Supporting Information

Construction of highly sterically hindered geminal disilylated terminal alkenes

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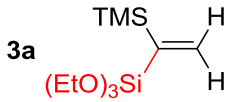
I. General Information

All air or moisture sensitive reactions were conducted in oven-dried glassware under nitrogen atmosphere using dry solvents. Flash column chromatography was performed over silica gel (200-300 mesh) purchased from Qingdao Puke Co., China. Silanes and common organic chemicals were purchased from commercial suppliers, such as Sigma-Aldrich® and J&K® Scientific Ltd., and used as received. $[CpRu(MeCN)_3]PF_6$ and $[Cp^*Ru(MeCN)_3]PF_6$ were purchased from Strem® Chemicals, Inc. ^1H and ^{13}C NMR spectra were collected on a Bruker AV 400 MHz NMR spectrometer using residue solvent peaks as an internal standard (^1H NMR: $CDCl_3$ at 7.26 ppm, ^{13}C NMR: $CDCl_3$ at 77.0 ppm). Mass spectra were collected on an Thermo Scientific GC/MS ISQ7000 system, or a Xevo G2 Qtof mass spectrometer.

II. Ru-Catalyzed Hydrosilylation of 1-Silyl Terminal Alkynes

General Procedure.

In a glove box, to an oven-dried 5-mL vial was added the alkyne (0.40 mmol), the silane (0.60 mmol), $[CpRu(MeCN)_3]PF_6$ (0.008 mmol), and DCM (2.0 mL). The vial was capped and removed from the glove box. The reaction mixture was stirred at room temperature for 4 h, and then concentrated under reduced pressure. The residue was purified by silica gel flash column chromatography (eluent: 0→10% EtOAc in hexanes) to give the desired product.

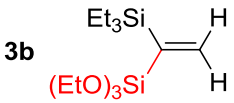


Triethoxy(1-(trimethylsilyl)vinyl)silane (3a) was prepared as colorless oil from ethynyltrimethylsilane (0.40 mmol, 40.0 mg) and $(EtO)_3SiH$ (0.60 mmol, 100.6 mg), according to the General Procedure in 78% yield (81.9 mg, 78%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.56 (d, *J* = 5.6 Hz, 1 H), 6.41 (d, *J* = 5.6 Hz, 1 H), 3.78 (q, *J* = 6.8 Hz, 6 H), 1.20 (t, *J* = 6.8 Hz, 9 H), 0.10 (s, 9 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 146.4, 144.9, 58.3, 18.1, -1.2.

MS (ESI) m/z (relative intensity) 247.11(100) $[M-15(CH_3)]^+$.

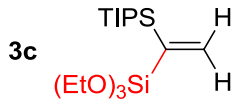


Triethoxy(1-(triethylsilyl)vinyl)silane (3b) was prepared as colorless oil from triethyl(ethynyl)silane (0.40 mmol, 56.2 mg) and $(EtO)_3SiH$ (0.60 mmol, 100.6 mg), according to the General Procedure in 96% yield (117.0 mg, 96%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.65 (d, *J* = 5.6 Hz, 1 H), 6.41 (d, *J* = 5.6 Hz, 1 H), 3.79 (q, *J* = 6.8 Hz, 6 H), 1.20 (t, *J* = 6.8 Hz, 9 H), 0.90 (t, *J* = 8.0 Hz, 9 H), 0.63 (q, *J* = 8.0 Hz, 6 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 146.3, 143.2, 58.3, 18.1, 7.2, 3.1.

MS (ESI) *m/z* (relative intensity) 275.21 (100) $[M-29(C_2H_5)]^+$.

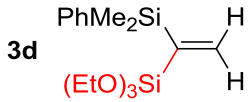


Triethoxy(1-(triisopropylsilyl)vinyl)silane (3c) was prepared as colorless oil from ethynyltriisopropylsilane (0.40 mmol, 73.0 mg) and $(EtO)_3SiH$ (0.60 mmol, 100.6 mg) according to the General Procedure in 89% yield (123.4 mg, 89%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.74 (d, *J* = 5.6 Hz, 1 H), 6.47 (d, *J* = 5.6 Hz, 1 H), 3.80 (q, *J* = 6.8 Hz, 6 H), 1.32-1.23 (m, 3 H), 1.22 (t, *J* = 6.8 Hz, 9 H), 1.05 (d, *J* = 7.6 Hz, 18 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 147.7, 141.3, 58.4, 18.7, 18.1, 11.3.

MS (ESI) *m/z* (relative intensity) 303.21(100) $[M-43(C_3H_7)]^+$.

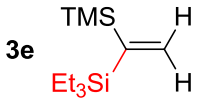


(1-(Dimethyl(phenyl)silyl)vinyl)triethoxysilane (3d) was prepared as colorless oil from ethynyldimethyl(phenyl)silane (0.40 mmol, 64.1 mg) and $(EtO)_3SiH$ (0.60 mmol, 100.6 mg) according to the General Procedure in 87% yield (112.8 mg, 87%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.56-7.53 (m, 2 H), 7.35-7.33 (m, 3 H), 6.67 (d, *J* = 5.6 Hz, 1 H), 6.40 (d, *J* = 5.6 Hz, 1 H), 3.73 (q, *J* = 7.2 Hz, 6 H), 1.17 (t, *J* = 7.2 Hz, 9 H), 0.43 (s, 6 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 146.9, 144.5, 138.4, 134.2, 128.7, 127.5, 58.3, 18.1, -2.5.

HRMS *m/z* (CI) calcd. for $C_{16}H_{29}O_3Si_2$ $(M+H)^+$ 325.1655, found 325.1641.

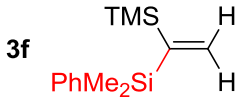


Triethyl(1-(trimethylsilyl)vinyl)silane (3e) was prepared as colorless oil from ethynyltrimethylsilane (0.40 mmol, 40.0 mg) and Et_3SiH (0.60 mmol, 69.8 mg) according to the General Procedure in 84% yield (72.1 mg, 84%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.38 (d, *J* = 5.2 Hz ,1 H), 6.28 (d, *J* = 5.2 Hz ,1 H), 0.90 (t, *J* = 7.6 Hz, 9 H), 0.62 (q, *J* = 7.6 Hz, 6 H), 0.09 (s, 9 H).

^{13}C NMR (100MHz, $CDCl_3$) δ 151.0, 141.6, 7.4, 3.6, 0.2.

MS (ESI) *m/z* (relative intensity) 214.28(0.5), 87.12(100) $[M]^+$.

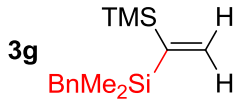


(1-(Dimethyl(phenyl)silyl)vinyl)trimethylsilane (3f) was prepared as colorless oil from ethynyltrimethylsilane (0.40 mmol, 40.0 mg) and $PhMe_2SiH$ (0.60 mmol, 81.8 mg) according to the General Procedure in 84% yield (78.8 mg, 84%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.50-7.46 (m, 2 H), 7.36-7.33 (m, 3 H), 6.41 (d, *J* = 4.8 Hz, 1 H), 6.31 (d, *J* = 4.8 Hz, 1 H), 0.39 (s, 6 H), 0.00 (s, 9 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 152.9, 141.9, 139.1, 134.1, 128.8, 127.6, -0.3, -1.8.

MS (ESI) *m/z* (relative intensity) 234.32(12), 135.14(100) $[M]^+$.

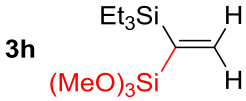


Benzyldimethyl(1-(trimethylsilyl)vinyl)silane (3g) was prepared as colorless oil from ethynyltrimethylsilane (0.40 mmol, 40.0 mg) and $BnMe_2SiH$ (0.60 mmol, 90.2 mg) according to the General Procedure in 85% yield (84.5 mg, 85%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.24-7.18 (m, 2 H), 7.10-7.15 (m, 1 H), 7.01-6.98 (m, 2 H), 6.36 (d, *J* = 5.2 Hz, 1 H), 6.29 (d, *J* = 5.2 Hz, 1 H), 2.18 (s, 2 H), 0.13 (s, 9 H), 0.07 (s, 6 H).

^{13}C NMR (100MHz, $CDCl_3$) δ 153.0, 141.2, 140.1, 128.3, 128.0, 123.9, 26.4, -0.3, -2.5.

HRMS *m/z* (CI) calcd. for $C_{14}H_{25}Si_2$ $(M+H)^+$ 249.1496, found 249.1507.



Triethyl(1-(trimethoxysilyl)vinyl)silane (3h) was prepared as colorless oil from triethyl(ethynyl)silane (0.40 mmol, 56.2 mg) and $(MeO)_3SiH$ (0.60 mmol, 73.3 mg) according to the General Procedure in 88% yield (92.4 mg, 88%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.66 (d, *J* = 5.2 Hz, 1 H), 6.46 (d, *J* = 5.2 Hz, 1 H), 3.55 (s, 9 H), 0.92 (t, *J* = 8.0 Hz, 9 H), 0.65 (q, *J* = 8.0 Hz, 6 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 147.0, 141.7, 50.5, 7.2, 3.0.

HRMS *m/z* (CI) calcd. for $C_{11}H_{27}O_3Si_2$ $(M+H)^+$ 263.1499, found 263.1469.

3i

(1-(Diethoxy(methyl)silyl)vinyl)triethylsilane (3i) was prepared as colorless oil from triethyl(ethynyl)silane (0.40 mmol, 56.2 mg) and $(EtO)_2MeSiH$ (0.60 mmol, 80.6 mg) according to the General Procedure in 88% yield (96.6 mg, 88%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.56 (d, *J* = 5.2 Hz, 1 H), δ 6.38 (d, *J* = 5.2 Hz, 1 H), 3.74 (q, *J* = 7.2 Hz, 4 H), 1.21 (t, *J* = 7.2 Hz, 6 H), 0.92 (t, *J* = 7.6 Hz, 9 H), 0.65 (t, *J* = 7.6 Hz, 6 H), 0.17 (s, 3 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 147.3, 144.7, 58.0, 18.3, 7.3, 3.2, -3.9.

HRMS *m/z* (CI) calcd. for $C_{13}H_{29}O_2Si_2$ $(M-H)^+$ 273.1705, found 273.1700.

3j

(1-(Dimethyl(phenyl)silyl)vinyl)triethylsilane (3j) was prepared as colorless oil from triethyl(ethynyl)silane (0.40 mmol, 56.2 mg) and $PhMe_2SiH$ (0.60 mmol, 81.8 mg) according to the General Procedure in 93% yield (102.9 mg, 93%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.55-7.52 (m, 2 H), 7.39-7.36 (m, 3 H), 6.46 (d, *J* = 5.2 Hz, 1 H), 6.44 (d, *J* = 5.2 Hz, 1 H), 0.88 (t, *J* = 8.0 Hz, 9 H), 0.56 (q, *J* = 8.0 Hz, 6 H), 0.43 (s, 6 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 149.4, 143.6, 139.1, 134.0, 128.7, 127.6, 7.3, 3.5, -1.7.

MS (ESI) *m/z* (relative intensity) 276.52 (0.6), 247.30 (100) $[M]^+$.

3k

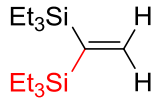
Benzyldimethyl(1-(triethylsilyl)vinyl)silane (3k) was prepared as colorless oil from triethyl(ethynyl)silane (0.40 mmol, 56.2 mg) and $BnMe_2SiH$ (0.60 mmol, 90.2 mg) according to the General Procedure in 97% yield (112.8 mg, 97%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.26-7.22 (m, 2 H), 7.12-7.02 (m, 3 H), 6.43 (d, *J* = 4.8 Hz, 1 H), 6.39 (d, *J* = 4.8 Hz, 1 H), 2.2 (s, 2 H), 0.96 (t, *J* = 7.6 Hz, 9 H), 0.68 (q, *J* =7.6 Hz, 6 H), 0.09 (s, 6 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 149.3, 142.8, 140.2, 128.4, 128.0, 123.9, 26.3, 7.4, 3.7, -2.5.

HRMS *m/z* (CI) calcd. for $C_{17}H_{34}NSi_2$ $(M+NH_4^+)^+$ 308.2230, found 308.2241.

3l



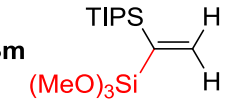
Ethene-1,1-diylbis(triethylsilane) (3l) was prepared as colorless oil from triethyl(ethynyl)silane (0.40 mmol, 56.2 mg) and Et_3SiH (0.60 mmol, 69.8 mg) according to the General Procedure in 93% yield (95.5 mg, 93%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.39 (s, 2 H), 0.91 (t, *J* = 7.6 Hz, 18 H), 3.78 (q, *J* = 7.6 Hz, 12 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 147.4, 143.1, 7.3, 3.6.

MS (ESI) *m/z* (relative intensity) 256.61 (1.0), 115.16 (100) $[M]^+$.

3m



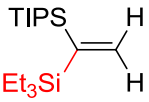
Triisopropyl(1-(trimethoxysilyl)vinyl)silane (3m) was prepared as colorless oil from ethynyltriisopropylsilane (0.40 mmol, 73.0 mg) and $(MeO)_3SiH$ (0.60 mmol, 73.3 mg) according to the General Procedure in 84% yield (102.3 mg, 84%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.75 (d, *J* = 5.2 Hz, 1 H), 6.51 (d, *J* = 5.2 Hz, 1 H), 3.54 (s, 9 H), 1.18-1.29 (m, 3 H), 1.04 (d, *J* = 4.4 Hz, 18 H).

^{13}C NMR (100MHz, $CDCl_3$) δ 148.4, 139.9, 50.5, 18.6, 11.2.

HRMS *m/z* (CI) calcd. for $C_{14}H_{31}O_3Si_2$ $(M-H)^+$ 303.1811, found 303.1850.

3n

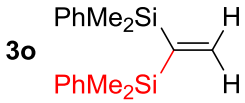


Triethyl(1-(triisopropylsilyl)vinyl)silane (3n) was prepared as colorless oil from ethynyltriisopropylsilane (0.40 mmol, 73.0 mg) and Et_3SiH (0.60 mmol, 69.8 mg) according to the General Procedure in 42% yield (50.2 mg, 42%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.50 (d, *J* = 4.8 Hz, 1 H), 6.46 (d, *J* = 4.8 Hz, 1 H), 1.15-1.23 (m, 3 H), 1.05 (d, *J* = 7.2 Hz, 18 H), 0.92 (t, *J* = 8.0 Hz, 9 H). 0.86 (q, J = 8.0 Hz, 6 H).

^{13}C NMR (100MHz, $CDCl_3$) δ 145.2, 145.1, 19.3, 11.6, 7.4, 4.1.

MS (ESI) *m/z* (relative intensity) 298.24 (0.1), 59.09 (100) $[M]^+$.

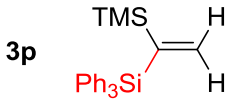


Ethene-1,1-diylbis(dimethyl(phenyl)silane) (3o) was prepared as colorless oil from ethynyldimethyl(phenyl)silane (0.40 mmol, 64.1 mg) and $PhMe_2SiH$ (0.60 mmol, 81.8 mg) according to the General Procedure in 94% yield (111.5 mg, 94%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.60-7.55 (m, 4 H), 7.49-7.42 (m, 6 H), 6.58 (s, 2 H), 0.42 (s, 12 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 150.9, 143.9, 138.8, 134.0, 128.8, 127.6, -1.8.

HRMS *m/z* (CI) calcd. for $C_{18}H_{25}Si_2$ $(M+H)^+$ 297.1495, found 297.1506.

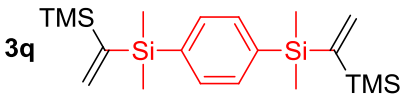


Trimethyl(1-(triphenylsilyl)vinyl)silane (3p) was prepared as colorless oil from ethynyltrimethylsilane (0.40 mmol, 40.0 mg) and Ph_3SiH (0.60 mmol, 156.2 mg), according to the General Procedure in 62% yield (88.9 mg, 62%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.60-7.55 (m, 6 H), 7.44-7.33 (m, 9 H), 6.74 (d, *J* = 4.8 Hz, 1 H), 6.40 (d, *J* = 4.8 Hz, 1 H), -0.10 (s, 9 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 149.1, 147.3, 136.5, 135.0, 129.4, 127.8, 0.0.

MS (ESI) m/z (relative intensity) 358.16(4.0), 259.32(100) $[M]^+$.

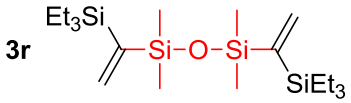


1,4-Bis(dimethyl(1-(trimethylsilyl)vinyl)silyl)benzene (3q) was prepared as colorless oil from ethynyltrimethylsilane (1.20 mmol, 120.0 mg) and 1,4-bis(dimethylsilyl)benzene (0.40 mmol, 77.7 mg) according to the General Procedure in 84% yield (131.3 mg, 84%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.51 (s, 4 H), 6.45 (d, *J* = 5.2 Hz, 2 H), 6.37 (d, *J* = 5.2 Hz, 2 H), 0.4 (s, 12 H), 0.04 (s, 18 H).

^{13}C NMR (100MHz, $CDCl_3$) δ 152.8, 141.8, 139.5, 133.2, -0.3, -1.8.

HRMS *m/z* (CI) calcd. for $C_{20}H_{39}Si_4$ $(M+H)^+$ 391.2130, found 391.2182.

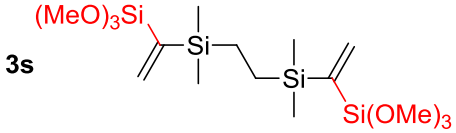


1,1,3,3-Tetramethyl-1,3-bis(1-(triethylsilyl)vinyl)disiloxane (3r) was prepared as colorless oil from triethyl(ethynyl)silane (1.20 mmol, 168.6 mg) and 1,1,3,3-tetramethyldisiloxane (0.40 mmol, 54.0 mg) according to the General Procedure in 70% yield (116.2 mg, 70%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.50 (d, *J* = 5.2 Hz, 2 H), 6.33 (d, *J* = 5.2 Hz, 2 H), 0.95 (t, *J* = 8.0 Hz, 18 H), 0.67 (q, *J* = 8.0 Hz, 12 H), 0.2 (s, 12 H).

^{13}C NMR (100MHz, $CDCl_3$) δ 150.8, 142.2, 7.1, 3.8, 1.6.

HRMS *m/z* (CI) calcd. for $C_{20}H_{47}OSi_4$ $(M+H)^+$ 415.2704, found 415.2668.



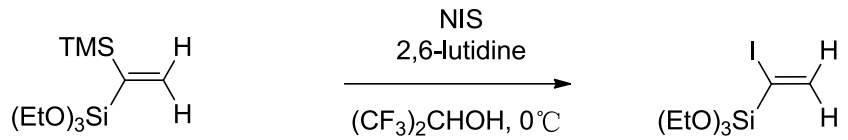
3,3,10,10-Tetramethoxy-5,5,8,8-tetramethyl-4,9-dimethylene-2,11-dioxa-3,5,8,10-tetrasiladodecane (3s) was prepared as colorless oil from 1,2-bis(ethynyldimethylsilyl)ethane (0.40 mmol, 77.8 mg) and $(MeO)_3SiH$ (1.20 mmol, 146.6 mg) according to the General Procedure in 58% yield (101.8 mg, 58%, α/β > 50:1).

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.58 (d, *J* = 5.6 Hz, 2 H), 6.43 (d, *J* = 5.6 Hz, 2 H), 3.52 (s, 18 H), 0.5 (s, 4 H), 0.07 (s, 12 H).

^{13}C NMR (100MHz, $CDCl_3$) δ 146.0, 144.1, 50.4, 37.2, 3.7.

HRMS *m/z* (CI) calcd. for $C_{16}H_{38}KO_6Si_4$ $(M+K)^+$ 477.1383, found 477.1380.

III. Derivatizations of the Hydrosilylation Products



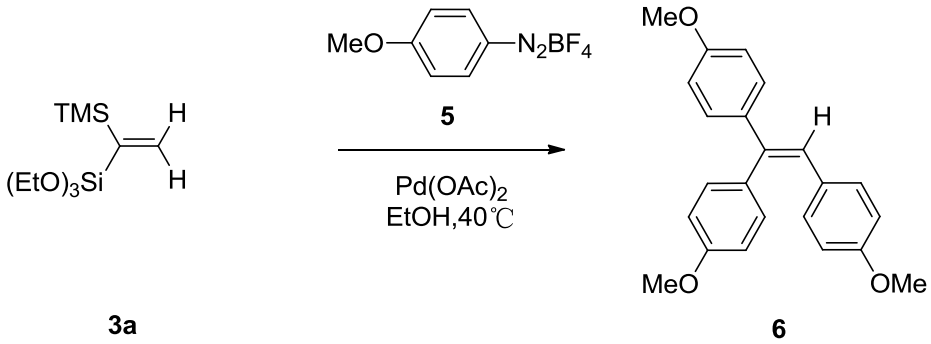
3a **4**

Triethoxy(1-iodovinyl)silane (4). To an oven-dried 5-mL vial was added **3a** (54 mg, 0.20 mmol), 2,6-lutidine (12 μL, 0.10 mmol), and $(CF_3)_2CHOH$ (1.0 mL). The reaction mixture was cooled to 0℃, and N-iodosuccinimide (0.25 mmol) was added in one portion. The reaction mixture was stirred for 1 h under air, and then concentrated under reduced pressure. The residue was purified by silica gel flash column chromatography (eluent: hexanes) to give the desired product **4** as pale yellow oil (38.0 mg, 60%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.13-7.12 (m, 1 H), 6.89-6.87 (m, 1 H), 3.89 (q, J = 7.2 Hz, 6 H), 1.25 (t, J = 7.2 Hz, 9 H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 143.7, 102.9, 60.2, 18.7.

HRMS *m/z* (CI) calcd. for $C_8H_{18}IO_3Si$ $(M+H)^+$ 317.0071, found 317.0065.



3a **6**

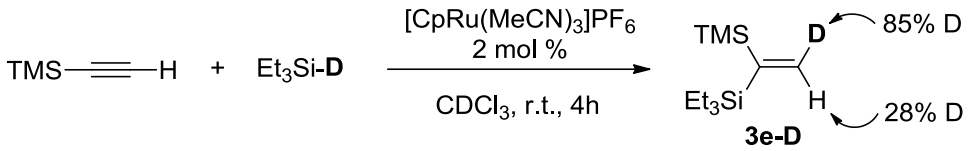
4,4',4''-(ethene-1,1,2-triyl)tris(methoxybenzene) (6). To an oven-dried 5-mL vial was added **3a** (104 mg, 0.40 mmol), 4-methoxybenzenediazonium tetrafluoroborate (**5**, 320 mg, 1.44 mmol), $Pd(OAc)_2$ (9.0 mg, 0.04 mmol), and EtOH (2.0 mL). The reaction mixture was stirred at 40℃ for 4 h, and then concentrated under reduced pressure. The residue was purified by silica gel flash column chromatography (eluent: 2% EtOAc in hexanes) to give the desired product **6** as colorless oil (54.4 mg, 40%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.16 (d, J = 9.2 Hz, 2 H), 7.05 (d, J = 8.8 Hz, 2 H), 6.89 (t, J = 8.8 Hz, 2 H), 6.81-6.74 (m, 4 H), 6.70 (s, 1 H), 6.60 (d, J = 8.0 Hz, 2 H), 3.76 (s, 3 H), 3.73 (s, 3 H), 3.67 (s, 3 H).

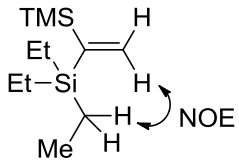
^{13}C NMR (100 MHz, $CDCl_3$) δ 159.0, 158.8, 158.1, 139.8, 136.6, 133.0, 131.6, 130.6, 128.6, 125.8, 114.0, 113.5, 113.4, 55.3, 55.2, 55.1.

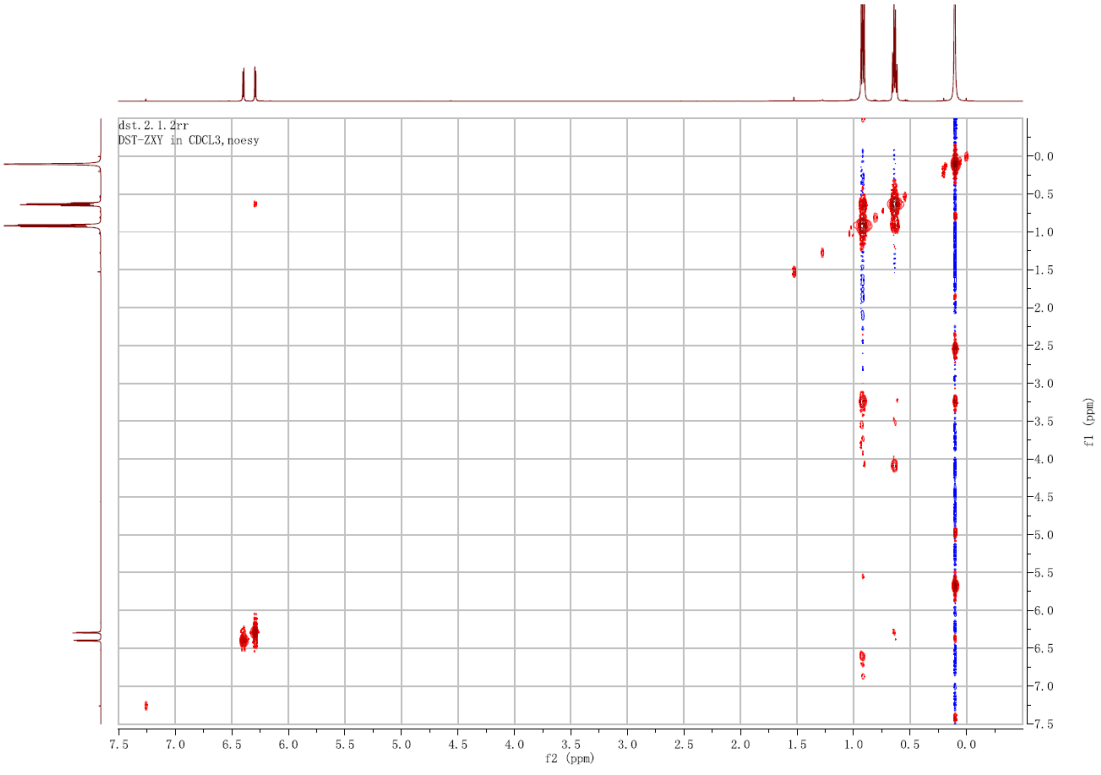
MS (ESI) *m/z* (relative intensity) 346.31 (100) $[M]^+$.

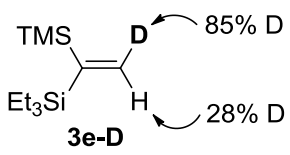
IV. Deuterium Labeling Experiment

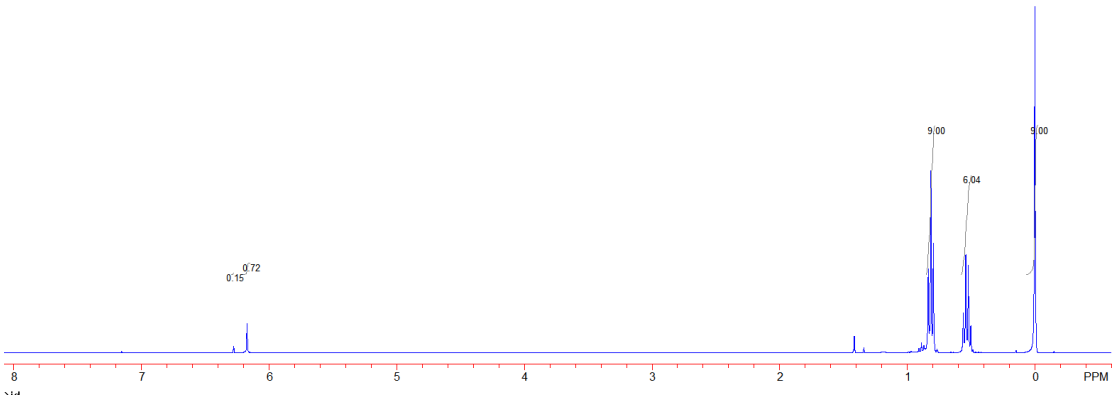


Triethyl(1-(trimethylsilyl)vinyl)silane (3e-D) was prepared as colorless oil from ethynyltrimethylsilane (0.40 mmol) and Et_3SiD (0.60 mmol) according to the General Procedure.



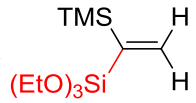




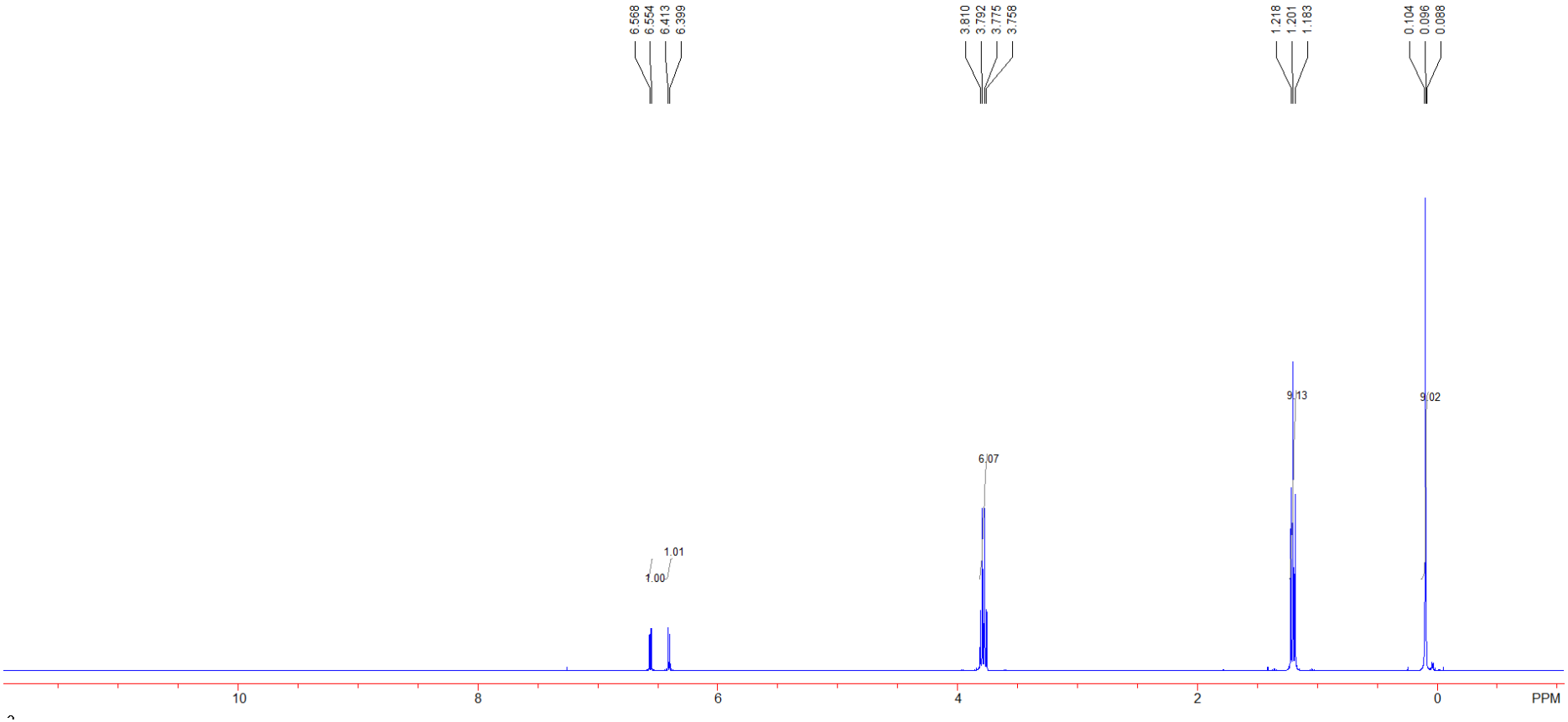

9.00
9.00
6.04
0.72
0.15
8
7
6
5
4
3
2
1
0
PPM

V. ^{1}H NMR and ^{13}C NMR Spectra

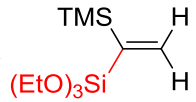
3a


TMS
H
(EtO)3Si
H

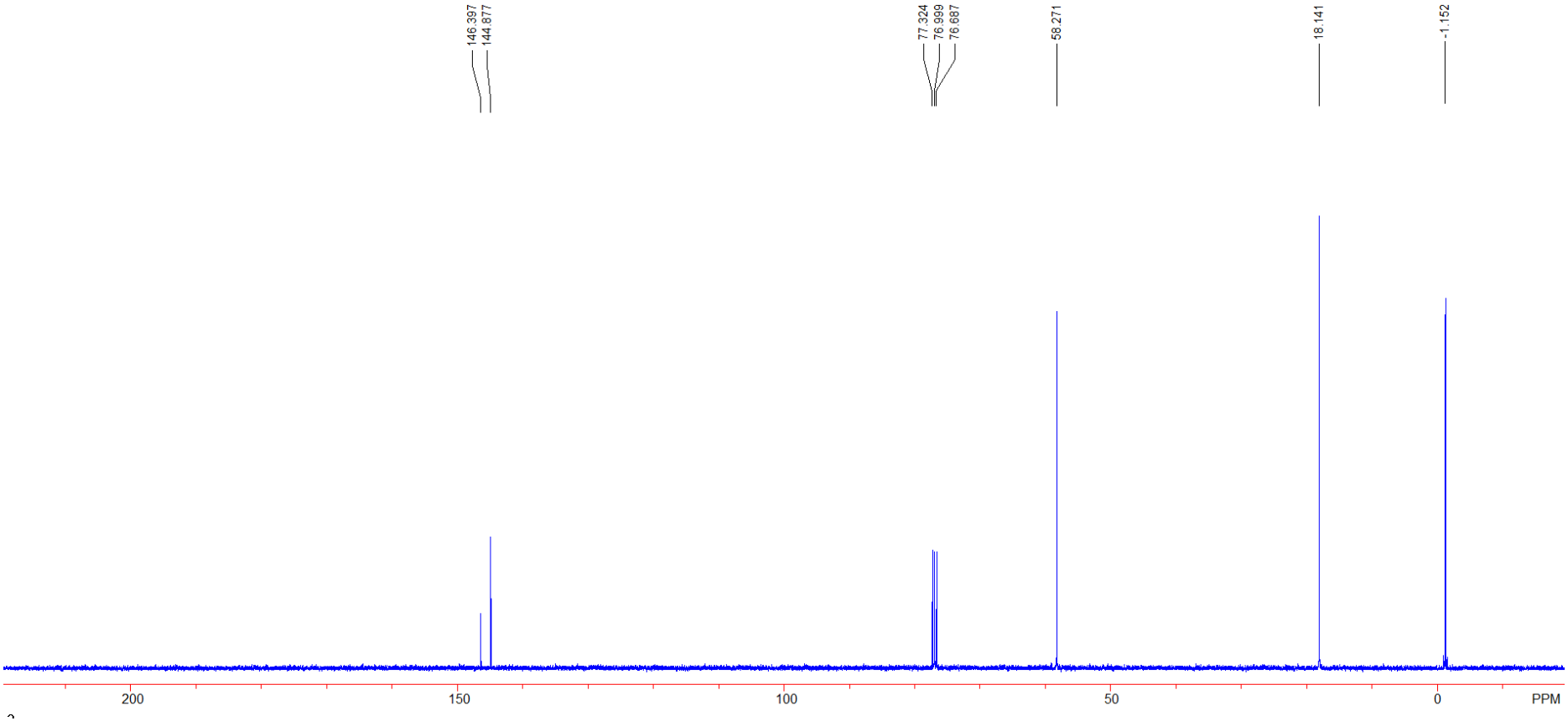
^{1}H NMR


6.568
6.554
6.413
6.399
3.810
3.792
3.775
3.758
1.218
1.201
1.183
0.104
0.096
0.088
1.01
1.00
6.07
9.13
9.02
10
8
6
4
2
0
PPM

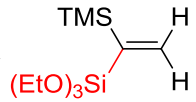
3a


TMS
H
(EtO)3Si
H

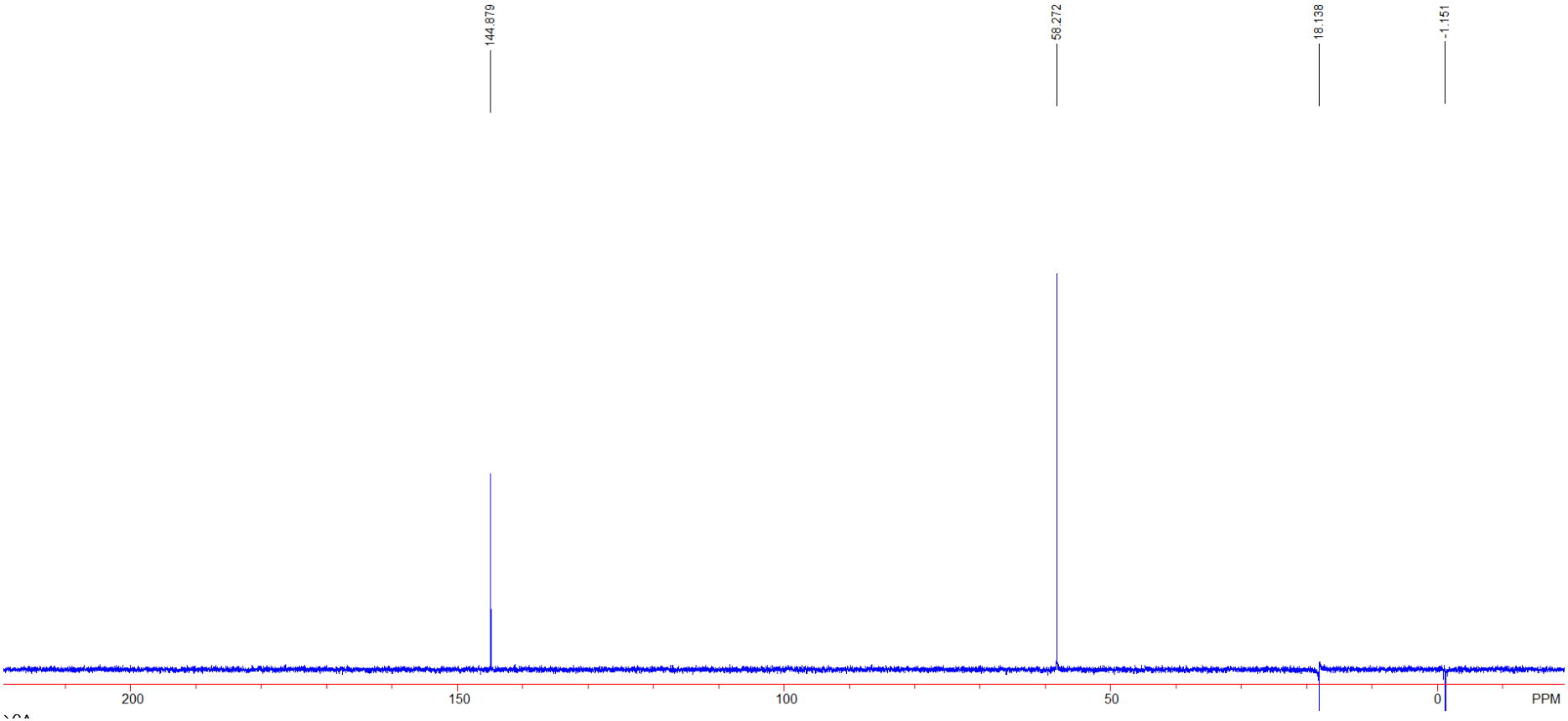
^{13}C NMR


146.397
144.877
77.324
76.999
76.687
58.271
18.141
-1.152
200
150
100
50
0
PPM

3a



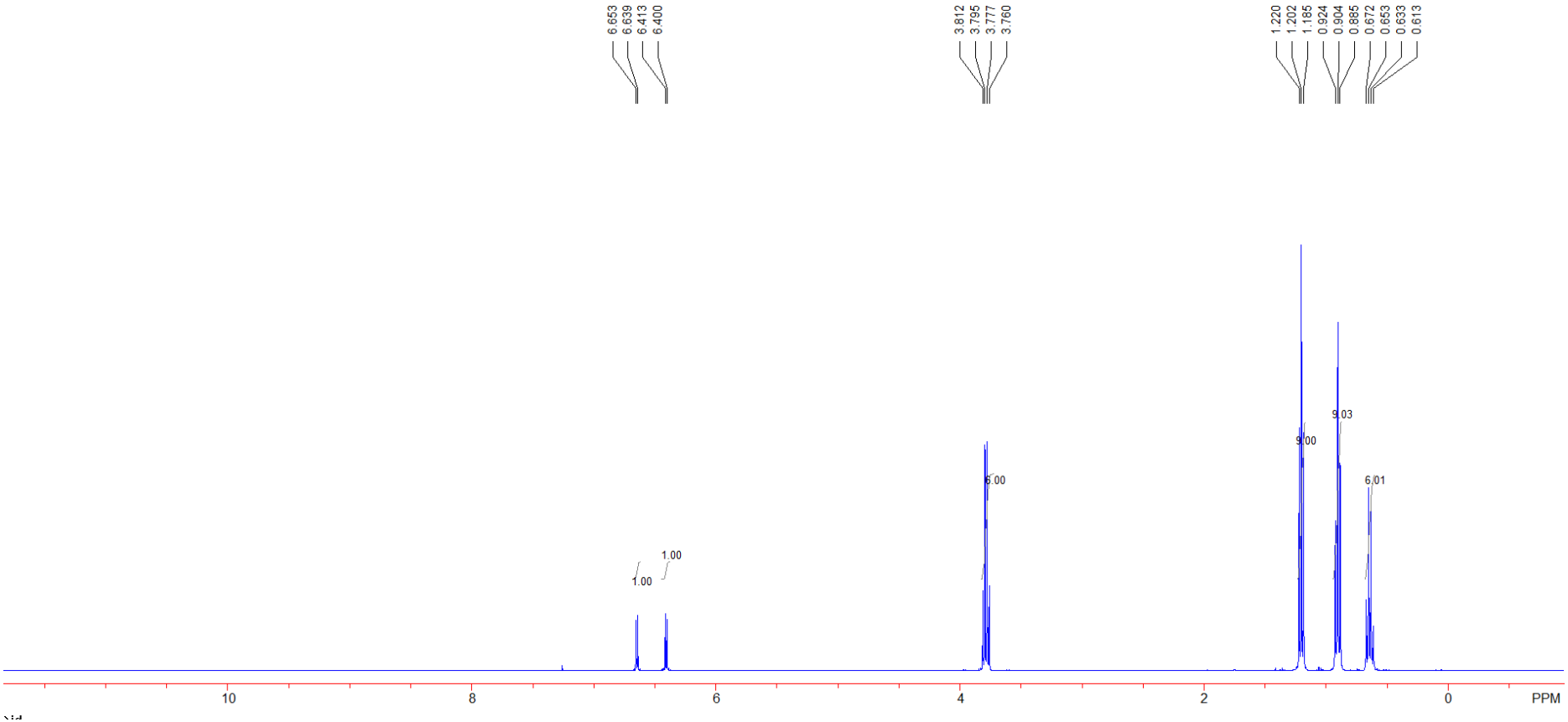
DEPT 135



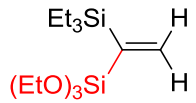
3b


Et3Si
H
(EtO)3Si
H

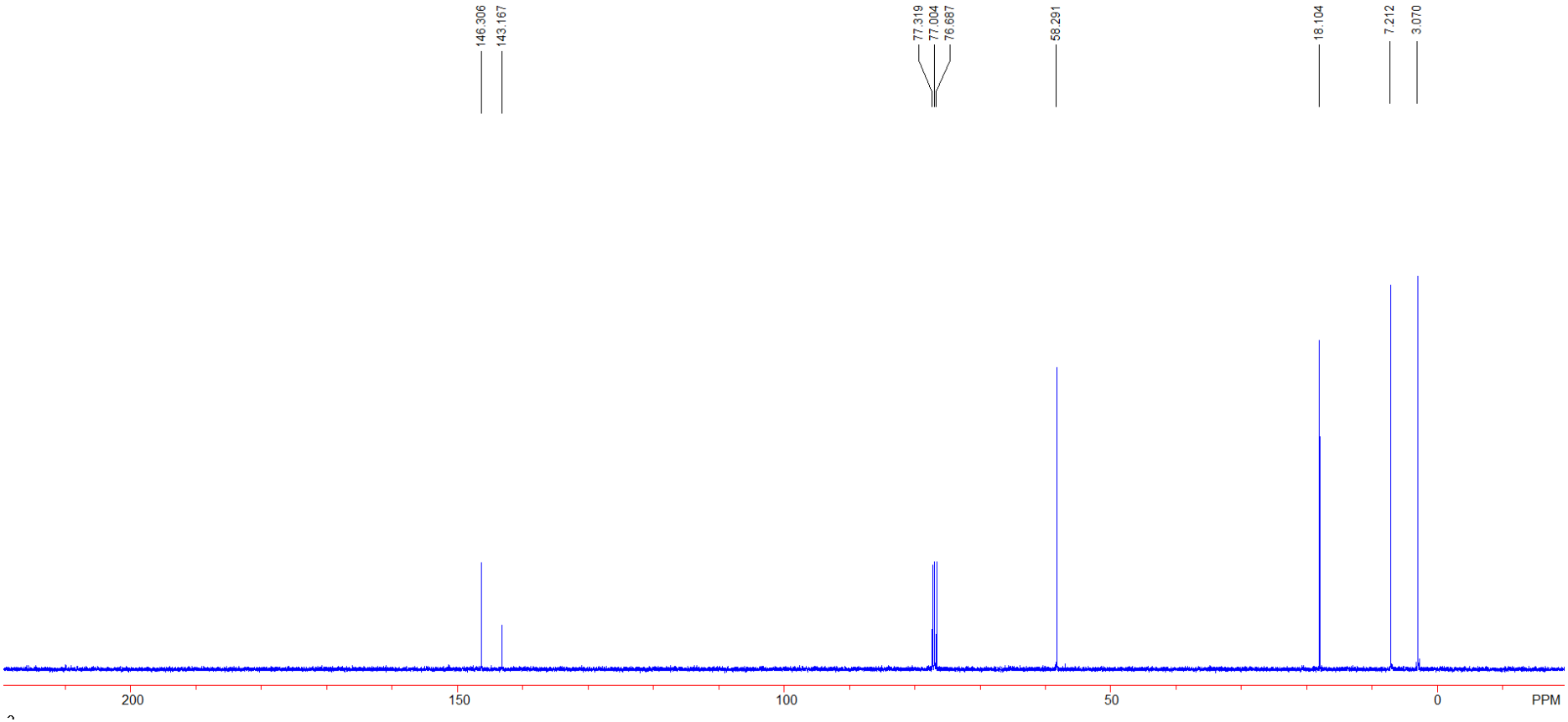
^{1}H NMR


6.653
6.639
6.413
6.400
3.812
3.795
3.777
3.760
1.220
1.202
1.185
0.924
0.904
0.885
0.672
0.653
0.633
0.613
1.00
1.00
6.00
9.00
9.03
6.01
10
8
6
4
2
0
PPM

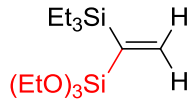
3b


Et3Si
H
(EtO)3Si
H

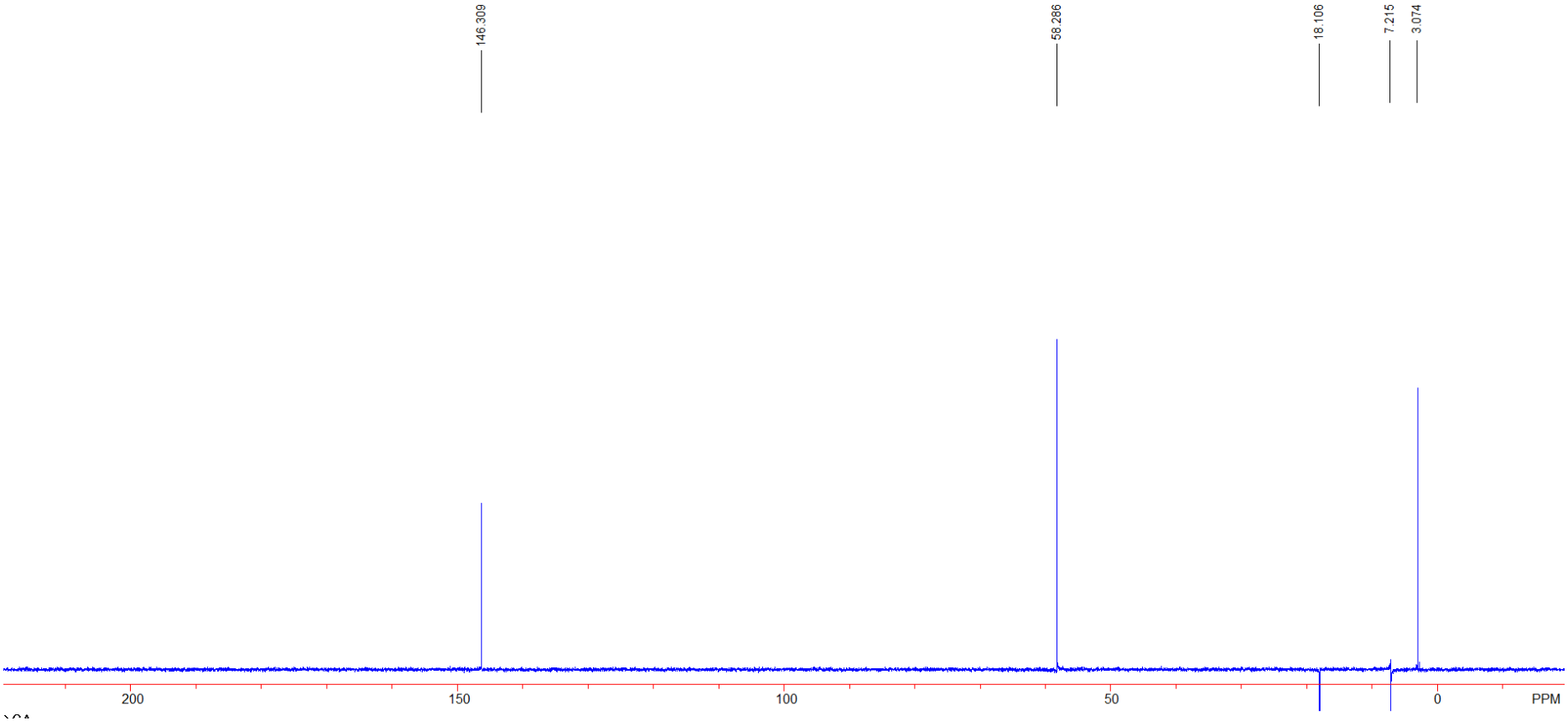
^{13}C NMR


146.306
143.167
77.319
77.004
76.687
58.291
18.104
7.212
3.070
200
150
100
50
0
PPM

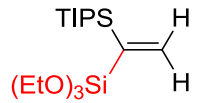
3b


Et3Si
H
(EtO)3Si
H

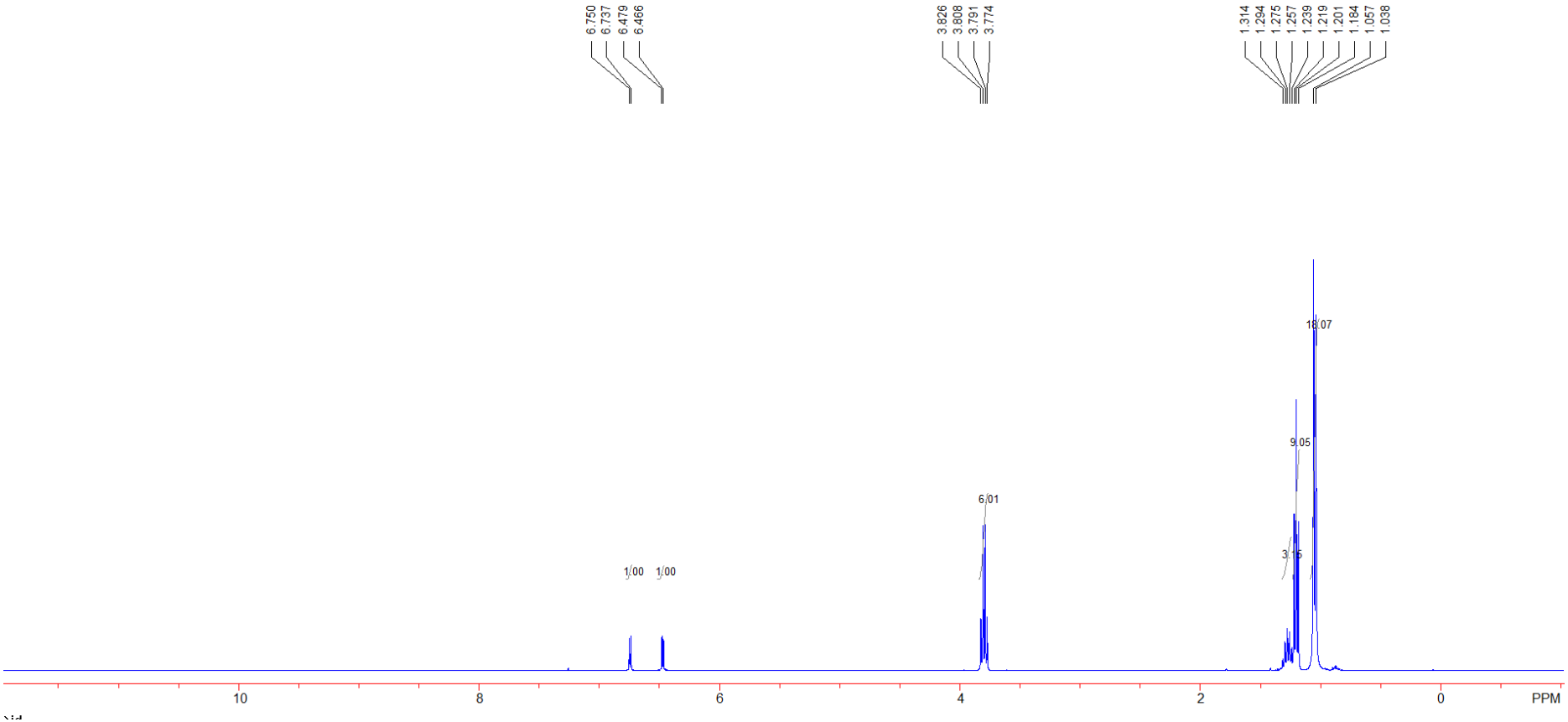
DEPT 135


146.309
58.286
18.106
7.215
3.074
200
150
100
50
0
PPM

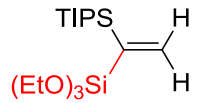
3c


TIPS
H
(EtO)3Si
H

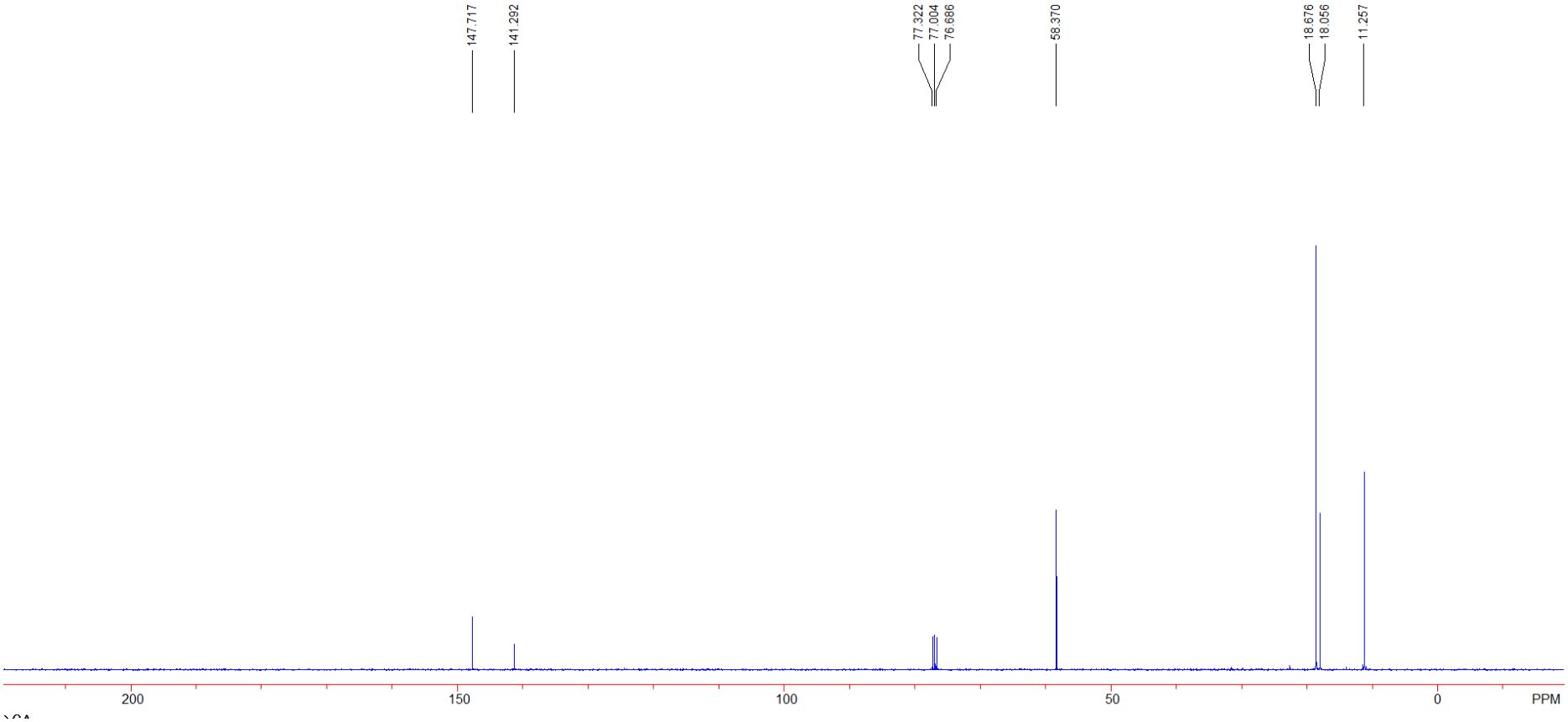
^{1}H NMR


6.750
6.737
6.479
6.466
3.826
3.808
3.791
3.774
1.314
1.294
1.275
1.257
1.239
1.219
1.201
1.184
1.057
1.038
18.07
9.05
6.01
3.16
1.00
1.00
10
8
6
4
2
0
PPM

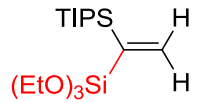
3c


TIPS
H
(EtO)3Si
H

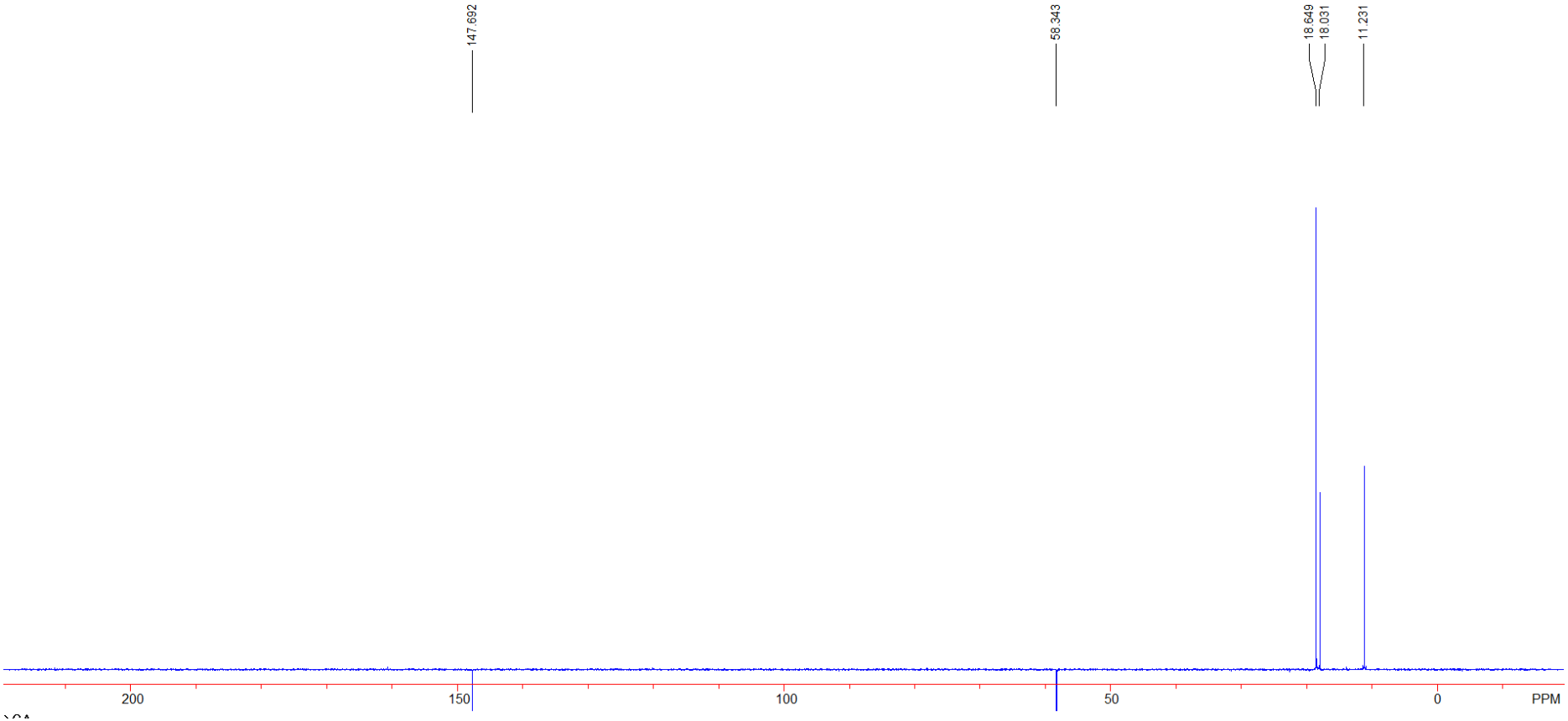
^{13}C NMR


147.717
141.292
77.322
77.004
76.686
58.370
18.676
18.056
11.257
200
150
100
50
0
PPM

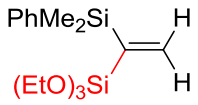
3c


TIPS
H
H
(EtO)3Si

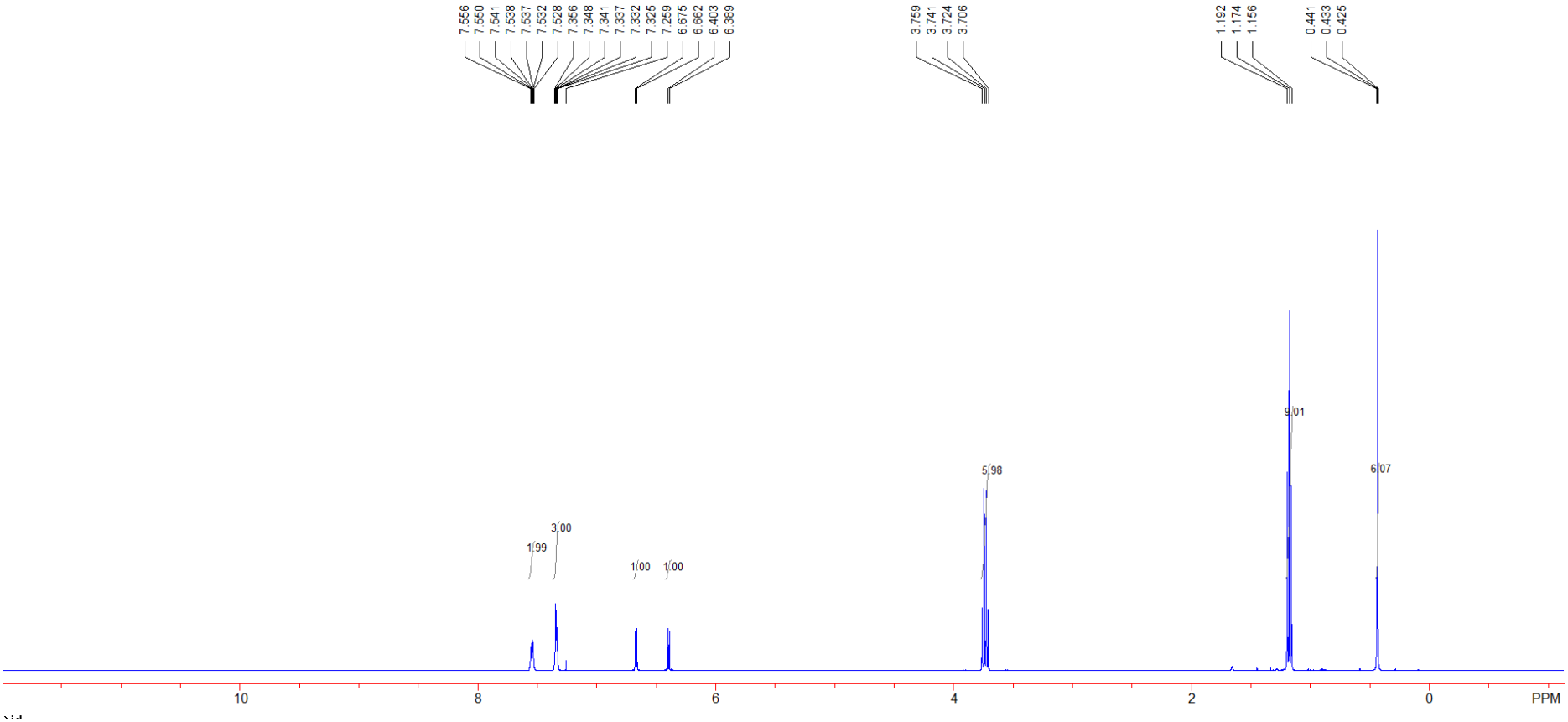
DEPT 135


147.692
58.343
18.649
18.031
11.231
200
150
100
50
0
PPM

3d


PhMe2Si
H
(EtO)3Si
H

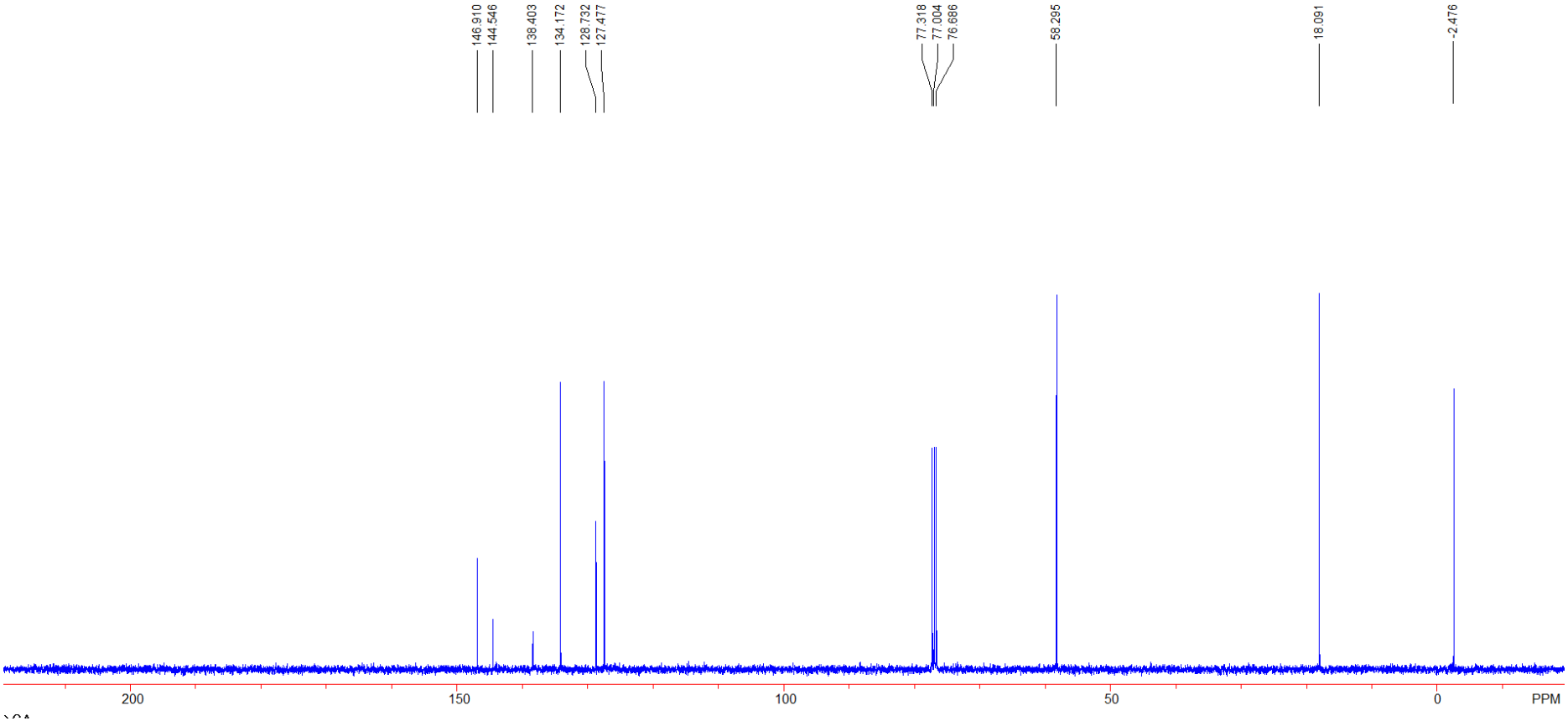
^{1}H NMR


7.556
7.550
7.541
7.538
7.537
7.532
7.528
7.356
7.348
7.341
7.337
7.332
7.325
7.259
6.675
6.662
6.403
6.389
3.759
3.741
3.724
3.706
1.192
1.174
1.156
0.441
0.433
0.425
1.99
3.00
1.00
1.00
5.98
9.01
6.07
10
8
6
4
2
0
PPM

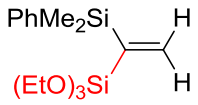
3d


PhMe2Si
H
(EtO)3Si
H

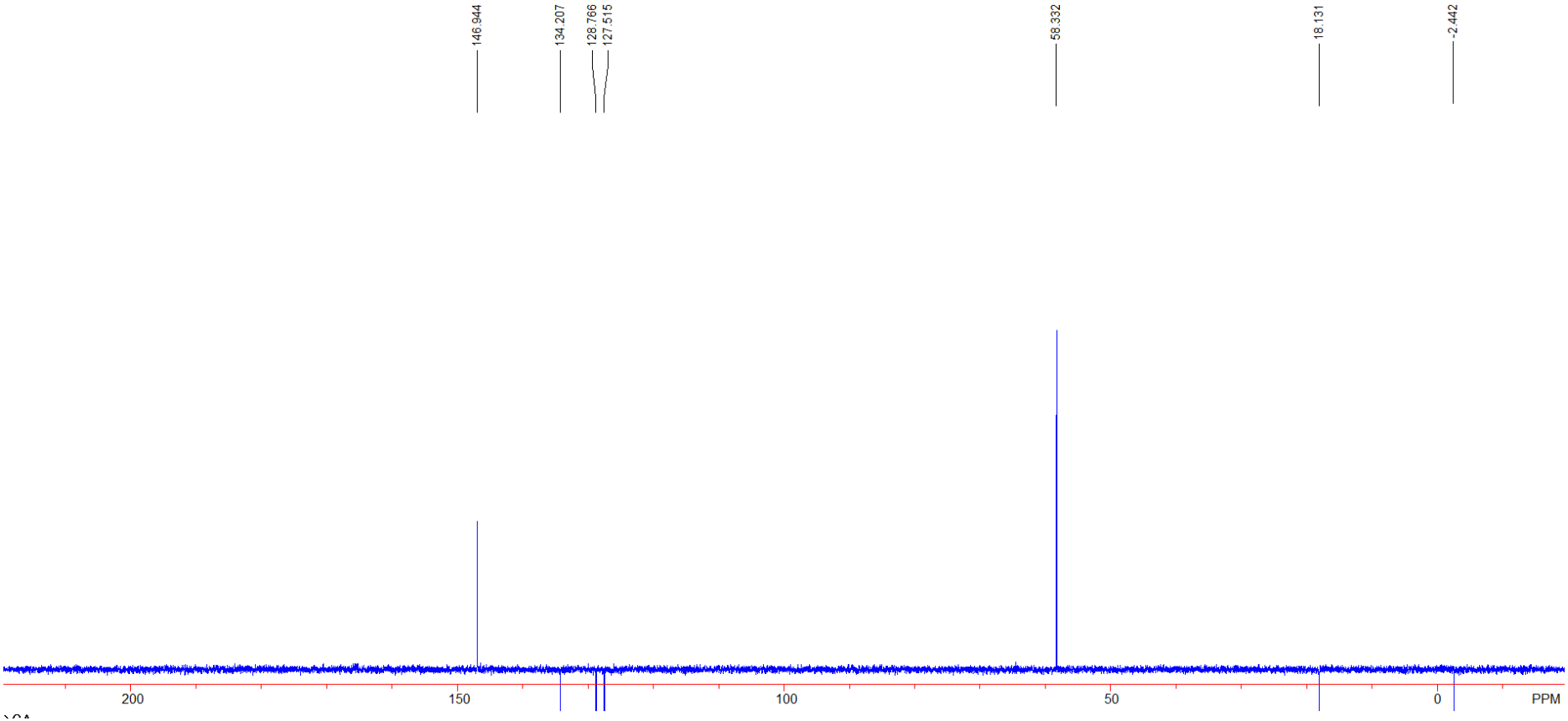
^{13}C NMR


146.910
144.546
138.403
134.172
128.732
127.477
77.318
77.004
76.686
58.295
18.091
-2.476
200
150
100
50
0
PPM

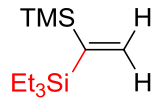
3d


PhMe2Si
H
(EtO)3Si
H

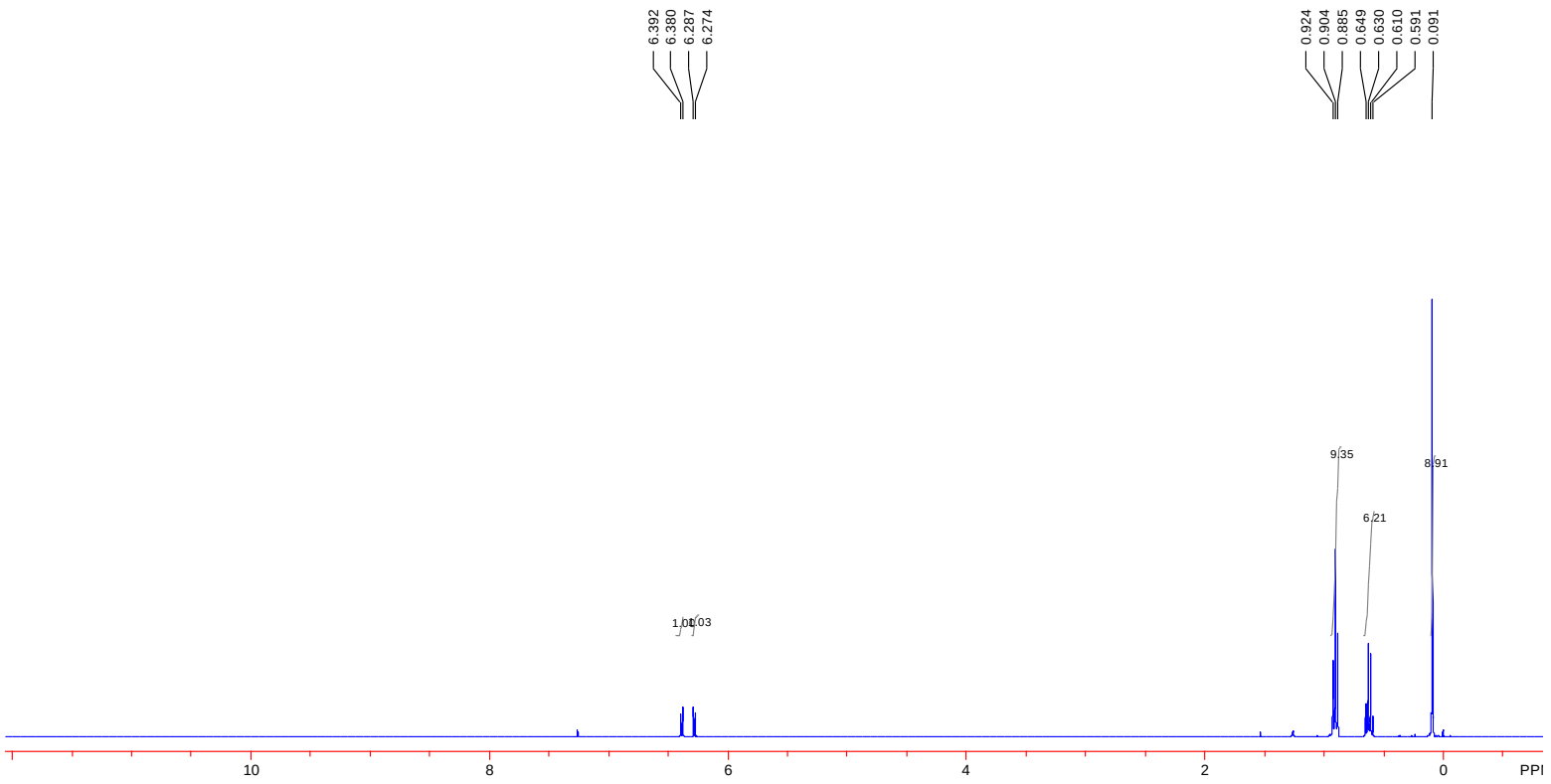
DEPT 135


146.944
134.207
128.766
127.515
58.332
18.131
-2.442
200
150
100
50
0
PPM

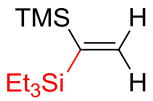
3e


TMS
H
Et3Si
H

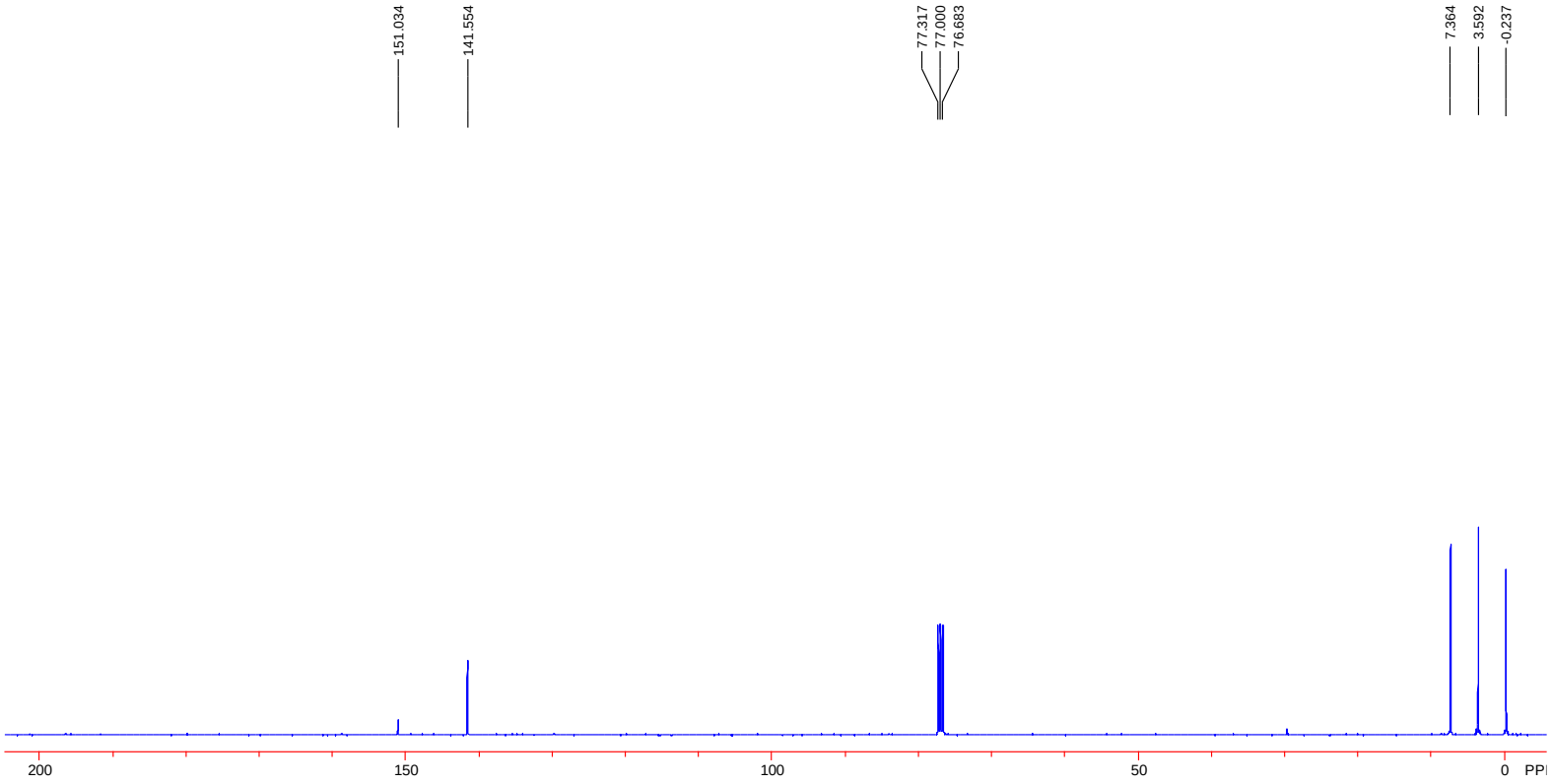
^{1}H NMR


6.392
6.380
6.287
6.274
0.924
0.904
0.885
0.649
0.630
0.610
0.591
0.091
9.35
8.91
6.21
1.00
1.03
10
8
6
4
2
0
PPI

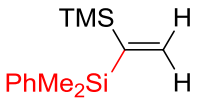
3e


TMS
H
Et3Si
H

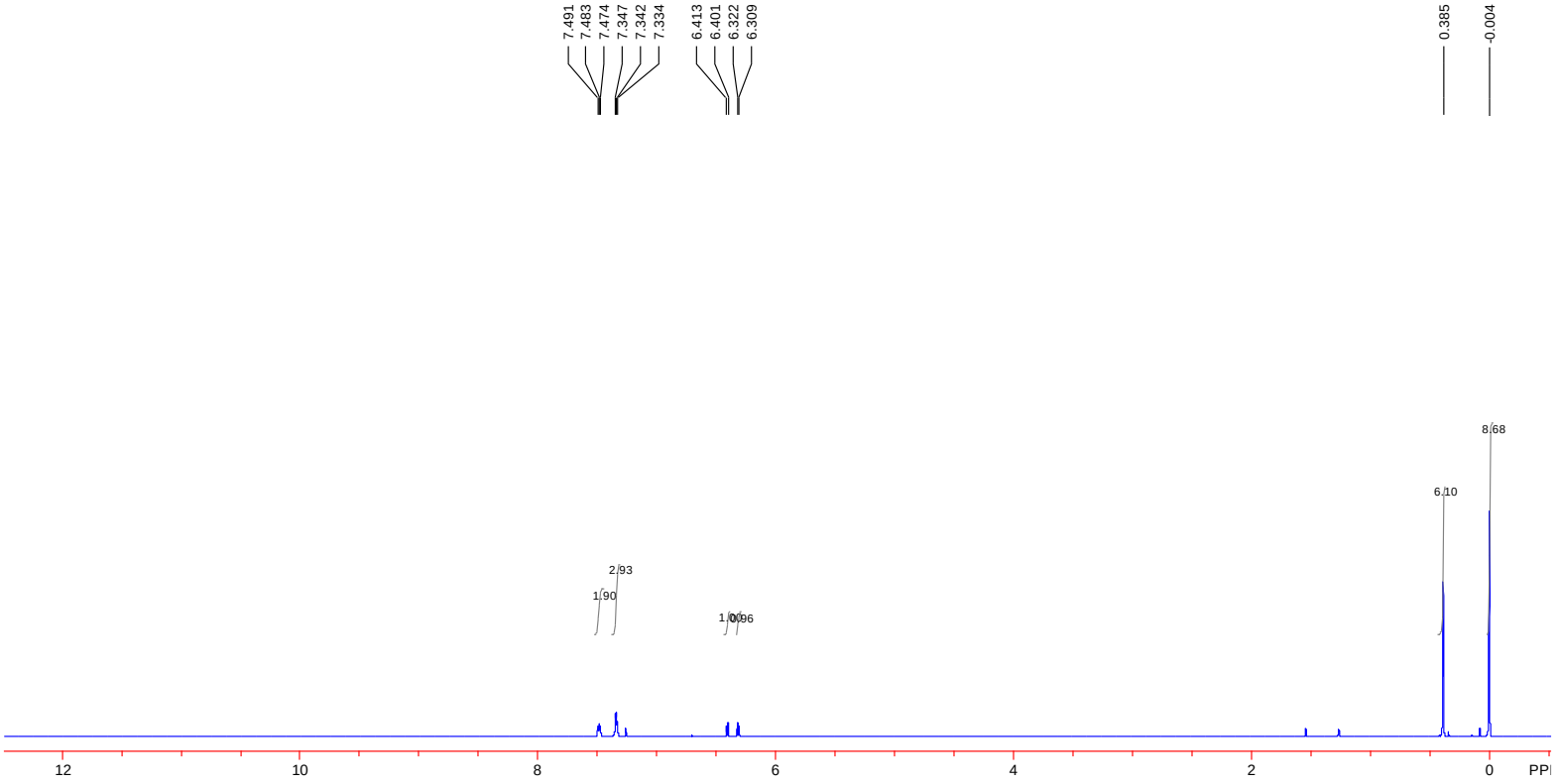
^{13}C NMR


151.034
141.554
77.317
77.000
76.683
7.364
3.592
-0.237
200
150
100
50
0
PPI

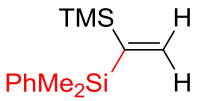
3f


TMS
H
PhMe2Si
H

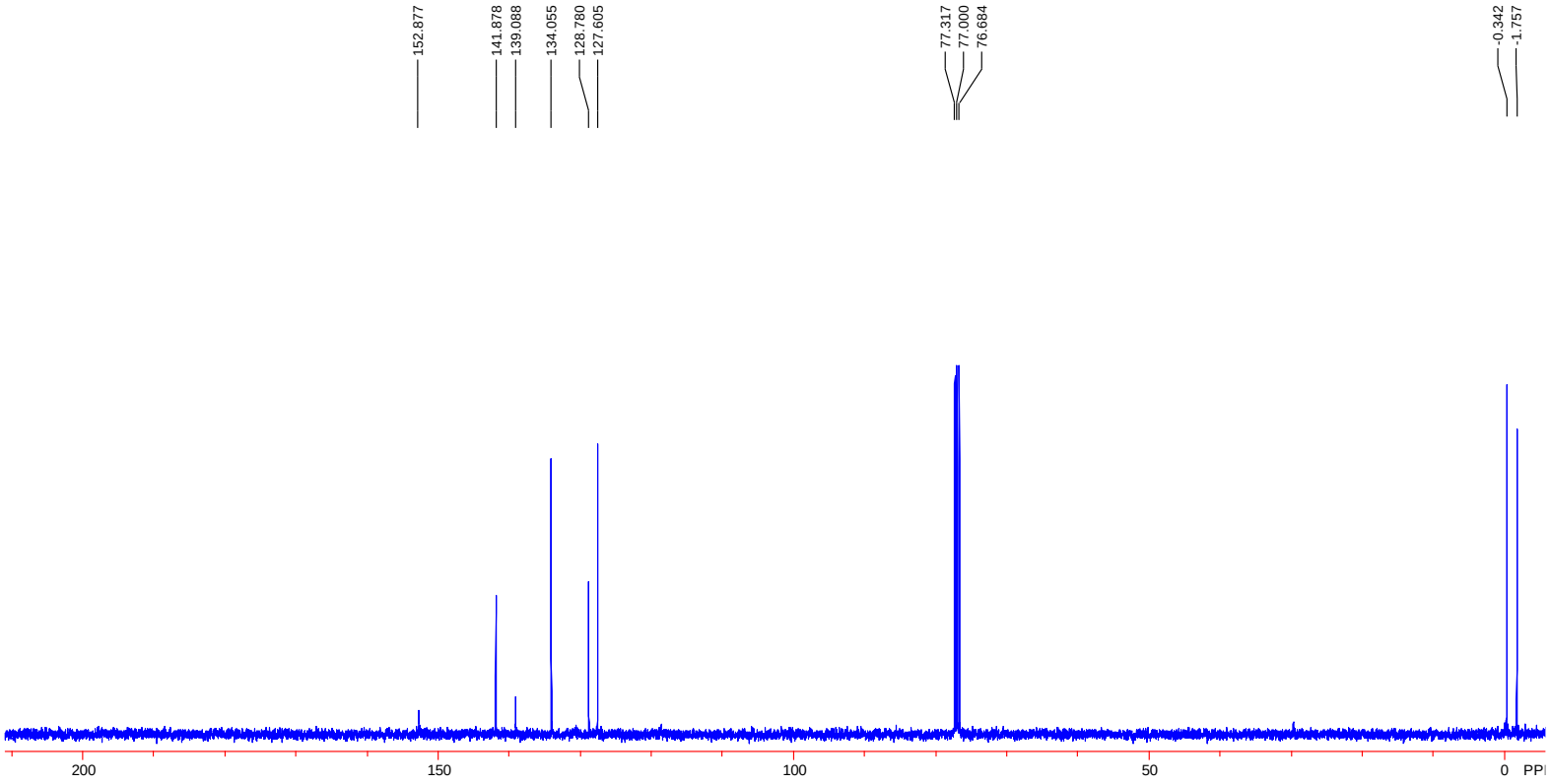
^{1}H NMR


7.491
7.483
7.474
7.347
7.342
7.334
6.413
6.401
6.322
6.309
0.385
-0.004
8.68
6.10
2.93
1.90
1.00
0.96
12
10
8
6
4
2
0
PPI

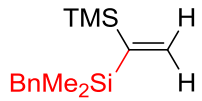
3f


TMS
H
PhMe2Si
H

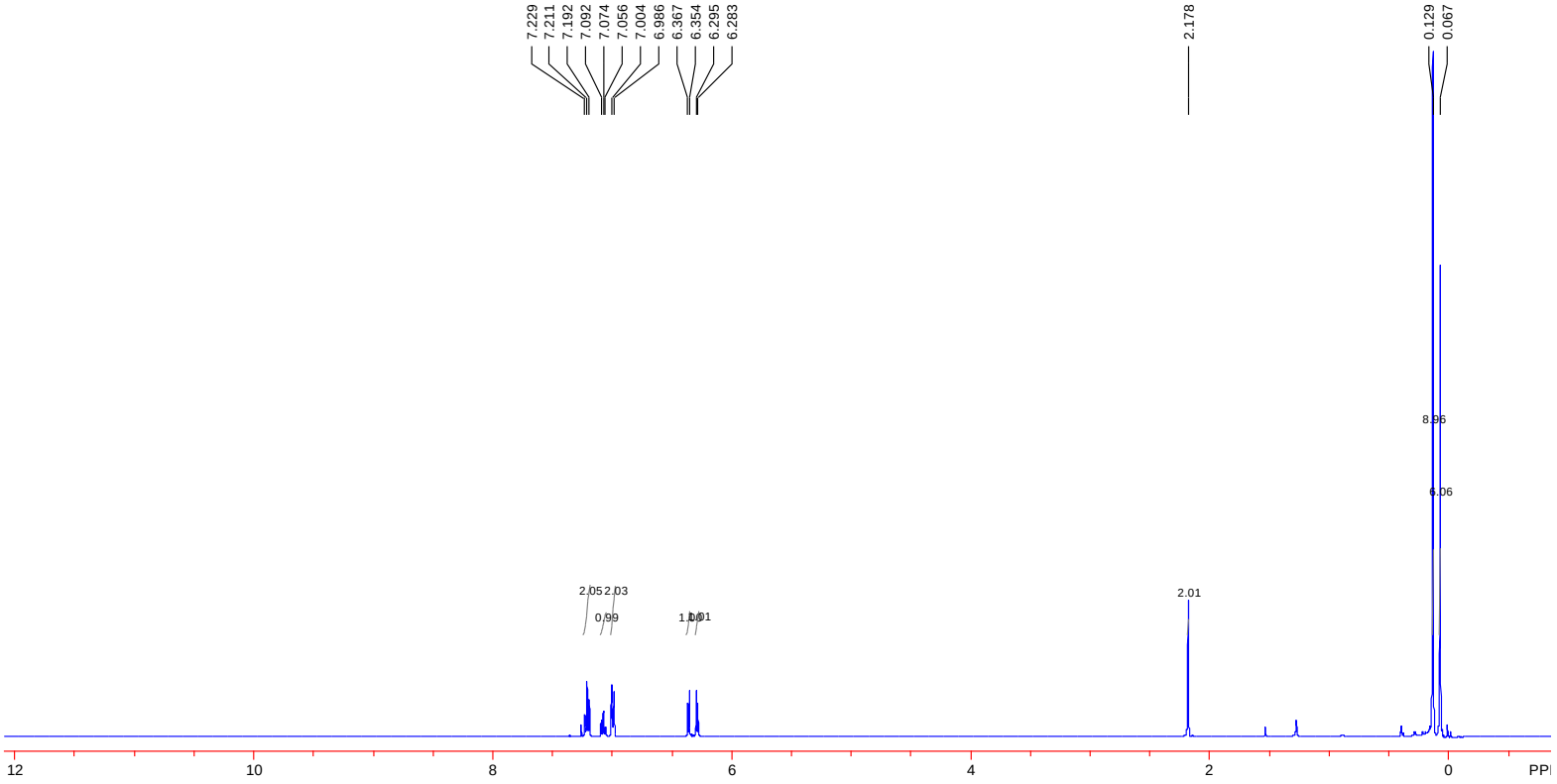
^{13}C NMR


152.877
141.878
139.088
134.055
128.780
127.605
77.317
77.000
76.684
-0.342
-1.757
200
150
100
50
0
PPI

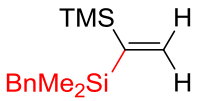
3g


TMS
H
BnMe2Si
H

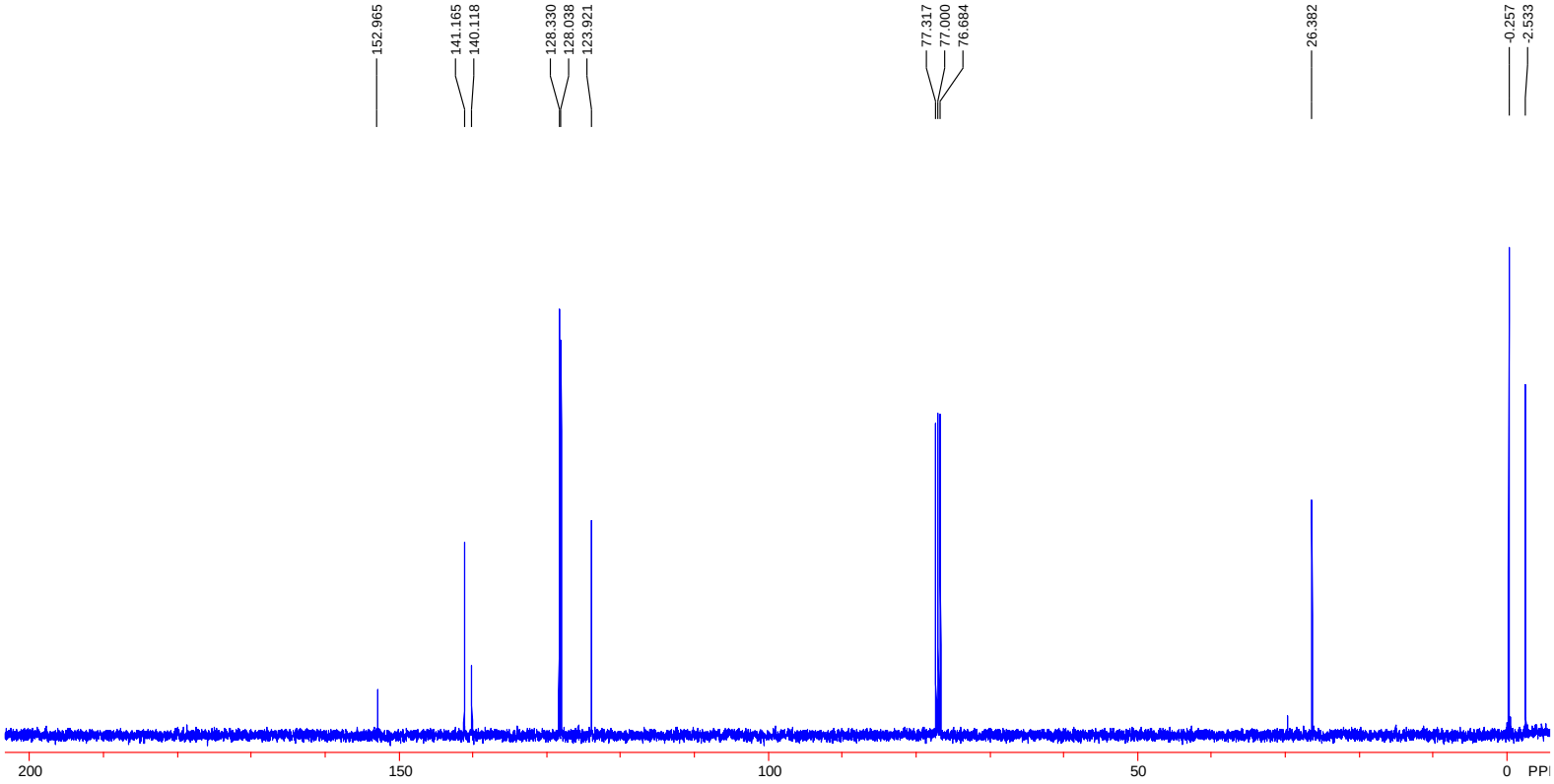
^{1}H NMR


7.229
7.211
7.192
7.092
7.074
7.056
7.004
6.986
6.367
6.354
6.295
6.283
2.178
0.129
0.067
8.96
6.06
2.05
2.03
0.99
1.00
1.01
2.01
12
10
8
6
4
2
0
PPI

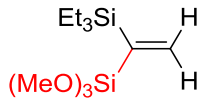
3g


TMS
H
BnMe2Si
H

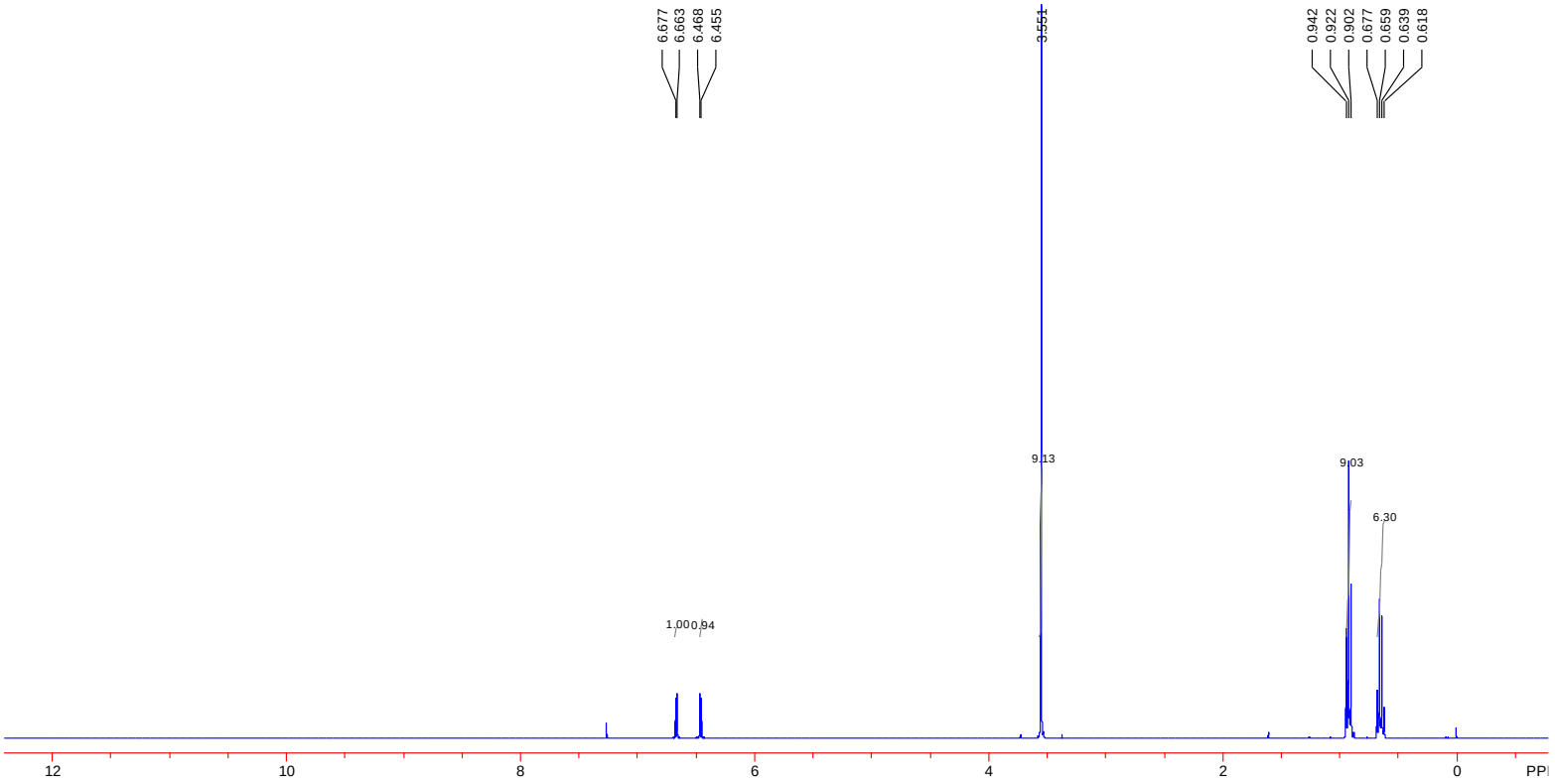
^{13}C NMR


152.965
141.165
140.118
128.330
128.038
123.921
77.317
77.000
76.684
26.382
-0.257
-2.533
200
150
100
50
0
PPI

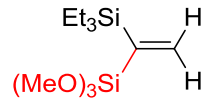
3h


Et3Si
H
(MeO)3Si
H

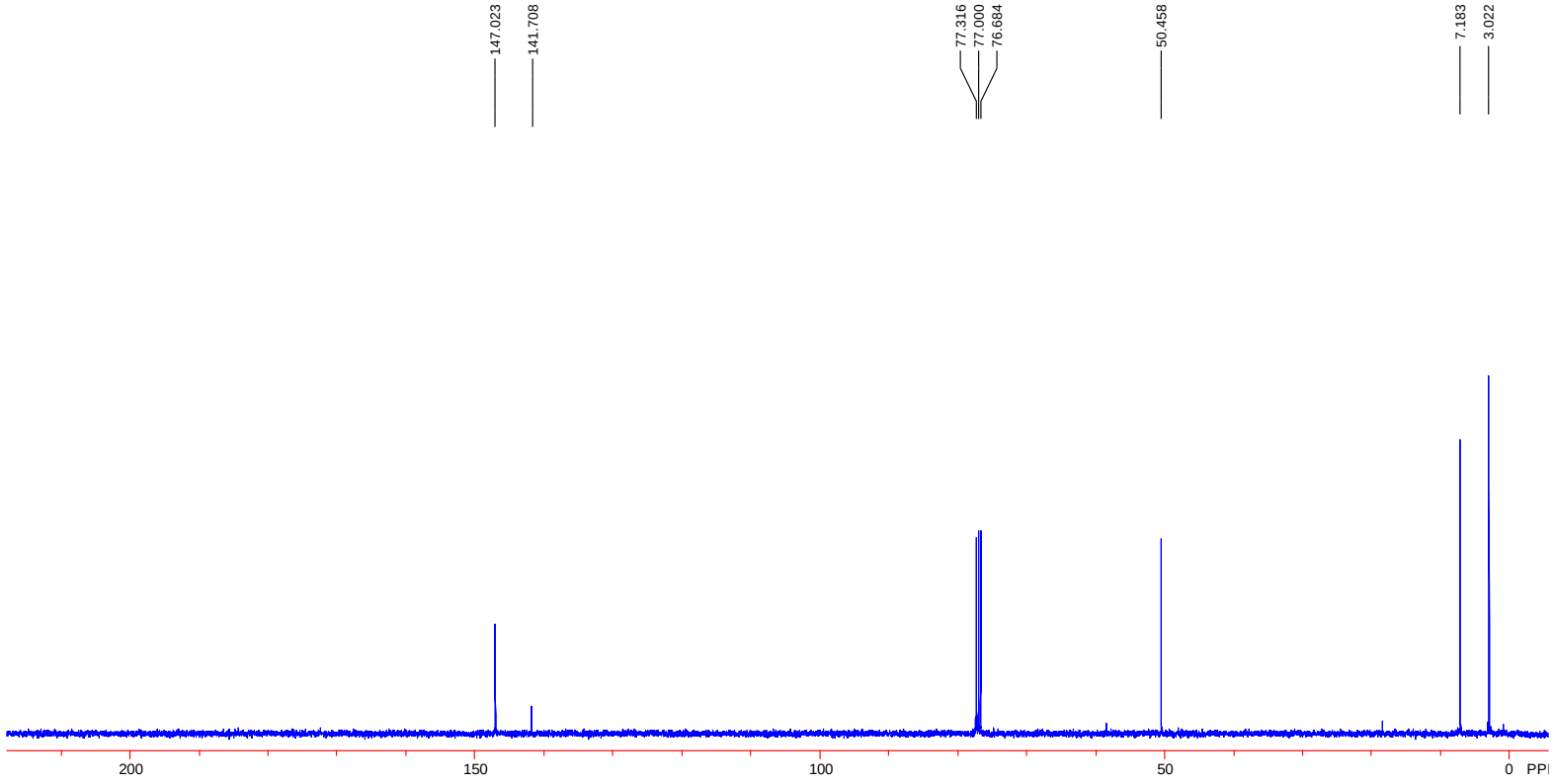
^{1}H NMR


6.677
6.663
6.468
6.455
3.551
0.942
0.922
0.902
0.677
0.659
0.639
0.618
1.00
0.94
9.13
9.03
6.30
12
10
8
6
4
2
0
PPM

3h


Et3Si
H
(MeO)3Si
H

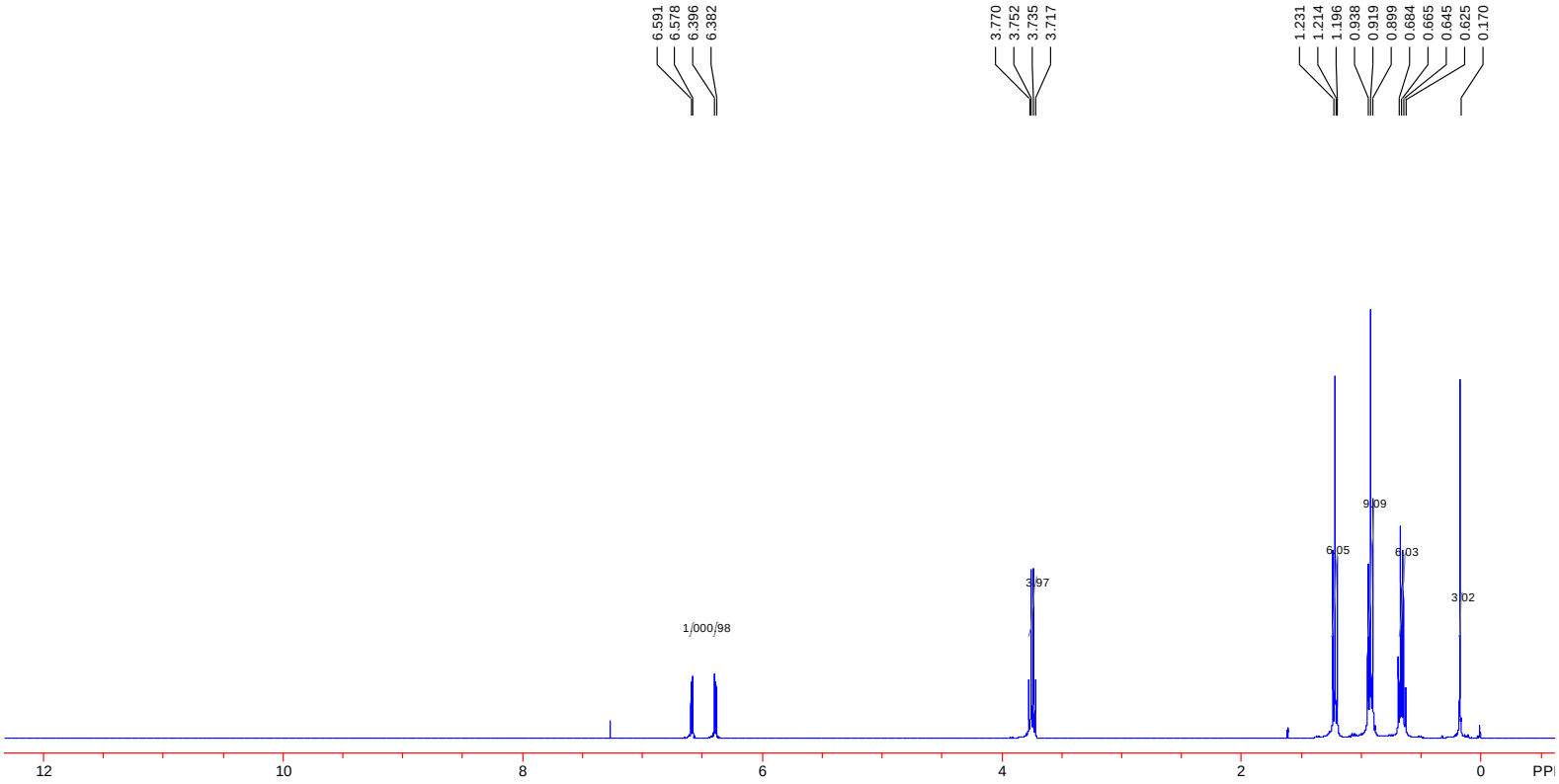
^{13}C NMR


147.023
141.708
77.316
77.000
76.684
50.458
7.183
3.022
200
150
100
50
0
PPI

3i


Et3Si
H
H
(EtO)2MeSi

^{1}H NMR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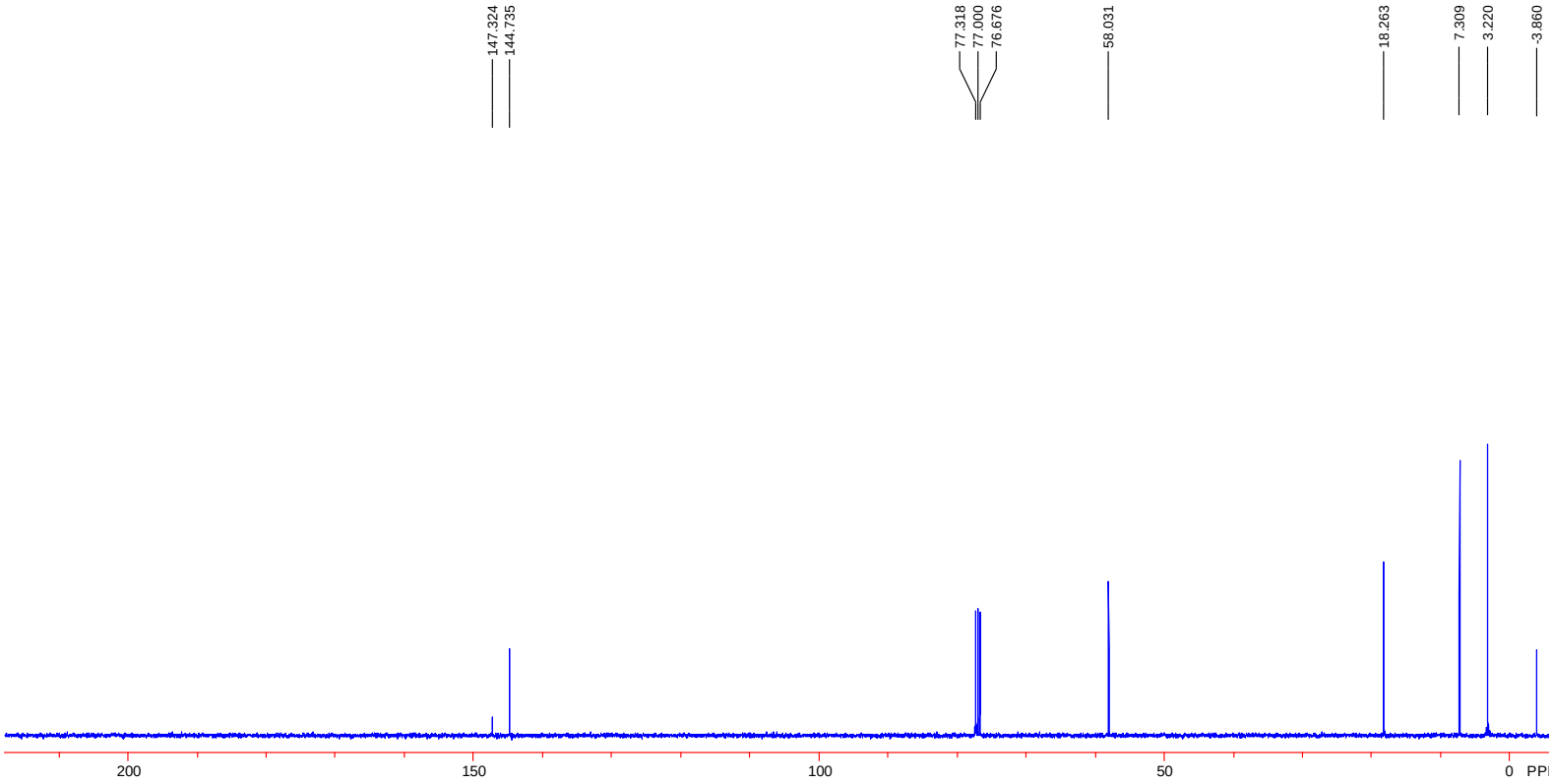
6.578
6.396
6.382
3.770
3.752
3.735
3.717
1.231
1.214
1.196
0.938
0.919
0.899
0.684
0.665
0.645
0.625
0.170
1.000
0.98
3.97
6.05
9.09
6.03
3.02
12
10
8
6
4
2
0
PPM

3i


Et3Si
H
(EtO)2MeSi
H

^{13}C NMR


147.324
144.735
77.318
77.000
76.676
58.031
18.263
7.309
3.220
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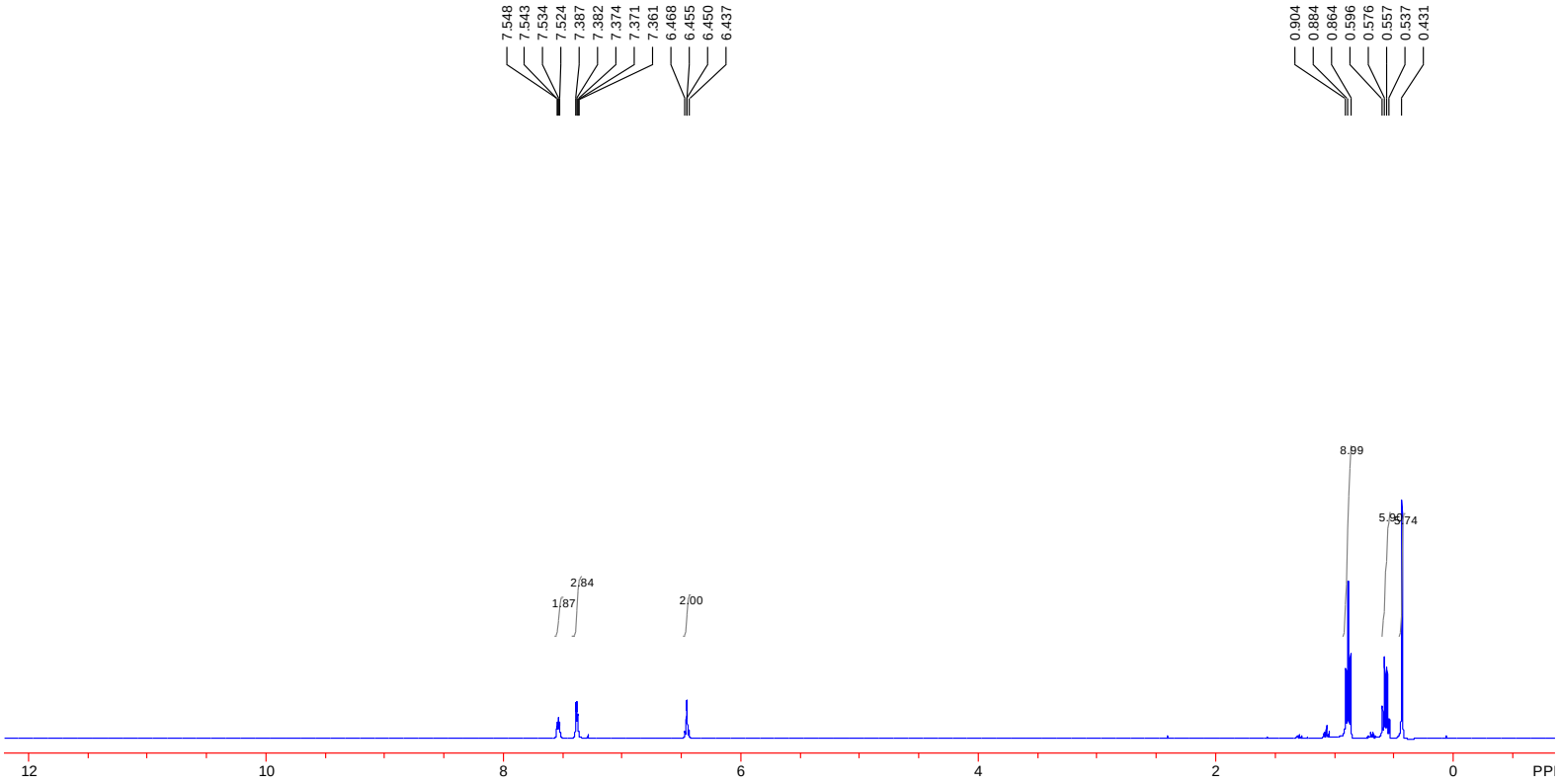
200
150
100
50
0
PPI

3j


Et3Si
H
PhMe2Si
H

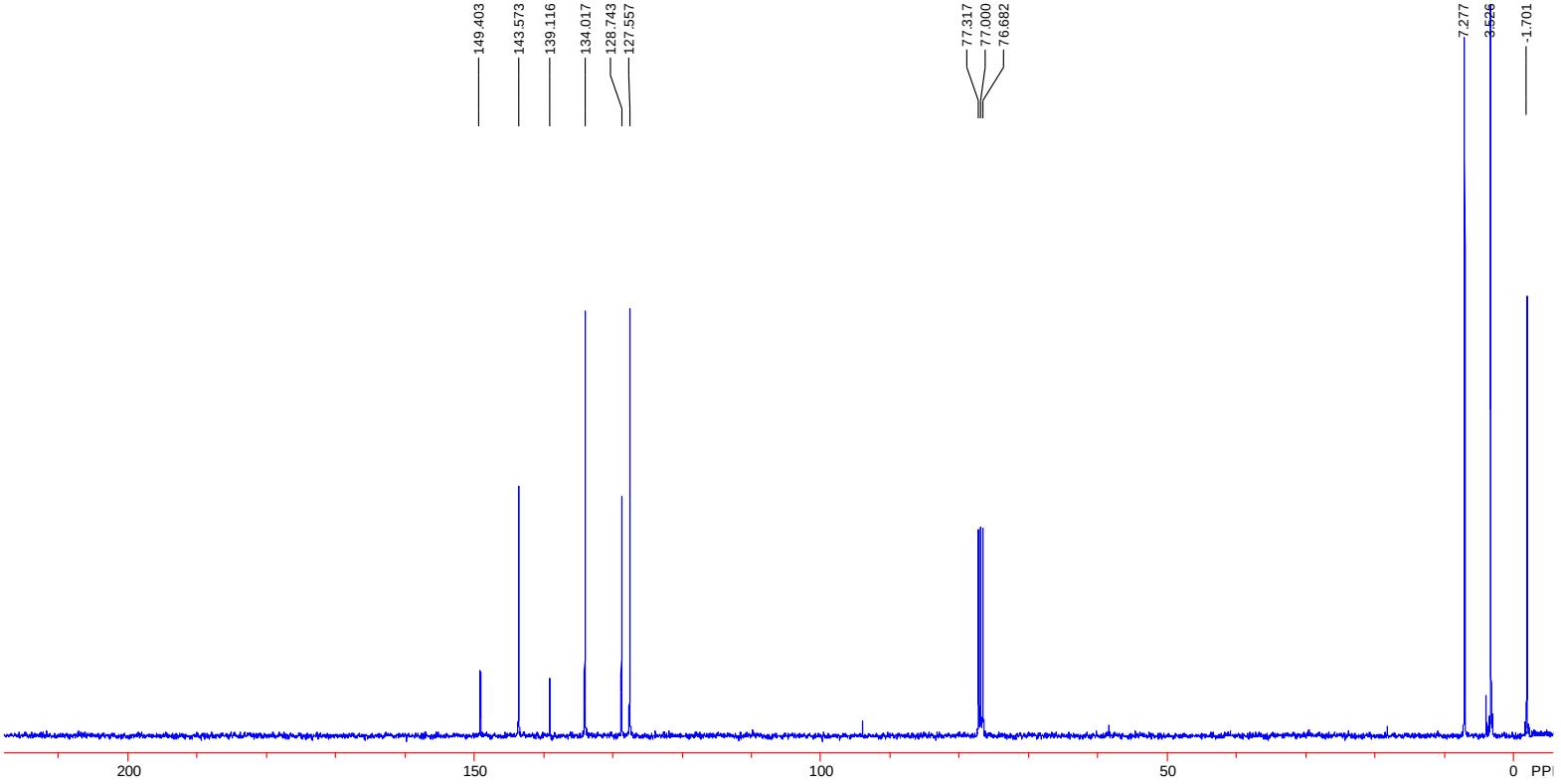
^{1}H NMR


7.548
7.543
7.534
7.524
7.387
7.382
7.374
7.371
7.361
6.468
6.455
6.450
6.437
0.904
0.884
0.864
0.596
0.576
0.557
0.537
0.431
8.99
5.99
5.74
2.84
1.87
2.00
12
10
8
6
4
2
0
PPM

3j


Et3Si
H
PhMe2Si
H

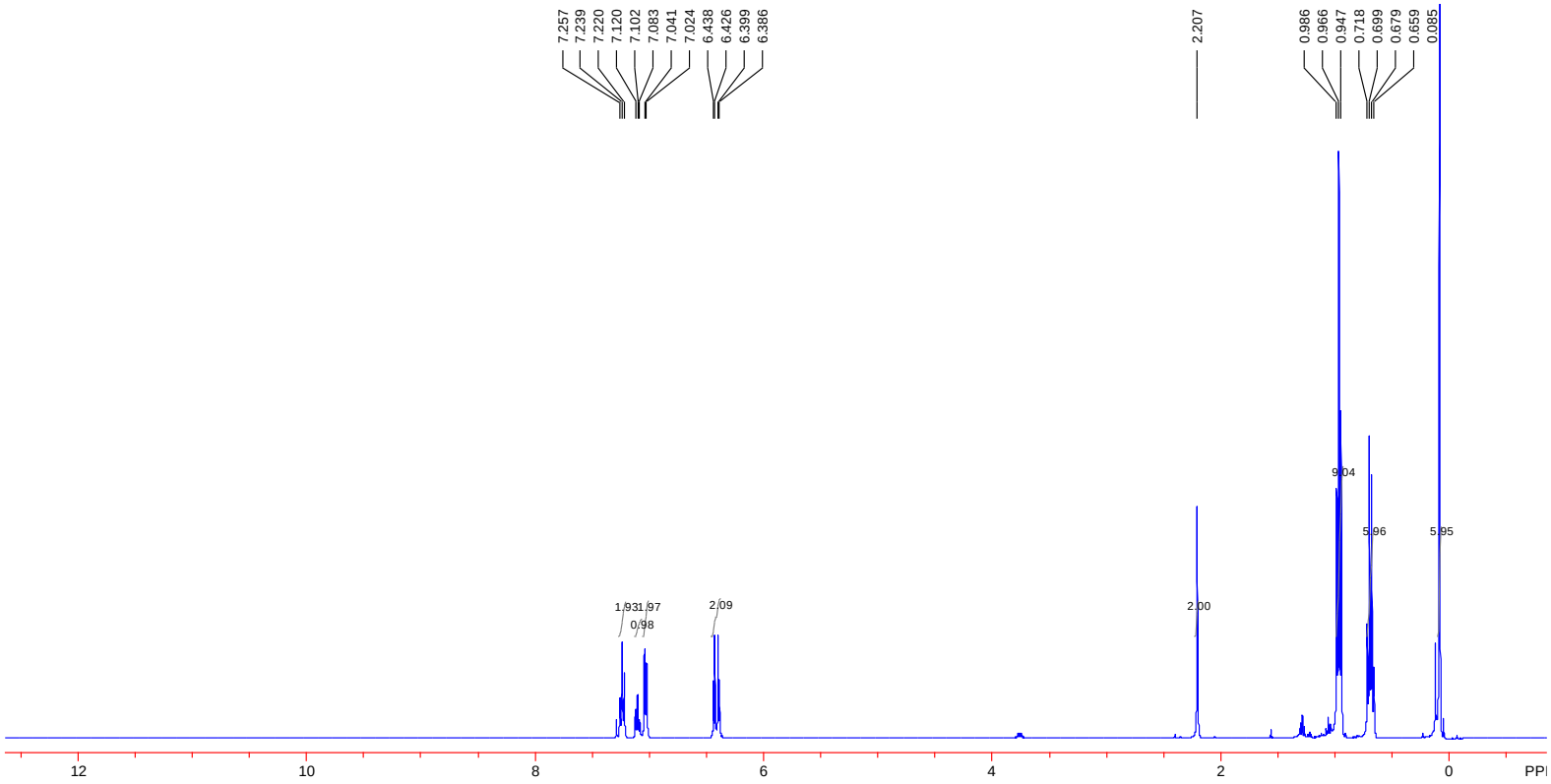
^{13}C NMR


149.403
143.573
139.116
134.017
128.743
127.557
77.317
77.000
76.682
7.277
3.526
-1.701
200
150
100
50
0
PPM

3k


Et3Si
H
BnMe2Si
H

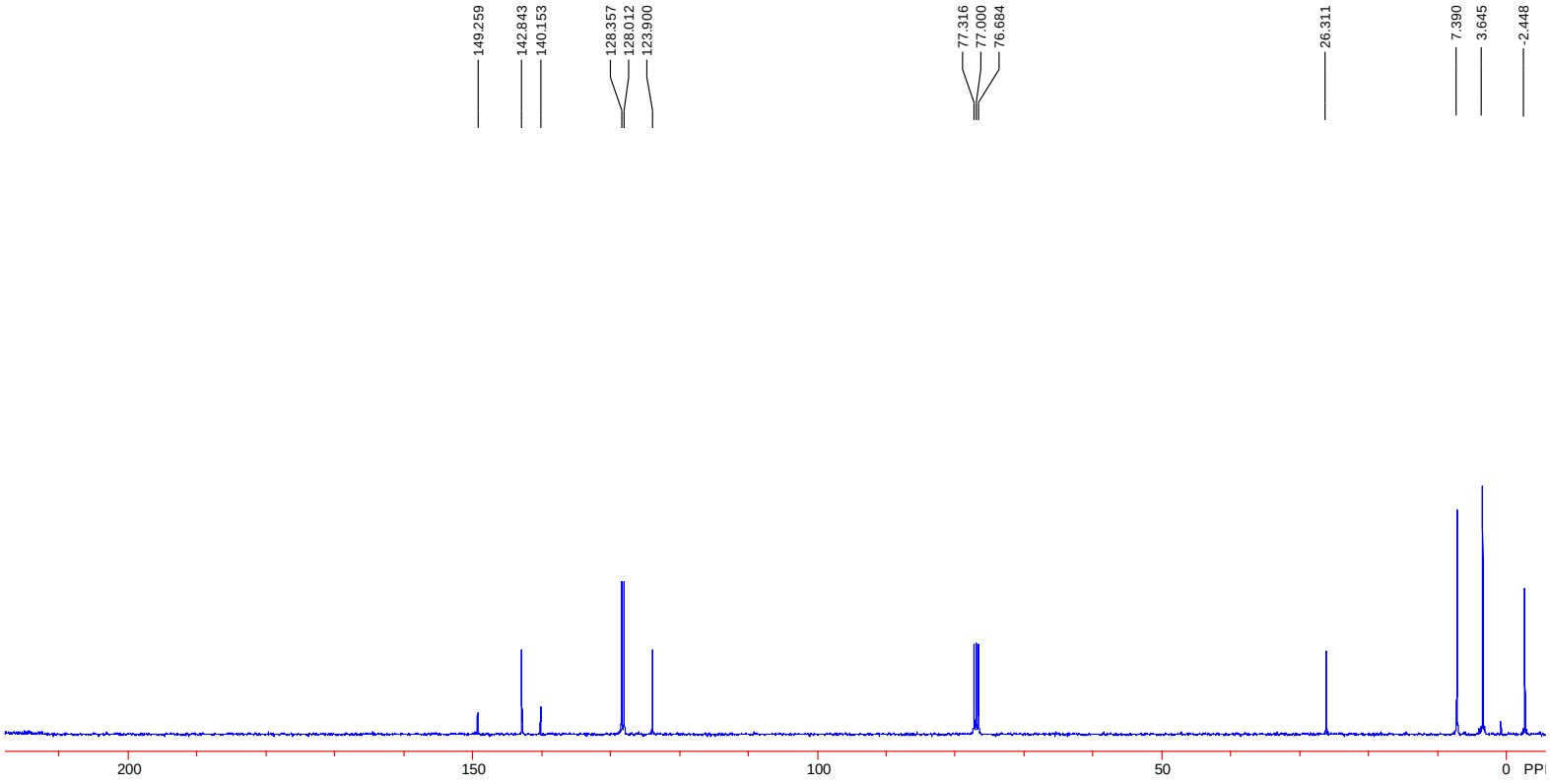
^{1}H NMR


7.257
7.239
7.220
7.120
7.102
7.083
7.041
7.024
6.438
6.426
6.399
6.386
2.207
0.986
0.966
0.947
0.718
0.699
0.679
0.659
0.085
9.04
5.96
5.95
1.93
1.97
0.98
2.09
2.00
12
10
8
6
4
2
0
PPI

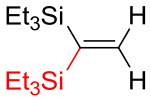
3k


Et3Si
H
BnMe2Si
H

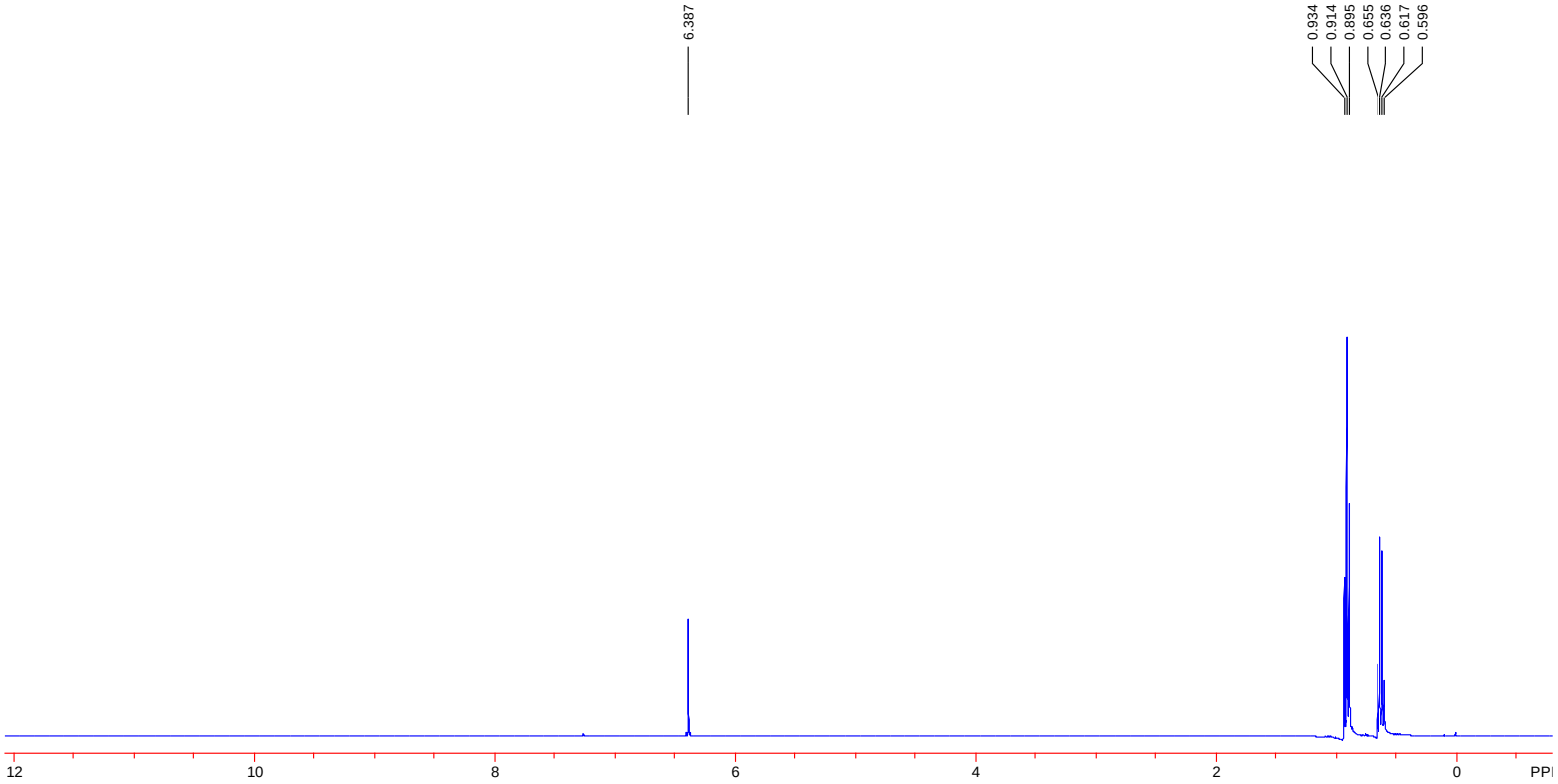
^{13}C NMR


149.259
142.843
140.153
128.357
128.012
123.900
77.316
77.000
76.684
26.311
7.390
3.645
-2.448
200
150
100
50
0
PPI

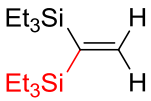
3l


Et3Si
H
Et3Si
H

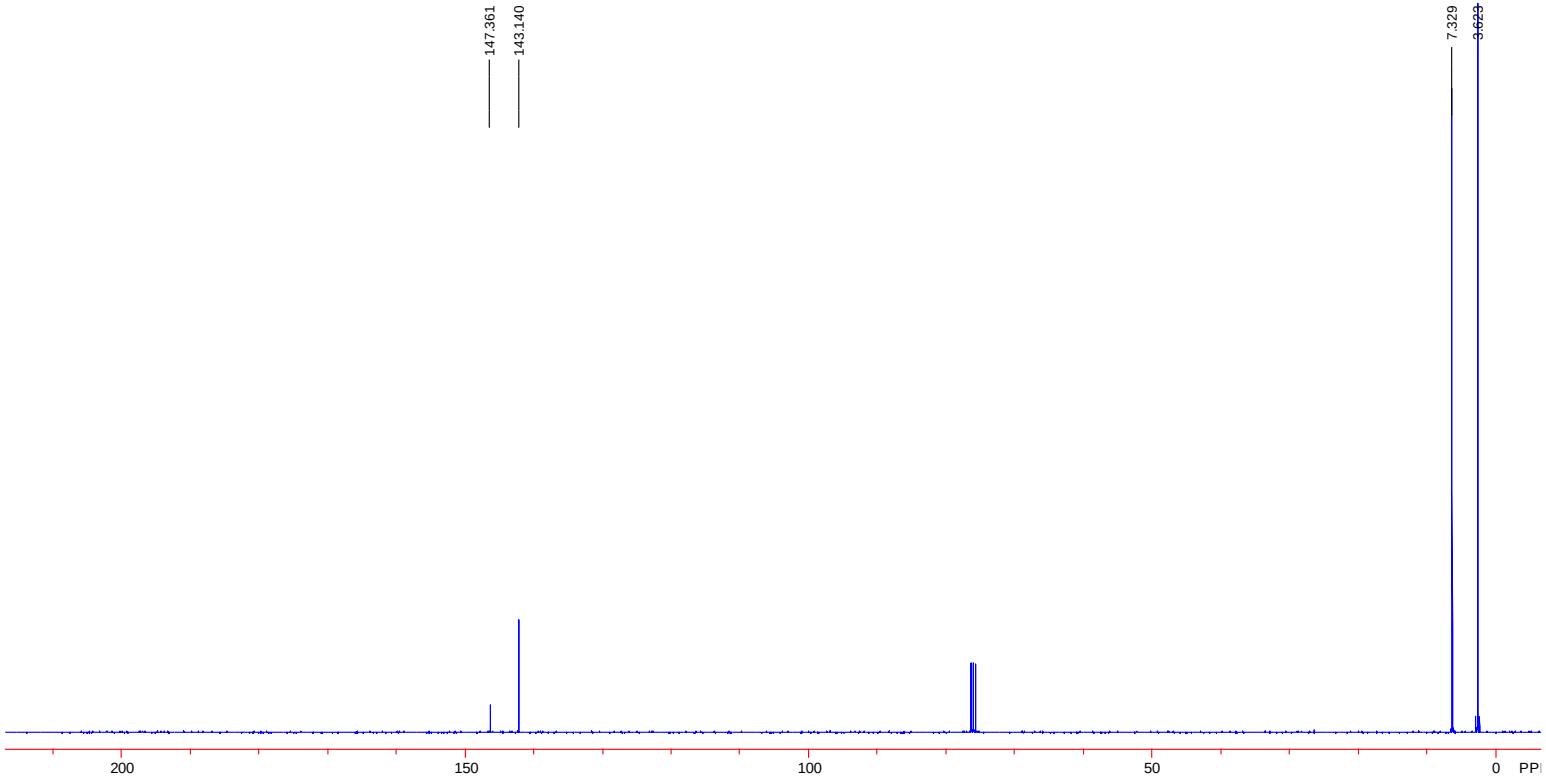
^{1}H NMR


6.387
0.934
0.914
0.895
0.655
0.636
0.617
0.596
12
10
8
6
4
2
0
PPI

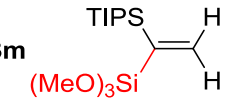
3l



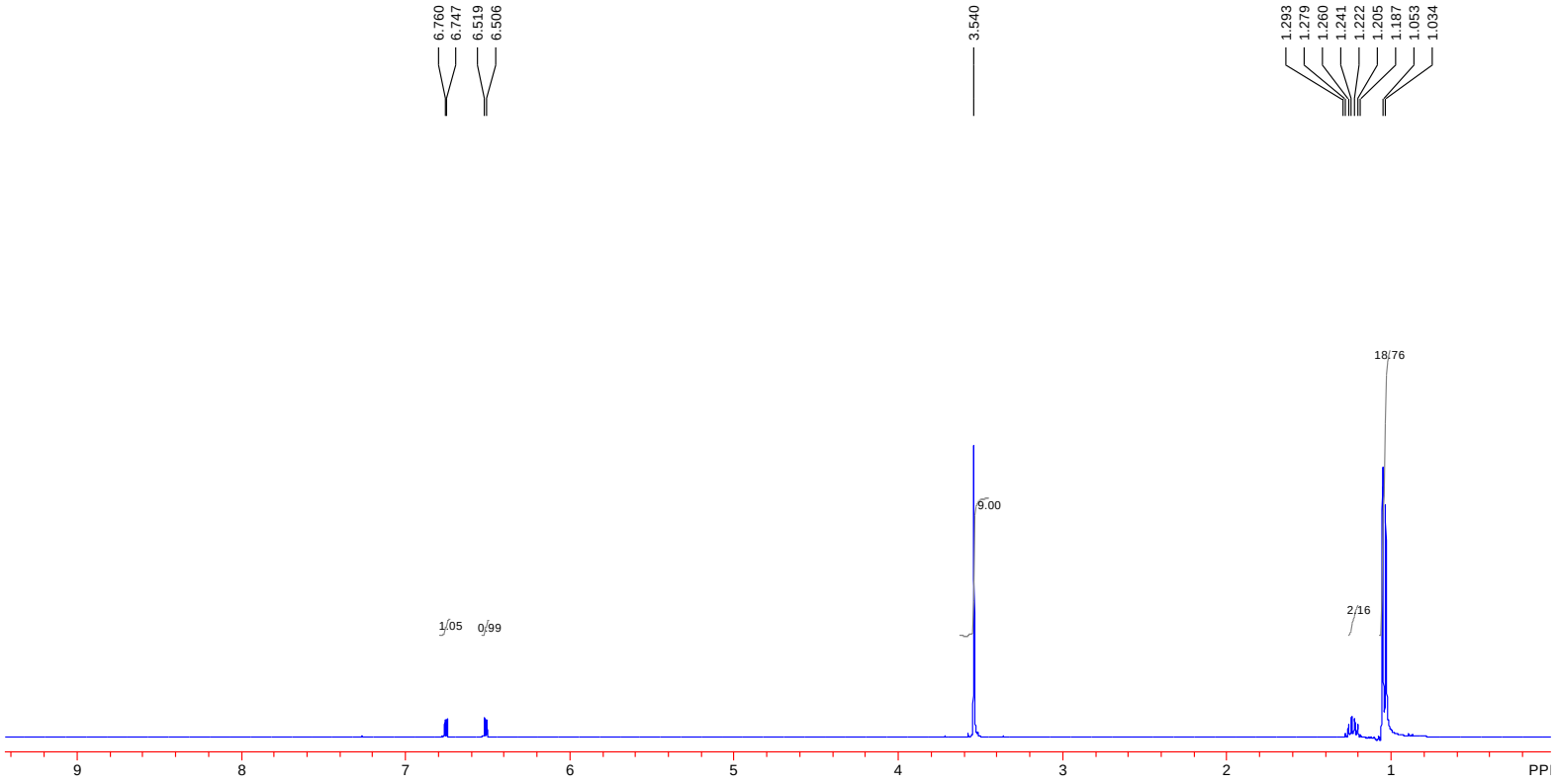
^{13}C NMR



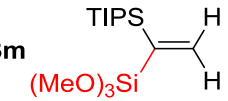
3m


TIPS
H
(MeO)3Si
H

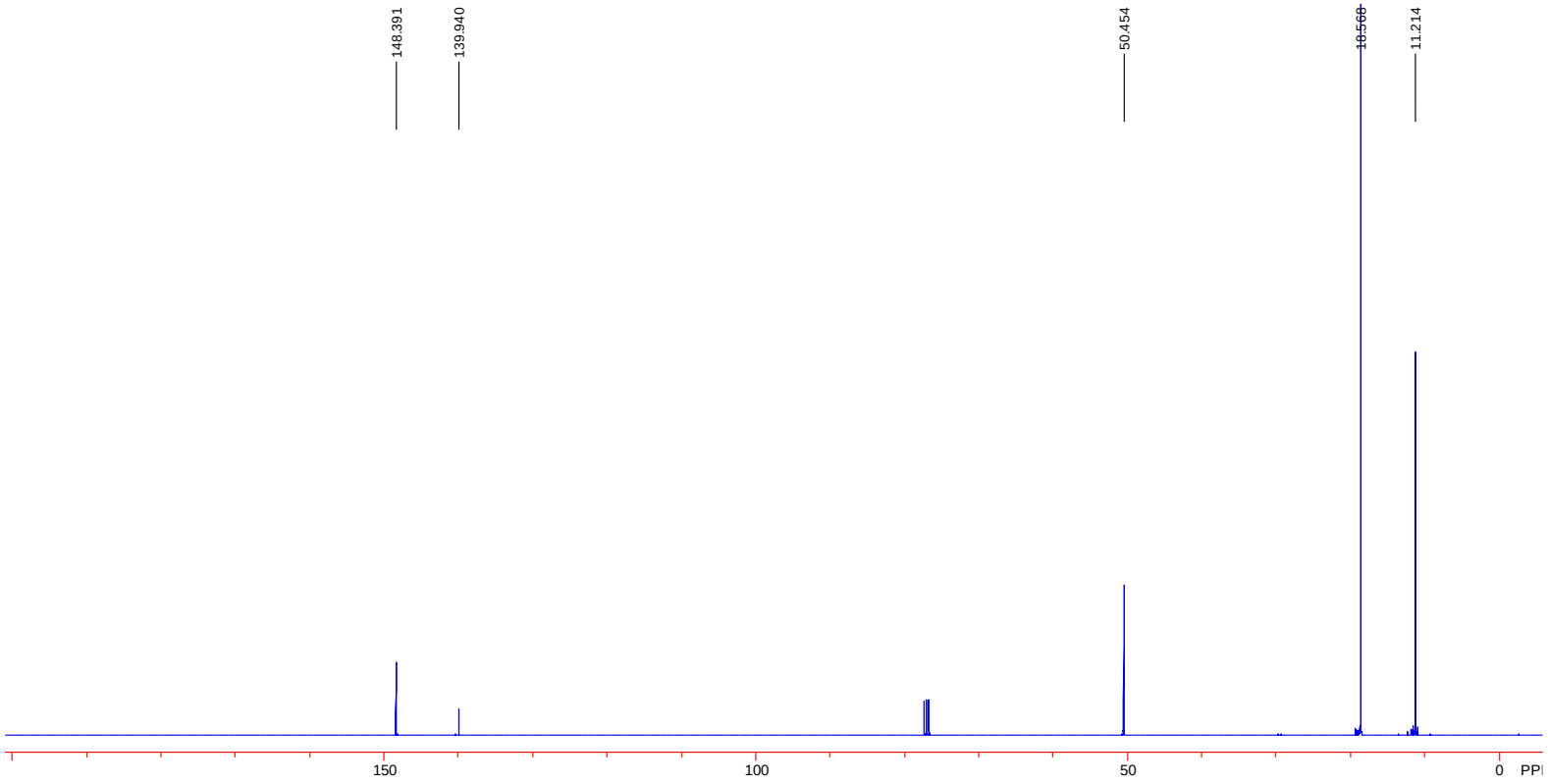
^{1}H NMR


6.760
6.747
6.519
6.506
3.540
1.293
1.279
1.260
1.241
1.222
1.205
1.187
1.053
1.034
18.76
5.00
2.16
1.05
0.99
9
8
7
6
5
4
3
2
1
PPM

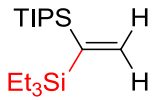
3m


TIPS
H
(MeO)3Si
H

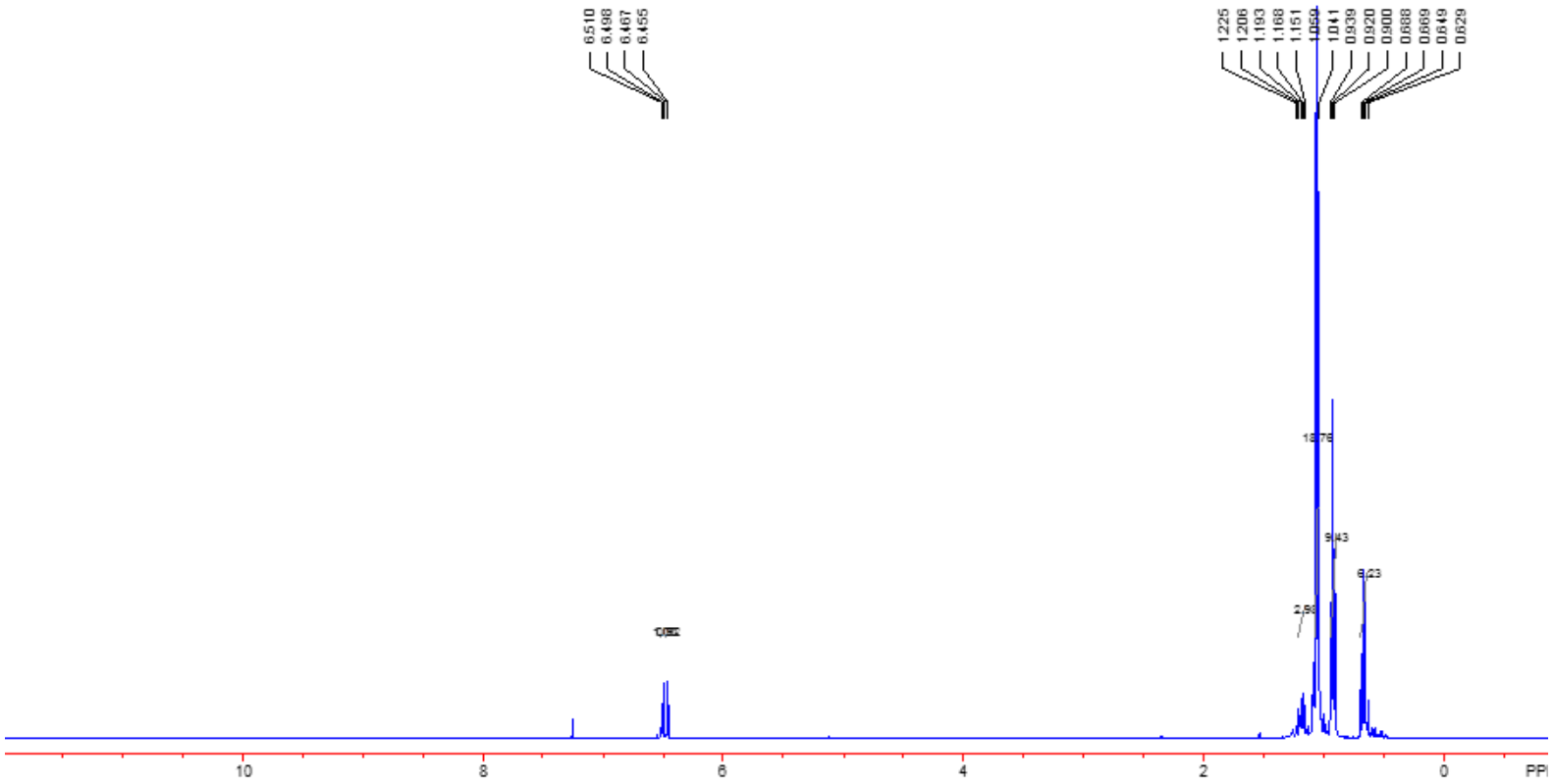
^{13}C NMR


148.391
139.940
50.454
18.568
11.214
150
100
50
0
PPI

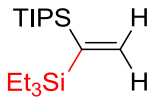
3n


TIPS
H
Et3Si
H

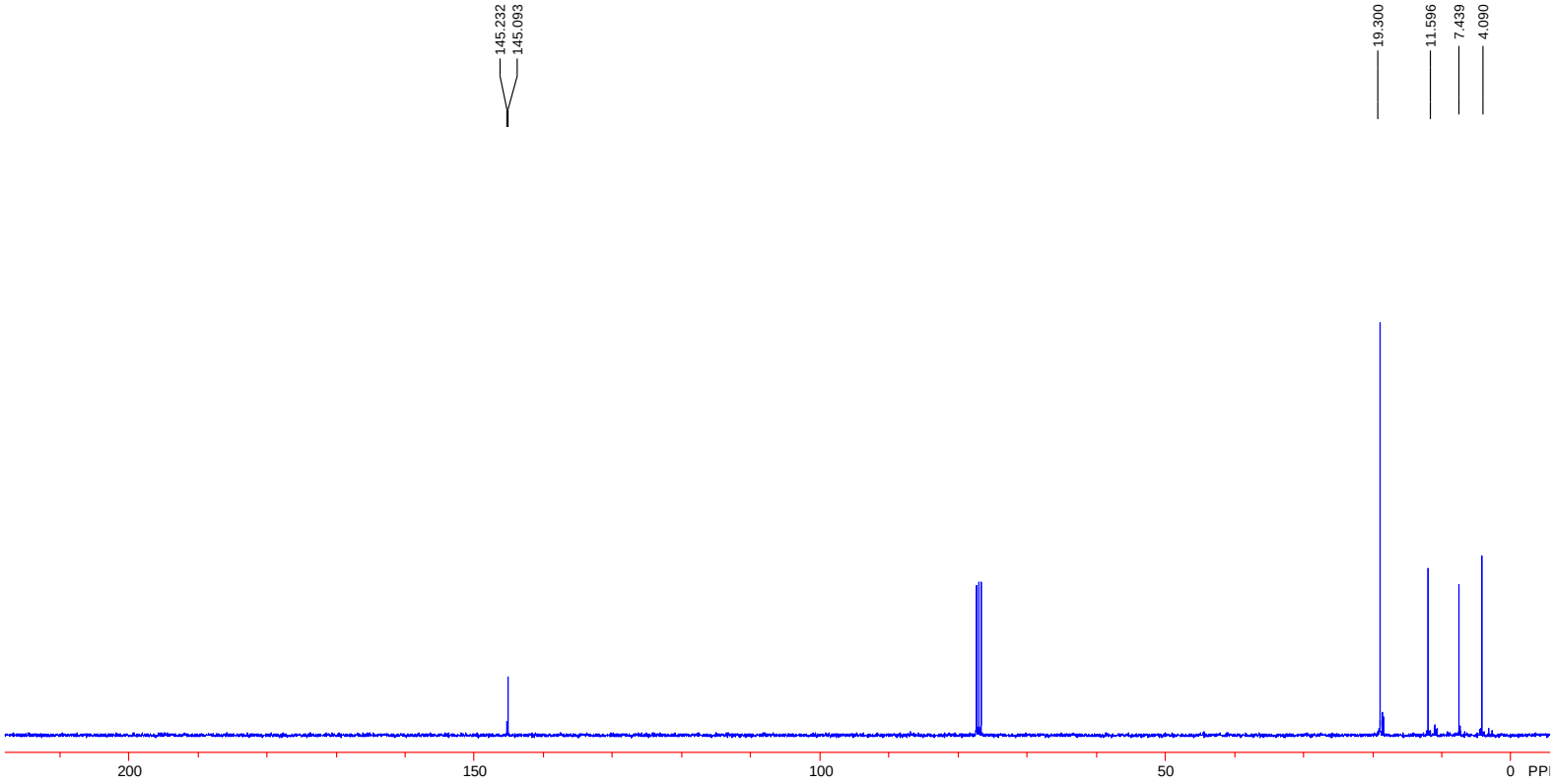
^{1}H NMR


6.510
6.498
6.467
6.455
1.225
1.206
1.193
1.168
1.151
1.059
1.041
0.939
0.920
0.900
0.688
0.669
0.649
0.629
10
8
6
4
2
0
PPI

3n


TIPS
H
Et3Si
H

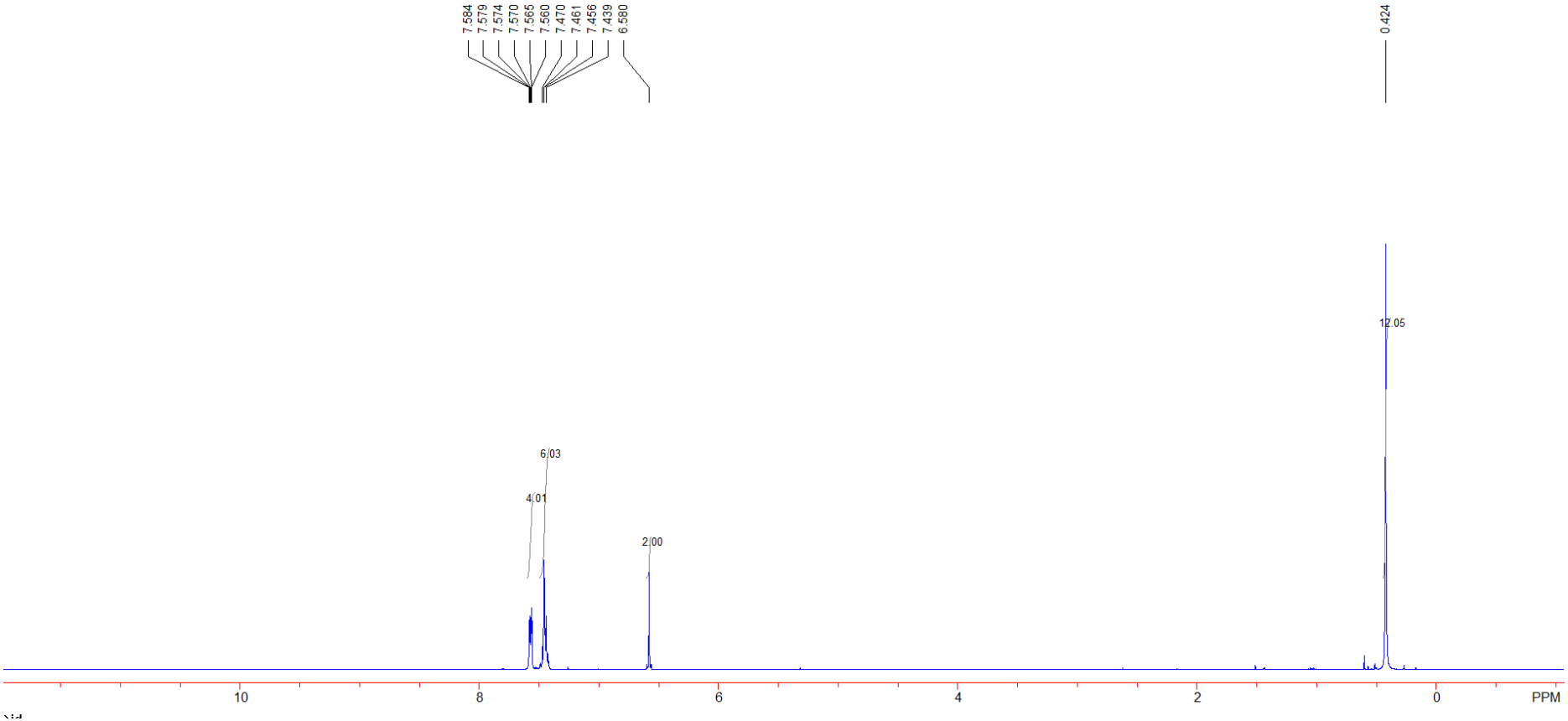
^{13}C NMR


145.232
145.093
19.300
11.596
7.439
4.090
200
150
100
50
0
PPI

3o


PhMe2Si
H
PhMe2Si
H

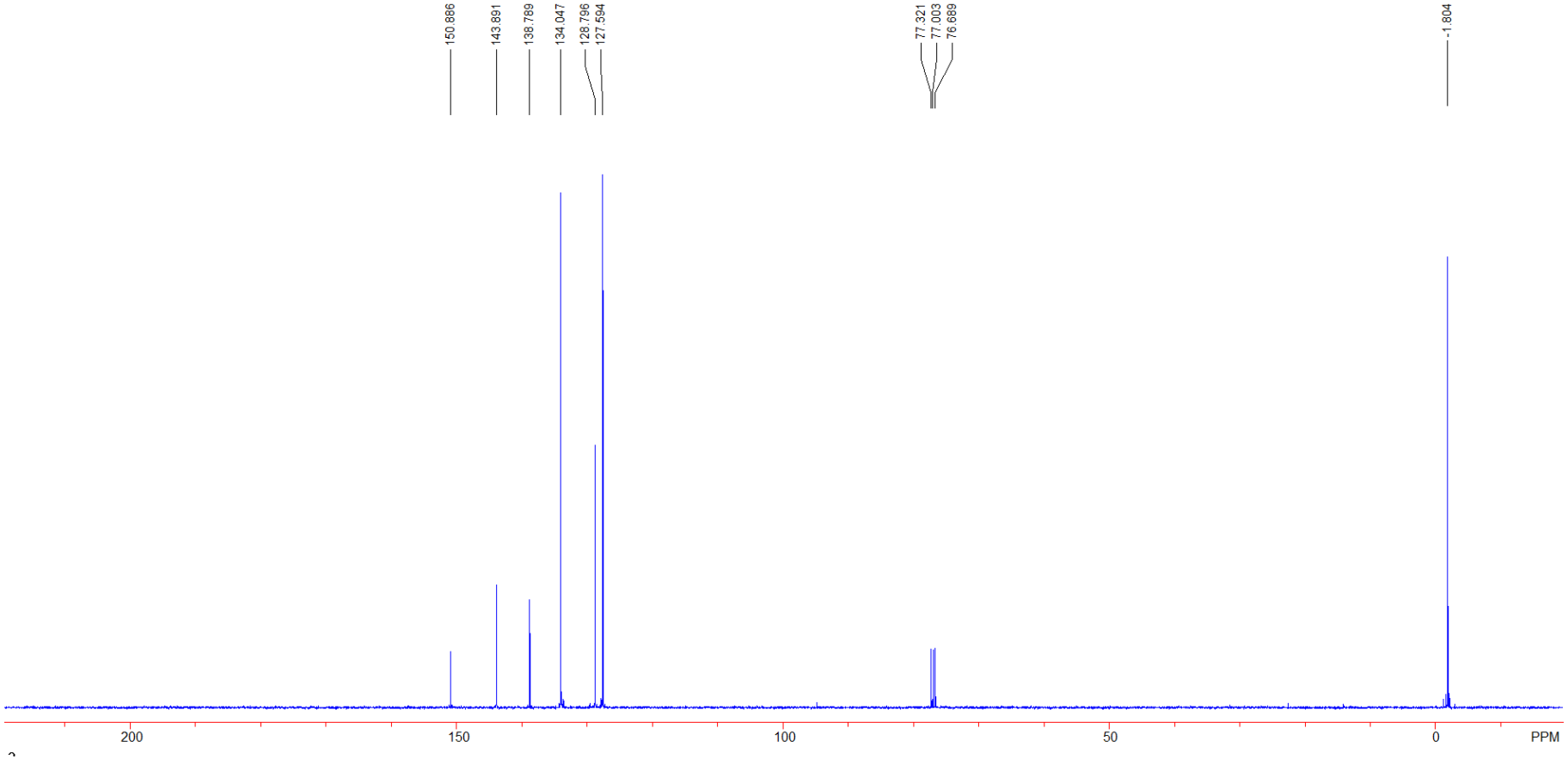
^{1}H NMR


7.584
7.579
7.574
7.570
7.565
7.560
7.470
7.461
7.456
7.439
6.580
0.424
12.05
6.03
4.01
2.00
10
8
6
4
2
0
PPM

3o


PhMe2Si
H
PhMe2Si
H

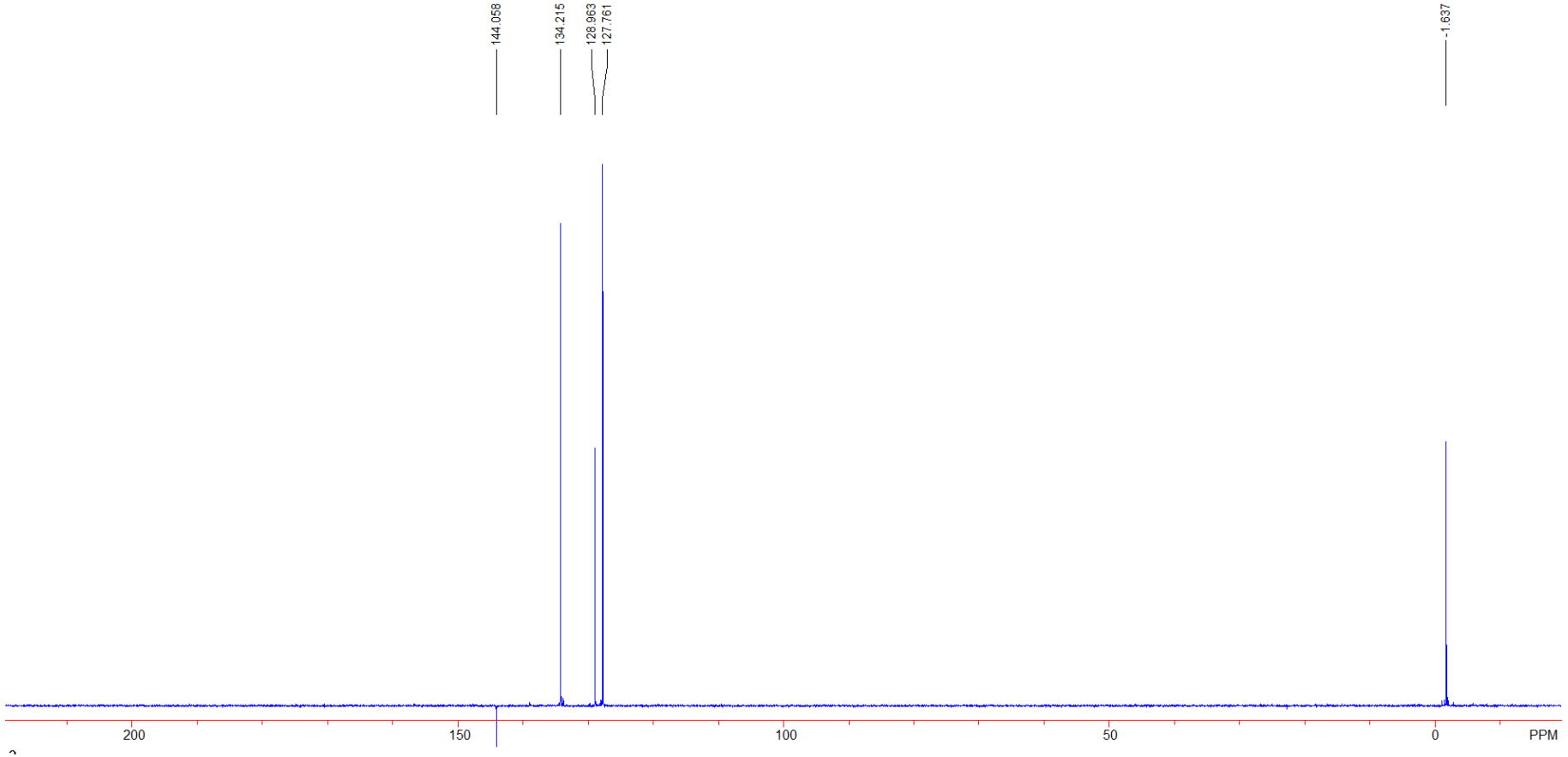
^{13}C NMR


150.886
143.891
138.789
134.047
128.796
127.594
77.321
77.003
76.689
-1.804
200
150
100
50
0
PPM

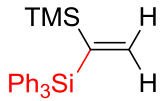
3o


PhMe2Si
H
PhMe2Si
H

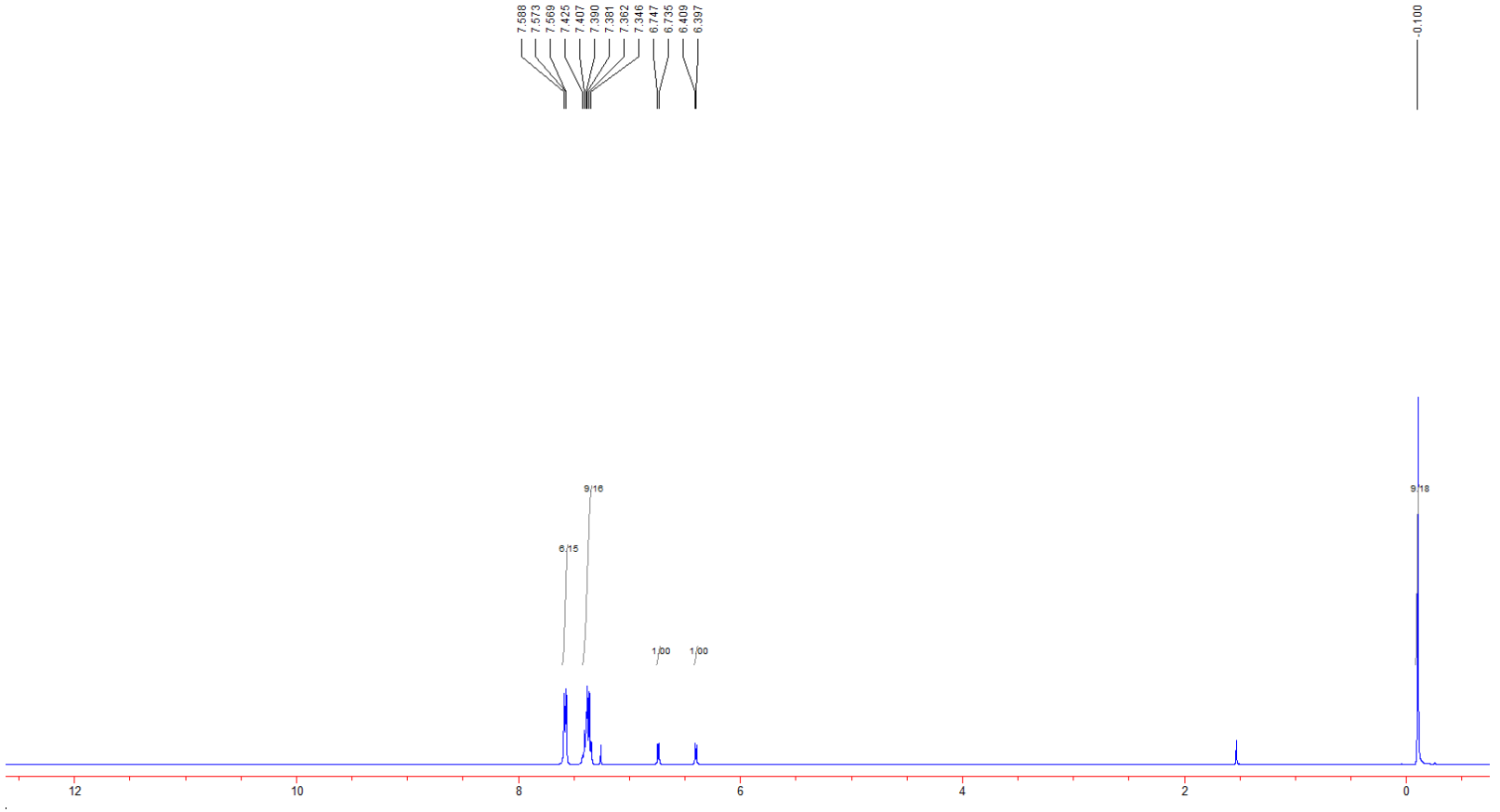
DEPT135


144.058
134.215
128.963
127.761
-1.637
200
150
100
50
0
PPM

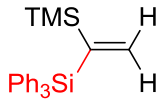
3p


TMS
H
Ph3Si
H

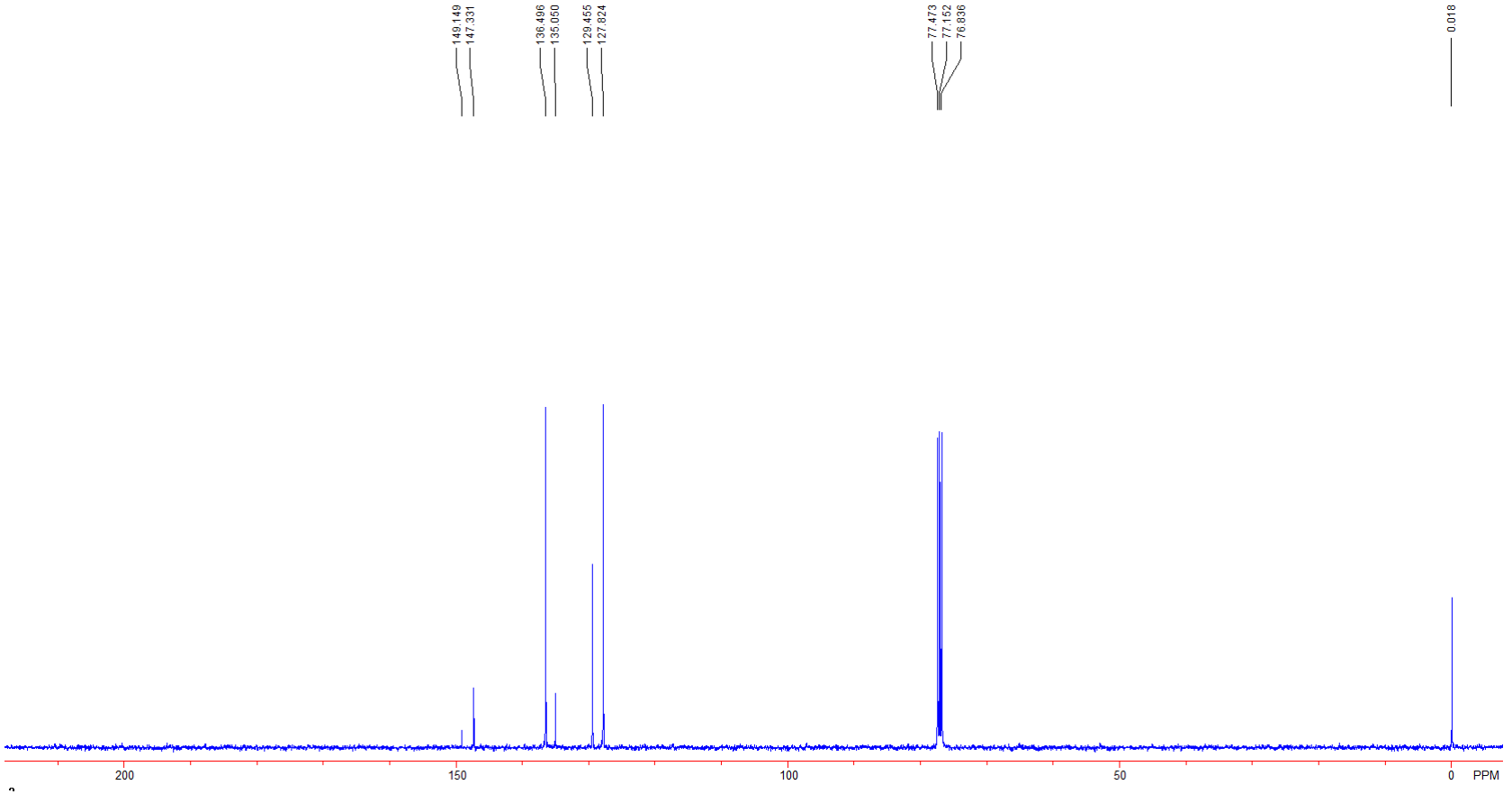
^{1}H NMR


7.588
7.573
7.569
7.425
7.407
7.390
7.381
7.362
7.346
6.747
6.735
6.409
6.397
0.100
9.16
6.15
1.00
1.00
9.18
12
10
8
6
4
2
0

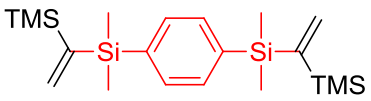
3p


TMS
H
Ph3Si
H

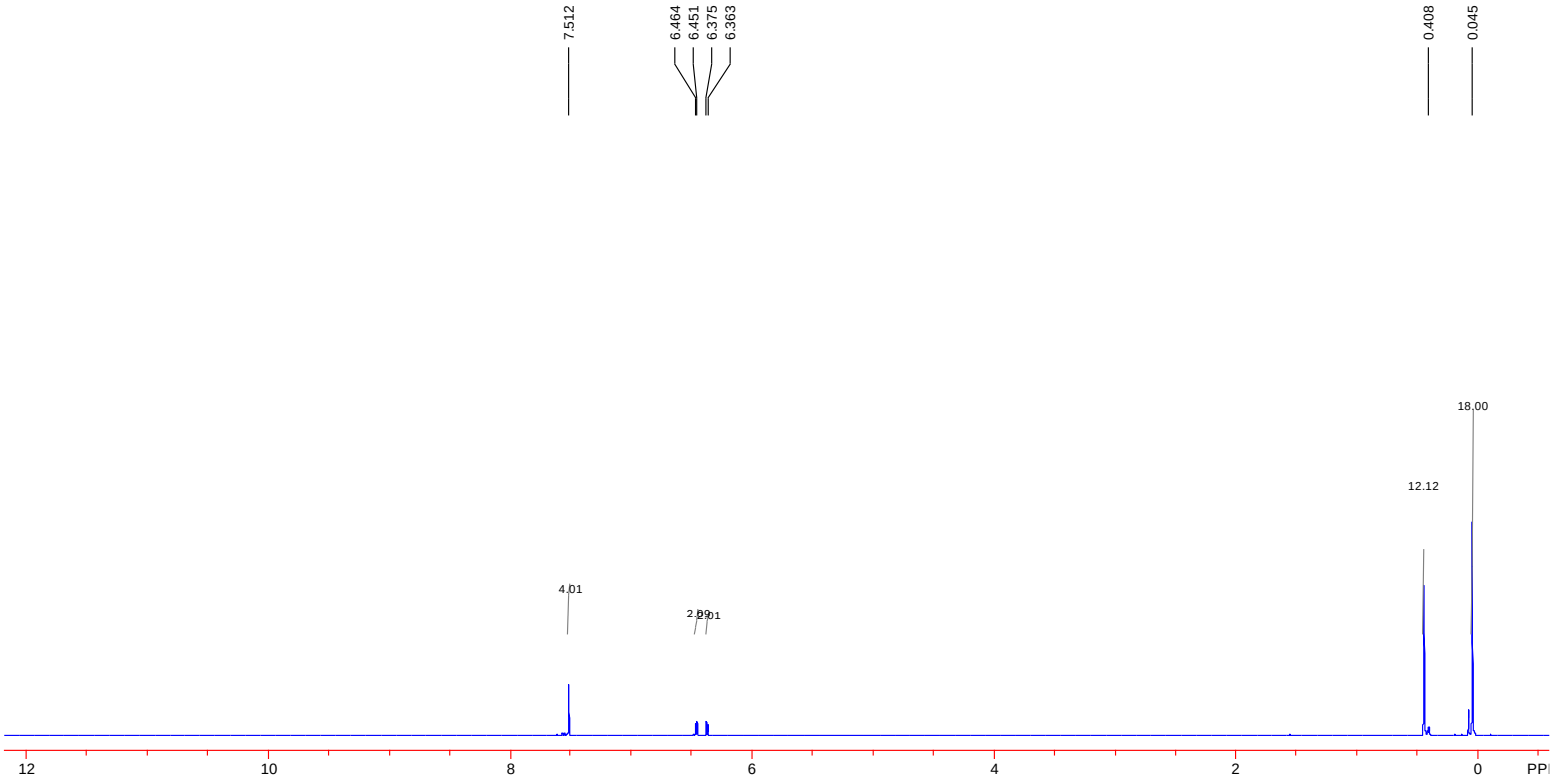
^{13}C NMR


149.149
147.331
136.496
135.050
129.455
127.824
77.473
77.152
76.836
0.018
200
150
100
50
0
PPM

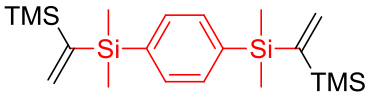
3q


TMS
Si
Si
TMS

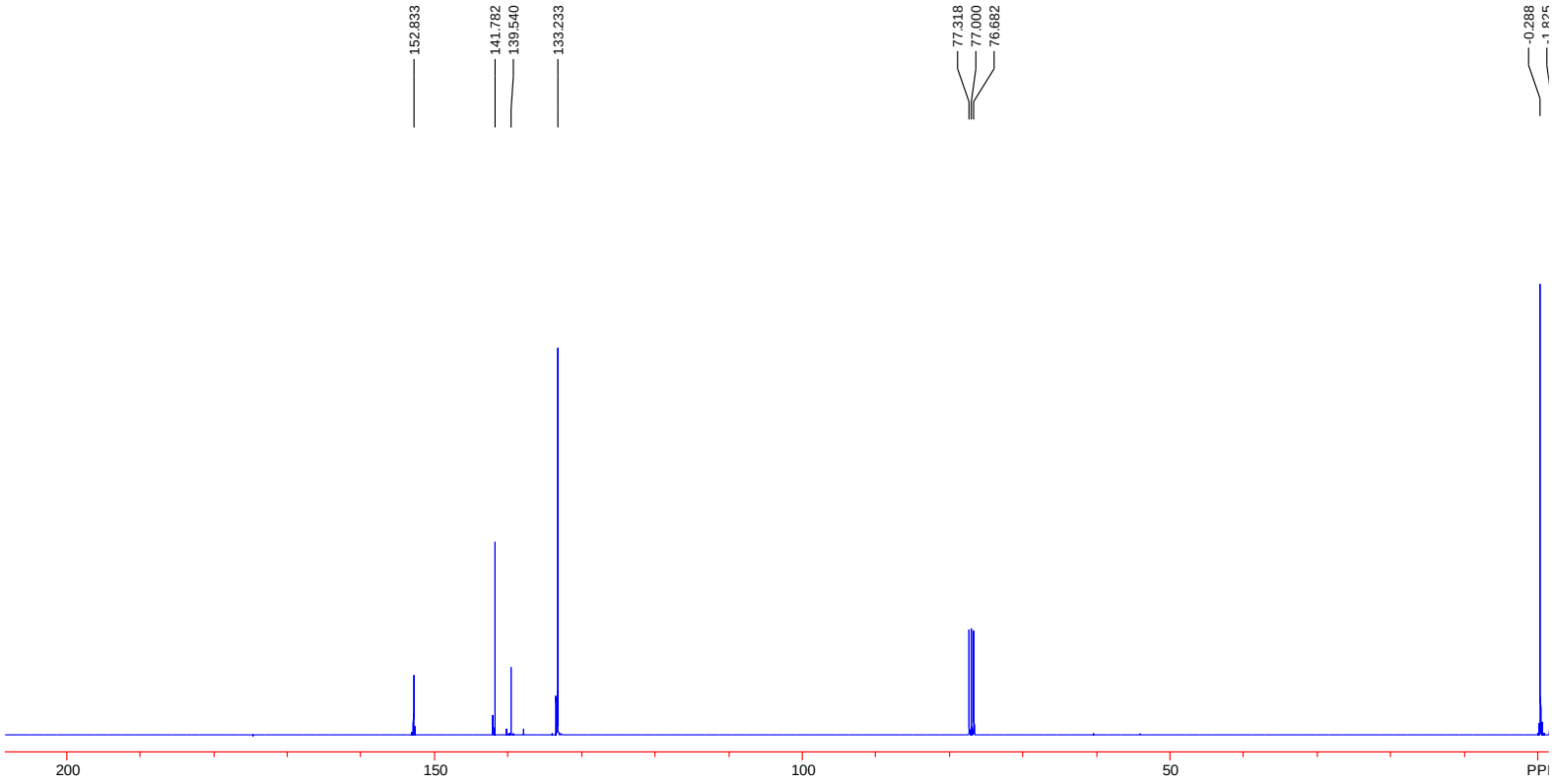
^{1}H NMR


7.512
6.464
6.451
6.375
6.363
0.408
0.045
18.00
12.12
4.01
2.99
2.01
12
10
8
6
4
2
0
PPM

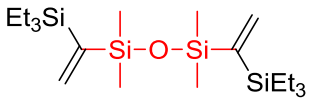
3q


TMS
Si
Si
TMS

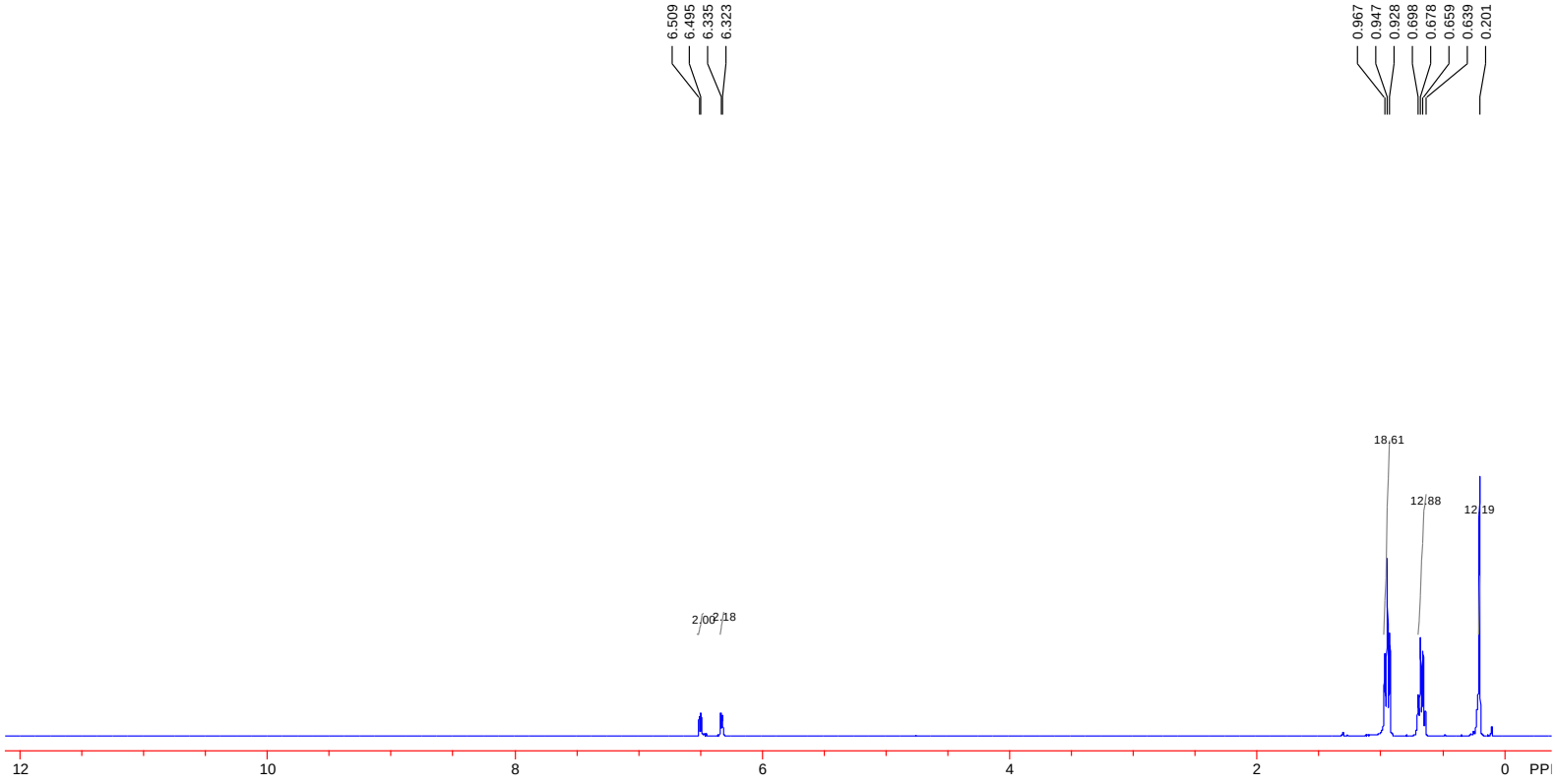
^{13}C NMR


152.833
141.782
139.540
133.233
77.318
77.000
76.682
-0.288
200
150
100
50
PPI

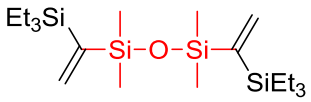
3r


Et3Si
Si
O
Si
SiEt3

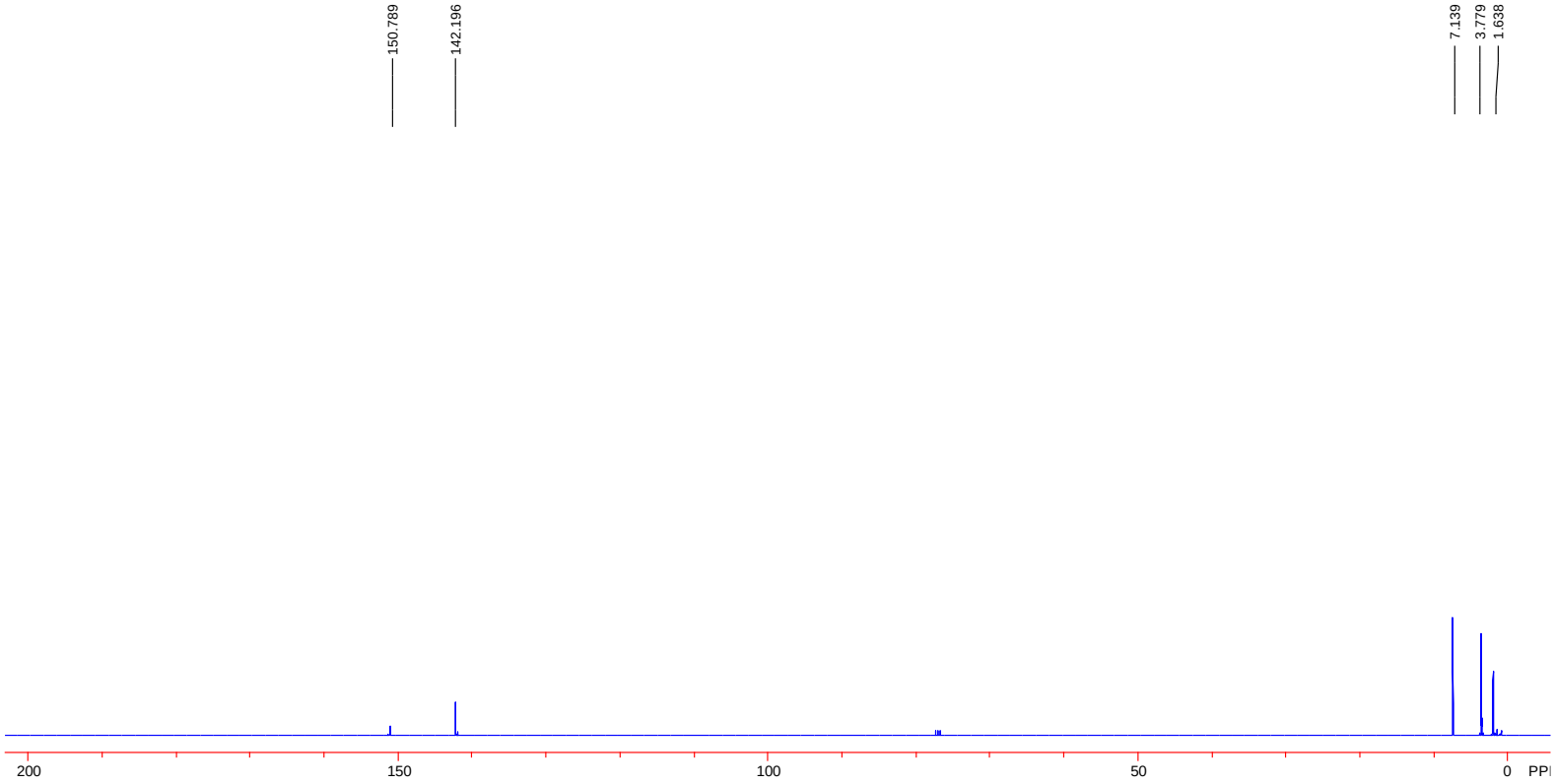
^{1}H NMR


6.509
6.495
6.335
6.323
0.967
0.947
0.928
0.698
0.678
0.659
0.639
0.201
18.61
12.88
12.19
2.00
2.18
12
10
8
6
4
2
0
PPI

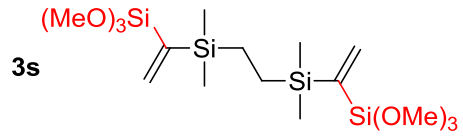
3r


Et3Si
Si
O
Si
SiEt3

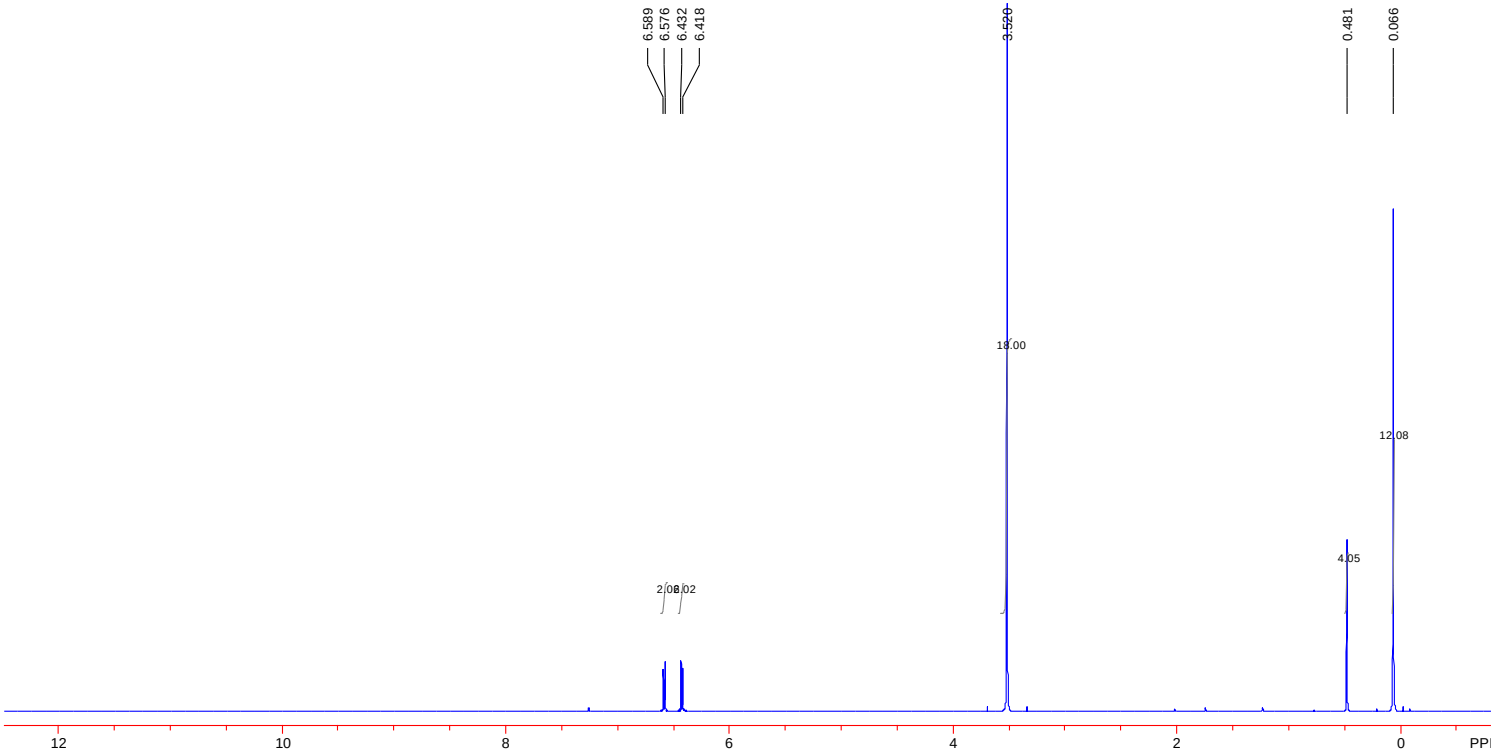
^{13}C NMR


150.789
142.196
7.139
3.779
1.638
200
150
100
50
0
PPI

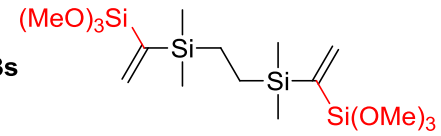
3s


(MeO)3Si
Si
Si
Si(OMe)3

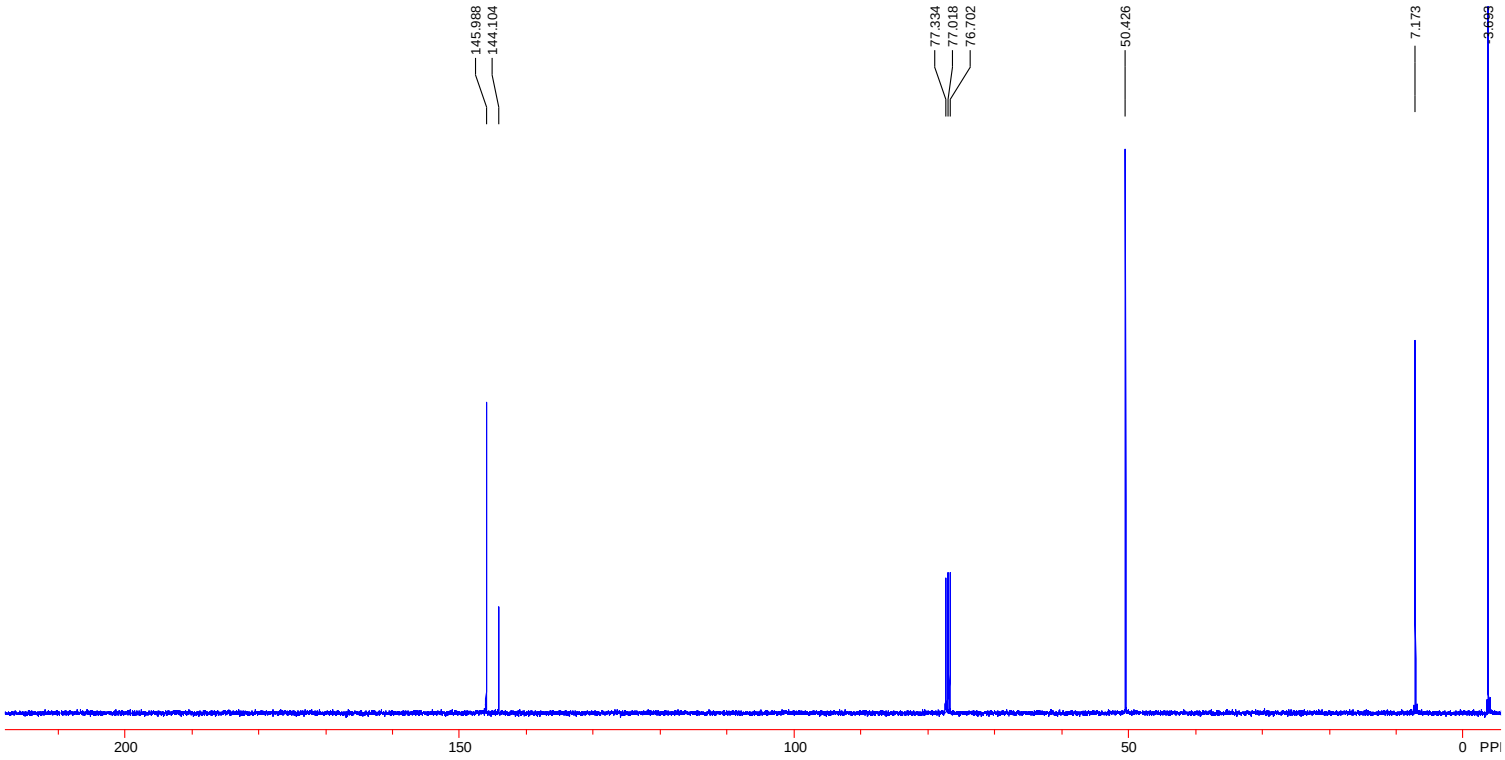
^{1}H NMR


6.589
6.576
6.432
6.418
3.520
0.481
0.066
18.00
12.08
4.05
2.08
2.02
12
10
8
6
4
2
0
PPM

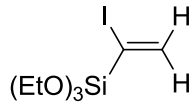
3s


(MeO)3Si
Si
Si
Si(OMe)3

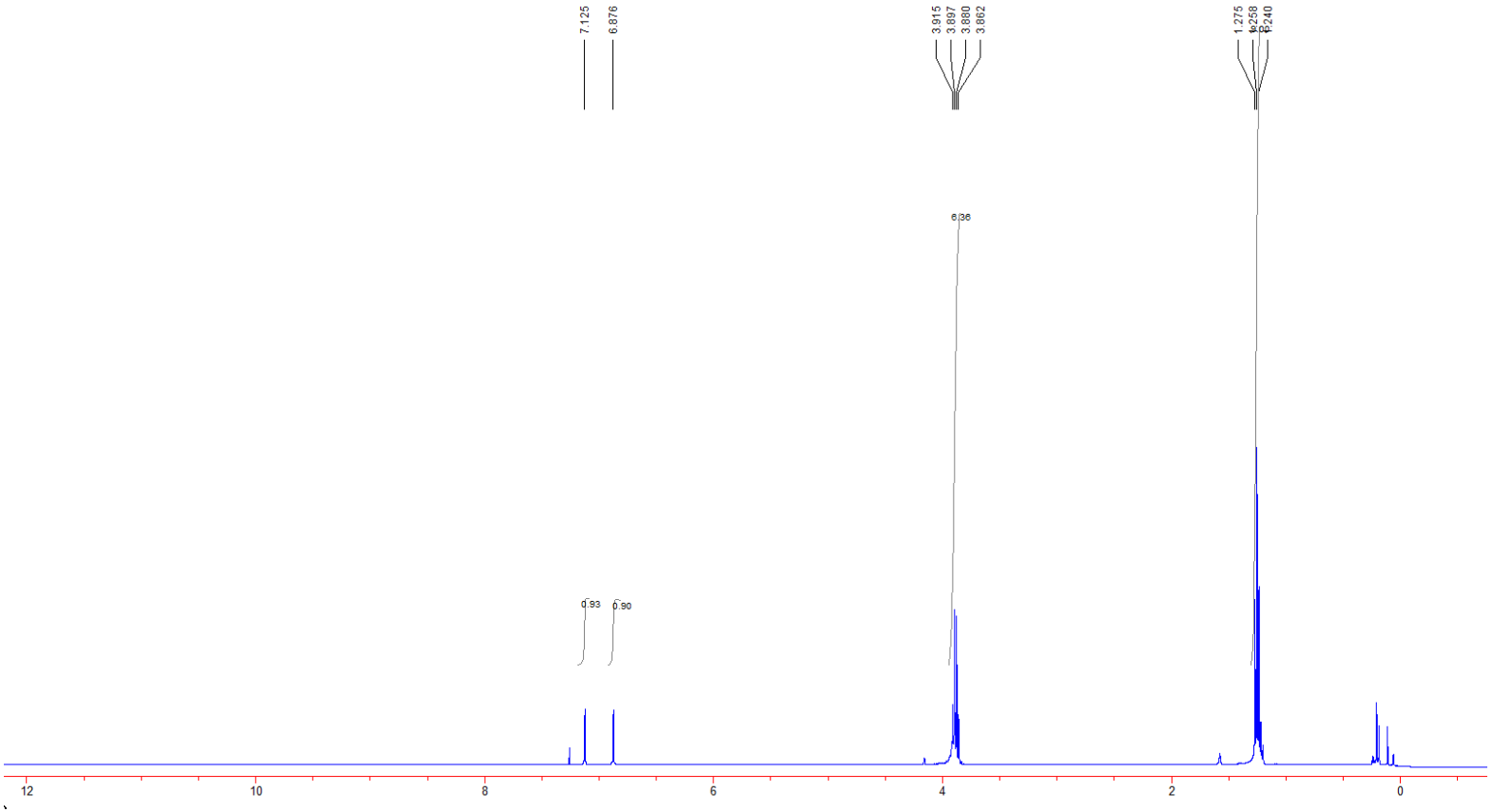
^{13}C NMR


145.988
144.104
77.334
77.018
76.702
50.426
7.173
200
150
100
50
0
PPI

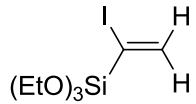
4


I
H
(EtO)3Si
H

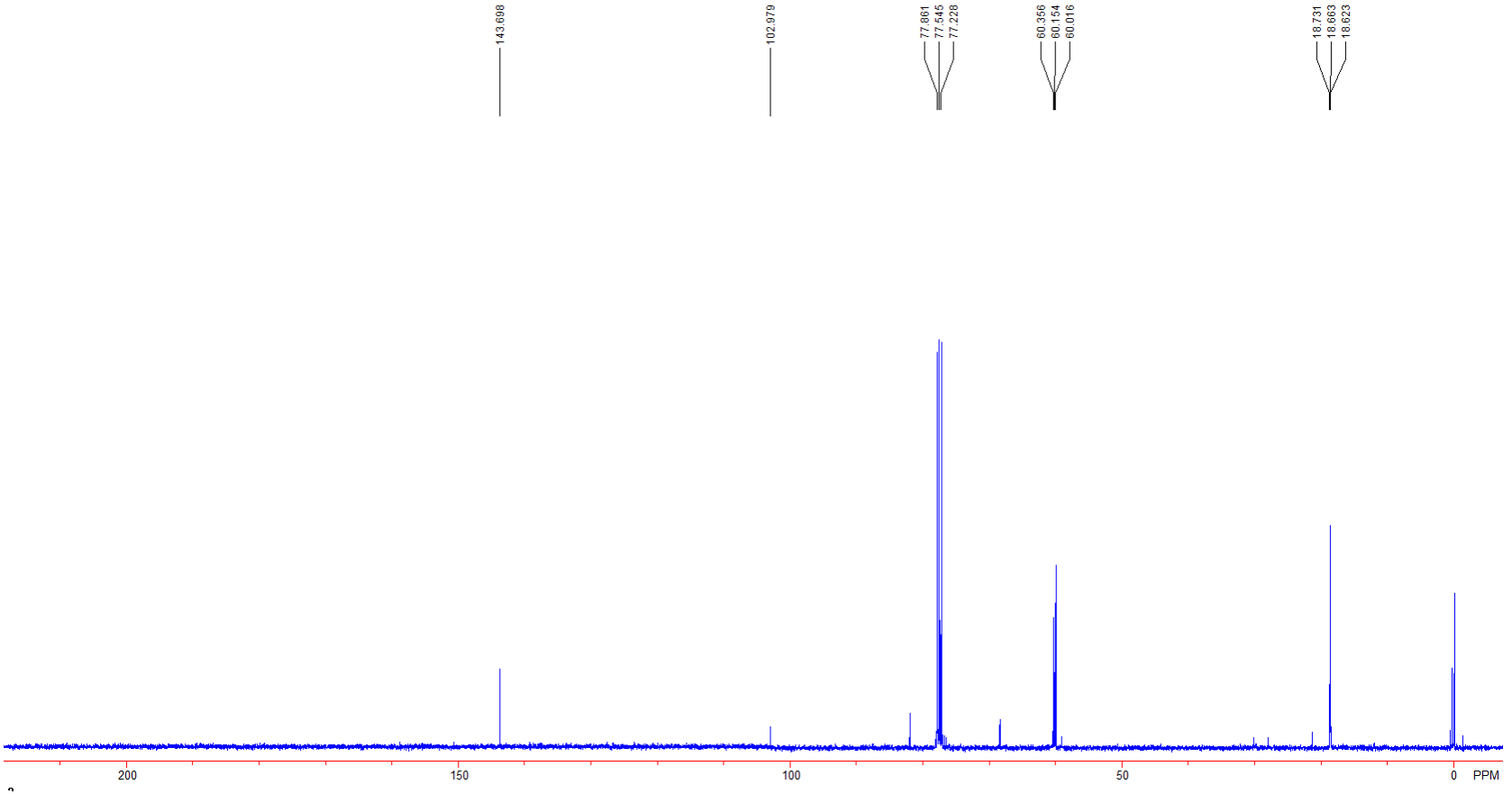
^{1}H NMR


7.125
6.876
3.915
3.897
3.880
3.862
1.275
1.258
1.240
6.36
0.93
0.90
12
10
8
6
4
2
0

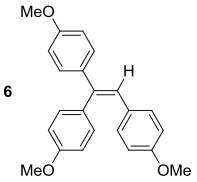
4


I
H
(EtO)3Si
H

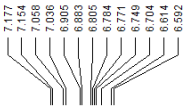
^{13}C NMR

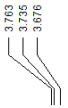

143.698
102.979
77.861
77.545
77.228
60.356
60.154
60.016
18.731
18.663
18.623
200
150
100
50
0
PPM

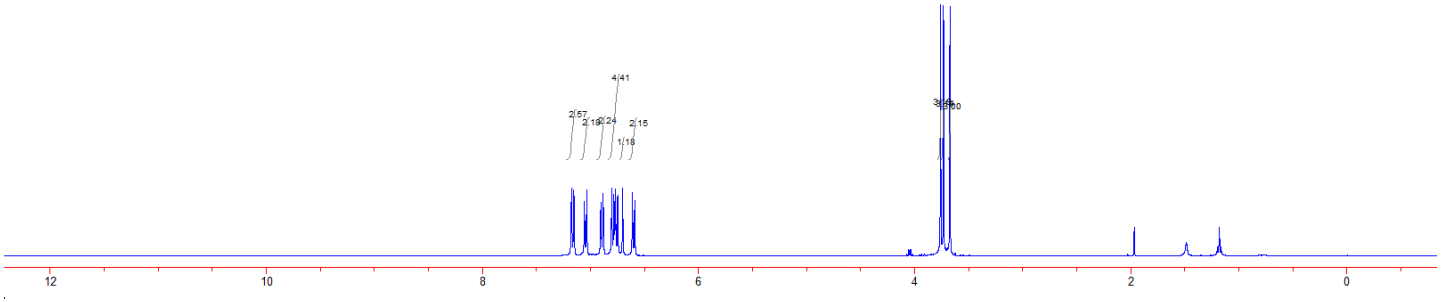
6

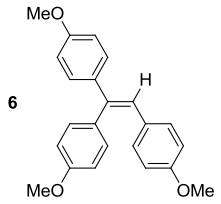

MeO
H
MeO
OMe

^{1}H NMR


7.177
7.154
7.058
7.036
6.905
6.883
6.805
6.784
6.771
6.749
6.704
6.614
6.592

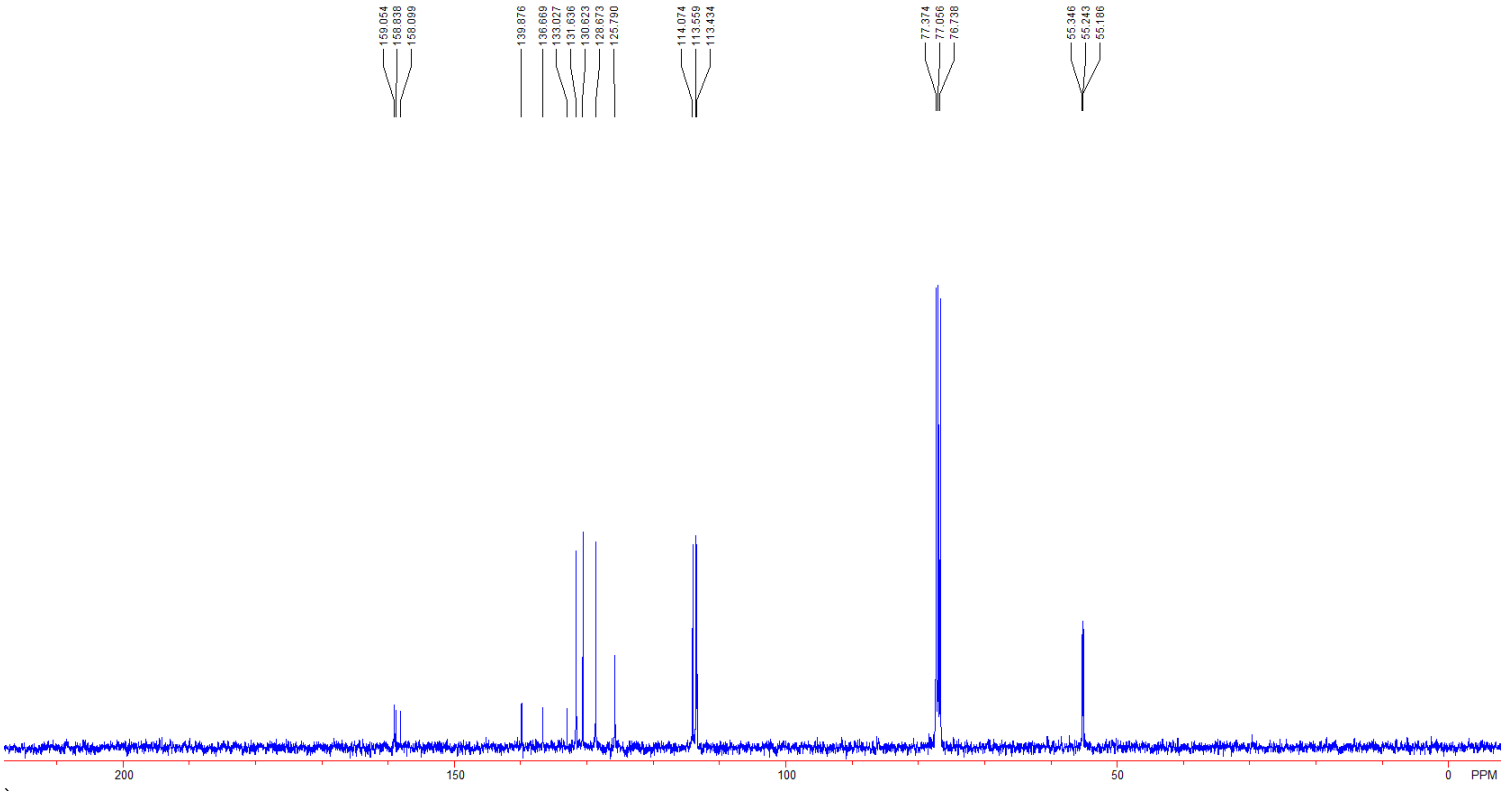

3.763
3.735
3.676


4.41
2.57
2.18
2.24
2.15
1.18
12
10
8
6
4
2
0


MeO
H
MeO
OMe

6

^{13}C NMR


159.054
156.838
156.099
139.876
136.669
133.027
131.636
130.623
128.673
125.790
114.074
113.559
113.434
77.374
77.056
76.738
55.346
55.243
55.186
200
150
100
50
0
PPM