Supporting Information

Lewis acid-catalyzed [3+2] annulations of oxindole based spirocyclic donor–acceptor cyclopropanes with ynamides

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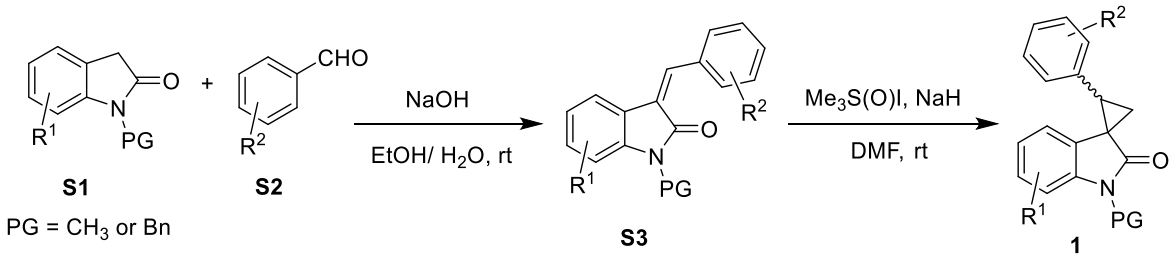
1. General

^{1}H NMR and ^{13}C NMR were recorded on a Bruker-400 MHz spectrometer. Proton chemical shifts are reported in ppm downfield from tetramethylsilane or from the residual solvent as internal standard in $CDCl_3$ (δ 7.26 ppm) and in $(CD_3)_2SO$ (2.50 ppm). Carbon chemical shifts were internally referenced to the deuterated solvent signals in $CDCl_3$ (δ 77.0 ppm) and in $(CD_3)_2SO$ (39.5 ppm). High-resolution mass spectra were recorded on a Thermo Scientific LTQ Orbitrap ESI ion trap mass spectrometer. Reagents obtained from commercial sources are used without further purification and all solvents were purified and dried according to standard methods prior to use, unless stated otherwise. Spirocyclopropyl oxindoles **1**[1] and ynamides **2**[2] were synthesized according to reported procedures.

2. Procedures for synthesis of spirocyclopropyl oxindoles 1

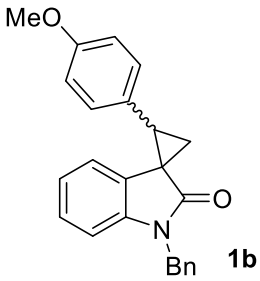


***General Procedure*:** Spirocyclopropyl oxindoles **1** were synthesized in two steps starting from *N*-protected oxindoles.[1] **1a**, **1d**, **1f** are known compounds and the characterization data all corresponded to the reported values.[1]

Step 1: To a solution of *N*-protected oxindole **S1** (1.0 equiv) in ethanol (1 M) at room temperature was added aromatic aldehyde **S2** (1.1 equiv) under vigorous stirring, and then the solution was added a solution of NaOH (2.0 equiv) in ethanol-water (1:2, 0.5 M) dropwise. The resulting mixture stirred for a specified time. Then water was added to the resulting mixture. After extraction with EtOAc, the organic layer was dried over anhydrous $MgSO_4$, and then concentrated under reduced pressure, the crude product was purified by flash silica gel column chromatography.

Step 2: A suspension of sodium hydride (2.2 equiv) in anhydrous DMF (50 mg/ mL) was added trimethylsulfoxonium iodide (2.0 equiv) and the suspension was stirred for 30 min at room temperature, then solution of **S3** (1.0 equiv) in DMF was added dropwise. After completion of the addition (TLC controlled), the resulting mixture was quenched with distilled water, after extraction with EtOAc, the organic layer was washed with brine three times, the organic layer was dried over anhydrous $MgSO_4$, and then concentrated under reduced pressure, the crude product was purified by flash silica gel column chromatography.

1'-benzyl-2-(4-methoxyphenyl)spiro[cyclopropane-1,3'-indolin]-2'-one (1b)



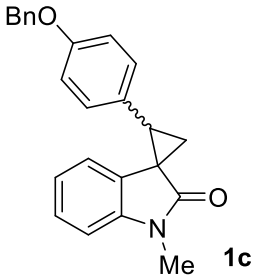
1b

Synthesized by the general procedure using 1-benzylindolin-2-one (500 mg, 2.24 mmol), 4-methoxybenzaldehyde (335.5 mg, 2.46 mmol), and trimethylsulfoxonium iodide (887.3 mg, 4.04 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), separated diastereomers.

1b-1: 315.8 mg (40%), R_f = 0.42 (petroleum ether:ethyl acetate = 6:1). Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.35-7.42 (m, 4H), 7.28-7.31 (m, 1H), 7.18 (d, *J* = 8.5 Hz, 2H), 7.07 (t, *J* = 7.7 Hz, 1H), 6.89 (d, *J* = 8.6 Hz, 2H), 6.82 (d, *J* = 7.8 Hz, 1H), 6.72 (t, *J* = 7.5 Hz, 1H), 6.10 (d, *J* = 7.4 Hz, 1H), 5.12 (d, *J* = 15.7 Hz, 1H), 5.05 (d, *J* = 15.7 Hz, 1H), 3.79 (s, 3H), 3.45 (t, *J* = 8.5 Hz, 1H), 2.33 (dd, *J* = 4.4 Hz, 9.1 Hz, 1H), 2.06 (dd, *J* = 4.5 Hz, 7.9 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 176.3, 158.5, 142.6, 136.0, 130.7, 128.5, 127.3, 127.2, 127.0, 126.8, 126.1, 121.2, 120.6, 113.5, 108.5, 54.8, 43.8, 35.4, 33.0, 22.6 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{24}H_{22}NO_2$ 356.1645; Found 356.1647.

1b-2: 280 mg (35%), R_f = 0.35 (petroleum ether:ethyl acetate = 6:1). Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.28-7.35 (m, 7H), 7.19-7.23 (m, 1H), 7.07-7.11 (m, 1H), 7.0 (dd, *J* = 0.6 Hz, 7.3 Hz, 1H), 6.94 (d, *J* = 8.7 Hz, 2H), 6.85 (d, *J* = 7.7 Hz, 1H), 4.96 (d, *J* = 15.6 Hz, 1H), 4.91 (d, *J* = 15.6 Hz, 1H), 3.83 (s, 3H), 3.21 (t, *J* = 8.8 Hz, 1H), 2.51 (dd, *J* = 4.9 Hz, 8.6 Hz, 1H), 2.16 (dd, *J* = 4.9 Hz, 9.0 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 173.7, 158.5, 142.2, 136.2, 130.7, 130.1, 128.4, 127.2, 126.4, 126.1, 121.7, 117.9, 113.2, 108.5, 54.9, 43.6, 38.1, 33.7, 22.3 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{24}H_{22}NO_2$ 356.1645; Found 356.1648.

2-(4-(benzyloxy)phenyl)-1'-methylspiro[cyclopropane-1,3'-indolin]-2'-one (1c)

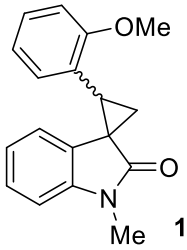


1c

Synthesized by the general procedure using 1-methylindolin-2-one (500 mg, 3.40 mmol), 4-methoxybenzaldehyde (335.5 mg, 3.74 mmol), and trimethylsulfoxonium iodide (1.34 g, 6.05 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), *dr* = 1:1, 1.07 g (77%).

Yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.47-7.49 (m, 4H), 7.41-7.45 (m, 4H), 7.31-7.39 (m, 5H), 7.21 (t, *J* = 7.7 Hz, 1H), 7.12-7.17 (m, 3H), 6.96-7.01 (m, 5H), 6.88 (d, *J* = 7.8 Hz, 2H), 6.79 (t, *J* = 7.6 Hz, 1H), 6.14 (d, *J* = 7.4 Hz, 1H), 5.00-5.05 (m, 2H + 2H), 3.39 (t, *J* = 8.4 Hz, 1H), 3.33 (s, 3H), 3.17 (s, 3H), 3.14 (t, *J* = 8.9 Hz, 1H), 2.43 (dd, *J* = 4.8 Hz, 7.9 Hz, 1H), 2.25 (dd, *J* = 4.4 Hz, 9.1 Hz, 1H), 2.07 (dd, *J* = 4.9 Hz, 9.1 Hz, 1H), 2.01 (dd, *J* = 4.5 Hz, 7.9 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 175.7, 173.1, 157.5, 157.4, 143.3, 142.8, 136.6, 136.4, 130.5, 130.3, 129.8, 128.0, 127.43, 127.36, 127.02, 126.98, 126.9, 126.2, 126.1, 126.0, 121.3, 120.9, 120.2, 117.5, 114.2, 113.6, 107.3, 69.3, 69.2, 37.3, 34.8, 33.4, 32.9, 26.0, 25.8, 22.0 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{24}H_{22}NO_2$ 356.1645; Found 356.1648.

2-(2-methoxyphenyl)-1'-methylspiro[cyclopropane-1,3'-indolin]-2'-one (1e)

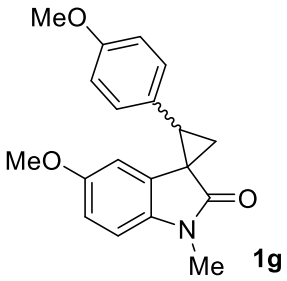


1e

Synthesized by the general procedure using 1-methylindolin-2-one (500 mg, 3.40 mmol), 2-methoxybenzaldehyde (509.2 mg, 3.74 mmol), and trimethylsulfoxonium iodide (1.27 g, 5.78 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), *dr* = 3:1, 646 mg (68%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.39 (d, *J* = 7.2 Hz, 1H), 7.33 (d, *J* = 7.4 Hz, 1H × 3), 7.22-7.28 (m, 2H + 1H × 3), 7.11 (td, *J* = 7.7 Hz, 1.0 Hz, 1H × 3), 7.06 (t, *J* = 7.5 Hz, 1H), 6.96-7.00 (m, 2H + 1H × 3), 6.87 (d, *J* = 7.8 Hz, 1H), 6.84 (d, *J* = 7.7 Hz, 1H × 3), 6.77 (d, *J* = 8.2 Hz, 1H), 6.62-6.67 (m, 2H × 3), 5.89 (d, *J* = 7.4 Hz, 1H × 3), 3.55 (s, 3H), 3.33 (s, 3H × 3), 3.27 (s, 3H × 3), 3.16 (s, 3H), 3.15 (t, *J* = 8.5 Hz, 1H × 3), 3.06 (t, *J* = 8.7 Hz, 1H), 2.28 (dd, *J* = 4.8 Hz, 8.9 Hz, 1H), 2.22 (dd, *J* = 4.6 Hz, 8.1 Hz, 1H × 3), 2.03 (dd, *J* = 4.8 Hz, 8.9 Hz, 1H), 1.95 (dd, *J* = 4.6 Hz, 8.1 Hz, 1H × 3) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): MAJOR, δ = 176.5, 158.8, 143.4, 129.3, 128.5, 128.0, 125.9, 124.1, 120.8, 119.84, 119.1, 110.3, 107.1, 54.8, 32.5, 32.0, 26.3, 21.5 ppm; MINOR, δ = 173.9, 158.2, 143.1, 130.9, 129.8, 128.2, 126.2, 123.3, 121.4, 119.76, 117.8, 109.7, 107.2, 54.9, 32.9, 32.6, 26.0, 22.0 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{18}H_{18}NO_2$ 280.1332; Found 280.1335.

5'-methoxy-2-(4-methoxyphenyl)-1'-methylspiro[cyclopropane-1,3'-indolin]-2'-one (1g)

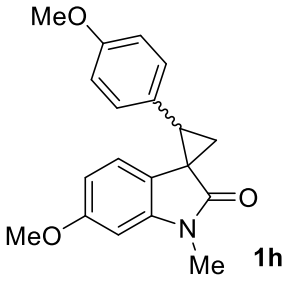


1g

Synthesized by the general procedure using 5-methoxy-1-methylindolin-2-one (500 mg, 2.82 mmol), 4-methoxybenzaldehyde (422.3 mg, 3.10 mmol), and trimethylsulfoxonium iodide (1.04 g, 4.74 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), major diastereomer, *dr* = 6.2:1, 601 mg (69%).

Yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): MAJOR δ = 7.15 (d, *J* = 8.7 Hz, 2H), 6.87 (d, *J* = 8.6 Hz, 2H), 6.78-6.79 (m, 1H), 6.72 (dd, *J* = 2.4 Hz, 8.5 Hz, 1H), 5.68 (d, *J* = 2.4 Hz, 1H), 3.80 (s, 3H), 3.52 (s, 3H), 3.32-3.36 (m, 1H), 3.33 (s, 3H), 2.22 (dd, *J* = 4.5 Hz, 9.1 Hz, 1H), 1.98 (dd, *J* = 4.5 Hz, 7.9 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 176.1, 158.8, 154.9, 137.4, 130.9, 130.2, 128.9, 126.99, 113.7, 113.3, 111.2, 107.9, 55.4, 55.2, 35.2, 34.2, 33.6, 26.6, 22.6 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{19}H_{20}NO_3$ 310.1438; Found 310.1441.

6'-methoxy-2-(4-methoxyphenyl)-1'-methylspiro[cyclopropane-1,3'-indolin]-2'-one (1h)



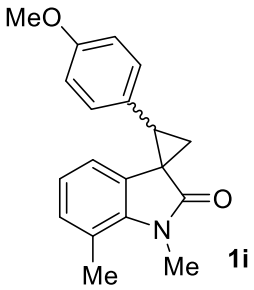
1h

Synthesized by the general procedure using 6-methoxy-1-methylindolin-2-one (500 mg, 2.82 mmol), 4-methoxybenzaldehyde (422.3 mg, 3.10 mmol), and trimethylsulfoxonium iodide (1.05 g, 4.79 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), *dr* = 3.7:1, 593 mg (68%).

Yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.22 (d, *J* = 8.6 Hz, 2H), 7.08 (d, *J* = 8.4 Hz, 2H × 3.7), 6.79-6.84 (m, 3H + 2H × 3.7), 6.56 (dd, *J* = 2.2 Hz, 8.1 Hz, 1H), 6.46-6.47 (m, 1H × 4.7), 6.22 (dd, *J* = 2.3 Hz, 8.2 Hz, 1H × 3.7), 5.88 (d, *J* = 8.3 Hz, 1H × 3.7), 3.82 (s, 3H), 3.76 (s, 3H × 3.7), 3.74 (s, 3H), 3.71 (s, 3H × 3.7), 3.27 (s, 3H × 3.7), 3.19 (t, *J* = 8.4 Hz, 1H × 3.7), 3.12 (s, 3H), 3.02 (t, *J* = 8.8 Hz, 1H), 2.78 (dd, *J* = 4.9 Hz, 8.5 Hz, 1H), 2.09 (dd, *J* = 4.4 Hz, 9.1 Hz, 1H × 3.7), 1.96 (dd, *J* = 4.9 Hz, 9.0 Hz, 1H), 1.87 (dd, *J* = 4.5 Hz, 7.8 Hz, 1H × 3.7) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): MAJOR, δ = 177.1, 159.2, 158.5, 144.9, 130.9, 127.4, 121.2, 119.4, 113.7, 105.4, 96.1, 55.4, 55.2, 34.5, 32.9, 26.6, 22.1 ppm; MINOR, δ

= 174.5, 159.4, 158.7, 144.5, 130.2, 126.4, 122.9, 118.5, 113.3, 105.8, 95.9, 55.6, 55.1, 37.2, 33.4, 26.4, 22.2 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{19}H_{20}NO_3$ 310.1438; Found 310.1442.

2-(4-methoxyphenyl)-1',7'-dimethylspiro[cyclopropane-1,3'-indolin]-2'-one (1i)

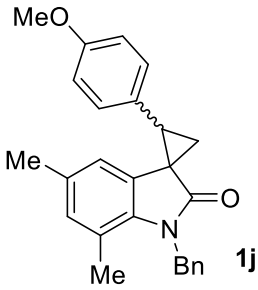


1i

Synthesized by the general procedure using 1,7-dimethylindolin-2-one (500 mg, 3.10 mmol), 4-methoxybenzaldehyde (464.3 mg, 3.41 mmol), and trimethylsulfoxonium iodide (1.09 g, 4.96 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), major diastereomer, *dr* = 6:1, 582 mg (64%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): MAJOR δ = 7.10 (d, *J* = 8.6 Hz, 2H), 6.87 (d, *J* = 7.8 Hz, 1H), 6.82 (d, *J* = 8.6 Hz, 2H), 6.59 (t, *J* = 7.6 Hz, 1H), 5.84 (d, *J* = 7.4 Hz, 1H), 3.77 (s, 3H), 3.61 (s, 3H), 3.28 (t, *J* = 8.5 Hz, 1H), 2.59 (s, 3H), 2.17 (dd, *J* = 4.4 Hz, 9.1 Hz, 1H), 1.91 (dd, *J* = 4.4 Hz, 8.0 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 177.2, 158.7, 141.6, 131.1, 130.3, 128.1, 127.1, 121.3, 119.4, 118.7, 113.7, 113.3, 55.2, 35.8, 32.9, 29.9, 23.2, 19.7, 19.2 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{19}H_{20}NO_2$ 294.1489; Found 294.1492.

1'-benzyl-2-(4-methoxyphenyl)-5',7'-dimethylspiro[cyclopropane-1,3'-indolin]-2'-one (1j)



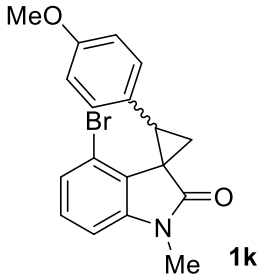
1j

Synthesized by the general procedure using 1-benzyl-5,7-dimethylindolin-2-one (500 mg, 1.99 mmol), 4-methoxybenzaldehyde (298.2 mg, 2.19 mmol), and trimethylsulfoxonium iodide (744.5 mg, 3.38 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), *dr* = 1:1, 261 mg (68%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.26 (d, *J* = 8.0 Hz, 4H), 7.13-7.20 (m, 6H), 7.10 (d, *J* = 8.4 Hz, 2H), 7.01 (d, *J* = 7.2 Hz, 2H), 6.81 (dd, *J* = 2.1 Hz, 8.7 Hz, 4H), 6.69 (s, 1H), 6.61 (s, 1H), 6.57 (s, 1H), 5.69 (s, 1H), 5.26 (s, 2H), 5.02-5.15 (m, 2H), 3.72 (s, 3H), 3.70 (s, 3H), 3.33 (t, *J* = 8.4 Hz, 1H), 3.07 (t, *J* = 8.7 Hz, 1H), 2.41 (dd, *J* = 4.8 Hz, 8.5 Hz, 1H), 2.27 (s, 3H), 2.24-2.25 (m, 1H), 2.22 (s, 3H), 2.20 (s, 3H), 2.04 (dd, *J* = 4.8 Hz,

9.0 Hz, 1H), 2.00 (s, 3H), 1.92-1.94 (m, 1H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): MAJOR, δ = 177.6, 158.6, 138.6, 138.2, 131.5, 131.1, 130.92, 130.2, 128.6, 127.1, 126.8, 125.7, 119.6, 119.1, 113.7, 55.2, 45.2, 38.9, 33.6, 23.2, 20.8, 18.61 ppm; MINOR, δ = 174.7, 158.8, 138.2, 138.1, 131.4, 130.94, 130.7, 128.7, 128.2, 127.0, 126.4, 125.6, 119.3, 116.6, 113.2, 55.0, 44.9, 36.2, 32.8, 22.6, 20.7, 18.56 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{26}H_{26}NO_2$ 384.1958; Found 384.1961.

4'-bromo-2-(4-methoxyphenyl)-1'-methylspiro[cyclopropane-1,3'-indolin]-2'-one (1k)

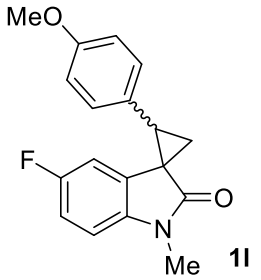


1k

Synthesized by the general procedure using 4-bromo-1-methylindolin-2-one (500 mg, 2.21 mmol), 4-methoxybenzaldehyde (331.0 mg, 2.43 mmol), and trimethylsulfoxonium iodide (779.0 mg, 3.54 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), single diastereomer, 475 mg (60%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.25 (d, *J* = 8.7 Hz, 2H), 7.16 (dd, *J* = 0.7 Hz, 8.1 Hz, 1H), 7.08-7.12 (m, 1H), 6.81-6.87 (m, 3H), 4.05 (t, *J* = 9.0 Hz, 1H), 3.79 (s, 3H), 3.15 (s, 3H), 2.87 (dd, *J* = 4.8 Hz, 9.2 Hz, 1H), 2.21 (dd, *J* = 4.8 Hz, 8.8 Hz, 1H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 172.8, 158.4, 145.3, 130.5, 127.6, 126.7, 126.0, 125.8, 114.6, 113.1, 106.9, 54.9, 35.4, 32.5, 26.4, 19.0 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{18}H_{17}BrNO_2$ 358.0437; Found 358.0440.

5'-fluoro-2-(4-methoxyphenyl)-1'-methylspiro[cyclopropane-1,3'-indolin]-2'-one (1l)



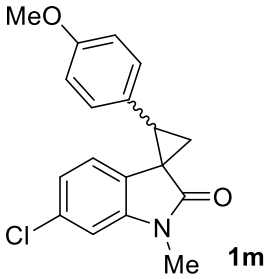
1l

Synthesized by the general procedure using 5-fluoro-1-methylindolin-2-one (500 mg, 3.03 mmol), 4-methoxybenzaldehyde (453.8 mg, 3.33 mmol), and trimethylsulfoxonium iodide (1.12 g, 5.09 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), major diastereomer, *dr* = 4.5:1, 558.6 mg (62%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): MAJOR δ = 7.05 (d, *J* = 8.6 Hz, 2H), 6.76-6.81 (m, 3H), 6.70 (dd, *J* = 4.3 Hz, 8.4 Hz, 1H), 5.73 (dd, *J* = 2.5 Hz,

8.6 Hz, 1H), 3.72 (s, 3H), 3.27 (t, *J* = 8.6 Hz, 1H), 3.25 (s, 3H), 2.15 (dd, *J* = 4.5 Hz, 9.1 Hz, 1H), 1.91 (dd, *J* = 4.6 Hz, 8.0 Hz, 1H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 175.8, 158.7, 158.1 (d, J_{C-F} = 237.3Hz), 139.4 (d, J_{C-F} = 2.0Hz), 130.5, 129.1 (d, J_{C-F} = 8.8Hz), 126.2, 113.6, 112.3 (d, J_{C-F} = 23.6Hz), 108.4 (d, J_{C-F} = 26.0Hz), 107.7 (d, J_{C-F} = 8.5Hz), 54.8, 35.4, 33.4 (d, J_{C-F} = 2.2Hz), 26.4, 22.7 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{18}H_{17}FNO_2$ 298.1238; Found 298.1242.

6'-chloro-2-(4-methoxyphenyl)-1'-methylspiro[cyclopropane-1,3'-indolin]-2'-one (1m)

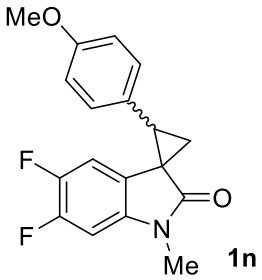


1m

Synthesized by the general procedure using 6-chloro-1-methylindolin-2-one (500 mg, 2.75 mmol), 4-methoxybenzaldehyde (411.2 mg, 3.02 mmol), and trimethylsulfoxonium iodide (992.5 mg, 4.51 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), major diastereomer, *dr* = 14:1, 569.5 mg (66%).

Yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): MAJOR δ = 7.10 (d, *J* = 8.6 Hz, 2H), 6.87 (d, *J* = 1.8 Hz, 1H), 6.84 (d, *J* = 8.7 Hz, 2H), 6.69 (dd, *J* = 1.8 Hz, 8.0 Hz, 1H), 5.89 (d, *J* = 8.0 Hz, 1H), 3.80 (s, 3H), 3.28-3.32 (m, 1H), 3.31 (s, 3H), 2.20 (dd, *J* = 4.5 Hz, 9.1 Hz, 1H), 1.98 (dd, *J* = 4.5 Hz, 7.9 Hz, 1H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 176.4, 158.9, 144.9, 132.3, 130.9, 126.7, 125.9, 121.4, 121.3, 121.2, 113.8, 108.4, 55.2, 35.6, 33.1, 26.7, 22.8 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{18}H_{17}ClNO_2$ 314.0942; Found 314.0945.

5',6'-difluoro-2-(4-methoxyphenyl)-1'-methylspiro[cyclopropane-1,3'-indolin]-2'-one (1n)



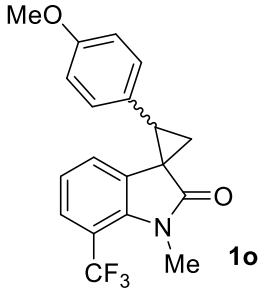
1n

Synthesized by the general procedure using 5,6-difluoro-1-methylindolin-2-one (500 mg, 2.73 mmol), 4-methoxybenzaldehyde (408.4 mg, 3.00 mmol), and trimethylsulfoxonium iodide (913.3 mg, 4.15 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), *dr* = 2.6:1, 482 mg (56%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.19-7.23 (m, 2H), 7.05-7.08 (m, 2H × 2.6), 6.90-6.95 (m, 1H), 6.79-6.83 (m, 1H + 2H × 2.6), 6.72-6.76 (m, 1H

× 2.6), 6.64-6.69 (m, 2H), 5.73-5.82 (m, 1H × 2.6), 3.75 (s, 3H × 2.6), 3.74 (s, 3H), 3.28 (s, 3H × 2.6), 3.25 (s, 3H), 3.04-3.13 (m, 1H × 3.6), 2.33-2.38 (m, 1H), 2.14-2.19 (m, 1H × 2.6), 1.98-2.03 (m, 1H), 1.90-1.95 (m, 1H × 2.6) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 176.2, 176.0, 149.5, (dd, J_{C-F} = 14.1 Hz, 243.52 Hz), 145.6 (dd, J_{C-F} = 13.1 Hz, 239.0 Hz), 139.71, 139.69, 130.8, 130.7, 130.19, 130.18, 129.45, 129.36, 126.4, 126.2, 125.8, 125.5, 123.0 (dd, J_{C-F} = 3.6 Hz, 7.3 Hz), 113.9, 113.8, 112.5 (d, J_{C-F} = 23.5 Hz), 110.1 (d, J_{C-F} = 21.3 Hz), 108.8, 108.6, 107.9, 107.8, 55.1, 55.0, 35.7, 35.5, 33.7, 33.68, 26.7, 26.6, 22.9, 22.8 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{18}H_{16}F_2NO_2$ 316.1144; Found 316.1147.

2-(4-methoxyphenyl)-1'-methyl-7'-(trifluoromethyl)spiro[cyclopropane-1,3'-indolin]-2'-one (1o)

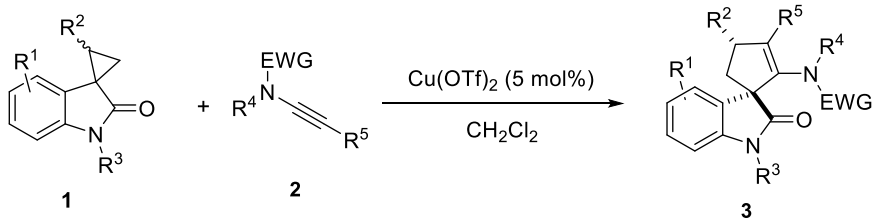


1o

Synthesized by the general procedure using 1-methyl-7-(trifluoromethyl)indolin-2-one (500 mg, 2.32 mmol), 4-methoxybenzaldehyde (347.4 mg, 2.55 mmol), and trimethylsulfoxonium iodide (796.5 mg, 3.62 mmol), flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1), major diastereomer, *dr* = 25:1, 483 mg (60%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): MAJOR δ = 7.45 (d, *J* = 8.0 Hz, 1H), 7.12 (d, *J* = 8.6 Hz, 2H), 6.86 (d, *J* = 8.6 Hz, 2H), 6.77 (t, *J* = 7.8 Hz, 1H), 6.16 (d, *J* = 7.4 Hz, 1H), 3.81 (s, 3H), 3.57 (d, *J* = 2.3 Hz, 3H), 3.39 (t, *J* = 8.6 Hz, 1H), 2.29 (dd, *J* = 4.5 Hz, 9.2 Hz, 1H), 2.05 (dd, *J* = 4.5 Hz, 8.1 Hz, 1H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 177.2, 158.9, 141.39, 141.38, 131.0, 129.9, 126.4, 124.3 (q, J_{C-F} = 5.9 Hz), 123.7 (q, J_{C-F} = 269.7 Hz), 123.8, 120.6, 113.8, 112.0 (q, J_{C-F} = 32.5 Hz), 55.1, 36.9, 32.2, 29.1 (q, J_{C-F} = 6.4 Hz), 23.8 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{19}H_{17}F_3NO_2$ 348.1206; Found 348.1210.

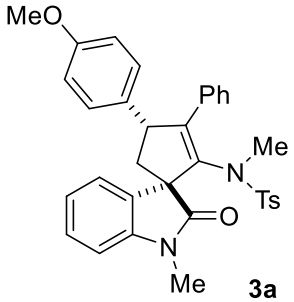
3. Procedures for the synthesis of spirocyclopenteneoxindoles 3



***General Procedure*:** To a mixture of spirocyclopropyl oxindole **1** (0.10 mmol, 1.0 equiv, diastereomeric mixture) and ynamide **2** (0.12 mmol, 1.2 equiv) in CH_2Cl_2 (1.0 mL), $Cu(OTf)_2$

(1.8 mg, 0.005 mmol, 0.05 equiv) was added. The mixture was stirred at room temperature (25 ℃) in air for 4 h. Then, the solvent was removed in vacuo and the residue was purified by silica gel flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1) to provide product **3**. Ynamide **2** are known compounds and the characterization data all corresponded to the reported values.[2]

***N*-(4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-*N*,4-dimethylbenzenesulfonamide (3a)**

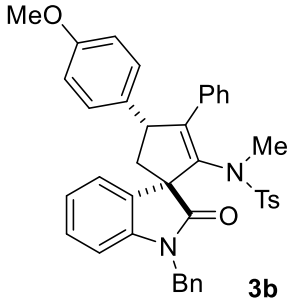


3a

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* = 9:1, 48.6 mg (86%).

Colorless solid. mp 253-255 ^{o}C. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.61 (d, *J* = 5.7 Hz, 1H), 7.27-7.33 (m, 5H), 7.12-7.14 (m, 4H), 6.80-6.93 (m, 6H), 6.74 (d, *J* = 7.7 Hz, 1H), 4.71 (t, *J* = 7.9 Hz, 1H), 3.67 (s, 3H), 3.13 (s, 3H), 2.96 (dd, *J* = 8.4 Hz, 13.4 Hz, 1H), 2.65 (s, 3H), 2.32 (dd, *J* = 7.8 Hz, 13.4 Hz, 1H), 2.26 (s, 3H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 178.7, 158.0, 149.5, 143.8, 142.2, 136.8, 136.2, 135.4, 134.5, 130.7, 129.0, 128.7, 128.3, 128.1, 127.6, 127.4, 127.3, 126.9, 122.4, 113.7, 107.6, 61.5, 54.8, 50.1, 45.4, 37.0, 26.1, 21.0 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{34}H_{33}N_2O_4S$ 565.2156; Found 565.2158.

***N*-(1'-benzyl-4-(4-methoxyphenyl)-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-*N*,4-dimethylbenzenesulfonamide (3b)**



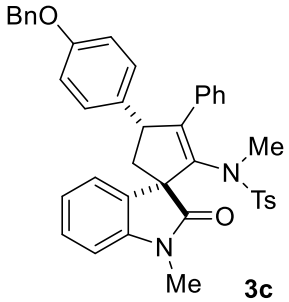
3b

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* > 20:1, 41.0 mg (64%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.71-7.72 (m, 1H), 7.15-7.36 (m, 11H), 7.08-7.11 (m, 4H), 6.81-6.87 (m, 4H), 6.71-6.75 (m, 2H), 5.02 (d, *J* = 15.5

Hz, 1H), 4.70-4.76 (m, 2H), 3.75 (s, 3H), 2.98 (dd, *J* = 8.4 Hz, 13.4 Hz, 1H), 2.49 (s, 3H), 2.36 (dd, *J* = 8.1 Hz, 13.4 Hz, 1H), 2.26 (s, 3H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 179.2, 158.2, 151.0, 143.2, 142.6, 137.1, 136.2, 135.6, 134.5, 131.3, 131.0, 129.3, 129.2, 129.0, 128.8, 128.5, 128.4, 128.2, 127.8, 127.4, 127.3, 126.9, 122.9, 113.9, 108.8, 62.1, 55.1, 52.6, 50.5, 45.6, 43.8, 21.3 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{40}H_{37}N_2O_4S$ 641.2469; Found 641.2472.

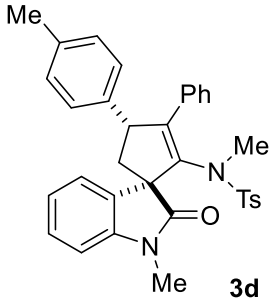
_N_-(4-(4-(benzyloxy)phenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3c)



3c

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* > 20:1, 51.3 mg (80%).
Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.63-7.65 (m, 1H), 7.24-7.44 (m, 10H), 7.16-7.20 (m, 5H), 6.92-6.95 (m, 5H), 6.78 (d, *J* = 7.7 Hz, 1H), 5.01 (s, 2H), 4.72 (t, *J* = 8.0 Hz, 1H), 3.18 (s, 3H), 2.98 (dd, *J* = 8.4 Hz, 13.4 Hz, 1H), 2.66 (s, 3H), 2.35 (dd, *J* = 7.8 Hz, 13.4 Hz, 1H), 2.32 (s, 3H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 179.0, 157.4, 149.7, 143.9, 142.4, 137.0, 136.8, 136.4, 135.9, 134.7, 130.9, 129.2, 128.8, 128.5, 128.4, 128.3, 127.8, 127.6, 127.3, 127.1, 122.6, 114.8, 107.8, 69.8, 61.7, 50.3, 45.5, 37.4, 26.2, 21.2 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{40}H_{37}N_2O_4S$ 641.2469; Found 641.2471.

_N_,4-dimethyl-_N_-(1'-methyl-2'-oxo-3-phenyl-4-(_p_-tolyl)spiro[cyclopentane-1,3'-indolin]-2-en-2-yl)benzenesulfonamide (3d)

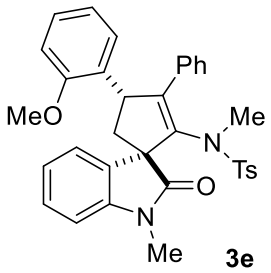


3d

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), *dr* = 2:1, 39.0 mg (71%).
Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.61-7.66 (m, 3H), 7.12-7.40 (m, 28H), 7.09 (d, *J* = 7.8 Hz, 4H), 7.02 (d, *J* = 7.9 Hz, 2H), 6.80-6.86 (m, 12H), 6.76

(d, *J* = 7.7 Hz, 2H), 4.70 (t, *J* = 8.2 Hz, 1H × 3), 3.19 (s, 3H), 3.16 (s, 3H × 2), 2.95 (dd, *J* = 8.5 Hz, 13.4 Hz, 1H × 2), 2.78 (s, 3H), 2.72-2.76 (m, 1H), 2.62-2.67 (m, 1H), 2.62 (s, 3H × 2), 2.30-2.35 (m, 2H), 2.31 (s, 3H), 2.30 (s, 3H × 2), 2.28 (s, 3H × 2), 2.23 (s, 3H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 179.1, 178.8, 150.0, 149.8, 144.0, 143.5, 142.6, 142.5, 140.6, 139.7, 137.2, 136.5, 136.1, 136.0, 135.9, 135.8, 135.1, 134.8, 131.7, 131.0, 129.3, 129.0, 128.9, 128.6, 128.4, 128.2, 128.1, 128.0, 127.8, 127.6, 127.5, 127.2, 125.5, 122.7, 107.9, 107.8, 61.8, 61.7, 53.4, 52.6, 51.0, 50.8, 45.2, 44.6, 37.8, 37.2, 26.5, 26.3, 21.3, 21.0 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{34}H_{33}N_2O_3S$ 549.2206; Found 549.2207.

_N_-(4-(2-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3e)

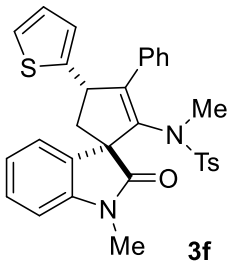


3e

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* = 3.5:1, 42.9 mg (76%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.54-7.56 (m, 1H), 7.35-7.39 (m, 2H), 7.29 (td, *J* = 7.7 Hz, 0.8 Hz, 1H), 7.12-7.20 (m, 6H), 6.87-6.95 (m, 5H), 6.78 (d, *J* = 8.1 Hz, 1H), 6.69 (d, *J* = 7.5 Hz, 1H), 5.10 (t, *J* = 8.0 Hz, 1H), 3.80 (s, 3H), 3.10 (s, 3H), 2.97 (dd, *J* = 8.8 Hz, 13.1 Hz, 1H), 2.71 (s, 3H), 2.33-2.41 (m, 1H), 2.30 (s, 3H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 179.0, 157.2, 149.9, 143.4, 142.5, 142.2, 136.1, 136.0, 135.0, 134.6, 131.6, 129.4, 128.8, 128.3, 128.0, 127.8, 127.7, 127.6, 126.9, 122.6, 120.4, 110.3, 107.6, 61.8, 55.0, 45.4, 43.4, 37.2, 26.2, 21.2 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{34}H_{33}N_2O_4S$ 565.2156; Found 565.2159.

_N_,4-dimethyl-_N_-(1'-methyl-2'-oxo-3-phenyl-4-(thiophen-2-yl)spiro[cyclopentane-1,3'-indolin]-2-en-2-yl)benzenesulfonamide (3f)

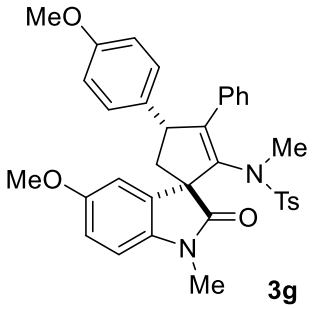


3f

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* = 15:1, 44.3 mg (82%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.55-7.56 (m, 1H), 7.34 (td, *J* = 7.7 Hz, 0.9 Hz, 1H), 7.13-7.26 (m, 7H), 6.96-6.99 (m, 4H), 6.86-6.87 (m, 2H), 6.77 (d, *J* = 7.7 Hz, 1H), 5.00 (t, *J* = 7.8 Hz, 1H), 3.16 (s, 3H), 3.04 (dd, *J* = 8.2 Hz, 13.3 Hz, 1H), 2.62 (s, 3H), 2.48 (dd, *J* = 7.5 Hz, 13.3 Hz, 1H), 2.32 (s, 3H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 178.7, 149.0, 147.1, 144.0, 142.6, 137.1, 136.3, 134.3, 130.8, 129.0, 128.6, 128.4, 127.8, 127.3, 126.7, 125.5, 124.1, 122.7, 107.9, 61.6, 52.6, 46.3, 45.9, 37.9, 26.4, 21.3 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{31}H_{29}N_2O_3S_2$ 541.1614; Found 541.1619.

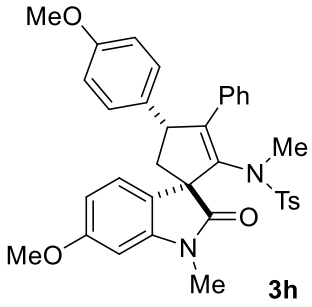
_N_-(5'-methoxy-4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3g)



3g

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* = 17:1, 51.1 mg (86%).
Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.31-7.36 (m, 3H), 7.23-7.27 (m, 5H), 6.97-6.99 (m, 4H), 6.88-6.91 (m, 3H), 6.69 (d, *J* = 8.4 Hz, 1H), 4.73 (t, *J* = 7.8 Hz, 1H), 3.86 (s, 3H), 3.79 (s, 3H), 3.18 (s, 3H), 3.02 (dd, *J* = 8.4 Hz, 13.3 Hz, 1H), 2.71 (s, 3H), 2.35 (s, 3H), 2.34 (dd, *J* = 7.4 Hz, 13.3 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 178.6, 158.1, 155.97, 149.5, 142.4, 137.2, 136.8, 136.5, 135.8, 135.7, 134.8, 134.7, 131.98, 129.3, 129.2, 128.8, 128.3, 127.97, 127.79, 127.6, 127.0, 113.8, 113.5, 112.98, 108.0, 62.1, 55.96, 55.89, 55.84, 55.79, 54.97, 50.2, 45.7, 26.3, 21.2 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{35}H_{35}N_2O_5S$ 595.2261; Found 591.2265.

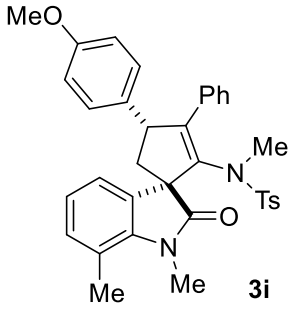
_N_-(6'-methoxy-4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3h)



3h

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* > 40:1, 49.9 mg (84%).
Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.45 (d, *J* = 7.6 Hz, 1H), 7.13-7.24 (m, 7H), 6.94 (br, 4H), 6.82 (d, *J* = 8.5 Hz, 2H), 6.63 (dd, *J* = 2.2 Hz, 8.2 Hz, 1H), 6.29 (s, 1H), 4.66 (t, *J* = 7.9 Hz, 1H), 3.85 (s, 3H), 3.75 (s, 3H), 3.12 (s, 3H), 2.92 (dd, *J* = 8.5 Hz, 13.4 Hz, 1H), 2.65 (s, 3H), 2.31 (s, 3H), 2.24 (dd, *J* = 7.6 Hz, 13.4 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 179.8, 160.7, 158.2, 149.5, 145.2, 142.4, 137.3, 136.9, 135.9, 134.9, 129.3, 128.9, 128.4, 127.9, 127.7, 127.0, 122.8, 113.9, 106.3, 96.1, 61.3, 55.5, 55.1, 50.3, 45.7, 29.7, 26.4, 21.4 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{35}H_{35}N_2O_5S$ 595.2261; Found 591.2263.

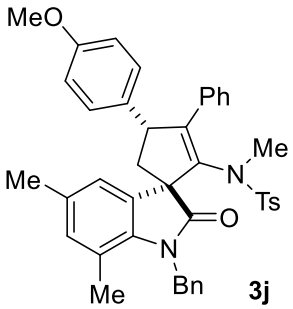
_N_-(4-(4-methoxyphenyl)-1',7'-dimethyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3i)



3i

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* = 20:1, 46.3 mg (80%).
Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.40-7.51 (m, 2H), 7.32-7.35 (m, 3H), 7.20-7.24 (m, 3H), 7.08-7.11 (m, 2H), 7.01-7.05 (m, 4H), 6.88 (d, *J* = 8.6 Hz, 2H), 4.78 (t, *J* = 8.0 Hz, 1H), 3.78 (s, 3H), 3.47 (s, 3H), 3.01 (dd, *J* = 8.5 Hz, 13.4 Hz, 1H), 2.74 (s, 3H), 2.56 (s, 3H), 2.38 (s, 3H), 2.33 (dd, *J* = 7.8 Hz, 13.4 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 179.7, 158.2, 149.6, 142.3, 141.8, 139.8, 137.4, 136.9, 135.8, 134.8, 132.3, 131.7, 129.4, 129.3, 129.2, 128.9, 128.8, 128.7, 128.6, 128.4, 128.0, 127.9, 127.7, 127.5, 127.0, 122.6, 119.3, 113.9, 61.2, 55.1, 50.3, 46.0, 29.7, 21.3, 18.96 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{35}H_{35}N_2O_4S$ 579.2312; Found 579.2313.

_N_-(1'-benzyl-4-(4-methoxyphenyl)-5',7'-dimethyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3j)

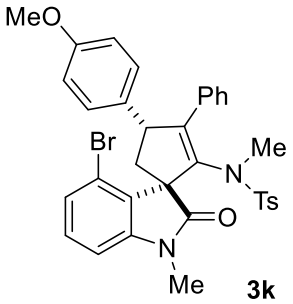


3j

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* = 15:1, 46.8 mg (70%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.38-7.42 (m, 2H), 7.21-7.28 (m, 6H), 7.12-7.16 (m, 1H), 7.02-7.06 (m, 2H), 6.81-6.93 (m, 9H), 5.16 (d, *J* = 17.2 Hz, 1H), 5.03 (d, *J* = 17.2 Hz, 1H), 4.75 (t, *J* = 8.4 Hz, 1H), 3.75 (s, 3H), 2.96 (dd, *J* = 8.4 Hz, 13.4 Hz, 1H), 2.51 (s, 3H), 2.38 (s, 3H), 2.33-2.37 (m, 1H), 2.28 (s, 3H), 2.20 (s, 3H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 180.1, 158.2, 151.1, 146.2, 144.7, 142.6, 139.2, 137.7, 137.6, 136.8, 135.7, 134.6, 132.8, 132.4, 131.9, 129.3, 129.0, 128.5, 128.4, 127.8, 127.5, 126.8, 125.4, 119.0, 113.9, 61.6, 55.1, 50.4, 46.4, 45.1, 37.1, 21.3, 20.8, 18.5 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{42}H_{41}N_2O_4S$ 669.2782; Found 669.2785.

_N_-(4'-bromo-4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indoli n]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3k)



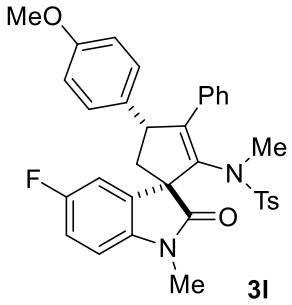
3k

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), *dr* = 1.3:1, 42.5 mg (66%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.43-7.47 (m, 3H × 2.3), 7.17-7.25 (m, 5H × 2.3), 7.08 (t, *J* = 7.4 Hz, 1H), 6.95-7.01 (m, 1H + 2H × 1.3), 6.77-6.83 (m, 4H × 2.3), 6.58 (d, *J* = 7.3 Hz, 2H), 6.41 (d, *J* = 7.6 Hz, 2H × 1.3), 4.61 (dd, *J* = 7.0 Hz, 10.0 Hz, 1H × 1.3), 4.55 (dd, *J* = 4.8 Hz, 10.5 Hz, 1H), 3.73 (s, 3H × 1.3), 3.72 (s, 3H), 3.28 (s, 3H × 1.3), 3.22 (s, 3H), 2.97 (m, 1H × 2.3), 2.72 (s, 3H × 1.3), 2.60 (s, 3H), 2.50-2.62 (m, 1H × 2.3), 2.43 (s, 3H × 1.3), 2.41 (s, 3H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 178.6, 178.2, 158.3, 158.0, 147.0, 146.3, 145.8, 143.23, 143.20, 137.2, 135.6, 135.3, 135.2, 135.1, 134.8, 134.7, 133.2, 130.6, 129.9, 129.7, 129.3, 128.5, 128.4, 128.0, 127.9, 127.8, 127.6, 127.5, 127.2, 127.1, 126.3, 126.1, 119.5, 119.4, 113.7, 113.6, 107.2, 107.1, 63.5, 62.7, 55.1, 55.0, 52.4, 50.9, 42.4, 40.2, 39.8,

39.0, 26.6, 26.5, 21.5 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{34}H_{32}BrN_2O_4S$ 643.1261; Found 643.1263.

_N_-(5'-fluoro-4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3l)

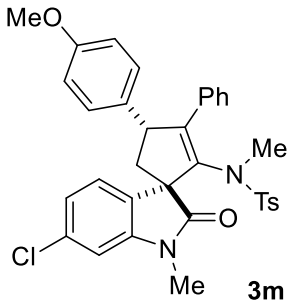


3l

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* = 3:1, 41.4 mg (71%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.31 (d, *J* = 8.6 Hz, 1H), 7.23-7.26 (m, 2H), 7.13-7.17 (m, 4H), 6.95-7.01 (m, 5H), 6.83 (d, *J* = 8.5 Hz, 2H), 6.74-6.76 (m, 1H), 6.63-6.66 (m, 1H), 4.66 (t, *J* = 8.0 Hz, 1H), 3.75 (s, 3H), 3.15 (s, 3H), 2.94 (dd, *J* = 8.4 Hz, 13.4 Hz, 1H), 2.66 (s, 3H), 2.31 (s, 3H), 2.26 (dd, *J* = 7.8 Hz, 13.4 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 178.8, 159.3 (d, J_{C-F} = 237.2 Hz), 158.3, 149.8, 142.6, 139.9, 136.4 (d, J_{C-F} = 9.6 Hz), 135.4, 135.0 (d, J_{C-F} = 24.9 Hz), 134.6, 132.6 (d, J_{C-F} = 7.9 Hz), 129.2, 129.0, 128.3, 127.9, 127.6, 127.0, 114.7 (d, J_{C-F} = 23.4 Hz), 114.0, 108.1 (d, J_{C-F} = 8.0 Hz), 62.1, 55.1, 50.3, 45.7, 37.2, 26.5, 21.3 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{34}H_{32}FN_2O_4S$ 583.2061; Found 583.2058.

_N_-(6'-chloro-4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3m)



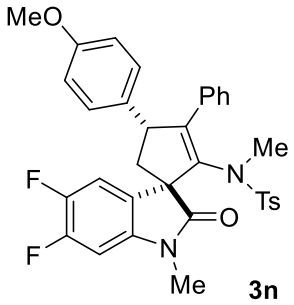
3m

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), *dr* = 2:1, 40.7 mg (68%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.51 (d, *J* = 7.9 Hz, 1H), 7.44 (d, *J* = 7.9 Hz, 2H), 7.29-7.32 (m, 3H), 7.22-7.26 (m, 6H), 7.12-7.17 (m, 10H), 7.06-7.09 (m, 5H), 6.99-7.01 (m, 10H), 6.89 (d, *J* = 8.0 Hz, 2H), 6.8 (d, *J* = 8.6 Hz, 4H),

6.74-6.78 (m, 3H), 6.61 (br, 2H), 4.63-4.70 (m, 1H × 3), 3.73 (s, 3H × 2), 3.69 (s, 3H), 3.15 (s, 3H), 3.10 (s, 3H × 2), 2.92 (dd, *J* = 8.5 Hz, 13.4 Hz, 1H × 2), 2.80 (s, 3H), 2.70 (s, 3H × 2), 2.68-2.73 (m, 1H), 2.59 (dd, *J* = 7.1 Hz, 13.5 Hz, 1H), 2.34 (s, 3H × 2), 2.33 (s, 3H), 2.22 (dd, *J* = 7.5 Hz, 13.4 Hz, 1H × 2) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 178.9, 178.8, 158.2, 158.1, 150.1, 149.6, 145.0, 144.6, 142.8, 142.6, 136.5, 135.9, 135.4, 135.1, 134.8, 134.6, 134.39, 134.37, 134.3, 130.0, 129.3, 129.2, 129.1, 129.0, 128.9, 128.22, 128.19, 128.1, 127.9, 127.8, 127.6, 127.3, 126.5, 126.2, 122.44, 122.39, 113.9, 113.7, 108.7, 108.4, 61.5, 61.4, 55.03, 54.96, 50.5, 50.1, 45.4, 44.5, 37.5, 26.5, 26.4, 21.3 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{34}H_{32}ClN_2O_4S$ 599.1766; Found 599.1771.

_N_-(5',6'-difluoro-4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3n)

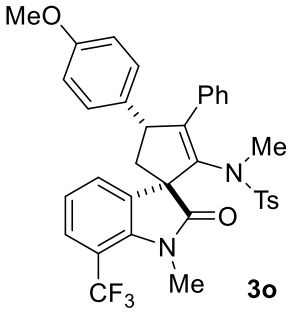


3n

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), *dr* = 1.5:1, 43.2 mg (72%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.38 (dd, *J* = 2.5 Hz, 8.0 Hz, 1H), 7.33 (d, *J* = 8.6 Hz, 2H × 1.5), 7.24-7.28 (m, 3H), 7.14-7.21 (m, 4H × 2.5), 7.01-7.07 (m, 1H + 4H × 1.5), 6.97-6.99 (m, 2H × 1.5 + 1H), 6.92 (d, *J* = 8.0 Hz, 2H), 6.85 (d, *J* = 8.6 Hz, 2H × 1.5), 6.76-6.78 (m, 3H), 6.66 (dd, *J* = 4.0 Hz, 8.6 Hz, 1H × 1.5), 4.64-4.69 (m, 1H × 2.5), 3.77 (s, 3H × 1.5), 3.72 (s, 3H), 3.22 (s, 3H), 3.18 (s, 3H × 1.5), 2.95 (dd, *J* = 8.3 Hz, 13.4 Hz, 1H × 1.5), 2.78 (s, 3H), 2.72-2.76 (m, 1H), 2.67 (s, 3H × 1.5), 2.63 (dd, *J* = 7.1 Hz, 13.4 Hz, 1H), 2.33 (s, 3H × 2.5), 2.28 (dd, *J* = 7.7 Hz, 13.4 Hz, 1H × 1.5) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ = 178.8 178.6, 159.4 (d, J_{C-F} = 221.8 Hz), 159.3 (d, J_{C-F} = 237.7 Hz), 150.2, 149.8, 142.7 (d, J_{C-F} = 21.2 Hz), 139.9, 139.4, 135.7, 135.4, 135.2, 134.9, 134.6 (d, J_{C-F} = 8.0 Hz), 133.3 (d, J_{C-F} = 7.7 Hz), 132.6 (d, J_{C-F} = 8.0 Hz), 129.4, 129.0, 128.3, 128.2 (d, J_{C-F} = 18.2 Hz), 127.8 (d, J_{C-F} = 27.2 Hz), 127.1, 114.8 (d, J_{C-F} = 23.5 Hz), 114.0, 113.7, 113.5 (d, J_{C-F} = 32.5 Hz), 108.2 (dd, J_{C-F} = 8.1 Hz, 10.0 Hz), 62.1, 55.1, 55.0, 50.6, 50.4, 45.7, 44.5, 37.7, 26.7, 26.5, 21.3 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{34}H_{31}F_2N_2O_4S$ 601.1967; Found 601.1969.

_N_-(4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenyl-7'-(trifluoromethyl)spiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3o)

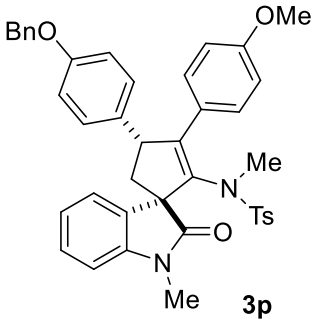


3o

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* = 2.3:1, 41.1 mg (65%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.78-7.82 (m, 1H × 3.3), 7.65 (d, *J* = 8.0 Hz, 1H), 7.59 (d, *J* = 8.0 Hz, 1H × 2.3), 7.32 (d, *J* = 8.6 Hz, 2H × 2.3), 7.23-7.27 (m, 4H + 2H × 2.3), 7.18-7.21 (m, 3H × 3.3), 7.11-7.14 (m, 1H × 3.3), 6.92-6.98 (m, 3H × 3.3), 6.83 (d, *J* = 8.6 Hz, 3H + 2H × 2.3), 6.77 (d, *J* = 8.6 Hz, 1H × 2.3), 4.67-4.73 (m, 1H × 3.3), 3.75 (s, 3H × 2.3), 3.71 (s, 3H), 3.38-3.39 (m, 3H), 3.35-3.36 (m, 3H × 2.3), 3.20-3.23 (m, 1H), 2.94 (dd, *J* = 8.4 Hz, 13.4 Hz, 1H × 2.3), 2.82 (s, 3H), 2.64 (s, 3H × 2.3), 2.36-2.39 (m, 1H), 2.31 (s, 3H × 3.3), 2.23-2.27 (m, 1H × 2.3) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 179.9, 179.7, 158.4, 158.3, 143.0, 142.9, 135.9, 135.4, 134.9, 134.6, 134.5, 133.6, 129.3, 129.1, 128.4, 128.3 (q, $J_{C\text{-}F}$ = 214.7 Hz), 128.2, 128.1, 127.9 (q, $J_{C\text{-}F}$ = 243.9 Hz), 126.5 (q, $J_{C\text{-}F}$ = 6.0 Hz), 122.1 (q, $J_{C\text{-}F}$ = 3.8 Hz), 114.1, 113.8, 112.3 (q, $J_{C\text{-}F}$ = 32.9 Hz), 112.1 (q, $J_{C\text{-}F}$ = 32.3 Hz), 60.5, 60.3, 55.2, 55.1, 50.7, 50.3, 46.0, 45.1, 37.6, 29.1, 29.0, 21.3 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{35}H_{32}F_3N_2O_4S$ 633.2029; Found 633.2027.

_N_-(4-(4-(benzyloxy)phenyl)-3-(4-methoxyphenyl)-1'-methyl-2'-oxospiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_,4-dimethylbenzenesulfonamide (3p)



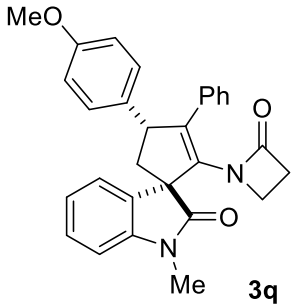
3p

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* > 20:1, 55.7 mg (83%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.25-7.61 (m, 1H), 7.21-7.43 (m, 10H), 7.12-7.18 (m, 2H), 6.90-6.98 (m, 5H), 6.67-6.74 (m, 3H), 5.01 (s, 2H), 4.66 (t, *J* = 7.8 Hz, 1H), 3.74 (s, 3H), 3.14 (s, 3H), 2.93 (dd, *J* = 8.5 Hz, 13.4 Hz, 1H), 2.67 (s, 3H), 2.31 (s, 3H), 2.26 (dd, *J* = 7.6 Hz, 13.4 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 179.3, 159.2, 157.5, 149.1, 144.0, 142.4, 137.0, 136.9, 136.5, 136.2, 131.2, 129.7, 129.3, 128.9,

128.5, 127.9, 127.5, 127.2, 127.0, 122.8, 115.0, 113.4, 107.8, 70.0, 61.9, 55.0, 50.2, 45.5, 37.0, 26.4, 21.4 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{41}H_{39}N_2O_5S$ 671.2574; Found 671.2577.

4-(4-methoxyphenyl)-1'-methyl-2-(2-oxoazetidin-1-yl)-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2'-one (3q)

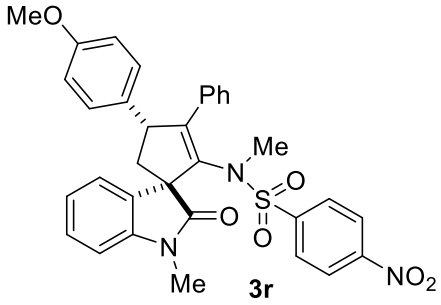


3q

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* = 8:1, 36.0 mg (80%).

Colorless amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.30 (d, *J* = 7.5 Hz, 2H), 7.27-7.28 (m, 1H), 7.26 (d, *J* = 2.9 Hz, 1H), 7.14-7.21 (m, 5H), 7.05-7.09 (m, 1H), 6.88 (d, *J* = 7.5 Hz, 1H), 6.75 (d, *J* = 8.7 Hz, 2H), 4.47 (t, *J* = 8.2 Hz, 1H), 3.73 (s, 3H), 3.28 (s, 3H), 2.96-3.01 (m, 1H), 2.49-2.69 (m, 5H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 178.9, 163.8, 158.2, 144.3, 134.99, 134.9, 132.7, 132.6, 132.5, 129.5, 129.4, 129.0, 128.5, 127.8, 127.7, 127.4, 122.2, 121.8, 113.9, 113.7, 108.4, 60.1, 55.1, 51.5, 46.3, 41.1, 36.2, 29.7, 26.7 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{29}H_{27}N_2O_3$ 451.2016; Found 451.2020.

***N*-(4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-*N*-methyl-4-nitrobenzenesulfonamide (3r)**



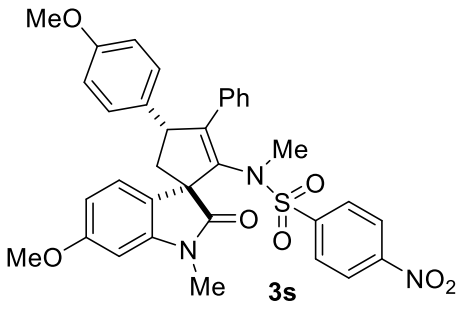
3r

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* > 40:1, 52.5 mg (88%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.91 (d, *J* = 8.9 Hz, 2H), 7.56 (br, 1H), 7.34 (td, *J* = 7.7 Hz, 1.0 Hz, 2H), 7.14-7.19 (m, 9H), 6.75-6.81 (m, 3H), 4.69-4.71 (m, 1H), 3.74 (s, 3H), 3.17 (s, 3H), 2.93 (dd, *J* = 8.3 Hz, 13.4 Hz, 1H), 2.79 (s, 3H), 2.29 (dd, *J* = 8.0 Hz, 13.4 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 178.8, 158.3, 151.1, 149.3, 145.3, 144.2, 136.3, 135.3, 134.4, 130.5, 129.2, 129.0, 128.1, 123.5, 122.8,

114.1,108.1, 61.6, 55.1, 50.2, 45.7, 26.5 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{33}H_{30}N_3O_6S$ 596.1850; Found 596.1855.

_N_-(6'-methoxy-4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_-methyl-4-nitrobenzenesulfonamide (3s)

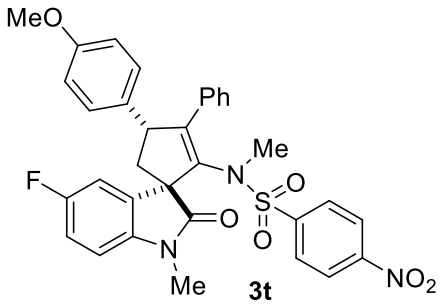


3s

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* > 40:1, 56.3 mg (90%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.93 (d, *J* = 8.9 Hz, 2H), 7.15-7.22 (m, 10H), 6.80-6.83 (m, 3H), 6.61-6.63 (m, 1H), 4.69 (t, *J* = 7.8 Hz, 1H), 3.81 (s, 3H), 3.73 (s, 3H), 3.14 (s, 3H), 2.94 (dd, *J* = 8.3 Hz, 13.3 Hz, 1H), 2.81 (s, 3H), 2.26 (dd, *J* = 7.7 Hz, 13.3 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 177.8, 157.7, 155.5, 150.1, 148.6, 144.8, 136.8, 135.5, 134.7, 133.7, 131.0, 128.6, 127.5, 127.4, 122.8, 113.4, 112.9, 112.5, 107.7, 61.4, 55.3, 54.5, 49.6, 45.3, 29.0, 25.9 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{34}H_{32}N_3O_7S$ 626.1955; Found 626.1959.

_N_-(5'-fluoro-4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-_N_-methyl-4-nitrobenzenesulfonamide (3t)



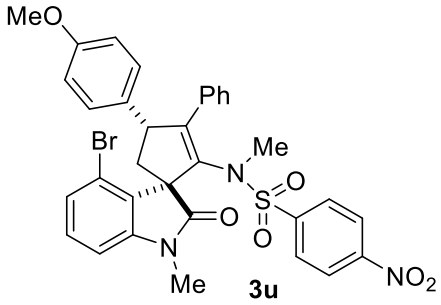
3t

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* > 40:1, 51.5 mg (84%).

Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.95 (d, *J* = 8.8 Hz, 2H), 7.31-7.35 (m, 3H), 7.09-7.17 (m, 6H), 7.02 (td, *J* = 2.4 Hz, 8.8 Hz, 2H), 6.82 (d, *J* = 7.9 Hz, 2H), 6.67-6.72 (m, 1H), 4.69 (t, *J* = 7.6 Hz, 1H), 3.75 (s, 3H), 3.19 (s, 3H), 2.94 (dd, *J* = 8.2 Hz, 13.5 Hz, 1H), 2.86 (s, 3H), 2.27 (dd, *J* = 8.1 Hz, 13.5 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 178.6, 159.4 (d, J_{C-F} = 239.9 Hz), 158.6, 151.3, 149.5, 145.3, 140.2, 135.9,

135.1, 134.3, 132.1 (d, J_{C-F} = 8 Hz), 129.3, 128.2, 123.7, 115.4 (d, J_{C-F} = 23.4 Hz), 114.2, 108.6 (d, J_{C-F} = 8 Hz), 62.1 (d, J_{C-F} = 1.5 Hz), 55.3, 53.6, 50.3, 46.1, 29.8, 26.8 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{33}H_{29}FN_3O_6S$ 614.1756; Found 614.1759.

***N*-(4'-bromo-4-(4-methoxyphenyl)-1'-methyl-2'-oxo-3-phenylspiro[cyclopentane-1,3'-indolin]-2-en-2-yl)-*N*-methyl-4-nitrobenzenesulfonamide (3u)**



3u

Synthesized by the general procedure, flash chromatography (petroleum ether:ethyl acetate = 10:1 to 5:1), major diastereomer, *dr* > 40:1, 54.5 mg (81%).

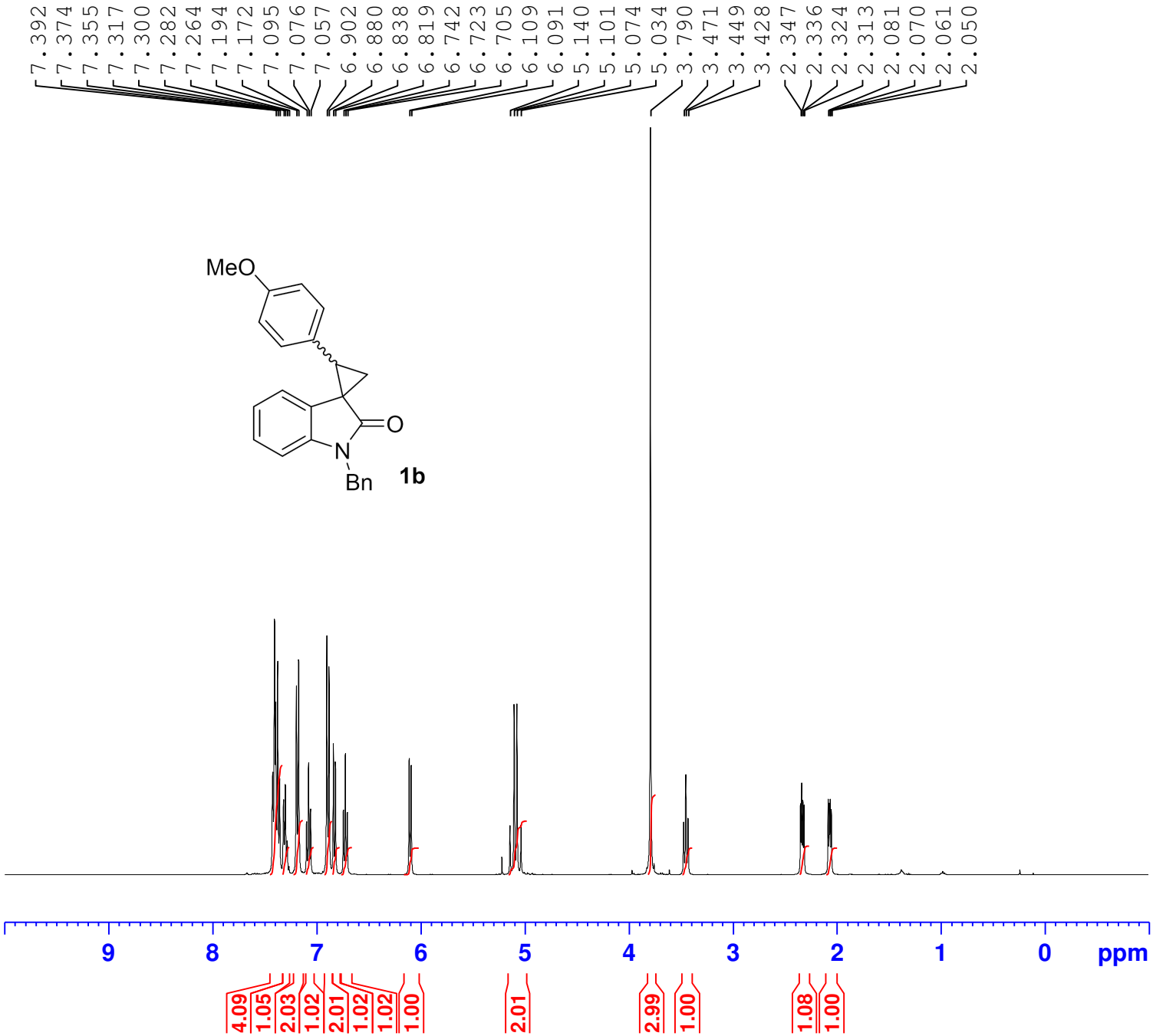
Light yellow amorphous solid. New compound. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 8.07 (d, *J* = 8.8 Hz, 2H), 7.70 (d, *J* = 8.8 Hz, 2H), 7.24-7.26 (m, 2H), 7.12 (d, *J* = 8.6 Hz, 2H), 6.98 (t, *J* = 7.5 Hz, 1H), 6.84-6.87 (m, 1H), 6.80 (t, *J* = 7.7 Hz, 2H), 6.7 (d, *J* = 8.6 Hz, 2H), 6.52 (d, *J* = 7.5 Hz, 2H), 4.69 (dd, *J* = 7.3 Hz, 9.9 Hz, 1H), 3.71 (s, 3H), 3.29 (s, 3H), 3.05 (dd, *J* = 10.0 Hz, 12.8 Hz, 1H), 3.01 (s, 3H), 2.62 (dd, *J* = 7.3 Hz, 12.8 Hz, 1H) ppm; ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$): δ = 178.1, 158.3, 149.9, 149.6, 147.0, 143.5, 135.8, 134.5, 134.4, 130.4, 129.7, 129.0, 127.96, 127.6, 127.5, 126.5, 123.7, 119.7, 113.8, 107.6, 62.9, 55.1, 50.8, 41.97, 40.7, 26.6 ppm. HRMS (ESI) m/z: $[M + H]^+$ Calcd. for $C_{33}H_{29}BrN_3O_6S$ 674.0955; Found 674.0958.

4. A gram-scale synthesis of spirocyclopenteneoxindole 3a

To a mixture of spirocyclopropyl oxindole **1a** (1.50 g, 5.40 mmol, 1.0 equiv, diastereomeric mixture) and ynamide **2a** (1.84 g, 6.44 mmol, 1.2 equiv) in CH_2Cl_2 (20 mL), $Cu(OTf)_2$ (115.5 mg, 0.32 mmol, 0.05 equiv) was added. The mixture was stirred at room temperature (25 ℃) in air for 8 h. Then, the mixture was diluted with CH_2Cl_2 (25.0 mL) and washed with saturated $NaHCO_3$. The aqueous phase was extracted with CH_2Cl_2 (25 mL × 3). The organic layers were combined, washed with brine, dried over Na_2SO_4, and concentrated. The residue was purified by silica gel flash chromatography (petroleum ether:ethyl acetate = 8:1 to 4:1) to provide product **3a** (2.41 g, 79%, *dr* = 9:1).

6. References

1. A. A. Akaev, E. V. Villemson, N. S. Vorobyeva, A. G. Majouga, E. M. Budynina and M. Y. Melnikov, *J. Org. Chem.*, 2017, **82**, 5689-5701.
2. D.-X. Zhang, J.-J. Man, Y. Chen, L. Yin, J.-C. Zhong and Q.-F. Zhang, *RSC Adv*., 2019, **9**, 12567-12571.

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PROCNO                      1

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TD                      65536
SOLVENT                 CDCl3
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DS                          2
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FIDRES               0.250967 Hz
AQ                   3.9845889 sec
RG                        25.4
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DE                       6.50 usec
TE                      301.1 K
D1                   1.00000000 sec
TD0                         1
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NUC1                       1H
P0                       3.33 usec
P1                      10.00 usec
PLW1             15.00000000 W

F2 - Processing parameters
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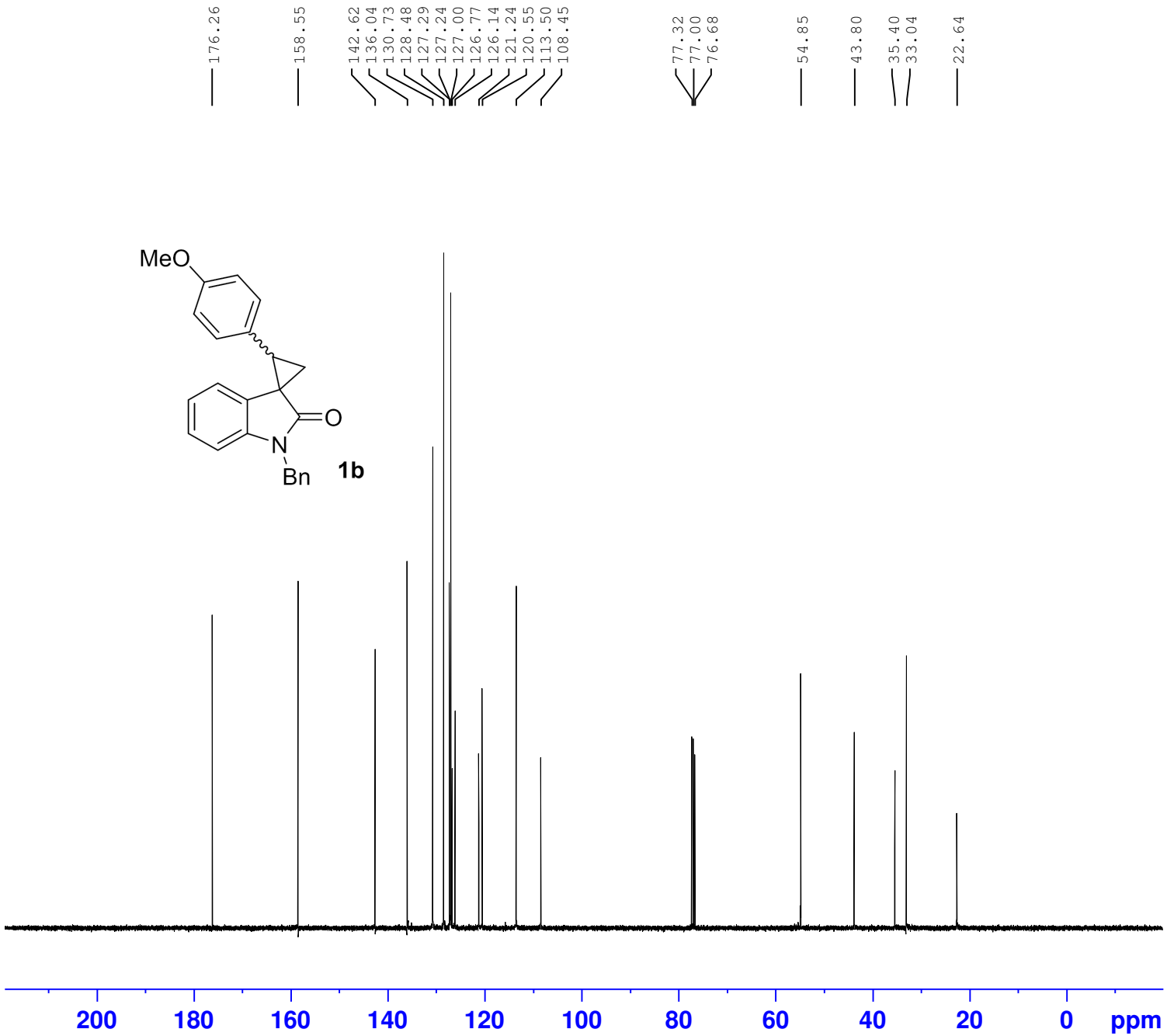


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PROCNO                      1

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PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         306
DS                           4
SWH                  24038.461 Hz
FIDRES                0.733596 Hz
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RG                        2050
DW                      20.800 usec
DE                       6.50 usec
TE                      301.5 K
D1                    2.00000000 sec
D11                   0.03000000 sec
TD0                          1
SFO1               100.6328888 MHz
NUC1                       13C
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P1                      10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                       1H
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PCPD2                   90.00 usec
PLW2               15.00000000 W
PLW12                0.18519001 W
PLW13                0.09314700 W

F2 - Processing parameters
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WDW                         no
SSB                          0
LB                           0 Hz
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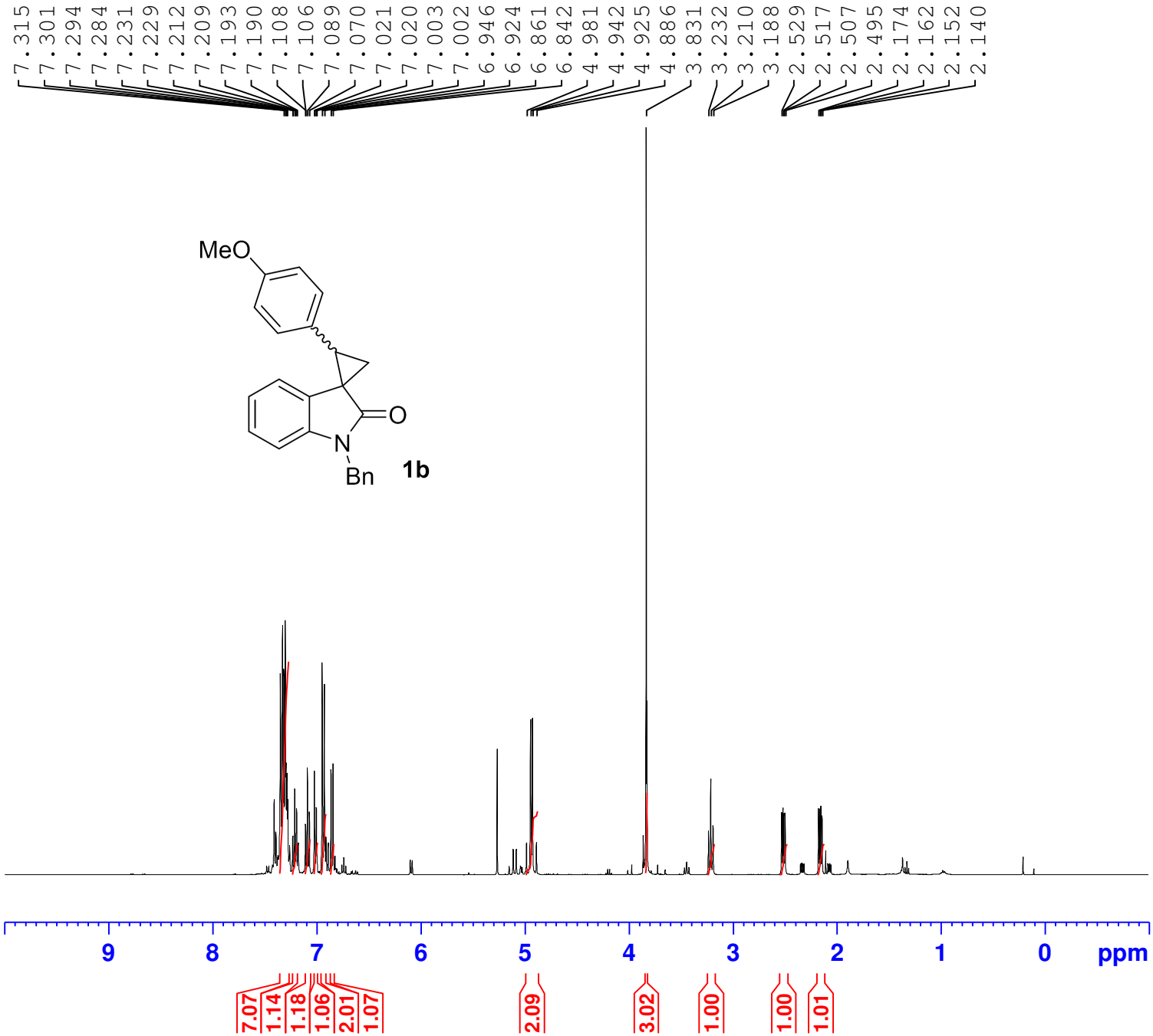


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PROCNO                    1

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PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8223.685 Hz
FIDRES             0.250967 Hz
AQ                 3.9845889 sec
RG                       32
DW                    60.800 usec
DE                     6.50 usec
TE                    301.0 K
D1              1.00000000 sec
TD0                       1
SFO1           400.1724712 MHz
NUC1                     1H
P0                    3.33 usec
P1                   10.00 usec
PLW1           15.00000000 W

F2 - Processing parameters
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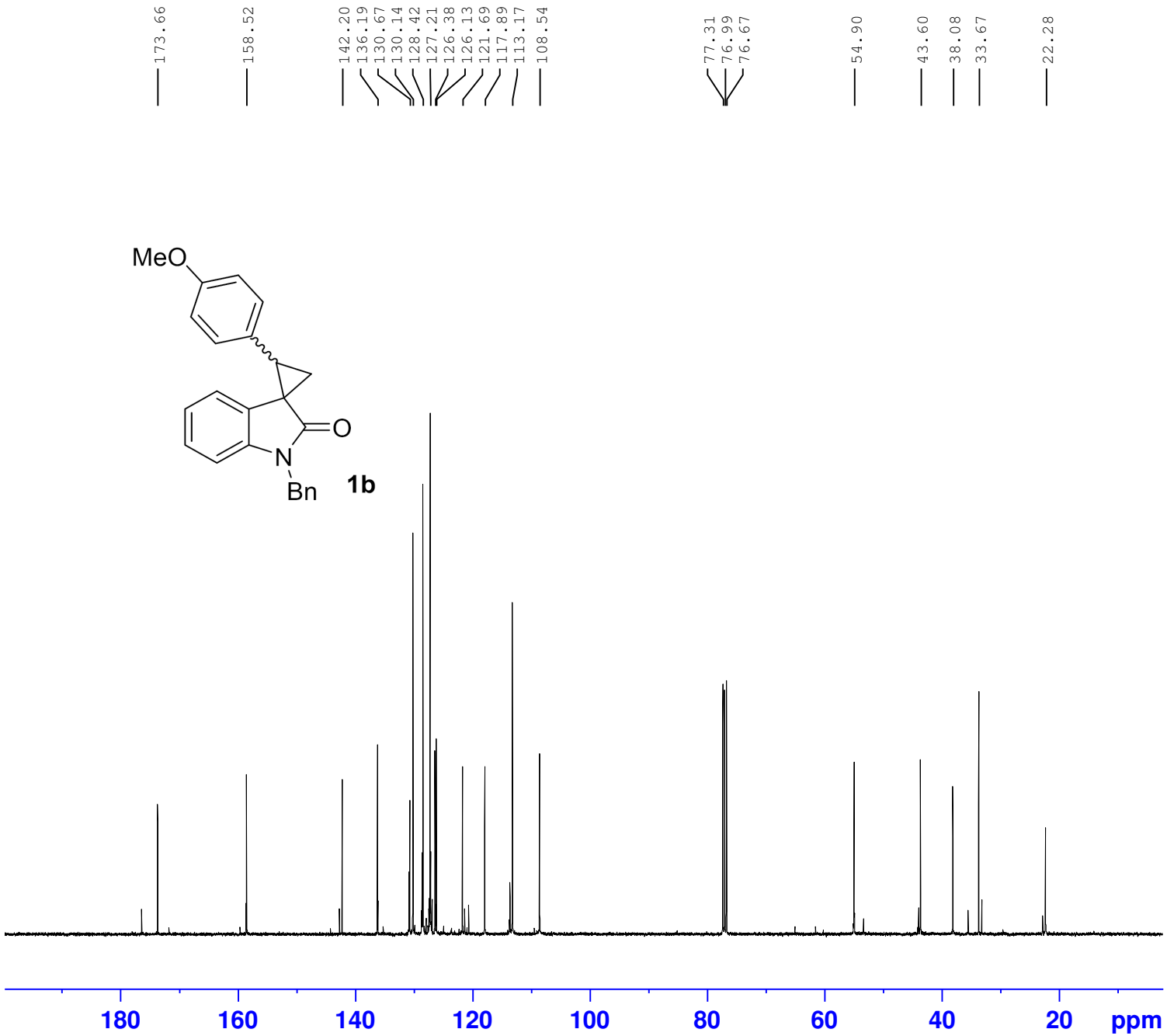


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PROCNO                1

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TD                65536
SOLVENT           CDCl3
NS                  400
DS                    4
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             1.3631488 sec
RG                 2050
DW               20.800 usec
DE                6.50 usec
TE               301.6 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1
SFO1        100.6328888 MHz
NUC1                13C
P0                3.33 usec
P1               10.00 usec
PLW1         50.00000000 W
SFO2        400.1716007 MHz
NUC2                1H
CPDPRG[2         waltz65
PCPD2            90.00 usec
PLW2         15.00000000 W
PLW12         0.18519001 W
PLW13         0.09314700 W

F2 - Processing parameters
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WDW                   EM
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LB                1.00 Hz
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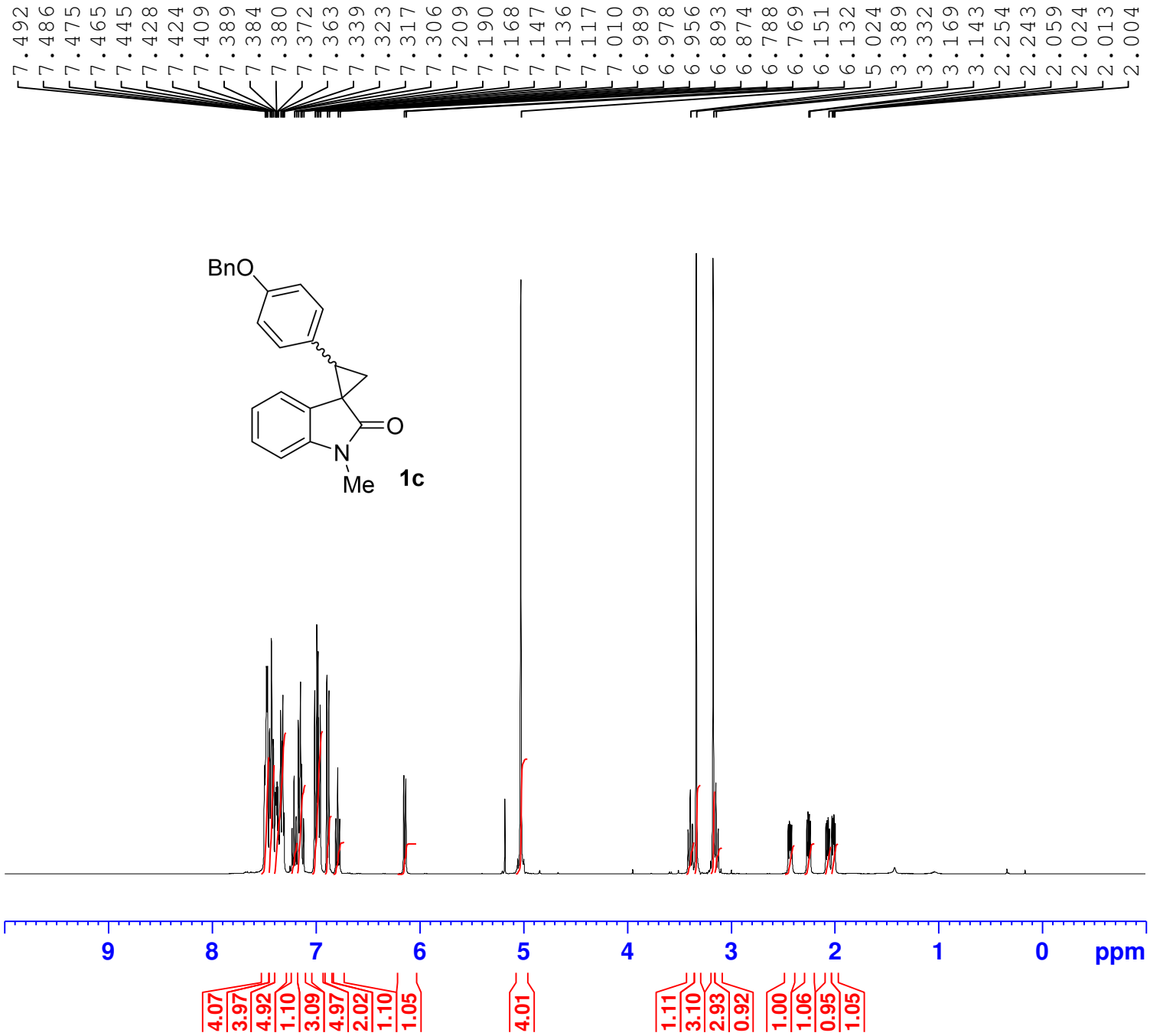


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PROCNO                   1

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PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8223.685 Hz
FIDRES            0.250967 Hz
AQ                3.9845889 sec
RG                       18
DW                   60.800 usec
DE                    6.50 usec
TE                   296.9 K
D1              1.00000000 sec
TD0                      1
SFO1           400.1724712 MHz
NUC1                    1H
P0                    3.33 usec
P1                   10.00 usec
PLW1           15.00000000 W

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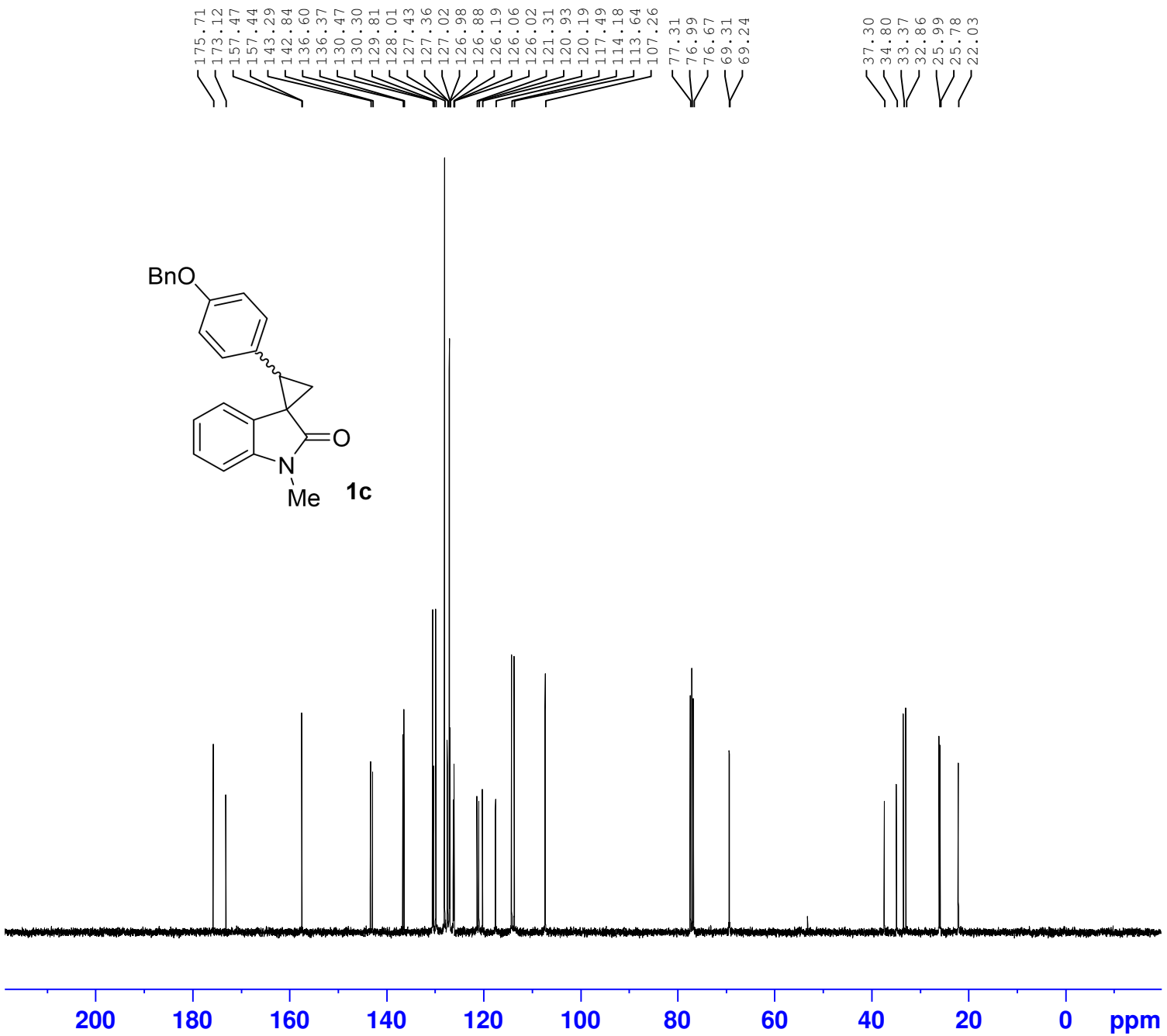


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PROCNO                   1

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TD                    65536
SOLVENT               CDCl3
NS                       47
DS                        4
SWH               24038.461 Hz
FIDRES             0.733596 Hz
AQ                1.3631488 sec
RG                     2050
DW                   20.800 usec
DE                    6.50 usec
TE                   296.8 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                       1
SFO1           100.6328888 MHz
NUC1                    13C
P0                    3.33 usec
P1                   10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                    1H
CPDPRG[2            waltz65
PCPD2                90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

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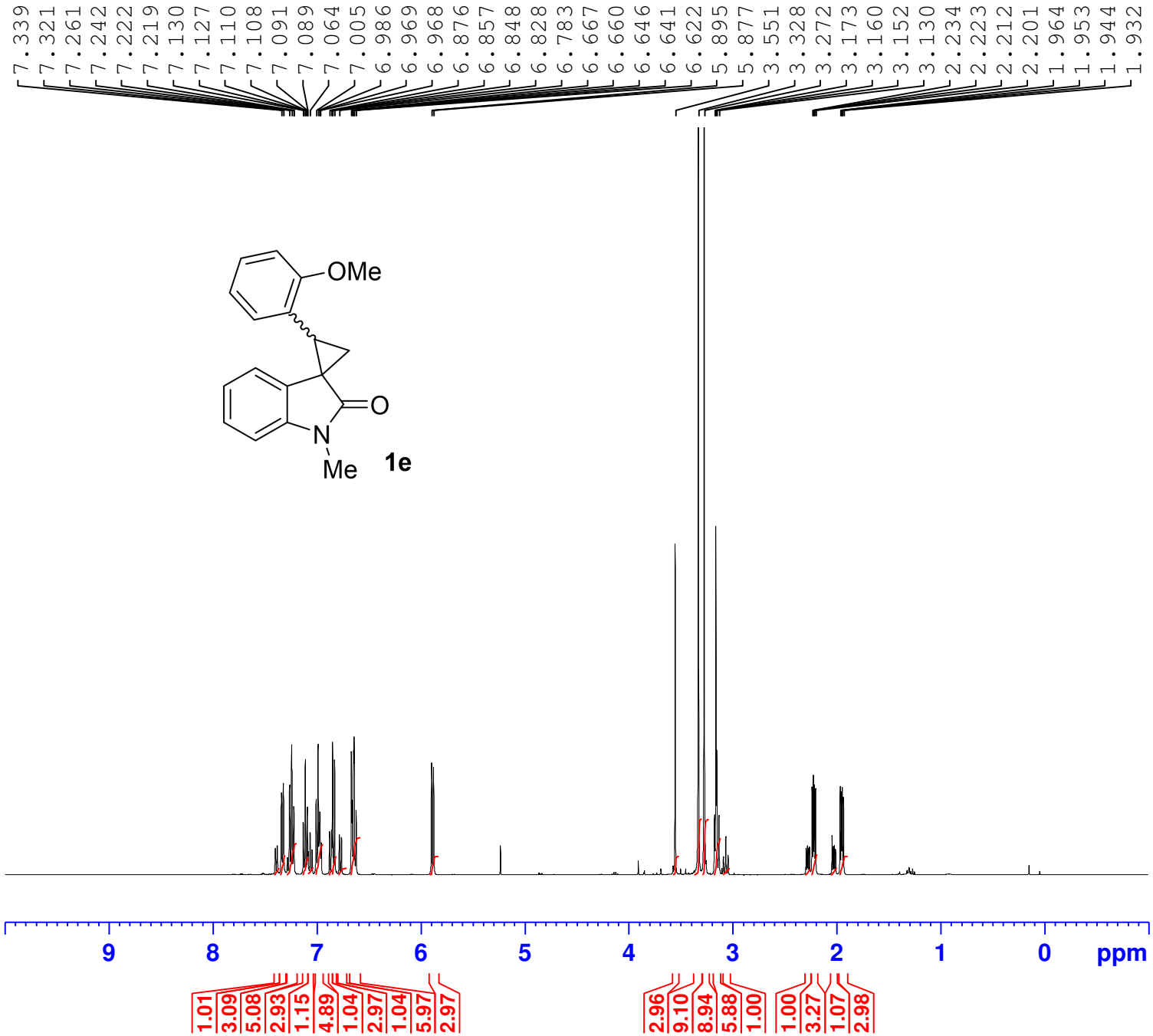


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PROCNO                   1

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PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
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DS                       2
SWH               8223.685 Hz
FIDRES           0.250967 Hz
AQ               3.9845889 sec
RG                      36
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DE                   6.50 usec
TE                   296.9 K
D1              1.00000000 sec
TD0                      1
SFO1           400.1724712 MHz
NUC1                   1H
P0                   3.33 usec
P1                  10.00 usec
PLW1           15.00000000 W

F2 - Processing parameters
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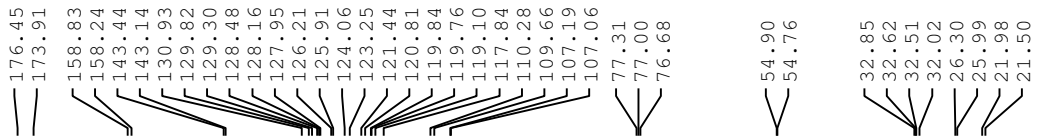

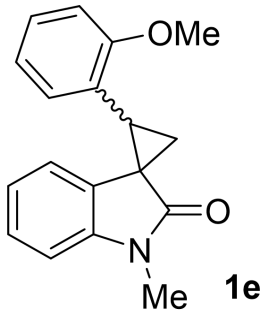

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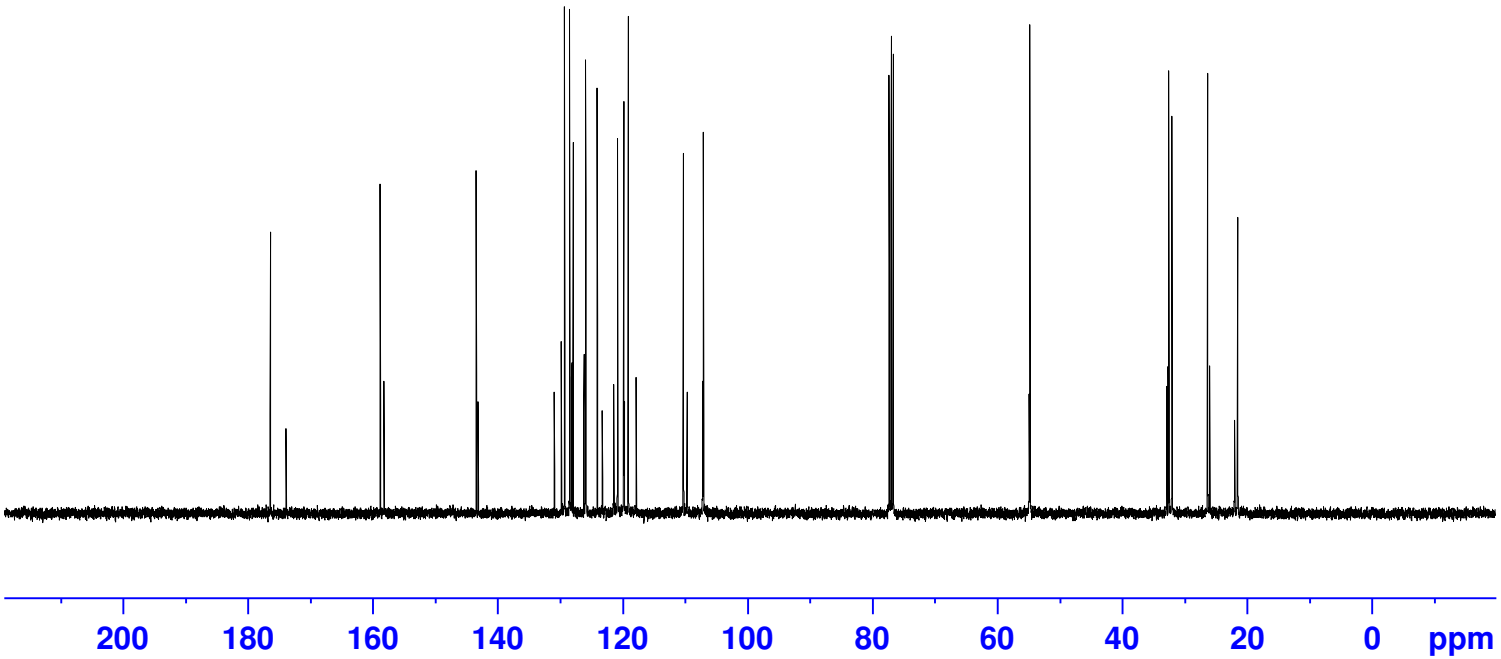


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FIDRES            0.733596 Hz
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RG                    2050
DW                  20.800 usec
DE                   6.50 usec
TE                  296.8 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                      1
SFO1           100.6328888 MHz
NUC1                   13C
P0                   3.33 usec
P1                  10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                   1H
CPDPRG[2           waltz65
PCPD2                90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

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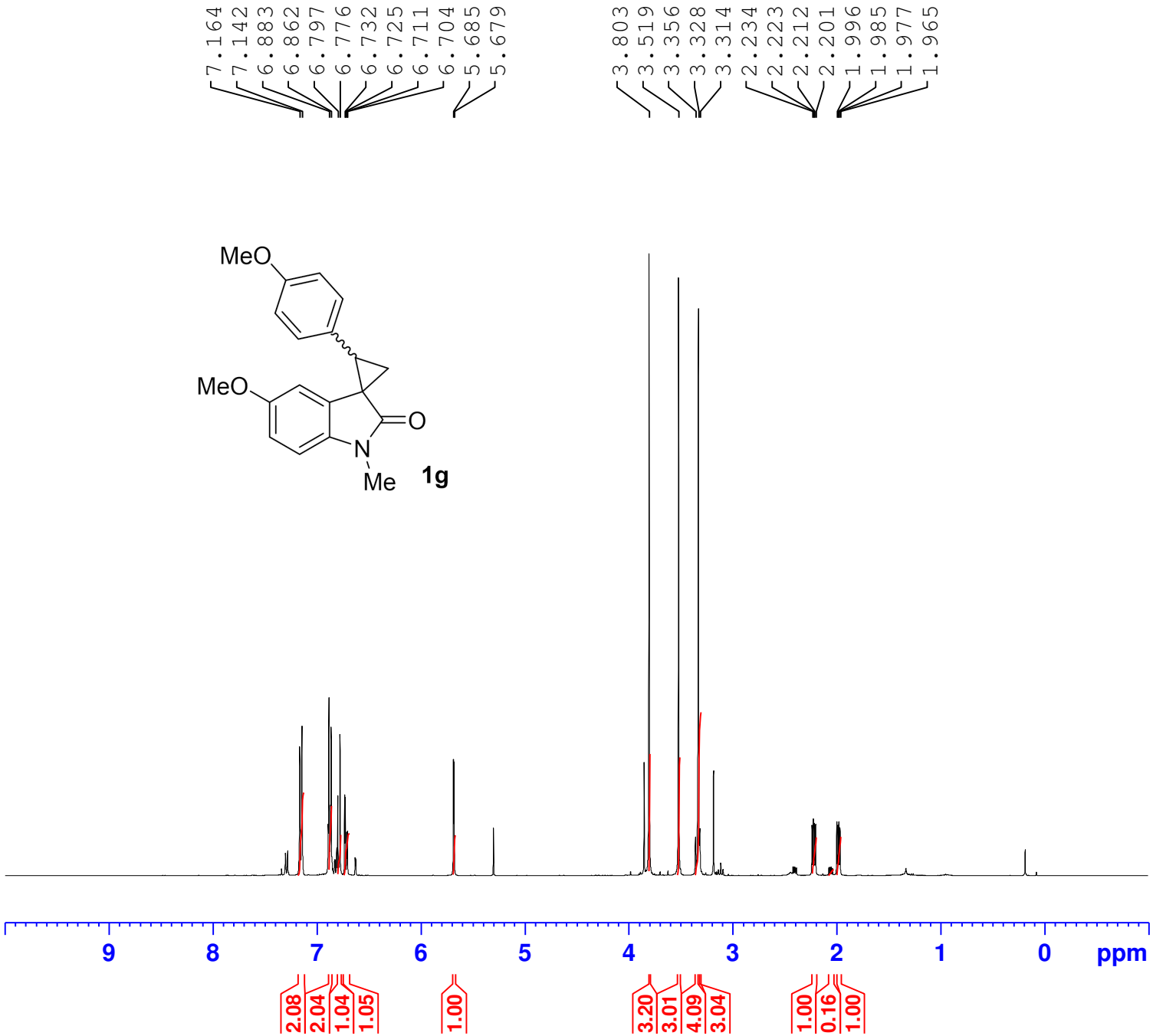


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TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8223.685 Hz
FIDRES            0.250967 Hz
AQ                3.9845889 sec
RG                     28.5
DW                   60.800 usec
DE                    6.50 usec
TE                   294.1 K
D1              1.00000000 sec
TD0                       1
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NUC1                    1H
P0                    3.33 usec
P1                   10.00 usec
PLW1           15.00000000 W

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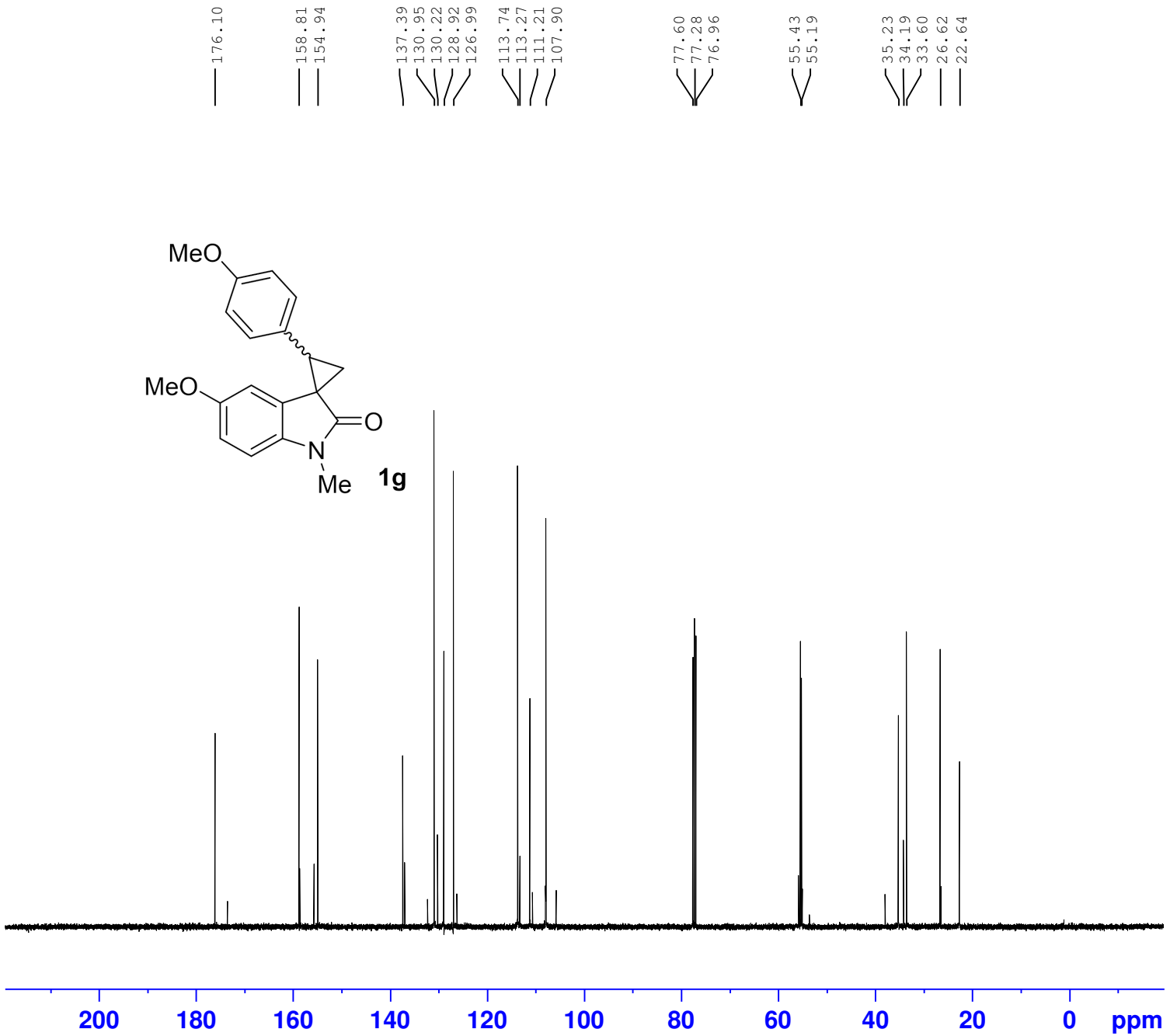


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PROCNO                   1

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TD                   65536
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DW                  20.800 usec
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TE                  294.3 K
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D11            0.03000000 sec
TD0                      1
SFO1          100.6328888 MHz
NUC1                   13C
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SFO2          400.1716007 MHz
NUC2                   1H
CPDPRG[2           waltz65
PCPD2                90.00 usec
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PLW12          0.18519001 W
PLW13          0.09314700 W

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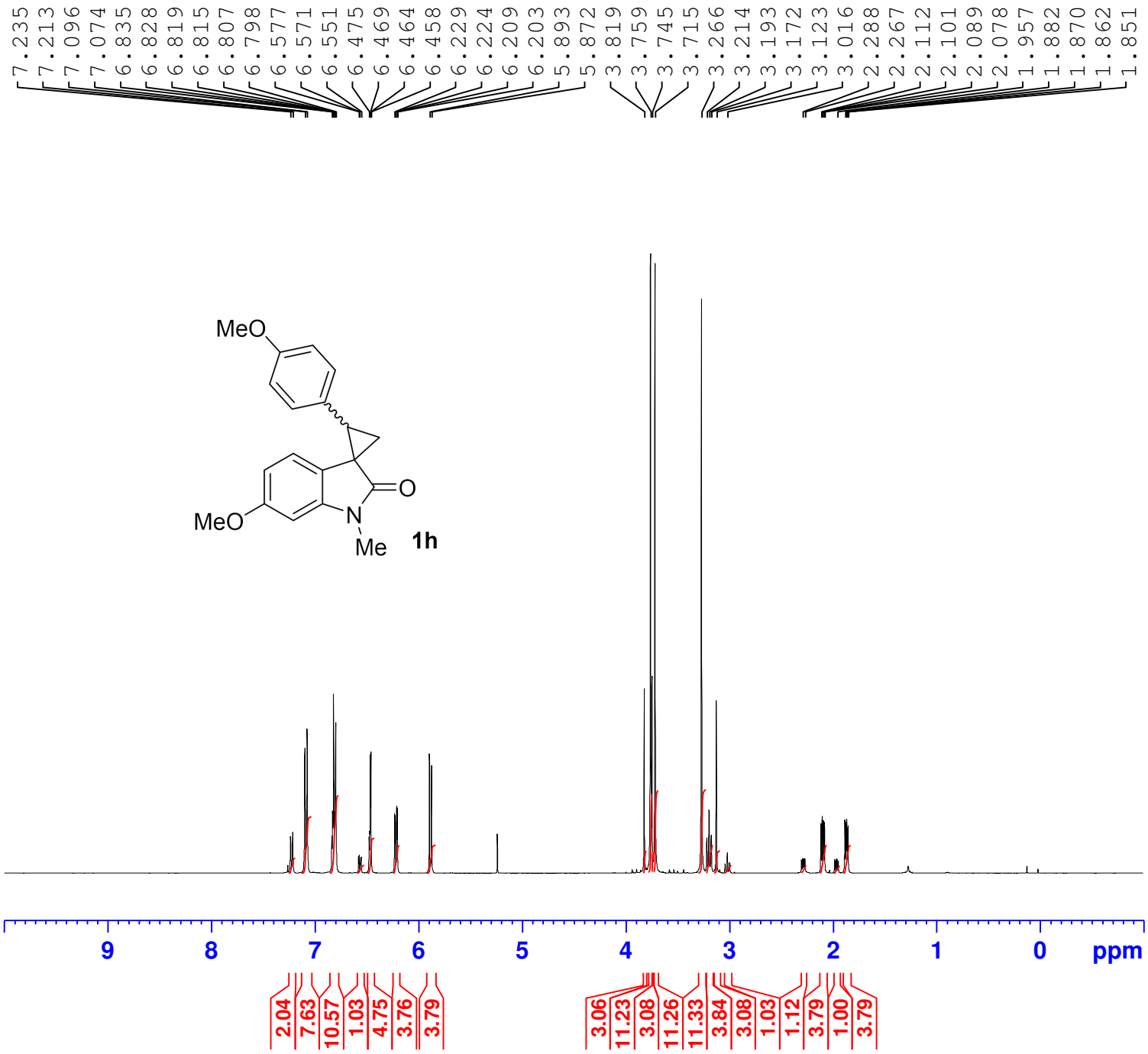


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TD                     65536
SOLVENT                CDCl3
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DE                      6.50 usec
TE                     294.5 K
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NUC1                      1H
P0                      3.33 usec
P1                     10.00 usec
PLW1             15.00000000 W

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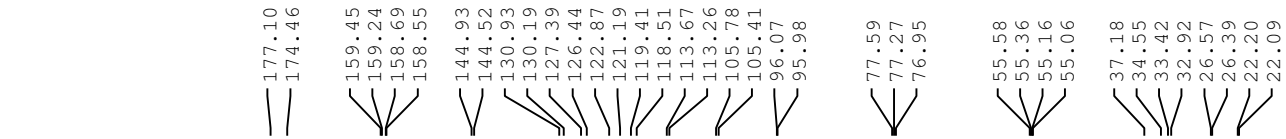

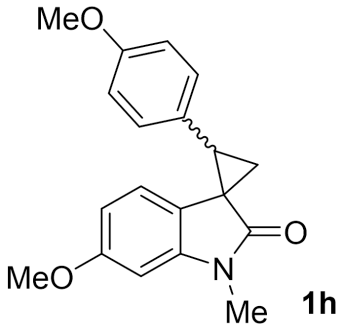

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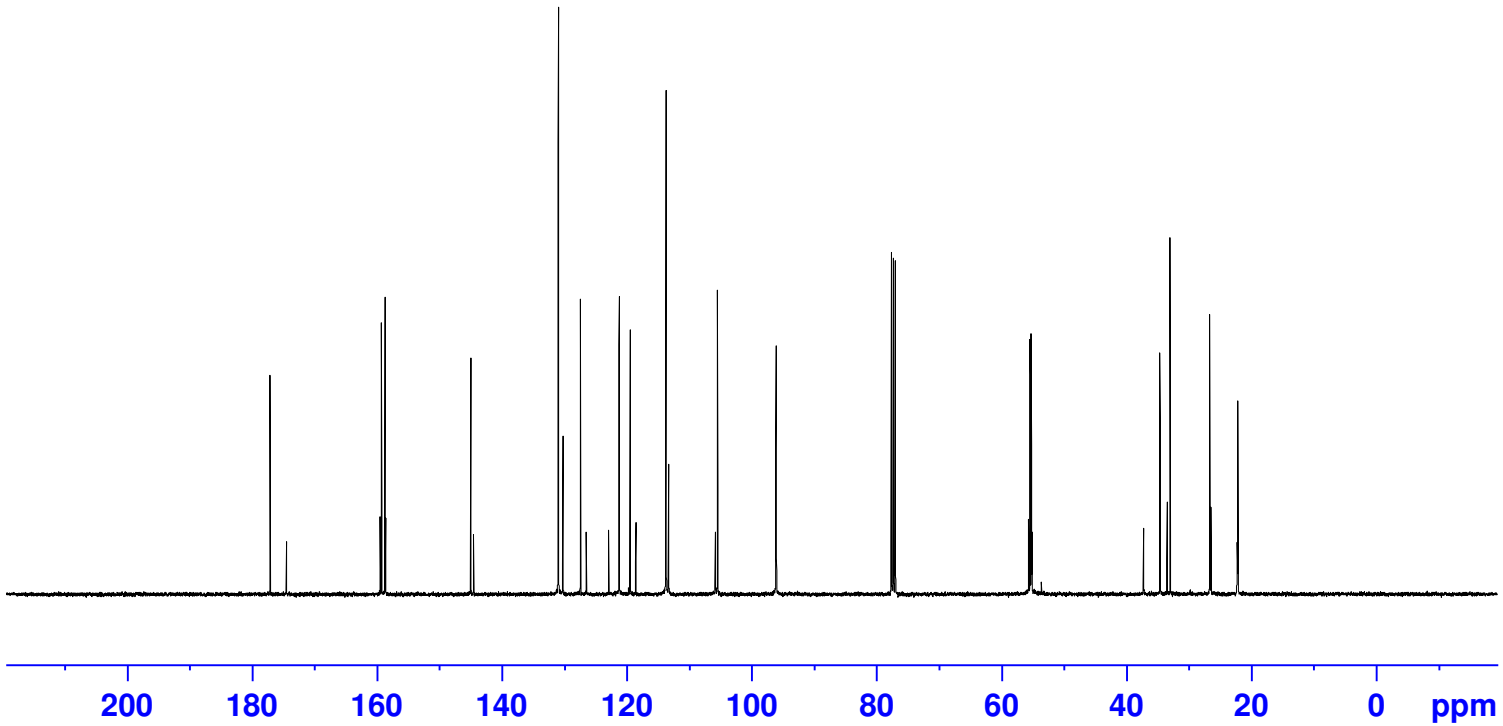


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TD                      65536
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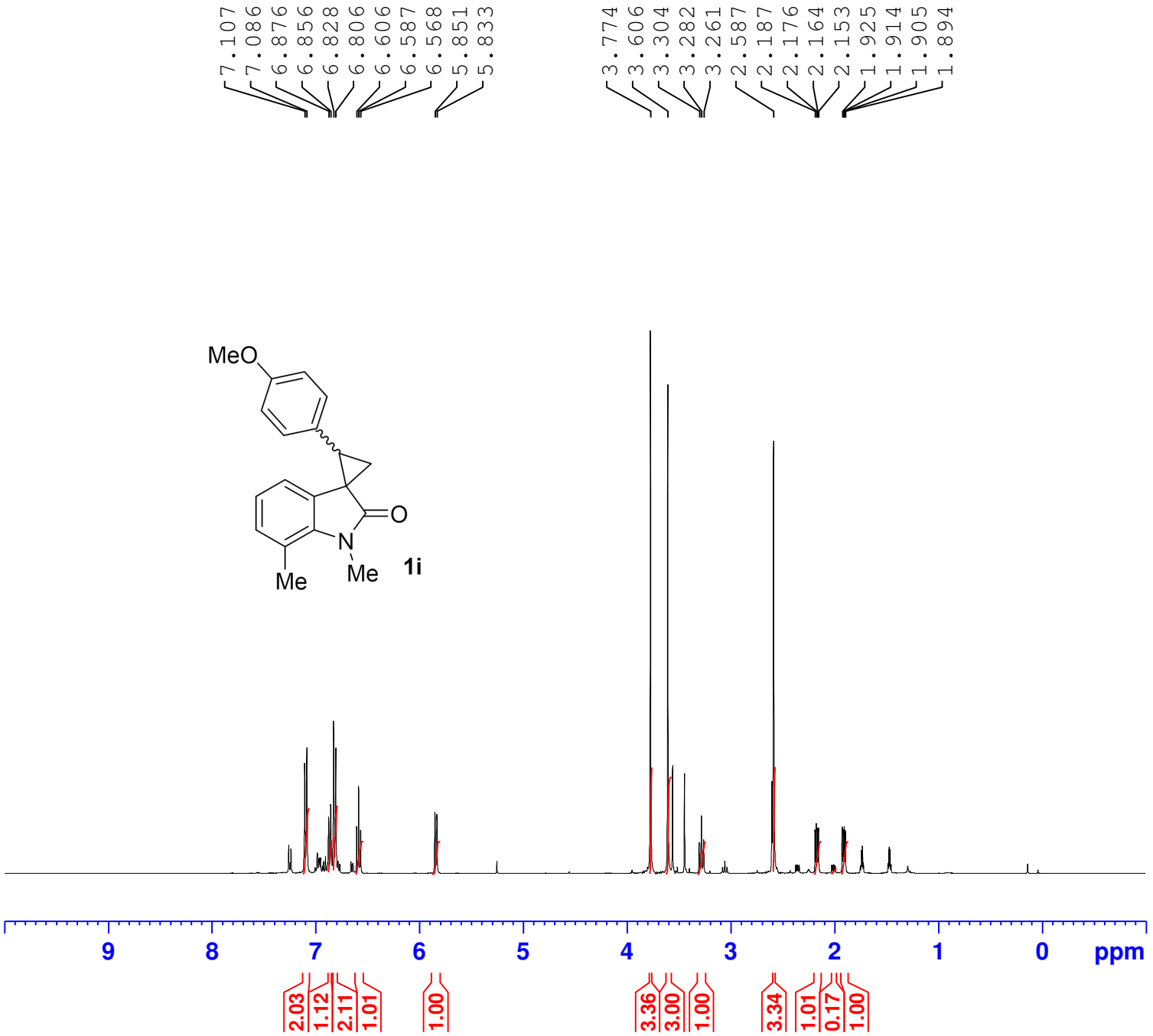
DS                          4
SWH                 24038.461 Hz
FIDRES               0.733596 Hz
AQ                   1.3631488 sec
RG                       2050
DW                     20.800 usec
DE                      6.50 usec
TE                     294.2 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                         1
SFO1               100.6328888 MHz
NUC1                       13C
P0                      3.33 usec
P1                     10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                       1H
CPDPRG[2              waltz65
PCPD2                  90.00 usec
PLW2               15.00000000 W
PLW12               0.18519001 W
PLW13               0.09314700 W

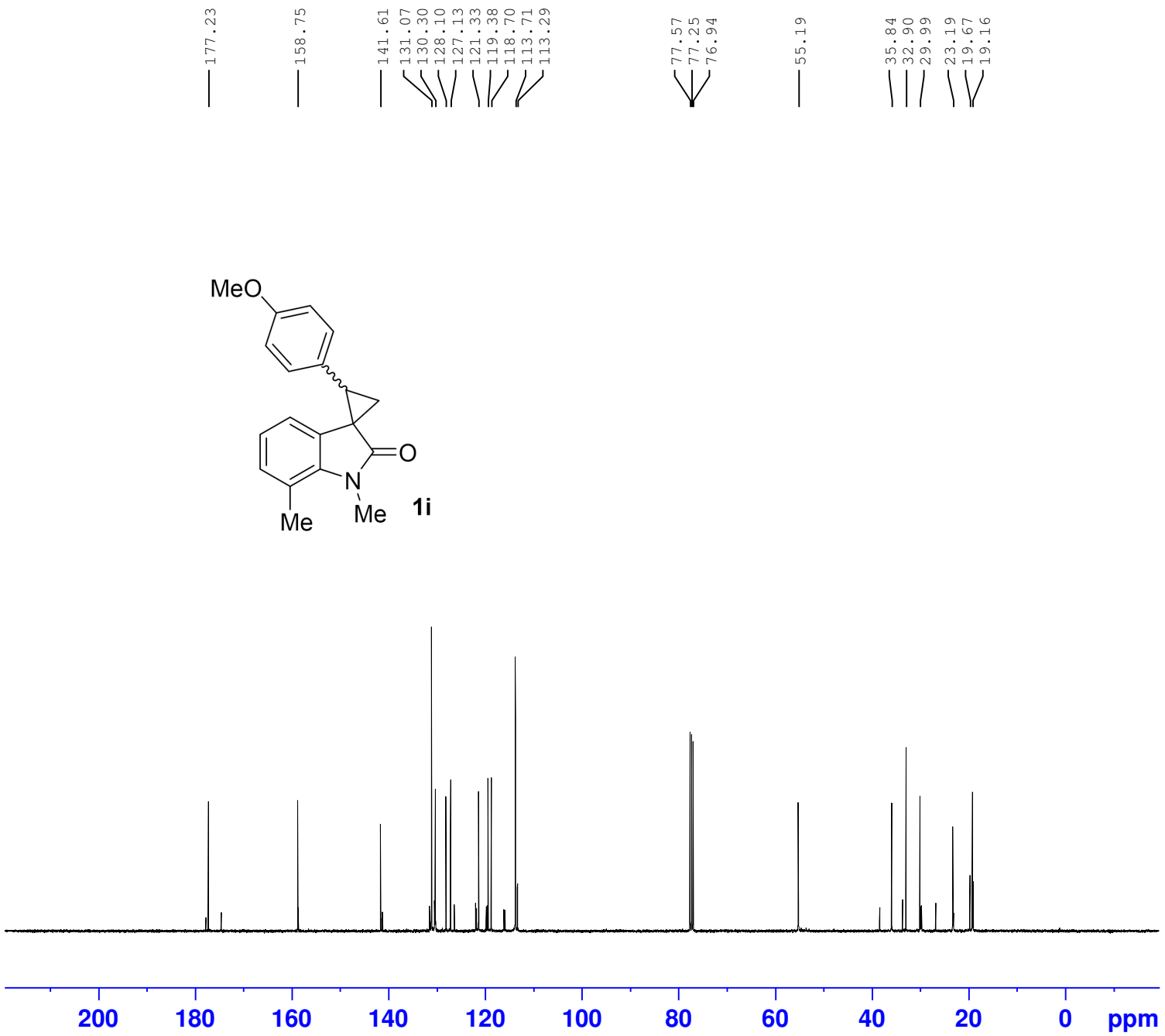
F2 - Processing parameters
SI                       32768
SF                 100.6228300 MHz
WDW                         EM
SSB                          0
LB                      1.00 Hz
GB                           0
PC                      1.40
```




```
Current Data Parameters
NAME                 cqh-162
EXPNO             2021030901
PROCNO                     1

F2 - Acquisition Parameters
Date_               20210310
Time                    6.36 h
INSTRUM                spect
PROBHD   Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                3.9845889 sec
RG                        32
DW                   60.800 usec
DE                    6.50 usec
TE                   294.5 K
D1                1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                    3.33 usec
P1                   10.00 usec
PLW1             15.00000000 W

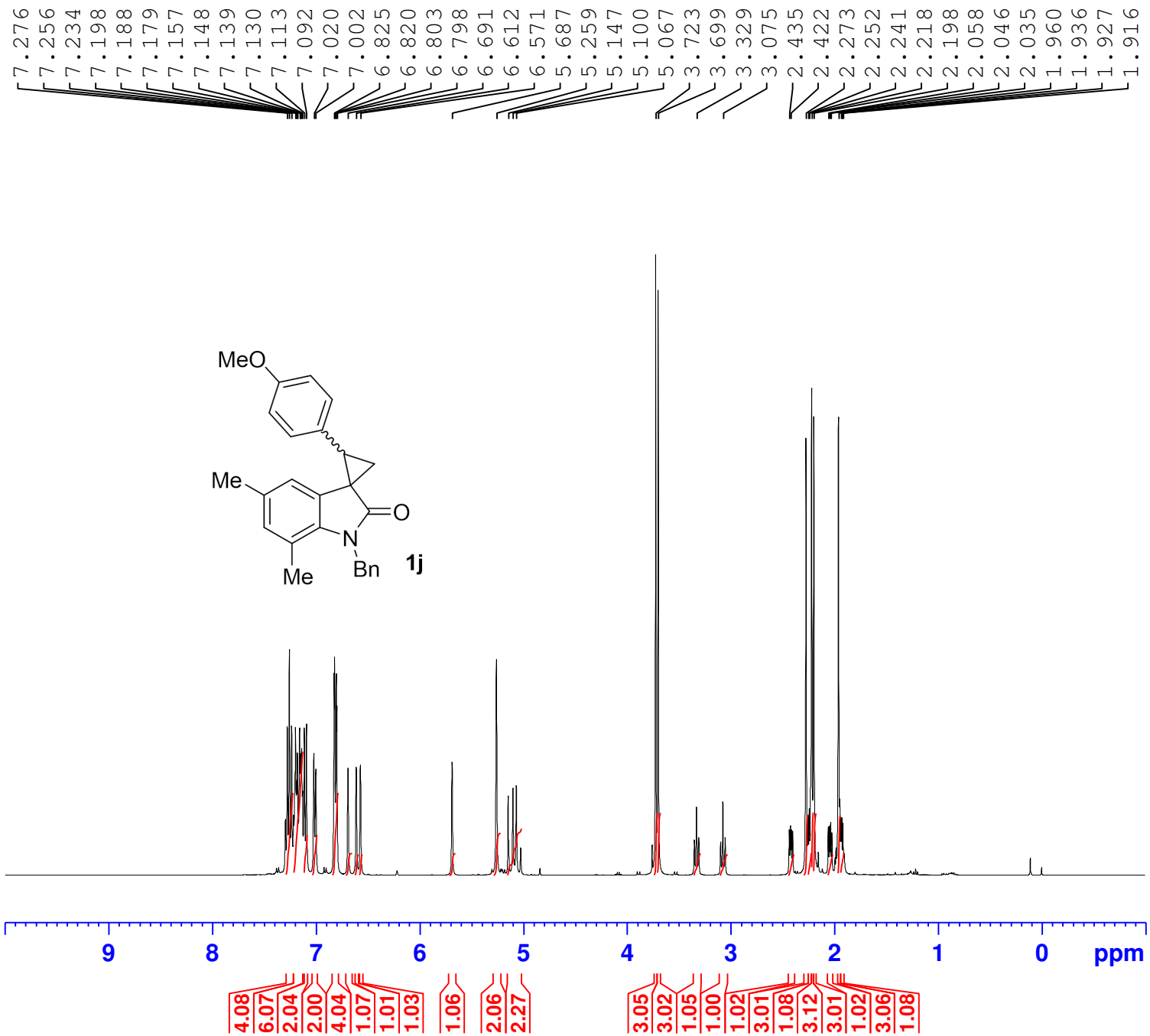
F2 - Processing parameters
SI                     32768
SF               400.1700072 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```




```
Current Data Parameters
NAME                  cqh-162
EXPNO              2021030902
PROCNO                      1

F2 - Acquisition Parameters
Date_               20210310
Time                   11.53 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      258
DS                        4
SWH               24038.461 Hz
FIDRES             0.733596 Hz
AQ                 1.3631488 sec
RG                     2050
DW                   20.800 usec
DE                    6.50 usec
TE                   294.7 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                        1
SFO1           100.6328888 MHz
NUC1                    13C
P0                    3.33 usec
P1                   10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                    1H
CPDPRG[2            waltz65
PCPD2                90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

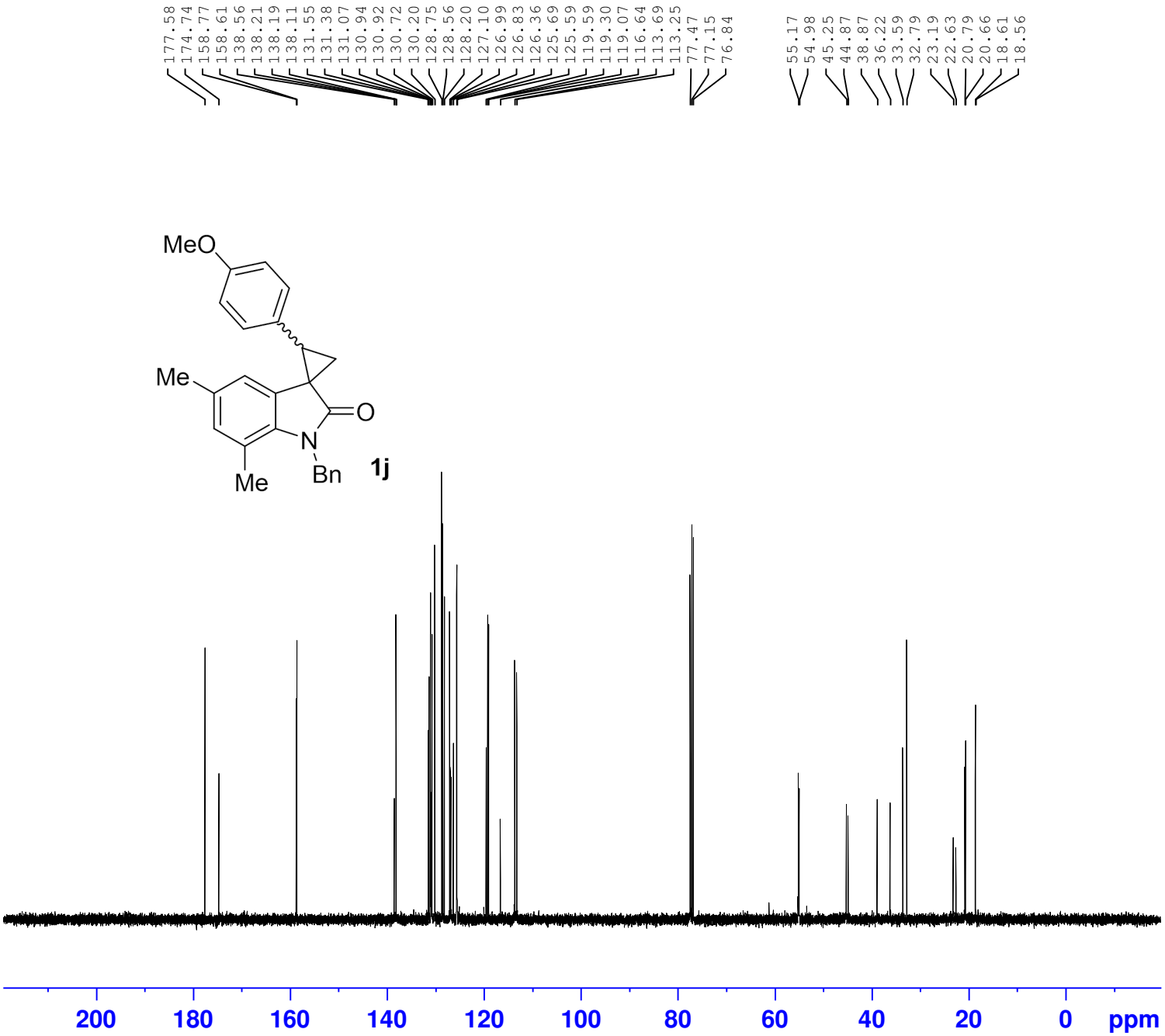
F2 - Processing parameters
SI                     32768
SF             100.6228300 MHz
WDW                       EM
SSB                        0
LB                    1.00 Hz
GB                         0
PC                    1.40
```




```
Current Data Parameters
NAME                  cqh-247
EXPNO              2021062501
PROCNO                      1

F2 - Acquisition Parameters
Date_                20210626
Time                     5.10 h
INSTRUM                 spect
PROBHD    Z108618_0256 (
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                  8223.685 Hz
FIDRES               0.250967 Hz
AQ                   3.9845889 sec
RG                       28.5
DW                     60.800 usec
DE                      6.50 usec
TE                     298.4 K
D1                1.00000000 sec
TD0                         1
SFO1              400.1724712 MHz
NUC1                       1H
P0                      3.33 usec
P1                     10.00 usec
PLW1             15.00000000 W

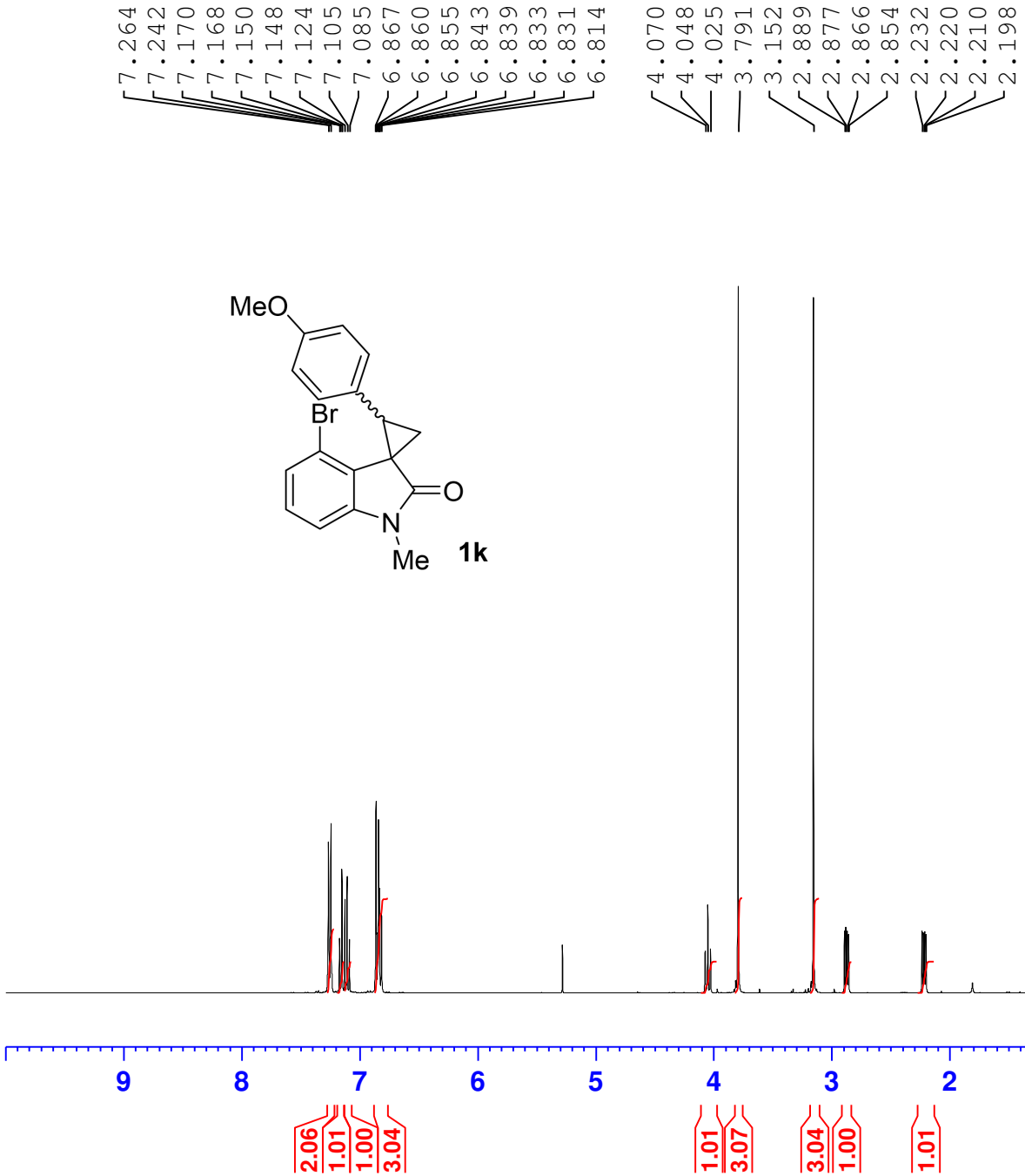
F2 - Processing parameters
SI                      32768
SF                400.1700524 MHz
WDW                        no
SSB                         0
LB                          0 Hz
GB                          0
PC                       1.00
```




```
Current Data Parameters
NAME                  cqh-247
EXPNO              2021062502
PROCNO                      1

F2 - Acquisition Parameters
Date_                20210626
Time                     5.57 h
INSTRUM                 spect
PROBHD    Z108618_0256 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         242
DS                           4
SWH                  24038.461 Hz
FIDRES                0.733596 Hz
AQ                    1.3631488 sec
RG                        2050
DW                      20.800 usec
DE                       6.50 usec
TE                       298.9 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                          1
SFO1               100.6328888 MHz
NUC1                        13C
P0                       3.33 usec
P1                      10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                        1H
CPDPRG[2              waltz65
PCPD2                   90.00 usec
PLW2               15.00000000 W
PLW12               0.18519001 W
PLW13               0.09314700 W

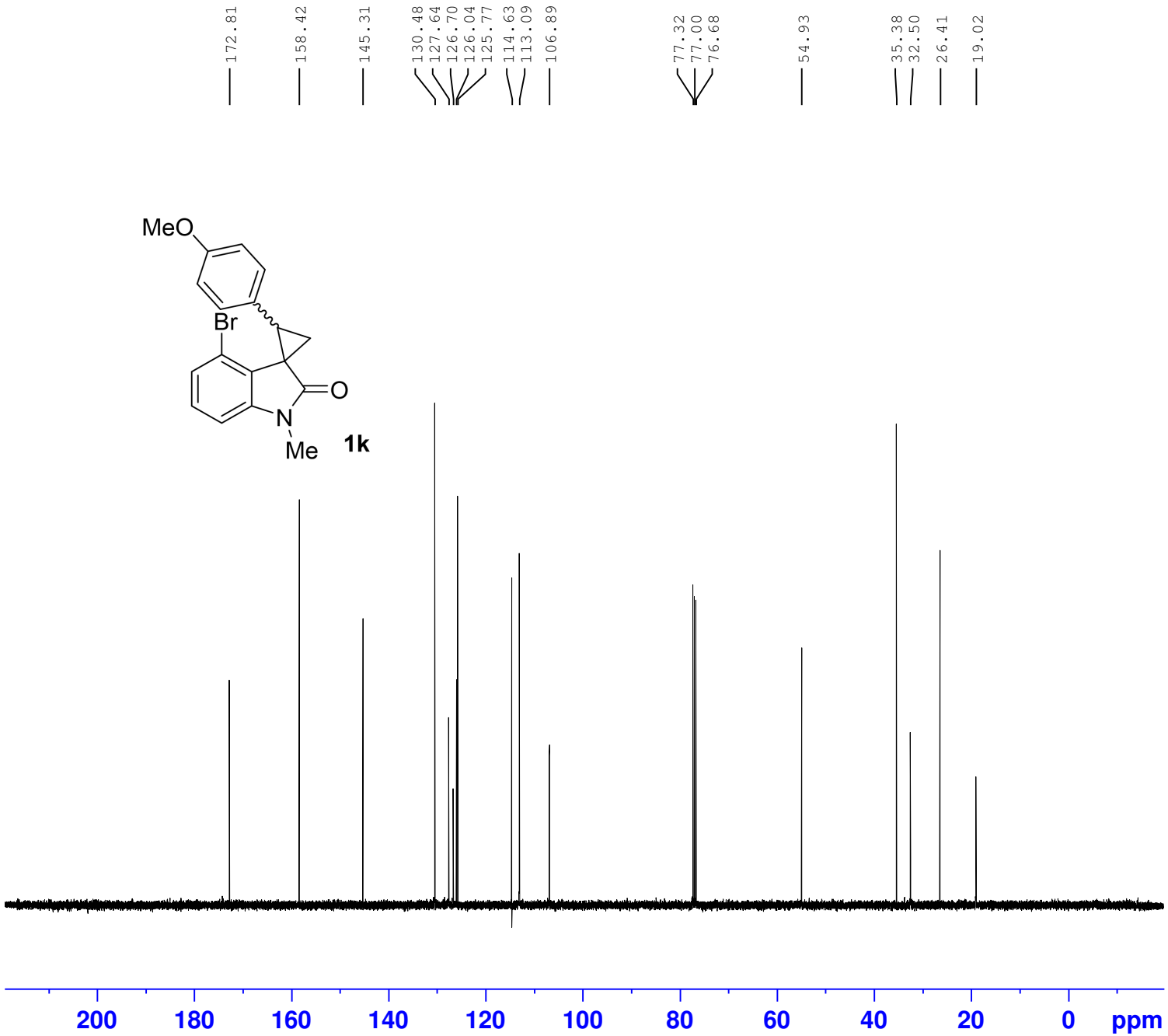
F2 - Processing parameters
SI                       32768
SF                 100.6228447 MHz
WDW                         no
SSB                          0
LB                           0 Hz
GB                           0
PC                        1.40
```




```
Current Data Parameters
NAME                  cqh-127-2
EXPNO              2020110801
PROCNO                      1

F2 - Acquisition Parameters
Date_                20201209
Time                     4.59 h
INSTRUM                  spect
PROBHD       Z108618_0256 (
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                   8223.685 Hz
FIDRES                0.250967 Hz
AQ                    3.9845889 sec
RG                         45.2
DW                       60.800 usec
DE                        6.50 usec
TE                       293.6 K
D1                  1.00000000 sec
TD0                         1
SFO1               400.1724712 MHz
NUC1                       1H
P0                        3.33 usec
P1                       10.00 usec
PLW1               15.00000000 W

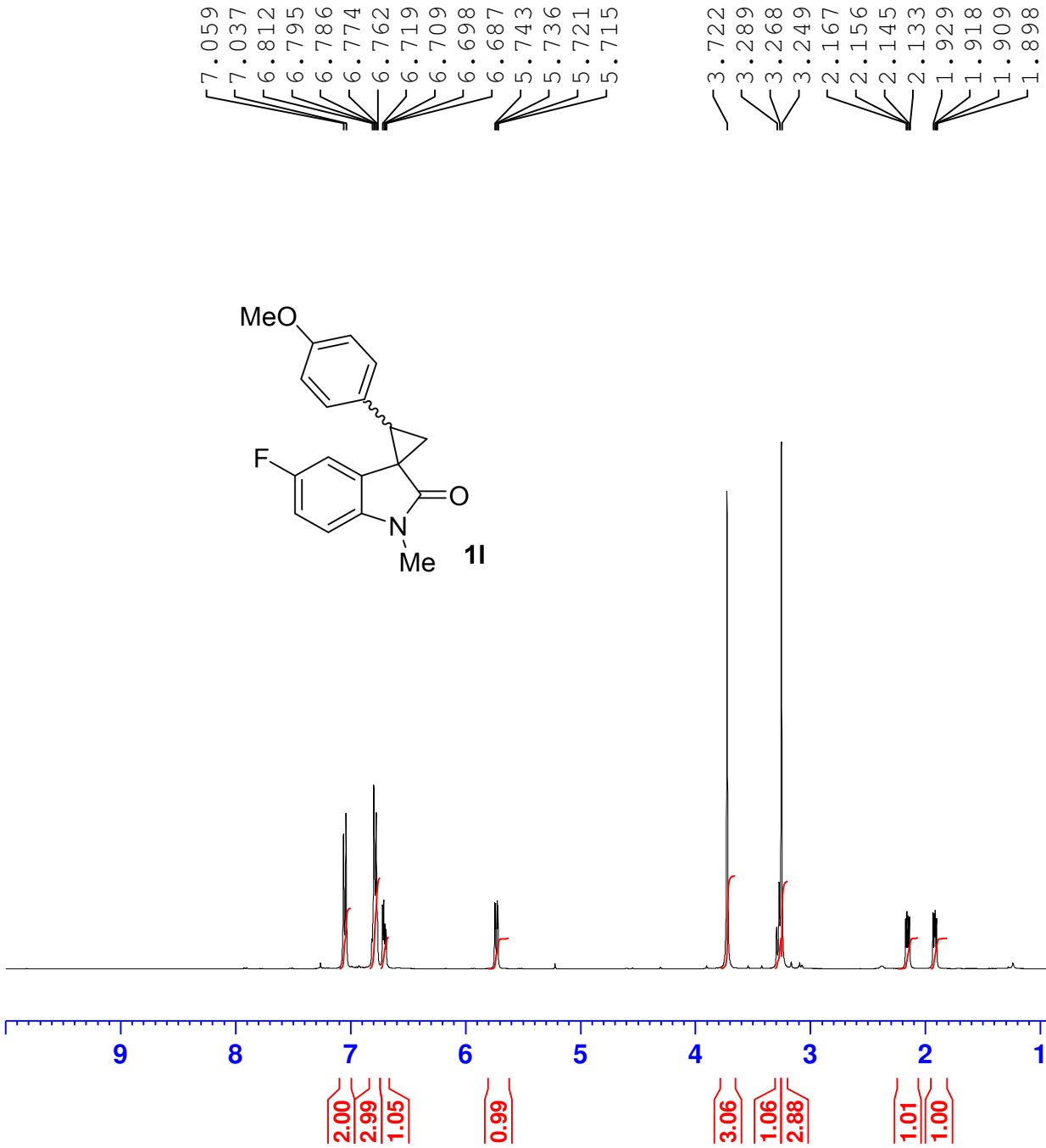
F2 - Processing parameters
SI                      32768
SF                 400.1700072 MHz
WDW                        no
SSB                         0
LB                          0 Hz
GB                          0
PC                       1.00
```




```
Current Data Parameters
NAME                  cqh-127-2
EXPNO              2020120802
PROCNO                      1

F2 - Acquisition Parameters
Date_                20201209
Time                     6.49 h
INSTRUM                  spect
PROBHD   Z108618_0256 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         160
DS                           4
SWH                  24038.461 Hz
FIDRES                0.733596 Hz
AQ                    1.3631488 sec
RG                        2050
DW                      20.800 usec
DE                       6.50 usec
TE                      293.1 K
D1                   2.00000000 sec
D11                  0.03000000 sec
TD0                          1
SFO1               100.6328888 MHz
NUC1                       13C
P0                       3.33 usec
P1                      10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                       1H
CPDPRG[2                waltz65
PCPD2                   90.00 usec
PLW2               15.00000000 W
PLW12               0.18519001 W
PLW13               0.09314700 W

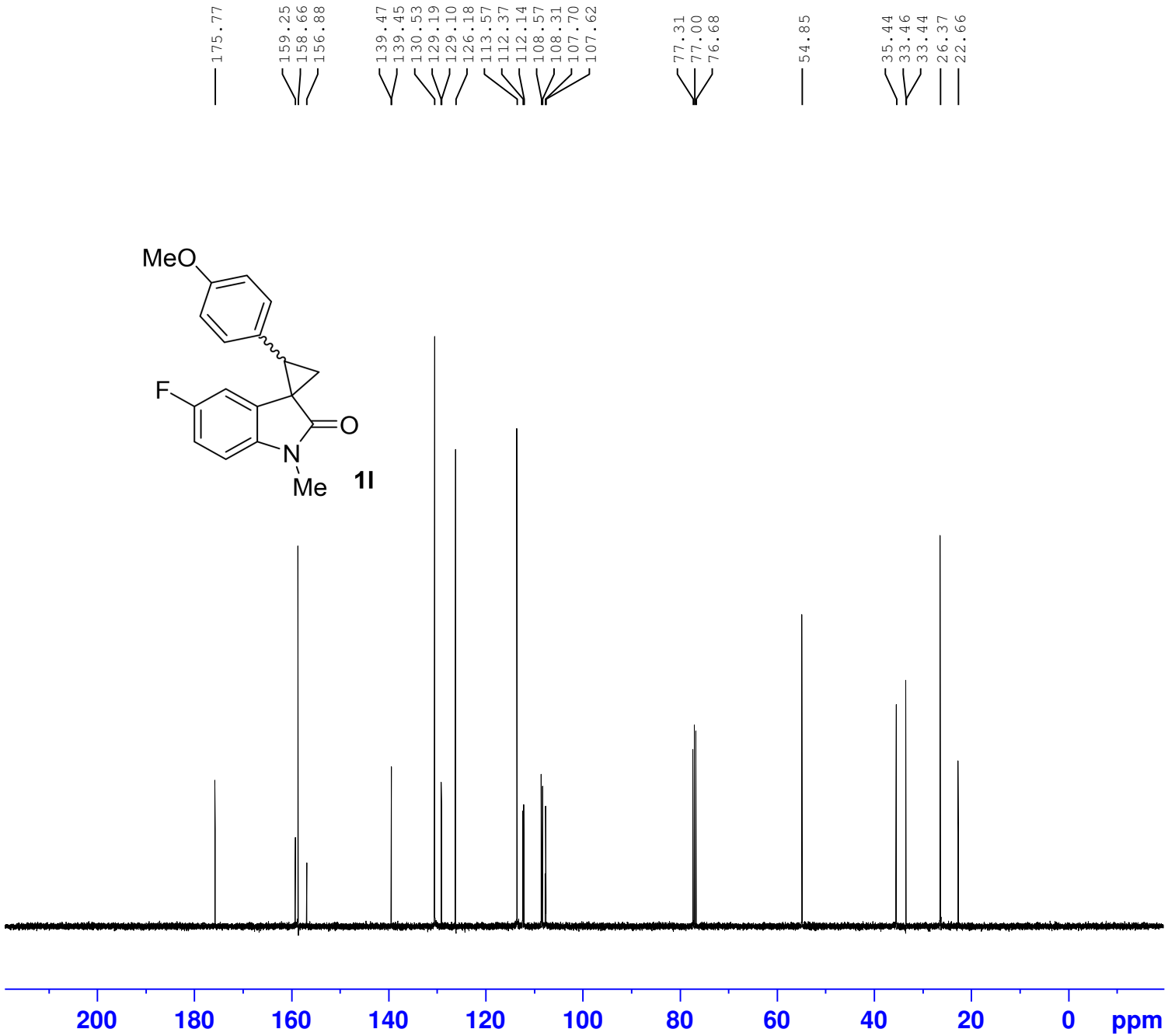
F2 - Processing parameters
SI                       32768
SF                 100.6228491 MHz
WDW                         no
SSB                          0
LB                           0 Hz
GB                           0
PC                        1.40
```




```
Current Data Parameters
NAME           cqh-128-1
EXPNO         2020110801
PROCNO                 1

F2 - Acquisition Parameters
Date_           20201209
Time                5.03 h
INSTRUM            spect
PROBHD   Z108618_0256 (
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              3.9845889 sec
RG                  28.5
DW                 60.800 usec
DE                  6.50 usec
TE                 293.7 K
D1            1.00000000 sec
TD0                    1
SFO1          400.1724712 MHz
NUC1                  1H
P0                  3.33 usec
P1                 10.00 usec
PLW1         15.00000000 W

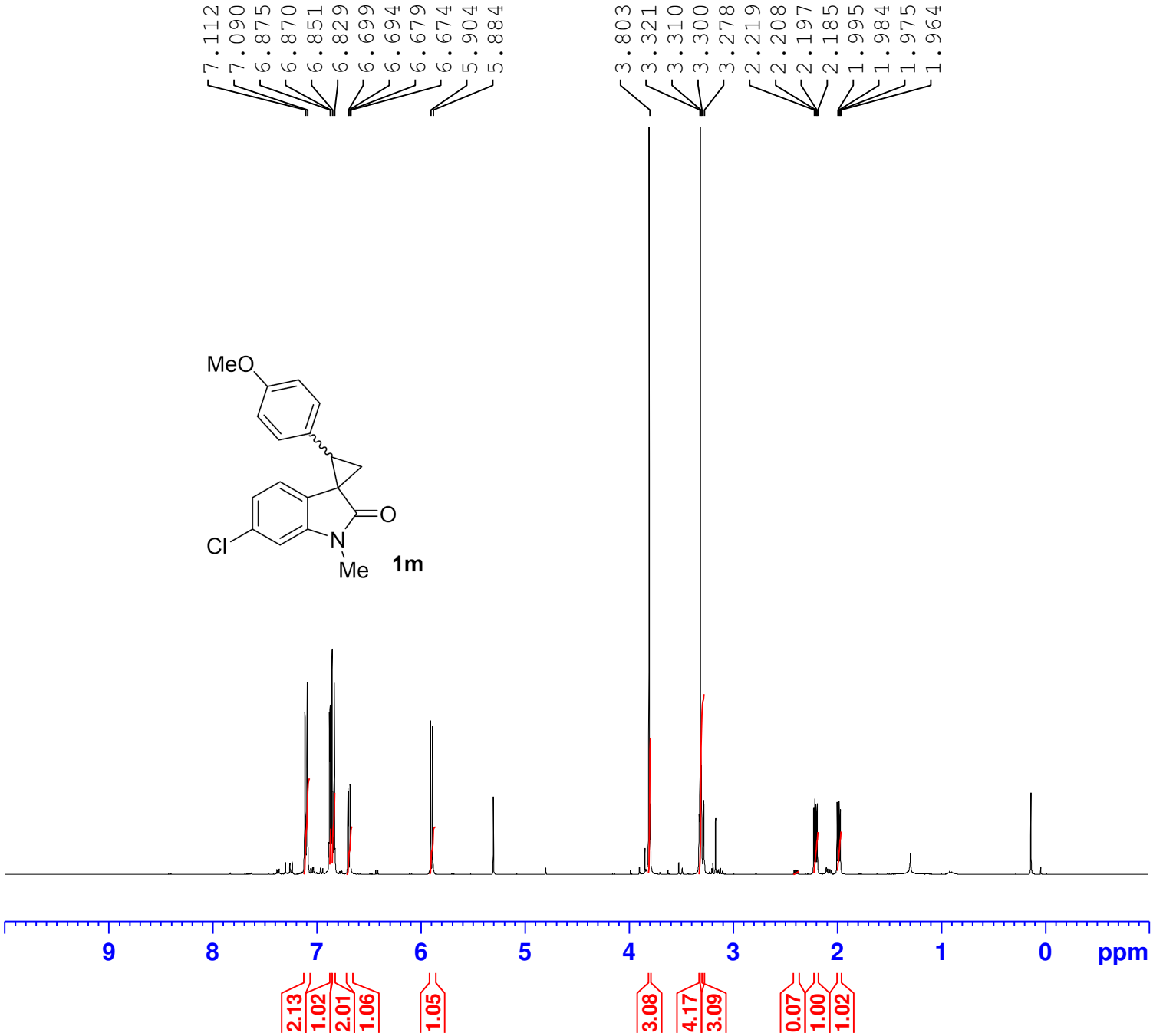
F2 - Processing parameters
SI                 32768
SF            400.1700057 MHz
WDW                   no
SSB                    0
LB                     0 Hz
GB                     0
PC                  1.00
```




```
Current Data Parameters
NAME          cqh-128-1
EXPNO        2020120802
PROCNO                1

F2 - Acquisition Parameters
Date_          20201209
Time               7.01 h
INSTRUM           spect
PROBHD   Z108618_0256 (
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  156
DS                    4
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             1.3631488 sec
RG                 2050
DW               20.800 usec
DE                6.50 usec
TE               293.2 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1
SFO1        100.6328888 MHz
NUC1               13C
P0                3.33 usec
P1               10.00 usec
PLW1         50.00000000 W
SFO2        400.1716007 MHz
NUC2               1H
CPDPRG[2        waltz65
PCPD2            90.00 usec
PLW2         15.00000000 W
PLW12         0.18519001 W
PLW13         0.09314700 W

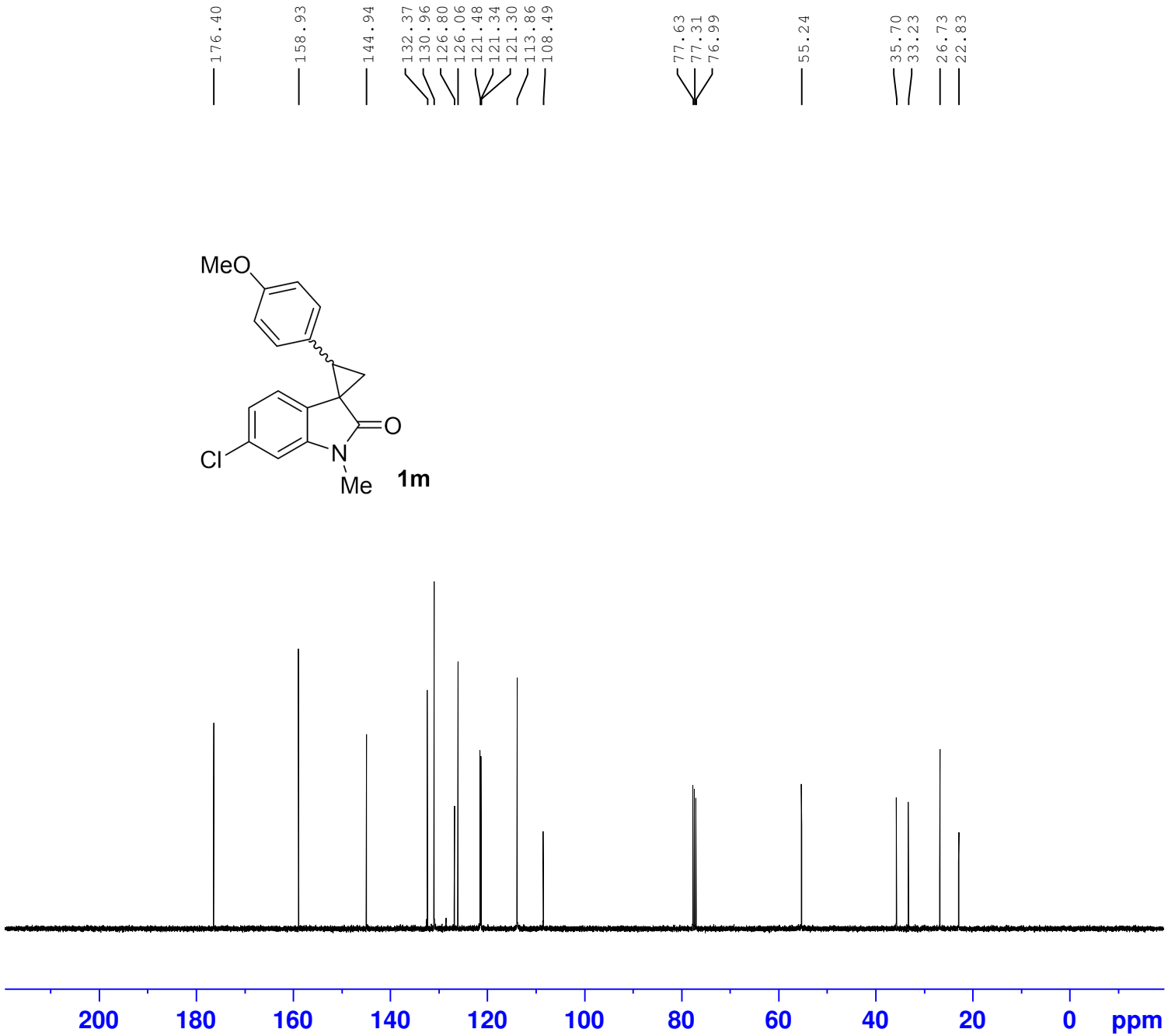
F2 - Processing parameters
SI                32768
SF          100.6228572 MHz
WDW                  no
SSB                   0
LB                    0 Hz
GB                    0
PC                 1.40
```




```
Current Data Parameters
NAME                  cqh-138-2
EXPNO              2020122301
PROCNO                      1

F2 - Acquisition Parameters
Date_                20201224
Time                     8.50 h
INSTRUM                  spect
PROBHD    Z108618_0256 (
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                  8223.685 Hz
FIDRES               0.250967 Hz
AQ                   3.9845889 sec
RG                        50.8
DW                      60.800 usec
DE                       6.50 usec
TE                      294.0 K
D1                   1.00000000 sec
TD0                         1
SFO1               400.1724712 MHz
NUC1                        1H
P0                       3.33 usec
P1                      10.00 usec
PLW1              15.00000000 W

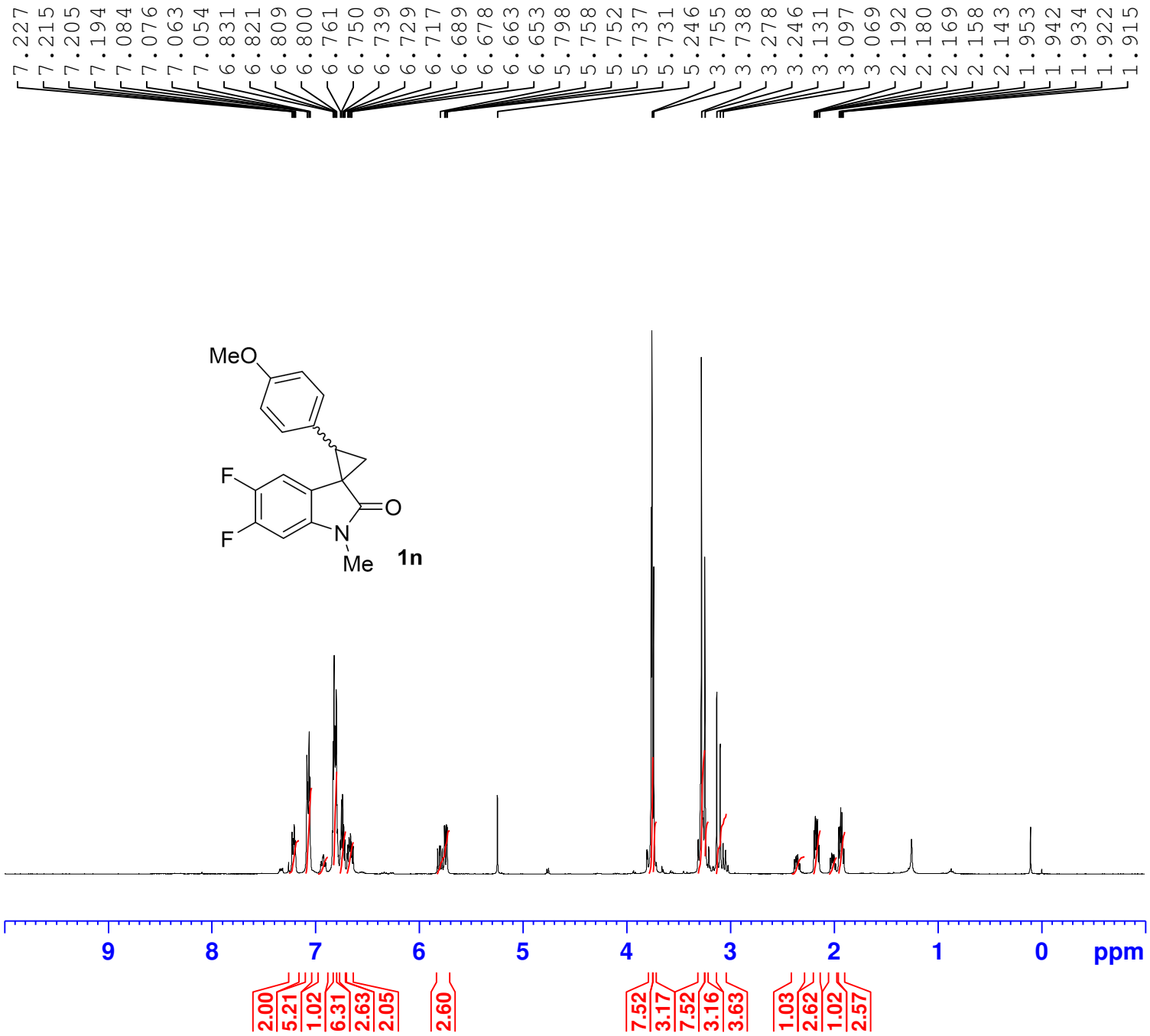
F2 - Processing parameters
SI                      32768
SF                 400.1699927 MHz
WDW                        no
SSB                         0
LB                          0 Hz
GB                          0
PC                       1.00
```




```
Current Data Parameters
NAME                  cqh-138
EXPNO              2020121602
PROCNO                      1

F2 - Acquisition Parameters
Date_                20201217
Time                     9.38 h
INSTRUM                 spect
PROBHD   Z108618_0256 (
PULPROG                zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                        150
DS                          4
SWH                 24038.461 Hz
FIDRES               0.733596 Hz
AQ                   1.3631488 sec
RG                       2050
DW                     20.800 usec
DE                      6.50 usec
TE                      294.1 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                         1
SFO1               100.6328888 MHz
NUC1                       13C
P0                      3.33 usec
P1                     10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                       1H
CPDPRG[2              waltz65
PCPD2                  90.00 usec
PLW2               15.00000000 W
PLW12               0.18519001 W
PLW13               0.09314700 W

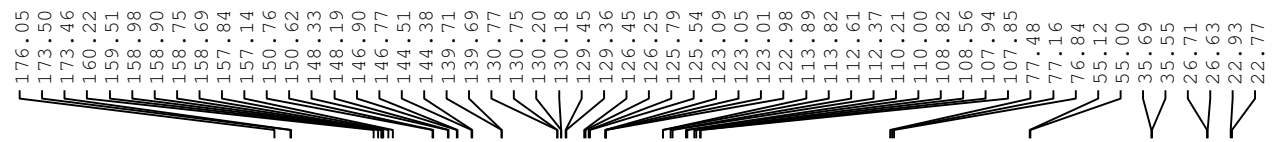
F2 - Processing parameters
SI                        32768
SF                 100.6228219 MHz
WDW                          no
SSB                           0
LB                            0 Hz
GB                            0
PC                         1.40
```

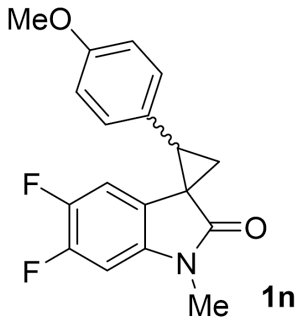



```
Current Data Parameters
NAME                  dhq-18
EXPNO           2020122301
PROCNO                   1

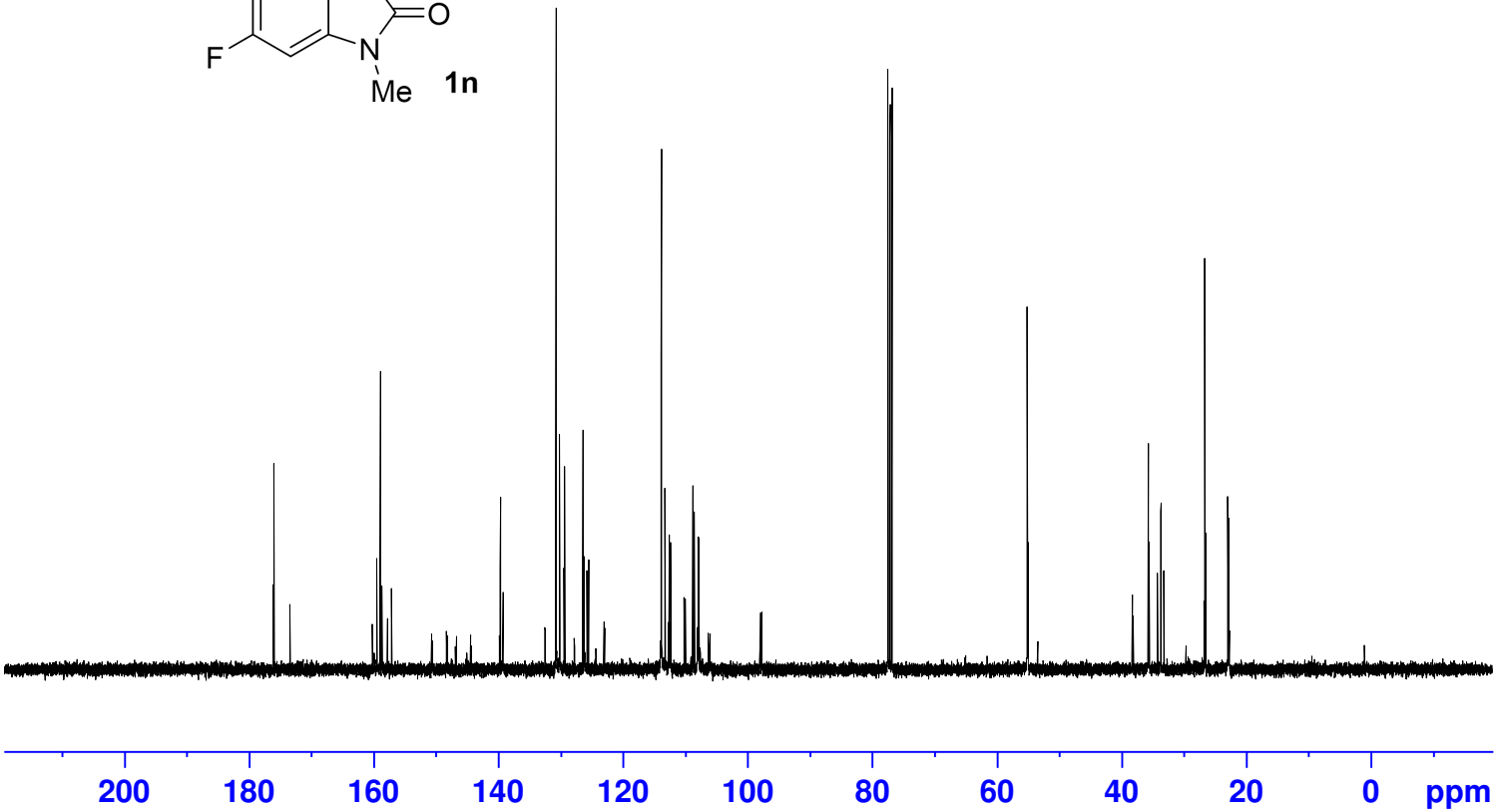
F2 - Acquisition Parameters
Date_              20201224
Time                   8.59 h
INSTRUM               spect
PROBHD    Z108618_0256 (
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8223.685 Hz
FIDRES            0.250967 Hz
AQ                3.9845889 sec
RG                       32
DW                  60.800 usec
DE                   6.50 usec
TE                   294.0 K
D1              1.00000000 sec
TD0                       1
SFO1           400.1724712 MHz
NUC1                    1H
P0                   3.33 usec
P1                  10.00 usec
PLW1           15.00000000 W

F2 - Processing parameters
SI                    32768
SF             400.1700072 MHz
WDW                      no
SSB                       0
LB                        0 Hz
GB                        0
PC                     1.00
```





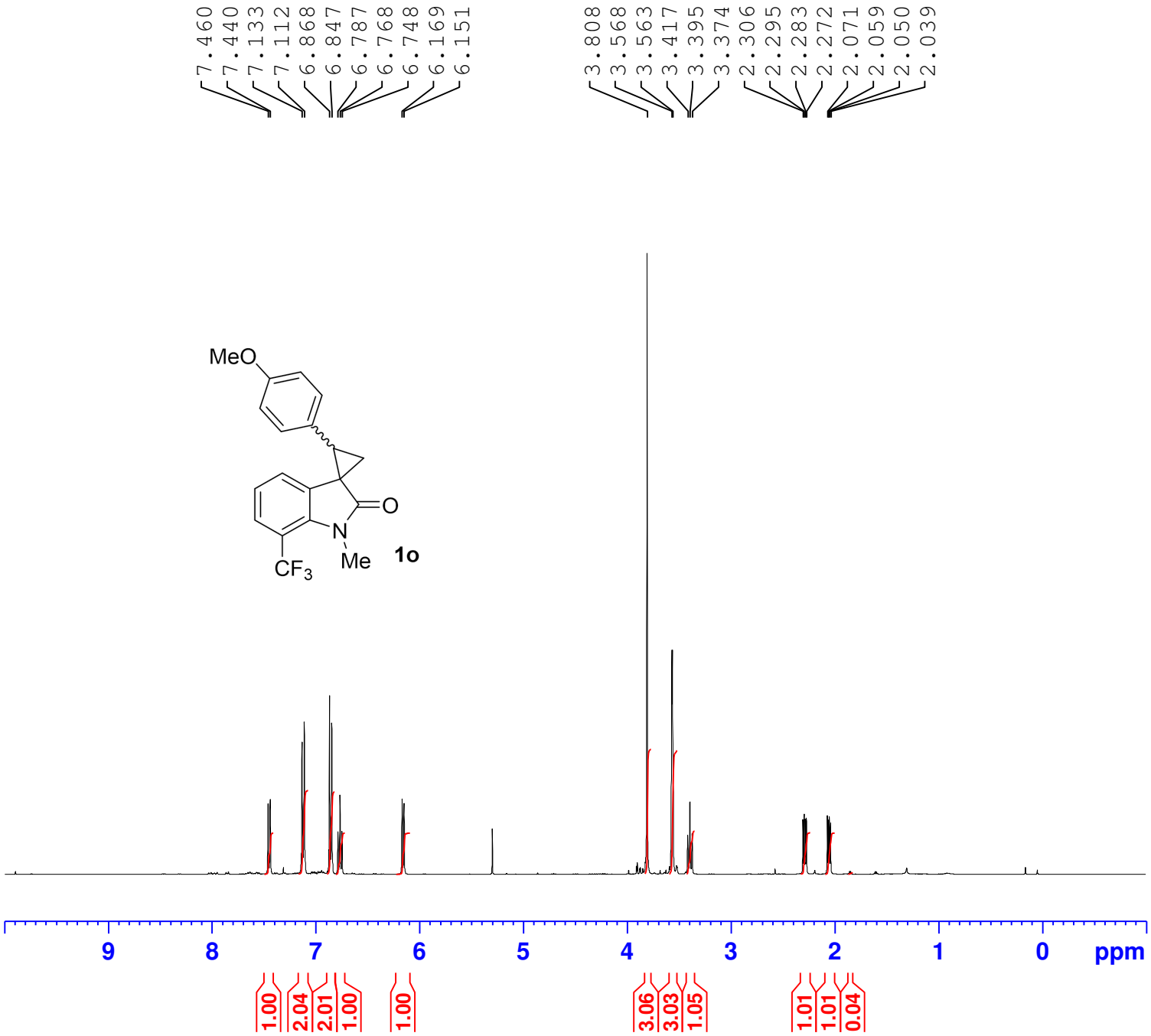
1n




```
Current Data Parameters
NAME                 dhq-18
EXPNO           2020122302
PROCNO                    1

F2 - Acquisition Parameters
Date_              20201224
Time                 11.10 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                     377
DS                       4
SWH              24038.461 Hz
FIDRES            0.733596 Hz
AQ                1.3631488 sec
RG                    2050
DW                  20.800 usec
DE                   6.50 usec
TE                  294.3 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                       1
SFO1           100.6328888 MHz
NUC1                    13C
P0                   3.33 usec
P1                  10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                    1H
CPDPRG[2           waltz65
PCPD2               90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

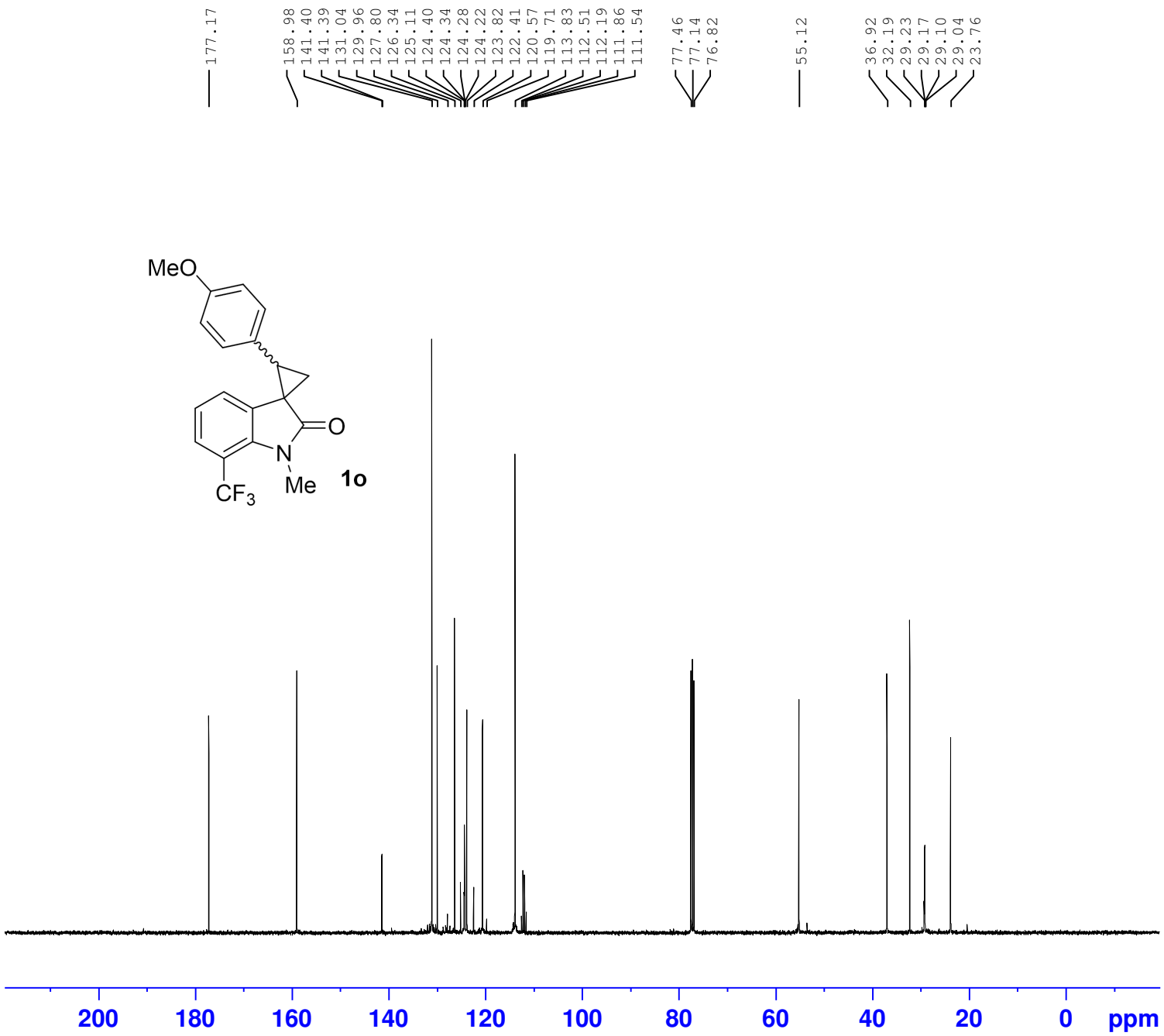
F2 - Processing parameters
SI                    32768
SF             100.6228345 MHz
WDW                      no
SSB                       0
LB                        0 Hz
GB                        0
PC                     1.40
```




```
Current Data Parameters
NAME                  cqh-139
EXPNO              2020121601
PROCNO                      1

F2 - Acquisition Parameters
Date_                20201217
Time                     6.13 h
INSTRUM                 spect
PROBHD    Z108618_0256 (
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                   8223.685 Hz
FIDRES                0.250967 Hz
AQ                    3.9845889 sec
RG                         50.8
DW                       60.800 usec
DE                        6.50 usec
TE                       293.7 K
D1                  1.00000000 sec
TD0                         1
SFO1               400.1724712 MHz
NUC1                       1H
P0                        3.33 usec
P1                       10.00 usec
PLW1               15.00000000 W

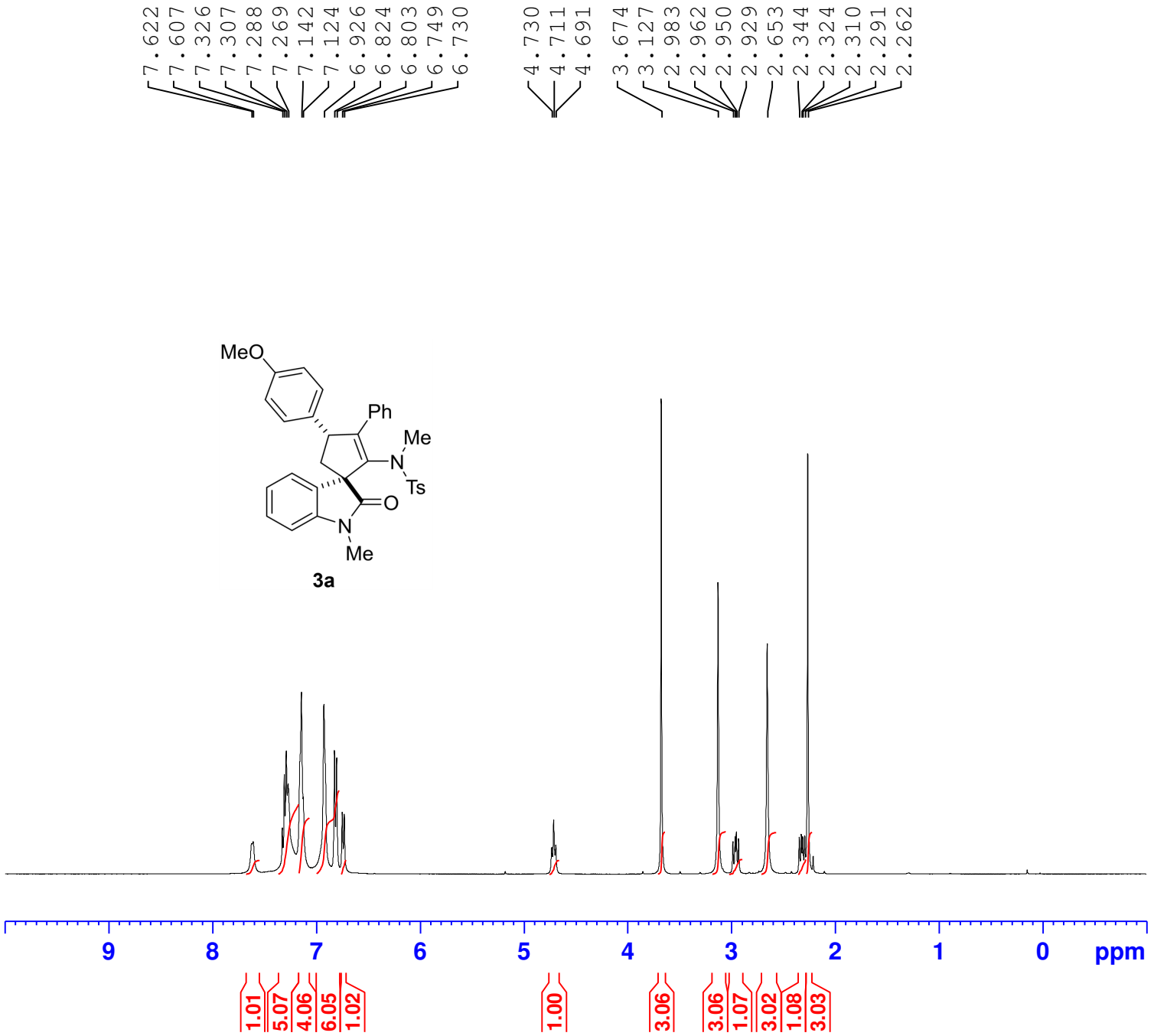
F2 - Processing parameters
SI                      32768
SF                 400.1699854 MHz
WDW                        no
SSB                         0
LB                          0 Hz
GB                          0
PC                       1.00
```




```
Current Data Parameters
NAME                  cqh-139
EXPNO              2020121602
PROCNO                      1

F2 - Acquisition Parameters
Date_                20201217
Time                     9.56 h
INSTRUM                 spect
PROBHD   Z108618_0256 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         274
DS                           4
SWH                  24038.461 Hz
FIDRES                0.733596 Hz
AQ                    1.3631488 sec
RG                        2050
DW                      20.800 usec
DE                       6.50 usec
TE                       294.1 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                          1
SFO1               100.6328888 MHz
NUC1                        13C
P0                       3.33 usec
P1                      10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                        1H
CPDPRG[2                waltz65
PCPD2                    90.00 usec
PLW2               15.00000000 W
PLW12               0.18519001 W
PLW13               0.09314700 W

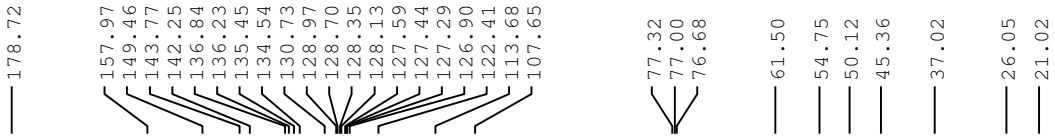
F2 - Processing parameters
SI                       32768
SF                 100.6228300 MHz
WDW                         EM
SSB                          0
LB                        1.00 Hz
GB                           0
PC                        1.40
```

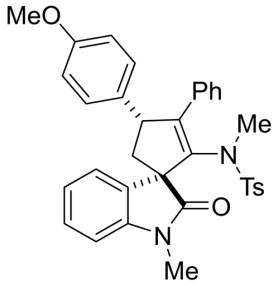



```
Current Data Parameters
NAME                  cqh-313
EXPNO              2021091601
PROCNO                      1

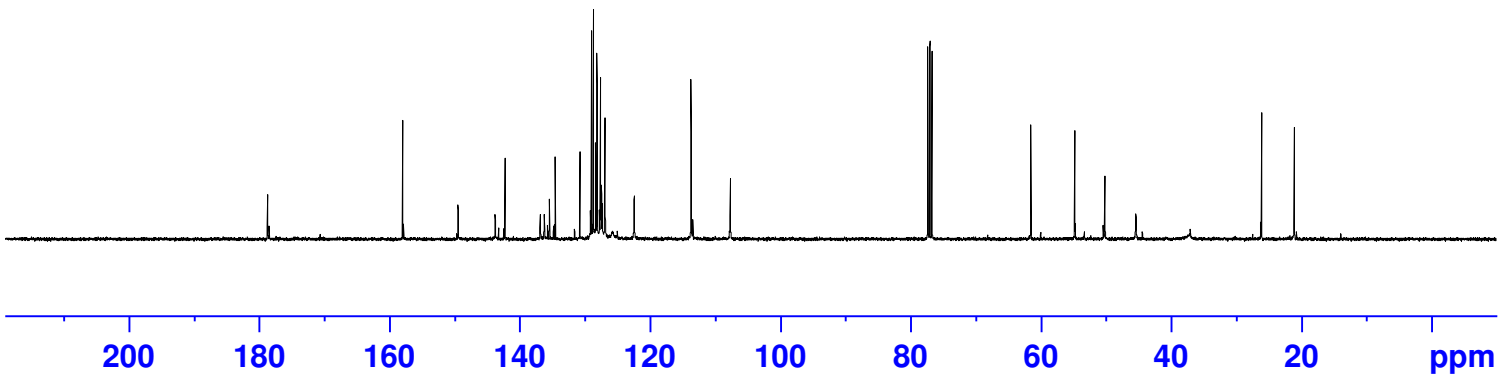
F2 - Acquisition Parameters
Date_              20210916
Time                    3.34 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                        18
DW                     60.800 usec
DE                      6.50 usec
TE                     296.4 K
D1                  1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                      3.33 usec
P1                     10.00 usec
PLW1             15.00000000 W

F2 - Processing parameters
SI                     32768
SF               400.1700072 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```





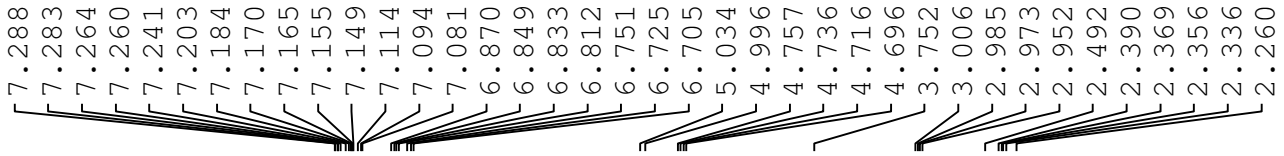
3a

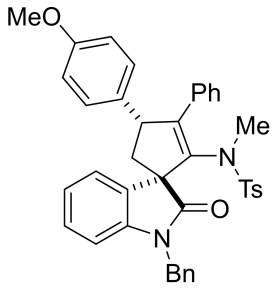



```
Current Data Parameters
NAME                  zy-2-2
EXPNO             2020102202
PROCNO                     1

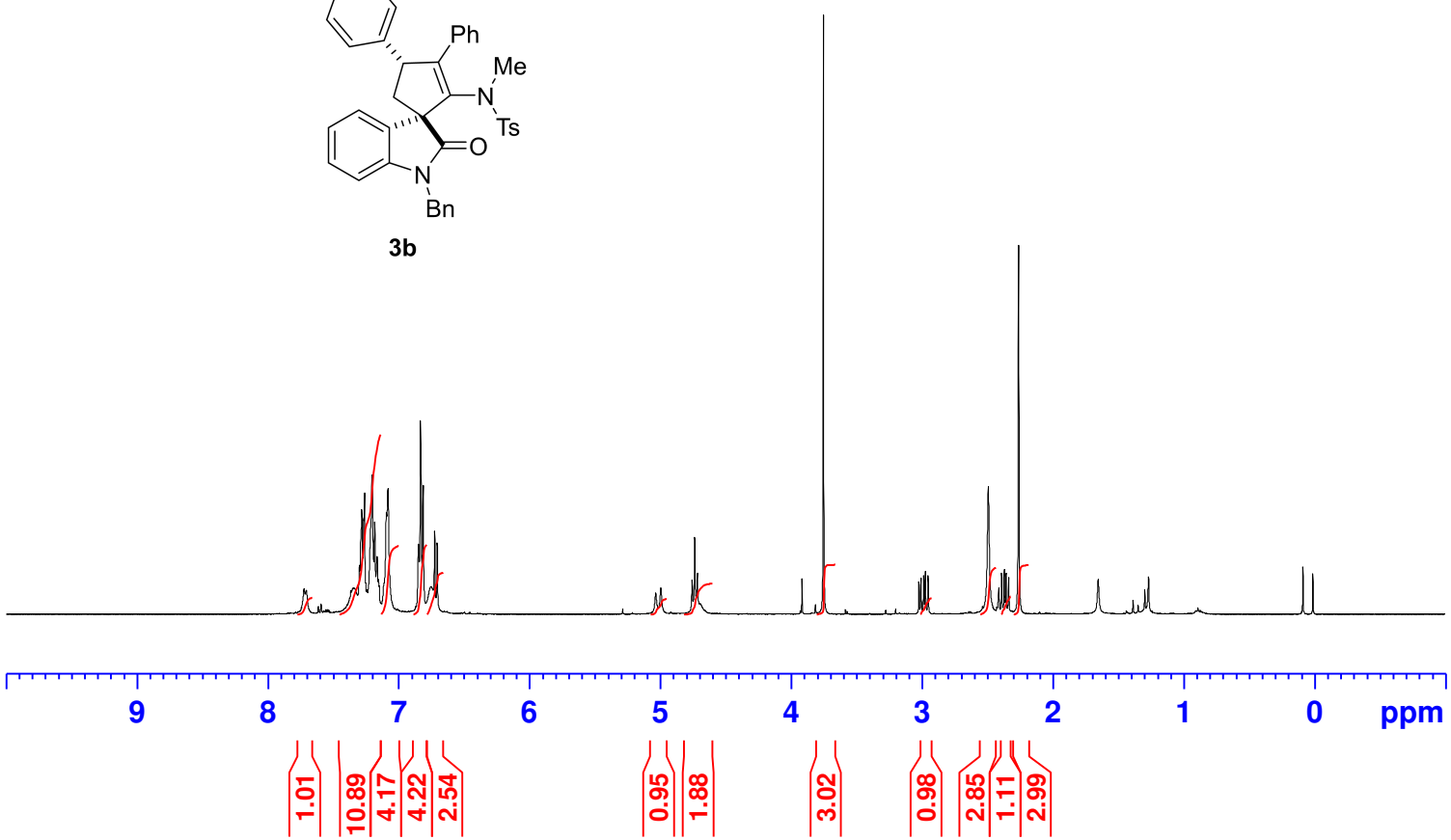
F2 - Acquisition Parameters
Date_               20201023
Time                  12.39 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      240
DS                        4
SWH               24038.461 Hz
FIDRES             0.733596 Hz
AQ                1.3631488 sec
RG                     2050
DW                   20.800 usec
DE                    6.50 usec
TE                   298.5 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                       1
SFO1           100.6328888 MHz
NUC1                    13C
P0                    3.33 usec
P1                   10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                    1H
CPDPRG[2           waltz65
PCPD2                90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

F2 - Processing parameters
SI                    32768
SF             100.6228660 MHz
WDW                      EM
SSB                       0
LB                    1.00 Hz
GB                        0
PC                    1.40
```





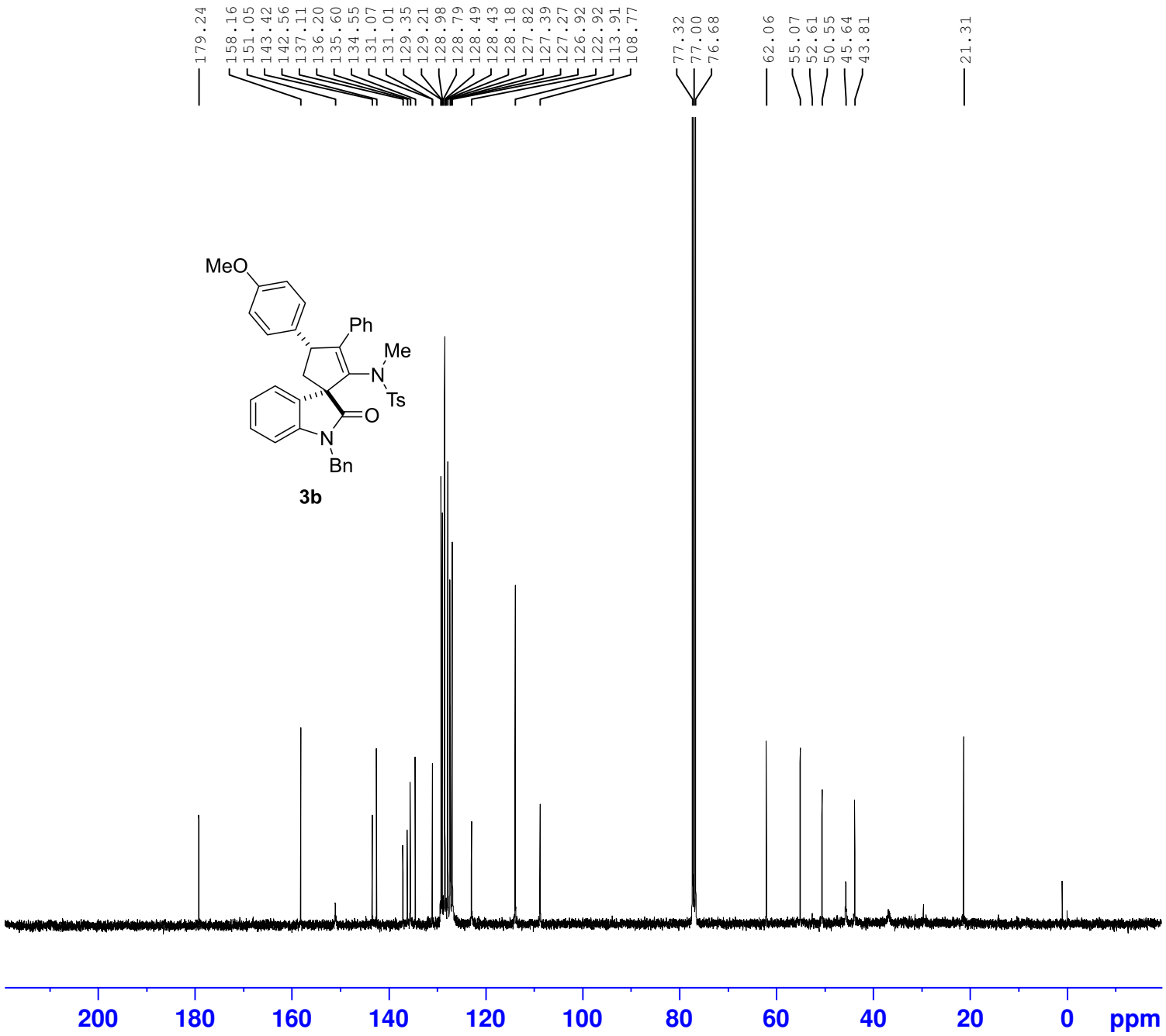
3b




```
Current Data Parameters
NAME                  cqh-103
EXPNO              2020111701
PROCNO                      1

F2 - Acquisition Parameters
Date_               20201118
Time                    5.44 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                       144
DW                    60.800 usec
DE                     6.50 usec
TE                    296.4 K
D1                 1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1            15.00000000 W

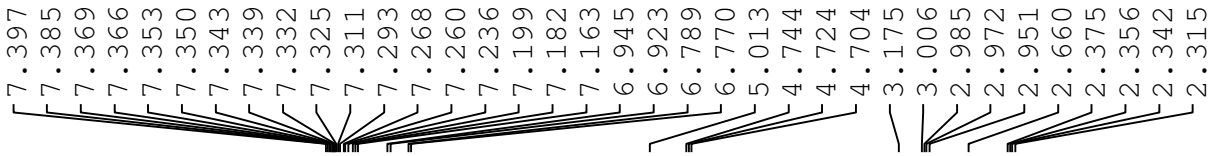
F2 - Processing parameters
SI                     32768
SF               400.1700088 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```

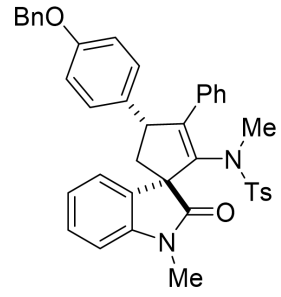



```
Current Data Parameters
NAME                  cqh-103-2
EXPNO              2021101902
PROCNO                      1

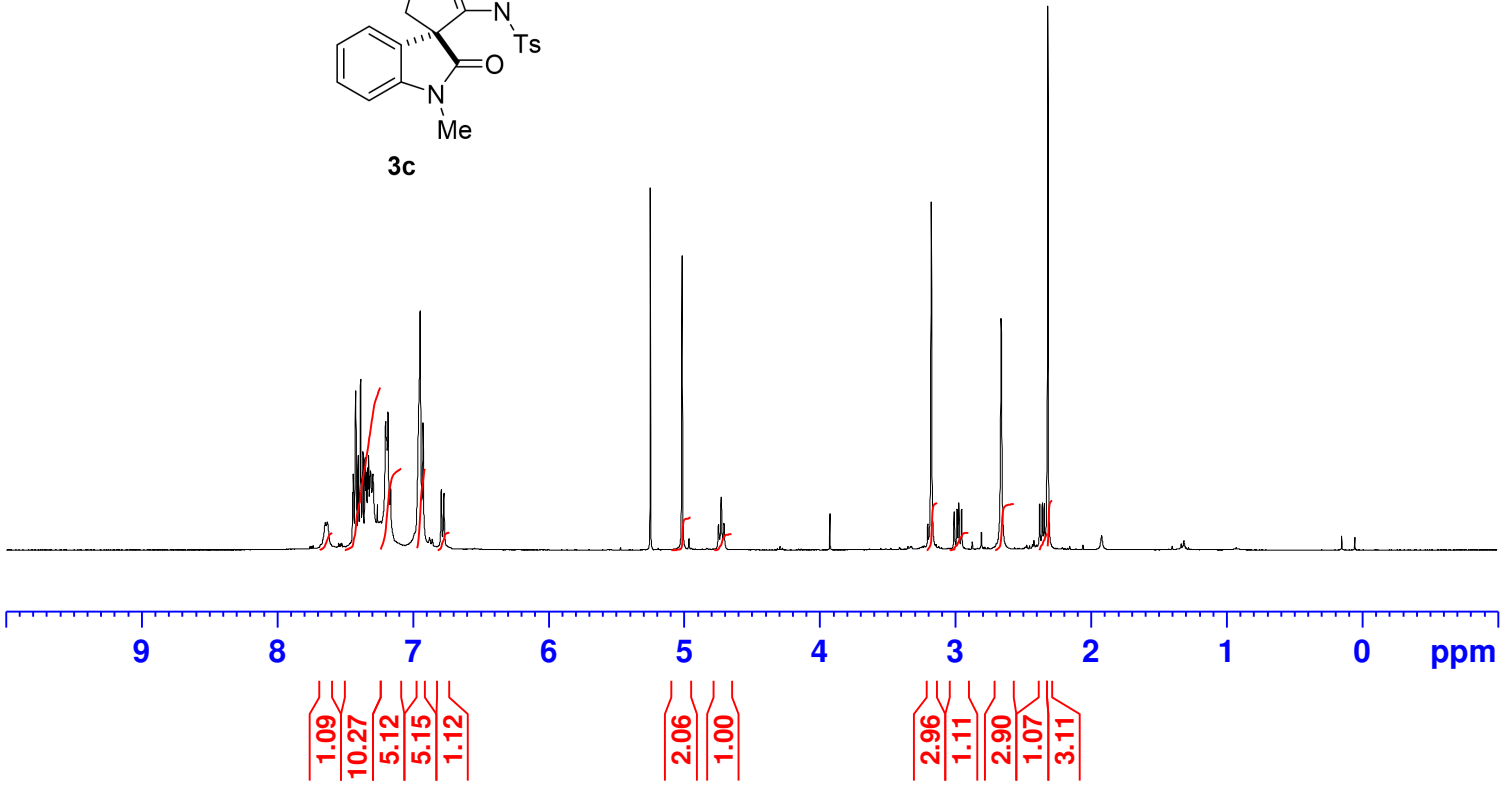
F2 - Acquisition Parameters
Date_                20211019
Time                    10.29 h
INSTRUM                  spect
PROBHD    Z108618_0256 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         800
DS                           4
SWH                  24038.461 Hz
FIDRES                0.733596 Hz
AQ                    1.3631488 sec
RG                        2050
DW                      20.800 usec
DE                       6.50 usec
TE                      293.2 K
D1                   2.00000000 sec
D11                  0.03000000 sec
TD0                          1
SFO1               100.6328888 MHz
NUC1                        13C
P0                       3.33 usec
P1                      10.00 usec
PLW1                50.00000000 W
SFO2               400.1716007 MHz
NUC2                        1H
CPDPRG[2                waltz65
PCPD2                   90.00 usec
PLW2                15.00000000 W
PLW12                0.18519001 W
PLW13                0.09314700 W

F2 - Processing parameters
SI                       32768
SF                 100.6228388 MHz
WDW                         EM
SSB                          0
LB                      1.00 Hz
GB                           0
PC                      1.40
```





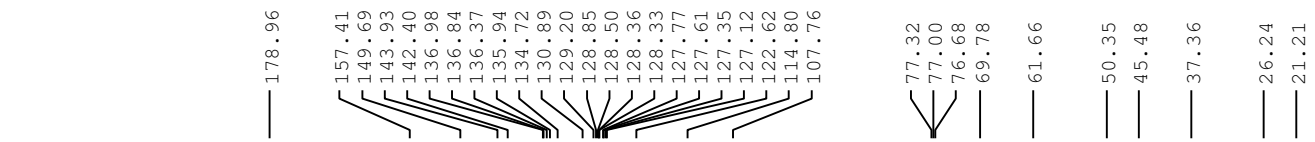
3c

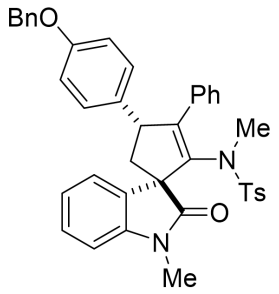



```
Current Data Parameters
NAME                  cqh-82
EXPNO           2020102901
PROCNO                   1

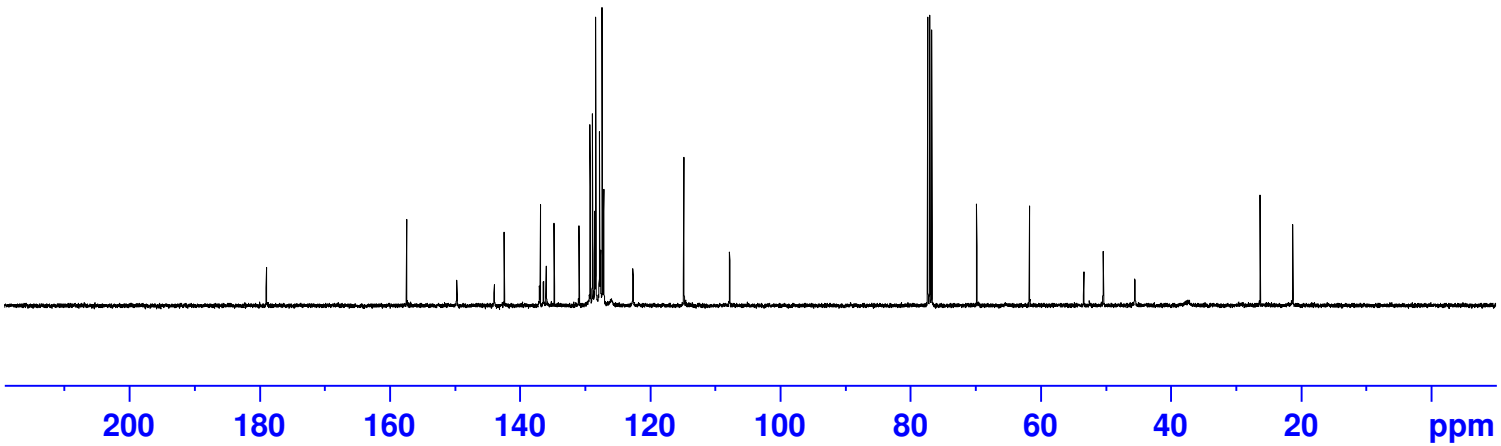
F2 - Acquisition Parameters
Date_              20201030
Time                 11.57 h
INSTRUM              spect
PROBHD    Z108618_0256 (
PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
NS                      16
DS                       2
SWH               8223.685 Hz
FIDRES            0.250967 Hz
AQ                3.9845889 sec
RG                      36
DW                  60.800 usec
DE                   6.50 usec
TE                  297.6 K
D1              1.00000000 sec
TD0                      1
SFO1           400.1724712 MHz
NUC1                    1H
P0                   3.33 usec
P1                  10.00 usec
PLW1           15.00000000 W

F2 - Processing parameters
SI                   32768
SF             400.1700072 MHz
WDW                     no
SSB                      0
LB                       0 Hz
GB                       0
PC                    1.00
```





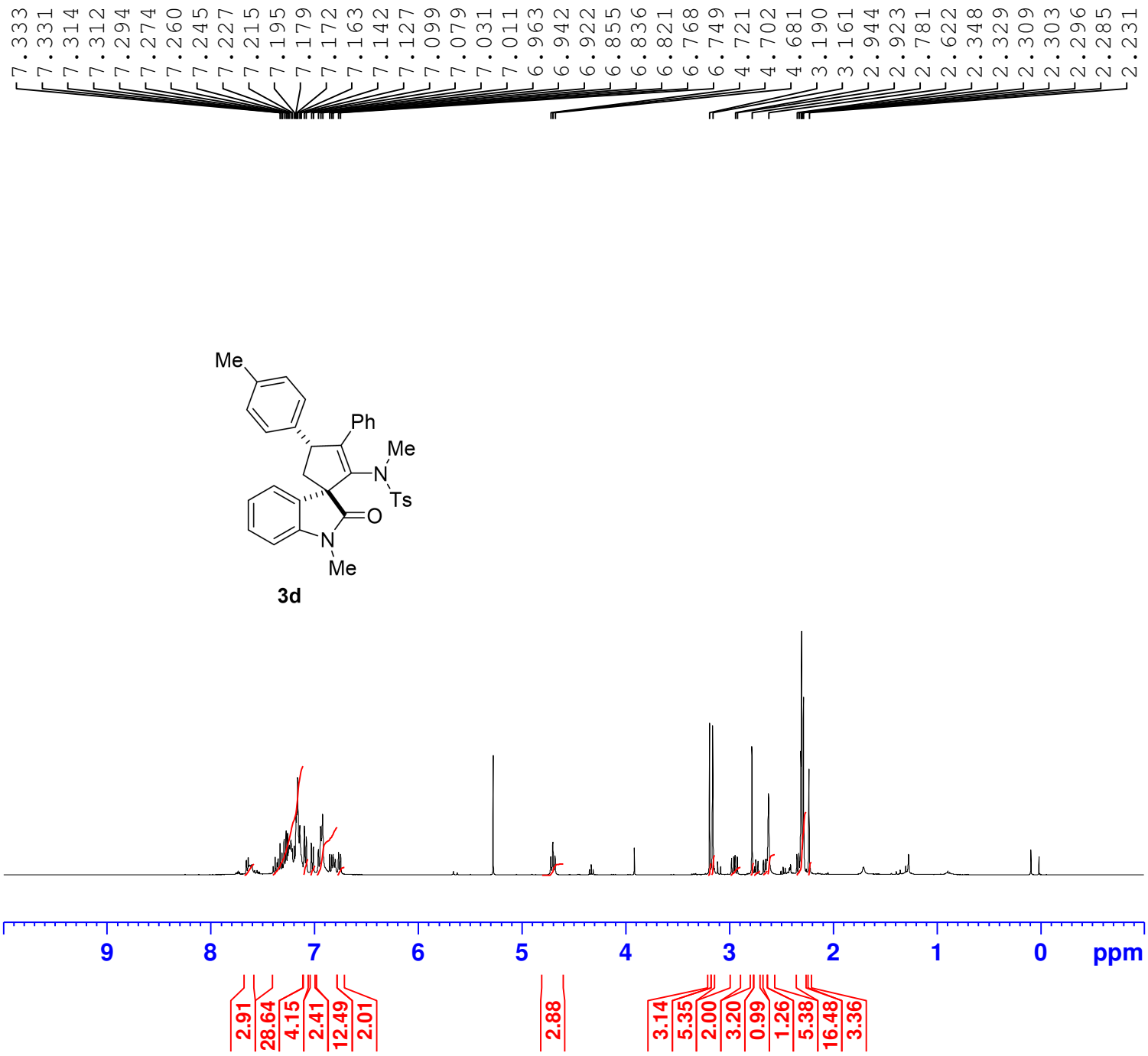
3c




```
Current Data Parameters
NAME                  cqh-82
EXPNO           2020102902
PROCNO                   1

F2 - Acquisition Parameters
Date_              20201030
Time                  12.44 h
INSTRUM               spect
PROBHD    Z108618_0256 (
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                     250
DS                       4
SWH              24038.461 Hz
FIDRES            0.733596 Hz
AQ                1.3631488 sec
RG                    2050
DW                  20.800 usec
DE                   6.50 usec
TE                  298.1 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                      1
SFO1          100.6328888 MHz
NUC1                  13C
P0                   3.33 usec
P1                  10.00 usec
PLW1          50.00000000 W
SFO2          400.1716007 MHz
NUC2                  1H
CPDPRG[2           waltz65
PCPD2                90.00 usec
PLW2          15.00000000 W
PLW12          0.18519001 W
PLW13          0.09314700 W

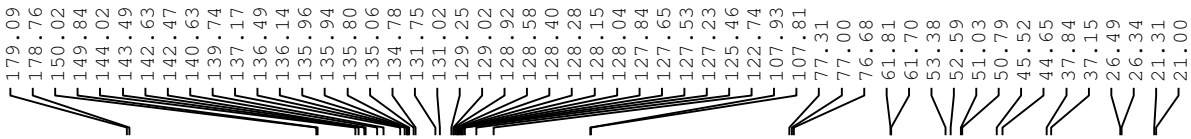
F2 - Processing parameters
SI                   32768
SF            100.6228506 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40
```



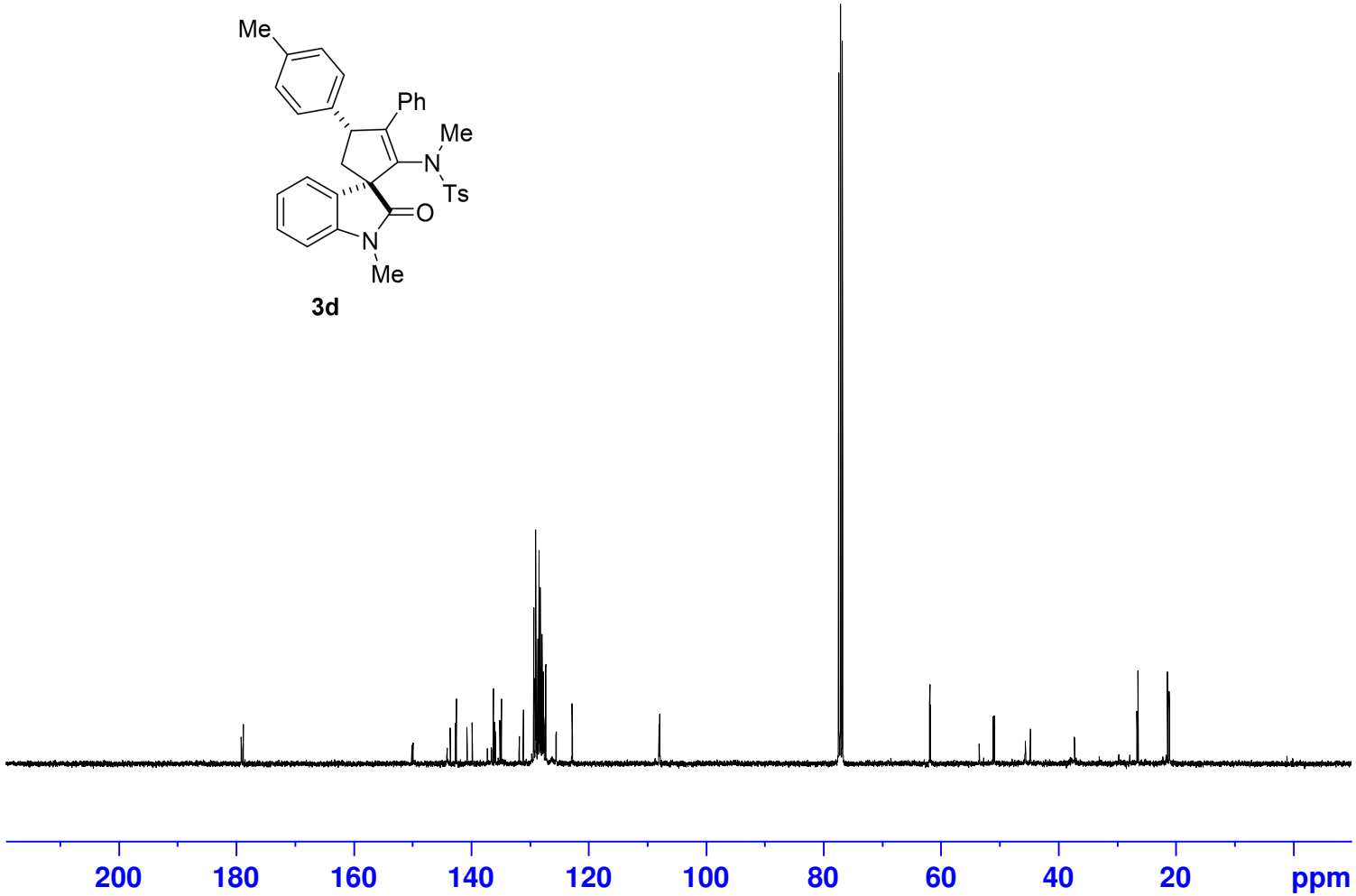

```
Current Data Parameters
NAME                  cqh-93
EXPNO             2020111001
PROCNO                     1

F2 - Acquisition Parameters
Date_              20201111
Time                   5.15 h
INSTRUM               spect
PROBHD    Z108618_0256 (
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8223.685 Hz
FIDRES             0.250967 Hz
AQ                 3.9845889 sec
RG                      114
DW                   60.800 usec
DE                    6.50 usec
TE                   297.0 K
D1                 1.00000000 sec
TD0                       1
SFO1             400.1724712 MHz
NUC1                     1H
P0                    3.33 usec
P1                   10.00 usec
PLW1            15.00000000 W

F2 - Processing parameters
SI                    32768
SF               400.1700081 MHz
WDW                      no
SSB                       0
LB                        0 Hz
GB                        0
PC                     1.00
```



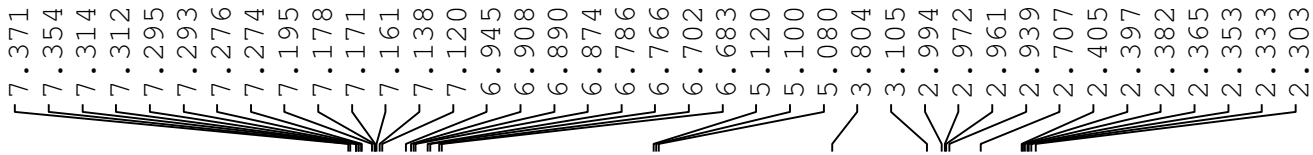
3d

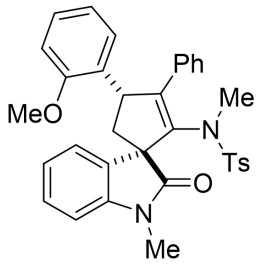



```
Current Data Parameters
NAME                  cqh-93
EXPNO           2020111002
PROCNO                   1

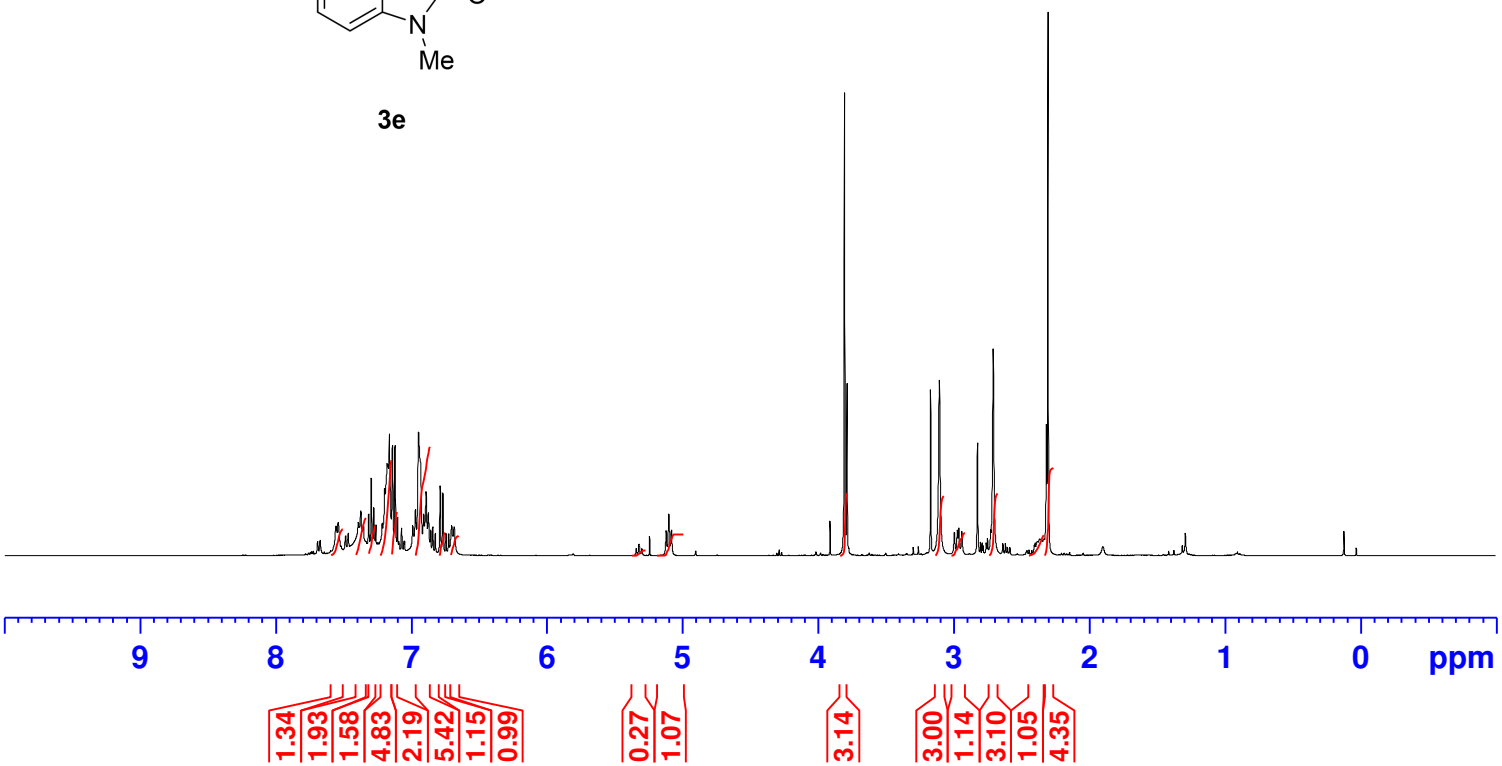
F2 - Acquisition Parameters
Date_              20201111
Time                   8.19 h
INSTRUM               spect
PROBHD    Z108618_0256 (
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      800
DS                        4
SWH               24038.461 Hz
FIDRES             0.733596 Hz
AQ                1.3631488 sec
RG                     2050
DW                   20.800 usec
DE                    6.50 usec
TE                   297.0 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                       1
SFO1           100.6328888 MHz
NUC1                   13C
P0                    3.33 usec
P1                   10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                   1H
CPDPRG[2            waltz65
PCPD2                90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

F2 - Processing parameters
SI                    32768
SF             100.6228366 MHz
WDW                      EM
SSB                       0
LB                     1.00 Hz
GB                        0
PC                     1.40
```





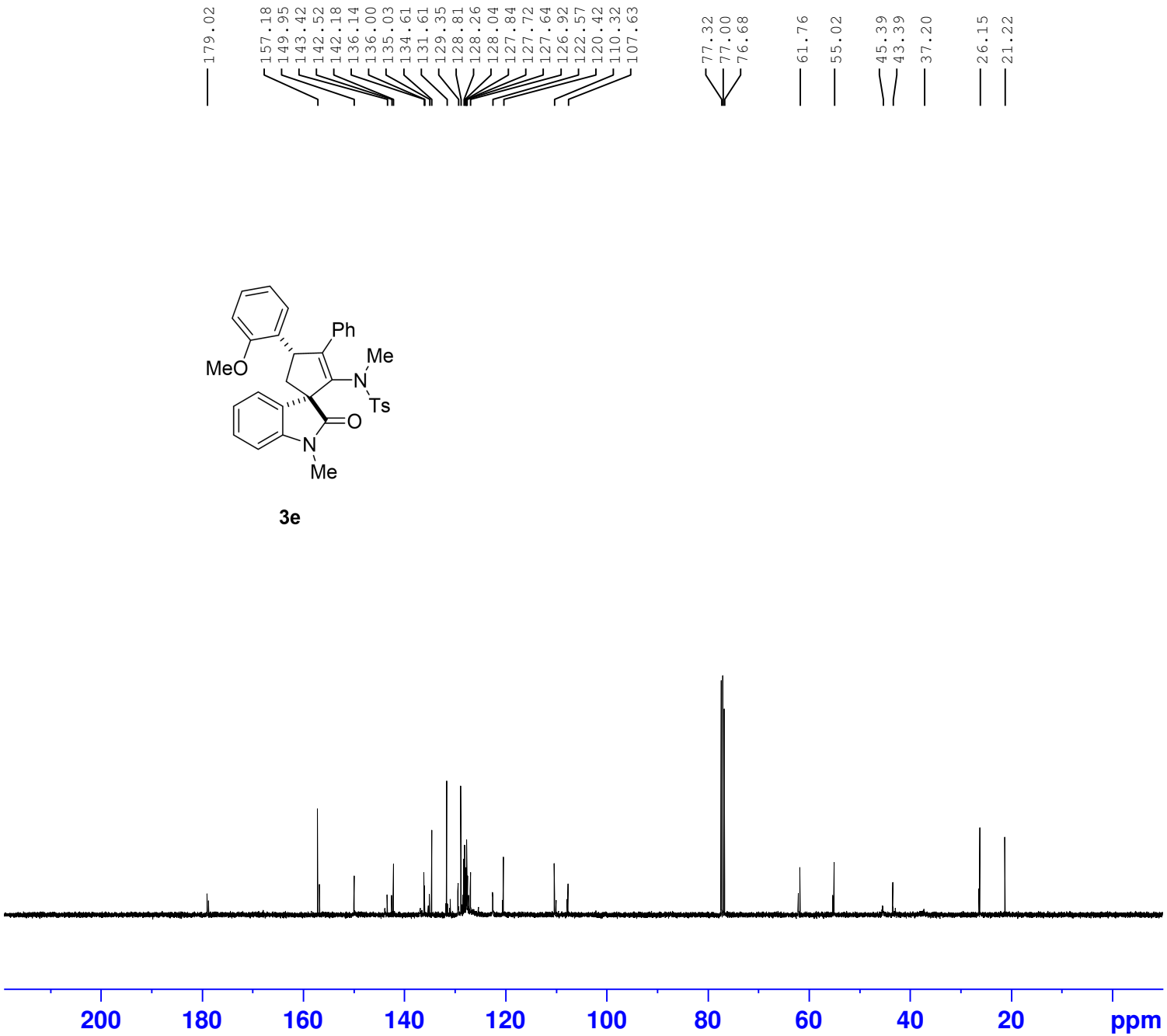
3e




```
Current Data Parameters
NAME                  cqh-95
EXPNO             2020111002
PROCNO                     1

F2 - Acquisition Parameters
Date_               20201111
Time                    5.20 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                3.9845889 sec
RG                      40.3
DW                    60.800 usec
DE                     6.50 usec
TE                    296.9 K
D1                1.00000000 sec
TD0                        1
SFO1            400.1724712 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1            15.00000000 W

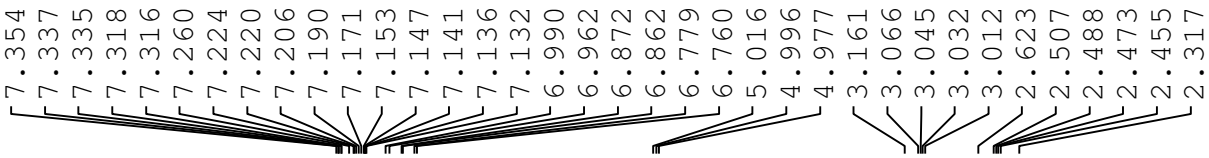
F2 - Processing parameters
SI                     32768
SF              400.1700072 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```



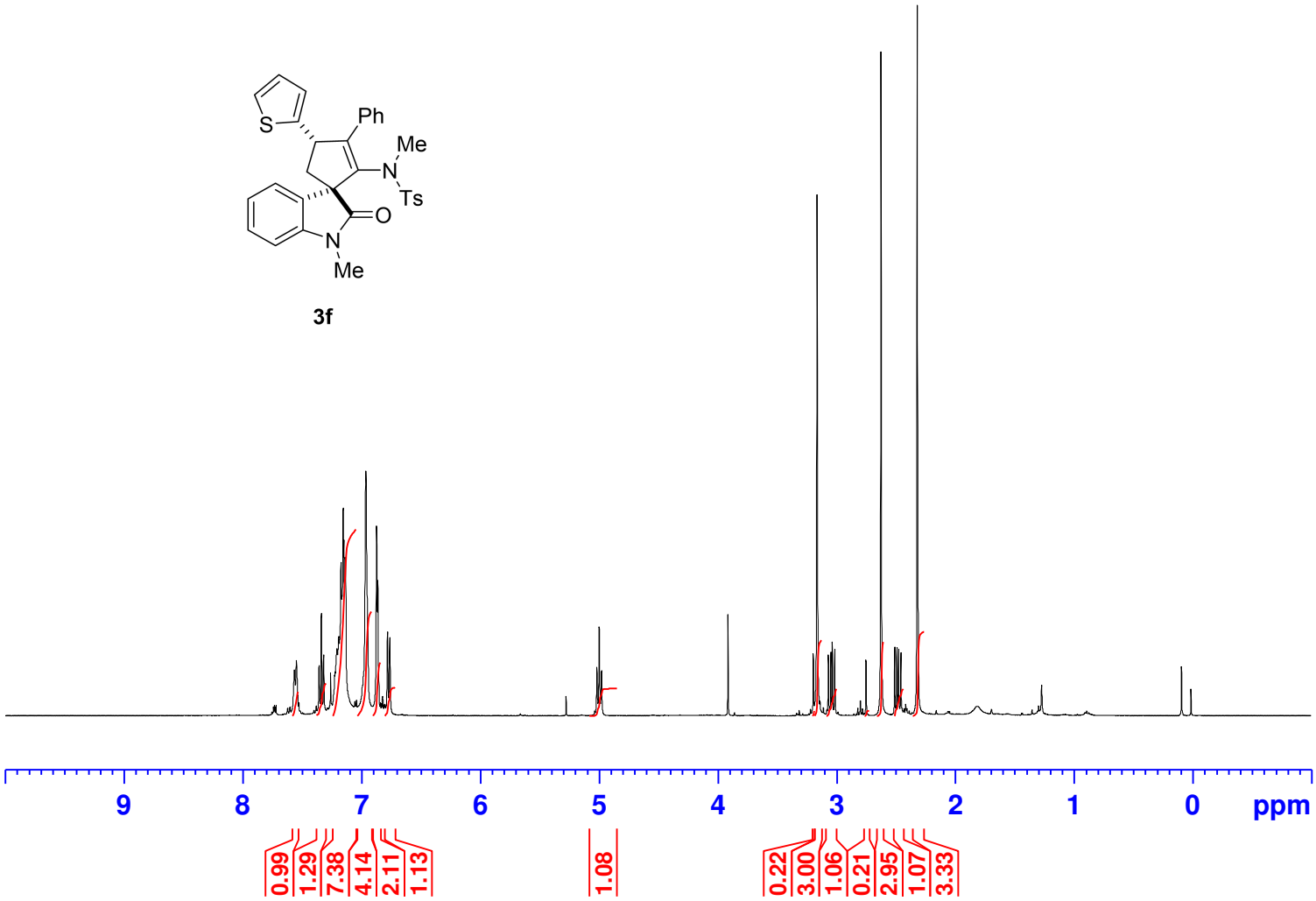

```
Current Data Parameters
NAME                  cqh-95
EXPNO            2020111003
PROCNO                    1

F2 - Acquisition Parameters
Date_              20201111
Time                   8.44 h
INSTRUM               spect
PROBHD    Z108618_0256 (
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      351
DS                        4
SWH              24038.461 Hz
FIDRES            0.733596 Hz
AQ                1.3631488 sec
RG                     2050
DW                   20.800 usec
DE                    6.50 usec
TE                   296.9 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                       1
SFO1           100.6328888 MHz
NUC1                    13C
P0                    3.33 usec
P1                   10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                    1H
CPDPRG[2           waltz65
PCPD2                90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

F2 - Processing parameters
SI                    32768
SF             100.6228476 MHz
WDW                     no
SSB                      0
LB                       0 Hz
GB                       0
PC                    1.40
```



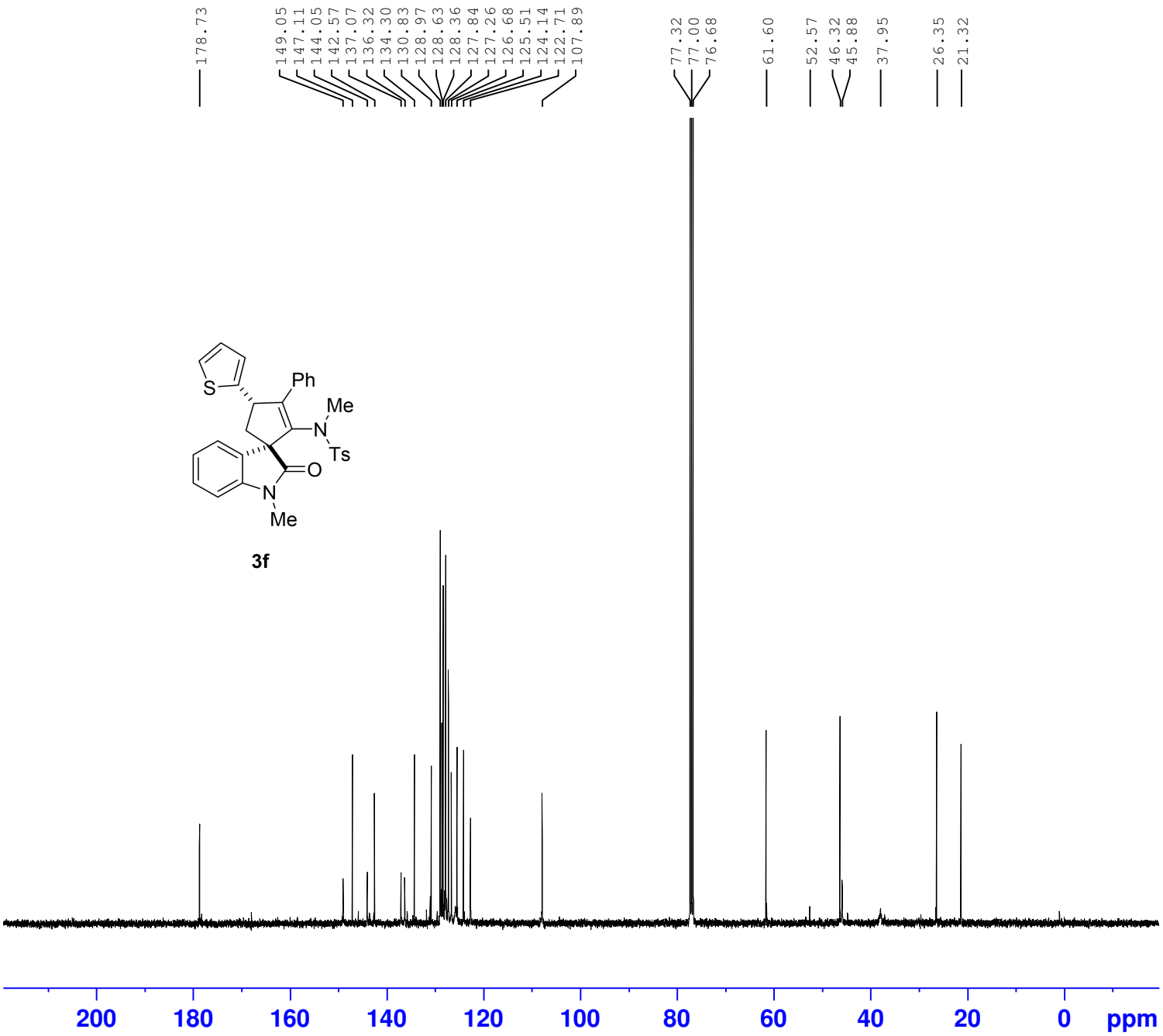
3f




```
Current Data Parameters
NAME                  cqh-71-1
EXPNO              2020092301
PROCNO                      1

F2 - Acquisition Parameters
Date_               20200924
Time                   23.39 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                       144
DW                    60.800 usec
DE                     6.50 usec
TE                    297.5 K
D1                 1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                    3.33 usec
P1                   10.00 usec
PLW1            15.00000000 W

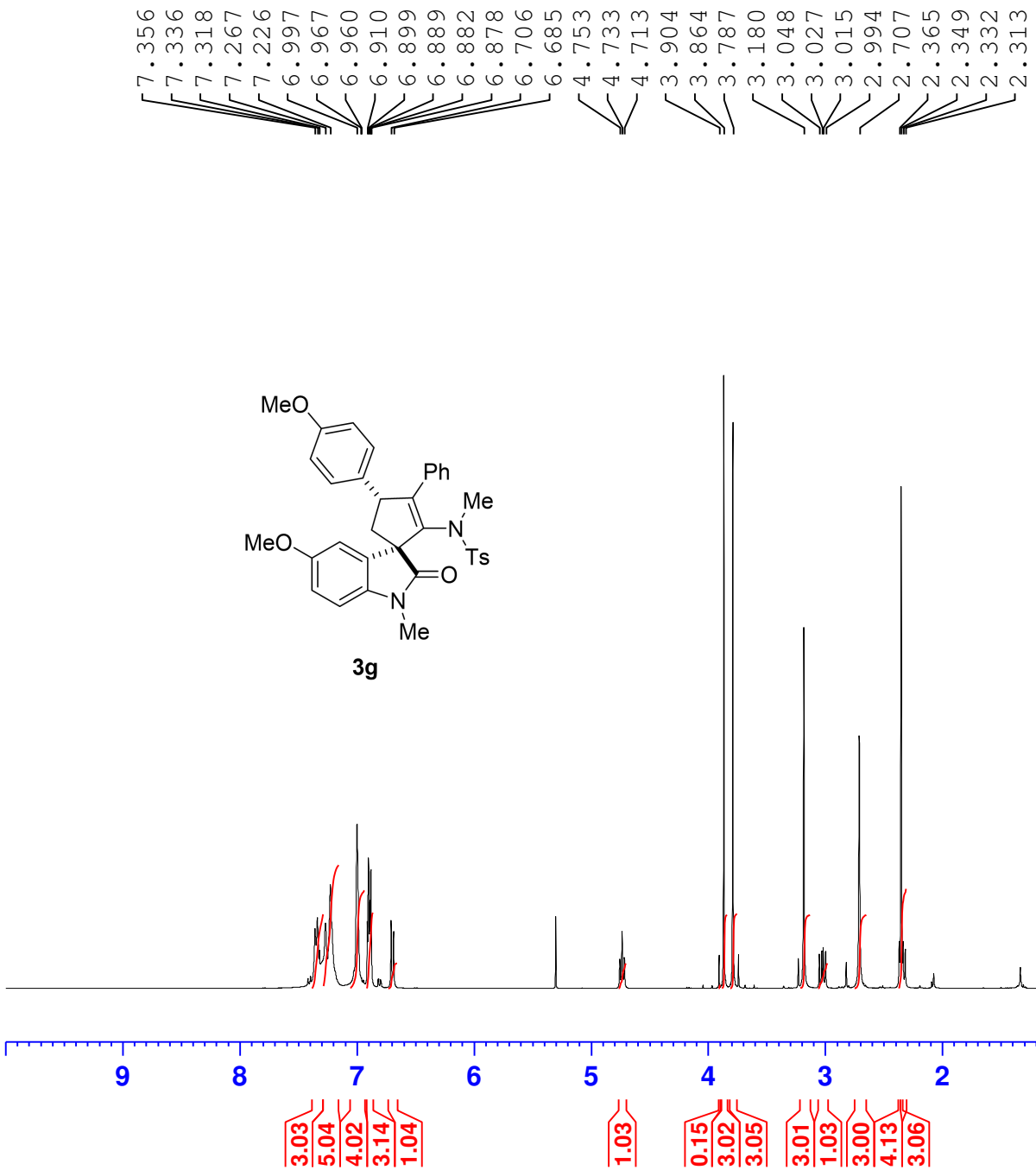
F2 - Processing parameters
SI                     32768
SF               400.1700087 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```




```
Current Data Parameters
NAME                  cqh-71-1
EXPNO              2020092302
PROCNO                      1

F2 - Acquisition Parameters
Date_                20200925
Time                      0.54 h
INSTRUM                  spect
PROBHD    Z108618_0256 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         661
DS                           4
SWH                  24038.461 Hz
FIDRES                0.733596 Hz
AQ                    1.3631488 sec
RG                        2050
DW                       20.800 usec
DE                        6.50 usec
TE                       298.0 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                          1
SFO1               100.6328888 MHz
NUC1                        13C
P0                        3.33 usec
P1                       10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                        1H
CPDPRG[2                waltz65
PCPD2                    90.00 usec
PLW2               15.00000000 W
PLW12               0.18519001 W
PLW13               0.09314700 W

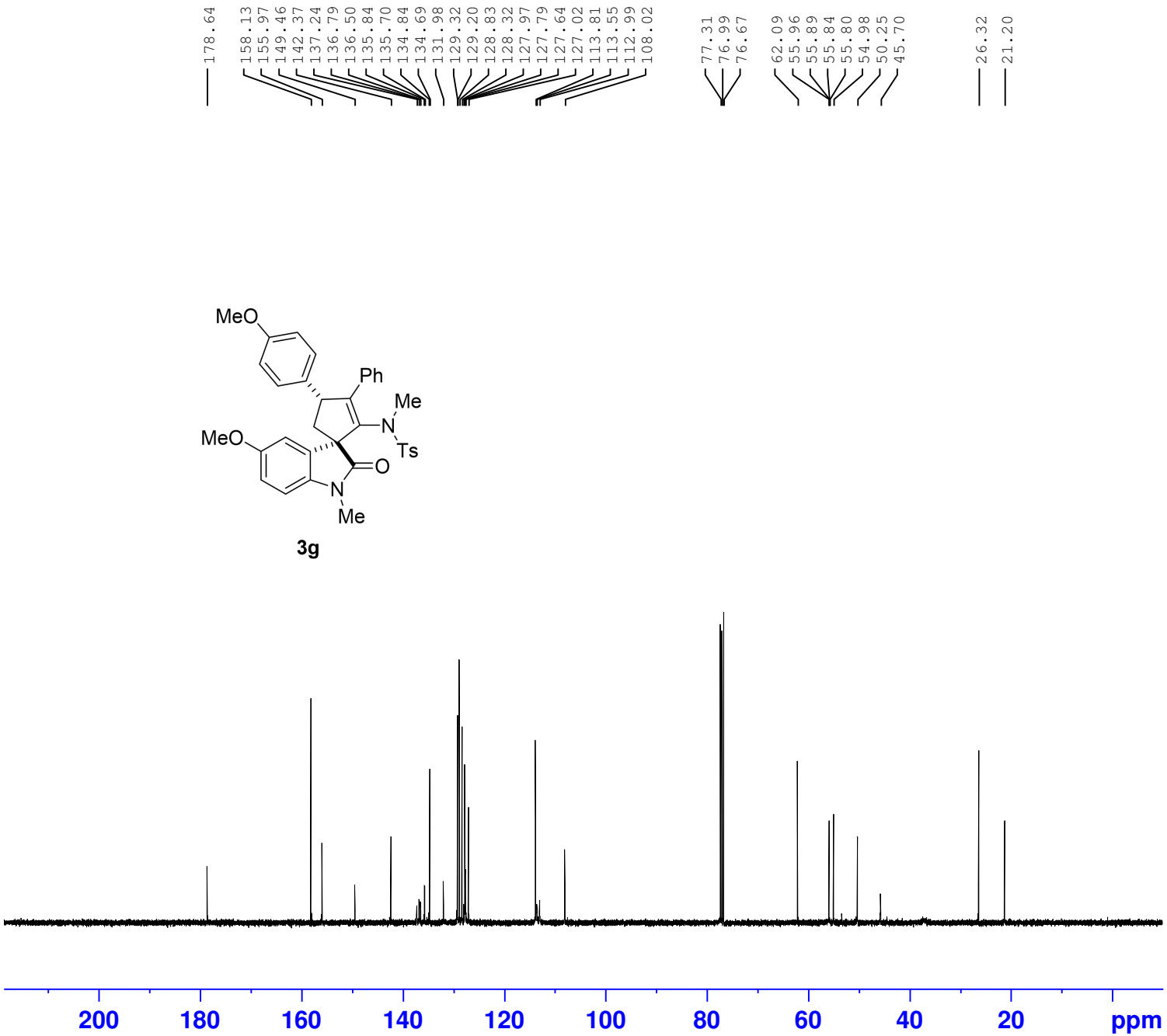
F2 - Processing parameters
SI                       32768
SF                 100.6228381 MHz
WDW                         EM
SSB                          0
LB                        1.00 Hz
GB                           0
PC                        1.40
```




```
Current Data Parameters
NAME                  cqh-144
EXPNO              2020122301
PROCNO                      1

F2 - Acquisition Parameters
Date_                20201224
Time                     9.08 h
INSTRUM                  spect
PROBHD    Z108618_0256 (
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                   8223.685 Hz
FIDRES                0.250967 Hz
AQ                    3.9845889 sec
RG                         32
DW                       60.800 usec
DE                        6.50 usec
TE                       294.0 K
D1                    1.00000000 sec
TD0                         1
SFO1               400.1724712 MHz
NUC1                       1H
P0                        3.33 usec
P1                       10.00 usec
PLW1              15.00000000 W

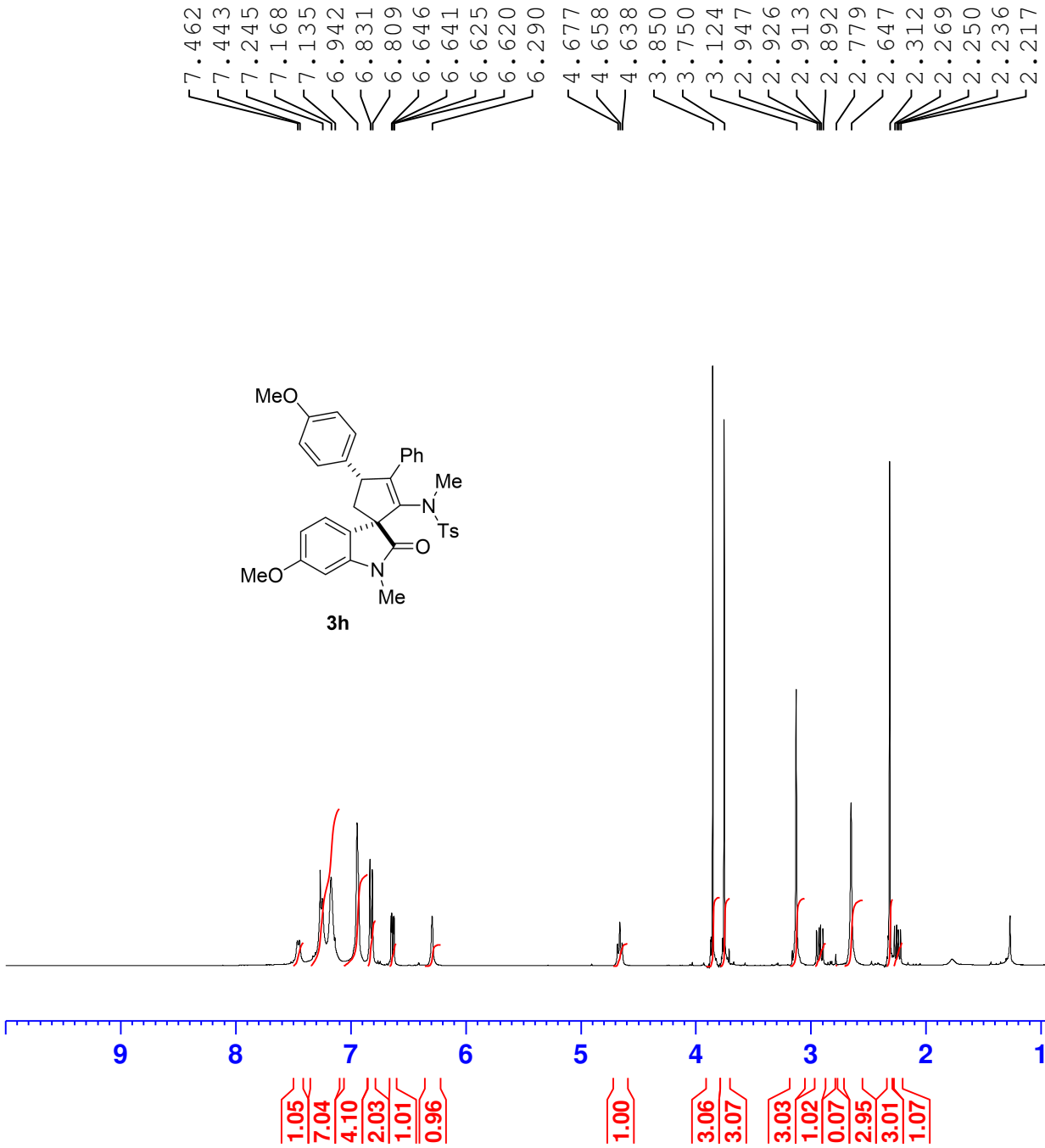
F2 - Processing parameters
SI                      32768
SF                 400.1699841 MHz
WDW                        no
SSB                         0
LB                          0 Hz
GB                          0
PC                       1.00
```




```
Current Data Parameters
NAME                  cqh-144
EXPNO              2020122302
PROCNO                      1

F2 - Acquisition Parameters
Date_               20201224
Time                  11.45 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG               zgpg30
TD                     65536
SOLVENT                CDCl3
NS                       400
DS                         4
SWH                24038.461 Hz
FIDRES             0.733596 Hz
AQ                 1.3631488 sec
RG                      2050
DW                    20.800 usec
DE                     6.50 usec
TE                     294.3 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                         1
SFO1             100.6328888 MHz
NUC1                     13C
P0                     3.33 usec
P1                    10.00 usec
PLW1              50.00000000 W
SFO2             400.1716007 MHz
NUC2                     1H
CPDPRG[2              waltz65
PCPD2                 90.00 usec
PLW2              15.00000000 W
PLW12              0.18519001 W
PLW13              0.09314700 W

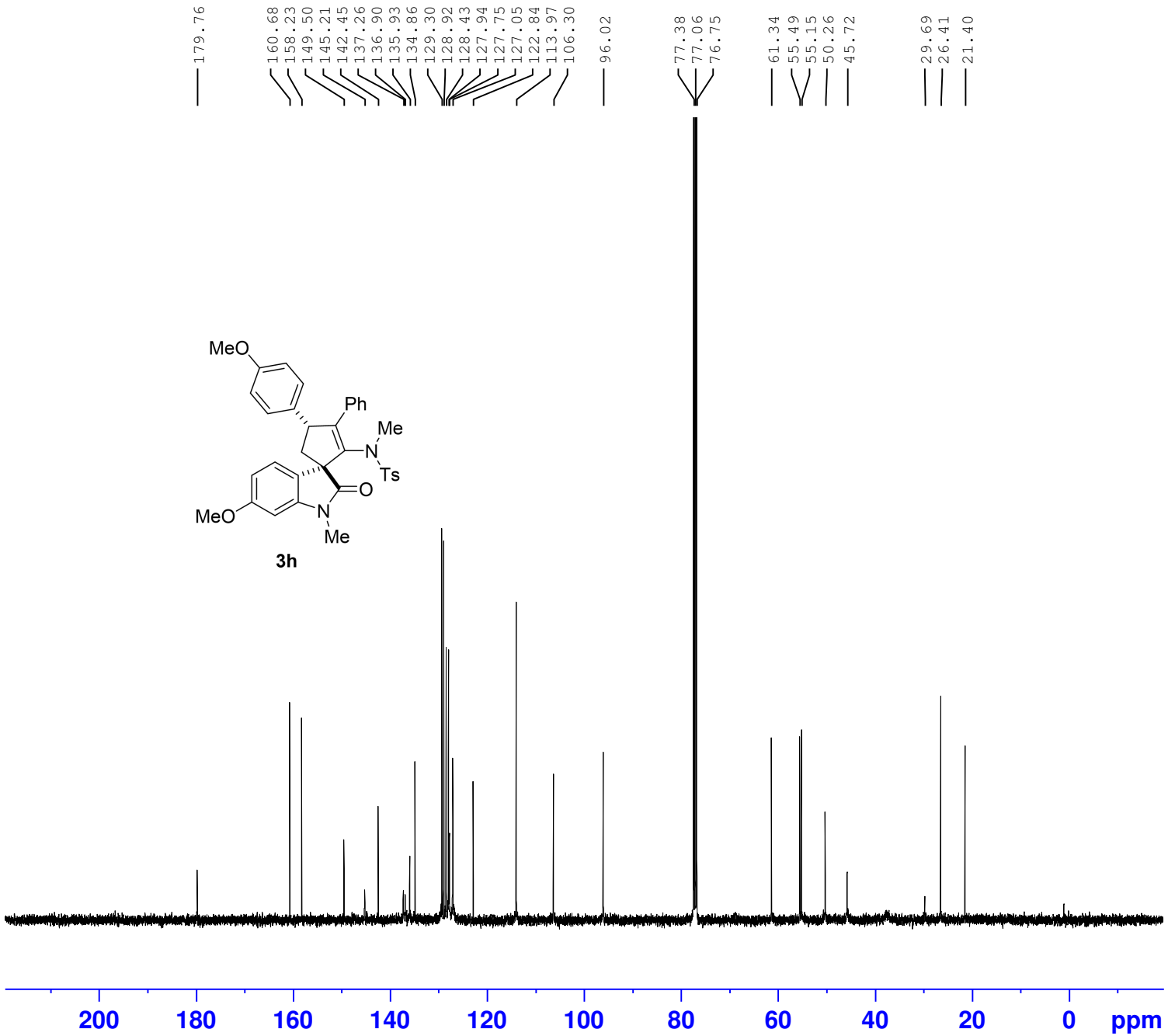
F2 - Processing parameters
SI                      32768
SF               100.6228484 MHz
WDW                        no
SSB                         0
LB                          0 Hz
GB                          0
PC                       1.40
```




```
Current Data Parameters
NAME                  cqh-163
EXPNO              2021030901
PROCNO                      1

F2 - Acquisition Parameters
Date_                20210310
Time                     6.30 h
INSTRUM                 spect
PROBHD    Z108618_0256 (
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                  8223.685 Hz
FIDRES               0.250967 Hz
AQ                   3.9845889 sec
RG                        90.5
DW                      60.800 usec
DE                       6.50 usec
TE                      294.6 K
D1                   1.00000000 sec
TD0                         1
SFO1              400.1724712 MHz
NUC1                       1H
P0                       3.33 usec
P1                      10.00 usec
PLW1              15.00000000 W

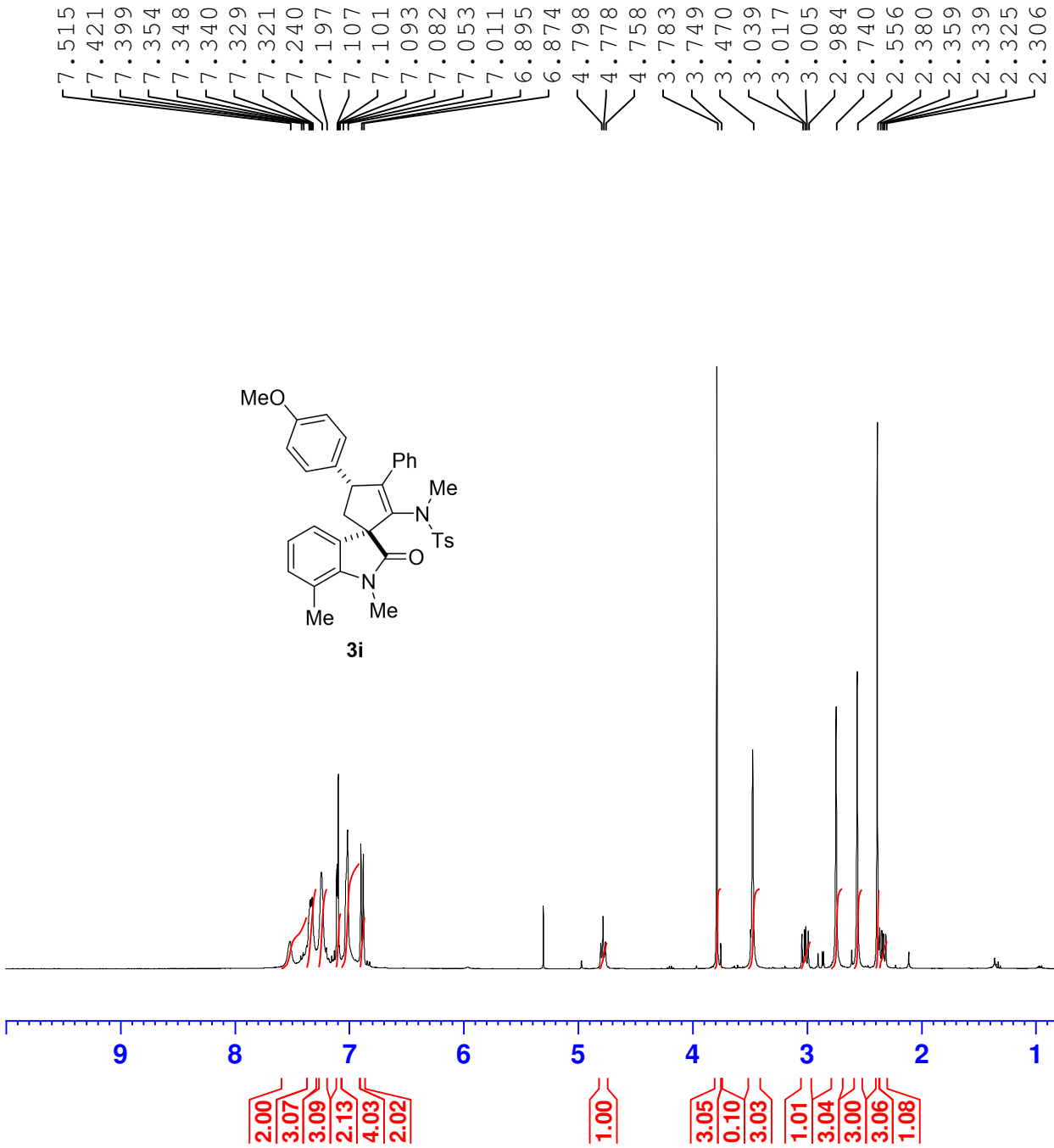
F2 - Processing parameters
SI                      32768
SF                400.1700072 MHz
WDW                        EM
SSB                         0
LB                       0.30 Hz
GB                          0
PC                       1.00
```




```
Current Data Parameters
NAME                  cqh-163
EXPNO              2021030902
PROCNO                      1

F2 - Acquisition Parameters
Date_                20210310
Time                    11.35 h
INSTRUM                 spect
PROBHD   Z108618_0256 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDC13
NS                         506
DS                           4
SWH                  24038.461 Hz
FIDRES                0.733596 Hz
AQ                    1.3631488 sec
RG                        2050
DW                      20.800 usec
DE                       6.50 usec
TE                      294.8 K
D1                   2.00000000 sec
D11                  0.03000000 sec
TD0                          1
SFO1               100.6328888 MHz
NUC1                        13C
P0                       3.33 usec
P1                      10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                        1H
CPDPRG[2                waltz65
PCPD2                    90.00 usec
PLW2               15.00000000 W
PLW12                0.18519001 W
PLW13                0.09314700 W

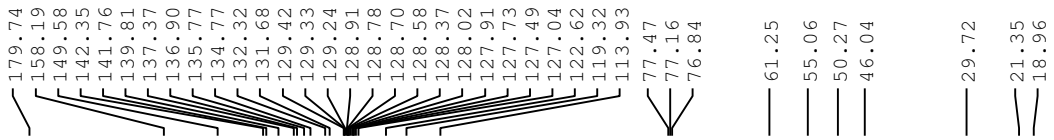
F2 - Processing parameters
SI                       32768
SF                 100.6228300 MHz
WDW                         EM
SSB                          0
LB                       1.00 Hz
GB                           0
PC                       1.40
```

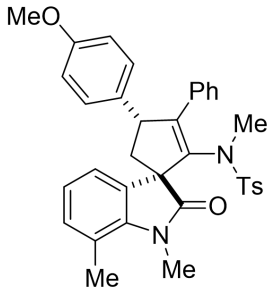



```
Current Data Parameters
NAME                  cqh-164
EXPNO              2021010801
PROCNO                      1

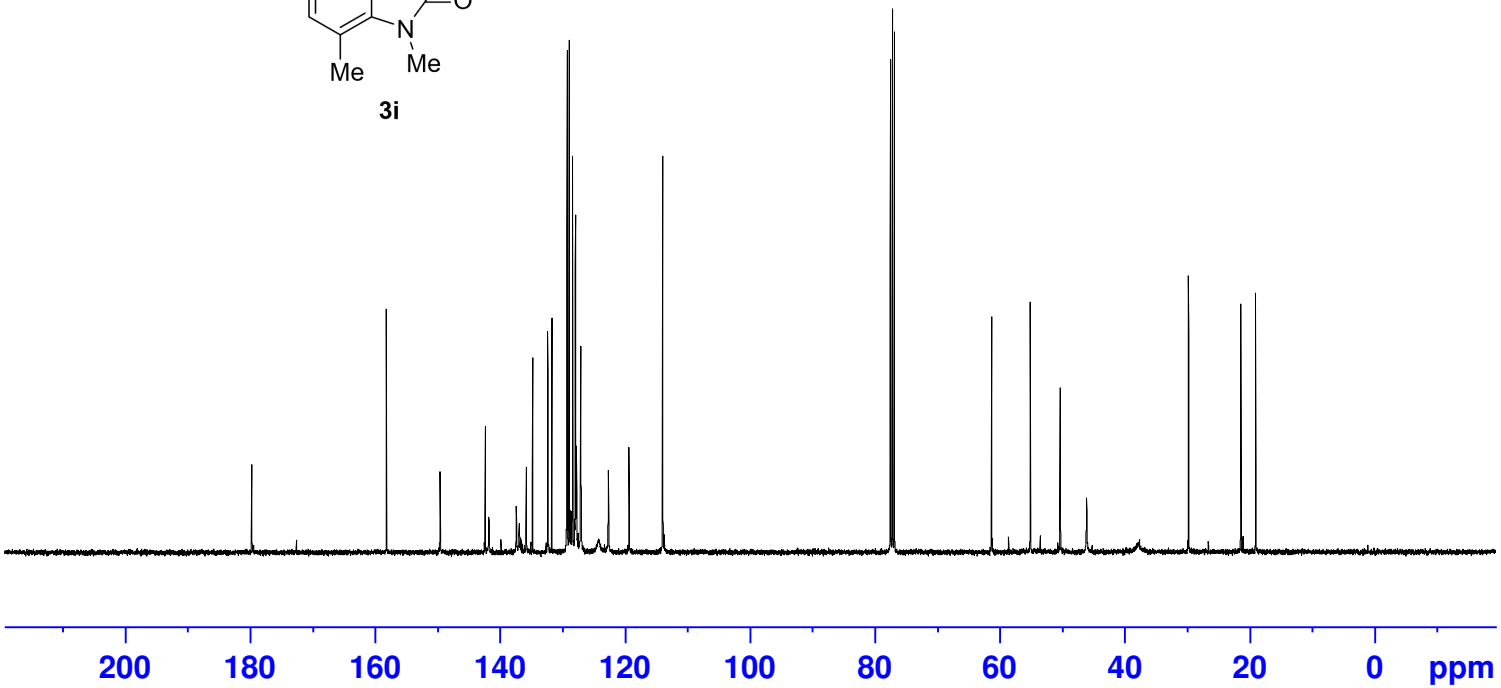
F2 - Acquisition Parameters
Date_               20210109
Time                    5.05 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                        32
DW                     60.800 usec
DE                      6.50 usec
TE                     293.7 K
D1                  1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                      3.33 usec
P1                     10.00 usec
PLW1            15.00000000 W

F2 - Processing parameters
SI                     32768
SF               400.1699791 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```





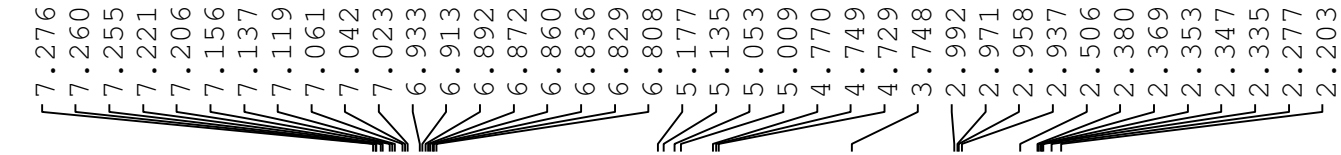
3i



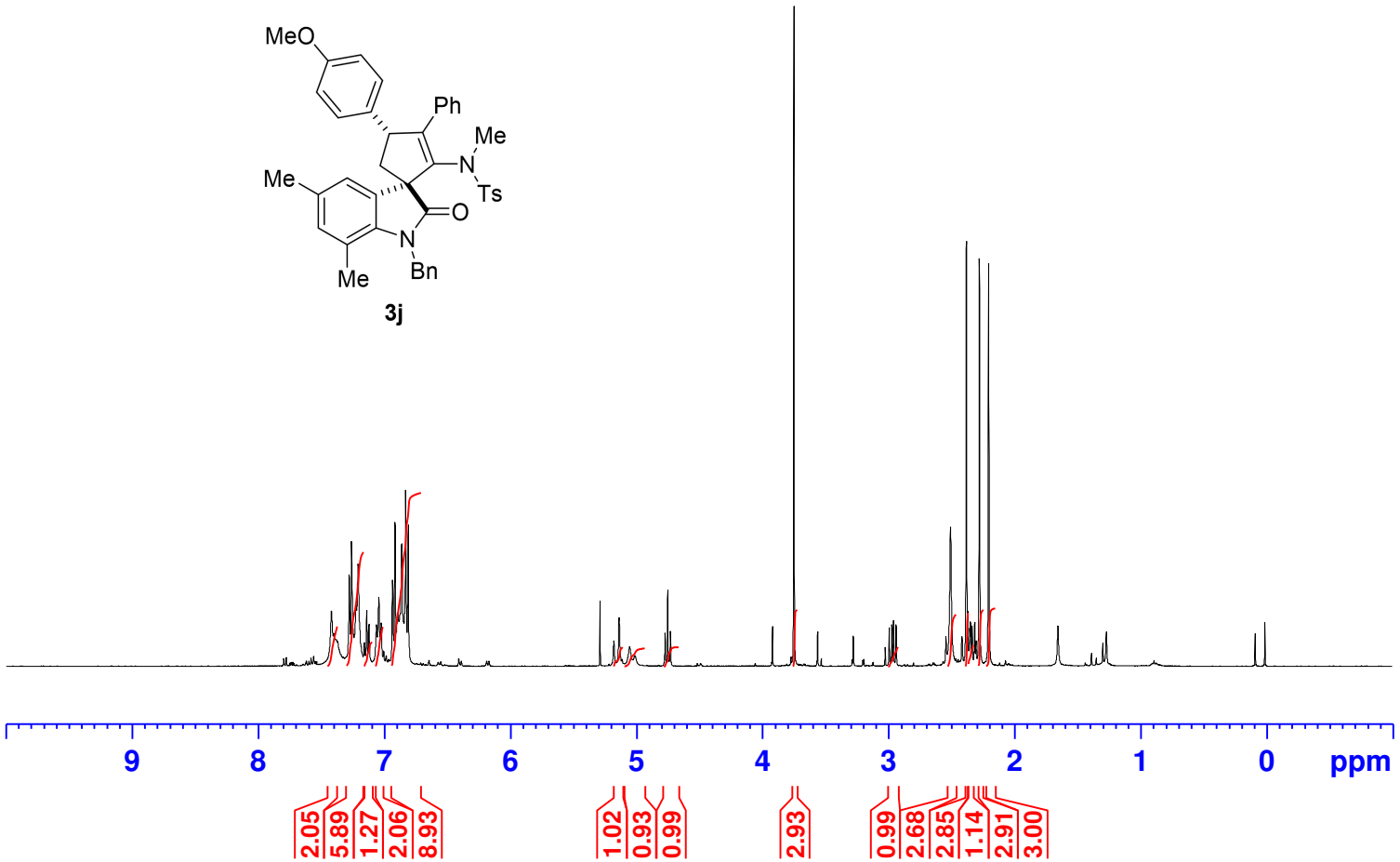

```
Current Data Parameters
NAME                  cqh-164
EXPNO              2021010802
PROCNO                      1

F2 - Acquisition Parameters
Date_                20210109
Time                     6.47 h
INSTRUM                 spect
PROBHD    Z108618_0256 (
PULPROG                zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                        519
DS                          4
SWH                 24038.461 Hz
FIDRES               0.733596 Hz
AQ                   1.3631488 sec
RG                       2050
DW                     20.800 usec
DE                      6.50 usec
TE                     294.2 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                         1
SFO1             100.6328888 MHz
NUC1                      13C
P0                      3.33 usec
P1                     10.00 usec
PLW1              50.00000000 W
SFO2             400.1716007 MHz
NUC2                      1H
CPDPRG[2              waltz65
PCPD2                  90.00 usec
PLW2              15.00000000 W
PLW12              0.18519001 W
PLW13              0.09314700 W

F2 - Processing parameters
SI                      32768
SF               100.6228367 MHz
WDW                        EM
SSB                         0
LB                      1.00 Hz
GB                          0
PC                      1.40
```



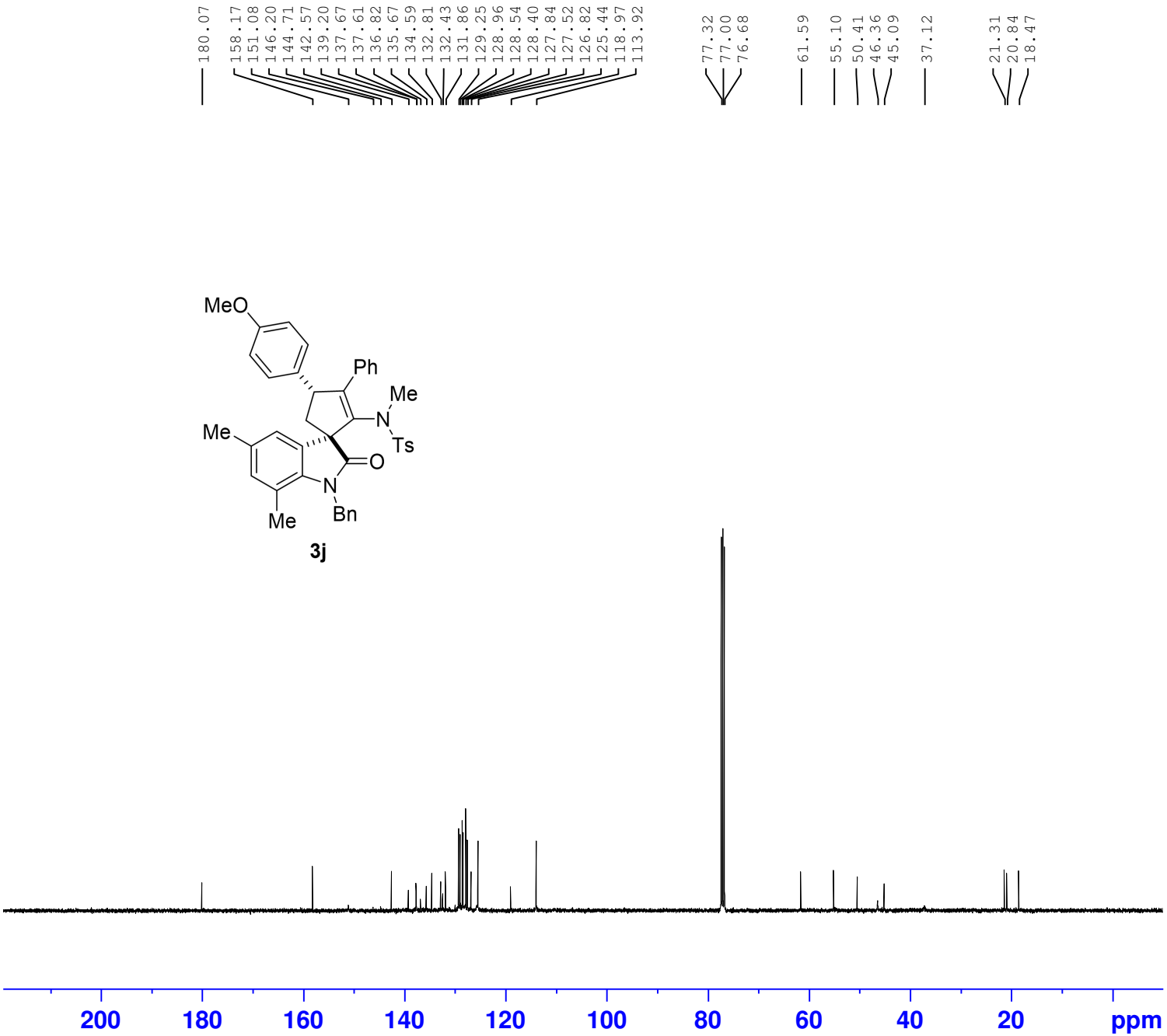
3j




```
Current Data Parameters
NAME                  zy-8
EXPNO           2020111701
PROCNO                   1

F2 - Acquisition Parameters
Date_              20201118
Time                   5.53 h
INSTRUM               spect
PROBHD    Z108618_0256 (
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8223.685 Hz
FIDRES            0.250967 Hz
AQ                3.9845889 sec
RG                      128
DW                   60.800 usec
DE                    6.50 usec
TE                   296.4 K
D1              1.00000000 sec
TD0                      1
SFO1           400.1724712 MHz
NUC1                    1H
P0                    3.33 usec
P1                   10.00 usec
PLW1           15.00000000 W

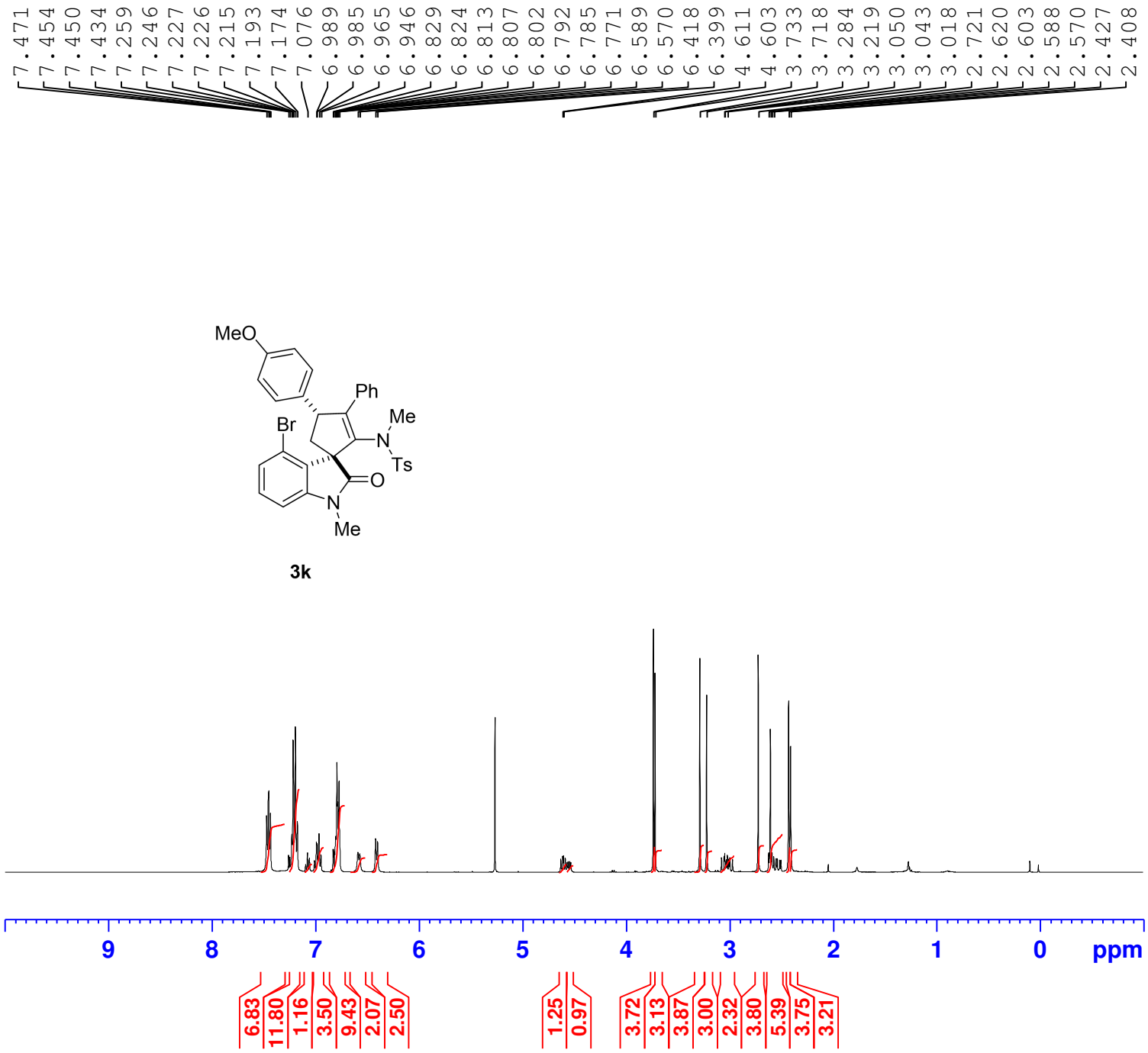
F2 - Processing parameters
SI                    32768
SF             400.1700087 MHz
WDW                     no
SSB                      0
LB                       0 Hz
GB                       0
PC                    1.00
```




```
Current Data Parameters
NAME                  zy-8
EXPNO           2020111702
PROCNO                   1

F2 - Acquisition Parameters
Date_              20201118
Time                  7.34 h
INSTRUM               spect
PROBHD    Z108618_0256 (
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                     500
DS                       4
SWH             24038.461 Hz
FIDRES           0.733596 Hz
AQ               1.3631488 sec
RG                    2050
DW                  20.800 usec
DE                   6.50 usec
TE                  296.8 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                      1
SFO1           100.6328888 MHz
NUC1                   13C
P0                   3.33 usec
P1                  10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                   1H
CPDPRG[2           waltz65
PCPD2                90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

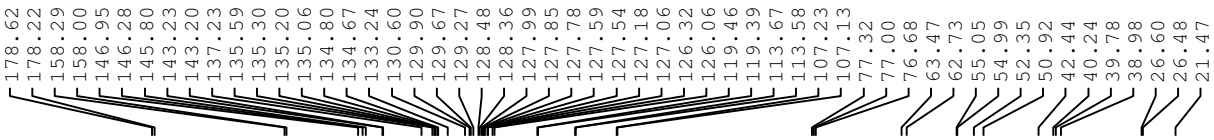
F2 - Processing parameters
SI                   32768
SF             100.6228337 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.40
```

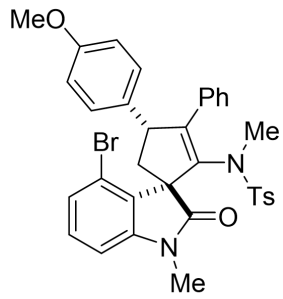



```
Current Data Parameters
NAME                  cqh-131
EXPNO              2020121601
PROCNO                      1

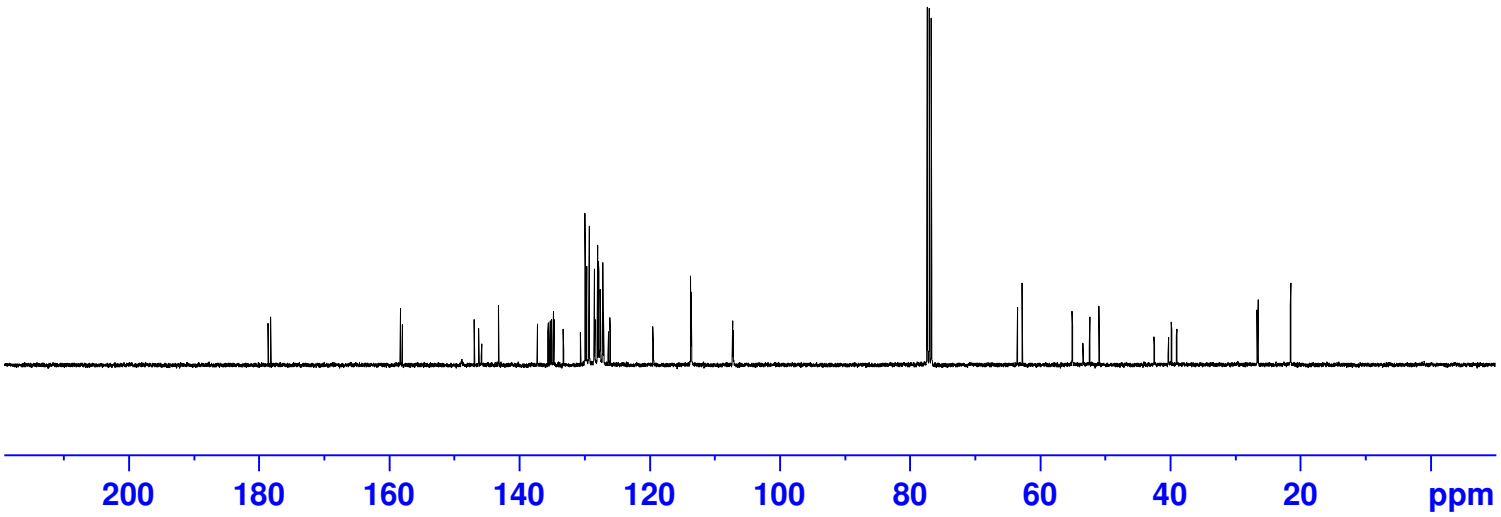
F2 - Acquisition Parameters
Date_                20201217
Time                     6.05 h
INSTRUM                  spect
PROBHD    Z108618_0256 (
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                   8223.685 Hz
FIDRES                0.250967 Hz
AQ                    3.9845889 sec
RG                         50.8
DW                       60.800 usec
DE                        6.50 usec
TE                       293.8 K
D1                  1.00000000 sec
TD0                         1
SFO1               400.1724712 MHz
NUC1                       1H
P0                        3.33 usec
P1                       10.00 usec
PLW1               15.00000000 W

F2 - Processing parameters
SI                      32768
SF                 400.1700072 MHz
WDW                        no
SSB                         0
LB                          0 Hz
GB                          0
PC                       1.00
```





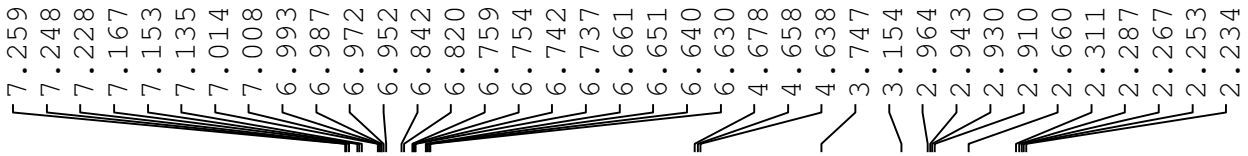
3k



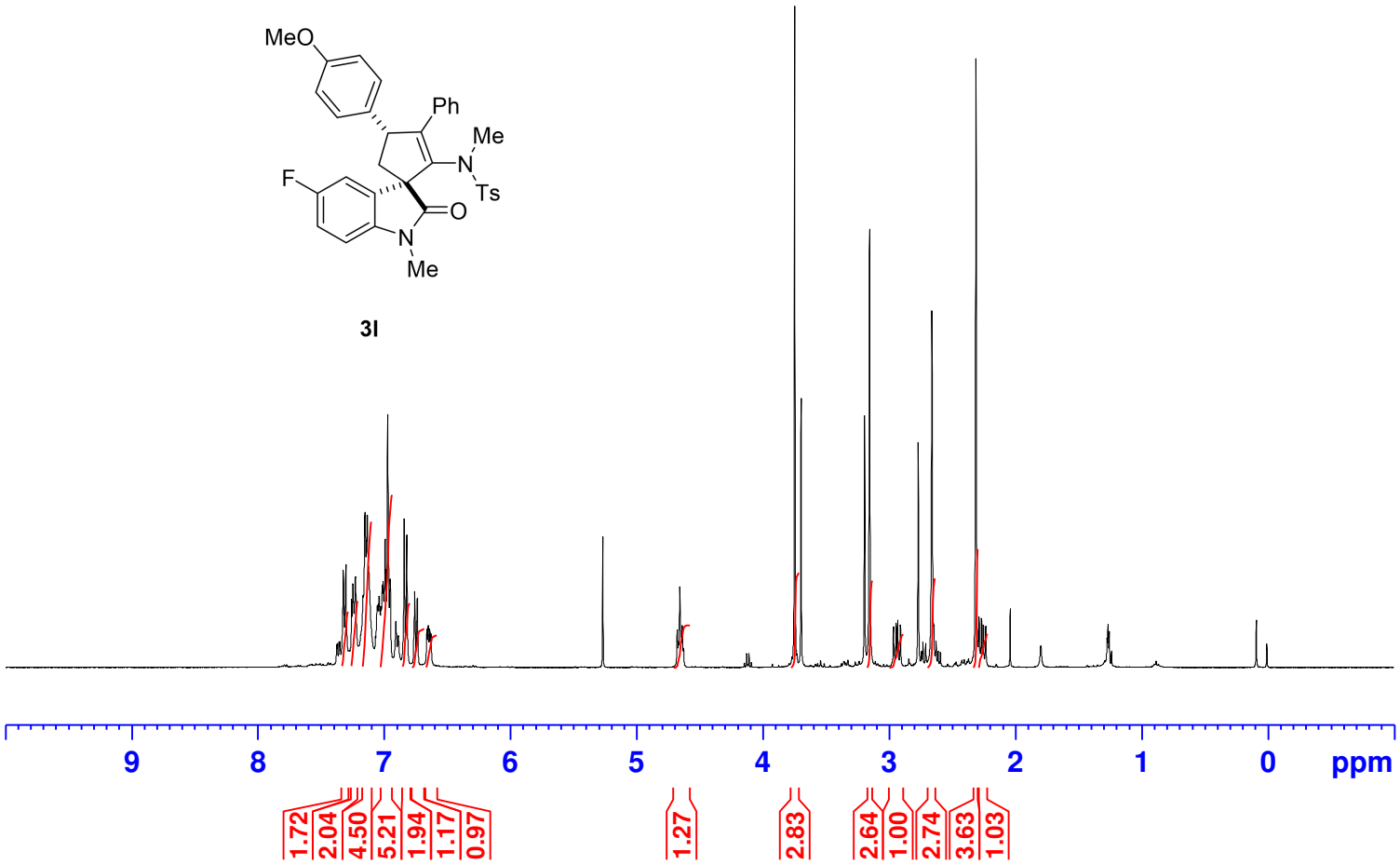

```
Current Data Parameters
NAME                  cqh-131
EXPNO              2020121602
PROCNO                      1

F2 - Acquisition Parameters
Date_               20201217
Time                    9.24 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG               zgpg30
TD                     65536
SOLVENT                CDCl3
NS                       400
DS                         4
SWH                24038.461 Hz
FIDRES              0.733596 Hz
AQ                  1.3631488 sec
RG                      2050
DW                     20.800 usec
DE                      6.50 usec
TE                     293.8 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                         1
SFO1             100.6328888 MHz
NUC1                     13C
P0                      3.33 usec
P1                     10.00 usec
PLW1              50.00000000 W
SFO2             400.1716007 MHz
NUC2                     1H
CPDPRG[2              waltz65
PCPD2                  90.00 usec
PLW2              15.00000000 W
PLW12              0.18519001 W
PLW13              0.09314700 W

F2 - Processing parameters
SI                      32768
SF               100.6228410 MHz
WDW                        EM
SSB                         0
LB                      1.00 Hz
GB                          0
PC                      1.40
```



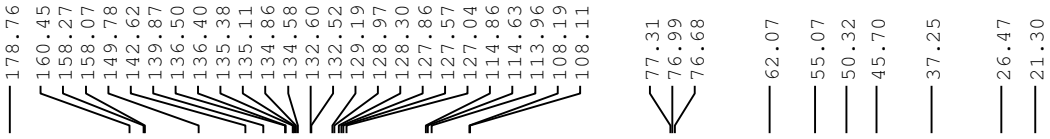
3l

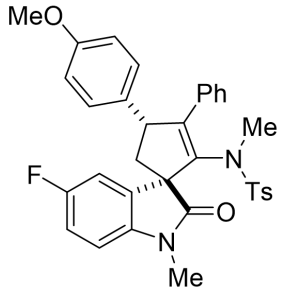



```
Current Data Parameters
NAME            cqh-130
EXPNO        2020121601
PROCNO                1

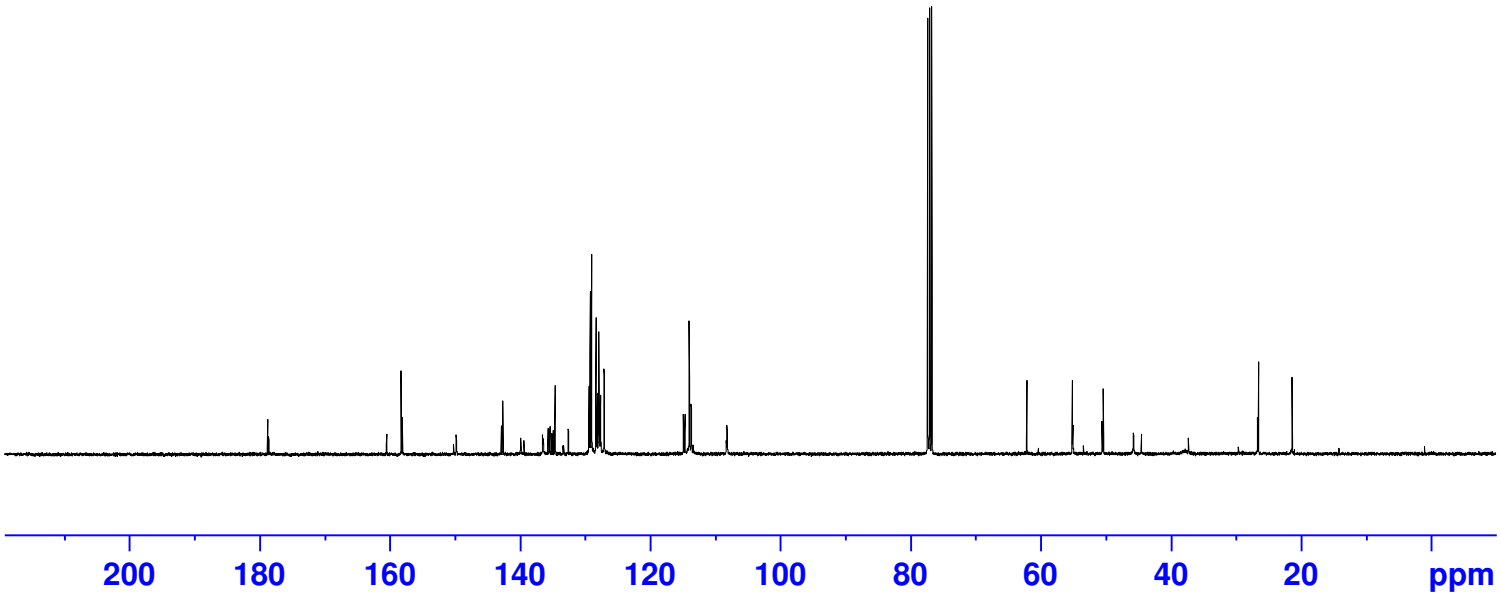
F2 - Acquisition Parameters
Date_          20201217
Time               6.01 h
INSTRUM           spect
PROBHD   Z108618_0256 (
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                   16
DS                    2
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            3.9845889 sec
RG                 50.8
DW               60.800 usec
DE                6.50 usec
TE               293.8 K
D1            1.00000000 sec
TD0                   1
SFO1        400.1724712 MHz
NUC1                1H
P0                3.33 usec
P1               10.00 usec
PLW1        15.00000000 W

F2 - Processing parameters
SI                32768
SF          400.1700072 MHz
WDW                  no
SSB                   0
LB                    0 Hz
GB                    0
PC                 1.00
```





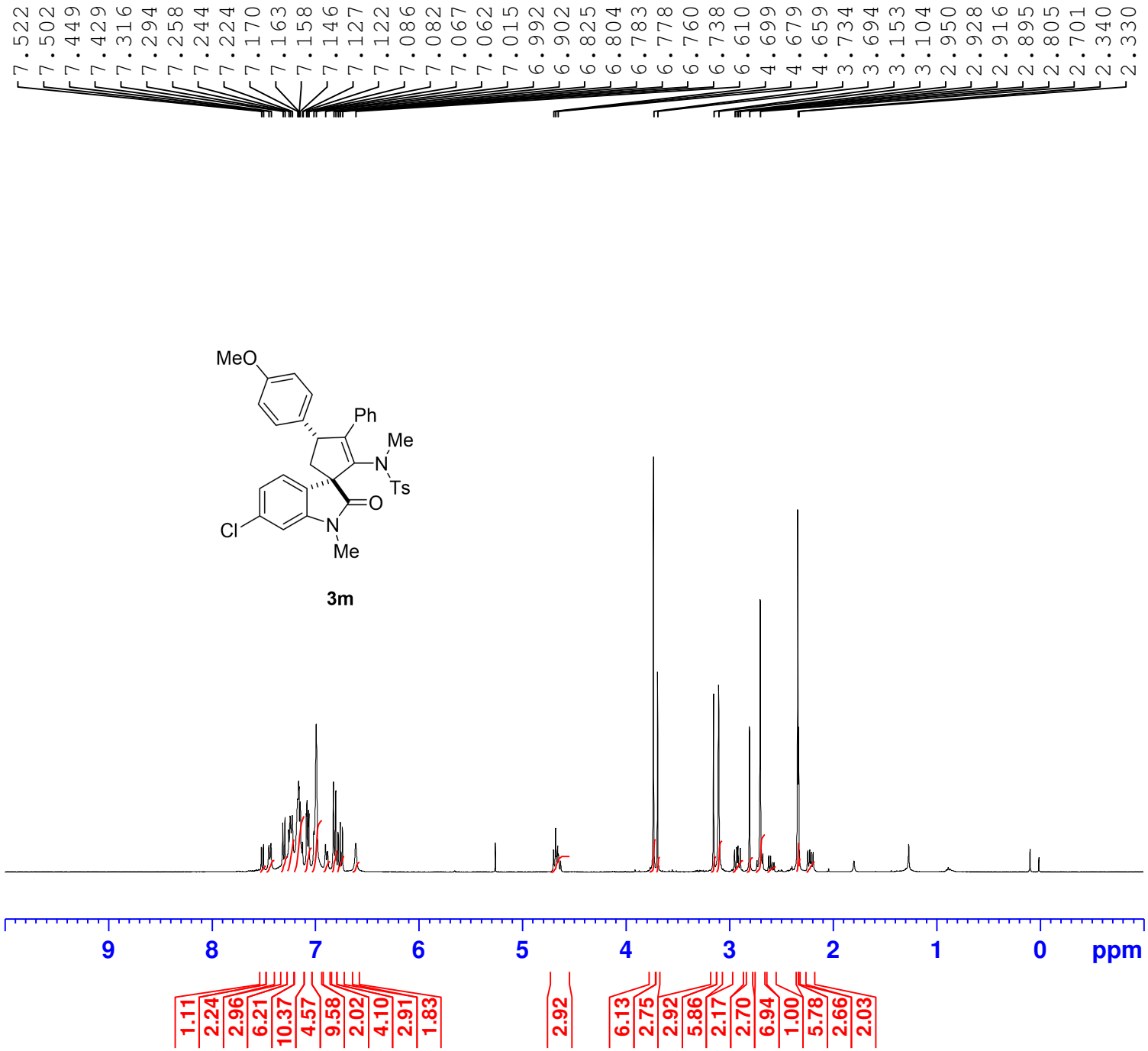
3l




```
Current Data Parameters
NAME              cqh-130
EXPNO          2020121602
PROCNO                  1

F2 - Acquisition Parameters
Date_            20201217
Time                8.38 h
INSTRUM            spect
PROBHD   Z108618_0256 (
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1000
DS                     4
SWH            24038.461 Hz
FIDRES          0.733596 Hz
AQ              1.3631488 sec
RG                  2050
DW                20.800 usec
DE                 6.50 usec
TE                293.7 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1
SFO1        100.6328888 MHz
NUC1                13C
P0                 3.33 usec
P1                10.00 usec
PLW1        50.00000000 W
SFO2        400.1716007 MHz
NUC2                1H
CPDPRG[2         waltz65
PCPD2             90.00 usec
PLW2        15.00000000 W
PLW12        0.18519001 W
PLW13        0.09314700 W

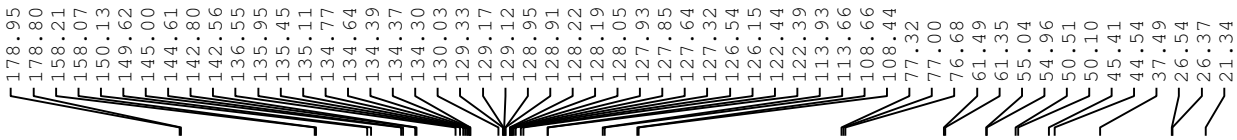
F2 - Processing parameters
SI                 32768
SF          100.6228403 MHz
WDW                   EM
SSB                    0
LB                 1.00 Hz
GB                     0
PC                 1.40
```

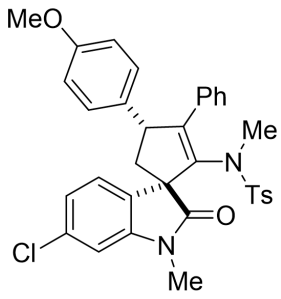



```
Current Data Parameters
NAME                 zy-10
EXPNO           2020121601
PROCNO                   1

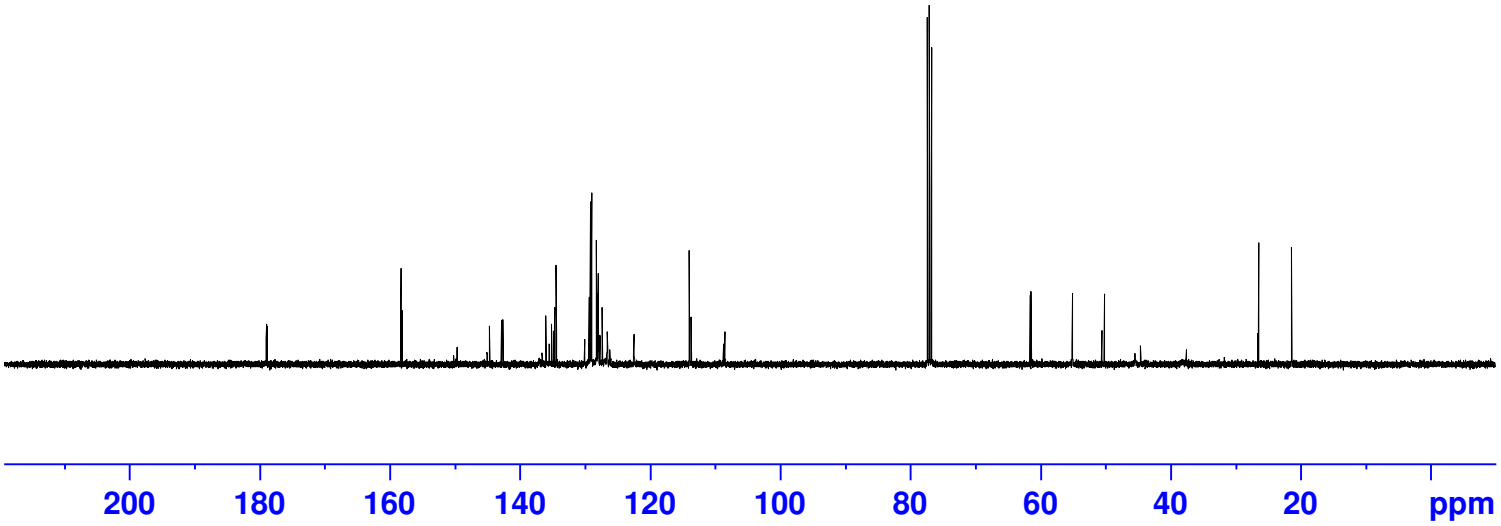
F2 - Acquisition Parameters
Date_              20201217
Time                   6.26 h
INSTRUM               spect
PROBHD    Z108618_0256 (
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8223.685 Hz
FIDRES             0.250967 Hz
AQ                 3.9845889 sec
RG                      45.2
DW                    60.800 usec
DE                     6.50 usec
TE                    293.4 K
D1              1.00000000 sec
TD0                       1
SFO1           400.1724712 MHz
NUC1                    1H
P0                     3.33 usec
P1                    10.00 usec
PLW1           15.00000000 W

F2 - Processing parameters
SI                    32768
SF             400.1700072 MHz
WDW                      no
SSB                       0
LB                        0 Hz
GB                        0
PC                     1.00
```





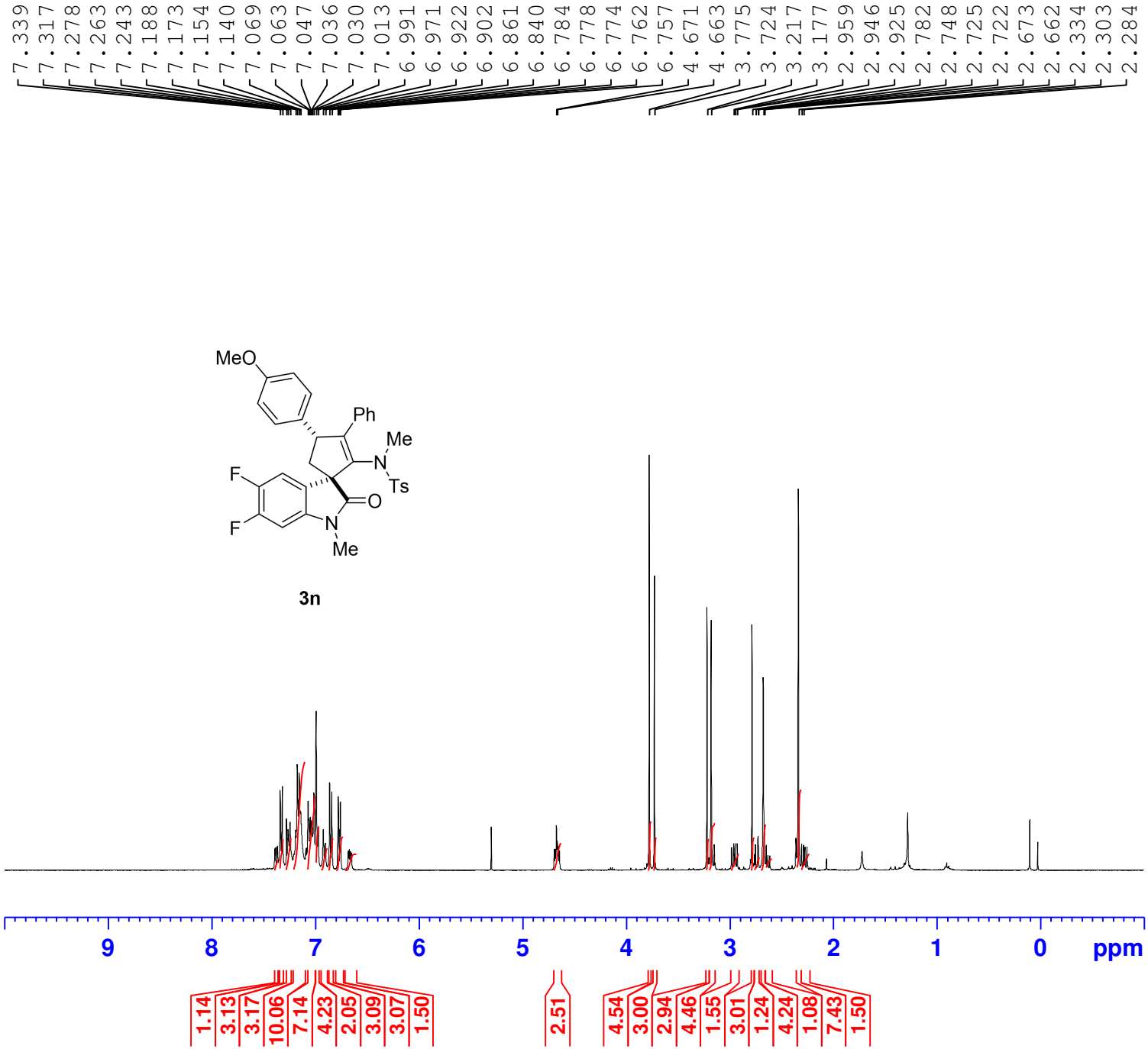
3m




```
Current Data Parameters
NAME                 zy-10
EXPNO          2020121602
PROCNO                  1

F2 - Acquisition Parameters
Date_             20201217
Time                11.01 h
INSTRUM              spect
PROBHD    Z108618_0256 (
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    400
DS                      4
SWH             24038.461 Hz
FIDRES           0.733596 Hz
AQ               1.3631488 sec
RG                   2050
DW                 20.800 usec
DE                  6.50 usec
TE                 293.7 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                     1
SFO1          100.6328888 MHz
NUC1                  13C
P0                  3.33 usec
P1                 10.00 usec
PLW1          50.00000000 W
SFO2          400.1716007 MHz
NUC2                  1H
CPDPRG[2          waltz65
PCPD2               90.00 usec
PLW2          15.00000000 W
PLW12          0.18519001 W
PLW13          0.09314700 W

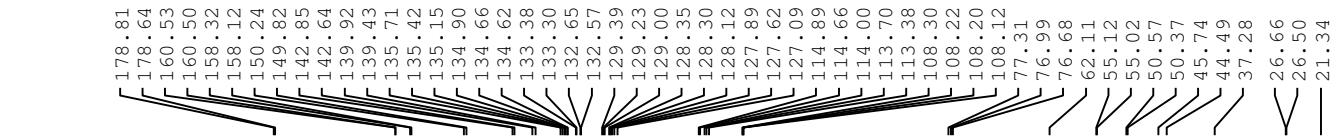
F2 - Processing parameters
SI                  32768
SF            100.6228418 MHz
WDW                   no
SSB                    0
LB                     0 Hz
GB                     0
PC                  1.40
```

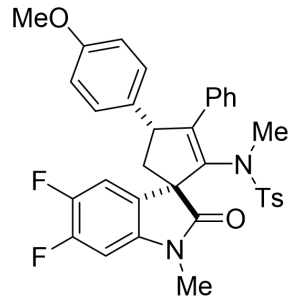



```
Current Data Parameters
NAME                  cqh-145
EXPNO              2020122301
PROCNO                      1

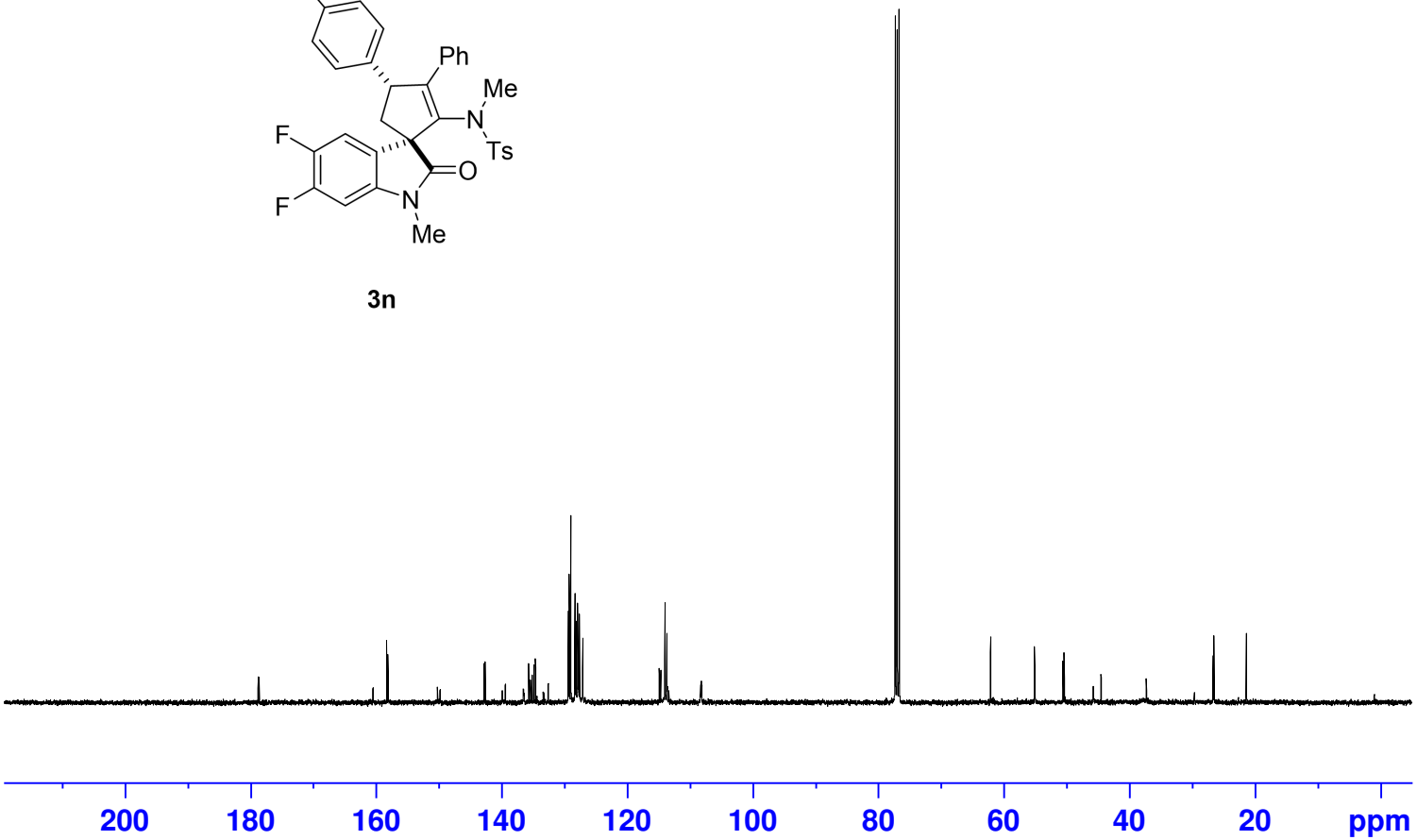
F2 - Acquisition Parameters
Date_               20201224
Time                    9.13 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                3.9845889 sec
RG                       114
DW                    60.800 usec
DE                     6.50 usec
TE                    294.0 K
D1                1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1             15.00000000 W

F2 - Processing parameters
SI                     32768
SF               400.1700012 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```





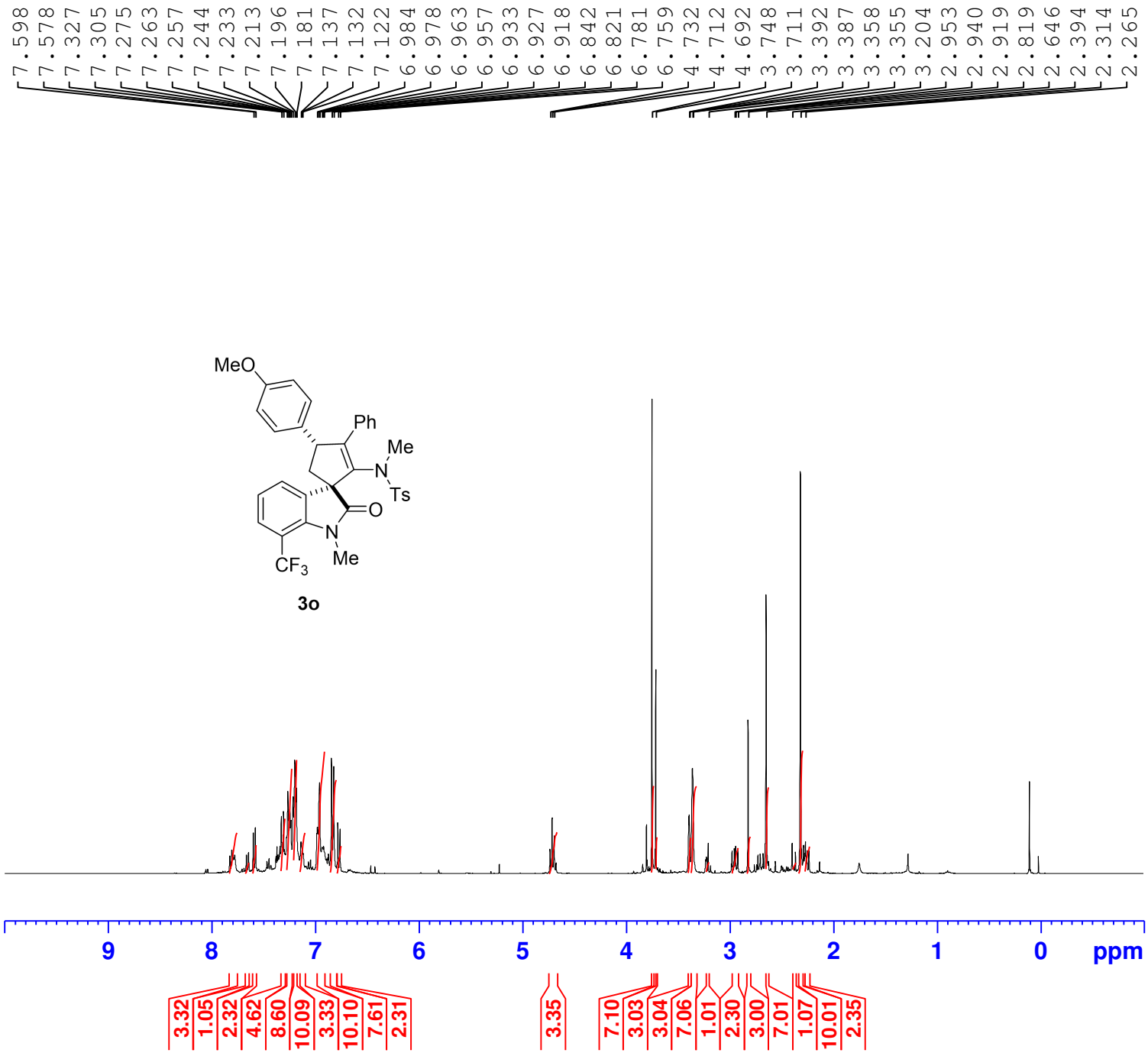
3n




```
Current Data Parameters
NAME                  cqh-145
EXPNO           2020122302
PROCNO                     1

F2 - Acquisition Parameters
Date_               20201224
Time                   13.27 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG              zgpg30
TD                     65536
SOLVENT                CDCl3
NS                       800
DS                         4
SWH                24038.461 Hz
FIDRES              0.733596 Hz
AQ                  1.3631488 sec
RG                      2050
DW                    20.800 usec
DE                     6.50 usec
TE                    294.6 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                        1
SFO1            100.6328888 MHz
NUC1                     13C
P0                     3.33 usec
P1                    10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                     1H
CPDPRG[2             waltz65
PCPD2                 90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

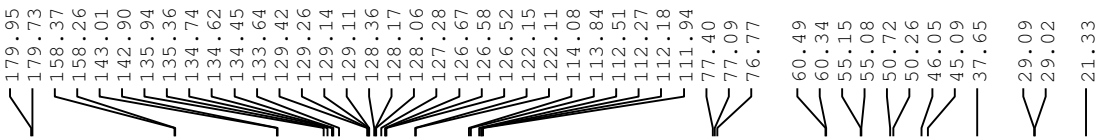
F2 - Processing parameters
SI                     32768
SF              100.6228359 MHz
WDW                       EM
SSB                        0
LB                     1.00 Hz
GB                         0
PC                     1.40
```

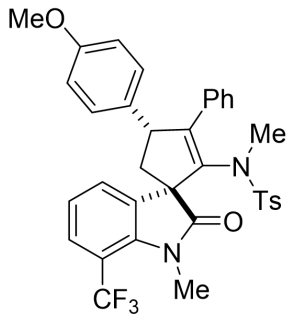



```
Current Data Parameters
NAME                  cqh-167
EXPNO              2021030901
PROCNO                      1

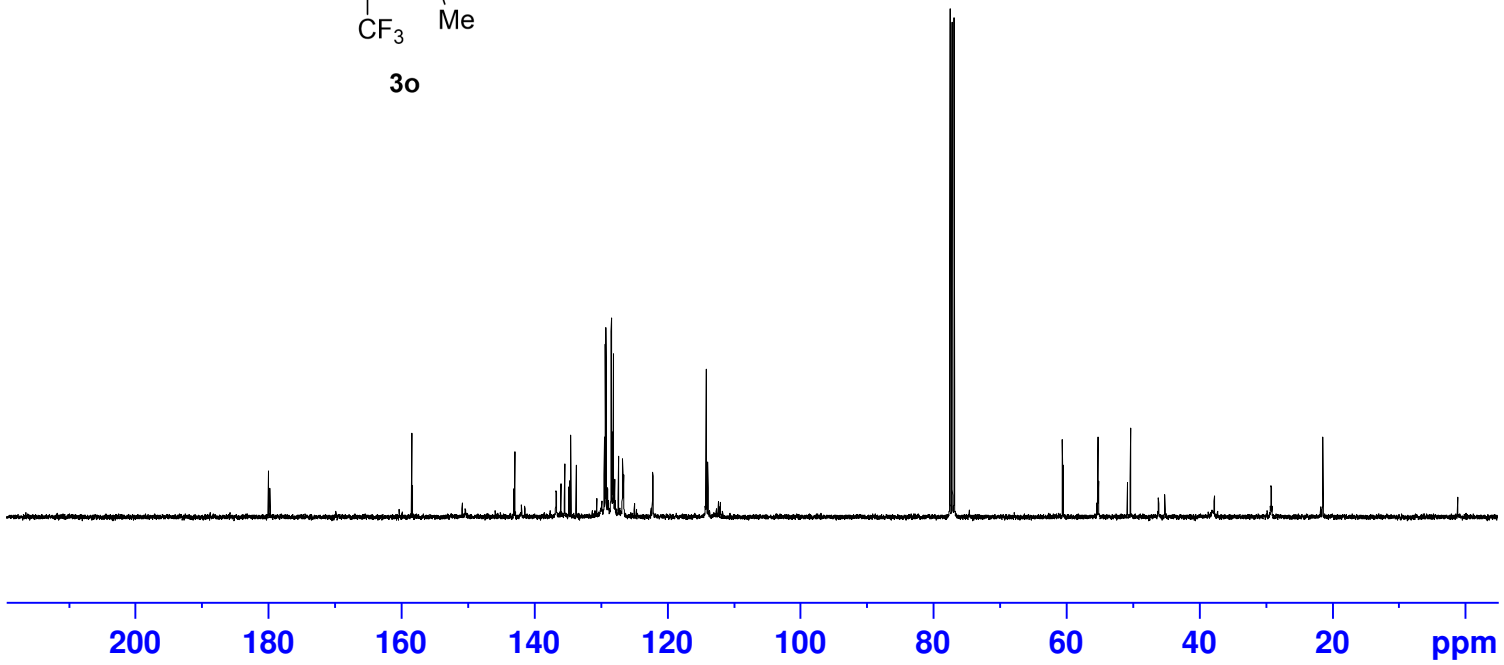
F2 - Acquisition Parameters
Date_                20210310
Time                     6.42 h
INSTRUM                  spect
PROBHD   Z108618_0256 (
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                  8223.685 Hz
FIDRES               0.250967 Hz
AQ                   3.9845889 sec
RG                        71.8
DW                     60.800 usec
DE                      6.50 usec
TE                     294.5 K
D1                   1.00000000 sec
TD0                         1
SFO1              400.1724712 MHz
NUC1                       1H
P0                      3.33 usec
P1                     10.00 usec
PLW1              15.00000000 W

F2 - Processing parameters
SI                      32768
SF                400.1700072 MHz
WDW                        no
SSB                         0
LB                          0 Hz
GB                          0
PC                       1.00
```





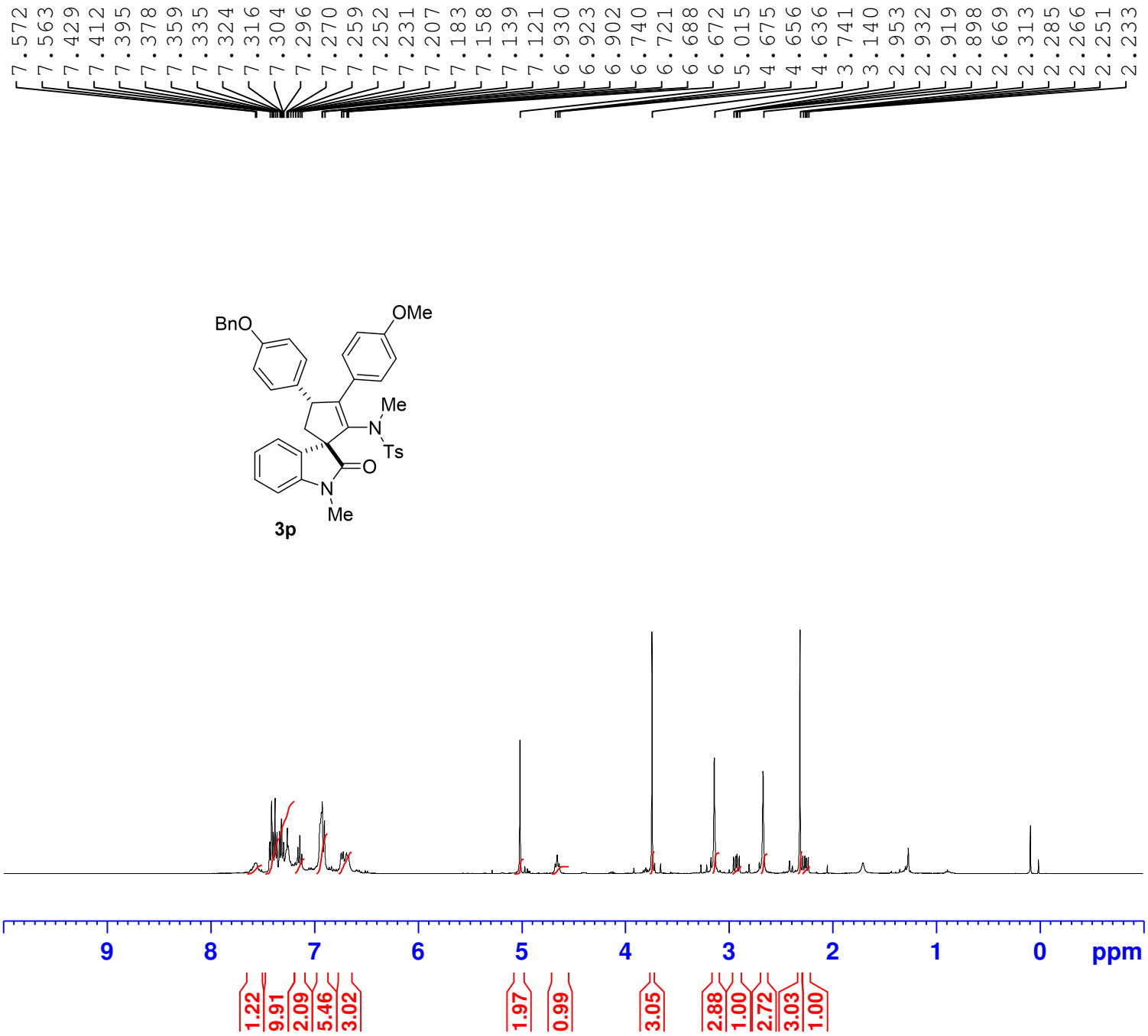
3o




```
Current Data Parameters
NAME                  cqh-167
EXPNO              2021030902
PROCNO                      1

F2 - Acquisition Parameters
Date_               20210310
Time                   13.16 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                      533
DS                        4
SWH               24038.461 Hz
FIDRES             0.733596 Hz
AQ                 1.3631488 sec
RG                     2050
DW                   20.800 usec
DE                    6.50 usec
TE                   294.5 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                       1
SFO1           100.6328888 MHz
NUC1                    13C
P0                    3.33 usec
P1                   10.00 usec
PLW1           50.00000000 W
SFO2           400.1716007 MHz
NUC2                    1H
CPDPRG[2             waltz65
PCPD2                90.00 usec
PLW2           15.00000000 W
PLW12           0.18519001 W
PLW13           0.09314700 W

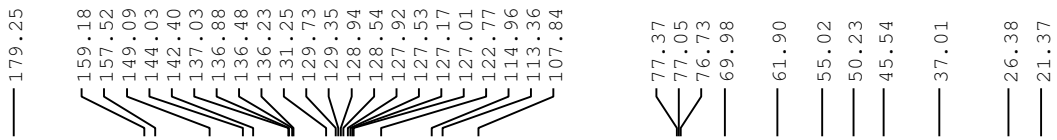
F2 - Processing parameters
SI                    32768
SF             100.6228300 MHz
WDW                      EM
SSB                       0
LB                    1.00 Hz
GB                        0
PC                    1.40
```

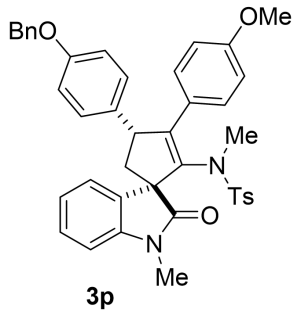



```
Current Data Parameters
NAME                  zy-1 pure
EXPNO              2020092101
PROCNO                      1

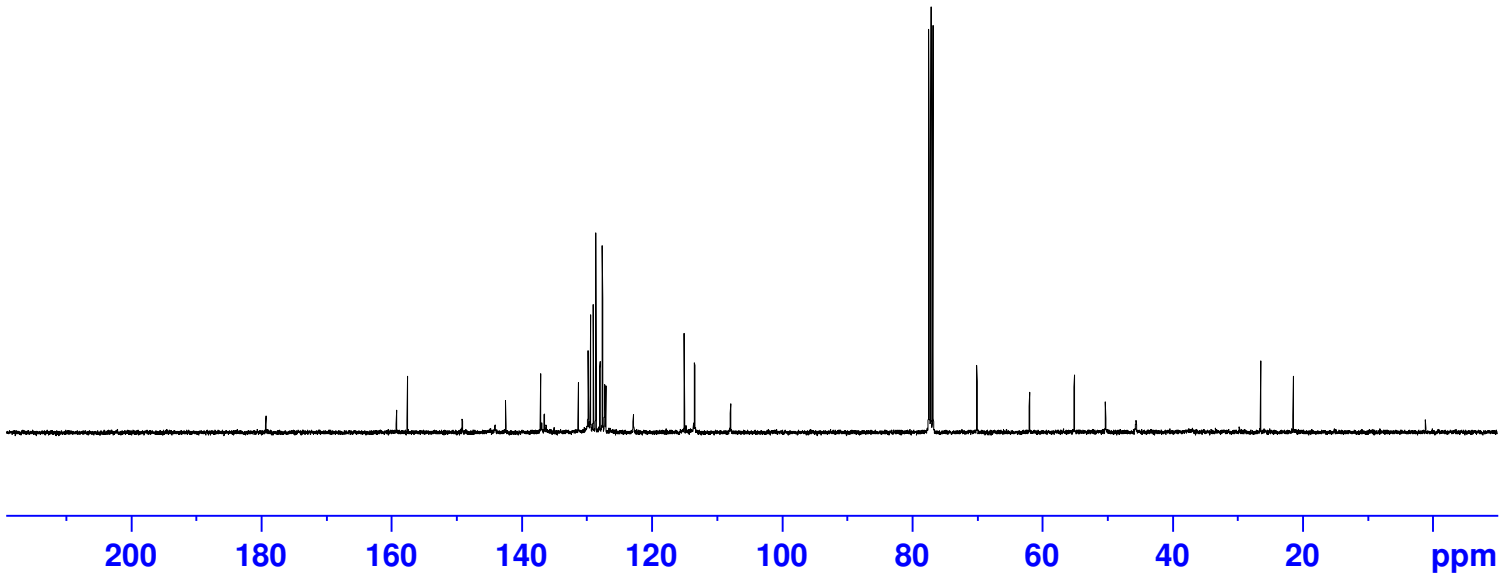
F2 - Acquisition Parameters
Date_               20200922
Time                    0.01 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                       128
DW                    60.800 usec
DE                     6.50 usec
TE                     297.5 K
D1                 1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1            15.00000000 W

F2 - Processing parameters
SI                     32768
SF               400.1700079 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```





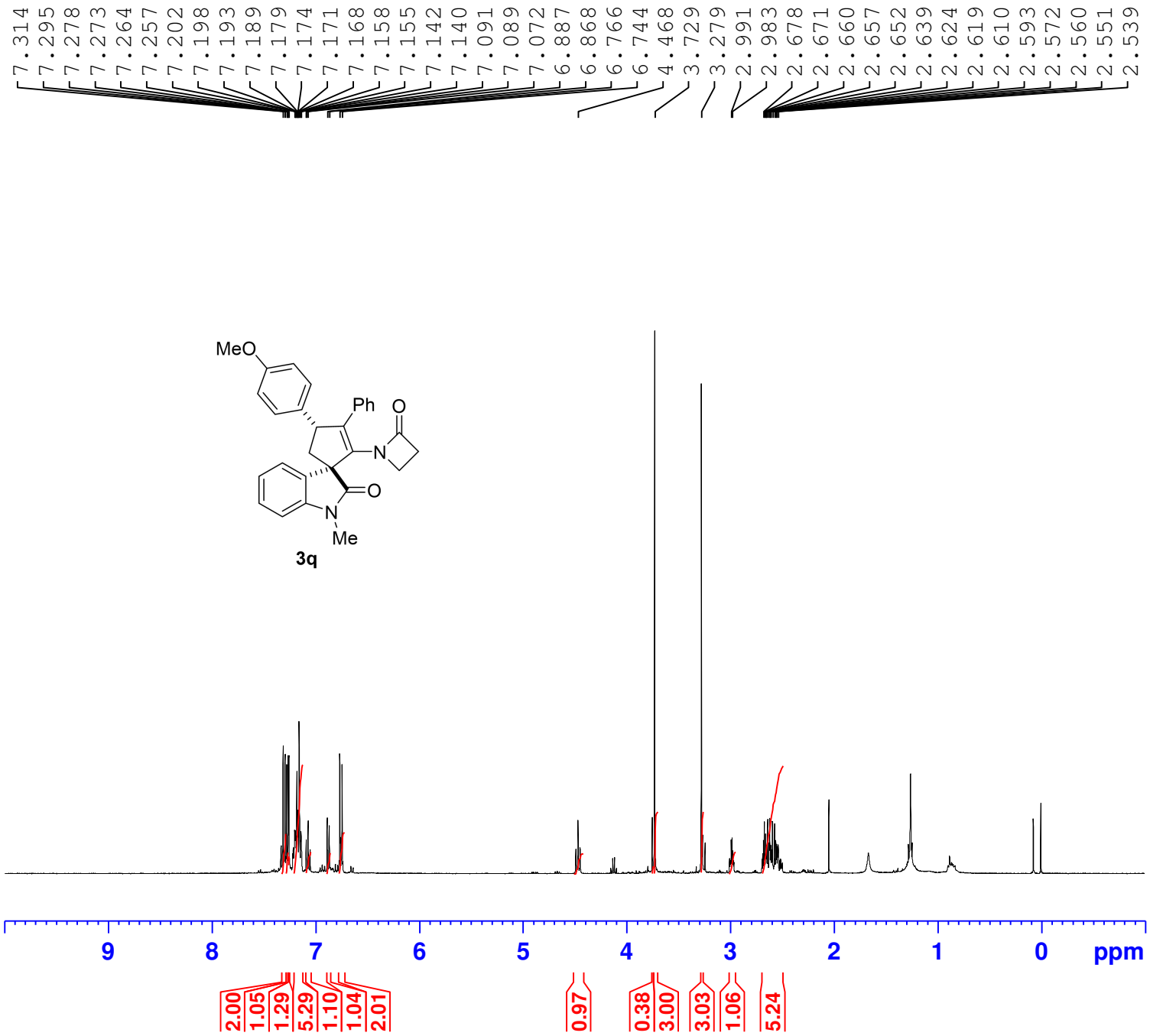
3p




```
Current Data Parameters
NAME                  zy-1
EXPNO           2020092102
PROCNO                   1

F2 - Acquisition Parameters
Date_              20200925
Time                  1.56 h
INSTRUM              spect
PROBHD    Z108618_0256 (
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    866
DS                      4
SWH             24038.461 Hz
FIDRES           0.733596 Hz
AQ               1.3631488 sec
RG                   2050
DW                 20.800 usec
DE                  6.50 usec
TE                 298.1 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                     1
SFO1          100.6328888 MHz
NUC1                 13C
P0                  3.33 usec
P1                 10.00 usec
PLW1          50.00000000 W
SFO2          400.1716007 MHz
NUC2                 1H
CPDPRG[2          waltz65
PCPD2               90.00 usec
PLW2          15.00000000 W
PLW12          0.18519001 W
PLW13          0.09314700 W

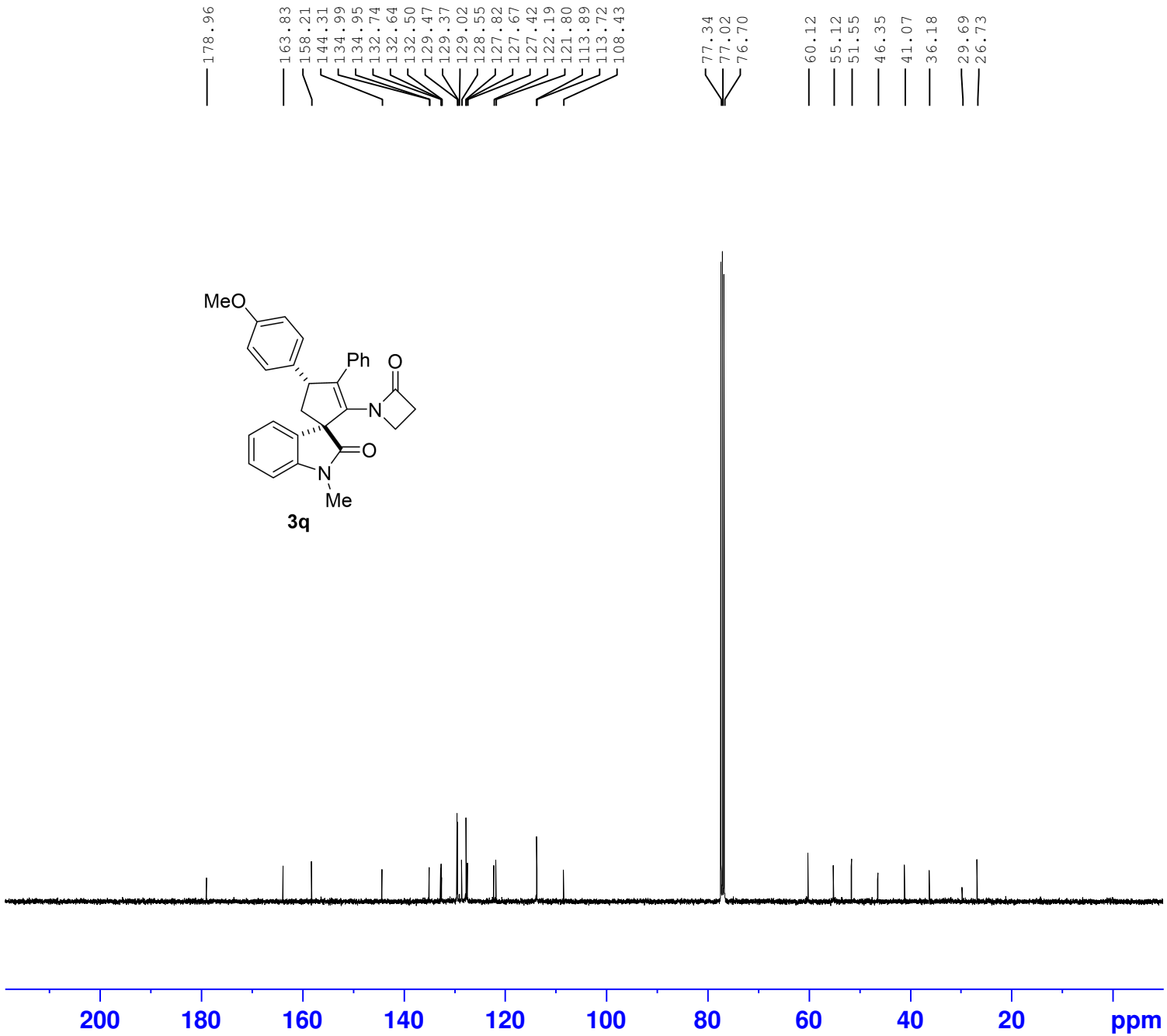
F2 - Processing parameters
SI                   32768
SF            100.6228300 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40
```




```
Current Data Parameters
NAME                  cqh-146
EXPNO              2021030901
PROCNO                     1

F2 - Acquisition Parameters
Date_               20210310
Time                    5.58 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                       362
DW                    60.800 usec
DE                     6.50 usec
TE                    294.4 K
D1                  1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1            15.00000000 W

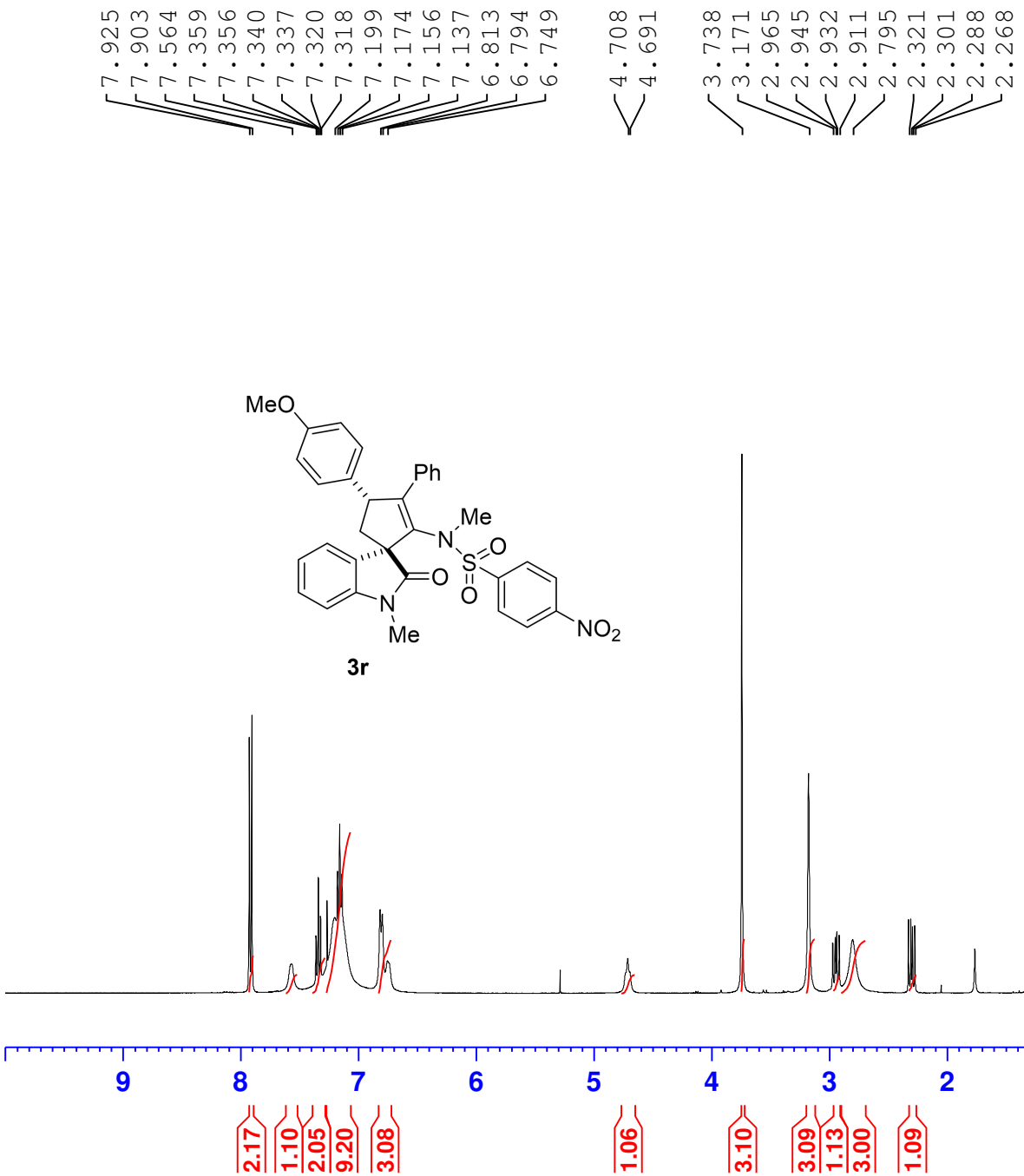
F2 - Processing parameters
SI                     32768
SF               400.1700072 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```




```
Current Data Parameters
NAME                  cqh-146
EXPNO              2021010802
PROCNO                      1

F2 - Acquisition Parameters
Date_                20210310
Time                     9.53 h
INSTRUM                  spect
PROBHD   Z108618_0256 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         681
DS                           4
SWH                 24038.461 Hz
FIDRES               0.733596 Hz
AQ                  1.3631488 sec
RG                        2050
DW                      20.800 usec
DE                       6.50 usec
TE                      294.7 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                          1
SFO1               100.6328888 MHz
NUC1                       13C
P0                       3.33 usec
P1                      10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                       1H
CPDPRG[2              waltz65
PCPD2                   90.00 usec
PLW2               15.00000000 W
PLW12               0.18519001 W
PLW13               0.09314700 W

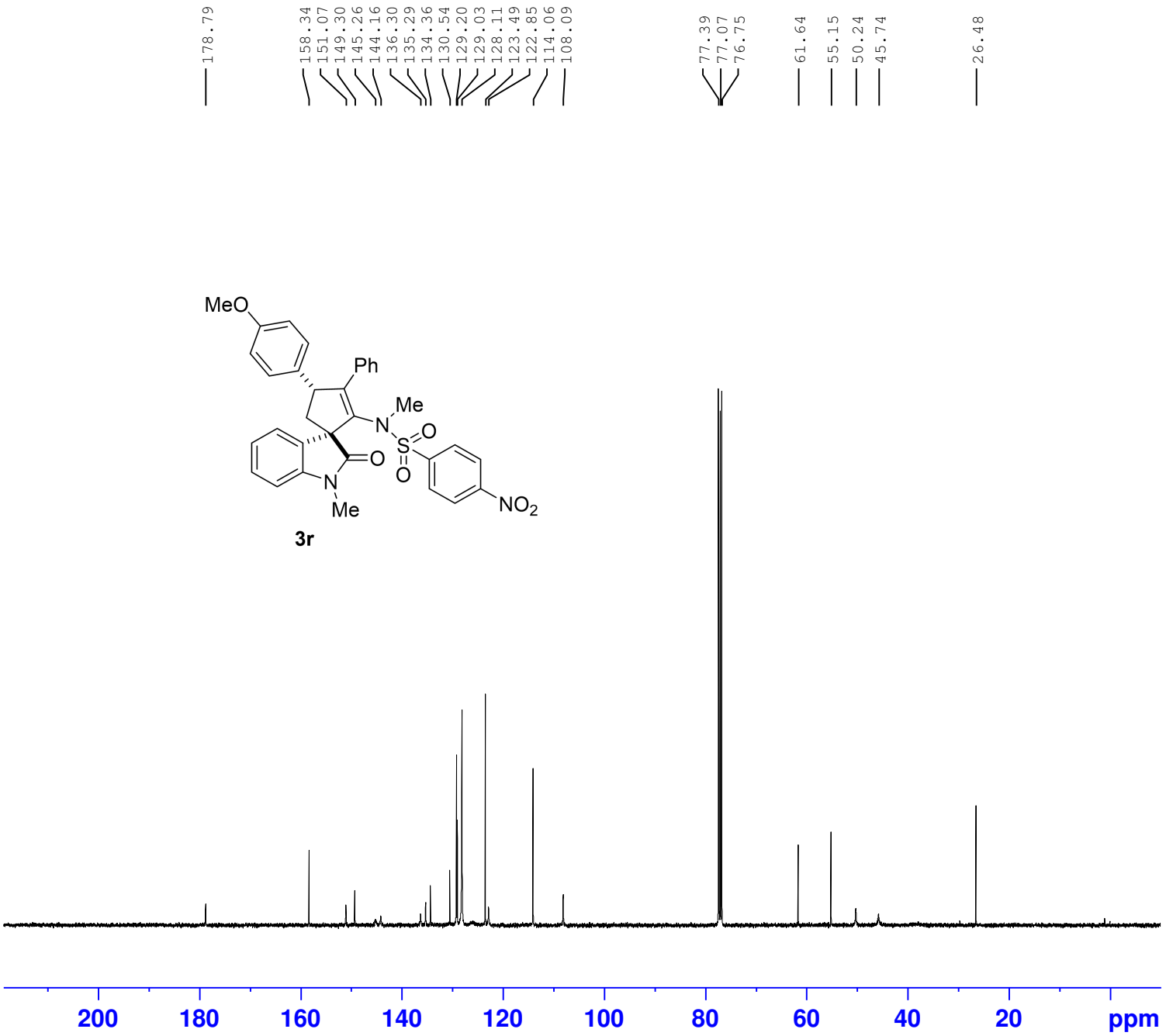
F2 - Processing parameters
SI                       32768
SF                 100.6228300 MHz
WDW                         EM
SSB                          0
LB                        1.00 Hz
GB                           0
PC                        1.40
```




```
Current Data Parameters
NAME                  cqh-148
EXPNO              2021030901
PROCNO                      1

F2 - Acquisition Parameters
Date_               20210310
Time                    6.04 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                       362
DW                    60.800 usec
DE                     6.50 usec
TE                    294.5 K
D1                  1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1            15.00000000 W

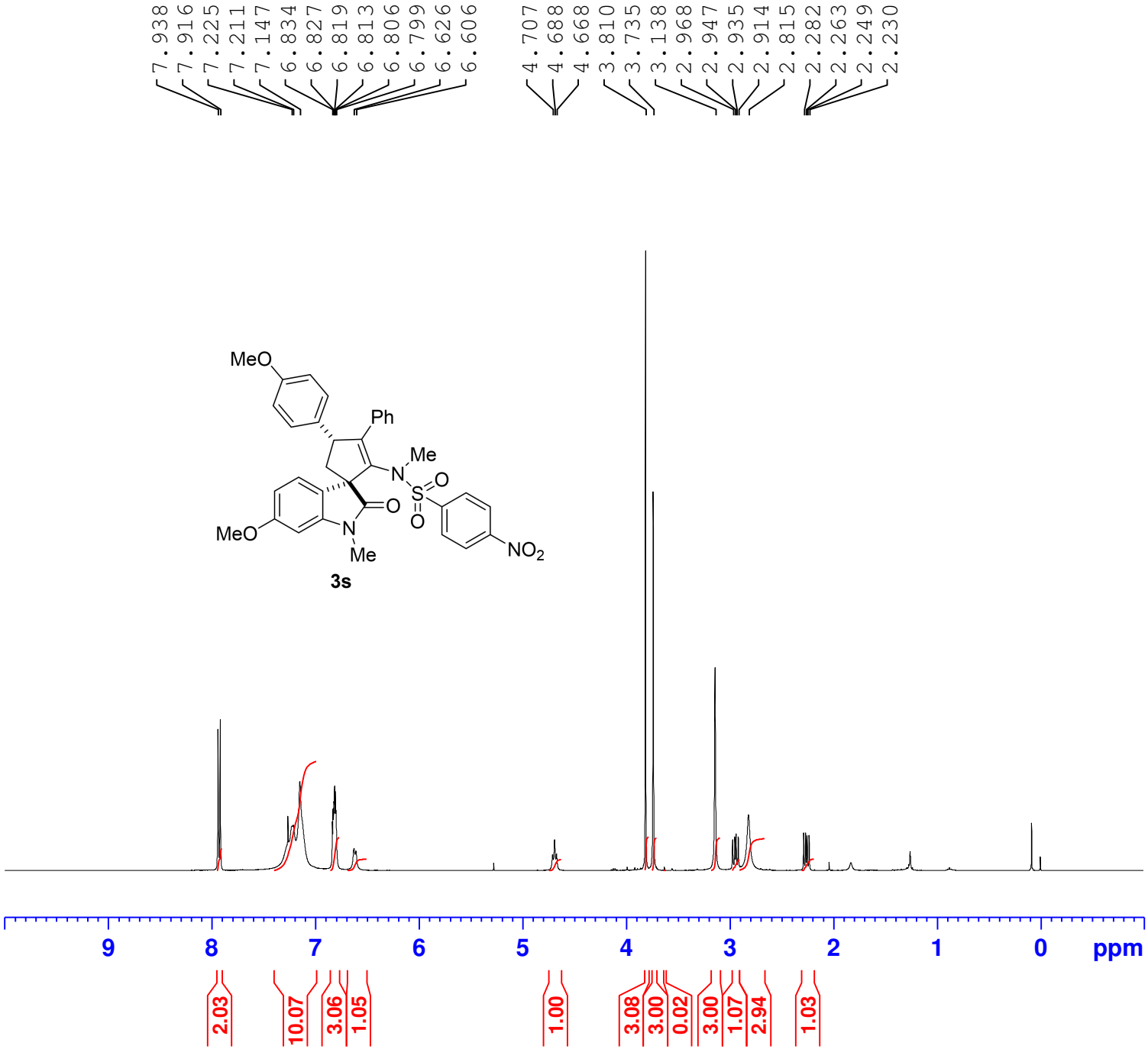
F2 - Processing parameters
SI                     32768
SF               400.1700072 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```




```
Current Data Parameters
NAME                  cqh-148
EXPNO              2021010802
PROCNO                      1

F2 - Acquisition Parameters
Date_               20210310
Time                  11.01 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                     1069
DS                        4
SWH               24038.461 Hz
FIDRES             0.733596 Hz
AQ                1.3631488 sec
RG                     2050
DW                   20.800 usec
DE                    6.50 usec
TE                   294.9 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                       1
SFO1            100.6328888 MHz
NUC1                    13C
P0                    3.33 usec
P1                   10.00 usec
PLW1            50.00000000 W
SFO2            400.1716007 MHz
NUC2                    1H
CPDPRG[2             waltz65
PCPD2                 90.00 usec
PLW2            15.00000000 W
PLW12            0.18519001 W
PLW13            0.09314700 W

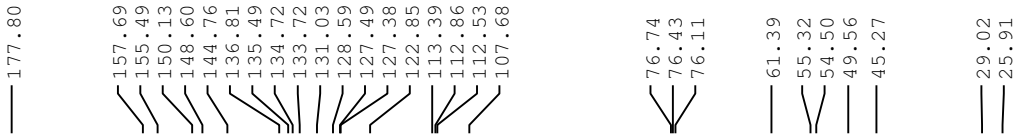
F2 - Processing parameters
SI                    32768
SF              100.6228300 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.40
```

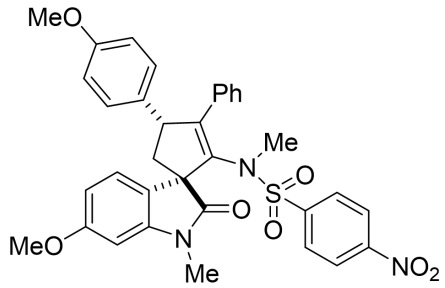



```
Current Data Parameters
NAME                  cqh-193
EXPNO              2021041901
PROCNO                      1

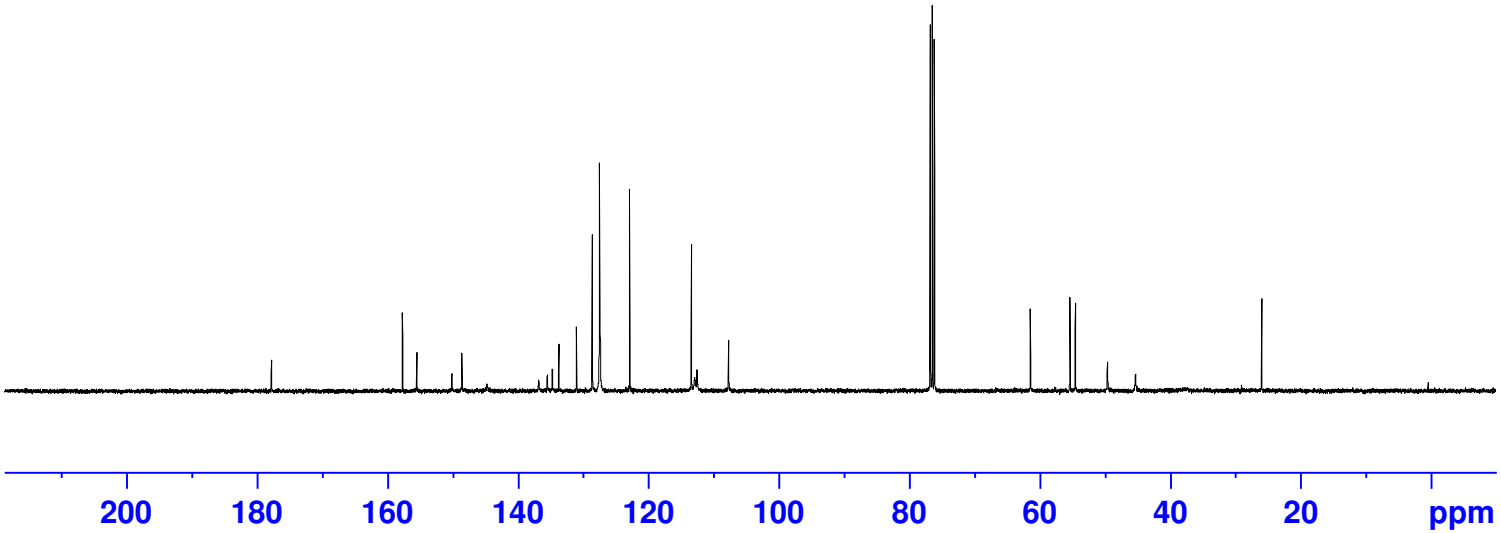
F2 - Acquisition Parameters
Date_                20210420
Time                     2.00 h
INSTRUM                 spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                       101
DW                    60.800 usec
DE                     6.50 usec
TE                    293.2 K
D1                 1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1            15.00000000 W

F2 - Processing parameters
SI                     32768
SF               400.1700072 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```





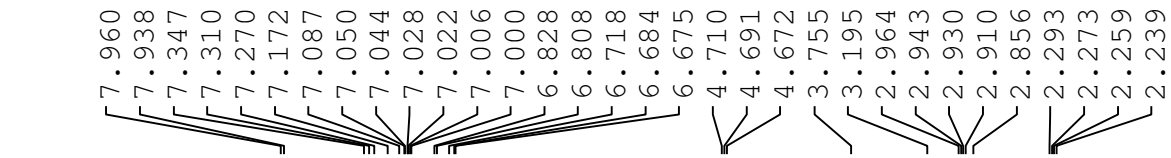
3s

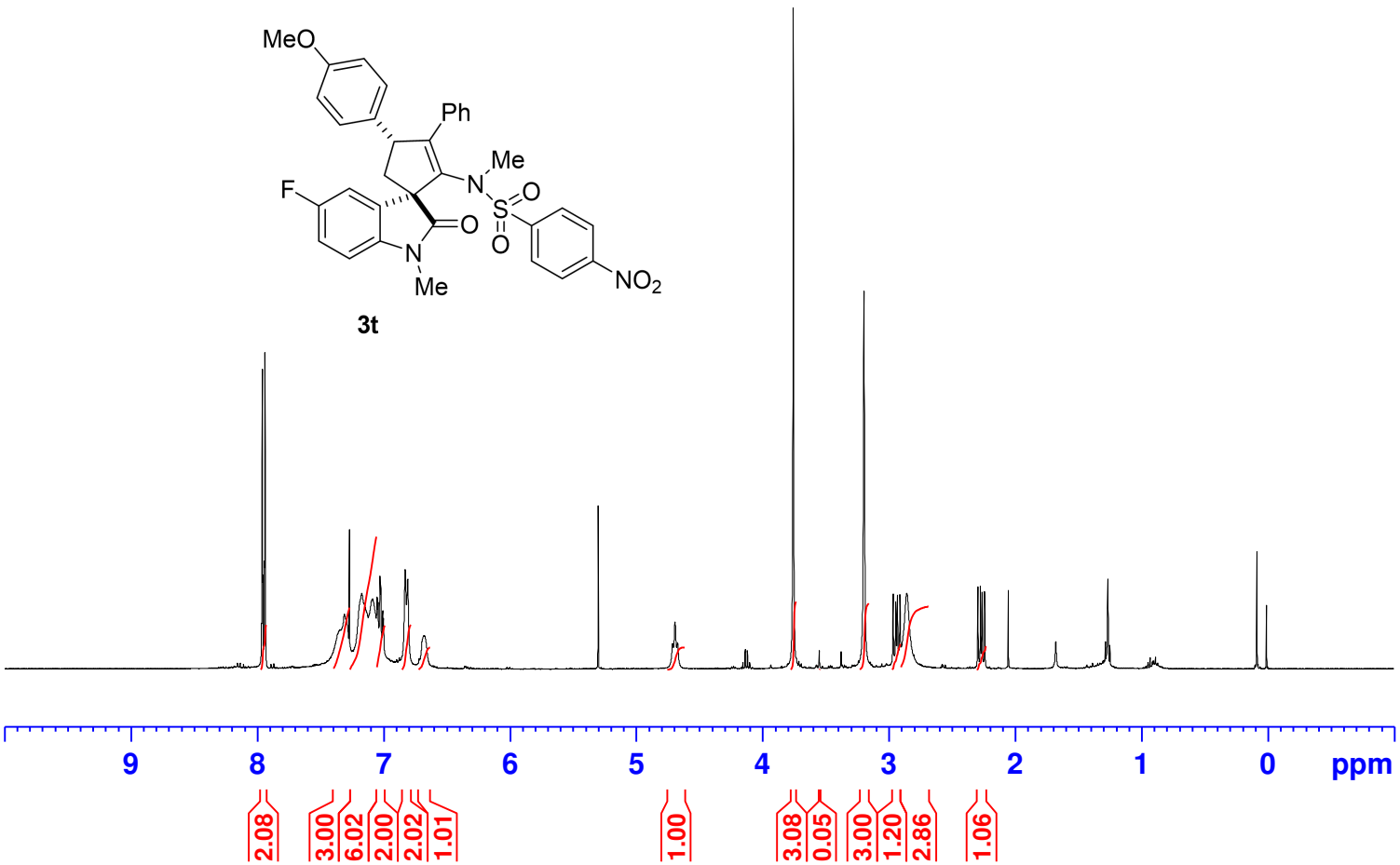



```
Current Data Parameters
NAME                cqh-193
EXPNO          2021041902
PROCNO                  1

F2 - Acquisition Parameters
Date_            20210420
Time                3.38 h
INSTRUM            spect
PROBHD    Z108618_0256 (
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                   501
DS                     4
SWH            24038.461 Hz
FIDRES          0.733596 Hz
AQ              1.3631488 sec
RG                  2050
DW                20.800 usec
DE                 6.50 usec
TE                293.7 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1
SFO1         100.6328888 MHz
NUC1                13C
P0                 3.33 usec
P1                10.00 usec
PLW1         50.00000000 W
SFO2         400.1716007 MHz
NUC2                1H
CPDPRG[2         waltz65
PCPD2              90.00 usec
PLW2         15.00000000 W
PLW12         0.18519001 W
PLW13         0.09314700 W

F2 - Processing parameters
SI                 32768
SF           100.6228963 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

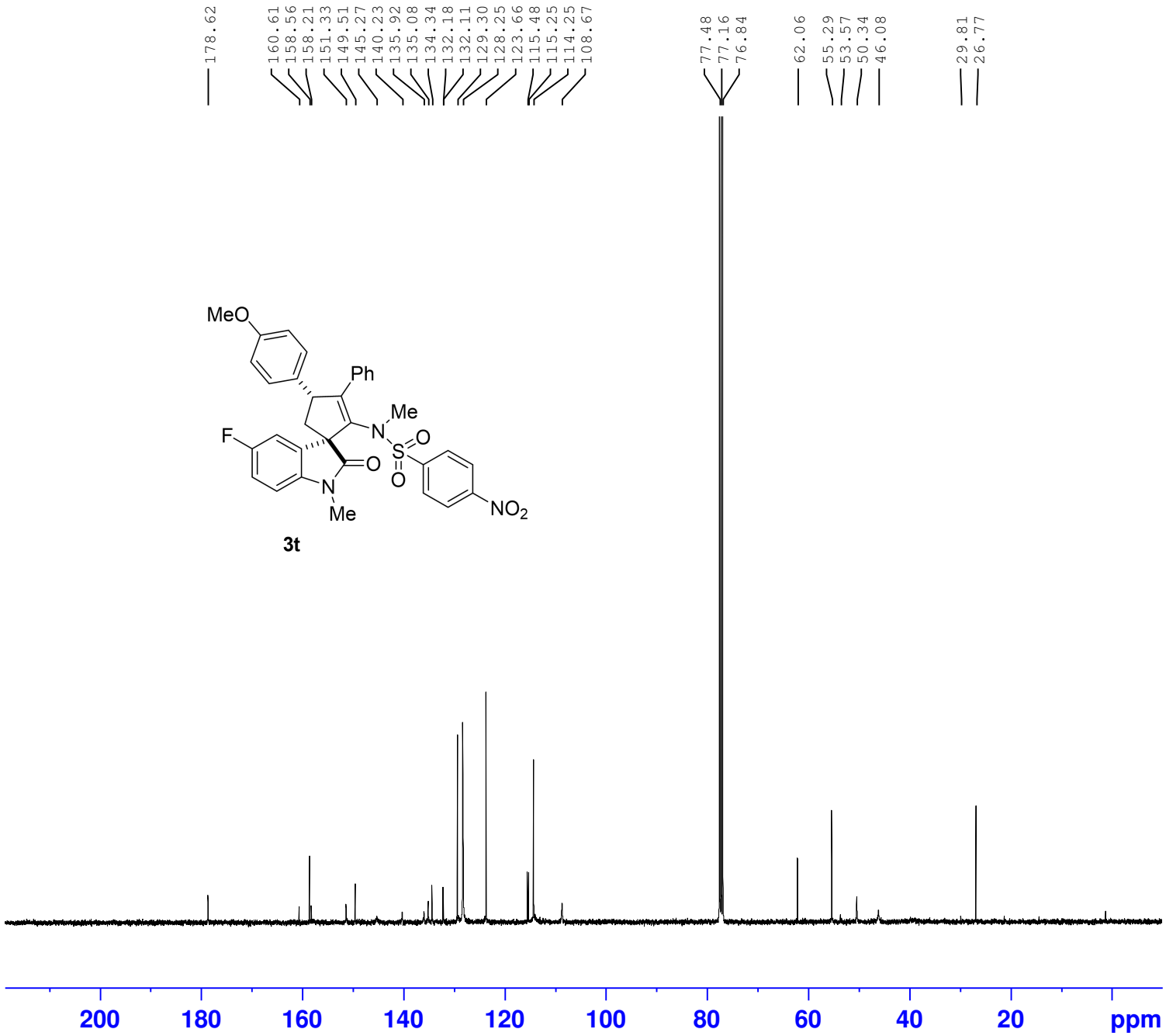





```
Current Data Parameters
NAME                  cqh-153
EXPNO              2021010801
PROCNO                      1

F2 - Acquisition Parameters
Date_               20210109
Time                    5.14 h
INSTRUM                spect
PROBHD   Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                       128
DW                    60.800 usec
DE                     6.50 usec
TE                    293.7 K
D1                  1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1            15.00000000 W

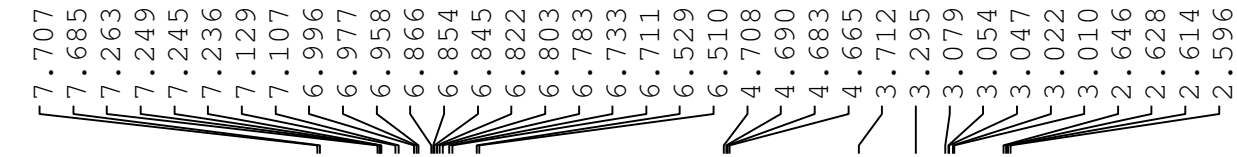
F2 - Processing parameters
SI                     32768
SF               400.1700042 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```

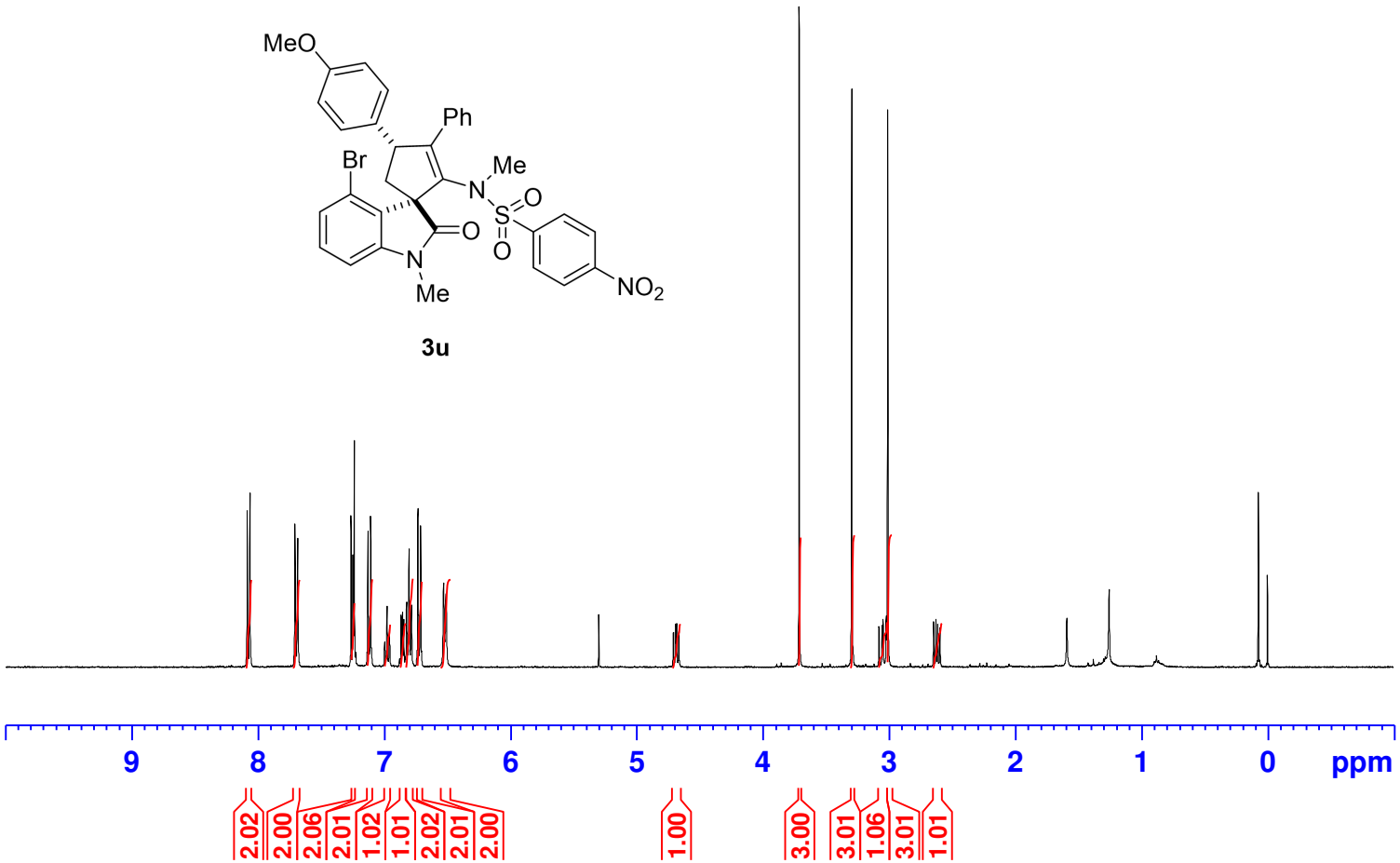



```
Current Data Parameters
NAME                  cqh-153
EXPNO              2021010802
PROCNO                      1

F2 - Acquisition Parameters
Date_               20210109
Time                    8.17 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                       1357
DS                          4
SWH                24038.461 Hz
FIDRES              0.733596 Hz
AQ                  1.3631488 sec
RG                       2050
DW                     20.800 usec
DE                      6.50 usec
TE                     294.2 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                         1
SFO1             100.6328888 MHz
NUC1                     13C
P0                      3.33 usec
P1                     10.00 usec
PLW1              50.00000000 W
SFO2              400.1716007 MHz
NUC2                     1H
CPDPRG[2              waltz65
PCPD2                  90.00 usec
PLW2              15.00000000 W
PLW12              0.18519001 W
PLW13              0.09314700 W

F2 - Processing parameters
SI                       32768
SF               100.6228176 MHz
WDW                        EM
SSB                         0
LB                      1.00 Hz
GB                          0
PC                      1.40
```

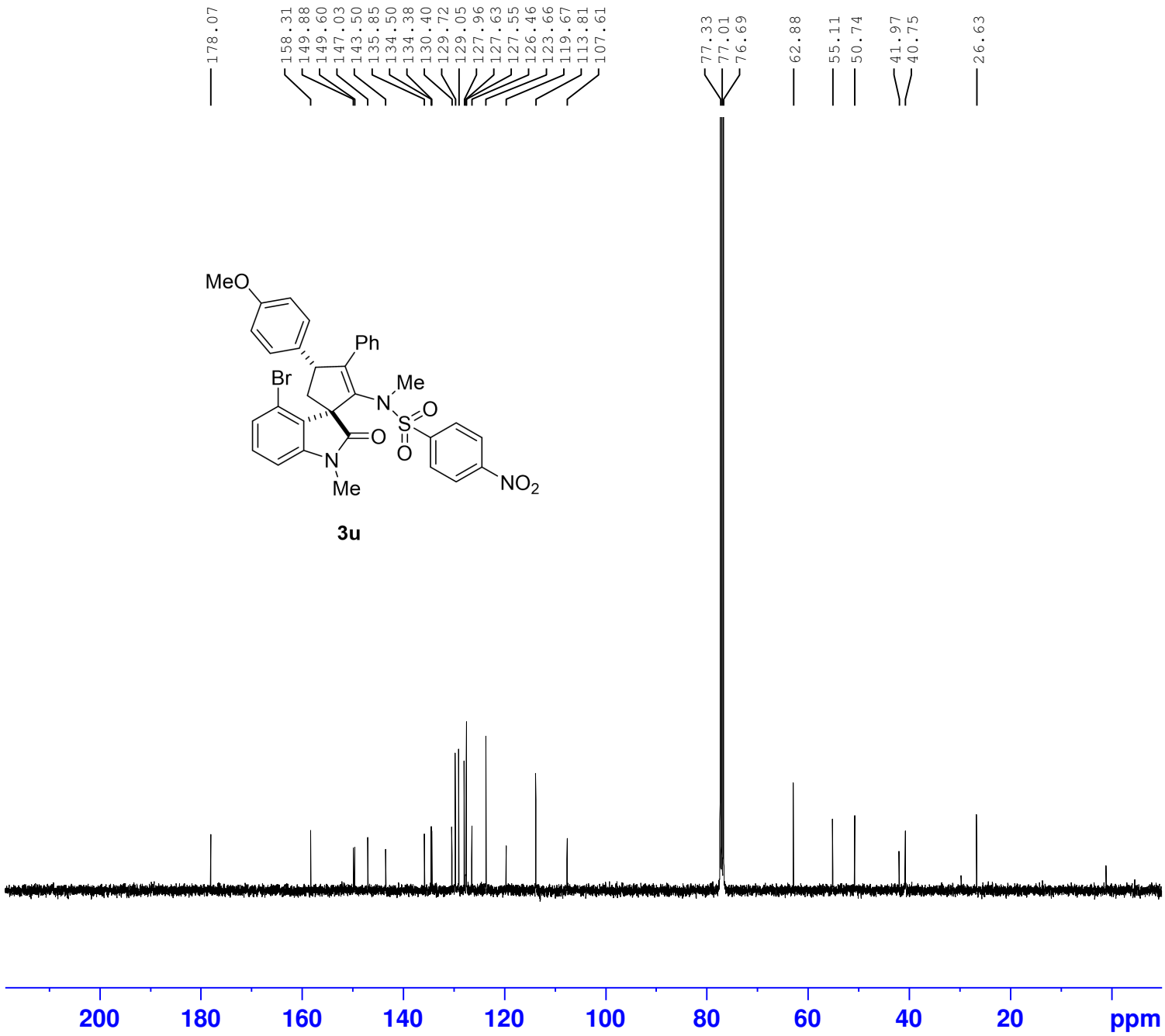





```
Current Data Parameters
NAME                  cqh-154
EXPNO              2021010801
PROCNO                      1

F2 - Acquisition Parameters
Date_               20210109
Time                    5.18 h
INSTRUM                spect
PROBHD    Z108618_0256 (
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8223.685 Hz
FIDRES              0.250967 Hz
AQ                  3.9845889 sec
RG                       287
DW                    60.800 usec
DE                     6.50 usec
TE                     293.7 K
D1                1.00000000 sec
TD0                        1
SFO1             400.1724712 MHz
NUC1                      1H
P0                     3.33 usec
P1                    10.00 usec
PLW1             15.00000000 W

F2 - Processing parameters
SI                     32768
SF               400.1700075 MHz
WDW                       no
SSB                        0
LB                         0 Hz
GB                         0
PC                      1.00
```




```
Current Data Parameters
NAME                  cqh-154
EXPNO              2021010802
PROCNO                      1

F2 - Acquisition Parameters
Date_                20210109
Time                    13.34 h
INSTRUM                 spect
PROBHD    Z108618_0256 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         800
DS                           4
SWH                  24038.461 Hz
FIDRES                0.733596 Hz
AQ                    1.3631488 sec
RG                        2050
DW                      20.800 usec
DE                       6.50 usec
TE                      294.0 K
D1                   2.00000000 sec
D11                  0.03000000 sec
TD0                          1
SFO1               100.6328888 MHz
NUC1                       13C
P0                       3.33 usec
P1                      10.00 usec
PLW1               50.00000000 W
SFO2               400.1716007 MHz
NUC2                       1H
CPDPRG[2                waltz65
PCPD2                   90.00 usec
PLW2               15.00000000 W
PLW12                0.18519001 W
PLW13                0.09314700 W

F2 - Processing parameters
SI                       32768
SF                 100.6228300 MHz
WDW                         EM
SSB                          0
LB                      1.00 Hz
GB                           0
PC                      1.40
```