

Supporting Information

Photochemically-Induced Alkynylation of C(sp³)-H Bonds

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General Information

All reactions sensitive to air or moisture were carried out under argon atmosphere and anhydrous conditions unless otherwise noted. Reagents were used as supplied unless otherwise stated. Analytical thin-layer chromatography (TLC) was performed using E. Merck Silica gel 60 F254 pre-coated plates. Flash column chromatography was generally performed using 40-50 μ m Silicagel 60N (Kanto) or 75 μ m Activated Alumina (Wako). ¹H and ¹³C NMR spectra were recorded on a JEOL JNM-ECX-500 (500 MHz), JNM-ECA-500 (500 MHz), or a JNM-ECS-400 (400 MHz) spectrometer. Chemical shifts are reported in δ (ppm) with reference to residual solvent signals [¹H-NMR: CDCl₃ (7.26); ¹³C-NMR: CDCl₃ (77.0)]. Signal patterns are indicated as s, singlet; d, doublet; t, triplet; q, quartet; m, multiplet; br, broad. IR spectra were recorded on a JASCO FT/IR-4100 spectrometer. ESI-TOF mass spectra were recorded on a BRUKER DALTONICS micrOTOF II or JEOL JMS-T100LP instrument (HRMS). UV irradiation was carried out by using a Riko 100 W medium-pressure mercury lamp.

Procedure for Photochemically-Induced Alkynylation of C-H Bonds

Conditions A:

To a *t*-BuOH (3.4 mL) solution of 1-tosyl-2-(trimethylsilyl)acetylene **2** (34.1 mg, 135 μ mol) in a test tube were added benzophenone (24.6 mg, 135 μ mol) and 5-methylpyrrolidone **1p** (105 μ L, 1.08 mmol) at room temperature. The mixture was degassed by freeze-thaw procedure for 3 times. The test tube was placed at 5 cm distance from a UV-lamp and irradiated with a Riko 100 W medium-pressure mercury lamp at room temperature for 1 h. The reaction mixture was treated with saturated aqueous sodium bicarbonate. The mixture was extracted with AcOEt (20 mL x 3), washed with brine, dried over Na₂SO₄, and concentrated. The residue was purified with flash column chromatography (hexane/AcOEt 1:1) to give alkynylated compound **3p** in 99% yield (26.1 mg).

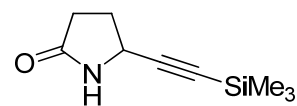
Conditions B:

To a *t*-BuOH (3.5 mL) solution of 5-methylpyrrolidone **1p** (13.8 mg, 139 μ mol) in a test tube were added benzophenone (12.7 mg, 69.7 μ mol) and 1-tosyl-2-(trimethylsilyl)acetylene **2** (52.7 mg, 209 μ mol) at room temperature. The mixture was degassed by freeze-thaw procedure for 3 times. The test tube was placed at 5 cm distance from a UV-lamp and irradiated with a Riko 100 W medium-pressure mercury lamp at room temperature for 10 h. The reaction mixture was treated with saturated aqueous sodium bicarbonate. The mixture was extracted with AcOEt (20 mL x 3), washed with brine, dried over Na₂SO₄, and concentrated. The residue was purified with flash column chromatography (hexane/AcOEt 1:1) to give alkynylated compound **3p** in 75% yield (20.4 mg).

Analytical Data

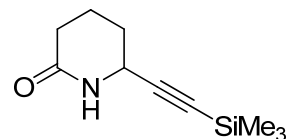
Compound 3a¹ [CAS: 111886-98-7]:

colorless solid; ¹H NMR (400 MHz, CDCl₃) δ 0.15 (9H, s), 2.17 (1H, m), 2.28 (1H, m), 2.30-2.50 (2H, m), 4.36 (1H, dd, *J* = 5.5, 7.3 Hz; NCH), 5.99 (1H, brs; NH); ¹³C NMR (100 MHz, CDCl₃) δ -0.25, 29.0, 29.3, 45.2, 88.9, 104.3, 177.4.



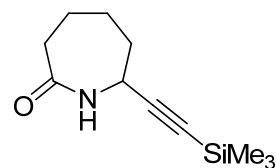
Compound 3b² [CAS: 1046796-49-9]:

colorless solid; ¹H NMR (400 MHz, CDCl₃) δ 0.15 (9H, s), 1.70-1.90 (2H, m), 1.95-2.10 (2H, m), 2.30-2.40 (2H, m), 4.25 (1H, m; NCH), 5.94 (1H, brs; NH); ¹³C NMR (100 MHz, CDCl₃) δ -0.24, 19.0, 29.0, 31.2, 45.1, 88.4, 104.3, 171.2.



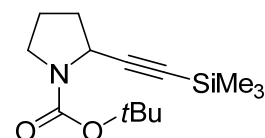
Compound 3c:

colorless solid; m.p. 126-128 °C; IR (neat) 3276, 2170, 1659, 839 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.16 (9H, s), 1.60-1.75 (3H, m), 1.80-2.05 (3H, m), 2.41 (1H, m), 2.64 (1H, m), 4.19 (1H, ddd, *J* = 2.3, 5.9, 8.0 Hz; NCH), 6.07 (1H, brs; NH); ¹³C NMR (100 MHz, CDCl₃) δ -0.25, 22.9, 27.7, 35.9, 36.8, 45.6, 89.7, 103.4, 177.5; HRMS (ESI-TOF) calcd for C₁₁H₁₉NOSiNa (M+Na)⁺ 232.1128, found 232.1124.



Compound 3d [CAS: 869112-02-7]:

colorless oil; IR (neat) 2172, 1702, 843 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.14 (9H, s), 1.48 (9H, s), 1.85 (1H, brm), 1.90-2.10 (3H, brm), 3.31 (1H, brs; NCH₂), 3.46 (1H, brs; NCH₂), 4.39 (1H, brs; NCH); ¹³C NMR (100 MHz, CDCl₃) δ -0.02, 23.8, 28.5, 33.7, 45.6 (NCH₂), 48.7 (NCH), 79.6, 85.5, 106.5,



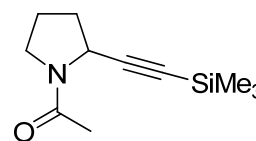
¹ Ye, L.; He, W.; Zhang, L. *Angew. Chem. Int. Ed.* **2011**, *50*, 3236.

² Miller, K. A.; Shanahan, C. S.; Martin, S. F. *Tetrahedron* **2008**, *64*, 6884.

154.1; HRMS (ESI-TOF) calcd for $C_{14}H_{25}NO_2SiNa$ ($M+Na$)⁺ 290.1547, found 290.1534.

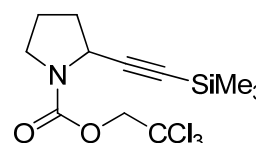
Compound 3e³ [CAS: 118800-18-3]:

colorless oil; 1:3 mixture of rotamers; ¹H NMR (400 MHz, CDCl₃)¹⁾ δ 0.11 (9/4H, s), 0.14 (27/4H, s), 1.80-2.30 (7H, m), 3.39 (1H, m), 3.60 (1H, m), 4.41 (3/4H, dd, *J* = 3.2, 6.9 Hz), 4.76 (1/4H, dd, *J* = 1.8, 6.9 Hz); Detectable signals of ¹³C NMR (100 MHz, CDCl₃) δ -0.23, -0.04, 22.5, 22.6, 23.2, 24.7, 32.8, 34.3, 45.6, 47.0, 47.9, 49.8, 88.3, 104.4, 105.2, 169.7;



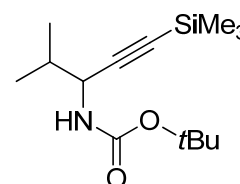
Compound 3f:

colorless oil; 1:1 mixture of rotamers; IR (neat) 2173, 1726, 1126, 844 cm⁻¹; ¹H NMR (400 MHz, CDCl₃)¹⁾ δ 0.12 (9/2H, s), 0.13 (9/2H, s), 1.90-2.20 (4H, m), 3.44 (1H, m), 3.60 (1H, m), 4.61 (1H, m), 4.68 (1/2H, d, *J* = 12.0 Hz; OCH₂), 4.72 (1/2H, d, *J* = 12.8 Hz; OCH₂), 4.79 (1/2H, d, *J* = 12.8 Hz; OCH₂), 4.84 (1/2H, d, *J* = 12.0 Hz; OCH₂); ¹³C NMR (100 MHz, CDCl₃) δ -0.08, 0.20, 23.6, 24.3, 33.2, 33.9, 45.9, 46.3, 48.9, 49.4, 74.87, 74.93, 86.8, 87.0, 95.6, 95.7, 104.6, 104.9, 152.5, 152.6; HRMS (ESI-TOF) calcd for $C_{12}H_{18}NO_2SiCl_3Na$ ($M+Na$)⁺ 364.0065, found 364.0065.



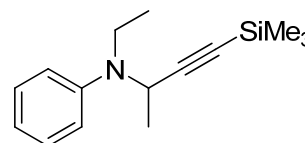
Compound 3g⁴

colorless oil; ¹H NMR (400 MHz, CDCl₃) δ 0.15 (9H, s), 0.95 (6H, dd, *J* = 2.3, 6.8 Hz), 1.44 (9H, s), 1.88 (1H, sextet, *J* = 6.4 Hz), 4.30 (1H, brs; NCH), 4.71 (1H, brs; NH); ¹³C NMR (100 MHz, CDCl₃) δ -0.08, 17.4, 18.7, 28.3, 33.1, 49.4, 79.6, 88.2, 103.9, 154.9.



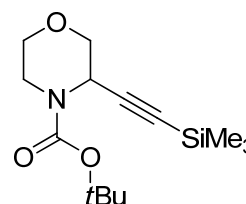
Compound 3h:

colorless oil; IR (neat) 2167, 1598, 1502, 1251, 845, 742, 692 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.16 (9H, s), 1.23 (3H, t, *J* = 6.9 Hz), 1.43 (3H, d, *J* = 6.9 Hz), 3.43 (2H, q, *J* = 6.4 Hz; NCH₂), 4.58 (1H, q, *J* = 6.9 Hz; NCH), 6.79 (1H, t, *J* = 7.3 Hz), 6.87 (2H, d, *J* = 7.8 Hz), 7.25 (2H, dd, *J* = 7.3, 7.8 Hz); ¹³C NMR (100 MHz, CDCl₃) δ -0.04, 14.4, 20.1, 41.5, 47.2, 87.6, 106.6, 115.1, 117.8, 129.0, 147.8; HRMS (ESI-TOF) calcd for $C_{15}H_{24}NSi$ ($M+H$)⁺ 246.1673, found 246.1659.



Compound 3i:

colorless oil; IR (neat) 2172, 1705, 1170, 1124, 845 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.16 (9H, s), 1.47 (9H, s), 3.27 (1H, brdt, *J* = 2.8, 13.2 Hz; NCH₂), 3.43 (1H, brdt, *J* = 2.8, 11.4 Hz; NCH₂CH₂O), 3.55 (1H, dd, *J* = 3.7, 11.4 Hz;



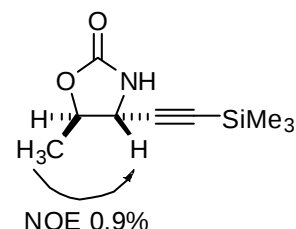
³ Lundkvist, J. R. M.; Ringdahl, B.; Hacksell, U. *J. Med. Chem.* **1989**, 32, 863.

⁴ Rae, A.; Castro, J. L.; Tabor, A. B. *J. Chem. Soc., Perkin Trans. 1* **1999**, 1943.

NCHCH₂O), 3.66 (1H, brd, *J* = 13.2 Hz; NCH₂), 3.88 (2H, brd, *J* = 11.4 Hz), 4.69 (1H, brs; NCH); ¹³C NMR (100 MHz, CDCl₃) δ -0.05, 28.3, 40.2 (NCH₂), 45.4 (NCH), 66.8, 69.7, 80.6, 88.2, 102.2, 154.6; HRMS (ESI-TOF) calcd for C₁₄H₂₅NO₃SiNa (M+Na)⁺ 306.1496, found 306.1490.

Compound 3j:

colorless solid; m.p. 73-76 °C; IR (neat) 3278, 2182, 1760, 846 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.16 (9H, s), 1.47 (3H, d, *J* = 6.4 Hz), 4.11 (1H, d, *J* = 6.4 Hz), 4.60 (1H, quintet, *J* = 6.4 Hz), 5.79 (1H, brs; NH); ¹³C NMR (100 MHz, CDCl₃) δ -0.39, 19.5, 50.9, 79.3, 91.4, 100.7, 158.2; HRMS (ESI-TOF) calcd for C₉H₁₅NO₂SiNa (M+Na)⁺ 220.0764, found 220.0771.



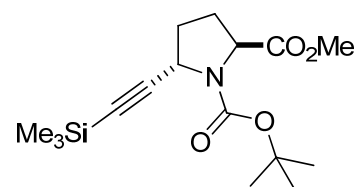
Compound 3k:⁵

The absolute structure of **3k** was unambiguously established by the data comparison with the known compound **S1**, which was derivatized from **3k** (See Page S7).

colorless oil; 1:2 mixture of rotamers; [α]_D²⁵ = -126.0 (c 1.84, CHCl₃);

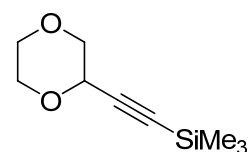
IR (neat) 2172, 1750, 1705, 844 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.131 (9H, s), 1.40 (3H, s), 1.47 (6H, s), 1.90-2.00 (2H, m), 2.18 (1H, m), 2.44 (1H, m), 3.695 (1H, s), 3.704 (2H, s), 4.30 (1/3H, d, *J* = 9.2

Hz), 4.39 (2/3H, d, *J* = 8.7 Hz), 4.58 (2/3H, d, *J* = 7.8 Hz), 4.71 (1/3H, d, *J* = 7.8 Hz); Detectable signals of ¹³C NMR (100 MHz, CDCl₃) δ -0.08, 28.2, 28.3, 28.5, 29.5, 31.3, 31.8, 49.3, 49.5, 52.0, 52.2, 58.4, 58.9, 80.36, 80.44, 85.9, 105.8, 152.9, 153.8, 173.0, 173.3; HRMS (ESI-TOF) calcd for C₁₆H₂₇NO₄SiNa (M+Na)⁺ 348.1602, found 348.1591.



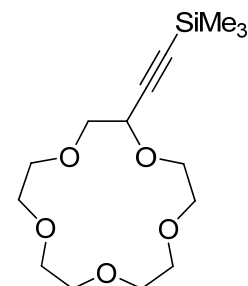
Compound 3l:

colorless oil; IR (neat) 2180, 1121, 1101, 846 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.17 (9H, s), 3.57 (1H, dd, *J* = 9.2, 11.9 Hz), 3.60-3.70 (3H, m), 3.80-3.90 (2H, m), 4.33 (1H, dd, *J* = 3.2, 9.2 Hz); ¹³C NMR (100 MHz, CDCl₃) δ -0.26, 65.8, 66.3, 66.4, 70.3, 91.8, 100.4; HRMS (ESI-TOF) calcd for C₉H₁₆O₂SiNa (M+Na)⁺ 207.0812, found 207.0814.



Compound 3m:

colorless oil; IR (neat) 2171, 1123, 844 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.15 (9H, s), 3.60-3.75 (17H, m), 3.86 (1H, m), 4.43 (1H, dd, *J* = 4.1, 7.3 Hz); ¹³C NMR (100 MHz, CDCl₃) δ -0.15, 68.4, 70.1, 70.3, 70.56, 70.60, 70.63, 70.69, 70.71, 71.0, 73.7, 91.4, 101.7; HRMS (ESI-TOF) calcd for C₁₅H₂₈O₅SiNa

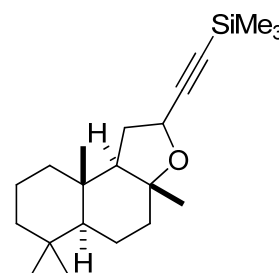


⁵ McDermott, T. S.; Bhagavatula, L.; Borchardt, T. B.; Engstrom, K. M.; Gandarilla, J.; Kotecki, B. J.; Kruger, A. W.; Rozema, M. J.; Sheikh, A. Y.; Wagaw, S. H.; Wittenberger, S. J. *Org. Process Res. Dev.* **2009**, *13*, 1145.

(M+Na)⁺ 339.1598, found 339.1610.

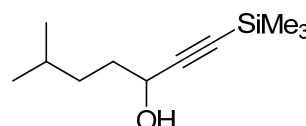
Compound 3n:

colorless oil; 3:4 mixture of diastereomers; ¹H NMR (400 MHz, CDCl₃) δ 0.15 (9H, s), 0.80-2.20 (26H, m), 4.56 (4/7H, t, *J* = 7.8 Hz; OCH), 4.68 (3/7H, dd, *J* = 2.7, 9.6 Hz; OCH); Detectable signals of ¹³C NMR (100 MHz, CDCl₃) δ -0.10, -0.04, 15.0, 15.3, 18.4, 20.5, 20.6, 21.07, 21.11, 21.2, 22.9, 31.4, 31.7, 33.0, 33.5, 36.2, 36.4, 39.8, 39.9, 40.0, 42.4, 56.9, 57.1, 59.3, 60.8, 65.3, 66.2, 81.9, 82.0, 88.3, 88.5, 106.9, 108.2; HRMS (ESI-TOF) calcd for C₂₁H₃₆OSiNa (M+Na)⁺ 355.2428, found 355.2411.



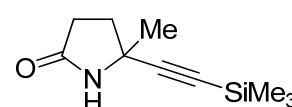
Compound 3o:

colorless oil; IR (neat) 3345, 2172, 845 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.17 (9H, s), 0.90 (6H, d, *J* = 6.9 Hz), 1.20-1.40 (2H, m), 1.58 (1H, septet, *J* = 6.9 Hz), 1.65- 1.90 (3H, m), 4.33 (1H, t, *J* = 6.9 Hz); ¹³C NMR (100 MHz, CDCl₃) δ -0.13, 22.5, 22.6, 27.7, 34.2, 35.6, 63.2, 89.3, 106.9; HRMS (ESI-TOF) calcd for C₁₁H₂₂OSiNa (M+Na)⁺ 221.1332, found 221.1326.



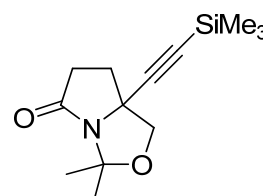
Compound 3p:

colorless solid; m.p. 110-113 °C; IR (neat) 3180, 2160, 1721, 840 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.15 (9H, s), 1.54 (3H, s; CH₃), 2.06 (1H, m), 2.30-2.45 (2H, m), 2.53 (1H, m), 5.63 (1H, brs; NH); ¹³C NMR (100 MHz, CDCl₃) δ -0.16, 29.4, 30.1, 36.8, 53.4, 86.9, 107.8, 176.8; HRMS (ESI-TOF) calcd for C₁₀H₁₇NOSiNa (M+Na)⁺ 218.0972, found 218.0967.



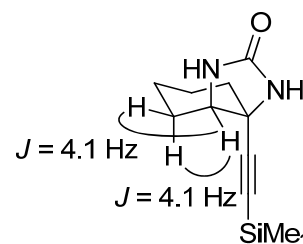
Compound 3q:

colorless oil; IR (neat) 2168, 1703, 1367, 1252, 1054, 844 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.16 (9H, s), 1.57 (3H, s; CH₃), 1.63 (3H, s; CH₃), 2.05 (1H, dt, *J* = 8.7, 12.4 Hz), 2.29 (1H, dd, *J* = 8.2, 12.4 Hz), 2.50 (1H, dd, *J* = 8.2, 16.5 Hz), 3.02 (1H, ddd, *J* = 8.7, 12.4, 16.5 Hz), 3.63 (1H, d, *J* = 8.2 Hz; OCH₂), 4.15 (1H, d, *J* = 8.2 Hz; OCH₂); ¹³C NMR (100 MHz, CDCl₃) δ -0.27, 23.8, 26.8, 33.1, 36.4, 65.5, 75.5, 88.7, 92.6, 105.6, 170.9; HRMS (ESI-TOF) calcd for C₁₃H₂₁NO₂SiNa (M+Na)⁺ 274.1234, found 274.1229.



Compound 3r:

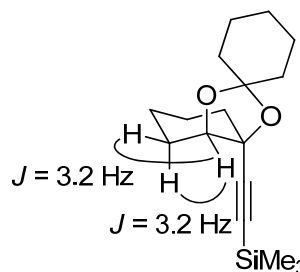
colorless solid; m.p. 198-204 °C (decomp.); IR (neat) 3192, 3081, 2172, 1719, 841 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 0.16 (9H, s), 1.35-1.65 (4H, m), 1.70-1.85 (3H, m), 1.93 (1H, ddt, *J* = 1.4, 4.1, 13.3 Hz), 3.81



(1H, t, $J = 4.1$ Hz; NCH), 4.80 (1H, brs; NH), 4.88 (1H, brs; NH); ^{13}C NMR (100 MHz, $CDCl_3$) δ -0.14, 19.6, 20.6, 26.5, 35.4, 54.8, 57.6, 88.1, 105.9, 162.5; HRMS (ESI-TOF) calcd for $C_{12}H_{20}N_2OSiNa$ ($M+Na$) $^+$ 259.1237, found 259.1230.

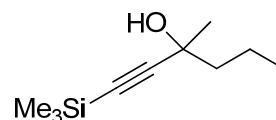
Compound 3t:

colorless oil; IR (neat) 2170, 1117, 1087, 1037, 843 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 0.16 (9H, s), 1.30-1.80 (16H, m), 1.92 (1H, dt, $J = 4.1$, 13.3 Hz), 2.05 (1H, m), 4.16 (1H, t, $J = 3.2$ Hz; OCH); ^{13}C NMR (100 MHz, $CDCl_3$) δ -0.09, 19.5, 21.7, 23.7, 23.9, 25.1, 25.8, 35.5, 36.0, 38.0, 74.6, 77.3, 89.2, 105.9, 109.3; HRMS (ESI-TOF) calcd for $C_{17}H_{28}O_2SiNa$ ($M+Na$) $^+$ 315.1751, found 315.1741.



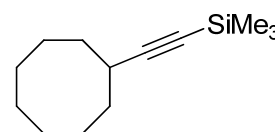
Compound 3u:

colorless oil; IR (neat) 3331, 2168, 843 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 0.16 (9H, s), 0.96 (3H, t, $J = 7.3$ Hz), 1.46 (3H, s), 1.48-1.65 (4H, m), 1.90 (1H, brs; OH); ^{13}C NMR (100 MHz, $CDCl_3$) δ -0.04, 14.2, 17.9, 29.7, 45.8, 68.4, 87.2, 109.6; HRMS (ESI-TOF) calcd for $C_{10}H_{20}OSiNa$ ($M+Na$) $^+$ 207.1176, found 207.1177.



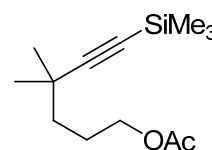
Compound 3v:

colorless oil; IR (neat) 2167, 841 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 0.14 (9H, s), 1.40-1.90 (14H, m), 2.59 (1H, septet, $J = 4.1$ Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ 0.29, 24.5, 25.5, 27.2, 31.0, 31.8, 83.5, 112.9; Anal. calcd for $C_{13}H_{24}Si$: C, 74.92; H, 11.61; N, 0.00; found: C, 74.70; H, 11.46; N, 0.00.



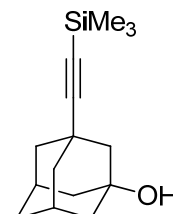
Compound 3w:

colorless oil; IR (neat) 2162, 1743, 1249, 843 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 0.13 (9H, s), 1.18 (6H, s), 1.42 (2H, m), 1.78 (2H, m), 2.05 (3H, s), 4.08 (2H, t, $J = 6.9$ Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ 0.26, 21.0, 24.8, 29.1, 31.5, 39.4, 64.8, 83.7, 114.0, 171.2; HRMS (ESI-TOF) calcd for $C_{13}H_{24}O_2SiNa$ ($M+Na$) $^+$ 263.1438, found 263.1419.



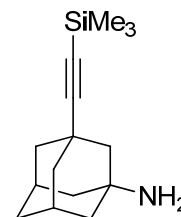
Compound 3x:

colorless oil; IR (neat) 3342, 2160, 845 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 0.12 (9H, s), 1.40-1.60 (3H, m), 1.65 (4H, d, $J = 2.8$ Hz), 1.75 (4H, d, $J = 2.3$ Hz), 1.80 (2H, s), 2.18 (2H, brs); ^{13}C NMR (100 MHz, $CDCl_3$) δ 0.27, 30.3, 33.3, 34.8, 41.5, 44.1, 50.2, 67.9, 82.8, 113.7; HRMS (ESI-TOF) calcd for $C_{15}H_{24}OSiNa$ ($M+Na$) $^+$ 271.1489, found 271.1487.



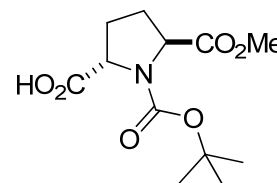
Compound 3y:

colorless oil; ^1H NMR (400 MHz, CDCl_3) δ 0.12 (9H, s), 1.50-1.60 (2H, brm), 1.65 (4H, brd, $J = 1.8$ Hz), 1.70-1.90 (6H, brm), 2.14 (2H, brs), 4.37 (2H, brs; NH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 0.23, 29.1, 32.1, 34.6, 41.3, 42.3, 48.5, 49.5, 83.1, 113.4; IR (neat) 3334, 3264, 2162, 1677, 1201, 843 cm^{-1} ; HRMS (ESI-TOF) calcd for $\text{C}_{15}\text{H}_{26}\text{NSi}$ ($\text{M}+\text{H}$) $^+$ 248.1829, found 248.1828.



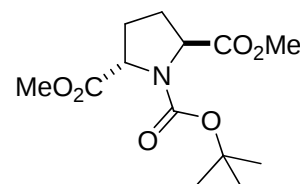
Compound 4⁶ [CAS: 120980-89-4]:

To a solution of acetylene **3k** (20.5 mg, 63.0 μmol) in $\text{MeCN}/\text{H}_2\text{O}/\text{AcOEt}$ (5:3:1, 3.7 mL) at 0 $^\circ\text{C}$ were added NaHCO_3 (52.4 mg, 624 μmol), Oxone (128 mg, 208 μmol), and $\text{RuO}_2\cdot\text{H}_2\text{O}$ (0.4 mg, 3.2 μmol). The mixture was stirred for 3 h at room temperature, and then the reaction was quenched with $\text{Na}_2\text{S}_2\text{O}_3$. The mixture was acidified to pH 2 by 1M HCl, and extracted with AcOEt (20 mL x 3). The combined organic layers were washed with brine, dried over Na_2SO_4 , and concentrated. The residue was purified with flash column chromatography (hexane/AcOEt/AcOH 15:5:1) to afford carboxylic acid **4** in 88% yield (15.1 mg): colorless oil; 1:2 mixture of rotamers; $[\alpha]_{\text{D}}^{25} = -78.4$ (c 0.75, CHCl_3); IR (neat) 2891 (br), 1746, 1706, 1393, 1365, 1165 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 1.42 (9H, s), 1.80-2.40 (4H, m), 3.73 (3H, s), 4.36 (2/3H, d, $J = 9.2$ Hz), 4.44 (1/3H, d, $J = 9.2$ Hz), 4.53 (1/3H, d, $J = 9.2$ Hz), 4.56 (2/3H, d, $J = 7.8$ Hz); ^{13}C NMR (100 MHz, CDCl_3) δ 26.8, 27.9, 28.06, 28.14, 29.0, 29.1, 52.2, 52.3, 59.16, 59.23, 59.65, 59.74, 81.1, 82.1, 153.5, 155.3, 172.8, 172.9, 174.8, 177.9; HRMS (ESI-TOF) calcd for $\text{C}_{12}\text{H}_{18}\text{NO}_6$ ($\text{M}-\text{H}$) $^-$ 272.1140, found 272.1120.



Compound S1⁷ [CAS 126640-85-5]:

To a solution of carboxylic acid **4** (9.8 mg, 35.9 μmol) in toluene/MeOH (2:1, 1.8 mL) was added TMSCHN_2 (27 μL , 2.0 M in hexane, 53.8 μmol) at room temperature. The reaction mixture was stirred for 3 h, and quenched with AcOH. The mixture was concentrated to afford methyl ester **S1** as a pure product in 100% yield (10.3 mg). Physical data of **S1** were matched with those described in the literatures^{7,8}: colorless oil; $[\alpha]_{\text{D}}^{25} = -63.7$ (c 0.53, CHCl_3); ^1H NMR (400 MHz, CDCl_3) δ 1.41 (s, 9H), 1.90-2.10 (2H, m), 2.20-2.40 (2H, m), 3.72 (3H, s), 3.73 (3H, s), 4.43 (1H, dd, $J = 1.8, 9.2$ Hz), 4.53 (1H, dd, $J = 1.8, 9.2$ Hz); ^{13}C NMR (100 MHz, CDCl_3) δ 28.1, 28.2, 29.0, 52.1, 52.3, 59.2, 59.4, 80.7, 153.5, 173.0, 173.2.



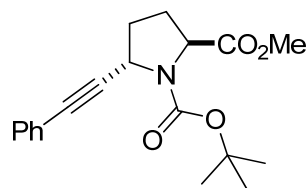
⁶ Kemp, D. S.; Curran, T. P.; Davis, W. M.; Boyd, J. G.; Muendel, C. *J. Org. Chem.* **1991**, 56, 6672.

⁷ Sasaki, N. A.; Sagnard, I. *Tetrahedron* **1994**, 50, 7093.

⁸ Donohoe, T. J.; Freestone, G. C.; Headley, C. E.; Rigby, C. L.; Cousins, R. P. C.; Bhalay, G. *Org. Lett.* **2004**, 6, 3055.

Compound 5:

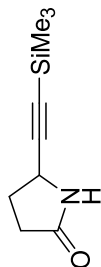
To a suspension of acetylene **3k** (15.8 mg, 48.5 μmol), iodobenzene (7.0 μL , 63 μmol), Ag_2CO_3 (6.7 mg, 24.3 μmol) and $n\text{-Bu}_4\text{NCl}$ (13.5 mg, 48.5 μmol) in THF (2.4 mL) was added a solution of $\text{Pd}(\text{OAc})_2$ (0.6 mg, 2.4 μmol) and PPh_3 (2.5 mg, 9.7 μmol) in THF (1.0 mL) at room temperature.



The mixture was then degassed by freeze-thaw procedure for 3 times. The solution was heated at 60 °C for 3 h, and treated with ice water. The mixture was extracted with AcOEt (20 mL x 3), washed with brine, dried over Na_2SO_4 , and concentrated. The residue was purified with flash column chromatography (hexane/AcOEt 5:1) to afford coupling product **5** in 89% yield (14.2 mg): colorless oil; 1:1 mixture of rotamers; $[\alpha]_D^{25} = -142.6$ (c 0.71, CHCl_3); IR (neat) 2234, 1748, 1701, 1388, 1164, 758, 692 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 1.42 (9/2H, s), 1.50 (9/2H, s), 2.00-2.15 (2H, m), 2.29 (1H, m), 2.52 (1H, m), 3.73 (3/2H, s), 3.74 (3/2H, s), 4.36 (1/2H, d, $J = 8.7$ Hz), 4.46 (1/2H, d, $J = 9.2$ Hz), 4.83 (1/2H, d, $J = 7.8$ Hz), 4.96 (1/2H, d, $J = 7.8$ Hz), 7.26-7.30 (3H, m), 7.35-7.45 (2H, m); Detectable signals of ^{13}C NMR (100 MHz, CDCl_3) δ 28.3, 28.4, 28.6, 29.6, 31.4, 32.0, 49.3, 49.5, 52.0, 52.2, 58.5, 59.0, 80.47, 80.52, 81.8, 89.1, 89.3, 123.0, 128.05, 128.13, 128.09, 128.3, 131.5, 131.8, 153.8, 173.0, 173.3; HRMS (ESI-TOF) calcd for $\text{C}_{19}\text{H}_{23}\text{NO}_4\text{Na}$ ($\text{M}+\text{Na}$) $^+$ 352.1519, found 352.1526.

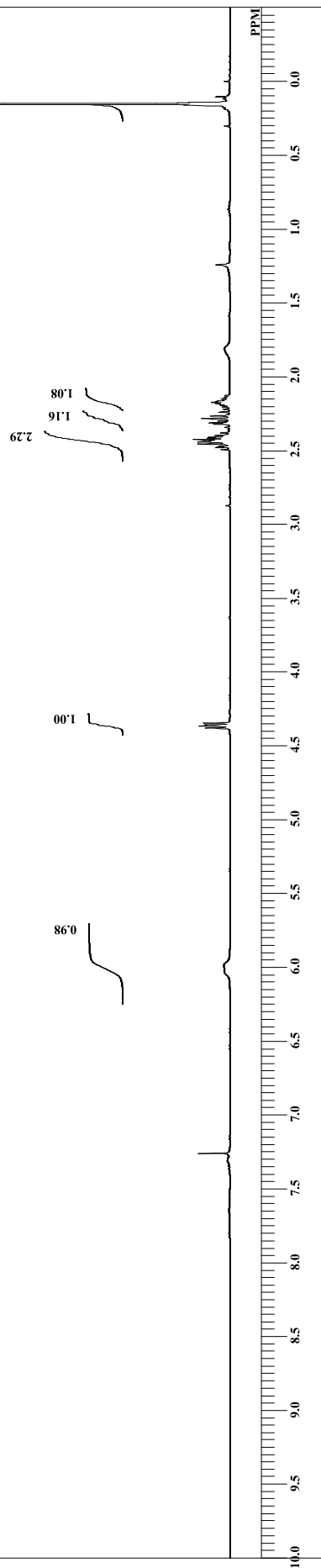
TH-9-163-f36-42H

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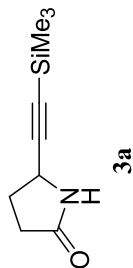
3a

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PD 5.0000 sec
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EXPCM
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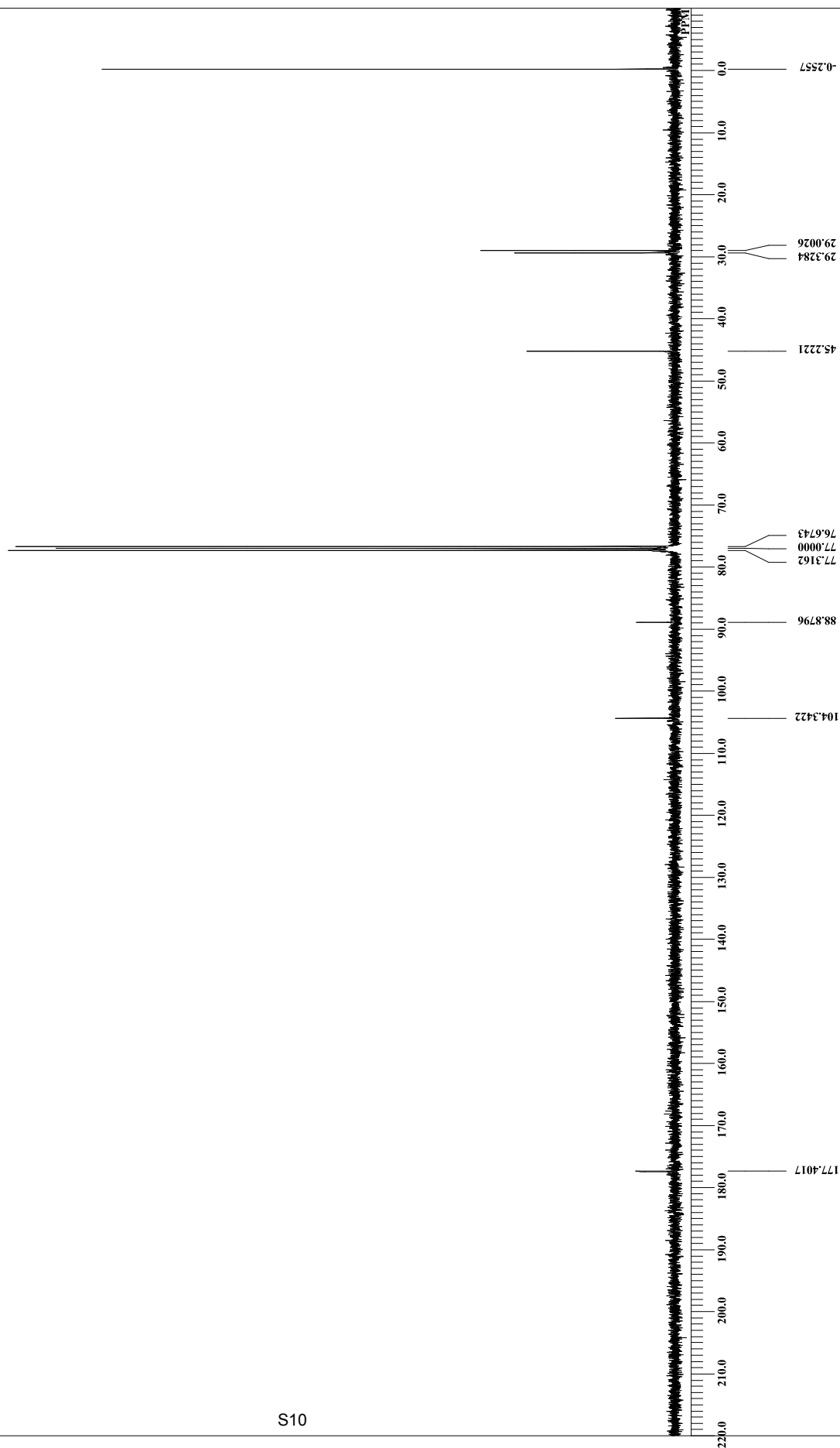


TH-9-163-f36-42C

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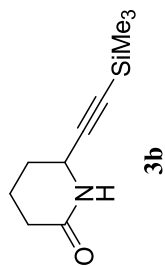


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T2 0.00
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EXPCM
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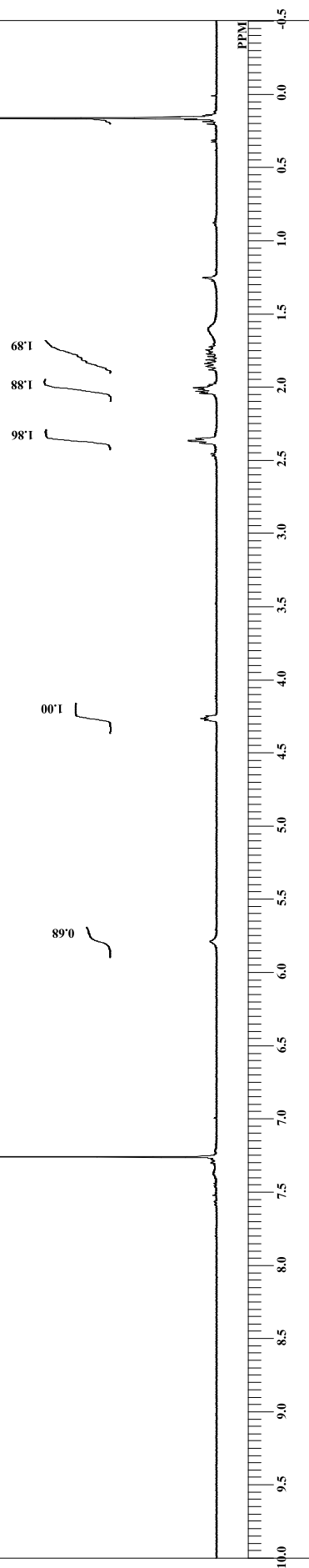


TH-11-33-f51-57

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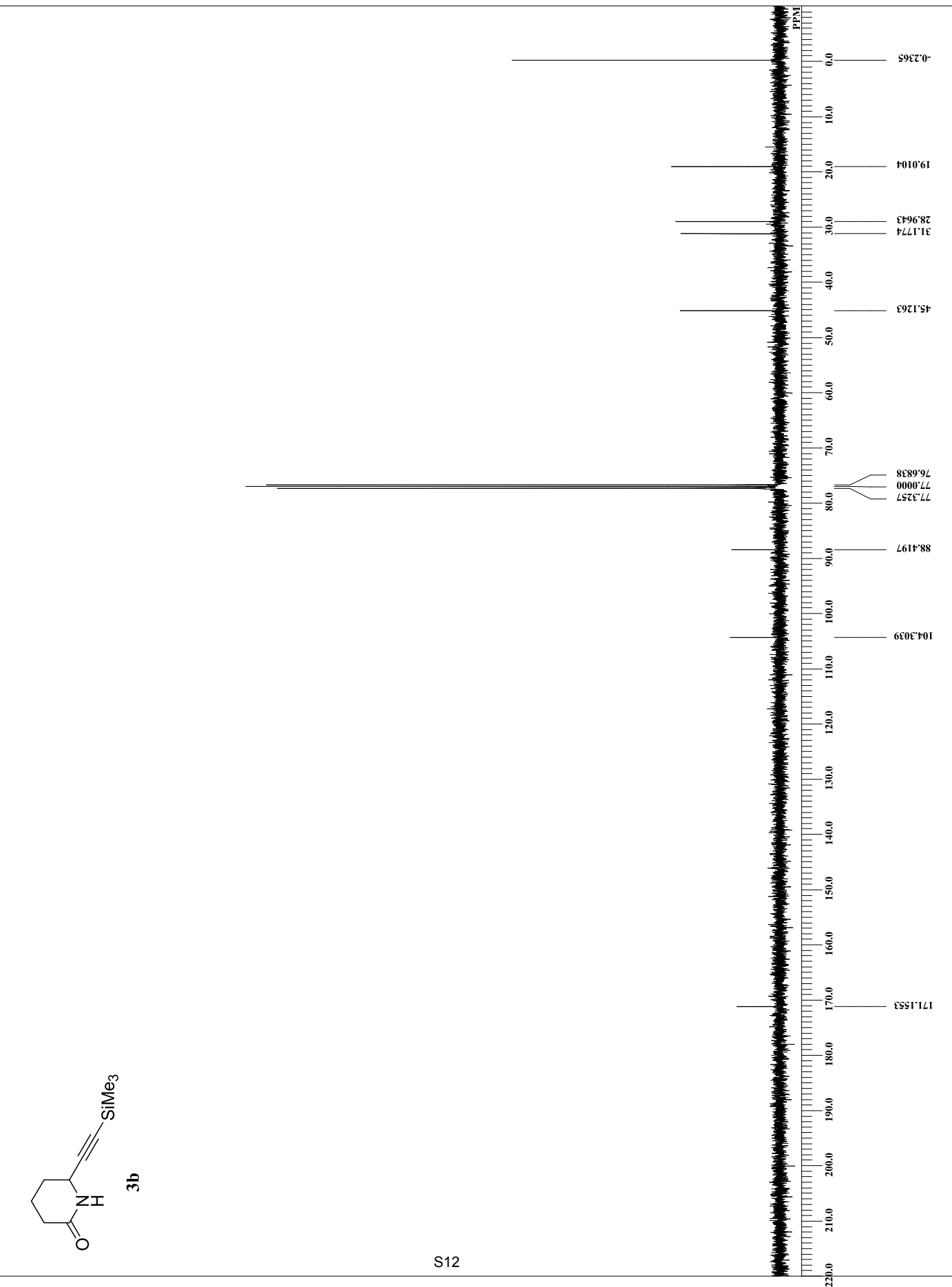
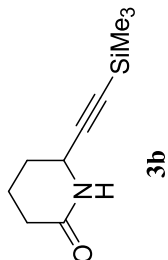


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SPO 16384
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PD 10.0000 sec
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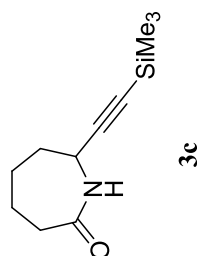
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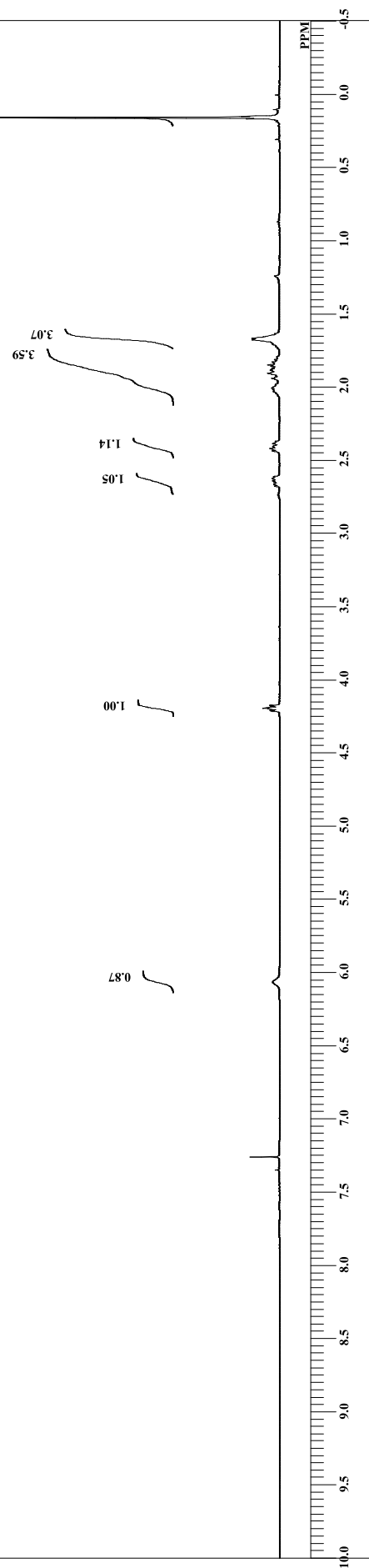
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FILDC
FILDF
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SLVNT CDCL3
EXREF 77.00 ppm

TH-11-35-f29-44

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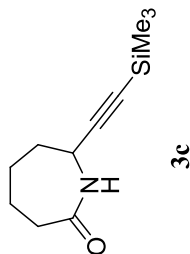


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PREDDL 0.00000 msec
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SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 34
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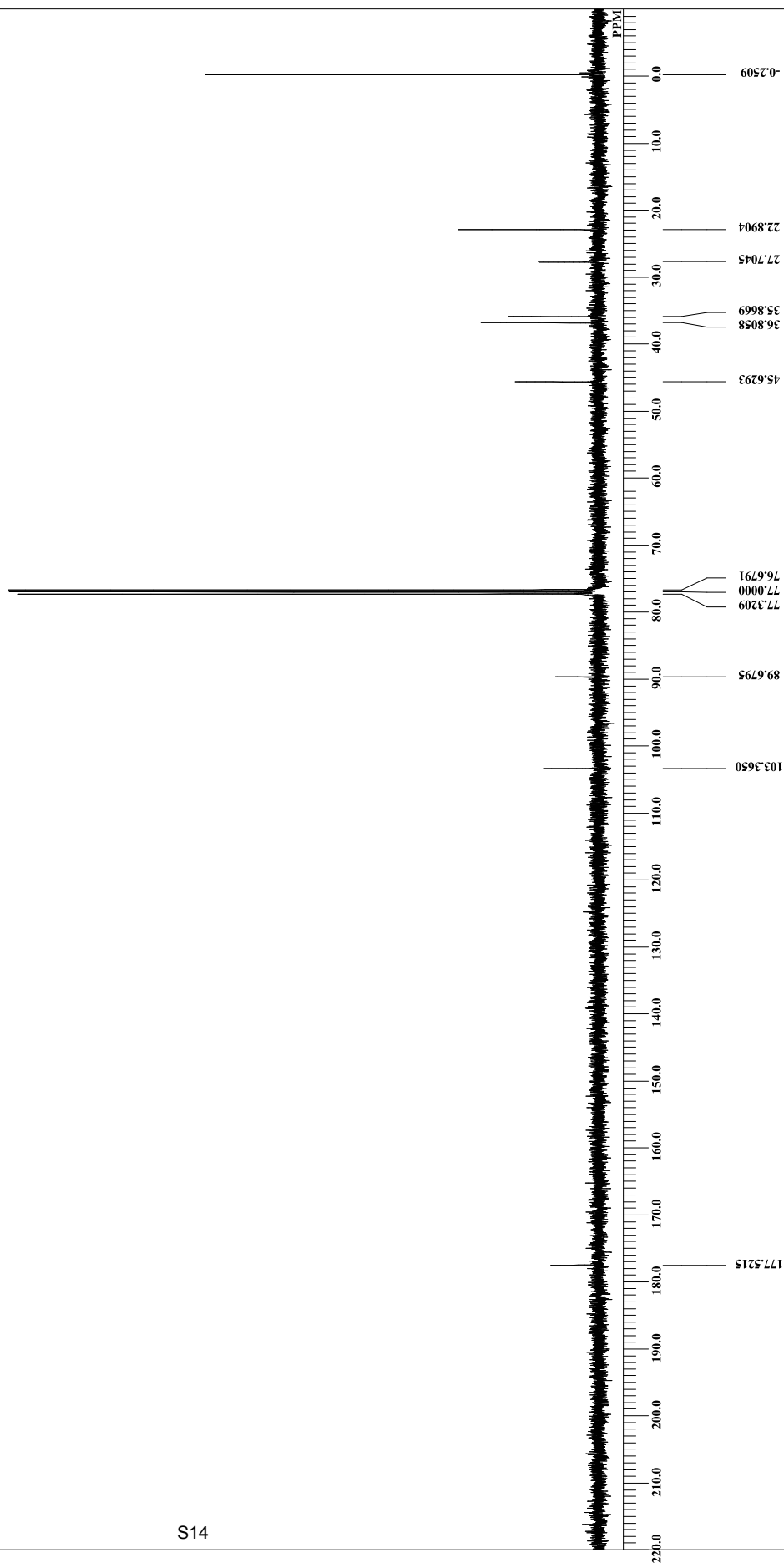


TH-11-35-f29-44C

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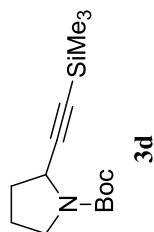


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IFR 395.88 MHz
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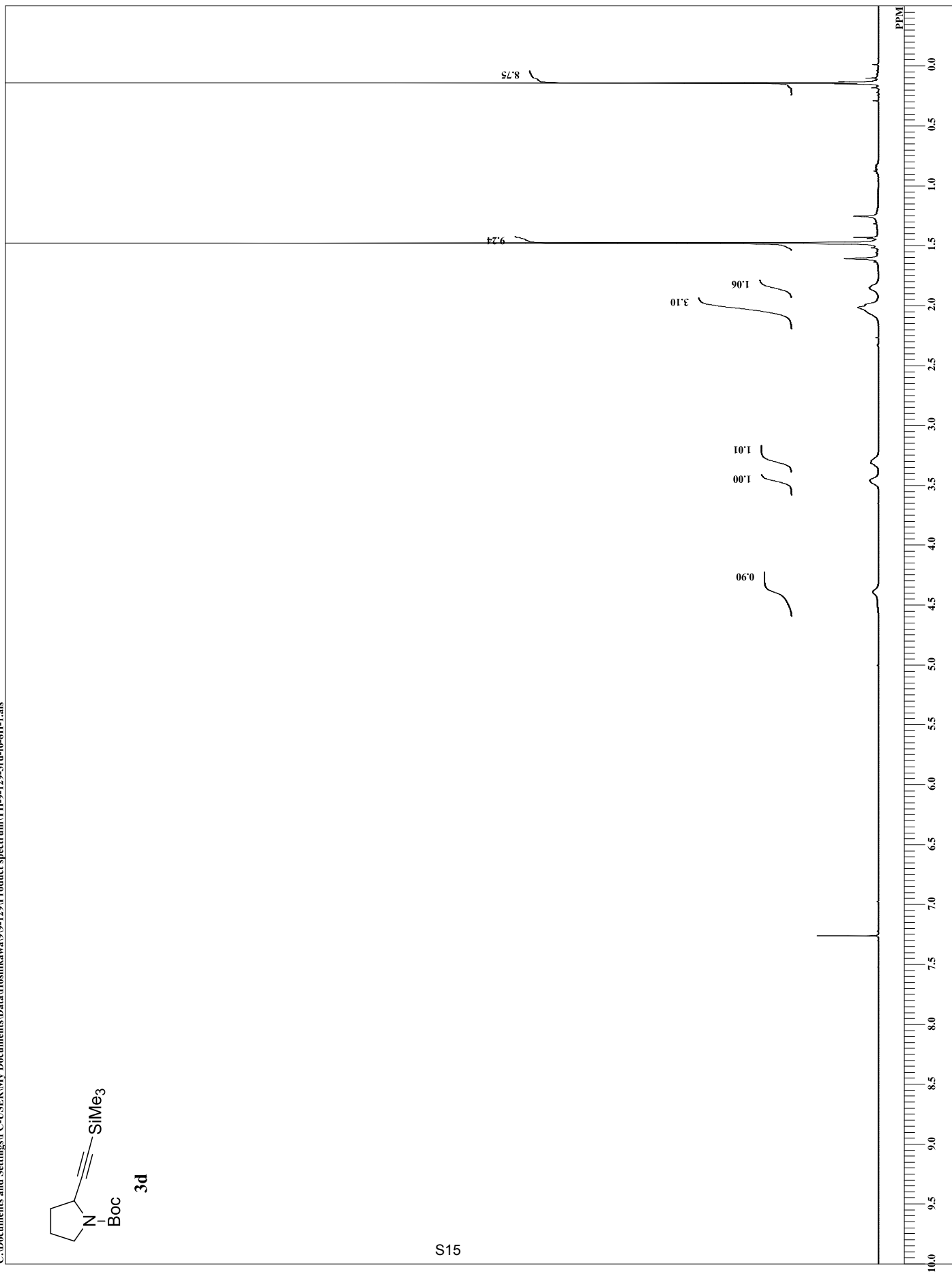


TH-9-129-3rd-f6-8H

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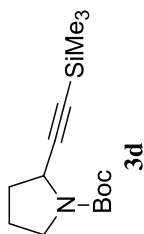


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T3 100.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFN 0.87 Hz
IRRPW 147 usec
IRATN 79
DFILE TH-9-129-3rd-f6-8H-1.als
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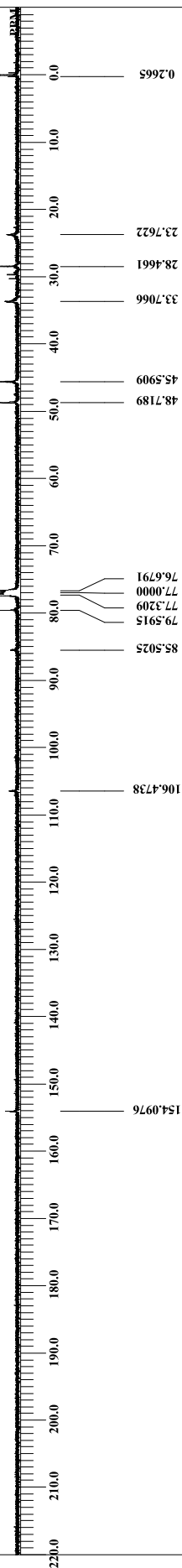


TH-9-129-3rd-f6-8C

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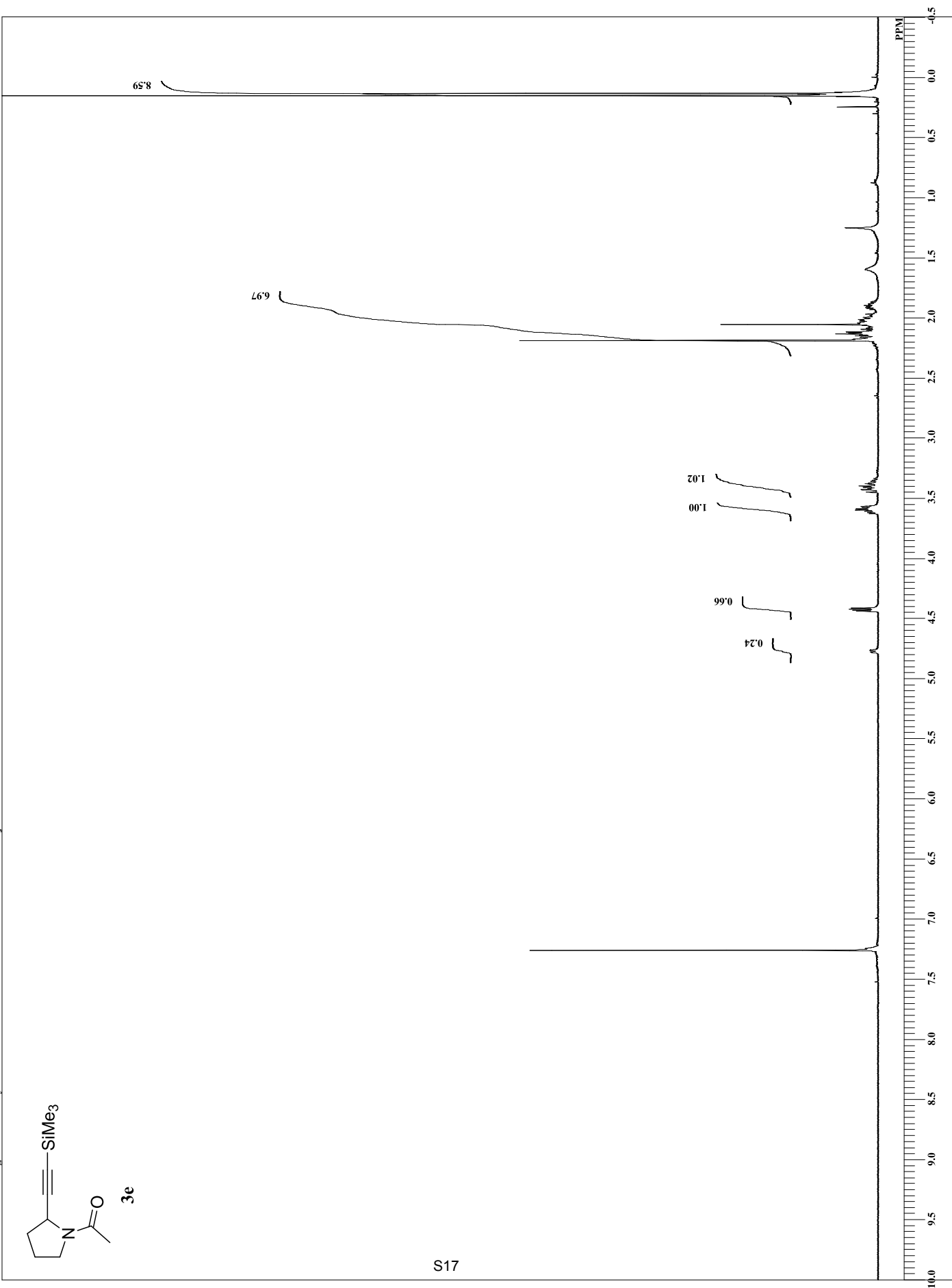
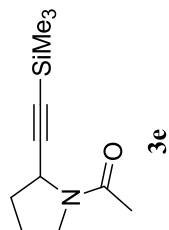


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OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 4.17 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 52428
SPO 52428
TIMES 2400
DUMMY 4
FREQU 24999.62 Hz
FLT 125000 Hz
DELAY 20.50 usec
AQTM 1.0486 sec
PD 8.0000 sec
SCANS 2400
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 100.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC
IH
IRF 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-9-129-3rd-f6-8C-1.als
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 25.1 c
SLVNT CDCL3
EXREF 77.00 ppm



TH-11-47-2nd-f20-25

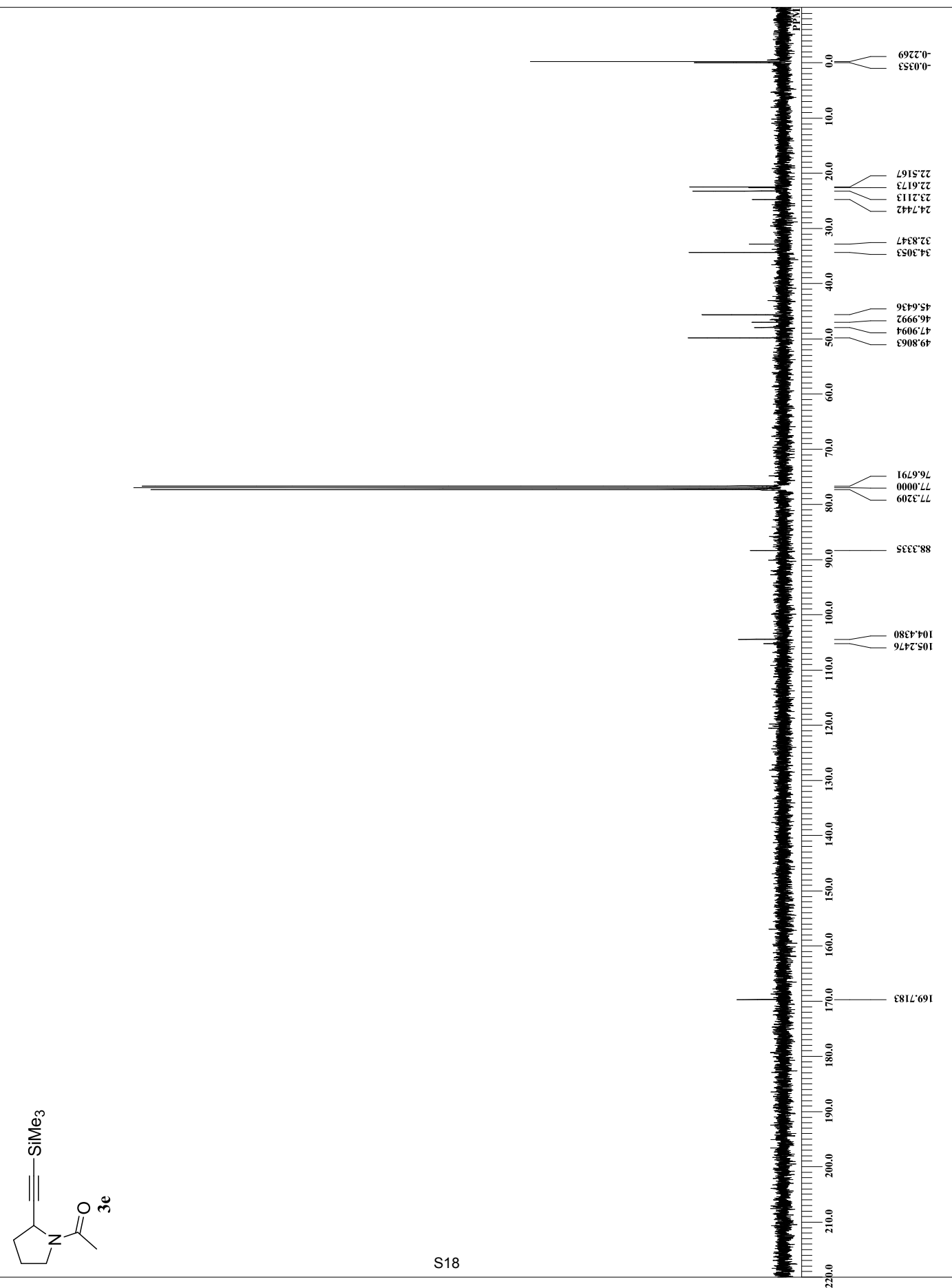
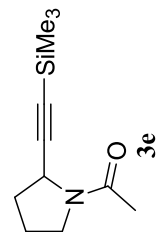
C:\Documents and Settings\PC-USER\Mv Documents\Data\Hoshikawa\11\TH-11-47-2nd-f20-25-1.jdf



DFILE TH-11-47-2nd-f20-25-1.jdf
COMINT TH-11-47-2nd-f20-25
DATIM 16-01-2012 13:27:32
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 8
SCANS 16
ADBIT 50
RGAIN 0.01 Hz
BF 0.00
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-47-2nd-f20-25-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0 Hz
CSPED
FILDC
FILDF
CTEMP 22.8 c
SLVNT CDCL3
EXREF 7.26 ppm

TH-11-47-f20-30C

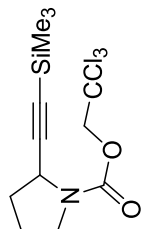
C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-47-f20-30C_40times.jdf



DFILE TH-11-47-f20-30C_40times.jdf
COMINT
DATIM TH-11-47-f20-30C
MENUF 11-01-2012 10:08:50
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 65536
SPO 65536
TIMES 42
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
AQTM 1.0486 sec
PD 5.0000 sec
SCANS 42
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM 1H
IRNUC 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-47-f20-30C_40times.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.1 c
SLVNT CDCL3
EXREF 77.00 ppm

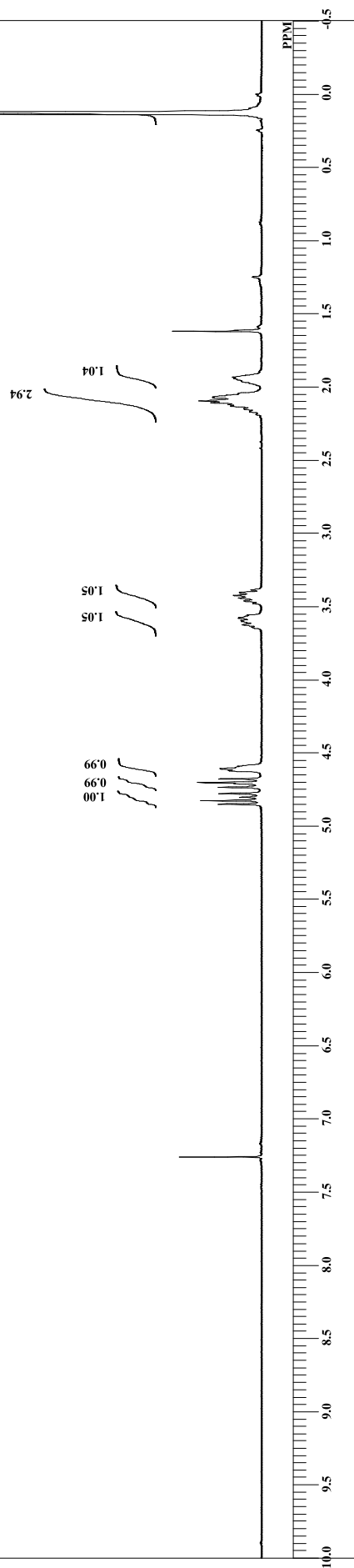
TH-11-49-3rd-f6-8

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-49-3rd-f6-8.1



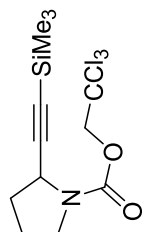
3f

DFILE TH-11-49-3rd-f6-8.1
COMET TH-11-49-3rd-f6-8
DATUM 18-06-2012 13:45:25
MENUF
OBNUC
OFR 490.15 MHz
OBFRQ 490.15 MHz
OBSET 9.16 KHz
OBFIN 7.60 Hz
PWL 6.50 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 9191.18 Hz
FLUT 37000 Hz
DELAY 13.52 usec
ACQTM 1.7826 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 36
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 490.15 MHz
IRSET 9.16 KHz
IRFIN 7.60 Hz
IRRPW 92 usec
IRATN 79
DFILE TH-11-49-3rd-f6-8.1
SF
LKSET 70.30 KHz
LKFIN 32.5 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 25.2 c
SLVNT CDCL3
XREF 7.26 ppm



TH-11-49-3rd-f6-8C

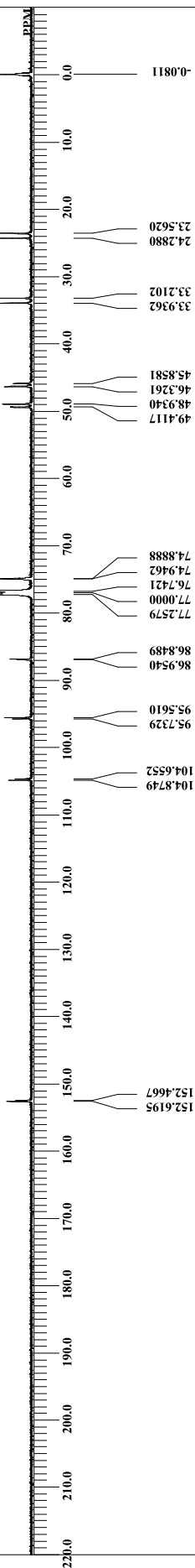
C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-49-3rd-f6-8C.als



3f

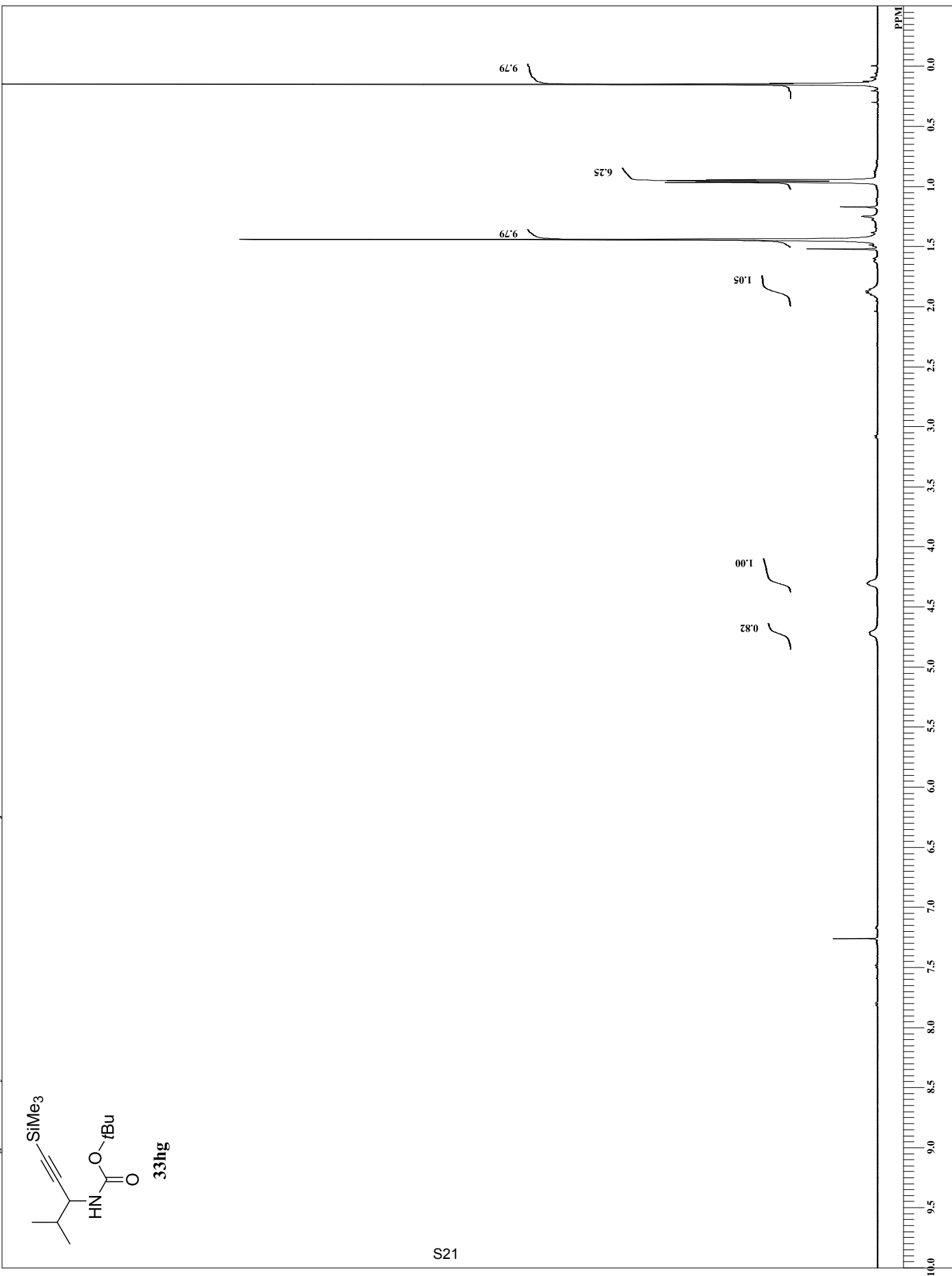
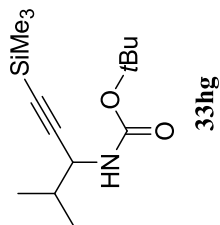
S20

DFILE TH-11-49-3rd-f6-8C.als
COMINT TH-11-49-3rd-f6-8C
DATIM 19-06-2012 00:53:04
MENUF
OBNUC
OFR 123.26 MHz
OBFRQ 123.26 MHz
OBSET 2.31 KHz
OBFIN 6.71 Hz
PW1 3.23 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 32768
SPO 32768
TIMES 4500
DUMIMY 4
FREQ 38580.25 Hz
FLU 155000 Hz
DELAY 21.06 usec
ACQTM 0.8493 sec
PD 8.0000 sec
SCANS 4500
ADBIT 16
RGAIN 60
BF 2.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC
IRF 490.15 MHz
IRSET 9.16 KHz
IRFIN 7.60 Hz
IRRPW 92 usec
IRATN 79
DFILE TH-11-49-3rd-f6-8C.als
SF 70.30 KHz
LKSET 32.5 Hz
LKFIN 0
LKLEY 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.5 c
SLVNT CDCL3
EXREF 77.00 ppm



TH-11-77-3rd-f8-13H

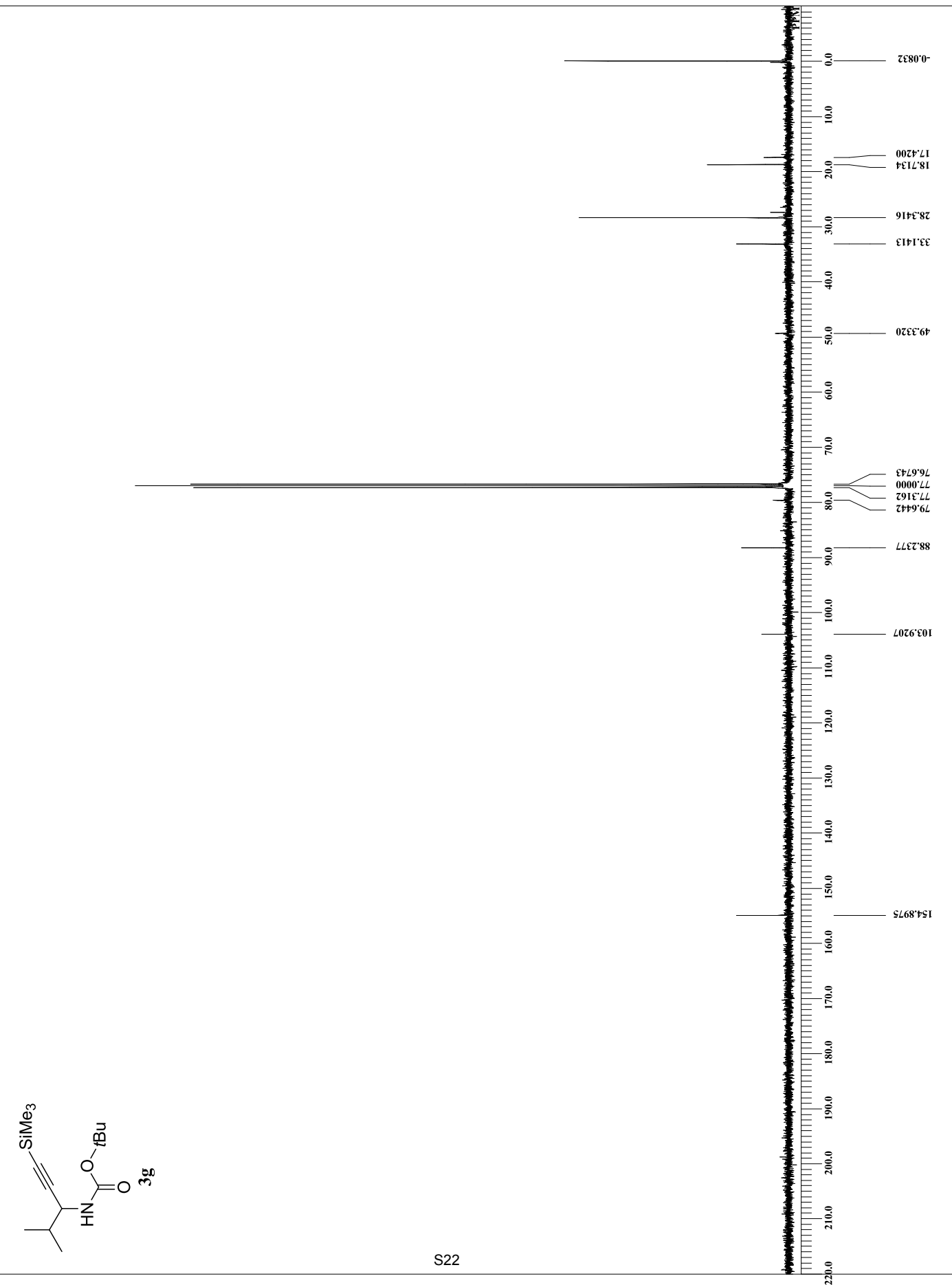
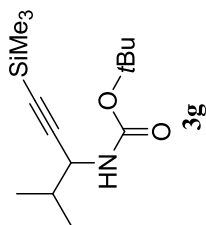
C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-77-3rd-f8-13H-1.jdf



DFILE TH-11-77-3rd-f8-13H-1.jdf
COMET TH-11-77-3rd-f8-13H
DATUM 16-03-2012 12:50:12
MENUF
MENUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
AQTM 2.2073 sec
PD 8
SCANS 16
ADBIT 30
RGAIN 0.01 Hz
BF 0.00
T1 0.00
T2 0.00
T3 100.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-77-3rd-f8-13H-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.3 c
SLVNT CDCL3
EXREF 7.26 ppm

TH-11-77-3rd-f8-13C

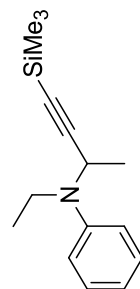
C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-77-3rd-f8-13C-1.jdf



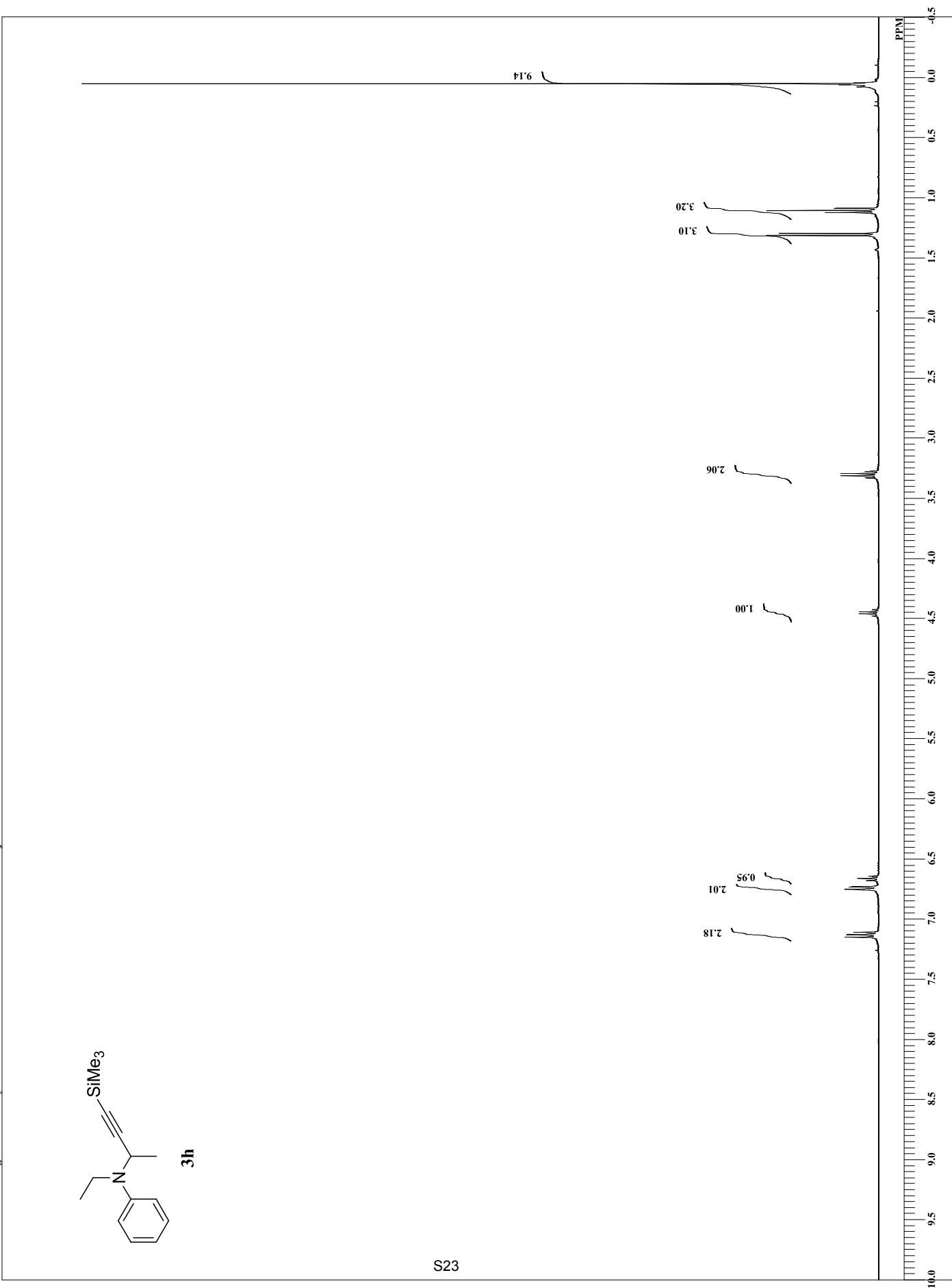
DFILE TH-11-77-3rd-f8-13C-1.jdf
COMINT TH-11-77-3rd-f8-13C
DATIM 16-03-2012 13:07:47
MENUF
OBNUC
13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 32768
SPO 32768
TIMES 103
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
AQTM 1.0486 sec
PD 8.0000 sec
SCANS 103
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 100.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-77-3rd-f8-13C-1.jdf
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.6 c
SLVNT CDCL3
EXREF 77.00 ppm

TH-11-63-f6-conc

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-63-f6-conc-1.jdf



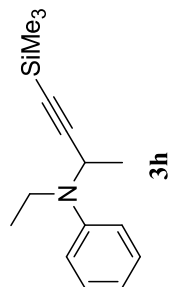
3h



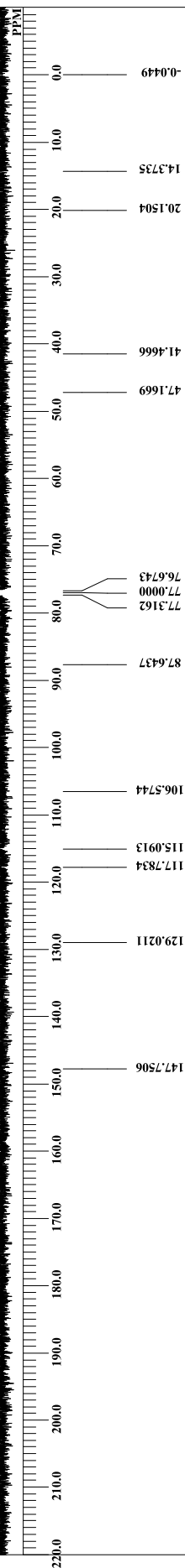
DFILE TH-11-63-f6-conc-1.jdf
COMET TH-11-63-f6-conc
DATIM 24-03-2012 17:09:29
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 32
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-63-f6-conc-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 25.2 c
SLVNT CDCL3
EXREF 7.26 ppm

TH-11-63-f6C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-63-f6C-1.jdf

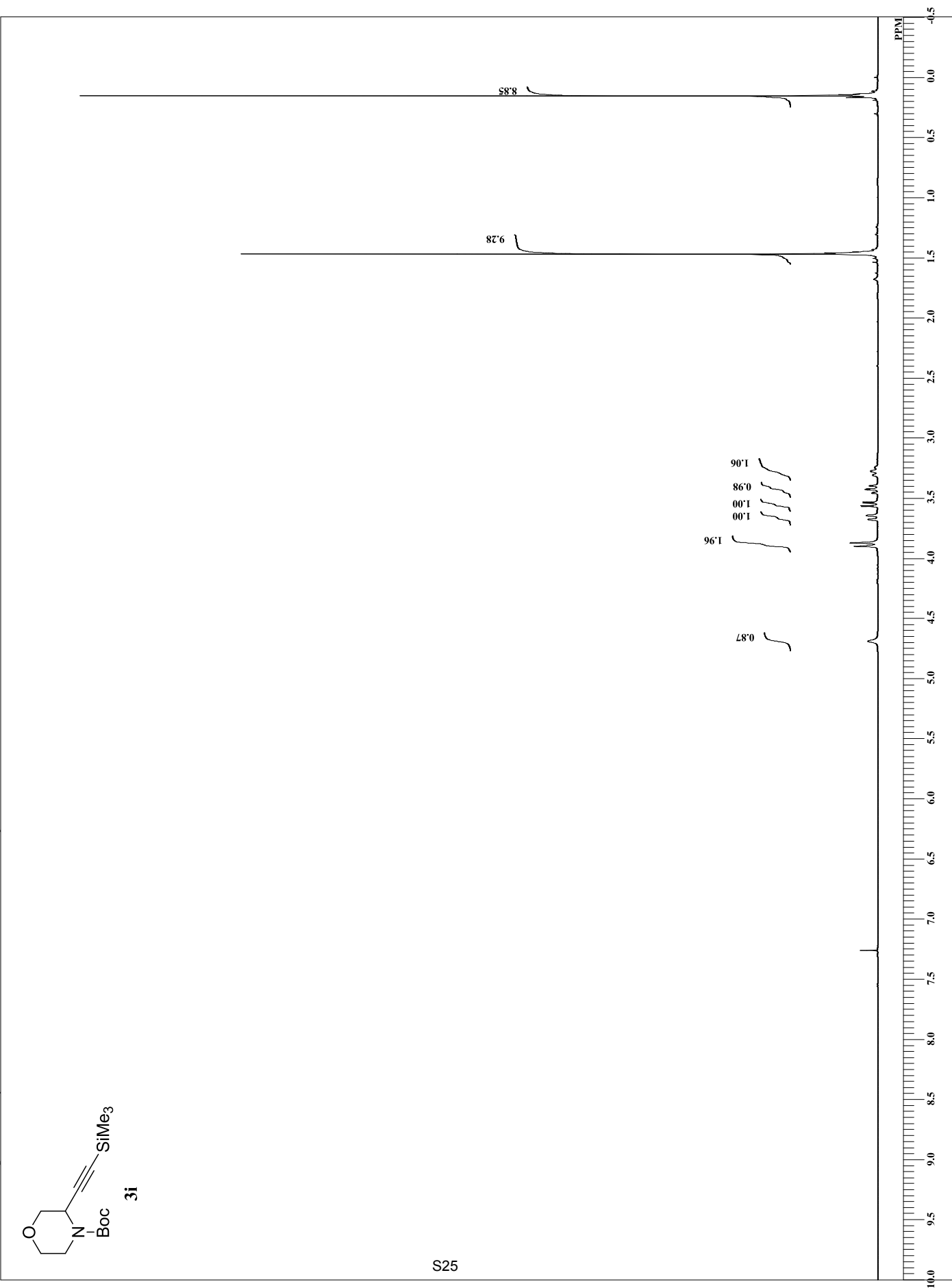
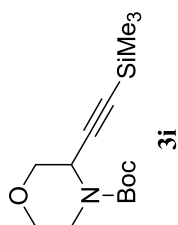


DFILE TH-11-63-f6C-1.jdf
COMNT TH-11-63-f6C
DATIM 24-03-2012 17:18:45
MENUF
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFN 0.98 Hz
PWL 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 32768
SPO 32768
TIMES 52
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 8.0000 sec
SCANS 52
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM 1H
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-63-f6C-1.jdf
SF
LKSET 13.20 KHz
LKFN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.3 c
SLVNT CDCL3
EXREF 77.00 ppm



TH-11-39-2nd-f24-27

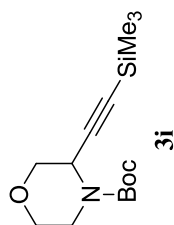
C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-39-2nd-f24-27-1.jdf



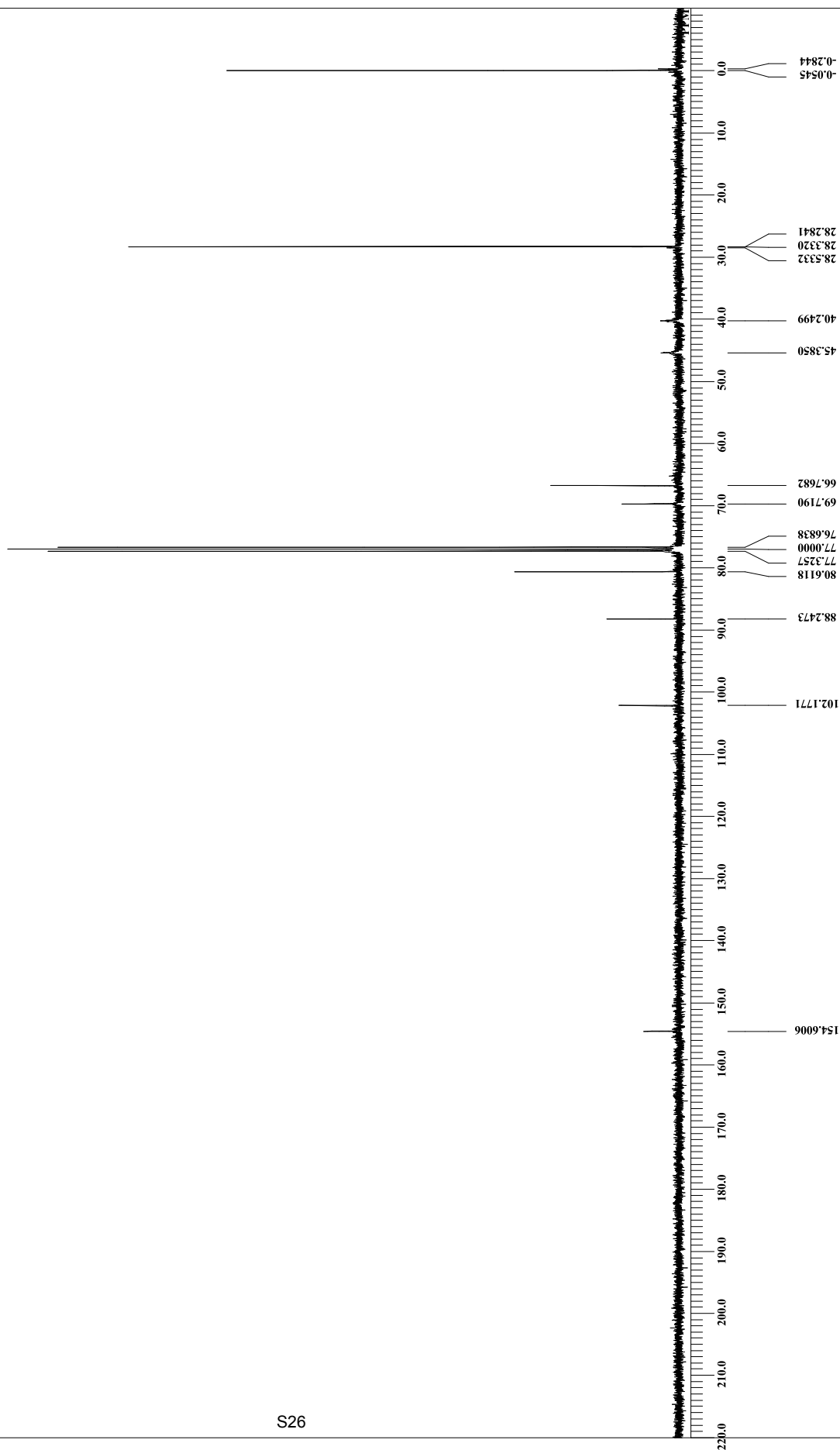
DFILE TH-11-39-2nd-f24-27-1.jdf
COMET TH-11-39-2nd-f24-27
DATIM 23-03-2012 13:06:47
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 8
SCANS 16
ADBIT 30
RGAIN 0.01 Hz
BF 0.00
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 147 usec
IRATN 79
DFILE TH-11-39-2nd-f24-27-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.8 c
SLVNT CDCL3
EXREF 7.26 ppm

TH-11-39-2nd-f24-27C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-39-2nd-f24-27C-1.jdf

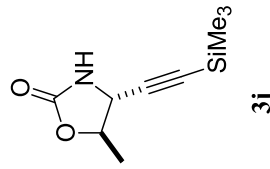


DFILE TH-11-39-2nd-f24-27C-1.jdf
COMNT TH-11-39-2nd-f24-27C
DATIM 23-03-2012 13:24:30
MENUF
OBNUC
13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 32768
SPO 32768
TIMES 103
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 8.0000 sec
SCANS 103
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-39-2nd-f24-27C-1.jdf
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.6 c
SLVNT CDCL3
EXREF 77.00 ppm

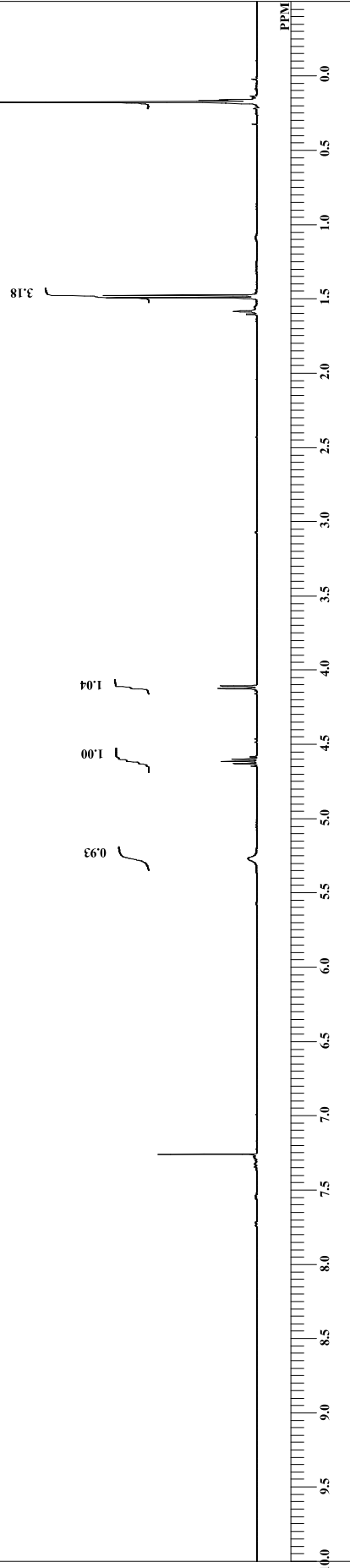


TH-11-157-f45-47-solid

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-157-f45-47-solid-1.xls

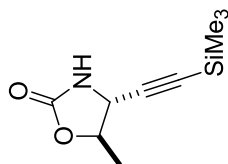


DFILE TH-11-157-f45-47-solid-1.xls
COMNT TH-11-157-f45-47-solid
DATIM 18-05-2012 19:30:46
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.55 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 5938.15 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 38
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-157-f45-47-solid-1.xls
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.5 c
SLVNT CDCL3
EXREF 7.26 ppm

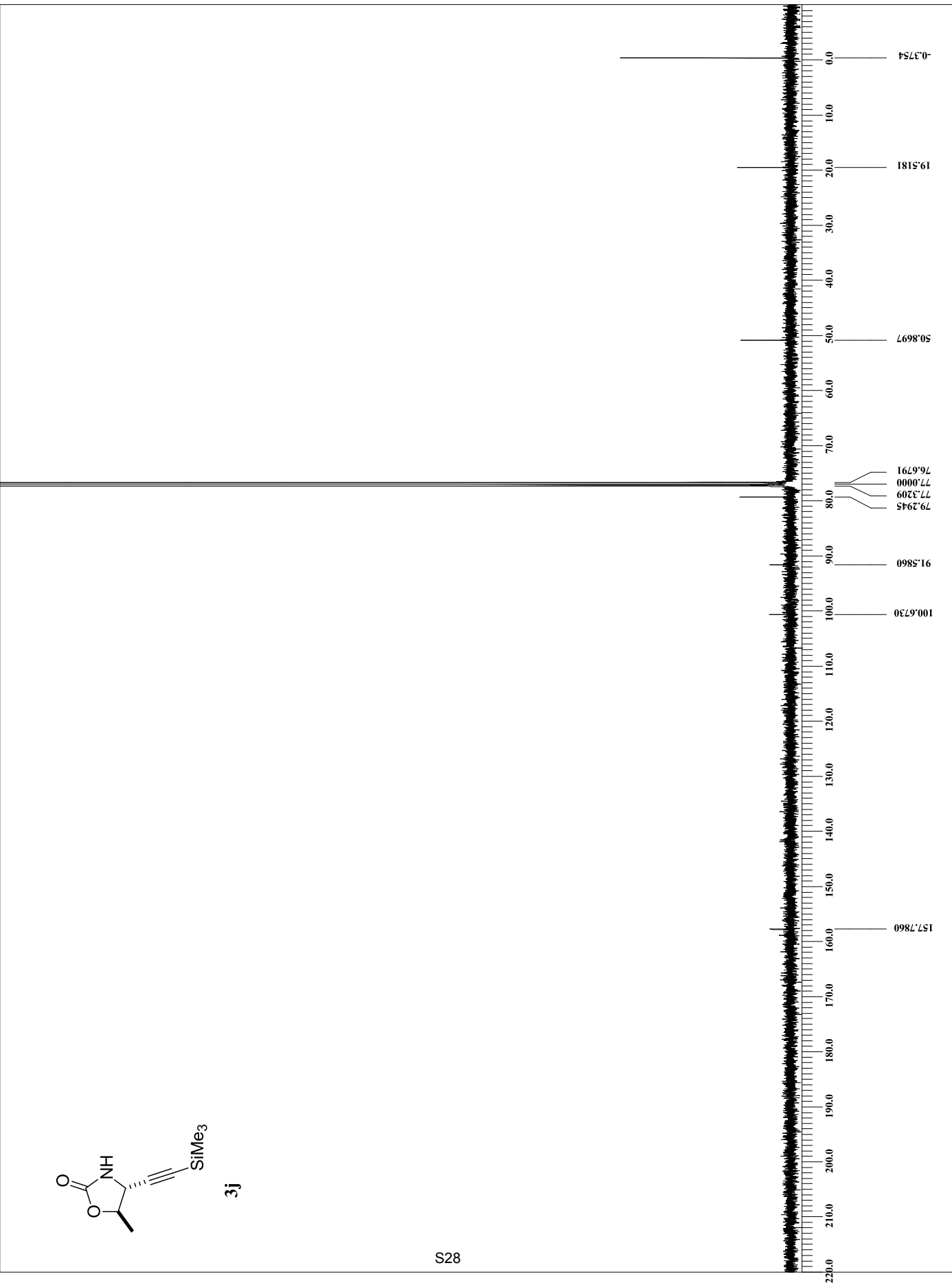


TH-11-157-f45-47-solid-C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-157-f45-47-solid-C-1.a1s



3j



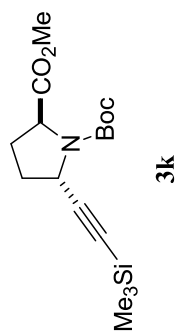
DFILE TH-11-157-f45-47-solid-C-1.a1s
COMNT TH-11-157-f45-47-solid-C-1.a1s
DATIM 19-05-2012 14:12:21
MENUF
OBNUC
13C
OFR 99.55 MHz
OBFRO 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 3.67 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 52428
SPO 52428
TIMES 142
DUMMY 4
FREQU 24999.62 Hz
FLT 125000 Hz
DELAY 20.50 usec
AQTM 1.0486 sec
PD 8.0000 sec
SCANS 142
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-157-f45-47-solid-C-1.a1s
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEY 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.5 c
SLVNT CDCL3
EXREF 77.00 ppm

3k

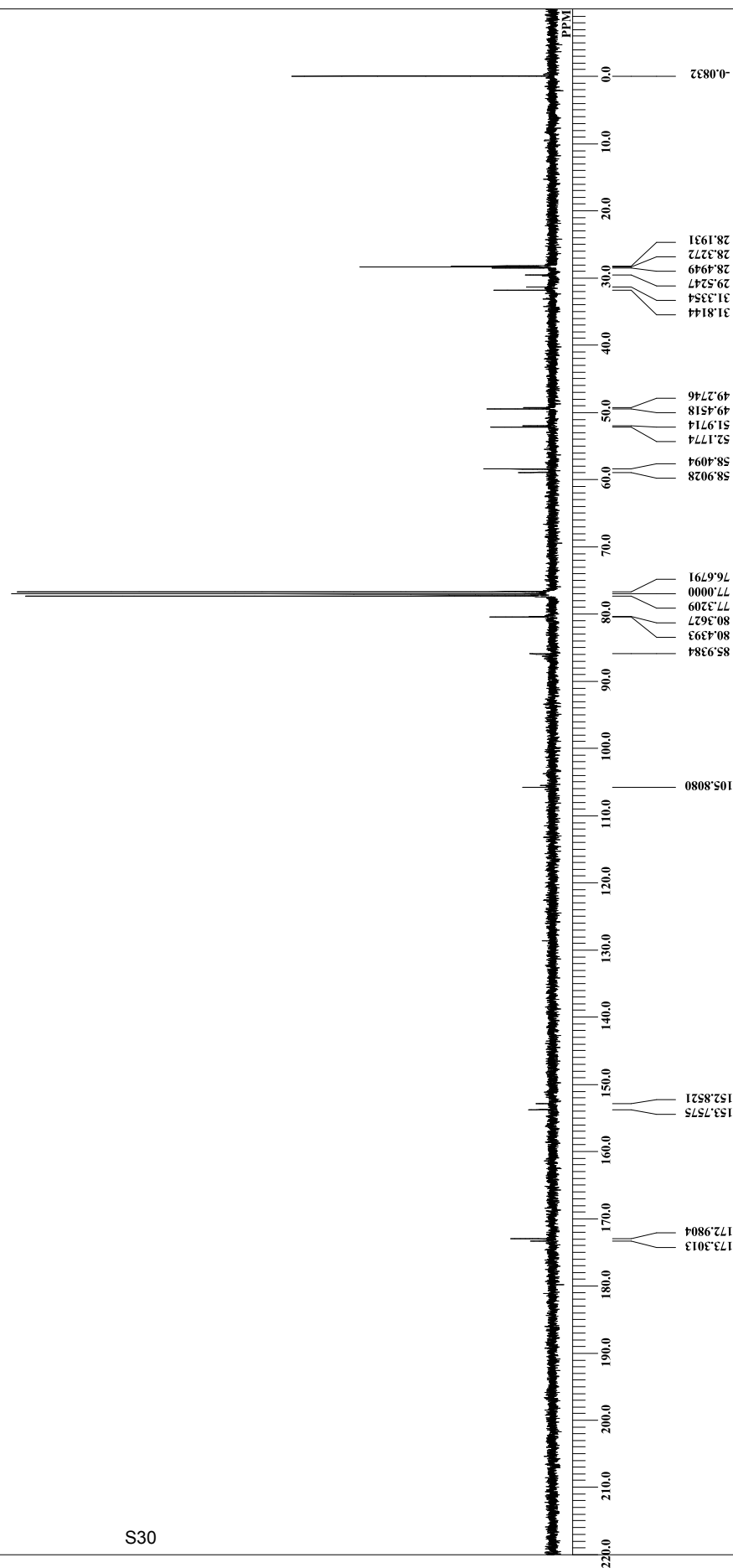
C[Si](C)(C)C#CC[C@H]1CCCN1C(=O)OC(C)(C)C

TH-11-155-f55-61C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-155-f55-61C-1.jdf

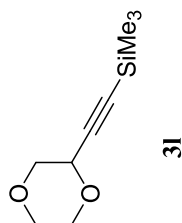


DFILE TH-11-155-f55-61C-1.jdf
COMNT TH-11-155-f55-61C
DATIM 25-04-2012 19:11:32
MENUF
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 3.67 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 65536
SPO 65536
TIMES 82
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 8.0000 sec
SCANS 82
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM 1H
IRNUC 1H
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-155-f55-61C-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEY 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.0 c
SLVNT CDCL3
EXREF 77.00 ppm

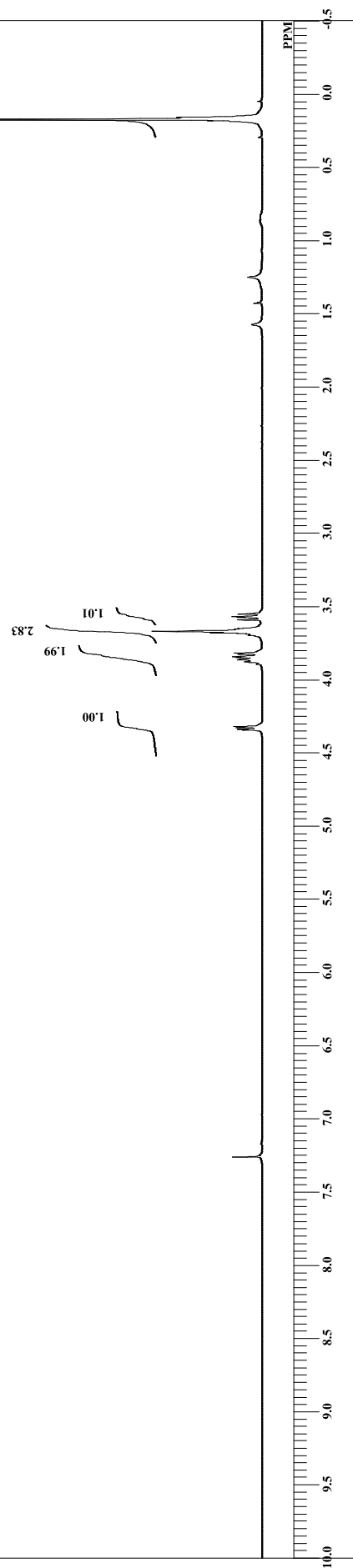


TH-11-57-f22-26H

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\ECX bacu up201206\Hoshikawa\TH-11-57-f22-26H.1

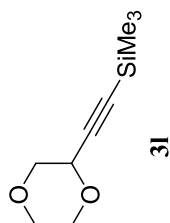


DFILE TH-11-57-f22-26H.1
COMNT TH-11-57-f22-26H
DATIM 17-03-2012 17:41:12
MENUF
OBNUC
OFR 490.15 MHz
OBFRQ 490.15 MHz
OBSET 9.16 KHz
OBFIN 7.60 Hz
PWL 8.55 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 9191.18 Hz
FLT 37000 Hz
DELAY 13.52 usec
ACQTM 1.7826 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 36
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IRFR 490.15 MHz
IRSET 9.16 KHz
IRFIN 7.60 Hz
IRRPW 92 usec
IRATN 79
DFILE TH-11-57-f22-26H.1
SF
LKSET 70.30 KHz
LKFIN 32.5 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.4 c
SLVNT CDCL3
EXREF 7.26 ppm

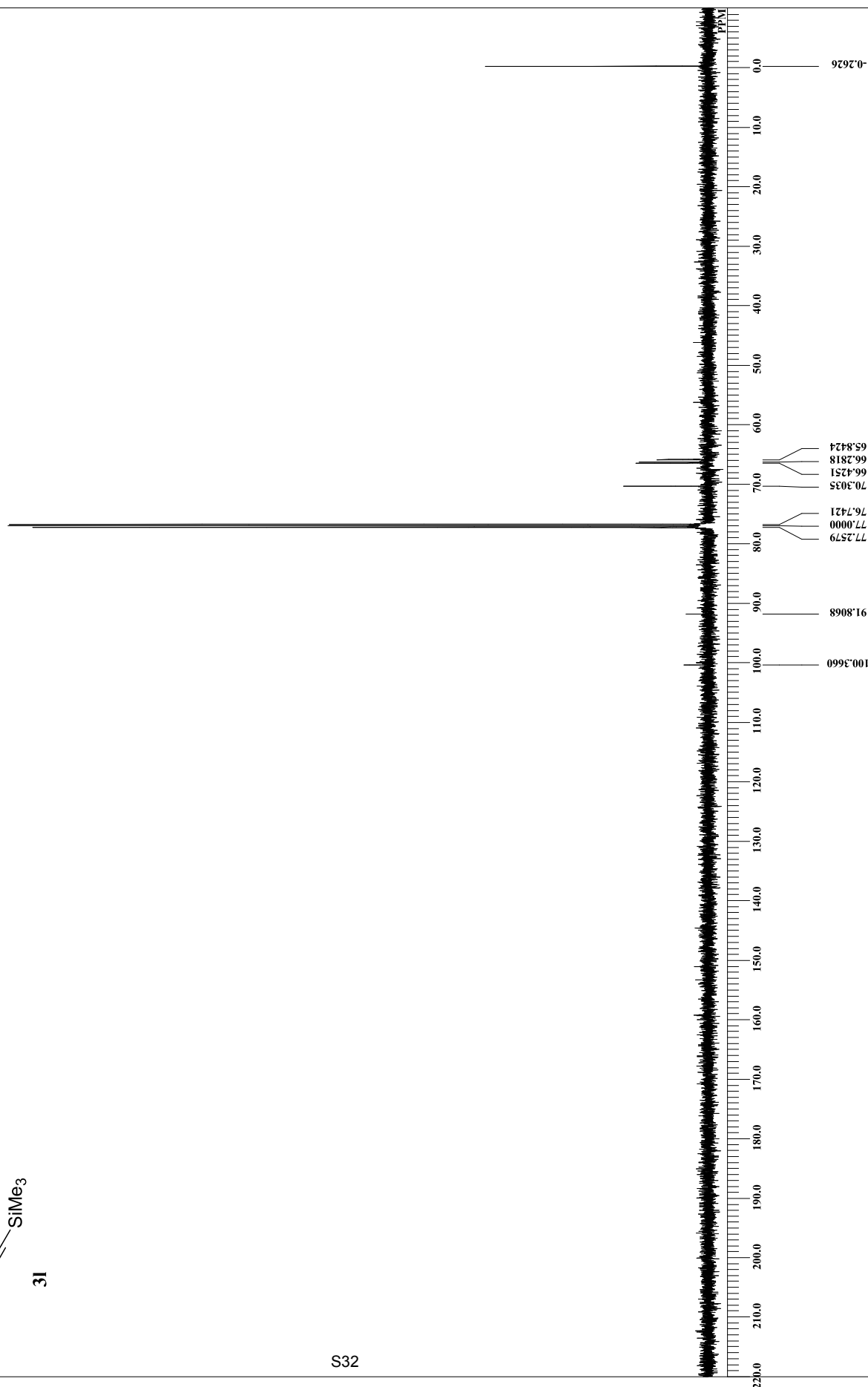


TH-11-57-f22-26C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\ECX bacu up201206\Hoshikawa\TH-11-57-f22-26C.1

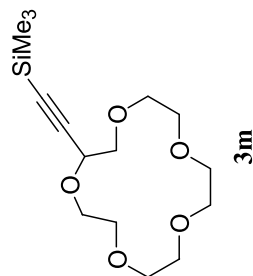


DFILE TH-11-57-f22-26C.1
COMNT TH-11-57-f22-26C
DATIM 17-03-2012 17:59:06
MENUF
OBNUC
OFR 123.26 MHz
OBFRQ 123.26 MHz
OBSET 2.31 KHz
OBFIN 6.71 Hz
PWL 3.20 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 sec
POINT 32768
SPO 32768
TIMES 102
DUMMY 4
FREQU 38580.25 Hz
FLT 155000 Hz
DELAY 21.06 usec
ACQTM 0.8493 sec
PD 8.0000 sec
SCANS 102
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC
IR 490.15 MHz
IRSET 9.16 KHz
IRFIN 7.60 Hz
IRRPW 92 usec
IRATN 79
DFILE TH-11-57-f22-26C.1
SF 70.30 KHz
LKSET 32.5 Hz
LKFIN 0
LKLEY 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 25.1 c
SLVNT CDCL3
EXREF 77.00 ppm

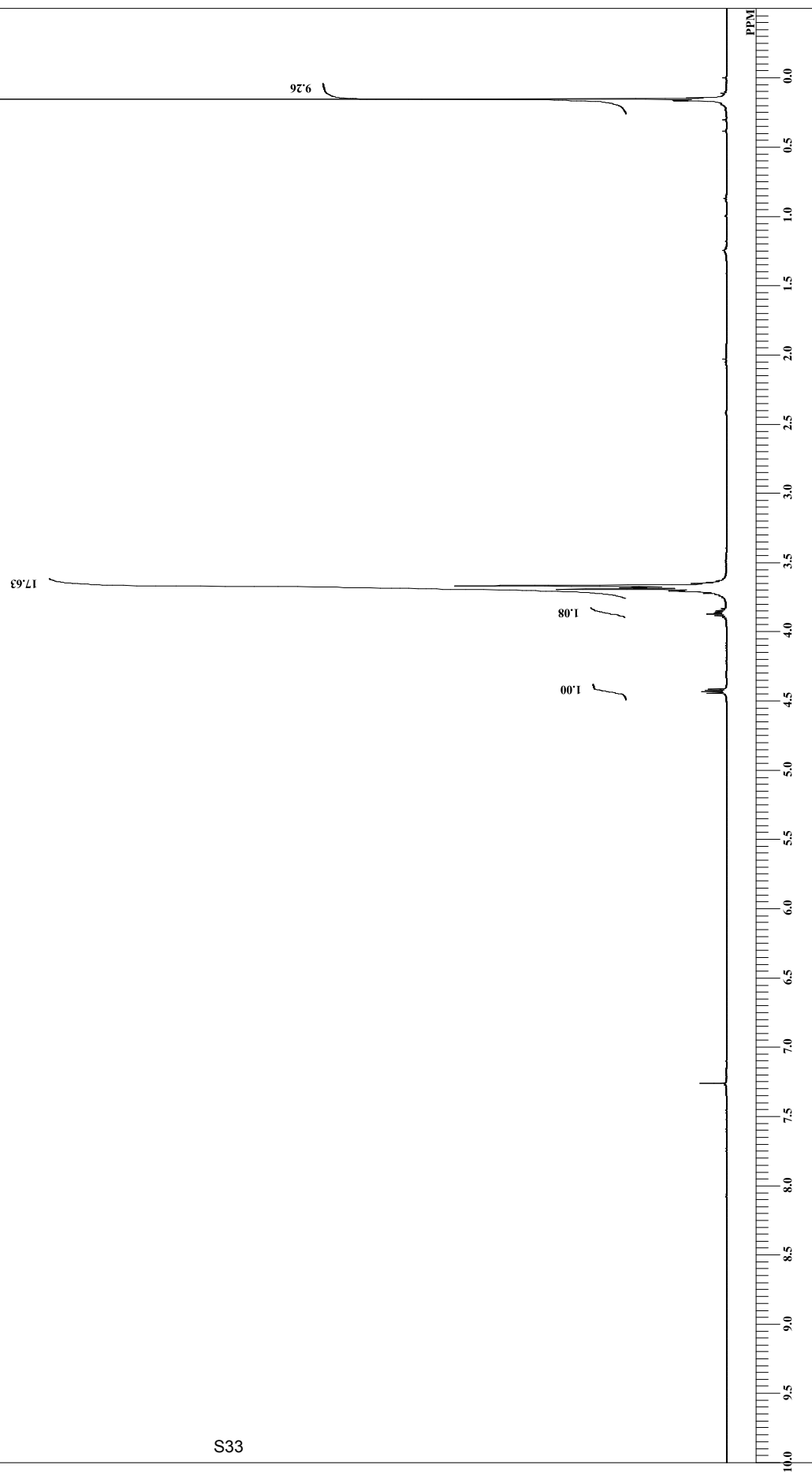


TH-10-177-f44-50

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\10\101-199\TH-10-177-f44-50-1.pdf

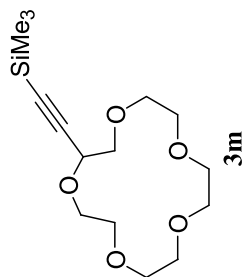


DFILE TH-10-177-f44-50-1.pdf
COMNT TH-10-177-f44-50
DATIM 24-11-2011 20:11:28
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 30
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-10-177-f44-50-1.pdf
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.6 c
SLVNT CDCL3
EXREF 7.26 ppm

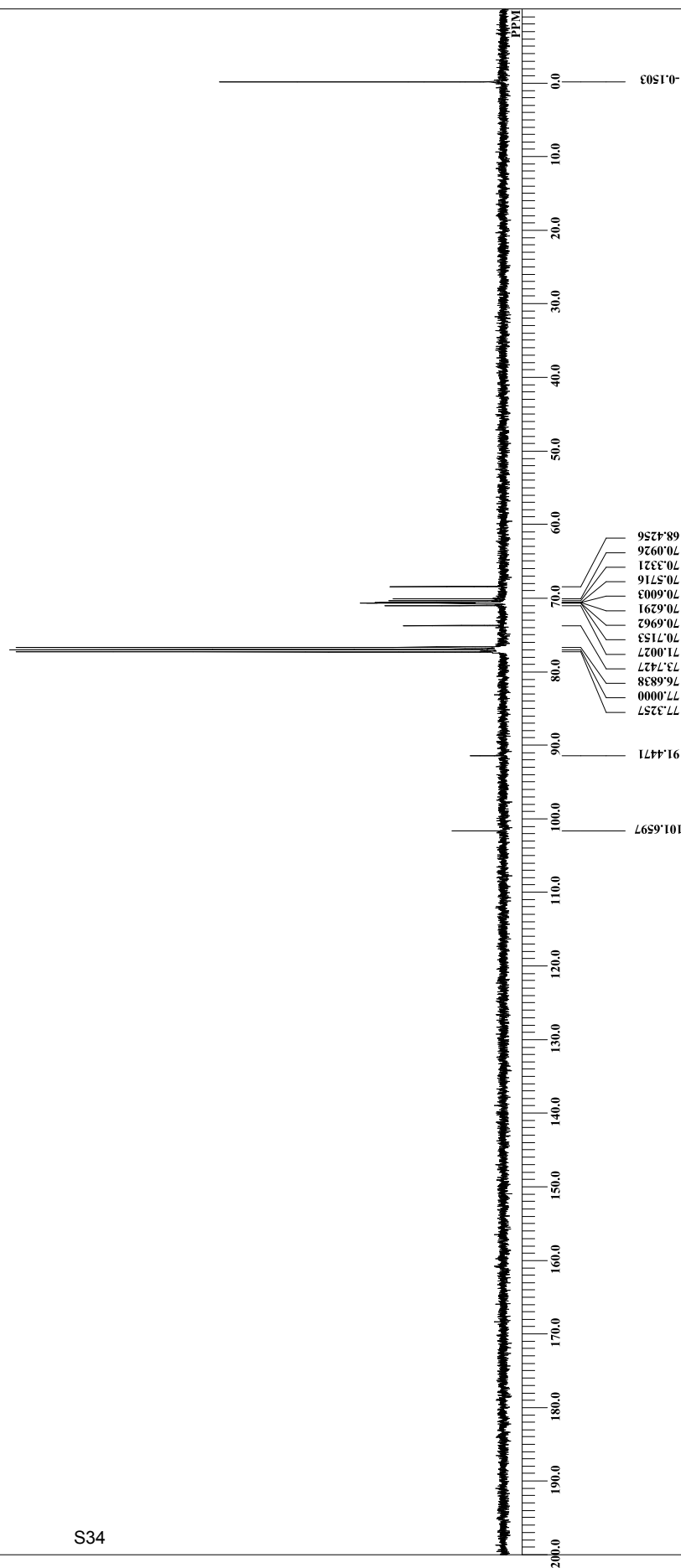


TH-10-177-f44-50C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\10\101-199\TH-10-177-f44-50C-1.jdf

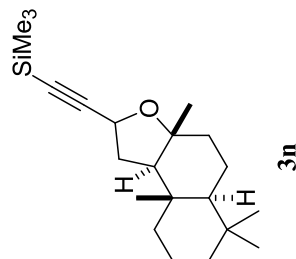


DFILE TH-10-177-f44-50C-1.jdf
COMNT TH-10-177-f44-50C-
DATIM 24-11-2011 20:21:33
MENUF
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 32768
SPO 32768
TIMES 82
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 5.0000 sec
SCANS 82
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM 1H
IRNUC 1H
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-10-177-f44-50C-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.5 c
SLVNT CDCL3
EXREF 77.00 ppm



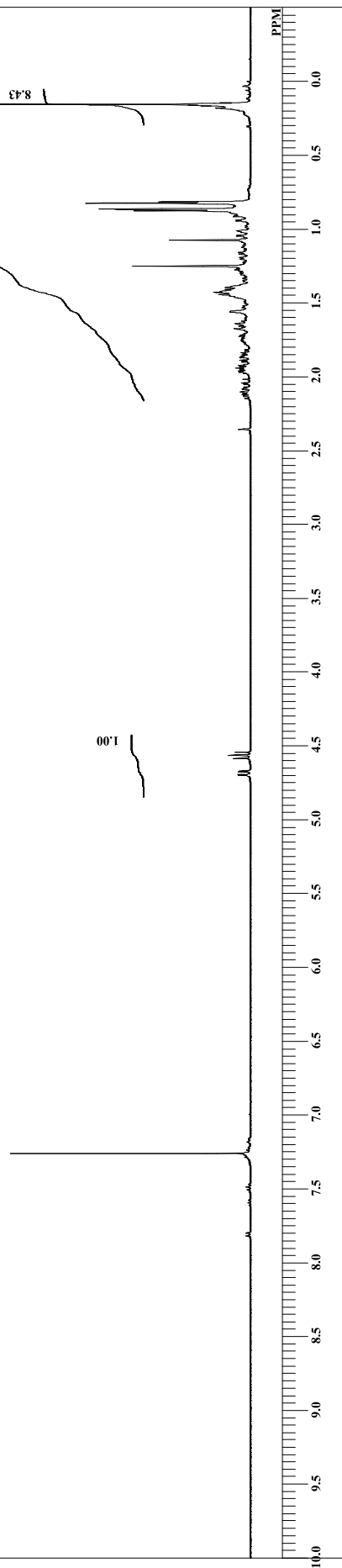
TH-11-67-2nd-f21

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-67-2nd-f21-L1.jdf



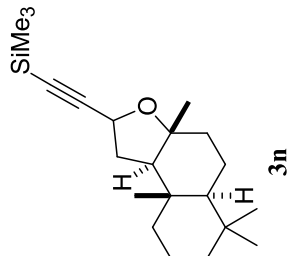
DFILE
COMNT
DATIM
MENUF
OBNUC
OFR
OBFRQ
OBSET
OBFIN
PWL
DEADT
PREDDL
IWT
POINT
SPO
TIMES
DUMMY
FREQU
FLT
DELAY
ACQTM
PD
SCANS
ADBIT
RGAIN
BF
T1
T2
T3
T4
EXMOD
EXPCM
IRNUC
IRF
IRSET
IRFIN
IRRPW
IRATN
DFILE
SF
LKSET
LKFIN
LKLEV
LGAIN
LKPHS
LKSIG
CSPED
FILDC
FILDF
CTEMP
SLVNT
EXREF

TH-11-67-2nd-f21-L1.jdf
TH-11-67-2nd-f21
03-04-2012 21:26:18
1H
395.88 MHz
395.88 MHz
6.28 KHz
0.87 Hz
6.62 usec
0.00 usec
0.00000 msec
1.0000 sec
16384
16384
8
1
7422.80 Hz
30000 Hz
16.68 usec
2.2073 sec
5.0000 sec
8
16
40
0.01 Hz
0.00
0.00
90.00
100.00
single_pulse.ex2
1H
395.88 MHz
6.28 KHz
0.87 Hz
115 usec
79
TH-11-67-2nd-f21-L1.jdf
13.20 KHz
75.7 Hz
0
0
0
0 Hz
23.6 c
CDCL3
7.26 ppm

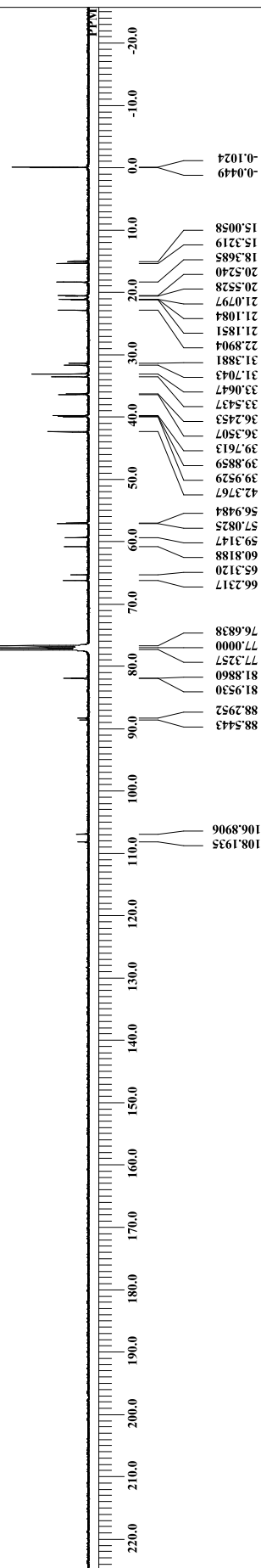


TH-11-67-2nd-f21C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-67-2nd-f21C-1.als

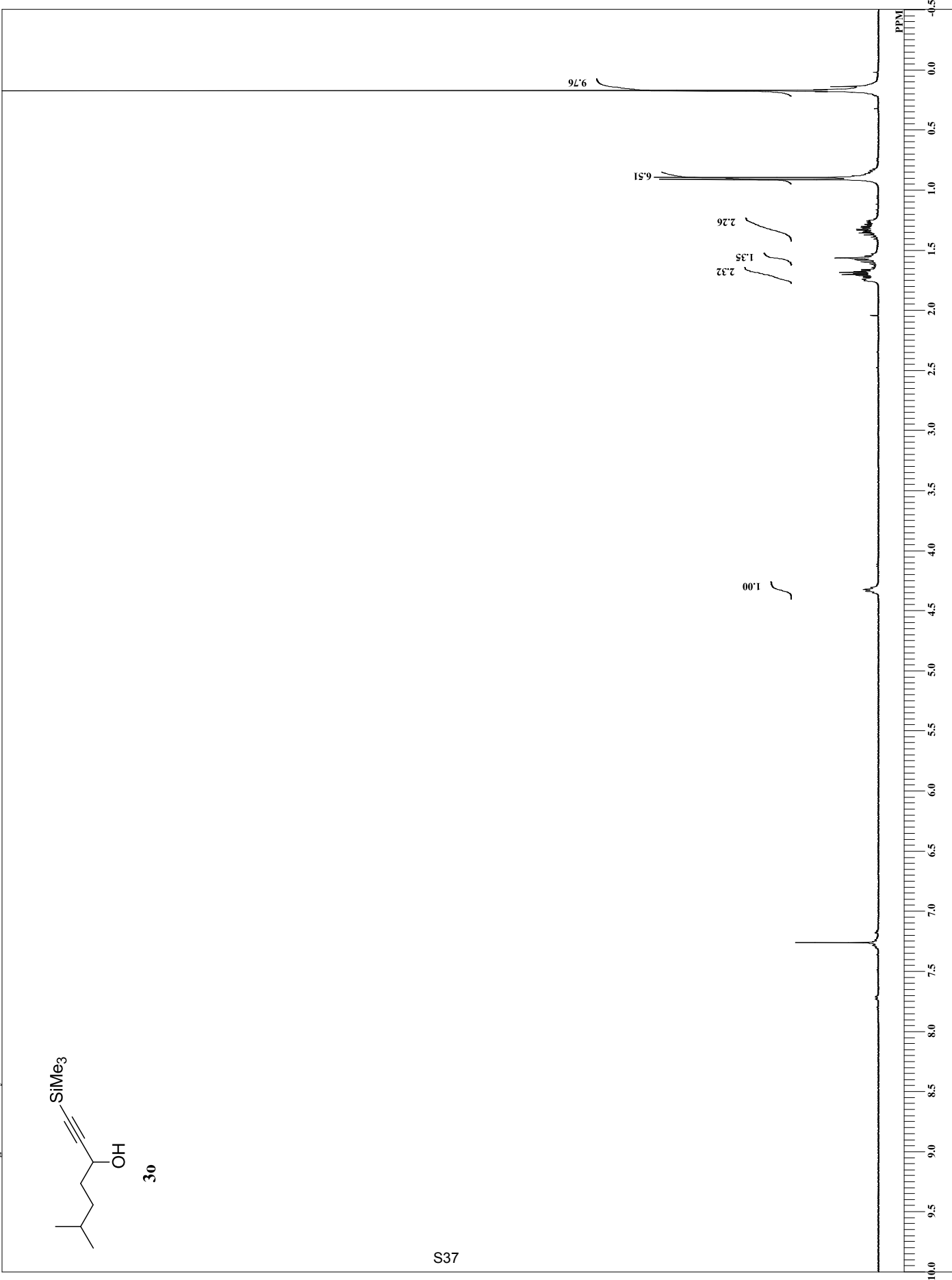
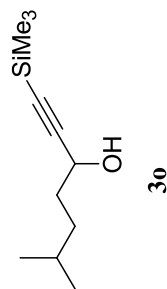


DFILE TH-11-67-2nd-f21C-1.als
COMNT TH-11-67-2nd-f21C
DATIM 05-04-2012 05:47:08
MENUF
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 26214
SPO 3200
TIMES 4
DUMMY 24999.62 Hz
FREQU 125000 Hz
FLT 20.50 usec
DELAY 1.0486 sec
ACQTM 8.0000 sec
PD 3200
SCANS 16
ADBIT 60
RGAIN 1.00 Hz
BF 0.00
T1 0.00
T2 90.00
T3 100.00
T4 single_pulse_dec
EXMOD
EXPCM 1H
IRNUC 395.88 MHz
IRF 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-67-2nd-f21C-1.als
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.4 c
SLVNT CDCL3
EXREF 77.00 ppm



TH-11-187-f26-28H

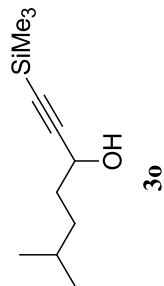
C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-187-f26-28H-1.als



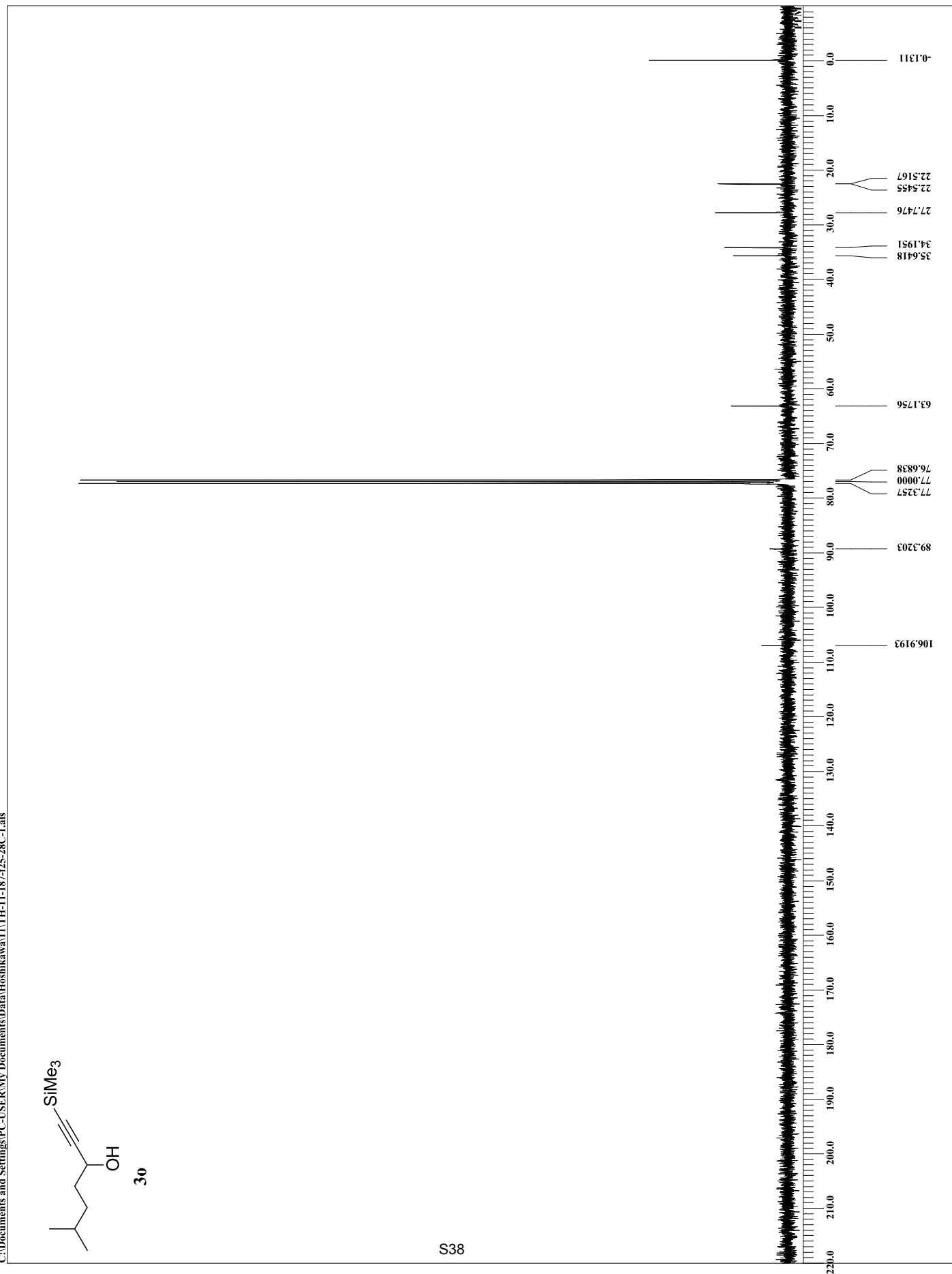
DFILE TH-11-187-f26-28H-1.als
COMNT TH-11-187-f26-28H
DATIM 14-05-2012 18:25:33
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.55 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 5938.15 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 36
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IRFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-187-f26-28H-1.als
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.1 c
SLVNT CDCL3
EXREF 7.26 ppm

TH-11-187-f25-28C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-187-f25-28C-1.als

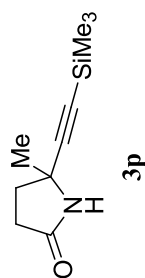


DFILE TH-11-187-f25-28C-1.als
COMNT TH-11-187-f25-28C
DATIM 14-05-2012 18:46:54
MENUF
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 3.67 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 26214
SPO 26214
TIMES 202
DUMIMY 4
FREQU 24999.62 Hz
FLUT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 5.0000 sec
SCANS 202
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM 1H
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-187-f25-28C-1.als
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.3 c
SLVNT CDCL3
EXREF 77.00 ppm

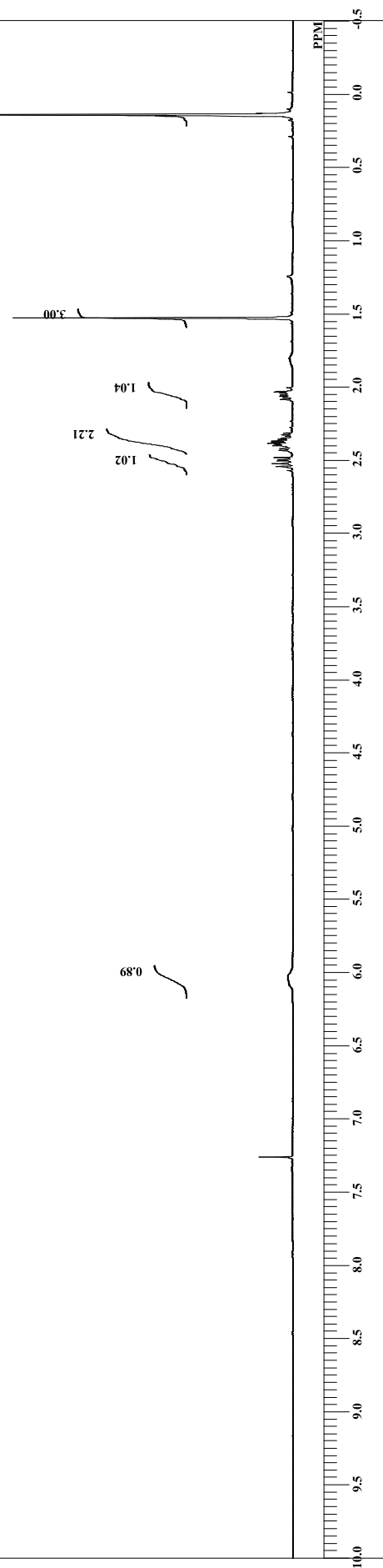


TH-10-143-f29-38

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\10\101-199\TH-10-143-f29-38-1.jdf

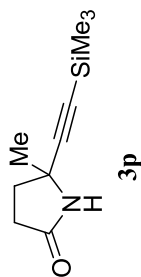


DFILE TH-10-143-f29-38-1.jdf
COMNT TH-10-143-f29-38
DATIM 02-11-2011 20:26:36
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 34
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-10-143-f29-38-1.jdf
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 25.1 c
SLVNT CDCL3
EXREF 7.26 ppm

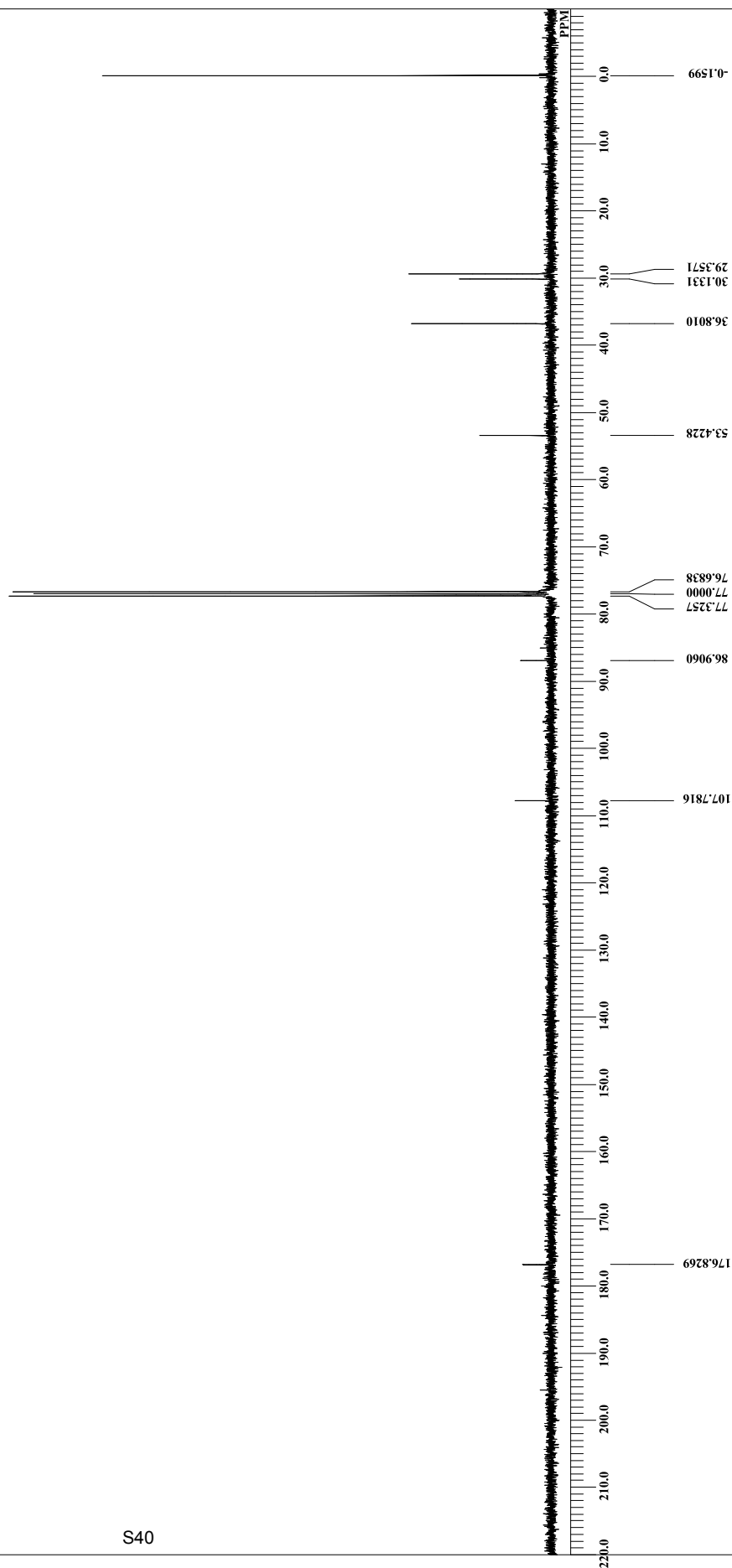


TH-10-143-f29-38C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\10\101-199\TH-10-143-f29-38C-1.jdf

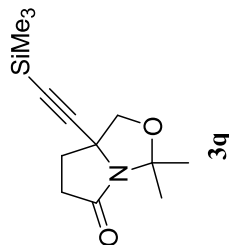


DFILE TH-10-143-f29-38C-1.jdf
COMNT TH-10-143-f29-38C
DATIM 02-11-2011 21:25:30
MENUF
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFN 0.98 Hz
PWL 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 32768
SPO 32768
TIMES 102
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
AQTM 1.0486 sec
PD 5.0000 sec
SCANS 102
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM 1H
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-10-143-f29-38C-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.9 c
SLVNT CDCL3
EXREF 77.00 ppm

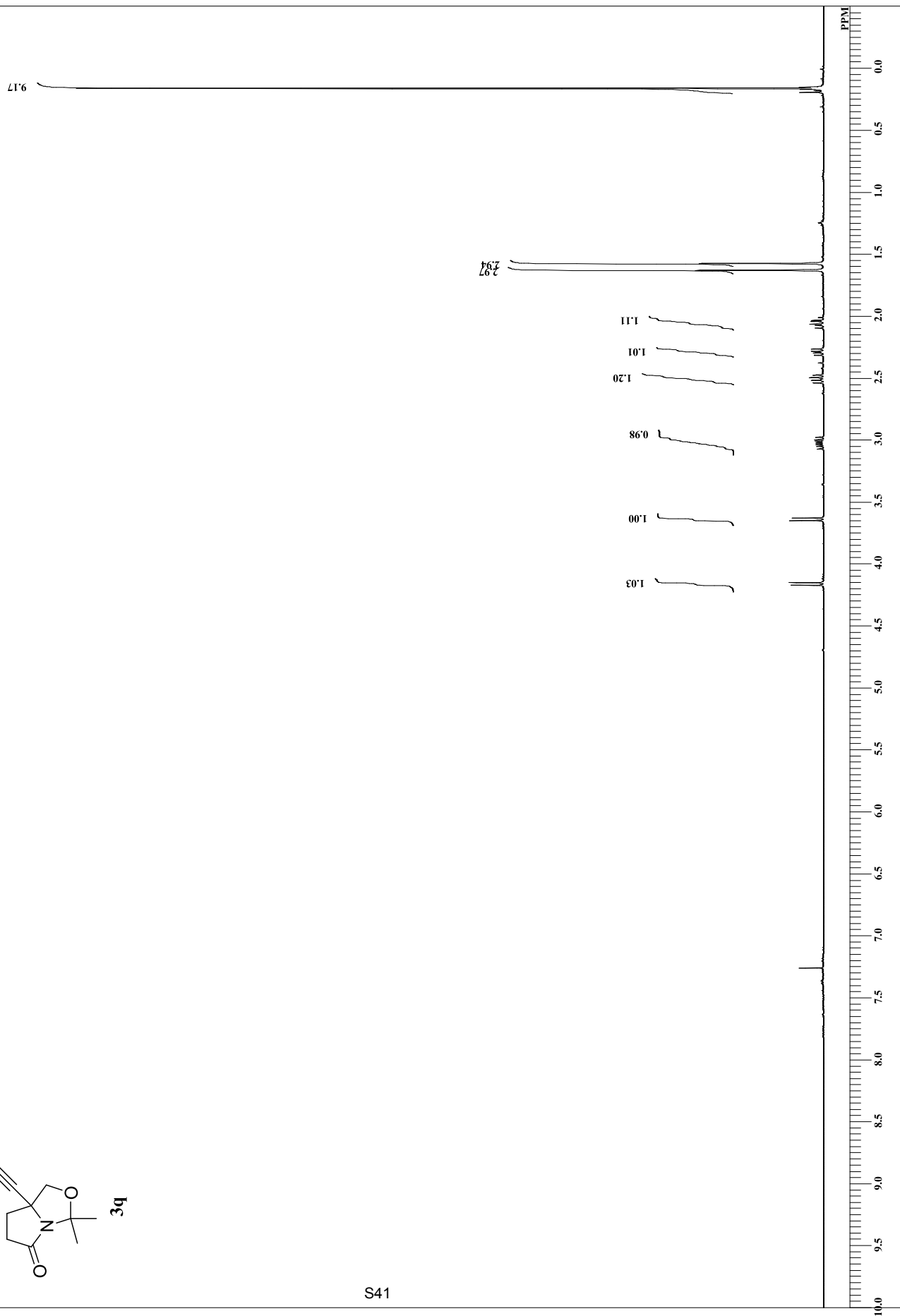


TH-11-7-f46-56

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-7-f46-56-1.jdf

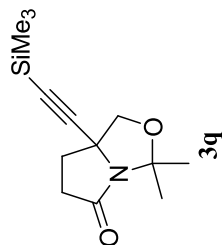


DFILE TH-11-7-f46-56-1.jdf
COMNT TH-11-7-f46-56
DATIM 07-12-2011 16:12:47
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 34
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-7-f46-56-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.0 c
SLVNT CDCL3
EXREF 7.26 ppm



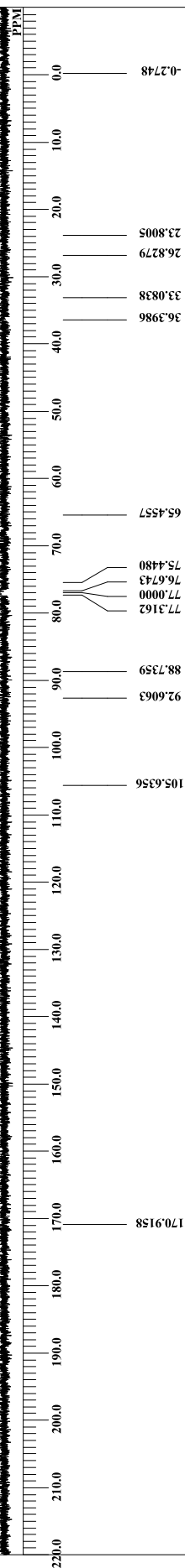
TH-11-7-f46-56C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-7-f46-56C-1.jdf



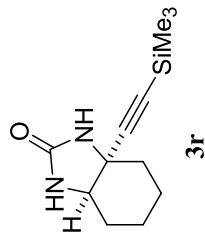
DFILE TH-11-7-f46-56C-1.jdf
COMNT TH-11-7-f46-56C
DATIM 07-12-2011 16:20:02
MENUF
OBNUC
13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFN 0.98 Hz
PWL 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 32768
SPO 32768
TIMES 52
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 6.0000 sec
SCANS 52
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 395.38 MHz
IRSET 6.28 KHz
IRFN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-7-f46-56C-1.jdf
SF
LKSET 13.20 KHz
LKFN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.6 c
SLVNT CDCL3
EXREF 77.00 ppm

S42

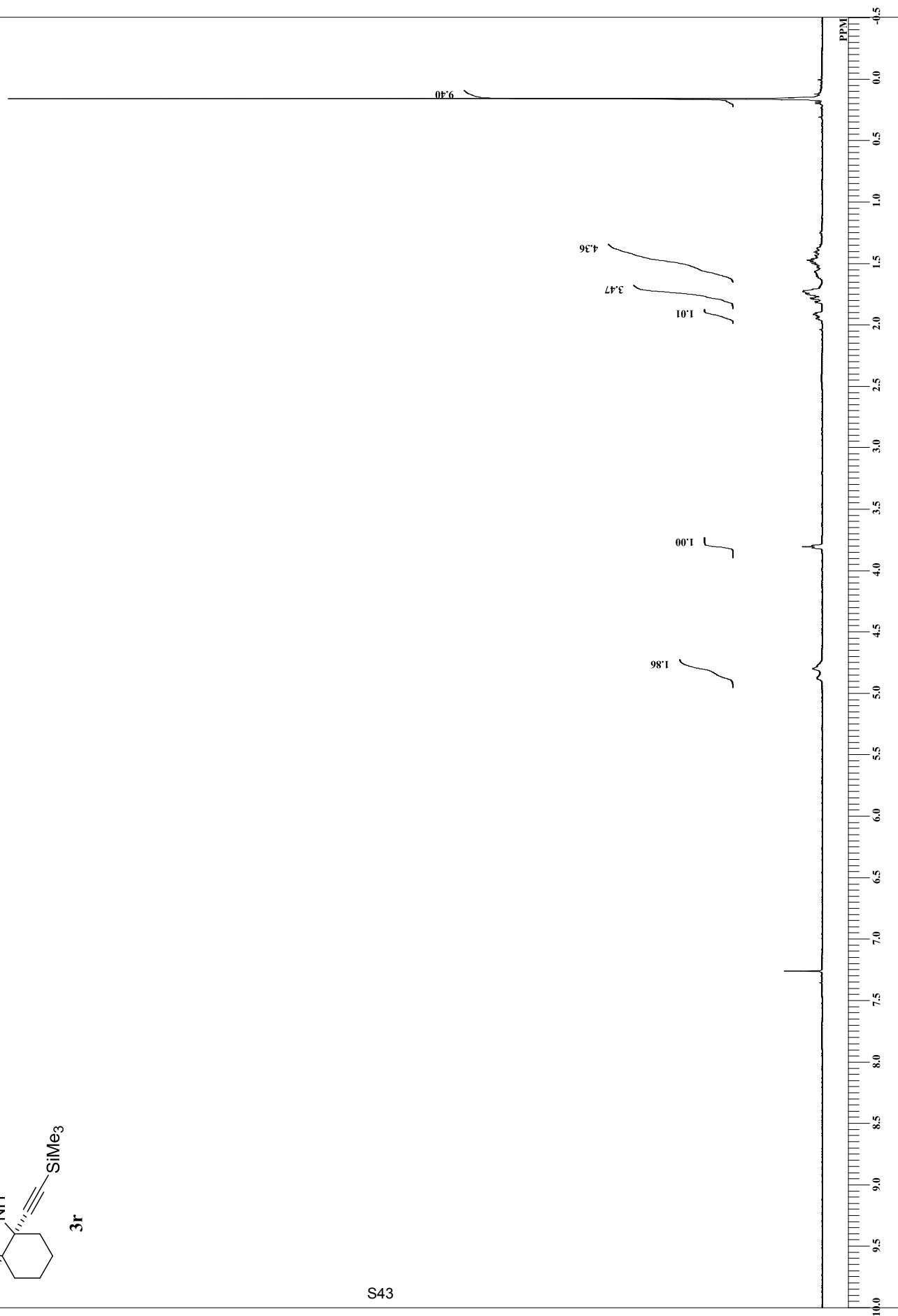


TH-11-113-f54-60

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-113-f54-60-1.jdf

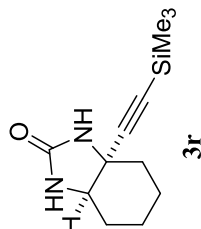


DFILE TH-11-113-f54-60-1.jdf
COMNT TH-11-113-f54-60
DATIM 16-02-2012 16:19:29
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQ 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 38
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-113-f54-60-1.jdf
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.1 c
SLVNT CDCL3
XREF 7.26 ppm

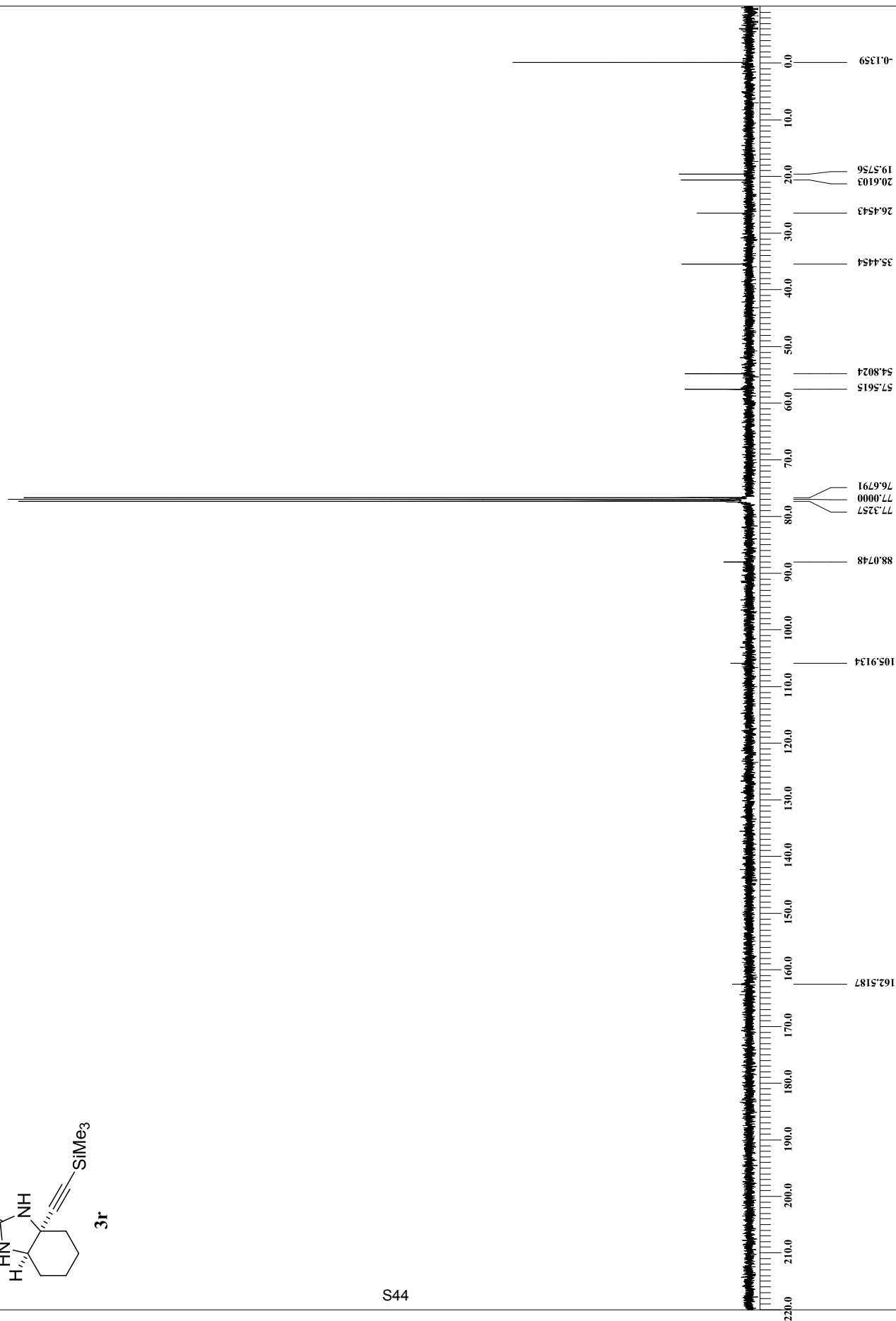


TH-11-113-f54-60C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-113-f54-60C-1.jdf

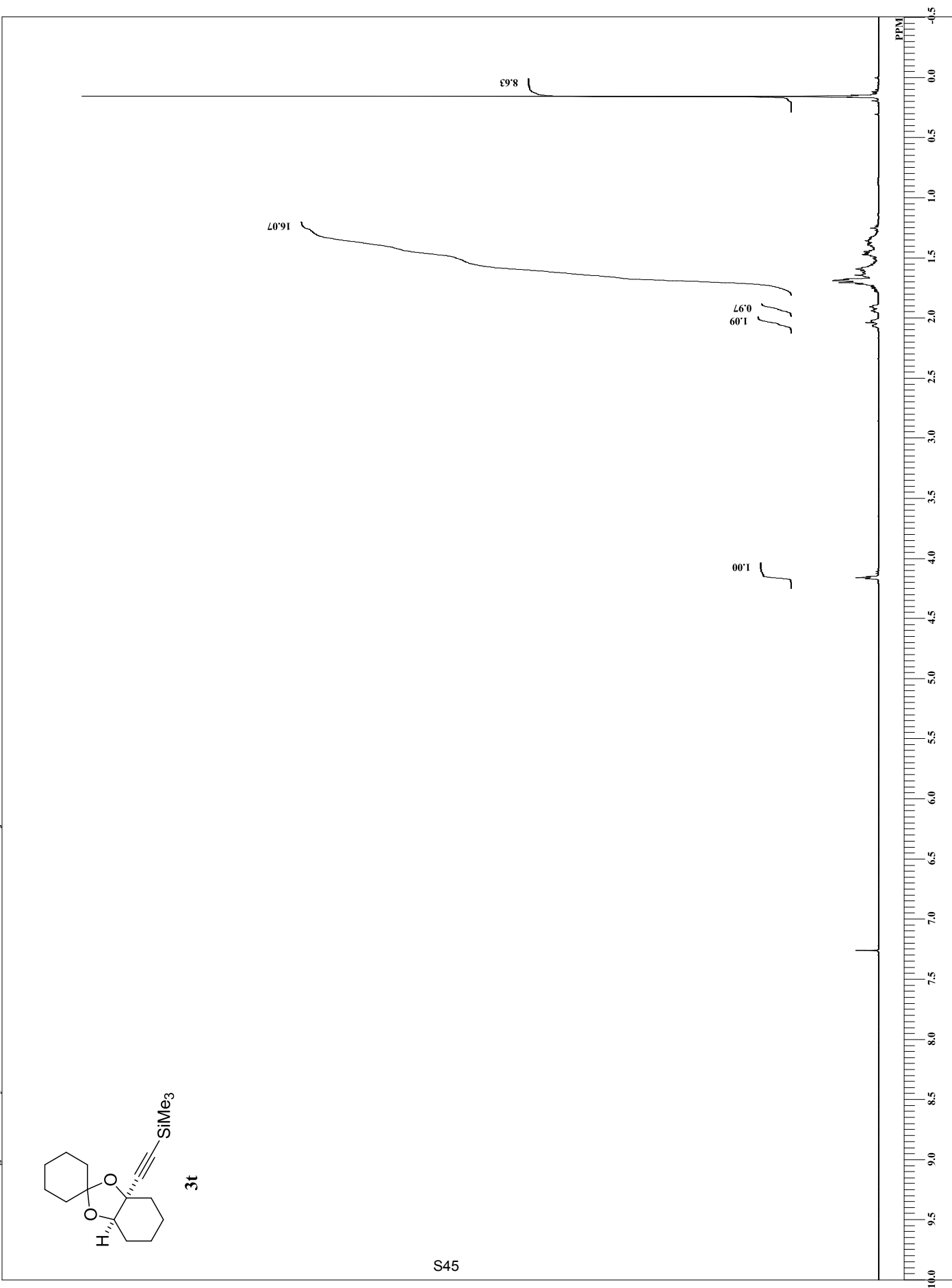
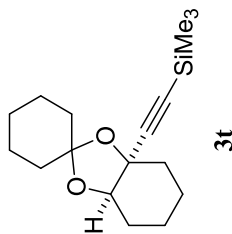


DFILE TH-11-113-f54-60C-1.jdf
COMNT TH-11-113-f54-60C
DATIM 16-02-2012 16:36:38
MENUF
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 65536
SPO 102
TIMES 4
DUMMY 31250.00 Hz
FREQU 125000 Hz
FLT 20.50 usec
DELAY 1.0486 sec
ACQTM 8.0000 sec
PD 102
SCANS 16
ADBIT 60
RGAIN 1.00 Hz
BF 0.00
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM 1H
IRNUC 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-113-f54-60C-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEY 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.2 c
SLVNT CDCL3
EXREF 77.00 ppm



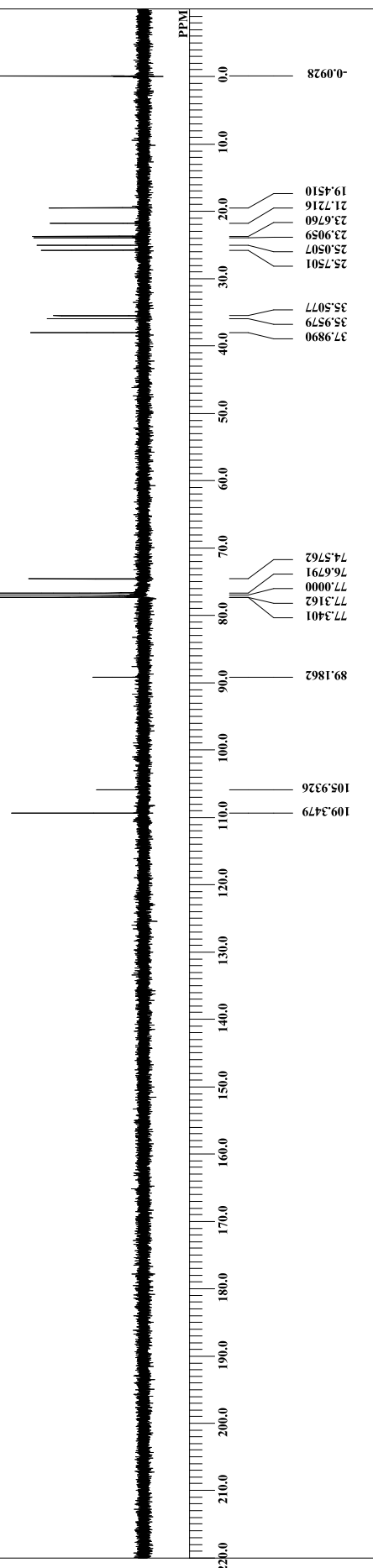
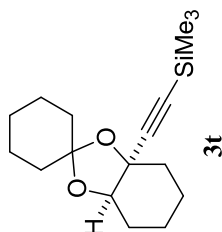
TH-11-125-3rd-f25-30

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-125-3rd-f25-30-1.jdf



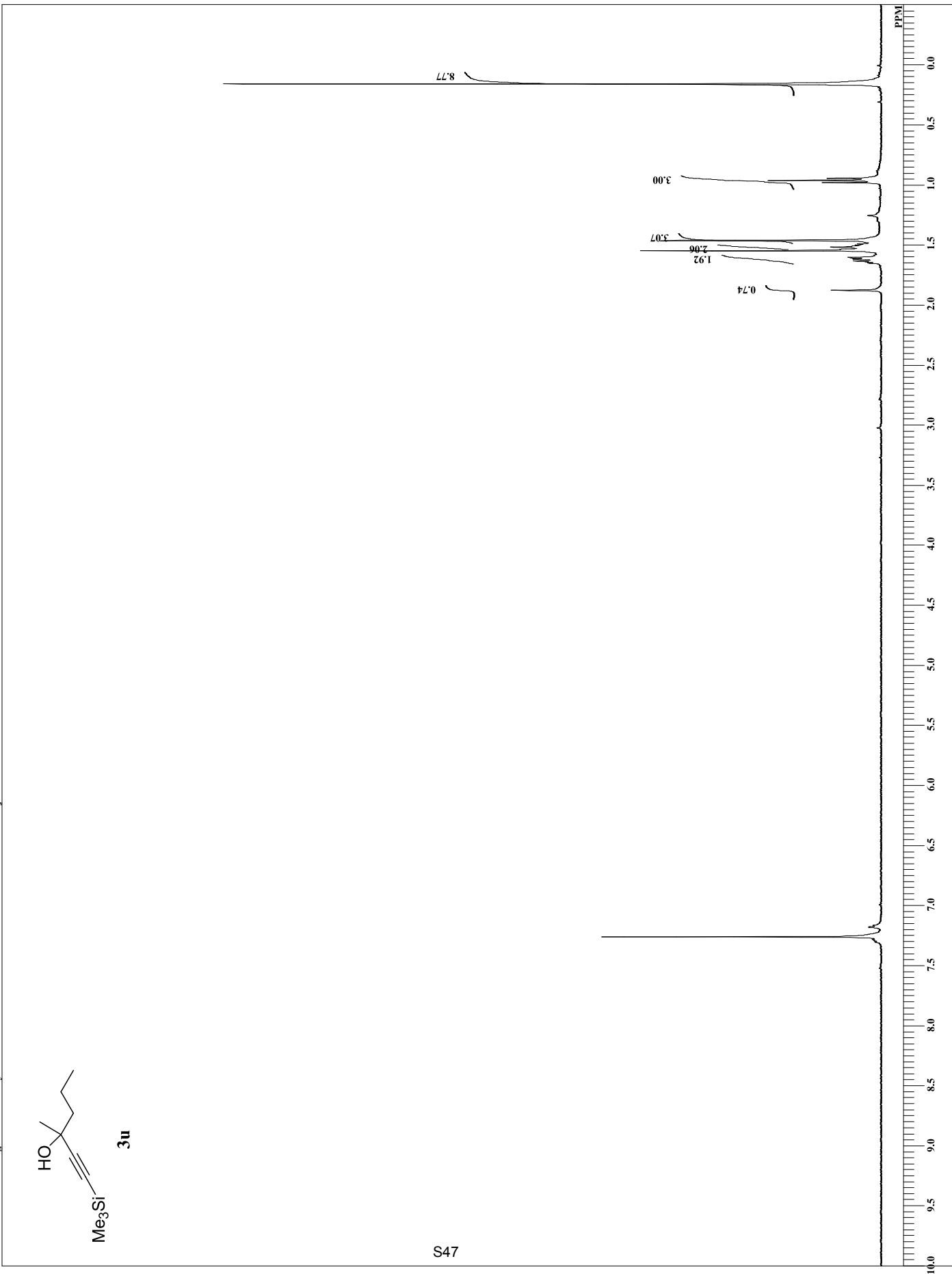
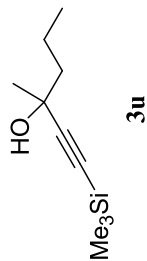
DFILE
COMET
DATUM
MENUF
OBNUC
OFR
OBFRQ
OBSET
OBFIN
PWL
DEADT
PREDL
IWT
POINT
SPO
TIMES
DUMMY
FREQU
FLT
DELAY
ACQTM
PD
SCANS
ADBIT
RGAIN
BF
T1
T2
T3
T4
EXMOD
EXPCM
IRNUC
IRF
IRSET
IRFIN
IRRPW
IRATN
DFILE
SF
LKSET
LKFIN
LKLEV
LGAIN
LKPHS
LKSIG
CSPED
FILDC
FILDF
CTEMP
SLVNT
EXREF

TH-11-125-3rd-f25-30-1.jdf
TH-11-125-3rd-f25-30
02-03-2012 15:55:55
1H
395.88 MHz
395.88 MHz
6.28 KHz
0.87 Hz
6.62 usec
0.00 usec
0.00000 msec
1.0000 sec
16384
16384
8
1
7422.80 Hz
30000 Hz
16.68 usec
2.2073 sec
5.0000 sec
8
16
30
0.01 Hz
0.00
0.00
90.00
100.00
single_pulse.ex2
1H
395.88 MHz
6.28 KHz
0.87 Hz
115 usec
79
TH-11-125-3rd-f25-30-1.jdf
13.20 KHz
75.7 Hz
0
0
0
0 Hz
22.9 c
CDCL3
7.26 ppm

[illegible]

TH-11-169-2nd-f16-18H

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-169-2nd-f16-18H-1.jdf

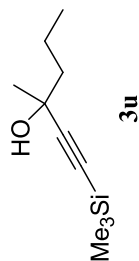


DFILE
COMINT
DATIM
MENUF
OBNUC
OFR
OBFRQ
OBSET
OBFIN
PWL
DEADT
PREDDL
IWT
POINT
SPO
TIMES
DUMMY
FREQU
FLT
DELAY
ACQTM
PD
SCANS
ADBIT
RGAIN
BF
T1
T2
T3
T4
EXMOD
EXPCM
IRNUC
IRSET
IRFIN
IRRPW
IRATN
DFILE
SF
LKSET
LKFIN
LKLEY
LGAIN
LKPHS
LKSIG
CSPED
FILDC
FILDF
CTEMP
SLVNT
EXREF

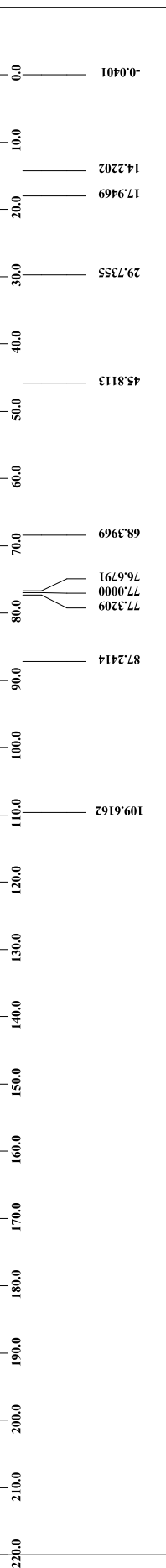
TH-11-169-2nd-f16-18H-1.jdf
TH-11-169-2nd-f16-18H-1.jdf
19-04-2012 22:06:12
1H
395.88 MHz
395.88 MHz
6.28 KHz
0.87 Hz
6.55 usec
0.00 usec
0.00000 msec
1.0000 sec
16384
16384
8
1
7422.80 Hz
30000 Hz
16.68 usec
2.2073 sec
2.0000 sec
8
16
42
1.00 Hz
0.00
0.00
90.00
100.00
single_pulse.ex2
1H
395.88 MHz
6.28 KHz
0.87 Hz
115 usec
79
TH-11-169-2nd-f16-18H-1.jdf
13.20 KHz
75.7 Hz
0
0
0
0 Hz
23.7 c
CDCL3
7.26 ppm

TH-11-169-2nd-f16-18C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-169-2nd-f16-18C-1.als

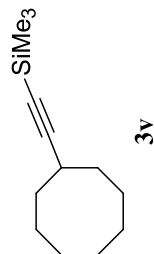


DFILE TH-11-169-2nd-f16-18C-1.als
COMINT TH-11-169-2nd-f16-18C
DATIM 20-04-2012 06:10:31
MENUF
OBNUC
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 3.67 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 52428
SPO 3200
TIMES 4
DUMIMY 24999.62 Hz
FREQU 125000 Hz
FLT 20.50 usec
DELAY 1.0486 sec
ACQTM 8.0000 sec
PD 3200
SCANS 16
ADBIT 60
RGAIN 1.00 Hz
BF 0.00
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-169-2nd-f16-18C-1.als
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEY 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.4 c
SLVNT CDCL3
EXREF 77.00 ppm

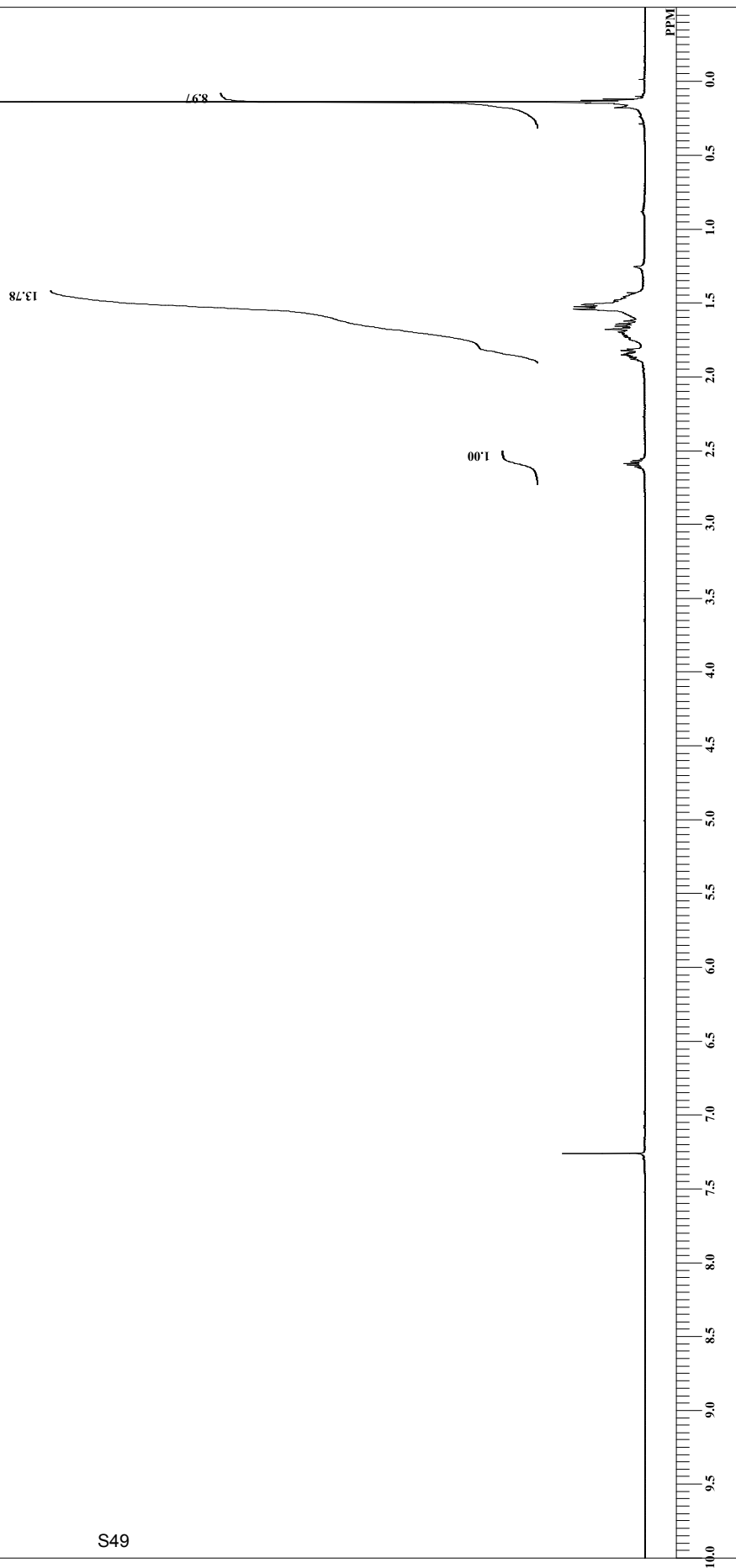


TH-11-59-f4

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-59-f4-1.jdf

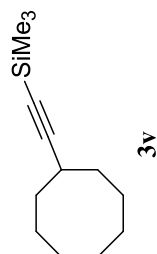


DFILE TH-11-59-f4-1.jdf
COMNT TH-11-59-f4
DATIM 19-03-2012 16:59:25
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 38
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IRFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-59-f4-1.jdf
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.3 c
SLVNT CDCL3
EXREF 7.26 ppm

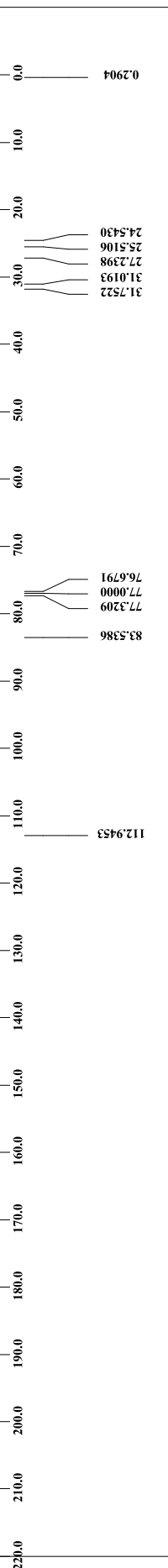


TH-11-59-f4C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-59-f4C-1.jdf

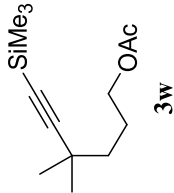


DFILE TH-11-59-f4C-1.jdf
COMNT TH-11-59-f4C
DATIM 19-03-2012 17:10:56
MENUF
OBNUC
13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFN 0.98 Hz
PW1 2.92 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 65536
SPO 65536
TIMES 102
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 5.0000 sec
SCANS 102
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-59-f4C-1.jdf
SF
LKSET 13.20 KHz
LKFN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.5 c
SLVNT CDCL3
EXREF 77.00 ppm

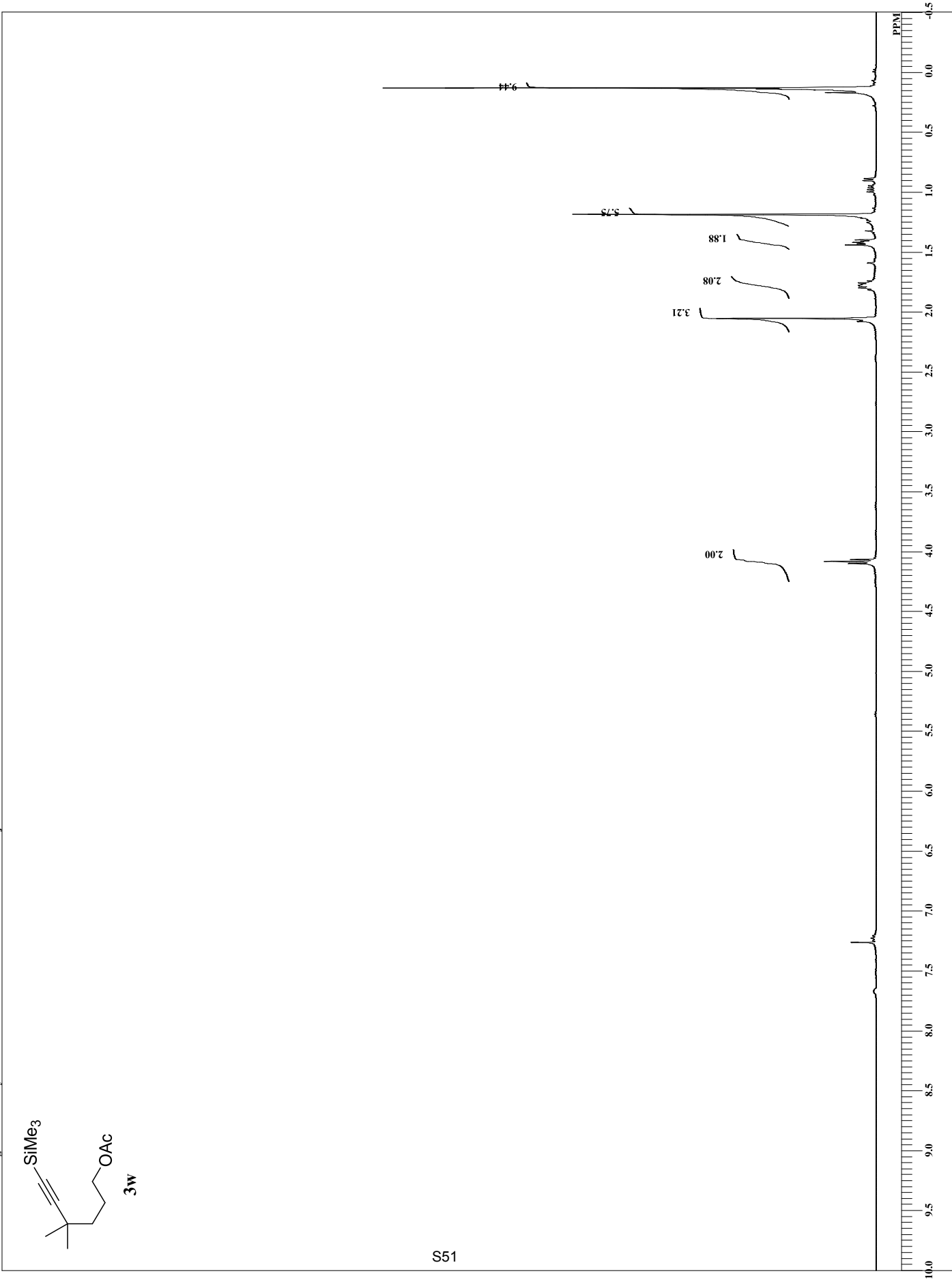


TH-11-179-f19-24H

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-179-f19-24H-1.jdf

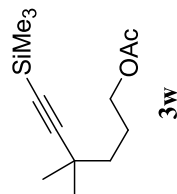


DFILE TH-11-179-f19-24H-1.jdf
COMNT TH-11-179-f19-24H
DATIM 11-05-2012 10:13:52
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.55 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQ 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 30
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 147 usec
IRATN 79
DFILE TH-11-179-f19-24H-1.jdf
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.4 c
SLVNT CDCL3
EXREF 7.26 ppm

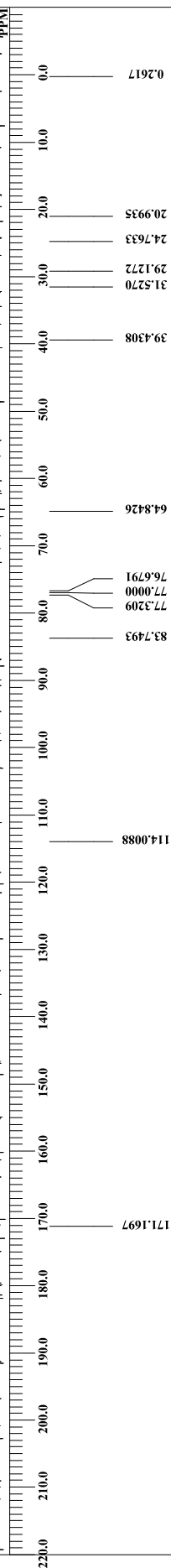


TH-11-179-f19-24C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-179-f19-24C-1.jdf

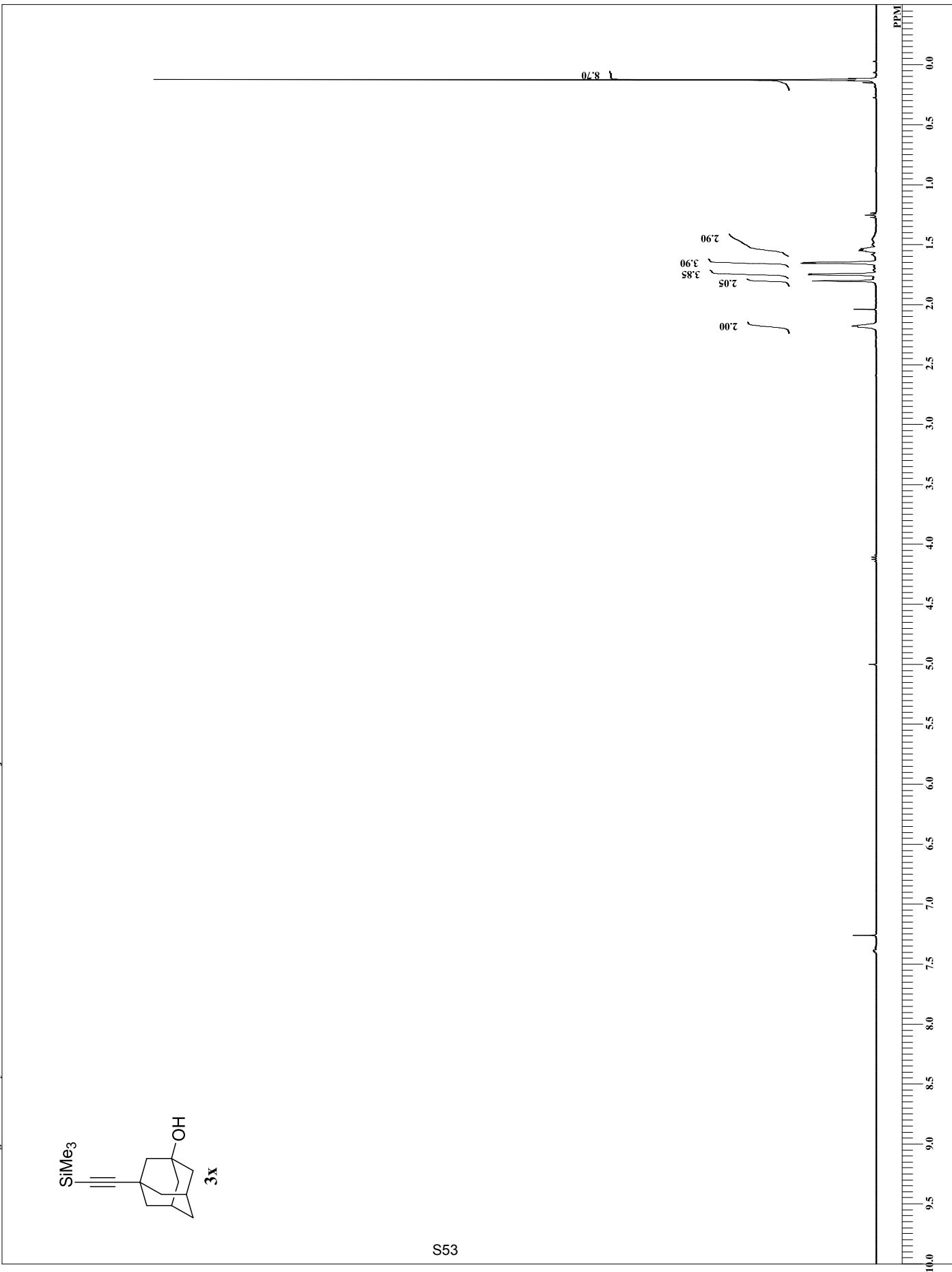
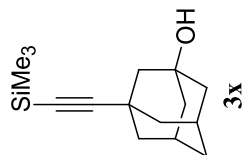


DFILE TH-11-179-f19-24C-1.jdf
COMNT TH-11-179-f19-24C
DATIM 11-05-2012 10:24:59
MENUF
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 3.67 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 sec
POINT 65536
SPO 65536
TIMES 62
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 8.0000 sec
SCANS 62
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM 1H
IRNUC 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-179-f19-24C-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEY 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.8 c
SLVNT CDCL3
EXREF 77.00 ppm



TH-10-175-2nd-f24-29H

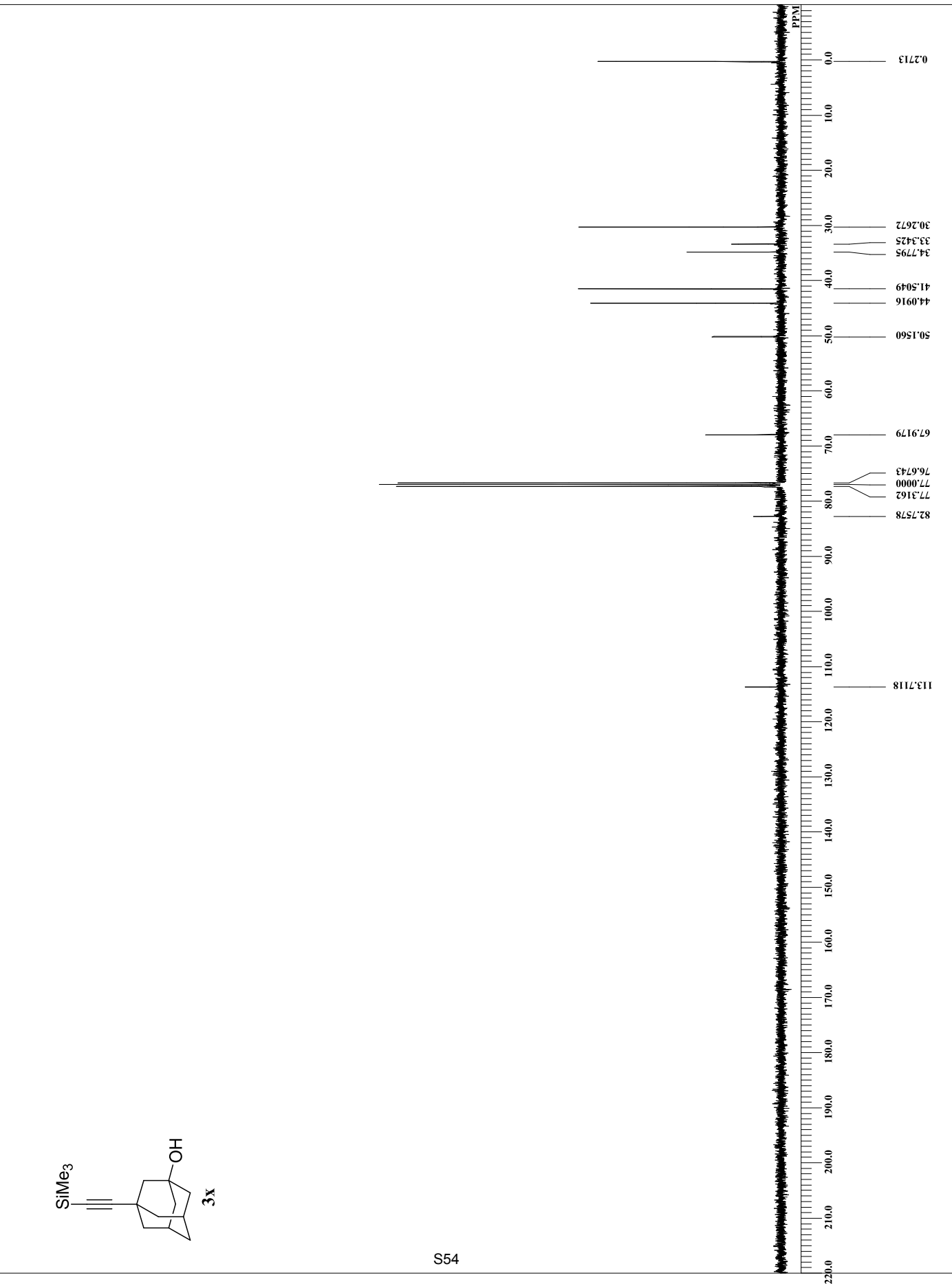
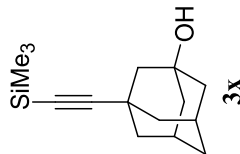
C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\101-199\TH-10-175-2nd-f24-29H-1.jdf



DFILE TH-10-175-2nd-f24-29H-1.jdf
COMINT TH-10-175-2nd-f24-29H
DATIM 22-03-2012 19:26:49
MENUF
OFR 395.88 MHz
OBNUC 395.88 MHz
OBFRQ 6.28 KHz
OBSF 0.87 Hz
OBFN 0.87 Hz
PWL 6.62 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQ 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 32
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-10-175-2nd-f24-29H-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.5 c
SLVNT CDCl₃
XREF 7.26 ppm

TH-10-175-2nd-f24-29C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\10\101-199\TH-10-175-2nd-f24-29C-1.jdf

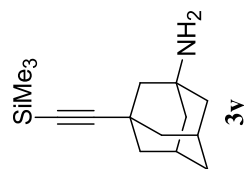


TH-10-175-2nd-f24-29C-1.jdf
TH-10-175-2nd-f24-29C-1.jdf
22-03-2012 19:33:07
13C
99.55 MHz
99.55 MHz
5.13 KHz
0.98 Hz
2.92 usec
0.00 usec
0.00000 msec
1.0000 sec
32768
32768
42
4
31250.00 Hz
125000 Hz
20.50 usec
1.0486 sec
5.0000 sec
42
16
60
1.00 Hz
0.00
0.00
90.00
100.00
single_pulse_dec
1H
395.88 MHz
6.28 KHz
0.87 Hz
115 usec
79
TH-10-175-2nd-f24-29C-1.jdf
13.20 KHz
75.7 Hz
0
0
0
0 Hz
23.5 c
CDCl3
77.00 ppm

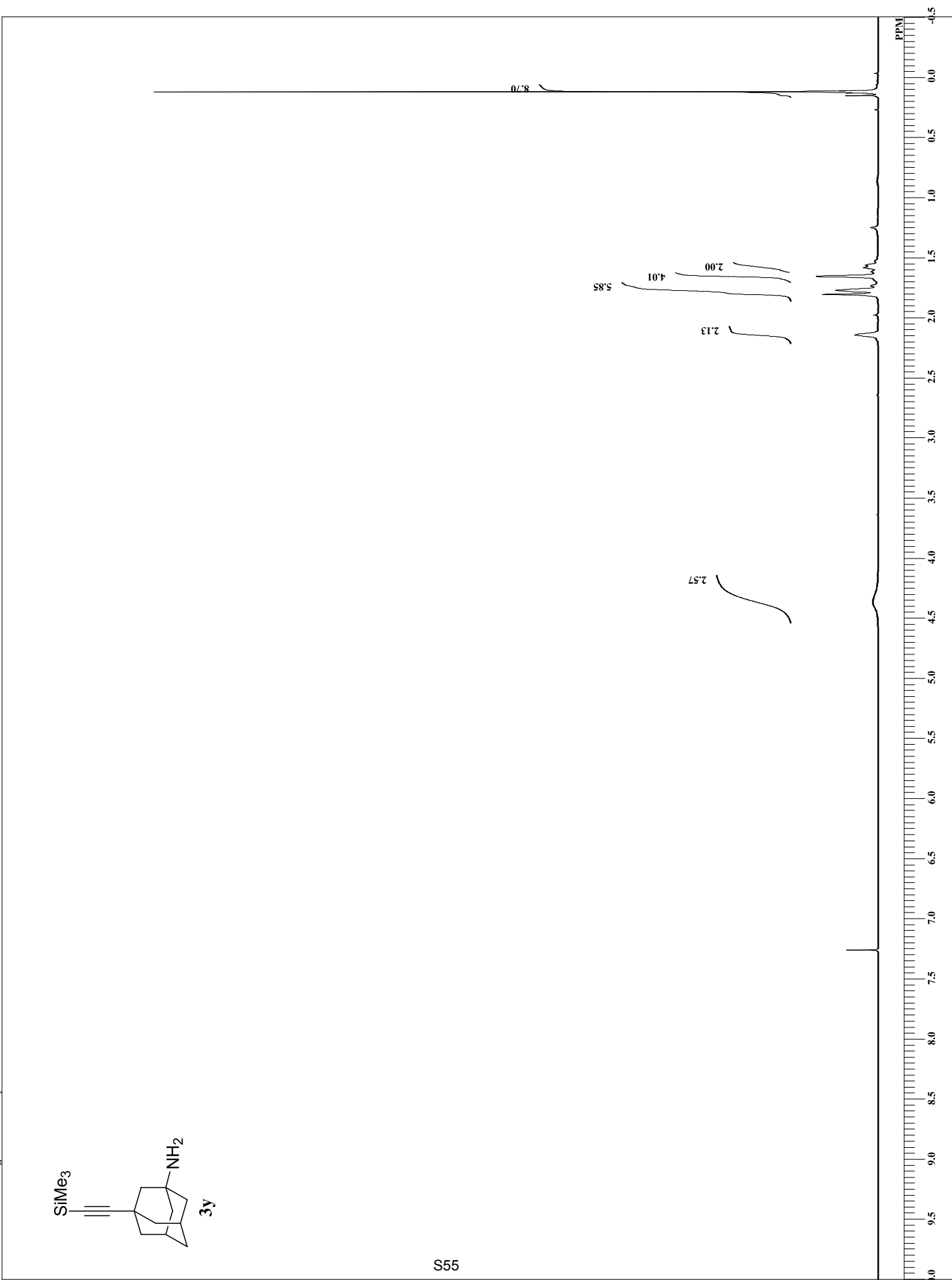
DFILE
COMINT
DATIM
MENUF
OBNUC
OFR
OBFRQ
OBSET
OBFIN
PWL
DEADT
PREDDL
IWT
POINT
SPO
TIMES
DUMMY
FREQU
FLU
DELAY
ACQTM
PD
SCANS
ADBIT
RGAIN
BF
T1
T2
T3
T4
EXMOD
EXPCM
IRNUC
IRSET
IRFIN
IRRPW
IRATN
DFILE
SF
LKSET
LKFIN
LKLEV
LGAIN
LKPHS
LKSIG
CSPED
FILDC
FILDF
CTEMP
SLVNT
EXREF

TH-11-191-f10-24

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-191-f10-24-1.als

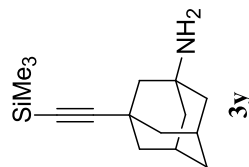


DFILE TH-11-191-f10-24-1.als
COMET TH-11-191-f10-24
DATIM 16-05-2012 18:58:28
MENUF
OBRUC
OFR 395.88 MHz
OBFRO 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.55 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 5938.15 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 34
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IRFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-191-f10-24-1.als
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.8 c
SLVNT CDCL3
EXREF 7.26 ppm

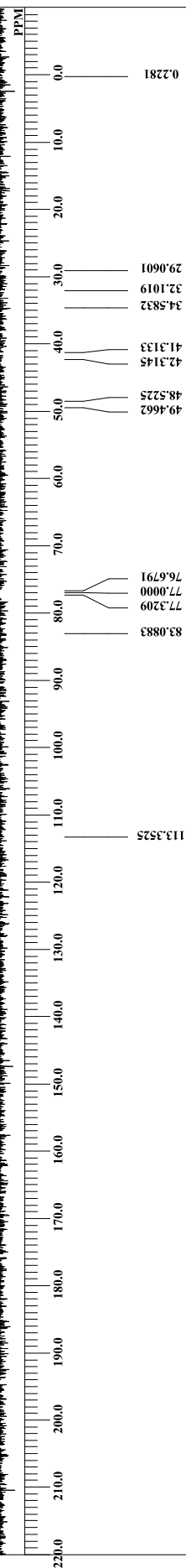


TH-11-191-f10-24C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\1\TH-11-191-f10-24C-1.jdf

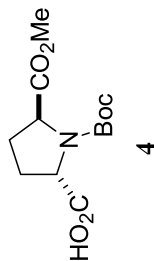


DFILE TH-11-191-f10-24C-1.jdf
COMNT TH-11-191-f10-24C
DATIM 16-05-2012 19:06:15
MENUF
OBNUC
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 3.67 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 sec
POINT 65536
SPO 65536
TIMES 42
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 8.0000 sec
SCANS 42
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-191-f10-24C-1.jdf
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEY 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.9 c
SLVNT CDCL3
EXREF 77.00 ppm

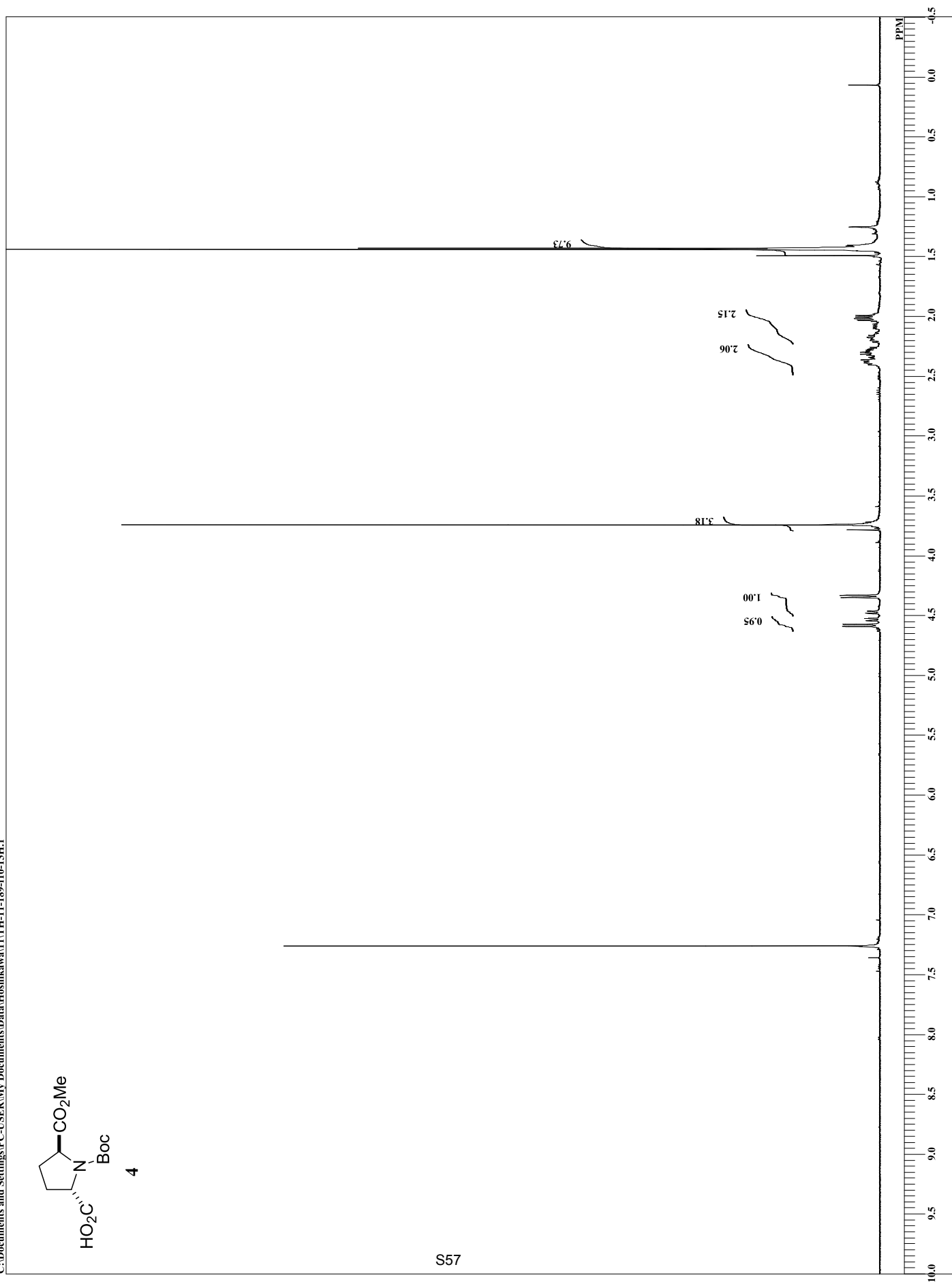


TH-11-189-f10-13

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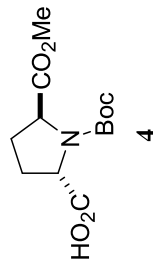


DFILE TH-11-189-f10-13H.1
COMNT TH-11-189-f10-13
DATIM 22-06-2012 13:30:57
MENUF
OBNUC 1H
OFR 490.15 MHz
OBFRQ 490.15 MHz
OBSET 9.16 KHz
OBFIN 7.60 Hz
PWL 6.50 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 9191.18 Hz
FLUT 37000 Hz
DELAY 13.52 usec
ACQTM 1.7826 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 36
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM 1H
IRNUC 1H
IRF 490.15 MHz
IRSET 9.16 KHz
IRFIN 7.60 Hz
IRRPW 92 usec
IRATN 79
DFILE TH-11-189-f10-13H.1
SF
LKSET 70.30 KHz
LKFIN 32.5 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 25.2 c
SLVNT CDCL3
EXREF 7.26 ppm

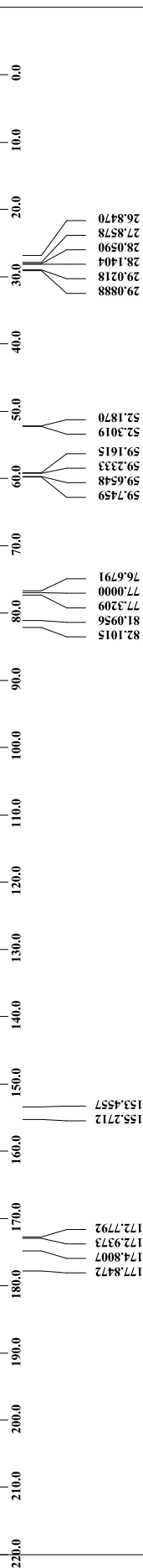


TH-11-189-f10-13C

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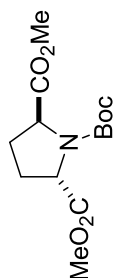


DFILE TH-11-189-f10-13C-1.jdf
COMNT TH-11-189-f10-13C
DATIM 15-05-2012 08:17:53
MENUF
OBNUC 13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 3.67 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 65536
SPO 4200
TIMES 4
DUMMY 4
FREQU 31250.00 Hz
FLT 125000 Hz
DELAY 20.50 usec
ACQTM 1.0486 sec
PD 8.0000 sec
SCANS 4200
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM 1H
IRNUC 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
TH-11-189-f10-13C-1.jdf
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEY 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.1 c
SLVNT CDCL3
EXREF 77.00 ppm



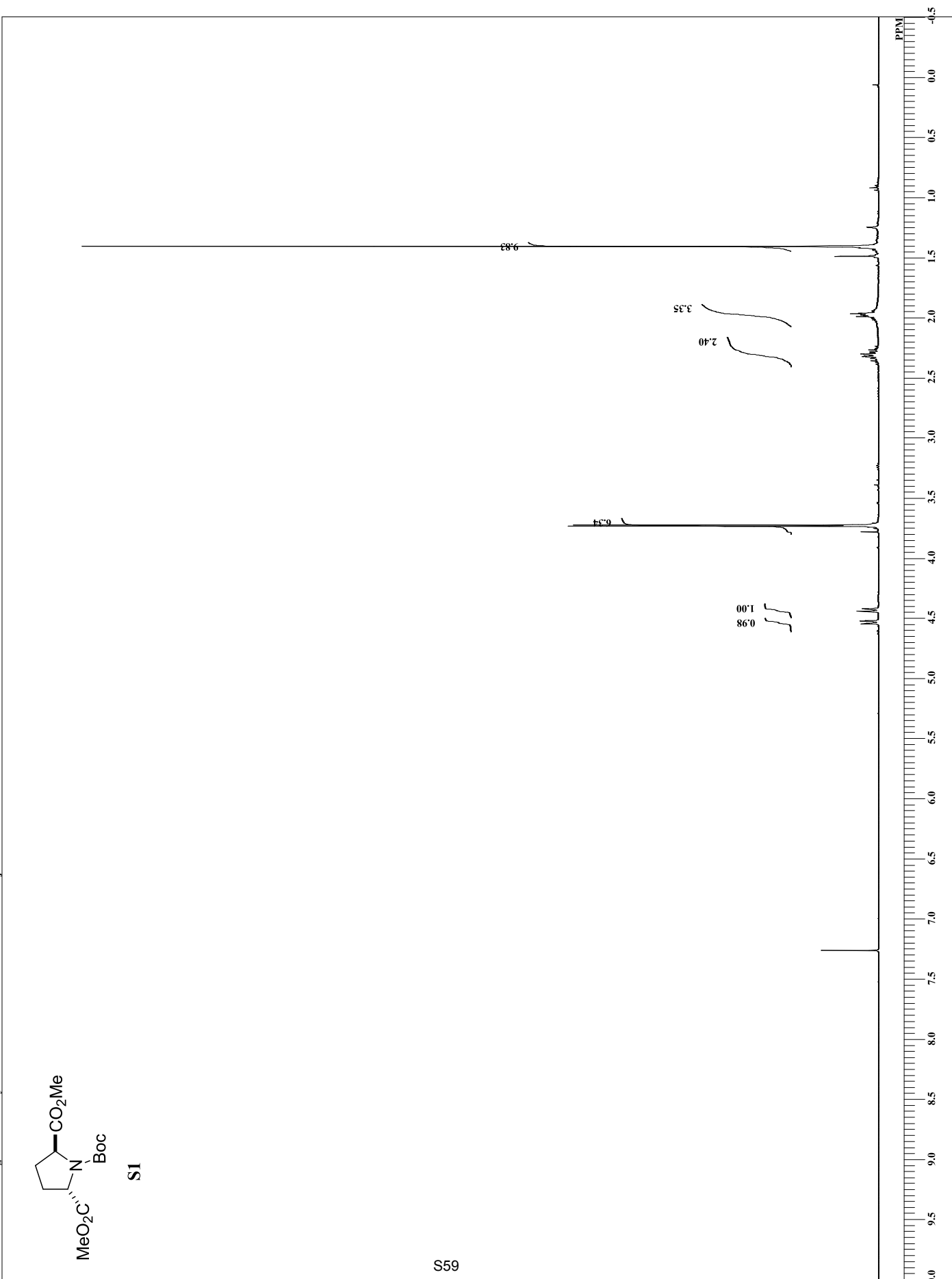
TH-11-193-crude

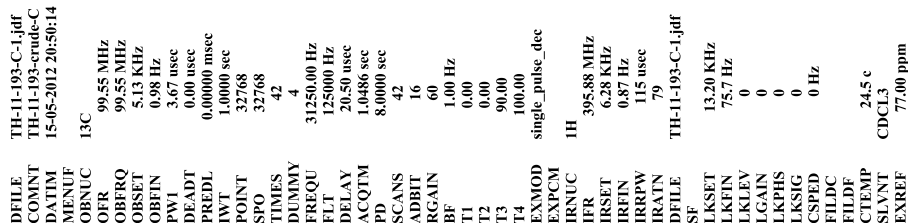
C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-193-H₂df



S1

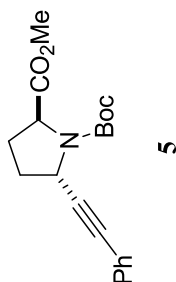
DFILE TH-11-193-H₂df
COMINT TH-11-193-crude
DATIM 15-05-2012 20:41:44
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFIN 0.87 Hz
PWL 6.55 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 36
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IRFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-193-H₂df
SF 13.20 KHz
LKSET 75.7 Hz
LKFIN 0
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.2 c
SLVNT CDCL₃
XREF 7.26 ppm



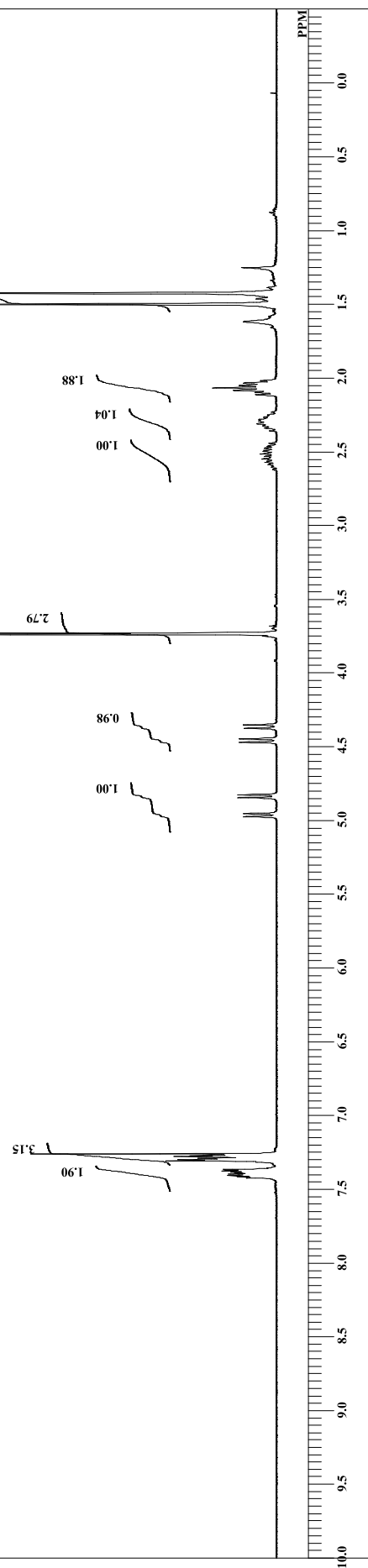


TH-11-185-f29-37

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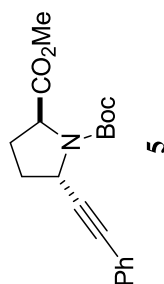


DFILE TH-11-185-f29-37-1.jdf
COMNT TH-11-185-f29-37
DATIM 09-05-2012 10:46:60
MENUF
OBNUC
OFR 395.88 MHz
OBFRQ 395.88 MHz
OBSET 6.28 KHz
OBFN 0.87 Hz
PWL 6.55 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 16384
SPO 16384
TIMES 8
DUMMY 1
FREQU 7422.80 Hz
FLT 30000 Hz
DELAY 16.68 usec
ACQTM 2.2073 sec
PD 5.0000 sec
SCANS 8
ADBIT 16
RGAIN 36
BF 0.01 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC
IR 395.88 MHz
IRSET 6.28 KHz
IRFN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-185-f29-37-1.jdf
SF
LKSET 13.20 KHz
LKFN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 23.9 c
SLVNT CDCL3
EXREF 7.26 ppm



TH-11-185-f29-37C

C:\Documents and Settings\PC-USER\My Documents\Data\Hoshikawa\11\TH-11-185-f29-37C-1.als



DFILE TH-11-185-f29-37C-1.als
COMINT TH-11-185-f29-37C
DATIM 09-05-2012 12:41:07
MENUF
OBNUC
13C
OFR 99.55 MHz
OBFRQ 99.55 MHz
OBSET 5.13 KHz
OBFIN 0.98 Hz
PWL 3.67 usec
DEADT 0.00 usec
PREDDL 0.00000 msec
IWT 1.0000 sec
POINT 52428
SPO 52428
TIMES 302
DUMMY 4
FREQU 24999.62 Hz
FLT 125000 Hz
DELAY 20.50 usec
AQTM 1.0486 sec
PD 5.0000 sec
SCANS 302
ADBIT 16
RGAIN 60
BF 1.00 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 395.88 MHz
IRSET 6.28 KHz
IRFIN 0.87 Hz
IRRPW 115 usec
IRATN 79
DFILE TH-11-185-f29-37C-1.als
SF
LKSET 13.20 KHz
LKFIN 75.7 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
CTEMP 24.2 c
SLVNT CDCL3
EXREF 77.00 ppm

