

Supporting Information

Diorganotelluride-Catalyzed Oxidation of Silanes to Silanols under Atmospheric Oxygen

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Contents

1. General information	S2
2. Materials	S2–S5
3. General procedure for oxidation of silanes	S5–S6
4. Hammett plot for 4-substituted PhMe ₂ SiH	S6–S7
5. Kinetic isotope effect of Ph ₂ MeSiH(D)	S7
6. Copies of ¹ H, ¹³ C, and ²⁹ Si NMR spectra of silanols	S8–S43

Experimental

General. Melting points were determined using a Yamato MP-21 melting point apparatus in open capillaries and are uncorrected. ^1H , ^{13}C , ^{29}Si , and ^{125}Te nuclear magnetic resonance (NMR) spectra were measured on a Varian Mercury plus 400 spectrometer at 400, 100, 80, and 126 MHz, respectively. All chemical shifts are reported as δ values (ppm) relative to residual chloroform (δ_{H} 7.26), the central peak of deuteriochloroform (δ_{C} 77.0), tetramethylsilane (δ_{Si} 0.0), and dimethyl telluride (δ_{Te} 0) unless otherwise noted; and J values are expressed in Hz. For ^{125}Te NMR, Mes_2Te (δ_{Te} 275)¹ or Tip_2TeO (δ_{Te} 1314)^{2a} was used as a secondary external standard. Mass spectra were obtained with a JEOL JMS-AX-500 spectrometer. Infrared spectra were measured with a JASCO IR Report-100 spectrometer.

Flash column chromatography was performed on a KANTO CHEMICAL Silica gel 60 N (spherical, neutral) 40–50 μm . For analytical purposes, thin layer chromatography (TLC) was performed using Merck Silica gel 60 F₂₅₄ pre-coated aluminum sheets (Merck 5554) which were observed under ultraviolet irradiation. GC measurements were performed on a Shimadzu GC-18A gas chromatograph using a 50 m $\times$ 0.25 mm methyl silicone capillary column (Quadrex).

All reagents and solvents were of commercial grade and used according to supplier instructions unless otherwise mentioned.

Materials.

Tellurides. Diphenyl telluride, bis(4-methoxyphenyl) telluride (An_2Te), and bis(2,4,6-trimethylphenyl) telluride (Mes_2Te) were prepared following the procedure described previously.^{2b}

For example, to a solution of MesMgBr , prepared from magnesium (1.34 g, 55.1 mmol) and MesBr (10.0 g, 50.2 mmol) in THF (50 ml), was added tellurium powder (6.48 g, 50.8 mmol) under an argon atmosphere. After it was refluxed for 1 h, the mixture was cooled to room temperature, diluted with benzene (65 ml), and poured into a mixture of crushed ice and concentrated HCl. After being stirred overnight, the organic phase was separated, washed with water and brine, dried over magnesium sulfate, and concentrated under reduced pressure. The crude product was washed with EtOH (30 ml) to give 73% yield of MesTeTeMes (9.05 g, 18.3 mmol) as a dark red solid, mp 124–127 $^\circ\text{C}$ (lit,³ 125–127 $^\circ\text{C}$). The obtained ditelluride was dissolved in toluene (30 ml) and the solution was refluxed overnight in the presence of copper powder (4.67

¹ Laur, P. H.; Saberi-Niaki, S. M.; Scheiter, M.; Hu, C.; Englert, U.; Wang, Y.; Fleischhauer, J. *Phosphorus, Sulfur, Silicon, Rel. Elem.* **2005**, *180*, 1035–1044.

² (a) Oba, M.; Endo, M.; Nishiyama, K.; Ouchi, A.; Ando, W. *Chem. Commun.* **2004**, 1672–1673; (b) Oba, M.; Okada, Y.; Nishiyama, K.; Ando, W. *Org. Lett.* **2009**, *11*, 1879–1881.

³ Akiba, M.; Lakshmikantham, M. V.; Jen, K.-Y.; Cava, M. P. *J. Org. Chem.* **1984**, *49*, 4819–4821.

g, 73.5 mmol). After removal of insoluble materials by filtration, the solution was concentrated under reduced pressure to give pure Mes₂Te^{3,4} (6.43 g, 17.6 mmol, 70%) as a pale yellow solid, mp 122–124.5 °C (lit.⁴ 124–126 °C). ¹H NMR (CDCl₃) δ 2.24 (s, 6H), 2.34 (s, 12H), 6.86 (s, 4H). ¹³C NMR (CDCl₃) δ 20.8, 28.1, 119.0 (d satellite, ¹J_{C-Te} = 295 Hz), 127.7, 137.7, 144.1. ¹²⁵Te NMR (CDCl₃) δ 275. MS (EI) *m/z* 368 (M⁺).

Other diaryl tellurides were similarly prepared and the physical and spectral data are as follows.

An₂Te.⁴ Yield 63%, colorless viscous oil. ¹H NMR (CDCl₃) δ 3.78 (s, 6H), 6.76 (d, *J* = 9 Hz, 4H), 7.63 (d, *J* = 9 Hz, 4H). ¹³C NMR (CDCl₃) δ 54.9, 104.2 (d satellite, ¹J_{C-Te} = 279 Hz), 155.2, 139.5, 159.4. ¹²⁵Te NMR (CDCl₃) δ 667. MS (EI) *m/z* 344 (M⁺).

Ph₂Te.^{3,4} Yield 96%, pale yellow oil. ¹H NMR (CDCl₃) δ 7.24 (m, 2H), 7.31 (m, 6H), 7.73 (d, *J* = 7 Hz, 4H). ¹³C NMR (CDCl₃) δ 114.6 (d satellite, ¹J_{C-Te} = 276 Hz), 127.8, 129.4, 137.9. ¹²⁵Te NMR (CDCl₃) δ 707. MS (EI) *m/z* 284 (M⁺).

Mes₂TeO. According to the literature method,⁵ a solution of Mes₂Te (918 mg, 2.51 mmol) and *N*-chlorosuccinimide (401 mg, 3.00 mmol) in MeOH-CH₂Cl₂ (350 ml, 1:1) was stirred at room temperature for 15 min. Then, the solution was added saturated aqueous NaHCO₃ (100 ml) and the stirring was continued for an additional 15 min. The reaction mixture was diluted with water (100 ml) and the organic phase was separated, washed with water, dried over MgSO₄, and concentrated under reduced pressure. Recrystallization of the crude products from ethyl acetate gave Mes₂TeO³ (853 mg, 2.23 mmol, 89%) as a colorless solid, mp 180–182 °C (lit.³ 179–180 °C). ¹H NMR (CDCl₃) δ 2.26 (s, 6H), 2.54 (s, 12H), 6.84 (s, 4H). ¹³C NMR (CDCl₃) δ 21.2, 21.6, 130.7, 131.1 (d, satellite, ¹J_{C-Te} = 350 Hz), 141.1, 143.0. ¹²⁵Te NMR (CDCl₃, Tip₂TeO) δ 1308.

Silanes. Ph₃SiH, Ph₂MeSiH, PhMe₂SiH, and Et₃SiH are commercial products. (*R*)-(+)-Me(α-Np)PhSiH was prepared in 67% yield by LiAlH₄-reduction of the corresponding (-)-menthoxyasilane following the procedure described by Sommer and co-workers.⁶ ¹H NMR (CDCl₃) δ 0.76 (d, *J* = 4 Hz, 3H), 5.36 (q, *J* = 4 Hz, 1H), 7.32–7.40 (m, 3H), 7.42–7.50 (m, 3H), 7.58 (d, *J* = 8 Hz, 2H), 7.74 (d, *J* = 7 Hz, 1H), 7.87 (d, *J* = 8 Hz, 1H), 7.92 (d, *J* = 8 Hz, 1H), 8.06 (d, *J* = 8 Hz, 1H). ¹³C NMR (CDCl₃) δ -4.5, 125.2, 125.6, 126.1, 128.0, 128.0, 128.9, 129.5, 130.5, 133.2, 133.3, 134.9, 135.2, 135.4, 137.1. ²⁹Si NMR (CDCl₃) δ -20.0. EI-MS (70 eV) *m/z* 248 (M⁺). IR (KBr, cm⁻¹) 2120 (Si-H). [α]_D²⁶ +32.3 (*c* 3.99, cyclohexane) (lit.⁶ [α]_D +33.7 (*c* 4.00, cyclohexane)).

1-Dodecyldimethylsilane was prepared by reduction of the corresponding chloride. To a suspension of LiAlH₄ (3.78 g, 99.6 mmol) in THF (100 ml) was added dropwise

⁴ Suzuki, H.; Nakamura, T. *Synthesis*, **1992**, 549–551; Suzuki, H.; Inoue, M. *Chem. Lett.* **1985**, 389–390.

⁵ Detty, M. R. *J. Org. Chem.* **1980**, 45, 274–279.

⁶ Sommer, L. H.; Frye, C. L.; Parker, G. A.; Michael, K. W. *J. Am. Chem. Soc.* **1964**, 86, 3271–3276.

1-dodecyldimethylsilyl chloride (21.8 g, 82.9 mmol) under an argon atmosphere at room temperature and the mixture was stirred for an additional 1h. The reaction mixture was quenched by the addition of dilute HCl and extracted with ether. The organic layer was washed with water and brine, dried over MgSO₄, and filtered and the solvent was removed by rotary evaporation. Vacuum distillation of the residue afforded pure 1-dodecyldimethylsilane⁷ (17.0 g, 74.4 mmol, 90%) as a colorless liquid, bp 105 °C/2 mmHg (lit,⁷ 84 °C/0.8 mmHg). ¹H NMR (CDCl₃) δ 0.06 (d, *J* = 4 Hz, 6H), 0.57 (m, 2H), 0.88 (t, *J* = 8 Hz, 3H), 1.26 (m, 20H), 3.83 (sept, *J* = 4 Hz, 1H). ¹³C NMR (CDCl₃) δ -4.4, 14.1, 14.2, 22.7, 24.4, 29.4, 29.4, 29.6, 29.7, 29.7, 29.7, 31.7, 33.3. ²⁹Si NMR (CDCl₃) δ -13.1. EI-MS (70 eV) *m/z* 226 [(M - H₂)⁺]. IR (neat, cm⁻¹) 2110 (Si-H).

Aryldimethylsilanes were prepared using the procedure developed by Fujita and co-workers.^{8a} For example, to a suspension of Mg (1.82 g, 74.8 mmol) and a catalytic amount of I₂ in THF (40 ml) was added dropwise a solution of 1-bromo-4-(trifluoromethyl)benzene (9.38 ml, 15.3 g, 68.0 mmol) and chlorodimethylsilane (7.4 ml, 6.44 g, 68.1 mmol) in THF (30 ml) at room temperature under an argon atmosphere. After being stirred overnight, the reaction mixture was quenched by the addition of saturated aqueous NH₄Cl and extracted with ether. The organic layer was washed with water and brine, dried over MgSO₄, and filtered and the solvent was removed by rotary evaporation. Vacuum distillation of the residue afforded pure (4-trifluoromethylphenyl)dimethylsilane^{8a} (5.59 g, 27.4 mmol, 40%) as a colorless liquid, bp 96–98 °C/10 mmHg (lit,^{8b} 100 °C/10 mmHg). ¹H NMR (CDCl₃) δ 0.39 (d, *J* = 4 Hz, 6H), 4.48 (sept, *J* = 4 Hz, 1H), 7.62 (d, *J* = 8 Hz, 2H), 7.68 (d, *J* = 8 Hz, 2H). ¹³C NMR (CDCl₃) δ -4.1, 124.2 (q, *J* = 272 Hz), 124.4 (q, *J* = 4 Hz), 131.2 (q, *J* = 32 Hz), 134.3, 142.5. ²⁹Si NMR (CDCl₃) δ -16.4. EI-MS (70 eV) *m/z* 203 [(M - H)⁺]. IR (neat, cm⁻¹) 2140 (Si-H).

(4-Methoxyphenyl)dimethylsilane,^{8a} (4-chlorophenyl)dimethylsilane,⁹ and (2-thienyl)dimethylsilane¹⁰ were similarly prepared and the physical and spectral data are as follows.

(4-Methoxyphenyl)dimethylsilane.^{8a} Yield 48%, colorless liquid, bp 108–110 °C/31 mmHg (lit,^{8a} 120 °C (bath temp)/20 mmHg). ¹H NMR (CDCl₃) δ 0.32 (d, *J* = 4 Hz, 6H), 3.82 (s, 3H), 4.41 (sept, *J* = 4 Hz, 1H), 6.92 (d, *J* = 8 Hz, 2H), 7.47 (d, *J* = 8 Hz, 2H). ¹³C NMR (CDCl₃) δ -3.6, 55.0, 113.6, 128.2, 135.4, 160.5. ²⁹Si NMR (CDCl₃) δ -17.7. EI-MS (70 eV) *m/z* 166 (M⁺). IR (neat, cm⁻¹) 2120 (Si-H).

(4-Chlorophenyl)dimethylsilane.⁹ Yield 42%, colorless liquid, bp 71 °C/10 mmHg. ¹H NMR (CDCl₃) δ 0.34 (d, *J* = 4 Hz, 6H), 4.41 (sept, *J* = 4 Hz, 1H), 7.34 (d, *J* = 8 Hz,

⁷ Itami, K.; Terakawa, K.; Yoshida, J.; Kajimoto, O. *J. Am. Chem. Soc.* **2003**, 125, 6058–6059.

⁸ (a) Fujita, M.; Hiyama, T. *J. Org. Chem.* **1988**, 53, 5405–5415; (b) Andreev, A. A.; Konshin, V. V.; Komarov, N. V.; Rubin, M.; Brouwer, C.; Gevorgyan, V. *Org. Lett.* **2003**, 6, 421–424.

⁹ Hevesi, L.; Dehon, M.; Crutzen, R.; Lazarescu-Grigore, A. *J. Org. Chem.* **1997**, 62, 2011–2017.

¹⁰ Hu, S.-S.; Weber, W. P. *J. Organomet. Chem.* **1989**, 369, 155–163.

2H), 7.46 (d, $J = 8$ Hz, 2H). ^{13}C NMR (CDCl_3) δ -3.8, 128.1, 135.3, 135.3, 135.6. ^{29}Si NMR (CDCl_3) δ -16.8. EI-MS (70 eV) m/z 170 (M^+). IR (neat, cm^{-1}) 2150 (Si-H).

(2-Thienyl)dimethylsilane.¹⁰ Yield 54%, colorless liquid, bp 39 °C/13 mmHg (lit,¹⁰ 74–75 °C/60 mmHg). ^1H NMR (CDCl_3) δ 0.40 (d, $J = 4$ Hz, 6H), 4.41 (sept, $J = 4$ Hz, 1H), 7.21 (dd, $J = 4$ and 5 Hz, 1H), 7.32 (d, $J = 4$ Hz, 1H), 7.63 (d, $J = 5$ Hz, 1H). ^{13}C NMR (CDCl_3) δ -2.8, 128.2, 131.0, 135.1, 136.2. ^{29}Si NMR (CDCl_3) δ -23.3. EI-MS (70 eV) m/z 142 (M^+). IR (neat, cm^{-1}) 2130 (Si-H).

General procedure for diorganotelluride-catalyzed oxidation of triorganosilanes. A 0.1 M solution (20 ml) of silane (2.00 mmol) containing diaryl telluride (10 mol %) in the presence of an appropriate photosensitizer (1.00×10^{-4} M) was irradiated under aerobic conditions (in an open flask with vigorous stirring) using a 500 W halogen lamp at a distance of 10–15 cm. An ice bath can be used to keep the reaction temperature between 10 and 20 °C, without which the temperature rose to 50–70 °C during irradiation. The progress of the reaction was monitored by ^1H NMR spectroscopy and the chemical yields were determined by integration of the ^1H NMR signals using *tert*-butylbenzene as an internal standard. After careful evaporation of the solvent, silanols were isolated by flash column chromatography on silica gel using a mixture of hexanes and ethyl acetate as an eluent. Identification of the products was carried out by comparison of ^1H , ^{13}C , and ^{29}Si NMR, MS, and infrared spectra to literature data or to those of commercial products. Physical and spectral data for the isolated silanols are as follows.

(4-Trifluoromethylphenyl)dimethylsilanol.¹¹ Colorless viscous oil. ^1H NMR (CDCl_3) δ 0.43 (s, 6H), 1.96 (s, 1H), 7.63 (d, $J = 8$ Hz, 2H), 7.70 (d, $J = 8$ Hz, 2H). ^{13}C NMR (CDCl_3) δ -0.1, 124.1 (q, $J = 272$ Hz), 124.3 (q, $J = 4$ Hz), 131.5 (q, $J = 32$ Hz), 133.3, 143.8. ^{29}Si NMR (CDCl_3) δ 7.4. EI-MS (70 eV) m/z 220 (M^+). IR (neat, cm^{-1}) 3300 (OH).

(4-Chlorophenyl)dimethylsilanol.¹² Colorless viscous oil. ^1H NMR (CDCl_3) δ 0.40 (s, 6H), 1.82 (s, 1H), 7.36 (d, $J = 8$ Hz, 2H), 7.52 (d, $J = 8$ Hz, 2H). ^{13}C NMR (CDCl_3) δ -0.1, 128.1, 134.4, 135.9, 137.3. ^{29}Si NMR (CDCl_3) δ 7.5. EI-MS (70 eV) m/z 186 (M^+). IR (neat, cm^{-1}) 3300 (OH).

(4-Methoxyphenyl)dimethylsilanol.¹¹ Colorless viscous oil. ^1H NMR (CDCl_3) δ 0.39 (s, 6H), 2.02 (s, 1H), 3.82 (s, 3H), 6.94 (d, $J = 8$ Hz, 2H), 7.53 (d, $J = 8$ Hz, 2H). ^{13}C NMR (CDCl_3) δ 0.0, 55.0, 113.5, 130.2, 134.6, 160.7. ^{29}Si NMR (CDCl_3) δ 7.4. EI-MS (70 eV) m/z 182 (M^+). IR (neat, cm^{-1}) 3300 (OH).

(2-Thienyl)dimethylsilanol.¹³ Colorless viscous oil. ^1H NMR (CDCl_3) δ 0.47 (s,

¹¹ Hirabayashi, K.; Kawashima, J.; Nishihara, Y.; Mori, A.; Hiyama, T. *Org. Lett.* **1999**, *1*, 299–301.

¹² Denmark, S. E.; Smith, R. C.; Chang, W. T.; Muhuhi, J. M. *J. Am. Chem. Soc.* **2009**, *131*, 3104–3118.

¹³ Denmark, S. E.; Baird, J. D. *Org. Lett.* **2006**, *8*, 793–795.

6H), 2.13 (s, 1H), 7.21 (dd, $J = 3$ and 4 Hz, 1H), 7.37 (d, $J = 3$ Hz, 1H), 7.64 (d, $J = 4$ Hz, 1H). ^{13}C NMR (CDCl_3) δ 0.8, 128.1, 131.0, 134.6, 138.5. ^{29}Si NMR (CDCl_3) δ 3.3. EI-MS (70 eV) m/z 158 (M^+). IR (neat, cm^{-1}) 3280 (OH).

1-Dodecyldimethylsilanol.⁷ Colorless viscous oil. ^1H NMR (CDCl_3) δ 0.12 (s, 6H), 0.59 (m, 2H), 0.88 (t, $J = 7$ Hz, 3H), 1.24–1.36 (m, 20H), 1.60 (s, 1H). ^{13}C NMR (CDCl_3) δ -0.3, 14.1, 16.5, 17.8, 22.7, 23.2, 29.4, 29.6, 29.7, 29.7, 31.9, 33.5. ^{29}Si NMR (CDCl_3) δ 17.6. EI-MS (70 eV) m/z 230 (M^+). IR (neat, cm^{-1}) 3280 (OH).

Triphenylsilanol.¹⁴ Colorless solid, mp 150–151 °C (lit,¹⁵ 148–150 °C). ^1H NMR (CDCl_3) δ 2.53 (brs, 1H), 7.36–7.46 (m, 9H), 7.63–7.65 (m, 6H). ^{13}C NMR (CDCl_3) δ 127.9, 130.1, 135.0, 135.1. ^{29}Si NMR (CDCl_3) δ -12.6. EI-MS (70 eV) m/z 276 (M^+). IR (KBr, cm^{-1}) 3300 (OH).

Diphenylmethylsilanol.¹⁶ Colorless viscous oil. ^1H NMR (CDCl_3) δ 0.68 (s, 3H), 2.16 (s, 1H), 7.40 (m, 6H), 7.61 (d, $J = 7$ Hz, 4H). ^{13}C NMR (CDCl_3) δ -1.3, 127.9, 129.8, 133.9, 137.0. ^{29}Si NMR (CDCl_3) δ -2.7. EI-MS (70 eV) m/z 214 (M^+). IR (neat, cm^{-1}) 3280 (OH).

Dimethylphenylsilanol.¹⁴ Colorless viscous oil. ^1H NMR (CDCl_3) δ 0.40 (s, 6H), 3.10 (s, 1H), 7.38–7.43 (m, 3H), 7.59–7.62 (m, 2H). ^{13}C NMR (CDCl_3) δ -0.1, 127.8, 129.5, 133.0, 139.1. ^{29}Si NMR (CDCl_3) δ 7.3. EI-MS (70 eV) m/z 152 (M^+). IR (neat, cm^{-1}) 3280 (OH).

(S)-(+)-Methyl(α -naphthyl)phenylsilanol.⁶ Colorless viscous oil. ^1H NMR (CDCl_3) δ 0.83 (s, 3H), 2.31 (s, 1H), 7.34–7.50 (m, 6H), 7.64 (d, $J = 7$ Hz, 2H), 7.81 (d, $J = 7$ Hz, 1H), 7.87 (d, $J = 7$ Hz, 1H), 7.93 (d, $J = 8$ Hz, 1H), 8.12 (d, $J = 8$ Hz, 1H). ^{13}C NMR (CDCl_3) δ -0.3, 124.9, 125.4, 125.9, 127.8, 128.4, 128.7, 129.6, 130.5, 133.2, 133.9, 134.6, 134.7, 136.6, 137.5. ^{29}Si NMR (CDCl_3) δ -1.6. EI-MS (70 eV) m/z 264 (M^+). IR (neat, cm^{-1}) 3300 (OH). $[\alpha]_{\text{D}}^{24} +18.2$ (c 5.98, Et_2O) (lit,⁶ $[\alpha]_{\text{D}} +20.5$ (c 6.66, Et_2O)).

Hammett plot for the reaction of substituted phenyldimethylsilanes with Mes_2TeO . The relative reaction rates of *para*-substituted phenyldimethylsilanes toward Mes_2TeO were determined via competition experiments by GC analysis. A pyridine solution (3 ml) containing two kinds of aryldimethylsilanes (total 2.25–6.00 mmol) was added to a 10 ml recovery flask and an initial molar ratio of aryldimethylsilanes was determined by GC analysis using decane (300–500 μl) as an internal standard. To this solution was added Mes_2TeO (100–150 μmol) and the mixture was stirred at room temperature for 30 min. The amounts of silanes consumed were determined by GC

¹⁴ Commercially available silanols.

¹⁵ Adam, W.; Mitchell, C. M.; Saha-Möller, C. R.; Weichold, O. *J. Am. Chem. Soc.* **1999**, *121*, 2097–2103.

¹⁶ Lycka, A.; Snobl, D.; Handlir, K.; Holecek, J.; Nadvornik, M. *Collect. Czech. Chem. Commun.* **1982**, *42*, 603–612.

analysis. At least three runs were averaged for each competition. The relative rates calculated under these conditions and Hammett's σ_p -values¹⁷ are compiled in Table S-1.

Table S-1. Relative reaction rates of substituted phenyldimethylsilanes toward Mes₂TeO

(4-X-C ₆ H ₄)Me ₂ SiH + PhMe ₂ SiH		Mes ₂ TeO pyridine, rt, 30 min	(4-X-C ₆ H ₄)Me ₂ SiOH + PhMe ₂ SiOH
X	k_X/k_H	$\log(k_X/k_H)$	σ_p
MeO	0.465 ± 0.019	-0.333 ± 0.018	-0.27
H	1.000 ± 0.000	0.000 ± 0.000	0.00
Cl	3.61 ± 0.18	0.557 ± 0.022	0.23
CF ₃	21.2 ± 1.0	1.33 ± 0.02	0.54

Kinetic isotope effect study of the oxidation of Ph₂MeSiH(D) with Mes₂TeO.

The deuterium kinetic isotope effect (KIE) was determined using a conventional competitive technique. Approximately equal amounts of Ph₂MeSiH and Ph₂MeSiD (total 1 mmol) in pyridine-*d*₅ (1 ml) were incompletely oxidized with Mes₂TeO (0.6–0.8 mmol) at room temperature for 1 h. The initial proportion of Ph₂MeSiD (R_0), fractional conversion of silanes (F), and final proportion of the deuteride in the remaining silanes (R) were determined by ¹H NMR integration of the methyl proton signals. The KIE (k_H/k_D) was calculated from equation 1¹⁸ for a total of 4 reactions and the results are compiled in Table S-2.

$$\text{KIE} = \frac{\ln(1 - F)}{\ln[(1 - F)R/R_0]} \quad (\text{eq. 1})$$

Table S-2. Deuterium kinetic isotope effect for oxidation of Ph₂MeSiH(D) with Mes₂TeO

Run	Fractional conversion (F)	R/R_0	KIE (k_H/k_D)
1	0.52	1.076	1.112
2	0.70	1.095	1.081
3	0.73	1.113	1.089
4	0.83	1.126	1.072

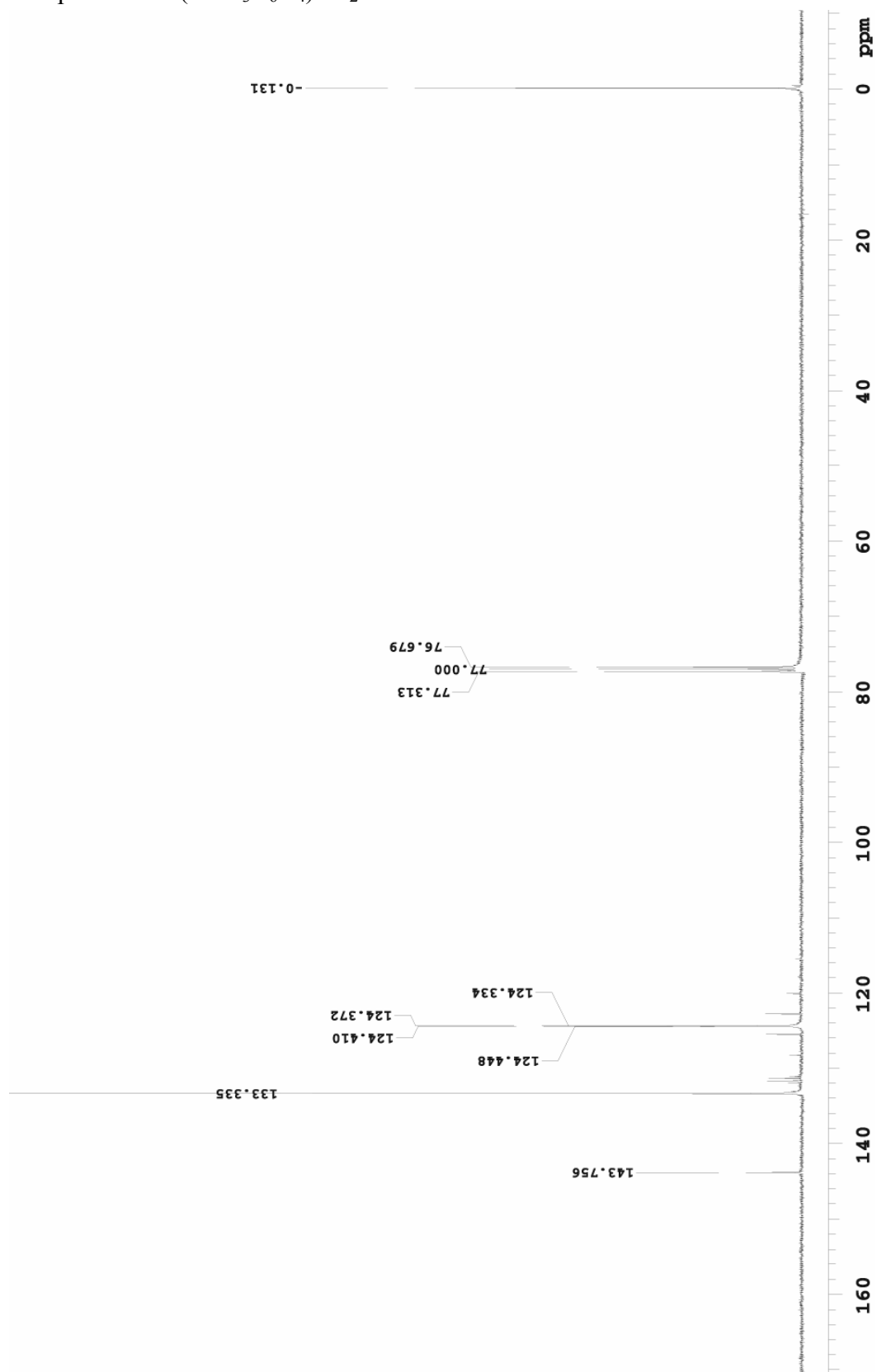
¹⁷ Hansch, C.; Leo, A.; Taft, R. W. *Chem. Rev.* **1991**, 91, 165–195.

¹⁸ (a) Bigeleisen, J.; Wolfsberg, M. *Adv. Chem. Phys.* **1958**, 1, 15–76; (b) Melander, L.; Saunders, W. H., Jr. *Reaction Rates of Isotopic Molecules*; Wiley: New York, 1980; pp 95–102.

^1H NMR spectrum of $(4\text{-CF}_3\text{C}_6\text{H}_4)\text{Me}_2\text{SiOH}$



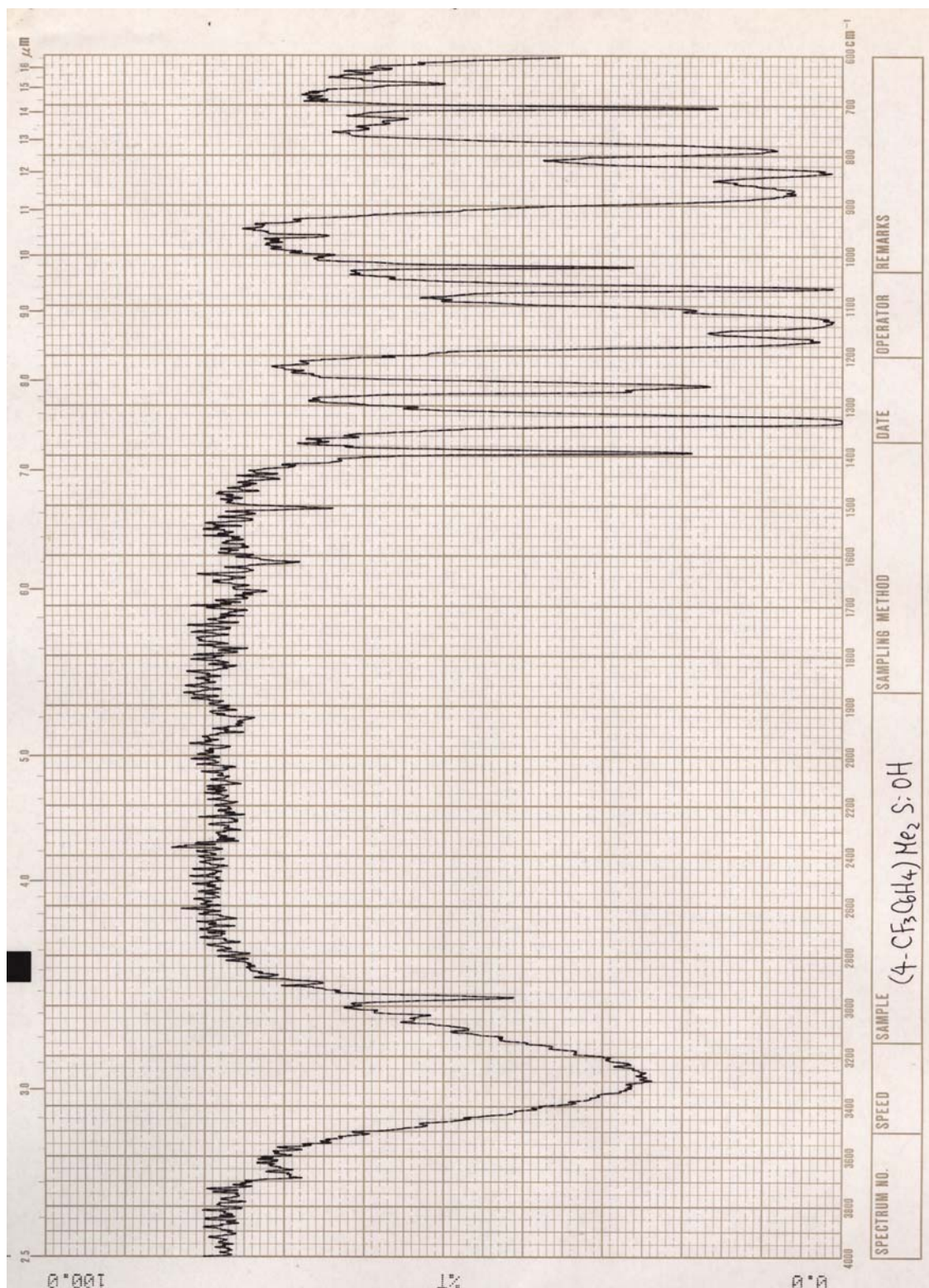
^{13}C NMR spectrum of (4- $\text{CF}_3\text{C}_6\text{H}_4$) Me_2SiOH



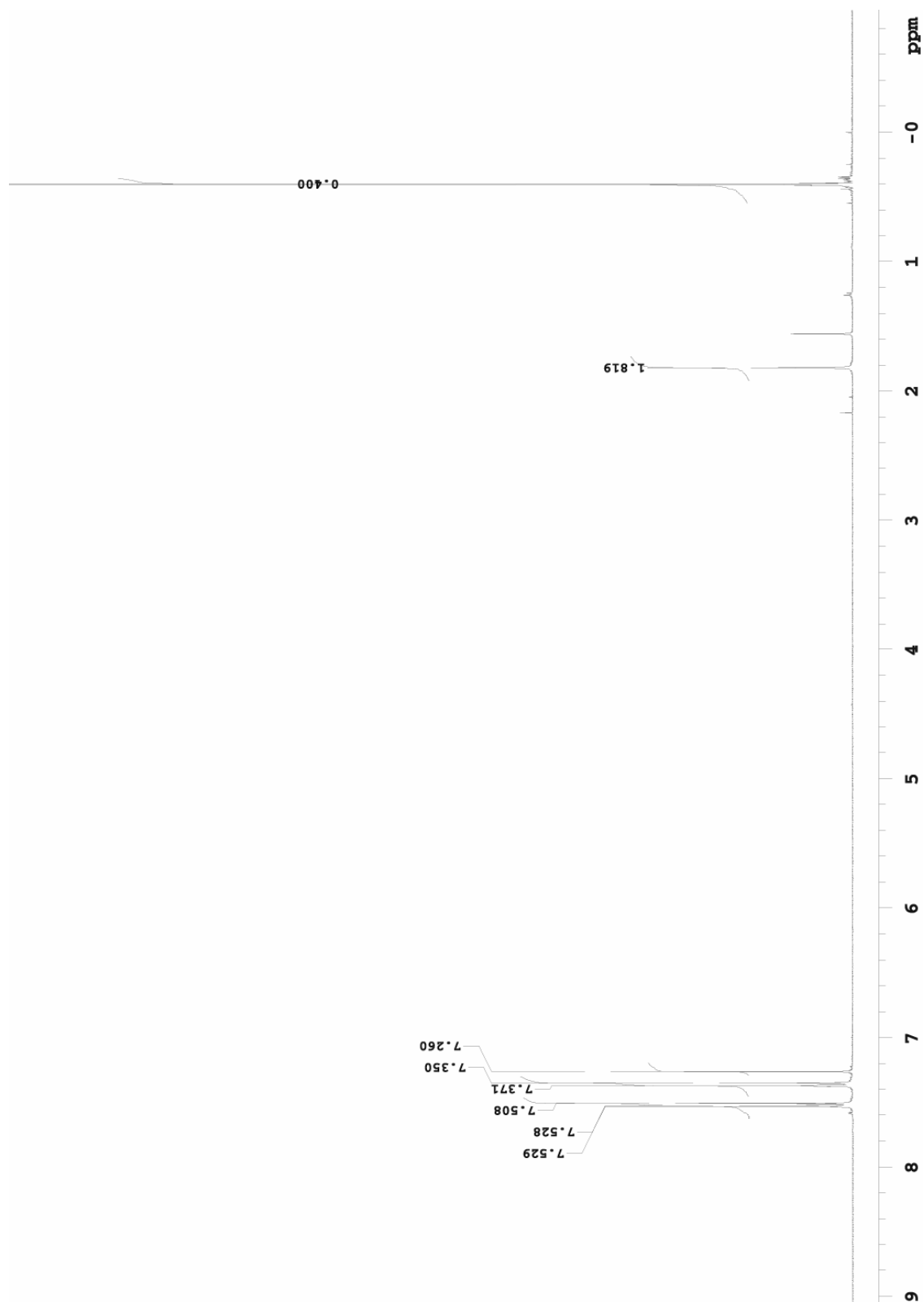
^{29}Si NMR spectrum of $(4\text{-CF}_3\text{C}_6\text{H}_4)\text{Me}_2\text{SiOH}$



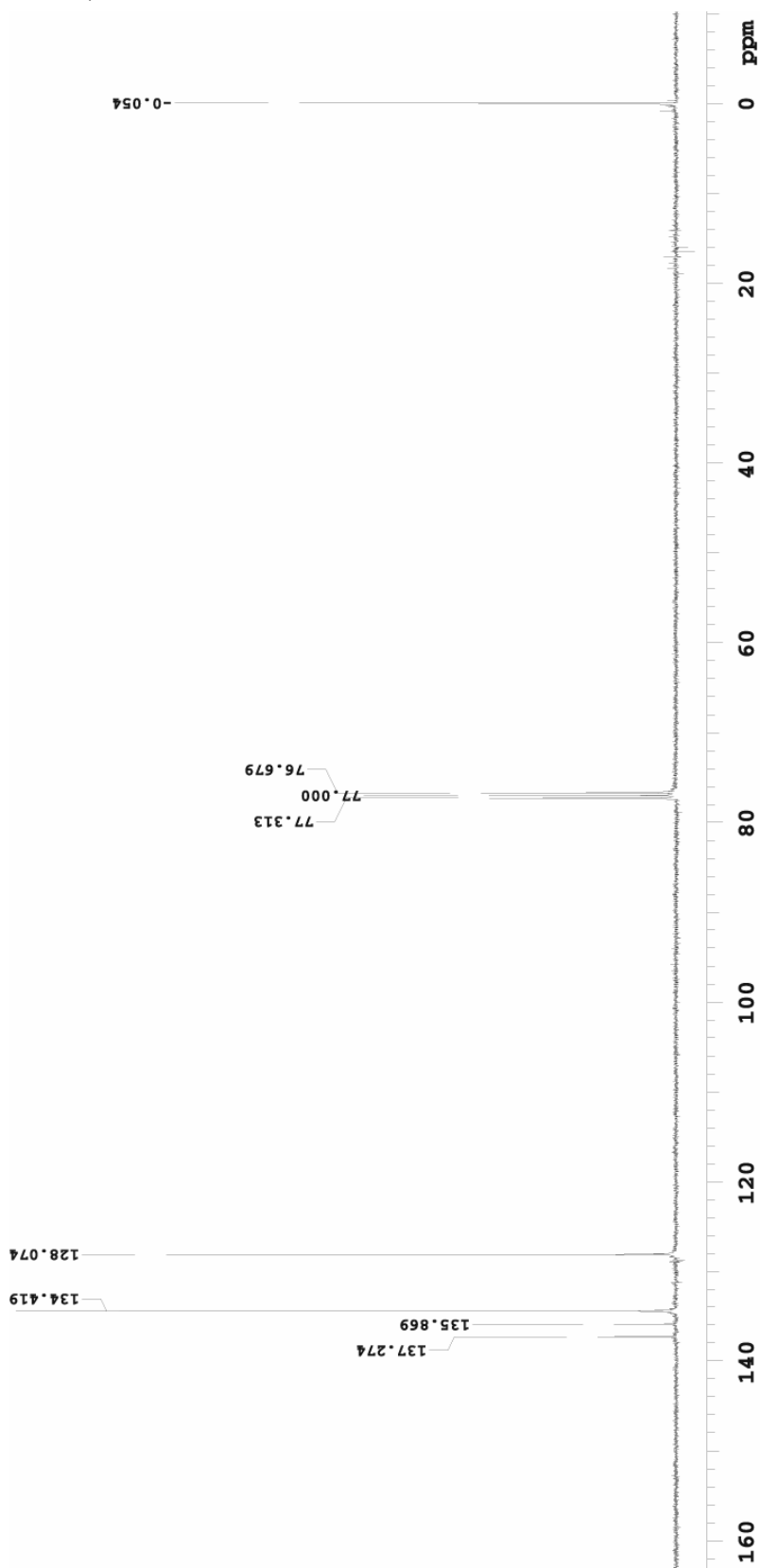
Infrared spectrum of $(4\text{-CF}_3\text{C}_6\text{H}_4)\text{Me}_2\text{SiOH}$



^1H NMR spectrum of (4-ClC₆H₄)Me₂SiOH



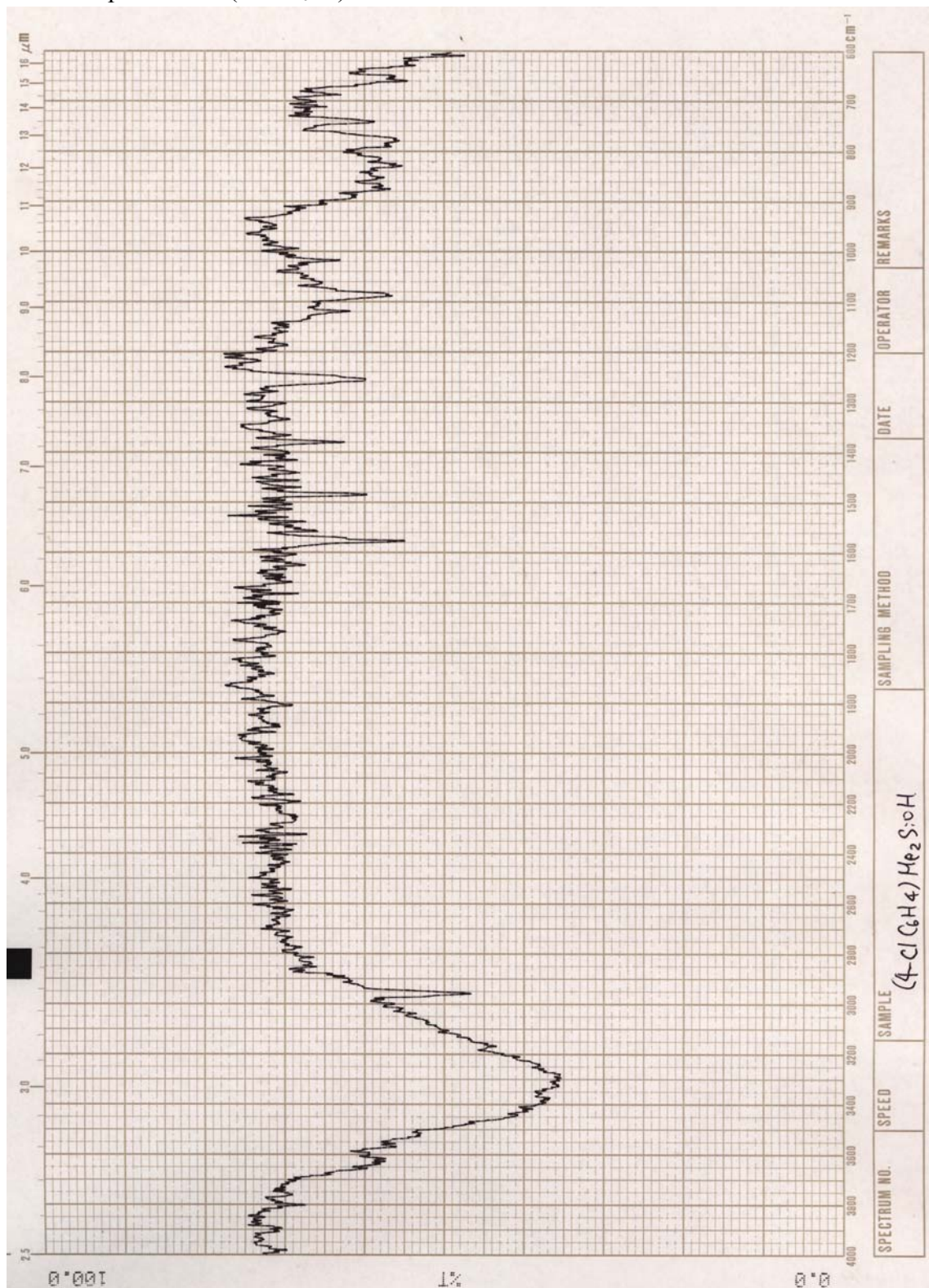
^{13}C NMR spectrum of (4-ClC₆H₄)Me₂SiOH



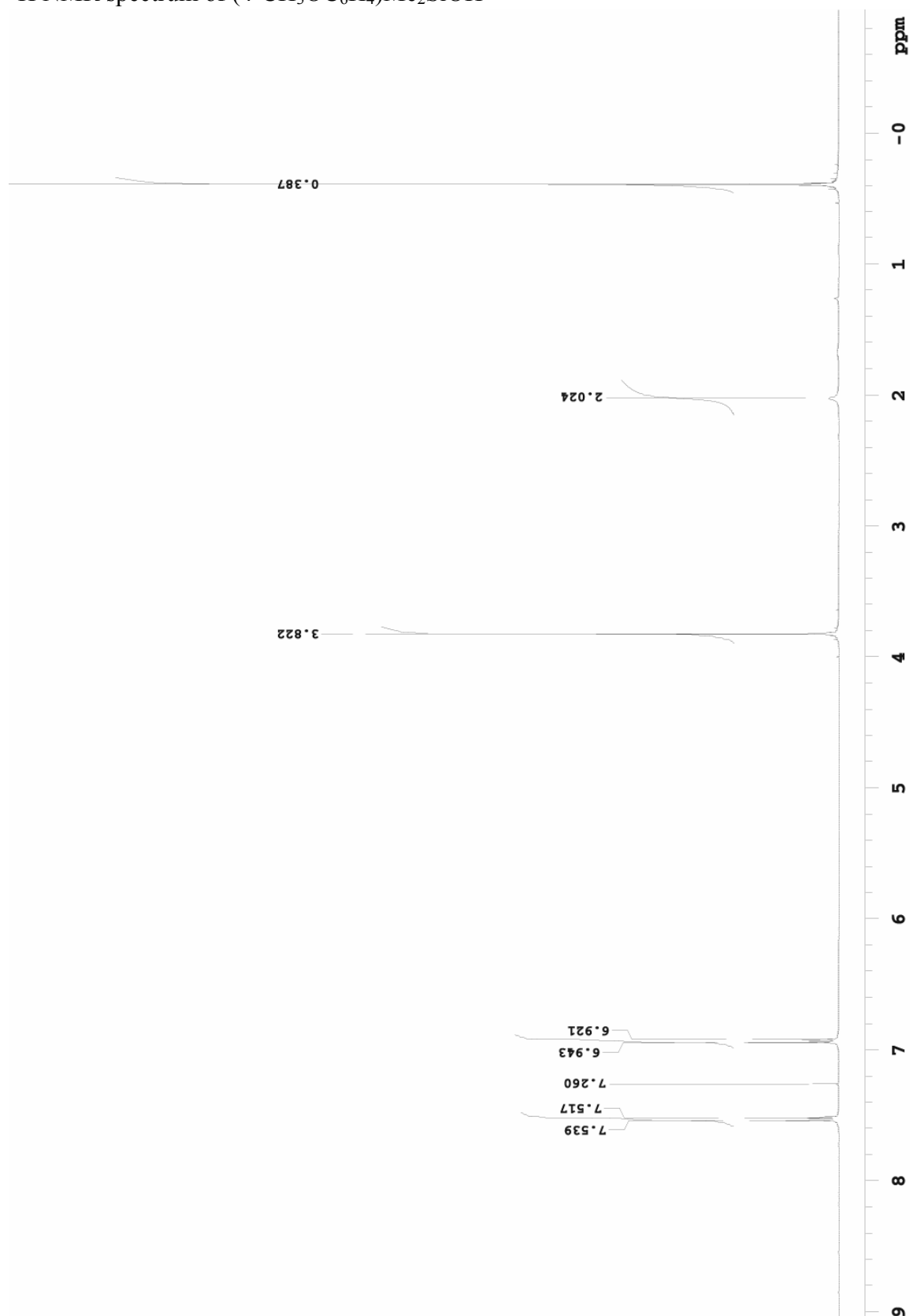
^{29}Si NMR spectrum of (4-ClC₆H₄)Me₂SiOH



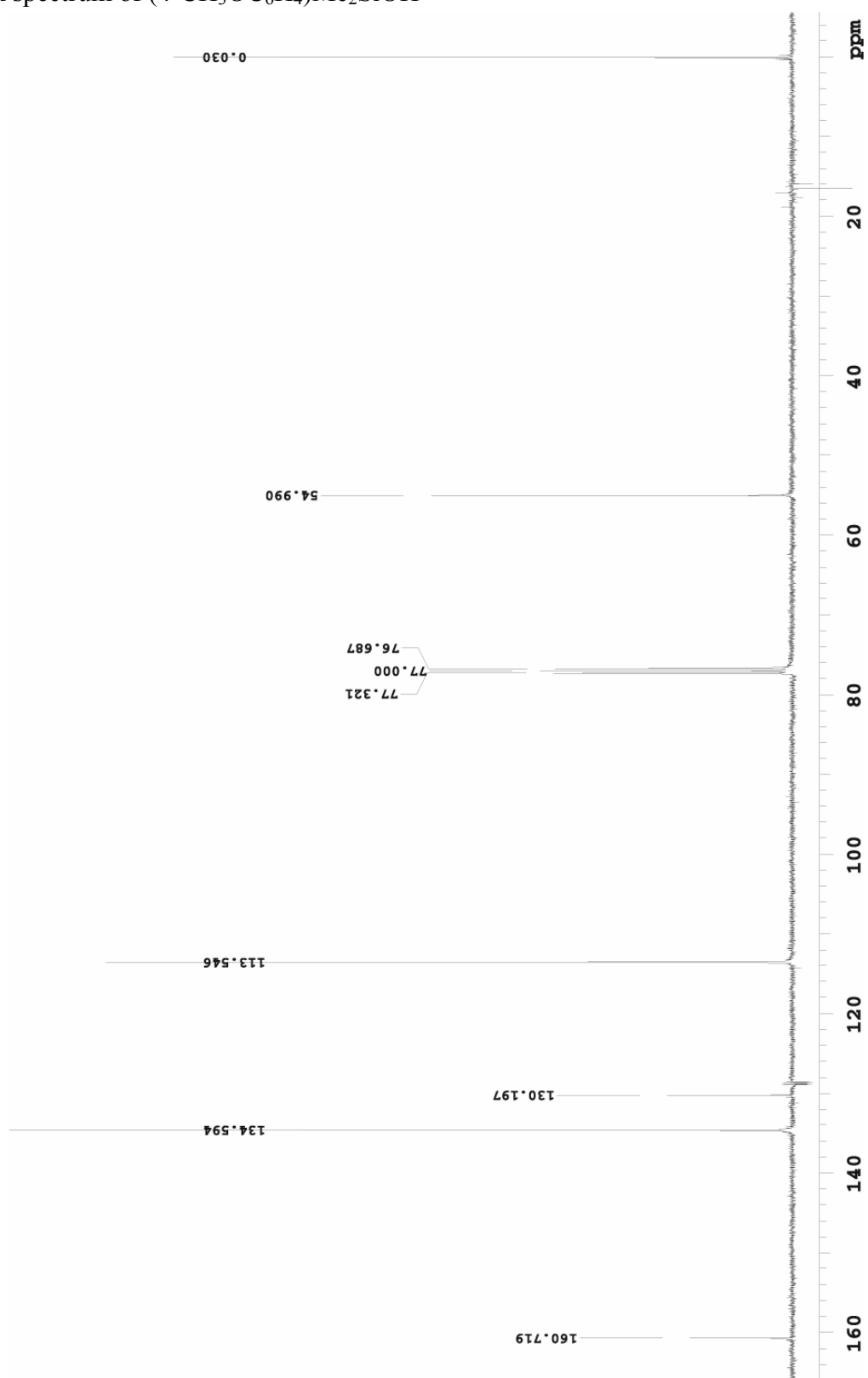
Infrared spectrum of (4-ClC₆H₄)Me₂SiOH



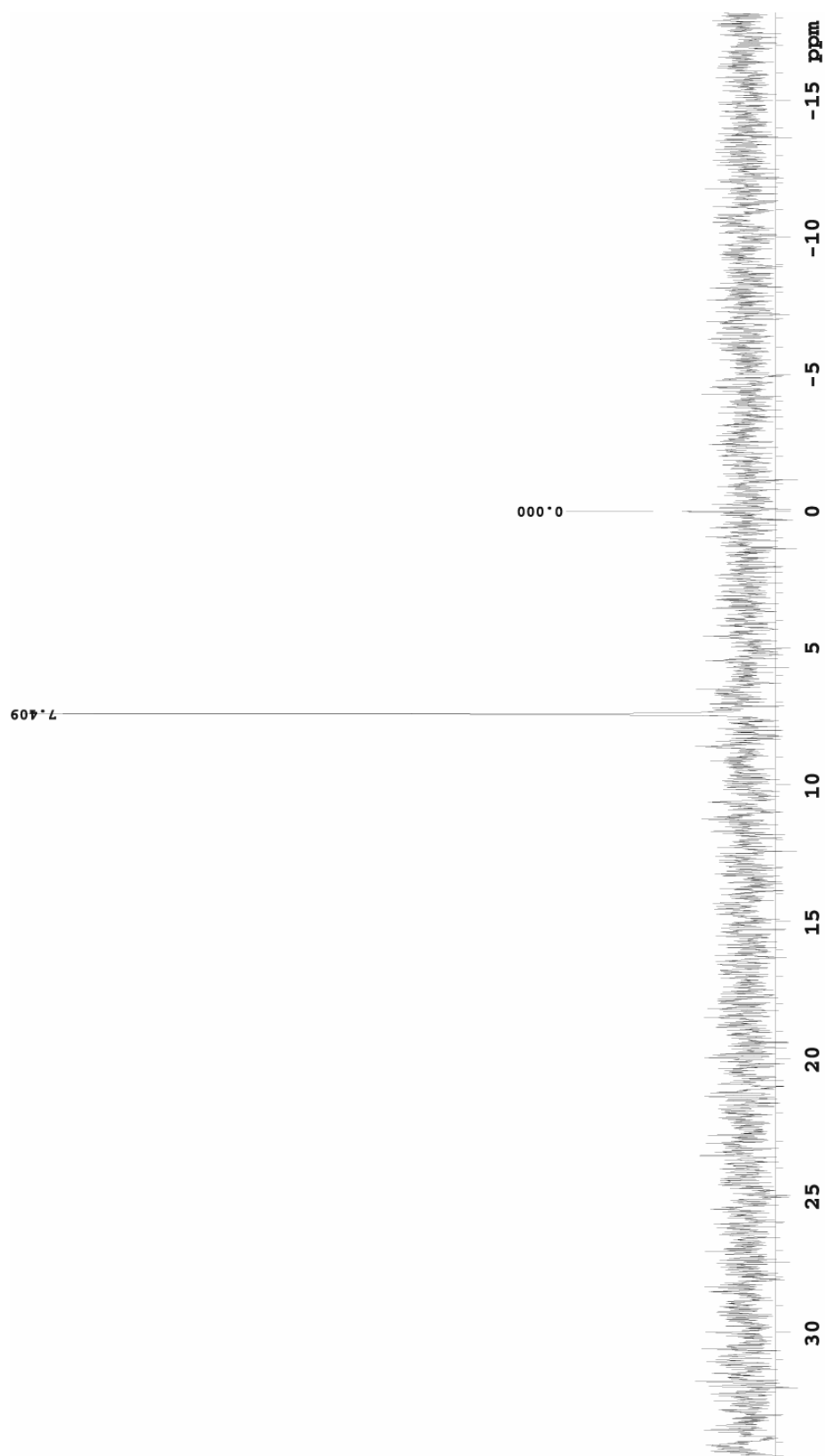
^1H NMR spectrum of $(4\text{-CH}_3\text{OC}_6\text{H}_4)\text{Me}_2\text{SiOH}$



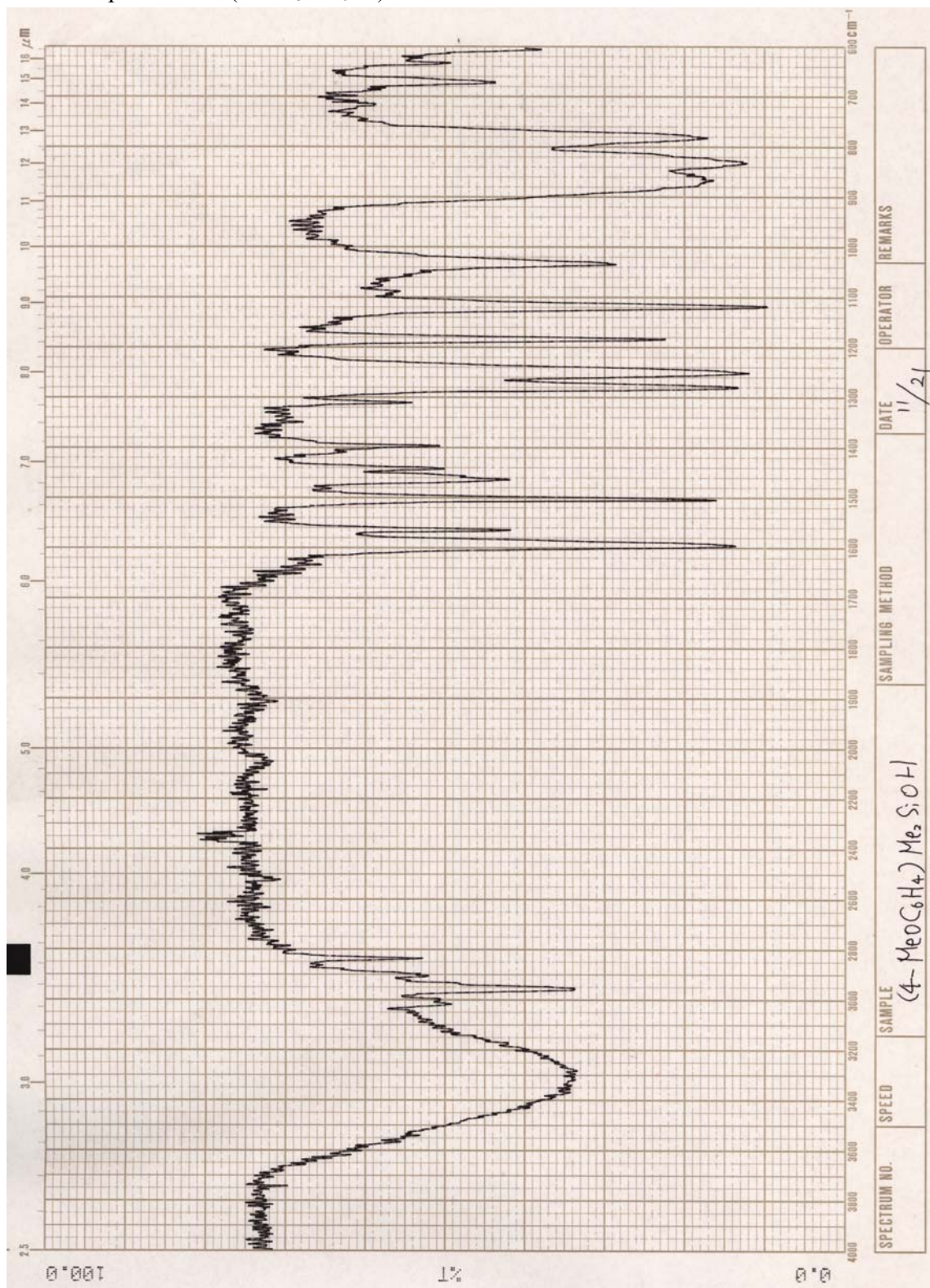
^{13}C NMR spectrum of (4- $\text{CH}_3\text{OC}_6\text{H}_4$) Me_2SiOH



^{29}Si NMR spectrum of (4- $\text{CH}_3\text{OC}_6\text{H}_4$) Me_2SiOH



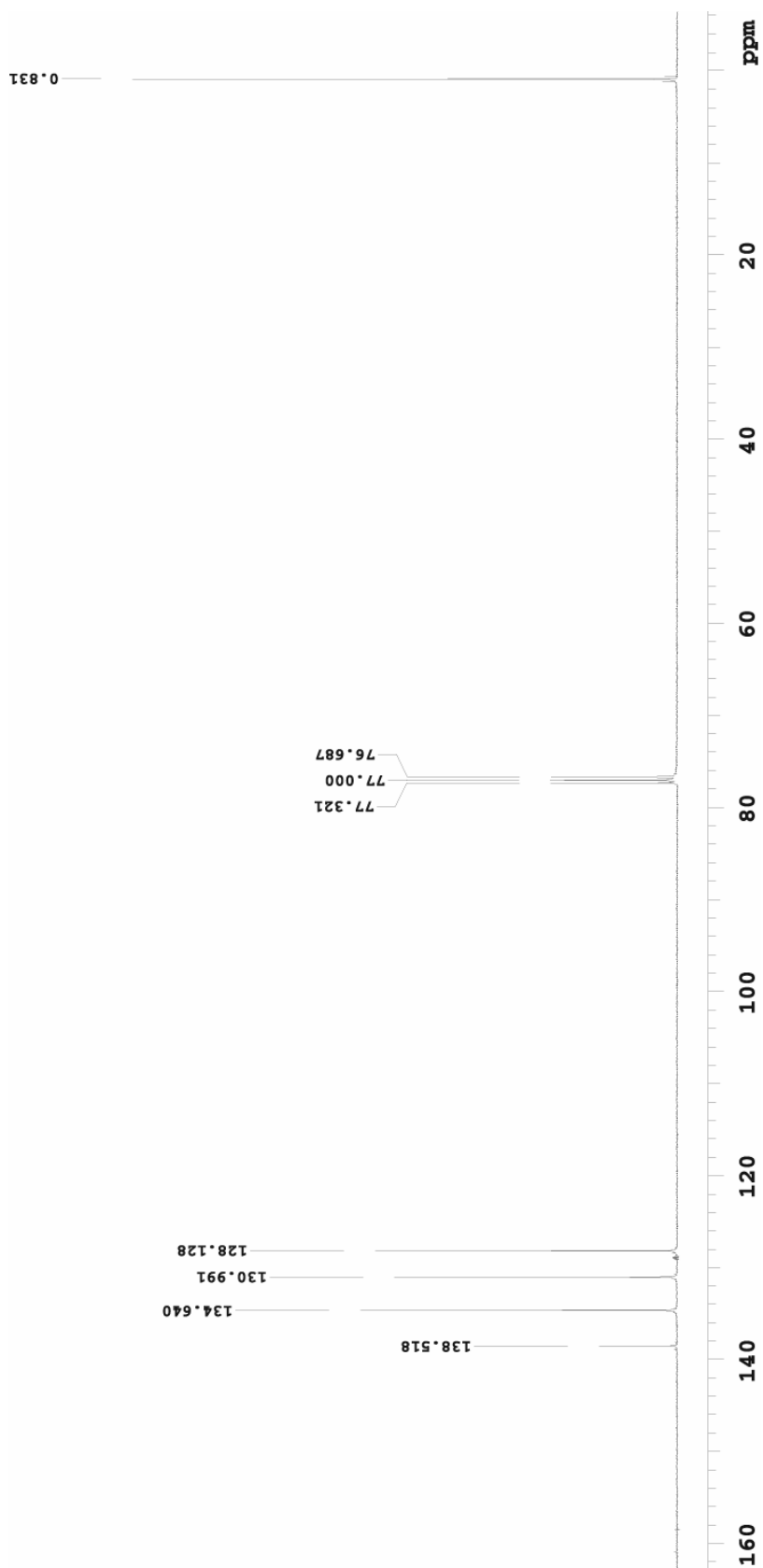
Infrared spectrum of (4-CH₃OC₆H₄)Me₂SiOH



^1H NMR spectrum of (2-thienyl) Me_2SiOH



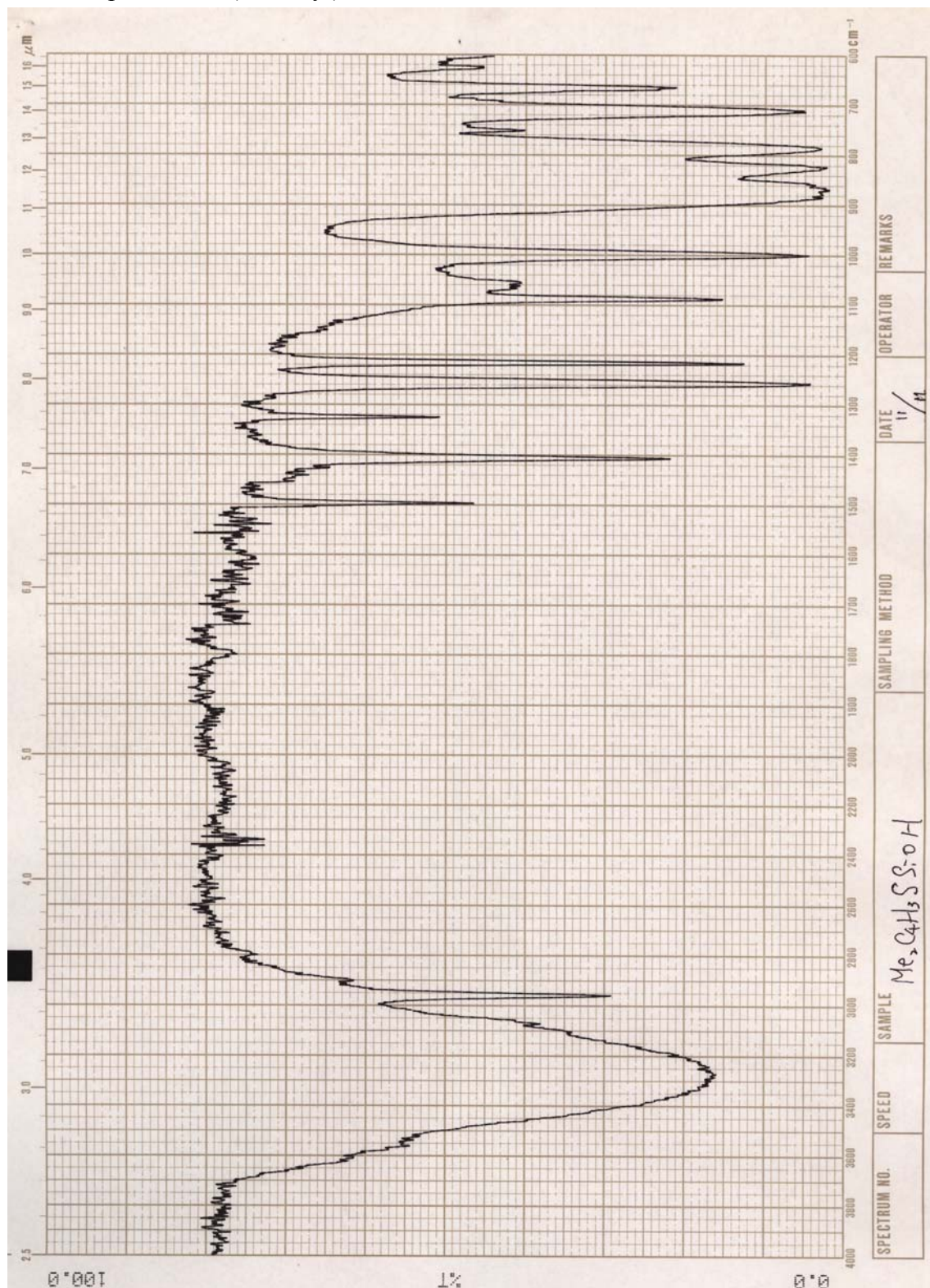
^{13}C NMR spectrum of (2-thienyl) Me_2SiOH



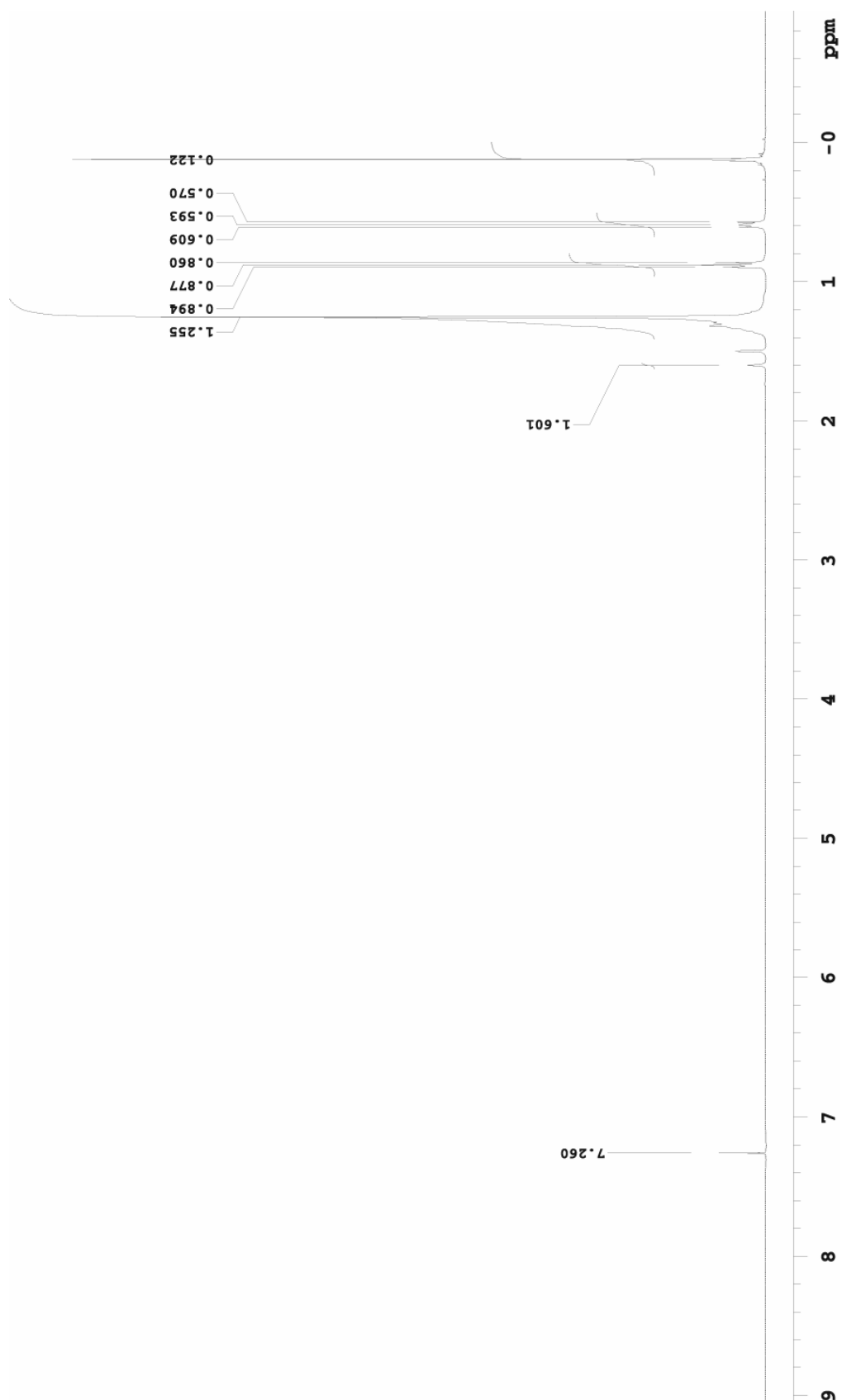
^{29}Si NMR spectrum of (2-thienyl) Me_2SiOH



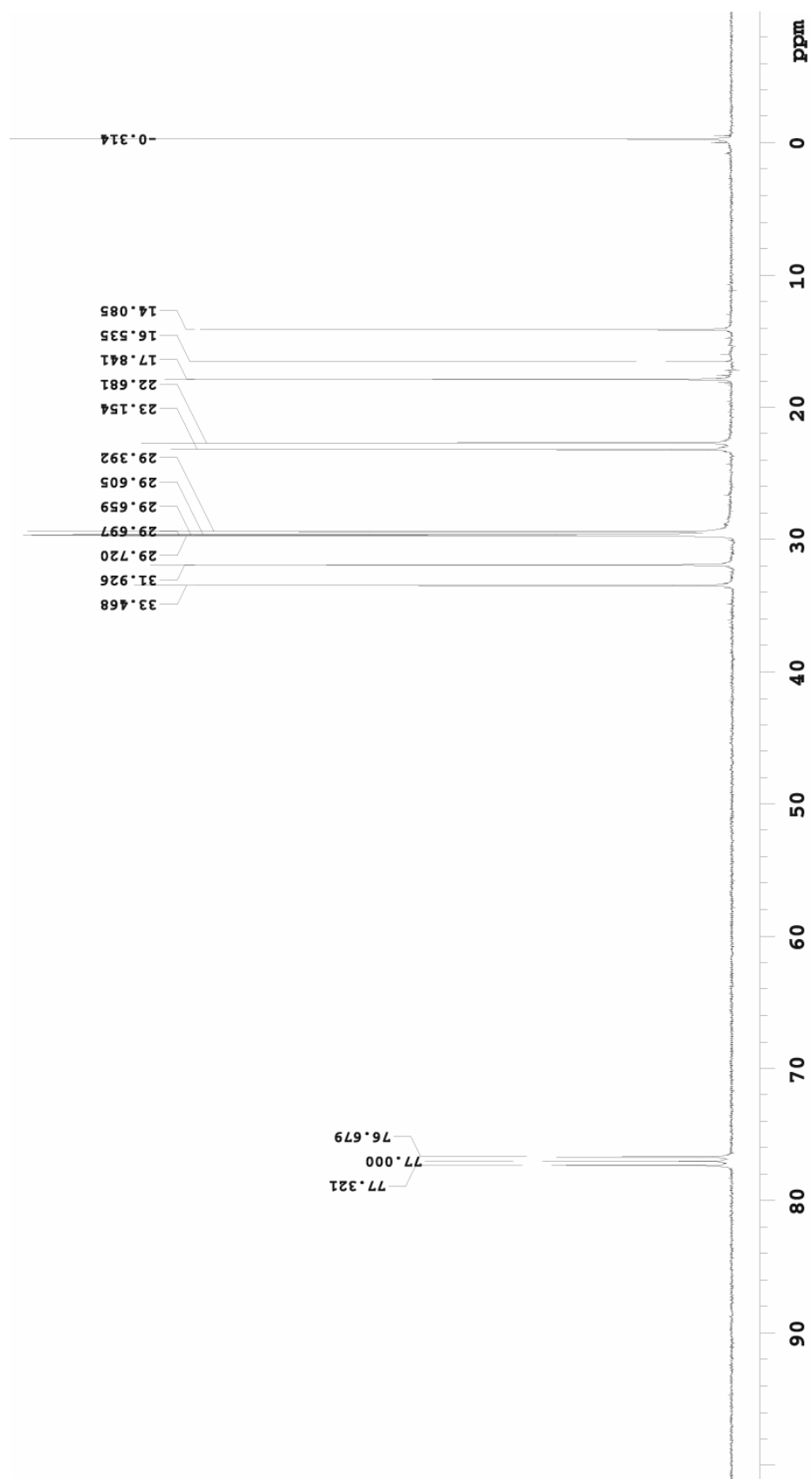
Infrared spectrum of (2-thienyl)Me₂SiOH



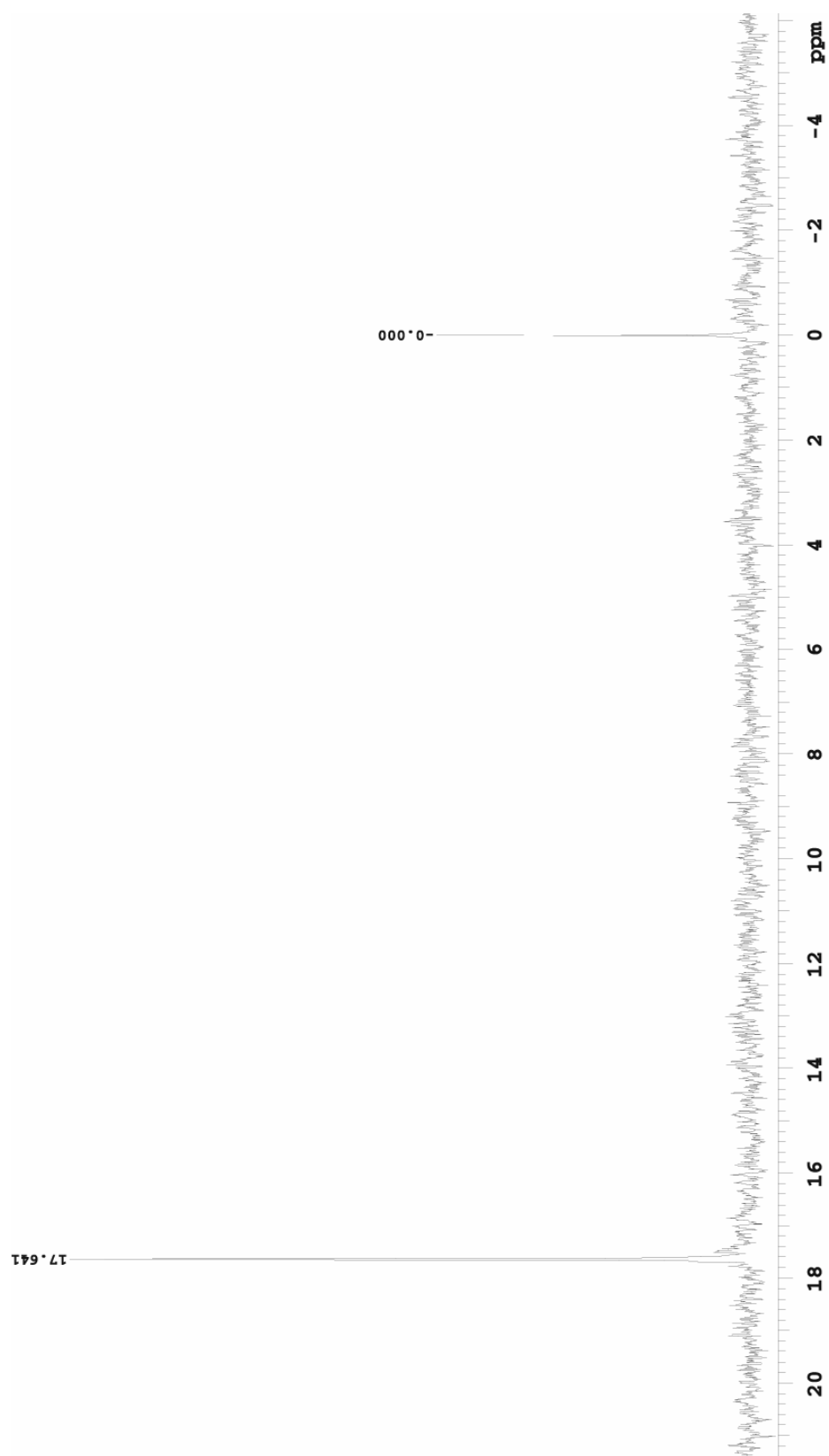
^1H NMR spectrum of (1-dodecyl) Me_2SiOH



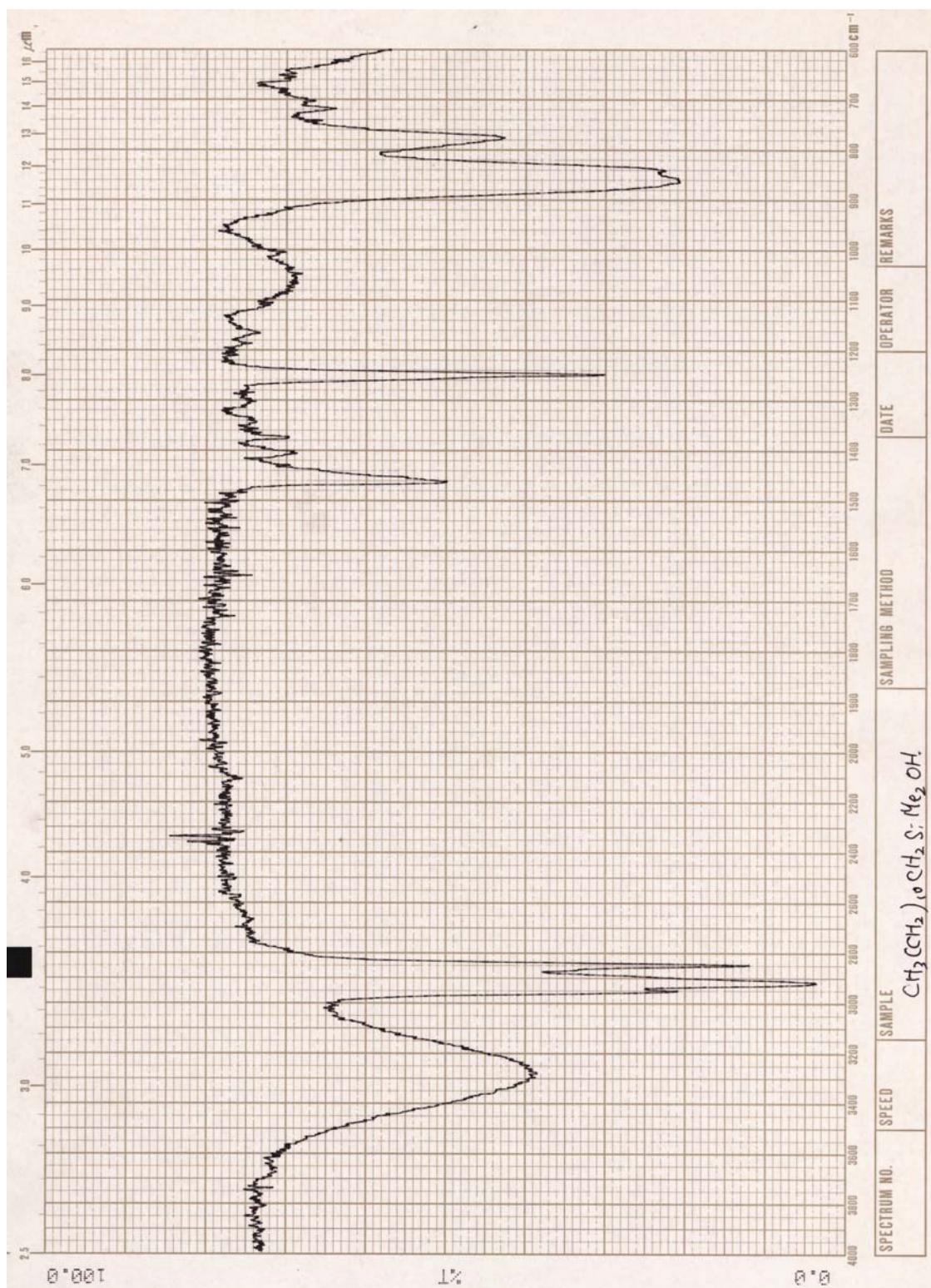
^{13}C NMR spectrum of (1-dodecyl) Me_2SiOH



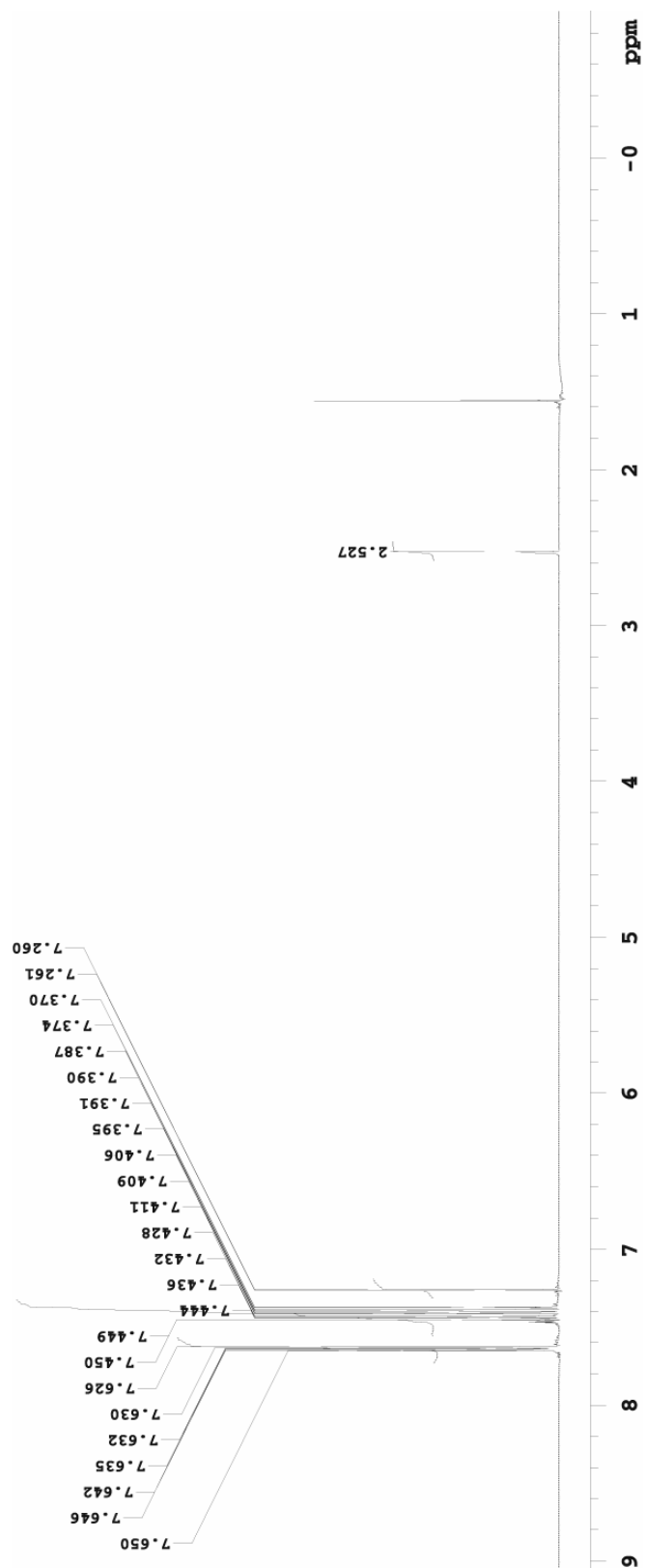
^{29}Si NMR spectrum of (1-dodecyl) Me_2SiOH



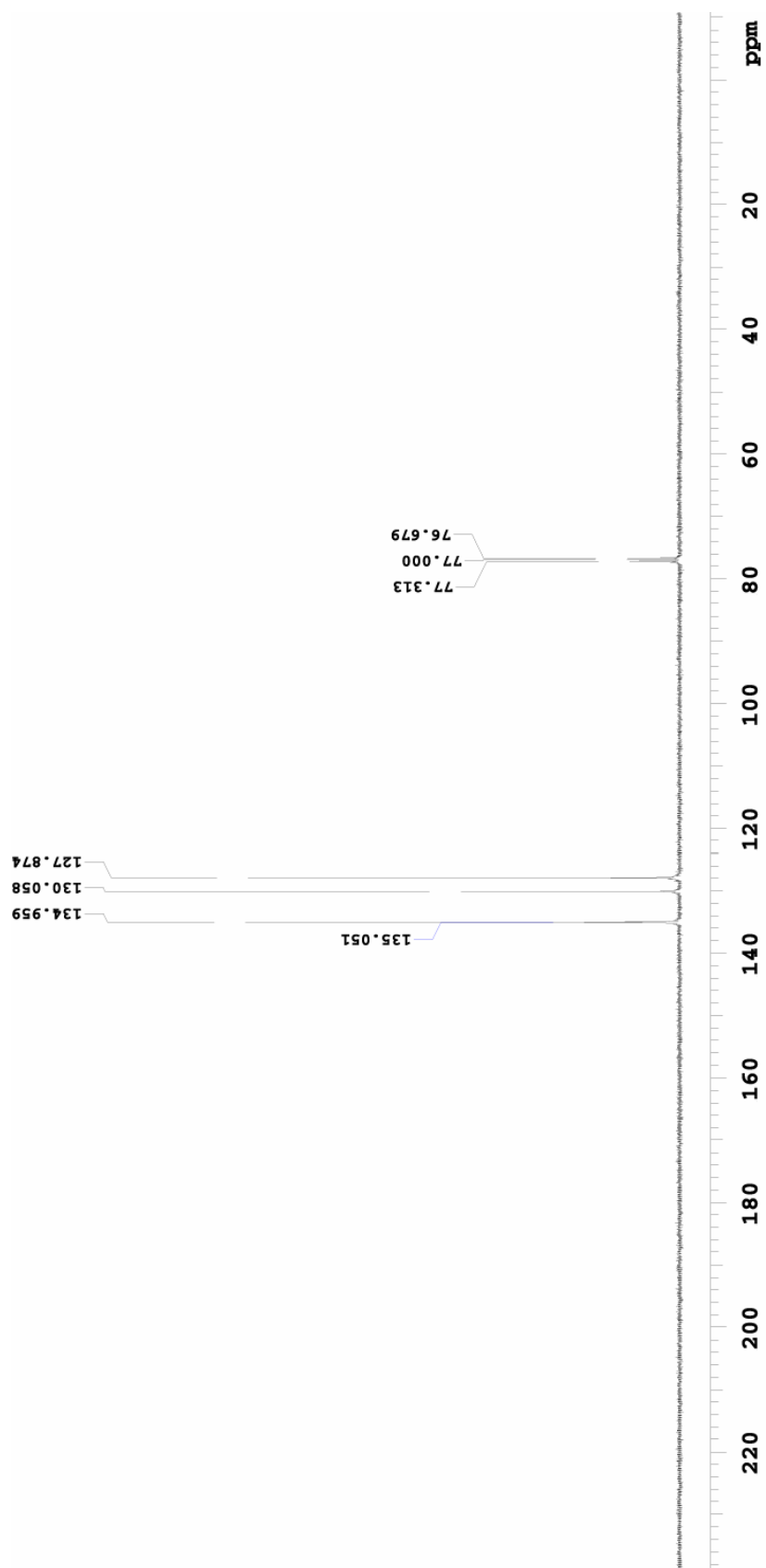
Infrared spectrum of (1-dodecyl)Me₂SiOH



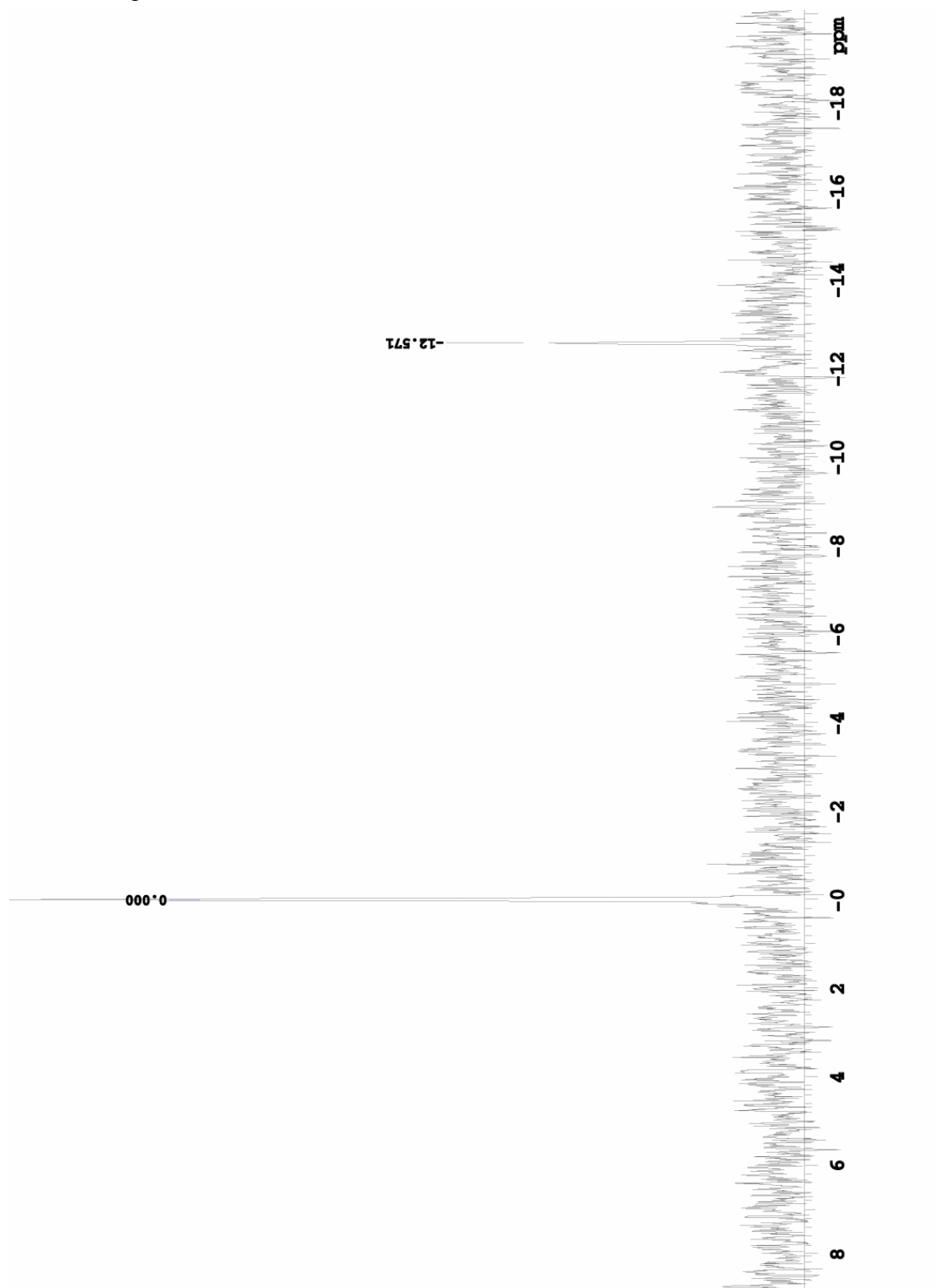
^1H NMR spectrum of Ph_3SiOH



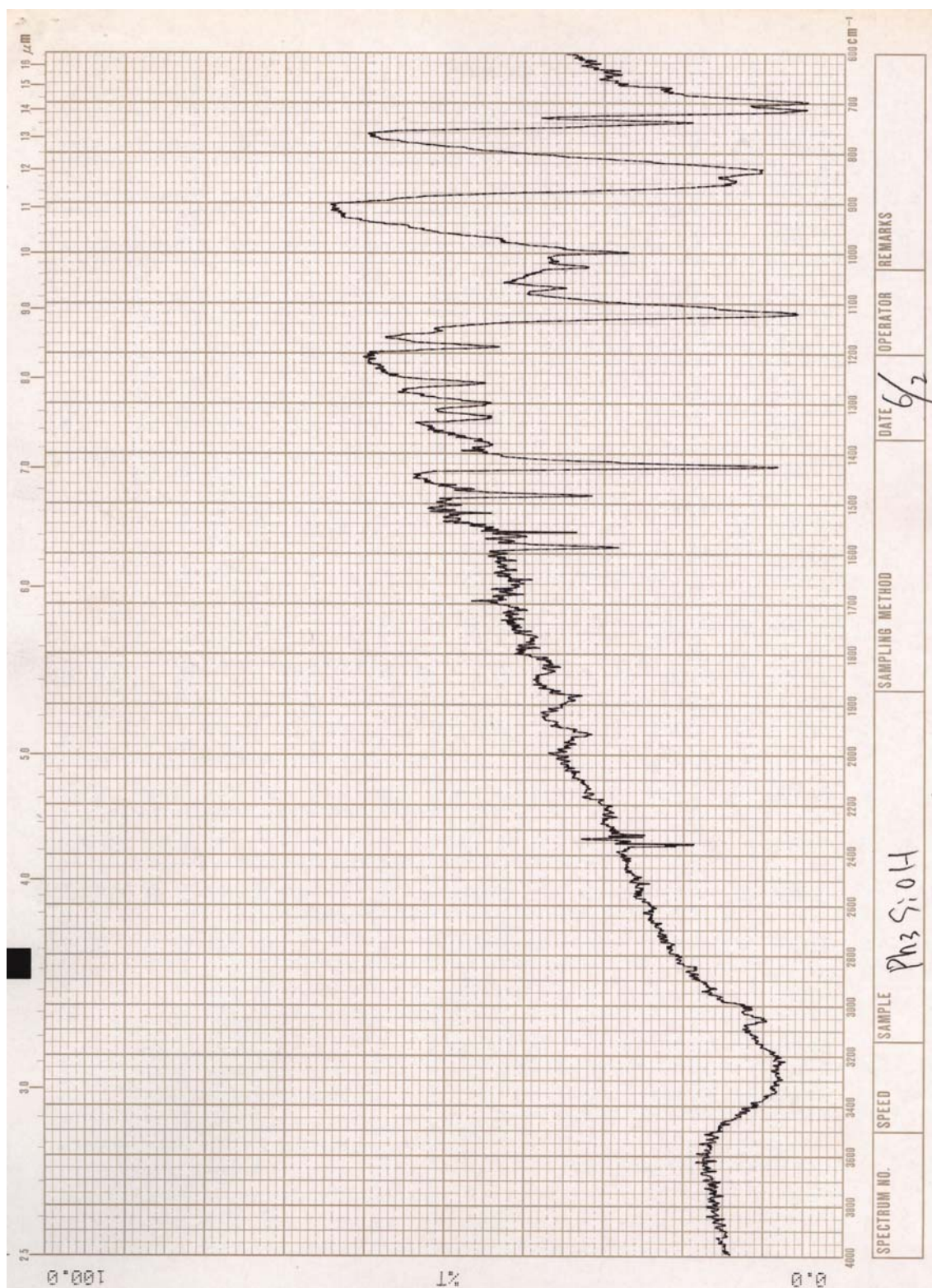
^{13}C NMR spectrum of Ph_3SiOH



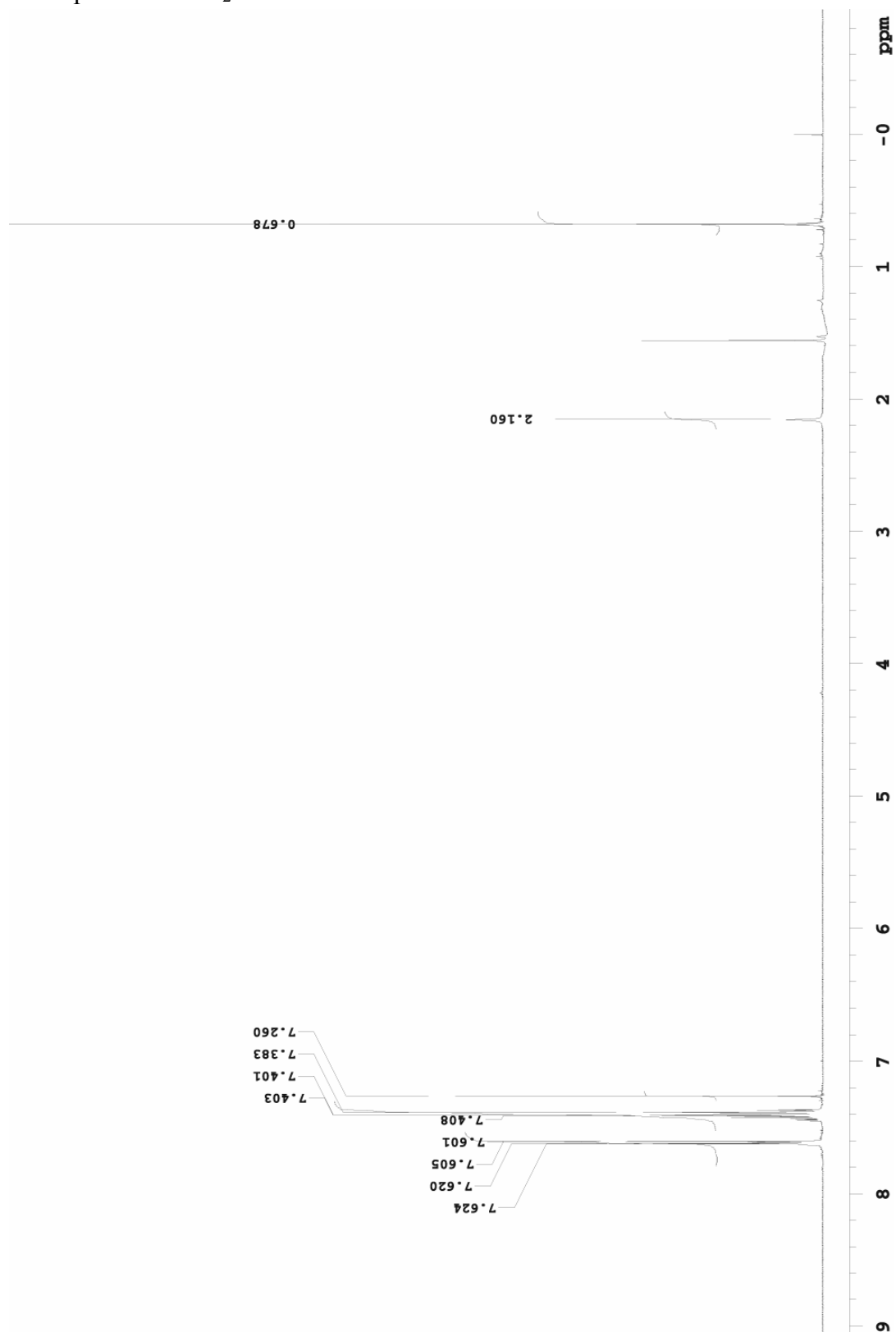
^{29}Si NMR spectrum of Ph_3SiOH



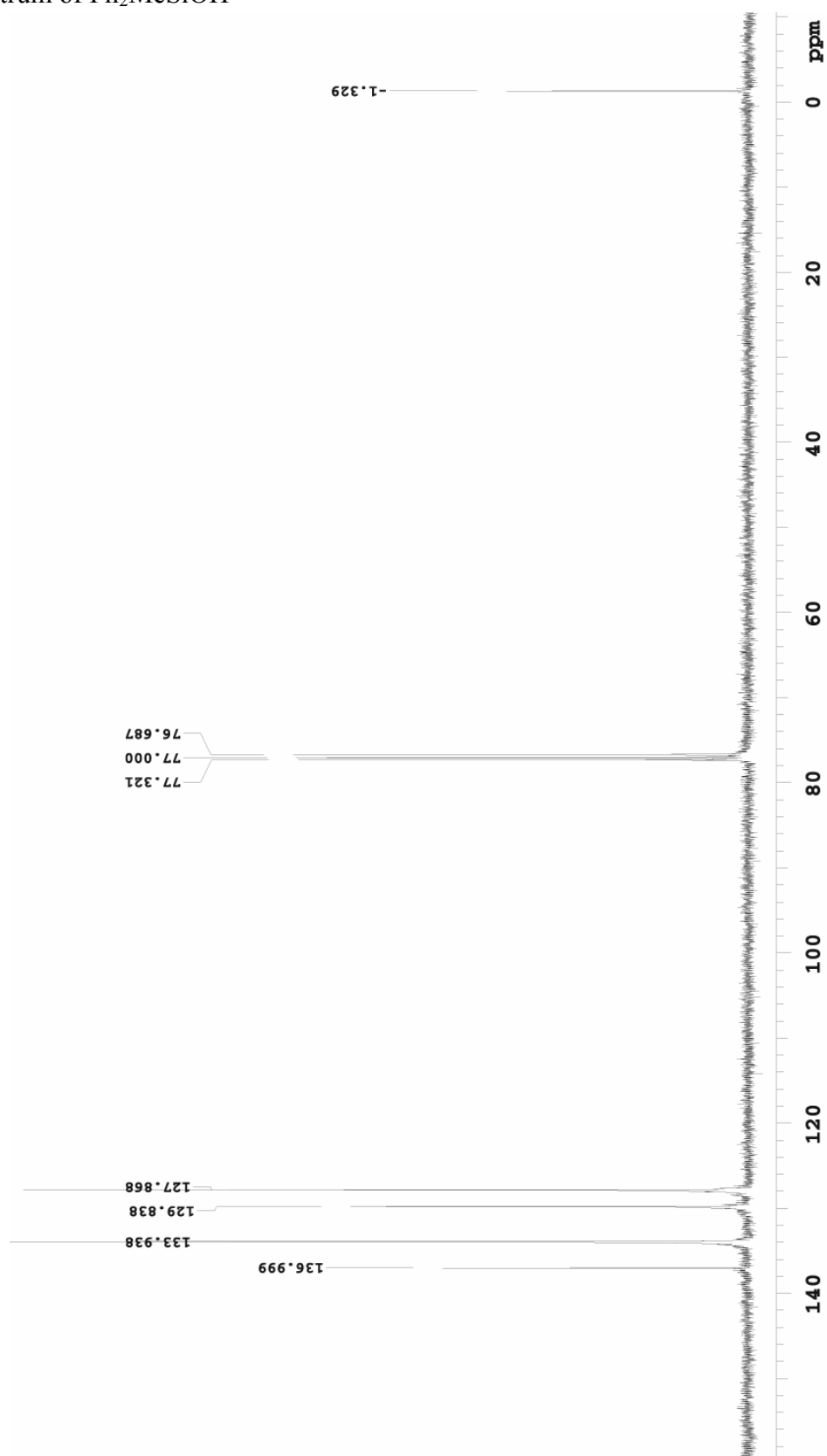
Infrared spectrum of Ph_3SiOH



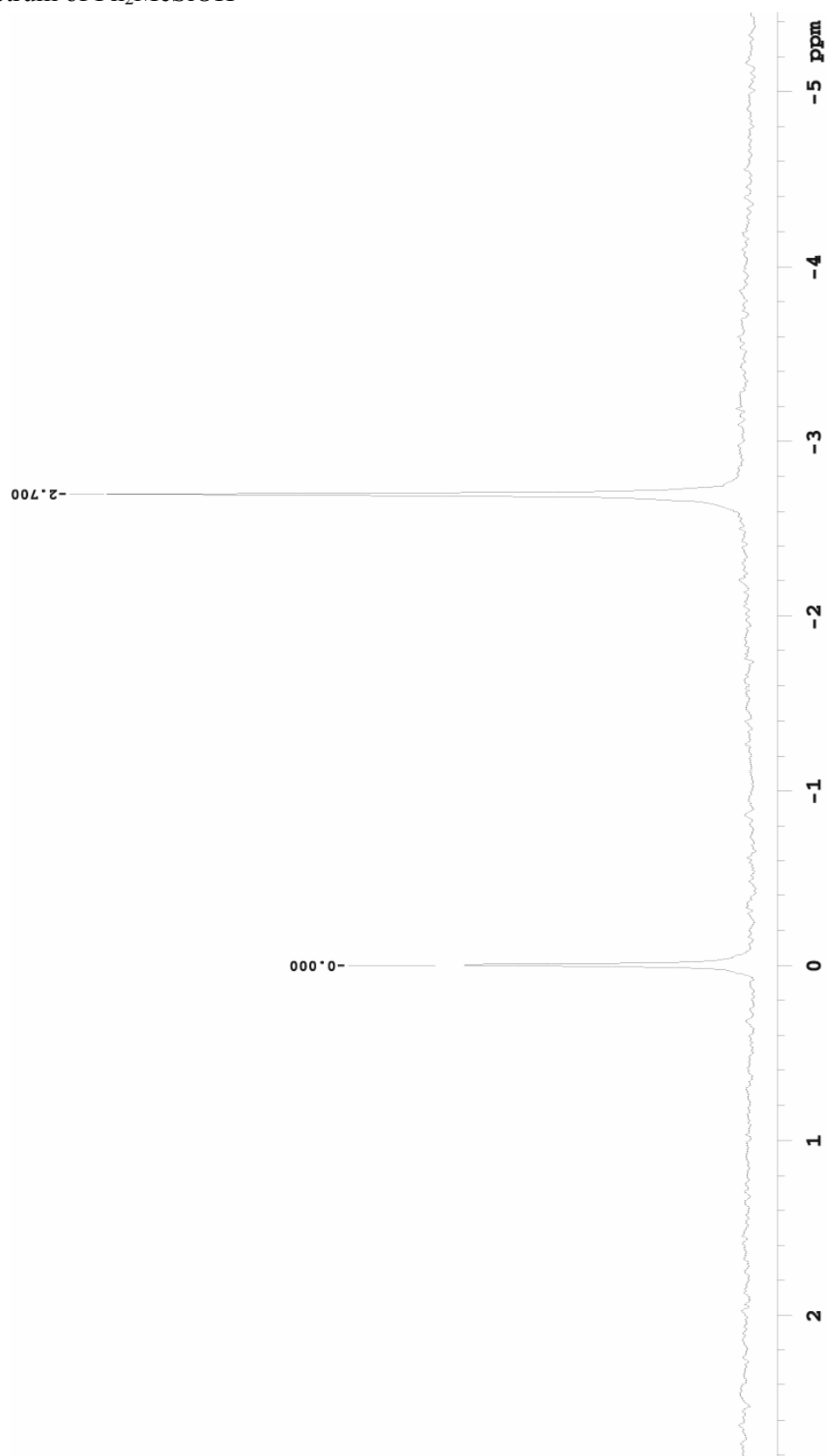
^1H NMR spectrum of Ph_2MeSiOH



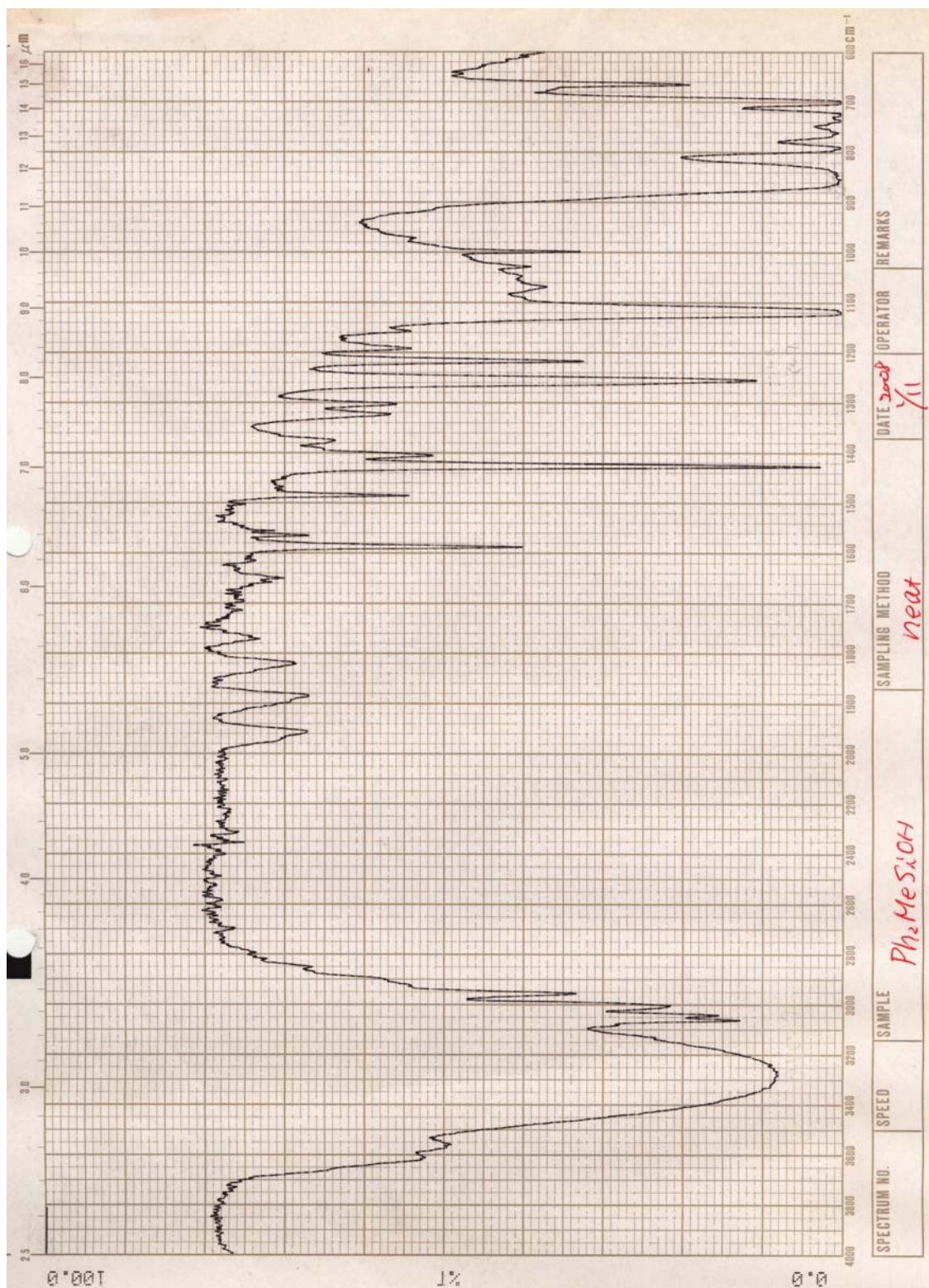
^{13}C NMR spectrum of Ph_2MeSiOH



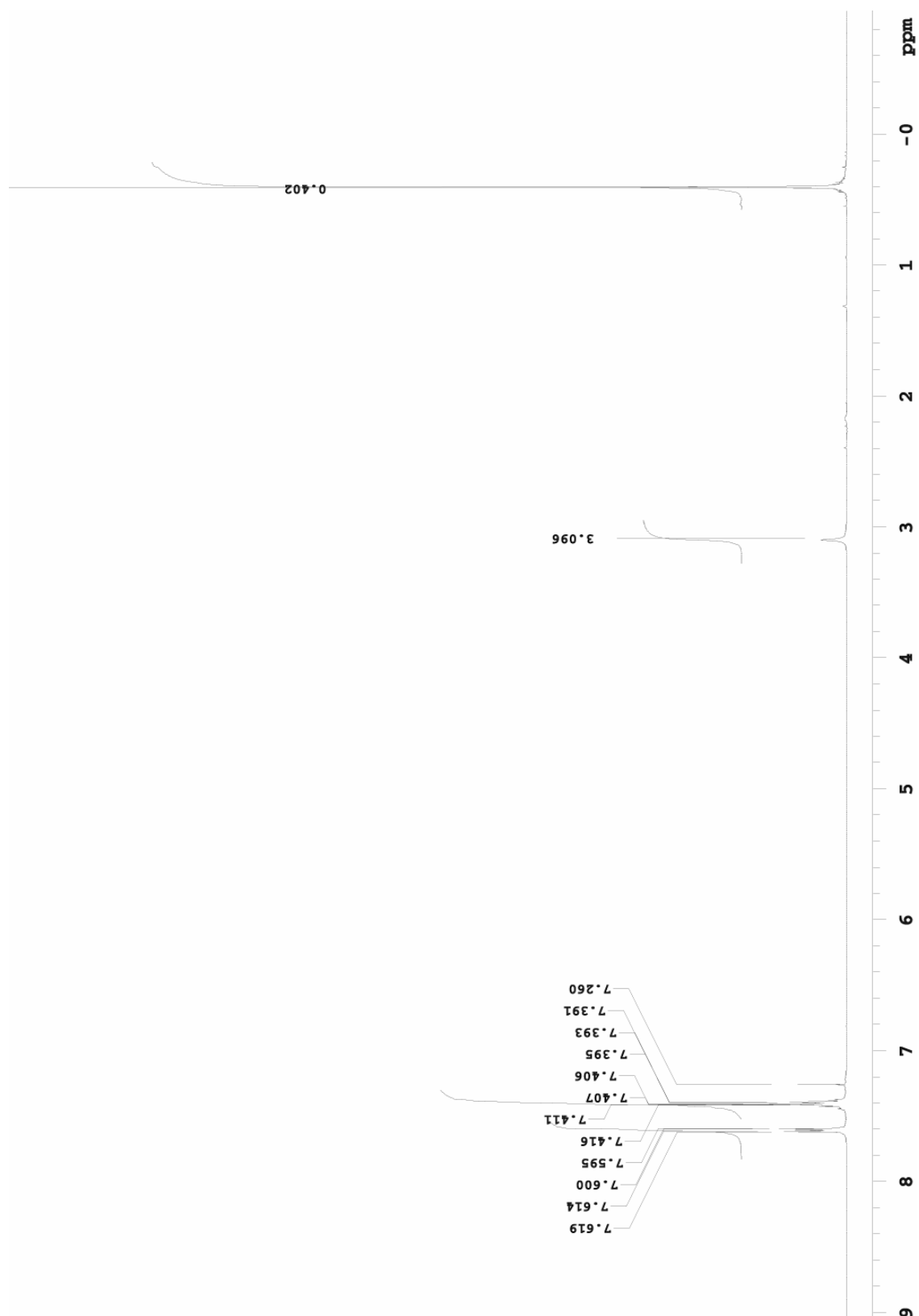
^{29}Si NMR spectrum of Ph_2MeSiOH



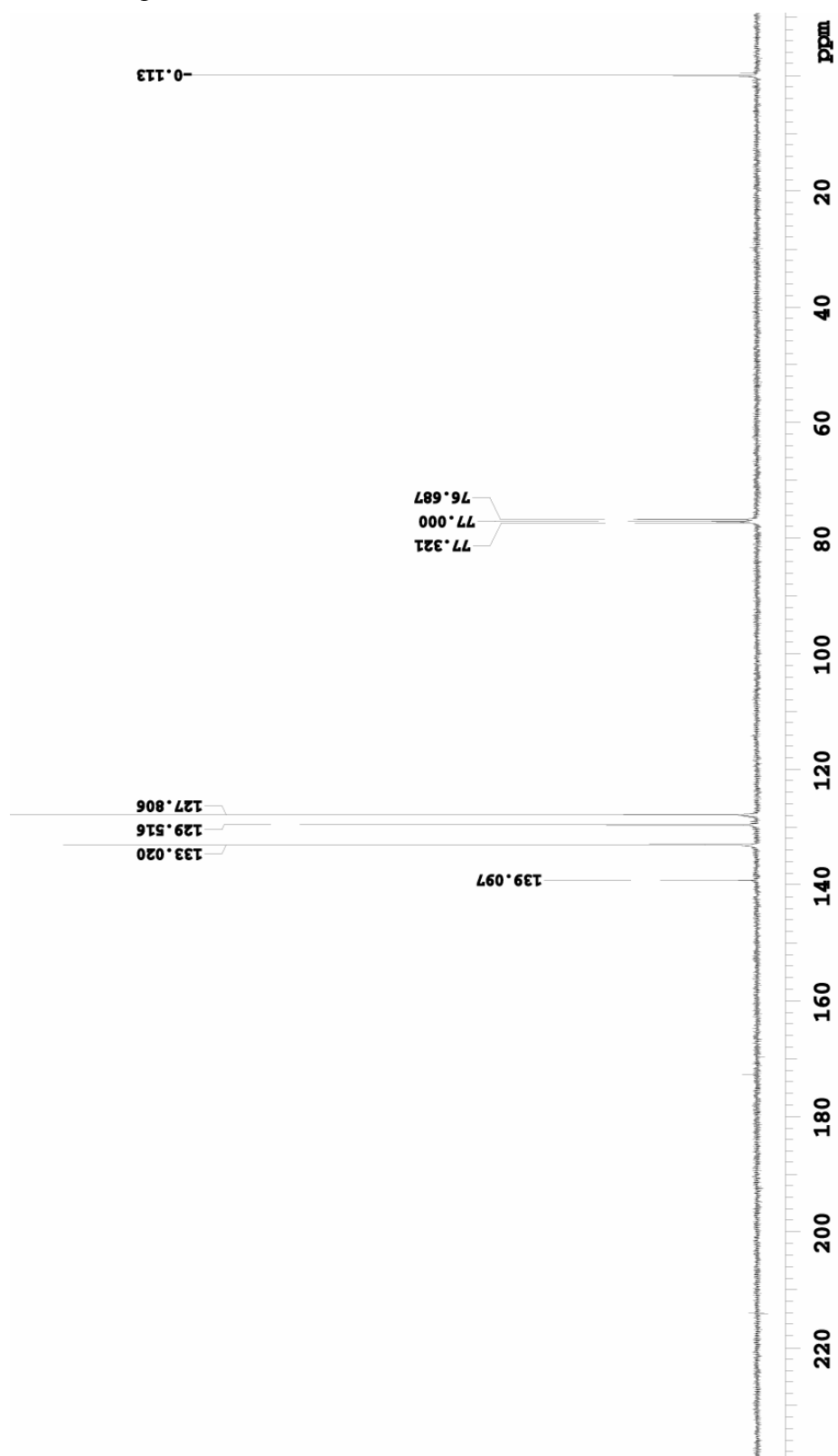
Infrared spectrum of Ph_2MeSiOH



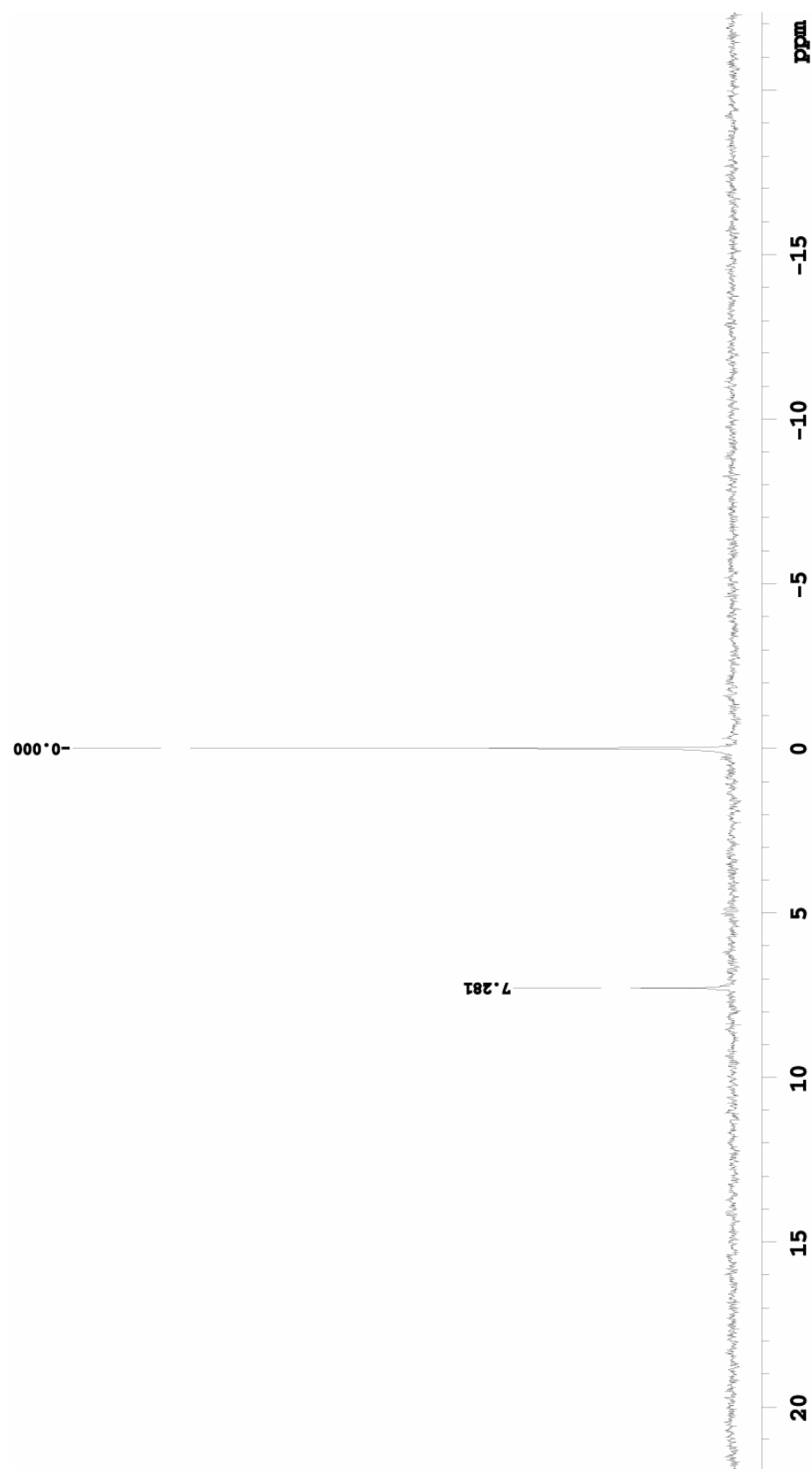
^1H NMR spectrum of PhMe_2SiOH



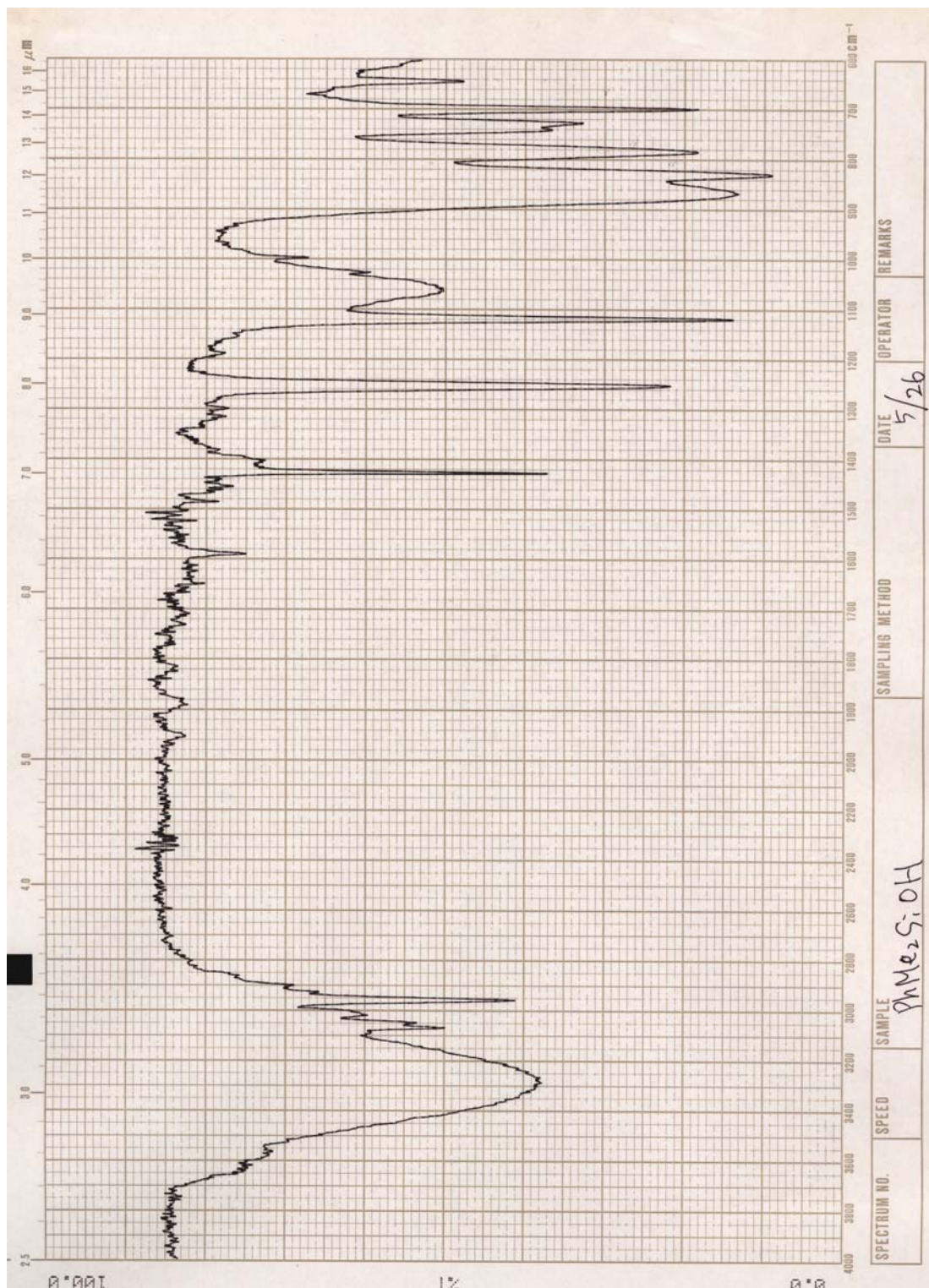
^{13}C NMR spectrum of PhMe_2SiOH



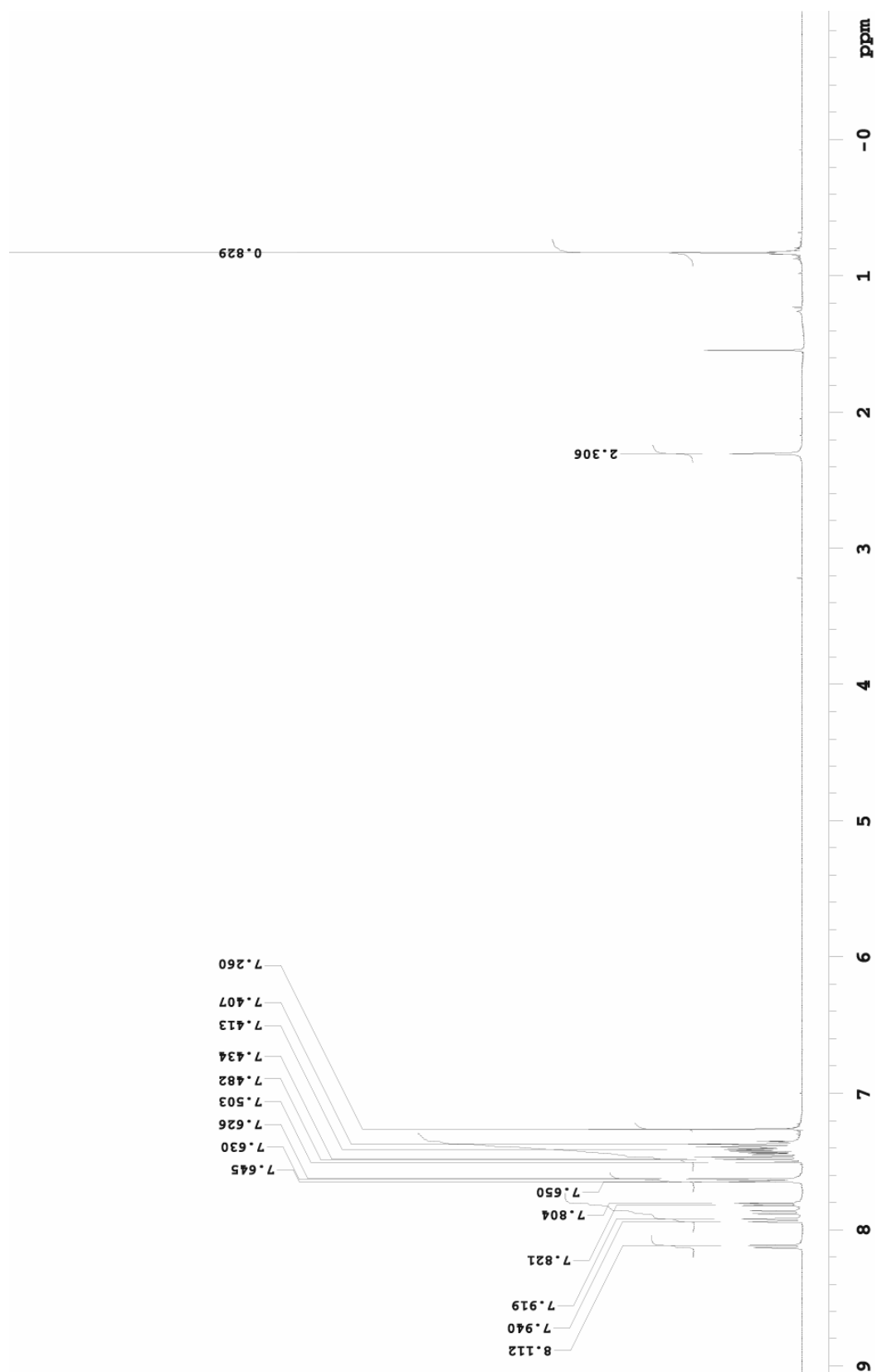
^{29}Si NMR spectrum of PhMe_2SiOH



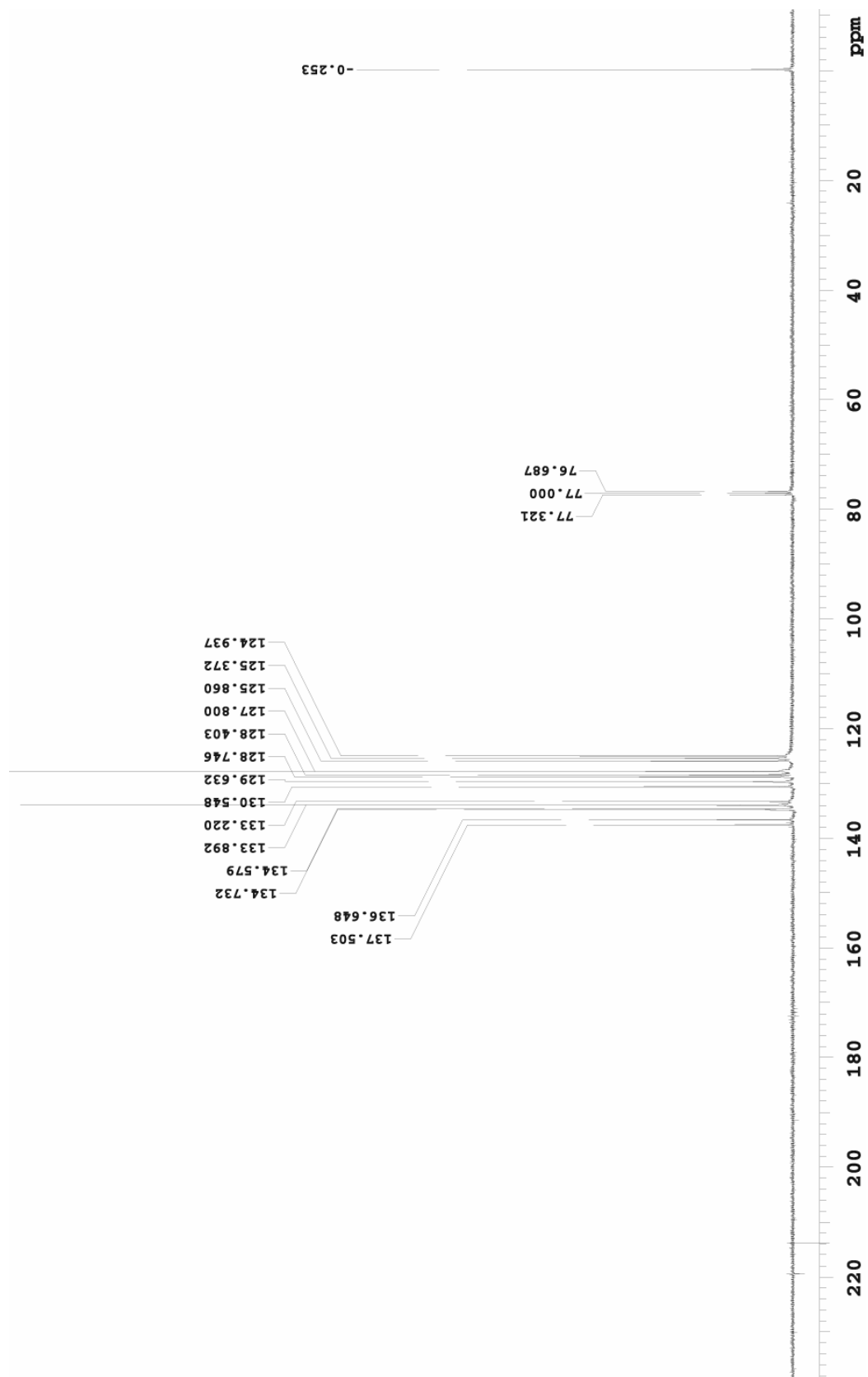
Infrared spectrum of PhMe_2SiOH



^1H NMR spectrum of $\text{Me}(\alpha\text{-Np})\text{PhSiOH}$



^{13}C NMR spectrum of $\text{Me}(\alpha\text{-Np})\text{PhSiOH}$



^{29}Si NMR spectrum of $\text{Me}(\alpha\text{-Np})\text{PhSiOH}$



Infrared spectrum of Me(α -Np)PhSiOH

