

Supporting Information

A novel iodine-mediated tandem cyclization-cycloaddition reactions leading to polyoxacyclic ring systems

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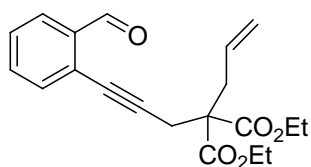
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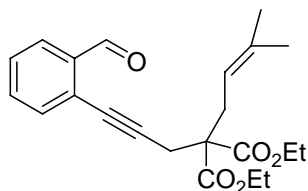
General Remarks

Column chromatography was carried out on silica gel (200–300 mesh). ^1H NMR spectra were recorded at 400 MHz in CDCl_3 by using TMS as an internal standard, Data for ^1H NMR are reported as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet), coupling constant in Hertz (Hz) and integration. ^{13}C NMR spectra were recorded at 100 MHz in CDCl_3 and ^{13}C NMR data are reported in terms of chemical shift in ppm with CDCl_3 as an internal standard. IR spectra were recorded with an FT-IR spectrometer and only major peaks are reported. Melting points were determined with a microscopic apparatus and are uncorrected. All compounds were further characterized by HRMS. Commercially available reagents and solvents were used without further purification.

The substrates **1a-15a** were prepared according to the methods in the literatures.¹

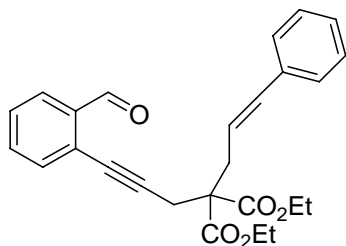


(1a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.25-1.29 (t, $J = 7.0$ Hz, 6 H), 2.87-2.88 (d, $J = 7.6$ Hz, 2 H), 3.11 (s, 2 H), 4.22-4.27 (q, $J = 7.2$ Hz, 4 H), 5.15-5.24 (m, 2 H), 5.66-5.73 (m, 1 H), 7.39-7.43 (m, 1 H), 7.48-7.55 (m, 2 H), 7.87-7.89 (t, $J = 4.0$ Hz, 1 H), 10.46 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.5, 169.5, 136.1, 133.5, 133.4, 131.5, 128.2, 126.8, 126.6, 119.8, 91.9, 79.0, 61.6, 56.7, 36.7, 23.7, 13.9. IR (neat): 3376, 2982, 1733, 1293, 1216, 1194, 765 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{20}\text{H}_{22}\text{O}_5$ ($\text{M}+\text{NH}_4$): 360.1805, found ($\text{M}+\text{NH}_4$): 360.1810.

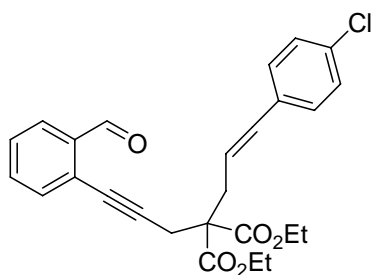


(2a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.24-1.28 (q, $J = 7.2$ Hz, 6 H), 1.67 (s, 3 H), 1.72 (s, 3 H), 2.82-2.84 (d, $J = 7.6$ Hz, 2 H), 3.08 (s, 2 H), 4.19-4.27 (m, 4 H), 4.96-

5.00 (t, $J = 7.2$ Hz, 1 H), 7.38-7.42 (t, $J = 7.4$ Hz, 1 H), 7.47-7.54 (m, 2 H), 7.87-7.89 (d, $J = 7.6$ Hz, 1 H), 10.46 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.7, 169.9, 136.7, 136.0, 133.5, 133.4, 128.2, 126.8, 116.9, 92.5, 78.8, 61.5, 57.1, 30.9, 25.9, 23.5, 17.9, 14.0. IR (neat): 3525, 2981, 1779, 1732, 1594, 1472, 1193, 766 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{20}\text{H}_{26}\text{O}_5$ ($\text{M}+\text{NH}_4$): 388.2118, found ($\text{M}+\text{NH}_4$): 388.2112.

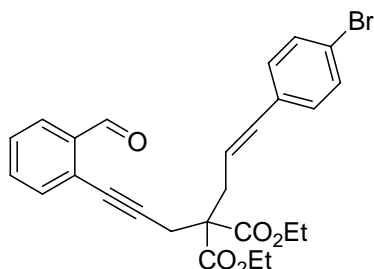


(3a): Yellow solid. mp 60-62 $^{\circ}\text{C}$; ^1H NMR (400 MHz, CDCl_3): δ 1.25-1.28 (t, $J = 7.0$ Hz, 6 H), 3.01-3.04 (q, $J = 0.8$ Hz, 2 H), 3.15 (s, 2 H), 4.22-4.28 (q, $J = 7.2$ Hz, 4 H), 6.05-6.12 (m, 1 H), 6.52-6.56 (d, $J = 15.6$ Hz, 1 H), 7.19-7.23 (m, 1 H), 7.25-7.30 (m, 4 H), 7.33-7.36 (m, 1 H), 7.38-7.54 (m, 2 H), 7.88-7.90 (d, $J = 7.6$ Hz, 1 H), 10.49 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.5, 169.5, 136.7, 136.0, 134.6, 133.5, 133.4, 128.4, 128.3, 127.4, 126.9, 126.6, 126.1, 123.0, 92.0, 79.2, 61.7, 57.1, 36.1, 24.0, 14.0. IR (KBr): 3466, 2981, 1732, 1696, 1194, 1095, 765, 694 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{26}\text{H}_{26}\text{O}_5$ ($\text{M}+\text{Na}$): 441.1672, found ($\text{M}+\text{Na}$): 441.1666.

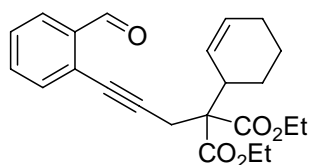


(4a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.25-1.28 (t, $J = 7.2$ Hz, 6 H), 3.00-3.02 (d, $J = 7.2$ Hz, 2 H), 3.14 (s, 2 H), 4.23-4.28 (q, $J = 7.2$ Hz, 4 H), 6.06-6.10 (t, $J = 8.0$ Hz, 1 H), 6.47-6.51 (d, $J = 16.0$ Hz, 1H), 7.24-7.27 (d, $J = 10.8$ Hz, 4 H), 7.41-7.43 (t, $J = 4.0$ Hz, 1 H), 7.50-7.52 (m, 2 H), 7.88-7.90 (d, $J = 7.6$ Hz, 1H), 10.48 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.5, 169.5, 136.0, 135.2, 133.5, 133.4, 133.3, 133.0, 128.5, 128.3, 127.3, 127.0, 126.5, 123.9, 91.9, 79.3, 61.7, 57.1, 36.2, 24.1, 14.0. IR (neat):

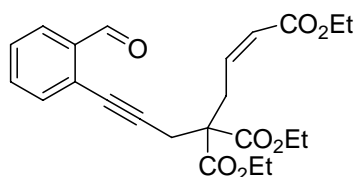
3465, 2982, 1731, 1696, 1486, 1193, 765, 492 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{26}\text{H}_{25}\text{ClO}_5$ (M+Na): 475.1283, found (M+Na): 475.1287.



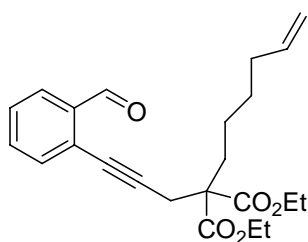
(5a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.26 (s, 6 H), 2.99-3.01 (d, $J = 7.6$ Hz, 2 H), 3.13 (s, 2 H), 4.22-4.28 (q, $J = 7.2$ Hz, 4 H), 6.06-6.12 (q, $J = 7.6$ Hz, 1 H), 6.45-6.49 (d, $J = 15.6$ Hz, 1 H), 7.18-7.20 (d, $J = 8.4$ Hz, 2 H), 7.39-7.44 (m, 3 H), 7.48-7.53 (m, 2 H), 7.89-7.90 (d, $J = 7.6$ Hz, 1 H), 10.47 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.6, 169.6, 136.1, 135.7, 133.6, 133.5, 133.4, 131.5, 128.4, 127.7, 127.1, 126.6, 124.1, 121.2, 91.9, 79.4, 61.8, 57.1, 36.3, 24.2, 14.1. IR (neat): 3458, 2978, 1730, 1698, 1190, 1093, 764 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{26}\text{H}_{25}\text{BrO}_5$ (M+Na): 496.0885, found (M+Na): 496.0881.



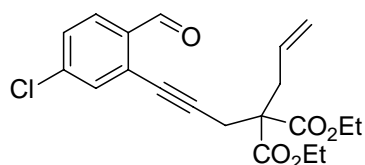
(6a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.45-1.48 (t, $J = 6.4$ Hz, 6 H), 1.54-1.61 (m, 1 H), 1.74 (s, 1H), 1.81-1.91 (m, 2 H), 1.95-1.99 (m, 2 H), 3.07-3.21 (m, 3 H), 4.18-4.27 (m, 4 H), 5.76 (s, 2 H), 7.38-7.41 (t, $J = 7.4$ Hz, 1 H), 7.46-7.53 (m, 2 H), 7.87-7.89 (d, $J = 7.6$ Hz, 1 H), 10.46 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.9, 169.7, 169.5, 136.1, 133.6, 133.3, 129.0, 128.2, 127.4, 127.0, 126.8, 93.0, 78.8, 61.4, 61.3, 60.2, 39.0, 24.8, 24.3, 23.3, 22.2, 14.1, 14.0. IR (neat): 3458, 2934, 1729, 1473, 1228, 1095, 766, 725 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{23}\text{H}_{26}\text{O}_5$ (M+ NH_4): 400.2118, found (M+ NH_4): 400.2125.



(7a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.26-1.29 (t, $J = 7.2$ Hz, 9 H), 2.99-3.02 (q, $J = 4.0$ Hz, 2 H), 3.11 (s, 2 H), 4.15-4.20 (m, 2 H), 4.23-4.28 (q, $J = 7.0$ Hz, 4 H), 5.87-5.98 (q, $J = 15.6$ Hz, 1 H), 6.75-6.87 (m, 1 H), 7.41-7.45 (m, 1 H), 7.49-7.56 (m, 2 H), 7.88-7.90 (m, 1 H), 10.44 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.4, 169.5, 169.1, 165.6, 141.7, 141.5, 136.0, 133.6, 133.5, 128.5, 127.1, 126.3, 125.7, 125.4, 91.2, 79.6, 62.0, 60.4, 56.5, 35.2, 24.2, 14.1, 14.0. IR (neat): 3466, 2983, 1730, 1656, 1273, 1096, 767, 638 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{23}\text{H}_{26}\text{O}_7$ ($\text{M}+\text{NH}_4$): 432.2017, found ($\text{M}+\text{NH}_4$):432.2016.

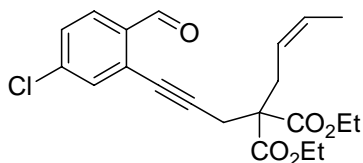


(8a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.24-1.30 (m, 8 H), 1.43-1.47 (t, $J = 7.40$ Hz, 2 H), 2.04-2.12 (m, 4 H), 3.11 (s, 2 H), 4.20-4.25 (m, 4 H), 4.92-5.01 (m, 2 H), 5.74-5.78 (t, $J = 8.6$ Hz, 1 H), 7.40-7.42 (d, $J = 7.6$ Hz, 1 H), 7.47-7.52 (m, 2 H), 7.88-7.89 (d, $J = 7.6$ Hz, 1 H), 10.45 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.7, 170.2, 138.4, 136.1, 133.6, 133.4, 128.3, 126.9, 126.8, 114.6, 92.2, 78.9, 61.6, 57.0, 33.3, 32.0, 28.8, 23.9, 23.3, 14.0. IR (neat): 3372, 2848, 1698, 1586, 1554, 1394, 1239, 1086, 984, 839, 775, 461 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{23}\text{H}_{28}\text{O}_5$ ($\text{M}+\text{Na}$): 407.1829, found ($\text{M}+\text{Na}$):407.1835.

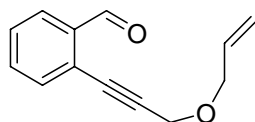


(9a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.25-1.29 (t, $J = 7.0$ Hz, 6 H), 2.84-2.86 (d, $J = 7.6$ Hz, 2 H), 3.10 (s, 2 H), 4.21-4.27 (q, $J = 7.2$ Hz, 4 H), 5.16-5.23 (q, $J =$

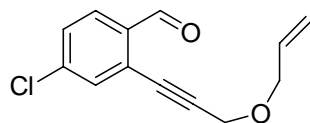
9.0 Hz, 2 H), 5.62-5.73 (m, 1 H), 7.37-7.39 (q, $J = 4.2$ Hz, 1 H), 7.47-7.48 (d, $J = 7.2$ Hz, 1 H), 7.81-7.83 (d, $J = 8.4$ Hz, 1 H), 10.38 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 190.3, 169.5, 140.0, 134.4, 133.1, 131.4, 128.9, 128.3, 128.1, 120.1, 93.5, 77.9, 61.7, 56.7, 36.8, 23.7, 14.0. IR (neat): 3459, 2982, 1733, 1588, 1293, 1216, 1090, 1011, 842, 777 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{20}\text{H}_{21}\text{O}_5$ ($\text{M}+\text{NH}_4$): 394.1416, found ($\text{M}+\text{NH}_4$):394.1421.



(10a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.25-1.28 (t, $J = 7.0$ Hz, 6 H), 1.66-1.70 (t, $J = 8.0$ Hz, 3 H), 2.76-2.78 (d, $J = 7.2$ Hz, 2 H), 3.07 (s, 1 H), 4.20-4.26 (q, $J = 7.0$ Hz, 4 H), 5.25-5.30 (m, 1H), 5.59-5.64 (m, 1 H), 7.27-7.39 (m, 1 H), 7.47-7.48 (d, $J = 2.0$ Hz, 1 H), 7.81-7.83 (m, 1 H), 10.39 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 190.4, 169.7, 140.0, 134.4, 133.1, 130.8, 128.8, 128.3, 128.2, 123.7, 93.7, 77.8, 61.7, 56.9, 35.6, 23.6, 18.0, 14.0. IR (neat): 3376, 2923, 1734, 1698, 1587, 1203, 839 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{21}\text{H}_{23}\text{O}_5\text{Cl}$ ($\text{M}+\text{H}$): 391.1307, found ($\text{M}+\text{H}$):391.1308.

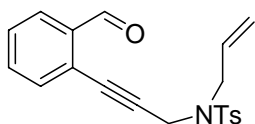


(11a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 4.14-4.16 (m, 2 H), 4.44 (s, 2 H), 5.24-5.27 (m, 1 H), 5.33-5.38 (m, 1 H), 5.90-5.98 (m, 1 H), 7.41-7.52 (m, 1 H), 7.53-7.57 (m, 2 H), 7.89-7.91 (m, 1 H), 10.51 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.1, 135.9, 133.6, 133.5, 133.3, 128.6, 127.0, 125.8, 117.8, 92.2, 81.6, 70.7, 57.6. IR (neat): 3378, 2847, 1697, 1594, 1083, 929, 765, 639 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{13}\text{H}_{12}\text{O}_2$ ($\text{M}+\text{Na}$): 223.0730, found ($\text{M}+\text{Na}$):223.0730.

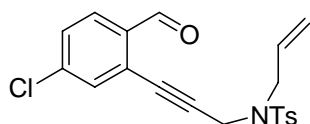


(12a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 4.14-4.15 (d, $J = 5.6$ Hz, 2 H), 4.44 (s,

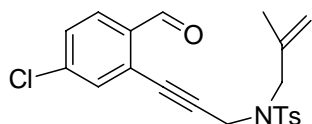
2 H), 5.25-5.38 (m, 2 H), 5.90-5.98 (m, 1 H), 7.39-7.42 (q, $J = 4.2$ Hz, 1 H), 7.52-7.53 (d, 1 H), 7.82-7.84 (d, 1 H), 10.43 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 189.8, 139.9, 134.2, 133.5, 132.9, 129.1, 128.4, 127.2, 118.0, 93.6, 80.3, 70.8, 57.4. IR (neat): 3393, 2923, 1734, 1190, 763 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{13}\text{H}_{11}\text{O}_2\text{Cl}$ ($\text{M}+\text{NH}_4$):252.0786, found ($\text{M}+\text{NH}_4$):252.0781.



(13a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 2.26 (s, 3 H), 3.91-3.93 (d, $J = 6.4$ Hz, 2 H), 4.39 (s, 2 H), 5.27-5.36 (m, 2 H), 5.77-5.84 (m, 1 H), 7.20-7.24 (t, $J = 8.2$ Hz, 3 H), 7.39-7.43 (t, $J = 7.4$ Hz, 1 H), 7.48-7.52 (m, 1 H), 7.74-7.76 (d, $J = 8.4$ Hz, 2 H), 7.82-7.84 (d, $J = 8.0$ Hz, 1 H), 9.92 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 190.5, 143.7, 135.6, 133.4, 133.2, 131.8, 129.5, 128.7, 127.5, 126.9, 125.4, 119.9, 88.9, 81.2, 49.4, 36.5, 21.1. IR (neat): 3555, 2962, 1696, 1594, 1349, 1161, 895, 763, 586, 544 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{20}\text{H}_{19}\text{O}_3\text{SN}$ ($\text{M}+\text{NH}_4$): 371.1424, found ($\text{M}+\text{NH}_4$):371.1417.



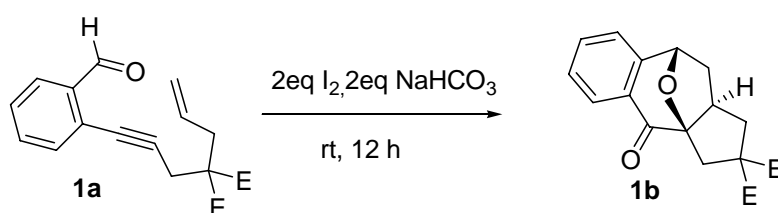
(14a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 2.32 (s, 3 H), 3.90-3.92 (d, $J = 6.4$ Hz, 2 H), 4.39 (s, 2 H), 5.28-5.35 (t, $J = 13.2$ Hz, 2 H), 5.78-5.84 (m, 1 H), 7.10-7.11 (d, $J = 1.6$ Hz, 1 H), 7.24-7.26 (d, $J = 8.0$ Hz, 2 H), 7.37-7.39 (m, 1 H), 7.75-7.78 (m, 3 H), 9.89 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 189.3, 143.9, 139.8, 135.6, 134.0, 132.9, 131.7, 129.5, 129.2, 128.4, 127.5, 126.7, 120.1, 90.2, 80.0, 49.5, 36.4, 21.2. IR (neat): 3371, 2850, 1698, 1350, 1162, 1089, 839, 664, 544 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{20}\text{H}_{18}\text{O}_3\text{SNCl}$ ($\text{M}+\text{NH}_4$): 405.1034, found ($\text{M}+\text{NH}_4$):405.1036.



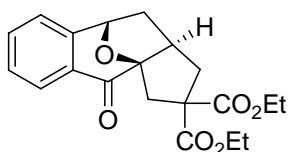
(15a): Yellow oil. ^1H NMR (400 MHz, CDCl_3): δ 1.70-1.72 (m, 3 H), 2.31-2.32 (d, $J = 6.0$ Hz, 3 H), 3.83-3.85 (d, $J = 6.8$ Hz, 2 H), 4.37 (s, 2 H), 5.42-5.48 (m, 1 H), 5.71-5.77

(m, 1 H), 7.10-7.11 (d, $J = 2.0$ Hz, 1 H), 7.23-7.30 (t, $J = 14.4$ Hz, 2 H), 7.36-7.39 (m, 1 H), 7.74-7.78 (t, $J = 8.6$ Hz, 3 H), 9.89 (s, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 189.2, 143.7, 139.7, 135.7, 133.9, 132.8, 131.7, 129.4, 129.1, 128.3, 127.5, 126.8, 124.3, 90.5, 79.8, 48.8, 36.1, 21.2, 17.6. IR (neat): 3371, 2921, 1698, 1587, 1349, 1162, 1088, 906, 839, 732, 659, 552 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{21}\text{H}_{20}\text{O}_3\text{SNCl}$ ($\text{M}+\text{NH}_4$): 419.1191, found ($\text{M}+\text{NH}_4$):419.1192.

General produce for the iodo-catalyzed cyclization of enynebenzaldehyde

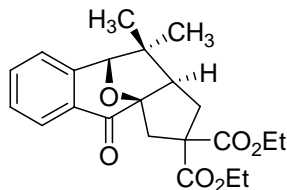


To a stirred solution of enynebenzaldehyde **1a** (0.2 mmol) in CH_2Cl_2 (3.0 mL) was added NaHCO_3 (33.6 mg, 0.40 mmol) and I_2 (101.6 mg, 0.4 mmol) at room temperature. When the reaction was considered complete as determined by TLC analysis, diethyl ether (15 mL) was added to the reaction, then, washed with 5% $\text{Na}_2\text{S}_2\text{O}_3$ solution and extracted with CH_2Cl_2 (3 \times 15 mL). The organic layer was washed with saturated NaCl solution (2 \times 10 mL), dried with Na_2SO_4 and the solvent was evaporated and the residue was purified by column chromatography, eluting with hexane/EtOAc (20:1) to give the pure **1b**. Other compounds **2b-15b** was synthesized by similar method.

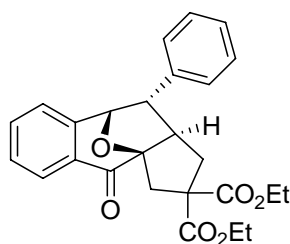


(1b): Yield 95 %, yellow solid, mp 82-84 $^\circ\text{C}$; ^1H NMR (400 MHz, CDCl_3): δ 1.25-1.30 (m, 6 H), 2.12-2.17 (m, 1 H), 2.37-2.43 (m, 2 H), 2.50-2.52 (d, $J = 4.0$ Hz, 1 H), 2.66-2.72 (t, $J = 11.0$ Hz, 2 H), 3.26-3.29 (d, $J = 14.4$ Hz, 1 H), 4.17-4.25 (m, 4 H), 5.29-5.31 (d, $J = 6.8$ Hz, 1 H), 7.16-7.18 (d, $J = 7.6$ Hz, 1 H), 7.35-7.39 (m, 1 H), 7.49-7.53 (m, 1 H), 7.99-8.01 (d, $J = 7.6$ Hz, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 193.7, 171.0, 170.9, 146.8, 133.7, 128.3, 127.8, 127.1, 123.8, 96.9, 79.8, 62.1, 61.7, 61.5, 43.8, 39.5, 39.3, 37.4, 14.0, 13.9. IR (KBr): 3383, 2980, 1731, 1248, 1091, 771, 565 cm^{-1} . HRMS (ESI)

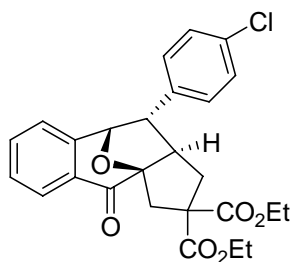
Calcd for C₂₀H₂₂O₆ (M+H): 359.1489, found (M+H): 359.1492.



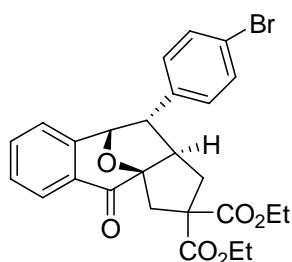
(2b): Yield 33%, yellow oil; ¹H NMR (400 MHz, CDCl₃): δ 0.79 (s, 3 H), 1.25-1.28 (q, *J* = 6.0 Hz, 3 H), 1.30-1.35 (q, *J* = 7.2 Hz, 6 H), 2.08-2.14 (q, *J* = 6.2 Hz, 1 H), 2.45-2.62 (m, 3 H), 3.19-3.23 (d, *J* = 14.4 Hz, 1 H), 4.16-4.30 (m, 4 H), 4.77 (s, 1 H), 7.14-7.16 (d, *J* = 7.2 Hz, 1 H), 7.37-7.41 (t, *J* = 7.6 Hz, 1 H), 7.49-7.53 (t, *J* = 7.6 Hz, 1 H), 8.00-8.01 (d, *J* = 7.6 Hz, 1 H); ¹³C NMR (100 MHz, CDCl₃): δ 194.4, 171.1, 170.5, 144.0, 133.1, 128.4, 128.0, 127.1, 125.8, 97.5, 91.9, 64.3, 61.7, 61.5, 54.9, 43.2, 38.0, 34.0, 26.7, 26.6, 13.9. IR (neat): 3463, 2962, 1732, 1602, 1462, 1249, 1094, 1022, 765, 439 cm⁻¹. HRMS (ESI) Calcd for C₂₂H₂₆O₆ (M+H): 387.1802, found (M+H):387.1795.



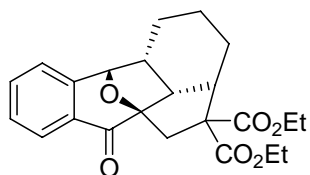
(3b): Yield 51%, yellow solid, mp 100-102 °C; ¹H NMR (400 MHz, CDCl₃): δ 1.26-1.32 (m, 6 H), 2.32-2.38 (q, *J* = 6.8 Hz, 1 H), 2.70-2.75 (m, 2 H), 2.85-2.89 (m, 1 H), 4.04-4.09 (m, 1 H), 4.18-4.30 (m, 4 H), 6.46-6.47 (d, *J* = 7.6 Hz, 1 H), 6.66-6.67 (d, *J* = 6.4 Hz, 2 H), 7.06-7.12 (m, 3 H), 7.21-7.26 (m, 1 H), 7.33-7.37 (m, 1 H), 8.08-8.09 (d, *J* = 7.2 Hz, 1 H); ¹³C NMR (100 MHz, CDCl₃): δ 193.5, 171.1, 170.8, 142.9, 137.0, 132.9, 129.2, 128.3, 128.1, 128.0, 127.0, 126.8, 126.5, 97.5, 84.5, 61.9, 61.8, 61.6, 57.3, 50.8, 38.4, 37.5, 14.0. IR (KBr): 3732, 2977, 1733, 1697, 1692, 1246, 1103, 700, 566 cm⁻¹. HRMS (ESI) Calcd for C₂₆H₂₆O₆ (M+H): 435.1802, found (M+H):435.1811.



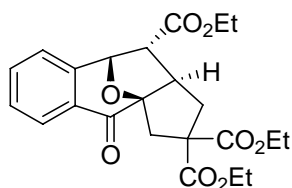
(4b): Yield 55%, yellow solid, mp 181-182 °C; ^1H NMR (400 MHz, CDCl_3): δ 1.26-1.32 (m, 6 H), 2.32-2.38 (q, $J = 6.8$ Hz, 1 H), 2.70-2.75 (m, 2 H), 2.85-2.89 (m, 1 H), 4.04-4.09 (m, 1 H), 4.18-4.30 (m, 4 H), 6.46-6.47 (d, $J = 7.6$ Hz, 1 H), 6.66-6.67 (d, $J = 6.4$ Hz, 2 H), 7.06-7.12 (m, 3 H), 7.21-7.26 (m, 1 H), 7.33-7.37 (m, 1 H), 8.08-8.09 (d, $J = 7.2$ Hz, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 193.3, 171.1, 170.7, 142.5, 135.6, 133.1, 132.8, 129.6, 129.2, 128.3, 128.2, 126.9, 126.5, 97.4, 84.2, 61.9, 61.8, 61.7, 56.6, 51.1, 38.3, 37.5, 14.0. IR (KBr): 3404, 2924, 1729, 1248, 1092, 761, 517 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{26}\text{H}_{25}\text{ClO}_6$ (M+H): 469.1412, found (M+H):469.1405.



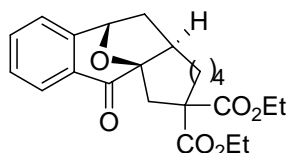
(5b): Yield 54%, yellow solid, mp 160-162 °C; ^1H NMR (400 MHz, CDCl_3): δ 1.28-1.30 (d, $J = 7.6$ Hz, 6 H), 2.30-2.36 (q, $J = 6.6$ Hz, 1 H), 2.68-2.78 (m, 3 H), 3.30-3.34 (d, $J = 14.8$ Hz, 1 H), 4.01 (s, 1 H), 4.20-4.30 (m, 4 H), 5.20-5.22 (s, $J = 6.4$ Hz, 1 H), 6.48-6.53 (m, 3 H), 7.20-7.22 (d, $J = 8.4$ Hz, 2 H), 7.26-7.30 (t, $J = 8.6$ Hz, 1 H), 7.36-7.40 (t, $J = 7.4$ Hz, 1 H), 8.08-8.10 (d, $J = 7.6$ Hz, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 193.3, 171.1, 170.7, 142.4, 136.1, 133.1, 131.2, 130.0, 129.2, 128.4, 127.0, 126.5, 121.0, 97.5, 84.2, 61.9, 61.8, 61.7, 56.7, 51.1, 38.3, 37.5, 14.0. IR (KBr): 3411, 2919, 1728, 1247, 1072, 513 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{26}\text{H}_{25}\text{BrO}_6$ (M+Na): 535.0727, found (M+Na):535.0724.



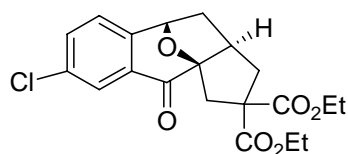
(6b): Yield 65%, yellow oil; ^1H NMR (400 MHz, CDCl_3): δ 1.00-1.11 (m, 2 H), 1.26 (s, 3 H), 1.34 (s, 3 H), 1.65-1.67 (m, 1 H), 1.73-1.76 (d, $J = 13.2$ Hz, 1 H), 2.23-2.30 (m, 2 H), 2.65-2.69 (d, $J = 14.4$ Hz, 1 H), 2.84-2.91 (m, 2 H), 3.10-3.14 (d, $J = 14$ Hz, 1 H), 4.13-4.17 (m, 1 H), 4.18-4.31 (m, 3 H), 5.02 (s, 1 H), 7.18-7.20 (d, $J = 7.6$ Hz, 1 H), 7.33-7.37 (t, $J = 7.6$ Hz, 1 H), 7.48-7.51 (t, $J = 7.2$ Hz, 1 H), 7.94-7.96 (d, $J = 7.6$ Hz, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 194.1, 171.2, 168.9, 144.9, 133.5, 128.1, 127.8, 127.1, 123.9, 95.1, 89.2, 69.3, 61.8, 61.2, 45.2, 41.2, 40.6, 34.8, 30.0, 24.8, 22.1, 14.1, 14.0. IR (neat): 3464, 2938, 1731, 1258, 1091, 995, 762, 654, 549 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{24}\text{H}_{28}\text{O}_6$ (M+H): 399.1705, found (M+H):399.1701.



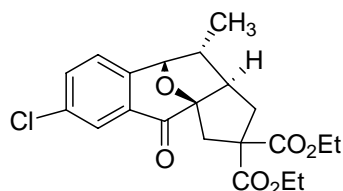
(7b): Yield 72%, yellow oil; ^1H NMR (400 MHz, CDCl_3): δ 1.13-1.17 (t, $J = 7.2$ Hz, 3 H), 1.25-1.29 (m, 6 H), 2.33-2.36 (t, $J = 6.8$ Hz, 1 H), 2.62-2.66 (d, $J = 14$ Hz, 2 H), 3.11-3.16 (m, 1 H), 3.25-3.28 (d, $J = 7.4$ Hz, 1 H), 3.82-3.85 (t, $J = 6.4$ Hz, 1 H), 3.82-3.98 (m, 2 H), 4.17-4.26 (m, 4 H), 5.42-5.44 (d, $J = 6.8$ Hz, 1 H), 7.13-7.14 (d, $J = 7.2$ Hz, 1 H), 7.40-7.43 (m, 1 H), 7.46-7.48 (m, 1 H), 8.01-8.03 (m, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 192.7, 171.0, 170.5, 169.6, 142.1, 133.2, 129.0, 128.7, 127.1, 125.4, 97.4, 80.4, 61.8, 61.6, 61.5, 60.9, 56.6, 45.8, 37.9, 37.4, 14.1, 14.0, 13.9, 13.9. IR (neat): 3456, 2982, 1733, 1267, 1187, 1106, 646 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{23}\text{H}_{26}\text{O}_8$ (M+H): 431.1700, found (M+H):431.1704.



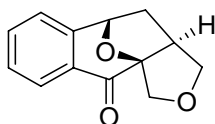
(8b): Yield 0%.



(9b): Yield 84%, yellow solid, mp 130-132 °C; $^1\text{H NMR}$ (400 MHz, CDCl_3): δ 1.24-1.30 (m, 6 H), 2.10-2.15 (q, $J = 6.2$ Hz, 1 H), 2.36-2.44 (m, 2 H), 2.50-2.55 (t, $J = 8.8$ Hz, 1 H), 2.65-2.71 (m, 2 H), 3.24-3.27 (d, $J = 14.8$ Hz, 1 H), 4.19-4.25 (m, 4 H), 5.28-5.30 (d, $J = 6.8$ Hz, 1 H), 7.13-7.15 (d, $J = 8.0$ Hz, 1 H), 7.45-7.48 (m, 1 H), 7.96-7.97 (d, $J = 2.0$ Hz, 1 H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3): δ 192.5, 170.8, 145.0, 134.1, 133.6, 129.8, 127.0, 125.5, 96.7, 79.4, 62.0, 61.8, 61.6, 43.7, 39.4, 39.2, 37.3, 14.0, 13.9. IR (KBr): 3379, 2926, 1728, 1699, 1255, 1179, 1101, 1019, 838, 549 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{20}\text{H}_{21}\text{ClO}_6$ (M+H): 393.1099, found (M+H): 393.1093.

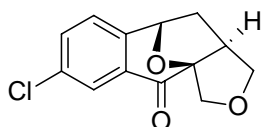


(10b): Yield 56%, yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3): δ 0.76-0.78 (d, $J = 6.8$ Hz, 3 H), 1.25-1.28 (t, $J = 5.2$ Hz, 6 H), 2.09-2.13 (m, 1 H), 2.30-2.35 (m, 1 H), 2.60-2.66 (m, 2 H), 2.77-2.82 (q, $J = 6.8$ Hz, 1 H), 3.18-3.22 (d, $J = 14.8$ Hz, 1 H), 4.21-4.23 (d, $J = 7.2$ Hz, 4 H), 5.04-5.06 (d, $J = 6.4$ Hz, 1 H), 7.07-7.09 (d, $J = 8.0$ Hz, 1 H), 7.46-7.48 (q, $J = 4.2$ Hz, 1 H), 8.00-8.01 (d, $J = 2.0$ Hz, 1 H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3): δ 192.6, 170.9, 170.8, 141.5, 134.2, 133.0, 130.4, 127.3, 127.1, 96.8, 83.0, 61.9, 61.8, 61.6, 51.8, 44.6, 37.9, 37.3, 31.9, 22.6, 15.7, 14.1, 14.0, 13.9. IR (neat): 3462, 2924, 1733, 1460, 1732, 1251, 862, 734, 474 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{21}\text{H}_{23}\text{ClO}_6$ (M+H): 407.1256, found (M+H): 407.1262.

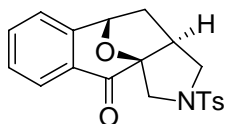


(11b): Yield 63%, yellow solid, mp 121-123 °C; $^1\text{H NMR}$ (400 MHz, CDCl_3): δ 2.17-2.28 (m, 2 H), 2.77-2.80 (q, $J = 4.0$ Hz, 1 H), 3.78-3.82 (m, 1 H), 3.98-4.02 (q, $J = 5.2$ Hz, 1 H), 4.10-4.15 (q, $J = 7.4$ Hz, 1 H), 4.53-4.56 (q, $J = 5.2$ Hz, 1 H), 5.50-5.52 (d, $J = 6.0$ Hz, 1 H), 7.23-7.28 (q, $J = 9.4$ Hz, 1 H), 7.39-7.43 (m, 1 H), 7.53-7.57 (m, 1 H), 8.01-

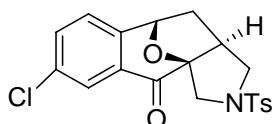
8.03 (q, $J = 3.8$ Hz, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 192.8, 146.4, 133.9, 128.7, 128.0, 126.9, 124.0, 97.5, 81.2, 74.1, 70.6, 46.7, 37.3. IR (KBr): 3381, 2865, 1698, 1601, 1288, 1077, 920, 755, 558 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{13}\text{H}_{12}\text{O}_3$ ($\text{M}+\text{NH}_4$): 234.1125, found ($\text{M}+\text{NH}_4$):234.1123.



(12b): Yield 76%, yellow solid, mp 158-160 $^\circ\text{C}$; ^1H NMR (400 MHz, CDCl_3): δ 2.16-2.30 (m, 2 H), 2.74-2.81 (m, 1 H), 3.79-3.83 (q, $J = 4.4$ Hz, 1 H), 3.99-4.02 (d, $J = 10.4$ Hz, 1 H), 4.11-4.15 (t, $J = 8.4$ Hz, 1 H), 4.51-4.53 (d, $J = 10.8$ Hz, 1 H), 5.49-5.51 (d, $J = 6.4$ Hz, 1 H), 7.19-7.26 (t, $J = 14.6$ Hz, 1 H), 7.49-7.52 (q, $J = 4.0$ Hz, 1 H), 7.98-7.99 (d, $J = 2.0$ Hz, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.6, 144.6, 134.3, 133.8, 130.2, 126.9, 125.7, 97.4, 80.8, 74.1, 70.6, 46.7, 37.3. IR (KBr): 3739, 2923, 1704, 1281, 1072, 833, 479 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{13}\text{H}_{11}\text{ClO}_3$ ($\text{M}+\text{NH}_4$): 268.0735, found ($\text{M}+\text{NH}_4$): 268.0733.

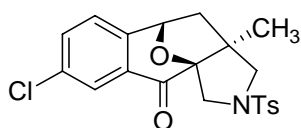


(13b): Yield 61%, yellow solid, Yellow solid. mp 181-183 $^\circ\text{C}$; ^1H NMR (400 MHz, CDCl_3): δ 2.15-2.21 (m, 2 H), 2.44 (s, 3 H), 2.62 (s, 1 H), 3.23-3.26 (q, $J = 5.0$ Hz, 1 H), 3.47-3.53 (m, 2 H), 4.01-4.04 (d, $J = 11.2$ Hz, 1 H), 5.39-5.40 (d, $J = 6.4$ Hz, 1 H), 7.19-7.20 (d, $J = 7.6$ Hz, 1 H), 7.35-7.40 (m, 3 H), 7.51-7.53 (q, $J = 3.8$ Hz, 1 H), 7.74-7.76 (d, $J = 8.4$ Hz, 2 H), 7.95-7.97 (d, $J = 8.0$ Hz, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 191.6, 146.2, 143.8, 134.2, 132.3, 129.7, 128.2, 128.0, 127.9, 127.2, 123.9, 95.3, 80.3, 53.8, 51.3, 44.0, 38.0, 21.5. IR (KBr): 3403, 2924, 1700, 1343, 1160, 1092, 1008, 663, 548 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{20}\text{H}_{19}\text{NSO}_4$ ($\text{M}+\text{H}$): 370.1108, found ($\text{M}+\text{H}$):370.1111.



(14b): Yield 83%, yellow solid, mp 170-172 $^\circ\text{C}$; ^1H NMR (400 MHz, CDCl_3): δ 2.11-

2.24 (m, 2 H), 2.45 (s, 3 H), 2.57-2.64 (m, 1 H), 3.22-3.26 (q, $J = 5.0$ Hz, 1 H), 3.45-3.52 (m, 2 H), 3.96-3.99 (d, $J = 5.8$ Hz, 1 H), 5.38-5.40 (d, $J = 6.4$ Hz, 1 H), 7.16-7.18 (d, $J = 8.0$ Hz, 1 H), 7.35-7.37 (d, $J = 8.0$ Hz, 2 H), 7.47-7.50 (q, $J = 4.2$ Hz, 1 H), 7.73-7.75 (d, $J = 4.2$ Hz, 2 H), 7.90-7.91 (d, $J = 2.4$ Hz, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 190.4, 144.4, 143.9, 134.3, 134.0, 132.1, 129.7, 129.5, 127.9, 127.1, 125.6, 95.1, 79.9, 53.7, 51.2, 43.9, 37.8, 21.5. IR (KBr): 3403, 2924, 2856, 1706, 1596, 1345, 1162, 1014, 664, 549 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{20}\text{H}_{18}\text{ClNSO}_4$ (M+H): 404.0718, found (M+H):404.0728.

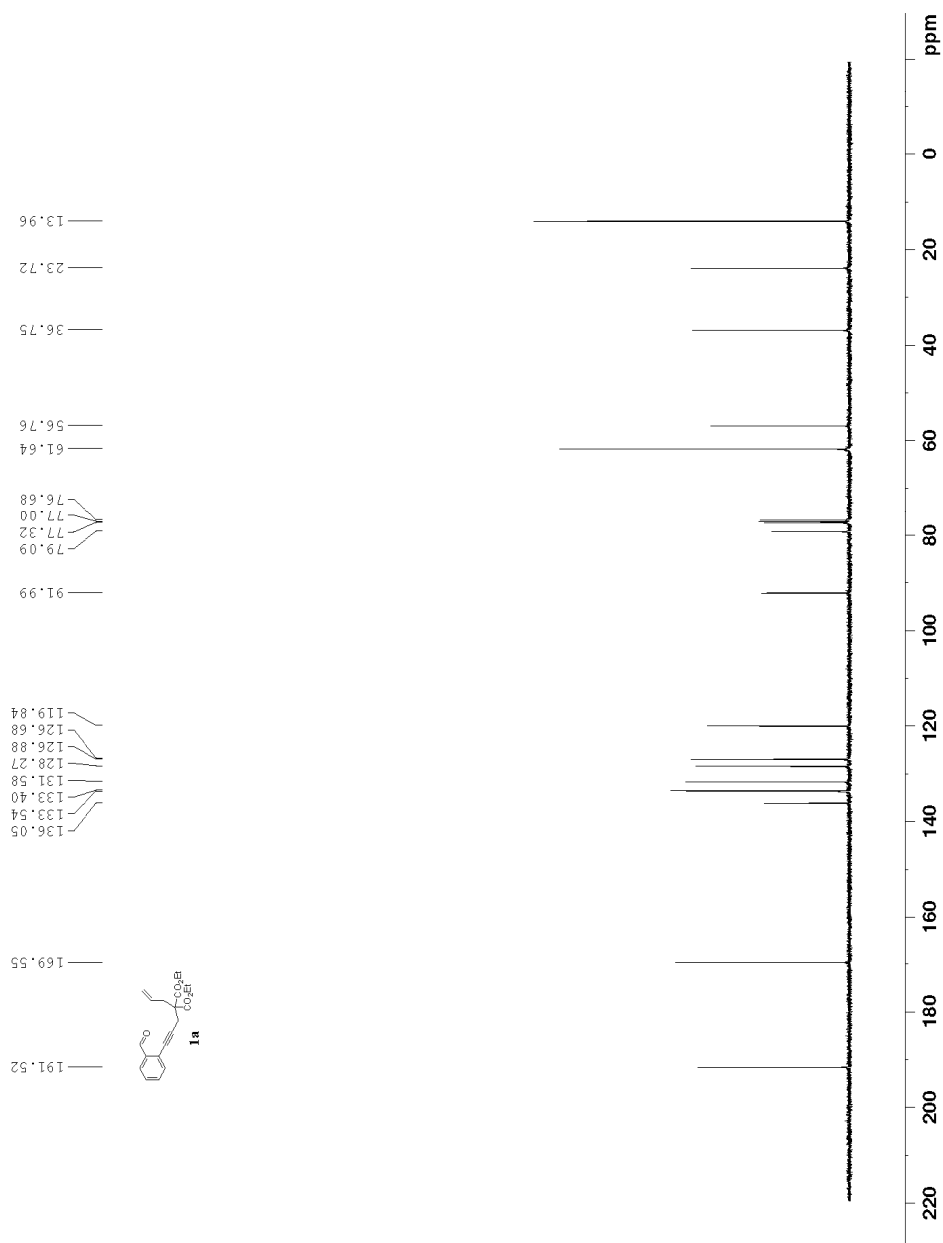


(15b): Yield 75%, yellow oil; ^1H NMR (400 MHz, CDCl_3): δ 0.87 (s, 3 H), 1.47-1.50 (d, $J = 12.4$ Hz, 1 H), 2.47 (s, 3 H), 3.02-3.05 (d, $J = 12.4$ Hz, 1 H), 3.56-3.59 (q, $J = 6.2$ Hz, 1 H), 4.03-4.06 (d, $J = 12.4$ Hz, 1 H), 4.76-4.79 (q, $J = 6.4$ Hz, 1 H), 7.19-7.23 (d, $J = 8.0$ Hz, 1 H), 7.37-7.44 (m, 3 H), 7.70-7.72 (d, $J = 8.4$ Hz, 2 H), 7.77-7.78 (d, $J = 1.6$ Hz, 1 H); ^{13}C NMR (100 MHz, CDCl_3): δ 190.5, 143.87, 140.07, 134.84, 134.75, 132.71, 131.52, 129.97, 129.36, 127.05, 124.03, 91.09, 72.84, 72.19, 58.19, 54.14, 40.35, 38.72, 31.36, 21.61. IR (neat): 3395, 2924, 1708, 1459, 1162, 1015, 664, 549 cm^{-1} . HRMS (ESI) Calcd for $\text{C}_{21}\text{H}_{20}\text{ClNSO}_4$ (M+H): 418.0874, found (M+H):418.0872.

Reference

- (a) G. Dyker, D.Hildebrandt, *J. Org. Chem.* **2005**, *70*, 6093-6096.

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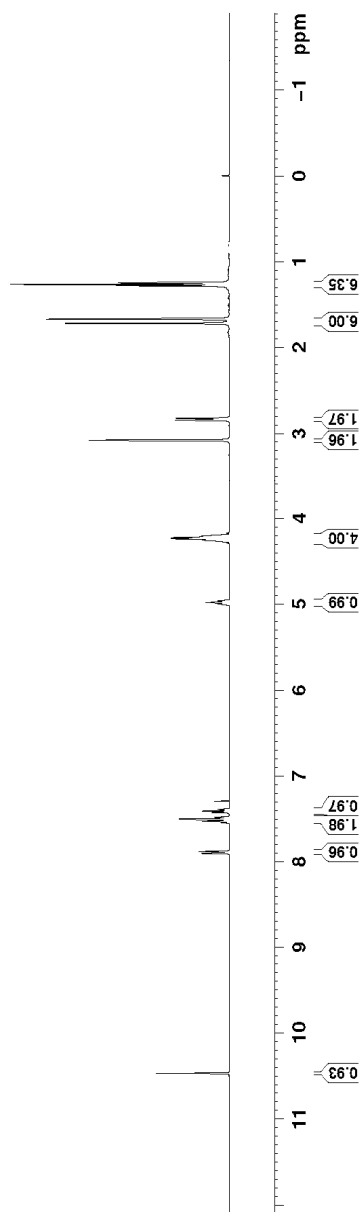
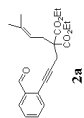
0.001
-0.002

1.249
1.264
1.266
1.284
1.670
1.720

2.828
2.847
3.081
4.194
4.203
4.212
4.221
4.229
4.238
4.245
4.247
4.253
4.256
4.262
4.271
4.271
4.964
4.981
5.000

7.291
7.387
7.405
7.424
7.478
7.497
7.506
7.524
7.543
7.778
7.897

10.467

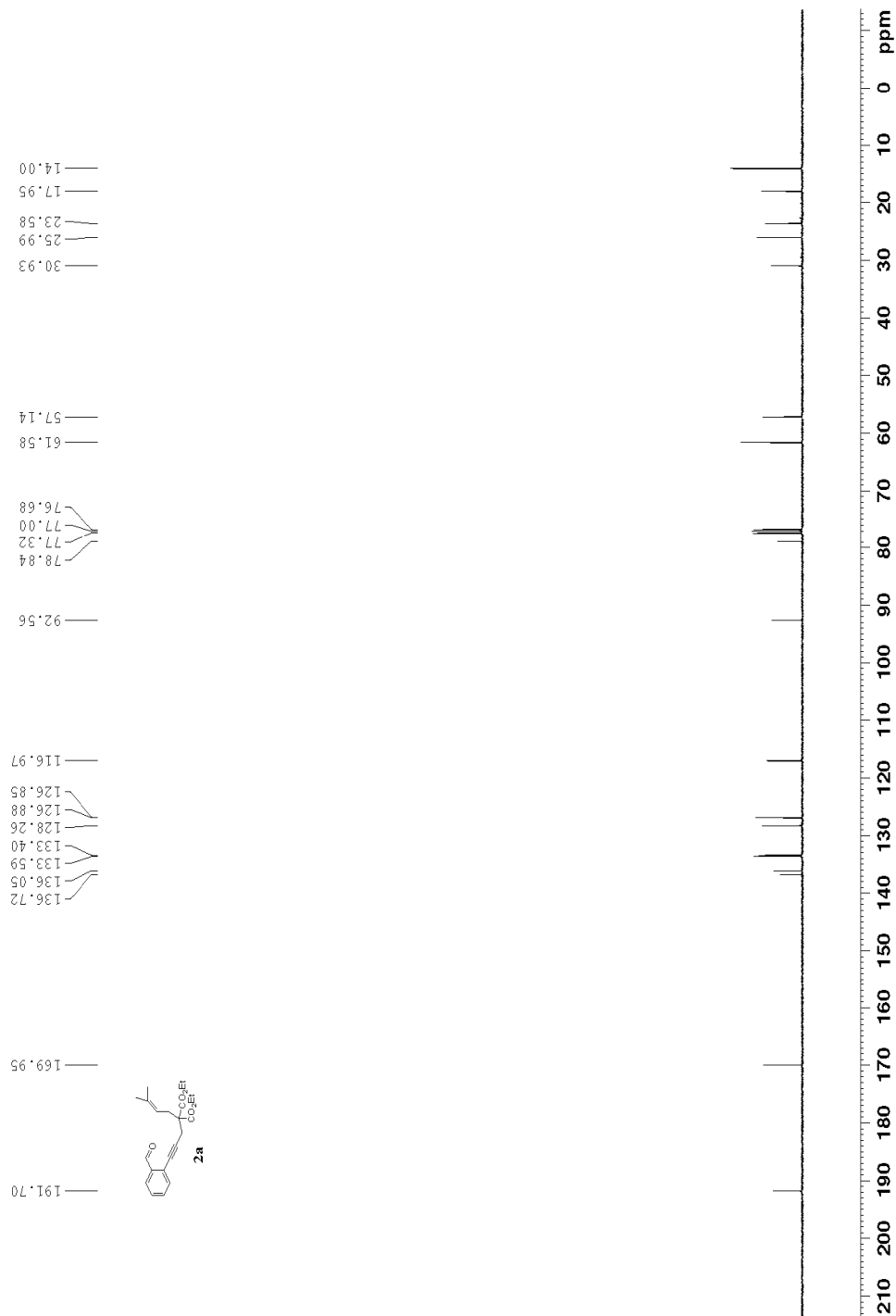


```

NAME          xyx0803-h
EXPNO         11
PROCNO        1
Date_         20081118
Time          16.56
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
TD            65536
SOLVENT       CHL2
DS            110
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.3652106 sec
RG           2050
DW           20.800 usec
DE           6.50 usec
TE           292.8 K
D1           2.0000000 sec
D11          0.0300000 sec
TD0          1

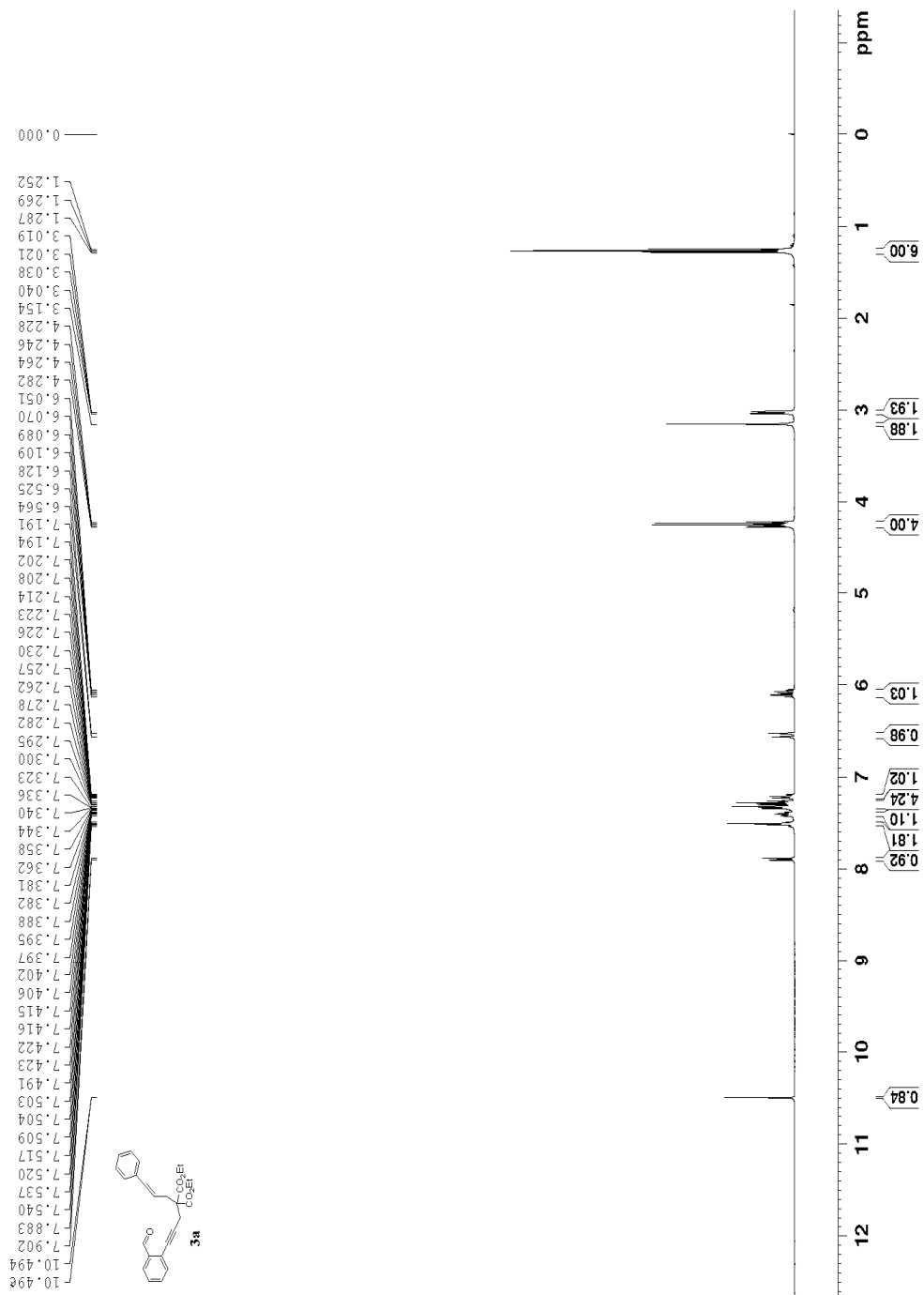
===== CHANNEL f1 =====
NUC1          13
PL1           9.00 usec
PL1          -2.00 dB
PL1W         57.32743073 W
SFO1         100.6228298 MHz

===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2          1H
PL2           90.00 usec
PL2          -2.00 dB
PL2W         18.19349861 W
PL3           15.50 dB
PL3W         18.19349861 W
PL4           15.50 dB
PL4W         18.19349861 W
PL5           0.32353121 W
PL5W         0.32353121 W
PL6           400.132768 MHz
PL6W         400.132768 MHz
SF           100.6127750 MHz
WDW           EM
SSB           0
GB           1.00 Hz
PC           1.40
    
```



xyx0829
NAME xyx0829
EXPNO 20
PROCNO 1
Date_ 20081023
Time 20.34
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
SOLVENT CDCl3
NS 16
DS 2
SWH 6225.632 Hz
FIDRES 0.73483 Hz
AQ 3.9846387 sec
RG 3.9846387 sec
DW 60.800 usec
DE 6.50 usec
DI 2.50 usec
TD 1.0000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 ¹H
P1 14.70 usec
PL1 -1.00 dB
PL1W 13.75590801 W
SFO1 400.1327748 MHz
SF 400.1300060 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

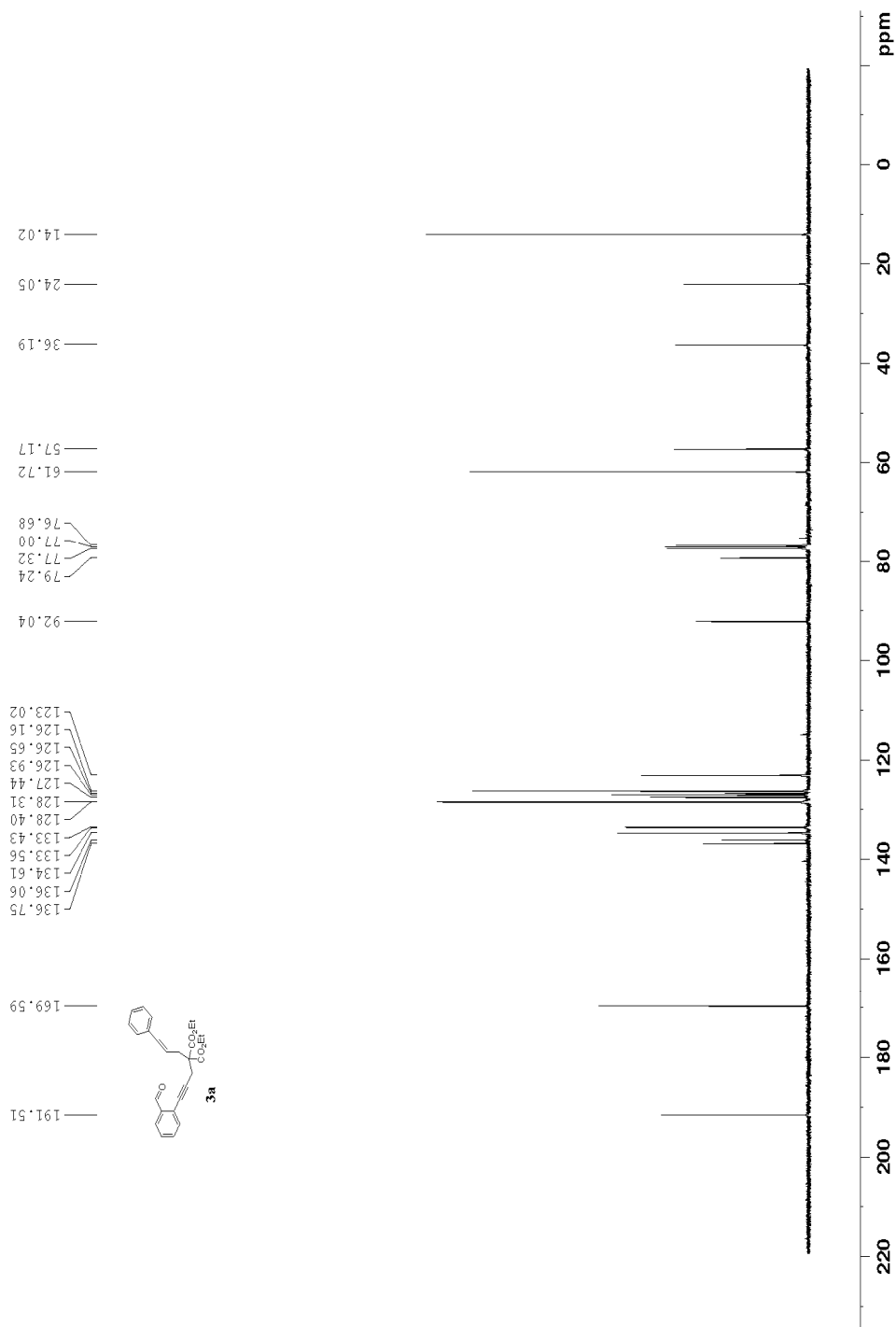


```

NAME xyx0829
EXPNO 21
PROCNO 1
Date_ 20081001
Time 20:31
INSTRUM spect
PROBHD 5 mm PABBO BR-
PULPROG zgpg30
AQ 0.00100000
SOLVENT CDCl3
NS 100
DS 4
SWH 24038.461 Hz
FIDRES 0.30000000 Hz
AQRES 1.5631998 sec
RG 912
DW 20.800 usec
DE 6.50 usec
TE 300.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 9.70 usec
PL1 -2.00 dB
PL1W 56.13311005 W
SFO1 100.6228298 MHz

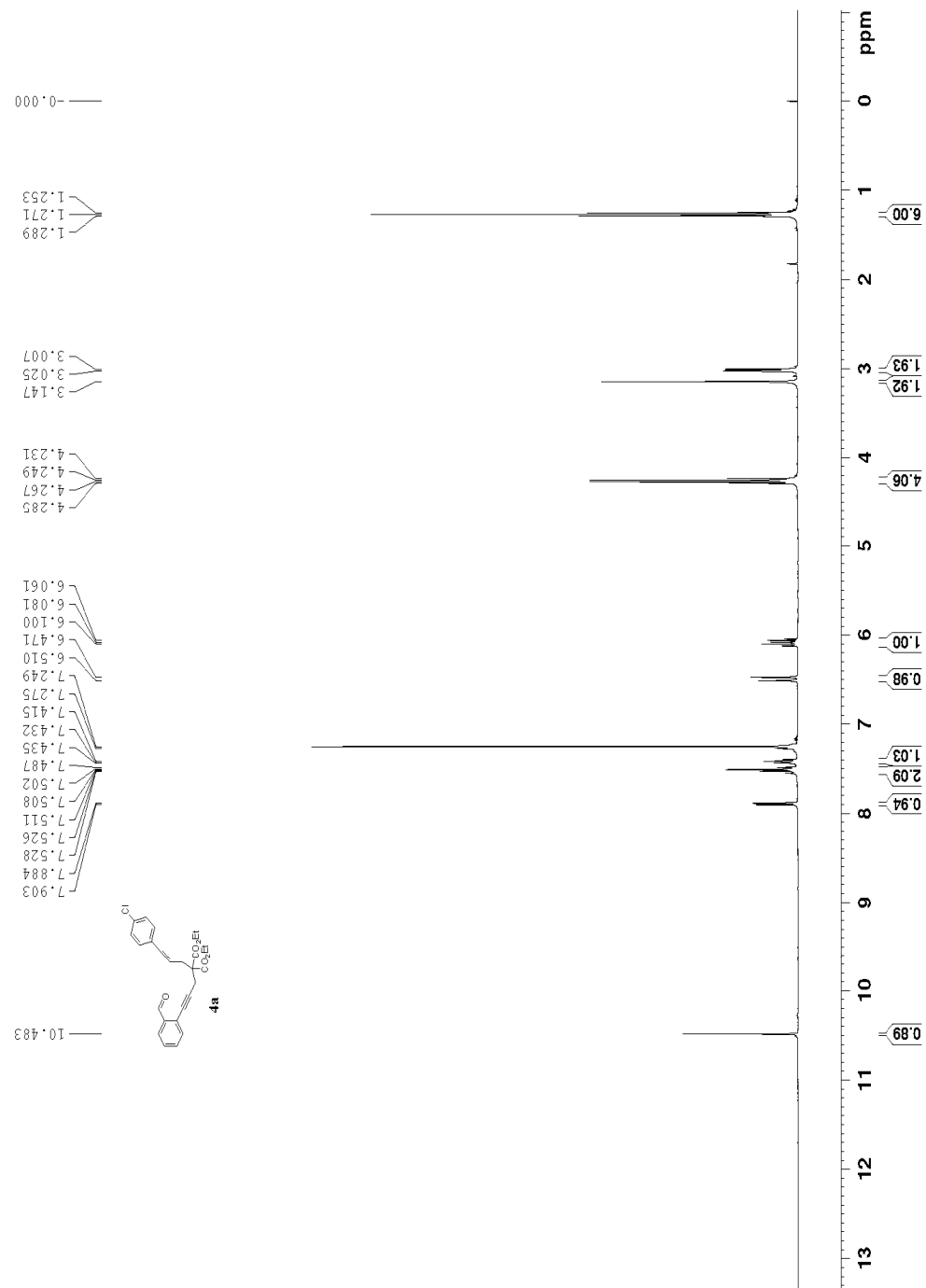
===== CHANNEL f2 =====
CFPRG2 waltz16
NUC2 1H
PCPD2 80.10 usec
PL2 -0.10 dB
PL12 13.90 dB
PL13 13.90 dB
PL1W 17.72104263 W
PL2W 0.44513249 W
PL13W 0.44513249 W
SFO2 400.1316005 MHz
SI 32768
SF 100.6127825 MHz
WDM EM
SSE 1.00 Hz
LB 0
GB 0
FC 1.40
    
```



```

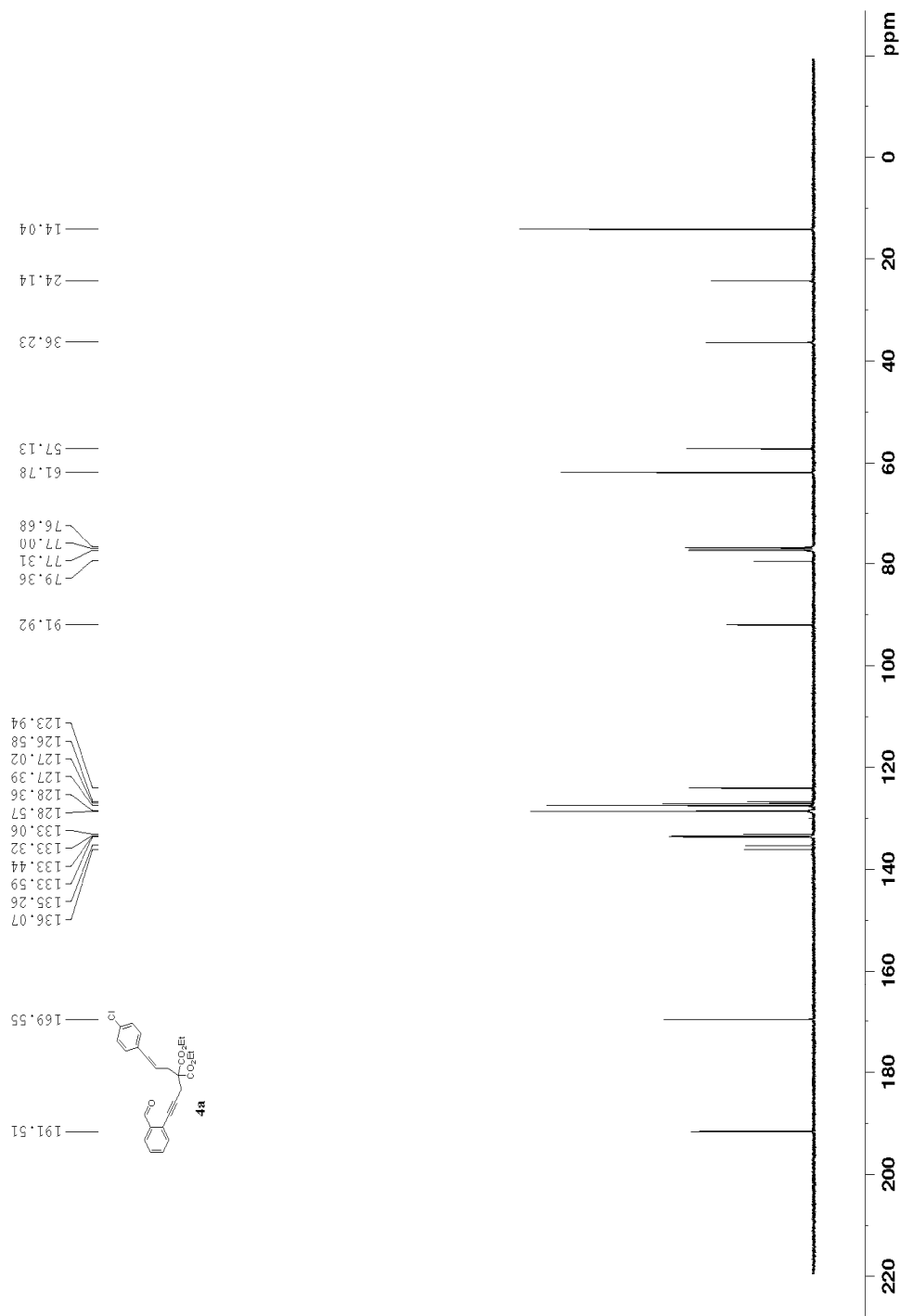
NAME          xyz-7-y-
EXPNO         10
PROCNO        1
Time          2008112
Time         8.10
INSTRUM       spect
PROBHD        5 mm FAREO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           6231.685 Hz
AQ           0.14685 sec
RG           3.9848387 sec
RG           45.2
DW           60.800 usec
DE           2.50 usec
TE           300.2 K
D1           1.00000000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
PI1           14.70 usec
PL1          -1.00 dB
PL1W         13.75590801 W
SFO1         400.1324710 MHz
SF           400.1299985 MHz
WDW          EM
SSB          0
LB           0.30 Hz
GB           0
PC           1.00
    
```



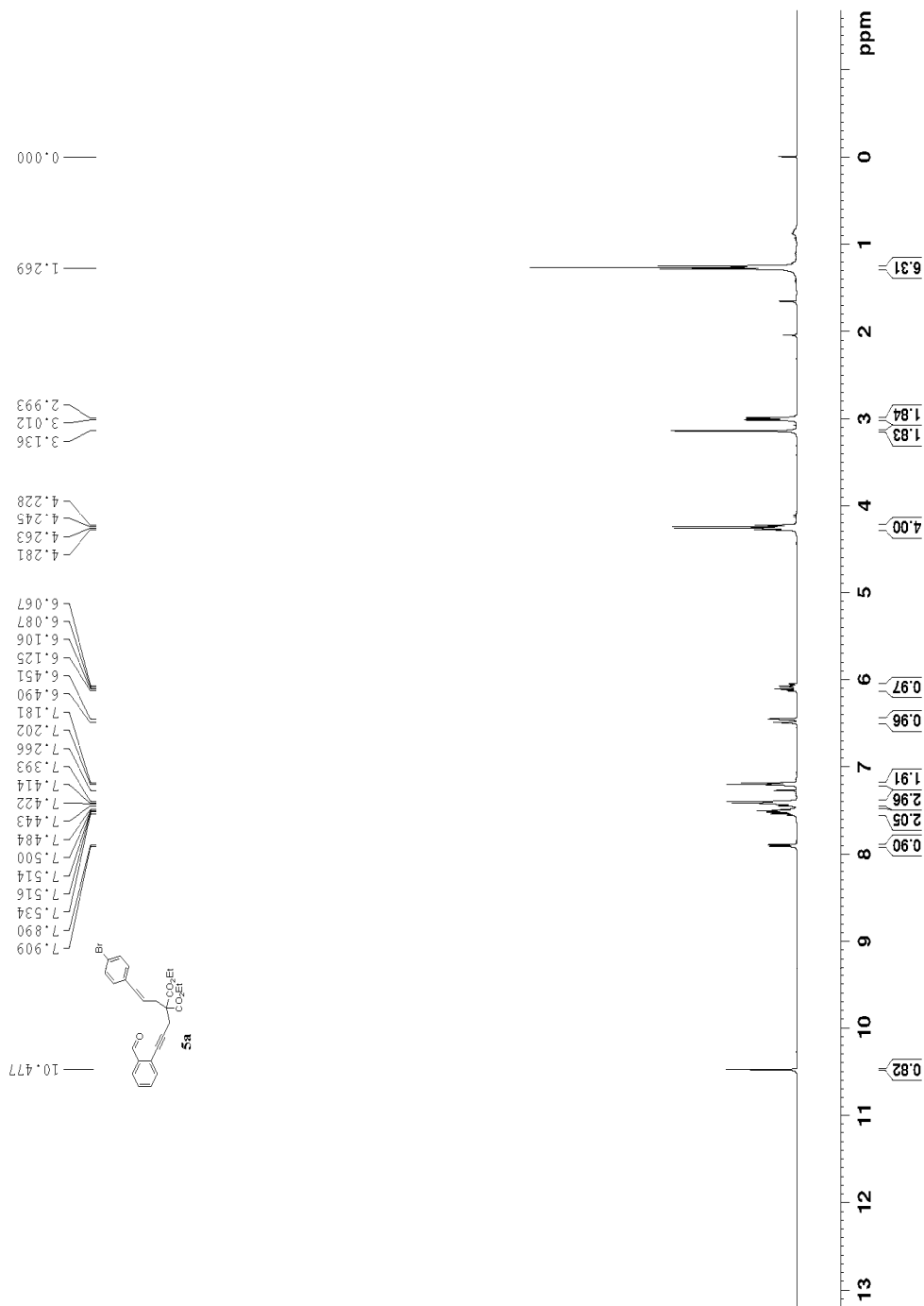
```

NAME          xyx-7-v-
EXPNO         12
PROCNO       1
Date_        20081121
Time         8.22
INSTRUM      spect
PROBHD       5 mm PABBO BB-
PULPROG      zgpg30
TD           65536
SOLVENT      CDCl3
NS           1160
DS           4
SWH          24038.461 Hz
FIDRES      0.366798 Hz
AQ          1.363194 sec
RG           64
DW          20.800 usec
DE          6.50 usec
TE          294.3 K
TD0         2.0300000 sec
D1          0.0300000 sec
D11         0.0300000 sec
TD0         1
===== CHANNEL f1 =====
NUC1         13C usec
P1          9.25
PL1         -2.00 dB
PL1W       56.13311005 W
SFO1       100.6228288 MHz
===== CHANNEL f2 =====
CPDPRG2     waltz16
NUC2         1H
PCPD2       80.00 usec
PL2         -2.10 dB
PL2W       13.90 dB
PL3         13.90 dB
PL3W       17.72104263 W
PL12W      0.44513249 W
PL13W      0.44513249 W
SFO2       400.1509068 MHz
SF         100.6127788 MHz
WDW         EM
SSB         0
LB          1.00 Hz
GB          0
PC          1.40
    
```



```

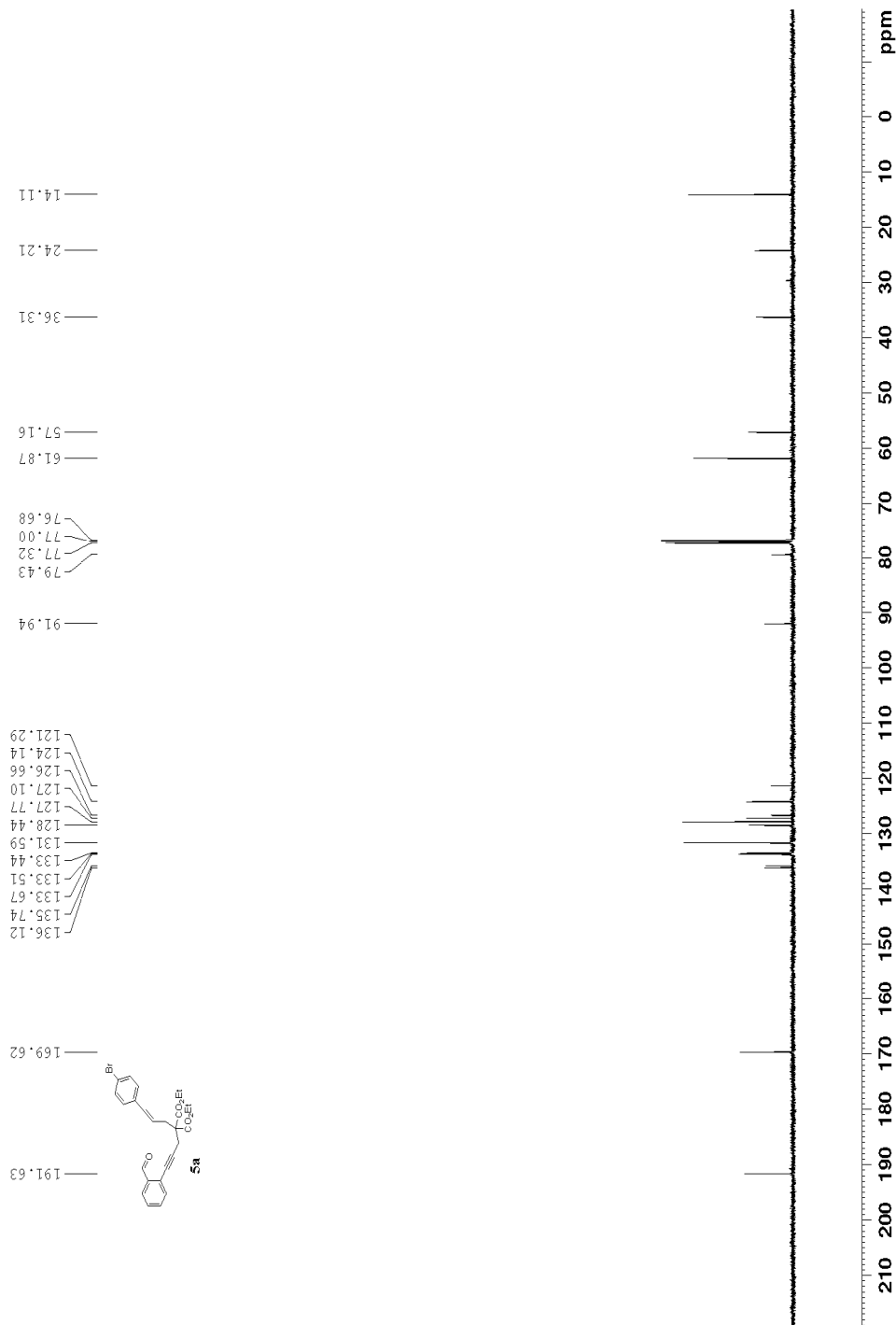
NAME          XYX-8-Y
EXPNO         10
PROCNO        1
Time          20081118
Time         12.100
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
WDW           EM
GB            0
FIDRES        0.174833 Hz
AQ            3.9848387 sec
RG            80.6
DW            60.800 usec
DE            8.19 usec
DL            1.00000000 sec
TD0           1
===== CHANNEL F1 =====
NUC1          14.70 usec
P1            -1.00 dB
PL1          13.75590801 W
PL1W         400.1327768 MHz
SFO1         400.1300024 MHz
SF           400.1300024 MHz
WDW          EM
SSB           0
RB            0.30 Hz
PC            1.00
    
```



NAME xyx-8-Y
EXNO 11
PROCNO 1
Date_ 20081111
Time_ 12.08
INSTRUM spect
PROBHD 5 mm PABBO BR-
PULPROG zgpg30
SOLVENT CDCl3
NS 100
DS 4
SWH 24038.461 Hz
FIDRES 0.55078 Hz
AQ 1.563198 sec
RG 32
LW 20.800 usec
DE 6.50 usec
TE 300.2 K
D1 2.0000000 sec
D11 0.0300000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
PI 9.70 usec
PL1 -2.00 dB
PL1W 56.1331005 W
SFO1 100.6228298 MHz

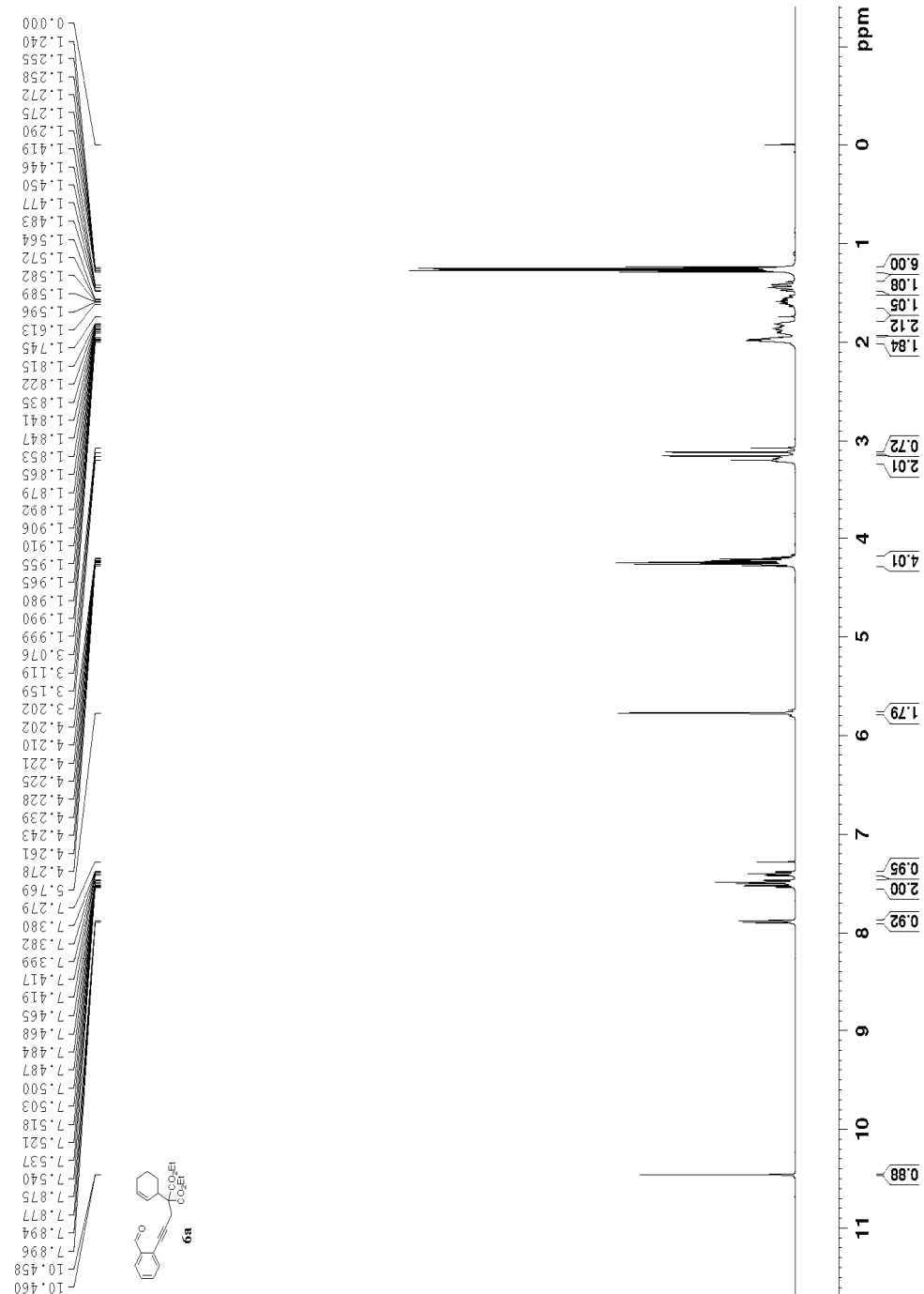
===== CHANNEL f2 =====
CFDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL12 13.80 dB
PL13 13.90 dB
PL1W 17.72104263 W
PL12W 0.44513249 W
PL13W 0.44513249 W
SFO2 400.1318065 MHz
SI 32768
SF 100.612724 MHz
EM
WDW EM
SSB 0
LB 1.00 Hz
GB 0
FC 1.40




```

NAME          xyx-1lhuan
EXPNO         10
PROCNO        1
Time          20090114
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
AQ            0.72483 Hz
RG            3.9848387 sec
DW            60.800 usec
DE            36.00 usec
TE            300.0 K
D1            1.00000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          1H
P1            14.70 usec
PL1          -1.00 dB
PL1W         13.75598001 W
SFO1         400.132778 MHz
SF           400.1299972 MHz
WDW          EM
SSB          0
GB           0
PC           1.00
    
```

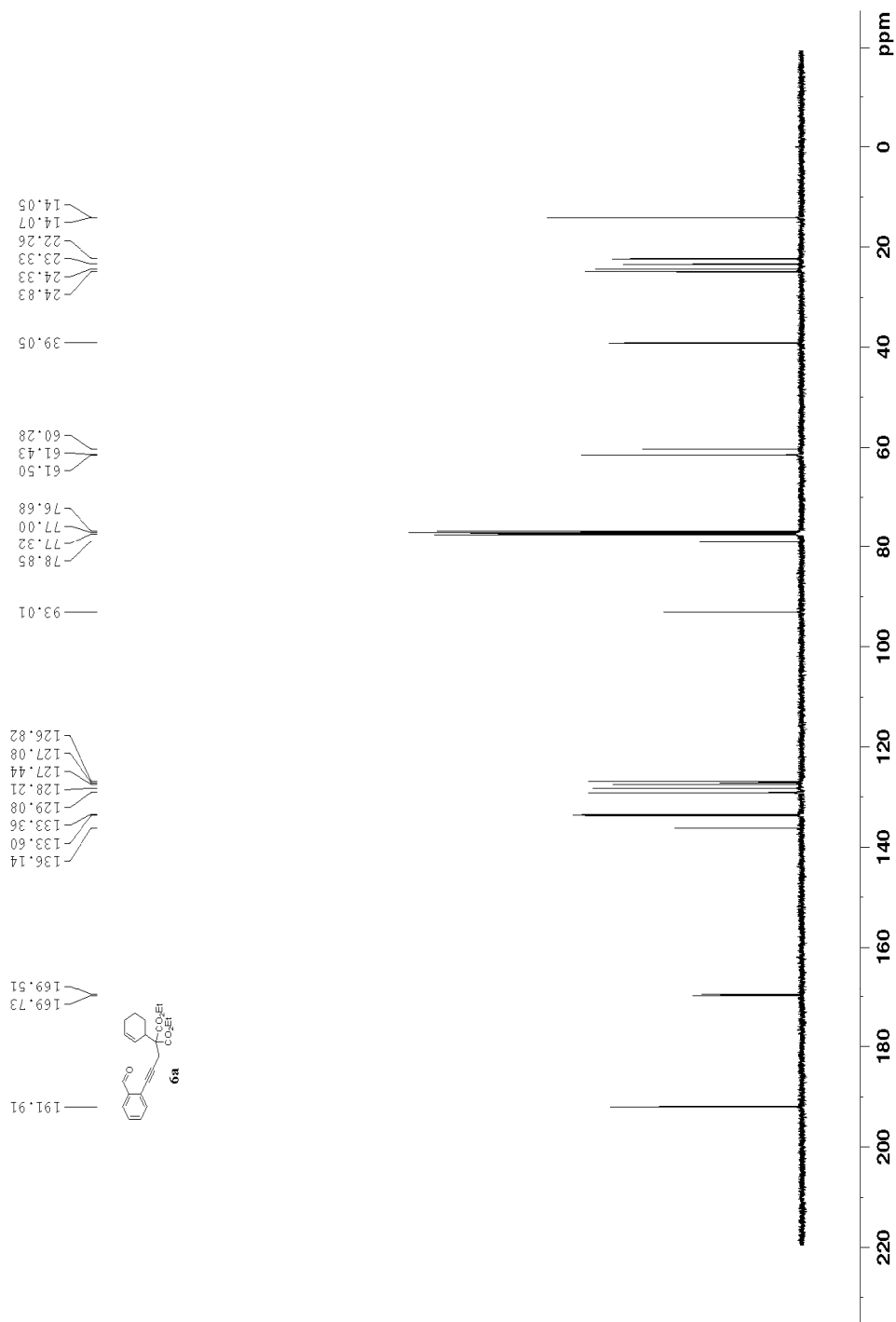


```

NAME          xyx-1lhuan
EXPNO         11
PROCNO        1
Date_         20090111
Time         23:43
INSTRUM       spect
PROBHD        5 mm PABBO BR-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            200
DS            4
SWH           24038.461 Hz
FIDRES       0.355998 Hz
AQ           1.565998 sec
RG           71.8
LW           20.800 usec
DE           6.50 usec
IE           0.000000 sec
DI1          2.0000000 sec
DI2          0.03000000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1            9.70 usec
PL1          -2.00 dB
PL1W         56.1331005 W
SFO1         100.6228298 MHz

===== CHANNEL f2 =====
CFDPRG2      waltz16
NUC2         1H
PCPD2        90.00 usec
PL2          13.90 dB
PL12         13.90 dB
PL13         13.90 dB
PL2W         17.72104263 W
PL12W        0.44513249 W
PL13W        0.44513249 W
SFO2         400.1316065 MHz
SI           32768
SF           100.6127735 MHz
WDW          EM
SSB          0
LB           1.00 Hz
GB           0
PC           1.40
    
```

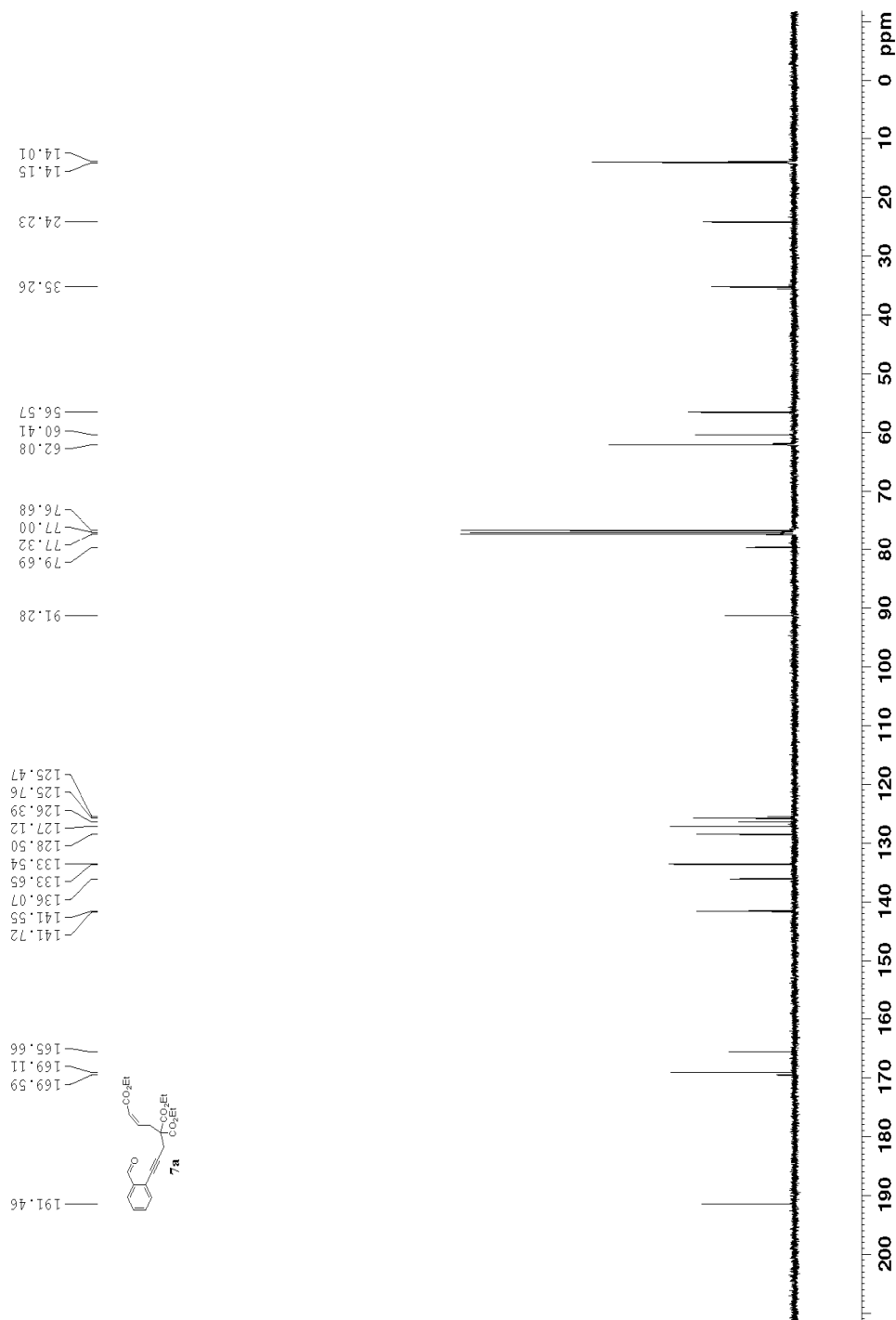



```

NAME          xyz-96
EXPNO         11
PROCNO        1
Date_         20090225
Time          19:17
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
TD            65536
AQ            0.393
RG            100
NS            4
DS            4
SWH           24038.461 Hz
FIDRES        0.366798 Hz
AQ            1.365205 sec
RG            2050
DW            20.800 usec
DE            6.50 usec
TE            292.2 K
D1            2.000000 sec
D11           0.0300000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          13C
P1            9.40 usec
PL1          -2.00 dB
PL1W         57.32743073 W
SFO1         100.6228298 MHz

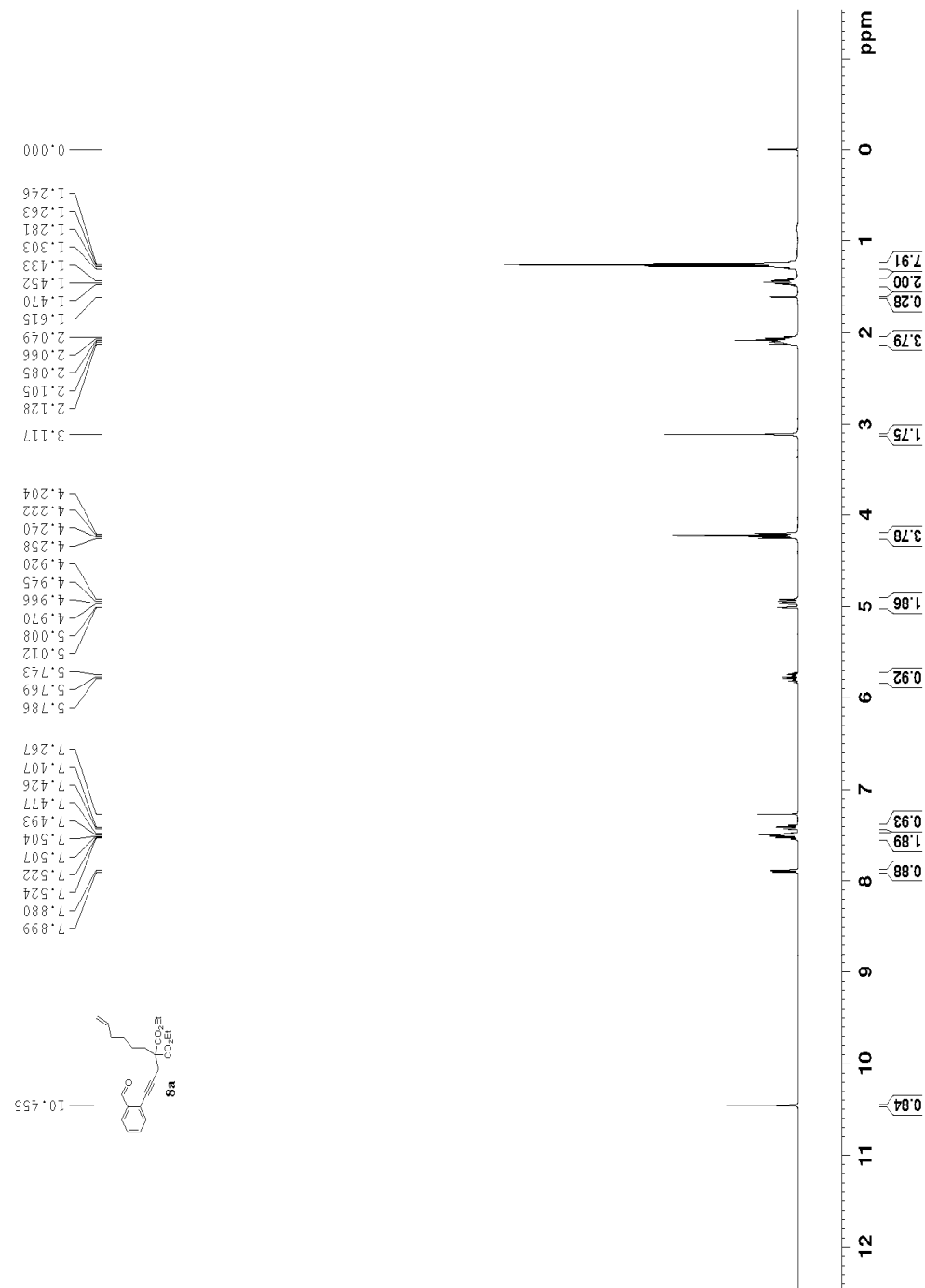
===== CHANNEL f2 =====
CPDPRG2       waltz16
NUC2          1H
PCPD2        90.00 usec
PL2          12.00 dB
PL2W         12.00 W
PL13         15.50 dB
PL2W         18.19349861 W
PL12W        0.32353121 W
PL13W        0.32353121 W
SFO2         400.1326041 MHz
SI           32768
SF           100.6127740 MHz
WDW           EM
SSB           0
GB           1.00 Hz
PC           1.40
    
```



```

NAME          xyx-17-v1
EXPNO         10
PROCNO        1
Time          20090211
Date_         21.34
INSTRUM       spect
PROBHD        5 mm FAREO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           8233.685 Hz
AQ           0.685 Hz
RG           3.984837 sec
RG           238
DE           60.800 usec
DE           6.50 usec
TE           300.2 K
TD0          1.00000000 sec

===== CHANNEL f1 =====
NUC1          13C
PULPROG       zgpg30
PL1           14.40 usec
PL12          0.00 dB
PL13          0.00 dB
PL14          0.00 dB
PL15          0.00 dB
PL1W          11.47932053 W
SFO1          400.1324710 MHz
SI           32768
SF           400.1330025 MHz
WDW           EM
SSB           0
LB           0.30 Hz
GB           0
PC           1.00
    
```

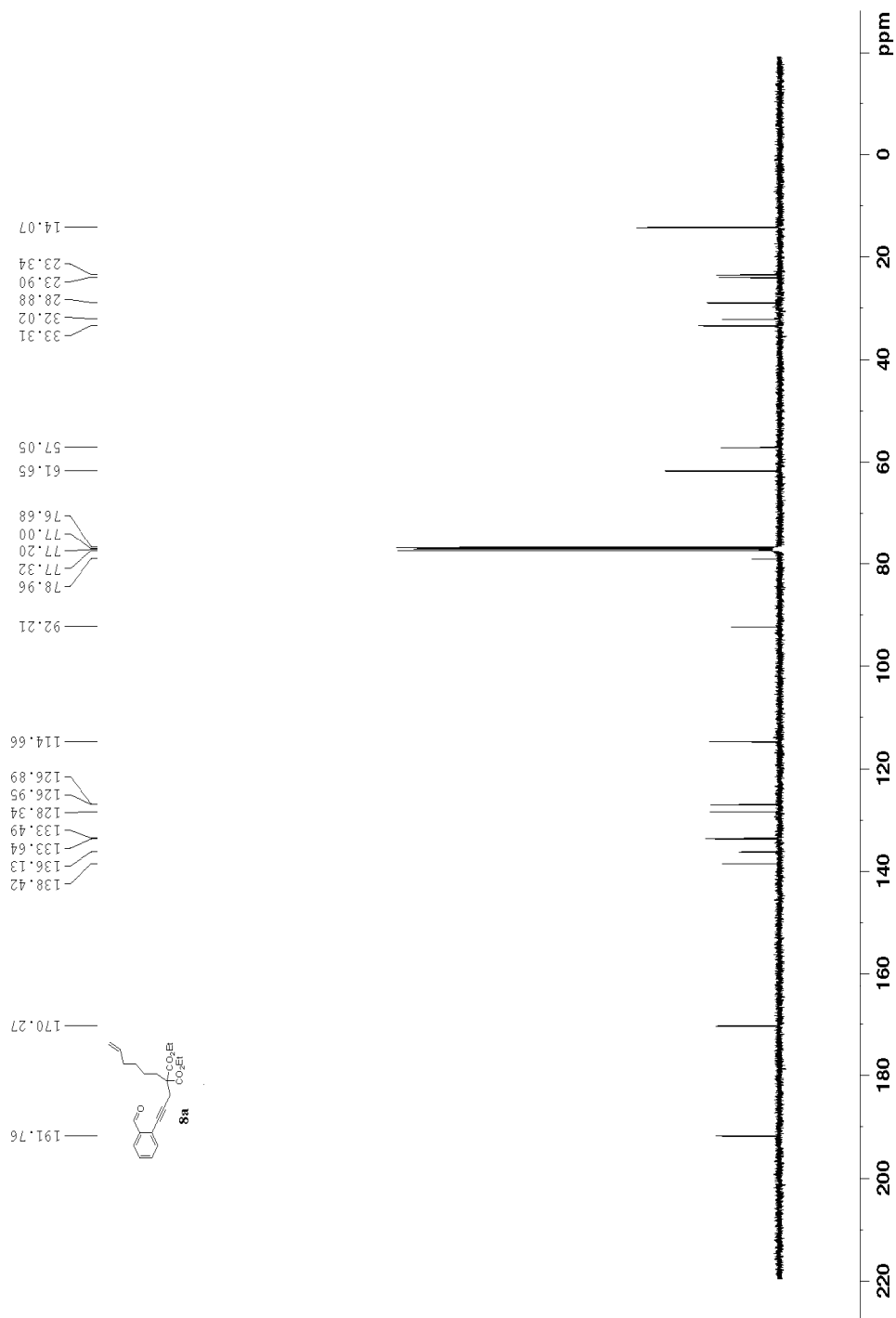


```

NAME          XYX-17-V1
EXPNO         11
PROCNO        1
Date_         20090214
Time          21:45
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
AQ            0.033
SOLVENT       CDCl3
NS            200
DS            4
SWH           24038.461 Hz
FIDRES       0.586678 Hz
AQ           1.505205 sec
RG            2050
DW            20.800 usec
DE            6.50 usec
TE            293.2 K
TD0           2.000000 sec
D11           0.03000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          13C
P1            9.40 usec
PL1           -2.00 dB
PL1W         57.32743073 W
SFO1         100.6228298 MHz

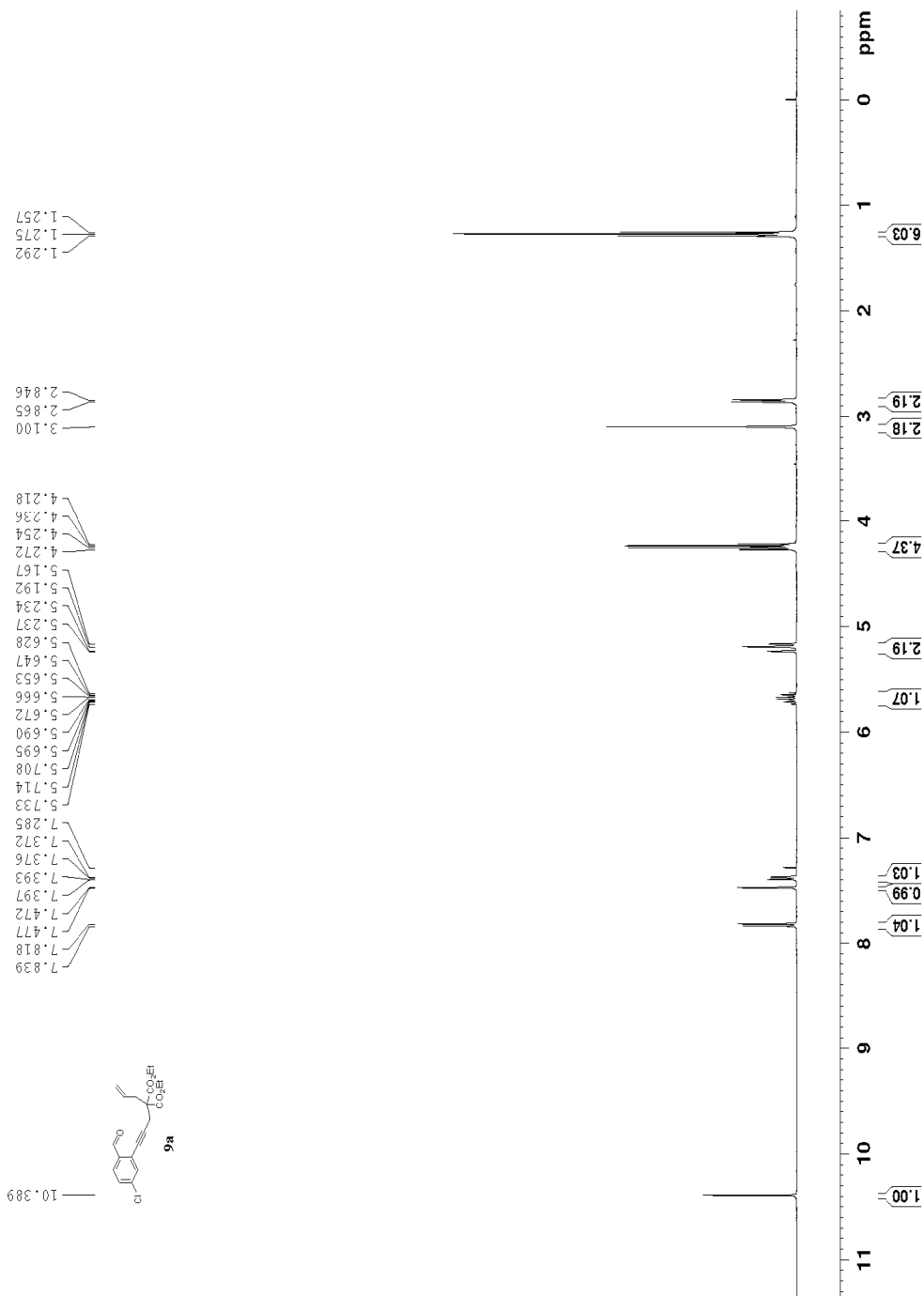
===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2          1H
PCPD2        90.00 usec
PL2           15.50 dB
PL2W         15.50 dB
PL13         15.50 dB
PL12W        18.19349861 W
PL12W        0.38253121 W
PL12W        0.38253121 W
SFO2         400.1318045 MHz
SI           32768
SF           100.6127703 MHz
WDW          EM
SSB          0
GB           1.00 Hz
PC           1.40
    
```



```

NAME          xyz-10-Y
EXPNO         10
PROCNO        1
Time          20081217
Time2         17.43
INSTRUM       spect
PROBHD        5 mm FAREO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           6233.685 Hz
AQ            0.16857 Hz
RG            3.984837 sec
DE            60.800 usec
TE            300.2 K
DEL           6.50 usec
TD0           1.0000000 sec

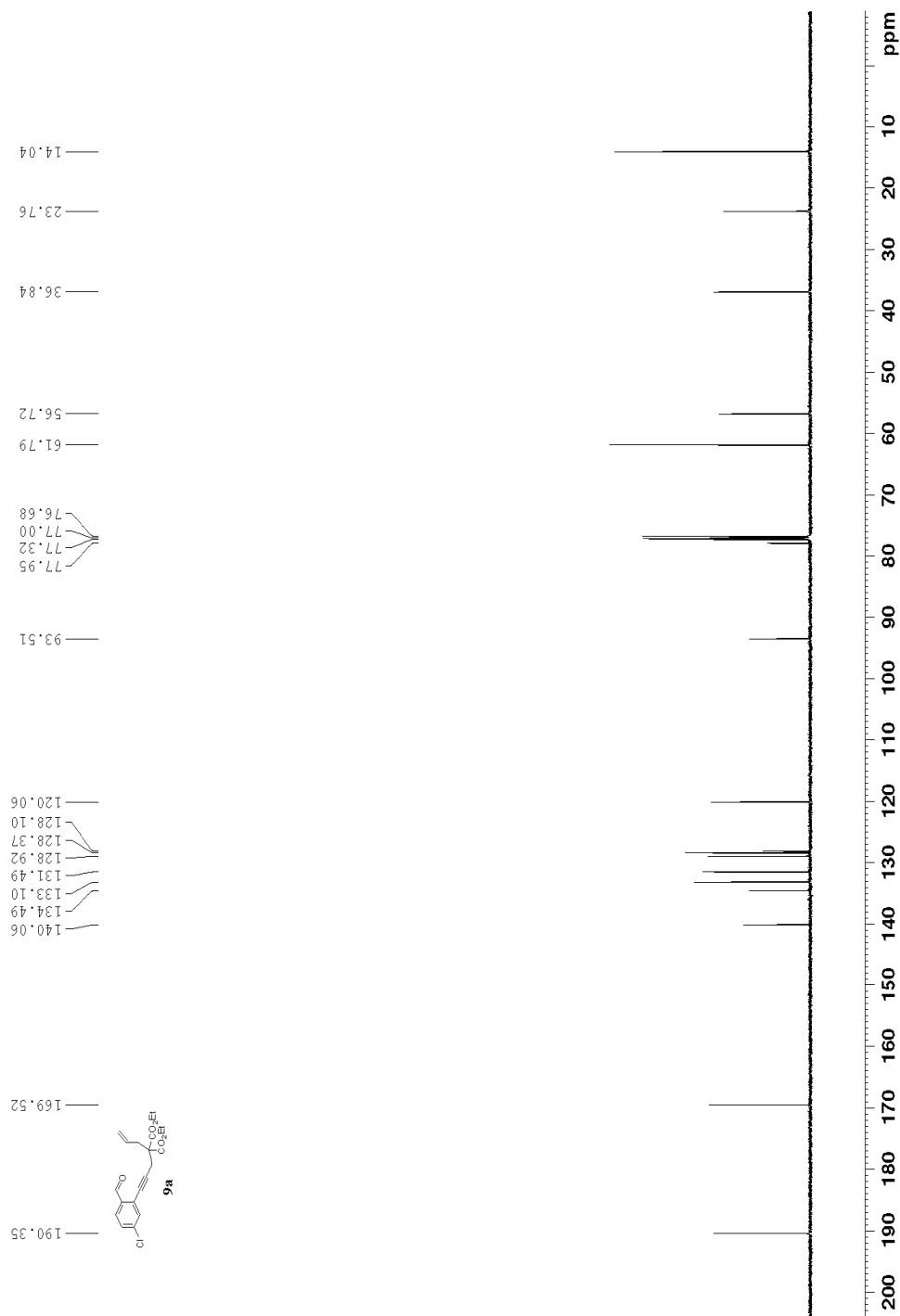
===== CHANNEL F1 =====
NUC1          13C
P1            14.70 usec
PL1           -1.00 dB
PL1W          13.75590801 W
SFO1          400.1324710 MHz
SF           400.1299955 MHz
WDW           EM
SSB           0
LB            0.30 Hz
GB            0
PC            1.00
    
```



```

NAME          xyx-10-1
EXPNO         11
PROCNO        1
Date_         20081217
Time          09:11:40
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            128
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.3653108 sec
RG            1030
DW           20.800 usec
DE           6.50 usec
TE           295.3 K
TD           2.0300000 sec
D1           0.0300000 sec
D11          0.0300000 sec
TD0          1

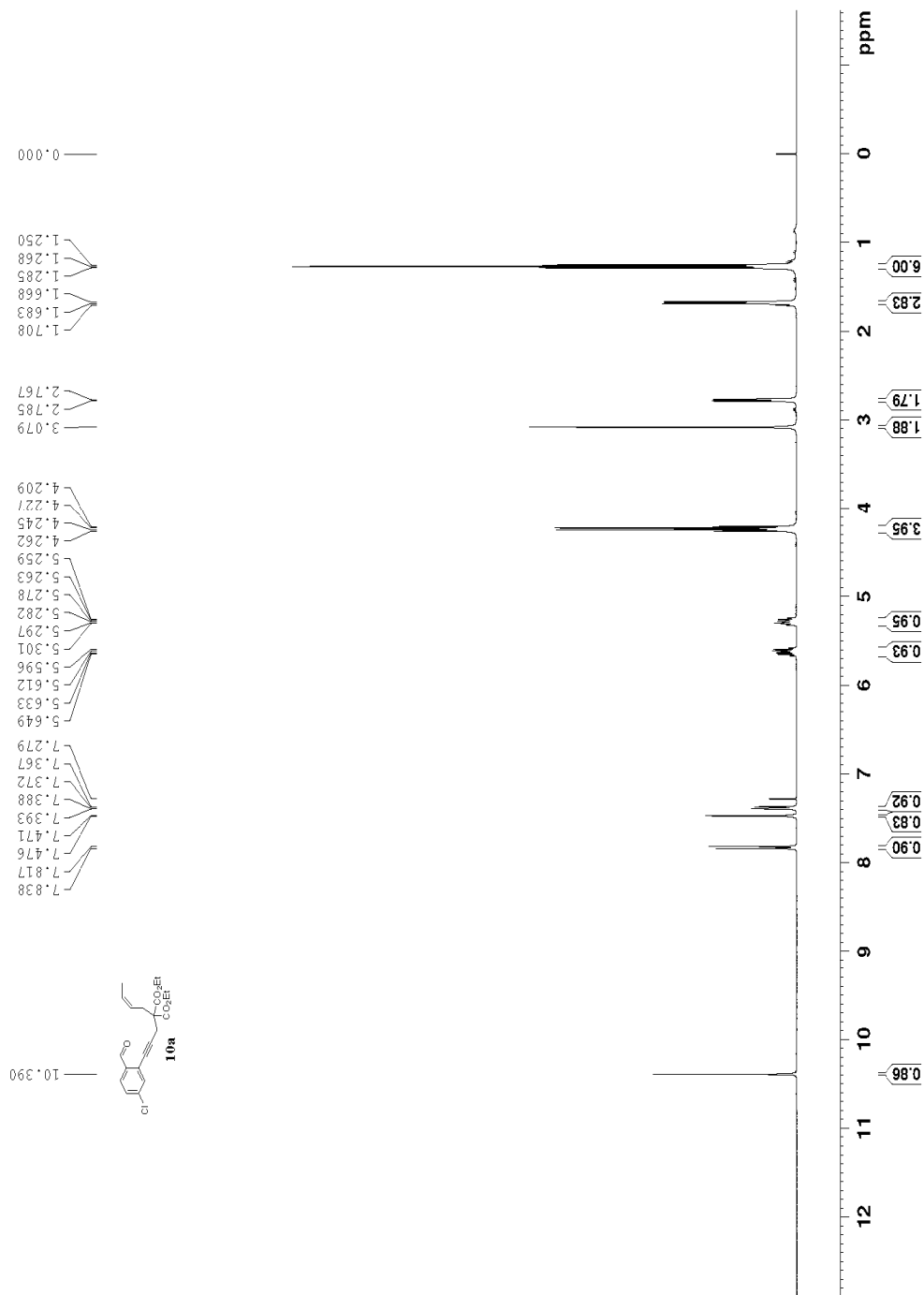
===== CHANNEL f1 =====
NUC1          13C usec
PL1           9.25
PL1W          -2.00 dB
SFO1         56.13311005 W
===== CHANNEL f2 =====
CPDPRG2       waltz16
NUC2          1H
PCPD2         80.00 usec
PL2           -2.10 dB
PL2W          13.90 dB
PL3           13.90 dB
PL3W          17.72104263 W
PL12W        0.44513249 W
PL13W        0.44513249 W
SFO2         400.152696 MHz
SF           100.612728 MHz
WDW           EM
SSB           0
LB           1.00 Hz
GB           0
PC           1.40
    
```




```

NAME          xyx-15-v1
EXPNO         10
PROCNO        1
Time          20090211
Time2         21.50
INSTRUM       spect
PROBHD        5 mm FAREO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           8233.685 Hz
AQ            0.1685 Hz
RG            3.984837 sec
RG            30.5
DW            60.800 usec
DE            6.50 usec
TE            300.2 K
D1            1.0000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          13C
P1            14.40 usec
PL1           0.00 dB
PL1W          11.47932053 W
SFO1          400.1324710 MHz
SI            32768
SF            400.1299971 MHz
WDW           EM
SSB           0
LB            0.30 Hz
GB            0
PC            1.00
    
```

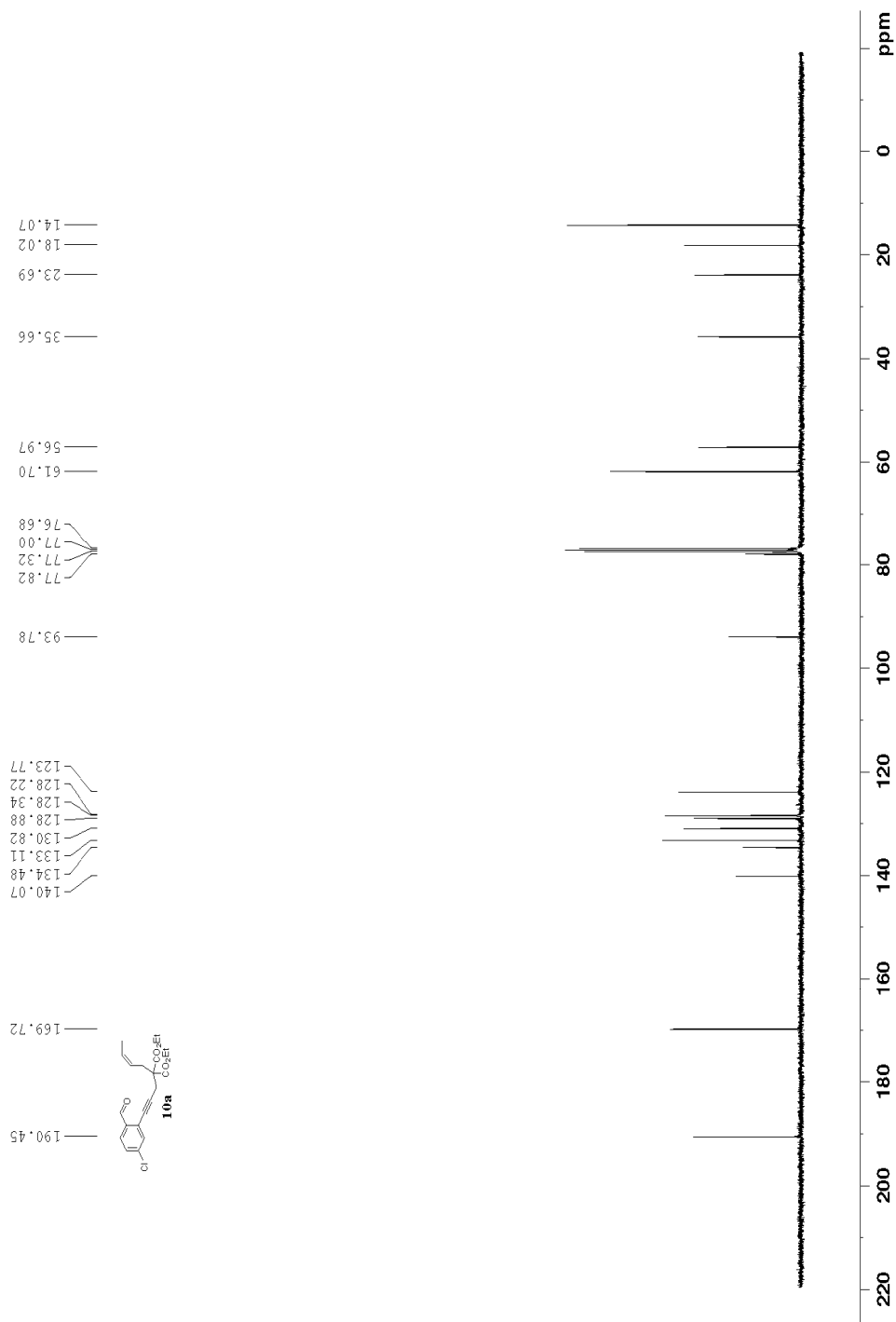


```

NAME          XYX-15-V1
EXPNO         11
PROCNO        1
Date_         20090211
Time          23:03
INSTRUM       spect
PROBHD        5 mm PABBO BR-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            200
DS            4
SWH           24038.461 Hz
FIDRES        0.356798 Hz
AQ            1.565798 sec
RG            2050
DW            20.800 usec
DE            6.50 usec
LB            0.000000 KHz
D1            2.0000000 sec
D11           0.0300000 sec
TD0           1

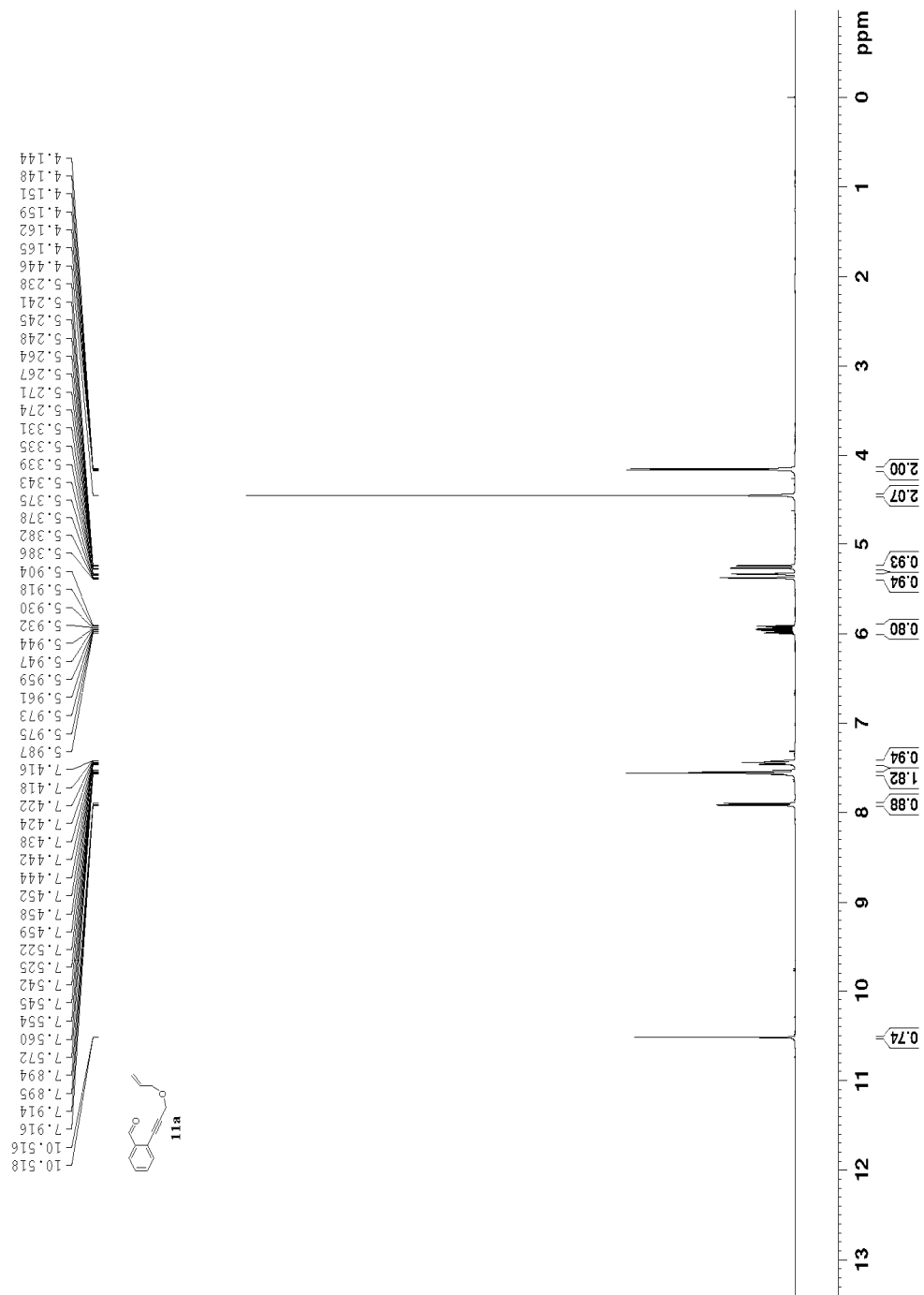
===== CHANNEL f1 =====
NUC1          13C
P1            9.40 usec
PL1          -2.00 dB
PL1W         57.32743073 W
SFO1         100.6228298 MHz

===== CHANNEL f2 =====
CFDPRG2      waltz16
NUC2         1H
PCPD2        90.00 usec
PL2          15.50 dB
PL12         15.50 dB
PL13         15.50 dB
PL1W         18.19349861 W
PL12W        0.32853121 W
PL13W        0.32853121 W
SFO2         400.1318065 MHz
SI           32788
SF           100.6127721 MHz
WDW          EM
SSB          0
LB           1.00 Hz
GB           0
PC           1.40
    
```



```

NAME          xyz4
EXPNO         10
PROCNO        1
Time          20081102
Time         1.00
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           6275.632 Hz
FIDRES        0.724833 Hz
AQ            3.9848387 sec
RG            36
DW            60.800 usec
DE            6.50 usec
DI            200.000 usec
TD0           1
===== CHANNEL f1 =====
NUC1          1H
PI           14.70 usec
PL1          -1.00 dB
PL1W         13.75590801 W
SFO1         400.1324710 MHz
SF           400.1298832 MHz
WDW          EM
SSB          0
LB           0.30 Hz
GB           0
PC           1.00
    
```

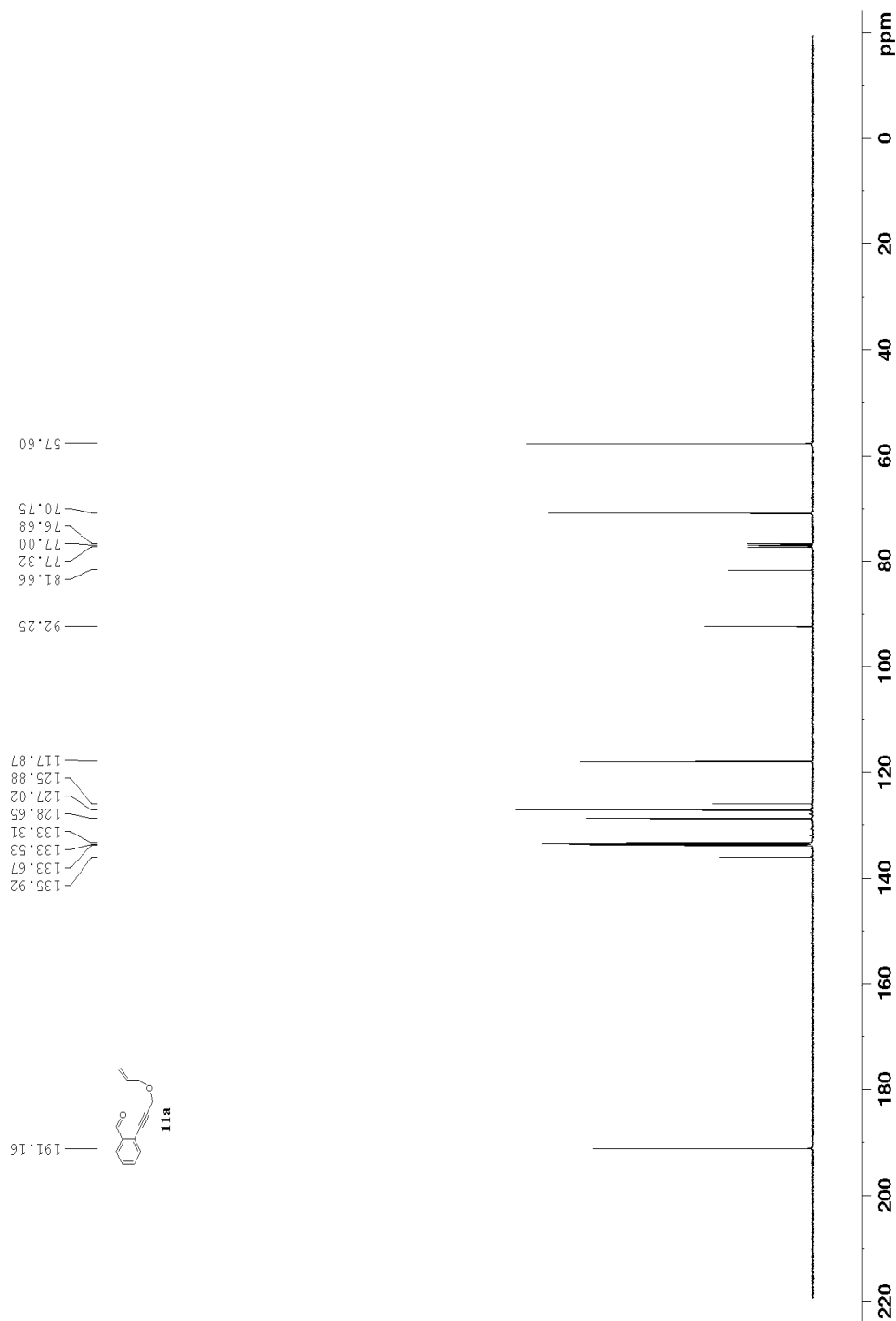


```

NAME          XYZ4
EXPNO         11
PROCNO        1
Date_         20081106
Time          10.08
INSTRUM       spect
PROBHD        5 mm PABBO BR-
PULPROG       zgpg30
TD            65536
SOLVENT       CDCl3
NS            100
DS            4
SWH           24038.461 Hz
FIDRES        0.366738 Hz
AQ            1.365118 sec
RG            645
DW            20.800 usec
DE            6.50 usec
TE            294.7 K
D1            2.000000 sec
D11           0.03000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          13C
P1            9.70 usec
PL1           -2.00 dB
PL1W          56.13311005 W
SFO1          100.6228298 MHz

===== CHANNEL f2 =====
CEPFRG2      waltz16
NUC2          1H
PCPD2         80.00 usec
PL2           13.00 dB
PL2W          13.00 W
PL13          13.90 dB
PL2W          17.72104263 W
PL12W         0.44513249 W
SFO2          400.132065 MHz
SI           32768
SF           100.6127841 MHz
WDW           EM
SSB           0
GB            1.00 Hz
PC            1.40
    
```

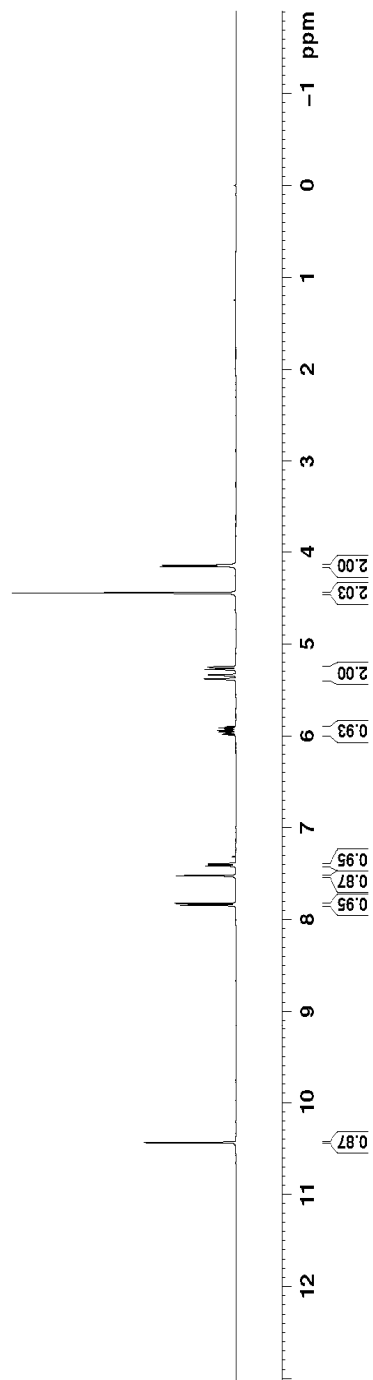
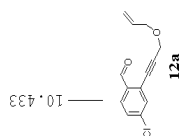


```

NAME          xyz-9-v1
EXPNO         10
PROCNO        1
Time          20081231
Time2         6.45
INSTRUM       spect
PROBHD        5 mm FAREO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           6231.685 Hz
AQ           0.174685 Hz
RG           3.9848387 sec
DE           60.800 usec
TE           2.50 usec
D1           1.0000000 sec
TD0          1

===== CHANNEL F1 =====
NUC1          13C
P1           14.70 usec
PL1          -1.00 dB
PL1W         13.75590801 W
SFO1         400.1324710 MHz
SF           400.1298821 MHz
WDW          EM
SSB          0
LB           0.30 Hz
GB           0
PC           1.00
    
```

7.849
7.828
7.831
7.526
7.420
7.416
7.399
7.395
5.985
5.973
5.971
5.959
5.942
5.930
5.928
5.916
5.902
5.387
5.383
5.343
5.340
5.282
5.280
5.257
5.254
4.449
4.159
4.145

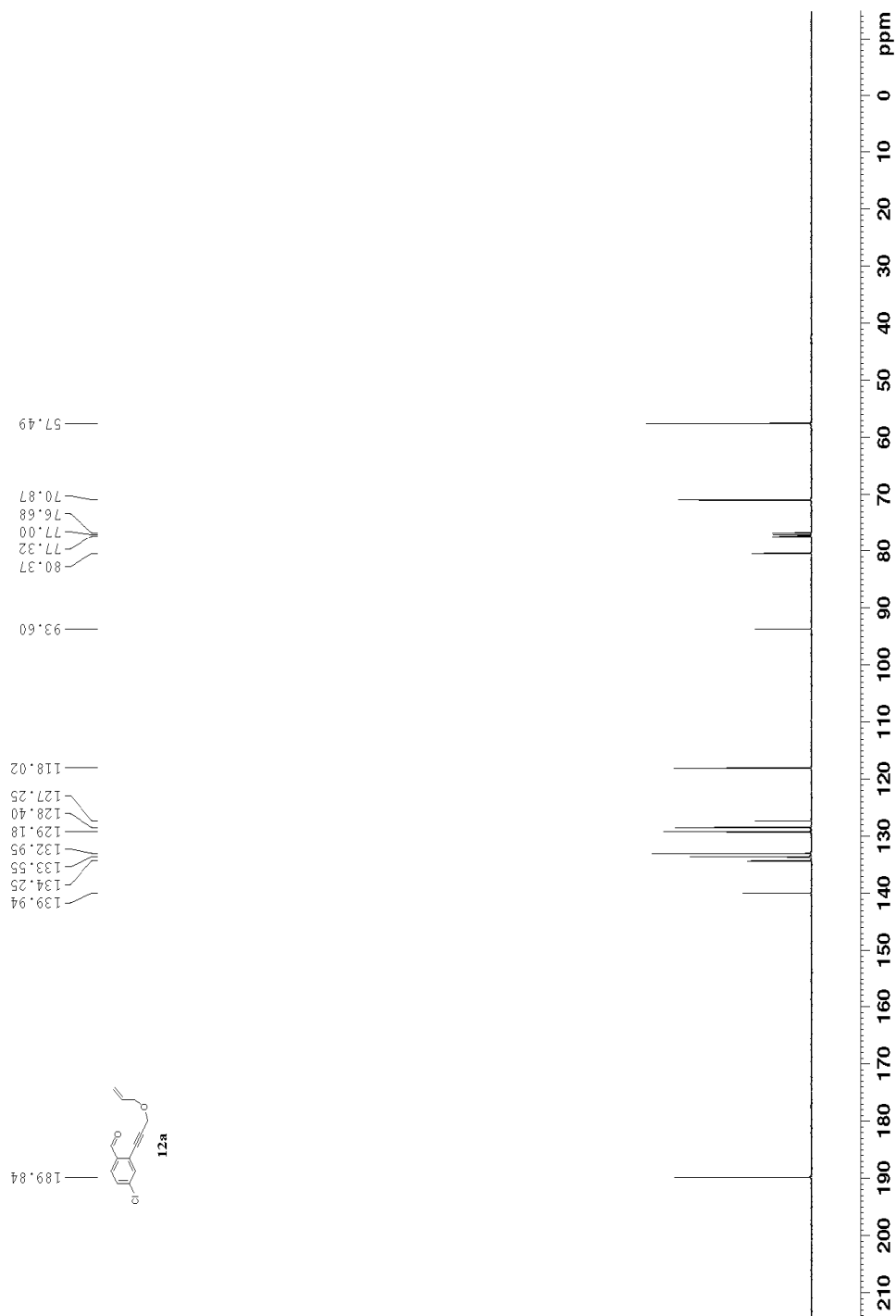


```

NAME          xyx-9-v1
EXPNO         11
PROCNO        1
Date_         200812_
Time          8:31
INSTRUM       spect
PROBHD        5 mm PABBO BR-
PULPROG       zgpg30
TD            65536
SOLVENT       CDCl3
NS            110
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.365386 sec
RG            80.6
DW           20.800 usec
DE           6.50 usec
TE           292.4 K
TD0          0.000000 sec
D11          0.0300000 sec
D10          0.03000000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13
P1           9.70 usec
PL1          -2.00 dB
PL1W         56.13311005 W
SFO1         100.6228298 MHz

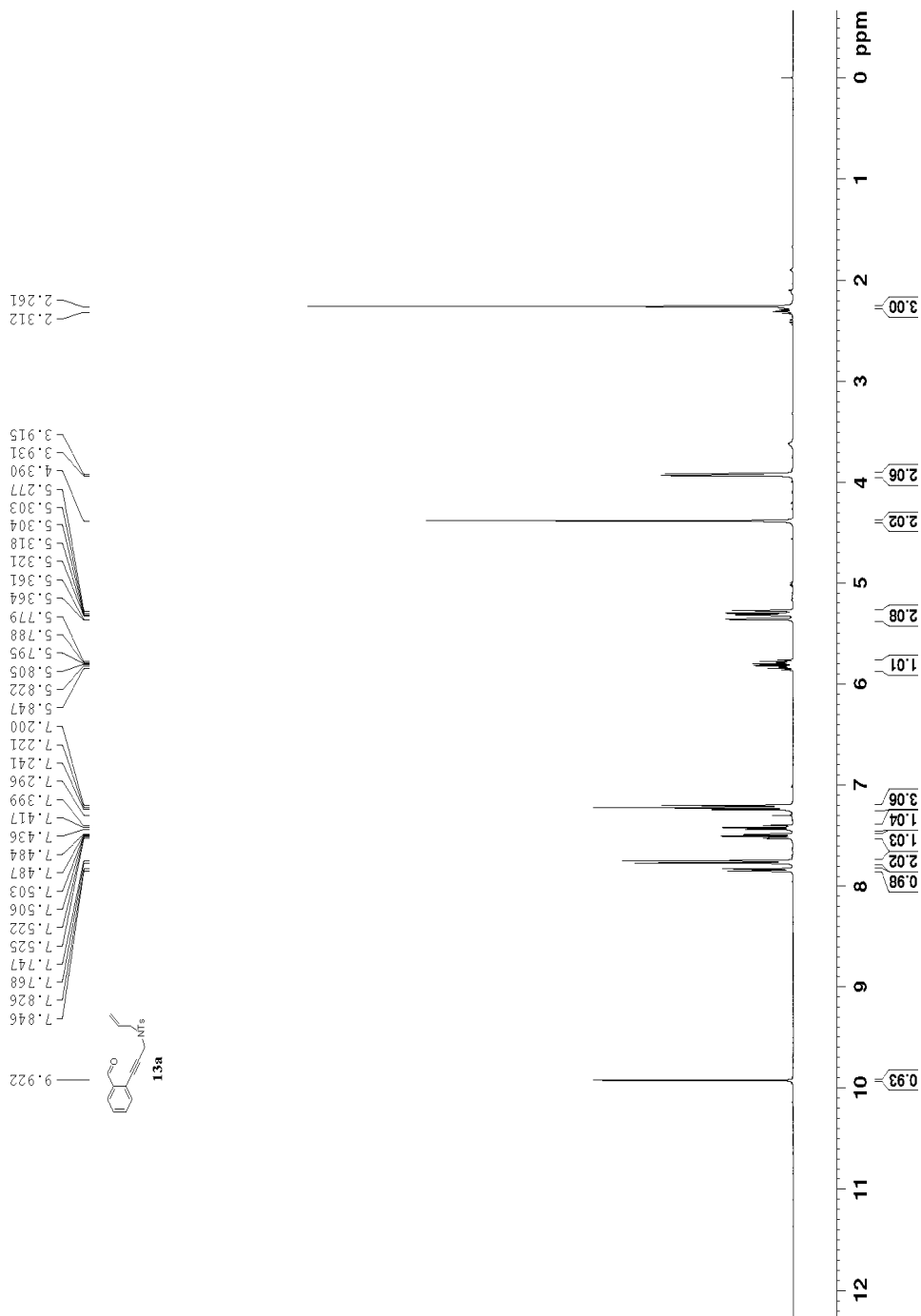
===== CHANNEL f2 =====
CPDPRG2       waltz16
NUC2          1H
P2           80.00 usec
PL2          -2.00 dB
PL2W         13.90 dB
PL3          13.90 dB
PL3W         17.72104263 W
PL4W         0.44513249 W
PL5W         0.44513249 W
SFO2         400.132768 MHz
SF           100.6127835 MHz
WDW           EM
SSB           0
GB            1.00 Hz
PC            1.40
    
```



```

NAME          xyx5
EXPNO         10
PROCNO        1
Time          20081102
Time          1.13
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
AQ            8223.66 Hz
FIDRES        0.72483 Hz
RG            3.9848387 sec
RG            40.3
DW            60.800 usec
DE            283.4 usec
TE            300.2 K
D1            1.00000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          1H
P1            14.70 usec
PL1          -1.00 dB
PL1W         13.75590801 W
SFO1          400.132768 MHz
SF           400.1299902 MHz
WDW           EM
SSB           0.0 Hz
GB           0
PC           1.00
    
```

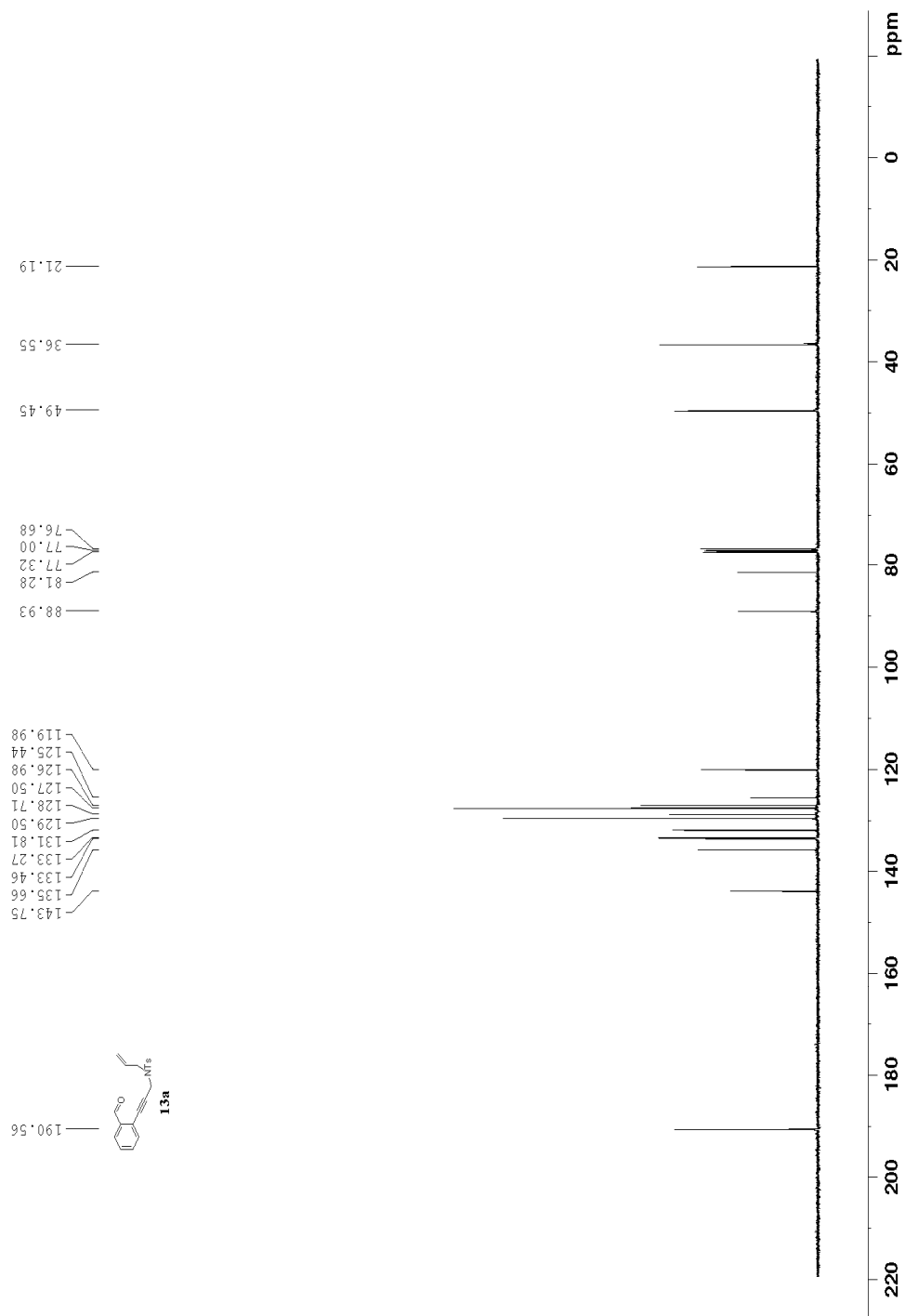


```

NAME          xyz5
EXPNO         11
PROCNO        1
Date_         20081106
Instrum       spect
PROBHD        5 mm PABBO BB
PULPROG       zgpg30
TD            65536
SOLVENT       CDCl3
NS            1100
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.363172 sec
RG            324
DW           20.800 usec
DE           6.50 usec
TE           294.7 K
D1           2.0000000 sec
D11          0.0500000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1           9.25 usec
PL1          -2.00 dB
PL1W        56.13311005 W
SFO1        100.6228298 MHz

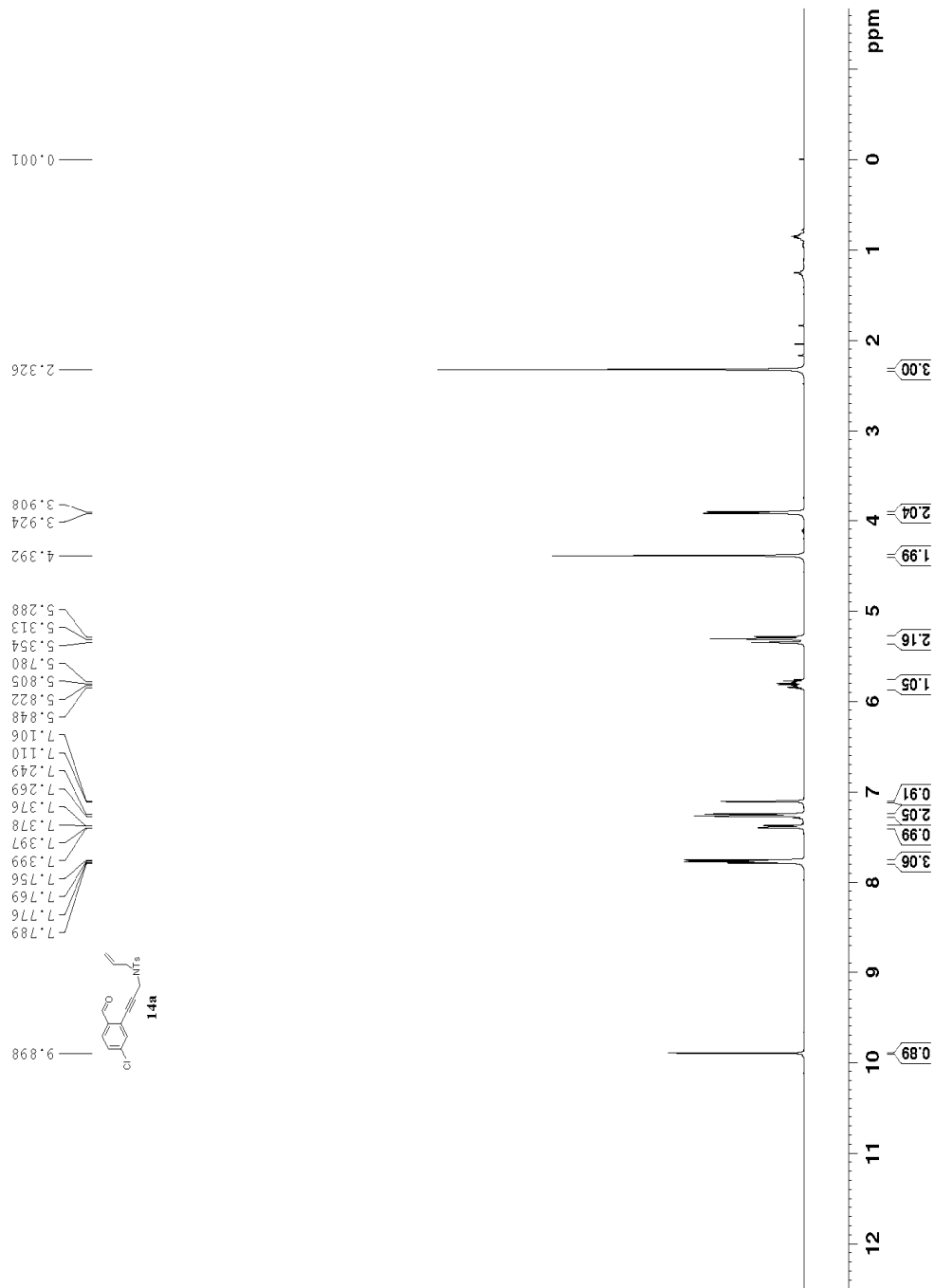
===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2          1H
PCPD2       80.00 usec
PL2         -2.10 dB
PL2W        13.90 dB
PL3         13.90 dB
PL3W        17.72104283 W
PL12W       0.44513249 W
PL13W       0.44513249 W
SFO2        400.1316005 MHz
SF          100.6127820 MHz
WDW         EM
SSB         0
LB          1.00 Hz
GB          0
PC          1.40
    
```




```

NAME          xyx-10-y1
EXPNO         10
PROCNO        1
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           8233.685 Hz
AQ           0.124483 Hz
RG           3.984452
RG            60.800 usec
DE           6.50 usec
TE           291.1 K
TD            1
TDO           1.0000000 sec

===== CHANNEL F1 =====
NUC1          1H
P1            14.00 usec
PL1           -1.00 dB
PL12         -1.00 dB
PL1W         13.75590801 W
SFO1         400.1524710 MHz
SI           32768
SF           400.1299956 MHz
XWDW         EO
SSB          EO
LB           0.30 Hz
GB           0
PC           1.00
    
```

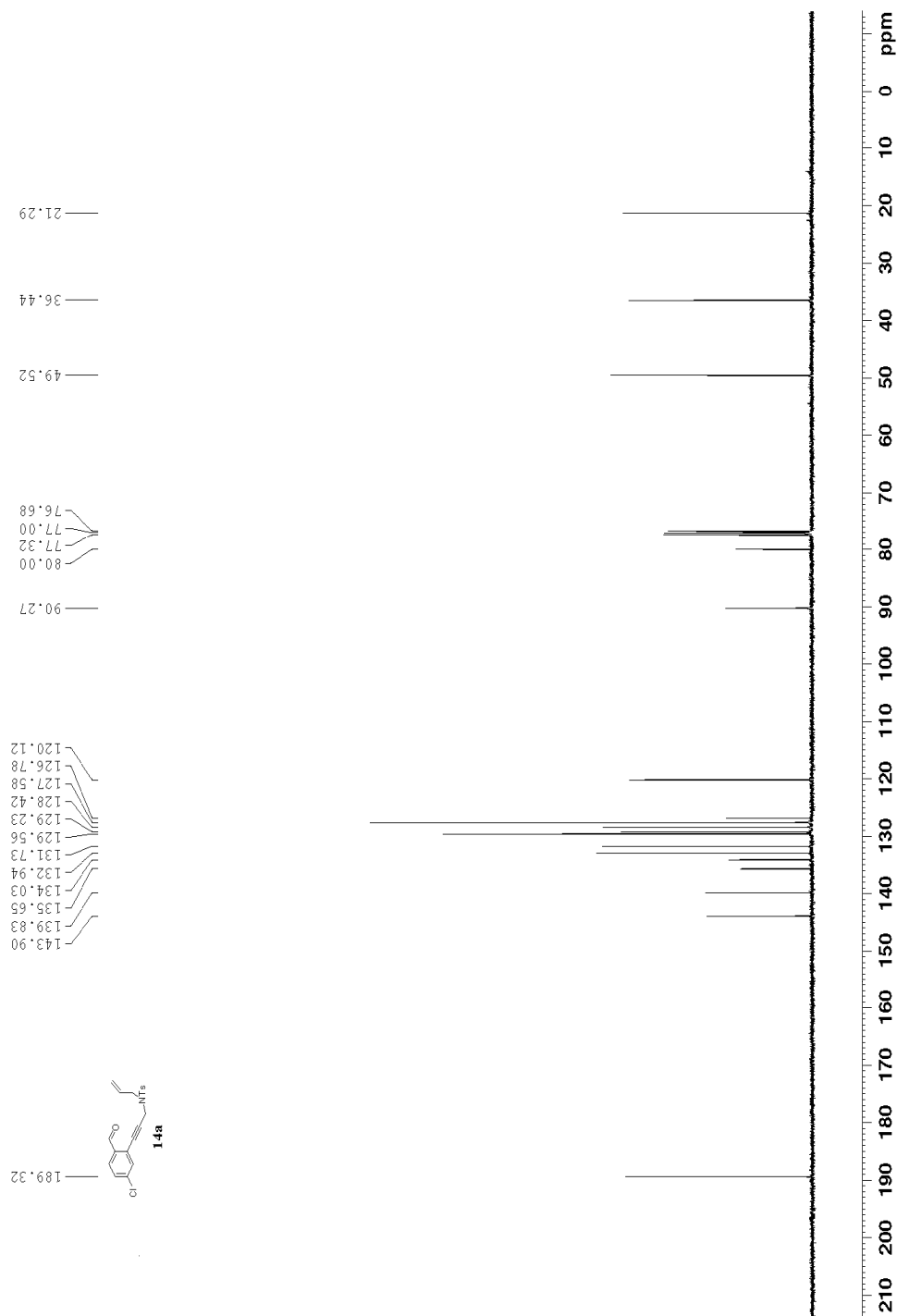


```

NAME          XYX-10-V1
EXPNO         1
PROCNO        1
Date_         20081221
Time          17.21
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            1100
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.365386 sec
RG            80.6
DW           20.800 usec
DE           6.50 usec
TE           292.4 K
TD           2.0300000 sec
D1           0.0300000 sec
D11          0.0300000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C usec
PL1           9.2
PL2          -2.00 dB
PL1W         56.13311005 W
SFO1         100.6228288 MHz

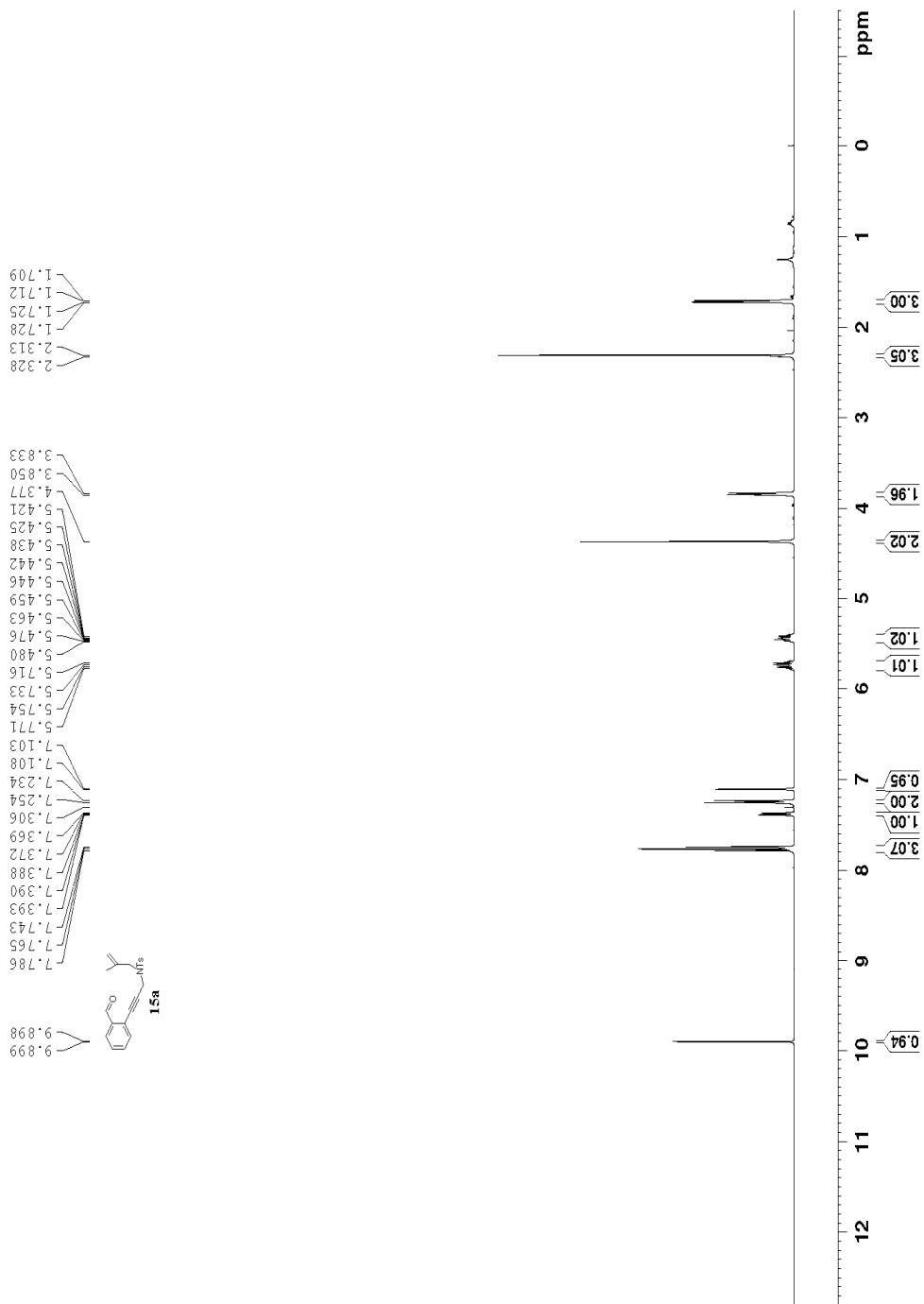
===== CHANNEL f2 =====
CPDPRG2       waltz16
NUC2          1H
PL2          80.00 usec
PL3          -2.10 dB
PL4          -2.10 dB
PL13         13.90 dB
PL14         13.90 dB
PL2W         17.72104263 W
PL12W        0.44513249 W
PL13W        0.44513249 W
SFO2         400.1526968 MHz
SF           100.6127812 MHz
WDW          EM
SSB          0
GB           1.00 Hz
PC           1.40
    
```



```

NAME          xyx-14-v1
EXPNO         10
PROCNO        1
Time          20090213
Time2         22.46
INSTRUM       spect
PROBHD        5 mm FAREO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           6223.685 Hz
AQ           0.14685 Hz
RG           3.984637 sec
DE           60.800 usec
TE           29.50 usec
D1           1.0000000 sec
TD0          1

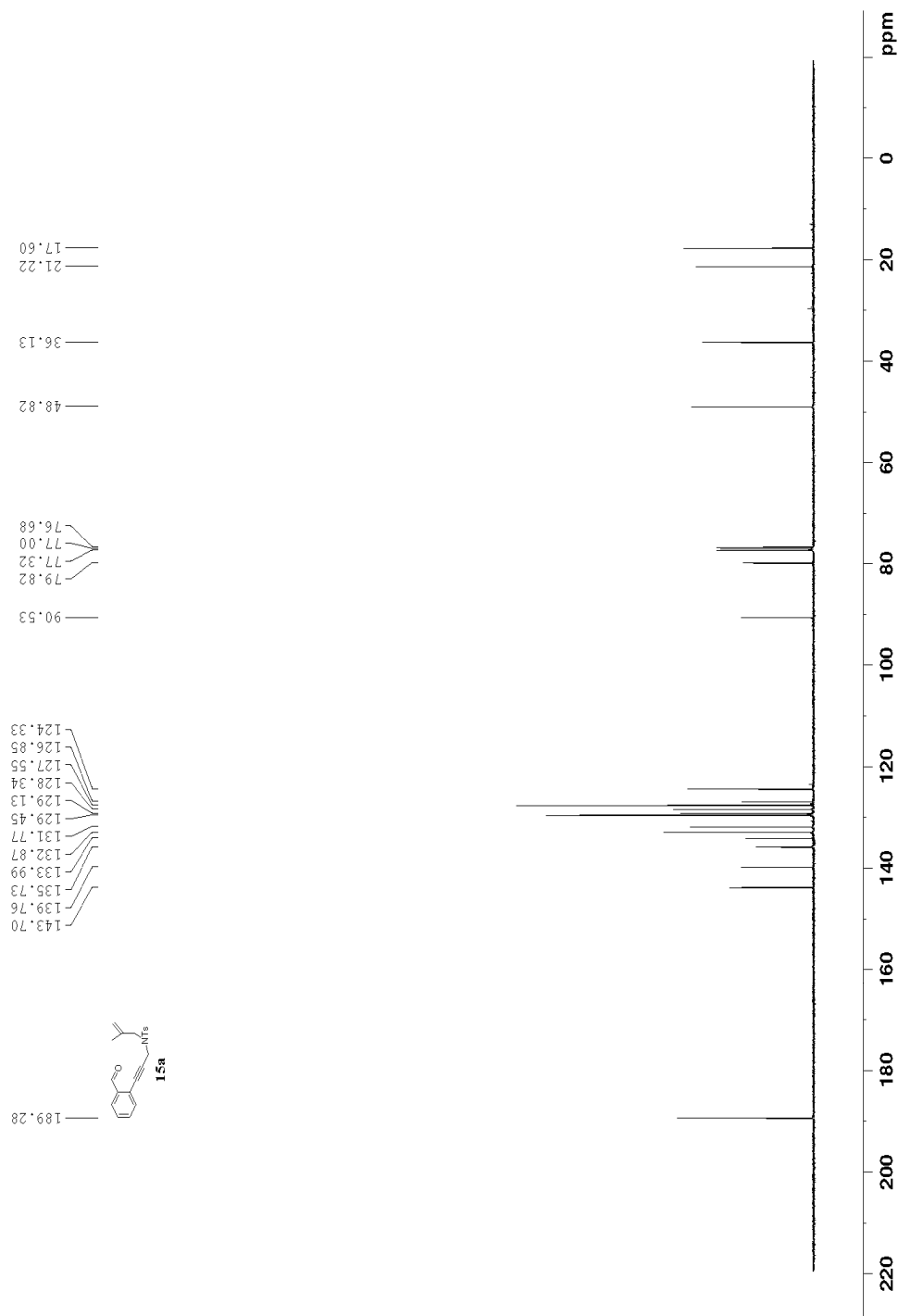
===== CHANNEL f1 =====
NUC1          13C
P1           14.70 usec
PL1          -1.00 dB
PL1W         13.75590801 W
SFO1         400.1324710 MHz
SF           400.1298662 MHz
WDW          EM
SSB          0
LB           0.30 Hz
GB           0
PC           1.00
    
```



```

NAME          XYX-14-Y1
EXPNO         11
PROCNO        1
Date_         20090218
Time          22:14
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
TD            65536
SOLVENT       CDCl3
NS            1100
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.3631984 sec
RG            64
DW           20.800 usec
DE           6.50 usec
TE           293.5 K
TD0          2.0300000 sec
D1           0.0300000 sec
D11          0.0300000 sec
TD0          1

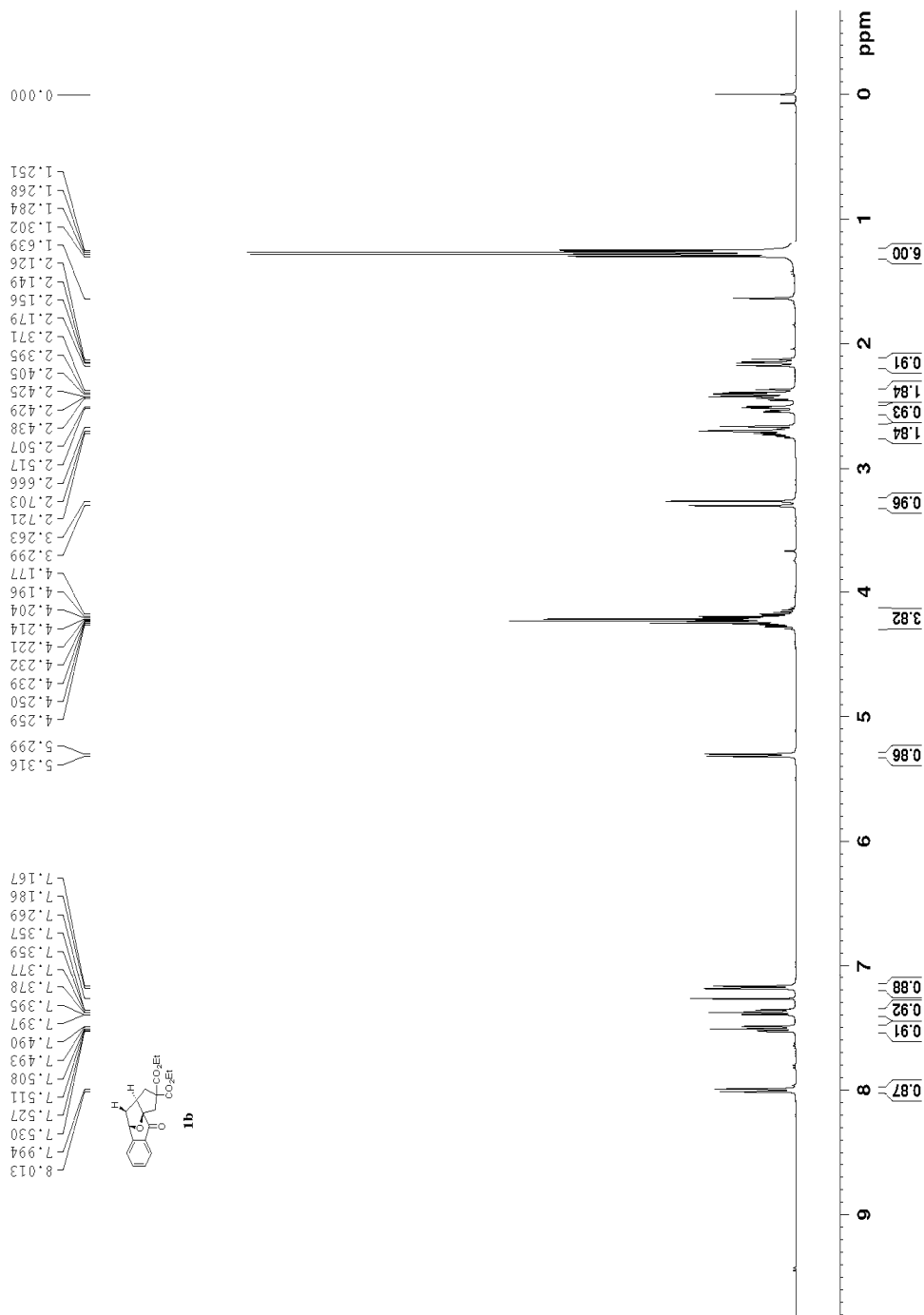
===== CHANNEL f1 =====
NUC1          13C usec
PL1           9.75
PL1W         -2.00 dB
SFO1         56.13311005 W
===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2          1H
PCPD2        80.00 usec
PL2          -2.10 dB
PL2W         13.40 dB
PL13         13.90 dB
PL12W        17.72104263 W
PL12W        0.44513249 W
PL13W        0.44513249 W
SFO2         400.1507618 MHz
SF           100.6127844 MHz
WDW          EM
SSB          0
GB           1.00 Hz
PC           1.40
    
```



```

NAME xyxquexi-1
EXPNO 10
PROCNO 1
Time 2008102
Time 18.46
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
SOLVENT CDCl3
NS 16
DS 2
WDW 8295.62 Hz
SSB 0
GAMMA 1.2483 Hz
FIDRES 3.9848387 sec
AQ 181
RG 60.800 usec
DE 28.54 usec
DI 1.00000000 sec
TD0 1

===== CHANNEL F1 =====
NUC1 1H
PI 14.60 usec
PL1 0.00 dB
PL1W 11.47932053 W
SFO1 400.1327718 MHz
SF 400.1300015 MHz
WDW EM
SSB 0
GB 0.30 Hz
PC 1.00
    
```

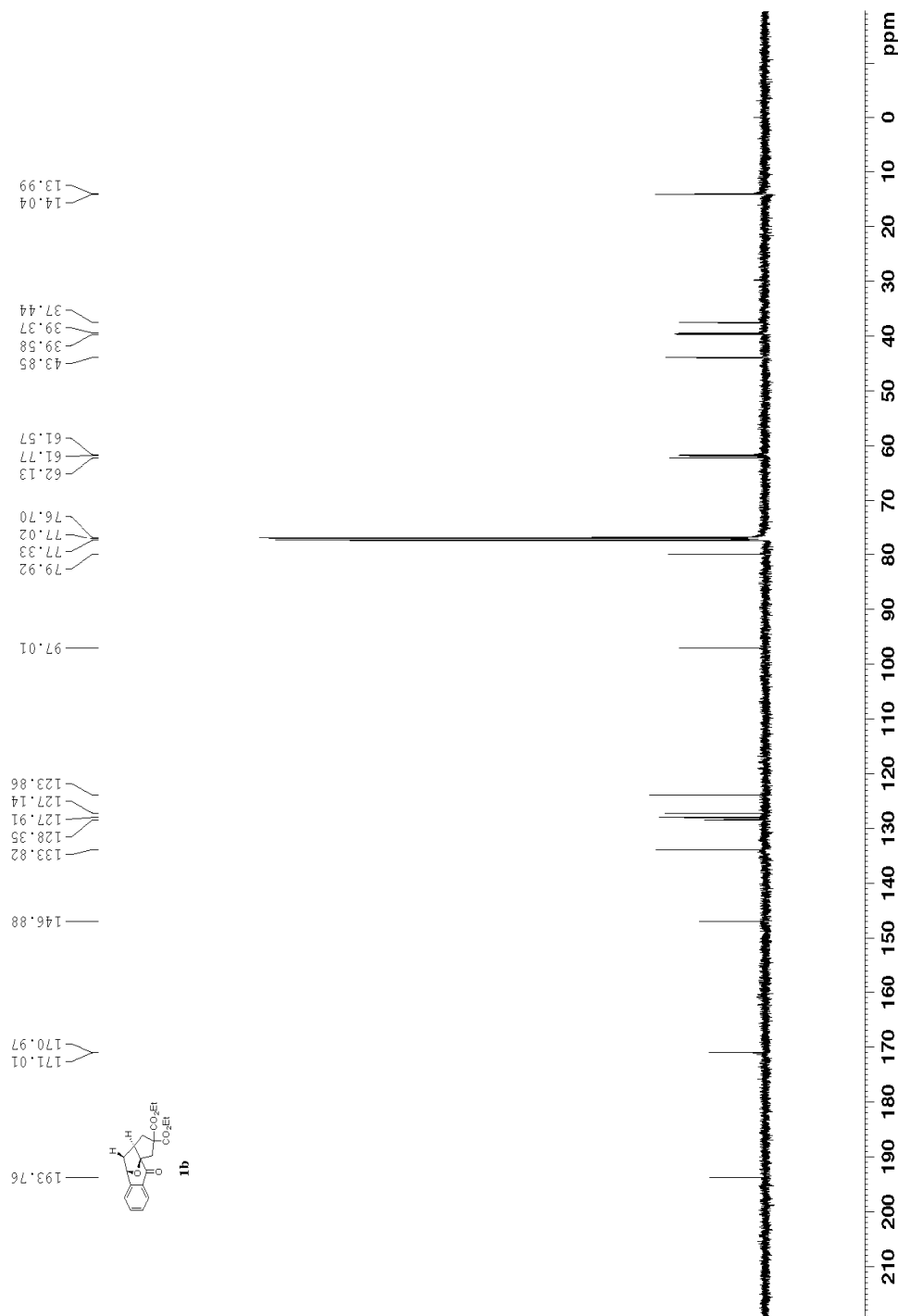


```

NAME xyxquxi-1
EXPNO 11
PROCNO 1
Date_ 20081022
INSTRUM spect
PROBHD 5 mm PABBO BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3653186 sec
RG 316
DW 20.800 usec
DE 6.50 usec
TE 295.3 K
D1 2.0000000 sec
d11 0.0500000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 9.00 usec
PL1 -2.00 dB
PL1W 57.32743073 W
SFO1 100.6228298 MHz

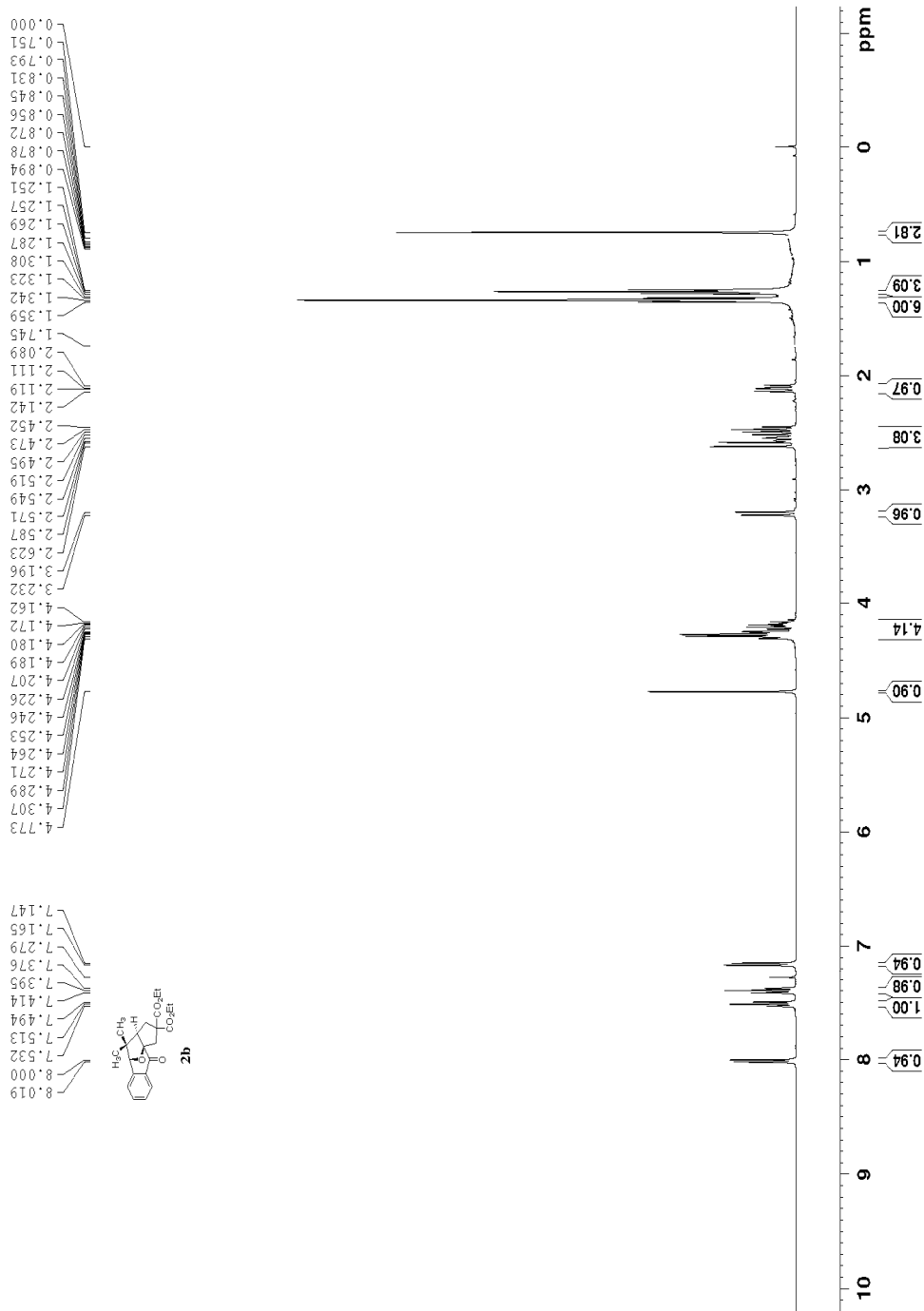
===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 90.00 usec
PL2 -2.00 dB
PL12 15.50 dB
PL13 15.50 dB
PL14 15.50 dB
PL15 15.50 dB
PL16 15.50 dB
PL17 18.19349881 W
PL12W 0.32353121 W
PL13W 0.32353121 W
SFO2 400.1316008 MHz
SF 400.1316008 MHz
SE 1
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
  
```



```

NAME          xyx08-4
EXPNO         10
PROCNO        1
Time          20081101
Time         11.27
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
WDW           EM
SSB           0
GB            0
FIDRES       0.12483 Hz
AQ            3.9848387 sec
RG            71.8
DW            60.800 usec
DE            26.59 usec
TE            300.2 K
D1            1.00000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          1H
P1            14.60 usec
PL1           0.00 dB
PL1W          11.47932053 W
SFO1          400.1327768 MHz
SF           400.1299978 MHz
WDW           EM
SSB           0
GB            0
PC            1.00
    
```

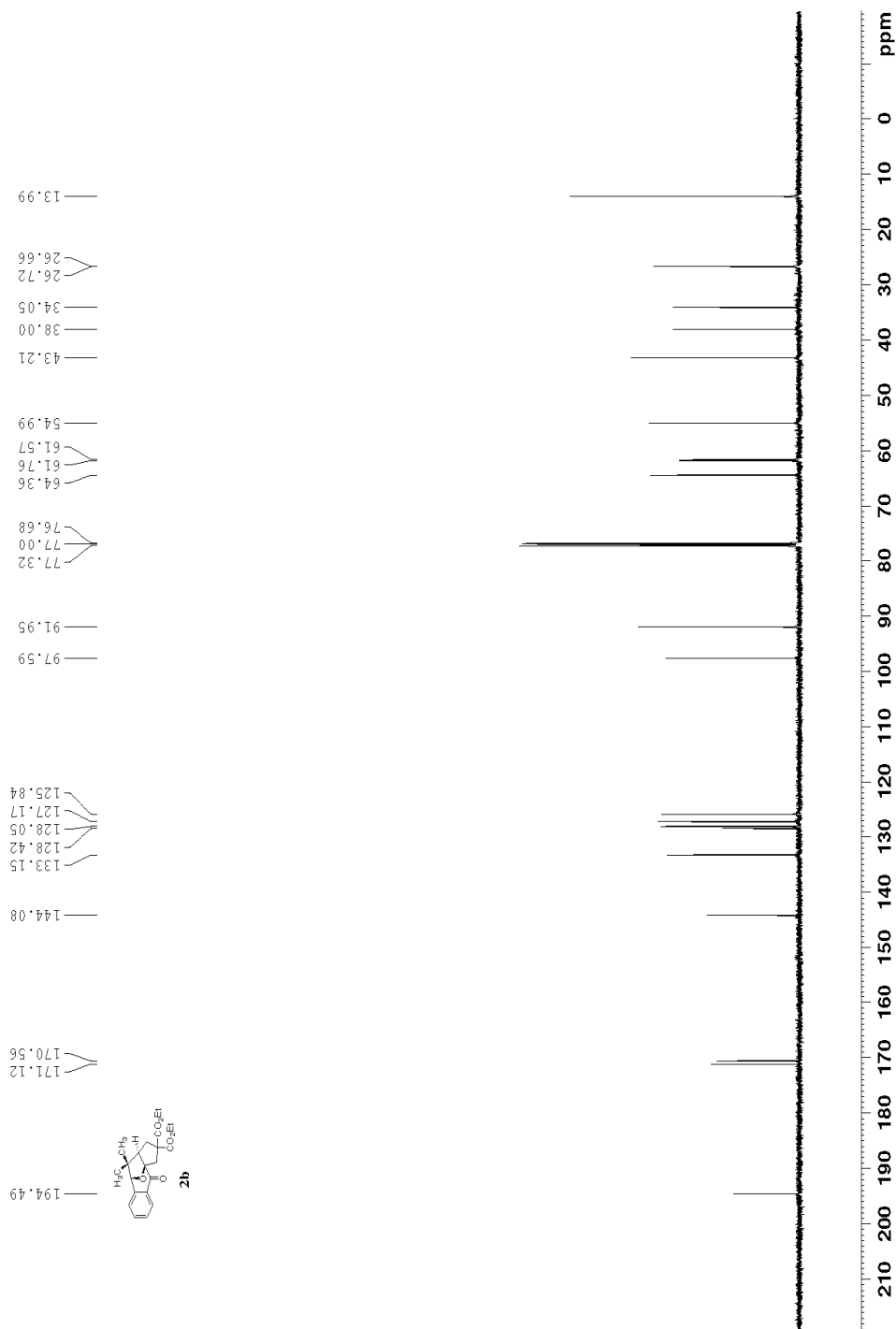


```

NAME xyx08-4
EXPNO 11
PROCNO 1
Date_ 20081101
Time 11:39
INSTRUM spect
PROBHD 5 mm PABBO BR-
PULPROG zgpg30
SOLVENT CDCl3
NS 200
DS 4
SWH 24038.461 Hz
AQ 0.0178 sec
RG 2050
FIDRES 1.3651988 sec
AQRES 1.3651988 sec
RG 2050
DWDW 20.800 usec
DE 8.50 usec
DI 8.50 usec
D1 0.0000000 sec
D11 2.0000000 sec
D10 0.0300000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 9.40 usec
PL1 -2.00 dB
PL1W 57.32743073 W
SFO1 100.6228296 MHz

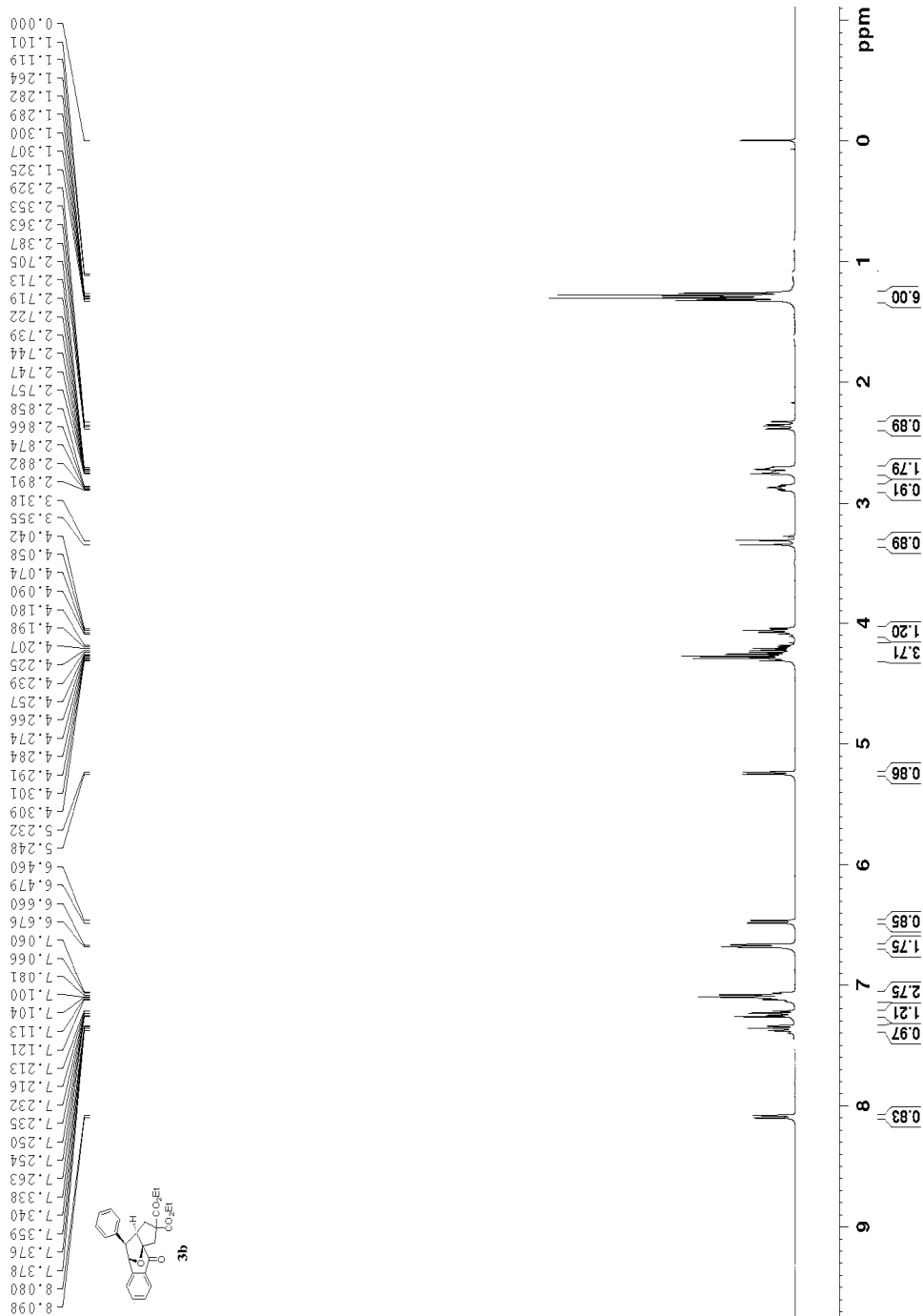
===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
P2 9.40 usec
PL2 -2.00 dB
PL12 15.50 dB
PL13 15.50 dB
PL1W 18.19349861 W
PL2W 0.32853121 W
PL3W 0.32853121 W
SFO2 400.1318005 MHz
SI 32768
SF 100.6127746 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
FC 1.40
    
```




```

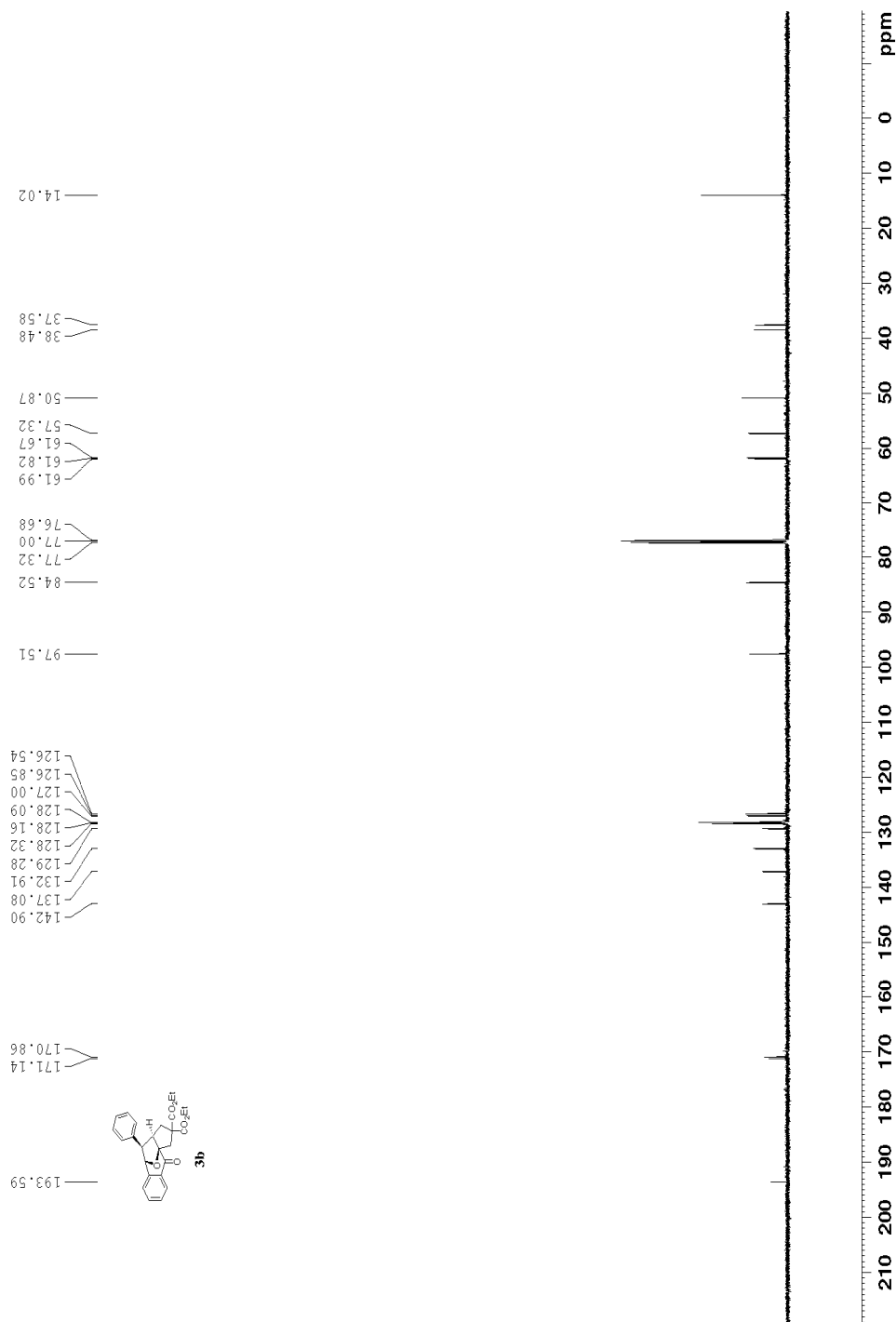
NAME xyx08-10-31
EXPNO 10
PROCNO 1
Time 20081101
Time 10.36
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
SOLVENT CDCl3
NS 16
DS 2
AQ 8223.62 Hz
FIDRES 0.72483 Hz
RG 3.9848387 sec
RG 101
DW 60.800 usec
DE 282.5 usec
TE 300.2 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 14.70 usec
PL1 -1.00 dB
PL1W 13.7559801 W
SFO1 400.132778 MHz
SF 400.1300041 MHz
WDW EM
SSB 0
GB 0
PC 1.00
    
```



```

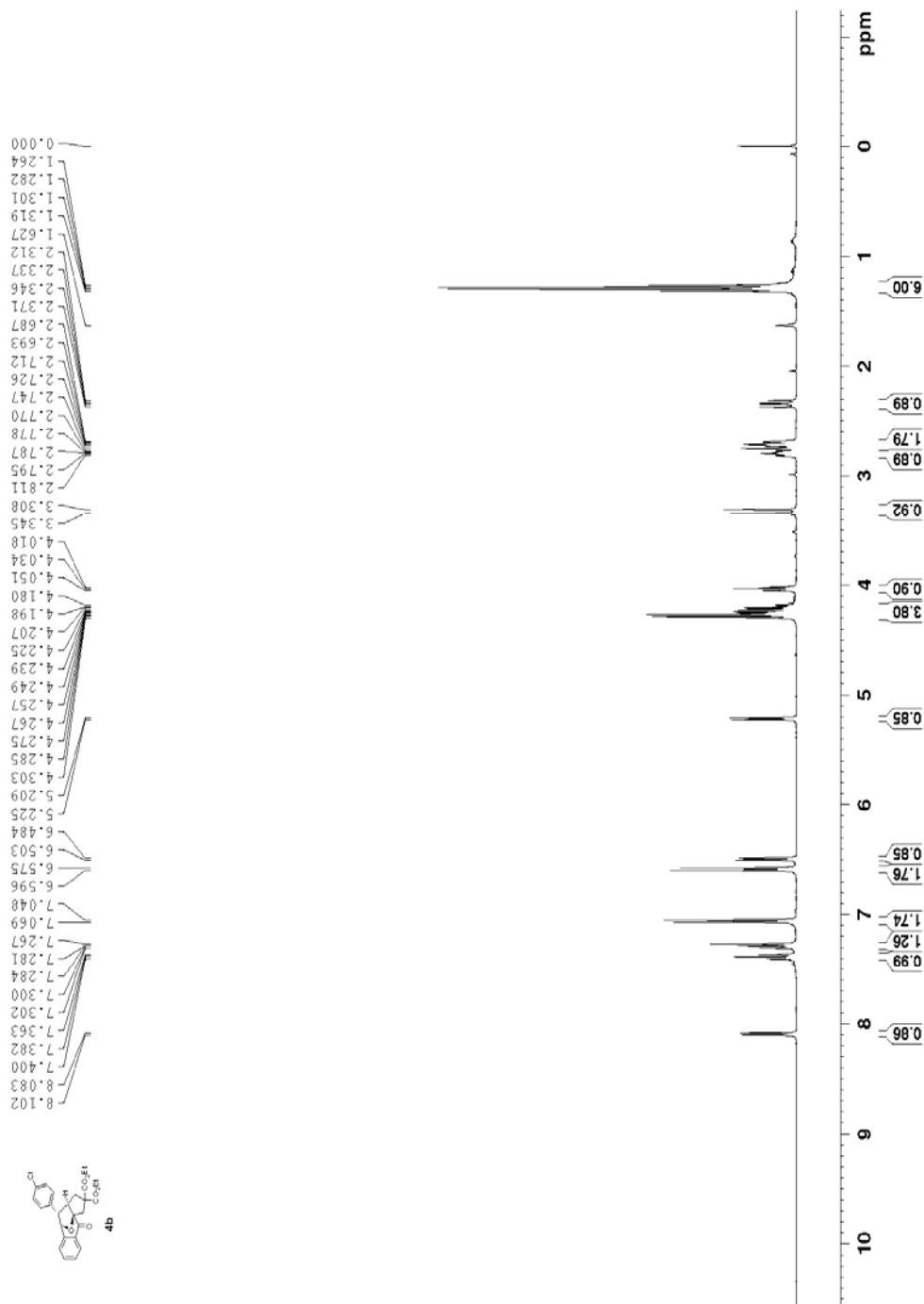
NAME XY*08-10-31
EXPNO 11
PROCNO 1
Date_ 20081108
Time 10.45
INSTRUM spect
PROBHD 5 mm PABBO BR-
PULPROG zgpg30
AQ 0.013
SOLVENT CDCl3
NS 128
DS 4
SWH 24038.461 Hz
FIDRES 0.36698 Hz
AQ 1.365108 sec
RG 912
DW 20.800 usec
DE 6.50 usec
TE 293.8 K
TD0 1
D1 2.000000 sec
D11 0.03000000 sec
D10 0.03000000 sec
===== CHANNEL f1 =====
NUC1 13C
P1 9.70 usec
PL1 -2.00 dB
PL1W 56.13311005 W
SFO1 100.6228298 MHz
===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 13.90 dB
PL2W 13.90 dB
PL3 13.90 dB
PL3W 13.90 dB
PL2W 17.72104263 W
PL3W 0.44513249 W
SFO2 400.1318045 MHz
SI 32768
SF 100.6127717 MHz
WDW EM
SSB 0
GB 1.00 Hz
PC 1.40
    
```



```

NAME          xyx-7-c
EXPNO         10
PROCNO        1
Time          20061117
Time2         19:25
INSTRUM       spect
PROBHD        5 mm FALSB0 BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            6416
DS            2
SWH           8232.685 Hz
AQ           0.224837 sec
RG           161
DW           60.800 usec
DE           2.50 usec
TE           300.2 K
D1           1.0000000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1           14.40 usec
PL1          0.00 dB
PL1W         11.47932013 W
SFO1         400.124710 MHz
SI           32768
SF           400.1300000 MHz
WDW          EM
SSB          0
LB           0.30 Hz
GB           0
PC           1.00
    
```

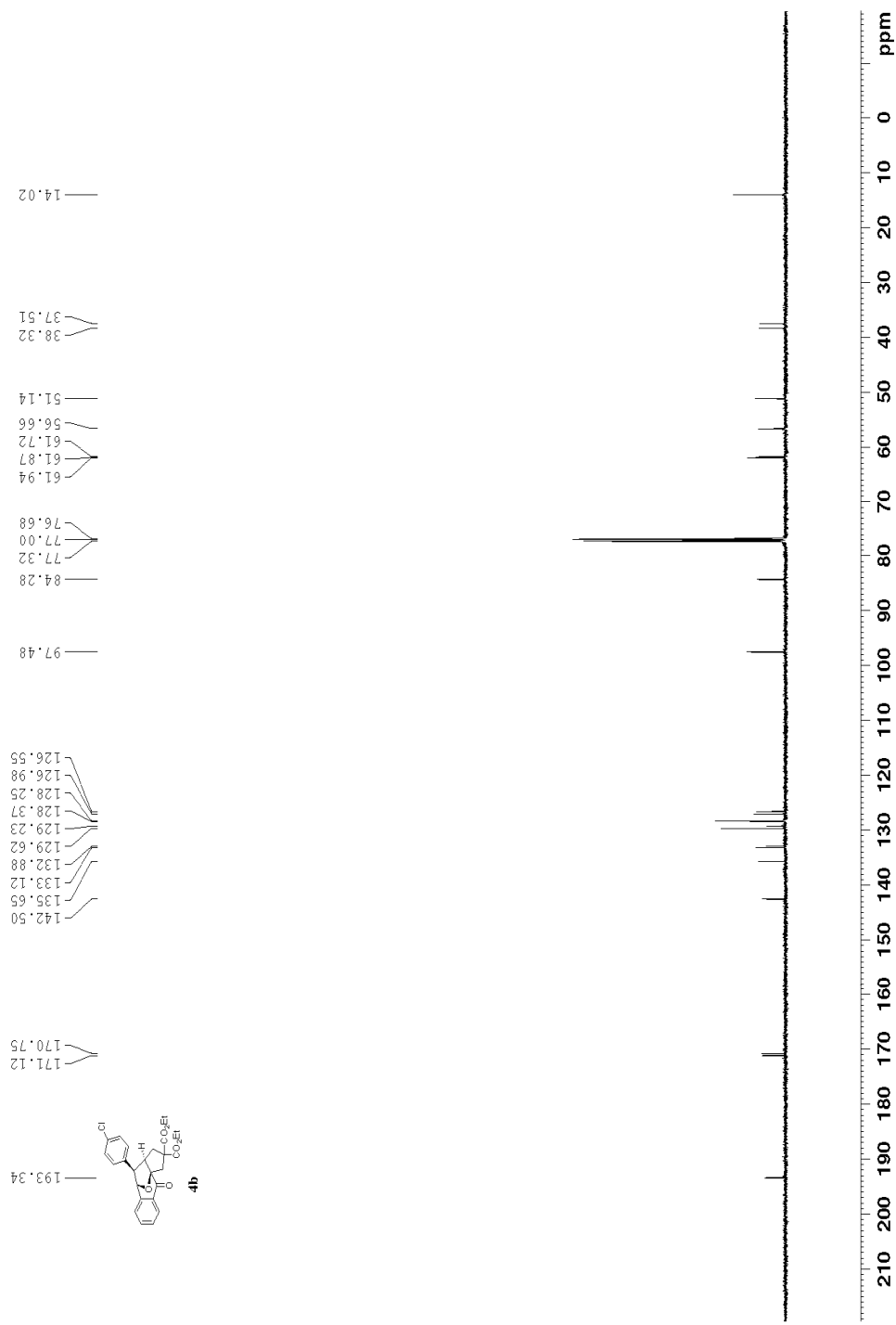


```

NAME          xyx-7-c
EXPNO         11
PROCNO        1
Date_         20081121
Time          14.33
INSTRUM       spect
PROBHD        5 mm PABBO BR-
PULPROG       zgpg30
TD            65536
AQ            0.001875
RG            200
NS            4
DS            24038.461 Hz
SWH           0.366798 Hz
FIDRES       1.3652050 sec
RG           2050
DW           20.800 usec
DE           6.50 usec
TE           294.0 K
D1           2.0000000 sec
D11          0.03000000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1           9.40 usec
PL1          -2.00 dB
PL1W         57.32743073 W
SFO1         100.6228298 MHz

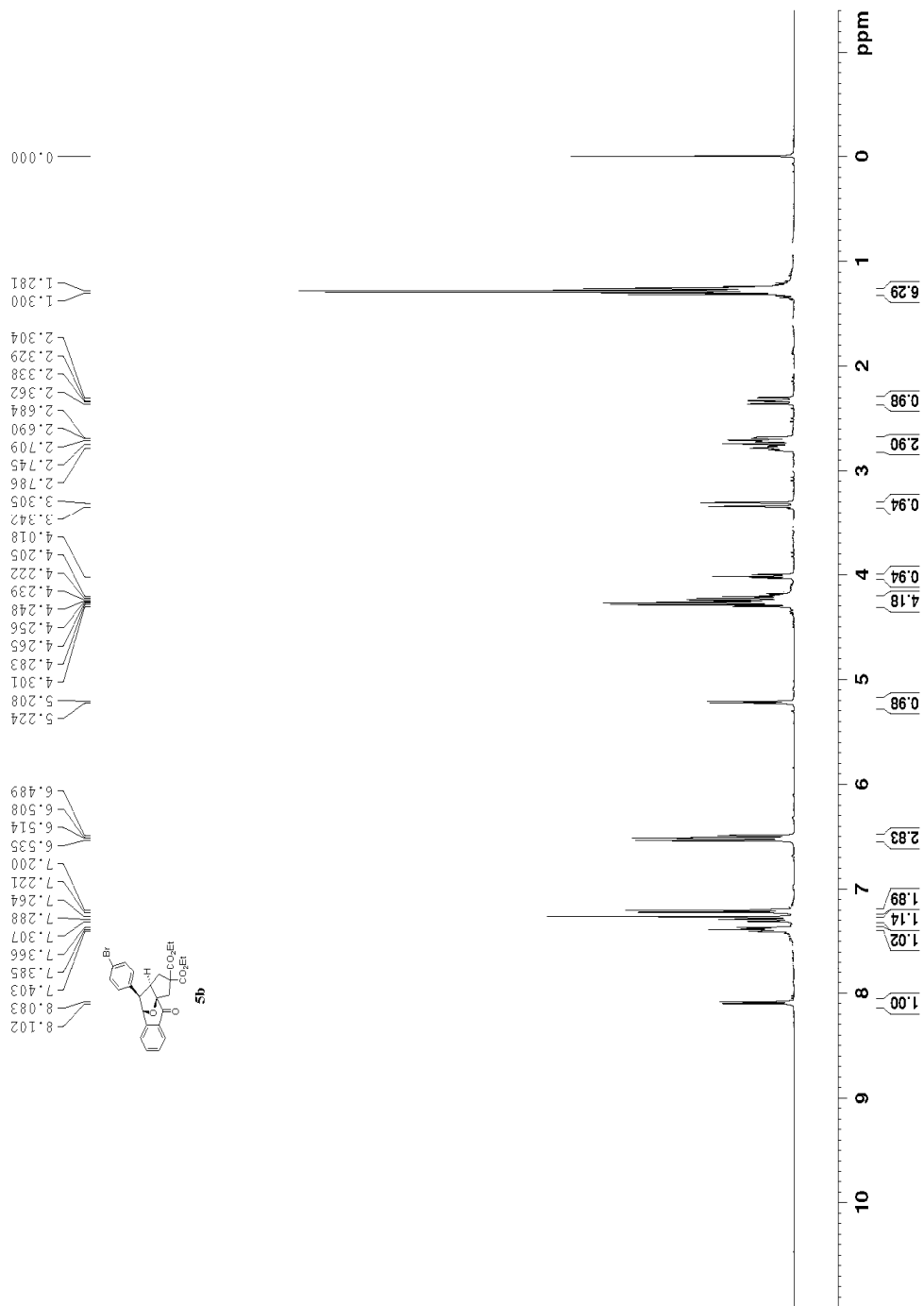
===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2          1H
PCPD2        90.00 usec
PL2          12.00 dB
PL2W         18.19349861 W
PL13         15.50 dB
PL2W         18.19349861 W
PL12W        0.32353121 W
SFO2         400.1326001 MHz
SI           32768
SF           100.6127715 MHz
WDW          EM
SSB          0
GB           1.00 Hz
PC           1.40
    
```



```

NAME          xyx-8
EXPNO         10
PROCNO        1
Time          20081213
Time2         22.20
INSTRUM       spect
PROBHD        5 mm FAREO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           6231.685 Hz
AQ            0.14685 Hz
RG            3.984837 sec
RG            362
DW            60.800 usec
DE            6.50 usec
TE            300.2 K
D1            1.00000000 sec
TD0           1

===== CHANNEL f1 =====
P1           14.50 usec
PL1          0.00 dB
PL12         0.00 dB
PL1W         11.47932053 W
SFO1         400.1324710 MHz
SF           400.1300038 MHz
WDW          EM
SSB          0
LB           0.30 Hz
GB           0
PC           1.00
    
```

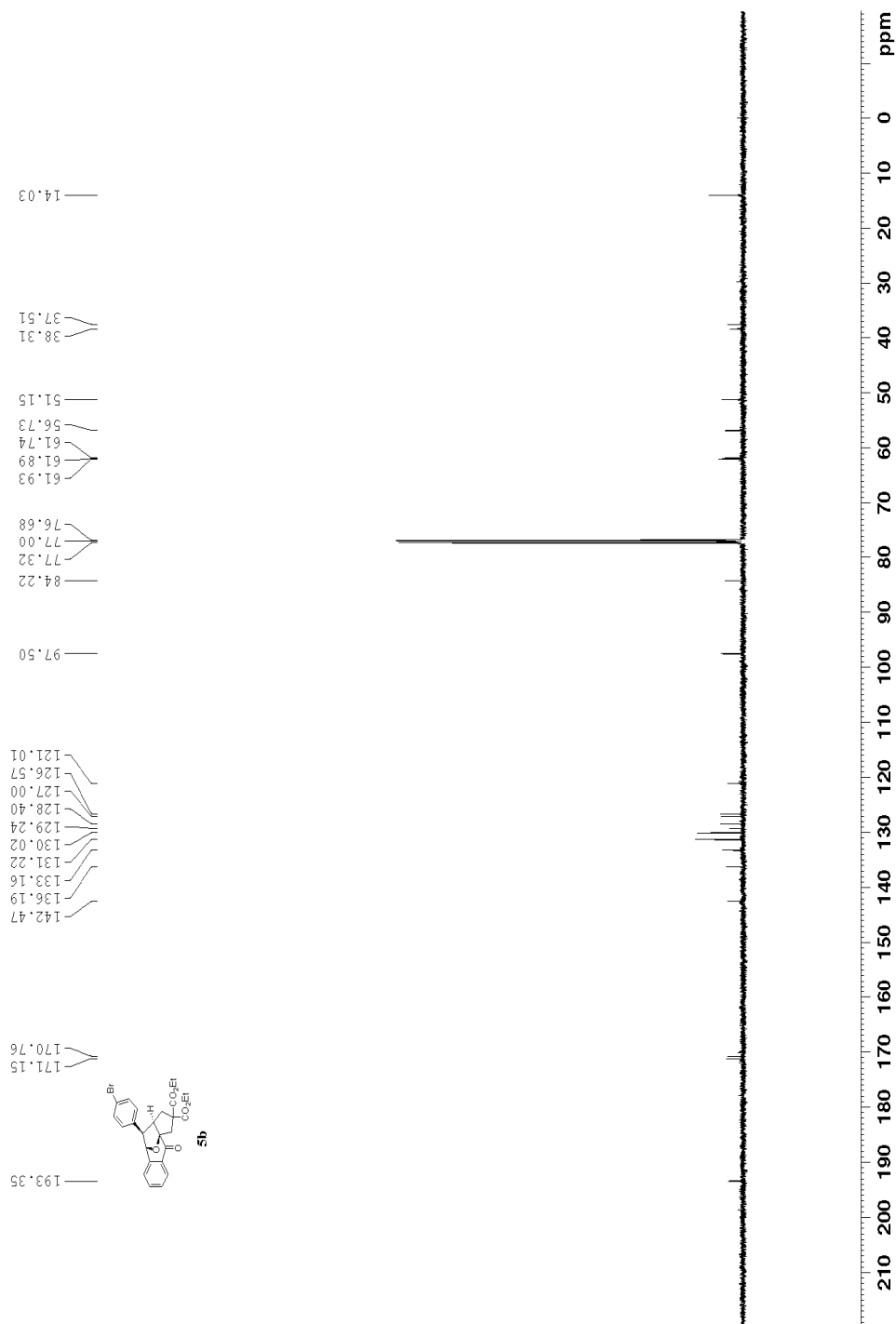


```

NAME          xyx-8
EXPNO         11
PROCNO        1
Date_         20081203
Time          22:36
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
AQ            0.00010000
RG            327.3
SOLVENT       CDCl3
NS            256
DS            4
SWH           24038.461 Hz
FIDRES       0.526798 Hz
AQ           1.5862050 sec
RG           2050
DW           20.800 usec
DE           6.50 usec
TE           300.2 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1           9.40 usec
PL1          -2.00 dB
PL1W         57.32743073 W
SFO1         100.6228298 MHz

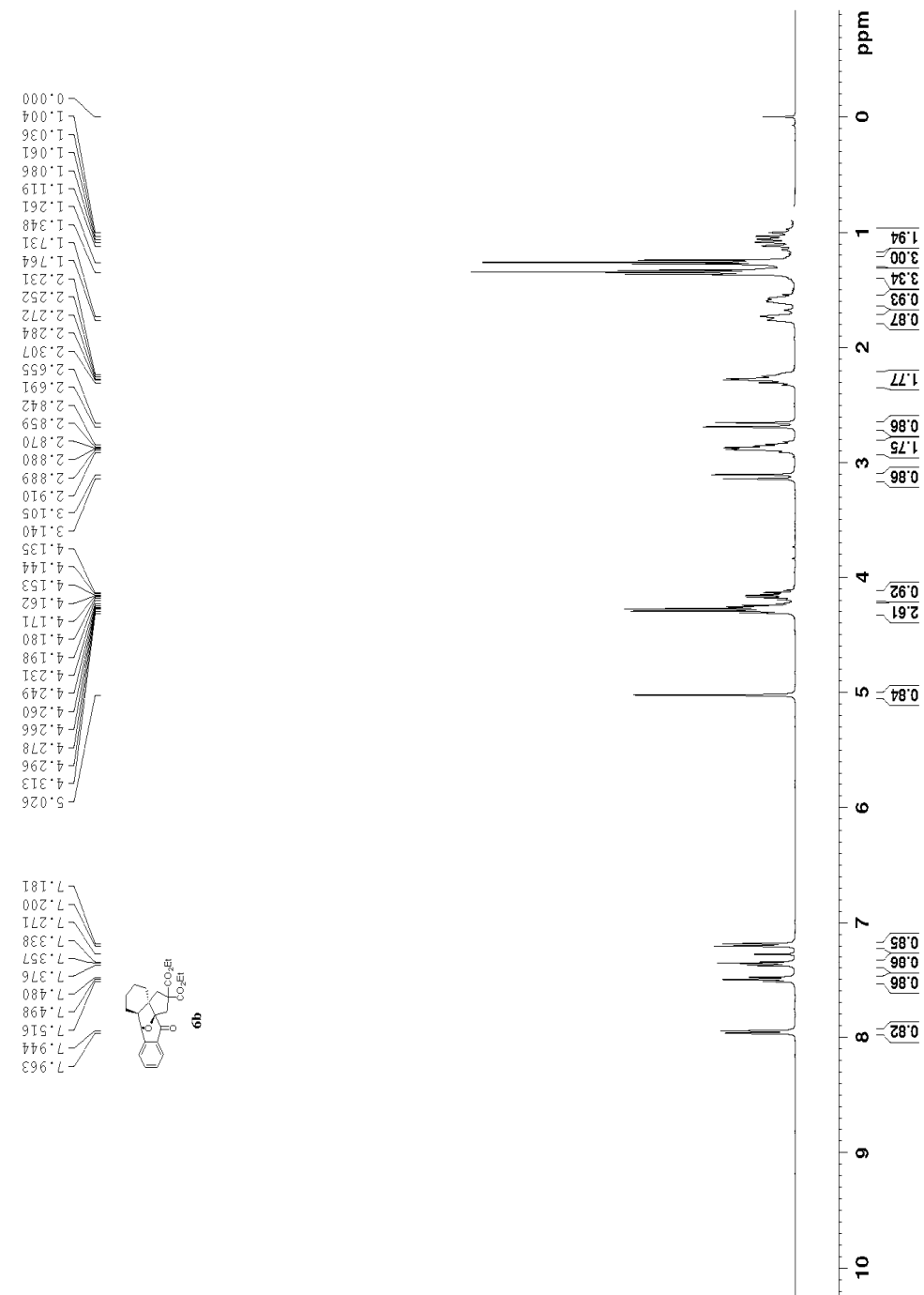
===== CHANNEL f2 =====
CFPRG2       waltz16
NUC2          1H
PCPD2        90.00 usec
PL2          15.50 dB
PL12         15.50 dB
PL13         15.50 dB
PL1W         18.19349861 W
PL12W        0.32853121 W
PL13W        0.32853121 W
SFO2         400.1313015 MHz
SI           32768
SF           100.6127705 MHz
WDW          EM
SSB          0
GB           1.00 Hz
PC           1.40
    
```



```

NAME          xyx-11-cw
EXPNO         10
PROCNO        1
Time          20090210
Time         18.36
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
AQ            8223.62 Hz
FIDRES        0.72683 Hz
WDW           3.9848387 sec
RG            101
DW            60.800 usec
DE            282.2 Ksec
TE            300.2
D1            1.00000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          1H
P1            14.60 usec
PL1           0.00 dB
PL1W          11.47932053 W
SFO1          400.133778 MHz
SF            400.13300012 MHz
WDW           EM
SSB           0
GB            0
PC            1.00
    
```

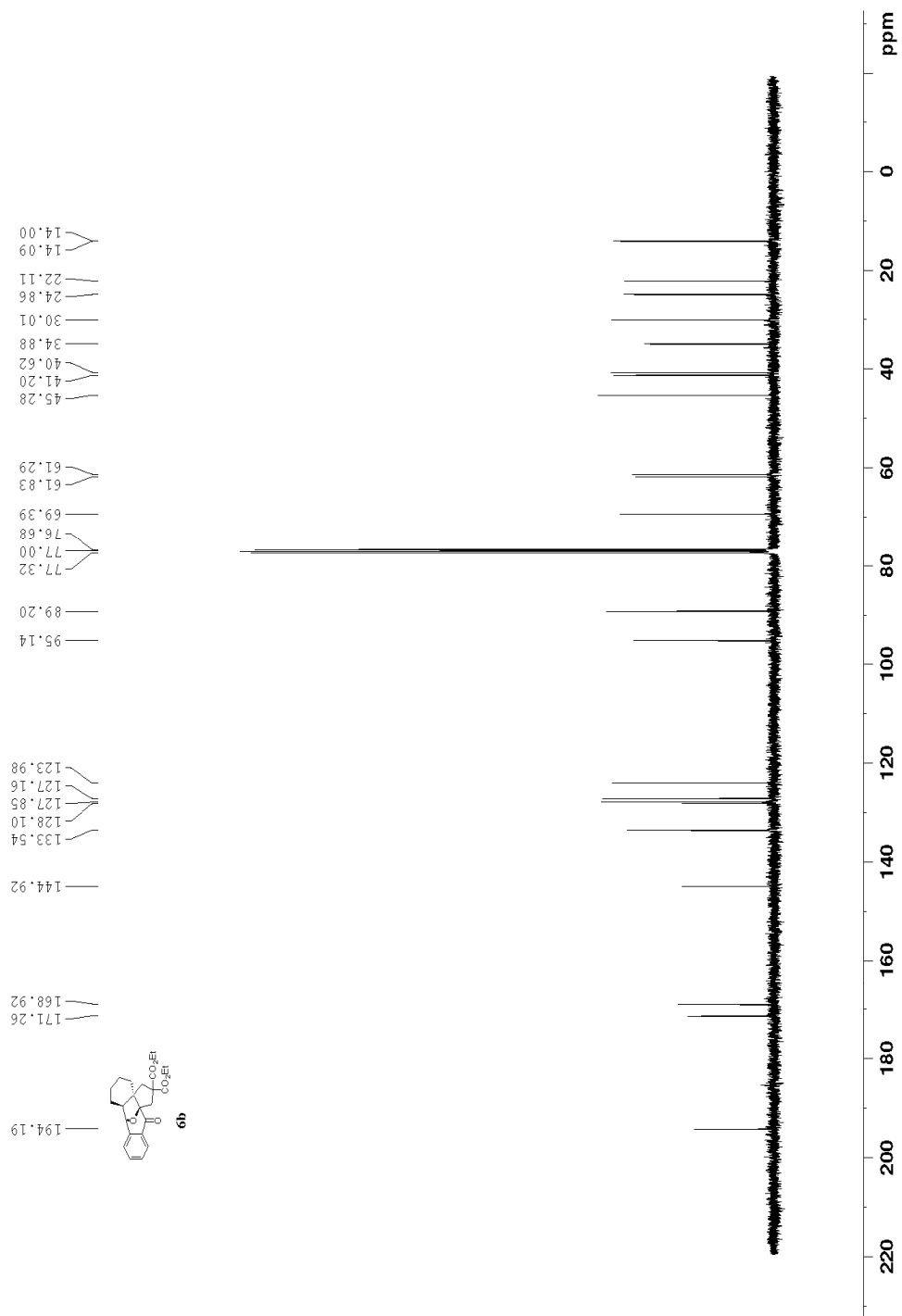


```

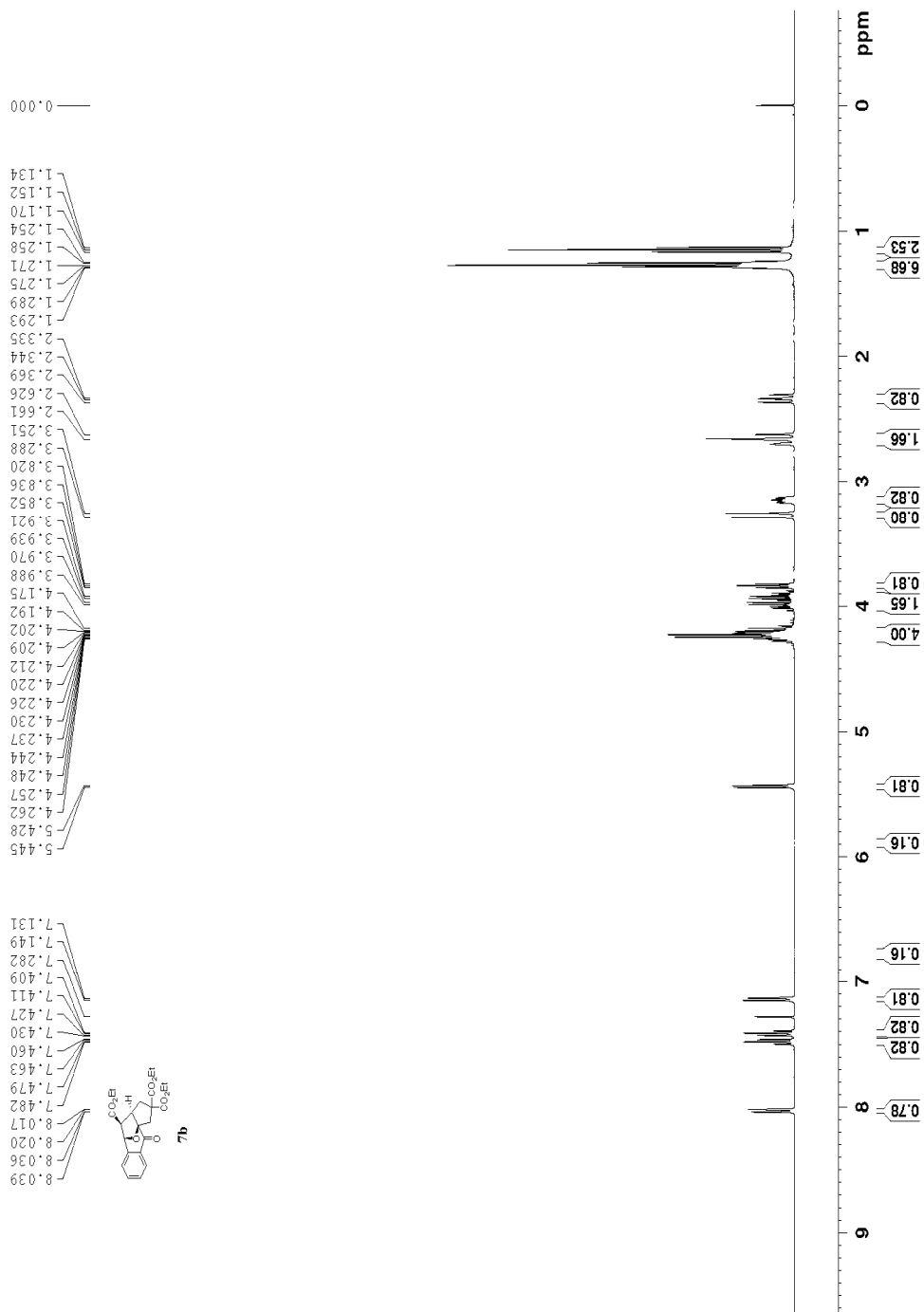
NAME          XYX-11-GW
EXPNO         11
PROCNO        1
Date_         20090211
Time          19:49
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            160
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.3652706 sec
RG           206
DW           20.800 usec
DE           6.50 usec
TE           293.0 K
TD           2.0000000 sec
D1           0.0300000 sec
D11          0.0300000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C usec
P1           9.00
PL1          -2.00 dB
PL1W        57.32743073 W
SFO1        100.6228288 MHz

===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2         1H
PCPD2        90.00 usec
PL2          -2.00 dB
PL3          15.50 dB
PL13         15.50 dB
PL1W        18.19349861 W
PL12W       0.32353121 W
PL13W       0.32353121 W
SFO2        400.1360976 MHz
SF          100.6127731 MHz
WDW          EM
SSB          0
LB           1.00 Hz
GB           0
PC           1.40
    
```




```
NAME xyx-zhi-cw
EXPNO 10
PROCNO 1
Time 20090307
Time 14.37
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
SOLVENT CDCl3
NS 16
DS 2
F2 8295.68 Hz
WDWRES 0.12483 Hz
AQ 3.9846387 sec
RG 64
DW 60.800 usec
DE 6.50 usec
DI 1.00000000 sec
TD0 1
===== CHANNEL F1 =====
NUC1 14.70 usec
PI -1.00 dB
PL1 13.75590801 W
SFO1 400.1327768 MHz
SF 400.1299963 MHz
WDW EM
SSB 0
GB 0.30 Hz
PC 1.00
```

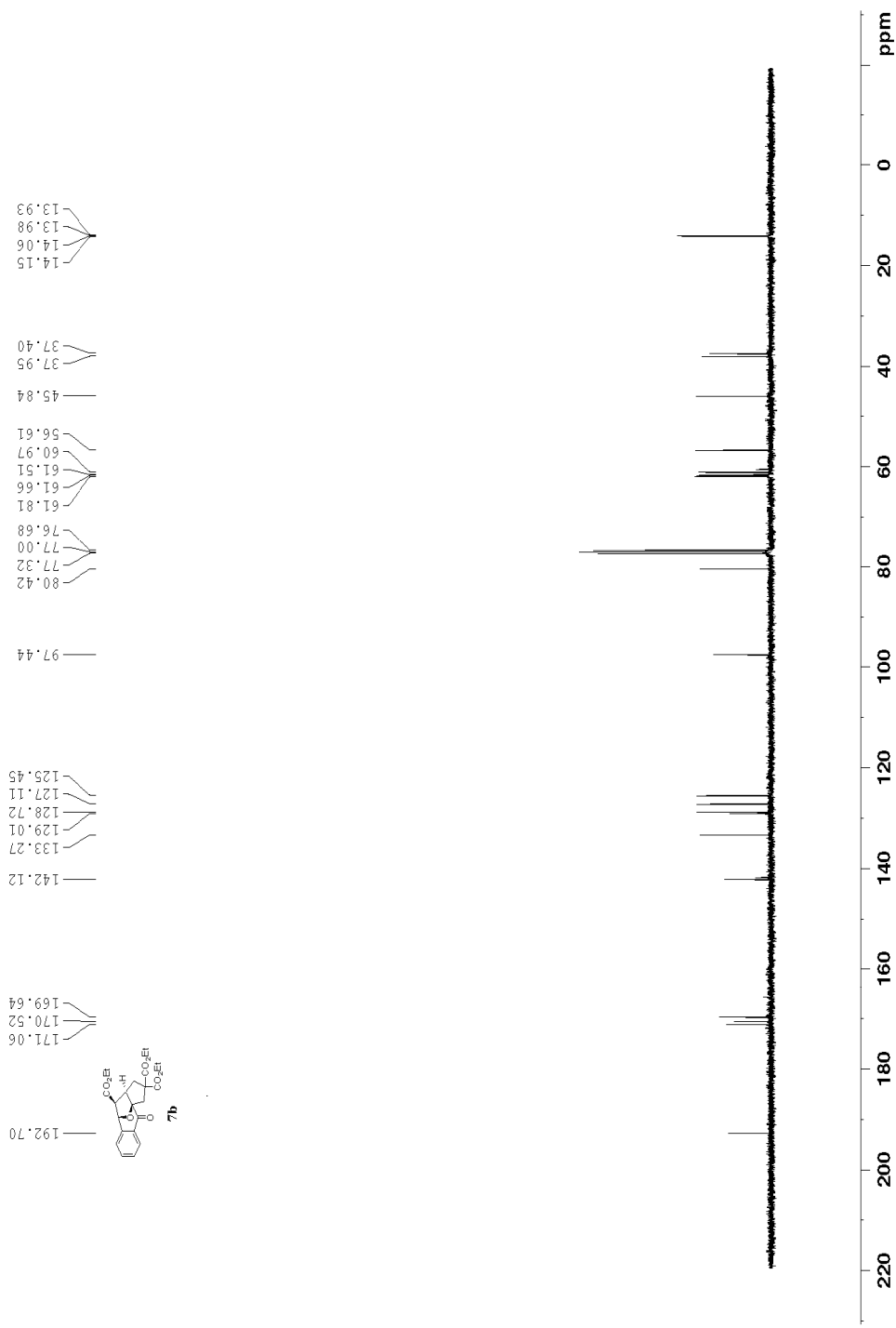


```

NAME          xyx-zhi-gw
EXPNO         11
PROCNO        1
Date_         20090307
Time          14.01
INSTRUM       spect
PROBHD        5 mm PABBO-BB-
PULPROG       zgpg30
TD            65536
AQ            0.0300000
SOLVENT       CDCl3
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.365718 sec
RG            71.8
DW           20.800 usec
DE           6.50 usec
TE           292.6 K
D1           2.000000 sec
D11          0.0300000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1           9.70 usec
PL1          -2.00 dB
PL1W        56.13311005 W
SFO1        100.6228298 MHz

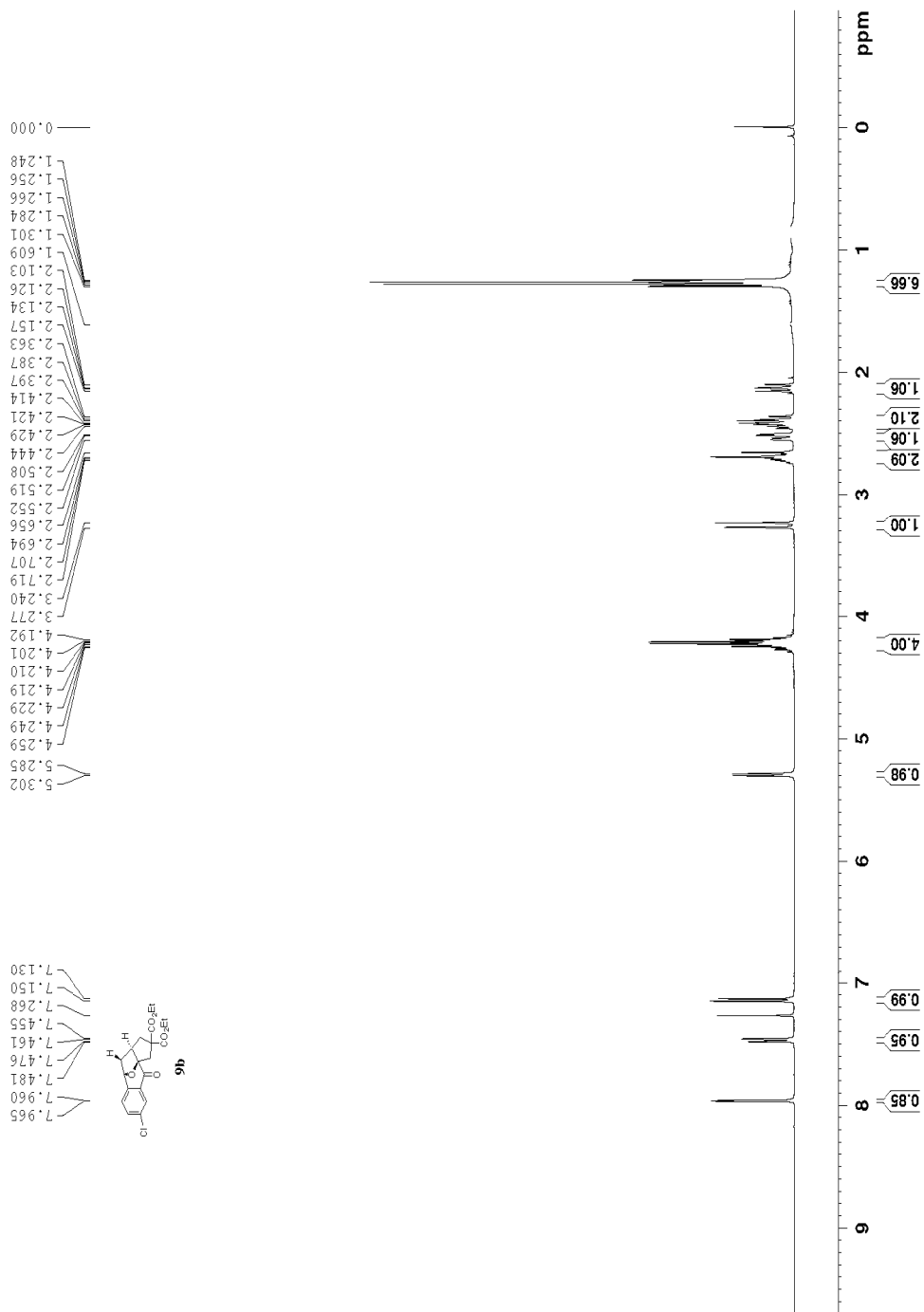
===== CHANNEL f2 =====
CEPFRG2      waltz16
NUC2         1H
PCPD2        80.00 usec
PL2          13.00 dB
PL2W        13.00 W
PL3         13.90 dB
PL3W        17.72104263 W
PL4W        0.44513249 W
PL5W        0.44513249 MHz
SF          400.132645 MHz
SI          32768
SF          100.6127736 MHz
WDW         EM
SSB         0
GB          1.00 Hz
PC          1.40
    
```



```

NAME          xyz-8-cw
EXPNO         10
PROCNO        1
Time          20081221
Time         20.153
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
WDW           EM
SSB           0
GB            0
FIDRES       0.174833 Hz
AQ            3.9848387 sec
RG            128
DW            60.800 usec
DE            2.50 usec
DL            1.00000000 sec
TD0           1

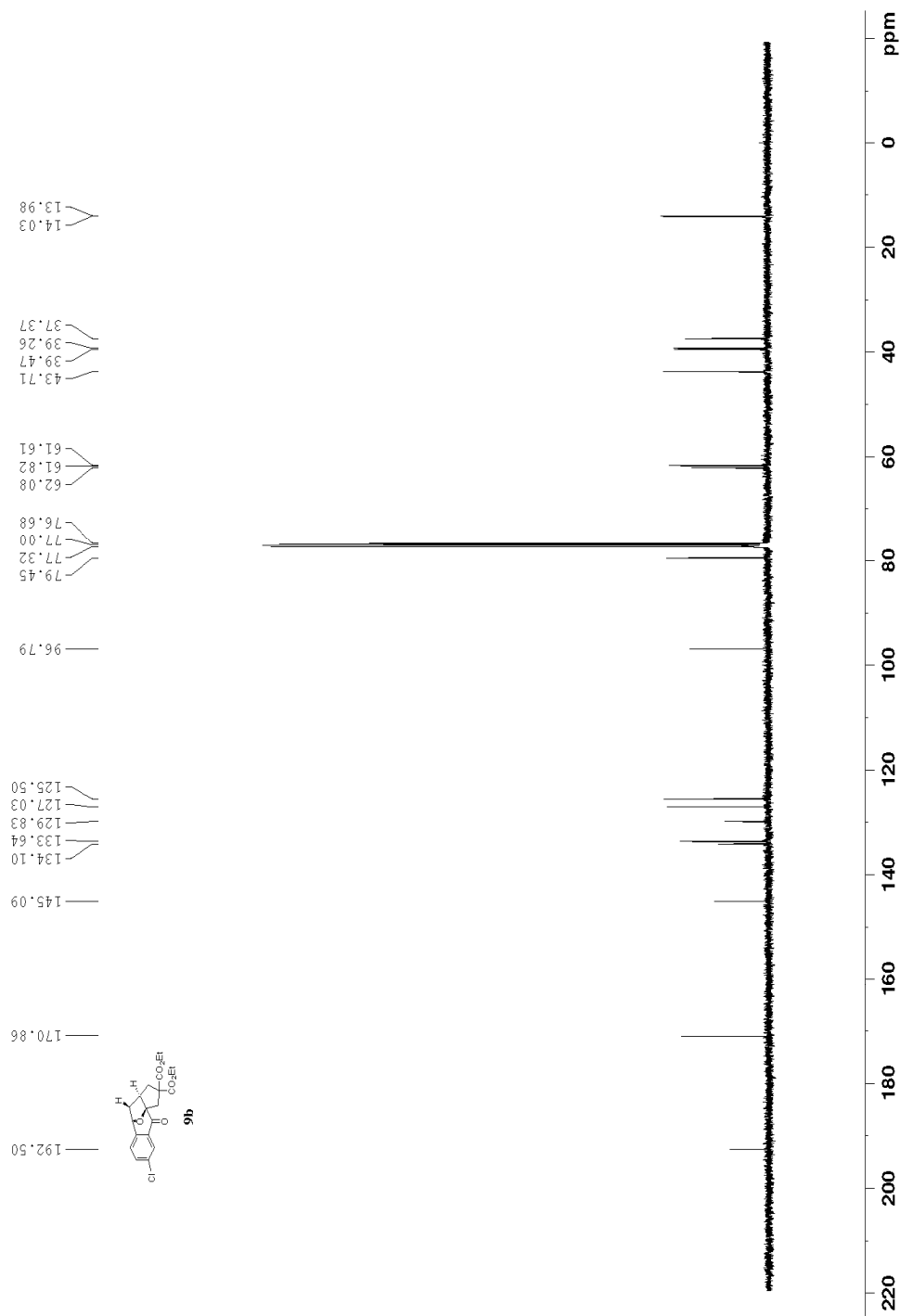
===== CHANNEL f1 =====
NUC1          1H
PI            14.70 usec
PL1          -1.00 dB
PL1W         13.75590801 W
SFO1         400.1327768 MHz
SF           400.1300018 MHz
WDW          EM
SSB          0
GB           0
PC           1.00
    
```



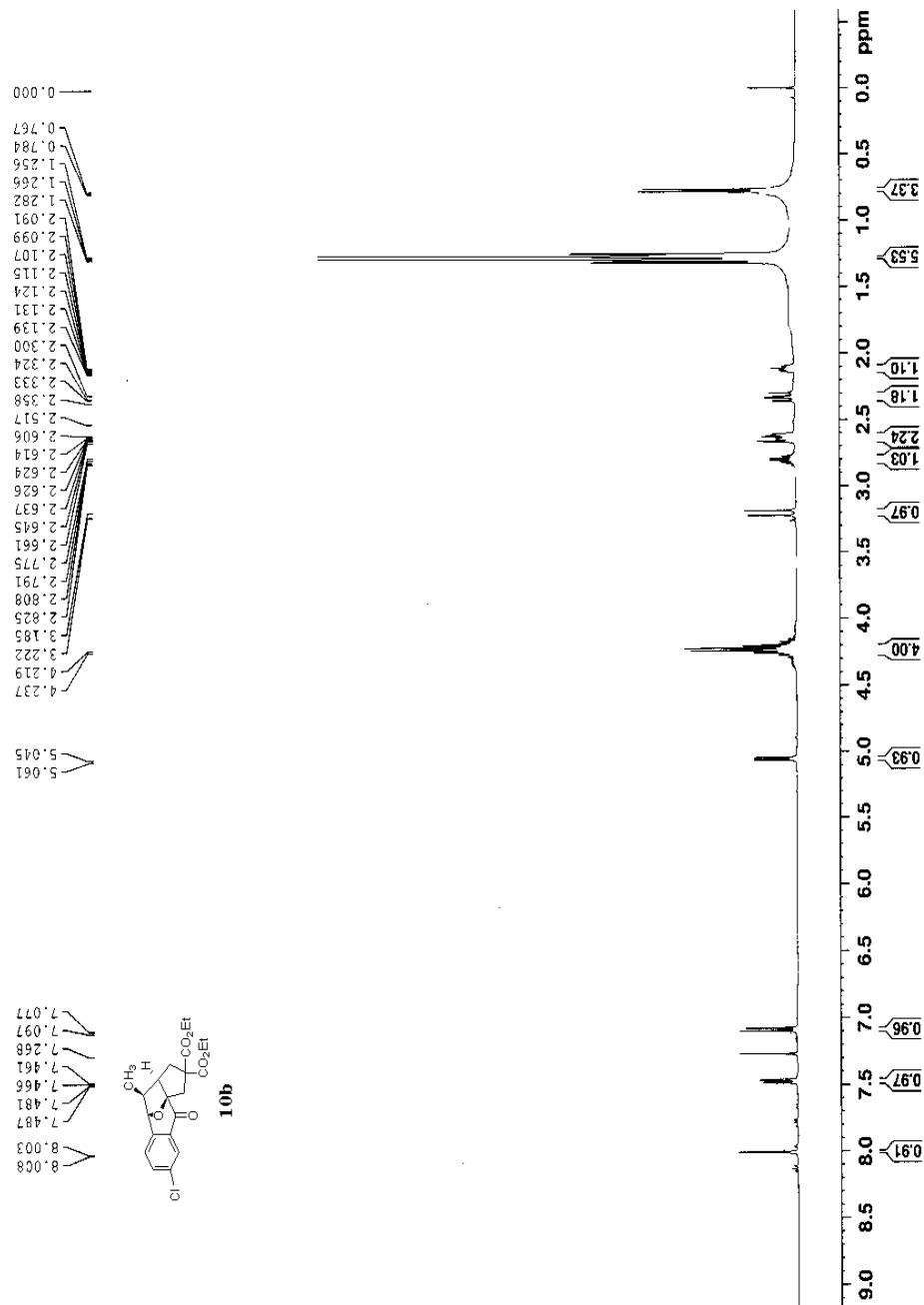
```

NAME          xyx-8-gw
EXPNO         11
PROCNO        1
Date_         20081226
Time          12:26
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
TD            65536
SOLVENT       CDCl3
DS            256
SS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.3631701 sec
RG           320
DW           20.800 usec
DE           6.50 usec
TE           294.1 K
TD0          2.03000000 sec
D1           0.03000000 sec
D11          0.03000000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1           13C
PL1          9.75 usec
PL1W         -2.00 dB
SFO1         56.13311005 W
===== CHANNEL f2 =====
CPDPRG2       waltz16
NUC2          1H
PCPD2        80.00 usec
PL2          -2.10 dB
PL2W         13.90 dB
PL13         13.90 dB
PL12W        17.72104263 W
PL12W        0.44513249 W
PL13W        0.44513249 W
SFO2         400.1527702 MHz
SF           100.6127702 MHz
WDW          EM
SSB          0
LB           1.00 Hz
GB           0
PC           1.40
    
```



NAME XYX-15-M
 EXPNO 10
 PROCNO 10
 F2 - 20090218
 Date_ 08-10-09
 INSTRUM spect
 PROBHD 5 mm PARRCO BBO
 P1 12.00
 T1 0.00
 T2 0.00
 T3 0.00
 SOLVENT CDCl3
 NS 12
 DS 4
 SWH 8223.685 Hz
 FIDRES 0.125403 Hz
 AQ 3.984632 sec
 RG 655.36
 DW 60.800 usec
 DE 6.10 usec
 TE 286.3 K
 D1 1.00000000 sec
 D11 0.00000000 sec
 CHANNEL F1
 NUC1 13C
 P1 14.00 usec
 PL1 0.00 dB
 FLLW 11.4732063 MHz
 SFO1 400.1300019 MHz
 SF 400.1300019 MHz
 WDW EM
 SSB 0
 GB 0.00 Hz
 EC 1.00

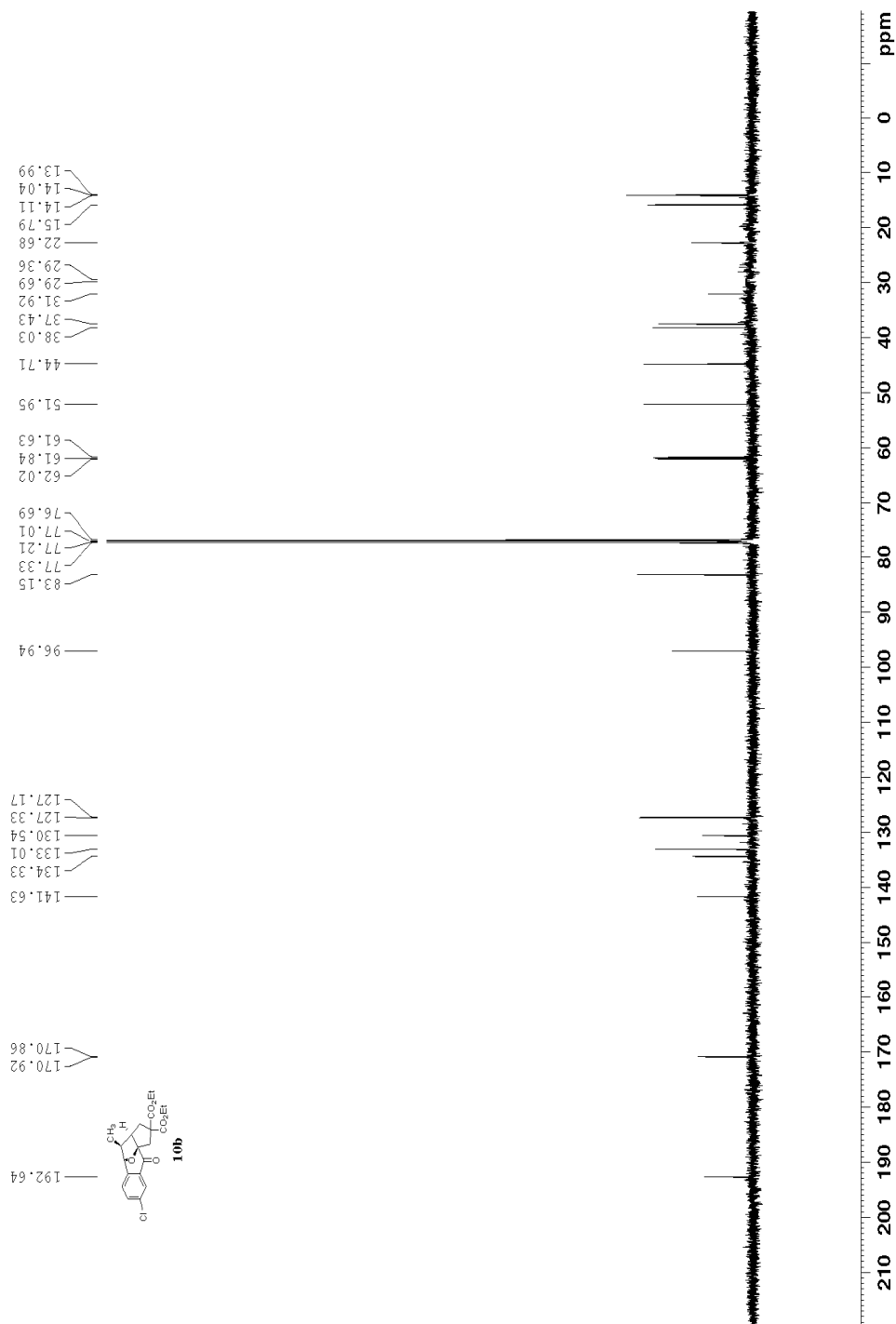


```

NAME          XYX-15-GW
EXPNO         11
PROCNO        1
Date_         20090211
Time          19:10
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            180
DS            4
SWH           24038.461 Hz
AQ            0.586698 Hz
RG            1.585978 sec
RG            71.8
DW            20.800 usec
DE            6.50 usec
TE            300.2 K
D1            2.000000 sec
D11           0.03000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          13C
P1            9.70 usec
PL1          -2.00 dB
PL1W         56.13311005 W
SFO1         100.6228298 MHz

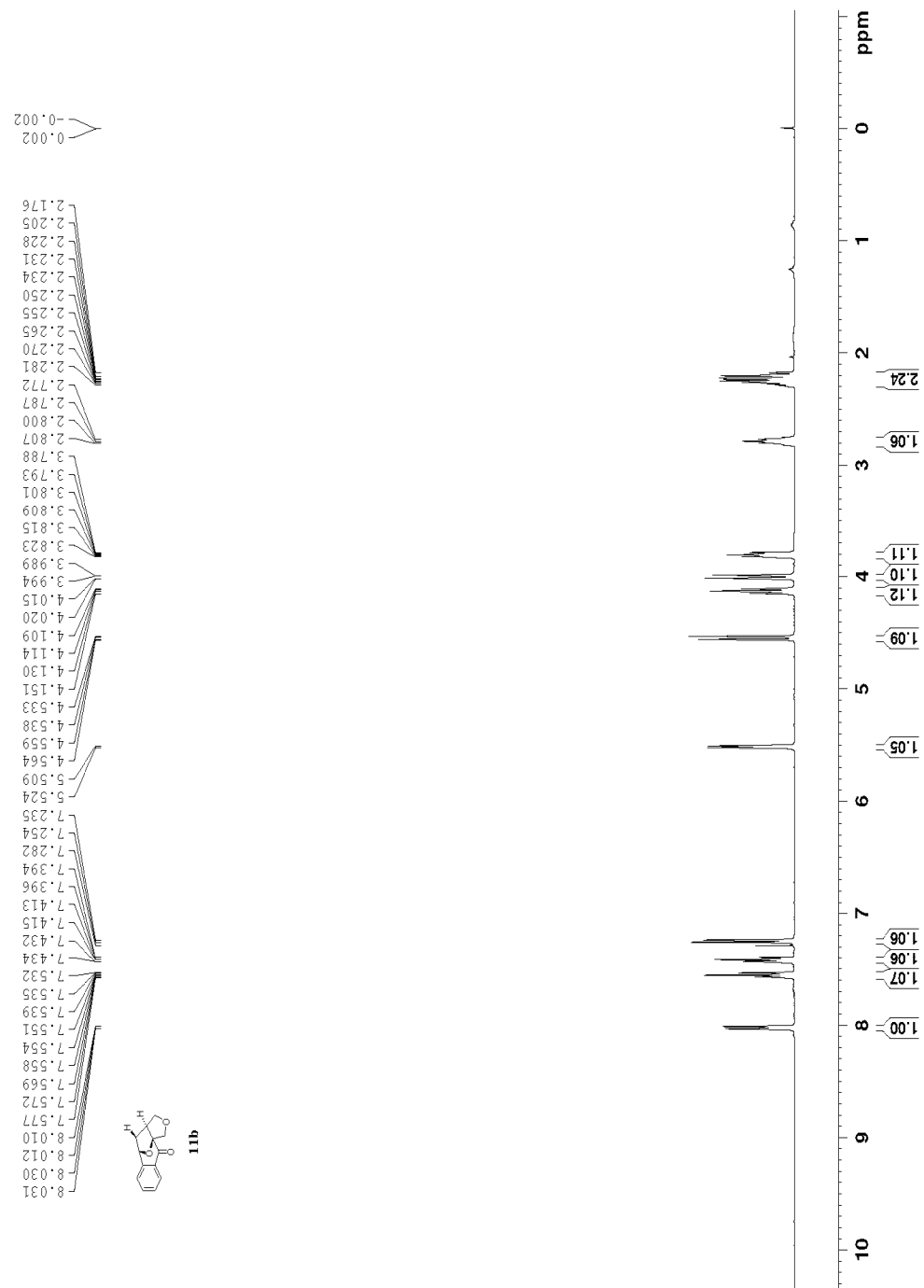
===== CHANNEL f2 =====
CFDPRG2      waltz16
NUC2          1H
PCPD2        80.00 usec
PL2          13.90 dB
PL2W         13.90 dB
PL3          13.90 dB
PL3W         17.72104263 W
PL4          0.44513249 W
PL4W         400.1312065 MHz
SFO2         400.1312065 MHz
SI           32768
SF           100.6127690 MHz
WDW          EM
SSB          0
GB           1.00 Hz
PC           1.40
    
```

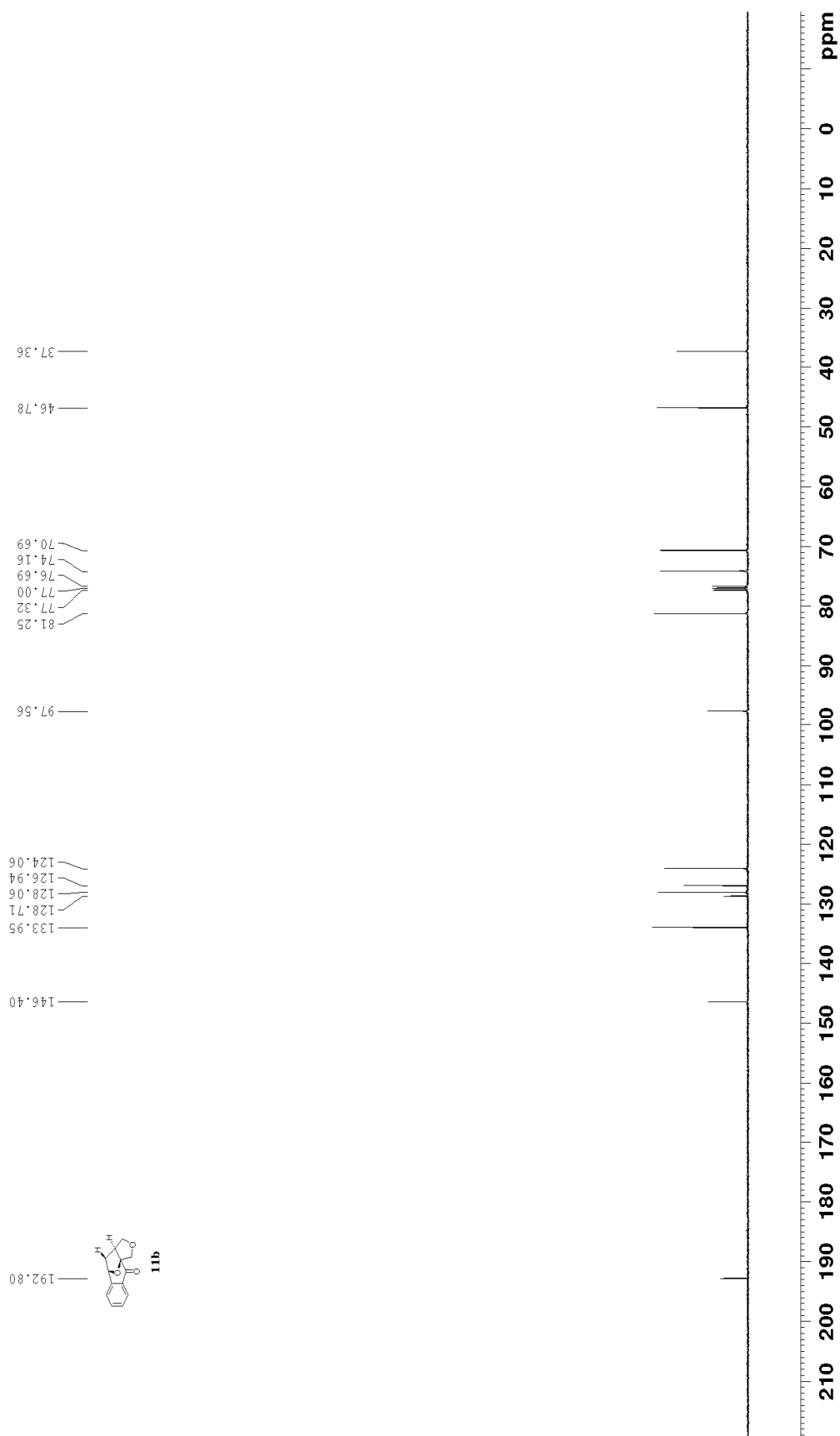


```

NAME xyx-cw-4
EXPNO 10
PROCNO 1
Time 20081107
Time 17.59
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
SOLVENT CDCl3
NS 16
DS 2
SWH 6225.642 Hz
FIDRES 0.72483 Hz
AQ 3.9846387 sec
RG 64
DW 60.800 usec
DE 6.50 usec
DI 8.00 usec
TD0 1.00000000 sec

===== CHANNEL f1 =====
NUC1 1H
PI 14.70 usec
PL1 -1.00 dB
PL1W 13.75590801 W
SFO1 400.1324740 MHz
SF 400.1299958 MHz
WDW EM
SSB 0
LB 0
GC 1.00
    
```

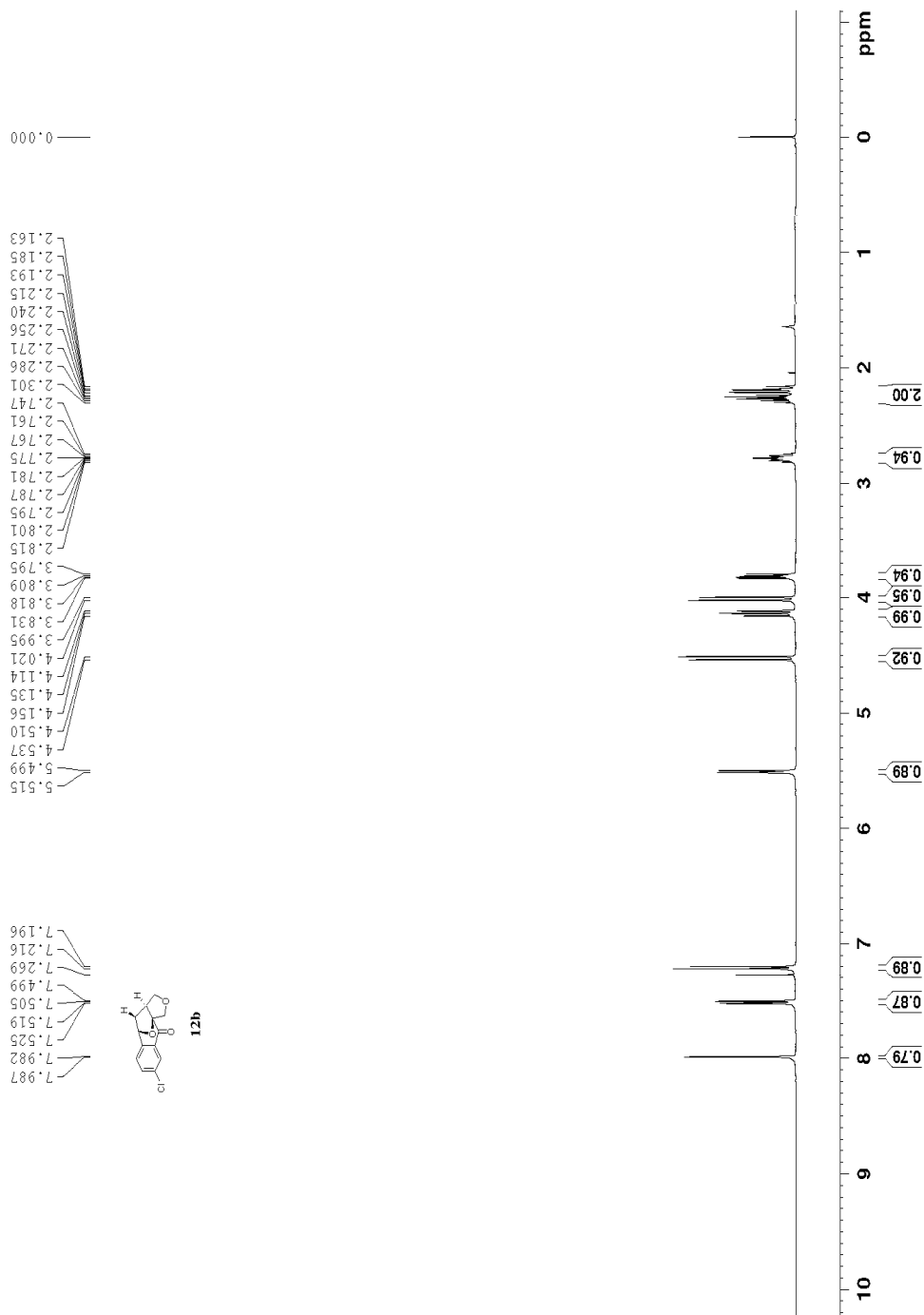





```

NAME          xyx-o-h
EXPNO         10
PROCNO        1
Time          20090108
Time         17.16
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
WDW           EM
SSB           0
GB            0
FIDRES        0.12483 Hz
AQ            3.9848387 sec
RG            101
DW            60.800 usec
DE            6.00 usec
TE            300.2 K
D1            1.00000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          1H
P1            14.70 usec
PL1          -1.00 dB
PL1W         13.75590801 W
SFO1         400.1327768 MHz
SF           400.1300017 MHz
WDW          EM
SSB          0
GB          0
PC           1.00
    
```

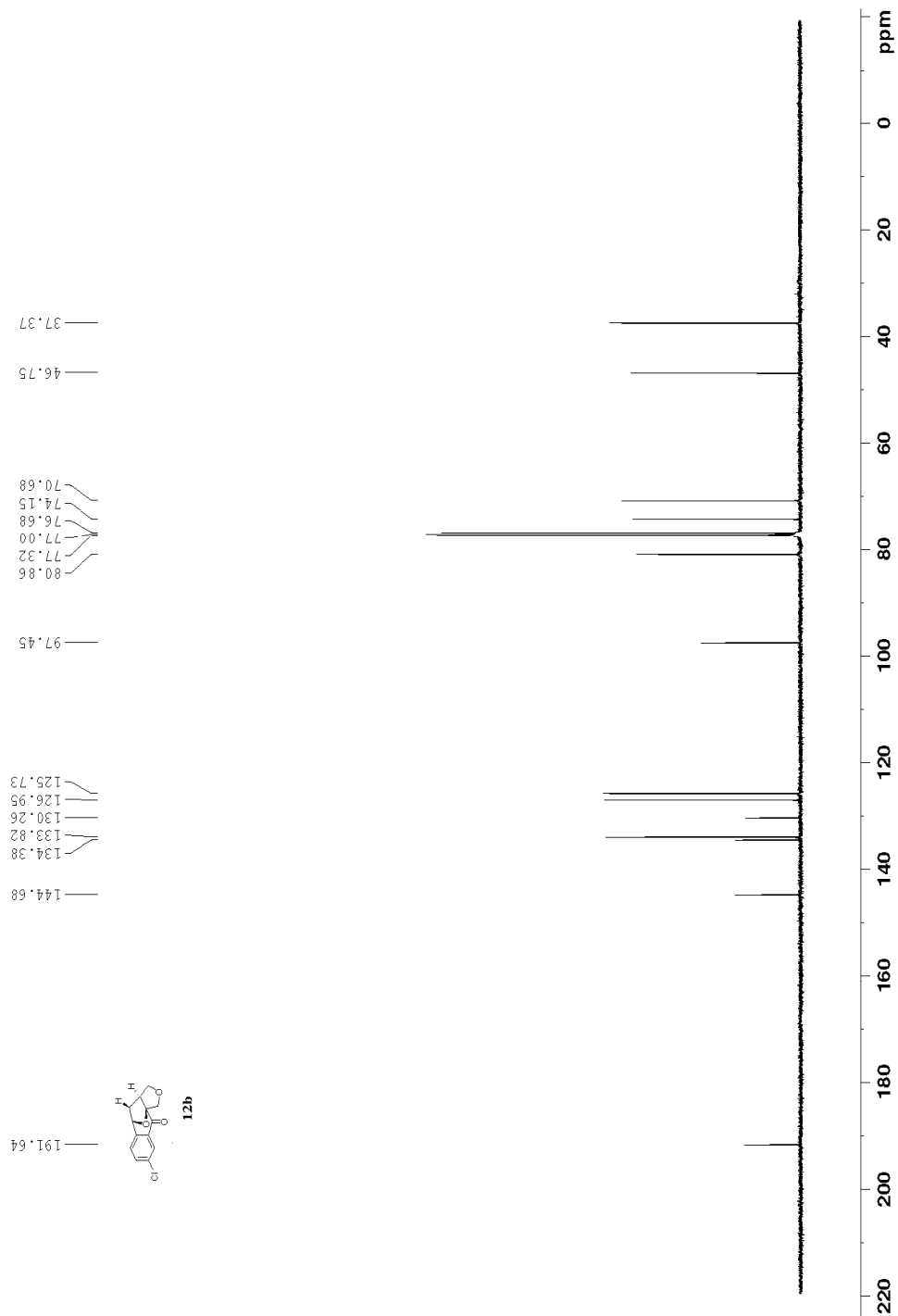


```

NAME      xyx-o-h
EXPNO    11
PROCNO   1
Date_    20090109
Time     17:07
INSTRUM  spect
PROBHD   5 mm PABBO BR-
PULPROG  zgpg30
TD       65536
SOLVENT  CDCl3
NS       512
DS       4
SWH      24038.461 Hz
FIDRES   0.366798 Hz
AQ       1.365718 sec
RG       718
DW       20.800 usec
DE       6.50 usec
TE       300.0 K
IE       0.000000 sec
D11      0.0300000 sec
TD0      1

===== CHANNEL f1 =====
NUC1     13C
P1       9.70 usec
PL1      -2.00 dB
PL1W     56.13311005 W
SFO1     100.6228298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2     1H
PCPD2    80.00 usec
PL2      -2.00 dB
PL2W     13.90 dB
PL3      13.90 dB
PL3W     17.72104263 W
PL4W     0.44513249 W
PL5W     0.44513249 W
SFO2     400.132768 MHz
SF       100.6127714 MHz
WDW      EM
SSB      0
GB       1.00 Hz
PC       1.40
    
```



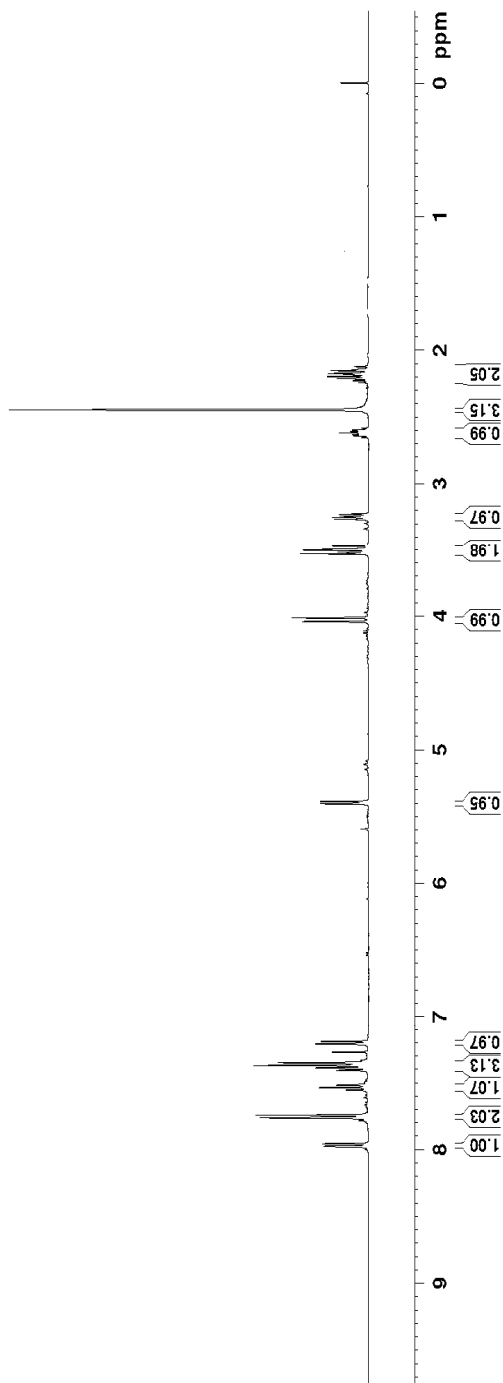
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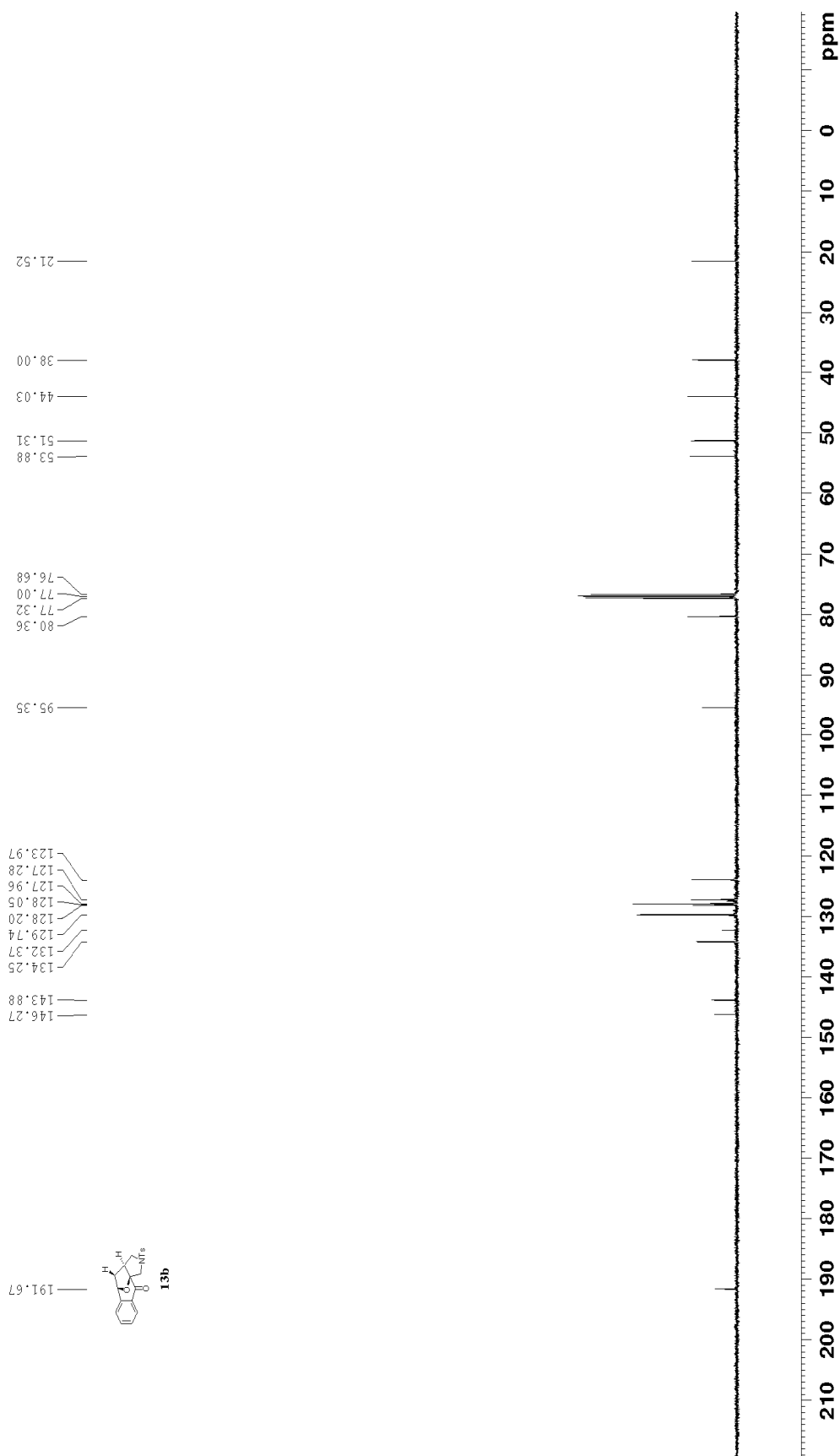
NAME          xyz-cw-5
EXPNO         10
PROCNO        1
Time          20081107
INSTRUM      spect
PROBHD        5 mm PABBO BB-
PULPROG      zgpg30
SOLVENT       CDCl3
NS            16
DS            2
WDW           EM
SSB           0
GB            0
FIDRES       0.12483 Hz
AQ            3.984837 sec
RG            80.6
DW            60.800 usec
DE            8.50 usec
DL            25.50 usec
TD0           1.00000000 sec
===== CHANNEL f1 =====
NUC1          1H
P1            14.70 usec
PL1          -1.00 dB
PL1W         13.75590801 W
SFO1         400.1327768 MHz
SF           400.1300008 MHz
WDW          EM
SSB          0
GB           0
PC           1.00
    
```

2.154
 2.176
 2.185
 2.200
 2.215
 2.215
 2.449
 2.621
 3.230
 3.244
 3.255
 3.269
 3.474
 3.496
 3.499
 3.505
 3.520
 3.533
 4.014
 4.042

5.390
 5.406

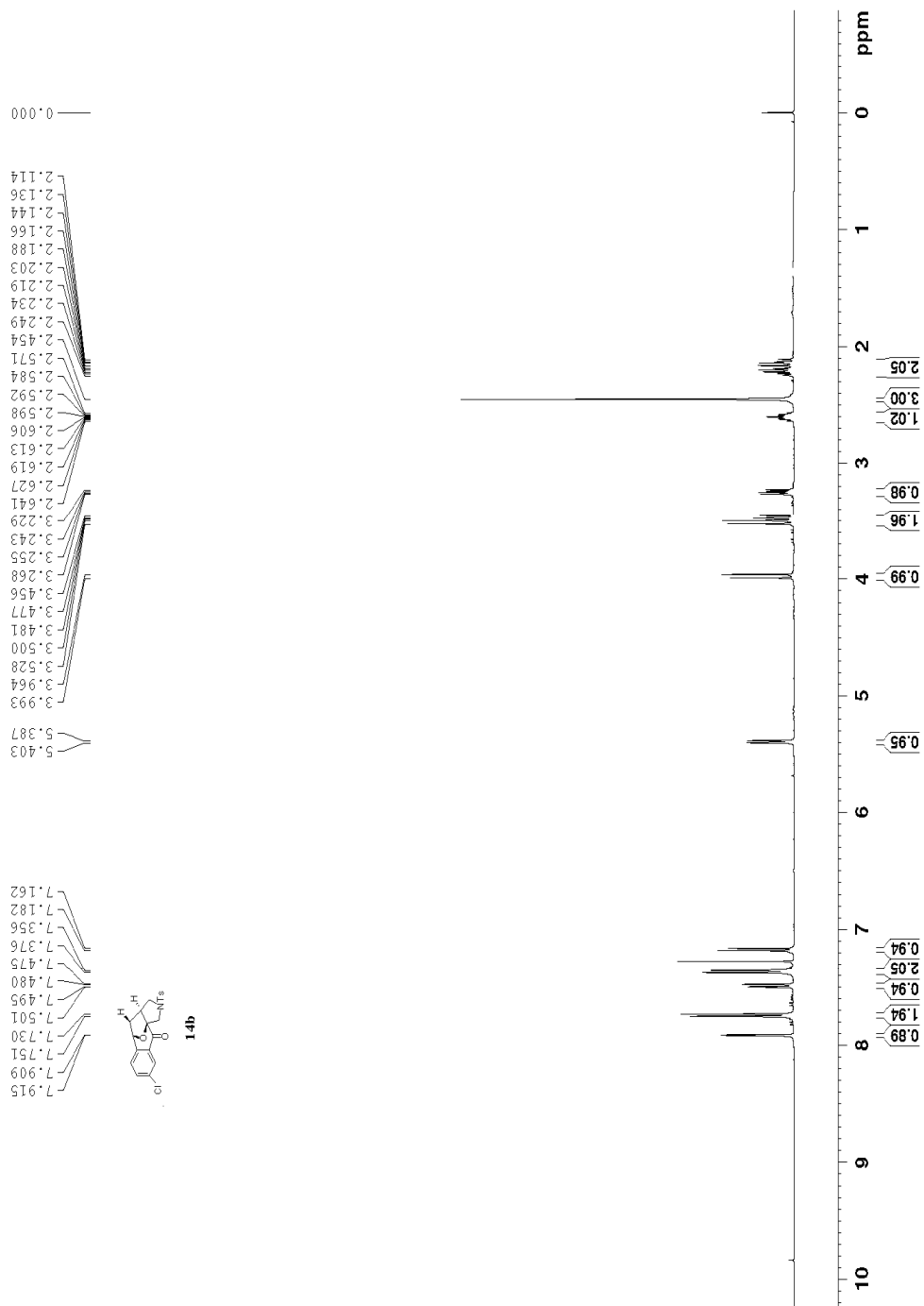
7.190
 7.209
 7.270
 7.350
 7.370
 7.388
 7.389
 7.407
 7.409
 7.515
 7.518
 7.534
 7.537
 7.537
 7.740
 7.761
 7.955
 7.975





```

NAME XYX-N-XIAXIA
EXPNO 10
PROCNO 1
Time 20090102
Time 8.02
INSTRUM spect
PROBHD 5 mm FAREO BB-
PULPROG zgpg30
SOLVENT CDCl3
NS 16
DS 2
SWH 6234.685 Hz
AQ 0.14685 sec
RG 3.984387 sec
DE 60.800 usec
TE 300.2 K
D1 6.50 usec
TD0 1.0000000 sec
===== CHANNEL f1 =====
NUC1 13C
P1 14.70 usec
PL1 -1.00 dB
PL1W 13.75590801 W
SFO1 400.1324710 MHz
SF 400.1324710 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```

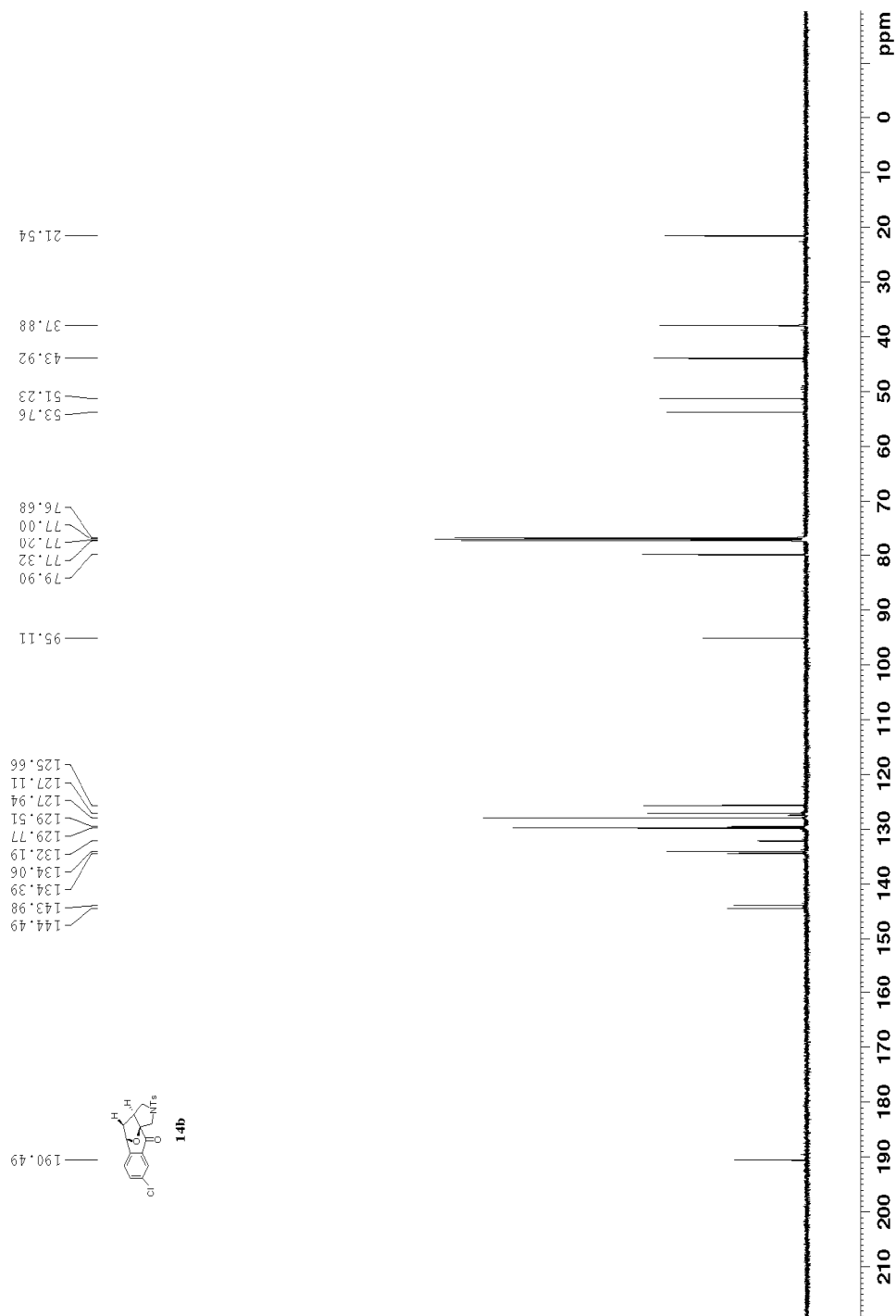


```

NAME          XXV-N-XIAXIA
EXPNO         11
PROCNO        1
Date_         20090109
Time          09:48
INSTRUM       spect
PROBHD        5 mm PABBO BR-
PULPROG       zgpg30
TD            65536
SOLVENT       CDCl3
NS            256
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.363172 sec
RG           724
DW           20.800 usec
DE           6.50 usec
TE           300.0 K
D1           2.000000 sec
D11          0.0300000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1           9.70 usec
PL1          -2.00 dB
PL1W        56.13311005 W
SFO1        100.6228298 MHz

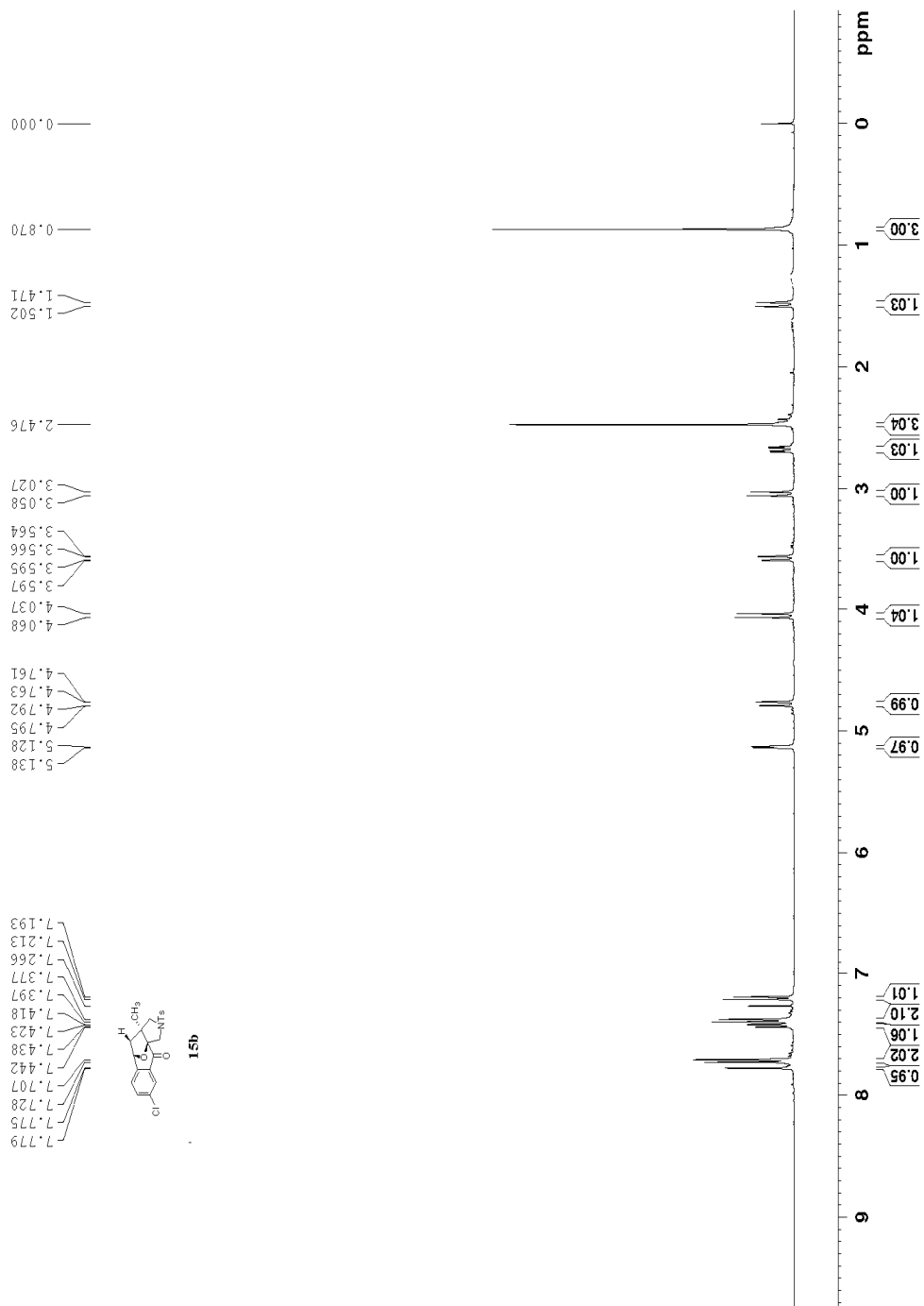
===== CHANNEL f2 =====
CPDPRG2       waltz16
NUC2          1H
P2           80.00 usec
PL2          -2.00 dB
PL2W        13.90 dB
PL3          13.90 dB
PL2W        17.72104263 W
PL12W       0.44513249 W
PL13W       0.44513249 W
SFO2        400.132768 MHz
SF          100.6127756 MHz
WDW          EM
SSB          0
GB           1.00 Hz
PC           1.40
    
```



```

NAME          xyx-13-cw
EXPNO         10
PROCNO        1
Time          20090213
Time2         5.02
INSTRUM       spect
PROBHD        5 mm FAREO BB-
PULPROG       zgpg30
SOLVENT       CDCl3
NS            16
DS            2
SWH           6233.4635 Hz
AQ            0.14635 sec
RG            3.9846387 sec
RG            128
DW            60.800 usec
DE            6.50 usec
TE            300.2 K
D1            1.00000000 sec
TD0           1

===== CHANNEL F1 =====
NUC1          13C
PI1           14.40 usec
PL1           0.00 dB
PL1W          11.47932053 W
SFO1          400.1324710 MHz
SF           400.1324710 MHz
WDW           EM
SSB           0
LB            0.30 Hz
GB            0
PC            1.00
    
```



```

NAME          XYX-13-CW
EXPNO         11
PROCNO        1
Date_         20090219
Time          09:43
INSTRUM       spect
PROBHD        5 mm PABBO BB-
PULPROG       zgpg30
TD            85536
SOLVENT       CDCl3
NS            512
DS            4
SWH           24038.461 Hz
FIDRES       0.366798 Hz
AQ           1.365266 sec
RG           2068
DM           20.800 usec
DE           6.50 usec
TE           292.0 K
D1           2.0000000 sec
D11          0.03000000 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1           9.20 usec
PL1          -2.00 dB
PL1W        57.32743073 W
SFO1        100.6228298 MHz

===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2          1H
PCPD2       90.00 usec
PL2         -2.00 dB
PL2W        18.19349861 W
PL12        12.50 dB
PL12W       18.19349861 W
PL13W       0.32353121 W
PL14W       0.32353121 W
SFO2        400.1359768 MHz
SF          100.612774 MHz
WDW          EM
SSB          0
LB           1.00 Hz
GB           0
PC           1.40
    
```

