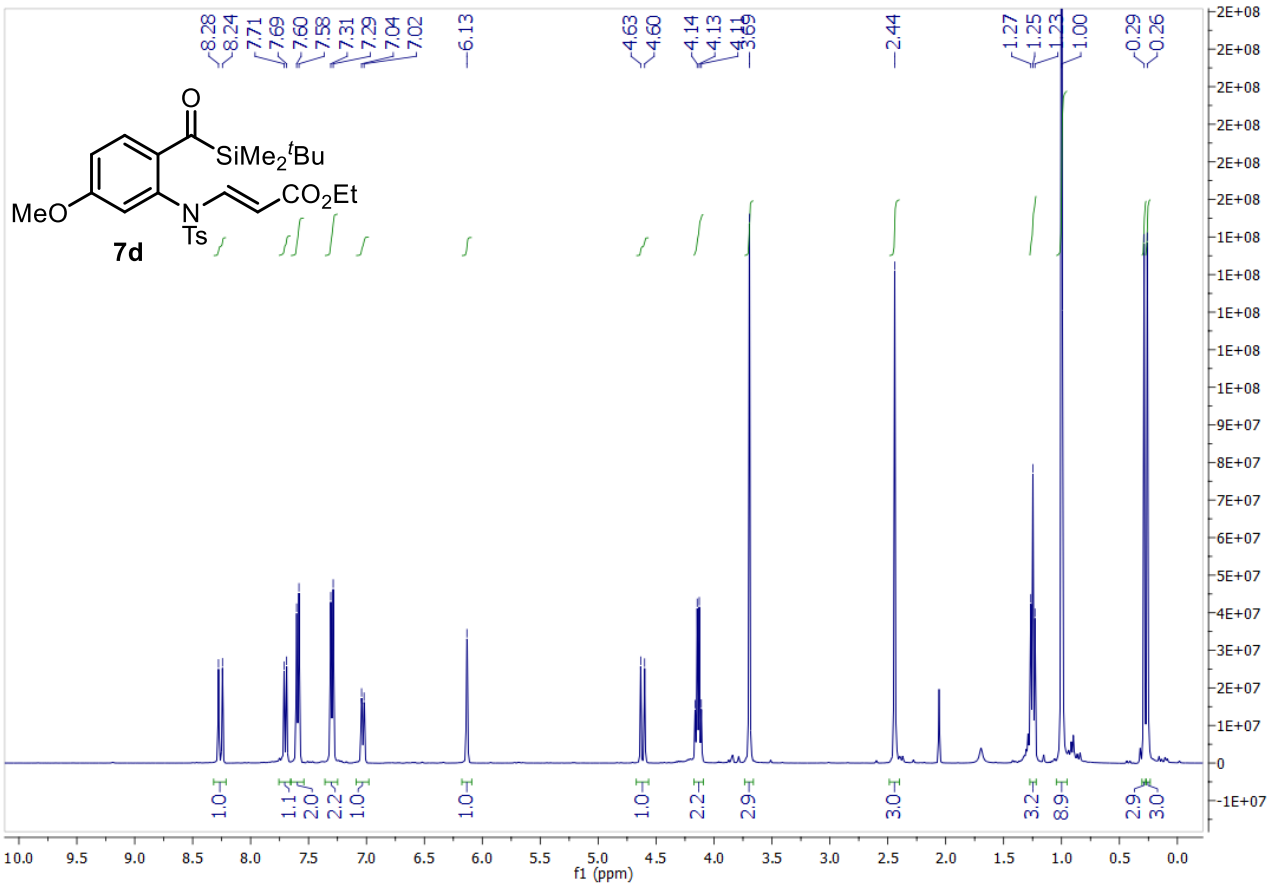

234.8
167.4
161.3
144.8
144.2
136.0
135.3
131.7
129.8
127.9
116.7
114.3
99.7
55.5
51.2
26.8
21.6
17.1
4.8
5.2
O
SiMe2tBu
MeO
N
CO2Me
Ts
7a
f1 (ppm)

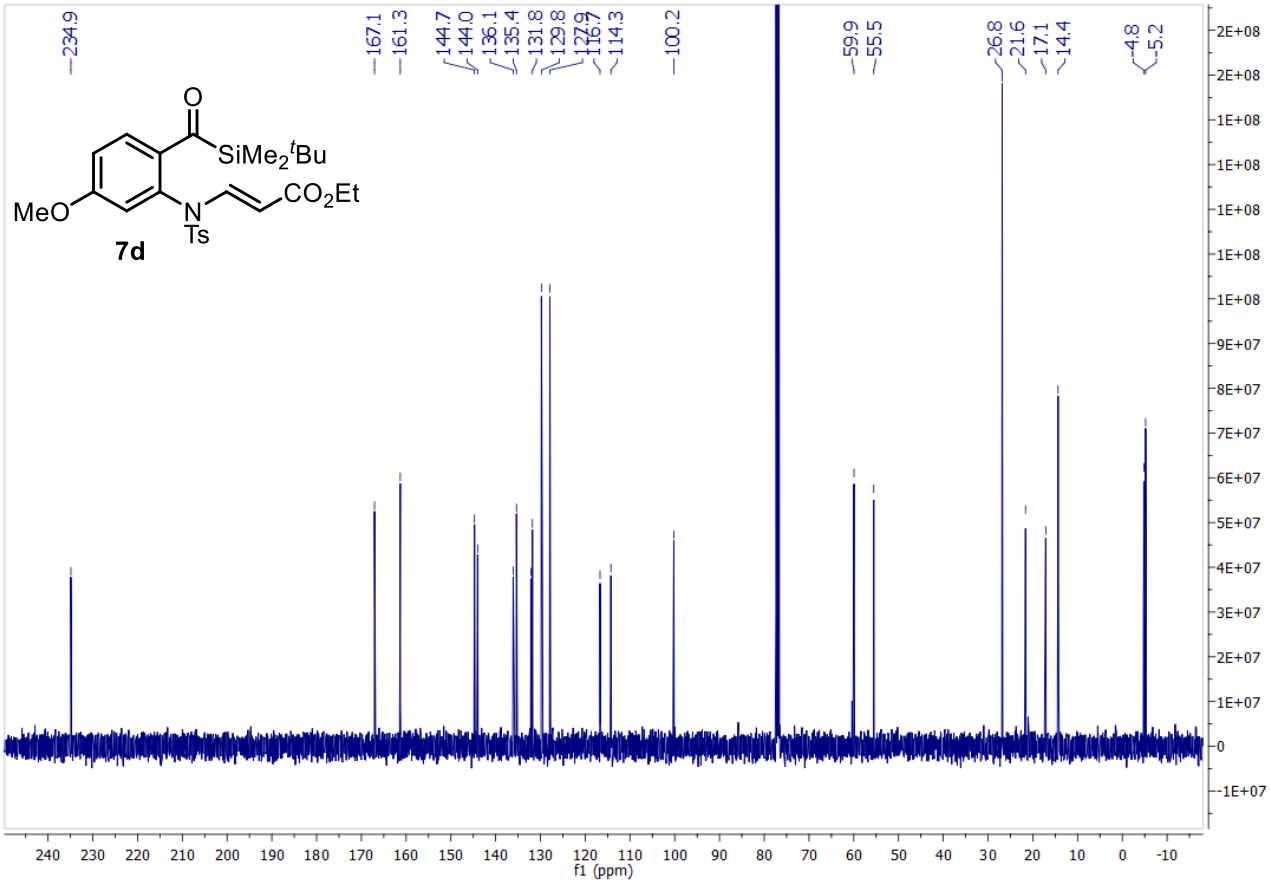

8.29
8.26
7.74
7.72
7.59
7.57
7.28
7.27
7.27
7.04
6.18
6.17
4.56
4.53
3.70
3.65
2.42
0.97
0.95
0.94
0.83
0.83
0.82
0.81
0.81
0.80
0.79
O
SiEt3
MeO
N
Ts
CO2Me
7b
0.9
1.0
2.0
2.2
1.0
1.0
0.9
3.0
3.0
3.0
9.0
6.0
f1 (ppm)

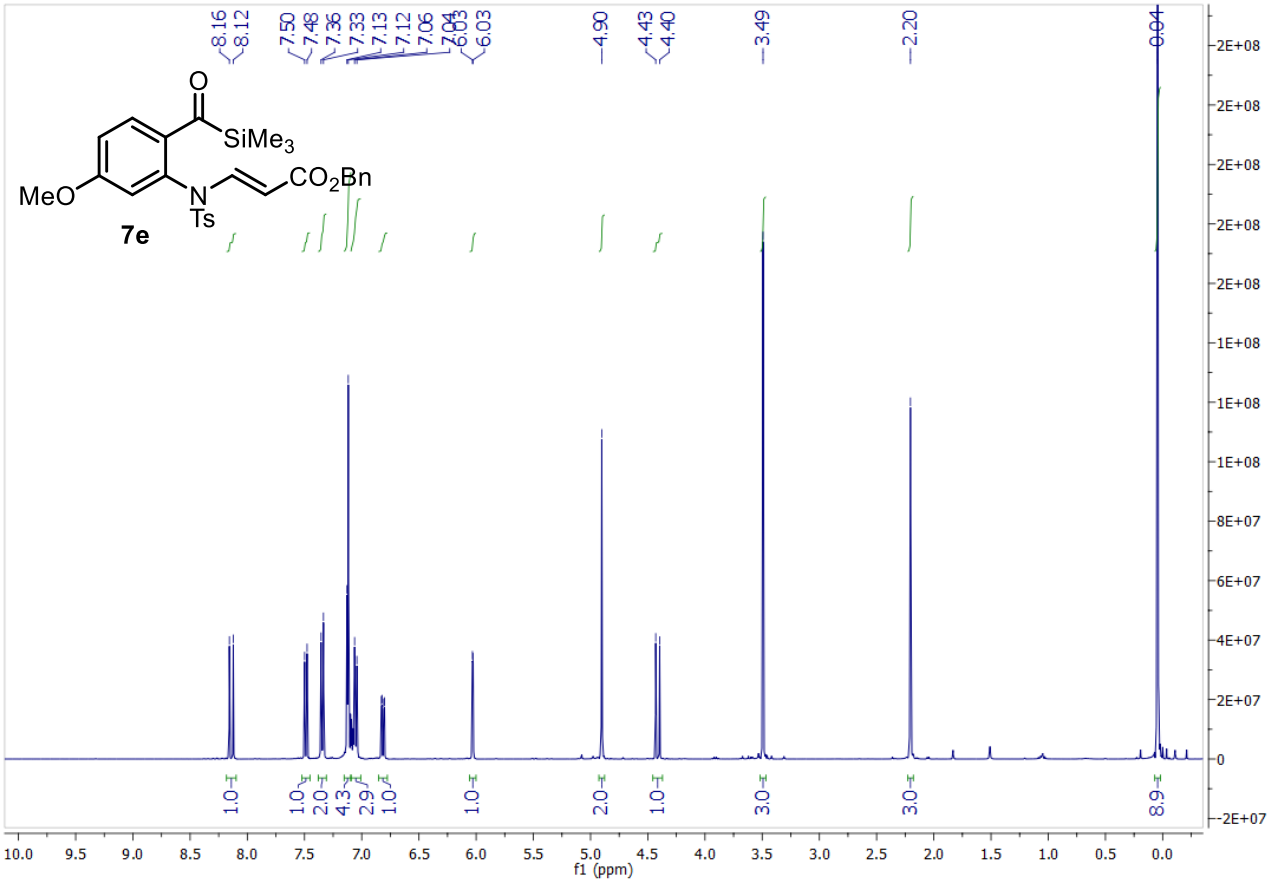

233.6
167.5
161.6
144.7
144.2
135.3
132.6
131.5
129.7
127.9
117.0
114.5
99.4
55.6
51.2
21.6
7.4
3.6
O
SiEt3
MeO
N
Ts
CO2Me
7b
f1 (ppm)

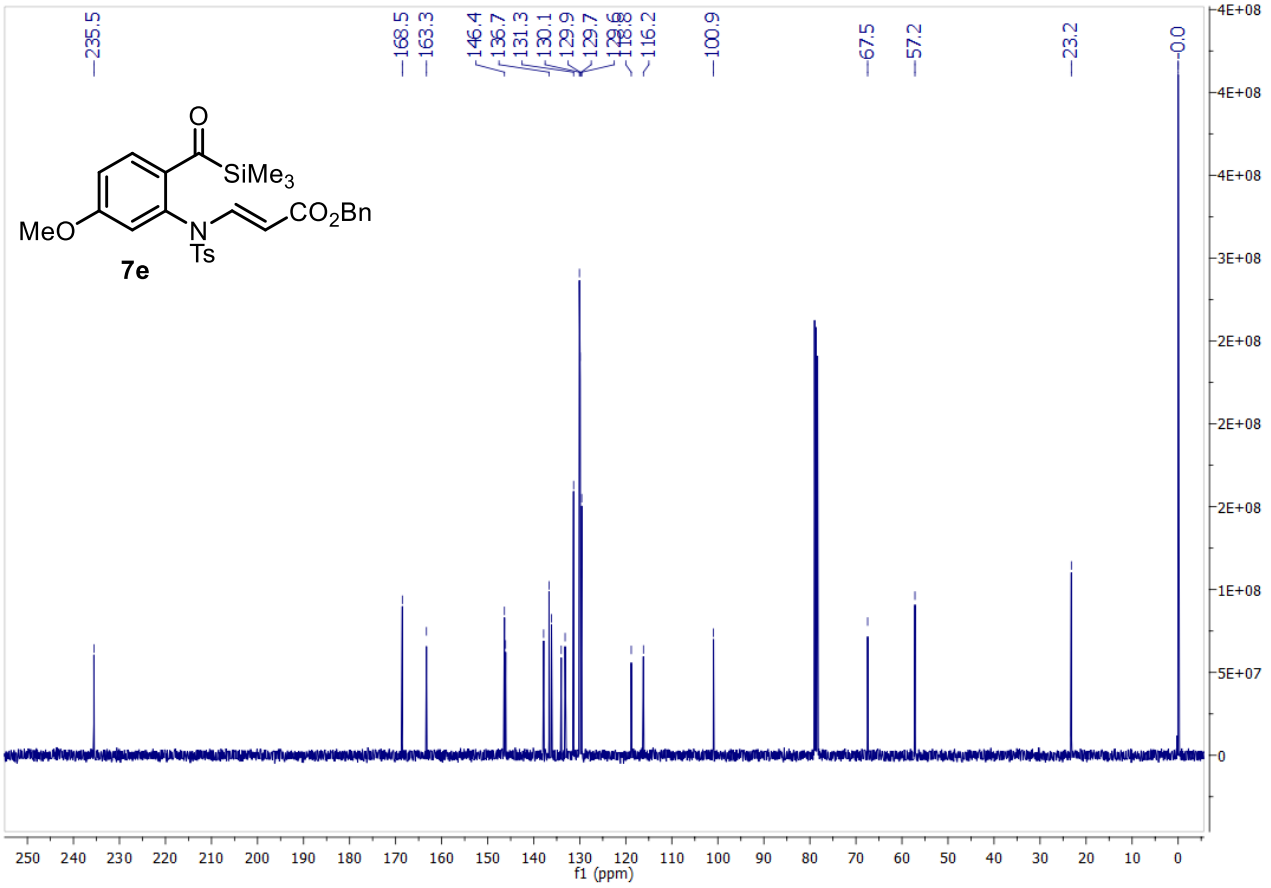

8.33
8.29
7.72
7.70
7.57
7.55
7.29
7.27
7.05
7.03
6.26
4.59
4.56
3.72
3.67
2.43
0.26
O
SiMe3
MeO
N
Ts
CO2Me
7c
1.0
1.0
2.0
2.2
1.0
1.0
0.9
3.0
3.1
3.1
8.7
f1 (ppm)

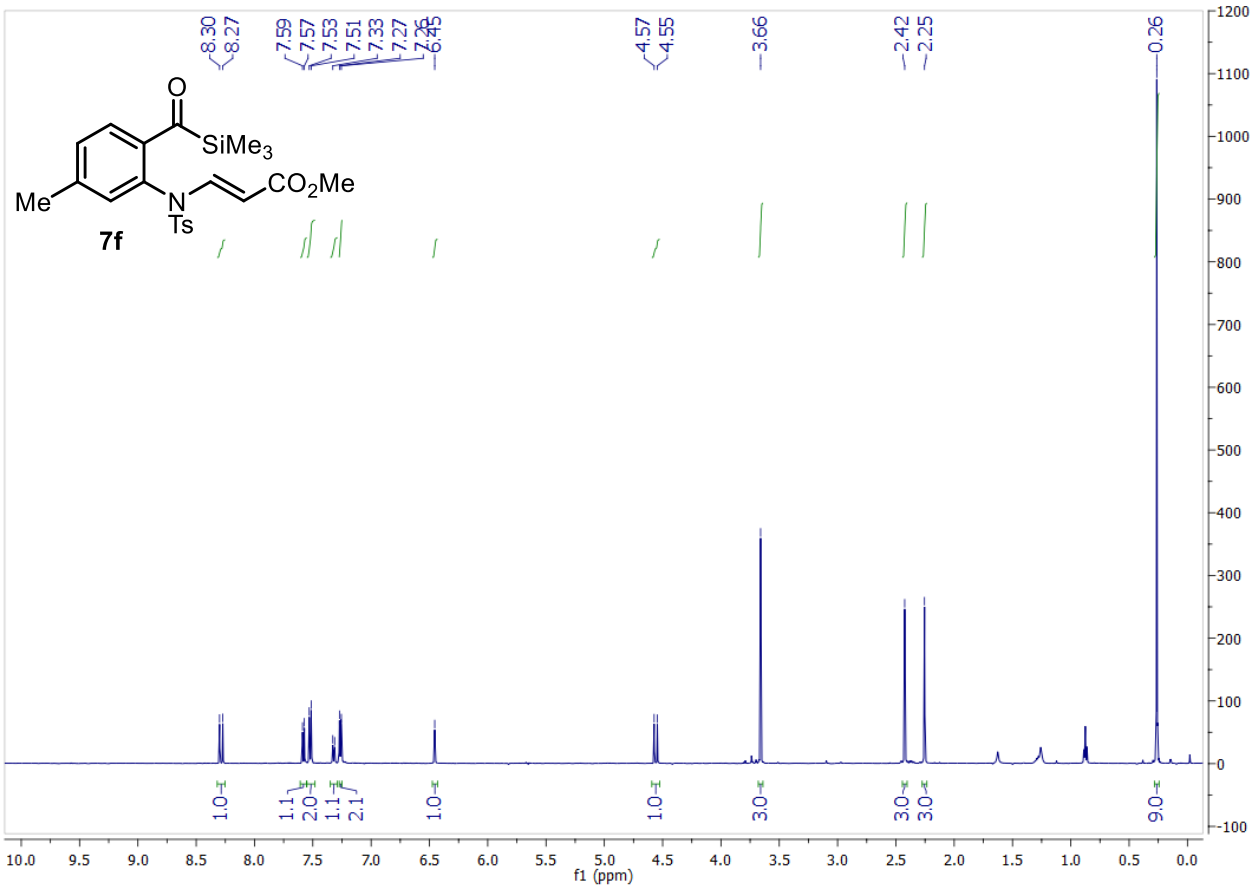

235.4
169.1
163.3
146.3
145.8
136.7
134.1
133.2
131.3
116.2
101.0
57.2
52.8
23.2
0.0
O
SiMe3
MeO
N
Ts
CO2Me
7c
f1 (ppm)

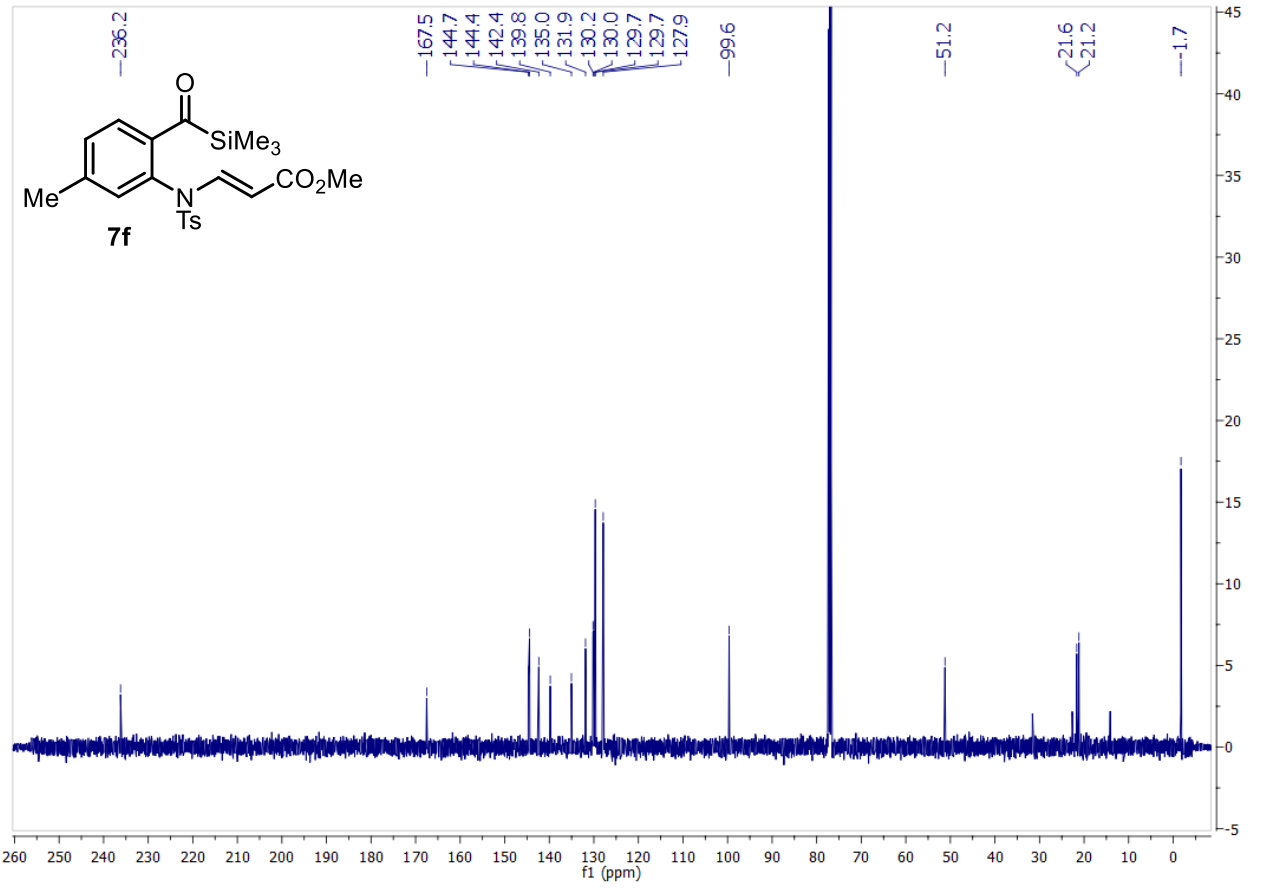

8.28
8.24
7.71
7.69
7.60
7.58
7.31
7.29
7.04
7.02
6.13
4.63
4.60
4.14
4.13
4.11
3.69
2.44
1.27
1.25
1.23
1.00
0.29
0.26
SiMe2tBu
MeO
N
Ts
CO2Et
7d
f1 (ppm)

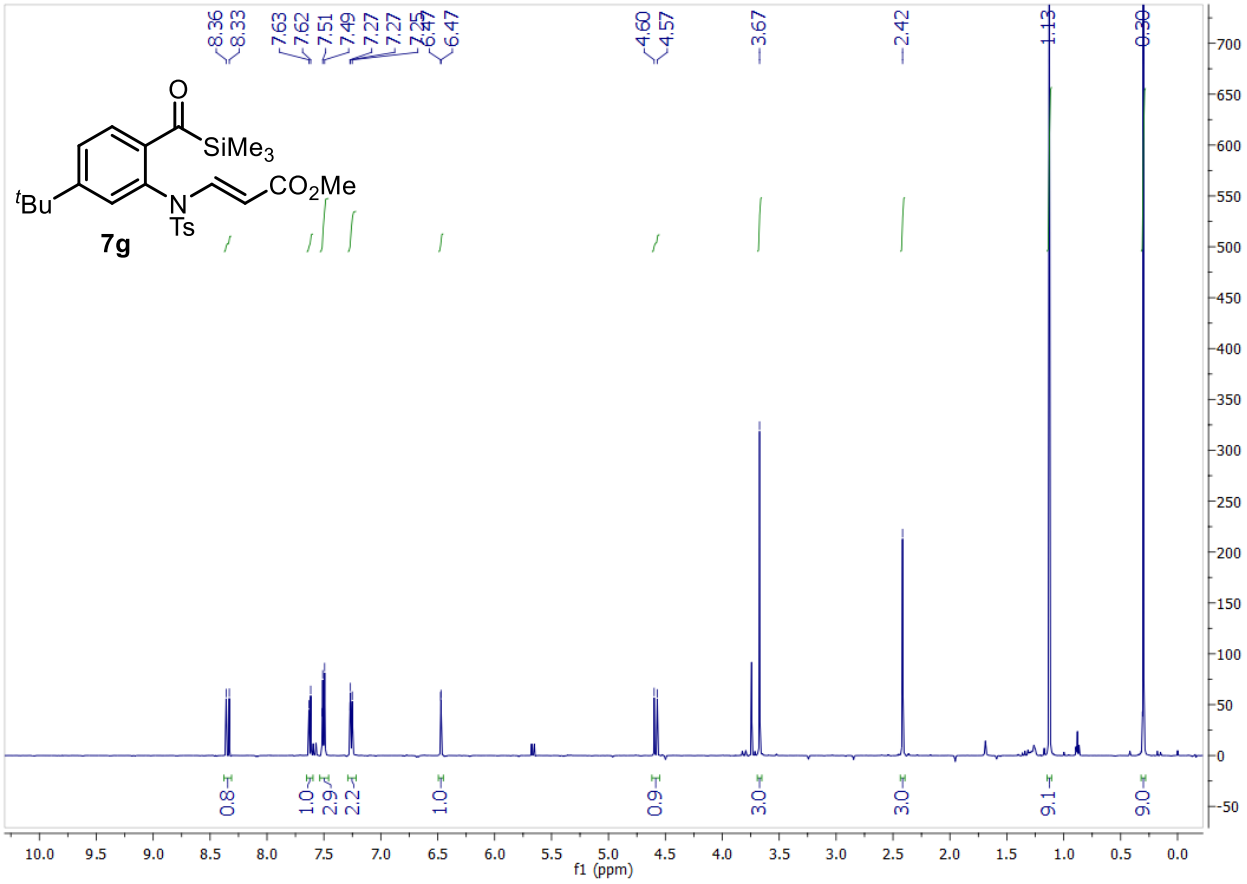

234.9
167.1
161.3
144.7
144.0
136.1
135.4
131.8
129.8
127.9
116.7
114.3
100.2
59.9
55.5
26.8
21.6
17.1
14.4
4.8
5.2
SiMe2tBu
MeO
N
Ts
CO2Et
7d
f1 (ppm)

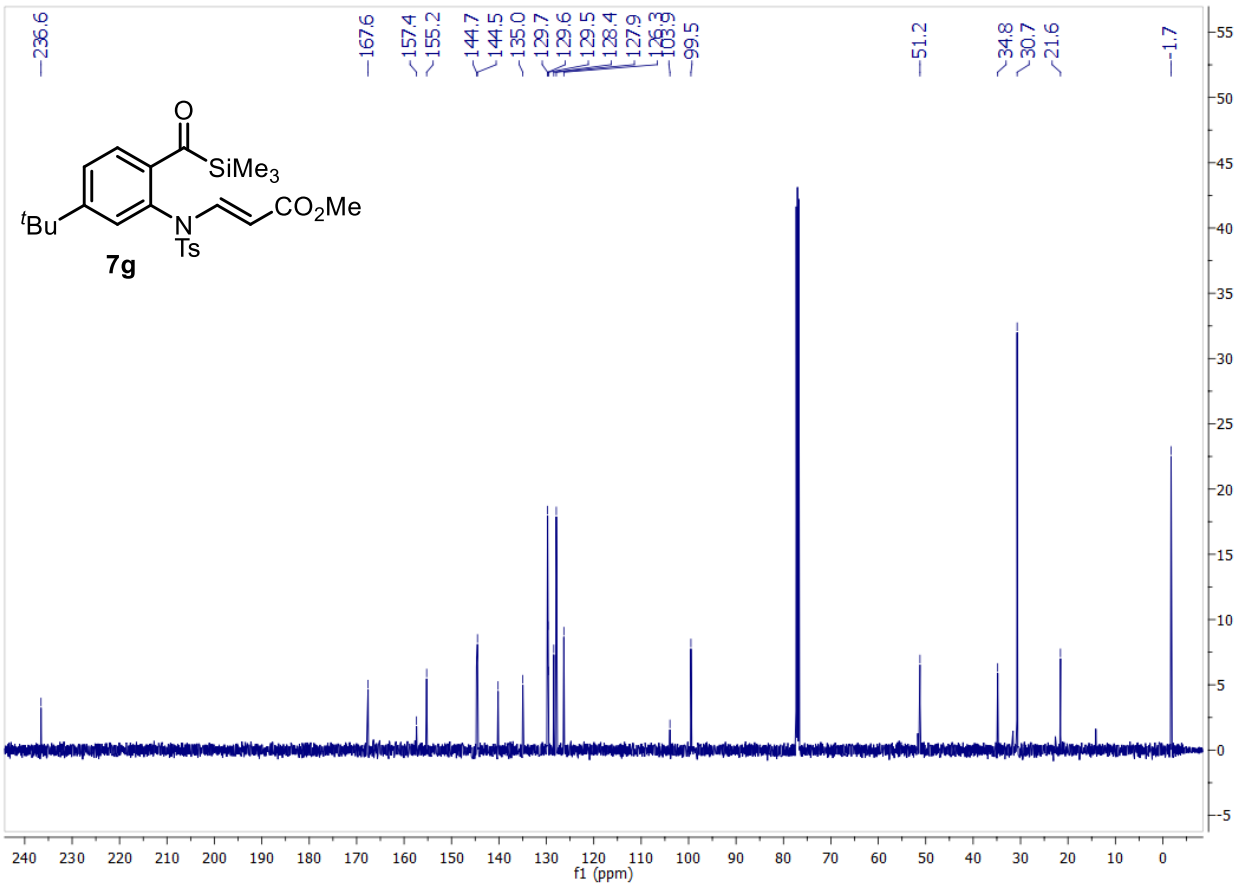

8.16
8.12
7.50
7.48
7.36
7.33
7.13
7.12
7.06
7.04
6.03
4.90
4.43
4.40
3.49
2.20
0.04
O
SiMe3
MeO
N
Ts
CO2Bn
7e
1.0
1.0
2.0
4.3
2.9
1.0
1.0
2.0
1.0
3.0
3.0
8.9
f1 (ppm)

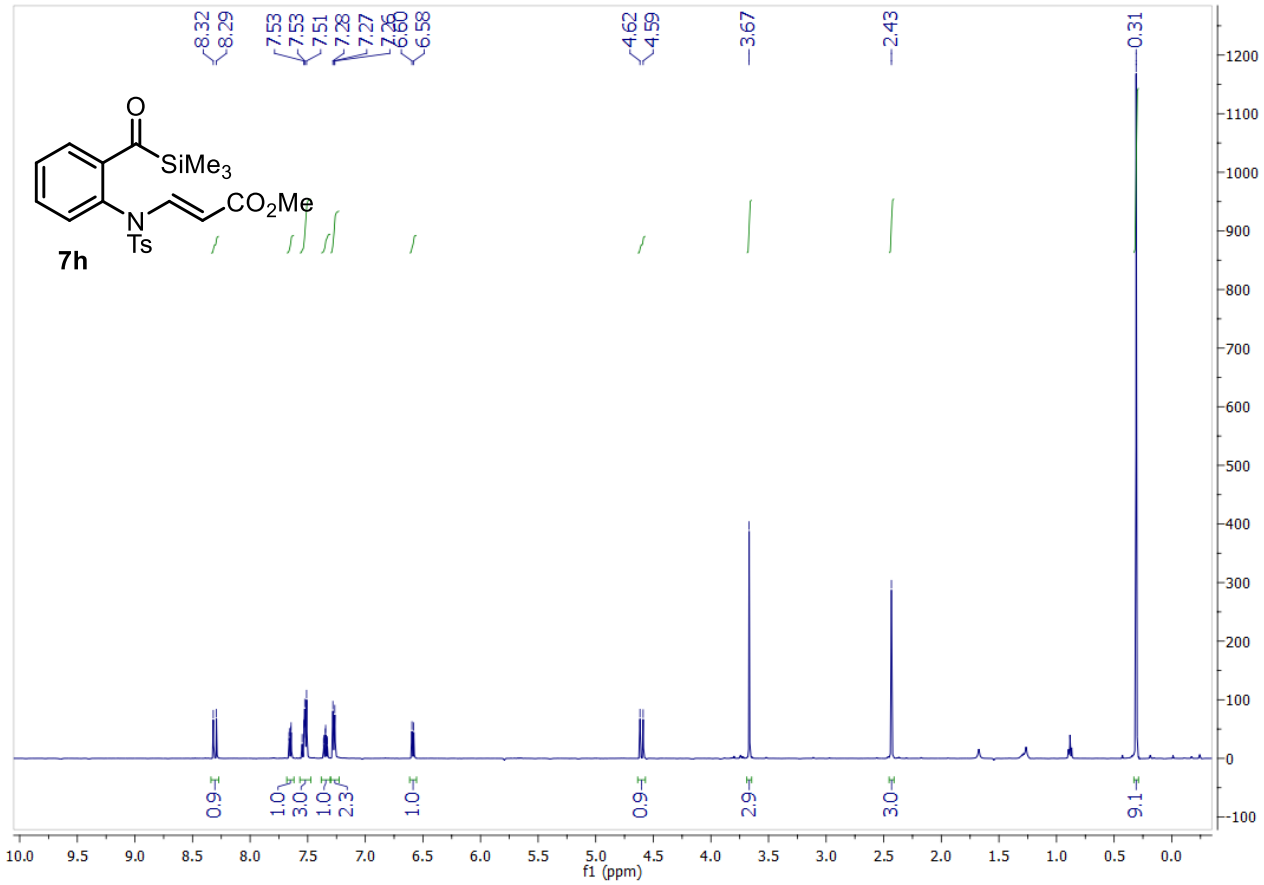

235.5
168.5
163.3
146.4
136.7
131.3
130.1
129.9
129.7
128.6
118.8
116.2
100.9
67.5
57.2
23.2
0.0
O
SiMe3
MeO
N
Ts
CO2Bn
7e
f1 (ppm)

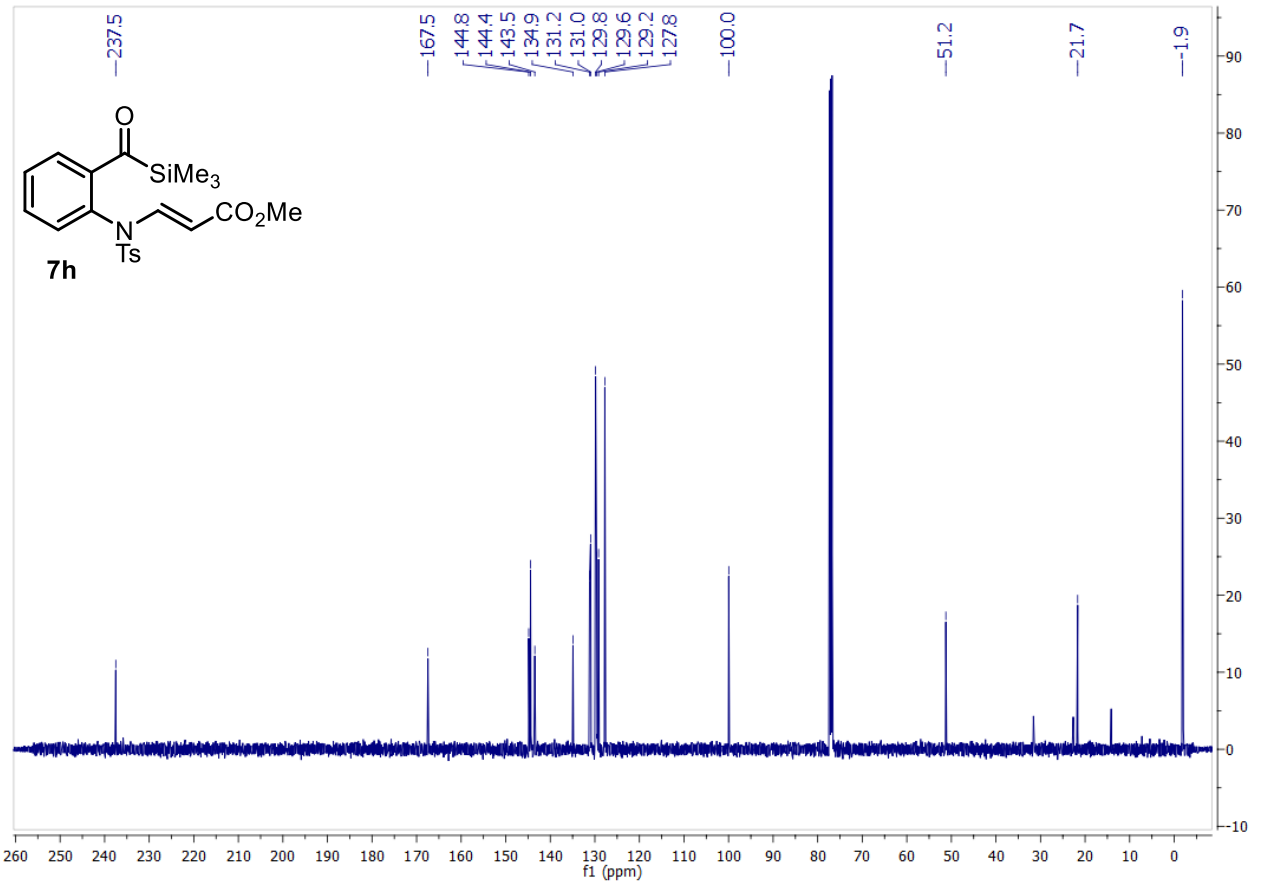

8.30
8.27
7.59
7.57
7.53
7.51
7.33
7.27
6.45
4.57
4.55
3.66
2.42
2.25
0.26
O
SiMe3
Me
N
Ts
CO2Me
7f
1.0
1.1
2.0
1.1
2.1
1.0
1.0
3.0
3.0
3.0
9.0
f1 (ppm)

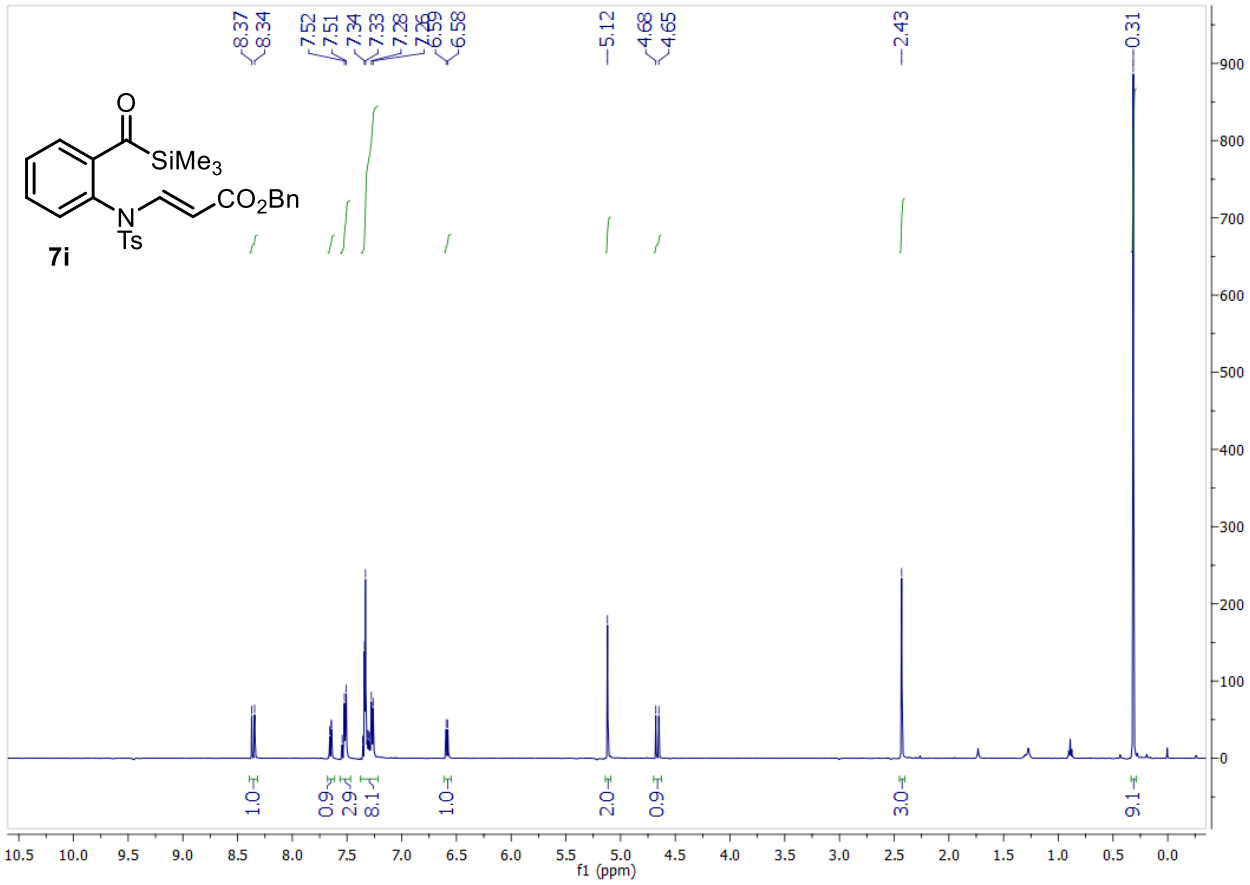

236.2
167.5
144.7
144.4
142.4
139.8
135.0
131.9
130.2
130.0
129.7
129.7
127.9
99.6
51.2
21.6
21.2
1.7
O
SiMe3
Me
N
Ts
CO2Me
7f
f1 (ppm)

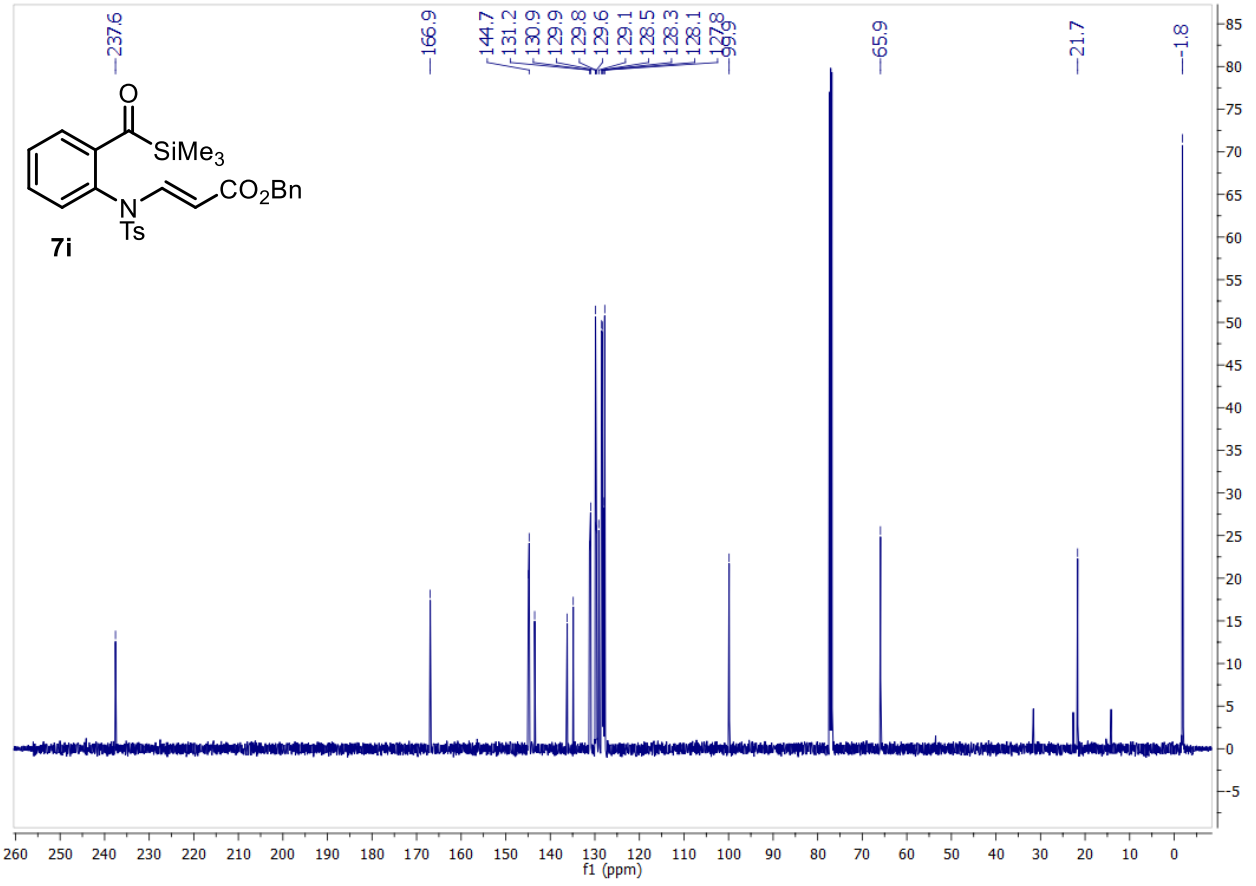

8.36
8.33
7.63
7.62
7.51
7.49
7.27
7.27
7.25
6.47
6.47
4.60
4.57
3.67
2.42
1.13
0.30
O
SiMe3
tBu
N
Ts
CO2Me
7g
0.8
1.0
2.9
2.2
1.0
0.9
3.0
3.0
9.1
9.0
f1 (ppm)

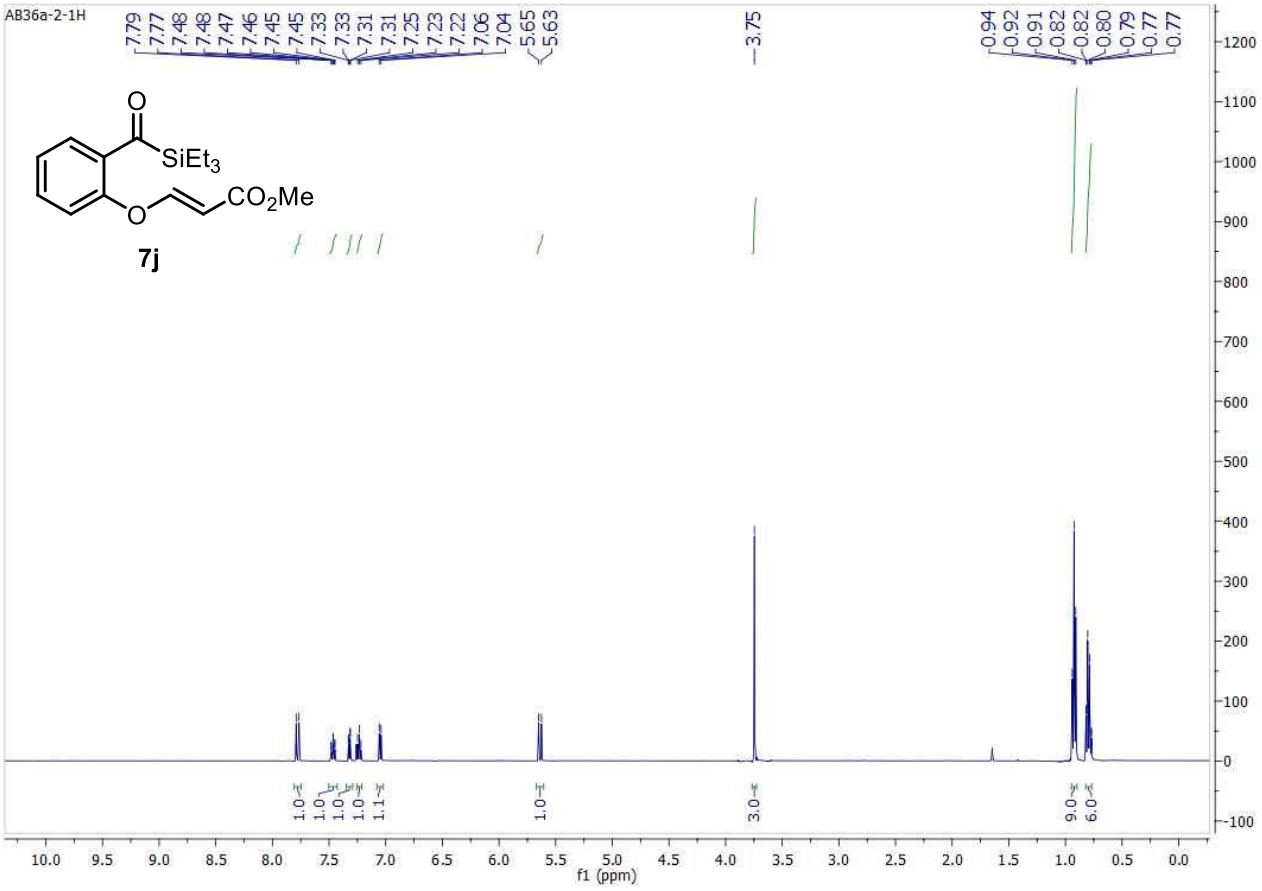

236.6
167.6
157.4
155.2
144.7
144.5
135.0
129.7
129.6
129.5
128.4
127.9
126.3
103.9
99.5
51.2
34.8
30.7
21.6
1.7
O
SiMe3
tBu
N
Ts
CO2Me
7g
f1 (ppm)

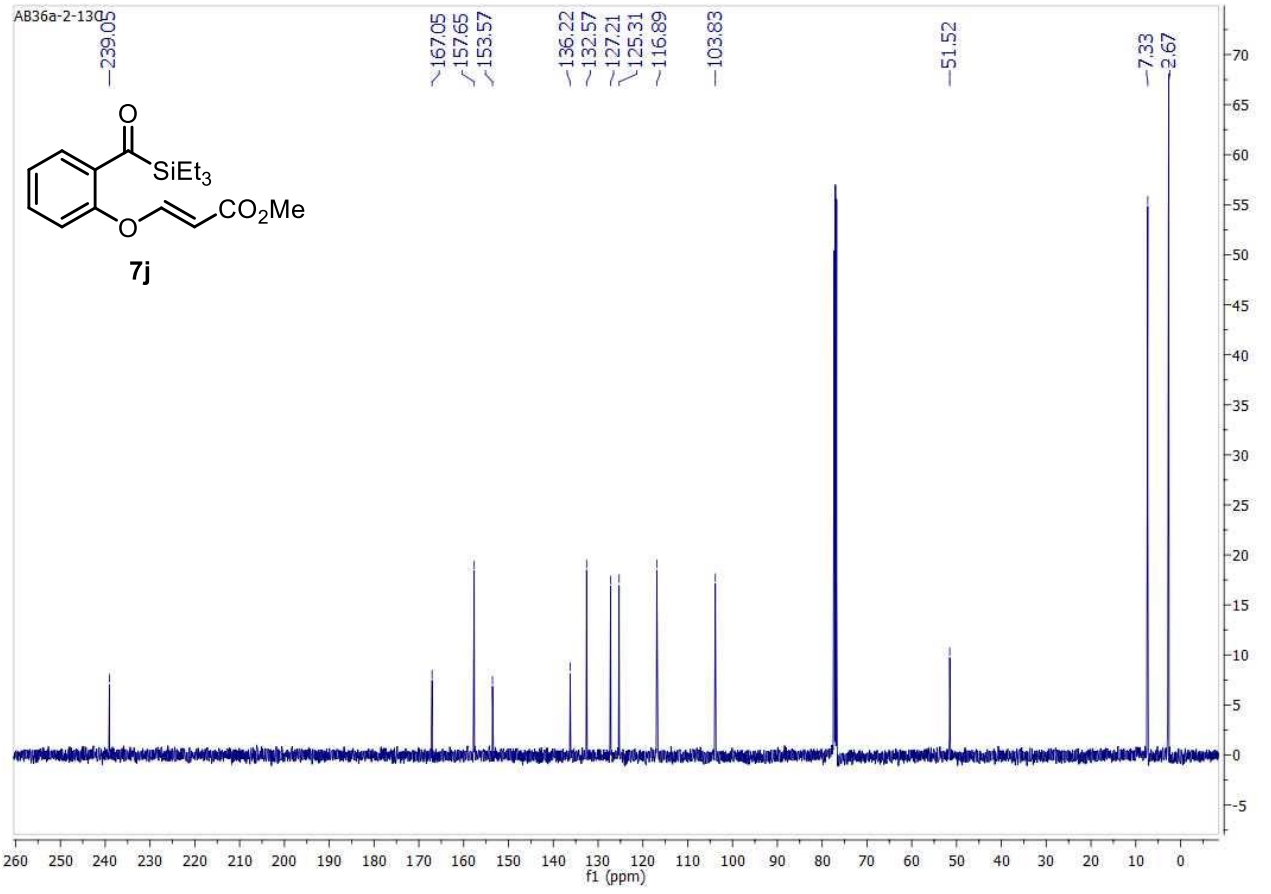

8.32
8.29
7.53
7.53
7.51
7.28
7.27
6.60
6.58
4.62
4.59
3.67
2.43
0.31
O
SiMe3
CO2Me
N
Ts
7h
0.9
1.0
3.0
1.0
2.3
1.0
0.9
2.9
3.0
9.1
f1 (ppm)

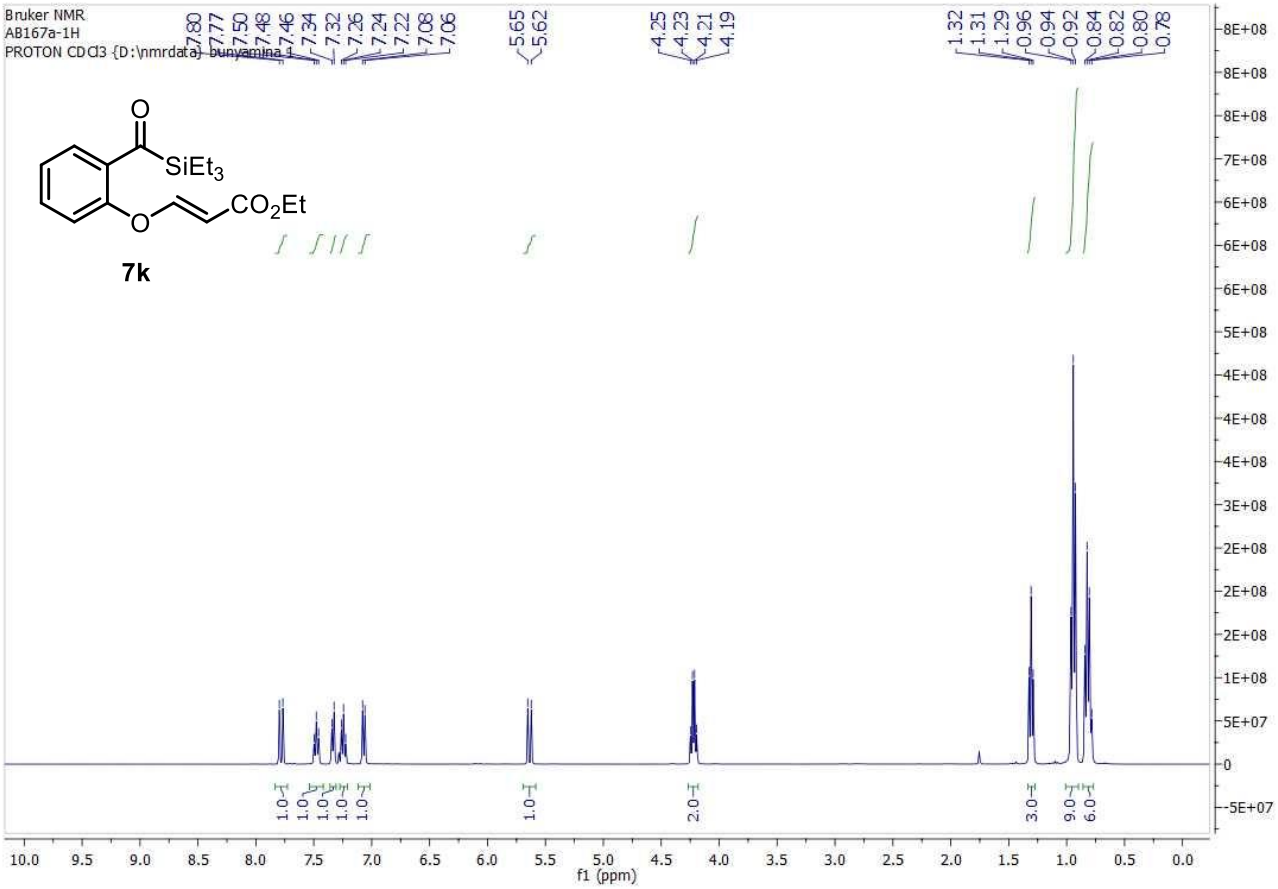

237.5
167.5
144.8
144.4
143.5
134.9
131.2
131.0
129.8
129.6
129.2
127.8
100.0
51.2
21.7
-1.9
O
SiMe3
CO2Me
N
Ts
7h
f1 (ppm)

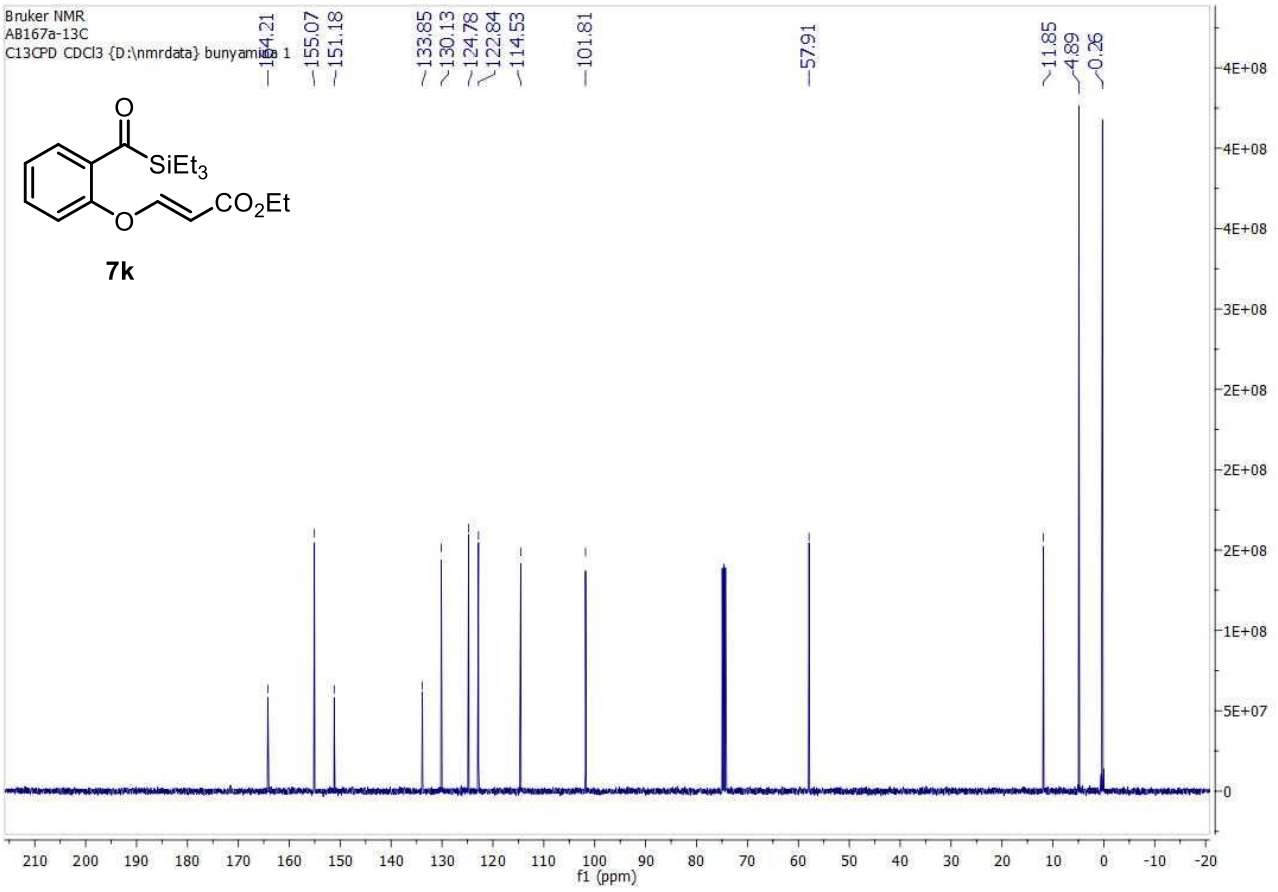

8.37
8.34
7.52
7.51
7.34
7.33
7.28
7.26
6.59
6.58
5.12
4.68
4.65
2.43
0.31
O
SiMe3
CO2Bn
N
Ts
7i
1.0
0.9
2.9
8.1
1.0
2.0
0.9
3.0
9.1
f1 (ppm)

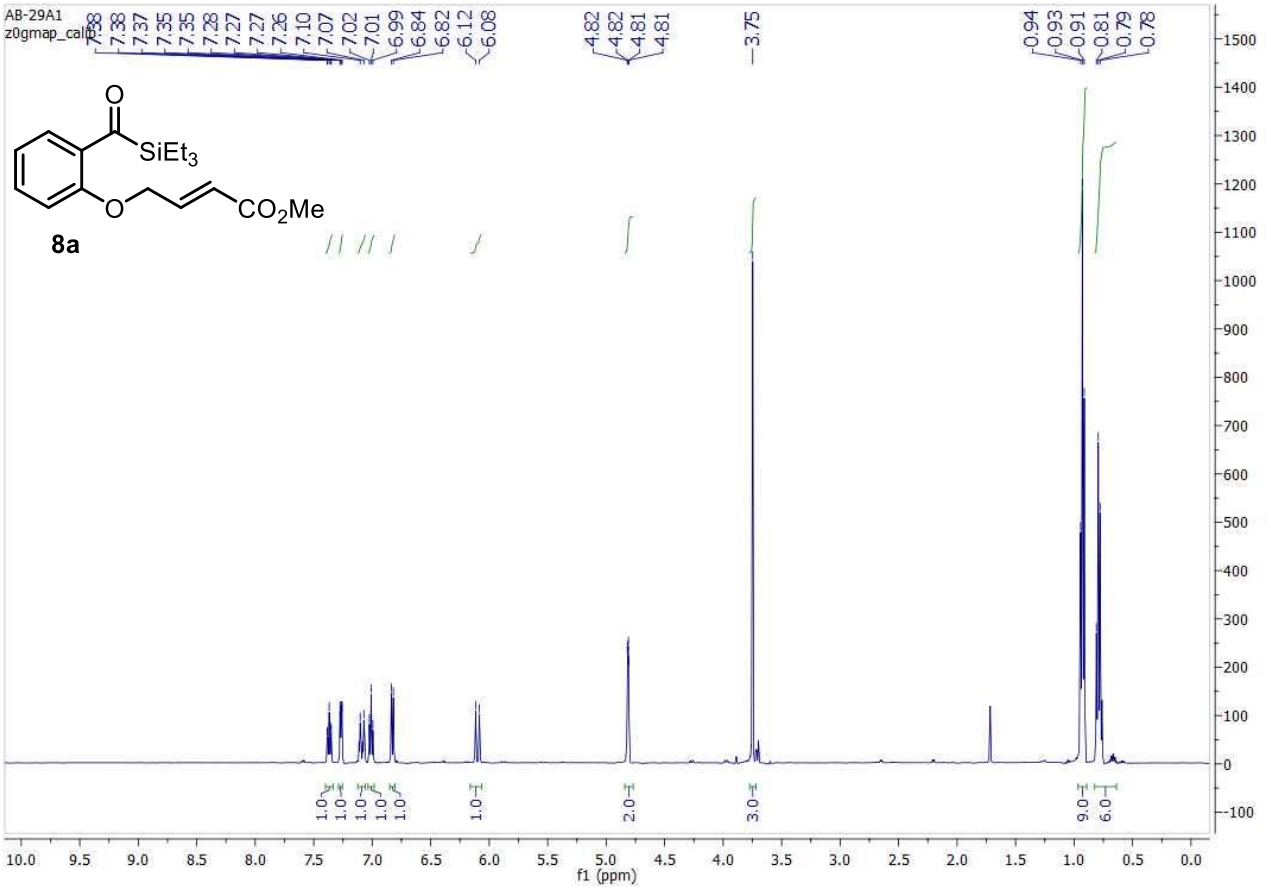

237.6
166.9
144.7
131.2
130.9
129.9
129.8
129.6
129.1
128.5
128.3
128.1
127.8
99.9
65.9
21.7
-1.8
O
SiMe3
CO2Bn
N
Ts
7i
f1 (ppm)

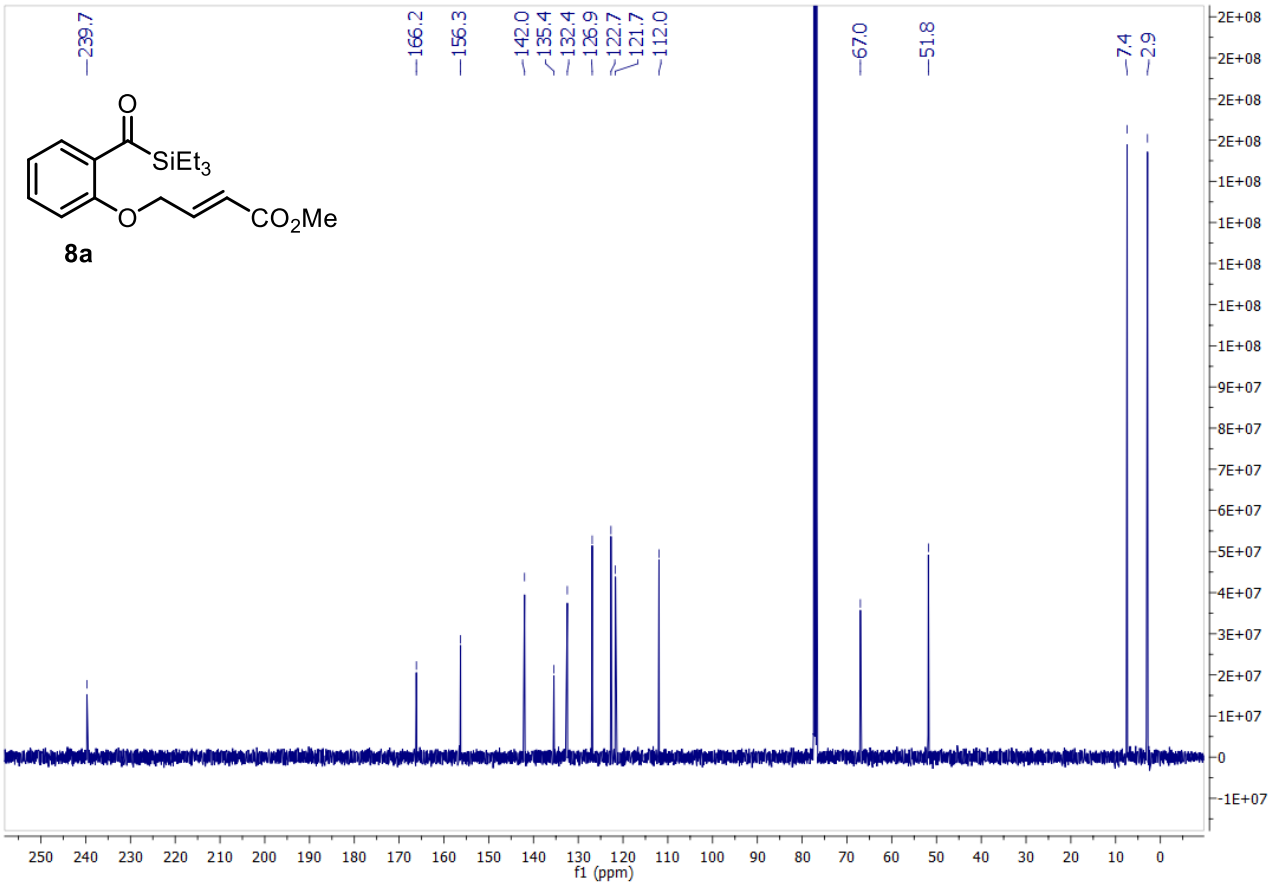

AB36a-2-1H
7.79
7.77
7.48
7.48
7.47
7.46
7.45
7.45
7.33
7.33
7.31
7.31
7.25
7.23
7.22
7.06
7.04
5.65
5.63
3.75
0.94
0.92
0.91
0.82
0.82
0.80
0.79
0.77
0.77
SiEt3
CO2Me
7j
1.0
1.0
1.0
1.0
1.1
1.0
3.0
9.0
6.0
f1 (ppm)

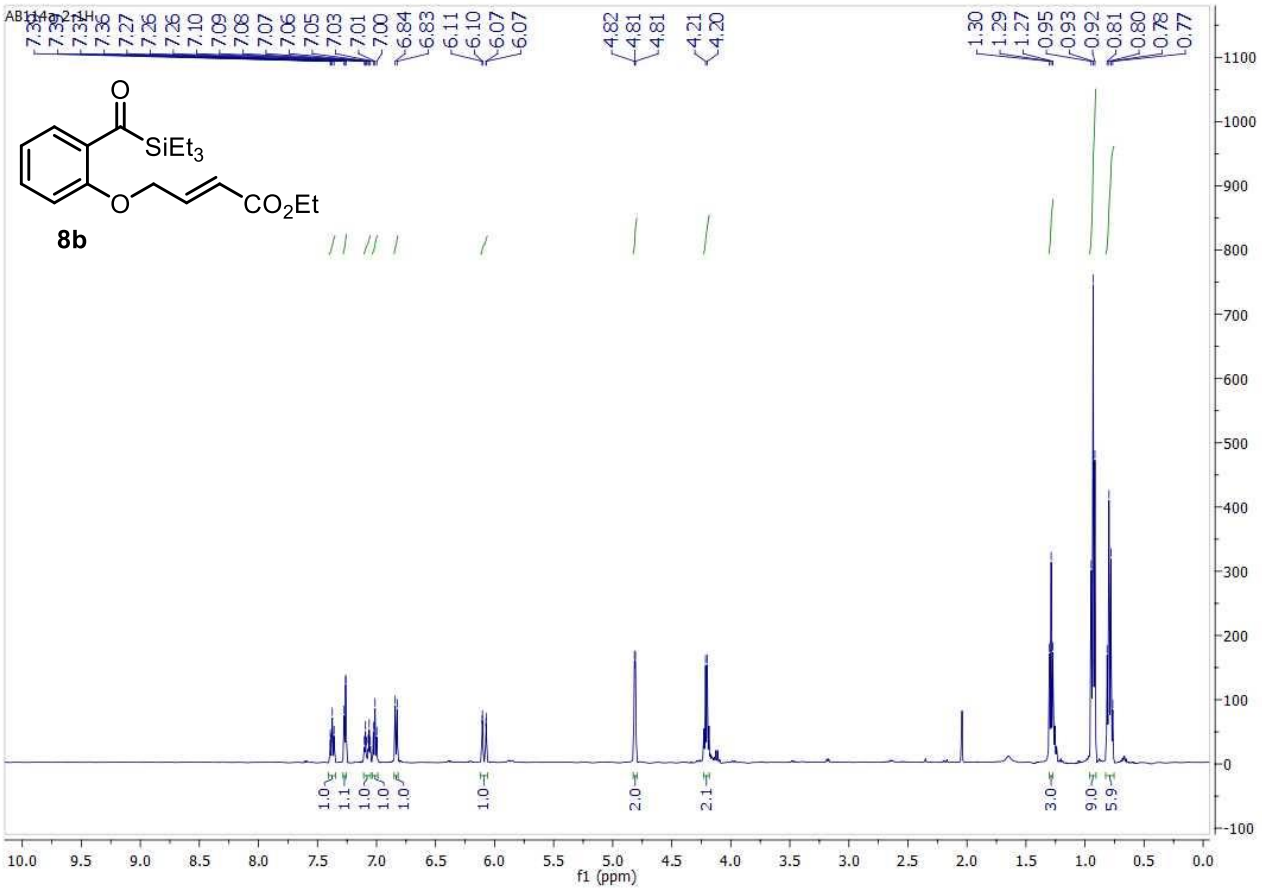

AB36a-2-13C
239.05
167.05
157.65
153.57
136.22
132.57
127.21
125.31
116.89
103.83
51.52
7.33
2.67
SiEt3
CO2Me
7j
f1 (ppm)

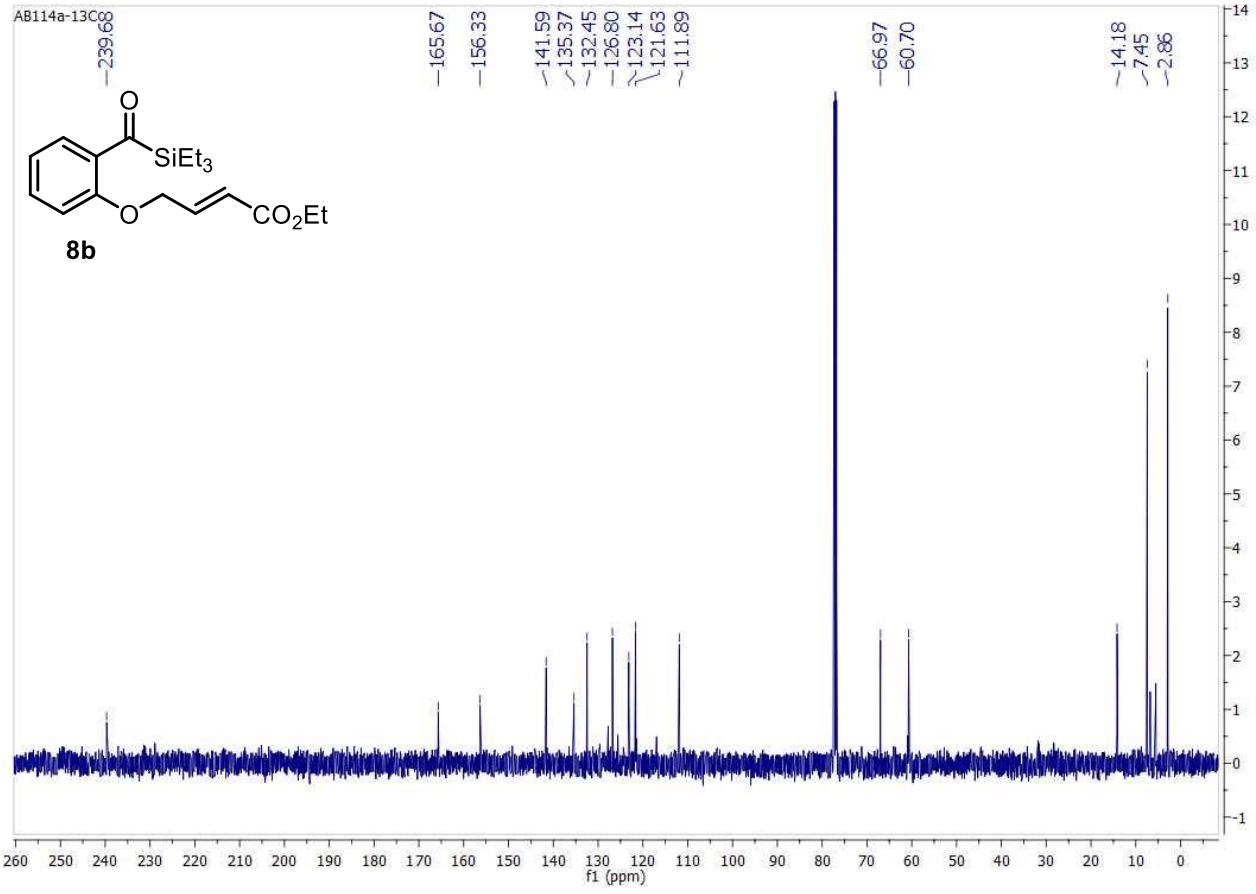

Bruker NMR
AB167a-1H
PROTON CDCl3 {D:\nmrdata} bunyamina 1
7.80
7.77
7.50
7.48
7.46
7.34
7.32
7.26
7.24
7.22
7.08
7.06
5.65
5.62
4.25
4.23
4.21
4.19
1.32
1.31
1.29
0.96
0.94
0.92
0.84
0.82
0.80
0.78
SiEt3
CO2Et
7k
1.0
1.0
1.0
1.0
1.0
2.0
3.0
9.0
6.0
f1 (ppm)

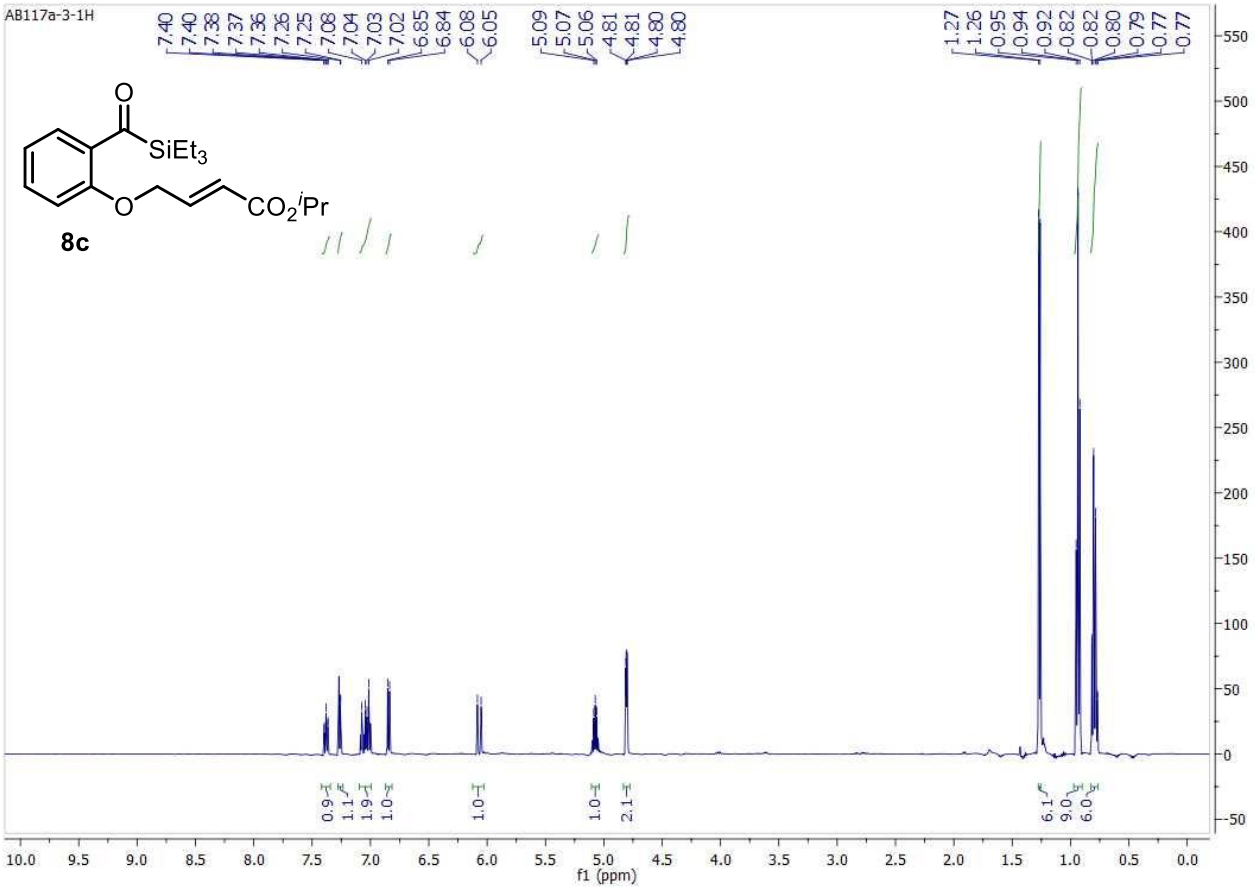

Bruker NMR
AB167a-13C
C13CPD CDCl3 {D:\nmrdata} bunyamina 1
164.21
155.07
151.18
133.85
130.13
124.78
122.84
114.53
101.81
57.91
11.85
4.89
0.26
SiEt3
CO2Et
7k
f1 (ppm)

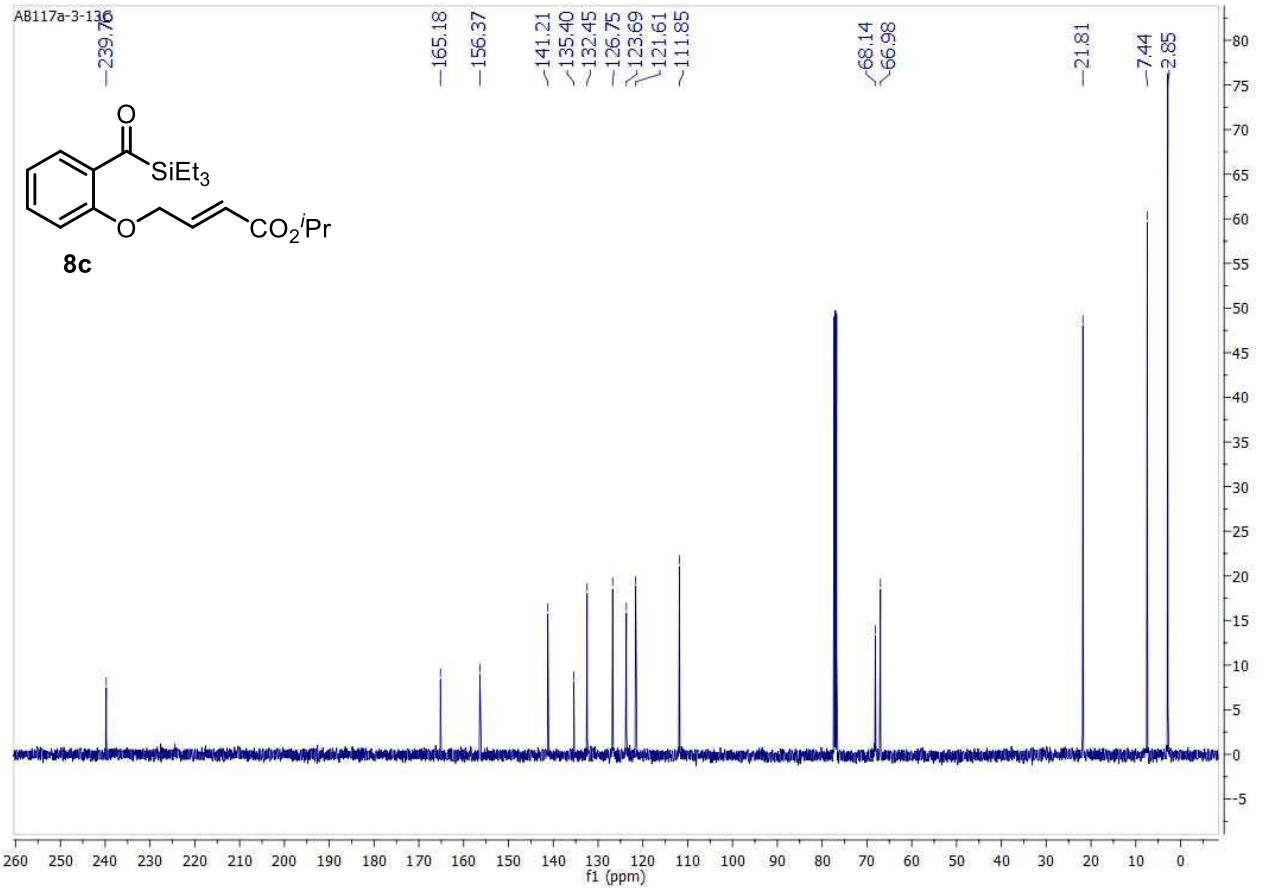

AB-29A1
z0gmap_cal
7.38
7.37
7.35
7.35
7.28
7.27
7.27
7.26
7.10
7.07
7.02
7.01
6.99
6.84
6.82
6.12
6.08
4.82
4.82
4.81
4.81
3.75
0.94
0.93
0.91
0.81
0.79
0.78
SiEt3
O
CO2Me
8a
1.0
1.0
1.0
1.0
1.0
2.0
3.0
9.0
6.0
f1 (ppm)

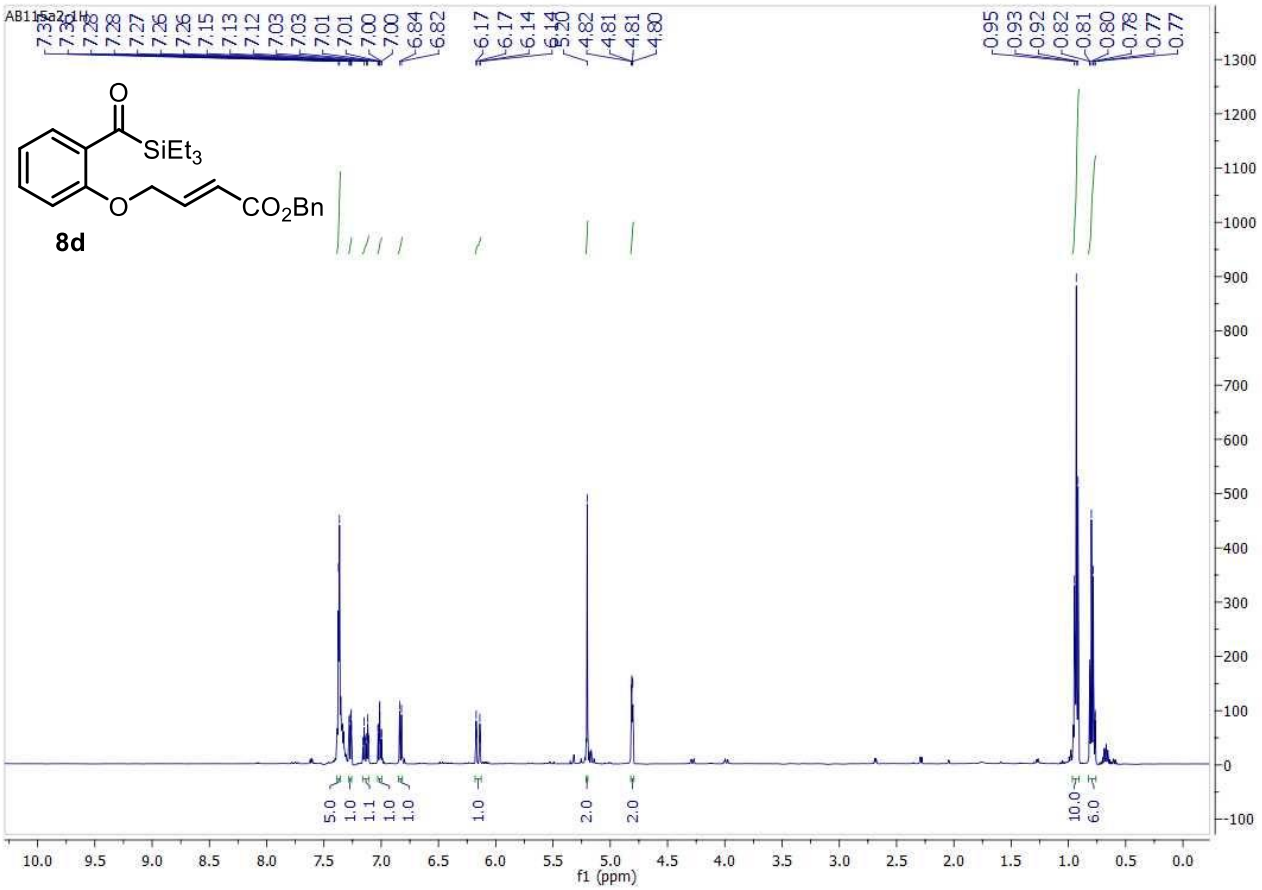

239.7
166.2
156.3
142.0
135.4
132.4
126.9
122.7
121.7
112.0
67.0
51.8
7.4
2.9
SiEt3
O
CO2Me
8a
f1 (ppm)

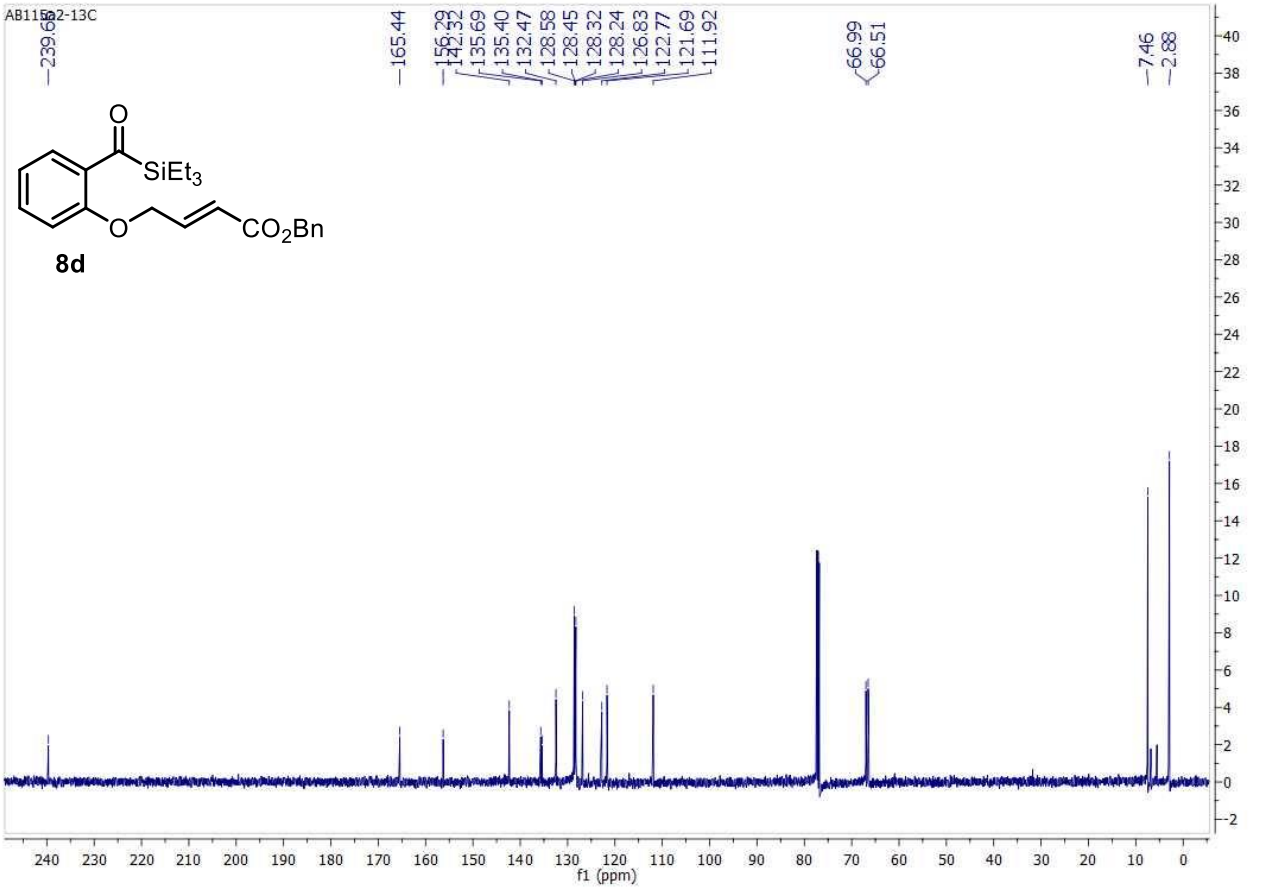

AB114a-2-1H
SiEt3
O
CO2Et
8b
f1 (ppm)

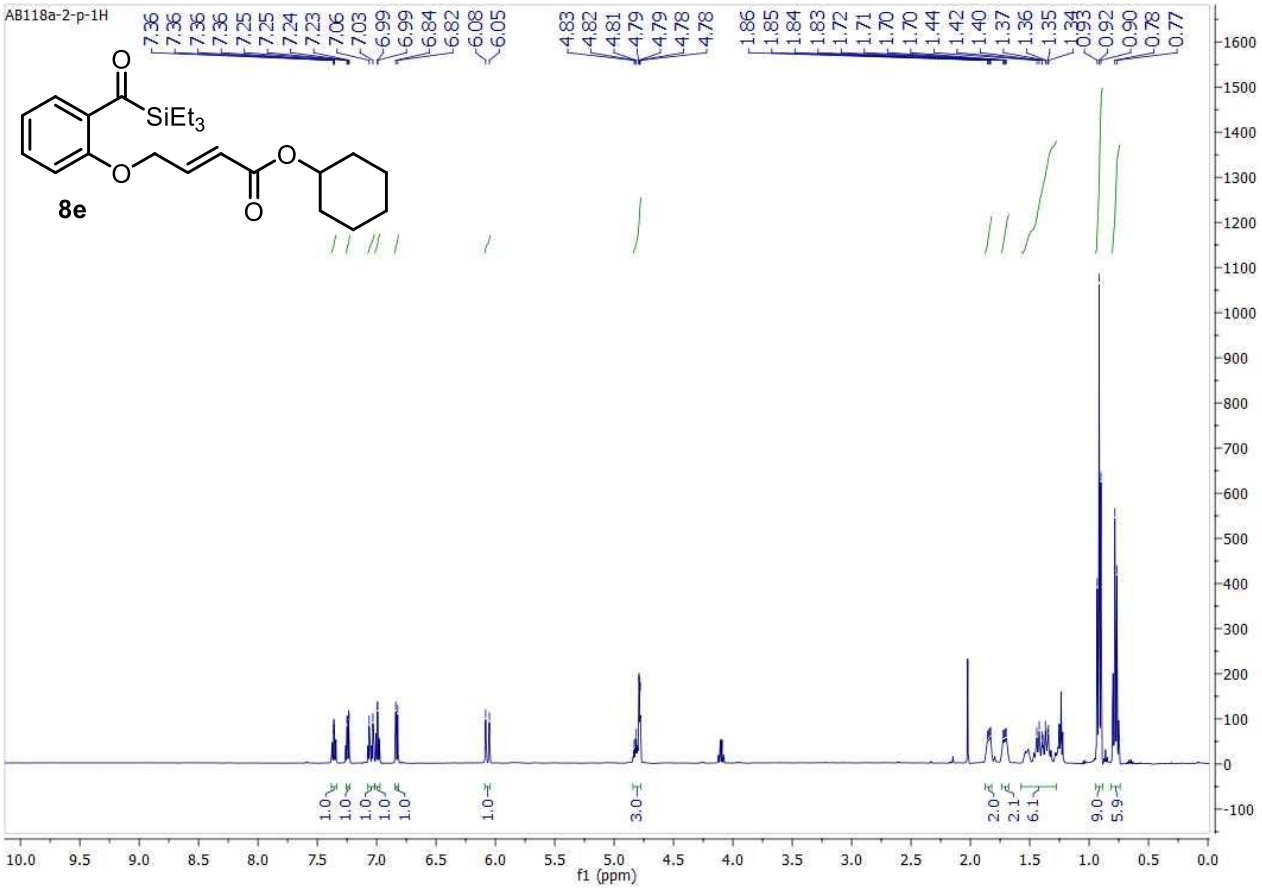

AB114a-13C
SiEt3
O
CO2Et
8b
f1 (ppm)

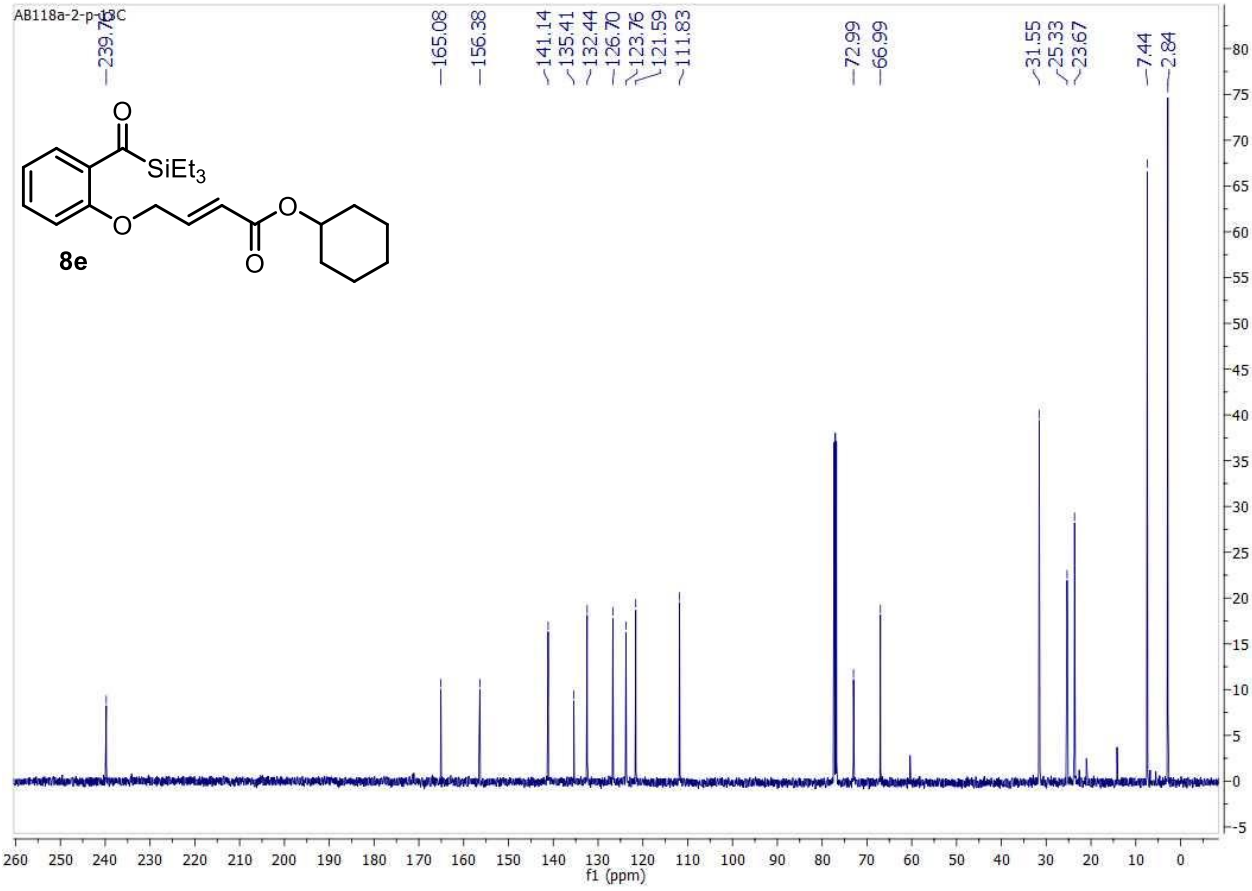

AB117a-3-1H
7.40
7.40
7.38
7.37
7.36
7.26
7.25
7.08
7.04
7.03
7.02
6.85
6.84
6.08
6.05
5.09
5.07
5.06
4.81
4.81
4.80
4.80
1.27
1.26
0.95
0.94
0.92
0.82
0.82
0.80
0.79
0.77
0.77
O
SiEt3
O
CO2iPr
8c
0.9
1.1
1.9
1.0
1.0
1.0
2.1
6.1
9.0
6.0
f1 (ppm)

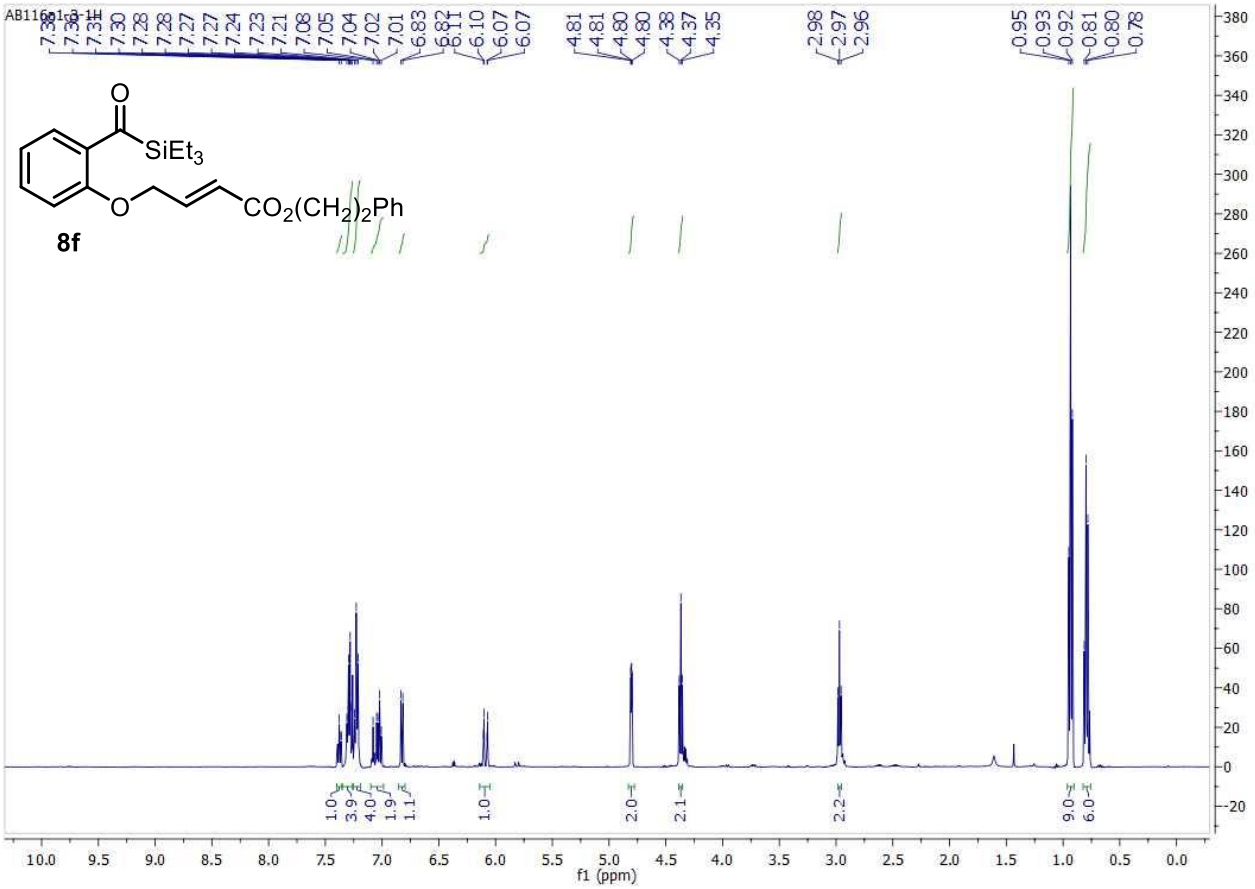

AB117a-3-13C
239.76
165.18
156.37
141.21
135.40
132.45
126.75
123.69
121.61
111.85
68.14
66.98
21.81
7.44
2.85
O
SiEt3
O
CO2iPr
8c
f1 (ppm)

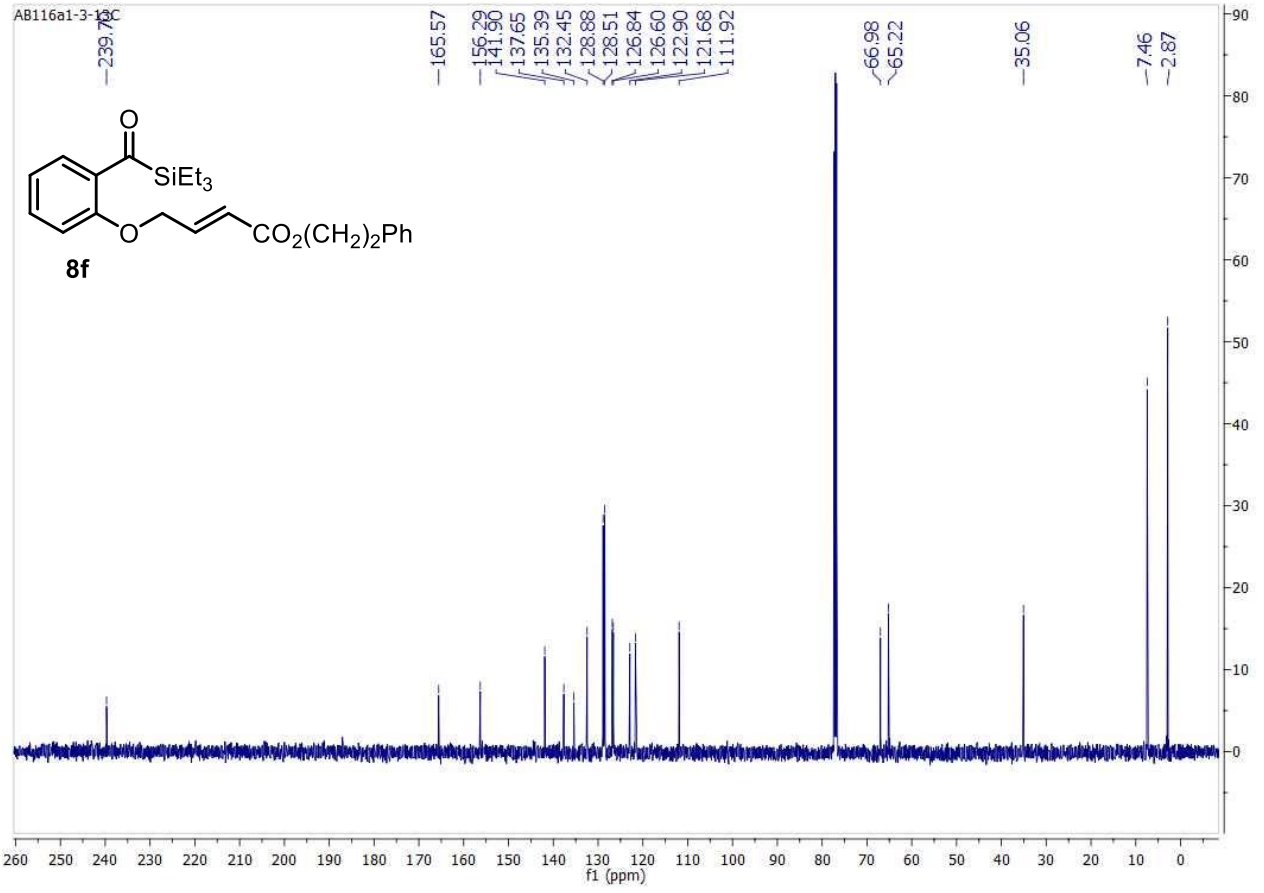

SiEt3
O
CO2Bn
8d
f1 (ppm)

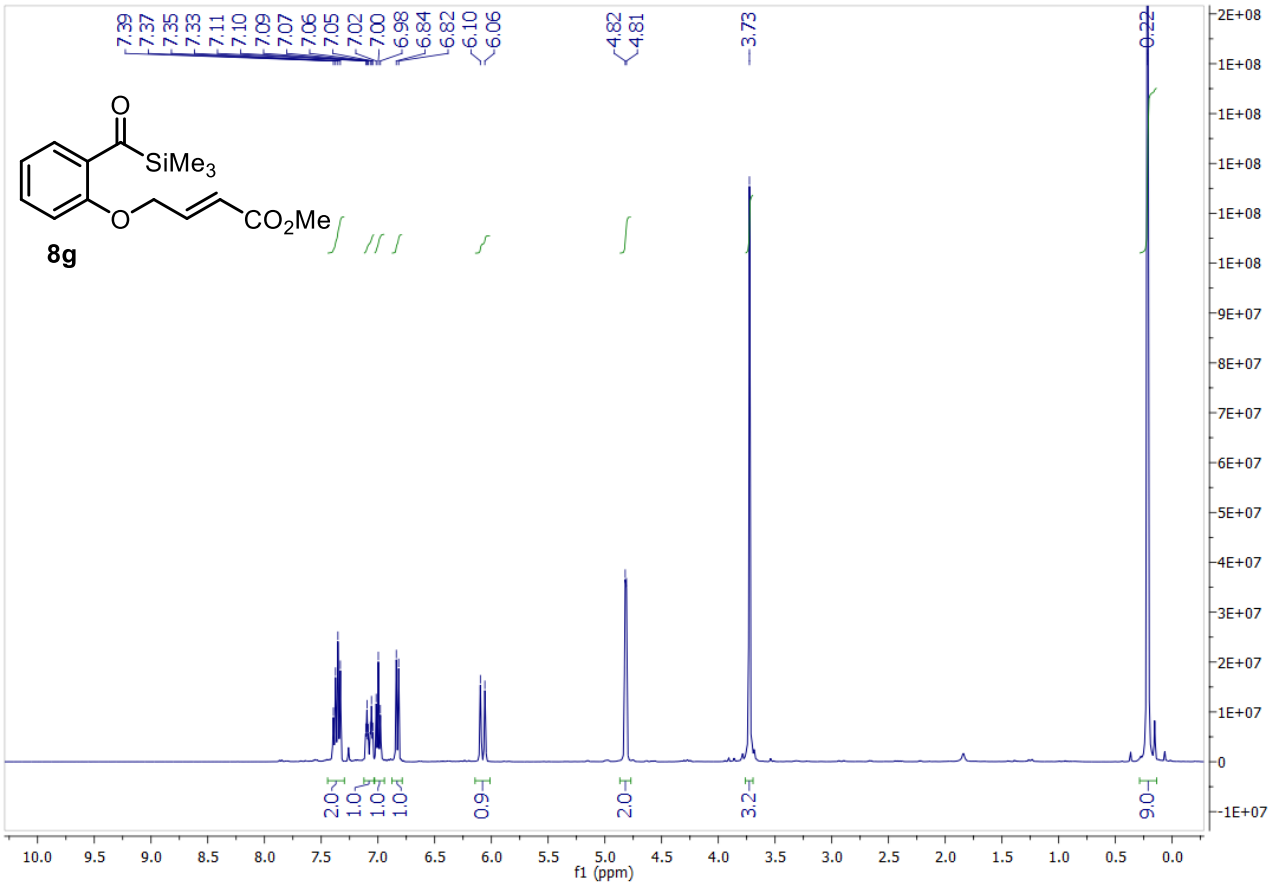

SiEt3
O
CO2Bn
8d
f1 (ppm)

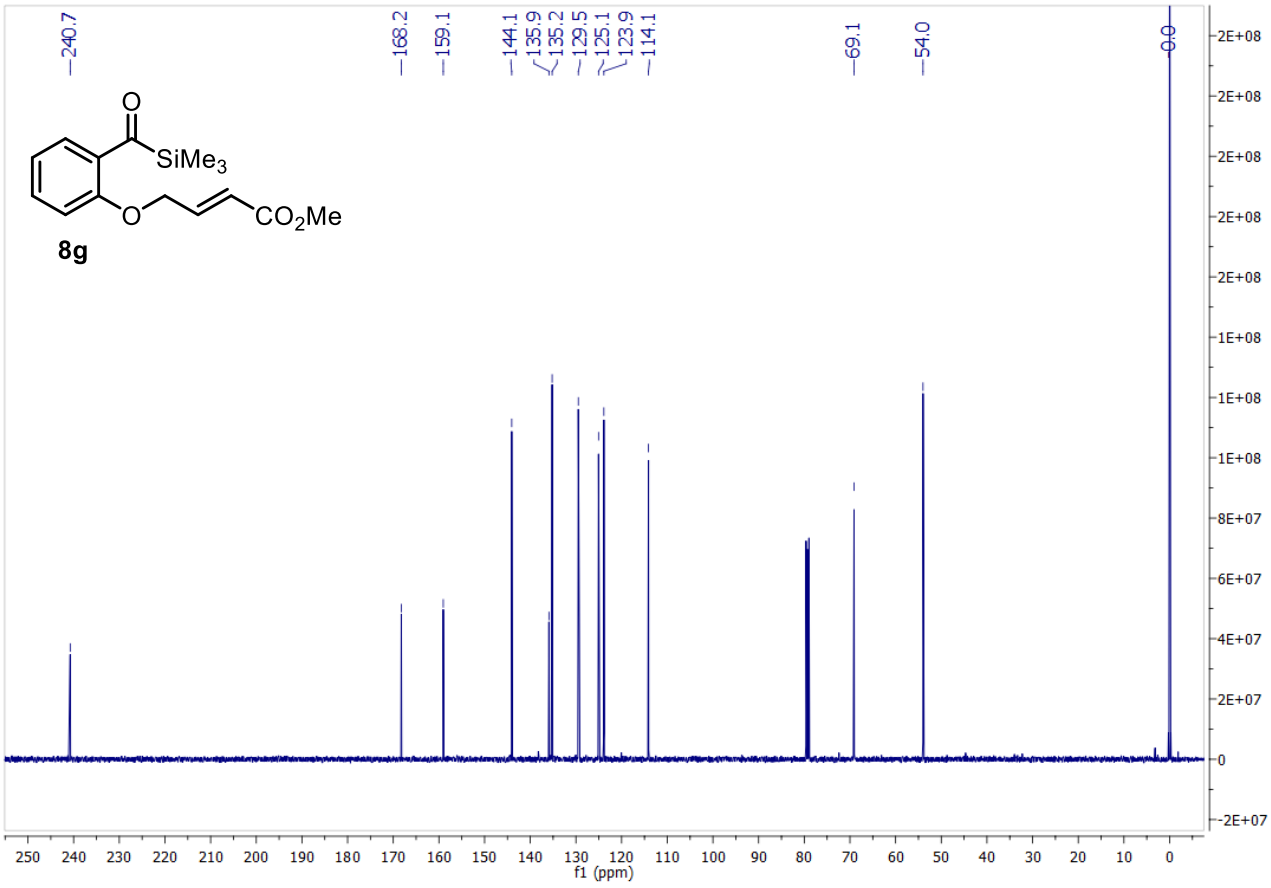

AB118a-2-p-1H
8e
f1 (ppm)

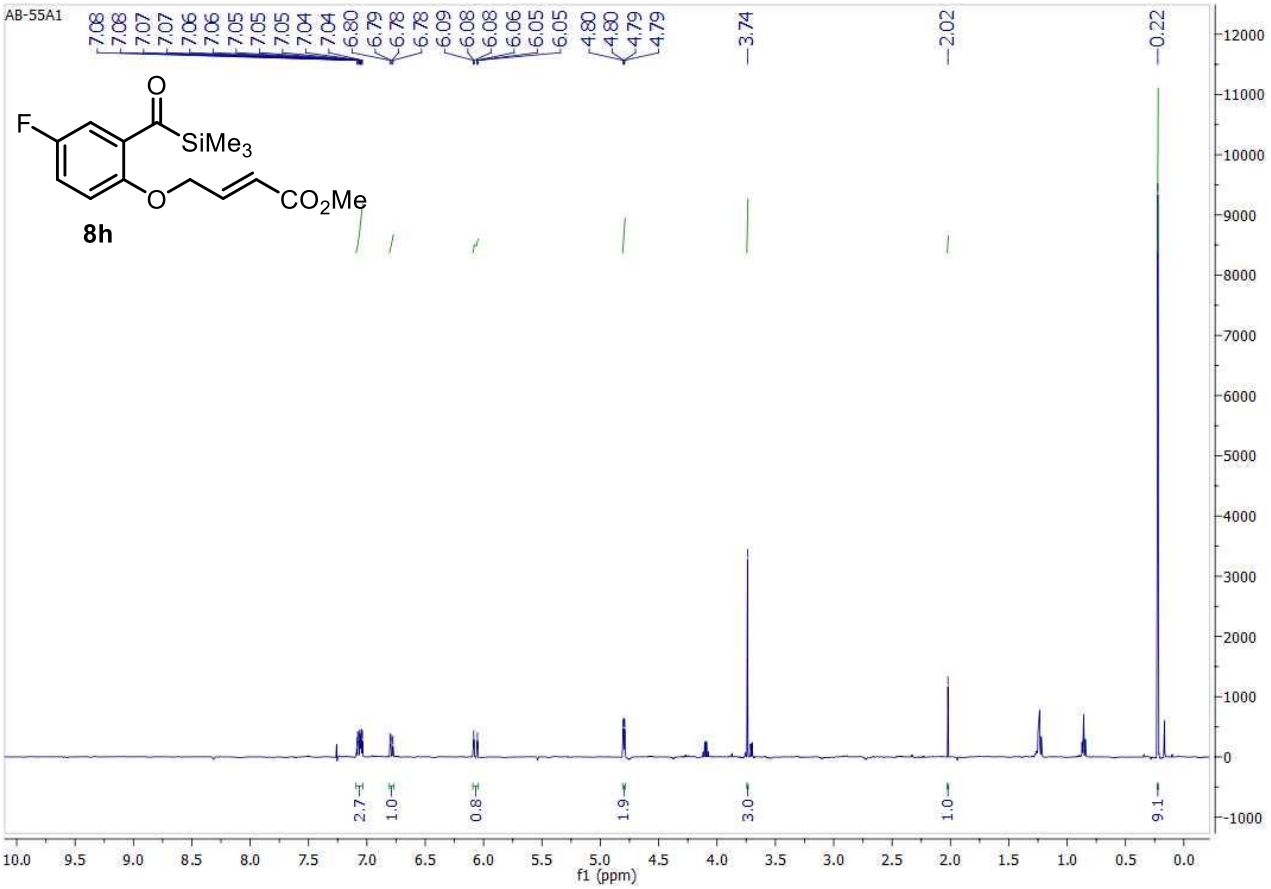

AB118a-2-p-13C
8e
f1 (ppm)

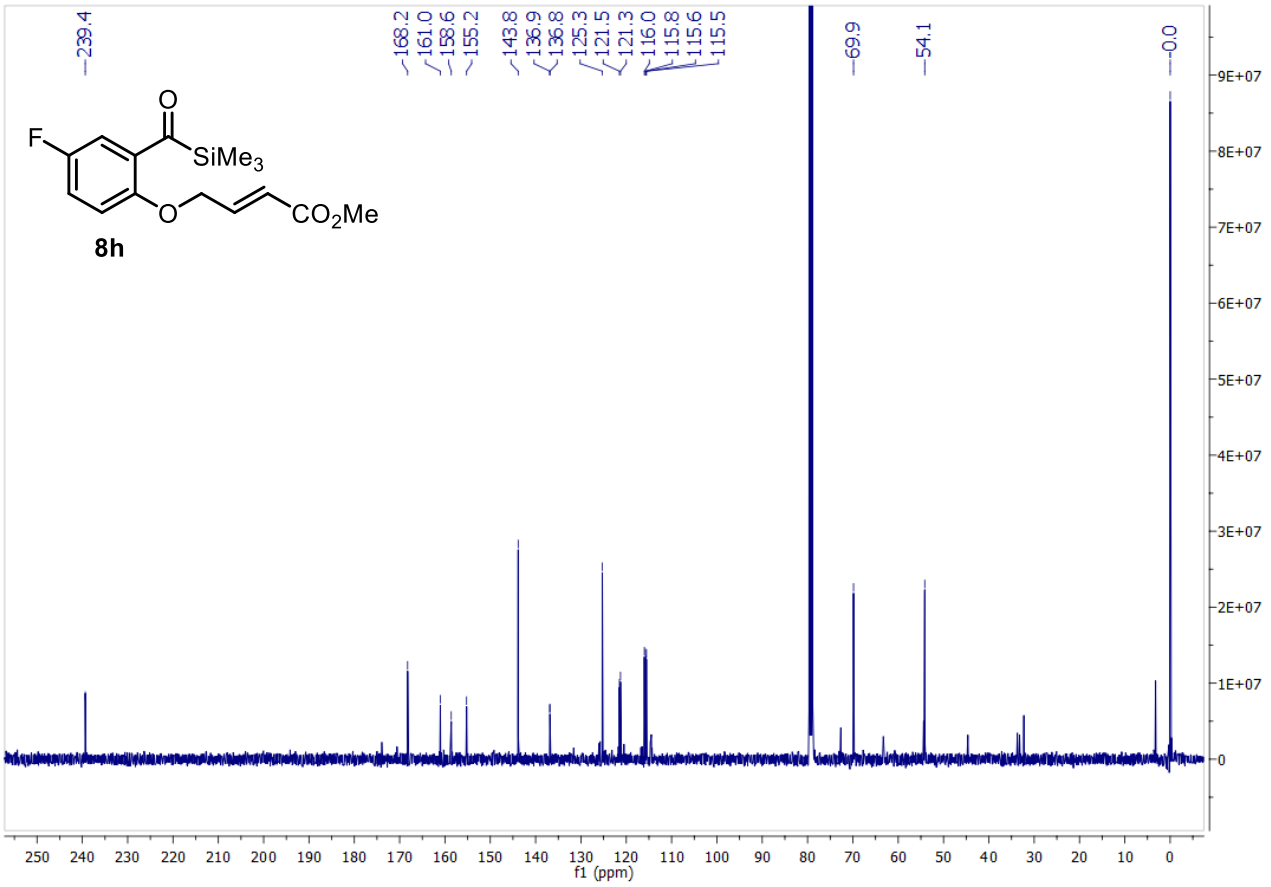

AB116a1-3-1H
7.36
7.36
7.31
7.30
7.28
7.28
7.27
7.27
7.24
7.23
7.21
7.08
7.05
7.04
7.02
7.01
6.83
6.82
6.11
6.10
6.07
6.07
4.81
4.81
4.80
4.80
4.38
4.37
4.35
2.98
2.97
2.96
0.95
0.93
0.92
0.81
0.80
0.78
O
SiEt3
O
CO2(CH2)2Ph
8f
1.0
3.9
4.0
1.9
1.1
1.0
2.0
2.1
2.2
9.0
6.0
f1 (ppm)

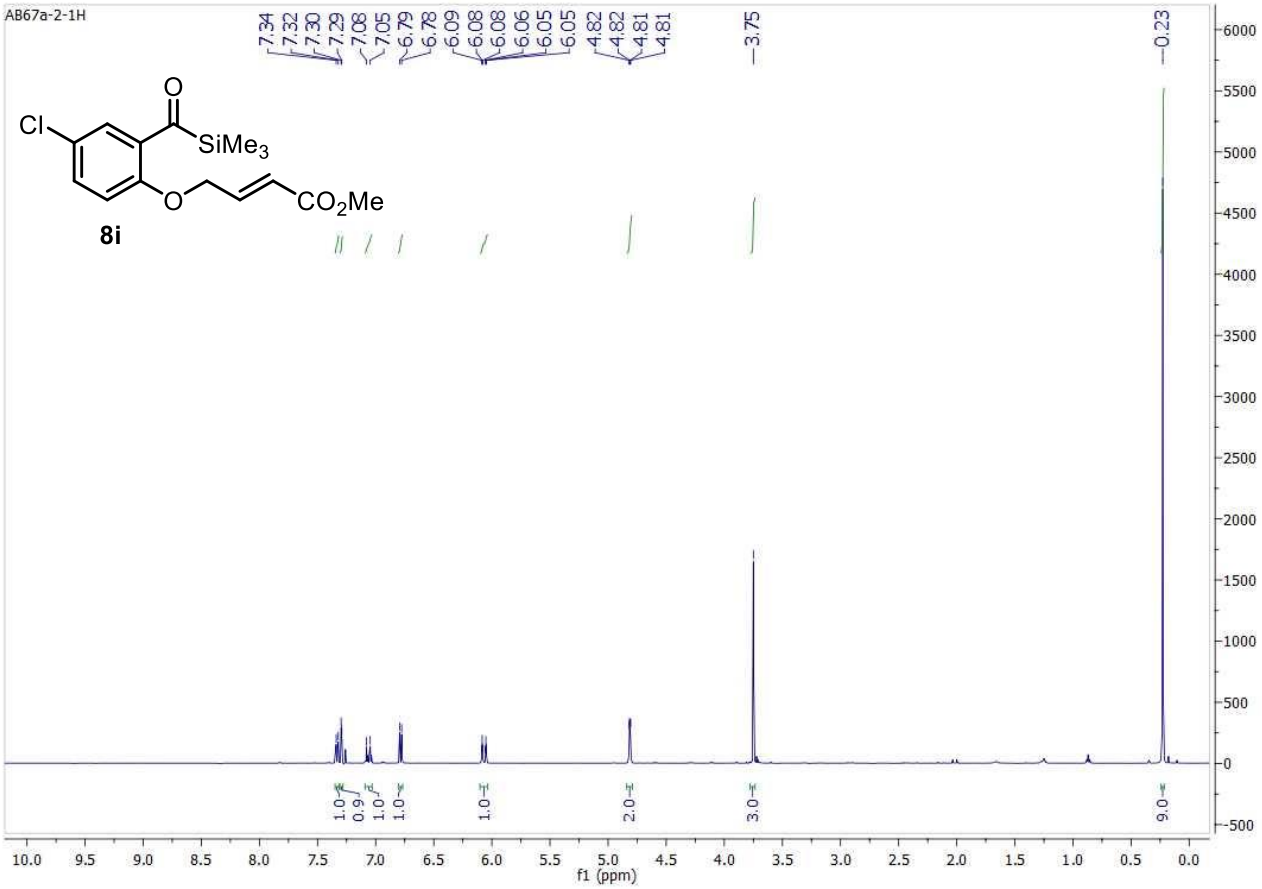

AB116a1-3-13C
239.78
165.57
156.29
141.90
137.65
135.39
132.45
128.88
128.51
126.84
126.60
122.90
121.68
111.92
66.98
65.22
35.06
7.46
2.87
O
SiEt3
O
CO2(CH2)2Ph
8f
f1 (ppm)

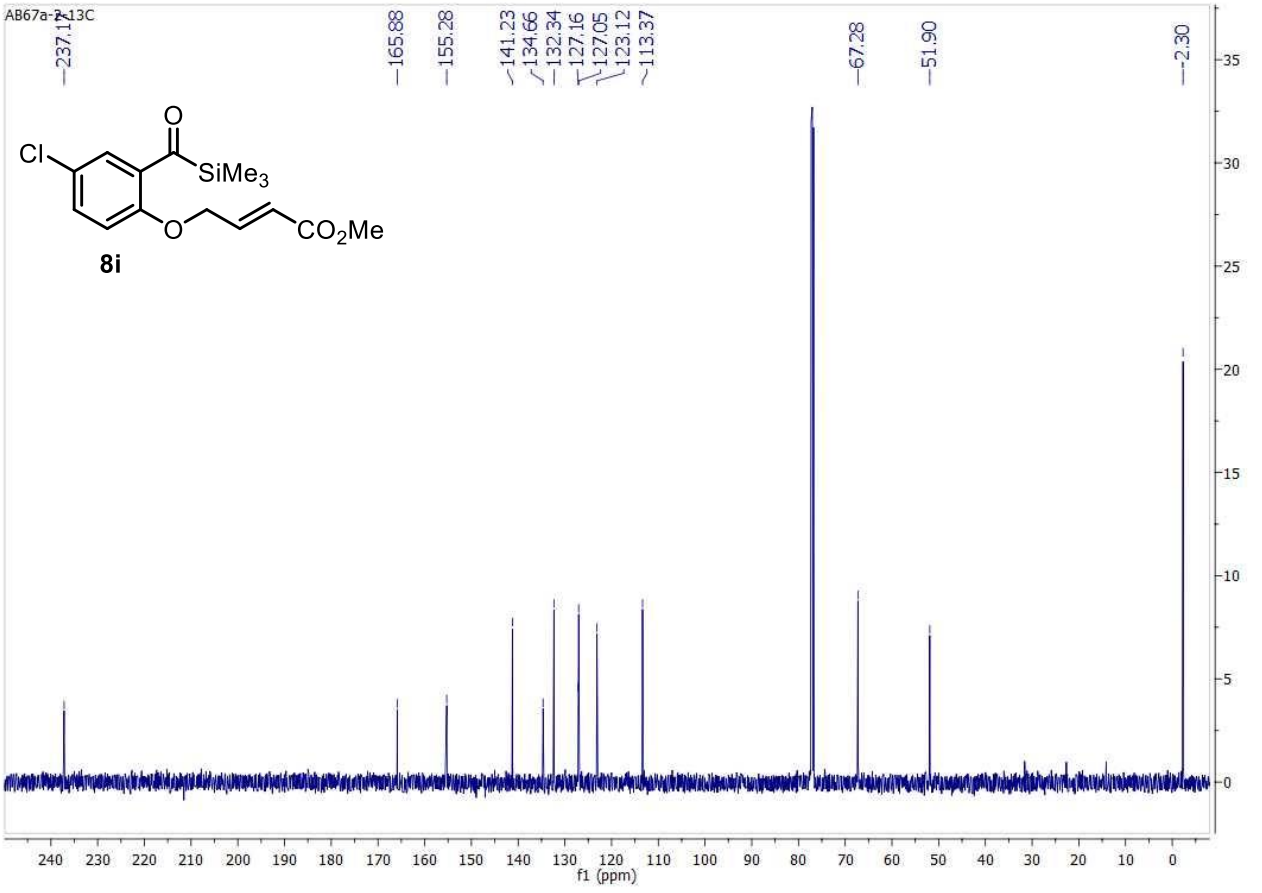

7.39
7.37
7.35
7.33
7.11
7.10
7.09
7.07
7.06
7.05
7.02
7.00
6.98
6.84
6.82
6.10
6.06
4.82
4.81
3.73
0.22
O
SiMe3
O
CO2Me
8g
2.0
1.0
1.0
1.0
0.9
2.0
3.2
9.0
f1 (ppm)

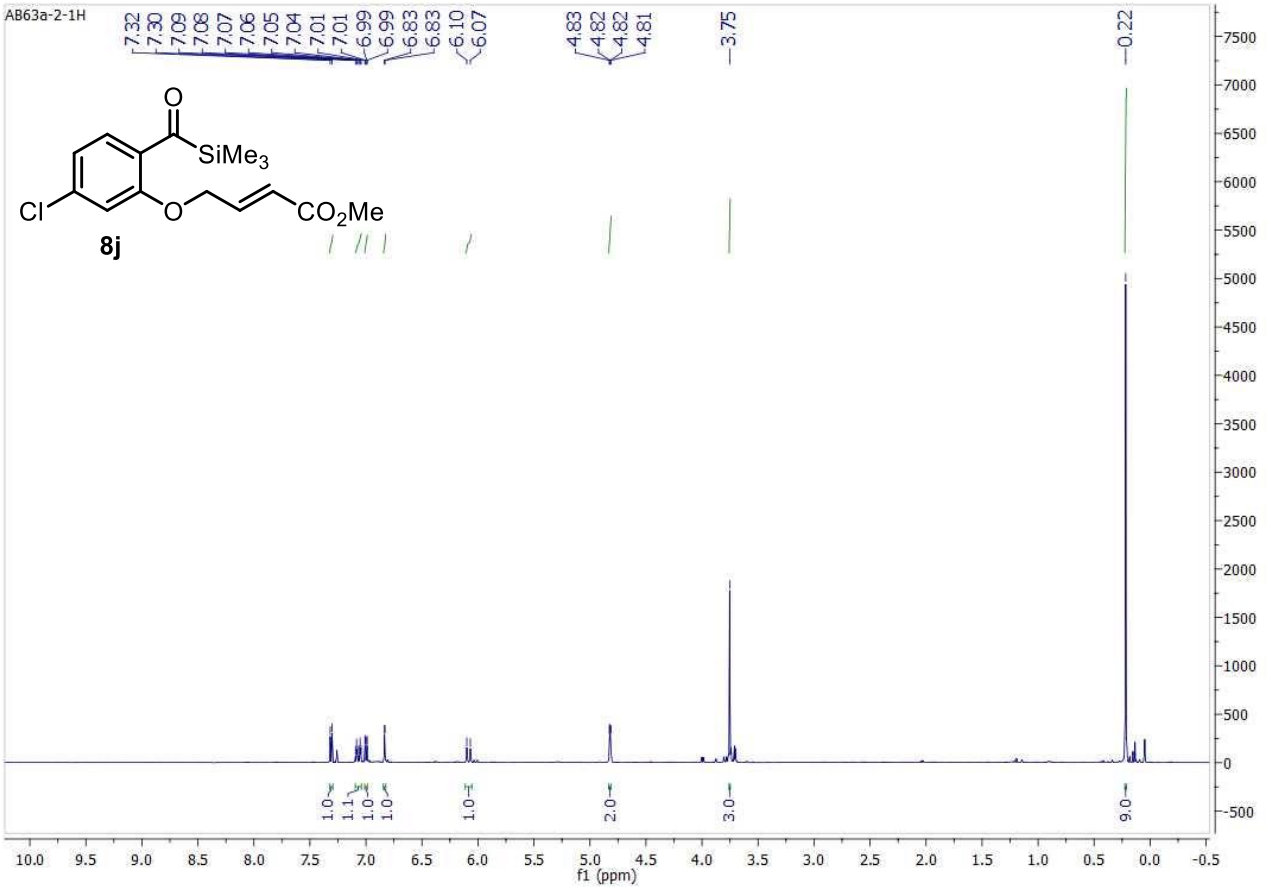

240.7
168.2
159.1
144.1
135.9
135.2
129.5
125.1
123.9
114.1
69.1
54.0
0.0
O
SiMe3
O
CO2Me
8g
f1 (ppm)

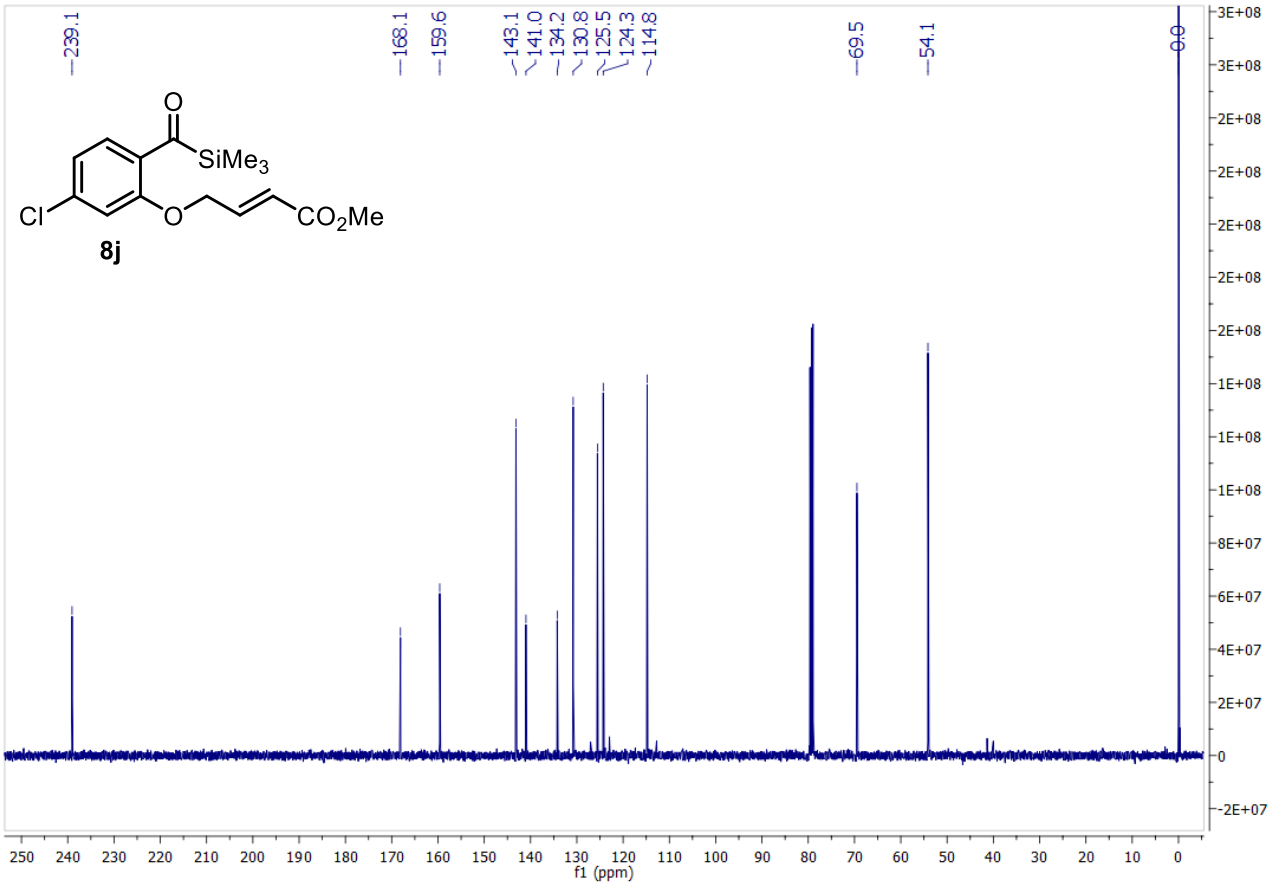

AB-55A1
7.08
7.08
7.07
7.07
7.06
7.06
7.05
7.05
7.05
7.04
7.04
6.80
6.79
6.78
6.78
6.09
6.08
6.08
6.06
6.05
6.05
4.80
4.80
4.79
4.79
3.74
2.02
0.22
F
O
SiMe3
O
CO2Me
8h
2.7
1.0
0.8
1.9
3.0
1.0
9.1
f1 (ppm)

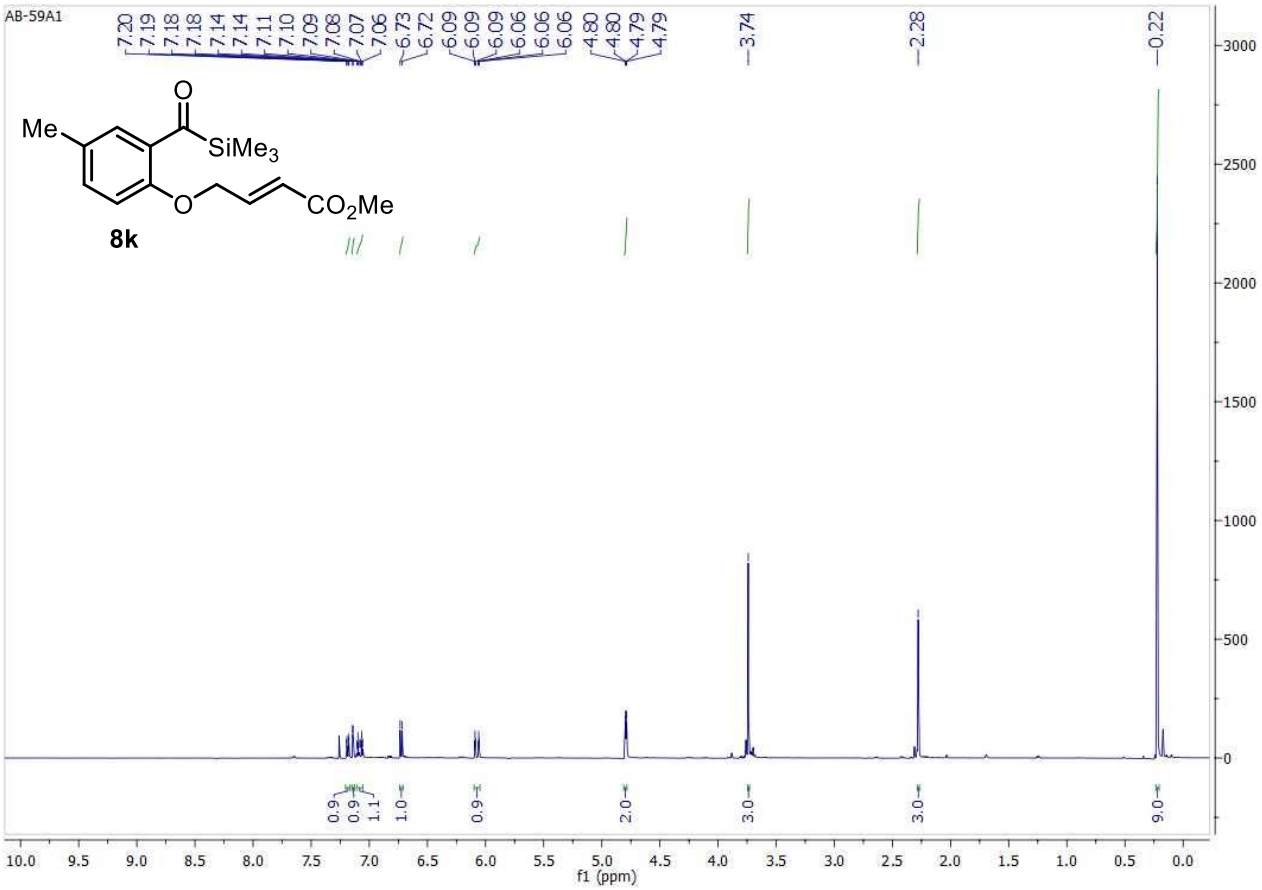

239.4
168.2
161.0
158.6
155.2
143.8
136.9
136.8
125.3
121.5
121.3
116.0
115.8
115.6
115.5
69.9
54.1
0.0
F
O
SiMe3
O
CO2Me
8h
f1 (ppm)

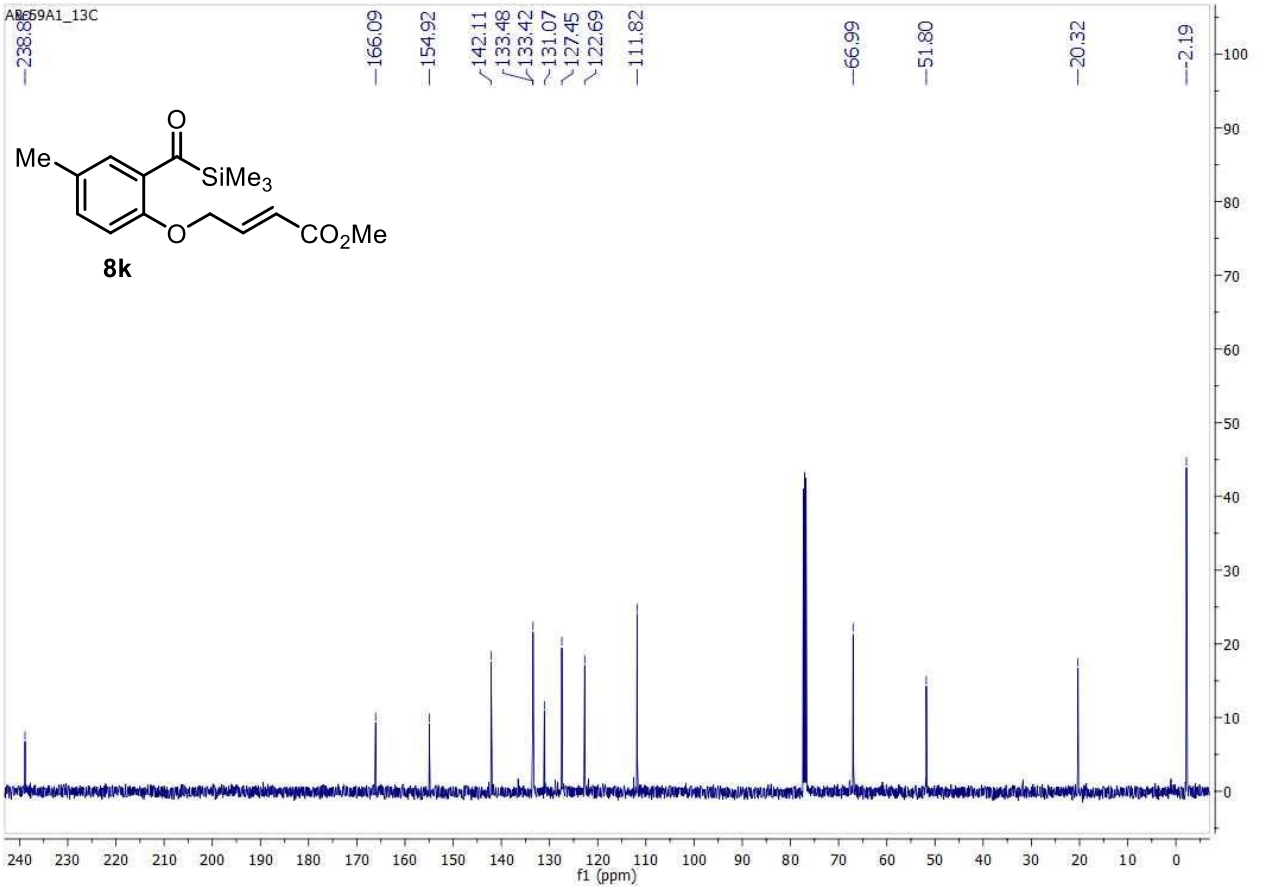

AB67a-2-1H
7.34
7.32
7.30
7.29
7.08
7.05
6.79
6.78
6.09
6.08
6.08
6.06
6.05
6.05
4.82
4.82
4.81
4.81
3.75
0.23
Cl
SiMe3
O
CO2Me
8i
f1 (ppm)

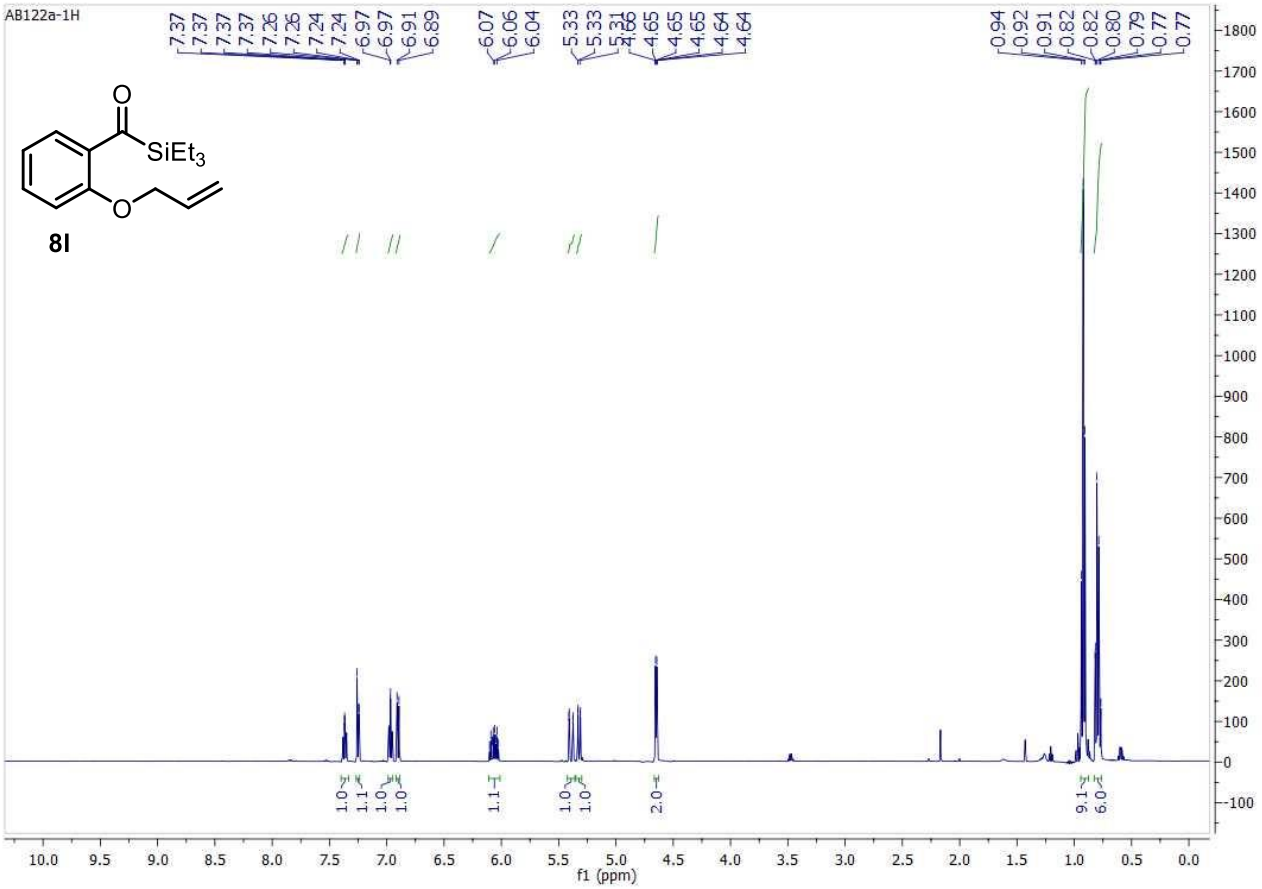

AB67a-2-13C
237.12
165.88
155.28
141.23
134.66
132.34
127.16
127.05
123.12
113.37
67.28
51.90
2.30
Cl
SiMe3
O
CO2Me
8i
f1 (ppm)

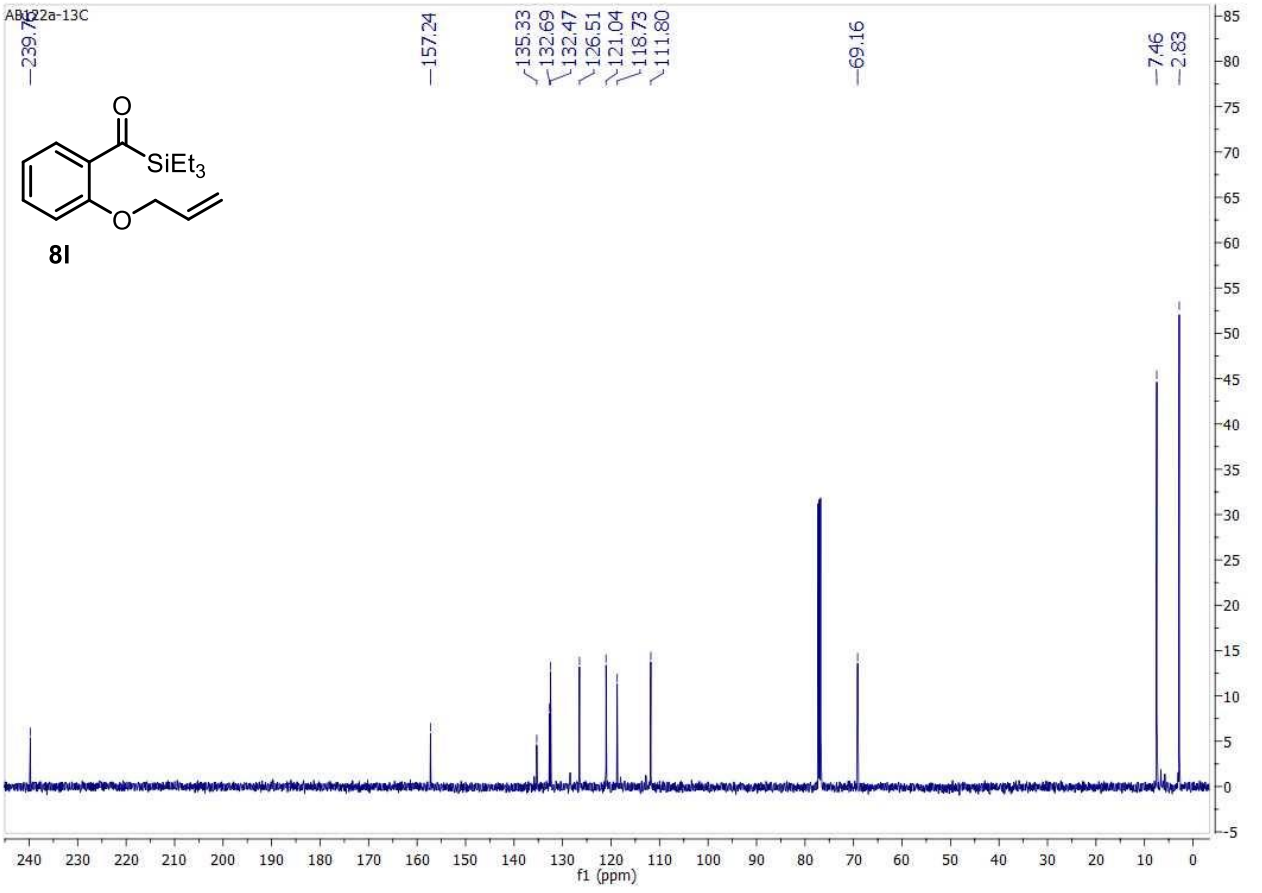

AB63a-2-1H
7.32
7.30
7.09
7.08
7.07
7.06
7.05
7.04
7.01
7.01
6.99
6.99
6.83
6.83
6.10
6.07
4.83
4.82
4.82
4.81
3.75
0.22
SiMe3
Cl
O
CO2Me
8j
1.0
1.1
1.0
1.0
1.0
2.0
3.0
9.0
f1 (ppm)

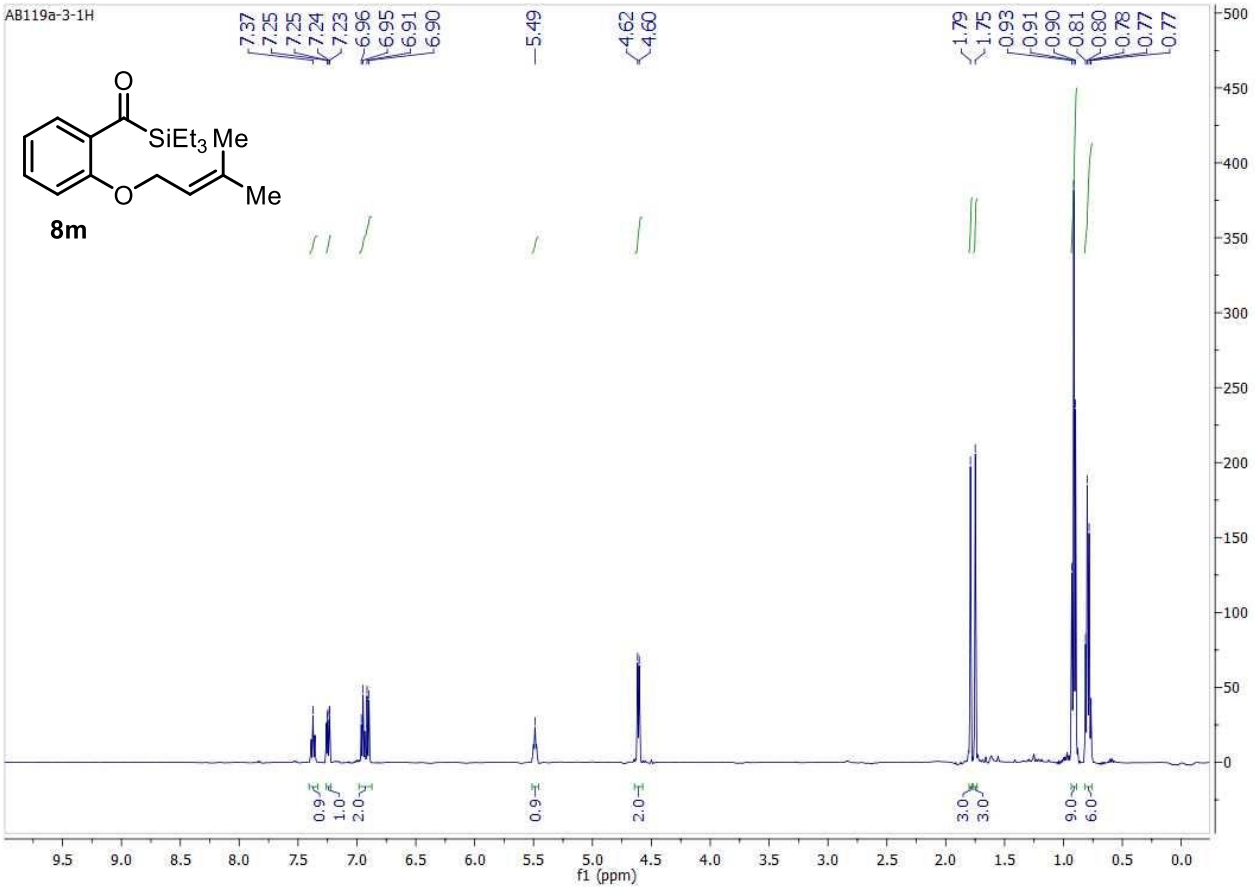

239.1
168.1
159.6
143.1
141.0
134.2
130.8
125.5
124.3
114.8
69.5
54.1
0.0
SiMe3
Cl
O
CO2Me
8j
f1 (ppm)

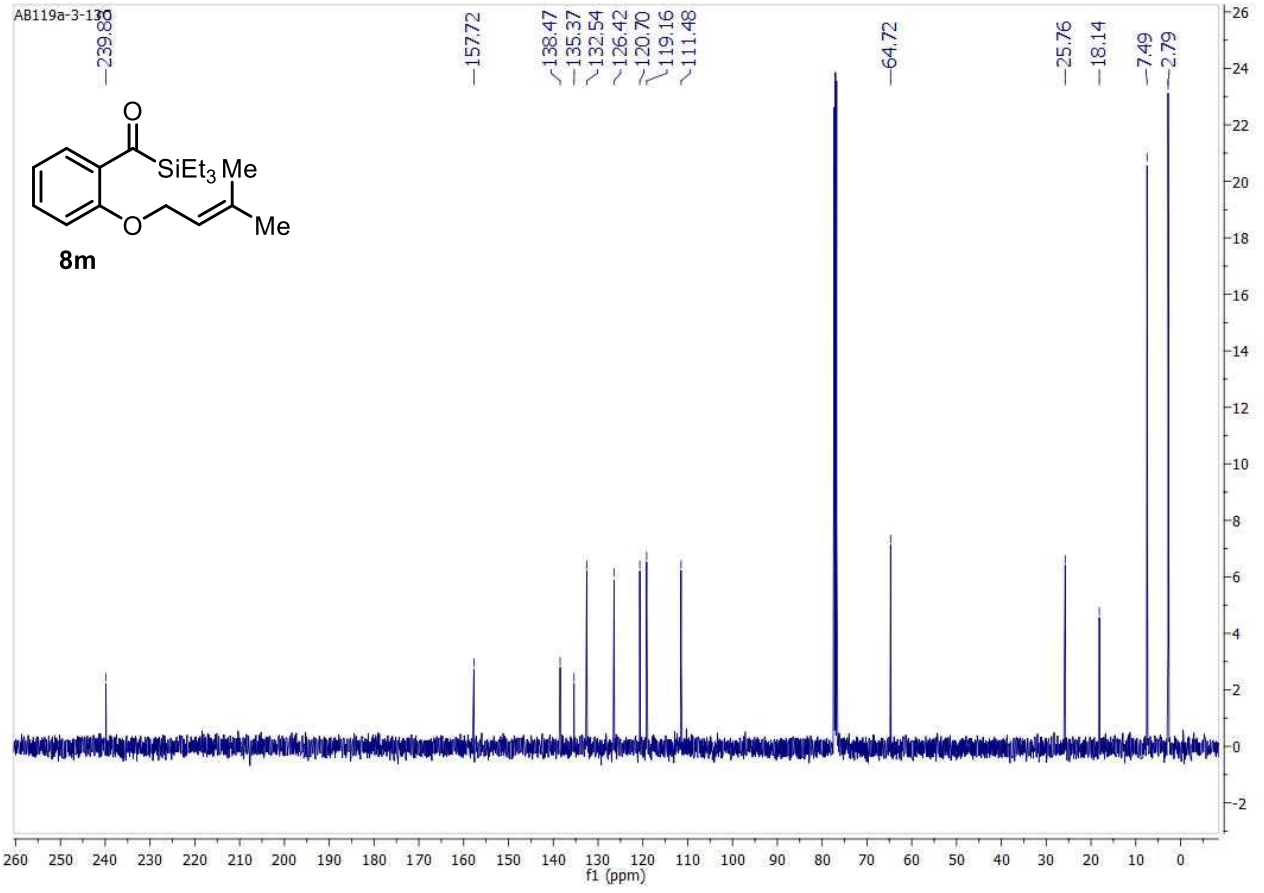

AB-59A1
7.20
7.19
7.18
7.18
7.14
7.14
7.11
7.10
7.09
7.08
7.07
7.06
6.73
6.72
6.09
6.09
6.09
6.06
6.06
6.06
4.80
4.80
4.79
4.79
3.74
2.28
0.22
Me
SiMe3
O
CO2Me
8k
0.9
0.9
1.1
1.0
0.9
2.0
3.0
3.0
9.0
f1 (ppm)

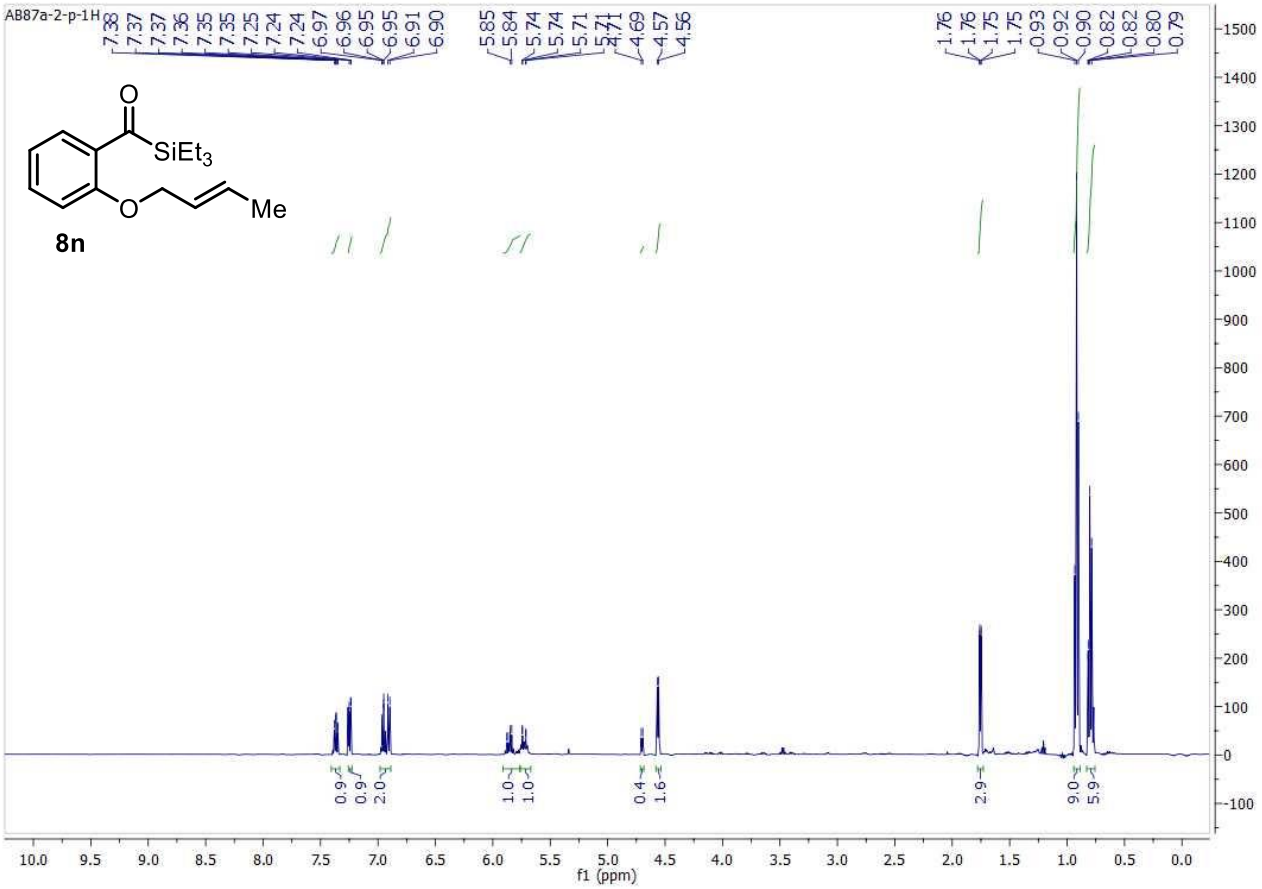

AB-59A1_13C
238.85
166.09
154.92
142.11
133.48
133.42
131.07
127.45
122.69
111.82
66.99
51.80
20.32
2.19
Me
SiMe3
O
CO2Me
8k
f1 (ppm)

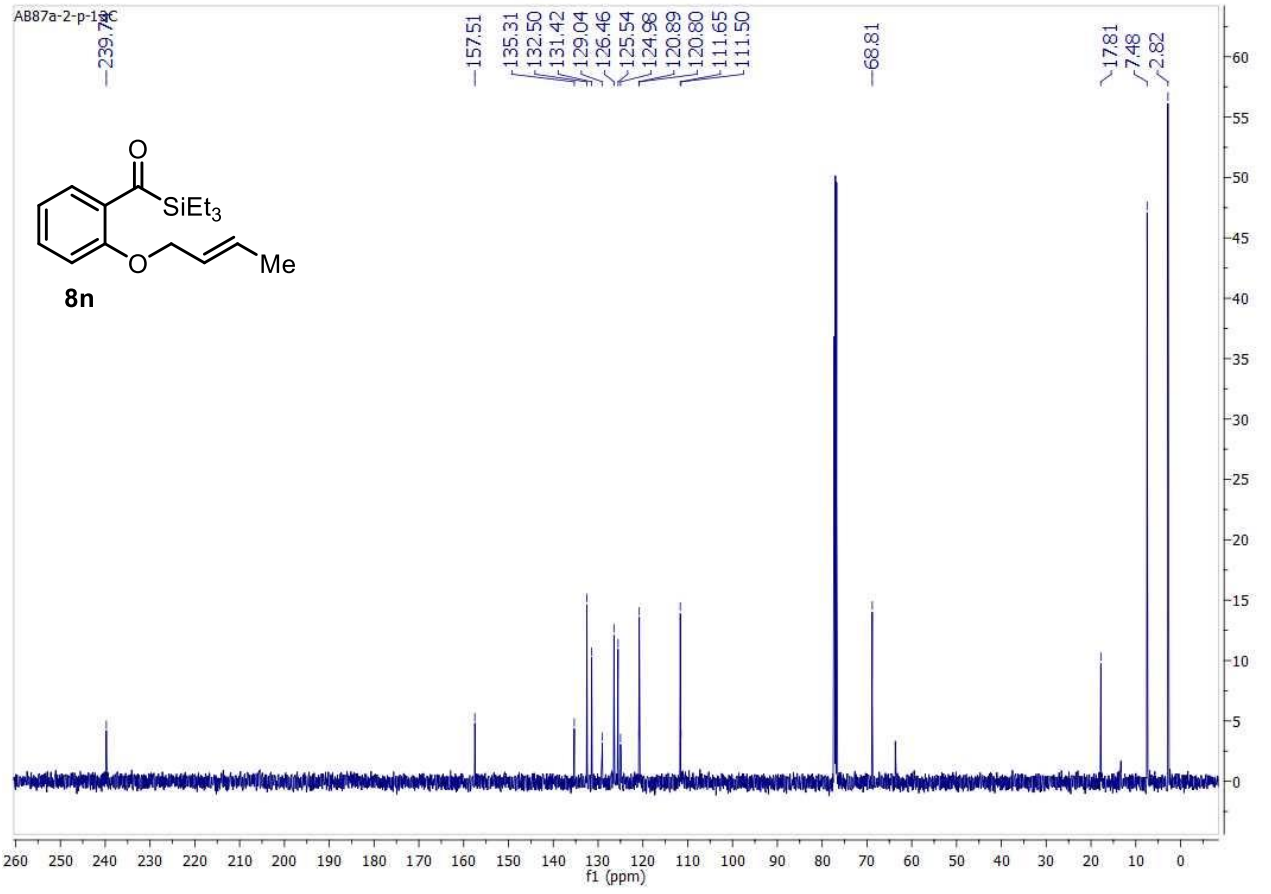

AB122a-1H
7.37
7.37
7.37
7.37
7.26
7.26
7.24
7.24
6.97
6.97
6.91
6.89
6.07
6.06
6.04
5.33
5.33
5.31
4.66
4.65
4.65
4.65
4.64
4.64
0.94
0.92
0.91
0.82
0.82
0.80
0.79
0.77
0.77
SiEt3
O
O
8l
1.0
1.1
1.0
1.0
1.1
1.0
1.0
2.0
9.1
6.0
f1 (ppm)

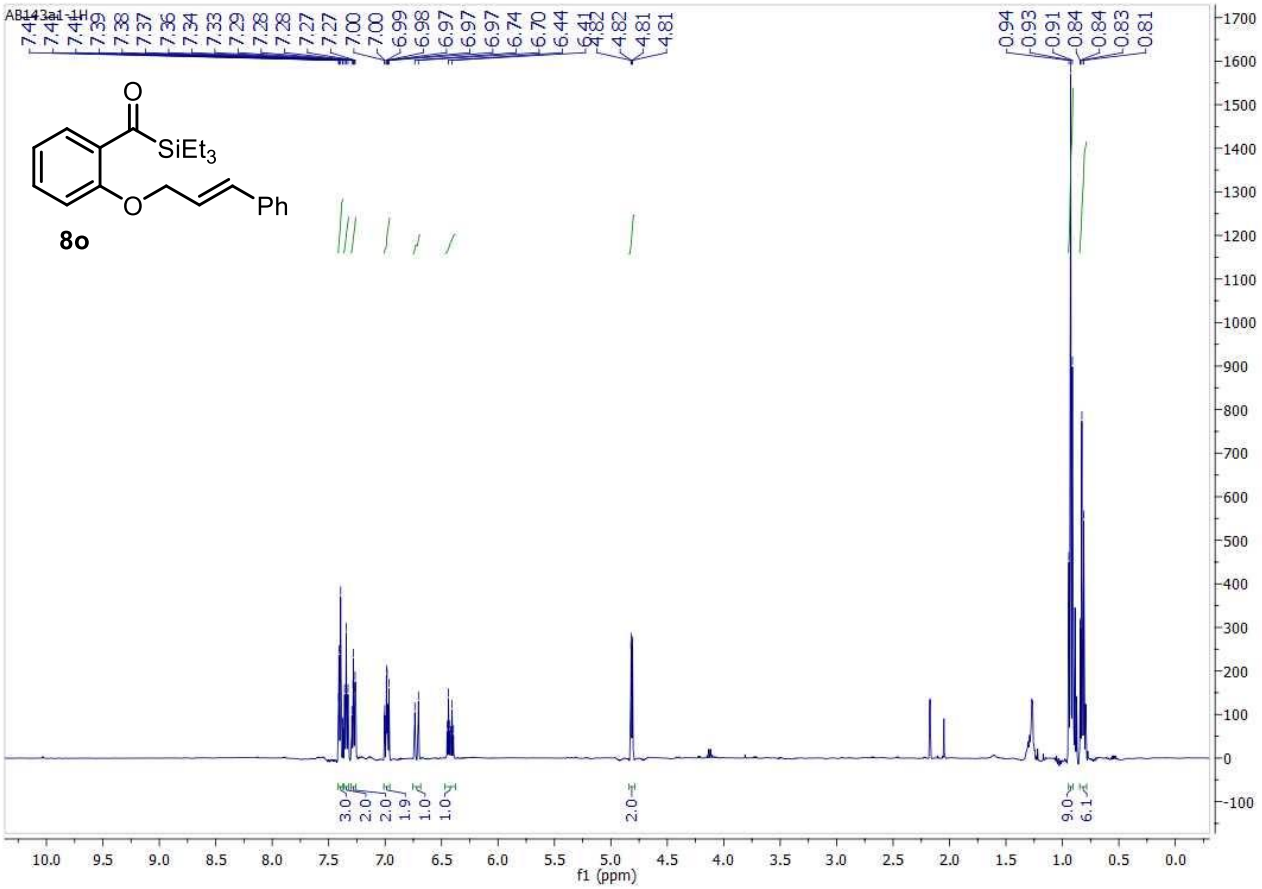

AB122a-13C
239.72
157.24
135.33
132.69
132.47
126.51
121.04
118.73
111.80
69.16
7.46
2.83
SiEt3
O
O
8l
f1 (ppm)

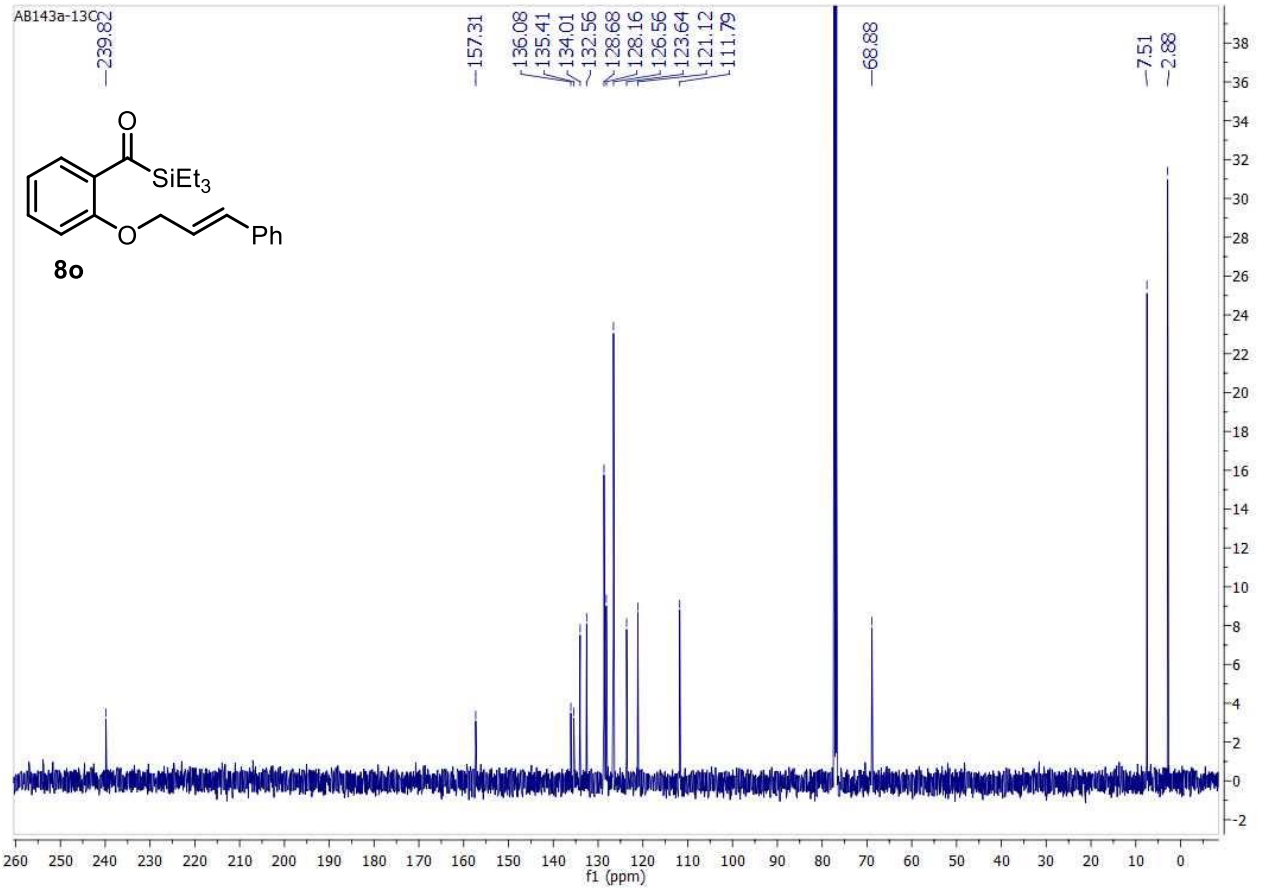

AB119a-3-1H
7.37
7.25
7.25
7.24
7.23
6.96
6.95
6.91
6.90
5.49
4.62
4.60
1.79
1.75
0.93
0.91
0.90
0.81
0.80
0.78
0.77
0.77
SiEt3
Me
O
Me
8m
f1 (ppm)

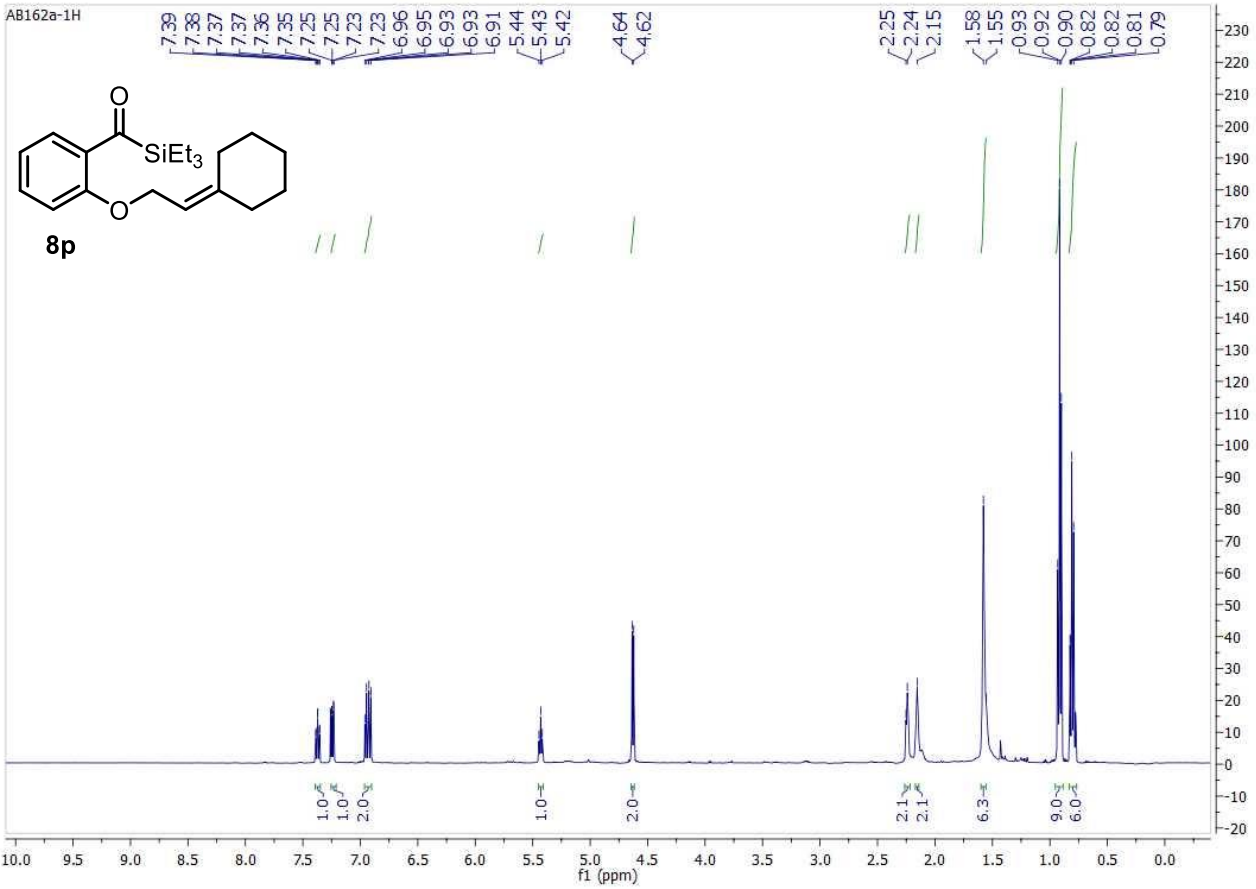

AB119a-3-13C
239.80
157.72
138.47
135.37
132.54
126.42
120.70
119.16
111.48
64.72
25.76
18.14
7.49
2.79
SiEt3
Me
O
Me
8m
f1 (ppm)

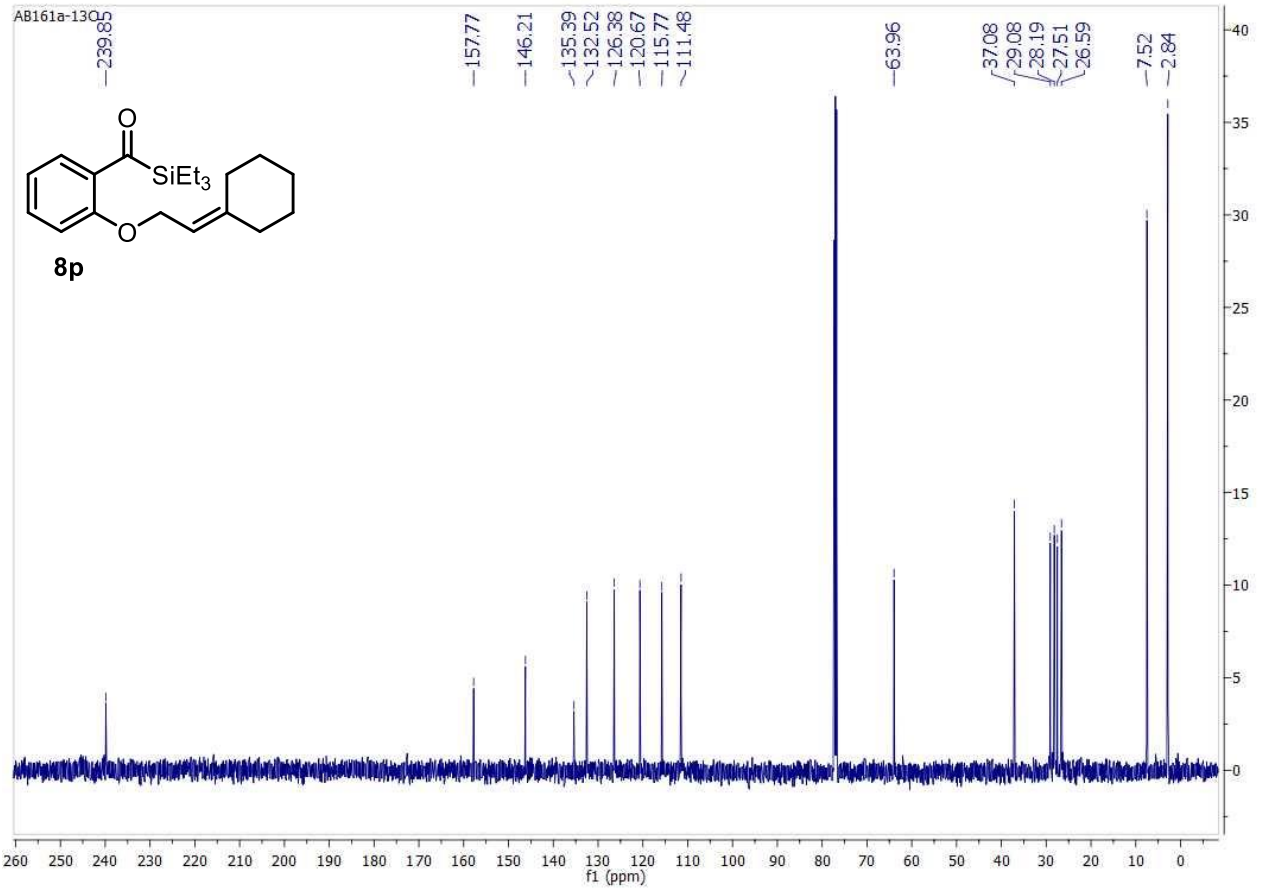

AB87a-2-p-1H
7.38
7.37
7.37
7.36
7.35
7.35
7.25
7.24
7.24
6.97
6.96
6.95
6.95
6.91
6.90
5.85
5.84
5.74
5.74
5.71
5.71
4.69
4.57
4.56
1.76
1.76
1.75
1.75
0.93
0.92
0.90
0.82
0.82
0.80
0.79
SiEt3
O
O
Me
8n
0.9
0.9
2.0
1.0
1.0
0.4
1.6
2.9
9.0
5.9
f1 (ppm)

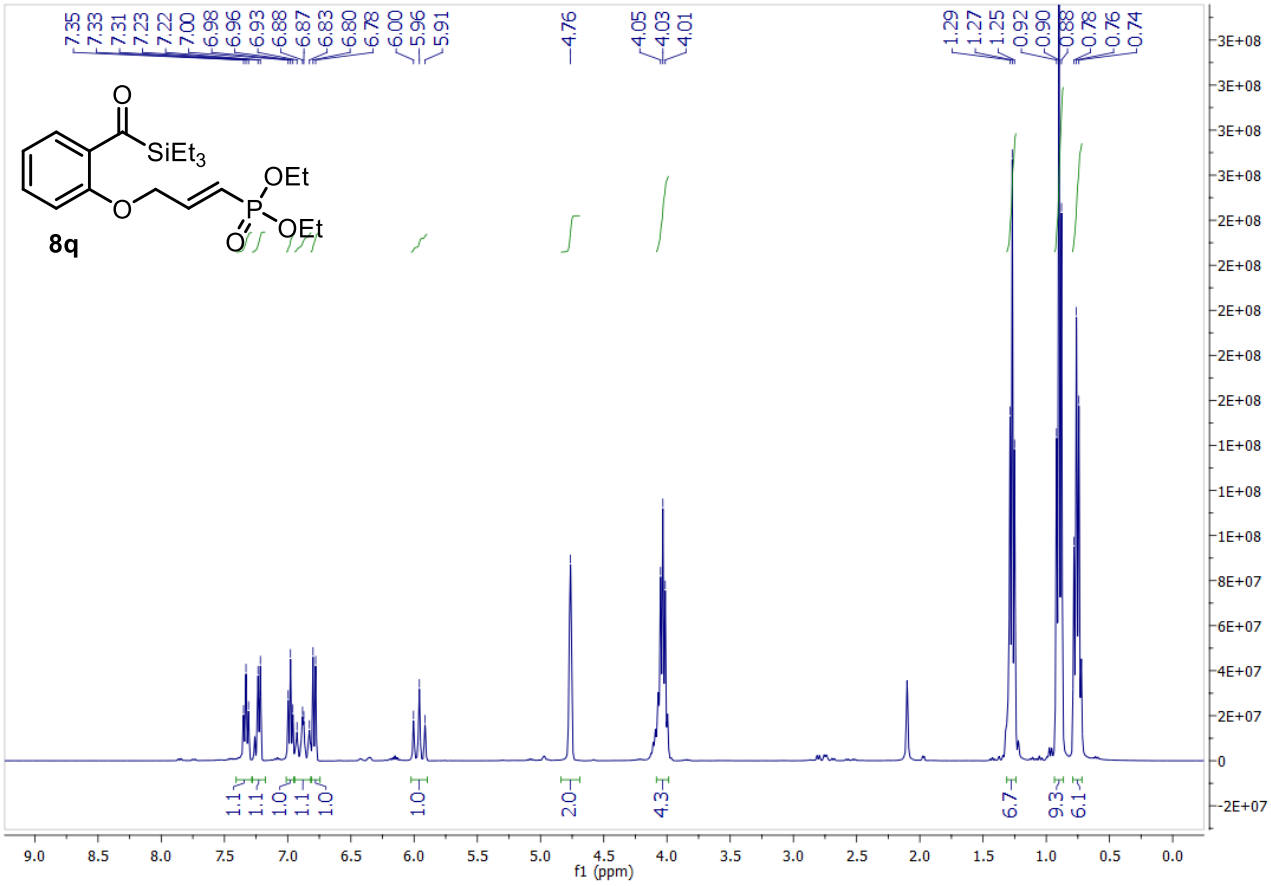

AB87a-2-p-1C
239.78
157.51
135.31
132.50
131.42
129.04
126.46
125.54
124.98
120.89
120.80
111.65
111.50
68.81
17.81
7.48
2.82
SiEt3
O
O
Me
8n
f1 (ppm)

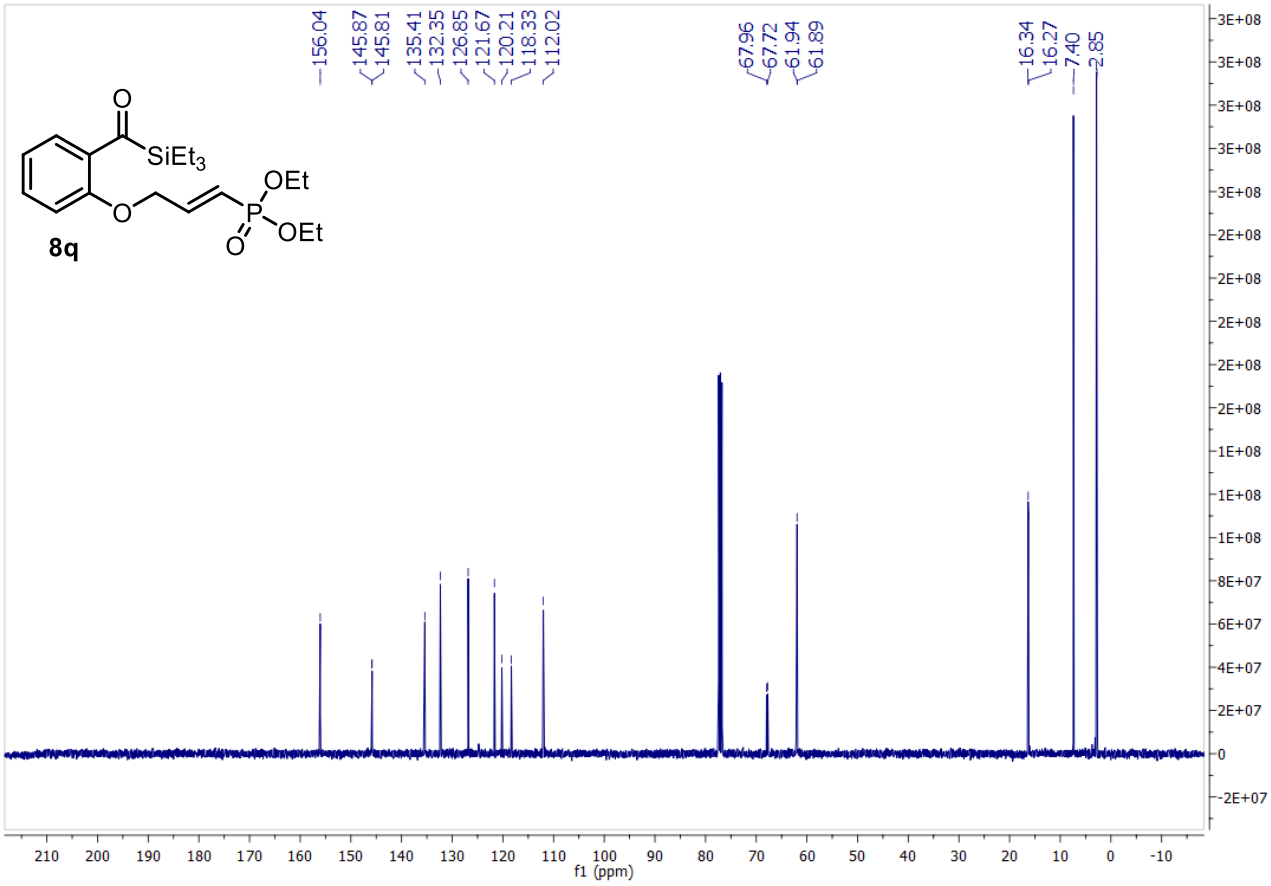

AB143a1-1H
7.41
7.41
7.39
7.38
7.37
7.36
7.34
7.33
7.29
7.28
7.28
7.27
7.27
7.00
7.00
6.99
6.98
6.97
6.97
6.97
6.74
6.70
6.44
6.41
4.82
4.82
4.81
4.81
0.94
0.93
0.91
0.84
0.84
0.83
0.81
SiEt3
O
Ph
8o
3.0
2.0
2.0
1.9
1.0
1.0
2.0
9.0
6.1
f1 (ppm)

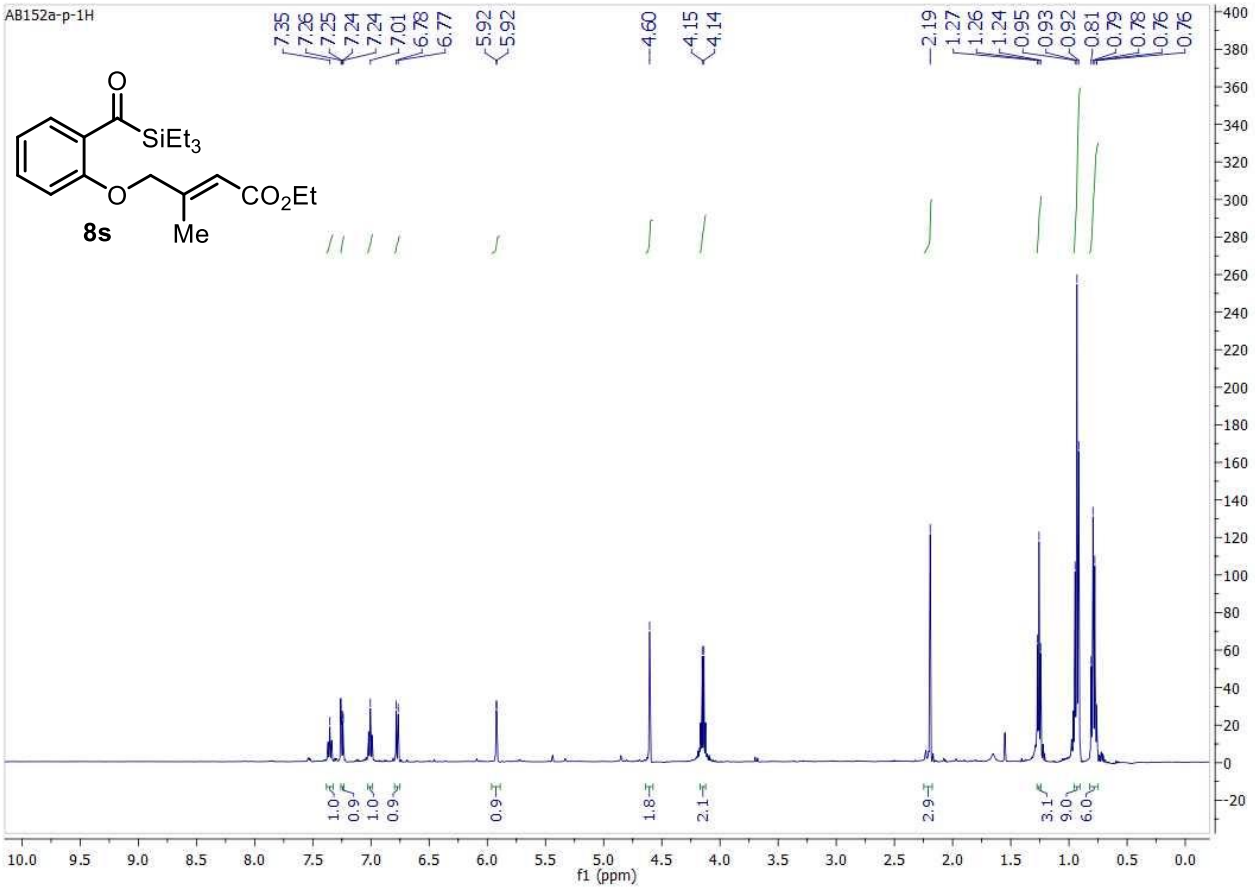

AB143a-13C
239.82
157.31
136.08
135.41
134.01
132.56
128.68
128.16
126.56
123.64
121.12
111.79
68.88
7.51
2.88
SiEt3
O
Ph
8o
f1 (ppm)

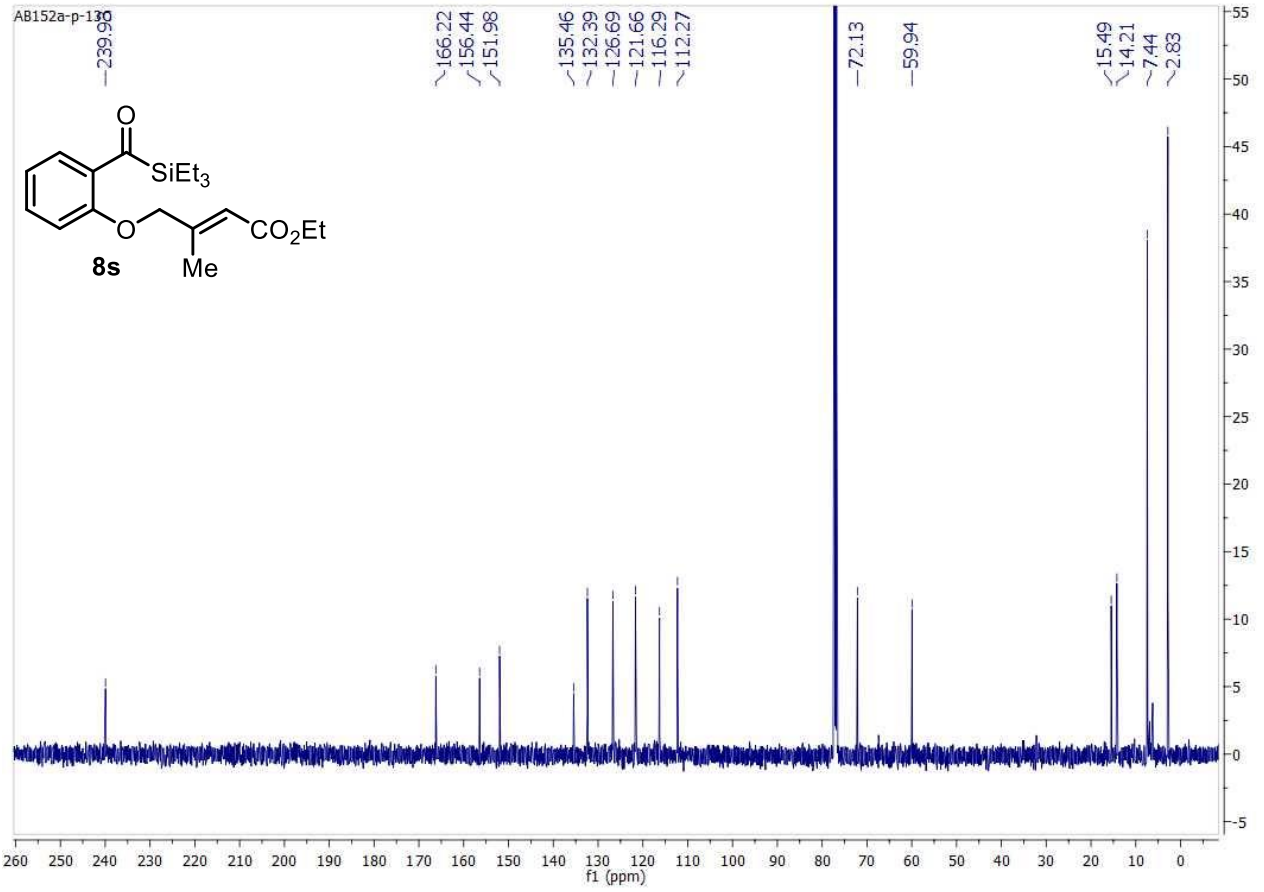

AB162a-1H
7.39
7.38
7.37
7.37
7.36
7.35
7.25
7.25
7.23
7.23
6.96
6.95
6.93
6.93
6.91
5.44
5.43
5.42
4.64
4.62
2.25
2.24
2.15
1.58
1.55
0.93
0.92
0.90
0.82
0.82
0.81
0.79
SiEt3
O
O
8p
1.0
1.0
2.0
1.0
2.0
2.1
2.1
6.3
9.0
6.0
f1 (ppm)

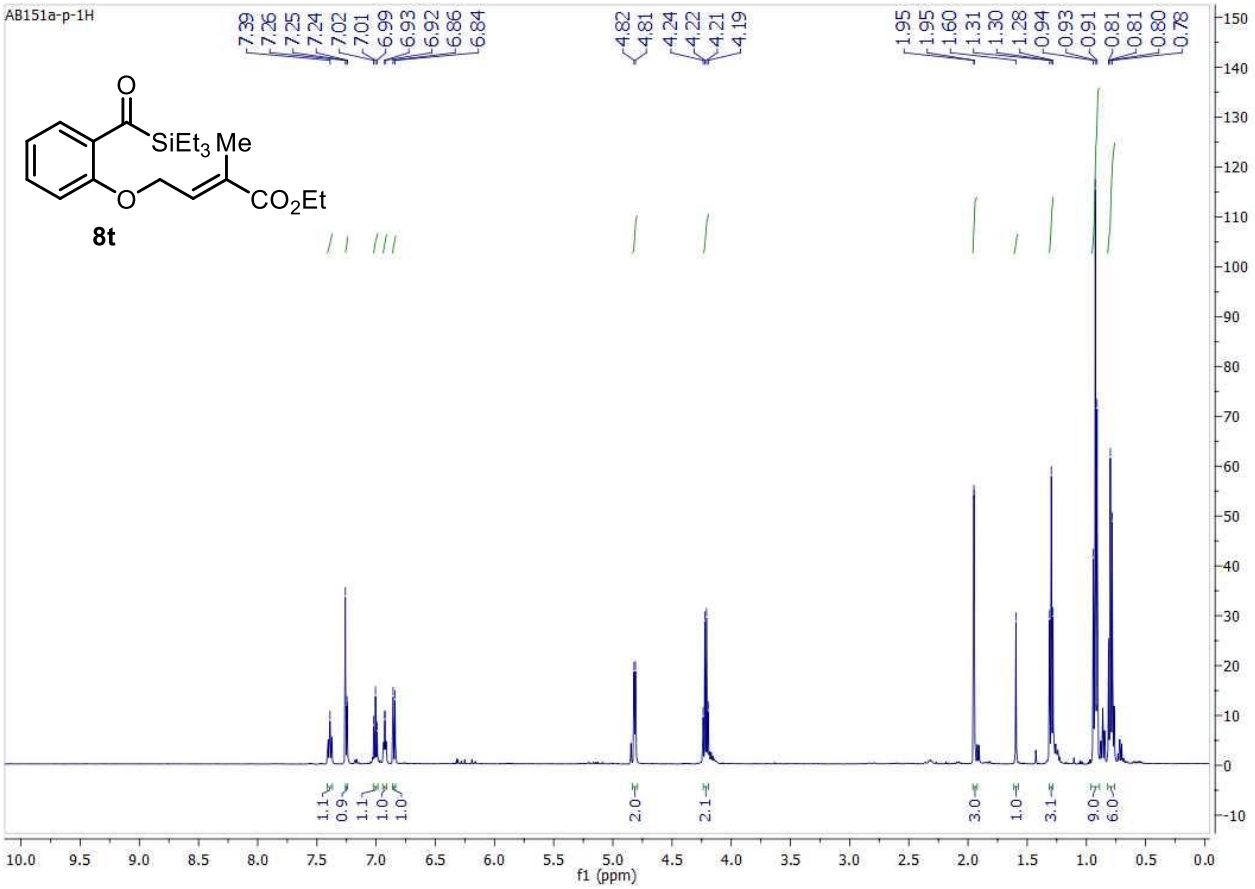

AB161a-13C
239.85
157.77
146.21
135.39
132.52
126.38
120.67
115.77
111.48
63.96
37.08
29.08
28.19
27.51
26.59
7.52
2.84
SiEt3
O
O
8p
f1 (ppm)

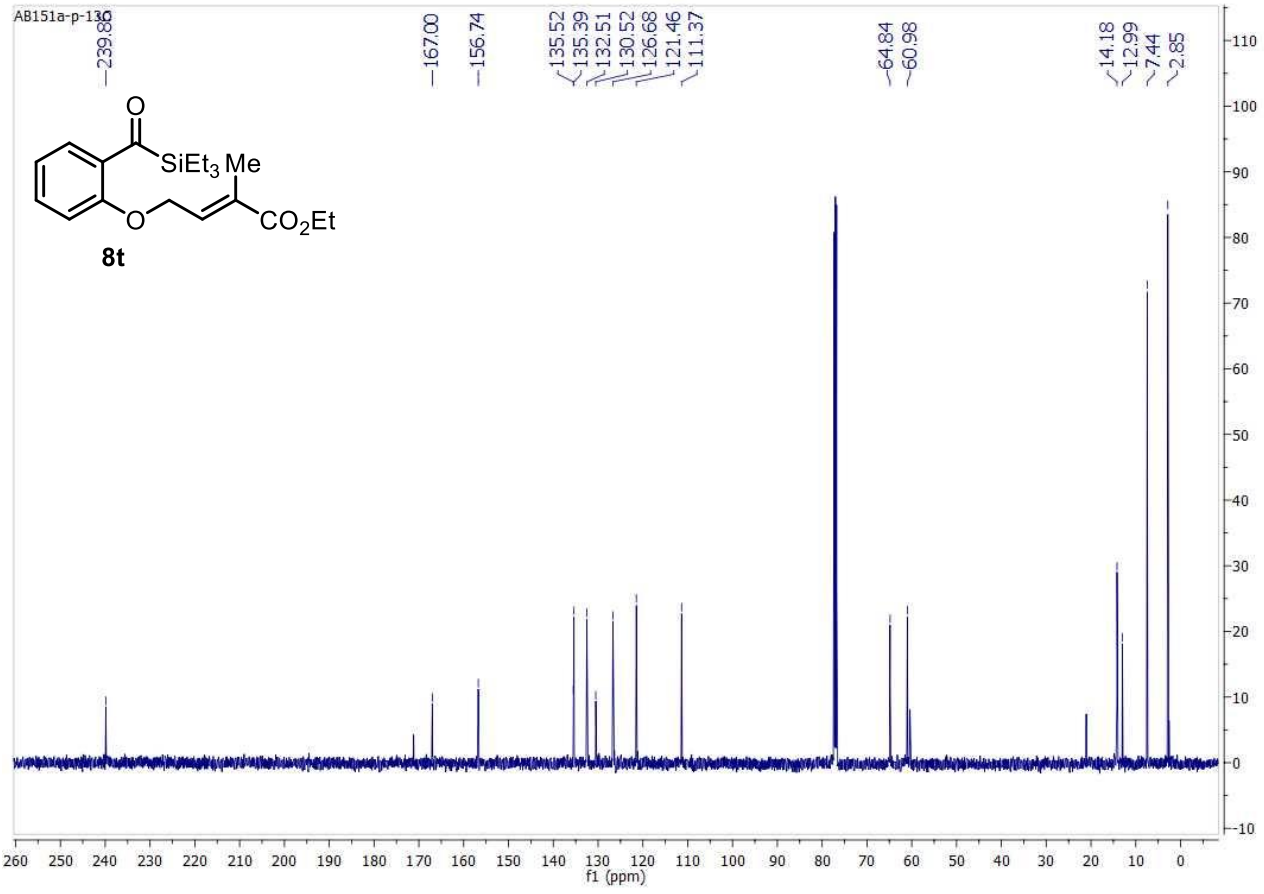

7.35
7.33
7.31
7.23
7.22
7.00
6.98
6.96
6.93
6.88
6.87
6.83
6.80
6.78
6.00
5.96
5.91
4.76
4.05
4.03
4.01
1.29
1.27
1.25
0.92
0.90
0.88
0.78
0.76
0.74
SiEt3
OEt
OEt
O
P
8q
1.1
1.1
1.0
1.1
1.0
1.0
2.0
4.3
6.7
9.3
6.1
f1 (ppm)

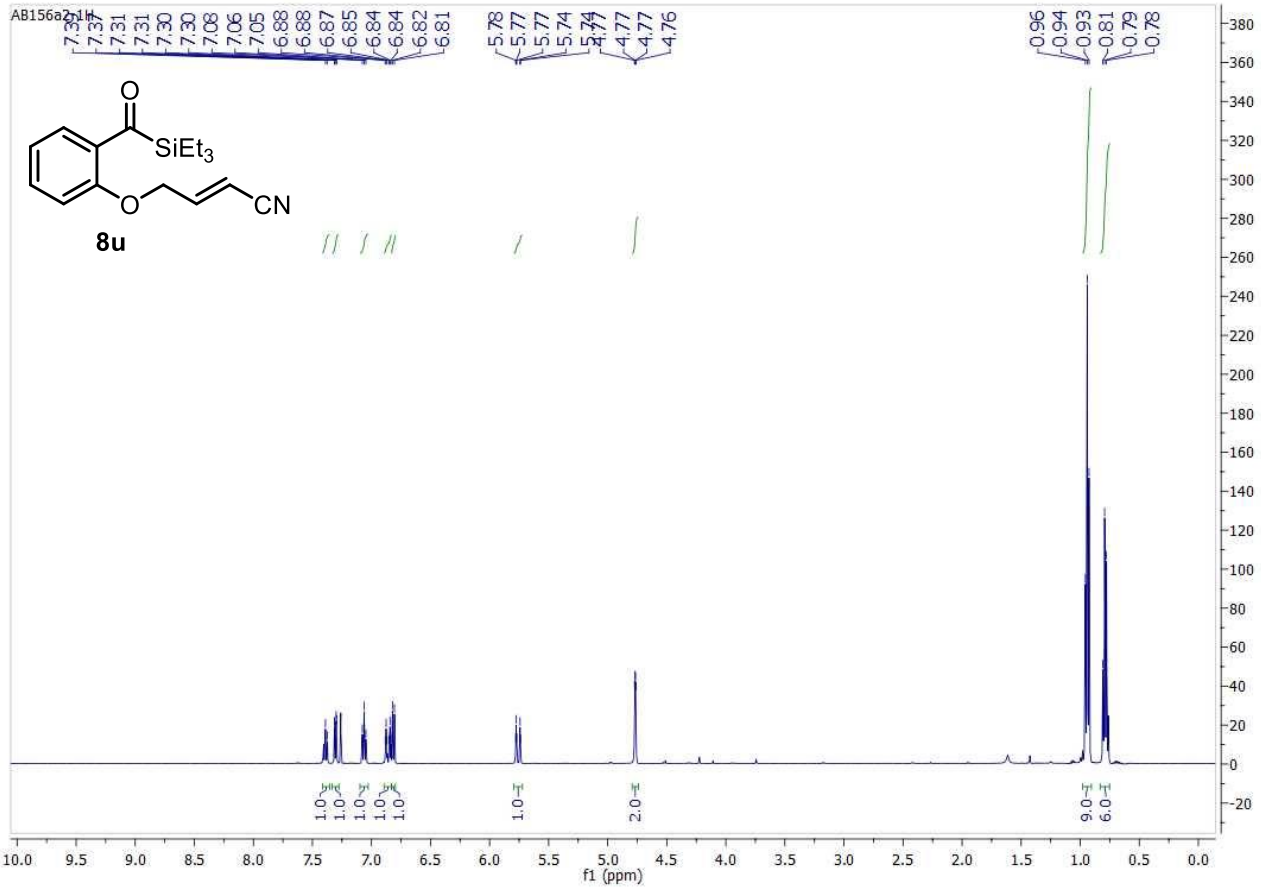

156.04
145.87
145.81
135.41
132.35
126.85
121.67
120.21
118.33
112.02
67.96
67.72
61.94
61.89
16.34
16.27
7.40
2.85
SiEt3
OEt
OEt
O
P
8q
f1 (ppm)

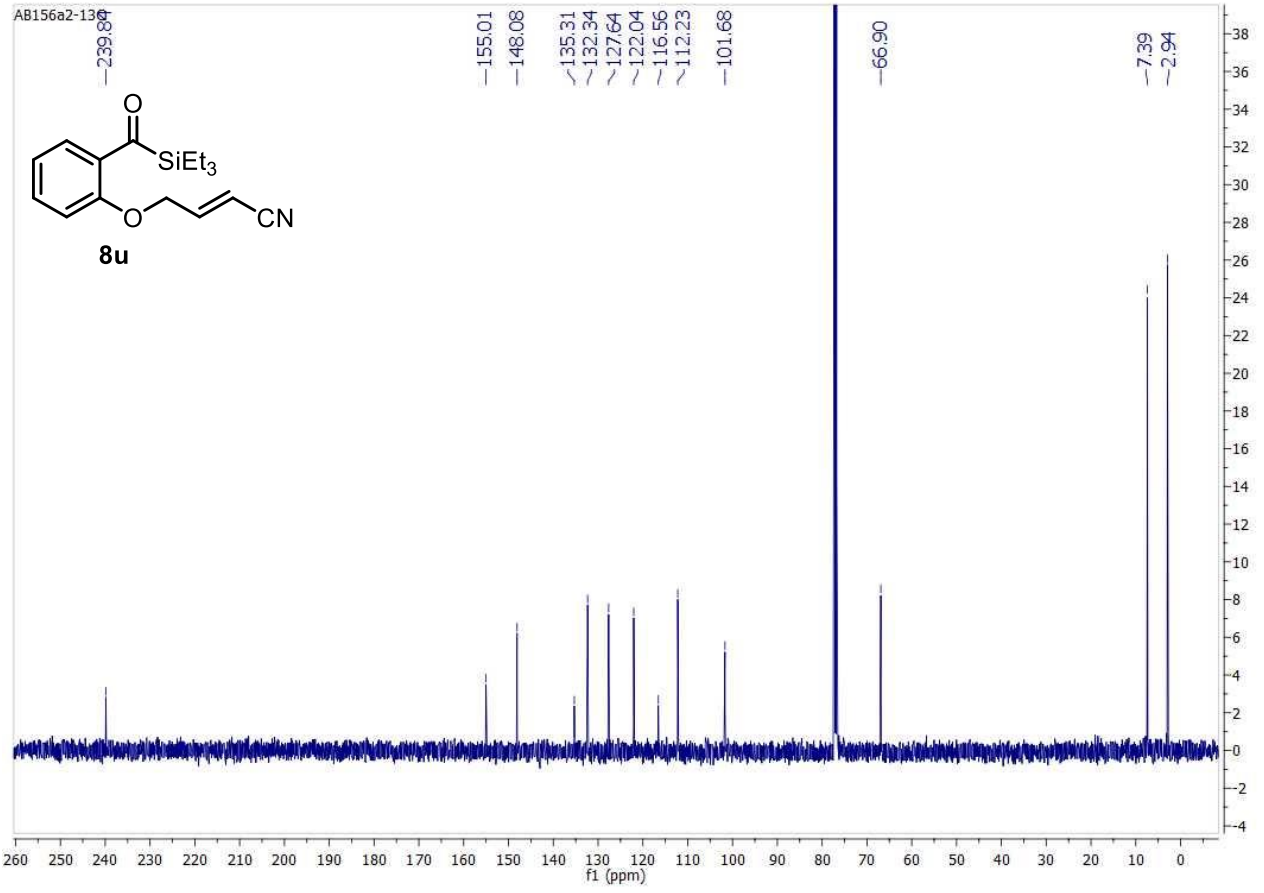

AB152a-p-1H
7.35
7.26
7.25
7.24
7.24
7.01
6.78
6.77
5.92
5.92
4.60
4.15
4.14
2.19
1.27
1.26
1.24
0.95
0.93
0.92
0.81
0.79
0.78
0.76
0.76
SiEt3
O
CO2Et
Me
8s
1.0
0.9
1.0
0.9
0.9
1.8
2.1
2.9
3.1
9.0
6.0
f1 (ppm)

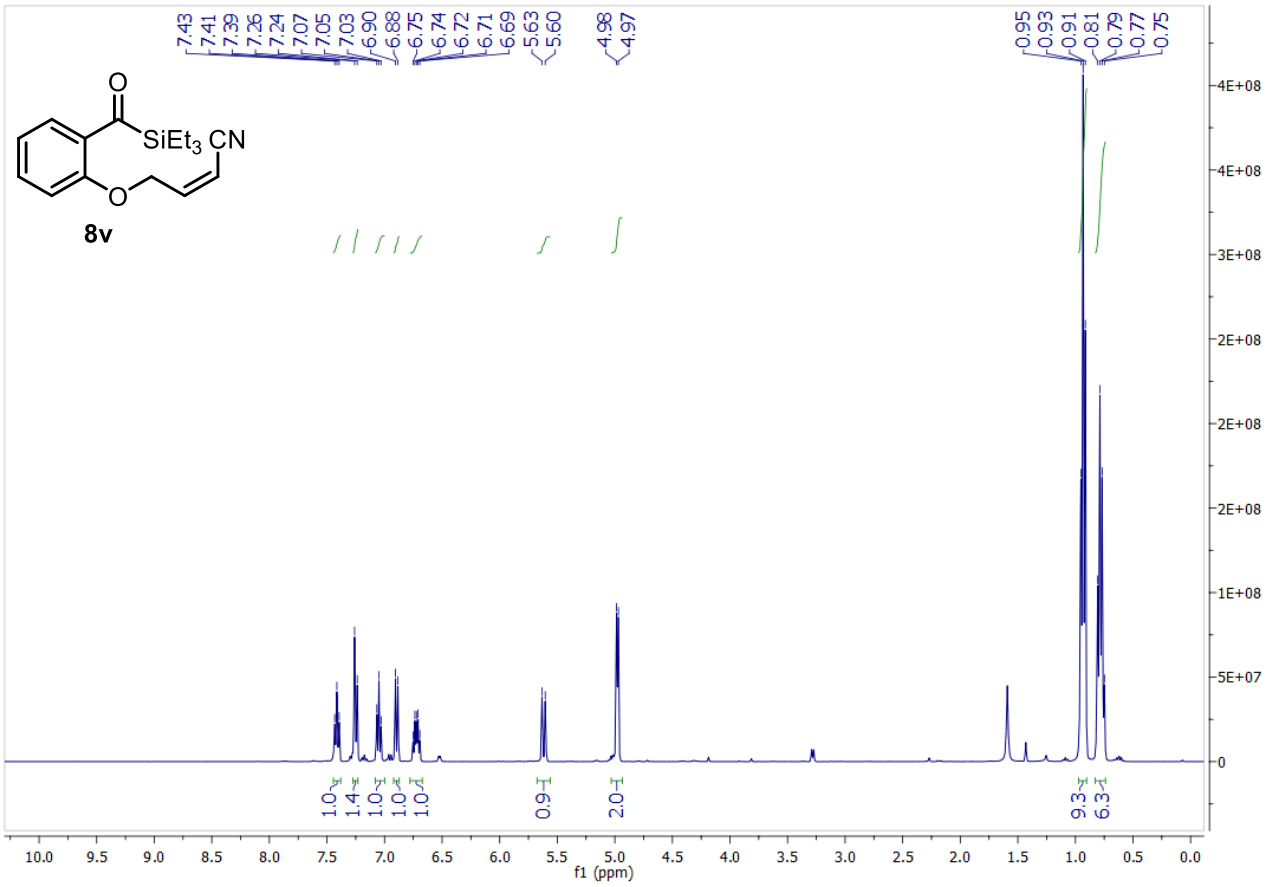

AB152a-p-13
239.93
166.22
156.44
151.98
135.46
132.39
126.69
121.66
116.29
112.27
72.13
59.94
15.49
14.21
7.44
2.83
SiEt3
O
CO2Et
Me
8s
f1 (ppm)

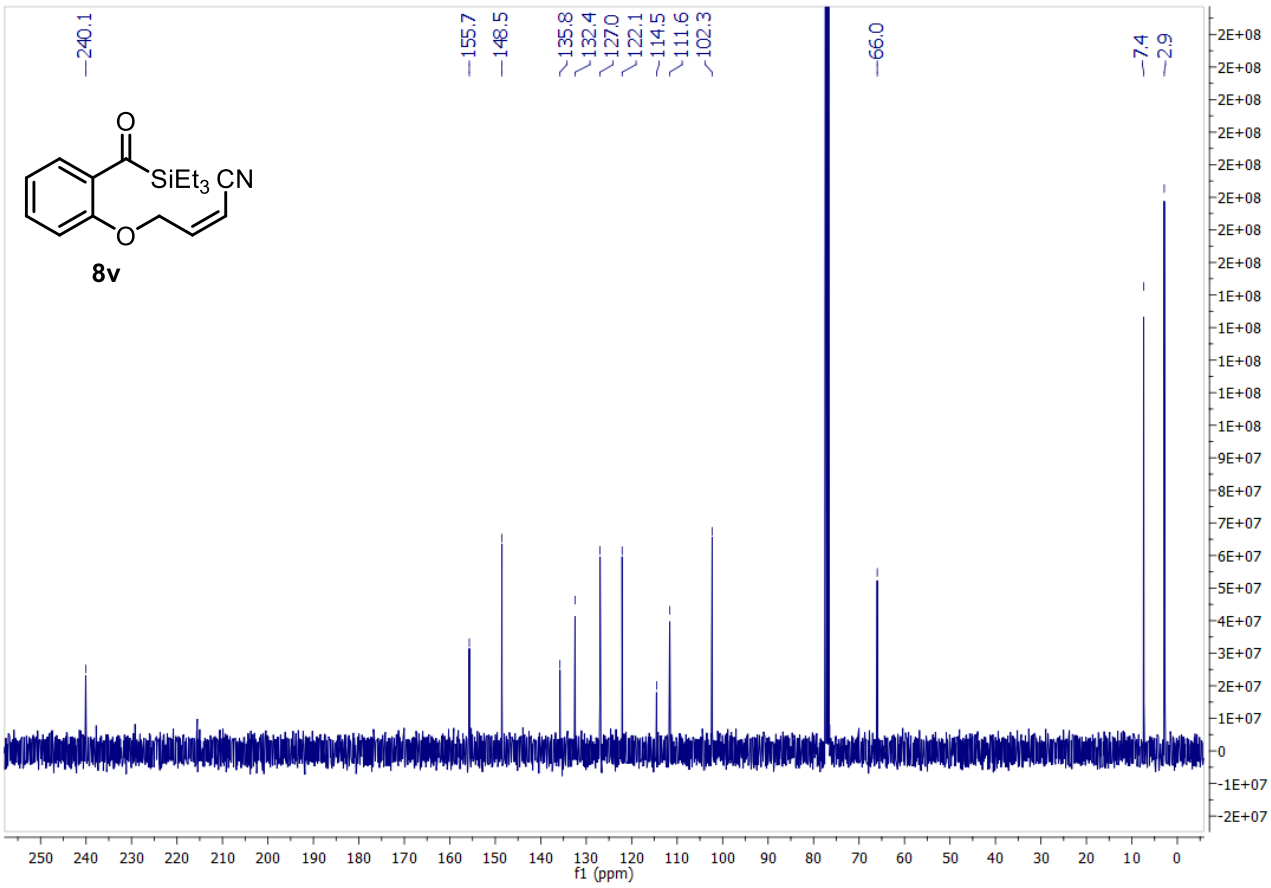

AB151a-p-1H
7.39
7.26
7.25
7.24
7.02
7.01
6.99
6.93
6.92
6.86
6.84
4.82
4.81
4.24
4.22
4.21
4.19
1.95
1.95
1.60
1.31
1.30
1.28
0.94
0.93
0.91
0.81
0.81
0.80
0.78
SiEt3
Me
CO2Et
O
O
8t
1.1
0.9
1.1
1.0
1.0
2.0
2.1
3.0
1.0
3.1
9.0
6.0
f1 (ppm)

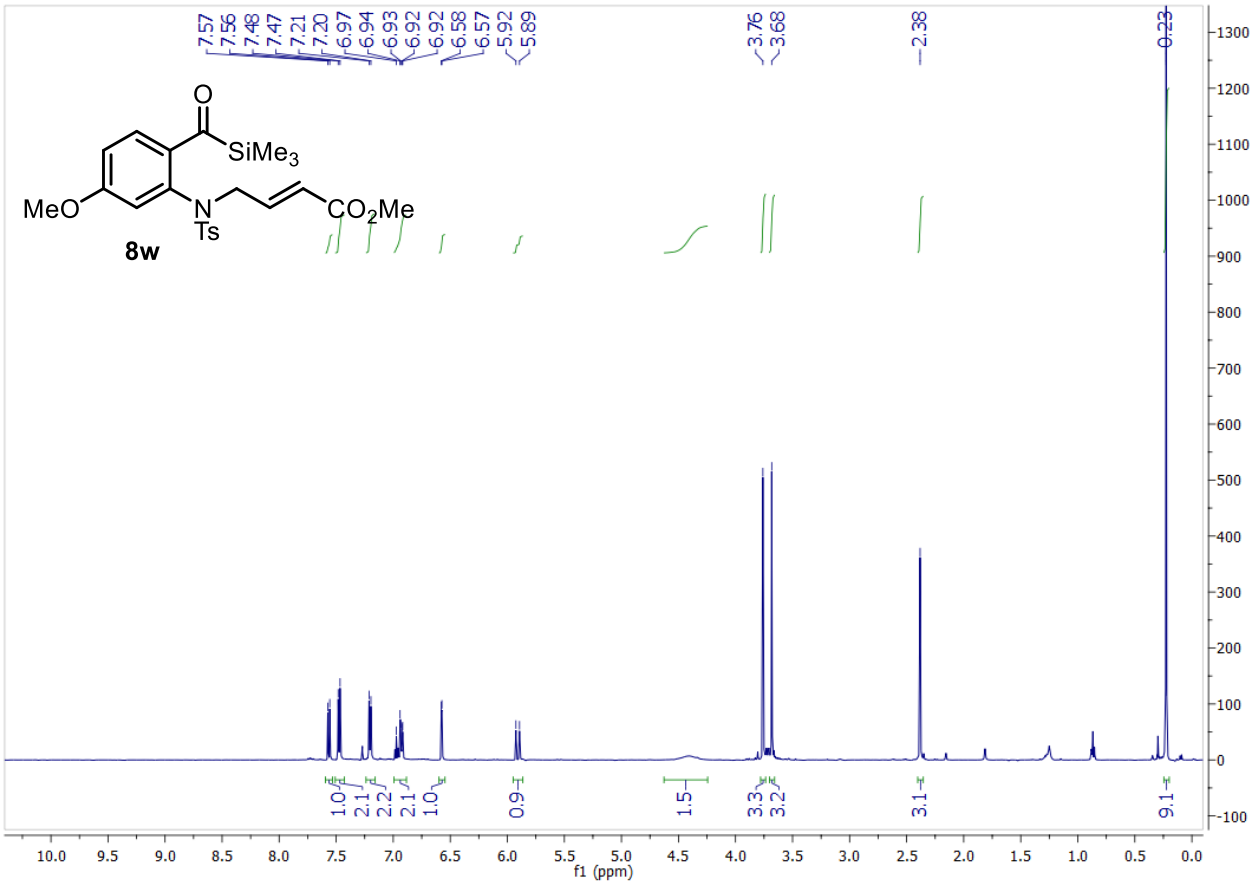

AB151a-p-13C
239.86
167.00
156.74
135.52
135.39
132.51
130.52
126.68
121.46
111.37
64.84
60.98
14.18
12.99
7.44
2.85
SiEt3
Me
CO2Et
O
O
8t
f1 (ppm)

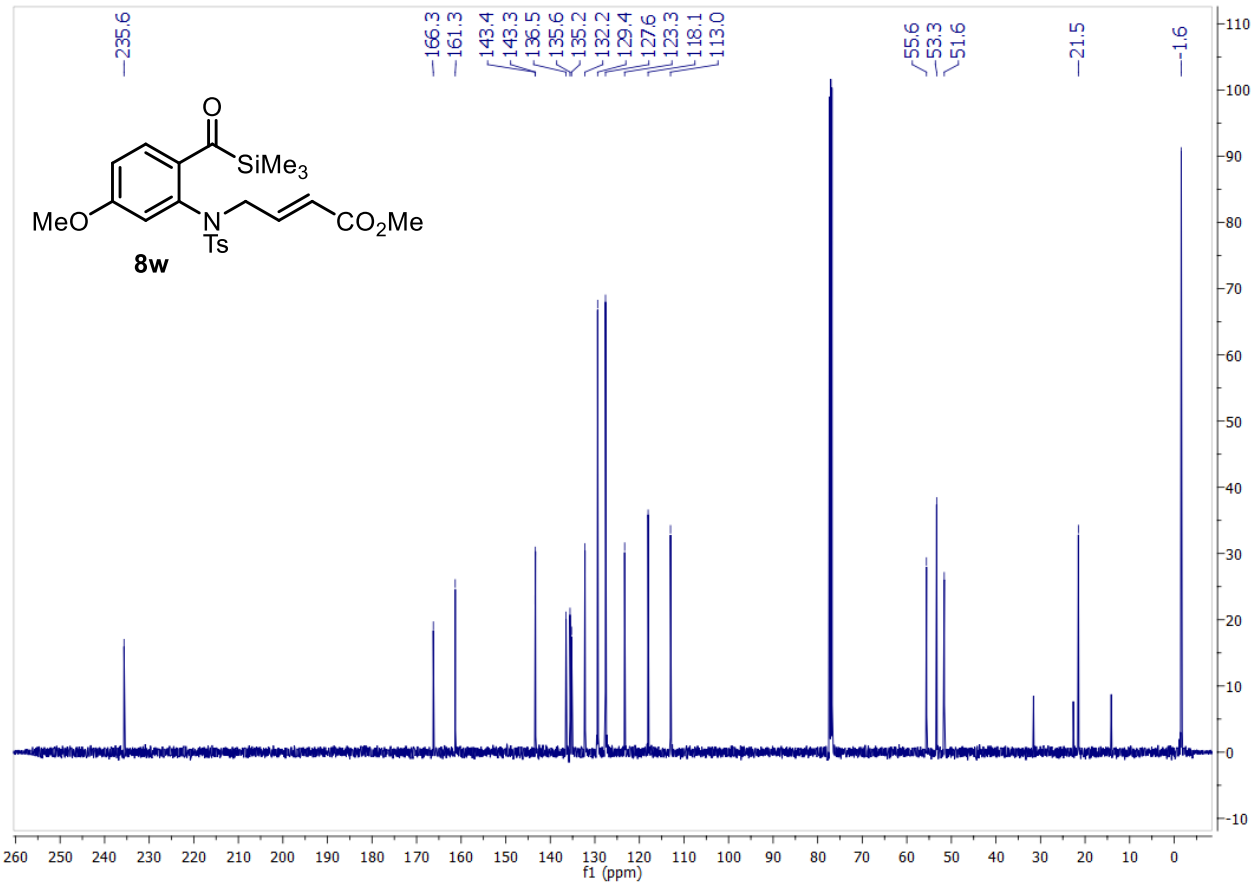

AB156a2-1H
7.38
7.37
7.31
7.31
7.30
7.30
7.08
7.06
7.05
6.88
6.87
6.85
6.84
6.84
6.82
6.81
5.78
5.77
5.77
5.74
4.77
4.77
4.77
4.76
0.96
0.94
0.93
0.81
0.79
0.78
O
SiEt3
O
CN
8u
1.0
1.0
1.0
1.0
1.0
2.0
9.0
6.0
f1 (ppm)

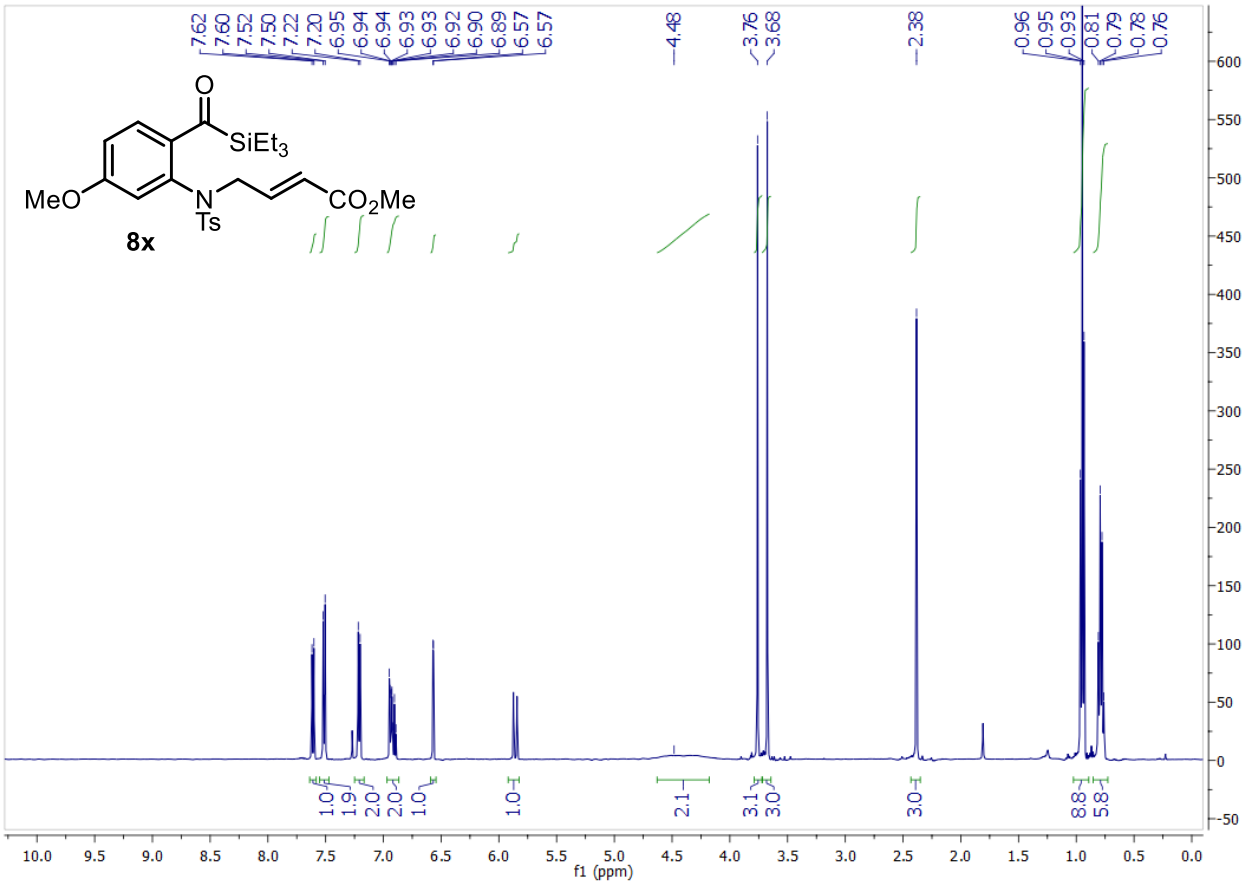

AB156a2-13C
239.84
155.01
148.08
135.31
132.34
127.64
122.04
116.56
112.23
101.68
66.90
7.39
2.94
O
SiEt3
O
CN
8u
f1 (ppm)

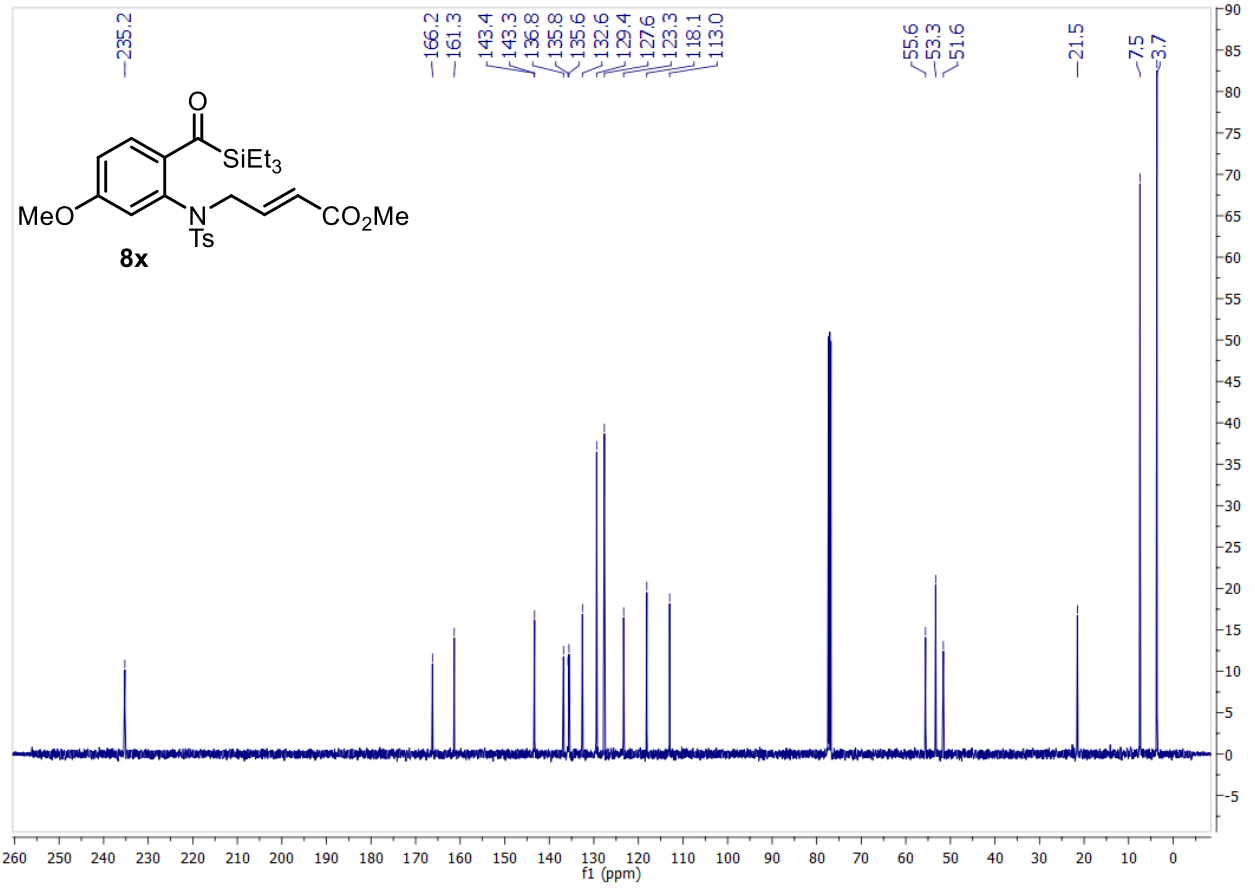

7.43
7.41
7.39
7.26
7.24
7.07
7.05
7.03
6.90
6.88
6.75
6.74
6.72
6.71
6.69
5.63
5.60
4.98
4.97
0.95
0.93
0.91
0.81
0.79
0.77
0.75
SiEt3 CN
8v
1.0
1.4
1.0
1.0
1.0
0.9
2.0
9.3
6.3
f1 (ppm)

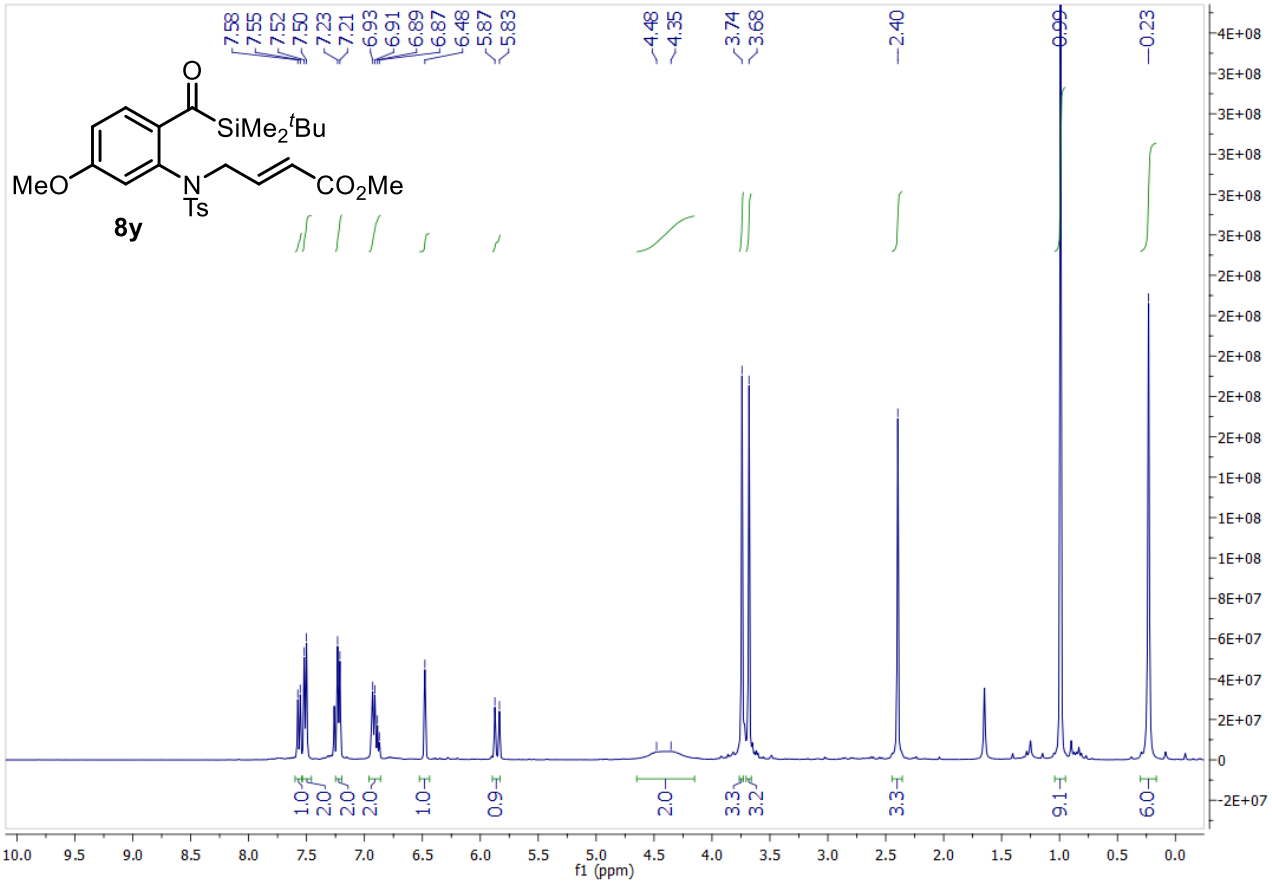

240.1
155.7
148.5
135.8
132.4
127.0
122.1
114.5
111.6
102.3
66.0
7.4
2.9
SiEt3 CN
8v
f1 (ppm)

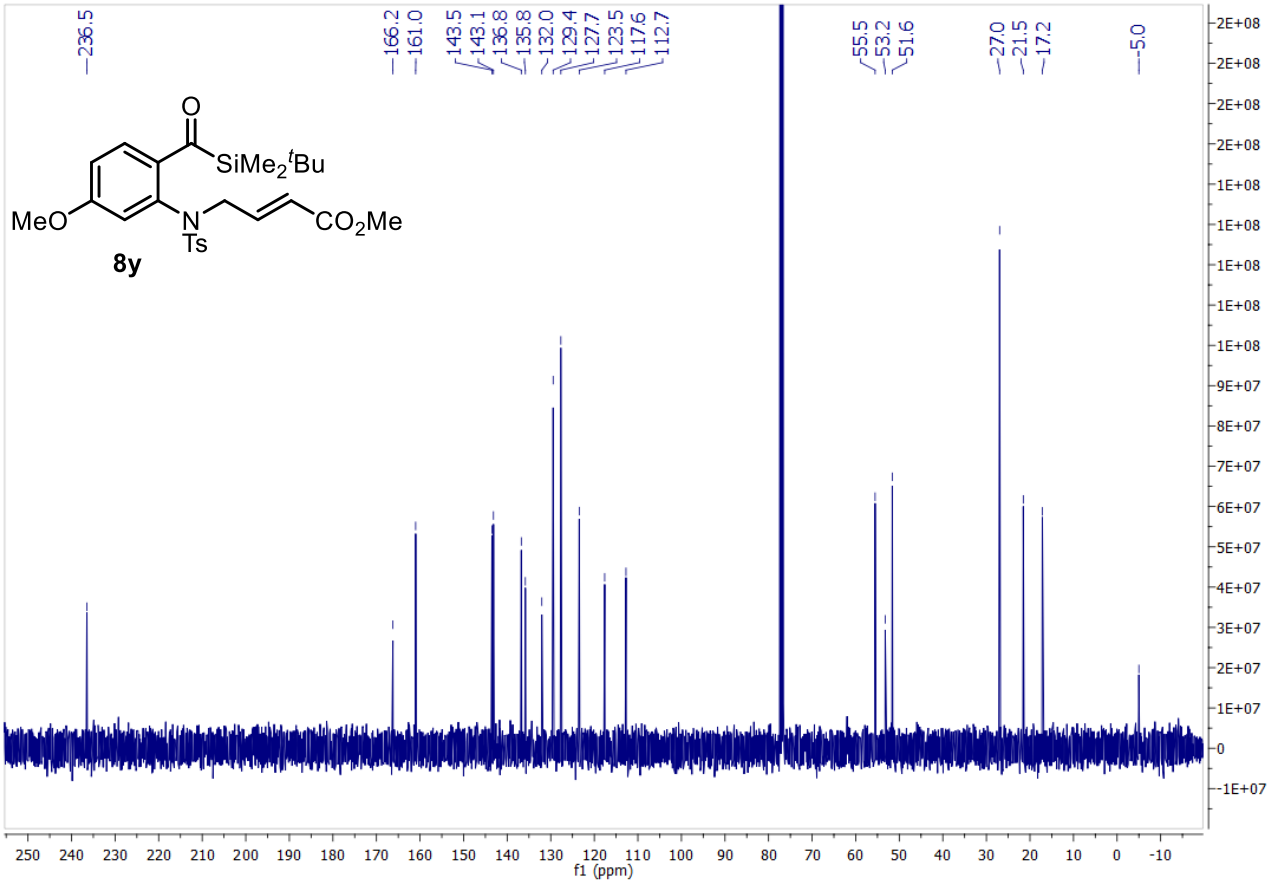

7.57
7.56
7.48
7.47
7.21
7.20
6.97
6.94
6.93
6.92
6.92
6.58
6.57
5.92
5.89
3.76
3.68
2.38
0.23
O
SiMe3
MeO
N
Ts
CO2Me
8w
1.0
2.1
2.2
2.1
1.0
0.9
1.5
3.3
3.2
3.1
9.1
f1 (ppm)

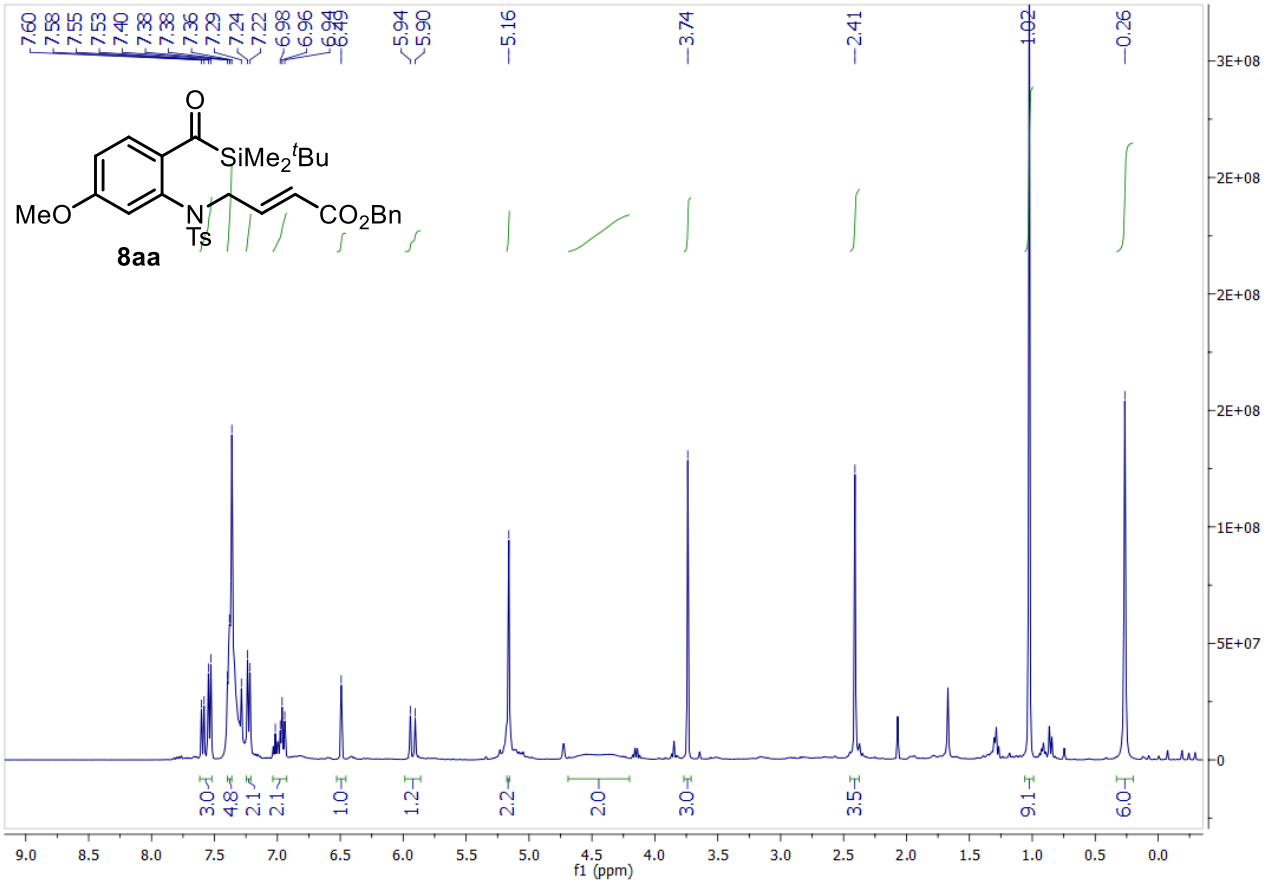

235.6
166.3
161.3
143.4
143.3
136.5
135.6
135.2
132.2
129.4
127.6
123.3
118.1
113.0
55.6
53.3
51.6
21.5
-1.6
O
SiMe3
MeO
N
Ts
CO2Me
8w
f1 (ppm)

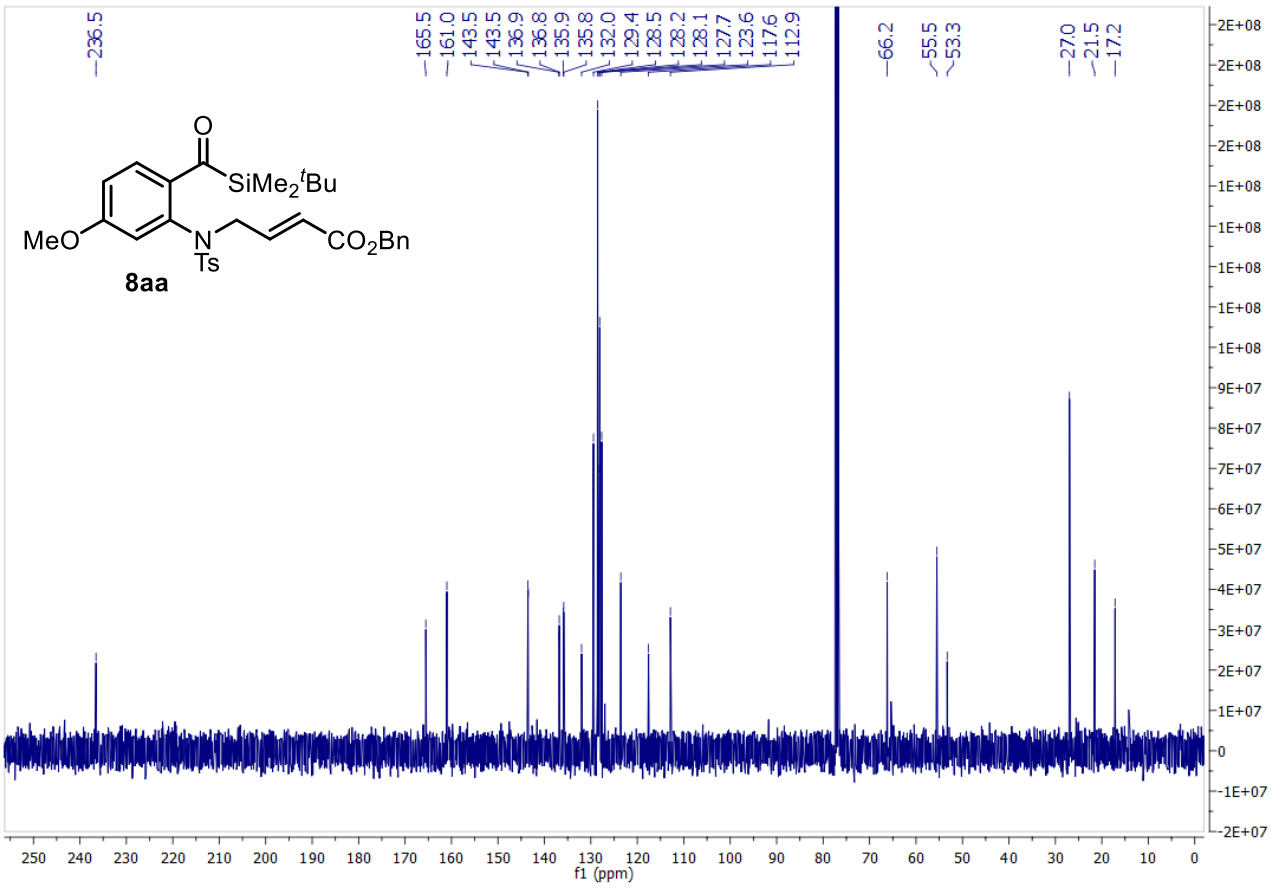

7.62
7.60
7.52
7.50
7.22
7.20
6.95
6.94
6.94
6.93
6.93
6.92
6.90
6.89
6.57
6.57
4.48
3.76
3.68
2.38
0.96
0.95
0.93
0.81
0.79
0.78
0.76
O
SiEt3
MeO
N
Ts
CO2Me
8x
1.0
1.9
2.0
2.0
1.0
1.0
2.1
3.1
3.0
3.0
8.8
5.8
f1 (ppm)

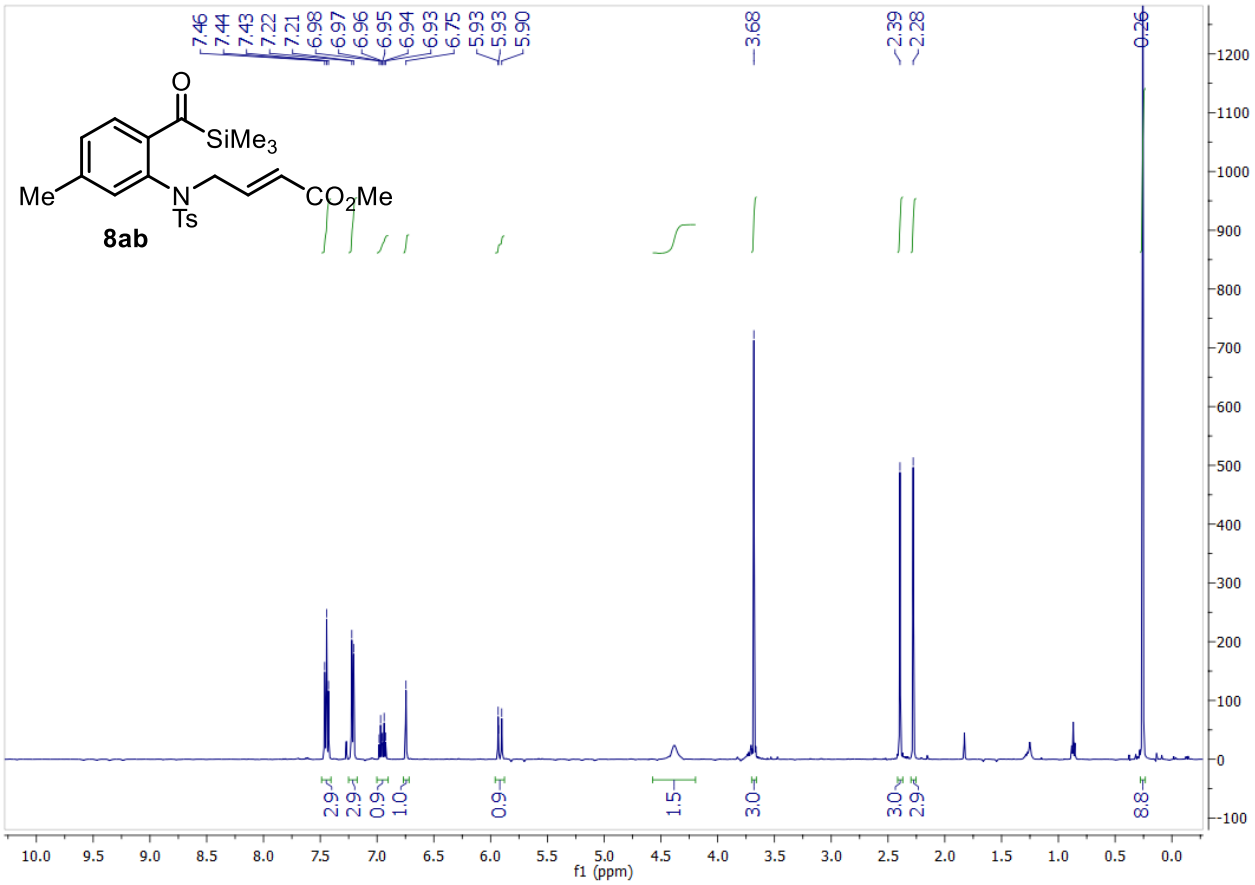

235.2
166.2
161.3
143.4
143.3
136.8
135.8
135.6
132.6
129.4
127.6
123.3
118.1
113.0
55.6
53.3
51.6
21.5
7.5
3.7
O
SiEt3
MeO
N
Ts
CO2Me
8x
f1 (ppm)

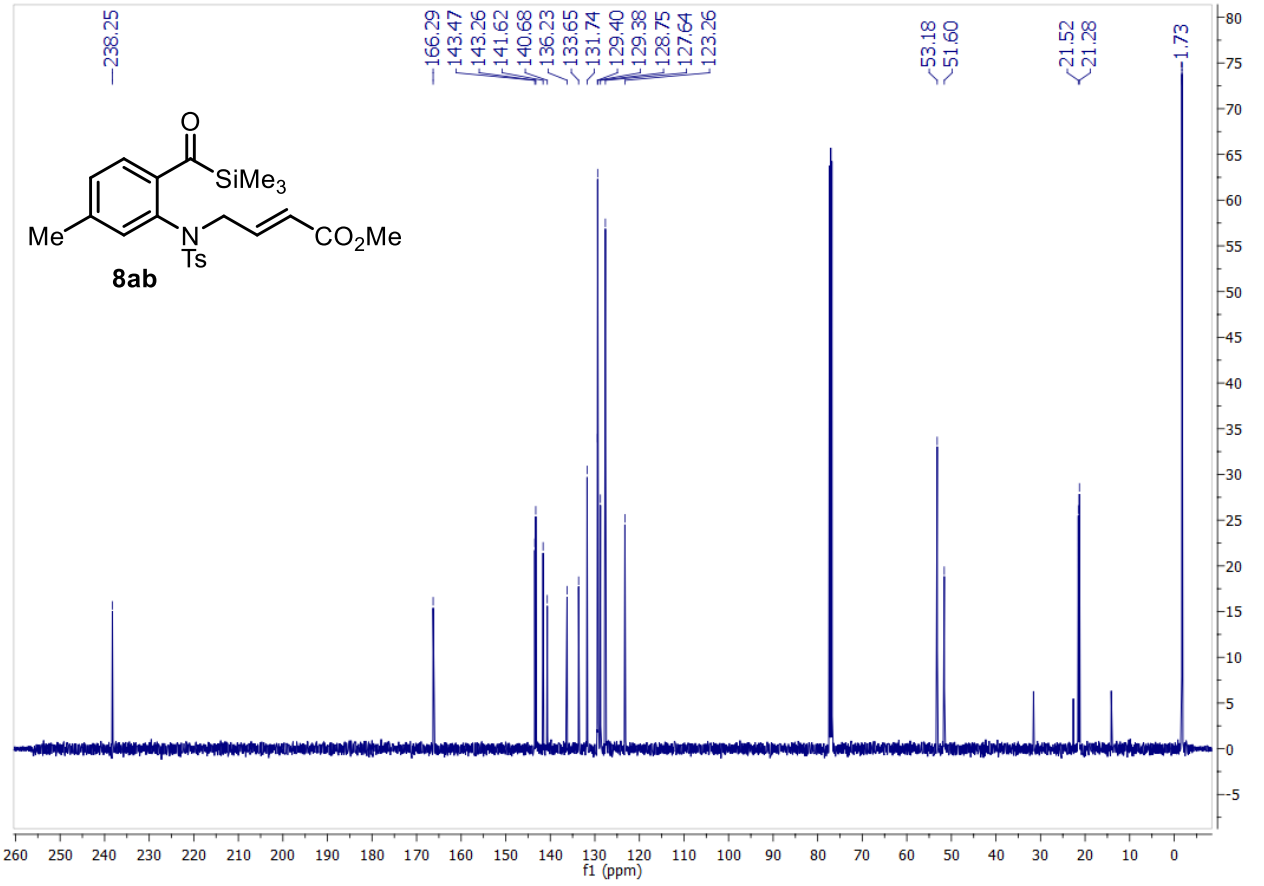

7.58
7.55
7.52
7.50
7.23
7.21
6.93
6.91
6.89
6.87
6.48
5.87
5.83
4.48
4.35
3.74
3.68
2.40
0.99
0.23
O
SiMe2tBu
MeO
N
Ts
CO2Me
8y
1.0
2.0
2.0
2.0
1.0
0.9
2.0
3.3
3.2
3.3
9.1
6.0
f1 (ppm)

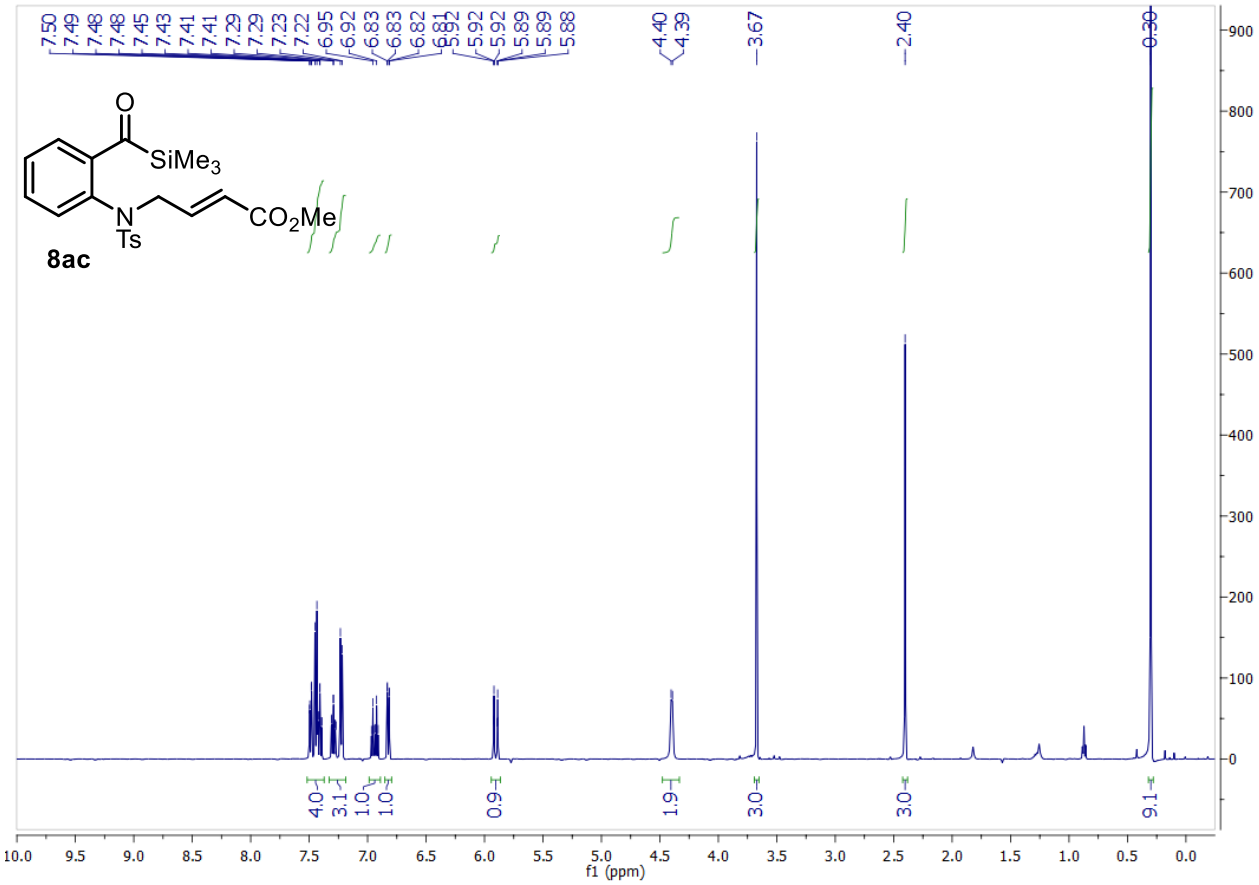

236.5
166.2
161.0
143.5
143.1
136.8
135.8
132.0
129.4
127.7
123.5
117.6
112.7
55.5
53.2
51.6
27.0
21.5
17.2
5.0
O
SiMe2tBu
MeO
N
Ts
CO2Me
8y
f1 (ppm)

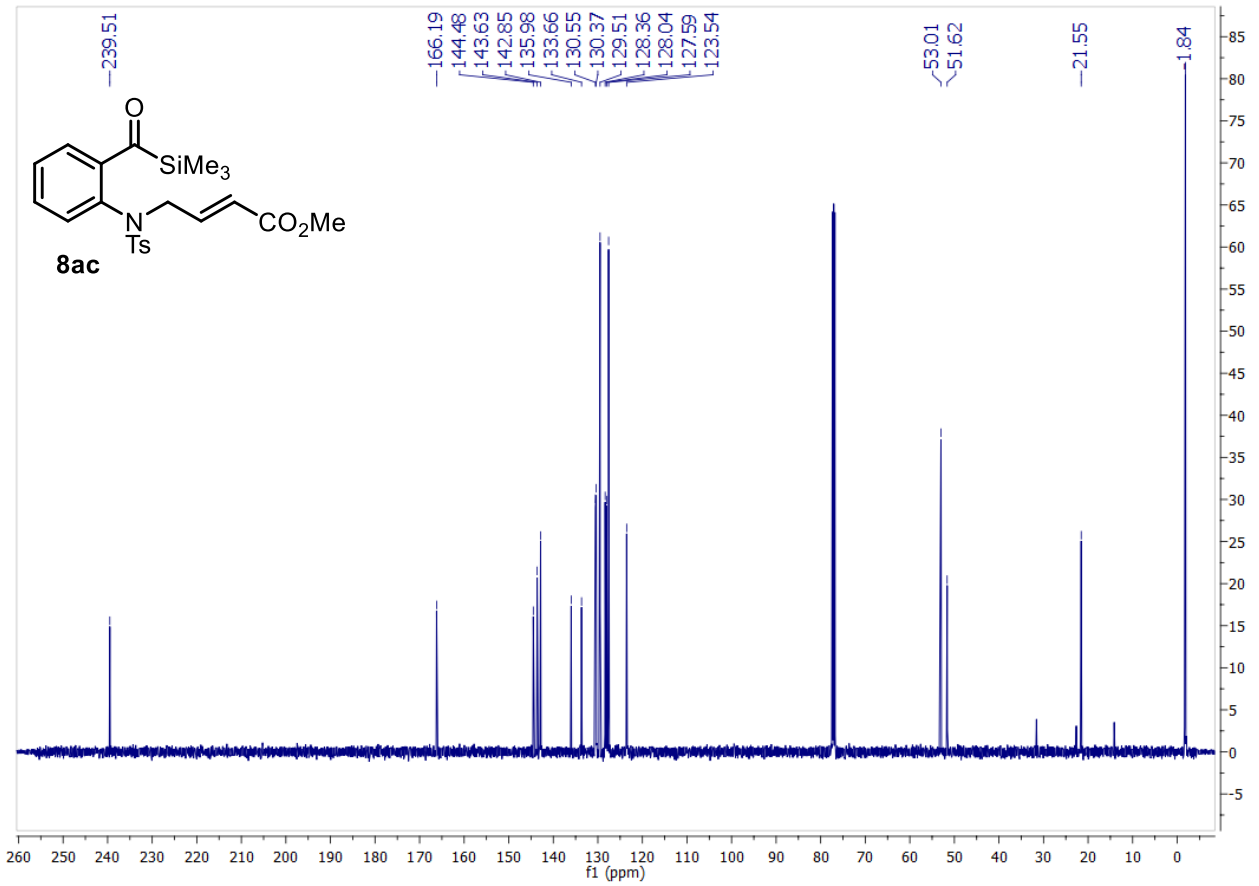

7.60
7.58
7.55
7.53
7.40
7.38
7.38
7.36
7.29
7.24
7.22
6.98
6.96
6.94
6.49
5.94
5.90
5.16
3.74
2.41
1.02
0.26
O
SiMe2tBu
MeO
N
Ts
CO2Bn
8aa
3.0
4.8
2.1
2.1
1.0
1.2
2.2
2.0
3.0
3.5
9.1
6.0
f1 (ppm)

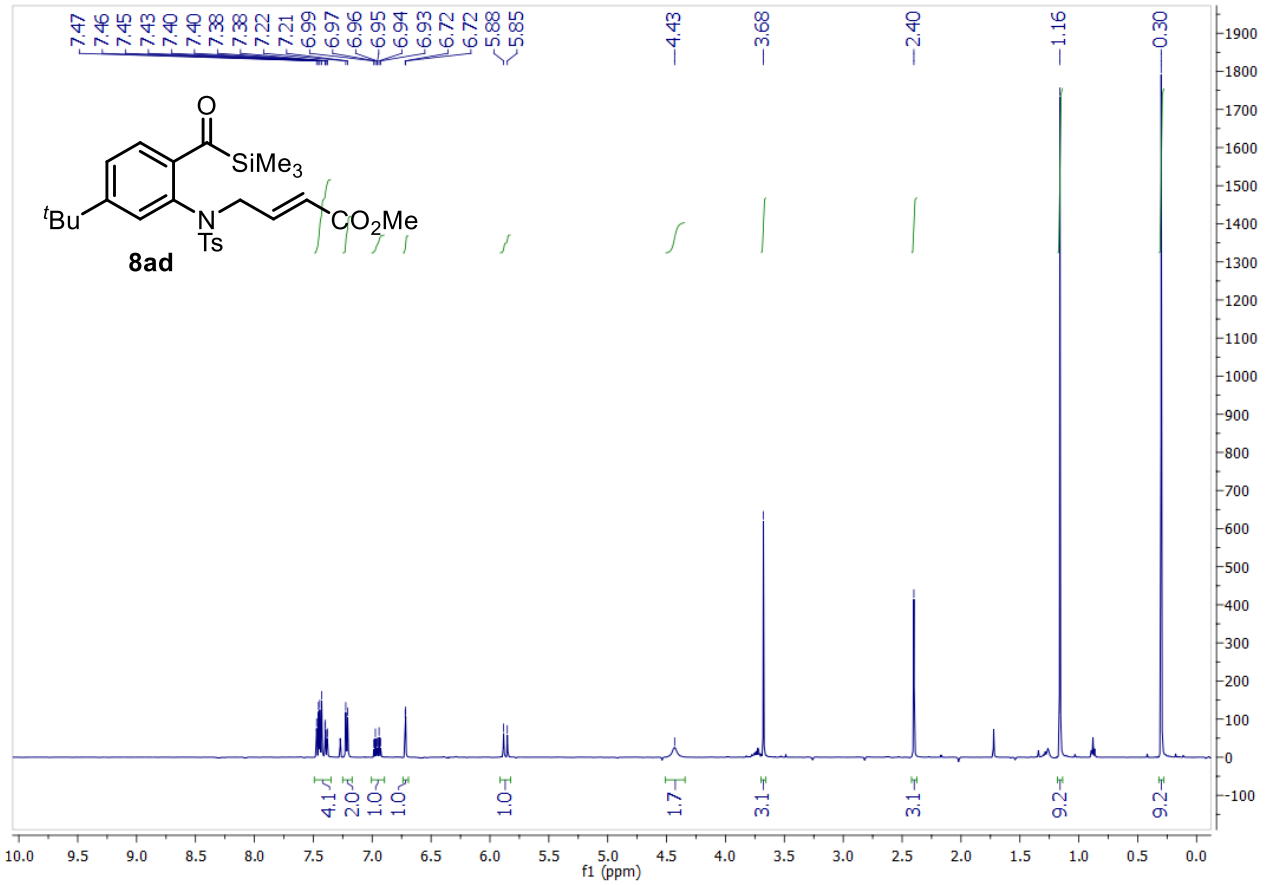

236.5
165.5
161.0
143.5
143.5
136.9
136.8
135.9
135.8
132.0
129.4
128.5
128.2
128.1
127.7
123.6
117.6
112.9
66.2
55.5
53.3
27.0
21.5
17.2
O
SiMe2tBu
MeO
N
Ts
CO2Bn
8aa
f1 (ppm)

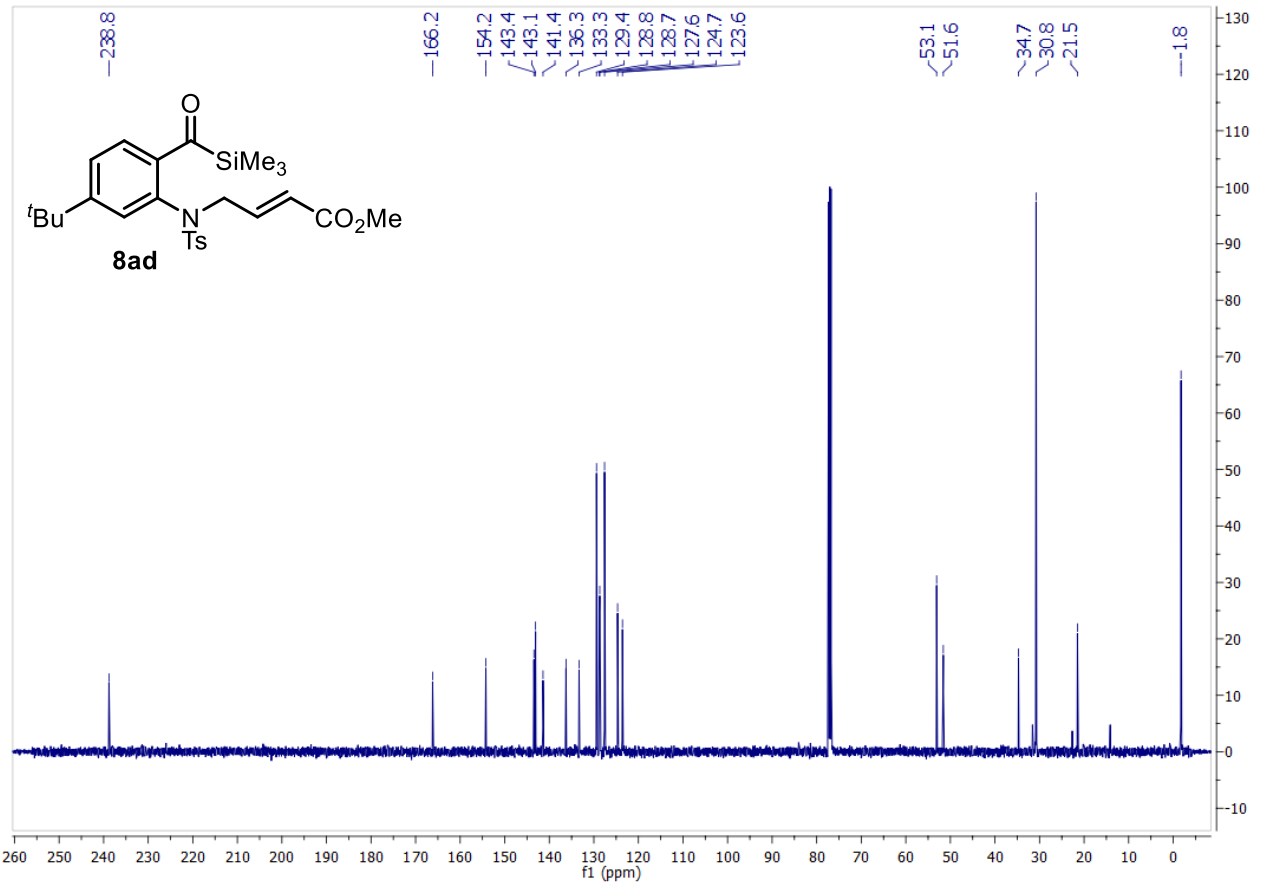

7.46
7.44
7.43
7.22
7.21
6.98
6.97
6.96
6.95
6.94
6.93
6.75
5.93
5.93
5.90
3.68
2.39
2.28
0.26
O
SiMe3
Me
N
Ts
CO2Me
8ab
2.9
2.9
0.9
1.0
0.9
1.5
3.0
3.0
2.9
8.8
f1 (ppm)

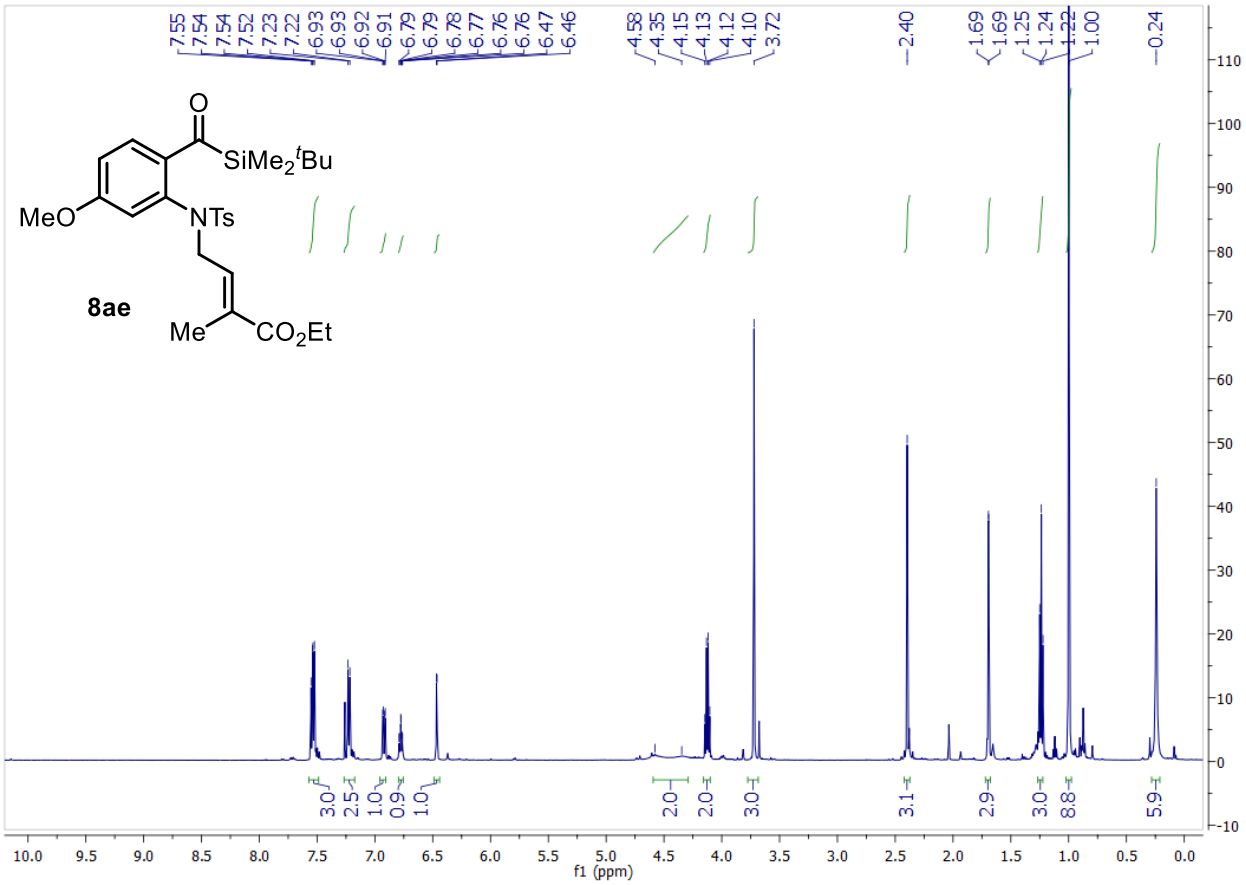

238.25
166.29
143.47
143.26
141.62
140.68
136.23
133.65
131.74
129.40
129.38
128.75
127.64
123.26
53.18
51.60
21.52
21.28
1.73
O
SiMe3
Me
N
Ts
CO2Me
8ab
f1 (ppm)

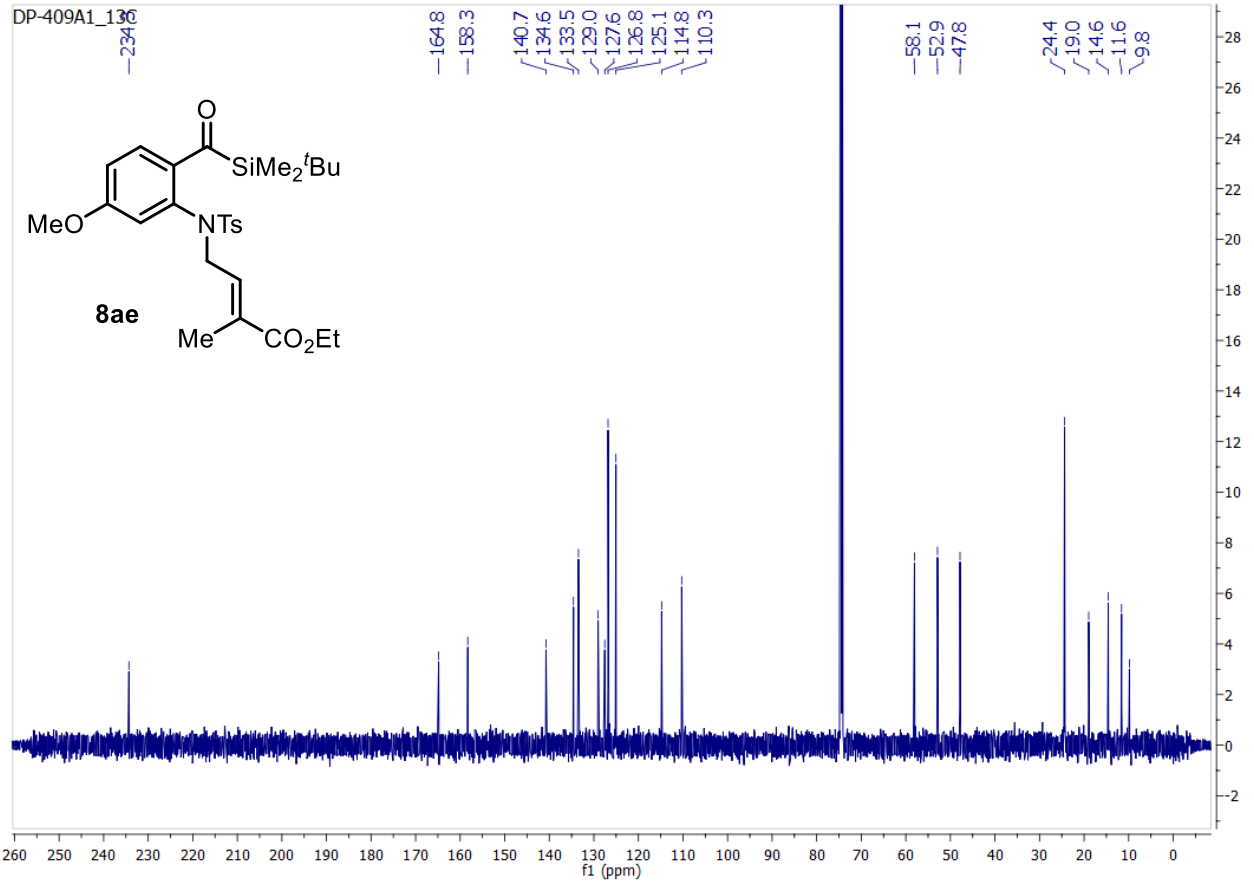

7.50
7.49
7.48
7.48
7.45
7.43
7.41
7.41
7.29
7.29
7.23
7.22
6.95
6.92
6.83
6.83
6.82
6.81
5.92
5.92
5.89
5.89
5.88
4.40
4.39
3.67
2.40
0.30
SiMe3
N
Ts
CO2Me
8ac
4.0
3.1
1.0
1.0
0.9
1.9
3.0
3.0
9.1
f1 (ppm)

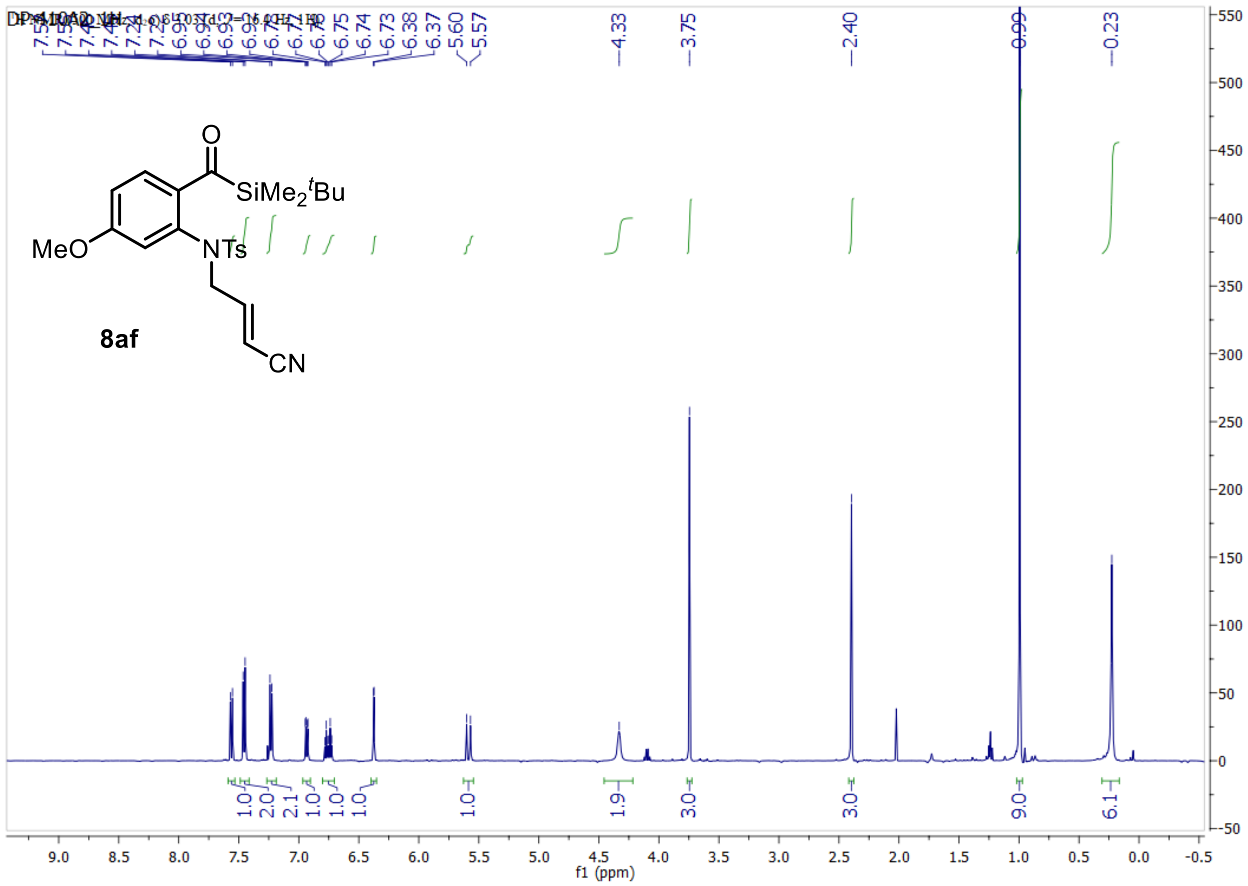

239.51
166.19
144.48
143.63
142.85
135.98
133.66
130.55
130.37
129.51
128.36
128.04
127.59
123.54
53.01
51.62
21.55
1.84
SiMe3
N
Ts
CO2Me
8ac
f1 (ppm)

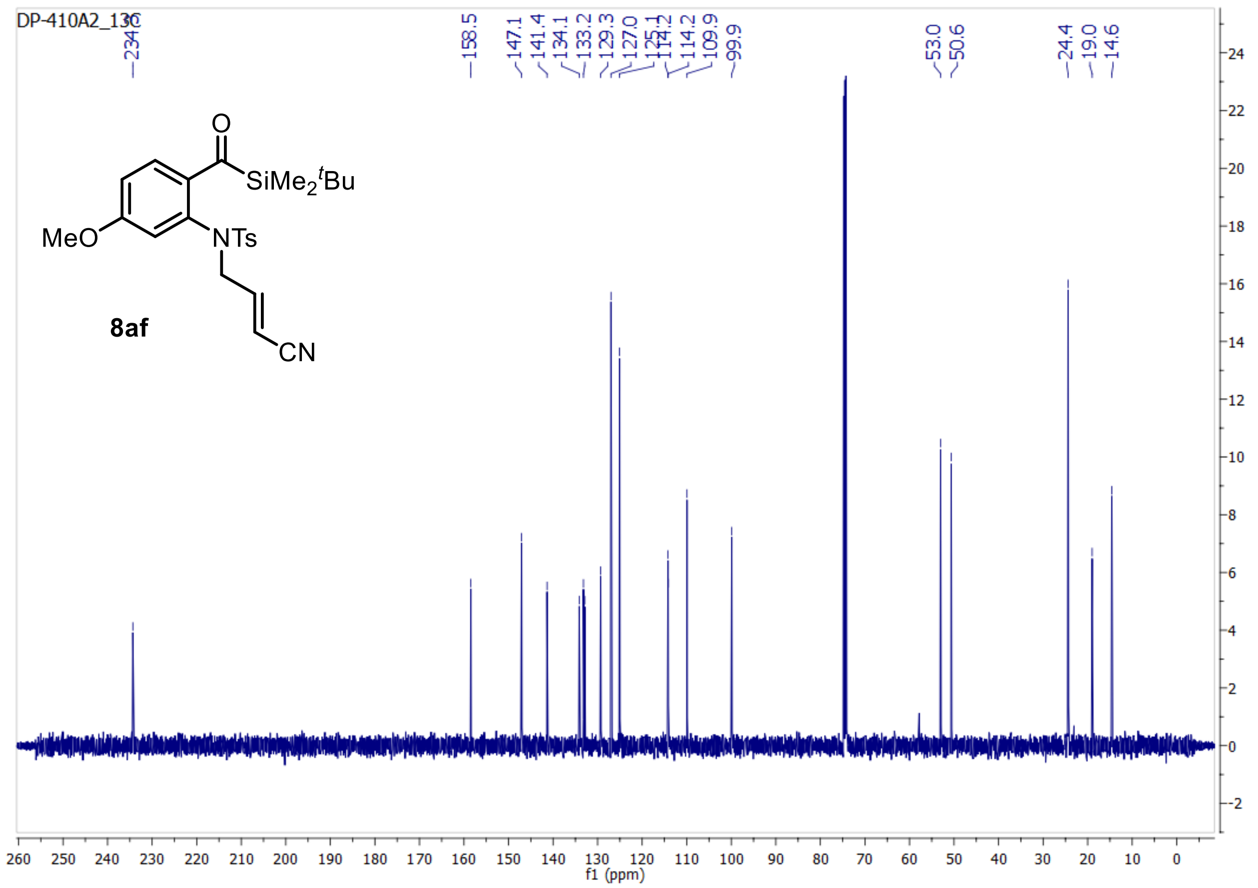

7.47
7.46
7.45
7.43
7.40
7.40
7.38
7.38
7.22
7.21
6.99
6.97
6.96
6.95
6.94
6.93
6.72
6.72
5.88
5.85
4.43
3.68
2.40
1.16
0.30
O
SiMe3
tBu
N
Ts
CO2Me
8ad
4.1
2.0
1.0
1.0
1.0
1.7
3.1
3.1
9.2
9.2
f1 (ppm)

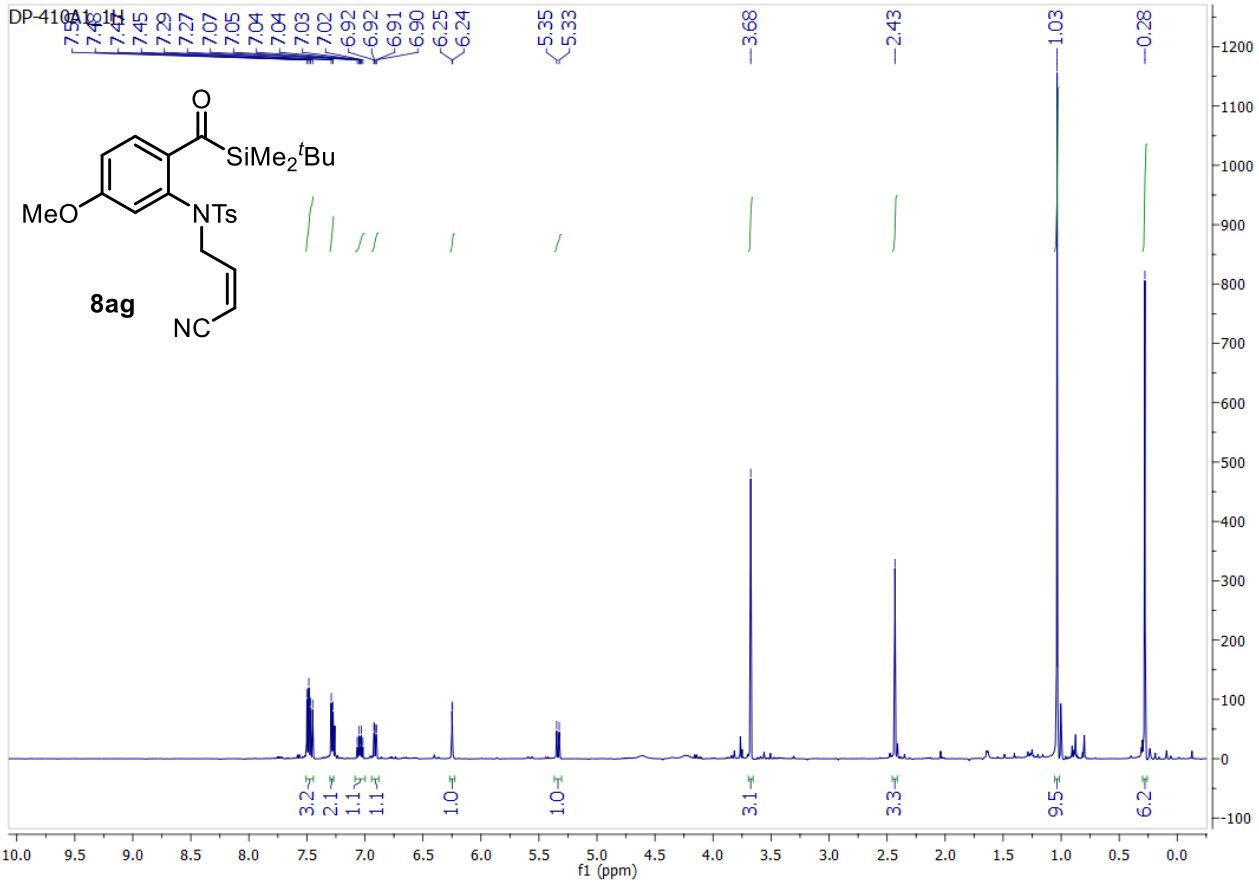

238.8
166.2
154.2
143.4
143.1
141.4
136.3
133.3
129.4
128.8
128.7
127.6
124.7
123.6
53.1
51.6
34.7
30.8
21.5
1.8
O
SiMe3
tBu
N
Ts
CO2Me
8ad
f1 (ppm)

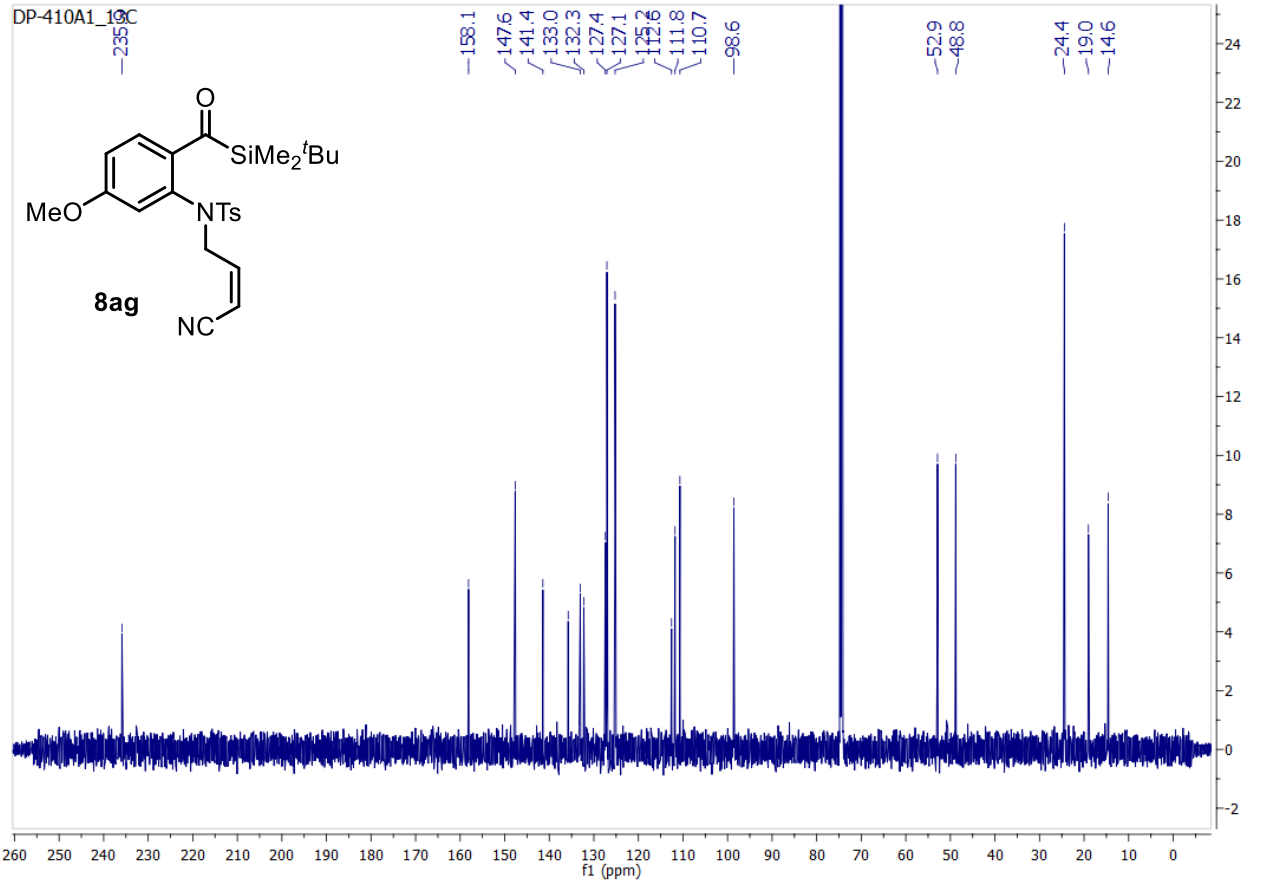

7.55
7.54
7.54
7.52
7.23
7.22
6.93
6.93
6.92
6.91
6.79
6.79
6.78
6.77
6.76
6.76
6.47
6.46
4.58
4.35
4.15
4.13
4.12
4.10
3.72
2.40
1.69
1.69
1.25
1.24
1.22
1.00
0.24
O
SiMe2tBu
MeO
NTs
8ae
Me
CO2Et
3.0
2.5
1.0
0.9
1.0
2.0
2.0
3.0
3.1
2.9
3.0
8.8
5.9
f1 (ppm)

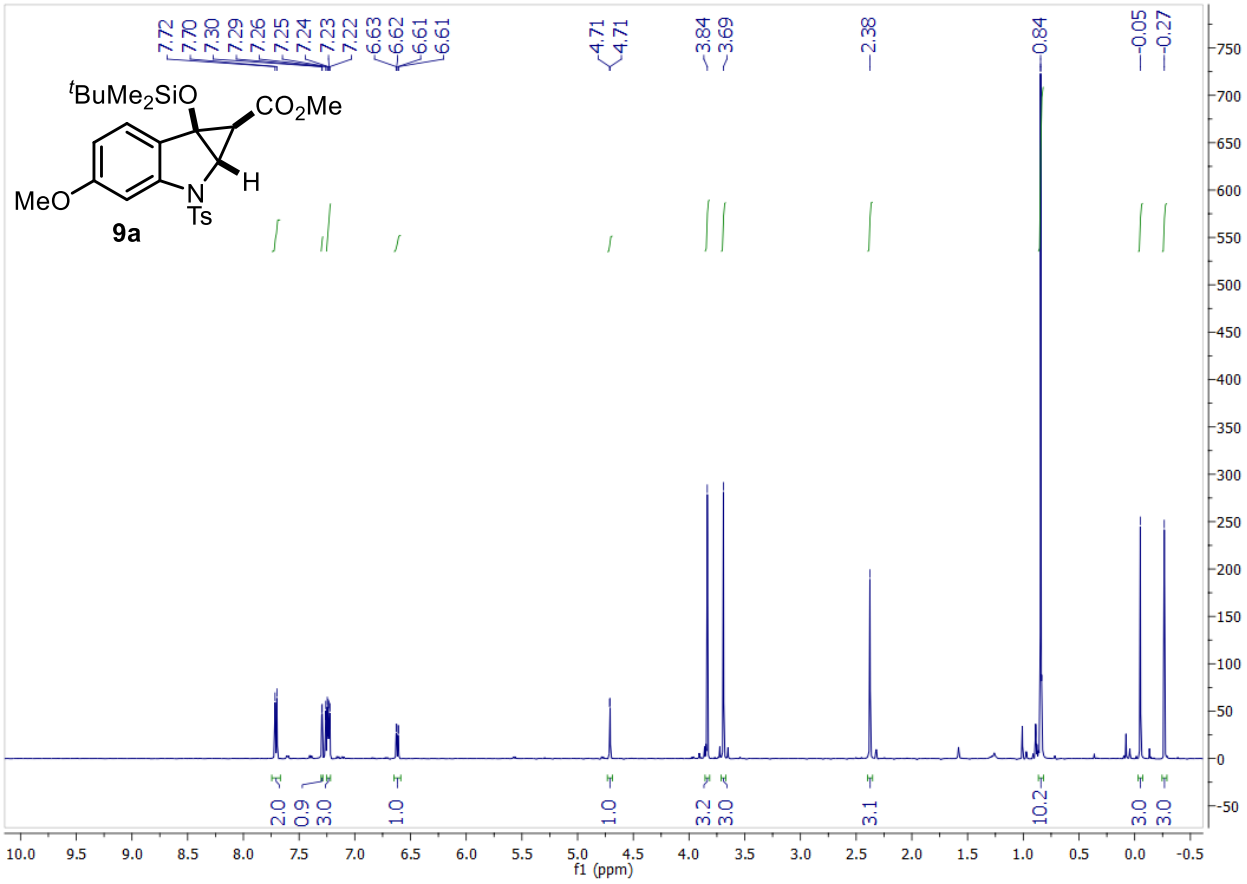

DP-409A1_13C
164.8
158.3
140.7
134.6
133.5
129.0
127.6
126.8
125.1
114.8
110.3
58.1
52.9
47.8
24.4
19.0
14.6
11.6
9.8
O
SiMe2tBu
MeO
NTs
8ae
Me
CO2Et
f1 (ppm)

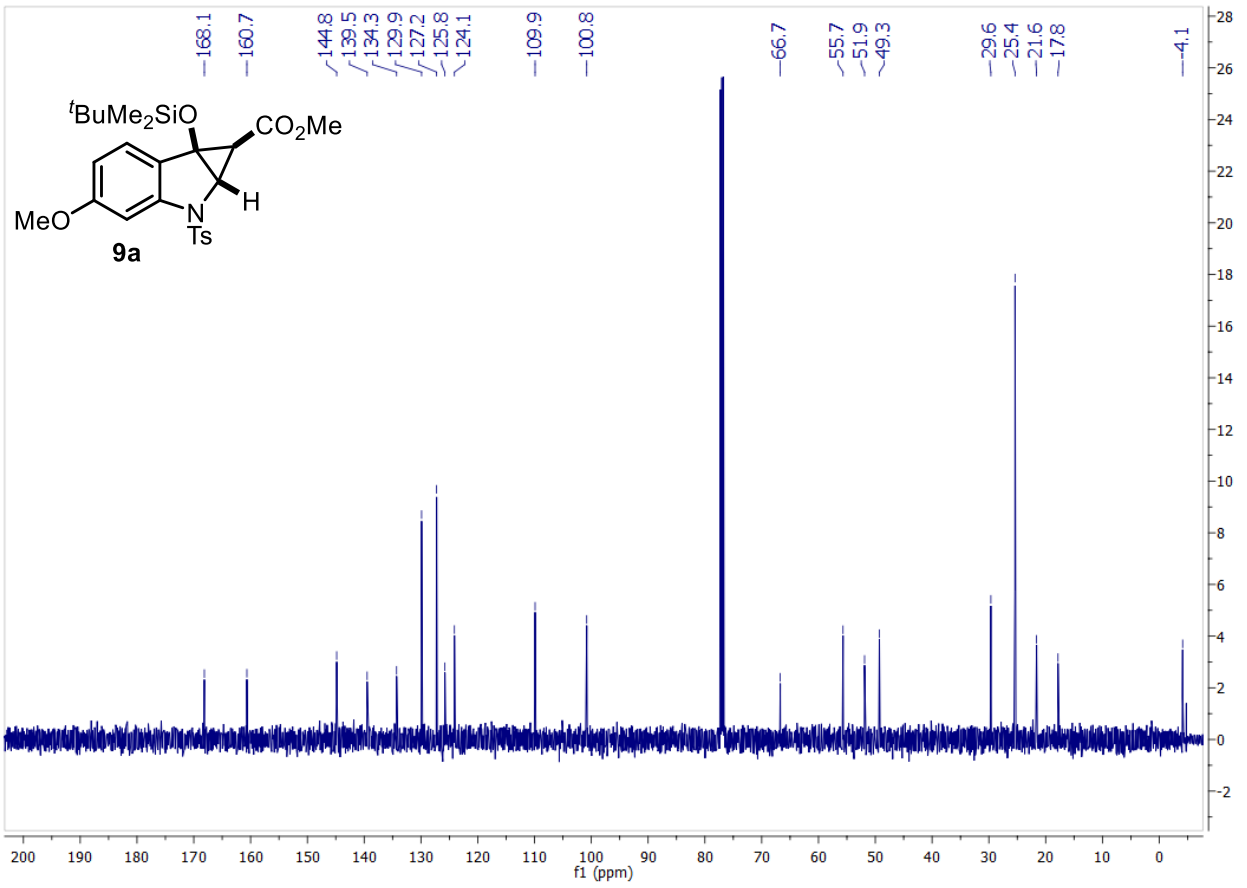


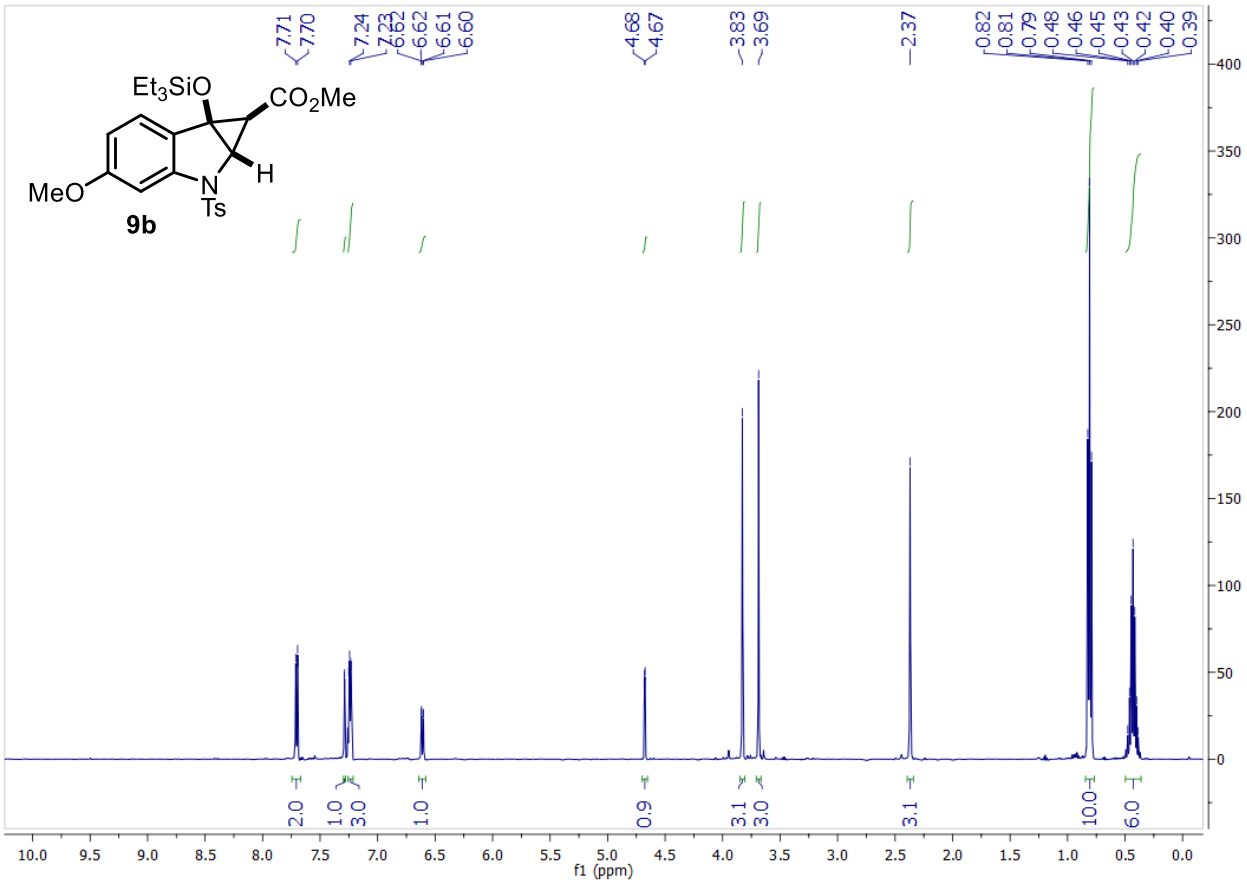


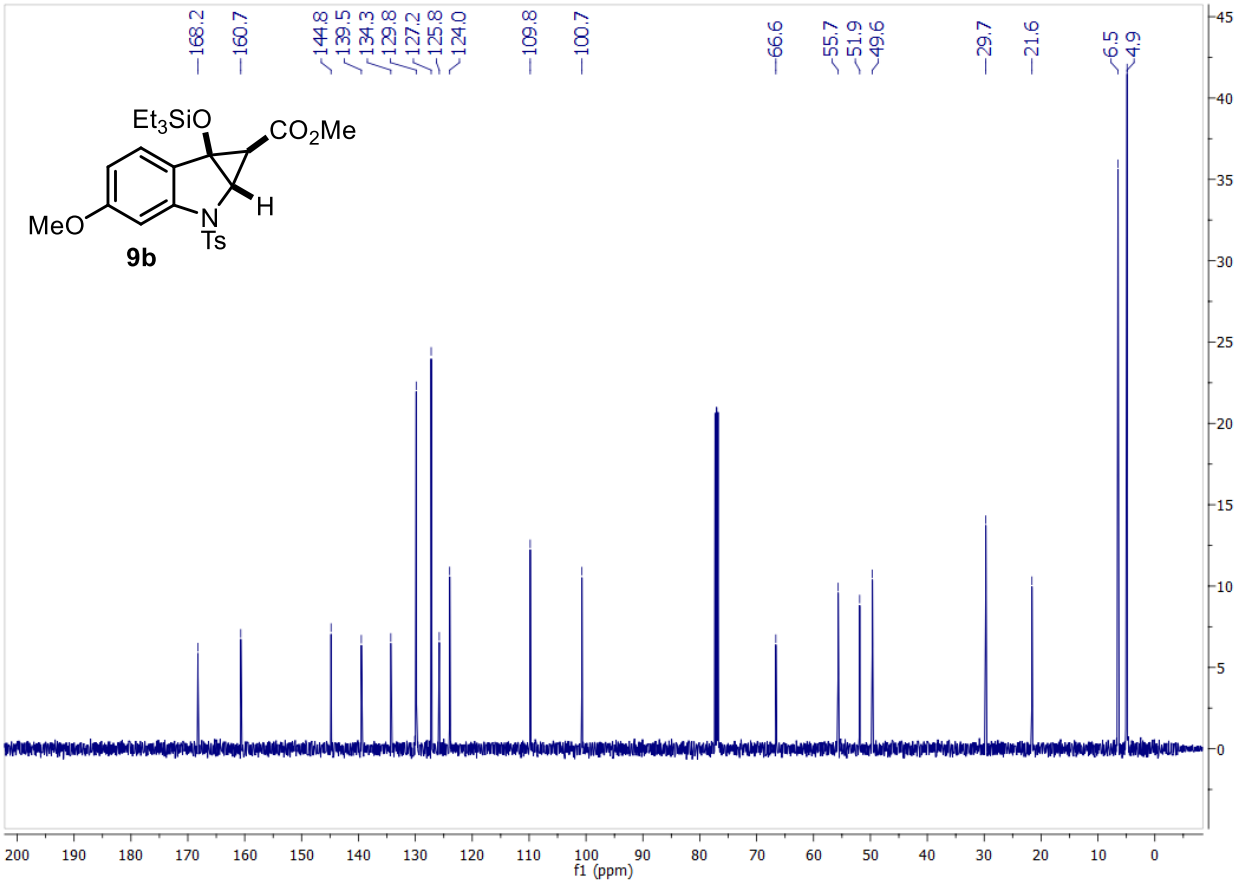

DP-410A1_01H
7.55
7.43
7.41
7.45
7.29
7.27
7.07
7.05
7.04
7.04
7.03
7.02
6.92
6.92
6.91
6.90
6.25
6.24
5.35
5.33
3.68
2.43
1.03
0.28
O
SiMe2tBu
MeO
NTs
8ag
NC
3.2
2.1
1.1
1.1
1.0
1.0
3.1
3.3
9.5
6.2
f1 (ppm)

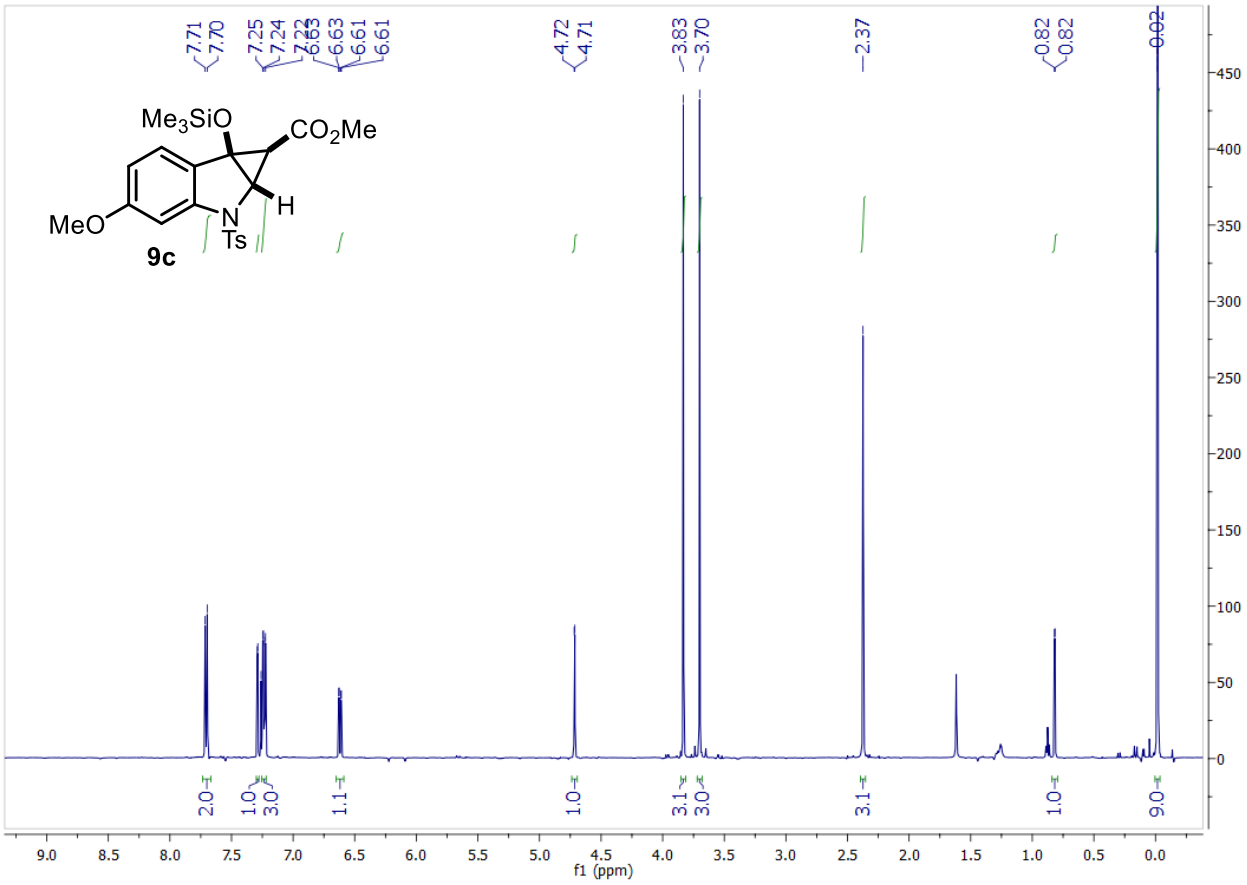

DP-410A1_13C
235.3
158.1
147.6
141.4
133.0
132.3
127.4
127.1
125.2
112.6
111.8
110.7
98.6
52.9
48.8
24.4
19.0
14.6
O
SiMe2tBu
MeO
NTs
8ag
NC
f1 (ppm)

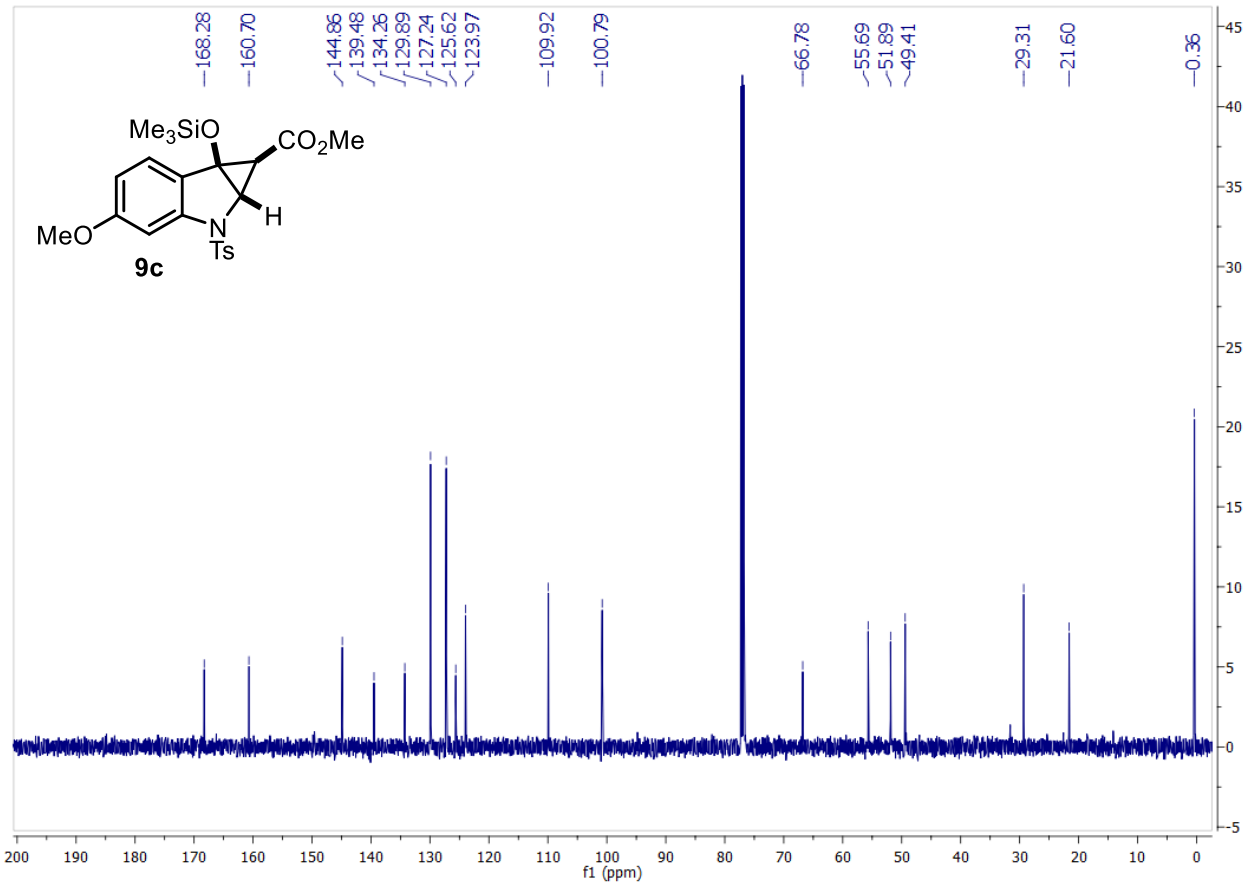

7.72
7.70
7.30
7.29
7.26
7.25
7.24
7.23
7.22
6.63
6.62
6.61
6.61
4.71
4.71
3.84
3.69
2.38
0.84
-0.05
-0.27
tBuMe2SiO
CO2Me
MeO
N
Ts
H
9a
2.0
0.9
3.0
1.0
1.0
3.2
3.0
3.1
10.2
3.0
3.0
f1 (ppm)

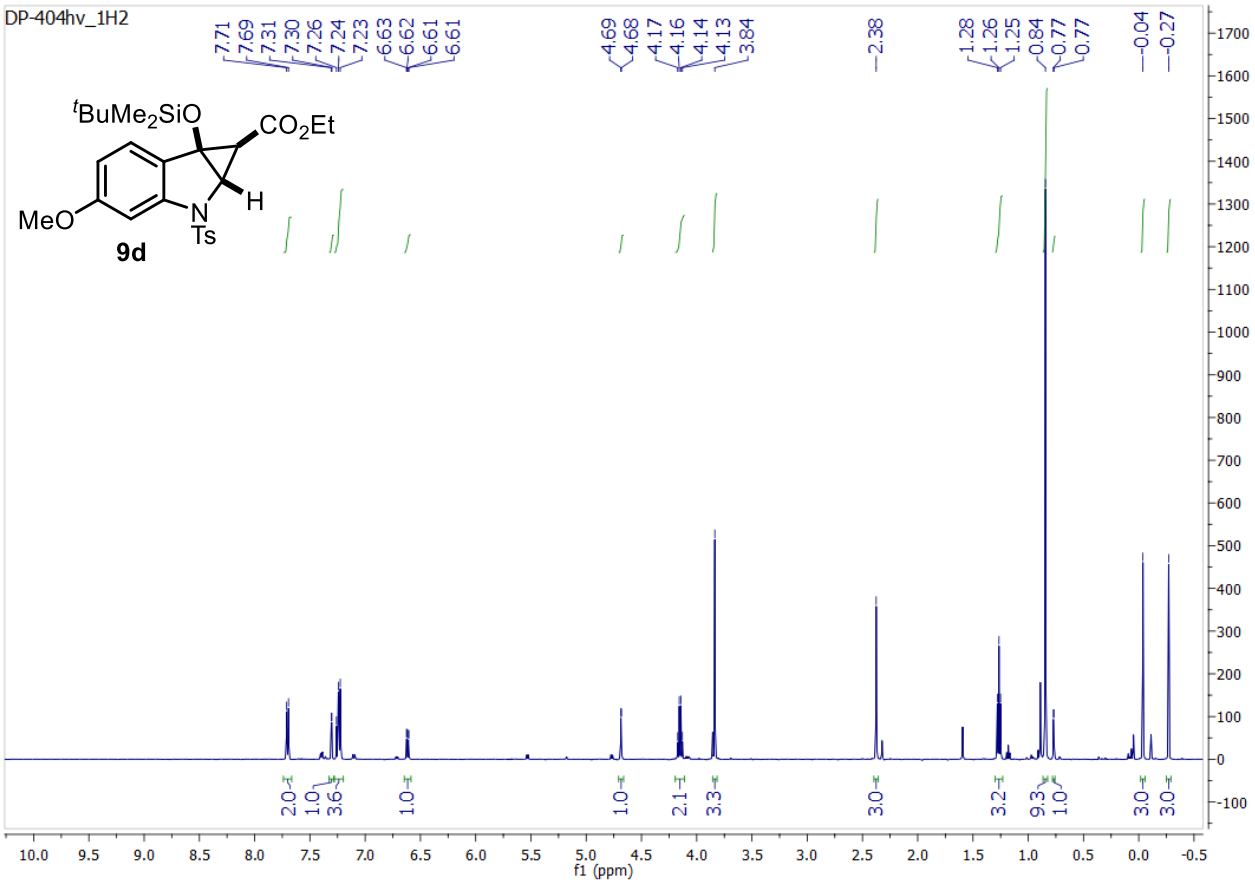

168.1
160.7
144.8
139.5
134.3
129.9
127.2
125.8
124.1
109.9
100.8
66.7
55.7
51.9
49.3
29.6
25.4
21.6
17.8
-4.1
tBuMe2SiO
CO2Me
MeO
N
Ts
H
9a
f1 (ppm)

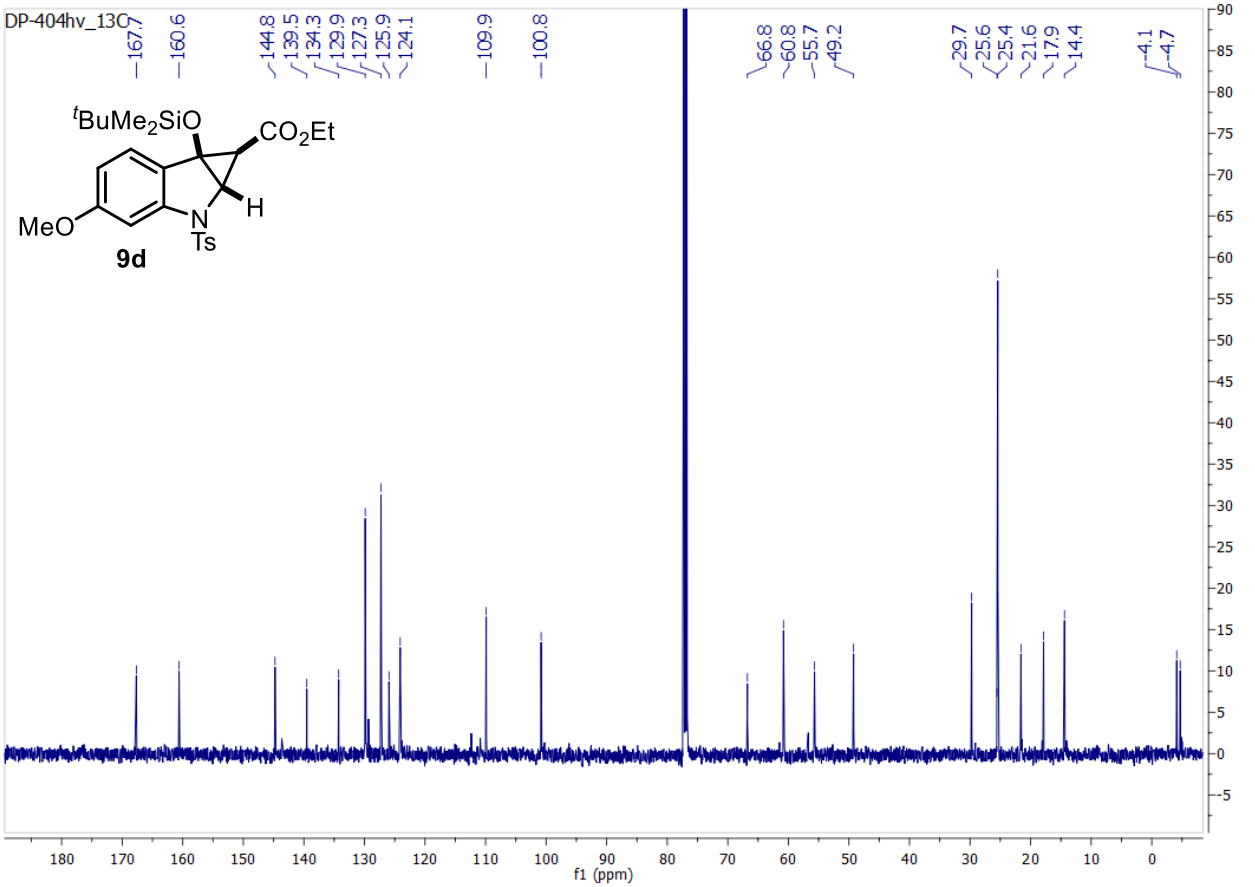

7.71
7.70
7.24
7.23
6.62
6.62
6.61
6.60
4.68
4.67
3.83
3.69
2.37
0.82
0.81
0.79
0.48
0.46
0.45
0.43
0.42
0.40
0.39
Et3SiO
CO2Me
MeO
N
Ts
H
9b
2.0
1.0
3.0
1.0
0.9
3.1
3.0
3.1
10.0
6.0
f1 (ppm)

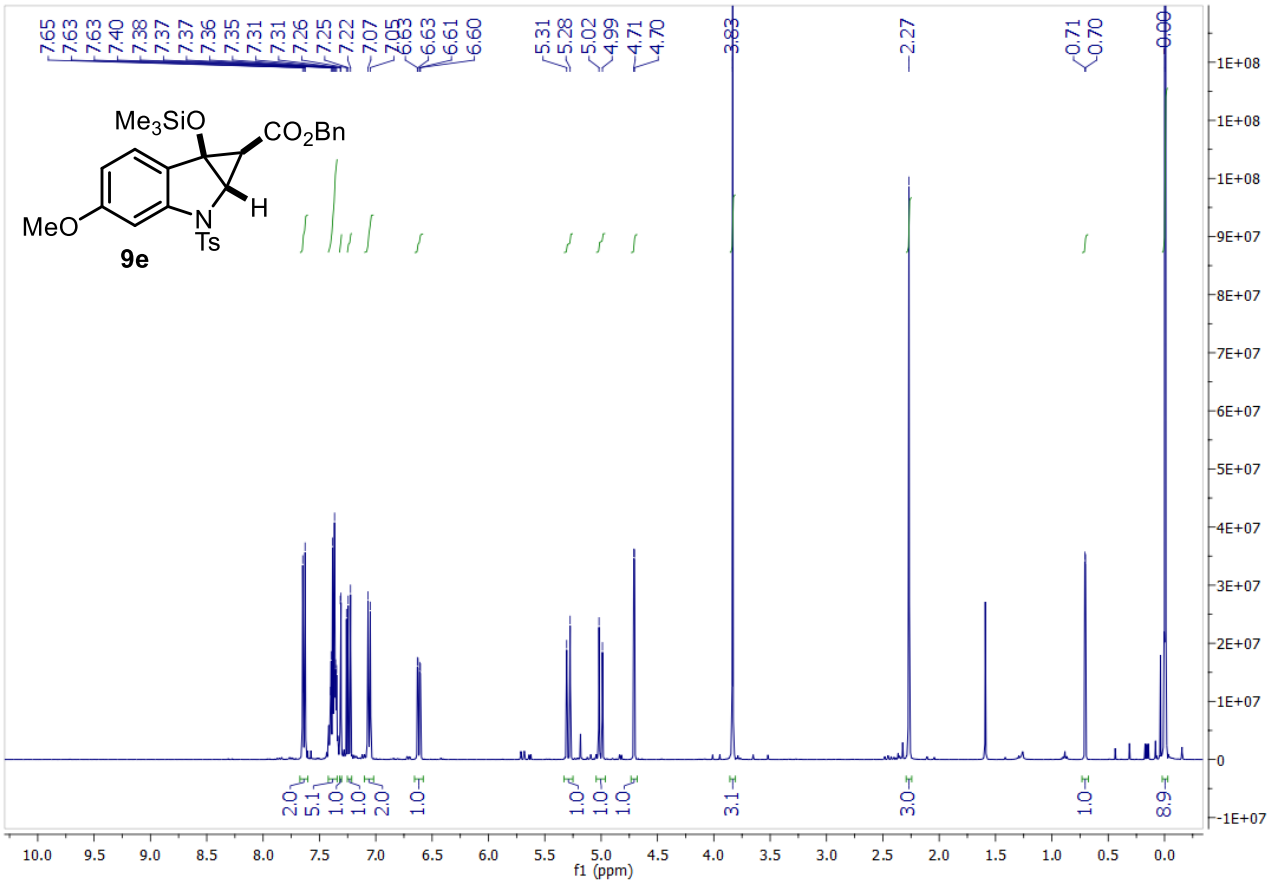

168.2
160.7
144.8
139.5
134.3
129.8
127.2
125.8
124.0
109.8
100.7
66.6
55.7
51.9
49.6
29.7
21.6
6.5
4.9
Et3SiO
CO2Me
MeO
N
Ts
H
9b
f1 (ppm)

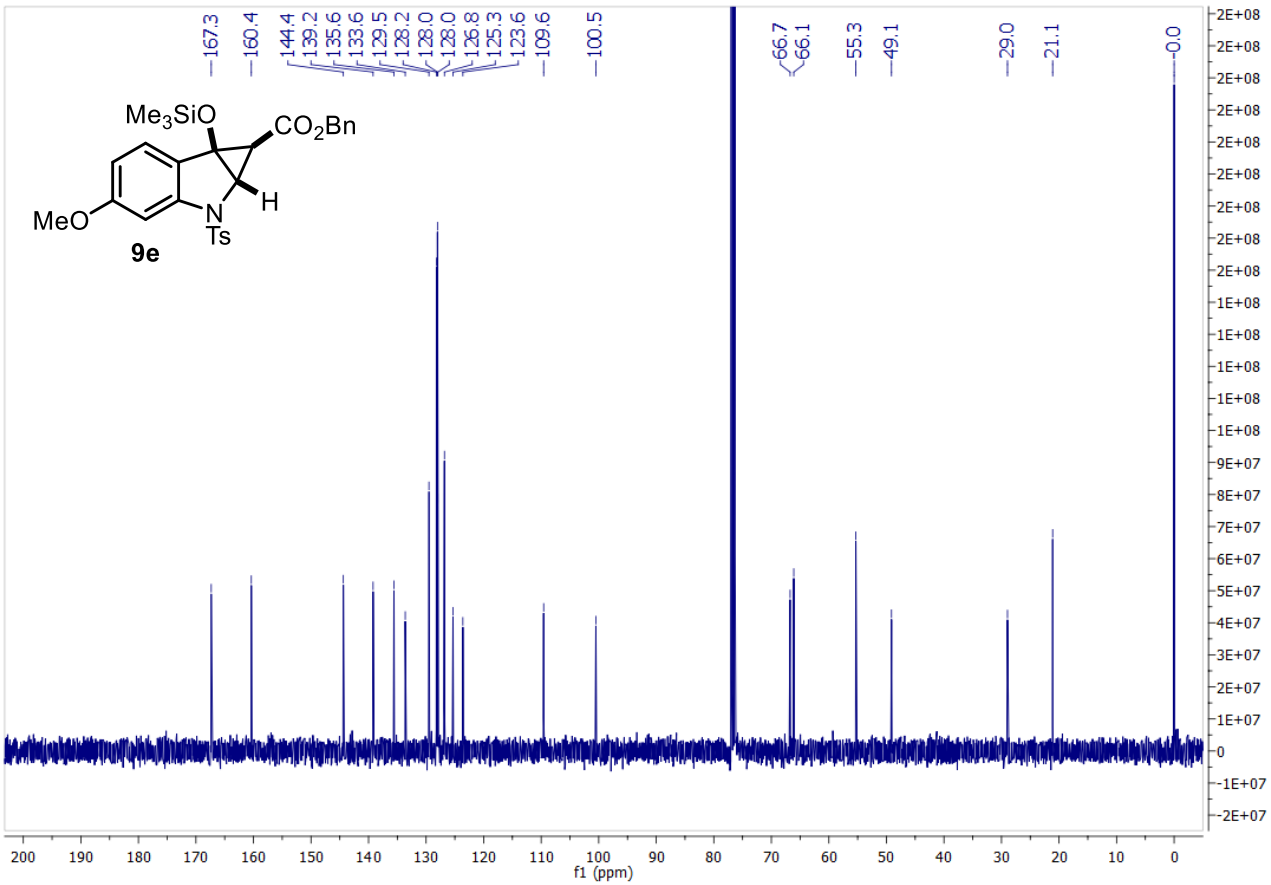

7.71
7.70
7.25
7.24
6.63
6.61
6.61
4.72
4.71
3.83
3.70
2.37
0.82
0.82
0.02
Me3SiO
CO2Me
MeO
N
Ts
H
9c
2.0
1.0
3.0
1.1
1.0
3.1
3.0
3.1
1.0
9.0
f1 (ppm)

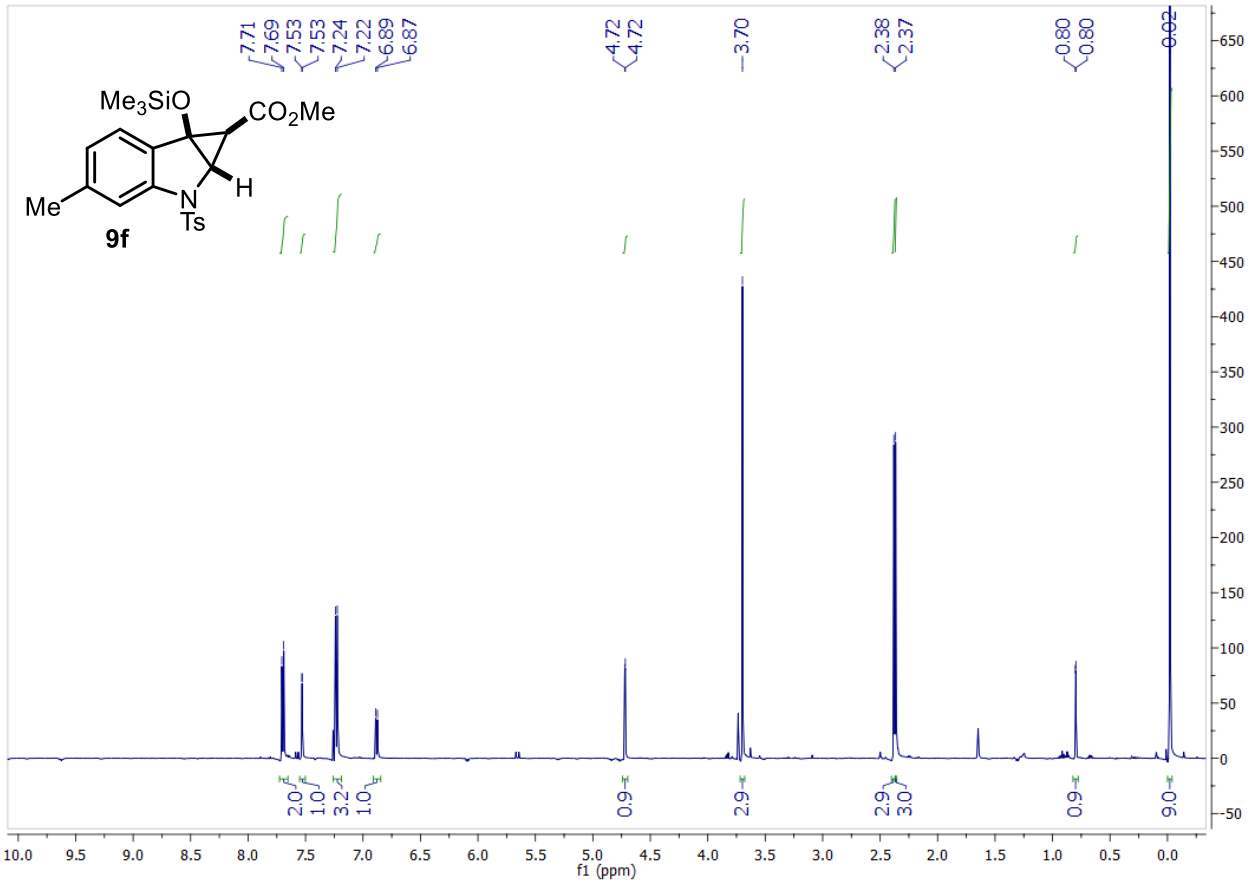

168.28
160.70
144.86
139.48
134.26
129.89
127.24
125.62
123.97
109.92
100.79
66.78
55.69
51.89
49.41
29.31
21.60
0.36
Me3SiO
CO2Me
MeO
N
Ts
H
9c
f1 (ppm)

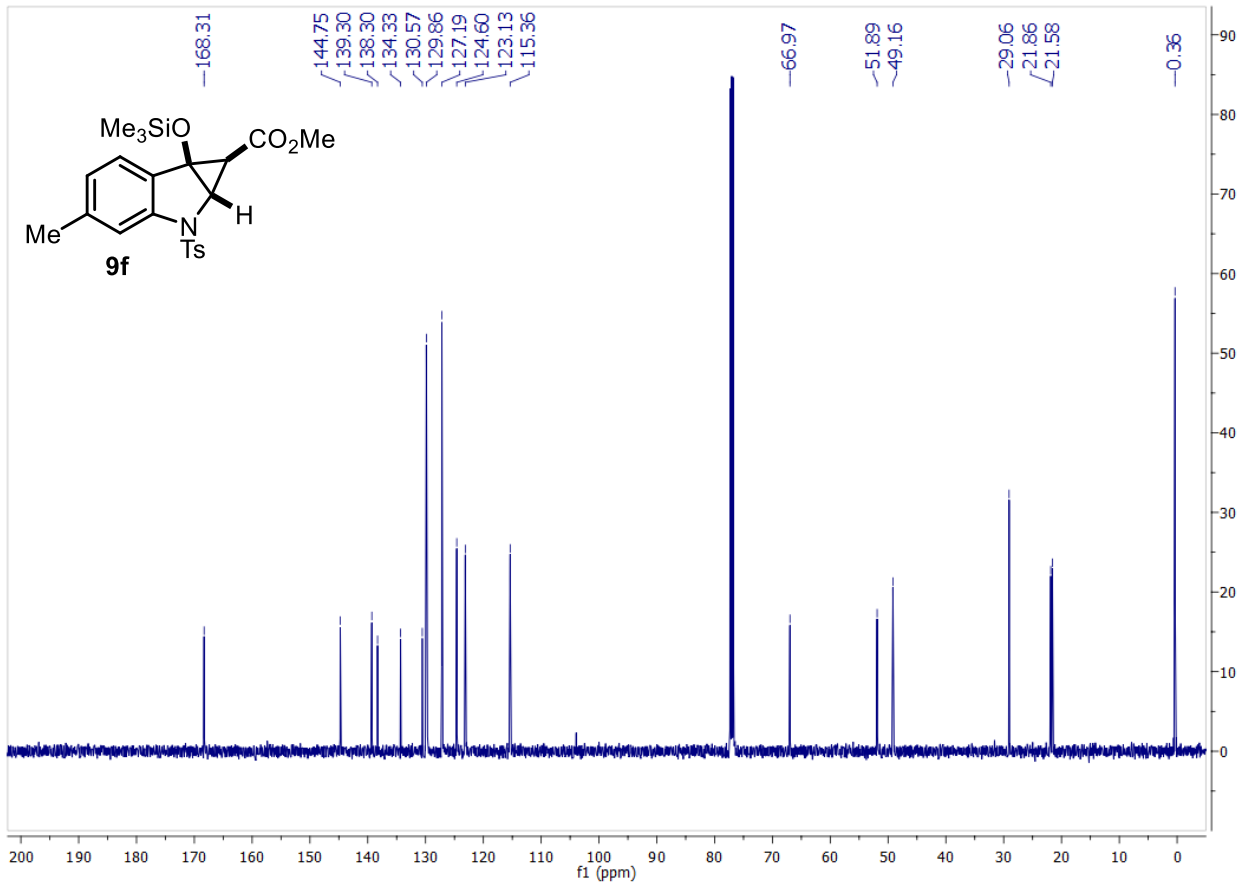

DP-404hv_1H2
7.71
7.69
7.31
7.30
7.26
7.24
7.23
6.63
6.62
6.61
6.61
4.69
4.68
4.17
4.16
4.14
4.13
3.84
2.38
1.28
1.26
1.25
0.84
0.77
0.77
-0.04
-0.27
tBuMe2SiO
CO2Et
MeO
N
Ts
H
9d
2.0
1.0
3.6
1.0
1.0
2.1
3.3
3.0
3.2
9.3
1.0
3.0
3.0
f1 (ppm)

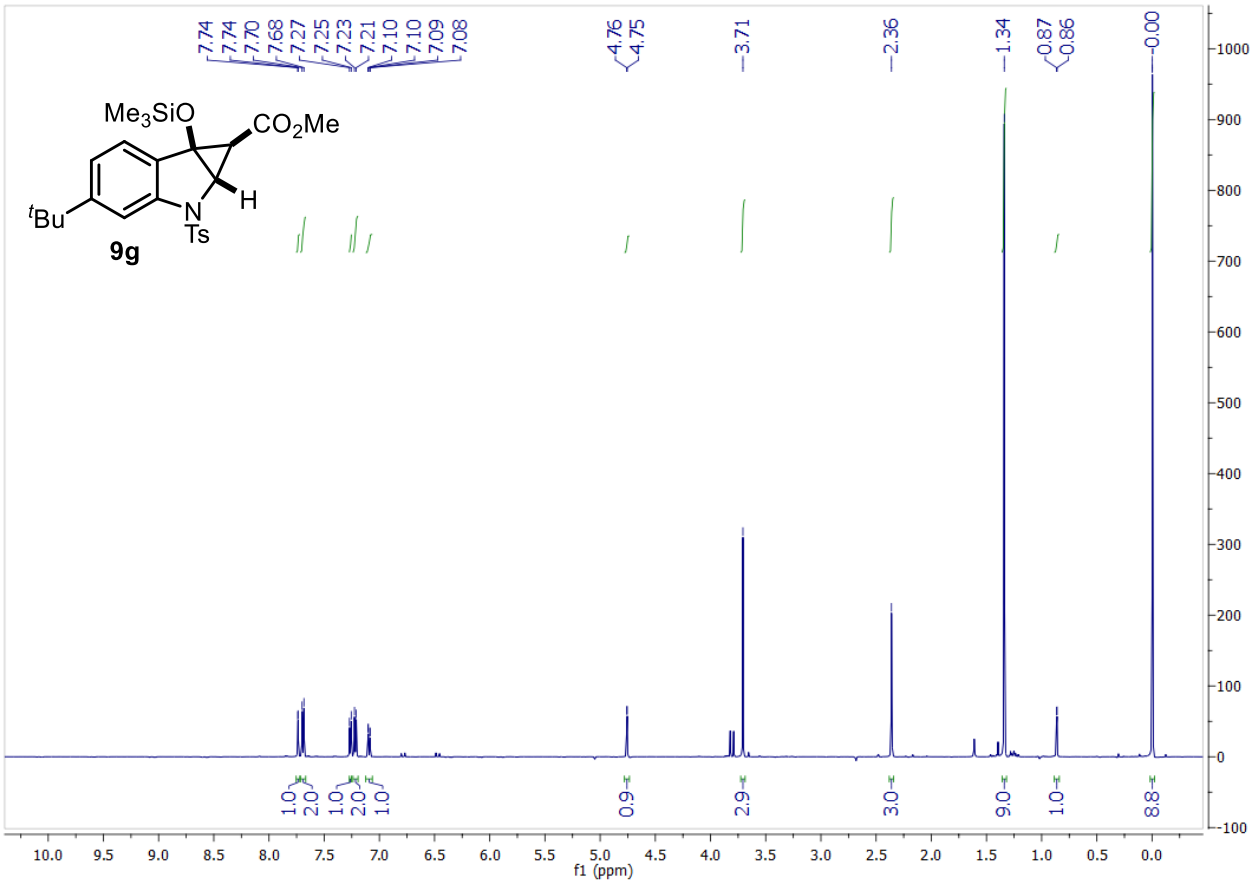

DP-404hv_13C
167.7
160.6
144.8
139.5
134.3
129.9
127.3
125.9
124.1
109.9
100.8
66.8
60.8
55.7
49.2
29.7
25.6
25.4
21.6
17.9
14.4
-4.1
-4.7
tBuMe2SiO
CO2Et
MeO
N
Ts
H
9d
f1 (ppm)

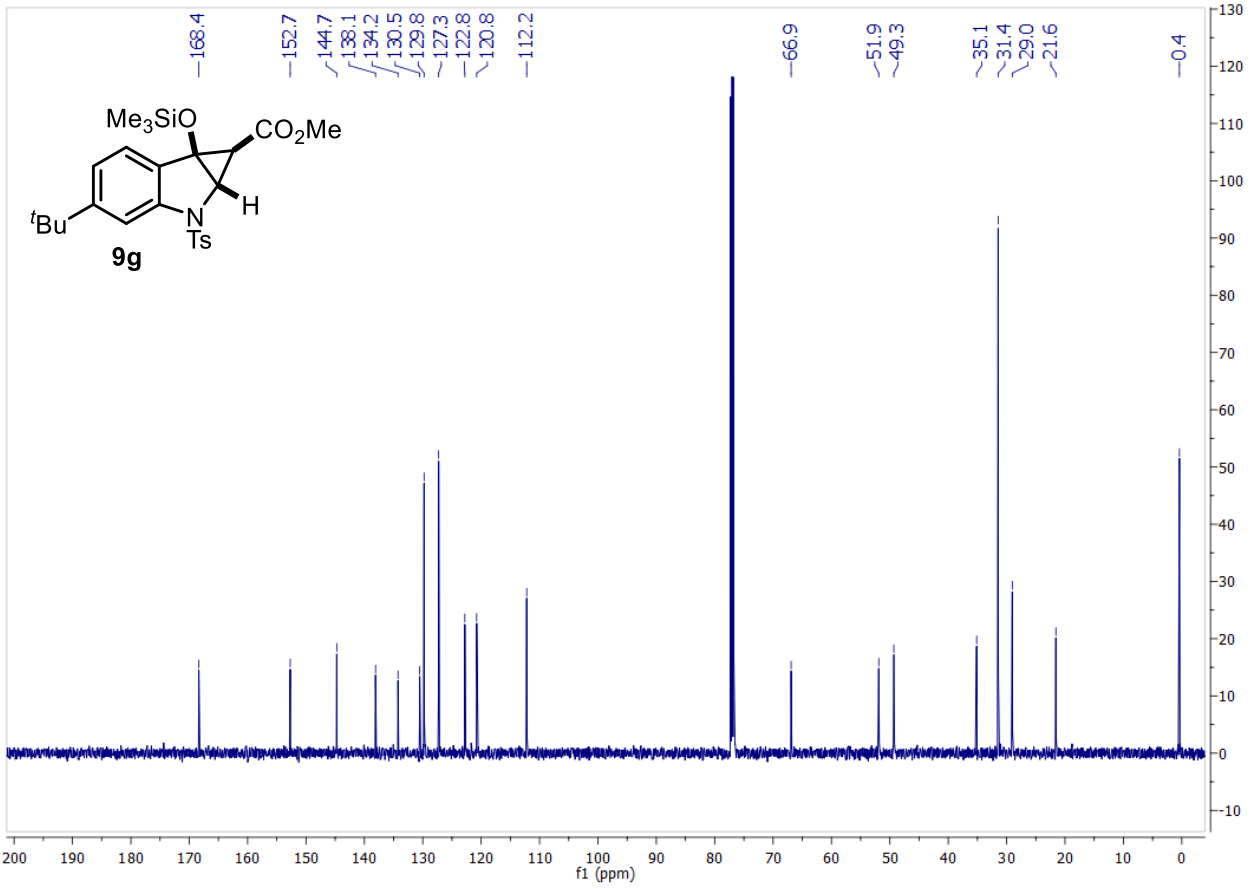

Me3SiO
CO2Bn
MeO
N
Ts
H
9e
f1 (ppm)

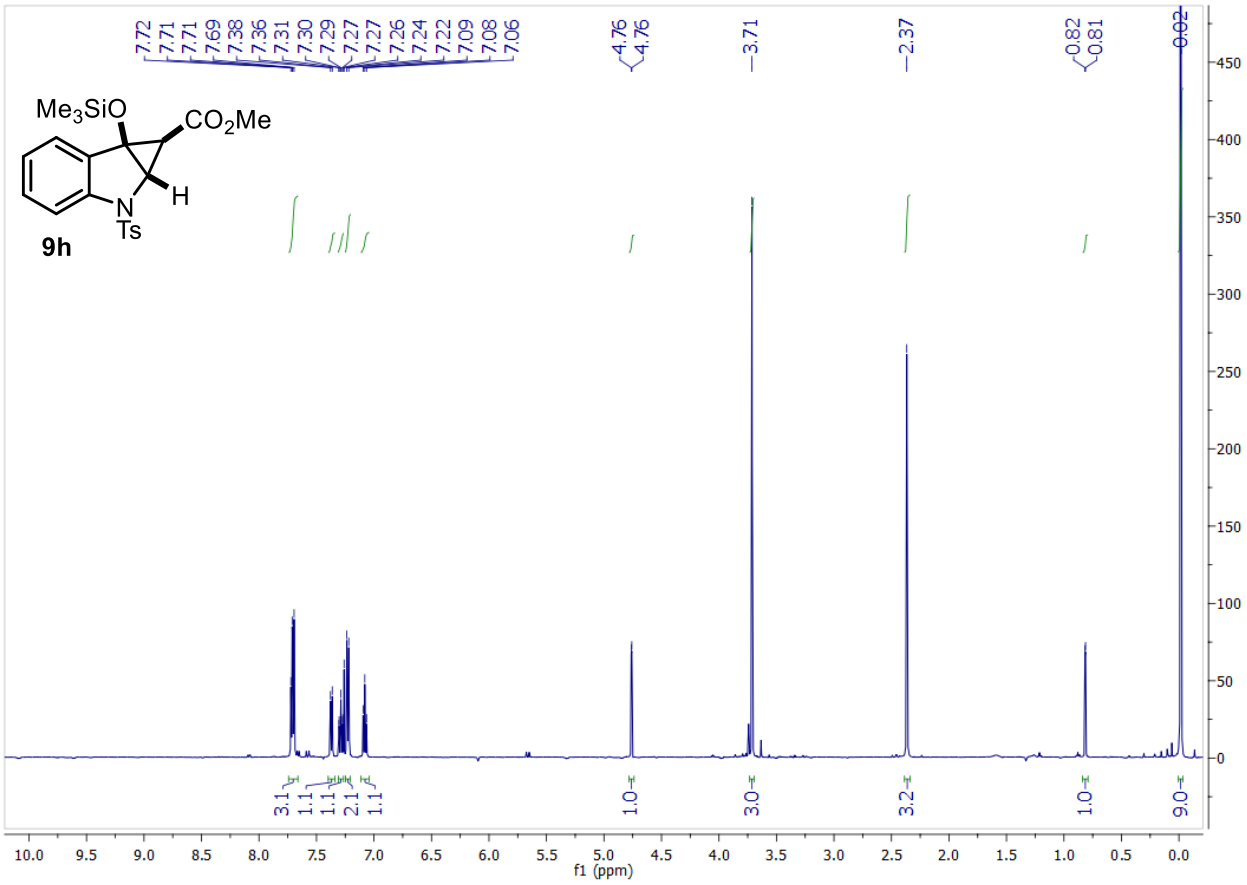

Me3SiO
CO2Bn
MeO
N
Ts
H
9e
f1 (ppm)

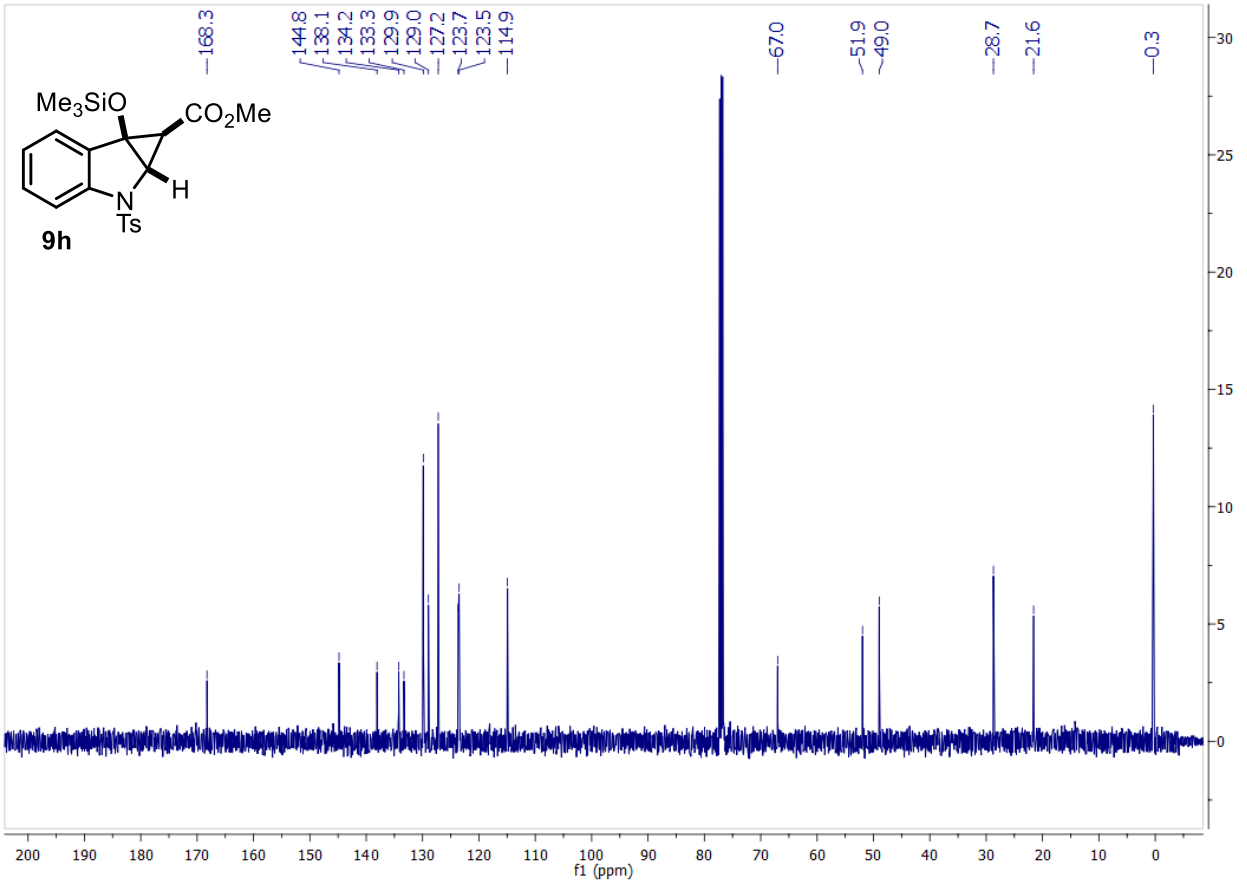

7.71
7.69
7.53
7.53
7.24
7.22
6.89
6.87
4.72
4.72
3.70
2.38
2.37
0.80
0.80
0.02
Me3SiO
CO2Me
Me
N
Ts
H
9f
2.0
1.0
3.2
1.0
0.9
2.9
2.9
3.0
0.9
9.0
f1 (ppm)

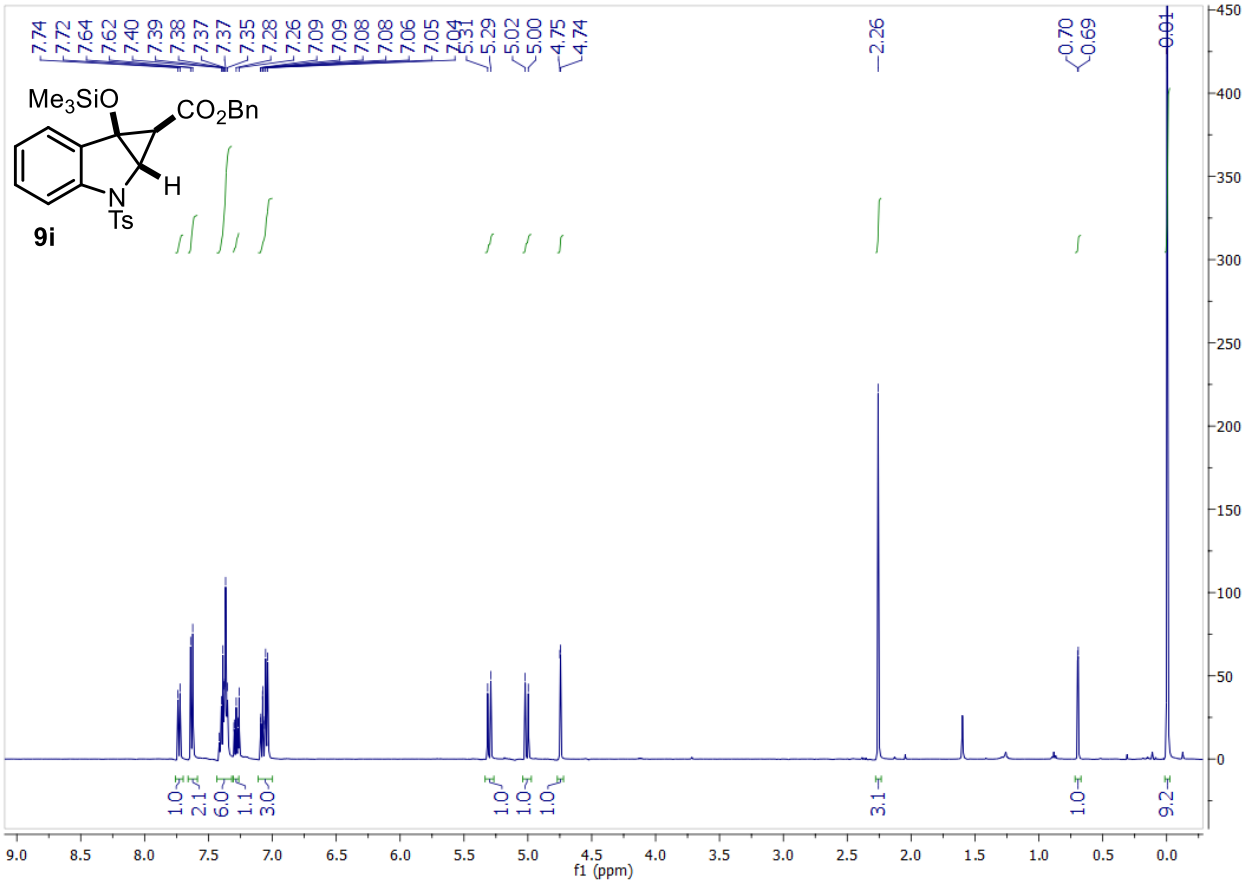

168.31
144.75
139.30
138.30
134.33
130.57
129.86
127.19
124.60
123.13
115.36
66.97
51.89
49.16
29.06
21.86
21.58
0.36
Me3SiO
CO2Me
Me
N
Ts
H
9f
f1 (ppm)

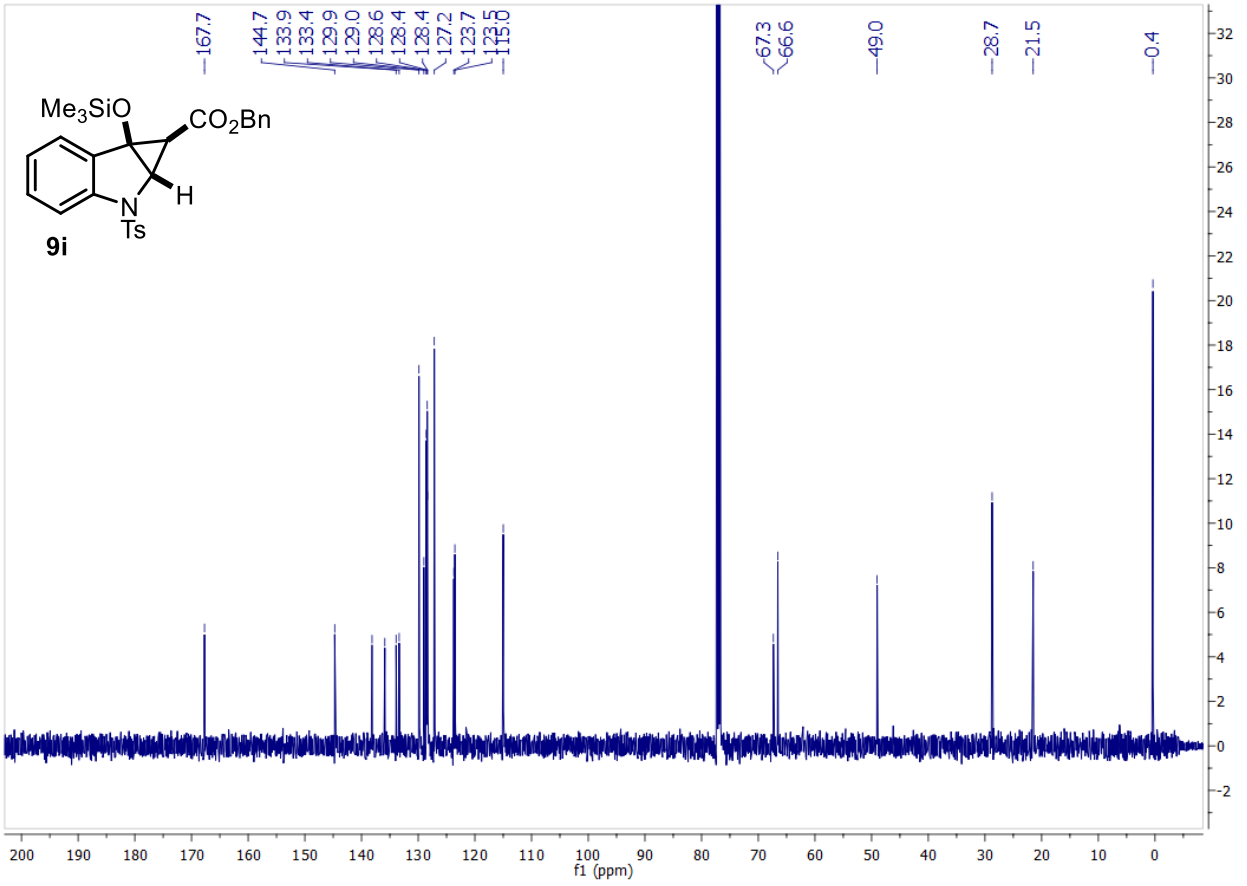

7.74
7.74
7.70
7.68
7.27
7.25
7.23
7.21
7.10
7.10
7.09
7.08
4.76
4.75
3.71
2.36
1.34
0.87
0.86
0.00
Me3SiO
CO2Me
tBu
N
Ts
H
9g
1.0
2.0
1.0
2.0
1.0
0.9
2.9
3.0
9.0
1.0
8.8
f1 (ppm)

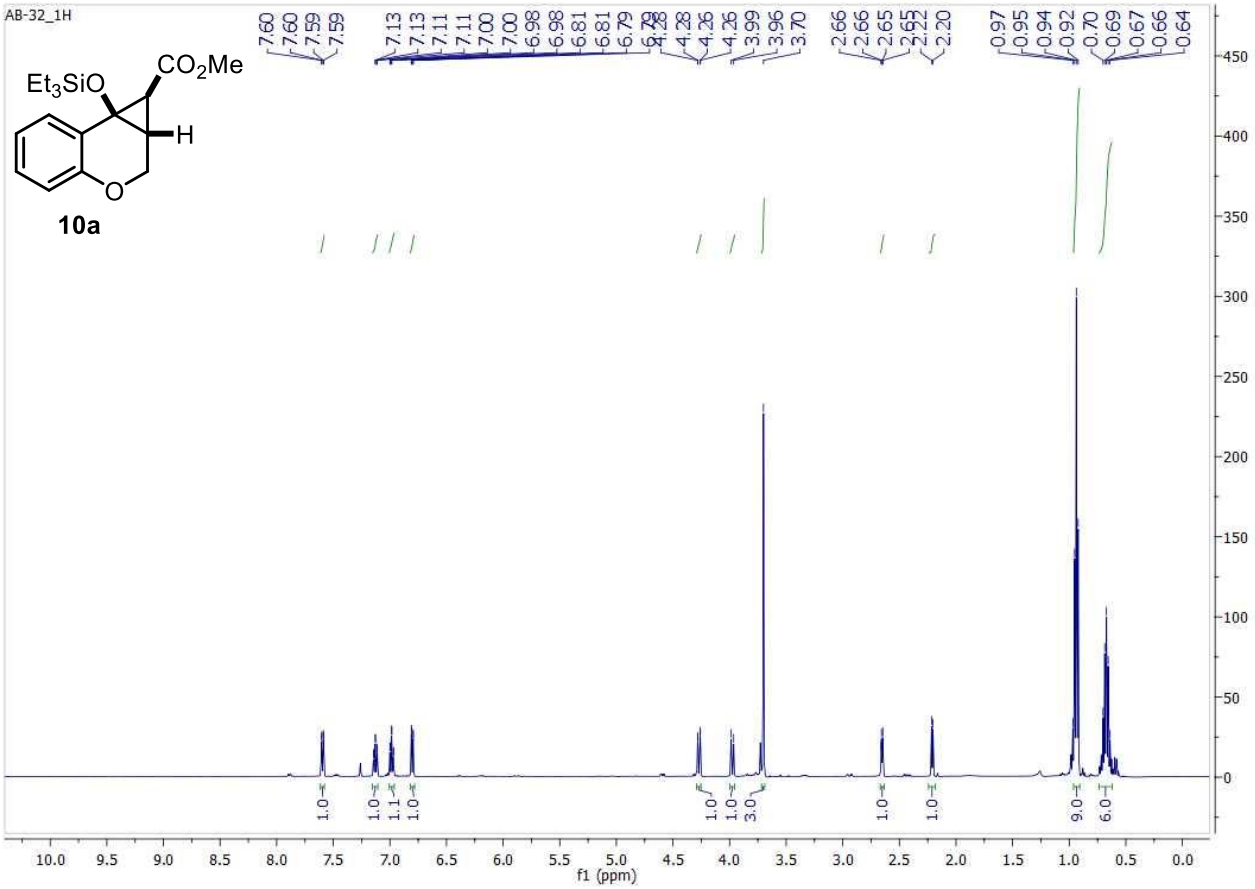

168.4
152.7
144.7
138.1
134.2
130.5
129.8
127.3
122.8
120.8
112.2
66.9
51.9
49.3
35.1
31.4
29.0
21.6
0.4
Me3SiO
CO2Me
tBu
N
Ts
H
9g
f1 (ppm)

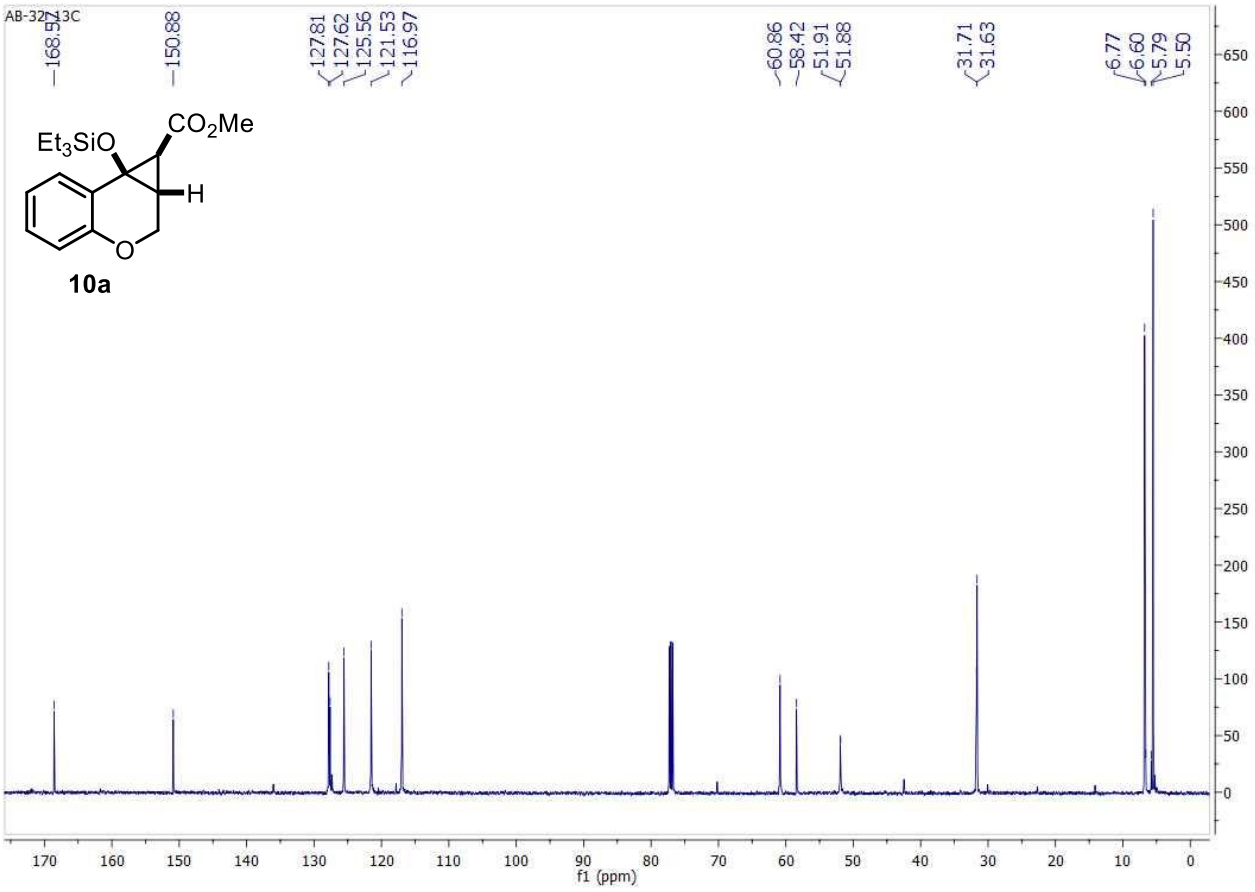

7.72
7.71
7.71
7.69
7.38
7.36
7.31
7.30
7.29
7.27
7.27
7.26
7.24
7.22
7.09
7.08
7.06
4.76
4.76
3.71
2.37
0.82
0.81
0.02
Me3SiO
CO2Me
H
N
Ts
9h
3.1
1.1
1.1
2.1
1.1
1.0
3.0
3.2
1.0
9.0
f1 (ppm)

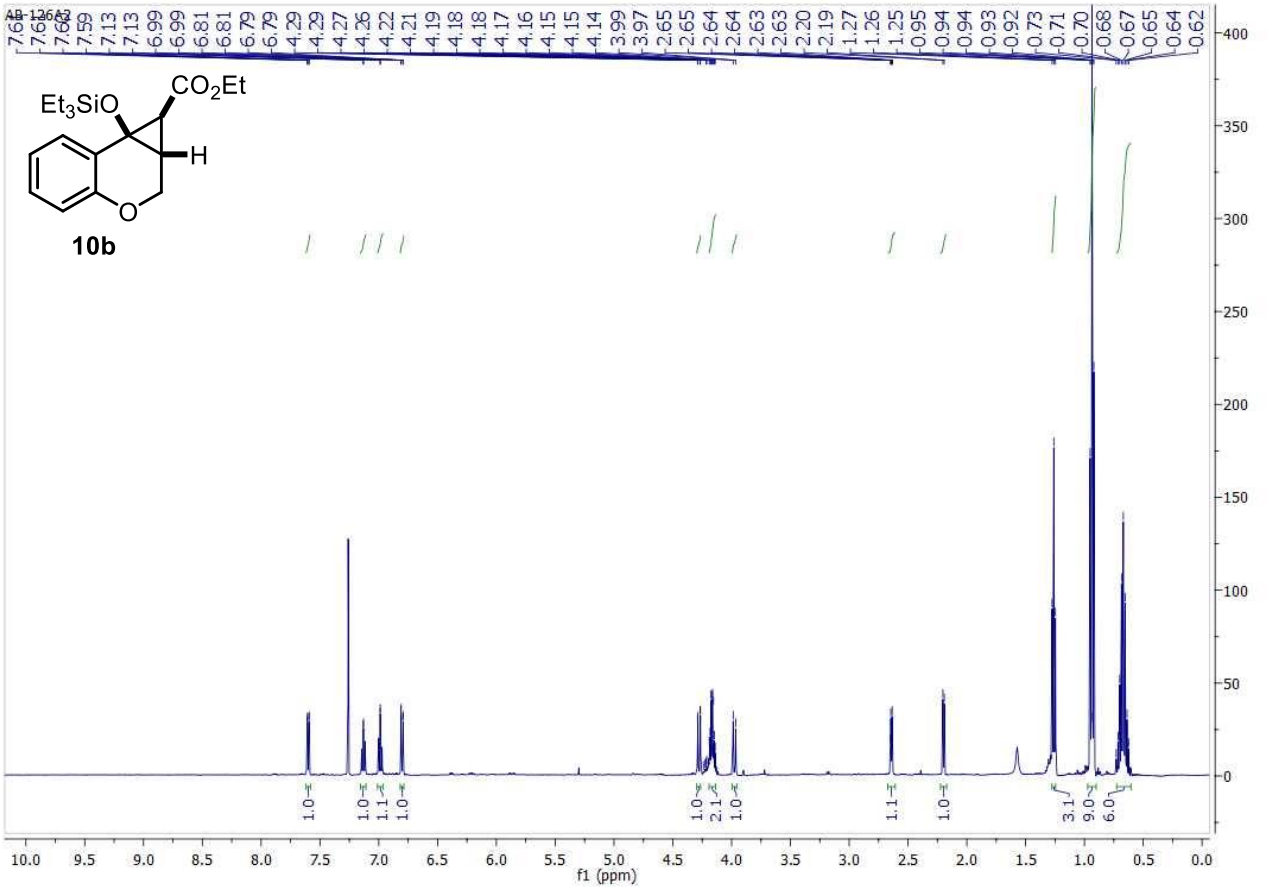

168.3
144.8
138.1
134.2
133.3
129.9
129.0
127.2
123.7
123.5
114.9
67.0
51.9
49.0
28.7
21.6
0.3
Me3SiO
CO2Me
H
N
Ts
9h
f1 (ppm)

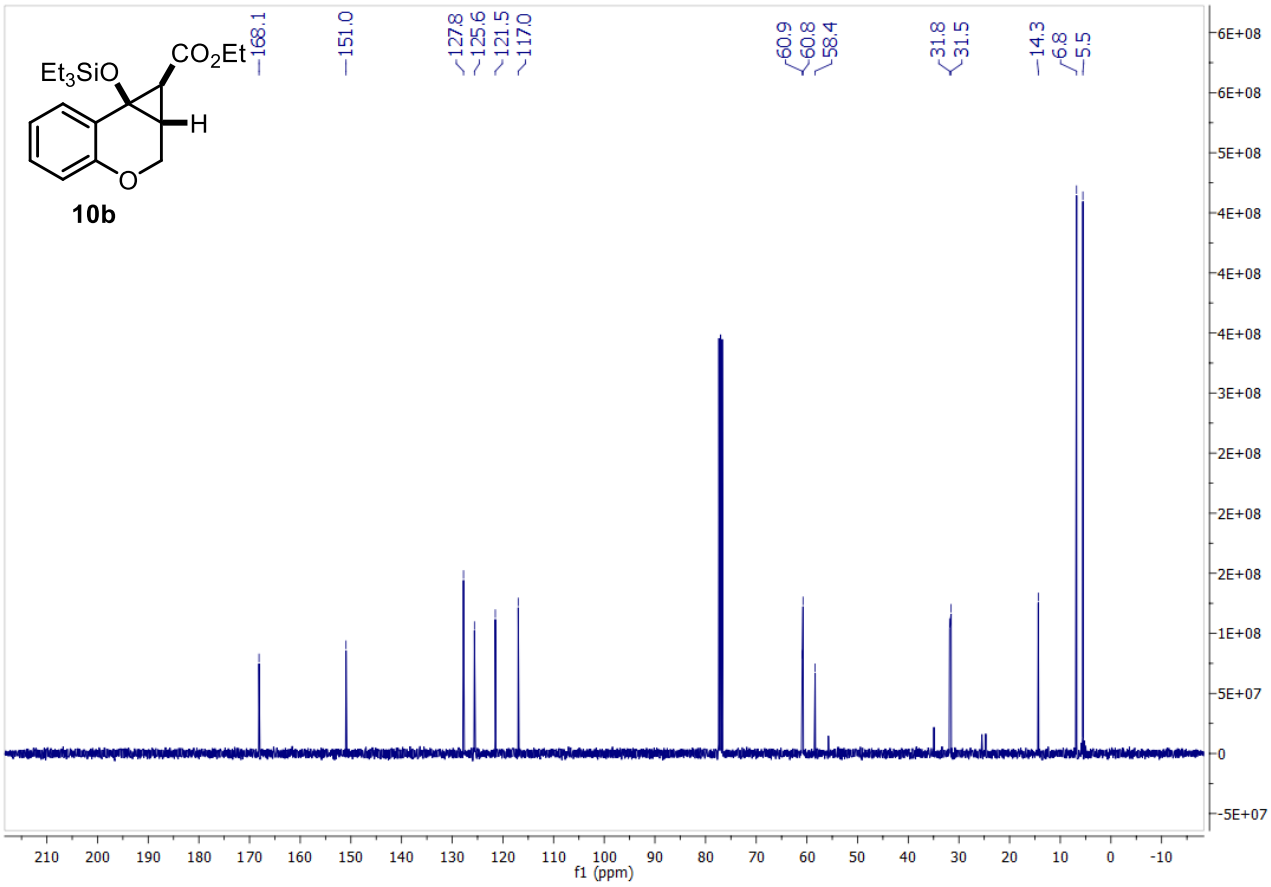

7.74
7.72
7.64
7.62
7.40
7.39
7.38
7.37
7.37
7.35
7.28
7.26
7.09
7.09
7.08
7.08
7.06
7.05
5.31
5.29
5.02
5.00
4.75
4.74
2.26
0.70
0.69
0.01
Me3SiO
CO2Bn
H
N
Ts
9i
1.0
2.1
6.0
1.1
3.0
1.0
1.0
1.0
3.1
1.0
9.2
f1 (ppm)

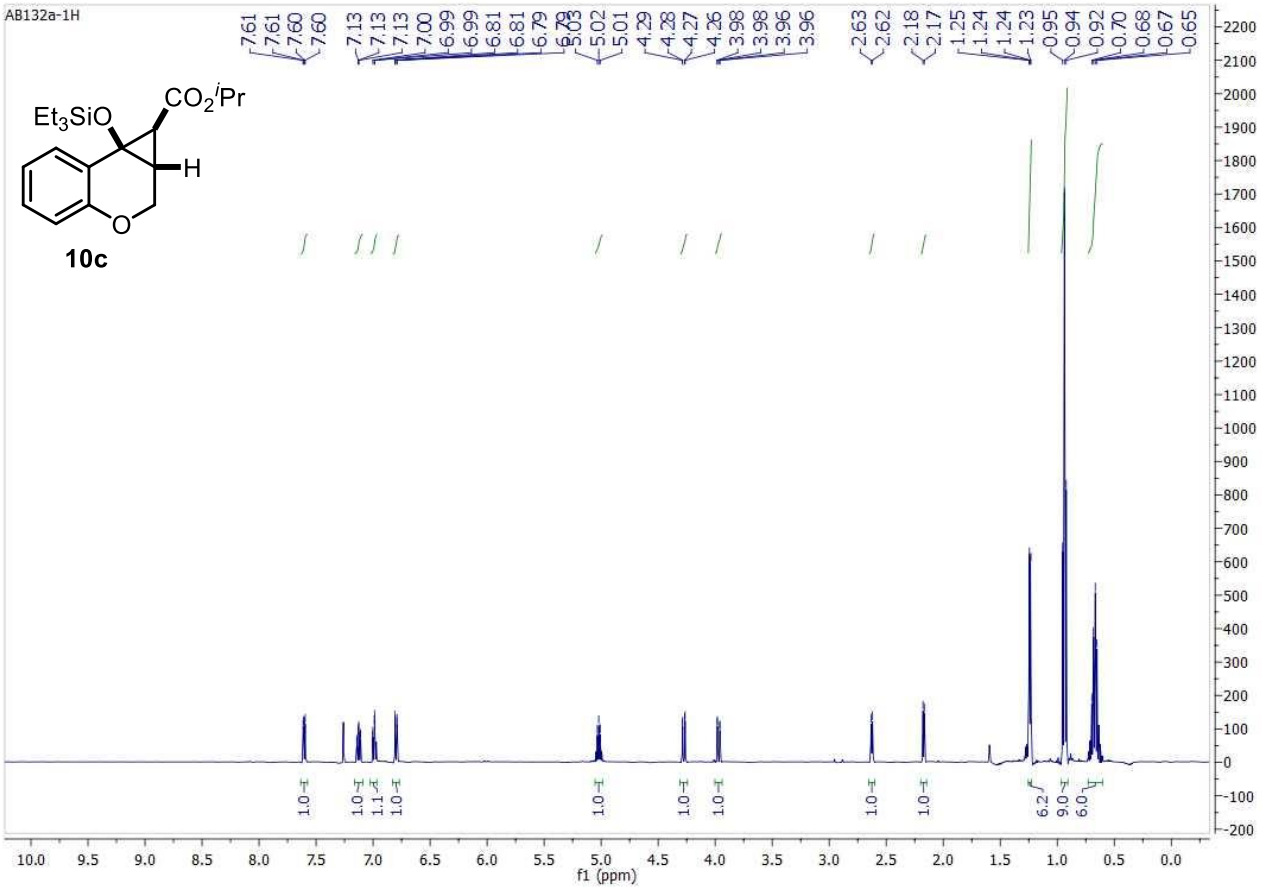

167.7
144.7
133.9
133.4
129.9
129.0
128.6
128.4
128.4
127.2
123.7
115.0
67.3
66.6
49.0
28.7
21.5
0.4
Me3SiO
CO2Bn
H
N
Ts
9i
f1 (ppm)

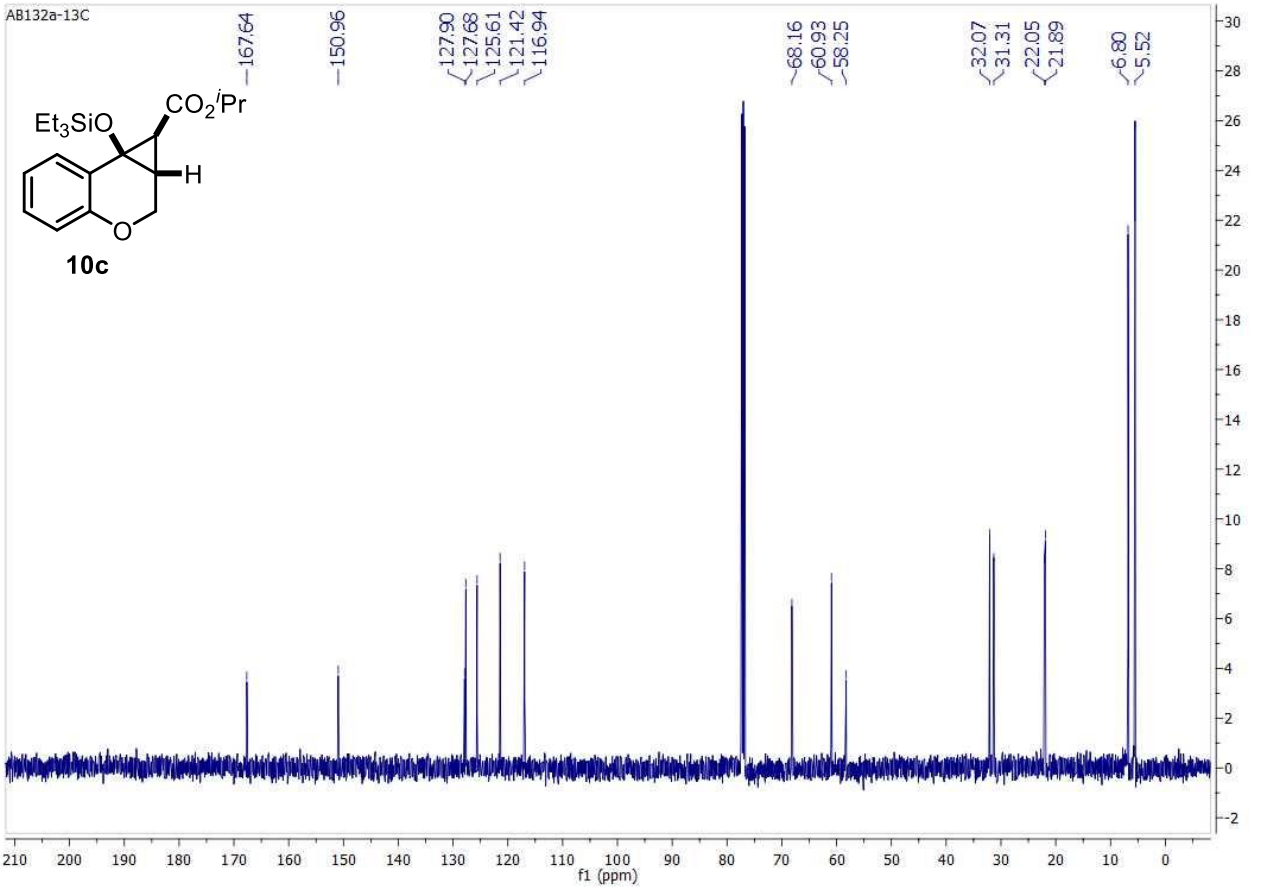

AB-32_1H
Et3SiO
CO2Me
H
O
10a
7.60
7.59
7.13
7.11
7.00
6.98
6.81
6.79
4.28
4.26
3.99
3.96
3.70
2.66
2.65
2.22
2.20
0.97
0.95
0.94
0.92
0.70
0.69
0.67
0.66
0.64
1.0
1.0
1.1
1.0
1.0
1.0
3.0
1.0
1.0
9.0
6.0
f1 (ppm)

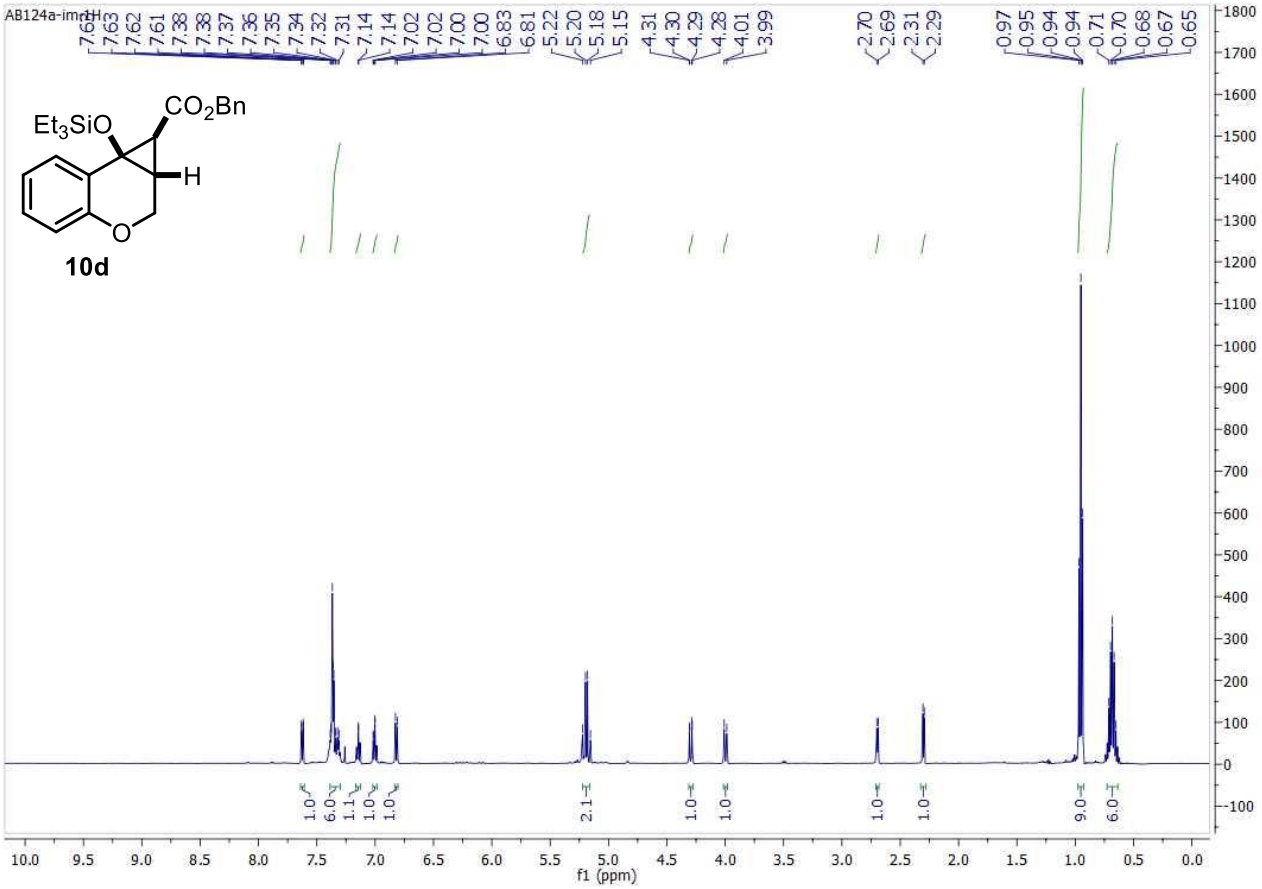

AB-32_13C
168.52
150.88
127.81
127.62
125.56
121.53
116.97
60.86
58.42
51.91
51.88
31.71
31.63
6.77
6.60
5.79
5.50
Et3SiO
CO2Me
H
O
10a
f1 (ppm)

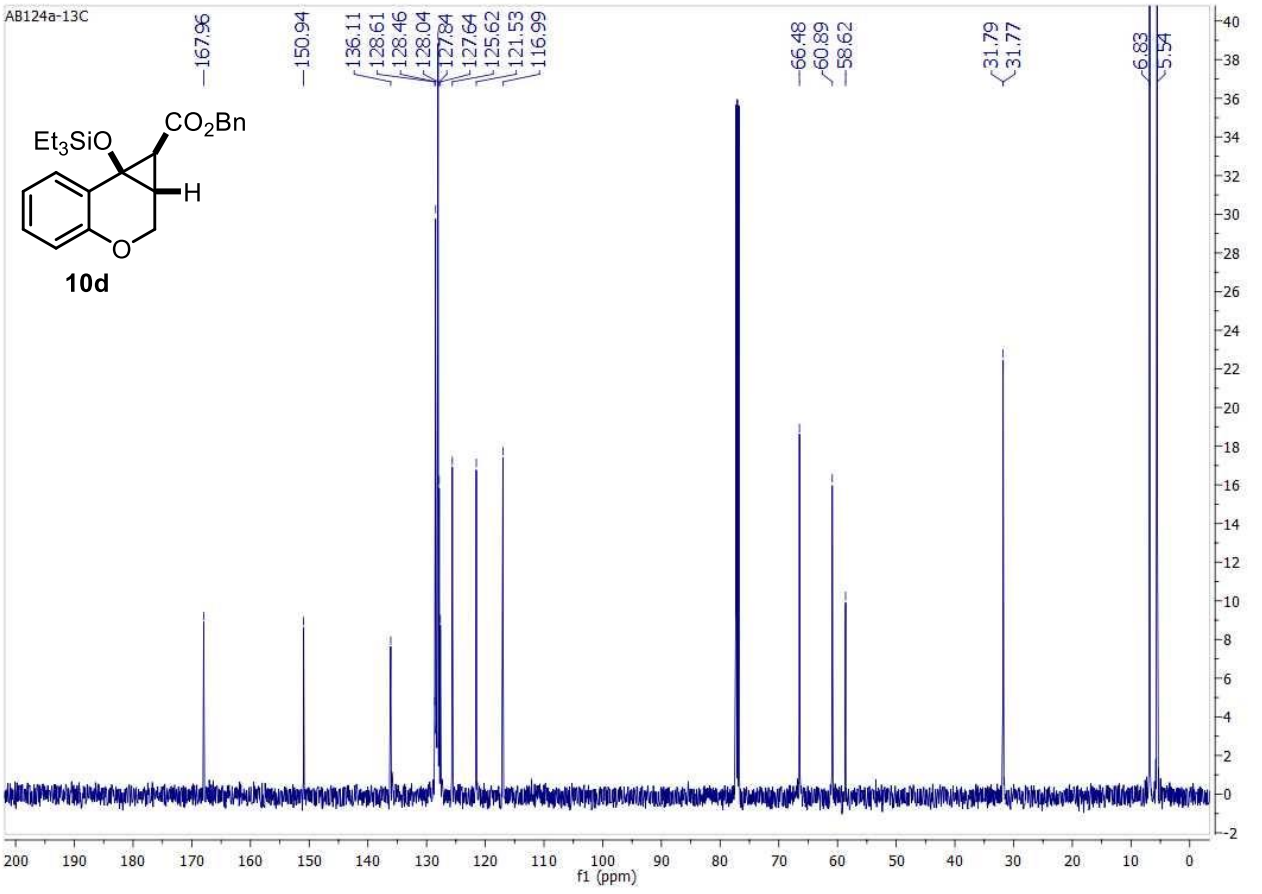

Et3SiO
CO2Et
H
O
10b
f1 (ppm)

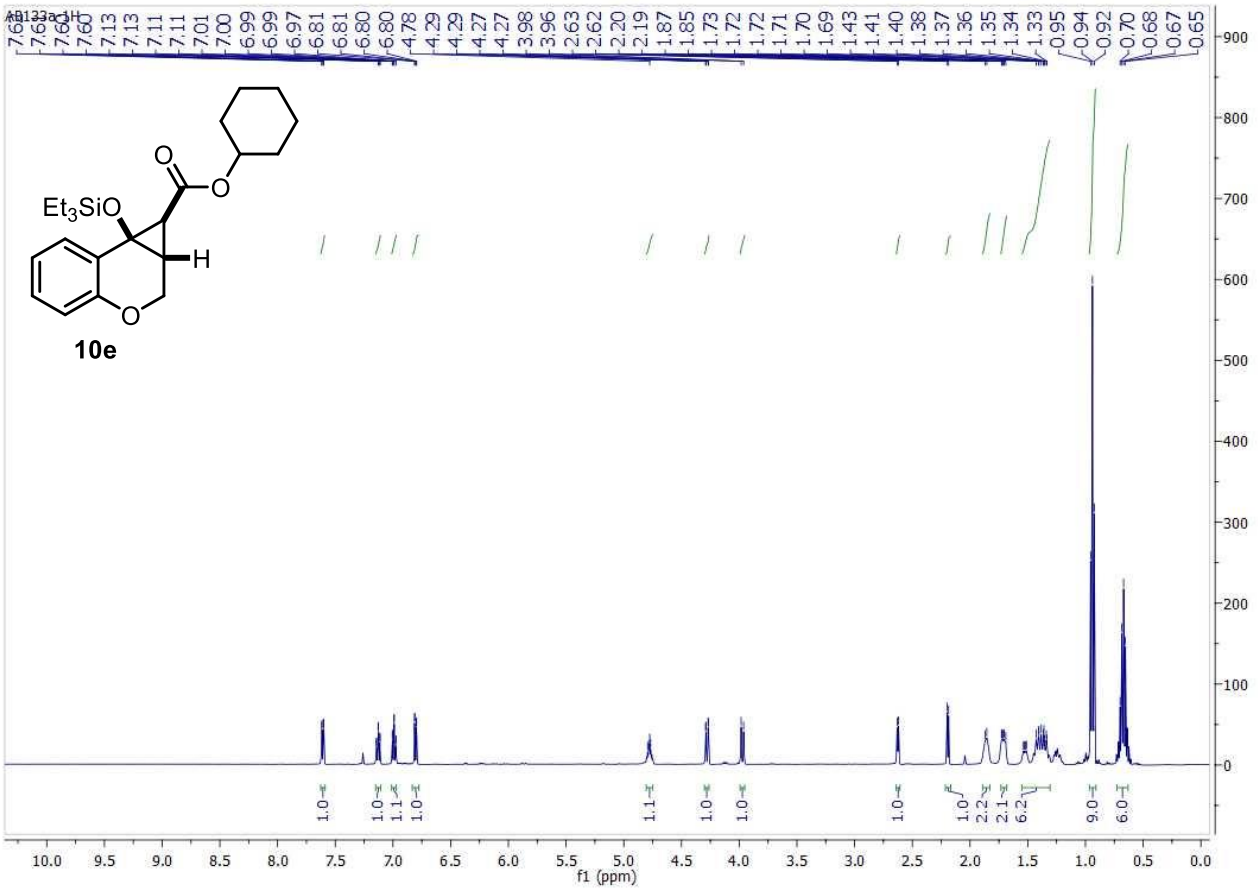

Et3SiO
CO2Et
H
O
10b
168.1
151.0
127.8
125.6
121.5
117.0
60.9
60.8
58.4
31.8
31.5
14.3
6.8
5.5
f1 (ppm)

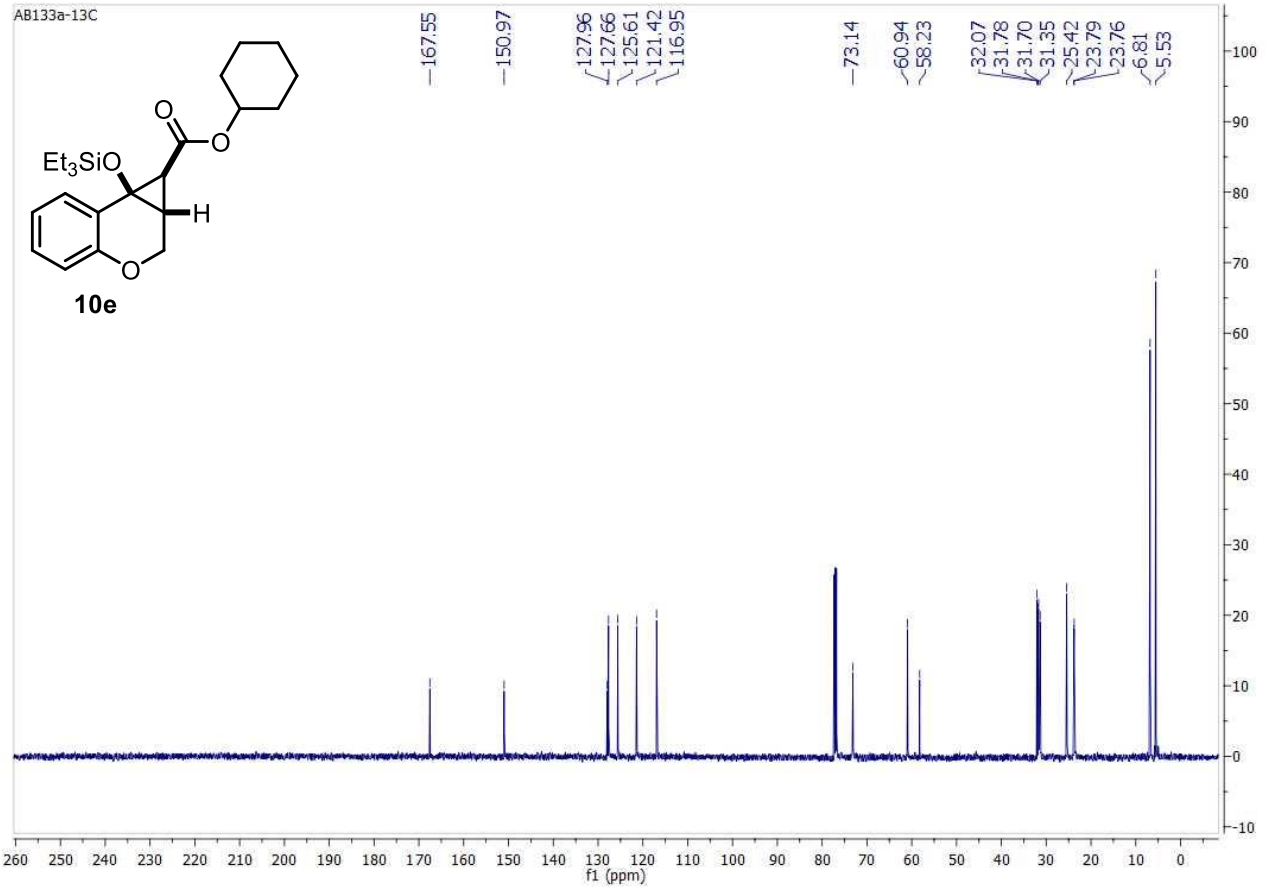

AB132a-1H
Et3SiO
CO2iPr
H
O
10c
f1 (ppm)

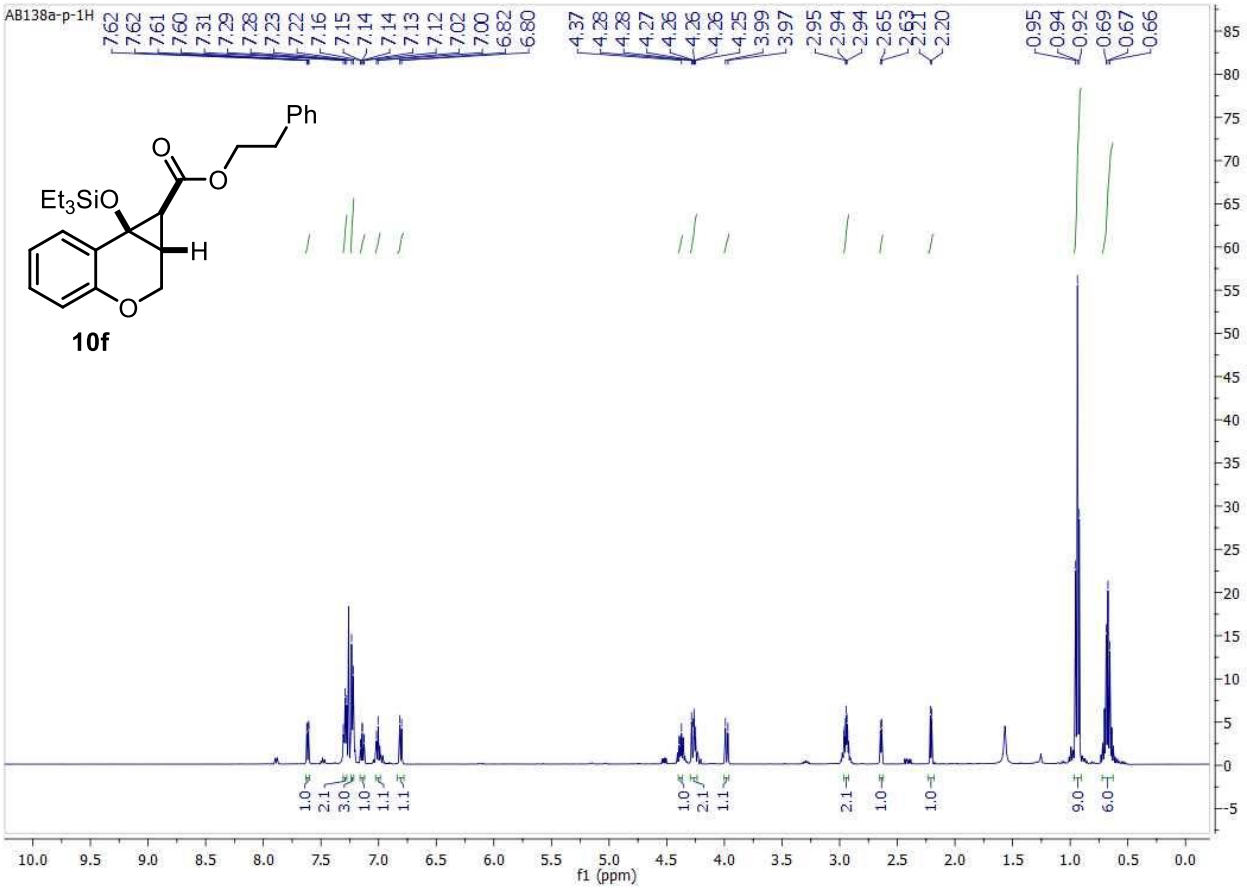

AB132a-13C
Et3SiO
CO2iPr
H
O
10c
f1 (ppm)

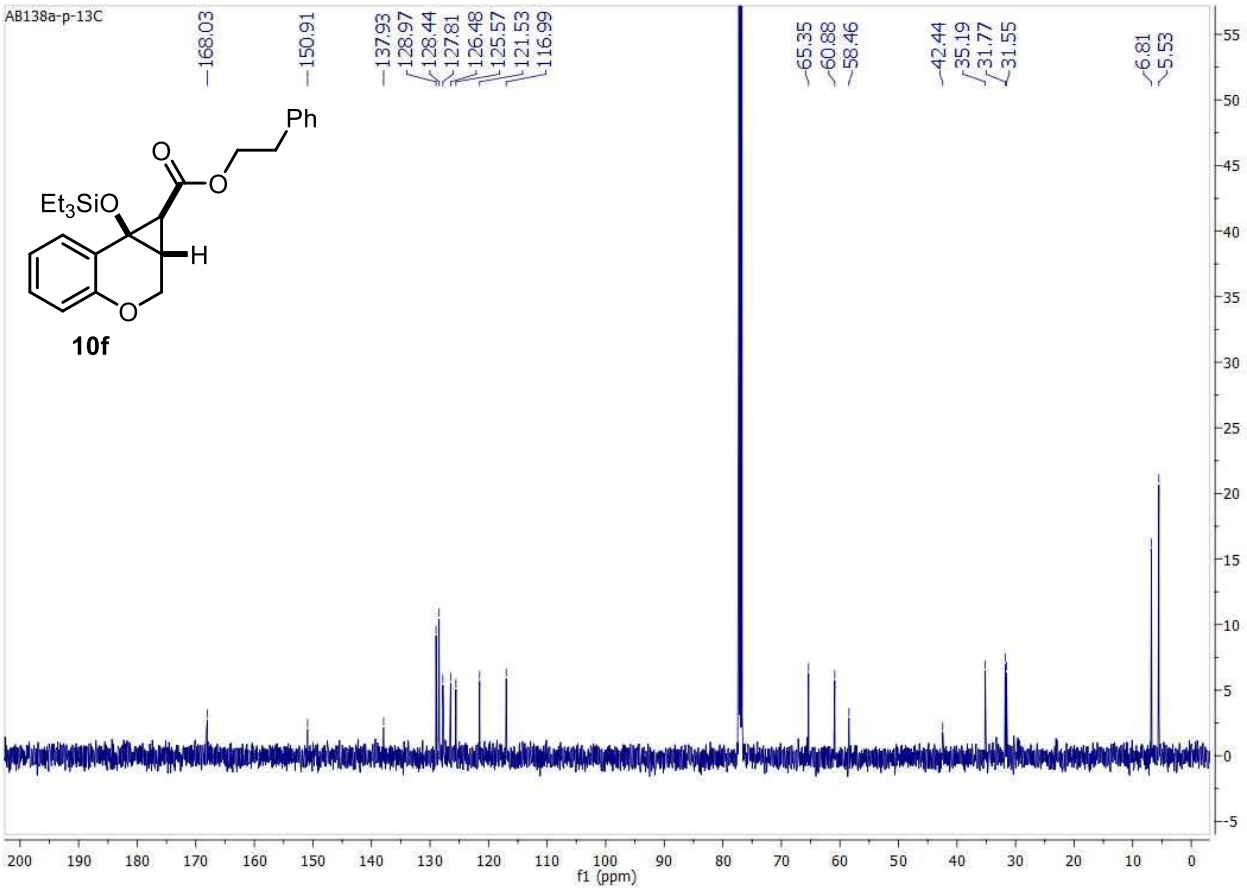

AB124a-imidH
7.65
7.63
7.62
7.61
7.38
7.38
7.37
7.36
7.35
7.34
7.32
7.31
7.14
7.14
7.02
7.02
7.00
7.00
6.83
6.81
5.22
5.20
5.18
5.15
4.31
4.30
4.29
4.28
4.01
3.99
2.70
2.69
2.31
2.29
0.97
0.95
0.94
0.94
0.71
0.70
0.68
0.67
0.65
Et3SiO
CO2Bn
H
O
10d
1.0
6.0
1.1
1.0
1.0
2.1
1.0
1.0
1.0
1.0
9.0
6.0
f1 (ppm)

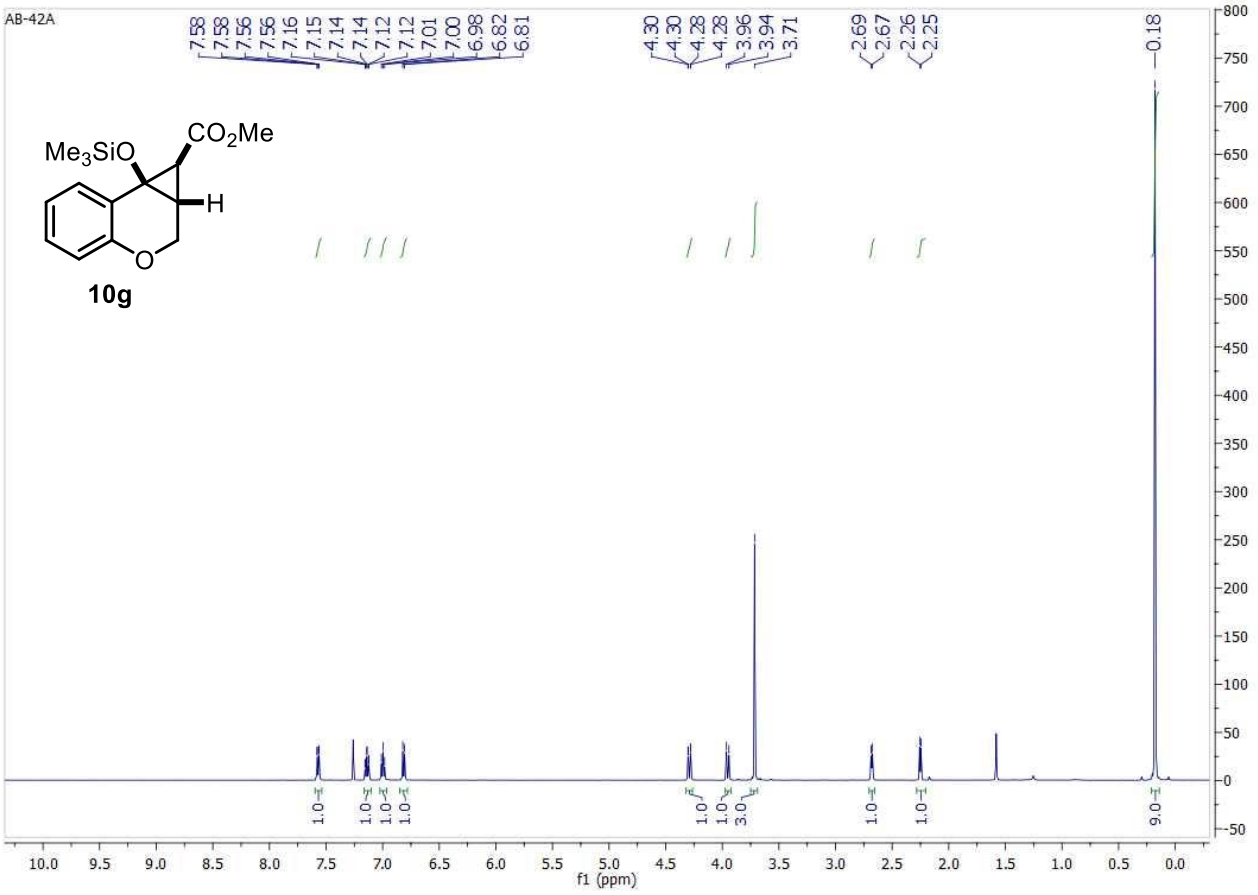

AB124a-13C
167.96
150.94
136.11
128.61
128.46
128.04
127.84
127.64
125.62
121.53
116.99
66.48
60.89
58.62
31.79
31.77
6.83
5.54
Et3SiO
CO2Bn
H
O
10d
f1 (ppm)

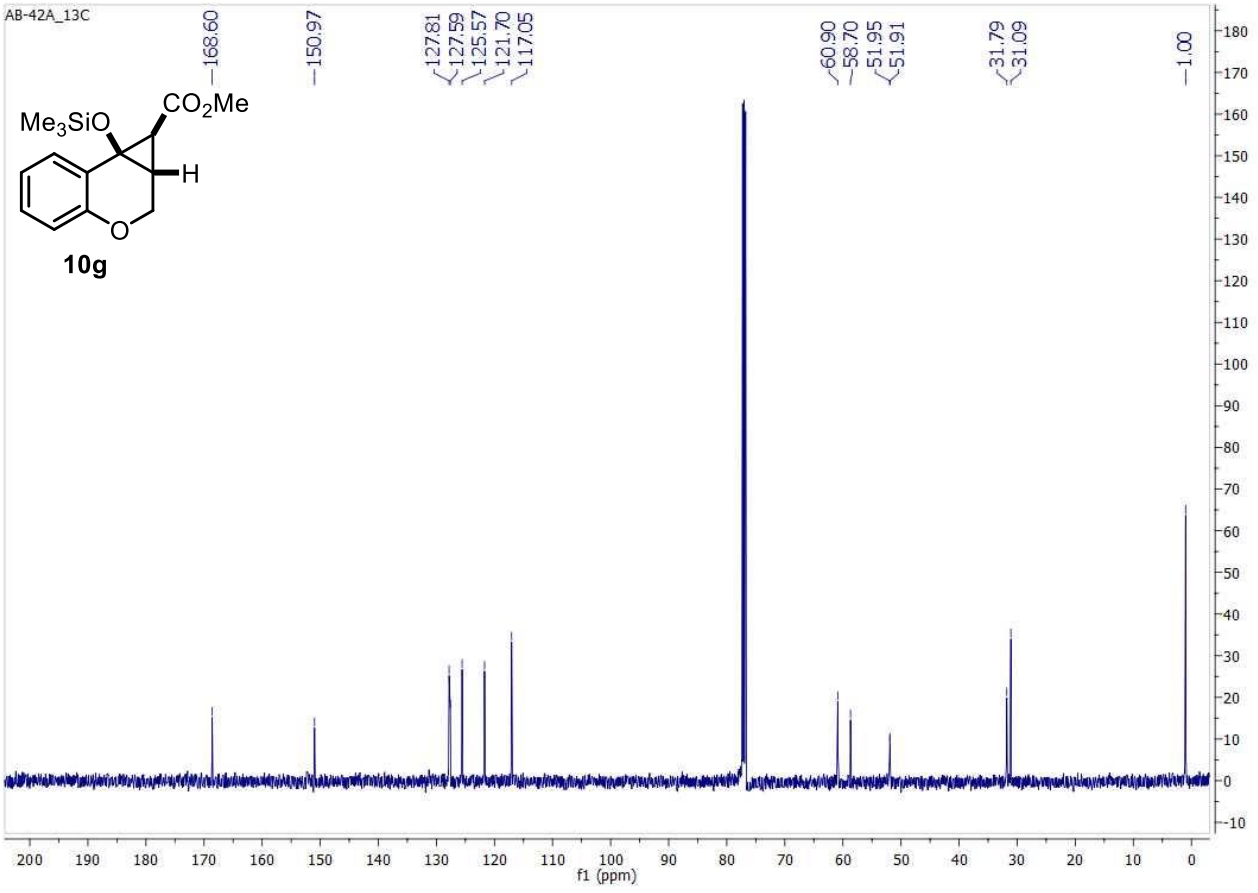

AB133a-1H
Et3SiO
O
O
H
O
10e
f1 (ppm)

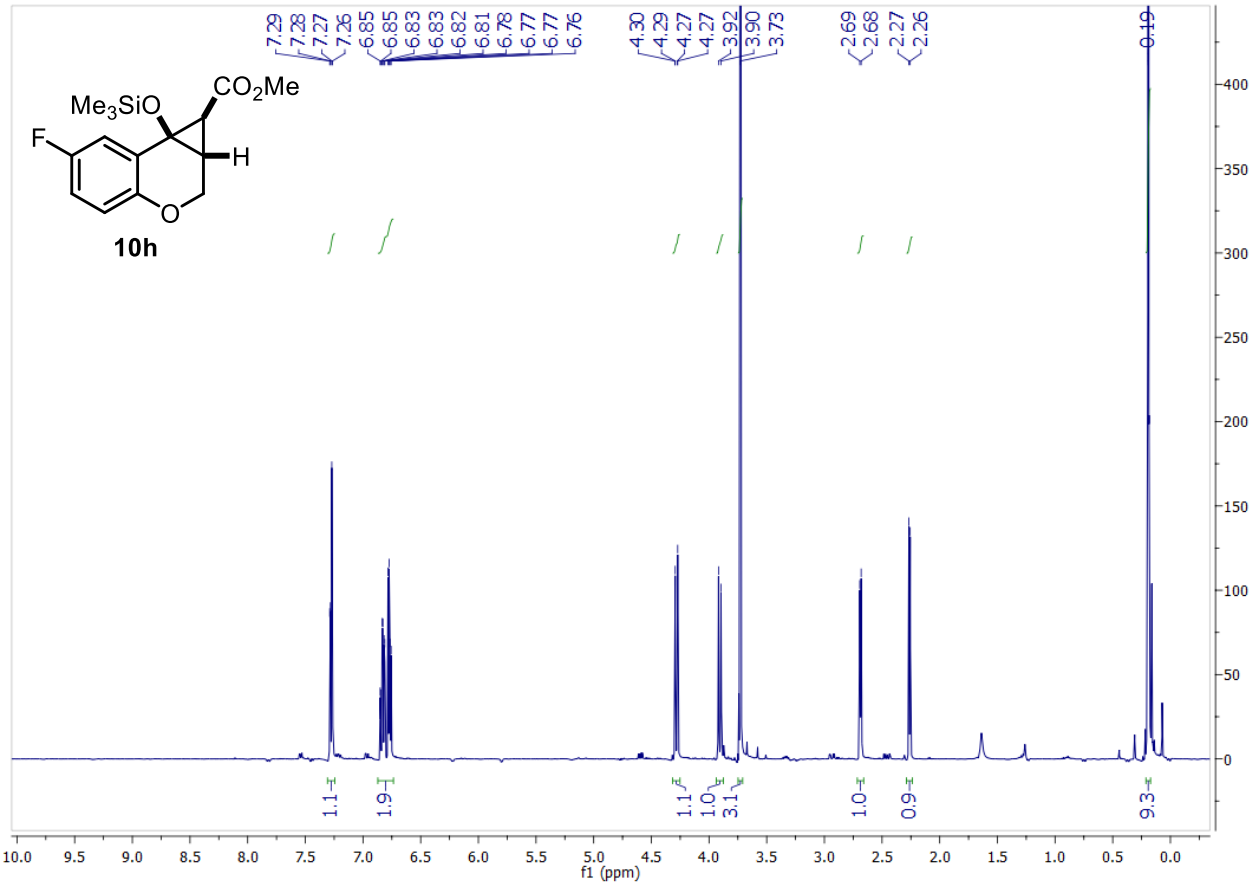

AB133a-13C
167.55
150.97
127.96
127.66
125.61
121.42
116.95
73.14
60.94
58.23
32.07
31.78
31.70
31.35
25.42
23.79
23.76
6.81
5.53
Et3SiO
O
O
H
O
10e
f1 (ppm)

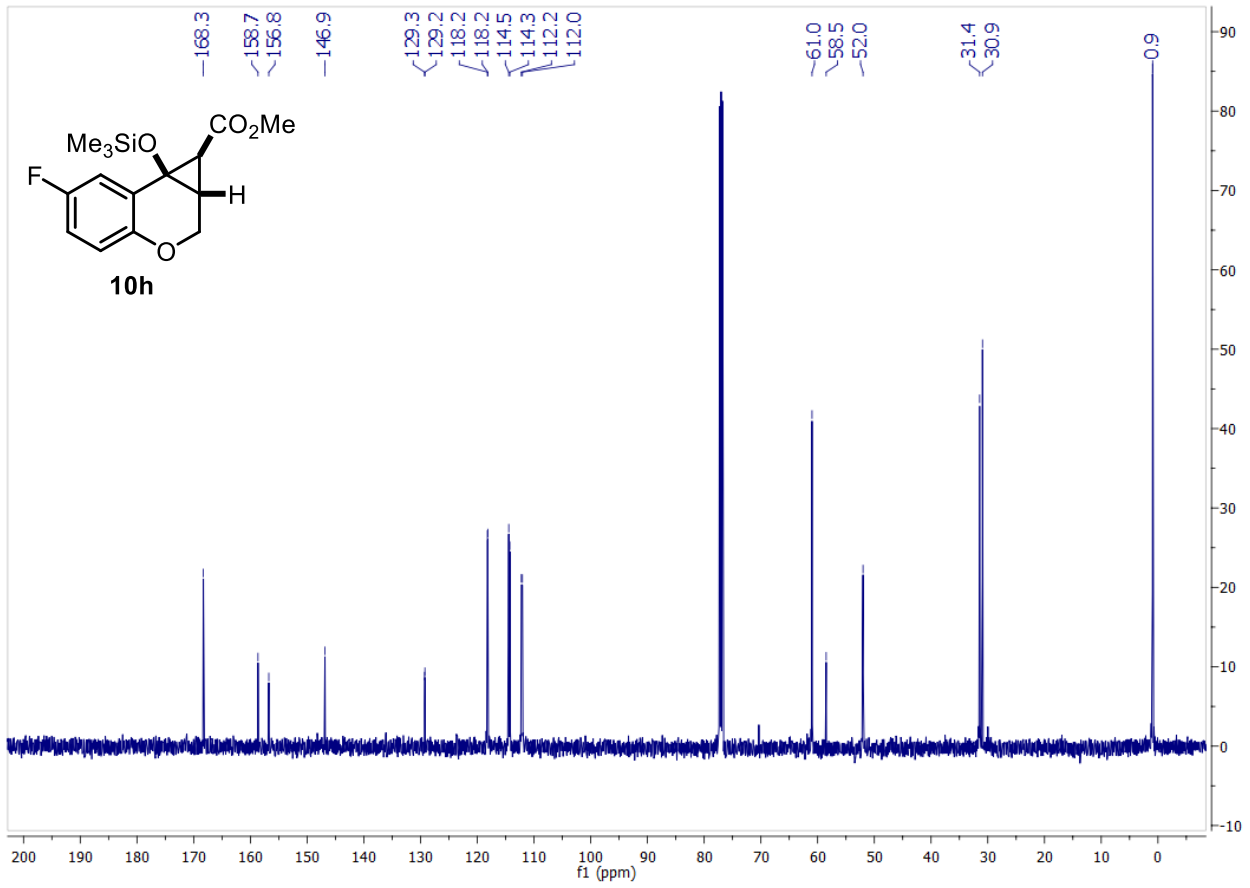

AB138a-p-1H
7.62 7.62 7.61 7.60 7.31 7.29 7.28 7.23 7.22 7.16 7.15 7.14 7.14 7.13 7.12 7.02 7.00 6.82 6.80
4.37 4.28 4.28 4.27 4.26 4.26 4.26 4.25 3.99 3.97
2.95 2.94 2.94 2.65 2.63 2.21 2.20
0.95 0.94 0.92 0.69 0.67 0.66
Ph
O
O
Et3SiO
H
O
10f
1.0 2.1 3.0 1.0 1.1 1.1
1.0 2.1 1.1 2.1 1.0 1.0 9.0 6.0
f1 (ppm)

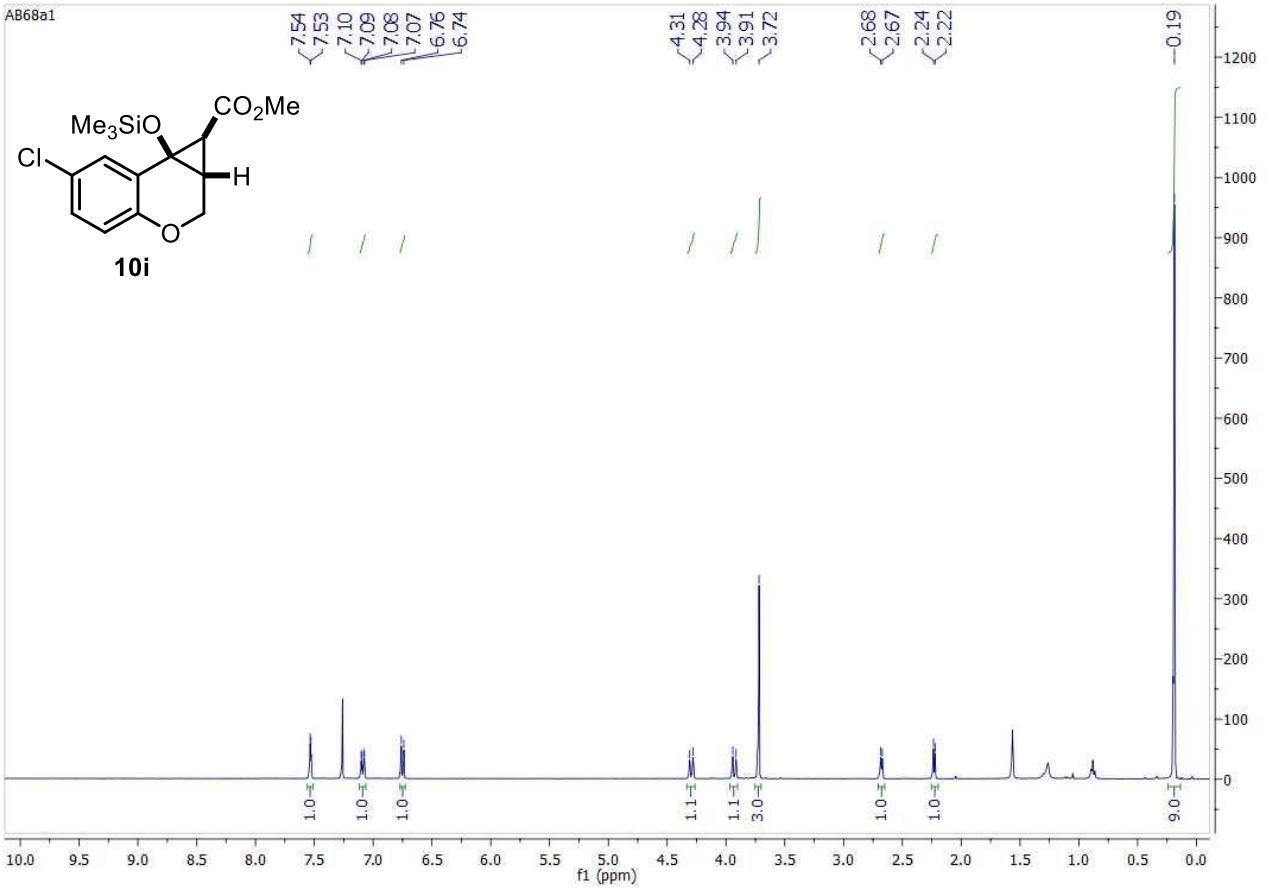

AB138a-p-13C
168.03 150.91 137.93 128.97 128.44 127.81 126.48 125.57 121.53 116.99
65.35 60.88 58.46
42.44 35.19 31.77 31.55
6.81 5.53
Ph
O
O
Et3SiO
H
O
10f
f1 (ppm)

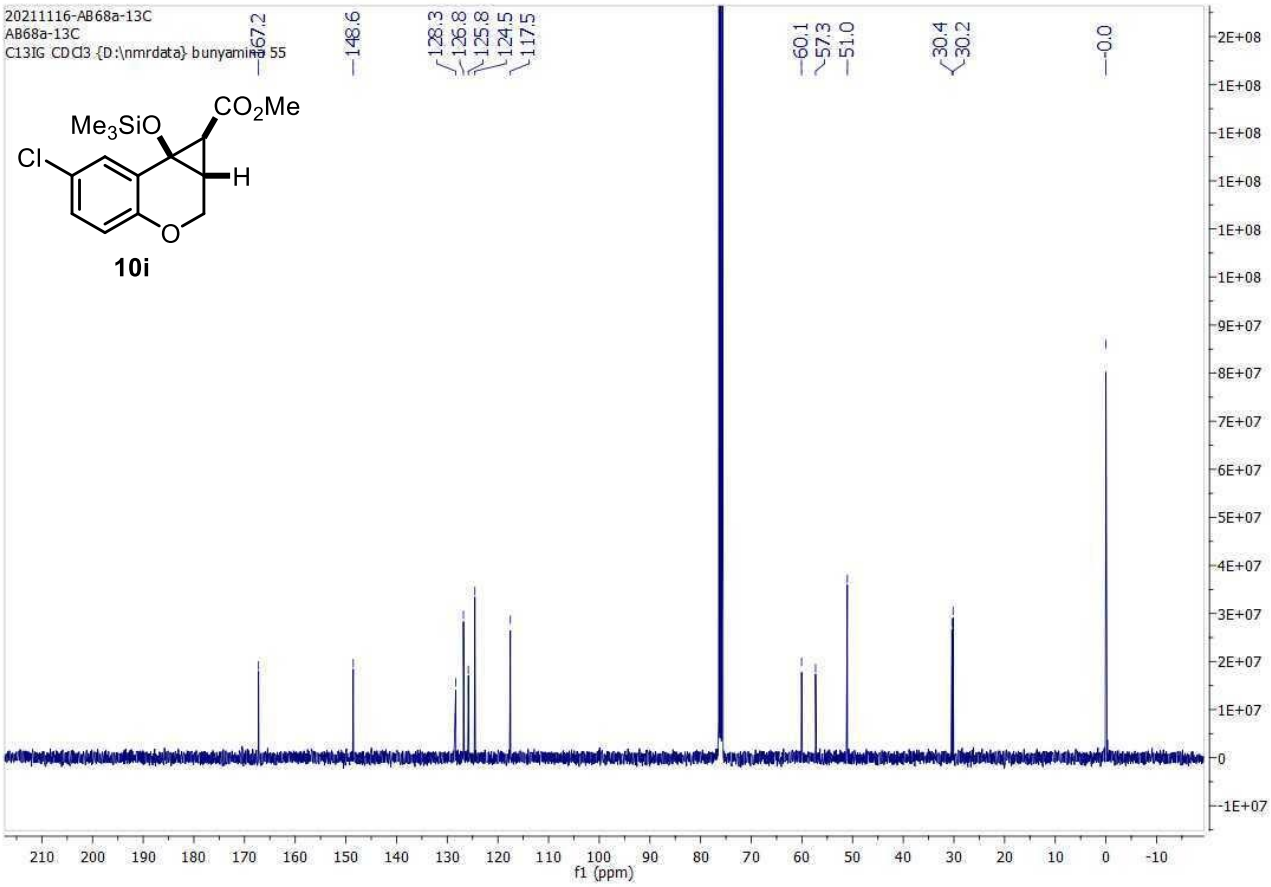

AB-42A
7.58
7.58
7.56
7.56
7.16
7.15
7.14
7.14
7.12
7.12
7.01
7.00
6.98
6.82
6.81
4.30
4.30
4.28
4.28
3.96
3.94
3.71
2.69
2.67
2.26
2.25
0.18
Me3SiO
CO2Me
H
O
10g
1.0
1.0
1.0
1.0
1.0
1.0
3.0
1.0
1.0
9.0
f1 (ppm)

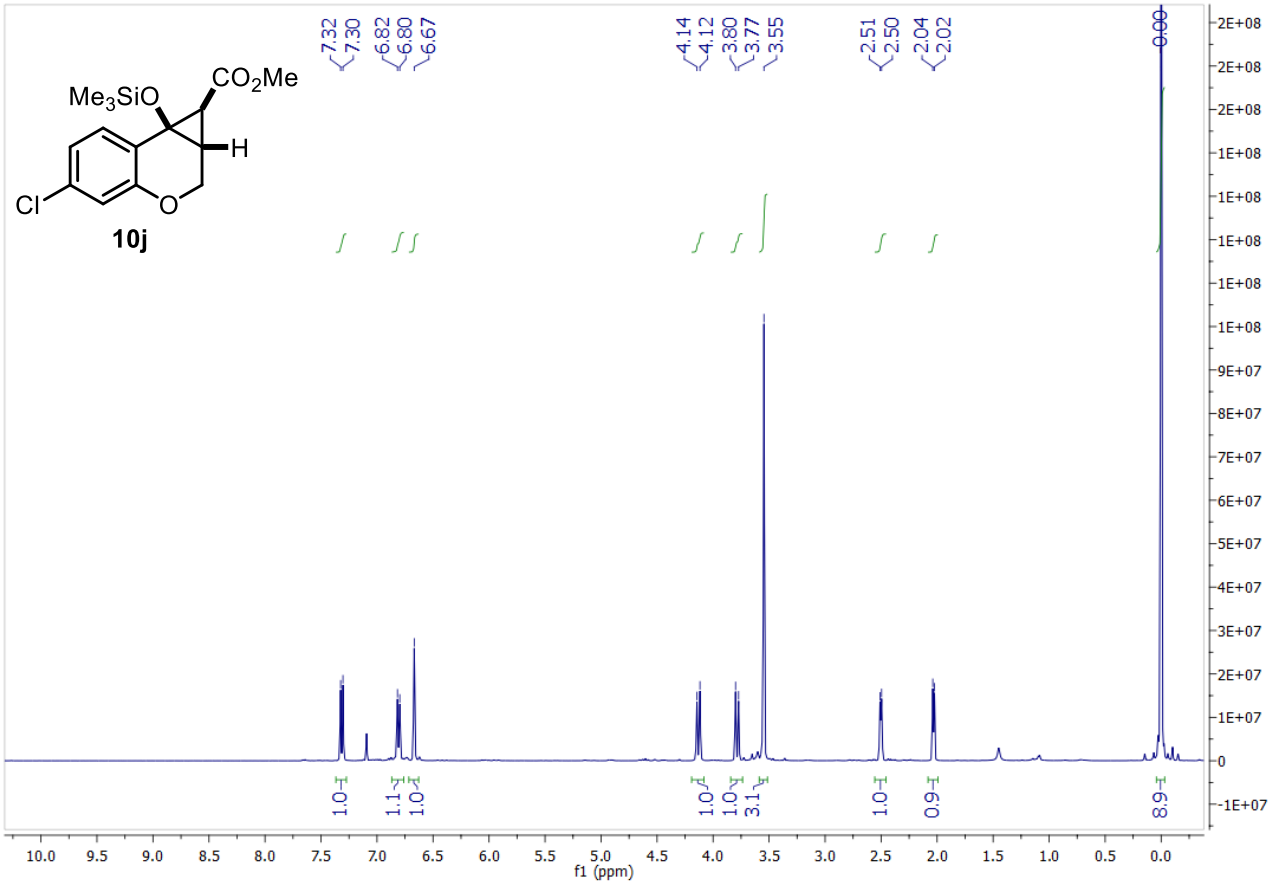

AB-42A_13C
168.60
150.97
127.81
127.59
125.57
121.70
117.05
60.90
58.70
51.95
51.91
31.79
31.09
1.00
Me3SiO
CO2Me
H
O
10g
f1 (ppm)

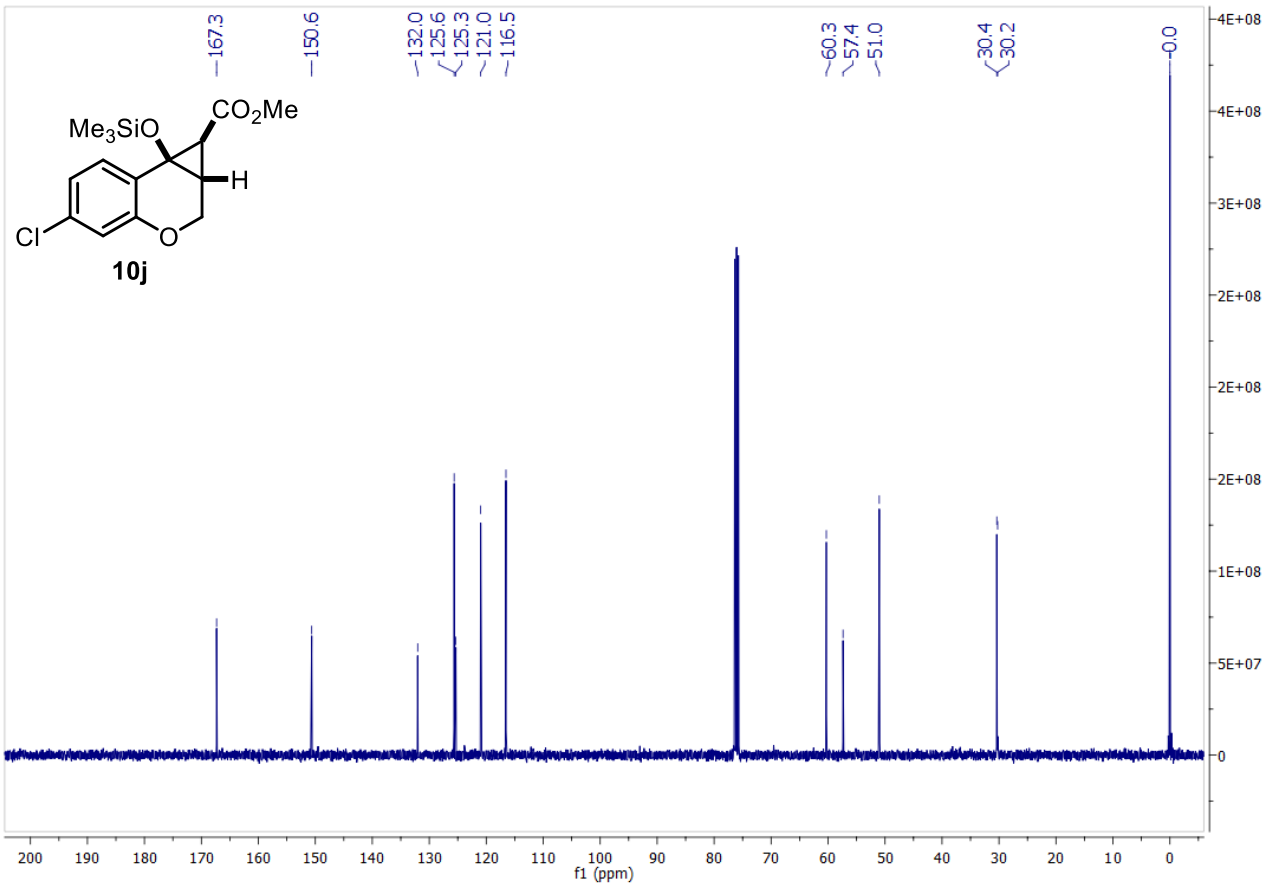

7.29
7.28
7.27
7.26
6.85
6.83
6.82
6.81
6.78
6.77
6.76
4.30
4.29
4.27
4.27
3.92
3.90
3.73
2.69
2.68
2.27
2.26
0.19
Me3SiO
CO2Me
F
H
O
10h
1.1
1.9
1.1
1.0
3.1
1.0
0.9
9.3
f1 (ppm)

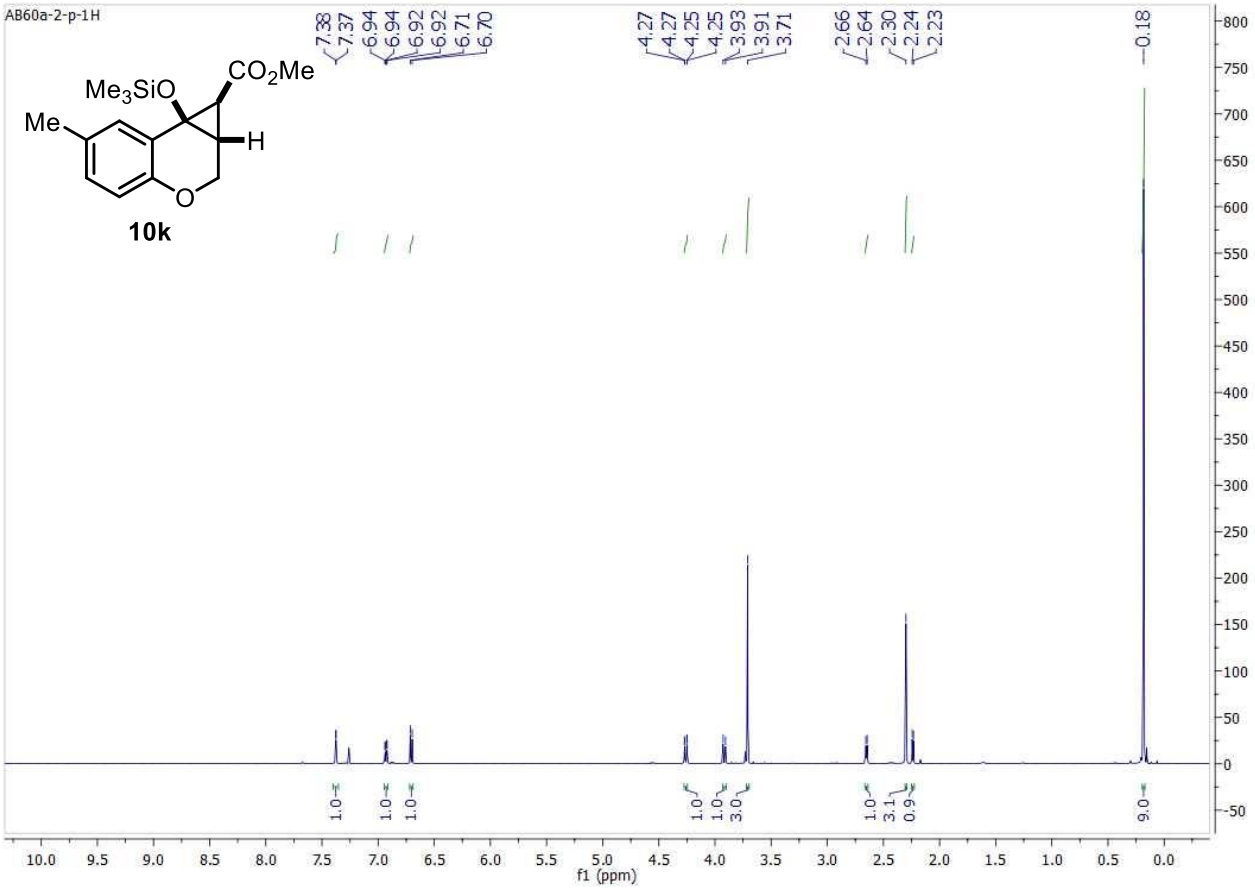

168.3
158.7
156.8
146.9
129.3
129.2
118.2
118.2
114.5
114.3
112.2
112.0
61.0
58.5
52.0
31.4
30.9
0.9
Me3SiO
CO2Me
F
H
O
10h
f1 (ppm)

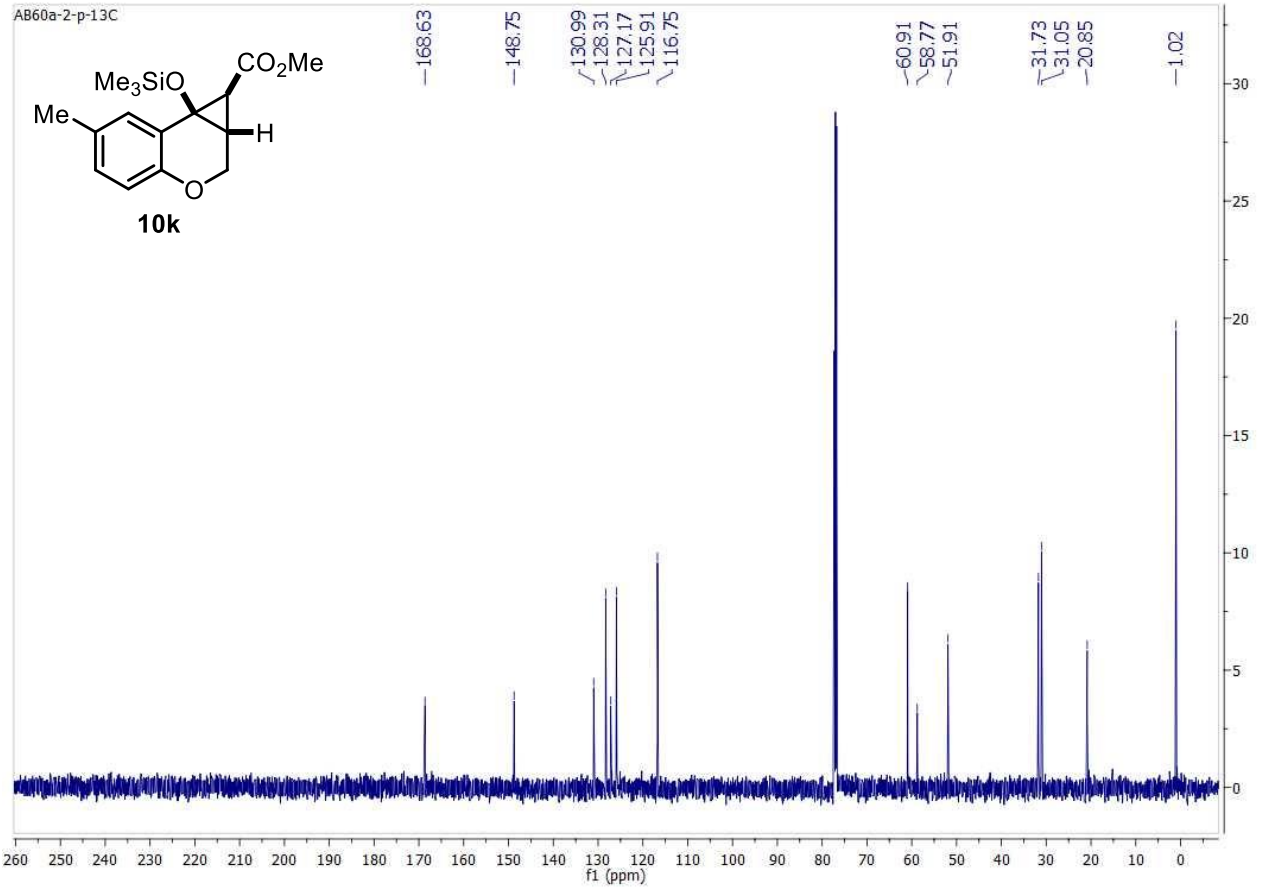

AB68a1
7.54
7.53
7.10
7.09
7.08
7.07
6.76
6.74
4.31
4.28
3.94
3.91
3.72
2.68
2.67
2.24
2.22
0.19
Me3SiO
CO2Me
Cl
H
O
10i
1.0
1.0
1.0
1.1
1.1
3.0
1.0
1.0
9.0
f1 (ppm)

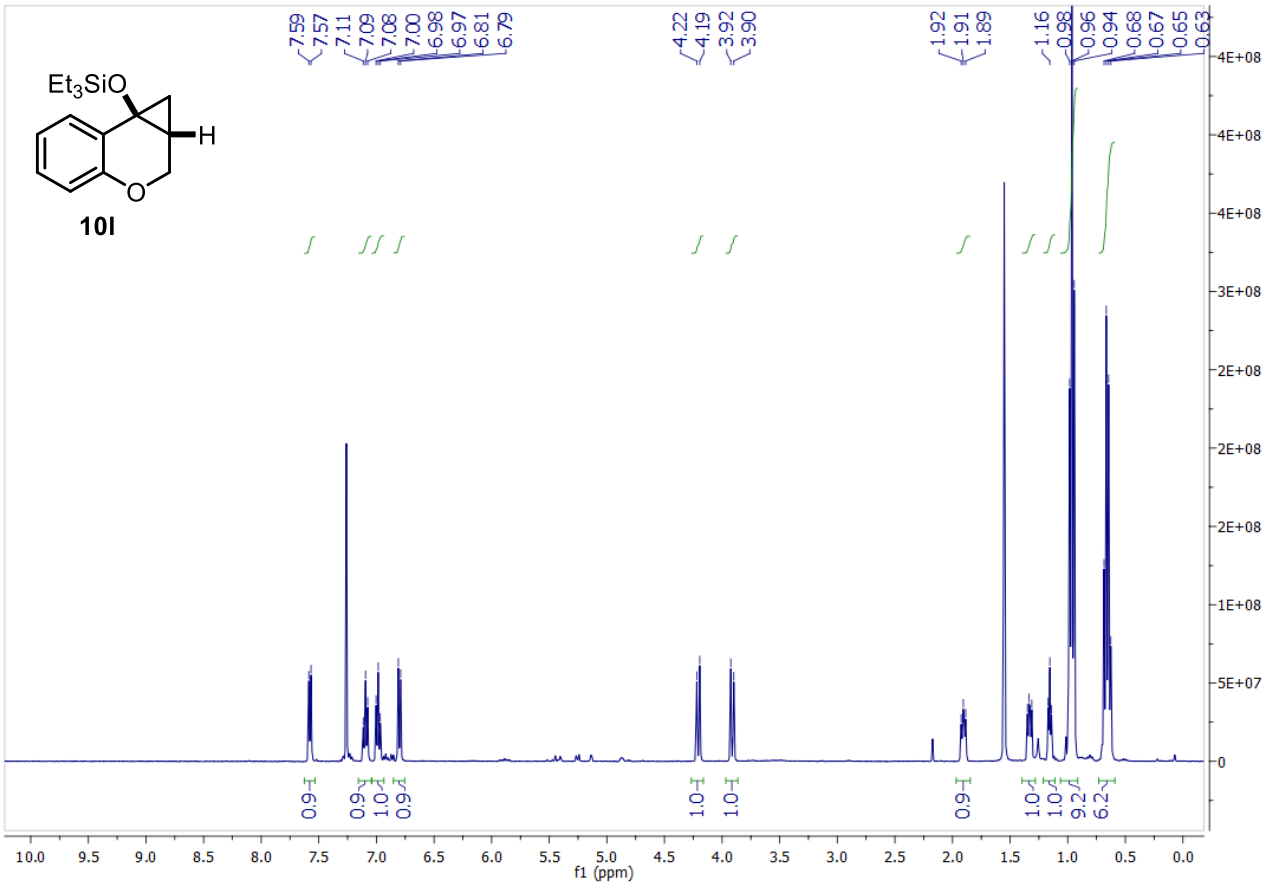

20211116-AB68a-13C
AB68a-13C
C13IG CDCl3 {D:\nmrdata} bunyamin 55
167.2
148.6
128.3
126.8
125.8
124.5
117.5
60.1
57.3
51.0
30.4
30.2
0.0
Me3SiO
CO2Me
Cl
H
O
10i
f1 (ppm)

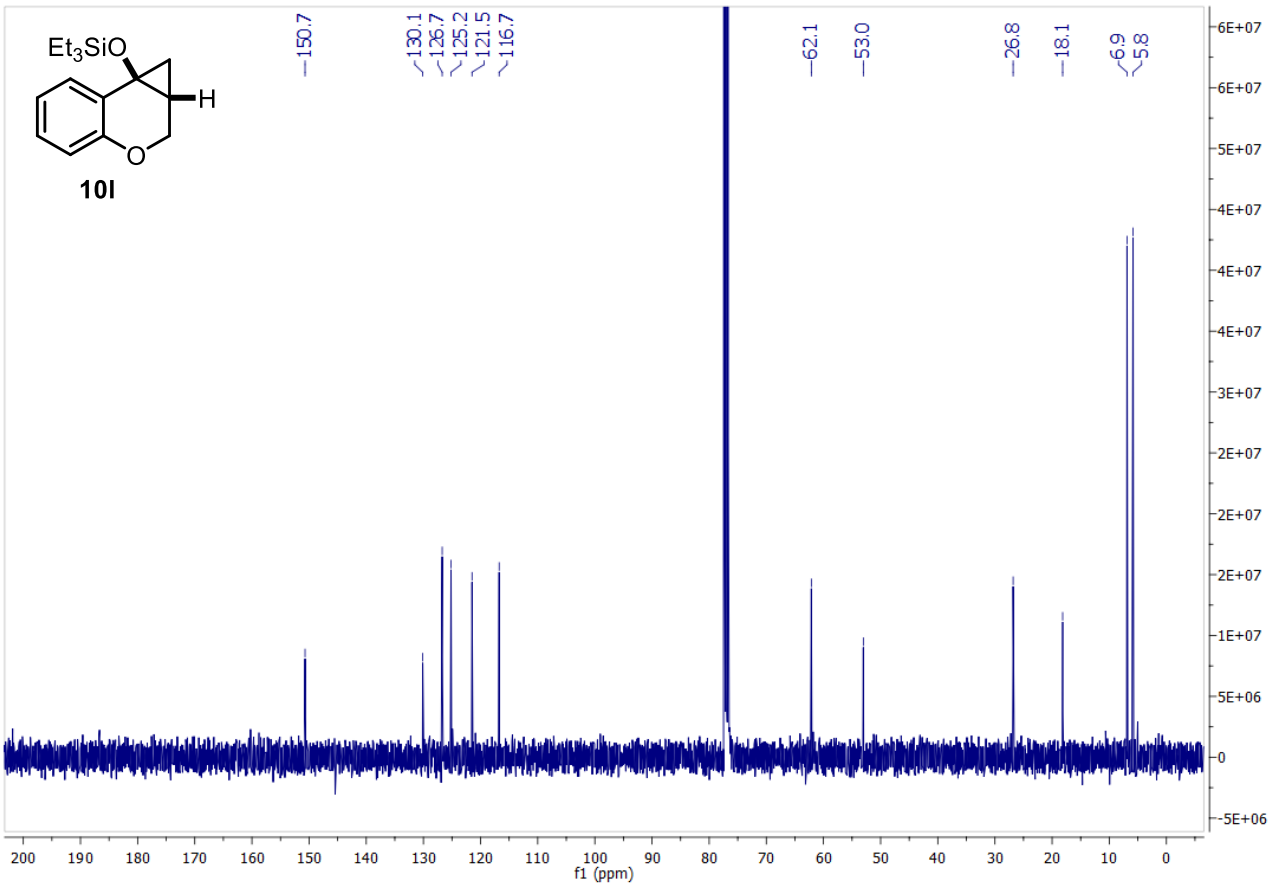

Me3SiO
CO2Me
H
Cl
O
10j
7.32
7.30
6.82
6.80
6.67
4.14
4.12
3.80
3.77
3.55
2.51
2.50
2.04
2.02
0.00
1.0
1.1
1.0
1.0
1.0
3.1
1.0
0.9
8.9
f1 (ppm)

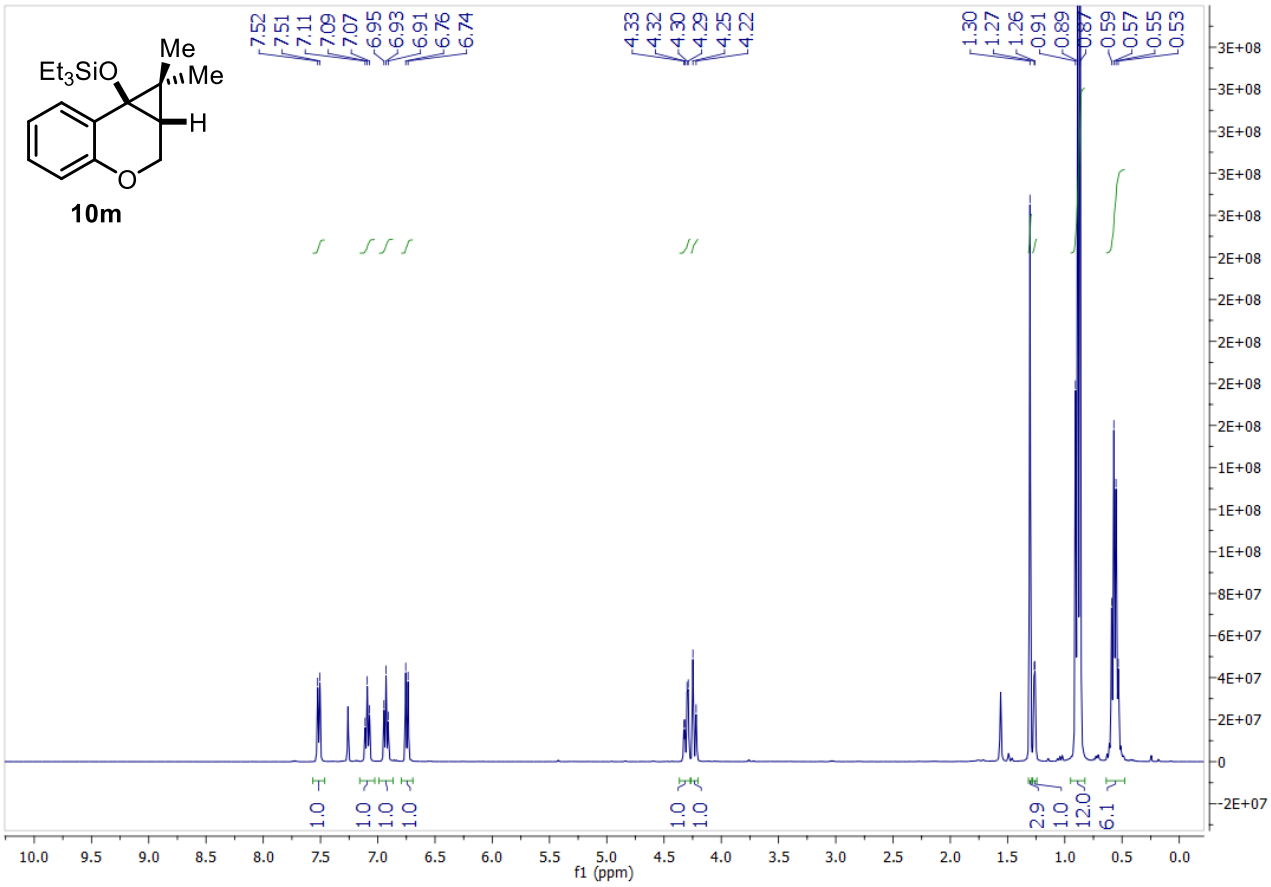

Me3SiO
CO2Me
H
Cl
O
10j
167.3
150.6
132.0
125.6
125.3
121.0
116.5
60.3
57.4
51.0
30.4
30.2
0.0
f1 (ppm)

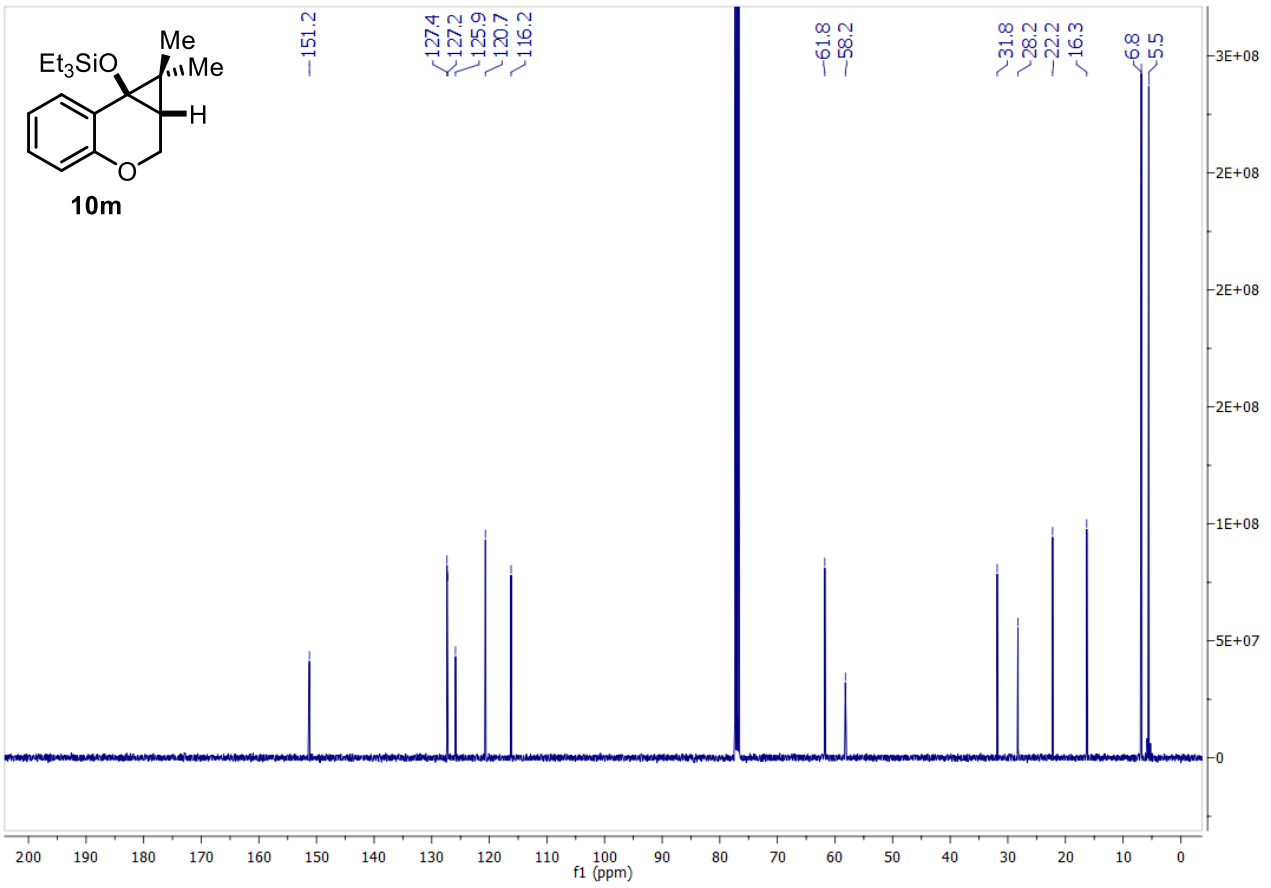

AB60a-2-p-1H
Me3SiO
CO2Me
Me
H
O
10k
7.38
7.37
6.94
6.94
6.92
6.92
6.71
6.70
4.27
4.27
4.25
4.25
3.93
3.91
3.71
2.66
2.64
2.30
2.24
2.23
0.18
1.0
1.0
1.0
1.0
1.0
3.0
1.0
3.1
0.9
9.0
f1 (ppm)

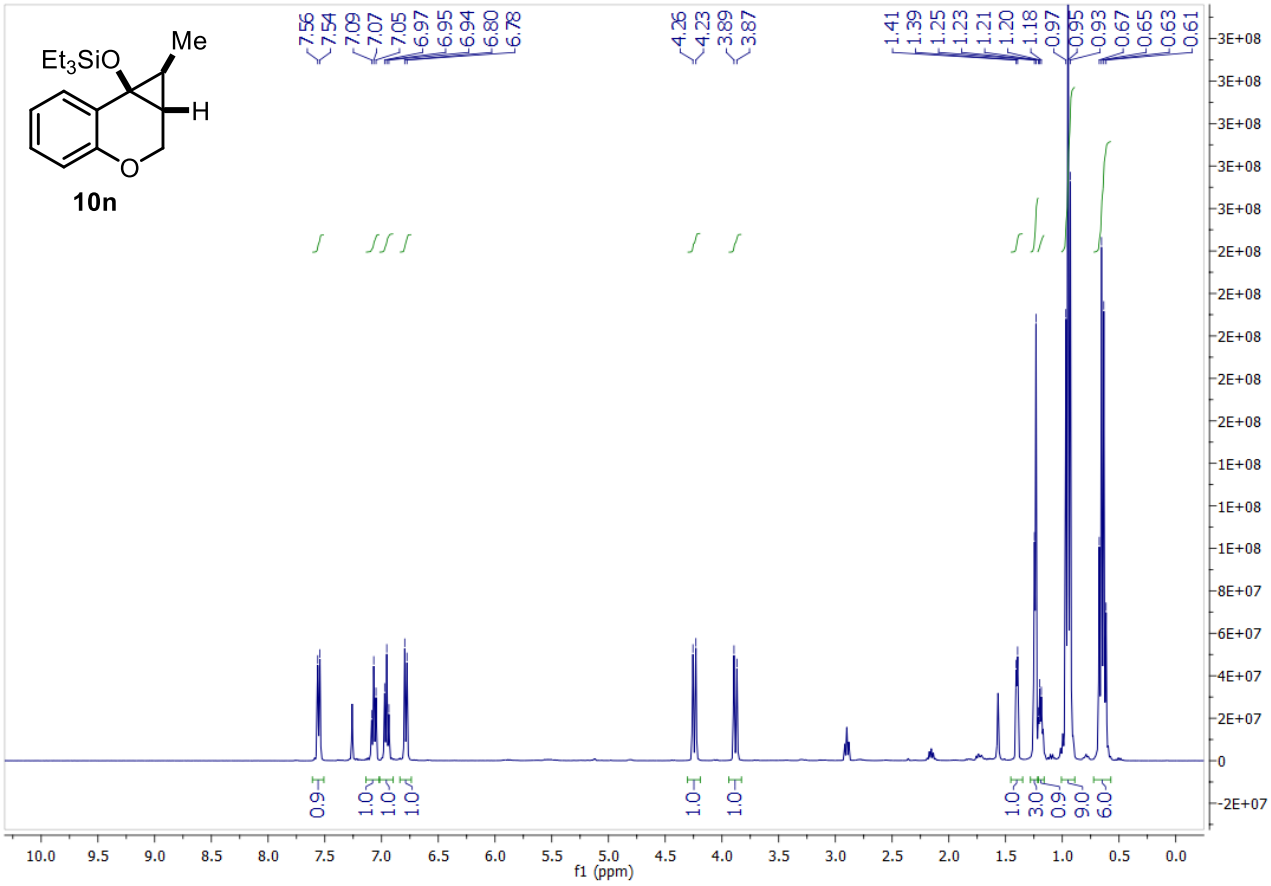

AB60a-2-p-13C
Me3SiO
CO2Me
Me
H
O
10k
168.63
148.75
130.99
128.31
127.17
125.91
116.75
60.91
58.77
51.91
31.73
31.05
20.85
1.02
f1 (ppm)

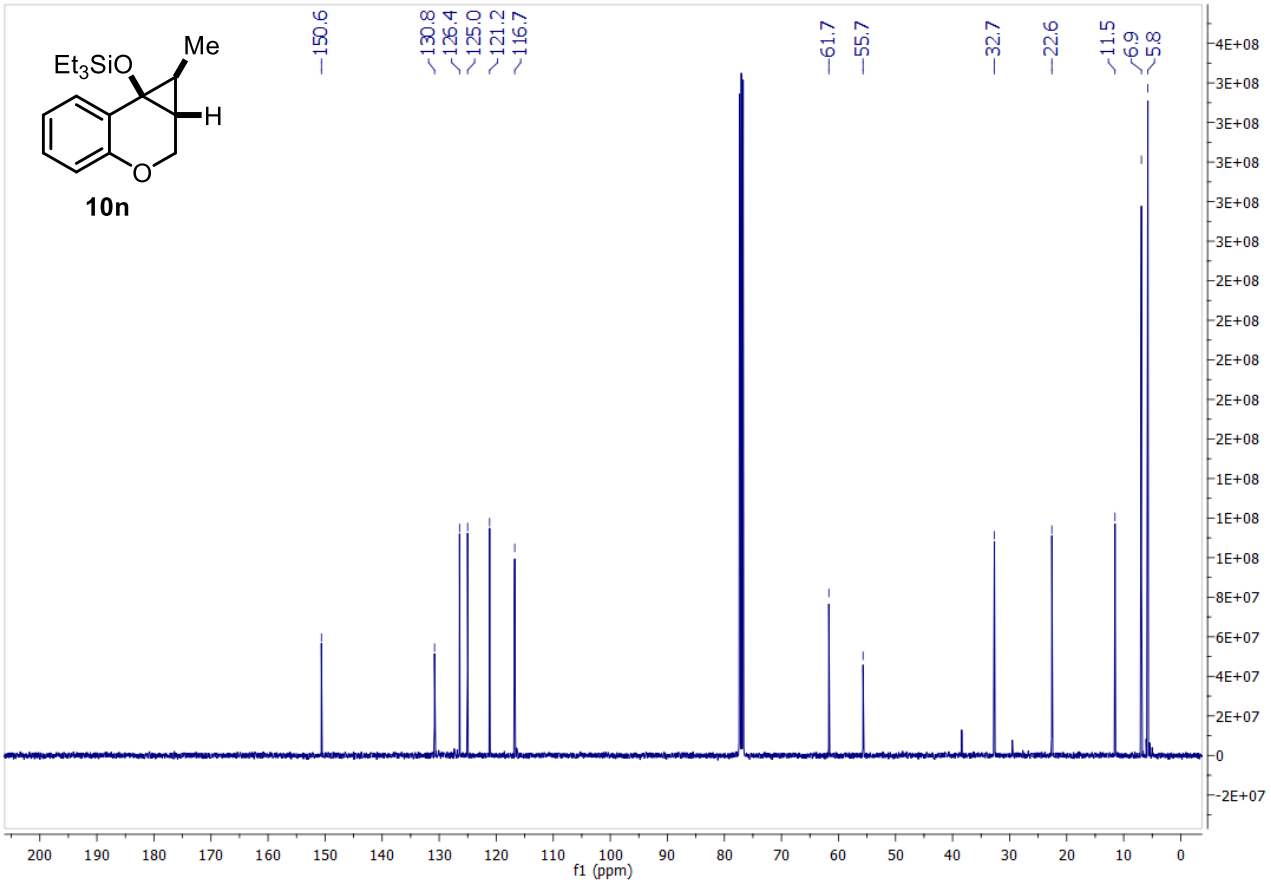

Et3SiO
H
O
10l
7.59
7.57
7.11
7.09
7.08
7.00
6.98
6.97
6.81
6.79
4.22
4.19
3.92
3.90
1.92
1.91
1.89
1.16
0.98
0.96
0.94
0.68
0.67
0.65
0.63
0.9
0.9
1.0
0.9
1.0
1.0
0.9
1.0
1.0
9.2
6.2
f1 (ppm)

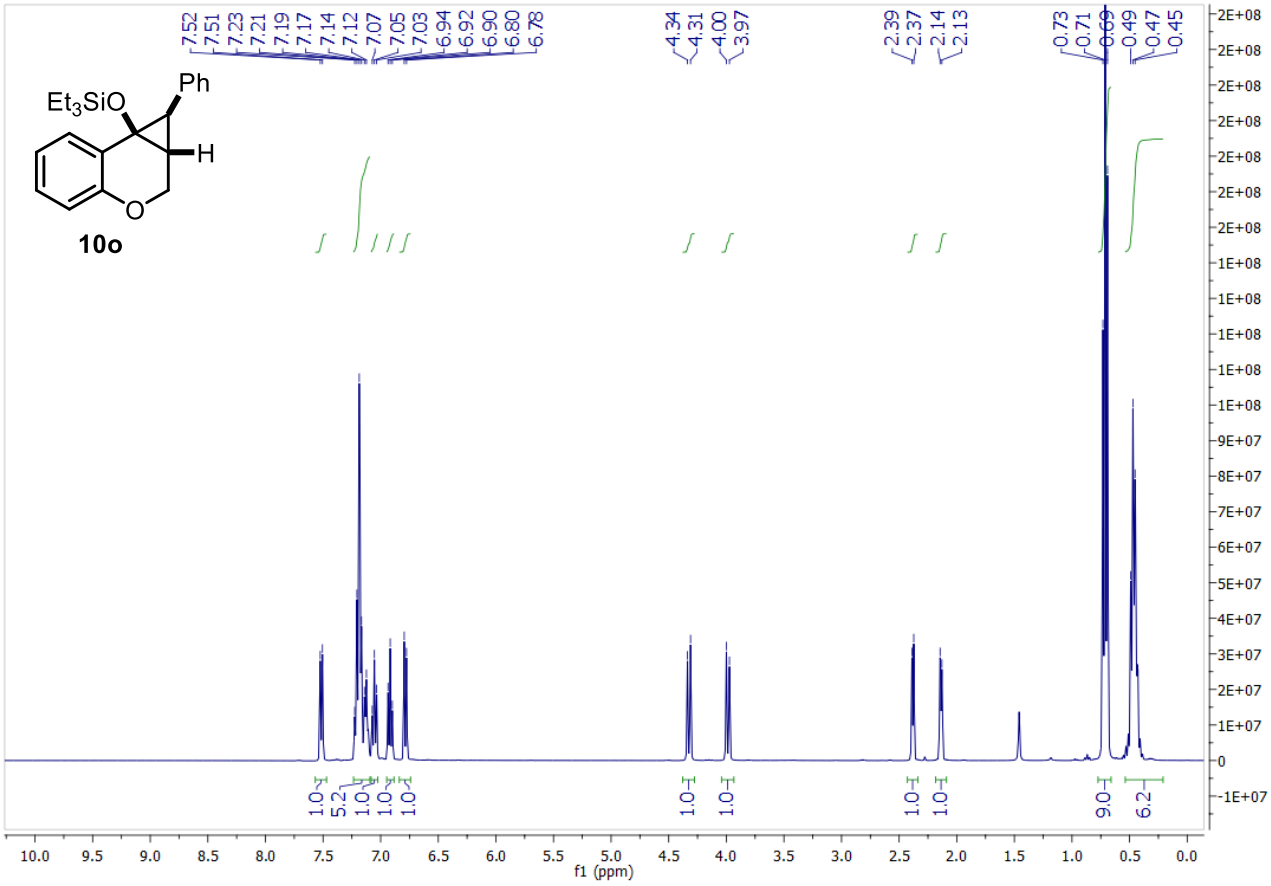

Et3SiO
H
O
10l
150.7
130.1
126.7
125.2
121.5
116.7
62.1
53.0
26.8
18.1
6.9
5.8
f1 (ppm)

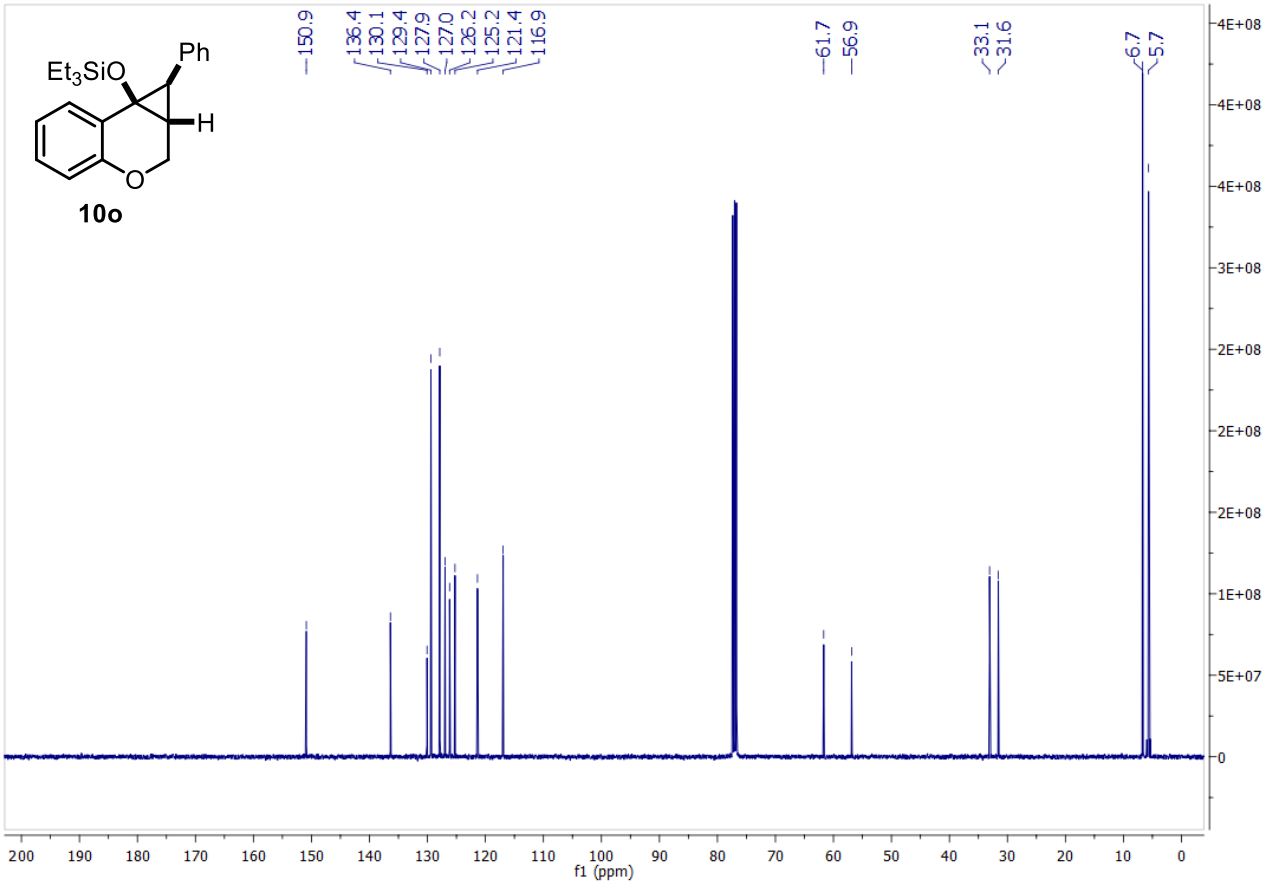

Et3SiO
Me
Me
H
O
10m
7.52
7.51
7.11
7.09
7.07
6.95
6.93
6.91
6.76
6.74
4.33
4.32
4.30
4.29
4.25
4.22
1.30
1.27
1.26
0.91
0.89
0.87
0.59
0.57
0.55
0.53
1.0
1.0
1.0
1.0
1.0
1.0
2.9
1.0
12.0
6.1
f1 (ppm)

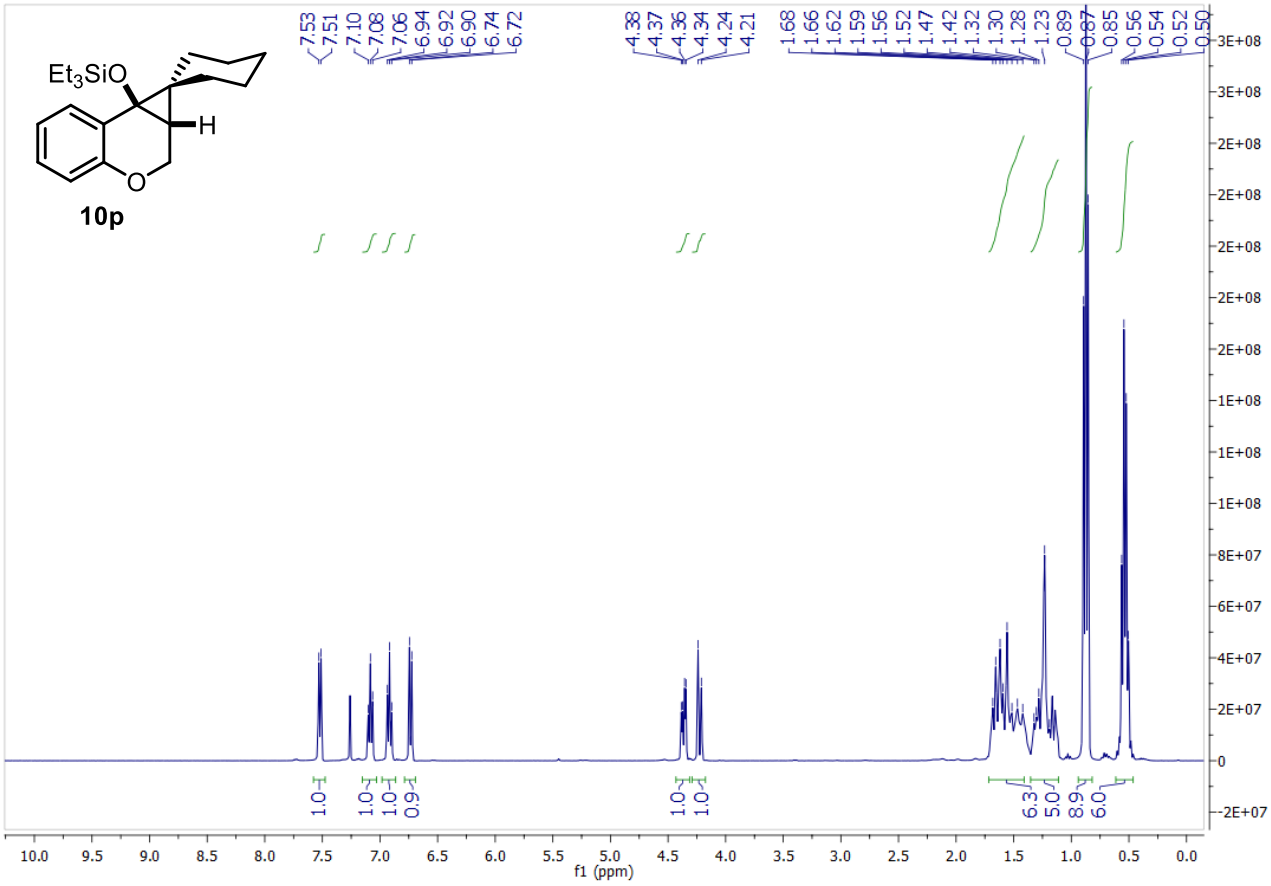

Et3SiO
Me
Me
H
O
10m
151.2
127.4
127.2
125.9
120.7
116.2
61.8
58.2
31.8
28.2
22.2
16.3
6.8
5.5
f1 (ppm)

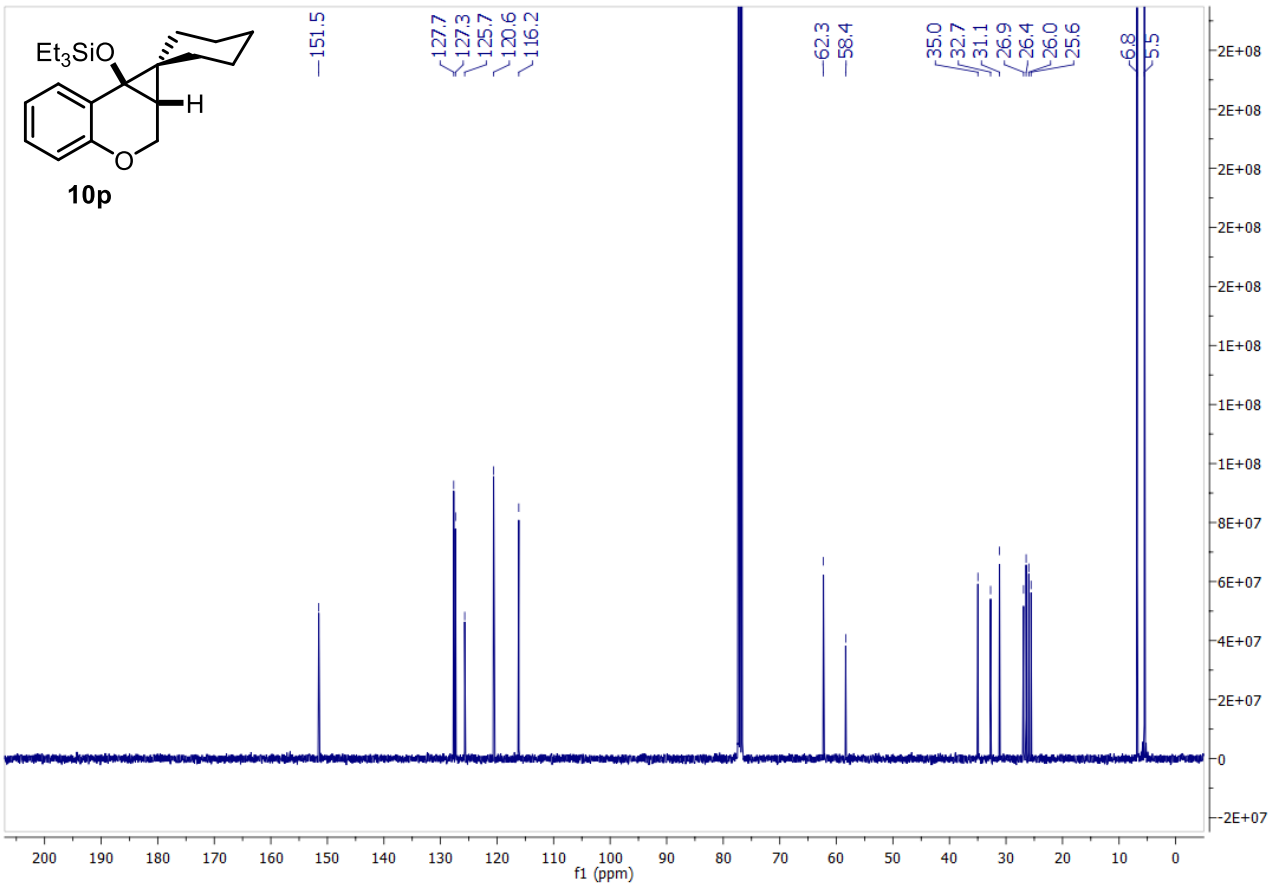

Et3SiO
Me
H
O
10n
7.56
7.54
7.09
7.07
7.05
6.97
6.95
6.94
6.80
6.78
4.26
4.23
3.89
3.87
1.41
1.39
1.25
1.23
1.21
1.20
1.18
0.97
0.95
0.93
0.67
0.65
0.63
0.61
0.9
1.0
1.0
1.0
1.0
1.0
1.0
3.0
0.9
9.0
6.0
f1 (ppm)

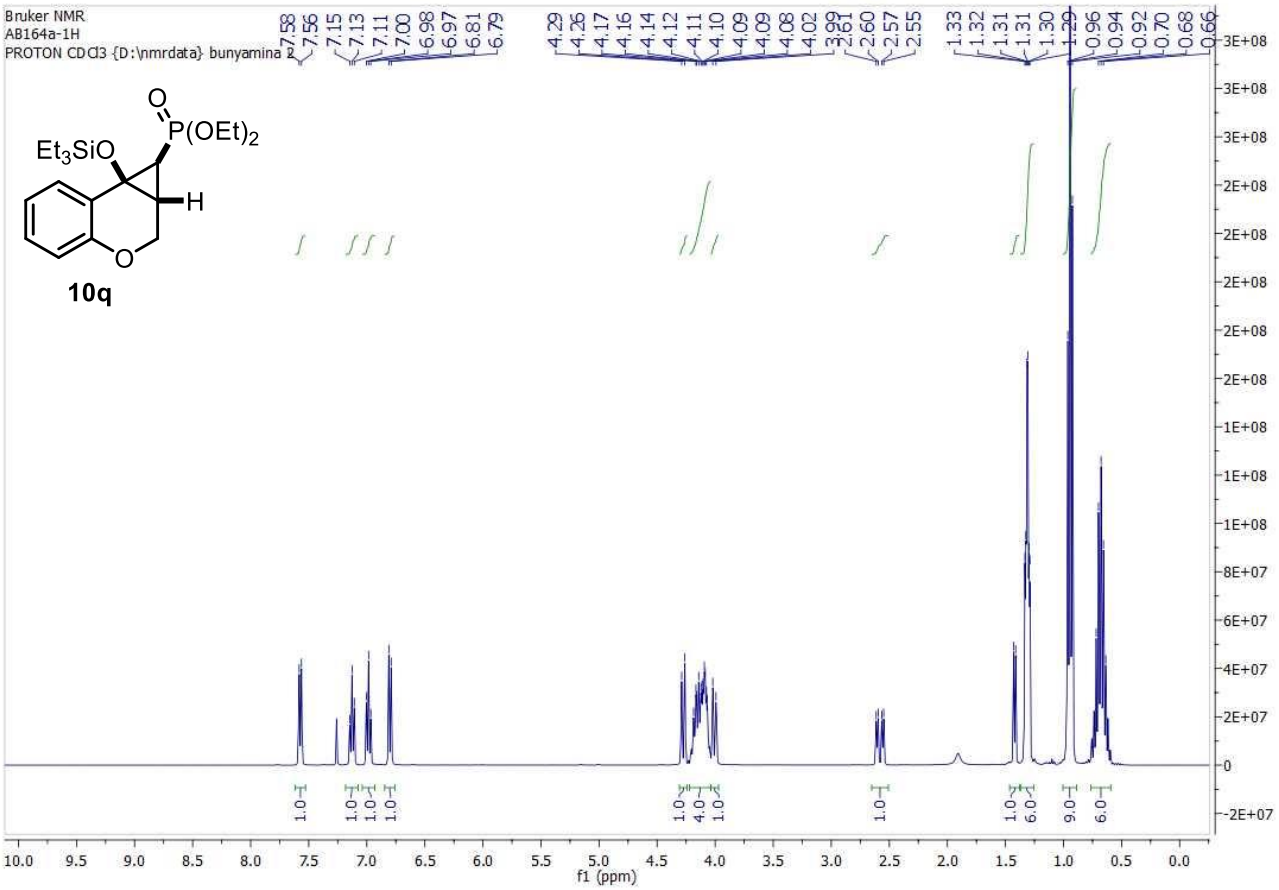

Et3SiO
Me
H
O
10n
150.6
130.8
126.4
125.0
121.2
116.7
61.7
55.7
32.7
22.6
11.5
6.9
5.8
f1 (ppm)

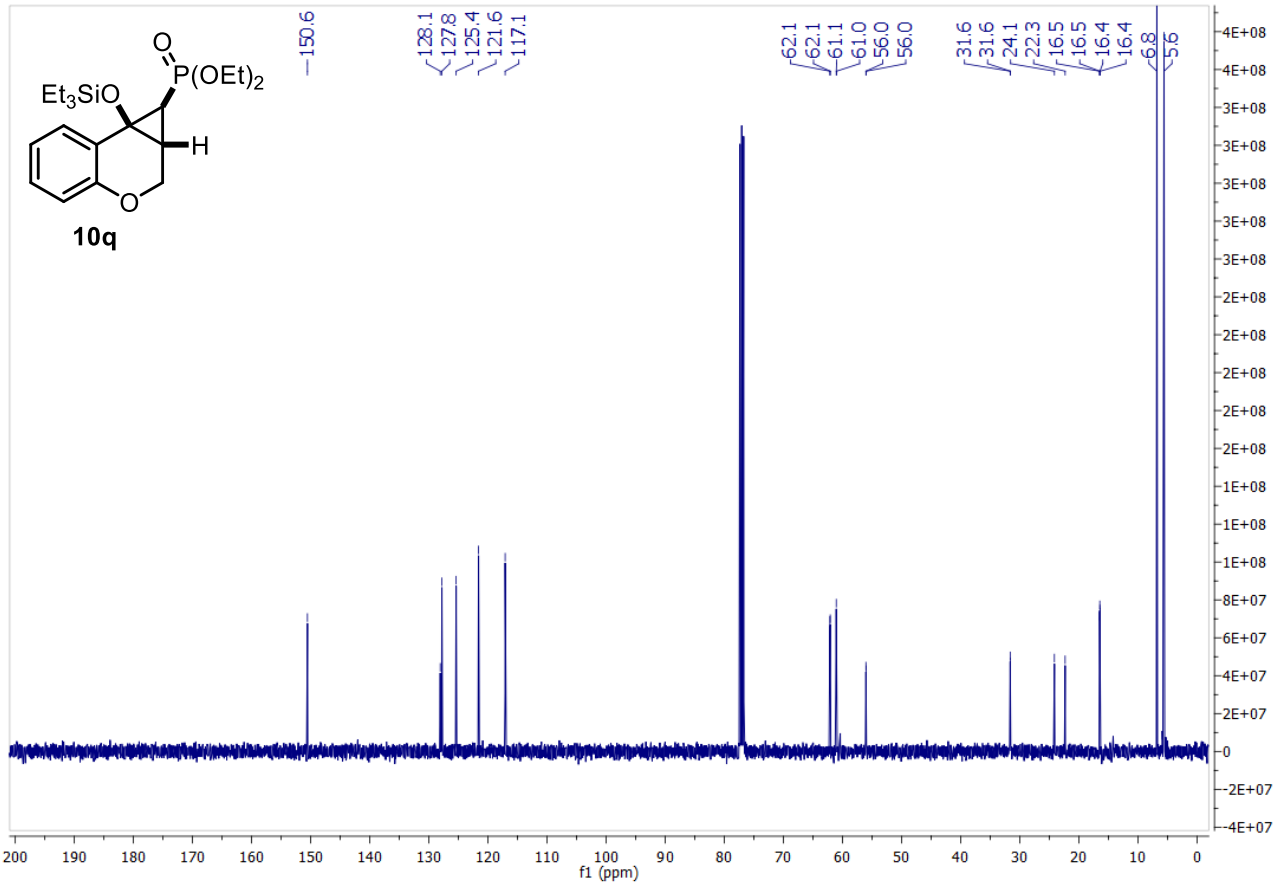

7.52
7.51
7.23
7.21
7.19
7.17
7.14
7.12
7.07
7.05
7.03
6.94
6.92
6.90
6.80
6.78
4.34
4.31
4.00
3.97
2.39
2.37
2.14
2.13
0.73
0.71
0.69
0.49
0.47
0.45
Et3SiO
Ph
H
O
10o
1.0
5.2
1.0
1.0
1.0
1.0
1.0
1.0
1.0
9.0
6.2
f1 (ppm)

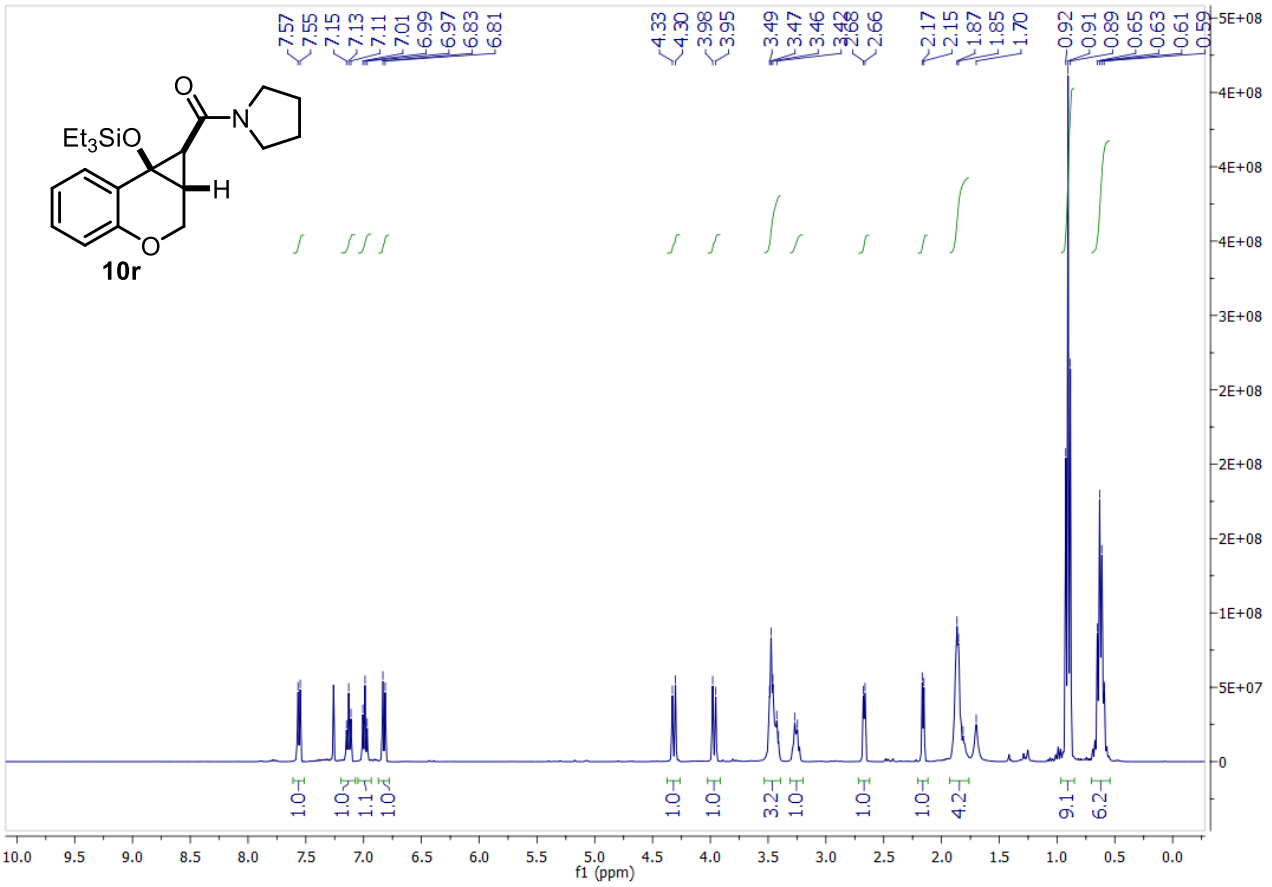

150.9
136.4
130.1
129.4
127.9
127.0
126.2
125.2
121.4
116.9
61.7
56.9
33.1
31.6
6.7
5.7
Et3SiO
Ph
H
O
10o
f1 (ppm)

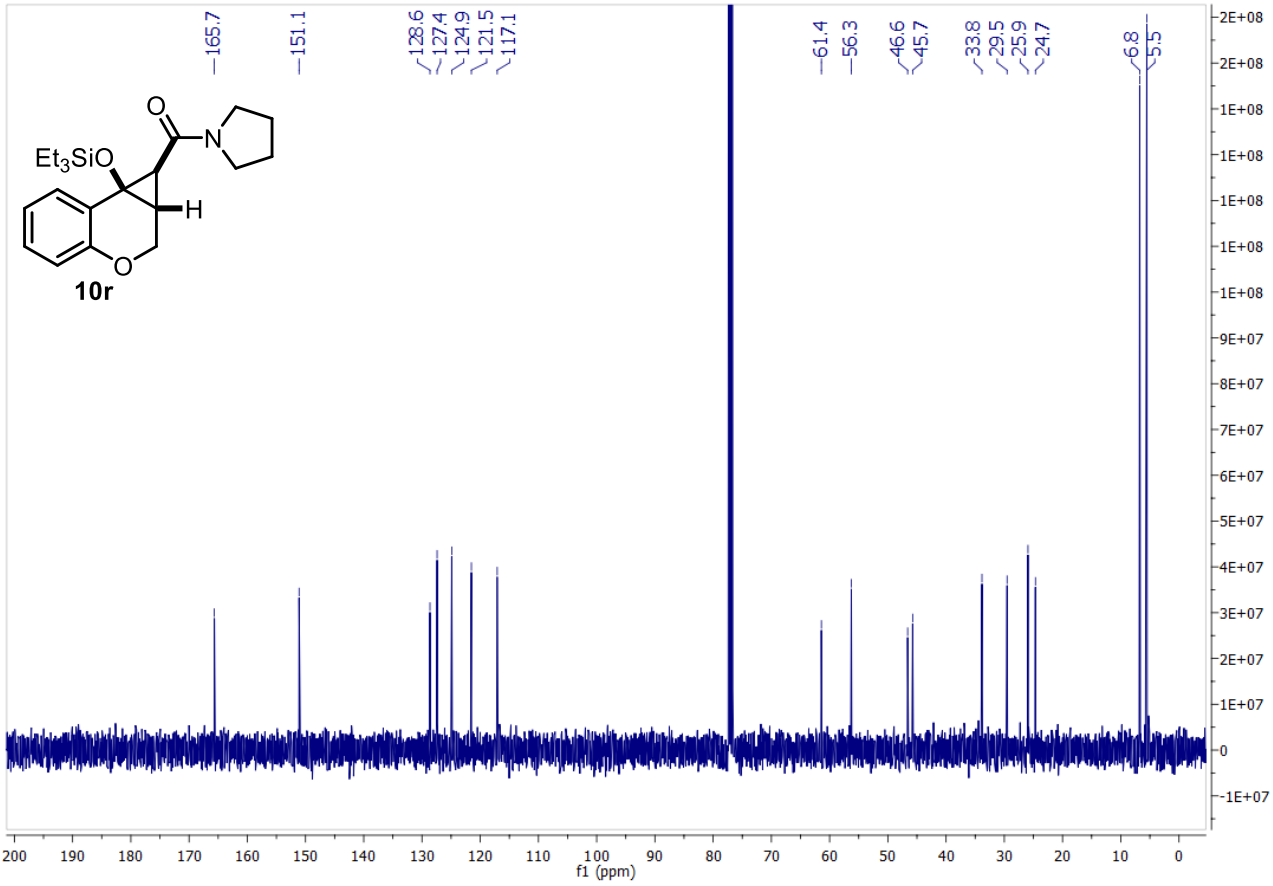

Et3SiO
H
O
10p
7.53
7.51
7.10
7.08
7.06
6.94
6.92
6.90
6.74
6.72
4.38
4.37
4.36
4.34
4.24
4.21
1.68
1.66
1.62
1.59
1.56
1.52
1.47
1.42
1.32
1.30
1.28
1.23
0.89
0.87
0.85
0.56
0.54
0.52
0.50
1.0
1.0
1.0
0.9
1.0
1.0
6.3
5.0
8.9
6.0
f1 (ppm)

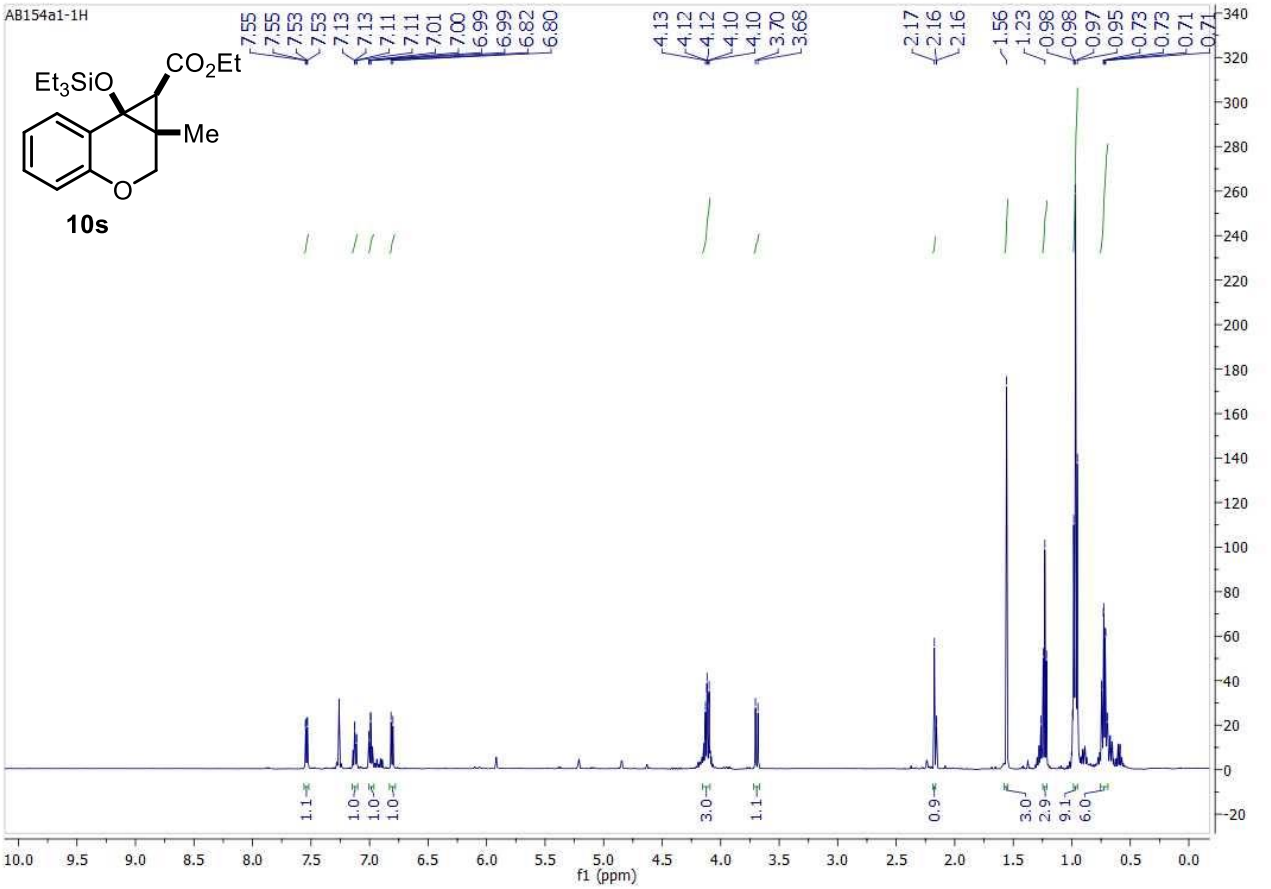

Et3SiO
H
O
10p
151.5
127.7
127.3
125.7
120.6
116.2
62.3
58.4
35.0
32.7
31.1
26.9
26.4
26.0
25.6
6.8
5.5
f1 (ppm)

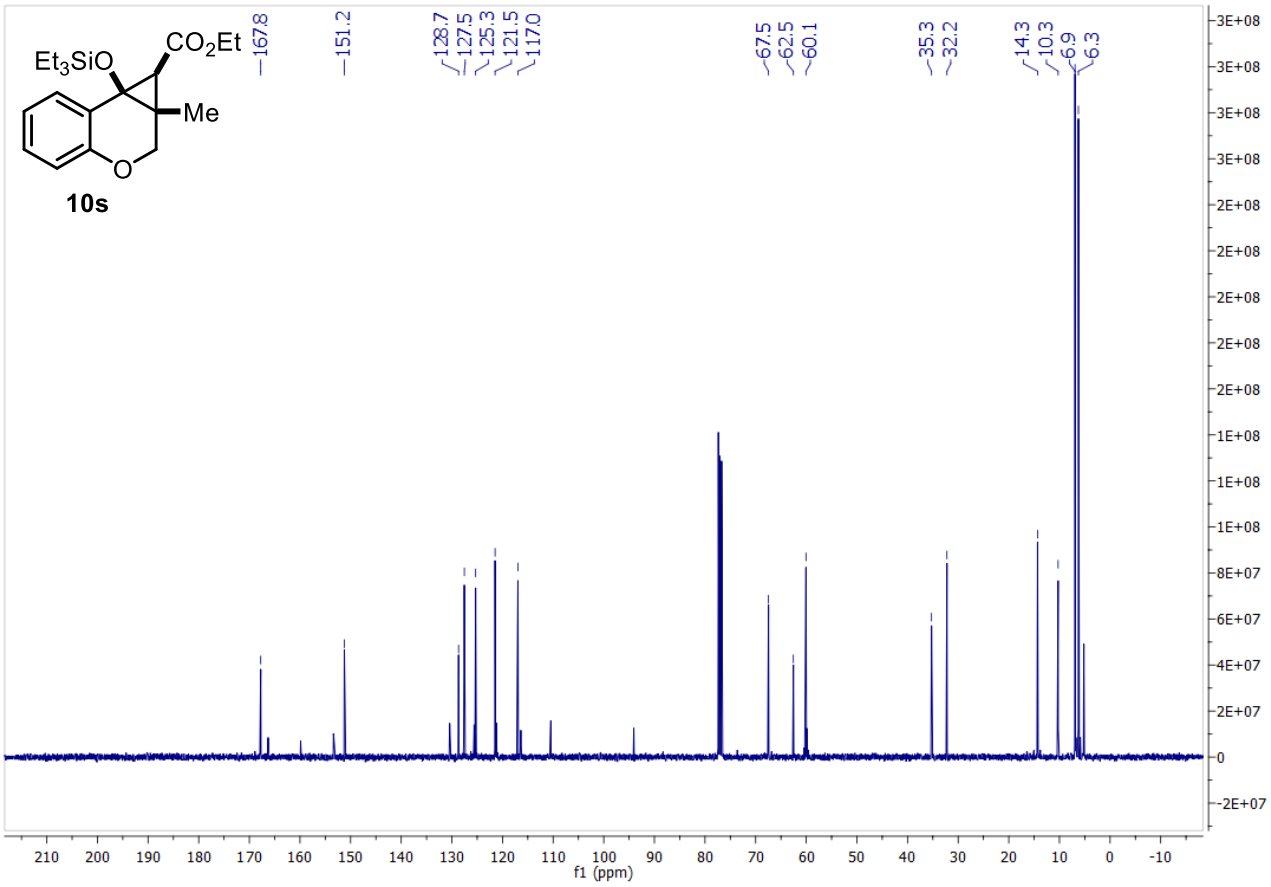

Bruker NMR
AB164a-1H
PROTON CDCl3 {D:\nmrdata} bunyamina 2
Et3SiO
P(OEt)2
H
O
10q
f1 (ppm)

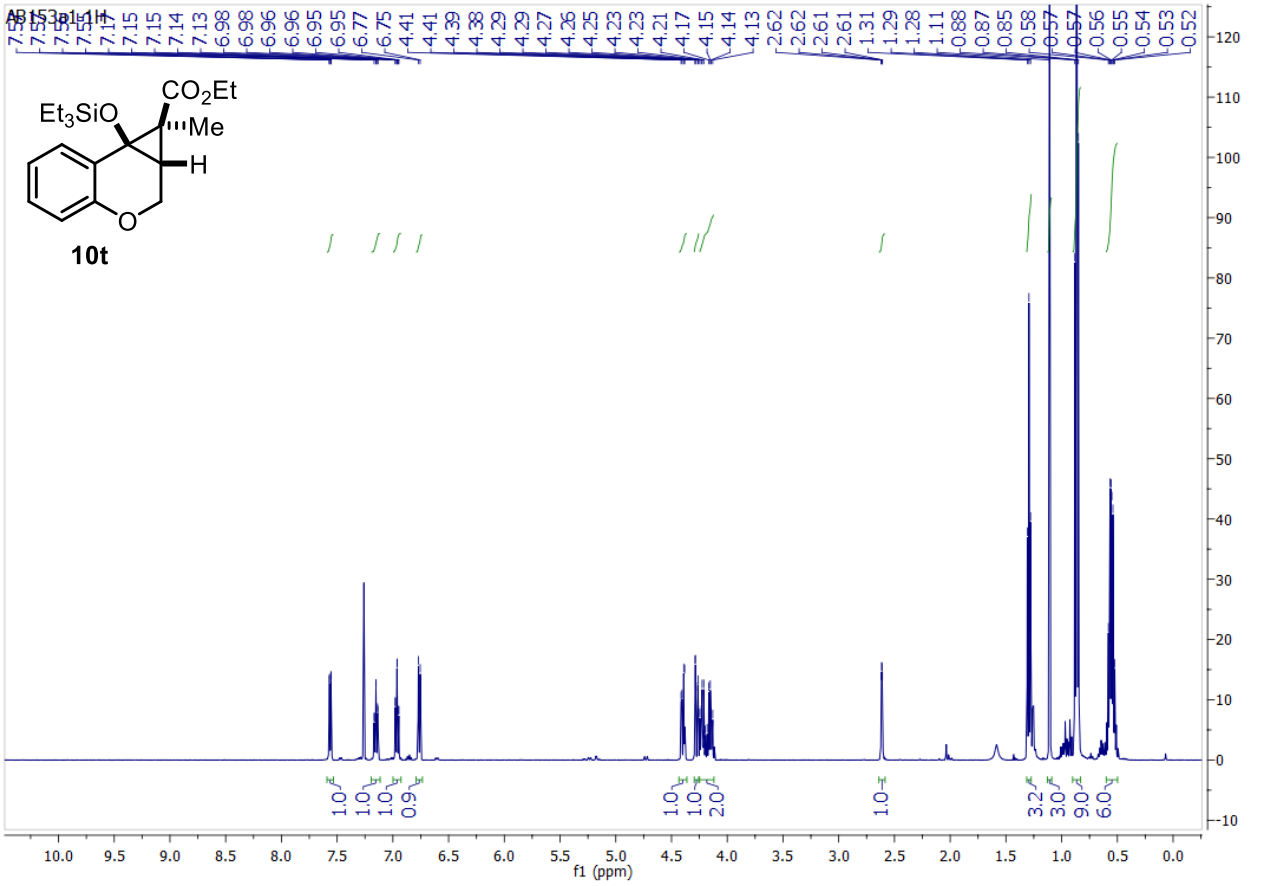

Et3SiO
P(OEt)2
H
O
10q
f1 (ppm)

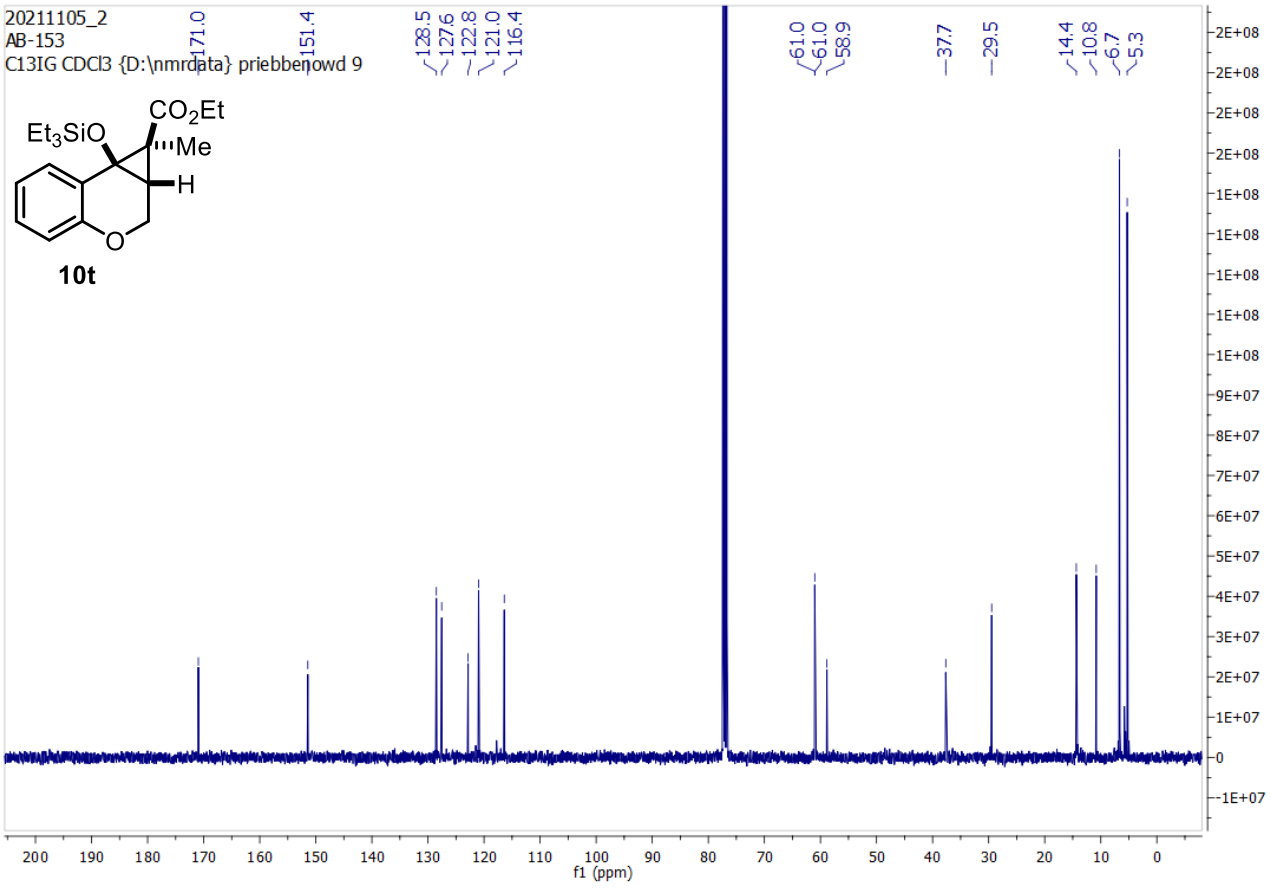

Et3SiO
O
N
H
O
10r
7.57
7.55
7.15
7.13
7.11
7.01
6.99
6.97
6.83
6.81
4.33
4.30
3.98
3.95
3.49
3.47
3.46
2.66
2.17
2.15
1.87
1.85
1.70
0.92
0.91
0.89
0.65
0.63
0.61
0.59
1.0
1.0
1.1
1.0
1.0
1.0
3.2
1.0
1.0
1.0
4.2
9.1
6.2
f1 (ppm)

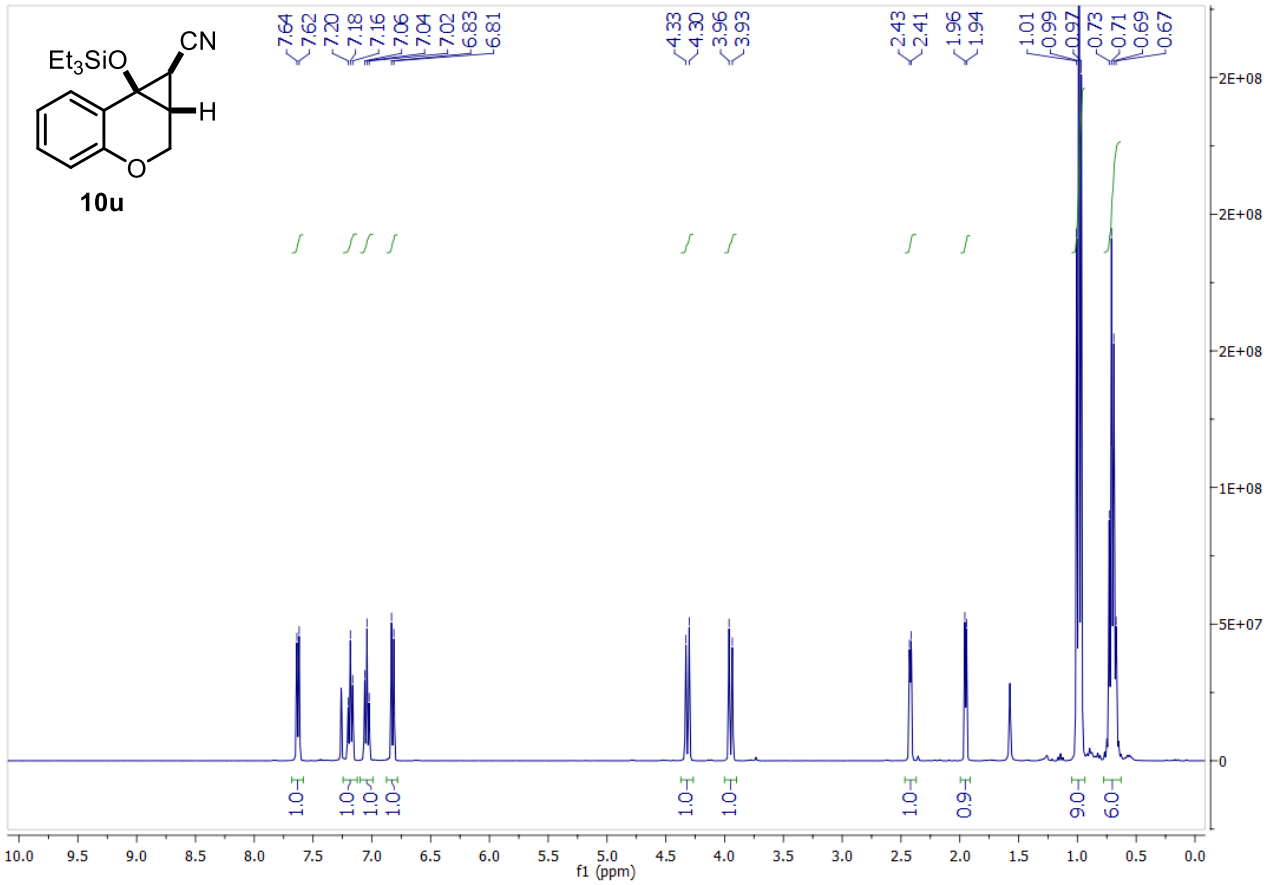

Et3SiO
O
N
H
O
10r
165.7
151.1
128.6
127.4
124.9
121.5
117.1
61.4
56.3
46.6
45.7
33.8
29.5
25.9
24.7
6.8
5.5
f1 (ppm)

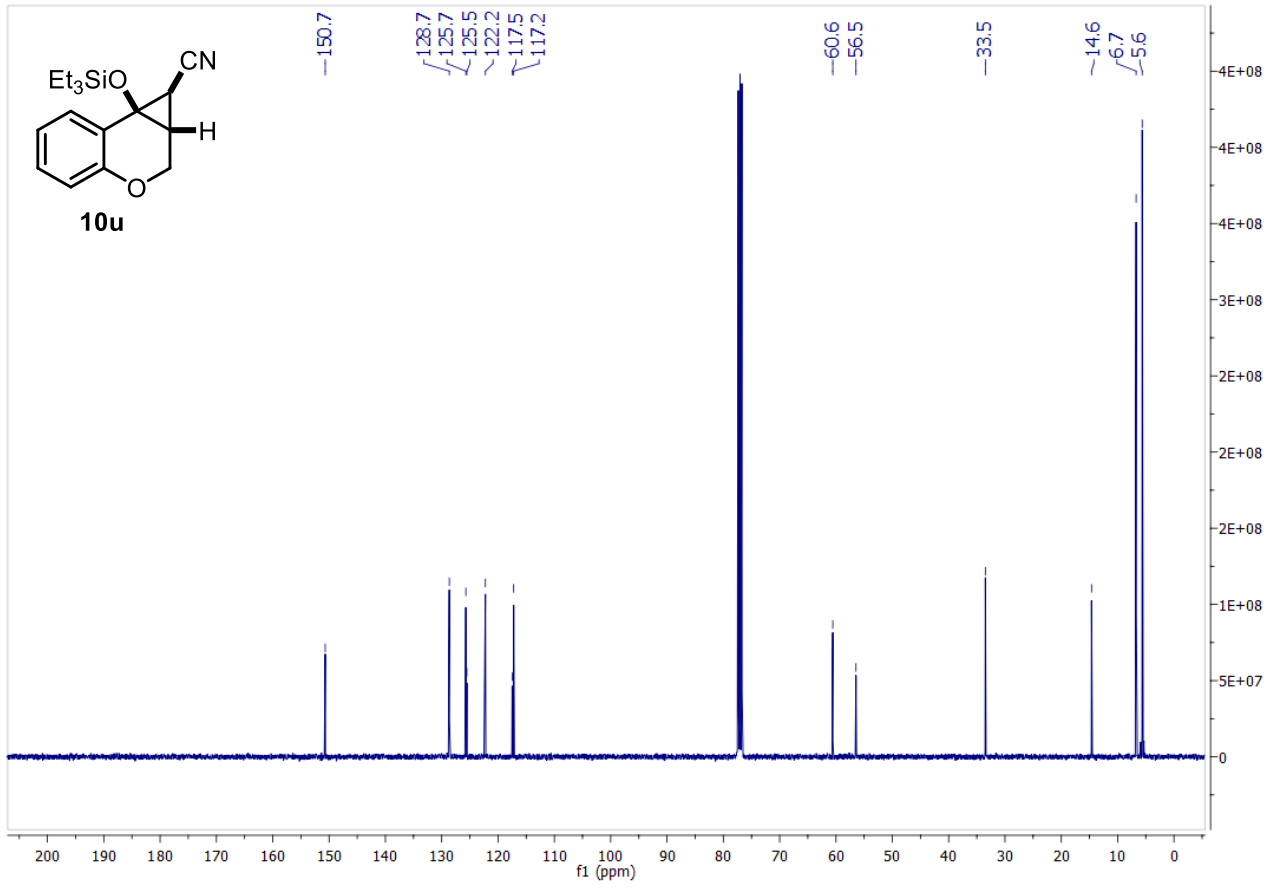

AB154a1-1H
Et3SiO
CO2Et
Me
O
10s
7.55
7.55
7.53
7.53
7.13
7.13
7.11
7.11
7.01
7.00
6.99
6.99
6.82
6.80
4.13
4.12
4.12
4.10
4.10
3.70
3.68
2.17
2.16
2.16
1.56
1.23
0.98
0.98
0.97
0.95
0.73
0.73
0.71
0.71
1.1
1.0
1.0
1.0
3.0
1.1
0.9
3.0
2.9
9.1
6.0
f1 (ppm)

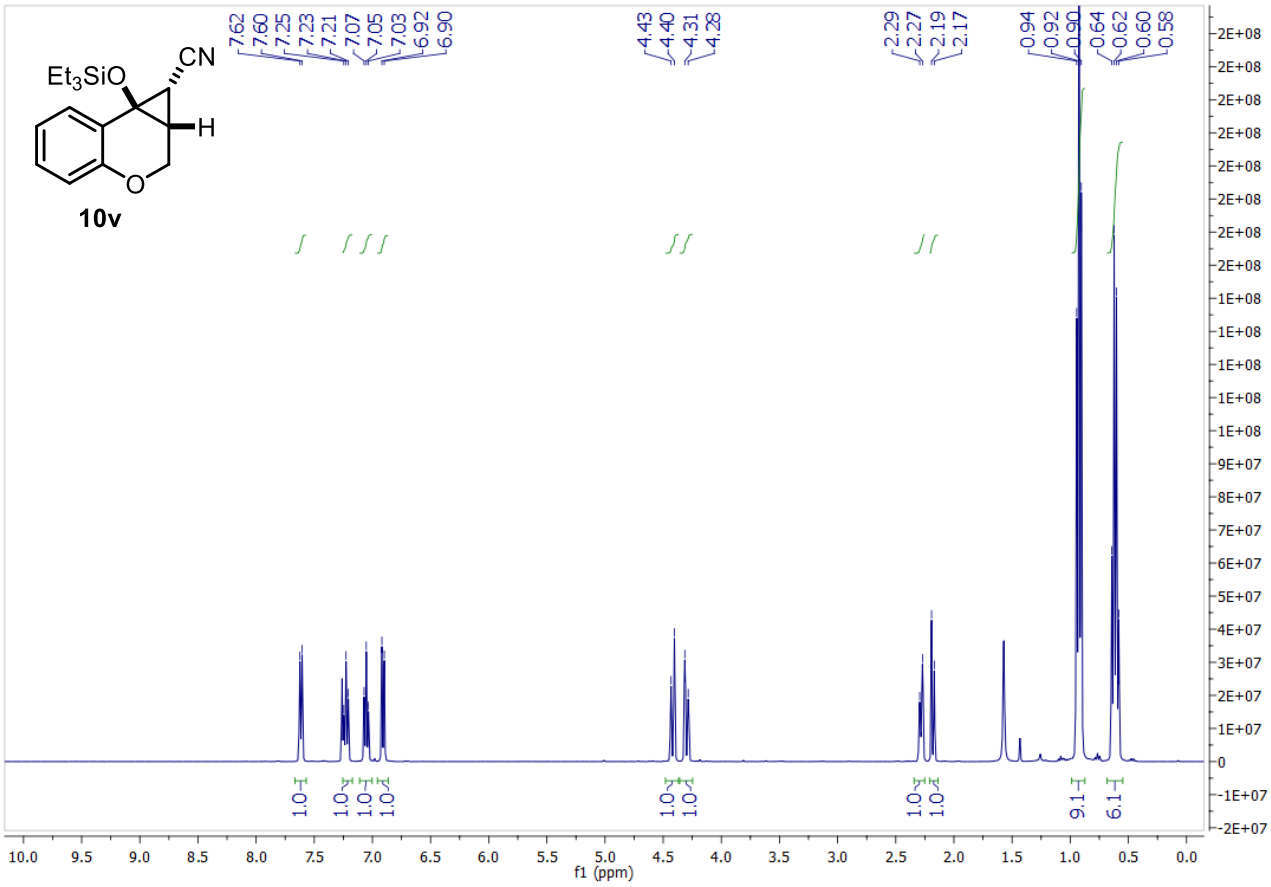

Et3SiO
CO2Et
Me
O
10s
167.8
151.2
128.7
127.5
125.3
121.5
117.0
67.5
62.5
60.1
35.3
32.2
14.3
10.3
6.9
6.3
f1 (ppm)

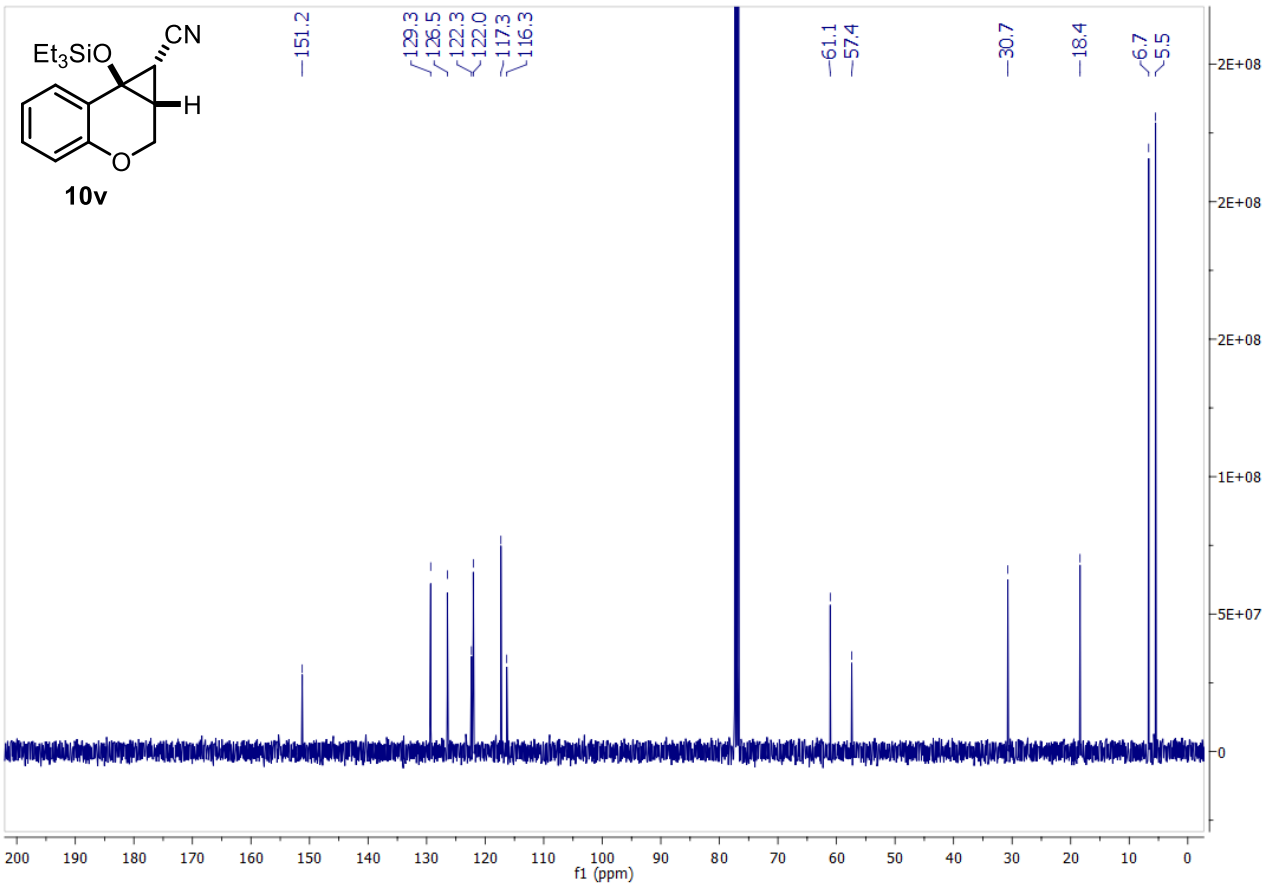

AB153a1+1H
Et3SiO
CO2Et
Me
H
O
10t
f1 (ppm)

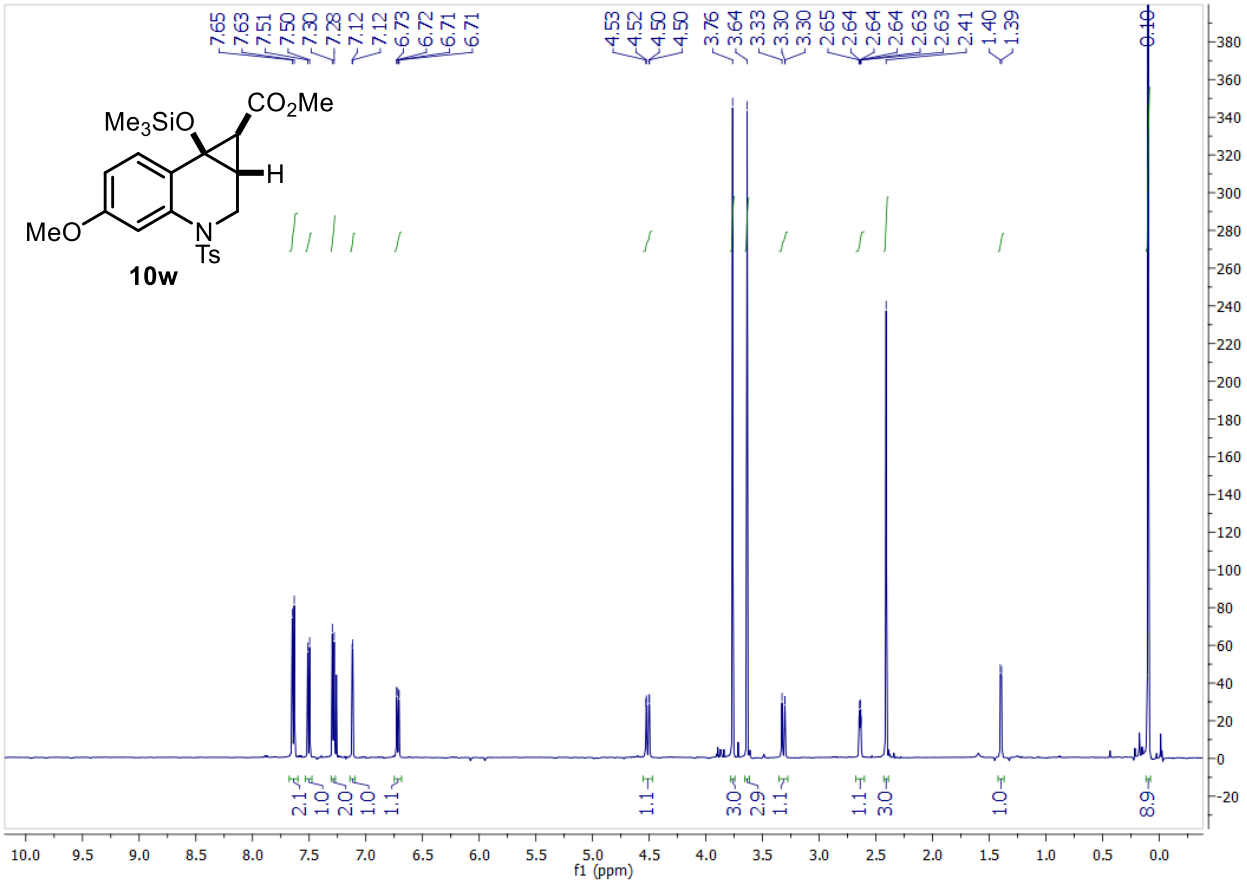

20211105_2
AB-153
C13IG CDCl3 {D:\nmrdata} priebbenowd 9
171.0
151.4
128.5
127.6
122.8
121.0
116.4
61.0
61.0
58.9
37.7
29.5
14.4
10.8
6.7
5.3
Et3SiO
CO2Et
Me
H
O
10t
f1 (ppm)

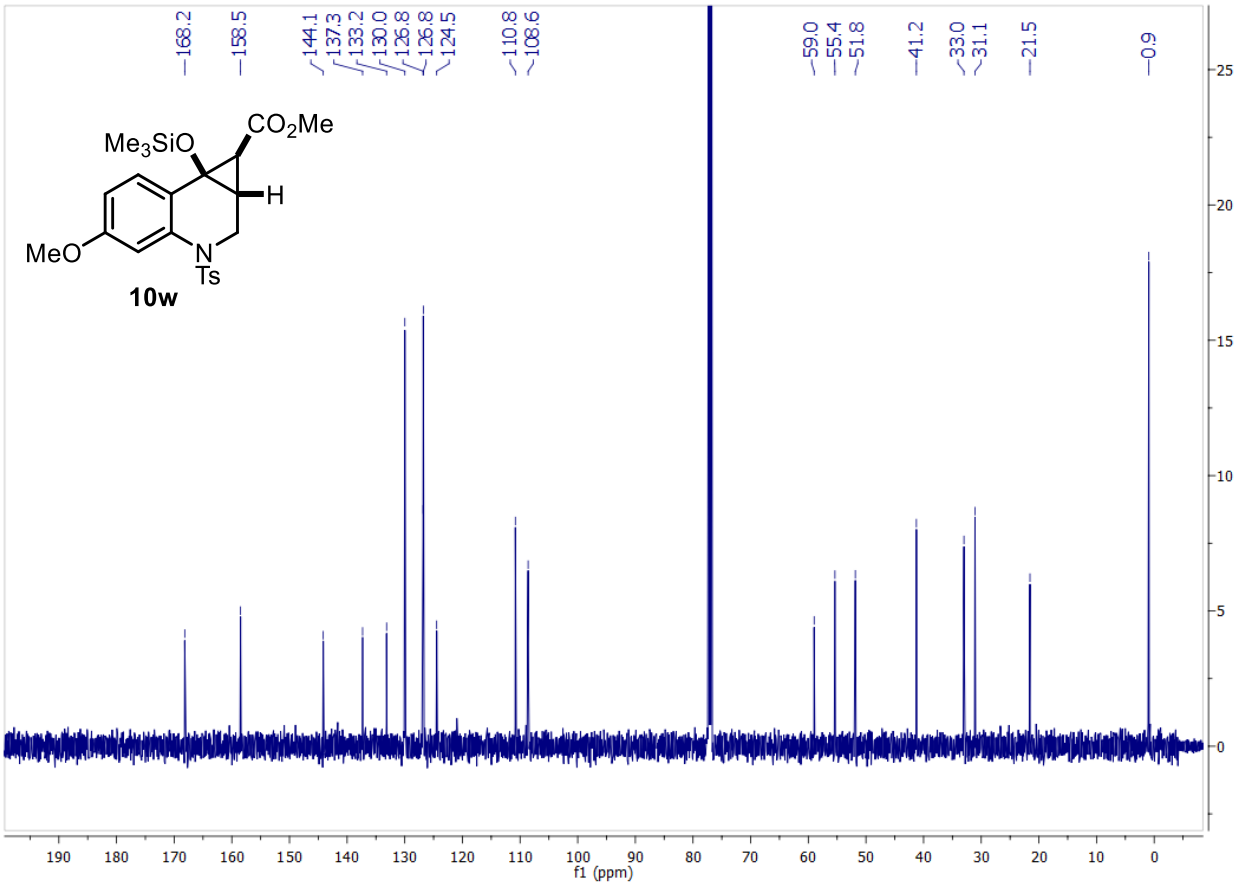

Et3SiO
CN
H
O
10u
7.64
7.62
7.20
7.18
7.16
7.06
7.04
7.02
6.83
6.81
4.33
4.30
3.96
3.93
2.43
2.41
1.96
1.94
1.01
0.99
0.97
0.73
0.71
0.69
0.67
1.0
1.0
1.0
1.0
1.0
1.0
1.0
0.9
9.0
6.0
f1 (ppm)

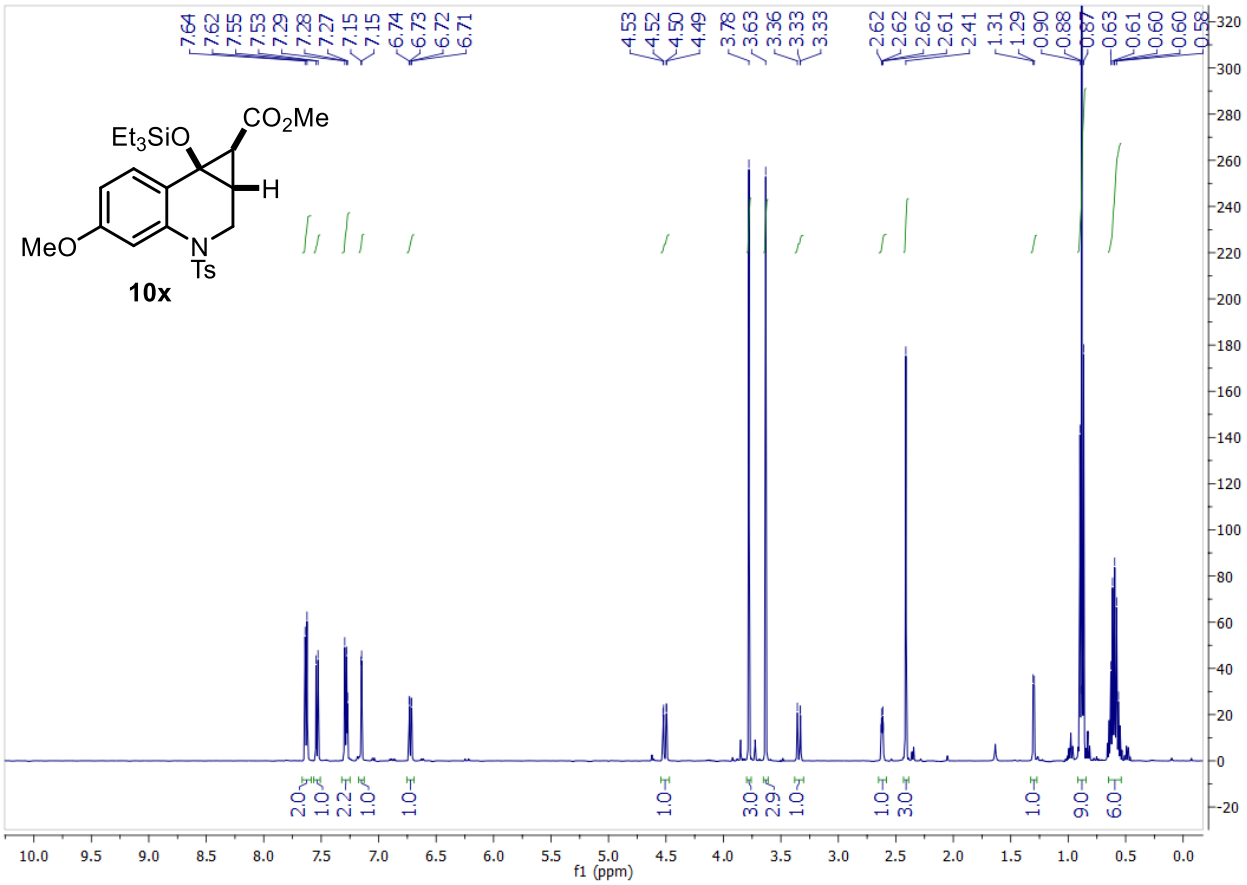

Et3SiO
CN
H
O
10u
150.7
128.7
125.7
125.5
122.2
117.5
117.2
60.6
56.5
33.5
14.6
6.7
5.6
f1 (ppm)

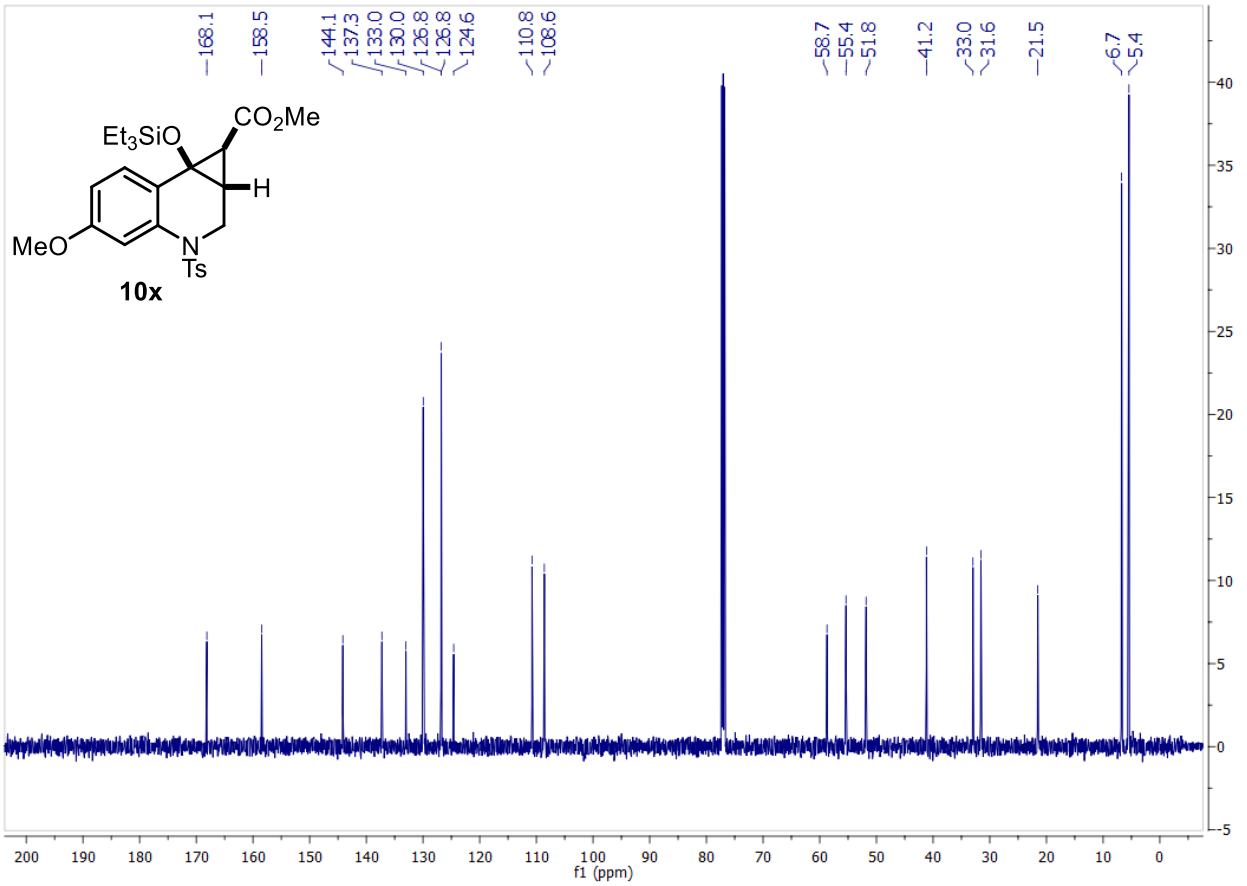

Et3SiO
CN
H
O
10v
7.62
7.60
7.25
7.23
7.21
7.07
7.05
7.03
6.92
6.90
4.43
4.40
4.31
4.28
2.29
2.27
2.19
2.17
0.94
0.92
0.90
0.64
0.62
0.60
0.58
1.0
1.0
1.0
1.0
1.0
1.0
1.0
9.1
6.1
f1 (ppm)

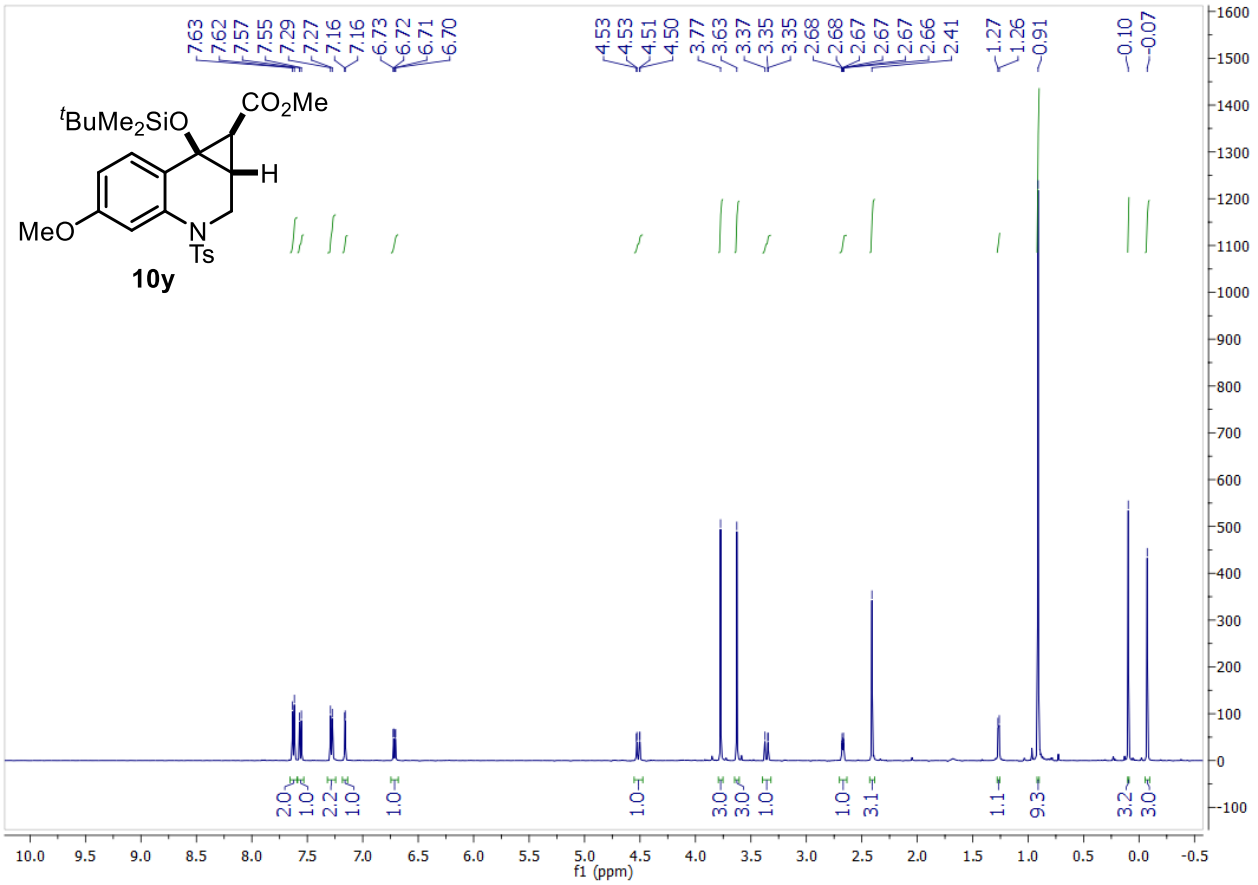

Et3SiO
CN
H
O
10v
151.2
129.3
126.5
122.3
122.0
117.3
116.3
61.1
57.4
30.7
18.4
6.7
5.5
f1 (ppm)

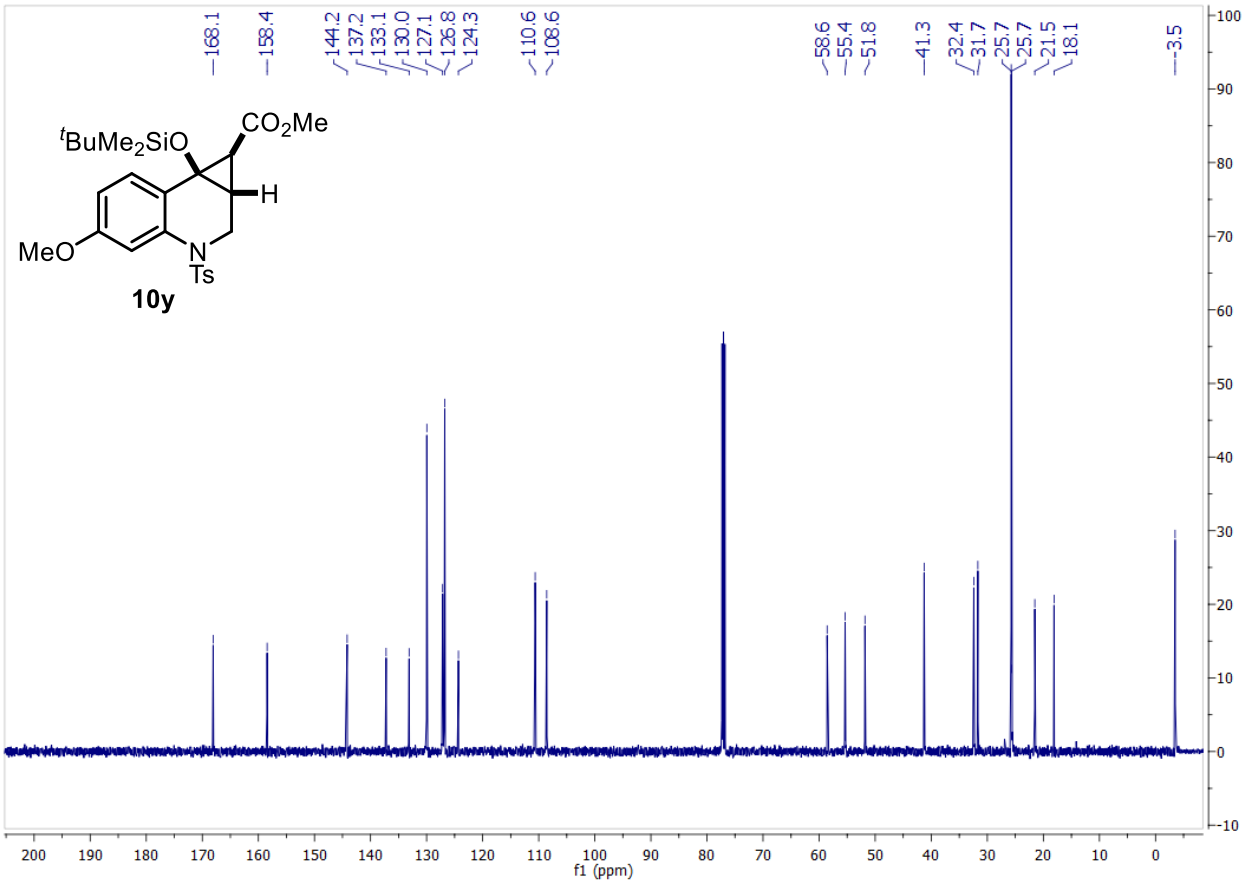

7.65
7.63
7.51
7.50
7.30
7.28
7.12
7.12
6.73
6.72
6.71
6.71
4.53
4.52
4.50
4.50
3.76
3.64
3.33
3.30
3.30
2.65
2.64
2.64
2.64
2.63
2.63
2.41
1.40
1.39
0.10
Me3SiO
CO2Me
H
MeO
N
Ts
10w
2.1
1.0
2.0
1.0
1.1
1.1
3.0
2.9
1.1
1.1
3.0
1.0
8.9
f1 (ppm)

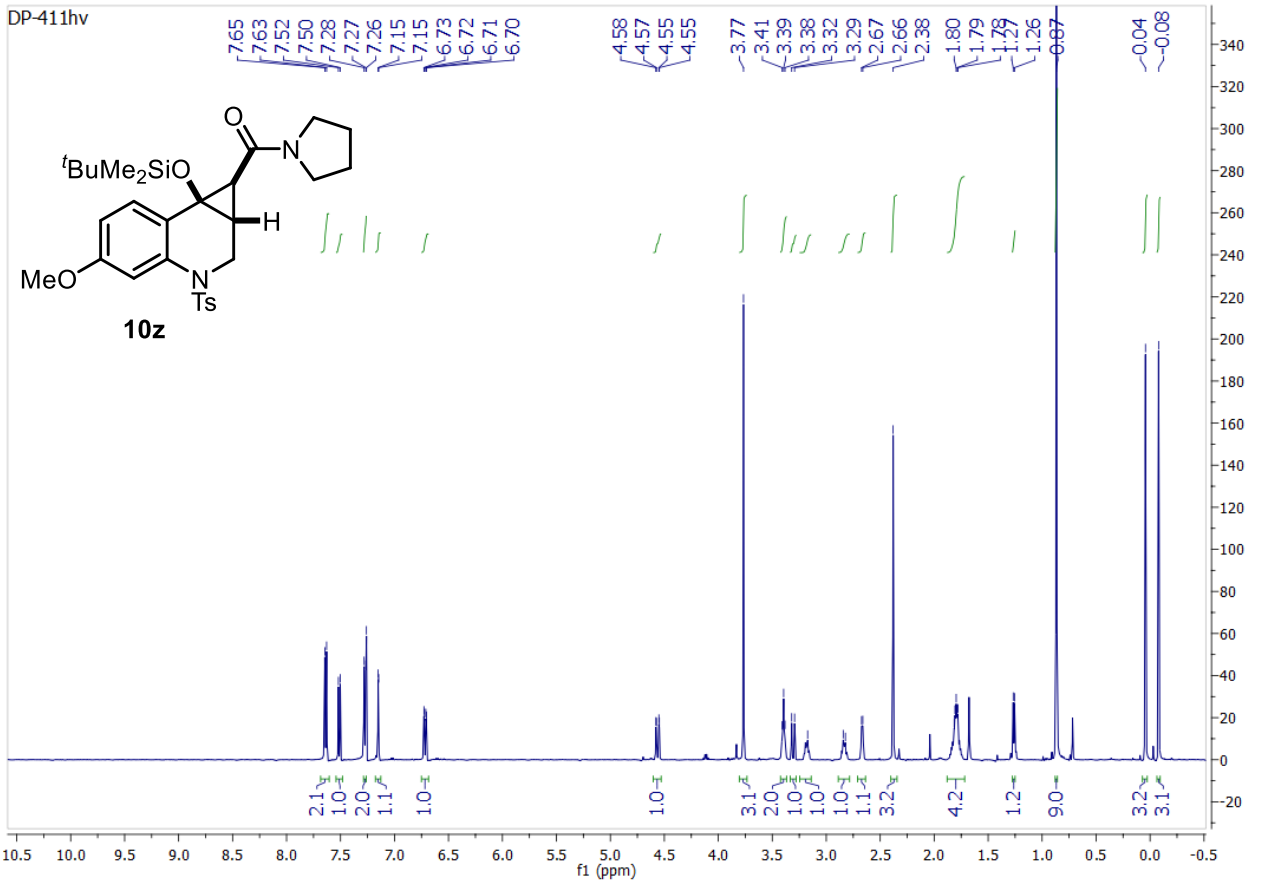

168.2
158.5
144.1
137.3
133.2
130.0
126.8
126.8
124.5
110.8
108.6
59.0
55.4
51.8
41.2
33.0
31.1
21.5
0.9
Me3SiO
CO2Me
H
MeO
N
Ts
10w
f1 (ppm)

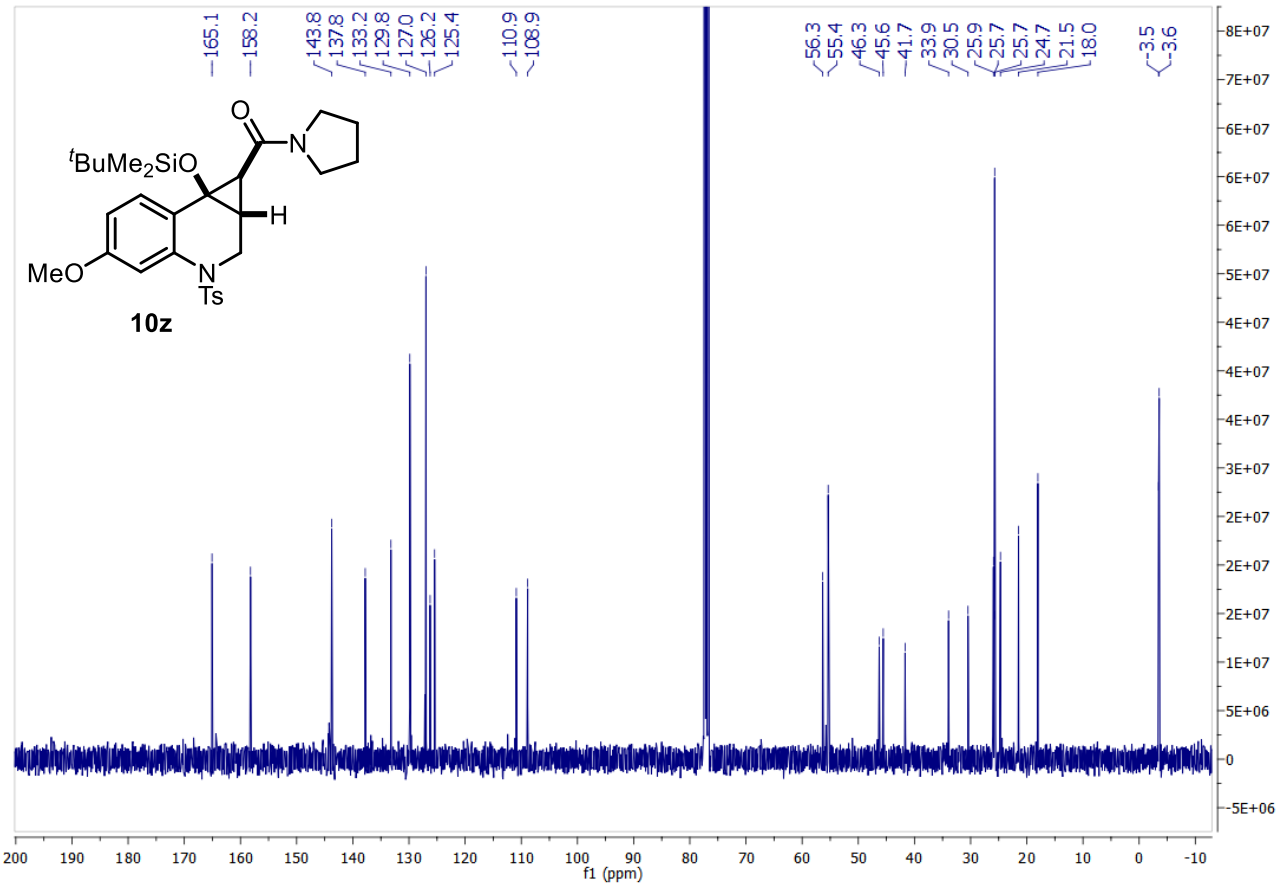

7.64
7.62
7.55
7.53
7.29
7.28
7.27
7.15
7.15
6.74
6.73
6.72
6.71
4.53
4.52
4.50
4.49
3.78
3.63
3.36
3.33
3.33
2.62
2.62
2.62
2.61
2.41
1.31
1.29
0.90
0.88
0.87
0.63
0.61
0.60
0.60
0.58
Et3SiO
CO2Me
H
MeO
N
Ts
10x
2.0
1.0
2.2
1.0
1.0
1.0
3.0
2.9
1.0
1.0
3.0
1.0
9.0
6.0
f1 (ppm)

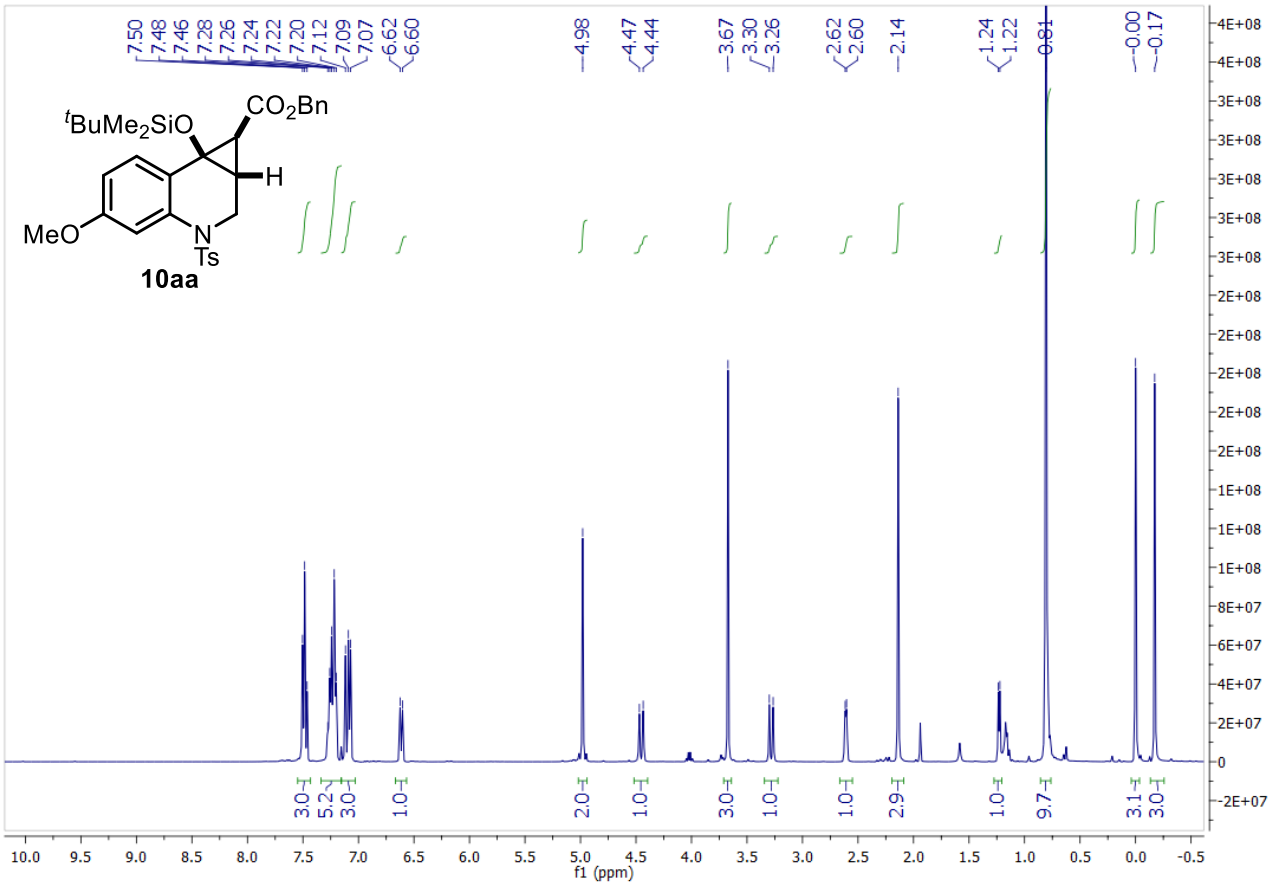

168.1
158.5
144.1
137.3
133.0
130.0
126.8
126.8
124.6
110.8
108.6
58.7
55.4
51.8
41.2
33.0
31.6
21.5
6.7
5.4
Et3SiO
CO2Me
H
MeO
N
Ts
10x
f1 (ppm)

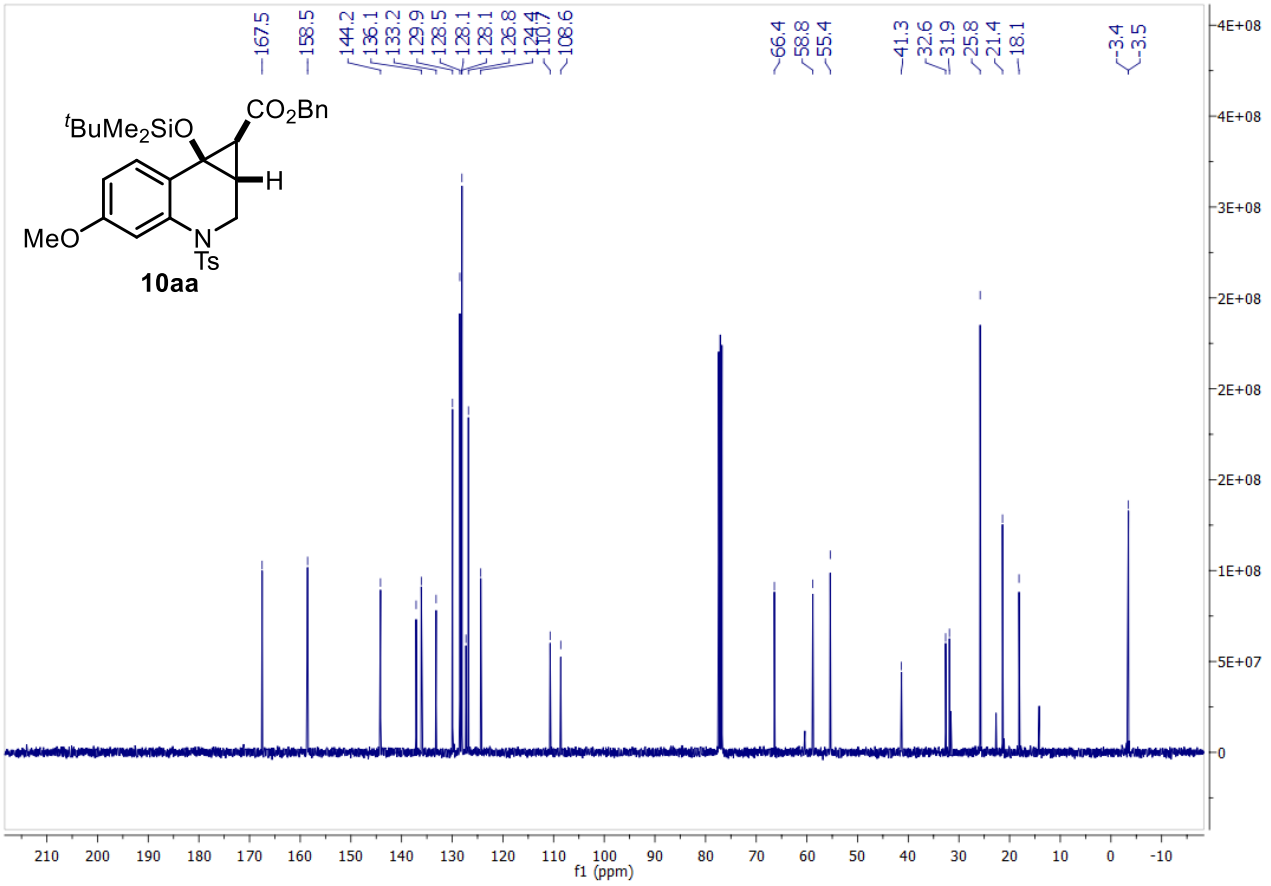

7.63
7.62
7.57
7.55
7.29
7.27
7.16
7.16
6.73
6.72
6.71
6.70
4.53
4.53
4.51
4.50
3.77
3.63
3.37
3.35
3.35
2.68
2.68
2.67
2.67
2.67
2.66
2.41
1.27
1.26
0.91
0.10
-0.07
tBuMe2SiO
CO2Me
H
MeO
N
Ts
10y
2.0
1.0
2.2
1.0
1.0
1.0
3.0
3.0
1.0
1.0
3.1
1.1
9.3
3.2
3.0
f1 (ppm)

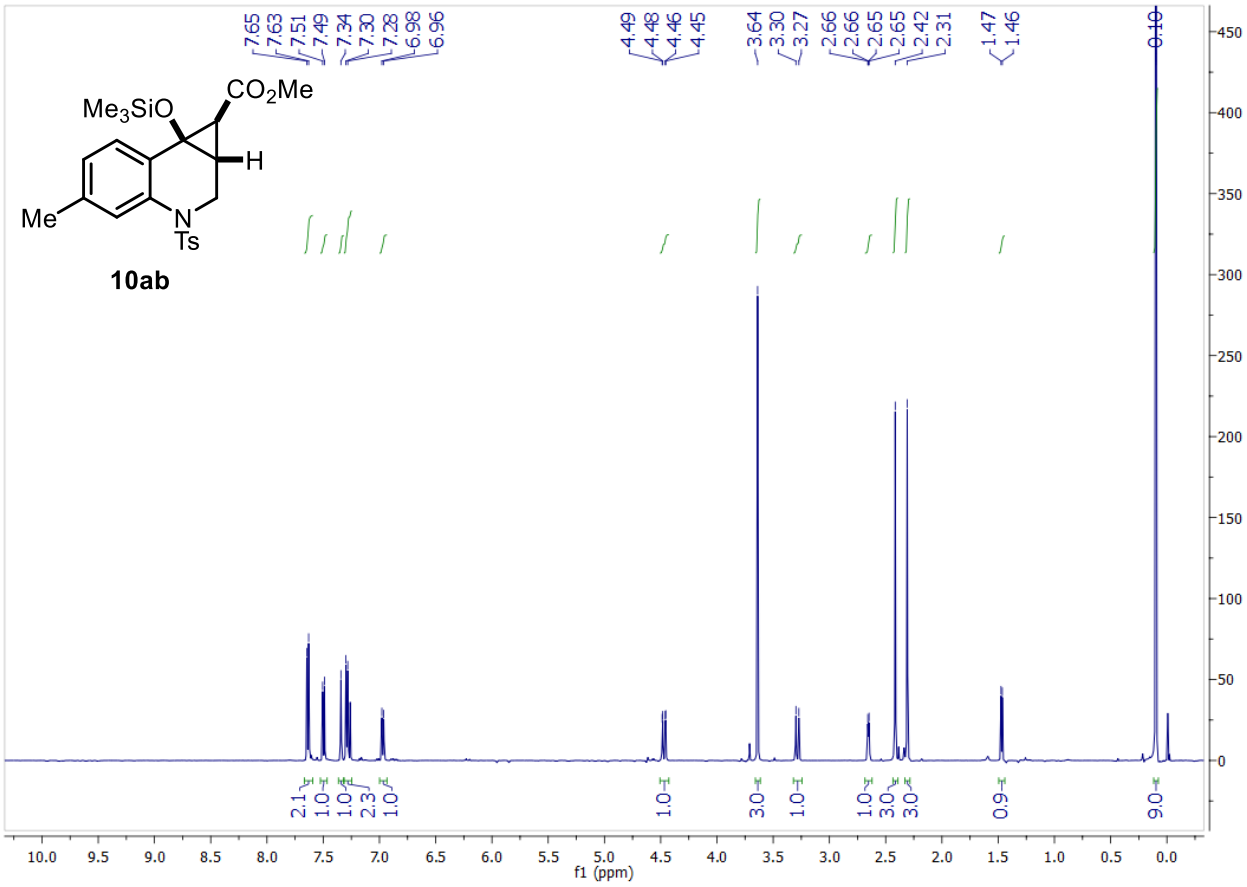

168.1
158.4
144.2
137.2
133.1
130.0
127.1
126.8
124.3
110.6
108.6
58.6
55.4
51.8
41.3
32.4
31.7
25.7
25.7
21.5
18.1
-3.5
tBuMe2SiO
CO2Me
H
MeO
N
Ts
10y
f1 (ppm)

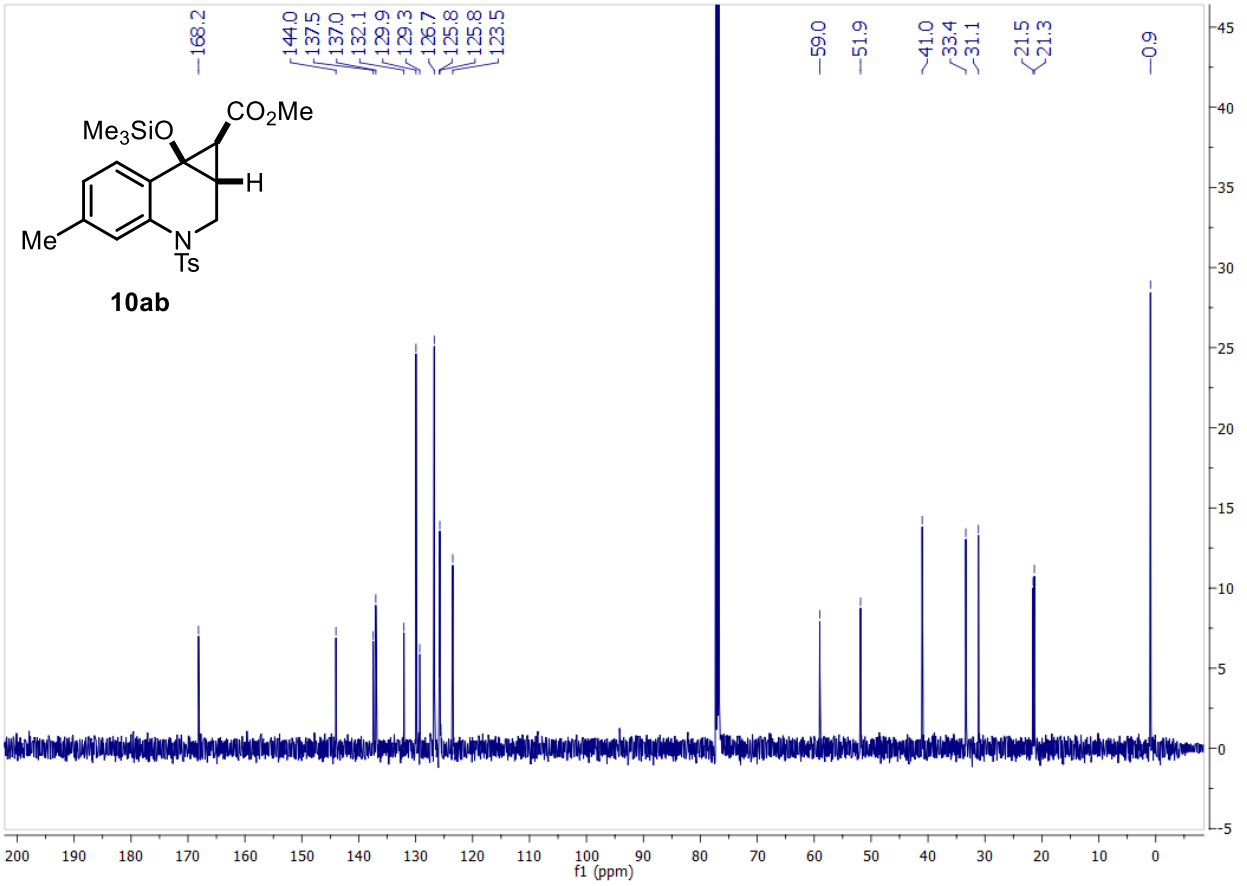

DP-411hv
7.65
7.63
7.52
7.50
7.28
7.27
7.26
7.15
7.15
6.73
6.72
6.71
6.70
4.58
4.57
4.55
4.55
3.77
3.41
3.39
3.38
3.32
3.29
2.67
2.66
2.38
1.80
1.79
1.27
1.26
0.87
0.04
-0.08
tBuMe2SiO
MeO
N
Ts
H
O
N
10z
f1 (ppm)

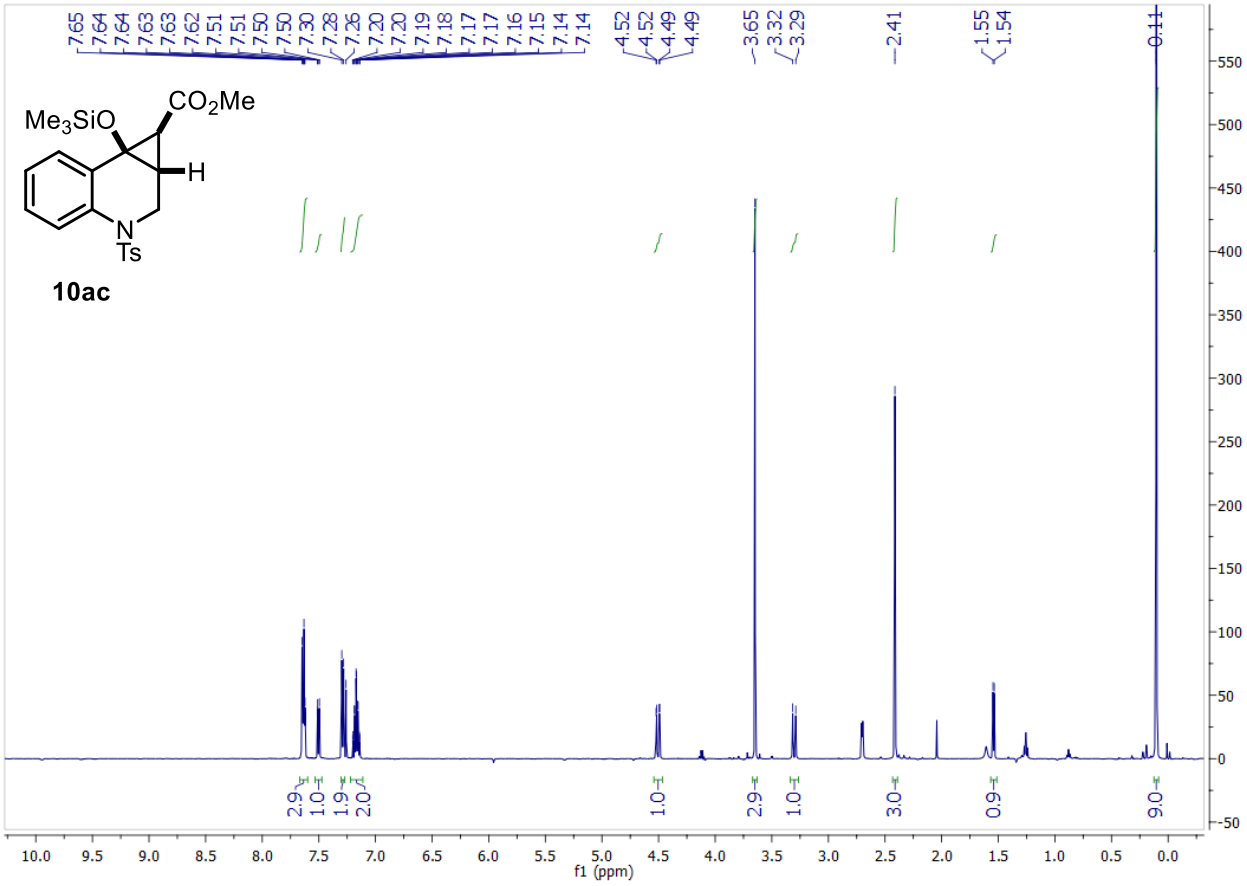

165.1
158.2
143.8
137.8
133.2
129.8
127.0
126.2
125.4
110.9
108.9
56.3
55.4
46.3
45.6
41.7
33.9
30.5
25.9
25.7
25.7
24.7
21.5
18.0
-3.5
-3.6
tBuMe2SiO
MeO
N
Ts
H
O
N
10z
f1 (ppm)

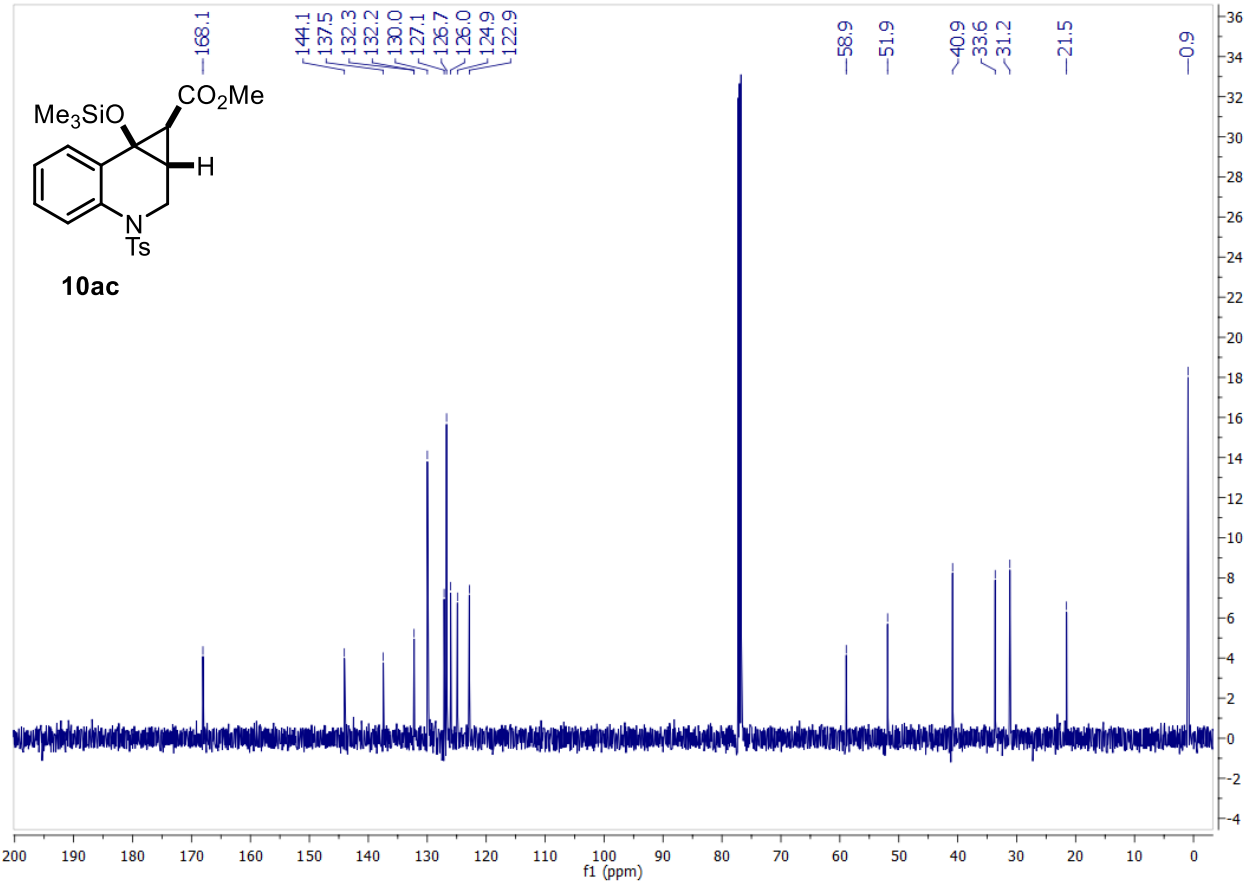

7.50
7.48
7.46
7.28
7.26
7.24
7.22
7.20
7.12
7.09
7.07
6.62
6.60
4.98
4.47
4.44
3.67
3.30
3.26
2.62
2.60
2.14
1.24
1.22
0.81
0.00
-0.17
tBuMe2SiO
CO2Bn
H
MeO
N
Ts
10aa
3.0
5.2
3.0
1.0
2.0
1.0
3.0
1.0
1.0
2.9
1.0
9.7
3.1
3.0
f1 (ppm)

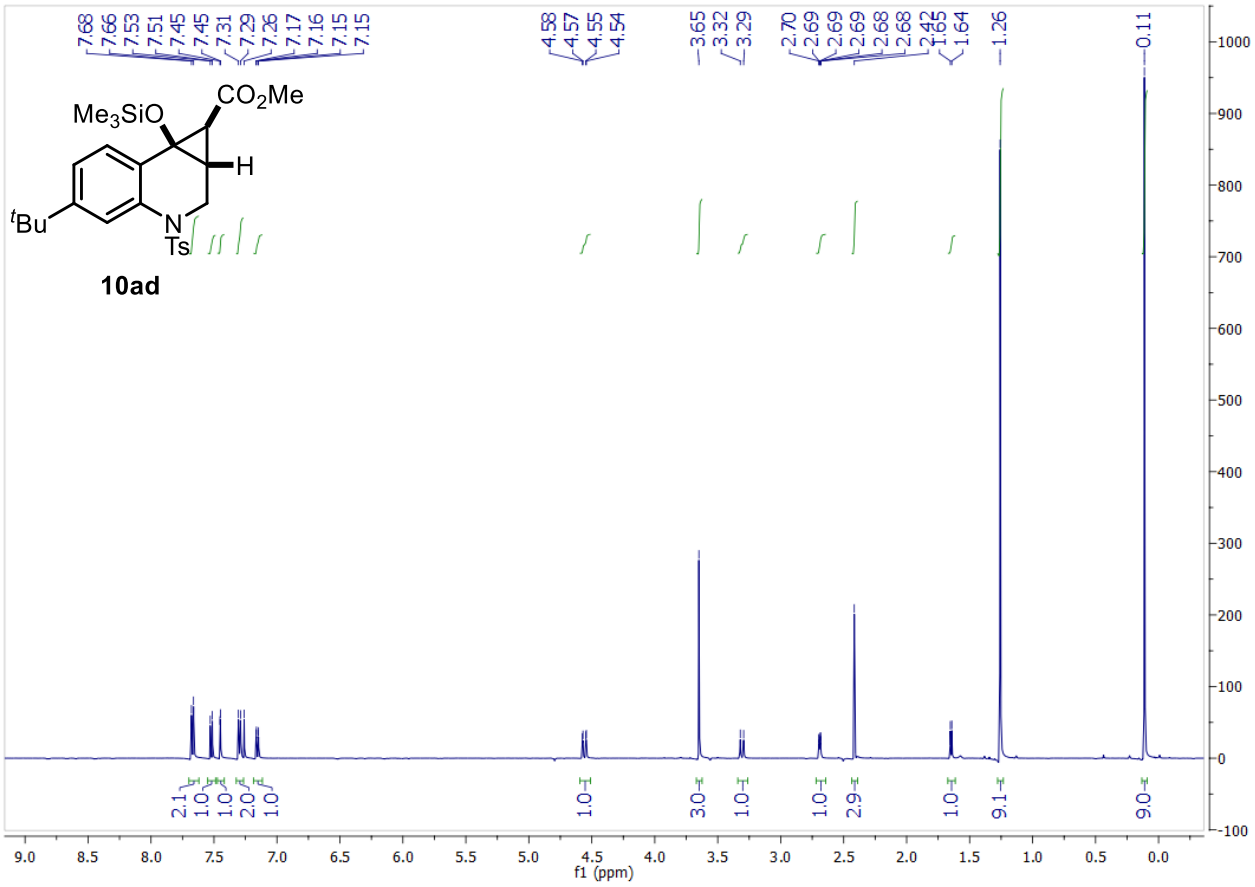

167.5
158.5
144.2
136.1
133.2
129.9
128.5
128.1
128.1
126.8
124.4
110.7
108.6
66.4
58.8
55.4
41.3
32.6
31.9
25.8
21.4
18.1
-3.4
-3.5
tBuMe2SiO
CO2Bn
H
MeO
N
Ts
10aa
f1 (ppm)

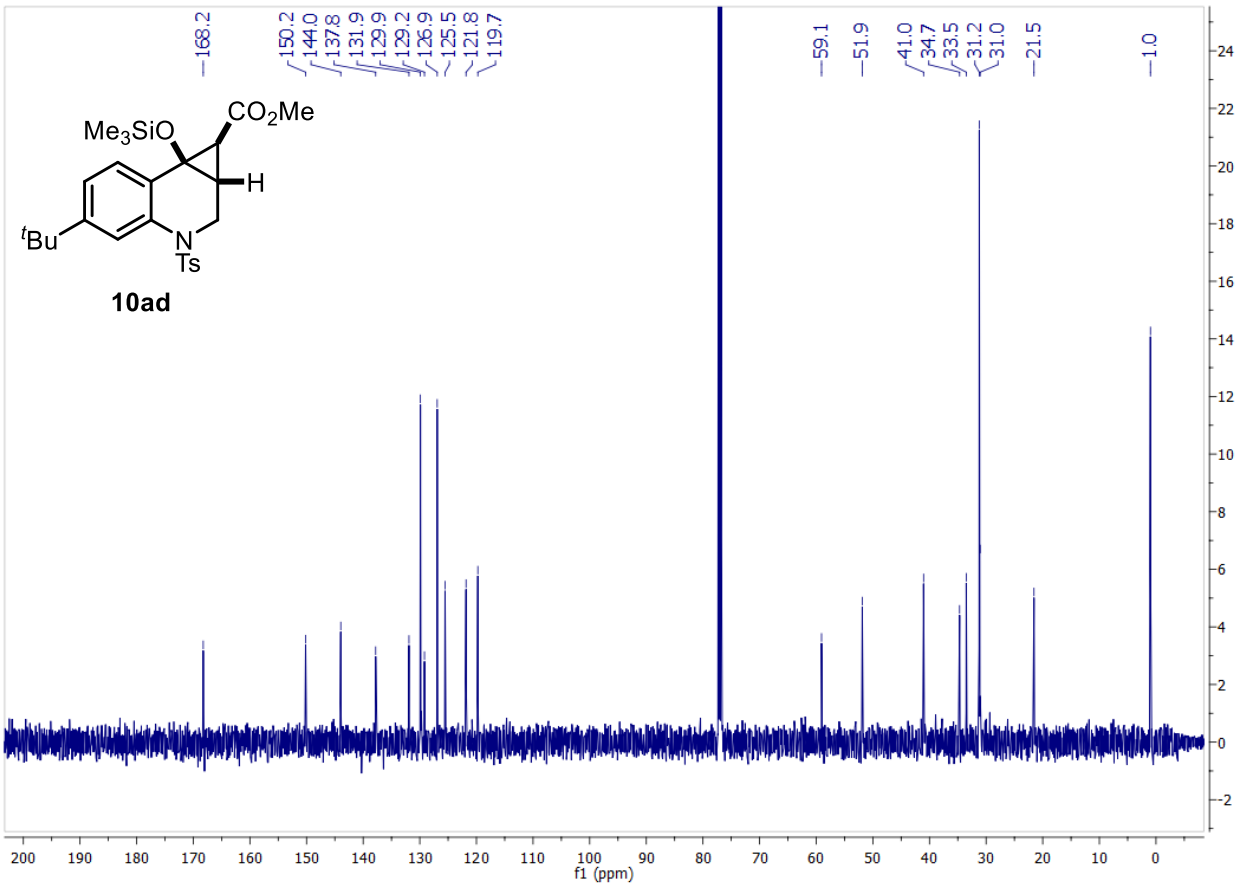

7.65
7.63
7.51
7.49
7.34
7.30
7.28
6.98
6.96
4.49
4.48
4.46
4.45
3.64
3.30
3.27
2.66
2.66
2.65
2.65
2.42
2.31
1.47
1.46
0.10
Me3SiO
CO2Me
H
Me
N
Ts
10ab
2.1
1.0
1.0
2.3
1.0
1.0
3.0
1.0
1.0
3.0
3.0
0.9
9.0
f1 (ppm)

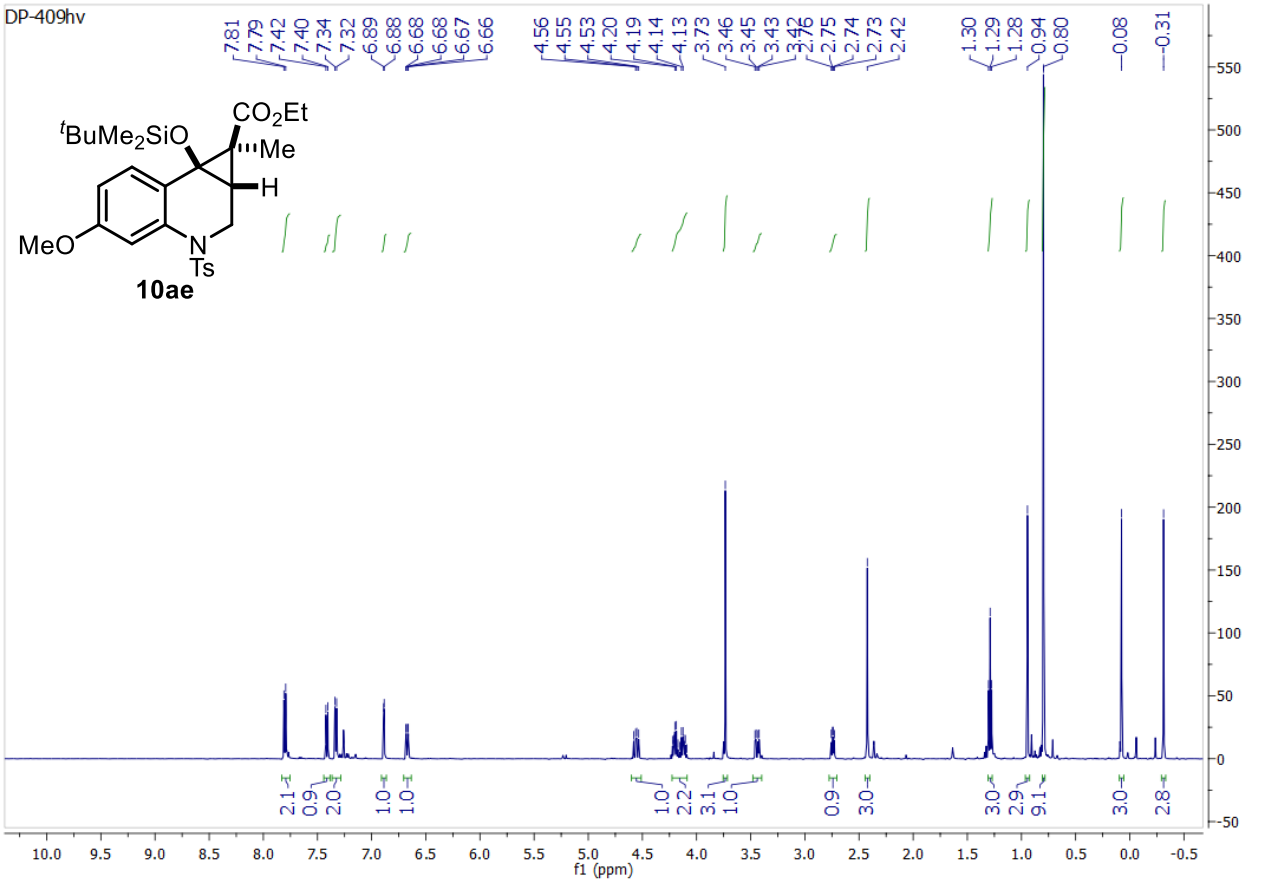

168.2
144.0
137.5
137.0
132.1
129.9
129.3
126.7
125.8
125.8
123.5
59.0
51.9
41.0
33.4
31.1
21.5
21.3
0.9
Me3SiO
CO2Me
H
Me
N
Ts
10ab
f1 (ppm)

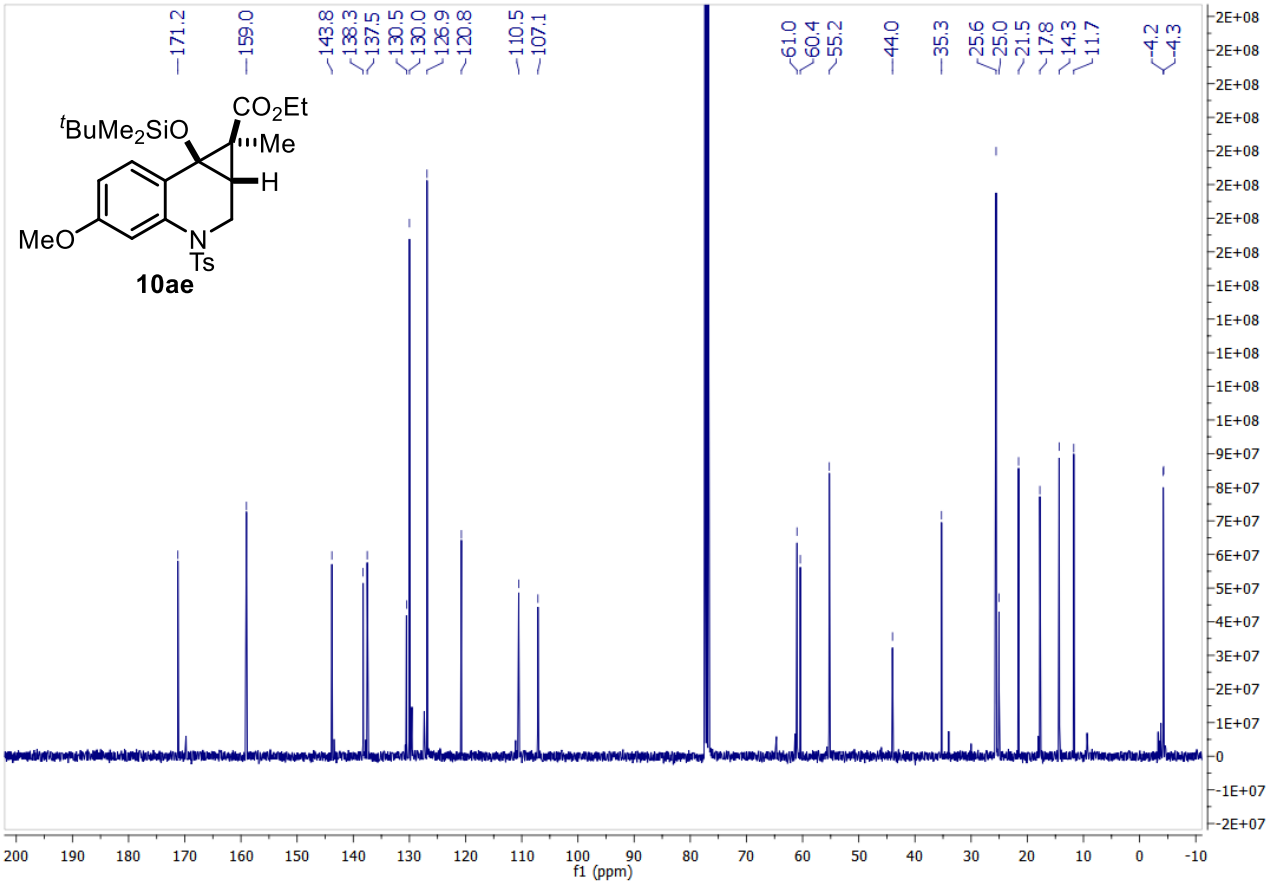

7.65
7.64
7.64
7.63
7.63
7.62
7.51
7.51
7.50
7.50
7.30
7.28
7.26
7.20
7.20
7.19
7.18
7.17
7.17
7.16
7.15
7.14
7.14
4.52
4.52
4.49
4.49
3.65
3.32
3.29
2.41
1.55
1.54
0.11
Me3SiO
CO2Me
H
N
Ts
10ac
2.9
1.0
1.9
2.0
1.0
2.9
1.0
3.0
0.9
9.0
f1 (ppm)

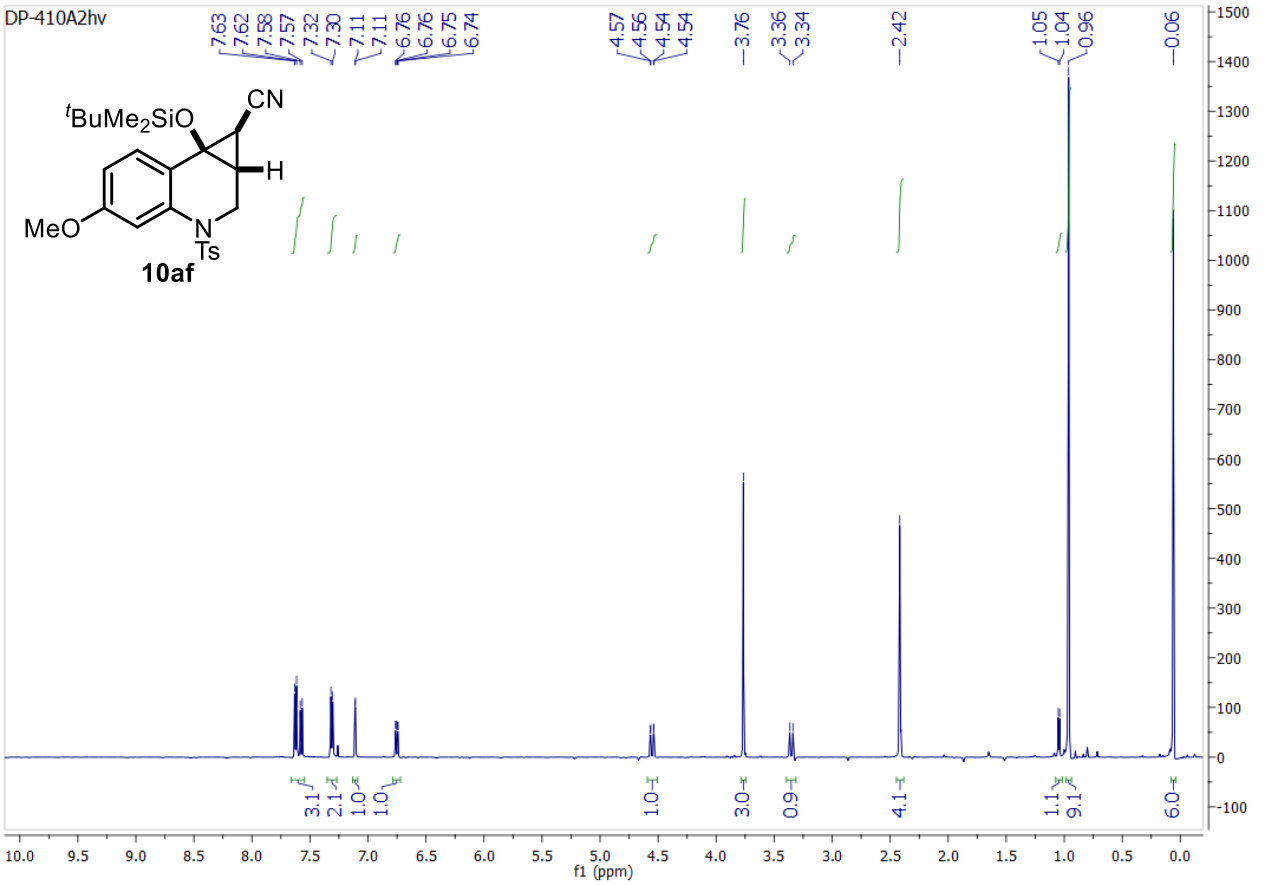

168.1
144.1
137.5
132.3
132.2
130.0
127.1
126.7
126.0
124.9
122.9
58.9
51.9
40.9
33.6
31.2
21.5
0.9
Me3SiO
CO2Me
H
N
Ts
10ac
f1 (ppm)

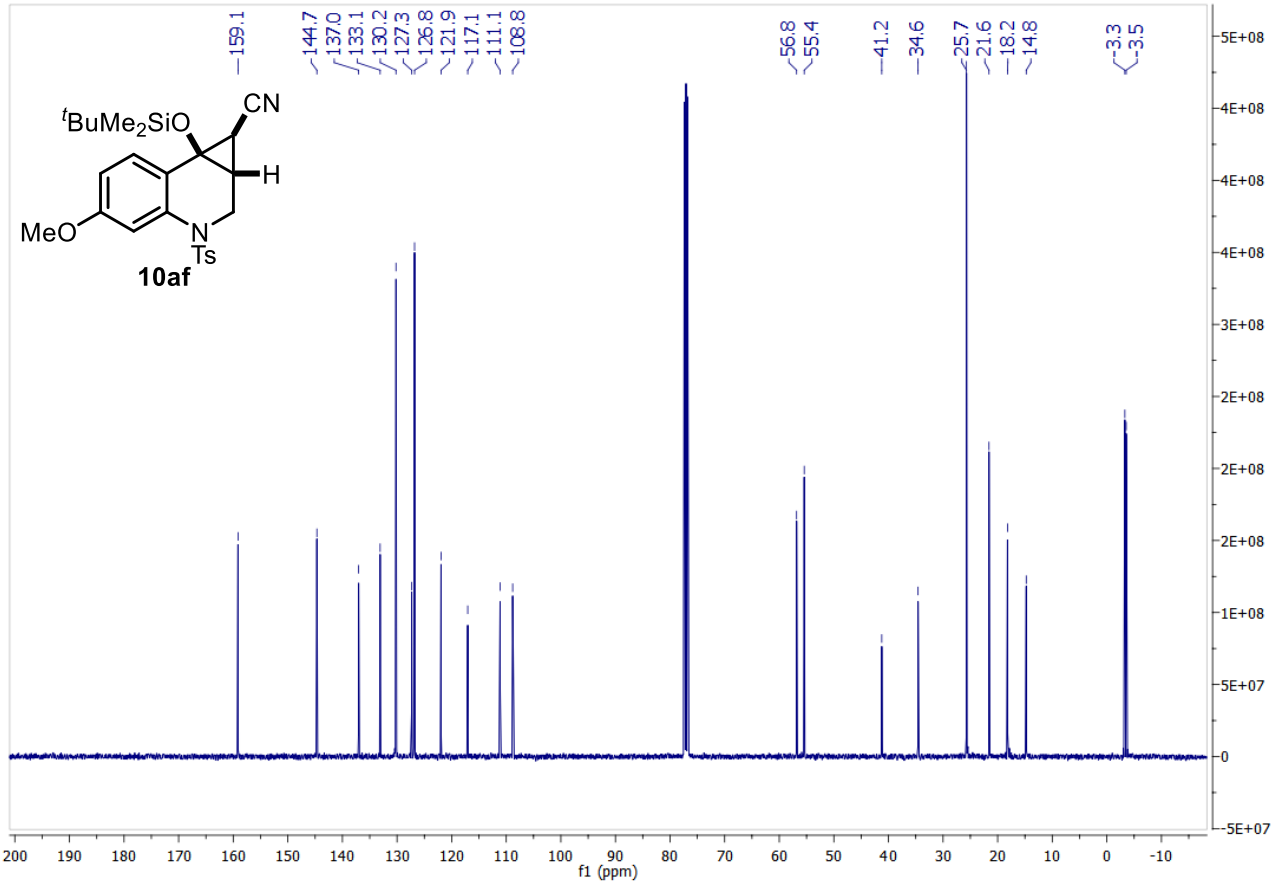

7.68
7.66
7.53
7.51
7.45
7.45
7.31
7.29
7.26
7.17
7.16
7.15
7.15
4.58
4.57
4.55
4.54
3.65
3.32
3.29
2.70
2.69
2.69
2.69
2.68
2.68
2.42
1.65
1.64
1.26
0.11
Me3SiO
CO2Me
H
tBu
N
Ts
10ad
2.1
1.0
1.0
2.0
1.0
1.0
3.0
1.0
1.0
2.9
1.0
9.1
9.0
f1 (ppm)

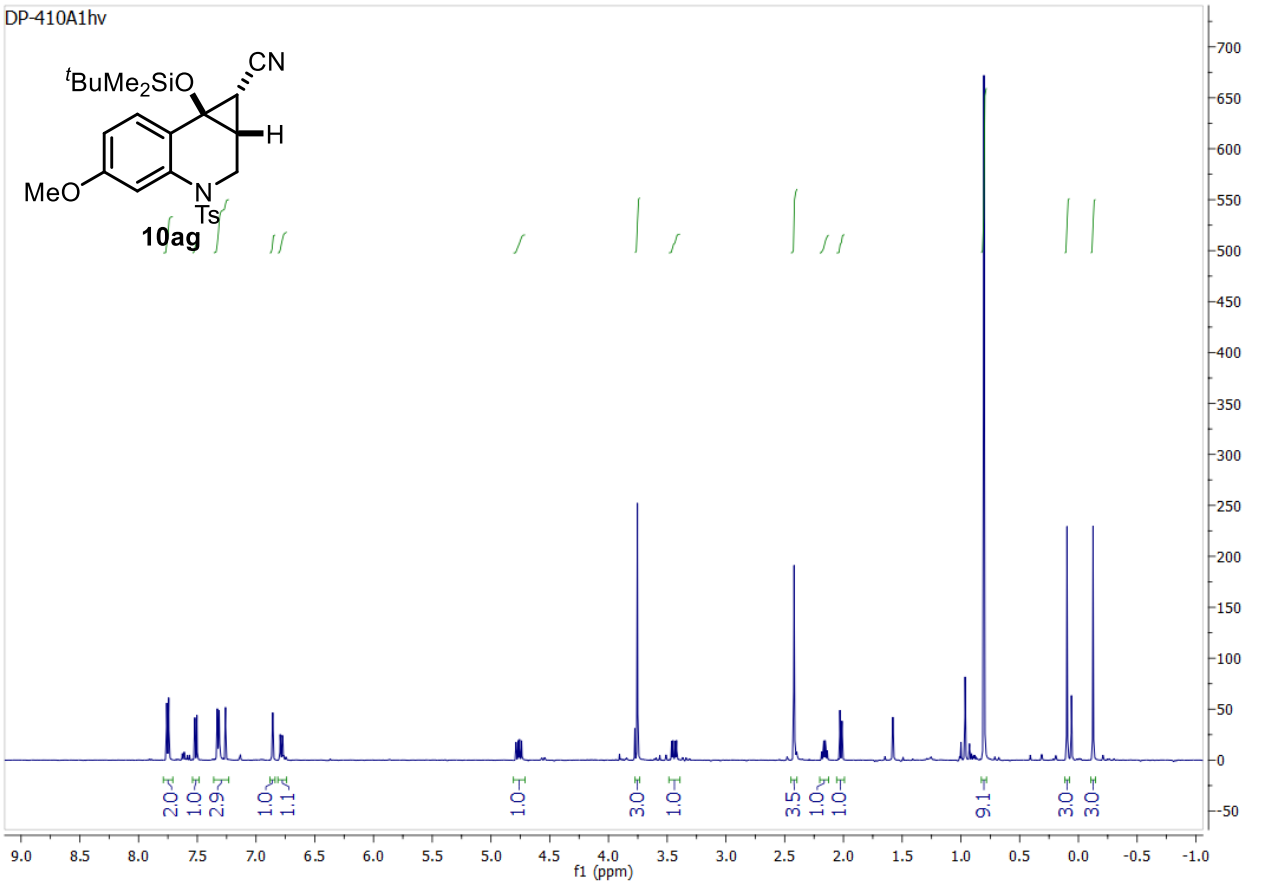

168.2
150.2
144.0
137.8
131.9
129.9
129.2
126.9
125.5
121.8
119.7
59.1
51.9
41.0
34.7
33.5
31.2
31.0
21.5
1.0
Me3SiO
CO2Me
H
tBu
N
Ts
10ad
f1 (ppm)

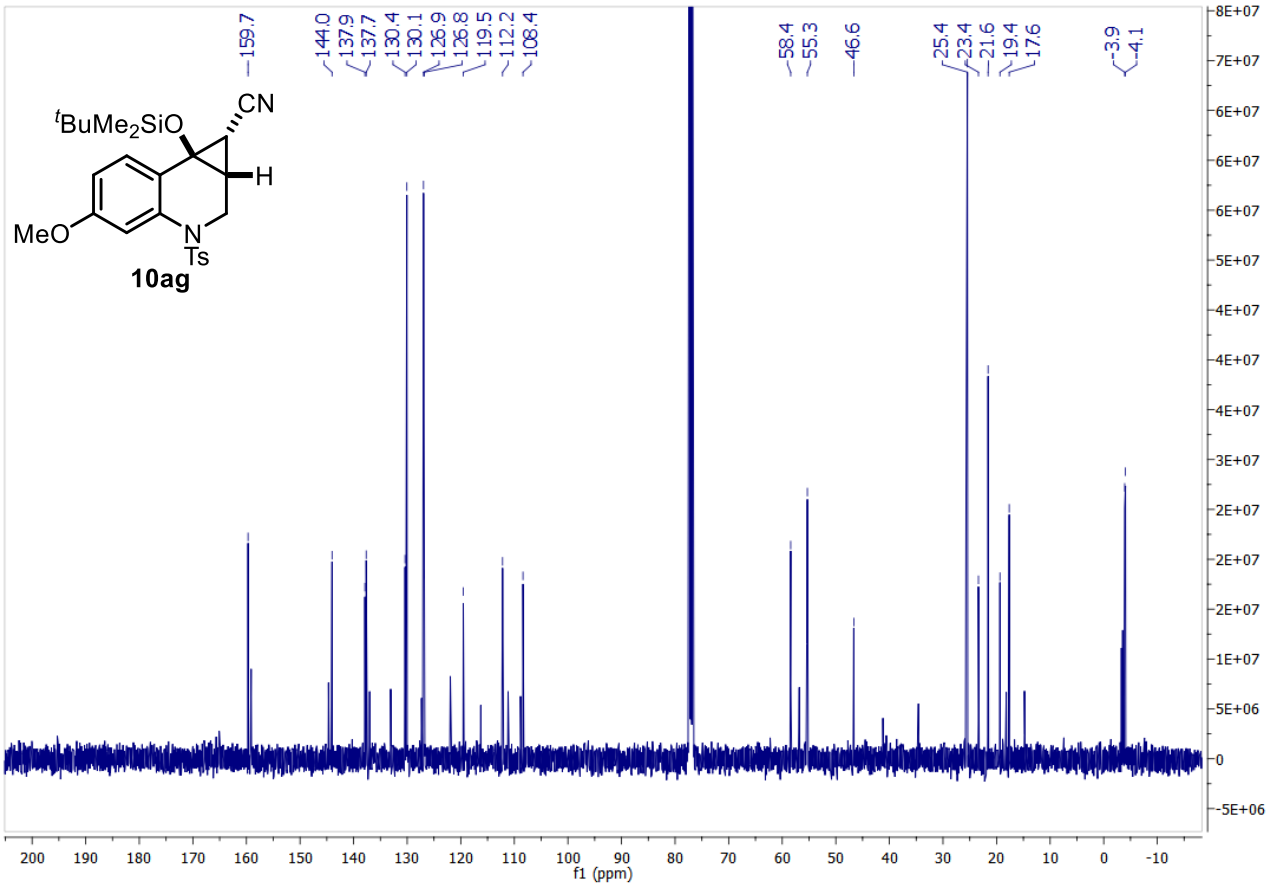

DP-409hv
7.81 7.79 7.42 7.40 7.34 7.32 6.89 6.88 6.68 6.68 6.67 6.66
4.56 4.55 4.53 4.20 4.19 4.14 4.13 3.73 3.46 3.45 3.43 3.42 2.76 2.75 2.74 2.73 2.42
1.30 1.29 1.28 0.94 0.80 0.08 0.31
^{t}BuMe$_2$SiO
CO$_2$Et
Me
H
MeO
N
Ts
10ae
2.1 0.9 2.0 1.0 1.0 1.0 2.2 3.1 1.0 0.9 3.0 3.0 2.9 9.1 3.0 2.8
f1 (ppm)


171.2 159.0 143.8 138.3 137.5 130.5 130.0 126.9 120.8 110.5 107.1
61.0 60.4 55.2 44.0 35.3 25.6 25.0 21.5 17.8 14.3 11.7 -4.2 -4.3
^{t}BuMe$_2$SiO
CO$_2$Et
Me
H
MeO
N
Ts
10ae
f1 (ppm)

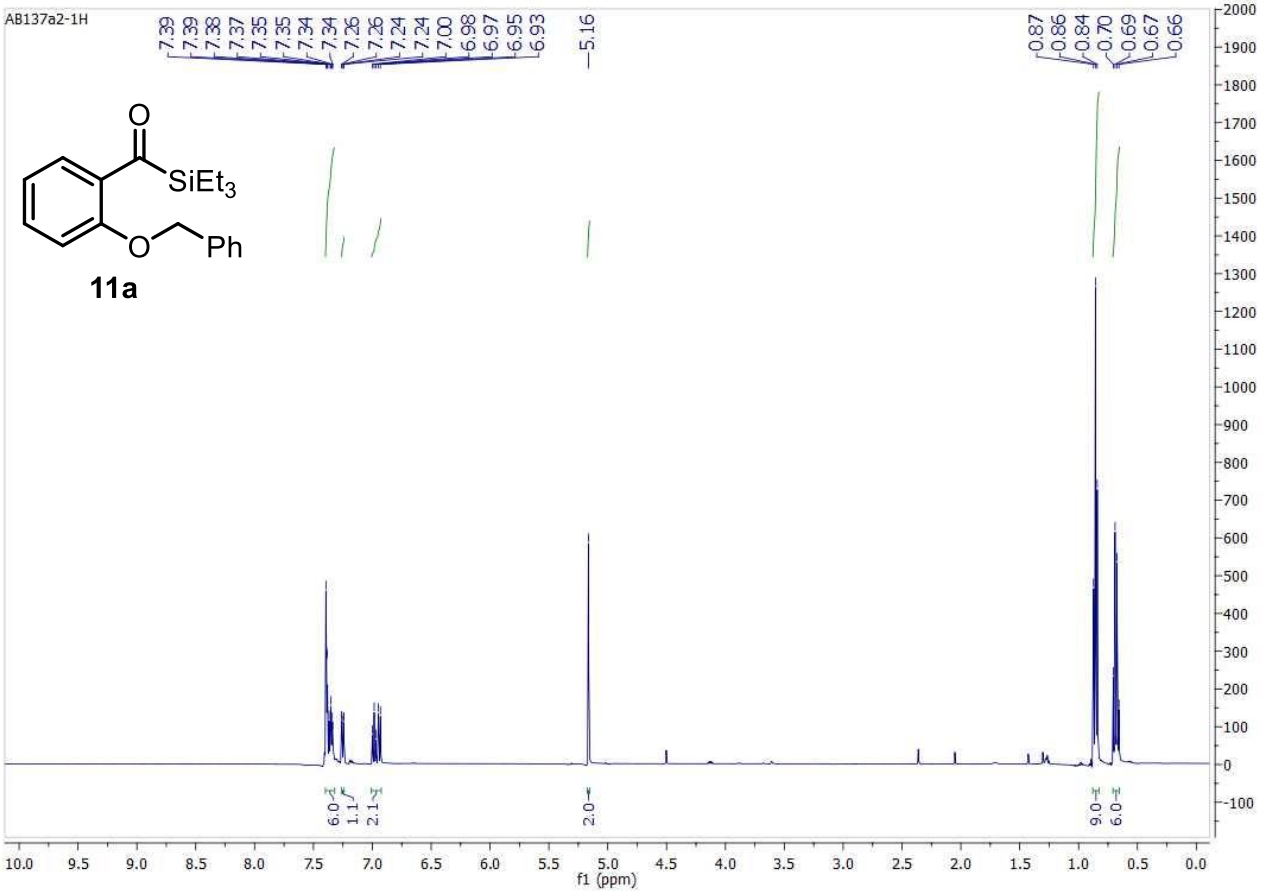

DP-410A2hv
7.63
7.62
7.58
7.57
7.32
7.30
7.11
7.11
6.76
6.76
6.75
6.74
4.57
4.56
4.54
4.54
3.76
3.36
3.34
2.42
1.05
1.04
0.96
0.06
tBuMe2SiO
CN
H
MeO
N
Ts
10af
3.1
2.1
1.0
1.0
1.0
3.0
0.9
4.1
1.1
9.1
6.0
f1 (ppm)

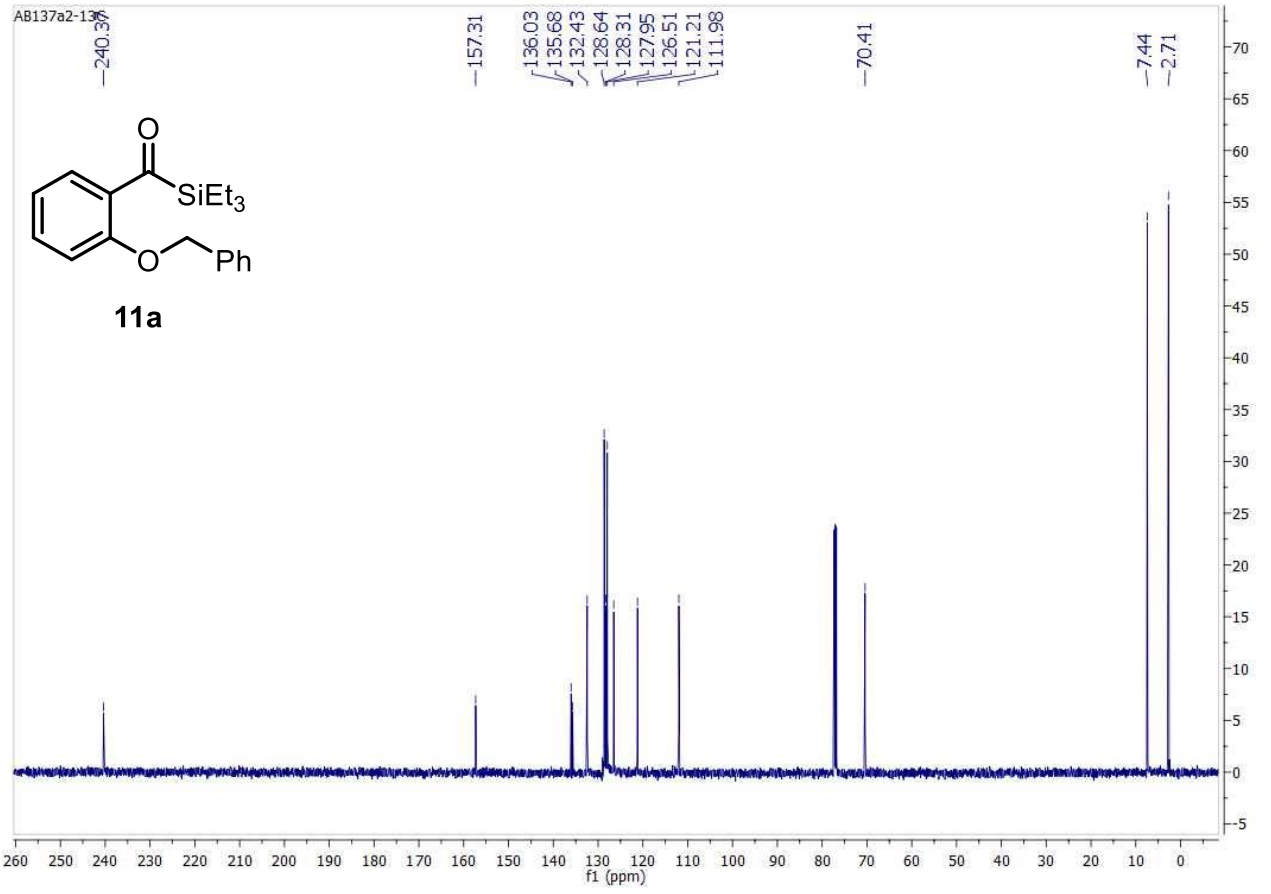

159.1
144.7
137.0
133.1
130.2
127.3
126.8
121.9
117.1
111.1
108.8
56.8
55.4
41.2
34.6
25.7
21.6
18.2
14.8
-3.3
-3.5
tBuMe2SiO
CN
H
MeO
N
Ts
10af
f1 (ppm)

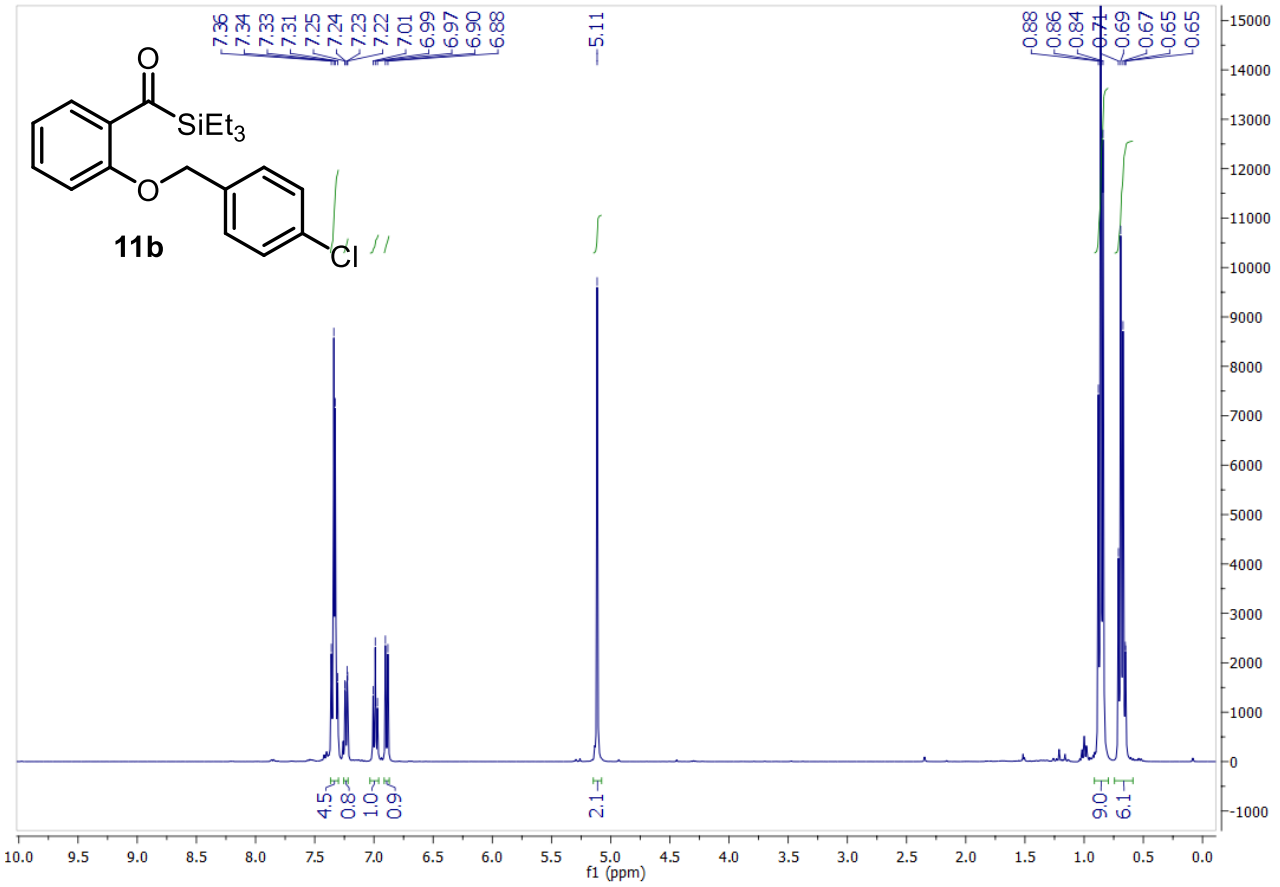


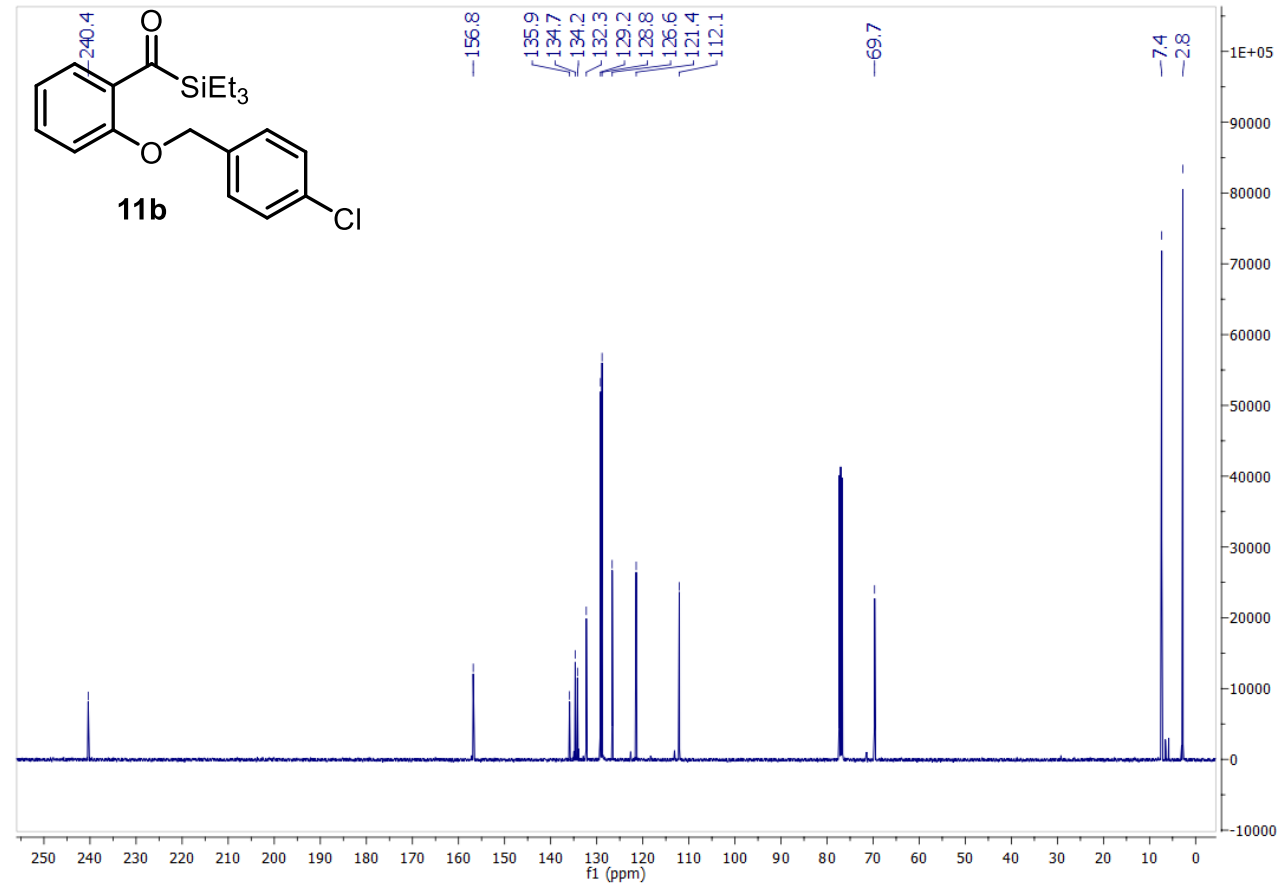


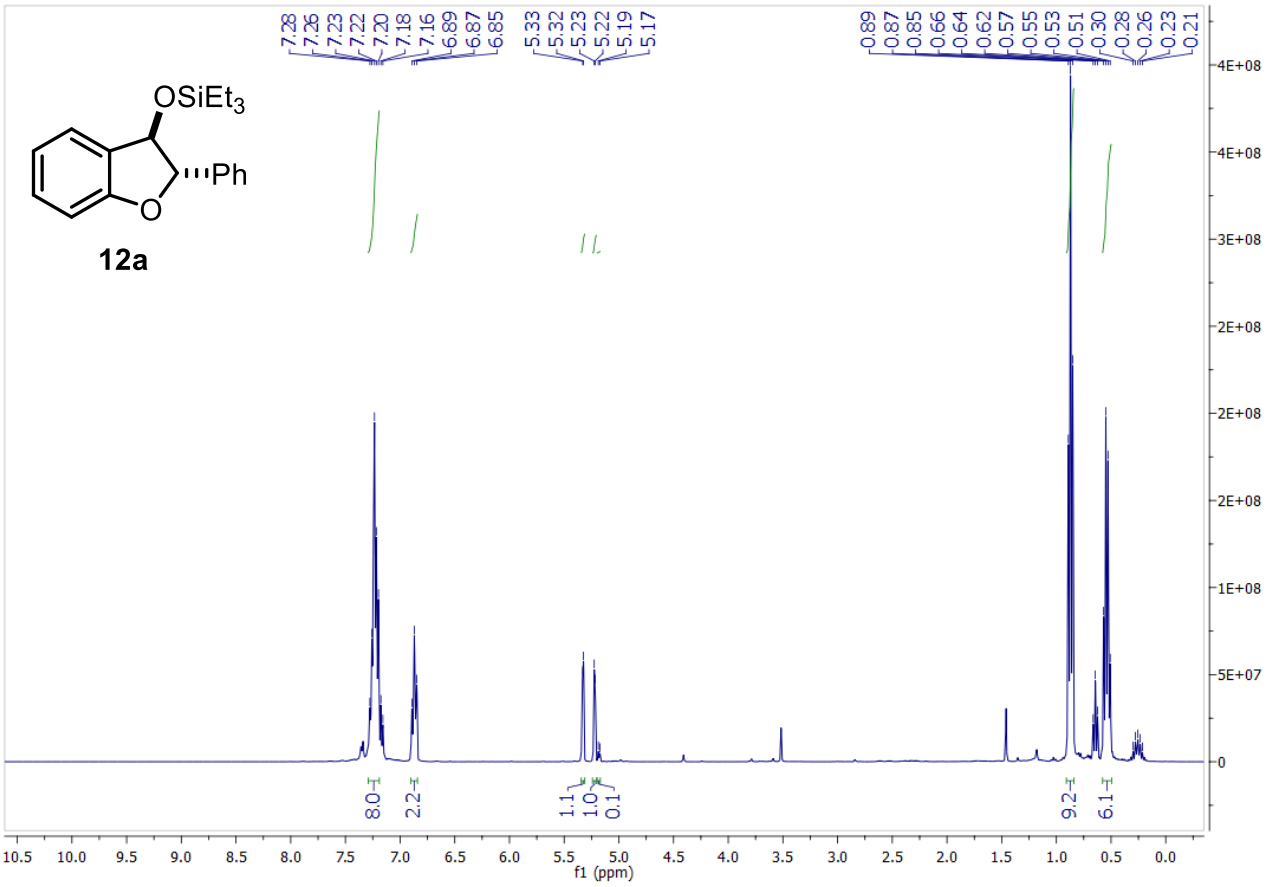
*^{13}C NMR of **10ag** collected after 48 hours leading to a 3:1 mixture of **10ag**/**10af** (see manuscript for details)

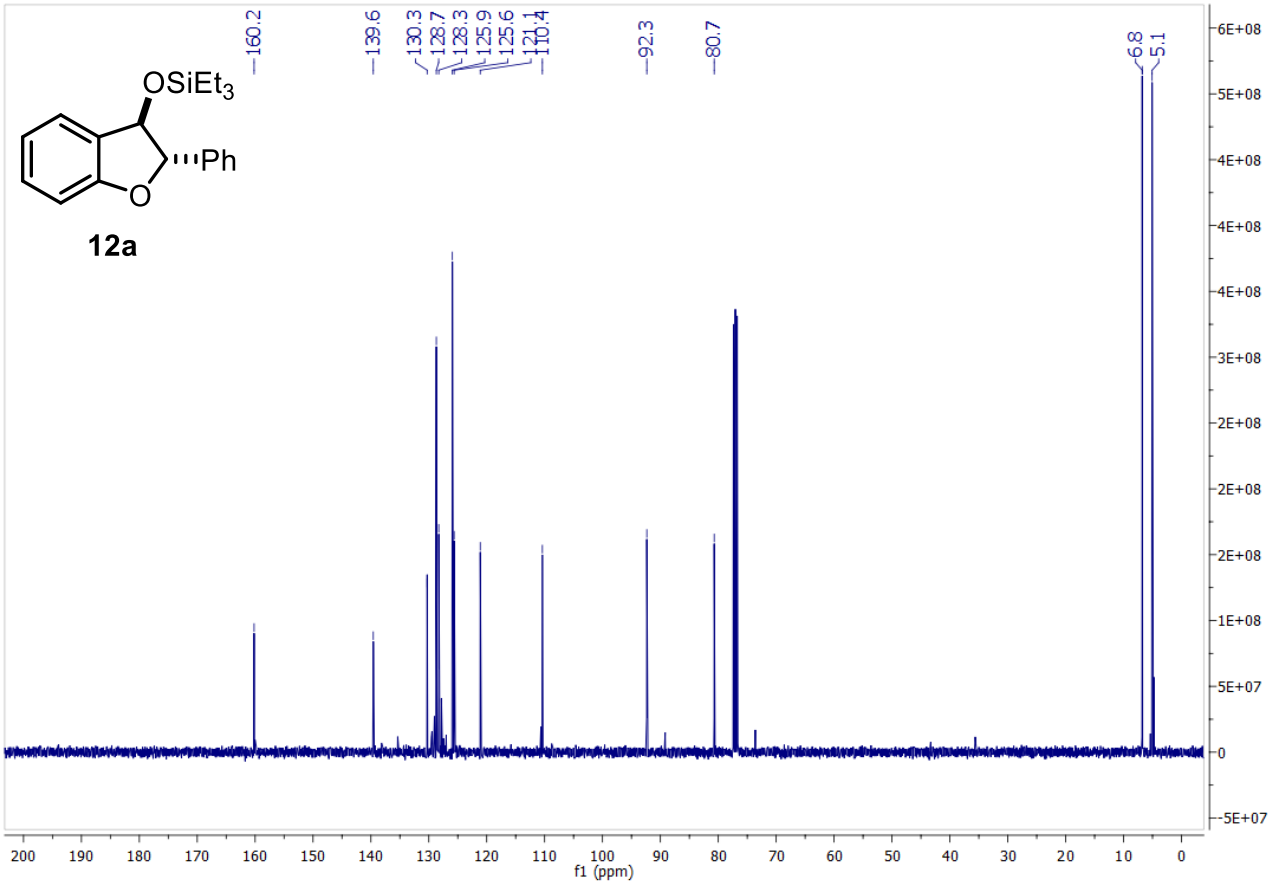

AB137a2-1H
7.39
7.39
7.38
7.37
7.35
7.35
7.34
7.34
7.26
7.26
7.24
7.24
7.00
6.98
6.97
6.95
6.93
5.16
0.87
0.86
0.84
0.70
0.69
0.67
0.66
SiEt3
O
Ph
11a
6.0
1.1
2.1
2.0
9.0
6.0
f1 (ppm)

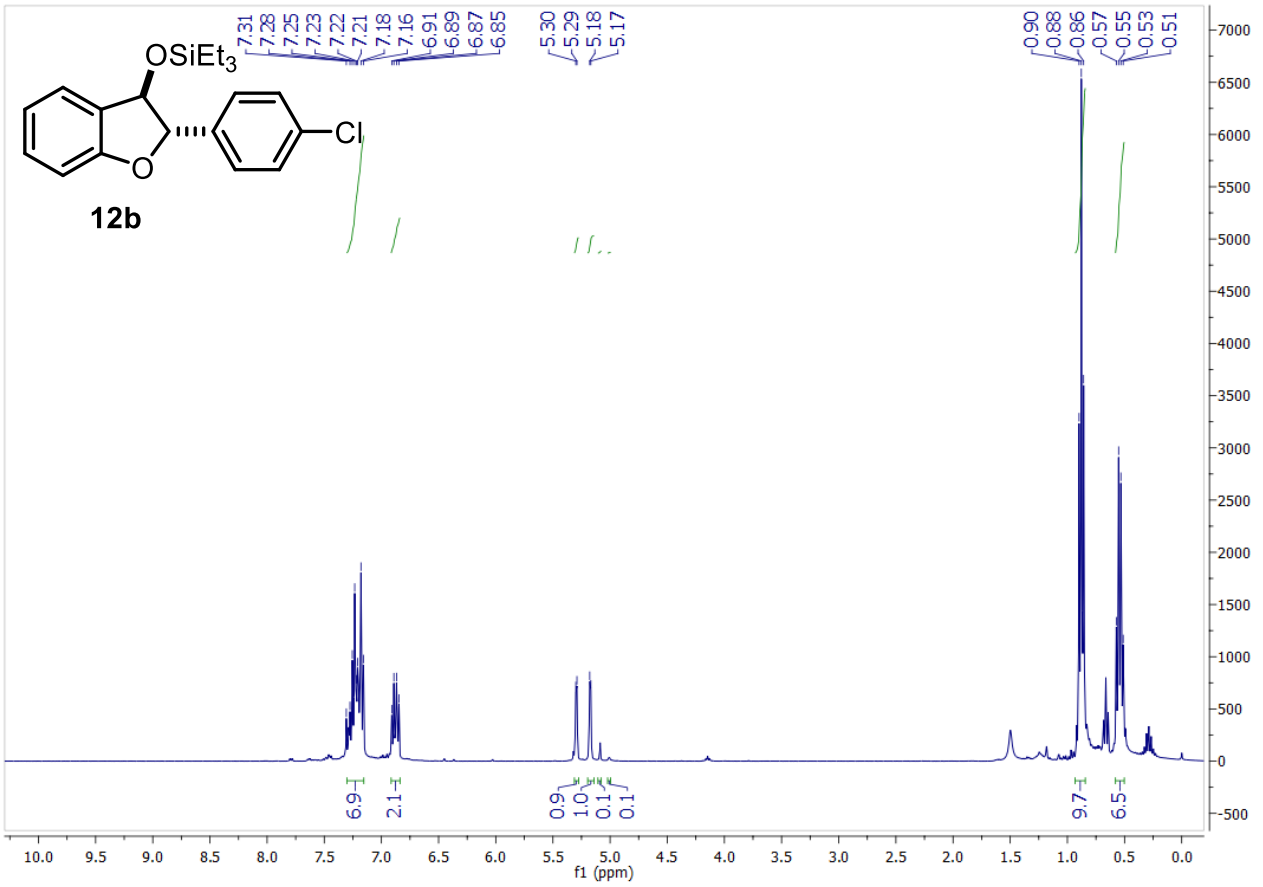

AB137a2-13C
240.39
157.31
136.03
135.68
132.43
128.64
128.31
127.95
126.51
121.21
111.98
70.41
7.44
2.71
SiEt3
O
Ph
11a
f1 (ppm)

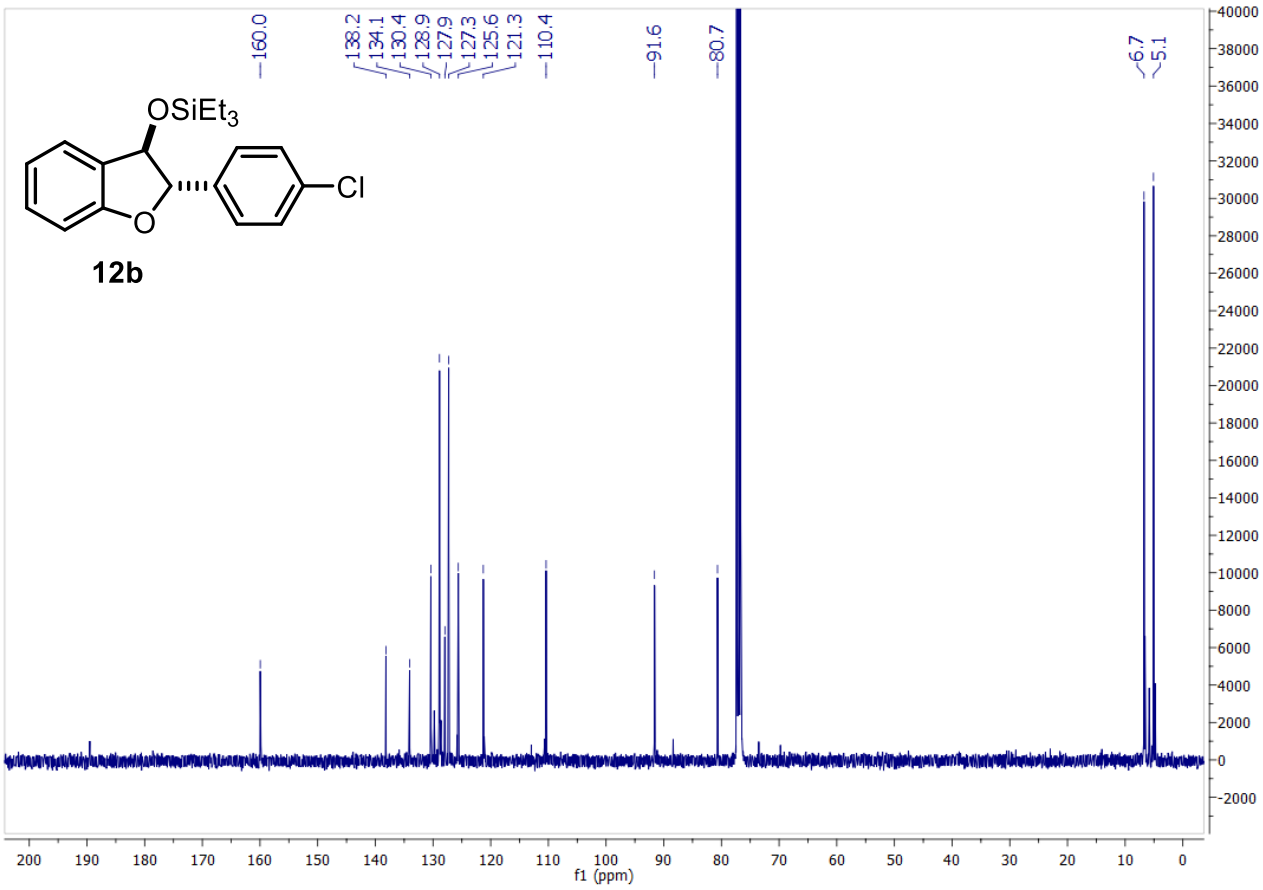

7.36
7.34
7.33
7.31
7.25
7.24
7.23
7.22
7.01
6.99
6.97
6.90
6.88
5.11
0.88
0.86
0.84
0.71
0.69
0.67
0.65
0.65
SiEt3
O
O
Cl
11b
4.5
0.8
1.0
0.9
2.1
9.0
6.1
f1 (ppm)

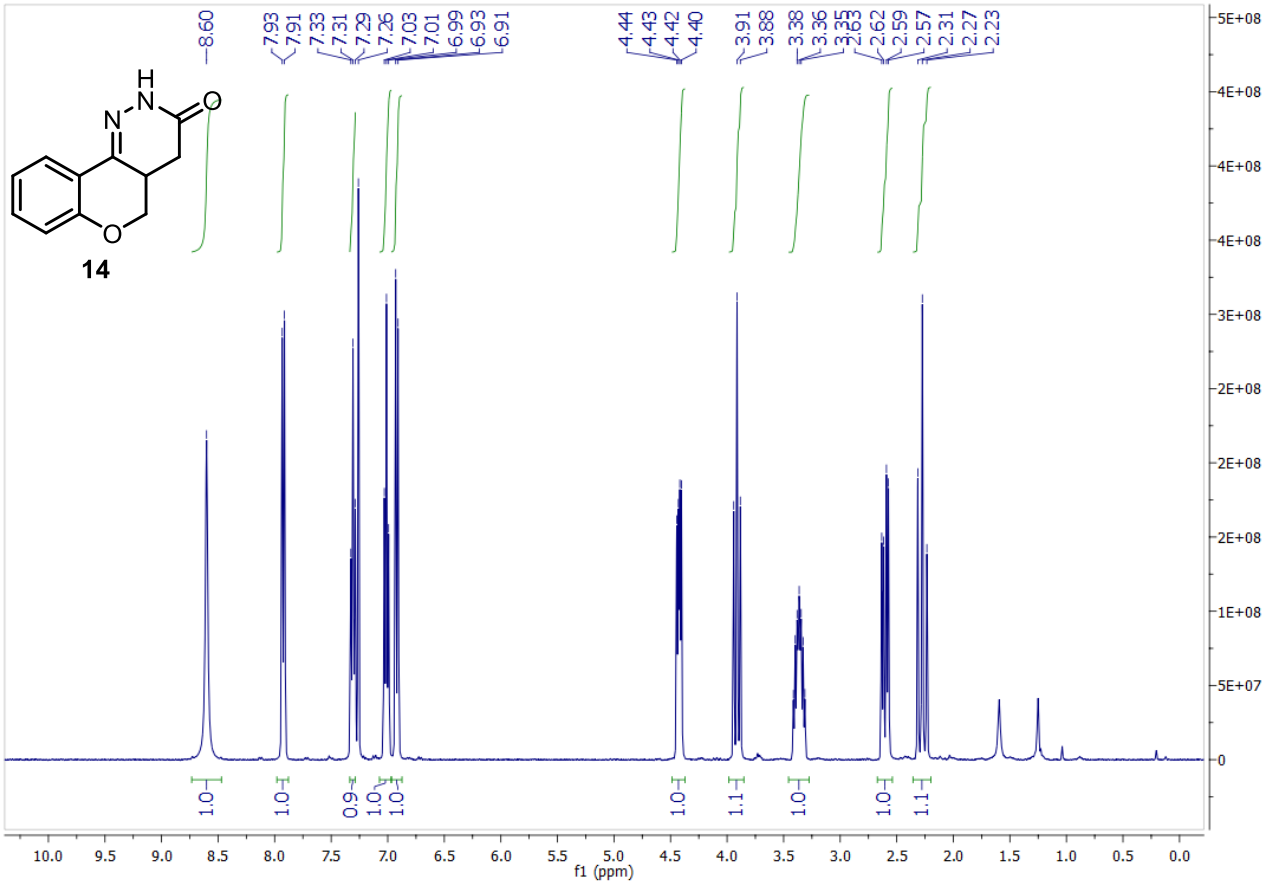

240.4
156.8
135.9
134.7
134.2
132.3
129.2
128.8
126.6
121.4
112.1
69.7
7.4
2.8
SiEt3
O
O
Cl
11b
f1 (ppm)

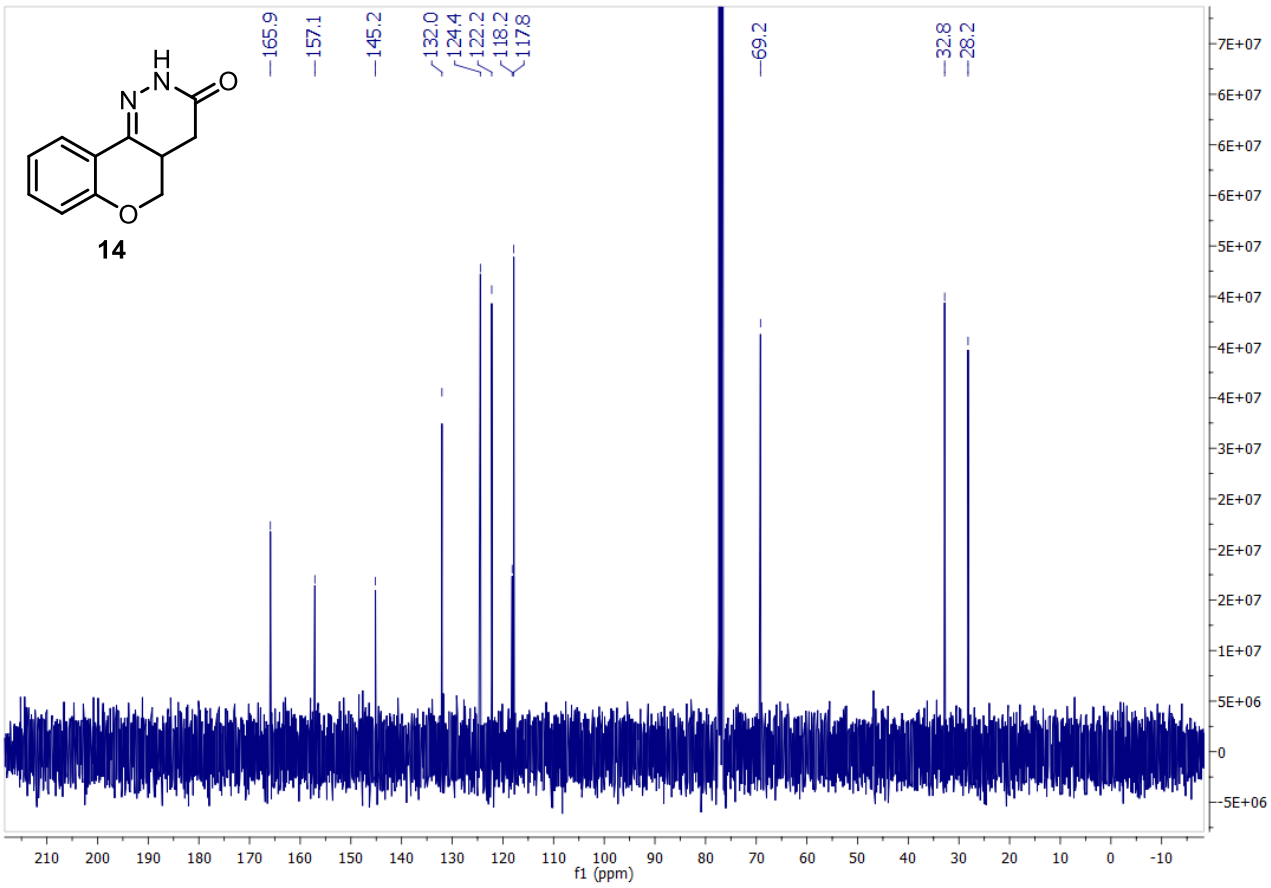

OSiEt3
Ph
O
12a
7.28
7.26
7.23
7.22
7.20
7.18
7.16
6.89
6.87
6.85
5.33
5.32
5.23
5.22
5.19
5.17
0.89
0.87
0.85
0.66
0.64
0.62
0.57
0.55
0.53
0.51
0.30
0.28
0.26
0.23
0.21
8.0
2.2
1.1
1.0
0.1
9.2
6.1
f1 (ppm)

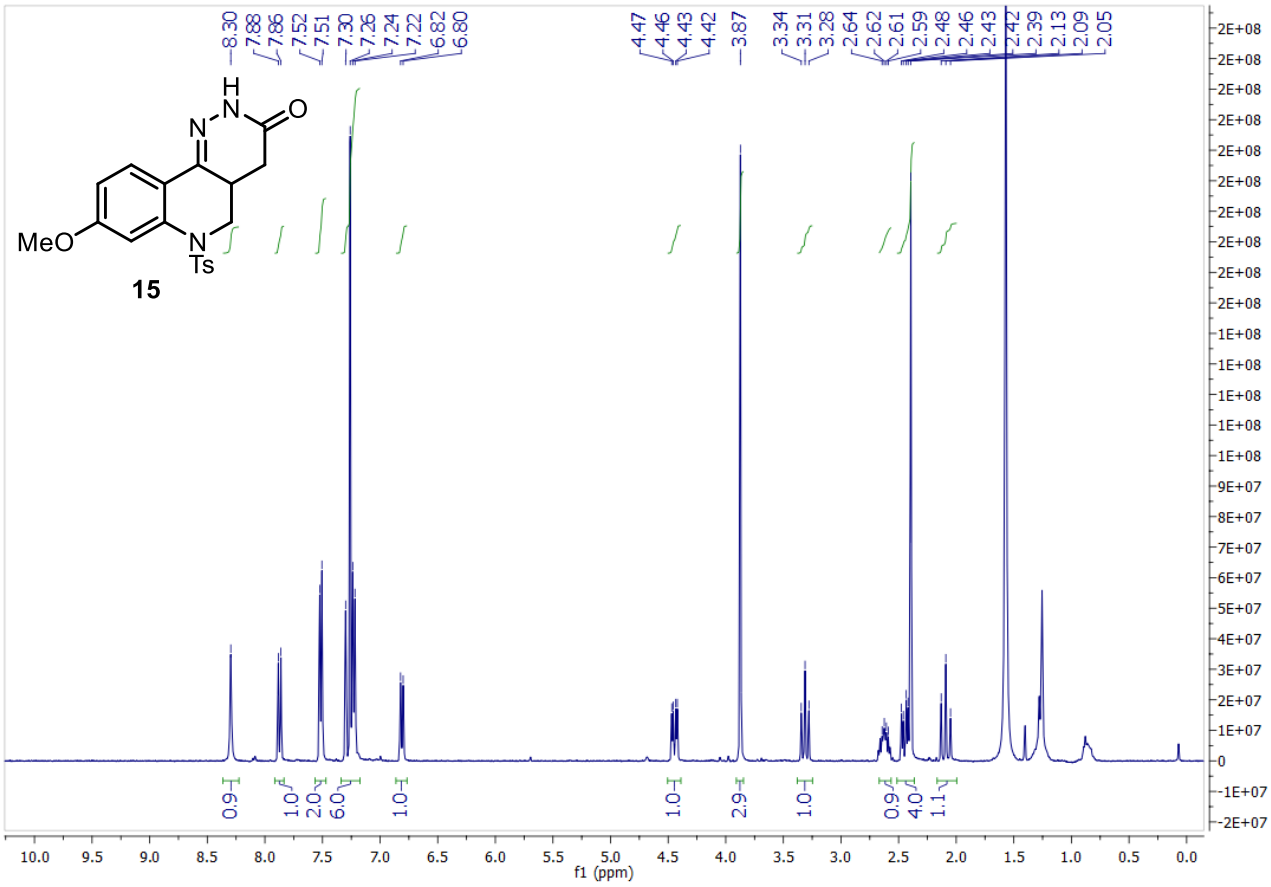

OSiEt3
Ph
O
12a
160.2
139.6
130.3
128.7
128.3
125.9
125.6
121.1
110.4
92.3
80.7
6.8
5.1
f1 (ppm)

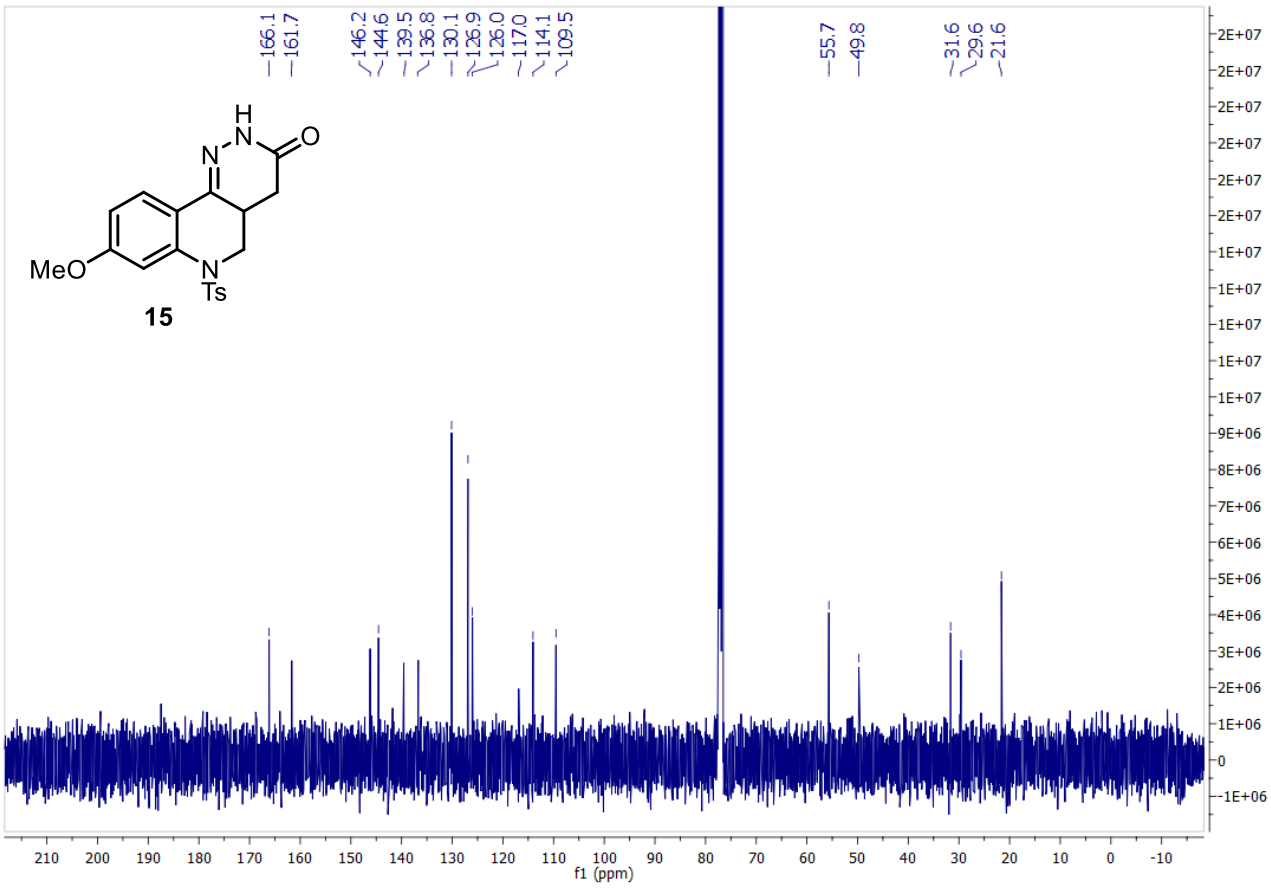

OSiEt3
Cl
O
12b
7.31
7.28
7.25
7.23
7.22
7.21
7.18
7.16
6.91
6.89
6.87
6.85
5.30
5.29
5.18
5.17
0.90
0.88
0.86
0.57
0.55
0.53
0.51
6.9
2.1
0.9
1.0
0.1
0.1
9.7
6.5
f1 (ppm)

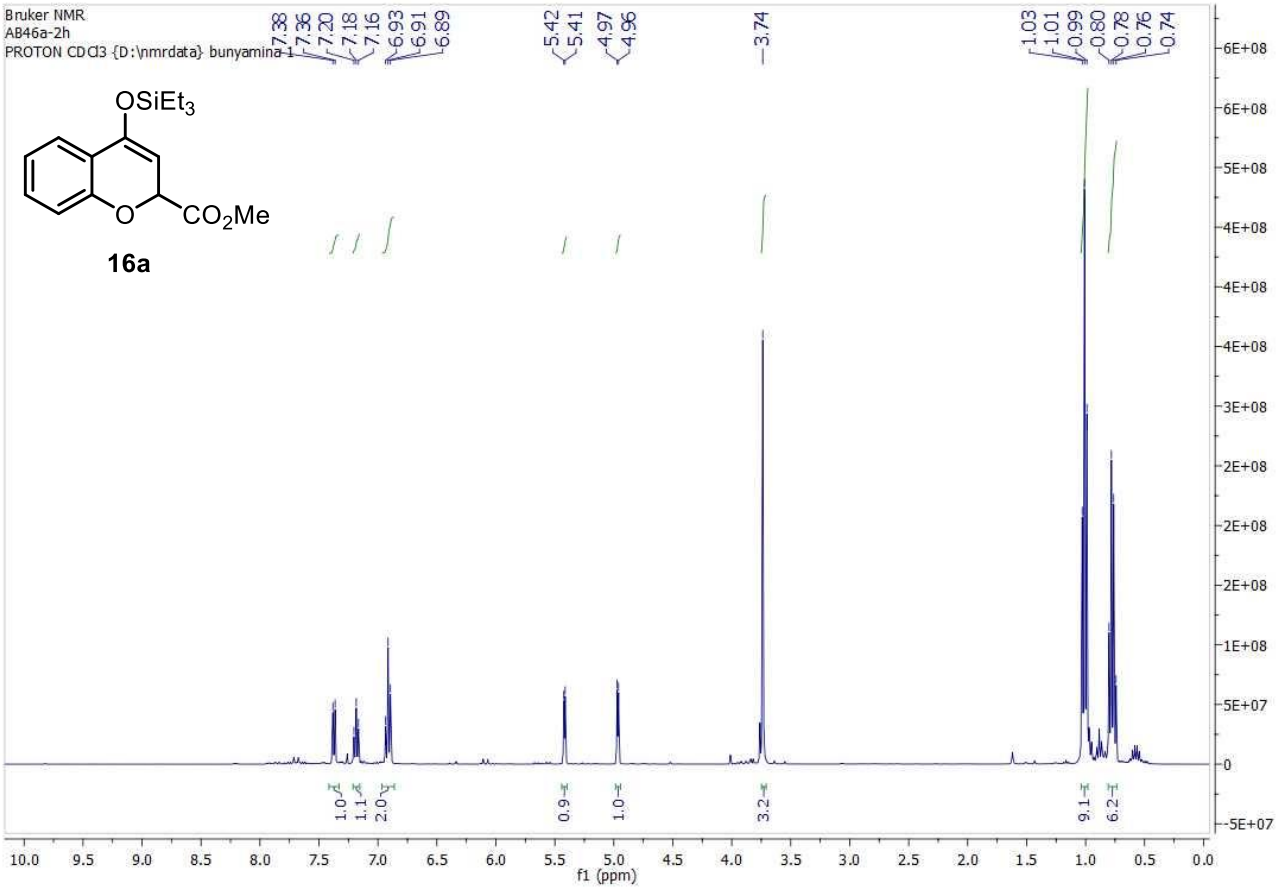

OSiEt3
Cl
O
12b
160.0
138.2
134.1
130.4
128.9
127.9
127.3
125.6
121.3
110.4
91.6
80.7
6.7
5.1
f1 (ppm)

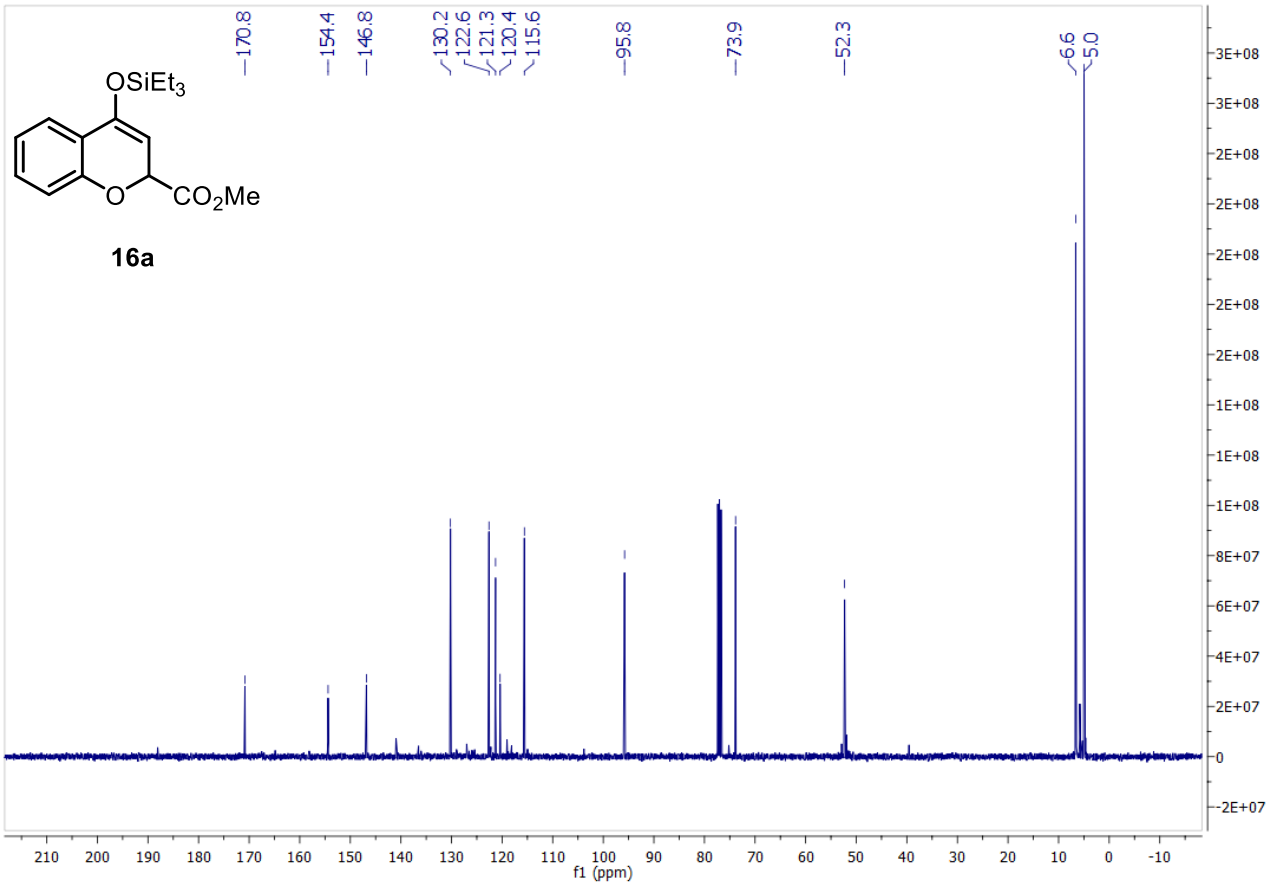

8.60
7.93
7.91
7.33
7.31
7.29
7.26
7.03
7.01
6.99
6.93
6.91
4.44
4.43
4.42
4.40
3.91
3.88
3.38
3.36
3.35
2.63
2.62
2.59
2.57
2.31
2.27
2.23
1.0
1.0
0.9
1.0
1.0
1.0
1.1
1.0
1.0
1.1
f1 (ppm)
14

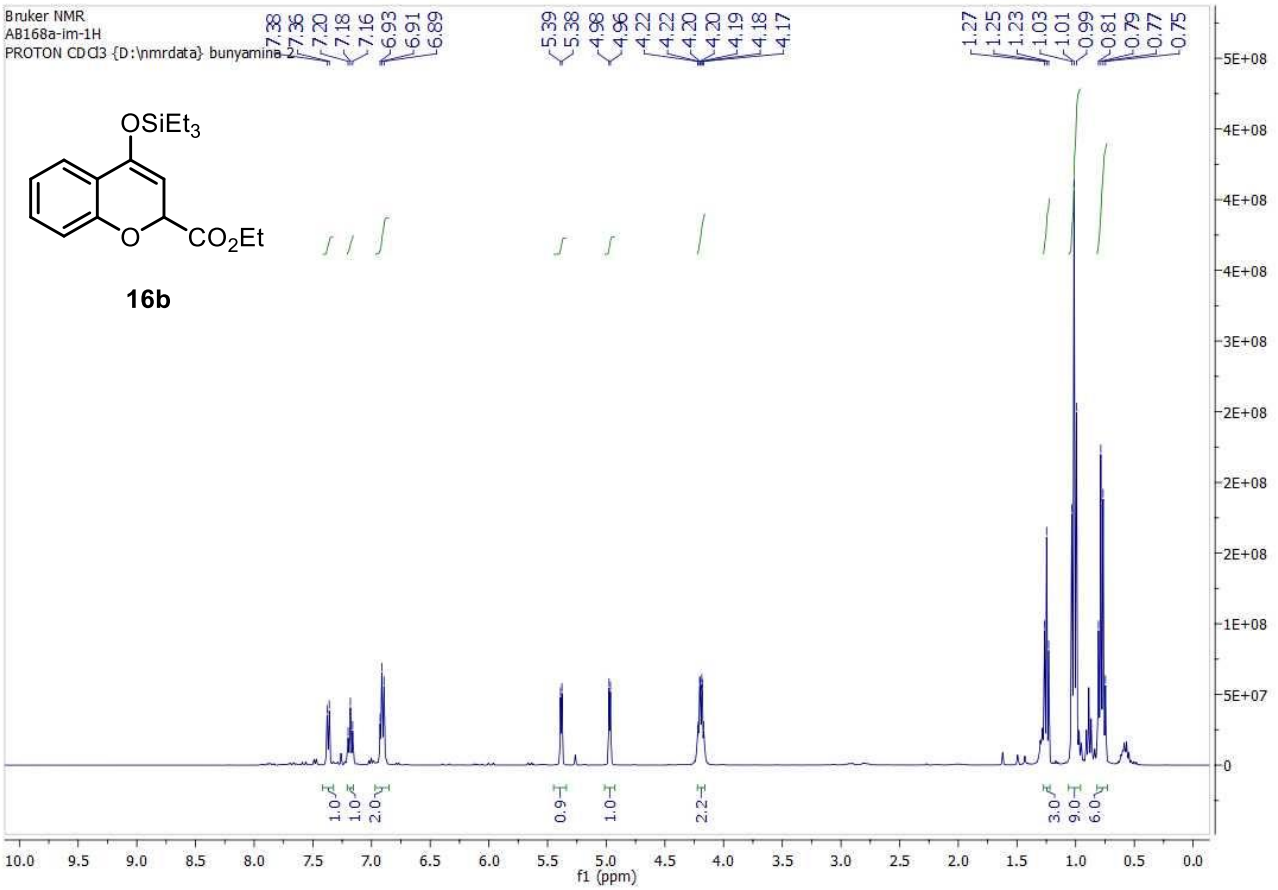

165.9
157.1
145.2
132.0
124.4
122.2
118.2
117.8
69.2
32.8
28.2
f1 (ppm)
14

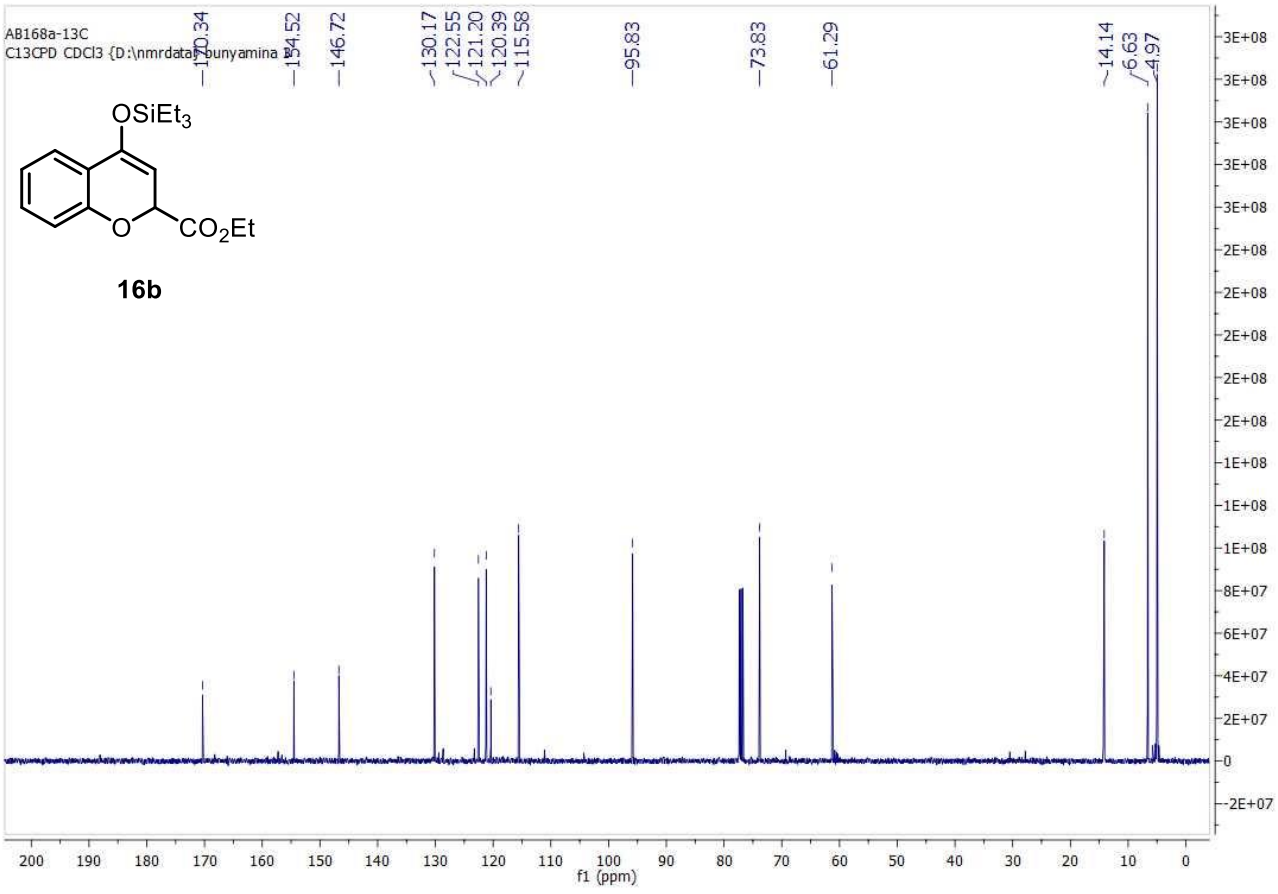

8.30
7.88
7.86
7.52
7.51
7.30
7.26
7.24
7.22
6.82
6.80
4.47
4.46
4.43
4.42
3.87
3.34
3.31
3.28
2.64
2.62
2.61
2.59
2.48
2.46
2.43
2.42
2.39
2.13
2.09
2.05
MeO
Ts
15
f1 (ppm)

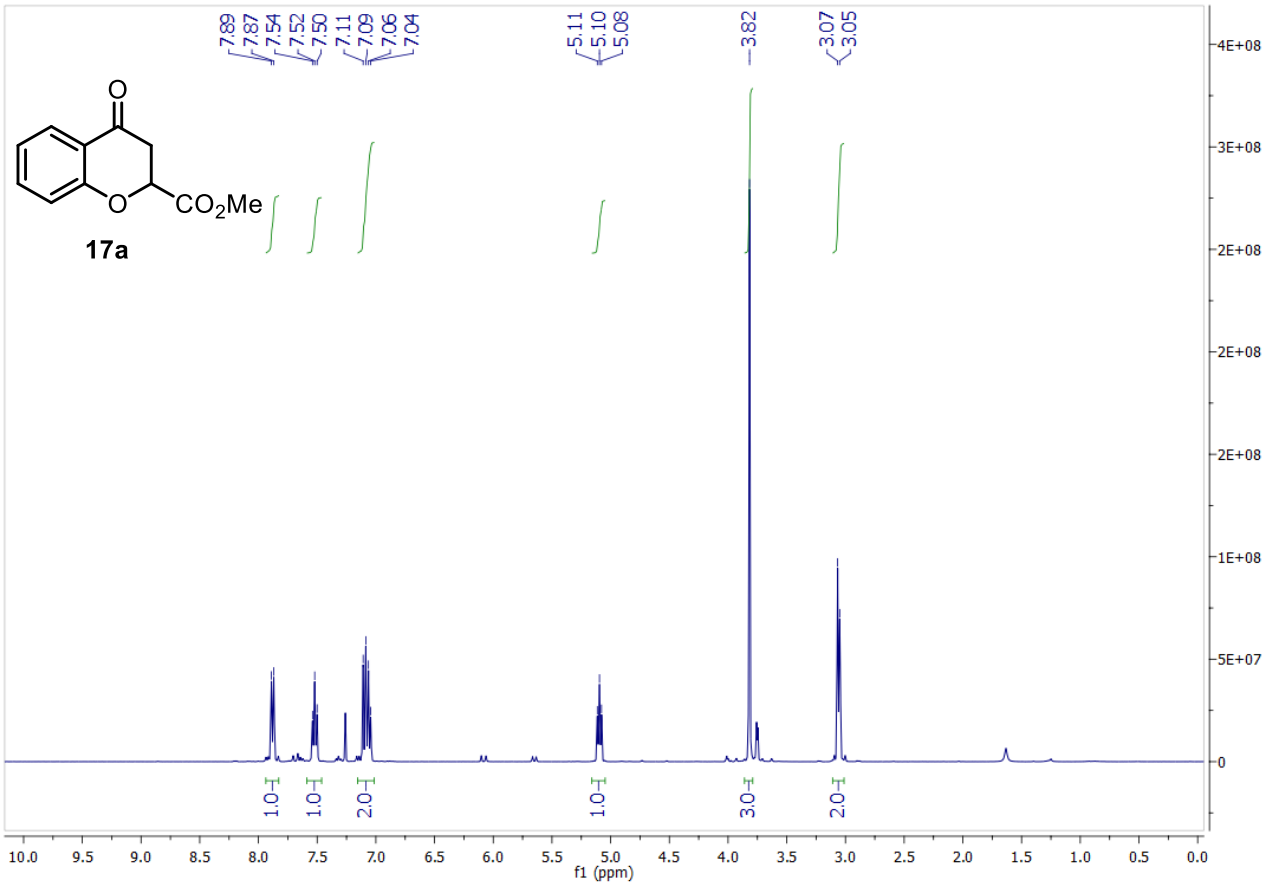

166.1
161.7
146.2
144.6
139.5
136.8
130.1
126.9
126.0
117.0
114.1
109.5
55.7
49.8
31.6
29.6
21.6
MeO
Ts
15
f1 (ppm)

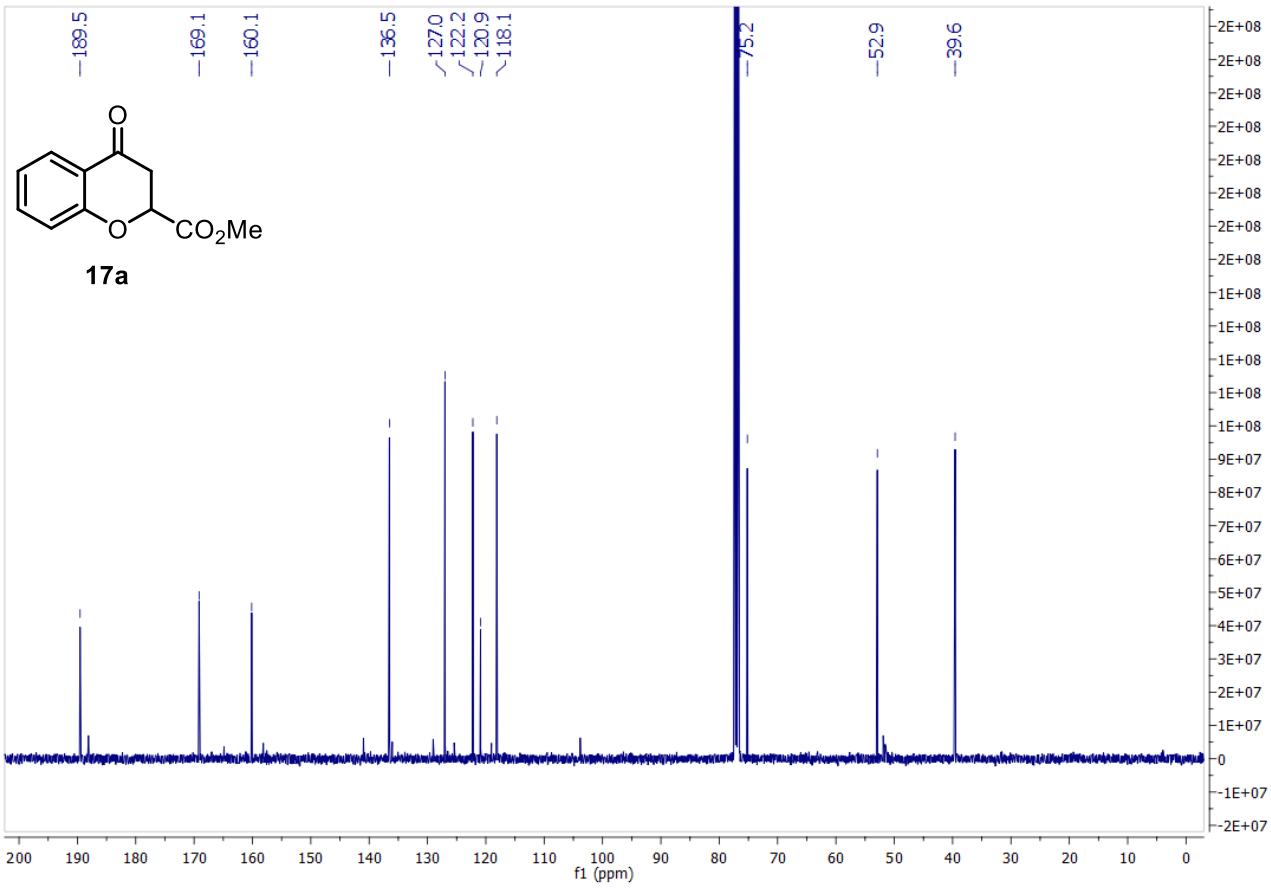

Bruker NMR
AB46a-2h
PROTON CDCl3 {D:\nmrdata} bunyamina-1
7.38
7.36
7.20
7.18
7.16
6.93
6.91
6.89
5.42
5.41
4.97
4.96
3.74
1.03
1.01
0.99
0.80
0.78
0.76
0.74
OSiEt3
O
CO2Me
16a
1.0
1.1
2.0
0.9
1.0
3.2
9.1
6.2
f1 (ppm)

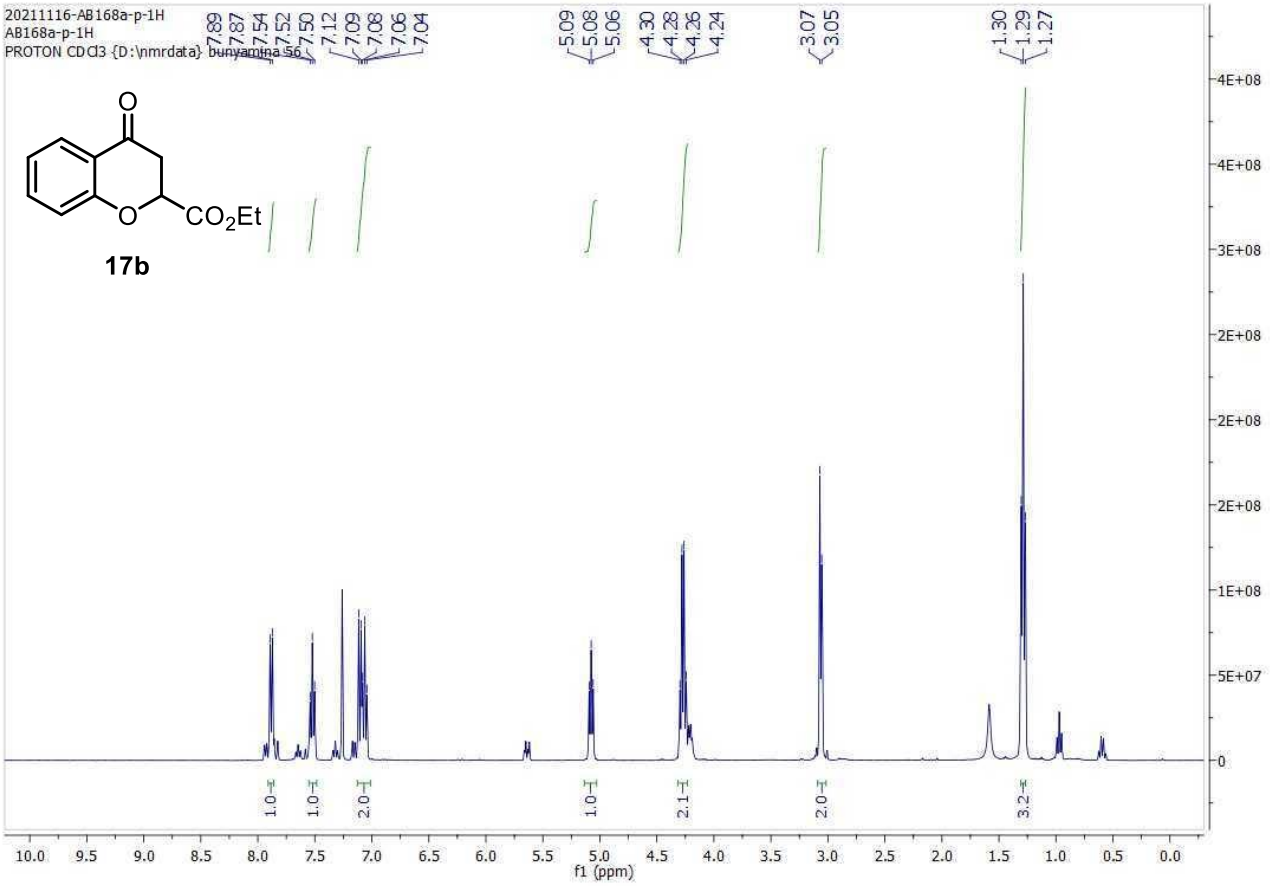

170.8
154.4
146.8
130.2
122.6
121.3
120.4
115.6
95.8
73.9
52.3
6.6
5.0
OSiEt3
O
CO2Me
16a
f1 (ppm)

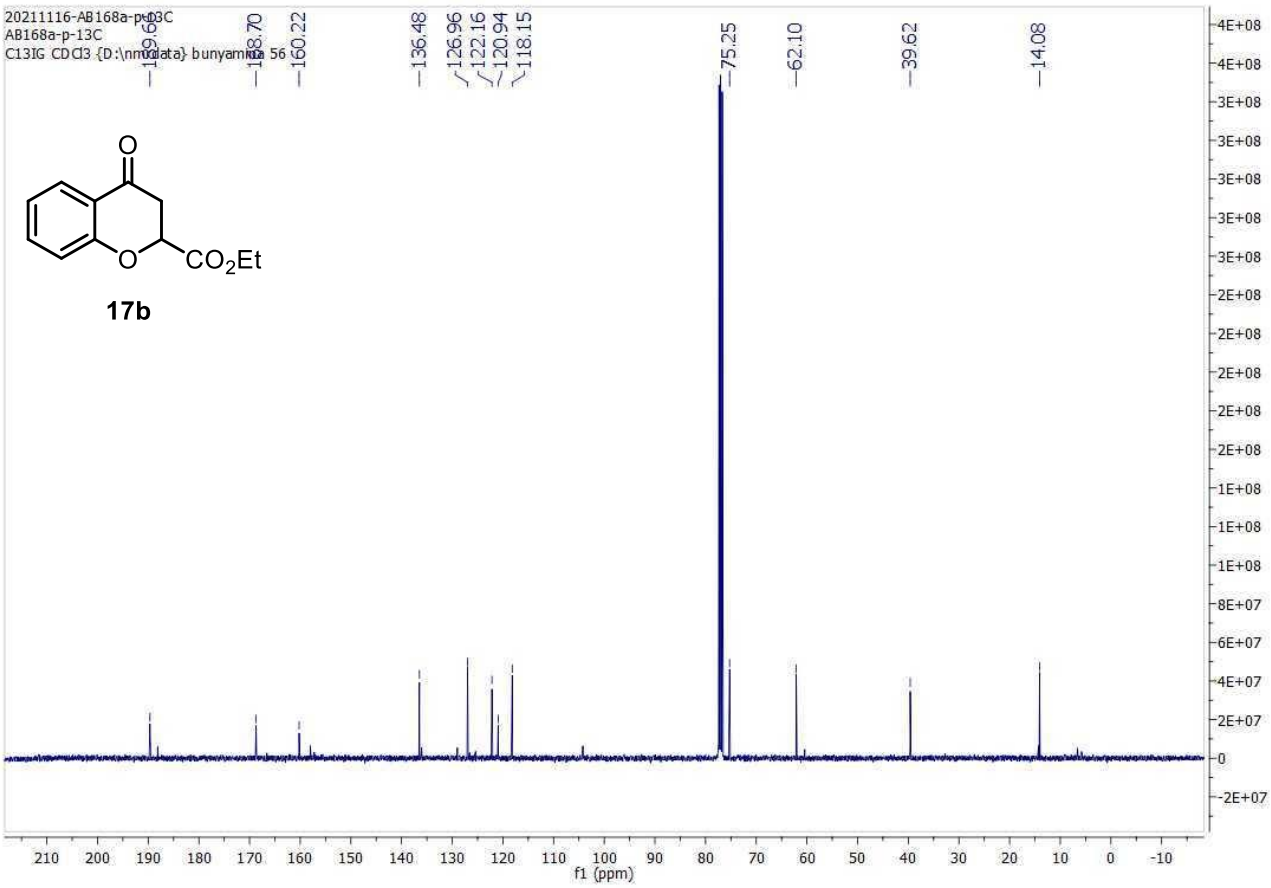

Bruker NMR
AB168a-im-1H
PROTON CDCl3 {D:\nmrdata} bunyamina 2
7.38
7.36
7.20
7.18
7.16
6.93
6.91
6.89
5.39
5.38
4.98
4.96
4.22
4.22
4.20
4.20
4.19
4.18
4.17
1.27
1.25
1.23
1.03
1.01
0.99
0.81
0.79
0.77
0.75
OSiEt3
CO2Et
16b
1.0
1.0
2.0
0.9
1.0
2.2
3.0
9.0
6.0
f1 (ppm)

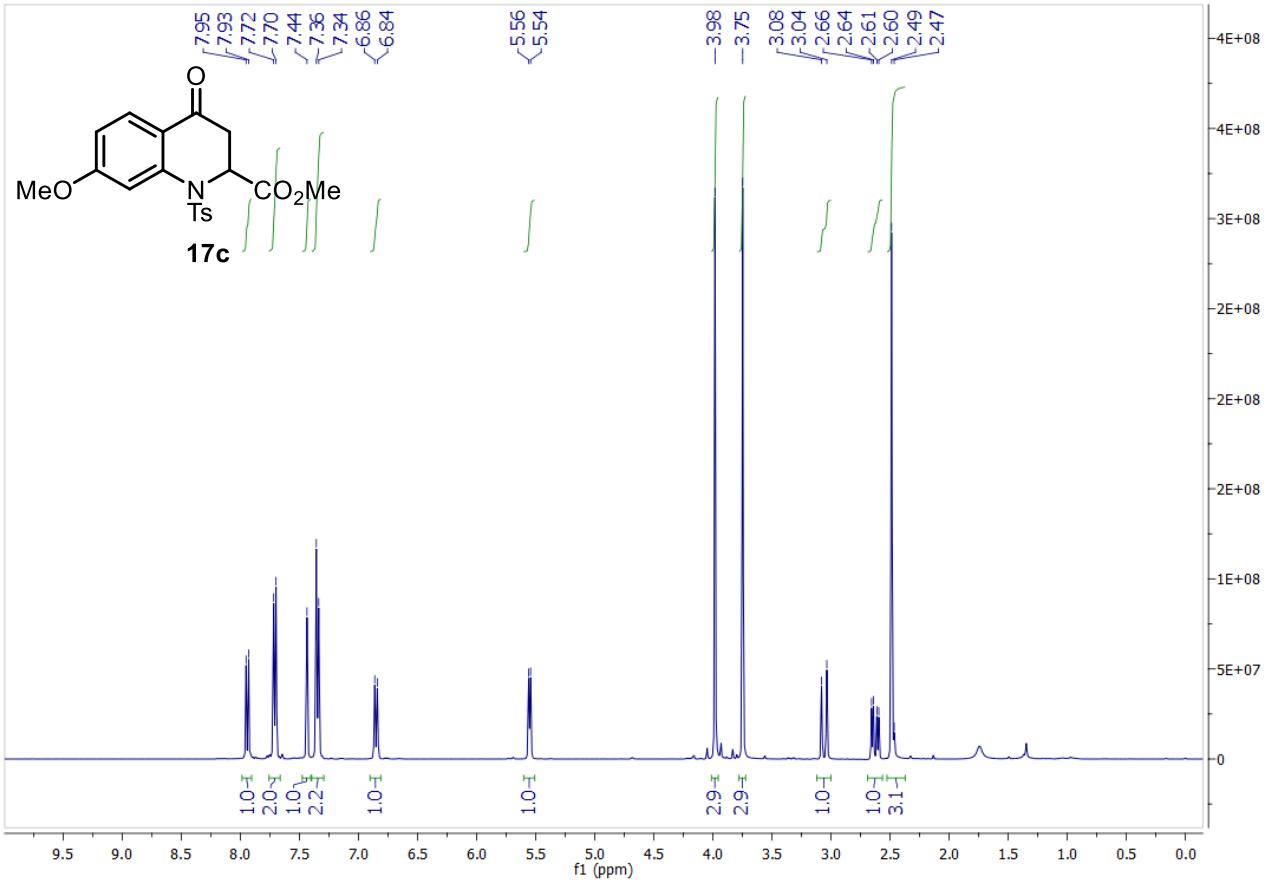

AB168a-13C
C13CPD CDCl3 {D:\nmrdata} bunyamina 2
170.34
154.52
146.72
130.17
122.55
121.20
120.39
115.58
95.83
73.83
61.29
14.14
6.63
4.97
OSiEt3
CO2Et
16b
f1 (ppm)

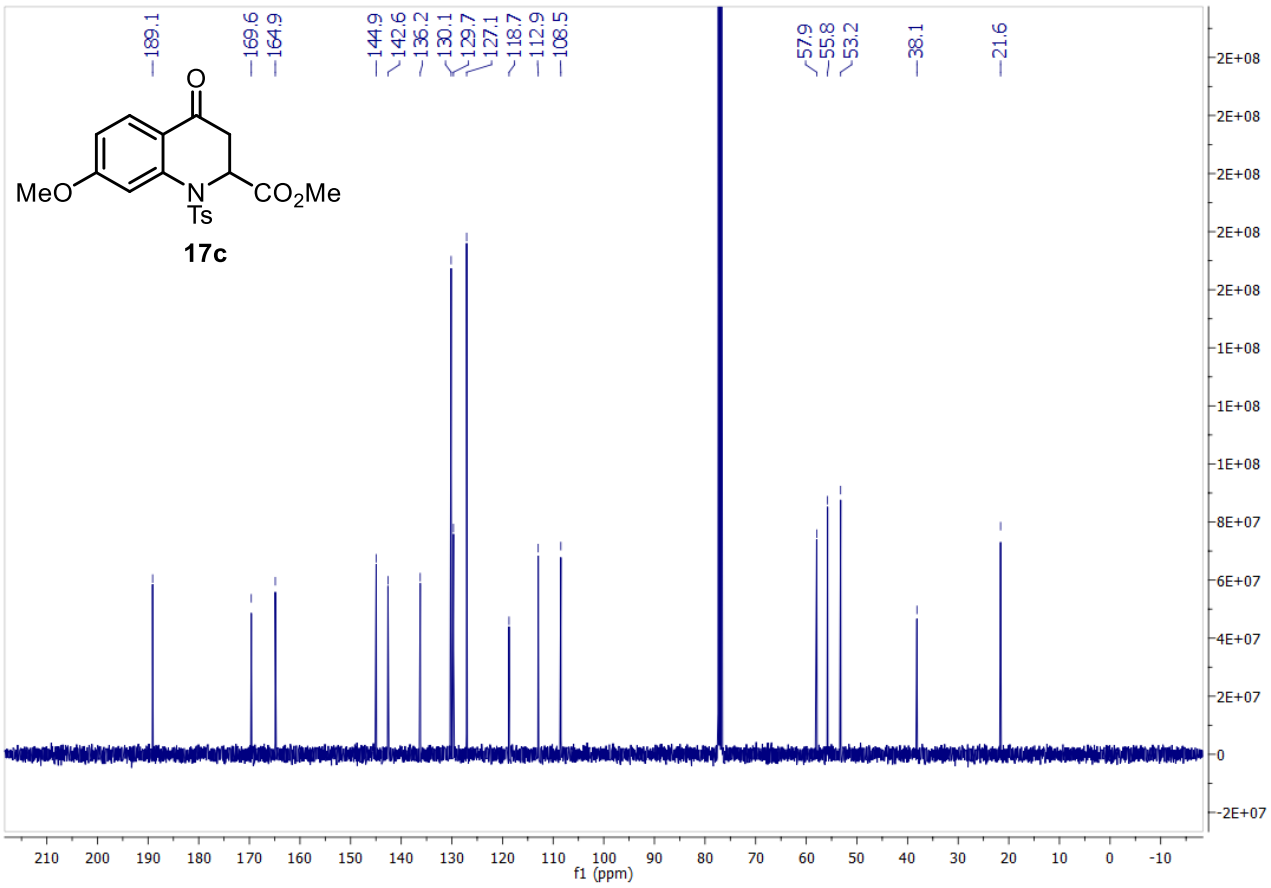

7.89
7.87
7.54
7.52
7.50
7.11
7.09
7.06
7.04
5.11
5.10
5.08
3.82
3.07
3.05
O
O
CO2Me
17a
1.0
1.0
2.0
1.0
3.0
2.0
f1 (ppm)


189.5
169.1
160.1
136.5
127.0
122.2
120.9
118.1
75.2
52.9
39.6
O
O
CO2Me
17a
f1 (ppm)


20211116-AB168a-p-1H
AB168a-p-1H
PROTON CDCl3 {D:\nmrdata} bunyamina 56
7.89
7.87
7.54
7.52
7.50
7.12
7.09
7.08
7.06
7.04
5.09
5.08
5.06
4.30
4.28
4.26
4.24
3.07
3.05
1.30
1.29
1.27
O
O
CO2Et
17b
1.0
1.0
2.0
1.0
2.1
2.0
3.2
f1 (ppm)


20211116-AB168a-p-13C
AB168a-p-13C
C13IG CDCl3 {D:\nmrdata} bunyamina 56
189.61
168.70
160.22
136.48
126.96
122.16
120.94
118.15
75.25
62.10
39.62
14.08
O
O
CO2Et
17b
f1 (ppm)


7.95
7.93
7.72
7.70
7.44
7.36
7.34
6.86
6.84
5.56
5.54
3.98
3.75
3.08
3.04
2.66
2.64
2.61
2.60
2.49
2.47
MeO
N
Ts
CO2Me
O
17c
1.0
2.0
1.0
2.2
1.0
1.0
2.9
2.9
1.0
1.0
3.1
f1 (ppm)


189.1
169.6
164.9
144.9
142.6
136.2
130.1
129.7
127.1
118.7
112.9
108.5
57.9
55.8
53.2
38.1
21.6
MeO
N
Ts
CO2Me
O
17c
f1 (ppm)