Electronic Supplementary Material (ESI) for Chemical Communications.

*Supporting Information for:*

# Acyl silane directed Cp*Rh(III)-catalysed alkylation/annulation reactions

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## GENERAL EXPERIMENTAL

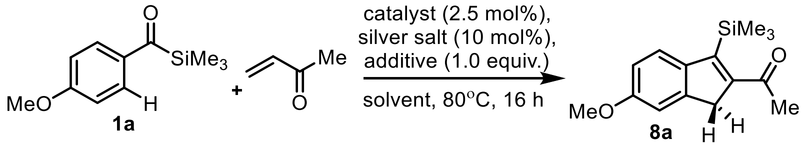
Analytical Thin Layer Chromatography (TLC) was carried out using aluminium-backed Merck Kieselgel KG60 F254 silica plates. The plates were visualized by irradiation with short-wave ultraviolet light. Flash chromatography was performed on SiliaFlashR P60 R12030B 40-63 micron silica gel. $^1$H NMR and $^{13}$C NMR spectra were recorded on a Varian MR-400 (400 MHz) or an Agilent DD2 NMR (500 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, assignment. 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).

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. Each scan or data point on the total ion chromatogram (TIC) is an average of 2247 transients per spectrum, producing four spectra every second. Acquisition was performed using the Agilent Mass Hunter data acquisition software ver. B.10.1 build 10.1.48, and analysis was performed using Mass Hunter Qualitative Analysis ver. B.10.0 build 10.0.10305.0. Acquisition parameters: mode, ESI; drying gas flow, 11 L min$^{-1}$; nebulizer pressure, 25 psi; drying gas temperature, 250 °C. Voltages: capillary, 4000 V; fragmentor, 180 V; skimmer, 45 V; octapole RF, 750 V; scan range, 100−1700m/z; positive ion mode internal reference ions, m/z 121.050873 and 922.009798. LC conditions: Agilent Zorbax C18 Eclipse Plus (2.1 mm Å~ 50 mm, 1.8 mm column), 30 °C; sample (2 μL) was eluted using a binary gradient (solvent A, 0.1% aq formic acid; solvent B, acetonitrile; 80−100% B [2 min], 0.4 mL min$^{-1}$).

Compounds **8a** and **9a** were recrystallized from *n*-hexanes by heating in a minimal amount of solvent until all solids were dissolved and then allowing this sample to cool slowly. Single crystal X-ray diffraction data was collected on the MX2 beamline at the Australian Synchrotron.[1] 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[2] and refined using a full matrix least-squares procedure based on $F^2$ (SHEXL),[3] within the Olex2[4] GUI program. In structures containing disordered solvent molecules that could not be satisfactorily modelled, the solvent mask routine within the Olex2 GUI was used.[4]

Unless otherwise stated, catalysts, reagents and solvents were purchased from commercial sources and used without further purification. Acyl silanes were prepared using established methods from the corresponding aldehydes via the dithiane pathway[5] and the measured spectroscopic data compared well with that previously reported for (4-methoxybenzoyl)trimethylsilane (**1a**)[6]; (4-methoxybenzoyl)triethylsilane (**1b**)[7]; (4-methoxybenzoyl)-*tri*-isopropylsilane (**1c**)[6]; (4-methoxybenzoyl)-*tert*-butyldimethylsilane (**1d**)[6]; benzoyl trimethylsilane (**1e**)[6]; (4-methylbenzoyl)trimethylsilane (**1f**)[6]; (3,4-dimethoxybenzoyl) trimethylsilane (**1g**)[8]; (3,4,5-trimethoxybenzoyl) trimethylsilane (**1h**)[9]; (4-*tert*-butylbenzoyl)trimethylsilane (**1i**)[6]; (3-methoxybenzoyl)trimethylsilane (**1j**)[10]; (3-methylbenzoyl)trimethylsilane (**1k**)[6]; (4-trifluoromethoxybenzoyl)trimethylsilane (**1l**)[6]; (4-chlorobenzoyl)trimethylsilane (**1m**)[6] and (2-hydroxybenzoyl)trimethylsilane (**12**).[11] Phenethyl vinyl ketone was prepared according to a literature method.[12]

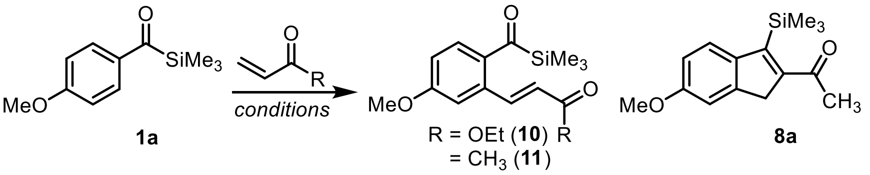
**Table S1.** Optimisation of reaction conditions



| Entry | Catalyst | Silver Salt | Additive | Solvent | Conversion (%) [b] |
|---|---|---|---|---|---|
| 1 | $[RhCp^*Cl_2]_2$ [a] | $AgSbF_6$ | $Cu(OAc)_2$ | 1,2-DCE | 33% |
| 2 | $[RhCp^*Cl_2]_2$ | $AgSbF_6$ | $Cu(OAc)_2$ | 1,2-DCE | 83% |
| 3 | $[RhCp^*Cl_2]_2$ | $AgNTf_2$ | $Cu(OAc)_2$ | 1,2-DCE | 77% |
| 4 | $[RhCp^*Cl_2]_2$ | AgOTf | $Cu(OAc)_2$ | 1,2-DCE | 84% |
| 5 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | $Cu(OAc)_2$ | 1,2-DCE | 99% (92%) |
| 6 | $[RhCp^*Cl_2]_2$ | - | $Cu(OAc)_2$ | 1,2-DCE | 0% |
| 7 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | $Cu(OAc)_2$ [d] | 1,2-DCE | 20% |
| 8 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | NaOAc | 1,2-DCE | 15% |
| 9 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | KOAc | 1,2-DCE | 18% |
| 10 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | KOPiv | 1,2-DCE | 10% |
| 11 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | AcOH | 1,2-DCE | 70% |
| 12 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | $Cu(OAc)_2$ | $CHCl_3$ | 67% |
| 13 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | $Cu(OAc)_2$ | Dioxane | 26% |
| 14 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | $Cu(OAc)_2$ | THF | 28% |
| 15 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | $Cu(OAc)_2$ | PhMe | 0% |
| 16 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | AgOAc [e] | 1,2-DCE | 77% |
| 17 | $[RhCp^*Cl_2]_2$ | $AgBF_4$ | AgOAc [f] | 1,2-DCE | 71% |
| 18 | $Cp^*Co(CO)I_2$ [c] | $AgBF_4$ | $Cu(OAc)_2$ | 1,2-DCE | 16% |
| 19 | $[Cp^*Rh(MeCN)_3](SbF_6)_2$ [c] | - | $Cu(OAc)_2$ | 1,2-DCE | 0% |
| 20 | $[Cp^*Rh(MeCN)_3](SbF_6)_2$ [c] | - | AgOAc [e] | 1,2-DCE | 37% |
| 21 | $[Cp^*Rh(MeCN)_3](SbF_6)_2$ [c] | - | AgOAc [f] | 1,2-DCE | 69% |

*Reaction Conditions:* acyl silane (0.2 mmol), methyl vinyl ketone (0.4 mmol), $[RhCp^*Cl_2]_2$ (2.5 mol%), silver salt (10 mol%), additive (1.0 equiv.) in 1.0 mL solvent heated to 80 °C for 16 h unless stated otherwise. [a] Reaction conducted at 60°C. [b] Conversion determined by $^1$H NMR employing dimethyl sulfone as an internal standard. Isolated yield in parentheses. [c] 5 mol% catalyst used, [d] 0.5 equivalents employed [e] 1.0 equivalents employed [f] 2.0 equivalents employed

**Table S2:** Comparison of Reaction Outcomes for Acyl Silane Directed C-H Functionalisation



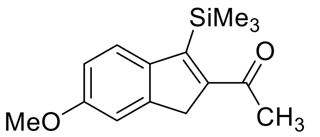
| Entry | Reaction Conditions | % Conversion of 1a to 10 or 11 | % Conversion of 1a to 8a |
|---|---|---|---|
| 1 | 2.0 equiv. Ethyl Acrylate, 2.5 mol% $[Cp^*RhCl_2]_2$, 10 mol% AgOTf, 1.2 equiv. $Cu(OAc)_2$, 1,2-DCE, 60 °C, 24 h. (adapted from Ref. 13) | 100% (**10**) | 0% |
| 2 | 2.0 equiv. Methyl Vinyl Ketone, 2.5 mol% $[Cp^*RhCl_2]_2$, 10 mol% $AgBF_4$, 1.0 equiv. $Cu(OAc)_2$, 1,2-DCE, 60 °C, 16 h. | 0% (**11**) | 33% [a] |
| 3 | 2.0 equiv. Methyl Vinyl Ketone, 2.5 mol% $[Cp^*RhCl_2]_2$, 10 mol% $AgBF_4$, 1.0 equiv. $Cu(OAc)_2$, 1,2-DCE, 80 °C, 16 h. | 0% (**11**) | 100% |
| 4 | 2.0 equiv. Methyl Vinyl Ketone, 5.0 mol% [Ru(*p*-cymene)$Cl_2$]$_2$, 10 mol% $AgSbF_6$, 1.0 equiv. $Cu(OAc)_2$, 1,2-DCE, 60 °C, 4 h. (adapted from Ref. 14) | 100% (**11**) | 0% |
| 5 | 2.0 equiv. Methyl Vinyl Ketone, 5.0 mol% [Ru(*p*-cymene)$Cl_2$]$_2$, 10 mol% $AgSbF_6$, 1.0 equiv. $Cu(OAc)_2$, 1,2-DCE, 80 °C, 16 h. | 75% (**11**) | 25% |

[a] Only 33% conversion to **8a** with remaining 67% being unreacted starting material **1a**.

## SPECIFIC EXPERIMENTAL DETAILS:

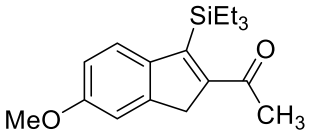
**General Procedure:** To an oven dried vial containing a stirrer bar was added AgBF$_4$ (6.0 mg, 10 mol%), [RhCp*Cl$_2$]$_2$ (4.6 mg, 2.5 mol%), Cu(OAc)$_2$ (65 mg, 0.3 mmol) and 1,2-dichloroethane (1.0 mL). After stirring for 5 minutes, acyl silane **1** (0.3 mmol, dissolved in an additional 0.5 mL 1,2-dichloroethane) and alkene (0.6 mmol) were added, the vial sealed and heated at 80°C for 16h. After this time, the reaction mixture was loaded directly onto a silica gel column and subject to flash chromatography to afford the silyl indene product.

### 1-(6-methoxy-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8a)



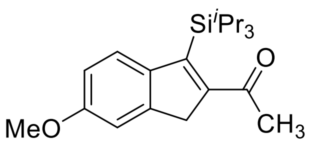
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a white solid in 92% yield (72 mg). MP = 129.1 – 130.6 °C; **$^{1}$H NMR** (400 MHz, CDCl$_3$) δ 7.74 (d, *J* = 8.6 Hz, 1H), 7.07 (d, *J* = 2.3 Hz, 1H), 6.88 (dd, *J* = 2.5 and 8.6 Hz, 1H), 3.86 (s, 3H), 3.72 (s, 2H), 2.42 (s, 3H), 0.37 (s, 9H) ppm; **$^{13}$C NMR** (100 MHz, CDCl$_3$) δ 196.1, 159.6, 156.0, 150.6, 146.6, 141.3, 126.2, 112.8, 109.6, 55.5, 41.7, 29.2, 0.5 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for C$_{15}$H$_{21}$O$_2$Si 261.1305, found 261.1306.

### 1-(6-methoxy-3-(triethylsilyl)-1*H*-inden-2-yl)ethanone (8b)



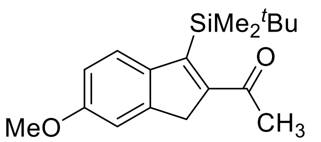
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 86% yield (78 mg). **$^{1}$H NMR** (400 MHz, CDCl$_3$) δ 7.70 (d, *J* = 8.6 Hz, 1H), 7.06 (d, *J* = 2.3 Hz, 1H), 6.88 (dd, *J* = 2.5 and 8.6 Hz, 1H), 3.85 (s, 3H), 3.74 (s, 2H), 2.43 (s, 3H), 0.94 (s, 15H) ppm; **$^{13}$C NMR** (100 MHz, CDCl$_3$) δ 196.7, 159.4, 153.1, 151.9, 146.3, 141.9, 126.2, 112.8, 109.4, 55.4, 42.1, 29.4, 8.0, 4.1 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for C$_{18}$H$_{27}$O$_2$Si 303.1775, found 303.1774.

### 1-(6-methoxy-3-(triisopropylsilyl)-1*H*-inden-2-yl)ethanone (8c)



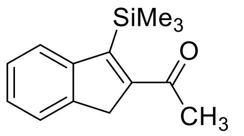
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 31% yield (32 mg). **$^{1}$H NMR** (400 MHz, CDCl$_3$) δ 7.68 (d, *J* = 8.7 Hz, 1H), 7.05 (d, *J* = 2.4 Hz, 1H), 6.86 (dd, *J* = 2.5 and 8.7 Hz, 1H), 3.85 (s, 3H), 3.74 (s, 2H), 2.44 (s, 3H), 1.66 (dt, *J* = 7.5 and 15.0 Hz, 3H), 1.12 (s, 9H), 1.10 (s, 9H) ppm; **$^{13}$C NMR** (100 MHz, CDCl$_3$) δ 199.3, 158.8, 154.3, 148.0, 145.5, 142.1, 126.2, 112.6, 109.1, 55.4, 43.1, 30.1, 19.4, 12.4 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for C$_{21}$H$_{33}$O$_2$Si 345.2244, found 345.2242.

### 1-(6-methoxy-3-(*tert*-butyldimethylsilyl)-1*H*-inden-2-yl)ethanone (8d)



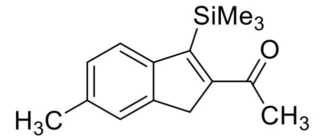
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 89% yield (81 mg). **$^{1}$H NMR** (400 MHz, CDCl$_3$) δ 7.63 (d, *J* = 8.6 Hz, 1H), 7.06 (d, *J* = 2.3 Hz, 1H), 6.88 (dd, *J* = 2.5 and 8.6 Hz, 1H), 3.85 (s, 3H), 3.74 (s, 2H), 2.41 (s, 3H), 1.01 (s, 9H), 0.30 (s, 6H) ppm; **$^{13}$C NMR** (100 MHz, CDCl$_3$) δ 197.0, 159.1, 152.8, 151.0, 145.7, 141.8, 126.6, 112.6, 109.3, 55.5, 42.6, 29.9, 27.8, 18.6, -2.2 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for C$_{18}$H$_{27}$O$_2$Si 303.1775, found 303.1775.

### 1-(3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8e)



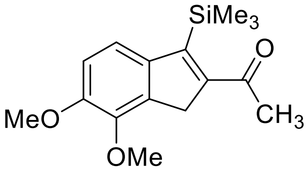
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a white solid in 59% yield (41 mg). **$^{1}$H NMR** (400 MHz, CDCl$_3$) δ 7.85 – 7.82 (m, 1H), 7.54 – 7.52 (m, 1H), 7.32 (dd, *J* = 3.0 and 5.4 Hz, 2H), 3.76 (s, 2H), 2.45 (s, 3H), 0.39 (s, 9H) ppm; **$^{13}$C NMR** (100 MHz, CDCl$_3$) δ 197.1, 155.3, 152.8, 148.0, 144.0, 127.0, 126.7, 125.4, 124.0, 41.8, 29.5, 0.5 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for C$_{14}$H$_{19}$OSi 231.1200, found 231.1198.

### 1-(6-methyl-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8f)



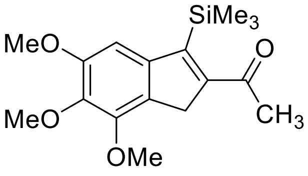
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 86% yield (63 mg). $^1$**H NMR** (500 MHz, $CDCl_3$) δ 7.72 (d, *J* = 8.0 Hz, 1H), 7.34 (s, 1H), 7.14 (d, *J* = 8.0 Hz, 1H), 3.71 (s, 2H), 2.43 (s, 3H), 2.42 (s, 3H), 0.38 (s, 9H) ppm; $^{13}$C NMR (126 MHz, $CDCl_3$) δ 196.8, 155.6, 151.8, 145.5, 144.6, 137.3, 127.7, 125.1, 124.7, 41.6, 29.4, 21.5, 0.6 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{21}OSi$ 245.1356, found 245.1357.

### 1-(6,7-dimethoxy-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8g)



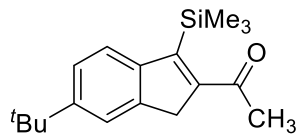
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (10% EtOAc/hexanes) afforded the title compound as a colorless oil in 91% yield (79 mg). $^1$**H NMR** (500 MHz, $CDCl_3$) δ 7.54 (d, *J* = 10.5 Hz, 1H), 6.91 (d, *J* = 10.5 Hz, 1H), 3.94 (s, 3H), 3.91 (s, 3H), 3.75 (s, 2H), 2.43 (s, 3H), 0.37 (s, 9H) ppm; $^{13}$**C NMR** (126 MHz, $CDCl_3$) δ 196.3, 155.8, 152.0, 151.1, 144.7, 142.5, 136.9, 121.4, 111.6, 60.2, 56.1, 39.0, 29.3, 0.5 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{16}H_{23}O_3Si$ 291.1411, found 291.1410.

### 1-(5,6,7-trimethoxy-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8h)



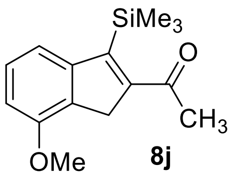
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (20% EtOAc/hexanes) afforded the title compound as a colorless oil in 96% yield (92 mg). $^1$**H NMR** (500 MHz, $CDCl_3$) δ 7.19 (s, 1H), 3.99 (s, 3H), 3.90 (s, 3H), 3.88 (s, 3H), 3.71 (s, 2H), 2.43 (s, 3H), 0.38 (s, 9H) ppm; $^{13}$**C NMR** (126 MHz, $CDCl_3$) δ 196.2, 155.5, 153.3, 152.7, 148.9, 143.8, 141.7, 128.8, 104.8, 61.1, 60.4, 56.2, 39.2, 29.2, 0.5 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{17}H_{25}O_4Si$ 321.1517, found 321.1516.

### 1-(6-*tert*-butyl-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8i)



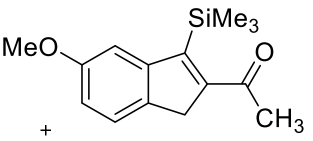
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a pale yellow solid in 92% yield (79 mg). MP = 121.1 – 123.9 °C; $^1$**H NMR** (500 MHz, $CDCl_3$) δ 7.79 (d, *J* = 8.3 Hz, 1H), 7.58 (d, *J* = 1.1 Hz, 1H), 7.40 (dd, *J* = 1. 9 and 8.3 Hz, 1H), 3.76 (s, 2H), 2.45 (s, 3H), 1.37 (s, 9H), 0.39 (s, 9H) ppm; $^{13}$**C NMR** (126 MHz, $CDCl_3$) δ 196.8, 155.6, 151.8, 145.5, 144.6, 137.3, 127.7, 125.1, 124.7, 41.6, 29.4, 21.5, 0.6 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{18}H_{27}OSi$ 287.1826, found 287.1825.

### 1-(7-methoxy-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8j)
### 1-(5-methoxy-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8j')



**8j**

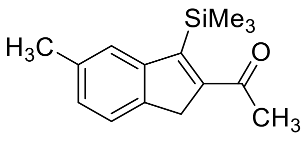
+



**8j'**

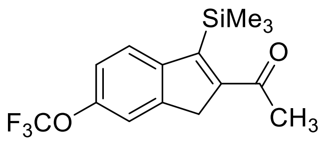
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 74% yield (58 mg, **8j/8j'** 4:1). $^1$**H NMR** (500 MHz, $CDCl_3$) **8j** = δ 7.46(d, *J* = 7.8 Hz, 0.8H), 7.31 (t, *J* = 8.0 Hz, 0.8H), 6.87 (d, *J* = 8.0 Hz, 0.8H), 3.92 (s, 2.4H), 3.70 (s, 1.6H), 2.46 (s, 2.4H), 0.37 (s, 7.2H) ppm; **8j'** = δ 7.40 (d, *J* = 8.2 Hz, 0.2H), 7.38 (d, *J* = 2.4 Hz, 0.2H), 6.92 (dd, *J* = 2.4 and 8.2 Hz, 0.2H), 3.84 (s, 0.6H), 3.70 (s, 0.4H), 2.44 (s, 0.6H), 0.39 (s, 1.8H) ppm; $^{13}$**C NMR** (126 MHz, $CDCl_3$) δ 197.1, 155.3, 155.2, 153.1, 149.7, 131.3, 128.3, 124.3, 118.3, 113.6, 110.5, 108.9, 55.3, 41.1, 39.2, 29.4, 26.9, 0.5 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{21}O_2Si$ 261.1305, found 261.1306.

### 1-(5-methyl-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8k)



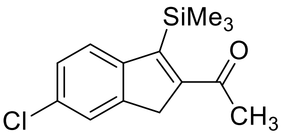
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 57% yield (42 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.64 (s, 1H), 7.40 (d, *J* = 7.5 Hz, 1H), 7.15 (d, *J* = 7.5 Hz, 1H), 3.71 (s, 2H), 2.44 (s, 3H), 2.41 (s, 3H), 0.38 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 197.2, 155.3, 153.2, 148.4, 141.2, 136.3, 128.1, 126.0, 123.7, 41.5, 29.4, 21.8, 0.6 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{21}OSi$ 245.1356, found 245.1357.

### 1-(6-trifluoromethoxy-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8l)



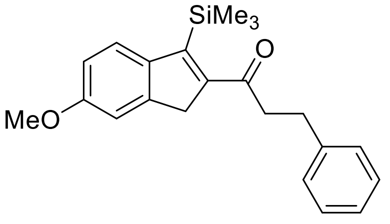
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 47% yield (44 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.81 (d, *J* = 8.5 Hz, 1H), 7.37 (s, 1H), 7.18 (d, *J* = 8.5 Hz, 1H), 3.77 (s, 2H), 2.45 (s, 3H), 0.38 (s, 9H) ppm. **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 196.8, 154.2, 153.7, 148.5, 146.7, 145.8, 126.1, 122.3 (q, $^1J_{CF}$ = 255 Hz), 119.7, 116.8, 41.9, 29.5, 0.5 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{18}F_3O_2Si$ 315.1023, found 315.1023.

### 1-(6-chloro-3-(trimethylsilyl)-1*H*-inden-2-yl)ethanone (8m)



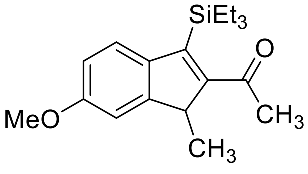
Prepared according to the General Procedure using methyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 27% yield (21 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.72 (d, *J* = 8.4 Hz, 1H), 7.49 (s, 1H), 7.29 (dd, *J* = 1.7 and 8.4 Hz, 1H), 3.74 (s, 2H), 2.44 (s, 3H), 0.37 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 196.8, 154.5, 152.9, 146.5, 145.7, 133.2, 127.1, 126.1, 124.2, 41.6, 29.4, 0.5 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{14}H_{18}ClOSi$ 265.0810, found 265.0811.

### 1-(6-methoxy-3-(trimethylsilyl)-1*H*-inden-2-yl)-3-phenylpropan-1-one (8n)



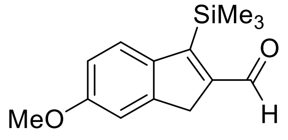
Prepared according to the General Procedure using phenethyl vinyl ketone. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 79% yield (83 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.75 (d, *J* = 8.6 Hz, 1H), 7.33 – 7.26 (m, 3H), 7.24 (s, 1H), 7.22 (d, *J* = 7.1 Hz, 1H), 7.05 (d, *J* = 2.3 Hz, 1H), 6.88 (dd, *J* = 2.5 and 8.6 Hz, 1H), 3.85 (s, 3H), 3.68 (s, 2H), 3.04 (d, *J* = 1.7 Hz, 4H), 0.40 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 197.5, 159.6, 156.1, 150.4, 146.5, 141.4, 141.2, 128.5, 128.4, 126.2, 126.1, 112.8, 109.6, 55.5, 43.1, 41.2, 30.2, 0.6 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{22}H_{27}O_2Si$ 351.1775, found 351.1776.

### 1-(6-methoxy-3-(triethylsilyl)-1-(methyl)inden-2-yl)ethanone (8o)



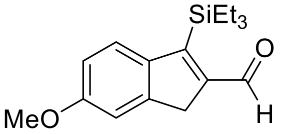
Prepared according to the General Procedure using 3-penten-2-one. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 54% yield (51 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.58 (d, *J* = 8.6 Hz, 1H), 6.96 (d, *J* = 2.2 Hz, 1H), 6.88 (dd, *J* = 2.5 and 8.5 Hz, 1H), 3.85 (s, 3H), 3.78 (q, *J* = 7.4 Hz, 1H), 2.42 (s, 3H), 1.35 (d, *J* = 7.4 Hz, 2H), 0.87 – 0.95 (m, 15H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 199.9, 160.2, 159.2, 151.7, 147.2, 139.8, 125.6, 112.4, 108.9, 55.5, 47.2, 30.5, 17.0, 7.8, 4.2 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{19}H_{29}O_2Si$ 317.1931, found 317.1929.

### 6-methoxy-3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9a)



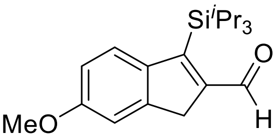
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a white solid in 91% yield (67 mg). MP = 121.7 – 123.9 °C; **$^1$H NMR** (500 MHz, $CDCl_3$) δ 10.16 (s, 1H), 7.64 (d, *J* = 8.6 Hz, 1H), 7.09 (s, 1H), 6.90 (dd, *J* = 2.4 and 8.6 Hz, 1H), 3.86 (s, 3H), 3.69 (s, 2H), 0.49 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 189.1, 162.4, 160.4, 153.0, 147.3, 140.6, 126.2, 113.4, 109.8, 55.5, 38.4, 1.4 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{14}H_{19}O_2Si$ 247.1149, found 247.1150.

**6-methoxy-3-(triethylsilyl)-1*H*- indene-2-carbaldehyde (9b)**



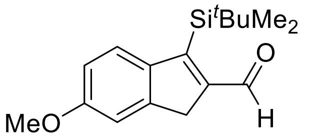
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 91% yield (79 mg). **$^{1}$H NMR** (500 MHz, CDCl$_3$) δ 10.09 (s, 1H), 7.65 (d, *J* = 8.6 Hz, 1H), 7.09 (s, 1H), 6.89 (dd, *J* = 2.5 and 8.6 Hz, 1H), 3.86 (s, 3H), 3.72 (s, 2H), 1.0 (s, 15H) ppm; **$^{13}$C NMR** (126 MHz, CDCl$_3$) δ 189.5, 160.4, 160.2, 154.6, 147.3, 140.9, 126.2, 113.4, 109.7, 55.5, 38.5, 7.5, 5.2 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for $C_{17}H_{25}O_2Si$ 289.1618, found 289.1618.

**6-methoxy-3-(triisopropylsilyl)-1*H*-indene-2-carbaldehyde (9c)**



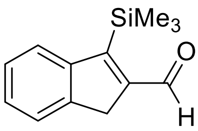
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 23% yield (23 mg). **$^{1}$H NMR** (500 MHz, CDCl$_3$) δ 10.10 (s, 1H), 7.72 (d, *J* = 8.8 Hz, 1H), 7.08 (s, 1H), 6.88 (d, *J* = 8.8 Hz, 1H), 3.86 (s, 3H), 3.76 (s, 2H), 1.68 – 1.59 (m, 3H), 1.15 (d, *J* = 7.5 Hz, 18H) ppm; **$^{13}$C NMR** (126 MHz, CDCl$_3$) δ 190.3, 160.2, 158.2, 155.1, 147.4, 127.1, 113.4, 109.3, 55.5, 39.0, 19.0, 13.4 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for $C_{20}H_{31}O_2Si$ 331.2088, found 331.2089.

**6-methoxy-3-(*tert*-butyldimethylsilyl)-1*H*-indene-2-carbaldehyde (9d)**



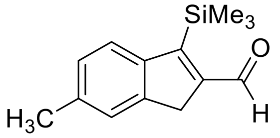
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 78% yield (67 mg). MP = 106.7 – 108.2 °C; **$^{1}$H NMR** (500 MHz, CDCl$_3$) δ 10.12 (s, 1H), 7.64 (d, *J* = 8.6 Hz, 1H), 7.08 (s, 1H), 6.88 (dd, *J* = 2.5 and 8.6 Hz, 1H), 3.85 (s, 3H), 3.72 (s, 2H), 0.98 (s, 9H), 0.50 (s, 6H) ppm; **$^{13}$C NMR** (126 MHz, CDCl$_3$) δ 189.7, 160.3, 154.5, 147.2, 141.4, 127.1, 113.3, 109.5, 55.5, 38.6, 26.8, 17.3, -1.3 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for $C_{17}H_{25}O_2Si$ 289.1618, found 289.1617.

**3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9e)**



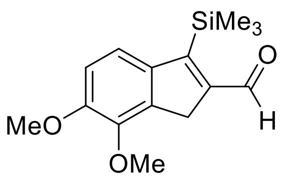
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a white solid in 48% yield (31 mg). MP = 123.4 – 125.1 °C; **$^{1}$H NMR** (500 MHz, CDCl$_3$) δ 10.25 (s, 1H), 7.78 – 7.72 (m, 1H), 7.56 (s, 1H), 7.40 – 7.33 (m, 2H), 3.72 (s, 2H), 0.51 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, CDCl$_3$) δ 189.8, 162.0, 154.7, 147.4, 144.7, 128.2, 126.7, 125.4, 124.6, 38.4, 1.4 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for $C_{13}H_{17}OSi$ 217.1043, found 217.1041.

**6-methyl-3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9f)**



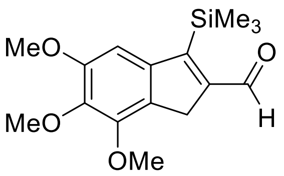
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 80% yield (55 mg). **$^{1}$H NMR** (500 MHz, CDCl$_3$) δ 10.22 (s, 1H), 7.63 (d, *J* = 8.0 Hz, 1H), 7.38 (s, 1H), 7.17 (d, *J* = 8.0 Hz, 1H), 3.68 (s, 2H), 2.43 (s, 3H), 0.50 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, CDCl$_3$) δ 189.7, 162.2, 153.9, 145.1, 144.9, 138.6, 127.7, 125.4, 125.1, 38.1, 21.7, 1.3 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for $C_{14}H_{19}OSi$ 231.1200, found 231.1195.

**6,7-dimethoxy-3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9g)**



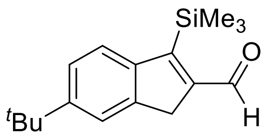
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (10% EtOAc/hexanes) afforded the title compound as a colorless oil in 87% yield (72 mg). **$^{1}$H NMR** (400 MHz, CDCl$_3$) δ 10.17 (s, 1H), 7.43 (d, *J* = 8.4 Hz, 1H), 6.93 (d, *J* = 8.4 Hz, 1H), 3.94 (s, 3H), 3.92 (s, 3H), 3.76 (s, 2H), 0.48 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, CDCl$_3$) δ 189.2, 162.0, 153.3, 152.8, 145.3, 142.0, 136.8, 121.2, 111.5, 60.0, 56.2, 36.0, 1.4 ppm; **HRMS** (*m/z*) [M+H]$^+$ Calcd. for $C_{15}H_{21}O_3Si$ 277.1254, found 277.1254.

### 5,6,7-trimethoxy-3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9h)



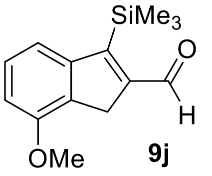
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (20% EtOAc/hexanes) afforded the title compound as a colorless oil in 92% yield (85 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 10.18 (s, 1H), 7.05 (s, 1H), 3.98 (s, 3H), 3.91 (s, 3H), 3.90 (s, 3H), 3.71 (s, 2H), 0.50 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 189.0, 161.7, 154.8, 153.3, 149.5, 143.3, 142.5, 129.2, 104.6, 61.2, 60.2, 56.3, 36.3, 1.4 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{16}H_{23}O_4Si$ 307.1360, found 307.1361.

### 6-*tert*-butyl-3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9i)



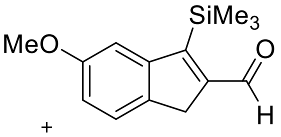
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 85% yield (69 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 10.23 (s, 1H), 7.69 (d, *J* = 8.2 Hz, 1H), 7.60 (s, 1H), 7.41 (dd, *J* = 1.7 and 8.2 Hz, 1H), 3.72 (s, 2H), 1.37 (s, 9H), 0.50 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 189.7, 162.2, 154.3, 151.9, 144.9, 144.8, 124.9, 124.0, 121.6, 38.4, 35.0, 31.4, 1.4 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{17}H_{25}OSi$ 273.1669, found 273.1670.

### 7-methoxy-3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9j)
### 5-methoxy-3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9j')



**9j**

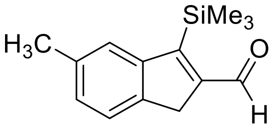
+



**9j'**

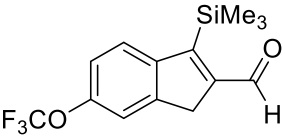
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 81% yield (60 mg, **9j/9j'** 3:1). **$^1$H NMR** (500 MHz, $CDCl_3$) **9j** = δ 10.24 (s, 0.75H), 7.37 (dt, *J* = 0.9 and 7.7 Hz, 0.75H), 7.33 (t, *J* = 7.8 Hz, 0.75H), 3.90 (s, 2.25 H), 3.67 (s, 1.5H), 0.49 (s, 6.75H) ppm; **9j'** = δ 10.23 (s, 0.25H), 7.45 (d, *J* = 8.3 Hz, 0.25H), 7.27 (d, *J* = 2.3 Hz, 0.25H), 3.85 (s, 0.75H), 3.66 (s, 0.5H), 0.51 (s, 2.25H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 189.7, 161.8, 155.9, 155.0, 149.0, 132.1, 128.3, 124.9, 118.1, 114.2, 110.8, 110.0, 55.4, 37.6, 36.0, 1.4 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{14}H_{19}O_2Si$ 247.1149, found 247.1149.

### 5-methyl-3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9k)



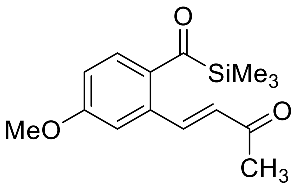
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 43% yield (30 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 10.24 (s, 1H), 7.54 (s, 1H), 7.44 (d, *J* = 7.6 Hz, 1H), 7.19 (d, *J* = 7.6 Hz, 1H), 3.68 (s, 2H), 2.43 (s, 3H), 0.51 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 189.8, 162.1, 155.1, 147.8, 141.8, 136.3, 129.3, 125.9, 124.3, 38.0, 21.7, 1.5 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{14}H_{19}OSi$ 231.1200, found 231.1192.

### 6-trifluoromethoxy-3-(trimethylsilyl)-1*H*-indene-2-carbaldehyde (9l)



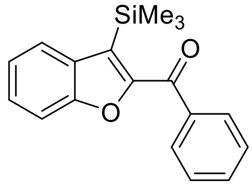
Prepared according to the General Procedure using acrolein. Purification by flash chromatography (5% EtOAc/hexanes) afforded the title compound as a colorless oil in 63% yield (57 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 10.23 (s, 1H), 7.73 (d, *J* = 8.0 Hz, 1H), 7.40 (s, 1H), 7.21 (d, *J* = 8.0 Hz, 1H), 3.74 (s, 2H), 0.51 (s, 9H) ppm; **$^{13}$C NMR** (126 MHz, $CDCl_3$) δ 189.4, 160.6, 155.5, 149.3, 146.6, 146.0, 126.1, 122.2 (q, $^1J_{CF}$ = 255 Hz), 119.7, 117.4, 38.7, 1.3 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{14}H_{16}F_3O_2Si$ 301.0866, found 301.0865.

### (*E*)-4-(5-methoxy-2-((trimethylsilyl)carbonyl)phenyl)but-3-en-2-one (11)



To an oven dried vial containing a stirrer bar was added $AgSbF_6$ (10.3 mg, 10 mol%), $[Ru(p\text{-cymene})Cl_2]_2$ (9.2 mg, 5.0 mol%), $Cu(OAc)_2$ (65 mg, 0.3 mmol) and 1,2-dichloroethane (1.0 mL). After stirring for 5 minutes, acyl silane **1a** (0.3 mmol, dissolved in an additional 0.5 mL 1,2-dichloroethane) and methyl vinyl ketone (0.050 mL, 0.6 mmol) were added, the vial sealed and heated at 60°C for 4 h. After this time, the reaction mixture was loaded directly onto a silica gel column and subject to flash chromatography (15% EtOAc/hexanes) to afford the title compound as a bright yellow oil in 83% yield (69 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 8.07 (d, *J* = 16.3 Hz, 1H), 7.81 (d, *J* = 8.5 Hz, 1H), 7.03 (dd, *J* = 5.5 and 15.2 Hz, 2H), 6.45 (d, *J* = 16.2 Hz, 1H), 3.90 (s, 3H), 2.43 (s, 3H), 0.36 (s, 9H) ppm; **$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 237.4, 199.2, 161.9, 144.3, 136.0, 134.6, 133.8, 130.3, 114.3, 113.8, 55.6, 26.8, -1.3 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{15}H_{21}O_3Si$ 277.1254, found 277.1254.

### 1-[3-(trimethylsilyl)benzofuran-2-yl]acetophenone (13)



To a stirred solution of (2-hydroxybenzoyl)trimethylsilane (58 mg, 0.3 mmol), and $Cs_2CO_3$ (195 mg, 0.6 mmol) in acetone (10 mL) was added 2-bromoacetophenone (90 mg, 0.45 mmol) and the resultant solution stirred at room temperature for 16h. After this time, the reaction mixture was diluted with water (10 mL) and extracted with EtOAc (3 × 10 mL). The combined organic fractions were washed with brine, dried over $MgSO_4$, filtered and the solvent removed *in vacuo*. Purification by flash chromatography (10% EtOAc/hexanes) afforded the title compound as a pale-yellow oil in 77% yield (68 mg). **$^1$H NMR** (500 MHz, $CDCl_3$) δ 8.11 (dd, *J* = 1.3 and 8.4 Hz, 2H), 7.94 (d, *J* = 8.1 Hz, 1H), 7.68 – 7.50 (m, 4H), 7.46 (ddd, *J* = 1.3, 7.2, and 8.4 Hz, 1H), 7.36 – 7.28 (m, 1H), 0.50 (s, 9H) ppm; **$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 185.8, 157.1, 155.3, 137.3, 132.9, 132.1, 130.1, 128.3, 127.2, 124.7, 124.5, 123.4, 112.2, 0.1 ppm; **HRMS** (*m/z*) $[M+H]^+$ Calcd. for $C_{18}H_{19}O_2Si$ 295.1149, found 295.1148.

## REFERENCES

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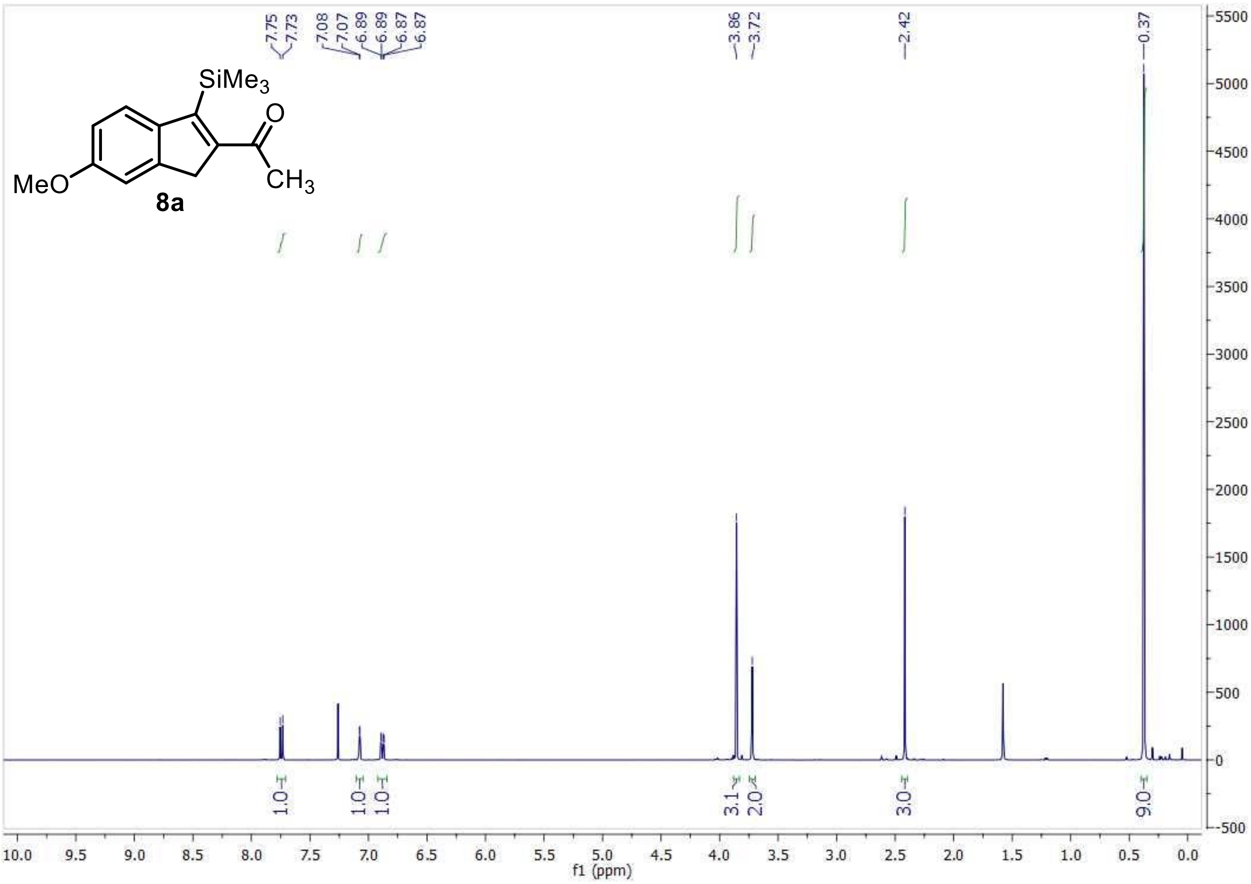
## NMR Spectra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O
CH$_3$
MeO
8a
1.0
1.0
1.0
3.1
2.0
3.0
9.0
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
-500
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
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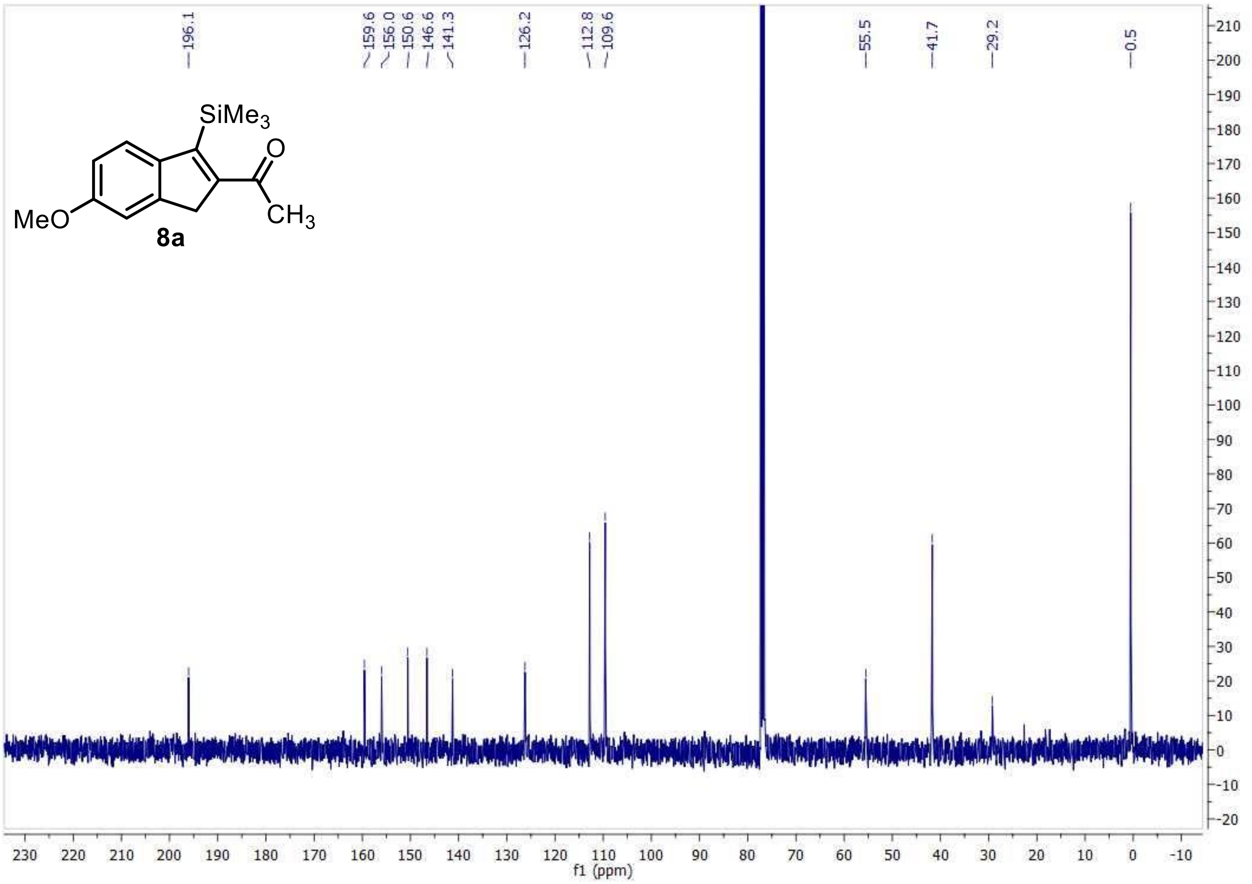
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CH$_3$
MeO
8a
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
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0
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180
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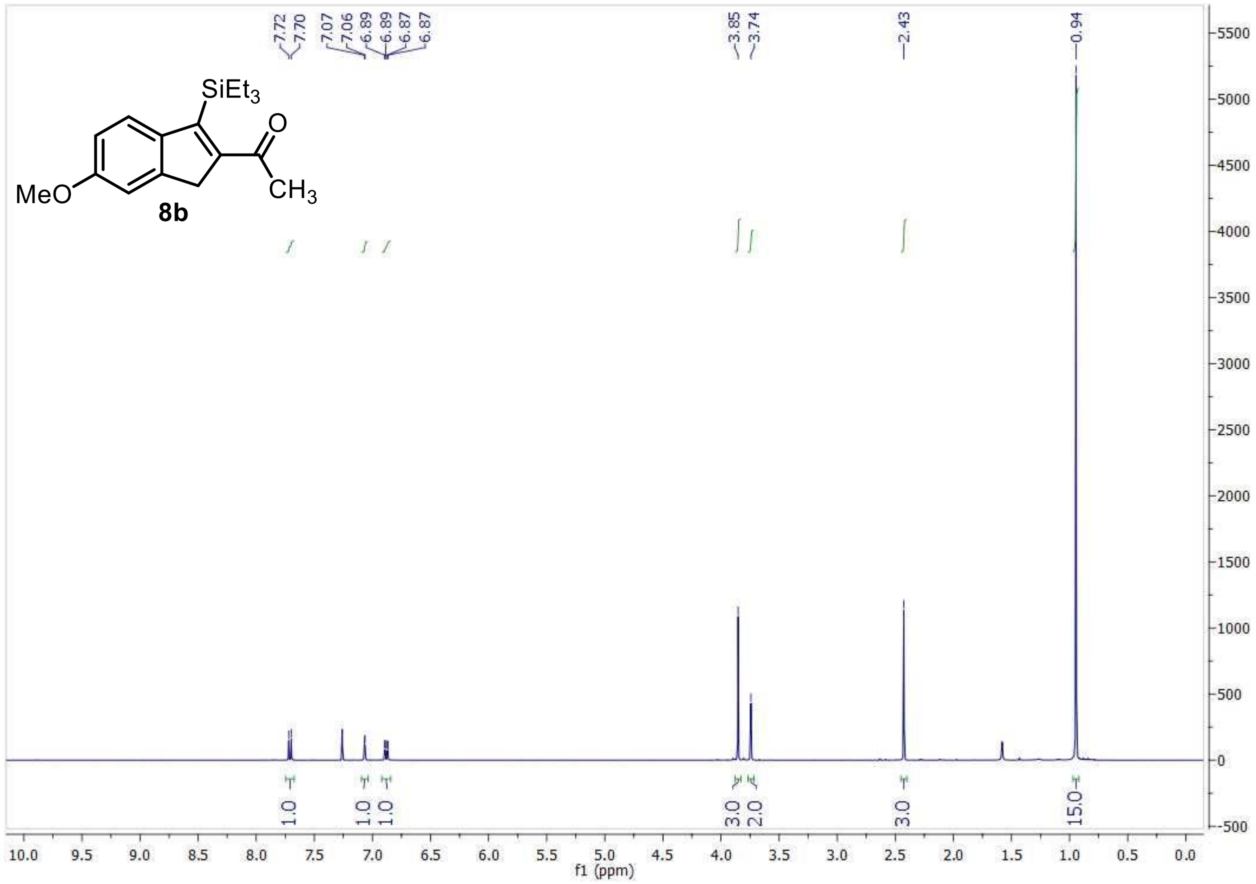
f1 (ppm)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CH3
8b
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1.0
1.0
3.0
2.0
3.0
15.0
f1 (ppm)
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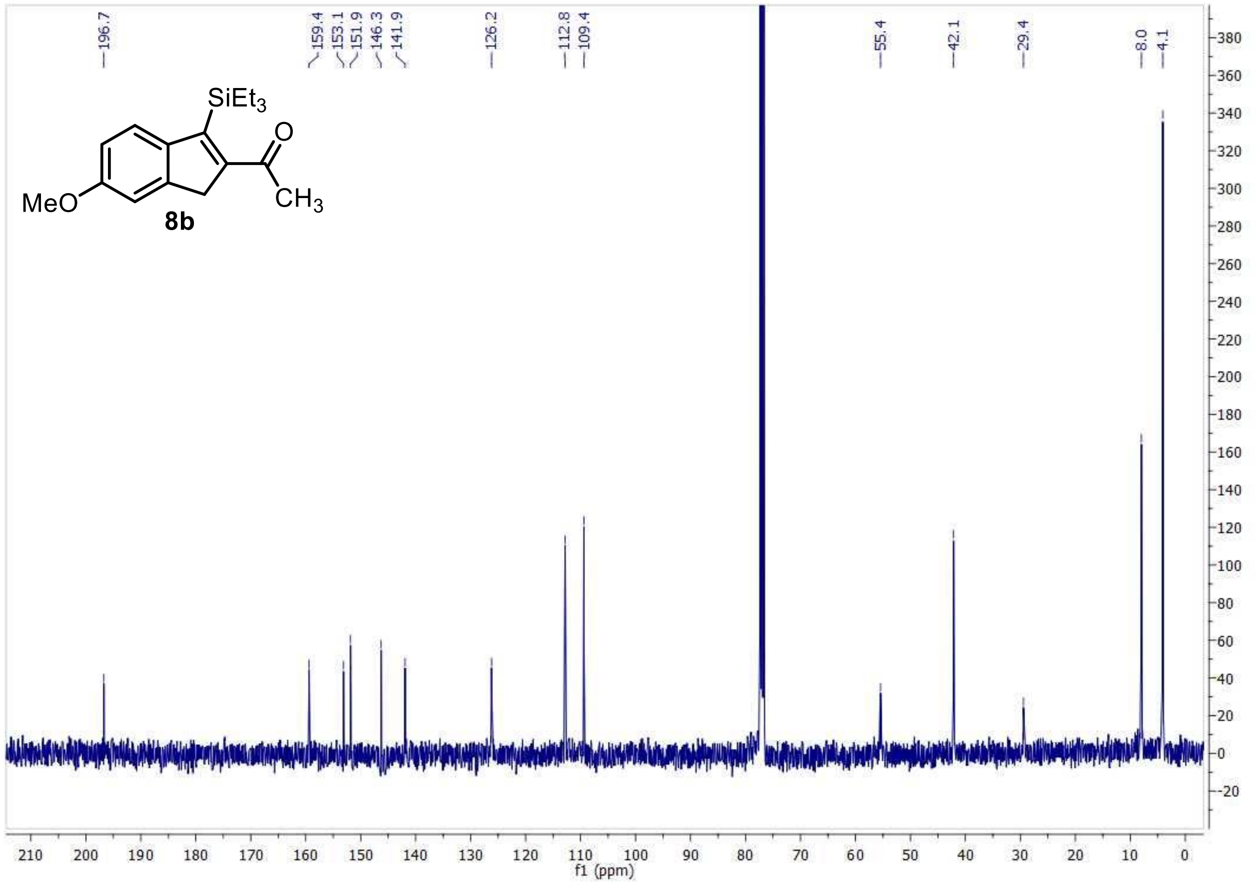
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4.1
SiEt3
O
MeO
CH3
8b
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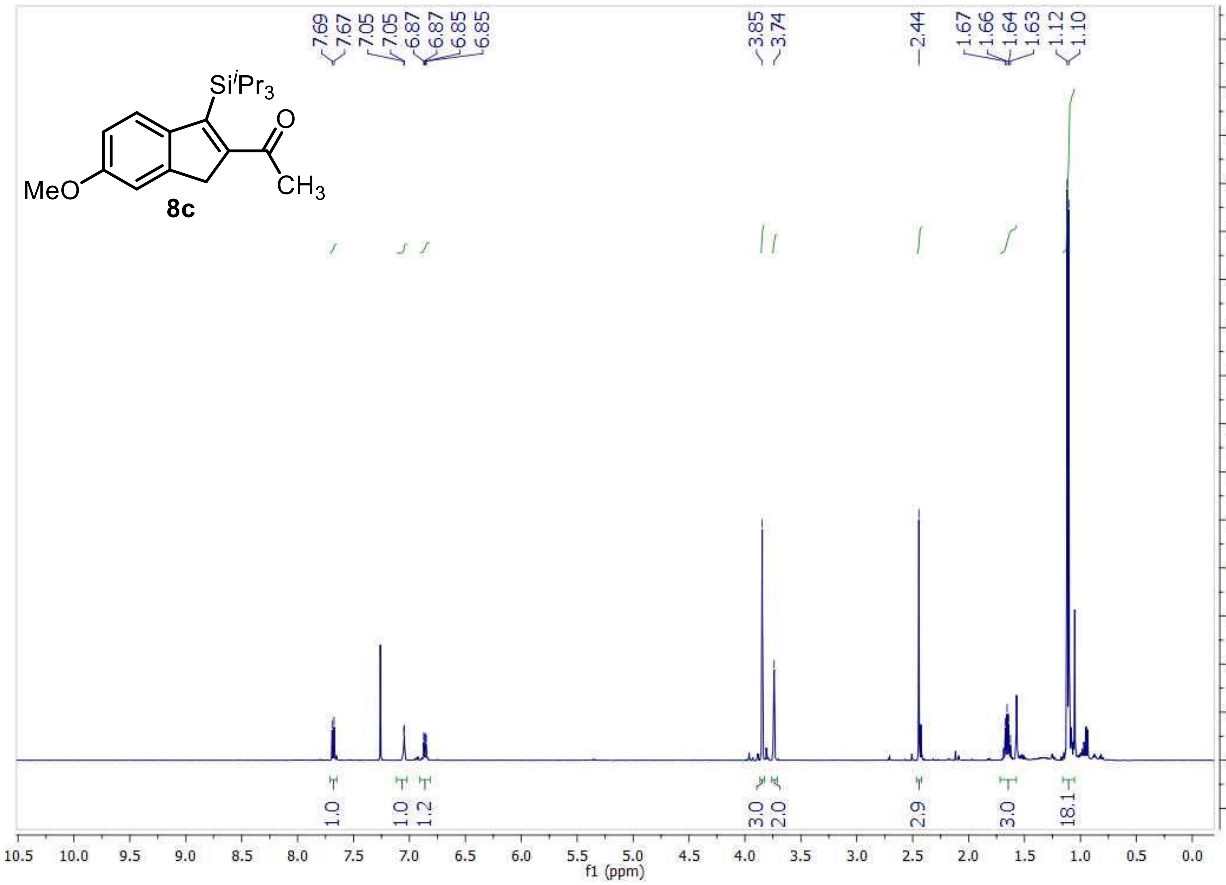

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6.85
3.85
3.74
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1.67
1.66
1.64
1.63
1.12
1.10
1.0
1.0
1.2
3.0
2.0
2.9
3.0
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1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
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10.0
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9.0
8.5
8.0
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7.0
6.5
6.0
5.5
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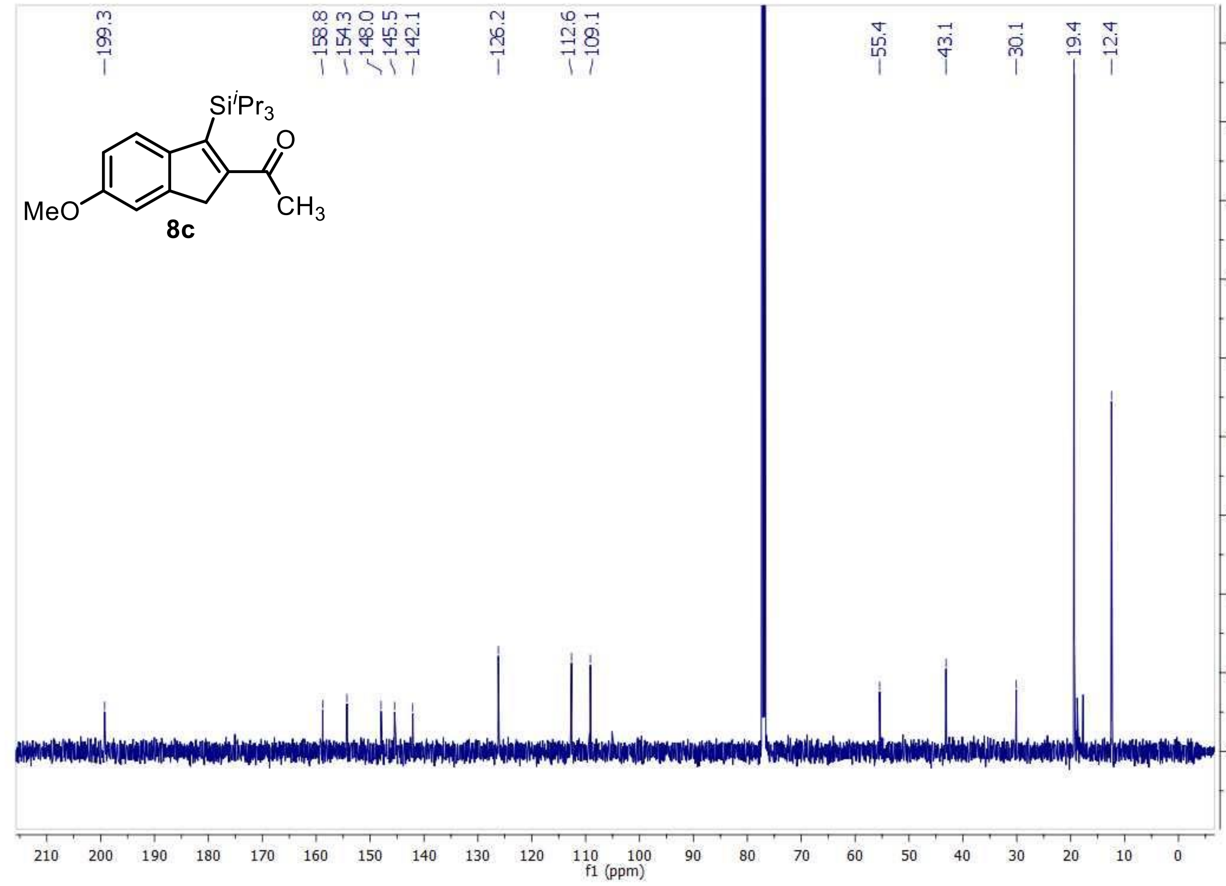

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MeO
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112.6
109.1
55.4
43.1
30.1
19.4
12.4
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80
70
60
50
40
30
20
10
0
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200
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180
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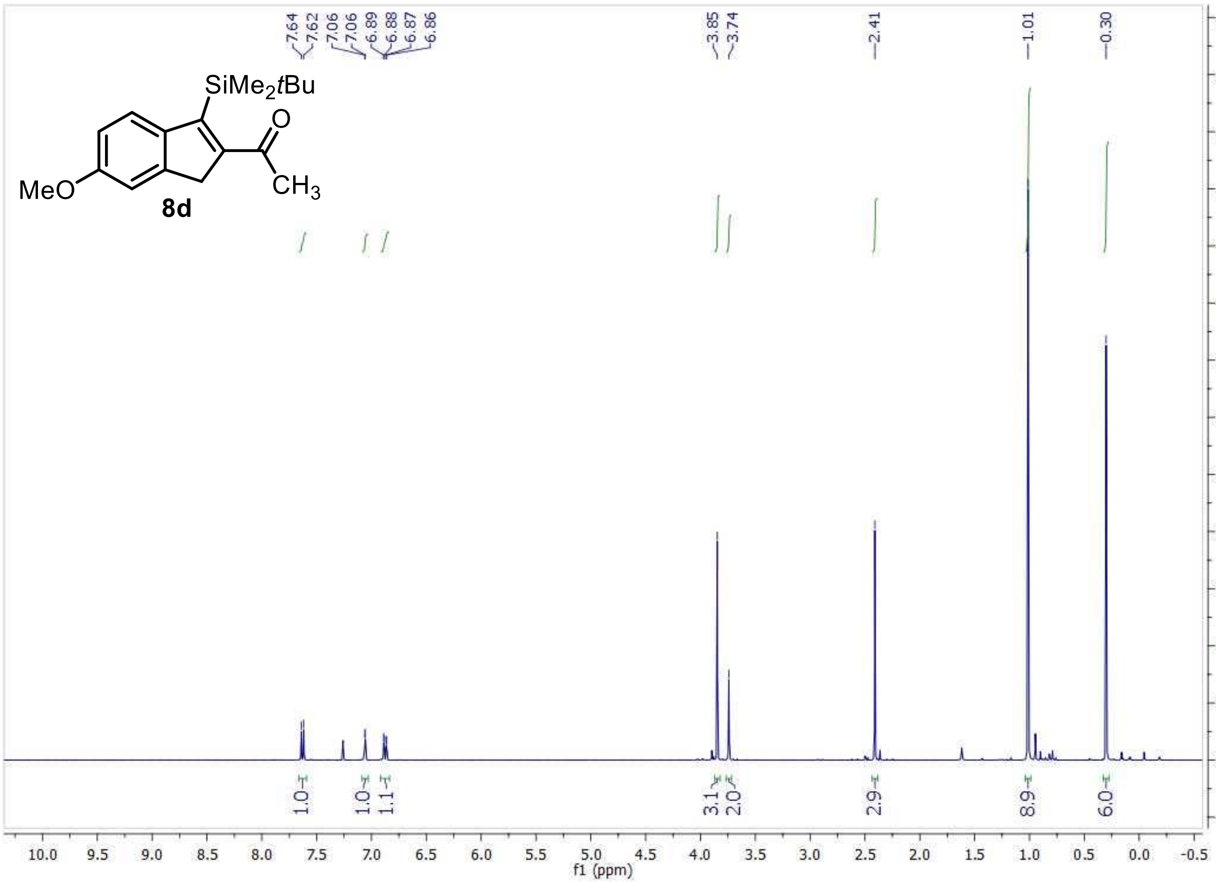
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8d
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6.0
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6.0
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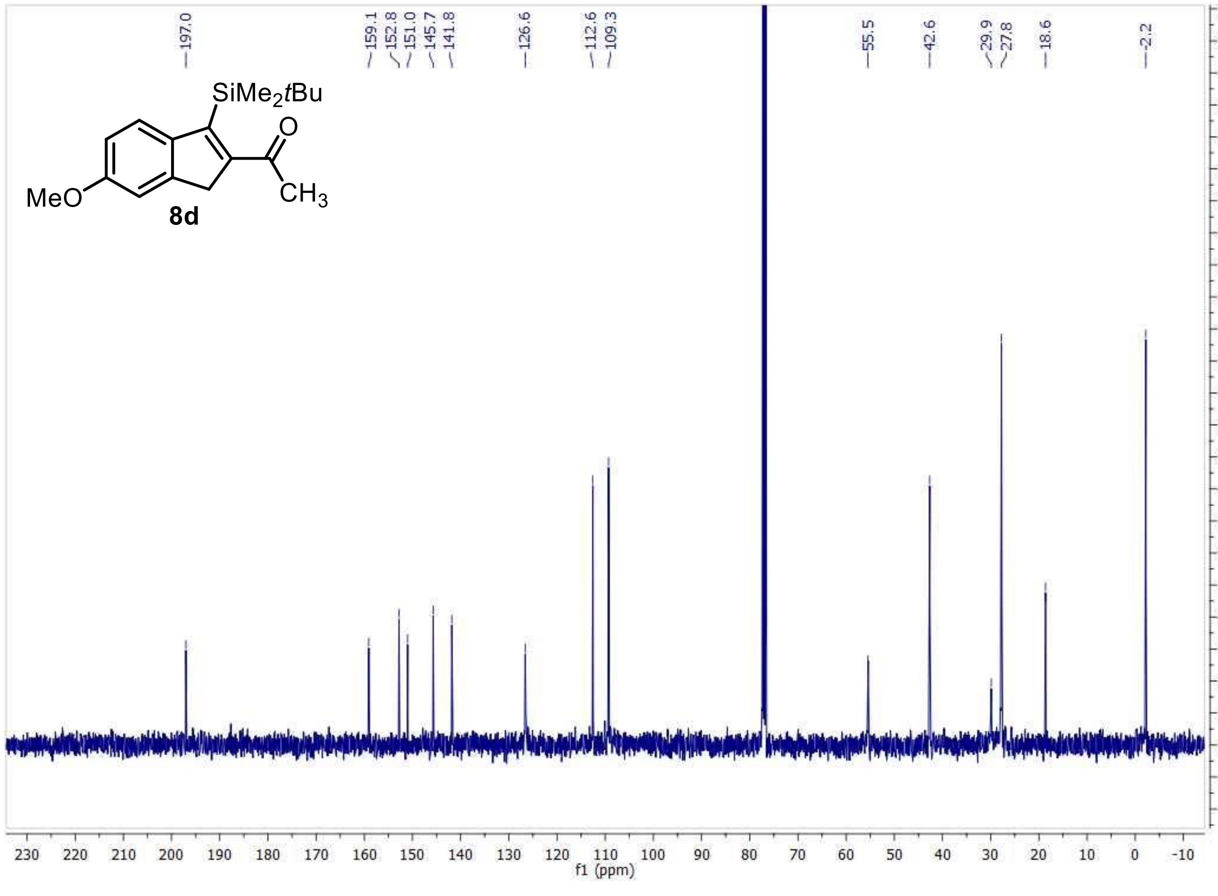
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-2.2
SiMe2tBu
O
MeO
CH3
8d
f1 (ppm)
230
220
210
200
190
180
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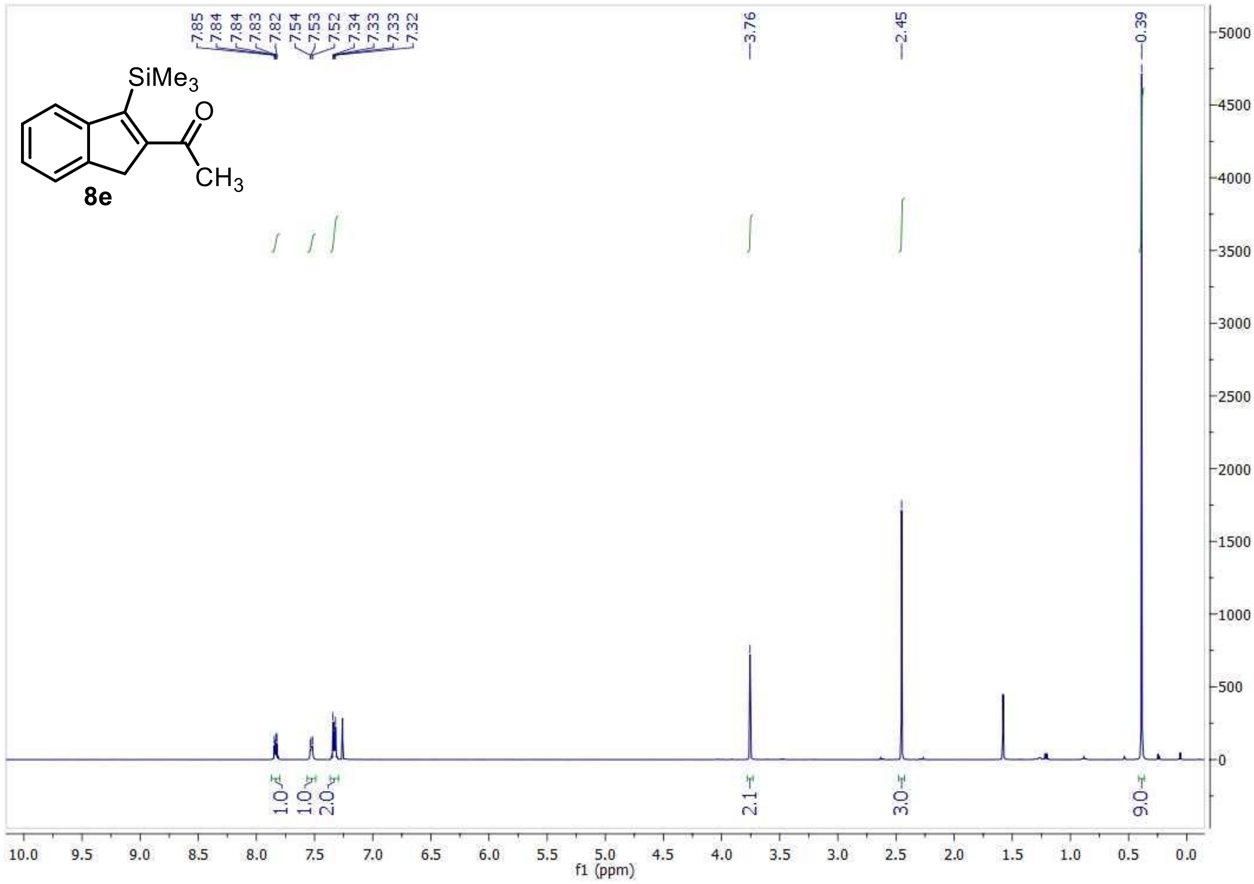
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O
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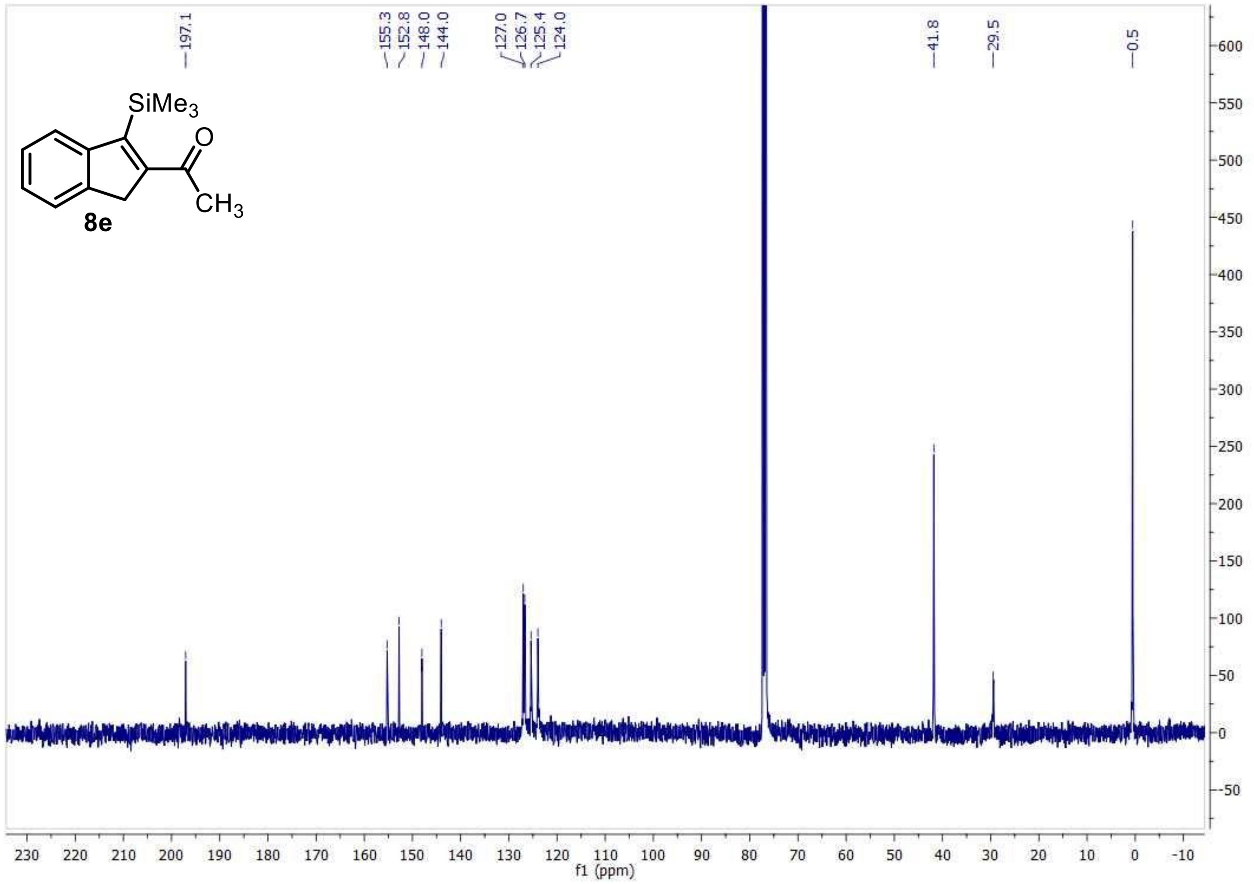
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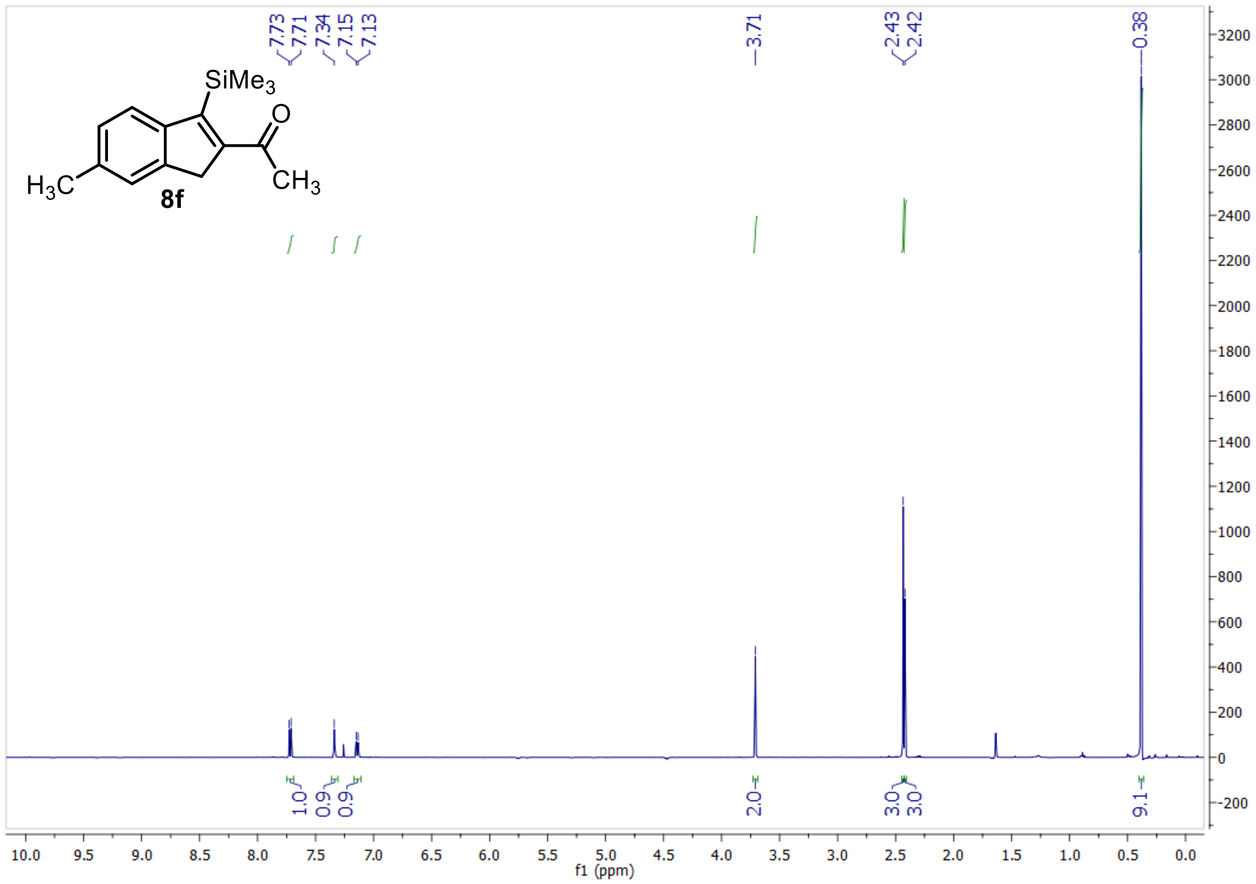
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8.5
8.0
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6.0
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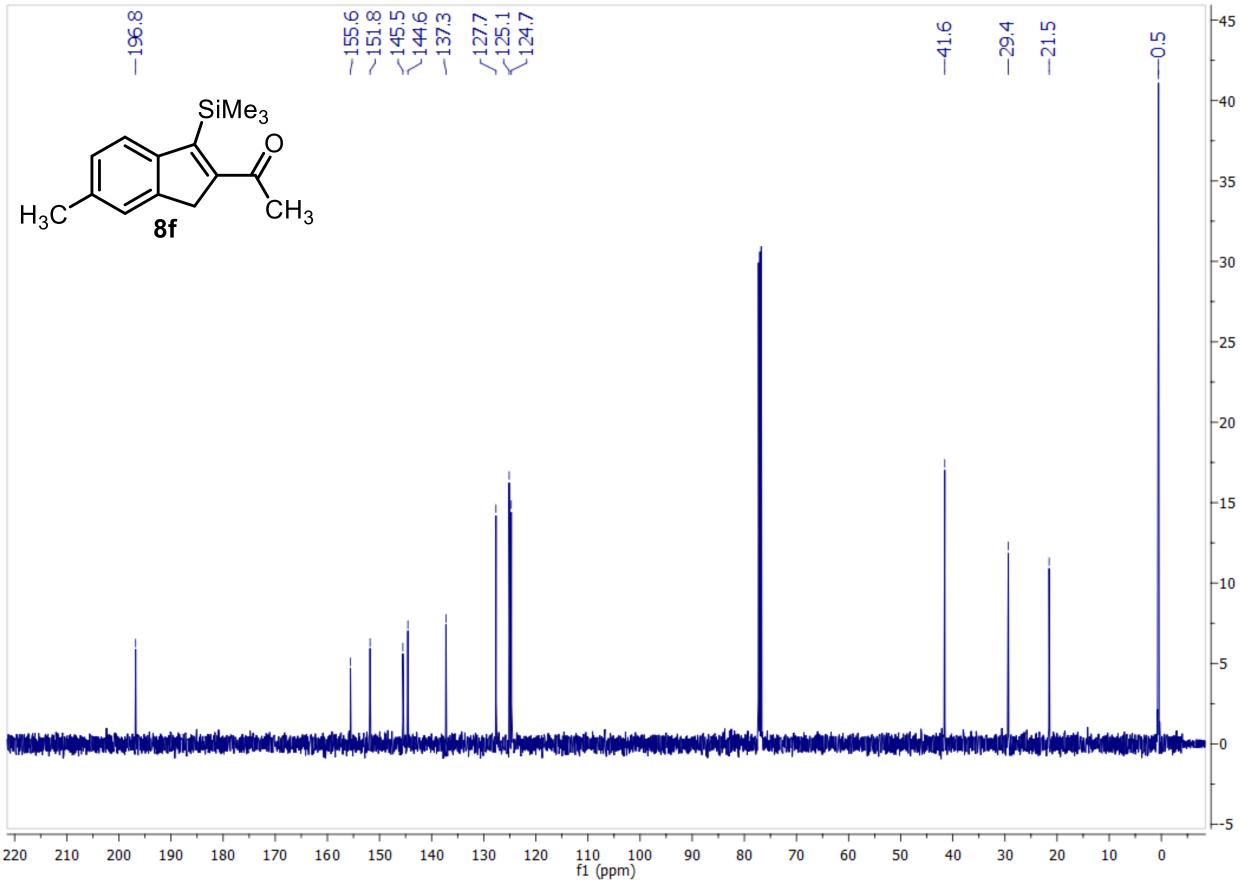
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O
H3C
CH3
8f
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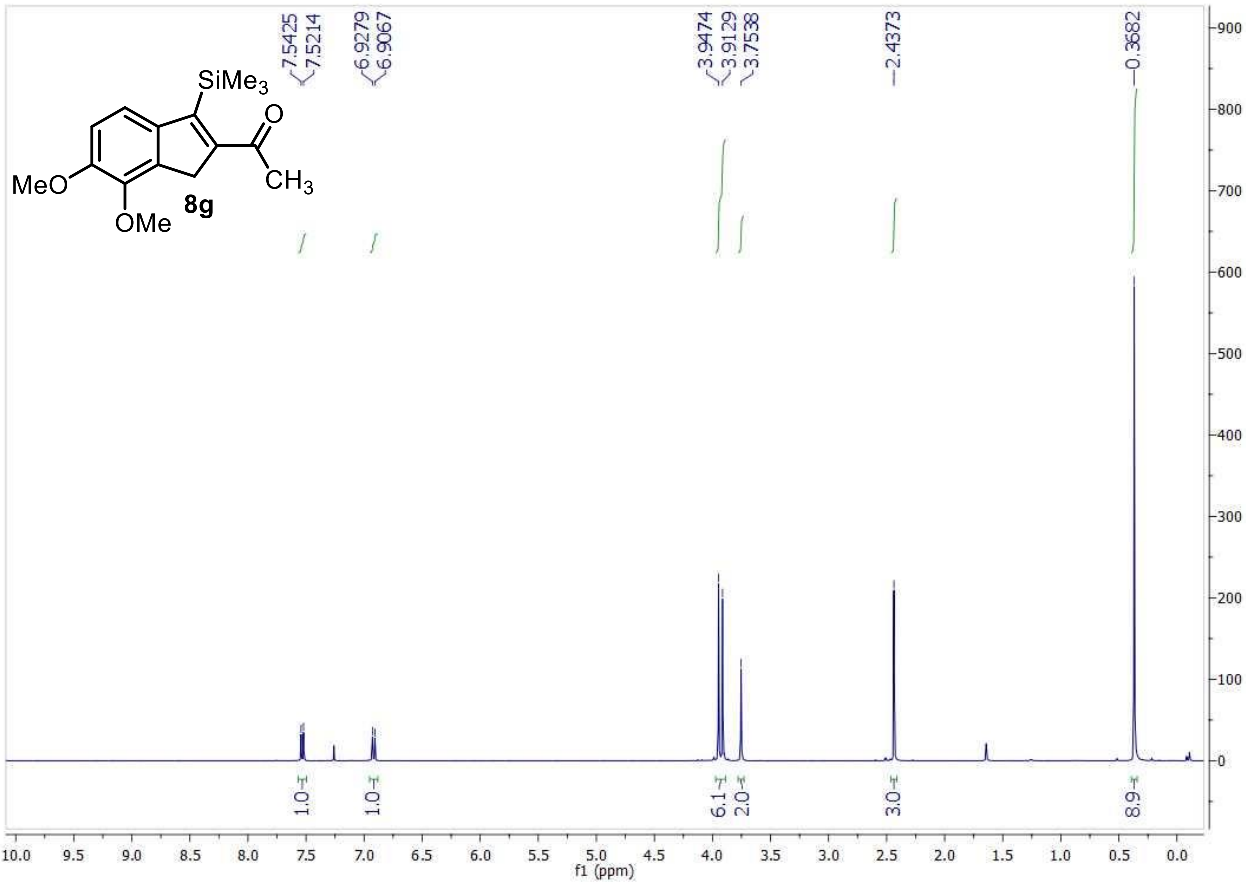
f1 (ppm)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3.0
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700
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400
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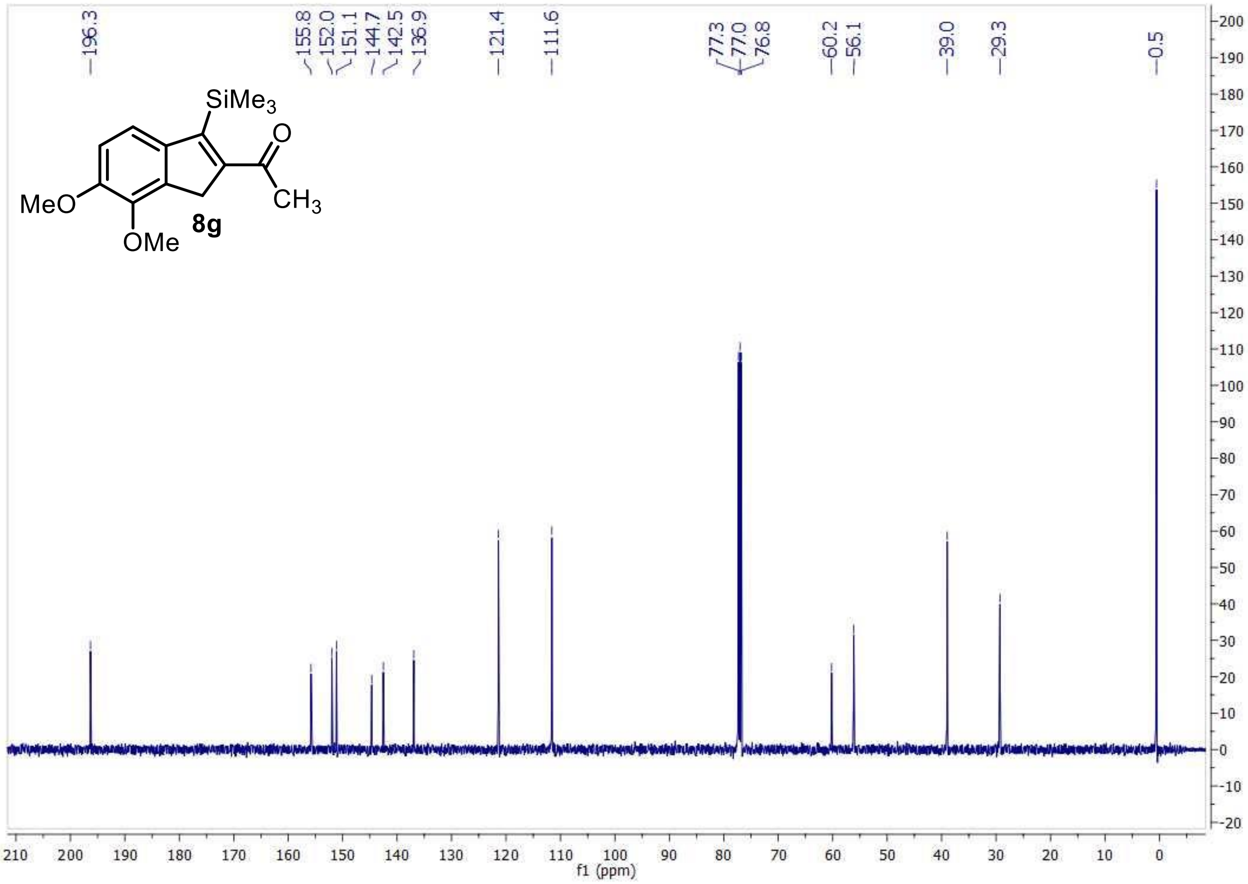
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121.4
111.6
77.3
77.0
76.8
60.2
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200
190
180
170
160
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140
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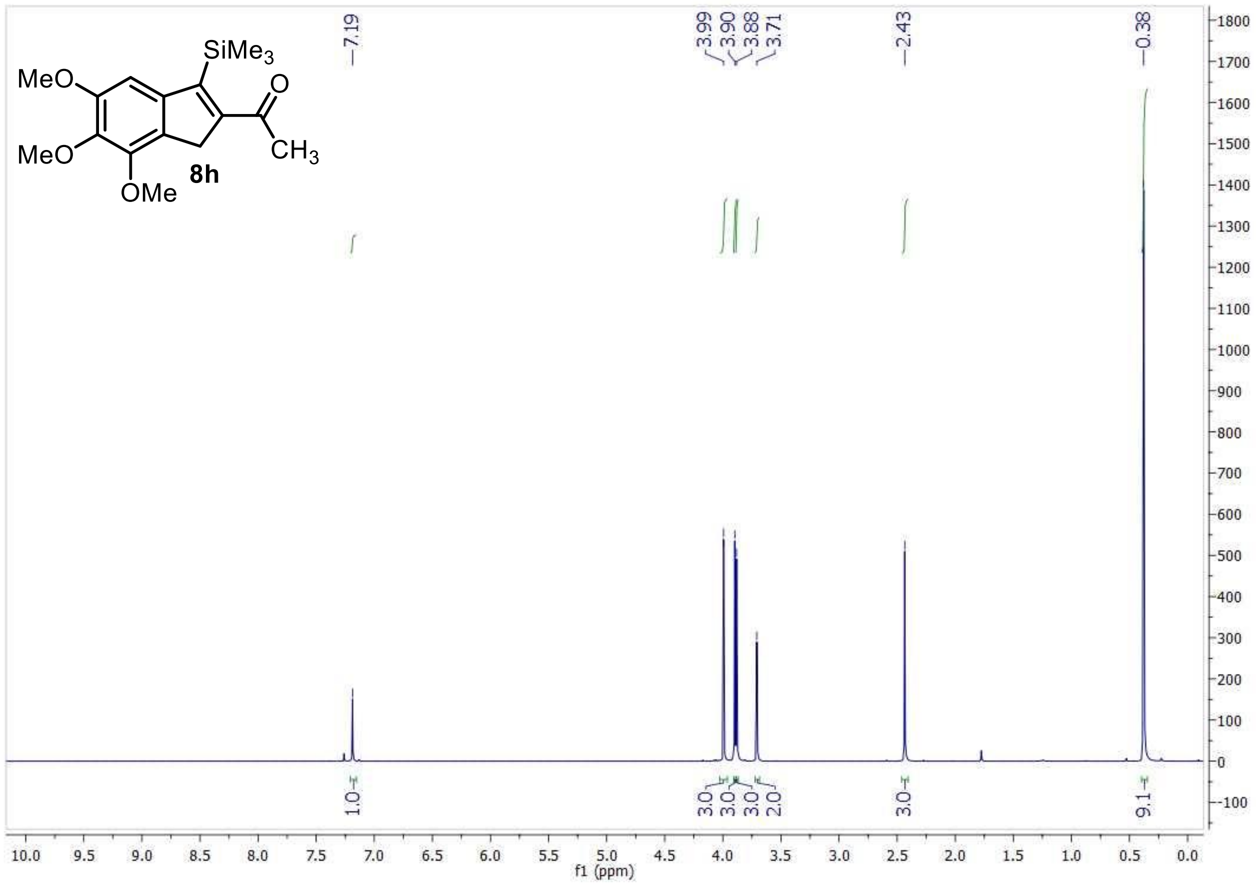
f1 (ppm)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6.5
6.0
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5.0
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4.0
3.5
3.0
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1.0
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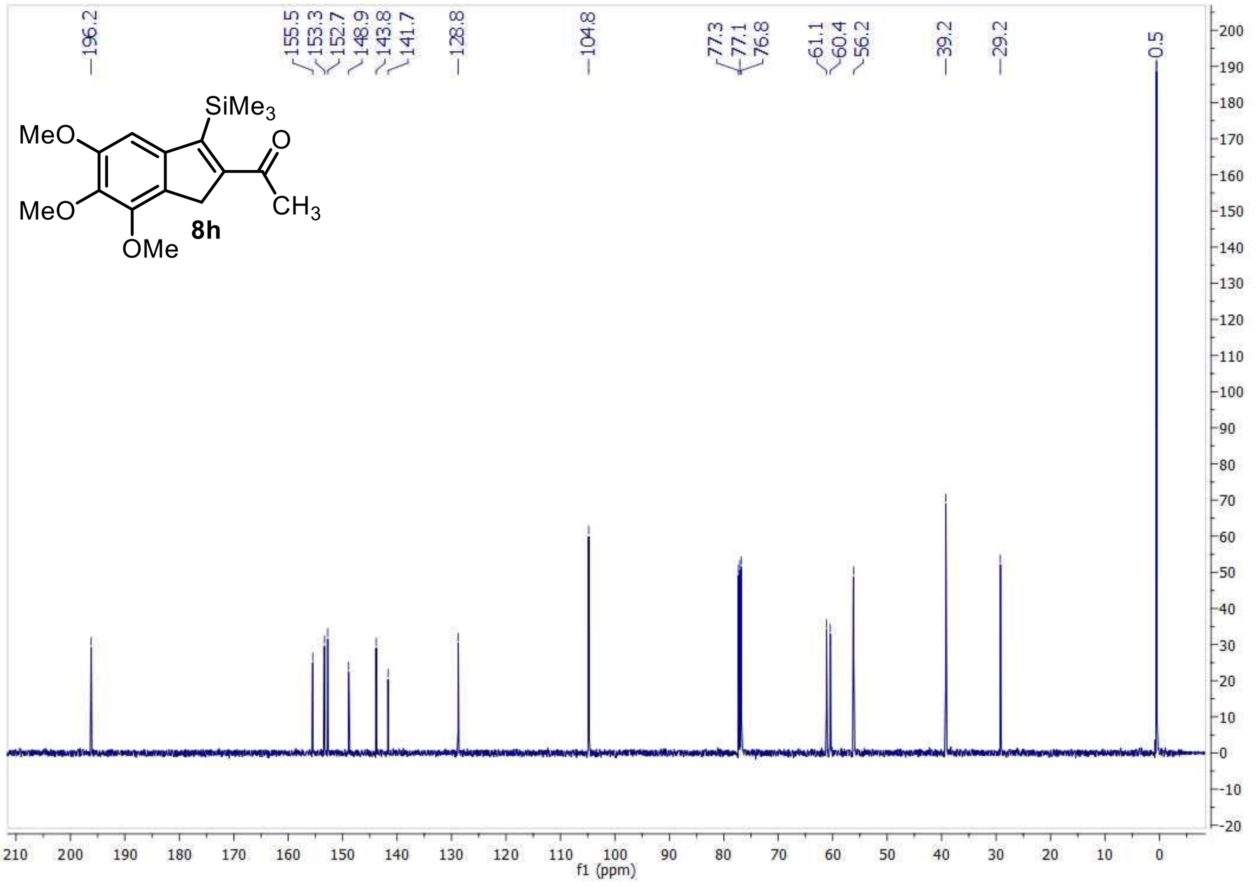
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MeO
MeO
OMe
O
CH3
8h
210
200
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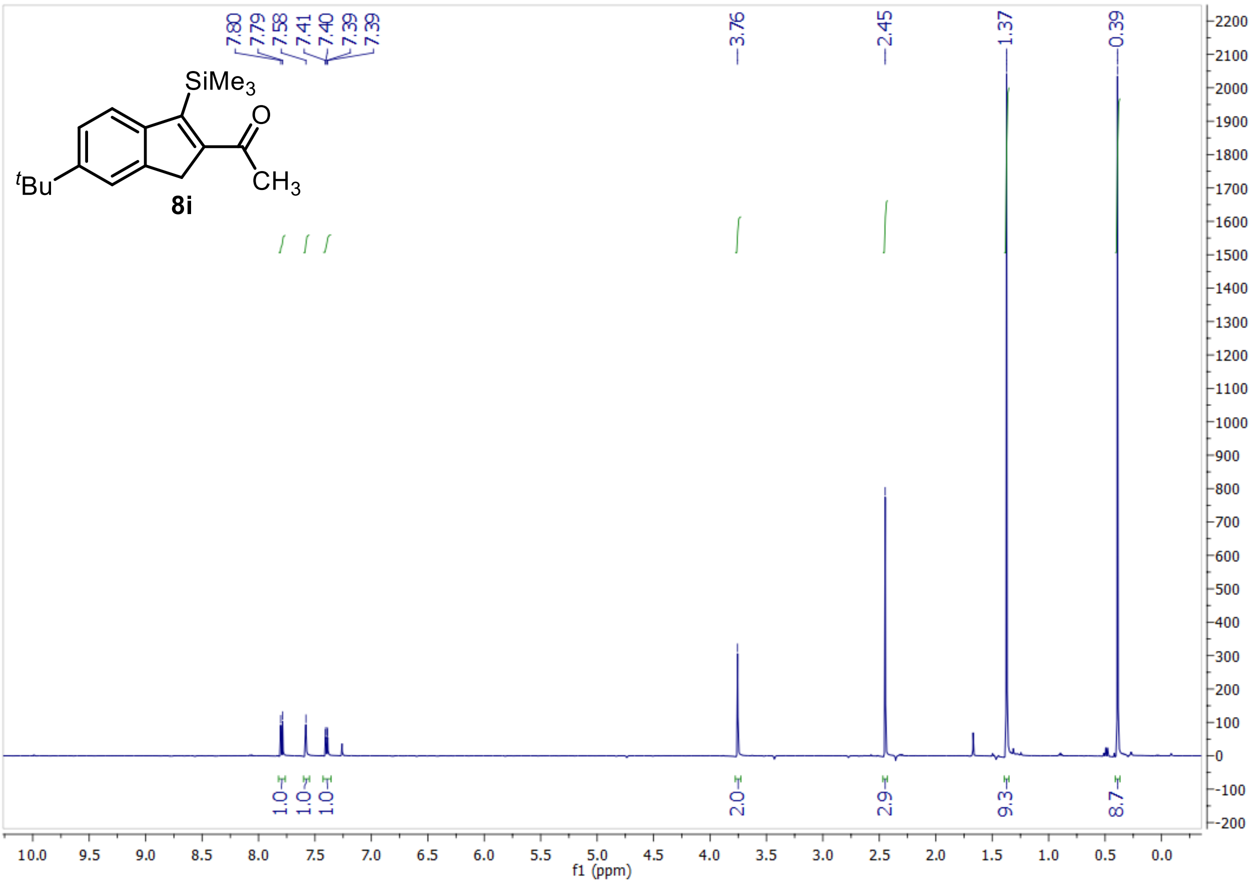
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CH3
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2.0
2.9
9.3
8.7
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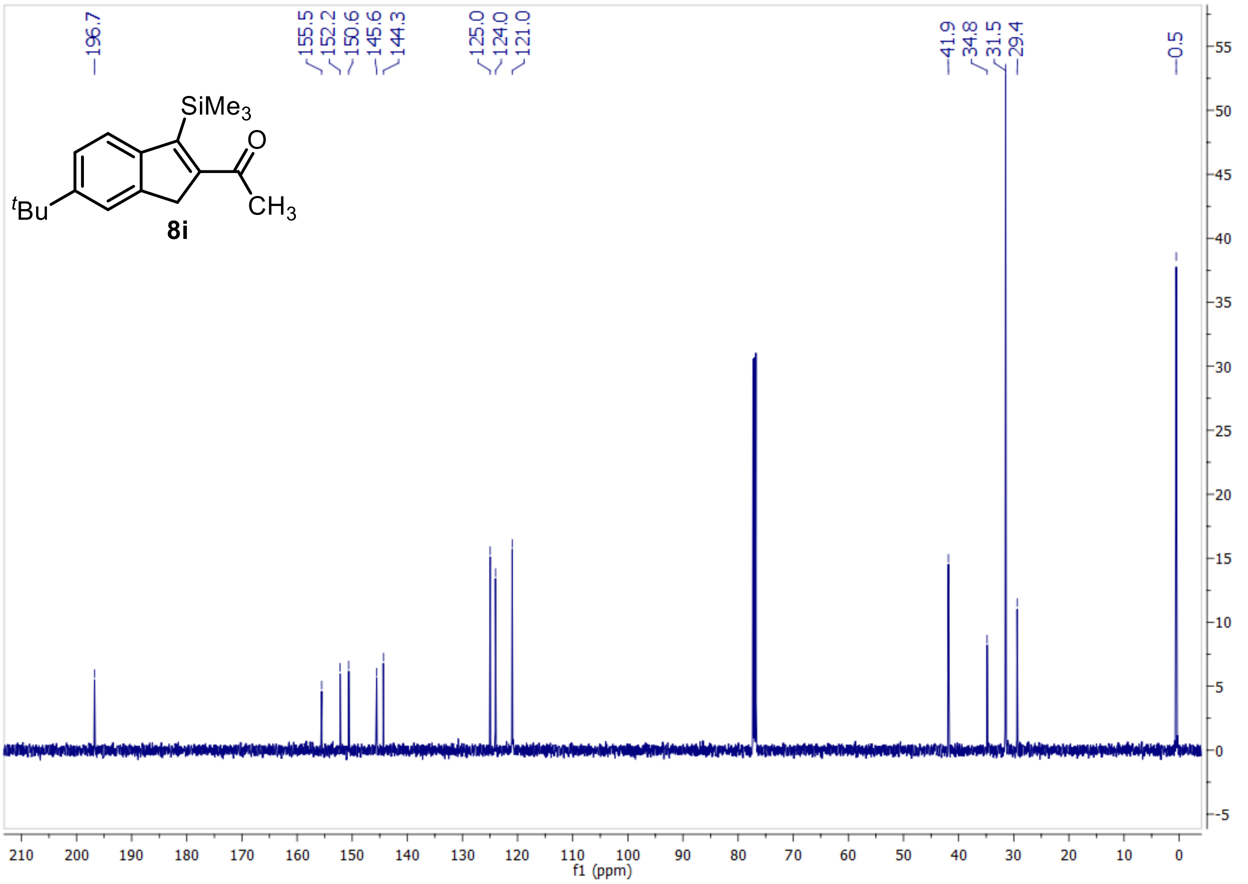
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-0.5
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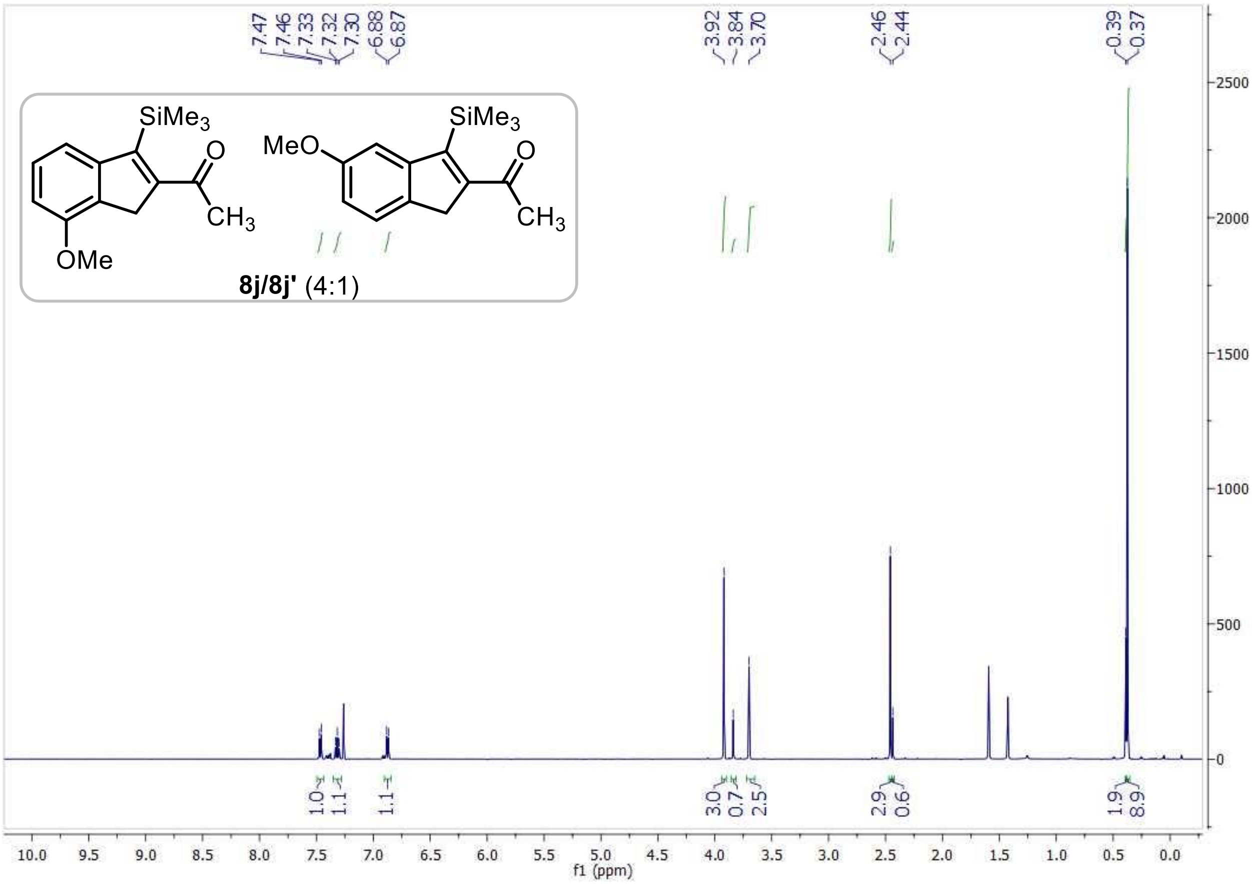
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0.37
SiMe3
O
CH3
OMe
MeO
8j/8j' (4:1)
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1.1
1.1
3.0
0.7
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2.9
0.6
1.9
8.9
2500
2000
1500
1000
500
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9.5
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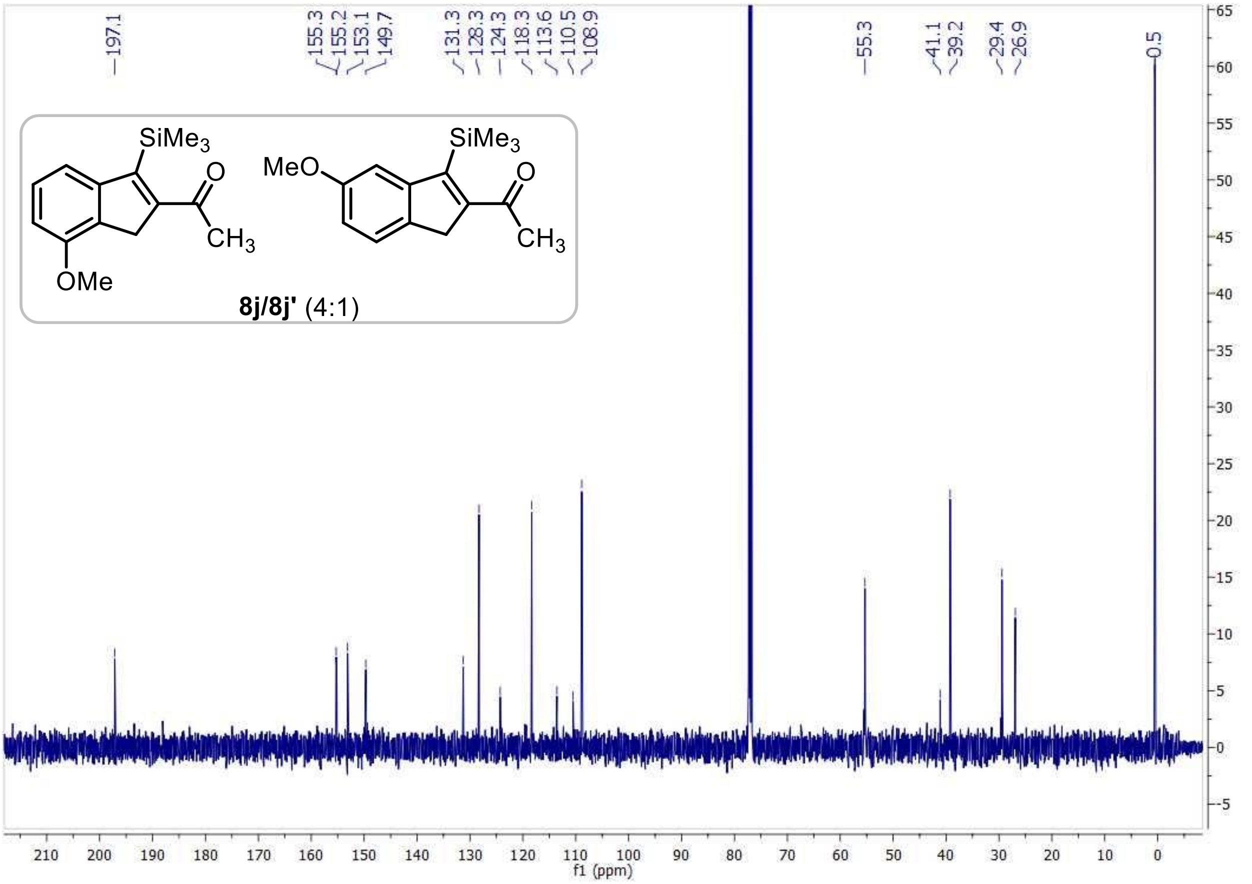
f1 (ppm)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39.2
29.4
26.9
0.5
SiMe3
O
CH3
OMe
MeO
8j/8j' (4:1)
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
210
200
190
180
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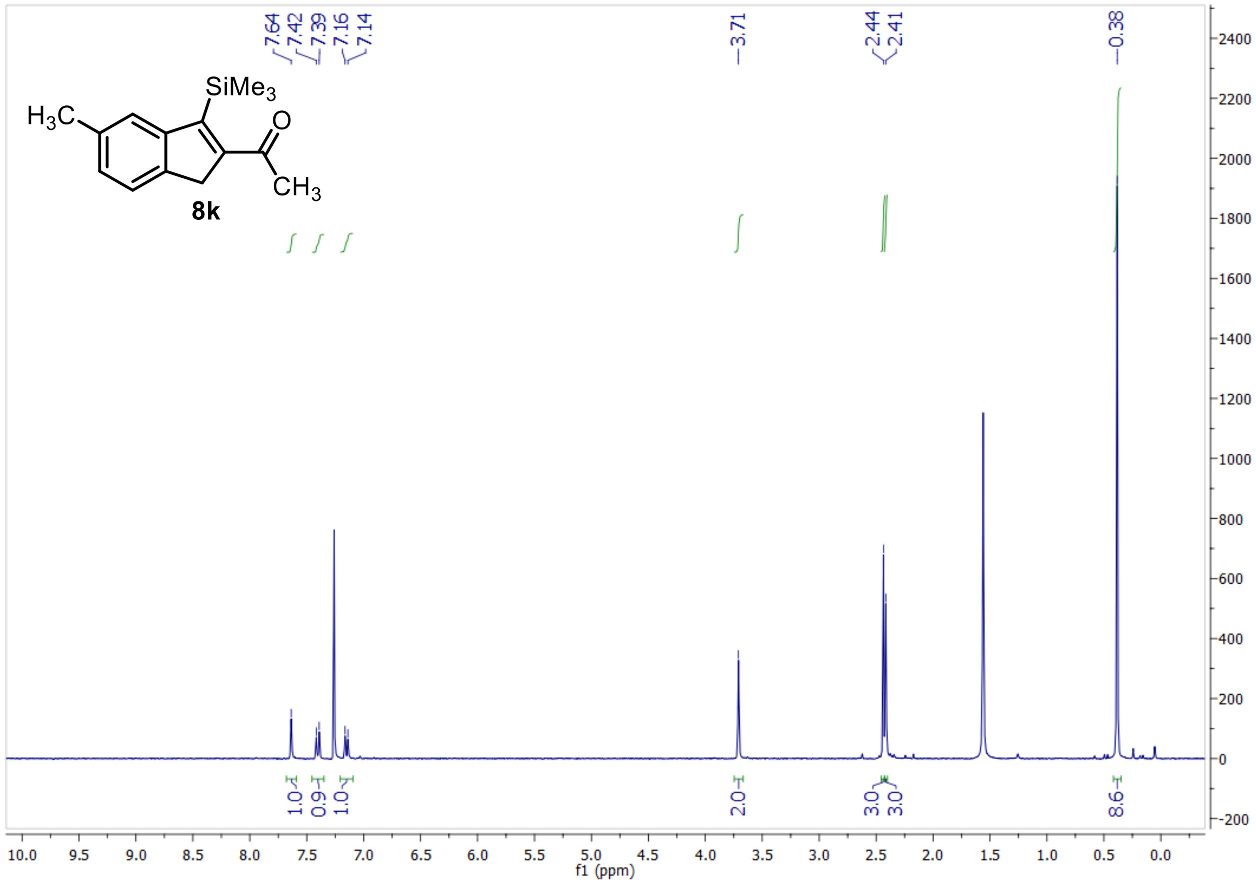
10
0
f1 (ppm)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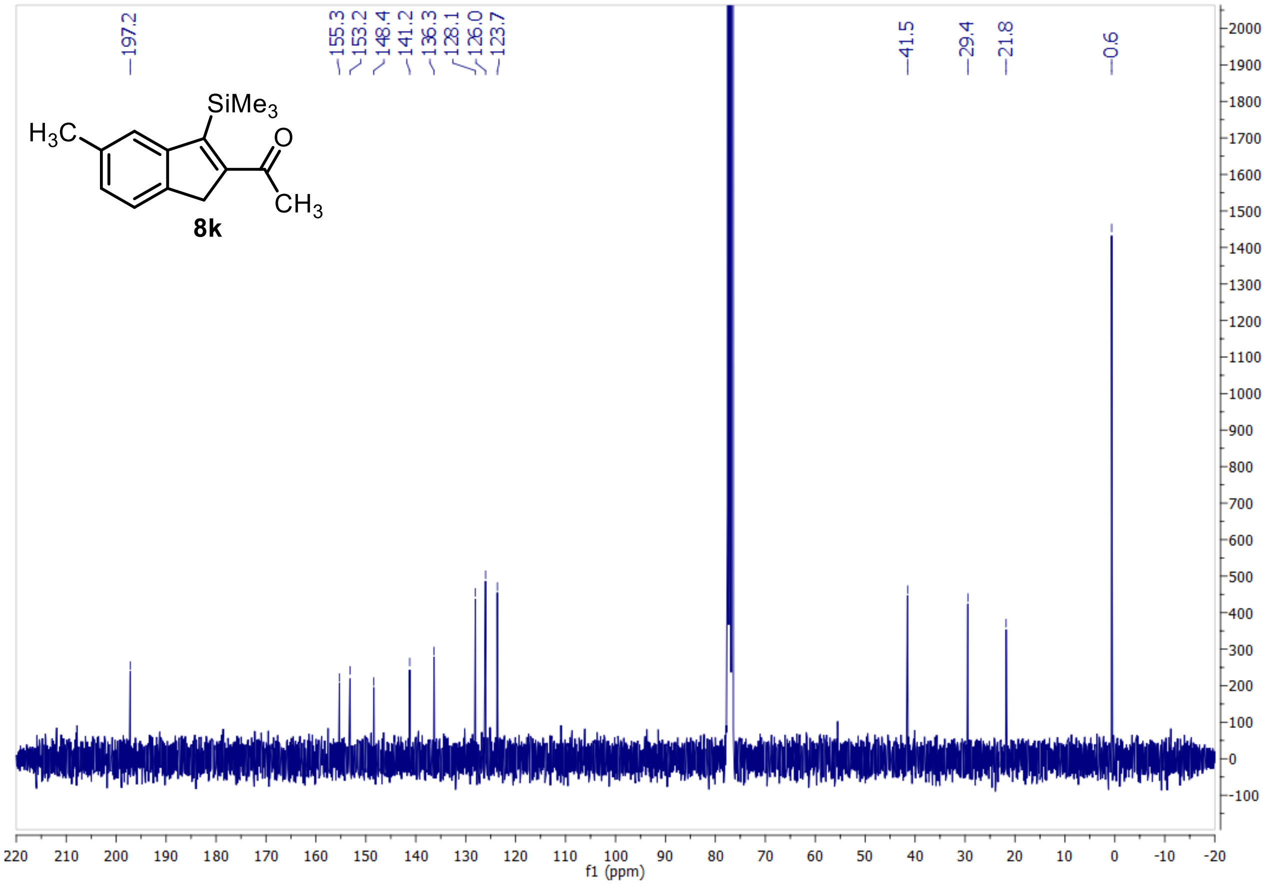
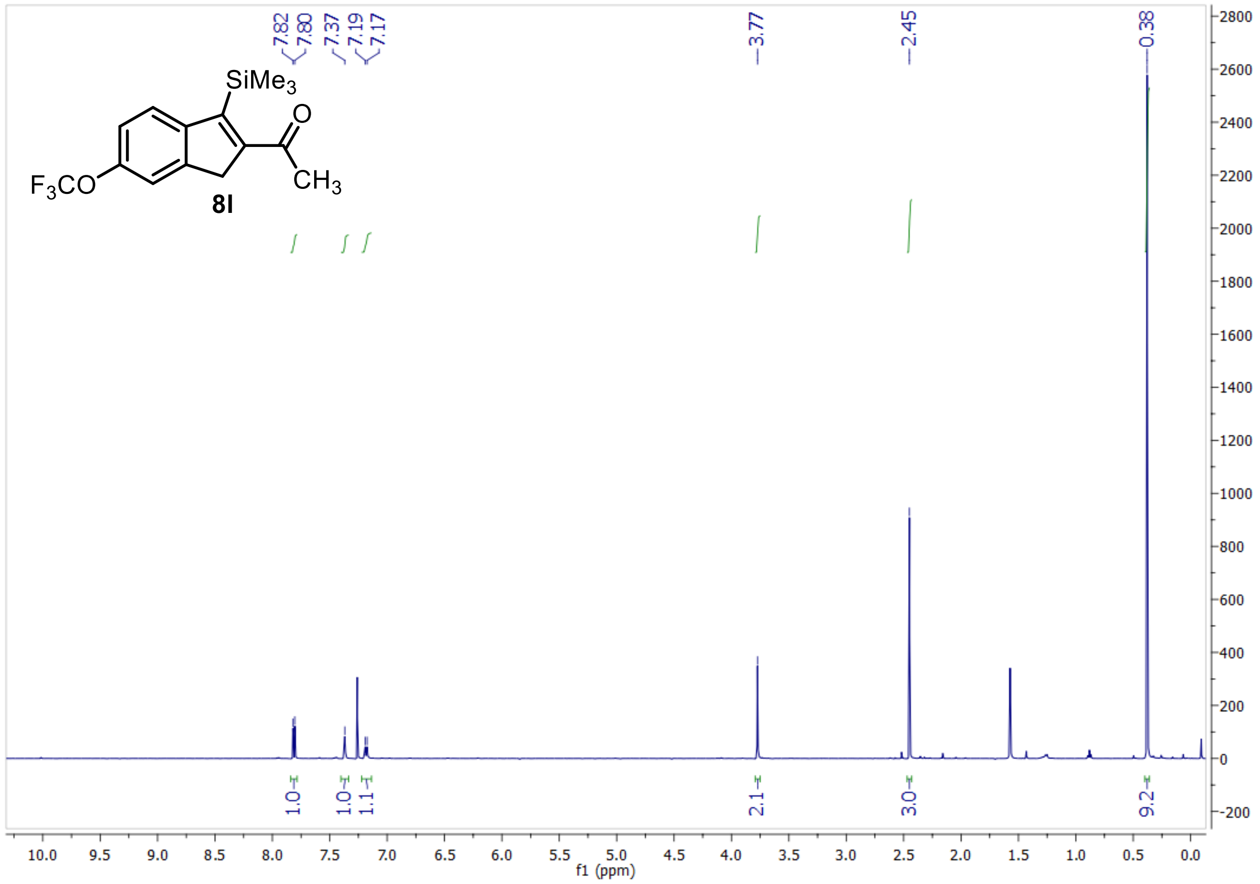
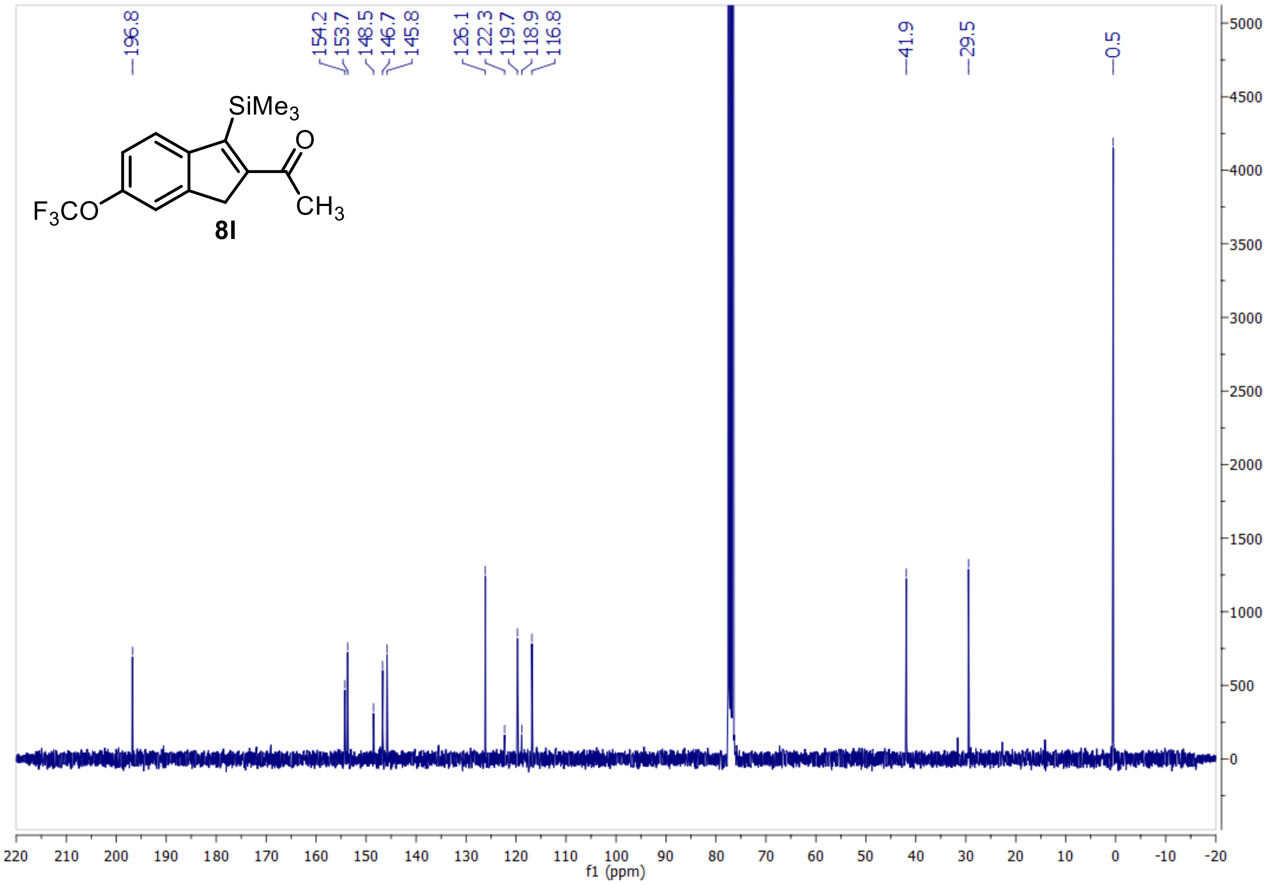
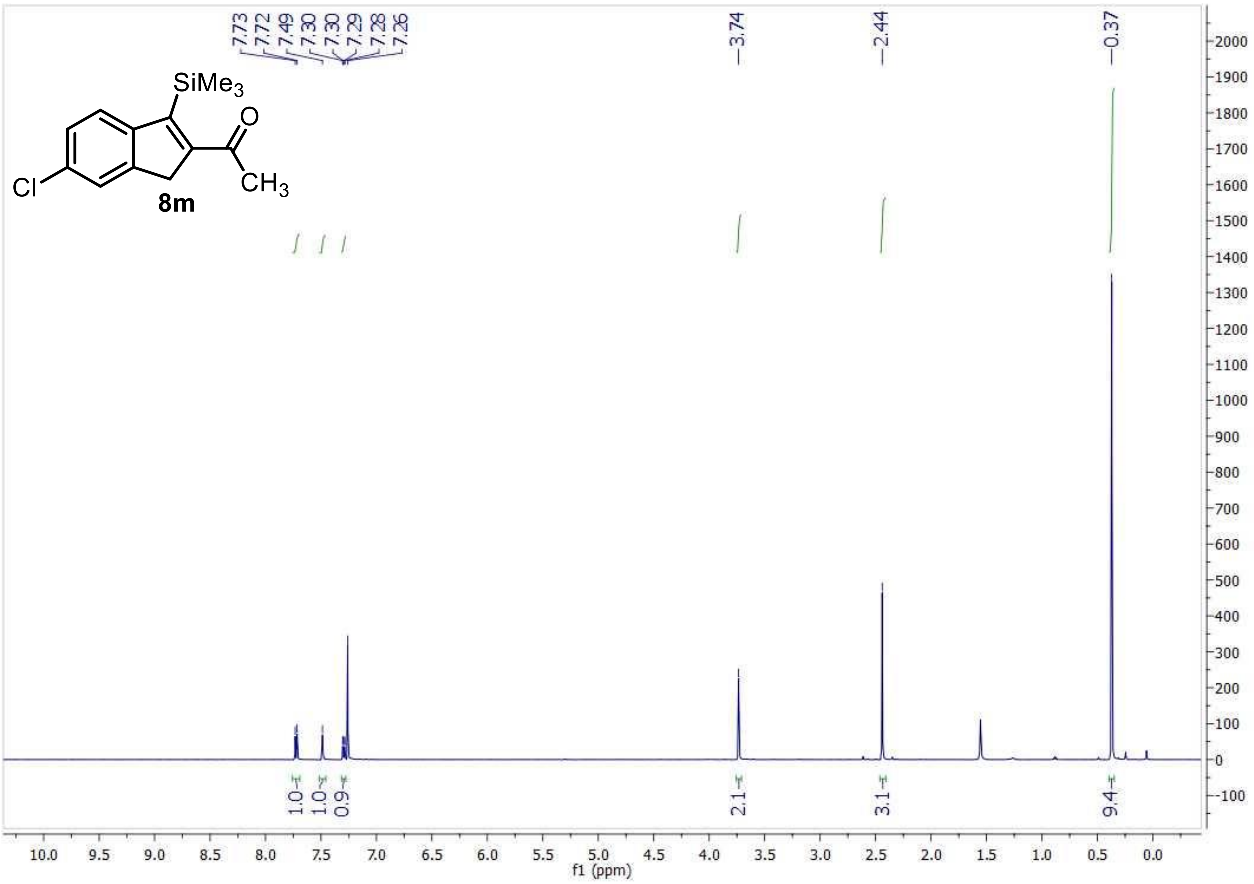
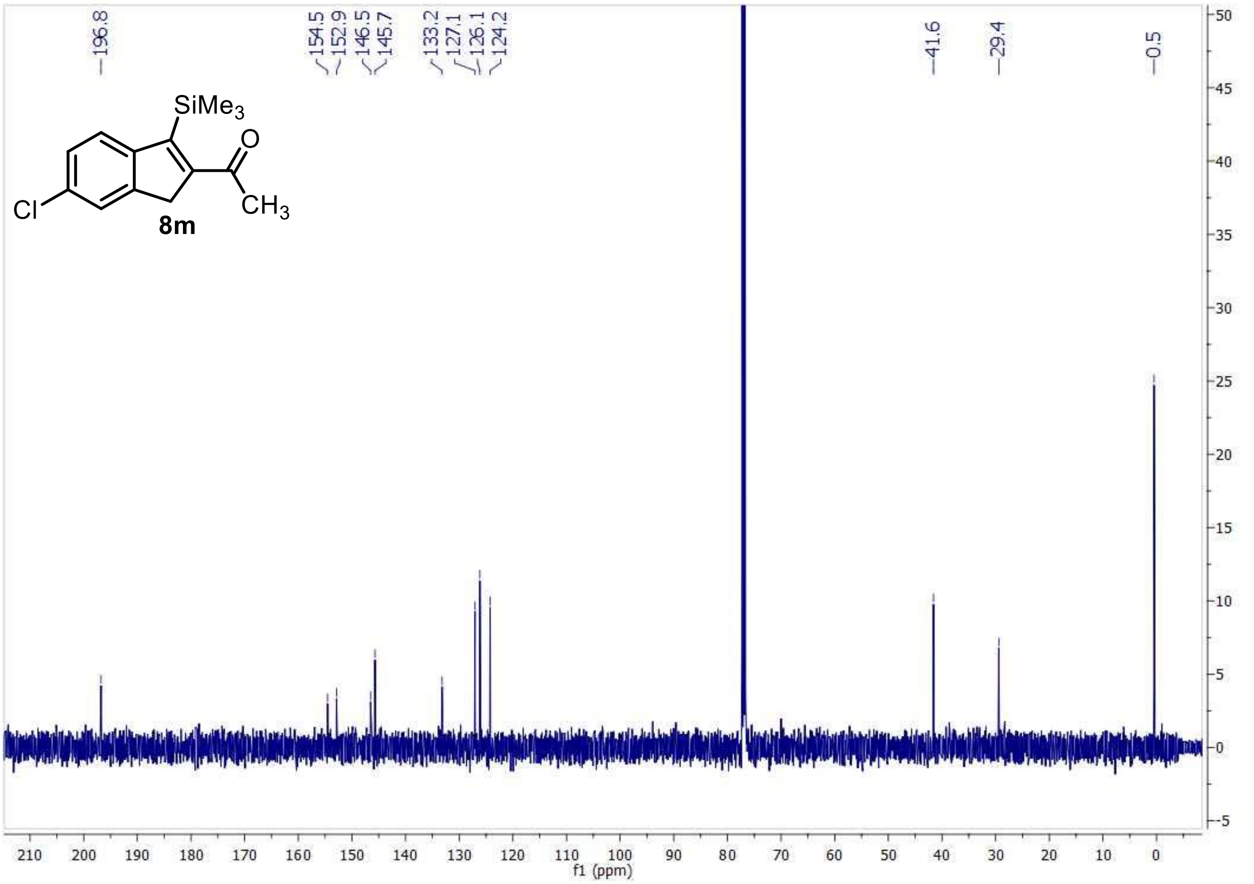
0.9
1.0
2.0
3.0
3.0
8.6
f1 (ppm)

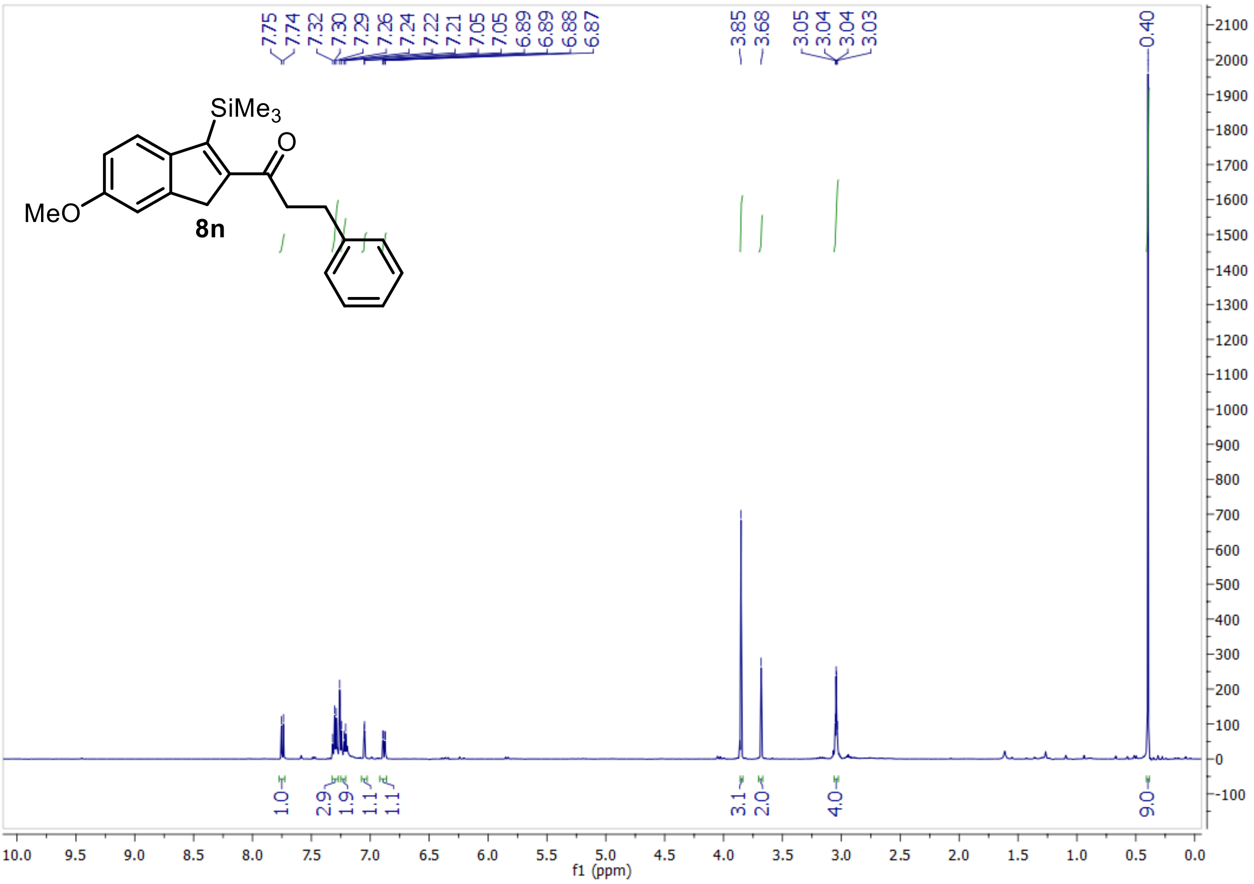

197.2
155.3
153.2
148.4
141.2
136.3
128.1
126.0
123.7
41.5
29.4
21.8
0.6
SiMe3
H3C
O
CH3
8k
f1 (ppm)


7.82
7.80
7.37
7.19
7.17
3.77
2.45
0.38
SiMe$_3$
O
CH$_3$
F$_3$CO
8l
1.0
1.0
1.1
2.1
3.0
9.2
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
-200
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

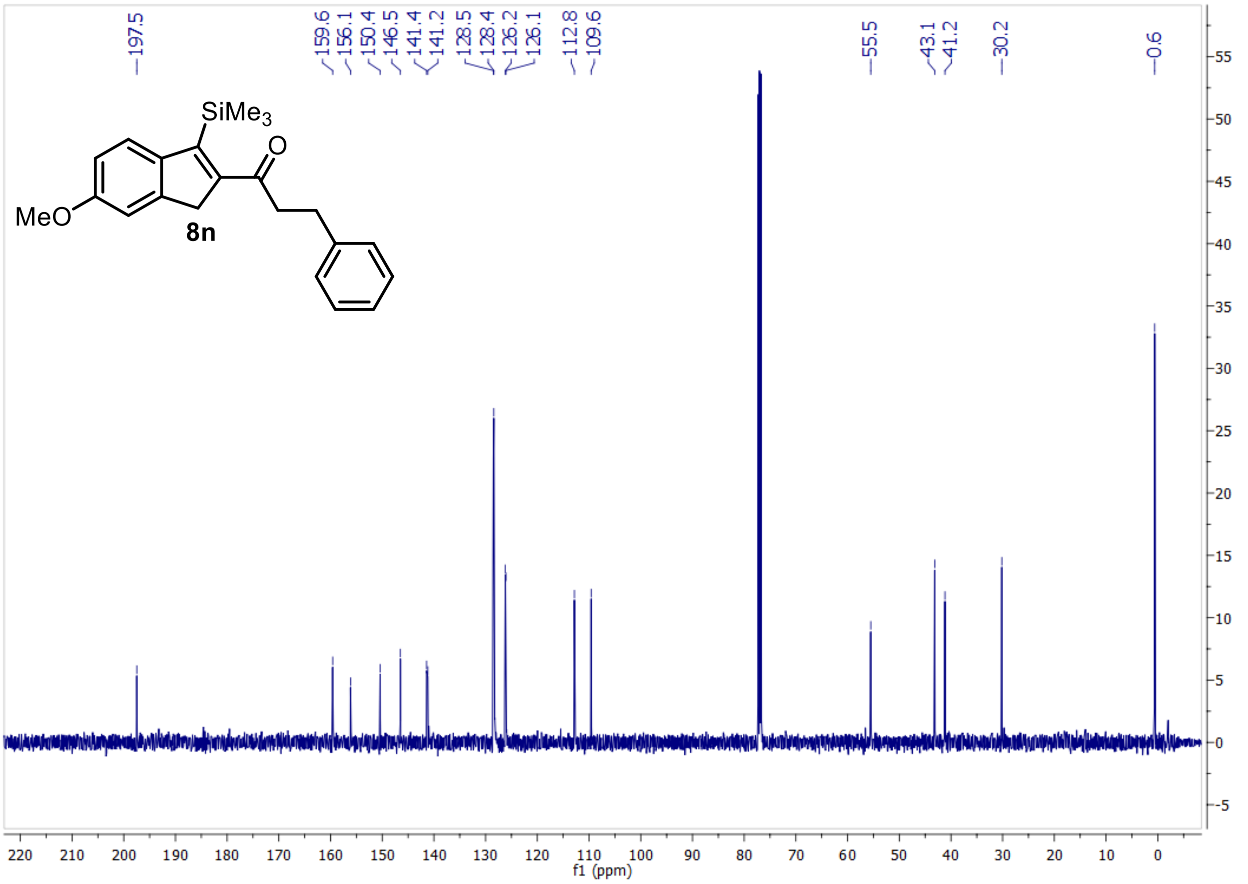

196.8
154.2
153.7
148.5
146.7
145.8
126.1
122.3
119.7
118.9
116.8
41.9
29.5
0.5
SiMe$_3$
O
CH$_3$
F$_3$CO
8l
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
f1 (ppm)


7.73
7.72
7.49
7.30
7.30
7.29
7.28
7.26
3.74
2.44
0.37
SiMe$_3$
O
Cl
CH$_3$
8m
1.0
1.0
0.9
2.1
3.1
9.4
f1 (ppm)

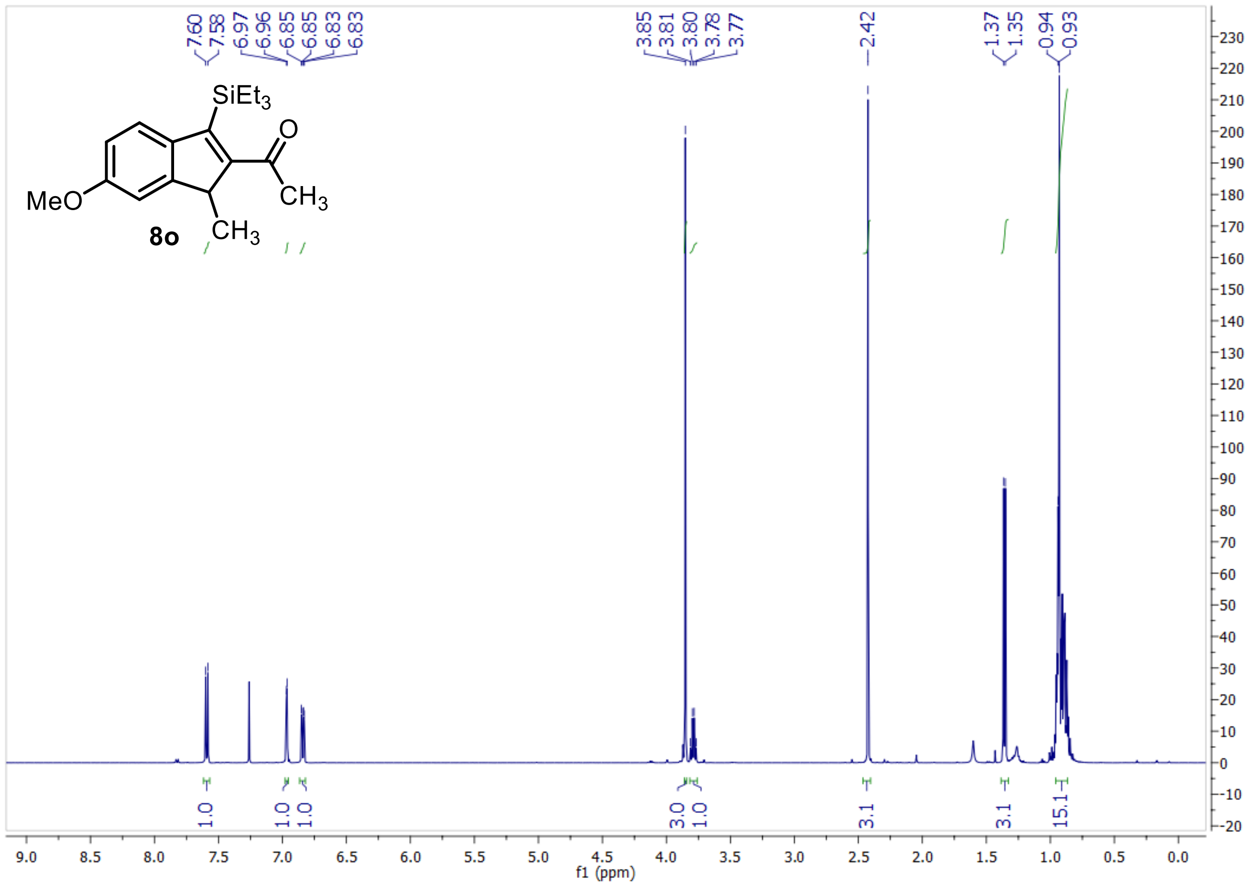

196.8
154.5
152.9
146.5
145.7
133.2
127.1
126.1
124.2
41.6
29.4
0.5
SiMe$_3$
O
Cl
CH$_3$
8m
f1 (ppm)

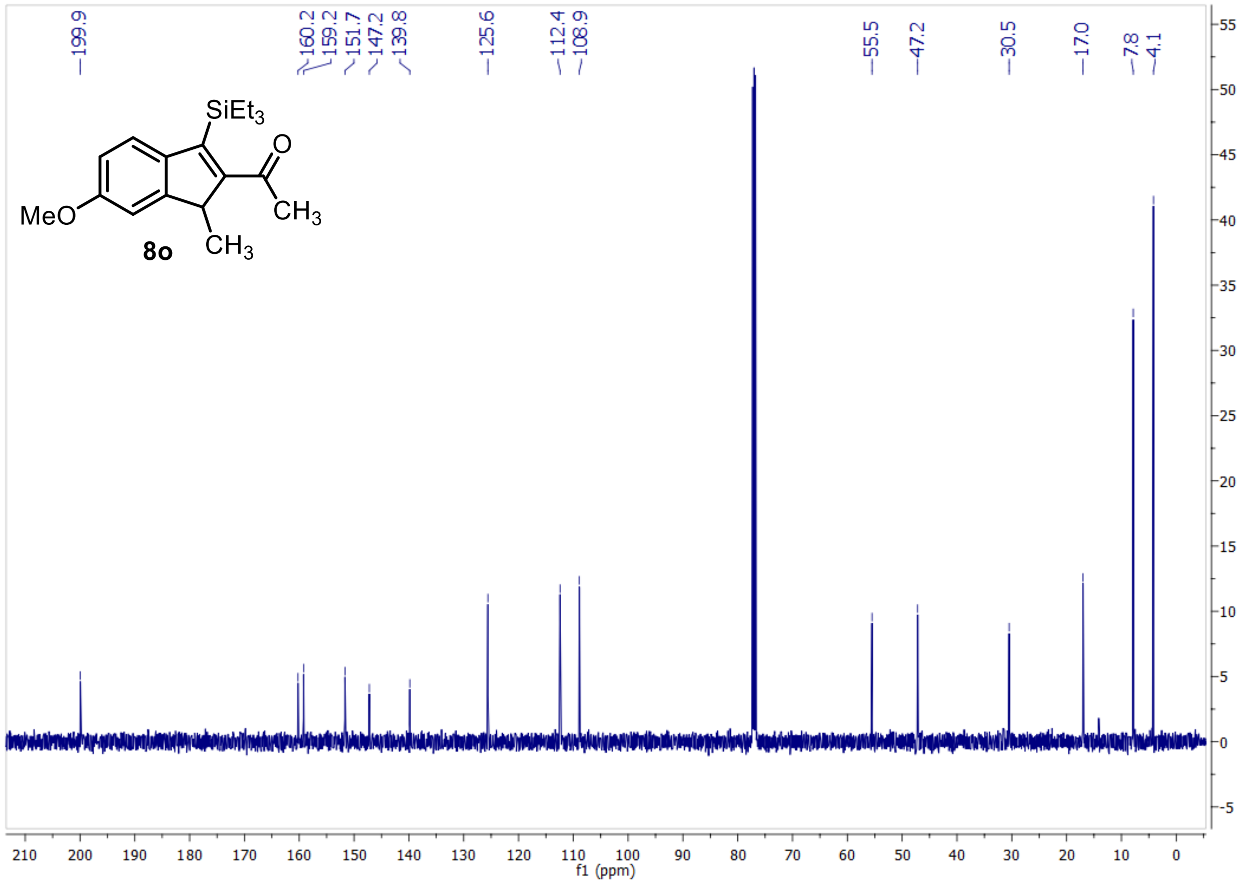


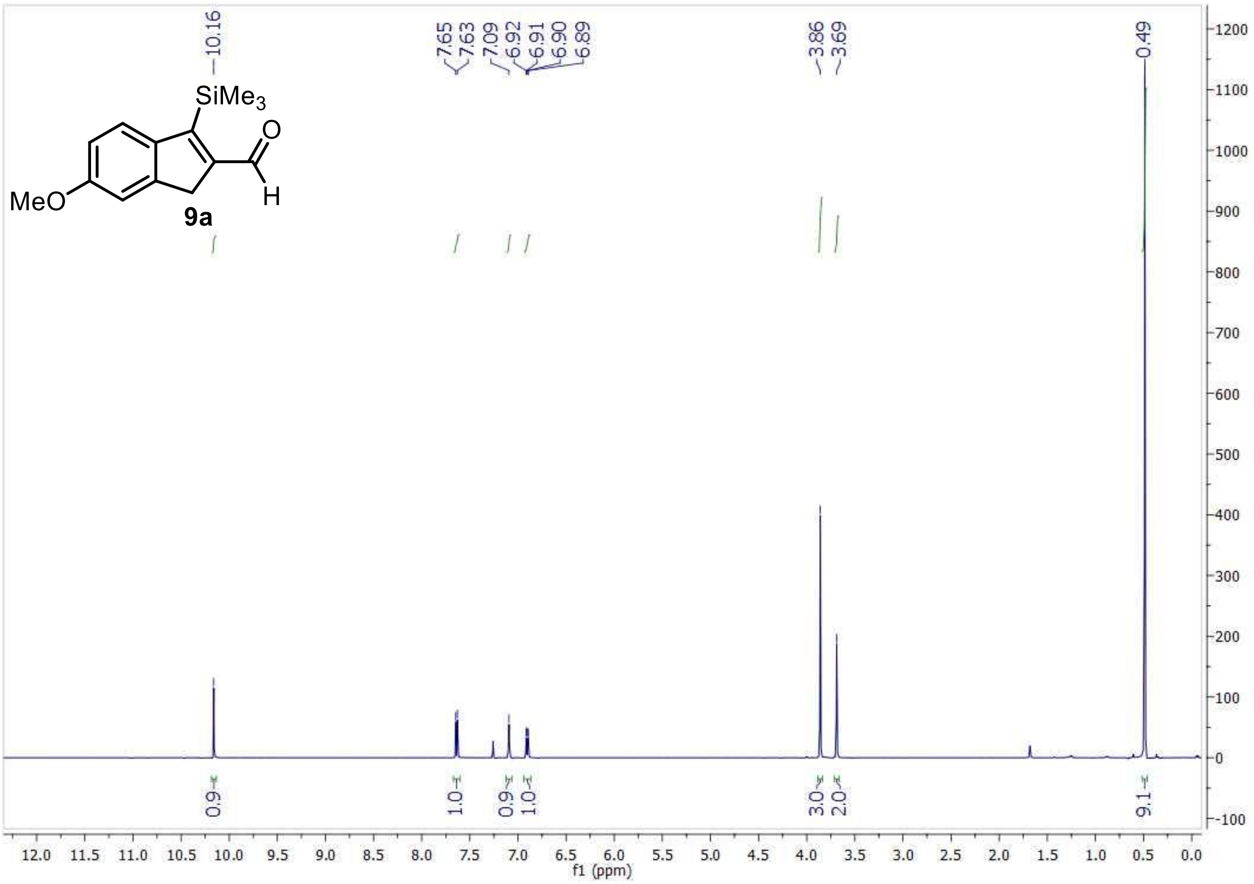
7.75
7.74
7.32
7.30
7.29
7.26
7.24
7.22
7.21
7.05
7.05
6.89
6.89
6.88
6.87
3.85
3.68
3.05
3.04
3.04
3.03
0.40
SiMe3
O
MeO
8n
1.0
2.9
1.9
1.1
1.1
3.1
2.0
4.0
9.0
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)
2100 2000 1900 1800 1700 1600 1500 1400 1300 1200 1100 1000 900 800 700 600 500 400 300 200 100 0 -100

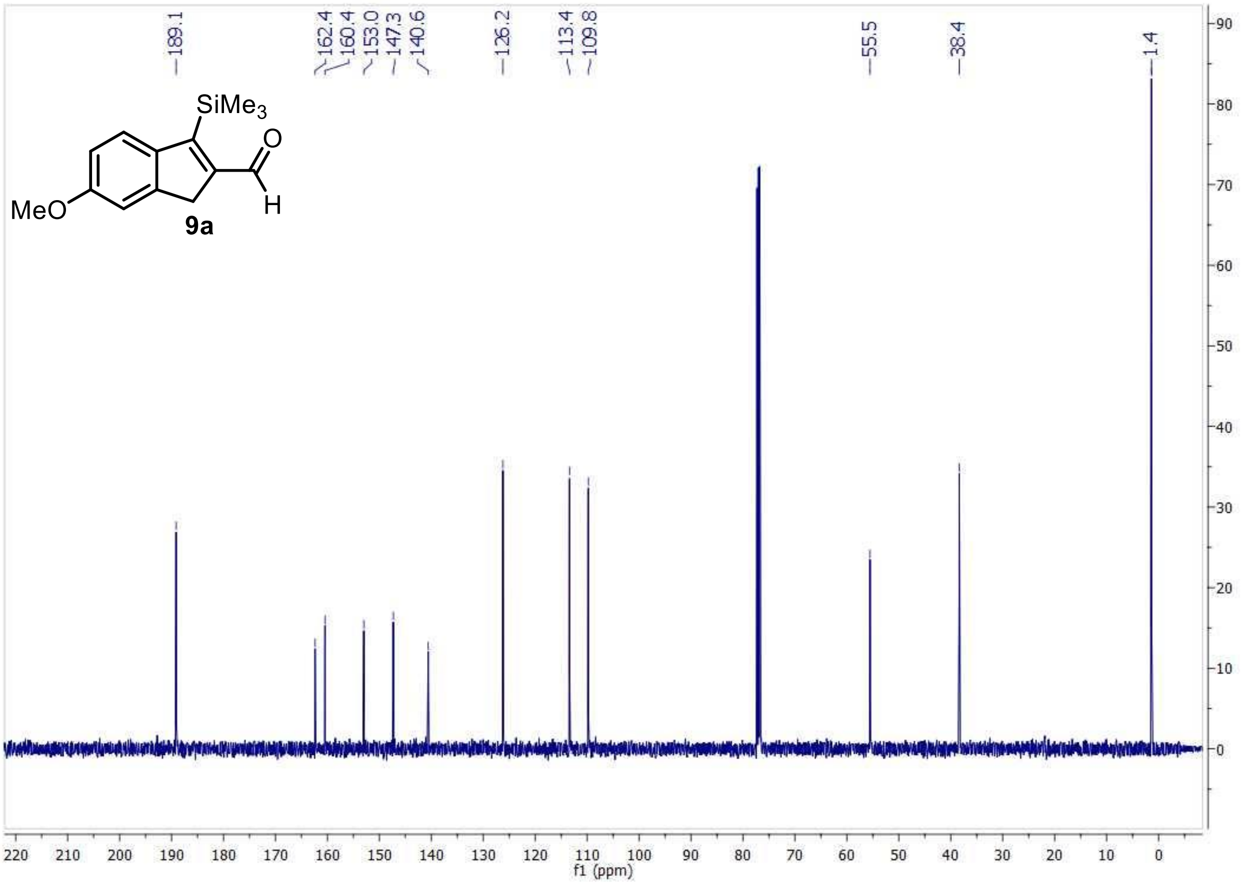


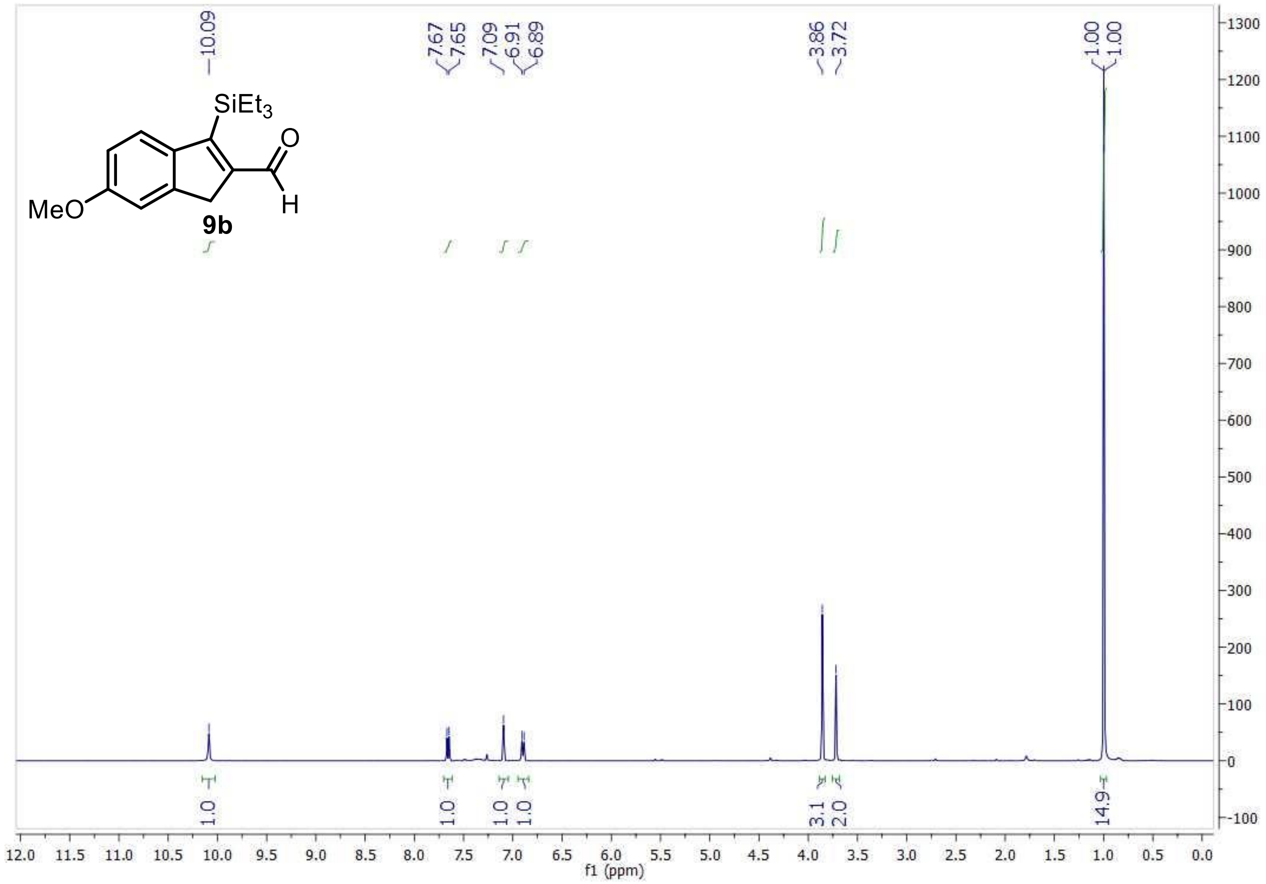
197.5
159.6
156.1
150.4
146.5
141.4
141.2
128.5
128.4
126.2
126.1
112.8
109.6
55.5
43.1
41.2
30.2
0.6
SiMe3
O
MeO
8n
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)
55 50 45 40 35 30 25 20 15 10 5 0 -5


7.60
7.58
6.97
6.96
6.85
6.85
6.83
6.83
3.85
3.81
3.80
3.78
3.77
2.42
1.37
1.35
0.94
0.93
SiEt3
O
MeO
CH3
CH3
8o
1.0
1.0
1.0
3.0
1.0
3.1
3.1
15.1
f1 (ppm)

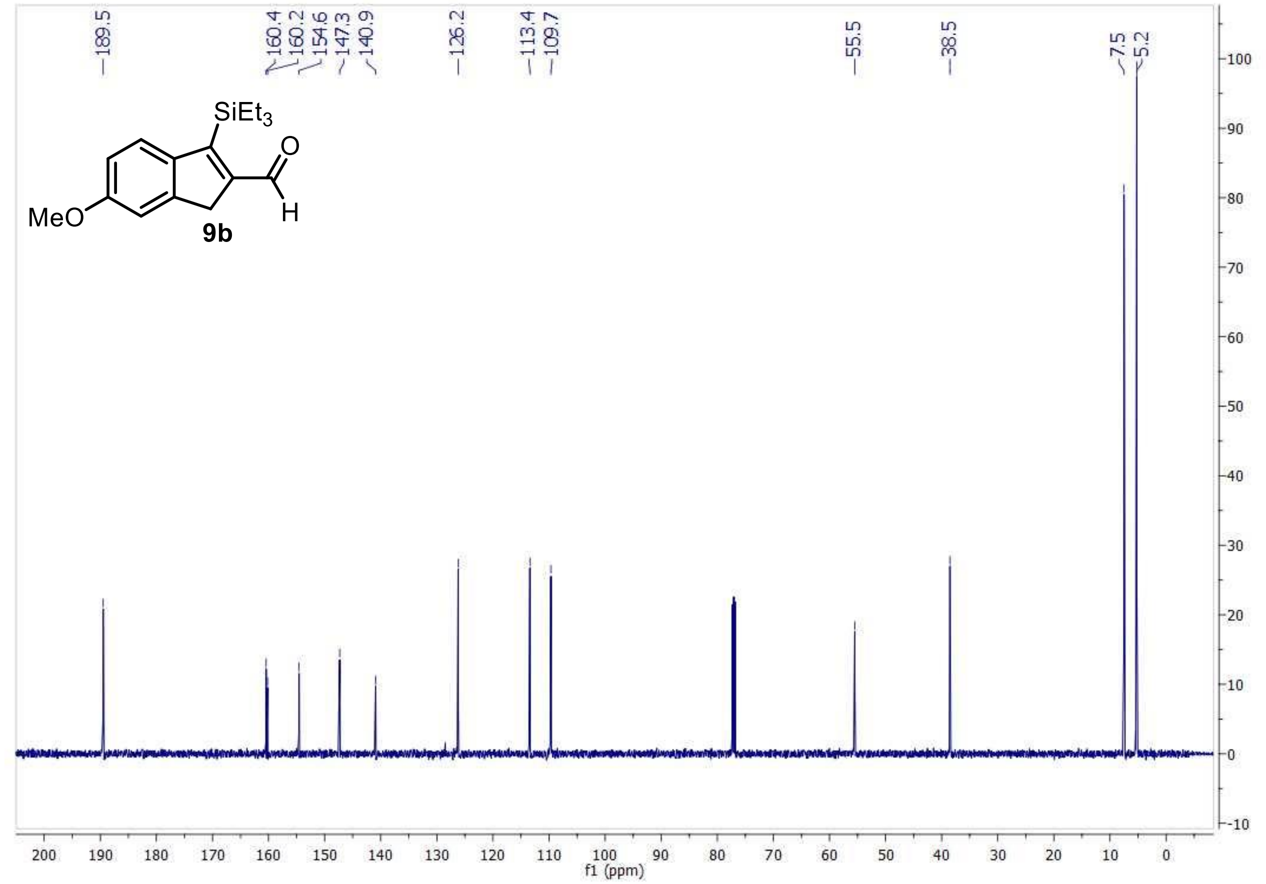

199.9
160.2
159.2
151.7
147.2
139.8
125.6
112.4
108.9
55.5
47.2
30.5
17.0
7.8
4.1
SiEt3
O
MeO
CH3
CH3
8o
f1 (ppm)


SiMe3
O
H
MeO
9a
10.16
7.65
7.63
7.09
6.92
6.91
6.90
6.89
3.86
3.69
0.49
0.9
1.0
0.9
1.0
3.0
2.0
9.1
12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)
1200 1100 1000 900 800 700 600 500 400 300 200 100 0 -100

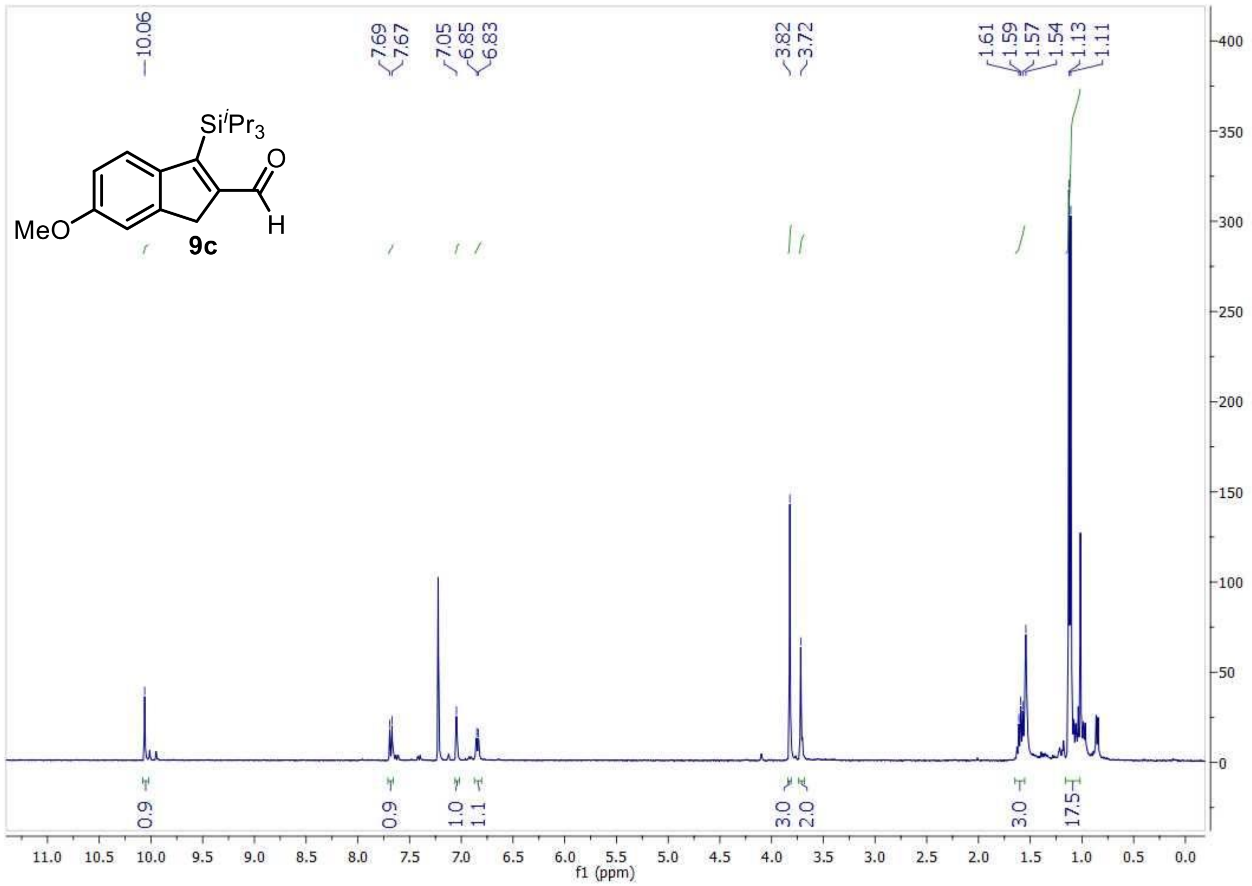

SiMe3
O
H
MeO
9a
189.1
162.4
160.4
153.0
147.3
140.6
126.2
113.4
109.8
55.5
38.4
-1.4
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)
90 80 70 60 50 40 30 20 10 0

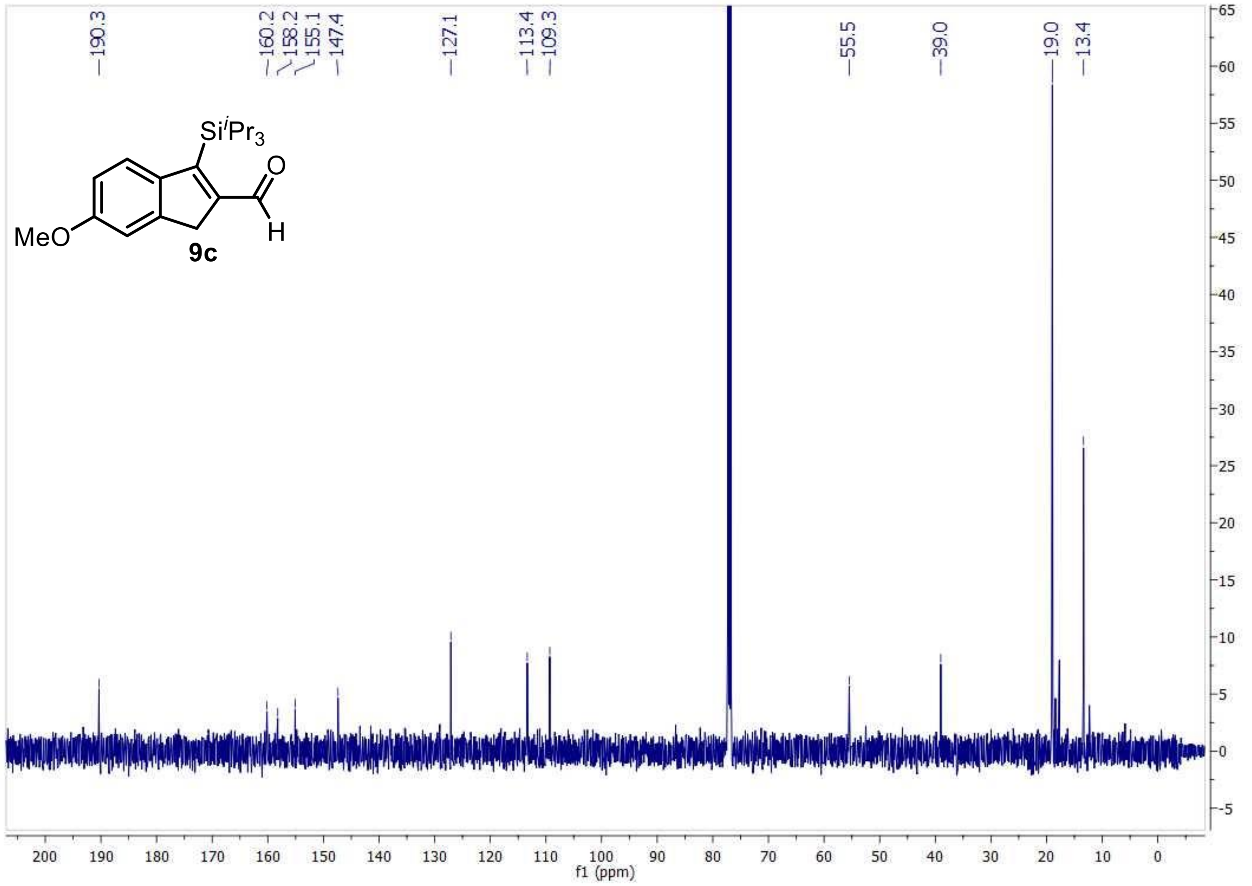


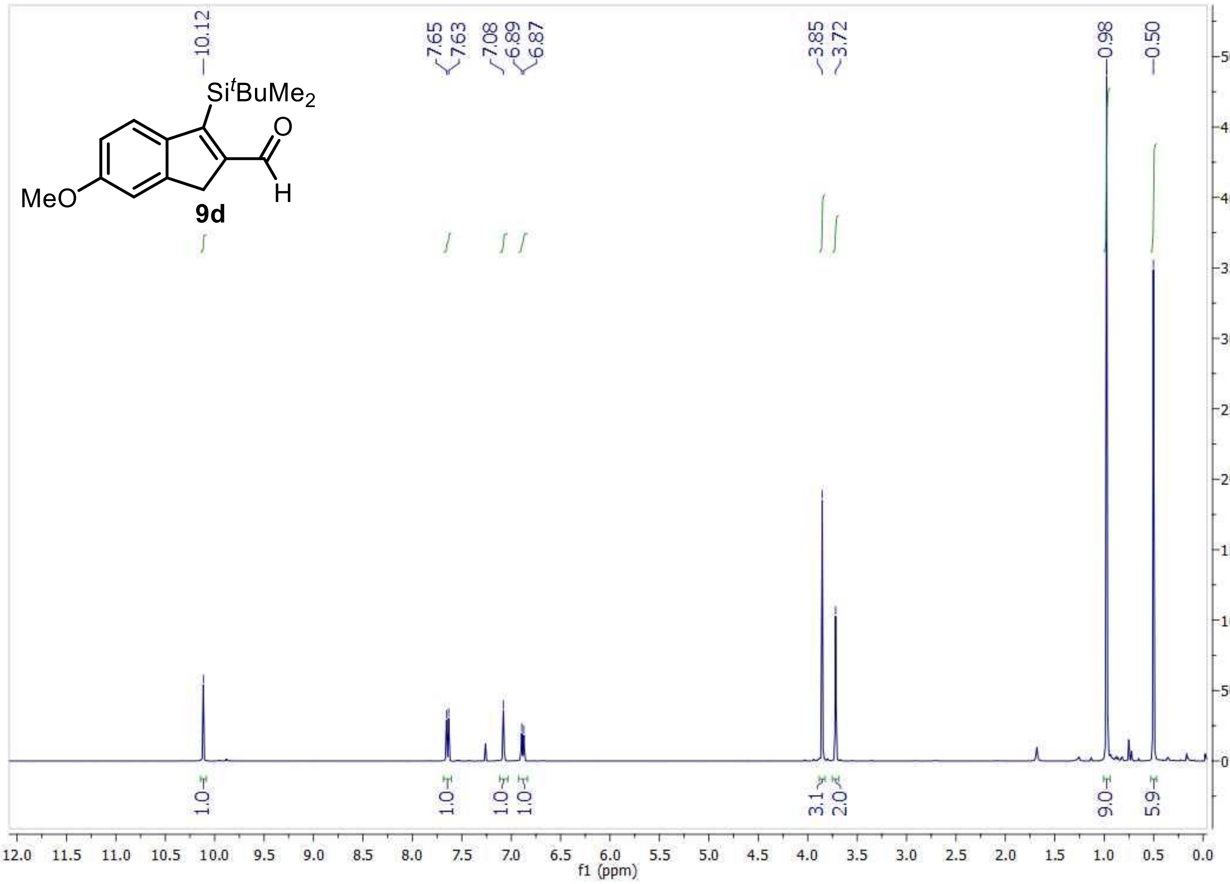
—10.09
7.67
7.65
7.09
6.91
6.89
3.86
3.72
1.00
1.00
SiEt3
O
MeO
H
9b
1.0
1.0
1.0
1.0
3.1
2.0
14.9
12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)
1300 1200 1100 1000 900 800 700 600 500 400 300 200 100 0 -100



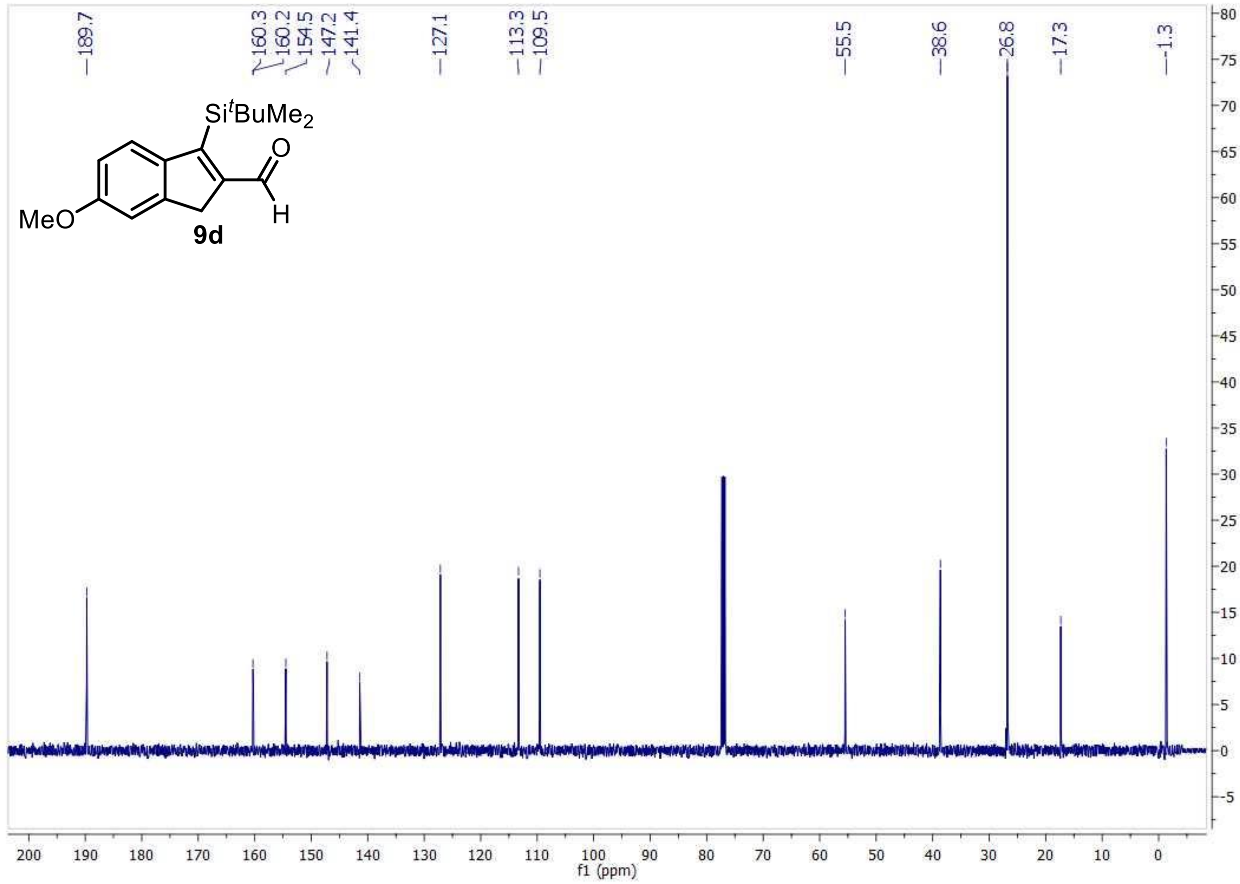
—189.5
160.4
160.2
154.6
147.3
140.9
—126.2
—113.4
—109.7
—55.5
—38.5
7.5
5.2
SiEt3
O
MeO
H
9b
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)
100 90 80 70 60 50 40 30 20 10 0 -10


10.06
7.69
7.67
7.05
6.85
6.83
3.82
3.72
1.61
1.59
1.57
1.54
1.13
1.11
Si$^i$Pr$_3$
O
H
MeO
9c
0.9
0.9
1.0
1.1
3.0
2.0
3.0
17.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)
400
350
300
250
200
150
100
50
0

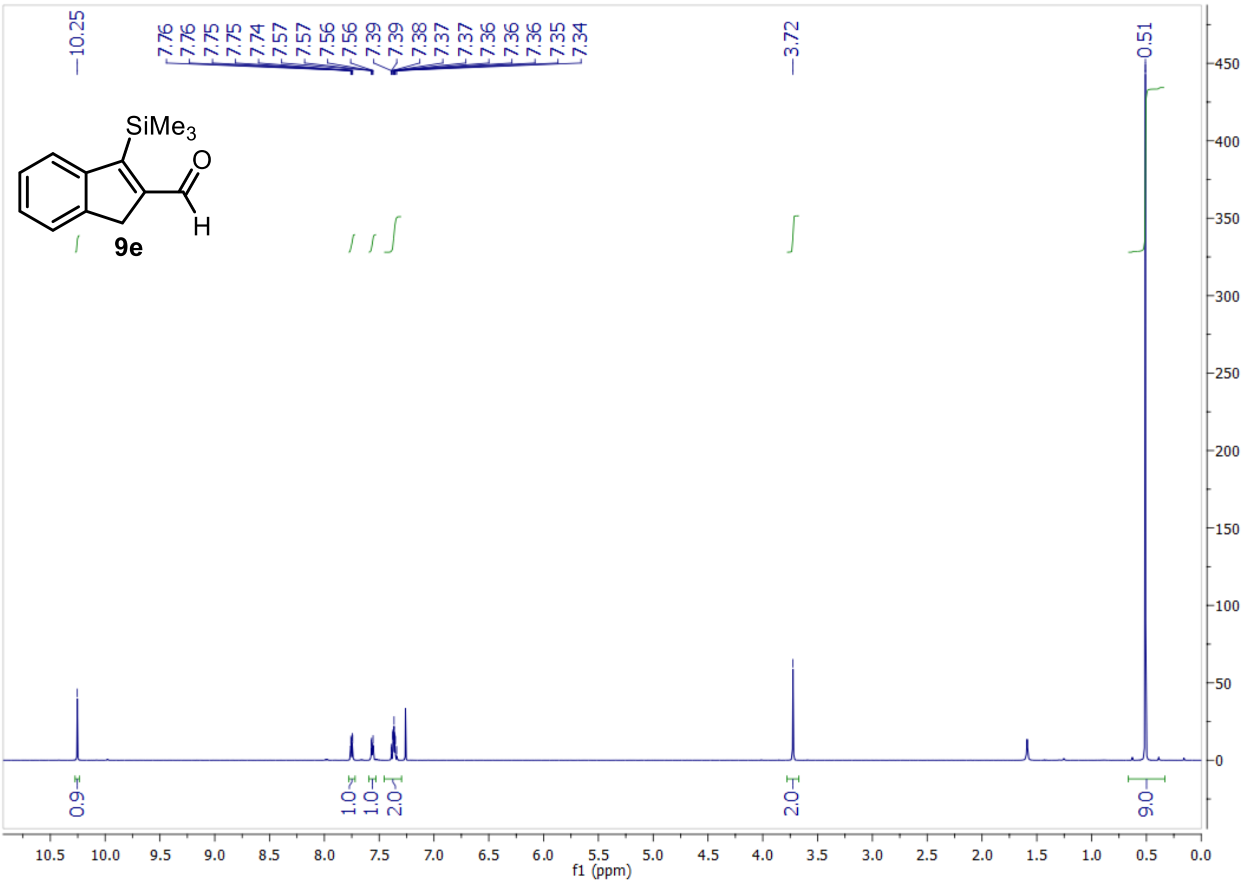

190.3
160.2
158.2
155.1
147.4
127.1
113.4
109.3
55.5
39.0
19.0
13.4
Si$^i$Pr$_3$
O
H
MeO
9c
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5

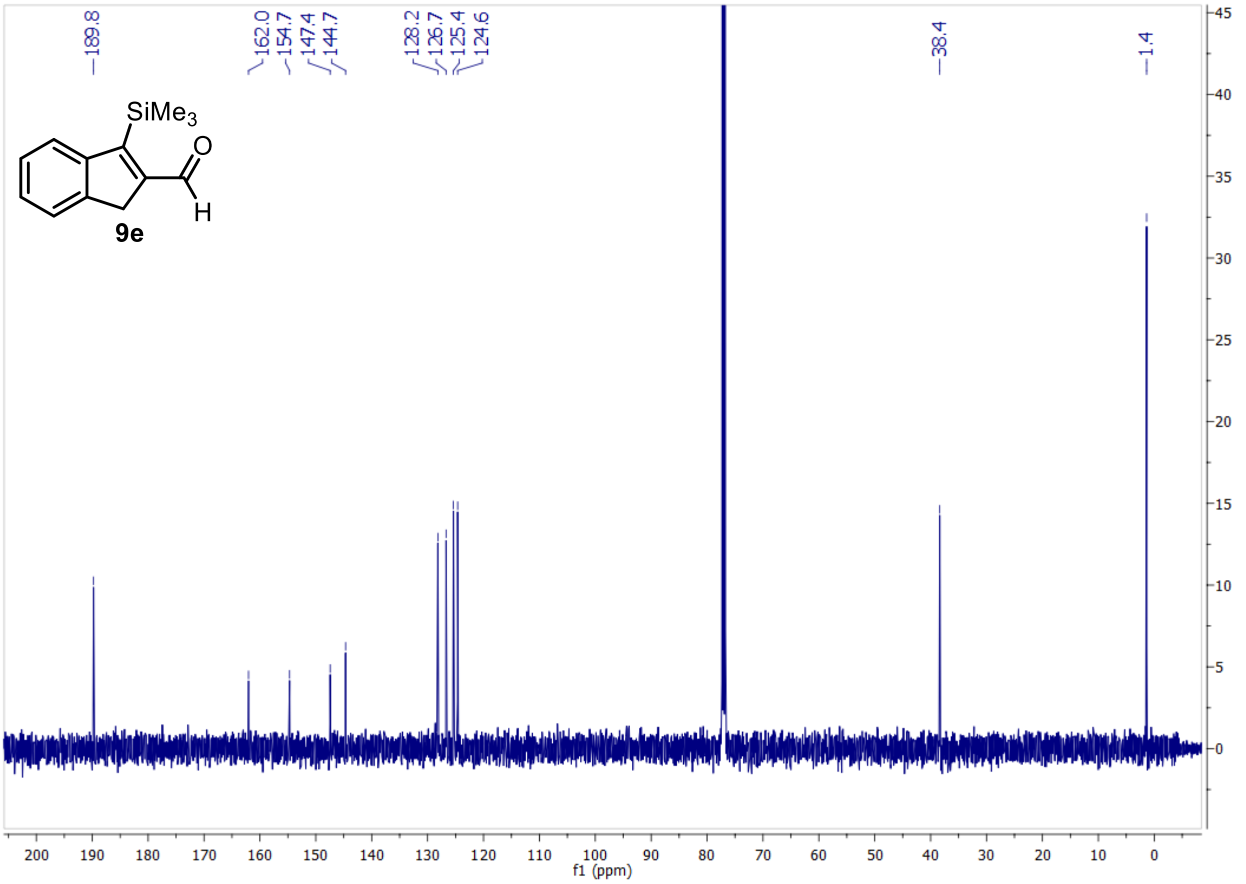


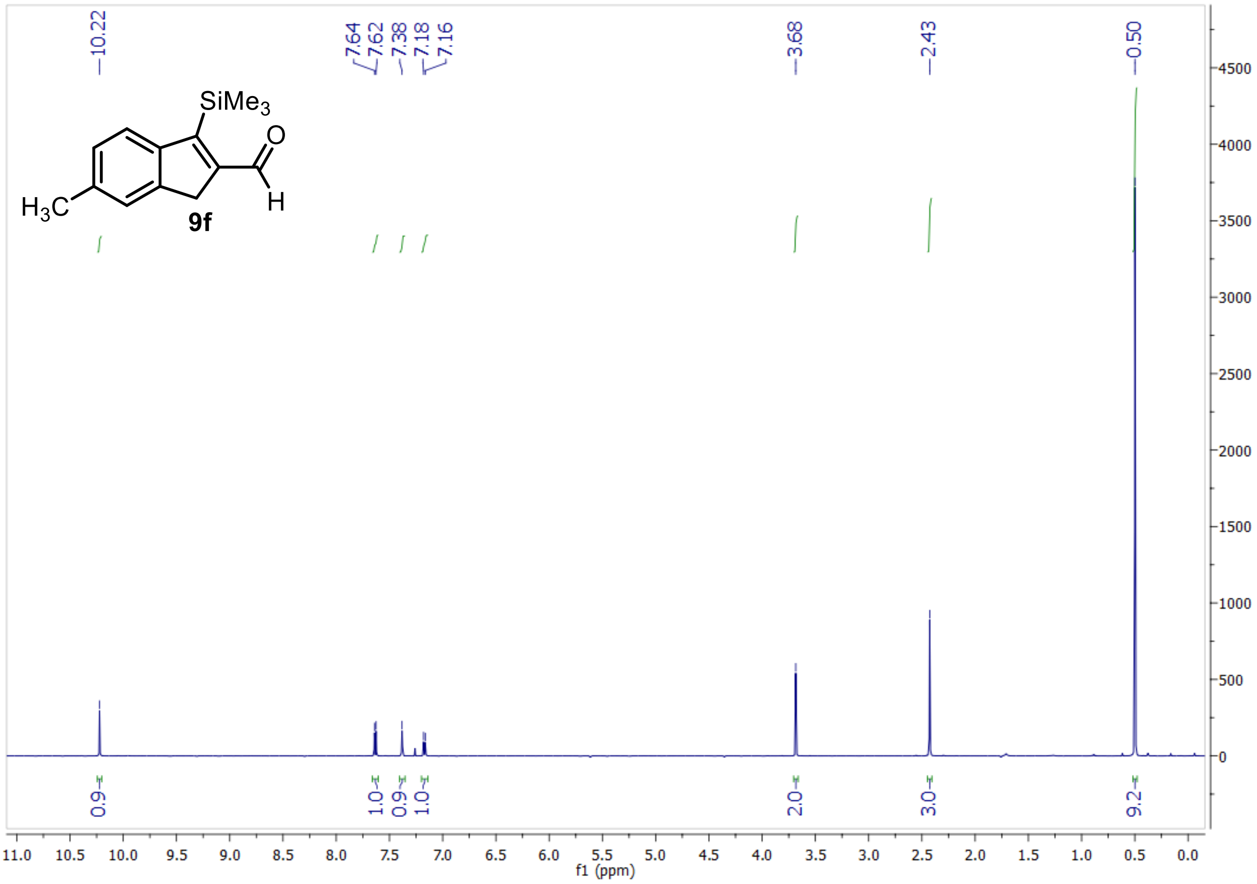
10.12
7.65
7.63
7.08
6.89
6.87
3.85
3.72
0.98
0.50
Si$^t$BuMe$_2$
O
H
MeO
9d
1.0
1.0
1.0
1.0
3.1
2.0
9.0
5.9
12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)
500 450 400 350 300 250 200 150 100 50 0

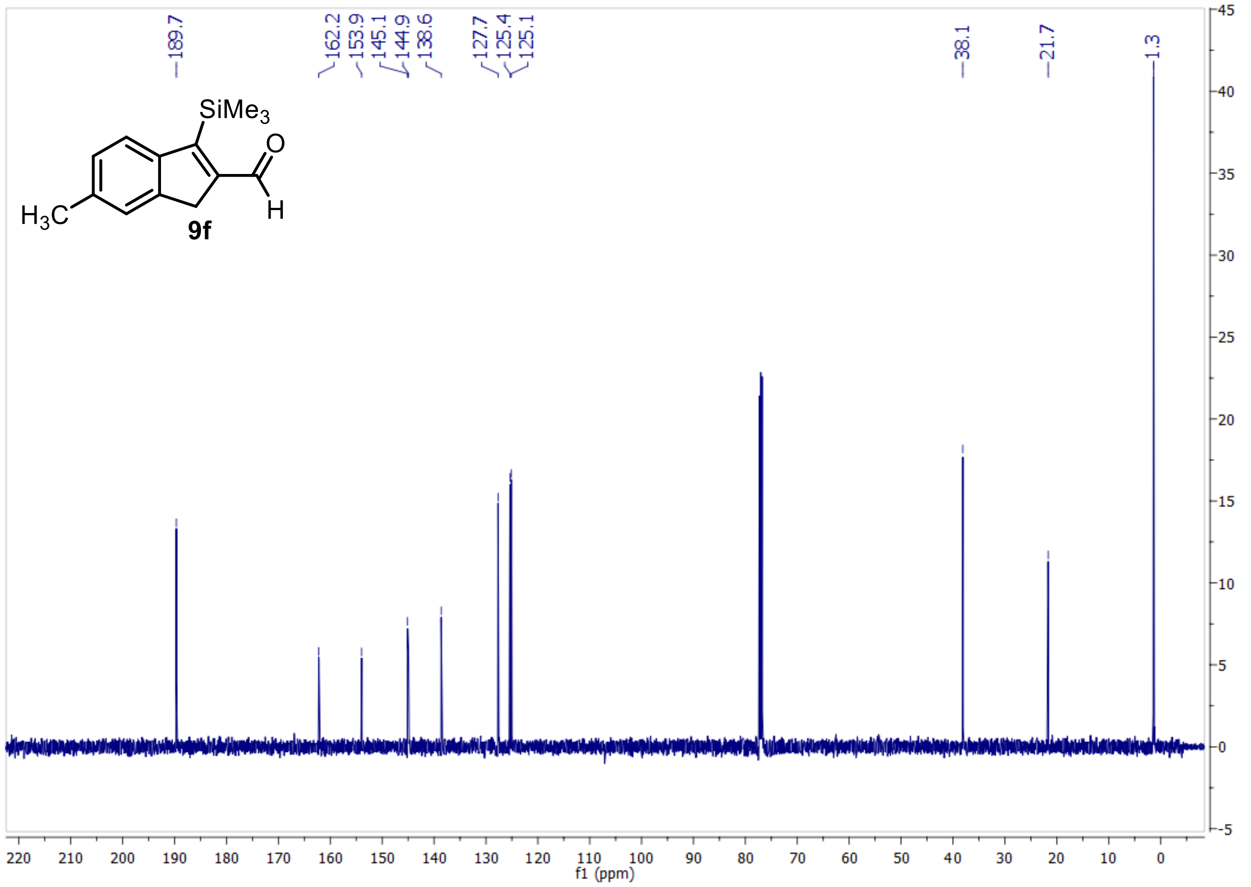


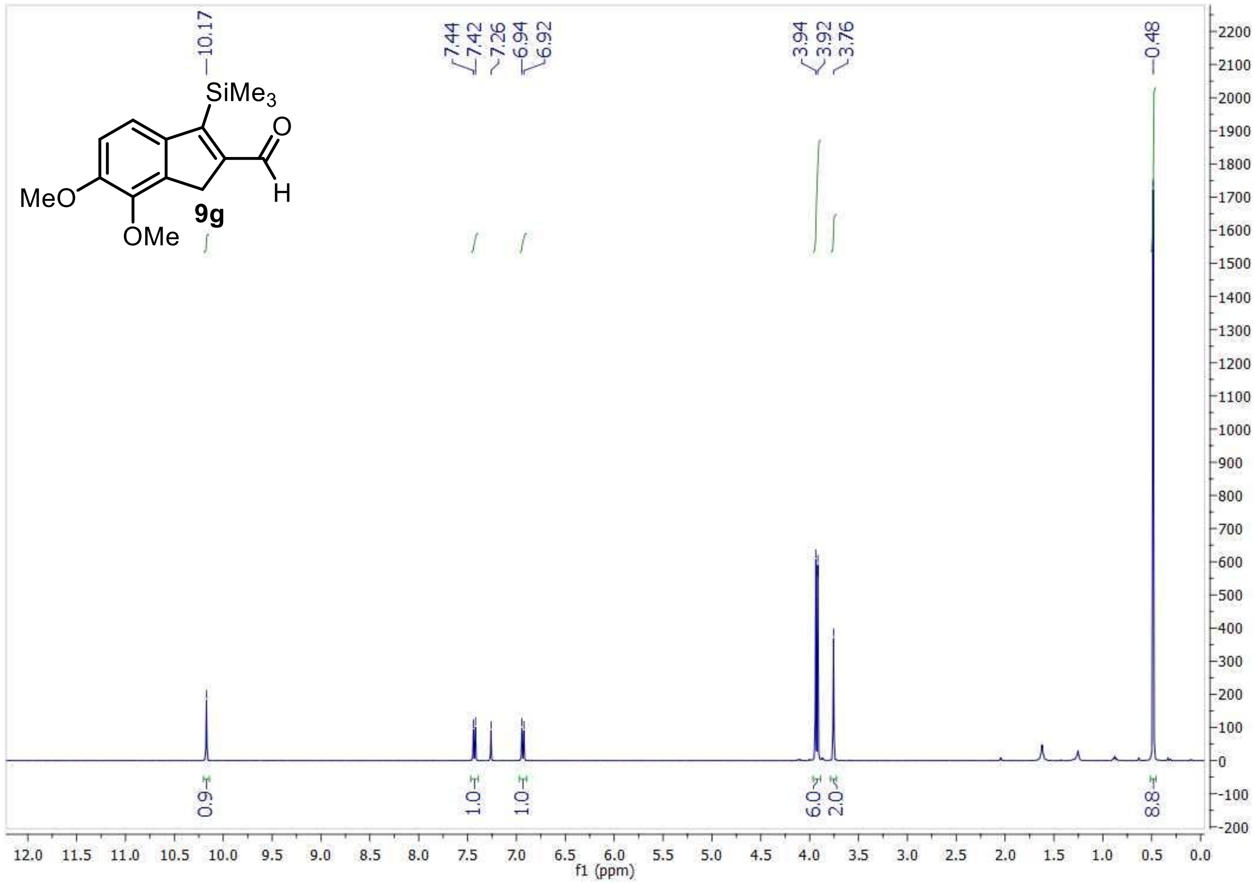
189.7
160.3
160.2
154.5
147.2
141.4
127.1
113.3
109.5
55.5
38.6
26.8
17.3
-1.3
Si$^t$BuMe$_2$
O
H
MeO
9d
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)
80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 -5

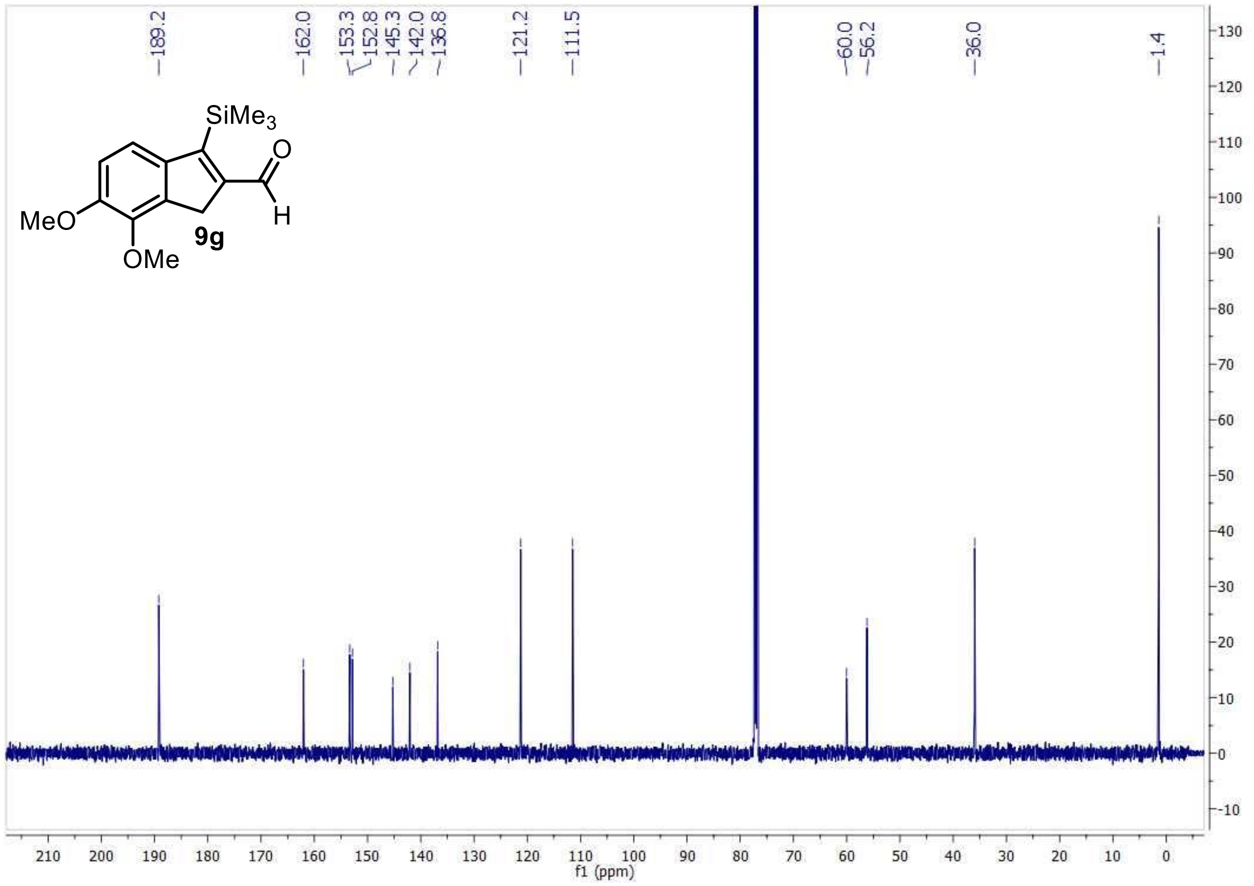

10.25
7.76
7.76
7.75
7.75
7.74
7.57
7.57
7.56
7.56
7.39
7.39
7.38
7.37
7.37
7.36
7.36
7.36
7.35
7.34
3.72
0.51
SiMe3
O
H
9e
0.9
1.0
1.0
2.0
2.0
9.0
450
400
350
300
250
200
150
100
50
0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

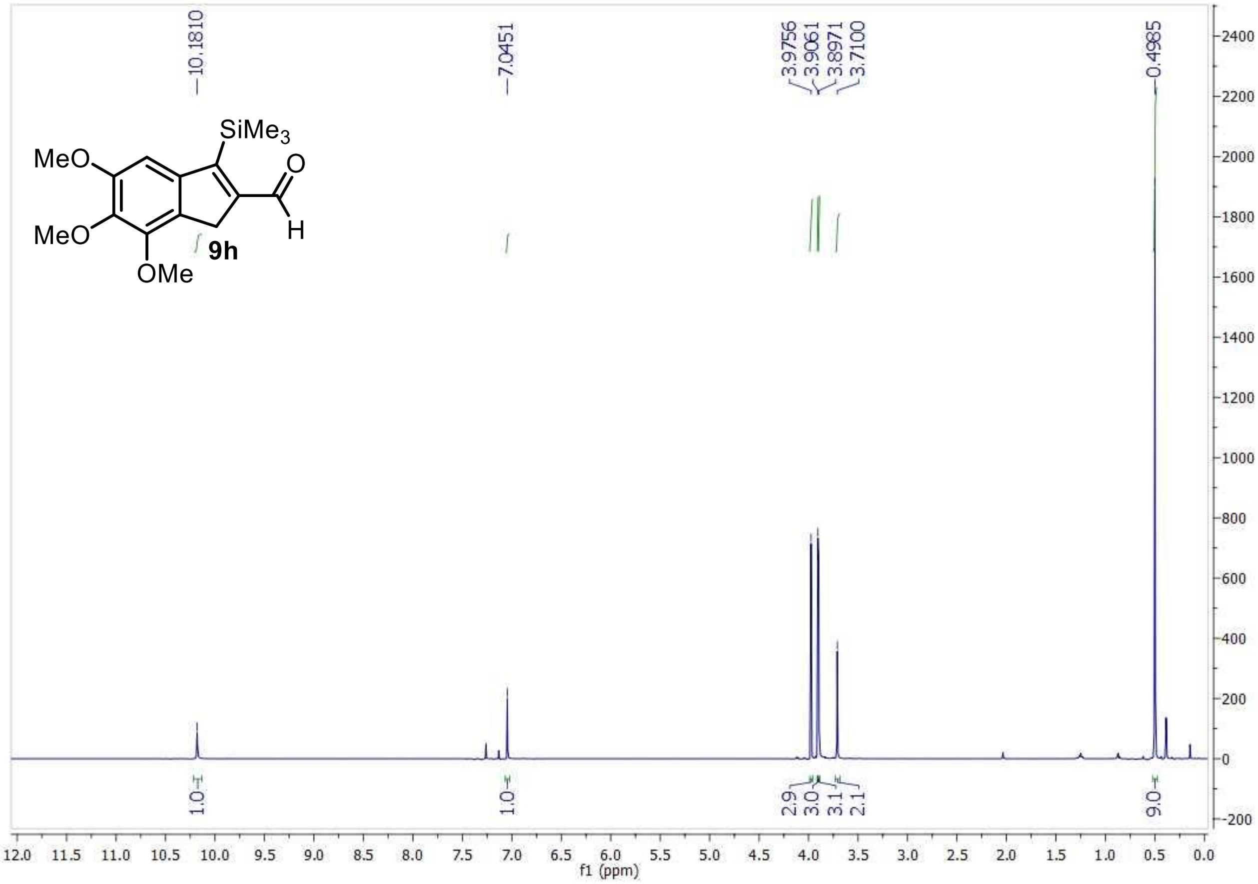

189.8
162.0
154.7
147.4
144.7
128.2
126.7
125.4
124.6
38.4
1.4
SiMe3
O
H
9e
45
40
35
30
25
20
15
10
5
0
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

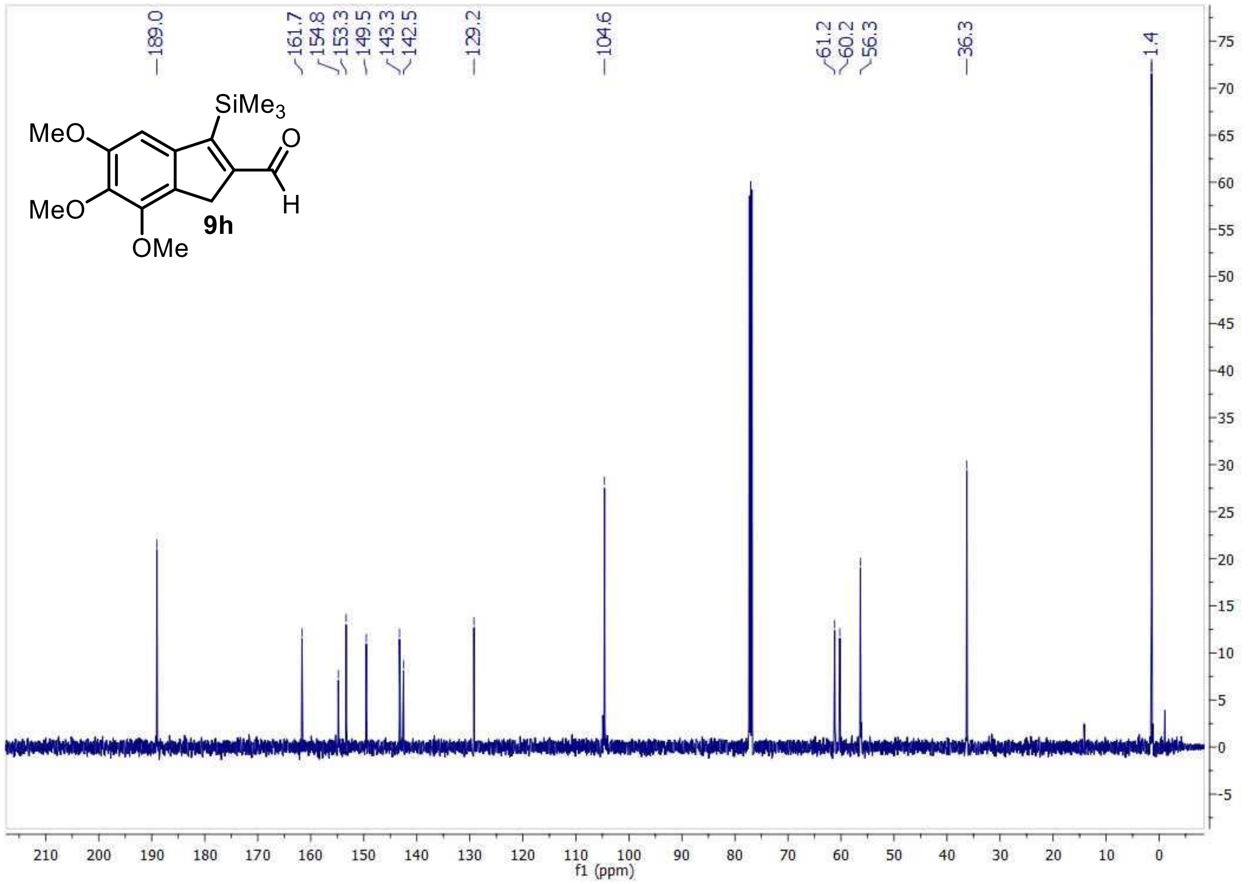

10.22
7.64
7.62
7.38
7.18
7.16
3.68
2.43
0.50
SiMe3
O
H
H3C
9f
0.9
1.0
0.9
1.0
2.0
3.0
9.2
11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)
4500
4000
3500
3000
2500
2000
1500
1000
500
0

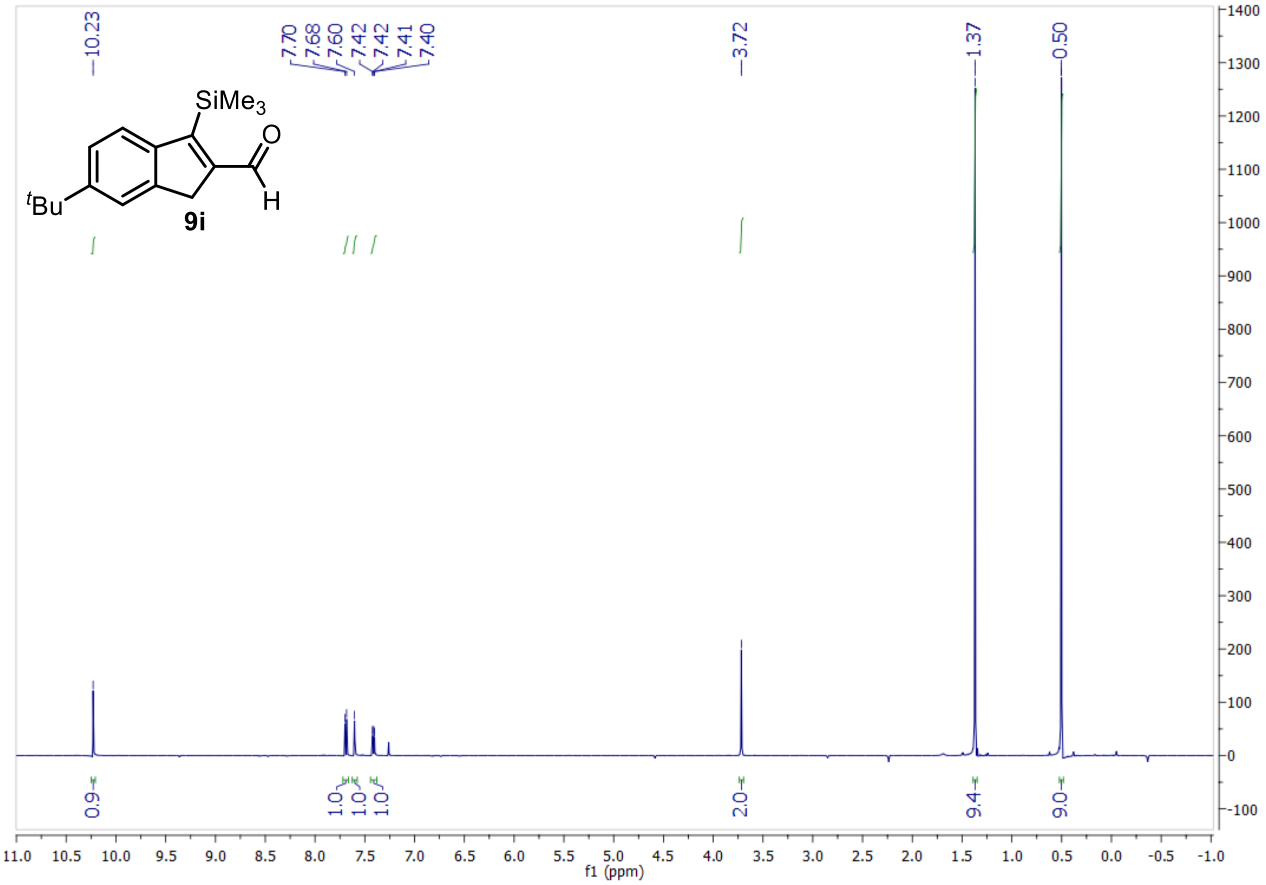

189.7
162.2
153.9
145.1
144.9
138.6
127.7
125.4
125.1
38.1
21.7
1.3
SiMe3
O
H
H3C
9f
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)
45
40
35
30
25
20
15
10
5
0
-5

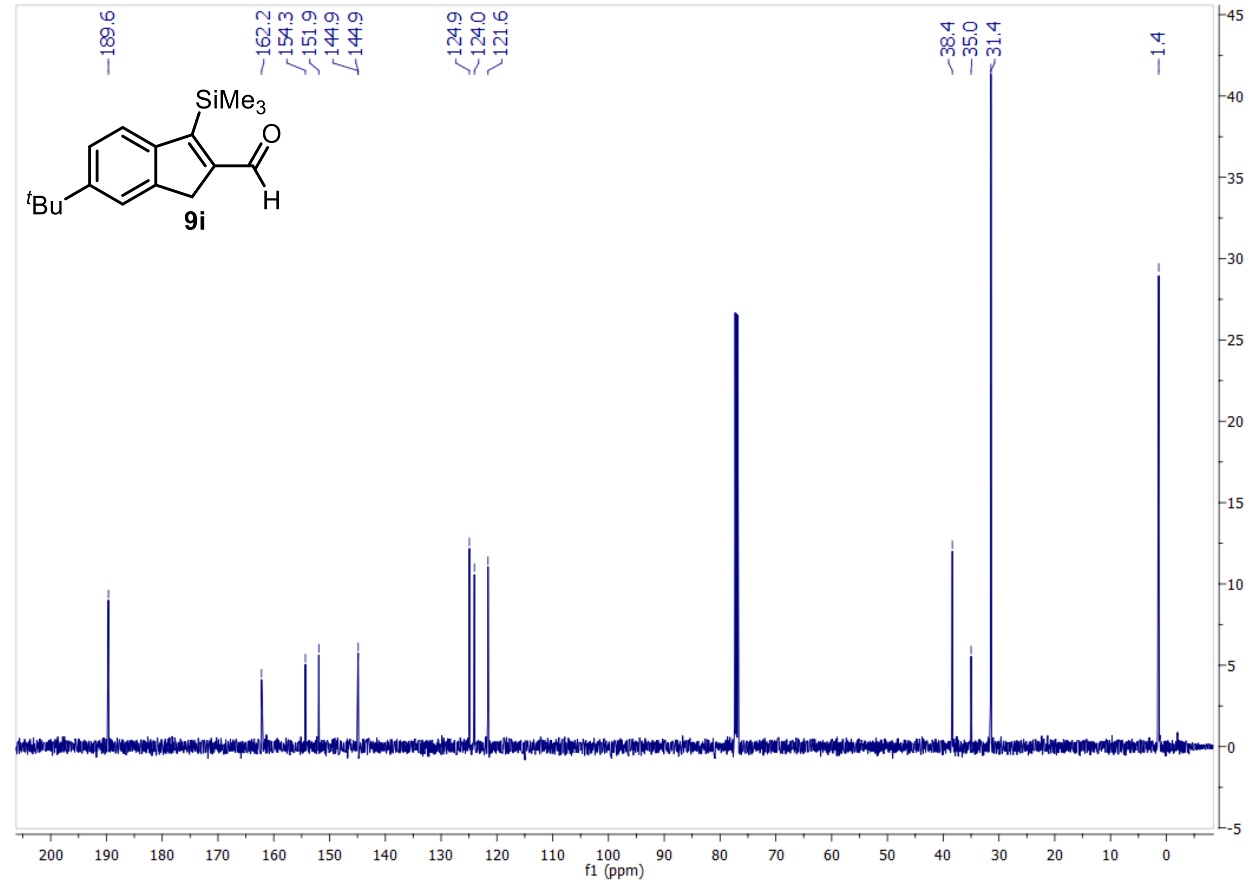

10.17
7.44
7.42
7.26
6.94
6.92
3.94
3.92
3.76
0.48
SiMe3
O
H
MeO
OMe
9g
0.9
1.0
1.0
6.0
2.0
8.8
f1 (ppm)

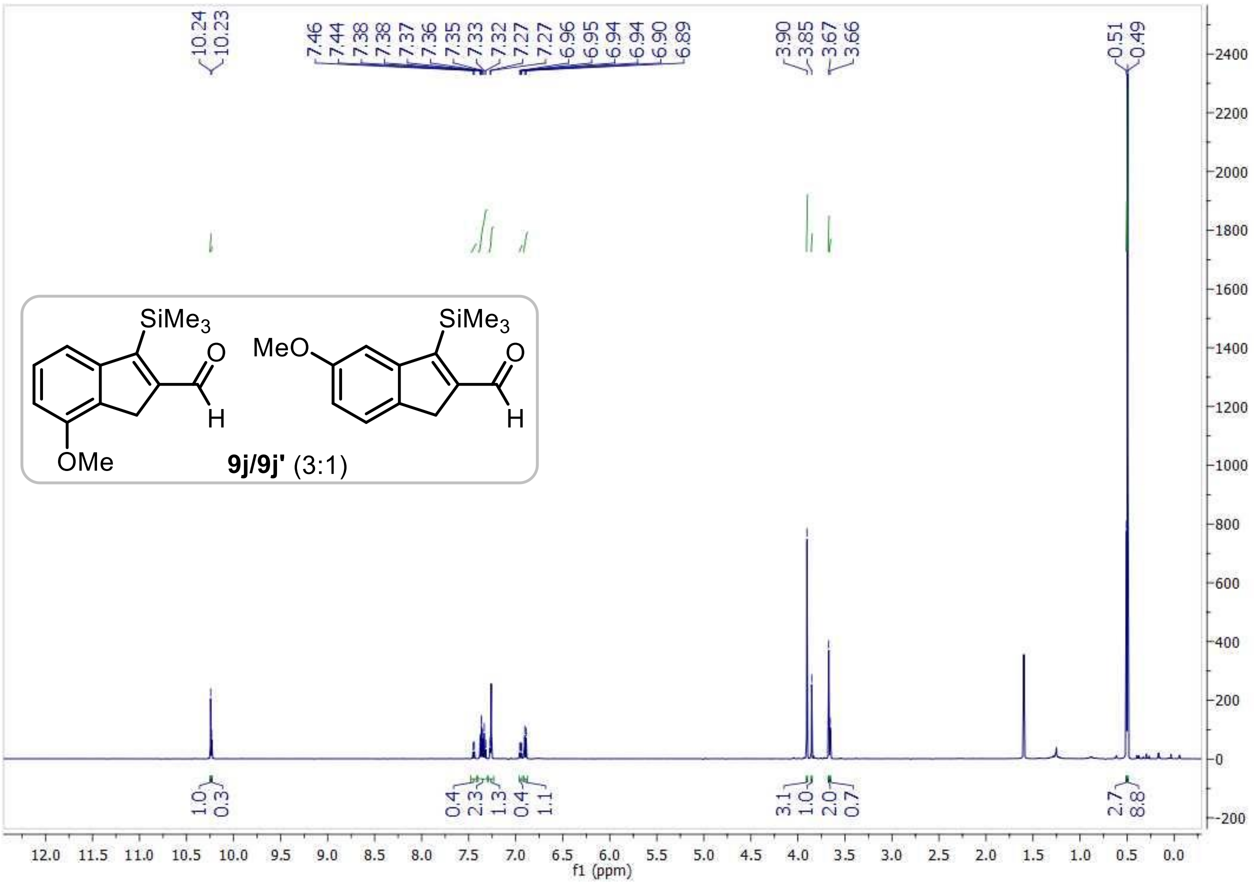

189.2
162.0
153.3
152.8
145.3
142.0
136.8
121.2
111.5
60.0
56.2
36.0
1.4
SiMe3
O
H
MeO
OMe
9g
f1 (ppm)


10.1810
7.0451
3.9756
3.9061
3.8971
3.7100
0.4985
SiMe3
MeO
MeO
OMe
O
H
9h
1.0
1.0
2.9
3.0
3.1
2.1
9.0
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
-200
12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

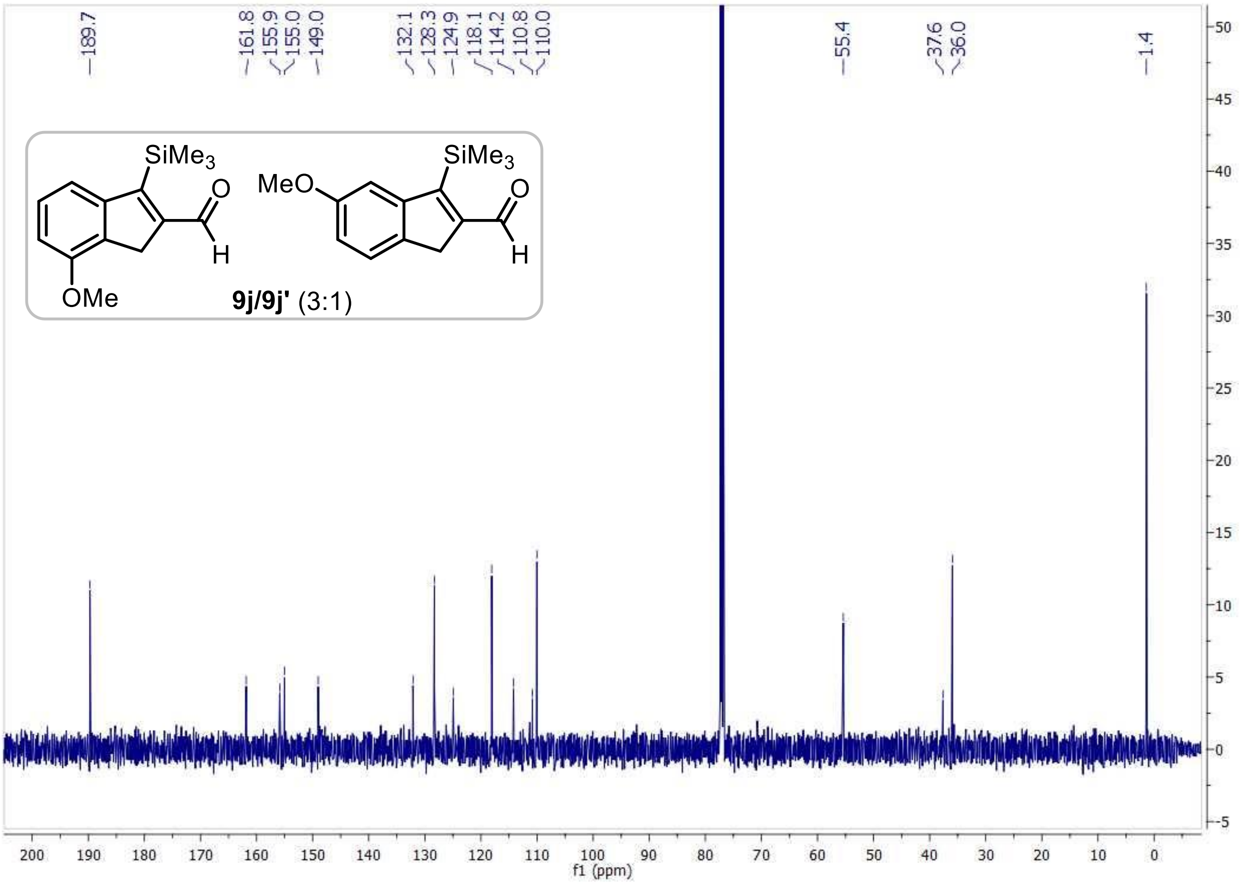

189.0
161.7
154.8
153.3
149.5
143.3
142.5
129.2
104.6
61.2
60.2
56.3
36.3
1.4
SiMe3
MeO
MeO
OMe
O
H
9h
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


10.23
7.70
7.68
7.60
7.42
7.42
7.41
7.40
3.72
1.37
0.50
SiMe3
O
H
tBu
9i
0.9
1.0
1.0
1.0
2.0
9.4
9.0
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
-100
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
f1 (ppm)

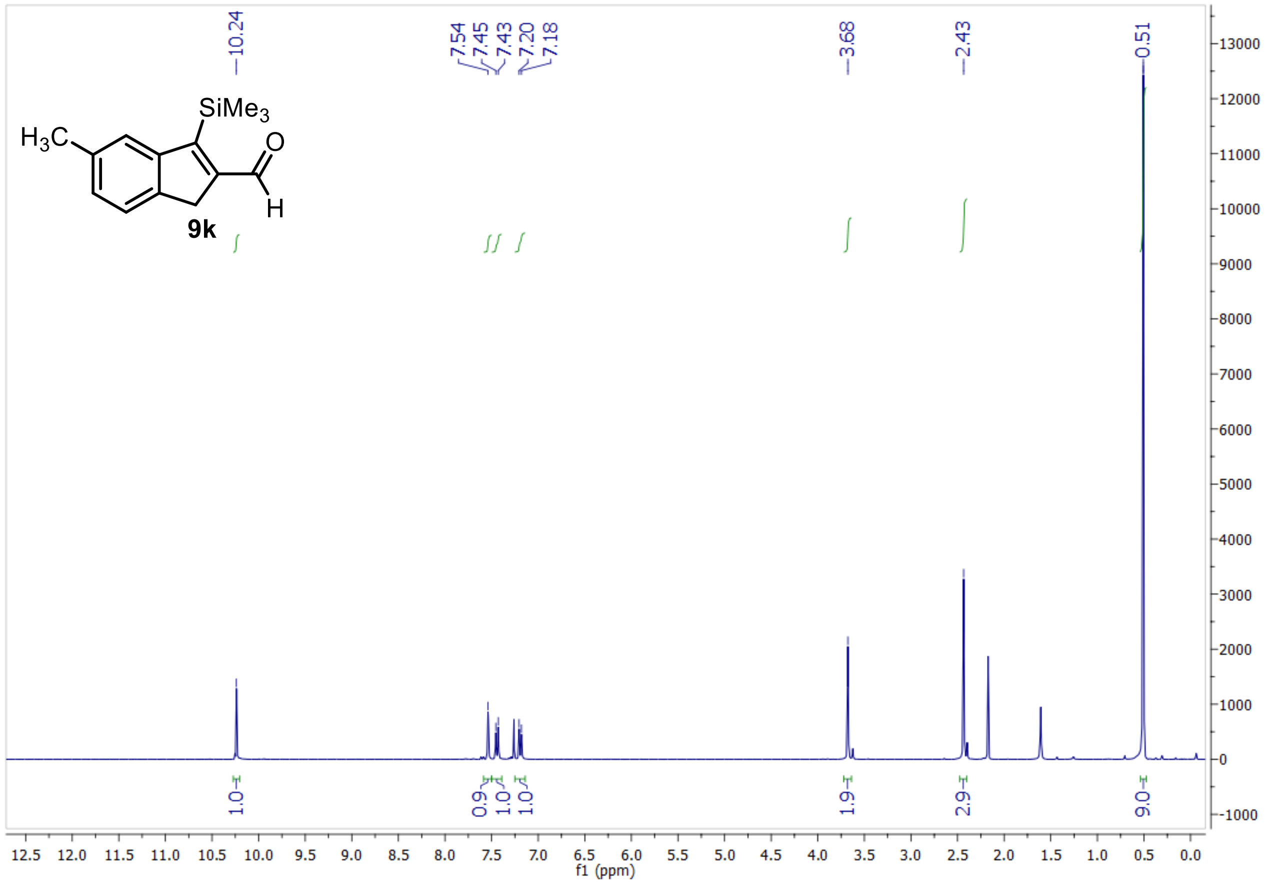

189.6
162.2
154.3
151.9
144.9
144.9
124.9
124.0
121.6
38.4
35.0
31.4
1.4
SiMe3
O
H
tBu
9i
45
40
35
30
25
20
15
10
5
0
-5
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

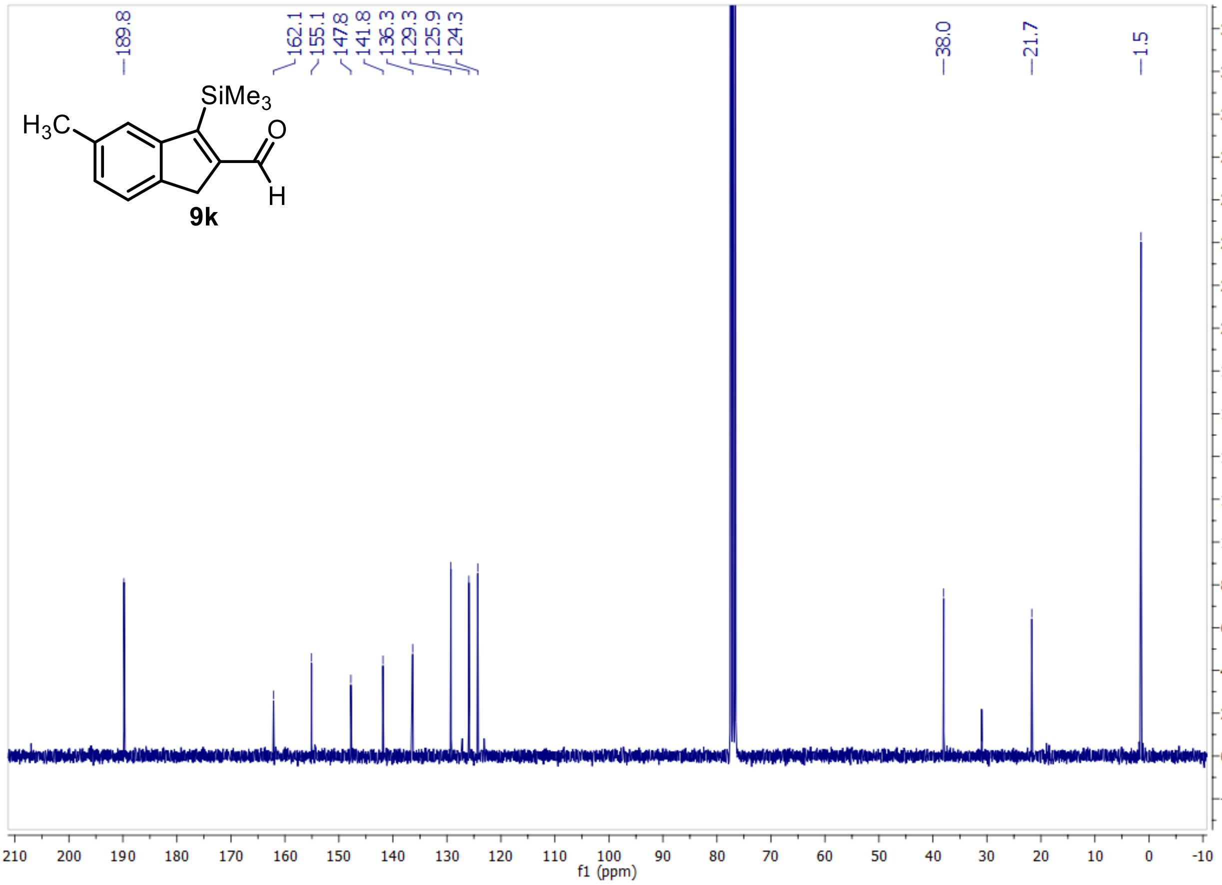


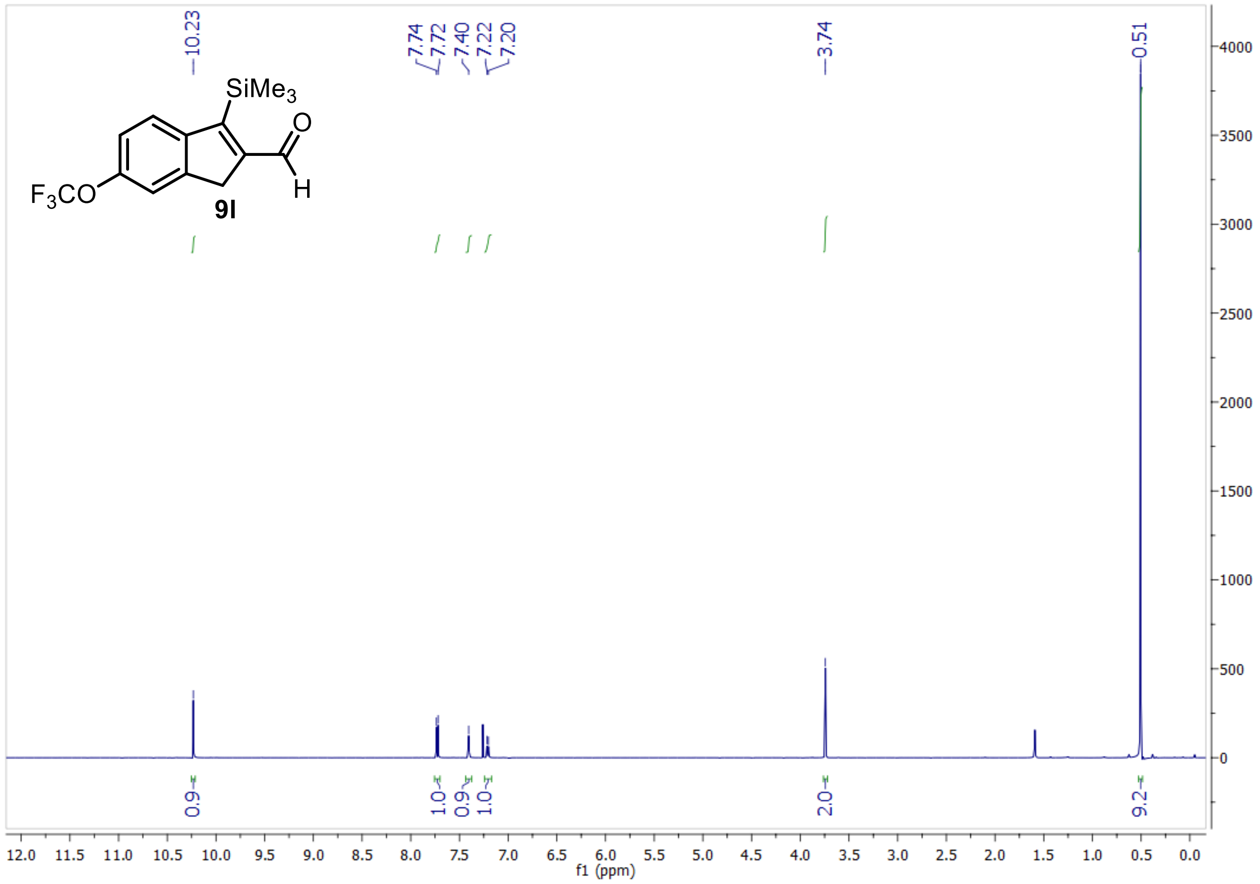
**9j/9j'** (3:1)

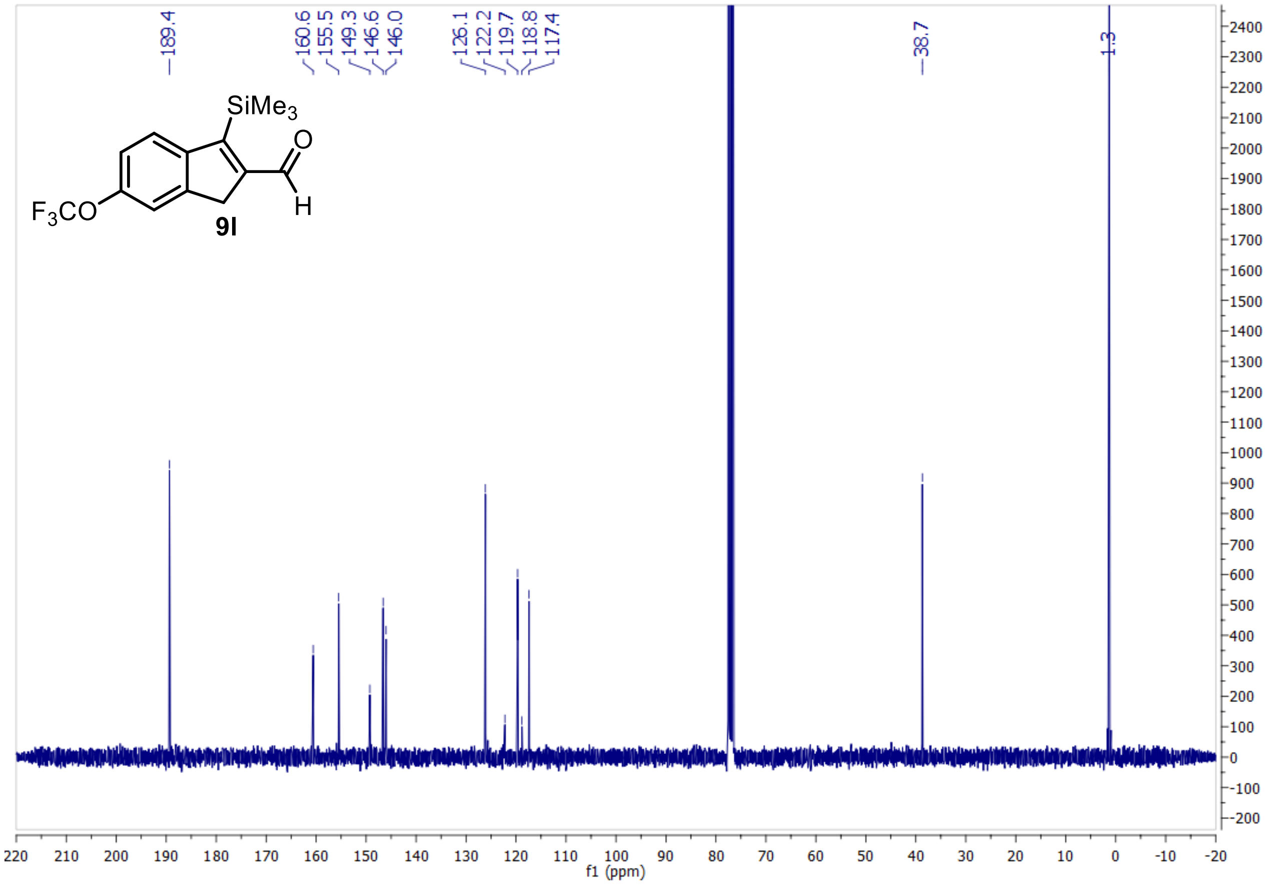


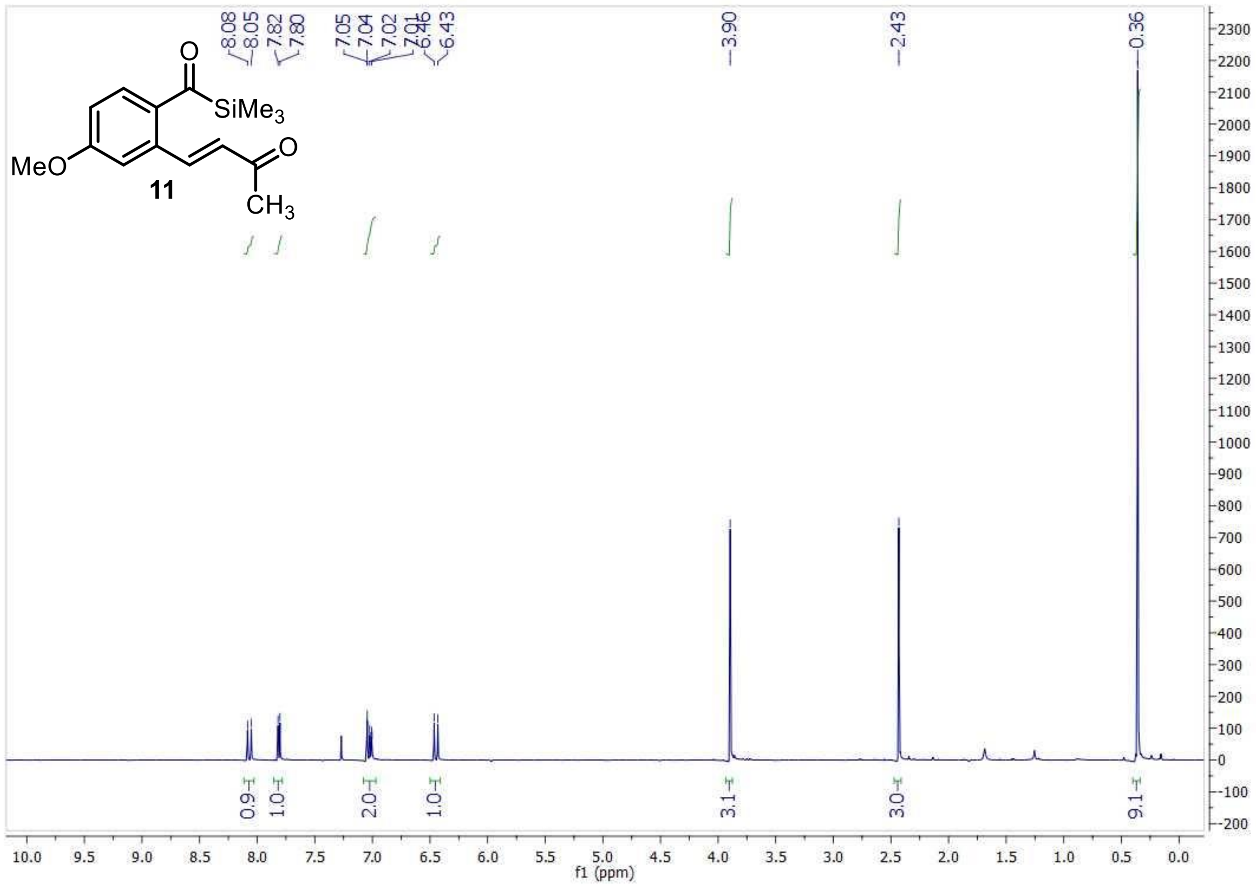
**9j/9j'** (3:1)


SiMe$_3$
H$_3$C
O
H
9k
10.24
7.54
7.45
7.43
7.20
7.18
3.68
2.43
0.51
1.0
0.9
1.0
1.0
1.9
2.9
9.0
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
-1000
12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

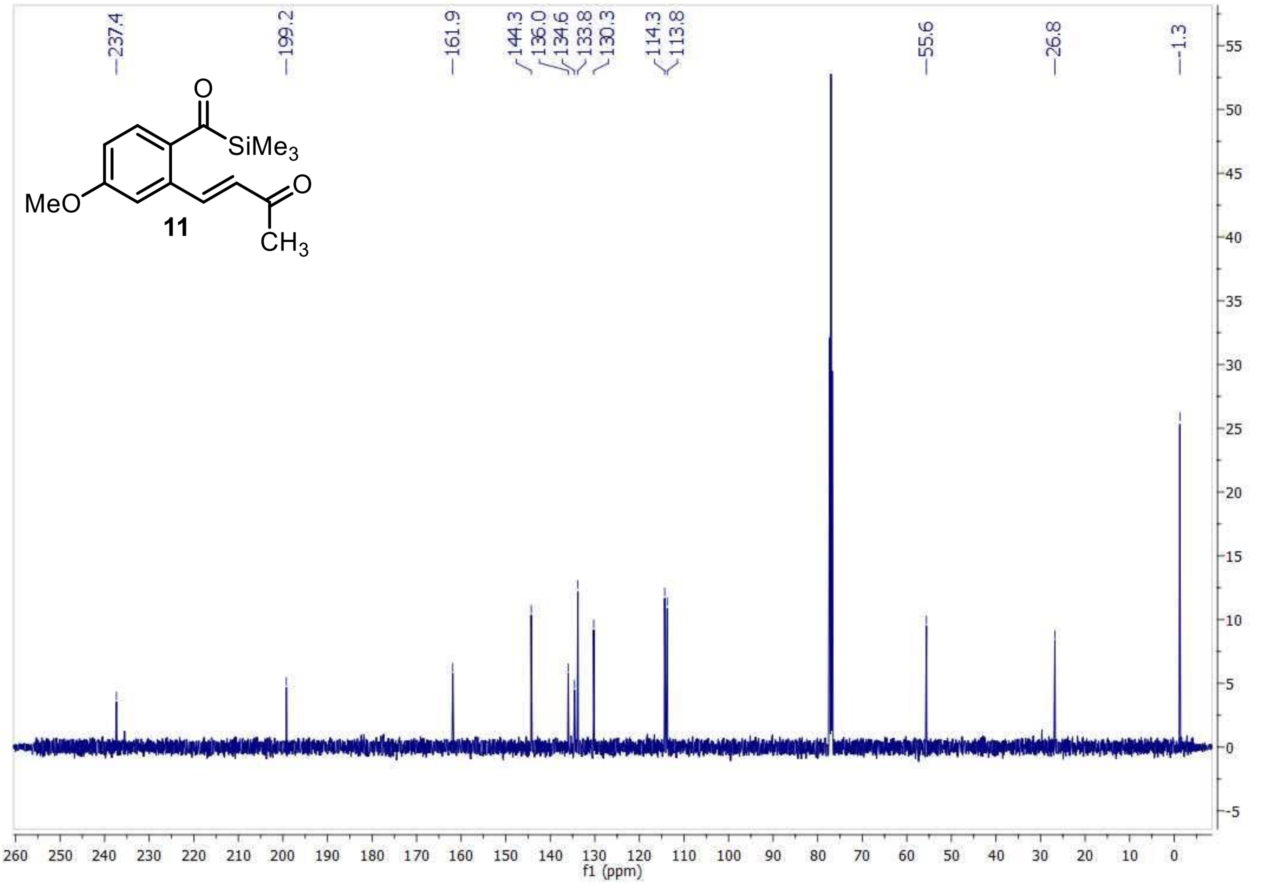

SiMe$_3$
H$_3$C
O
H
9k
189.8
162.1
155.1
147.8
141.8
136.3
129.3
125.9
124.3
38.0
21.7
1.5
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
-200
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


10.23
7.74
7.72
7.40
7.22
7.20
3.74
0.51
SiMe3
O
H
F3CO
9l
0.9
1.0
0.9
1.0
2.0
9.2
4000
3500
3000
2500
2000
1500
1000
500
0
12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

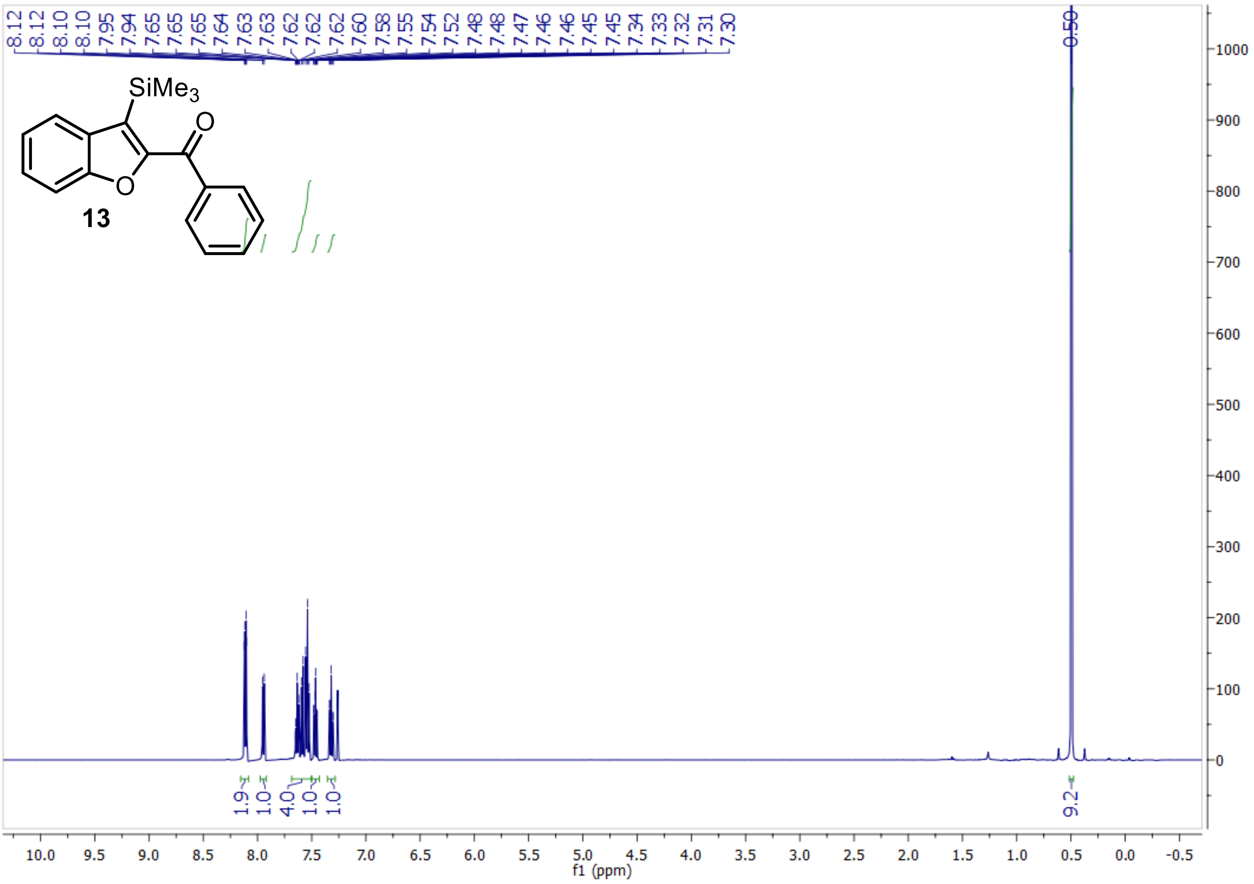

189.4
160.6
155.5
149.3
146.6
146.0
126.1
122.2
119.7
118.8
117.4
38.7
1.3
SiMe3
O
H
F3CO
9l
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
-100
-200
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
f1 (ppm)

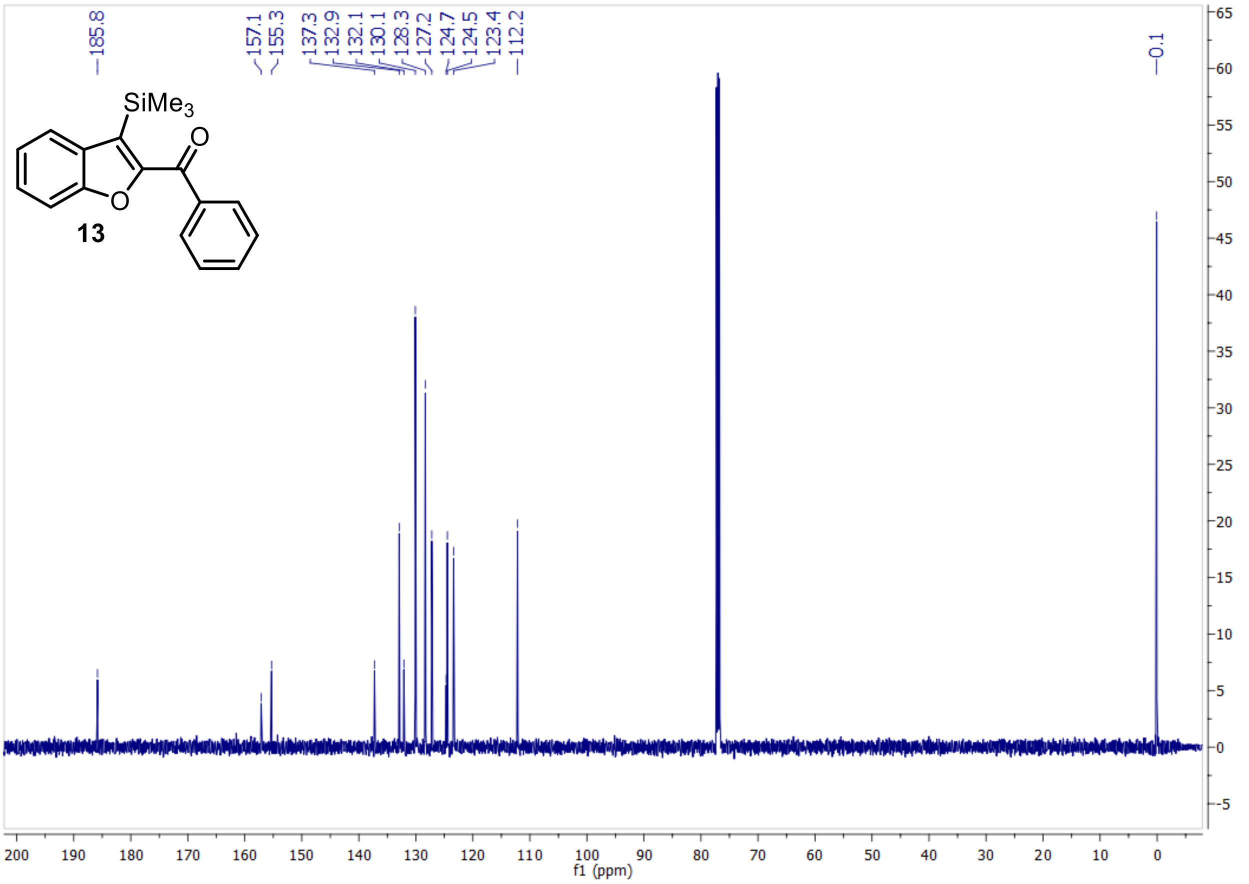


MeO
SiMe$_3$
O
O
CH$_3$
11
8.08
8.05
7.82
7.80
7.05
7.04
7.02
7.01
6.46
6.43
3.90
2.43
0.36
0.9
1.0
2.0
1.0
3.1
3.0
9.1
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)
2300 2200 2100 2000 1900 1800 1700 1600 1500 1400 1300 1200 1100 1000 900 800 700 600 500 400 300 200 100 0 -100 -200



MeO
SiMe$_3$
O
O
CH$_3$
11
237.4
199.2
161.9
144.3
136.0
134.6
133.8
130.3
114.3
113.8
55.6
26.8
-1.3
260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)
55 50 45 40 35 30 25 20 15 10 5 0 -5


8.12
8.12
8.10
8.10
7.95
7.94
7.65
7.65
7.65
7.64
7.63
7.63
7.62
7.62
7.62
7.60
7.58
7.55
7.54
7.52
7.48
7.48
7.47
7.46
7.46
7.45
7.45
7.34
7.33
7.32
7.31
7.30
0.50
SiMe3
O
O
13
1.9
1.0
4.0
1.0
1.0
9.2
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)
1000 900 800 700 600 500 400 300 200 100 0


185.8
157.1
155.3
137.3
132.9
132.1
130.1
128.3
127.2
124.7
124.5
123.4
112.2
-0.1
SiMe3
O
O
13
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)
65 60 55 50 45 40 35 30 25 20 15 10 5 0 -5

## X-Ray Crystallography Data for Compound 8a

The deposition number for **8a** at the Cambridge Crystallographic Data Centre is CCDC 2080244

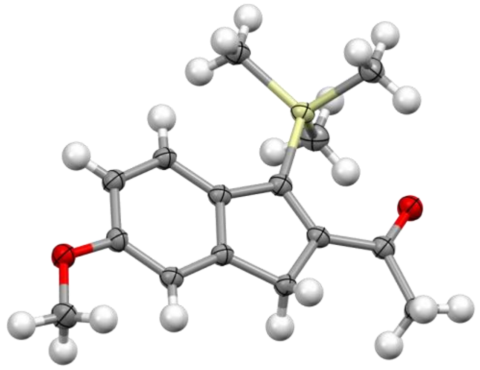


**Figure S1.** Ortep drawing of compound **8a** with ellipsoids at 50% occupancy

**Table S2. Crystal data and structure refinement for 8a.**

| | |
|---|---|
| Identification code | DP_18x |
| Empirical formula | $C_{15}H_{20}O_2Si$ |
| Formula weight | 260.40 |
| Temperature/K | 100(2) |
| Crystal system | orthorhombic |
| Space group | Pnma |
| a/Å | 16.140(3) |
| b/Å | 7.0200(14) |
| c/Å | 12.550(3) |
| α/° | 90 |
| β/° | 90 |
| γ/° | 90 |
| Volume/Å$^3$ | 1422.0(5) |
| Z | 4 |
| $\rho_{calc}$g/cm$^3$ | 1.216 |
| μ/mm$^{-1}$ | 0.158 |
| F(000) | 560.0 |
| Crystal size/mm$^3$ | 0.2 × 0.05 × 0.02 |
| Radiation | Synchrotron (λ = 0.710755) |
| 2Θ range for data collection/° | 4.112 to 57.256 |
| Index ranges | $-21 \leq h \leq 21$, $-9 \leq k \leq 9$, $-16 \leq l \leq 16$ |
| Reflections collected | 33258 |
| Independent reflections | 1869 [$R_{int} = 0.0384$, $R_{sigma} = 0.0143$] |
| Data/restraints/parameters | 1869/0/110 |
| Goodness-of-fit on $F^2$ | 1.176 |
| Final R indexes [I>=2σ (I)] | $R_1 = 0.0465$, $wR_2 = 0.1530$ |
| Final R indexes [all data] | $R_1 = 0.0587$, $wR_2 = 0.2032$ |
| Largest diff. peak/hole / e Å$^{-3}$ | 0.53/-0.76 |

# X-Ray Crystallography Data for Compound 9a

The deposition number for **9a** at the Cambridge Crystallographic Data Centre is CCDC 2080243

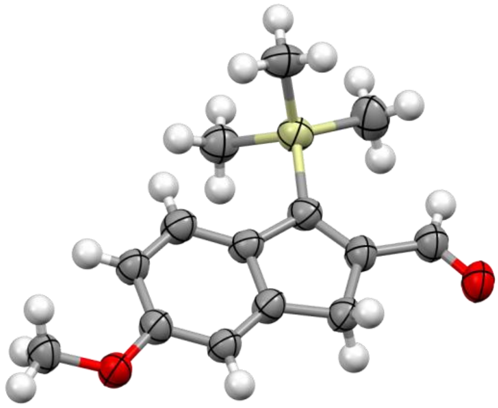


**Figure S2.** Ortep drawing of compound **9a** with ellipsoids at 50% occupancy

**Table S3. Crystal data and structure refinement for 9a.**

| | |
|---|---|
| Identification code | DP-200A |
| Empirical formula | $C_{14}H_{18}O_2Si$ |
| Formula weight | 246.37 |
| Temperature/K | 100(2) |
| Crystal system | monoclinic |
| Space group | $P2_1/n$ |
| a/Å | 6.9100(14) |
| b/Å | 16.060(3) |
| c/Å | 12.250(3) |
| α/° | 90 |
| β/° | 91.67(3) |
| γ/° | 90 |
| Volume/Å$^3$ | 1358.9(5) |
| Z | 4 |
| $\rho_{calc}$g/cm$^3$ | 1.204 |
| μ/mm$^{-1}$ | 0.161 |
| F(000) | 528.0 |
| Crystal size/mm$^3$ | 0.25 × 0.2 × 0.2 |
| Radiation | Synchrotron (λ = 0.71073) |
| 2Θ range for data collection/° | 4.182 to 57.402 |
| Index ranges | $-8 \leq h \leq 9$, $-19 \leq k \leq 21$, $-16 \leq l \leq 15$ |
| Reflections collected | 30967 |
| Independent reflections | 3127 [$R_{int}$ = 0.0557, $R_{sigma}$ = 0.0279] |
| Data/restraints/parameters | 3127/0/158 |
| Goodness-of-fit on F$^2$ | 1.605 |
| Final R indexes [I>=2σ (I)] | $R_1$ = 0.1173, w$R_2$ = 0.3125 |
| Final R indexes [all data] | $R_1$ = 0.1549, w$R_2$ = 0.3950 |
| Largest diff. peak/hole / e Å$^{-3}$ | 1.10/-0.89 |