Supporting Information

Highly efficient approach for the synthesis of bifunctional disiloxanes *via* subsequent hydrosilylation of alkenes and alkynes

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Outline

General information:

1.1. NMR analyzes

^{1}H, ^{13}C and ^{29}Si NMR spectra were recorded at 25 °C on Bruker UltraShield 300 or 400 MHz. Chemical shifts were reported in ppm with the reference to the residue portion solvent peak. Chloroform-d_1 or acetone-d_6 were used as solvents and for internal deuterium lock. The multiplicities were reported as follows: singlet (s), doublet (d), doublet of doublets (dd), multiplet (m), triplet (t), pentet (p), doublet of doublets of triplets (ddt).

1.2. GC-MS analysis

The mass spectrum of the products were obtained by GC-MS analysis on a Bruker Scion 436-GC with a 30m Varian DB-5 0.25mm capillary column and a Scion SQ-MS mass spectrometry detector. Two temperature programs were used a) 60 °C (3 min), 10°C/min, 250 °C (30 min), b) 100 °C (3 min), 10°C/min, 280 °C (44.5 min).

1.3. MALDI-TOF-MS

MALDI-TOF mass spectra were recorded on a UltrafleXtreme mass spectrometer (Bruker Daltonics), equipped with a SmartBeam II laser (355 nm) in 500-4000 m/z range. 2,5-Dihydroxybenzoic acid (DHB, Bruker Daltonics, Bremen, Germany) served as matrix and was prepared in TA30 solvent (30:70 v/v acetonitrile: 0.1% TFA in water) at a concentration of 20 mg/mL. Studied samples were dissolved in dichloromethane (2 mg/mL) and then mixed in a ratio 1:1 v/v with matrix solution. Matrix/sample mixtures (1 μL) were spotted onto the MALDI target and dried in air. Mass spectra were measured in reflection mode. The data were analyzed using the software provided with the Ultraflex instrument - FlexAnalysis (version 3.4). Mass calibration (cubic calibration based on five to seven points) was performed using external standards (Peptide Calibration Standard).

1.4. FT-IR analysis

FT-IR spectra were measured on a Nicolet iS50 FT-IR spectrometer (Thermo Scientific) equipped with a built-in ATR accessory with ATR diamond unit. In all experiments, 16 scans at a resolution of 2 cm^{-1} were performed

1.5. Elemental analysis

Elemental analyses were performed using a Vario EL III instrument.

1.6. Products purification

The UV-absorbing products were purified on silica by flash chromatography (Biotage IsoleraOne chromatograph) with UV detector (λ_1 = 255 nm, λ_2= 280 nm). Purification details: cartridge 10 g, flow rate: 12 mL/min, length: 10 CV (CV = column volume), phase: hexane/dichloromethane (step 1: hexane 100% by 4 CV, step 2: gradient 10%/CV by 4 CV, step 3: hexane 50% by 2 CV). The non-aromatic products were purified on silica using standard column chromatography using n-hexane/dichloromethane (95/5–7/3) as eluents. Products were characterized by GC-MS, ^{1}H, ^{13}C, ^{29}Si NMR, FT-IR analyses.

2. Materials

1,1,3,3-Tetramethyldisiloxane (97%, acbr), allyl alcohol (99%, Sigma-Aldrich), allyl glycidyl ether (99%, Sigma-Aldrich), 3-allyloxy-1,2-propanediol (99%, Sigma-Aldrich), 2-methoxy-4-(2-propenyl)phenol

(eugenol; 99%, Sigma-Aldrich), allylamine (98%, Sigma-Aldrich), allylpentafluorobenzene (98%, Sigma-Aldrich), 2-chloro(ethyl) vinyl ether ((98%, Sigma-Aldrich), hexamethyldisilazane (99%, Sigma-Aldrich), diphenylacetylene (98%, Sigma-Aldrich), bis(4-bromophenyl)acetylene (97%, acbr), 4-octyne (99%, Sigma-Aldrich), 4-[(trimethylsilyl)ethynyl]phenylboronic acid pinacol ester (97%, Sigma-Aldrich), phenylacetylene (98%, Sigma-Aldrich), 1-bromo-4-ethynylbenzene (97%, Sigma-Aldrich), 4-ethynylphenylboronic acid pinacol ester (95%, Sigma-Aldrich), 1-ethynyl-4-methoxybenzene (97%, Sigma-Aldrich), 9-ethynylphenanthrene (97%, Sigma-Aldrich), 3-ethynylthiophene (96%, Sigma-Aldrich), [(1,1-dimethyl-2-propynyl)oxy]trimethylsilane (98%, Sigma-Aldrich), ethynylcyclohexane (98%, Sigma-Aldrich), trimethylamine (99%, Sigma-Aldrich), chlorotrimethylsilane (98%, Sigma-Aldrich), hexamethyldisilazane (HMDS; 99%, Sigma-Aldrich) platinum(0)-1,3-divinyl-1,1,3,3-tetramethyldisiloxane (Karstedt's catalyst, solution in xylene, Pt~2%, Sigma-Aldrich), platinum(IV) oxide (99%, Sigma-Aldrich), chloro(1,5-cyclooctadiene)rhodium(I) dimer (98%, Sigma-Aldrich), 2-dicyclohexylphosphino-2′,4′,6′-triisopropylbiphenyl (XPhos; 97%, Sigma-Aldrich) were used as received. Deuterium solvents were obtained from Dr. Glaser AG Basel. The *n*-hexane (99%, POCH Basic), toluene (99%, POCH Basic), dichloromethane (99%, POCH Basic), tetrahydrofuran (99%, POCH Basic). Toluene, tetrahydrofuran, dichloromethane and *n*-hexane used in the reactions were distilled and store under argon prior use. were used as received.

3. General procedures

3.1 Protecting hydroxyl or amine group with trimethylsilyl group

3.1.1. Synthesis of (**2a, c**)

Allyl alcohol (0.05 mol) or 3-allyloxy-1,2-propanediol (0.05 mol) was placed under argon atmosphere in 250 mL two-neck round-bottom flask equipped with magnetic stirring bar. Subsequently, 100 mL of dry *n*-hexane and trimethylamine (0.06 mol per hydroxyl group) were added. Afterwards, chlorotrimethylsilane (0.06 mol per hydroxyl group) was dropwise added and the reaction mixture was stirred in 48-72 h at room temperature. Complete consumption of hydroxyl group(s) was confirmed by GC. The post-reaction mixture was filtered and white residue was washed by *n*-hexane (5x100 mL). After evaporation of volatiles on rotatory evaporator, product was purified by bulb to bulb distillation. Products were characterized by GC-MS, FT-IR and ^{1}H, ^{13}C and ^{29}Si NMR analyses.

3.1.2. Synthesis of (**2d**)

Allyl amine (0.05 mol) was placed under argon atmosphere in 250 mL two-neck round-bottom flask equipped with magnetic stirring bar. Subsequently, 100 mL of dry dichchloromethane and trimethylamine (0.1 mol) were added and reaction mixture was placed into ice-bath. Afterwards, chlorotrimethylsilane (0.11 mol) was dropwise added and the reaction mixture was stirred in 2 h at 0 °C and in 18 h at room temperature. The post-reaction mixture was filtered and white residue was washed by *n*-hexane (5x100 mL). After evaporation of volatiles on rotatory evaporator, product was purified by bulb to bulb distillation. Product was characterized by GC-MS, FT-IR and ^{1}H, ^{13}C and ^{29}Si NMR analyses and stored under argon.

3.1.3. Synthesis of (**2e**)

2-Methoxy-4-(2-propenyl)phenol (0.05 mol) was placed in three-neck round bottom flask equipped with stirring bar and reflux condenser under argon atmosphere. Subsequently, hexamethyldisilazane (0.03 mol) at 70 °C was slowly added. The reaction was allowed to continue until no further evidence

of ammonia was observed. Excess of HMDS was easily removed under vacuum. Product was characterized by GC-MS, FT-IR and ^{1}H, ^{13}C and ^{29}Si NMR analyses.

3.2. Hydrosilylation of **2a-g** with 1,1,3,3-tetramethyldisiloxane (**1**)

Olefin (**2**, 0.01 mol) and 1,1,3,3-tetramethyldisiloxane (0.04 mol) were placed in 100 mL round-bottom flask equipped with stirring bar and containing 10 mL of dry toluene. Subsequently, reaction mixture was heated up to 60 °C and chloro(1,5-cyclooctadiene)rhodium(I) dimer (10^{-6} mol of Rh) was added. After 18 h post-reaction mixture was cooled down and all volatiles were removed under vacuum. Products were characterized by GC-MS, FT-IR and ^{1}H, ^{13}C and ^{29}Si NMR analyses. New products were also characterized by elemental analysis.

3.3. Hydrosilylation of alkynes (**4)** with monofunctionalized disiloxanes (**3**)

3.3.1. In the presence of Karstedt's catalyst

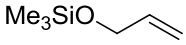
Alkyne (0.001 mol) and **3** (0.001 mol) were placed in 100 mL round-bottom flask equipped with stirring bar containing 10-20 mL of dry toluene. Subsequently, reaction mixture was heated up to 100 °C and Karstedt's catalyst (10^{-7} mol of Pt) was added. After 18 h post-reaction mixture was cooled down and all volatiles were removed under vacuum. Products were purified according to subsection 1.5 and characterized by GC-MS, FT-IR and ^{1}H, ^{13}C and ^{29}Si NMR and elemental analyses.

3.3.2. In the presence of platinum(IV) oxide/Xphos

Platinum(IV) oxide (10^{-5} mol) and Xphos ($2x10^{-5}$ mol) were placed in 25 mL Schlenk vessel equipped with stirring bar under argon atmosphere. 10-20 mL of dry tetrahydrofurane was added and reaction mixture was heated up to 60 °C and stirred by 1 hour. Subsequently, alkyne (0.001 mol) and **2** (0.001 mol) were added. After 18 h post-reaction mixture was cooled down, filtered through a syringe filter and all volatiles were removed under vacuum. Products were purified according to subsection 1.5 and characterized by GC-MS, FT-IR and ^{1}H, ^{13}C and ^{29}Si NMR analyses. New products were also characterized by elemental analysis.

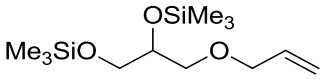
4. Products characterization

(Allyloxy)trimethylsilane (**2a**)



^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 5.92 (ddt, J_{H-H} = 17.1, 10.1, 4.9 Hz, 1H, $OCH_2C\underline{H}CH_2$), 5.31 – 5.04 (m, 2H), 4.16 – 410 (m, 2H), 0.12 (s, 9H, $OSi(C\underline{H}_3)_3$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 137.41, 114.66, 63.80, -0.30. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 18.79. **MS** (EI, m/z): 130(M^+, 16), 115(100), 99(10), 85(31), 73(20), 59(26). **FT-IR** (cm^{-1}): 3083 (C_{sp2}-H) 2958(C_{sp3}-H), 2853(C_{sp3}-H), 1646, 1457, 1422, 1250($SiCH_3$), 1137, 1084, 1033, 916, 868, 835, 747, 685. Colorless liquid. Isolated yield: 93%. The analytical data are in agreement with the literature[1].

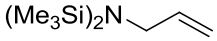
4-((Allyloxy)methyl)-2,2,7,7-tetramethyl-3,6-dioxa-2,7-disilaoctane (**2c**)



^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 5.89 (ddt, J_{H-H} = 17.1, 10.7, 5.5 Hz, 1H, $OCH_2C\underline{H}CH_2$), 5.30 – 5.22 (m, 1H, $OCH_2CHC\underline{H}_2$), 5.15 (dd, J_{H-H} = 10.4, 1.5 Hz, 1H, $OCH_2CHC\underline{H}_2$), 4.01 – 3.95 (m, 2H), 3.86 – 3.78 (m, 1H), 3.62 – 3.57 (m, 1H), 3.53 – 3.44 (m, 2H), 3.39 – 3.33 (m, 1H), 0.12 (s, 9H, $OSi(C\underline{H}_3)_3$), 0.10 (s, 9H, $OSi(C\underline{H}_3)_3$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 135.04, 116.72, 72.54, 72.41, 71.98, 64.55, 0.41, -0.37. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 18.31, 17.70. **MS** (EI, m/z): 276(M^+-15, 2), 219(4), 205(44), 147(72), 133(), 103(29), 89(10), 83(23), 73(100), 59(10). **FT-IR** (cm-

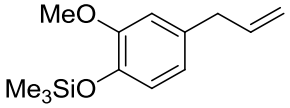
[1]): 3082 (C_{sp2}-H), 2956 (C_{sp3}-H), 2904 (C_{sp3}-H), 1249 ($SiCH_3$), 1097 (SiO), 992, 923, 834, 747. Colorless liquid. Isolated yield: 98%. The product **2c** is fully characterized for the first time despite previous reports[2].

N-Allyl-1,1,1-trimethyl-N-(trimethylsilyl)silanamine (**2d**)



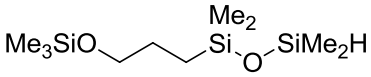
^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 5.87 – 5.70 (m, 1H), 5.19 – 4.92 (m, 2H), 3.49 – 3.40 (m, 2H), 0.09 (s, 18H, $N(Si(C\underline{H}_3)_3)_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 141.42, 113.42, 47.43, 2.10, 2.05. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 6.45. **MS** (EI, m/z): 202(M+, 20), 187(52), 173(26), 129(10), 113(34), 74(100). **FT-IR** (cm^{-1}): 3083 8(C_{sp2}-H), 2954(C_{sp3}-H), 2898(C_{sp3}-H), 1644, 1415, 1248($SiCH_3$), 1116, 1060, 1034, 1010, 916, 869, 833, 817, 753, 678, 618. Colorless liquid. Isolated yield: 94%. The analytical data are in agreement with the literature[3].

(4-Allyl-2-methoxyphenoxy)trimethylsilane (**2e**)



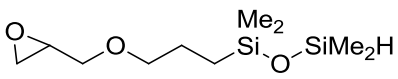
^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 6.79 (d, $J_{H\text{-}H}$ = 8.0 Hz, 1H, Ph), 6.73 – 6.63 (m, 2H, Ph), 5.99 (ddt, $J_{H\text{-}H}$ = 16.8, 10.0, 6.7 Hz, 1H, $OCH_2C\underline{H}CH_2$), 5.15 – 5.04 (m, 2H), 3.82 (s, 3H, $OC\underline{H}_3$), 3.35 (d, $J_{H\text{-}H}$ = 6.7 Hz, 2H), 0.26 (s, 9H, $OSi(C\underline{H}_3)_3$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 150.81, 142.84, 137.81, 133.72, 120.78, 120.70, 115.64, 112.57, 55.54, 40.01, 0.41. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 20.31. **MS** (EI, m/z): 236(M^+, 47), 221(30), 206(100), 179(10), 148(5), 131(5), 103(7), 73(31), 59(11). **FT-IR** (cm^{-1}): 3081 (C_{sp2}-H), 2958(C_{sp3}-H), 2903(C_{sp3}-H), 2833(C_{sp3}-H), 1638, 1585, 1509, 1465, 1418, 1280, 1249($SiCH_3$), 1230, 1154, 1125, 1038, 912, 889, 837, 750, 692. Pale brown liquid. Isolated yield: 99%. The analytical data are in agreement with the literature[4].

1,1,3,3-Tetramethyl-1-(3-((trimethylsilyl)oxy)propyl)disiloxane (**3a**)



^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 4.74 – 4.60 (m, 1H, $Si\underline{H}$), 3.52 (t, $J_{H\text{-}H}$ = 7.1 Hz, 2H, $-OC\underline{H}_2$), 1.64 – 1.46 (m, 2H, $SiCH_2C\underline{H}_2CH_2O$), 0.55 – 0.42 (m, 2H, $SiC\underline{H}_2CH_2CH_2O$), 0.15 (s, 3H), 0.16 (s, 3H), 0.10 (s, 9H, $OSi(C\underline{H}_3)_3$), 0.07 (s, 6H). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 65.56, 26.64, 13.98, 1.01, 0.08, -0.31. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 16.80 ($-OSiCH_3)_3$, 9.94 ($\underline{Si}(CH_3)_2$), -6.79($\underline{Si}CH_3H$). **MS** (EI, m/z): 249(M^+-15, 7), 221(12), 207(86), 133(48), 73(100), 59(15). **FT-IR** (cm^{-1}): 2957 (C_{sp3}-H), 2933 (C_{sp3}-H), 2901 (C_{sp3}-H), 2119 (Si-H), 1251 ($SiCH_3$), 1093 (SiO), 1051 (SiO), 905, 834, 786, 767, 747, 701 **Elemental Anal.** for $C_{10}H_{28}O_2Si_3$ (%): calcd.: C, 45.39; H, 10.69; found: C, 45.55; H, 10.93. Colorless liquid. Isolated yield: 93%. The **3a** is fully characterized for the first time despite previous reports[5].

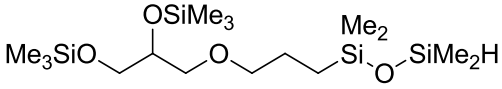
1,1,3,3-Tetramethyl-1-(3-(oxiran-2-ylmethoxy)propyl)disiloxane (**3b**)



^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 4.69 – 4.58 (m, 1H, $Si\underline{H}$), 3.66 (dd, $J_{H\text{-}H}$ = 11.5, 3.1 Hz, 1H, $-OC\underline{H}_2CH$), 3.46 – 3.37 (m, 2H), 3.34 (dd, $J_{H\text{-}H}$ = 11.5, 5.8 Hz, 1H, $-OC\underline{H}_2CH$), 3.15 – 3.06 (m, 1H), 2.78 – 2.72 (m, 1H), 2.56 (dd, $J_{H\text{-}H}$ = 5.1, 2.7 Hz, 1H), 1.67 – 1.53 (m, 2H), 0.56 – 0.46 (m, 2H, $-OSi(CH_3)_2C\underline{H}_2$), 0.12 (s, 6H, $-OSi(C\underline{H}_3)_2H$), 0.04 (s, 6H, $-OSi(C\underline{H}_3)_2CH_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 74.30,

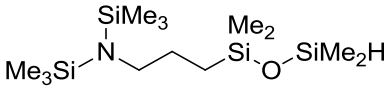
71.49, 50.90, 44.33, 23.48, 14.09, 0.93, 0.00. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 9.82, -6.68. **MS** (EI, m/z): 233(M^+-15, 1), 175(6), 149(6), 133(100), 119(), 73(13), 59(8). **FT-IR** (cm^{-1}): 2957 (C_{sp3}-H), 2933 (C_{sp3}-H), 2871 (C_{sp3}-H), 2116 (Si-H), 1253, 1105 (SiO), 1046 (SiO), 904, 835, 803, 768. Colorless liquid. Isolated yield: 91%. Analytical data are in agreement with the literature[6].

2,4,4,13,13-Pentamethyl-10-((trimethylsilyl)oxy)-3,8,12-trioxa-2,4,13-trisilatetradecane (**3c**)



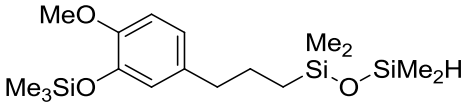
^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 4.75 – 4.60 (m, 1H, SiH), 3.86 – 3.73 (m, 1H, OCHCH$_2$CH$_2$), 3.67 – 3.25 (m, 6H), 1.69 – 1.48 (m, 2H), 0.60 – 0.44 (m, 2H), 0.15 (s, 3H, Si(CH$_3$)$_2$), 0.14 (s, 3H, Si(CH$_3$)$_2$), 0.12 (s, 9H, Si(CH$_3$)$_3$), 0.10 (s, 9H, Si(CH$_3$)$_3$), 0.06 (s, 6H, Si(CH$_3$)$_2$) **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 74.33, 72.61, 72.54, 64.67, 23.52, 14.25, 1.03, 0.45, 0.09, 0.08, -0.36. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 18.18, 17.51, 9.91, -6.73. **MS** (EI, m/z): 395(M^+-15, 1), 249(1), 221(35), 205(38), 147(39), 133(70), 117(25), 103(25), 73(100), 59(7). **FT-IR (cm^{-1}):** 2957 (C_{sp3}-H), 2902 (C_{sp3}-H), 2866 (C_{sp3}-H), 2121 (Si-H), 1250 ($SiCH_3$), 1144 (SiO), 1054 (SiO), 906, 834, 768, 748 **Elemental Anal.** for $C_{16}H_{42}O_4Si_4$ (%): calcd.: C, 46.77; H, 10.30; found: C, 46.23; H, 10.23. Pale yellow liquid. Isolated yield: 92%.

1,1,1-Trimethyl-N-(3-(1,1,3,3-tetramethyldisiloxanyl)propyl)-N-(trimethylsilyl)silanamine (**3d**)



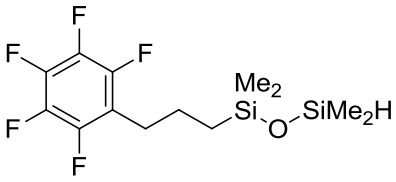
^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 4.77 – 4.66 (m, 1H, SiH), 2.79 – 2.66 (m, 2H), 1.44 – 1.27 (m, 2H), 0.48 – 0.35 (m, 2H), 0.18 (s, 3H), 0.17 (s, 3H), 0.09 (s, 18H, N(SiCH$_3$)$_2$, 0.07 (s, 6H). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 49.28, 29.14, 15.66, 2.27, 1.09, 0.15. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 8.90, 4.80(NSi(Me$_3$)$_2$), -6.60. **MS** (EI, m/z): 335(M^+, 1), 320(1), 246(1), 186(2), 174(100), 133(11), 116(), 100(6), 86(11), 73(33), 59(4). **FT-IR** (cm^{-1}): 2955 (C_{sp3}-H), 2897 (C_{sp3}-H), 2872 (C_{sp3}-H), 2121 (Si-H), 1251 ($SiCH_3$), 1065 (SiO), 1015 (SiO), 902, 876 (SiN), 833, 817, 764, 679. Colorless liquid. Isolated yield: 91%. Analytical data are in agreement with the literature[6].

1-(3-(4-Methoxy-3-((trimethylsilyl)oxy)phenyl)propyl)-1,1,3,3-tetramethyldisiloxane (**3e**)



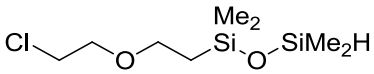
^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 6.84 – 6.59 (m, 3H, Ph), 4.79 – 4.64 (m, 1H, SiH), 3.82 (s, 3H, OCH$_3$), 2.59 (t, J_{H-H} = 7.6 Hz, 2H, PhCH$_2$CH$_2$CH$_2$Si), 1.75 – 1.55 (m, 2H, PhCH$_2$CH$_2$CH$_2$Si), 0.71 – 0.53 (m, 2H, PhCH$_2$CH$_2$CH$_2$Si), 0.26 (s, 9H, PhOSi(CH$_3$)$_3$), 0.19 (s, 3H, Si(CH$_3$)$_2$), 0.18 (s, 3H, Si(CH$_3$)$_2$), 0.10 (s, 6H, Si(CH$_3$)$_2$) **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 150.65 (Ph), 142.53 (Ph), 136.44 (Ph), 120.63 (Ph), 120.62 (Ph), 112.58 (Ph), 55.58, 39.44, 25.51, 18.06, 1.04, 0.46, 0.20. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 20.07 (PhOSiMe$_3$), 9.80, -6.75. **MS** (EI, m/z): 370(M^+, 18), 339(3), 209(36), 179(22), 163(6), 133(100), 103(5), 73(40), 59(7). **FT-IR** (cm^{-1}): 2956 (C_{sp3}-H), 2927 (C_{sp3}-H), 2119 (Si-H), 1512 (C=C), 1465, 1417 (CH_2), 1281, 1250 ($SiCH_3$), 1232, 1156, 1128, 1040 (SiO), 904, 835, 815, 784, 761, 693. Yellow liquid. Isolated yield: 93%. Analytical data are in agreement with the literature[6].

1,1,3,3-Tetramethyl-1-(3-(perfluorophenyl)propyl)disiloxane (**3f**)



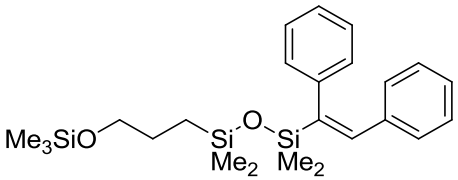
^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 4.73 – 4.59 (m, 1H, Si<u>H</u>), 2.71 (t, $J_{H\text{-}H}$ = 7.5 Hz, 2H), 1.76 – 1.56 (m, 2H), 0.66 – 0.51 (m, 2H), 0.16 (s, 3H, OSiC<u>H</u>$_3$), 0.15 (s, 3H, OSiC<u>H</u>$_3$), 0.07 (s, 6H, OSiC<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 146.43, 143.99, 140.80, 138.79, 136.29, 115.44, 25.88, 23.45, 17.99, 0.96, 0.07. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 9.23, -6.32. **FT-IR** (cm^{-1}): 2960 (C_{sp3}-H), 2122 (Si-H), 1519 (C=C), 1501 (C=C), 1254, 1120 (FPh), 1045 (SiO), 1011 (SiO), 972, 962, 943, 905, 835, 821, 776. **MS** (EI, m/z): 342(M^+, 1), 327(3), 181(4), 151(8), 133(100), 119(18), 103(4), 73(18), 59(9) **Elemental Anal.** for $C_{13}H_{19}F_5OSi_2$ (%): calcd.: C, 45.59; H, 5.59; found: C, 45.31; H, 5.38. Colorless liquid. Isolated yield: 92%.

1-(2-(2-Chloroethoxy)ethyl)-1,1,3,3-tetramethyldisiloxane (**3g**)



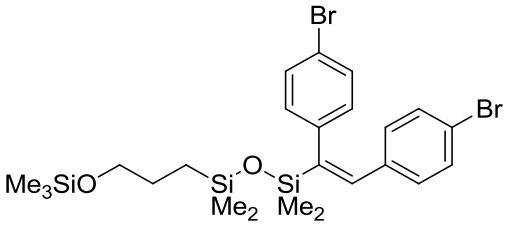
^{1}H NMR (400 MHz, $CDCl_3$, δ, ppm): 4.75 – 4.55 (m, $J_{H\text{-}H}$ = 2.8 Hz, 1H, Si<u>H</u>), 3.82 – 3.49 (m, 6H), 1.18 – 0.93 (m, 2H), 0.17 (s, 3H, SiC<u>H</u>$_3$), 0.16 (s, 3H, SiC<u>H</u>$_3$), 0.11 (s, 6H Si(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 70.41, 67.97, 43.01, 19.91, 0.99, 0.66. **^{29}Si NMR** (79 MHz, $CDCl_3$ δ, ppm): 8.20, -6.20. **FT-IR (cm^{-1}):** 2958 (C_{sp3}-H), 2923 (C_{sp3}-H), 2893 (C_{sp3}-H), 2864 (C_{sp3}-H), 2121 (Si-H), 1359 (CH_3), 1253 ($SiCH_3$), 1049 (SiO), 904, 835, 815, 787 (CH_2Cl), 767, 753, 710, 671. Colorless liquid. Isolated yield: 93%. Analytical data are in agreement with the literature[6].

(E)-1-(1,2-Diphenylvinyl)-1,1,3,3-tetramethyl-3-(3-((trimethylsilyl)oxy)propyl)disiloxane (**5aa**)



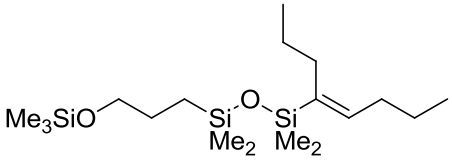
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.23 – 6.85 (m, 10H, Ph), 6.81 (s, 1H, C=C<u>H</u>) 3.44 (t, $J_{H\text{-}H}$ = 7.0 Hz, 2H), 1.53 – 1.39 (m, 2H), 0.48 – 0.34 (m, 2H), 0.10 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.02 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), -0.02 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 146.47, 142.11, 137.86, 137.36, 129.71, 128.70, 128.03, 127.80, 127.26, 125.85, 65.62, 26.72, 14.21, 0.38, -0.27. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.91, 9.03, -3.96. **MS** (EI, m/z): 442(M^+, 1), 385(7), 311(53), 223(54), 206(20), 194(22), 133(48), 73(100). **FT-IR** (cm^{-1}): 3057 (C_{sp2}-H), 3022 (C_{sp2}-H), 2955 (C_{sp3}-H), 2929 (C_{sp3}-H), 2869 (C_{sp3}-H), 1251 ($SiCH_3$), 1092, 1062, 958, 836, 791, 782, 699. **Elemental Anal.** for $C_{24}H_{38}O_2Si_3$ (%): calcd.: C, 65.10; H, 8.65; found: C, 64.88; H, 8.45. Colorless oil. Isolated yield: 81%.

(E)-1-(1,2-bis(4-Bromophenyl)vinyl)-1,1,3,3-tetramethyl-3-(3-((trimethylsilyl)oxy)propyl)disiloxane (**5ab**)



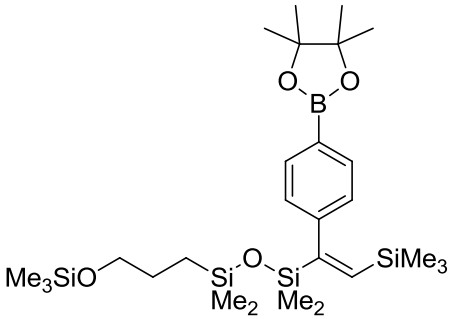
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.36 (d, $J_{H\text{-}H}$ = 8.3 Hz, 2H), 7.18 (d, $J_{H\text{-}H}$ = 8.5 Hz, 2H), 6.85 – 6.72 (m, 5H), 3.46 (t, $J_{H\text{-}H}$ = 7.0 Hz, 2H), 1.53 – 1.40 (m, 2H), 0.48 – 0.38 (m, 2H), 0.11 (s, 6H, $OSi(C\underline{H}_3)_2$)), 0.05 (s, 9H, $OSi(C\underline{H}_3)_3$)), 0.01 (s, 6H, $OSi(C\underline{H}_3)_2$)). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 146.20, 140.65, 137.14, 135.88, 131.98, 131.30, 131.15, 129.50, 121.46, 120.06, 65.54, 26.67, 14.18, 1.17, 0.39, 0.31, -0.27. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 17.09, 9.59, -4.00. **TOF MS ES+** - (m/z) ([(M - $SiMe_3$)+Na], (%)): 550.9869. **FT-IR** (cm^{-1}): 2954 (C_{sp3}-H), 2928 (C_{sp3}-H), 2872 (C_{sp3}-H), 1483 (C=C), 1252 ($SiCH_3$), 1068, 1051, 1009, 961, 934, 832, 814, 786, 748. **Elemental Anal.** for $C_{24}H_{36}Br_2O_2Si_3$ (%): calcd.: C, 47.99; H, 6.04; found: C, 48.11; H, 6.09. Colorless oil. Isolated yield: 77%.

(E)-1,1,3,3-Tetramethyl-1-(oct-4-en-4-yl)-3-(3-((trimethylsilyl)oxy)propyl)disiloxane (**5ac**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 5.78 (t, $J_{H\text{-}H}$ = 6.8 Hz, 1H), 3.52 (t, $J_{H\text{-}H}$ = 7.1 Hz, 2H), 2.06 (q, $J_{H\text{-}H}$ = 7.9, 7.3 Hz, 4H), 1.63 – 1.23 (m, 6H), 0.99 – 0.81 (m, 6H), 0.57 – 0.38 (m, 2H), 0.11 (s, 15H, $OSi(C\underline{H}_3)_2$, $OSi(C\underline{H}_3)_3$), 0.05 (s, 6H, $OSi(C\underline{H}_3)_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 141.15, 140.91, 65.72, 31.50, 30.52, 26.77, 23.50, 22.84, 14.62, 14.28, 14.08, 0.96, 0.40, -0.2. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.80, 7.65, -2.62. **MS** (EI, m/z): 359(M^+-15, 1) 317(4), 262(6), 243(7), 221(69), 207(100), 189(66), 148(30), 133(52) , 120(12), 73(75) **FT-IR** (cm^{-1}): 2956 (C_{sp3}-H), 2930 (C_{sp3}-H), 2901 (C_{sp3}-H), 2872 (C_{sp3}-H), 1250 ($SiCH_3$), 1093, 1052, 836, 794, 779. **Elemental Anal.** for $C_{18}H_{42}O_2Si_3$ (%): calcd.: C, 57.68; H, 11.30; found: C, 57.91; H, 11.43. Colorless oil. Isolated yield: 96%.

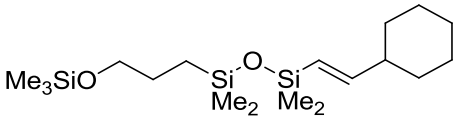
(E)-2,2,7,7,9,9,12,12-Octamethyl-10-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)-3,8-dioxa-2,7,9,12-tetrasilatridec-10-ene (**5ad**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.68 (d, $J_{H\text{-}H}$ = 8.0 Hz, 2H, Ph), 6.98 (d, $J_{H\text{-}H}$ = 8.0 Hz, 2H, Ph), 6.39 (s, 1H, C=C$\underline{H}$), 3.50 (t, $J_{H\text{-}H}$ = 7.0 Hz, 2H), 1.57 – 1.45 (m, 2H), 1,35 (s, 12H, $C\underline{H}_3$)$_4$), 0.49 – 0.38 (m, 2H), 0.11 (s, 9H, $OSi(C\underline{H}_3)_3$), 0.08 (s, 6H, $OSi(C\underline{H}_3)_2$), 0.02 (s, 6H, $OSi(C\underline{H}_3)_2$), -0.19 (s, 9H, $OSi(C\underline{H}_3)_3$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 165.89, 148.10, 144.37, 134.23, 127.02, 83.78, 65.65, 26.71, 25.09, 14.21, 0.37, 0.26, 0.20, -0.25. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.87, 8.77, -6.29, -9.58. **TOF MS ES+** - (m/z) ([M+Na], (%)): 587.3008. **FT-IR** (cm^{-1}): 2978 (C_{sp3}-H), 2955 (C_{sp3}-H), 2933 (C_{sp3}-H), 2898 (C_{sp3}-H), 1606

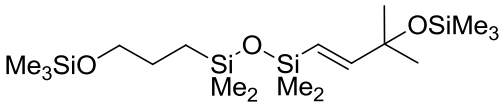
(C=C), 1396 (CH_3), 1359, 1318, 1249 ($SiCH_3$), 1145, 1087 (SiO), 1052 (SiO), 1021, 963, 925, 858, 830, 790, 689, 659. **Elemental Anal.** for $C_{27}H_{53}BO_4Si_4$ (%): calcd.: C, 57.41; H, 9.46; found: C, 56.98; H, 9.22. Colorless oil. Isolated yield: 73%.

(E)-1-(2-Cyclohexylvinyl)-1,1,3,3-tetramethyl-3-(3-((trimethylsilyl)oxy)propyl)disiloxane (**5ae**)



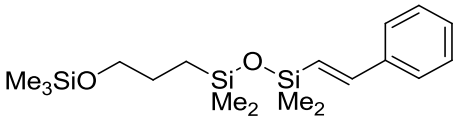
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 6.03 (dd, J_{H-H} = 18.9, 6.0 Hz, 1H, C<u>H</u>=CH), 5.53 (dd, J_{H-H} = 18.9, 1.4 Hz, 1H, CH=C<u>H</u>), 3.52 (t, J_{H-H} = 7.1 Hz, 2H), 1.76 – 1.51 (m, 7H), 1.35 – 0.93 (m, 6H), 0.54 – 0.40 (m, 2H), 0.11 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.10 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.05 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 153.67, 126.15, 65.71, 43.82, 32.41, 26.75, 26.41, 26.19, 14.24, 0.92, 0.49, -0.26. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.85, 8.16, -3.43. **MS** (EI, m/z): 372(M^+, 1), 357(3), 315(3), 241(56), 221(). 207(98). 133(100). 73(66). 59(10). **FT-IR** (cm^{-1}): 2956 (Csp^3-H), 2924 (Csp^3-H), 2852 (Csp^3-H), 1615 (C=C), 1449 (CH2), 1250 ($SiCH_3$), 1043 (SiO), 990, 837, 796. **Elemental Anal.** for $C_{18}H_{40}O_2Si_3$ (%): calcd.: C, 58.00; H, 10.82; found: C, 57.77; H, 10.73. Colorless oil. Isolated yield: 82%.

(E)-2,2,4,4,7,7,9,9,14,14-Decamethyl-3,8,13-trioxa-2,7,9,14-tetrasilapentadec-5-ene (**5af**)



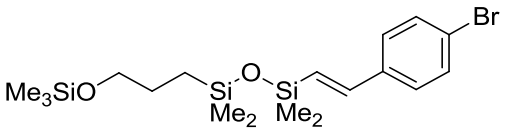
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 6.15 (d, J_{H-H} = 18.9 Hz, 1H, CH=C<u>H</u>), 5.68 (d, J_{H-H} = 18.9 Hz, 1H, C<u>H</u>=CH), 3.52 (t, J_{H-H} = 7.1 Hz, 2H), 1.65 – 1.46 (m, 2H), 1.29 (s, 6H, C(C<u>H</u>$_3$)$_2$), 0.60 – 0.39 (m, 2H), 0.12 (s, 6H, OSi(C<u>H</u>$_3$)$_2$)), 0.11 (s, 18H, OSi(C<u>H</u>$_3$)$_3$)), 0.06 (s, 6H, OSi(C<u>H</u>$_3$)$_2$)). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 154.80, 124.31, 74.74, 65.66, 30.09, 26.73, 14.23, 2.74, 0.87, 0.46, -0.27. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.83, 9.75, 8.40, -2.97. **MS** (EI, m/z): 405(M+-15, 2), 261(3), 221(100), 208(18), 191(10), 147(25), 131(32), 74(98). **FT-IR** (cm^{-1}): 2954 (C_{sp3}-H), 2922 (C_{sp3}-H), 2852 (C_{sp3}-H), 1741, 1459 (C=C), 1376 (CH_3), 1250 ($SiCH_3$), 1039, 838, 799. **Elemental Anal.** for $C_{18}H_{44}O_3Si_4$ (%): calcd.: C, 51.37; H, 10.54; found: C, 51.61; H, 10.61. Colorless oil. Isolated yield: 94%.

(E)-1,1,3,3-Tetramethyl-1-styryl-3-(3-((trimethylsilyl)oxy)propyl)disiloxane (**5ag**)



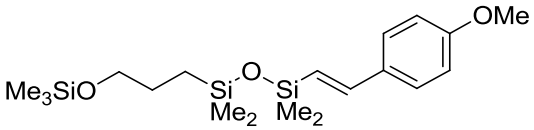
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.38 – 7.13 (m, 5H, Ph), 6.84 (d, J_{H-H} = 19.2 Hz, 1H, CH=C<u>H</u>), 6.32 (d, J_{H-H} = 19.2 Hz, 1H, CH=C<u>H</u>), 3.48 – 3.39 (m, 2H), 1.56 – 1.40 (m, 2H), 0.50 – 0.35 (m, 2H), 0.13 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.02 (s, 15H, OSi(C<u>H</u>$_3$)$_2$, OSi(C<u>H</u>$_3$)$_3$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 144.30, 138.32, 128.75, 128.64, 128.26, 126.65, 65.63, 26.73, 14.23, 0.97, 0.49, 0.42, -0.28. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.91, 8.84, -3.08. **MS** (EI, m/z): 366(M^+, 1), 351(1), 309(15), 292(9), 268(9), 237(100), 220(32), 205(33), 193(27), 161(45), 147(23), 133(95), 117(11), 74(85), 59(23). **FT-IR** (cm^{-1}): 2954 (C_{sp3}-H), 2923 (C_{sp3}-H), 2853 (C_{sp3}-H), 1460 (C=C), 1251 ($SiCH_3$), 1093 (SiO), 1053 (SiO), 840, 796. **Elemental Anal.** for $C_{18}H_{34}O_2Si_3$ (%): calcd.: C, 58.95; H, 9.35; found: C, 59.11; H, 9.82. Colorless oil. Isolated yield: 93%.

(E)-1-(4-Bromostyryl)-1,1,3,3-tetramethyl-3-(3-((trimethylsilyl)oxy)propyl)disiloxane (**5ah**)



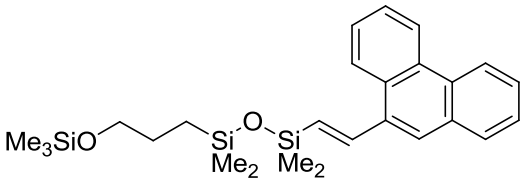
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.31 (d, J_{H-H} = 8.5 Hz, 2H, Ph), 7.16 (d, J_{H-H} = 8.5 Hz, 2H, Ph), 6.70 (d, J_{H-H} = 19.2 Hz, 1H, CH=C<u>H</u>), 6.25 (d, J_{H-H} = 19.2 Hz, 1H, CH=C<u>H</u>), 3.44 – 3.26 (m, 2H), 1.51 – 1.34 (m, 2H), 0.43 – 0.30 (m, 2H), 0.07 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), -0.04 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), -0.05 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 142.93, 137.26, 131.76, 131.20, 130.13, 129.88, 128.17, 122.12, 65.62, 26.72, 14.21, 0.93, 0.49, -0.28. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.98, 9.05, -3.21. **MS** (EI, m/z): 356(M^+-90 ($OSiMe_3$), 1), 317(5), 315(6), 243(17), 241(17), 175(16), 161(29), 149(34), 133(100), 115(23), 101(51), 75(20). **FT-IR** (cm^{-1}): 2955 (C_{sp3}-H), 2872 (C_{sp3}-H), 1604, 1448, 1253 ($SiCH_3$), 1051, 1009, 841, 797. **Elemental Anal.** for $C_{18}H_{33}BrO_2Si_3$ (%): calcd.: C, 48.52; H, 7.46; found: C, 48.84; H, 7.67. Colorless oil. Isolated yield: 92%.

(E)-1-(4-Methoxystyryl)-1,1,3,3-tetramethyl-3-(3-((trimethylsilyl)oxy)propyl)disiloxane (**5ai**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.39 (d, J_{H-H} = 8.6 Hz, 2H, Ph), 6.95 – 6.79 (m, 3H, Ph, C<u>H</u>=CH), 6.25 (d, J_{H-H} = 19.2 Hz, 1H, CH=C<u>H</u>), 3.82 (s, 3H, OC<u>H</u>$_3$), 3.54 (t, J_{H-H} = 7.1 Hz, 2H), 1.69 – 1.48 (m, 2H), 0.61 – 0.46 (m, 2H), 0.22 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.12 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.10 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 159.71, 143.61, 131.17, 127.77, 125.86, 113.90, 65.53, 55.28, 26.62, 14.11, 0.89, 0.38, -0.40. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.89, 8.64, -3.01. **MS** (EI, m/z): 396(M^+, 1), 381(1), 338(8), 267(78), 251(17), 221(29), 205(41), 175(17), 147(8), 133(100), 117(15), 104(10), 74(97), 59(13). **FT-IR** (cm^{-1}): 2954 (C_{sp3}-H), 2923 (C_{sp3}-H), 2853 (C_{sp3}-H), 1606 (C=C), 1509 (C=C), 1249 ($SiCH_3$), 1170 (SiO), 1090 (SiO), 1037 (SiO), 986, 837, 796. **Elemental Anal.** for $C_{19}H_{36}O_3Si_3$ (%): calcd.: C, 57.52; H, 9.15; found: C, 57.33; H, 9.03. Colorless oil. Isolated yield: 95%.

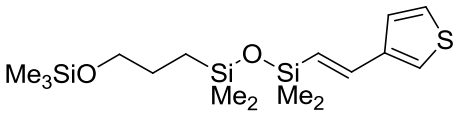
(E)-1,1,3,3-Tetramethyl-1-(2-(phenanthren-9-yl)vinyl)-3-(3-((trimethylsilyl)oxy)propyl)disiloxane (**5aj**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 8.78 – 8.61 (m, 2H, Phen), 8.26 – 8.15 (m, 1H, Phen), 7.95 – 7.86 (m, 2H, Phen,), 7.78 – 7.57 (m, 5H, Phen, C<u>H</u>=CH), 6.58 (d, J_{H-H} = 18.8 Hz, 1H, CH=C<u>H</u>), 3.56 (t, J_{H-H} = 7.1 Hz, 2H), 1.70 – 1.56 (m, 2H), 0.63 – 0.53 (m, 2H), 0.33 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.17 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.11 (s, 9H, OSi(C<u>H</u>$_3$)$_3$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 142.12, 135.65, 133.60, 131.93, 130.55, 130.50, 130.45, 128.94, 126.87, 126.76, 126.71, 126.57, 124.78, 124.51, 123.24, 122.65, 65.67, 26.79, 14.31, 1.13, 0.59, -0.27. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.99, 9.05, -3.48. **TOF MS ES+** - (m/z) ([(M - $SiMe_3$)+Na], (%)): 417.1679. **FT-IR** (cm^{-1}): 3075 (C_{sp2}-H), 2955 (C_{sp3}-H), 1599, 1250 ($SiCH_3$), 1046, 837, 793, 743.

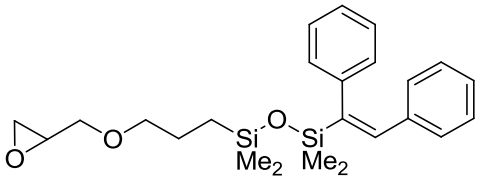
Elemental Anal. for $C_{26}H_{38}O_2Si_3$ (%): calcd.: C, 66.89; H, 8.20; found: C, 67.04; H, 8.33. Intense yellow oil. Isolated yield: 68%.

(E)-1,1,3,3-Tetramethyl-1-(2-(thiophen-3-yl)vinyl)-3-(3-((trimethylsilyl)oxy)propyl)disiloxane (**5ak**)



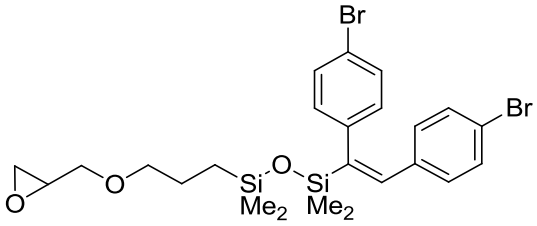
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.29 – 7.15 (m, 3H, Thioph), 6.88 (d, $J_{H\text{-}H}$ = 19.1 Hz, 1H, C<u>H</u>=CH), 6.15 (d, $J_{H\text{-}H}$ = 19.1 Hz, 1H, C<u>H</u>=CH), 3.50 (t, $J_{H\text{-}H}$ = 7.1 Hz, 2H), 0.53 – 0.41 (m, 2H), 0.17 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.08 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.06 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 142.12, 138.05, 128.47, 126.05, 125.07, 123.12, 65.64, 26.72, 14.21, 0.95, 0.48, -0.28. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 16.94, 8.81, -3.17. **FT-IR** (cm^{-1}): 2955 (Csp_3-H), 2931 (Csp_3-H), 2874 (Csp_3-H), 1603 (C=C), 1410 (CH2), 1251 ($SiCH_3$), 1039 (SiO), 984, 866, 838, 793, 762, 685 (C-S), 605**. Elemental Anal.** for $C_{16}H_{32}O_2SSi_3$ (%): calcd.: C, 51.56; H, 8.65; found: C, 51.79; H, 8.88. Colorless oil. Isolated yield: 84%. Molecular and fragmentation peaks could not be matched to the product mass.

(E)-1-(1,2-Diphenylvinyl)-1,1,3,3-tetramethyl-3-(3-(oxiran-2-ylmethoxy)propyl)disiloxane (**5ba**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.37 – 6.96 (m, 10H, Ph), 6.90 (s, 1H, C=C<u>H</u>), 3.71 (dd, $J_{H\text{-}H}$ = 11.5, 3.1 Hz, 1H, OC<u>H</u>$_2$CH), 3.56 – 3.30 (m, 3H), 3.22 – 3.07 (m, 1H), 2.92 – 2.72 (dd, $J_{H\text{-}H}$ = 5.0, 2.7 Hz, 1H), 2.60 (m, 1H), 1.74 – 1.56 (m, 2H), 0.63 – 0.44 (m, 2H), 0.20 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.09 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 146.43, 142.05, 137.83, 137.31, 129.67, 128.68, 128.01, 127.80, 127.77, 127.25, 125.84, 74.42, 71.52, 50.99, 44.45, 23.60, 14.37, 0.37. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 8.87, -3.87. **TOF MS ES+** - (m/z) ([M+Na], (%)): 449.1942. **FT-IR** (cm^{-1}): 3054 (C_{sp2}-H), 2954 (C_{sp3}-H), 2869 (C_{sp3}-H), 1251 ($SiCH_3$), 1043, 1062, 957, 829, 780, 693. **Elemental Anal.** for $C_{24}H_{34}O_3Si_2$ (%): calcd.: C, 67.56; H, 8.03; found: C, 67.88; H, 8.21. Colorless oil. Isolated yield: 78%.

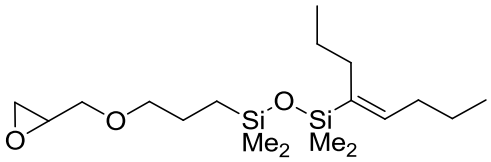
(E)-1-(1,2-bis(4-Bromophenyl)vinyl)-1,1,3,3-tetramethyl-3-(3-(oxiran-2-ylmethoxy)propyl)disiloxane (**5bb**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.56 (d, $J_{H\text{-}H}$ = 8.4 Hz, 2H), 7.38 (d, $J_{H\text{-}H}$ = 8.4 Hz, 2H, Ph), 3.84 (dd, $J_{H\text{-}H}$ = 11.5, 3.0 Hz, 1H, OC<u>H</u>$_2$CH), 3.63 – 3.42 (m, 3H), 3.33 – 3.23 (m, 1H), 3.00 – 2.86 (m, 1H), 2.73 (dd, $J_{H\text{-}H}$ = 5.0, 2.7 Hz, 1H), 1.78 – 1.66 (m, 2H), 0.71 – 0.59 (m, 2H), 0.31 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.20 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 146.19, 140.64, 137.16, 135.87, 131.99, 131.32, 131.15, 129.54, 129.51, 121.47, 120.05, 74.38, 71.61, 51.03, 44.45, 23.62, 14.37, 0.38, 0.31. **^{29}Si NMR** (79 MHz,

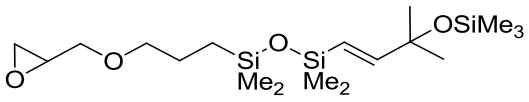
$CDCl_3$, δ, ppm): 9.43, -3.89. **TOF MS ES+** - (m/z) ([M+Na], (%)): 607.0142. **FT-IR** (cm^{-1}): 2954 (C_{sp3}-H), 2930 (C_{sp3}-H), 2869 (C_{sp3}-H), 1483 (C=C), 1252 ($SiCH_3$), 1100, 1068, 1043, 1008, 961, 934, 832, 814, 780, 748, 704, 496. **Elemental Anal.** for $C_{24}H_{32}Br_2O_3Si_2$ (%): calcd.: C, 49.32; H, 5.52; found: C, 49.08; H, 5.27. Colorless oil. Isolated yield: 82%.

(E)-1,1,3,3-Tetramethyl-1-(oct-4-en-4-yl)-3-(3-(oxiran-2-ylmethoxy)propyl)disiloxane (**5bc**)



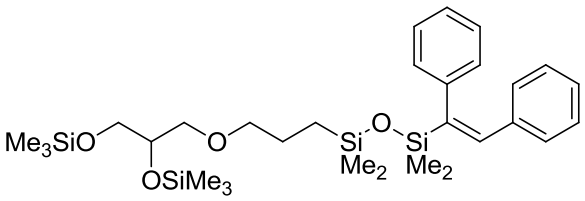
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): δ 5.77 (q, J_{H-H} = 6.8 Hz, 1H, C=C<u>H</u>), 3.68 (dd, J_{H-H} = 11.5, 3.1 Hz, 1H, OC<u>H</u>$_2$CH), 3.51 – 3.32 (m, 3H), 3.19 – 3.08 (m, 1H), 2.83 – 2.71 (m, 1H), 2.59 (dd, J_{H-H} = 5.1, 2.7 Hz, 1H), 2.17 – 1.95 (m, 4H), 1.70 – 1.51 (m, 2H), 1.42 – 1.24 (m, 4H), 0.94 – 0.84 (m, 6H), 0.58 – 0.43 (m, 2H), 0.09 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.04 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 140.90, 74.51, 71.52, 50.98, 44.43, 31.45, 30.46, 23.63, 23.45, 22.79, 14.58, 14.41, 14.03, 0.92, 0.36. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 7.51, -2.53. **TOF MS ES+** - (m/z) ([M+Na], (%)): 381.2260. **FT-IR** (cm^{-1}): 2956 (C_{sp3}-H), 2930, 2871 (C_{sp3}-H), 1612, 1457, 1251 ($SiCH_3$), 1041, , 832, 792, 776, 704. **Elemental Anal.** for $C_{18}H_{38}O_3Si_2$ (%): calcd.: C, 60.28; H, 10.58; found: C, 60.05; H, 10.39. Colorless oil. Isolated yield: 84%.

(E)-2,2,4,4,7,7,9,9-Octamethyl-14-(oxiran-2-yl)-3,8,13-trioxa-2,7,9-trisilatetradec-5-ene (**5bf**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 6.14 (d, J_{H-H} = 18.9 Hz, 1H, C<u>H</u>=CH), 5.67 (d, J_{H-H} = 18.9 Hz, 1H, C<u>H</u>=CH), 3.69 (dd, J_{H-H} = 11.5, 3.1 Hz, 1H, OC<u>H</u>$_2$CH), 3.49 – 3.35 (m, 3H), 3.17 – 3.10 (m, 1H), 2.79 (t, J_{H-H} = 4.6 Hz, 1H), 2.64 – 2.56 (m, 1H), 1.69 – 1.48 (m, 3H), 1.28 (s, 6H, C(C<u>H</u>$_3$)$_2$), 0.55 – 0.47 (m, 2H), 0.12 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.10 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.05 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 154.81, 124.25, 74.73, 74.49, 71.56, 51.00, 44.49, 30.06, 23.62, 14.39, 2.72, 0.85, 0.45. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 9.78, 8.27, -2.86. **MS** (EI, m/z): 389(M^+-15, 1), 221(14), 207(11), 190(18), 175(63), 147(23), 133(100), 74(88). **FT-IR** (cm^{-1}): 2957 (C_{sp3}-H), 2929 (C_{sp3}-H), 2868 (C_{sp3}-H), 1250 ($SiCH_3$), 1104, 1033, 1002, 835, 795, 755. **Elemental Anal.** for $C_{18}H_{40}O_4Si_3$ (%): calcd.: C, 53.41; H, 9.96; found: C, 53.11; H, 9.78. Colorless oil. Isolated yield: 93%.

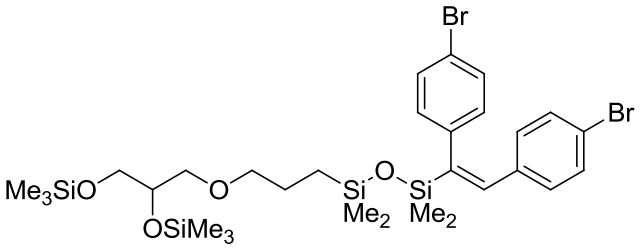
(E)-2,2,11,11,13,13-Hexamethyl-14,15-diphenyl-5-((trimethylsilyl)oxy)-3,7,12-trioxa-2,11,13-trisilapentadec-14-ene (**5ca**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.27 – 6.82 (m, 10H, Ph), 6.77 (s, 1H, C=C<u>H</u>), 3.71 (p, J_{H-H} = 5.5 Hz, 1H, CH_2C<u>H</u>CH_2), 3.57 – 3.15 (m, 6H), 1.56 – 1.39 (m, 2H), 0.50 – 0.34 (m, 2H), 0.07 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.02 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), -0.00 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), -0.05 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ,

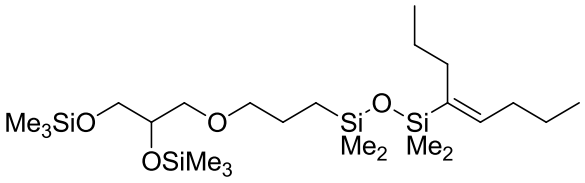
ppm): 146.50, 142.11, 137.83, 137.36, 129.70, 128.70, 128.03, 127.81, 127.26, 125.84, 74.41, 72.60, 72.55, 64.68, 23.60, 14.48, 0.46, 0.38, -0.34. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 18.27, 17.61, 8.92, -3.98. **TOF MS ES+** - (m/z) ([(M-2SiMe$_3$)+Na+H], (%)): 467.2051. **FT-IR** (cm^{-1}): 3056, 3023 (C_{sp2}-H), 2955 (C_{sp3}-H), 2926 (C_{sp3}-H), 2864 (C_{sp3}-H), 1250 ($SiCH_3$), 1143, 1070, 838, 792, 783, 755, 699. **Elemental Anal.** for $C_{30}H_{52}O_4Si_4$ (%): calcd.: C, 61.17; H, 8.90; found: C, 60.98; H, 8.74. Colorless oil. Isolated yield: 78%.

(E)-14,15-Bis(4-bromophenyl)-2,2,11,11,13,13-hexamethyl-5-((trimethylsilyl)oxy)-3,7,12-trioxa-2,11,13-trisilapentadec-14-ene (**5cb**)



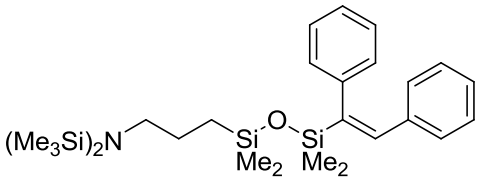
^{1}H NMR (300 MHz, acetone-d_6, δ, ppm): 7.53 (d, J_{H-H} = 8.4 Hz, 2H, Ph), 7.33 (d, J_{H-H} = 8.6 Hz, 2H, Ph), 7.07 – 6.92 (m, 5H, Ph, C=C<u>H</u>), 3.90 – 3.72 (m, 1H), 3.64 – 3.25 (m, 6H), 1.69 – 1.48 (m, 2H), 0.69 – 0.49 (m, 2H), 0.23 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.11 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.10 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.09 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, acetone-d_6, δ, ppm): 147.38, 141.92, 138.23, 137.24, 132.93, 132.38, 132.23, 130.80, 122.03, 120.69, 74.80, 73.78, 73.53, 65.67, 24.58, 15.24, 0.84, 0.67, -0.07. **^{29}Si NMR** (79 MHz, acetone-d_6, δ, ppm): 17.11, 15.95, 9.44, -3.81. **TOF MS ES+** - (m/z) ([M+Na], (%)): 769.1031. **FT-IR** (cm^{-1}): 2955 (C_{sp3}-H), 2929 (C_{sp3}-H), 2866 (C_{sp3}-H), 1484 (C=C), 1250 ($SiCH_3$), 1097, 1070, 1010, 838, 815, 789. **Elemental Anal.** for $C_{30}H_{50}Br_2O_4Si_4$ (%): calcd.: C, 48.24; H, 6.75; found: C, 47.96.98; H, 6.66. Colorless oil. Isolated yield: 74%.

(E)-2,2,11,11,13,13-Hexamethyl-14-propyl-5-((trimethylsilyl)oxy)-3,7,12-trioxa-2,11,13-trisilaoctadec-14-ene (**5cc**)



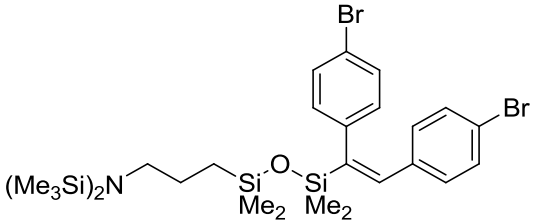
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 5.77 (t, J_{H-H} = 6.9 Hz, 1H, C=C<u>H</u>), 3.81 (p, J_{H-H} = 5.4 Hz, 1H, $CH_2C\underline{H}CH_2$), 3.67 – 3.26 (m, 6H), 2.18 – 1.96 (m, 4H), 1.66 – 1.50 (m, 2H), 1.49 – 1.22 (m, 4H), 0.97 – 0.80 (m, 6H), 0.61 – 0.44 (m, 2H), 0.12 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.10 (s, 15H, OSi(C<u>H</u>$_3$)$_2$, OSi(C<u>H</u>$_3$)$_3$), 0.04 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 141.12, 140.87, 74.45, 72.63, 72.54, 64.69, 31.47, 30.49, 23.62, 23.47, 22.82, 14.60, 14.53, 14.05, 0.95, 0.43, 0.37, -0.38. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 18.11, 17.44, 7.52, -2.63. **TOF MS ES+** - (m/z) ([M+Na], (%)): 543.3147. **FT-IR** (cm^{-1}): 2956 (C_{sp3}-H), 2930 (C_{sp3}-H), 2870 (C_{sp3}-H), 1249 ($SiCH_3$), 1144, 1100, 1046), 834, 794, 778, 749. **Elemental Anal.** for $C_{24}H_{56}O_4Si_4$ (%): calcd.: C, 55.32; H, 10.83; found: C, 55.03; H, 10.54. Colorless oil. Isolated yield: 84%.

(E)-N-(3-(3-(1,2-Diphenylvinyl)-1,1,3,3-tetramethyldisiloxanyl)propyl)-1,1,1-trimethyl-N-(trimethylsilyl)silanamine (**5da**)



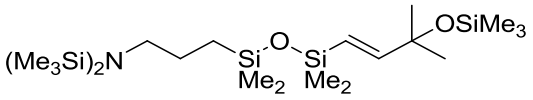
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.24 – 6.92 (m, 10H, Ph), 6.84 (s, 1H, C=C<u>H</u>), 2.78 – 2.55 (m, 2H), 1.42 – 1.16 (m, 2H), 0.41 – 0.29 (m, 2H), 0.13 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.02 (s, 18H, N(Si(C<u>H</u>$_3$)$_3$)$_2$), 0.01 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 146.50, 142.14, 137.87, 137.39, 129.74, 128.72, 128.03, 127.83, 127.26, 125.86, 49.33, 29.25, 15.91, 2.28, 0.42, 0.40. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 8.55, 5.15, -4.07. **MS** (EI, m/z): 354(M^+-160 [N(TMS)$_2$], 1) 311(4), 296(3), 221(3), 191(100), 174(11), 149(12), 133(29), 74(13). **FT-IR** (cm^{-1}): 3055 (C_{sp2}-H), 3022 (C_{sp2}-H), 2954 (C_{sp3}-H), 2925 (C_{sp3}-H), 2900 (C_{sp3}-H), 2871 (C_{sp3}-H), 1598 (C=C), 1571 (C=C), 1489 (CH_2), 1446 ($SiCH_3$), 1251 ($SiCH_3$), 1046, 1029, 957, 910, 903, 828, 779, 754, 691. **Elemental Anal.** for $C_{27}H_{47}NOSi_4$ (%): calcd.: C, 63.09; H, 9.22; found: C, 62.88; H, 9.03. Colorless oil. Isolated yield: 79%.

(E)-N-(3-(3-(1,2-bis(4-Bromophenyl)vinyl)-1,1,3,3-tetramethyldisiloxanyl)propyl)-1,1,1-trimethyl-N-(trimethylsilyl)silanamine (**5db**)



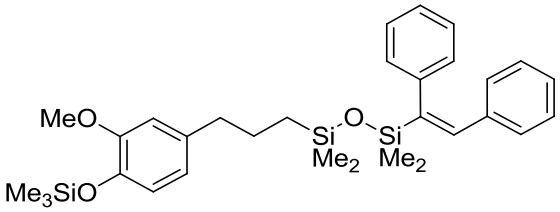
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.34 (d, $J_{H\text{-}H}$ = 8.4 Hz, 2H, Ph), 7.17 (d, $J_{H\text{-}H}$ = 8.5 Hz, 2H, Ph), 6.88 – 6.69 (m, 5H, Ph, C=C<u>H</u>), 2.71 – 2.48 (m, 2H), 1.31 – 1.17 (m, 2H), 0.51 – 0.17 (m, 2H), 0.10 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.05 – -0.10 (m, 24H, OSi(C<u>H</u>$_3$)$_2$, N(Si(C<u>H</u>$_3$)$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 146.18, 140.65, 137.15, 135.87, 135.85, 131.98, 131.28, 131.15, 129.49, 121.45, 120.06, 49.26, 29.18, 15.83, 2.25, 0.38, 0.32. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 9.11, 7.32, 5.16, -4.12. **IR** (cm^{-1}): 2958 (C_{sp3}-H), 1483, 1257 ($SiCH_3$), 1069, 1023,1008, 961, 785, 589. **Elemental Anal.** for $C_{27}H_{45}Br_2NOSi_4$ (%): calcd.: C, 48.27; H, 6.75; found: C, 48.01; H, 6.55. Colorless oil. Isolated yield: 84%. Molecular and fragmentation peaks could not be matched to the product mass.

(E)-1,1,1-Trimethyl-N-(3-(1,1,3,3-tetramethyl-3-(3-methyl-3-((trimethylsilyl)oxy)but-1-en-1-yl)disiloxanyl)propyl)-N-(trimethylsilyl)silanamine (**5df**)



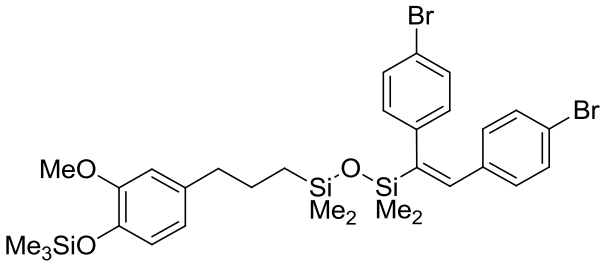
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 6.16 (d, $J_{H\text{-}H}$ = 18.9 Hz, 1H, C<u>H</u>=CH), 5.69 (d, $J_{H\text{-}H}$ = 18.9 Hz, 1H, CH=C<u>H</u>), 2.82 – 2.53 (m, 2H), 1.29 (s, 6H, C(C<u>H</u>$_3$)$_3$ (m, 2H), 0.13 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.11 (s, 9H, NSi(C<u>H</u>$_3$)$_3$), 0.08 (s, 15H, NSi(C<u>H</u>$_3$)$_3$, OSi(C<u>H</u>$_3$)$_2$), 0.05 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 154.79, 124.36, 74.76, 49.30, 30.11, 29.20, 15.93, 2.77, 2.27, 0.92, 0.49. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 9.74, 7.94, 5.08, -3.05. **TOF MS ES+** - (m/z) ([M+H], (%)): 493.3594. **FT-IR** (cm^{-1}): (C_{sp2}-H), 2957 (C_{sp3}-H), 1578, 1311, 1250 ($SiCH_3$), 1034, 835, 749, 683. **Elemental Anal.** for $C_{21}H_{53}NO_2Si_5$ (%): calcd.: C, 51.26; H, 10.86; found: C, 51.03; H, 10.64. Colorless oil. Isolated yield: 90%.

(E)-1-(1,2-Diphenylvinyl)-3-(3-(3-methoxy-4-((trimethylsilyl)oxy)phenyl)propyl)-1,1,3,3-tetramethyldisiloxane (**5ea**)



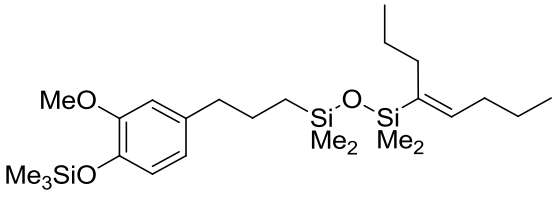
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.25 – 6.89 (m, 10H, Ph), 6.85 (s, 1H, C=C<u>H</u>), 6.74 – 6.53 (m, 3H, Ph), 3.72 (s, 3H, OC<u>H</u>$_3$), 2.51 (t, $J_{H\text{-}H}$ = 7.7 Hz, 2H), 1.68 – 1.52 (m, 2H), 0.61 – 0.49 (m, 2H), 0.20 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.14 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.02 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 150.65, 146.51, 142.51, 142.10, 137.82, 137.35, 136.48, 129.69, 128.69, 128.04, 127.79, 127.27, 125.84, 120.61, 112.57, 55.59, 39.57, 25.64, 18.39, 0.50, 0.48, 0.39. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 20.14, 8.71, -4.07. **TOF MS ES+** - (m/z) ([M+Na], (%)): 571.2489. **FT-IR** (cm^{-1}): 3057 (C_{sp2}-H), 3022 (C_{sp2}-H), 2955 (C_{sp3}-H), 2929 (C_{sp3}-H), 2869 (C_{sp3}-H), 1251 ($SiCH_3$), 1092, 1062, 958, 836, 791, 782, 699. **Elemental Anal.** for $C_{31}H_{44}O_3Si_3$ (%): calcd.: C, 67.83; H, 8.08; found: C, 67.55; H, 7.91. Pale yellow oil. Isolated yield: 80%.

(E)-1-(1,2-Bis(4-bromophenyl)vinyl)-3-(3-(3-methoxy-4-((trimethylsilyl)oxy)phenyl)propyl)-1,1,3,3-tetramethyldisiloxane (**5eb**)



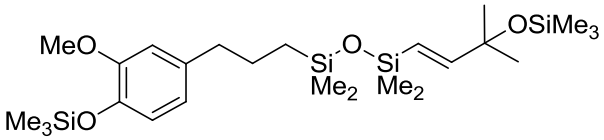
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.41 (d, $J_{H\text{-}H}$ = 8.4 Hz, 2H, Ph), 7.24 (d, $J_{H\text{-}H}$ = 8.6 Hz, 2H, Ph), 6.94 – 6.53 (m, 8H, Ph, C=C<u>H</u>), 3.77 (s, 3H, OC<u>H</u>$_3$), 2.54 (t, $J_{H\text{-}H}$ = 7.6 Hz, 2H), 1.69 – 1.57 (m, 2H), 0.63 – 0.49 (m, 2H), 0.23 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.15 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.05 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 150.67, 146.24, 142.57, 140.66, 137.13, 136.35, 135.87, 131.99, 131.33, 131.13, 129.50, 121.47, 120.65, 120.59, 120.05, 112.59, 55.63, 39.53, 25.62, 18.31, 0.49, 0.32. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 20.19, 9.29, -4.16. **TOF MS ES+** - (m/z) ([M+Na], (%)): 729.0691. **FT-IR** (cm^{-1}): 2955 (C_{sp3}-H), 2930 (C_{sp3}-H), 1512 (C=C), 1484 (CH_2), 1281 ($SiCH_3$), 1250 (CH_2), 1232 ($SiCH_2$), 1069 (SiO), 1055, 1041, 1010 908, 840, 815, 789. **Elemental Anal.** for $C_{31}H_{42}Br_2O_3Si_3$ (%): calcd.: C, 52.68; H, 5.99; found: C, 52.11; H, 5.76. Pale yellow oil. Isolated yield: 71%.

(E)-1-(3-(3-Methoxy-4-((trimethylsilyl)oxy)phenyl)propyl)-1,1,3,3-tetramethyl-3-(oct-4-en-4-yl)disiloxane (**5ec**)



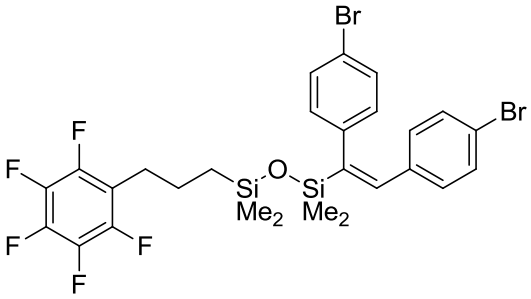
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 6.80 – 6.57 (m, 3H, Ph), 5.78 (t, J_{H-H} = 6.8 Hz, 1H, C=C<u>H</u>), 3.80 (s, 3H, OC<u>H</u>$_3$), 2.55 (t, J_{H-H} = 7.7 Hz, 2H), 2.16 – 1.99 (m, 4H), 1.71 – 1.55 (m, 2H), 1.47 – 1.20 (m, 4H), 0.97 – 0.83 (m, 6H), 0.63 – 0.49 (m, 2H), 0.24 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.10 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.05 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 150.64, 142.49, 141.17, 140.90, 136.59, 120.62, 120.60, 112.59, 55.61, 39.60, 31.49, 30.50, 25.66, 23.48, 22.83, 18.46, 14.63, 14.08, 0.99, 04.52, 0.46. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 20.13, 7.39, -2.70. **TOF MS ES+** - (m/z) ([M+Na], (%)): 503.2811. **FT-IR** (cm^{-1}): 2955 (C_{sp3}-H), 2931 (C_{sp3}-H), 2898 (C_{sp3}-H), 2873 (C_{sp3}-H), 1602 (C=C), 1409 (CH_2), 1251 ($SiCH_3$), 1039, 984, 865, 837, 793, 781, 761, 685. **Elemental Anal.** for $C_{25}H_{48}O_3Si_3$ (%): calcd.: C, 62.44; H, 10.06; found: C, 62.12; H, 9.89. Pale yellow oil. Isolated yield: 85%.

(E)-1-(3-(3-Methoxy-4-((trimethylsilyl)oxy)phenyl)propyl)-1,1,3,3-tetramethyl-3-(3-methyl-3-((trimethylsilyl)oxy)but-1-en-1-yl)disiloxane (**5ef**)



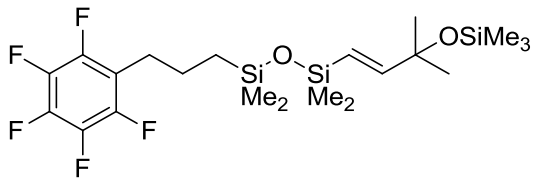
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 6.83 – 6.52 (m, 3H, Ph), 6.16 (d, J_{H-H} = 18.9 Hz, 1H, C<u>H</u>=CH), 5.69 (d, J_{H-H} = 18.9 Hz, 1H, CH=C<u>H</u>), 3.80 (s, 3H, OC<u>H</u>$_3$), 2.55 (t, J_{H-H} = 7.7 Hz, 2H), 1.68 – 1.58 (m, 2H), 1.28 (s, 6H, C(C<u>H</u>$_3$)$_2$), 0.64 - 0.50 (m, 2H), 0.24 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.12 (s, 6H, OSi(C<u>H</u>$_3$)$_2$), 0.11 (s, 9H, OSi(C<u>H</u>$_3$)$_3$), 0.06 (s, 6H, OSi(C<u>H</u>$_3$)$_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 154.77, 150.65, 142.51, 136.55, 124.33, 120.63, 120.60, 112.60, 74.74, 55.63, 39.56, 30.08, 25.64, 18.42, 2.74, 0.90, 0.58, 0.47. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 20.13, 9.81, 8.14, -3.05. **TOF MS ES+** - (m/z) ([M+Na], (%)): 549.2675. **FT-IR** (cm^{-1}): 2956 (C_{sp3}-H), 2926 (C_{sp3}-H), 2856 (C_{sp3}-H), 1512 (C=C), 1281 ($SiCH_3$), 1249 (CH_2), 1232, 1154 (SiO), 1038 (SiO), 909, 836, 805, 754. **Elemental Anal.** for $C_{25}H_{50}O_4Si_4$ (%): calcd.: C, 56.98; H, 9.56; found: C, 57.14; H, 9.77. Pale yellow oil. Isolated yield: 82%.

(E)-1-(1,2-bis(4-Bromophenyl)vinyl)-1,1,3,3-tetramethyl-3-(3-(perfluorophenyl)propyl)disiloxane (**5fb**)



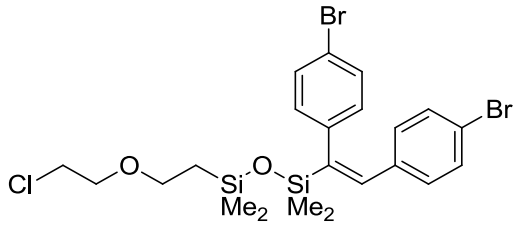
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.35 (d, J_{H-H} = 8.4 Hz, 2H, Ph), 7.19 (d, J_{H-H} = 8.4 Hz, 2H, Ph), 6.86 – 6.70 (m, 5H, Ph, C=C<u>H</u>), 2.63 (t, J_{H-H} = 7.6 Hz, 2H), 1.60 – 1.40 (m, 2H), 0.57 – 0.41 (m, 2H), 0.11 (s, 6H, OSi(C<u>H</u>$_3$)$_2$)), -0.00 (s, 6H, OSi(C<u>H</u>$_3$)$_2$)). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 146.06, 140.58, 137.23, 135.80, 132.00, 131.34, 131.11, 129.49, 121.55, 120.10, 25.92, 23.49, 18.21, 0.36, 0.27.**^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 8.71, -3.66. **FT-IR** (cm^{-1}): 2956 (C_{sp3}-H), 2928 (C_{sp3}-H), 2899 (C_{sp3}-H), 2881 (C_{sp3}-H), 2875 (C_{sp3}-H), 1519 (C=C), 1502 (C=C), 1485 (CH_2), 1254 ($SiCH_3$), 1119, 1070, 1010, 962, 835, 815, 789. **Elemental Anal.** for $C_{27}H_{27}Br_2F_5OSi_2$ (%): calcd.: C, 47.80; H, 4.01; found: C, 47.55; H, 3.88. Colorless oil. Isolated yield: 84%. Molecular and fragmentation peaks could not be matched to the product mass by TOF MS ES+.

(E)-1,1,3,3-Tetramethyl-1-(3-methyl-3-((trimethylsilyl)oxy)but-1-en-1-yl)-3-(3-(perfluorophenyl)propyl)disiloxane (**5ff**)



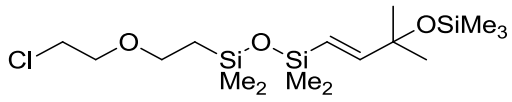
^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 6.15 (d, $J_{H\text{-}H}$ = 18.9 Hz, 1H, C<u>H</u>=CH), 5.68 (d, $J_{H\text{-}H}$ = 18.9 Hz, 1H, CH=C<u>H</u>), 2.71 (t, *J* = 7.6 Hz, 2H), 1.74 – 1.51 (m, 2H), 1.28 (s, 6H, $C(CH_3)_2$), 0.70 – 0.46 (m, 2H), 0.12 (s, 6H, $OSi(C\underline{H}_3)_2$), 0.10 (s, 9H, $OSi(C\underline{H}_3)_3$), 0.06 (s, 6H, $OSi(C\underline{H}_3)_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 154.97, 145.25, 140.38, 136.30, 124.14, 74.74, 30.03, 25.93, 23.58, 18.27, 2.68, 0.79, 0.45. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 9.81, 7.56, -2.61. **MS** (EI, m/z): 483 (M^+-15, 2), 415 (12), 341 (10), 208 (20), 158 (14), 147 (18), 134 (66), 74 (100), 69 (40), 60 (10). **FT-IR** (cm^{-1}): 2956 (C_{sp3}-H), 2924 (C_{sp3}-H), 2854 (C_{sp3}-H), 1519 (C=C), 1503 (C=C), 1251 (FPh), 1038 (SiO), 1001 (SiO), 837, 799. **Elemental Anal.** for $C_{21}H_{35}F_5O_2Si_3$ (%): calcd.: C, 50.57; H, 7.07; found: C, 50.33; H, 6.93. Colorless oil. Isolated yield: 94%.

(E)-1-(1,2-Bis(4-bromophenyl)vinyl)-3-(2-(2-chloroethoxy)ethyl)-1,1,3,3-tetramethyldisiloxane (**5gb**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 7.39 (d, $J_{H\text{-}H}$ = 8.4 Hz, 2H, Ph), 7.21 (d, *J* = 8.5 Hz, 2H, Ph), 6.90 – 6.73 (m, 5H, Ph, C=C<u>H</u>), 3.63 – 3.45 (m, 6H), 1.05 – 0.89 (m, 2H), 0.15 (s, 6H, $OSi(C\underline{H}_3)_2$), 0.06 (s, 6H, $OSi(C\underline{H}_3)_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 146.01, 140.56, 137.25, 135.78, 132.01, 131.33, 131.14, 129.49, 121.53, 120.11, 70.45, 67.89, 43.06, 20.08, 0.95, 0.30. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 7.54, -3.49. **MS** (EI, m/z): 577(M+, 1), 410(3), 212(25), 168(100), 133(10), 74(10). **FT-IR** (cm^{-1}): 2956 (Csp_3-H), 2922 (Csp_3-H), 2894 (Csp_3-H), 2863 (Csp_3-H), 1484 (C=C), 1253 ($SiCH_3$), 1069 (SiO), 1054 (SiO), 1010, 962, 934, 834, 815, 788, 749 (CH_2Cl), 497. **Elemental Anal.** for $C_{22}H_{29}Br_2ClO_2Si_2$ (%): calcd.: C, 45.80; H, 5.07; found: C, 45.49; H, 4.90. Colorless oil. Isolated yield: 77%.

(E)-14-Chloro-2,2,4,4,7,7,9,9-octamethyl-3,8,12-trioxa-2,7,9-trisilatetradec-5-ene (**5gf**)



^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 6.14 (d, $J_{H\text{-}H}$ = 18.9 Hz, 1H, C<u>H</u>=CH), 5.67 (d, $J_{H\text{-}H}$ = 18.9 Hz, 1H, CH=C<u>H</u>), 3.74 – 3.66 (m, 1H), 3.50 – 3.34 (m, 4H), 3.18 – 3.10 (m, 1H), 2.79 (t, $J_{H\text{-}H}$ = 4.6 Hz, 1H), 2.63 – 2.57 (m, 1H), 1.70 – 1.52 (m, 3H), 1.28 (s, 6H, $C(CH_3)_2$), 0.55 – 0.46 (m, 2H), 0.12 (s, 6H, $OSi(C\underline{H}_3)_2$), 0.10 (s, 9H, $OSi(C\underline{H}_3)_3$), 0.05 (s, 6H, $OSi(C\underline{H}_3)_2$). **^{13}C NMR** (101 MHz, $CDCl_3$, δ, ppm): 155.00, 124.06, 74.73, 70.43, 70.38, 68.08, 68.01, 43.03, 43.00, 30.08, 20.16, 20.11, 2.73, 1.02, 0.83. **^{29}Si NMR** (79 MHz, $CDCl_3$, δ, ppm): 9.81, 6.31, -2.44. **MS** (EI, m/z): 382(M^+-15, 1), 275(2), 240(8), 221(36), 168(100), 148(23), 132(80),

95(10), 74(92). **FT-IR** (cm^{-1}): 2957 (C_{sp3}-H), 2926 (C_{sp3}-H), 2898 (C_{sp3}-H), 2858 (C_{sp3}-H), 1359 (CH_3), 1250 ($SiCH_3$), 1218 (CH_2Cl), 1034 (SiO), 834, 789 (CH_2Cl), 753. **Elemental Anal.** for $C_{16}H_{37}ClO_3Si_3$ (%): calcd.: C, 48.38; H, 9.39; found: C, 48.11; H, 9.13. Colorless oil. Isolated yield: 95%. Molecular and fragmentation peaks could not be matched to the product mass.

5. NMR spectra

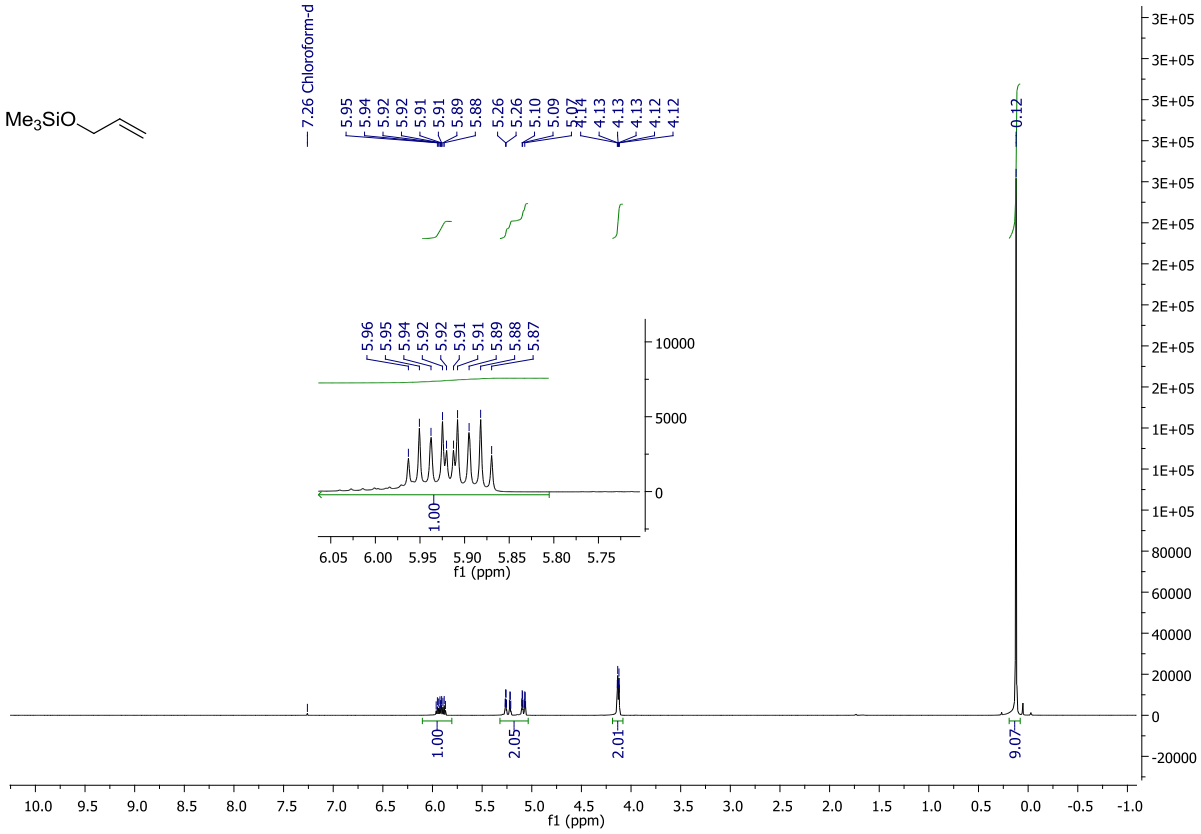


Figure S1. [1]H NMR spectrum of **2a**

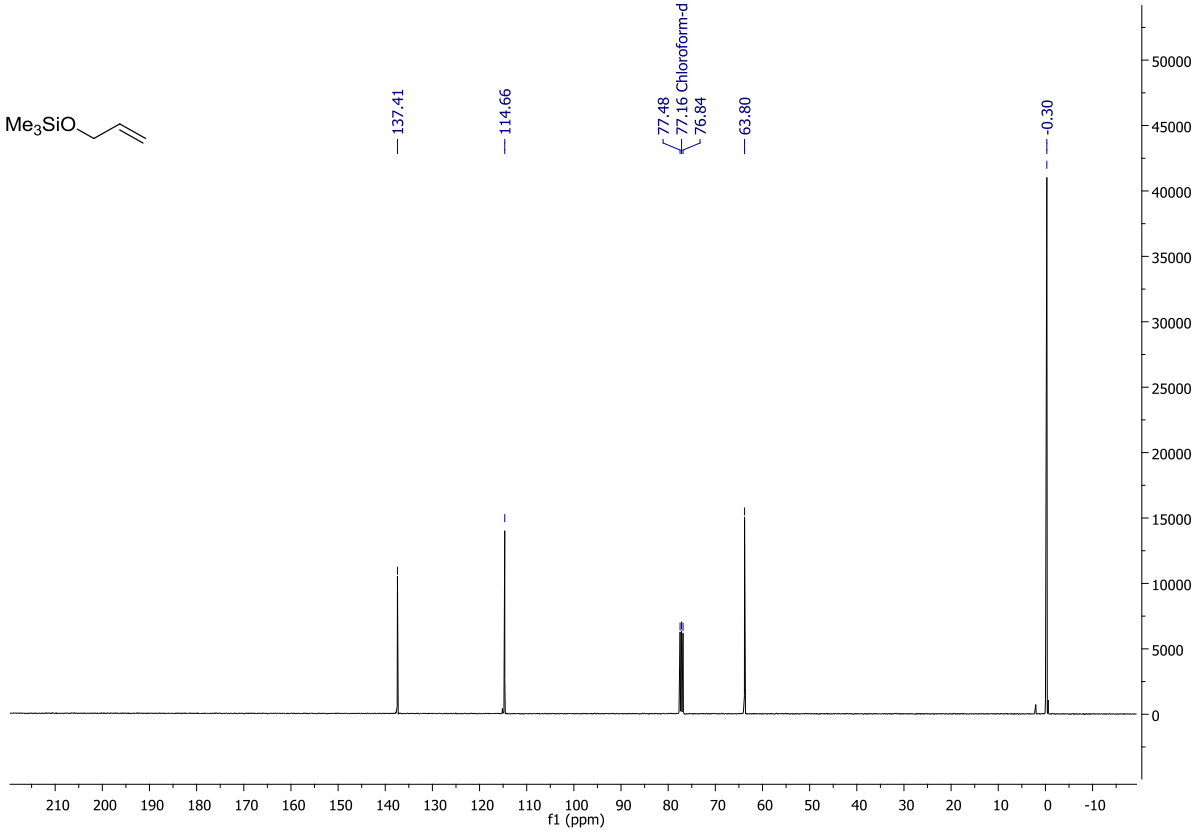


Figure S2. [13]C NMR spectrum of **2a**

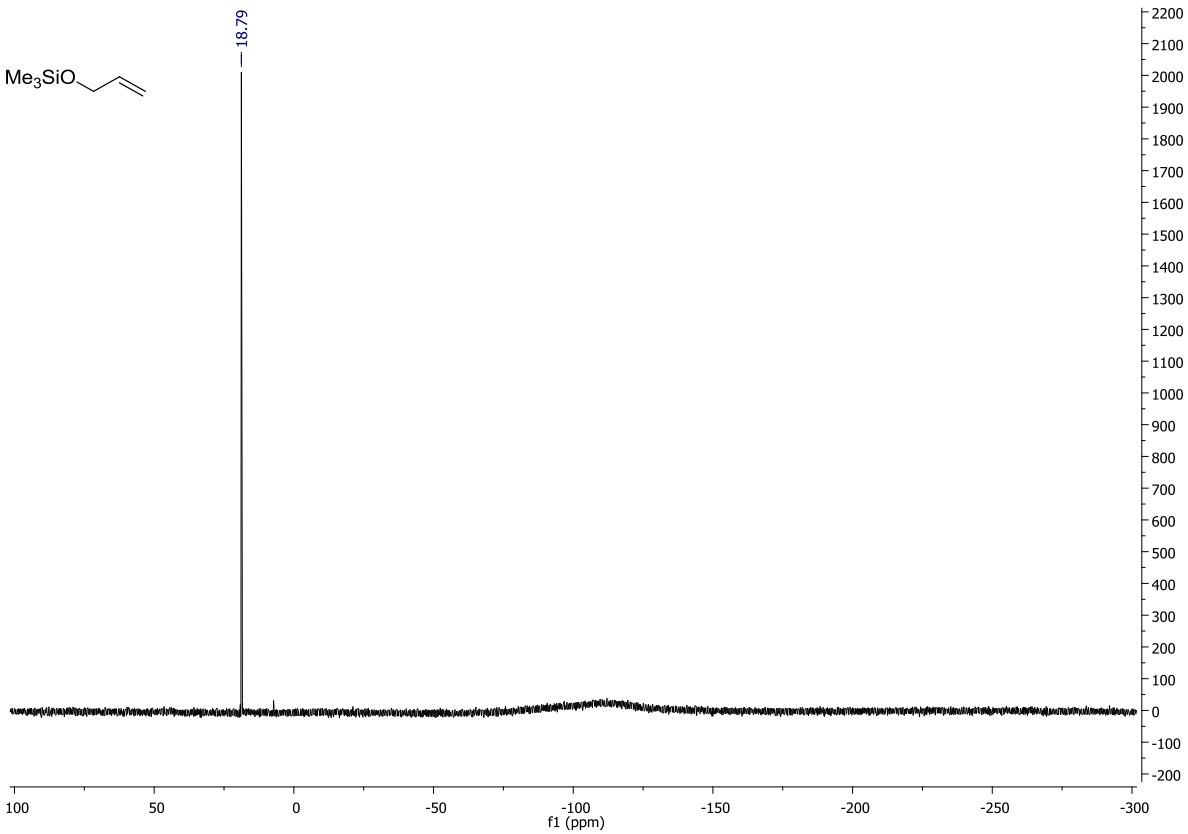


Figure S3. ^{29}Si NMR spectrum of **2a**

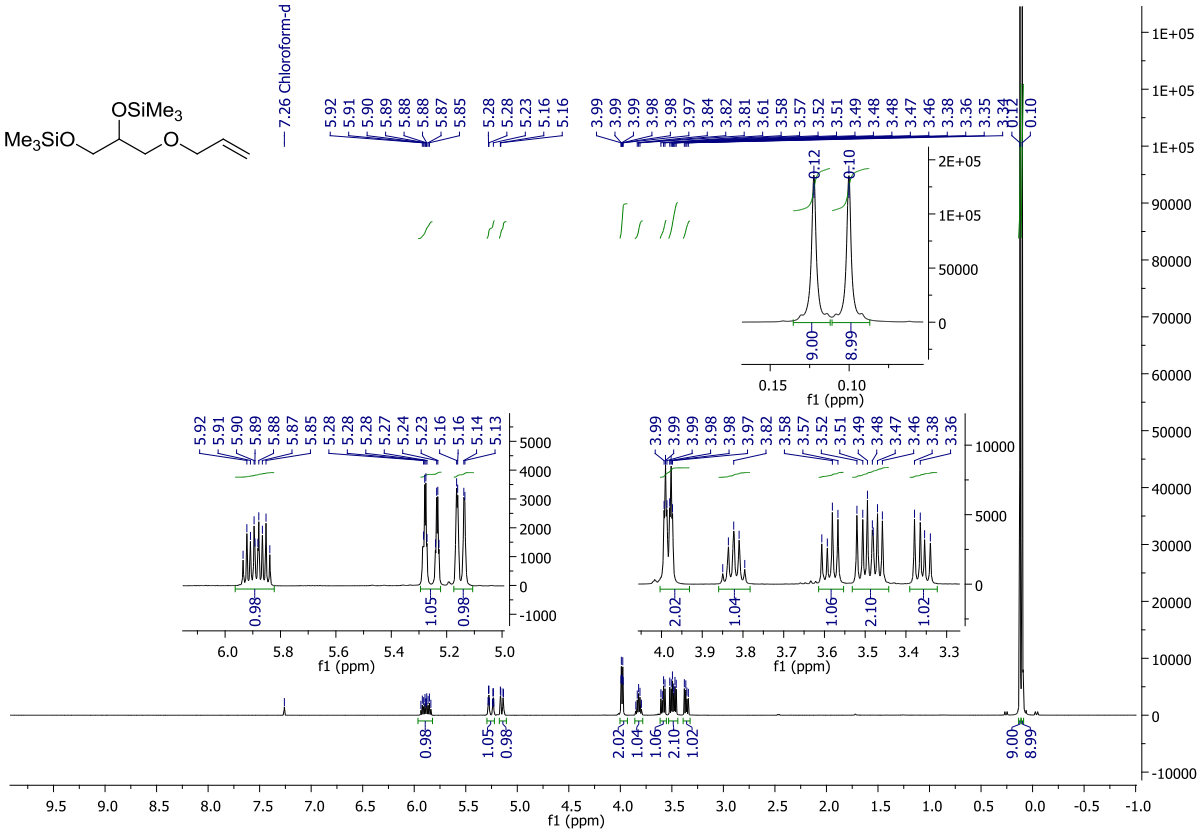


Figure S4. ^{1}H NMR spectrum of **2c**

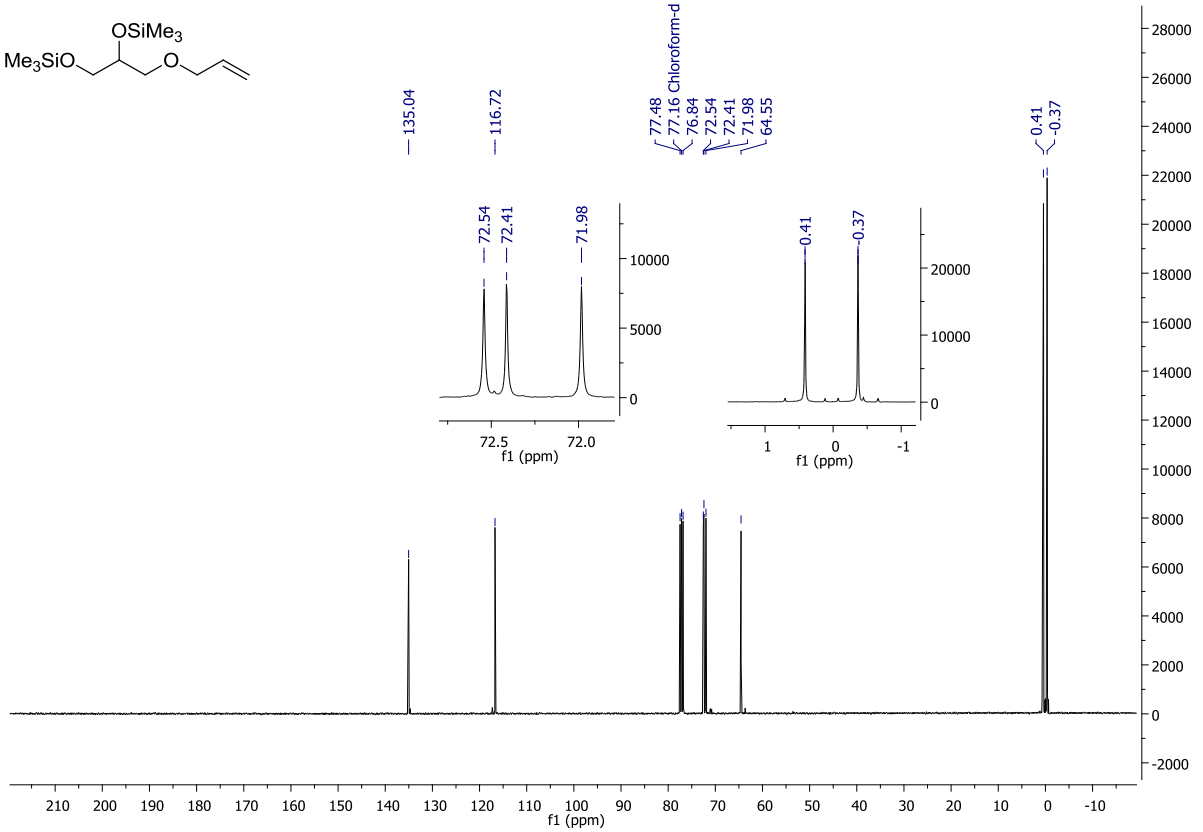


Figure S5. ^{13}C NMR spectrum of **2c**

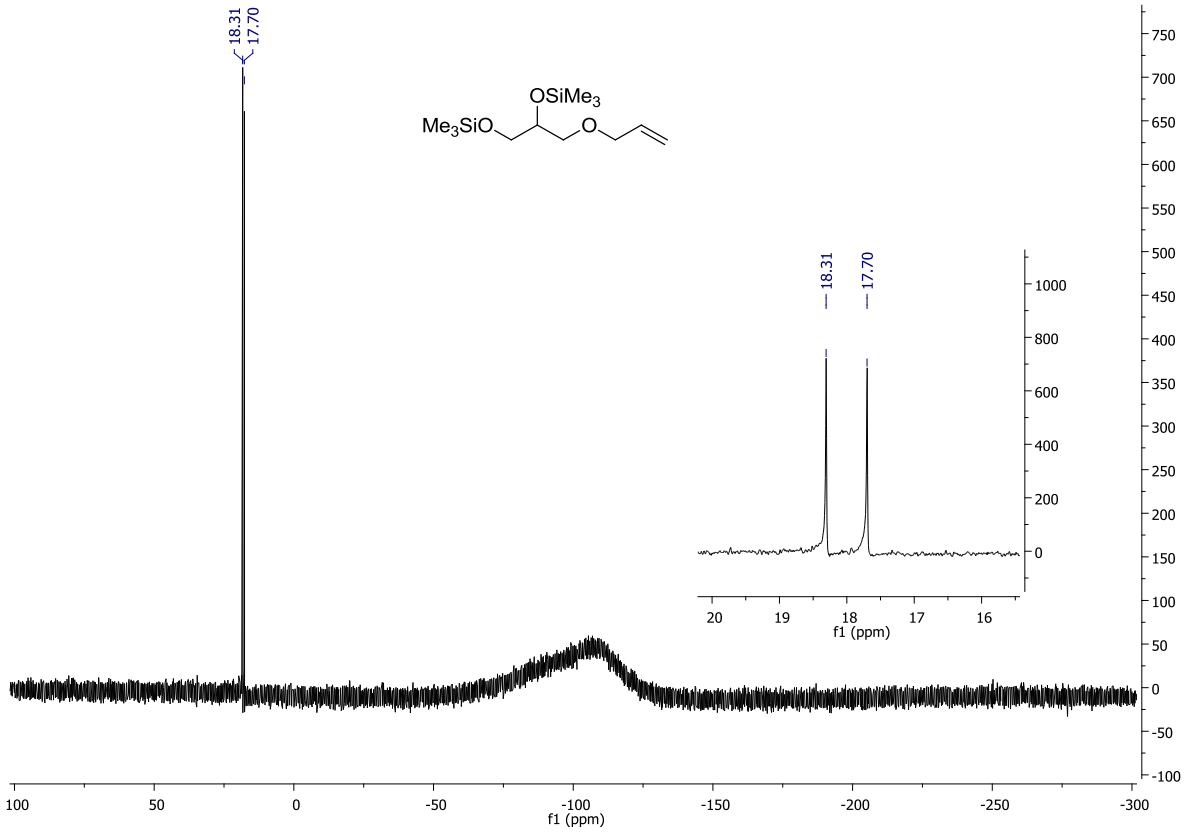


Figure S6. ^{29}Si NMR spectrum of **2c**

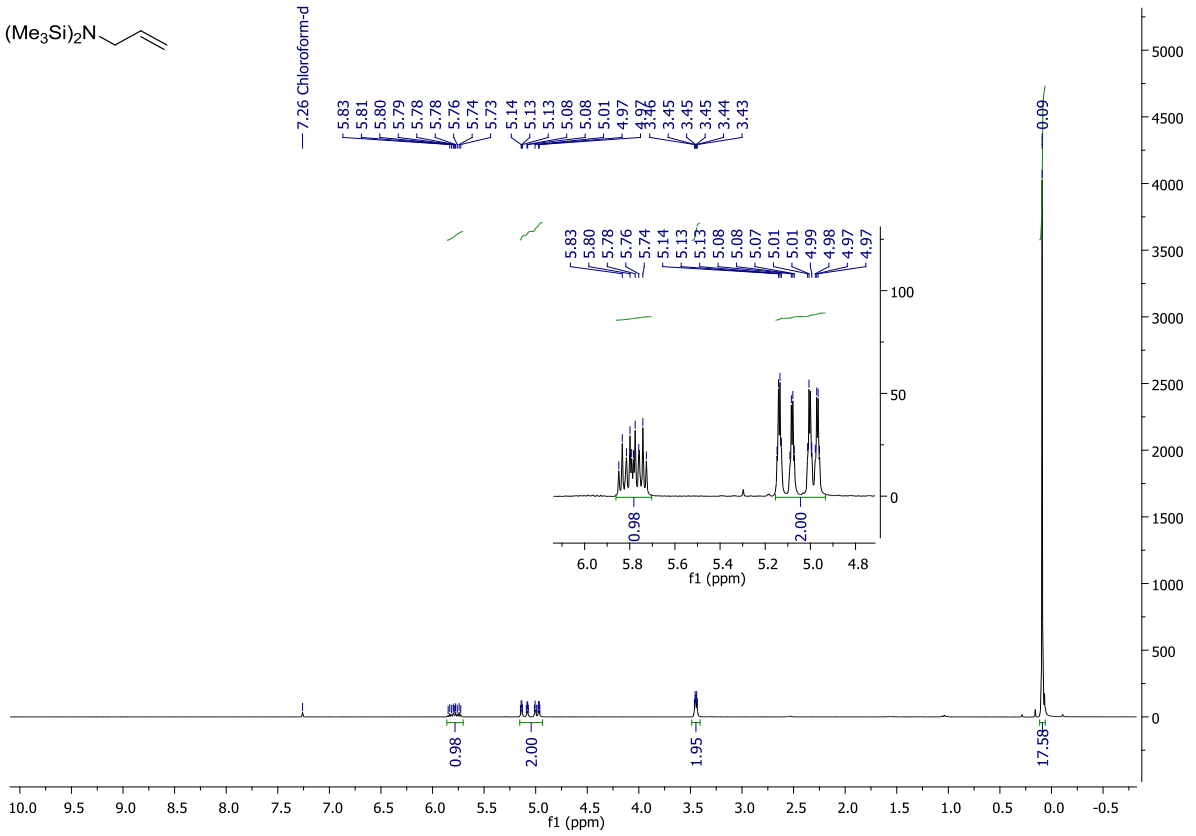


Figure S7. ^{1}H NMR spectrum of **2d**

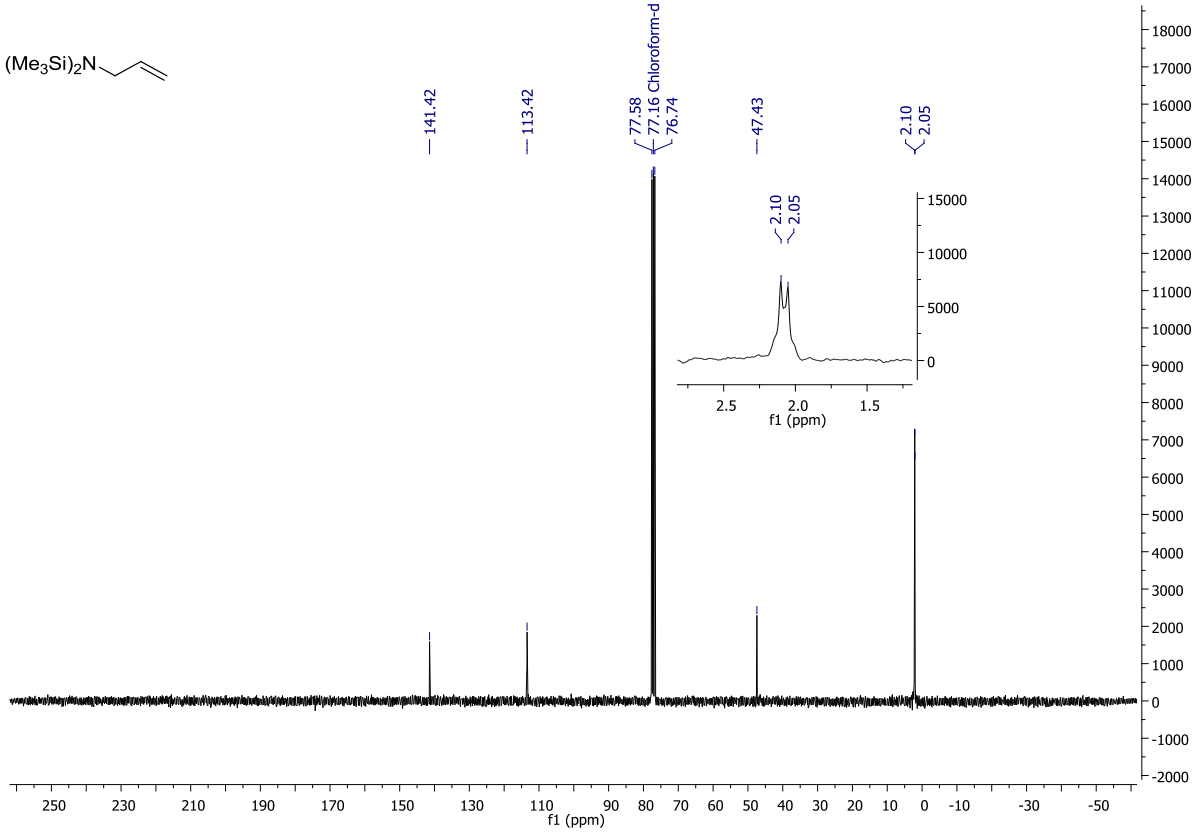


Figure S8. ^{13}C NMR spectrum of **2d**

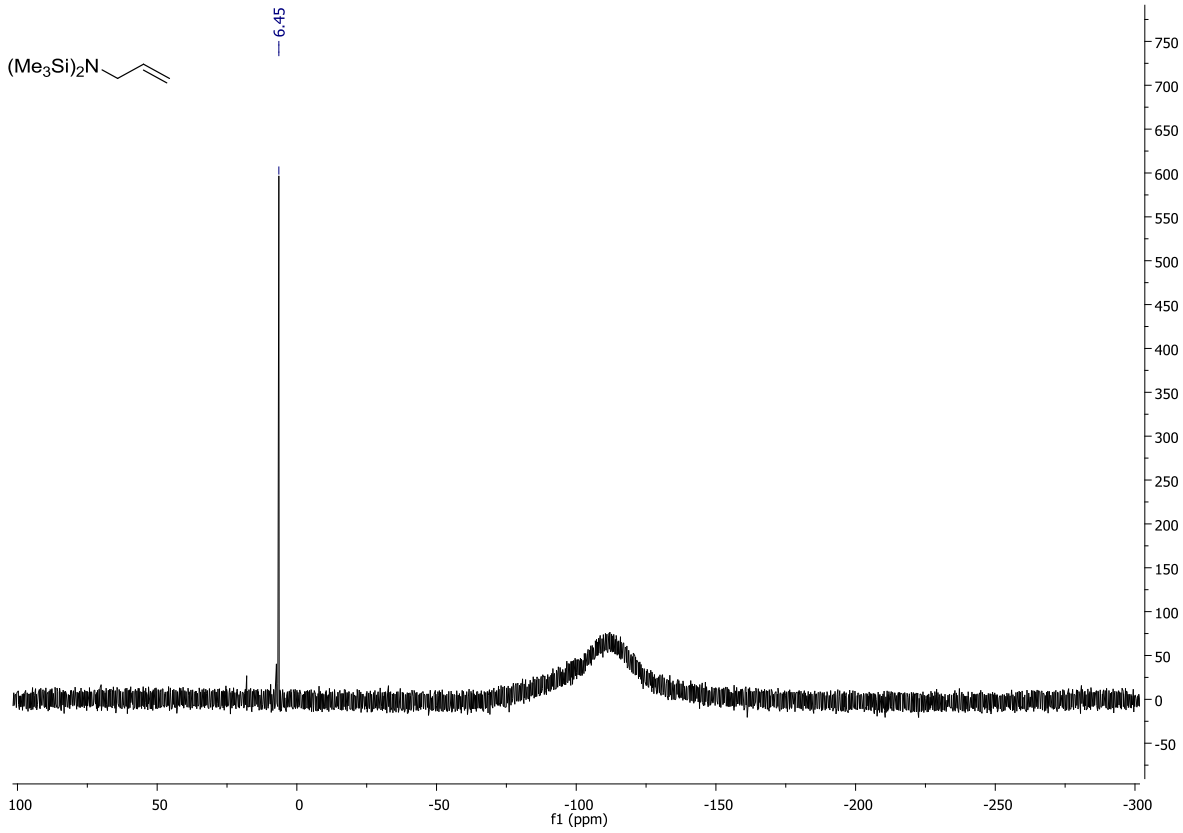


Figure S9. ^{29}Si NMR spectrum of **2d**

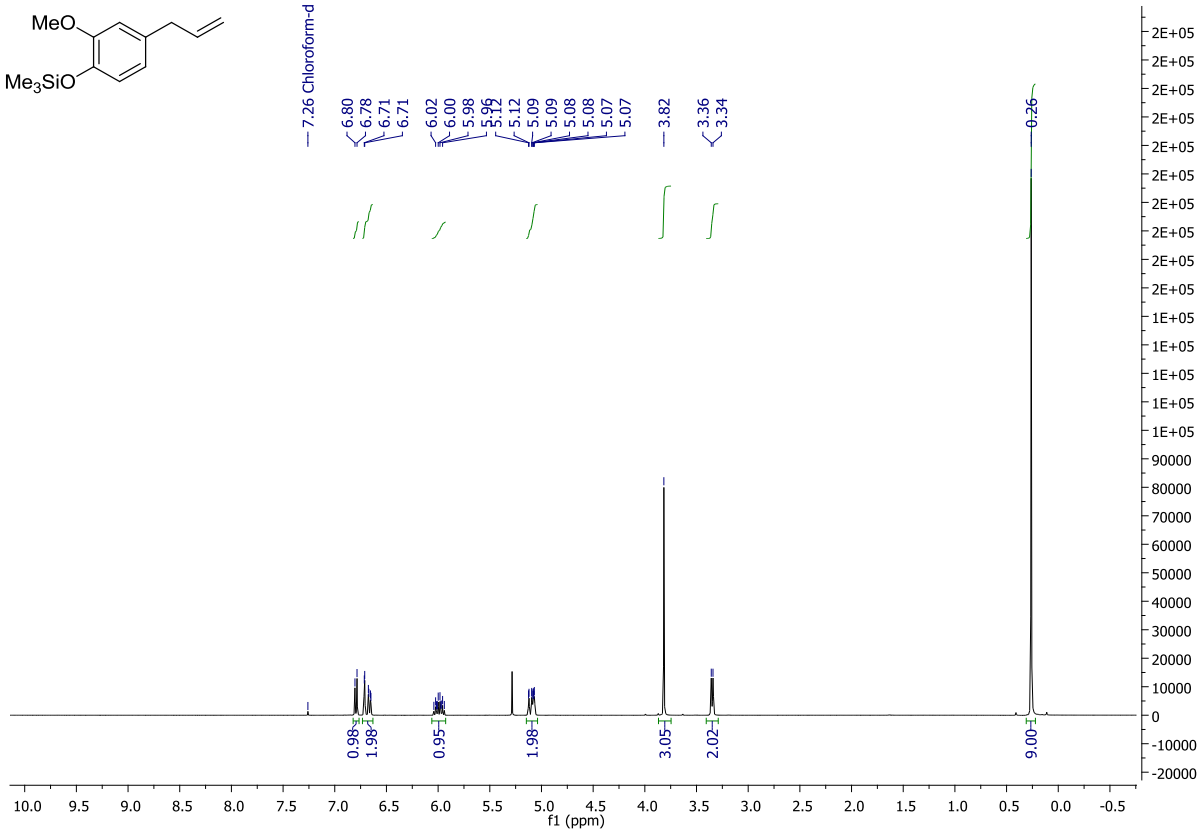


Figure S10. ^{1}H NMR spectrum of **2e**

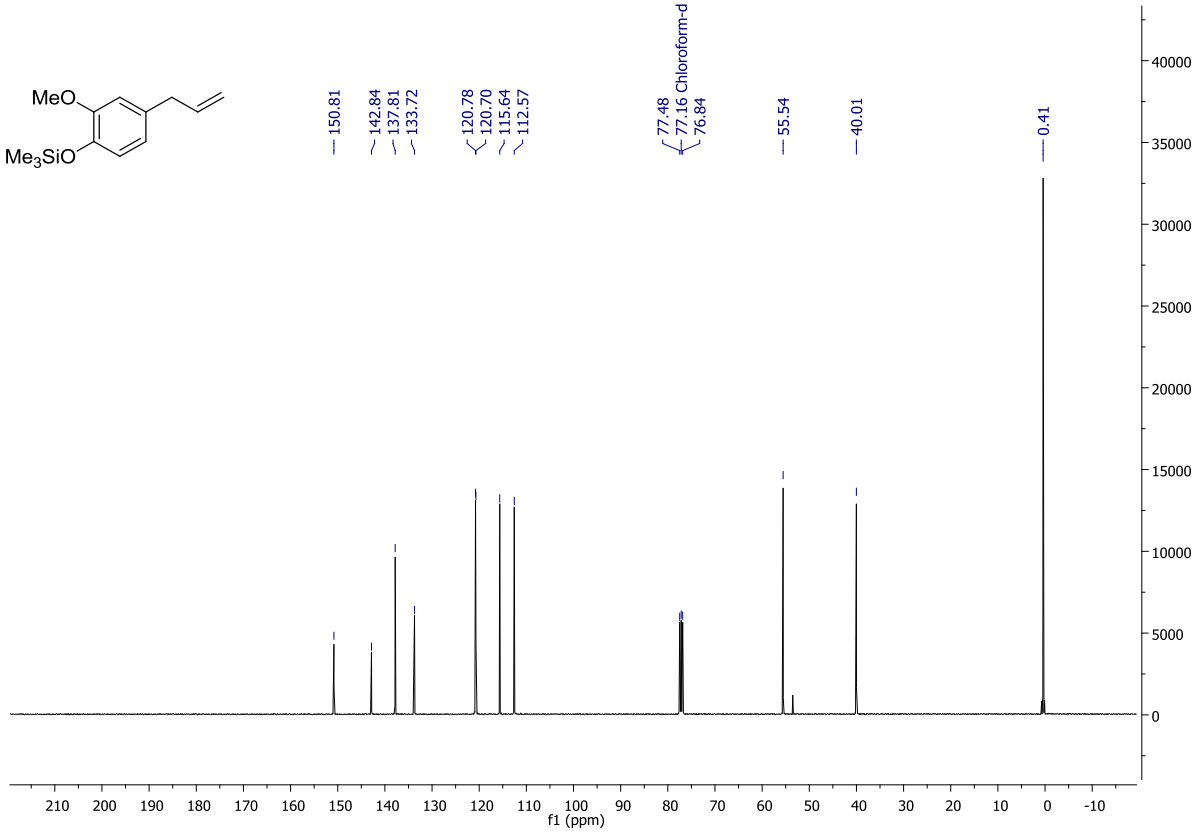


Figure S11. ^{13}C NMR spectrum of **2e**

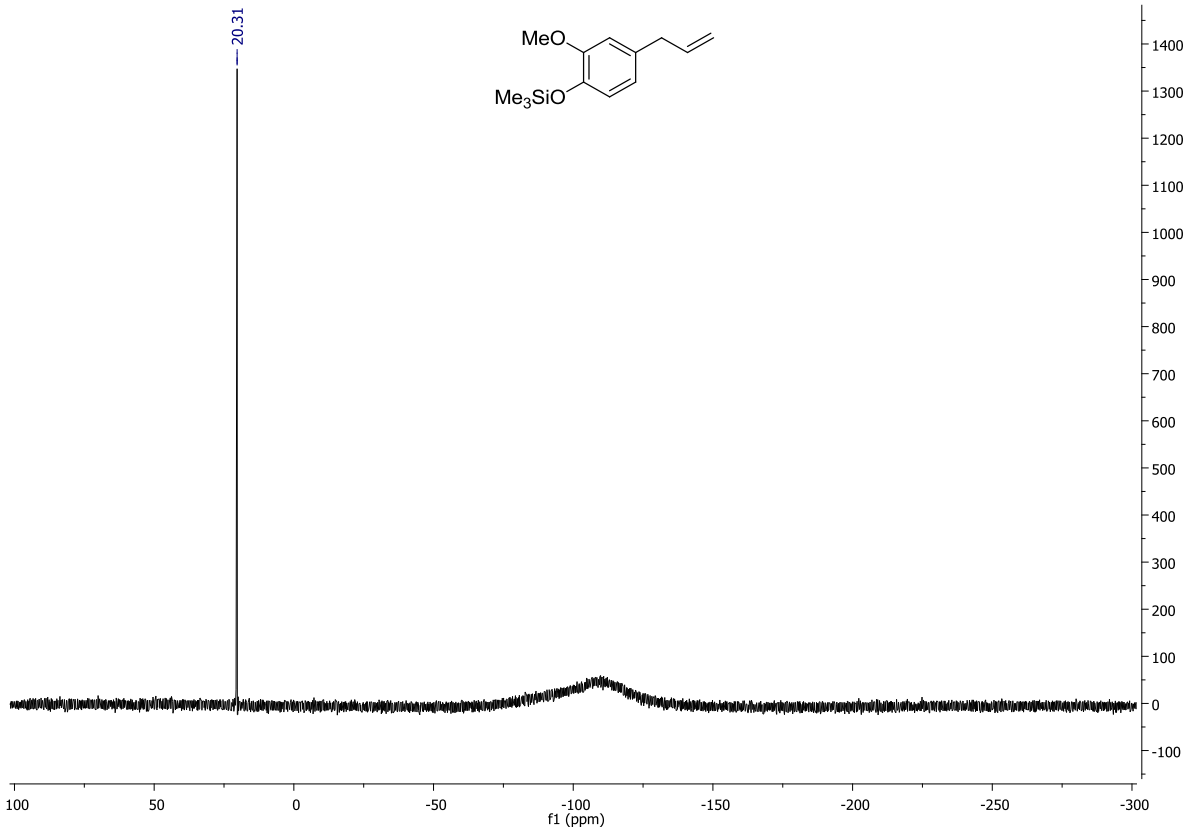


Figure S12. ^{29}Si NMR spectrum of **2e**

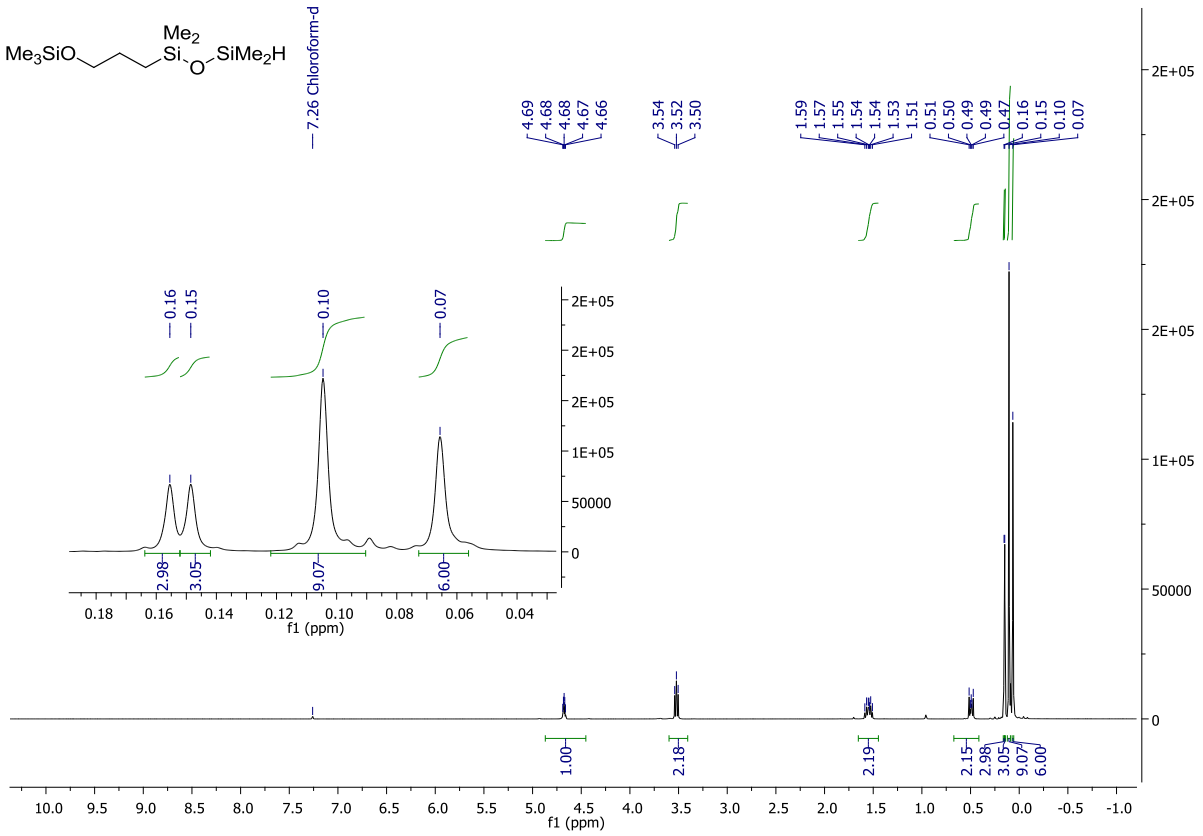


Figure S13. ^{1}H NMR spectrum of **3a**

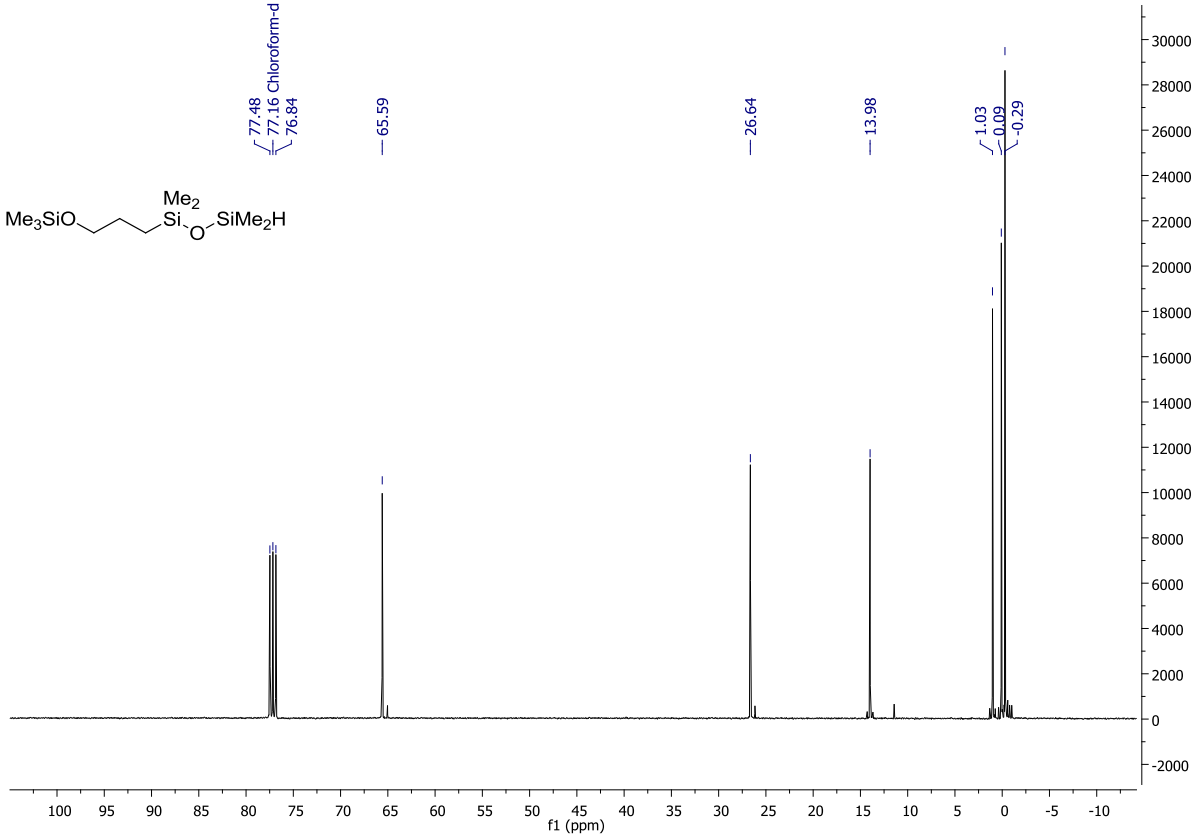


Figure S14. ^{13}C NMR spectrum of **3a**

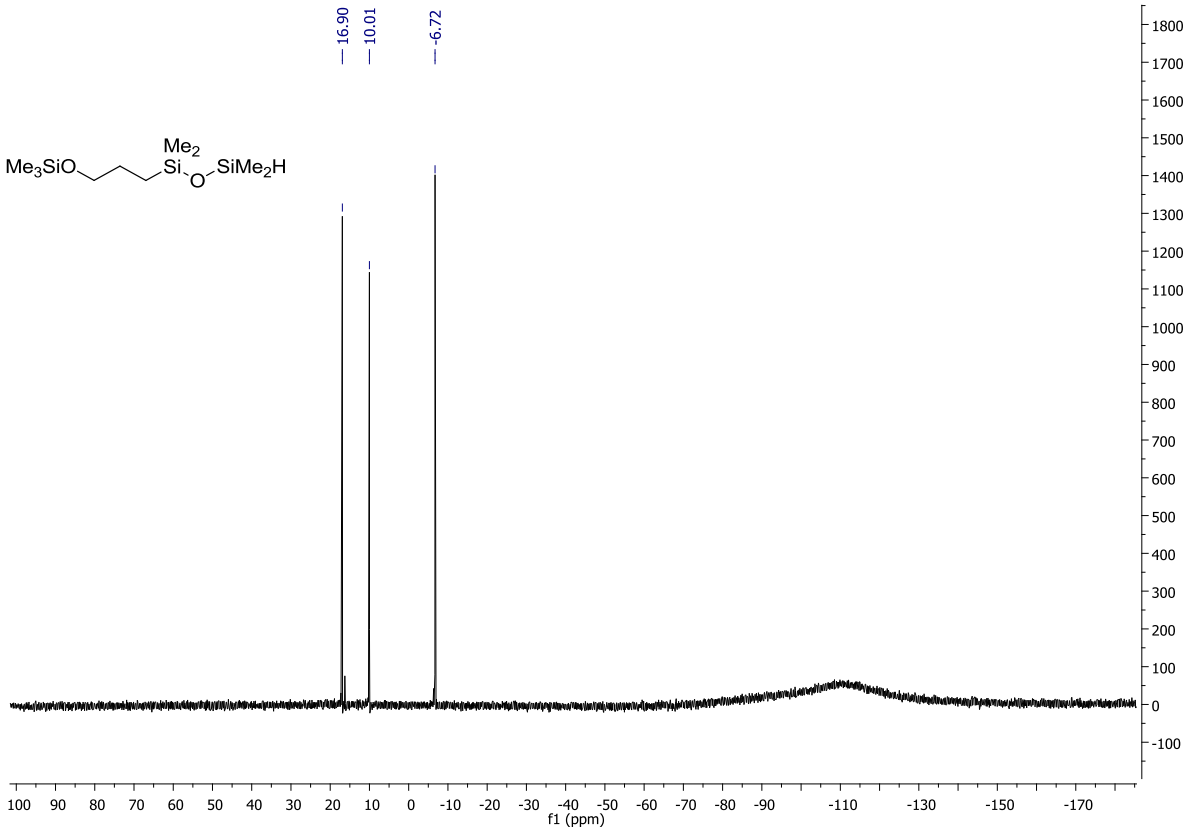


Figure S15. ^{29}Si NMR spectrum of **3a**

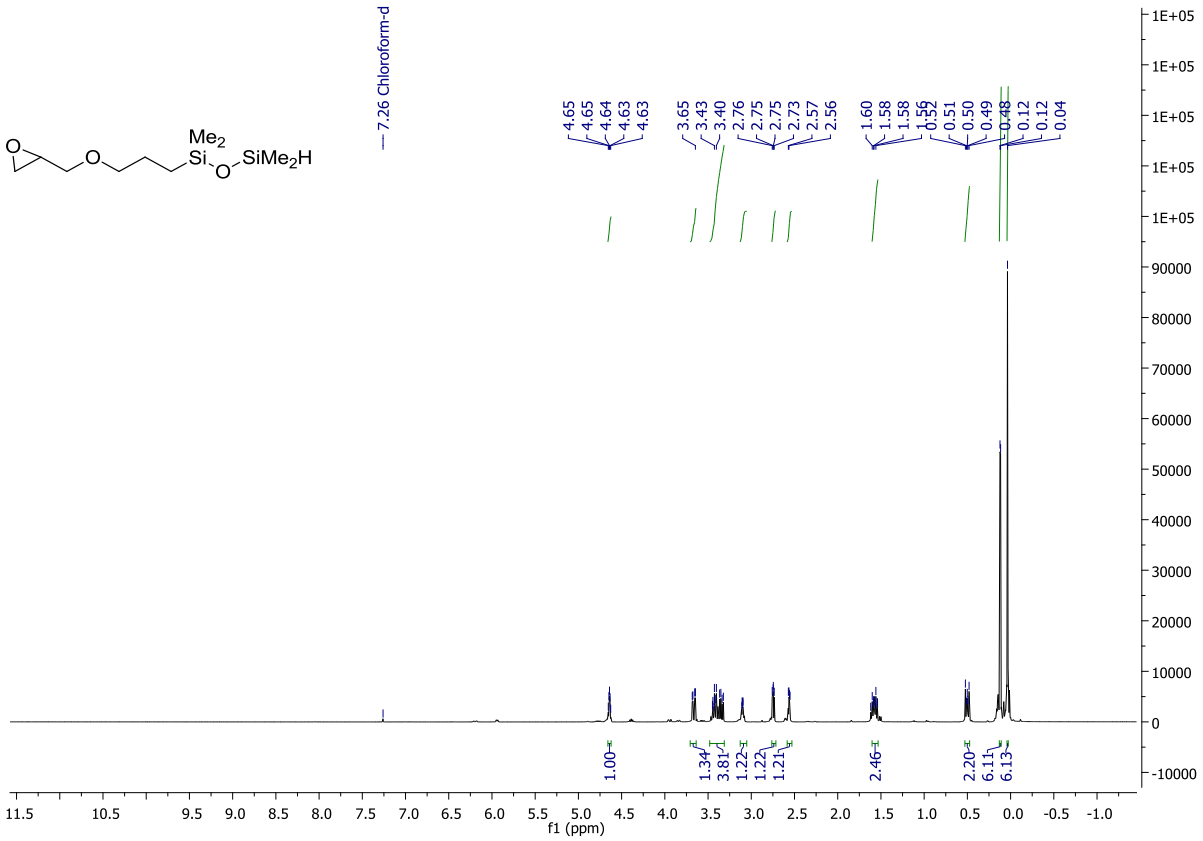


Figure S16. [1]H NMR spectrum of **3b**

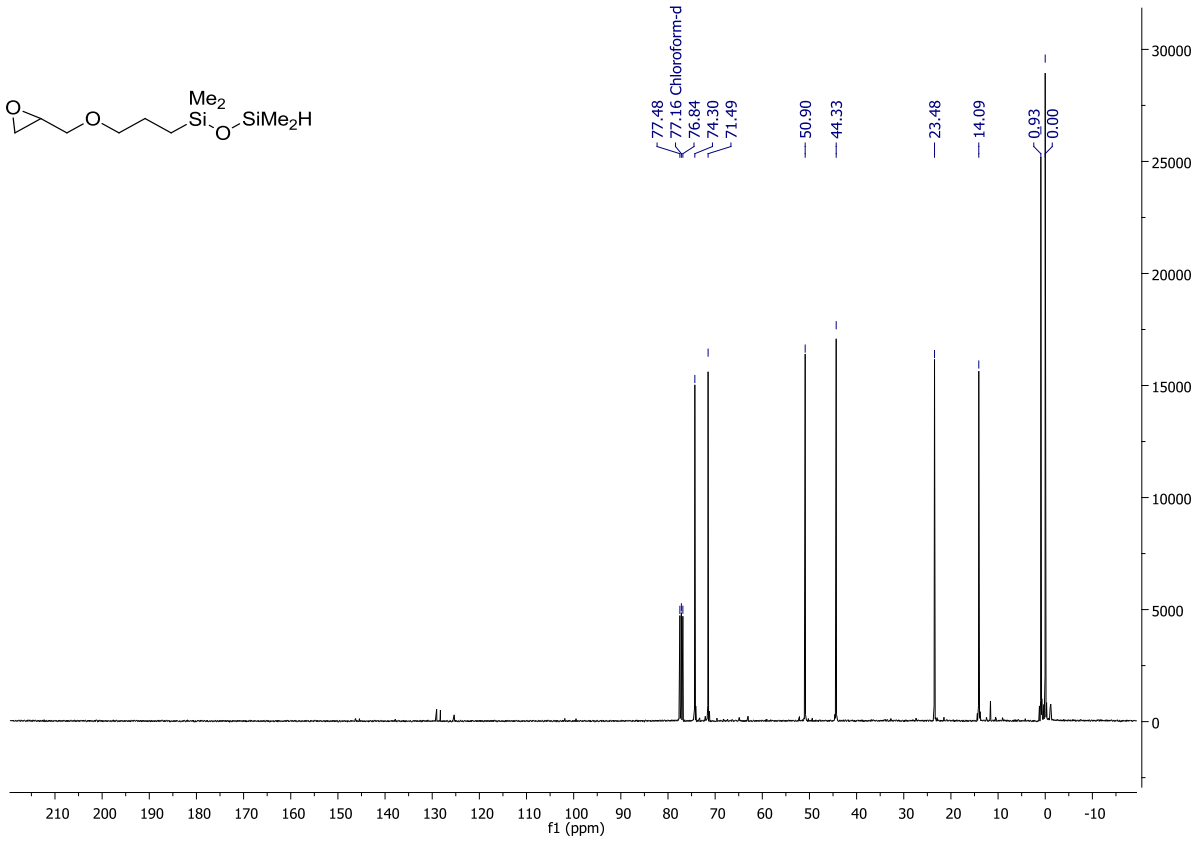


Figure S17. [13]C NMR spectrum of **3b**

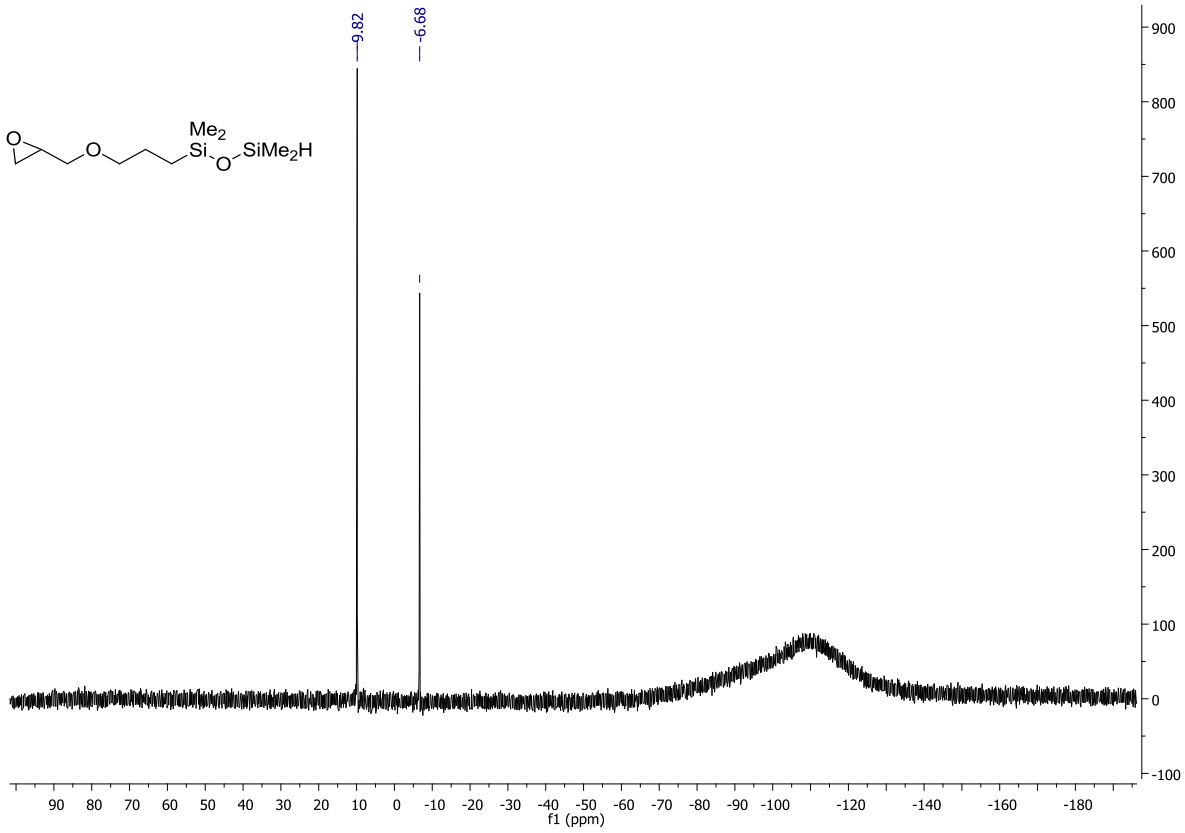


Figure S18. ^{29}Si NMR spectrum of **3b**

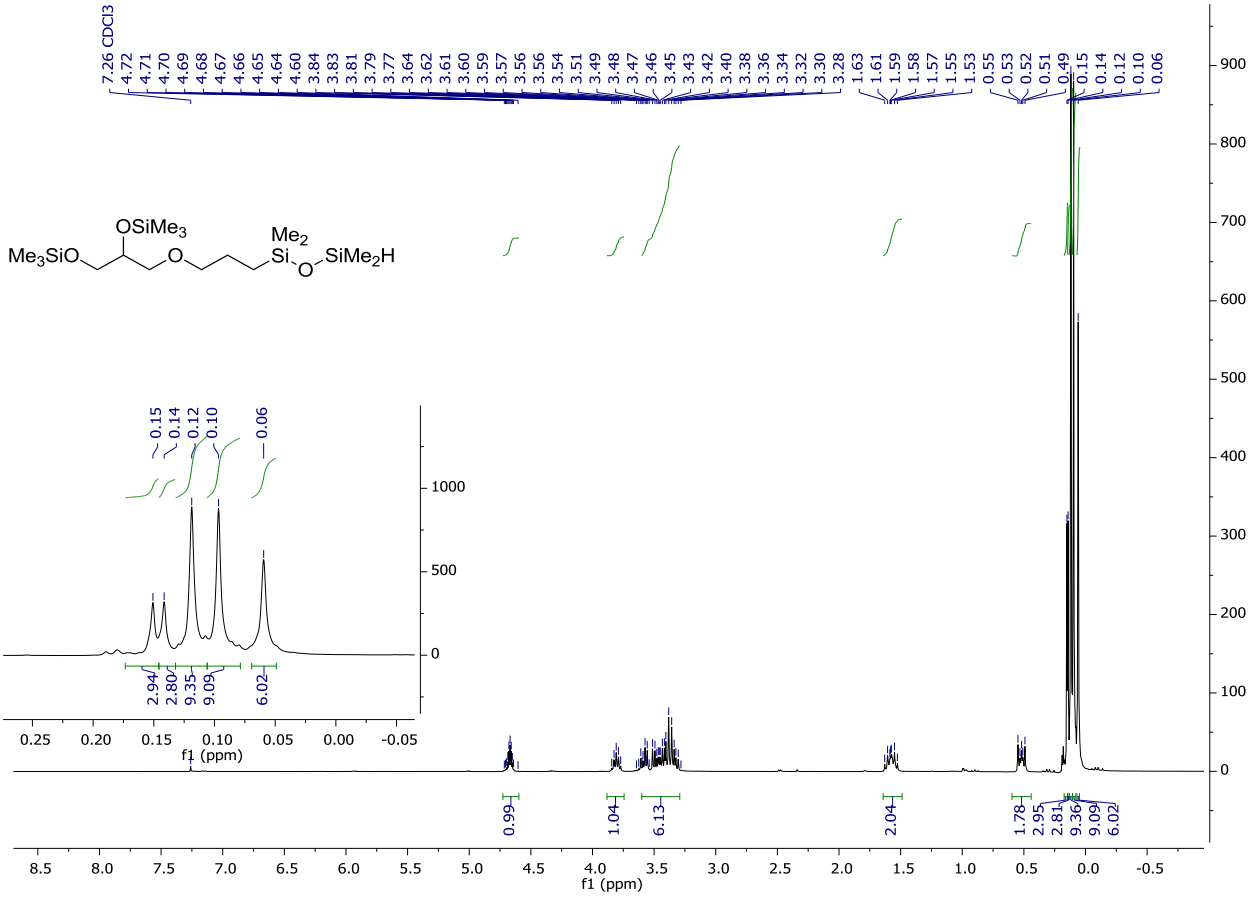


Figure S19. [1]H NMR spectrum of **3c**

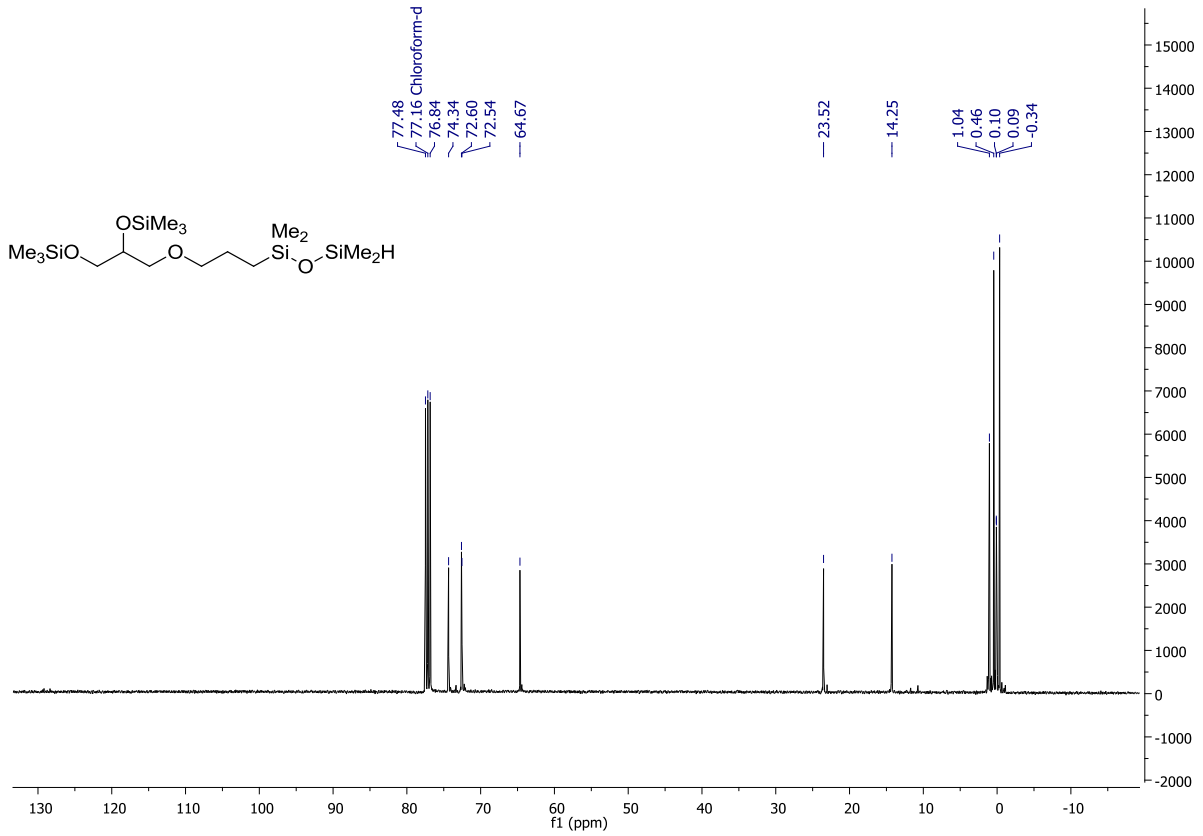


Figure S20. ^{13}C NMR spectrum of **3c**

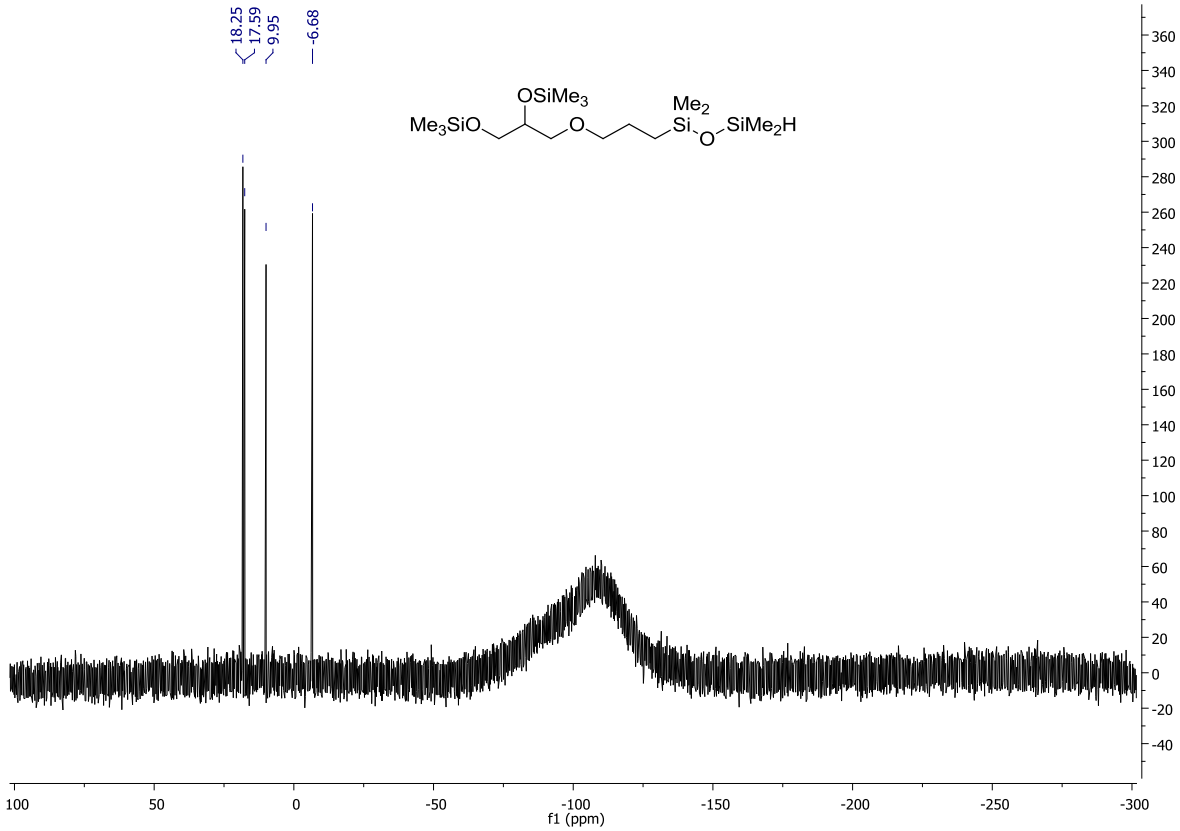


Figure S21. ^{29}Si NMR spectrum of **3c**

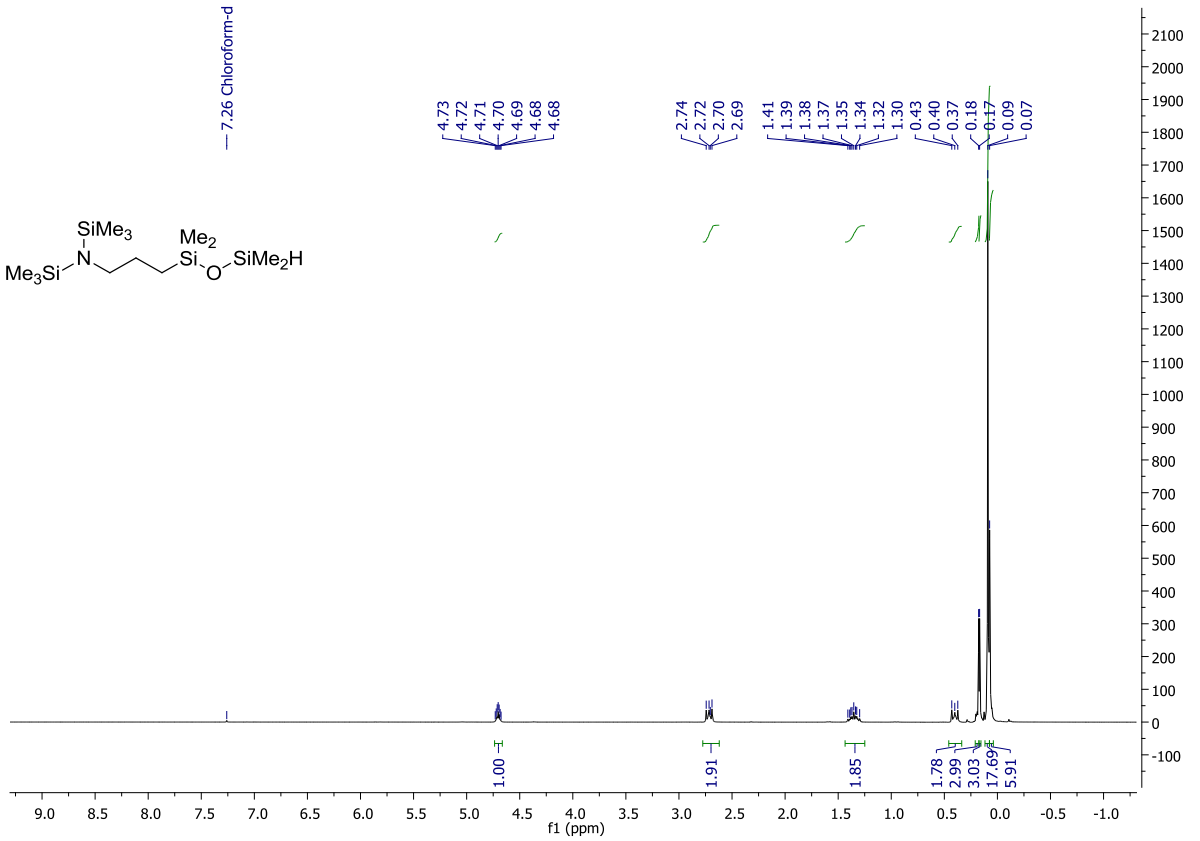


Figure S22. [1]H NMR spectrum of **3d**

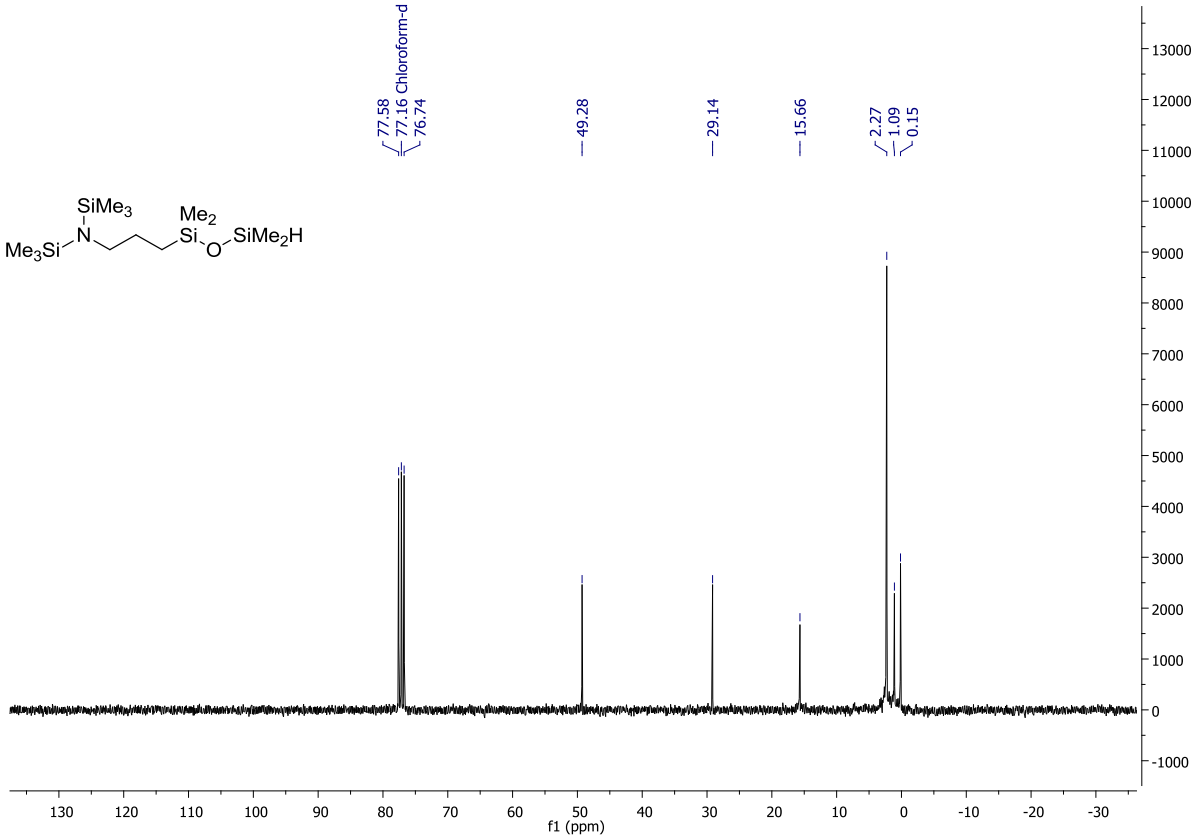


Figure S23. [13]C NMR spectrum of **3d**

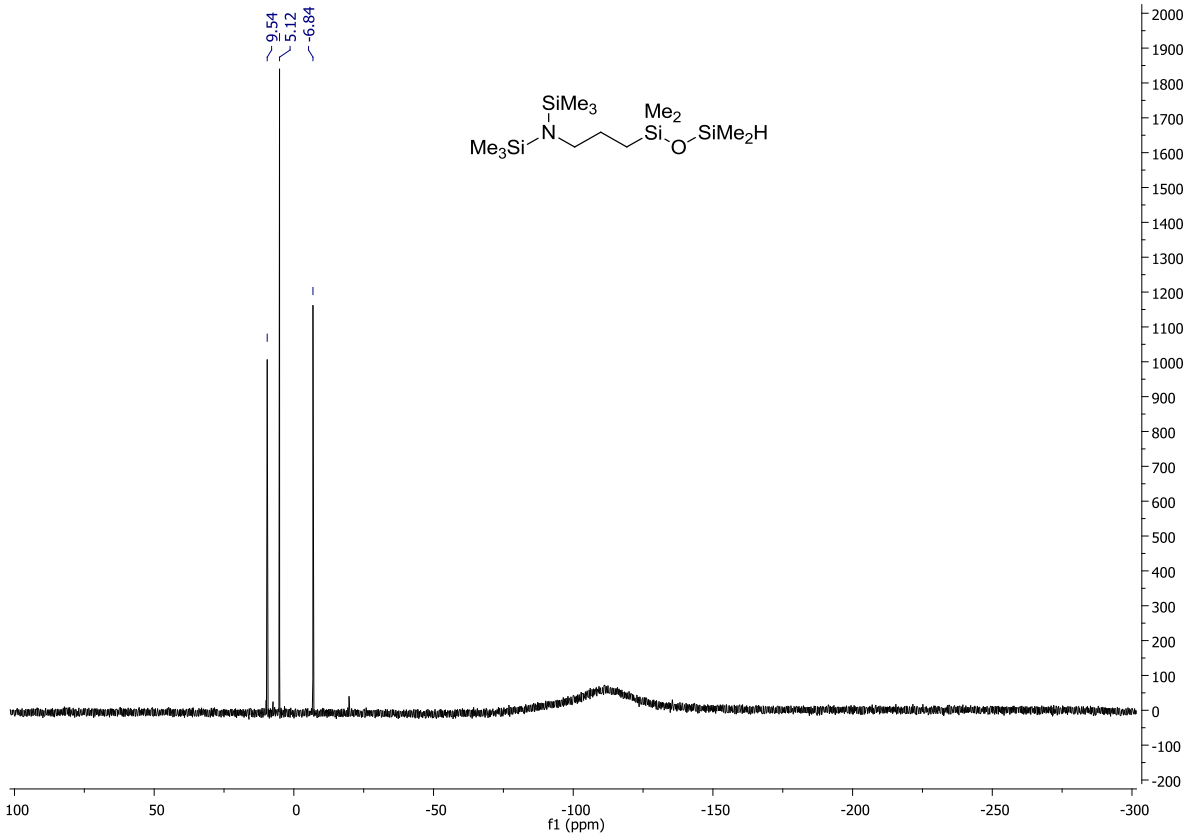


Figure S24. ^{29}Si NMR spectrum of **3d**

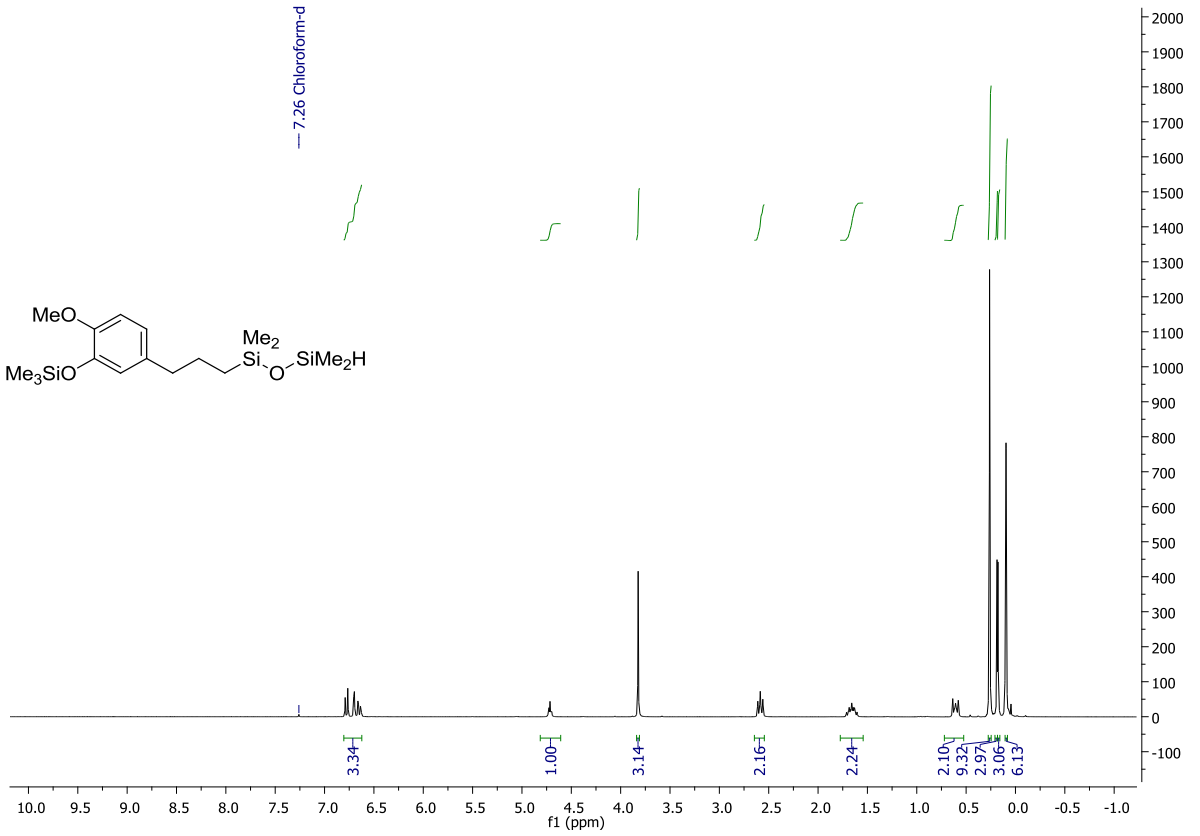


Figure S25. [1]H NMR spectrum of **3e**

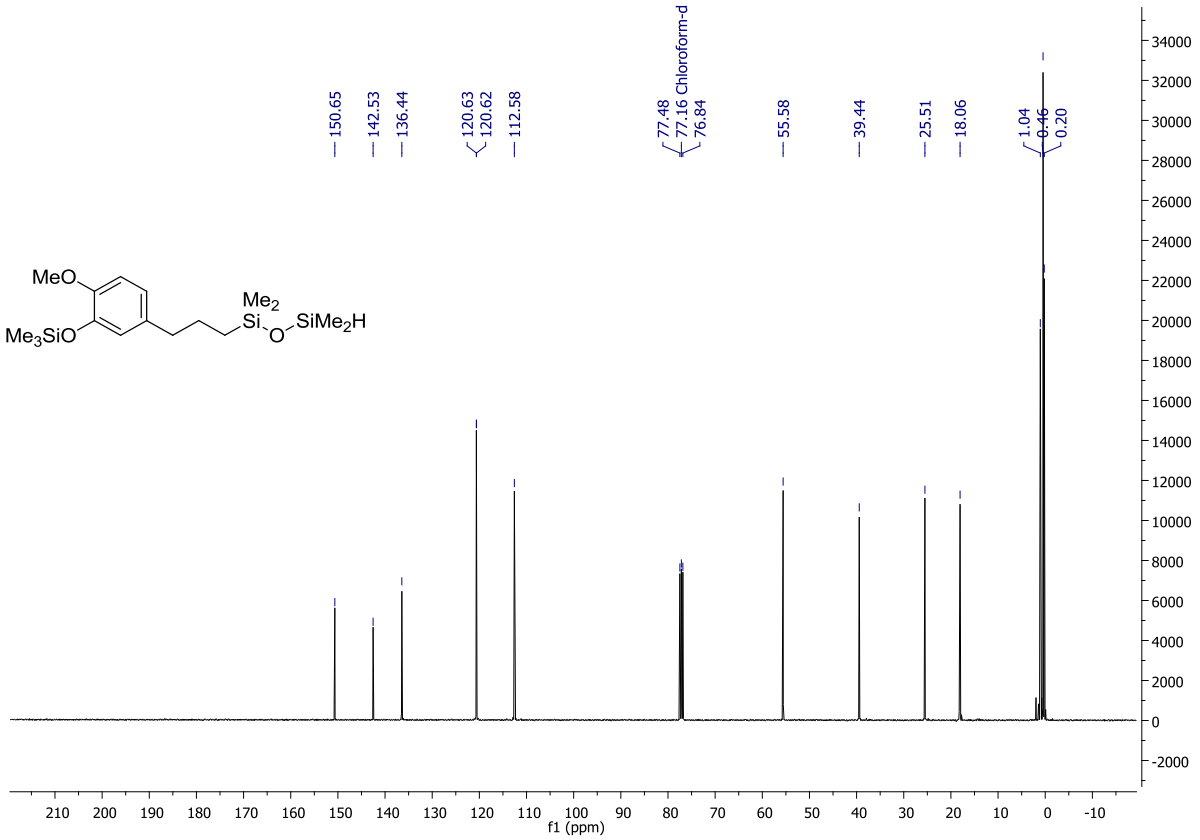


Figure S26. [13]C NMR spectrum of **3e**

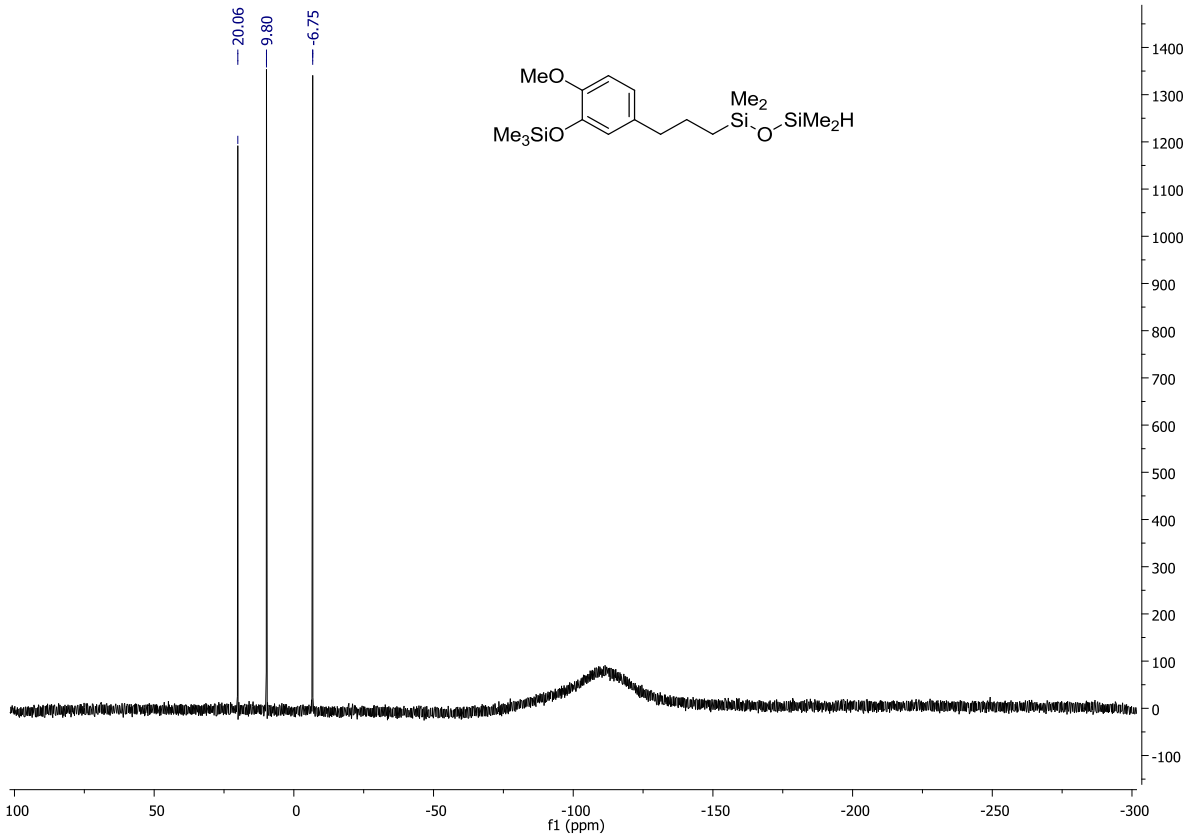


Figure S27. ^{29}Si NMR spectrum of **3e**

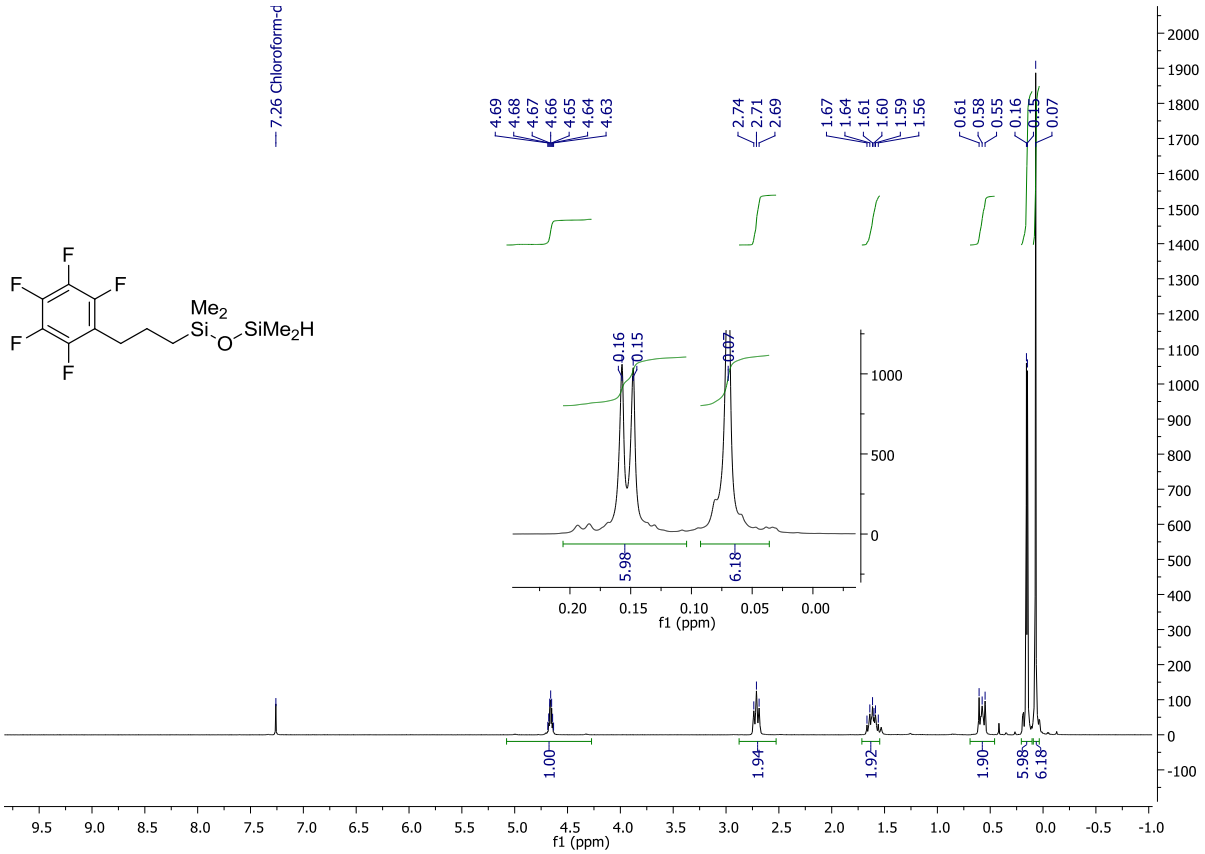


Figure S28. [1]H NMR spectrum of **3f**

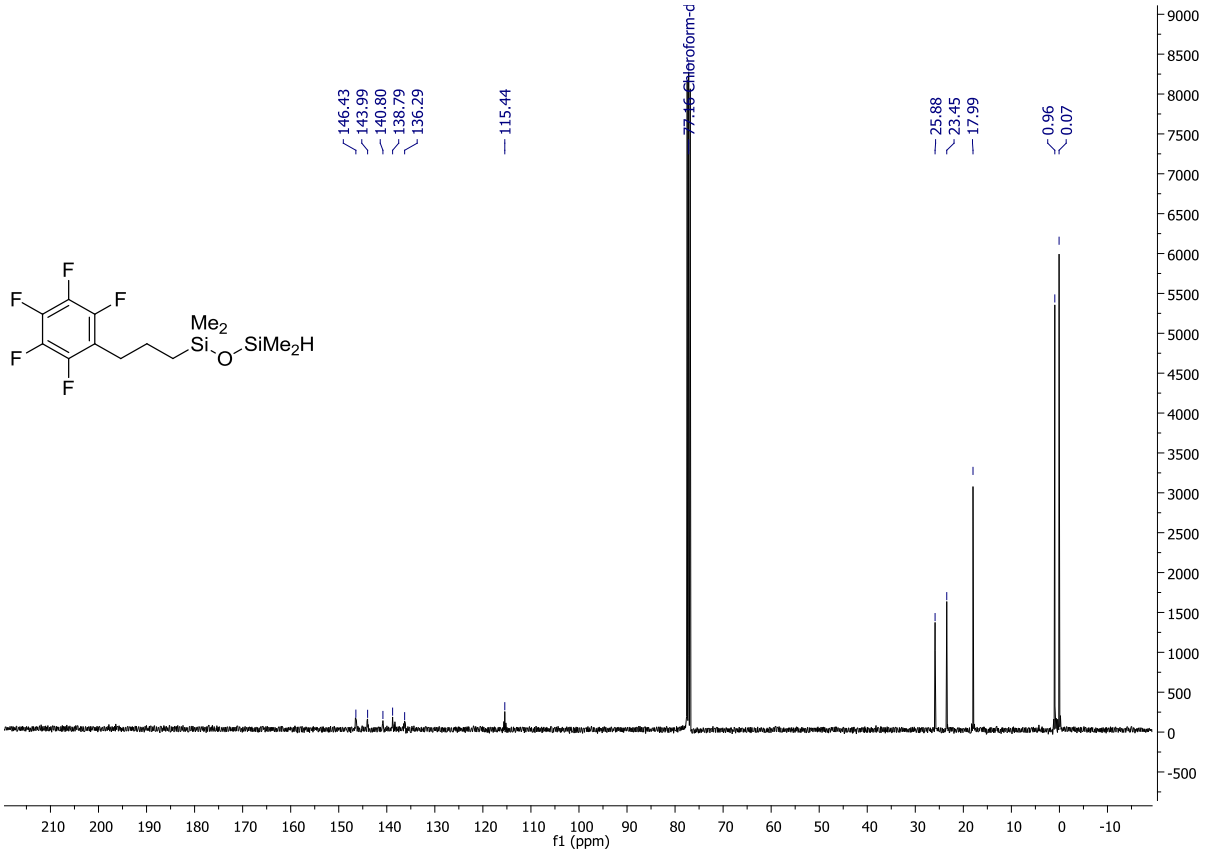


Figure S29. [13]C NMR spectrum of **3f**

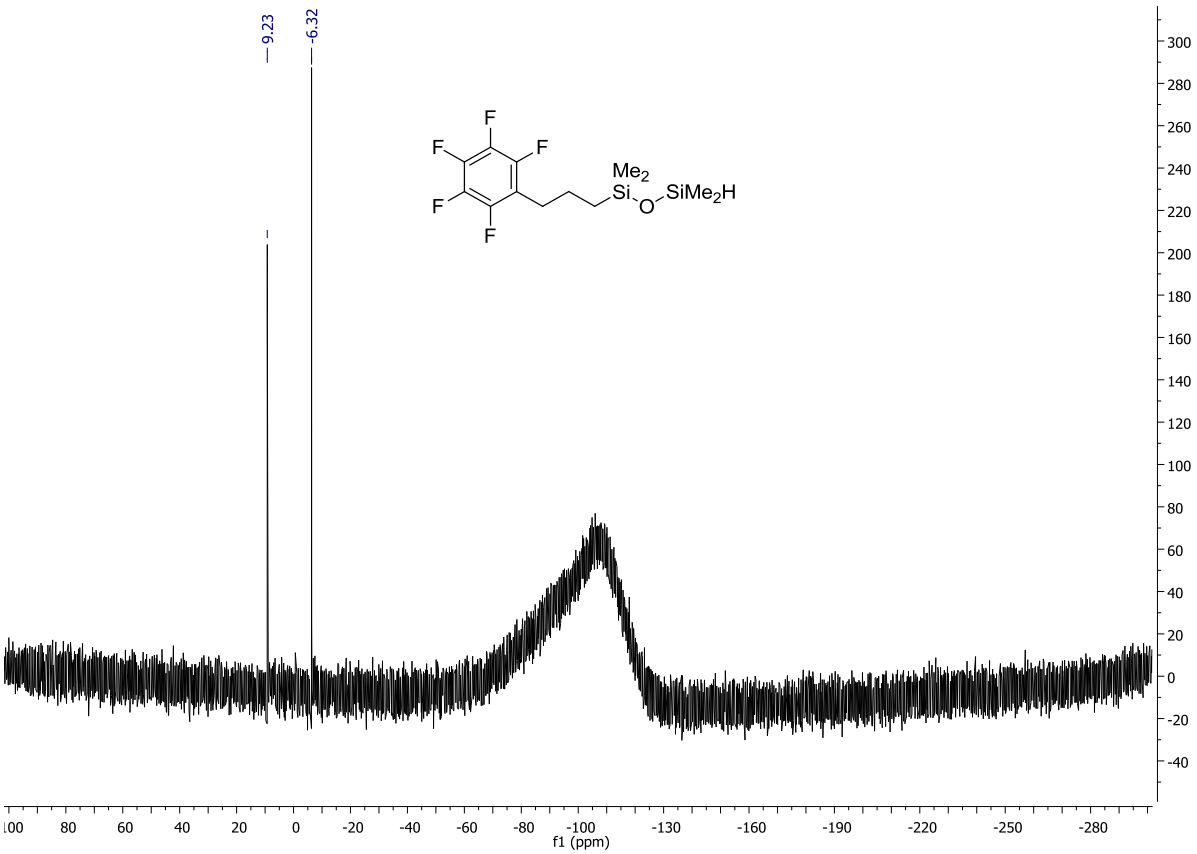


Figure S30. ^{29}Si NMR spectrum of **3f**

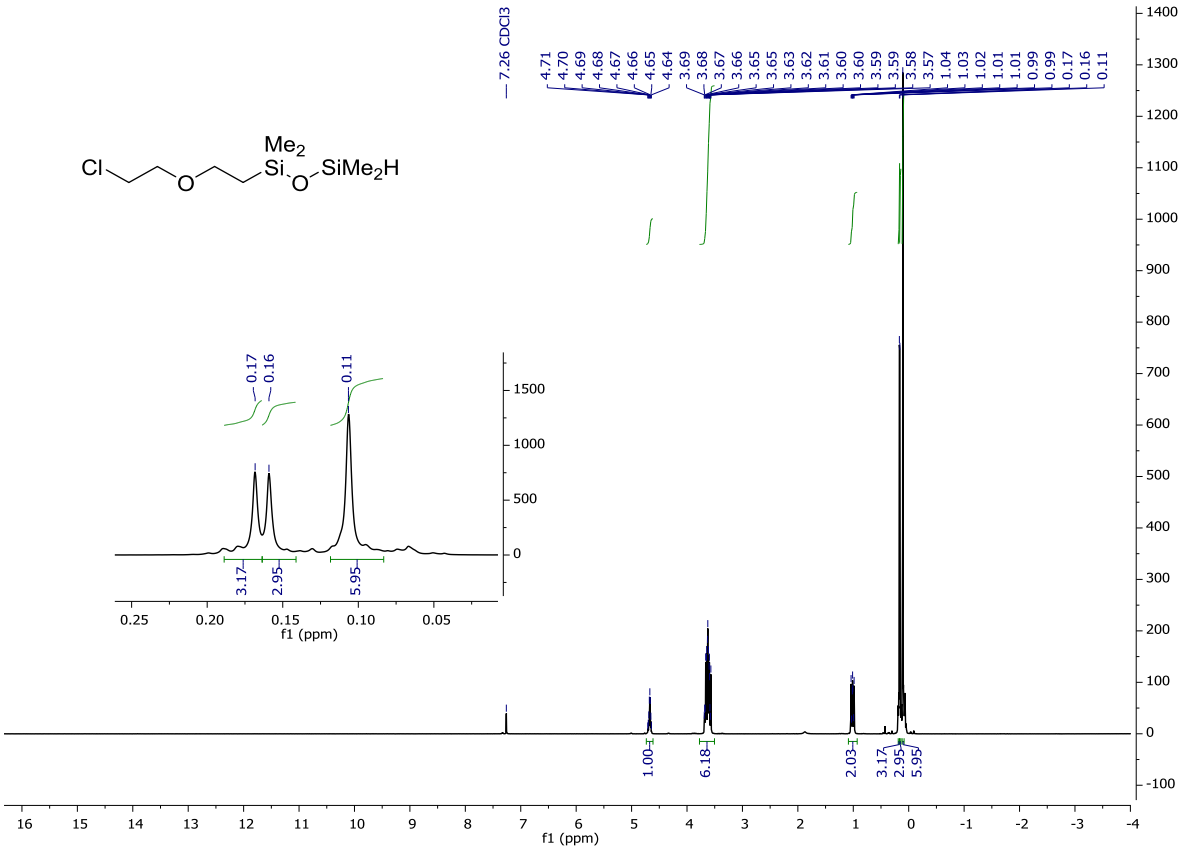


Figure S31. [1]H NMR spectrum of **3g**

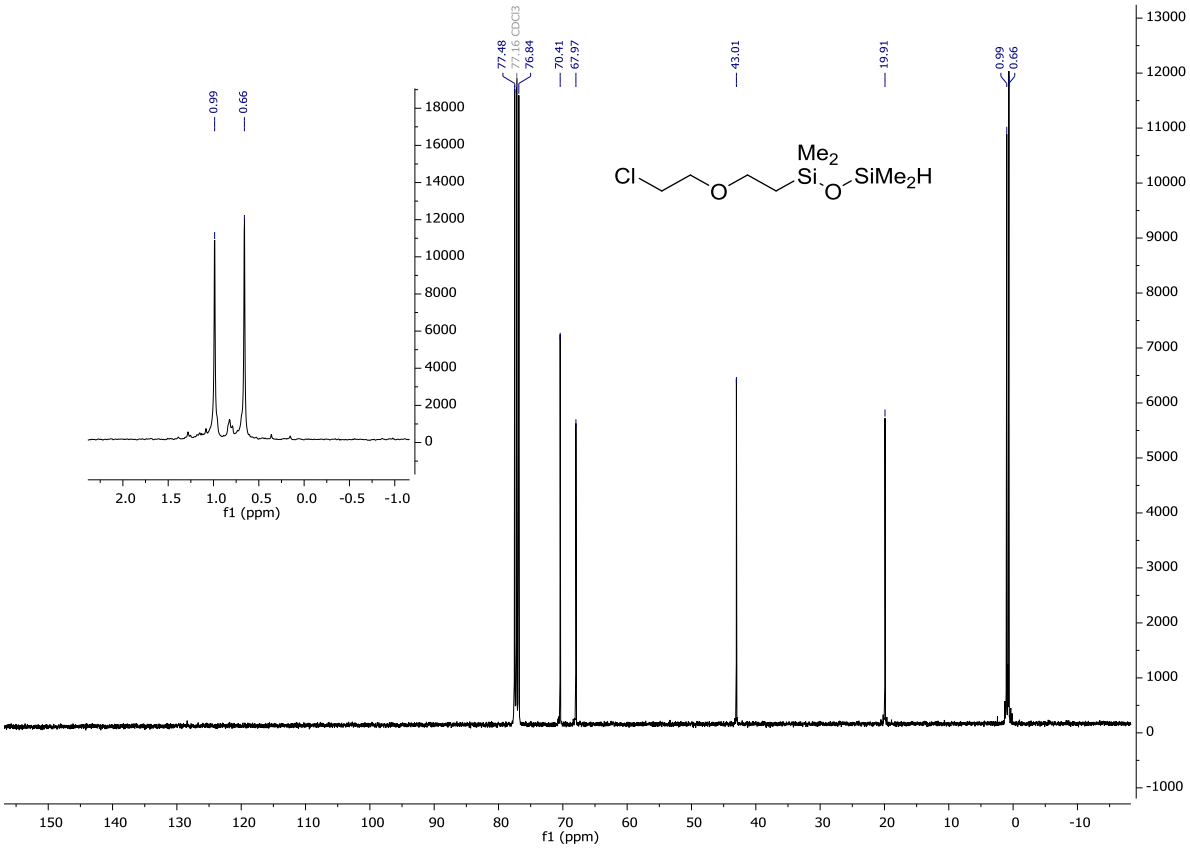


Figure S32. [13]C NMR spectrum of **3g**

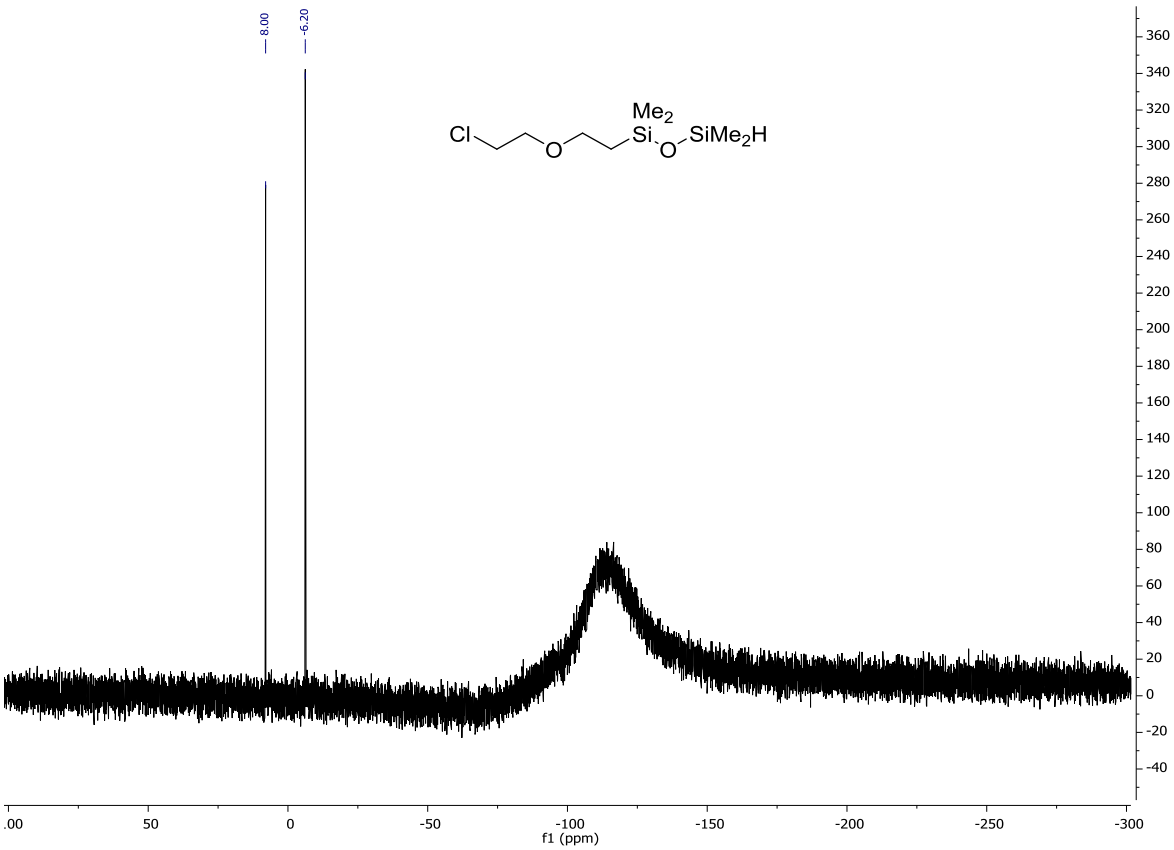


Figure S33. ^{29}Si NMR spectrum of **3g**

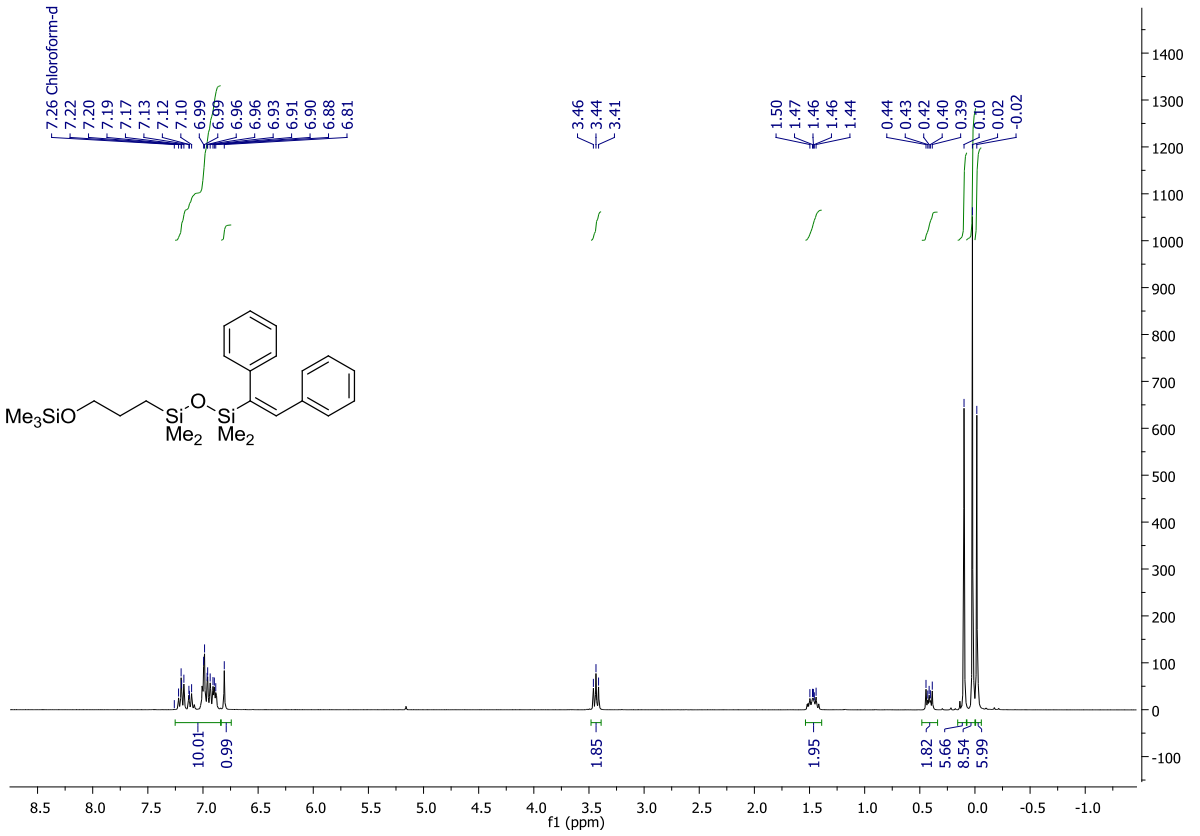


Figure S34. [1]H NMR spectrum of **5aa**

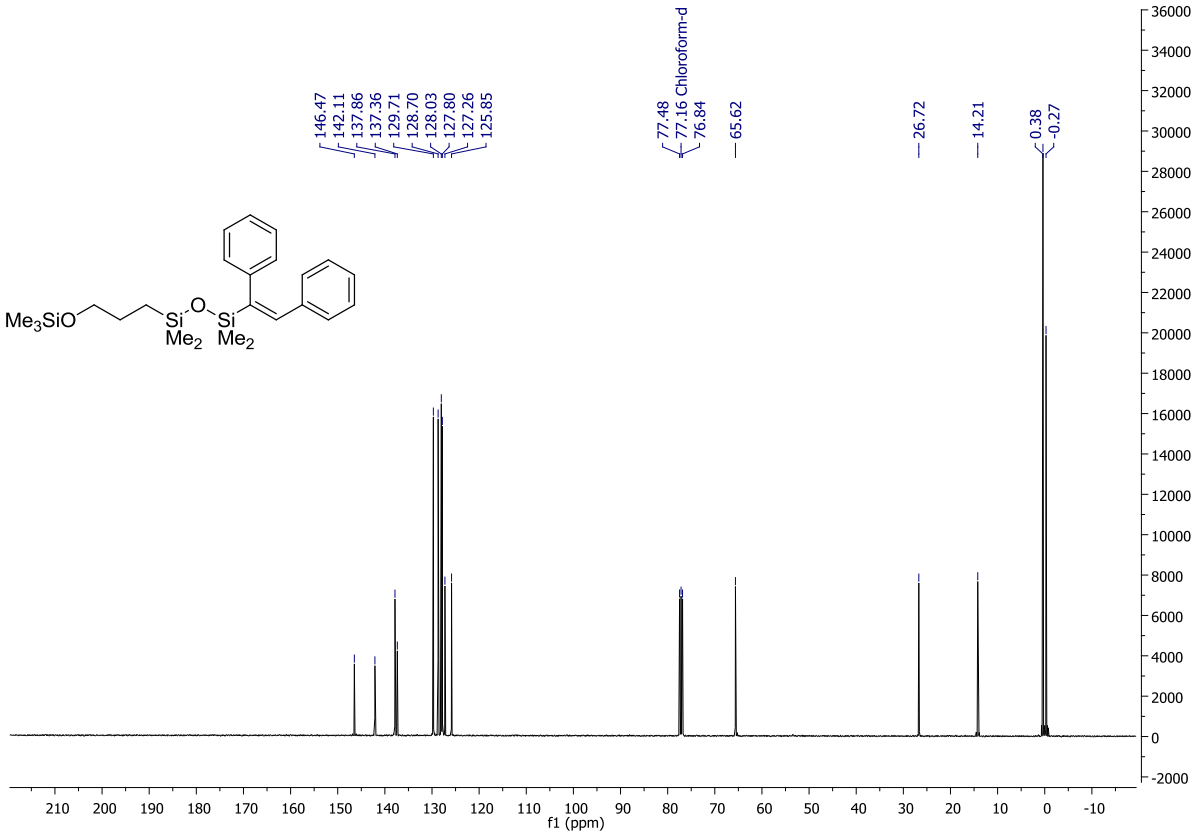


Figure S35. [13]C NMR spectrum of **5aa**

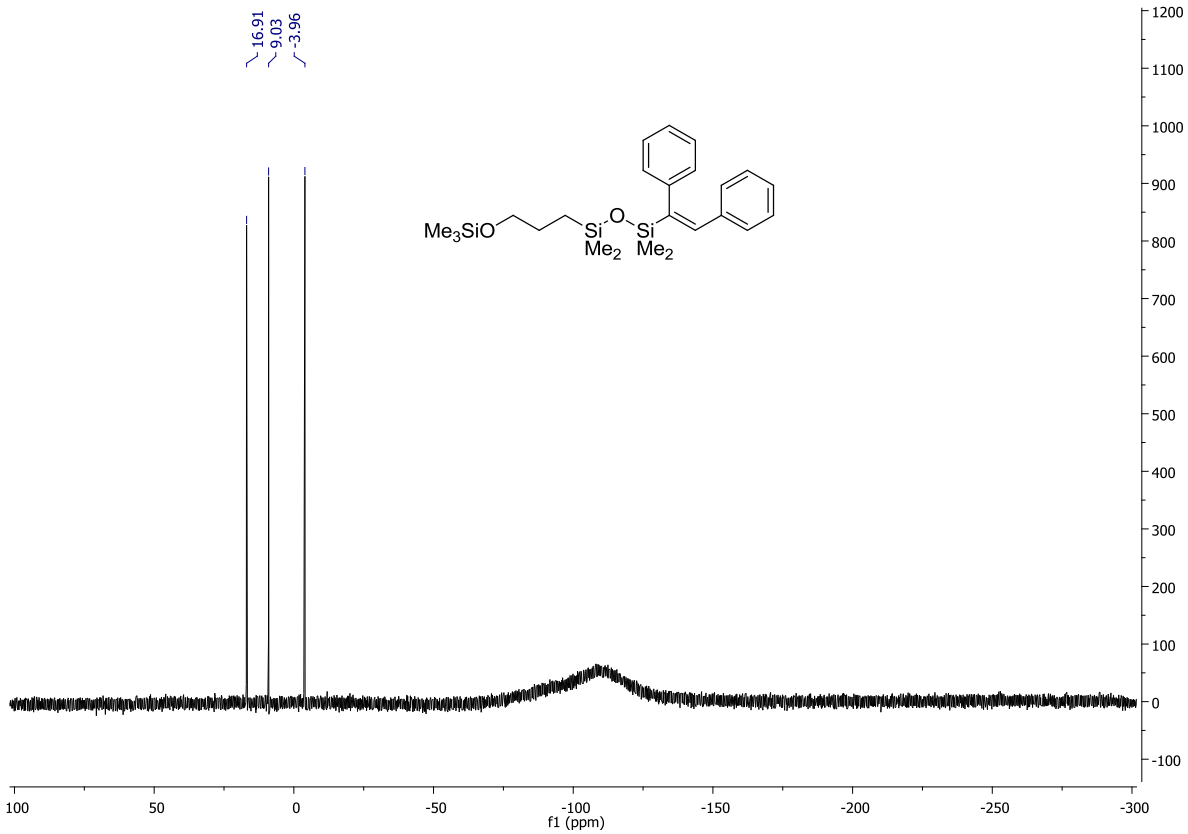


Figure S36. ^{29}Si NMR spectrum of **5aa**

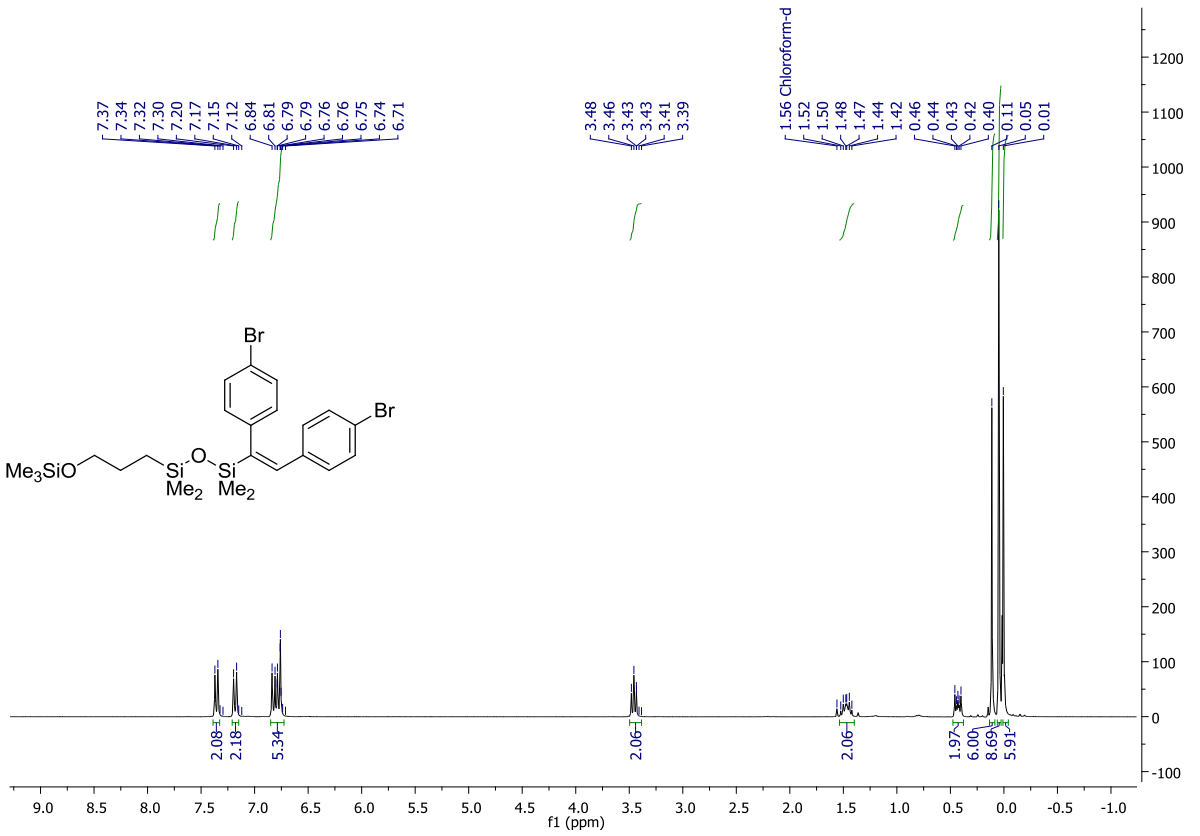


Figure S37. [1]H NMR spectrum of **5ab**

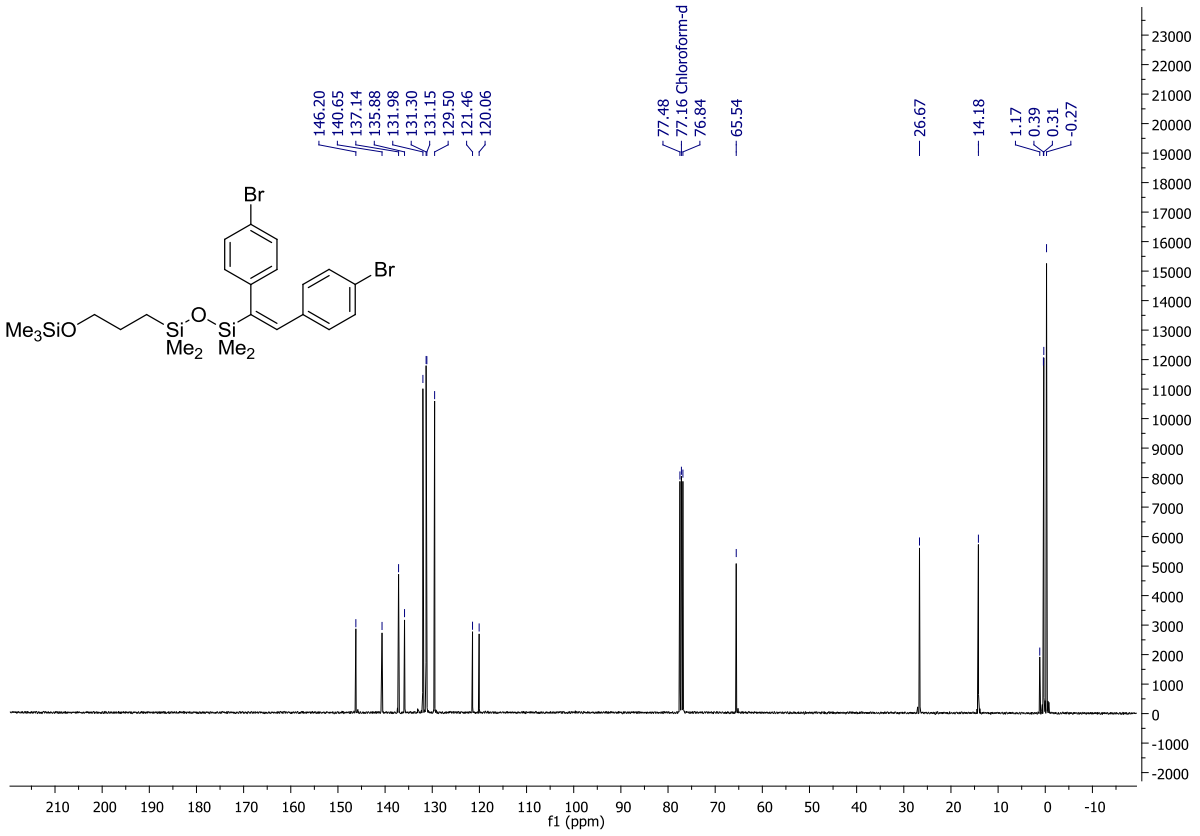


Figure S38. [13]C NMR spectrum of **5ab**

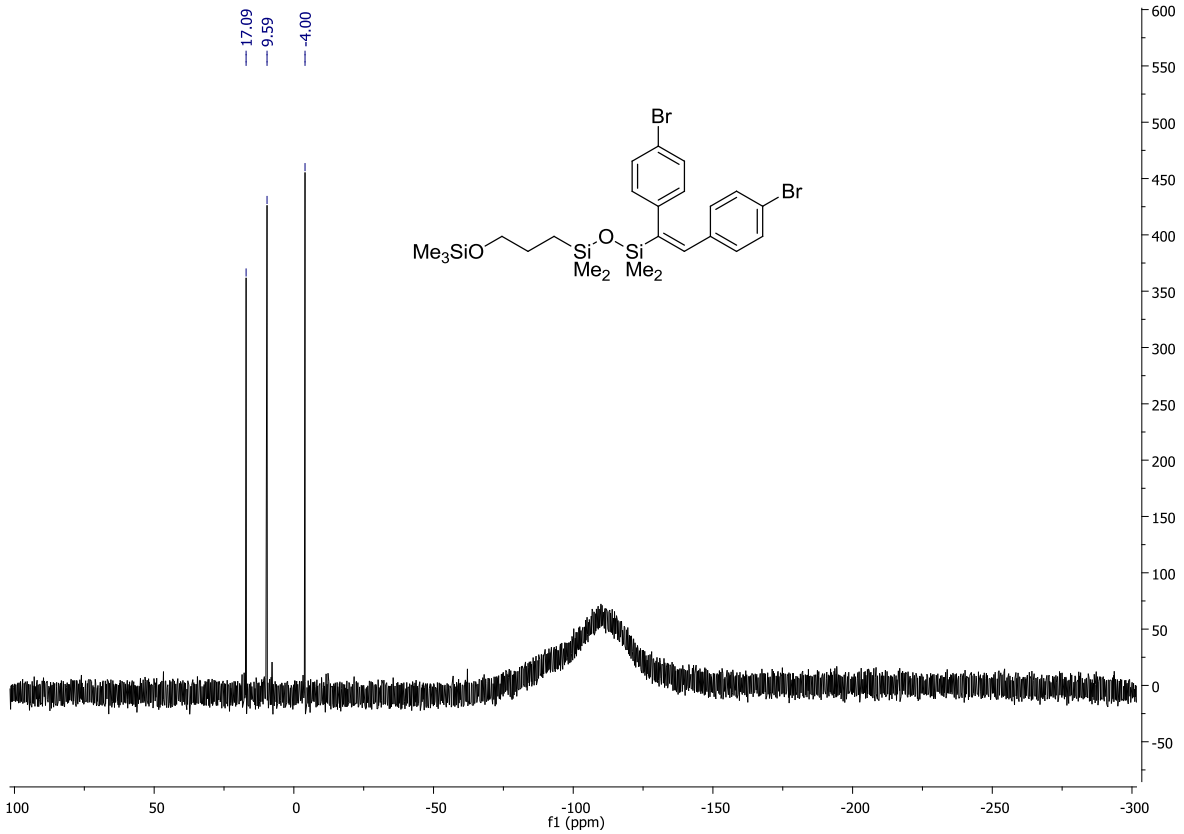


Figure S39. ^{29}Si NMR spectrum of **5ab**

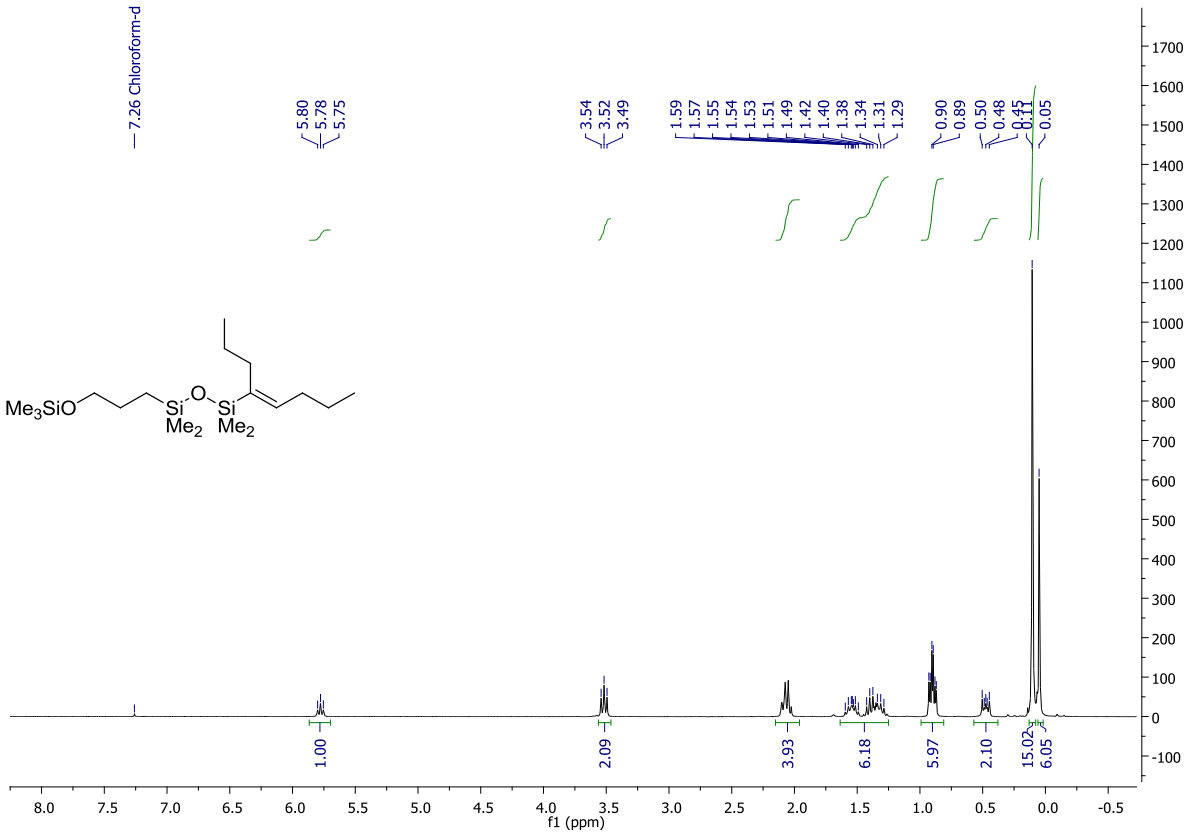


Figure S40. [1]H NMR spectrum of **5ac**

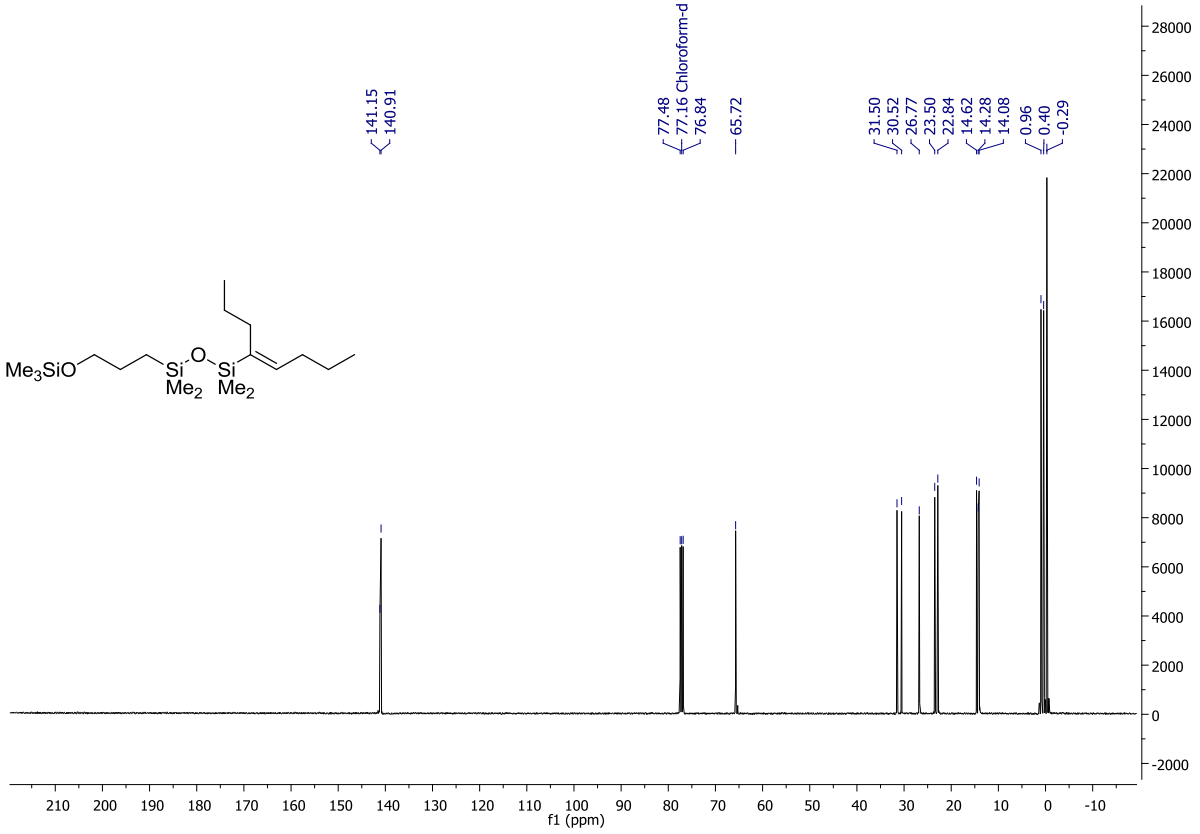


Figure S41. [13]C NMR spectrum of **5ac**

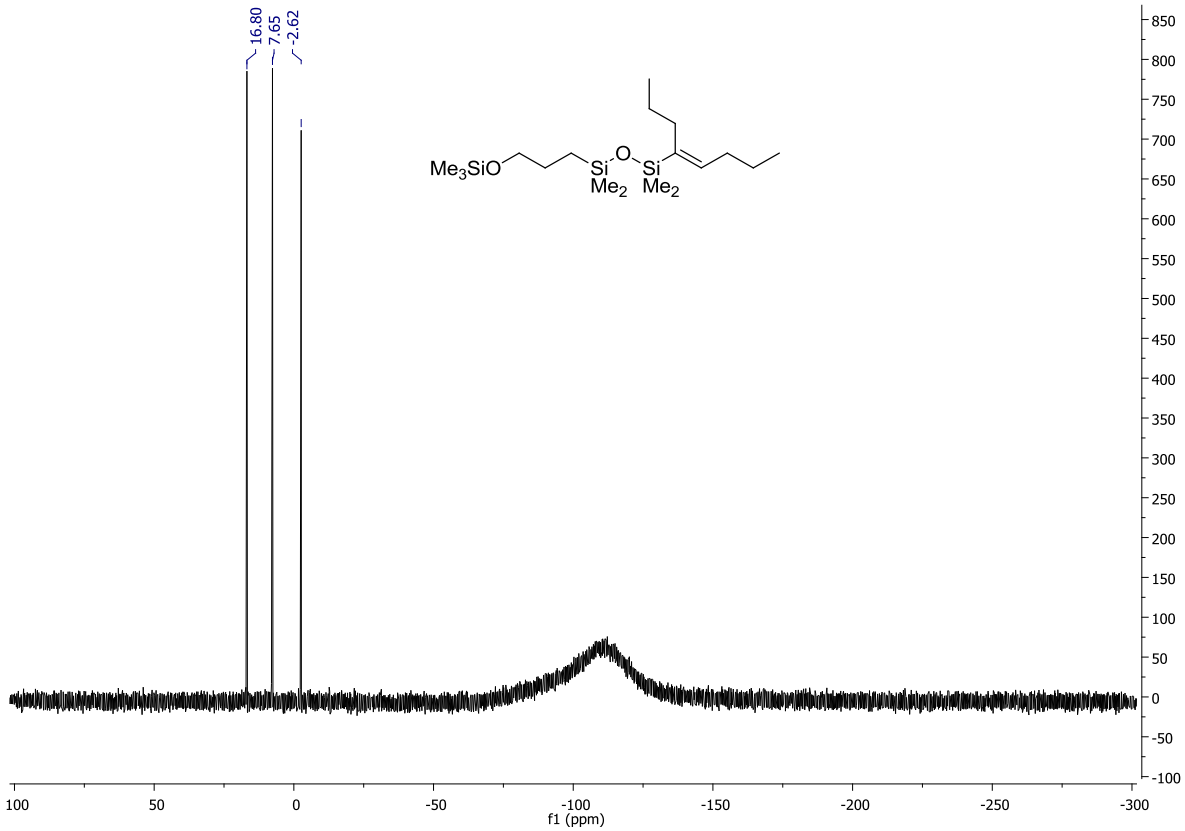


Figure S42. ^{29}Si NMR spectrum of **5ac**

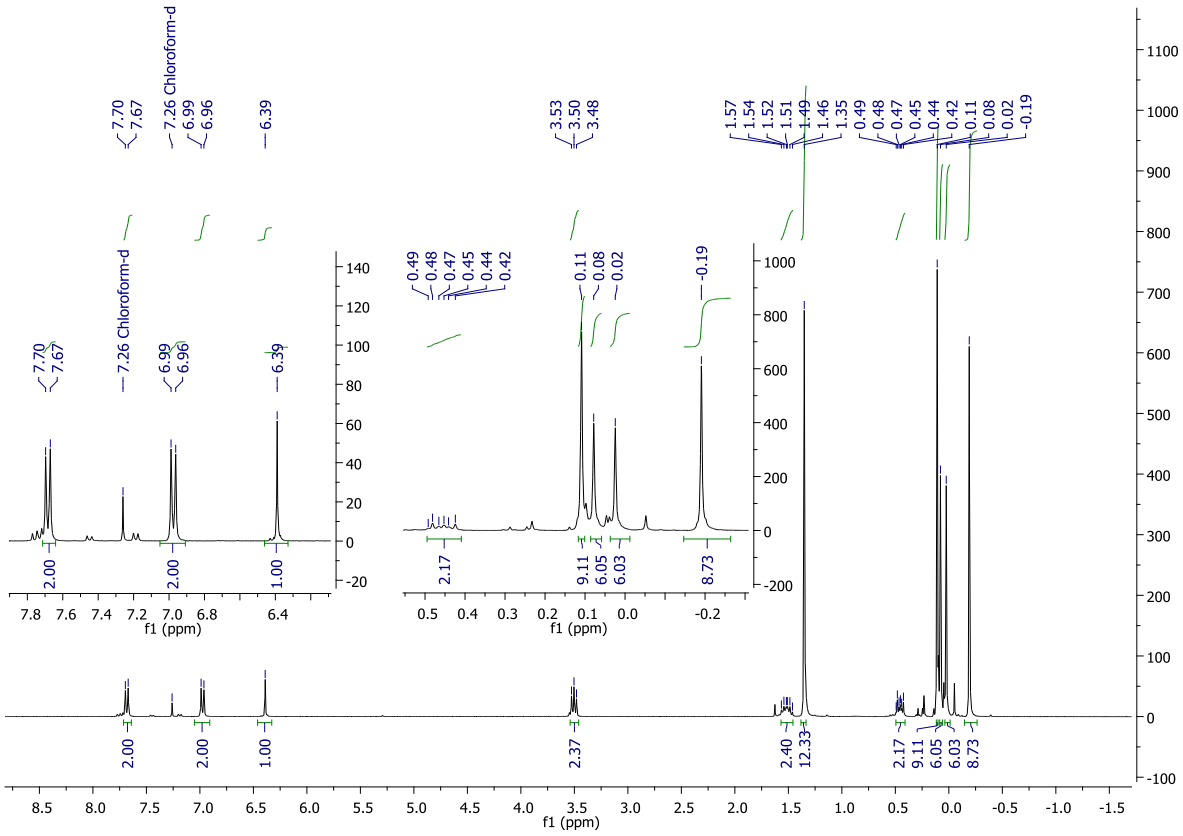


Figure S43. [1]H NMR spectrum of **5ad**

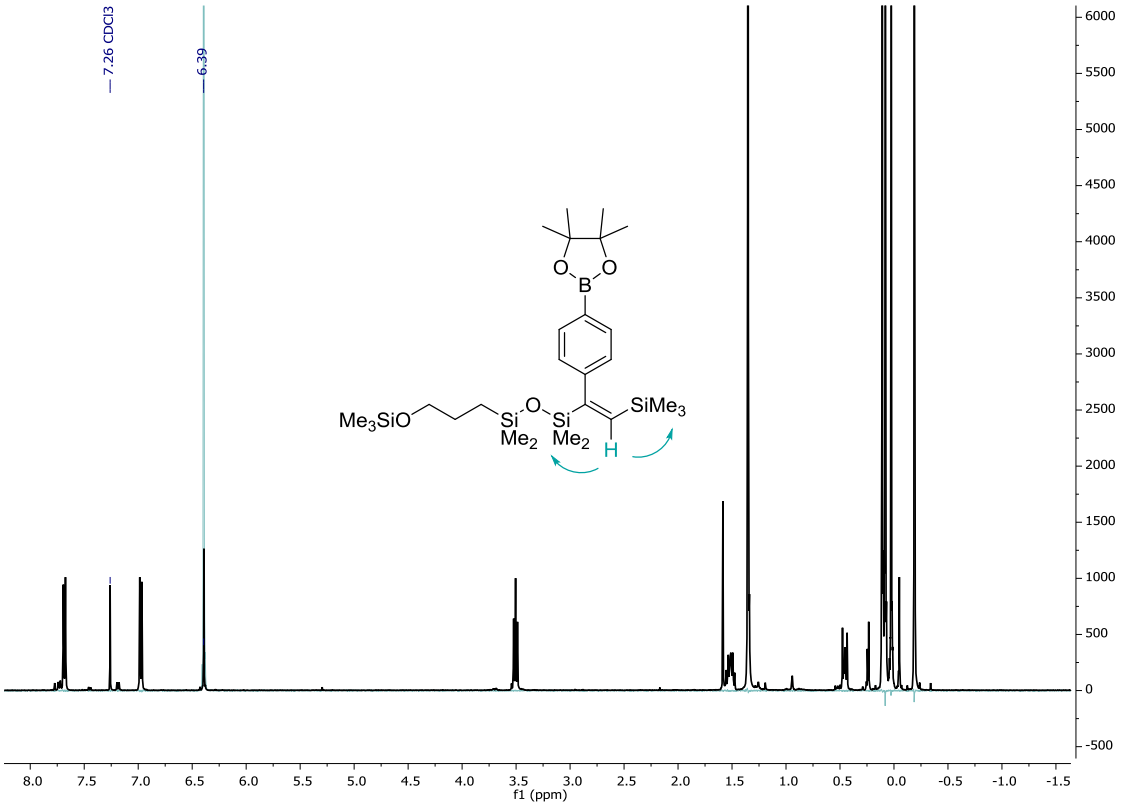


Figure S44. 1D selectivegradient NOESY of **5ad** directed at alkenyl proton at 6.39 ppm.

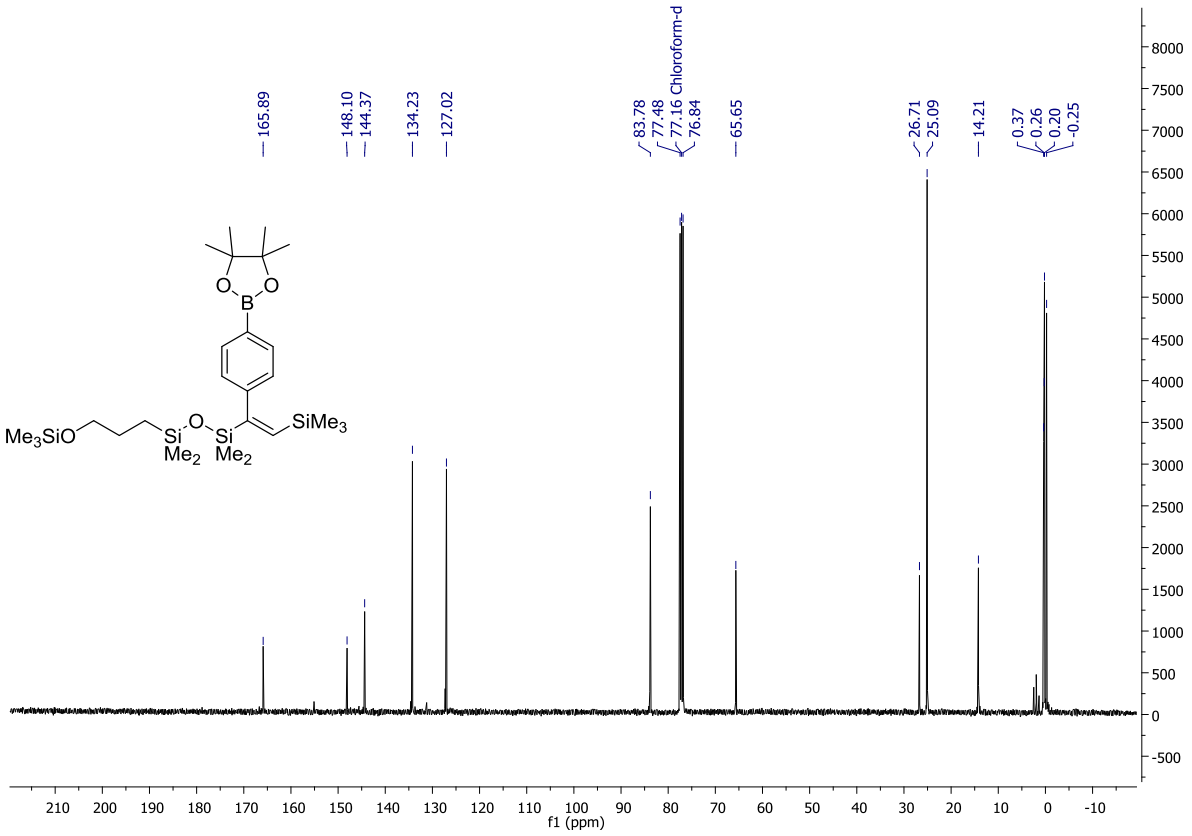


Figure S45. ^{13}C NMR spectrum of **5ad**

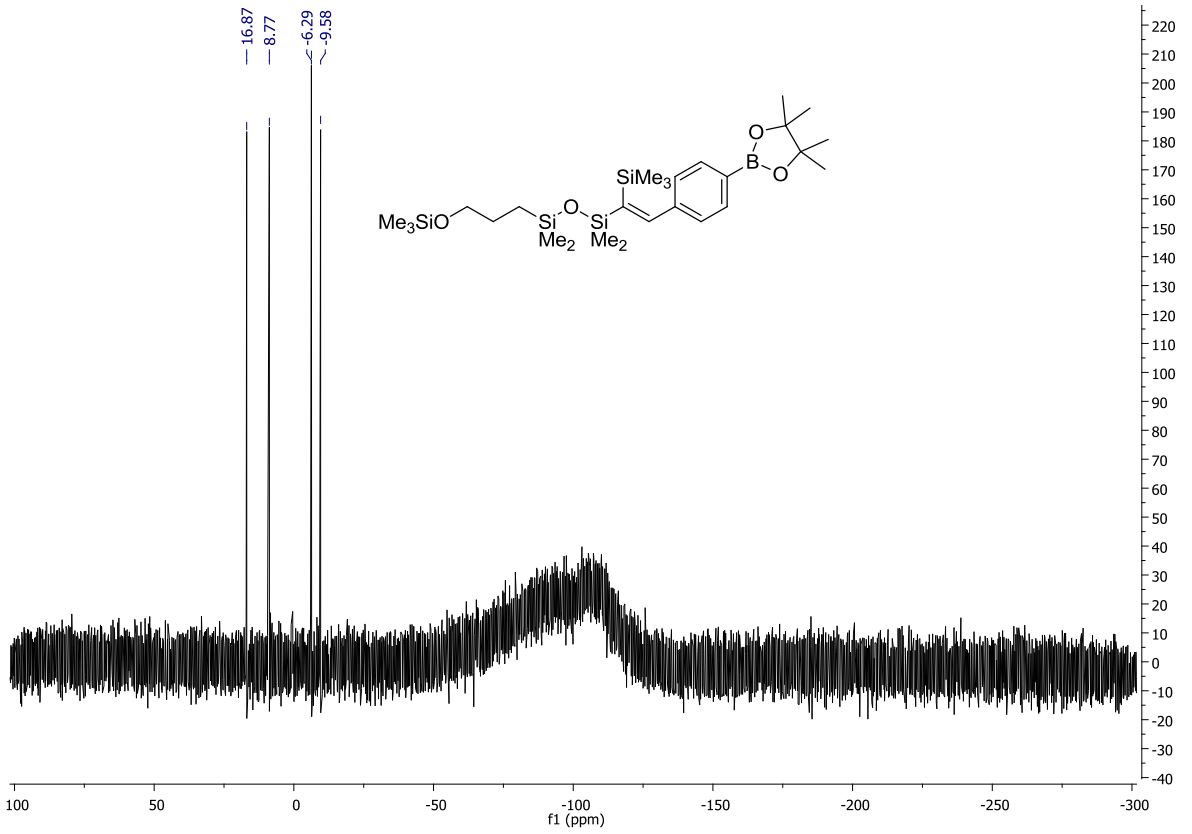


Figure S46. ^{29}Si NMR spectrum of **5ad**

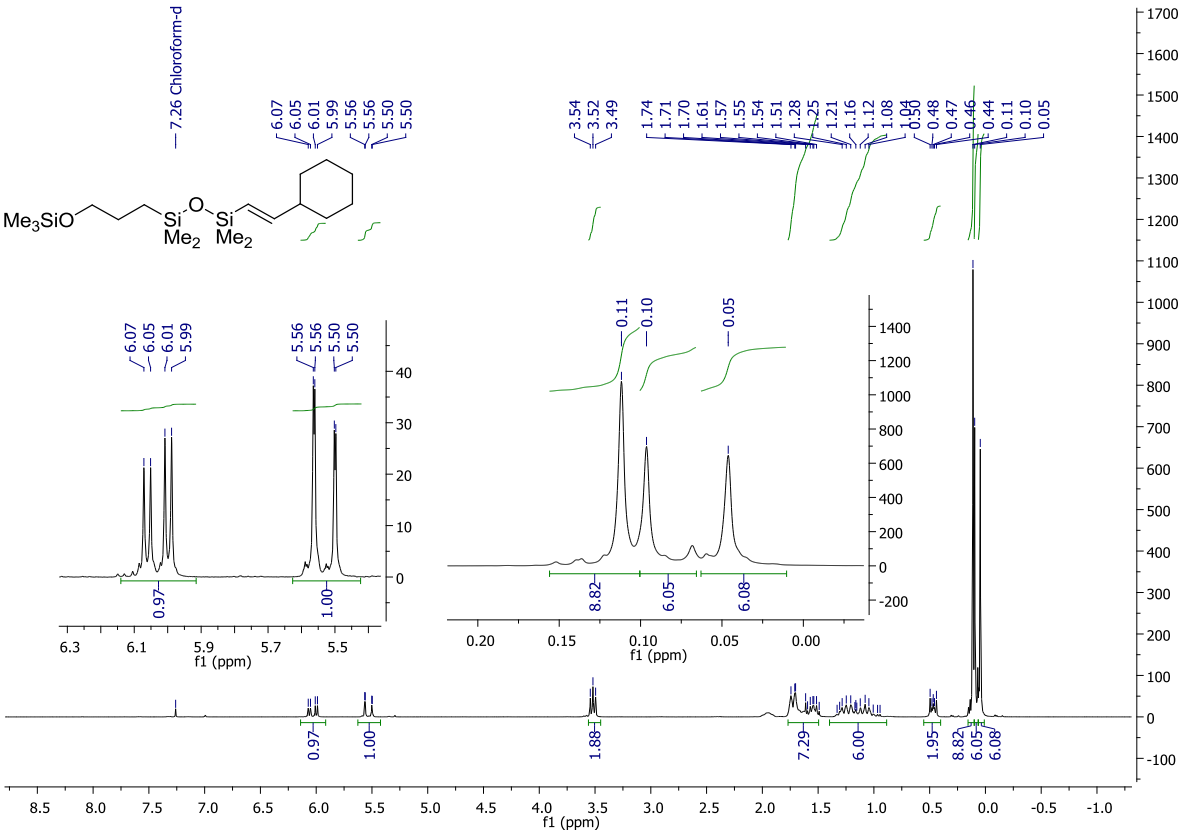


Figure S47. ^{1}H NMR spectrum of **5ae**

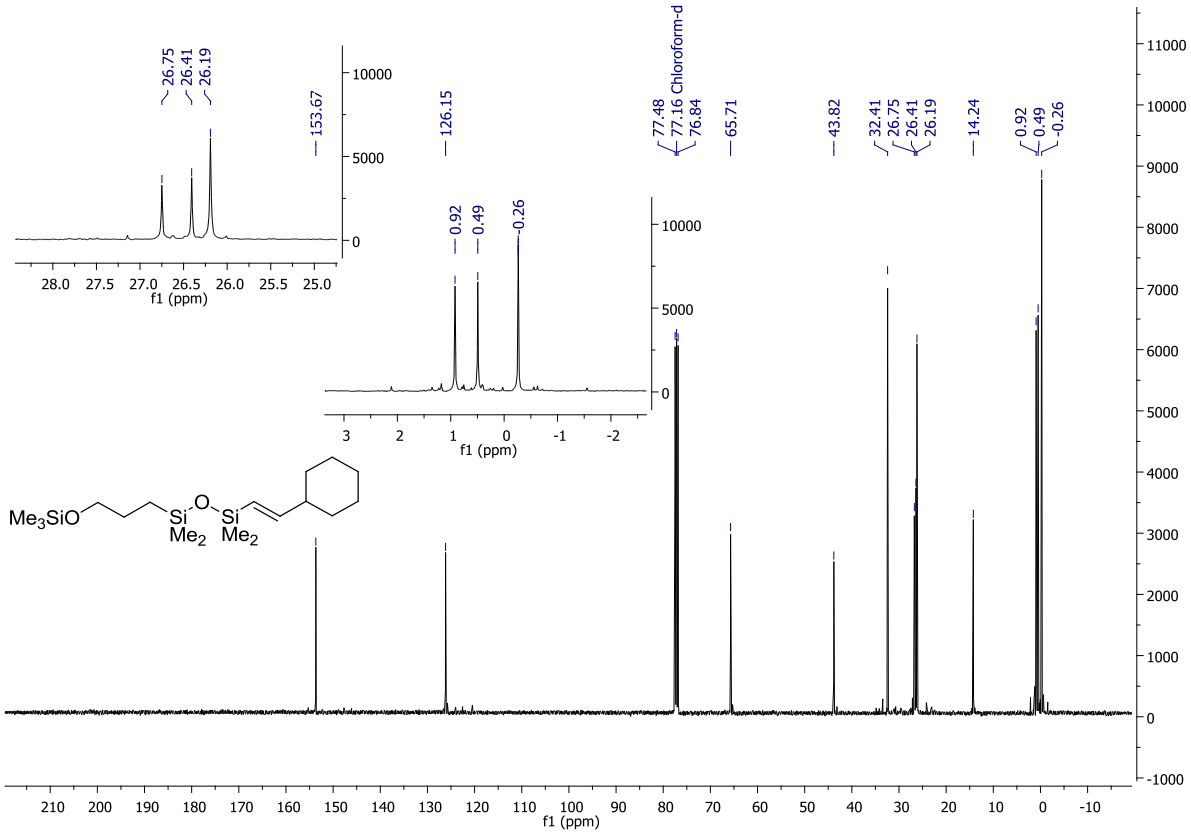


Figure S48. ^{13}C NMR spectrum of **5ae**

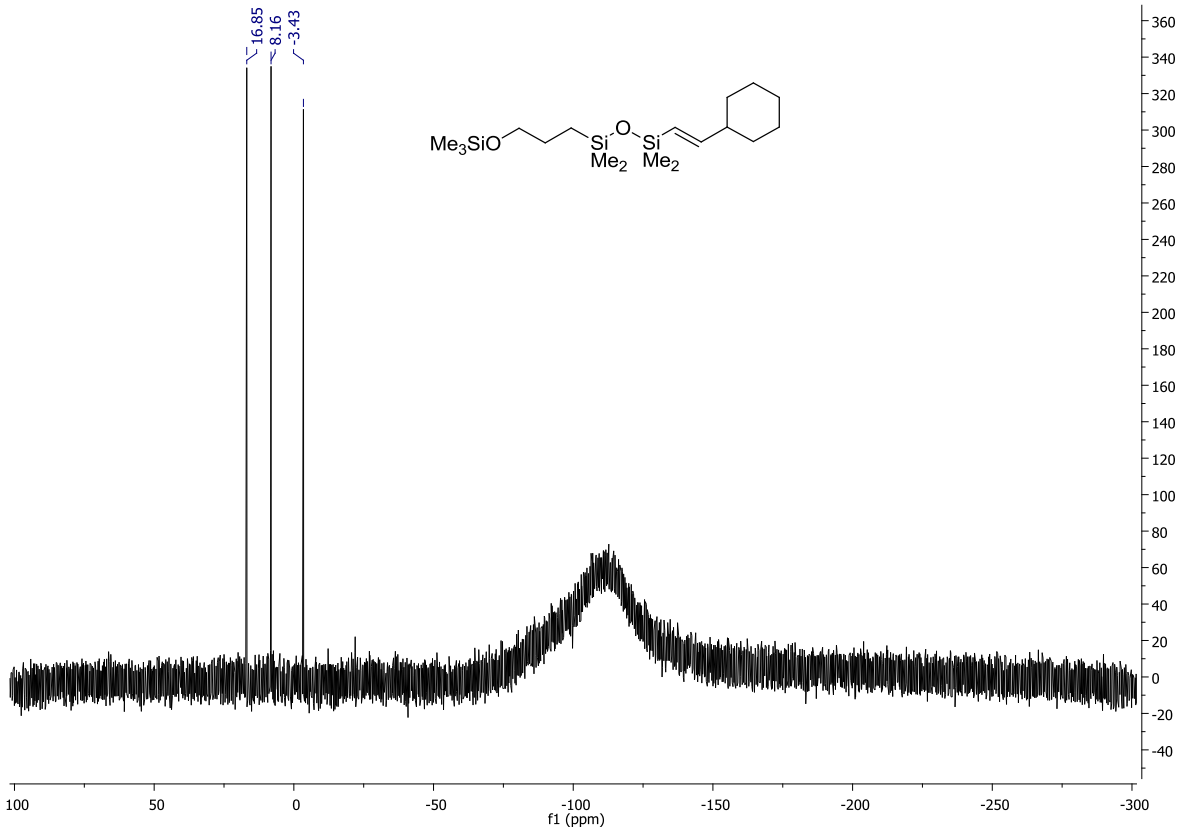


Figure S49. ^{29}Si NMR spectrum of **5ae**

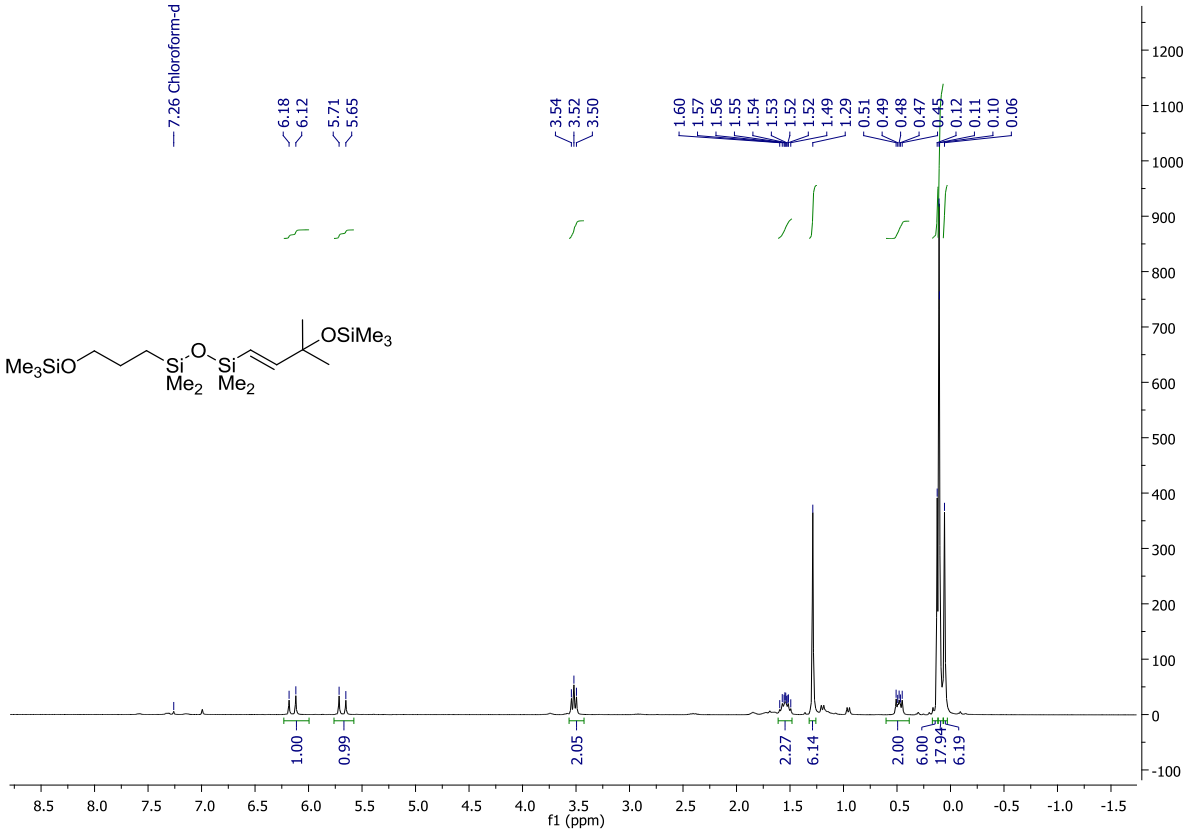


Figure S50. [1]H NMR spectrum of **5af**

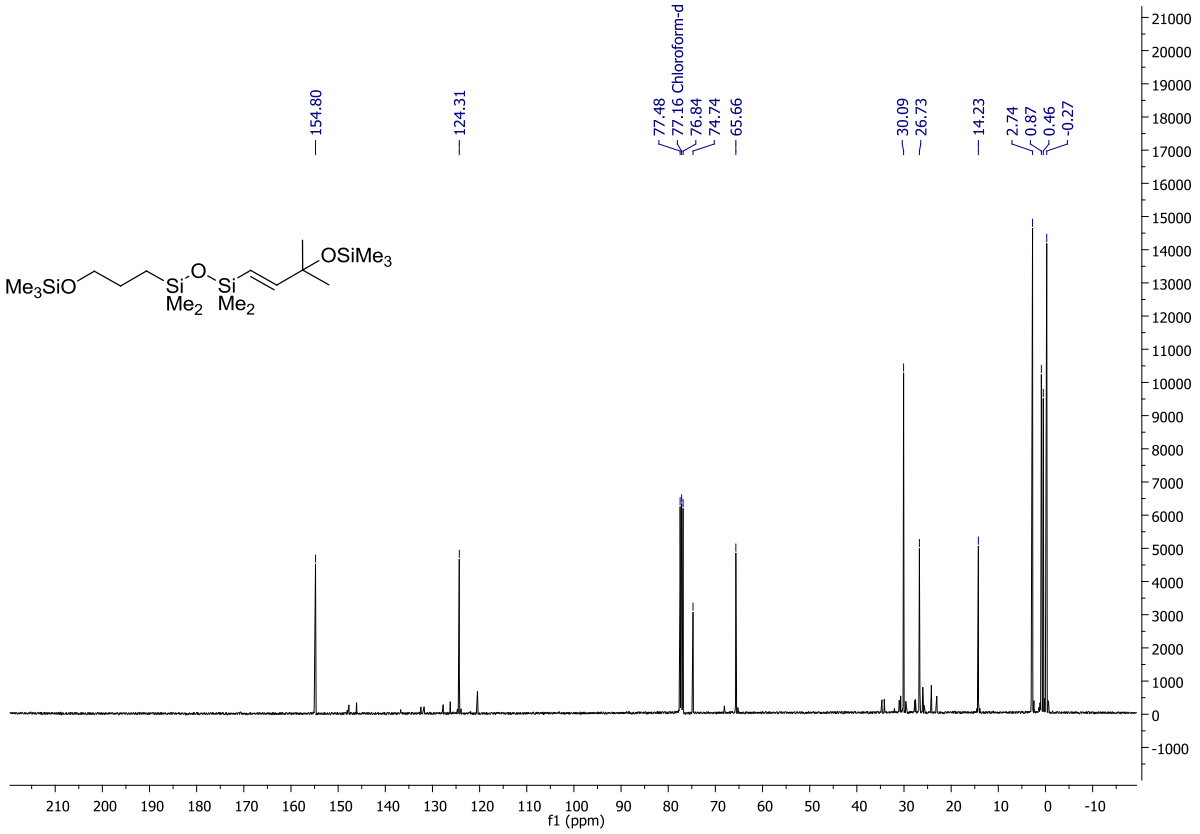


Figure S51. [13]C NMR spectrum of **5af**

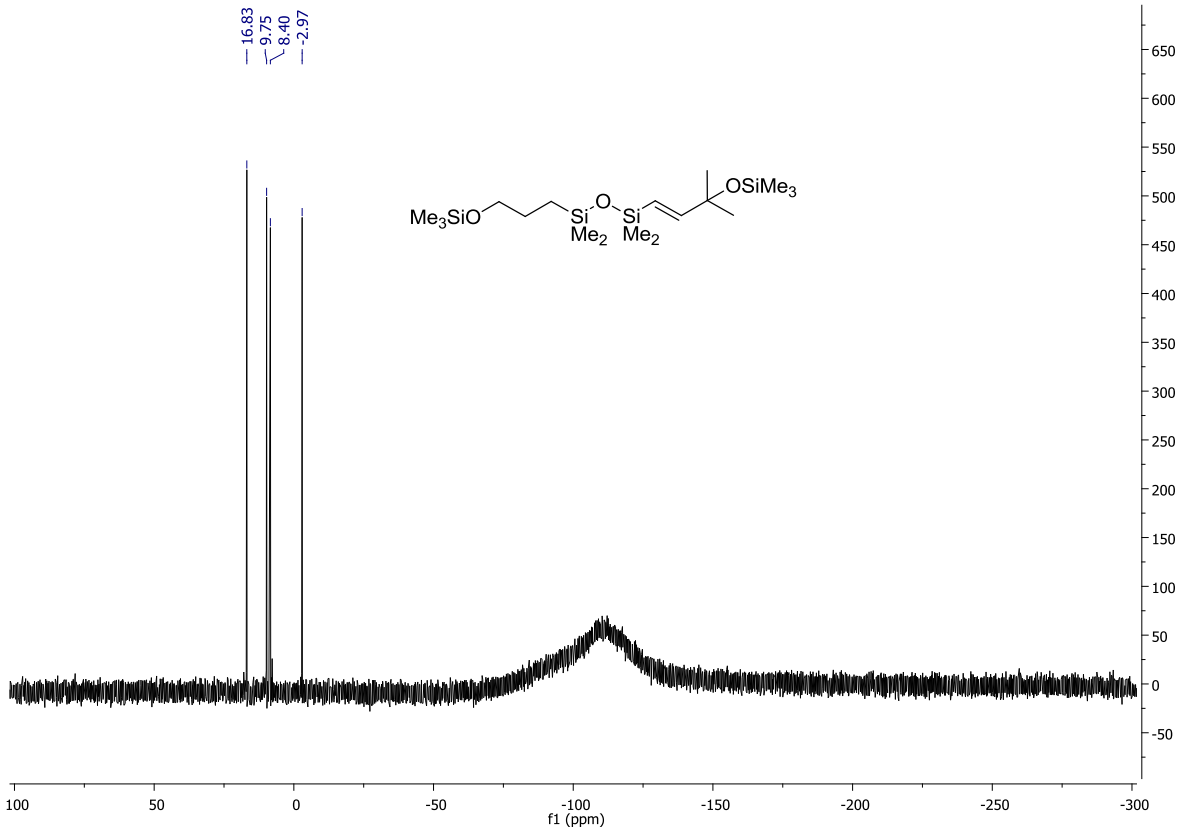


Figure S52. ^{29}Si NMR spectrum of **5af**

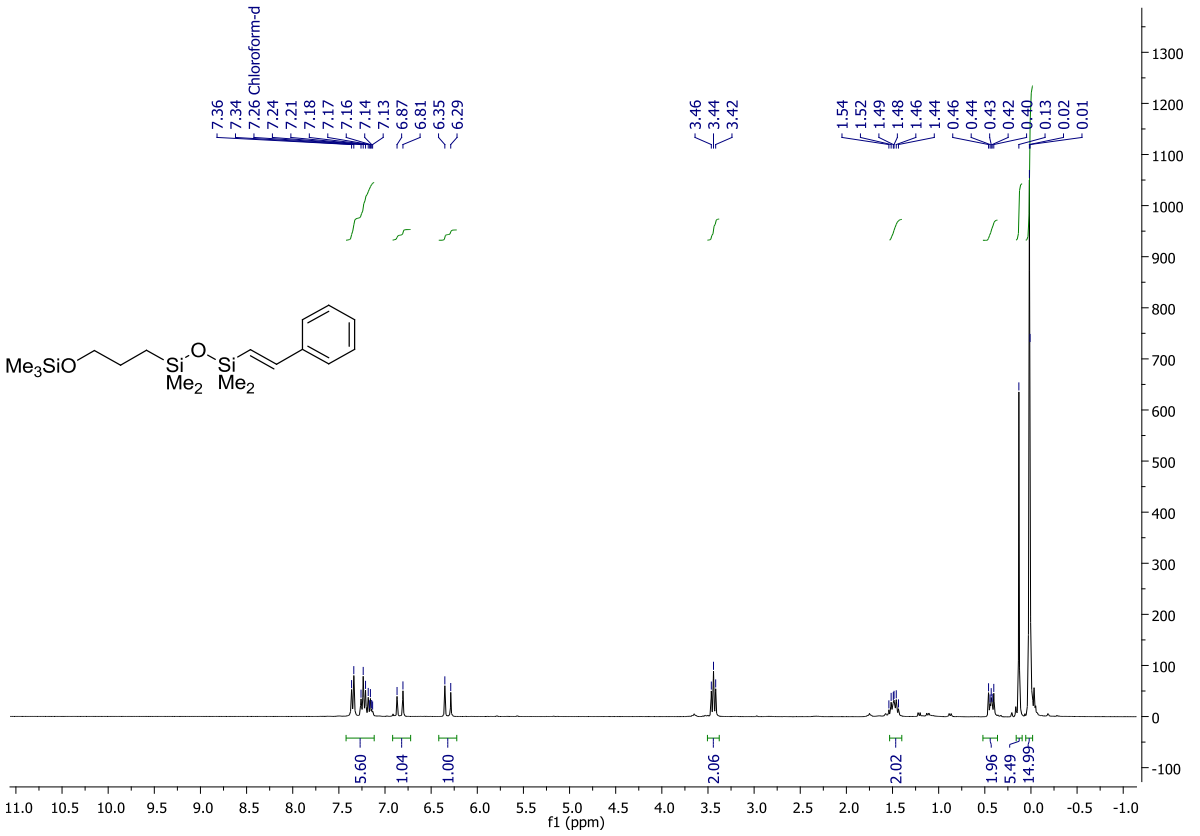


Figure S53. [1]H NMR spectrum of **5ag**

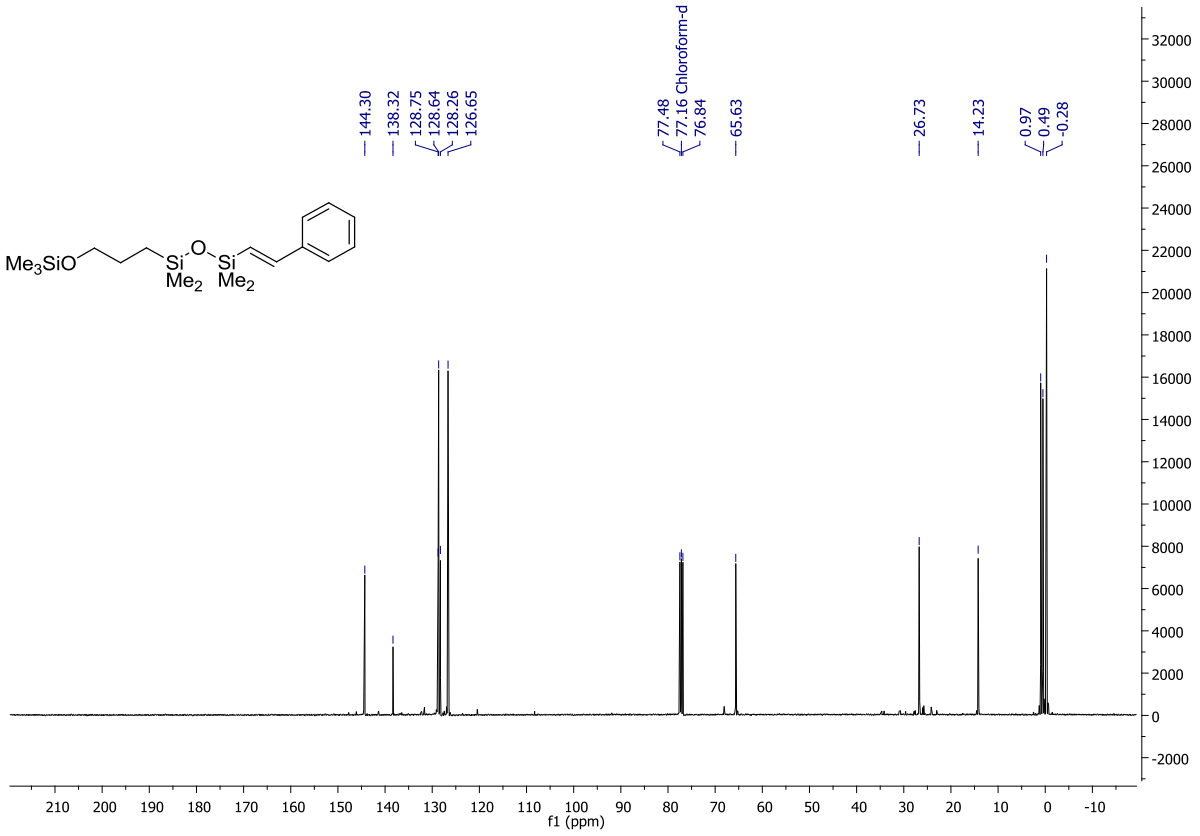


Figure S54. [13]C NMR spectrum of **5ag**

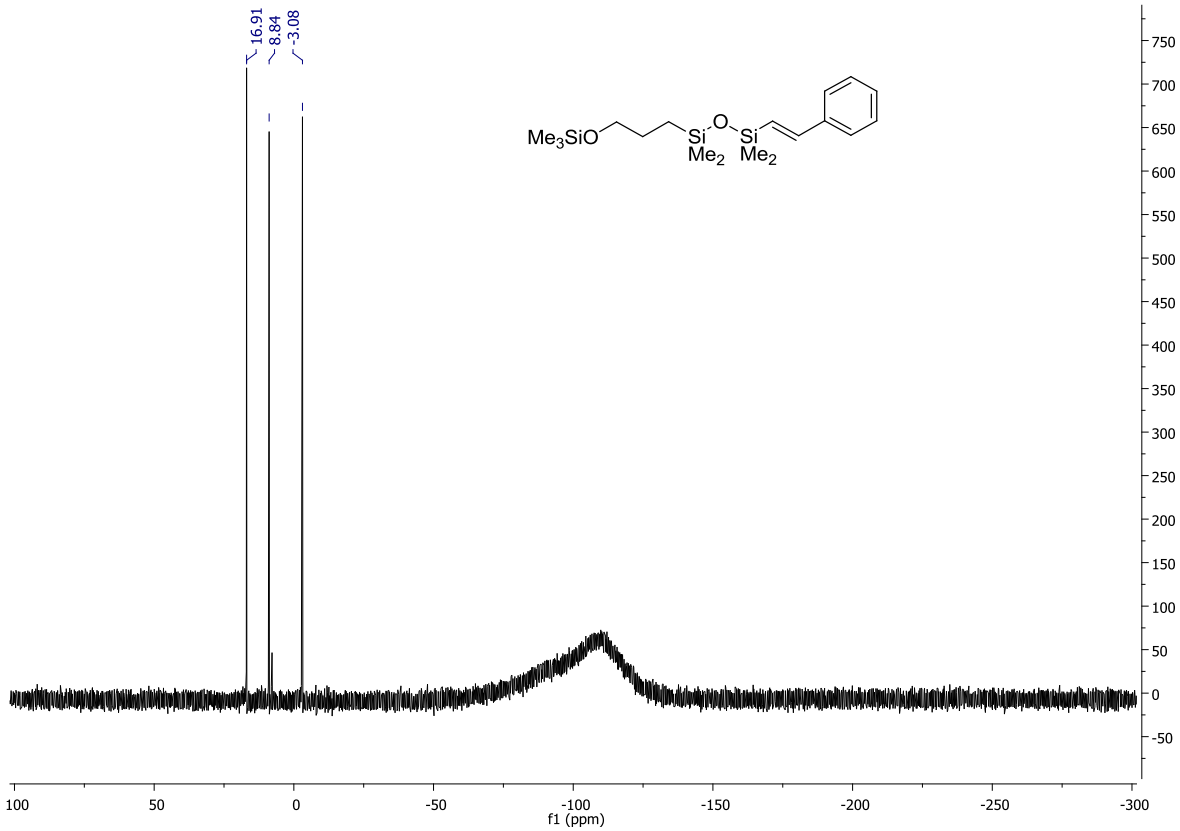


Figure S55. ^{29}Si NMR spectrum of **5ag**

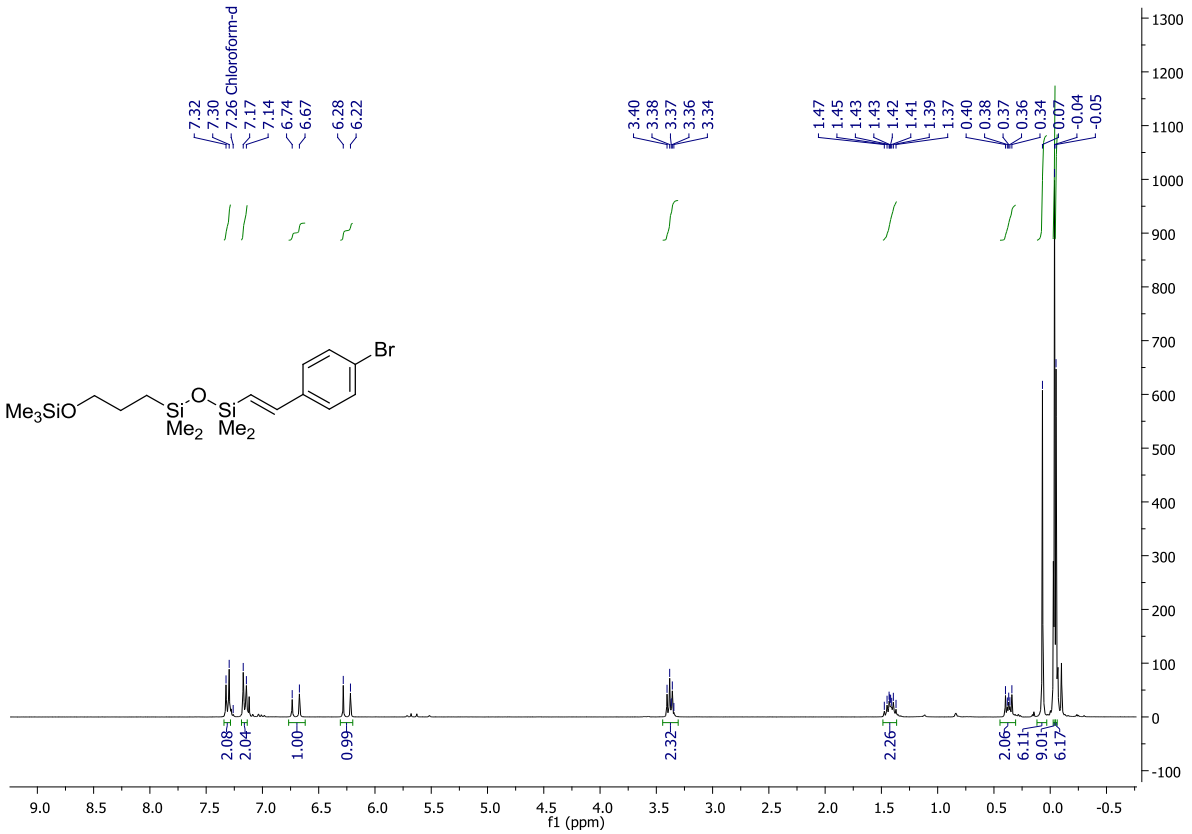


Figure S56. [1]H NMR spectrum of **5ah**

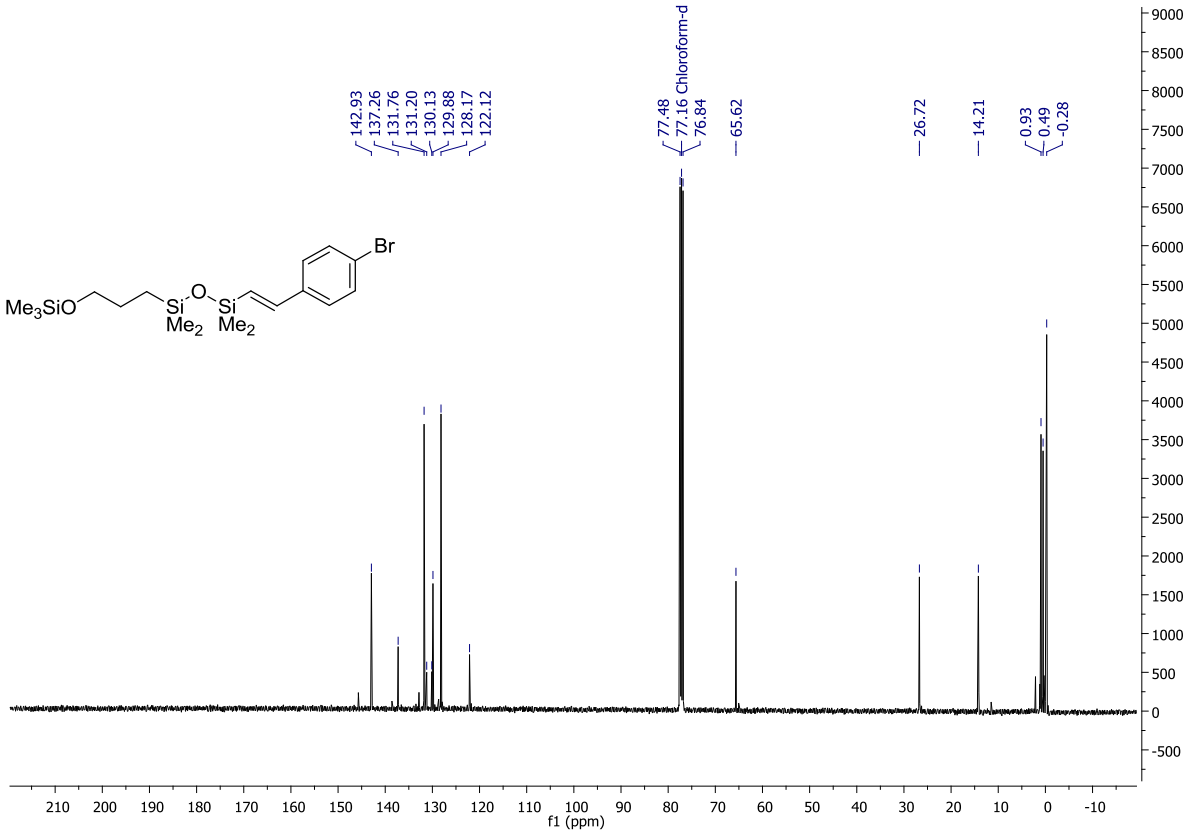


Figure S57. [13]C NMR spectrum of **5ah**

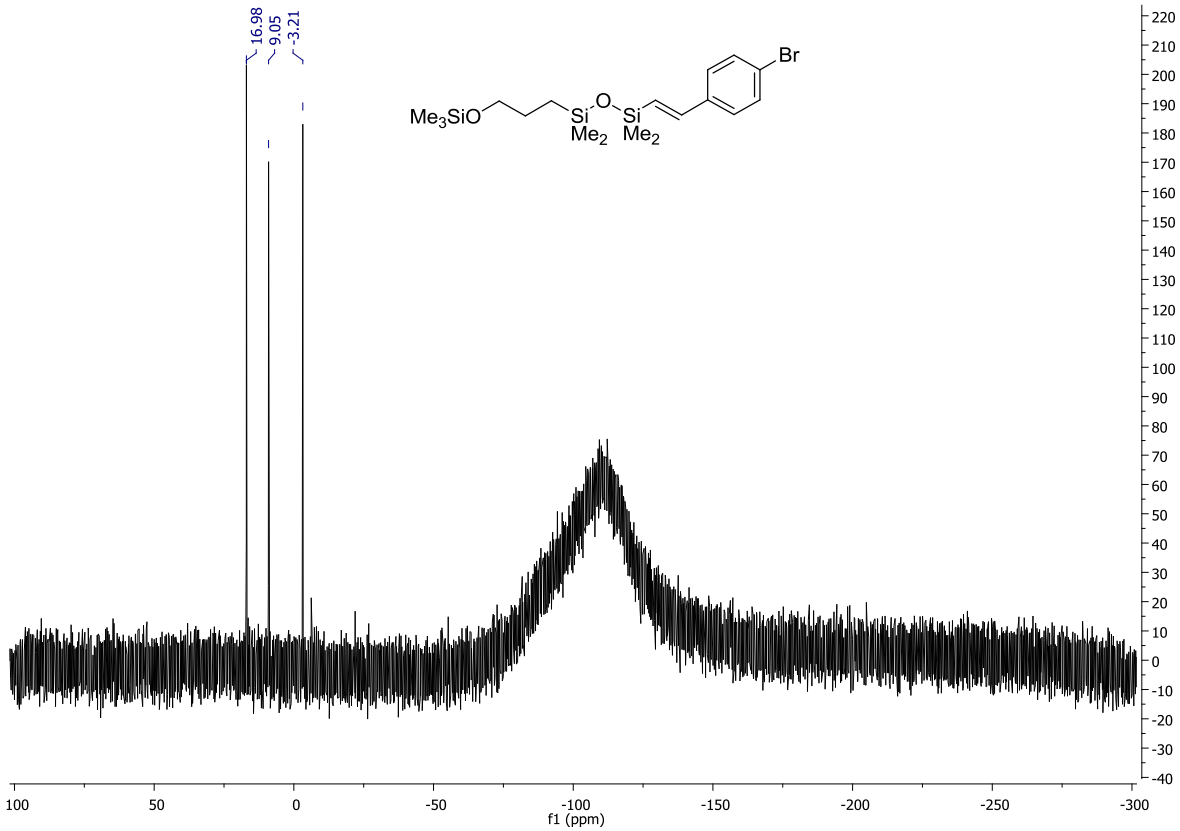


Figure S58. ^{29}Si NMR spectrum of **5ah**

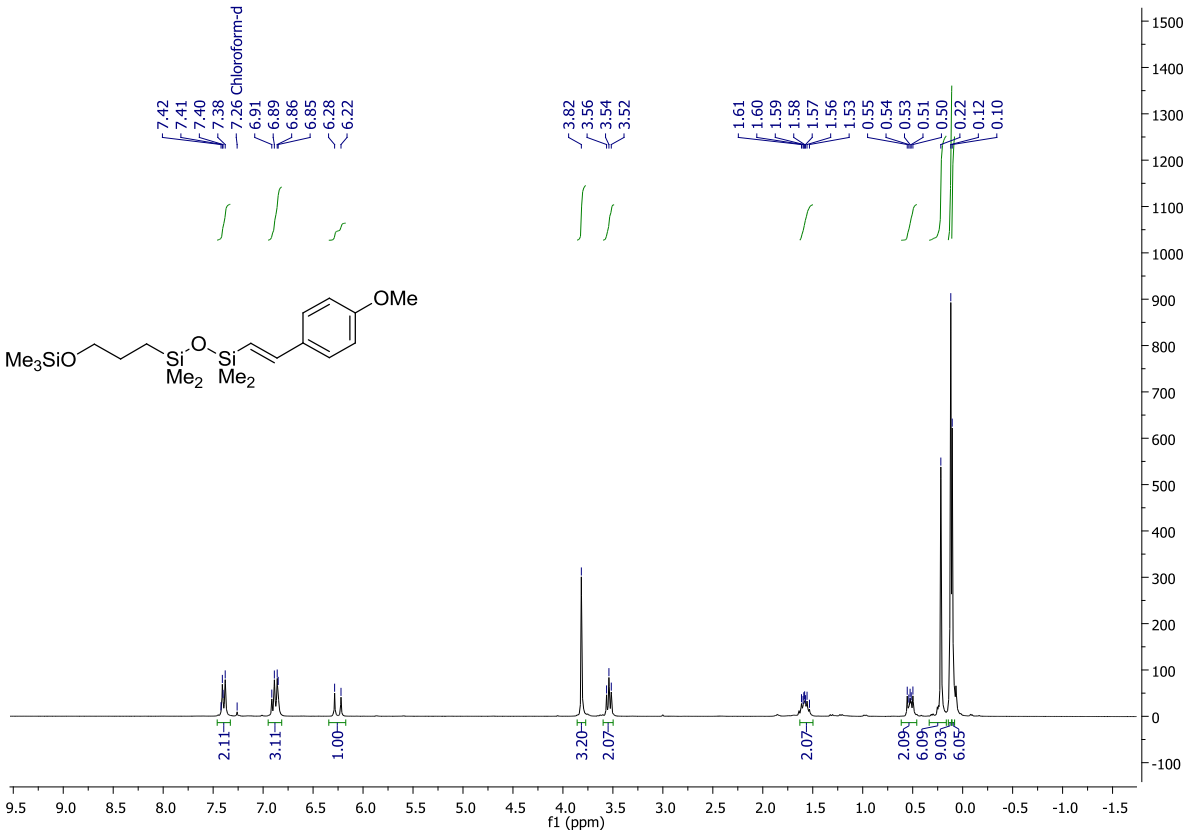


Figure S59. [1]H NMR spectrum of **5ai**

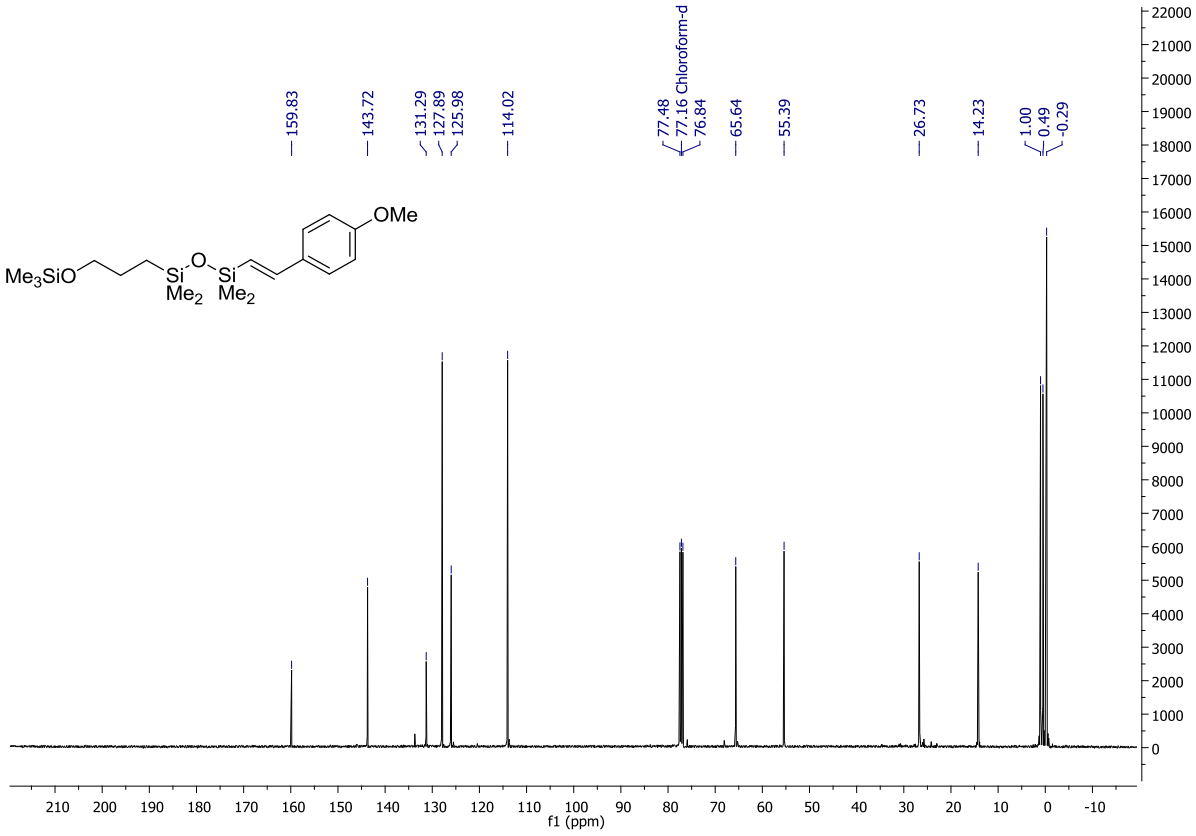


Figure SX60. [13]C NMR spectrum of **5ai**

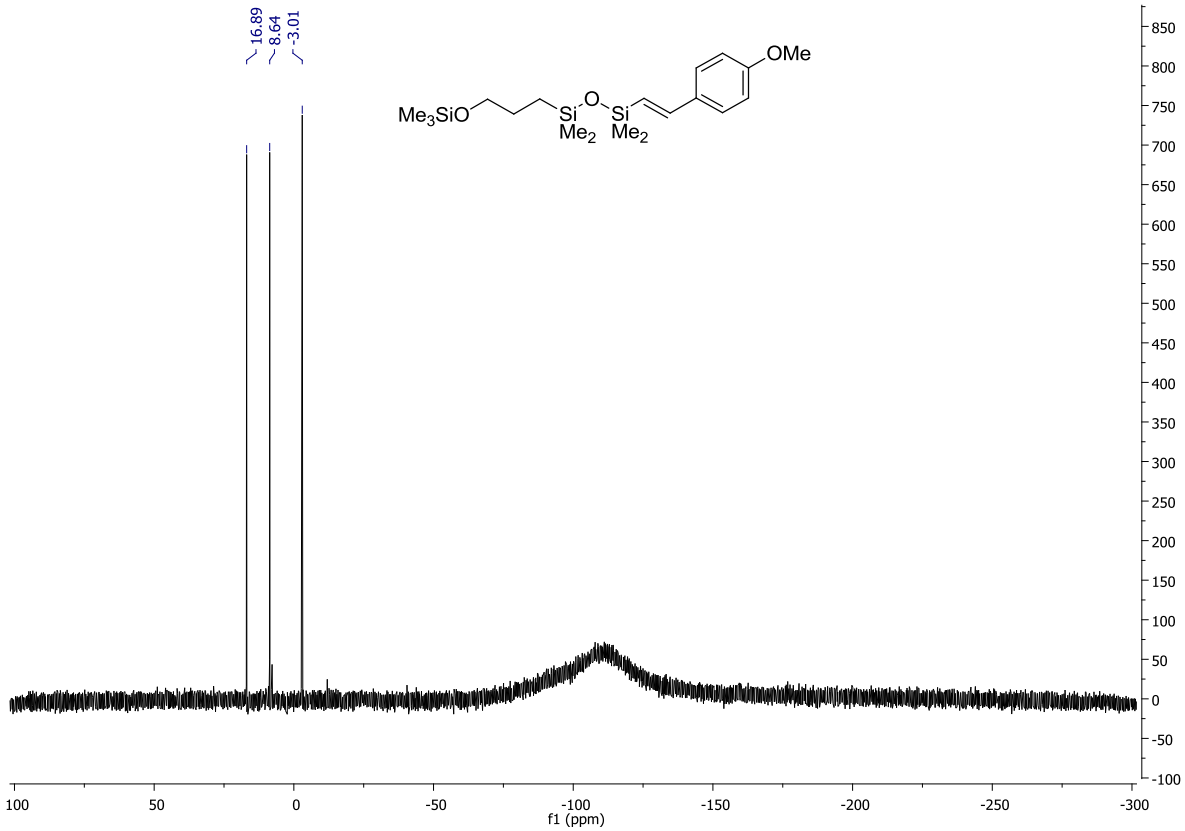


Figure S61. ^{29}Si NMR spectrum of **5ai**

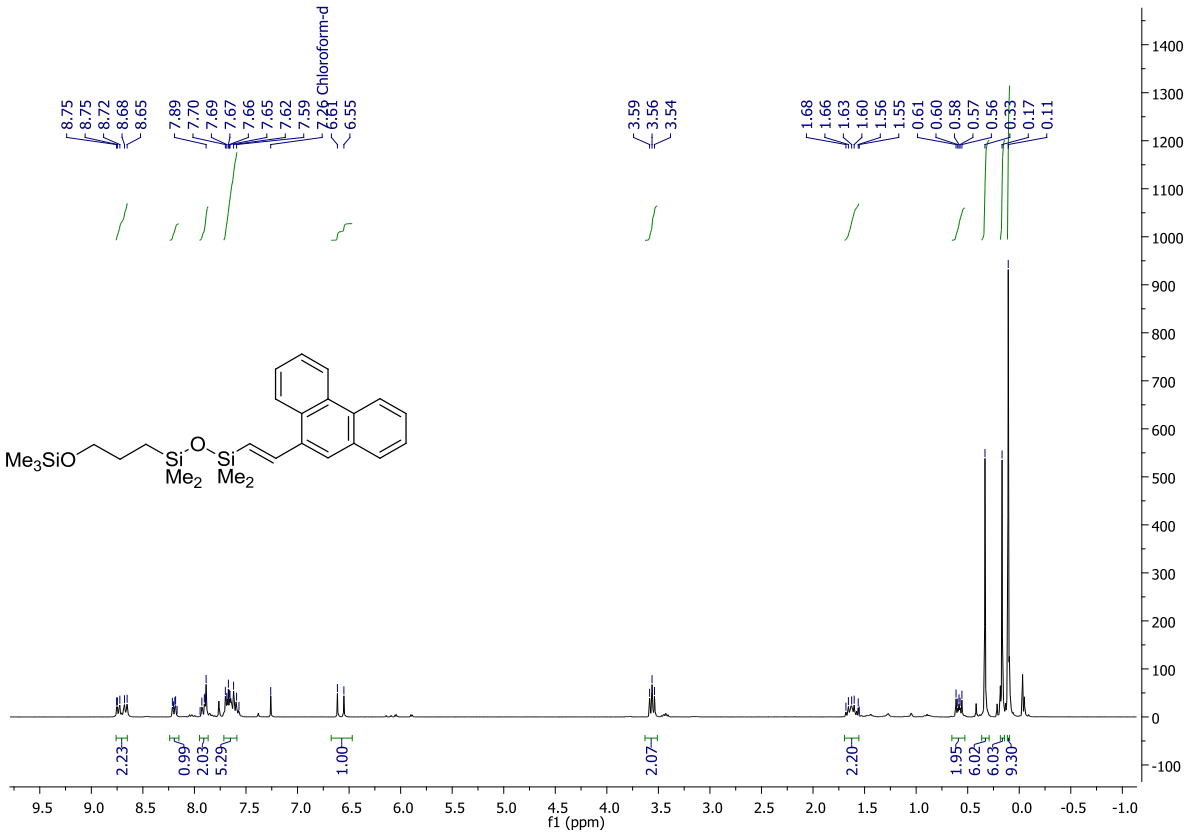


Figure S62. [1]H NMR spectrum of **5aj**

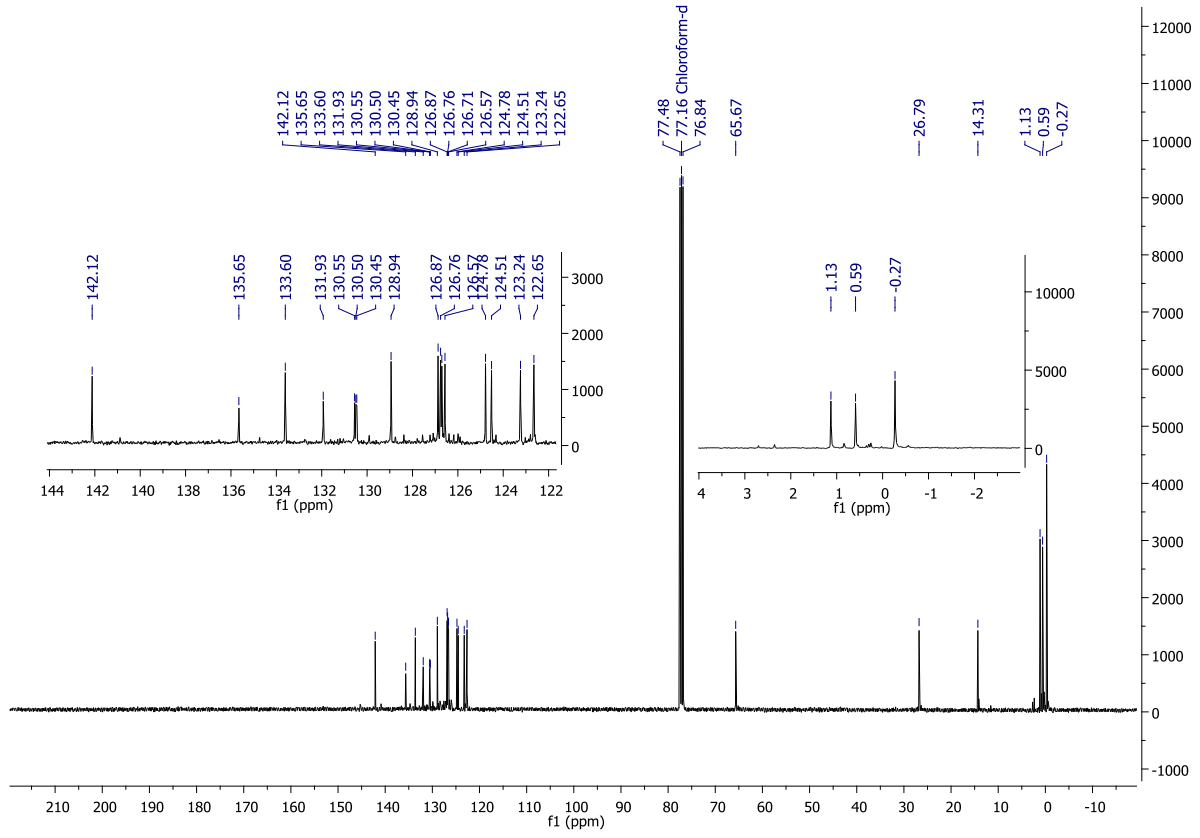


Figure S63. [13]C NMR spectrum of **5aj**

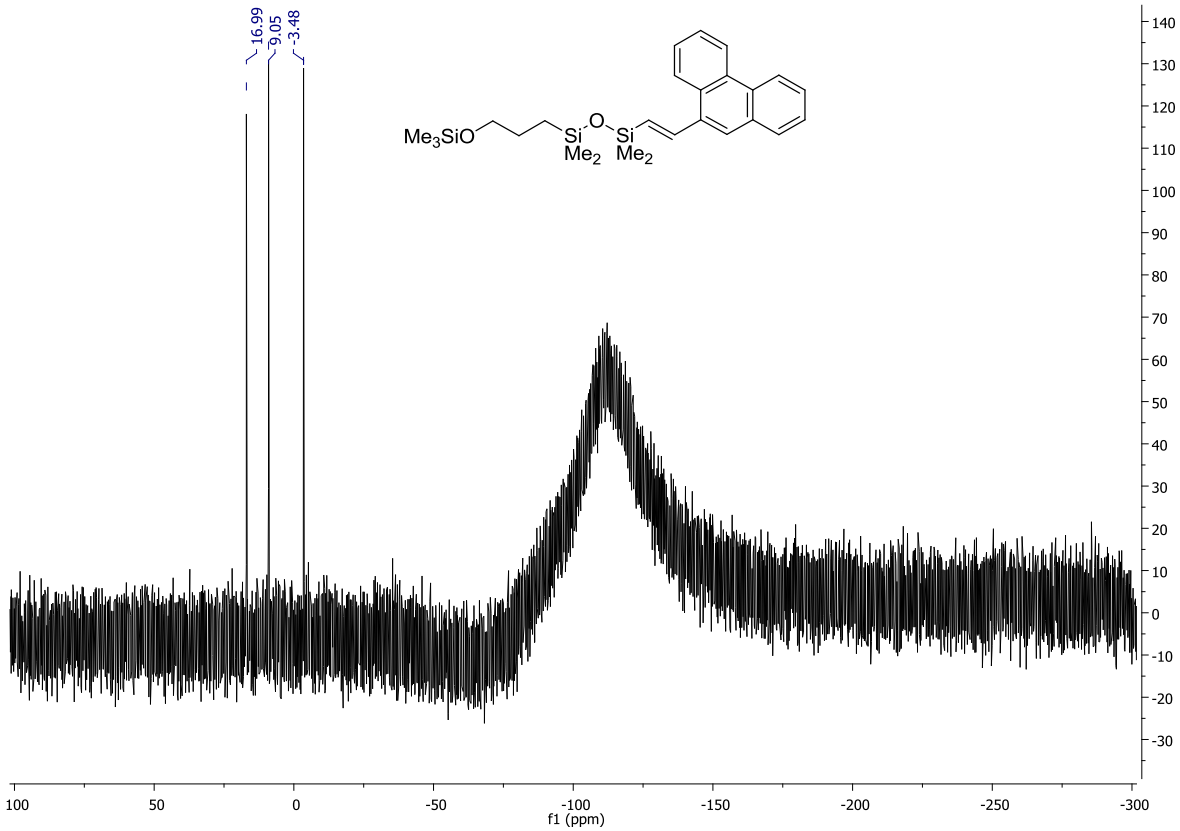


Figure S64. ^{29}Si NMR spectrum of **5aj**

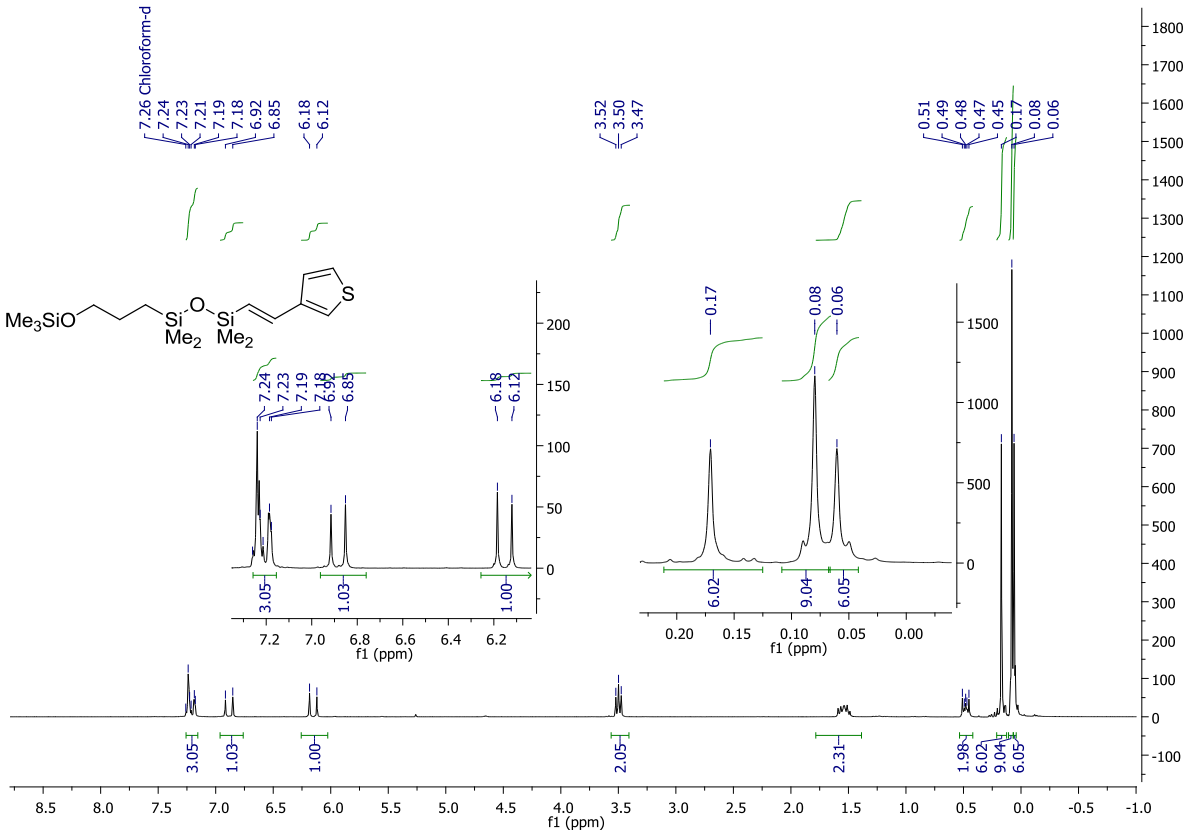


Figure S65. [1]H NMR spectrum of **5ak**

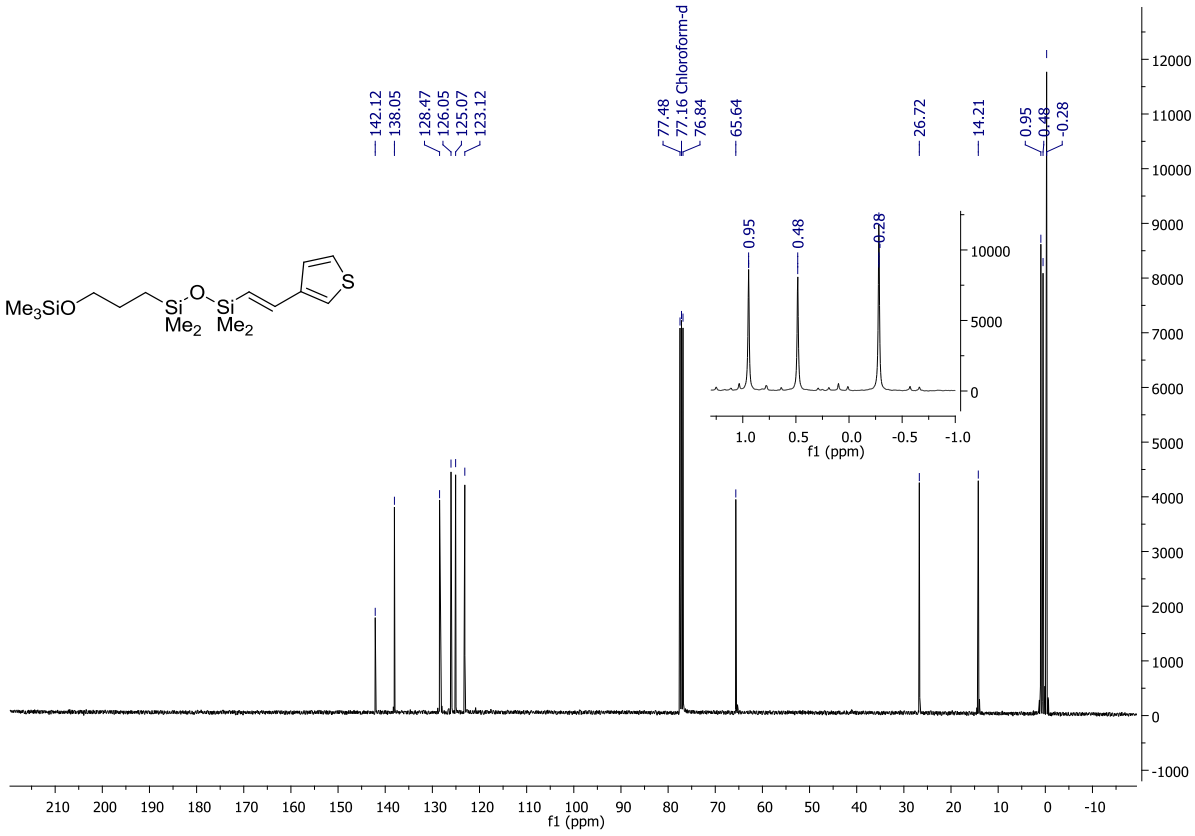


Figure S66. [13]C NMR spectrum of **5ak**

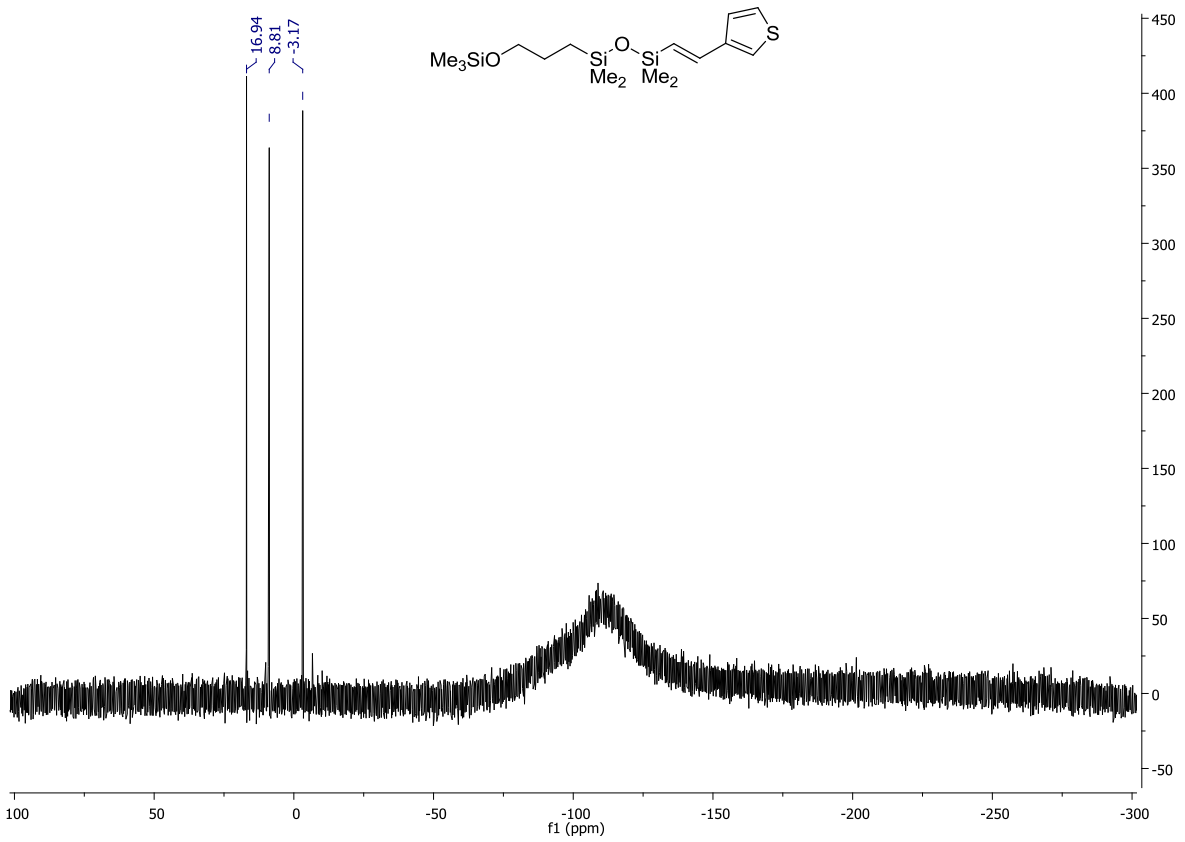


Figure S67. ^{29}Si NMR spectrum of **5ak**

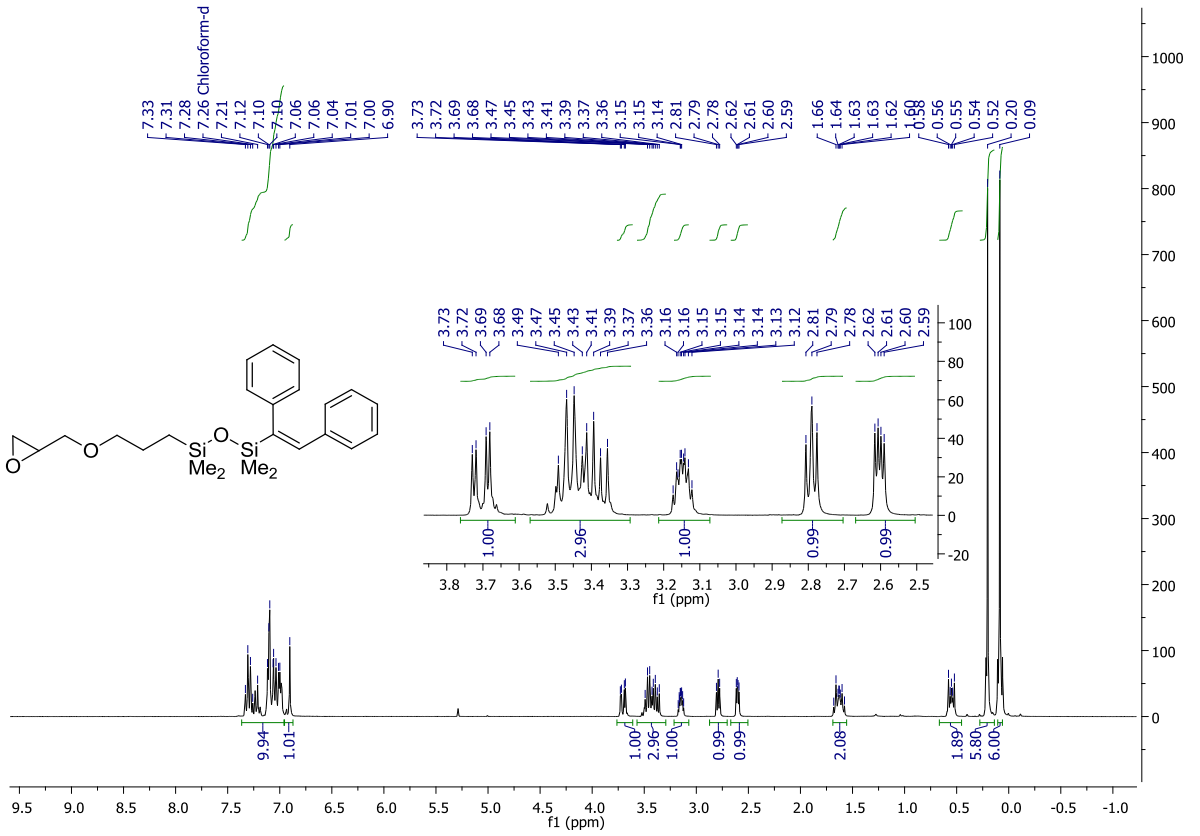


Figure S68. ^{1}H NMR spectrum of **5ba**

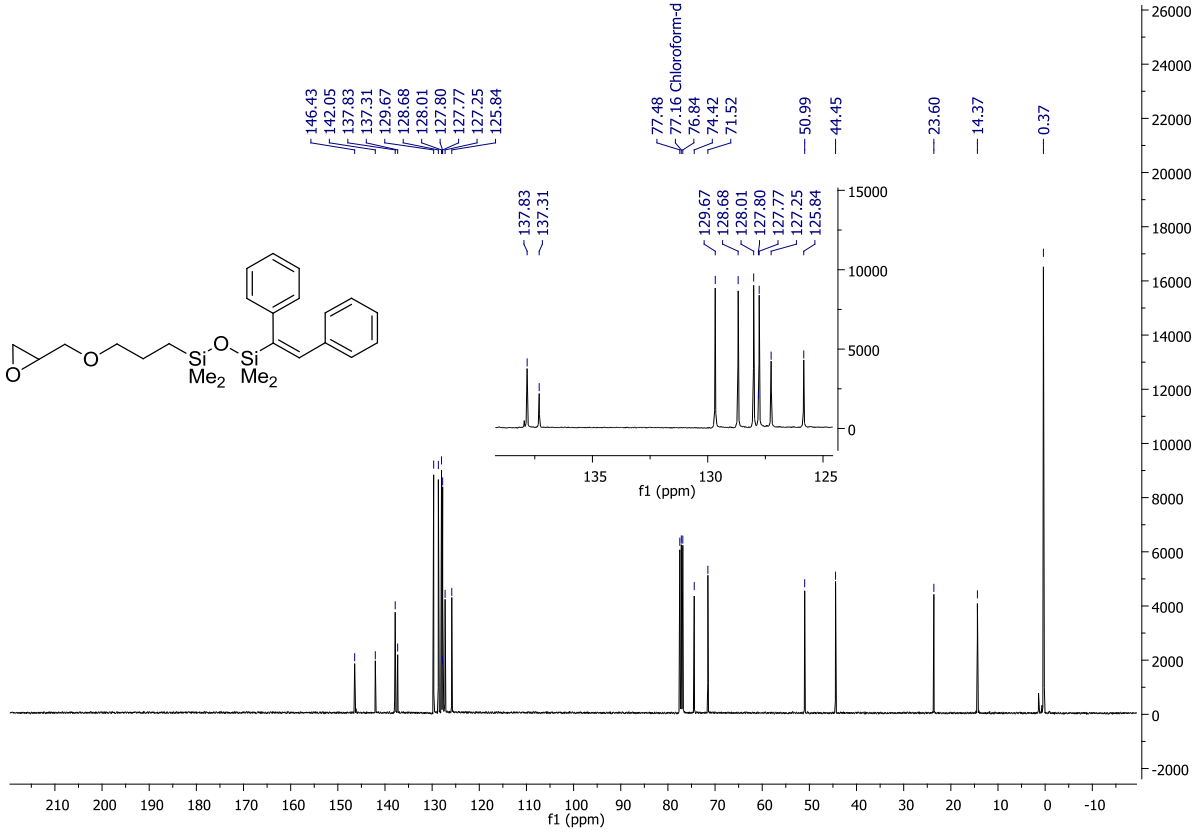


Figure S69. ^{13}C NMR spectrum of **5ba**

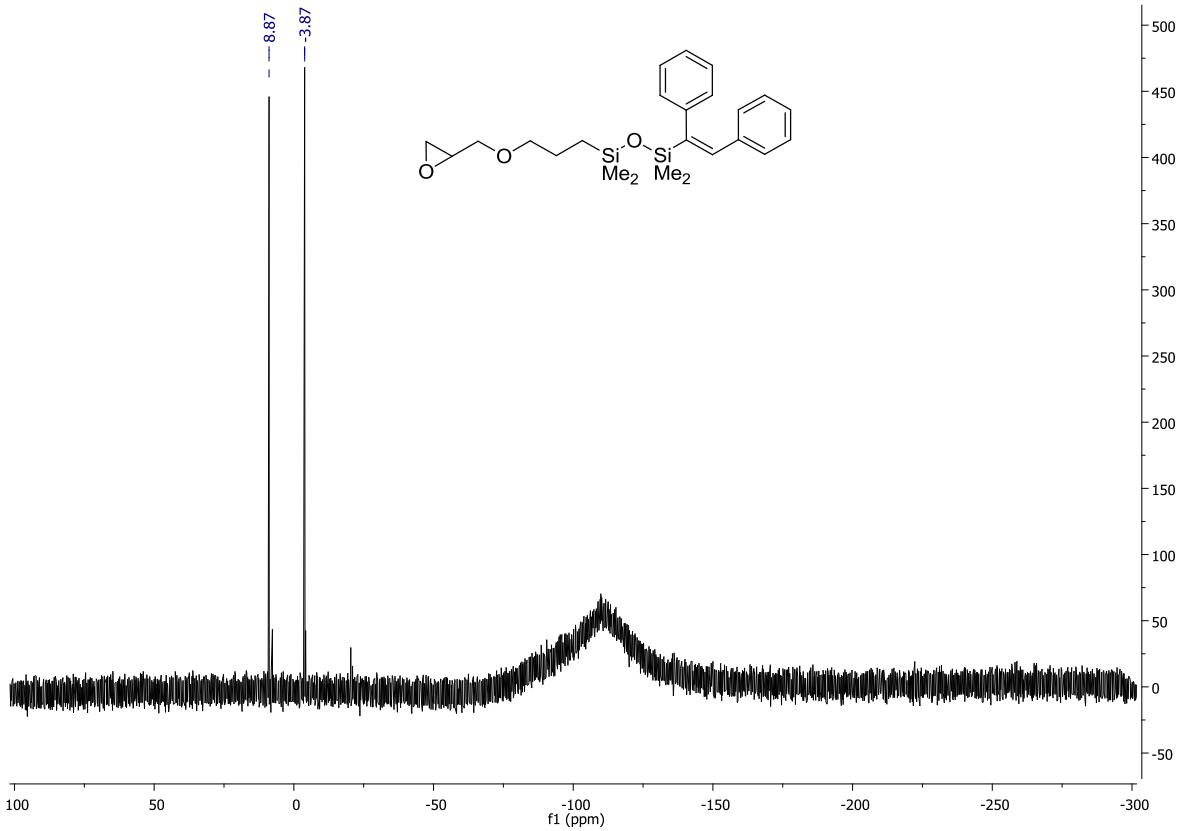


Figure S70. ^{29}Si NMR spectrum of **5ba**

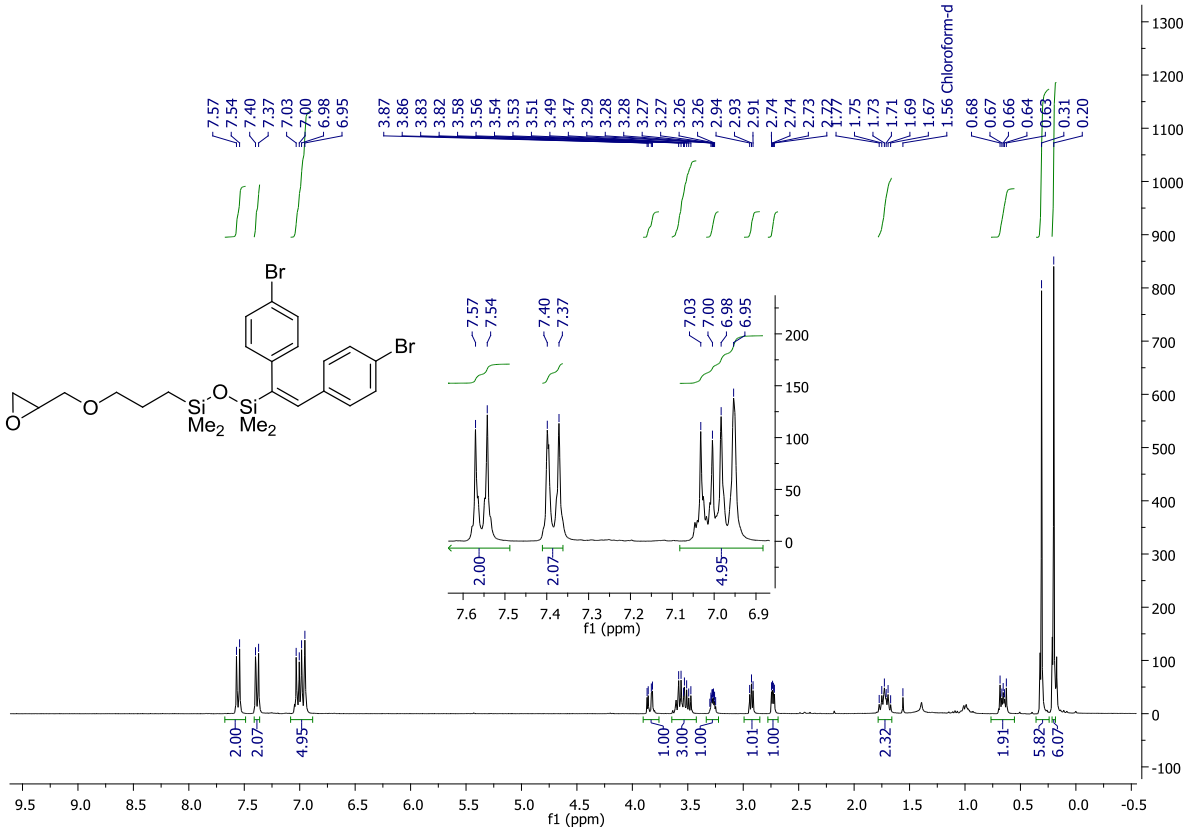


Figure S71. [1]H NMR spectrum of **5bb**

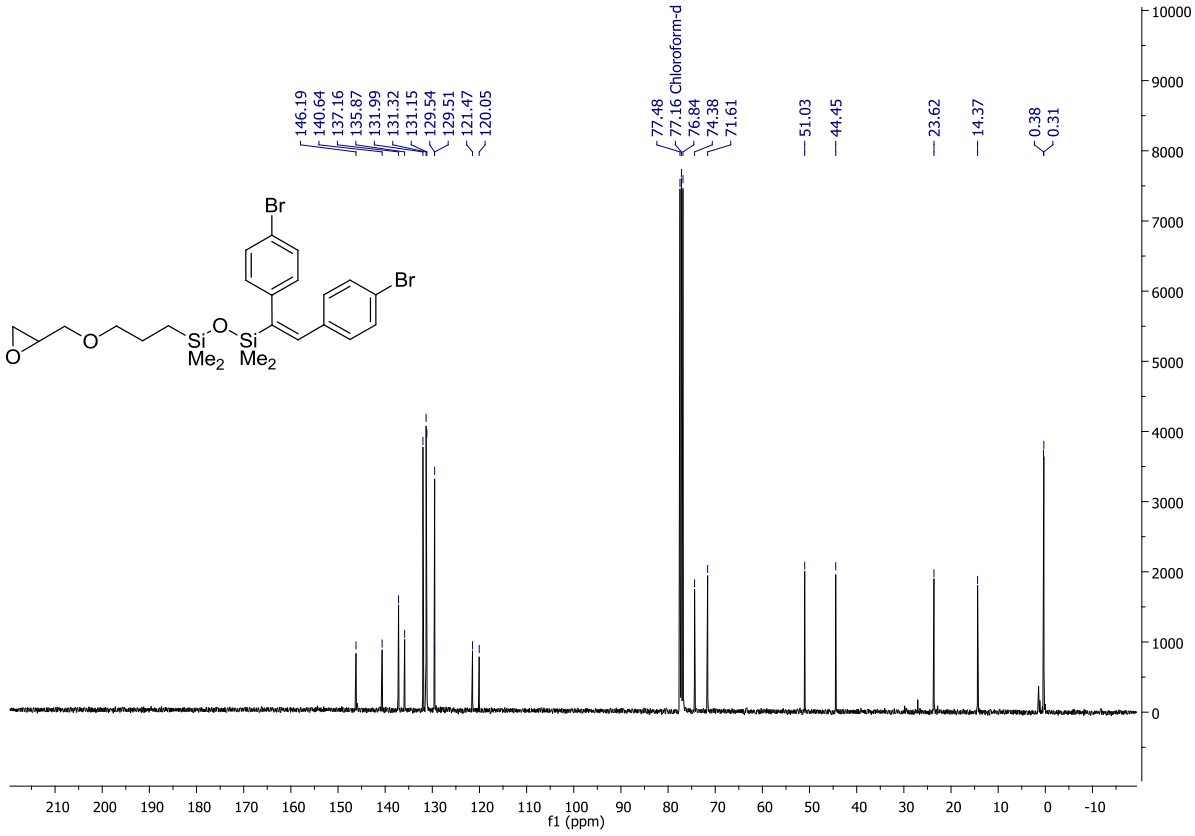


Figure S72. [13]C NMR spectrum of **5bb**

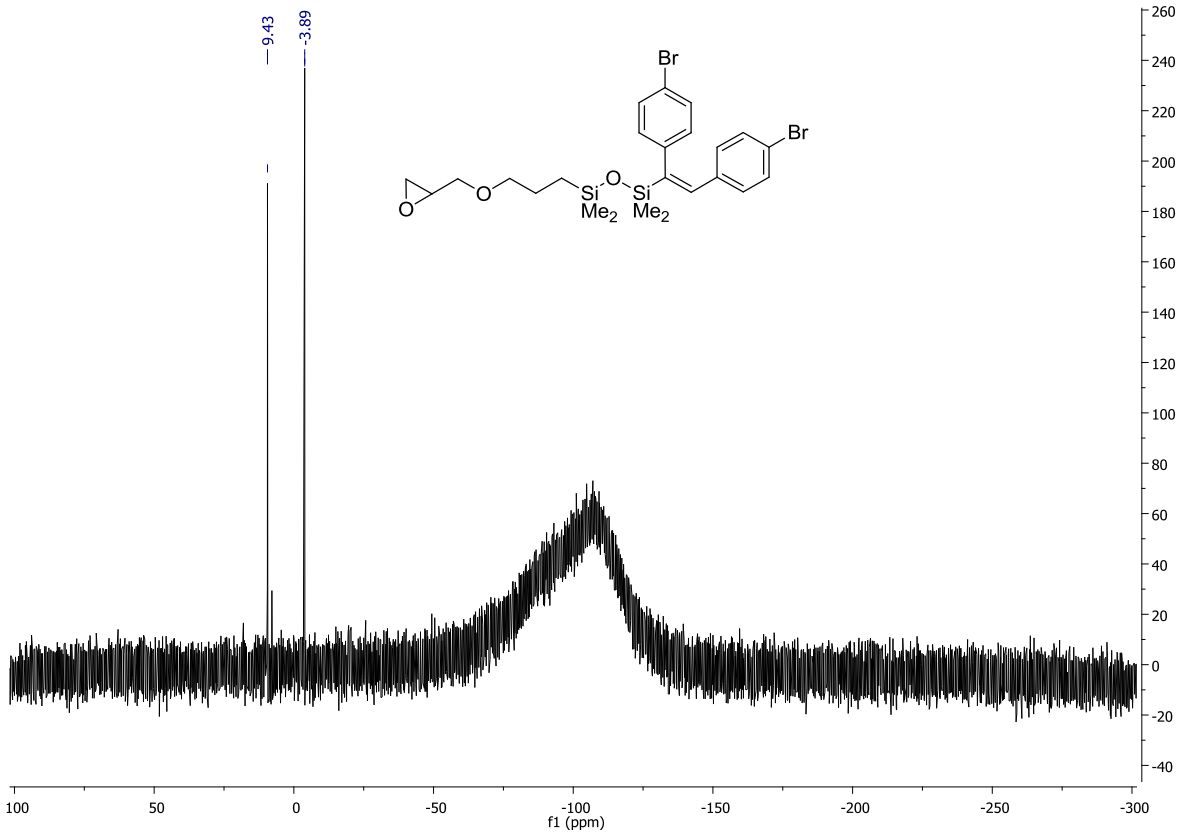


Figure S73. ^{29}Si NMR spectrum of **5bb**

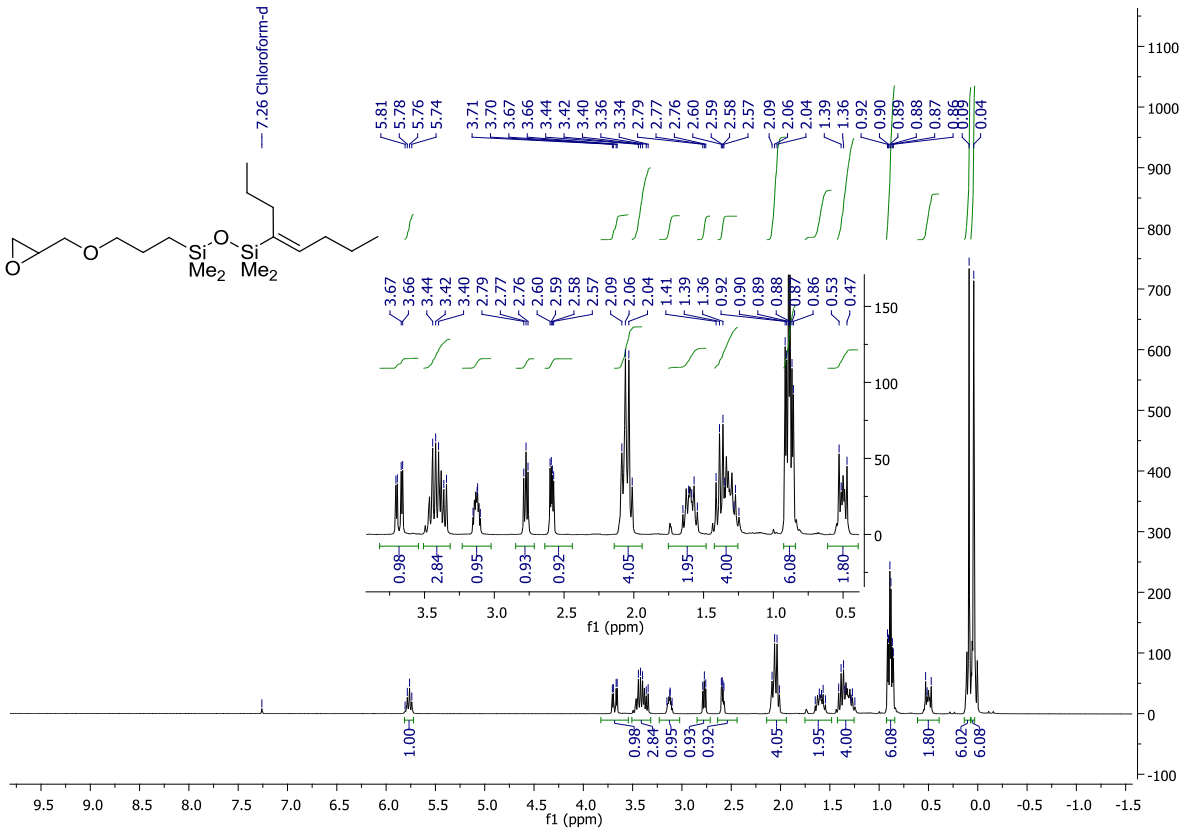


Figure S74. [1]H NMR spectrum of **5bc**

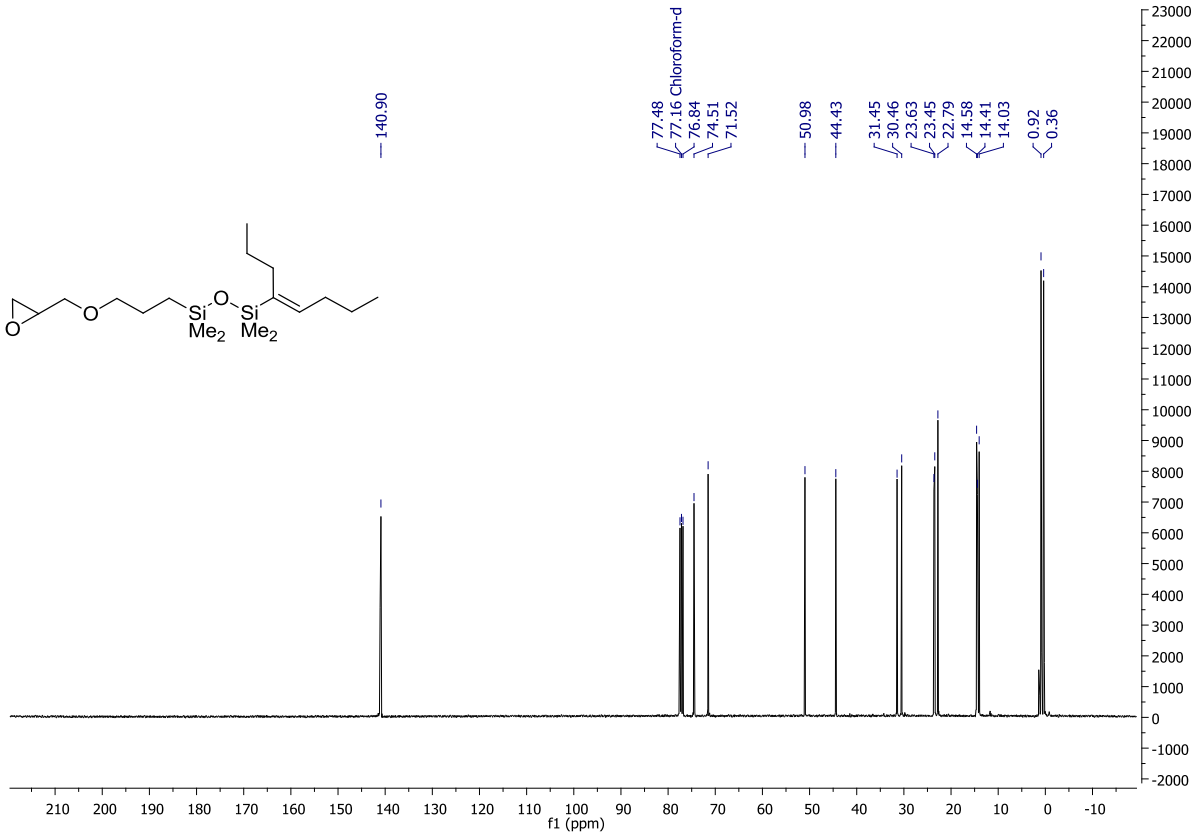


Figure S75. [13]C NMR spectrum of **5bc**

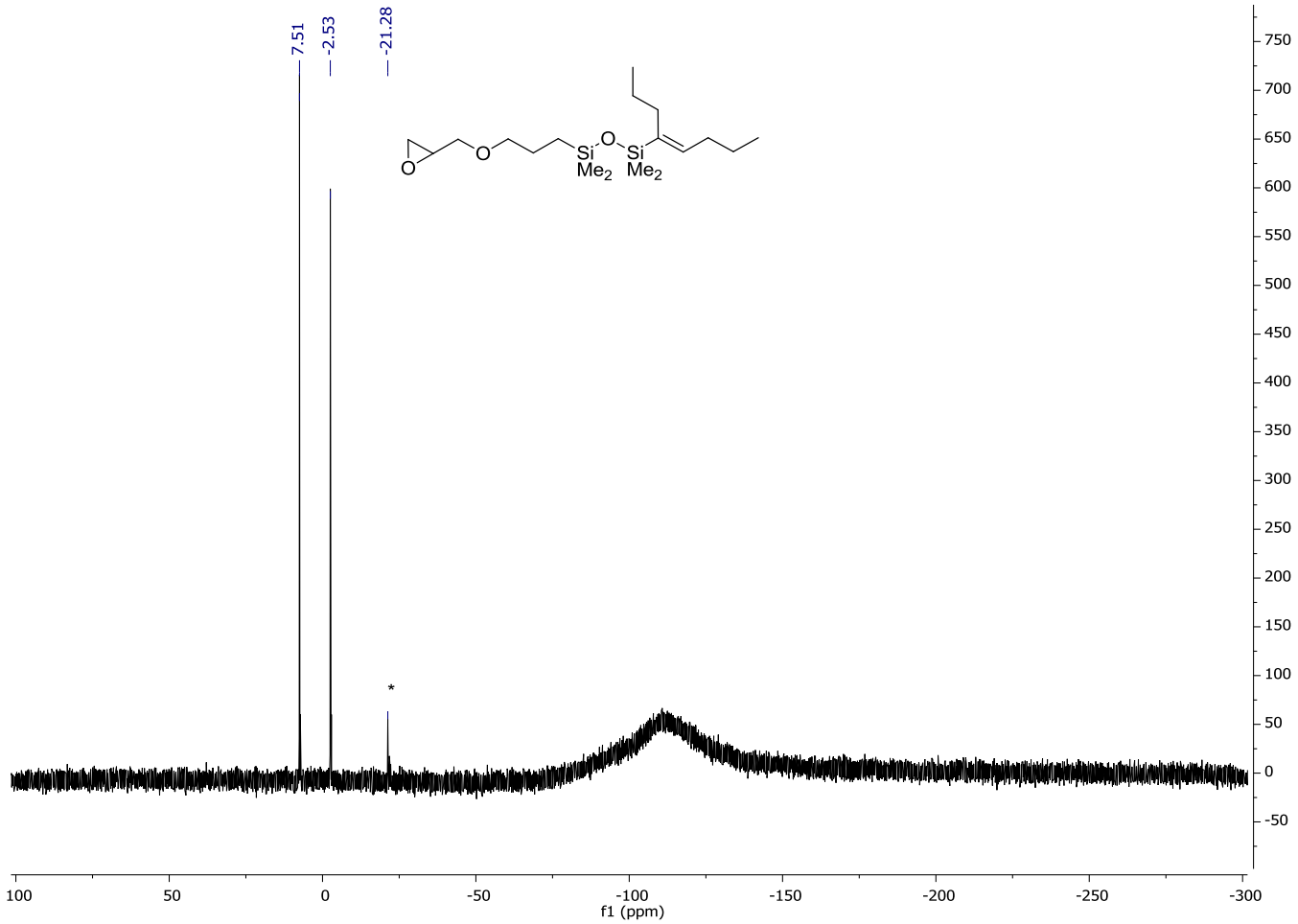


Figure S76. ^{29}Si NMR spectrum of **5bc.** *Grease

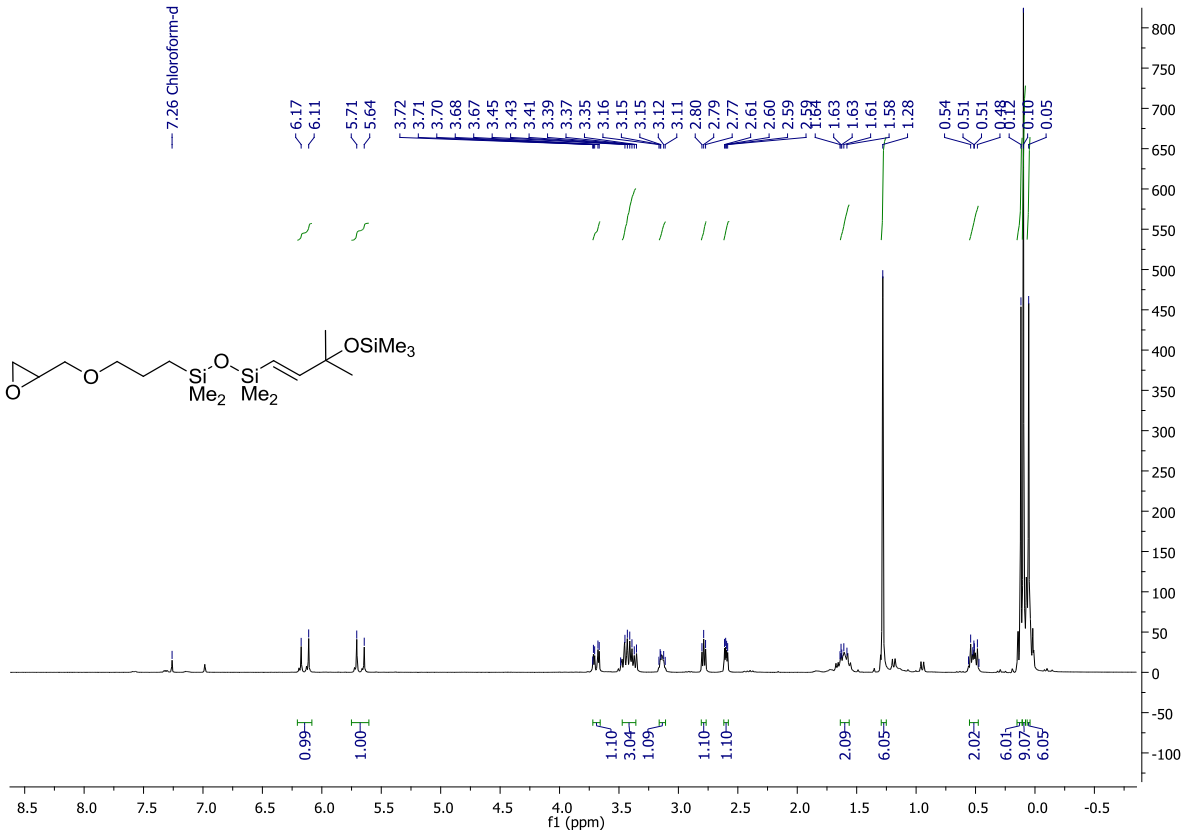


Figure S77. [1]H NMR spectrum of **5bf**

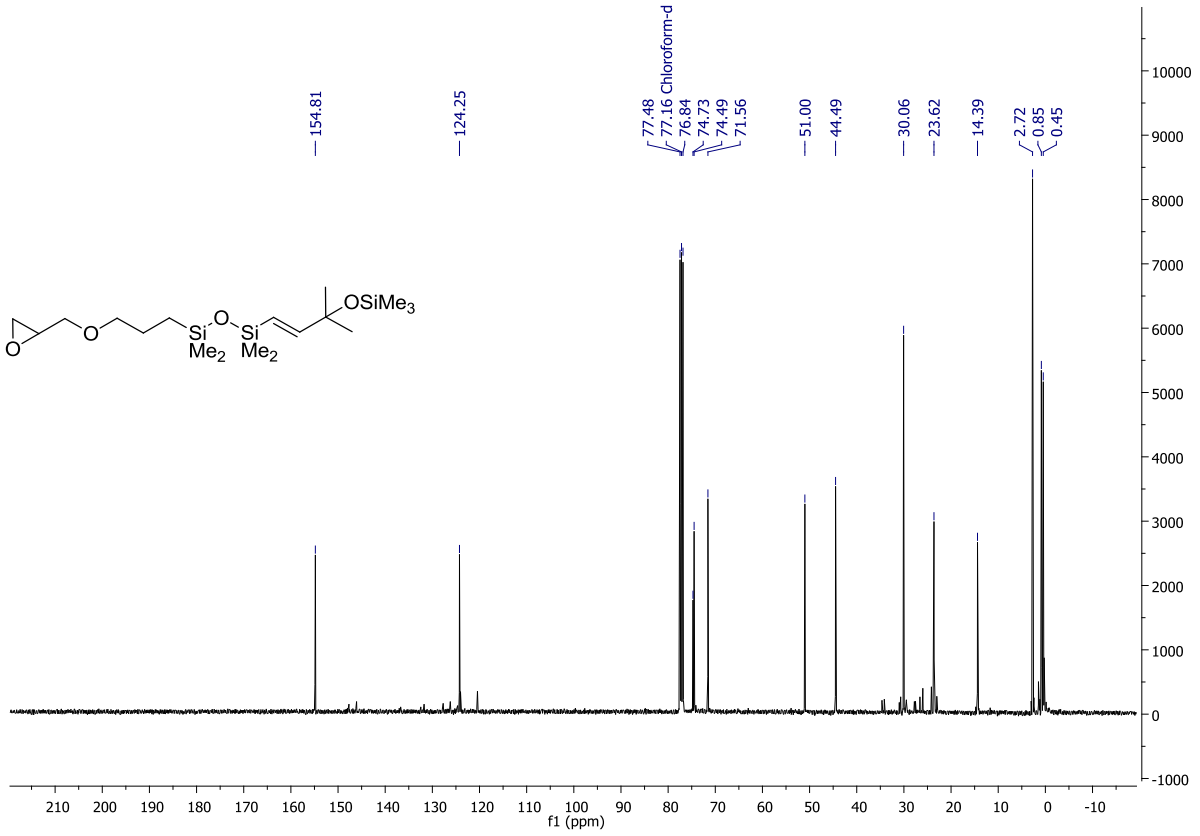


Figure S78. [13]C NMR spectrum of **5bf**

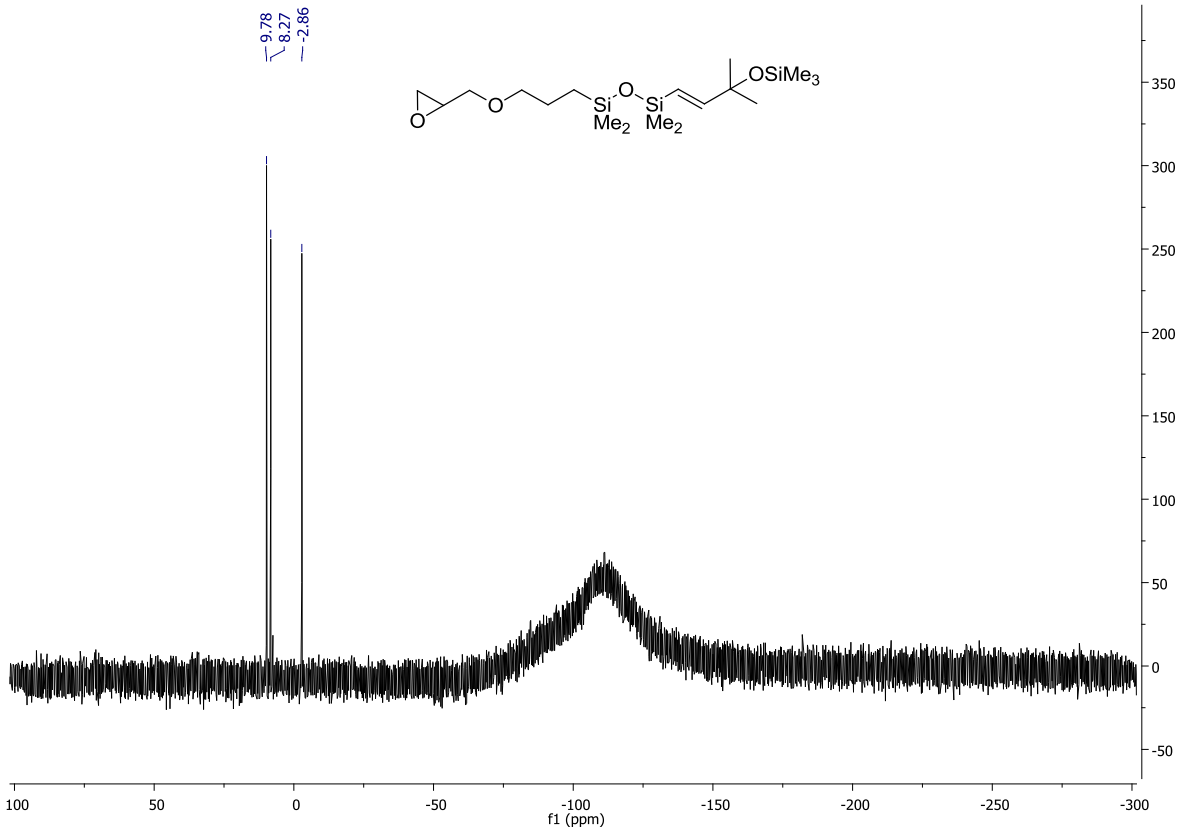


Figure S79. ^{29}Si NMR spectrum of **5bf**

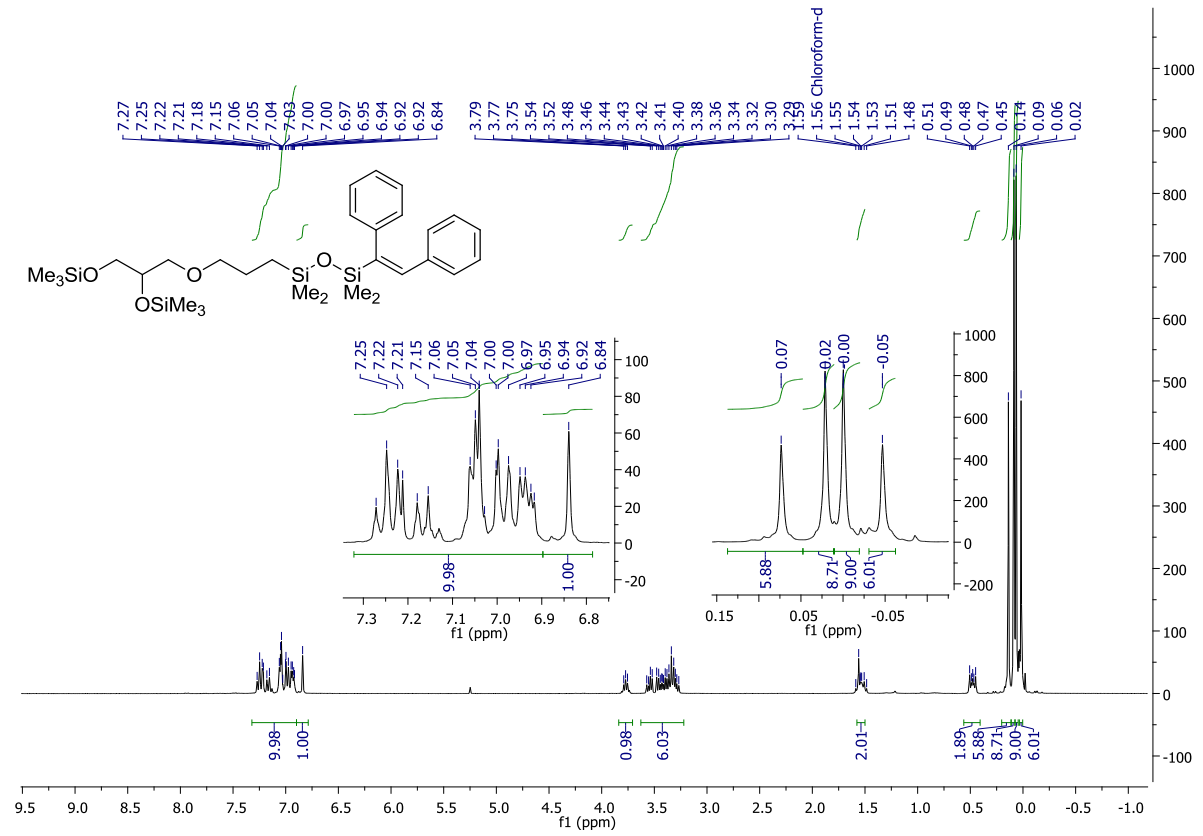


Figure S80. ^{1}H NMR spectrum of **5ca**

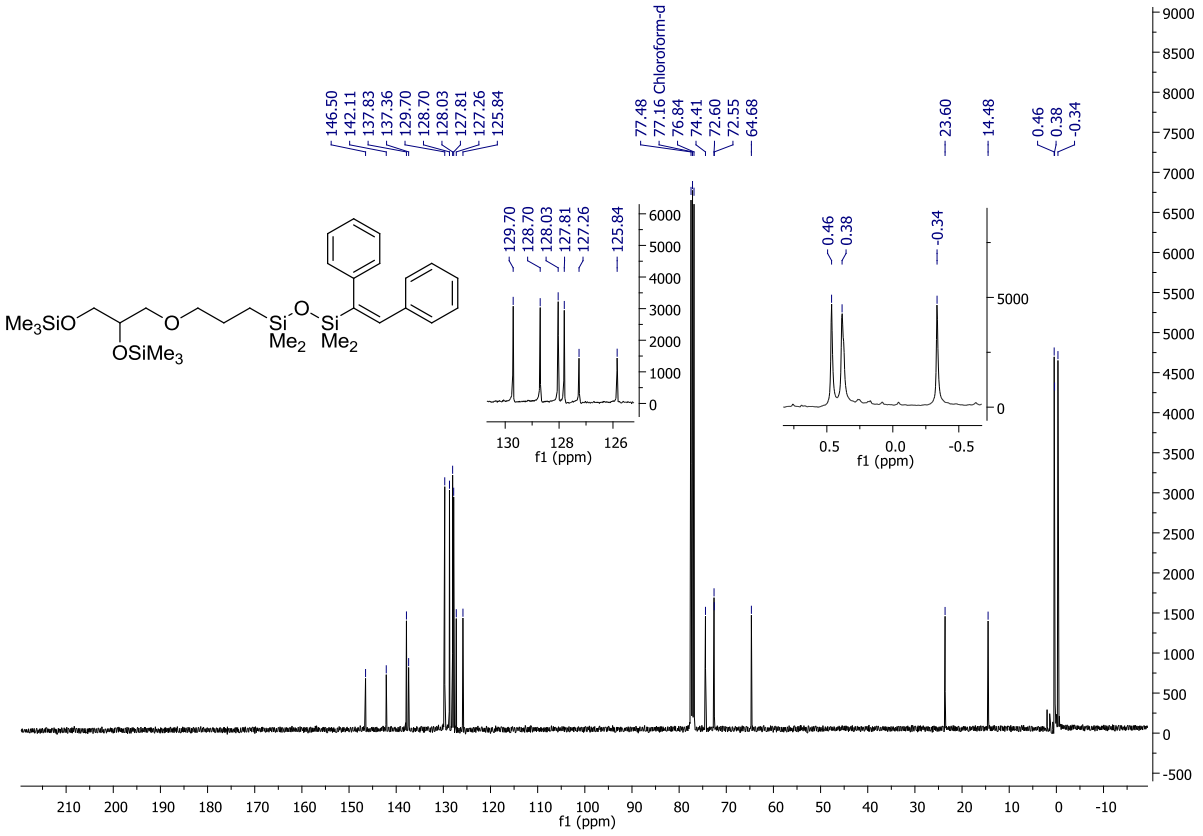


Figure S81. ^{13}C NMR spectrum of **5ca**

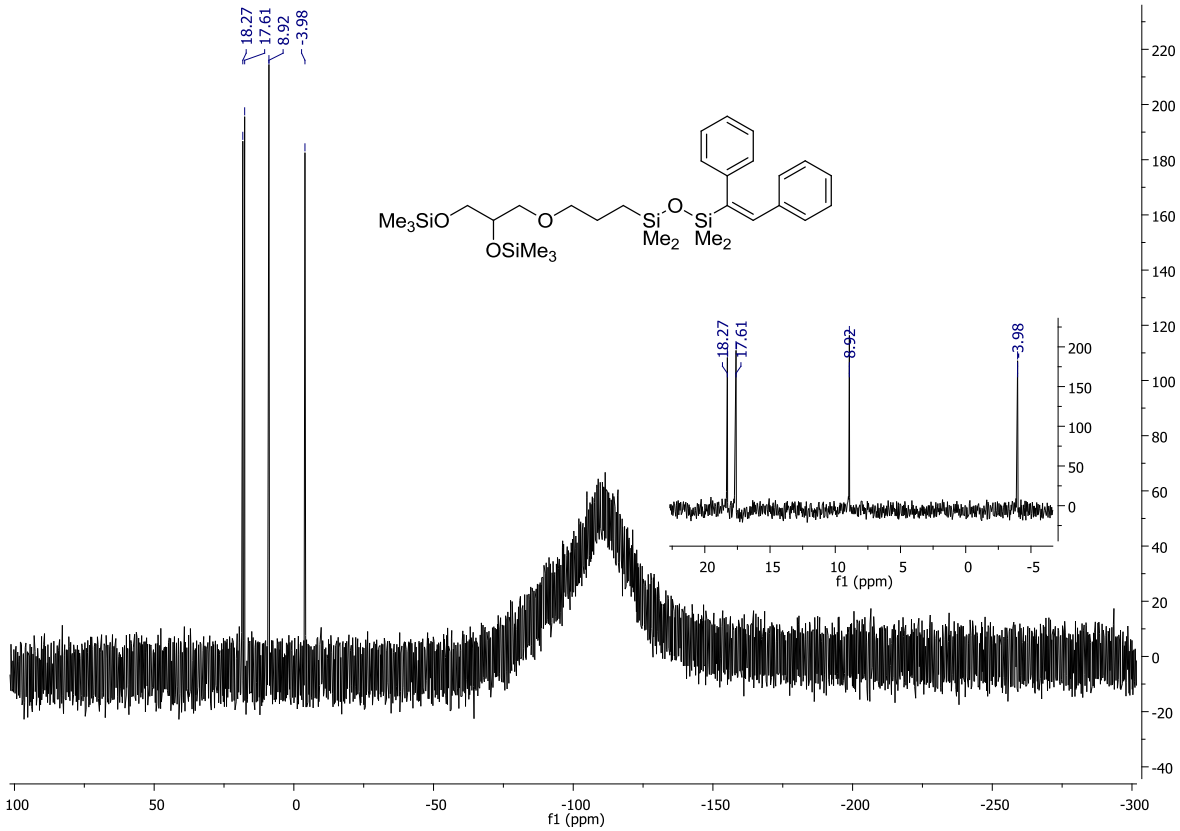


Figure S82. ^{29}Si NMR spectrum of **5ca**

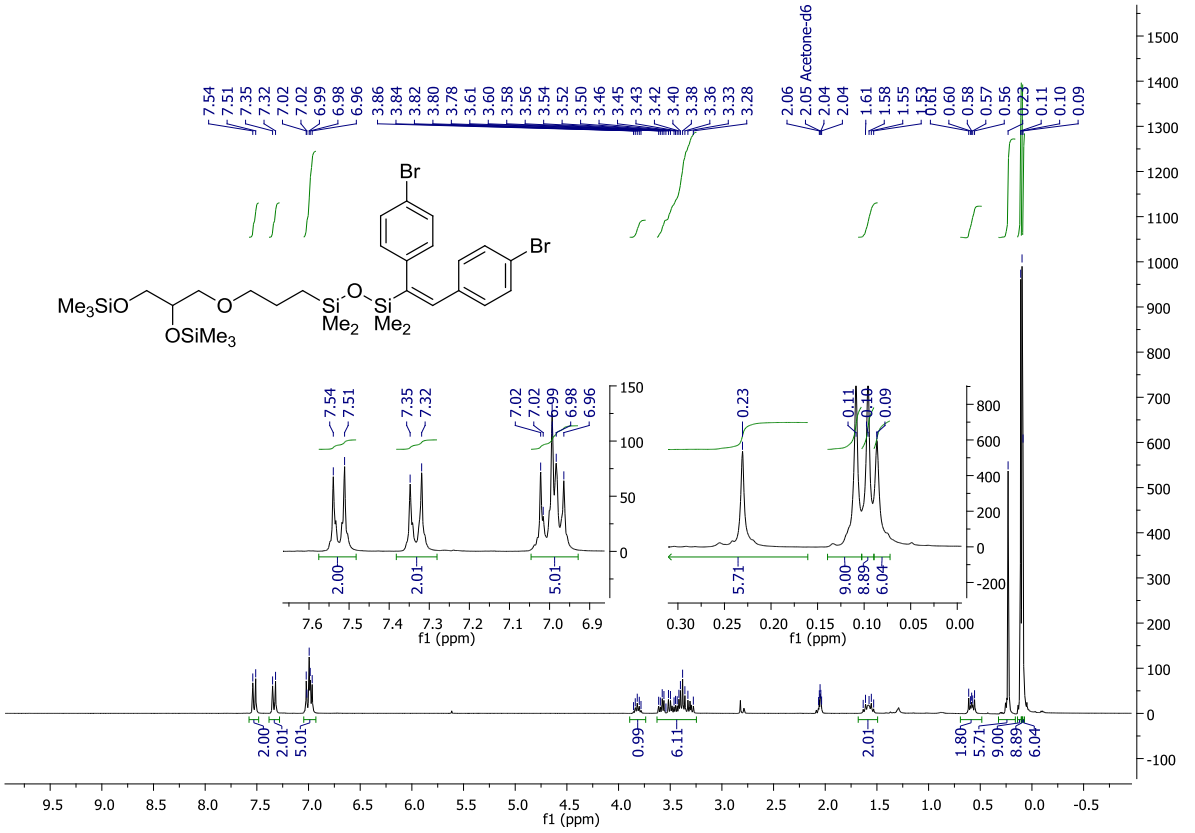


Figure S83. ^{1}H NMR spectrum of **5cb**

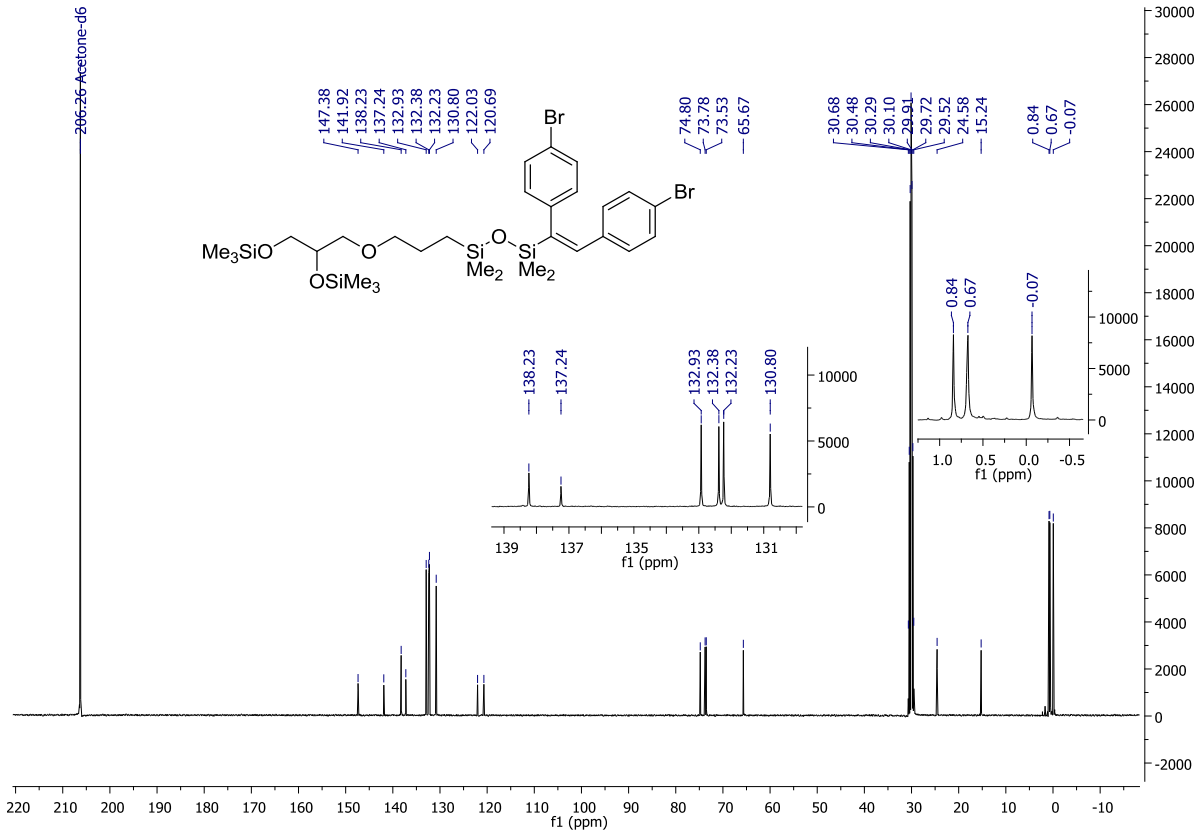


Figure S84. ^{13}C NMR spectrum of **5cb**

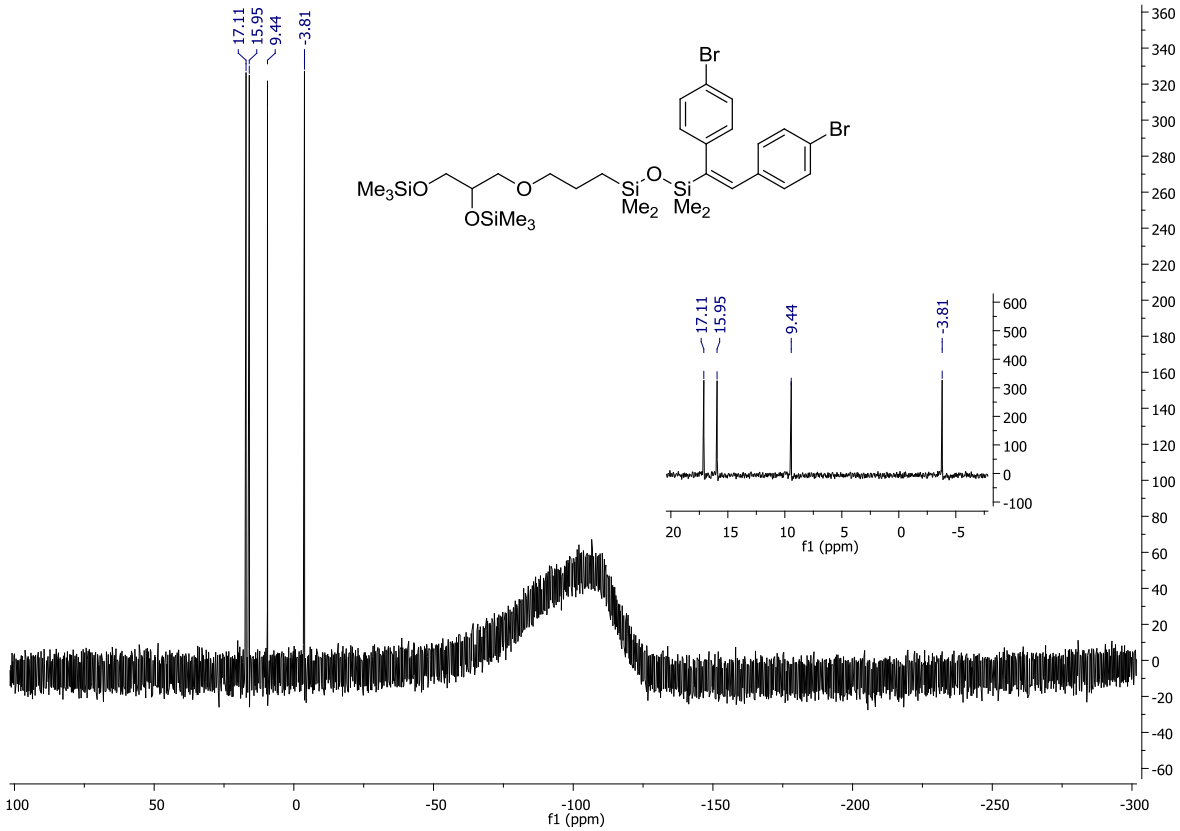


Figure S85. ^{29}Si NMR spectrum of **5cb**

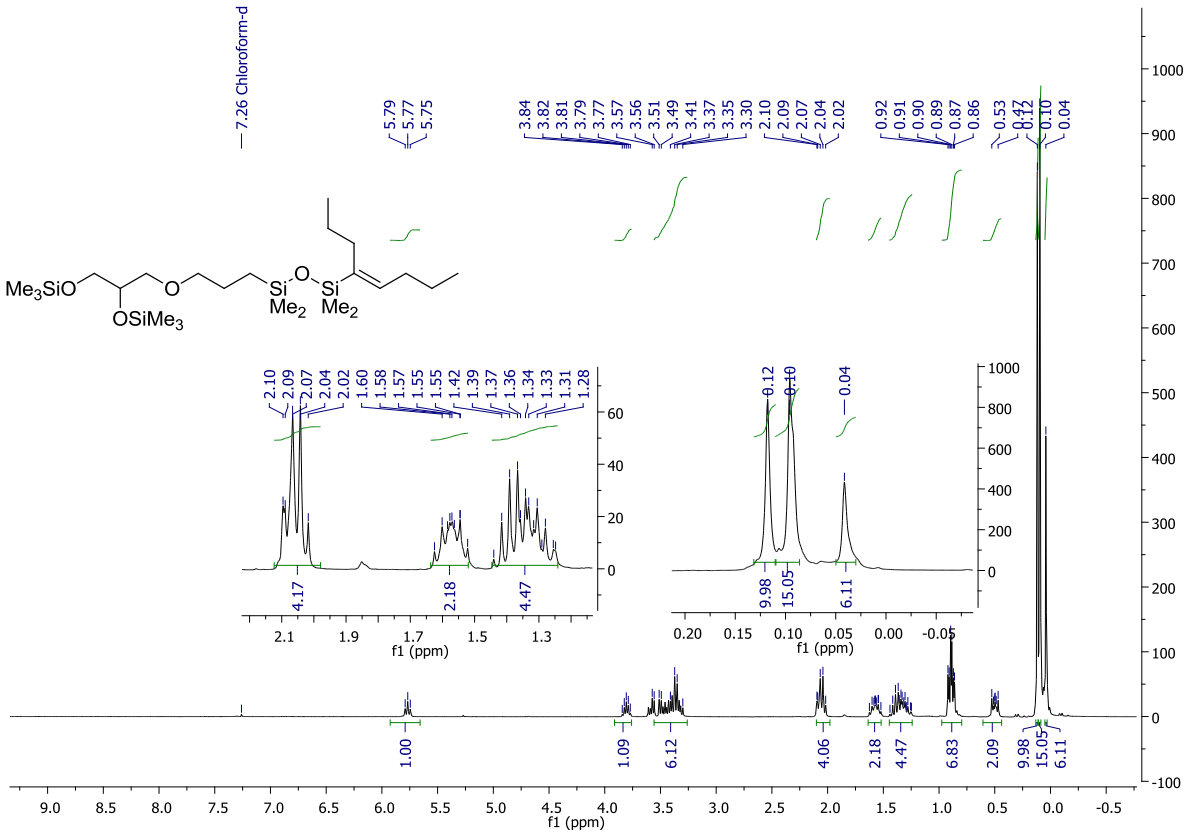


Figure S86. ^{1}H NMR spectrum of **5cc**

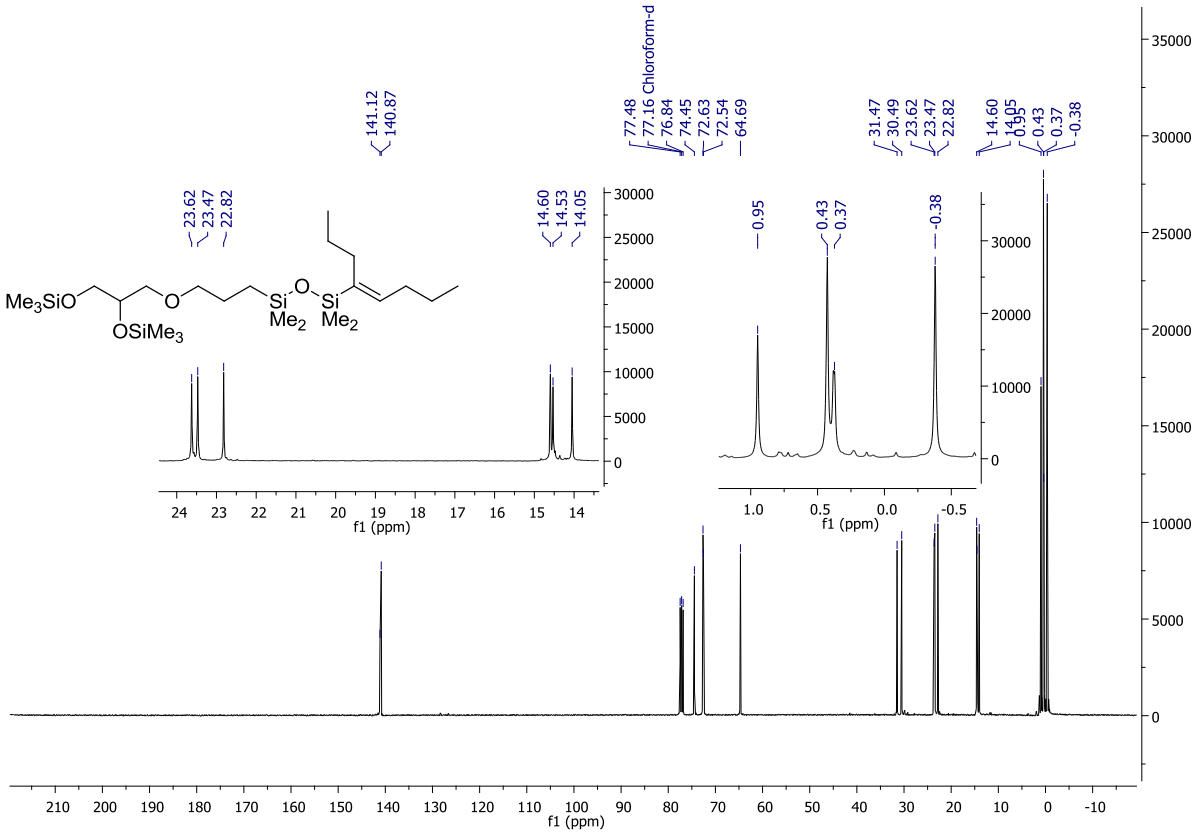


Figure S87. ^{13}C NMR spectrum of **5cc**

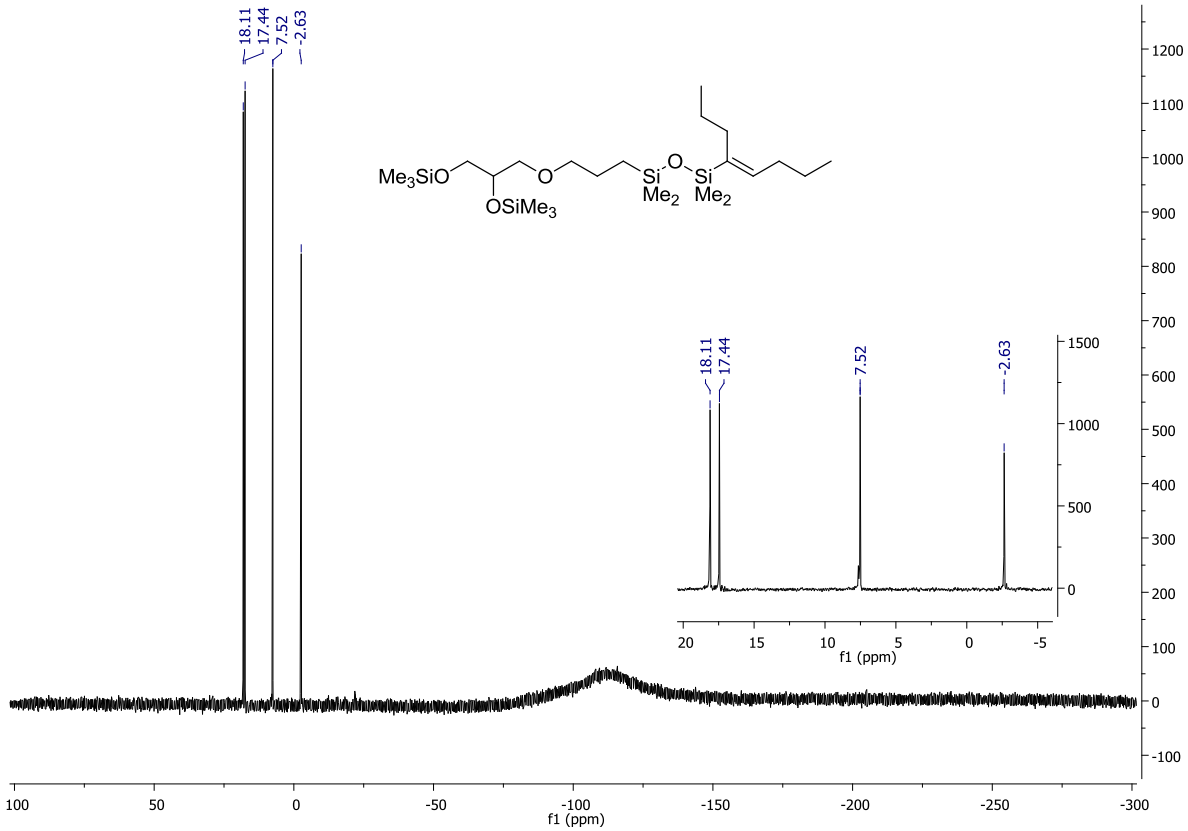


Figure S88. ^{29}Si NMR spectrum of **5cc**

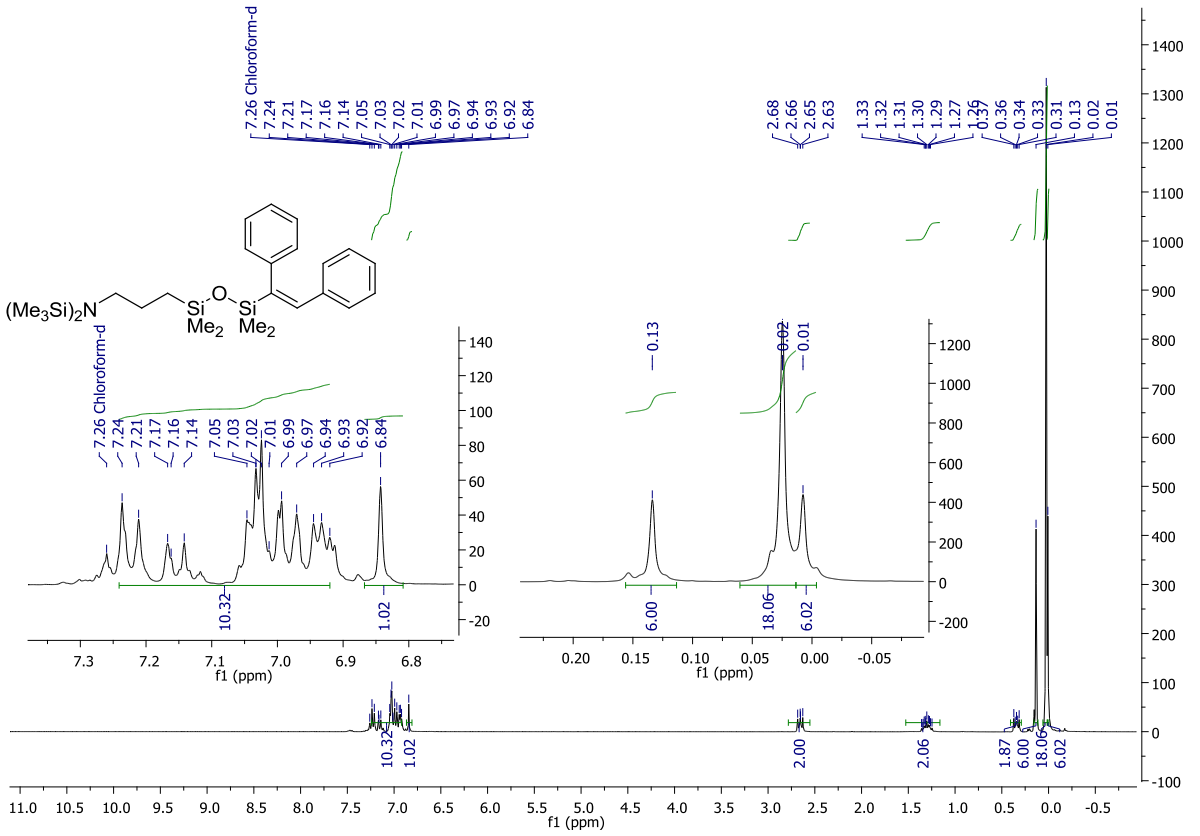


Figure S89. [1]H NMR spectrum of **5da**

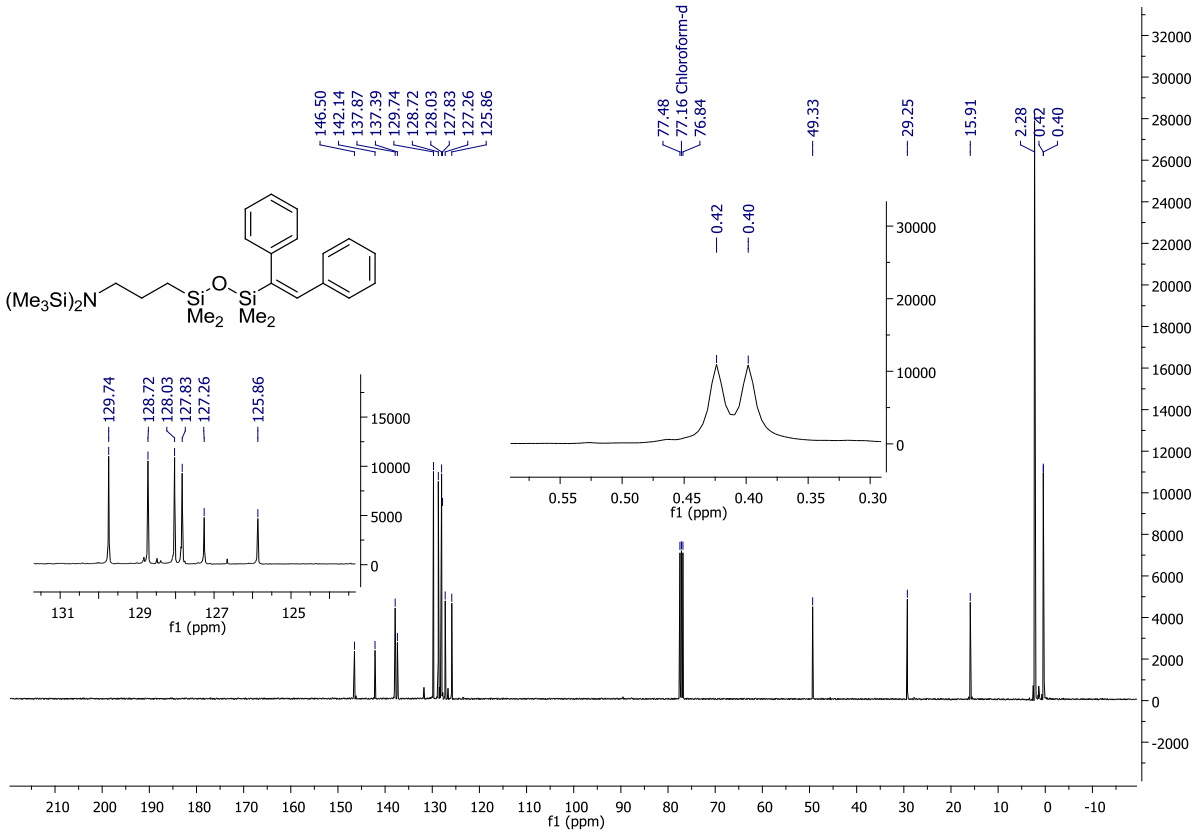


Figure S90. [13]C NMR spectrum of **5da**

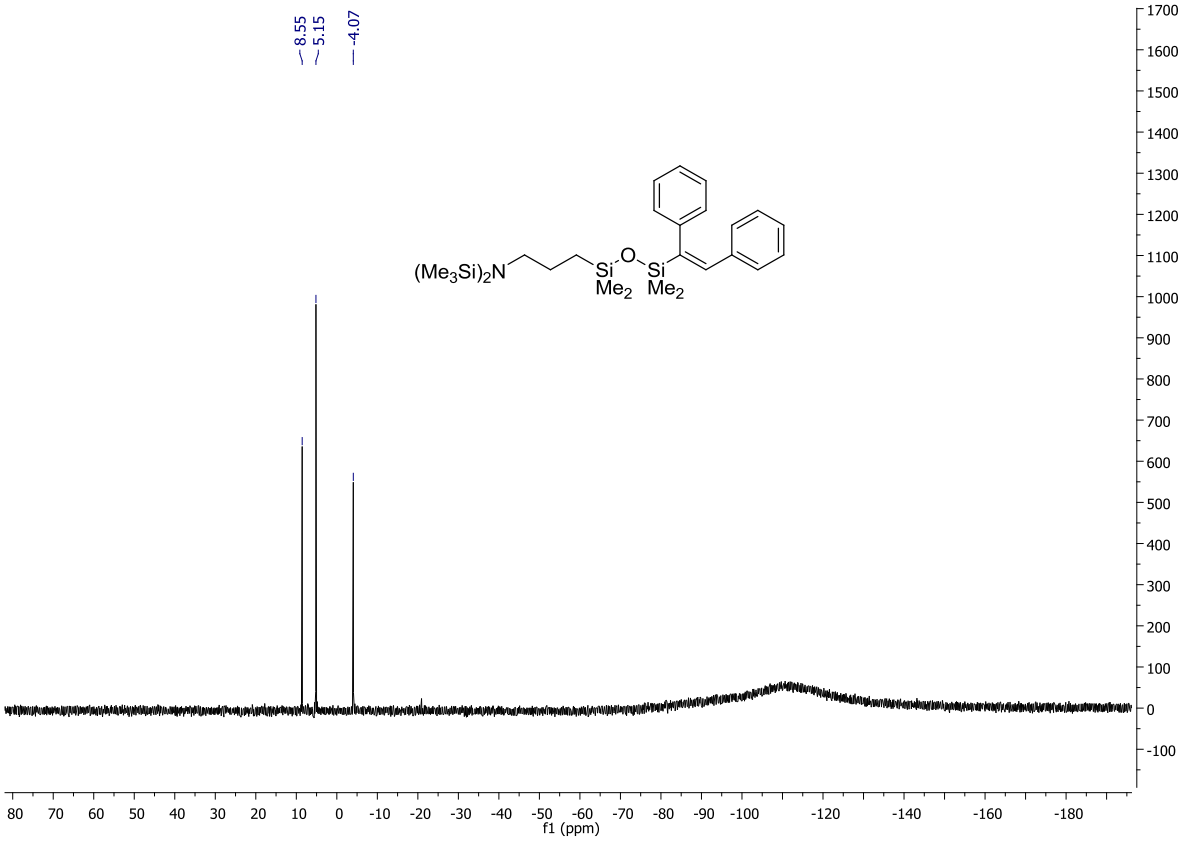


Figure S91. ^{29}Si NMR spectrum of **5da**

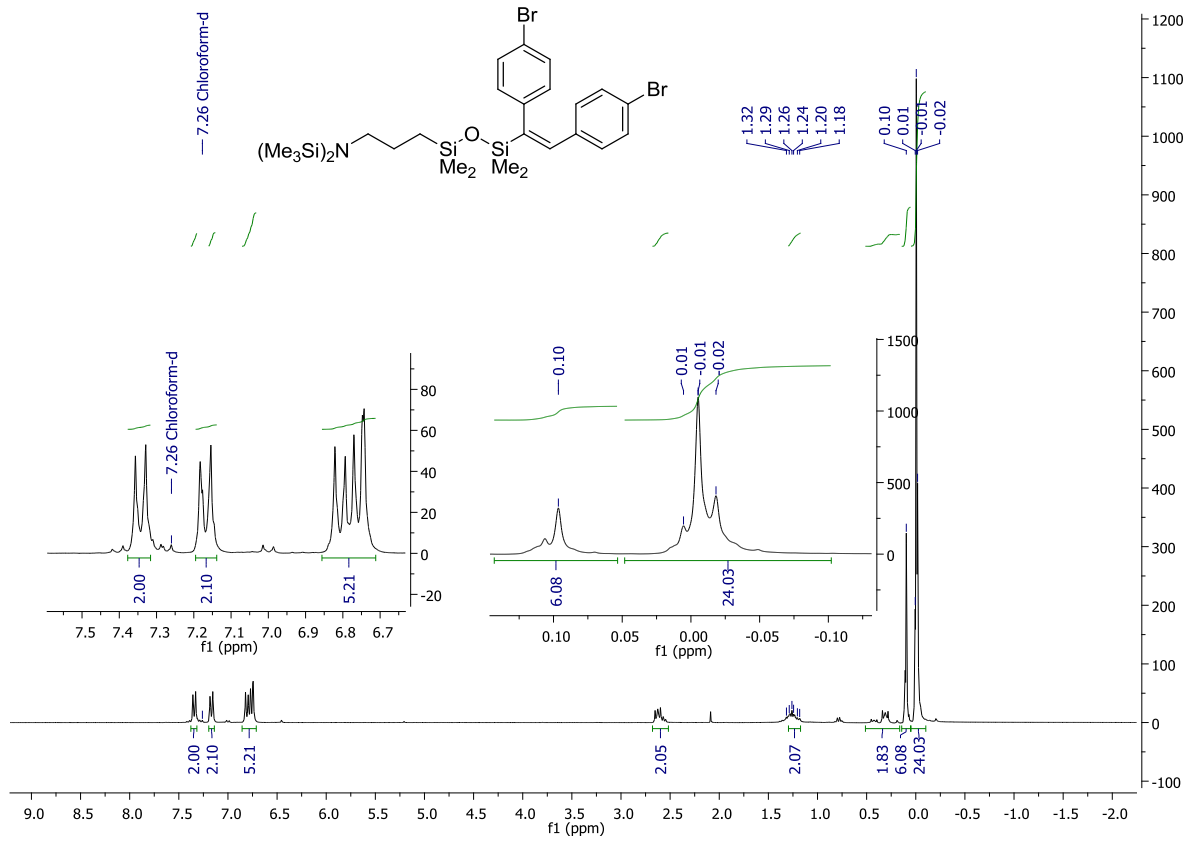


Figure S92. [1]H NMR spectrum of **5db**

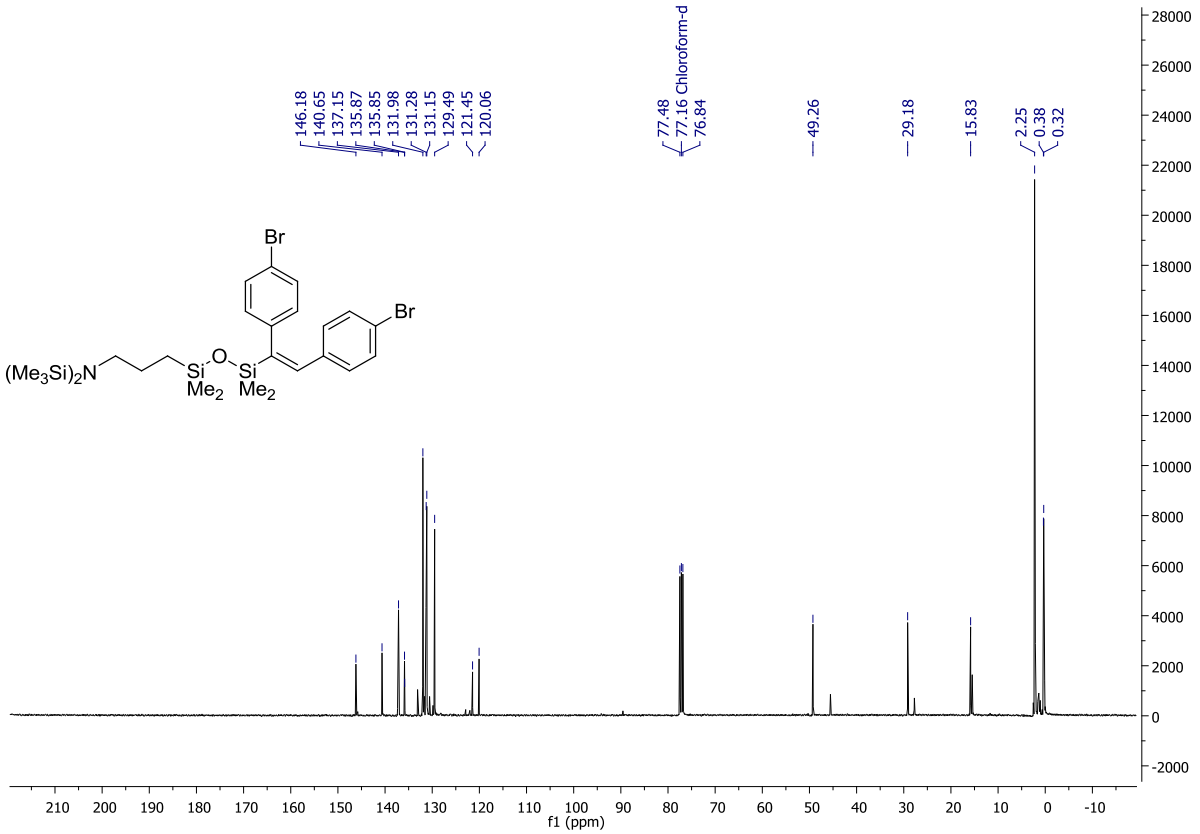


Figure S93. [13]C NMR spectrum of **5db**

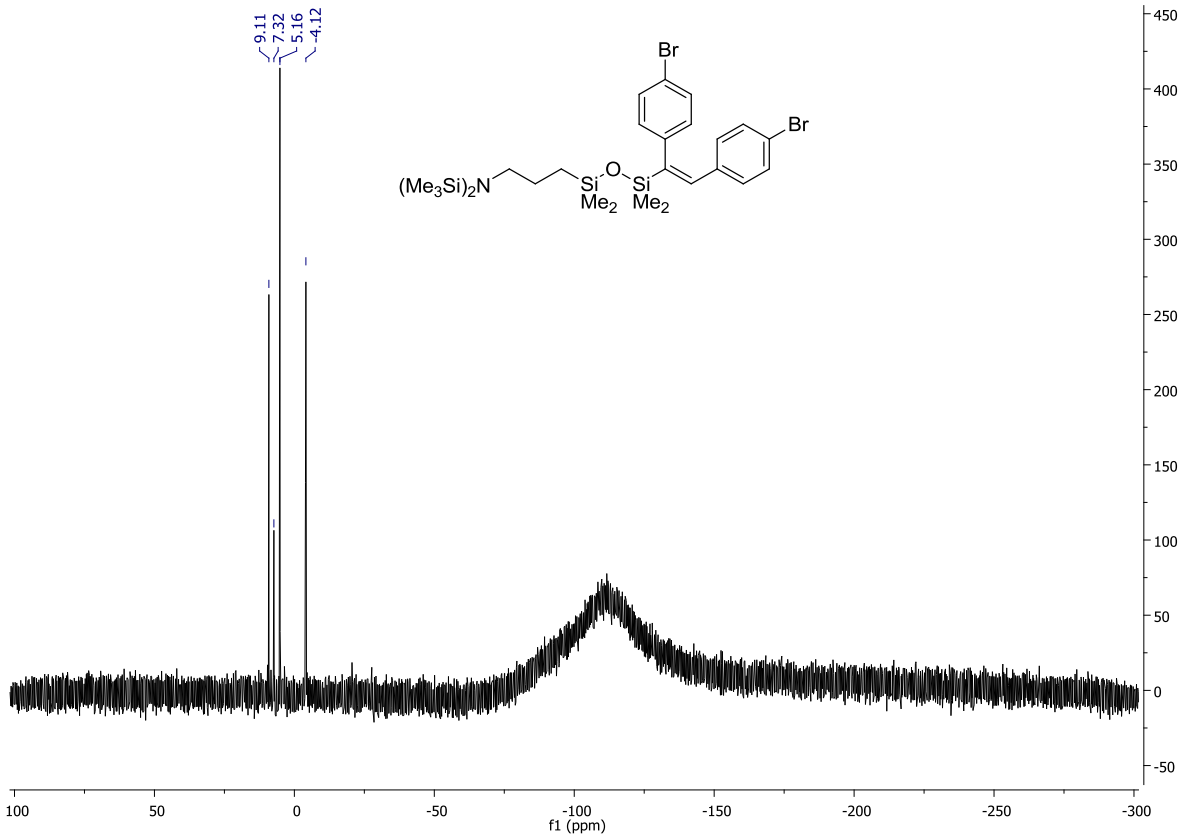


Figure S94. ^{29}Si NMR spectrum of **5db**

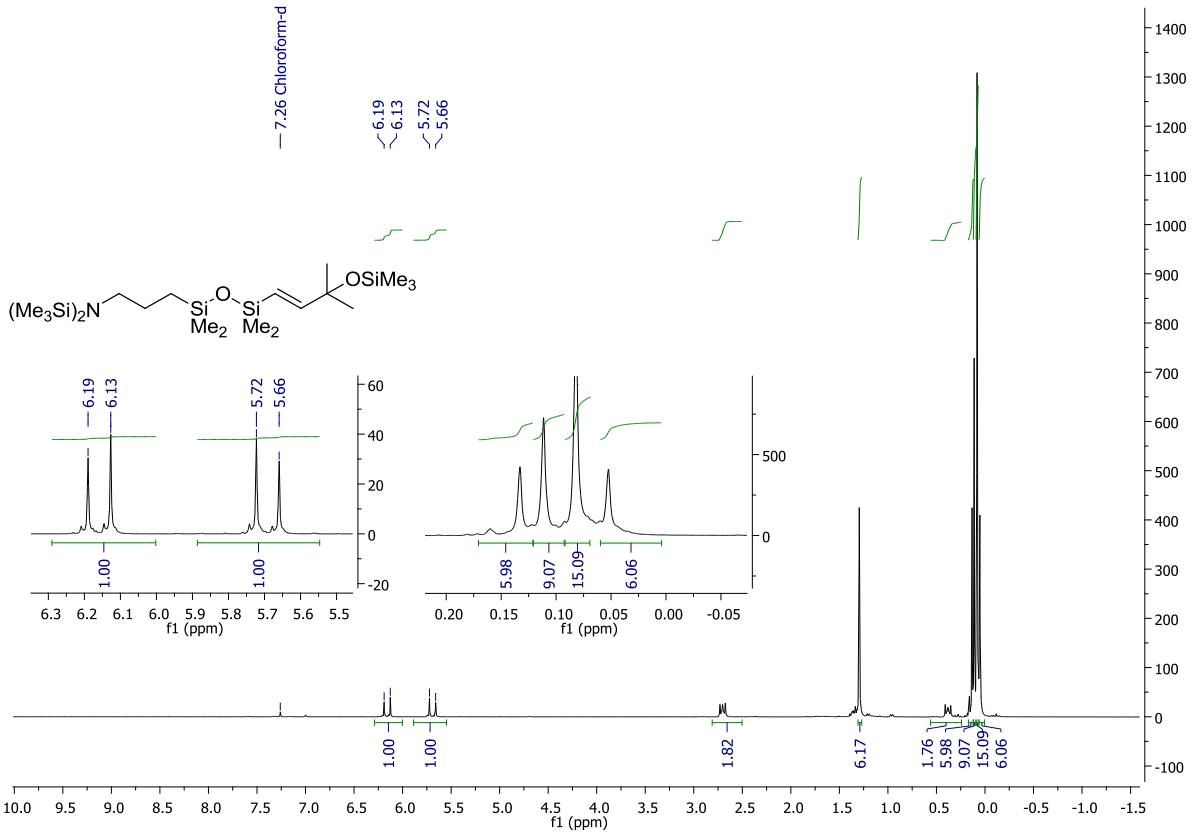


Figure S95. [1]H NMR spectrum of **5df**

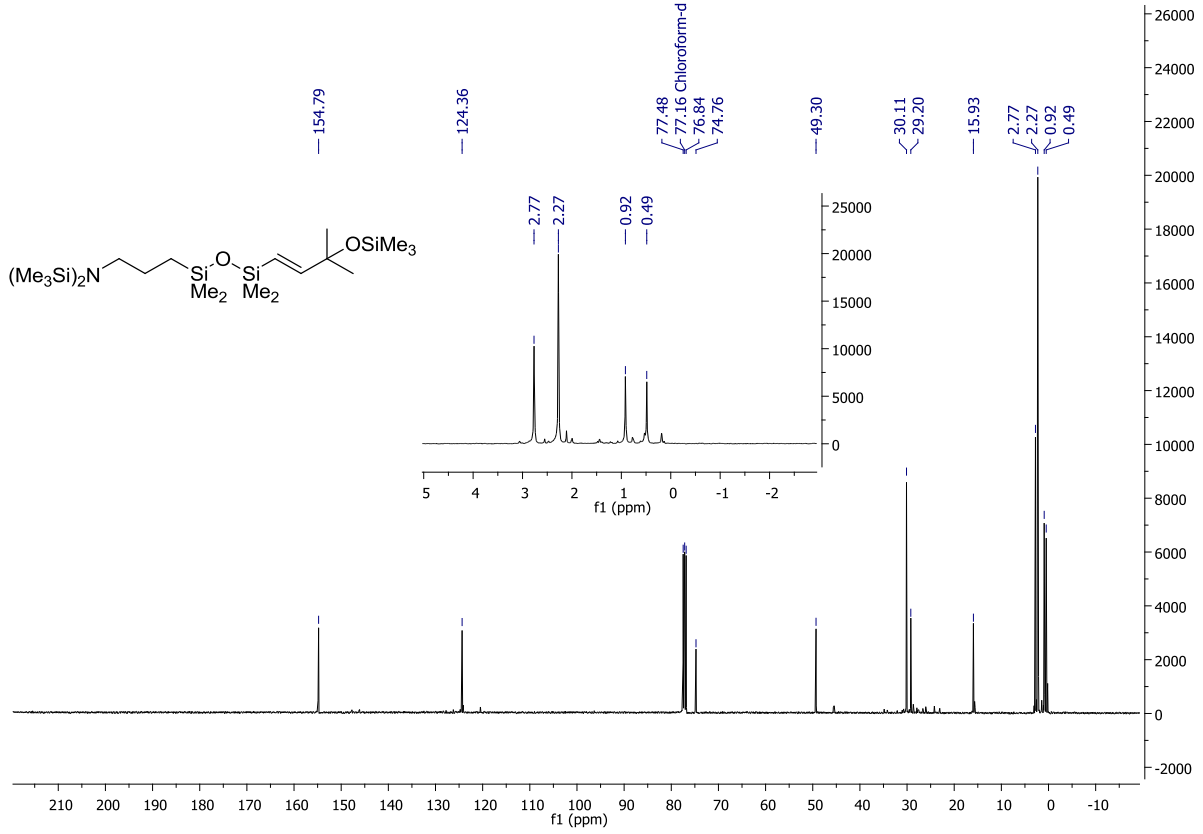


Figure S96. [13]C NMR spectrum of **5df**

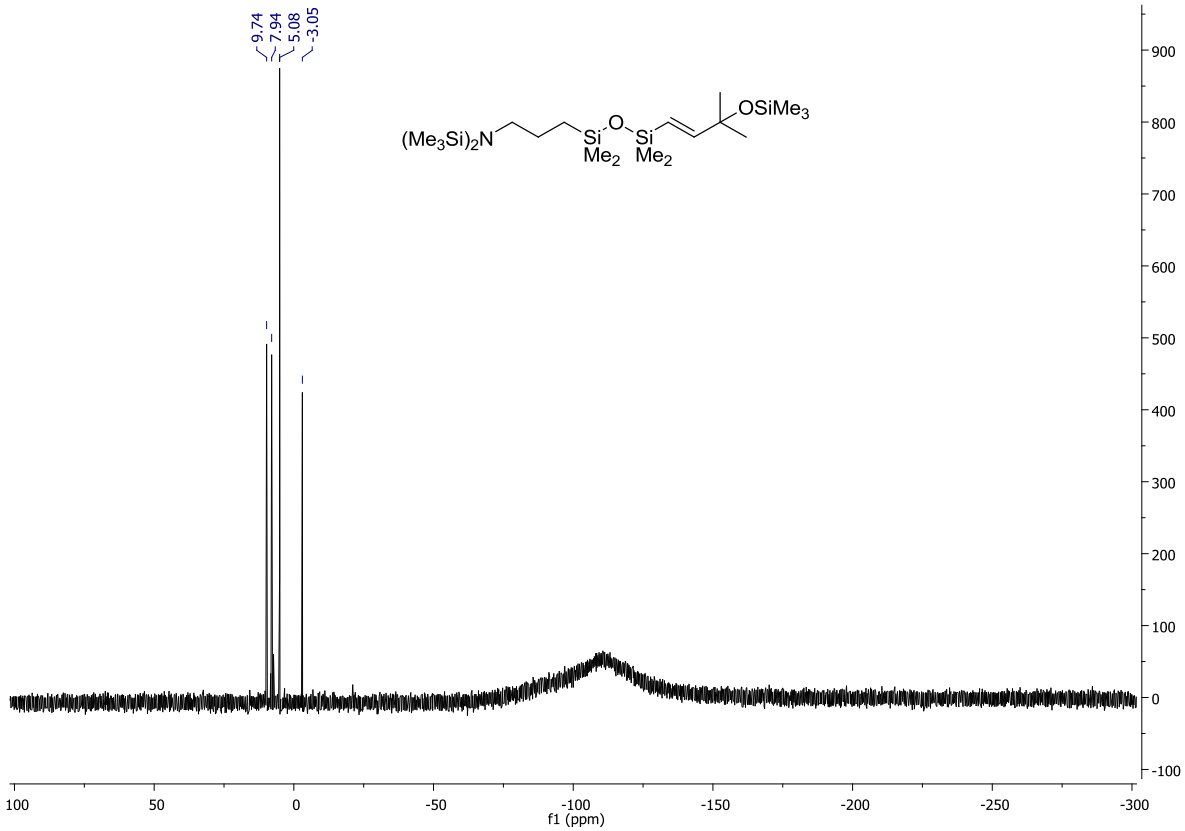


Figure S97. ^{29}Si NMR spectrum of **5df**

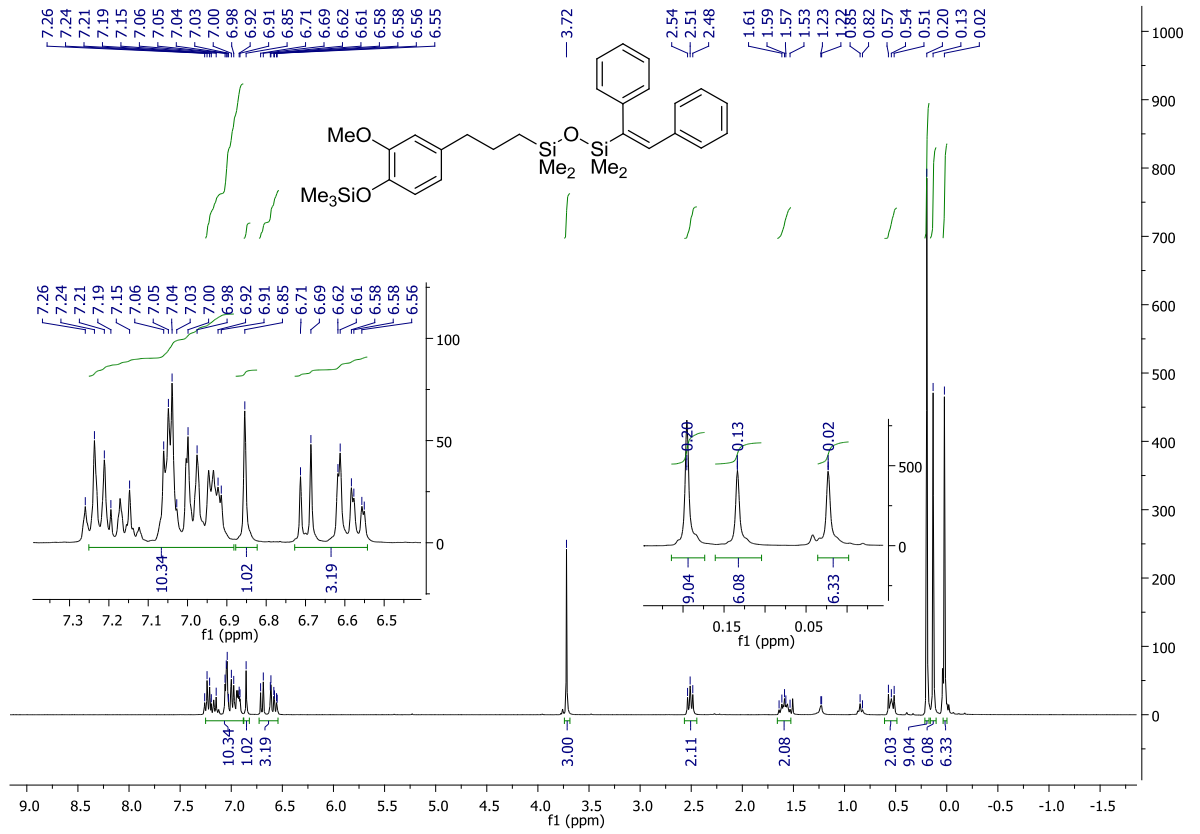


Figure S98. ^{1}H NMR spectrum of **5ea**

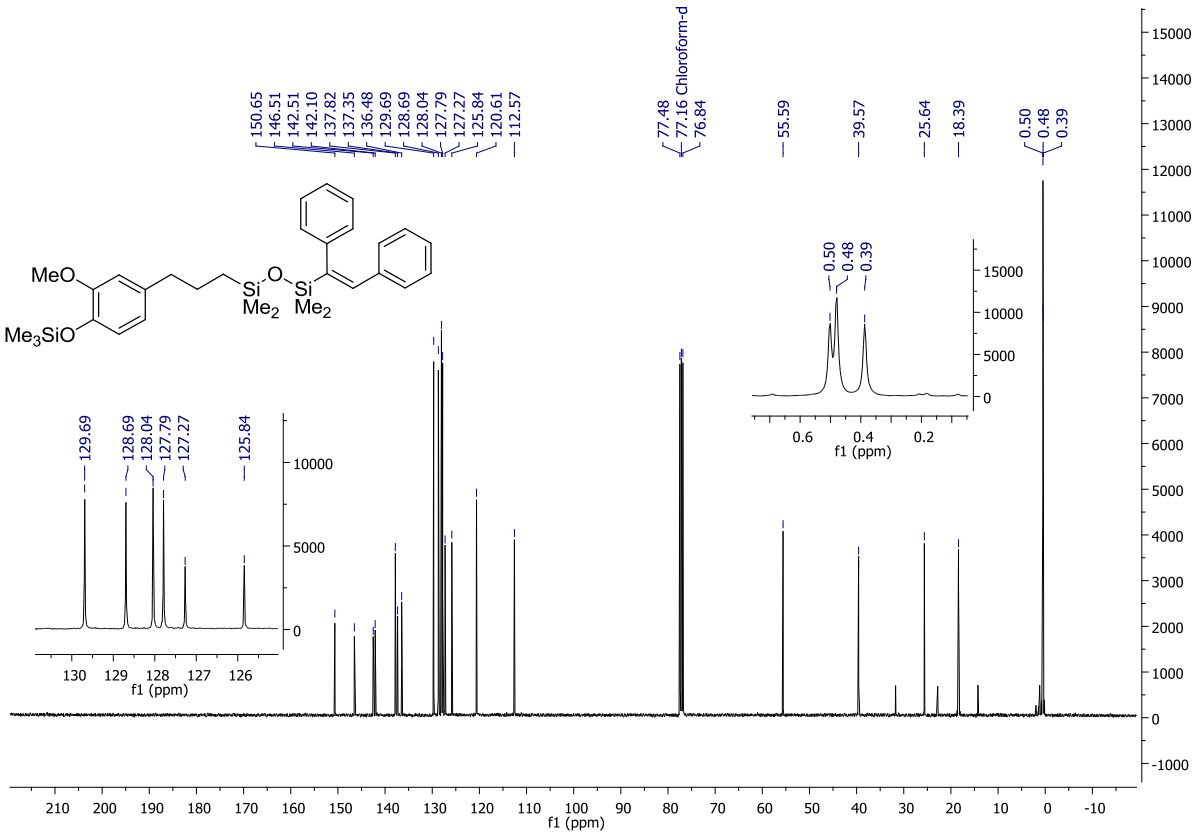


Figure S99. ^{13}C NMR spectrum of **5ea**

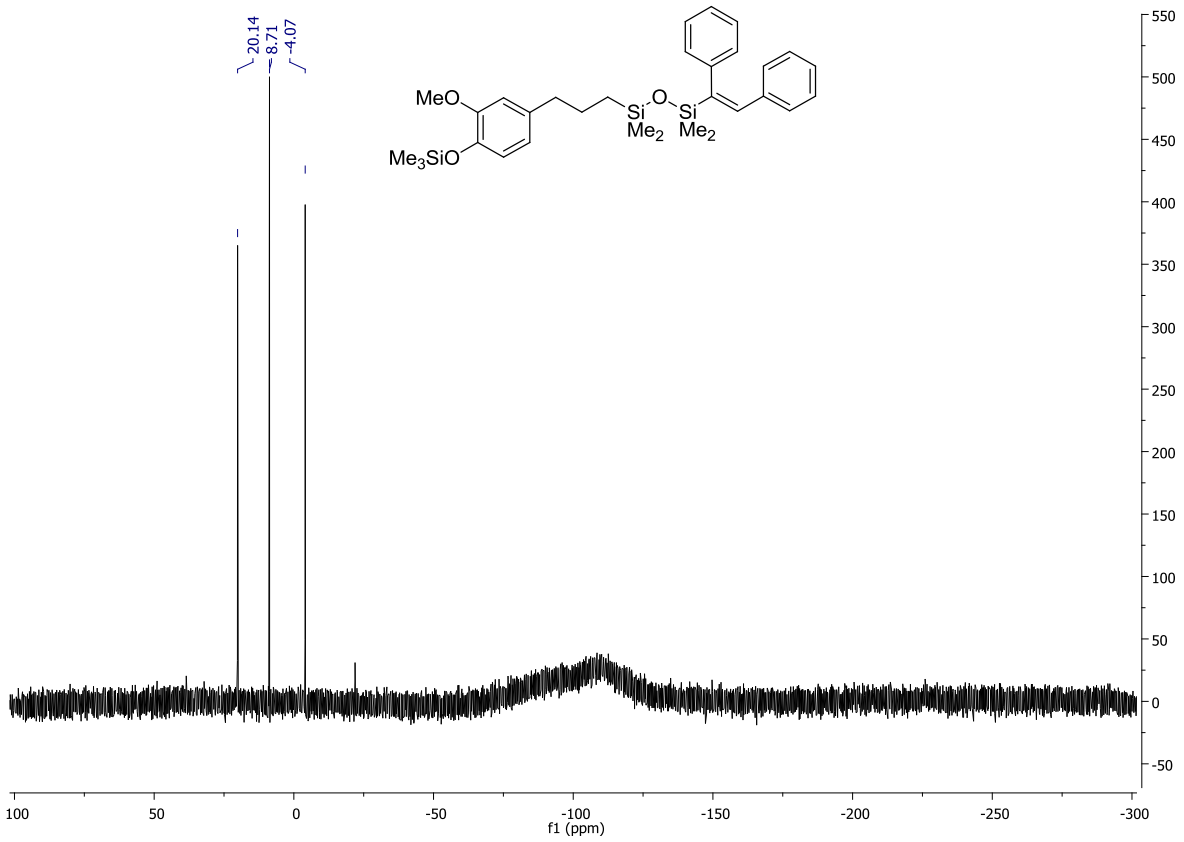


Figure S100. ^{29}Si NMR spectrum of **5ea**

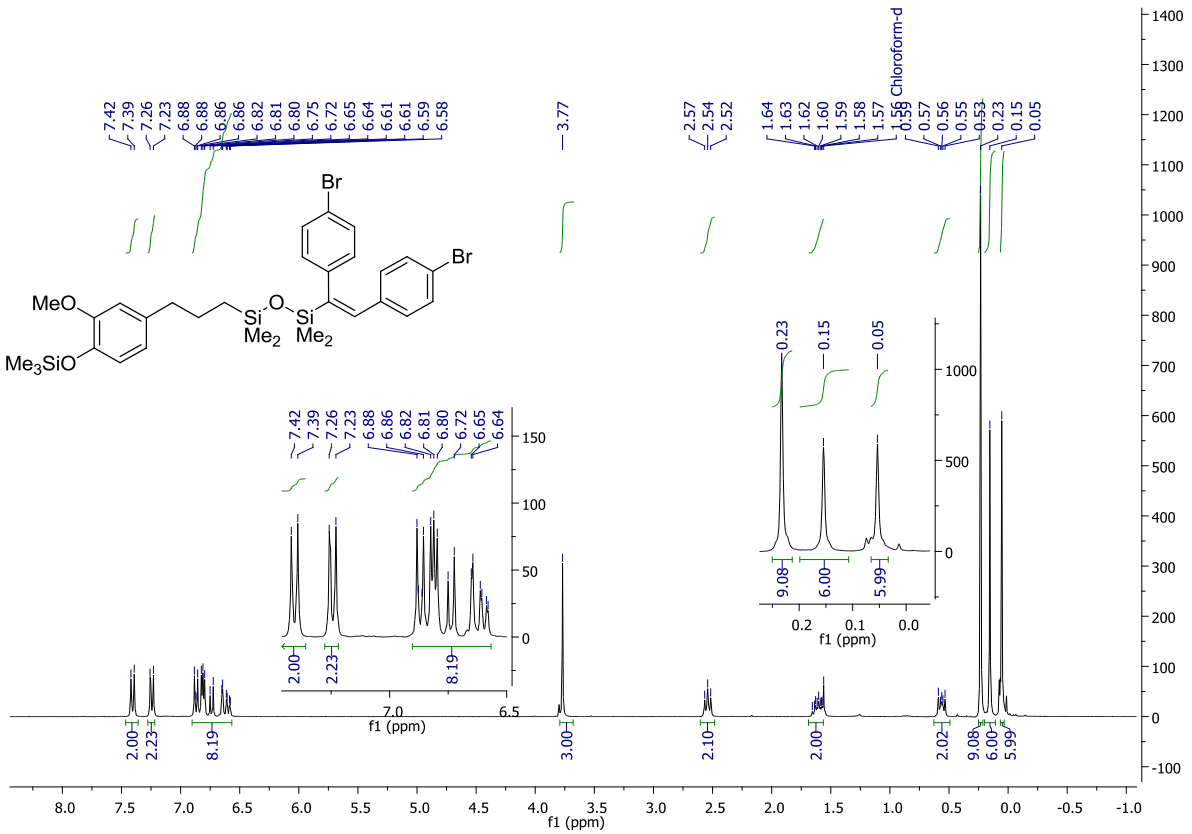


Figure S101. [1]H NMR spectrum of **5eb**

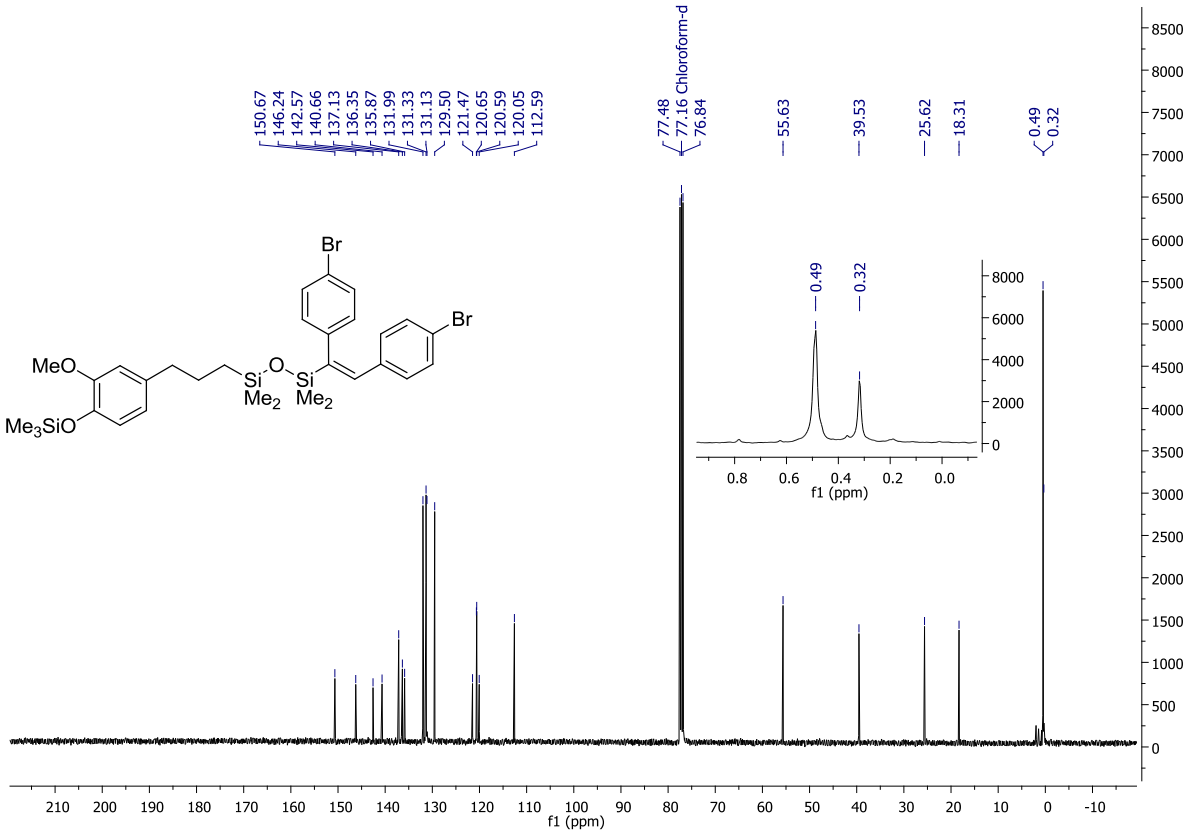


Figure S102. [13]C NMR spectrum of **5eb**

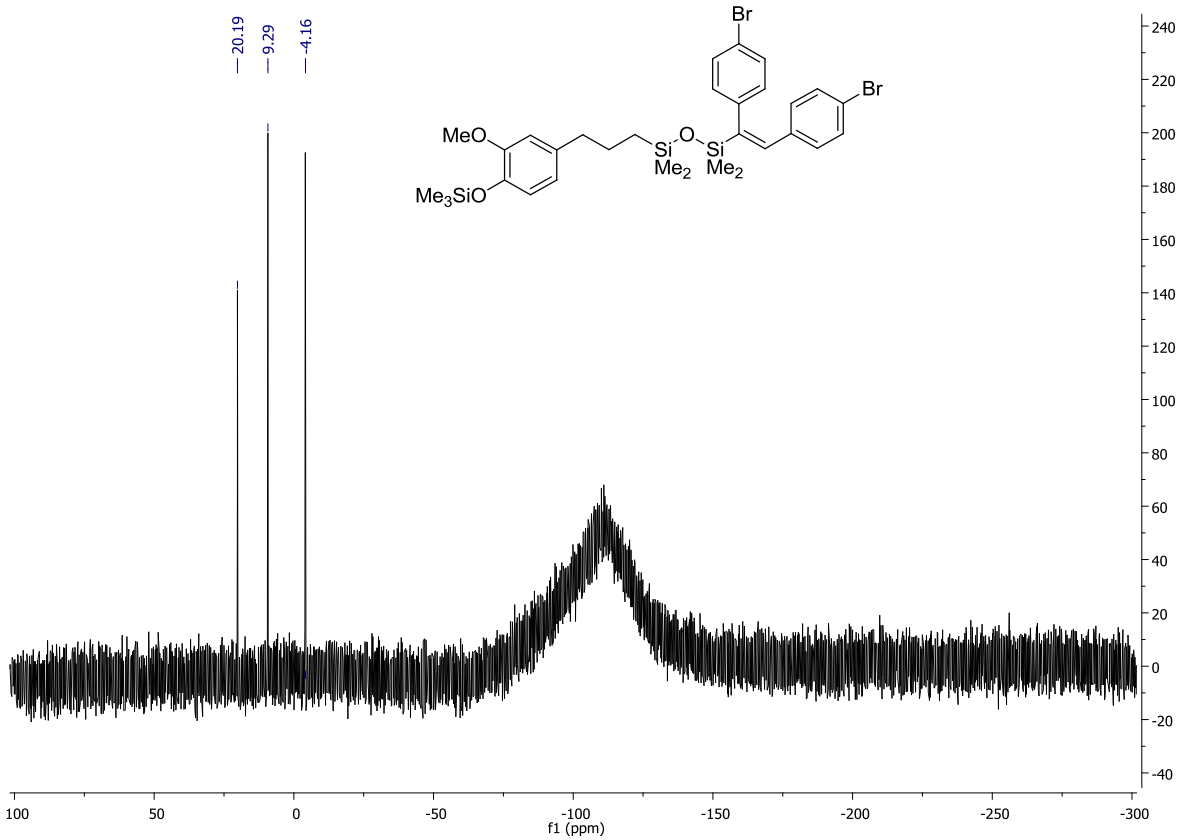


Figure S103. ^{29}Si NMR spectrum of **5eb**

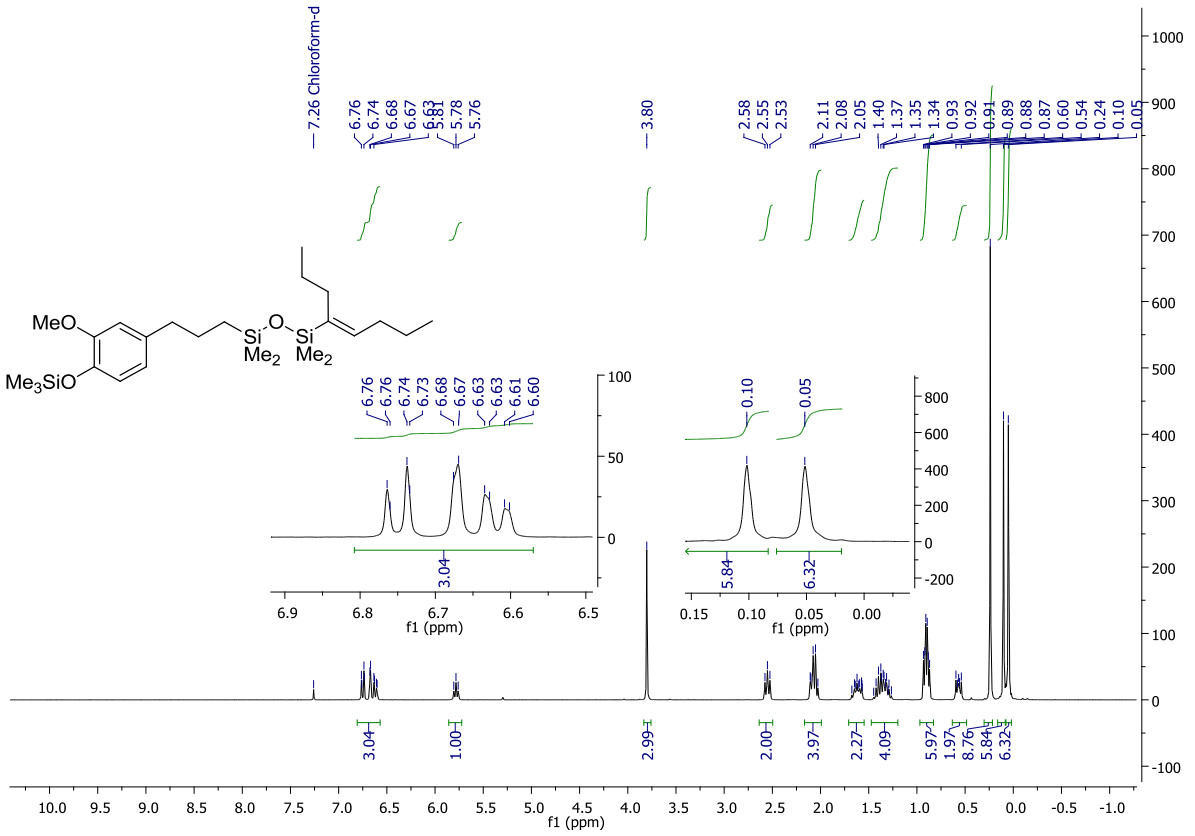


Figure S104. [1]H NMR spectrum of **5ec**

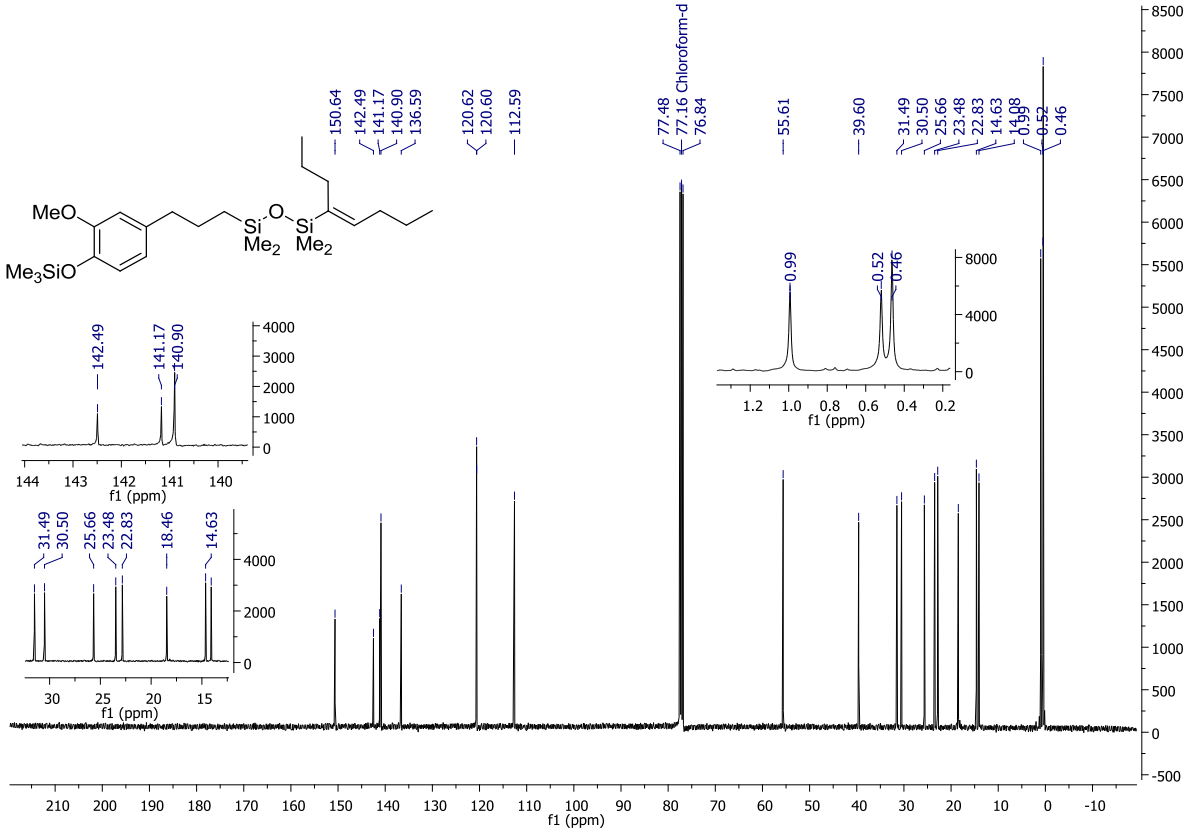


Figure S105. [13]C NMR spectrum of **5ec**

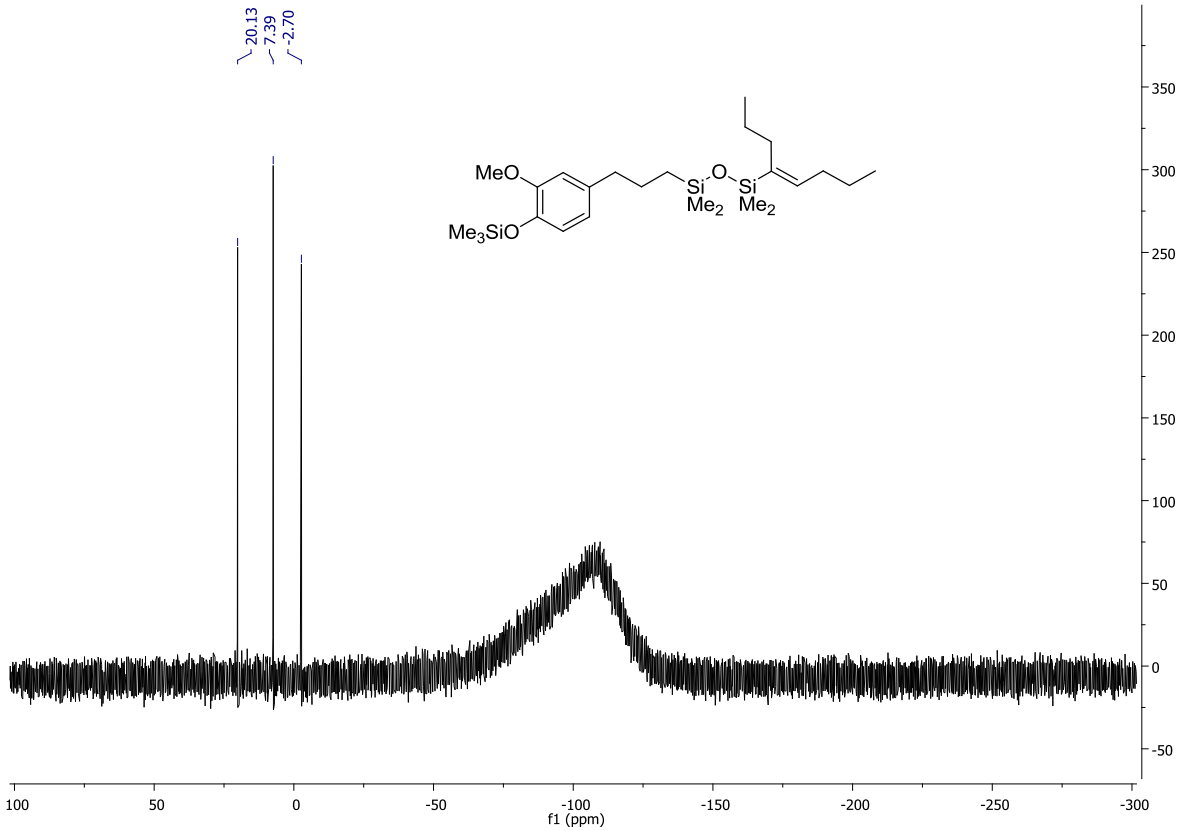


Figure S106. ^{29}Si NMR spectrum of **5ec**

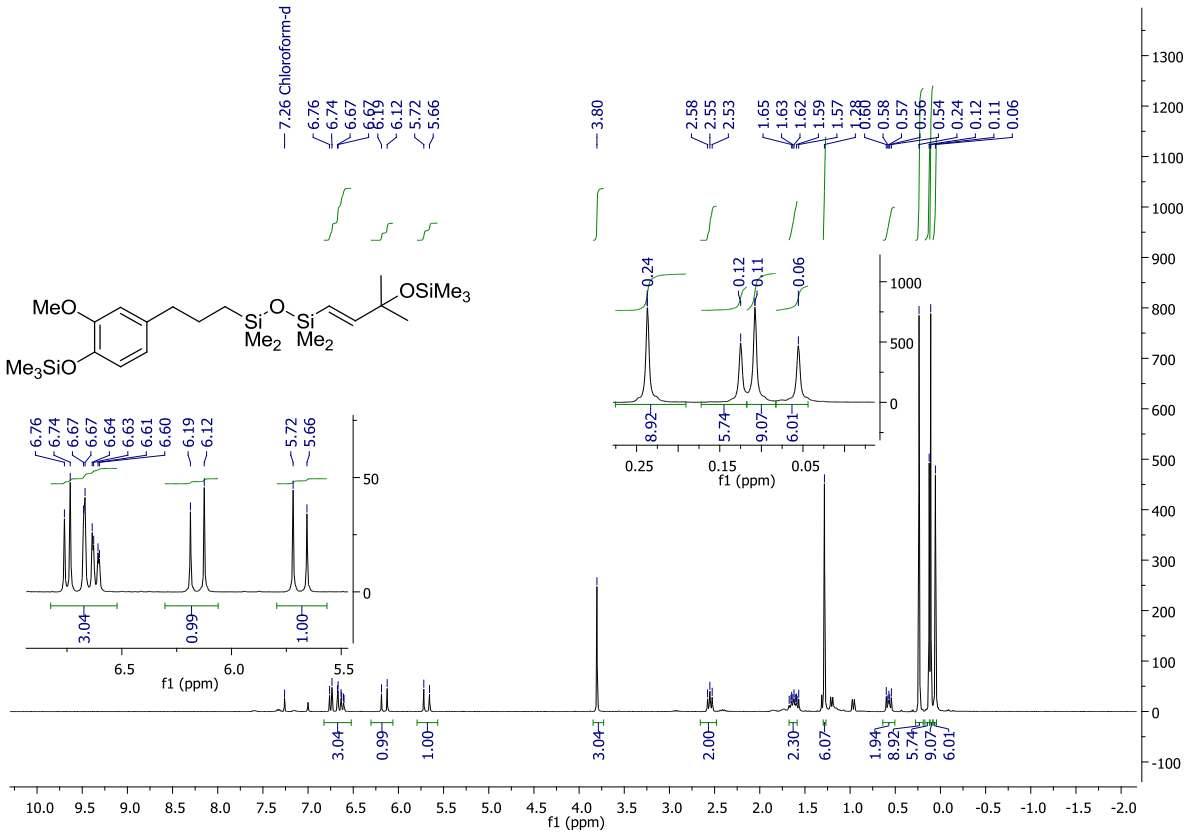


Figure S107. [1]H NMR spectrum of **5ef**

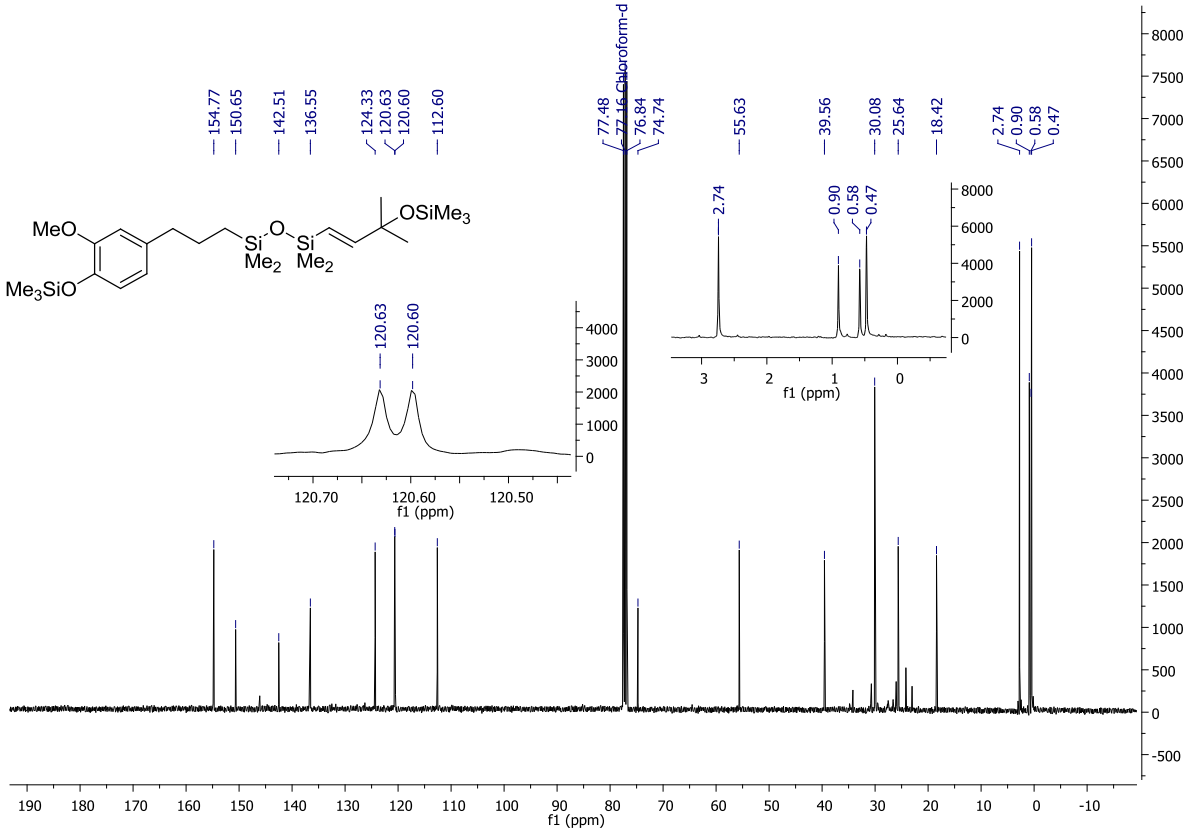


Figure S108. [13]C NMR spectrum of **5ef**

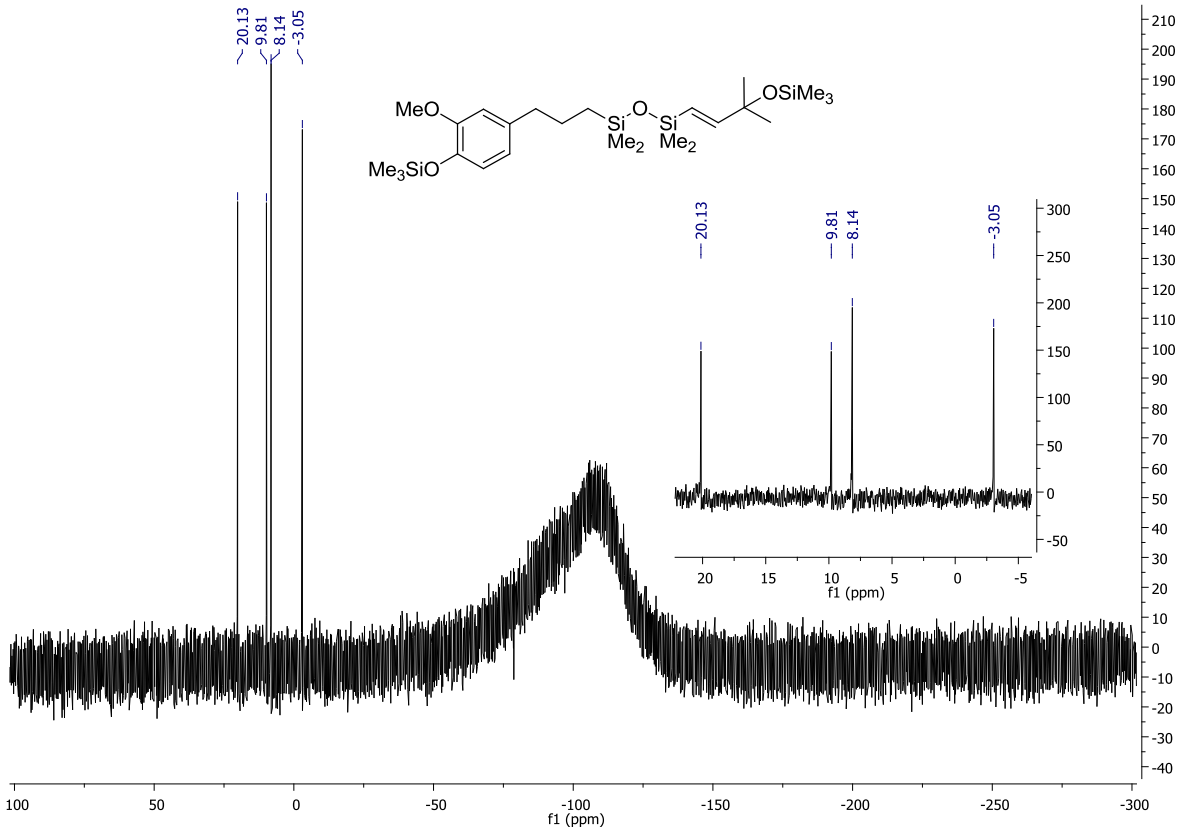


Figure S109. ^{29}Si NMR spectrum of **5ef**

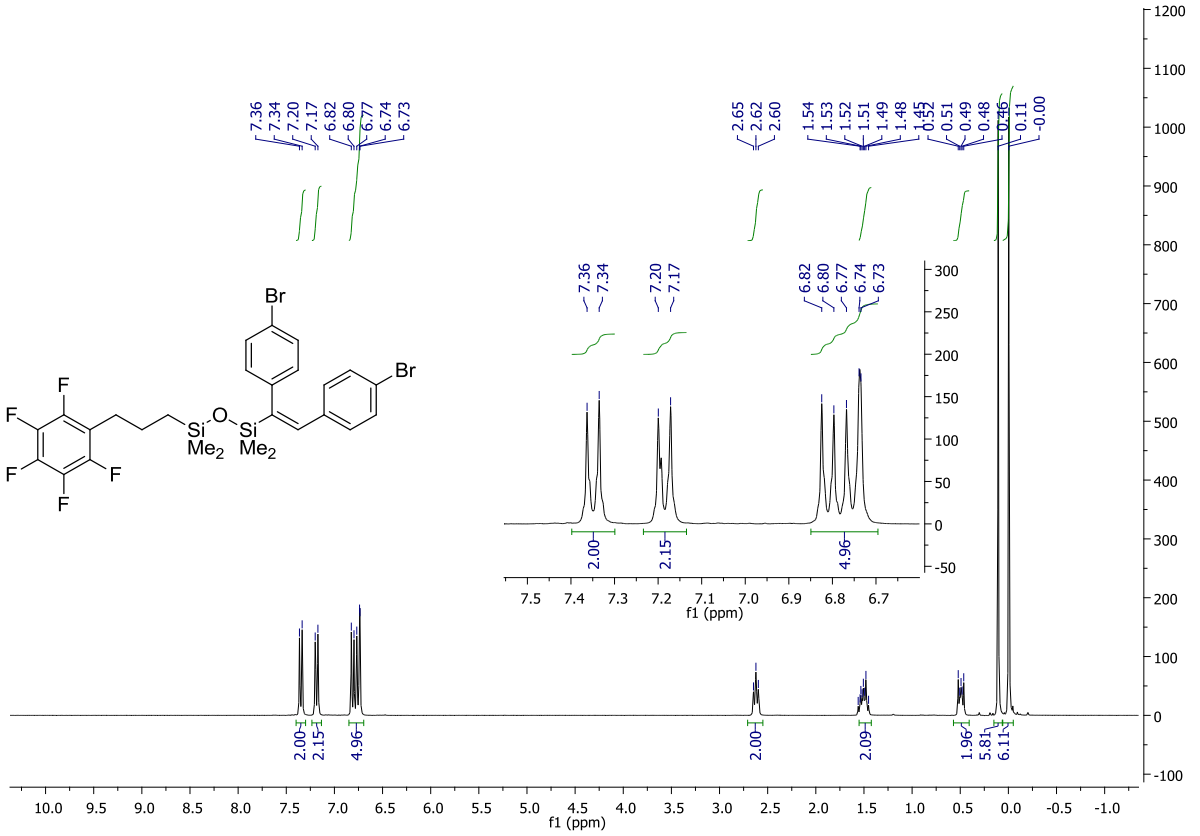


Figure S110. ^{1}H NMR spectrum of **5fb**

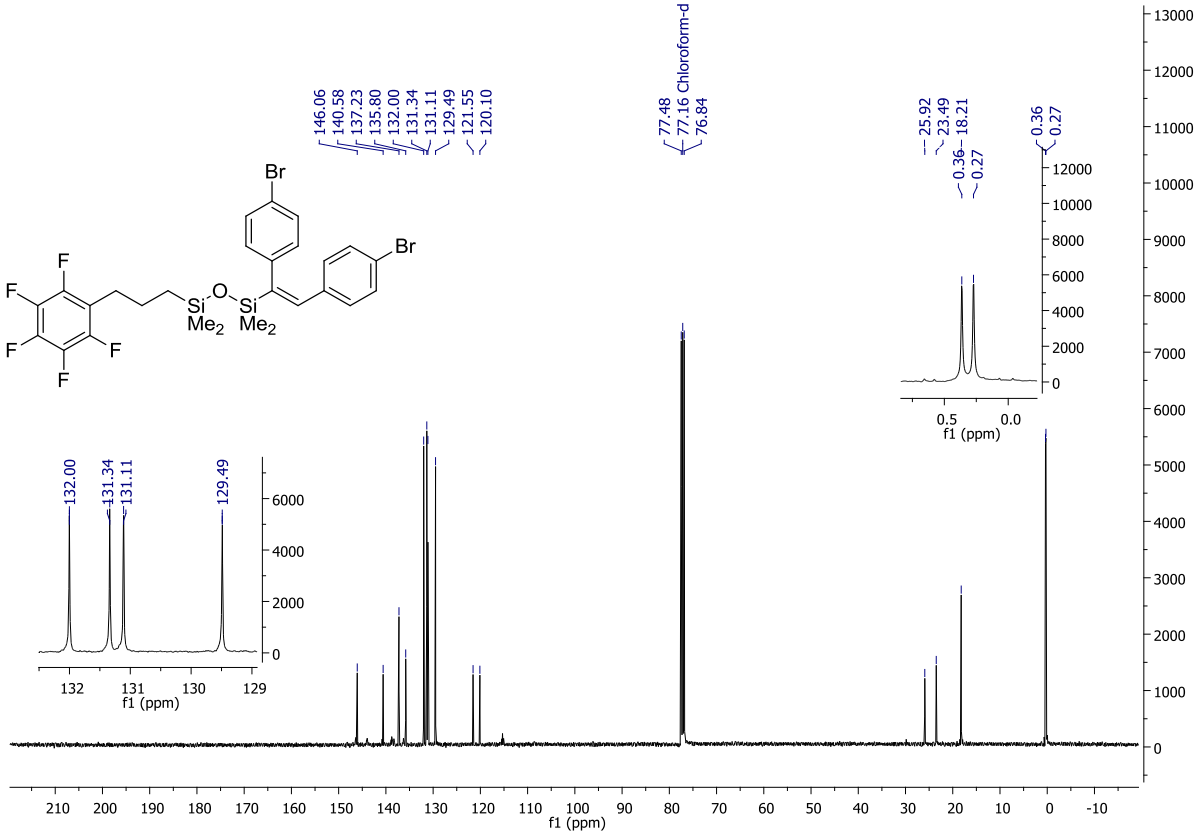


Figure S111. ^{13}C NMR spectrum of **5fb**

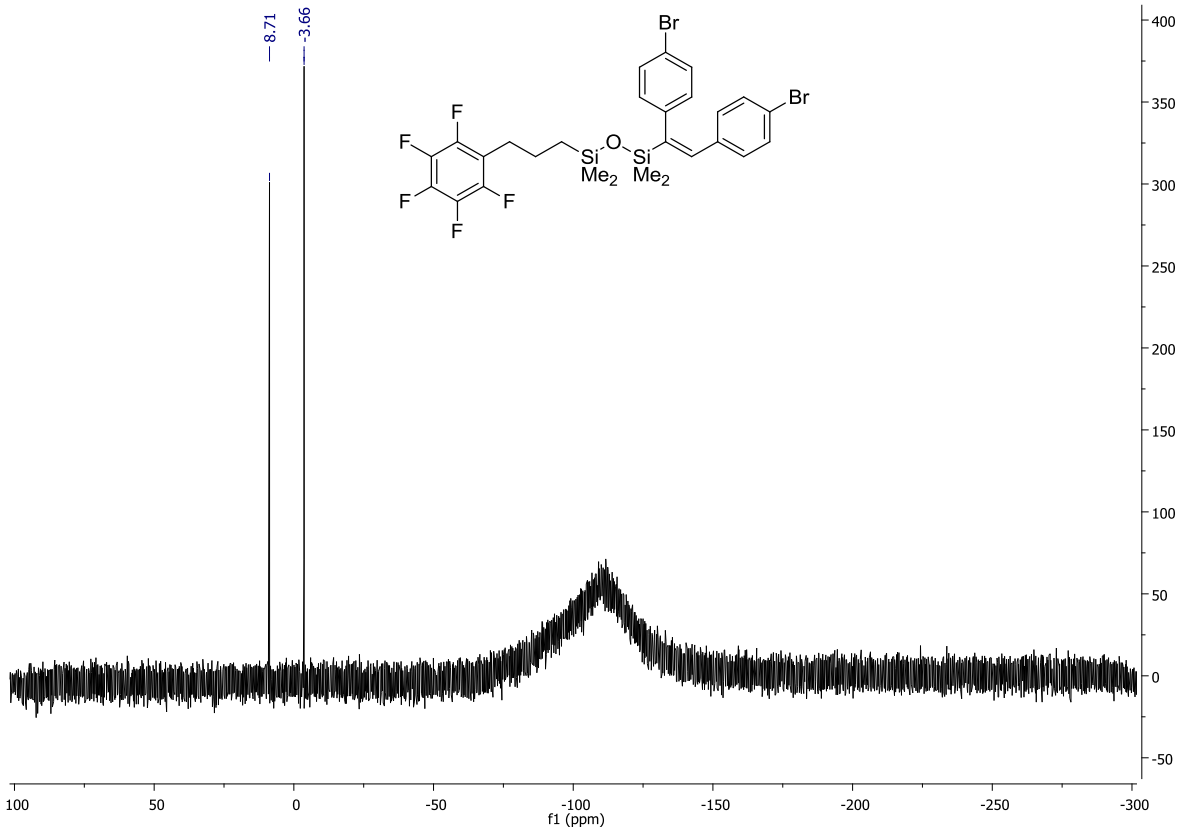


Figure S112. ^{29}Si NMR spectrum of **5fb**

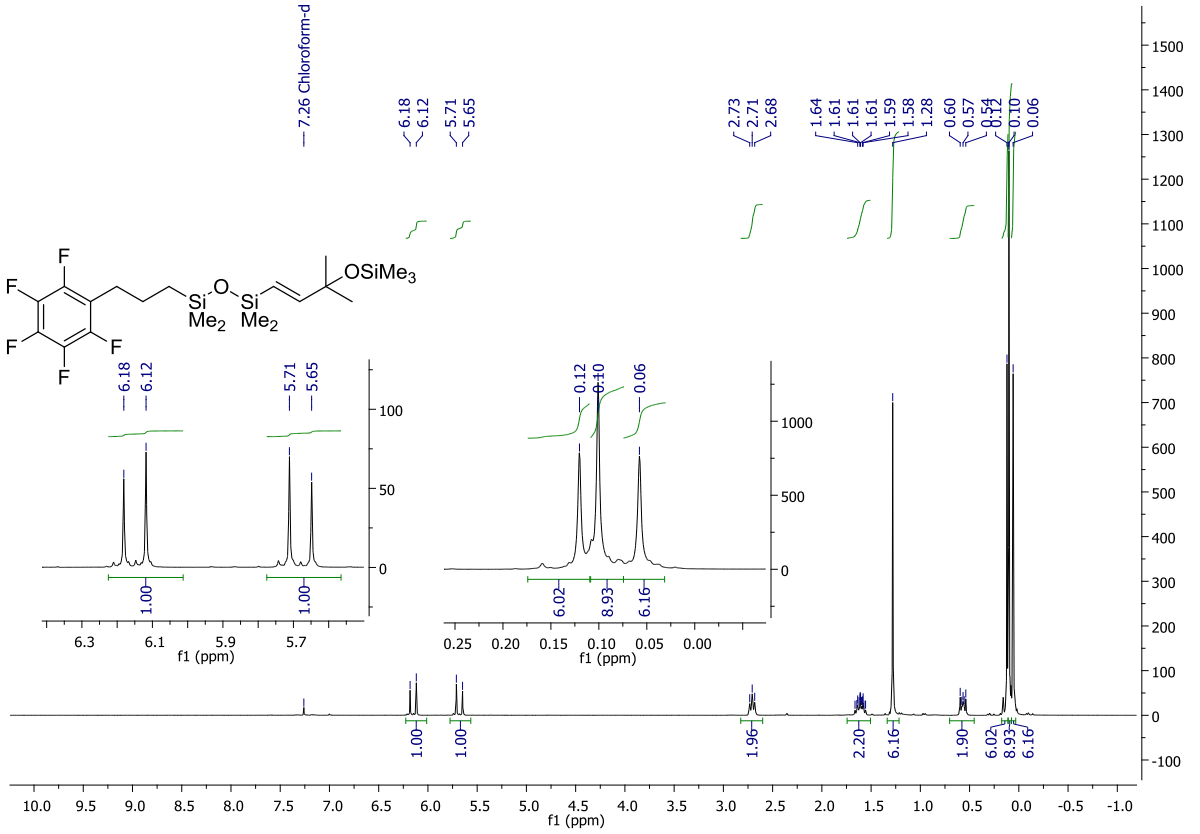


Figure S113. [1]H NMR spectrum of **5ff**

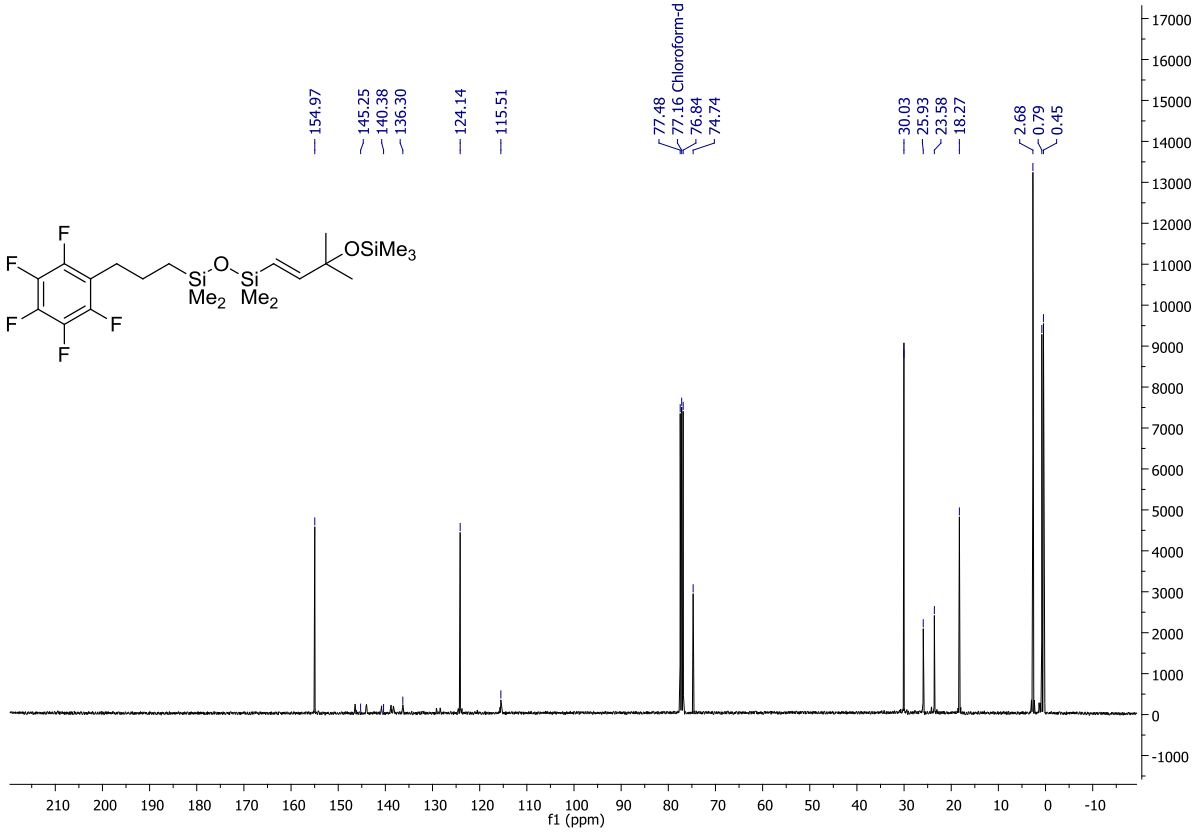


Figure S114. [13]C NMR spectrum of **5ff**

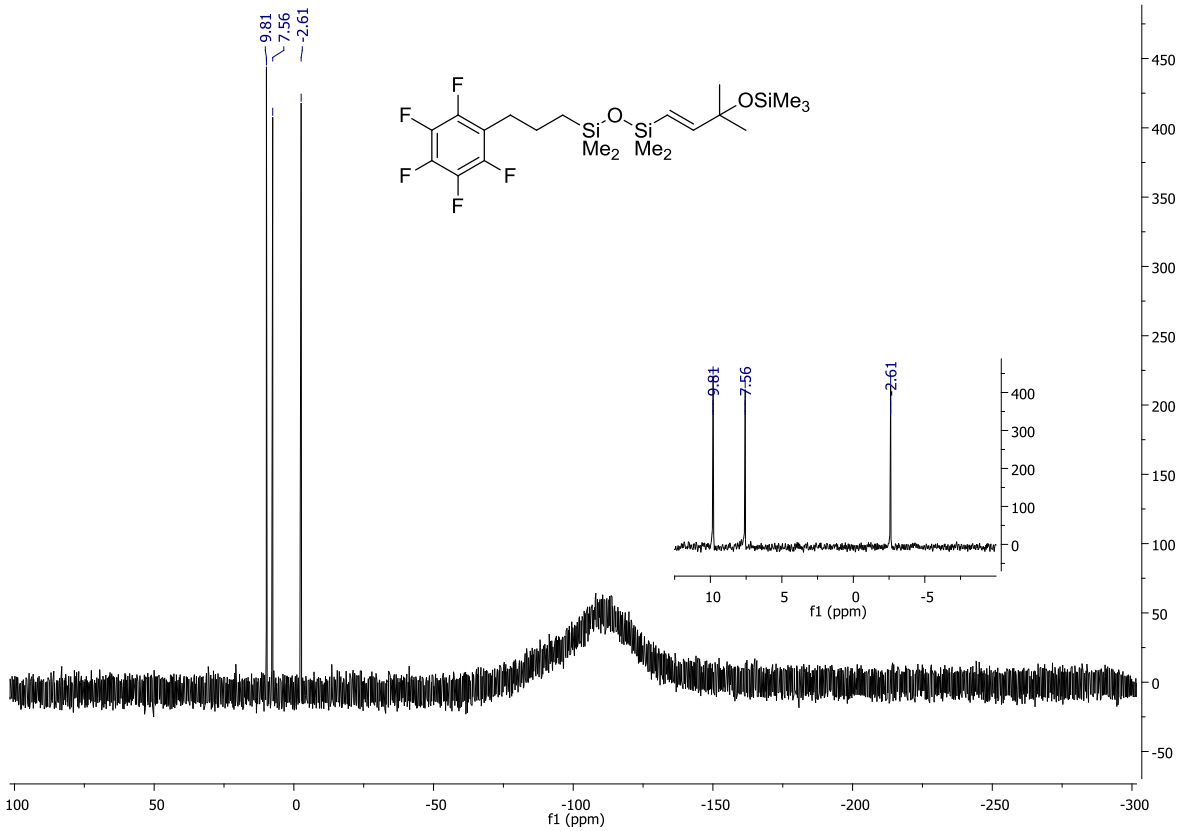


Figure S115. ^{29}Si NMR spectrum of **5ff**

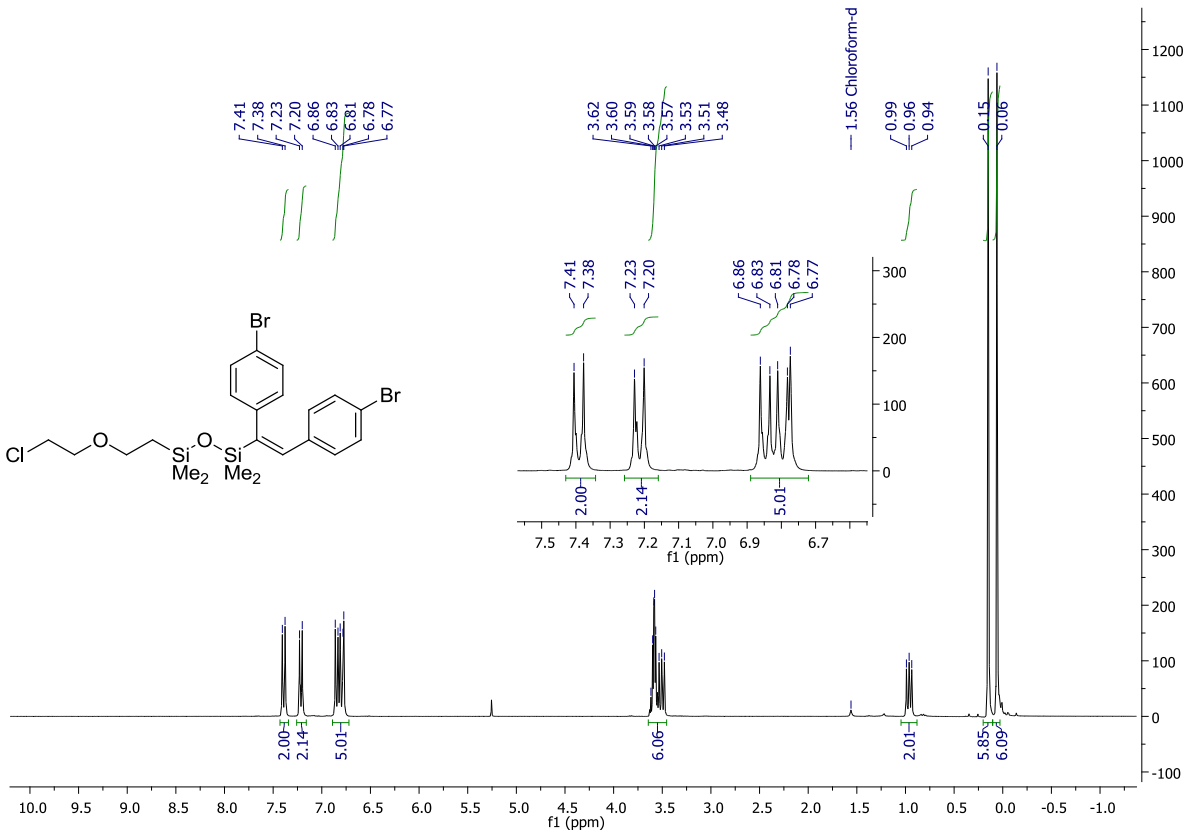


Figure S116. [1]H NMR spectrum of **5gb**

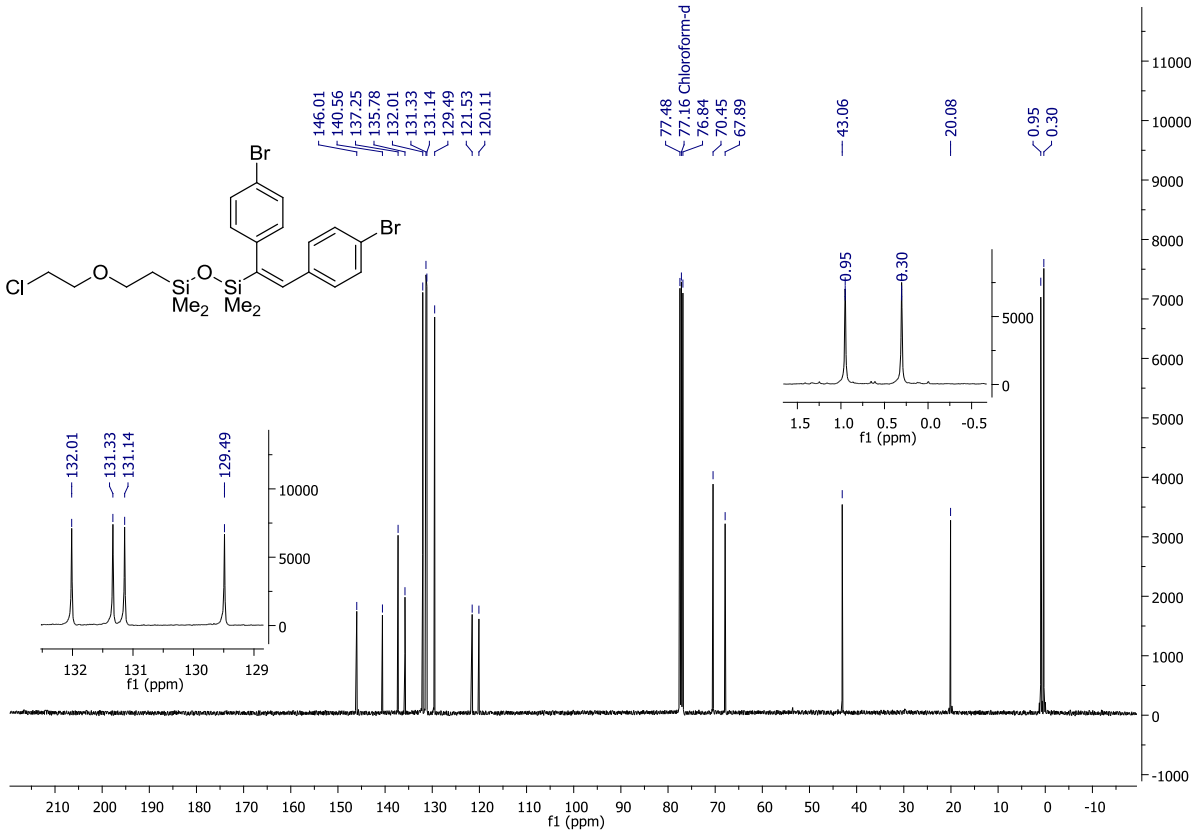


Figure S117. [13]C NMR spectrum of **5gb**

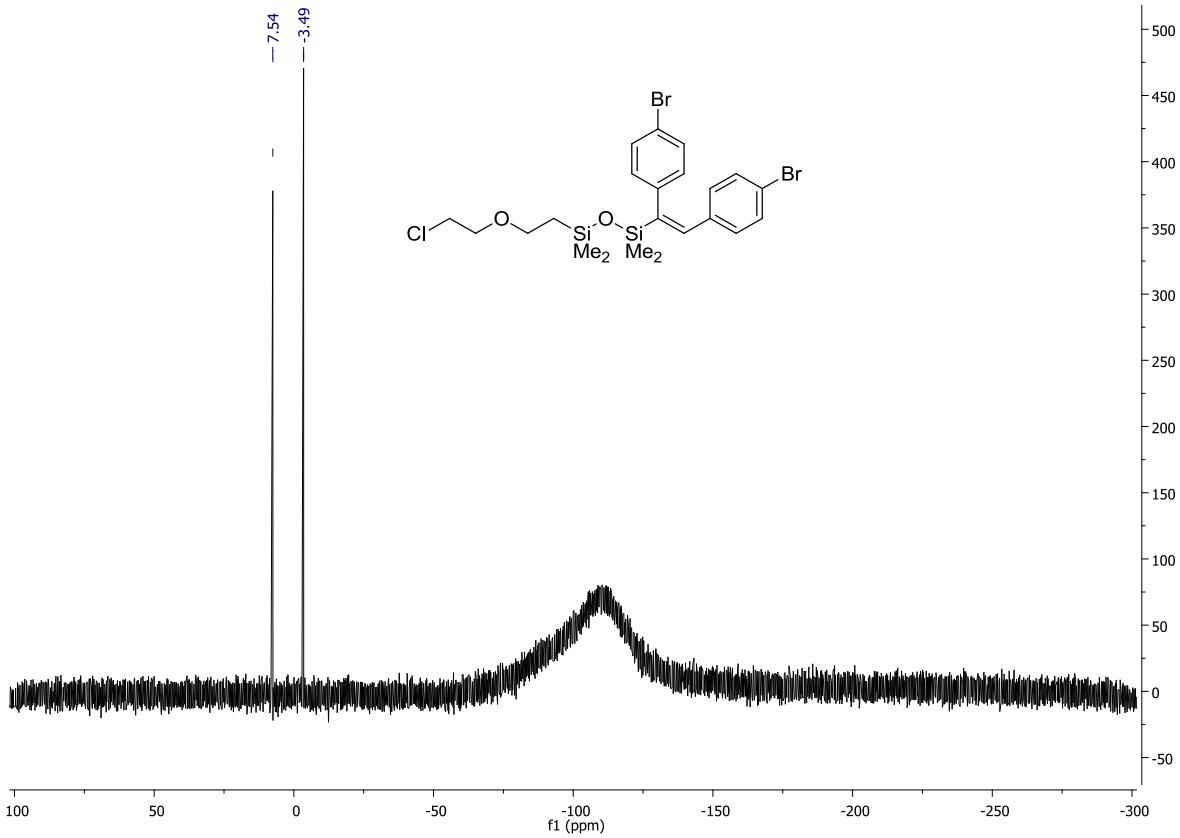


Figure S118. ^{29}Si NMR spectrum of **5gb**

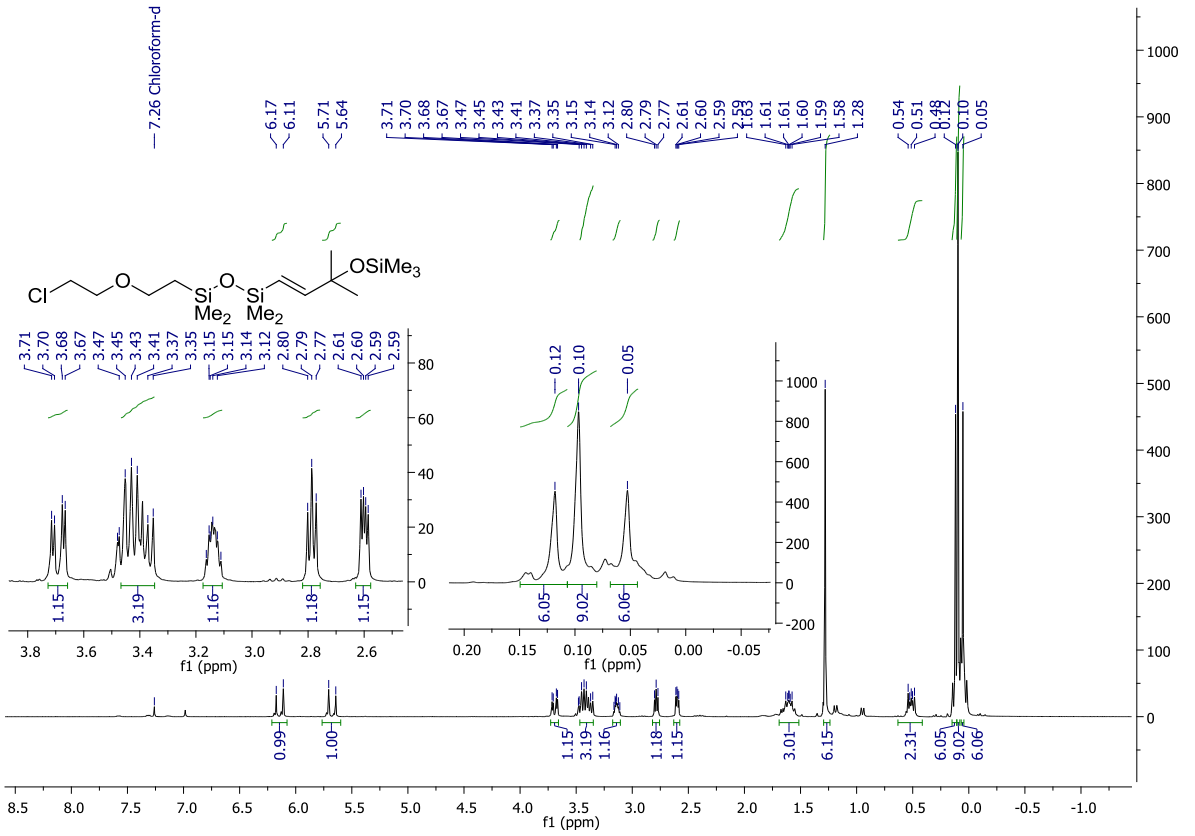


Figure S119. [1]H NMR spectrum of **5gf**

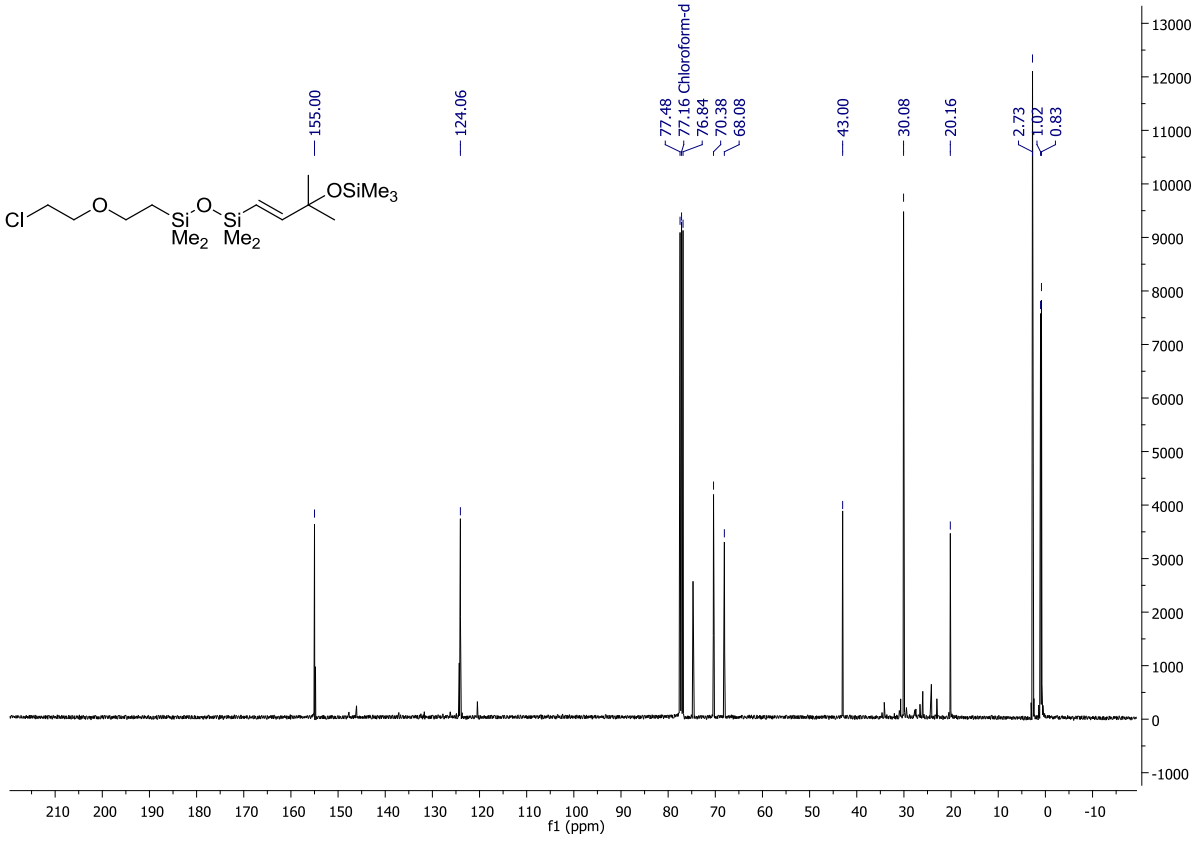


Figure S120. [13]C NMR spectrum of **5gf**

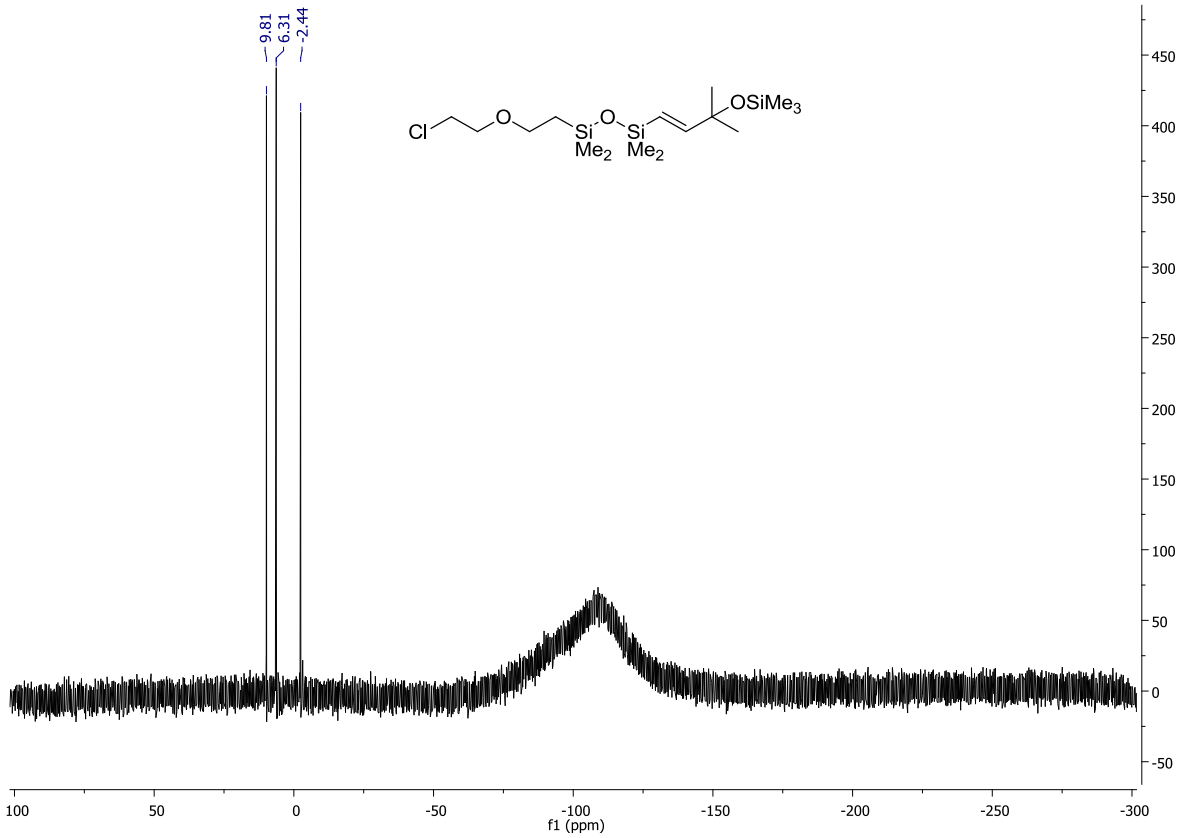


Figure S121. ^{29}Si NMR spectrum of **5gf**

6. HMRS spectra

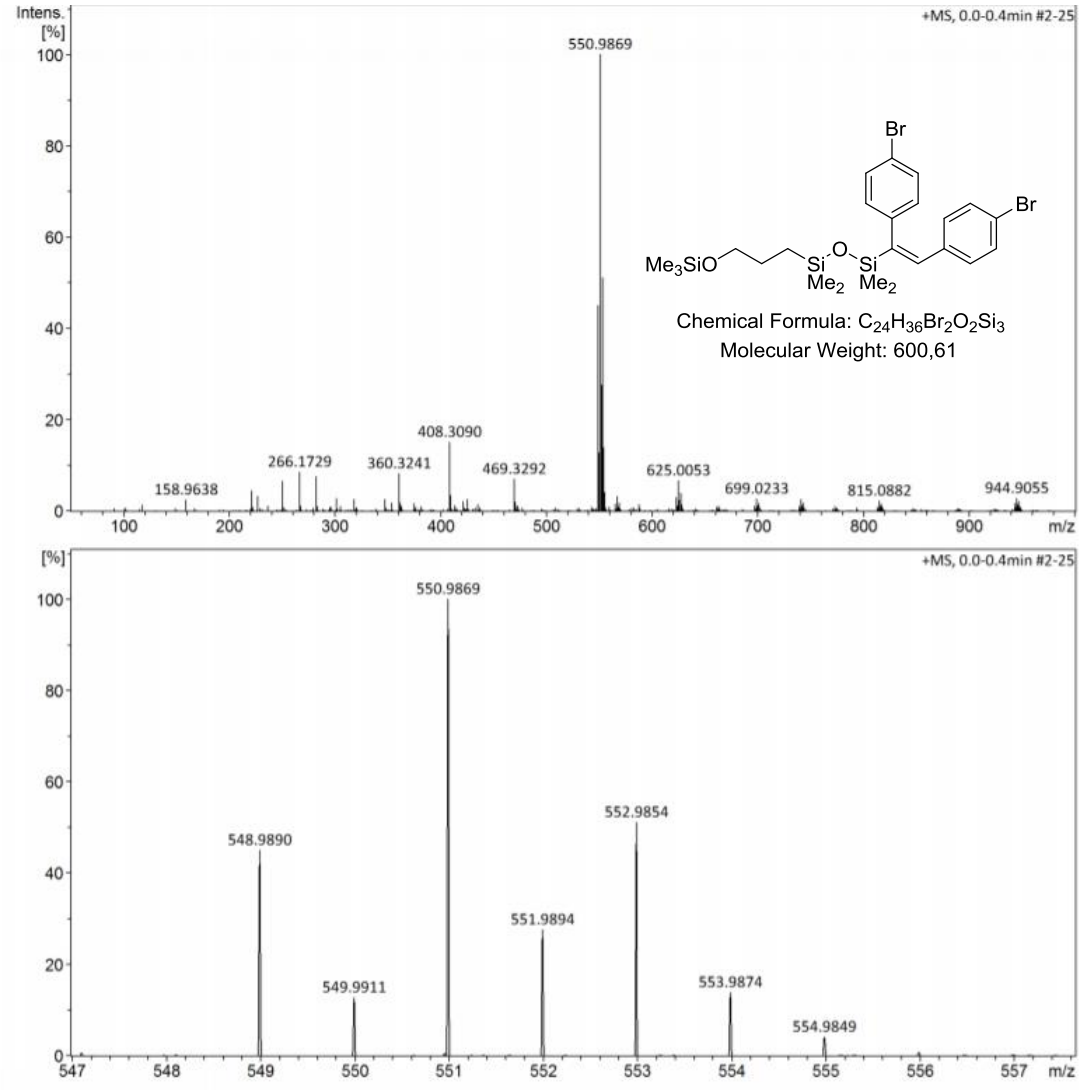


Figure S122. HRMS spectrum of **5ab.**

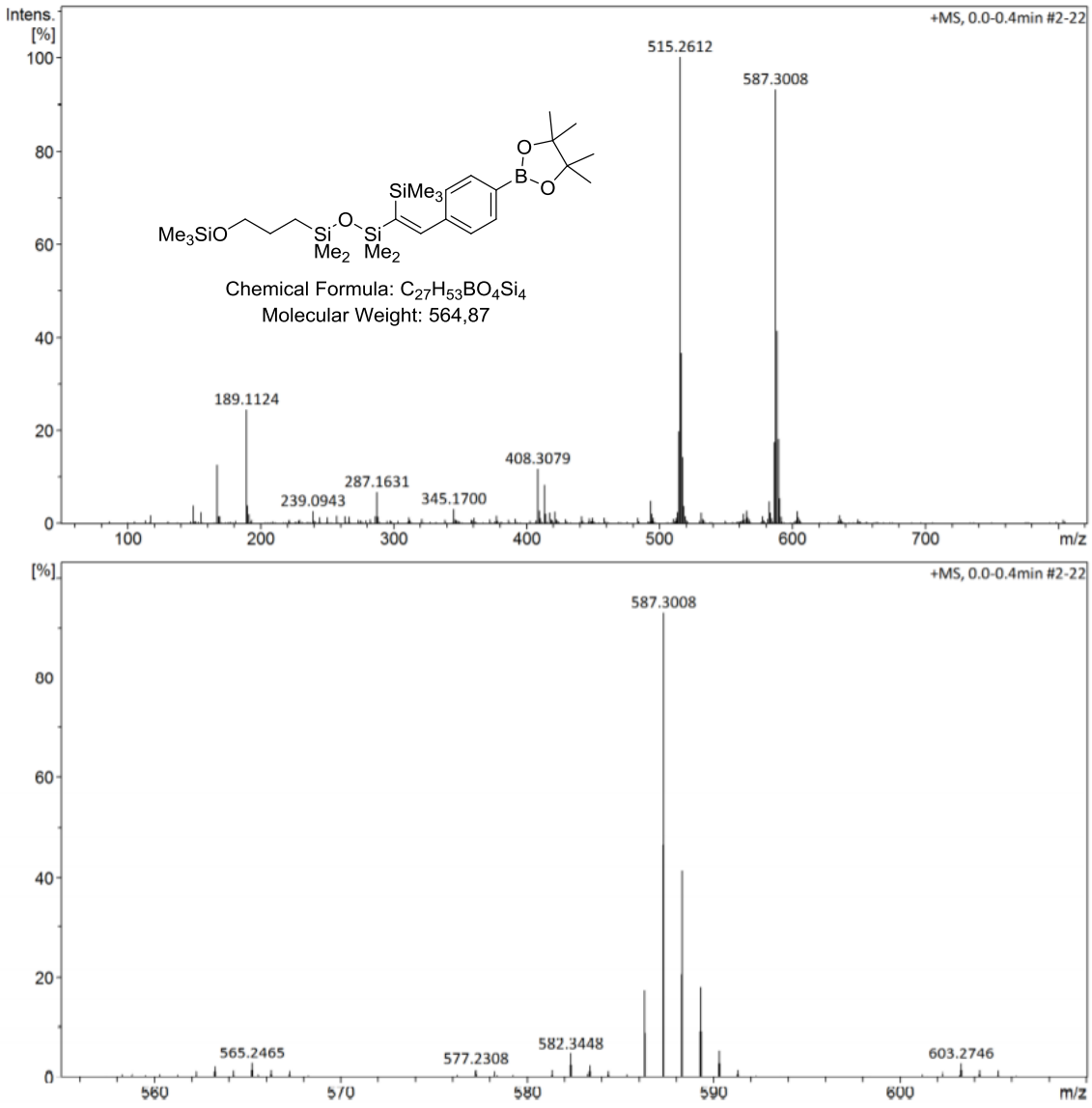


Figure S123. HRMS spectrum of **5ad.**

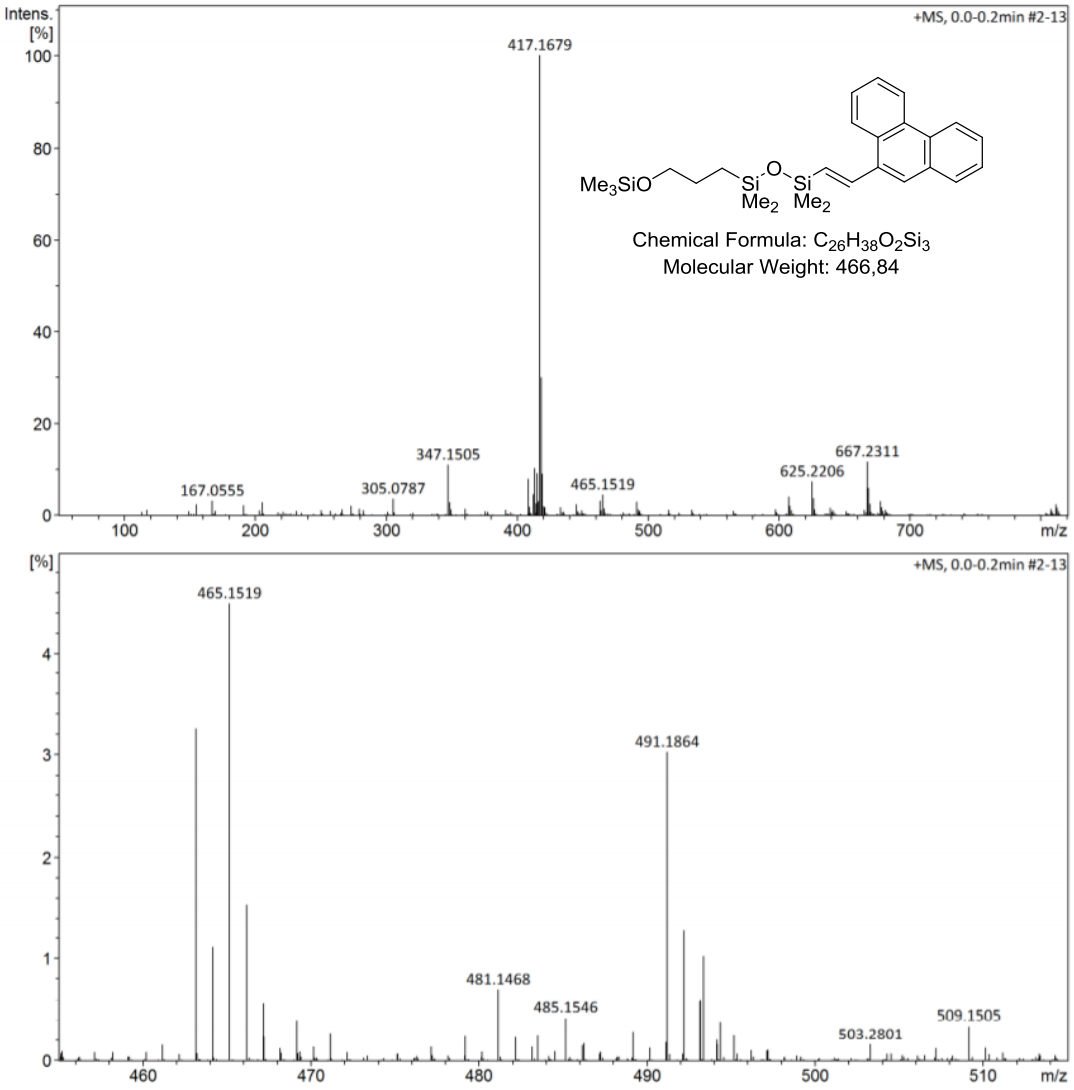


Figure S124. HRMS spectrum of **5aj.**

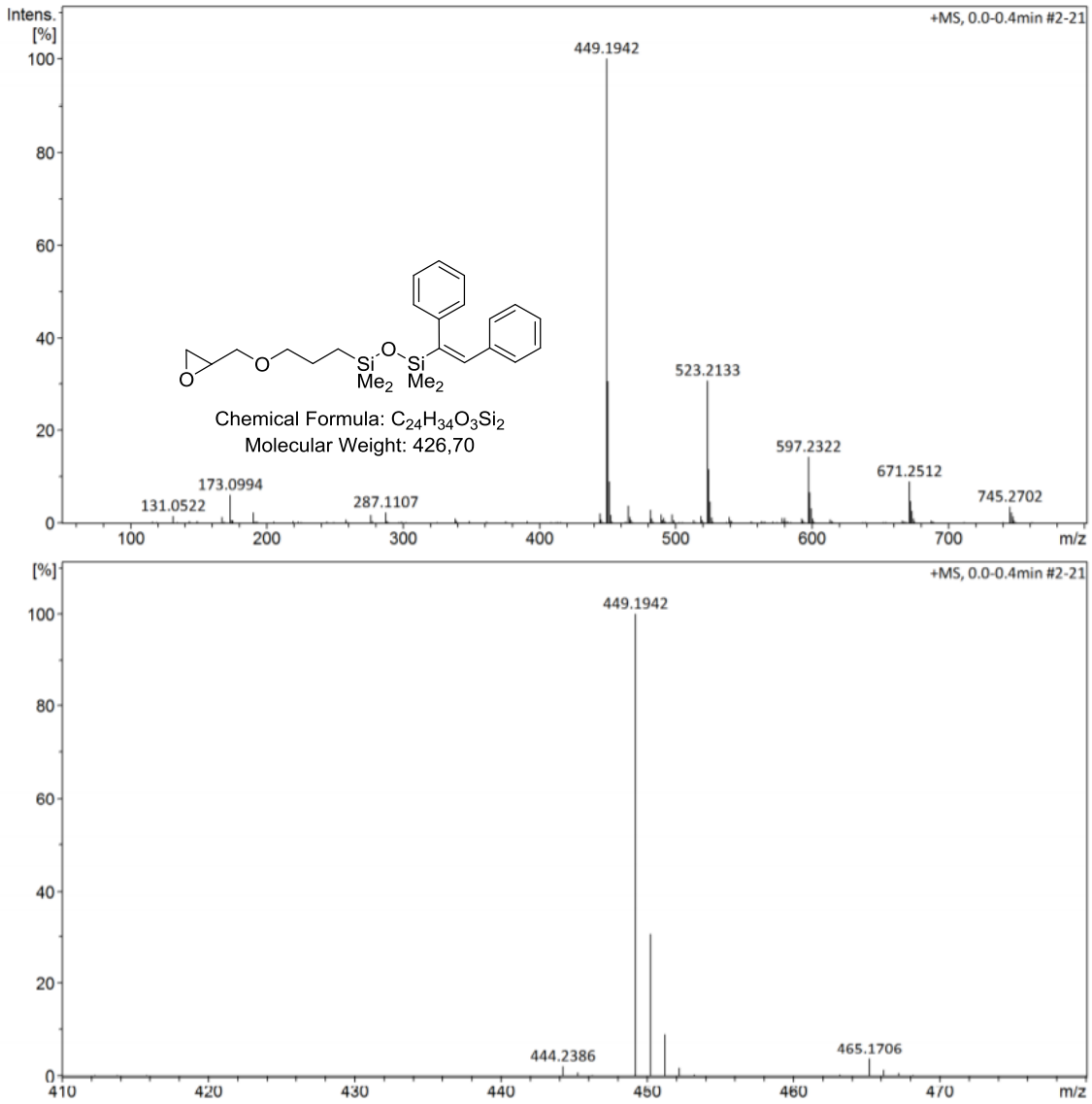


Figure S125. HRMS spectrum of **5ba.**

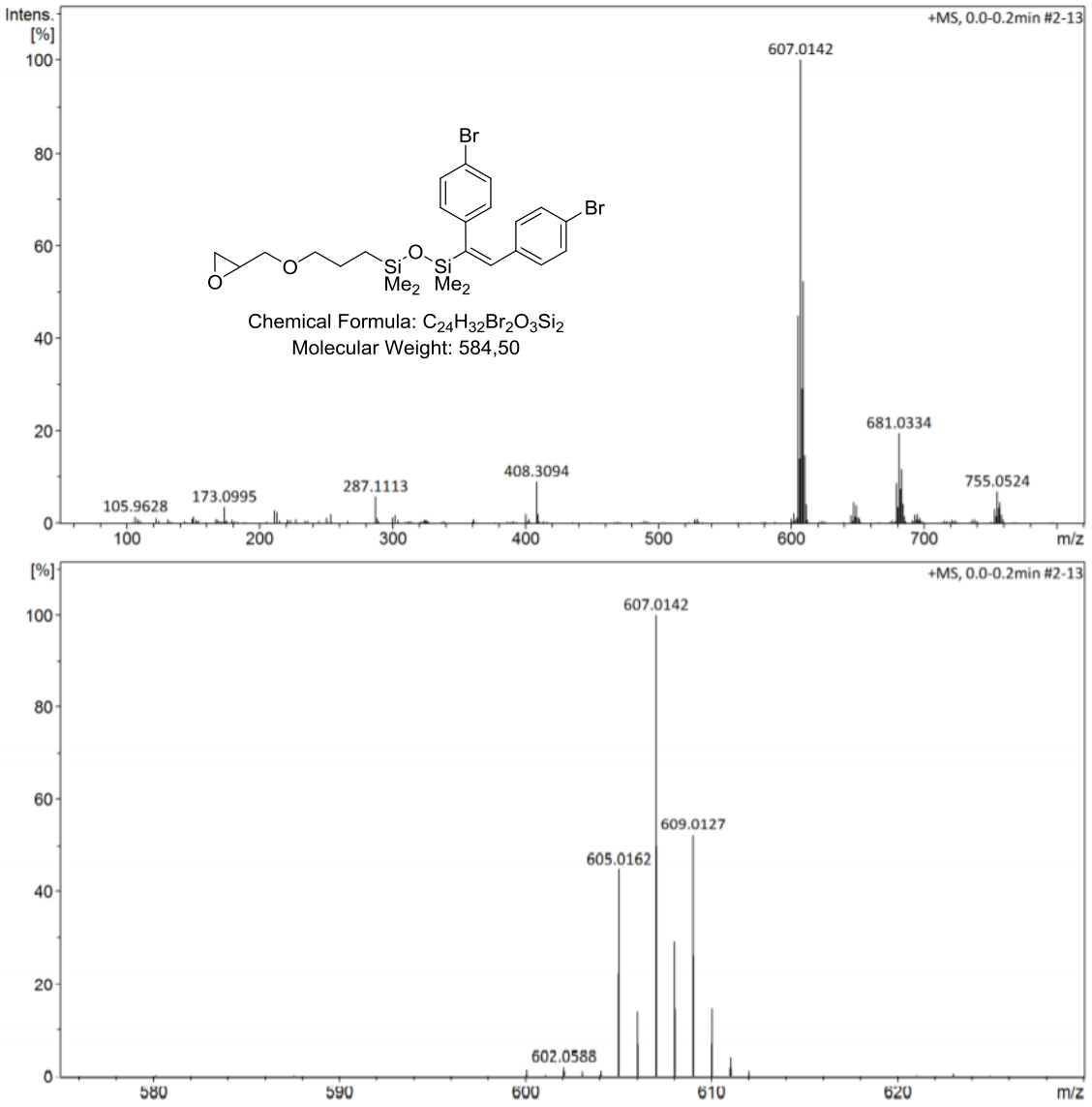


Figure S126. HRMS spectrum of **5bb.**

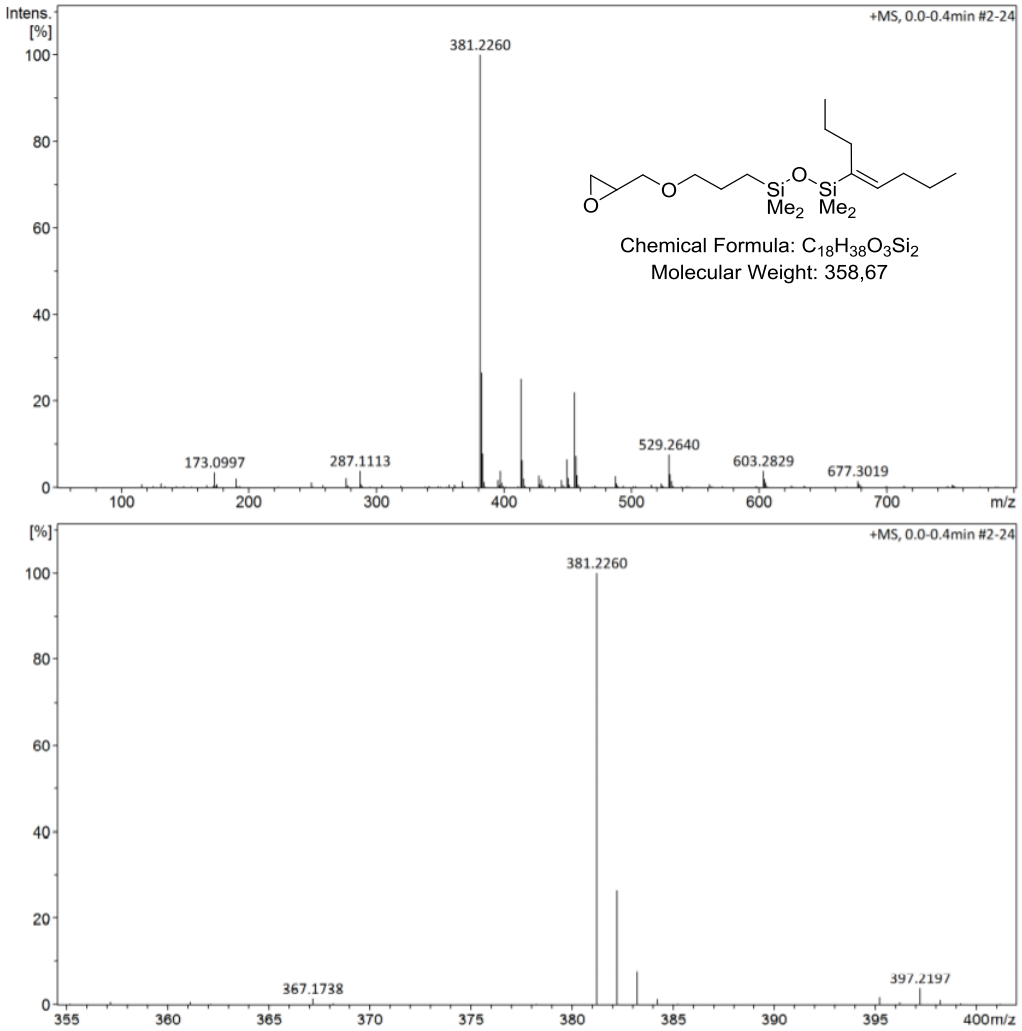


Figure S127. HRMS spectrum of **5bc.**

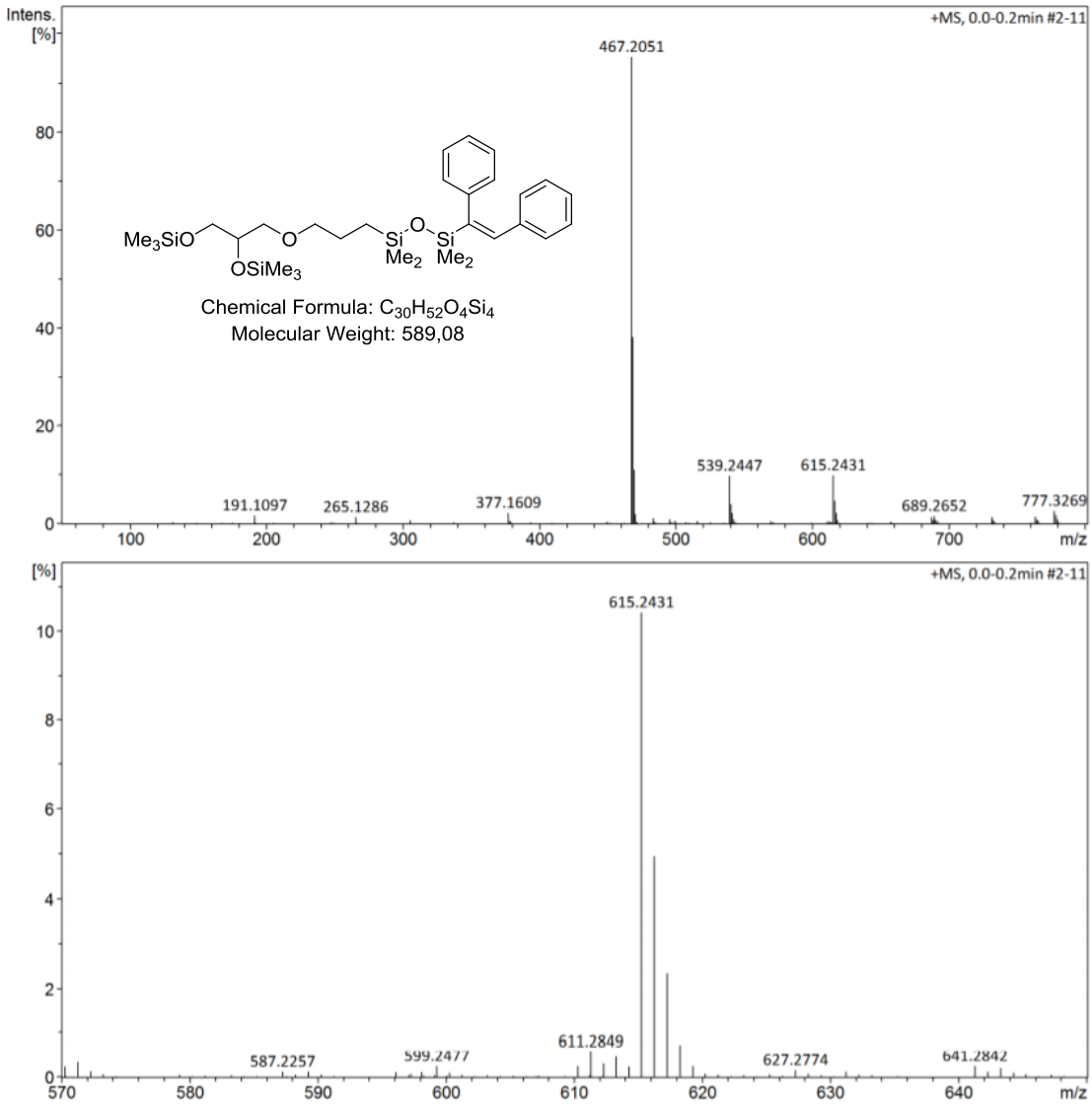


Figure S128. HRMS spectrum of **5ca.**

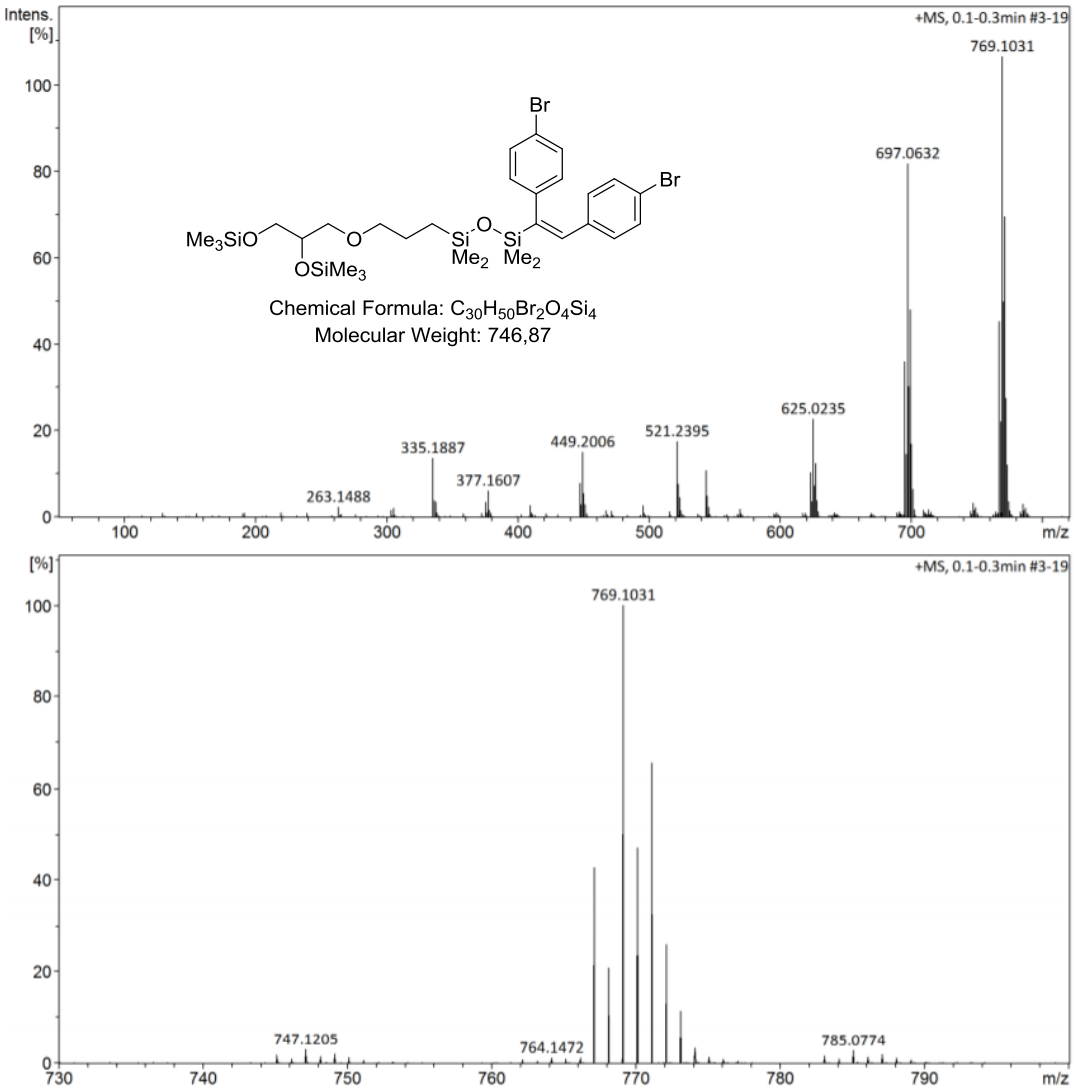


Figure S129. HRMS spectrum of **5cb.**

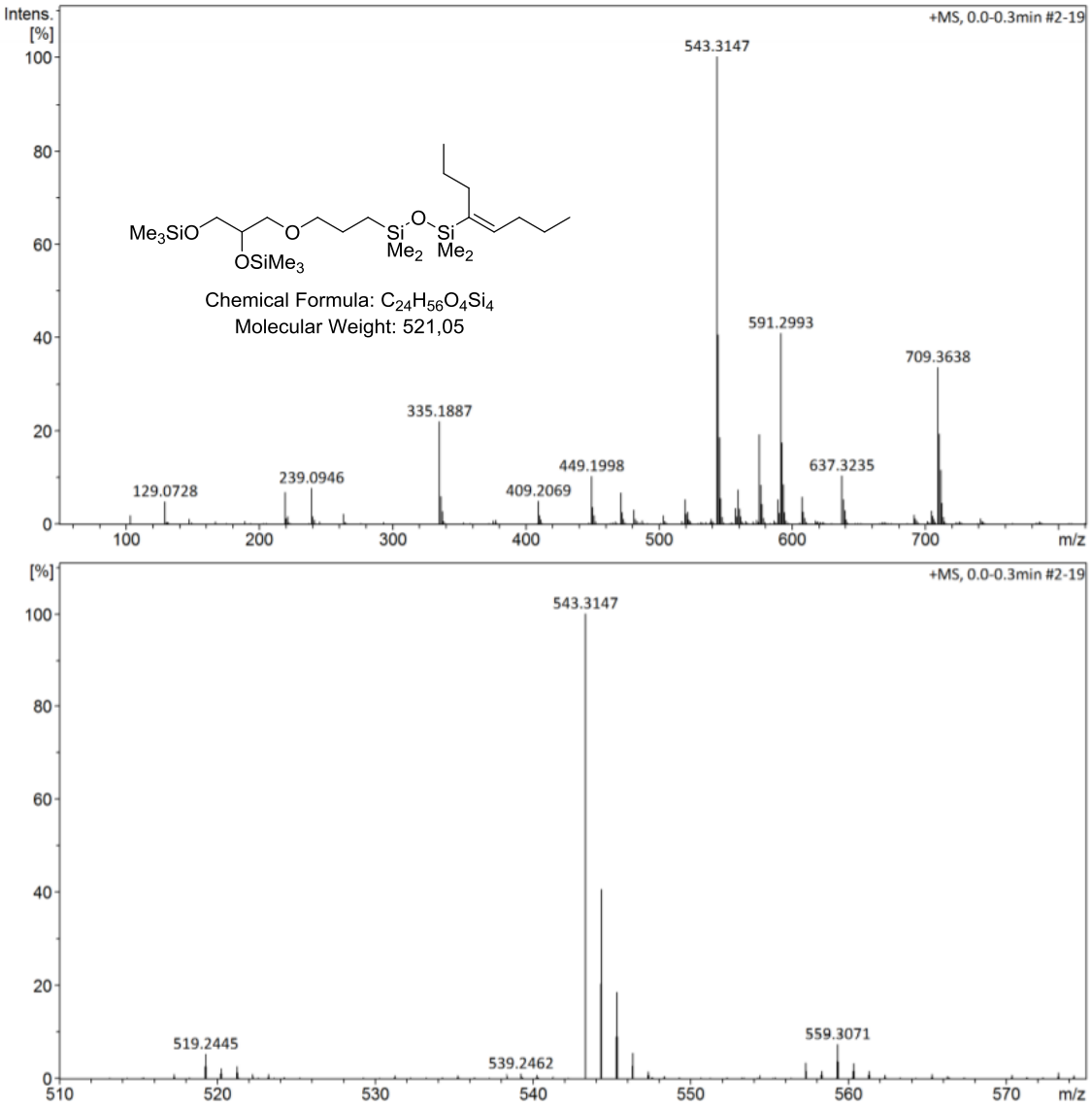


Figure S130. HRMS spectrum of **5cc.**

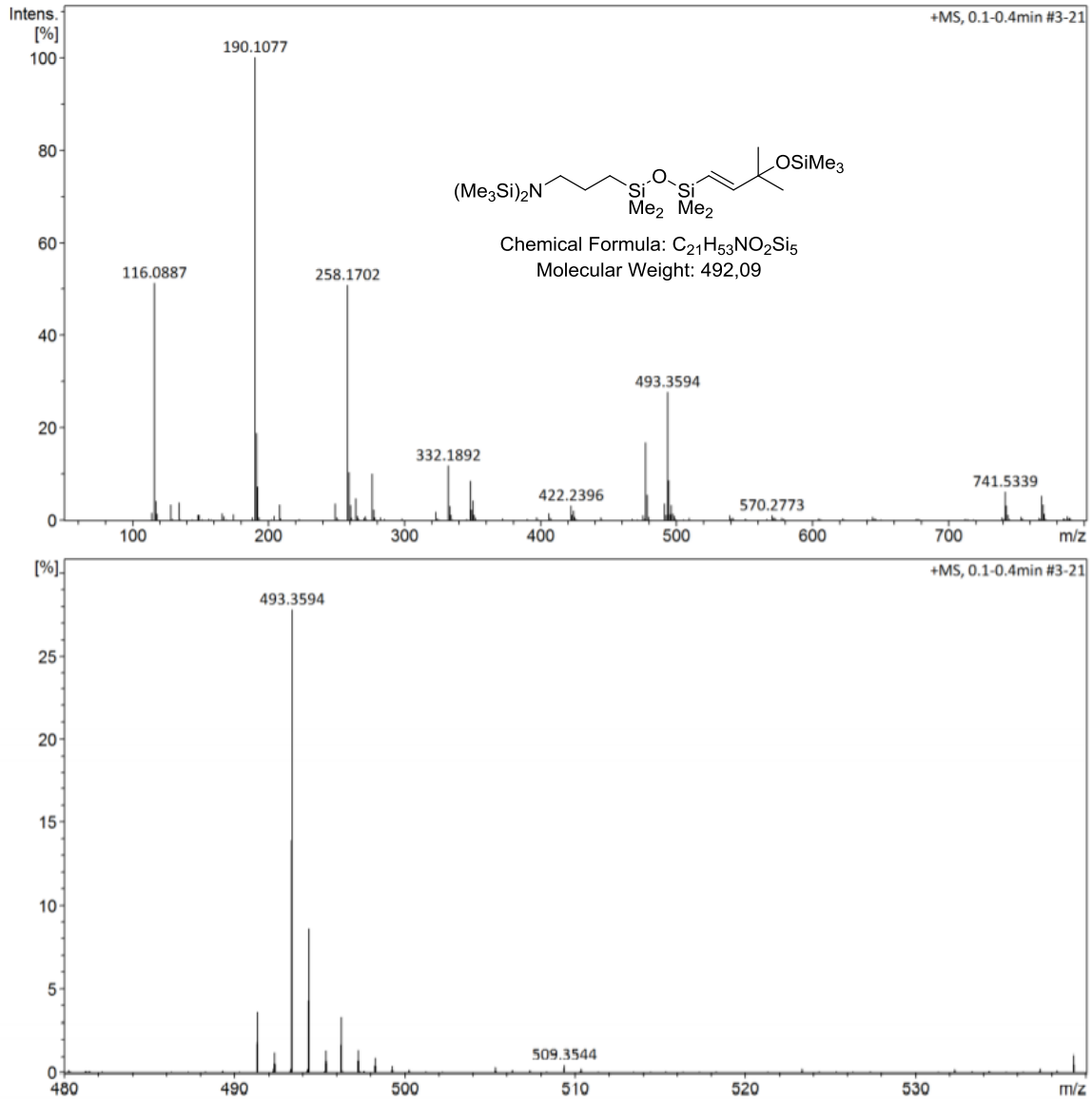


Figure S131. HRMS spectrum of **5df.**

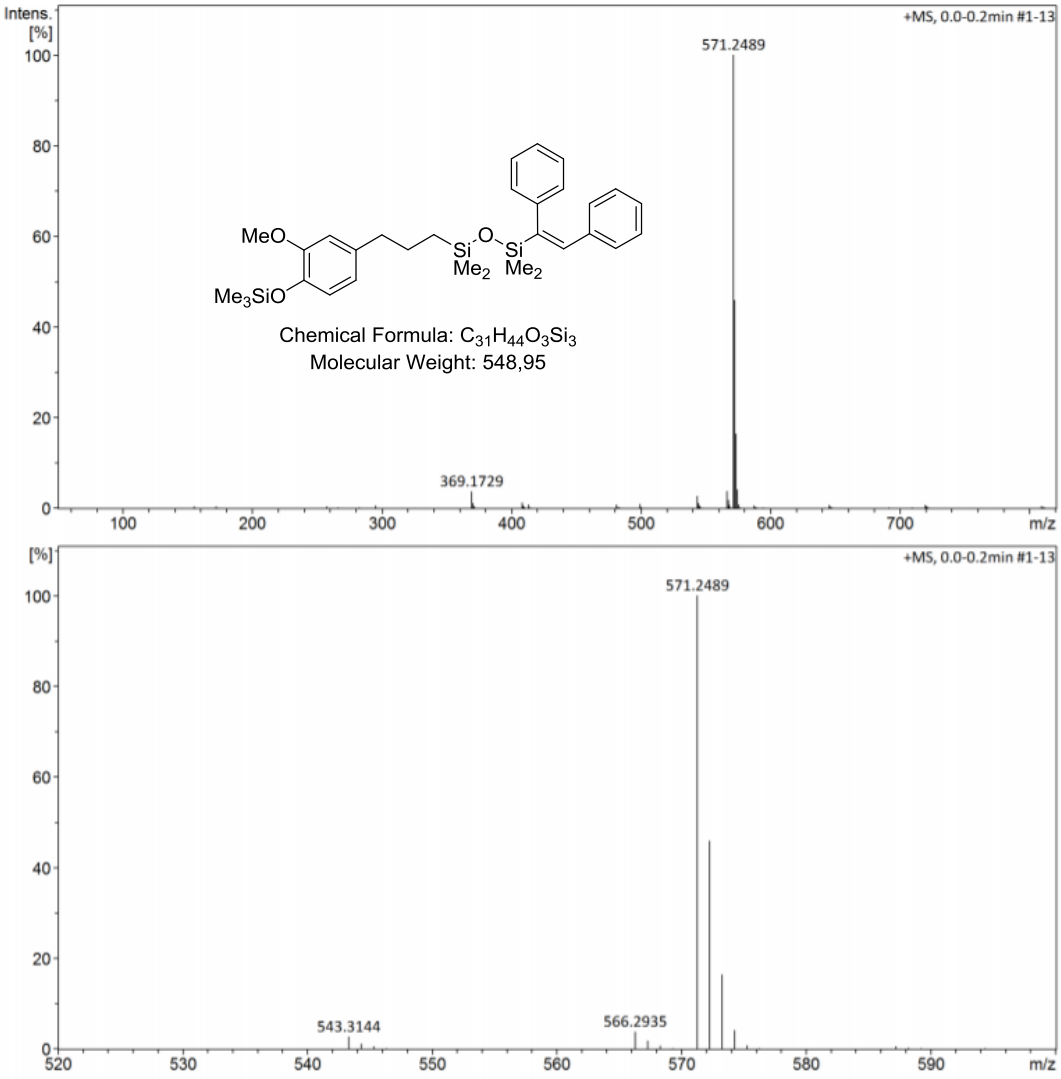


Figure S132. HRMS spectrum of **5ea.**

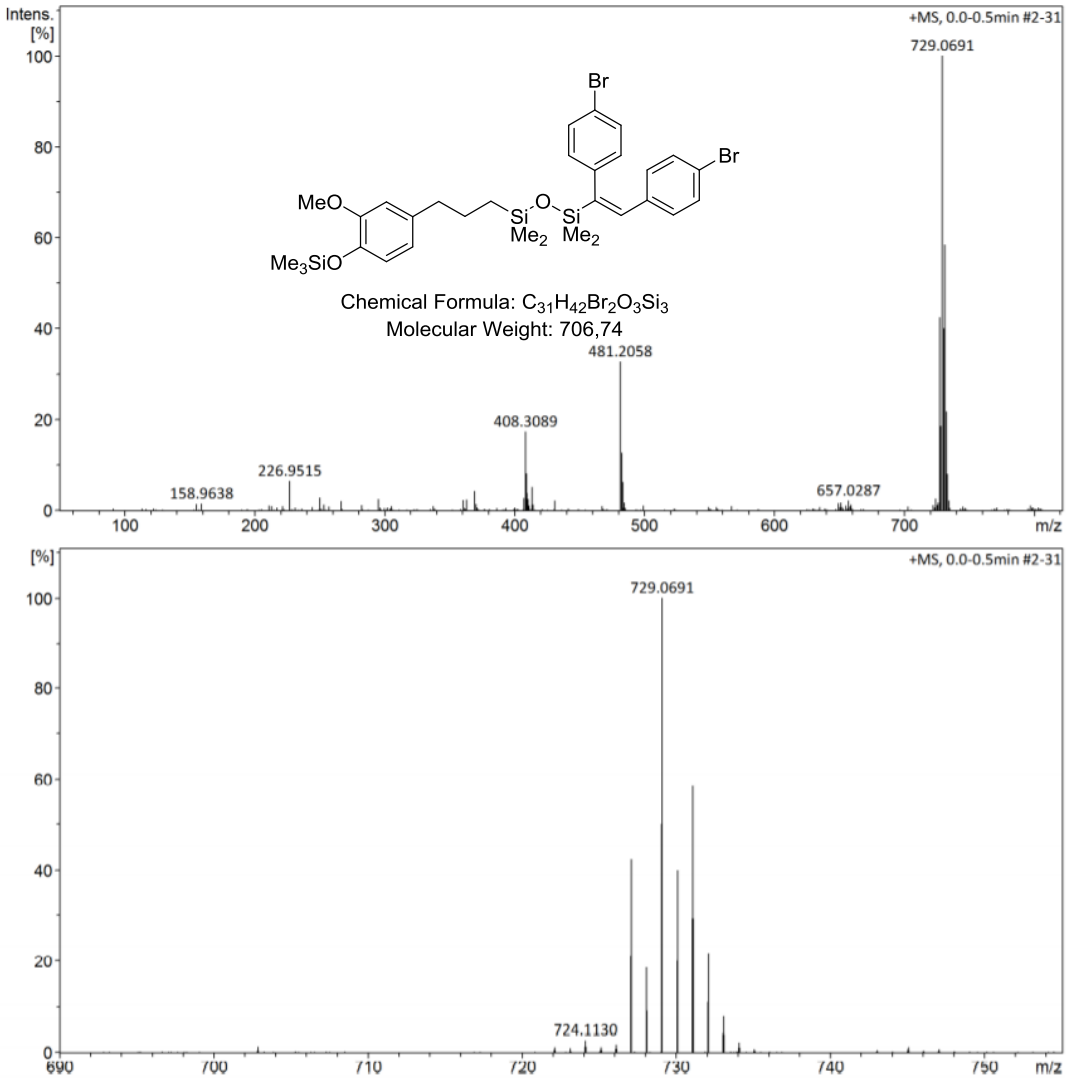


Figure S133. HRMS spectrum of **5eb.**

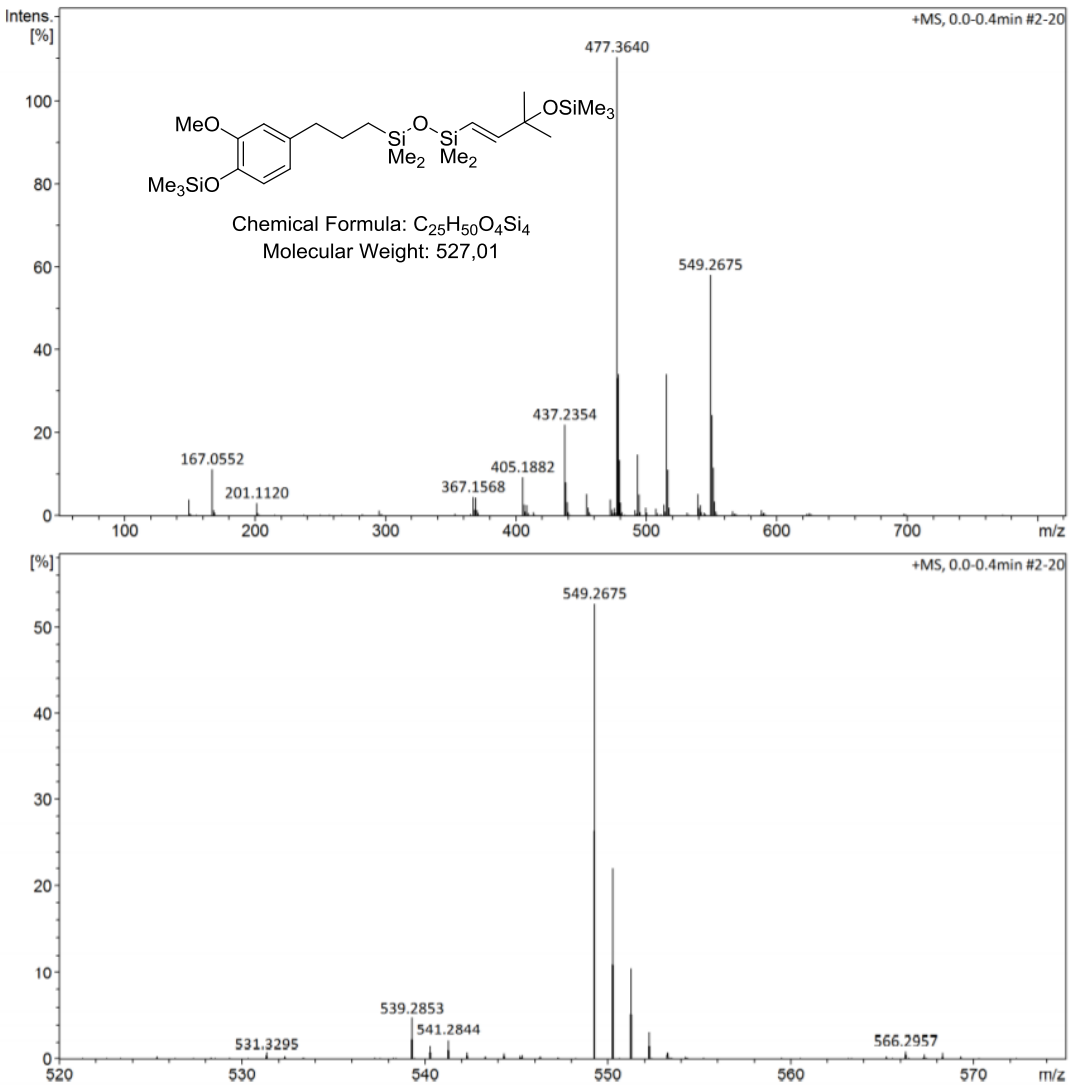


Figure S134. HRMS spectrum of **5ec.**

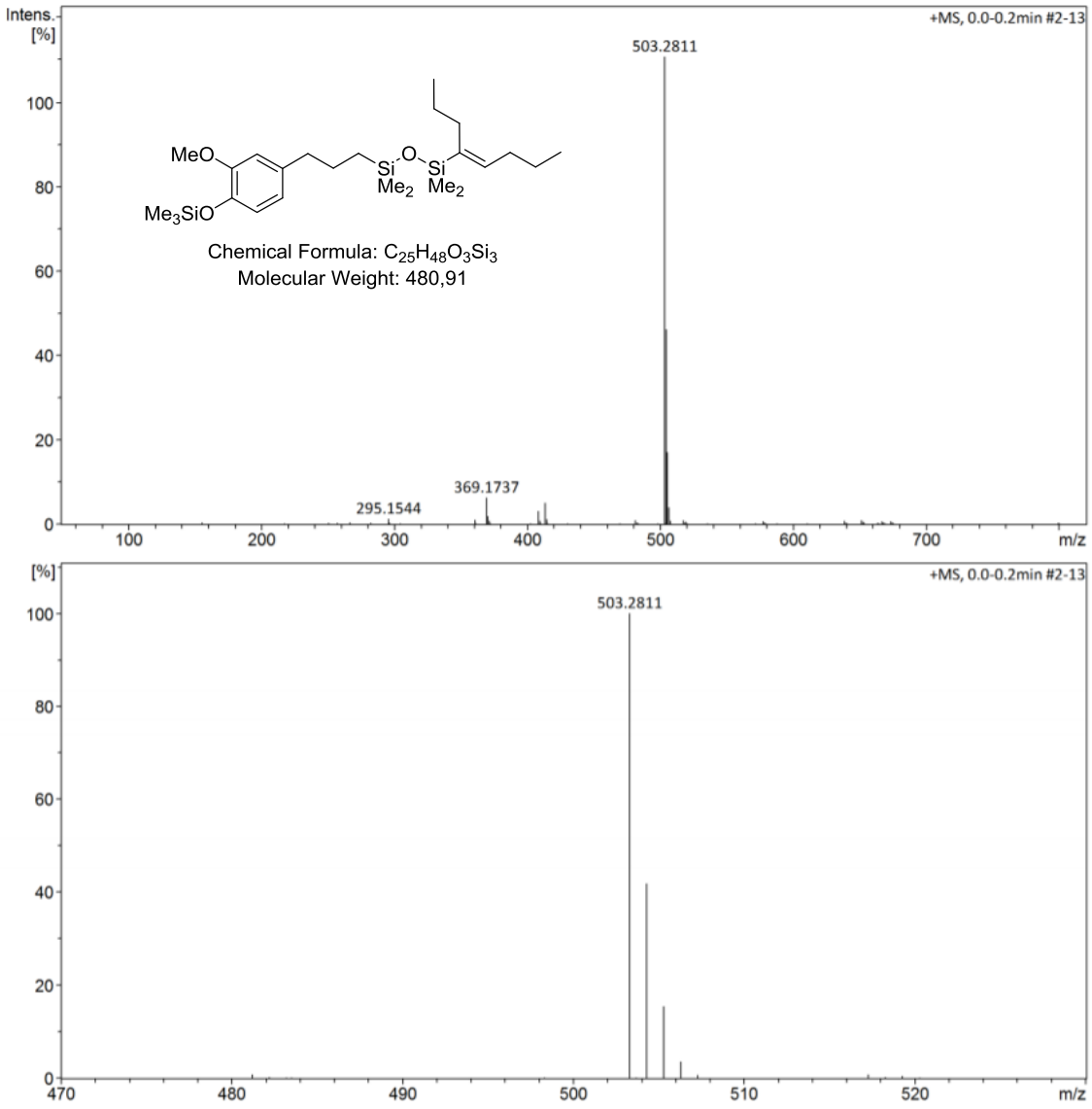


Figure S135. HRMS spectrum of **5ef.**

7. References

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