

Supporting Information

An Efficient [3+2] Annulation for the Asymmetric Synthesis of Densely-Functionalized Pyrrolidinones and γ -Butenolides

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NMR Spectra

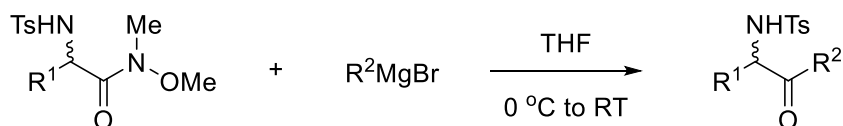
I. General Information

All air or moisture sensitive reactions were conducted in oven-dried glassware under nitrogen atmosphere using dry solvents. Flash column chromatography was performed over silica gel (230-400 mesh) purchased from Qingdao Puke Co., China. Anhydrous dichloromethane, acetonitrile and tetrahydrofuran were purified by Innovative® solvent purification system. Anhydrous chloroform, toluene, diethyl ether, 1,2-dichloroethane, and hexane were purchased from Sigma-Aldrich® and used as received. ¹H and ¹³C NMR spectra were collected on a Bruker AV 400 MHz NMR spectrometer using residue solvent peaks as an internal standard (¹H NMR: CDCl₃ at 7.26 ppm, ¹³C NMR: CDCl₃ at 77.16 ppm). Mass spectra were collected on an Agilent GC/MS 5975C system, or a MALDI Micro MX mass spectrometer, or an API QSTAR XL System.

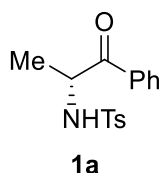
II. Substrate Preparation

All the siloxy alkynes are known compounds, which were prepared according to the literature procedure.¹

General Procedure A.



Under N₂, a solution of the Weinreb amide² (3 mmol) in THF (15 mL) was cooled to 0 °C and treated with a solution of R²MgBr (8 mmol, 1.0 M in THF) dropwise over 5 min. The reaction mixture was stirred for 30 min at 0 °C and further 18 h at room temperature. Then, a saturated aqueous NH₄Cl solution was added. The mixture was extracted with ethyl acetate (3 × 20 mL). The combined organic layers were washed with brine (30 mL), dried with Na₂SO₄, and concentrated under reduced pressure. The crude product was purified by silica gel flash chromatography to afford the desired ketone.



(R)-4-Methyl-N-(1-oxo-1-phenylpropan-2-yl)benzenesulfonamide (1a) was prepared according to the General Procedure A.

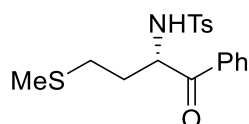
¹H NMR (400 MHz, CDCl₃) δ 7.77 (d, *J* = 8.0 Hz, 2H), 7.69 (d, *J* = 8.0 Hz, 2H), 7.61 – 7.57 (m, 1H), 7.47 – 7.43 (m, 2H), 7.17 (d, *J* = 8.0 Hz, 2H), 5.78 (d, *J* = 8.0 Hz, 1H), 4.93 (td, *J* = 9.0, 2.8 Hz, 1H), 2.32 (s, 3H), 1.41 (d, *J* = 7.2 Hz, 3H).

1. M. P. Schramm, V. Shubinets, and S. A. Kozmin, *Org. Synth.*, 2010, **87**, 253.
2. The Weinreb amide was synthesized by following the literature procedure:
 - a) S. B. Sdira, C. P. Felix, M.-B. A. Giudicelli, P. F. Seigle-Ferrand, M. Perrin, and R. J. Lamartine, *J. Org. Chem.*, 2003, **68**, 6632; b) M. G. Unthank, B. Tavassoli, and V. K. Aggarwal, *Org. Lett.*, 2008, **10**, 1501.

^{13}C NMR (100 MHz, CDCl_3) δ 198.2, 143.7, 137.2, 134.2, 133.5, 129.8, 129.0, 128.6, 127.2, 53.5, 21.6, 21.3.

IR (neat, cm^{-1}): 3278, 1686, 1597, 1340, 1162.

HRMS (CI) calculated for $\text{C}_{16}\text{H}_{17}\text{NO}_3\text{S}$ [M^+]: 303.0929, found: 303.0931.



1b

(S)-4-Methyl-N-(4-(methylthio)-1-oxo-1-phenylbutan-2-yl)benzenesulfonamide (1b)

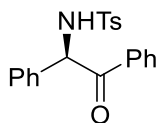
was prepared according to the General Procedure A.

^1H NMR (400 MHz, CDCl_3) δ 7.77 (d, $J = 7.9$ Hz, 2H), 7.66 (d, $J = 7.8$ Hz, 2H), 7.59 – 7.51 (m, 1H), 7.46 – 7.37 (m, 2H), 7.10 (d, $J = 7.9$ Hz, 2H), 5.87 (d, $J = 8.9$ Hz, 1H), 5.06 (td, $J = 9.0, 2.8$ Hz, 1H), 2.82 – 2.53 (m, 2H), 2.25 (s, 3H), 2.01 (s, 3H), 2.00 – 1.88 (m, 1H), 1.76 – 1.63 (m, 1H).

^{13}C NMR (100 MHz, CDCl_3) δ 197.7, 143.7, 136.5, 134.2, 133.5, 129.7, 128.9, 128.5, 127.2, 56.3, 33.4, 30.3, 21.5, 15.5.

IR (neat, cm^{-1}): 3512, 2957, 2868, 1741, 1169.

HRMS (CI) calculated for $\text{C}_{18}\text{H}_{22}\text{NO}_3\text{S}_2$ [$\text{M}+\text{H}^+$]: 364.1041, found: 364.1065.



1c

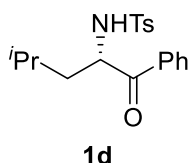
(R)-4-Methyl-N-(2-oxo-1,2-diphenylethyl)benzenesulfonamide (1c) was prepared according to the General Procedure A.

^1H NMR (400 MHz, CDCl_3) δ 7.80 (d, $J = 8.0$ Hz, 2H), 7.54 (d, $J = 7.7$ Hz, 2H), 7.51 – 7.42 (m, 1H), 7.38 – 7.29 (m, 2H), 7.23 – 7.11 (m, 5H), 7.04 (d, $J = 7.9$ Hz, 2H), 6.36 (d, $J = 7.4$ Hz, 1H), 6.02 (d, $J = 7.4$ Hz, 1H), 2.27 (s, 3H).

¹³C NMR (100 MHz, CDCl₃) δ 194.7, 143.2, 137.4, 135.7, 134.0, 133.8, 129.4, 129.1, 129.0, 128.7, 128.5, 128.2, 127.0, 61.7, 21.4.

IR (neat, cm⁻¹): 3487, 2940, 1734, 1357, 1089.

HRMS (CI) calculated for C₂₁H₂₀NO₃S [M+H⁺]: 366.1164, found: 366.1148.



(S)-4-Methyl-N-(4-methyl-1-oxo-1-phenylpentan-2-yl)benzenesulfonamide

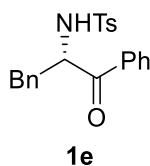
(1d) was prepared according to the General Procedure A.

¹H NMR (400 MHz, CDCl₃) δ 7.68 (d, *J* = 7.8 Hz, 2H), 7.63 (d, *J* = 7.8 Hz, 2H), 7.59 – 7.52 (m, 1H), 7.48 – 7.35 (m, 2H), 7.07 (d, *J* = 7.8 Hz, 2H), 5.61 (d, *J* = 9.5 Hz, 1H), 4.87 (td, *J* = 9.5, 3.9 Hz, 1H), 2.25 (s, 3H), 2.11 – 1.94 (m, 1H), 1.48 – 1.29 (m, 2H), 1.04 (d, *J* = 6.4 Hz, 3H), 0.88 (d, *J* = 6.7 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃) δ 198.7, 143.5, 136.7, 134.0, 133.9, 129.6, 128.9, 128.2, 127.3, 56.1, 43.1, 24.7, 23.4, 21.5, 21.2.

IR (neat, cm⁻¹): 3467, 2878, 1637, 1344, 1091.

HRMS (CI) calculated for C₁₉H₂₄NO₃S [M+H⁺]: 346.1477, found: 346.1491.



(S)-4-Methyl-N-(1-oxo-1,3-diphenylpropan-2-yl)benzenesulfonamide (1e)

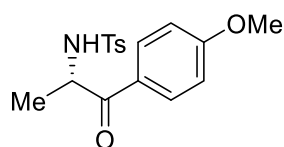
was prepared according to the General Procedure A.

¹H NMR (400 MHz, CDCl₃) δ 7.71 (d, *J* = 7.7 Hz, 2H), 7.64 – 7.53 (m, 3H), 7.46 – 7.39 (m, 2H), 7.22 – 7.13 (m, 3H), 7.09 (d, *J* = 8.0 Hz, 2H), 6.98 (s, 2H), 5.61 (d, *J* = 8.8 Hz, 1H), 5.14 (dd, *J* = 14.5, 5.8 Hz, 1H), 3.14 (dd, *J* = 13.9, 5.7 Hz, 1H), 2.96 (dd, *J* = 13.9, 5.9 Hz, 1H), 2.29 (s, 3H).

¹³C NMR (100 MHz, CDCl₃) δ 197.4, 143.6, 136.9, 135.0, 134.3, 134.1, 129.8, 129.7, 128.9, 128.5(2C), 127.2, 127.1, 58.2, 40.3, 21.5.

IR (neat, cm⁻¹): 3425, 1634, 1448, 1159, 750.

HRMS (CI) calculated for C₂₂H₂₂NO₃S [M+H⁺]: 380.1320, found: 380.1341.



1f

(S)-N-(1-(4-Methoxyphenyl)-1-oxopropan-2-yl)-4-methylbenzene

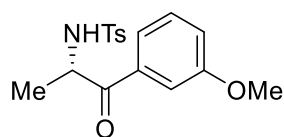
sulfonamide (1f) was prepared according to the General Procedure A.

¹H NMR (400 MHz, CDCl₃) δ 7.76 – 7.72 (m, 2H), 7.68 – 7.65 (m, 2H), 7.13 (d, *J* = 8.0 Hz, 2H), 6.90 – 6.89 (m, 2H), 5.91 (d, *J* = 8.0 Hz, 1H), 4.91 – 4.84 (m, 1H), 3.83 (s, 3H), 2.28 (s, 3H), 1.35 (d, *J* = 7.1 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃) δ 196.3, 164.2, 143.4, 137.1, 130.9, 129.6, 127.0, 126.1, 114.0, 55.6, 52.9, 21.4, 21.3.

IR (neat, cm⁻¹): 3282, 2979, 1673, 1600, 1093.

HRMS (CI) calculated for C₁₇H₂₀NO₄S [M+H⁺]: 334.1113, found: 334.1091.



1g

(S)-N-(1-(3-Methoxyphenyl)-1-oxopropan-2-yl)-4-methylbenzene

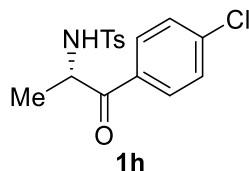
sulfonamide (1g) was prepared according to the General Procedure A.

¹H NMR (400 MHz, CDCl₃) δ 7.71 – 7.69 (m, 2H), 7.35 – 7.32 (m, 2H), 7.29 – 7.28 (m, 1H), 7.18 – 7.10 (m, 3H), 5.93 (d, *J* = 8.0 Hz, 1H), 4.97 – 4.89 (m, 1H), 3.82(s, 3H), 2.32 (s, 3H), 1.40 – 1.38 (m, 3H).

¹³C NMR (100 MHz, CDCl₃) δ 198.1, 160.0, 143.6, 137.1, 134.8, 129.9, 129.7, 127.1, 121.0, 120.5, 112.9, 55.6, 53.6, 21.5, 21.3.

IR (neat, cm^{-1}): 3279, 2977, 1689, 1597, 1162.

HRMS (CI) calculated for $\text{C}_{17}\text{H}_{19}\text{NNaO}_4\text{S}$ [$\text{M}+\text{Na}^+$]: 356.0932, found: 356.0901.



(S)-N-(1-(4-Chlorophenyl)-1-oxopropan-2-yl)-4-methylbenzenesulfonamide

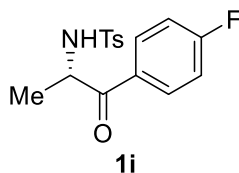
(1h) was prepared according to the General Procedure A.

^1H NMR (400 MHz, CDCl_3) δ 7.73 – 7.67 (m, 4H), 7.41 – 7.38 (m, 2H), 7.16 (d, J = 8.0 Hz, 2H), 5.82 (d, J = 8.2 Hz, 1H), 4.93 – 4.86 (m, 1H), 2.31 (s, 3H), 1.35 (d, J = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3) δ 197.1, 143.7, 140.7, 137.1, 131.8, 129.9, 129.8, 129.3, 127.1, 53.3, 21.5, 20.9.

IR (neat, cm^{-1}): 3447, 2981, 1687, 1636, 1592.

HRMS (CI) calculated for $\text{C}_{16}\text{H}_{17}\text{ClNO}_3\text{S}$ [$\text{M}+\text{H}^+$]: 338.0618, found: 338.0586.



(S)-N-(1-(4-Fluorophenyl)-1-oxopropan-2-yl)-4-methylbenzenesulfonamide

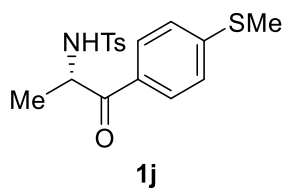
(1i) was prepared according to the General Procedure A.

^1H NMR (400 MHz, CDCl_3) δ 7.88 – 7.75 (m, 2H), 7.68 (d, J = 8.3 Hz, 2H), 7.16 (d, J = 8.0 Hz, 2H), 7.14 – 7.07 (m, 2H), 5.81 (d, J = 8.2 Hz, 1H), 4.96 – 4.81 (m, 1H), 2.32 (s, 3H), 1.37 (d, J = 7.2 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3) δ 196.7, 167.5, 165.0, 143.7, 137.1, 131.4 (d, J = 9.5 Hz), 129.8, 127.1, 116.3 (d, J = 21.7 Hz), 53.3, 21.5, 21.0.

IR (neat, cm^{-1}): 3282, 2983, 1687, 1598, 1163.

HRMS (CI) calculated for $\text{C}_{16}\text{H}_{17}\text{FNO}_3\text{S}$ [$\text{M}+\text{H}^+$]: 322.0913, found: 322.0930.



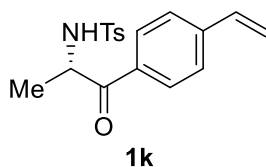
(S)-4-Methyl-N-(1-(4-(methylthio)phenyl)-1-oxopropan-2-yl)benzenesulfonamide (1j) was prepared according to the General Procedure A.

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.67 (d, $J = 8.2$ Hz, 4H), 7.22 (d, $J = 8.2$ Hz, 2H), 7.16 (d, $J = 8.0$ Hz, 2H), 5.81 (d, $J = 8.0$ Hz, 1H), 4.94 – 4.79 (m, 1H), 2.51 (s, 3H), 2.31 (s, 3H), 1.38 (d, $J = 7.1$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 197.0, 147.8, 143.6, 137.2, 129.8, 129.4, 128.9, 127.1, 125.0, 53.2, 21.5, 21.4, 14.7.

IR (neat, cm^{-1}): 3278, 1682, 1598, 1340, 1162.

HRMS (CI) calculated for $\text{C}_{17}\text{H}_{20}\text{NO}_3\text{S}_2$ [$\text{M}+\text{H}^+$]: 350.0885, found: 350.0888.



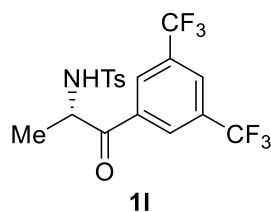
(S)-4-Methyl-N-(1-oxo-1-(4-vinylphenyl)propan-2-yl)benzenesulfonamide (1k) was prepared according to the General Procedure A.

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.73 (d, $J = 8.1$ Hz, 2H), 7.68 (d, $J = 8.0$ Hz, 2H), 7.45 (d, $J = 8.1$ Hz, 2H), 7.16 (d, $J = 8.0$ Hz, 2H), 6.80 – 6.67 (m, 1H), 5.89 (d, $J = 17.6$ Hz, 1H), 5.80 (d, $J = 8.0$ Hz, 1H), 5.43 (d, $J = 10.9$ Hz, 1H), 4.97 – 4.84 (m, 1H), 2.31 (s, 3H), 1.39 (d, $J = 7.1$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 197.5, 143.6, 143.2, 137.1, 135.7, 132.5, 129.8, 129.0, 127.1, 126.6, 117.7, 53.4, 21.5, 21.3.

IR (neat, cm^{-1}): 3282, 2982, 1681, 1602, 1162.

HRMS (CI) calculated for $\text{C}_{18}\text{H}_{20}\text{NO}_3\text{S}$ [$\text{M}+\text{H}^+$]: 330.1164, found: 330.1173.



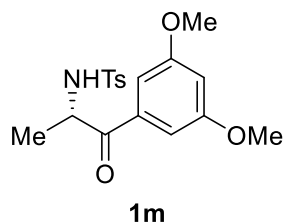
(S)-N-(1-(3,5-Bis(trifluoromethyl)phenyl)-1-oxopropan-2-yl)-4-methyl benzenesulfonamide (11) was prepared according to the General Procedure A.

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 8.22 (s, 2H), 8.07 (s, 1H), 7.70 (d, $J = 7.8$ Hz, 2H), 7.19 (d, $J = 7.9$ Hz, 2H), 5.81 (d, $J = 8.6$ Hz, 1H), 5.05 – 4.88 (m, 1H), 2.33 (s, 3H), 1.38 (d, $J = 7.1$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 196.3, 144.1, 137.0, 135.4, 133.2 (q, $J = 34.0$ Hz), 129.9, 128.5, 127.2, 127.1 (q, $J = 3.6$ Hz), 124.1 (q, $J = 271.4$ Hz), 53.5, 21.4, 20.0.

IR (neat, cm^{-1}): 3424, 2081, 1629, 1381, 1281.

HRMS (CI) calculated for $\text{C}_{18}\text{H}_{15}\text{F}_6\text{NNaO}_3\text{S}$ [$\text{M}+\text{Na}^+$]: 462.0575, found: 462.0581.



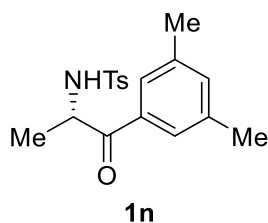
(S)-N-(1-(3,5-Dimethoxyphenyl)-1-oxopropan-2-yl)-4-methylbenzene sulfonamide (1m) was prepared according to the General Procedure A.

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.68 (d, $J = 8.0$ Hz, 2H), 7.16 (d, $J = 8.0$ Hz, 2H), 6.88 (d, $J = 2.2$ Hz, 2H), 6.64 (t, $J = 2.2$ Hz, 1H), 5.84 (d, $J = 8.2$ Hz, 1H), 4.90 – 4.82 (m, 1H), 3.79 (s, 6H), 2.31 (s, 3H), 1.36 (d, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 198.0, 161.1, 143.7, 137.2, 135.4, 129.8, 127.2, 106.4, 106.2, 55.7, 53.6, 21.5, 21.3.

IR (neat, cm^{-1}): 3290, 2976, 1688, 1598, 1159.

HRMS (CI) calculated for $\text{C}_{18}\text{H}_{21}\text{NNaO}_5\text{S}$ [$\text{M}+\text{Na}^+$]: 386.1038, found: 386.1050.



(S)-N-(1-(3,5-Dimethylphenyl)-1-oxopropan-2-yl)-4-methylbenzene

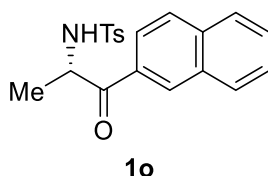
sulfonamide (1n) was prepared according to the General Procedure A.

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.69 (d, $J = 7.7$ Hz, 2H), 7.35 (s, 2H), 7.21 – 7.10 (m, 3H), 5.86 (d, $J = 8.0$ Hz, 1H), 4.98 – 4.83 (m, 1H), 2.32 (s, 6H), 2.31 (s, 3H), 1.37 (d, $J = 7.1$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 198.5, 143.4, 138.6, 137.2, 135.8, 133.5, 129.7, 127.0, 126.2, 53.4, 21.4, 21.3, 21.2.

IR (neat, cm^{-1}): 3287, 2980, 1686, 1601, 1380.

HRMS (CI) calculated for $\text{C}_{18}\text{H}_{22}\text{NO}_3\text{S}$ [$\text{M}+\text{H}^+$]: 332.1320, found: 332.1341.



(S)-4-Methyl-N-(1-(naphthalen-2-yl)-1-oxopropan-2-yl)benzenesulfonamide

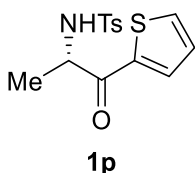
(1o) was prepared according to the General Procedure A.

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 8.30 (s, 1H), 7.94 (d, $J = 8.0$ Hz, 1H), 7.87 (d, $J = 8.6$ Hz, 2H), 7.80 (d, $J = 8.6$ Hz, 1H), 7.71 (d, $J = 8.0$ Hz, 2H), 7.67 – 7.54 (m, 2H), 7.13 (d, $J = 8.0$ Hz, 2H), 5.89 (d, $J = 8.2$ Hz, 1H), 5.17 – 5.04 (m, 1H), 2.25 (s, 3H), 1.47 (d, $J = 7.1$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 198.1, 143.6, 137.20, 136.0, 132.3, 130.8, 130.5, 129.8(2C), 129.3, 128.9, 127.9, 127.3, 127.1, 123.8, 53.5, 21.5, 21.5.

IR (neat, cm^{-1}): 3486, 2942, 1734, 1357, 1089.

HRMS (CI) calculated for $\text{C}_{20}\text{H}_{20}\text{NO}_3\text{S}$ [$\text{M}+\text{H}^+$]: 354.1164, found: 354.1147.



(S)-4-Methyl-N-(1-oxo-1-(thiophen-2-yl)propan-2-yl)benzenesulfonamide

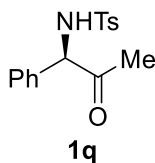
(1p) was prepared according to the General Procedure A.

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.74 – 7.60 (m, 4H), 7.20 – 7.08 (m, 3H), 5.66 (d, J = 8.6 Hz, 1H), 4.83 – 4.69 (m, 1H), 2.32 (s, 3H), 1.45 (d, J = 7.1 Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 190.9, 143.7, 140.4, 137.0, 135.4, 133.1, 129.7, 128.5, 127.2, 54.3, 21.6(2C).

IR (neat, cm^{-1}): 3423, 1656, 1410, 1162, 1091.

HRMS (CI) calculated for $\text{C}_{14}\text{H}_{16}\text{NO}_3\text{S}_2$ [$\text{M}+\text{H}^+$]: 310.0572, found: 310.0586.



(R)-4-Methyl-N-(2-oxo-1-phenylpropyl)benzenesulfonamide sulfonamide

(1q) was prepared according to the General Procedure A.

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.48 (d, J = 8.0 Hz, 2H), 7.22 – 7.20 (m, 3H), 7.11 – 7.07 (m, 4H), 6.10 (s, 1H), 5.03 (d, J = 5.2 Hz, 1H), 2.33 (s, 3H), 1.98 (s, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 201.9, 143.3, 137.3, 135.1, 129.4, 129.1, 128.7, 128.1, 127.0, 66.5, 26.7, 21.5.

IR (neat, cm^{-1}): 3260, 3064, 1686, 1449, 1093.

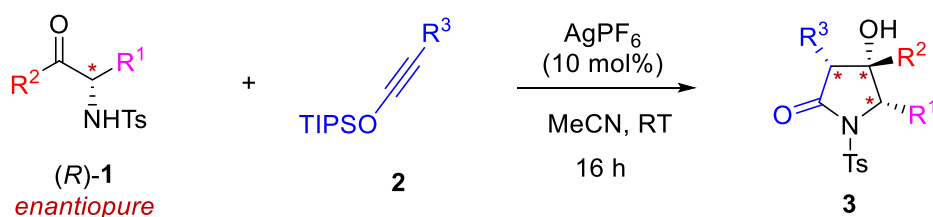
HRMS (CI) calculated for $\text{C}_{16}\text{H}_{17}\text{NNaO}_3\text{S}$ [$\text{M}+\text{Na}^+$]: 326.0827, found: 326.0822.

The α -siloxy ketones are known compounds, which were prepared according to the literature procedure.³

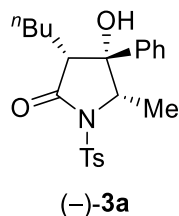
3. D. Gala and D. J. DiBenedetto, *Tetrahedron Lett.*, 1994, **35**, 8299.

III. Silver-Catalyzed Synthesis of Chiral Pyrrolidinones

General Procedure B.



In a glovebox, an oven-dried 4-mL vial was charged with the ketone **1** (1.0 equiv), siloxy alkyne **2** (2.0 equiv) and dry acetonitrile (0.2 M). The mixture was stirred for 3 min to be homogeneous. Next, AgPF₆ (10 mol%) was added. The vial was capped and removed from the glovebox. The reaction mixture was stirred at room temperature for 16 h. The reaction mixture was then filtered through a short pad of silica gel, which was washed with ethyl acetate. The filtrate was concentrated under reduced pressure. The residue was purified by silica gel flash column chromatography to give the desired product as a single diastereomer.



(3R,4R,5S)-3-Butyl-4-hydroxy-5-methyl-4-phenyl-1-tosylpyrrolidin-2-one (3a) was prepared as a colorless oil from (*R*)-4-methyl-*N*-(1-oxo-1-phenylpropan-2-yl)benzenesulfonamide (90.9 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 86% yield (103.6 mg, >99% ee based on HPLC analysis).

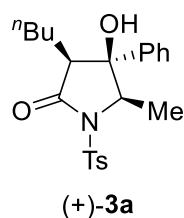
$[\alpha]_{\text{D}}^{26}$: -40.9 ($c = 1.0$, CHCl₃).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.86 (d, $J = 8.0$ Hz, 2H), 7.41 – 7.29 (m, 4H), 7.27 – 7.20 (m, 2H), 4.38 (q, $J = 6.4$ Hz, 1H), 2.91 – 2.88 (m, 1H), 2.44 (s, 3H), 1.97 (s, 1H), 1.70 – 1.65 (m, 2H), 1.40 (d, $J = 6.4$ Hz, 3H), 1.31 – 1.27 (m, 2H), 1.14 – 1.02 (m, 2H), 0.70 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.6, 144.9, 140.1, 137.0, 129.8, 128.9, 128.2, 128.0, 125.4, 79.1, 65.6, 54.1, 29.7, 23.1, 22.6, 21.8, 13.7, 12.3.

IR (neat, cm^{-1}): 3512, 2957, 1741, 1357, 1169.

HRMS (CI) calculated for $\text{C}_{22}\text{H}_{28}\text{NO}_4\text{S}$ [$\text{M}+\text{H}^+$]: 402.1739, found: 402.1748.

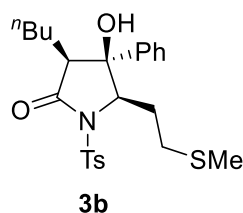


(3S,4S,5R)-3-Butyl-4-hydroxy-5-methyl-4-phenyl-1-tosylpyrrolidin-2-one

(3a') was prepared as a colorless oil from (*S*)-4-methyl-*N*-(1-oxo-1-phenylpropan-2-yl)benzenesulfonamide (606.6 mg, 2.0 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (1.02 g, 4.0 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 92% yield (739 mg).

$[\alpha]_{\text{D}}^{26}$: +42.6 ($c = 1.0$, CHCl_3).

The spectra data is consistent with that of **3a**.



(3S,4S,5R)-3-Butyl-4-hydroxy-5-(2-(methylthio)ethyl)-4-phenyl-1-tosylpyrrolidin-2-one (3b) was prepared as a colorless oil from (*S*)-4-methyl-*N*-(4-(methylthio)-1-oxo-1-phenylbutan-2-yl)benzenesulfonamid

e (109.1 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 83% yield (115.6 mg).

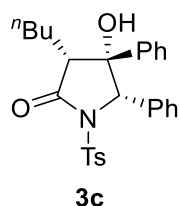
$[\alpha]_{\text{D}}^{26}$: +19.8 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.92 (d, $J = 8.2$ Hz, 2H), 7.42 (d, $J = 7.8$ Hz, 2H), 7.39 – 7.27 (m, 5H), 4.58 – 4.49 (m, 1H), 2.75 – 2.67 (m, 1H), 2.59 – 2.39 (m, 5H), 2.36 – 2.26 (m, 2H), 2.26 – 2.18 (m, 1H), 1.91 (s, 3H), 1.70 – 1.61 (m, 1H), 1.40 – 1.24 (m, 2H), 1.14 – 0.99 (m, 3H), 0.74 – 0.66 (m, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.6, 145.0, 142.0, 136.4, 129.7, 128.8 (2C), 128.1, 125.1, 78.2, 68.7, 55.2, 30.7, 29.7, 27.9, 23.5, 22.5, 21.8, 15.1, 13.7.

IR (neat, cm^{-1}): 3504, 2957, 1740, 1514, 1356.

HRMS (CI) calculated for $\text{C}_{24}\text{H}_{32}\text{NO}_5\text{S}_2$ [$\text{M}+\text{OH}^-$]: 478.1722, found: 478.1706.



(3R,4R,5S)-3-Butyl-4-hydroxy-4,5-diphenyl-1-tosylpyrrolidin-2-one (3c) was prepared as a colorless oil from (*R*)-4-methyl-*N*-(2-oxo-1,2-diphenylethyl) benzenesulfonamide (109.6 mg, 0.3 mmol) and (hex-1-yn-1-yloxy) triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 76% yield (105.9 mg).

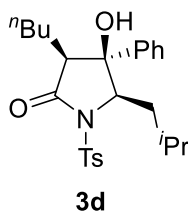
$[\alpha]_{\text{D}}^{26}$: -20.5 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.86 (d, $J = 7.8$ Hz, 2H), 7.41 – 7.29 (m, 8H), 7.27 – 7.20 (m, 2H), 6.90 (d, $J = 4.9$ Hz, 2H), 5.57 (s, 1H), 3.00 (t, $J = 6.5$ Hz, 1H), 2.49 (s, 3H), 1.86 – 1.75 (m, 1H), 1.75 (s, 1H), 1.58 – 1.45 (m, 1H), 1.33 – 1.24 (m, 1H), 1.16 – 0.98 (m, 2H), 0.97 – 0.79 (m, 1H), 0.72 (t, $J = 7.1$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.3, 145.1, 140.9, 136.1, 132.8, 129.4, 129.0, 128.7(2C), 128.6, 128.1, 127.9, 125.4, 77.9, 73.0, 54.8, 29.6, 23.5, 22.5, 21.8, 13.7.

IR (neat, cm^{-1}): 3542, 2957, 1744, 1360, 1168.

HRMS (CI) calculated for $\text{C}_{27}\text{H}_{30}\text{NO}_4\text{S}$ [$\text{M}+\text{H}^+$]: 464.1896, found: 464.1911.



(3*S*,4*S*,5*R*)-3-Butyl-4-hydroxy-5-isobutyl-4-phenyl-1-tosylpyrrolidin-2-one

(3d) was prepared as a white solid from (*S*)-4-methyl-*N*-(4-methyl-1-oxo-1-phenylpentan-2-yl)benzenesulfonamide (103.6 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 73% yield (97.4 mg).

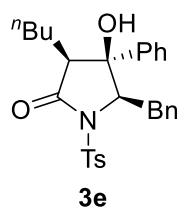
$[\alpha]_{\text{D}}^{26}$: +23.6 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.92 (d, $J = 8.0$ Hz, 2H), 7.43 (d, $J = 8.0$ Hz, 2H), 7.37 – 7.28 (m, 5H), 4.44 (q, $J = 3.2$ Hz, 1H), 2.81 – 2.78 (m, 1H), 2.43 (s, 3H), 2.10 (s, 1H), 2.06 – 1.99 (m, 1H), 1.80 – 1.74 (m, 1H), 1.70 – 1.63 (m, 1H), 1.53 – 1.46 (m, 1H), 1.38 – 1.26 (m, 2H), 1.15 – 1.00 (m, 3H), 0.70 (t, $J = 7.2$ Hz, 3H), 0.65 (d, $J = 6.4$ Hz, 3H), 0.58 (d, $J = 6.4$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.7, 144.8, 142.0, 136.9, 129.7, 128.8, 128.0, 127.9, 125.1, 78.4, 68.4, 55.2, 37.6, 29.7, 25.5, 23.4, 23.3, 22.5, 21.8, 21.6, 13.7.

IR (neat, cm^{-1}): 3504, 2958, 1742, 1360, 1168.

HRMS (CI) calculated for $\text{C}_{25}\text{H}_{33}\text{NNaO}_4\text{S}$ [$\text{M}+\text{Na}^+$]: 466.2028, found: 466.2004.



(3*S*,4*S*,5*R*)-5-Benzyl-3-butyl-4-hydroxy-4-phenyl-1-tosylpyrrolidin-2-one (3e)

was prepared as a white solid from (*S*)-4-methyl-*N*-(1-oxo-1,3-diphenylpropan-2-yl)benzenesulfonamide (113.9 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 87% yield (129.0 mg).

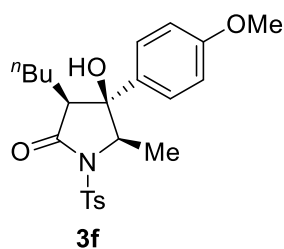
$[\alpha]_{\text{D}}^{26}$: +18.4 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.97 (d, $J = 8.4$ Hz, 2H), 7.34 (d, $J = 8.0$ Hz, 2H), 7.13 – 7.04 (m, 3H), 7.04 – 6.93 (m, 7H), 4.87 (dd, $J = 9.9, 3.9$ Hz, 1H), 3.81 (dd, $J = 13.8, 3.8$ Hz, 1H), 3.06 (dd, $J = 13.8, 9.9$ Hz, 1H), 2.74 (dd, $J = 7.5, 5.4$ Hz, 1H), 2.46 (s, 3H), 2.24 (s, 1H), 1.70 – 1.57 (m, 1H), 1.41 – 1.23 (m, 2H), 1.14 – 1.00 (m, 3H), 0.69 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.4, 145.0, 142.4, 136.7, 136.6, 129.7, 129.3, 128.3, 128.2, 128.0, 127.1, 126.4, 124.4, 78.2, 70.3, 55.4, 35.1, 29.6, 23.5, 22.5, 21.8, 13.7.

IR (neat, cm^{-1}): 3462, 2957, 1742, 1630, 1168.

HRMS (CI) calculated for $\text{C}_{28}\text{H}_{31}\text{NO}_4\text{S}$ [M^+]: 477.1974, found: 477.1987.



(3*S*,4*S*,5*R*)-3-Butyl-4-hydroxy-4-(4-methoxyphenyl)-5-methyl-1-tosylpyrrolidin-2-one (3f) was prepared as a colorless oil from (*S*)-*N*-(1-(4-methoxyphenyl)-1-oxopropan-2-yl)-4-methylbenzenesulfonamide (100.0 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 80% yield (103.2 mg).

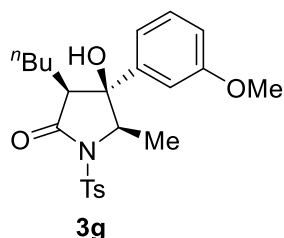
$[\alpha]_{\text{D}}^{26}$: + 28.5 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.94 (d, $J = 8.0$ Hz, 2H), 7.40 – 7.27 (m, 4H), 6.90 (d, $J = 8.6$ Hz, 2H), 4.33 (q, $J = 6.2$ Hz, 1H), 3.81 (s, 3H), 2.88 – 2.77 (m, 1H), 2.43 (s, 3H), 1.98 (s, 1H), 1.69 – 1.59 (m, 1H), 1.38 (d, $J = 6.3$ Hz, 3H), 1.34 – 1.25 (m, 2H), 1.17 – 1.01 (m, 3H), 0.72 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.6, 159.4, 144.8, 136.9, 131.9, 129.7, 127.9, 126.6, 114.1, 78.8, 65.6, 55.4, 53.9, 29.8, 23.0, 22.6, 21.8, 13.7, 12.2.

IR (neat, cm^{-1}): 3504, 2957, 1740, 1612, 1170.

HRMS (CI) calculated for $\text{C}_{23}\text{H}_{29}\text{NNaO}_5\text{S}$ [$\text{M}+\text{Na}^+$]: 454.1664, found: 454.1656.



(3*S*,4*S*,5*R*)-3-Butyl-4-hydroxy-4-(3-methoxyphenyl)-5-methyl-1-tosylpyrrolidin-2-one (3g) was prepared as a colorless oil from (*S*)-*N*-(1-(3-methoxyphenyl)-1-oxopropan-2-yl)-4-methylbenzenesulfonamide (100.0 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 88% yield (113.6 mg).

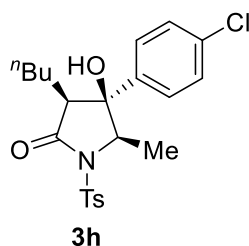
$[\alpha]_{\text{D}}^{26}$: +27.2 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.93 (d, $J = 7.9$ Hz, 2H), 7.35 – 7.25 (m, 3H), 7.06 – 6.92 (m, 2H), 6.84 (d, $J = 8.2$ Hz, 1H), 4.36 (q, $J = 6.2$ Hz, 1H), 3.80 (s, 3H), 2.91 – 2.79 (m, 1H), 2.42 (s, 3H), 2.27 (s, 1H), 1.73 – 1.60 (m, 1H), 1.38 (d, $J = 6.3$ Hz, 3H), 1.35 – 1.23 (m, 2H), 1.18 – 0.96 (m, 3H), 0.70 (t, $J = 7.1$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.5, 159.9, 144.7, 142.0, 136.8, 129.8, 129.7, 127.9, 117.6, 112.9, 111.9, 78.9, 65.5, 55.4, 54.0, 29.6, 23.0, 22.5, 21.7, 13.7, 12.4.

IR (neat, cm^{-1}): 3503, 2868, 1740, 1603, 1357.

HRMS (CI) calculated for $\text{C}_{23}\text{H}_{29}\text{NNaO}_5\text{S}$ [$\text{M}+\text{Na}^+$]: 454.1664, found: 454.1669.



(3*S*,4*S*,5*R*)-3-Butyl-4-(4-chlorophenyl)-4-hydroxy-5-methyl-1-tosylpyrrolidin-2-one (3h) was prepared as a colorless oil from (*S*)-*N*-(1-(4-chlorophenyl)-1-oxopropan-2-yl)-4-methylbenzenesulfonamide (98.9 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 81% yield (104.3 mg).

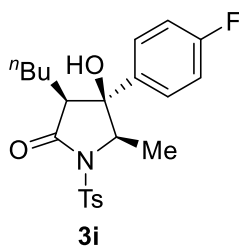
$[\alpha]_{\text{D}}^{26}$: +19.3 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.92 (d, $J = 8.0$ Hz, 2H), 7.46 – 7.28 (m, 6H), 4.33 (q, $J = 6.2$ Hz, 1H), 2.89 – 2.78 (m, 1H), 2.43 (s, 3H), 2.21 (s, 1H), 1.72 – 1.61 (m, 1H), 1.38 (d, $J = 6.3$ Hz, 3H), 1.35 – 1.18 (m, 2H), 1.16 – 1.05 (m, 2H), 1.05 – 0.94 (m, 1H), 0.71 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.2, 144.9, 138.8, 136.7, 134.1, 129.7, 128.9, 127.9, 126.9, 78.7, 65.4, 54.0, 29.7, 23.0, 22.5, 21.8, 13.7, 12.3.

IR (neat, cm^{-1}): 3506, 2957, 1740, 1357, 1169.

HRMS (CI) calculated for $\text{C}_{22}\text{H}_{26}\text{ClNNaO}_4\text{S}$ $[\text{M}+\text{Na}^+]$: 458.1169, found: 458.1135.



(3*S*,4*S*,5*R*)-3-Butyl-4-(4-fluorophenyl)-4-hydroxy-5-methyl-1-tosylpyrrolidin-2-one (3i) was prepared as colorless oil from (*S*)-*N*-(1-(4-fluorophenyl)-1-

oxopropan-2-yl)-4-methylbenzenesulfonamide (96.4 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 91% yield (114.8 mg).

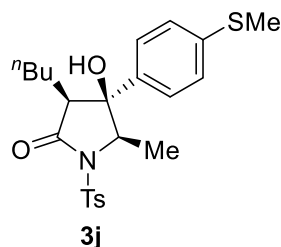
$[\alpha]_{\text{D}}^{26}$: +29.4 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.92 (d, $J = 8.4$ Hz, 2H), 7.50 – 7.36 (m, 2H), 7.31 (d, $J = 8.0$ Hz, 2H), 7.14 – 7.00 (m, 2H), 4.34 (q, $J = 6.3$ Hz, 1H), 2.89 – 2.77 (m, 1H), 2.42 (s, 3H), 2.22 (s, 1H), 1.74 – 1.62 (m, 1H), 1.38 (d, $J = 6.3$ Hz, 3H), 1.33 – 1.21 (m, 2H), 1.14 – 1.04 (m, 2H), 1.05 – 0.94 (m, 1H), 0.70 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.3, 163.6 (d, $J = 246.1$ Hz), 144.9, 136.7, 136.0 (d, $J = 3.1$ Hz), 129.7, 127.9, 127.3 (d, $J = 8.2$ Hz), 115.7 (d, $J = 21.3$ Hz), 78.7, 65.6, 54.1, 29.6, 23.0, 22.5, 21.7, 13.69, 12.3.

IR (neat, cm^{-1}): 3503, 2957, 1740, 1512, 1168.

HRMS (CI) calculated for $\text{C}_{22}\text{H}_{27}\text{FNO}_4\text{S}$ [$\text{M}+\text{H}^+$]: 420.1645, found: 420.1655.



(3S,4S,5R)-3-Butyl-4-hydroxy-5-methyl-4-(4-(methylthio)phenyl)-1-tosylpyrrolidin-2-one (3j) was prepared as colorless oil from (S)-4-methyl-N-(1-(4-(methylthio)phenyl)-1-oxopropan-2-yl)benzenesulfonamide (104.9 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 94% yield (126.3 mg).

$[\alpha]_{\text{D}}^{26}$: +20.7 ($c = 1.0$, CHCl_3).

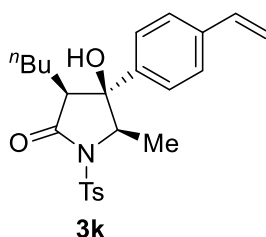
$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.82 (d, $J = 7.8$ Hz, 2H), 7.28 – 7.18 (m, 4H), 7.13 (d, $J = 8.1$ Hz, 2H), 4.22 (q, $J = 6.2$ Hz, 1H), 2.78 – 2.66 (m, 1H), 2.37 (s, 3H), 2.32

(s, 3H), 2.15 (s, 1H), 1.61 – 1.50 (m, 1H), 1.27 (d, $J = 6.3$ Hz, 3H), 1.24 – 1.10 (m, 2H), 1.08 – 0.87 (m, 3H), 0.61 (t, $J = 7.2$ Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3) δ 174.5, 144.7, 138.7, 136.8, 136.7, 129.7, 127.9, 126.3, 125.9, 78.8, 65.5, 53.9, 29.7, 23.0, 22.5, 21.7, 15.5, 13.7, 12.3.

IR (neat, cm^{-1}): 3463, 1740, 1632, 1356, 1169.

HRMS (CI) calculated for $\text{C}_{23}\text{H}_{30}\text{NO}_4\text{S}_2$ [$\text{M}+\text{H}^+$]: 448.1616, found: 448.1627.



(3S,4S,5R)-3-Butyl-4-hydroxy-5-methyl-1-tosyl-4-(4-vinylphenyl)pyrrolidin-2-one (3k) was prepared as colorless oil from (*S*)-4-methyl-*N*-(1-oxo-1-(4-vinylphenyl)propan-2-yl)benzenesulfonamide (98.8 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 81% yield (104.3 mg).

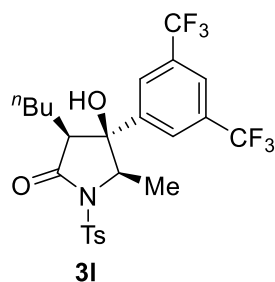
$[\alpha]_{\text{D}}^{26}$: +15.5 ($c = 1.0$, CHCl_3).

^1H NMR (400 MHz, CDCl_3) δ 7.95 (d, $J = 8.0$ Hz, 2H), 7.49 – 7.36 (m, 4H), 7.33 (d, $J = 8.0$ Hz, 2H), 6.72 (dd, $J = 17.6, 10.9$ Hz, 1H), 5.79 (d, $J = 17.6$ Hz, 1H), 5.30 (d, $J = 10.9$ Hz, 1H), 4.37 (q, $J = 6.3$ Hz, 1H), 2.93 – 2.82 (m, 1H), 2.44 (s, 3H), 1.98 (s, 1H), 1.70 – 1.59 (m, 1H), 1.39 (d, $J = 6.3$ Hz, 3H), 1.35 – 1.21 (m, 3H), 1.18 – 1.07 (m, 2H), 0.72 (t, $J = 7.2$ Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3) δ 174.5, 144.8, 139.5, 137.5, 136.9, 136.0, 129.7, 127.9, 126.6, 125.6, 114.9, 79.0, 65.5, 54.0, 29.7, 23.1, 22.6, 21.8, 13.7, 12.3.

IR (neat, cm^{-1}): 3501, 1740, 1630, 1288, 1169.

HRMS (CI) calculated for $\text{C}_{24}\text{H}_{30}\text{NO}_4\text{S}$ [$\text{M}+\text{H}^+$]: 428.1896, found: 428.1907.



(3S,4S,5R)-4-(3,5-Bis(trifluoromethyl)phenyl)-3-butyl-4-hydroxy-5-methyl-1-tosylpyrrolidin-2-one (3l) was prepared as colorless oil from (*S*)-*N*-(1-(3,5-bis(trifluoromethyl)phenyl)-1-oxopropan-2-yl)-4-methylbenzene sulfonamide (131.8 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 83% yield (134.6 mg).

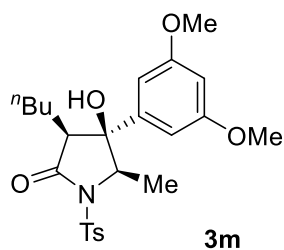
$[\alpha]_D^{26}$: +26.0 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 8.00 (s, 2H), 7.95 (d, $J = 7.9$ Hz, 2H), 7.86 (s, 1H), 7.35 (d, $J = 8.0$ Hz, 2H), 4.42 (q, $J = 6.2$ Hz, 1H), 2.95 (t, $J = 6.6$ Hz, 1H), 2.63 (s, 1H), 2.45 (s, 3H), 1.79 – 1.66 (m, 1H), 1.41 (d, $J = 6.2$ Hz, 3H), 1.37 – 1.28 (m, 1H), 1.17 – 1.03 (m, 3H), 1.01 – 0.91 (m, 1H), 0.67 (t, $J = 6.9$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 173.5, 145.2, 143.6, 136.4, 132.7 (q, $J = 33.3$ Hz), 129.9, 128.1, 126.1, 124.5 (q, $J = 271.3$ Hz), 122.2, 78.7, 65.4, 54.1, 29.5, 23.0, 22.4, 21.8, 13.5, 12.5.

IR (neat, cm^{-1}): 3442, 1741, 1625, 1280, 1170.

HRMS (CI) calculated for $\text{C}_{24}\text{H}_{25}\text{F}_6\text{NNaO}_4\text{S}$ $[\text{M}+\text{Na}^+]$: 560.1306, found: 560.1293.



(3S,4S,5R)-3-Butyl-4-(3,5-dimethoxyphenyl)-4-hydroxy-5-methyl-1-tosylpyrr

olidin-2-one (3m) was prepared as colorless oil from (*S*)-*N*-(1-(3,5-dimethoxyphenyl)-1-oxopropan-2-yl)-4-methylbenzenesulfonamide (109.0 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 71% yield (98.9 mg).

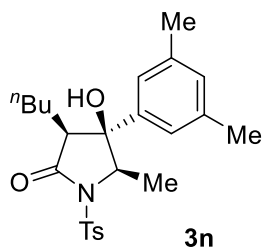
$[\alpha]_{\text{D}}^{26}$: +21.8 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.93 (d, $J = 8.0$ Hz, 2H), 7.31 (d, $J = 8.0$ Hz, 2H), 6.55 (s, 2H), 6.40 (s, 1H), 4.36 (q, $J = 6.2$ Hz, 1H), 3.78 (s, 6H), 2.88 – 2.79 (m, 1H), 2.42 (s, 3H), 2.08 (s, 1H), 1.72 – 1.58 (m, 1H), 1.39 (d, $J = 6.3$ Hz, 3H), 1.34 – 1.25 (m, 2H), 1.19 – 1.02 (m, 3H), 0.72 (t, $J = 7.1$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.4, 161.1, 144.7, 142.9, 136.9, 129.7, 127.9, 103.9, 99.4, 79.0, 65.4, 55.5, 54.0, 29.6, 23.0, 22.6, 21.7, 13.7, 12.4.

IR (neat, cm^{-1}): 3503, 2956, 1741, 1599, 1459.

HRMS (CI) calculated for $\text{C}_{24}\text{H}_{32}\text{NO}_6\text{S}$ $[\text{M}+\text{H}^+]$: 462.1950, found: 462.1977.



(3*S*,4*S*,5*R*)-3-Butyl-4-(3,5-dimethylphenyl)-4-hydroxy-5-methyl-1-tosylpyrrolidin-2-one (3n) was prepared as colorless oil from (*S*)-*N*-(1-(3,5-dimethylphenyl)-1-oxopropan-2-yl)-4-methylbenzenesulfonamide (99.5 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 67% yield (86.9 mg).

$[\alpha]_{\text{D}}^{26}$: +24.8 ($c = 1.0$, CHCl_3).

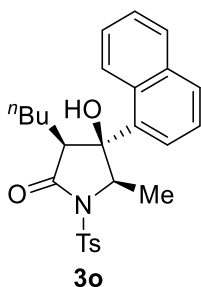
$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.95 (d, $J = 8.0$ Hz, 2H), 7.32 (d, $J = 8.0$ Hz, 2H), 7.01 (s, 2H), 6.95 (s, 1H), 4.39 (q, $J = 6.2$ Hz, 1H), 2.92 – 2.79 (m, 1H), 2.43 (s,

3H), 2.32 (s, 6H), 1.95 (s, 1H), 1.76 – 1.60 (m, 1H), 1.39 (d, $J = 6.3$ Hz, 3H), 1.36 – 1.22 (m, 2H), 1.20 – 1.02 (m, 3H), 0.73 (t, $J = 7.1$ Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3) δ 174.7, 144.7, 140.1, 138.4, 137.0, 129.8, 129.7, 127.9, 123.1, 79.0, 65.6, 54.0, 29.7, 23.1, 22.6, 21.7, 21.6, 13.7, 12.4.

IR (neat, cm^{-1}): 3502, 1740, 1602, 1357, 1169.

HRMS (CI) calculated for $\text{C}_{24}\text{H}_{32}\text{NO}_4\text{S}$ [$\text{M}+\text{H}^+$]: 430.2052, found: 430.2057.



(3S,4S,5R)-3-Butyl-4-hydroxy-5-methyl-4-(naphthalen-1-yl)-1-tosylpyrrolidin-2-one (3o) was prepared as colorless oil from (*S*)-4-methyl-*N*-(1-(naphthalen-2-yl)-1-oxopropan-2-yl)benzenesulfonamide (106 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 86% yield (116.9 mg).

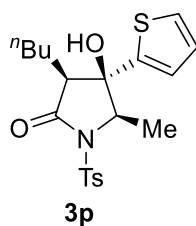
$[\alpha]_{\text{D}}^{26}$: +5.6 ($c = 1.0$, CHCl_3).

^1H NMR (400 MHz, CDCl_3) δ 8.02 – 7.90 (m, 3H), 7.88 – 7.78 (m, 3H), 7.55 – 7.49 (m, 2H), 7.49 – 7.45 (m, 1H), 7.30 (d, $J = 8.2$ Hz, 2H), 4.51 (q, $J = 6.3$ Hz, 1H), 3.05 – 2.95 (m, 1H), 2.70 (s, 1H), 2.42 (s, 3H), 1.77 – 1.66 (m, 1H), 1.42 (d, $J = 6.0$ Hz, 3H), 1.40 – 1.23 (m, 2H), 1.16 – 0.98 (m, 3H), 0.66 (t, $J = 7.2$ Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3) δ 174.6, 144.8, 137.6, 136.8, 133.0, 132.8, 129.6, 128.7, 128.2, 127.9, 127.6, 126.7, 126.6, 125.1, 122.8, 79.0, 65.4, 54.0, 29.7, 23.2, 22.6, 21.7, 13.6, 12.6.

IR (neat, cm^{-1}): 3500, 1740, 1356, 1169, 1089.

HRMS (CI) calculated for $\text{C}_{26}\text{H}_{30}\text{NO}_4\text{S}$ [$\text{M}+\text{H}^+$]: 452.1896, found: 452.1911.



(3*S*,4*R*,5*R*)-3-Butyl-4-hydroxy-5-methyl-4-(thiophen-2-yl)-1-tosylpyrrolidin-2-one (3p) was prepared as a colorless oil from (*S*)-4-methyl-*N*-(1-oxo-1-(thiophen-2-yl)propan-2-yl)benzenesulfonamide (92.8 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 90% yield (110.4 mg).

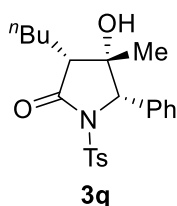
$[\alpha]_{\text{D}}^{26}$: +39.5 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.91 (d, $J = 8.4$ Hz, 2H), 7.31 – 7.27 (m, 3H), 7.00 – 6.98 (m, 2H), 4.37 (q, $J = 6.3$ Hz, 1H), 2.76 – 2.73 (m, 1H), 2.42 (s, 4H), 1.74 – 1.65 (m, 1H), 1.50 (d, $J = 6.4$ Hz, 3H), 1.46 – 1.41 (m, 2H), 1.21 – 1.14 (m, 3H), 0.76 (t, $J = 7.0$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 173.8, 145.3, 144.9, 136.7, 129.7, 127.9, 127.6, 125.7, 124.5, 78.1, 65.9, 55.2, 29.8, 23.1, 22.6, 21.8, 13.8, 12.6.

IR (neat, cm^{-1}): 3482, 1741, 1631, 1357, 1170.

HRMS (CI) calculated for $\text{C}_{20}\text{H}_{26}\text{NO}_4\text{S}_2$ $[\text{M}+\text{H}^+]$: 408.1303, found: 408.1314.



(3*R*,4*R*,5*S*)-3-Butyl-4-hydroxy-4-methyl-5-phenyl-1-tosylpyrrolidin-2-one

(3q) was prepared as a colorless oil from (*R*)-4-methyl-*N*-(2-oxo-1-phenylpropyl)benzenesulfonamide (91.0 mg, 0.3 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 80% yield (96.4

mg).

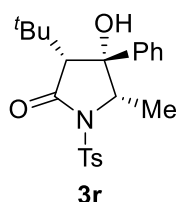
$[\alpha]_{\text{D}}^{26}$: -30.2 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.74 (d, $J = 8.4$ Hz, 2H), 7.42 – 7.31 (m, 3H), 7.27 (d, $J = 7.2$ Hz, 2H), 7.21 – 7.14 (m, 2H), 5.02 (s, 1H), 2.43 (s, 3H), 2.36 (t, $J = 6.0$ Hz, 1H), 1.78 – 1.67 (m, 1H), 1.66 – 1.55 (m, 2H), 1.49 – 1.28 (m, 6H), 1.03 (s, 1H), 0.90 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.8, 145.0, 136.2, 133.8, 129.4, 128.9, 128.6, 128.6, 128.5, 74.0, 71.8, 53.4, 30.5, 25.3, 24.1, 22.9, 21.8, 13.9.

IR (neat, cm^{-1}): 3503, 2957, 1741, 1598, 1495.

HRMS (CI) calculated for $\text{C}_{22}\text{H}_{28}\text{NO}_4\text{S}$ $[\text{M}+\text{H}^+]$: 402.1739, found: 402.1724.



(3R,4R,5S)-3-(tert-Butyl)-4-hydroxy-5-methyl-4-phenyl-1-tosylpyrrolidin-2-one (3r) was prepared as a colorless oil from (*R*)-4-methyl-*N*-(1-oxo-1-phenylpropan-2-yl)benzenesulfonamide (91.0 mg, 0.3 mmol) and ((3,3-dimethylbut-1-yn-1-yl)oxy)triisopropylsilane (152.7 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 70% yield (84.9 mg).

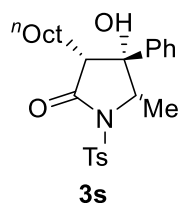
$[\alpha]_{\text{D}}^{26}$: -22.3 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.95 (d, $J = 8.4$ Hz, 2H), 7.46 – 7.41 (m, 2H), 7.41 – 7.32 (m, 4H), 7.32 – 7.27 (m, 1H), 4.16 (q, $J = 6.3$ Hz, 1H), 2.87 (s, 1H), 2.44 (s, 3H), 2.09 (s, 1H), 1.32 (d, $J = 6.3$ Hz, 3H), 0.93 (s, 9H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 173.1, 144.8, 141.6, 136.8, 129.7, 128.6, 128.0, 127.7, 125.4, 81.0, 65.9, 61.1, 33.3, 29.7, 21.8, 11.8.

IR (neat, cm^{-1}): 3505, 2958, 1741, 1355, 1169.

HRMS (CI) calculated for $\text{C}_{22}\text{H}_{28}\text{NO}_4\text{S}$ $[\text{M}+\text{H}^+]$: 402.1739, found: 402.1737.



(3R,4R,5S)-4-Hydroxy-5-methyl-3-octyl-4-phenyl-1-tosylpyrrolidin-2-one (3s)

was prepared as a colorless oil from (*R*)-4-methyl-*N*-(1-oxo-1-phenylpropan-2-yl)benzenesulfonamide (91.0 mg, 0.3 mmol) and (dec-1-yn-1-yloxy)triisopropylsilane (186.4 mg, 0.6 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 78% yield (107.4 mg).

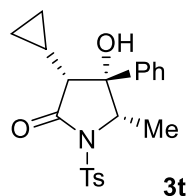
$[\alpha]_D^{26}$: -38.7 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.94 (d, $J = 8.4$ Hz, 2H), 7.45 – 7.37 (m, 4H), 7.34 – 7.31 (m, 3H), 4.39 (q, $J = 6.3$ Hz, 1H), 2.90 – 2.87 (m, 1H), 2.43 (s, 3H), 2.15 (brs, 1H), 1.69 – 1.65 (m, 1H), 1.39 (d, $J = 6.3$ Hz, 3H), 1.34 – 1.18 (m, 4H), 1.15 – 1.05 (m, 9H), 0.83 (t, $J = 7.0$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.6, 144.8, 140.1, 136.9, 129.7, 128.8, 128.1, 127.9, 125.4, 79.0, 65.6, 54.1, 31.8, 29.4, 29.2 (2C), 27.5, 23.3, 22.7, 21.8, 14.1, 12.3.

IR (neat, cm^{-1}): 3449, 2855, 1740, 1630, 1169.

HRMS (CI) calculated for $\text{C}_{26}\text{H}_{36}\text{NO}_4\text{S}$ [$\text{M}+\text{H}^+$]: 458.2365, found: 458.2343.



(3R,4R,5S)-3-Cyclopropyl-4-hydroxy-5-methyl-4-phenyl-1-tosylpyrrolidin-2-one (3t)

was prepared as a colorless oil from (*R*)-4-methyl-*N*-(1-oxo-1-phenylpropan-2-yl)benzenesulfonamide (30.3 mg, 0.1 mmol) and ((cyclopropylethynyl)oxy)triisopropylsilane (47.6 mg, 0.2 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 78% yield

(30.1 mg).

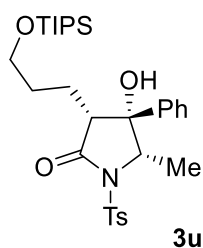
$[\alpha]_{\text{D}}^{26}$: -41.8 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.95 (d, $J = 8.3$ Hz, 2H), 7.44 – 7.28 (m, 7H), 4.39 (q, $J = 6.3$ Hz, 1H), 2.44 (s, 3H), 2.42 – 2.34 (m, 2H), 1.44 (d, $J = 6.3$ Hz, 3H), 0.85 – 0.74 (m, 1H), 0.71 – 0.58 (m, 1H), 0.41 – 0.29 (m, 1H), 0.29 – 0.16 (m, 1H), -0.13 – -0.23 (m, 1H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 173.2, 144.8, 141.0, 136.8, 129.7, 128.8, 128.1, 128.0, 125.2, 78.8, 65.2, 58.6, 21.8, 12.8, 5.1, 3.6, 1.2.

IR (neat, cm^{-1}): 3501, 3011, 1740, 1356, 1169.

HRMS (CI) calculated for $\text{C}_{21}\text{H}_{24}\text{NO}_4\text{S}$ $[\text{M}+\text{H}^+]$: 386.1426, found: 386.1418.



(3R,4R,5S)-4-Hydroxy-5-methyl-4-phenyl-1-tosyl-3-(3-((triisopropylsilyl)oxy)propyl)pyrrolidin-2-one (3u) was prepared as a colorless oil from (*R*)-4-methyl- *N*-(1-oxo-1-phenylpropan-2-yl)benzenesulfonamide (30.3 mg, 0.1 mmol) and 3,3,11,11-tetraisopropyl-2,12-dimethyl-4,10-dioxa-3,11-disilatridec-5-yne (80 mg, 0.2 mmol) according to the General Procedure B (eluent: hexanes/ethyl acetate = 5:1) in 77% yield (43.2 mg).

$[\alpha]_{\text{D}}^{26}$: -31.0 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.95 (d, $J = 8.3$ Hz, 2H), 7.43 (d, $J = 7.4$ Hz, 2H), 7.40 – 7.28 (m, 5H), 4.36 (q, $J = 6.3$ Hz, 1H), 3.47 (t, $J = 5.7$ Hz, 2H), 2.97 (t, $J = 6.5$ Hz, 1H), 2.44 (s, 3H), 2.35 (s, 1H), 1.86 – 1.72 (m, 1H), 1.62 – 1.50 (m, 2H), 1.41 (d, $J = 6.3$ Hz, 3H), 1.34 – 1.21 (m, 1H), 1.01 – 0.88 (m, 21H).

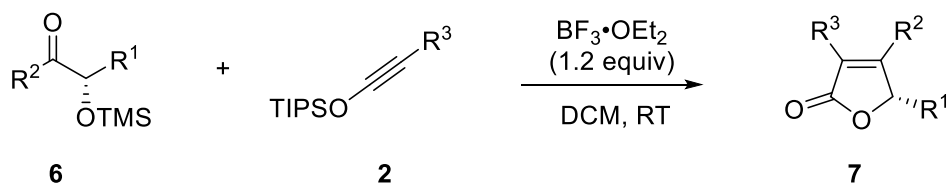
$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.4, 144.8, 140.7, 136.9, 129.7, 128.8, 128.1, 128.0, 125.3, 78.8, 65.7, 62.8, 53.9, 30.3, 21.8, 19.9, 18.0, 12.4, 12.0.

IR (neat, cm^{-1}): 3499, 2943, 1742, 1359, 1170.

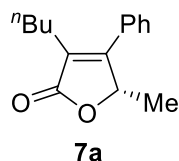
HRMS (CI) calculated for $\text{C}_{30}\text{H}_{45}\text{NNaO}_5\text{SSi}$ $[\text{M}+\text{Na}^+]$: 582.2685, found:
582.2703.

IV. $\text{BF}_3 \cdot \text{OEt}_2$ -Promoted Synthesis of γ -Butenolides

General Procedure C.



In a glovebox, an oven-dried 4-mL vial was charged with the ketone **4** (1.0 equiv), the siloxy alkyne **2** (1.5 equiv) and dry dichloromethane (0.1 M). Next, $\text{BF}_3 \cdot \text{OEt}_2$ (1.2 equiv) was added. The vial was capped and removed from the glovebox. The reaction mixture was stirred at room temperature for 12 h. The reaction mixture was immediately loaded to the silica gel and purified by flash column chromatography.



(S)-3-Butyl-5-methyl-4-phenylfuran-2(5H)-one (7a) was prepared as a colorless oil from *(S)*-1-phenyl-2-((trimethylsilyl)oxy)propan-1-one (22.2 mg, 0.1 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (38.2 mg, 0.15 mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 97% yield (22.3 mg, 98% ee based on HPLC analysis).

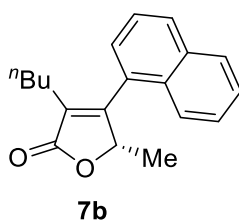
$[\alpha]_{\text{D}}^{26}$: +192.8 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.50 – 7.42 (m, 3H), 7.32 – 7.30 (m, 2H), 5.36 (q, $J = 6.8$ Hz, 1H), 2.47 – 2.34 (m, 2H), 1.61 – 1.48 (m, 2H), 1.38 – 1.33 (m, 5H), 0.88 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.1, 161.1, 131.8, 129.8, 129.2, 128.0, 127.7, 78.3, 30.3, 24.1, 22.8, 19.3, 13.9.

IR (neat, cm^{-1}): 3478, 2954, 1750, 1650, 1453.

HRMS (CI) calculated for $\text{C}_{15}\text{H}_{18}\text{O}_2$ [M^+]: 230.1307, found: 230.1306.



(S)-3-Butyl-5-methyl-4-(naphthalen-2-yl)furan-2(5H)-one (7b) was prepared as a colorless oil from (S)-1-(naphthalen-2-yl)-2-((trimethylsilyl)oxy)propan-1-one (27.2 mg, 0.2 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (38.2 mg, 0.3 mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 80% yield (22.4 mg).

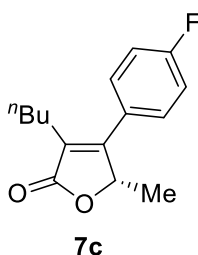
$[\alpha]_{\text{D}}^{26}$: +124.4 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.96 – 7.89 (m, 3H), 7.79 (s, 1H), 7.58 – 7.57 (m, 2H), 7.43 – 7.40 (m, 1H), 5.50 (q, $J = 6.8$ Hz, 1H), 2.52 – 2.49 (m, 2H), 1.67 – 1.56 (m, 2H), 1.39 – 1.34 (m, 5H), 0.89 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.1, 161.1, 133.6, 133.2, 129.2, 129.0, 128.5, 128.2, 128.0, 127.6, 127.5, 127.1, 124.8, 78.4, 30.4, 24.2, 22.8, 19.4, 17.8, 13.9.

IR (neat, cm^{-1}): 3481, 2956, 2865, 1749, 1504.

HRMS (CI) calculated for $\text{C}_{19}\text{H}_{20}\text{O}_2$ $[\text{M}^+]$: 280.1463, found: 280.1455.



(S)-3-Butyl-4-(4-fluorophenyl)-5-methylfuran-2(5H)-one (7c) was prepared as a colorless oil from (S)-1-(4-fluorophenyl)-2-((trimethylsilyl)oxy)propan-1-one (48.0 mg, 0.2 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (76.4 mg, 0.3 mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 95% yield (47.2 mg).

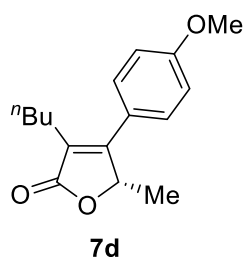
$[\alpha]_{\text{D}}^{26}$: +196.3 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.32 – 7.28 (m, 2H), 7.19 – 7.15 (m, 2H), 5.32 (q, J = 6.8 Hz, 1H), 2.45 – 2.32 (m, 2H), 1.61 – 1.44 (m, 2H), 1.37 – 1.27 (m, 5H), 0.88 (t, J = 7.2 Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 173.9, 164.6 (d, J = 249.4 Hz), 159.9, 129.7 (d, J = 8.2 Hz), 128.1, 127.9 (d, J = 3.5 Hz), 116.5 (d, J = 21.8 Hz), 78.2, 30.3, 24.1, 22.8, 19.2, 13.8.

IR (neat, cm^{-1}): 3474, 2956, 1751, 1605, 1455.

HRMS (CI) calculated for $\text{C}_{15}\text{H}_{17}\text{O}_2$ [M^+]: 248.1213, found: 248.1205.



(S)-3-Butyl-4-(4-methoxyphenyl)-5-methylfuran-2(5H)-one (7d) was prepared as a colorless oil from (S)-1-(4-methoxyphenyl)-2-((trimethylsilyl)oxy)propan-1-one (50.5 mg, 0.2 mmol) and (hex-1-yn-1-yloxy)triisopropyl silane (76.4 mg, 0.3 mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 84% yield (43.8 mg).

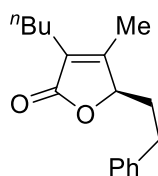
$[\alpha]_{\text{D}}^{26}$: +246.4 (c = 1.0, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.28 (d, J = 8.8 Hz, 2H), 7.00 (d, J = 8.8 Hz, 2H), 5.38 (q, J = 6.8 Hz, 1H), 3.87 (s, 3H), 2.50 – 2.37 (m, 2H), 1.66 – 1.47 (m, 2H), 1.40 – 1.34 (m, 5H), 0.90 (t, J = 7.2 Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.4, 160.7, 160.5, 129.2, 126.3, 124.0, 114.6, 78.1, 55.5, 30.3, 24.2, 22.9, 19.5, 13.9.

IR (neat, cm^{-1}): 3480, 2955, 2865, 1748, 1607.

HRMS (CI) calculated for $\text{C}_{16}\text{H}_{20}\text{O}_2$ [M^+]: 260.1412, found: 260.1416.



7e

(R)-3-Butyl-4-methyl-5-phenethylfuran-2(5H)-one (7e) was prepared as a colorless oil from (*R*)-5-phenyl-3-((trimethylsilyl)oxy)pentan-2-one (50.1 mg, 0.2 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (76.4 mg, 0.3 mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 77% yield (39.8 mg).

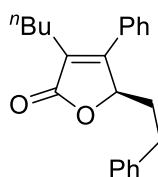
$[\alpha]_{\text{D}}^{26}$: -10.8 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.31 – 7.28 (m, 2H), 7.21 – 7.19(m, 3H), 4.72 (d, $J = 8.4$ Hz, 1H), 2.82 – 2.69 (m, 2H), 2.26 – 2.17 (m, 2H), 2.16 – 2.13 (m, 1H), 1.91 (s, 3H), 1.77 – 1.67 (m, 1H), 1.51 – 1.43 (m, 2H), 1.36 – 1.26 (m, 2H), 0.91 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.4, 159.3, 140.9, 128.7 (2C), 128.0, 126.3, 82.1, 34.5, 31.1, 30.2, 23.3, 22.6, 13.9, 12.0.

IR (neat, cm^{-1}): 3481, 2930, 2864, 1750, 1497.

HRMS (CI) calculated for $\text{C}_{17}\text{H}_{22}\text{O}_2$ [M^+]: 258.1620, found: 258.1622.



7f

(R)-3-Butyl-5-phenethyl-5-phenethylfuran-2(5H)-one (7f) was prepared as a colorless oil from (*R*)-1,4-diphenyl-2-((trimethylsilyl)oxy)butan-1-one (62.5 mg, 0.2 mmol) and (hex-1-yn-1-yloxy)triisopropylsilane (76.4 mg, 0.3 mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 92% yield (59.0 mg).

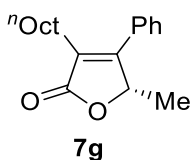
$[\alpha]_{\text{D}}^{26}$: -147.8 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.47 – 7.44 (m, 3H), 7.24 – 7.22 (m, 4H), 7.18 – 7.15 (m, 1H), 7.10 – 7.08 (m, 2H), 5.28 (d, $J = 7.2$ Hz, 1H), 2.80 – 2.67 (m, 2H), 2.48 – 2.36 (m, 2H), 2.10 – 2.01 (m, 1H), 1.74 – 1.47 (m, 3H), 1.39 – 1.28 (m, 2H), 0.88 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.2, 159.8, 140.7, 131.7, 129.8, 129.2, 128.6 (2C), 128.5, 127.6, 126.3, 80.9, 35.0, 31.0, 30.4, 24.2, 22.8, 13.9.

IR (neat, cm^{-1}): 3483, 3027, 2952, 1750, 1495.

HRMS (CI) calculated for $\text{C}_{22}\text{H}_{24}\text{O}_2$ [M^+]: 320.1776, found: 320.1777.



(S)-5-Methyl-3-octyl-4-phenylfuran-2(5H)-one (7g) was prepared as a colorless oil from (S)-1-phenyl-2-((trimethylsilyl)oxy)propan-1-one (44.5 mg, 0.2 mmol) and (dec-1-yn-1-yloxy)triisopropylsilane (93.2 mg, 0.3 mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 84% yield (47.9 mg).

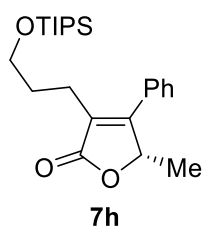
$[\alpha]_{\text{D}}^{26}$: +165.1 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.49 – 7.42 (m, 3H), 7.31 – 7.29 (m, 2H), 5.36 (q, $J = 6.8$ Hz, 1H), 2.46 – 2.33 (m, 2H), 1.62 – 1.47 (m, 2H), 1.35 (d, $J = 6.8$ Hz, 3H), 1.30 – 1.22 (m, 10H), 0.86 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.1, 161.0, 131.8, 129.7, 129.2, 128.0, 127.7, 78.3, 31.9, 29.7, 29.3, 29.2, 28.2, 24.3, 22.7, 19.2, 14.2.

IR (neat, cm^{-1}): 3479, 2926, 2858, 1752, 1454.

HRMS (CI) calculated for $\text{C}_{19}\text{H}_{26}\text{O}_2$ [M^+]: 286.1933, found: 286.1919.



(S)-5-Methyl-4-phenyl-3-(3-((triisopropylsilyloxy)propyl)furan-2(5H)-one

(7h) was prepared as a colorless oil from (*S*)-1-phenyl-2-((trimethylsilyloxy)propan-1-one (44.5 mg, 0.2 mmol) and 3,3,11,11-tetraisopropyl-2,12-dimethyl-4,10-dioxo-3,11-disilatridec-5-yne (120 mg, 0.3 mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 64% yield (49.7 mg).

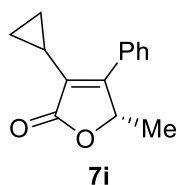
$[\alpha]_{\text{D}}^{26}$: +116.9 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.47 – 7.42 (m, 3H), 7.38 – 7.36 (m, 2H), 5.39 (q, $J = 6.8$ Hz, 1H), 3.78 – 3.66 (m, 2H), 2.65 – 2.48 (m, 2H), 1.91 – 1.75 (m, 2H), 1.36 (d, $J = 6.8$ Hz, 3H), 1.07 – 1.02 (m, 21H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.1, 161.0, 131.6, 129.8, 129.2, 127.8, 127.5, 78.3, 62.9, 31.4, 21.2, 19.4, 18.1, 12.1.

IR (neat, cm^{-1}): 2942, 2864, 1752, 1457, 1102.

HRMS (CI) calculated for $\text{C}_{23}\text{H}_{37}\text{O}_3\text{Si}$ [$\text{M}+\text{H}^+$]: 389.2512, found: 389.2502.



(S)-3-Cyclopropyl-5-methyl-4-phenylfuran-2(5H)-one (7i) was prepared as a colorless oil from (*S*)-1-phenyl-2-((trimethylsilyloxy)propan-1-one (44.5 mg, 0.2 mmol) and ((cyclopropylethynyl)oxy)triisopropylsilane (71.4 mg, 0.3mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 83% yield (35.6 mg).

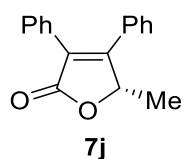
$[\alpha]_{\text{D}}^{26}$: +274.8 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.49 – 7.41 (m, 5H), 5.31 (q, $J = 6.8$ Hz, 1H), 1.75 – 1.67 (m, 1H), 1.33 (d, $J = 6.8$ Hz, 3H), 1.26 – 1.20 (m, 1H), 1.11 – 1.06 (m, 1H), 0.94 – 0.87 (m, 1H), 0.70 – 0.63 (m, 1H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 172.2, 161.0, 131.6, 129.7, 129.0, 128.2, 127.3, 77.6, 19.2, 7.6, 6.6, 5.4.

IR (neat, cm^{-1}): 2989, 2931, 1746, 1495, 1325.

HRMS (CI) calculated for $\text{C}_{14}\text{H}_{14}\text{O}_2$ [M^+]: 214.0994, found: 214.0991.



(S)-5-Methyl-3,4-diphenylfuran-2(5H)-one (7j) was prepared as a colorless oil from (*S*)-1-phenyl-2-((trimethylsilyl)oxy)propan-1-one (44.5 mg, 0.2 mmol) and triisopropyl((phenylethynyl)oxy)silane (82.2 mg, 0.3 mmol) according to the General Procedure C (eluent: hexanes/ethyl acetate = 10:1) in 76% yield (38.0 mg).

$[\alpha]_{\text{D}}^{26}$: +38.0 ($c = 1.0$, CHCl_3).

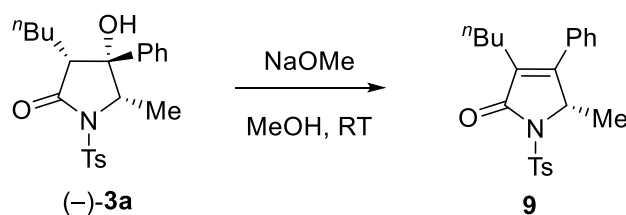
$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.41 – 7.31 (m, 8H), 7.25 – 7.23 (m, 2H), 5.53 (q, $J = 6.8$ Hz, 1H), 1.35 (d, $J = 6.8$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 172.4, 161.7, 131.3, 130.1, 130.0, 129.4, 129.1, 128.7, 128.6, 128.2, 126.2, 78.2, 19.2.

IR (neat, cm^{-1}): 3448, 3064, 2980, 1735, 1640.

HRMS (CI) calculated for $\text{C}_{17}\text{H}_{14}\text{O}_2$ [M^+]: 250.0994, found: 250.0992.

V. Product Transformations



(S)-3-Butyl-5-methyl-4-phenyl-1-tosyl-1,5-dihydro-2H-pyrrol-2-one (4). To a solution of (-)-**3a** (0.1 mmol, 40.2 mg) in MeOH (1.0 mL) was added dropwise NaOMe (0.1 mL, 5.4 M solution in MeOH). After stirring for 2 h at room temperature, water (2 mL) was added. The mixture was extracted with DCM (3 × 10 mL). The combined organic layers were washed with brine, dried with Na₂SO₄, and concentrated. The crude product was purified by flash column chromatography to yield **9** (37.6 mg, 98% yield).

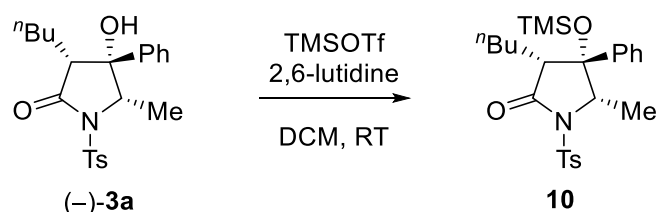
$[\alpha]_{\text{D}}^{26}$: -5.2 ($c = 1.0$, CHCl₃).

¹H NMR (400 MHz, CDCl₃) δ 8.02 (d, $J = 8.4$ Hz, 2H), 7.53 – 7.38 (m, 3H), 7.34 (d, $J = 8.1$ Hz, 2H), 7.29 – 7.26 (m, 2H), 5.11 (q, $J = 6.5$ Hz, 1H), 2.43 (s, 3H), 2.35 – 2.20 (m, 2H), 1.55 – 1.45 (m, 1H), 1.45 – 1.33 (m, 4H), 1.30 – 1.22 (m, 2H), 0.82 (t, $J = 7.3$ Hz, 3H).

¹³C NMR (100 MHz, CDCl₃) δ 169.4, 157.6, 144.9, 136.6, 132.1, 132.0, 129.7, 129.1, 128.2, 128.0, 59.7, 30.4, 24.0, 22.8, 21.8, 19.7, 13.82.

IR (neat, cm⁻¹): 3420, 2959, 1717, 1643, 1354.

HRMS (CI) calculated for C₂₂H₂₅NO₃S [M+H⁺]: 384.1633, found: 384.1644.



(3R,4R,5S)-3-Butyl-5-methyl-4-phenyl-1-tosyl-4-((trimethylsilyl)oxy)

pyrrolidin-2-one (10). To a solution of (-)-**3a** (0.37 mmol, 150.0 mg) and 2,6-lutidine (0.75 mmol, 87 μ L) in DCM (4.0 mL) was added dropwise

TMSOTf (0.67 mmol, 120 μ L). After stirring overnight at room temperature, water (2 mL) was added. The mixture was extracted with DCM (3×10 mL). The combined organic layers were washed with brine, dried with Na_2SO_4 , and concentrated. The crude product was purified by flash column chromatography to yield **10** (156.7 mg, 88% yield).

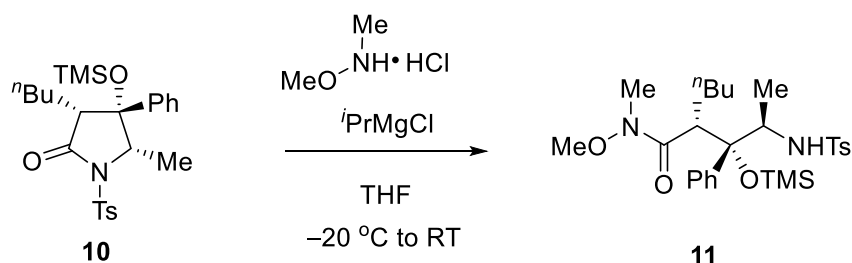
$[\alpha]_{\text{D}}^{26}$: -38.9 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.72 (d, $J = 8.4$ Hz, 2H), 7.27 – 7.26 (m, 5H), 7.20 (d, $J = 8.4$ Hz, 2H), 4.42 (q, $J = 6.4$ Hz, 1H), 2.84 – 2.80 (m, 1H), 2.41 (s, 3H), 1.74 – 1.66 (m, 2H), 1.57 – 1.53 (m, 4H), 1.31 – 1.23 (m, 3H), 0.84 (t, $J = 7.2$ Hz, 3H), 0.97 (s, 9H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.4, 144.6, 143.2, 135.9, 129.4, 128.5, 128.0, 127.9, 126.1, 81.5, 67.4, 53.7, 30.4, 26.5, 22.7, 21.7, 16.0, 13.9, 2.2.

IR (neat, cm^{-1}): 3442, 2958, 1739, 1362, 1170.

HRMS (CI) calculated for $\text{C}_{25}\text{H}_{35}\text{NNaO}_4\text{SSi}$ [$\text{M}+\text{Na}^+$]: 496.1954, found: 496.1943.



(R)-N-Methoxy-N-methyl-2-((1S,2R)-2-((4-methylphenyl)sulfonamido)-1-phenyl-1-((trimethylsilyl)oxy)propyl)hexanamide (11). At -20 $^\circ\text{C}$, to a solution of **10** (0.13 mmol, 55.6 mg) and *N,O*-dimethylhydroxylamine hydrochloride (0.5 mmol, 48.8 mg) in DCM (4.0 mL) was added a solution of isopropylmagnesium chloride (1.0 mmol, 2.0 M in THF, 0.5 mL) dropwise. Then the mixture was stirred overnight at room temperature before water (2 mL) was added. Upon completion, the reaction was quenched by a saturated aqueous NH_4Cl solution. The mixture was extracted with ethyl acetate (3×10

mL). The combined organic layers were washed with brine (30 mL), dried with Na₂SO₄, and concentrated under reduced pressure. The crude product was purified by flash chromatography to afford **11** (60.6 mg, 87%).

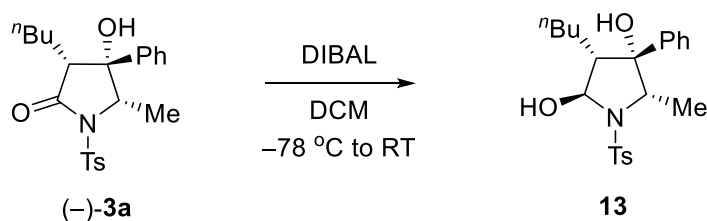
[α]_D²⁶: +21.9 (*c* = 1.0, CHCl₃).

¹H NMR (400 MHz, CDCl₃) δ 7.80 (d, *J* = 8.4 Hz, 2H), 7.32 – 7.22 (m, 5H), 7.18 – 7.16 (m, 2H), 4.98 (d, *J* = 8.4 Hz, 1H), 4.18 – 4.10 (m, 1H), 3.80 – 3.77 (m, 4H), 3.20 (s, 3H), 2.41 (s, 3H), 1.12 – 1.05 (m, 2H), 1.00 – 0.89 (m, 7H), 0.74 (t, *J* = 7.2 Hz, 3H), 0.13 (s, 9H).

¹³C NMR (100 MHz, CDCl₃) δ 173.9, 143.3, 139.8, 139.3, 129.8, 127.9, 127.4, 126.9(2C), 86.2, 61.5, 54.5, 47.2, 32.2, 30.2, 29.8, 23.0, 21.6, 17.8, 14.1, 3.2.

IR (neat, cm⁻¹): 3391, 2958, 1659, 1158, 1087.

HRMS (CI) calculated for C₂₇H₄₂N₂NaO₅SSi [M+Na⁺]: 557.2481, found: 557.2474.



(2S,3R,4R,5S)-3-Butyl-5-methyl-4-phenyl-1-tosylpyrrolidine-2,4-diol (13). To a solution of (-)-**3a** (0.2 mmol, 80.3 mg) in DCM (2.0 mL) was added DIBAL (0.44 mmol, 0.44 mL, 1.0 M solution in hexane) dropwise. After stirring for 2 h at -78 °C, it was allowed to warm to room temperature and stir overnight. Upon completion, the reaction was quenched by saturated aqueous NH₄Cl solution. The mixture was extracted with DCM (3 × 10 mL). The combined organic layers were washed with brine, dried over Na₂SO₄, and concentrated. The crude product was purified by silica gel flash column chromatography to yield **13** (53.8 mg, 73% yield).

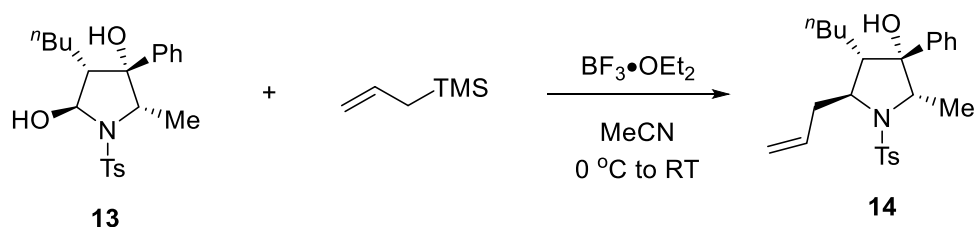
[α]_D²⁶: -50.2 (*c* = 1.0, CHCl₃).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.81 (d, $J = 8.0$ Hz, 2H), 7.38 (d, $J = 8.0$ Hz, 2H), 7.32 – 7.24 (m, 3H), 7.17 (d, $J = 8.0$ Hz, 2H), 5.61 (t, $J = 5.2$ Hz, 1H), 3.75 (d, $J = 4.8$ Hz, 1H), 3.61 (q, $J = 6.4$ Hz, 1H), 3.25 (s, 1H), 2.48 (s, 3H), 1.84 – 1.81 (m, 1H), 1.70 – 1.65 (m, 1H), 1.32 – 1.24 (m, 4H), 1.18 – 1.53 (m, 2H), 1.12 – 0.99 (m, 2H), 0.77 (t, $J = 7.2$ Hz, 3H).

$^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 144.0, 140.1, 136.1, 130.0, 128.4, 127.5, 127.3, 125.2, 85.7, 84.0, 67.7, 52.8, 29.6, 22.8, 21.9, 21.7, 14.6, 14.0.

IR (neat, cm^{-1}): 3474, 2958, 1343, 1165, 1029.

HRMS (CI) calculated for $\text{C}_{22}\text{H}_{28}\text{NO}_3\text{S}$ [M-OH^+]: 386.1789, found: 386.1771.



(2S,3R,4S,5S)-5-Allyl-4-butyl-2-methyl-3-phenyl-1-tosylpyrrolidin-3-ol (14).

At 0 °C, to a solution of **13** (0.05 mmol, 20.1 mg) and allyltrimethylsilane (0.25 mmol, 40 μL) in MeCN (1.0 mL) was added $\text{BF}_3 \cdot \text{OEt}_2$ (0.1 mmol, 16 μL). After stirring for 30 min at 0 °C, it was warmed to room temperature and stir for 30 min. Upon completion, the reaction mixture was then filtered through a short pad of silica gel, which was washed with ethyl acetate. The filtrate was concentrated to give the product **14** (18.3 mg, 86% yield) without further purification.

$[\alpha]_{\text{D}}^{26}$: -58.1 ($c = 1.0$, CHCl_3).

$^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.81 (d, $J = 8.0$ Hz, 2H), 7.40 (d, $J = 8.0$ Hz, 2H), 7.22 – 7.20 (m, 3H), 6.86 – 6.84 (m, 2H), 6.18 – 6.07 (m, 1H), 5.16 – 5.12 (m, 2H), 4.17 – 4.11 (m, 1H), 3.68 (q, $J = 6.4$ Hz, 1H), 2.73 – 2.65 (m, 1H), 2.51 – 2.45 (m, 4H), 1.87 (s, 1H), 1.82 – 1.77 (m, 1H), 1.38 – 1.32 (m, 1H), 1.27 (d, $J = 6.4$ Hz, 3H), 1.14 – 1.03 (m, 3H), 0.97 – 0.87 (m, 2H), 0.73 (t, $J = 7.2$ Hz, 3H).

¹³C NMR (100 MHz, CDCl₃) δ 143.9, 143.2, 136.7, 135.1, 129.8, 128.5, 128.1, 127.4, 124.8, 116.8, 84.2, 68.1, 63.4, 52.8, 36.7, 29.8, 22.8, 22.6, 21.7, 15.6, 13.9.

IR (neat, cm⁻¹): 3505, 2930, 1639, 1376, 1162.

HRMS (CI) calculated for C₂₅H₃₂NO₂S [M-OH⁺]: 410.2153, found: 410.2155.

VI. Determination of the Product Structure

The structure and stereochemistry of product **3e** were determined by X-ray diffraction. The X-ray data have been deposited at the Cambridge Crystallographic Data Center (CCDC 1047790). The structure of other products was assumed by analogy.

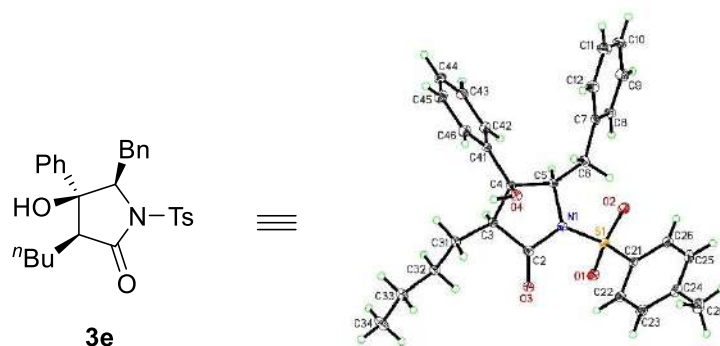


Table S1. Crystal data and structure refinement for **3e.**

Identification code	3e
Empirical formula	C ₂₈ H ₃₁ NO ₄ S
Formula weight	477.60
Temperature/K	99.9(5)
Crystal system	monoclinic
Space group	P2 ₁
a/Å	11.8701(4)
b/Å	9.35538(18)
c/Å	12.2790(4)
α/°	90.00
β/°	117.558(4)
γ/°	90.00
Volume/Å ³	1208.86(6)
Z	2
ρ _{calc} /cm ³	1.312
μ/mm ⁻¹	1.472

F(000)	508.0
Crystal size/mm ³	0.25 × 0.1 × 0.03
Radiation	CuKα (λ = 1.54184)
2θ range for data collection/°	8.4 to 134.96
Index ranges	-14 ≤ h ≤ 13, -8 ≤ k ≤ 11, -14 ≤ l ≤ 14
Reflections collected	6698
Independent reflections	3391 [R _{int} = 0.0194, R _{sigma} = 0.0249]
Data/restraints/parameters	3391/1/310
Goodness-of-fit on F ²	1.001
Final R indexes [I ≥ 2σ (I)]	R ₁ = 0.0242, wR ₂ = 0.0598
Final R indexes [all data]	R ₁ = 0.0250, wR ₂ = 0.0604
Largest diff. peak/hole / e Å ⁻³	0.19/-0.24
Flack parameter	0.007(11)

Table S2. Fractional Atomic Coordinates (×10⁴) and Equivalent Isotropic Displacement Parameters (Å²×10³) for 3e. U_{eq} is defined as 1/3 of the trace of the orthogonalised U_{ij} tensor.

Atom	x	y	z	U(eq)
S1	3039.6 (3)	845.5 (4)	2187.4 (3)	14.54 (9)
O1	4011.7 (11)	49.2 (13)	2075.0 (11)	19.9 (3)
O2	1845.0 (11)	180.8 (13)	1882.3 (10)	19.3 (3)
O3	5729.4 (10)	1731.5 (14)	4080.1 (11)	18.7 (3)
O4	3979.7 (10)	3334.7 (13)	5586.8 (10)	15.8 (2)
N1	3635.2 (12)	1334.6 (15)	3655.5 (12)	14.7 (3)
C2	4950.0 (15)	1452.6 (18)	4422.3 (15)	14.8 (3)
C3	5162.3 (14)	1199.6 (17)	5723.3 (14)	13.2 (3)
C4	3923.2 (14)	1818.0 (18)	5653.9 (14)	13.4 (3)
C5	2894.9 (14)	1308.2 (18)	4364.6 (14)	13.9 (3)
C6	1686.4 (14)	2233.3 (19)	3803.1 (15)	15.9 (3)
C7	537.4 (14)	1553.6 (19)	3827.0 (15)	15.5 (3)

C8	78.8 (16)	226 (2)	3291.3 (16)	19.5 (4)
C9	-1020.6 (17)	-343 (2)	3249.5 (17)	23.5 (4)
C10	-1676.7 (16)	399 (2)	3756.1 (17)	24.1 (4)
C11	-1216.3 (17)	1707 (2)	4311.8 (18)	25.5 (4)
C12	-122.8 (16)	2285 (2)	4334.0 (16)	20.8 (4)
C20	2140.7 (19)	6533 (2)	-415.0 (18)	26.7 (4)
C21	2760.6 (15)	2457.1 (18)	1358.3 (14)	14.8 (3)
C22	3798.5 (15)	3269 (2)	1497.7 (15)	16.7 (3)
C23	3578.8 (16)	4575.8 (19)	901.2 (15)	18.7 (4)
C24	2342.6 (17)	5077.9 (19)	170.2 (15)	20.0 (4)
C25	1324.8 (17)	4222 (2)	27.8 (16)	21.9 (4)
C26	1523.4 (16)	2908 (2)	624.6 (15)	19.5 (3)
C31	6417.1 (14)	1819.3 (18)	6687.2 (15)	15.1 (3)
C32	7543.4 (14)	869 (2)	6877.9 (14)	16.0 (3)
C33	8820.5 (15)	1573 (2)	7686.0 (17)	21.8 (4)
C34	9948.8 (15)	646 (2)	7863.1 (17)	27.0 (4)
C41	3651.7 (14)	1334.1 (19)	6698.1 (15)	15.4 (3)
C42	3301.3 (16)	-69 (2)	6761.8 (16)	19.8 (4)
C43	3090.9 (17)	-526 (2)	7734.4 (17)	24.9 (4)
C44	3242.5 (17)	411 (2)	8660.5 (17)	26.8 (4)
C45	3592.9 (17)	1814 (2)	8606.2 (17)	26.2 (4)
C46	3791.3 (16)	2274 (2)	7629.2 (16)	21.0 (4)

Table S3. Anisotropic Displacement Parameters ($\text{\AA}^2 \times 10^3$) for 3e. The Anisotropic displacement factor exponent takes the form: $-2\pi^2[h^2a^{*2}U_{11}+2hka^*b^*U_{12}+\dots]$.

Atom	U ₁₁	U ₂₂	U ₃₃	U ₂₃	U ₁₃	U ₁₂
S1	15.82 (17)	14.87 (19)	13.18 (17)	-0.25 (15)	6.92 (13)	-1.81 (15)
O1	23.9 (6)	19.3 (7)	19.5 (6)	0.7 (5)	12.5 (5)	2.0 (5)
O2	20.4 (6)	20.3 (6)	16.3 (6)	-1.2 (5)	7.6 (5)	-6.6 (5)
O3	14.4 (5)	24.4 (7)	19.8 (6)	2.5 (5)	9.9 (5)	0.1 (5)

O4	15.7 (5)	12.4 (6)	17.9 (6)	-0.6 (5)	6.7 (4)	-0.3 (4)
N1	12.3 (6)	19.0 (7)	13.3 (6)	0.3 (5)	6.5 (5)	-0.8 (5)
C2	14.0 (7)	12.6 (8)	17.8 (8)	1.2 (6)	7.5 (6)	1.5 (6)
C3	12.7 (7)	14.2 (9)	13.2 (7)	0.4 (6)	6.5 (6)	0.7 (6)
C4	12.4 (7)	13.1 (8)	14.6 (7)	1.0 (6)	6.0 (6)	0.2 (6)
C5	12.5 (7)	16.5 (8)	14.0 (7)	1.4 (6)	7.3 (6)	-0.3 (6)
C6	12.6 (7)	15.4 (8)	18.4 (7)	1.9 (6)	6.2 (6)	-0.3 (6)
C7	10.8 (7)	18.0 (8)	15.4 (7)	4.1 (6)	4.3 (6)	0.9 (6)
C8	16.6 (8)	22.7 (9)	21.4 (8)	-0.5 (7)	10.7 (7)	-0.6 (7)
C9	22.1 (8)	22.0 (9)	25.5 (9)	-0.9 (7)	10.3 (7)	-7.3 (7)
C10	15.4 (7)	29.3 (10)	29.0 (9)	9.3 (8)	11.5 (7)	0.1 (7)
C11	22.4 (8)	26.6 (10)	34.6 (10)	6.0 (8)	19.3 (8)	6.1 (8)
C12	21.3 (8)	17.8 (9)	26.2 (9)	-0.1 (7)	13.5 (7)	0.4 (7)
C20	30.4 (9)	22.7 (10)	22.6 (9)	5.6 (8)	8.6 (8)	-1.2 (8)
C21	19.3 (7)	15.5 (8)	10.6 (7)	0.3 (6)	7.6 (6)	-1.2 (6)
C22	16.7 (7)	20.7 (9)	14.3 (7)	-1.8 (6)	8.5 (6)	-1.2 (7)
C23	21.7 (8)	19.5 (9)	15.8 (8)	-2.5 (7)	9.5 (7)	-4.2 (7)
C24	25.8 (9)	20.3 (10)	13.1 (8)	1.0 (7)	8.3 (7)	-0.6 (7)
C25	19.8 (8)	26 (1)	15.2 (8)	2.9 (7)	4.3 (7)	1.7 (7)
C26	17.4 (7)	24.2 (10)	15.5 (8)	0.5 (7)	6.5 (6)	-4.5 (7)
C31	12.4 (7)	15.3 (8)	16.2 (7)	-0.1 (6)	5.4 (6)	0.1 (6)
C32	13.2 (7)	16.2 (8)	18.3 (7)	0.7 (7)	7.0 (6)	0.2 (7)
C33	13.8 (7)	22.6 (10)	26.7 (9)	-3.5 (8)	7.4 (7)	-0.6 (7)
C34	13.5 (7)	31.2 (11)	32.8 (9)	-7.0 (8)	7.8 (7)	-0.4 (8)
C41	10.8 (7)	21.3 (9)	14.4 (7)	2.3 (6)	6.0 (6)	2.5 (6)
C42	18.5 (8)	23.5 (10)	16.7 (8)	1.8 (7)	7.5 (7)	-1.0 (7)
C43	19.5 (8)	32.1 (11)	22.8 (9)	9.7 (8)	9.5 (7)	-2.0 (8)
C44	20.5 (8)	44.7 (13)	20.7 (8)	10.5 (8)	14.3 (7)	8.8 (8)
C45	28.0 (9)	34.7 (11)	20.2 (9)	2.7 (8)	14.7 (7)	14.6 (8)
C46	23.3 (8)	21.5 (9)	19.4 (8)	2.1 (7)	11.0 (7)	8.6 (7)

Table S4. Bond Lengths for 3e.

Atom	Atom	Length/Å	Atom	Atom	Length/Å
S1	O1	1.4328 (12)	C10	C11	1.384 (3)
S1	O2	1.4305 (12)	C11	C12	1.395 (2)
S1	N1	1.6672 (14)	C20	C24	1.506 (3)
S1	C21	1.7627 (17)	C21	C22	1.389 (2)
O3	C2	1.208 (2)	C21	C26	1.386 (2)
O4	C4	1.425 (2)	C22	C23	1.387 (3)
N1	C2	1.405 (2)	C23	C24	1.400 (3)
N1	C5	1.4964 (19)	C24	C25	1.391 (3)
C2	C3	1.516 (2)	C25	C26	1.395 (3)
C3	C4	1.546 (2)	C31	C32	1.530 (2)
C3	C31	1.525 (2)	C32	C33	1.525 (2)
C4	C5	1.561 (2)	C33	C34	1.525 (2)
C4	C41	1.528 (2)	C41	C42	1.390 (3)
C5	C6	1.538 (2)	C41	C46	1.390 (3)
C6	C7	1.517 (2)	C42	C43	1.396 (2)
C7	C8	1.393 (3)	C43	C44	1.380 (3)
C7	C12	1.386 (2)	C44	C45	1.388 (3)
C8	C9	1.388 (2)	C45	C46	1.393 (2)
C9	C10	1.387 (3)			

Table S5. Bond Angles for 3e.

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
O1	S1	N1	106.81 (7)	C12	C7	C8	118.28 (15)
O1	S1	C21	109.49 (7)	C9	C8	C7	120.96 (16)
O2	S1	O1	119.59 (8)	C10	C9	C8	120.33 (17)
O2	S1	N1	106.00 (7)	C11	C10	C9	119.20 (16)
O2	S1	C21	108.78 (8)	C10	C11	C12	120.27 (17)
N1	S1	C21	105.19 (7)	C7	C12	C11	120.93 (17)

C2	N1	S1	122.01 (11)	C22	C21	S1	118.53 (13)
C2	N1	C5	112.37 (13)	C26	C21	S1	119.67 (13)
C5	N1	S1	123.73 (11)	C26	C21	C22	121.76 (16)
O3	C2	N1	125.14 (15)	C23	C22	C21	118.54 (15)
O3	C2	C3	128.27 (14)	C22	C23	C24	121.30 (16)
N1	C2	C3	106.58 (12)	C23	C24	C20	119.82 (16)
C2	C3	C4	101.15 (12)	C25	C24	C20	121.53 (17)
C2	C3	C31	112.64 (12)	C25	C24	C23	118.62 (16)
C31	C3	C4	117.61 (13)	C24	C25	C26	121.03 (16)
O4	C4	C3	107.87 (12)	C21	C26	C25	118.71 (16)
O4	C4	C5	106.34 (12)	C3	C31	C32	111.63 (13)
O4	C4	C41	112.17 (13)	C33	C32	C31	112.58 (15)
C3	C4	C5	102.67 (12)	C34	C33	C32	112.98 (16)
C41	C4	C3	114.05 (13)	C42	C41	C4	120.78 (15)
C41	C4	C5	113.01 (13)	C46	C41	C4	120.76 (16)
N1	C5	C4	101.01 (11)	C46	C41	C42	118.42 (16)
N1	C5	C6	114.00 (13)	C41	C42	C43	120.95 (18)
C6	C5	C4	114.35 (13)	C44	C43	C42	120.23 (19)
C7	C6	C5	114.56 (14)	C43	C44	C45	119.29 (16)
C8	C7	C6	121.52 (15)	C44	C45	C46	120.49 (18)
C12	C7	C6	120.12 (15)	C41	C46	C45	120.62 (18)

Table S6. Hydrogen Bonds for 3e.

D	H	A	d(D-H)/Å	d(H-A)/Å	d(D-A)/Å	D-H-A/°
O4	H4	O1 ¹	0.84	2.37	3.1885 (17)	165.9

¹1-X,1/2+Y,1-Z

Table S7. Torsion Angles for 3e.

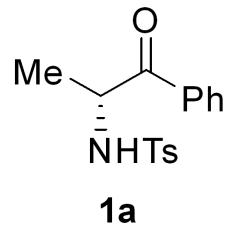
A	B	C	D	Angle/°	A	B	C	D	Angle/°
S1	N1	C2	O3	28.1(2)	C4	C41	C42	C43	177.99(15)
S1	N1	C2	C3	-153.24(11)	C4	C41	C46	C45	-177.39(15)
S1	N1	C5	C4	178.39(11)	C5	N1	C2	O3	-167.08(16)
S1	N1	C5	C6	-58.49(18)	C5	N1	C2	C3	11.60(18)
S1	C21	C22	C23	-176.34(12)	C5	C4	C41	C42	46.4(2)
S1	C21	C26	C25	176.67(13)	C5	C4	C41	C46	-135.83(16)
O1	S1	N1	C2	23.89(15)	C5	C6	C7	C8	-56.5(2)
O1	S1	N1	C5	-139.22(13)	C5	C6	C7	C12	126.82(17)
O1	S1	C21	C22	-46.39(14)	C6	C7	C8	C9	-175.81(17)
O1	S1	C21	C26	135.94(13)	C6	C7	C12	C11	176.92(16)
O2	S1	N1	C2	152.44(13)	C7	C8	C9	C10	-0.7(3)
O2	S1	N1	C5	-10.67(15)	C8	C7	C12	C11	0.1(3)
O2	S1	C21	C22	-178.73(12)	C8	C9	C10	C11	-0.5(3)
O2	S1	C21	C26	3.60(15)	C9	C10	C11	C12	1.6(3)
O3	C2	C3	C4	146.49(18)	C10	C11	C12	C7	-1.4(3)
O3	C2	C3	C31	20.0(2)	C12	C7	C8	C9	0.9(2)
O4	C4	C5	N1	80.23(14)	C20	C24	C25	C26	-176.71(17)
O4	C4	C5	C6	-42.65(16)	C21	S1	N1	C2	-92.42(14)
O4	C4	C41	C42	166.60(14)	C21	S1	N1	C5	104.48(14)
O4	C4	C41	C46	-15.6(2)	C21	C22	C23	C24	-0.1(2)
N1	S1	C21	C22	68.06(14)	C22	C21	C26	C25	-0.9(3)
N1	S1	C21	C26	-109.60(14)	C22	C23	C24	C20	177.10(16)
N1	C2	C3	C4	-32.14(16)	C22	C23	C24	C25	-1.4(2)
N1	C2	C3	C31	-158.59(13)	C23	C24	C25	C26	1.7(3)
N1	C5	C6	C7	138.70(14)	C24	C25	C26	C21	-0.6(3)
C2	N1	C5	C4	13.85(17)	C26	C21	C22	C23	1.3(2)
C2	N1	C5	C6	136.97(14)	C31	C3	C4	O4	50.95(17)
C2	C3	C4	O4	-72.14(14)	C31	C3	C4	C5	163.00(13)
C2	C3	C4	C5	39.92(15)	C31	C3	C4	C41	-74.37(18)

C2 C3 C4 C41	162.54 (14)	C31 C32 C33 C34	-178.99 (14)
C2 C3 C31 C32	-77.72 (17)	C41 C4 C5 N1	-156.27 (13)
C3 C4 C5 N1	-32.96 (15)	C41 C4 C5 C6	80.85 (17)
C3 C4 C5 C6	-155.83 (13)	C41 C42 C43 C44	-0.7 (3)
C3 C4 C41 C42	-70.39 (19)	C42 C41 C46 C45	0.5 (2)
C3 C4 C41 C46	107.39 (17)	C42 C43 C44 C45	0.7 (3)
C3 C31 C32 C33	171.14 (14)	C43 C44 C45 C46	-0.1 (3)
C4 C3 C31 C32	165.24 (13)	C44 C45 C46 C41	-0.5 (3)
C4 C5 C6 C7	-105.77 (16)	C46 C41 C42 C43	0.2 (2)

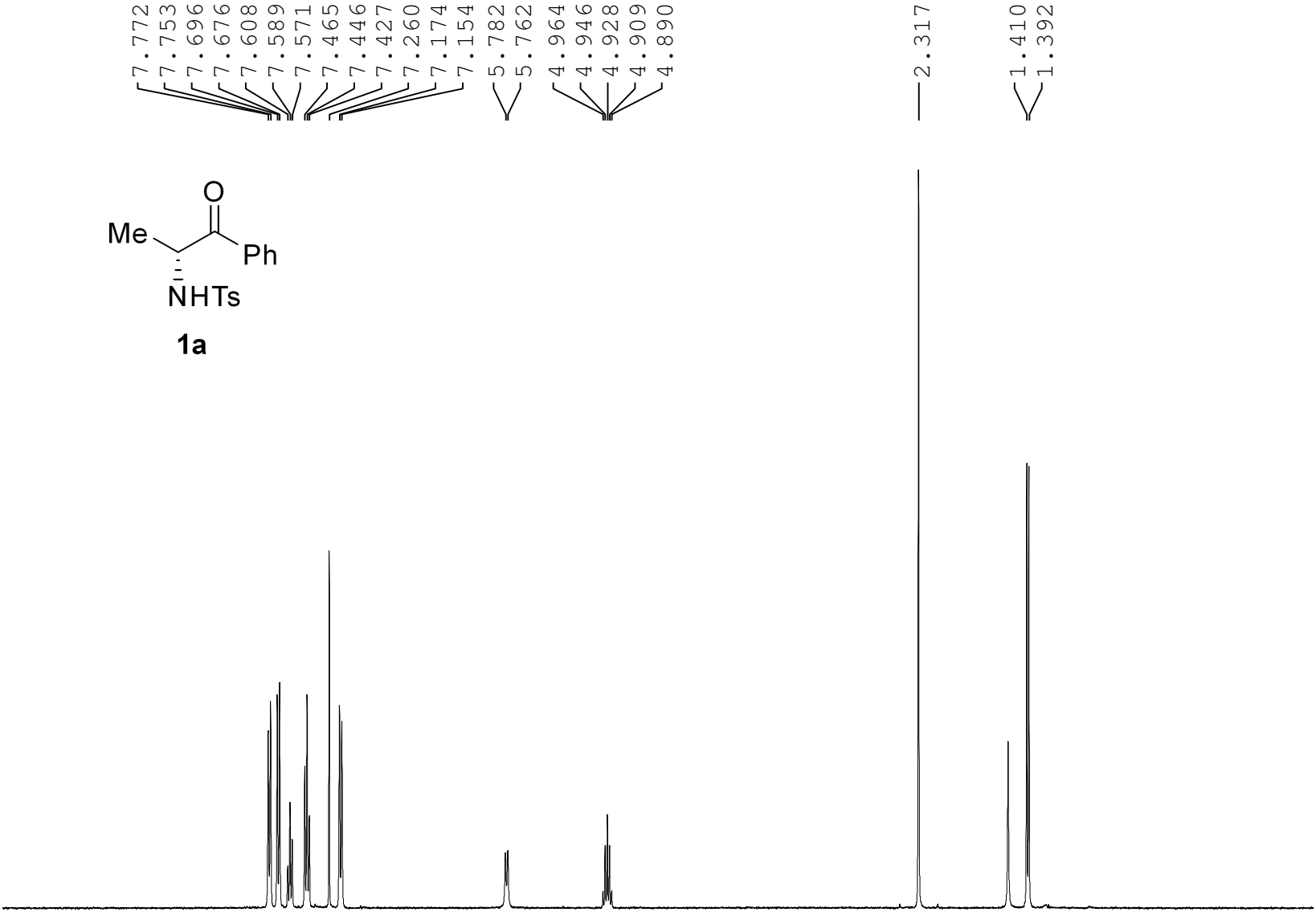
Table S8. Hydrogen Atom Coordinates ($\text{\AA}\times 10^4$) and Isotropic Displacement Parameters ($\text{\AA}^2\times 10^3$) for 3e.

Atom	<i>x</i>	<i>y</i>	<i>z</i>	U(eq)
H4	4584	3647	6236	24
H3	5171	145	5860	16
H5	2655	299	4429	17
H6A	1870	3151	4254	19
H6B	1473	2451	2940	19
H8	525	-298	2950	23
H9	-1325	-1245	2872	28
H10	-2433	15	3722	29
H11	-1647	2213	4680	31
H12	174	3193	4702	25
H20A	1228	6710	-907	40
H20B	2553	6572	-946	40
H20C	2510	7263	227	40
H22	4641	2936	1991	20
H23	4281	5142	990	22
H25	481	4538	-484	26

H26	824	2333	530	23
H31A	6386	1920	7476	18
H31B	6538	2783	6425	18
H32A	7488	-41	7261	19
H32B	7492	643	6069	19
H33A	8868	2493	7310	26
H33B	8877	1785	8500	26
H34A	9891	417	7060	40
H34B	9940	-240	8285	40
H34C	10741	1165	8358	40
H42	3204	-726	6134	24
H43	2842	-1486	7759	30
H44	3108	99	9328	32
H45	3698	2466	9240	31
H46	4024	3239	7599	25



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PROCNO 1

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DE 6.50 usec
TE 296.4 K
D1 1.00000000 sec
TD0 1

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NUC1 1H
P1 14.50 usec
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SF 400.130092 MHz
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SSB 0
LB 0.30 Hz
GB 0
PC 1.00



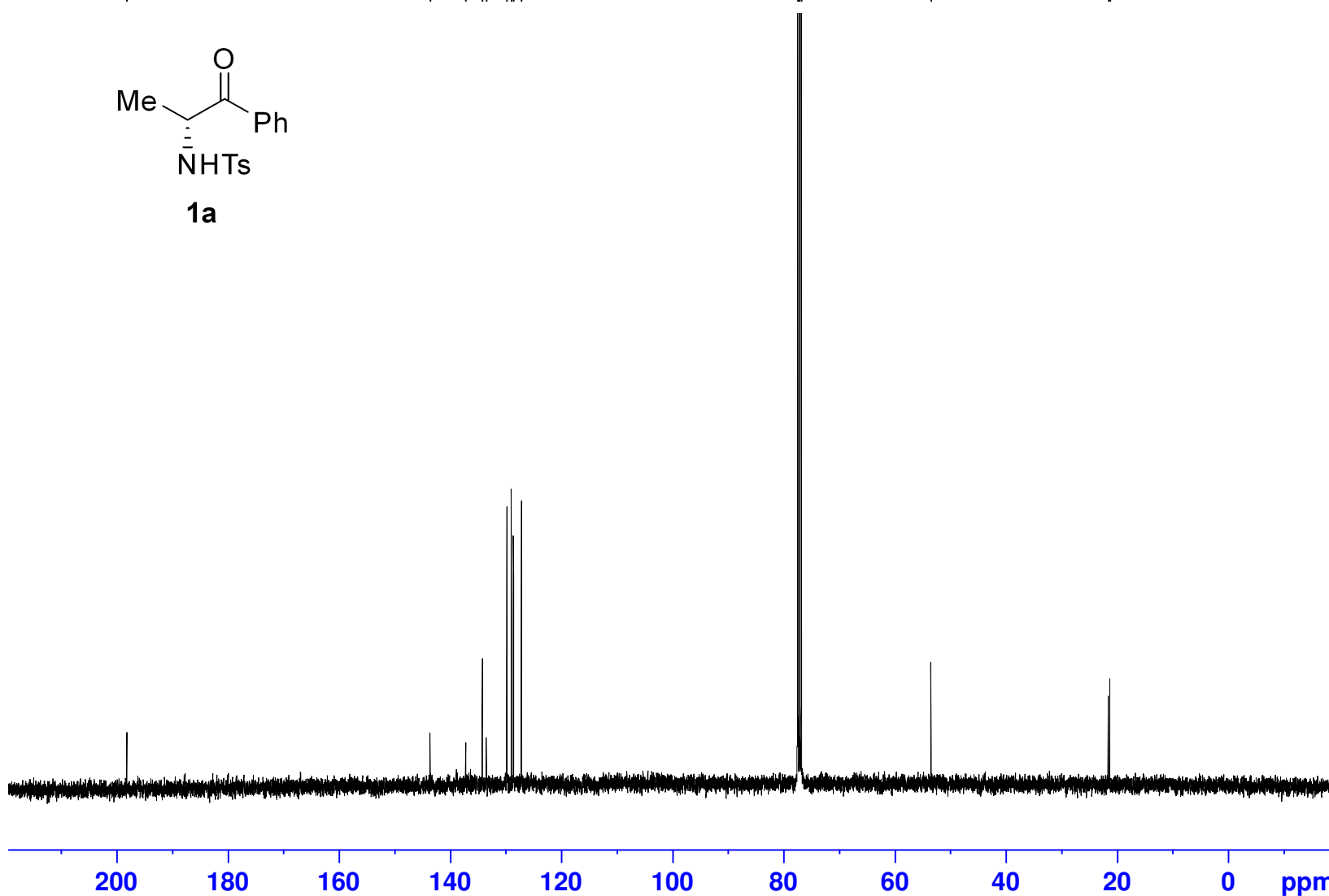
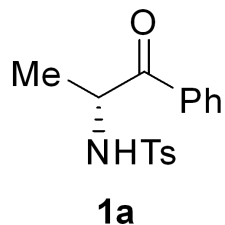
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21.304



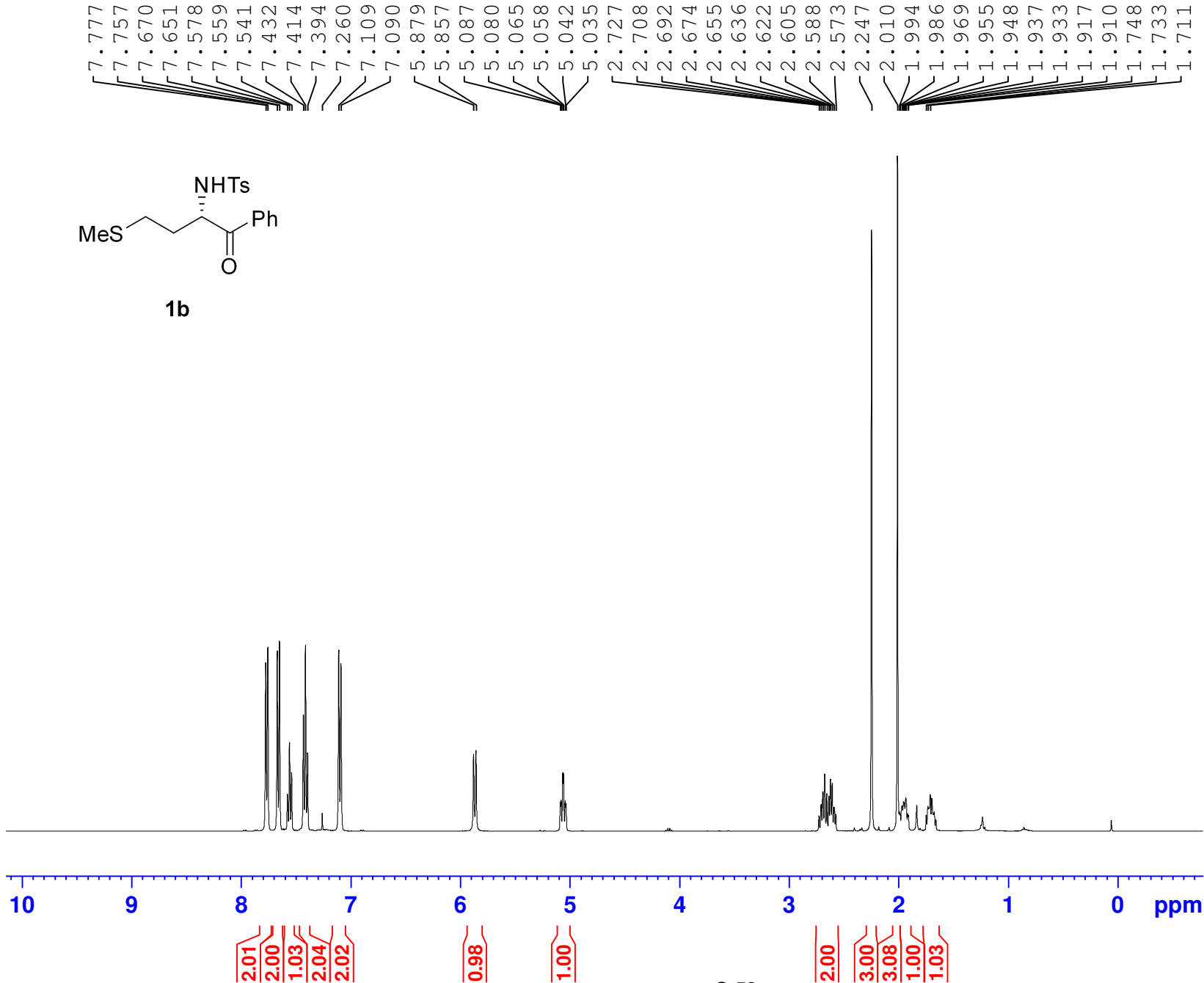
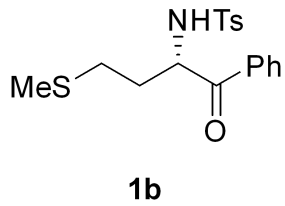
Current Data Parameters
NAME qh-11241
EXPNO 5
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150401
Time 19.49
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 369
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127546 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

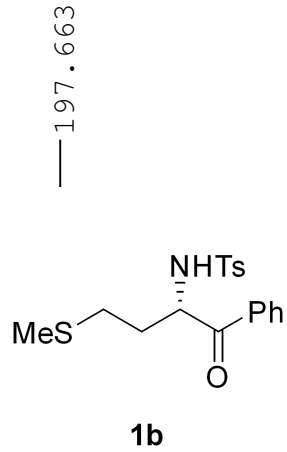


Current Data Parameters
NAME qh-11120
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150108
Time 16.19
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 25.32
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



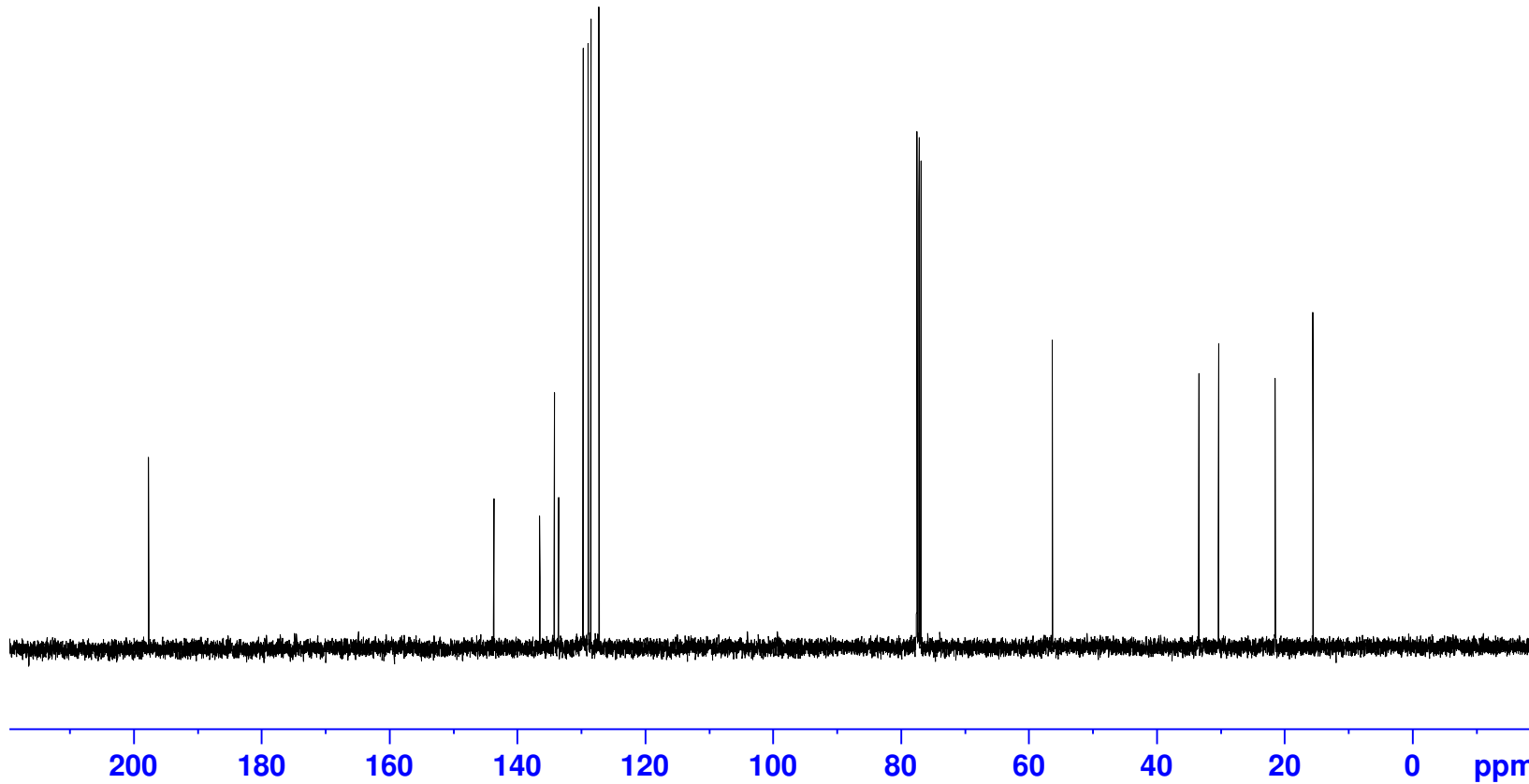
— 197.663

143.668
136.480
134.204
133.513
129.678
128.913
128.492
127.229

77.481
77.162
76.844

— 56.294

33.383
30.300
21.447
15.513



Current Data Parameters
NAME qh-11120
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150108
Time 16.21
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 40
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

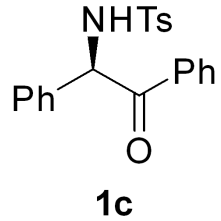
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

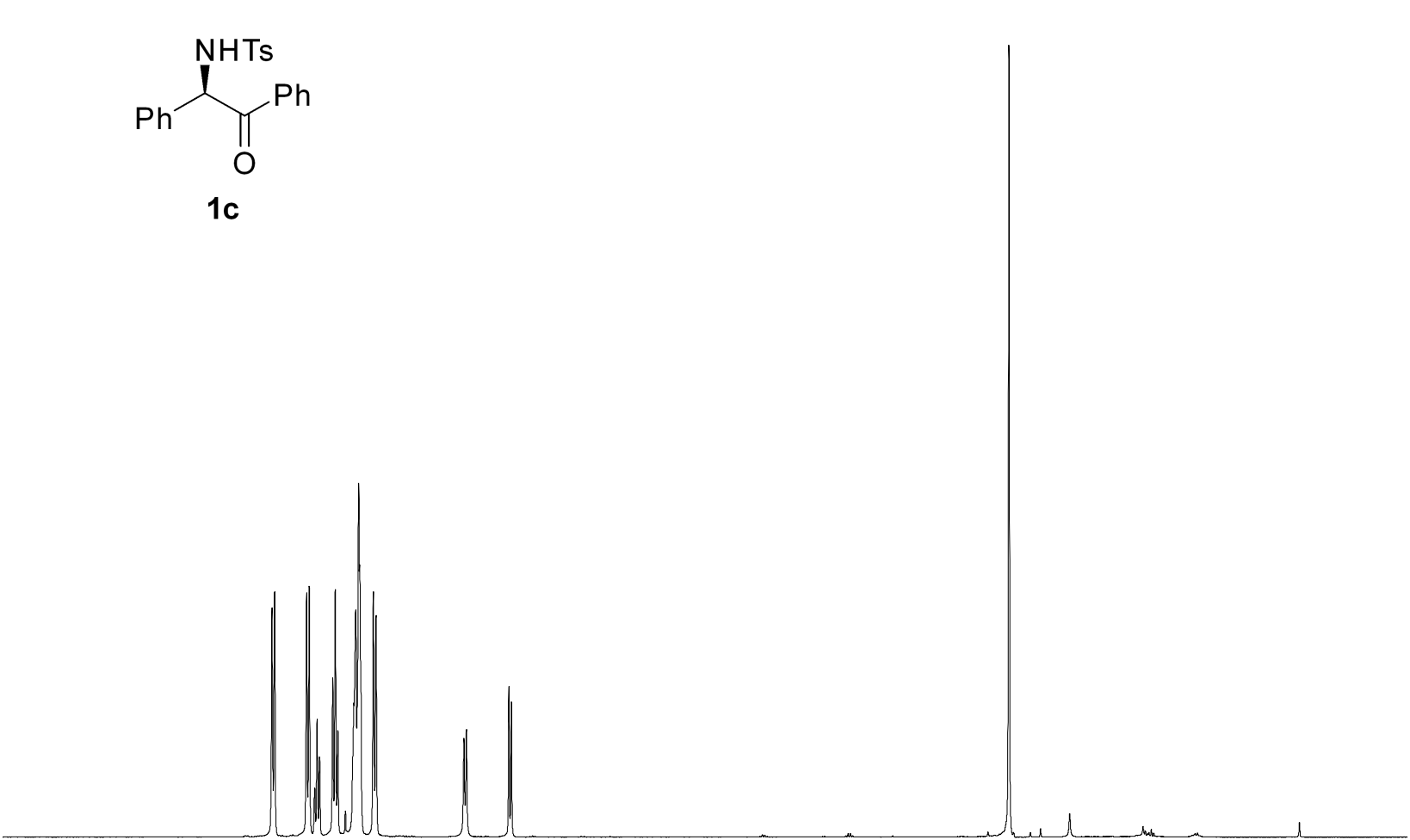
F2 - Processing parameters
SI 32768
SF 100.6127663 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.811
7.791
7.550
7.531
7.491
7.472
7.454
7.354
7.336
7.316
7.259
7.195
7.182
7.159
7.152
7.049
7.029
6.368
6.350
6.030
6.011



2.272

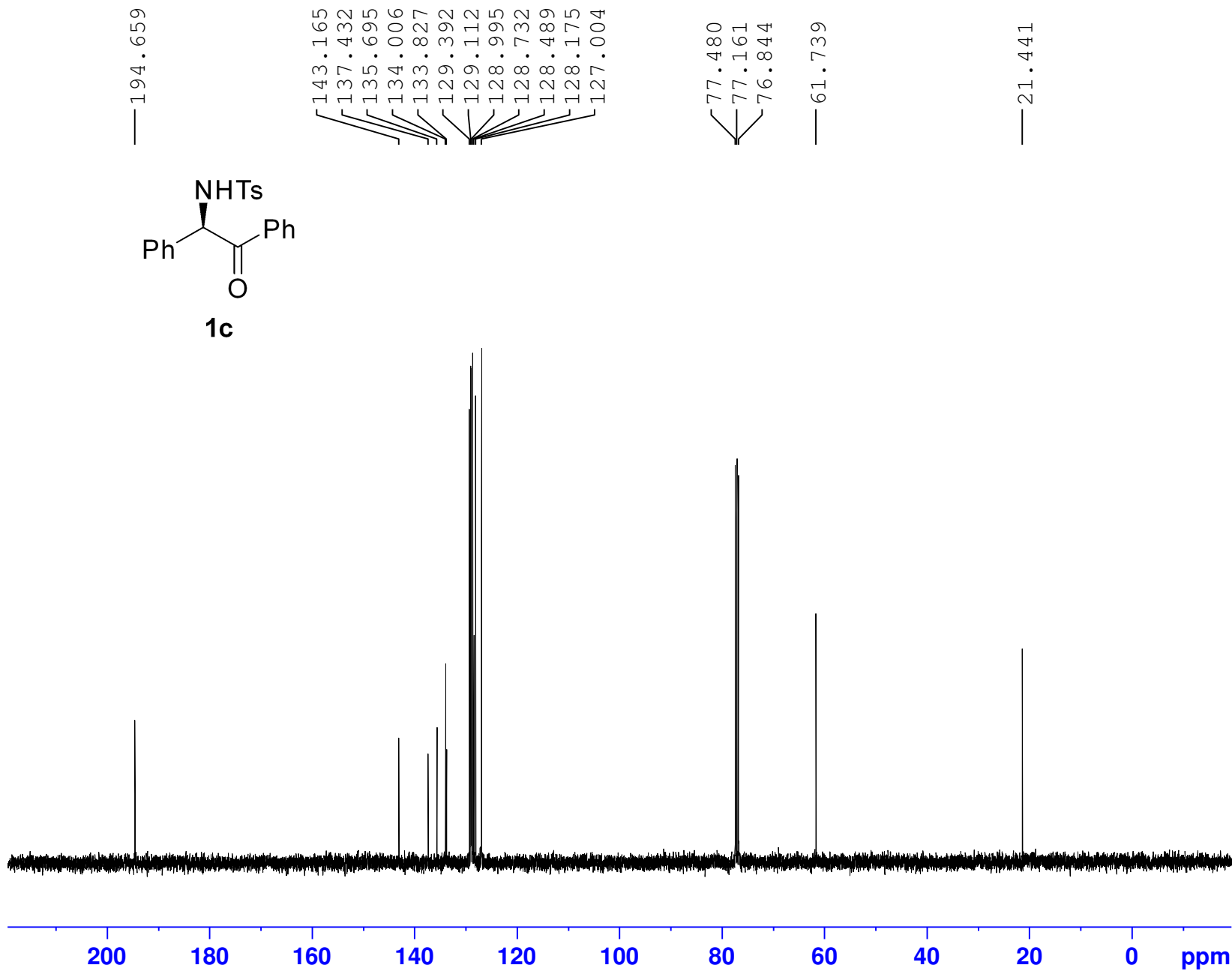
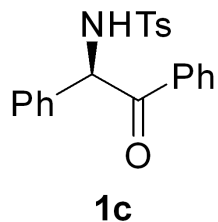
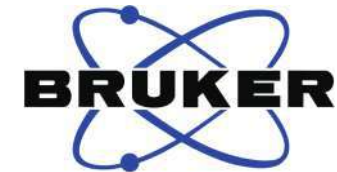


Current Data Parameters
NAME qh-11109
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150103
Time 16.31
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 1
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 39.46
DW 62.400 usec
DE 6.50 usec
TE 295.7 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



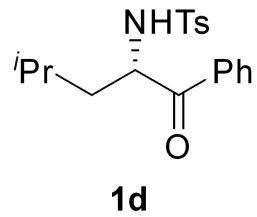
Current Data Parameters
NAME qh-11109
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150103
Time 16.33
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 31
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

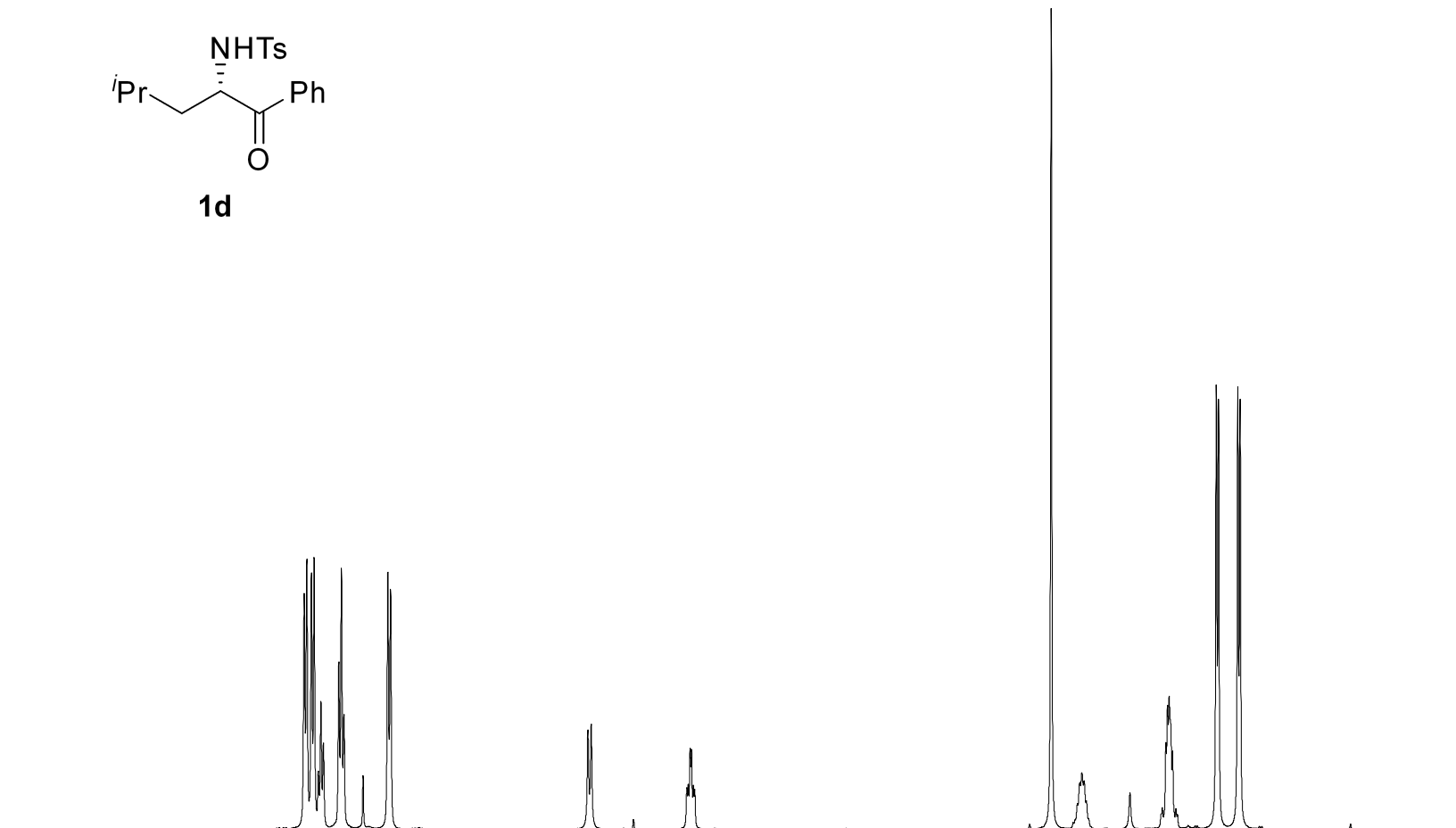
F2 - Processing parameters
SI 32768
SF 100.6127663 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.689
7.670
7.636
7.617
7.586
7.567
7.549
7.436
7.418
7.399
7.260
7.079
7.060

5.622
5.598
4.901
4.891
4.877
4.868
4.854
4.844

2.247
2.056
2.040
2.023
2.007
1.991
1.411
1.400
1.388
1.363
1.045
1.029
0.888
0.871



4.09
1.12
2.15
2.06

1.00
1.03

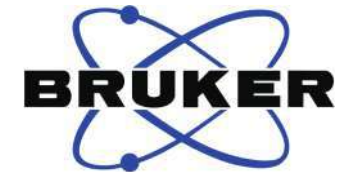
3.10
1.05
2.08
3.14
3.17

Current Data Parameters
NAME qh-11129
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150112
Time 22.24
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 54.81
DW 62.400 usec
DE 6.50 usec
TE 296.3 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



—198.663

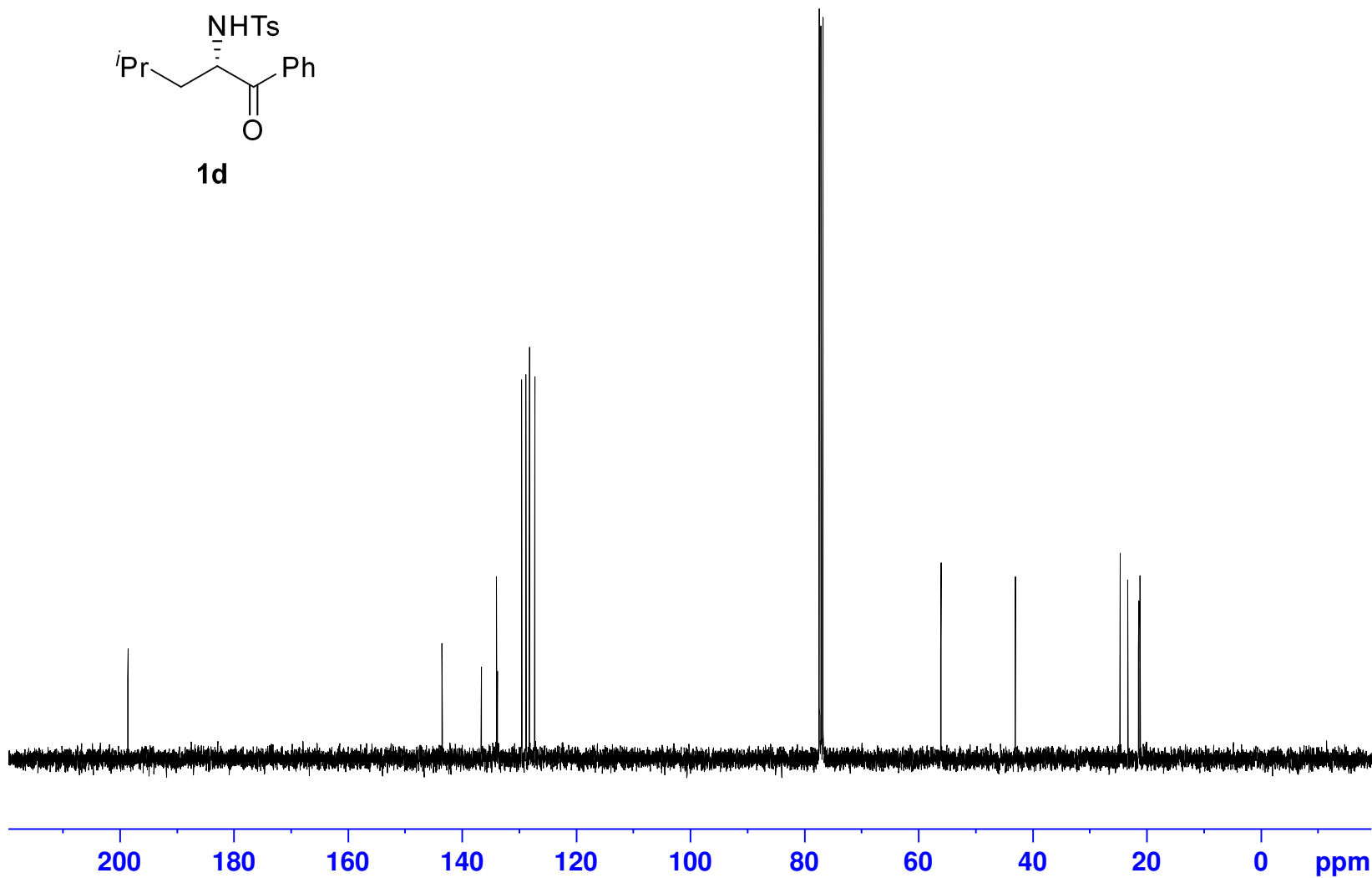
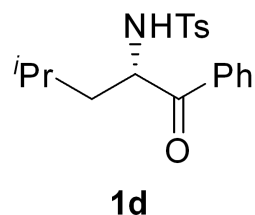
143.583
136.702
134.053
133.903
129.645
128.900
128.272
127.326

77.481
77.163
76.845

—56.153

—43.097

24.742
23.413
21.492
21.253



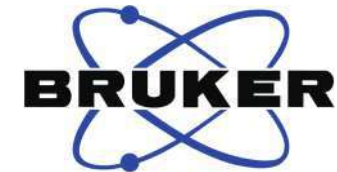
Current Data Parameters
NAME qh-11129
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150112
Time 22.25
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 76
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

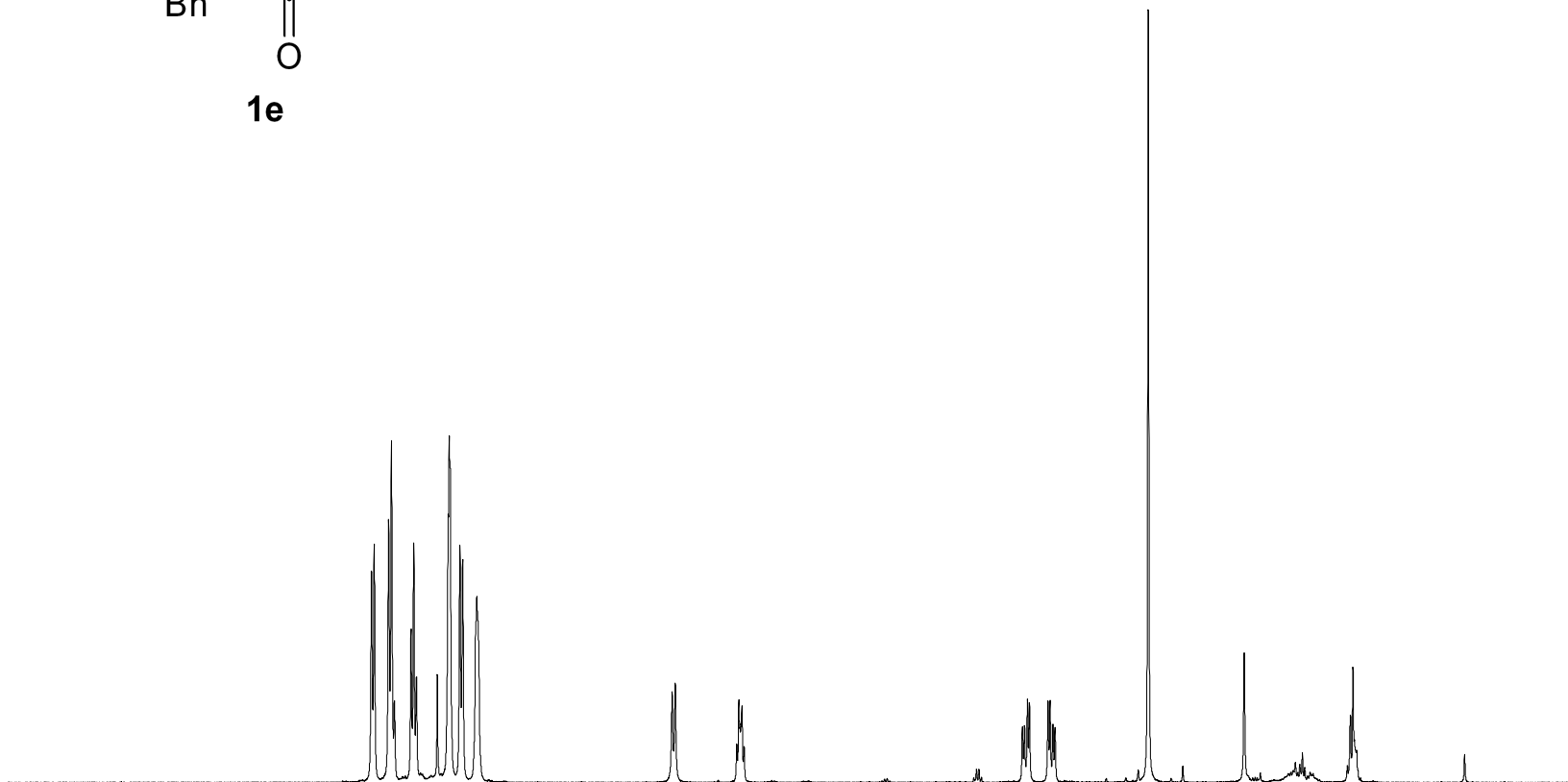
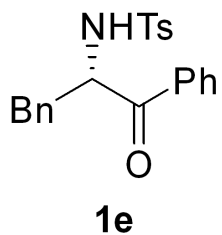
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127583 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.721
7.701
7.601
7.581
7.560
7.444
7.425
7.406
7.260
7.184
7.176
7.170
7.102
7.082
6.983
5.618
5.596
5.165
5.151
5.143
5.136
5.129
5.114
3.167
3.153
3.132
3.118
2.988
2.974
2.954
2.939
2.287



10 9 8 7 6 5 4 3 2 1 0 ppm

2.01
3.00
2.01
3.08
2.07
2.07

0.98

1.01

1.01

1.01

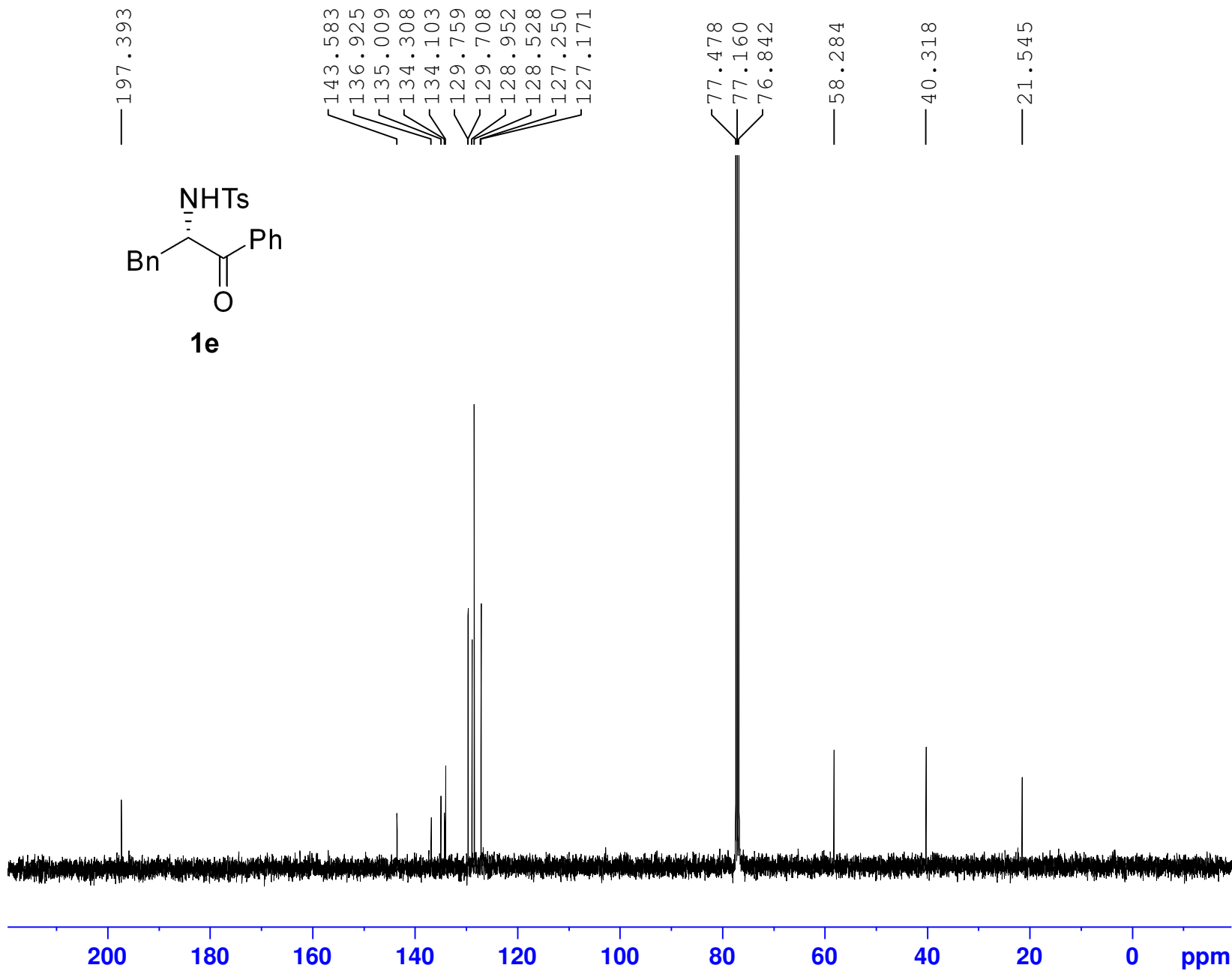
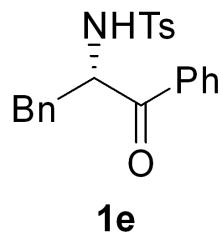
3.01

Current Data Parameters
NAME qh-11112
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150106
Time 14.30
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 1
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 88.84
DW 62.400 usec
DE 6.50 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SF01 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
NAME qh-11112
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150106
Time 14.33
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 112
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127575 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

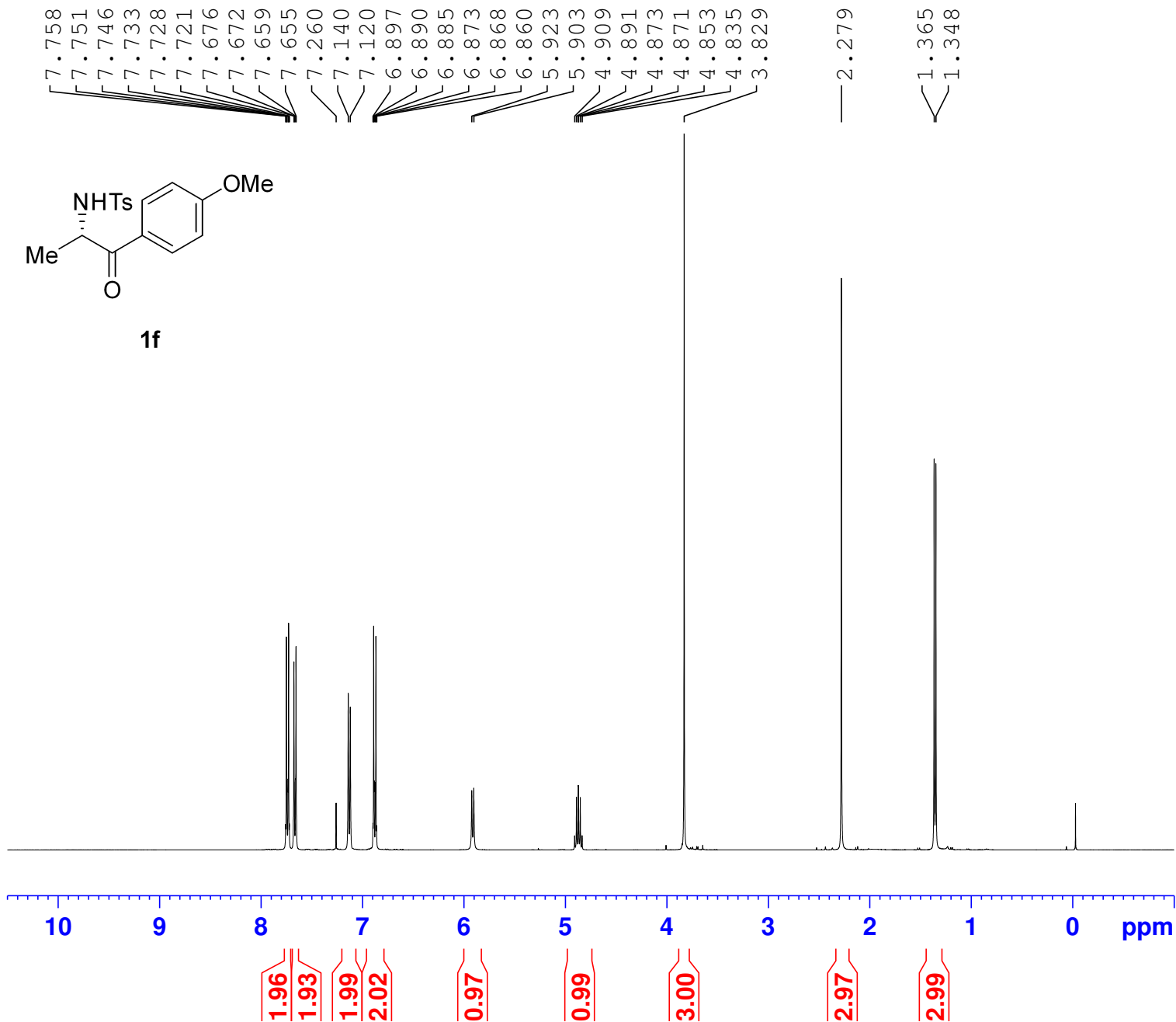


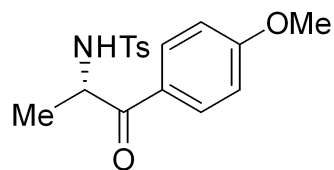
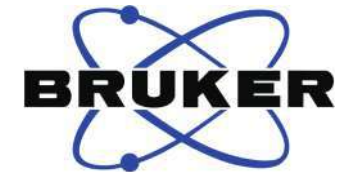
Current Data Parameters
NAME ss-qh-11142
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20200811
Time 20.07
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 6
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 27.78
DW 62.400 usec
DE 6.50 usec
TE 297.7 K
D1 1.00000000 sec
TD0 1

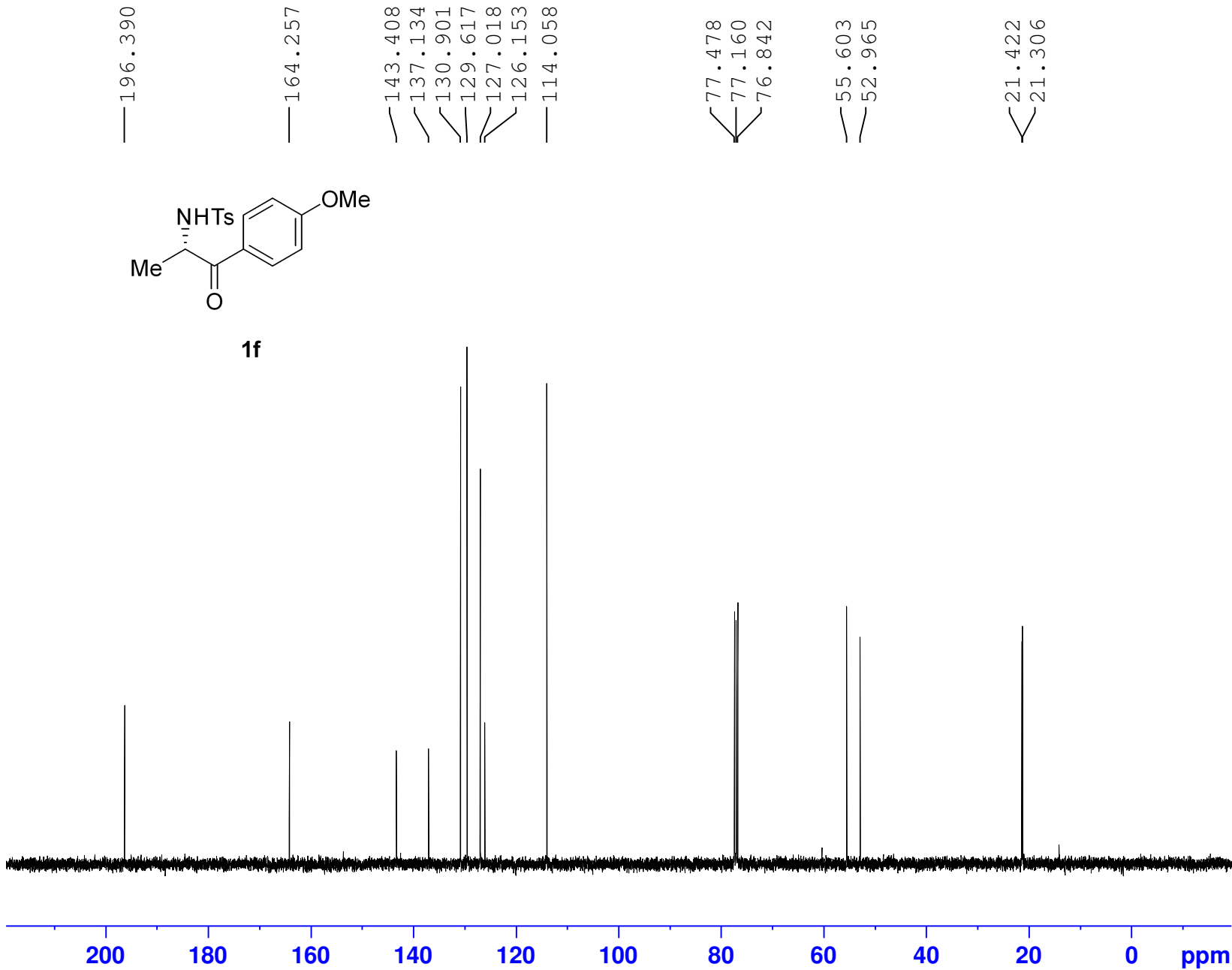
===== CHANNEL f1 =====
SF01 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





1f



Current Data Parameters
NAME qh-11142
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150119
Time 12.19
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127696 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



Current Data Parameters
NAME ss-qh-11147
EXPNO 1
PROCNO 1

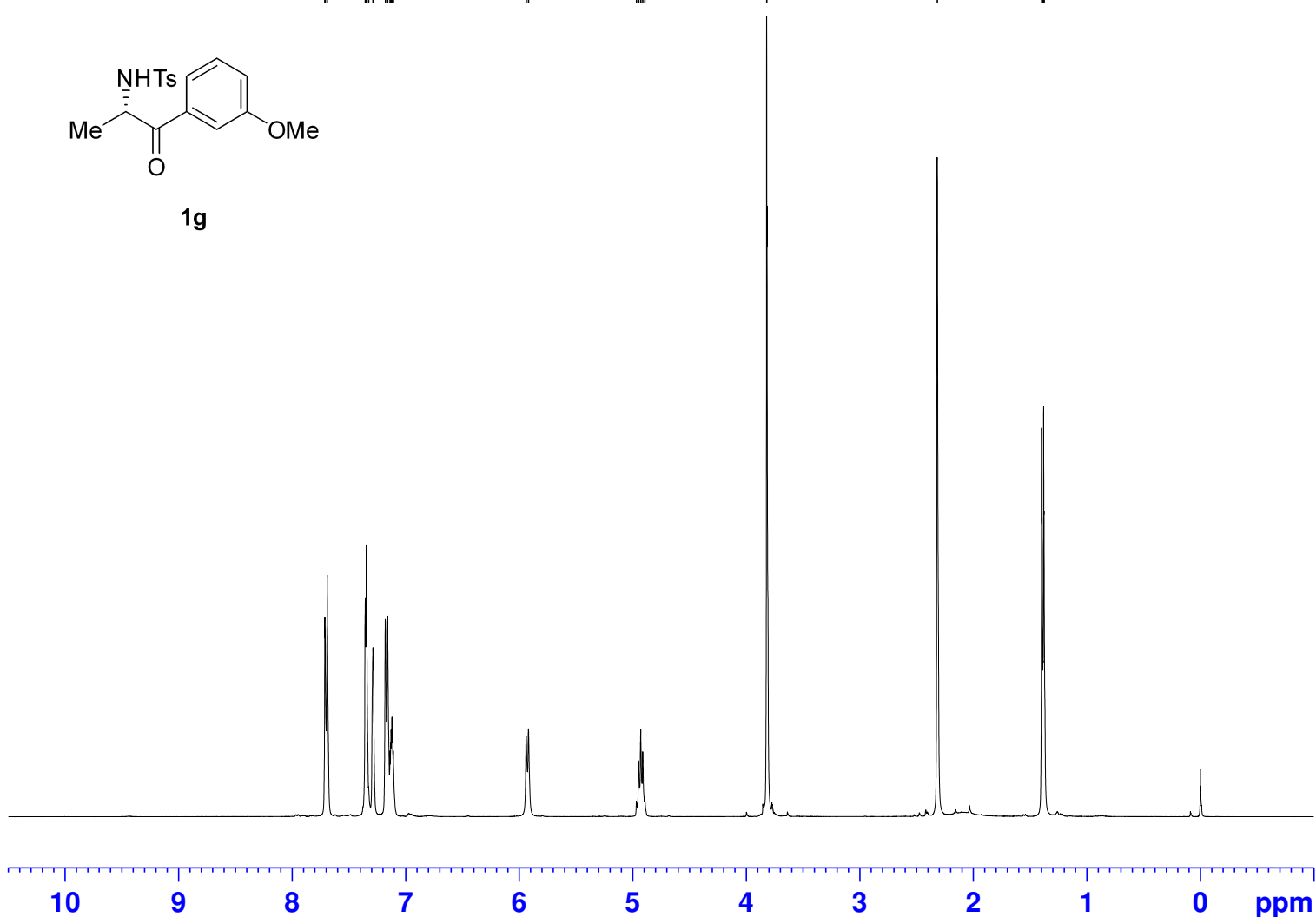
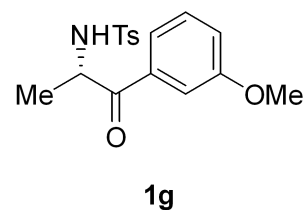
F2 - Acquisition Parameters
Date_ 20200811
Time 20.09
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 6
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 27.78
DW 62.400 usec
DE 6.50 usec
TE 297.6 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300016 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

7.712
7.708
7.691
7.355
7.349
7.345
7.326
7.288
7.283
7.179
7.159
7.139
7.132
7.128
7.126
7.121
7.116
7.109
7.109
5.938
5.918
4.968
4.950
4.947
4.929
4.911
4.894
3.820

— 2.318
1.398
1.395
1.385
1.380
1.377



1.94
2.01
1.12
2.96
0.97
0.99
3.12
3.00
3.01



— 198.123

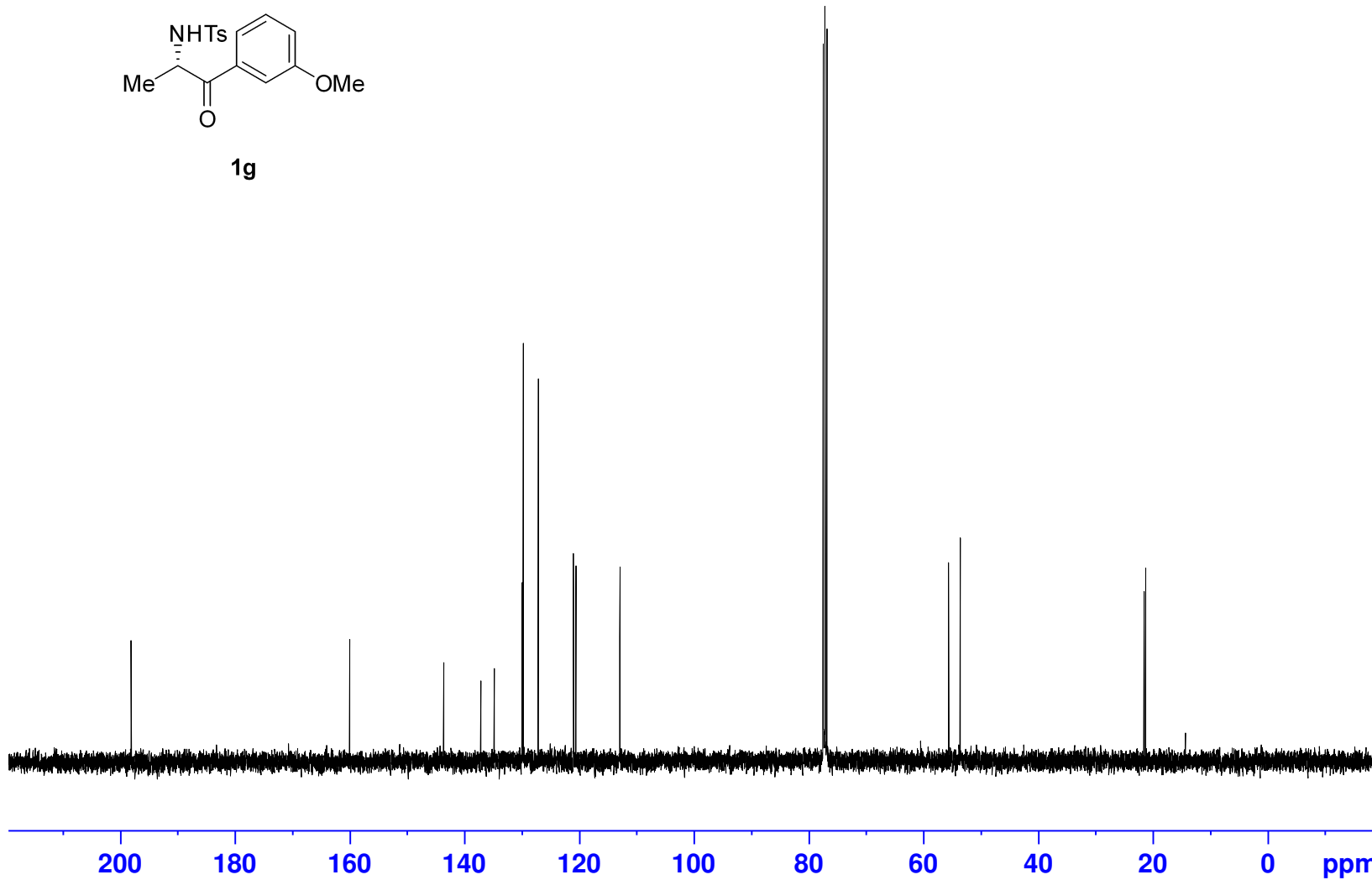
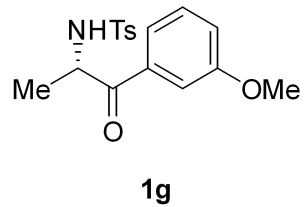
— 160.038

143.625
137.159
134.831
129.953
129.787
127.146
121.024
120.587
112.924

77.476
77.159
76.841

55.605
53.580

21.549
21.288



Current Data Parameters
NAME qh-11147
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150121
Time 16.08
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 77
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.0000000 sec
D11 0.0300000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127590 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



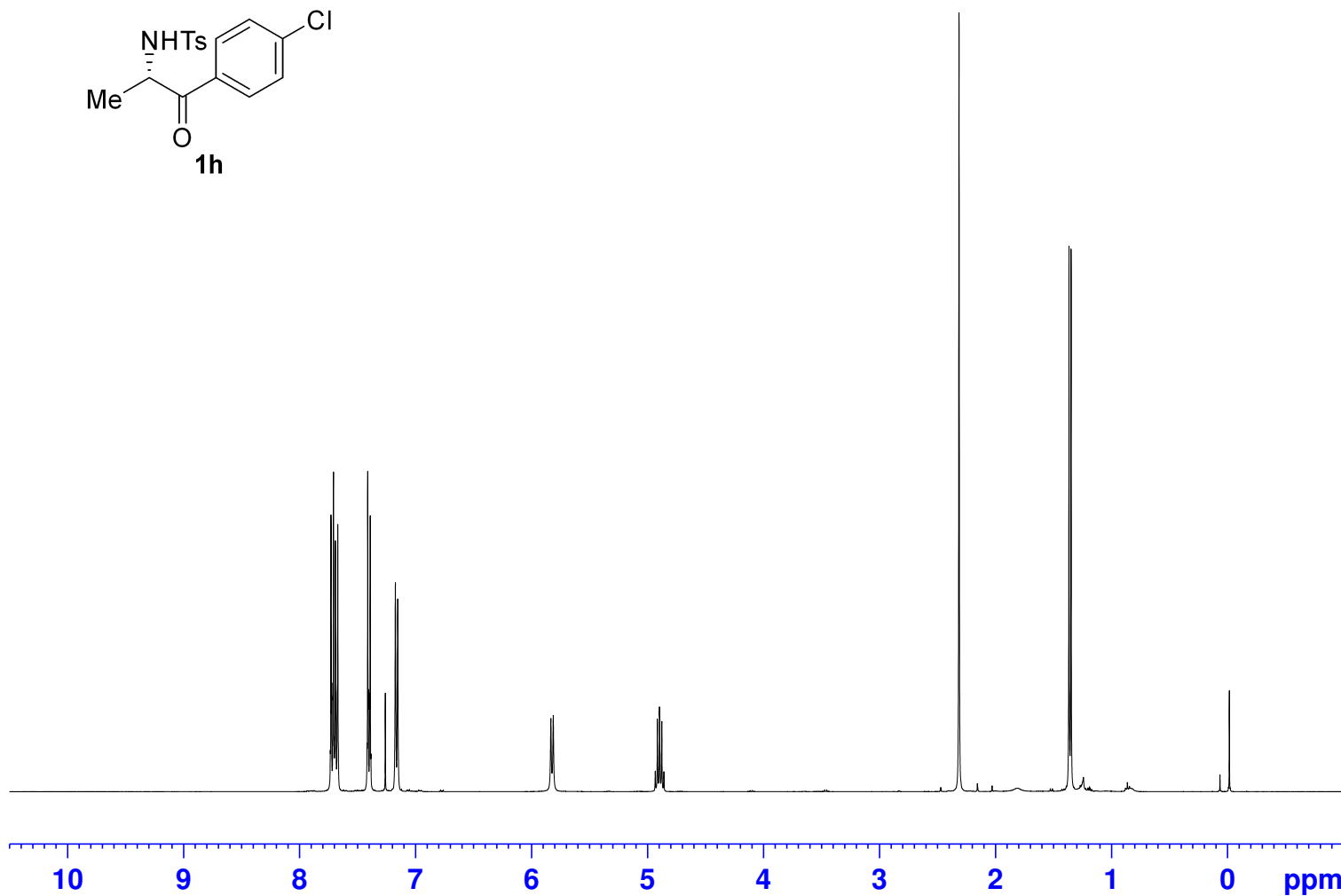
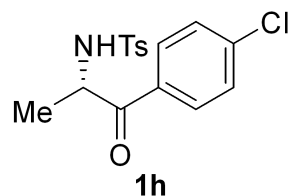
Current Data Parameters
NAME ss-qh-11146
EXPNO 1
PROCNO 1

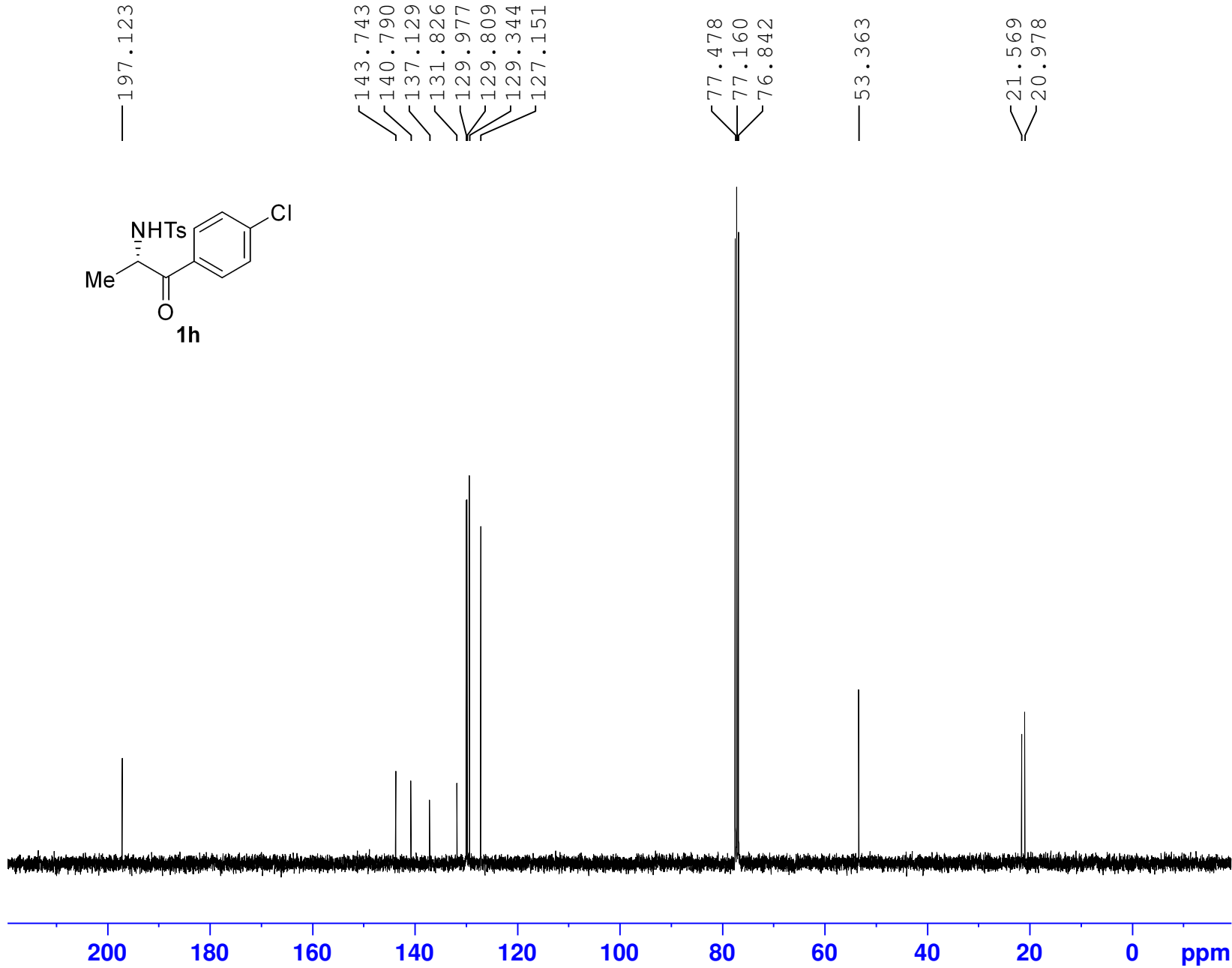
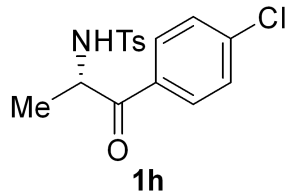
F2 - Acquisition Parameters
Date_ 20200811
Time 20.24
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 9
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 34.77
DW 62.400 usec
DE 6.50 usec
TE 297.2 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

7.734
7.728
7.723
7.711
7.707
7.701
7.690
7.670
7.418
7.412
7.407
7.395
7.390
7.384
7.260
7.173
7.153
5.832
5.812
4.932
4.914
4.896
4.894
4.876
4.858





Current Data Parameters
NAME qh-11146
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150121
Time 16.00
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 70
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

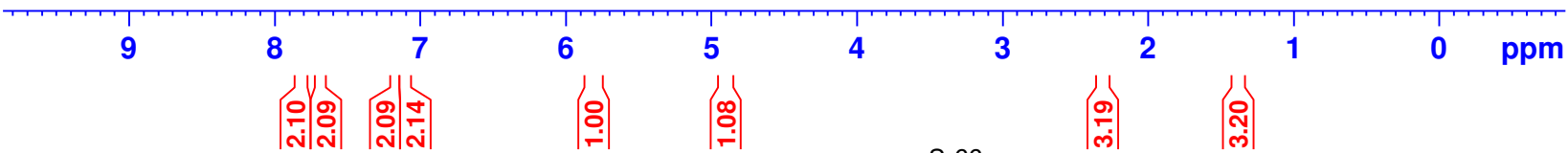
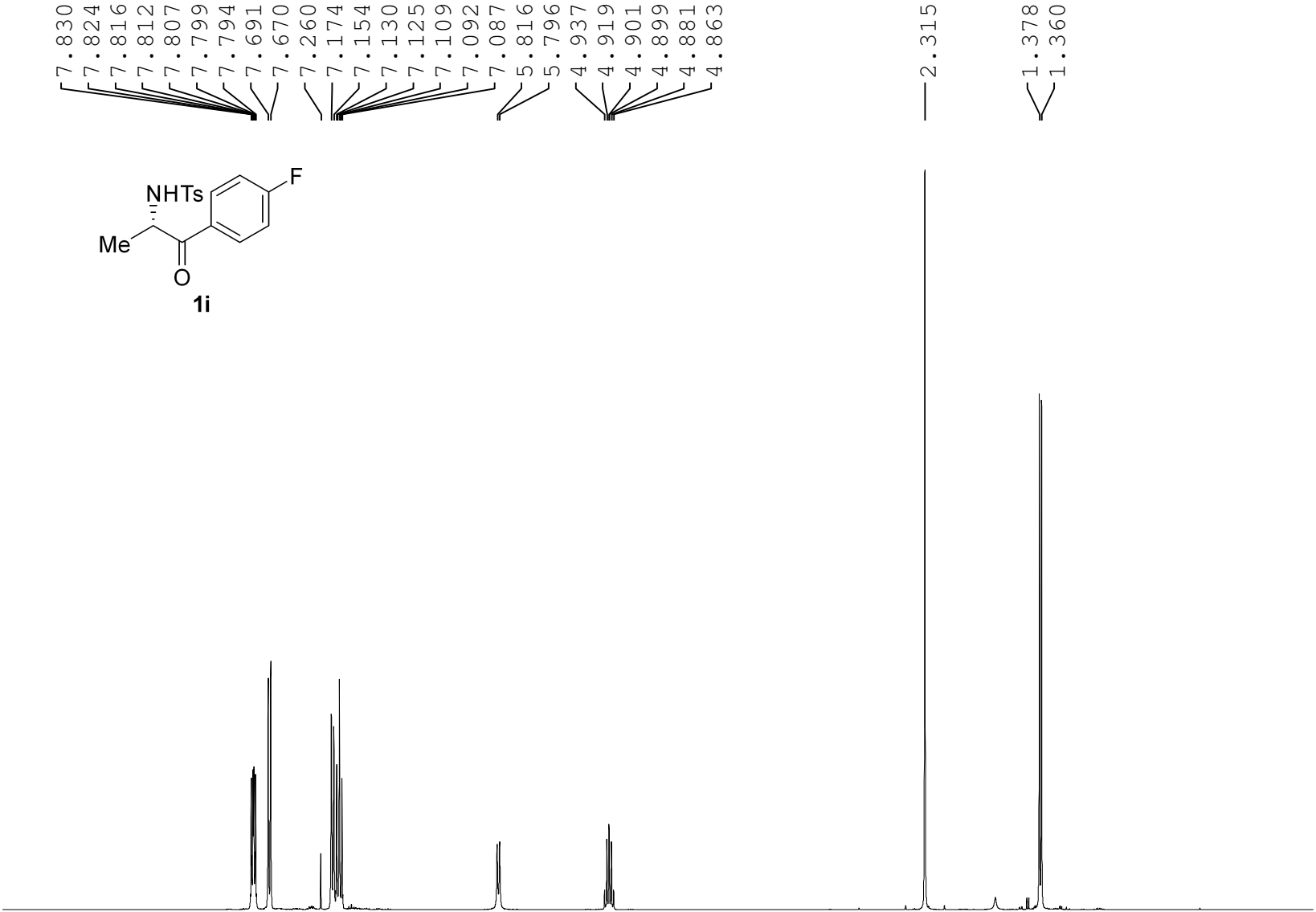
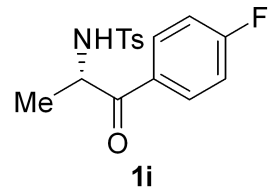
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127590 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.830
7.824
7.816
7.812
7.807
7.799
7.794
7.691
7.670
7.260
7.174
7.154
7.130
7.125
7.109
7.092
7.087
5.816
5.796
4.937
4.919
4.901
4.899
4.881
4.863

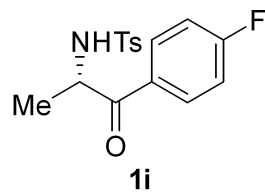


Current Data Parameters
NAME qh-11130
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150113
Time 13.49
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 62.93
DW 62.400 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

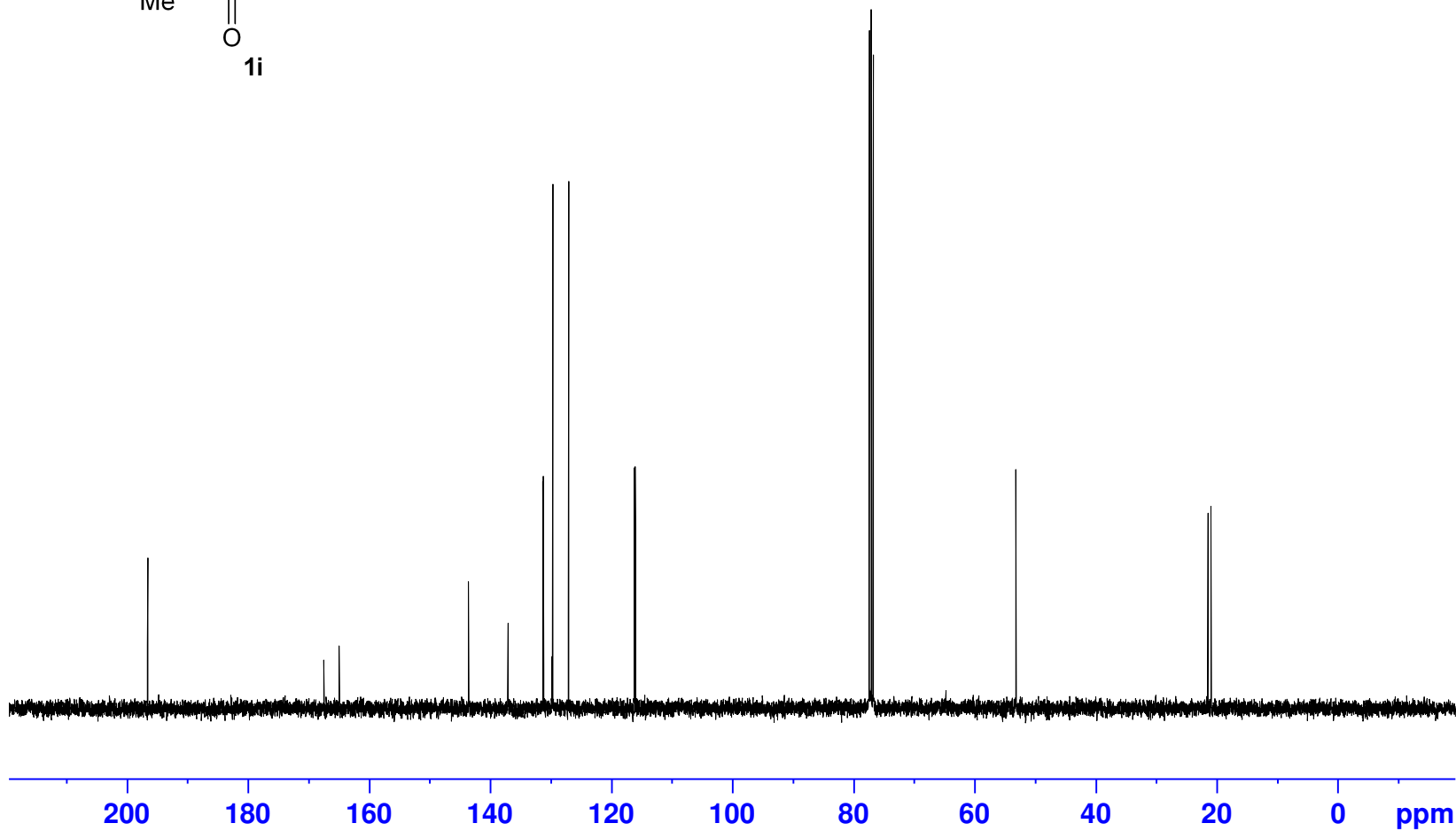


— 196.686
 < 167.580
 < 165.027
 < 143.693
 < 137.150
 < 131.394
 < 131.299
 < 129.931
 < 129.902
 < 129.774
 < 127.156
 < 116.328
 < 116.109

< 77.479
 < 77.161
 < 76.843

— 53.294

< 21.543
 < 21.028



Current Data Parameters
 NAME qh-11130
 EXPNO 4
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150113
 Time 13.51
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 70
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 296.1 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

==== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.60 usec
 PLW1 31.98900032 W

==== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 9.10000038 W
 PLW12 0.24608000 W
 PLW13 0.19933000 W

F2 - Processing parameters
 SI 32768
 SF 100.6127597 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

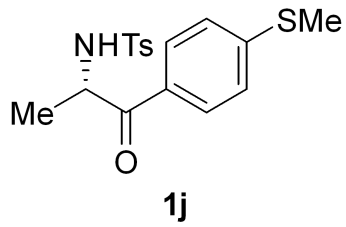


Current Data Parameters
NAME qh-11150
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150121
Time 20.02
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 82.92
DW 62.400 usec
DE 6.50 usec
TE 296.3 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



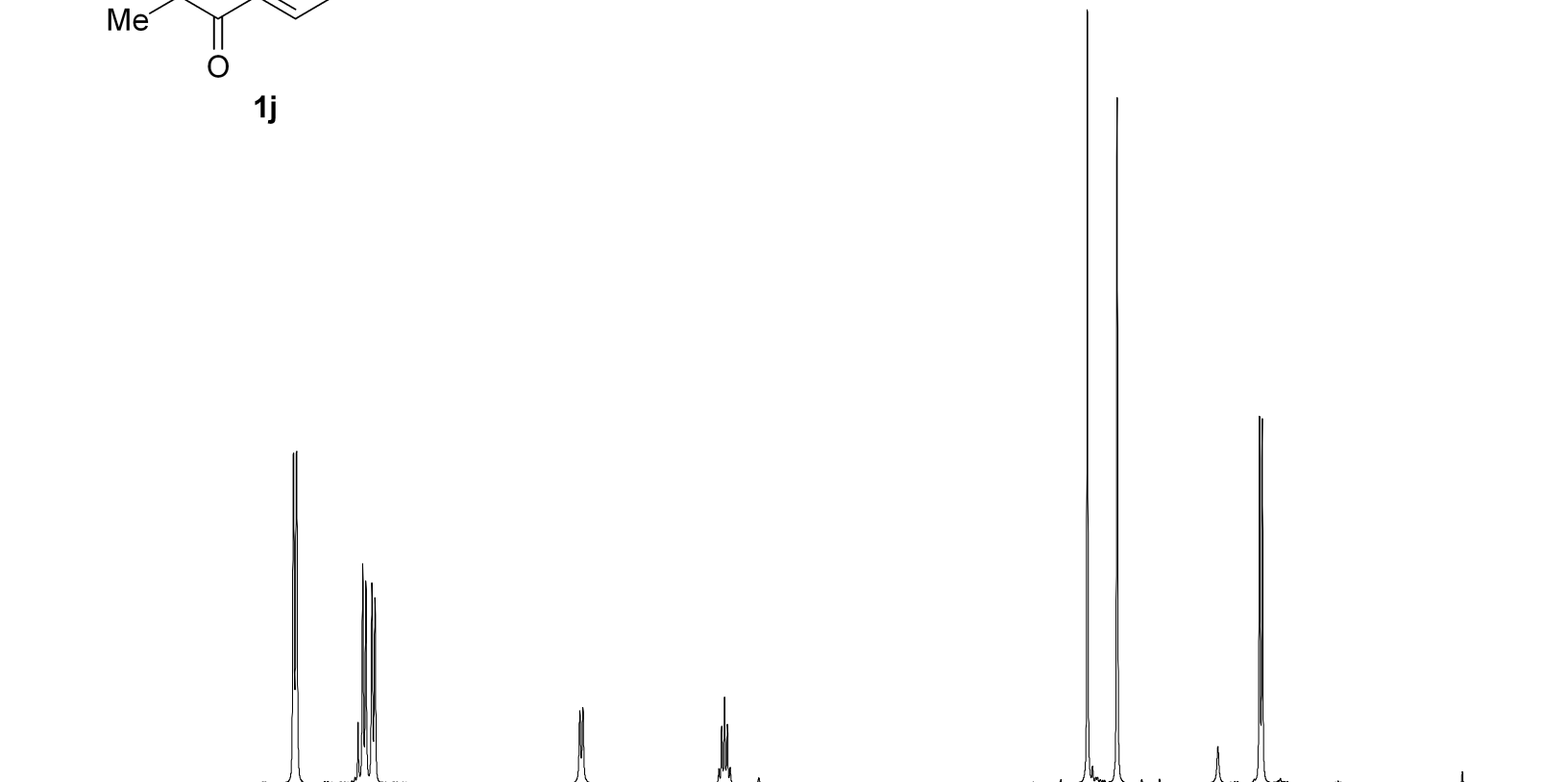
7.681
7.660
7.260
7.230
7.209
7.170
7.150

5.815
5.795

4.909
4.891
4.872
4.854
4.836

2.508
2.315

1.386
1.369



4.00
2.04
2.02

0.95

1.01

3.05
3.03

3.03



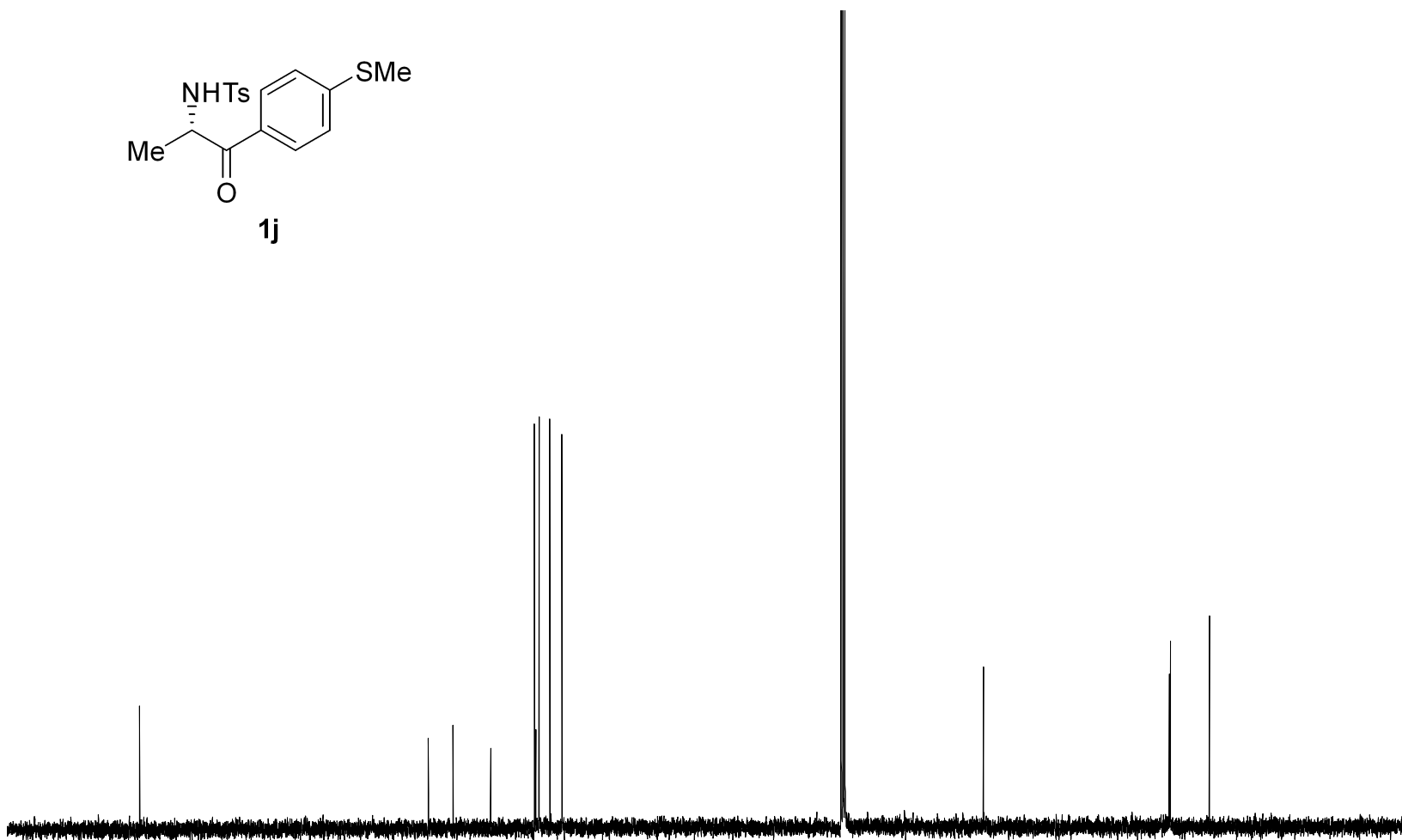
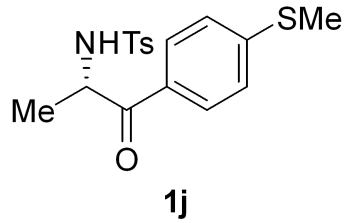
— 197.021

147.801
143.606
137.200
129.773
129.483
128.949
127.134
125.056

77.480
77.162
76.845

— 53.220

21.569
21.383
14.724



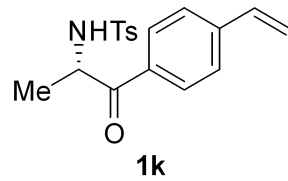
Current Data Parameters
NAME qh-11150
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150121
Time 20.07
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 150
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

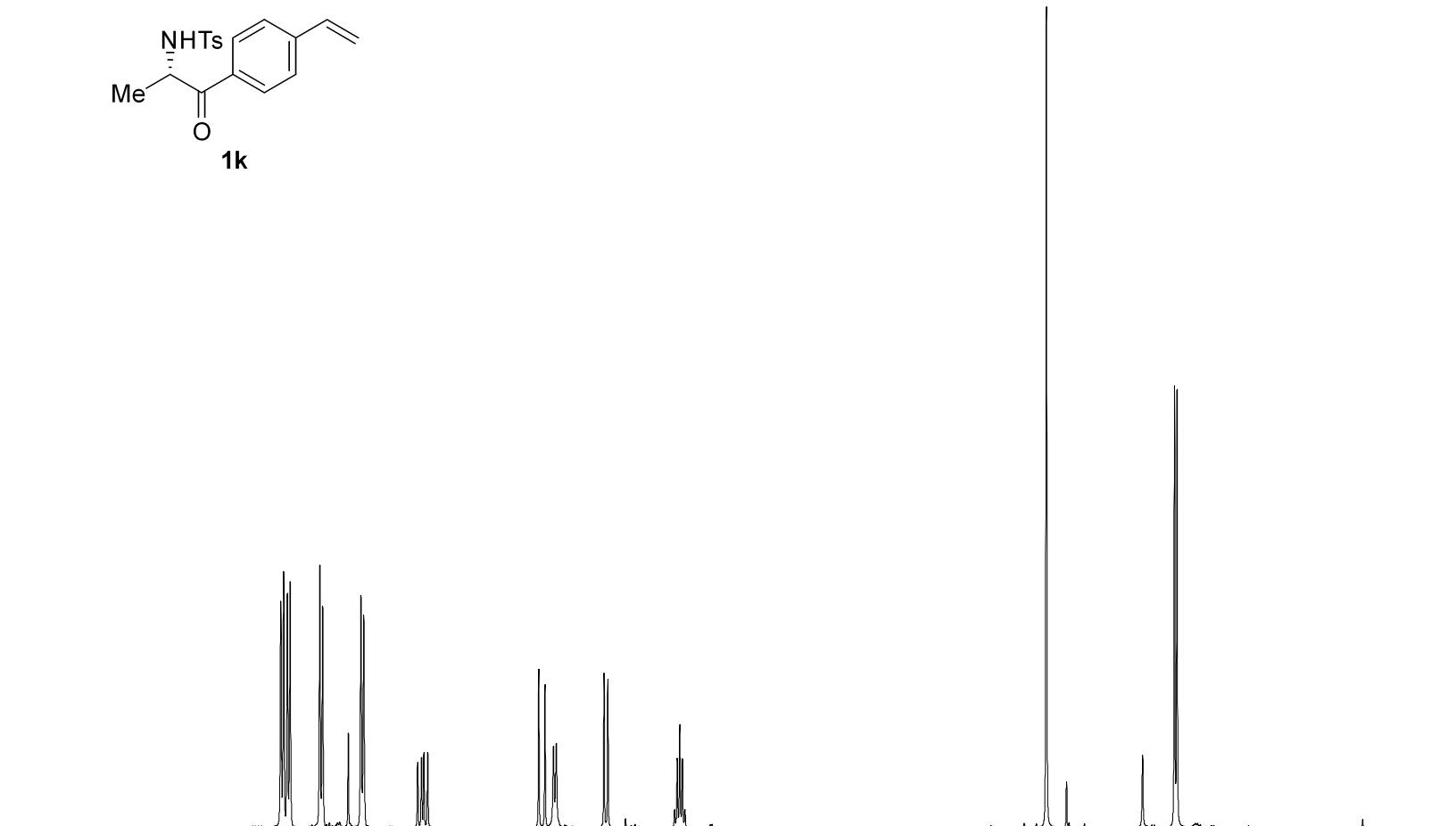
==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127582 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.739
7.719
7.692
7.672
7.462
7.442
7.260
7.171
7.151
6.768
6.741
6.724
6.697
5.909
5.866
5.806
5.786
5.447
5.420
4.946
4.928
4.910
4.891
4.873

2.311
1.402
1.384



2.03
2.00
2.04
2.02
1.02

1.02
0.96
1.01
1.03

3.05
3.06

Current Data Parameters
NAME qh-11150
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150122
Time 19.35
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 4
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 103.52
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



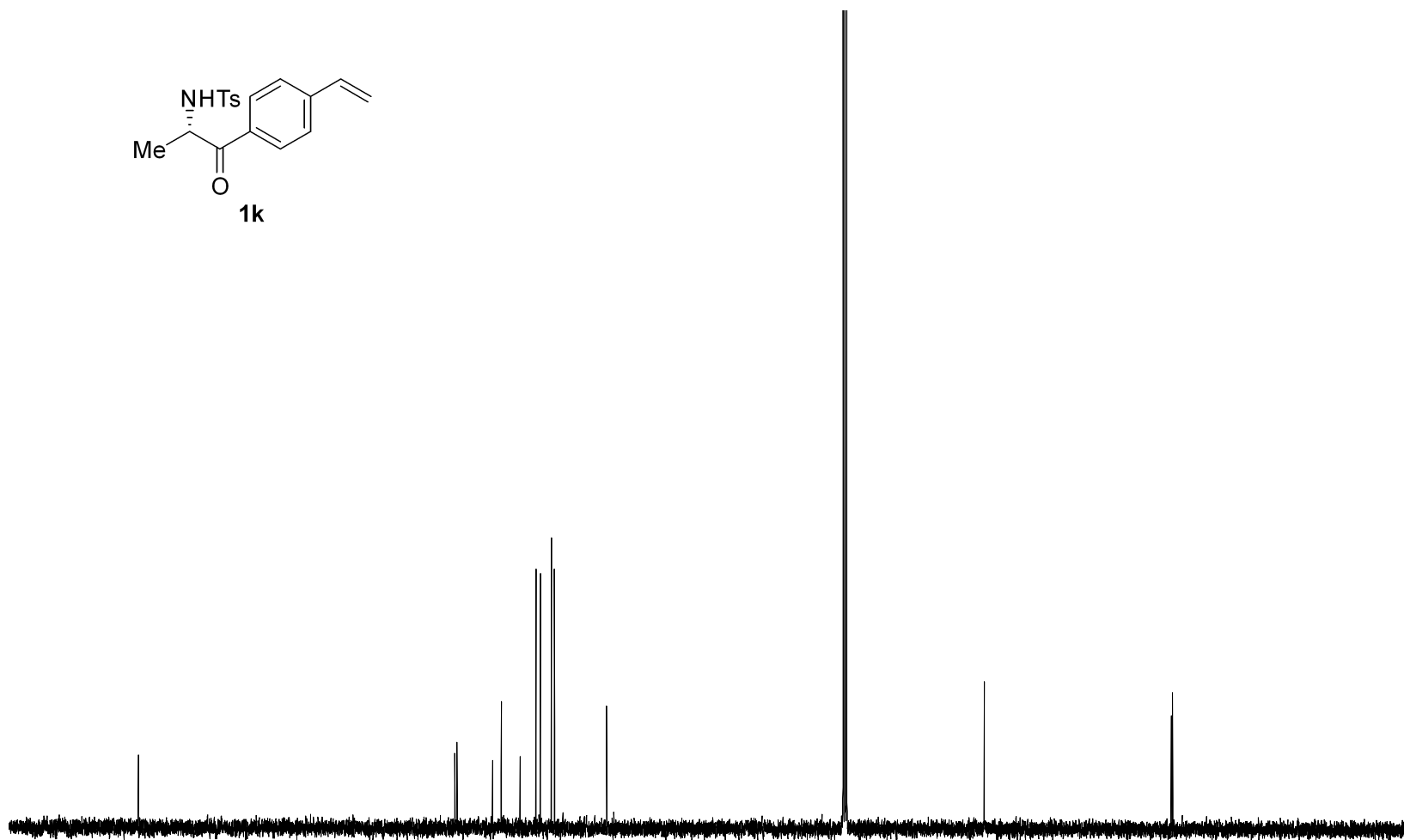
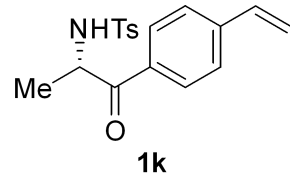
— 197.532

143.640
143.232
137.178
135.712
132.504
129.795
129.039
127.160
126.638
117.756

77.478
77.161
76.843

— 53.424

21.570
21.328



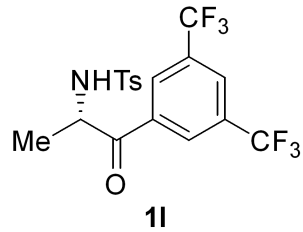
Current Data Parameters
NAME qh-11150
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150122
Time 19.38
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 154
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127571 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

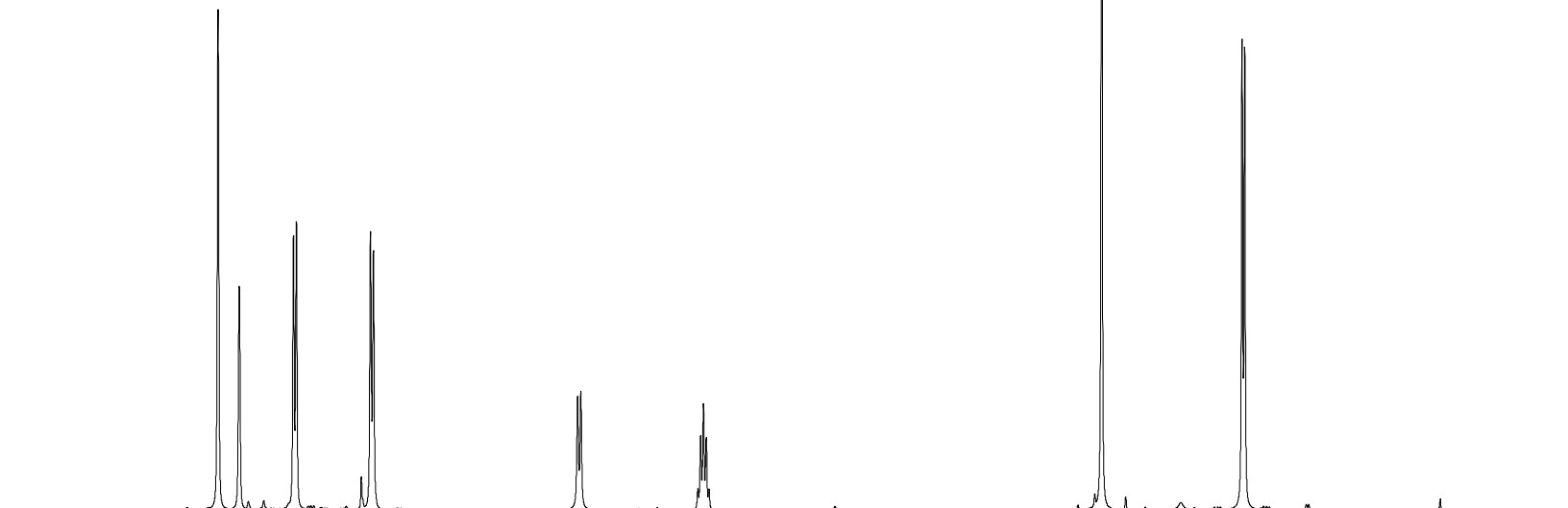


8.215
8.074
7.713
7.693
7.260
7.199
7.180

5.819
5.798
5.018
5.000
4.981
4.962
4.944

2.328

1.392
1.374



9 8 7 6 5 4 3 2 1 0 ppm

2.03
1.00
2.04
2.04

0.99
1.02

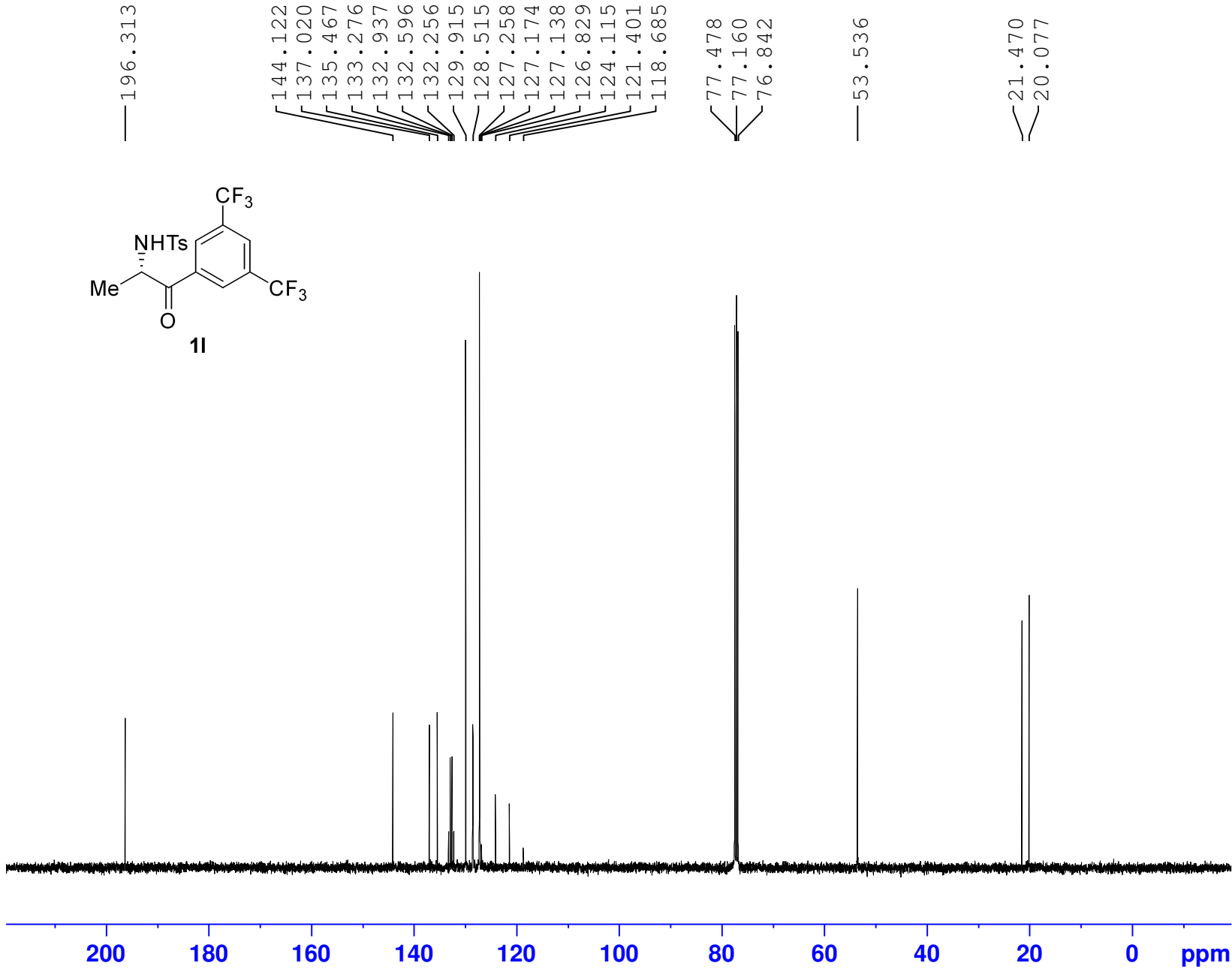
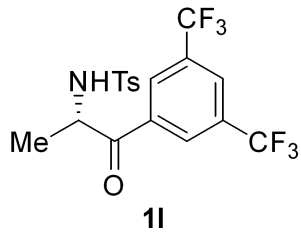
3.10
3.07

Current Data Parameters
NAME qh-11153
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150122
Time 20.02
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 31.55
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300091 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
NAME qh-11153
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150122
Time 20.11
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 219
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127568 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

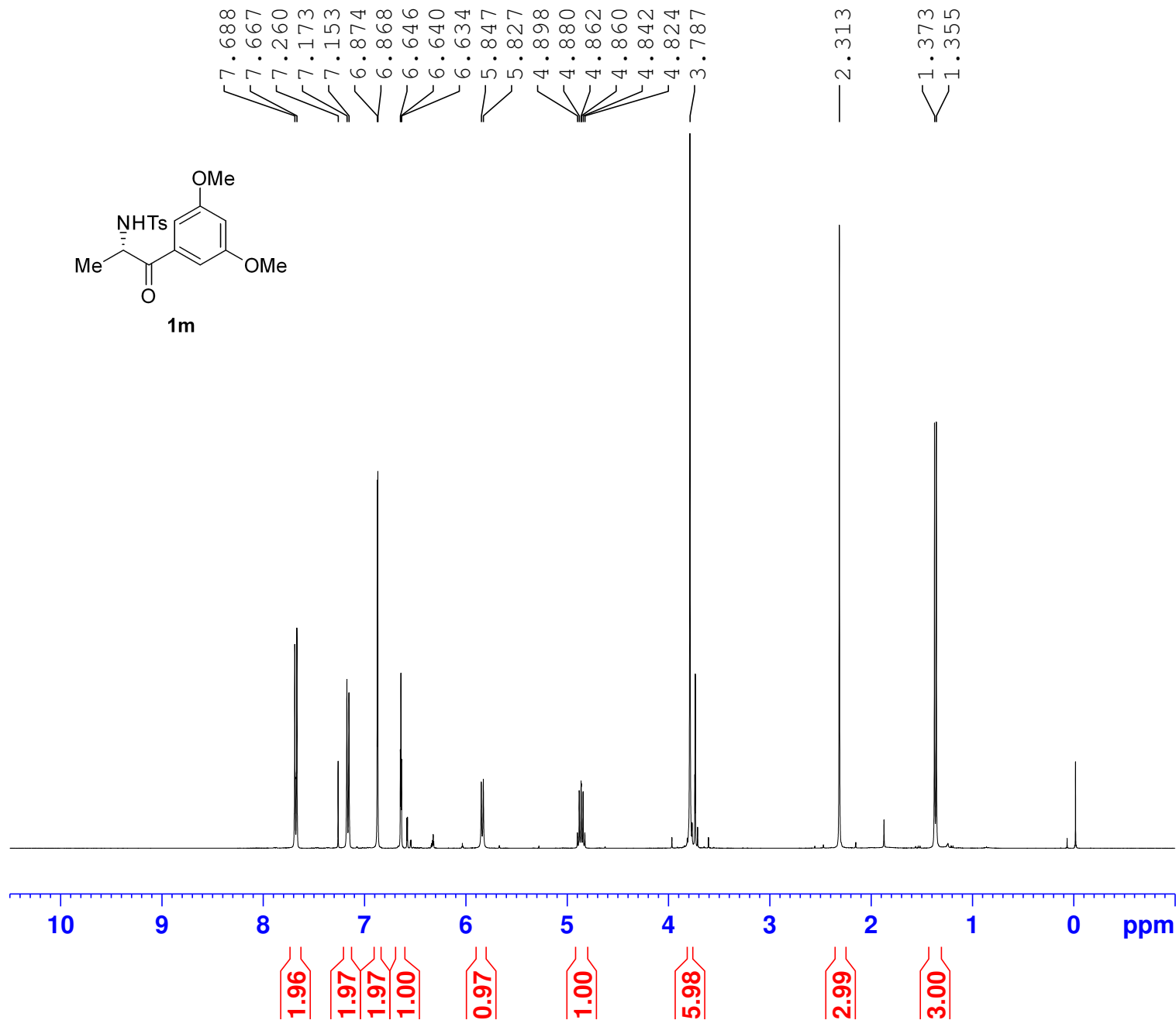
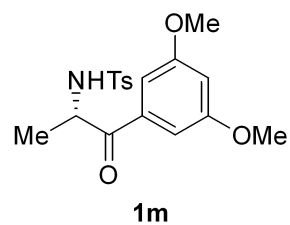


Current Data Parameters
NAME ss-qh-11144
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20200811
Time 20.13
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 6
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 31.55
DW 62.400 usec
DE 6.50 usec
TE 297.5 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





— 198.080

— 161.116

— 143.653

— 137.186

— 135.403

— 129.833

— 127.157

— 106.384

— 106.197

— 77.477

— 77.159

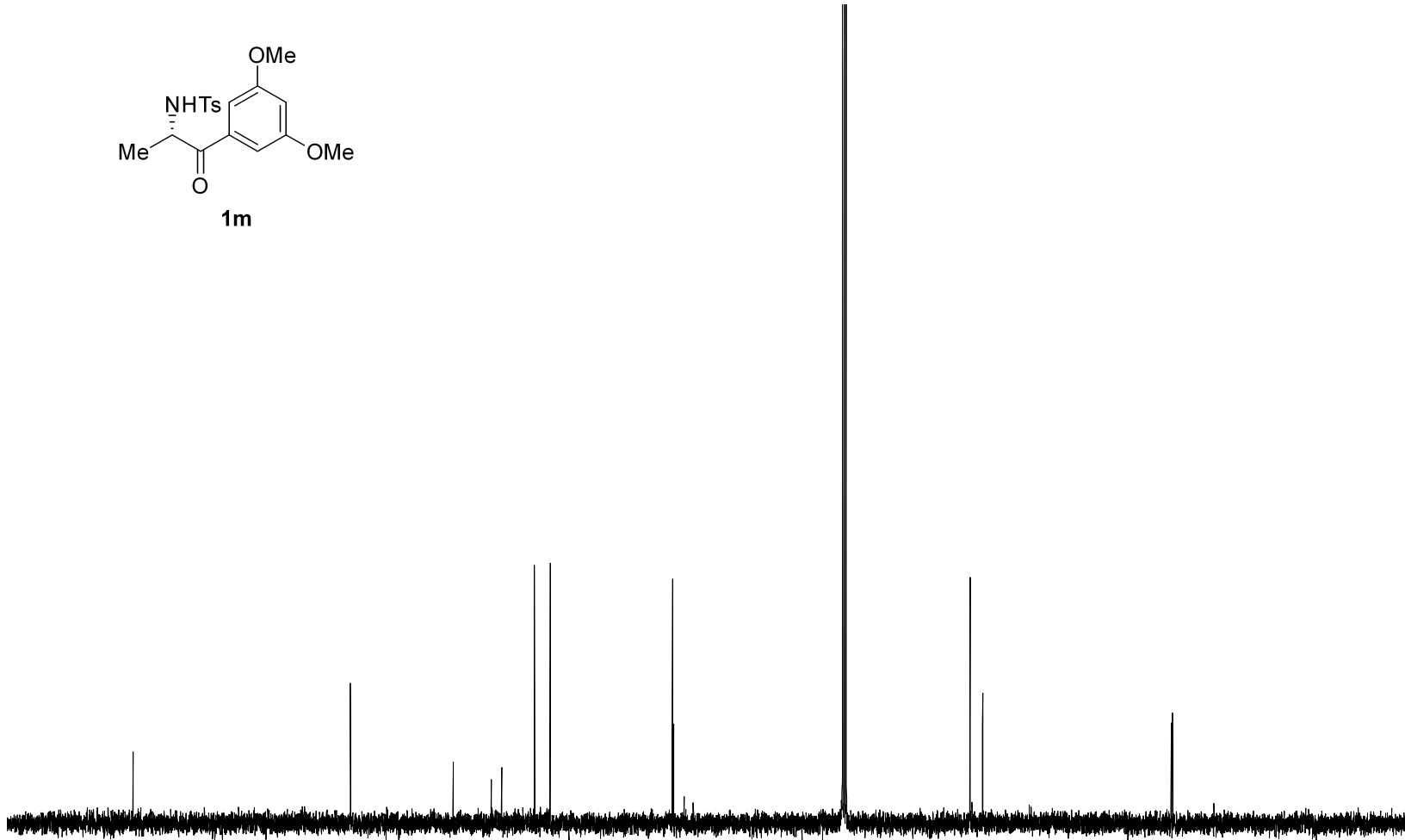
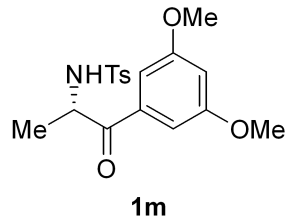
— 76.841

— 55.784

— 53.640

— 21.586

— 21.366



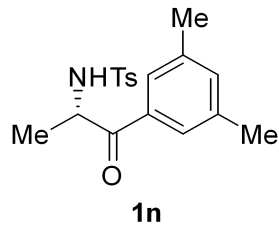
Current Data Parameters
NAME qh-11144
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150120
Time 11.39
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 121
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127568 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.700
7.681
7.349
7.260
7.194
7.168
7.149

5.873
5.853

4.949
4.930
4.912
4.894
4.875

2.324
2.306

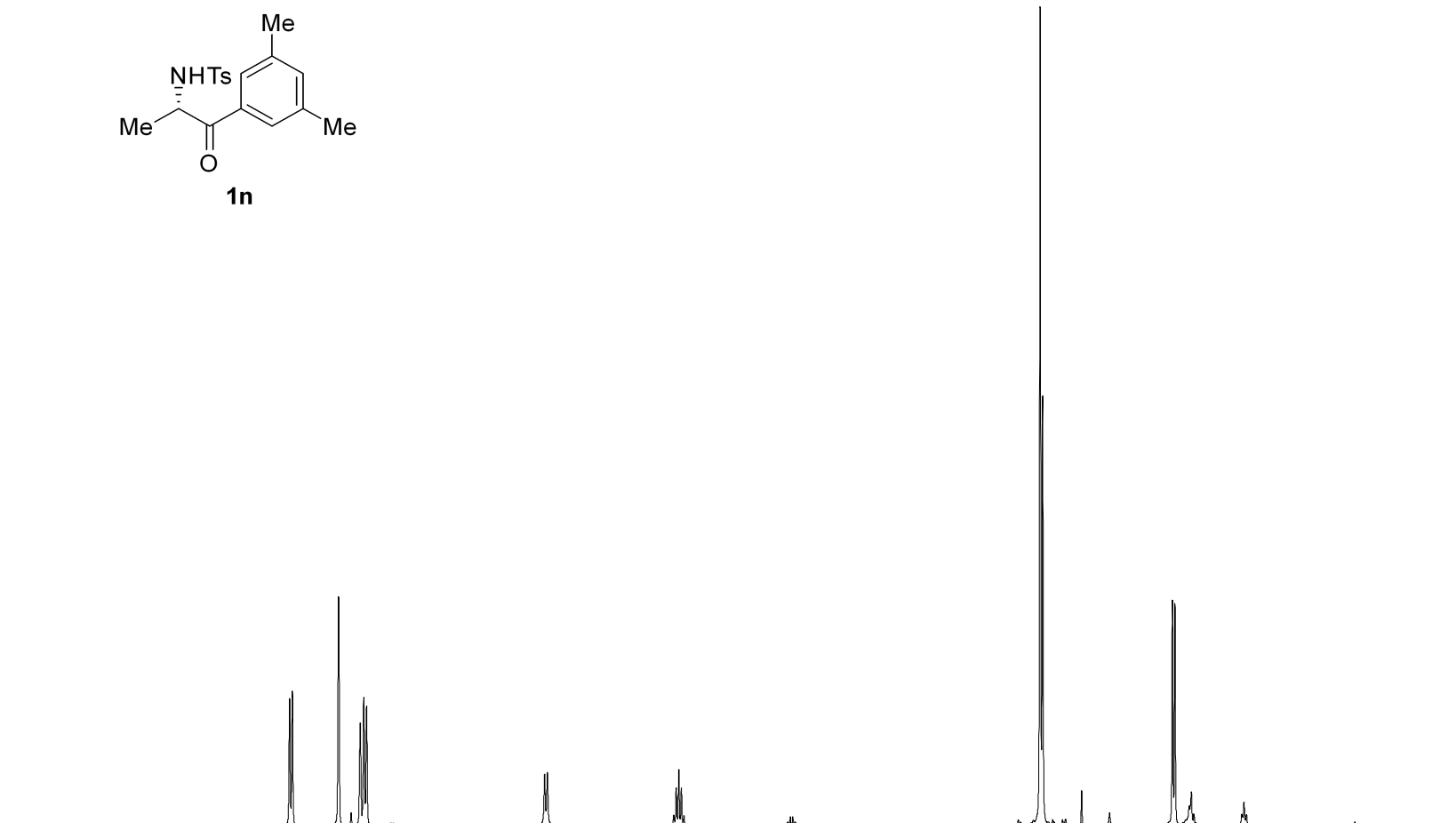
1.376
1.358

Current Data Parameters
NAME qh-11143
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150119
Time 12.22
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 22.47
DW 62.400 usec
DE 6.50 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



2.04
2.08
3.11

1.00

1.04

6.14
3.09

3.12

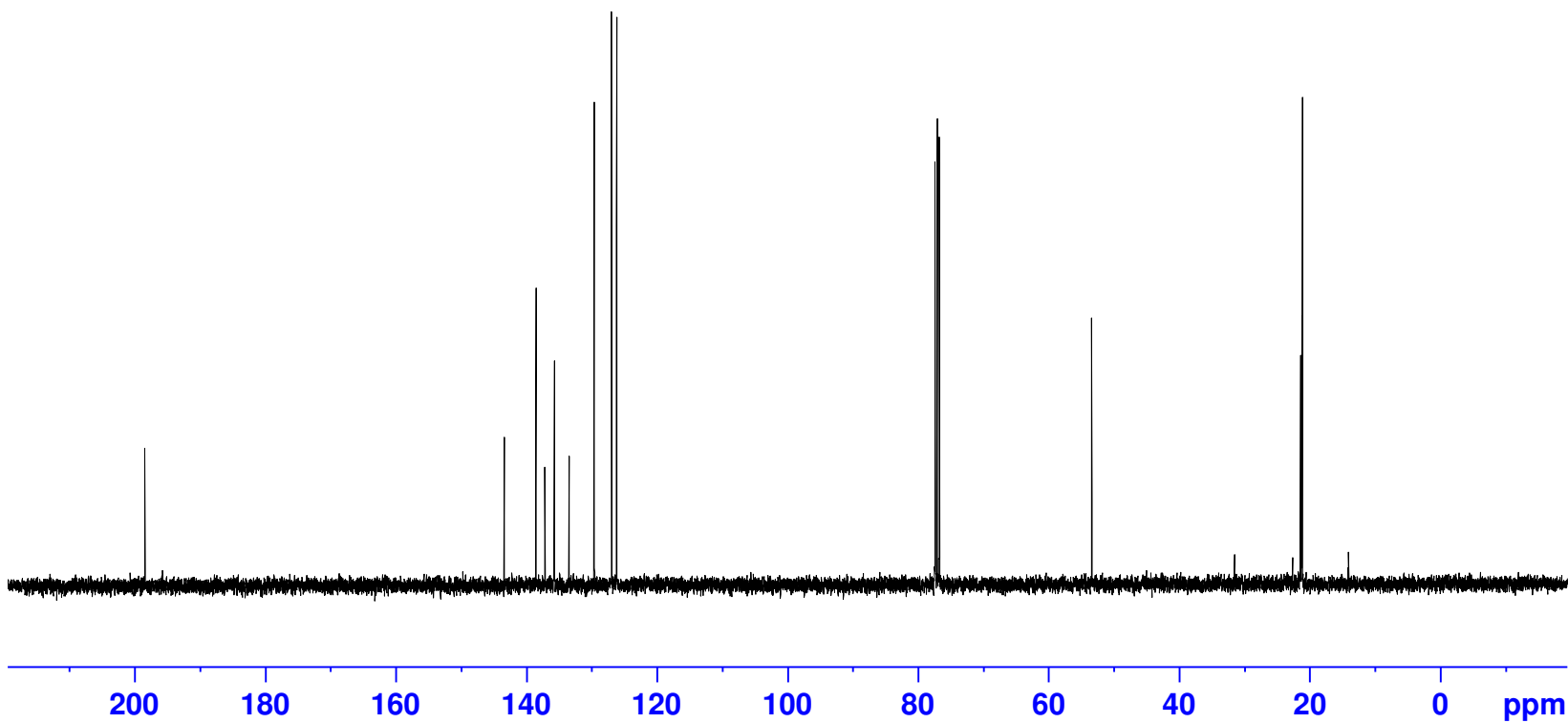
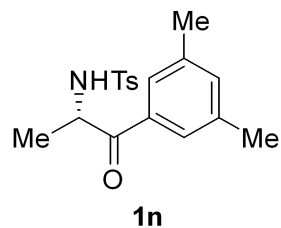
—198.527

143.476
138.629
137.263
135.814
133.548
129.697
127.062
126.267

77.477
77.159
76.841

—53.476

21.485
21.318
21.221



Current Data Parameters
 NAME qh-11143
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150119
 Time 12.24
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 31
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 296.4 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1

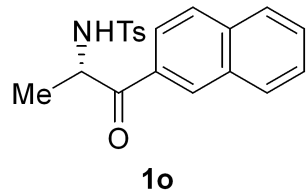
==== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.60 usec
 PLW1 31.98900032 W

==== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 9.10000038 W
 PLW12 0.24608000 W
 PLW13 0.19933000 W

F2 - Processing parameters
 SI 32768
 SF 100.6127649 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



8.296
7.955
7.935
7.878
7.856
7.809
7.787
7.724
7.704
7.654
7.636
7.616
7.599
7.579
7.561
7.260
7.135
7.115
5.898
5.878
5.156
5.138
5.120
5.101
5.082



— 2.252
1.477
1.459

Current Data Parameters
NAME qh-11155
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150123
Time 19.30
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 1
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 62.93
DW 62.400 usec
DE 6.50 usec
TE 295.5 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



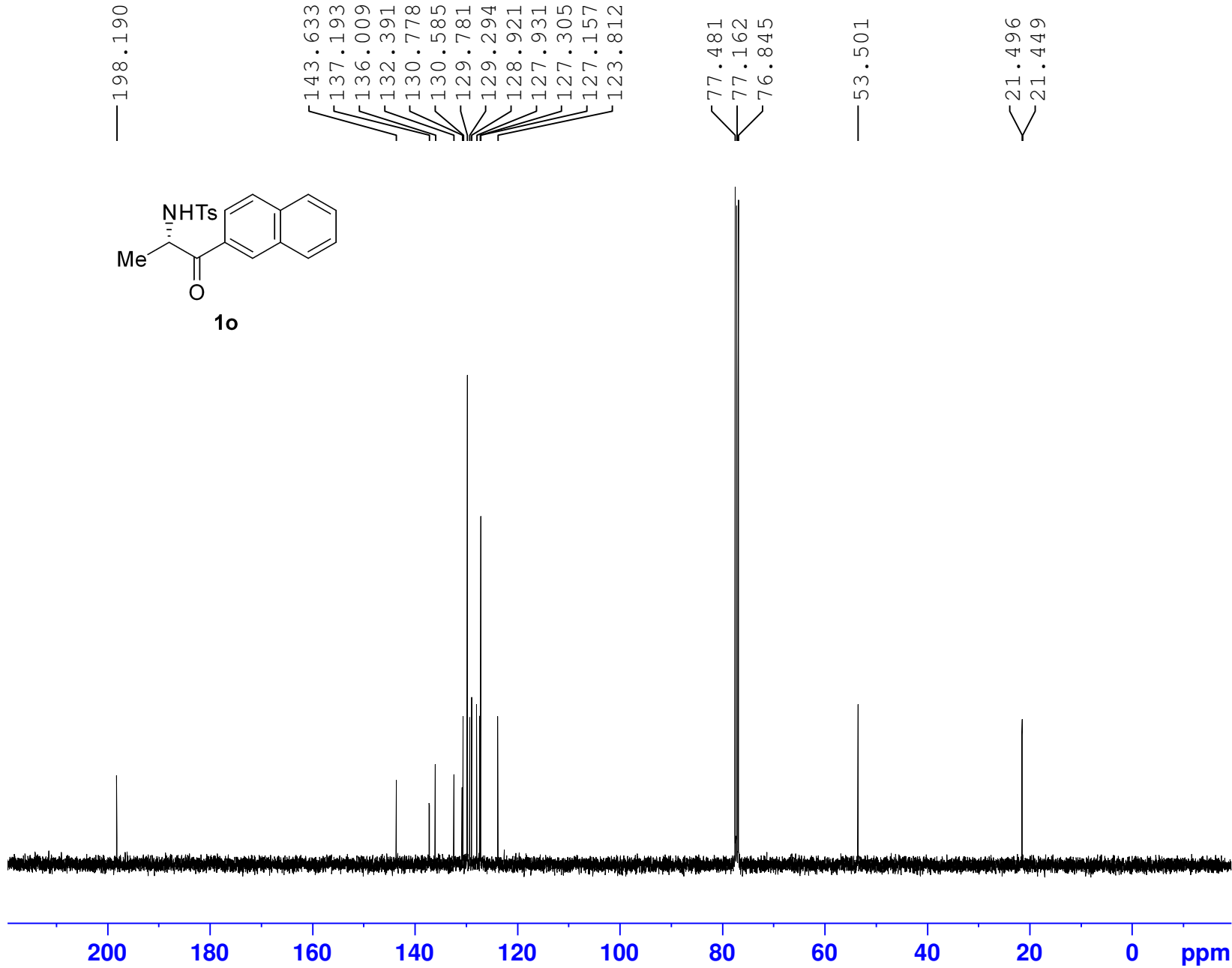
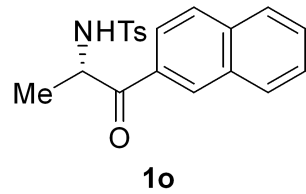
1.00
1.06
2.04
1.07
2.02
2.06
2.01

0.95

1.01

3.01

3.00



Current Data Parameters
NAME qh-11155
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150123
Time 19.35
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 88
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

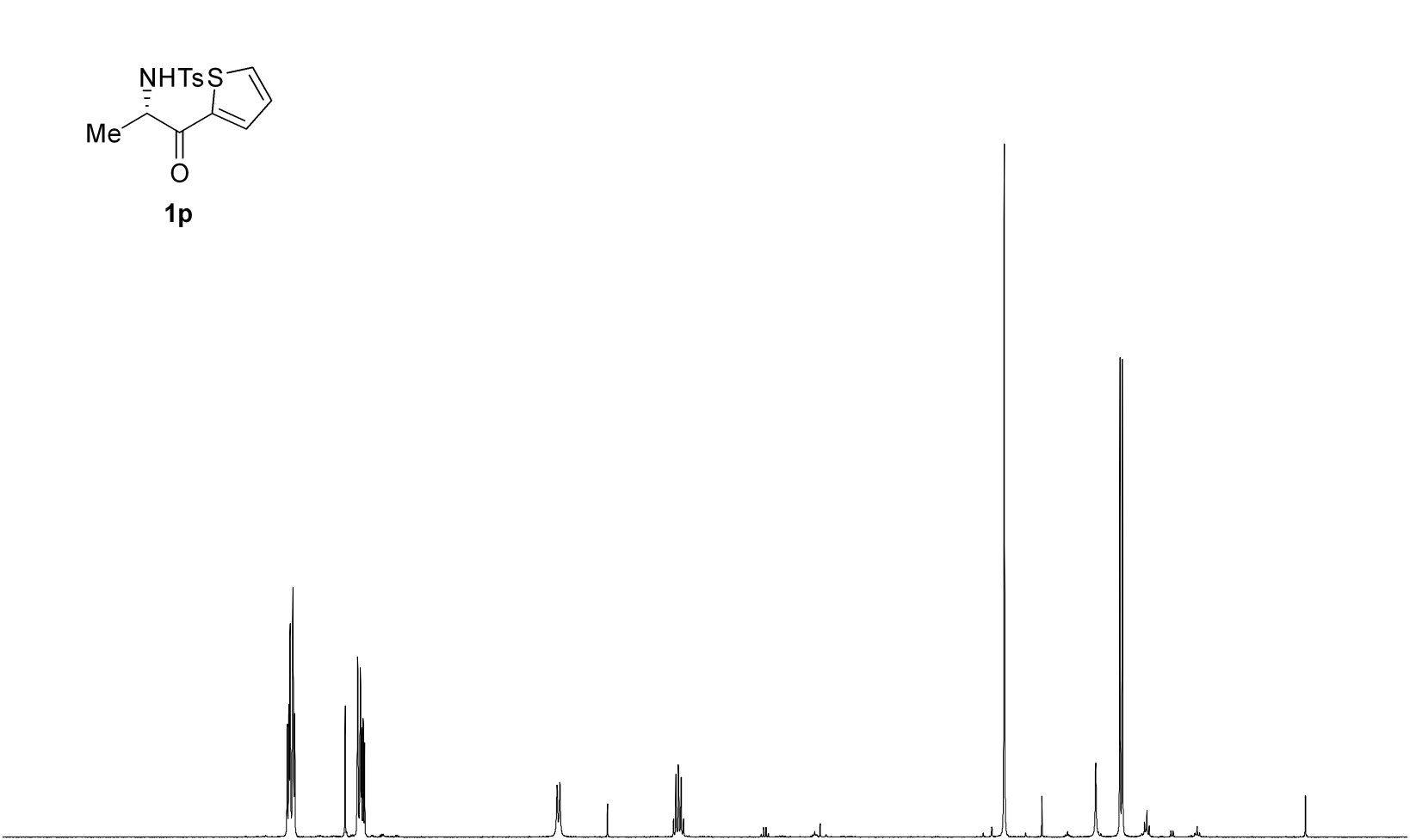
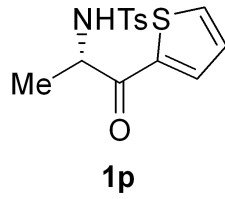
F2 - Processing parameters
SI 32768
SF 100.6127597 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.695
7.693
7.683
7.681
7.673
7.652
7.647
7.639
7.637
7.260
7.166
7.146
7.136
7.126
7.124
7.114
5.673
5.651
4.799
4.782
4.764
4.760
4.742
4.724

2.322

1.455
1.437



4.00

3.00

0.94

1.02

3.02

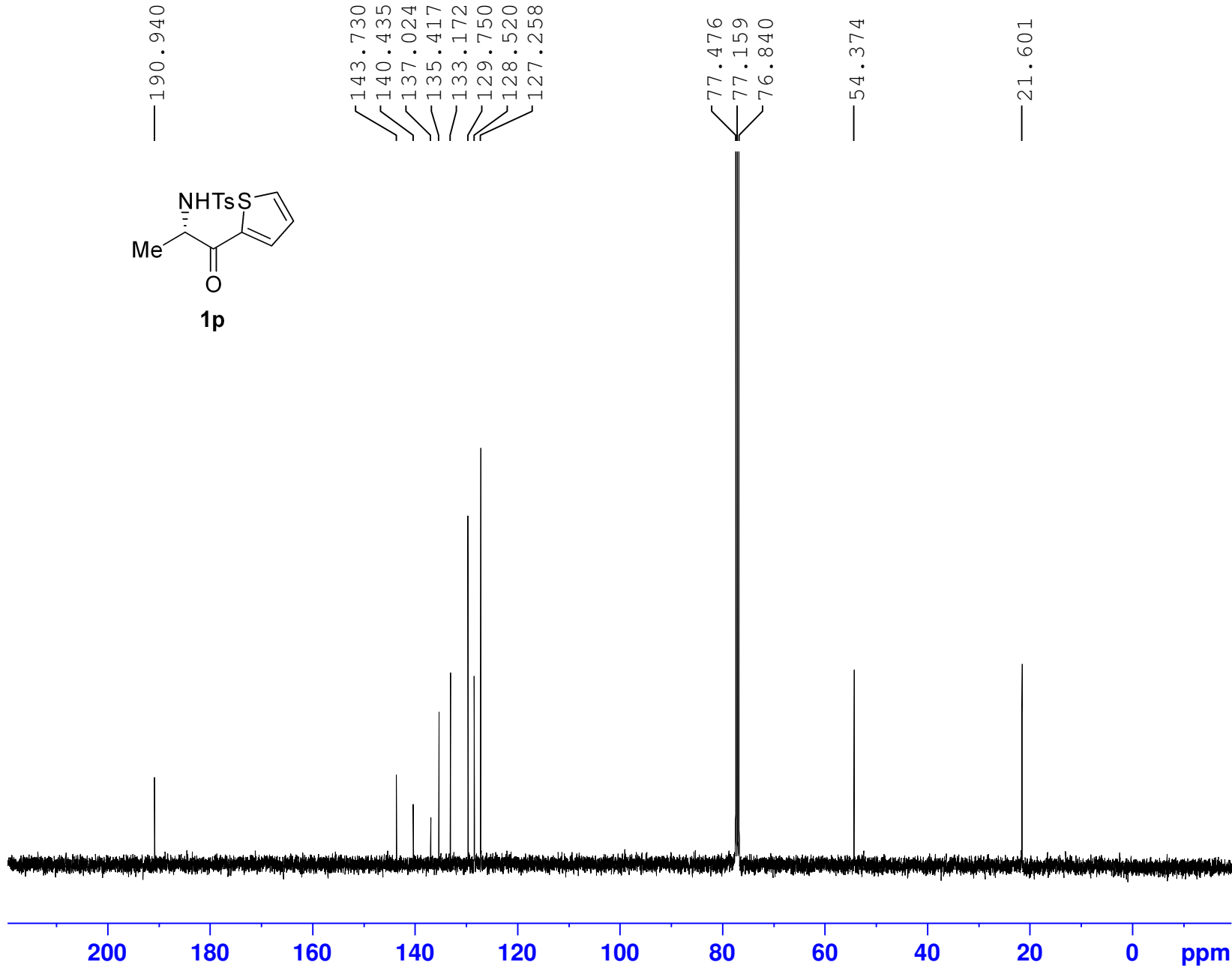
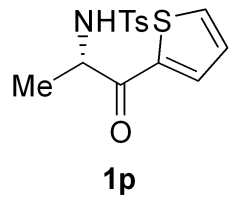
3.05

Current Data Parameters
NAME qh-11158
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150127
Time 14.13
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 1
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 82.92
DW 62.400 usec
DE 6.50 usec
TE 296.1 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



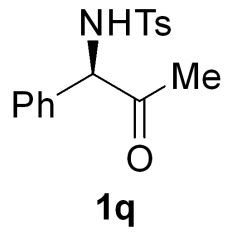
Current Data Parameters
NAME qh-11158
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150127
Time 14.19
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 118
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

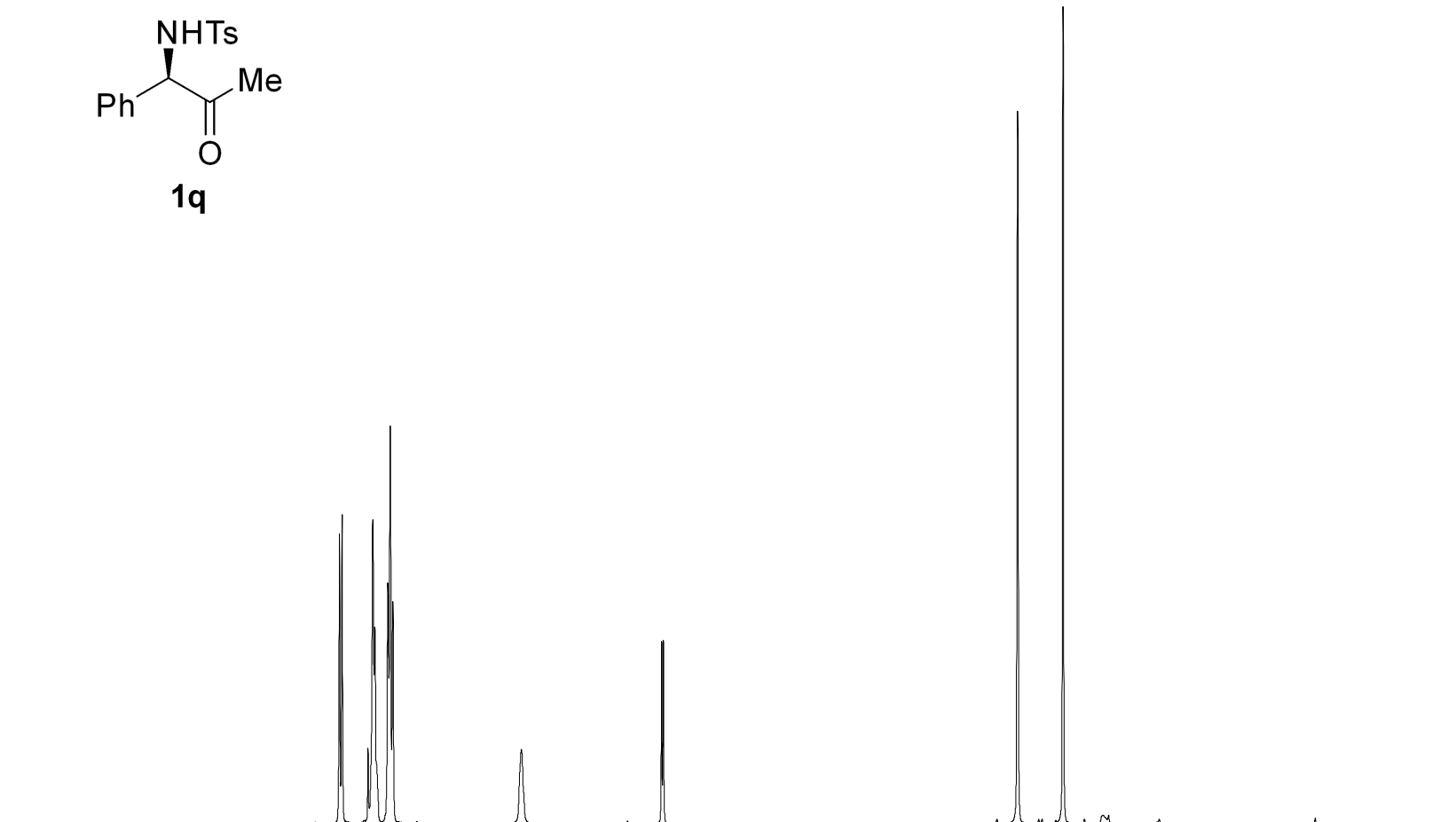
F2 - Processing parameters
SI 32768
SF 100.6127568 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.477
7.456
7.260
7.224
7.209
7.196
7.110
7.091
7.072
— 6.096

5.030
5.017

2.326
1.983
1.981



Current Data Parameters
NAME qh-11063-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150401
Time 19.04
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 54.81
DW 62.400 usec
DE 6.50 usec
TE 296.4 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

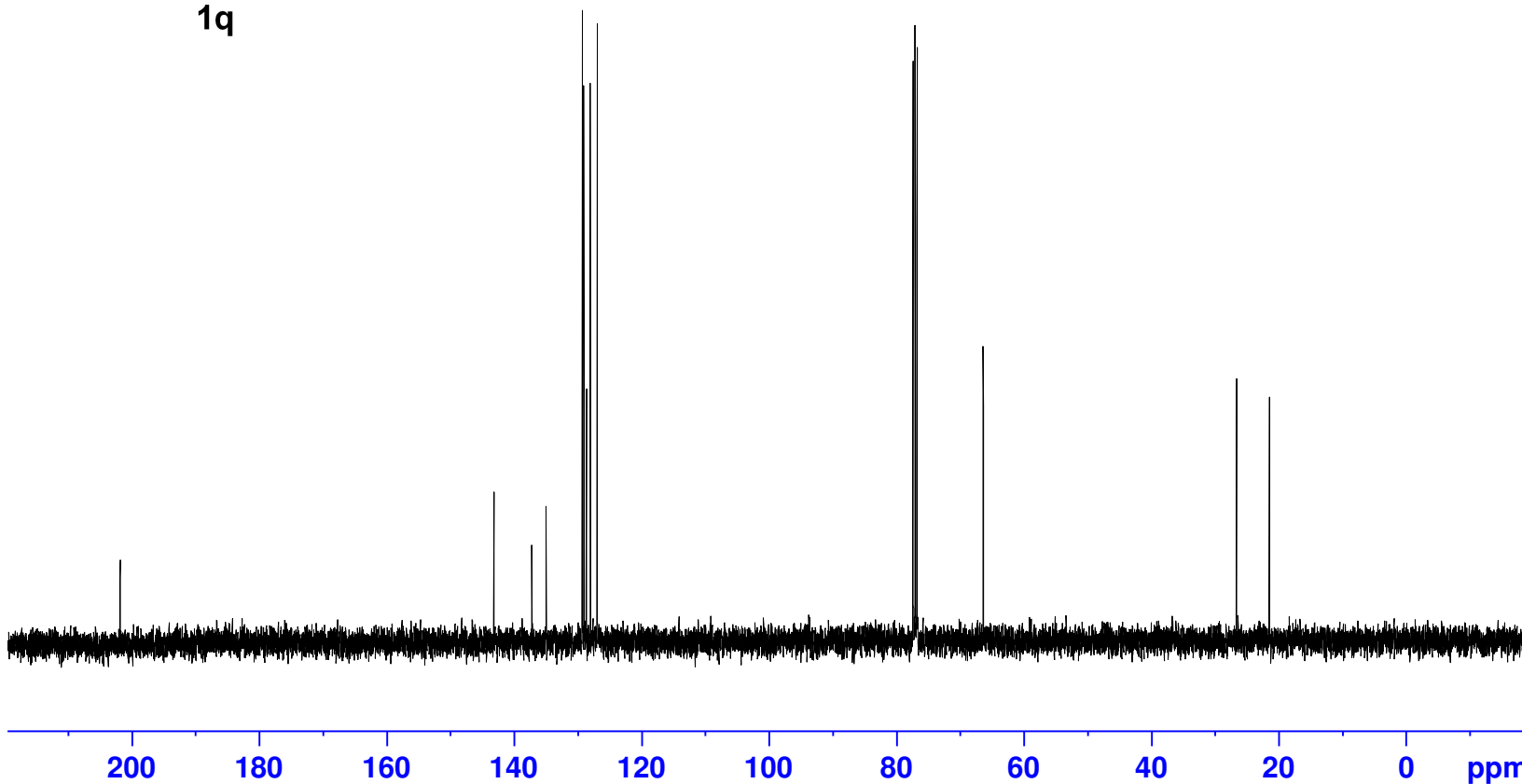
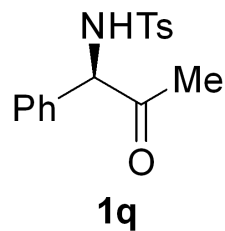
F2 - Processing parameters
SI 65536
SF 400.1300091 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

— 201.927

143.255
137.328
135.098
129.387
129.142
128.742
128.129
127.038

77.477
77.159
76.841
— 66.455

— 26.689
— 21.536



Current Data Parameters
 NAME qh-11063-2
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150401
 Time 19.05
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 22
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 296.9 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

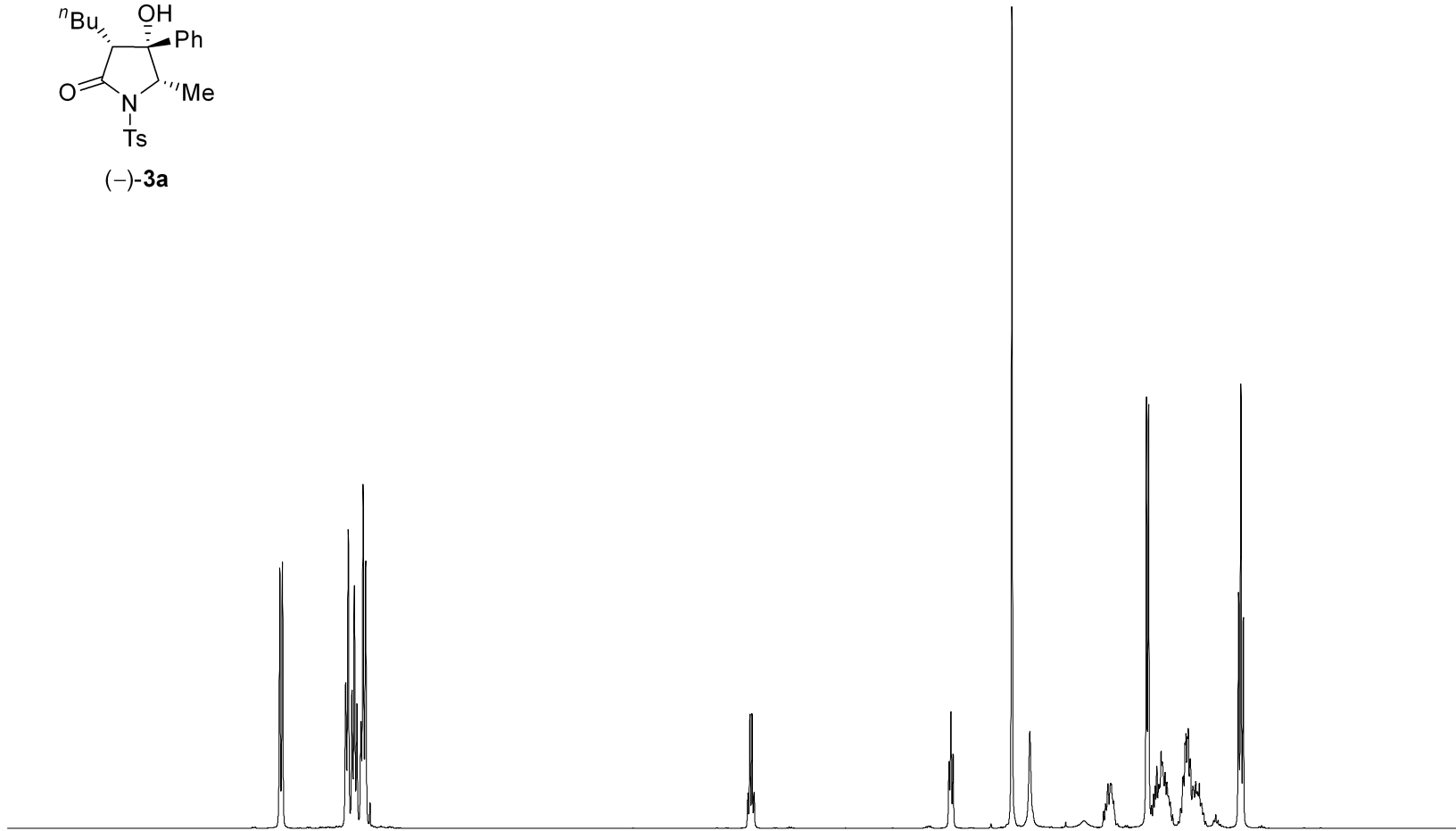
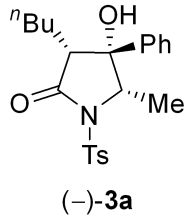
==== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.70 usec
 PLW1 46.98899841 W

==== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 11.99499989 W
 PLW12 0.34213999 W
 PLW13 0.27713001 W

F2 - Processing parameters
 SI 32768
 SF 100.6127597 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.942
7.921
7.443
7.425
7.397
7.378
7.359
7.329
7.313
7.293
4.406
4.390
4.375
4.359
2.887
2.873
2.856
2.412
2.276
1.687
1.667
1.663
1.395
1.380
1.342
1.330
1.317
1.303
1.296
1.285
1.276
1.255
1.241
1.121
1.116
1.104
1.098
1.086
1.080
1.064
1.045
1.025
1.013
1.008
0.996
0.700
0.682
0.664



Current Data Parameters
NAME qh-11062
EXPNO 1
PROCNO 1

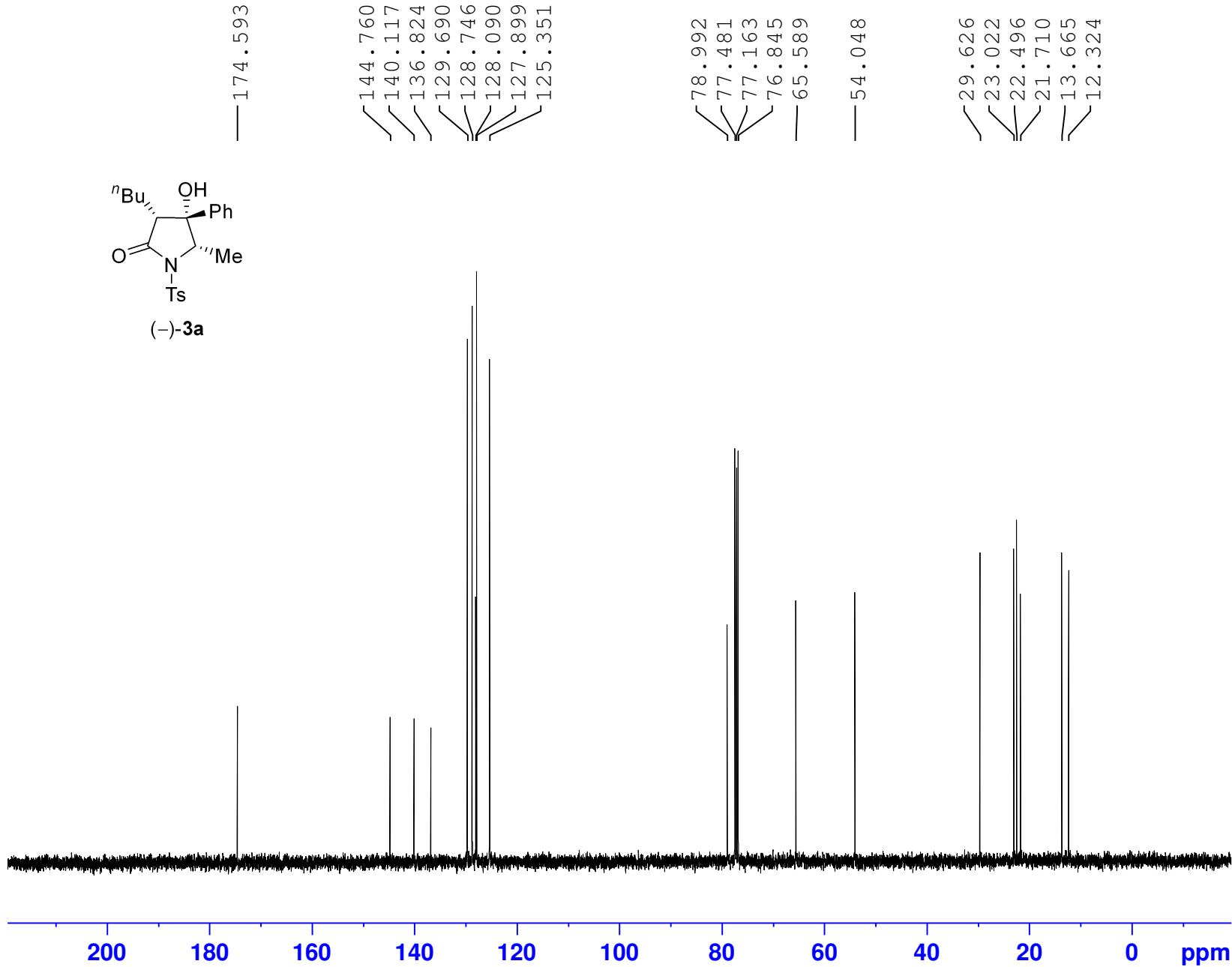
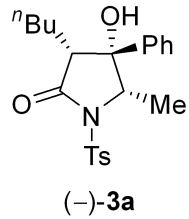
F2 - Acquisition Parameters
Date_ 20150401
Time 18.56
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 22.47
DW 62.400 usec
DE 6.50 usec
TE 296.6 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300087 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

9 8 7 6 5 4 3 2 1 0 ppm

2.00
1.99
2.08
3.02
1.00
1.00
3.06
0.95
0.97
2.98
2.34
3.16
3.03



Current Data Parameters
NAME qh-11062
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150401
Time 18.58
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 29
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

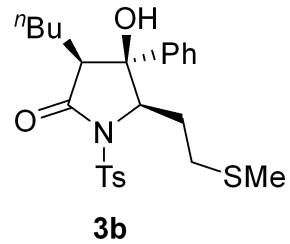
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127656 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.926
7.905
7.427
7.408
7.373
7.356
7.338
7.320
7.303
7.260
4.567
4.559
4.546
4.539
2.731
2.713
2.699
2.571
2.547
2.537
2.529
2.521
2.512
2.462
2.447
2.343
2.324
2.320
2.303
2.285
2.253
2.235
2.220
2.201
1.905
1.641
1.381
1.135
1.118
1.102
1.087
1.071
1.056
1.047
1.032
0.720
0.703
0.685

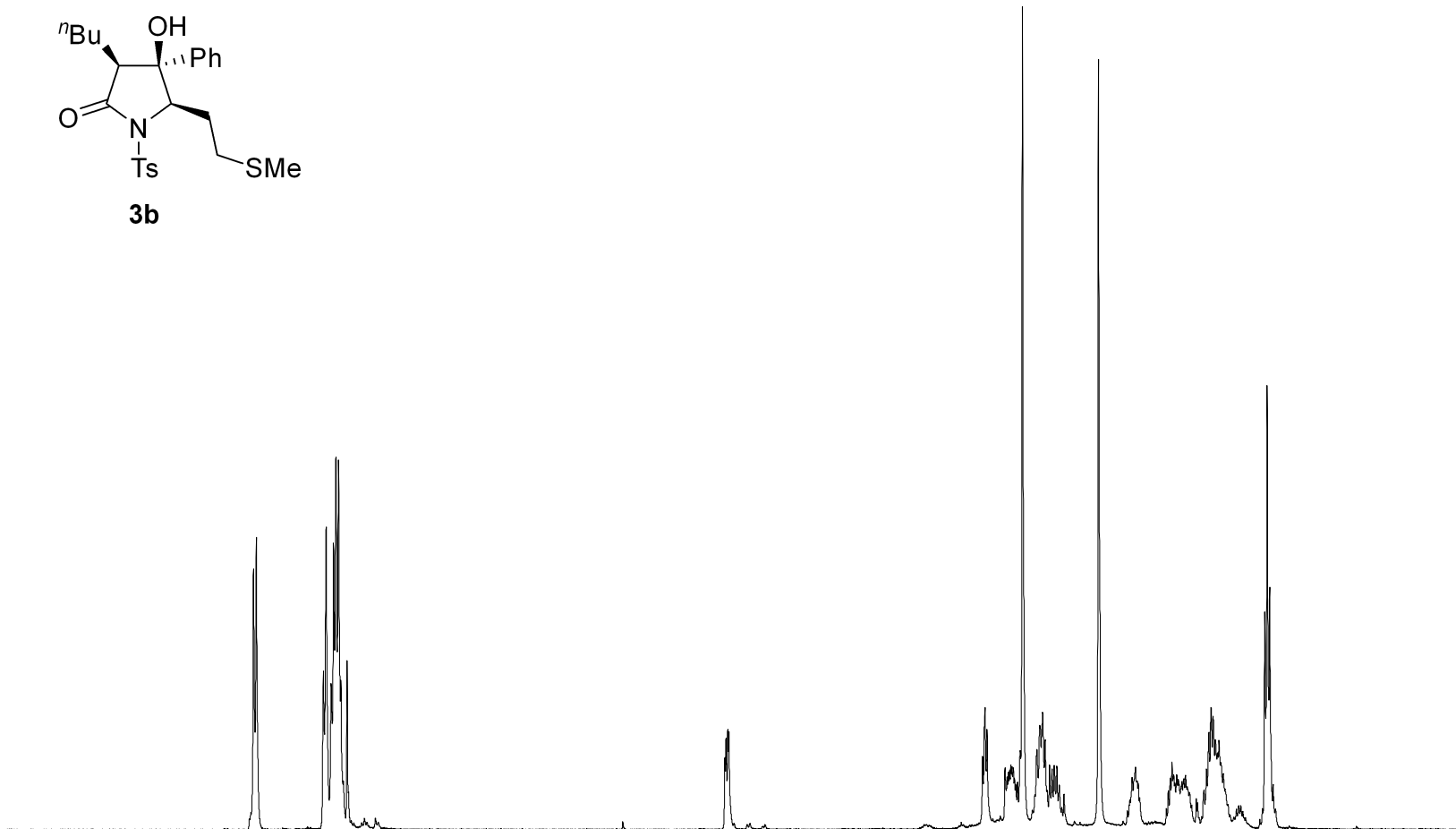


Current Data Parameters
NAME qh-11127
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150113
Time 13.56
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 88.84
DW 62.400 usec
DE 6.50 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300103 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



9 8 7 6 5 4 3 2 1 0 ppm

2.16

7.29

1.00

1.15

4.96

3.48

3.02

1.19

2.35

3.67

3.26



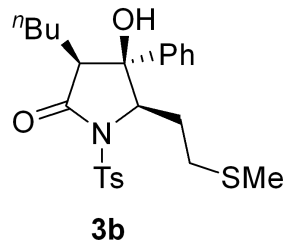
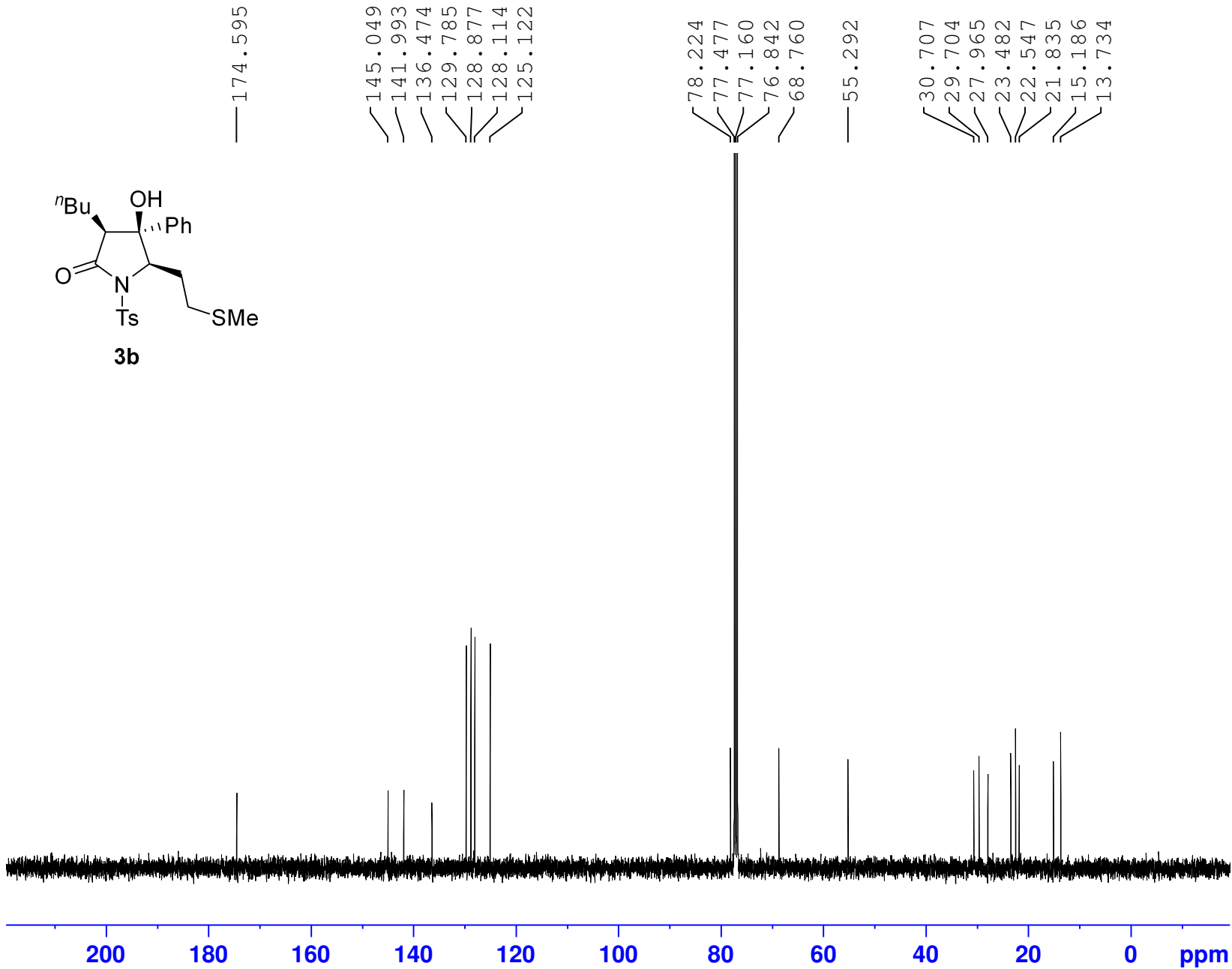
Current Data Parameters
NAME qh-11127
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150113
Time 14.00
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 209
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

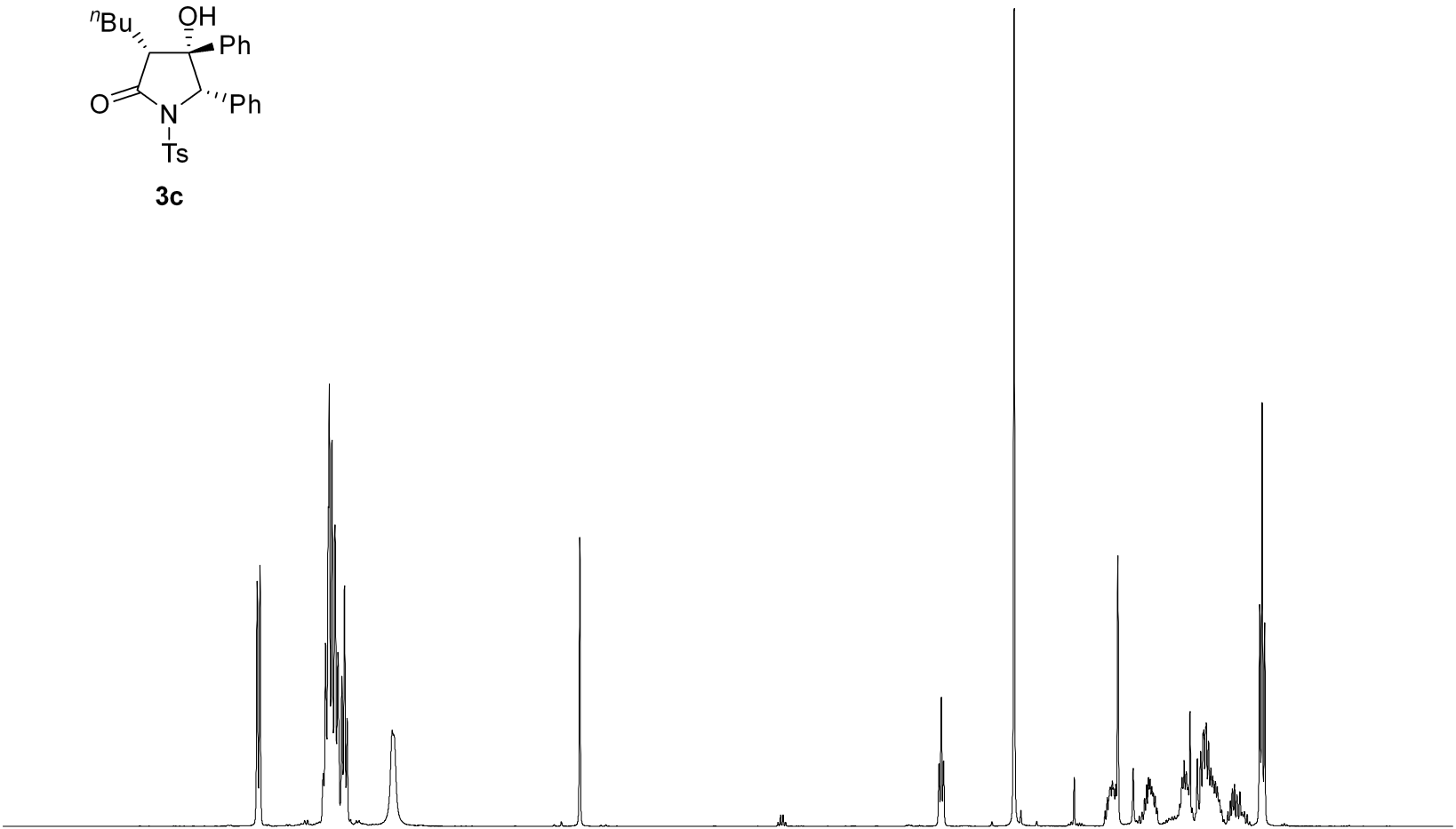
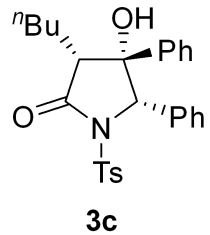
==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127568 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40





7.865
7.846
7.395
7.379
7.359
7.352
7.334
7.311
7.291
7.263
7.245
7.226
6.905
6.893
5.572
3.019
3.003
2.987
2.486
1.803
1.788
1.780
1.543
1.531
1.518
1.508
1.496
1.293
1.277
1.262
1.183
1.160
1.143
1.137
1.124
1.120
1.104
1.087
1.074
1.056
1.041
0.934
0.919
0.901
0.881
0.740
0.723
0.705

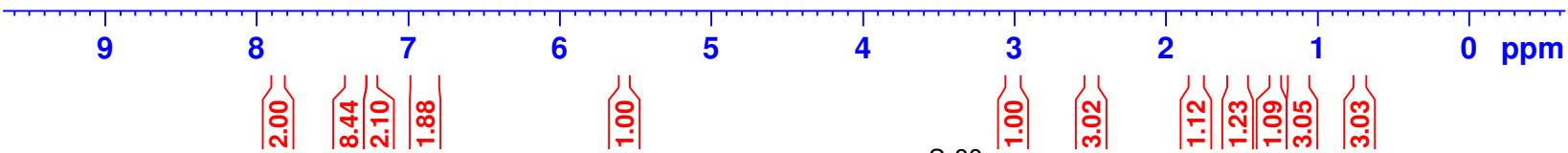


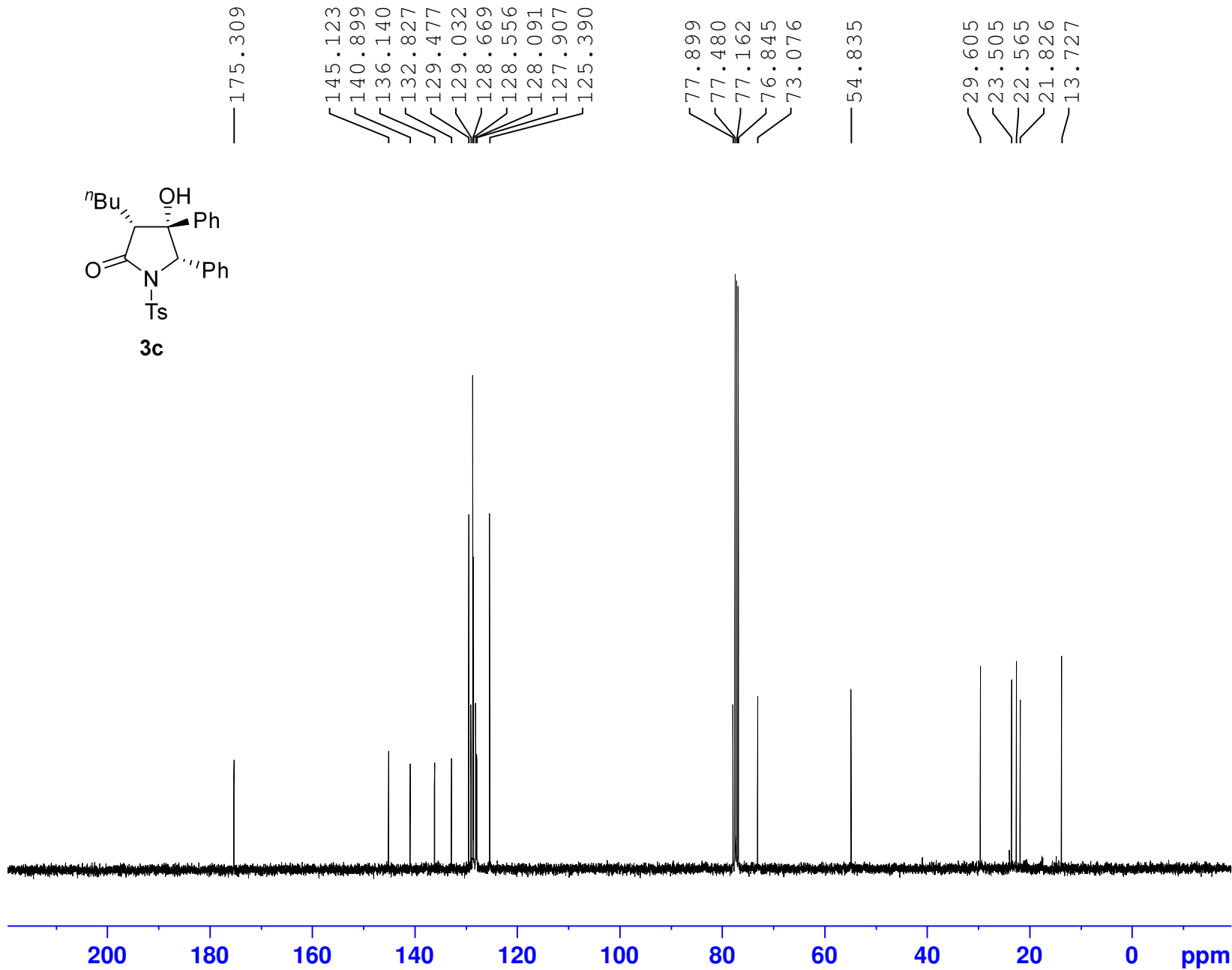
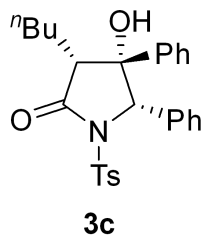
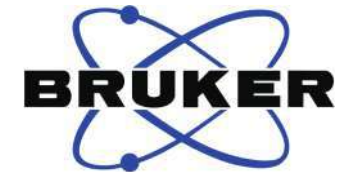
Current Data Parameters
NAME qh-11131-3
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150113
Time 17.51
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 3
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 27.78
DW 62.400 usec
DE 6.50 usec
TE 295.7 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





Current Data Parameters
NAME qh-11131-3
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150113
Time 18.00
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 158
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.6 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

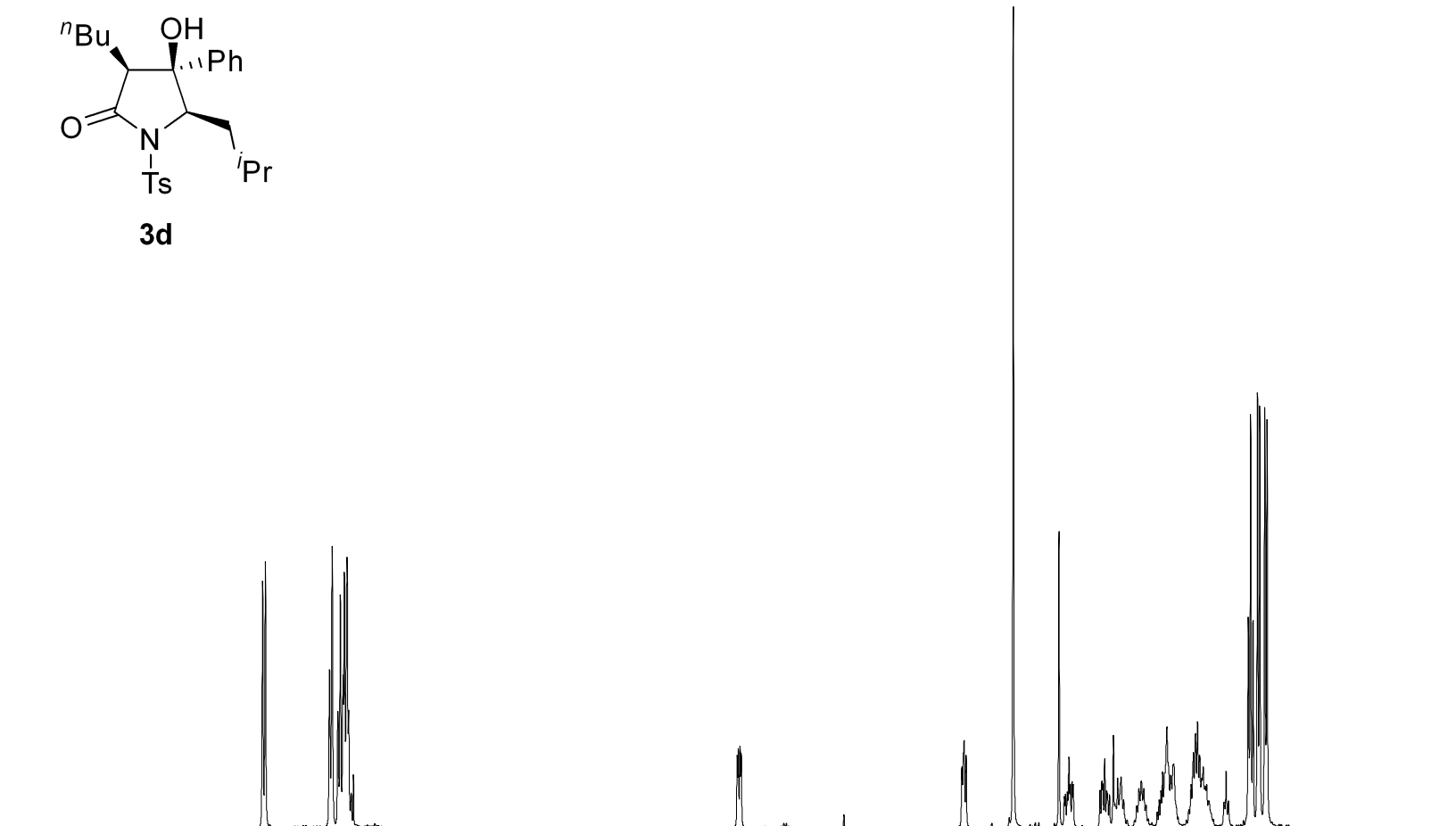
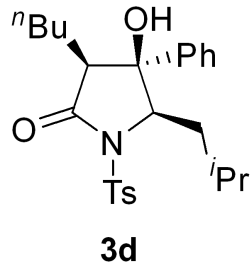
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127612 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.923
7.903
7.434
7.414
7.373
7.355
7.335
7.326
7.306
7.294
7.260
4.452
4.444
4.431
4.423
2.809
2.792
2.778
2.433
2.098
2.025
2.003
1.994
1.785
1.778
1.764
1.700
1.669
1.644
1.497
1.341
1.309
1.281
1.258
1.115
1.099
1.085
1.069
1.056
1.044
1.018
0.714
0.697
0.679
0.646
0.630
0.593
0.577



Current Data Parameters
NAME qh-11131-2
EXPNO 1
PROCNO 1

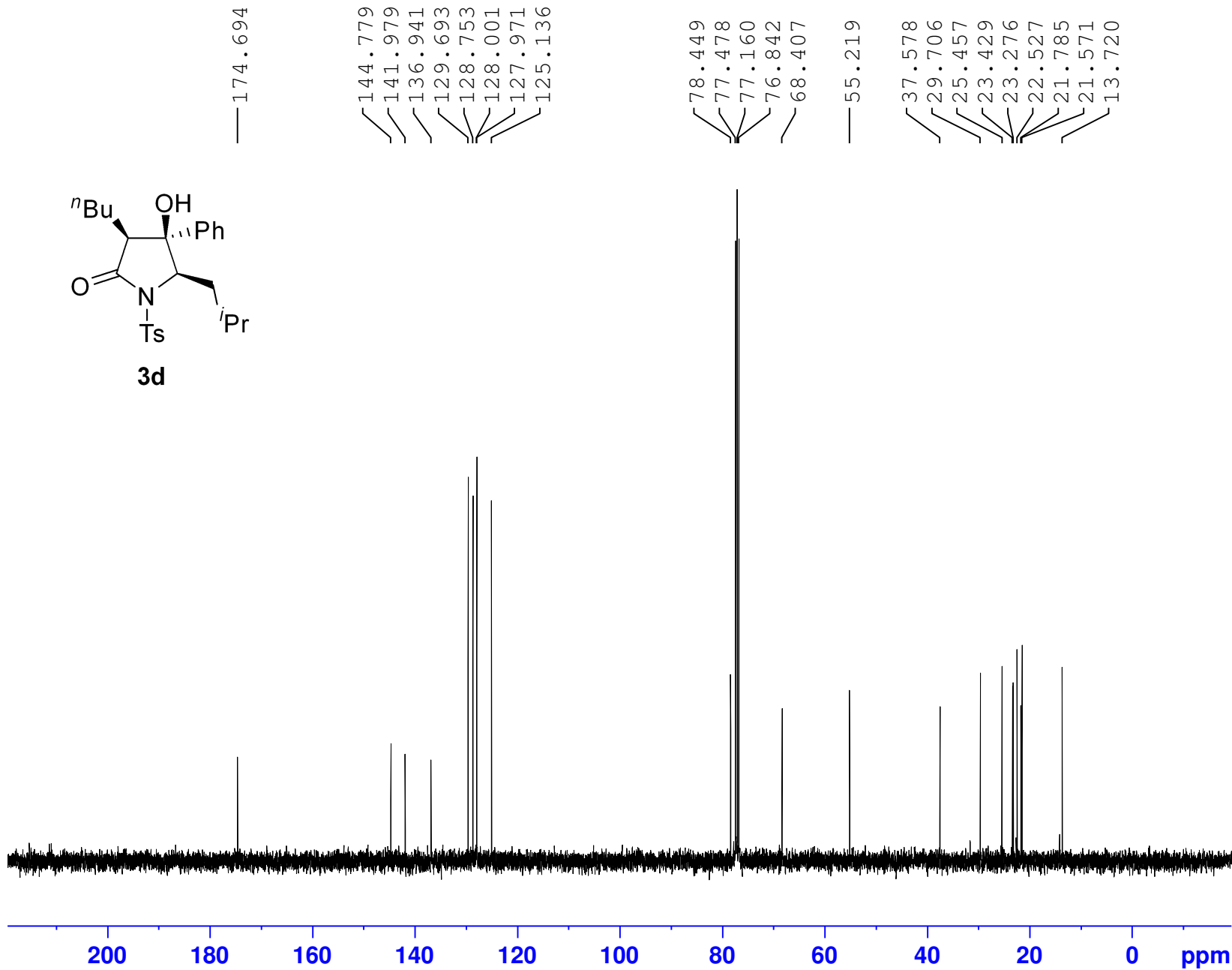
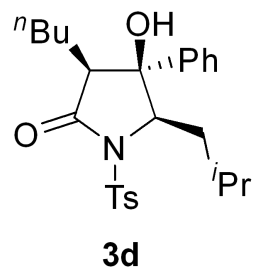
F2 - Acquisition Parameters
Date_ 20150123
Time 16.35
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 27.78
DW 62.400 usec
DE 6.50 usec
TE 295.7 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

2.00
2.03
5.08
1.00
1.00
3.05
0.99
1.06
1.01
1.02
1.02
2.74
3.36
3.05
3.03
3.06

S-90



Current Data Parameters
NAME qh-11131-2
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150123
Time 16.38
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 53
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

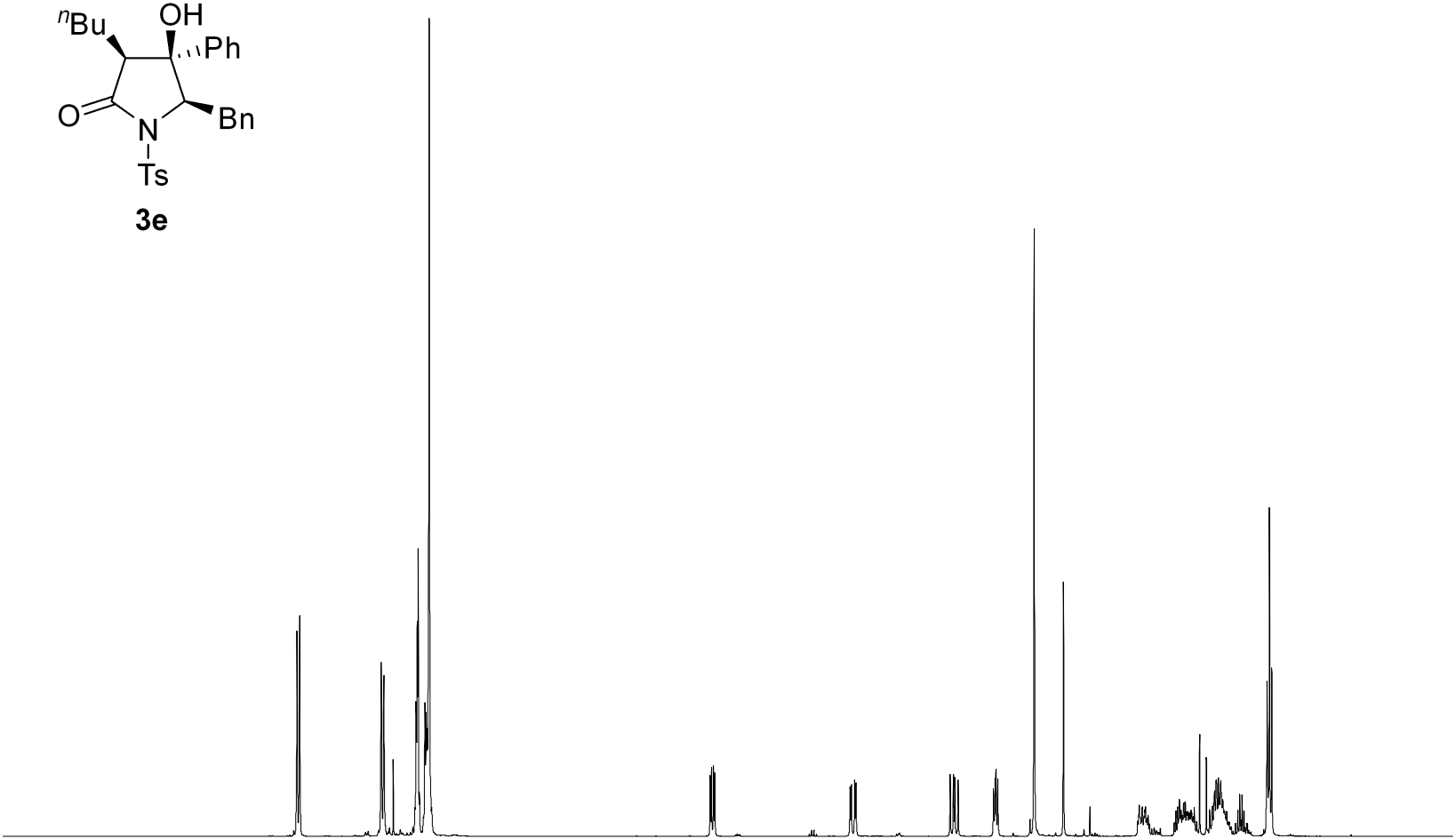
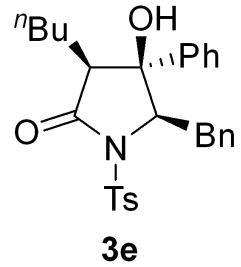
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127597 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.982
7.961
7.350
7.330
7.260
7.090
7.084
7.080
7.073
7.064
7.023
7.014
7.010
7.005
6.990
6.980
4.884
4.874
4.859
4.850
3.835
3.825
3.801
3.791
3.085
3.060
3.051
3.026
2.760
2.747
2.742
2.728
2.455
2.236
1.668
1.367
1.334
1.323
1.109
1.102
1.091
1.089
1.074
1.056
1.042
0.710
0.692
0.674



Current Data Parameters
NAME qh-11134-1
EXPNO 1
PROCNO 1

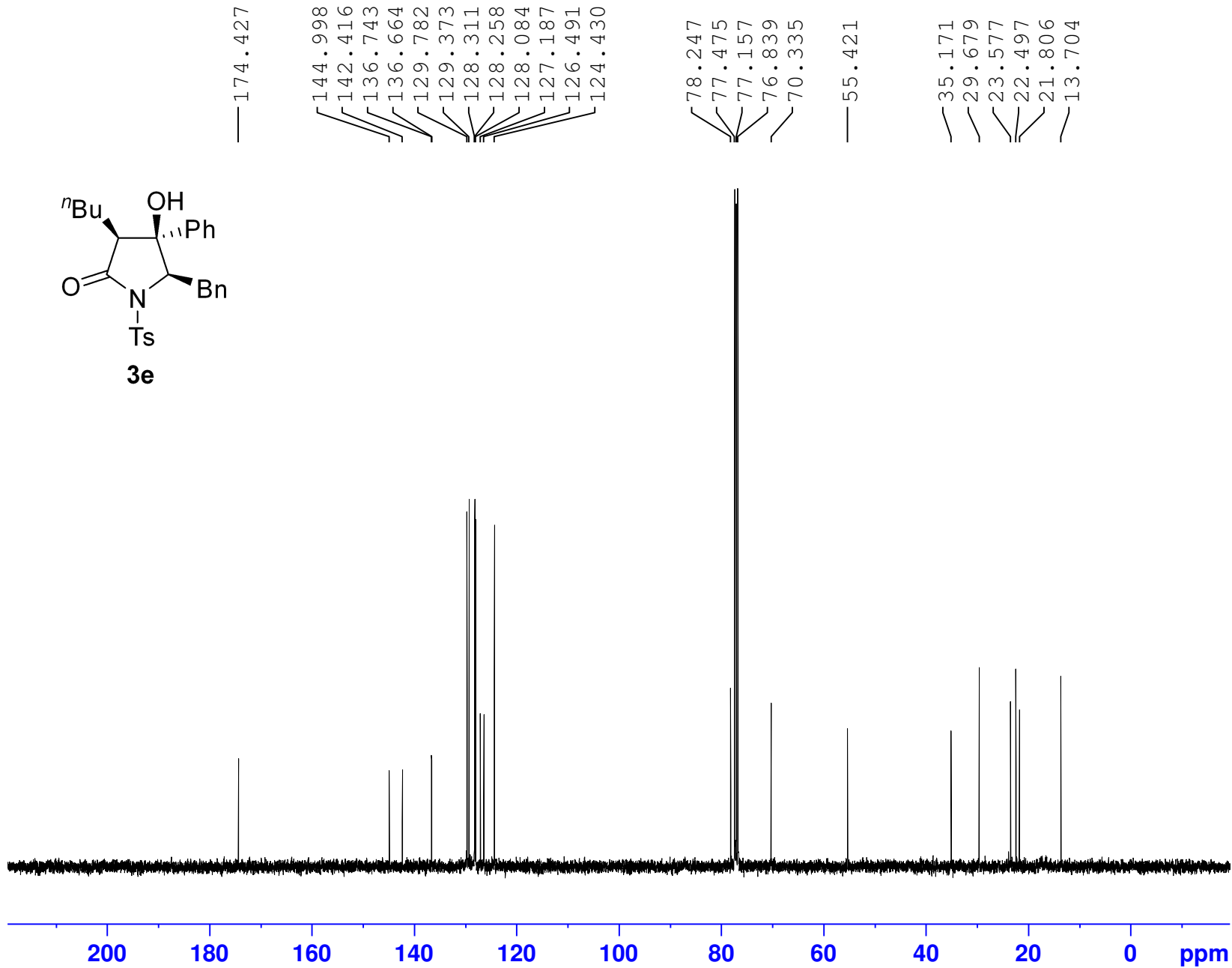
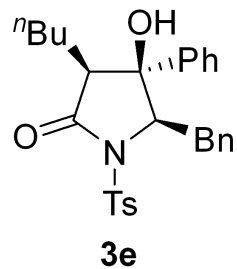
F2 - Acquisition Parameters
Date_ 20150115
Time 9.42
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 27.78
DW 62.400 usec
DE 6.50 usec
TE 295.5 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

10 9 8 7 6 5 4 3 2 1 0 ppm

2.05
2.15
3.14
7.17
1.00
1.00
1.03
3.04
0.97
1.13
2.03
3.11
3.14



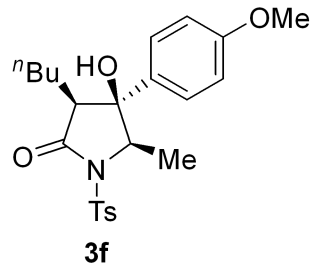
Current Data Parameters
NAME qh-11134-1
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150115
Time 9.50
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 130
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

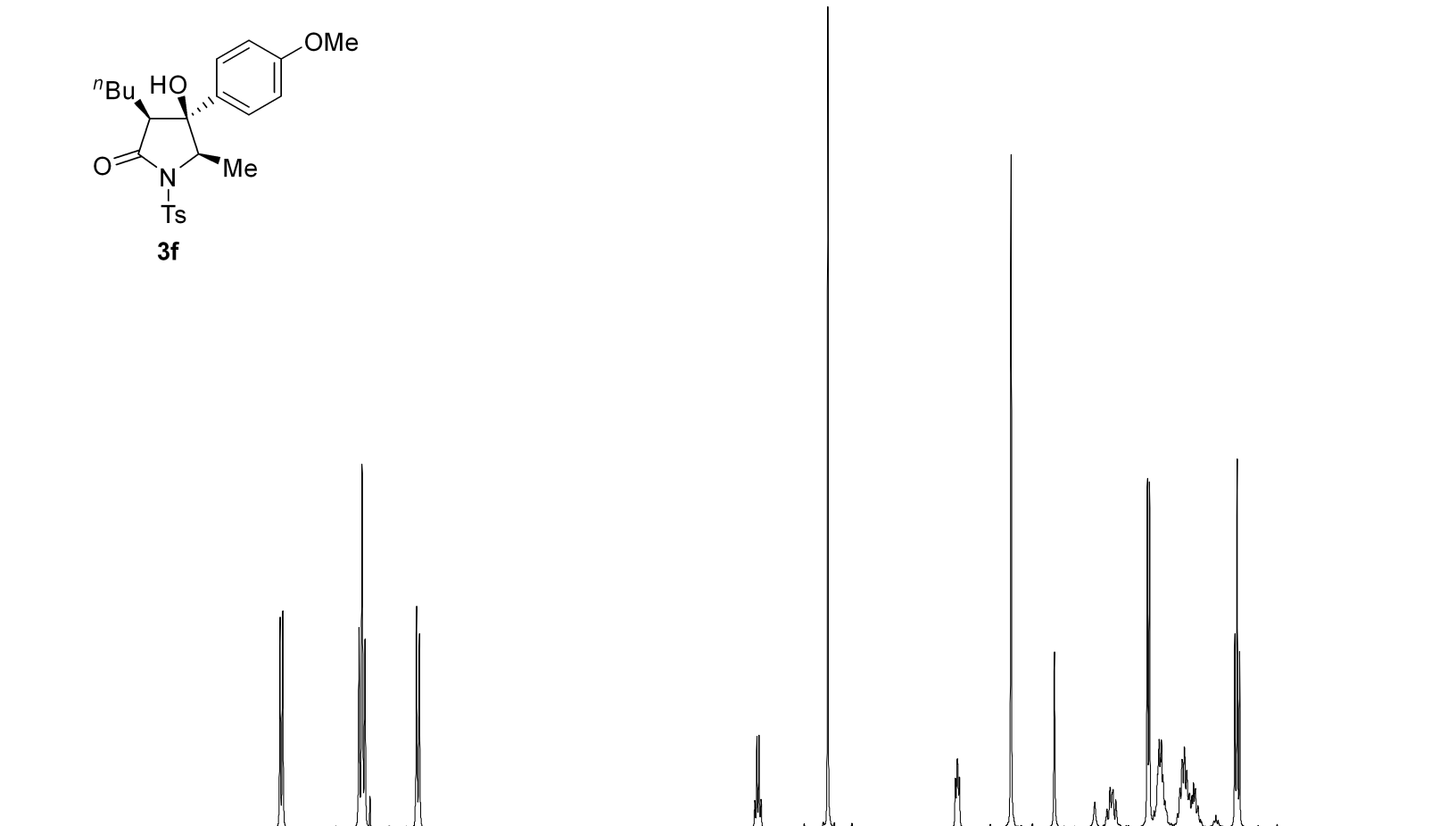
==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127612 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.940
7.919
7.343
7.320
7.298
7.260
6.909
6.887

4.353
4.338
4.322
4.306
3.802
2.839
2.825
2.808
2.418
2.090
1.671
1.648
1.627
1.388
1.373
1.312
1.300
1.290
1.282
1.271
1.256
1.142
1.127
1.123
1.109
1.091
1.071
1.051



Current Data Parameters
NAME qh-11145-1
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150401
Time 18.31
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 27.78
DW 62.400 usec
DE 6.50 usec
TE 296.4 K
D1 1.00000000 sec
TD0 1

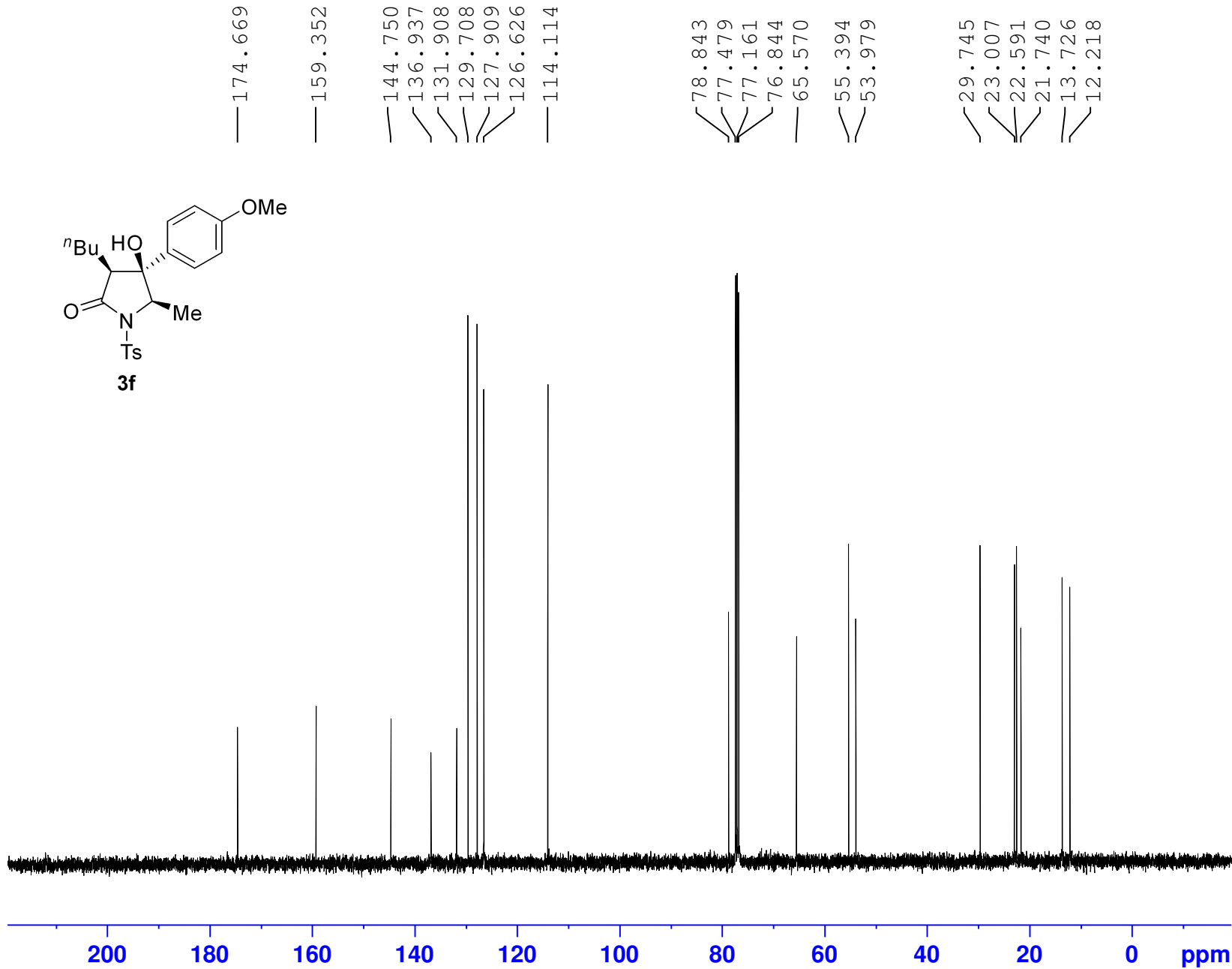
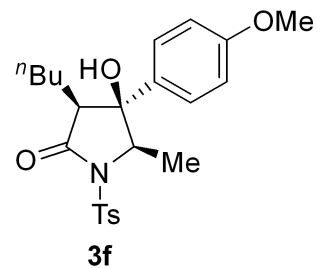
==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300088 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

2.00
4.03
2.01

1.00
3.05
0.99
3.05
0.95
1.05
3.02
2.31
3.17
3.03

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Current Data Parameters
NAME qh-11145-1
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150401
Time 18.35
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 53
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

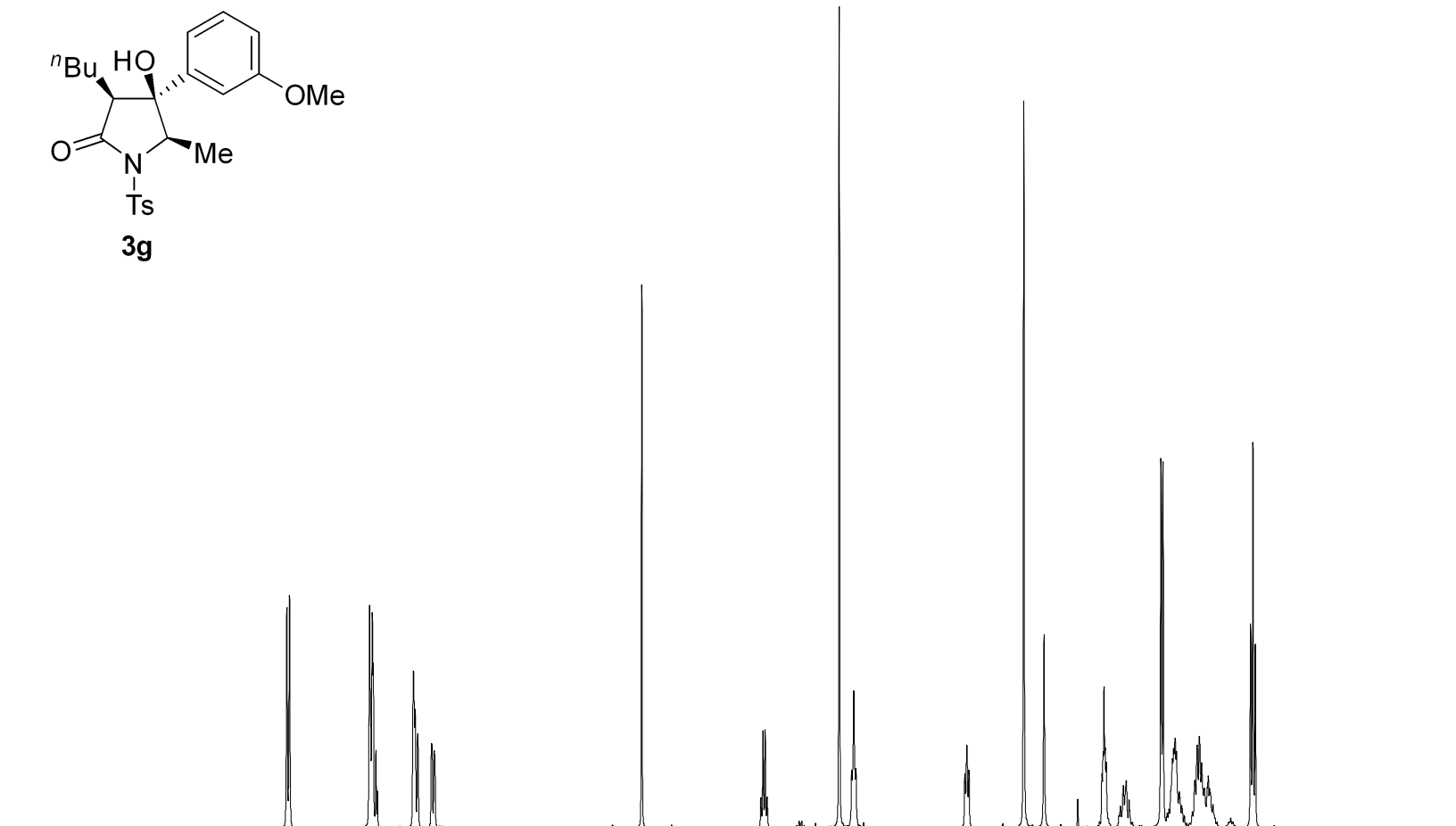
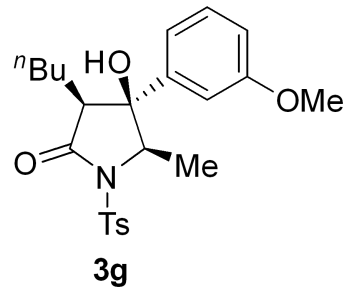
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127620 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.937
7.917
7.318
7.298
7.291
7.270
7.259
6.989
6.977
6.957
6.854
6.833
5.280
4.371
4.356
3.800
3.706
3.691
3.676
2.859
2.844
2.829
2.418
2.266
1.832
1.824
1.816
1.809
1.801
1.672
1.650
1.391
1.375
1.305
1.296
1.286
1.274
1.253
1.136
1.118
1.103
1.086
1.067
1.037
1.027
0.719
0.702
0.684



2.01
3.02
2.01
1.00
1.82
1.00
3.05
1.43
1.00
3.05
0.99
1.58
1.03
3.03
2.33
3.07
3.02

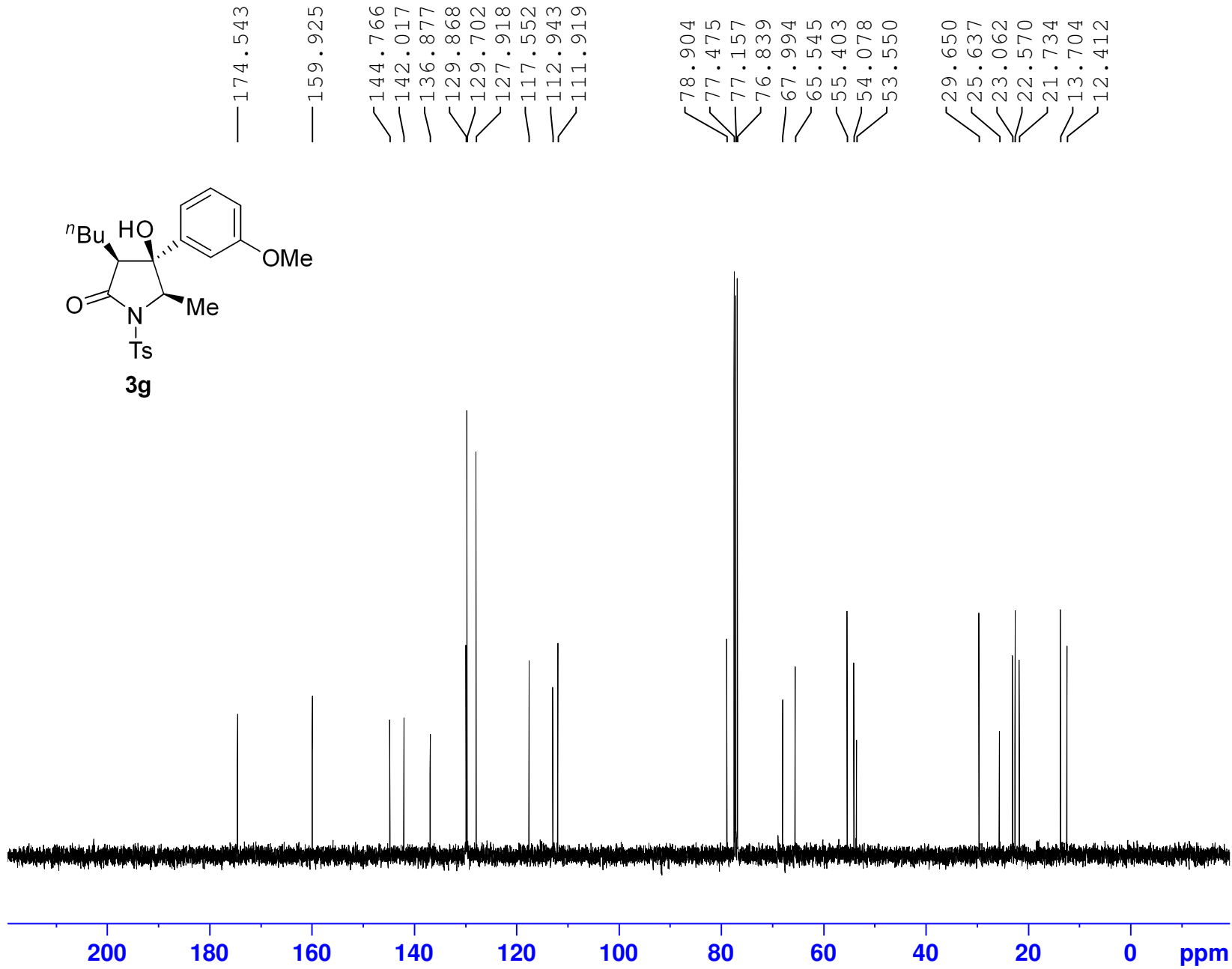
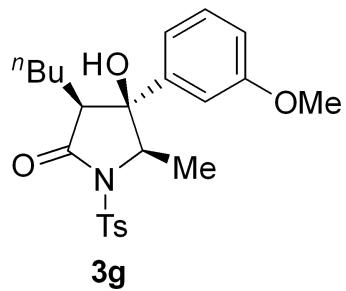
S-96

Current Data Parameters
NAME qh-11154-3
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150122
Time 19.30
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 25.32
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
NAME qh-11154-3
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150122
Time 19.33
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 49
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

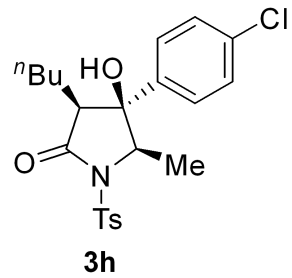
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127626 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.929
7.909
7.397
7.375
7.356
7.334
7.325
7.305
7.260
4.352
4.336
4.320
4.305
2.841
2.826
2.810
2.425
2.208
1.706
1.687
1.660
1.642
1.387
1.371
1.325
1.312
1.299
1.281
1.266
1.256
1.237
1.221
1.210
1.133
1.120
1.114
1.102
1.097
1.081
1.062
1.039
1.020
1.003
0.993
0.975
0.724
0.706
0.688

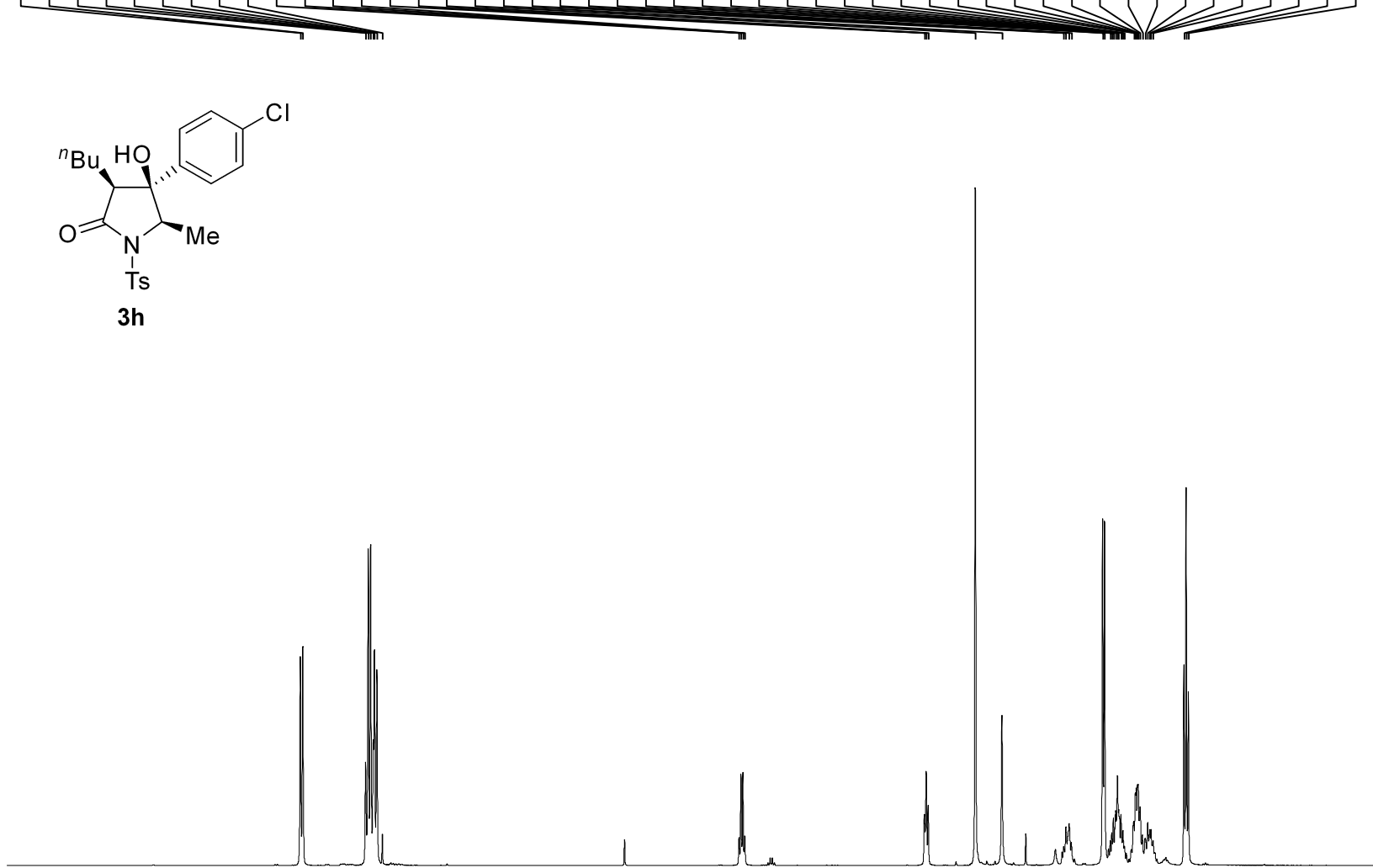


Current Data Parameters
NAME qh-11154-1
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150122
Time 19.20
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 3
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 45.67
DW 62.400 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1

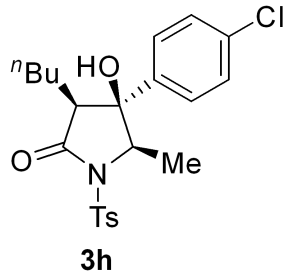
==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



10 9 8 7 6 5 4 3 2 1 0 ppm

2.00
6.10
1.00
1.00
3.07
0.96
1.03
3.02
2.43
2.21
1.16
3.03

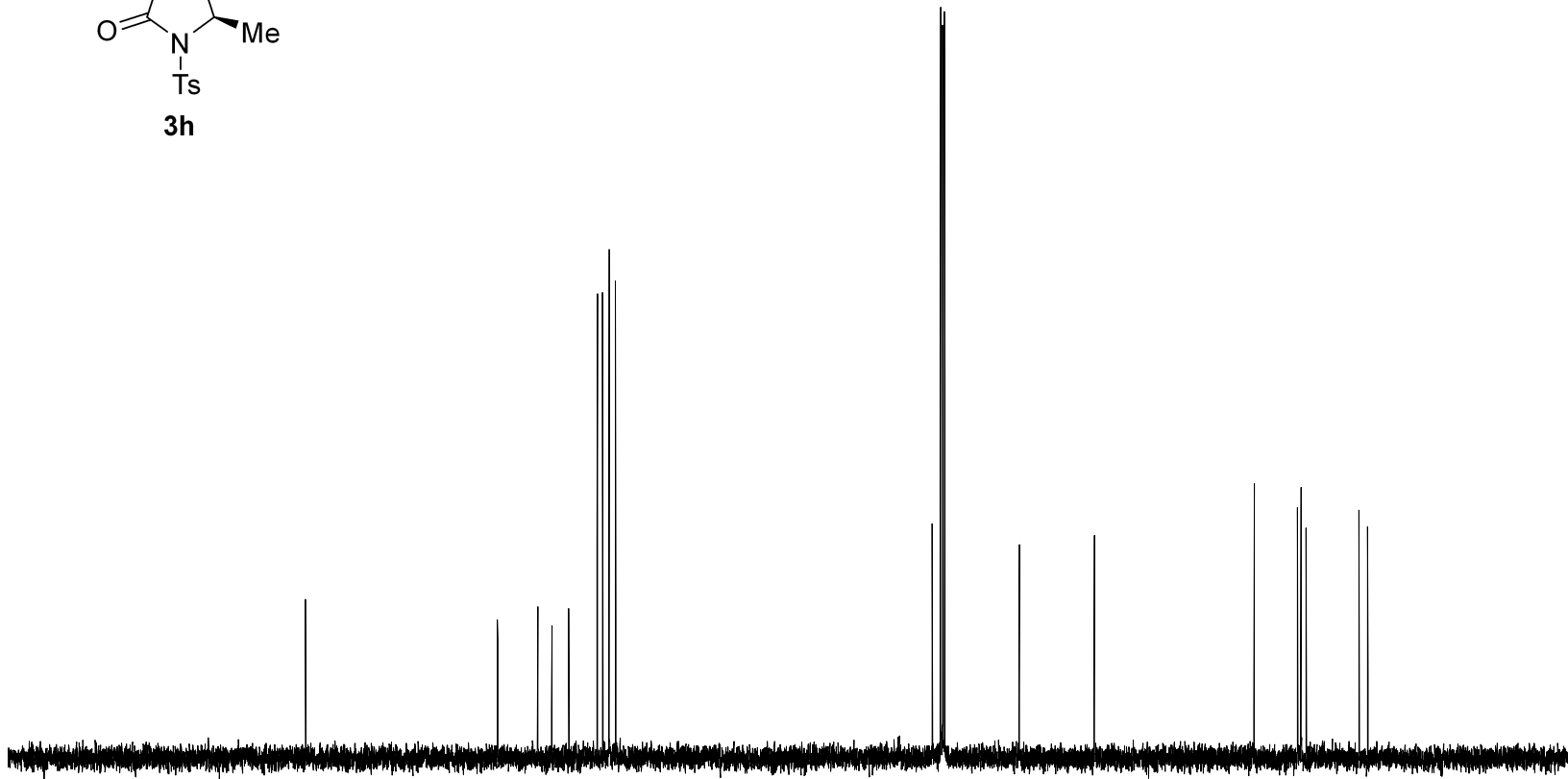


— 174.229

144.952
 138.835
 136.696
 134.141
 129.772
 128.951
 127.952
 126.974

78.749
 77.481
 77.163
 76.846
 65.481
 — 54.056

29.700
 23.088
 22.571
 21.776
 13.707
 12.382



Current Data Parameters
 NAME qh-11154-1
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150122
 Time 19.22
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 42
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 296.3 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

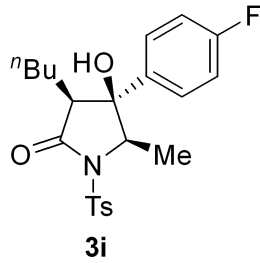
===== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.60 usec
 PLW1 31.98900032 W

===== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 9.10000038 W
 PLW12 0.24608000 W
 PLW13 0.19933000 W

F2 - Processing parameters
 SI 32768
 SF 100.6127612 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.933
7.912
7.438
7.433
7.425
7.421
7.416
7.408
7.403
7.323
7.303
7.260
7.084
7.079
7.063
7.046
7.041
4.347
4.331
2.847
2.832
2.830
2.815
2.421
2.223
1.687
1.657
1.390
1.374
1.317
1.303
1.290
1.282
1.267
1.253
1.246
1.235
1.116
1.108
1.098
1.090
1.080
1.073
1.018
0.993
0.716
0.698
0.680

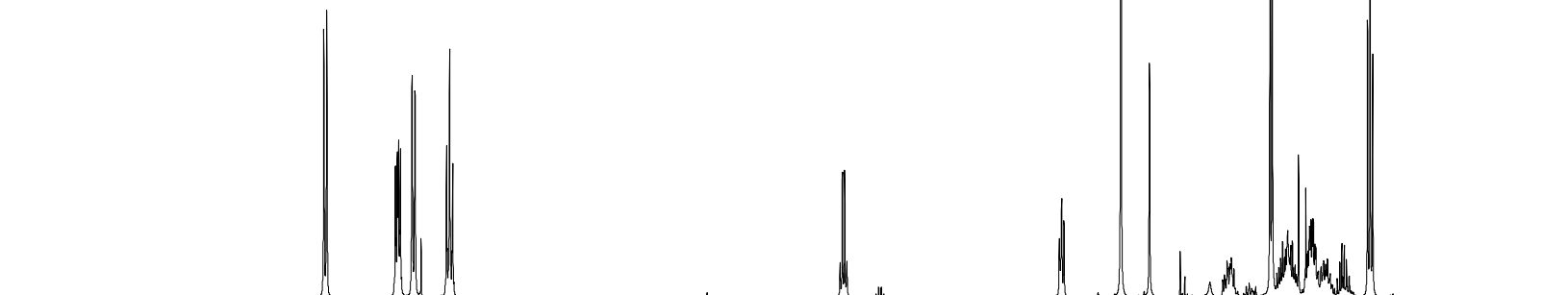


Current Data Parameters
NAME qh-11134-2
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150114
Time 18.10
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 5
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 25.32
DW 62.400 usec
DE 6.50 usec
TE 295.7 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



10 9 8 7 6 5 4 3 2 1 0 ppm

2.00

2.08

2.07

2.03

1.00

1.00

3.06

0.98

0.99

3.06

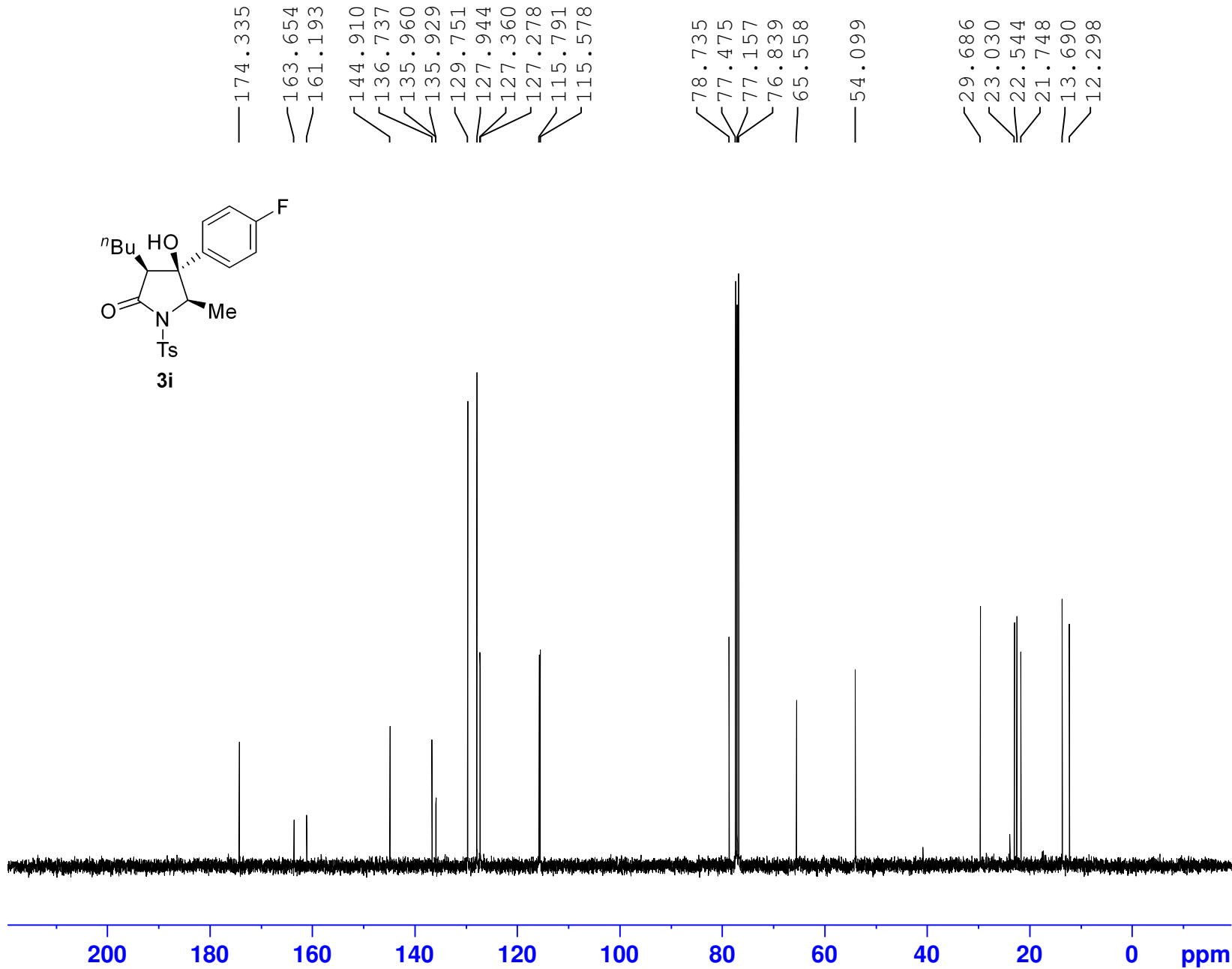
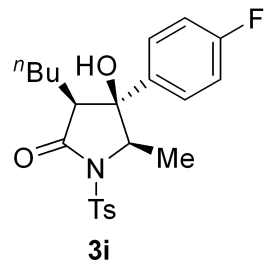
2.43

2.32

1.10

3.04

S-100



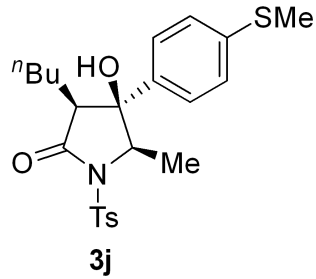
Current Data Parameters
NAME qh-11134-2
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150114
Time 18.14
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 74
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

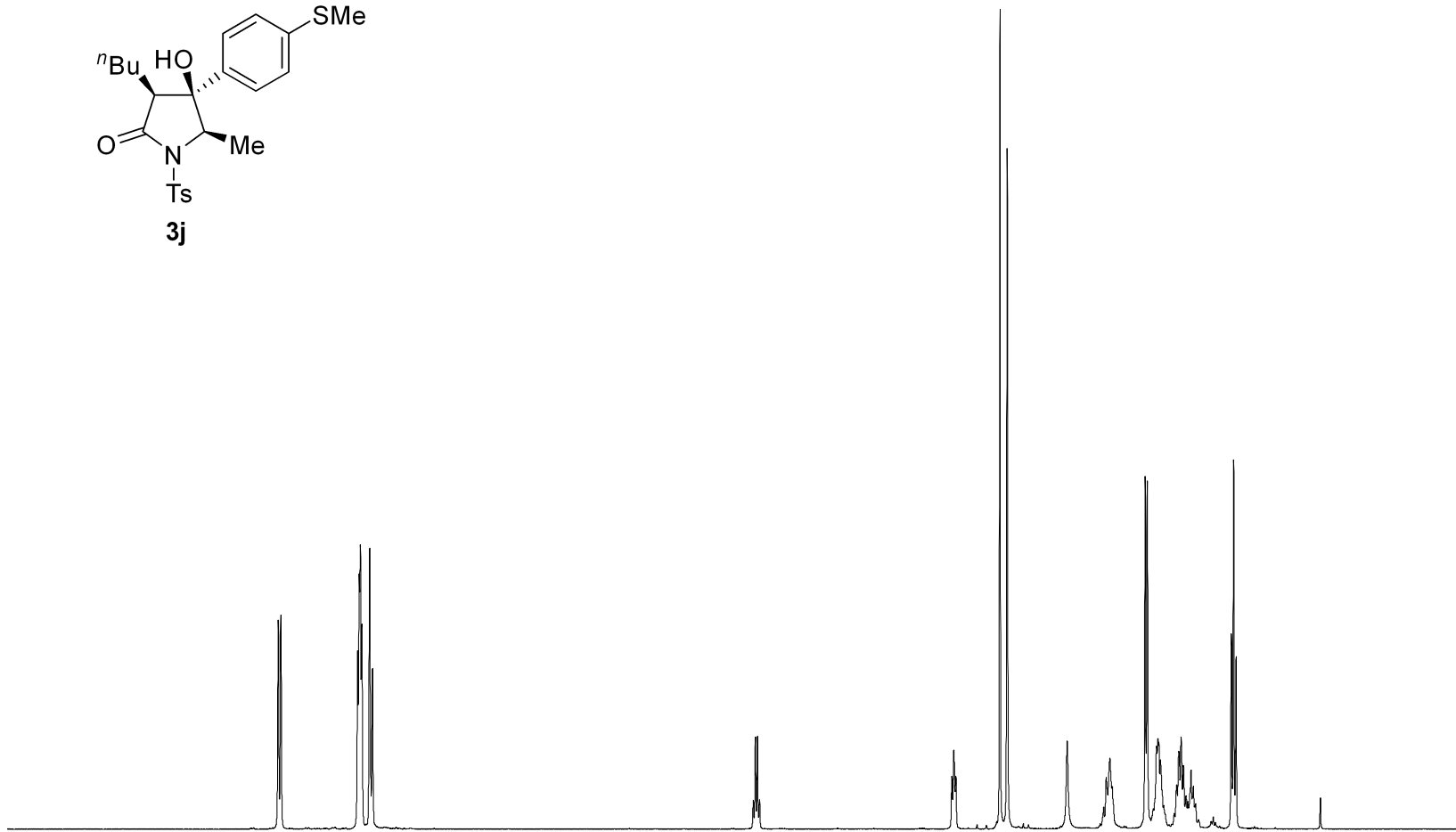
==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127619 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.951
 7.931
 7.350
 7.338
 7.330
 7.319
 7.259
 7.238

4.358
 4.342
 4.326
 4.311
 2.857
 2.842
 2.826
 2.493
 2.438
 1.985
 1.689
 1.662
 1.644
 1.394
 1.378
 1.309
 1.298
 1.291
 1.279
 1.157
 1.141
 1.123
 1.106
 1.086
 1.048
 1.030
 0.743

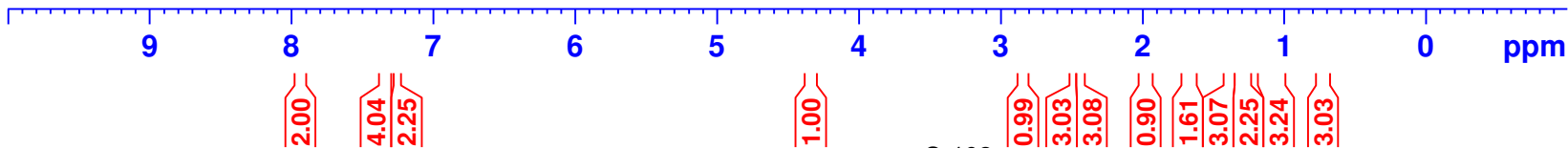


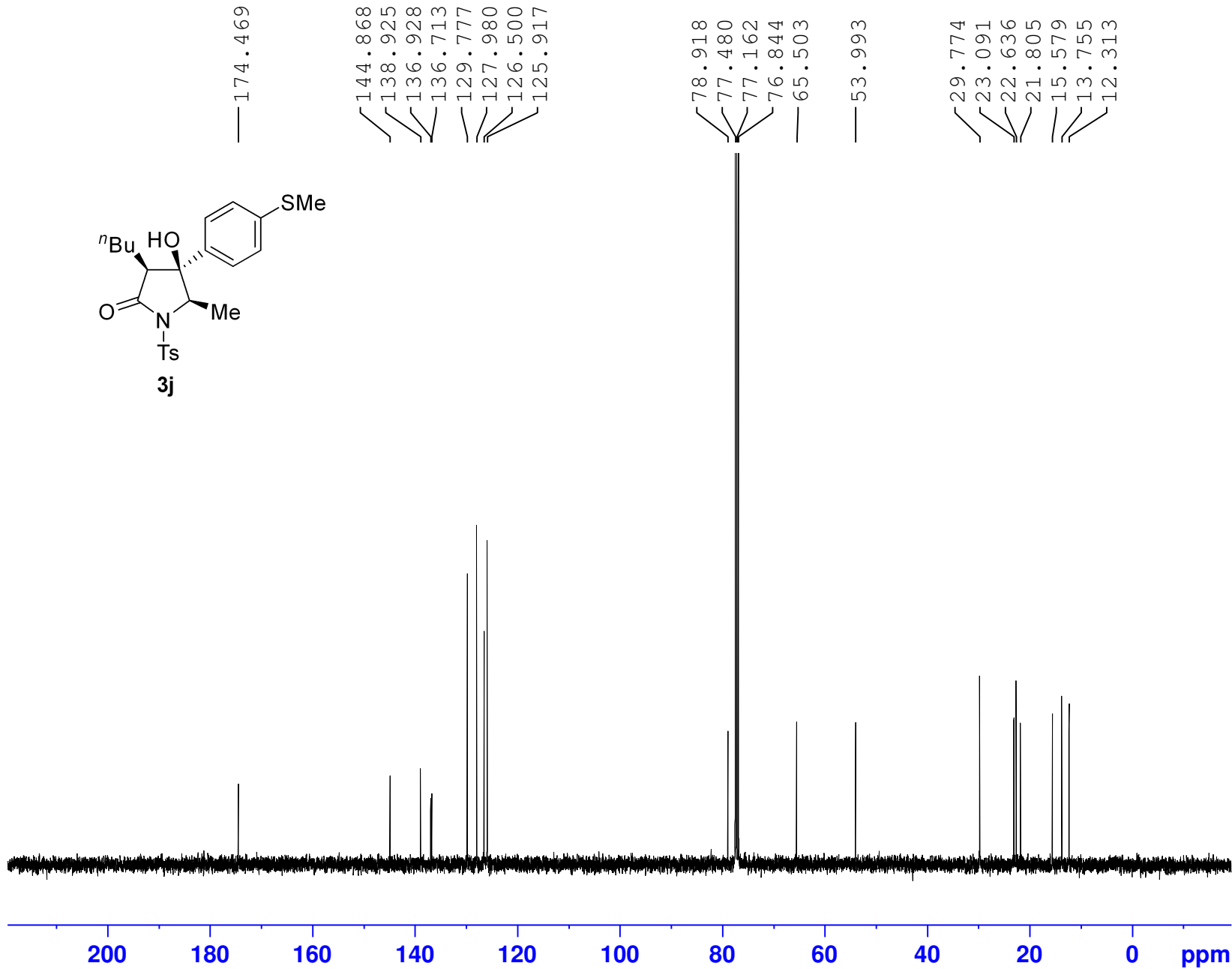
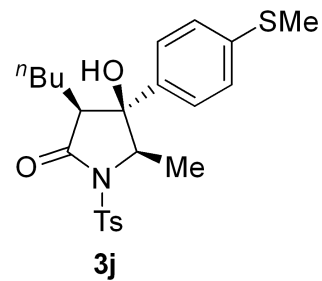
Current Data Parameters
 NAME qh-11154-2
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150401
 Time 18.37
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 2
 DS 0
 SWH 8012.820 Hz
 FIDRES 0.122266 Hz
 AQ 4.0894465 sec
 RG 54.81
 DW 62.400 usec
 DE 6.50 usec
 TE 296.5 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 SFO1 400.1324710 MHz
 NUC1 1H
 P1 14.50 usec
 PLW1 11.99499989 W

F2 - Processing parameters
 SI 65536
 SF 400.1300081 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00





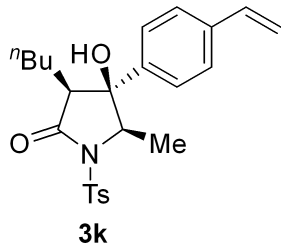
Current Data Parameters
NAME qh-11154-2
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150401
Time 18.42
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 86
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

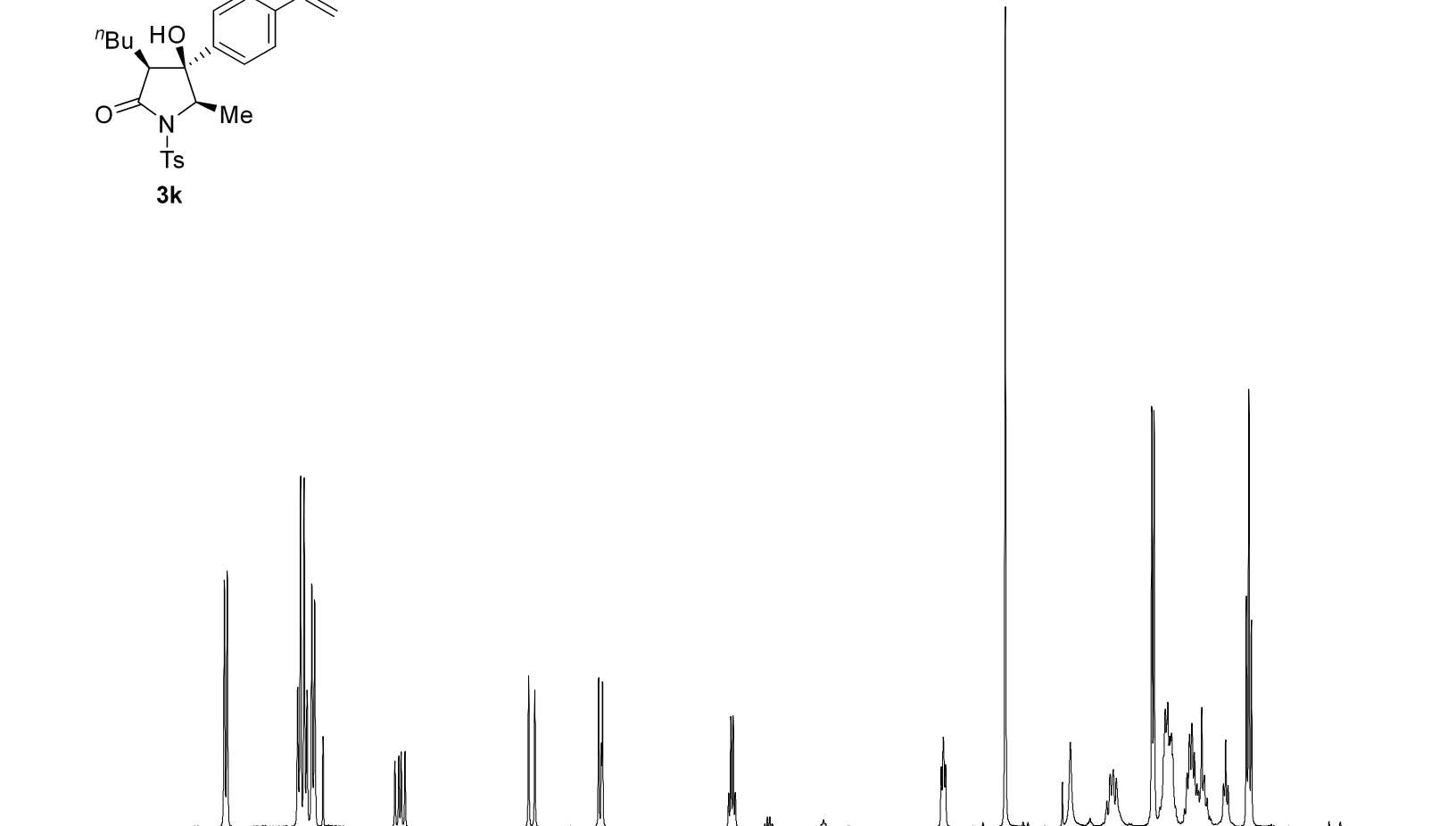
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127575 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.957
7.937
7.440
7.419
7.394
7.373
7.339
7.319
7.260
6.752
6.725
6.708
6.681
5.807
5.763
5.312
5.285
4.393
4.378
4.362
4.346
2.891
2.876
2.860
2.439
1.978
1.839
1.720
1.697
1.675
1.654
1.402
1.387
1.320
1.307
1.289
1.278
1.270
1.263
1.254
1.153
1.137
1.119
1.102



Current Data Parameters
NAME qh-11156-1
EXPNO 1
PROCNO 1

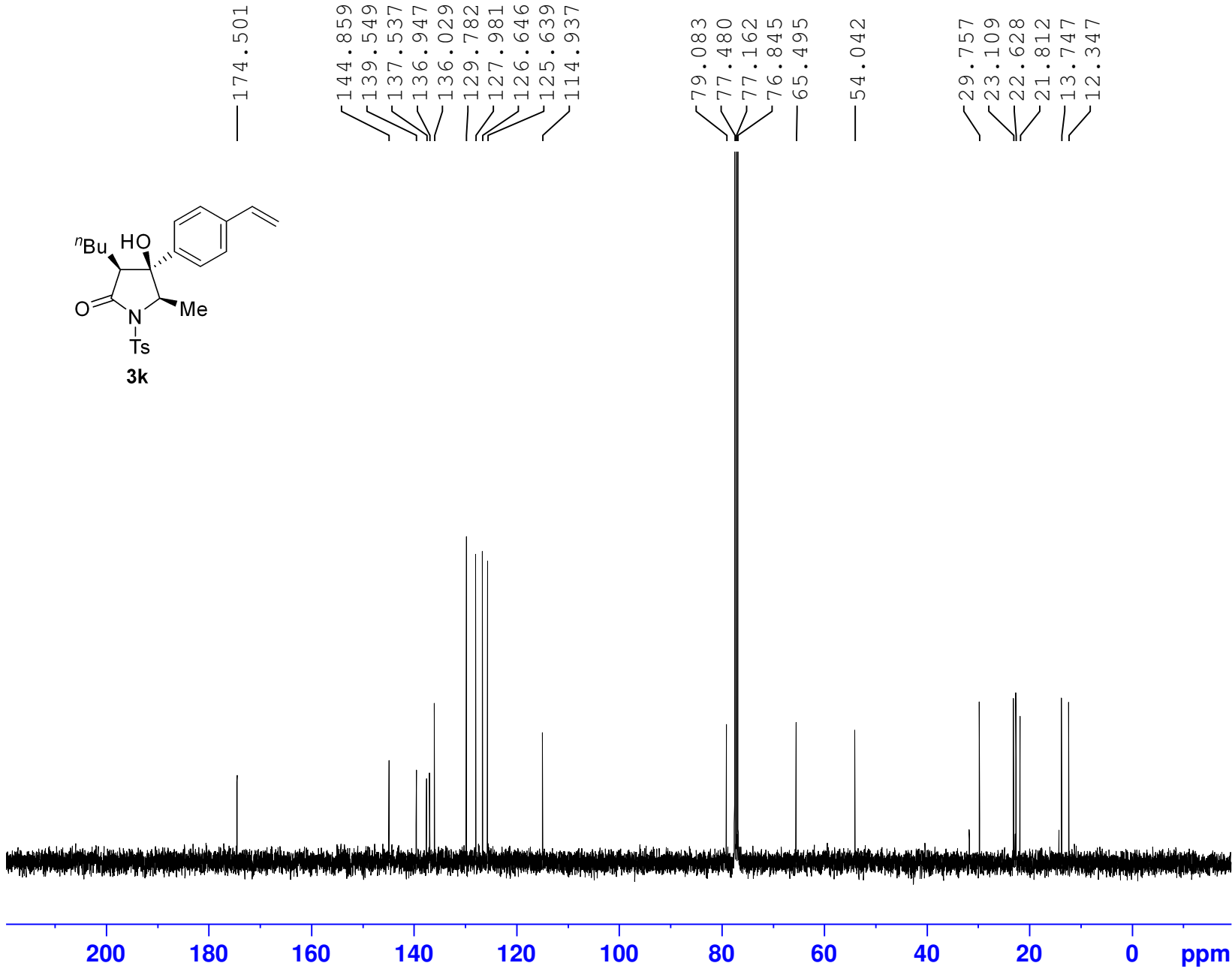
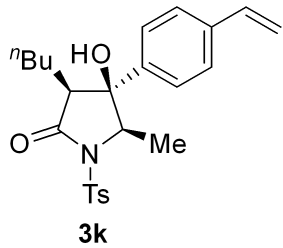
F2 - Acquisition Parameters
Date_ 20150124
Time 15.12
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 70.97
DW 62.400 usec
DE 6.50 usec
TE 296.2 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

9 8 7 6 5 4 3 2 1 0 ppm

2.00
4.02
2.03
0.98
0.99
1.06
1.00
1.00
3.01
0.92
1.43
3.07
3.34
2.31
3.04



Current Data Parameters
NAME qh-11156-1
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150124
Time 15.06
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 100
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 295.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

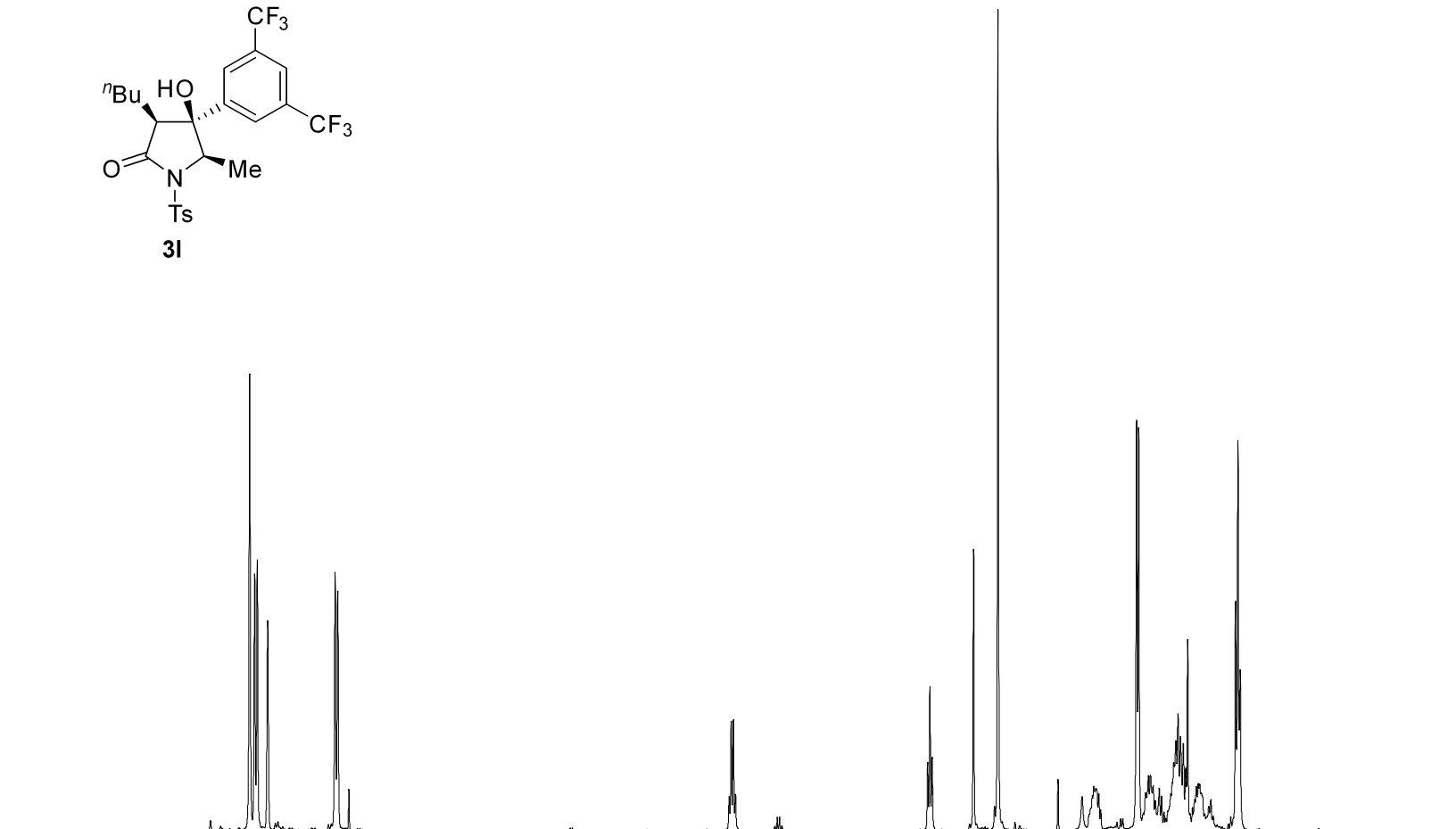
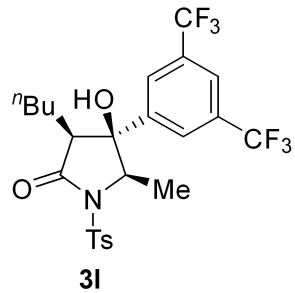
==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127575 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.995
7.958
7.938
7.861
7.362
7.342
7.260

4.442
4.426
4.411
4.395
2.970
2.954
2.937
2.630
2.450
1.751
1.739
1.724
1.423
1.407
1.357
1.335
1.320
1.299
1.255
1.237
1.170
1.158
1.147
1.132
1.116
1.097
1.076
1.058
1.044
0.991



Current Data Parameters
NAME qh-11156-3
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150124
Time 15.15
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 45.67
DW 62.400 usec
DE 6.50 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

9

8

7

6

5

4

3

2

1

0

ppm

1.00

S-106

1.00

0.98

3.13

1.04

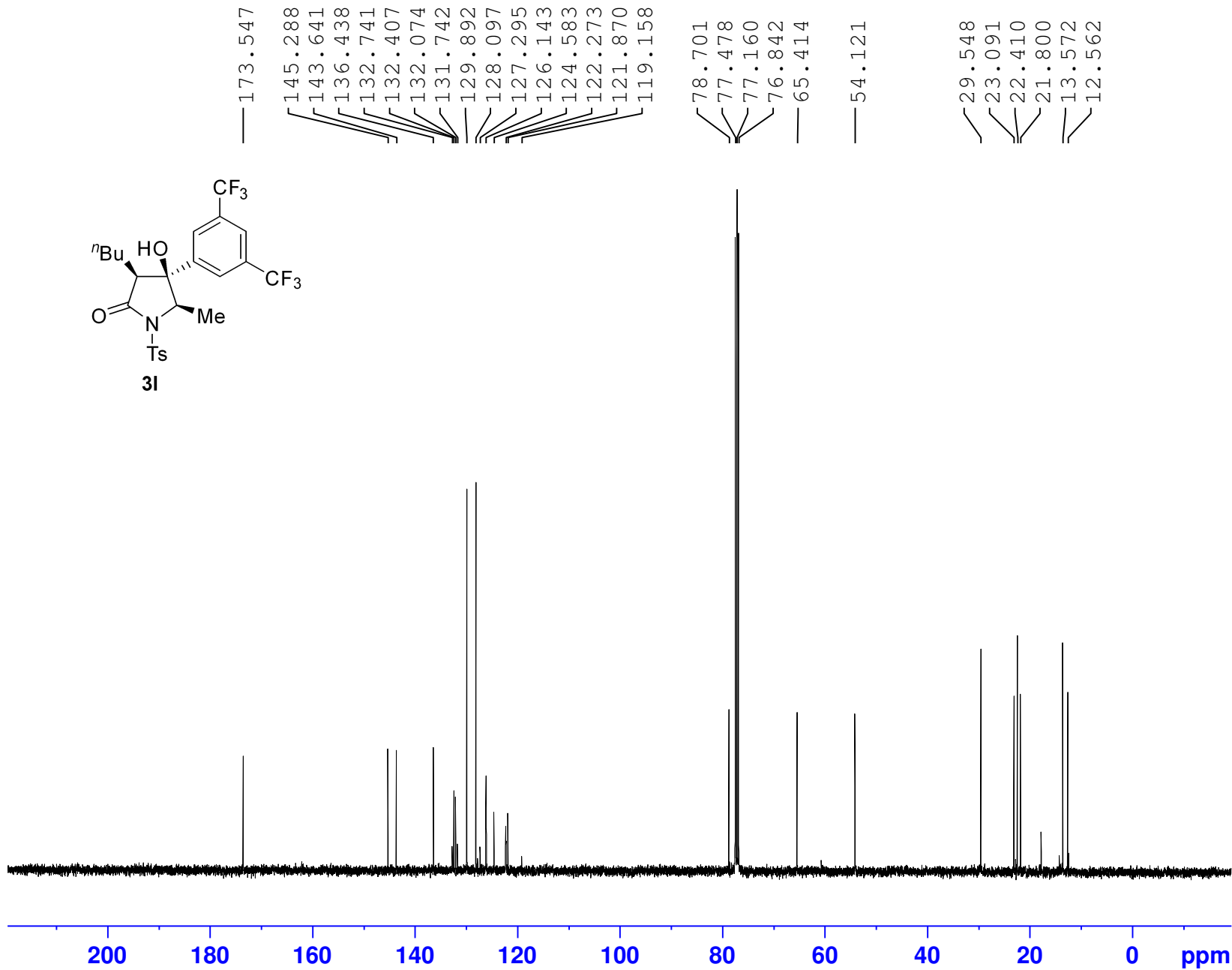
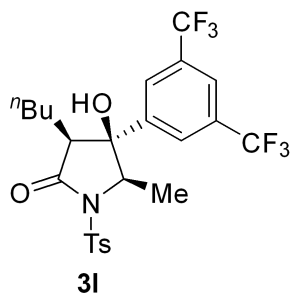
3.00

1.23

3.07

1.16

3.04



Current Data Parameters
NAME qh-11156-3
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150124
Time 15.22
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 213
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127568 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

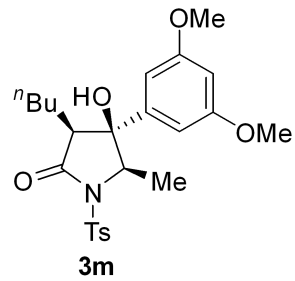
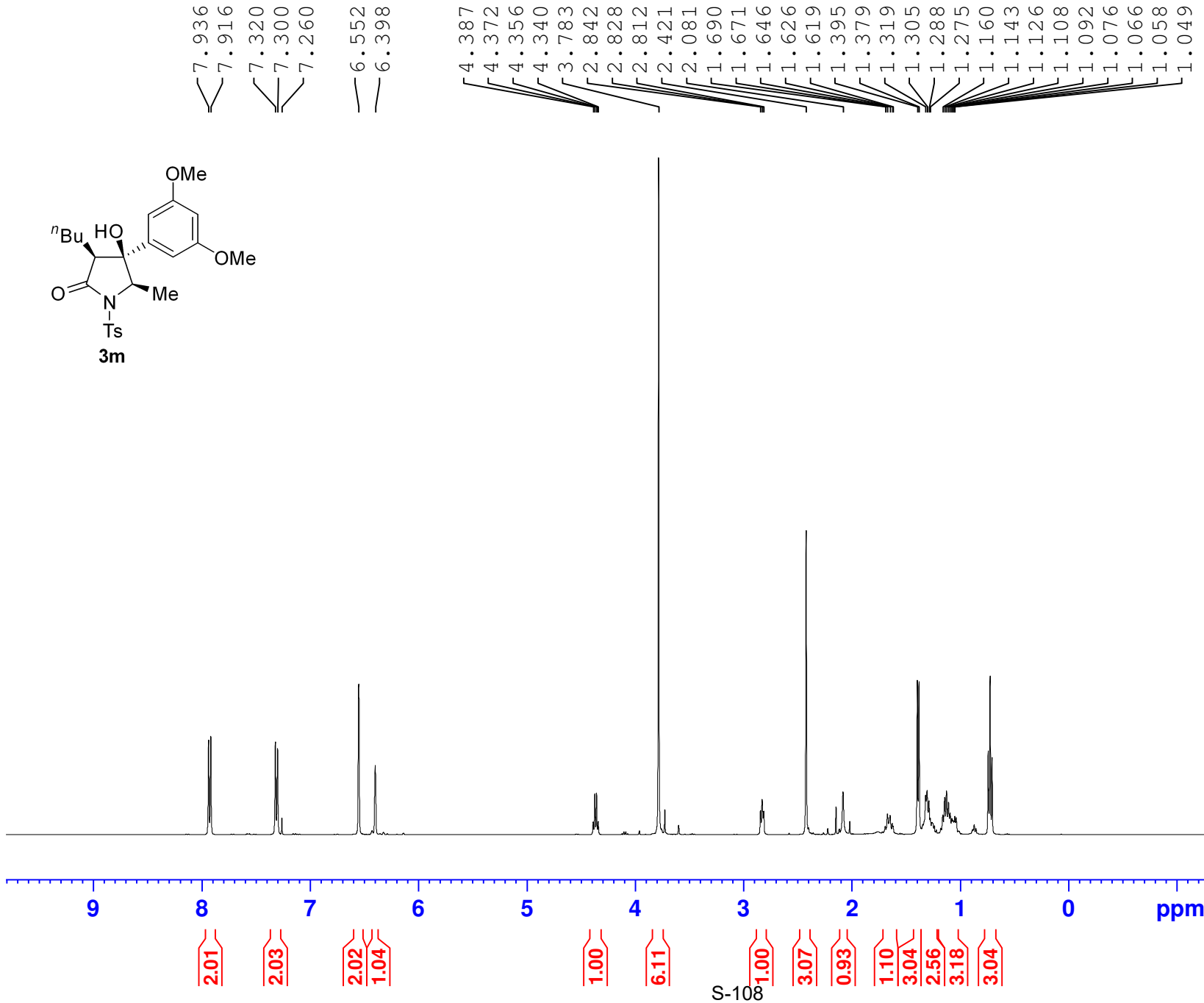


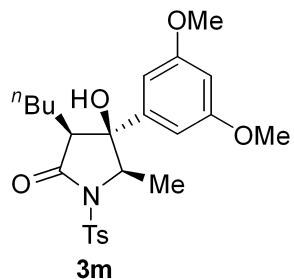
Current Data Parameters
 NAME qh-11149
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150121
 Time 19.57
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 2
 DS 0
 SWH 8012.820 Hz
 FIDRES 0.122266 Hz
 AQ 4.0894465 sec
 RG 39.46
 DW 62.400 usec
 DE 6.50 usec
 TE 296.2 K
 D1 1.0000000 sec
 TD0 1

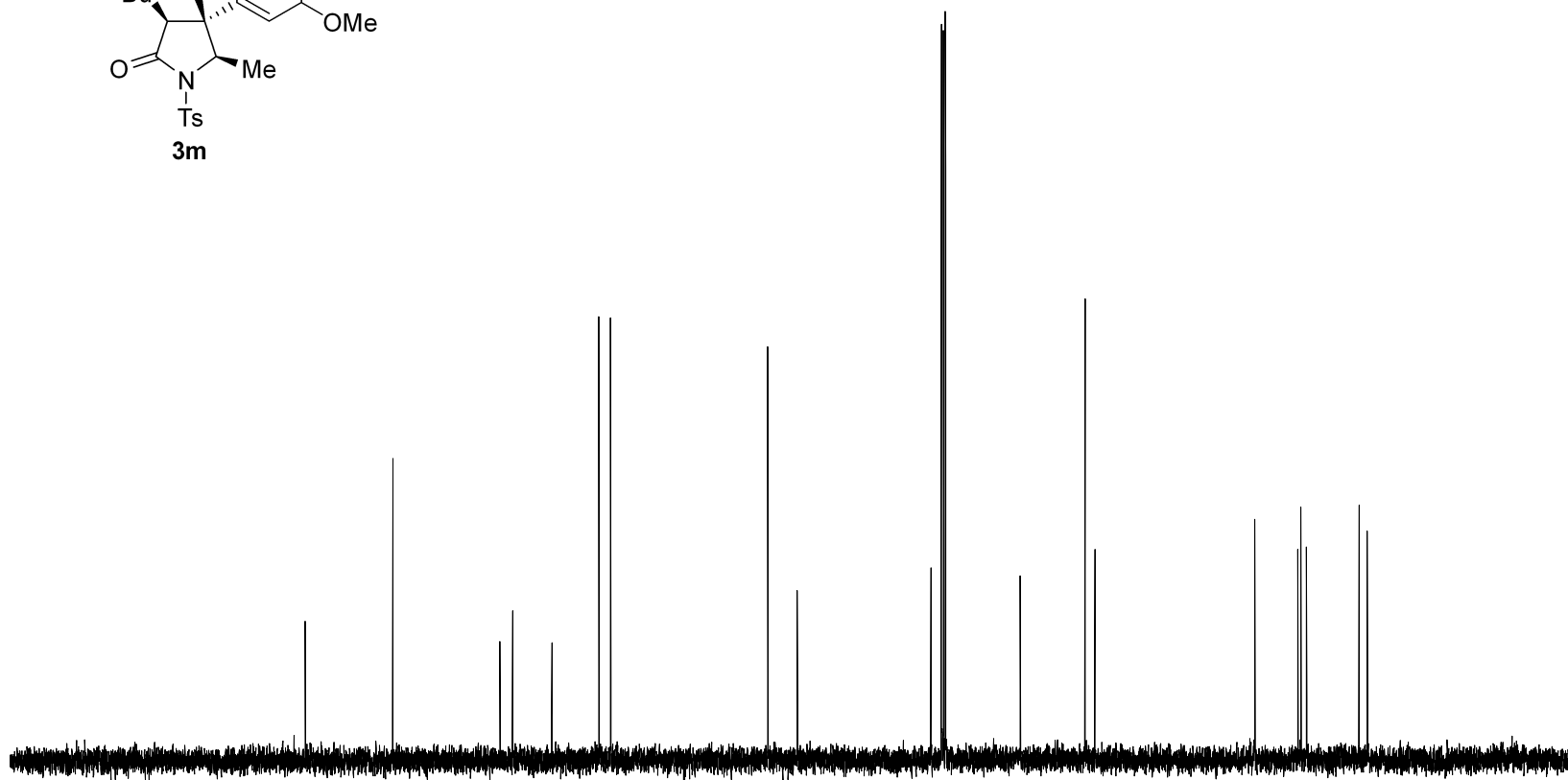
==== CHANNEL f1 =====
 SFO1 400.1324710 MHz
 NUC1 1H
 P1 14.30 usec
 PLW1 9.10000038 W

F2 - Processing parameters
 SI 65536
 SF 400.1300096 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00





— 174.490
 — 161.143
 — 144.791
 — 142.884
 — 136.887
 — 129.724
 — 127.916
 — 103.954
 — 99.432
 — 79.043
 — 77.475
 — 77.157
 — 76.839
 — 65.439
 — 55.529
 — 54.047
 — 29.649
 — 23.076
 — 22.615
 — 21.753
 — 13.734
 — 12.480



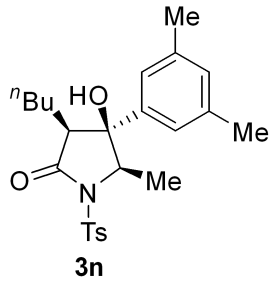
Current Data Parameters
 NAME qh-11149
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150121
 Time 20.00
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 42
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 296.8 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

==== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.60 usec
 PLW1 31.98900032 W

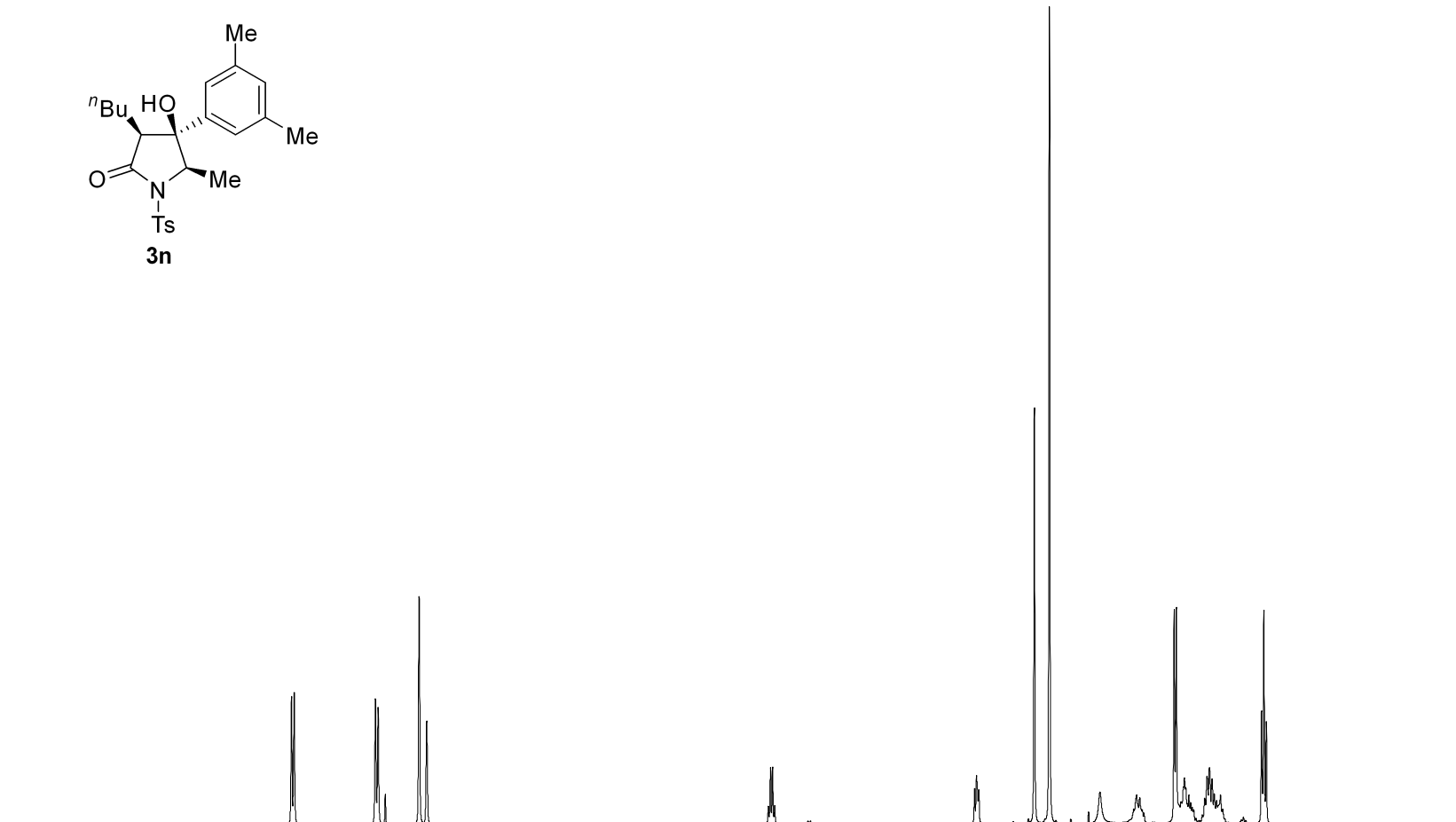
==== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 9.10000038 W
 PLW12 0.24608000 W
 PLW13 0.19933000 W

F2 - Processing parameters
 SI 32768
 SF 100.6127612 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.958
7.938
7.334
7.314
7.260
7.009
6.953

4.412
4.397
4.381
4.365
2.879
2.864
2.848
2.435
2.323
1.948
1.695
1.675
1.651
1.631
1.620
1.395
1.379
1.345
1.339
1.327
1.318
1.309
1.298
1.286
1.272
1.168
1.152



2.00
2.01
2.01
1.00

1.00

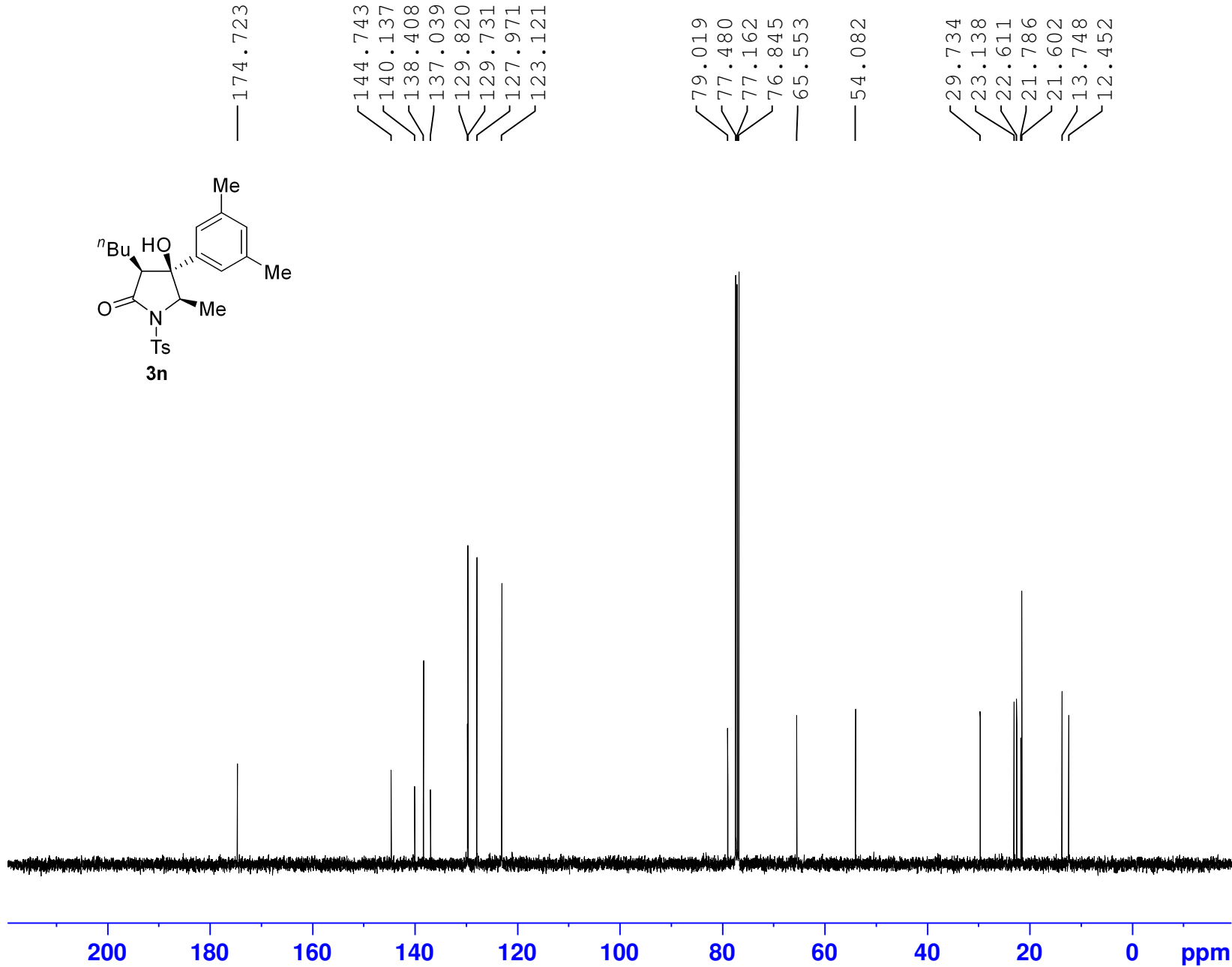
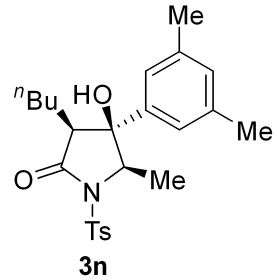
1.00
3.08
6.09
0.88
1.19
3.24
2.14
3.22
3.01

Current Data Parameters
NAME qh-11145-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150120
Time 21.24
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 31.55
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



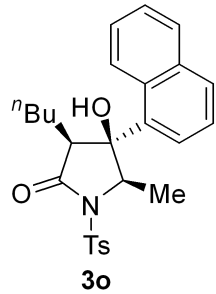
Current Data Parameters
 NAME qh-11145-2
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150120
 Time 21.32
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 125
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 296.7 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

===== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.60 usec
 PLW1 31.98900032 W

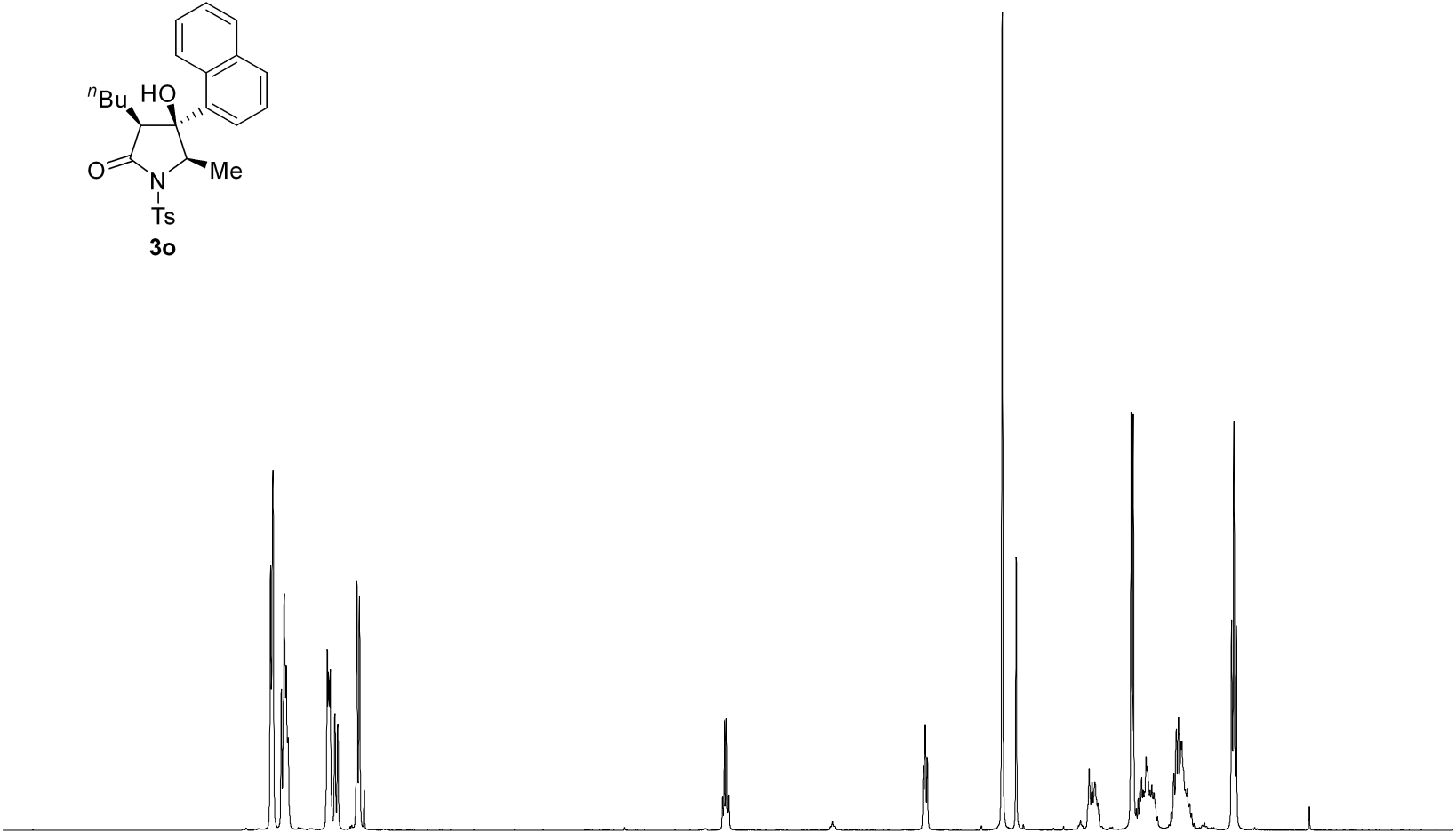
===== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 9.10000038 W
 PLW12 0.24608000 W
 PLW13 0.19933000 W

F2 - Processing parameters
 SI 32768
 SF 100.6127590 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.970
7.952
7.888
7.867
7.851
7.837
7.540
7.532
7.525
7.517
7.483
7.461
7.316
7.296
7.260

4.545
4.530
4.514
4.498
3.021
3.007
2.990
2.424
2.317
1.764
1.742
1.719
1.446
1.430
1.379
1.366
1.353
1.344
1.333
1.324
1.303
1.289
1.273
1.122
1.102
1.087
1.069
1.061



9 8 7 6 5 4 3 2 1 0 ppm

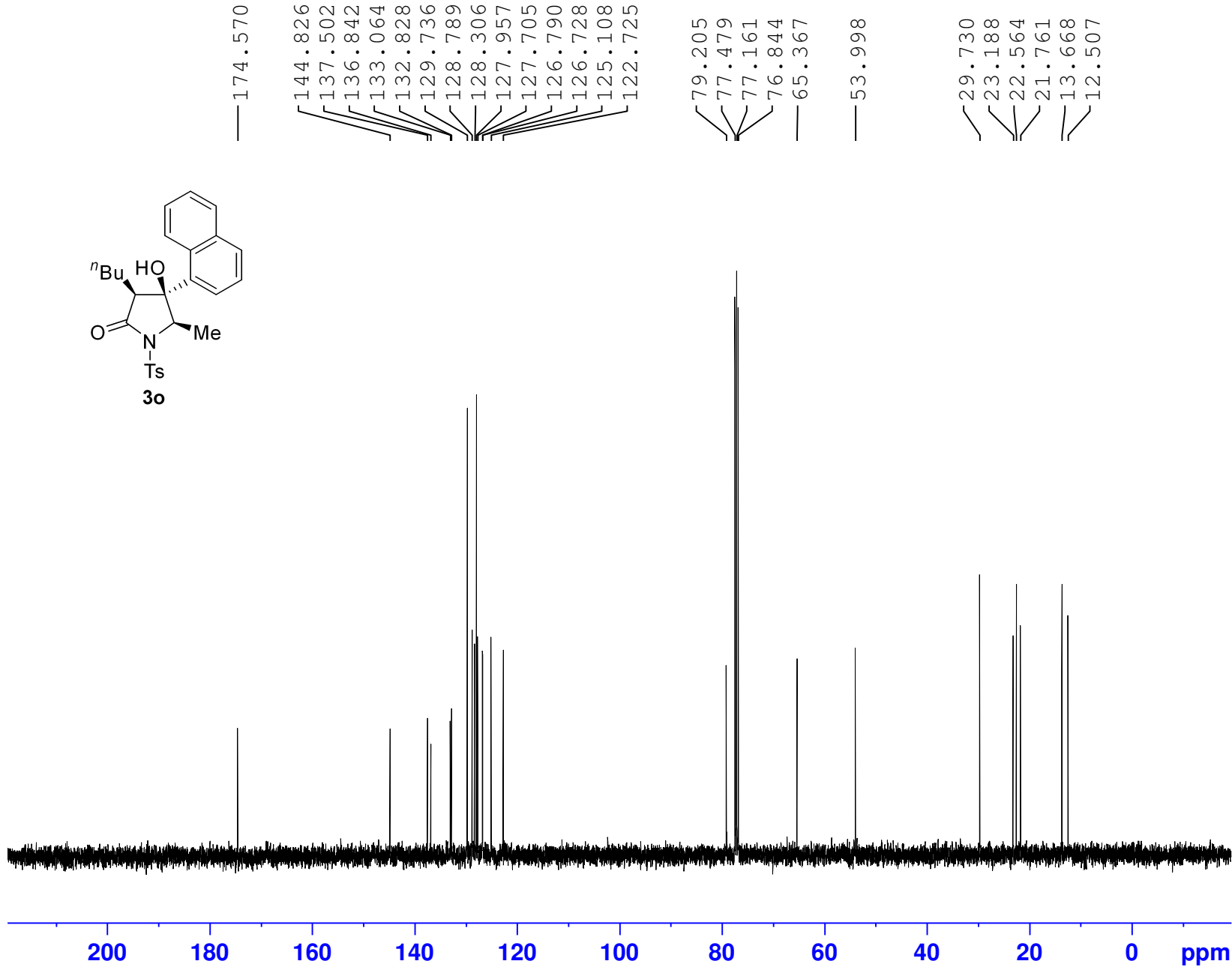
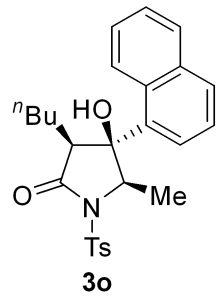
3.02
3.06
3.06
2.03
1.00
1.00
3.03
0.96
1.27
3.04
2.21
3.20
3.03

Current Data Parameters
NAME qh-11159-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150401
Time 19.51
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 34.77
DW 62.400 usec
DE 6.50 usec
TE 296.5 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300089 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
NAME qh-11159-2
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150401
Time 19.53
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 27
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127627 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

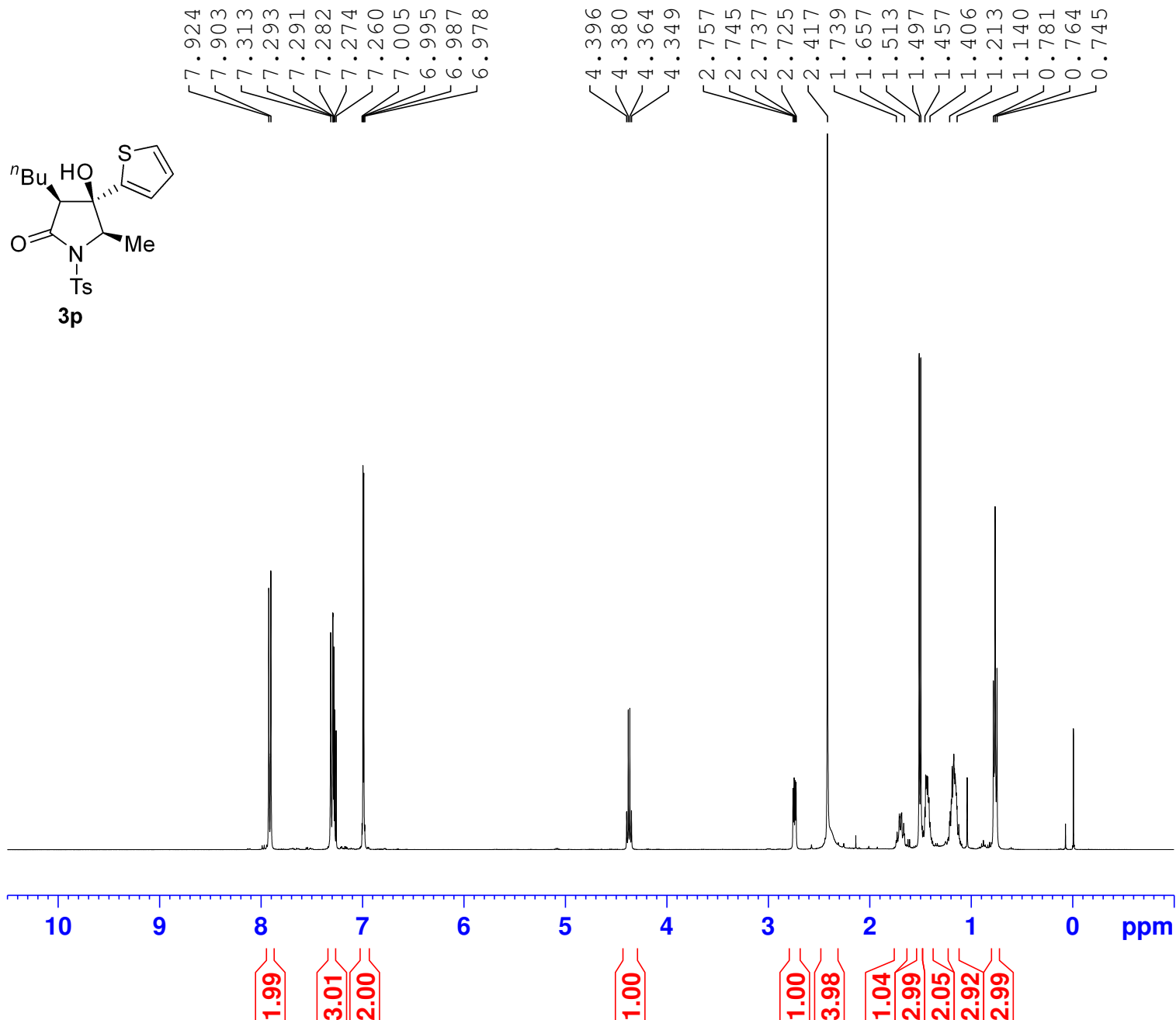


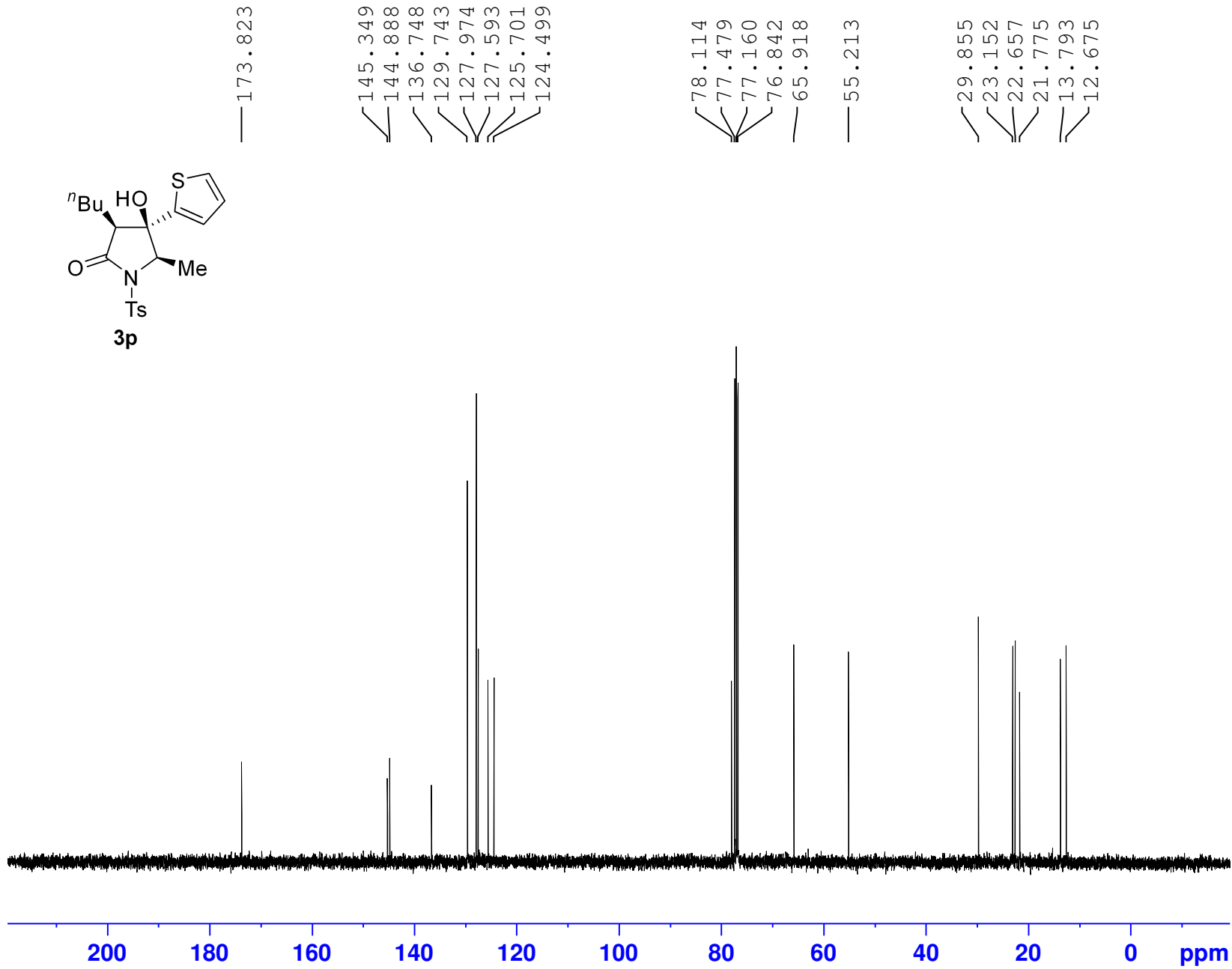
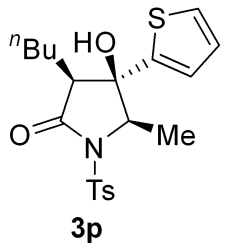
Current Data Parameters
NAME ss-qh-1160-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20200811
Time 20.27
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 6
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 27.78
DW 62.400 usec
DE 6.50 usec
TE 297.1 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300100 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





— 173.823

145.349
144.888
136.748
129.743
127.974
127.593
125.701
124.499

78.114
77.479
77.160
76.842
65.918

— 55.213

29.855
23.152
22.657
21.775
13.793
12.675

Current Data Parameters
 NAME qh-11160-2
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150128
 Time 19.20
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 51
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 296.7 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

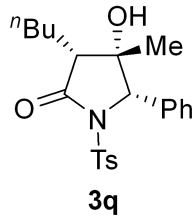
==== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.70 usec
 PLW1 46.98899841 W

==== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 11.99499989 W
 PLW12 0.34213999 W
 PLW13 0.27713001 W

F2 - Processing parameters
 SI 32768
 SF 100.6127604 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.754
7.733
7.388
7.381
7.376
7.369
7.351
7.336
7.329
7.278
7.260
7.199
7.183
7.179
5.021
2.434
2.375
2.360
2.345
1.747
1.743
1.739
1.725
1.718
1.706
1.688
1.633
1.629
1.622
1.612
1.604
1.598
1.594
1.586
1.575
1.411
1.395
1.383
1.373
1.356
1.338
1.327
1.302
1.028
1.026
0.918
0.900
0.882

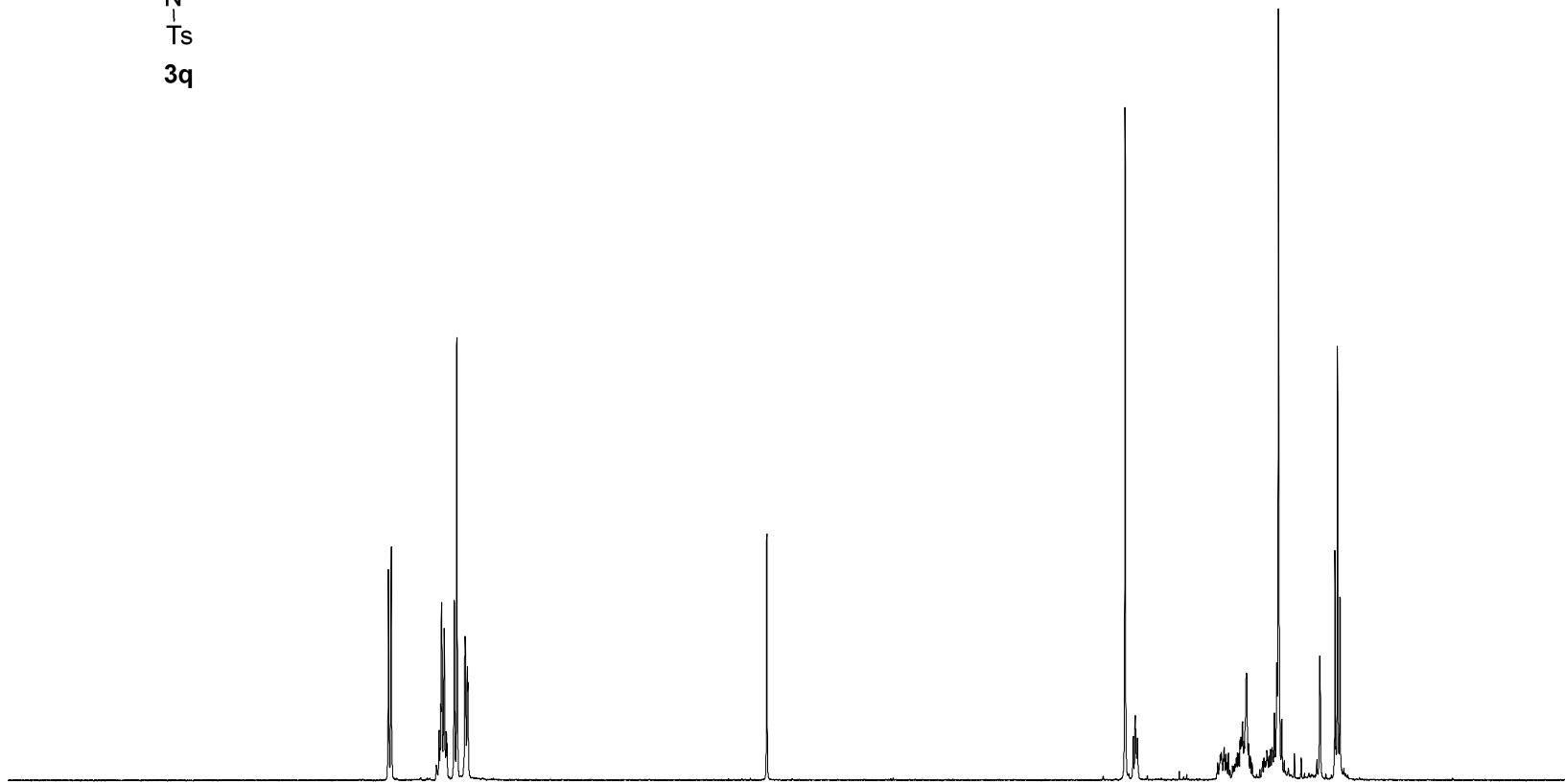


Current Data Parameters
NAME qh-11131-4
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150115
Time 19.15
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 126.97
DW 62.400 usec
DE 6.50 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

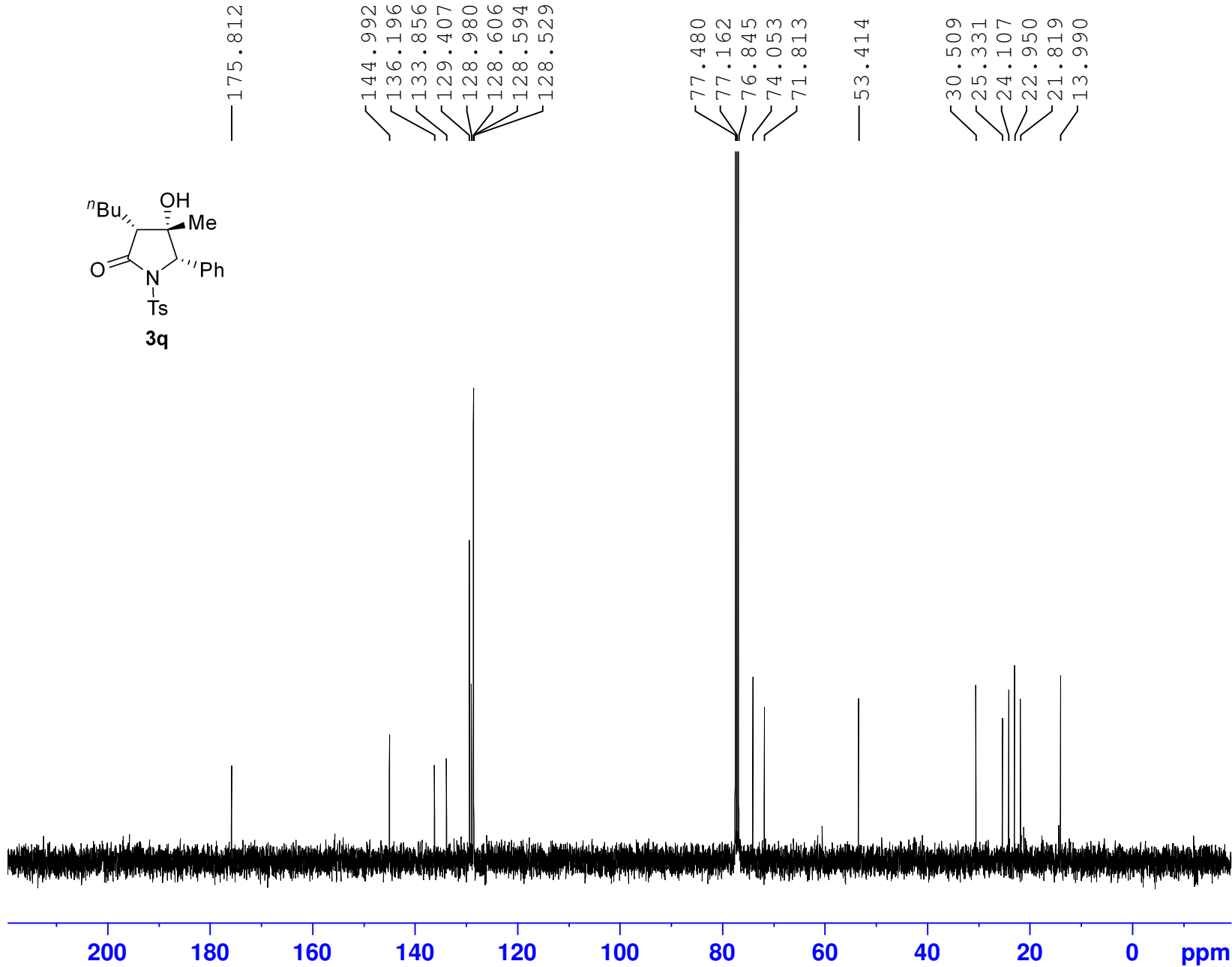
F2 - Processing parameters
SI 65536
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



2.00
3.07
2.80
2.09

1.03

3.07
1.08
1.09
2.06
6.43
1.07
3.21



Current Data Parameters
NAME qh-11131-4a
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150115
Time 16.57
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 107
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127568 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

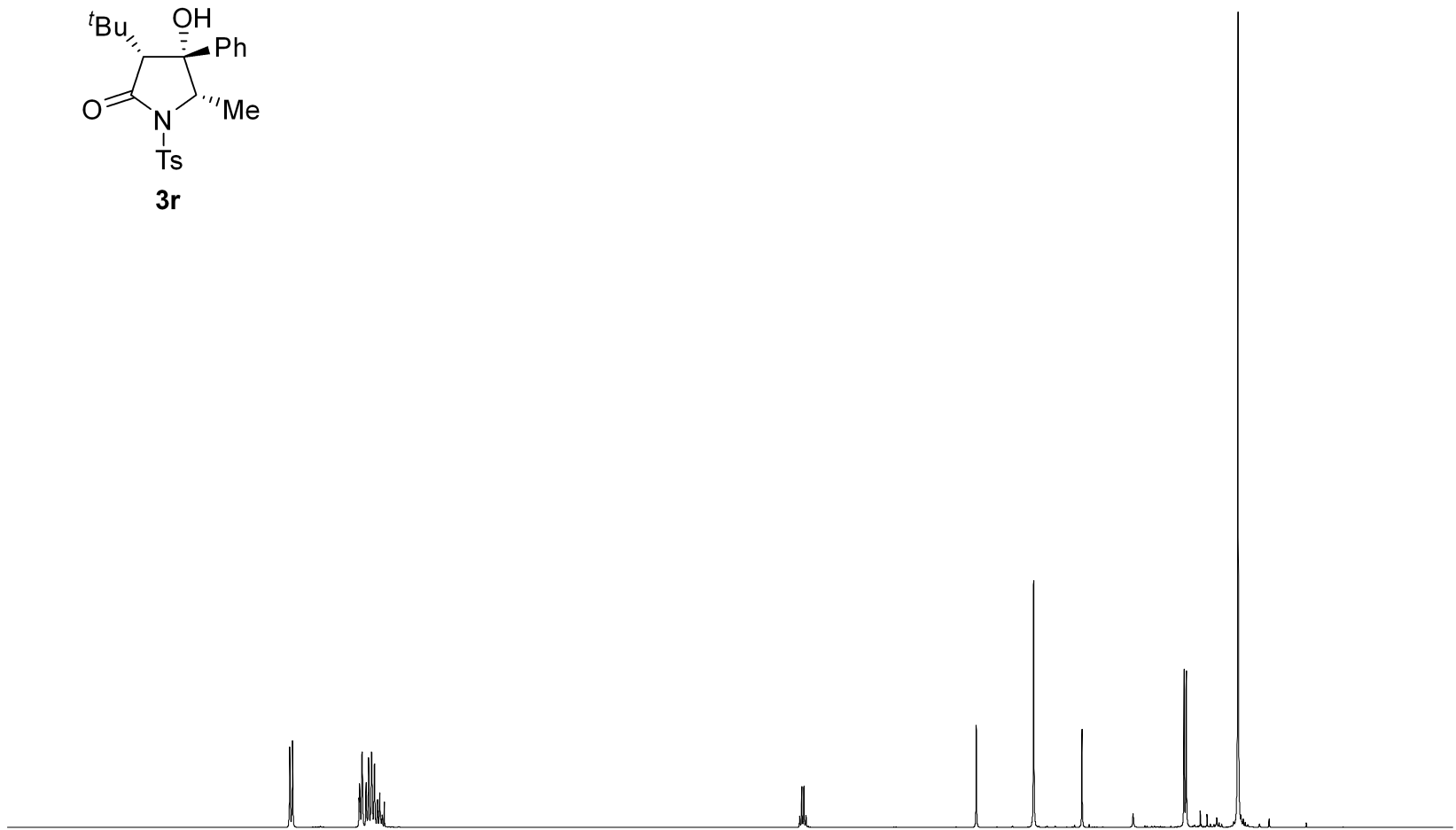
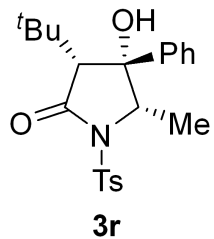


7.962
7.941
7.447
7.444
7.425
7.395
7.390
7.377
7.355
7.353
7.333
7.315
7.312
7.308
7.299
7.294
7.288
7.279
7.276
7.260

4.180
4.164
4.148
4.133

— 2.870
— 2.445
— 2.086

< 1.328
< 1.313
— 0.929



Current Data Parameters
NAME qh-11135-1
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150114
Time 18.17
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 31.55
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.30 usec
PLW1 9.10000038 W

F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

1.98
2.00
4.06
1.07

1.00

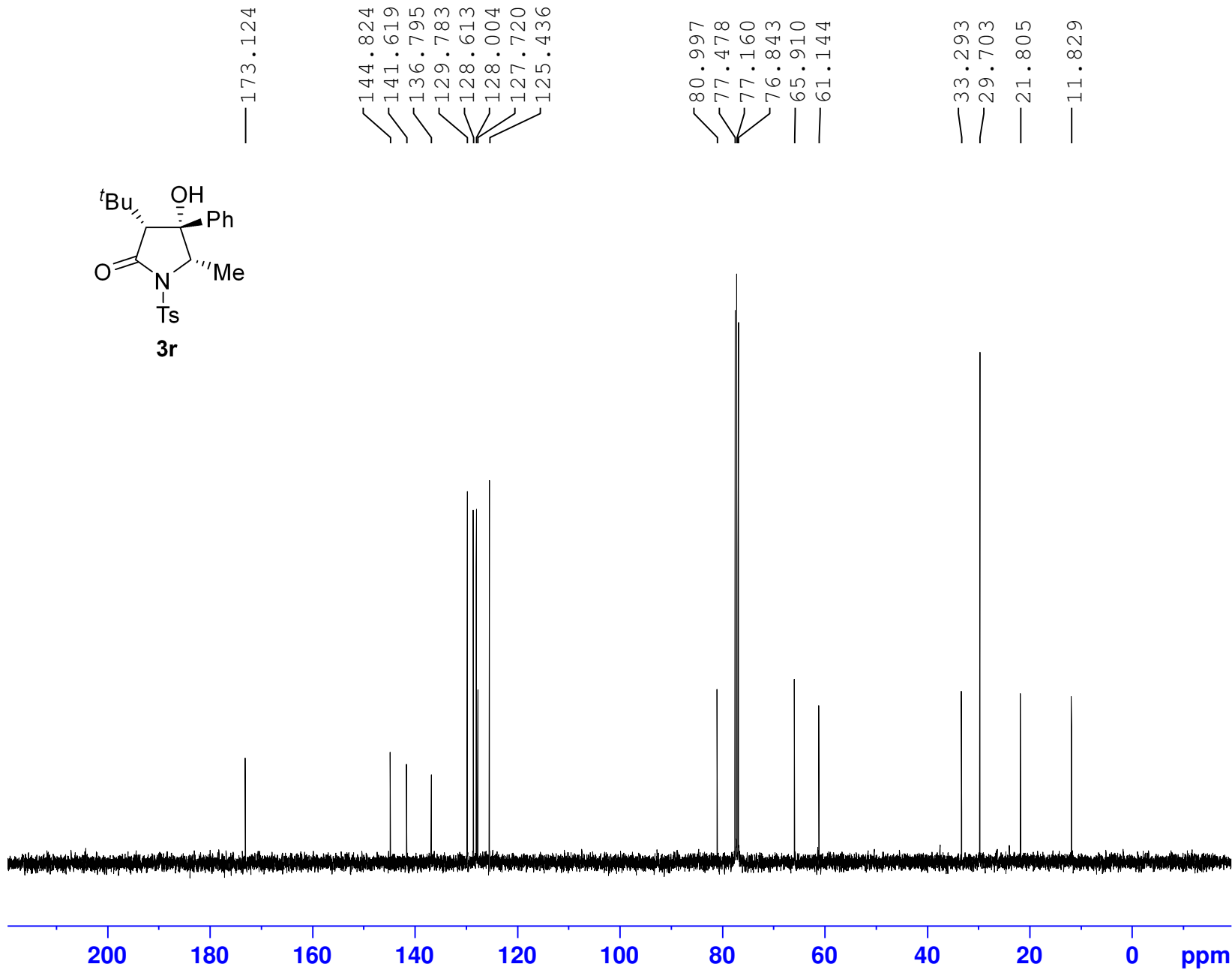
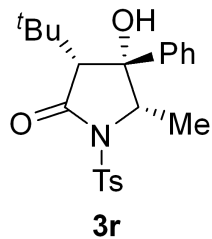
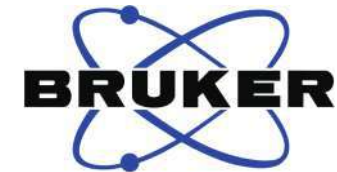
1.00

3.06

0.98

3.06

9.10



Current Data Parameters
NAME qh-11135-1
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150114
Time 18.21
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 68
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127597 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

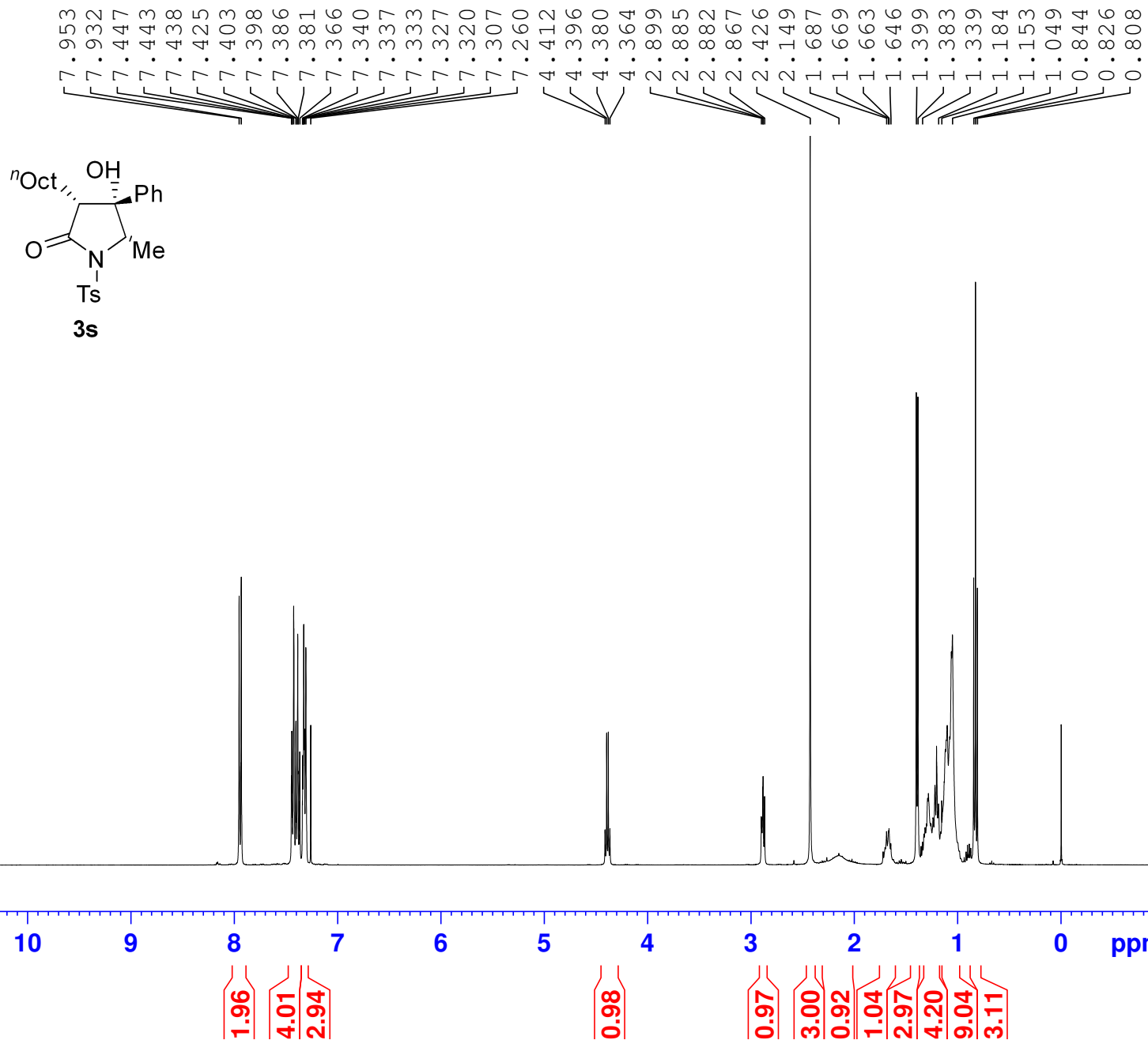


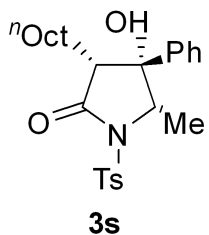
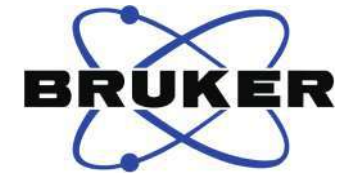
Current Data Parameters
NAME ss-qh-11137
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20200811
Time 20.04
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 6
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 27.78
DW 62.400 usec
DE 6.50 usec
TE 297.9 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





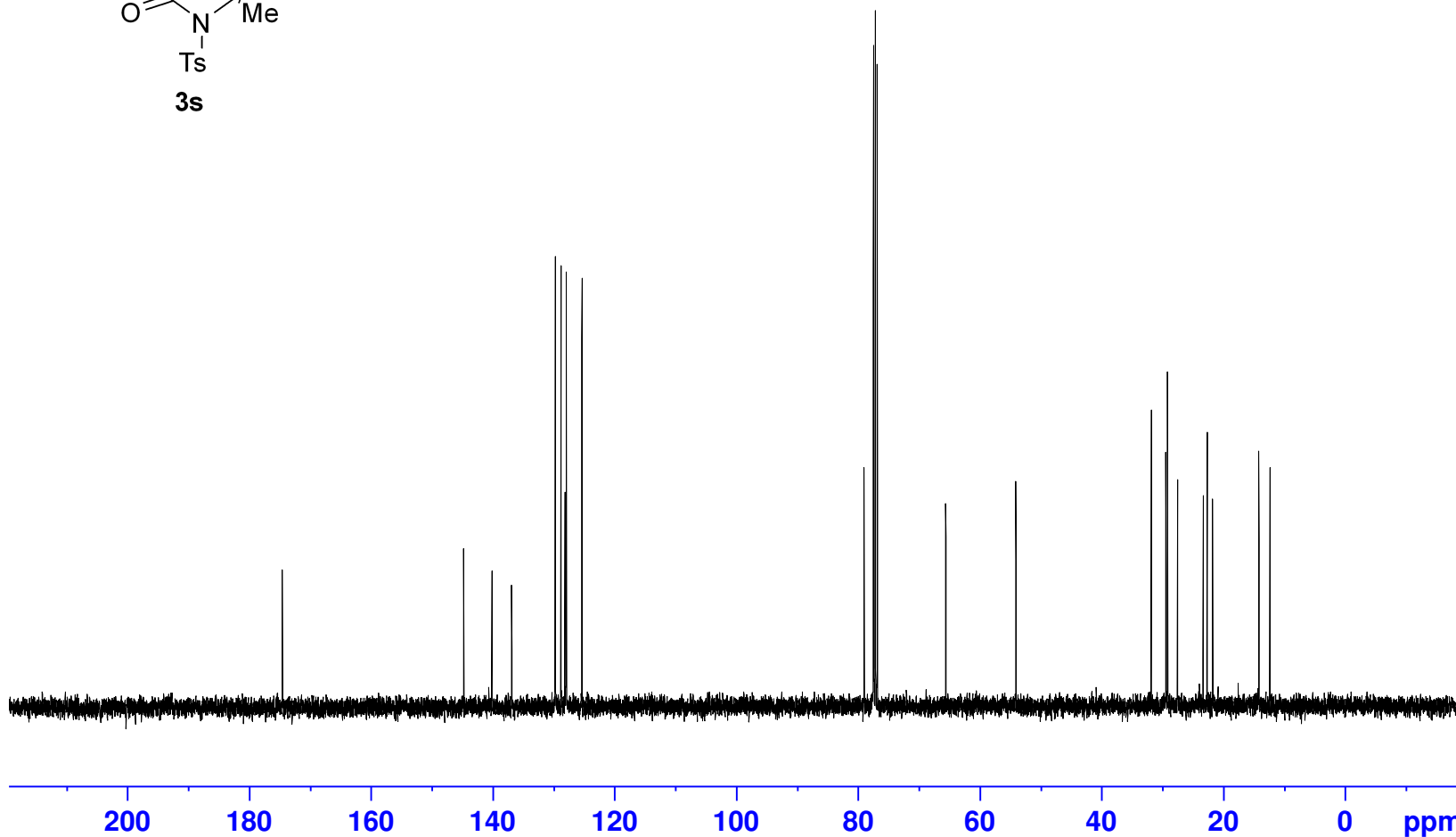
— 174.570

144.786
140.141
136.895
129.728
128.791
128.141
127.939
125.365

79.026
77.479
77.161
76.843
65.587

— 54.068

31.830
29.425
29.164
27.498
23.320
22.664
21.756
14.148
12.325



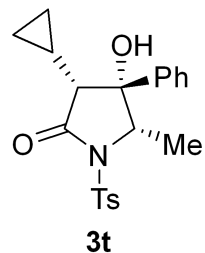
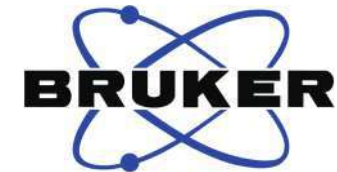
Current Data Parameters
NAME qh-11137
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150117
Time 16.12
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.60 usec
PLW1 31.98900032 W

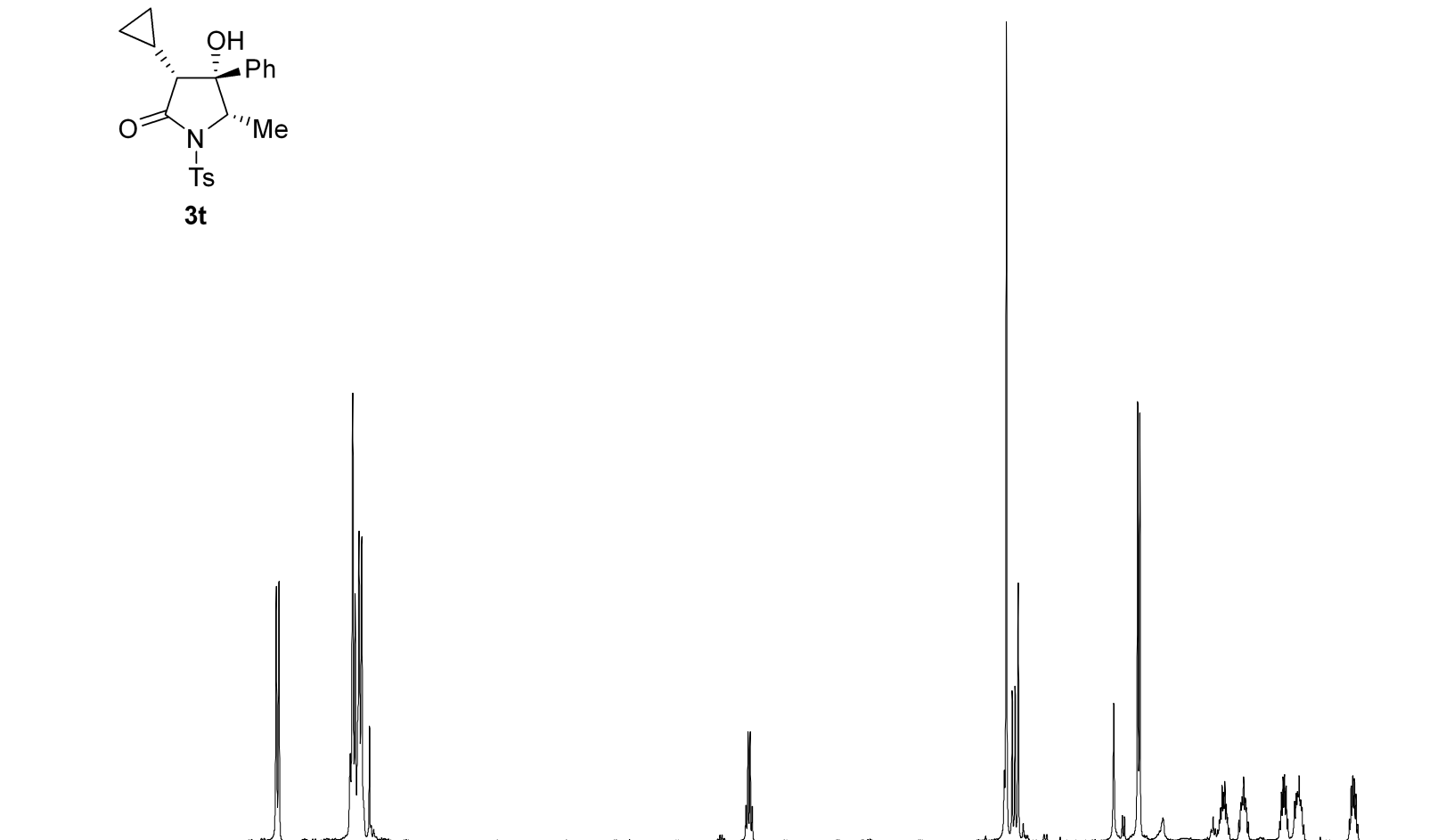
==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 9.10000038 W
PLW12 0.24608000 W
PLW13 0.19933000 W

F2 - Processing parameters
SI 32768
SF 100.6127619 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.966
7.945
7.406
7.387
7.369
7.340
7.319
7.260

4.413
4.397
4.381
4.366
2.443
2.399
2.378
2.353
1.450
1.434
0.824
0.812
0.802
0.791
0.780
0.771
0.671
0.661
0.649
0.636
0.628
0.363
0.351
0.340
0.327



9 8 7 6 5 4 3 2 1 0 ppm

2.08

7.24

1.00

3.18

1.07

0.91

3.02

1.06

1.02

1.05

1.22

0.98

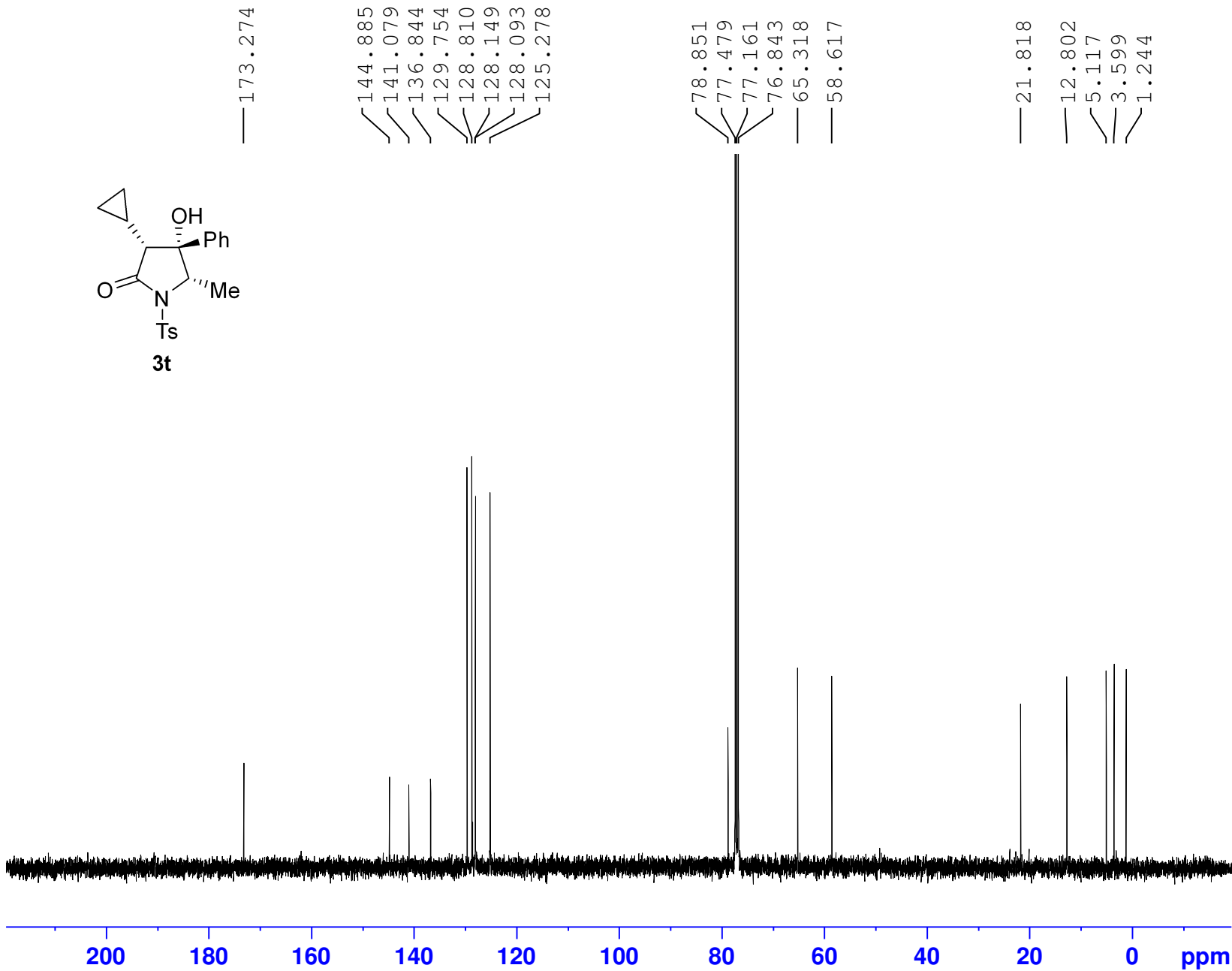
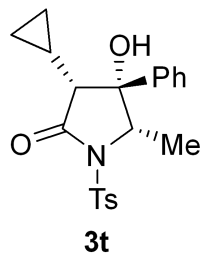
S-122

Current Data Parameters
NAME qh-11168-1
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150401
Time 18.45
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 70.97
DW 62.400 usec
DE 6.50 usec
TE 296.6 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300091 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
 NAME qh-11168-1
 EXPNO 4
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150401
 Time 18.53
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 134
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 297.5 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

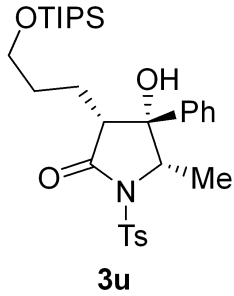
===== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.70 usec
 PLW1 46.98899841 W

===== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 11.99499989 W
 PLW12 0.34213999 W
 PLW13 0.27713001 W

F2 - Processing parameters
 SI 32768
 SF 100.6127568 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.957
7.937
7.438
7.420
7.389
7.371
7.352
7.342
7.322
7.310
7.292
7.260
4.385
4.369
4.353
4.338
3.481
3.467
3.452
2.989
2.973
2.956
2.441
2.347
1.819
1.797
1.781
1.756
1.688
1.582
1.562
1.549
1.533
1.518
1.508
1.416
1.400
1.312
1.304
1.287
1.270
1.262
1.253
1.244
1.235
0.966
0.955
0.946

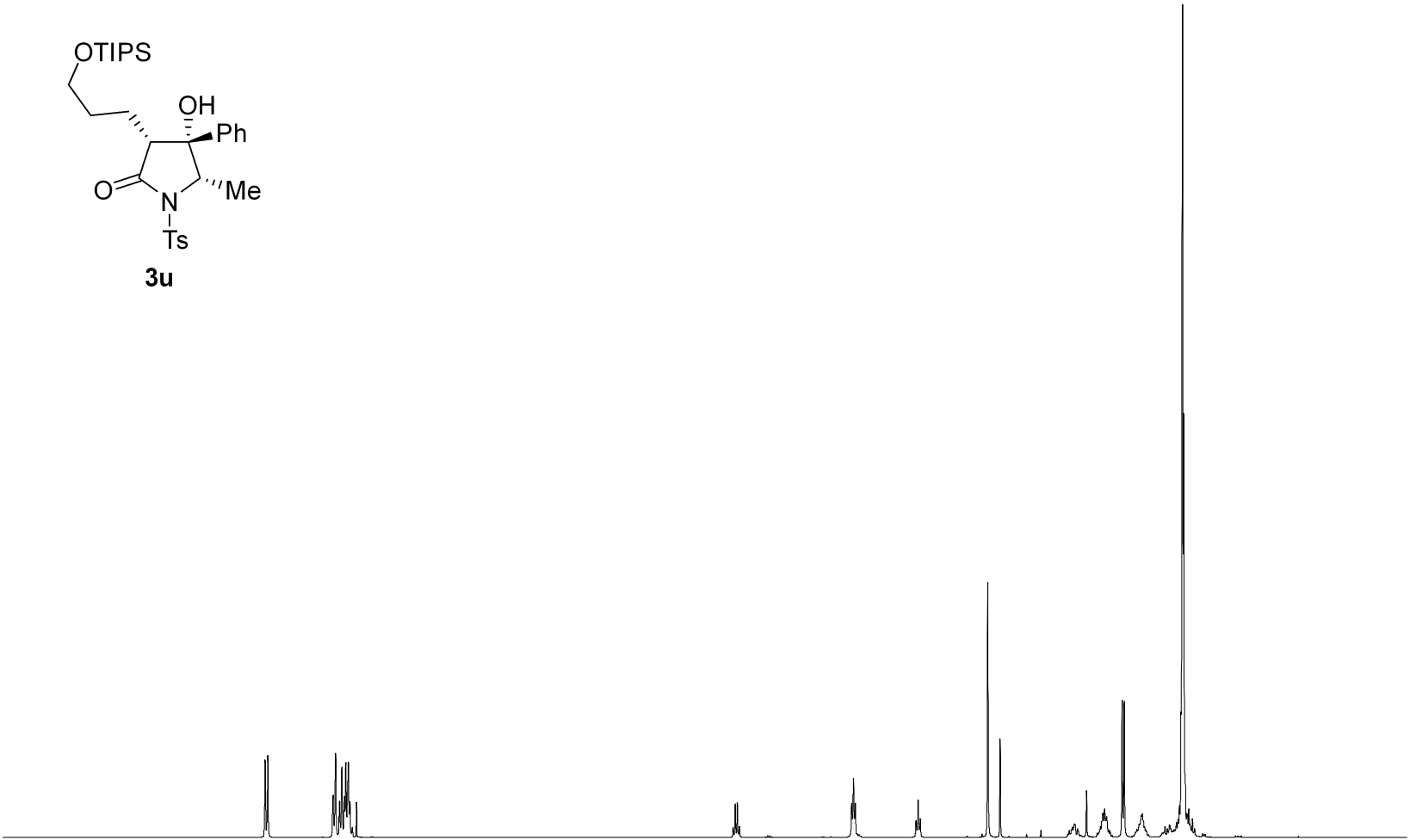


Current Data Parameters
NAME qh-11168-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150203
Time 18.30
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 6
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 45.67
DW 62.400 usec
DE 6.50 usec
TE 296.2 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SF01 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



1.99
2.03
5.05

1.00

S-124

1.99
0.99

3.03
0.94

1.03

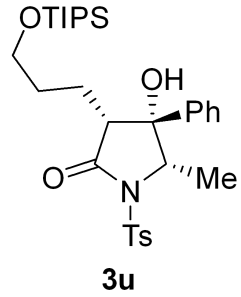
2.08

3.06

1.79

21.78

9 8 7 6 5 4 3 2 1 0 ppm

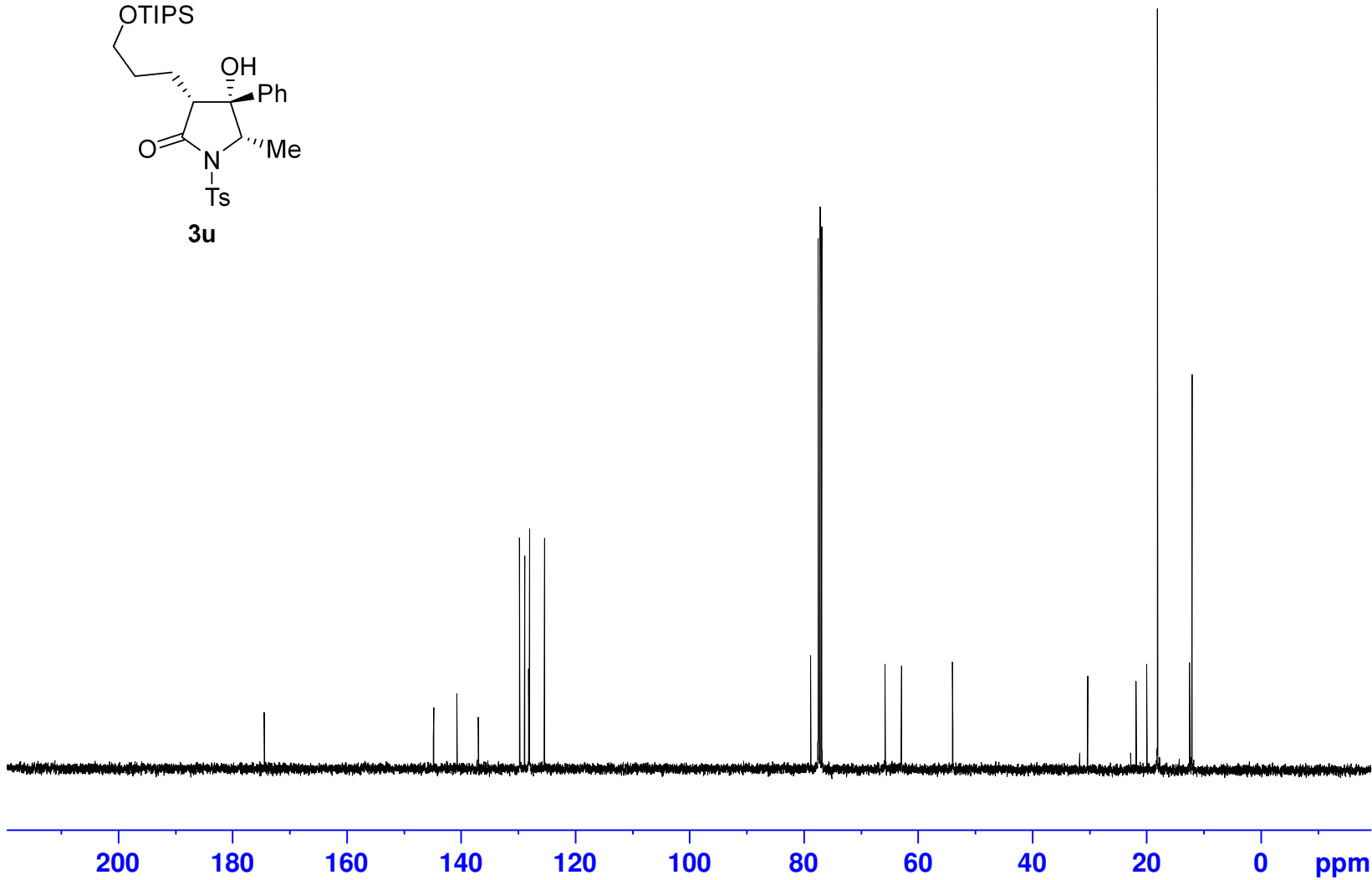


— 174.465

144.808
140.711
136.967
129.758
128.865
128.153
128.001
125.378

78.779
77.477
77.159
76.841
65.771
62.882
53.936

30.292
21.809
19.929
18.070
12.438
12.006



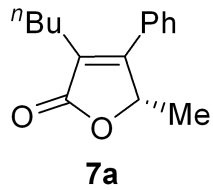
Current Data Parameters
NAME qh-11168-2
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150203
Time 18.36
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 130
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

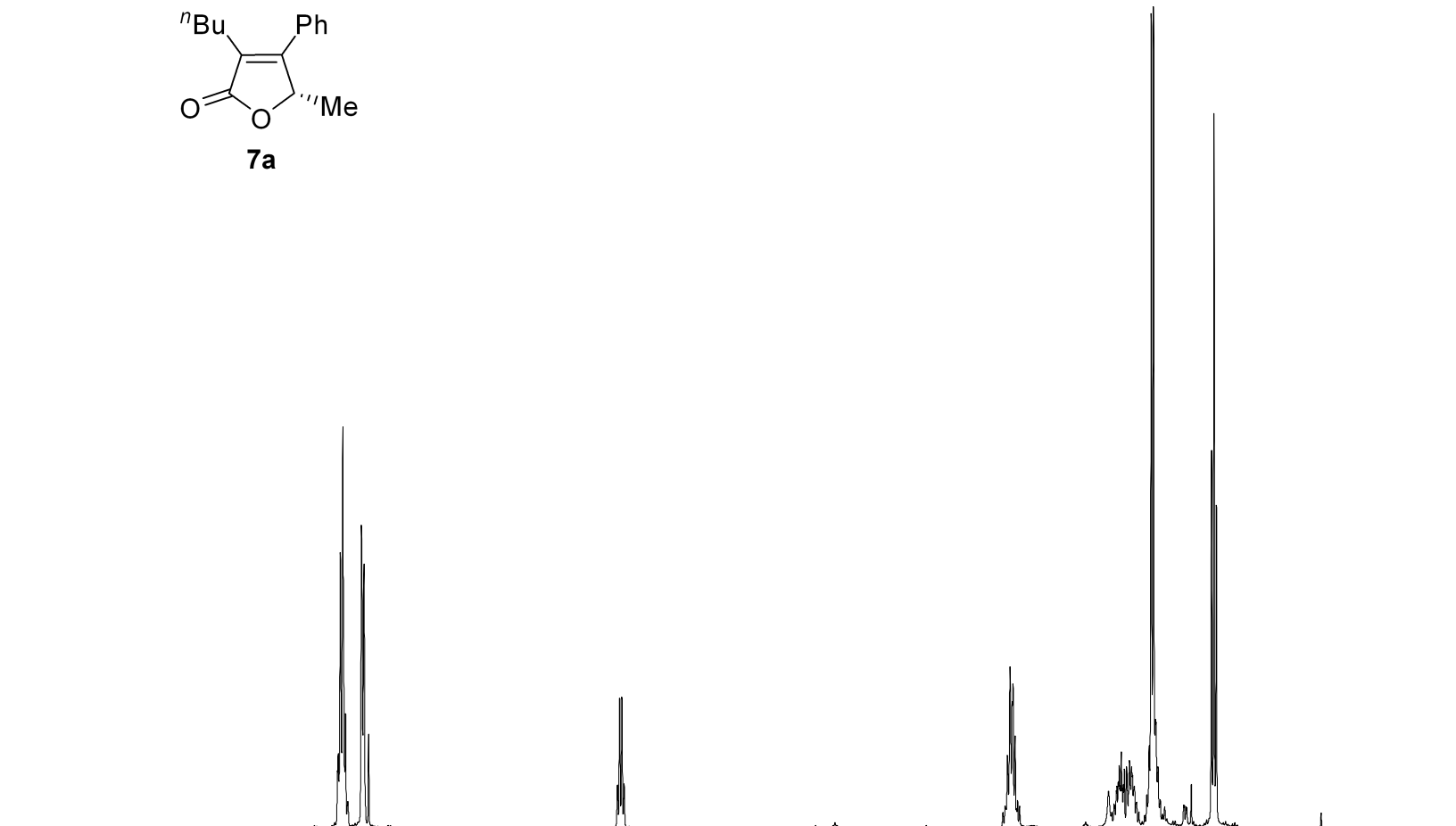
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127568 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.496
7.491
7.475
7.456
7.442
7.435
7.416
7.316
7.312
7.296
7.260
5.382
5.365
5.348
5.331
2.469
2.453
2.435
2.416
2.400
2.393
2.377
2.367
2.359
2.343
1.608
1.598
1.591
1.584
1.575
1.568
1.559
1.551
1.535
1.513
1.498
1.491
1.476
1.382
1.364
1.348
1.332

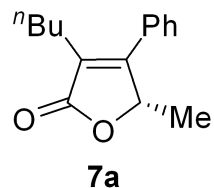
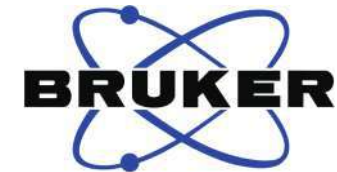


Current Data Parameters
NAME qh-11273
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150416
Time 13.28
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 54.81
DW 62.400 usec
DE 6.50 usec
TE 296.3 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300087 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



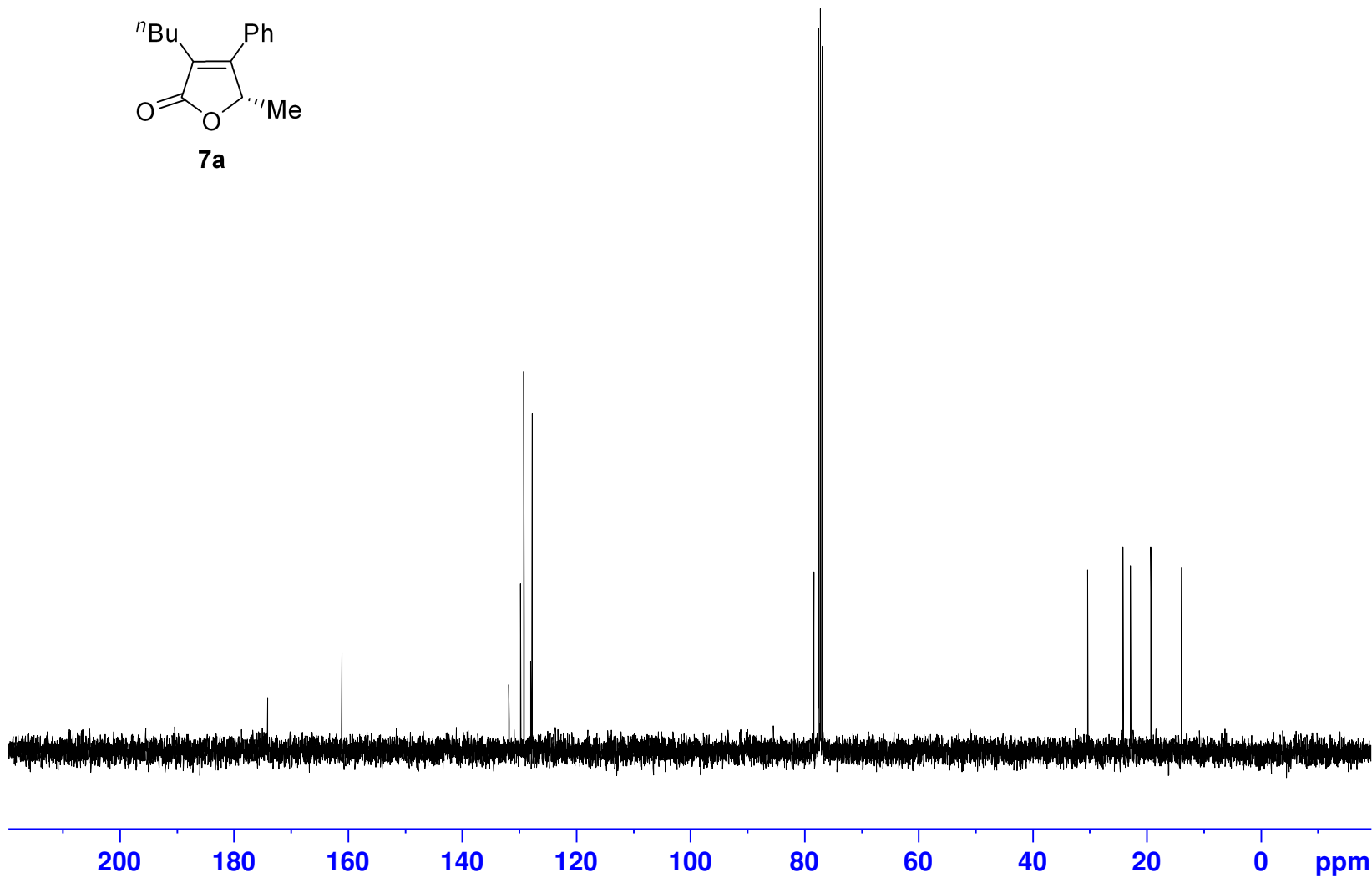
— 174.096

— 161.061

131.783
129.763
129.163
127.981
127.707

78.338
77.479
77.161
76.844

30.347
24.131
22.830
19.252
13.877



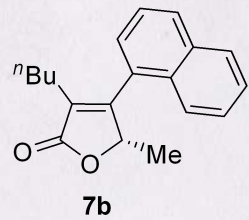
Current Data Parameters
NAME qh-11273
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150416
Time 13.30
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 14
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127575 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.956
7.935
7.902
7.886
7.792
7.583
7.576
7.566
7.426
7.405
7.260

5.515
5.499
5.482

2.505
2.489
1.671
1.657
1.639
1.618
1.597
1.578
1.558
1.393
1.377
1.360
1.342
1.326
1.052
0.909
0.891
0.873

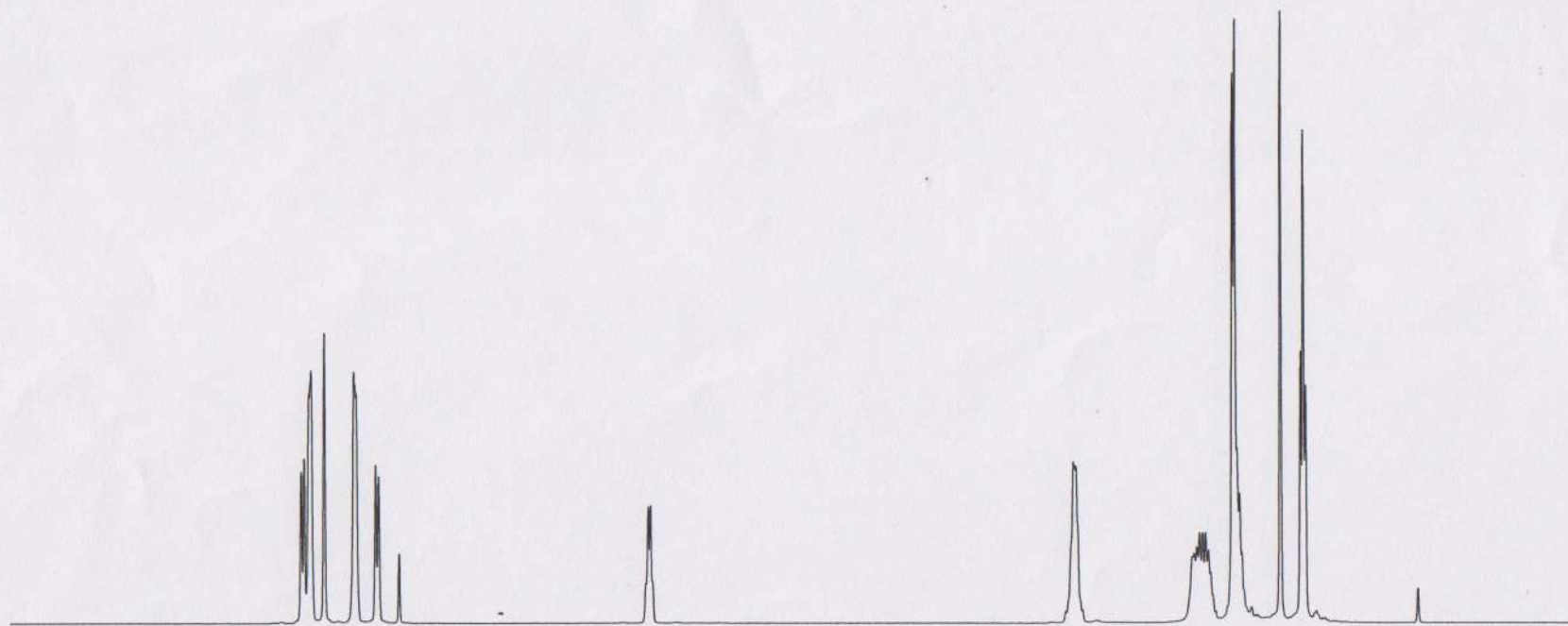


Current Data Parameters
NAME qh-11264-1
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150411
Time 14.52
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 4
DS 0
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 203
DW 60.800 usec
DE 6.00 usec
TE 293.3 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 13.60 usec
PL1 -1.00 dB
SFO1 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300051 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm

3.04
1.07
2.04
1.06

1.00

2.05

2.65
5.26
2.10
3.24



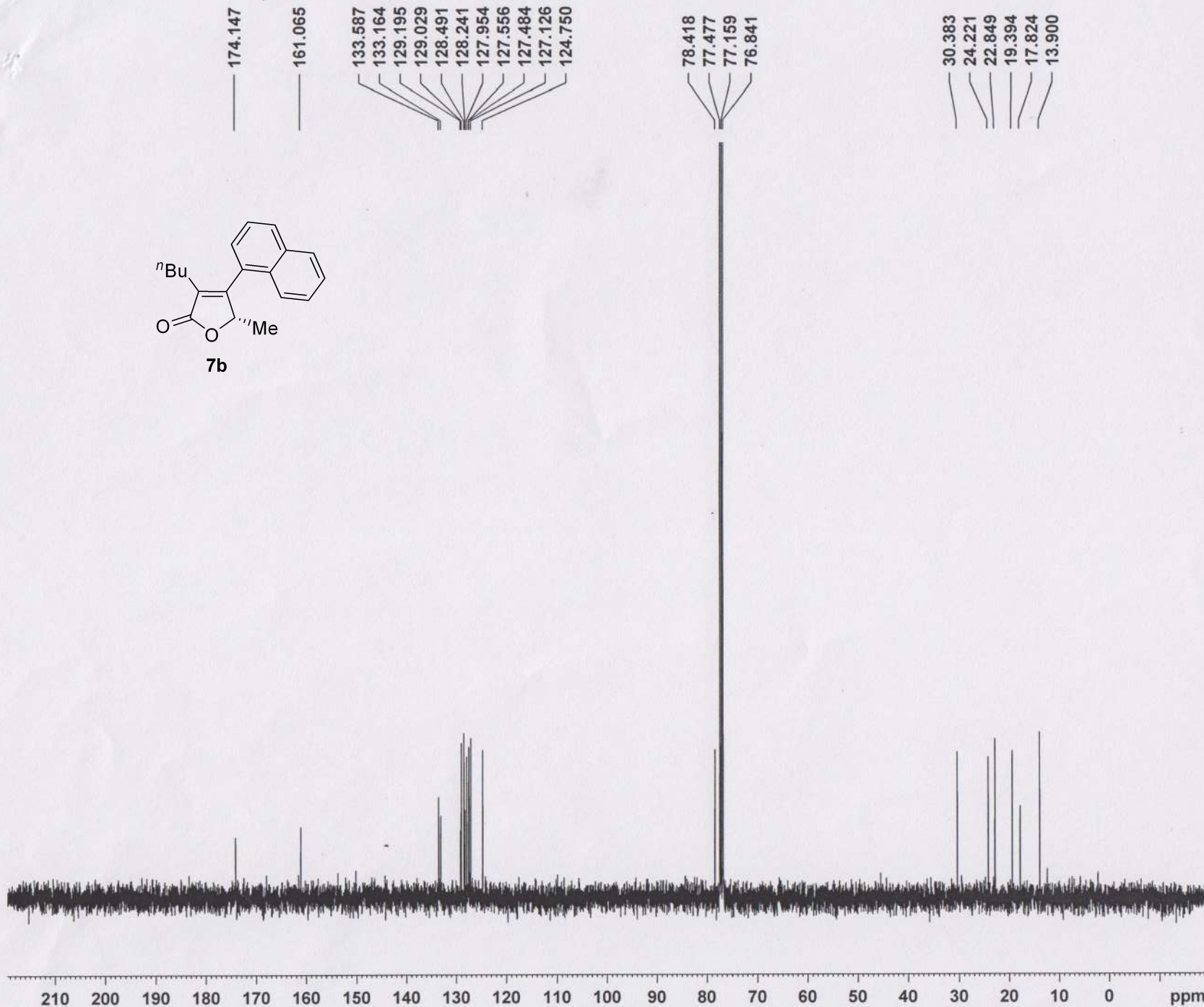
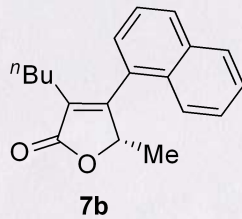
Current Data Parameters
NAME qh-11264-1
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150411
Time 14.57
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 70
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 2050
DW 20.800 usec
DE 6.00 usec
TE 294.1 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 9.25 usec
PL1 -3.00 dB
SFO1 100.6228298 MHz

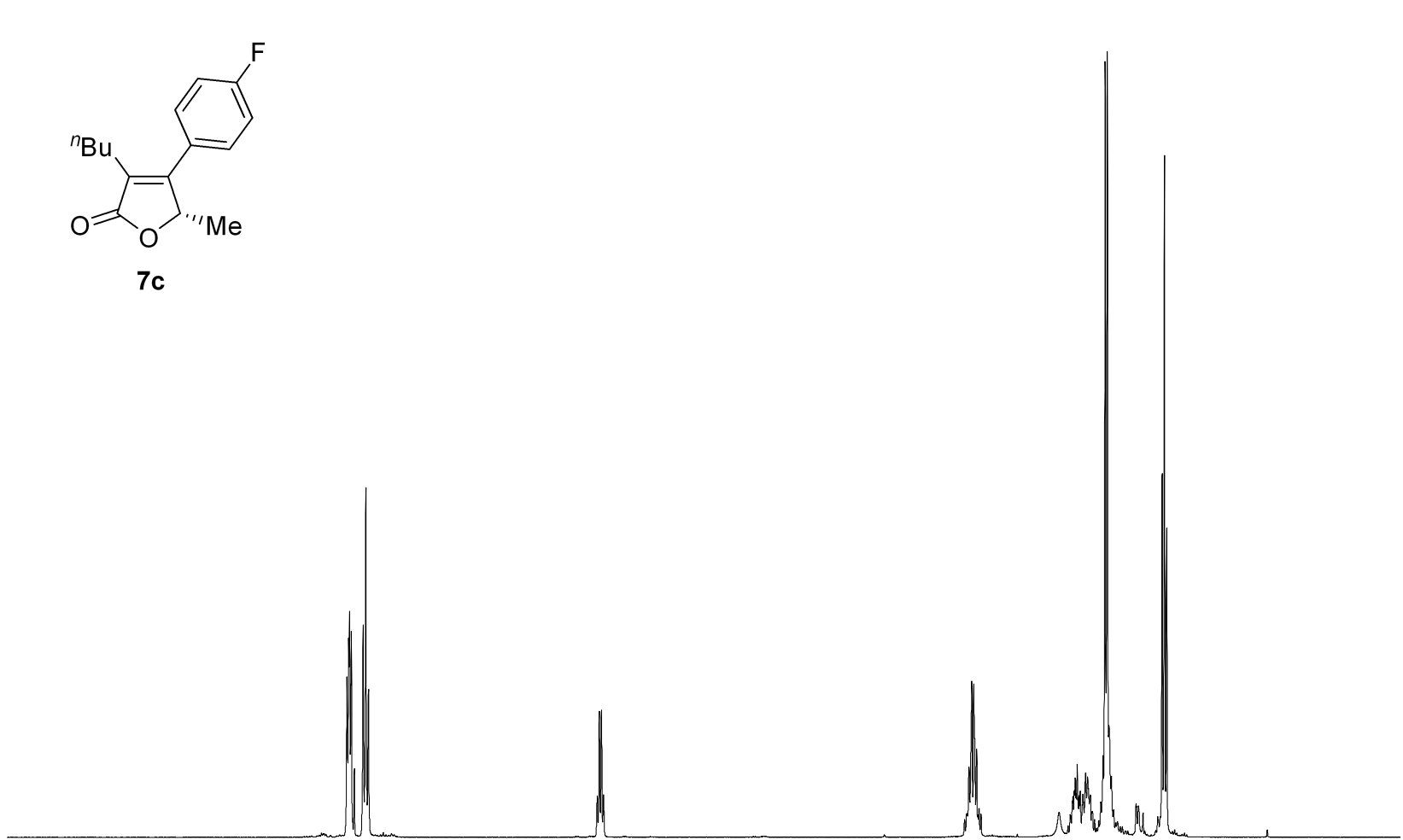
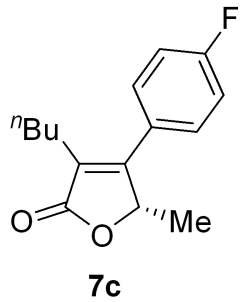
===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL12 12.45 dB
PL13 18.00 dB
PL2 -1.00 dB
SFO2 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127575 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40





7.319
7.305
7.297
7.284
7.260
7.191
7.170
7.148
5.345
5.328
5.311
5.295
2.431
2.413
2.391
2.375
2.352
2.342
2.333
2.318
1.614
1.597
1.592
1.582
1.575
1.568
1.559
1.552
1.544
1.536
1.514
1.509
1.493
1.477
1.455
1.444
1.438
1.373
1.355
1.338
1.322
1.309
1.305
1.289
1.271
0.889
0.871
0.852

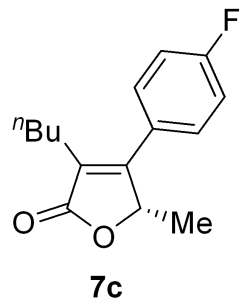


Current Data Parameters
NAME qh-11278-1
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150417
Time 12.24
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 49.32
DW 62.400 usec
DE 6.50 usec
TE 296.3 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300089 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

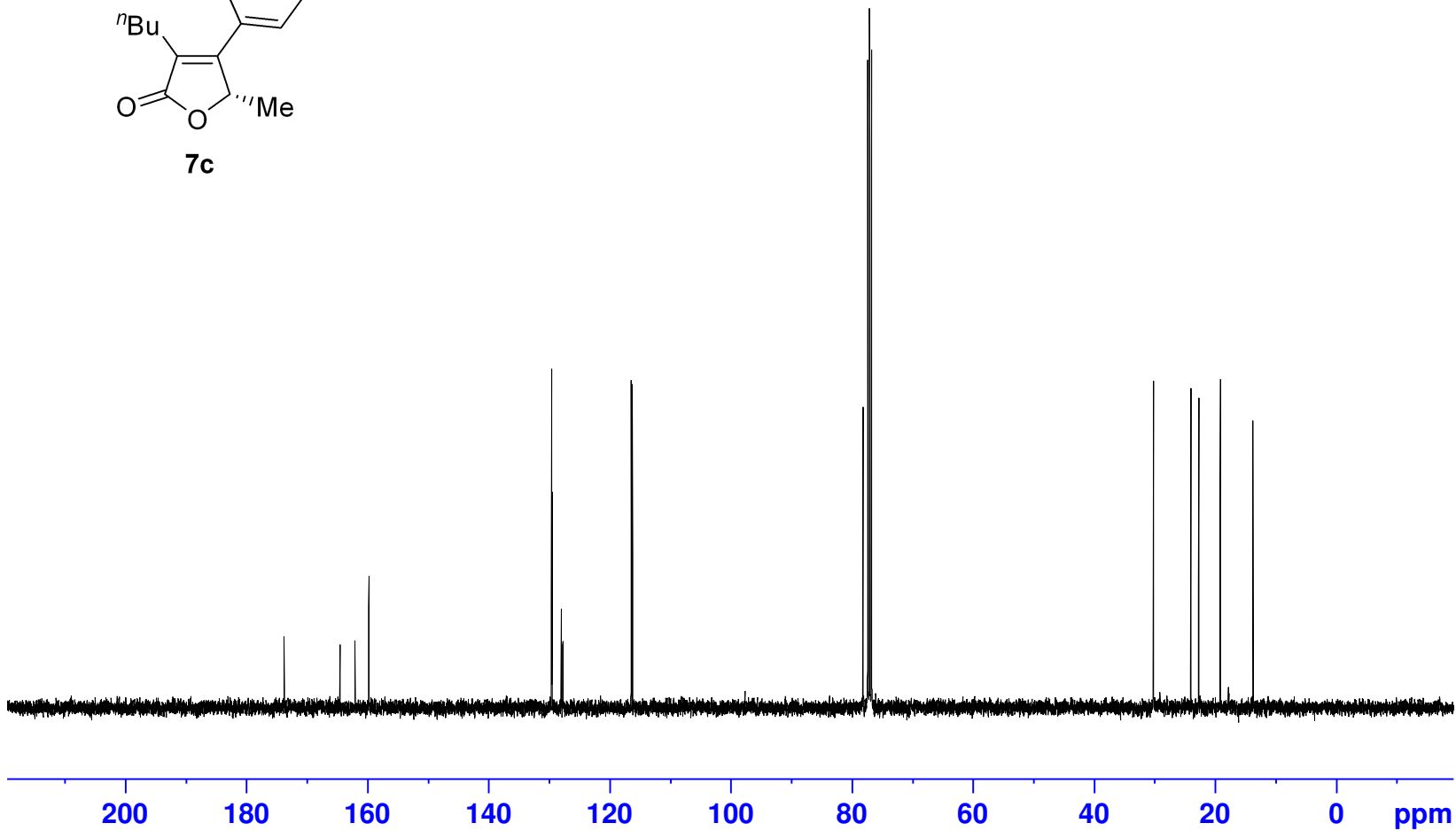


— 173.855
— 164.642
— 162.148
— 159.881

— 129.709
— 129.627
— 128.076
— 127.869
— 127.834
— 116.540
— 116.322

— 78.234
— 77.478
— 77.160
— 76.842

— 30.269
— 24.101
— 22.806
— 19.245
— 13.845



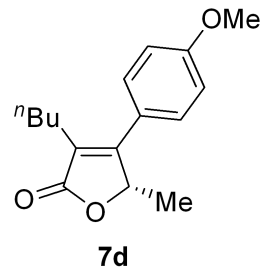
Current Data Parameters
NAME qh-11278-1
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150417
Time 12.28
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 80
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

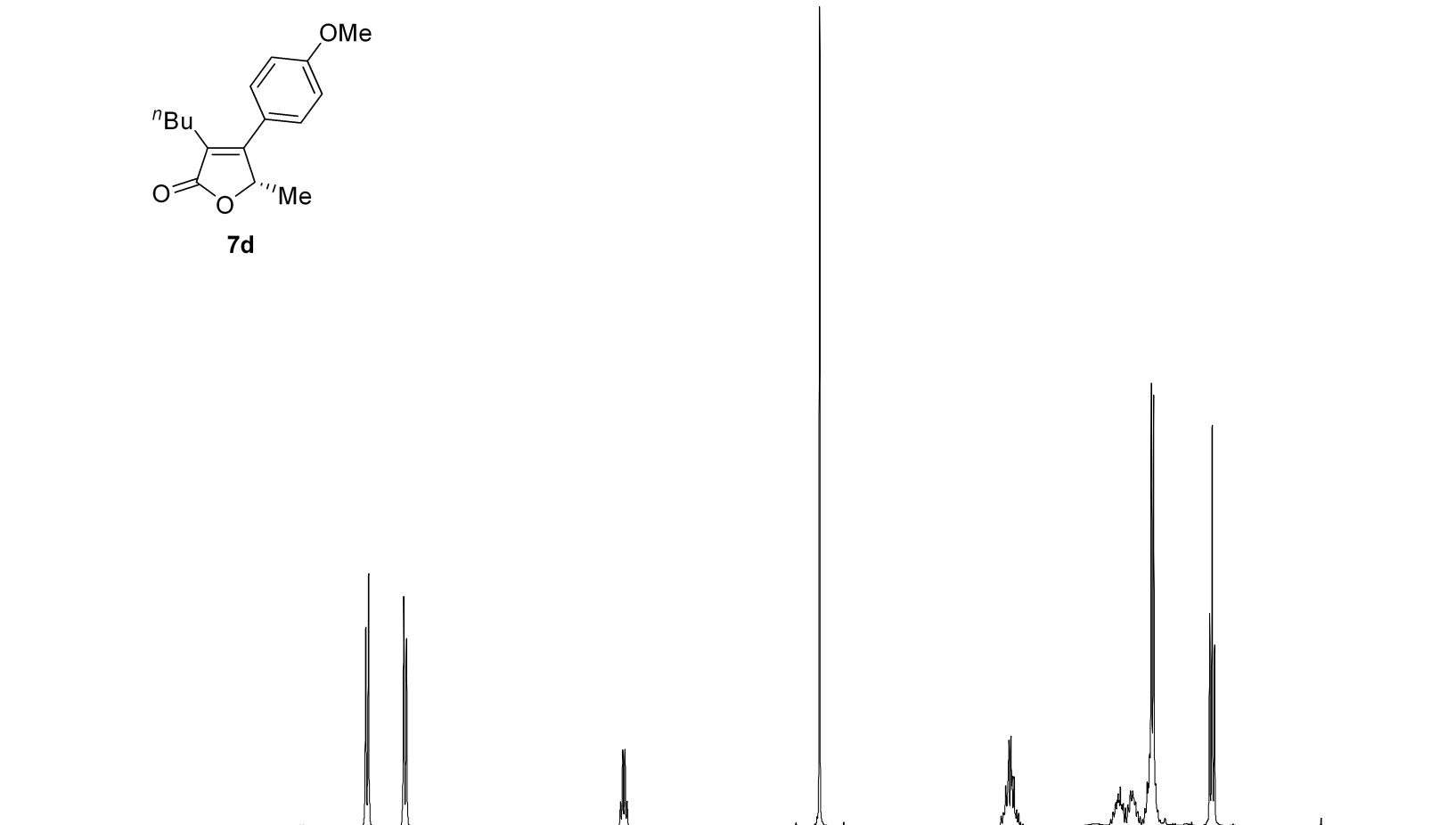
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127575 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.304
7.282
7.017
6.995
5.379
5.362
5.345
5.329
3.873
2.501
2.485
2.467
2.443
2.427
2.418
2.403
2.394
2.384
2.370
1.656
1.650
1.639
1.634
1.624
1.617
1.610
1.601
1.594
1.586
1.578
1.562
1.544
1.523
1.507
1.485
1.474
1.469



Current Data Parameters
NAME qh-11278-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150417
Time 12.32
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 45.67
DW 62.400 usec
DE 6.50 usec
TE 296.5 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

2.12
2.02

1.00

3.08

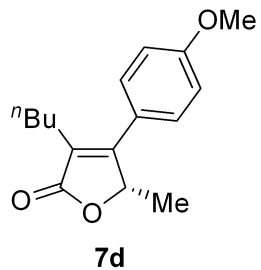
2.08

1.07

1.16

5.24

3.25



— 174.392

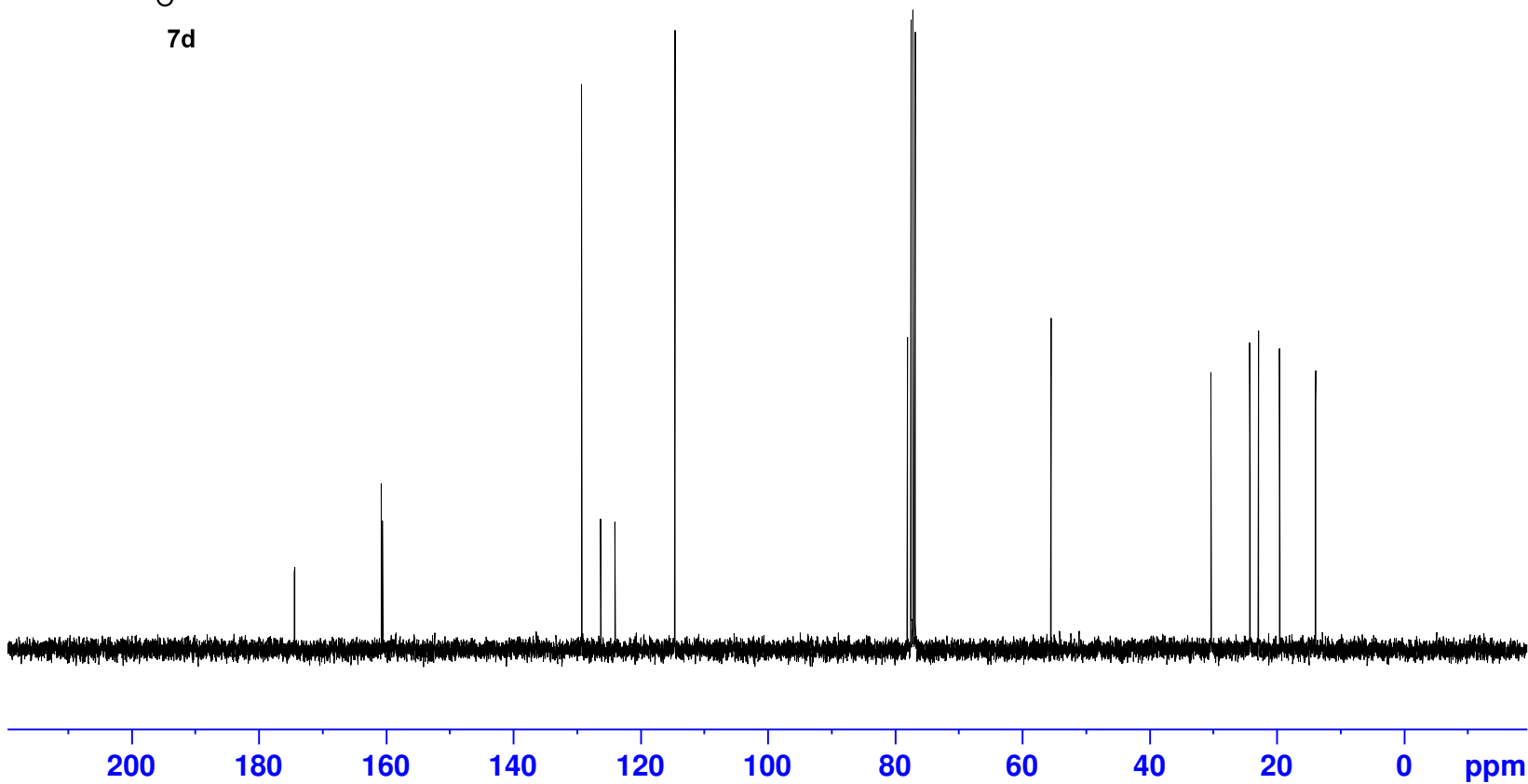
< 160.747
< 160.547

< 129.246
< 126.267
< 124.005
— 114.595

< 78.057
< 77.479
< 77.161
< 76.844

— 55.483

< 30.324
< 24.204
< 22.862
< 19.529
< 13.896



Current Data Parameters
NAME qh-11278-2
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150417
Time 12.34
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 30
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

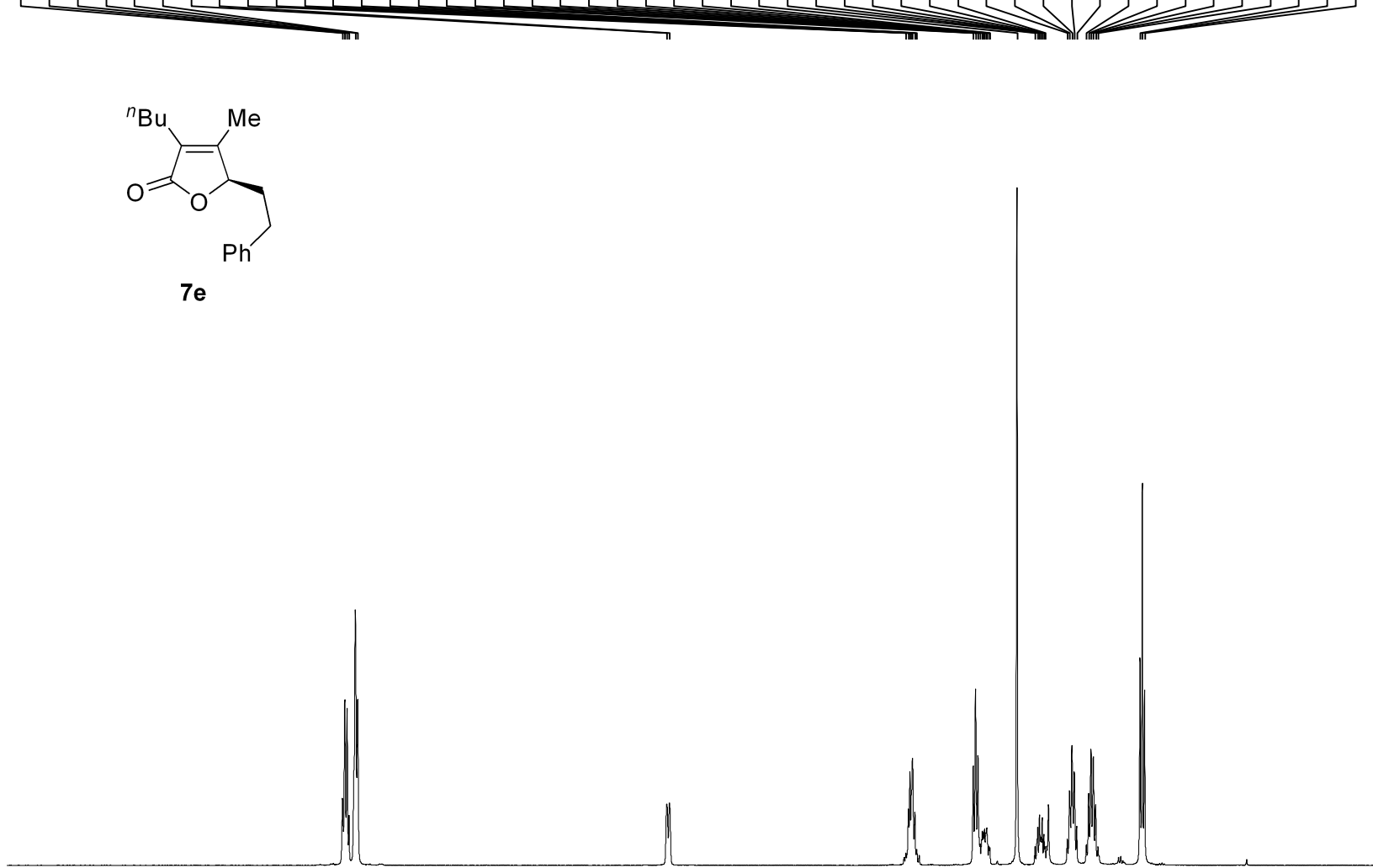
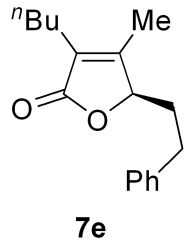
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127590 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.313
7.294
7.275
7.260
7.210
7.191
4.715
4.694
2.802
2.780
2.768
2.756
2.748
2.729
2.713
2.261
2.243
2.224
2.206
2.188
2.179
2.170
2.158
2.153
2.135
2.128
1.911
1.766
1.745
1.730
1.721
1.709
1.695
1.687
1.508
1.491
1.471
1.452
1.432
1.355
1.337
1.318
1.300
1.281
1.263
0.926
0.907
0.889



Current Data Parameters
NAME qh-11286-2
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150423
Time 14.41
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 49.32
DW 62.400 usec
DE 6.50 usec
TE 296.2 K
D1 1.00000000 sec
TD0 1

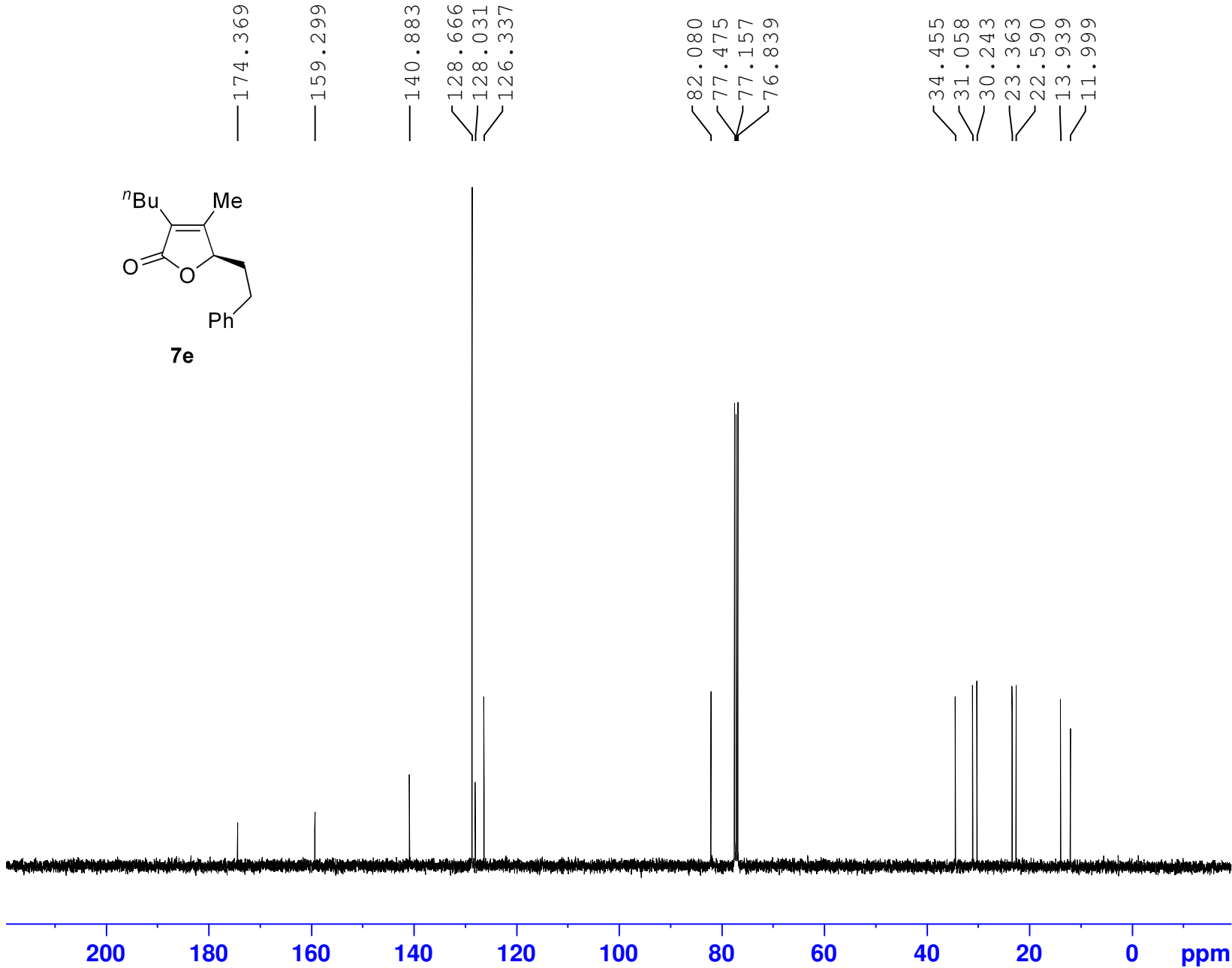
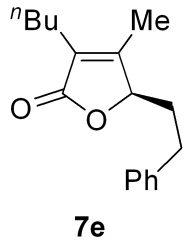
==== CHANNEL f1 =====
SF01 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

2.03
3.02

1.00

2.04
2.09
0.98
3.04
1.02
2.06
2.17
3.10



Current Data Parameters
NAME qh-11286-2
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150423
Time 14.44
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 60
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

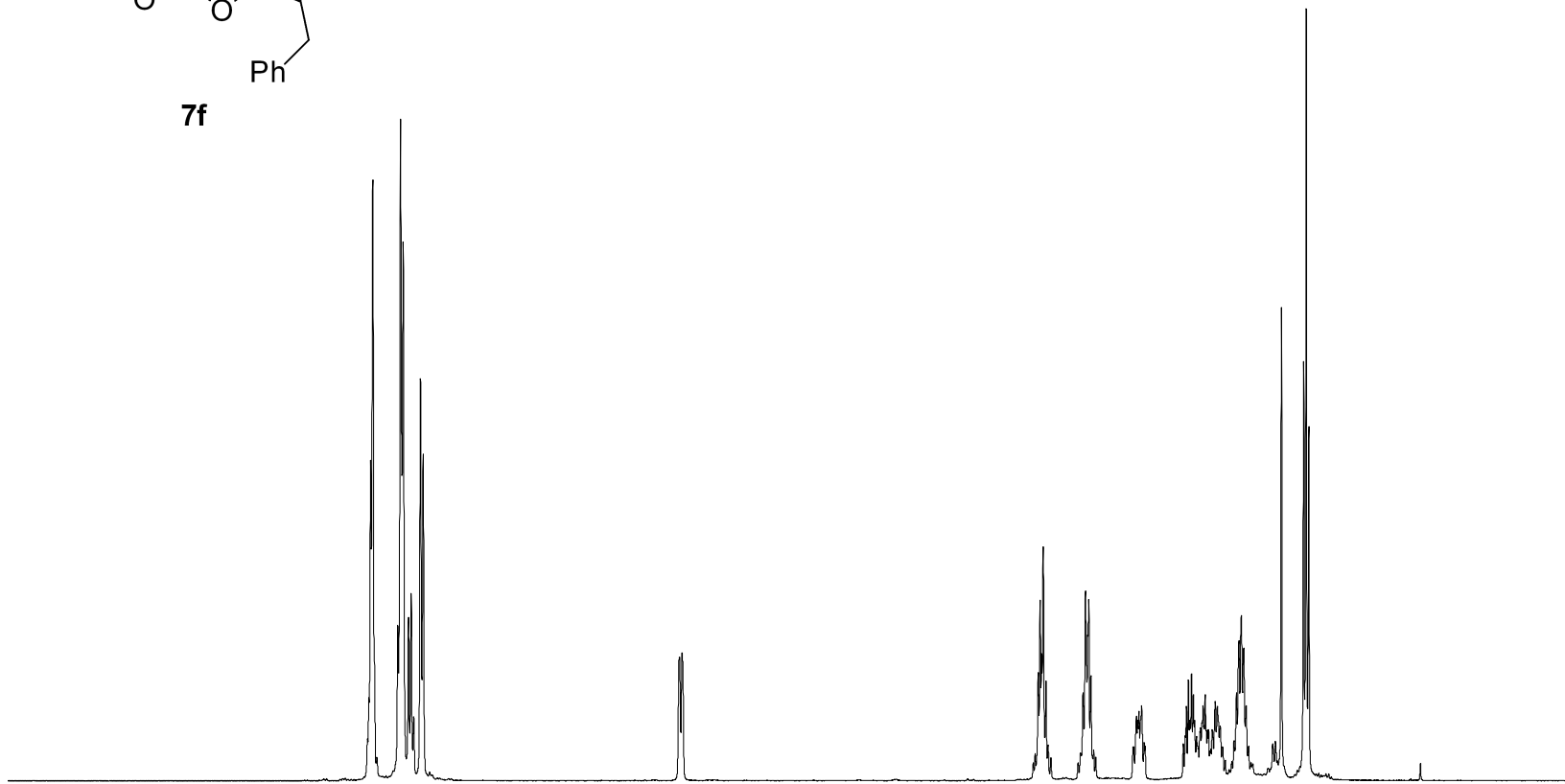
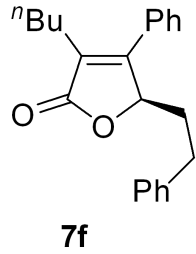
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127589 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.463
7.451
7.436
7.260
7.241
7.222
7.184
7.166
7.149
7.101
7.082
5.281
5.263
2.761
2.747
2.737
2.726
2.706
2.446
2.429
2.412
2.406
2.390
2.070
2.062
2.053
2.039
2.035
1.720
1.706
1.697
1.684
1.671
1.662
1.610
1.603
1.596
1.587
1.518
1.501
1.368
1.351
1.334
1.316
1.300
0.896
0.878
0.859



Current Data Parameters
NAME qh-11286-3
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150423
Time 14.47
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 39.46
DW 62.400 usec
DE 6.50 usec
TE 296.4 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

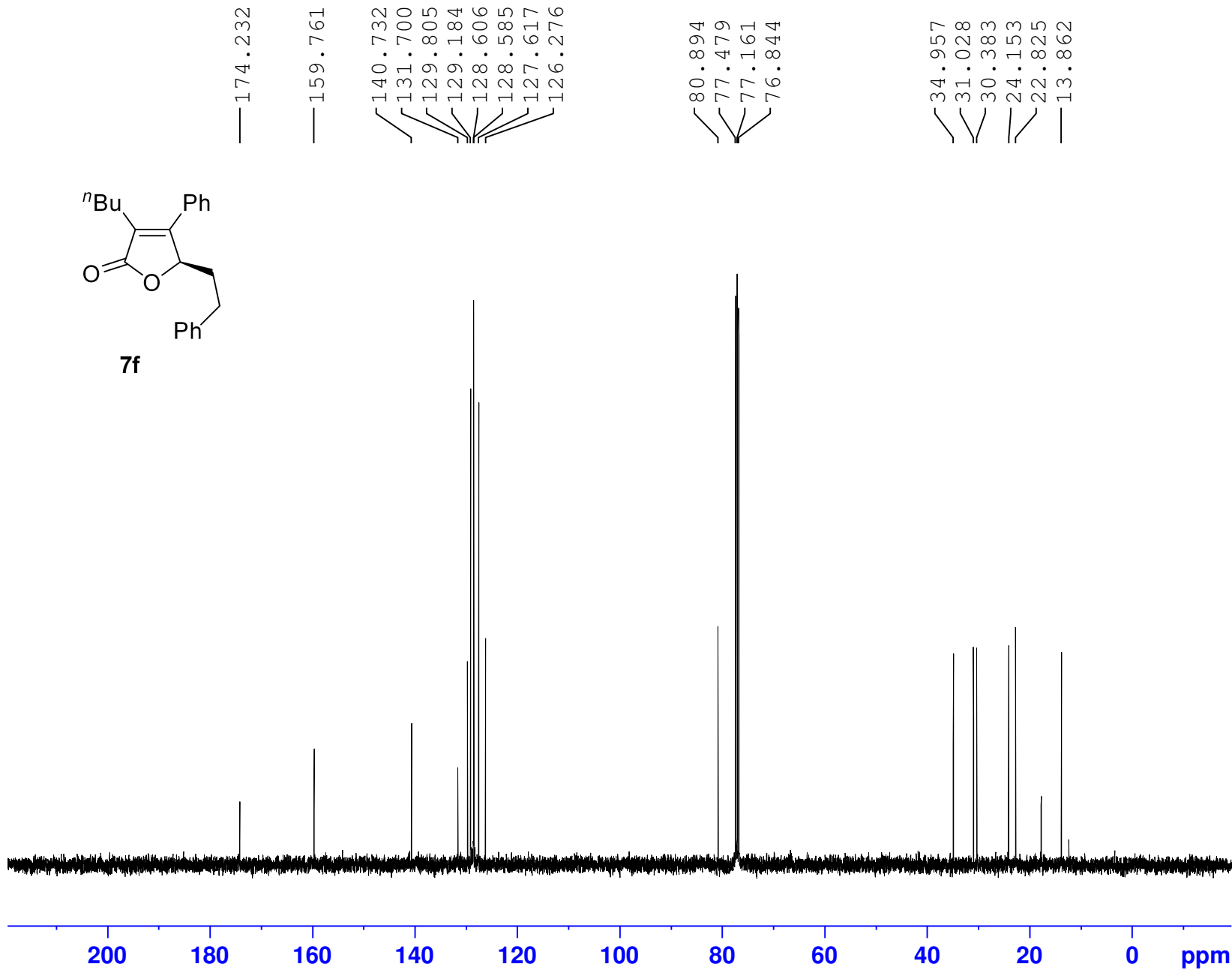
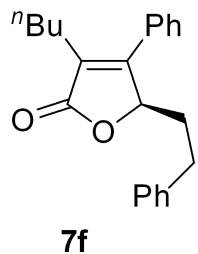
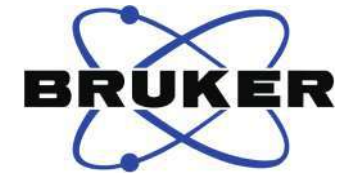
F2 - Processing parameters
SI 65536
SF 400.1300132 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

9 8 7 6 5 4 3 2 1 0 ppm

3.07
4.18
1.11
2.07

1.00

2.07
2.07
1.03
3.43
2.37
3.22



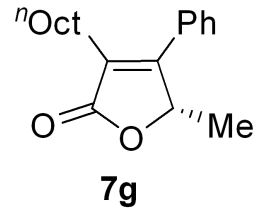
Current Data Parameters
NAME qh-11286-3
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150423
Time 14.50
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 37
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127605 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.489
7.473
7.455
7.434
7.416
7.312
7.293
7.260

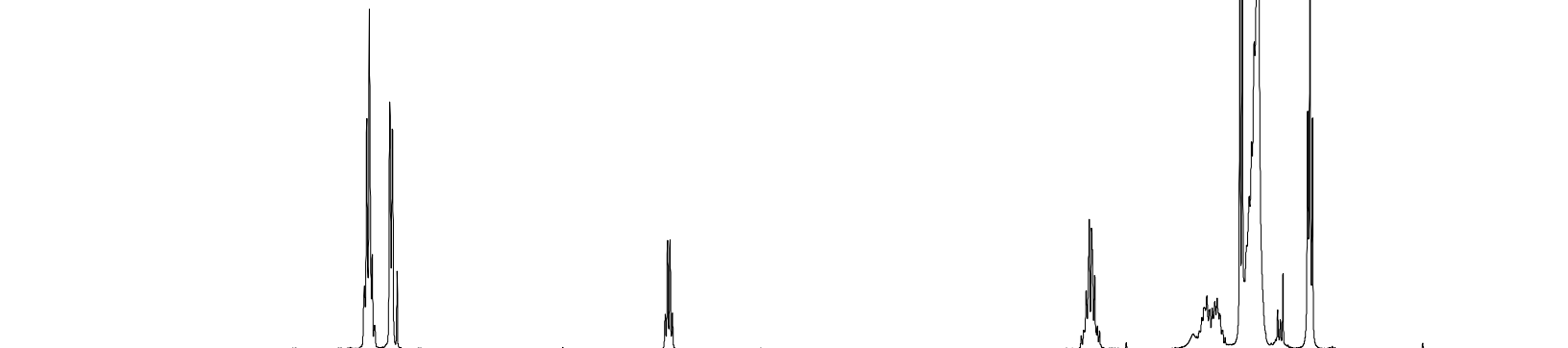
5.380
5.363
5.346
5.329
2.461
2.443
2.427
2.405
2.389
2.367
2.357
2.348
2.333
1.615
1.602
1.596
1.580
1.564
1.558
1.542
1.524
1.508
1.490
1.468
1.348
1.331
1.301
1.283
1.266
1.248

Current Data Parameters
 NAME qh-11276-3
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150416
 Time 16.27
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 2
 DS 0
 SWH 8012.820 Hz
 FIDRES 0.122266 Hz
 AQ 4.0894465 sec
 RG 45.67
 DW 62.400 usec
 DE 6.50 usec
 TE 296.4 K
 D1 1.00000000 sec
 TD0 1

==== CHANNEL f1 =====
 SFO1 400.1324710 MHz
 NUC1 1H
 P1 14.50 usec
 PLW1 11.99499989 W

F2 - Processing parameters
 SI 65536
 SF 400.1300092 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



9 8 7 6 5 4 3 2 1 0 ppm

3.06
2.03

1.00

S-138

2.06

2.18
3.37
10.47
3.19

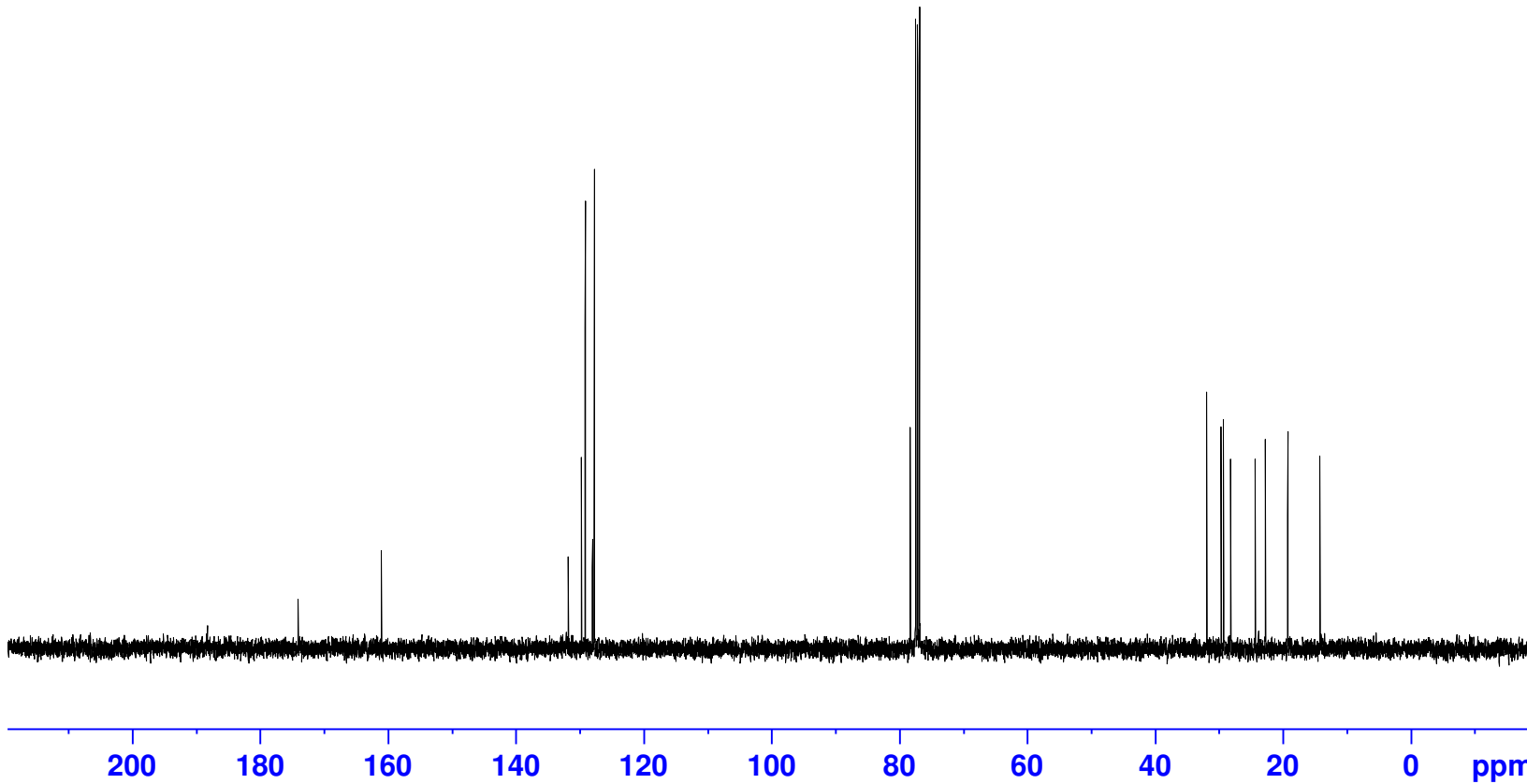
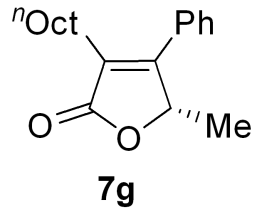


— 174.084
— 161.036

131.809
129.747
129.155
128.025
127.703

78.328
77.475
77.157
76.839

31.932
29.680
29.320
29.288
28.195
24.345
22.747
19.245
14.209



Current Data Parameters
NAME qh-11276-3
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150416
Time 16.29
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 41
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

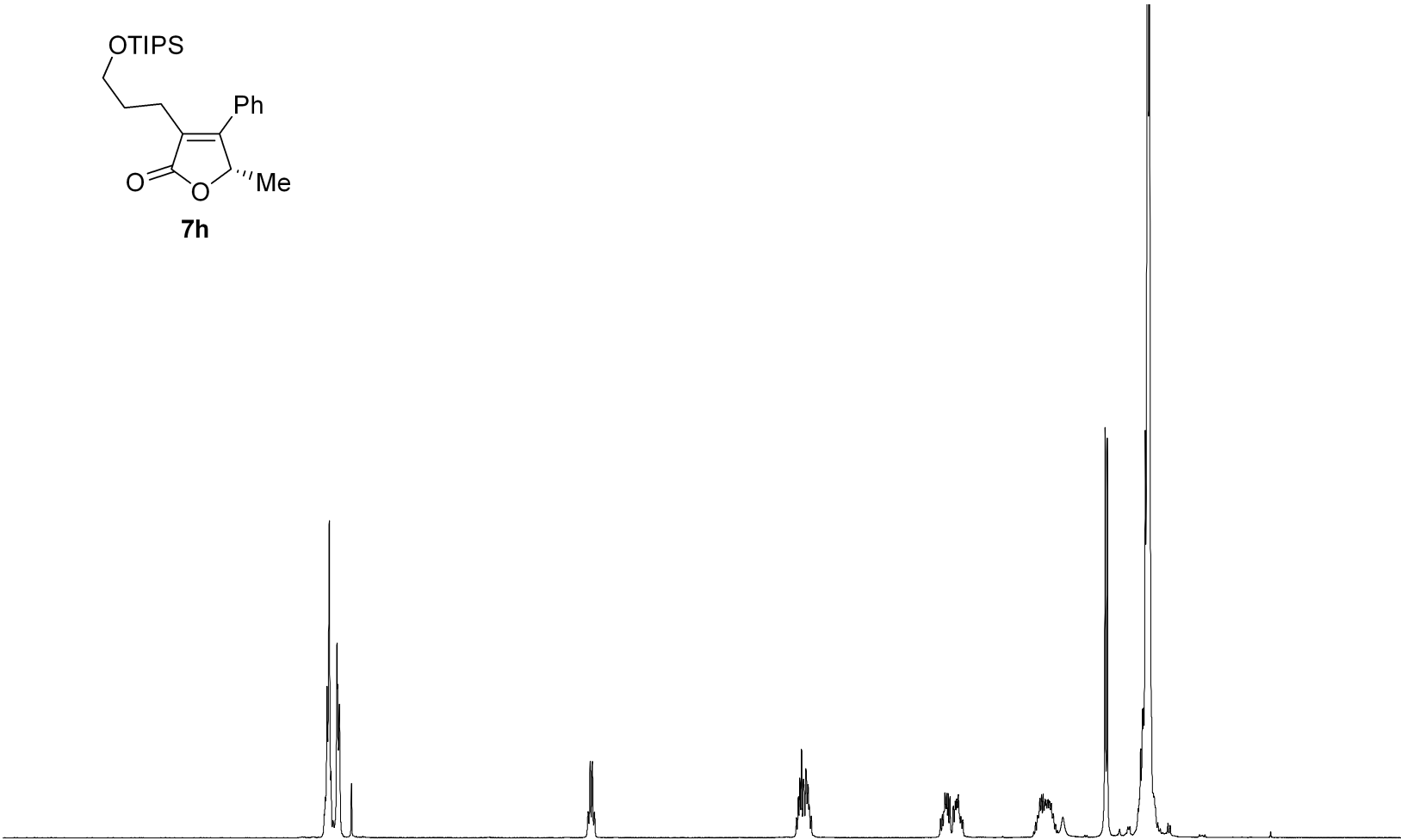
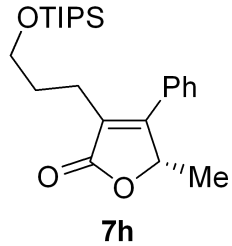
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127575 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.474
7.466
7.453
7.435
7.422
7.375
7.370
7.355
7.260
5.410
5.393
5.376
5.360
3.764
3.752
3.739
3.724
3.718
3.704
3.687
3.680
2.636
2.624
2.616
2.602
2.591
2.577
2.551
2.536
2.525
2.512
1.893
1.873
1.860
1.847
1.833
1.826
1.809
1.800
1.783
1.768
1.362
1.345
1.070
1.062
1.048
1.027
1.015

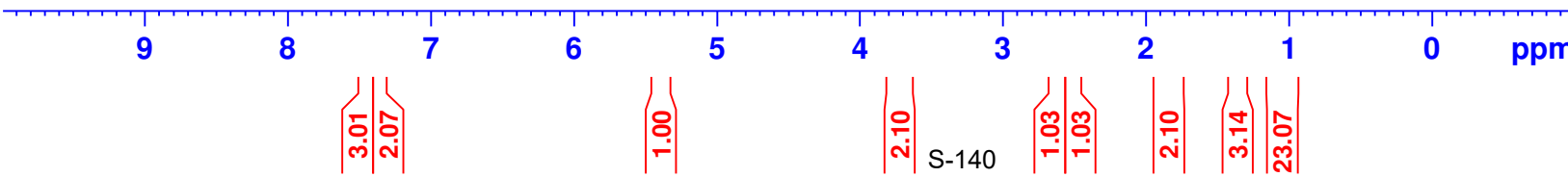


Current Data Parameters
NAME qh-11276-5
EXPNO 1
PROCNO 1

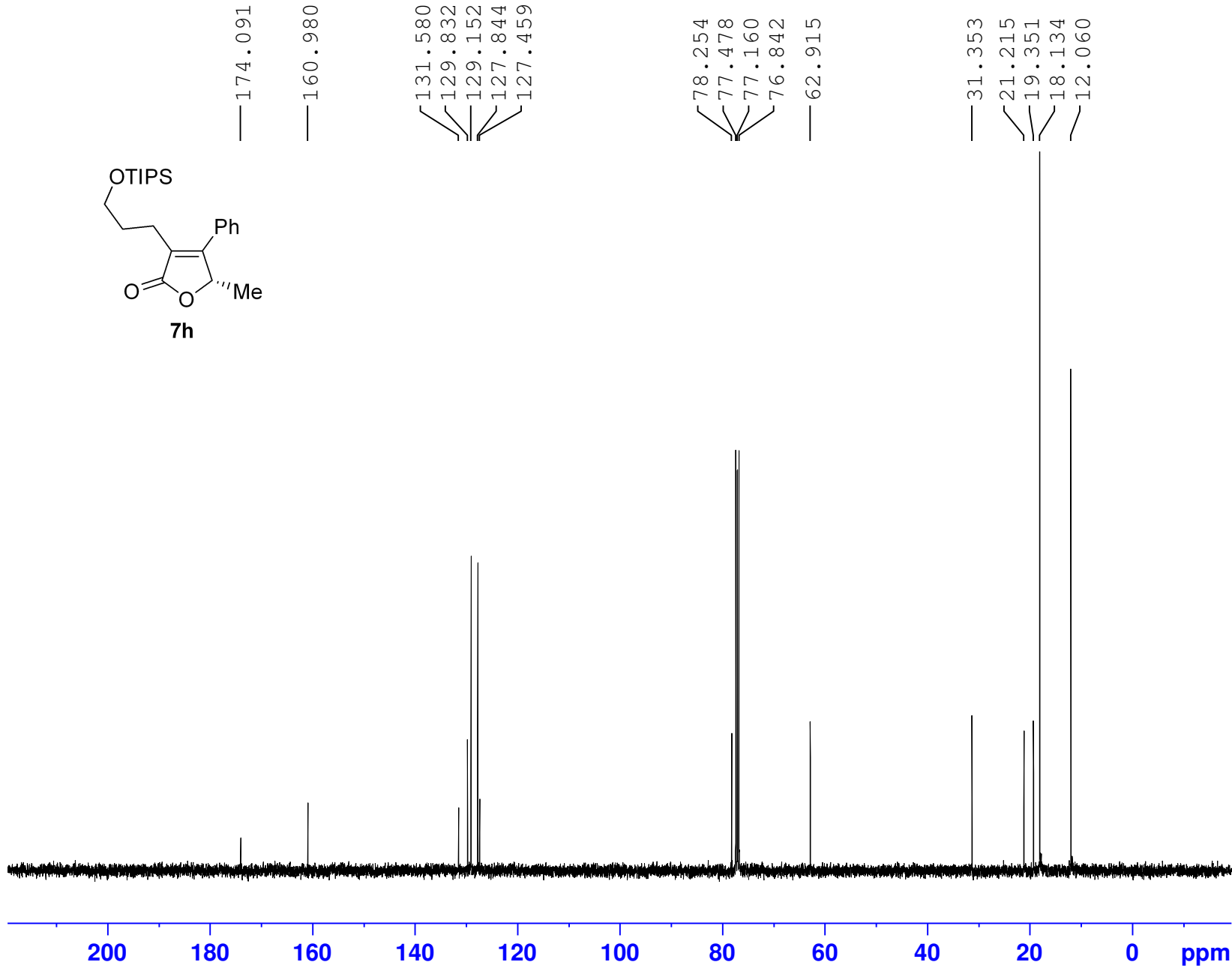
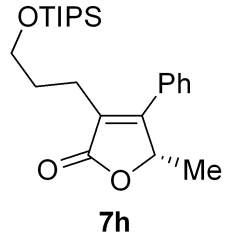
F2 - Acquisition Parameters
Date_ 20150416
Time 16.36
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 34.77
DW 62.400 usec
DE 6.50 usec
TE 296.3 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300088 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



S-140



Current Data Parameters
 NAME qh-11276-5
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150416
 Time 16.39
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 47
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 297.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

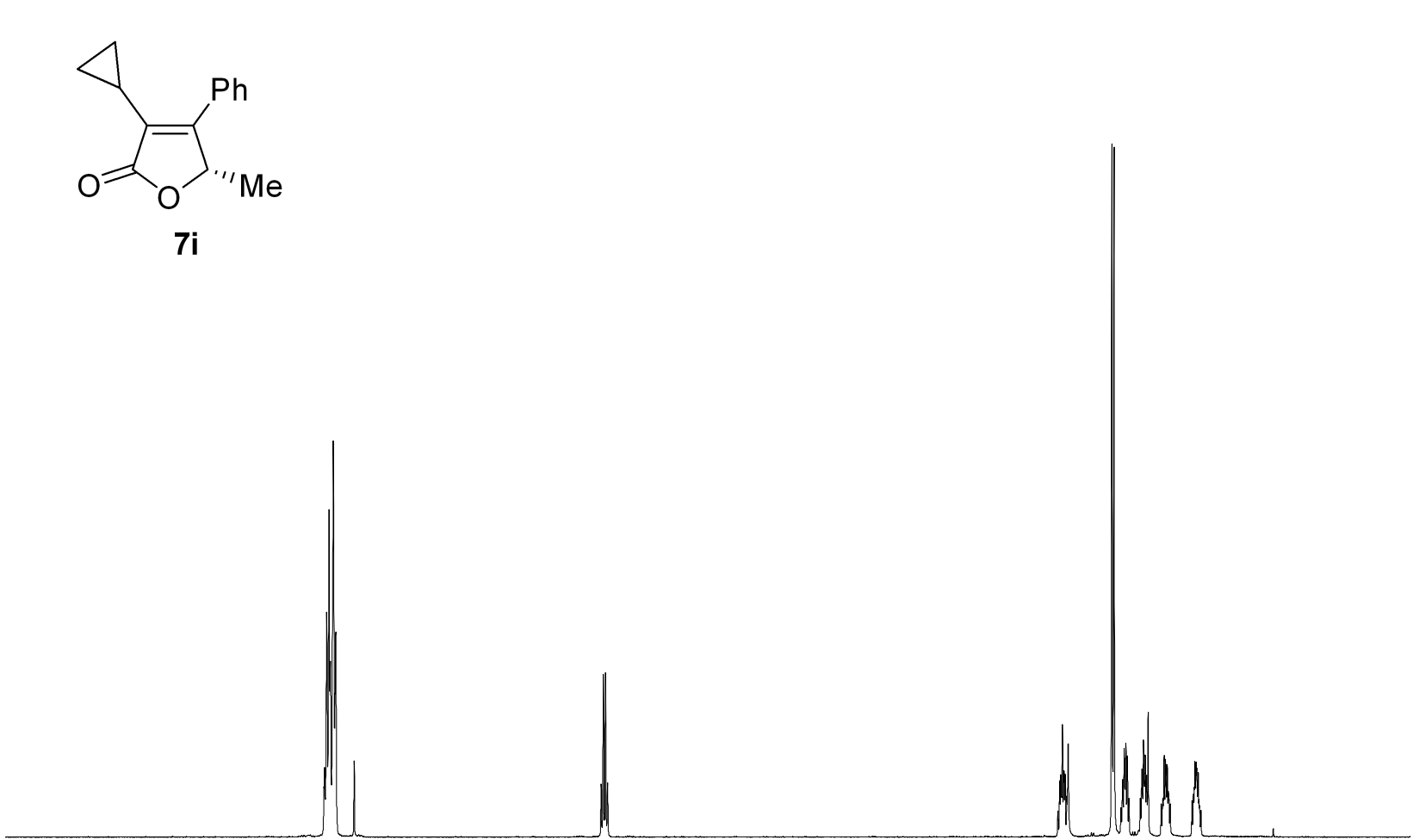
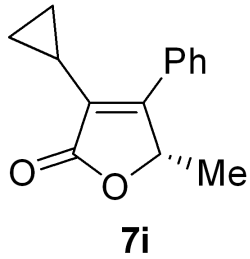
===== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.70 usec
 PLW1 46.98899841 W

===== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 11.99499989 W
 PLW12 0.34213999 W
 PLW13 0.27713001 W

F2 - Processing parameters
 SI 32768
 SF 100.6127572 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.496
7.491
7.475
7.457
7.447
7.424
7.421
7.405
7.260
5.327
5.310
5.293
5.276
1.738
1.730
1.717
1.703
1.695
1.682
1.671
1.329
1.312
1.246
1.244
1.233
1.220
1.209
1.195
1.095
1.093
1.083
1.068
1.059
1.046
0.927
0.920
0.910
0.905
0.897
0.888
0.884
0.691
0.685
0.680
0.675
0.669
0.664
0.654



Current Data Parameters
NAME qh-11276-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150416
Time 16.22
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 1
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 62.93
DW 62.400 usec
DE 6.50 usec
TE 296.2 K
D1 1.00000000 sec
TD0 1

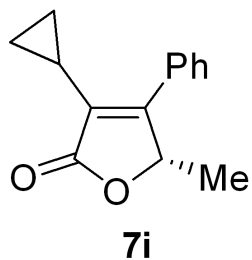
==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

5.03

1.00

1.03
3.05
1.08
1.17
1.06
1.03



— 172.247

— 161.046

131.640
129.651
128.984
128.151
127.287

77.610
77.476
77.159
76.841

— 19.170

7.631

6.552

5.365



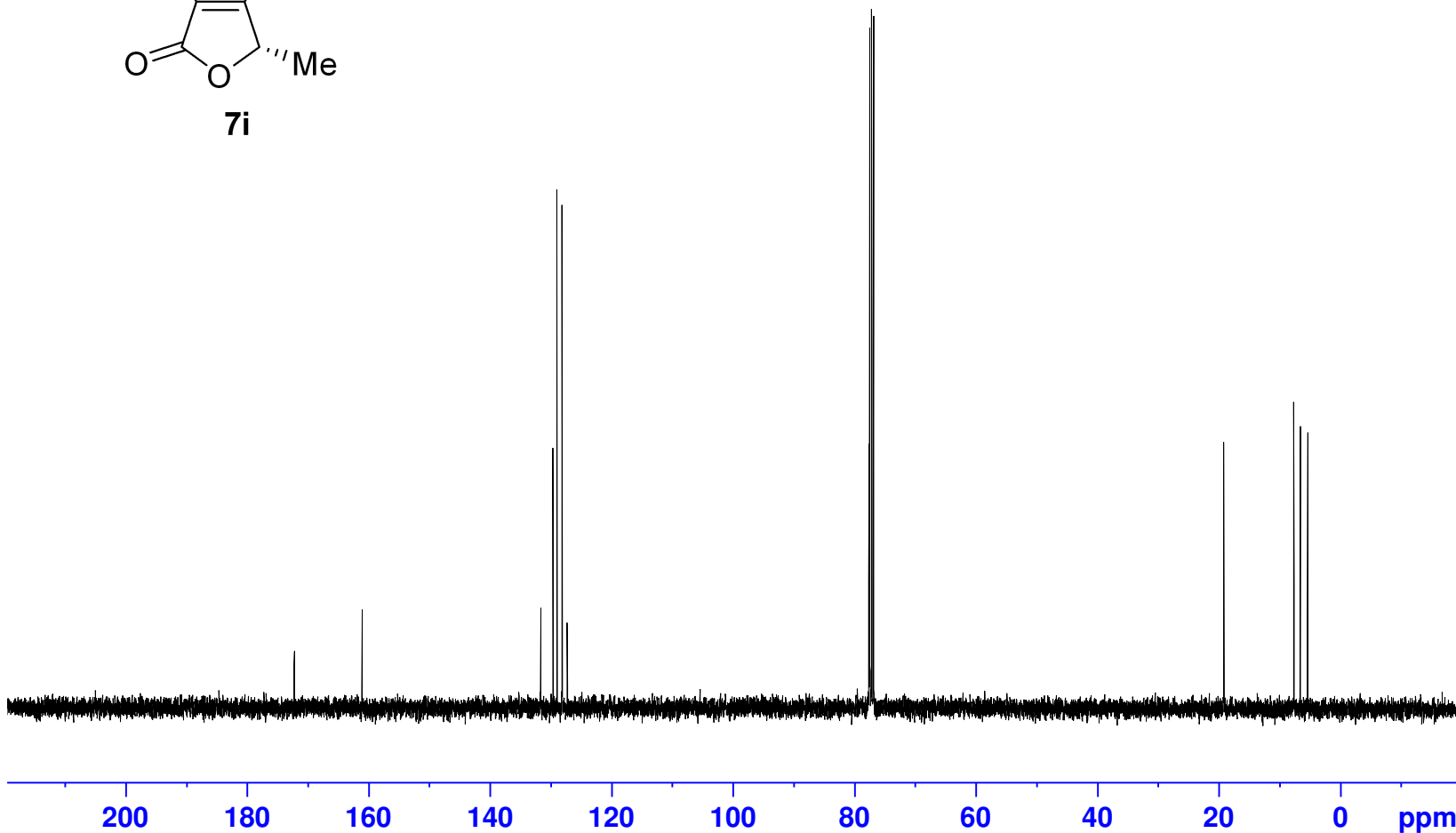
Current Data Parameters
NAME qh-11276-2
EXPNO 2
PROCNO 1

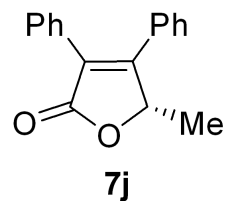
F2 - Acquisition Parameters
Date_ 20150416
Time 16.24
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 40
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

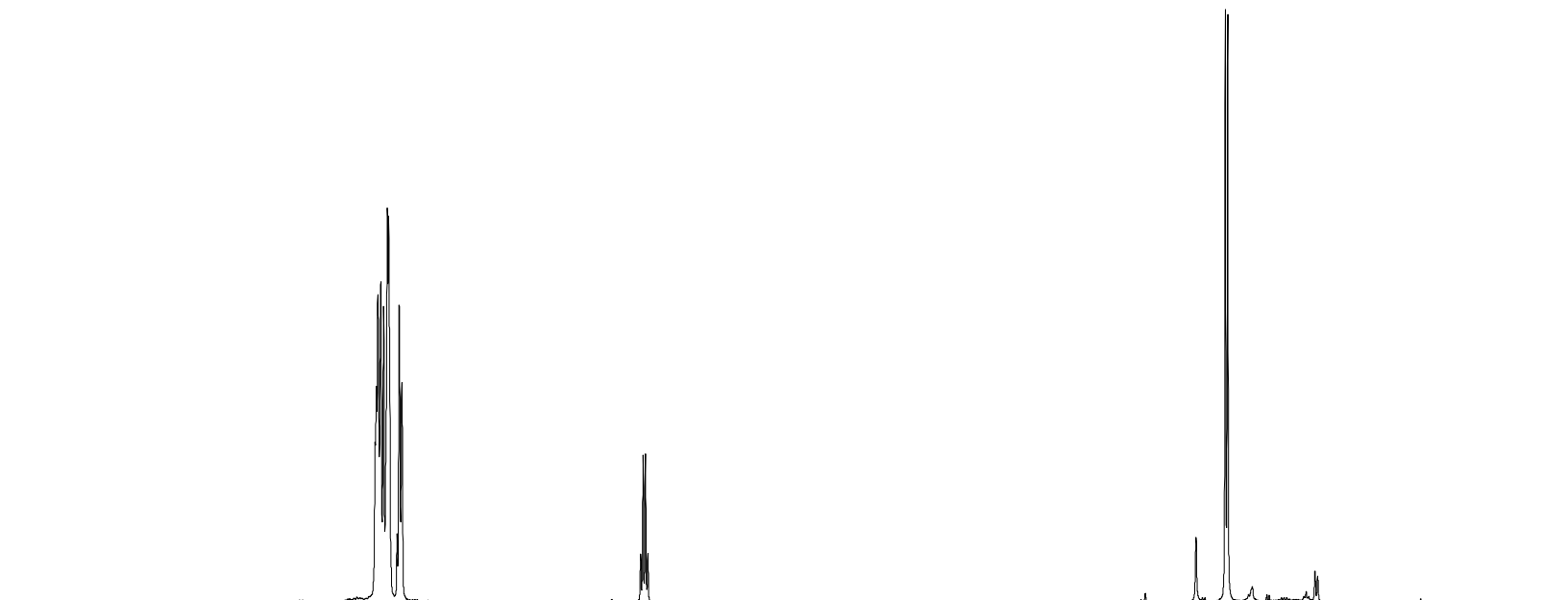
F2 - Processing parameters
SI 32768
SF 100.6127583 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40





7.414
7.405
7.396
7.374
7.355
7.328
7.320
7.312
7.260
7.246
7.227
5.551
5.535
5.518
5.501

1.450
1.433

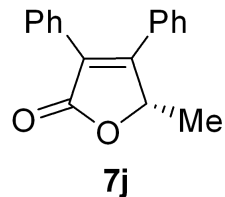


Current Data Parameters
NAME qh-11276-6
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150416
Time 16.41
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 2
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 54.81
DW 62.400 usec
DE 6.50 usec
TE 296.5 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300088 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



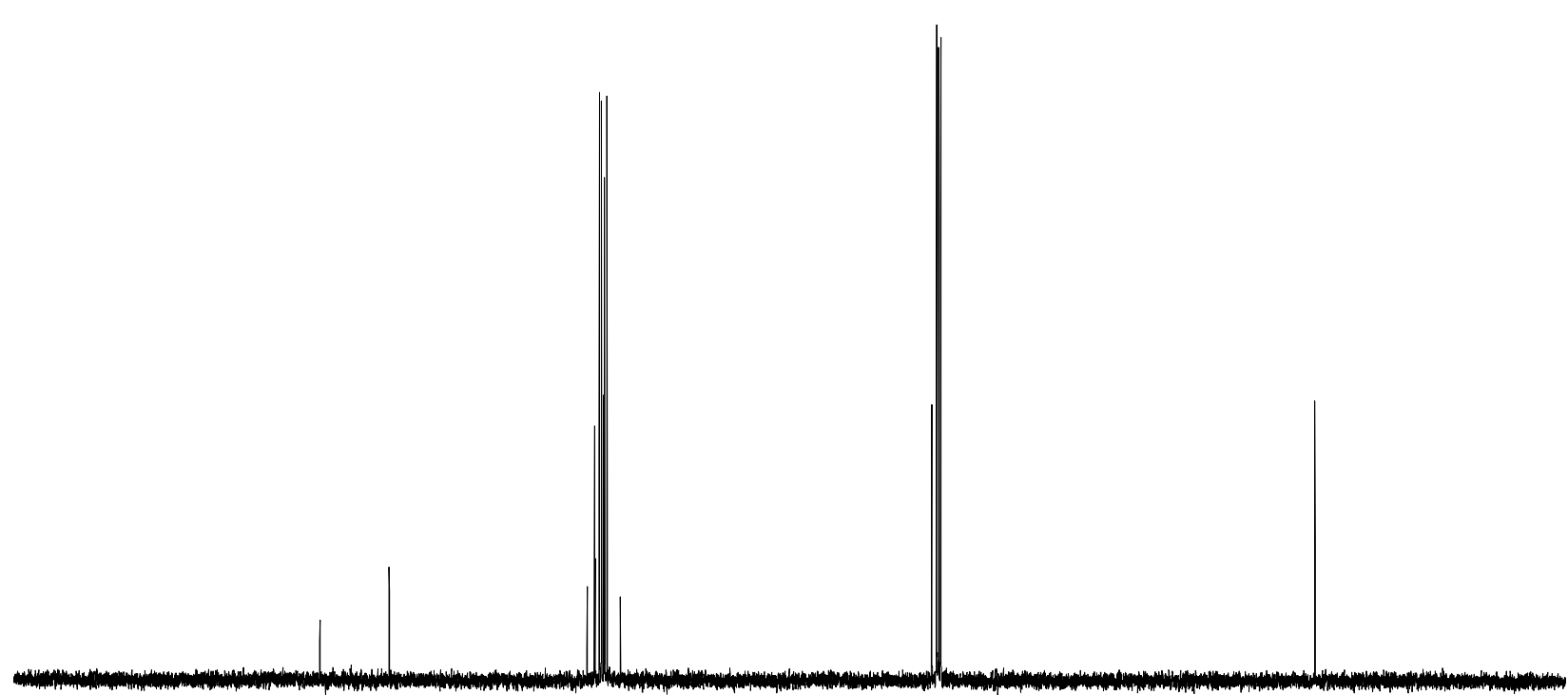
—172.410

—161.737

131.277
 130.146
 130.015
 129.408
 129.095
 128.739
 128.588
 128.206
 126.156

78.202
 77.481
 77.163
 76.845

—19.232



Current Data Parameters
 NAME qh-11276-6
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150416
 Time 16.44
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 50
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.366798 Hz
 AQ 1.3631488 sec
 RG 196.92
 DW 20.800 usec
 DE 6.50 usec
 TE 297.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

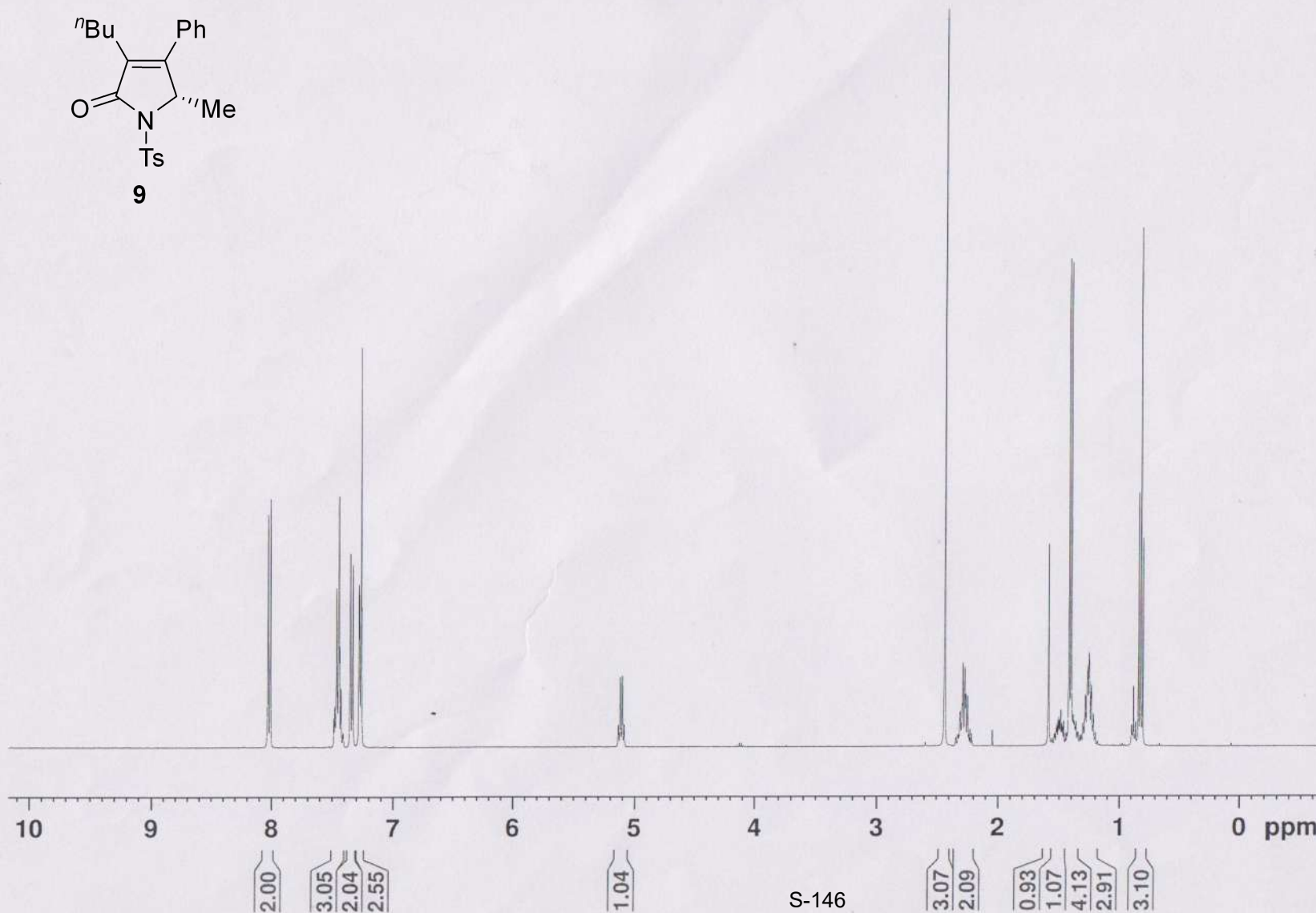
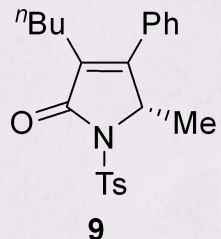
==== CHANNEL f1 =====
 SFO1 100.6228298 MHz
 NUC1 13C
 P1 9.70 usec
 PLW1 46.98899841 W

==== CHANNEL f2 =====
 SFO2 400.1316005 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 90.00 usec
 PLW2 11.99499989 W
 PLW12 0.34213999 W
 PLW13 0.27713001 W

F2 - Processing parameters
 SI 32768
 SF 100.6127597 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



8.031
8.010
7.485
7.477
7.473
7.462
7.455
7.443
7.438
7.427
7.425
7.350
7.330
7.280
7.275
7.270
7.260
7.257
5.119
5.103
2.434
2.310
2.308
2.292
2.286
2.271
2.262
2.248
1.591
1.511
1.503
1.496
1.487
1.421
1.404
1.392
1.385
1.361
1.286
1.267
1.256
1.252
1.238
1.234
1.216
0.839
0.821
0.802

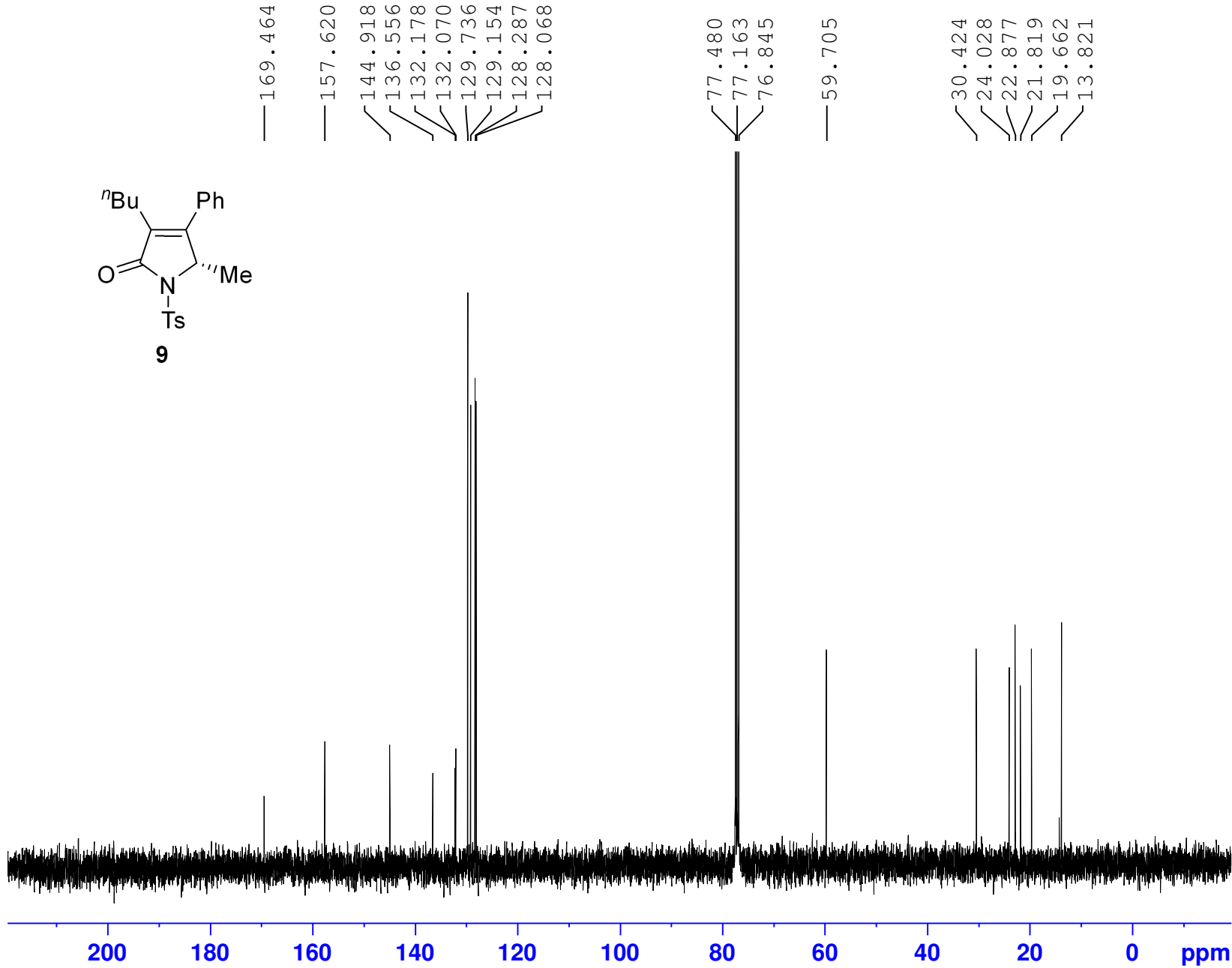
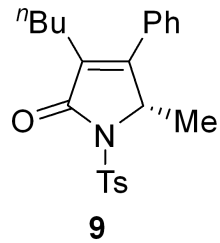


Current Data Parameters
NAME qh-11165
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150129
Time 20.18
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 2
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 88.84
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



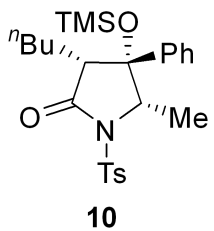
Current Data Parameters
NAME qh-11165
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150129
Time 20.26
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 170
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

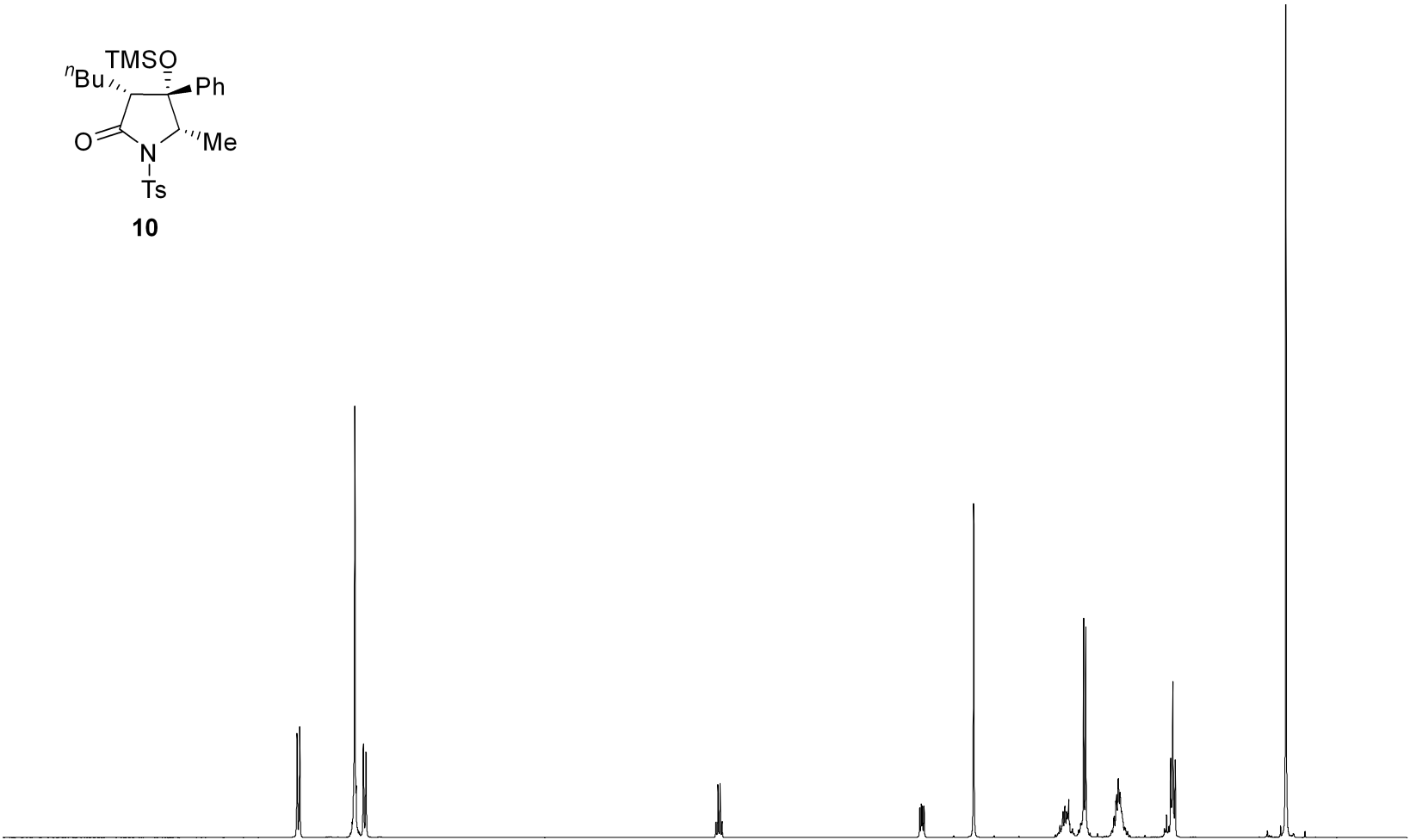
==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127554 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.727
 7.706
 7.274
 7.264
 7.206
 7.186

4.437
 4.421
 4.405
 4.388
 2.835
 2.823
 2.814
 2.802
 2.412
 1.735
 1.721
 1.711
 1.696
 1.682
 1.670
 1.665
 1.658
 1.573
 1.568
 1.548
 1.532
 1.313
 1.308
 1.295
 1.289
 1.277
 1.263
 1.250
 1.227

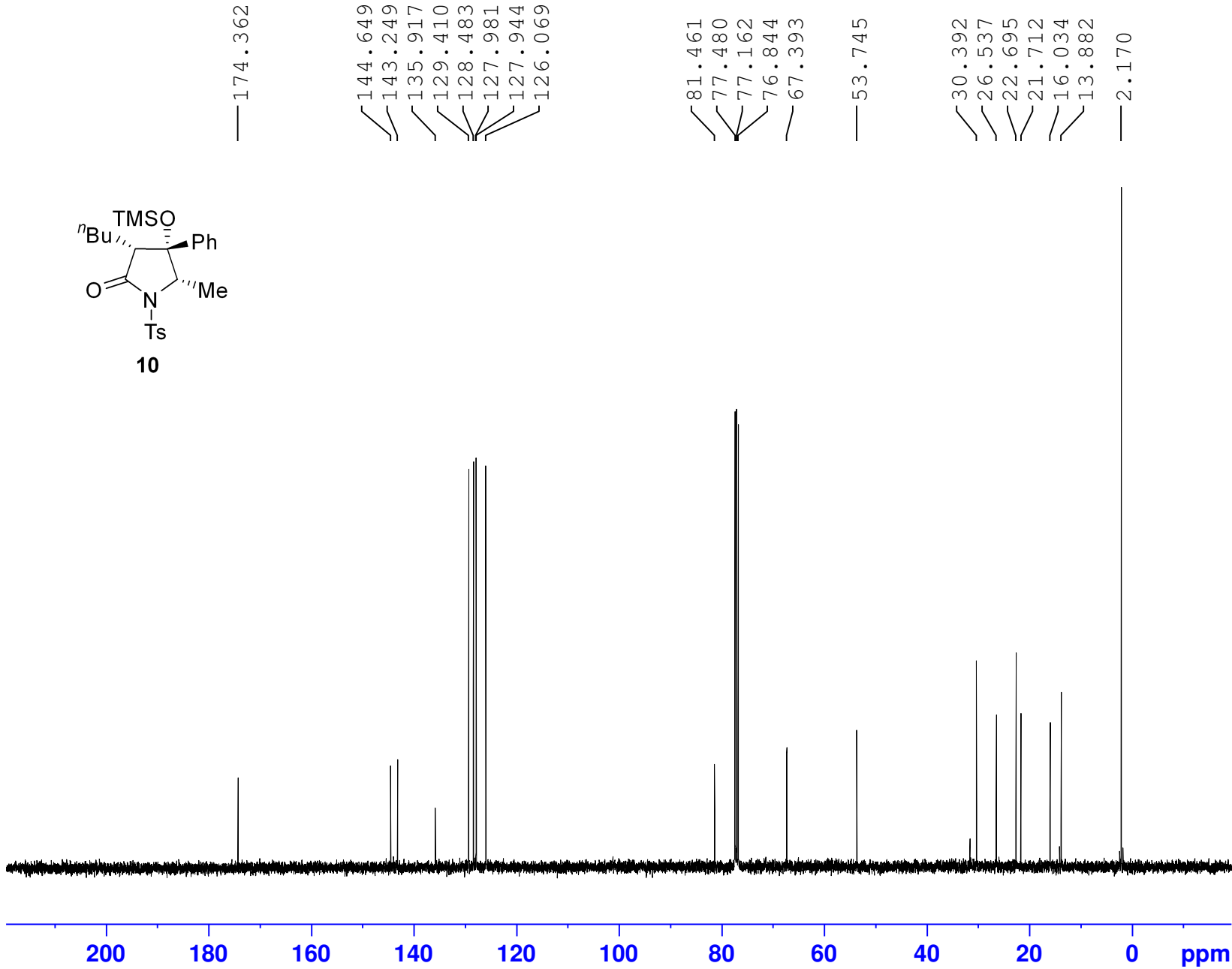
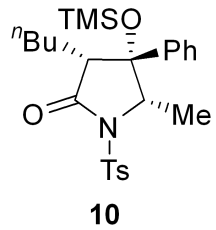


Current Data Parameters
 NAME qh-11182
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150212
 Time 12.14
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 2
 DS 0
 SWH 8012.820 Hz
 FIDRES 0.122266 Hz
 AQ 4.0894465 sec
 RG 31.55
 DW 62.400 usec
 DE 6.50 usec
 TE 297.0 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 SFO1 400.1324710 MHz
 NUC1 1H
 P1 14.50 usec
 PLW1 11.99499989 W

F2 - Processing parameters
 SI 65536
 SF 400.1300000 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



Current Data Parameters
NAME qh-11182
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150212
Time 12.17
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 50
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 297.8 K
D1 2.0000000 sec
D11 0.0300000 sec
TD0 1

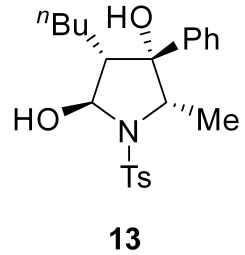
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127590 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.811
7.791
7.388
7.368
7.318
7.314
7.297
7.278
7.260
7.257
7.254
7.245
7.239
7.170
7.166
7.149
5.621
5.608
5.596
3.753
3.741
3.626
3.610
3.594
3.248
2.480
1.836
1.824
1.819
1.807
1.594
1.260
1.244
1.175
1.157
1.153
1.140
1.135
1.121
1.051
1.037
1.028
1.010
0.997
0.990
0.791
0.773
0.754

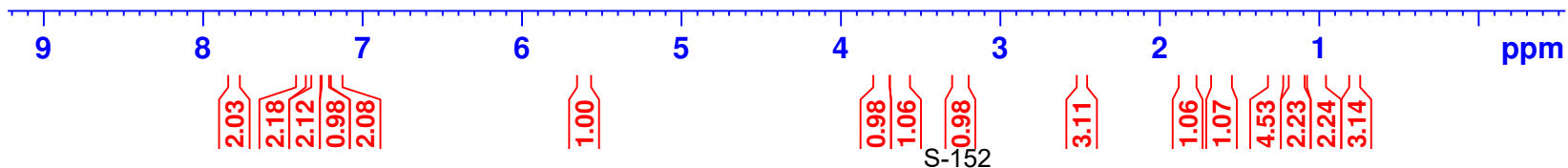
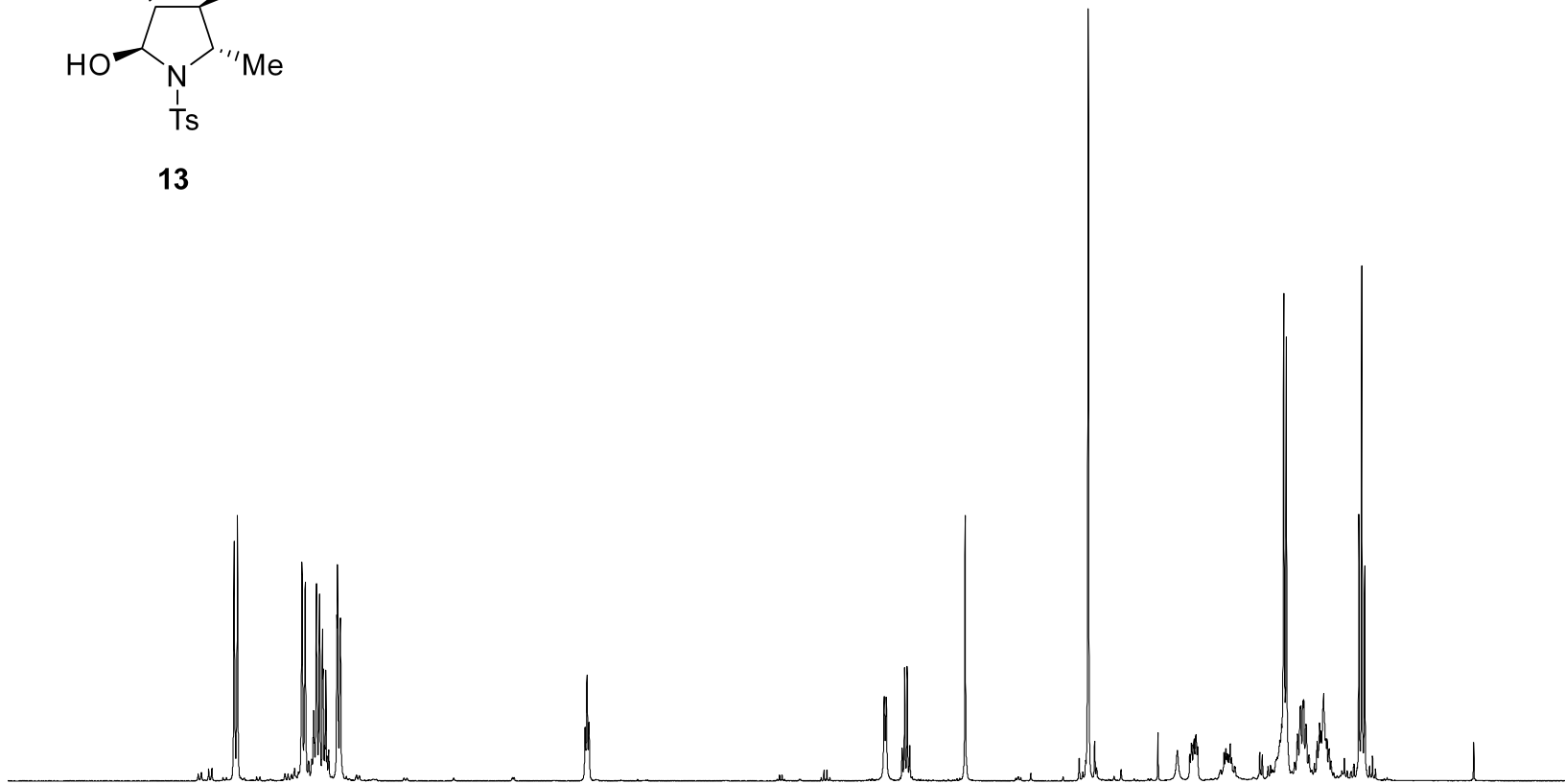


Current Data Parameters
NAME qh-11176
EXPNO 2
PROCNO 1

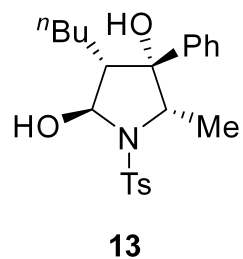
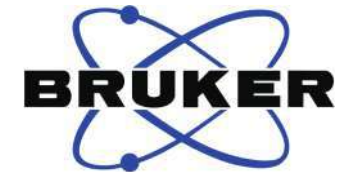
F2 - Acquisition Parameters
Date_ 20150211
Time 15.14
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 1
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 45.67
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



S-152

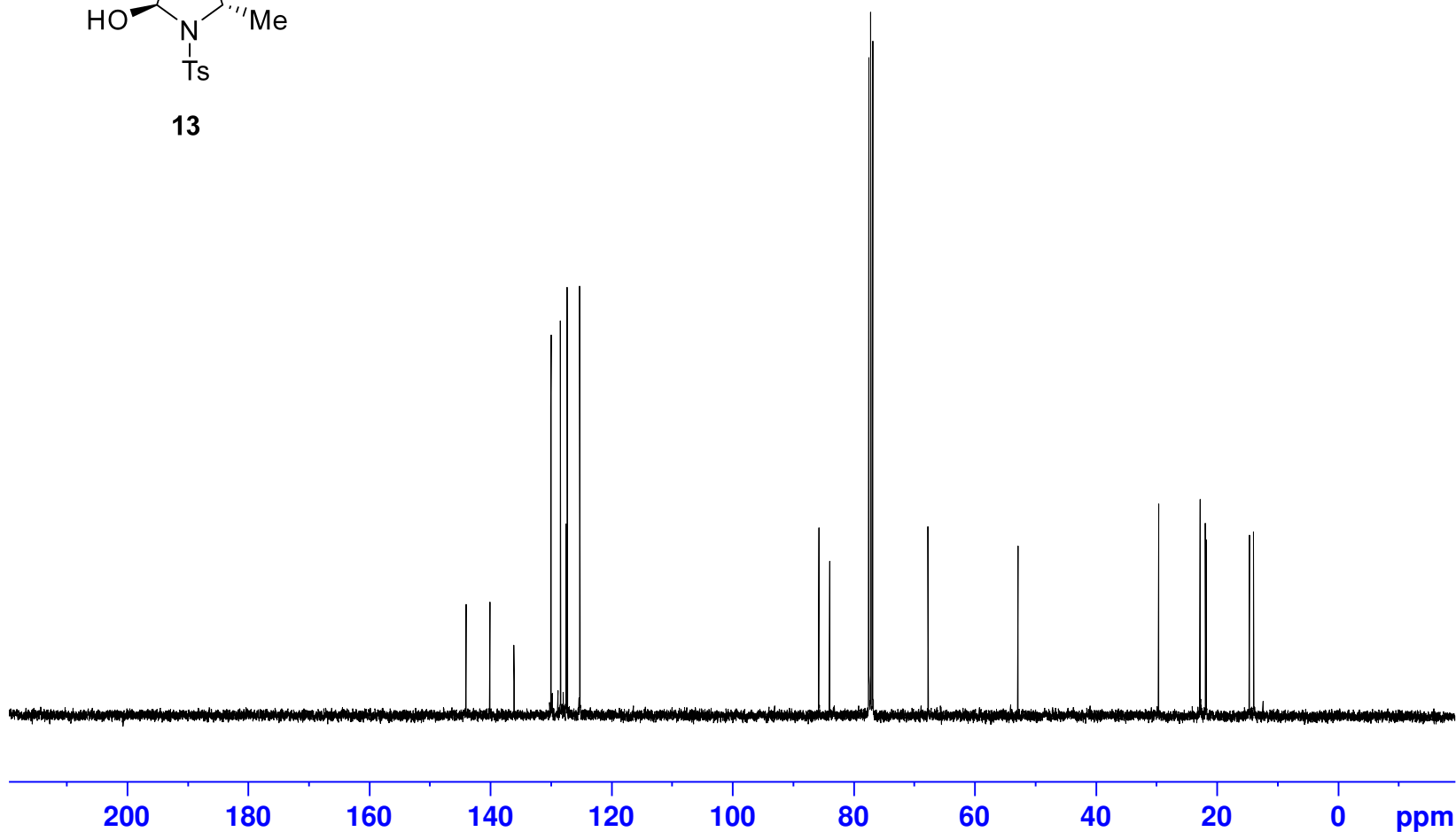


144.015
140.091
136.087
129.987
128.448
127.484
127.296
125.224

85.733
83.960
77.477
77.159
76.841
67.712

52.848

29.615
22.773
21.907
21.732
14.616
13.956



Current Data Parameters
NAME qh-11176
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150211
Time 15.17
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 134
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

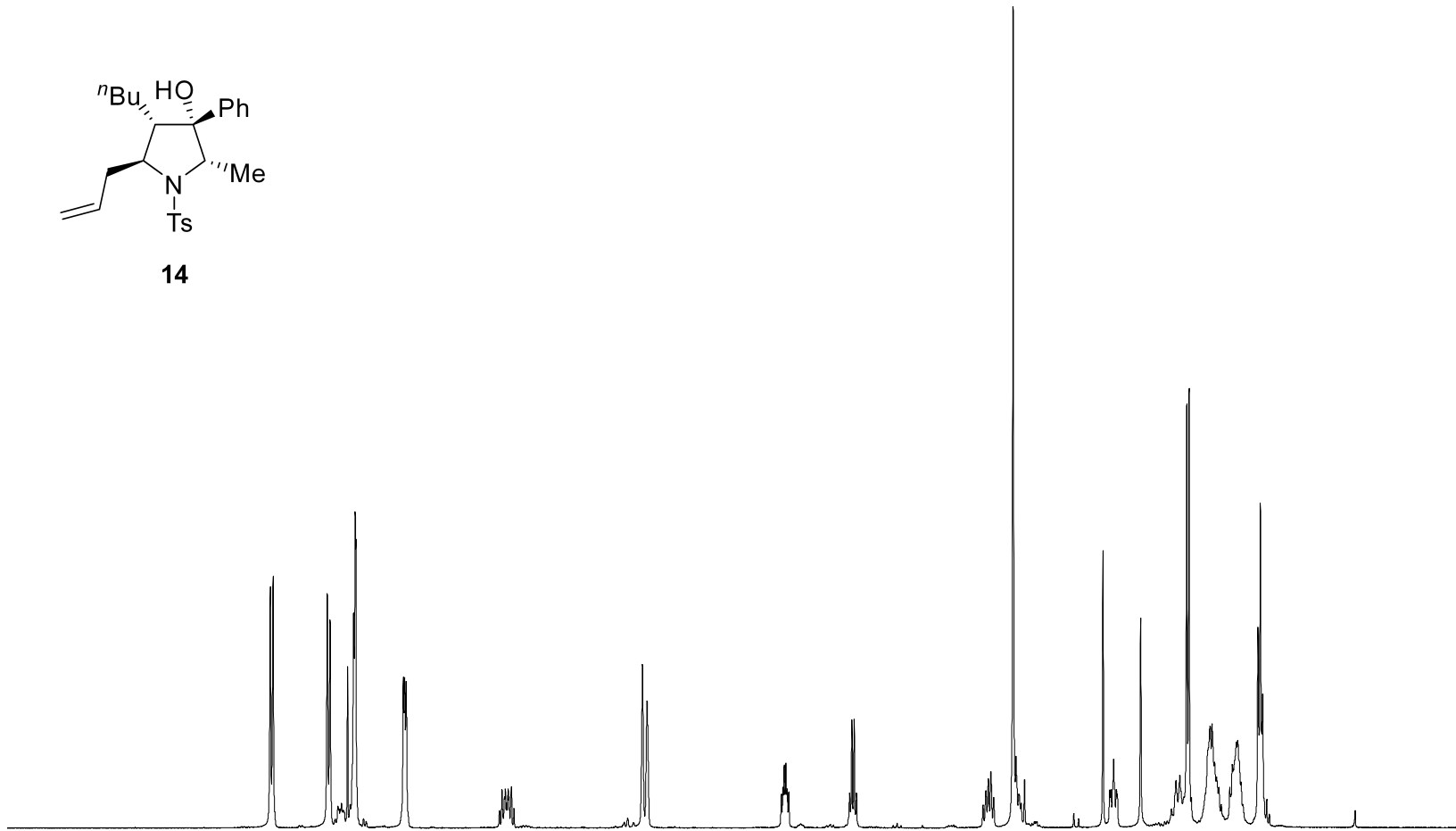
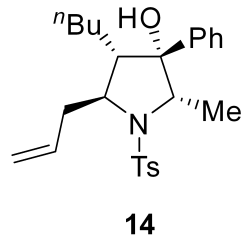
==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127583 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



7.812
7.791
7.405
7.385
7.260
7.218
7.206
7.201
6.862
6.853
6.843
6.134
6.114
6.091
5.156
5.123
4.153
4.144
4.133
4.123
3.661
3.645
2.688
2.670
2.511
2.490
1.869
1.813
1.794
1.774
1.348
1.321
1.272
1.256
1.106
1.091
1.074
1.059
1.043
0.965
0.947
0.940
0.919
0.908
0.885
0.764
0.747
0.730



Current Data Parameters
NAME qh-11195
EXPNO 1
PROCNO 1

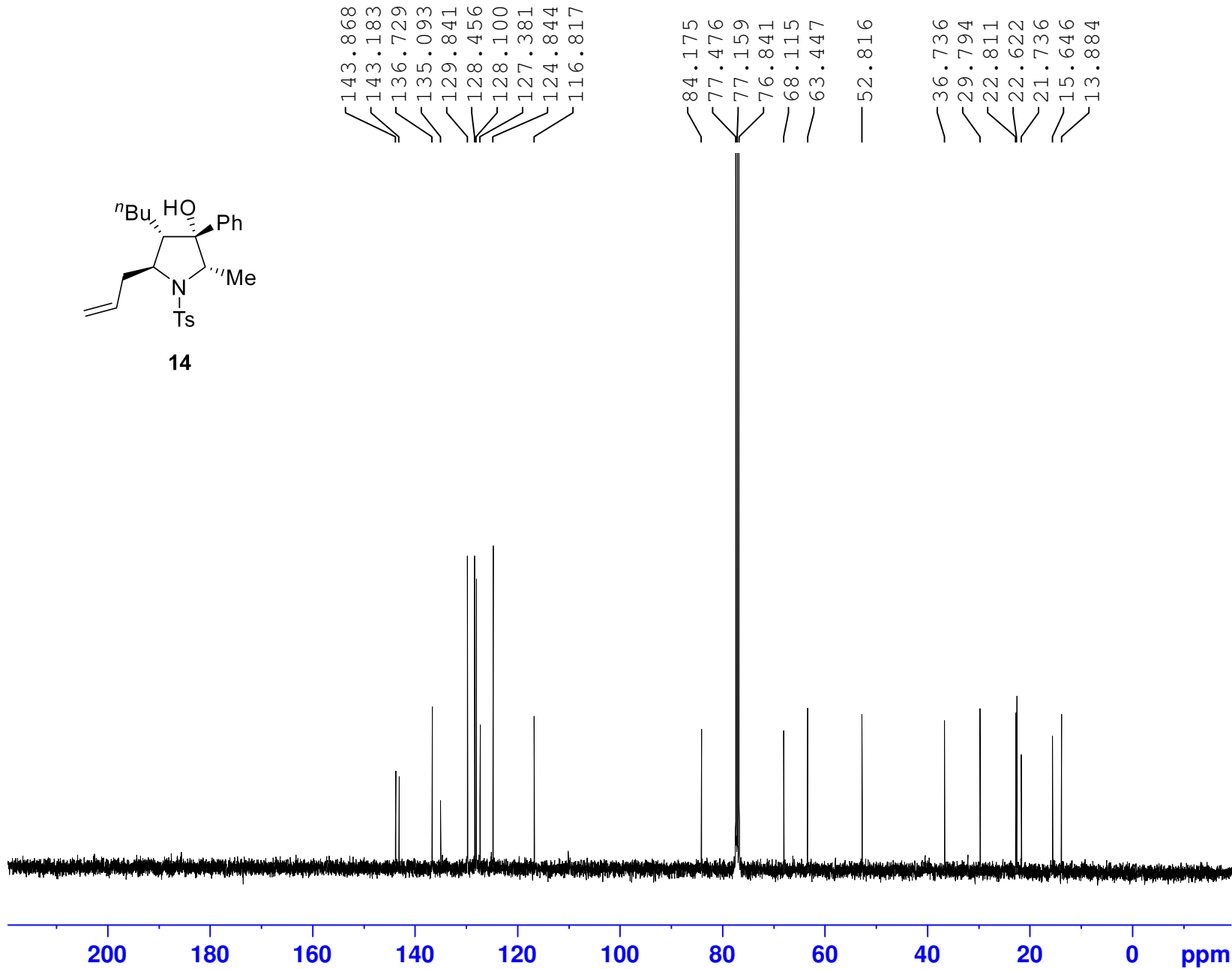
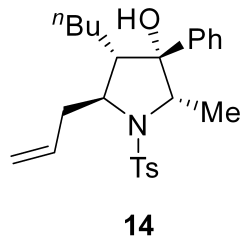
F2 - Acquisition Parameters
Date_ 20150304
Time 16.55
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 4
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 70.97
DW 62.400 usec
DE 6.50 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 14.50 usec
PLW1 11.99499989 W

F2 - Processing parameters
SI 65536
SF 400.1300088 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

9 8 7 6 5 4 3 2 1 0 ppm

2.20
2.12
3.06
2.01
1.00
2.00
1.03
1.09
1.05
4.18
0.99
1.10
1.12
3.34
3.39
2.58
3.17



Current Data Parameters
NAME qh-11195
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150304
Time 17.00
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 210
DS 2
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 196.92
DW 20.800 usec
DE 6.50 usec
TE 296.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.70 usec
PLW1 46.98899841 W

==== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLW2 11.99499989 W
PLW12 0.34213999 W
PLW13 0.27713001 W

F2 - Processing parameters
SI 32768
SF 100.6127561 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40