Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.

Highly stereoselective synthesis of spirocyclopropylthiooxindoles and biological evaluation

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Contents

1. General information

Reactions were monitored by thin layer chromatography using UV light or $KMnO_4$ to visualize the course of reaction. Purification of reaction products was carried out by flash chromatography on silica gel. Chemical yields refer to pure isolated substances. The $[\alpha]_D$ was recorded using Autopol VI High Accuracy Polarimeter. The infrared (IR) spectra were obtained using a Shimadzu Irtracer-100 infrared spectrometer. Chiral HPLC analysis was performed on a Shimadzu LC-20AD instrument using Daicel Chiracel columns at 25 °C and a mixture of HPLC-grade hexane and isopropanol as eluent. ^{1}H, ^{13}C, ^{19}F NMR spectra were obtained using a Bruker DPX-400 MHz spectrometer. Chemical shifts were reported in ppm from $CDCl_3$ with the solvent resonance or TMS as the internal standard. The following abbreviations were used to designate chemical shift multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet.

Anhydrous CH_2Cl_2 was prepared by distillation over P_2O_5 and then from CaH_2. Anhydrous toluene, *n*-hexane, Et_2O, THF and MTBE were prepared by distillation over sodium-benzophenone ketyl prior to use. The 3-diazothiooxindole **1**[1] and alkenes **2**[2] were prepared according to the corresponding literature reports. Chiral Rh_2(*R*-BTPCP)$_4$ and Rh_2(*R*-DOSP)$_4$ were purched from Strem. Chiral Rh_2(*S*-PTPA)$_4$, Rh_2(*S*-PTTL)$_4$, Rh_2(*S*-TFPTTL)$_4$ and Rh_2(*S*-TCPTTL)$_4$ were purched from TCI.

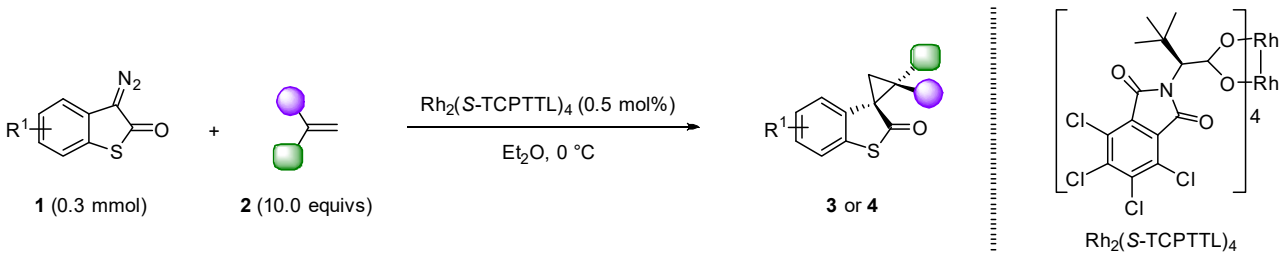
List of abbreviation:

Entry	Chemical name	Abbreviation
1	Petroleum ether	PE
2	Tetrahydrofuran	THF
3	Ethyl acetate	EtOAc
4	Dichloromethane	CH_2Cl_2
5	Methyl *tert*-butyl ether	MTBE

[1] X.-Y. Cui, Y.-L. Zhao, Y.-M. Chen, S.-Z. Dong, F. Zhou, H.-H. Wu and J. Zhou, Au-Catalyzed Formal Allylation of Diazo(thio)oxindoles: Application to Tandem Asymmetric Synthesis of Quaternary Stereocenters, *Org. Lett.*, 2021, **23**, 4864.

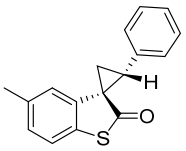
[2] (a) C. Schlinquer, W.-S. Huang, L. Chen, T. Poisson, X. Pannecoucke, A. B. Charette and P. Jubault, Rhodium Catalysed Enantioselective Synthesis of Mono-(Halo)-Methyl-Cyclopropanes, *Org. Biomol. Chem.,* 2019, **17**, 472; (b) S.-B. Kim, C.-H. Lee and C.-H. Jun, Styrylsilane Coupling Reagents for Immobilization of Organic Functional Groups on Silica and Glass Surfaces, *Chem. Commun.,* 2018, **54**, 9961.

2. General procedure for enantioselective cyclopropanation and experimental data.

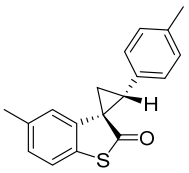


1 (0.3 mmol) **2** (10.0 equivs) **3** or **4** $Rh_2(S\text{-TCPTTL})_4$

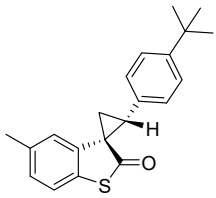
To a 10 mL Schlenk tube were charged with $Rh_2(S\text{-TCPTTL})_4$ (3.0 mg, 0.0015 mmol, 0.5 mol %), Et_2O (6.0 mL) was added followed by the alkenes **2** (3.0 mol, 10.0 equivs), after the reaction was cooled to 0 °C and stirred for 0.5 hour, 3-diazothiooxindole **1** (0.3 mmol) was added directly. The resulting mixture was stirred at 0 °C till full conversion of **1** by TLC analysis. Then, the reaction mixture was rapidly passed through a short pad of silica gel, and washed with Et_2O. The resulting organic solution was concentrated in vacuo to give the crude product. To determine the diastereoselectivity, the residue was first dissolved in $CDCl_3$ or acetone-d_6, and took some samples for ^1H NMR analysis of crude reaction mixture. Then the sample for analysis and rest crude product were recombined for column chromatography purification to afford products **3** or **4**, using PE/EtOAc (60/1, v/v) as the eluent.



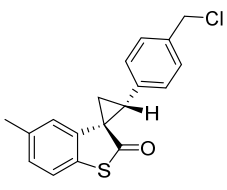
Product **3a** was obtained in 92% yield, with a dr ratio of 10:1 indicated by ^1H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 119-121 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 9.34 min, t_r (major) = 7.07 min) gave the isomeric composition of the major isomer: 97% ee; $[\alpha]_D^{25}$ = 13.3 (*c* = 0.18, Acetone); ^1H NMR (400 MHz, $CDCl_3$): δ 7.29-7.21 (m, 4H), 7.15-7.11 (m, 2H), 6.95-6.92 (m, 1H), 5.71-5.70 (m, 1H), 3.42 (t, *J* = 8.8 Hz, 1H), 2.38 (dd, *J* = 9.3, 4.6 Hz, 1H), 2.03 (dd, *J* = 8.4, 4.6 Hz, 1H), 1.96 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.78, 134.98, 134.95, 134.22, 131.32, 130.46, 128.47, 127.82, 127.79, 122.83, 122.45, 43.17, 42.09, 26.79, 21.15; IR (ATR): 3024, 1684, 1572, 1497, 1196, 986, 806 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{17}H_{14}NaOS$ $[M+Na]^+$: 289.0658, Found: 289.0653.



Product **3b** was obtained in 92% yield, with a dr ratio of 7:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 137-139 °C); HPLC analysis (Chiralcel OJ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 12.04 min, t_r (major) = 10.24 min) gave the isomeric composition of the major isomer: 96% ee; $[\alpha]_D^{25}$ = 13.3 (*c* = 0.24, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.25-7.23 (m, 1H), 7.11-7.09 (m, 2H), 7.04-7.02 (m, 2H), 6.97-6.94 (m, 1H), 5.79-5.78 (m, 1H), 3.41 (t, *J* = 8.8 Hz, 1H), 2.39 (dd, *J* = 9.3, 4.6 Hz, 1H), 2.33 (s, 3H), 2.05-2.02 (m, 1H), 2.01 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.78, 137.49, 135.08, 134.92, 131.31, 131.08, 130.27, 129.12, 127.75, 122.84, 122.40, 43.32, 42.14, 26.86, 21.23, 21.20; IR (ATR): 3024, 2920, 1684, 1516, 1190, 988, 770 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{16}NaOS$ $[M+Na]^+$: 303.0814, Found: 303.0805.

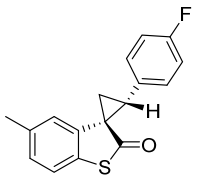


Product **3c** was obtained in 88% yield, with a dr ratio of 6:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 116-118 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 7.06 min, t_r (major) = 10.08 min) gave the isomeric composition of the major isomer: 90% ee; $[\alpha]_D^{25}$ = -12.5 (*c* = 0.16, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.33-7.30 (m, 2H), 7.25-7.23 (m, 1H), 7.09-7.06 (m, 2H), 6.96-6.94 (m, 1H), 5.65-5.64 (m, 1H), 3.44 (t, *J* = 8.8 Hz, 1H), 2.40 (dd, *J* = 9.3, 4.5 Hz, 1H), 2.04 (dd, *J* = 8.3, 4.6 Hz, 1H), 1.96 (s, 3H), 1.31 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.85, 150.96, 135.14, 134.84, 131.32, 131.29, 130.28, 127.68, 125.31, 122.90, 122.35, 43.15, 41.83, 34.68, 31.40, 27.12, 21.05; IR (ATR): 2963, 2918, 1694, 1364, 1194, 989, 772 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{21}H_{22}NaOS$ $[M+Na]^+$: 345.1284, Found: 345.1283.

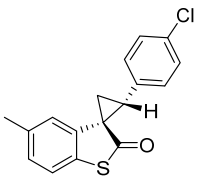


Product **3d** was obtained in 94% yield, with a dr ratio of 13:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 133-135 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 15/85, 1.0 mL/min, 230 nm; t_r (minor) = 6.32 min, t_r (major) = 10.06 min) gave the isomeric composition of the major isomer: 95% ee; $[\alpha]_D^{25}$ = 41.8 (*c* = 0.24, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.32-7.30 (m, 2H), 7.25-7.23 (m, 1H), 7.14-7.12 (m, 2H), 6.97-6.94 (m, 1H), 5.69-5.68 (m, 1H), 4.55 (s, 2H), 3.41 (t, *J* = 8.8 Hz, 1H), 2.40 (dd, *J* = 9.3, 4.7 Hz, 1H), 2.03 (dd, *J* =

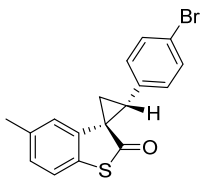
8.4, 4.7 Hz, 1H), 1.99 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.66, 137.20, 135.13, 134.70, 134.67, 131.34, 130.90, 128.76, 127.97, 122.81, 122.53, 45.91, 43.10, 41.53, 26.66, 21.16; IR (ATR): 2916, 2849, 1682, 1464, 1368, 1196, 993, 814 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{15}ClNaOS$ $[M+Na]^+$: 337.0424, Found: 337.0424.



Product **3e** was obtained in 90% yield, with a dr ratio of 7:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 106-108 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 9.73 min, t_r (major) = 13.04 min) gave the isomeric composition of the major isomer: 96% ee; $[\alpha]_D^{25}$ = 25.0 (*c* = 0.24, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.25-7.23 (m, 1H), 7.12-7.08 (m, 2H), 6.99-6.95 (m, 3H), 5.71-5.70 (m, 1H), 3.35 (t, *J* = 8.8 Hz, 1H), 2.39 (dd, *J* = 9.4, 4.7 Hz, 1H), 2.01 (s, 3H), 1.98 (dd, *J* = 8.3, 4.7 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.59, 162.29 (d, *J* = 246.9 Hz), 135.12, 134.69, 132.11 (d, *J* = 8.2 Hz), 131.43, 130.15 (d, *J* = 3.3 Hz), 128.00, 122.79, 122.60, 115.55 (d, *J* = 21.6 Hz), 43.13, 41.15, 26.82, 21.22; ^{19}F NMR (376 MHz, $CDCl_3$): δ -113.94; IR (ATR): 2918, 1690, 1605, 1512, 1464, 1231, 839, 772 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{17}H_{13}FNaOS$ $[M+Na]^+$: 307.0563, Found: 307.0559.

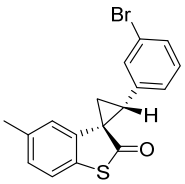


Product **3f** was obtained in 85% yield, with a dr ratio of 9:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 139-141 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 3/97, 1.0 mL/min, 254 nm; t_r (minor) = 7.07 min, t_r (major) = 9.76 min) gave the isomeric composition of the major isomer: 97% ee; $[\alpha]_D^{25}$ = 57.6 (*c* = 0.25, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.26-7.23 (m, 3H), 7.08-7.06 (m, 2H), 6.98-6.96 (m, 1H), 5.73-5.72 (m, 1H), 3.34 (t, *J* = 8.8 Hz, 1H), 2.39 (dd, *J* = 9.3, 4.7 Hz, 1H), 2.02 (s, 3H), 1.98 (dd, *J* = 8.4, 4.7 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.54, 135.21, 134.55, 133.73, 132.88, 131.79, 131.43, 128.69, 128.10, 122.76, 122.66, 43.12, 41.15, 26.53, 21.27; IR (ATR): 2916, 2849, 1692, 1495, 1190, 835, 770 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{17}H_{13}ClNaOS$ $[M+Na]^+$: 323.0268, Found: 323.0265.

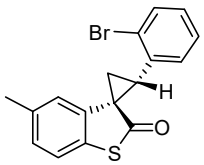


Product **3g** was obtained in 88% yield, with a dr ratio of 13:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 146-148 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0

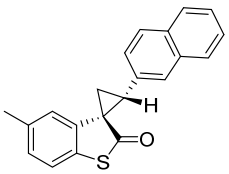
mL/min, 254 nm; t_r (minor) = 11.59 min, t_r (major) = 17.73 min) gave the isomeric composition of the major isomer: 97% ee; $[\alpha]_D^{25}$ = 22.9 (*c* = 0.14, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.42-7.39 (m, 2H), 7.26-7.23 (m, 1H), 7.02-6.96 (m, 3H), 5.73-5.72 (m, 1H), 3.32 (t, *J* = 8.8 Hz, 1H), 2.39 (dd, *J* = 9.3, 4.7 Hz, 1H), 2.02 (s, 3H), 1.98 (dd, *J* = 8.4, 4.7 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.50, 135.21, 134.50, 133.39, 132.12, 131.64, 131.42, 128.11, 122.74, 122.66, 121.83, 43.07, 41.18, 26.44, 21.27; IR (ATR): 2916, 2849, 1690, 1489, 1192, 991, 808 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{17}H_{13}BrNaOS$ $[M+Na]^+$: 366.9763, Found: 366.9753.



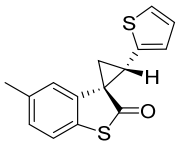
Product **3h** was obtained in 83% yield, with a dr ratio of 14:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 91-93 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 10.03 min, t_r (major) = 8.88 min) gave the isomeric composition of the major isomer: 98% ee; $[\alpha]_D^{25}$ = 19.1 (*c* = 0.23, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.40-7.38 (m, 1H), 7.34-7.33 (m, 1H), 7.26-7.24 (m, 1H), 7.15-7.11 (m, 1H), 7.04-6.96 (m, 2H), 5.77-5.76 (m, 1H), 3.35 (t, *J* = 8.8 Hz, 1H), 2.37 (dd, *J* = 9.3, 4.8 Hz, 1H), 2.03 (s, 3H), 1.99 (dd, *J* = 8.3, 4.8 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.47, 136.66, 135.21, 134.39, 133.25, 131.41, 130.95, 129.98, 129.28, 128.16, 122.82, 122.68, 122.47, 43.07, 41.01, 26.32, 21.24; IR (ATR): 2918, 2849, 1690, 1468, 1194, 993, 768 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{17}H_{13}BrNaOS$ $[M+Na]^+$: 366.9763, Found: 366.9758.



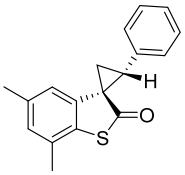
Product **3i** was obtained in 78% yield, with a dr ratio of 6:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 151-153 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 11.89 min, t_r (major) = 13.34 min) gave the isomeric composition of the major isomer: 97% ee; $[\alpha]_D^{25}$ = -49.5 (*c* = 0.21, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.46-7.35 (m, 3H), 7.24-7.22 (m, 1H), 7.18-7.14 (m, 1H), 6.98-6.95 (m, 1H), 5.67-5.66 (m, 1H), 3.24 (t, *J* = 8.8 Hz, 1H), 2.45 (dd, *J* = 9.1, 4.9 Hz, 1H), 2.05 (dd, *J* = 8.4, 4.9 Hz, 1H), 1.97 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.79, 134.92, 134.55, 134.54, 132.83, 131.95, 131.18, 129.44, 128.02, 127.18, 122.53, 121.60, 43.20, 43.19, 26.30, 21.20; IR (ATR): 2920, 2855, 1680, 1466, 1192, 991, 752 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{17}H_{13}BrNaOS$ $[M+Na]^+$: 366.9763, Found: 366.9753.



Product **3j** was obtained in 98% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 160-162 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 3/97, 1.0 mL/min, 254 nm; t_r (minor) = 7.47 min, t_r (major) = 9.63 min) gave the isomeric composition of the major isomer: 93% ee; $[\alpha]_D^{25}$ = 48.4 (*c* = 0.19, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.82-7.79 (m, 2H), 7.73-7.70 (m, 2H), 7.52-7.47 (m, 2H), 7.25-7.23 (m, 1H), 7.16-7.13 (m, 1H), 6.92-6.90 (m, 1H), 5.79-5.78 (m, 1H), 3.58 (t, *J* = 8.8 Hz, 1H), 2.49 (dd, *J* = 9.3, 4.6 Hz, 1H), 2.19 (dd, *J* = 8.4, 4.6 Hz, 1H), 1.81 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.78, 135.08, 134.86, 133.21, 132.87, 131.83, 131.36, 129.13, 128.27, 128.21, 127.89, 127.83, 127.80, 126.41, 126.29, 122.71, 122.53, 43.41, 42.47, 26.81, 21.12; IR (ATR): 2918, 2849, 1690, 1603, 1194, 773, 748 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{21}H_{16}NaOS$ $[M+Na]^+$: 339.0814, Found: 339.0817.

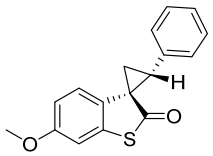


Product **3k** was obtained in 86% yield, with a dr ratio of 5:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a yellowish solid (m.p. 115-117 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 9.59 min, t_r (major) = 7.47 min) gave the isomeric composition of the major isomer: 90% ee; $[\alpha]_D^{25}$ = -59.1 (*c* = 0.21, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.27-7.25 (m, 1H), 7.21-7.20 (m, 1H), 7.02-7.00 (m, 1H), 6.97-6.94 (m, 1H), 6.90-6.89 (m, 1H), 6.03-6.02 (m, 1H), 3.36 (t, *J* = 8.6 Hz, 1H), 2.46 (dd, *J* = 9.2, 4.7 Hz, 1H), 2.09-2.06 (m, 1H), 2.08 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.18, 137.86, 135.27, 134.40, 131.35, 128.62, 128.20, 126.83, 126.10, 122.57, 122.30, 43.94, 36.14, 27.70, 21.29; IR (ATR): 3103, 2922, 2855, 1684, 1572, 1470, 1194, 978, 698 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{15}H_{12}NaOS_2$ $[M+Na]^+$: 295.0222, Found: 295.0214.

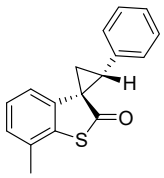


Product **3l** was obtained in 99% yield, with a dr ratio of 16:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 89-91 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 8.78 min, t_r (major) = 6.64 min) gave the isomeric composition of the major isomer: 96% ee; $[\alpha]_D^{25}$ = 55.7 (*c* = 0.23, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.29-7.21 (m, 3H), 7.16-7.11 (m, 2H), 6.78-6.77 (m, 1H), 5.56-5.55 (m, 1H), 3.42 (t, *J* = 8.9 Hz, 1H),

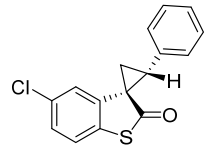
2.38 (dd, J = 9.4, 4.5 Hz, 1H), 2.28 (s, 3H), 2.01 (dd, J = 8.4, 4.6 Hz, 1H), 1.94 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.86, 134.89, 134.35, 131.58, 131.16, 130.48, 128.91, 128.44, 127.74, 120.18, 43.69, 42.13, 26.93, 21.05, 20.61; IR (ATR): 2911, 2857, 1678, 1584, 1375, 1103, 743 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{16}NaOS$ $[M+Na]^+$: 303.0814, Found: 303.0818.



Product **3m** was obtained in 96% yield, with a dr ratio of 16:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a colorless oil; HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 14.89 min, t_r (major) = 11.96 min) gave the isomeric composition of the major isomer: 82% ee; $[\alpha]_D^{25}$ = 65.2 (c = 0.27, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.29-7.24 (m, 3H), 7.14-7.12 (m, 2H), 6.93-6.92 (m, 1H), 6.36-6.34 (m, 1H), 5.83-5.81 (m, 1H), 3.71 (s, 3H), 3.37 (t, J = 8.9 Hz, 1H), 2.35 (dd, J = 9.4, 4.7 Hz, 1H), 1.98 (dd, J = 8.3, 4.7 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.65, 158.90, 135.80, 134.36, 130.41, 128.57, 127.80, 126.90, 122.57, 111.49, 108.70, 55.50, 42.76, 41.43, 26.38; IR (ATR): 2999, 2835, 1686, 1601, 1489, 1032, 980, 696 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{17}H_{14}NaO_2S$ $[M+Na]^+$: 305.0607, Found: 305.0599.

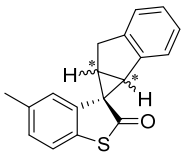


Product **3n** was obtained in 93% yield, with a dr ratio of 15:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 92-94 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 11.51 min, t_r (major) = 7.17 min) gave the isomeric composition of the major isomer: 84% ee; $[\alpha]_D^{25}$ = 95.5 (c = 0.31, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.27-8.24 (m, 3H), 8.14-8.12 (m, 2H), 7.96-7.94 (m, 1H), 7.74-7.70 (m, 1H), 6.78-6.76 (m, 1H), 4.44 (t, J = 8.9 Hz, 1H), 3.40 (dd, J = 9.3, 4.6 Hz, 1H), 3.32 (s, 3H), 3.04 (dd, J = 8.4, 4.6 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.40, 134.98, 134.70, 134.25, 132.00, 130.43, 128.55, 127.99, 127.84, 125.17, 119.19, 43.82, 42.29, 27.02, 20.76; IR (ATR): 2918, 1690, 1587, 1368, 1103, 986, 741 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{17}H_{14}NaOS$ $[M+Na]^+$: 289.0658, Found: 289.0648.

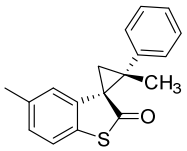


Product **3o** was obtained in 93% yield, with a dr ratio of 12:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 151-153 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 12.57 min, t_r (major) = 8.85 min) gave the isomeric composition of the

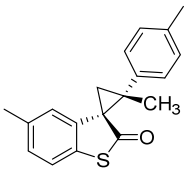
major isomer: 88% ee; $[\alpha]_D^{25}$ = -30.0 (*c* = 0.61, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.36-7.26 (m, 4H), 7.15-7.10 (m, 3H), 5.89-5.88 (m, 1H), 3.49 (t, *J* = 9.0 Hz, 1H), 2.45 (dd, *J* = 9.4, 4.8 Hz, 1H), 2.09 (dd, *J* = 8.5, 4.8 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.38, 136.86, 133.49, 133.19, 131.37, 130.33, 128.80, 128.30, 127.20, 123.68, 122.20, 43.38, 42.80, 27.27; IR (ATR): 2924, 1697, 1560, 1500, 1269, 986, 814 cm^{-1}; HRMS (EI): Exact mass calcd for $C_{16}H_{11}OSCl$ $[M]^+$: 286.0219, Found: 286.0218.



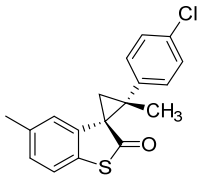
Product **3p** was obtained in 82% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 149-151 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 10.31 min, t_r (major) = 8.86 min) gave the isomeric composition of the major isomer: 85% ee; $[\alpha]_D^{25}$ = 77.2 (*c* = 0.29, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.35-7.30 (m, 3H), 7.26-7.20 (m, 2H), 6.97-6.94 (m, 1H), 5.47-5.46 (m, 1H), 3.64 (d, *J* = 6.8 Hz, 1H), 3.57 (dd, *J* = 18.8, 6.5 Hz, 1H), 3.25 (d, *J* = 18.9 Hz, 1H), 3.00 (t, *J* = 6.7 Hz, 1H), 1.95 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.70, 145.76, 138.64, 135.24, 133.80, 132.36, 128.10, 127.62, 127.44, 126.83, 124.01, 123.14, 122.83, 47.55, 45.29, 40.91, 32.56, 21.42; IR (ATR): 2916, 2849, 1684, 1460, 1088, 808, 760 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{14}NaOS$ $[M+Na]^+$: 301.0658, Found: 301.0659.



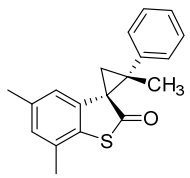
Product **4a** was obtained in 45% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a colorless oil; HPLC analysis (Chiralpak AD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 14.94 min, t_r (major) = 10.72 min) gave the isomeric composition of the major isomer: 99% ee; $[\alpha]_D^{25}$ = -21.7 (*c* = 0.24, Acetone); ^{1}H NMR (400 MHz, Acetone-d_6): δ 7.44-7.42 (m, 1H), 7.29-7.26 (m, 4H), 7.22-7.17 (m, 3H), 2.55 (d, *J* = 5.3 Hz, 1H), 2.39 (s, 3H), 2.17 (d, *J* = 5.3 Hz, 1H), 1.58 (s, 3H); ^{13}C NMR (100 MHz, Acetone-d_6): δ 199.04, 142.79, 136.01, 135.91, 132.91, 129.59, 128.95, 128.88, 127.68, 125.14, 123.79, 49.79, 47.46, 28.40, 22.97, 21.39; IR (ATR): 2916, 2849, 1462, 1445, 1152, 959, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{16}NaOS$ $[M+Na]^+$: 303.0814, Found: 303.0813.



Product **4b** was obtained in 58% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 100-102 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 12.58 min, t_r (major) = 16.48 min) gave the isomeric composition of the major isomer: 98% ee; $[\alpha]_D^{25}$ = -331.4 (*c* = 0.21, Acetone); ^{1}H NMR (400 MHz, Acetone-*d*$_6$): δ 7.43-7.41 (m, 1H), 7.21-7.13 (m, 4H), 7.08-7.06 (m, 2H), 2.53 (d, *J* = 5.3 Hz, 1H), 2.39 (s, 3H), 2.28 (s, 3H), 2.15 (d, *J* = 5.3 Hz, 1H), 1.56 (s, 3H); ^{13}C NMR (100 MHz, Acetone-*d*$_6$): δ 199.08, 139.88, 137.28, 136.31, 136.06, 133.13, 129.76, 129.67, 128.99, 125.30, 123.96, 50.13, 47.50, 28.58, 23.19, 21.56, 21.26; IR (ATR): 2924, 1694, 1516, 1458, 1152, 1043, 959, 818 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{19}H_{18}NaOS$ $[M+Na]^+$: 317.0971, Found: 317.0973.

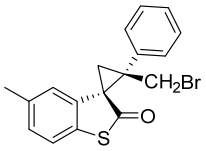


Product **4c** was obtained in 46% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 126-128 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 10.76 min, t_r (major) = 16.94 min) gave the isomeric composition of the major isomer: 98% ee; $[\alpha]_D^{25}$ = -358.0 (*c* = 0.20, Acetone); ^{1}H NMR (400 MHz, Acetone-*d*$_6$): δ 7.44-7.42 (m, 1H), 7.31-7.27 (m, 4H), 7.21-7.19 (m, 2H), 2.54 (d, *J* = 5.5 Hz, 1H), 2.39 (s, 3H), 2.19 (d, *J* = 5.5 Hz, 1H), 1.59 (s, 3H); ^{13}C NMR (100 MHz, Acetone-*d*$_6$): δ 199.49, 142.01, 136.24, 135.97, 133.10, 133.09, 131.59, 129.22, 129.18, 125.40, 124.04, 50.06, 46.69, 28.65, 22.82, 21.56; IR (ATR): 2924, 2862, 1692, 1491, 1344, 1013, 899, 777 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{15}ClNaOS$ $[M+Na]^+$: 337.0424, Found: 337.0422.

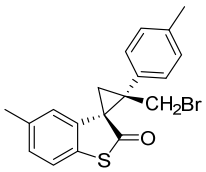


Product **4d** was obtained in 46% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a colorless oil; HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 14.65 min, t_r (major) = 12.44 min) gave the isomeric composition of the major isomer: 98% ee; $[\alpha]_D^{25}$ = -46.7 (*c* = 0.24, Acetone); ^{1}H NMR (400 MHz, Acetone-*d*$_6$): δ 7.30-7.17 (m, 5H), 7.04-7.01 (m, 2H), 2.55 (d, *J* = 5.3 Hz, 1H), 2.36 (s, 3H), 2.30 (s, 3H), 2.13 (d, *J* = 5.3 Hz, 1H), 1.57 (s, 3H); ^{13}C NMR (100 MHz, Acetone-*d*$_6$): δ 199.12, 143.08, 136.10, 135.97, 132.80, 132.78, 130.09, 129.80, 129.14, 127.86, 122.75, 50.52, 47.70, 28.63, 23.22, 21.49, 20.70; IR

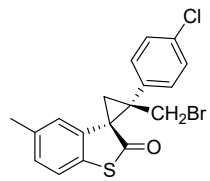
(ATR): 2926, 1699, 1497, 1144, 1045, 856, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{19}H_{18}NaOS$ $[M+Na]^+$: 317.0971, Found: 317.0965.



Product **4e** was obtained in 98% yield, with a dr ratio of 7:1 indicated by ^1H NMR analysis of crude reaction mixture; The major isomer was isolated as a colorless oil; HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 11.48 min, t_r (major) = 10.14 min) gave the isomeric composition of the major isomer: 94% ee; $[\alpha]_D^{25}$ = -24.1 (*c* = 0.58, Acetone); ^1H NMR (400 MHz, $CDCl_3$): δ 7.31-7.20 (m, 5H), 6.96-6.93 (m, 2H), 5.40-5.39 (m, 1H), 4.29 (d, *J* = 10.2 Hz, 1H), 3.94 (dd, *J* = 10.2, 1.2 Hz, 1H), 2.51 (d, *J* = 5.5 Hz, 1H), 2.27 (dd, *J* = 5.5, 1.2 Hz, 1H), 1.90 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.41, 136.42, 134.75, 134.50, 131.30, 130.84, 128.31, 128.25, 128.21, 124.43, 122.29, 50.60, 49.42, 37.65, 32.22, 21.05; IR (ATR): 3026, 2920, 1603, 1495, 1352, 1167, 934, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{15}BrNaOS$ $[M+Na]^+$: 380.9919, Found: 380.9912.

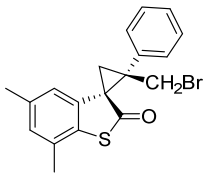


Product **4f** was obtained in 95% yield, with a dr ratio of 6:1 indicated by ^1H NMR analysis of crude reaction mixture; The major isomer was isolated as a colorless oil; HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 13.54 min, t_r (major) = 12.05 min) gave the isomeric composition of the major isomer: 94% ee; $[\alpha]_D^{25}$ = -12.5 (*c* = 0.45, Acetone); ^1H NMR (400 MHz, $CDCl_3$): δ 7.26-6.99 (m, 4H), 6.96-6.93 (m, 2H), 5.43-5.42 (m, 1H), 4.28 (d, *J* = 10.1 Hz, 1H), 3.92 (dd, *J* = 10.2, 1.2 Hz, 1H), 2.49 (d, *J* = 5.5 Hz, 1H), 2.33 (s, 3H), 2.24 (dd, *J* = 5.5, 1.2 Hz, 1H), 1.91 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.45, 138.06, 134.66, 134.62, 133.36, 131.14, 130.83, 128.95, 128.13, 124.47, 122.22, 50.51, 49.56, 37.88, 32.34, 21.25, 21.07; IR (ATR): 2920, 2851, 1692, 1260, 1092, 935, 802 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{19}H_{17}BrNaOS$ $[M+Na]^+$: 395.0076, Found: 395.0069.

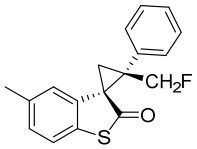


Product **4g** was obtained in 86% yield, with a dr ratio of 6:1 indicated by ^1H NMR analysis of crude reaction mixture; The major isomer was isolated as a colorless oil; HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 13.67 min, t_r (major) = 12.87 min) gave the isomeric composition of the major isomer: 95% ee; $[\alpha]_D^{25}$ = -8.3 (*c* = 0.29, Acetone); ^1H NMR (400 MHz, $CDCl_3$): δ 7.25-7.21 (m, 5H), 6.98-6.95 (m, 1H), 5.42-5.41 (m, 1H), 4.21 (d, *J* = 10.3 Hz, 1H), 3.90 (d, *J* = 10.3 Hz, 1H), 2.50

(d, J = 5.6 Hz, 1H), 2.21 (d, J = 6.0 Hz, 1H), 1.95 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.05, 135.02, 134.93, 134.26, 134.08, 132.64, 130.97, 128.53, 128.48, 124.32, 122.50, 49.58, 49.20, 37.23, 31.89, 21.14; IR (ATR): 3044, 2920, 1686, 1570, 1493, 1236, 932, 737 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{14}BrClNaOS$ $[M+Na]^+$: 414.9529, Found: 414.9528.

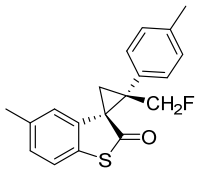


Product **4h** was obtained in 92% yield, with a dr ratio of 8:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a yellowish oil; HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 10.31 min, t_r (major) = 7.84 min) gave the isomeric composition of the major isomer: 92% ee; $[\alpha]_D^{25}$ = -9.0 (c = 0.40, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.27-7.13 (m, 5H), 6.70-6.69 (m, 1H), 5.16-5.15 (m, 1H), 4.20 (d, J = 10.2 Hz, 1H), 3.86 (dd, J = 10.1, 1.1 Hz, 1H), 2.42 (d, J = 5.5 Hz, 1H), 2.21 (s, 3H), 2.16 (dd, J = 5.4, 1.1 Hz, 1H), 1.78 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.48, 136.53, 134.61, 134.43, 131.37, 131.22, 130.64, 129.27, 128.25, 128.19, 121.82, 50.60, 49.90, 37.77, 32.35, 20.94, 20.54; IR (ATR): 2857, 1682, 1495, 1233, 1036, 935, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{19}H_{17}BrNaOS$ $[M+Na]^+$: 395.0076, Found: 395.0067.

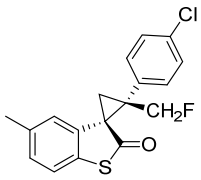


Product **4i** was obtained in 87% yield, with a dr ratio of 3:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 123-125 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 10.58 min, t_r (major) = 8.41 min) gave the isomeric composition of the major isomer: 95% ee; $[\alpha]_D^{25}$ = -9.5 (c = 0.55, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.29-7.20 (m, 6H), 6.95-6.92 (m, 1H), 5.43-5.42 (m, 1H), 5.07 (dd, J = 46.8, 9.7 Hz, 1H), 4.85 (dd, J = 47.4, 9.7 Hz, 1H), 2.46 (dd, J = 5.4, 1.7 Hz, 1H), 2.17 (t, J = 5.4 Hz, 1H), 1.89 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.40, 136.15, 134.67, 134.44, 131.16, 128.48, 128.18, 128.13, 124.29, 122.30, 83.71 (d, J = 172.0 Hz), 48.94 (d, J = 21.4 Hz), 45.29 (d, J = 4.4 Hz), 28.86 (d, J = 7.7 Hz), 21.06; ^{19}F NMR (376 MHz, $CDCl_3$): δ -215.54; IR (ATR): 2922, 2855, 1697, 1497, 1462, 993, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{15}FNaOS$ $[M+Na]^+$: 321.0720, Found: 321.0711. The minor isomer was isolated a white solid (m.p. 143-145 °C); HPLC analysis (Chiralpak AD-H, ^{i}PrOH/hexane = 2/98, 1.0 mL/min, 230 nm; t_r (minor) = 11.32 min, t_r (major) = 9.99 min) gave the isomeric composition of the product: 98% ee; $[\alpha]_D^{25}$ = -280.0 (c = 0.16, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.37-7.29 (m, 6H), 7.18-7.16 (m, 1H), 6.96-6.95 (m, 1H), 4.78 (dd, J = 47.6, 10.4 Hz, 1H), 4.75 (dd, J = 47.6, 10.4

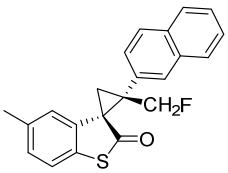
Hz, 1H), 2.60 (dd, *J* = 5.8, 4.6 Hz, 1H), 2.42 (s, 3H), 2.20 (d, *J* = 5.8 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 199.28(d, *J* = 1.5 Hz), 137.14, 135.63, 133.88, 132.53, 129.79, 128.84, 128.60, 128.11, 123.46, 123.38 (d, *J* = 2.7 Hz), 84.74 (d, *J* = 175.8 Hz), 48.43 (d, *J* = 21.6 Hz), 47.75 (d, *J* = 4.4 Hz), 24.19 (d, *J* = 8.0 Hz), 21.63; ^{19}F NMR (376 MHz, $CDCl_3$): δ -214.53; IR (ATR): 2922, 2853, 1699, 1497, 1150, 812, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{15}FNaOS$ $[M+Na]^+$: 321.0720, Found: 321.0718.



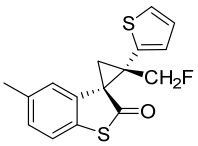
Product **4j** was obtained in 89% yield, with a dr ratio of 5:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a yellowish solid (m.p. 76-78 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 7.83 min, t_r (major) = 7.30 min) gave the isomeric composition of the major isomer: 96% ee; $[\alpha]_D^{25}$ = 15.4 (*c* = 0.26, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.30-6.92 (m, 6H), 5.46-5.45 (m, 1H), 5.05 (dd, *J* = 46.8, 9.7 Hz, 1H), 4.83 (dd, *J* = 47.5, 9.7 Hz, 1H), 2.44 (dd, *J* = 5.4, 1.6 Hz, 1H), 2.31 (s, 3H), 2.15 (t, *J* = 5.3 Hz, 1H), 1.90 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.43, 137.96, 134.58, 134.54, 133.06, 131.12, 129.09, 128.04, 124.32, 122.22, 83.81 (d, *J* = 171.6 Hz), 48.79 (d, *J* = 21.5 Hz), 45.39 (d, *J* = 4.4 Hz), 28.94 (d, *J* = 7.7 Hz), 21.21, 21.07; ^{19}F NMR (376 MHz, $CDCl_3$): δ -215.10; IR (ATR): 2922, 1692, 1516, 1458, 1157, 980, 808 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{19}H_{17}FNaOS$ $[M+Na]^+$: 335.0876, Found: 335.0875.



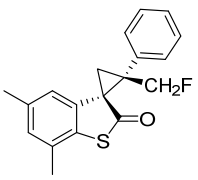
Product **4k** was obtained in 78% yield, with a dr ratio of 5:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 96-98 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 14.04 min, t_r (major) = 12.72 min) gave the isomeric composition of the major isomer: 97% ee; $[\alpha]_D^{25}$ = 28.2 (*c* = 0.27, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.26-7.21 (m, 5H), 6.97-6.95 (m, 1H), 5.47-5.46 (m, 1H), 5.04 (dd, *J* = 46.9, 9.8 Hz, 1H), 4.80 (dd, *J* = 47.5, 9.8 Hz, 1H), 2.45 (dd, *J* = 5.5, 1.7 Hz, 1H), 2.12 (t, *J* = 5.5 Hz, 1H), 1.95 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.03, 134.87, 134.73, 134.21, 133.99, 131.26, 128.67, 128.39, 124.15, 122.51, 83.42 (d, *J* = 172.3 Hz), 47.98 (d, *J* = 21.4 Hz), 45.20 (d, *J* = 4.1 Hz), 28.39 (d, *J* = 7.6 Hz), 21.15; ^{19}F NMR (376 MHz, $CDCl_3$): δ -215.09; IR (ATR): 2922, 1690, 1491, 1157, 1092, 808, 725 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{18}H_{14}ClFNaOS$ $[M+Na]^+$: 355.0330, Found: 355.0331.



Product **4l** was obtained in 85% yield, with a dr ratio of 9:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a yellowish solid (m.p. 129-131 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 23.79 min, t_r (major) = 22.03 min) gave the isomeric composition of the major isomer: 93% ee; $[\alpha]_D^{25}$ = 125.6 (*c* = 0.43, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.83-7.21 (m, 8H), 6.90-6.88 (m, 1H), 5.44 (s, 1H), 5.16 (dd, *J* = 46.7, 9.8 Hz, 1H), 4.94 (dd, *J* = 47.5, 9.8 Hz, 1H), 2.56 (dd, *J* = 5.5, 1.7 Hz, 1H), 2.32 (t, *J* = 5.5 Hz, 1H), 1.65 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.35, 134.70, 134.24, 133.11, 132.97, 131.14, 128.14, 127.95, 127.71, 126.50, 126.36, 124.14, 122.33, 83.85 (d, *J* = 172.1 Hz), 49.02 (d, *J* = 21.3 Hz), 45.37, 28.90 (d, *J* = 7.7 Hz), 20.89; ^{19}F NMR (376 MHz, $CDCl_3$): δ -214.75; IR (ATR): 2855, 1686, 1504, 1452, 1153, 978, 737 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{22}H_{17}FNaOS$ $[M+Na]^+$: 371.0876, Found: 371.0872.

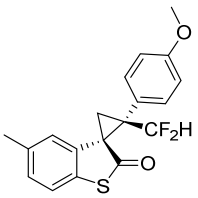


Product **4m** was obtained in 73% yield, with a dr ratio of 18:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a yellowish solid (m.p. 102-104 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 2/98, 1.0 mL/min, 230 nm; t_r (minor) = 13.50 min, t_r (major) = 9.28 min) gave the isomeric composition of the major isomer: 93% ee; $[\alpha]_D^{25}$ = -21.8 (*c* = 0.22, Acetone); ^{1}H NMR (400 MHz, Acetone-d_6): δ 7.38-7.37 (m, 1H), 7.35-7.33 (m, 1H), 7.08-7.07 (m, 1H), 7.06-7.03 (m, 1H), 7.01-6.99 (m, 1H), 6.05-6.04 (m, 1H), 5.06 (dd, *J* = 46.8, 9.9 Hz, 1H), 4.84 (dd, *J* = 47.9, 9.9 Hz, 1H), 2.57 (t, *J* = 5.9 Hz, 1H), 2.52 (dd, *J* = 5.9, 1.8 Hz, 1H), 2.00 (s, 3H); ^{13}C NMR (100 MHz, Acetone-d_6): δ 201.70, 139.51, 135.73, 134.89, 131.39, 130.49, 129.22, 127.68, 126.97, 124.07, 123.14, 83.97 (d, *J* = 170.1 Hz), 47.07 (d, *J* = 4.1 Hz), 44.63 (d, *J* = 21.6 Hz), 29.06 (d, *J* = 8.0 Hz), 21.08; ^{19}F NMR (376 MHz, Acetone-d_6): δ -213.46; IR (ATR): 2924, 1705, 1653, 1470, 1236, 1113, 1034, 704 cm^{-1}; HRMS (EI): Exact mass calcd for $C_{16}H_{13}FOS_2$ $[M]^+$: 304.0392, Found: 304.0395.

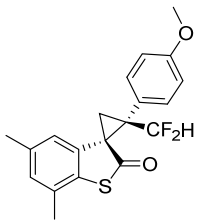


Product **4n** was obtained in 96% yield, with a dr ratio of 5:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a reddish solid (m.p. 107-109 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 10.75 min, t_r (major) = 8.75 min) gave the isomeric

composition of the major isomer: 95% ee; $[\alpha]_D^{25}$ = 11.6 (*c* = 0.38, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.26-7.24 (m, 5H), 6.77-6.76 (m, 1H), 5.27-5.26 (m, 1H), 5.07 (dd, *J* = 46.8, 9.7 Hz, 1H), 4.85 (dd, *J* = 47.5, 9.7 Hz, 1H), 2.44 (dd, *J* = 5.4, 1.7 Hz, 1H), 2.28 (s, 3H), 2.14 (t, *J* = 5.4 Hz, 1H), 1.86 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 202.44, 136.25, 134.52, 134.34, 131.35, 130.93, 129.17, 128.40, 128.10, 121.64, 83.75 (d, *J* = 171.8 Hz), 48.93 (d, *J* = 21.3 Hz), 45.77 (d, *J* = 4.3 Hz), 28.91 (d, *J* = 7.7 Hz), 20.94, 20.51; ^{19}F NMR (376 MHz, $CDCl_3$): δ -215.01; IR (ATR): 3059, 1684, 1495, 1458, 1265, 854, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{19}H_{17}FNaOS$ $[M+Na]^+$: 335.0876, Found: 335.0871.

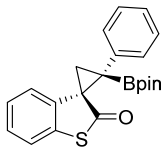


Product **4o** was obtained in 68% yield, with a dr ratio of 18:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a reddish solid (m.p. 87-89 °C); HPLC analysis (Chiralcel OD-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 11.99 min, t_r (major) = 10.71 min) gave the isomeric composition of the major isomer: 96% ee; $[\alpha]_D^{25}$ = 58.3 (*c* = 0.46, Acetone); ^{1}H NMR (400 MHz, Acetone-*d*$_6$): δ 7.52-7.50 (m, 1H), 7.37-7.35 (m, 1H), 7.06-7.04 (m, 2H), 6.72-6.60 (m, 2H), 6.44 (t, *J* = 55.8 Hz, 1H), 5.60-5.59 (m, 1H), 3.79 (s, 3H), 2.68 (dt, *J* = 6.1, 1.8 Hz, 1H), 2.49 (dd, *J* = 7.3, 6.1 Hz, 1H), 1.92 (s, 3H); ^{13}C NMR (100 MHz, Acetone-*d*$_6$): δ 203.26, 161.23, 135.92, 135.08, 134.46, 134.31, 131.61, 129.57, 125.90, 123.39, 122.99 (d, *J* = 1.7 Hz), 115.79 (dd, *J* = 237.9, 236.4 Hz), 114.52 (d, *J* = 12.0 Hz), 55.86, 48.75 (dd, *J* = 29.9, 25.3 Hz), 45.90 (d, *J* = 4.3 Hz), 28.64 (d, *J* = 8.0 Hz), 21.22; ^{19}F NMR (376 MHz, Acetone-*d*$_6$): δ -114.62 (d, *J* = 289.5 Hz, 1F), -121.26 (d, *J* = 289.1 Hz, 1F); IR (ATR): 2837, 1688, 1514, 1325, 1157, 930, 760 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{19}H_{16}F_2NaO_2S$ $[M+Na]^+$: 369.0731, Found: 369.0724.

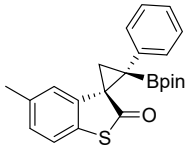


Product **4p** was obtained in 62% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a reddish solid (m.p. 143-145 °C); HPLC analysis (Chiralcel OZ-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 9.98 min, t_r (major) = 8.71 min) gave the isomeric composition of the major isomer: 97% ee; $[\alpha]_D^{25}$ = 100.7 (*c* = 0.27, Acetone); ^{1}H NMR (400 MHz, Acetone-*d*$_6$): δ 7.51-7.49 (m, 1H), 7.04-7.02 (m, 1H), 6.90-6.89 (m, 1H), 6.71-6.59 (m, 2H), 6.43 (t, *J* = 55.8 Hz, 1H), 5.44-5.43 (m, 1H), 3.79 (s, 3H), 2.67 (dt, *J* = 6.1, 1.8 Hz, 1H), 2.47 (dd, *J* = 7.3, 6.0 Hz, 1H), 2.27 (s, 3H), 1.89 (s, 3H); ^{13}C NMR (100 MHz, Acetone-*d*$_6$): δ 202.92,

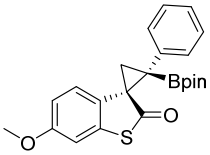
161.03, 135.68, 134.92, 134.21, 134.11, 132.12, 131.11, 130.35, 123.15, 122.91 (d, J = 1.7 Hz), 115.64 (dd, J = 237.9, 235.0 Hz), 114.31 (d, J = 4.2 Hz), 55.68, 48.60 (dd, J = 29.7, 25.3 Hz), 46.22 (d, J = 4.0 Hz), 28.57 (d, J = 8.0 Hz), 20.97, 20.29; ^{19}F NMR (376 MHz, Acetone-d_6): δ -114.62 (d, J = 289.5 Hz, 1F), -121.31 (d, J = 289.2 Hz, 1F); IR (ATR): 2963, 1682, 1516, 1252, 1153, 937, 766 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{20}H_{18}F_2NaO_2S$ [M+Na]$^+$: 383.0888, Found: 383.0878.



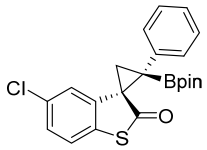
Product **4q** was obtained in 92% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 141-143 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 6.48 min, t_r (major) = 8.09 min) gave the isomeric composition of the major isomer: 94% ee; $[\alpha]_D^{25}$ = -101.5 (c = 0.26, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.34-7.32 (m, 1H), 7.26-7.18 (m, 5H), 7.12-7.08 (m, 1H), 6.75-6.71 (m, 1H), 5.65-5.62 (m, 1H), 2.52 (d, J = 3.9 Hz, 1H), 2.09 (d, J = 3.9 Hz, 1H), 1.19 (s, 6H), 1.18 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 204.20, 136.54, 135.22, 135.13, 130.89, 128.35, 127.18, 127.01, 125.00, 122.72, 122.53, 84.30, 46.51, 31.40, 24.90, 24.56 (Note: the carbon attached to boron was not observed due to quadrupole broadening caused by the ^{11}B nucleus); IR (ATR): 2978, 1688, 1447, 1371, 1250, 1186, 849, 743 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{22}H_{23}BNaO_3S$ [M+Na]$^+$: 401.1357, Found: 401.1357.



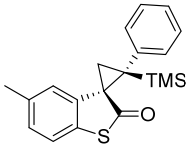
Product **4r** was obtained in 91% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a yellowish solid (m.p. 121-123 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 6.40 min, t_r (major) = 7.75 min) gave the isomeric composition of the major isomer: 99% ee; $[\alpha]_D^{25}$ = -192.0 (c = 0.15, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.26-7.17 (m, 6H), 6.93-6.91 (m, 1H), 5.40-5.39 (m, 1H), 2.50 (d, J = 3.9 Hz, 1H), 2.07 (d, J = 3.9 Hz, 1H), 1.91 (s, 3H), 1.20 (s, 6H), 1.19 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 204.68, 136.71, 135.11, 134.70, 131.54, 130.99, 128.29, 128.23, 127.73, 127.05, 123.57, 122.31, 84.28, 46.41, 31.31, 24.91, 24.57, 21.13 (Note: the carbon attached to boron was not observed due to quadrupole broadening caused by the ^{11}B nucleus); IR (ATR): 2976, 1690, 1468, 1369, 1256, 1186, 847, 702 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{23}H_{25}BNaO_3S$ [M+Na]$^+$: 415.1514, Found: 415.1514.



Product **4s** was obtained in 95% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 163-165 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 10.77 min, t_r (major) = 13.59 min) gave the isomeric composition of the major isomer: 98% ee; $[\alpha]_D^{25}$ = -85.3 (*c* = 0.15, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.26-7.16 (m, 5H), 6.90-6.89 (m, 1H), 6.30-6.27 (m, 1H), 5.53-5.51 (m, 1H), 3.71 (s, 3H), 2.46 (d, *J* = 3.9 Hz, 1H), 2.01 (d, *J* = 4.0 Hz, 1H), 1.19 (s, 6H), 1.18 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 204.51, 158.83, 136.73, 136.02, 130.90, 128.32, 127.12, 127.08, 123.25, 111.21, 108.54, 84.25, 55.47, 46.01, 30.89, 24.89, 24.56 (Note: the carbon attached to boron was not observed due to quadrupole broadening caused by the ^{11}B nucleus); IR (ATR): 2974, 1694, 1489, 1371, 1287, 1186, 847, 702 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{23}H_{25}BNaO_4S$ $[M+Na]^+$: 431.1463, Found: 431.1467.

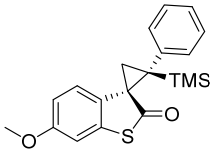


Product **4t** was obtained in 87% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a yellowish solid (m.p. 117-119 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 254 nm; t_r (minor) = 7.97 min, t_r (major) = 9.14 min) gave the isomeric composition of the major isomer: 98% ee; $[\alpha]_D^{25}$ = -186.0 (*c* = 0.20, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.30-7.22 (m, 5H), 7.19-7.17 (m, 1H), 7.09-7.07 (m, 1H), 5.56-5.55 (m, 1H), 2.55 (d, *J* = 4.0 Hz, 1H), 2.11 (d, *J* = 4.1 Hz, 1H), 1.19 (s, 6H), 1.18 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 203.29, 137.04, 135.96, 133.37, 131.11, 130.82, 128.57, 127.57, 127.08, 123.49, 122.85, 84.46, 46.51, 31.75, 24.91, 24.57 (Note: the carbon attached to boron was not observed due to quadrupole broadening caused by the ^{11}B nucleus); IR (ATR): 2978, 1458, 1371, 1250, 1188, 847, 702 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{22}H_{22}BClNaO_3S$ $[M+Na]^+$: 435.0967, Found: 435.0972.

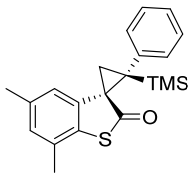


Product **4u** was obtained in 96% yield, with a dr ratio of 13:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 79-81 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 0.1/99.9, 1.0 mL/min, 230 nm; t_r (minor) = 13.88 min, t_r (major) = 15.51 min) gave the isomeric composition of the major isomer: 98% ee; $[\alpha]_D^{25}$ = -153.3 (*c* = 0.24, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.37-7.33

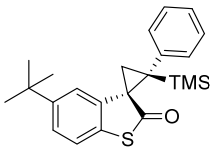
(m, 1H), 7.25-7.22 (m, 1H), 7.19-7.17 (m, 1H), 7.15-7.12 (m, 1H), 7.01-6.97 (m, 1H), 6.91-6.88 (m, 1H), 6.43-6.40 (m, 1H), 5.32-5.31 (m, 1H), 2.51 (d, J = 4.1 Hz, 1H), 2.17 (d, J = 4.2 Hz, 1H), 1.87 (s, 3H), 0.04 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 204.85, 141.14, 135.57, 134.35, 131.10, 131.04, 129.34, 128.47, 127.98, 127.47, 126.21, 124.32, 122.11, 47.23, 46.12, 32.22, 21.07, 0.03; IR (ATR): 2361, 1695, 1470, 1248, 1070, 841, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{20}H_{22}NaOSSi$ $[M+Na]^+$: 361.1053, Found: 361.1046.



Product **4v** was obtained in 97% yield, with a dr ratio of >20:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 136-138 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 1/99, 1.0 mL/min, 230 nm; t_r (minor) = 12.79 min, t_r (major) = 13.45 min) gave the isomeric composition of the major isomer: 90% ee; $[\alpha]_D^{25}$ = -22.5 (c = 0.16, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.36-7.31 (m, 1H), 7.22-7.19 (m, 1H), 7.16-7.12 (m, 1H), 7.03-6.99 (m, 1H), 6.89-6.88 (m, 1H), 6.47-6.44 (m, 1H), 6.24-6.21 (m, 1H), 5.45-5.42 (m, 1H), 3.72 (s, 3H), 2.47 (d, J = 4.2 Hz, 1H), 2.11 (d, J = 4.2 Hz, 1H), 0.02 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 204.62, 158.64, 141.13, 135.46, 131.08, 129.23, 128.54, 128.14, 127.64, 126.25, 123.96, 110.94, 108.22, 55.49, 46.80, 45.24, 31.88, 0.03; IR (ATR): 2955, 1697, 1489, 1441, 1121, 845, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{20}H_{22}NaO_2SSi$ $[M+Na]^+$: 377.1002, Found: 377.1008.

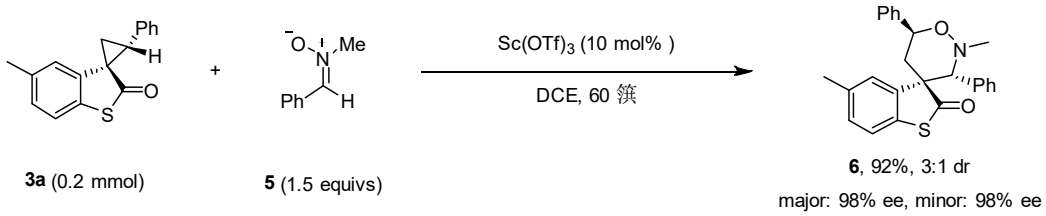


Product **4w** was obtained in 90% yield, with a dr ratio of 11:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a reddish solid (m.p. 60-62 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 0.5/99.5, 1.0 mL/min, 254 nm; t_r (minor) = 7.91 min, t_r (major) = 6.90 min) gave the isomeric composition of the major isomer: 98% ee; $[\alpha]_D^{25}$ = -113.3 (c = 0.12, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.36-7.32 (m, 1H), 7.24-7.21 (m, 1H), 7.15-7.11 (m, 1H), 7.02-6.97 (m, 1H), 6.75-6.74 (m, 1H), 6.45-6.42 (m, 1H), 5.17-5.16 (m, 1H), 2.50 (d, J = 4.0 Hz, 1H), 2.28 (s, 3H), 2.15 (d, J = 4.1 Hz, 1H), 1.85 (s, 3H), 0.04 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 204.96, 141.24, 135.53, 134.22, 131.14, 131.09, 130.85, 129.34, 128.57, 128.41, 127.94, 126.16, 121.71, 47.72, 46.15, 32.41, 20.97, 20.53, 0.05; IR (ATR): 2949, 1699, 1487, 1248, 1148, 849, 700 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{21}H_{24}NaOSSi$ $[M+Na]^+$: 375.1209, Found: 375.1208.



Product **4x** was obtained in 74% yield, with a dr ratio of 10:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major isomer was isolated as a white solid (m.p. 142-144 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 0.1/99.9, 1.0 mL/min, 254 nm; t_r (minor) = 9.73 min, t_r (major) = 12.67 min) gave the isomeric composition of the major isomer: 92% ee; $[\alpha]_D^{25}$ = -123.2 (*c* = 0.38, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.38-7.34 (m, 1H), 7.26-7.22 (m, 2H), 7.14-7.10 (m, 2H), 7.00-6.96 (m, 1H), 6.43-6.40 (m, 1H), 5.63-5.62 (m, 1H), 2.52 (d, *J* = 4.1 Hz, 1H), 2.18 (d, *J* = 4.1 Hz, 1H), 0.88 (s, 9H), 0.02 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 205.02, 147.83, 141.13, 134.99, 131.28, 131.06, 129.19, 128.73, 128.26, 126.36, 124.03, 122.02, 120.80, 47.31, 46.00, 34.35, 32.12, 31.08, 0.01; IR (ATR): 2968, 1701, 1246, 1128, 990, 852, 745 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{23}H_{28}NaOSSi$ $[M+Na]^+$: 403.1522, Found: 403.1513.

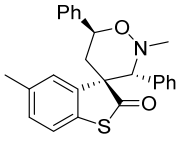
3. Transformations of product 3a to 6



3a (0.2 mmol) **5** (1.5 equivs) **6**, 92%, 3:1 dr

major: 98% ee, minor: 98% ee

To a Schlenk tube was sequentially added **3a** (53.2 mg, 0.2 mmol), nitrone **5** (40.5 mg, 0.3 mmol, 1.5 equivs) and $Sc(OTf)_3$ (9.8 mg, 0.02 mmol, 10 mol %), followed by the addition of anhydrous DCE (2.0 mL). The reaction mixture was stirred vigorously at 50 °C until almost full consumption of **3a** by TLC analysis (about 7 h). The reaction mixture was rapidly passed through a short pad of silica gel, and washed with Et_2O. The obtained organic solution was concentrated in vacuo to give the crude product. To determine the diastereoselectivity of the product, the residue was first dissolved in $CDCl_3$, and took some samples for ^{1}H NMR analysis. Then the sample for analysis and rest crude product were recombined for column chromatography purification to afford product **6** (73.4 mg, 92%), using PE/EtOAc (50/1, v/v) as the eluent.



Product **6** was obtained in 92% yield, with a dr ratio of 3:1 indicated by ^{1}H NMR analysis of crude reaction mixture; The major distereoisomer was isolated as a white solid (m.p. 144-146 °C); HPLC analysis (Chiralcel OX-H, ^{i}PrOH/hexane = 0.5/99.5, 1.0 mL/min, 230 nm; t_r (minor) = 11.70 min, t_r (major) = 14.02 min) gave the isomeric composition of

the product: 98% ee; $[\alpha]_D^{25}$ = -143.3 (*c* = 0.12, Acetone); ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.42-8.41 (m, 1H), 7.47-7.44 (m, 2H), 7.40-7.36 (m, 2H), 7.34-7.30 (m, 1H), 7.15-6.85 (m, 6H), 6.69-6.66 (m, 1H), 5.69 (dd, *J* = 12.0, 2.5 Hz, 1H), 4.21 (s, 1H), 2.56 (s, 3H), 2.54 (s, 3H), 2.49 (dd, *J* = 13.3, 12.0 Hz, 1H), 2.04 (dd, *J* = 13.3, 2.5 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 207.62, 140.10, 139.07, 135.55, 135.47, 131.22, 130.46, 129.21, 128.96, 128.65, 128.32, 127.95, 127.74, 126.56, 122.57, 76.71, 75.46, 63.95, 44.91, 42.54, 21.86; IR (ATR): 2918, 1701, 1493, 1454, 1047, 972, 698 cm^{-1}; HRMS (ESI): Exact mass calcd for $C_{25}H_{23}NNaO_2S$ $[M+Na]^+$: 424.1342, Found: 424.1340.

4. X-ray crystallographic data of 3a, 4l and 6

Data intensity of **3a**[3] was collected using a 'XtaLAB AFC12 (RINC)' diffractometer at 99.9(9) K. Data collection and reduction were done by using Olex2 and the structure was solved with the ShelXS structure solution program using Intrinsic Phasing and refined with the ShelXL refinement package using Least Squares minimization. Crystal data for **3a**: $C_{17}H_{14}OS$, *T* = 99.9(9) K, orthorhombic, $P2_12_12_1$, *a* = 7.54810(10) Å, *b* = 11.5576(2) Å, *c* = 15.3921(3) Å, *α* = 90°, *β* = 90°, *γ* = 90°, *V* = 1342.77(4) Å^3. Z = 4, ρ_{calc} = 1.317 g/cm^3. 25631 reflections collected, 2375 [R_{int} = 0.0506, R_{sigma} = 0.0203] independent reflections, R_1 = 0.0252, wR_2 = 0.06080 ($I > 2\sigma(I)$, final), R_1 = 0.0264, wR_2 = 0.0613 (all data), GOF = 1.038, and 173 parameters.

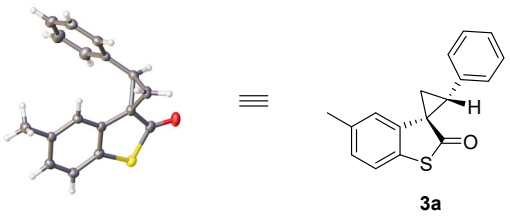


Table S1. Crystal data and structure refinement for **3a**.

Identification code	**3a**
Empirical formula	$C_{17}H_{14}OS$
Formula weight	266.34
Temperature/K	99.9(9)
Crystal system	orthorhombic
Space group	$P2_12_12_1$
a/Å	7.54810(10)
b/Å	11.5576(2)

[3] Supplementary crystallographic data have been deposited at Cambridge Crystallographic Data Center (CCDC number: 2053474).

c/Å	15.3921(3)
α/°	90
β/°	90
γ/°	90
Volume/Å^3	1342.77(4)
Z	4
ρ_{calc}g/cm^3	1.317
μ/mm^{-1}	2.029
F(000)	560.0
Crystal size/mm^3	0.36 × 0.22 × 0.18
Radiation	CuKα (λ = 1.54184)
2Θ range for data collection/°	9.57 to 134.156
Index ranges	-9 ≤ h ≤ 8, -13 ≤ k ≤ 13, -18 ≤ l ≤ 18
Reflections collected	25631
Independent reflections	2375 [R_{int} = 0.0506, R_{sigma} = 0.0203]
Data/restraints/parameters	2375/0/173
Goodness-of-fit on F^2	1.038
Final R indexes [I>=2σ (I)]	R_1 = 0.0252, wR_2 = 0.0608
Final R indexes [all data]	R_1 = 0.0264, wR_2 = 0.0613
Largest diff. peak/hole / e Å^{-3}	0.14/-0.15
Flack parameter	-0.012(7)

Table S2. Fractional Atomic Coordinates (×10^4) and Equivalent Isotropic Displacement Parameters (Å^2×10^3) for **3a**. **U_{eq} is defined as 1/3 of of the trace of the orthogonalised U_{IJ} tensor.**

Atom	***x***	***y***	***z***	**U(eq)**
S1	-132.3(7)	5120.1(4)	2904.6(3)	25.99(14)
O1	310(2)	6692.8(13)	1666.9(9)	31.0(4)
C10	3302(3)	5368.6(16)	3210.0(12)	19.7(4)
C14	1913(3)	3945.8(17)	4147.0(13)	24.0(4)
C15	1810(3)	4762.5(17)	3485.3(12)	22.1(4)
C12	5051(3)	4359.5(15)	4287.9(11)	21.2(4)
C6	5019(3)	7814.7(15)	3088.7(12)	22.6(4)
C9	2917(3)	6180.0(18)	2487.9(12)	21.7(4)
C16	1032(3)	6132.0(18)	2232.5(13)	24.8(5)
C4	7964(3)	8155.5(19)	3636.1(15)	31.5(5)
C11	4919(3)	5162.4(15)	3608.8(11)	20.4(4)
C7	3773(3)	7402.3(18)	2400.5(13)	24.6(5)
C5	6839(3)	7795.9(18)	2974.2(14)	27.1(5)

C13	3536(3)	3761.5(18)	4541.4(13)	23.2(5)
C8	4252(3)	6474.2(19)	1775.6(13)	25.7(5)
C17	6791(3)	4157.3(19)	4729.2(14)	26.9(5)
C2	5458(3)	8565.8(19)	4537.2(15)	34.8(6)
C1	4337(3)	8208.9(18)	3878.7(14)	29.7(5)
C3	7273(3)	8540.8(19)	4418.2(16)	33.1(5)

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

Atom	**U_{11}**	**U_{22}**	**U_{33}**	**U_{23}**	**U_{13}**	**U_{12}**
S1	17.8(3)	33.1(3)	27.0(2)	-0.6(2)	-1.8(2)	-1.0(2)
O1	28.3(9)	41.4(9)	23.4(7)	1.8(6)	-5.8(7)	6.3(7)
C10	21.1(11)	20.5(9)	17.5(9)	-3.1(8)	1.9(8)	0.9(8)
C14	22.3(12)	24.0(10)	25.6(10)	-0.4(8)	4.6(9)	-3.4(8)
C15	20.2(11)	24.3(10)	22.0(9)	-4.4(8)	1.1(8)	0.9(9)
C12	23.6(11)	20.0(9)	19.9(9)	-0.9(7)	2.3(9)	0.5(9)
C6	23.5(11)	19.0(9)	25.3(10)	4.5(7)	-0.7(9)	0.0(9)
C9	23.4(12)	23.5(10)	18.2(9)	0.4(8)	-0.1(8)	1.6(9)
C16	24.8(12)	29.1(10)	20.5(10)	-5.0(9)	0.0(9)	2.7(9)
C4	24.2(12)	28.6(11)	41.9(13)	5.7(10)	-2.9(10)	-3.0(10)
C11	19.2(10)	21.7(9)	20.4(9)	-0.5(7)	3.1(8)	-0.6(9)
C7	25.9(13)	24.5(10)	23.4(10)	5.6(8)	0.9(9)	0.4(9)
C5	28.6(13)	25.0(10)	27.7(11)	4.4(9)	3.3(10)	-2.7(9)
C13	27.1(12)	21.4(10)	21.1(10)	1.0(8)	2.7(8)	0.9(8)
C8	22.7(11)	36.4(12)	18.1(9)	2.8(9)	1.0(8)	-0.7(9)
C17	25.1(13)	28.4(11)	27.3(11)	6.0(9)	-1.3(9)	0.8(9)
C2	37.7(15)	32.6(12)	33.9(12)	-9.3(10)	-2.2(10)	2.8(10)
C1	26.4(13)	29.8(11)	32.9(12)	-3.8(9)	0.6(9)	3.0(9)
C3	35.1(14)	27.0(11)	37.3(13)	-2.0(9)	-9.2(11)	-2.8(10)

Table S4. Bond Lengths for **3a**.

Atom	**Atom**	**Length/Å**	**Atom**	**Atom**	**Length/Å**
S1	C15	1.766(2)	C6	C7	1.494(3)
S1	C16	1.792(2)	C6	C5	1.385(3)
O1	C16	1.215(3)	C6	C1	1.397(3)
C10	C15	1.392(3)	C9	C16	1.477(3)
C10	C9	1.483(3)	C9	C7	1.559(3)

C10	C11	1.386(3)	C9	C8	1.527(3)
C14	C15	1.391(3)	C4	C5	1.390(3)
C14	C13	1.384(3)	C4	C3	1.385(3)
C12	C11	1.401(3)	C7	C8	1.485(3)
C12	C13	1.392(3)	C2	C1	1.383(3)
C12	C17	1.497(3)	C2	C3	1.383(4)

Table S5. Bond Angles for **3a**.

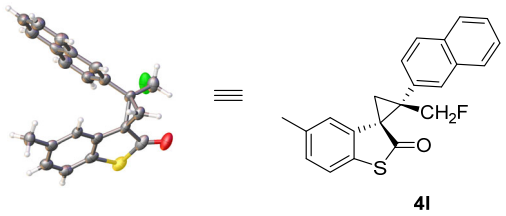
Atom	**Atom**	**Atom**	**Angle/°**	**Atom**	**Atom**	**Atom**	**Angle/°**
C15	S1	C16	92.16(10)	C16	C9	C7	114.22(18)
C15	C10	C9	112.80(18)	C16	C9	C8	116.92(17)
C11	C10	C15	119.39(18)	C8	C9	C7	57.52(14)
C11	C10	C9	127.81(19)	O1	C16	S1	122.83(17)
C13	C14	C15	118.38(19)	O1	C16	C9	127.1(2)
C10	C15	S1	113.57(15)	C9	C16	S1	110.09(15)
C14	C15	S1	125.16(16)	C3	C4	C5	120.2(2)
C14	C15	C10	121.27(19)	C10	C11	C12	120.46(19)
C11	C12	C17	120.30(19)	C6	C7	C9	119.24(17)
C13	C12	C11	118.6(2)	C8	C7	C6	122.4(2)
C13	C12	C17	121.06(17)	C8	C7	C9	60.15(13)
C5	C6	C7	121.92(19)	C6	C5	C4	120.5(2)
C5	C6	C1	118.8(2)	C14	C13	C12	121.86(19)
C1	C6	C7	119.3(2)	C7	C8	C9	62.32(14)
C10	C9	C7	123.80(18)	C1	C2	C3	120.2(2)
C10	C9	C8	123.33(19)	C2	C1	C6	120.7(2)
C16	C9	C10	111.37(18)	C2	C3	C4	119.6(2)

Table S6. Hydrogen Atom Coordinates (Å×104) and Isotropic Displacement Parameters ($Å^2×10^3$) for **3a**.

Atom	***x***	***y***	***z***	**U(eq)**
H14	915.53	3533.69	4320.13	29
H4	9184.3	8137.47	3553.59	38
H11	5921.97	5559.71	3424.37	25
H7	2984.99	7999.51	2166.39	30
H5	7311.51	7540.69	2450.19	33
H13	3617.12	3222.86	4988.51	28
H8A	5427.2	6140.36	1821.75	31

H8B	3808.83	6543.3	1186.34	31
H17A	7508.06	3655.86	4377.71	40
H17B	6591.36	3803.35	5284.89	40
H17C	7388.72	4882.81	4807.97	40
H2	4988.84	8823.27	5061.43	42
H1	3117.34	8231.59	3962.78	36
H3	8026.87	8781.28	4860.84	40

Data intensity of **4l**[4] was collected using a 'XtaLAB AFC12 (RINC)' diffractometer at 99.99(10) K. Data collection and reduction were done by using Olex2 and the structure was solved with the ShelXS structure solution program using Intrinsic Phasing and refined with the ShelXL refinement package using Least Squares minimization. Crystal data for **4l:** $C_{22}H_{17}FOS$, T = 99.99(10) K, monoclinic, $P2_1$, a = 6.6246(2) Å, b = 12.6387(3) Å, c = 10.4032(2) Å, α = 90°, β = 90.958(2)°, γ = 90°, V = 870.90(4) Å^3. Z = 2, ρ_{calc} = 1.329 g/cm^3. 16182 reflections collected, 3057 [R_{int} = 0.0661, R_{sigma} = 0.0370] independent reflections, R_1 = 0.0705, wR_2 = 0.1874 ($I > 2\sigma(I)$, final), R_1 = 0.0743, wR_2 = 0.1912 (all data), GOF = 1.038, and 227 parameters.



4l

Table S7. Crystal data and structure refinement for **4l**.

Identification code	**4l**
Empirical formula	$C_{22}H_{17}FOS$
Formula weight	348.41
Temperature/K	99.99(10)
Crystal system	monoclinic
Space group	$P2_1$
a/Å	6.6246(2)
b/Å	12.6387(3)
c/Å	10.4032(2)
α/°	90

[4] Supplementary crystallographic data have been deposited at Cambridge Crystallographic Data Center (CCDC number: 2053475).

β/°	90.958(2)
γ/°	90
Volume/Å^3	870.90(4)
Z	2
ρ_{calc}g/cm^3	1.329
μ/mm^{-1}	1.782
F(000)	364.0
Crystal size/mm^3	0.36 × 0.28 × 0.12
Radiation	CuKα (λ = 1.54184)
2Θ range for data collection/°	8.5 to 134.03
Index ranges	-7 ≤ h ≤ 7, -15 ≤ k ≤ 15, -12 ≤ l ≤ 12
Reflections collected	16182
Independent reflections	3057 [R_{int} = 0.0661, R_{sigma} = 0.0370]
Data/restraints/parameters	3057/1/227
Goodness-of-fit on F^2	1.038
Final R indexes [I>=2σ (I)]	R_1 = 0.0705, wR_2 = 0.1874
Final R indexes [all data]	R_1 = 0.0743, wR_2 = 0.1912
Largest diff. peak/hole / e Å^{-3}	0.74/-0.40
Flack parameter	0.017(14)

Table S8. Fractional Atomic Coordinates (×10^4) and Equivalent Isotropic Displacement Parameters (Å^2×10^3) for **4l**. U_{eq} is defined as 1/3 of of the trace of the orthogonalised U_{IJ} tensor.

Atom	***x***	***y***	***z***	**U(eq)**
S1	721(2)	5426.5(15)	9719.0(15)	47.0(5)
F1	-511(7)	3154(4)	6863(6)	69.0(15)
O1	775(8)	3333(5)	9860(5)	57.1(15)
C6	4019(9)	5230(5)	8350(5)	34.9(14)
C5	5781(8)	5554(5)	7752(5)	33.3(13)
C4	6291(10)	6629(5)	7741(6)	34.4(14)
C7	3268(9)	4130(5)	8471(6)	35.6(14)
C10	3018(9)	3410(5)	7270(6)	36.1(14)
C19	4278(11)	4917(5)	3692(7)	42.6(16)
C1	2802(10)	5975(6)	8942(6)	39.6(15)
C3	5054(11)	7360(6)	8333(7)	41.8(16)
C9	4584(10)	3169(6)	8292(6)	38.4(14)
C14	5703(10)	4247(5)	4176(7)	43.5(16)
C12	3536(10)	3901(6)	6008(6)	40.8(15)
C17	6456(14)	5192(6)	1849(7)	55(2)

C22	8195(10)	6987(6)	7069(7)	41.8(16)
C2	3311(12)	7051(6)	8929(6)	42.2(16)
C15	7555(11)	4046(6)	3583(7)	46.2(16)
C16	7940(13)	4521(6)	2432(7)	51.0(17)
C8	1551(9)	4105(6)	9395(6)	44.7(18)
C18	4724(11)	5406(6)	2458(6)	47.1(15)
C11	1283(10)	2632(6)	7185(8)	47.0(17)
C13	5269(11)	3722(6)	5400(6)	44.2(16)
C21	2147(13)	4658(6)	5458(7)	49.3(18)
C20	2459(11)	5133(6)	4314(7)	48.1(17)

Table S9. Anisotropic Displacement Parameters ($Å^2 \times 10^3$) for **4l**. The Anisotropic displacement factor exponent takes the form: $-2\pi^2[h^2a^{*2}U_{11}+2hka^*b^*U_{12}+\ldots]$.

Atom	**U_{11}**	**U_{22}**	**U_{33}**	**U_{23}**	**U_{13}**	**U_{12}**
S1	32.9(8)	68.2(11)	40.2(8)	10.3(8)	6.1(6)	8.3(8)
F1	35(2)	67(3)	105(4)	37(3)	-22(2)	-13(2)
O1	46(3)	72(4)	53(3)	26(3)	12(2)	0(3)
C6	31(3)	48(4)	25(3)	7(3)	-6(2)	2(3)
C5	26(3)	45(3)	29(3)	10(3)	-3(2)	-1(3)
C4	31(3)	45(3)	27(3)	3(2)	-10(2)	2(3)
C7	29(3)	49(4)	29(3)	14(3)	0(2)	-4(3)
C10	32(3)	46(4)	31(3)	10(3)	-7(2)	-6(3)
C19	40(4)	33(3)	54(4)	-9(3)	-16(3)	4(3)
C1	30(3)	63(4)	25(3)	4(3)	-6(2)	3(3)
C3	41(4)	47(4)	37(3)	-2(3)	-8(3)	-1(3)
C9	31(3)	48(4)	36(3)	12(3)	-2(3)	0(3)
C14	29(3)	39(4)	62(4)	-17(3)	-3(3)	0(3)
C12	40(4)	50(4)	32(3)	3(3)	-7(3)	-16(3)
C17	78(6)	47(4)	41(3)	-3(3)	3(3)	-18(4)
C22	36(4)	45(4)	44(4)	10(3)	-4(3)	-5(3)
C2	46(4)	49(4)	31(3)	-3(3)	-2(3)	13(3)
C15	42(4)	49(4)	47(4)	-3(3)	-1(3)	5(3)
C16	53(4)	53(4)	47(4)	-2(3)	5(3)	-2(4)
C8	21(3)	75(5)	38(3)	17(3)	2(2)	2(3)
C18	47(4)	45(4)	49(3)	-2(3)	-6(3)	0(4)
C11	31(4)	54(4)	56(4)	16(3)	-6(3)	-6(3)
C13	37(4)	61(4)	35(3)	-1(3)	-5(3)	-13(3)
C21	64(5)	44(4)	40(4)	0(3)	-9(3)	2(3)

C20	46(4)	47(4)	50(4)	2(3)	-5(3)	8(3)

Table S10. Bond Lengths for **4l**.

Atom	**Atom**	**Length/Å**	**Atom**	**Atom**	**Length/Å**
S1	C1	1.752(7)	C10	C11	1.514(9)
S1	C8	1.792(8)	C19	C14	1.359(10)
F1	C11	1.395(8)	C19	C18	1.460(11)
O1	C8	1.208(9)	C19	C20	1.404(11)
C6	C5	1.394(8)	C1	C2	1.402(11)
C6	C7	1.483(9)	C3	C2	1.376(11)
C6	C1	1.389(9)	C14	C15	1.406(10)
C5	C4	1.400(10)	C14	C13	1.469(10)
C4	C3	1.386(10)	C12	C13	1.339(10)
C4	C22	1.521(10)	C12	C21	1.439(10)
C7	C10	1.552(9)	C17	C16	1.425(12)
C7	C9	1.509(10)	C17	C18	1.347(11)
C7	C8	1.502(8)	C15	C16	1.367(11)
C10	C9	1.504(9)	C21	C20	1.352(10)
C10	C12	1.498(8)			

Table S11. Bond Angles for **4l**.

Atom	**Atom**	**Atom**	**Angle/°**	**Atom**	**Atom**	**Atom**	**Angle/°**
C1	S1	C8	92.0(3)	C6	C1	S1	113.8(6)
C5	C6	C7	126.7(6)	C6	C1	C2	120.7(6)
C1	C6	C5	119.7(6)	C2	C1	S1	125.4(5)
C1	C6	C7	113.5(6)	C2	C3	C4	121.2(7)
C6	C5	C4	119.5(6)	C10	C9	C7	62.0(4)
C5	C4	C22	119.6(6)	C19	C14	C15	123.8(7)
C3	C4	C5	119.9(6)	C19	C14	C13	117.3(7)
C3	C4	C22	120.5(6)	C15	C14	C13	119.0(6)
C6	C7	C10	120.9(5)	C13	C12	C10	123.7(6)
C6	C7	C9	123.3(5)	C13	C12	C21	118.2(6)
C6	C7	C8	109.4(6)	C21	C12	C10	118.0(6)
C9	C7	C10	58.8(4)	C18	C17	C16	120.4(7)
C8	C7	C10	115.5(6)	C3	C2	C1	118.9(6)
C8	C7	C9	120.5(6)	C16	C15	C14	118.8(7)
C9	C10	C7	59.1(4)	C15	C16	C17	119.8(7)

C9	C10	C11	115.1(5)	O1	C8	S1	123.0(5)
C12	C10	C7	116.1(5)	O1	C8	C7	127.2(7)
C12	C10	C9	122.6(6)	C7	C8	S1	109.8(5)
C12	C10	C11	113.7(5)	C17	C18	C19	121.0(7)
C11	C10	C7	119.9(6)	F1	C11	C10	110.5(6)
C14	C19	C18	116.1(7)	C12	C13	C14	121.0(7)
C14	C19	C20	123.1(7)	C20	C21	C12	122.6(7)
C20	C19	C18	120.7(6)	C21	C20	C19	117.7(7)

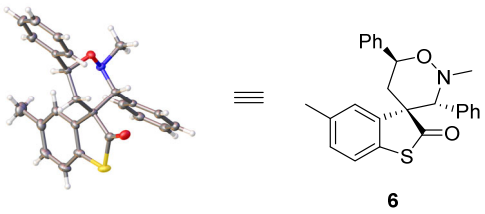
Table S12. Hydrogen Atom Coordinates (Å×10^4) and Isotropic Displacement Parameters (Å^2×10^3) for **4l**.

Atom	***x***	***y***	***z***	**U(eq)**
H5	6612.46	5060	7362.47	40
H3	5408.78	8072.19	8328.2	50
H9A	5987.7	3286.36	8082.76	46
H9B	4349.51	2564.59	8844.57	46
H17	6685.66	5483.42	1043.72	67
H22A	9185.66	7203.49	7699.86	63
H22B	7881.06	7570.65	6510.43	63
H22C	8720.92	6411.84	6573.2	63
H2	2484.69	7548.07	9317.14	51
H15	8502.24	3598.01	3965.86	55
H16	9164.98	4407.68	2031.03	61
H18	3798.68	5872.68	2085.81	57
H11A	1565.23	2101.09	6538.72	56
H11B	1139.68	2275.96	8004.06	56
H13	6211.99	3258.35	5759.11	53
H21	988.92	4826.55	5907.53	59
H20	1501.96	5587.31	3952.44	58

Data intensity of **6**[5] was collected using a 'XtaLAB AFC12 (RINC)' diffractometer at 100.00(10) K. Data collection and reduction were done by using Olex2 and the structure was solved with the ShelXS structure solution program using direct methods and refined by full-matrix least-squares on F^2 with anisotropic displacement parameters for non-H atoms using SHELX-97. Hydrogen atoms were added at their geometrically idea positions and refined isotropically. Crystal data for **6**:

[5] Supplementary crystallographic data have been deposited at Cambridge Crystallographic Data Center (CCDC number: 2053476).

$C_{25}H_{23}NO_2S$, T = 100.00(10) K, orthorhombic, $P2_12_12_1$, a = 8.40850(10) Å, b = 9.74720(10) Å, c = 25.2684(3) Å, α = 90°, β = 90°, γ = 90°, V = 2070.98(4) Å^3. Z = 4, ρ_{calc} = 1.288 g/cm^3. 48728 reflections collected, 4211 [R_{int} = 0.0860, R_{sigma} = 0.0316] independent reflections, R_1 = 0.0362, wR_2 = 0.0892 ($I > 2\sigma(I)$, final), R_1 = 0.0385, wR_2 = 0.0913 (all data), GOF = 1.107, and 264 parameters.



6

Table S13. Crystal data and structure refinement for **6**.

Identification code	**6**
Empirical formula	$C_{25}H_{23}NO_2S$
Formula weight	401.50
Temperature/K	100.00(10)
Crystal system	orthorhombic
Space group	$P2_12_12_1$
a/Å	8.40850(10)
b/Å	9.74720(10)
c/Å	25.2684(3)
α/°	90
β/°	90
γ/°	90
Volume/Å^3	2070.98(4)
Z	4
ρ_{calc}g/cm^3	1.288
μ/mm^{-1}	1.548
F(000)	848.0
Crystal size/mm^3	0.38 × 0.12 × 0.08
Radiation	CuKα (λ = 1.54184)
2Θ range for data collection/°	6.996 to 149.406
Index ranges	-10 ≤ h ≤ 10, -12 ≤ k ≤ 12, -31 ≤ l ≤ 31
Reflections collected	48728
Independent reflections	4211 [R_{int} = 0.0860, R_{sigma} = 0.0316]
Data/restraints/parameters	4211/0/264
Goodness-of-fit on F^2	1.107

Final R indexes [I>=2σ (I)]	R_1 = 0.0362, wR_2 = 0.0892
Final R indexes [all data]	R_1 = 0.0385, wR_2 = 0.0913
Largest diff. peak/hole / e Å^{-3}	0.19/-0.31
Flack parameter	0.012(8)

Table S14. Fractional Atomic Coordinates (×10^4) and Equivalent Isotropic Displacement Parameters (Å^2×10^3) for **6**. U_{eq} is defined as 1/3 of of the trace of the orthogonalised U_{IJ} tensor.

Atom	***x***	***y***	***z***	**U(eq)**
C1	7691(3)	1430(3)	3547.6(11)	24.8(5)
C2	7482(4)	222(3)	3827.7(12)	30.9(7)
C3	7140(4)	292(3)	4362.7(12)	32.5(7)
C4	6996(3)	1546(3)	4622.7(10)	27.7(6)
C5	7225(3)	2751(3)	4330.2(10)	22.7(6)
C6	7581(3)	2717(2)	3793.4(10)	20.4(5)
C7	7830(3)	3923(2)	3424.6(9)	19.1(5)
C8	8240(3)	3313(3)	2876.3(10)	22.9(5)
C9	6301(3)	4804(2)	3335.2(9)	18.8(5)
C10	4887(3)	3939(2)	3177.6(10)	19.6(5)
C11	4471(4)	3864(3)	2642.2(10)	24.2(6)
C12	3224(4)	3033(3)	2477.8(11)	27.8(6)
C13	2372(4)	2275(3)	2845.7(12)	29.5(6)
C14	2744(3)	2371(3)	3376.9(11)	27.7(6)
C15	4002(3)	3190(3)	3542.8(11)	24.5(6)
C16	9213(3)	4892(2)	3581.0(10)	19.8(5)
C17	8734(3)	5909(2)	4008.7(9)	18.8(5)
C18	4591(3)	6478(3)	3774.1(11)	26.0(6)
C19	9911(3)	7044(2)	4113.2(10)	18.6(5)
C20	10206(3)	7446(3)	4632.2(10)	24.3(5)
C21	11212(4)	8538(3)	4743.8(10)	29.1(6)
C22	11951(4)	9240(3)	4333.6(11)	28.3(6)
C23	11661(3)	8850(2)	3813.2(10)	24.8(6)
C24	10642(3)	7768(2)	3703.3(10)	21.6(5)
C25	6591(5)	1613(3)	5201.9(11)	41.3(8)
N1	5997(3)	5597(2)	3823.3(8)	19.5(5)
O1	8597(2)	3986.2(19)	2494.8(7)	27.7(4)
O2	7297(2)	6606.0(17)	3851.0(7)	19.8(4)
S1	8101.3(9)	1504.3(7)	2864.6(3)	28.08(17)

Table S15. Anisotropic Displacement Parameters ($Å^2 \times 10^3$) for **6**. The Anisotropic displacement factor exponent takes the form: $-2\pi^2[h^2a^{*2}U_{11}+2hka^*b^*U_{12}+\ldots]$.

Atom	U_{11}	U_{22}	U_{33}	U_{23}	U_{13}	U_{12}
C1	21.7(14)	17.2(11)	35.5(13)	-2.1(11)	2.9(11)	-0.5(11)
C2	31.5(17)	15.7(12)	45.7(17)	1.1(11)	3.6(14)	1.1(11)
C3	33.5(18)	19.2(12)	44.9(16)	10.9(12)	-2.3(14)	0.2(12)
C4	27.6(15)	26.6(13)	28.9(13)	8.9(11)	-3.2(11)	-3.5(13)
C5	25.3(15)	19.7(12)	23.2(12)	2.5(9)	-2.6(10)	-2.0(10)
C6	19.7(13)	15.7(12)	25.9(12)	2.0(9)	-2.6(10)	0.6(10)
C7	21.6(14)	16.2(11)	19.4(11)	-1.3(9)	2.1(10)	0.9(9)
C8	21.6(14)	22.5(12)	24.6(12)	-3.7(10)	0.1(11)	0.6(11)
C9	22.6(14)	15.5(11)	18.2(11)	-0.9(9)	0.4(10)	0.9(10)
C10	20.5(13)	13.9(10)	24.3(12)	-3.1(9)	-1.4(10)	1.7(10)
C11	28.2(15)	19.6(12)	24.7(12)	-0.5(10)	-2.1(10)	2.2(11)
C12	27.7(16)	25.6(13)	30.2(13)	-6.8(10)	-7.0(12)	3.4(11)
C13	26.2(15)	18.7(12)	43.5(15)	-7.2(11)	-5.5(13)	0.9(11)
C14	25.7(15)	18.2(12)	39.2(15)	-0.4(11)	3.3(12)	-0.7(11)
C15	25.7(15)	22.0(13)	25.8(12)	0.8(10)	0.2(11)	-0.4(10)
C16	22.2(14)	15.6(11)	21.4(11)	-0.1(9)	1.7(10)	0.4(10)
C17	20.8(13)	17.2(11)	18.4(11)	0.4(9)	0.1(9)	2.5(10)
C18	25.4(15)	22.7(12)	29.9(13)	-4.4(11)	-0.6(11)	2.3(12)
C19	18.9(14)	15.3(10)	21.5(12)	0.7(9)	-1.6(10)	2.2(9)
C20	30.0(15)	22.8(12)	19.9(12)	1.6(10)	-1.4(10)	-2.0(12)
C21	35.7(17)	28.9(13)	22.7(12)	-4.0(11)	-6.2(11)	-7.2(13)
C22	30.4(16)	19.8(12)	34.9(14)	-1.7(10)	-5.2(13)	-5.2(12)
C23	29.1(16)	18.6(12)	26.8(12)	1.8(9)	2.7(12)	-1.0(11)
C24	26.8(15)	16.3(12)	21.6(12)	-0.2(9)	-0.3(10)	0.4(11)
C25	56(2)	39.8(17)	28.5(14)	11.8(13)	-1.9(14)	-10.4(17)
N1	18.4(12)	18.2(10)	22.0(10)	-4.0(8)	0.5(9)	-1.7(8)
O1	35.6(12)	27.1(9)	20.5(8)	-2.4(7)	5.7(8)	-1.0(8)
O2	19.4(9)	14.8(8)	25.2(8)	-1.7(7)	-1.7(7)	-0.3(7)
S1	32.8(4)	17.6(3)	33.9(3)	-7.9(3)	9.2(3)	-2.9(3)

Table S16. Bond Lengths for **6**.

Atom	Atom	Length/Å	Atom	Atom	Length/Å
C1	C2	1.385(4)	C10	C15	1.392(4)
C1	C6	1.403(3)	C11	C12	1.389(4)

C1	S1	1.761(3)	C12	C13	1.387(4)
C2	C3	1.384(4)	C13	C14	1.381(4)
C3	C4	1.393(4)	C14	C15	1.390(4)
C4	C5	1.401(3)	C16	C17	1.521(3)
C4	C25	1.504(4)	C17	C19	1.508(4)
C5	C6	1.390(4)	C17	O2	1.442(3)
C6	C7	1.515(3)	C18	N1	1.467(3)
C7	C8	1.547(3)	C19	C20	1.391(4)
C7	C9	1.562(4)	C19	C24	1.396(4)
C7	C16	1.549(4)	C20	C21	1.388(4)
C8	O1	1.204(3)	C21	C22	1.389(4)
C8	S1	1.767(3)	C22	C23	1.390(4)
C9	C10	1.510(4)	C23	C24	1.387(4)
C9	N1	1.478(3)	N1	O2	1.472(3)
C10	C11	1.399(4)			

Table S17. Bond Angles for **6**.

Atom	**Atom**	**Atom**	**Angle/°**	**Atom**	**Atom**	**Atom**	**Angle/°**
C2	C1	C6	121.7(2)	C15	C10	C9	122.6(2)
C2	C1	S1	124.1(2)	C15	C10	C11	118.7(2)
C6	C1	S1	114.2(2)	C12	C11	C10	120.6(3)
C3	C2	C1	119.0(3)	C13	C12	C11	120.0(3)
C2	C3	C4	121.4(3)	C14	C13	C12	119.9(3)
C3	C4	C5	118.4(2)	C13	C14	C15	120.3(3)
C3	C4	C25	121.1(2)	C14	C15	C10	120.5(3)
C5	C4	C25	120.5(3)	C17	C16	C7	112.3(2)
C6	C5	C4	121.6(2)	C19	C17	C16	115.4(2)
C1	C6	C7	114.4(2)	O2	C17	C16	109.4(2)
C5	C6	C1	117.9(2)	O2	C17	C19	104.64(19)
C5	C6	C7	127.7(2)	C20	C19	C17	119.2(2)
C6	C7	C8	106.46(19)	C20	C19	C24	118.6(2)
C6	C7	C9	113.7(2)	C24	C19	C17	122.0(2)
C6	C7	C16	114.8(2)	C21	C20	C19	121.1(2)
C8	C7	C9	105.40(19)	C20	C21	C22	119.9(2)
C8	C7	C16	107.2(2)	C21	C22	C23	119.5(3)
C16	C7	C9	108.65(19)	C24	C23	C22	120.4(2)
C7	C8	S1	112.58(17)	C23	C24	C19	120.5(2)

O1	C8	C7	124.3(2)	C18	N1	C9	112.0(2)
O1	C8	S1	123.1(2)	C18	N1	O2	102.21(18)
C10	C9	C7	112.28(19)	O2	N1	C9	105.14(18)
N1	C9	C7	107.99(19)	C17	O2	N1	108.69(16)
N1	C9	C10	112.1(2)	C1	S1	C8	92.14(12)
C11	C10	C9	118.8(2)				

Table S18. Hydrogen Atom Coordinates (Å×10^4) and Isotropic Displacement Parameters (Å^2×10^3) for **6**.

Atom	***x***	***y***	***z***	**U(eq)**
H2	7570.32	-621.95	3658.87	37
H3	7004.24	-516.78	4552.92	39
H5	7135.97	3594.59	4499.61	27
H9	6515.24	5454.51	3048.28	23
H11	5034.09	4375.56	2394.38	29
H12	2961.04	2983.78	2120.88	33
H13	1551.84	1702.72	2735.07	35
H14	2150.45	1886.35	3624.61	33
H15	4255.29	3237.84	3900.66	29
H16A	10100.68	4346.93	3706.81	24
H16B	9562.9	5392.13	3270.3	24
H17	8535.84	5410.34	4338.98	23
H18A	4648.25	6985.05	3448.94	39
H18B	4553.64	7104.84	4066.82	39
H18C	3649.53	5920.39	3774.19	39
H20	9722.47	6975.32	4908.89	29
H21	11389.73	8798.75	5092.8	35
H22	12635.26	9965.79	4406.53	34
H23	12153.57	9317.33	3537.2	30
H24	10443.3	7523.47	3353.74	26
H25A	5498.25	1878.11	5242.87	62
H25B	7262.12	2276.28	5372.48	62
H25C	6754.36	729.08	5360.04	62

5. Biological activity evaluation

Cells culture

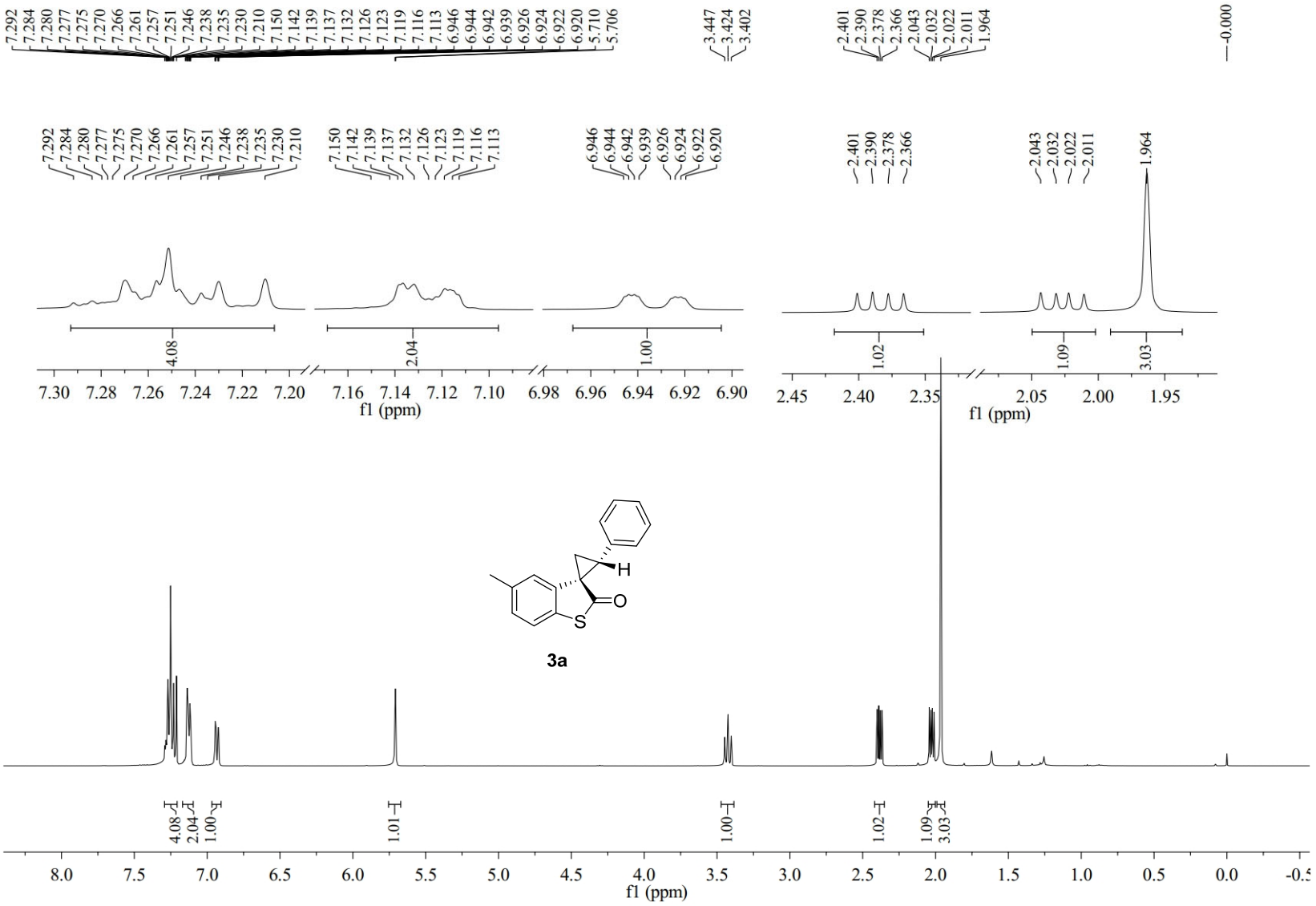
Human cancer cell lines HCT116, SJSA-1, MCF-7 were purchased from the American Tissue Culture Collection (ATCC), and normal cell lines HUVEC were obtained from ScienCell Research

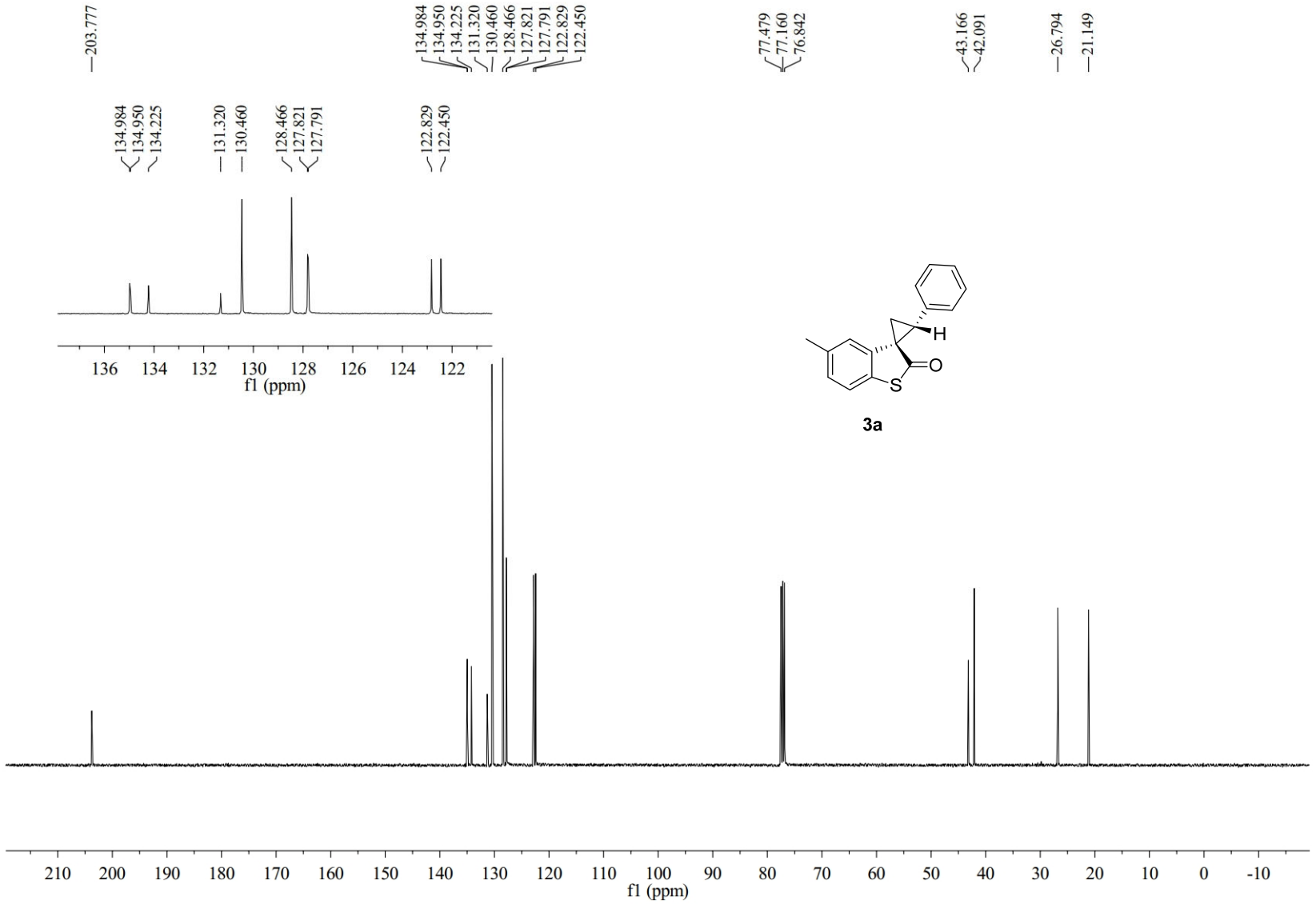
Laboratories. Cells were cultured aseptically at 37°C with 5% CO_2 using McCoy's 5A, RPMI-1640, MEM and ECM (Gibco) with 10% (v/v) FBS and 1% (v/v) penicillin-streptomycin (Sigma).

CCK-8 assay

The *in vitro* inhibitory effect on cell proliferation was measured using CCK-8 assay. Different kinds of cells were seeded in 96-well plates at a concentration of 3,000 cells/well. After 24 h incubation, compounds were added into each well at 50 μM. Seventy-two hours later, the old medium was replaced with fresh medium containing 10% CCK-8, and the cells were incubated for additional 4 h. The optical density was measured at 450 nm and 620 nm (reference wavelength) using a microplate reader (Berthold). If the inhibition rate of compounds on cells is higher than 70%, the IC_{50} value was determined by testing the inhibitory effects of the compound with 8 gradient-dilution concentrations. The IC_{50} value was calculated using GraphPad software.

6. NMR spectra

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77.160
76.842
43.166
42.091
26.794
21.149
136
134
132
130
128
126
124
122
f1 (ppm)
H
O
S
3a
210
200
190
180
170
160
150
140
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120
110
100
90
80
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30
20
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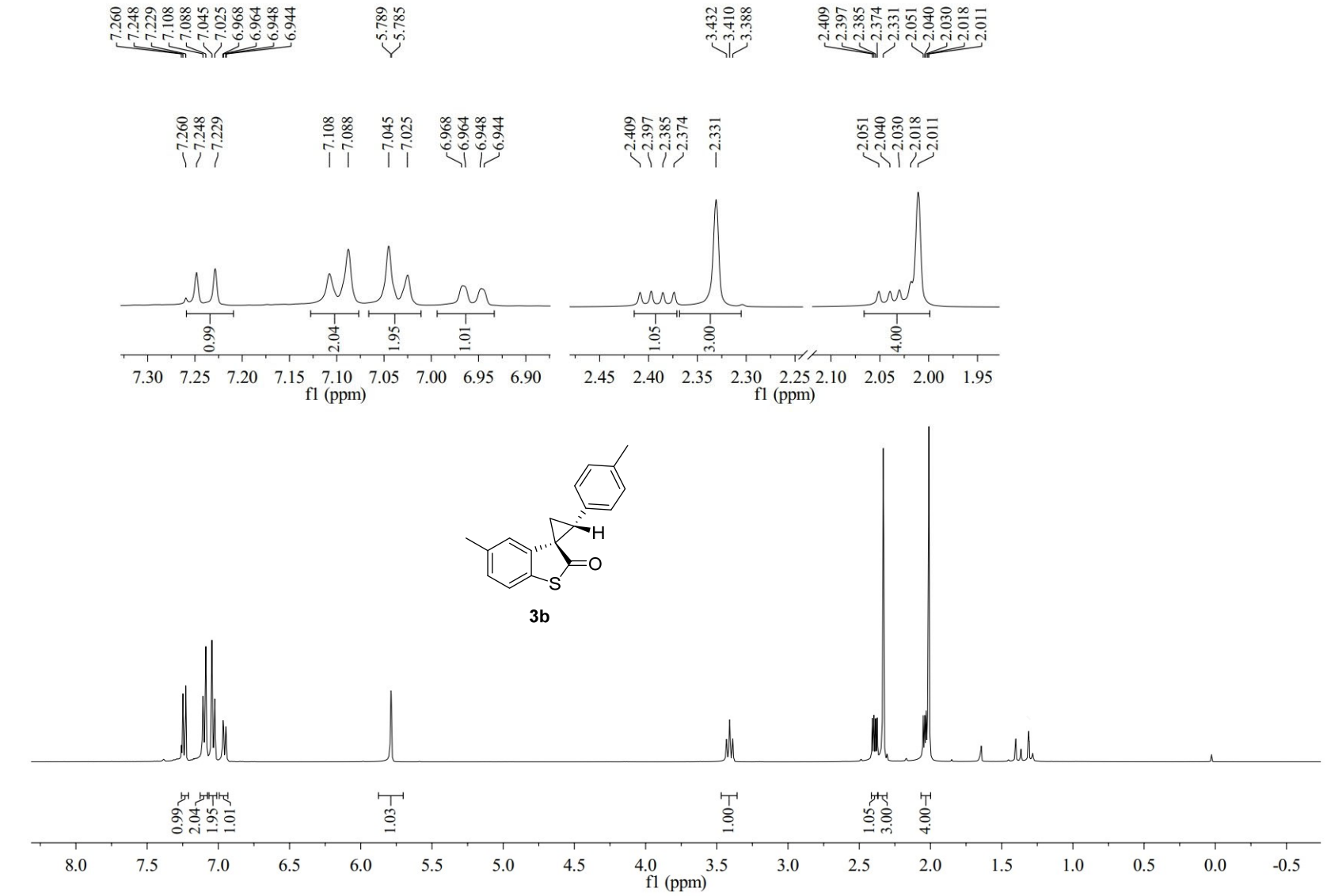
f1 (ppm)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3.410
3.388
2.409
2.397
2.385
2.374
2.331
2.051
2.040
2.030
2.018
2.011
0.99
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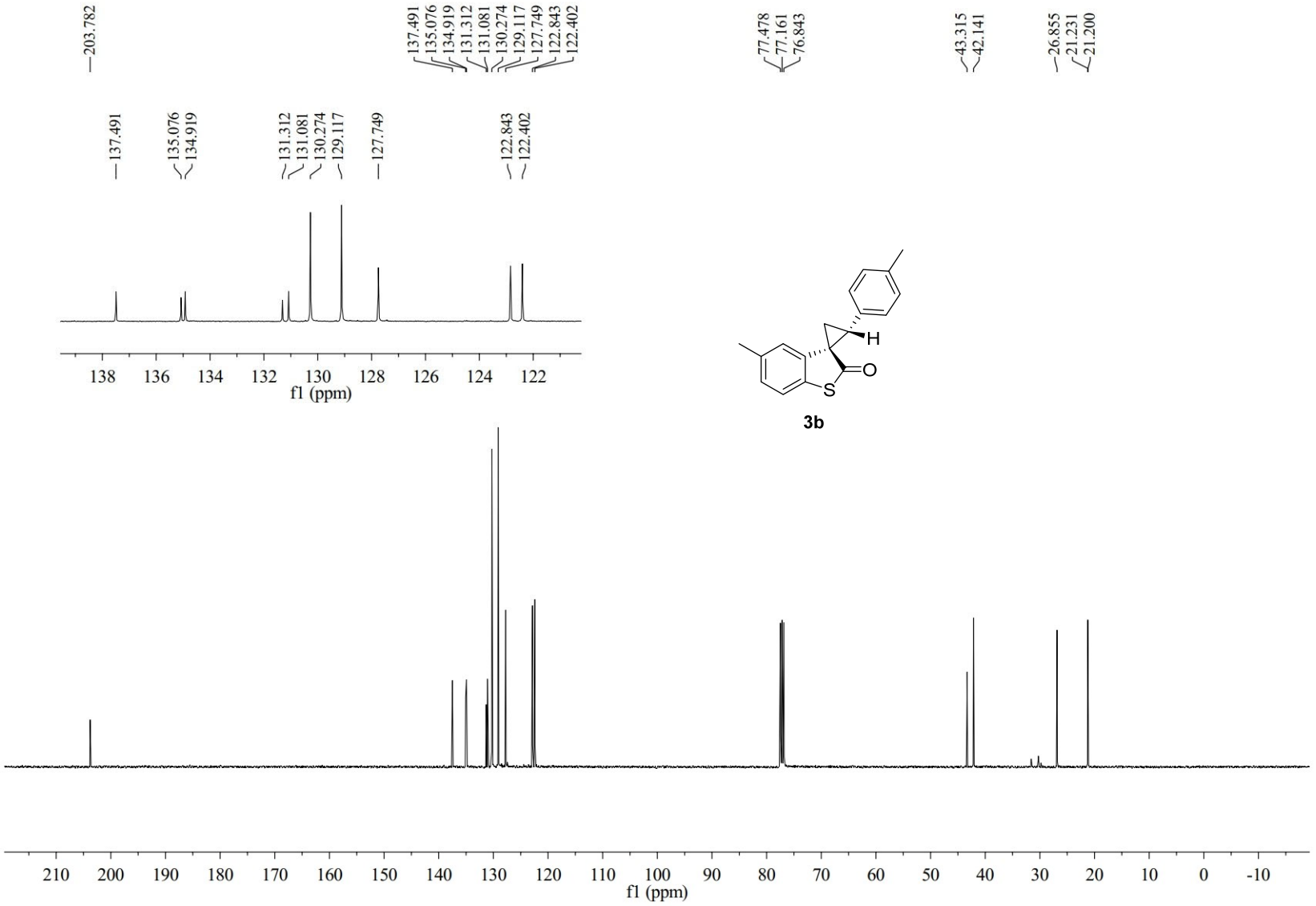
f1 (ppm)
H
O
S
3b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76.843
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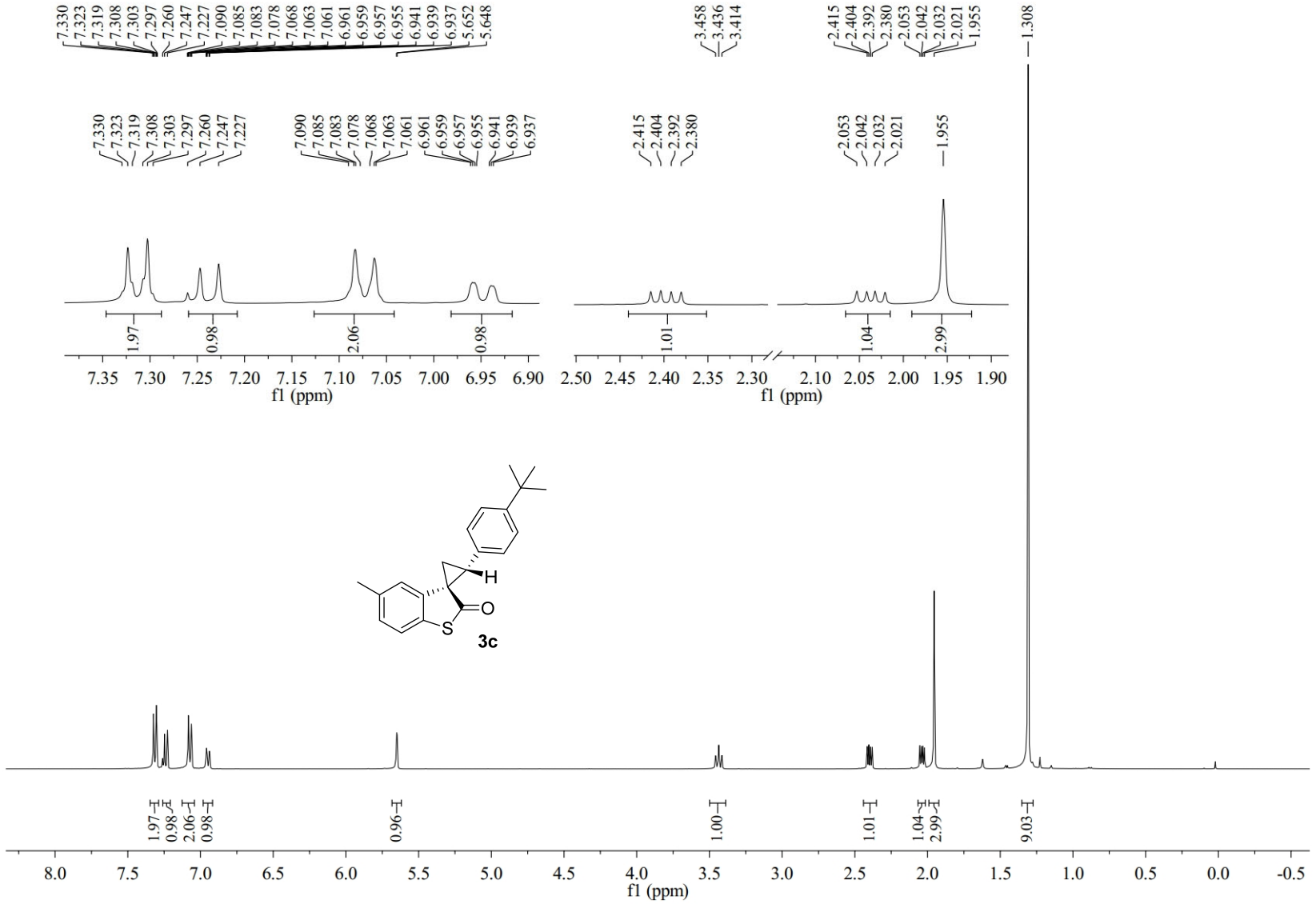
21.231
21.200
f1 (ppm)
H
O
S
3b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7.068
7.063
7.061
6.961
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6.957
6.955
6.941
6.939
6.937
5.652
5.648
3.458
3.436
3.414
2.415
2.404
2.392
2.380
2.053
2.042
2.032
2.021
1.955
1.308
1.97
0.98
2.06
0.98
1.01
1.04
2.99
f1 (ppm)
H
O
S
3c
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2.06
0.98
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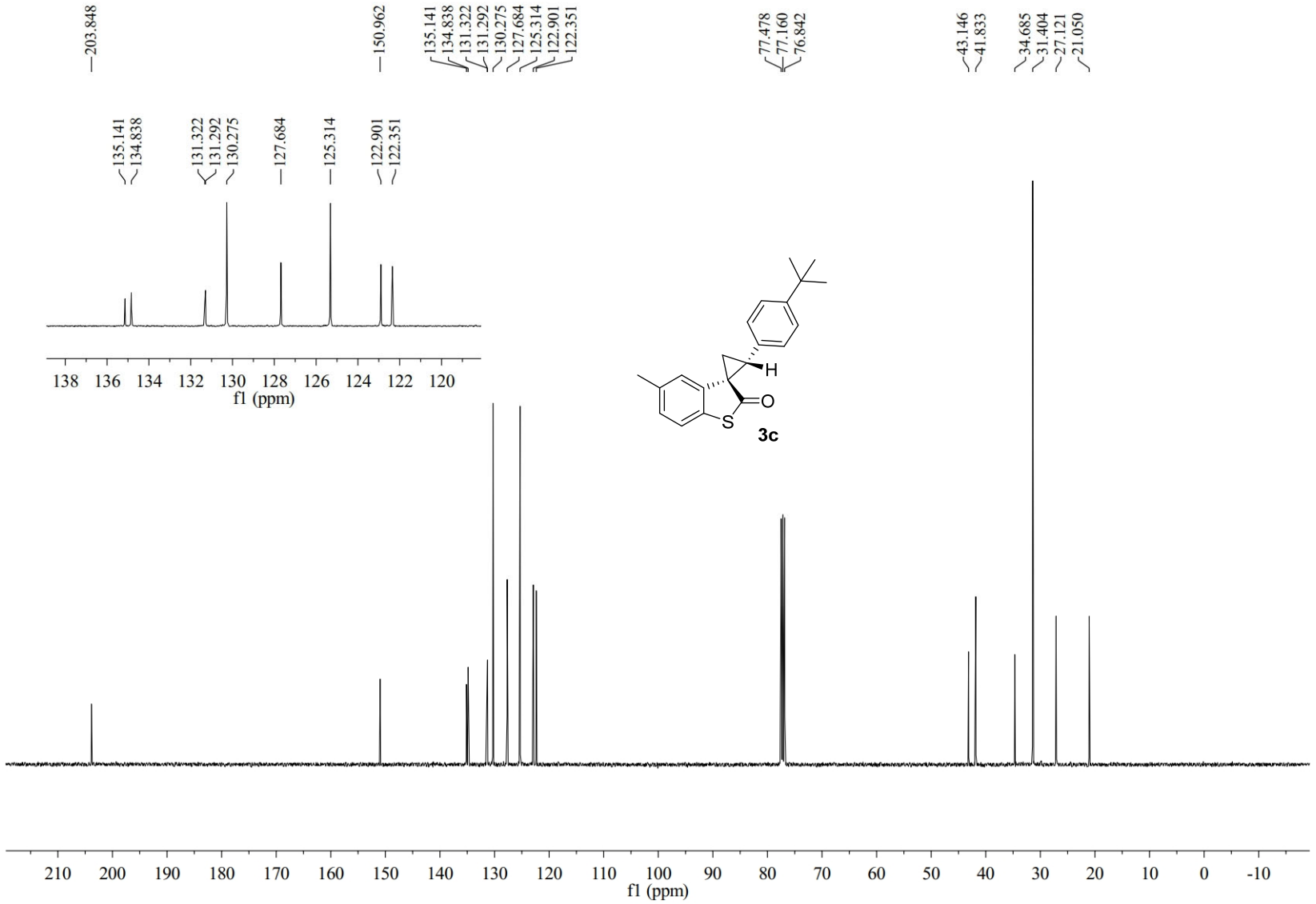
1.04
2.99
9.03
f1 (ppm)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77.160
76.842
43.146
41.833
34.685
31.404
27.121
21.050
H
O
S
3c
f1 (ppm)


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7.314
7.304
7.299
7.260
7.251
7.231
7.144
7.130
7.125
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6.968
6.966
6.964
6.948
6.946
6.944
5.692
5.690
5.687
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3.408
3.386
2.420
2.409
2.397
2.386
2.041
2.030
2.020
2.009
1.986
2.00
0.96
1.98
1.01
0.96
1.01
3.98
f1 (ppm)
Cl
H
O
S
3d
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0.96
1.98
1.01
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1.00
1.01
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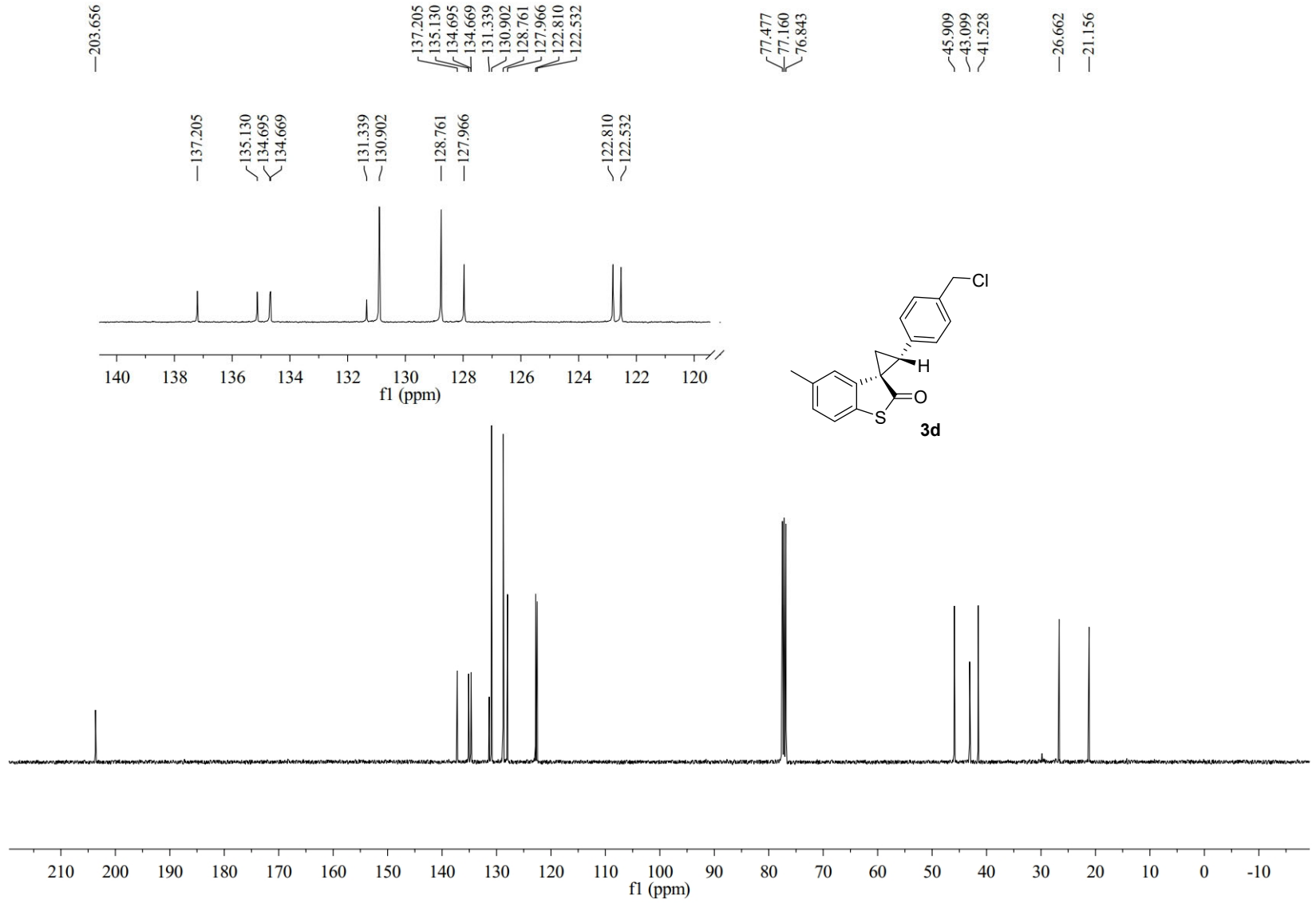
f1 (ppm)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122.532
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77.160
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43.099
41.528
26.662
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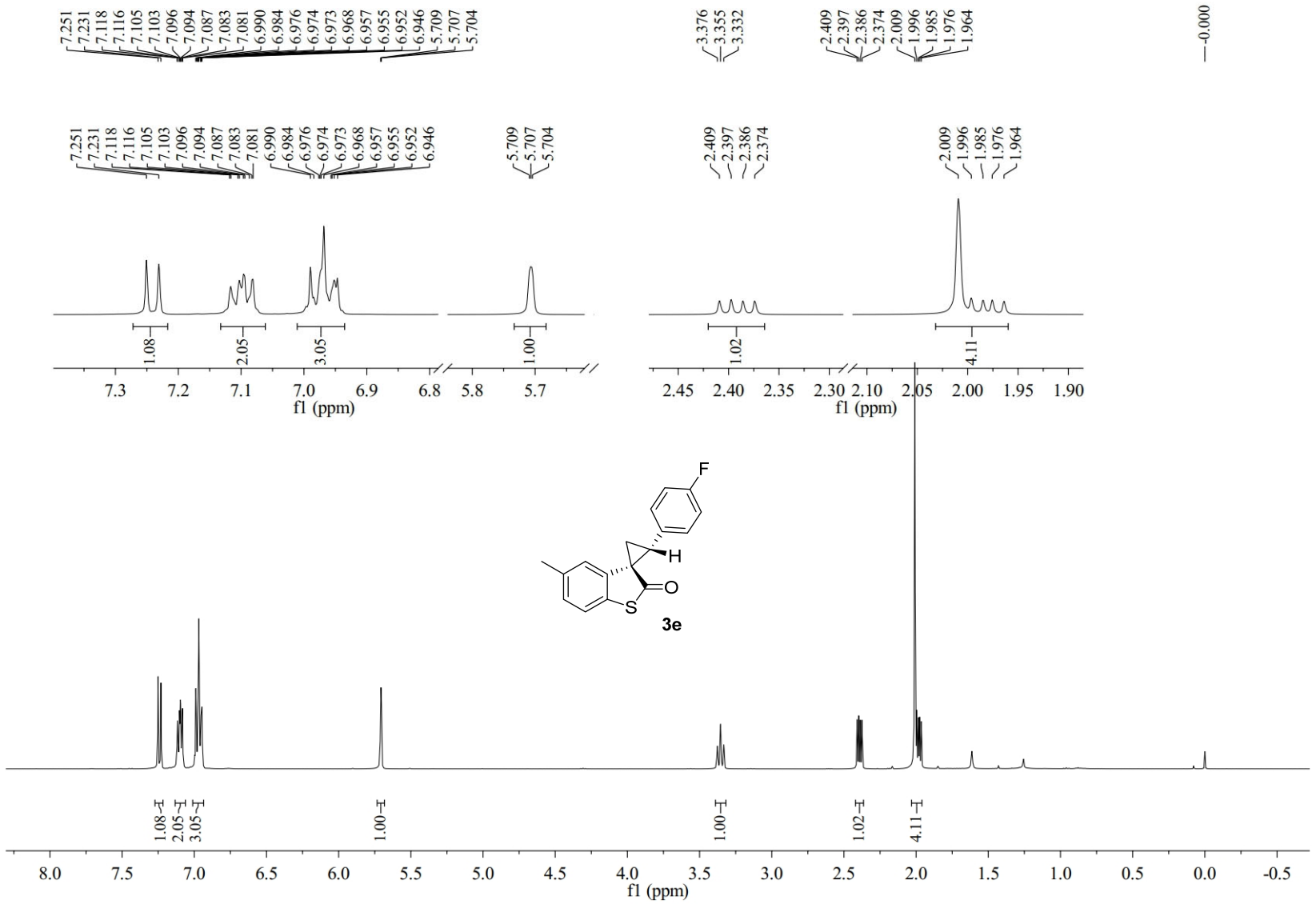
Cl
H
O
S
3d
f1 (ppm)
f1 (ppm)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7.103
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7.094
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7.083
7.081
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6.984
6.976
6.974
6.973
6.968
6.957
6.955
6.952
6.946
5.709
5.707
5.704
3.376
3.355
3.332
2.409
2.397
2.386
2.374
2.009
1.996
1.985
1.976
1.964
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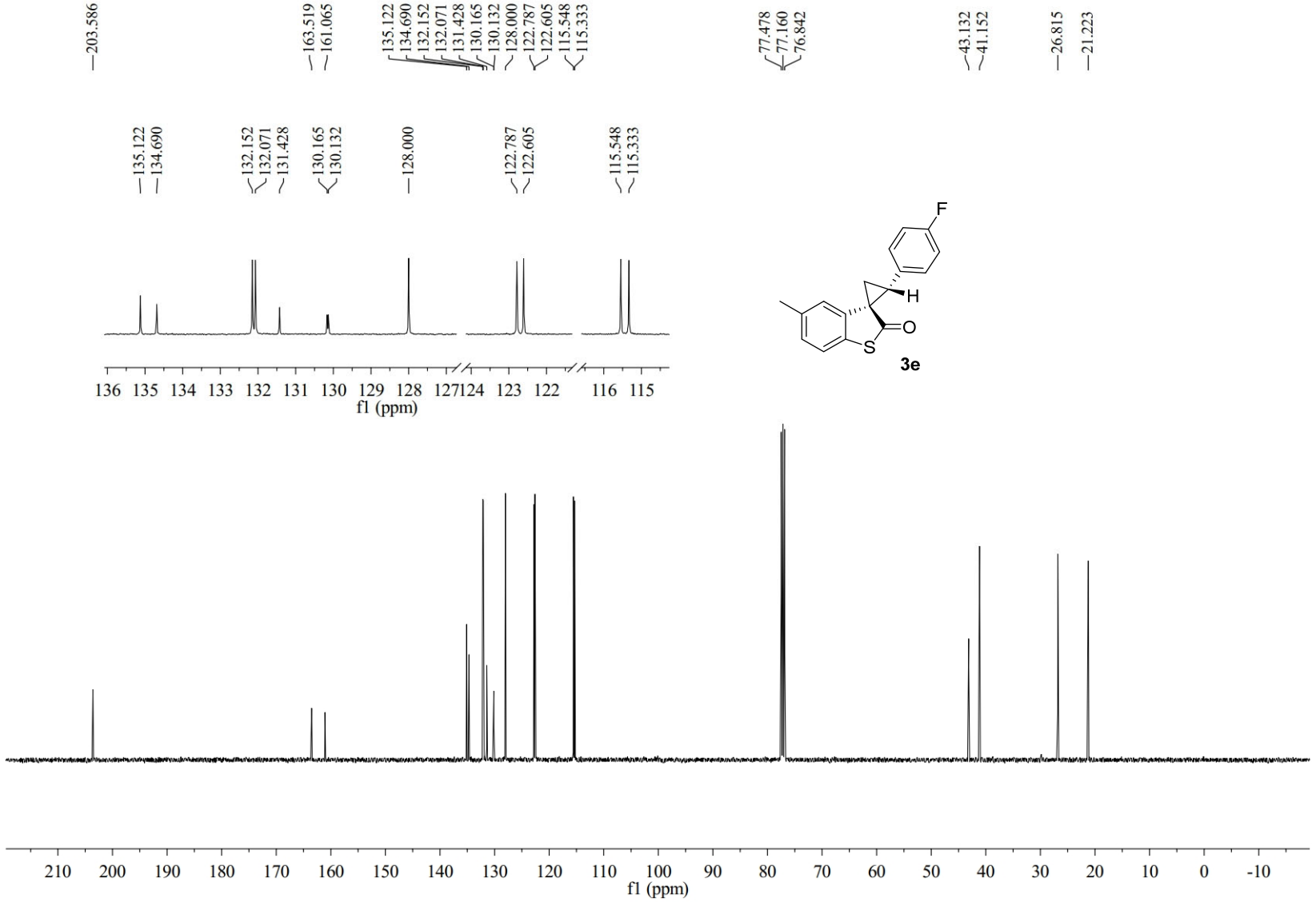
2.05
3.05
1.00
1.02
4.11
f1 (ppm)
F
H
O
S
3e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115.333
77.478
77.160
76.842
43.132
41.152
26.815
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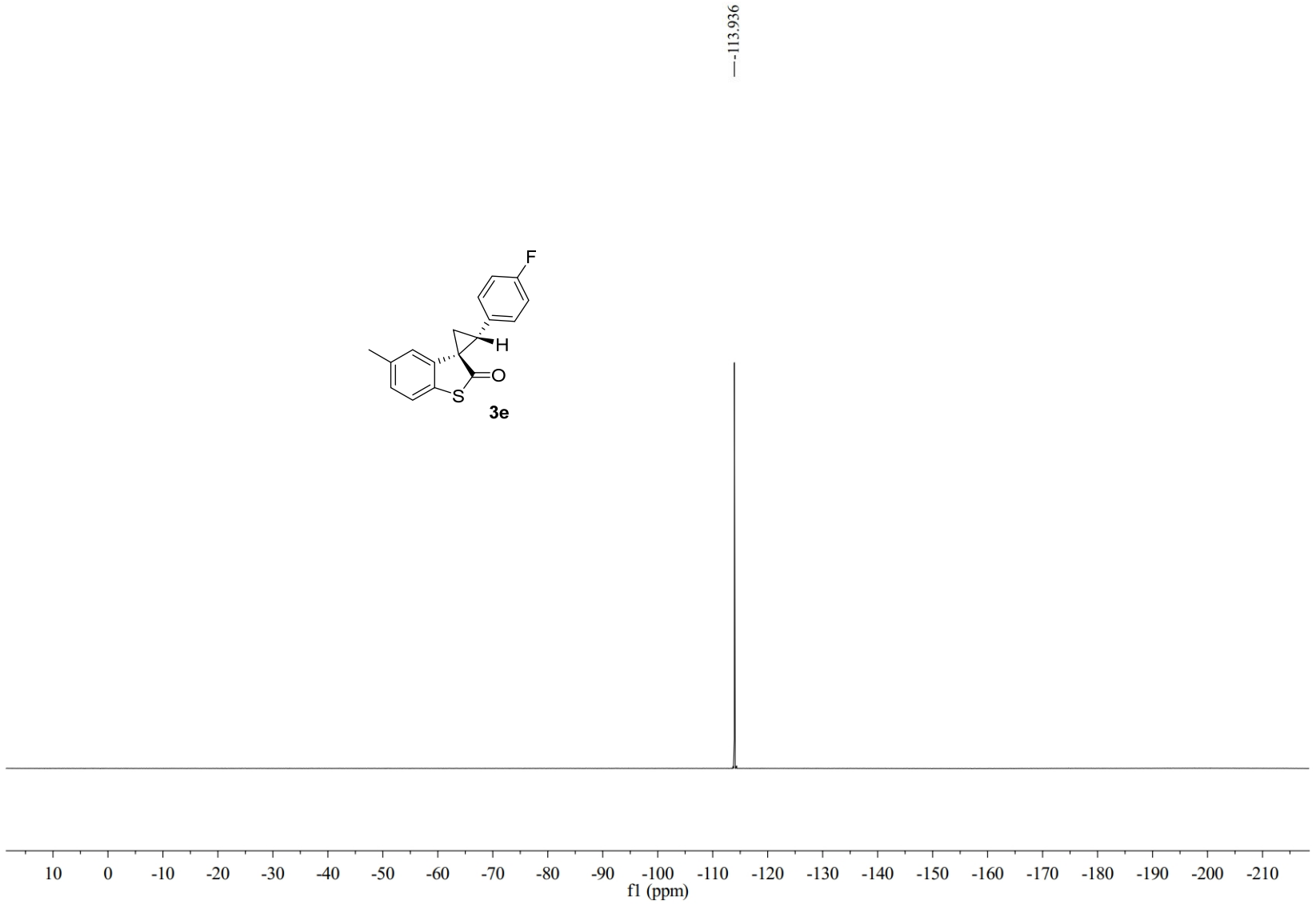
F
H
O
S
3e
f1 (ppm)
f1 (ppm)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-180
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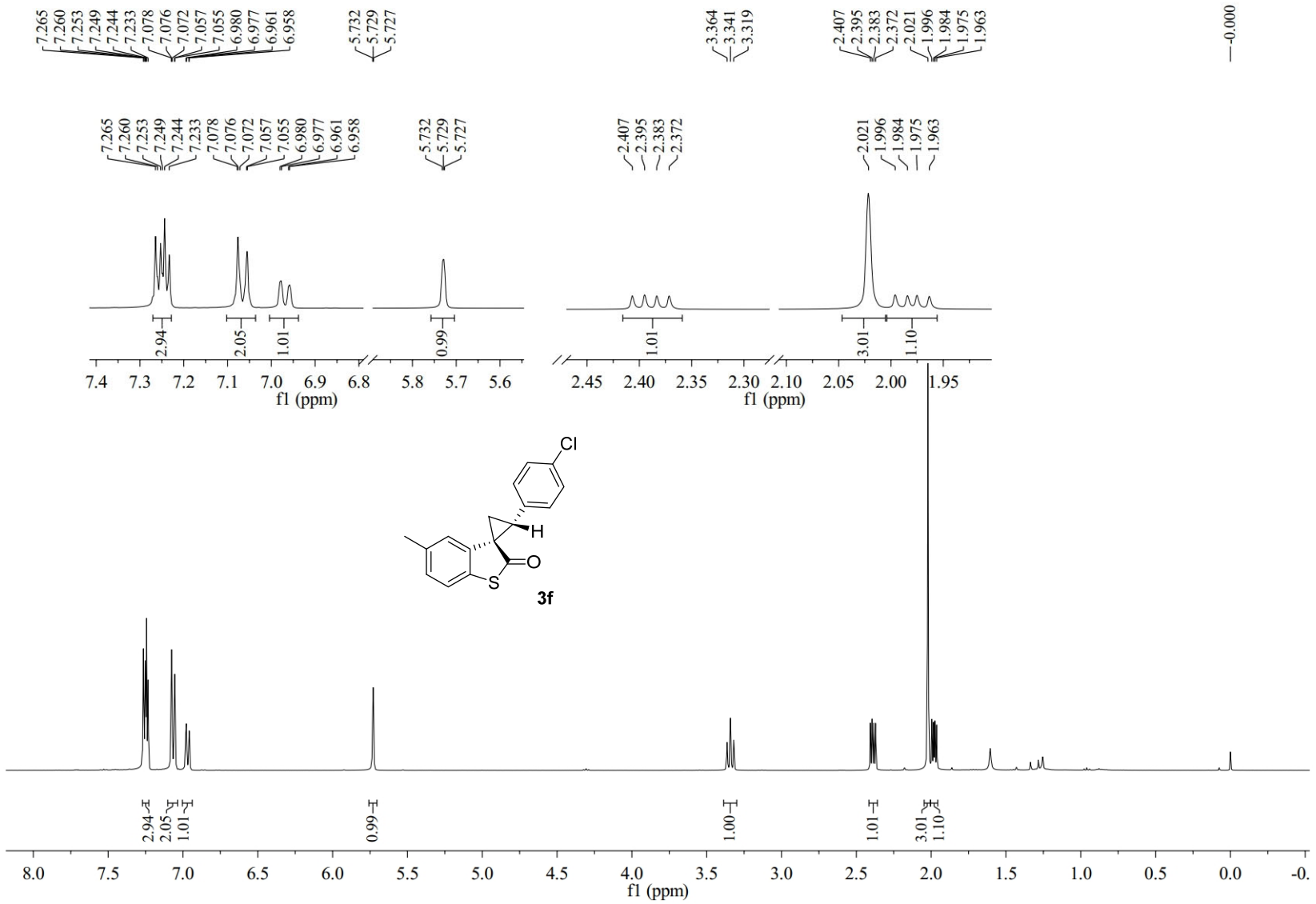
-210
f1 (ppm)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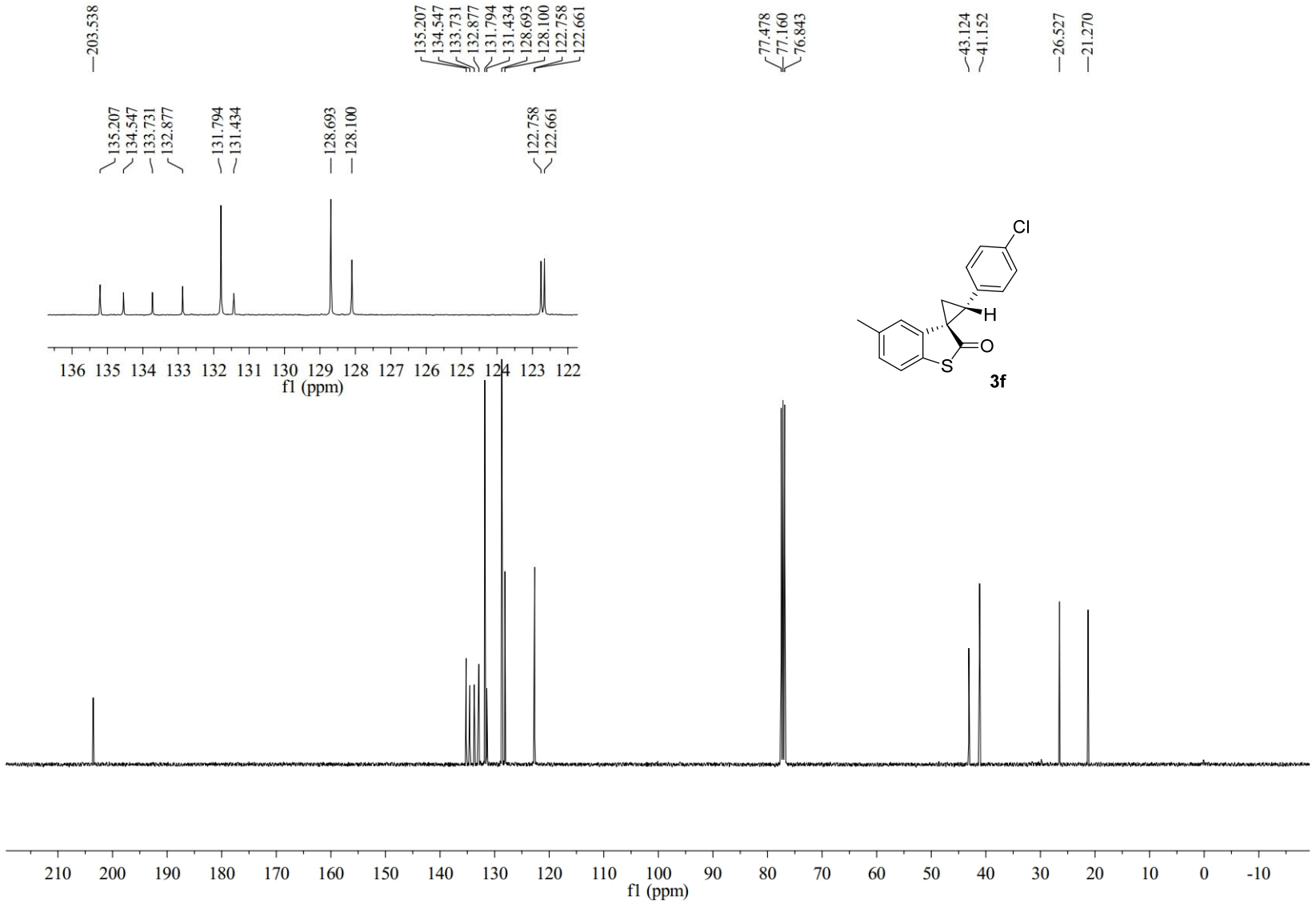
6.977
6.961
6.958
5.732
5.729
5.727
3.364
3.341
3.319
2.407
2.395
2.383
2.372
2.021
1.996
1.984
1.975
1.963
-0.000
2.94
2.05
1.01
0.99
1.01
3.01
1.10
fl (ppm)
Cl
H
O
S
3f
2.94
2.05
1.01
0.99
1.00
1.01
3.01
1.10
fl (ppm)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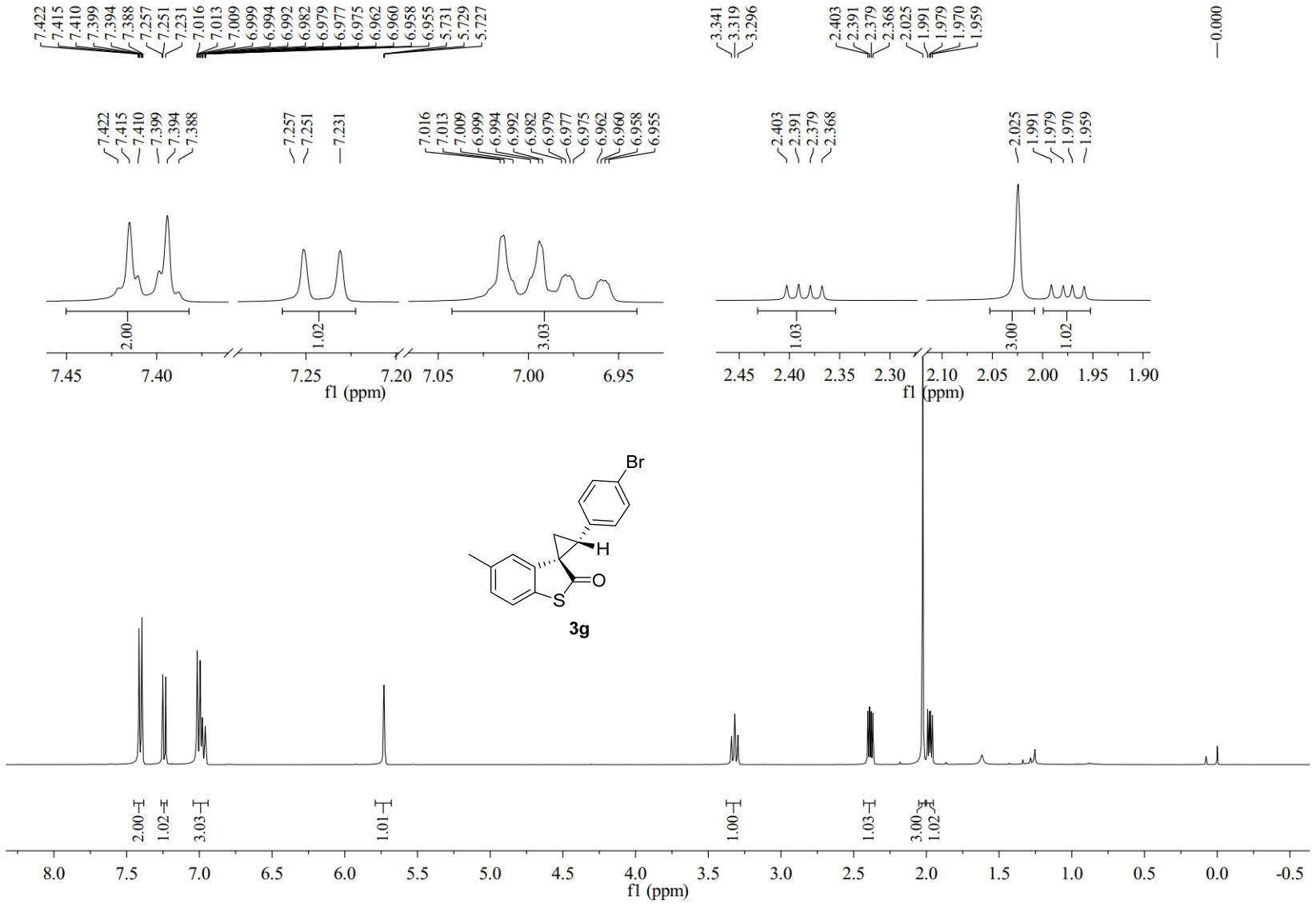
H
O
S
3f
f1 (ppm)
f1 (ppm)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7.00
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2.40
2.35
2.30
2.10
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1.95
1.90
f1 (ppm)
Br
H
O
S
3g
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1.02
3.03
1.01
1.00
1.03
3.00
1.02
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
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2.0
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0.0
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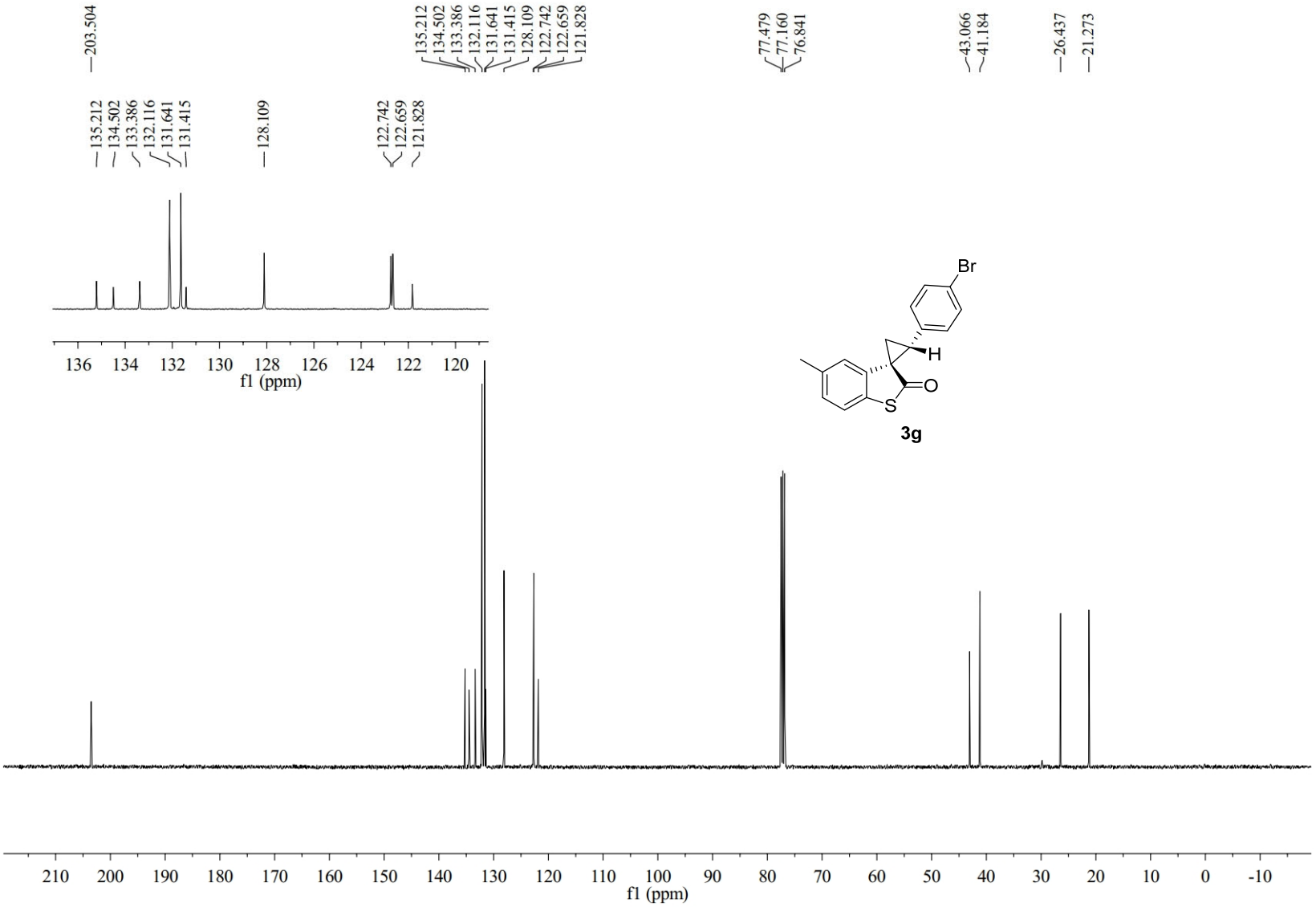
f1 (ppm)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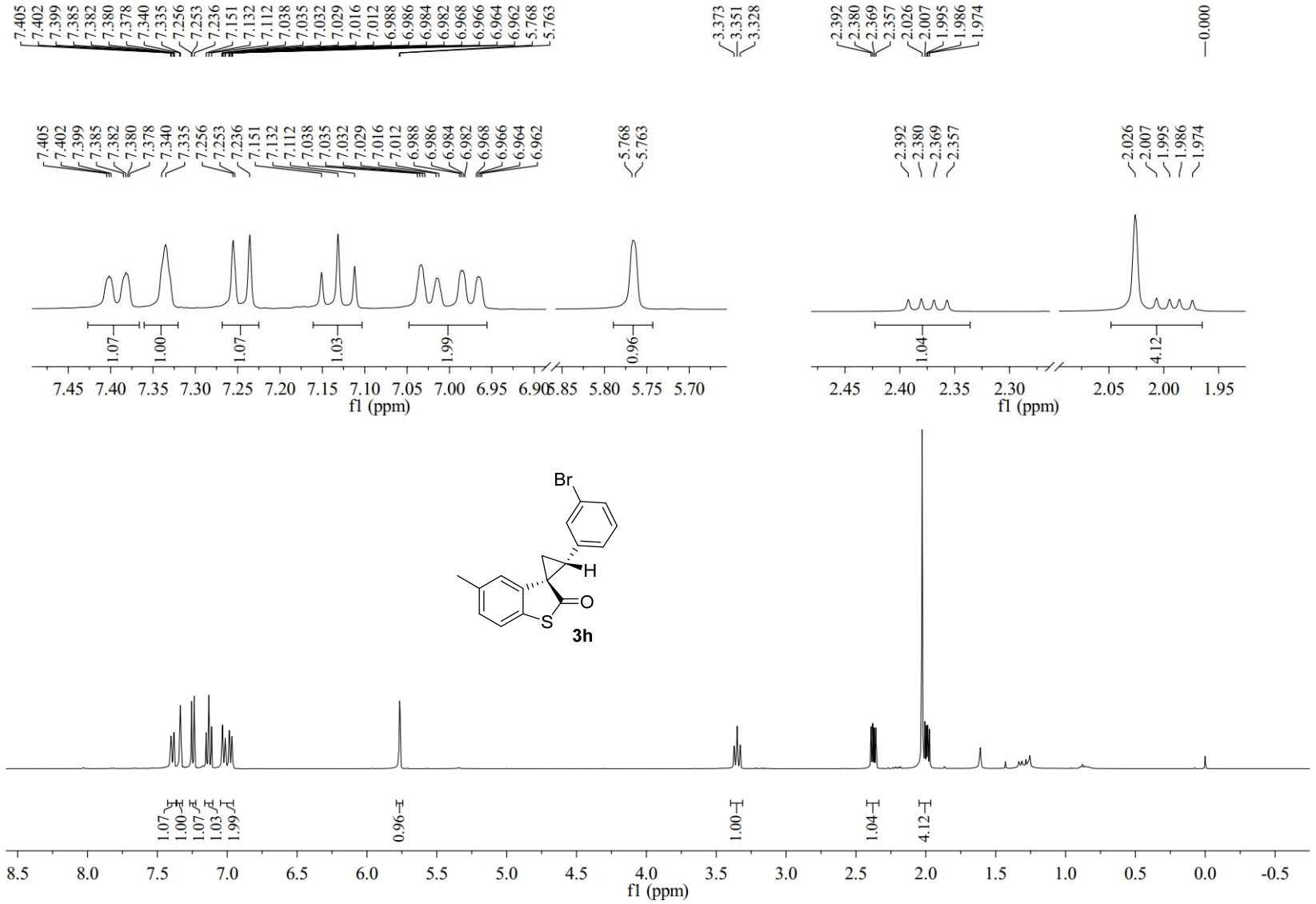
f1 (ppm)
Br
H
O
S
3g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7.032
7.029
7.016
7.012
6.988
6.986
6.984
6.982
6.968
6.966
6.964
6.962
5.768
5.763
3.373
3.351
3.328
2.392
2.380
2.369
2.357
2.026
2.007
1.995
1.986
1.974
0.000
1.07
1.00
1.07
1.03
1.99
0.96
1.04
4.12
f1 (ppm)
Br
H
O
S
3h
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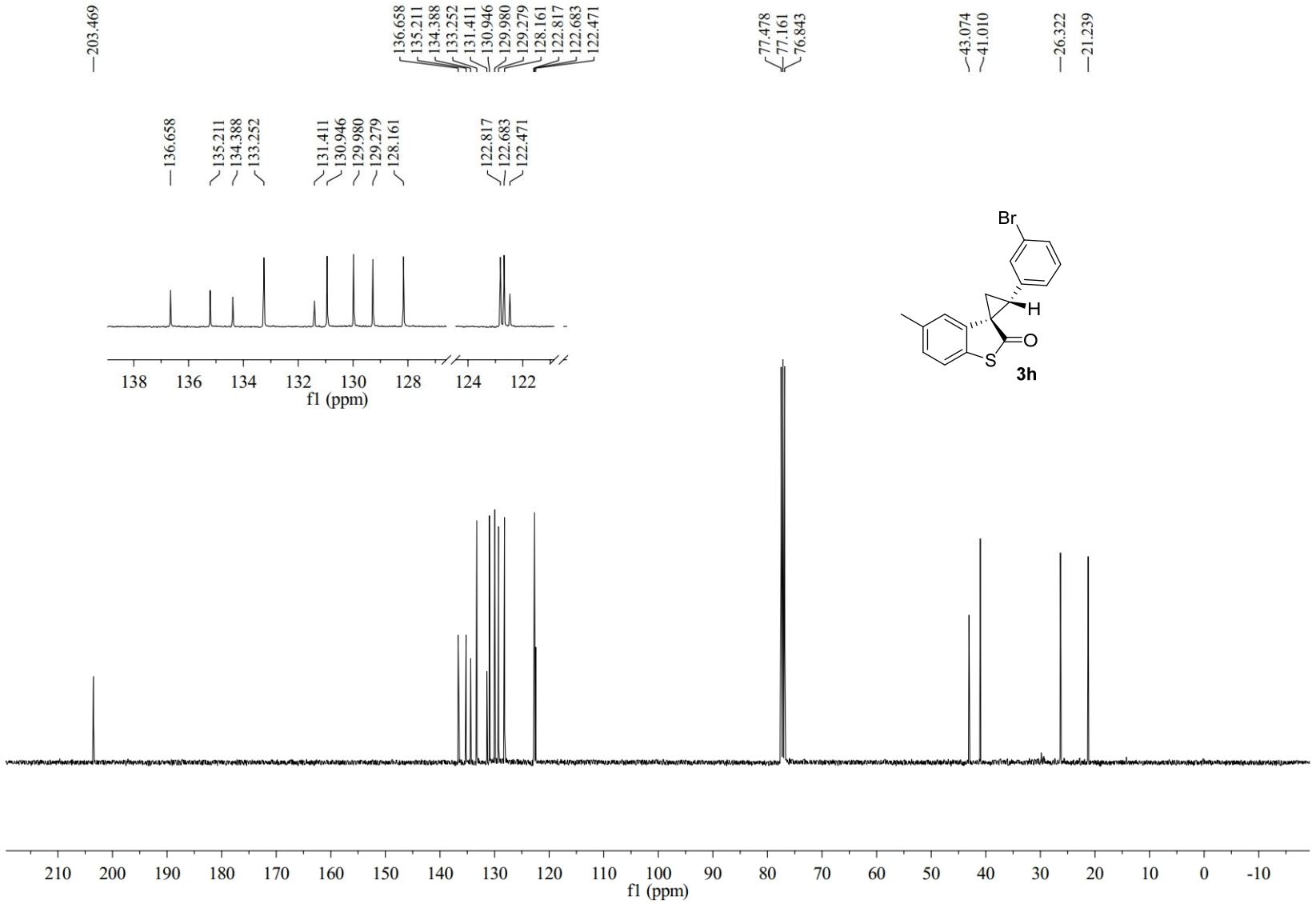
1.07
1.03
1.99
0.96
1.00
1.04
4.12
f1 (ppm)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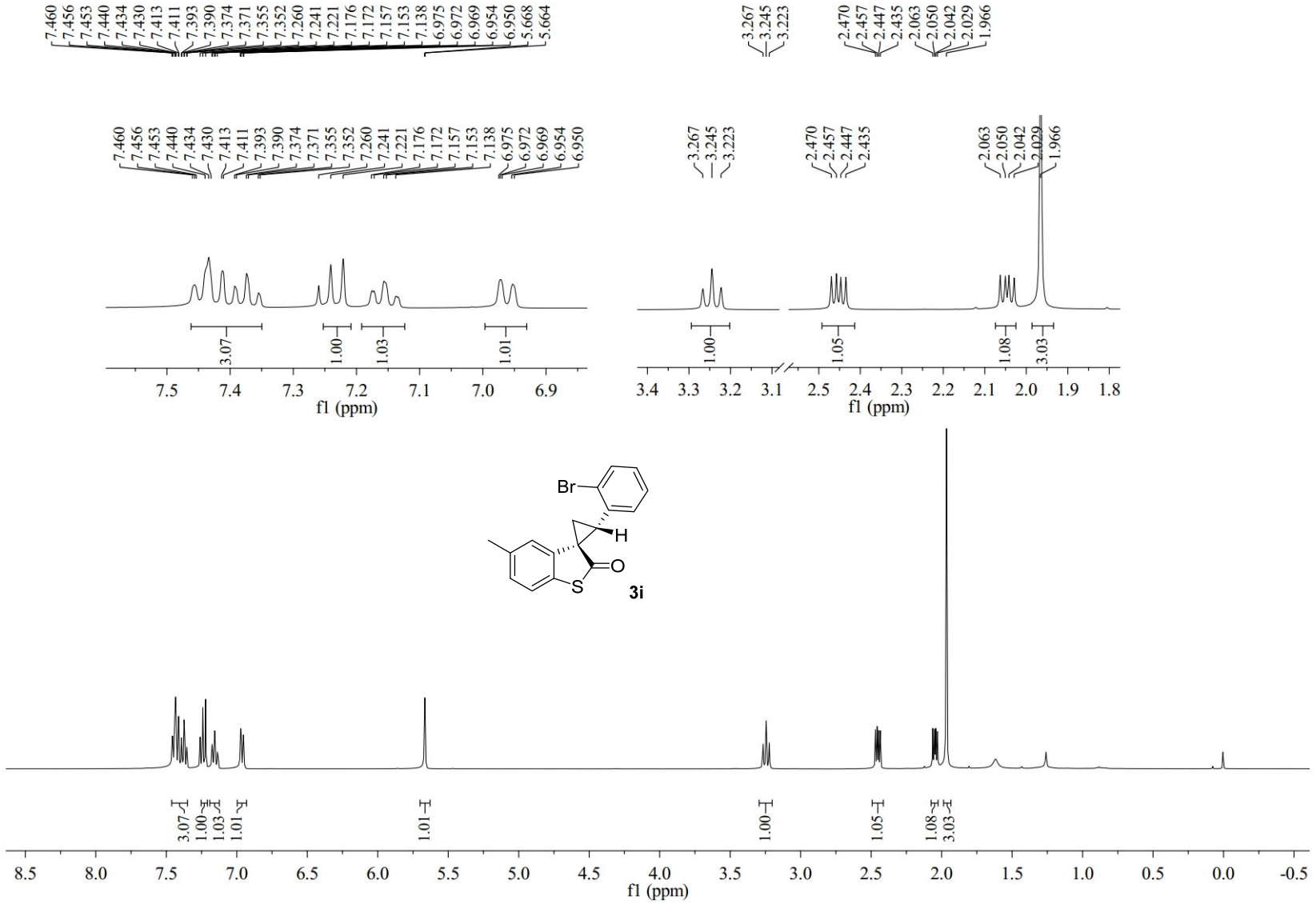
H
O
S
3h
f1 (ppm)
f1 (ppm)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7.157
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6.969
6.954
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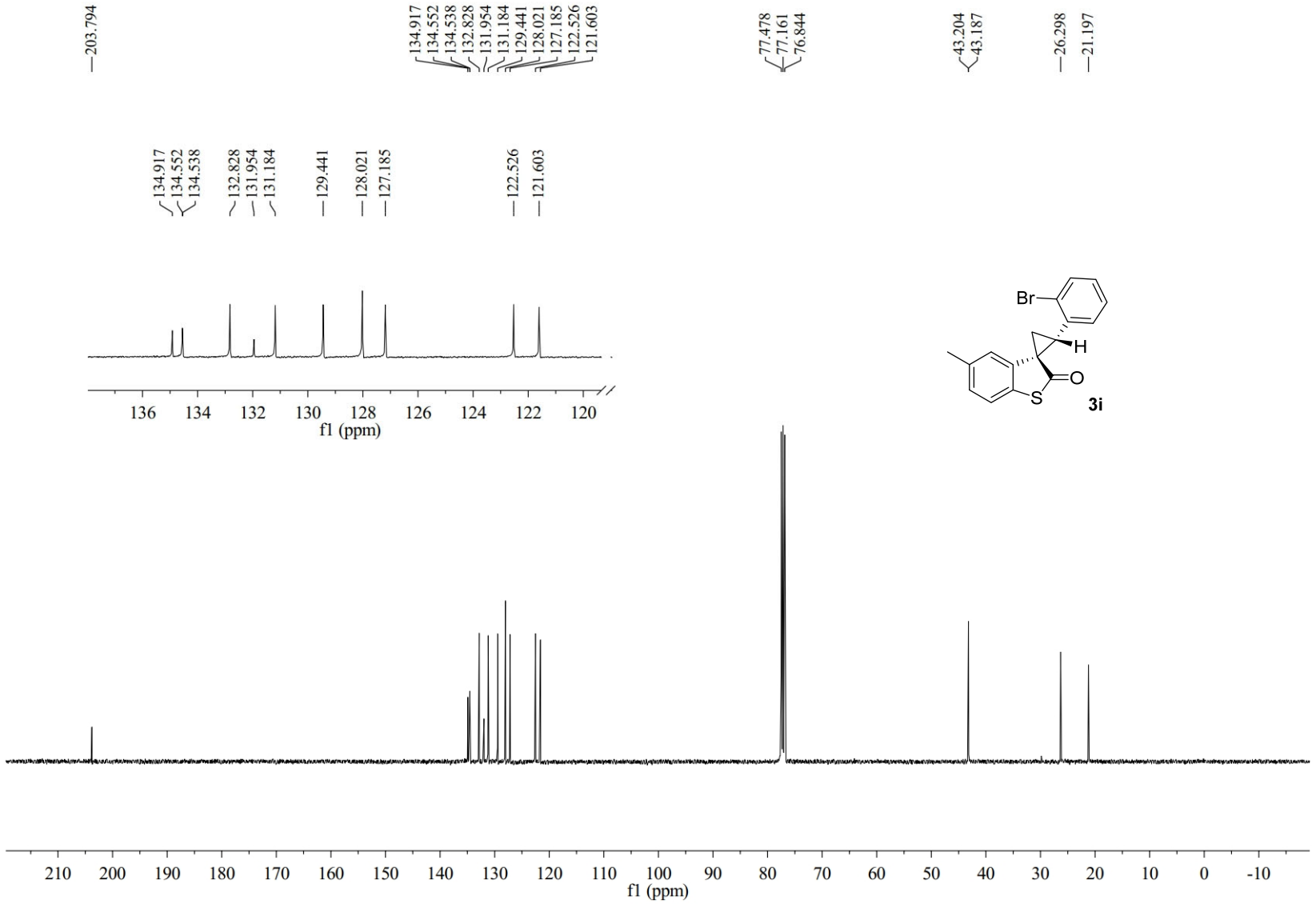
1.00
1.05
1.08
3.03
f1 (ppm)
Br
H
O
S
3i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134.552
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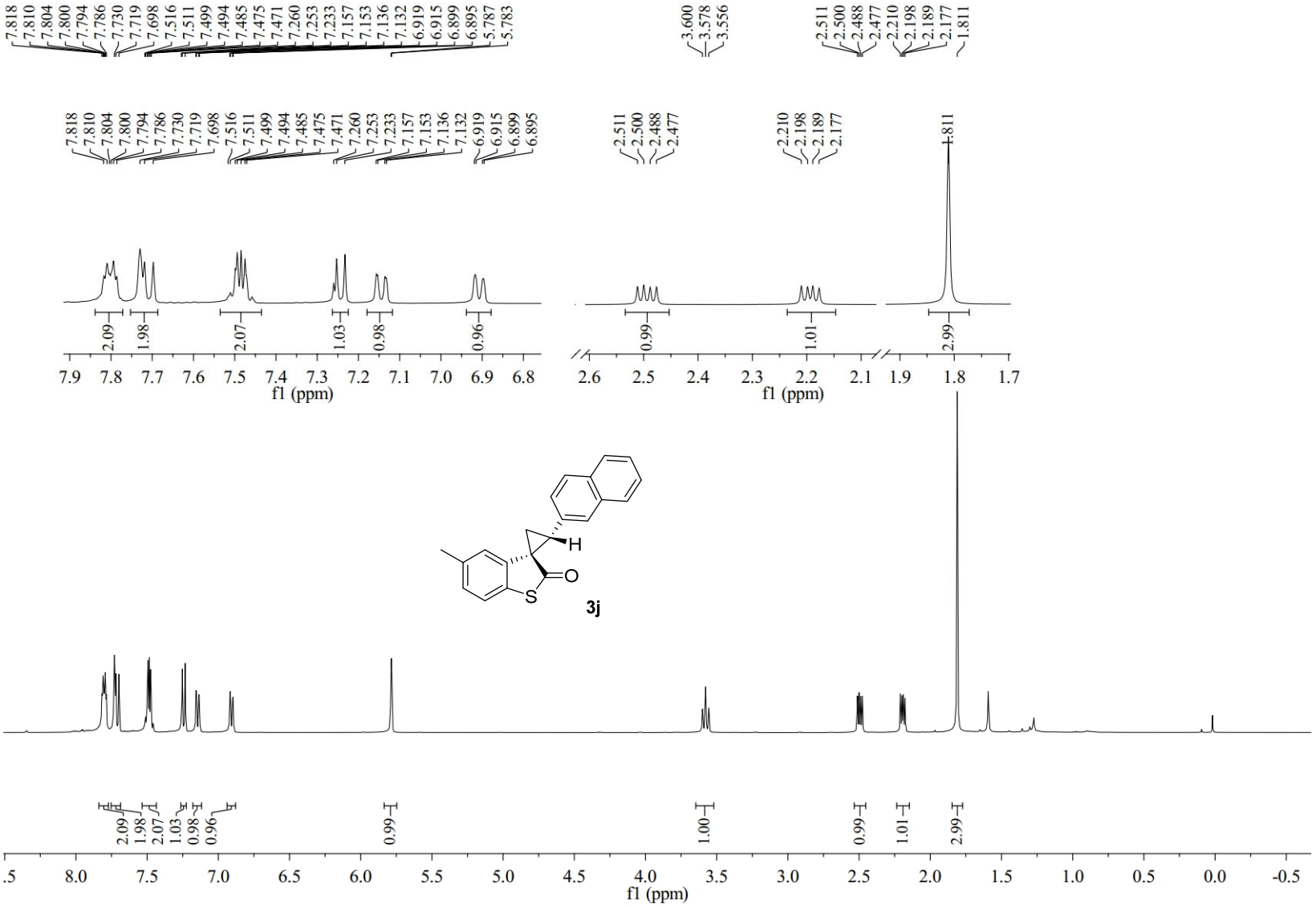
131.184
129.441
128.021
127.185
122.526
121.603
77.478
77.161
76.844
43.204
43.187
26.298
21.197
Br
H
O
S
3i
f1 (ppm)
f1 (ppm)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7.786
7.730
7.719
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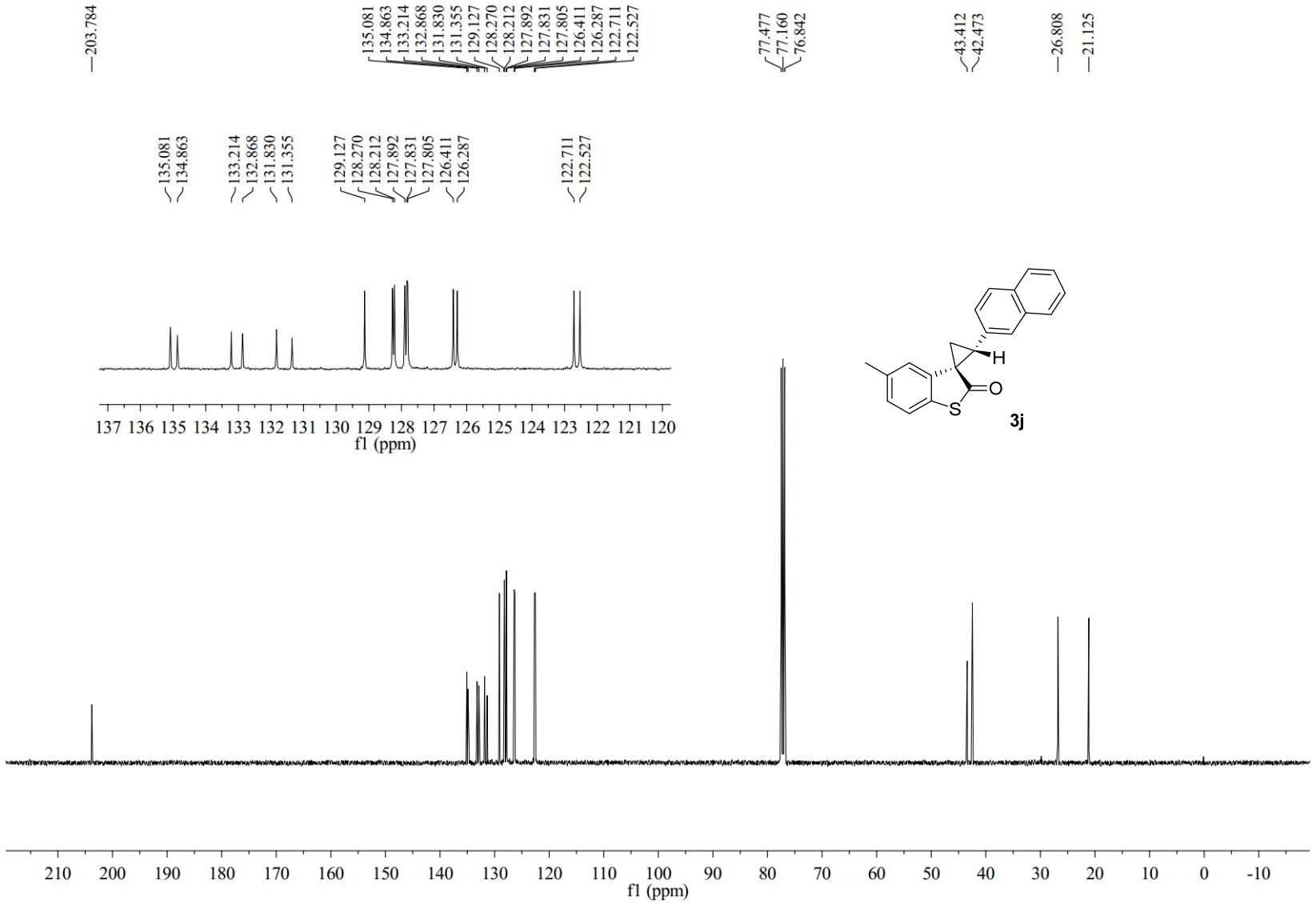
7.499
7.494
7.485
7.475
7.471
7.260
7.253
7.233
7.157
7.153
7.136
7.132
6.919
6.915
6.899
6.895
5.787
5.783
3.600
3.578
3.556
2.511
2.500
2.488
2.477
2.210
2.198
2.189
2.177
1.811
2.09
1.98
2.07
1.03
0.98
0.96
0.99
1.01
2.99
f1 (ppm)
H
O
S
3j
1.00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129.127
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128.212
127.892
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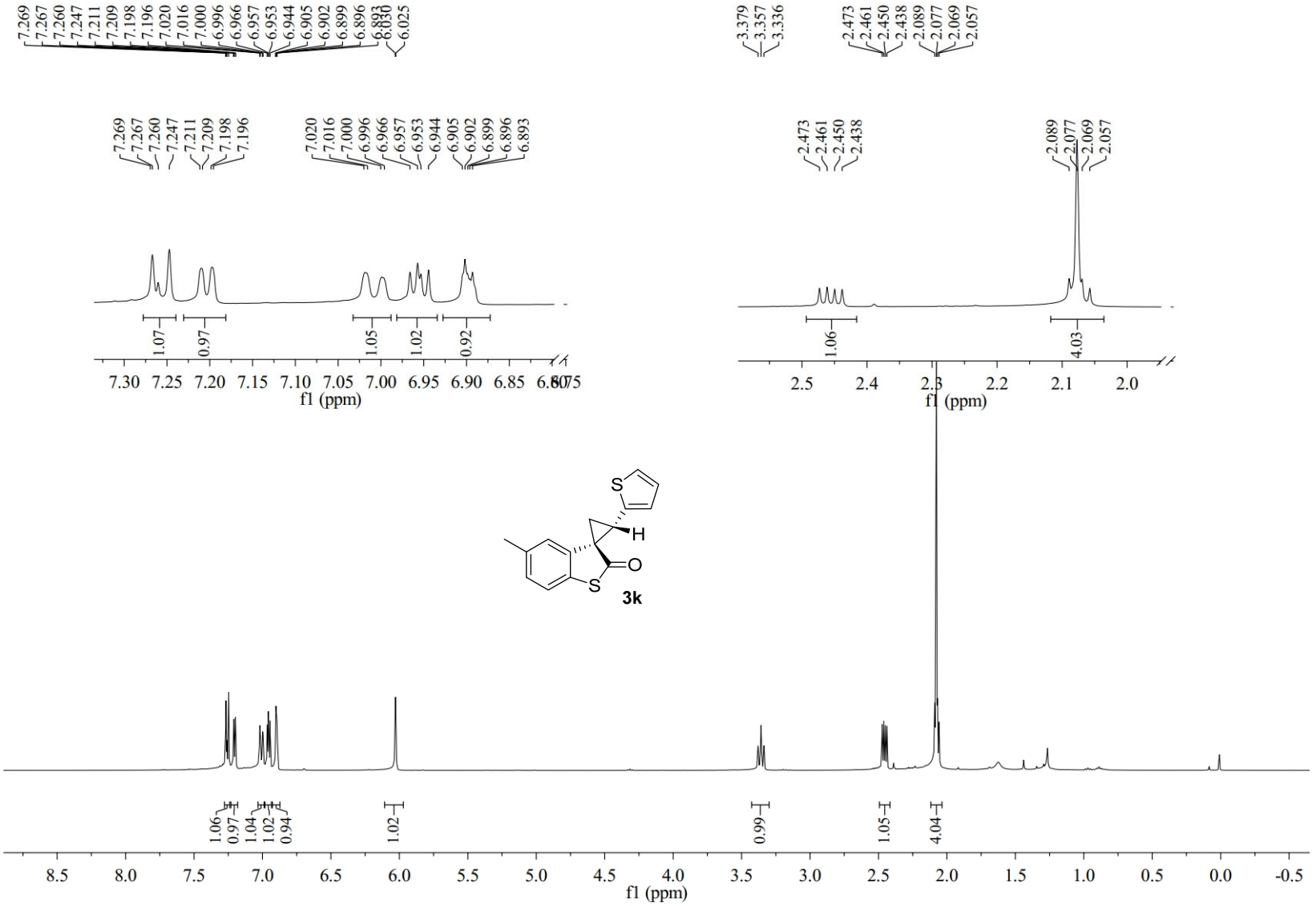
127.805
126.411
126.287
122.711
122.527
77.477
77.160
76.842
43.412
42.473
26.808
21.125
137 136 135 134 133 132 131 130 129 128 127 126 125 124 123 122 121 120
f1 (ppm)
H
O
S
3j
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


7.269
7.267
7.260
7.247
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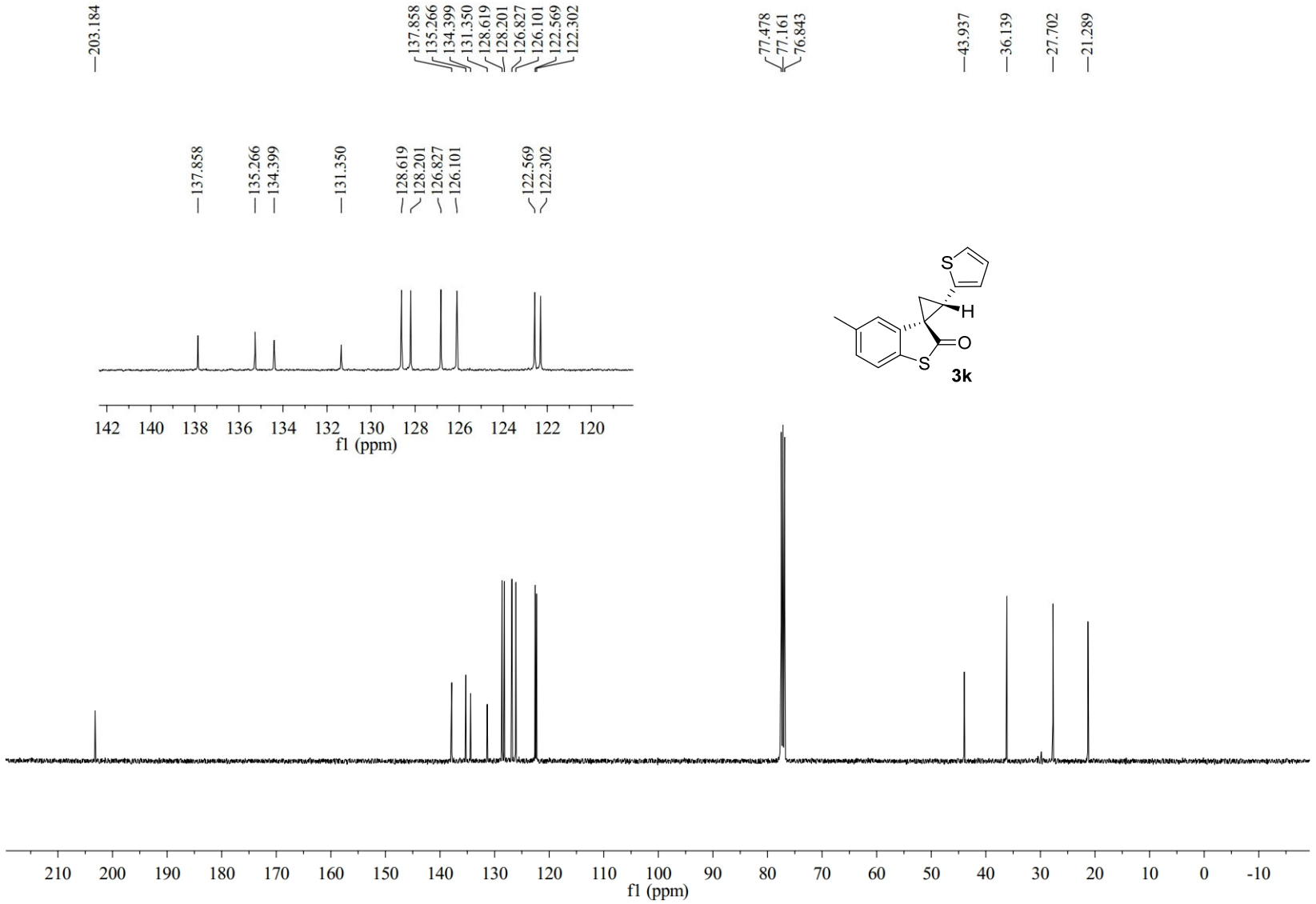
7.209
7.198
7.196
7.020
7.016
7.000
6.996
6.966
6.957
6.953
6.944
6.905
6.902
6.899
6.896
6.893
6.030
6.025
3.379
3.357
3.336
2.473
2.461
2.450
2.438
2.089
2.077
2.069
2.057
1.07
0.97
1.05
1.02
0.92
1.06
4.03
7.30 7.25 7.20 7.15 7.10 7.05 7.00 6.95 6.90 6.85
f1 (ppm)
2.5 2.4 2.3 2.2 2.1 2.0
f1 (ppm)
S
H
O
S
3k
1.06
0.97
1.04
1.02
0.94
1.02
0.99
1.05
4.04
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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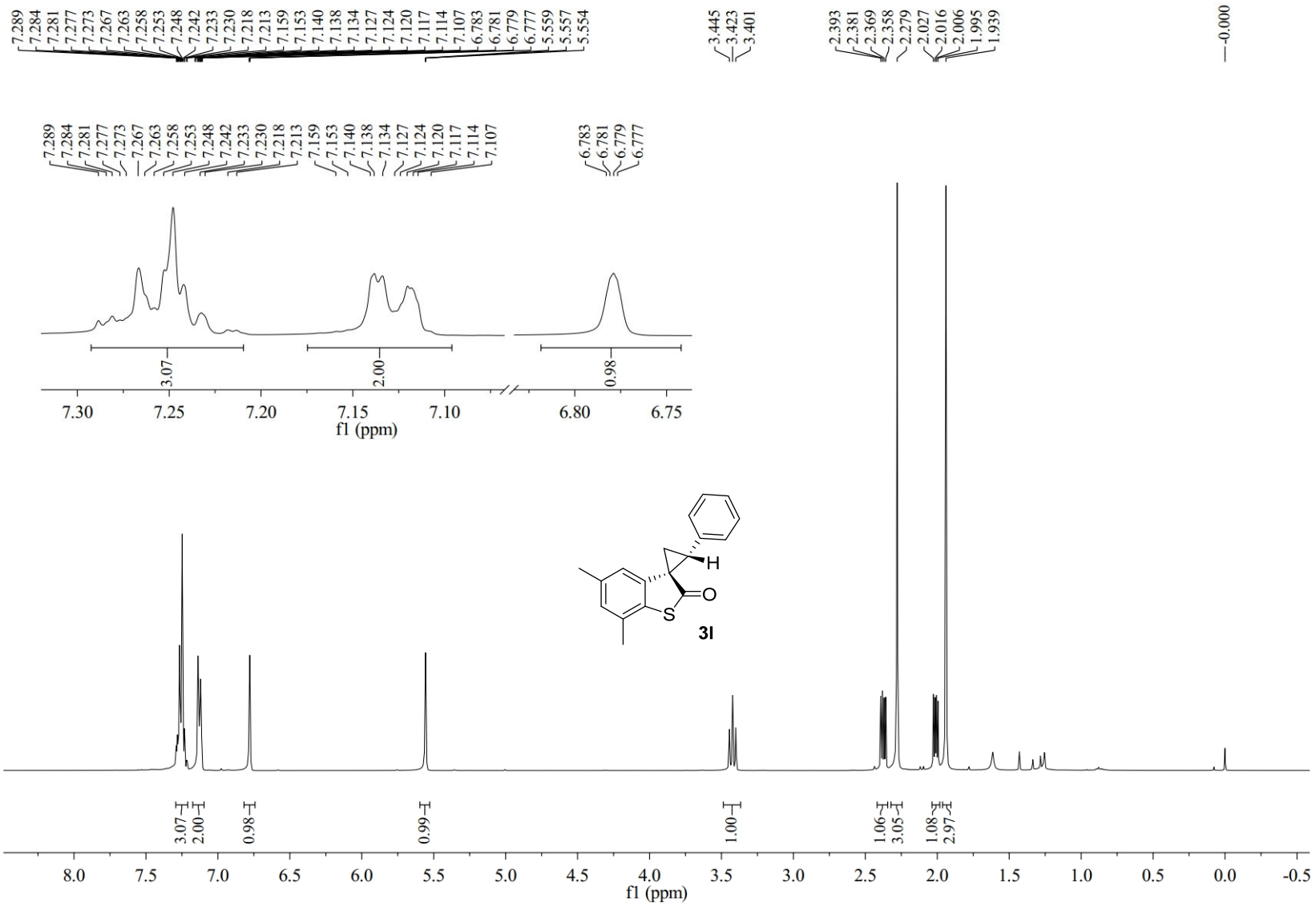
128.201
126.827
126.101
122.569
122.302
77.478
77.161
76.843
43.937
36.139
27.702
21.289
S
H
O
S
3k
f1 (ppm)
f1 (ppm)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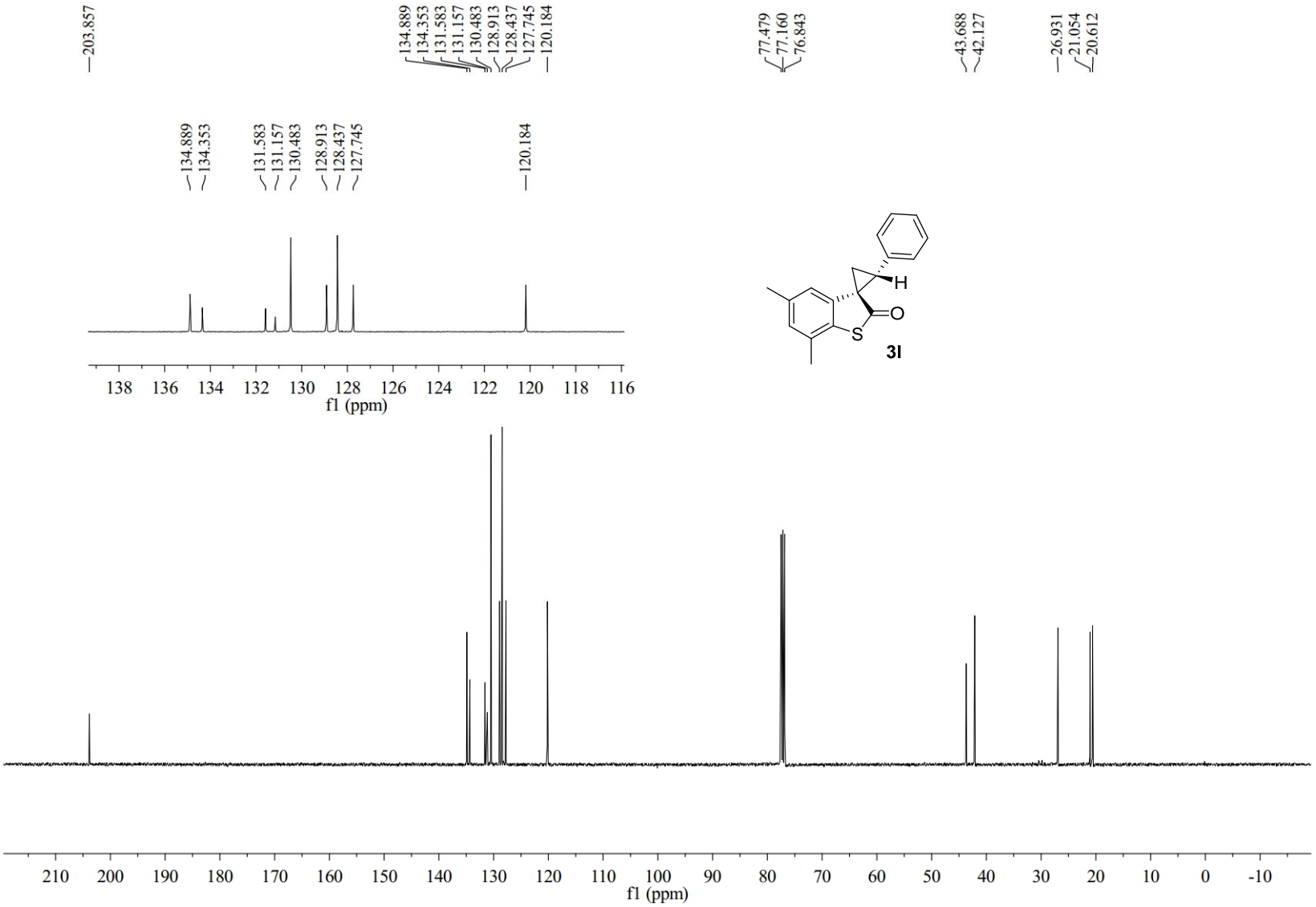
7.273
7.267
7.263
7.258
7.253
7.248
7.242
7.233
7.230
7.218
7.213
7.159
7.153
7.140
7.138
7.134
7.127
7.124
7.120
7.117
7.114
7.107
6.783
6.781
6.779
6.777
5.559
5.557
5.554
3.445
3.423
3.401
2.393
2.381
2.369
2.358
2.279
2.027
2.016
2.006
1.995
1.939
-0.000
3.07
2.00
0.98
7.30
7.25
7.20
7.15
7.10
6.80
6.75
f1 (ppm)
H
O
S
3l
3.07
2.00
0.98
0.99
1.00
1.06
3.05
1.08
2.97
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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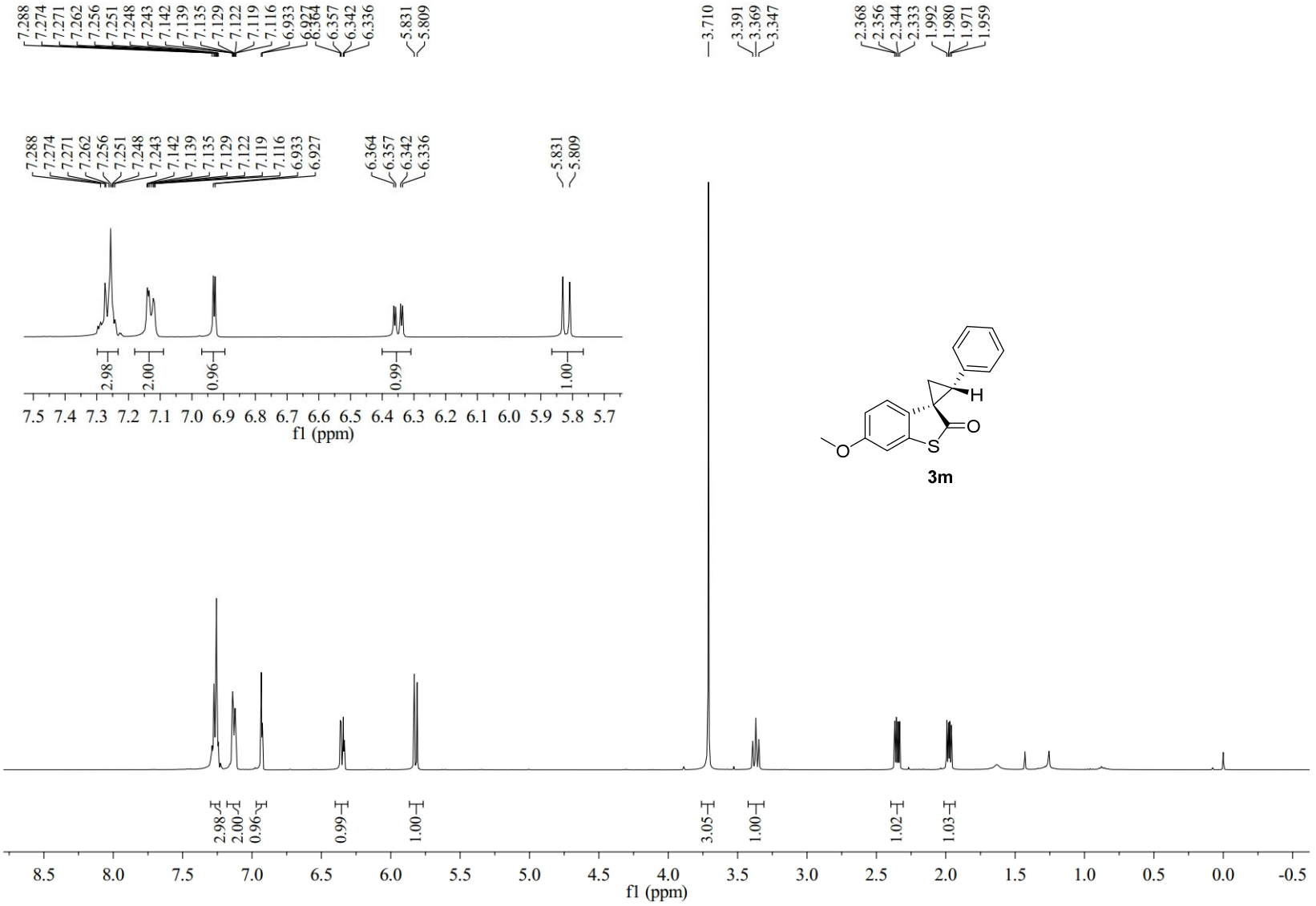
134.889
134.353
131.583
131.157
130.483
128.913
128.437
127.745
120.184
77.479
77.160
76.843
43.688
42.127
26.931
21.054
20.612
f1 (ppm)
H
O
S
3l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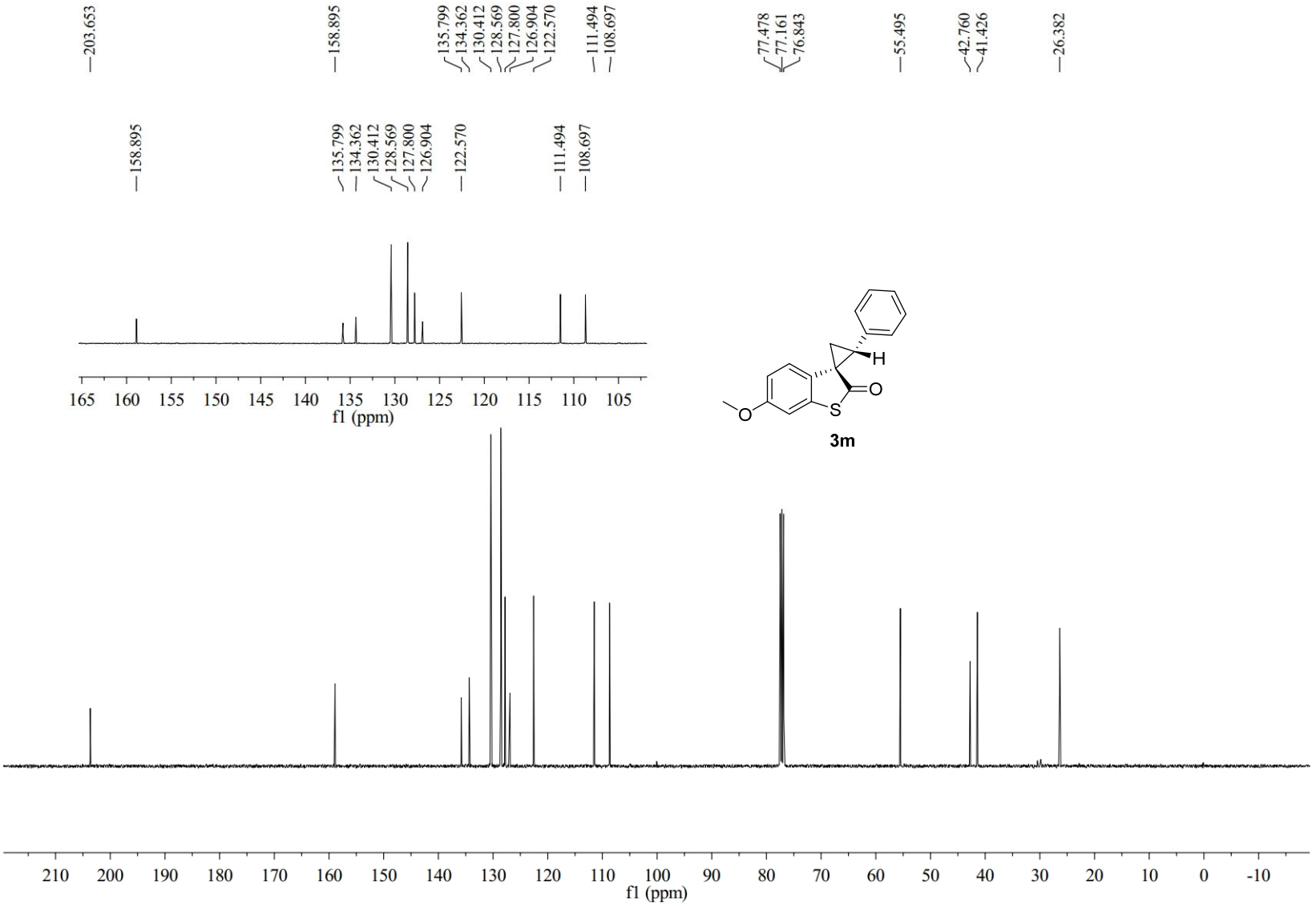
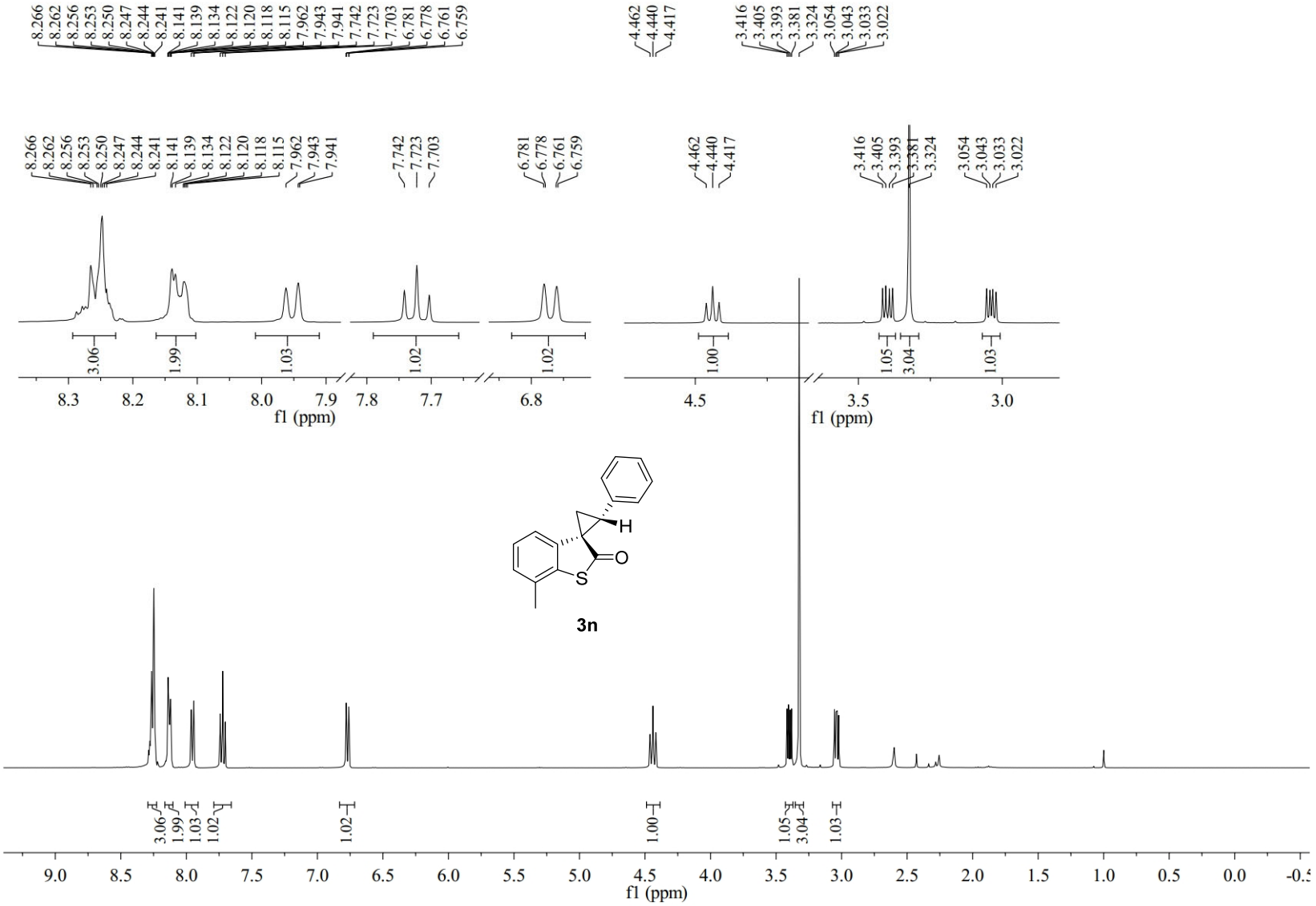
7.271
7.262
7.256
7.251
7.248
7.243
7.142
7.139
7.135
7.129
7.122
7.119
7.116
6.933
6.927
6.364
6.357
6.342
6.336
5.831
5.809
3.710
3.391
3.369
3.347
2.368
2.356
2.344
2.333
1.992
1.980
1.971
1.959
2.98
2.00
0.96
0.99
1.00
3.05
1.00
1.02
1.03
7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 6.7 6.6 6.5 6.4 6.3 6.2 6.1 6.0 5.9 5.8 5.7
f1 (ppm)
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)
H
O
S
O
3m


203.653
158.895
135.799
134.362
130.412
128.569
127.800
126.904
122.570
111.494
108.697
77.478
77.161
76.843
55.495
42.760
41.426
26.382
f1 (ppm)
O
H
O
S
3m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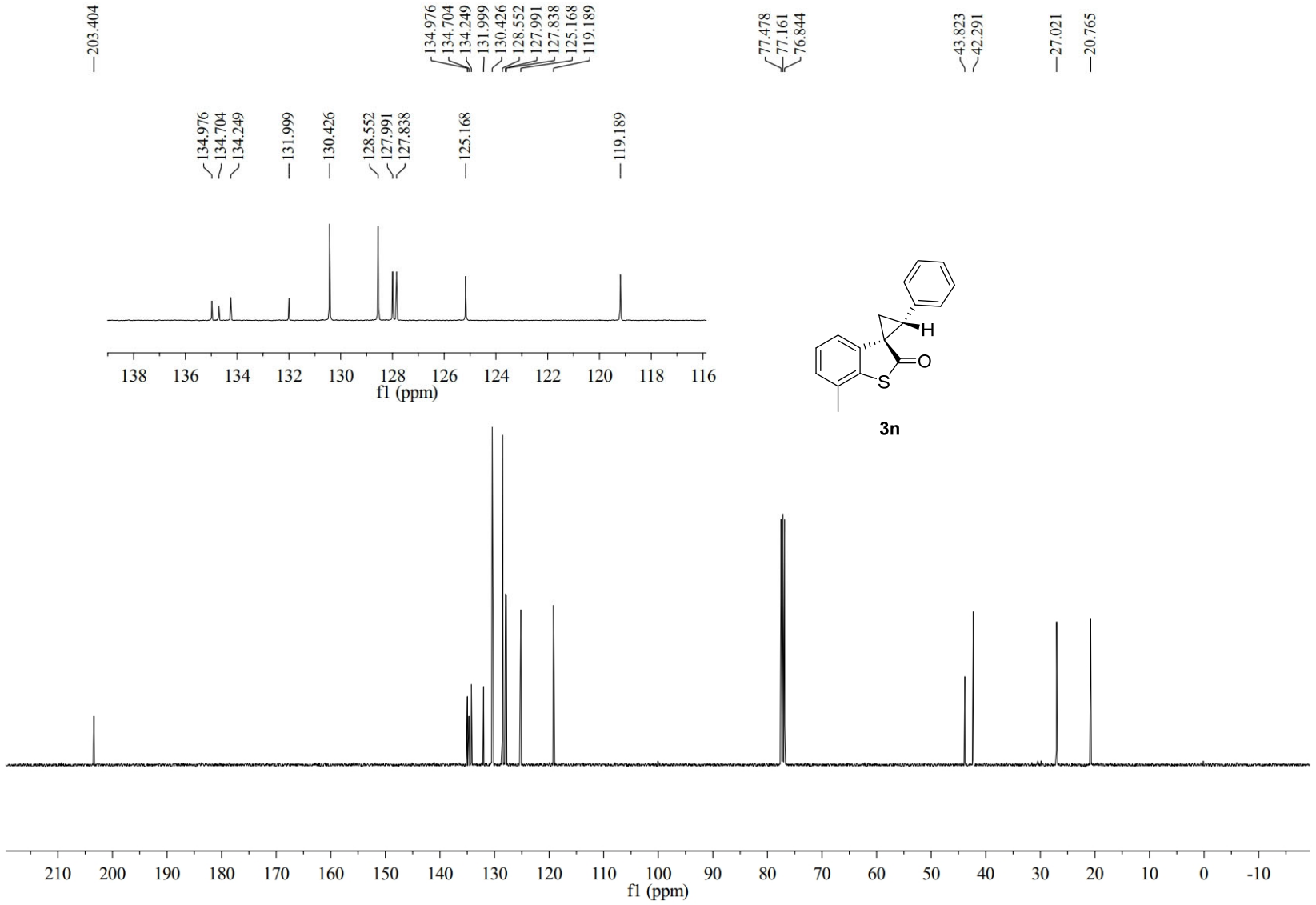
8.262
8.256
8.253
8.250
8.247
8.244
8.241
8.141
8.139
8.134
8.122
8.120
8.118
8.115
7.962
7.943
7.941
7.742
7.723
7.703
6.781
6.778
6.761
6.759
4.462
4.440
4.417
3.416
3.405
3.393
3.381
3.324
3.054
3.043
3.033
3.022
3.06
1.99
1.03
1.02
1.02
1.00
1.05
3.04
1.03
f1 (ppm)
H
O
S
3n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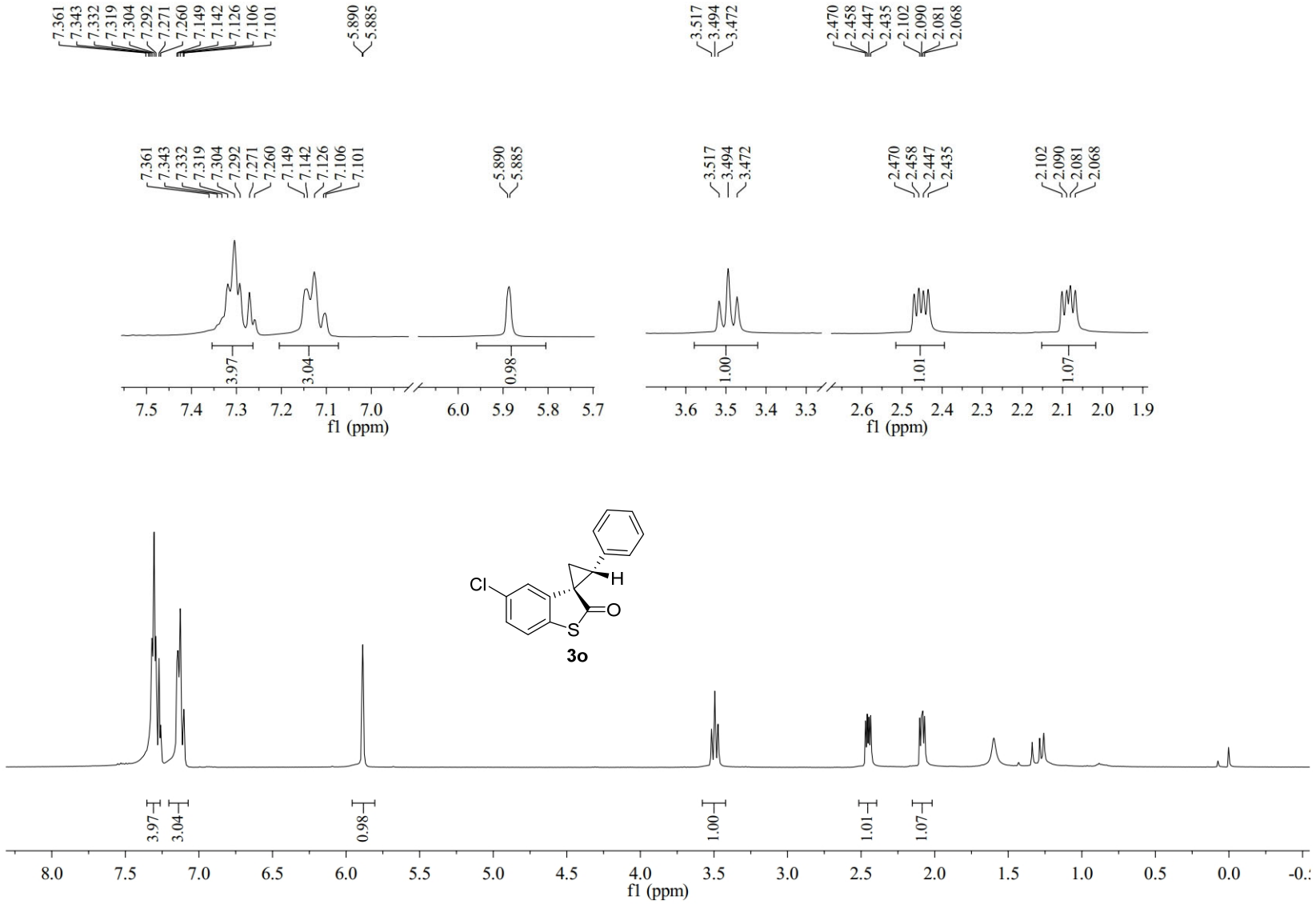
134.704
134.249
131.999
130.426
128.552
127.991
127.838
125.168
119.189
77.478
77.161
76.844
43.823
42.291
27.021
20.765
f1 (ppm)
H
O
S
3n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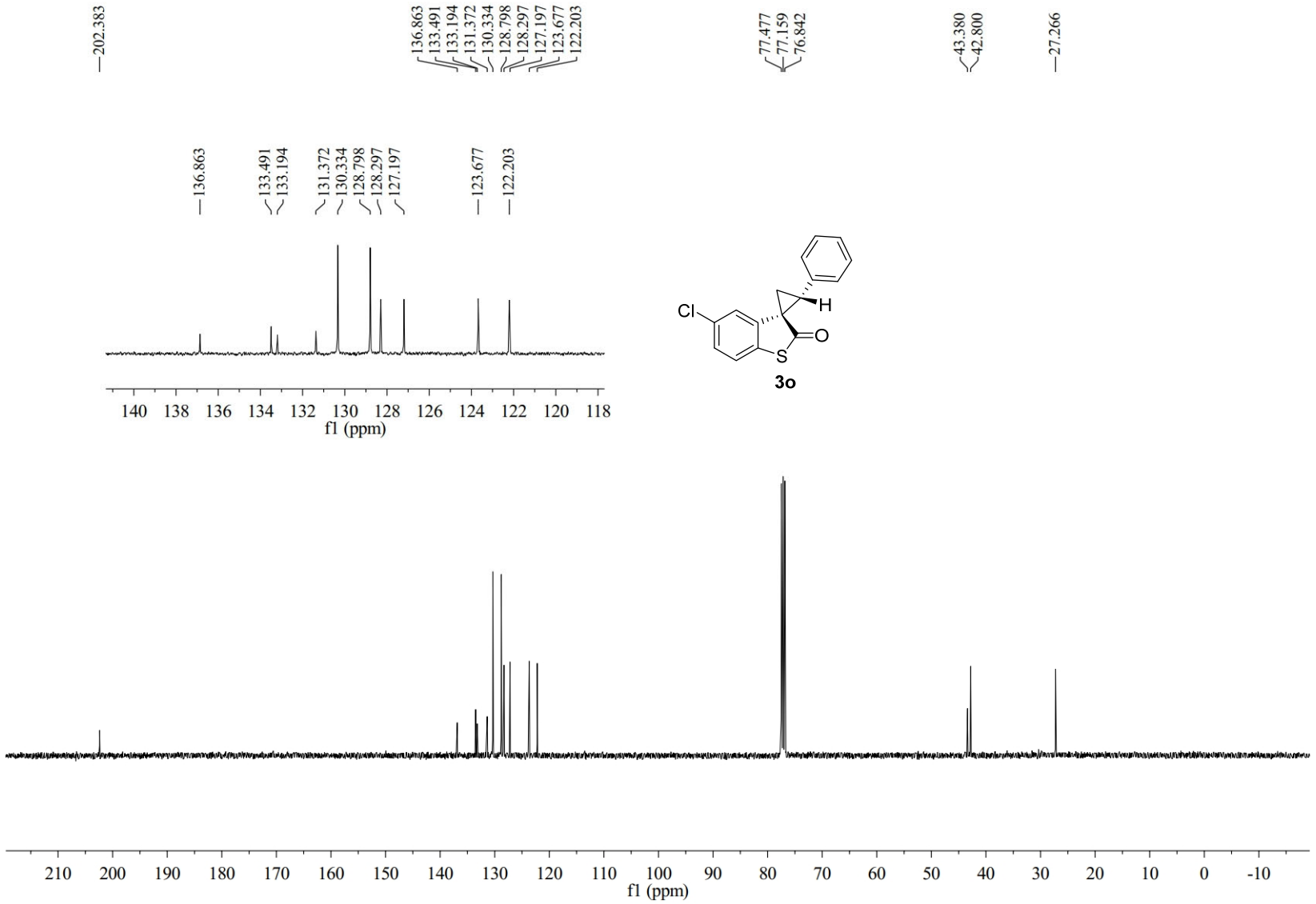
7.332
7.319
7.304
7.292
7.271
7.260
7.149
7.142
7.126
7.106
7.101
5.890
5.885
3.517
3.494
3.472
2.470
2.458
2.447
2.435
2.102
2.090
2.081
2.068
3.97
3.04
0.98
1.00
1.01
1.07
f1 (ppm)
Cl
H
O
S
3o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136.863
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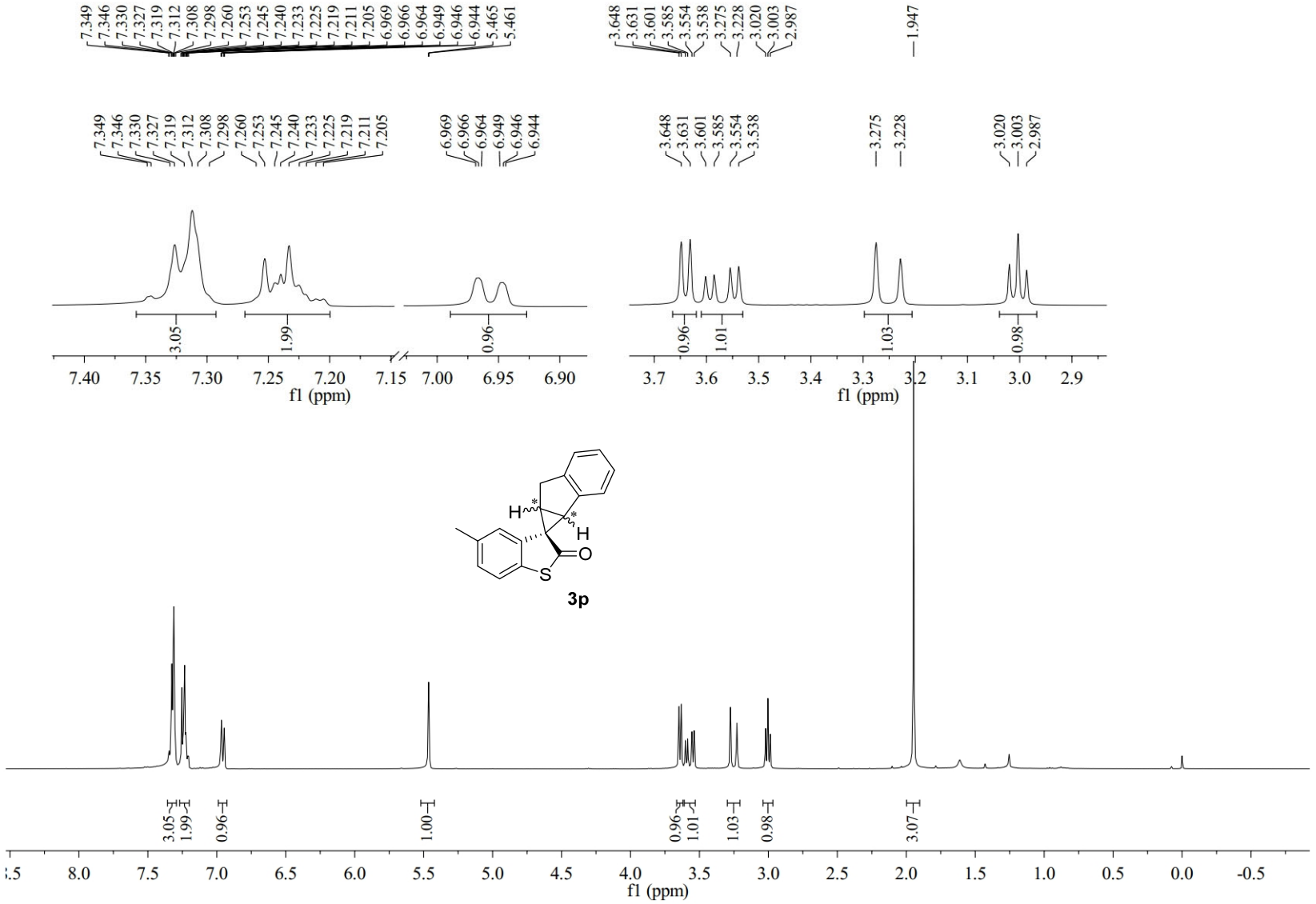
133.194
131.372
130.334
128.798
128.297
127.197
123.677
122.203
77.477
77.159
76.842
43.380
42.800
27.266
Cl
H
O
S
3o
f1 (ppm)
f1 (ppm)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7.346
7.330
7.327
7.319
7.312
7.308
7.298
7.260
7.253
7.245
7.240
7.233
7.225
7.219
7.211
7.205
6.969
6.966
6.964
6.949
6.946
6.944
5.465
5.461
3.648
3.631
3.601
3.585
3.554
3.538
3.275
3.228
3.020
3.003
2.987
1.947
3.05
1.99
0.96
0.96
1.01
1.03
0.98
f1 (ppm)
H
H
O
S
3p
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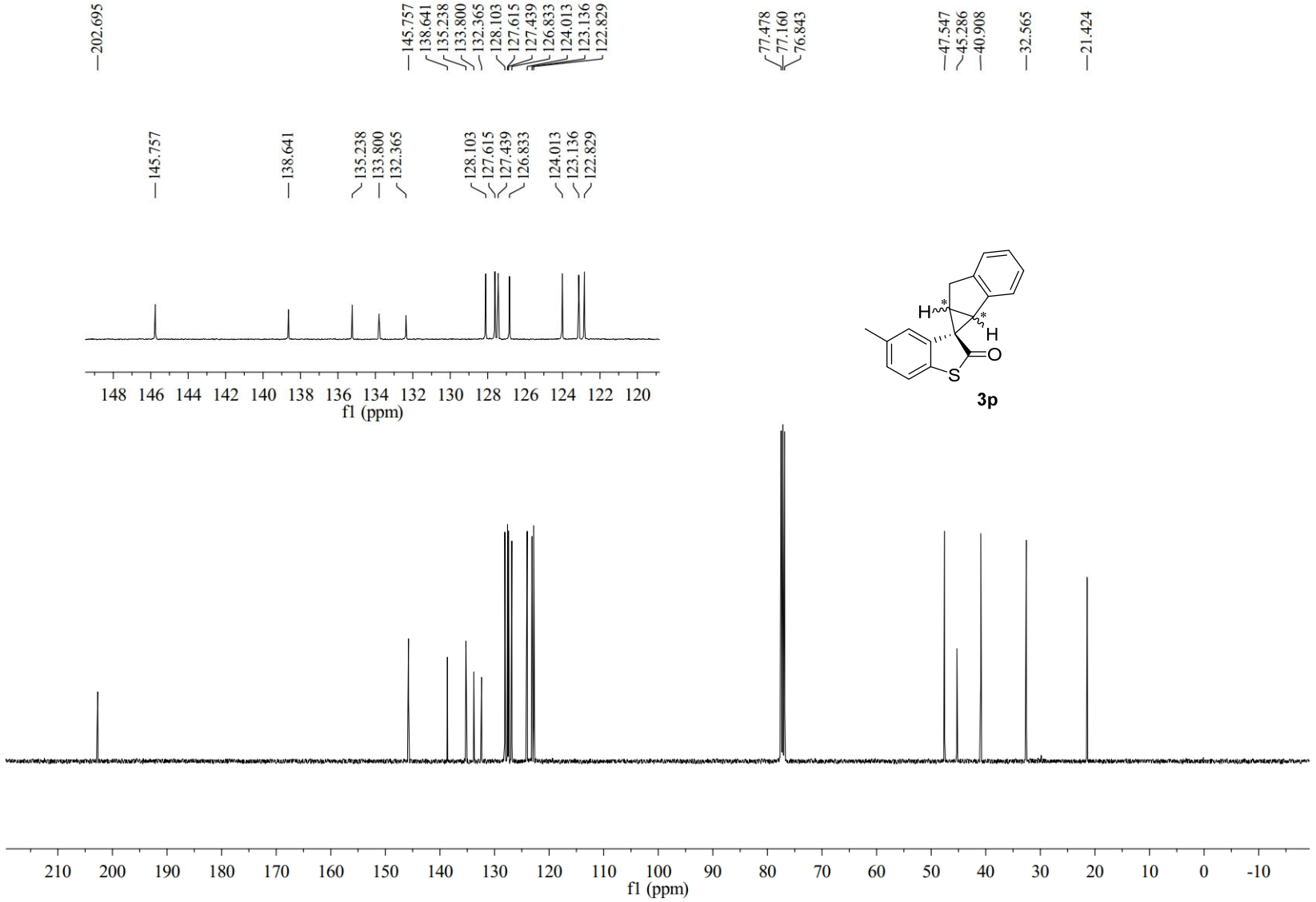
1.99
0.96
1.00
0.96
1.01
1.03
0.98
3.07
f1 (ppm)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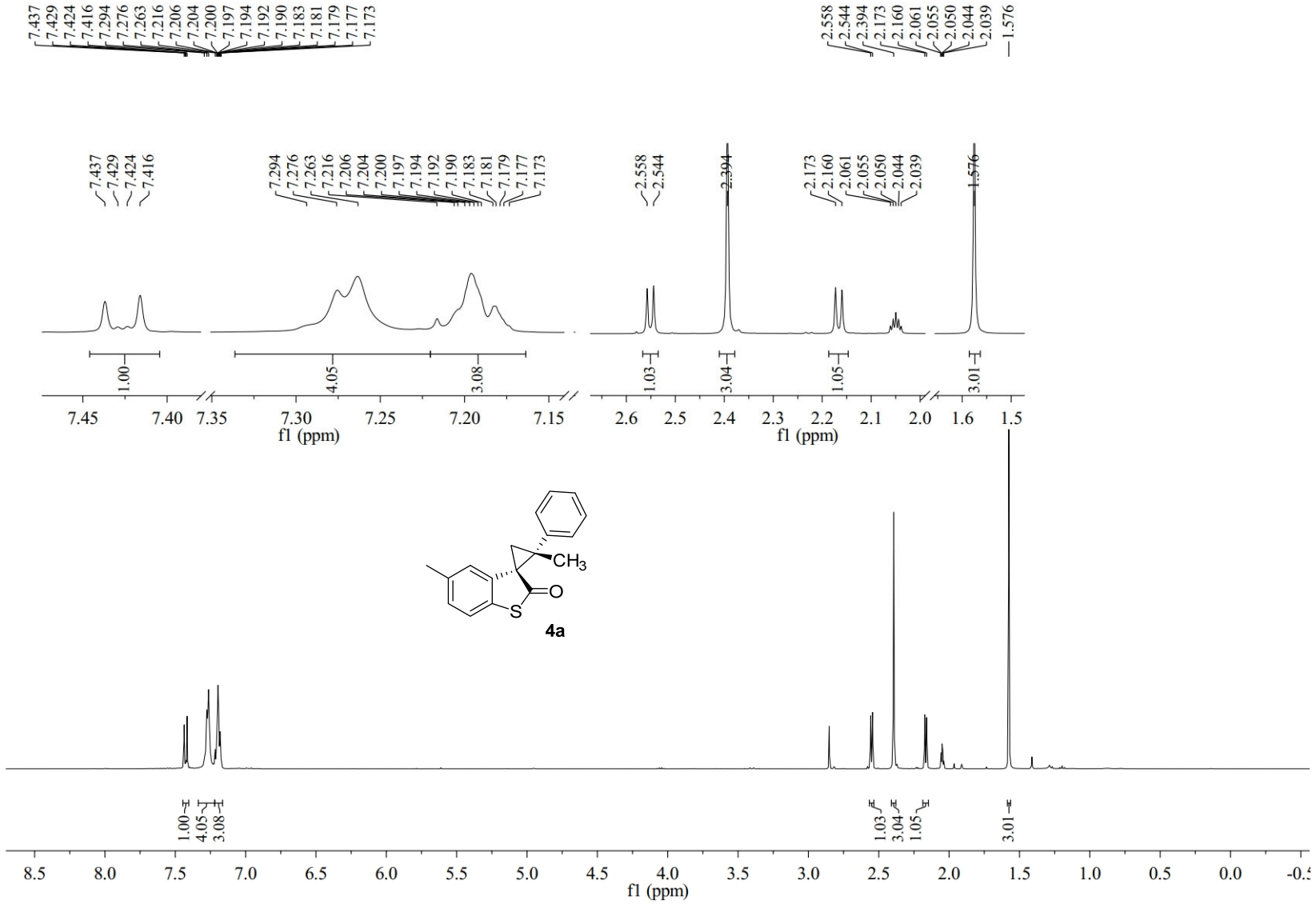
128.103
127.615
127.439
126.833
124.013
123.136
122.829
77.478
77.160
76.843
47.547
45.286
40.908
32.565
21.424
148 146 144 142 140 138 136 134 132 130 128 126 124 122 120
f1 (ppm)
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)
H
H
O
S
3p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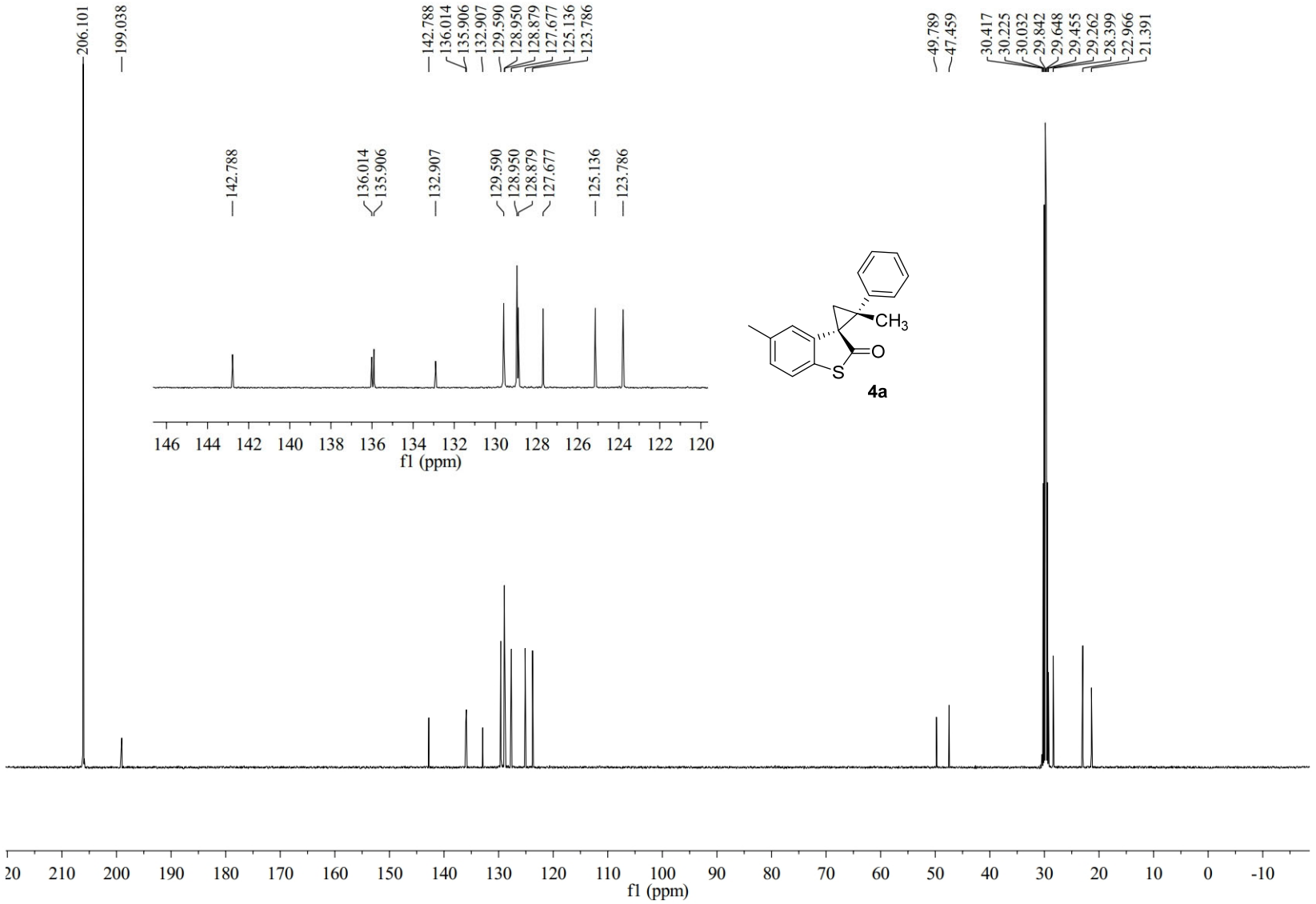
7.429
7.424
7.416
7.294
7.276
7.263
7.216
7.206
7.204
7.200
7.197
7.194
7.192
7.190
7.183
7.181
7.179
7.177
7.173
2.558
2.544
2.394
2.173
2.160
2.061
2.055
2.050
2.044
2.039
1.576
1.00
4.05
3.08
1.03
3.04
1.05
3.01
fl (ppm)
CH3
O
S
4a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135.906
132.907
129.590
128.950
128.879
127.677
125.136
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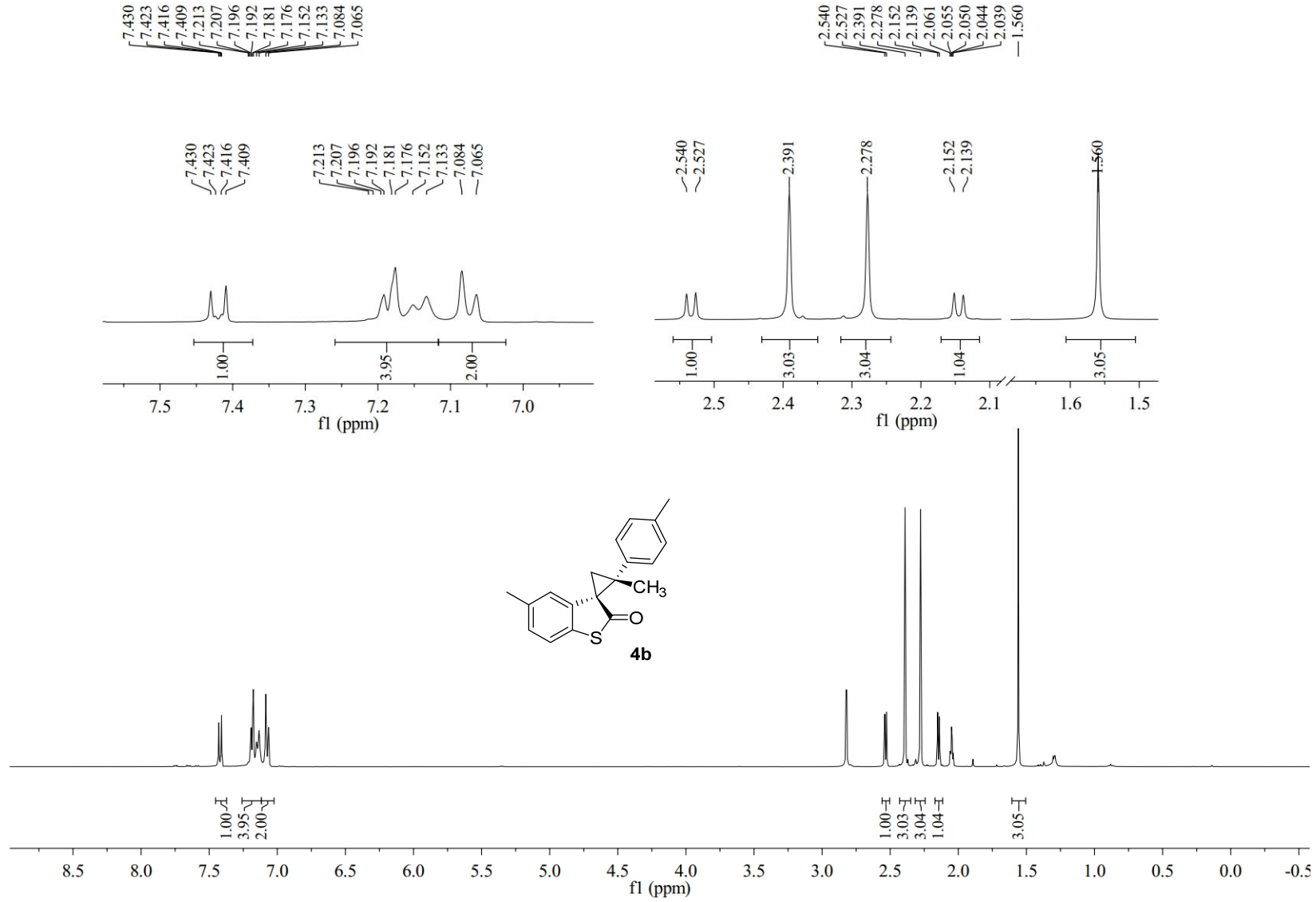
49.789
47.459
30.417
30.225
30.032
29.842
29.648
29.455
29.262
28.399
22.966
21.391
f1 (ppm)
CH3
O
S
4a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7.423
7.416
7.409
7.213
7.207
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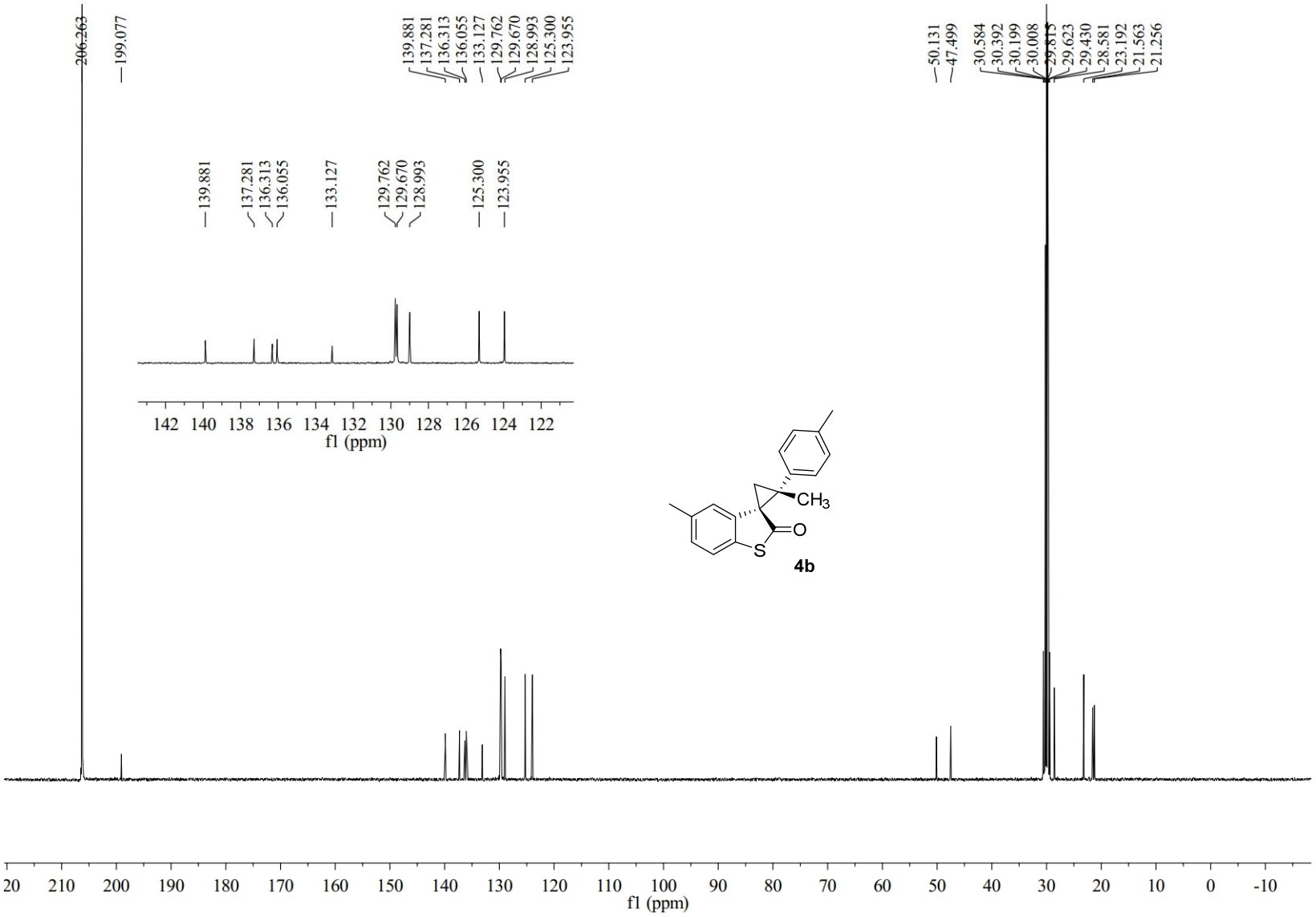
7.192
7.181
7.176
7.152
7.133
7.084
7.065
2.540
2.527
2.391
2.278
2.152
2.139
2.061
2.055
2.050
2.044
2.039
1.560
1.00
3.95
2.00
3.03
3.04
1.04
3.05
f1 (ppm)
CH3
O
S
4b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136.055
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129.762
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125.300
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50.131
47.499
30.584
30.392
30.199
30.008
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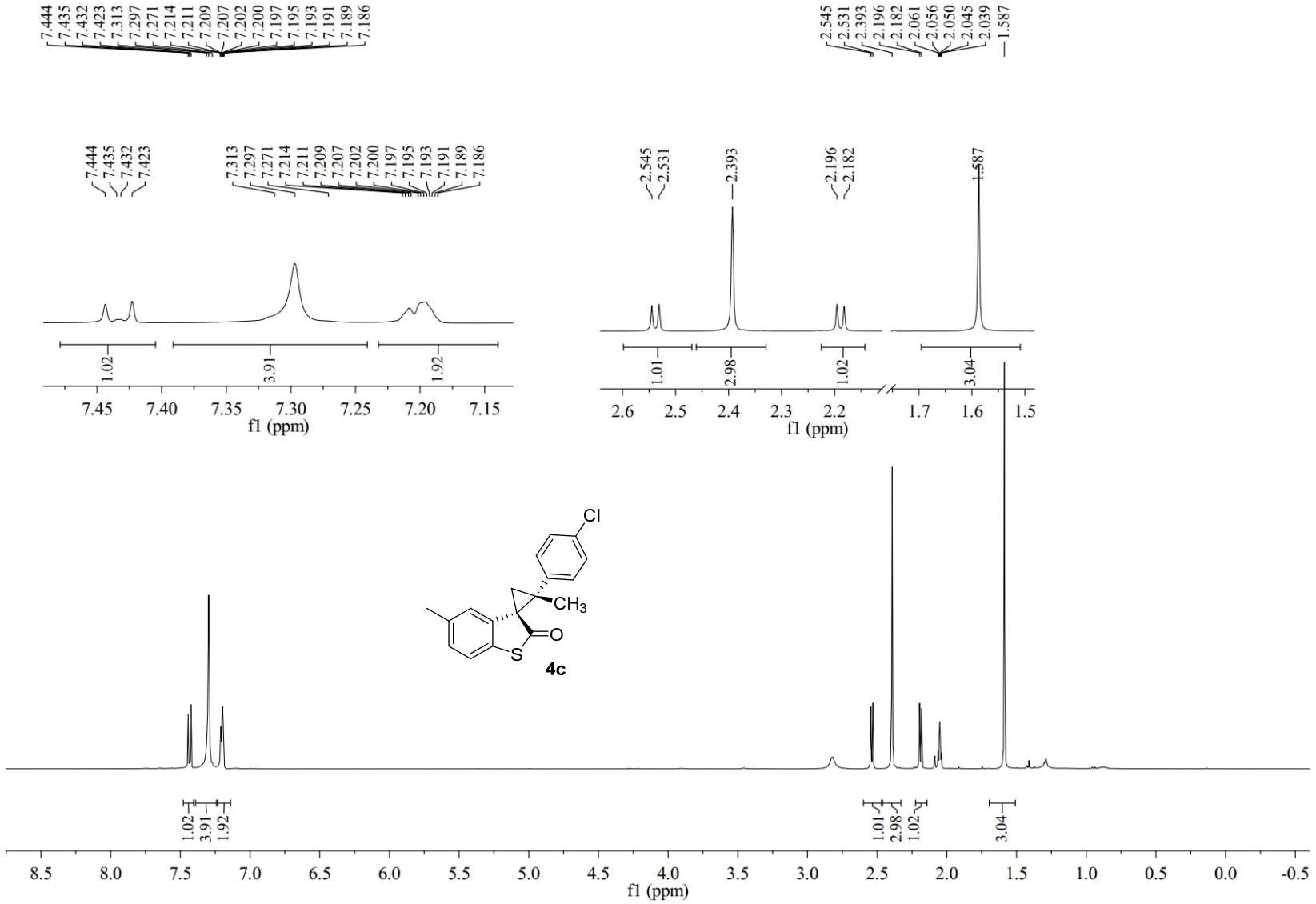
29.430
28.581
23.192
21.563
21.256
f1 (ppm)
CH3
O
S
4b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7.297
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7.214
7.211
7.209
7.207
7.202
7.200
7.197
7.195
7.193
7.191
7.189
7.186
2.545
2.531
2.393
2.196
2.182
2.061
2.056
2.050
2.045
2.039
1.587
1.02
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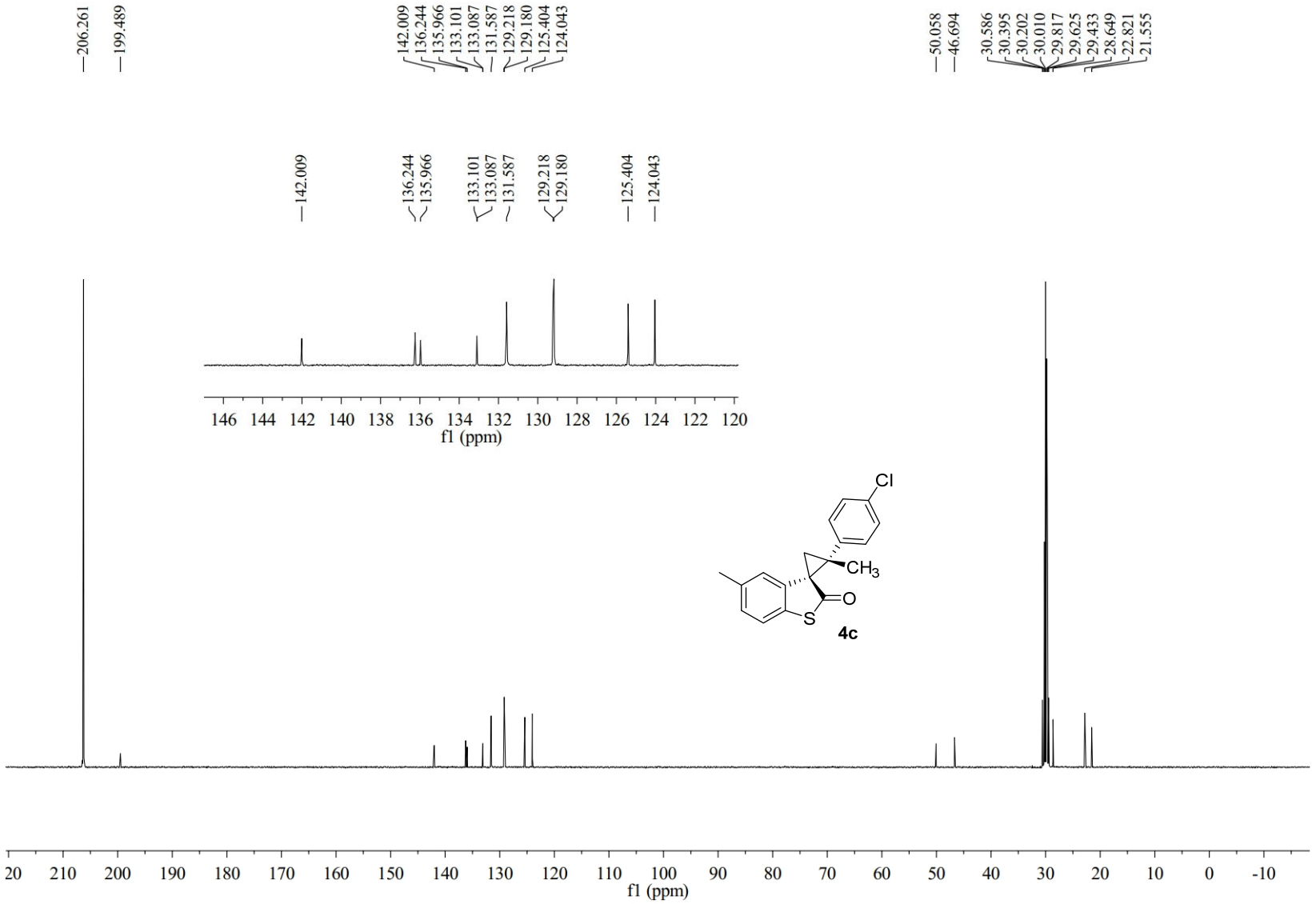
1.92
1.01
2.98
1.02
3.04
f1 (ppm)
Cl
CH3
O
S
4c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133.101
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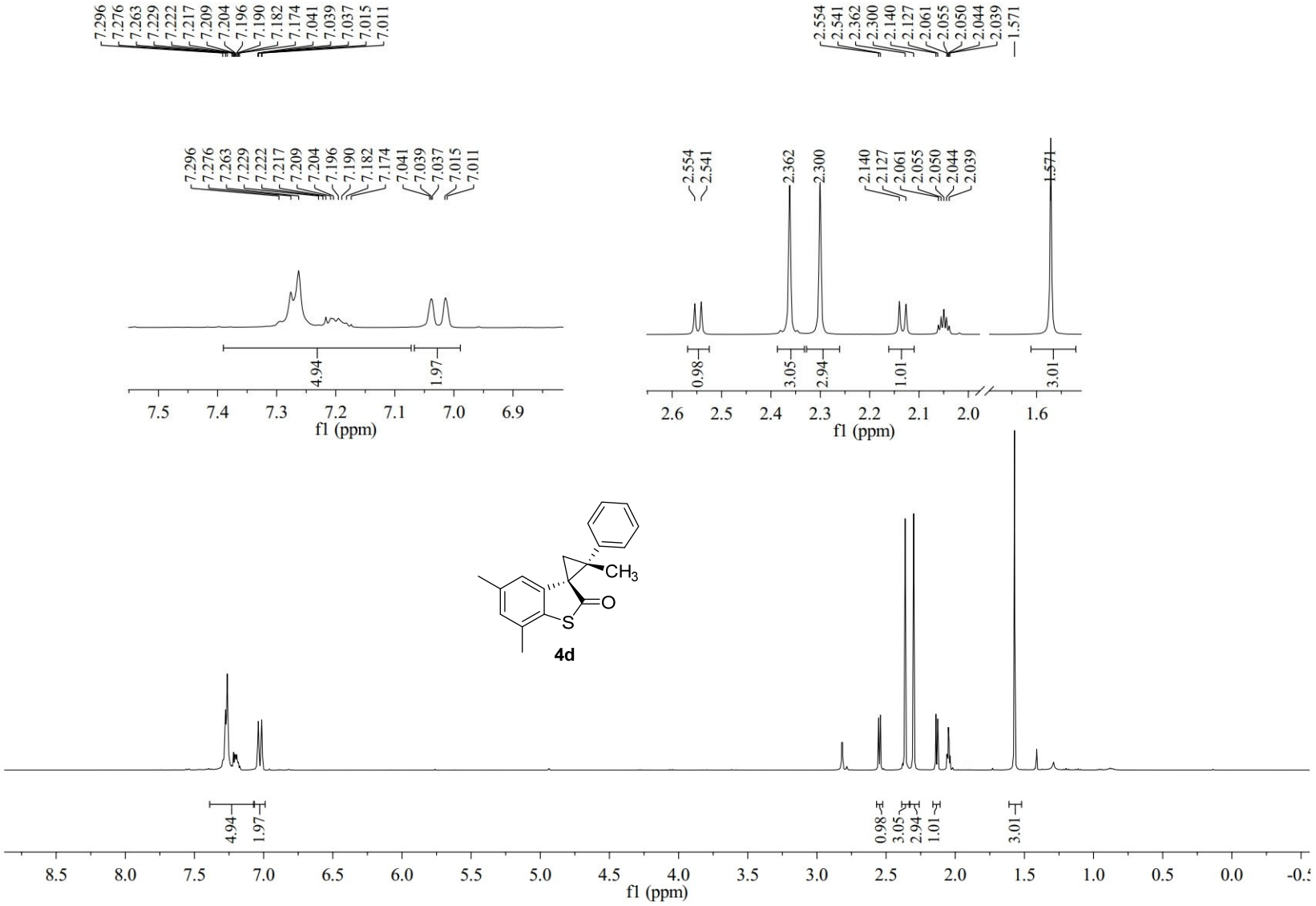
131.587
129.218
129.180
125.404
124.043
50.058
46.694
30.586
30.395
30.202
30.010
29.817
29.625
29.433
28.649
22.821
21.555
f1 (ppm)
Cl
CH3
O
S
4c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7.196
7.190
7.182
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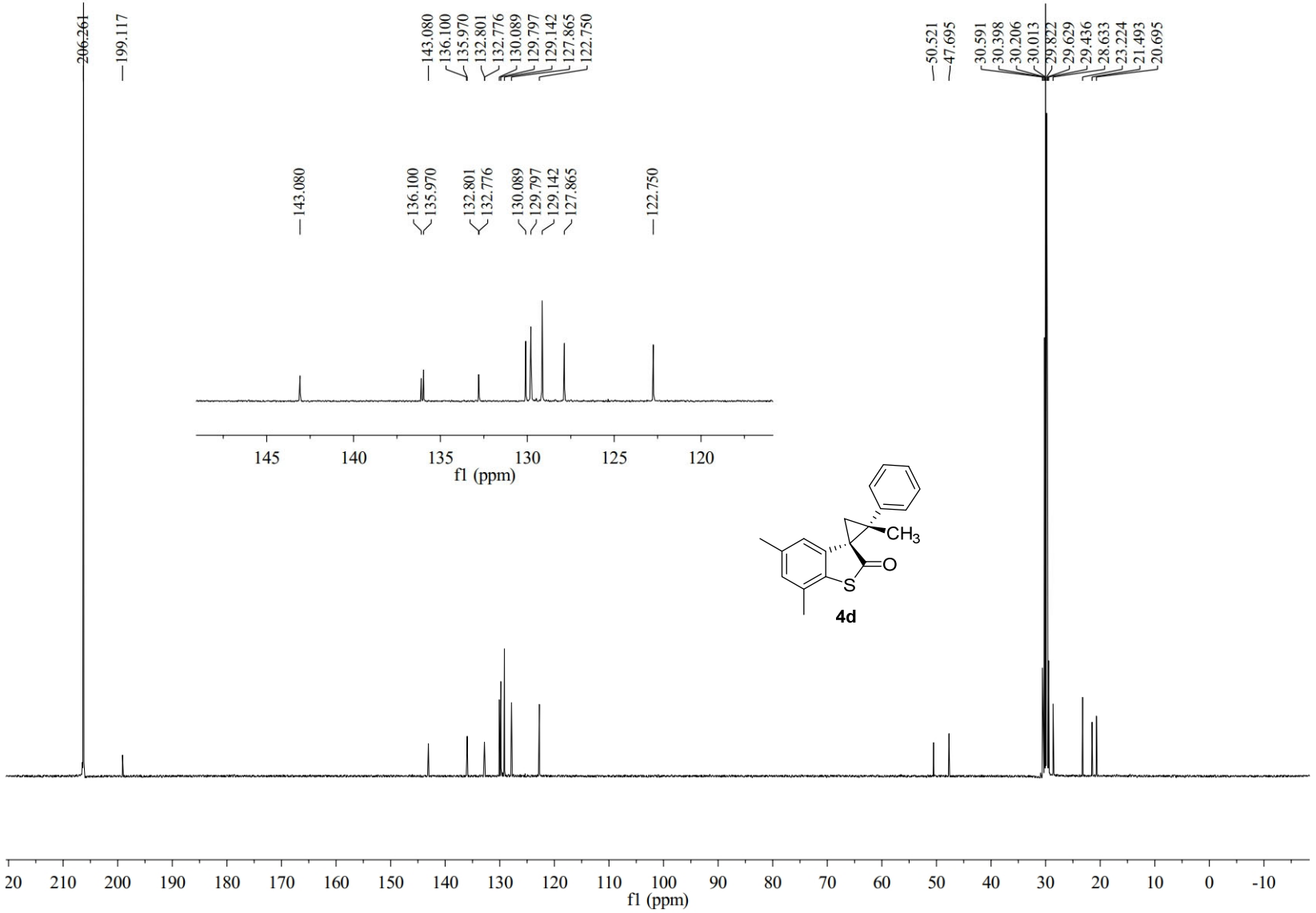
7.041
7.039
7.037
7.015
7.011
2.554
2.541
2.362
2.300
2.140
2.127
2.061
2.055
2.050
2.044
2.039
1.571
4.94
1.97
0.98
3.05
2.94
1.01
3.01
f1 (ppm)
CH3
O
S
4d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50.521
47.695
30.591
30.398
30.206
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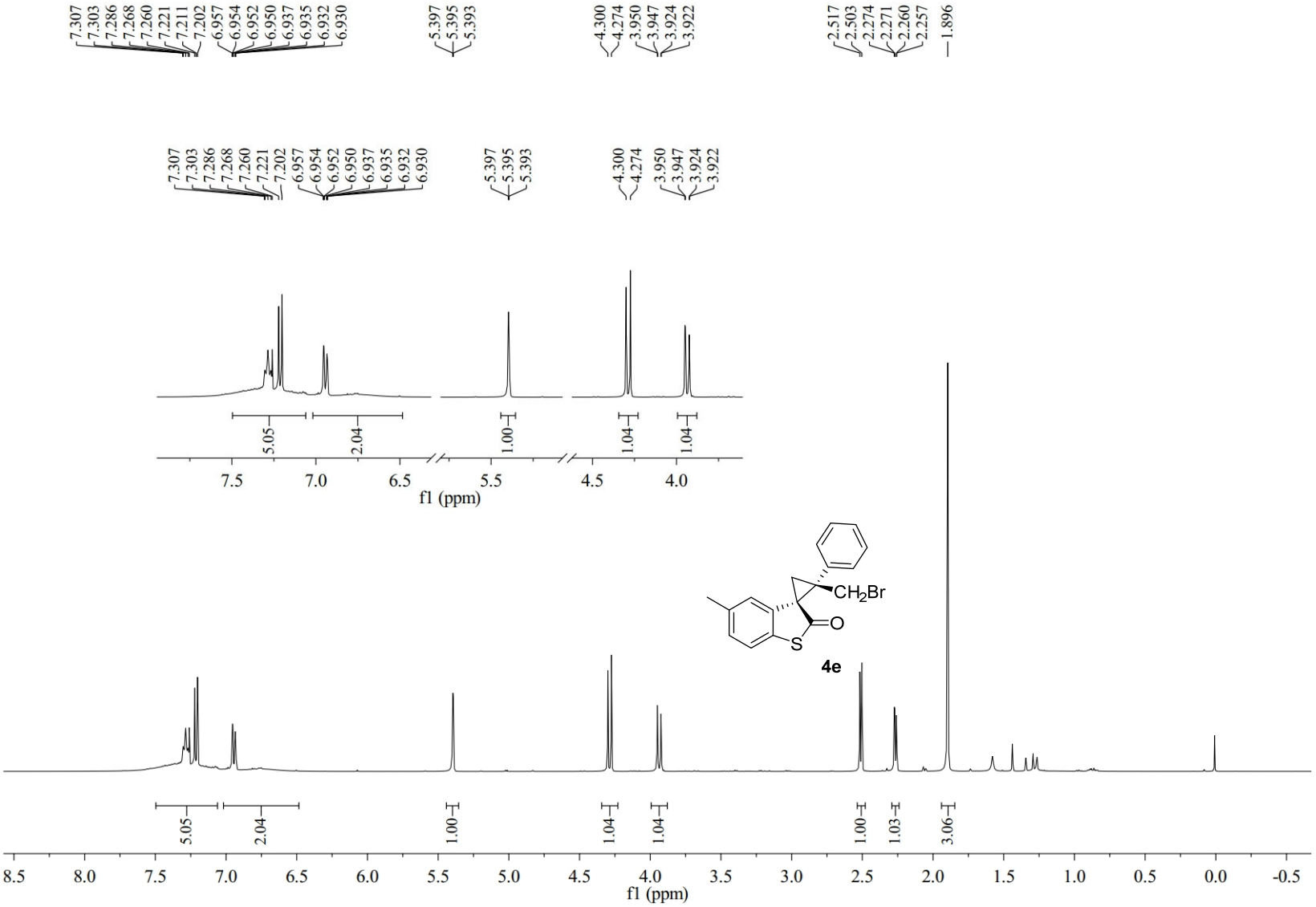
29.436
28.633
23.224
21.493
20.695
f1 (ppm)
CH3
O
S
4d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6.954
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6.937
6.935
6.932
6.930
5.397
5.395
5.393
4.300
4.274
3.950
3.947
3.924
3.922
2.517
2.503
2.274
2.271
2.260
2.257
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1.00
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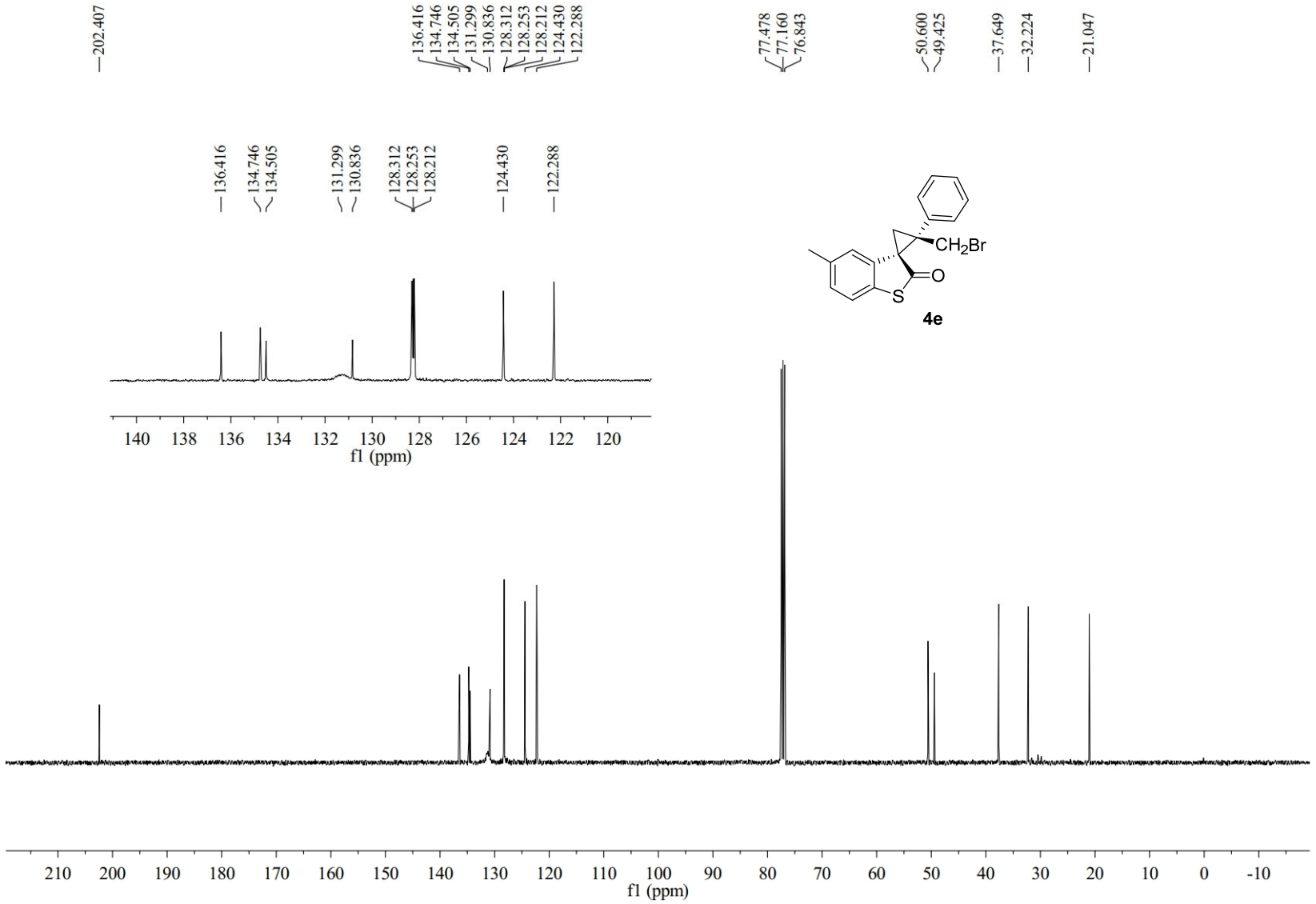
f1 (ppm)
CH2Br
O
S
4e
1.03
3.06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131.299
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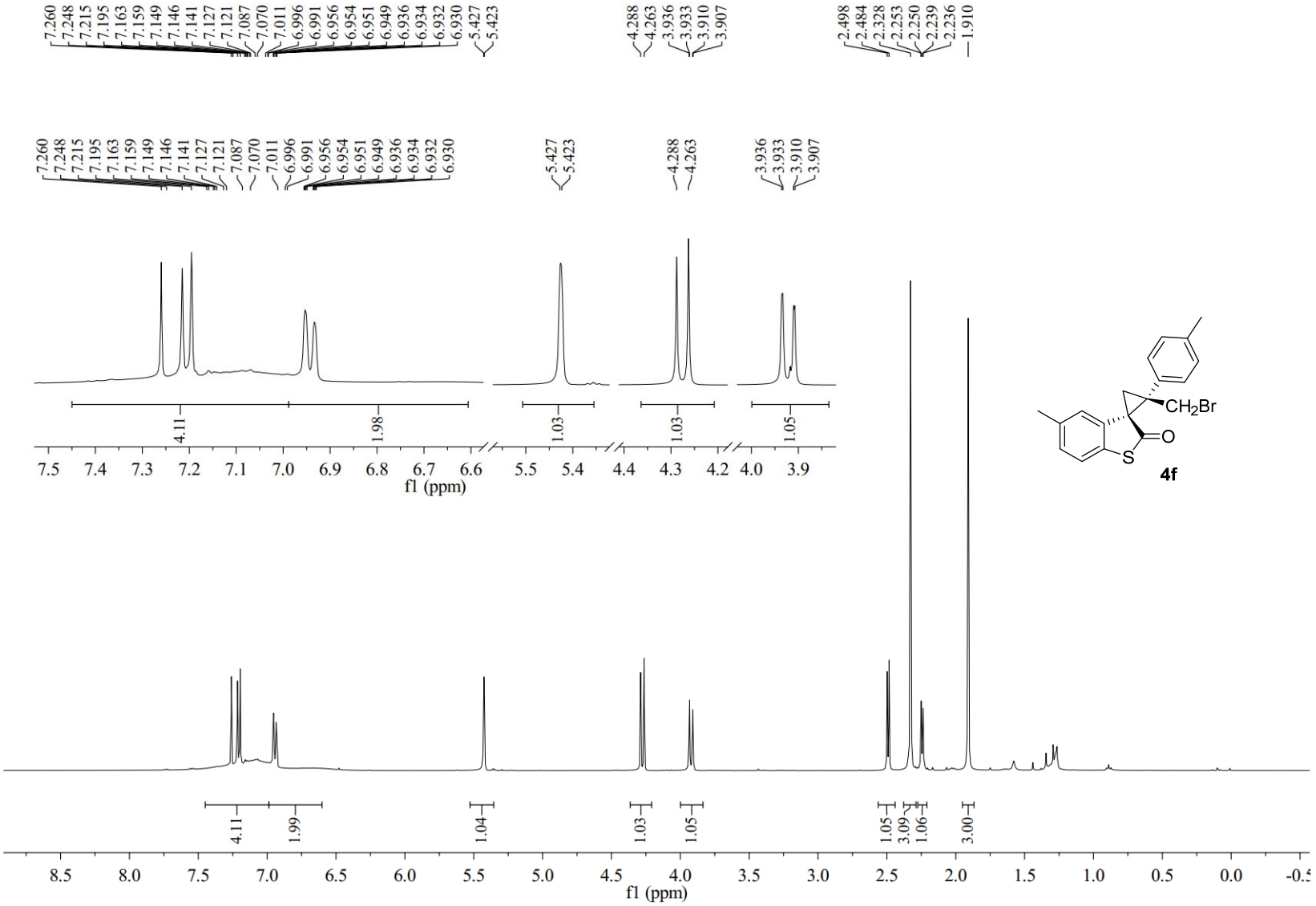
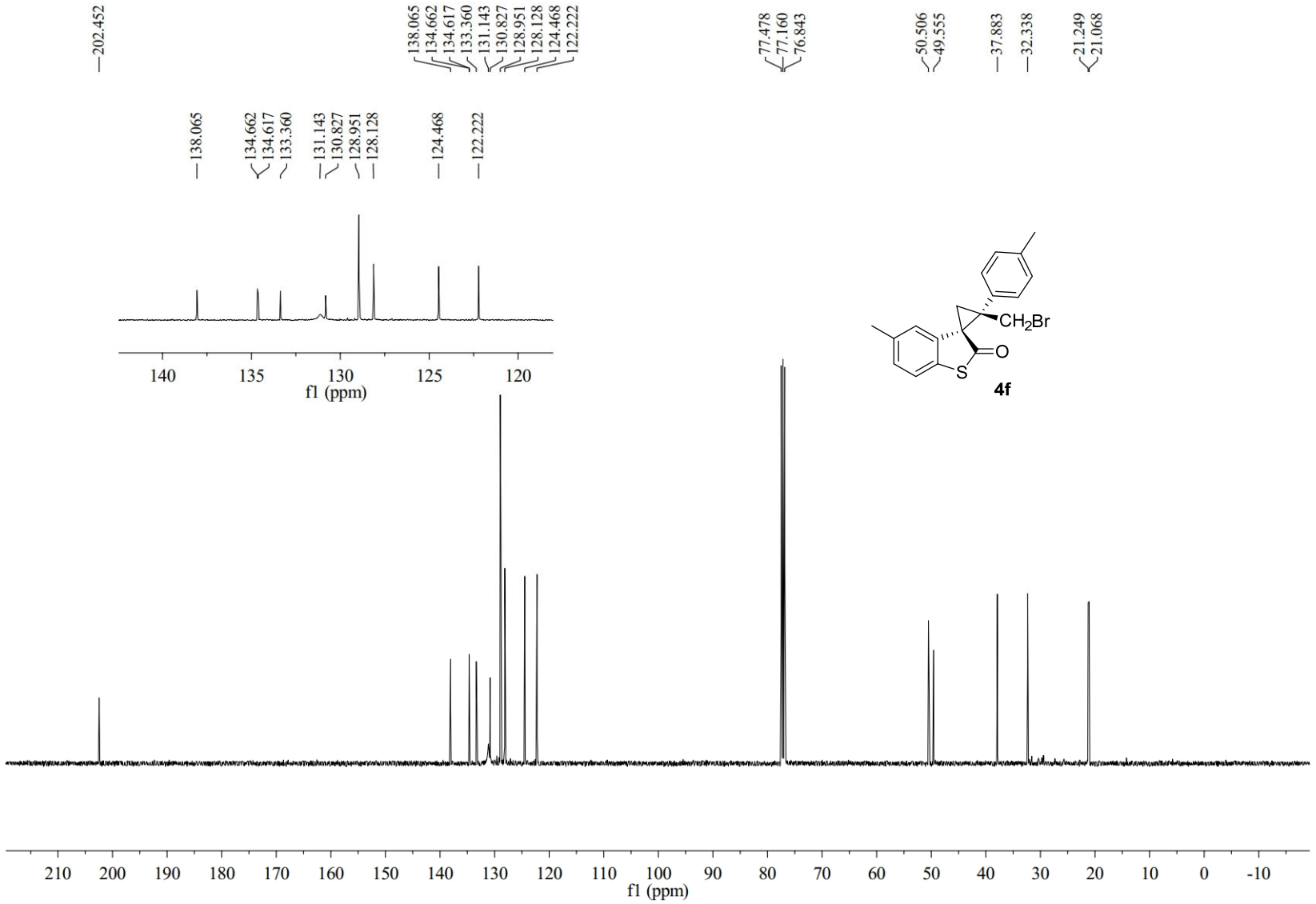
128.253
128.212
124.430
122.288
77.478
77.160
76.843
50.600
49.425
37.649
32.224
21.047
CH2Br
O
S
4e
f1 (ppm)
f1 (ppm)


7.260
7.248
7.215
7.195
7.163
7.159
7.149
7.146
7.141
7.127
7.121
7.087
7.070
7.011
6.996
6.991
6.956
6.954
6.951
6.949
6.936
6.934
6.932
6.930
5.427
5.423
4.288
4.263
3.936
3.933
3.910
3.907
2.498
2.484
2.328
2.253
2.250
2.239
2.236
1.910
4.11
1.98
1.03
1.03
1.05
f1 (ppm)
CH2Br
O
S
4f
4.11
1.99
1.04
1.03
1.05
1.05
3.09
1.06
3.00
f1 (ppm)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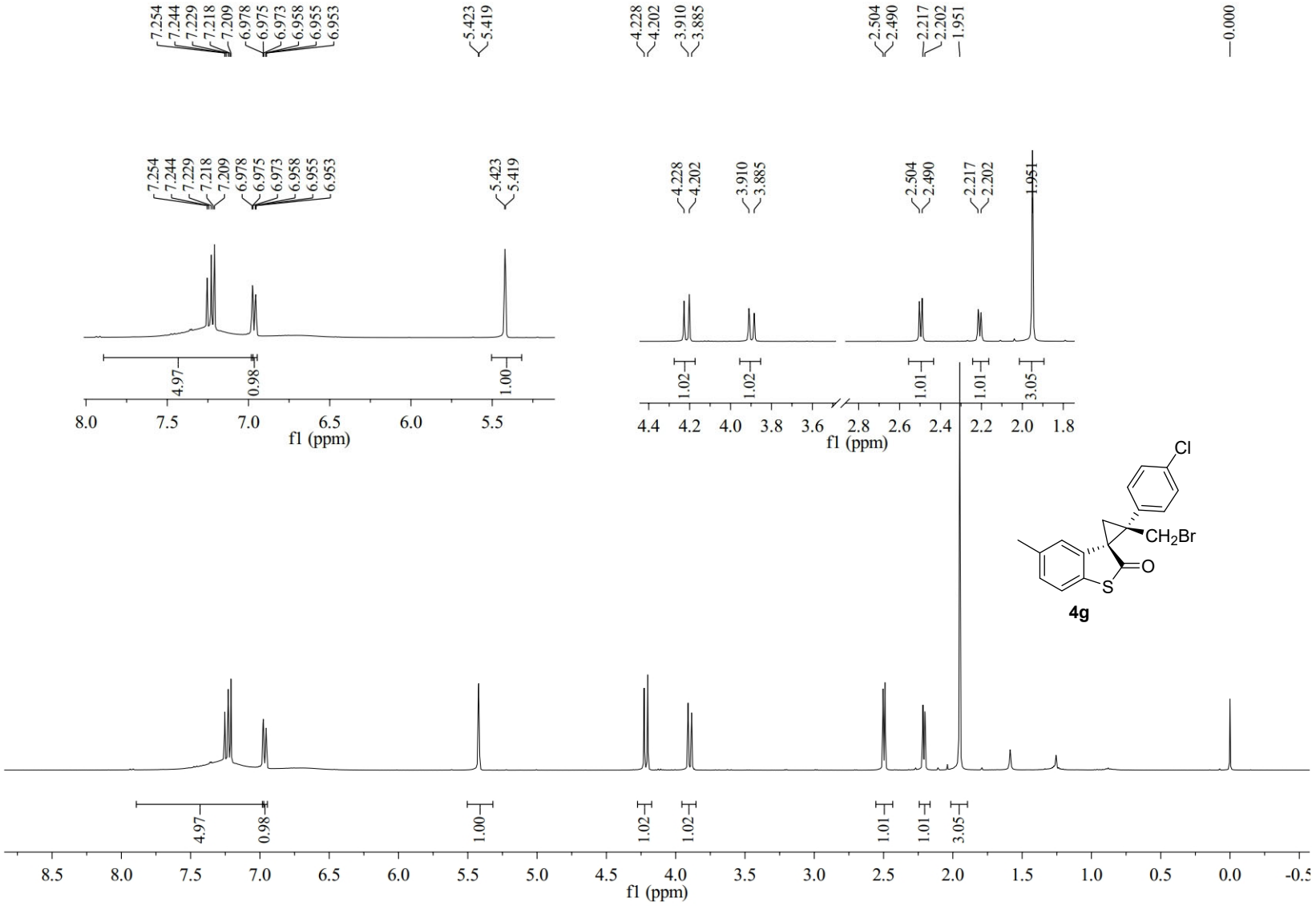
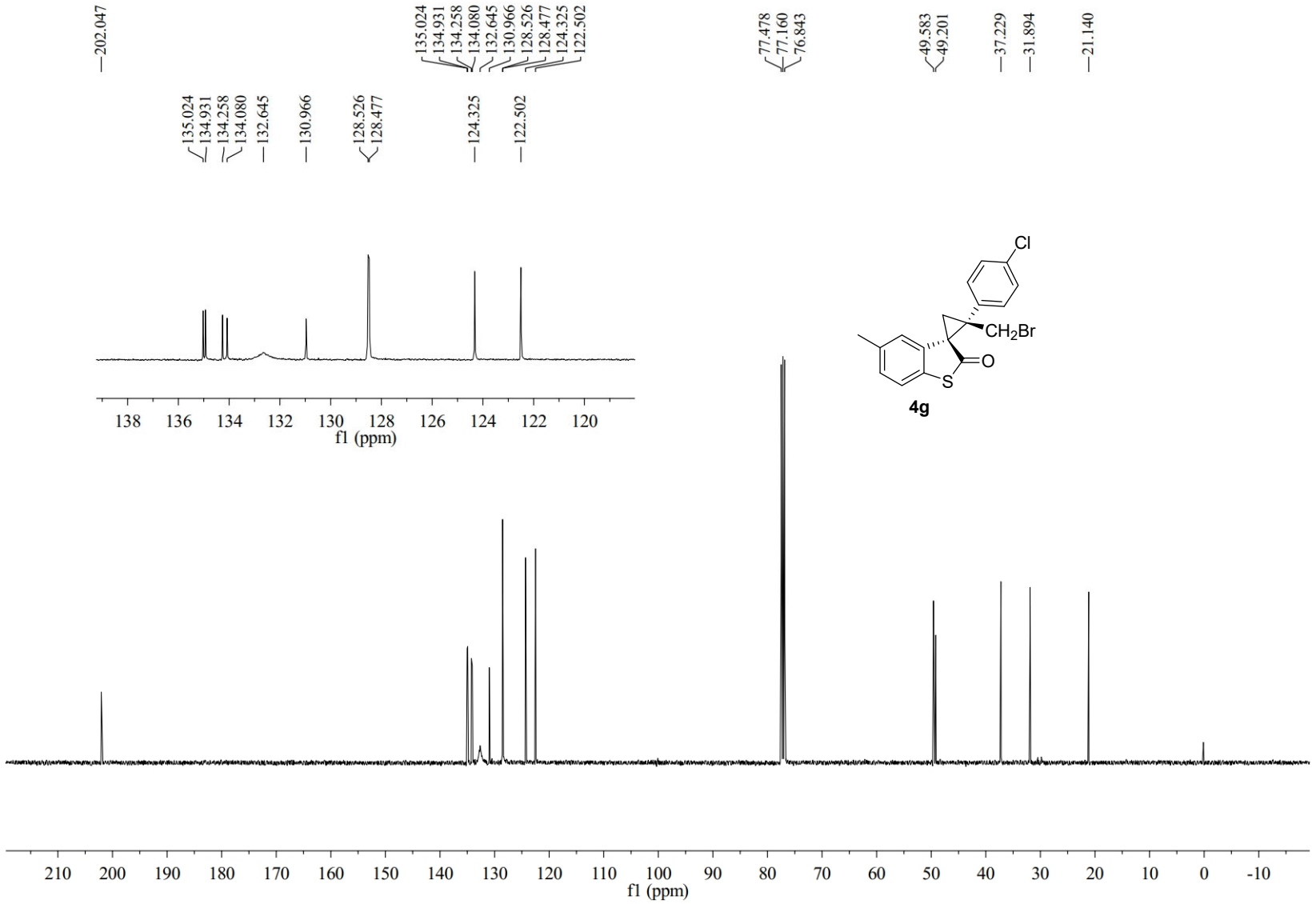
138.065
134.662
134.617
133.360
131.143
130.827
128.951
128.128
124.468
122.222
77.478
77.160
76.843
50.506
49.555
37.883
32.338
21.249
21.068
CH2Br
O
S
4f
f1 (ppm)


7.254
7.244
7.229
7.218
7.209
6.978
6.975
6.973
6.958
6.955
6.953
5.423
5.419
4.228
4.202
3.910
3.885
2.504
2.490
2.217
2.202
1.951
0.000
4.97
0.98
1.00
1.02
1.02
1.01
1.01
3.05
f1 (ppm)
Cl
CH2Br
O
S
4g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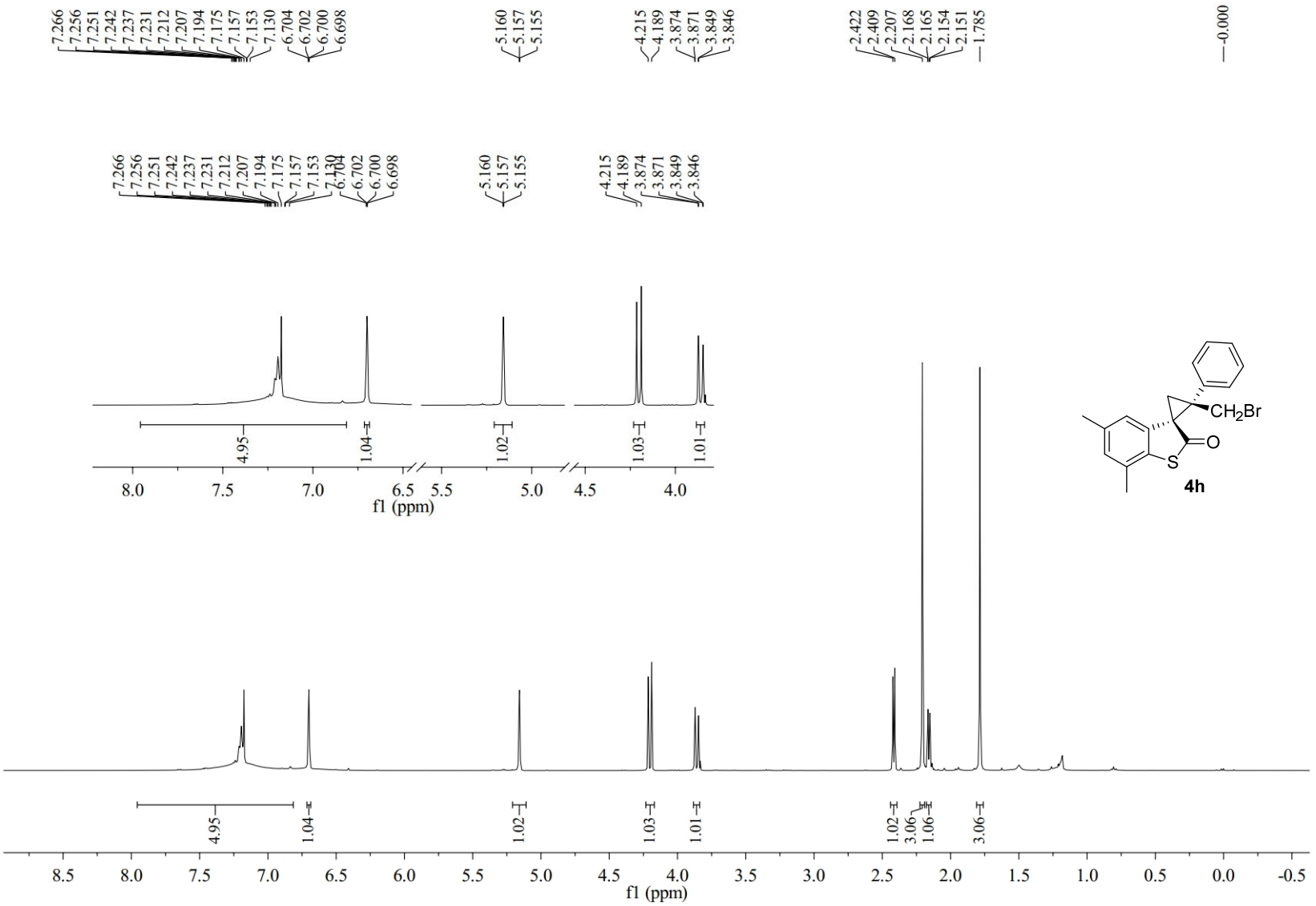
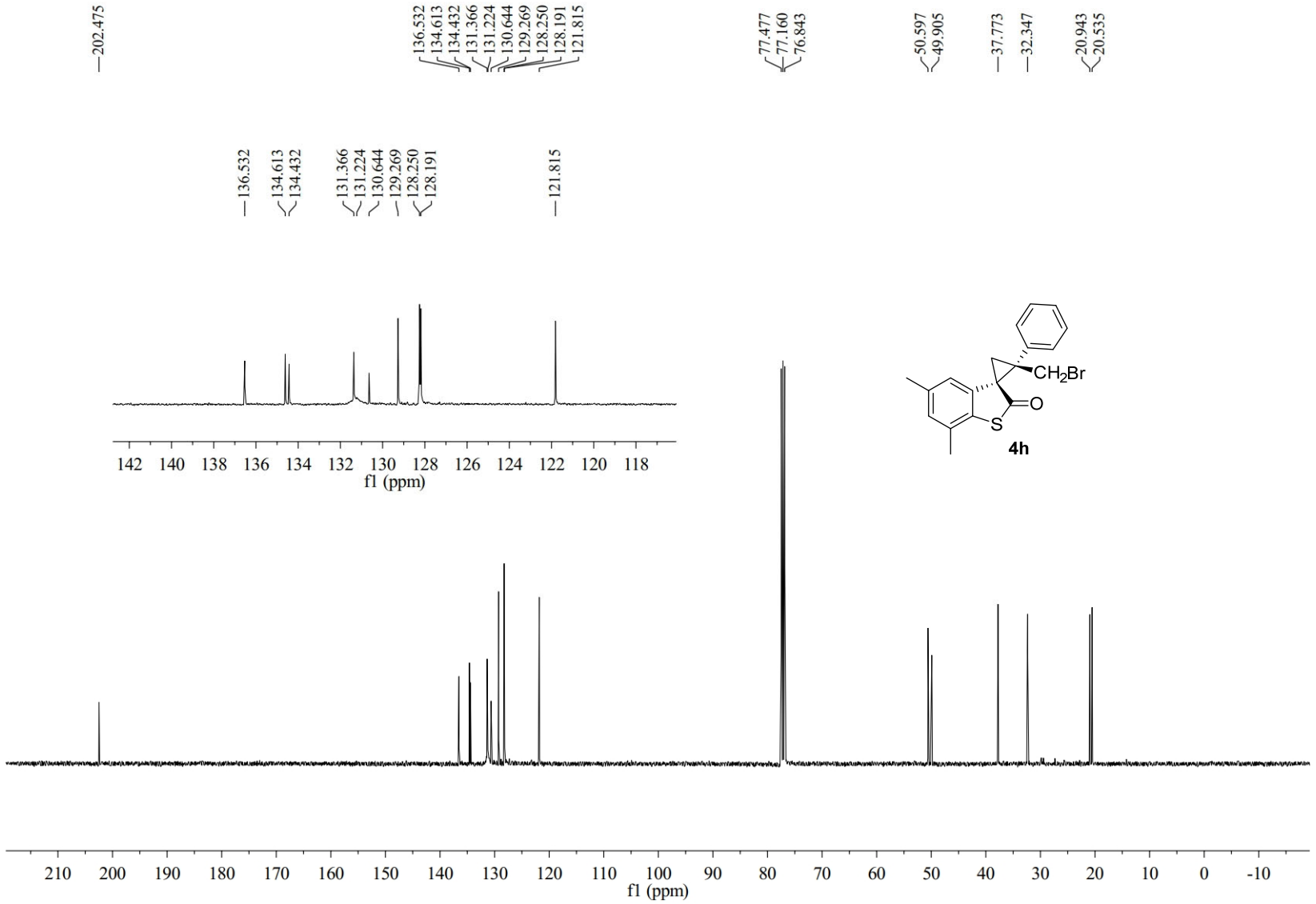
134.931
134.258
134.080
132.645
130.966
128.526
128.477
124.325
122.502
77.478
77.160
76.843
49.583
49.201
37.229
31.894
21.140
Cl
CH2Br
O
S
4g
f1 (ppm)
f1 (ppm)


7.266
7.256
7.251
7.242
7.237
7.231
7.212
7.207
7.194
7.175
7.157
7.153
7.130
6.704
6.702
6.700
6.698
5.160
5.157
5.155
4.215
4.189
3.874
3.871
3.849
3.846
2.422
2.409
2.207
2.168
2.165
2.154
2.151
1.785
-0.000
4.95
1.04
1.02
1.03
1.01
3.06
1.06
f1 (ppm)
CH2Br
O
S
4h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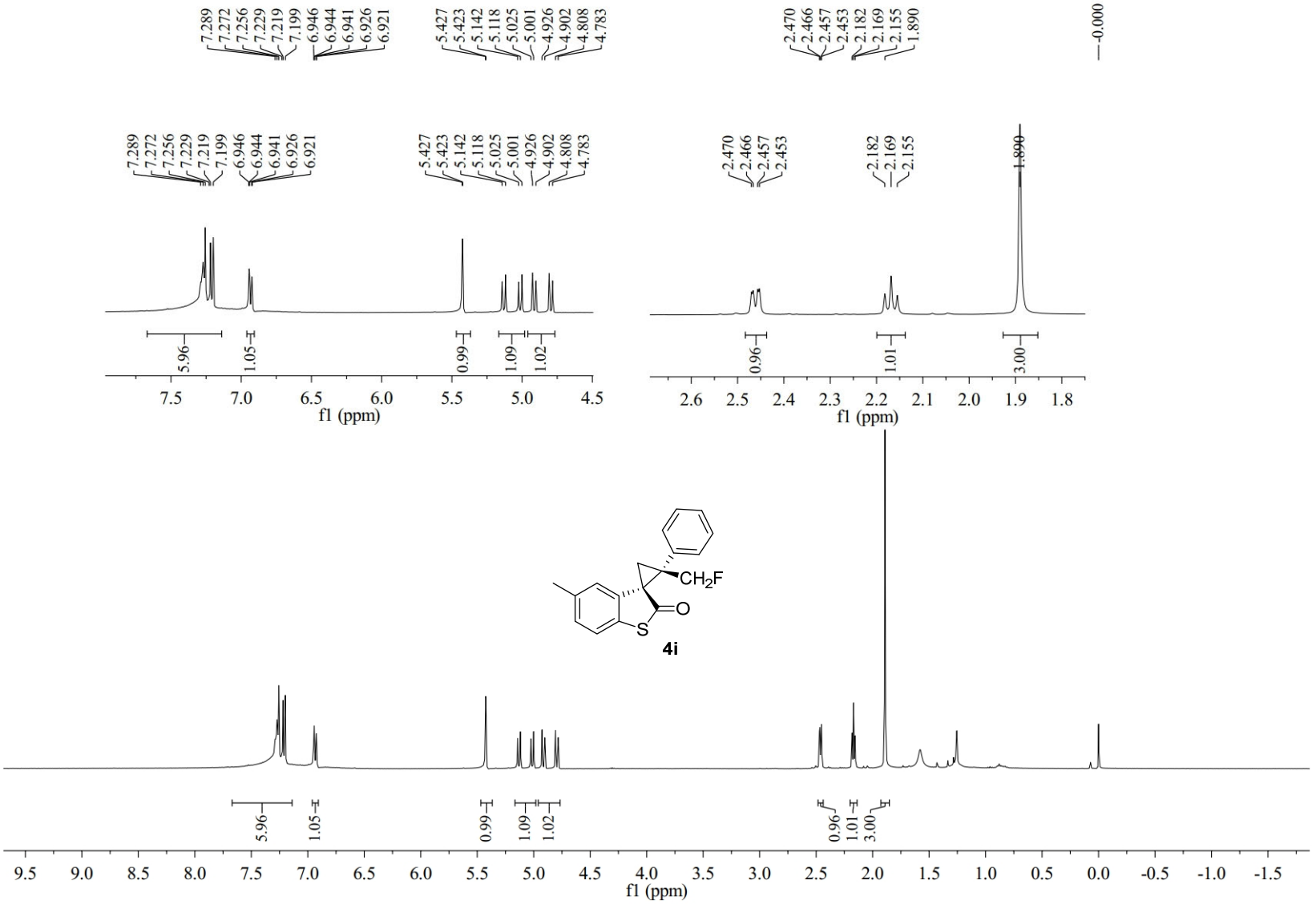
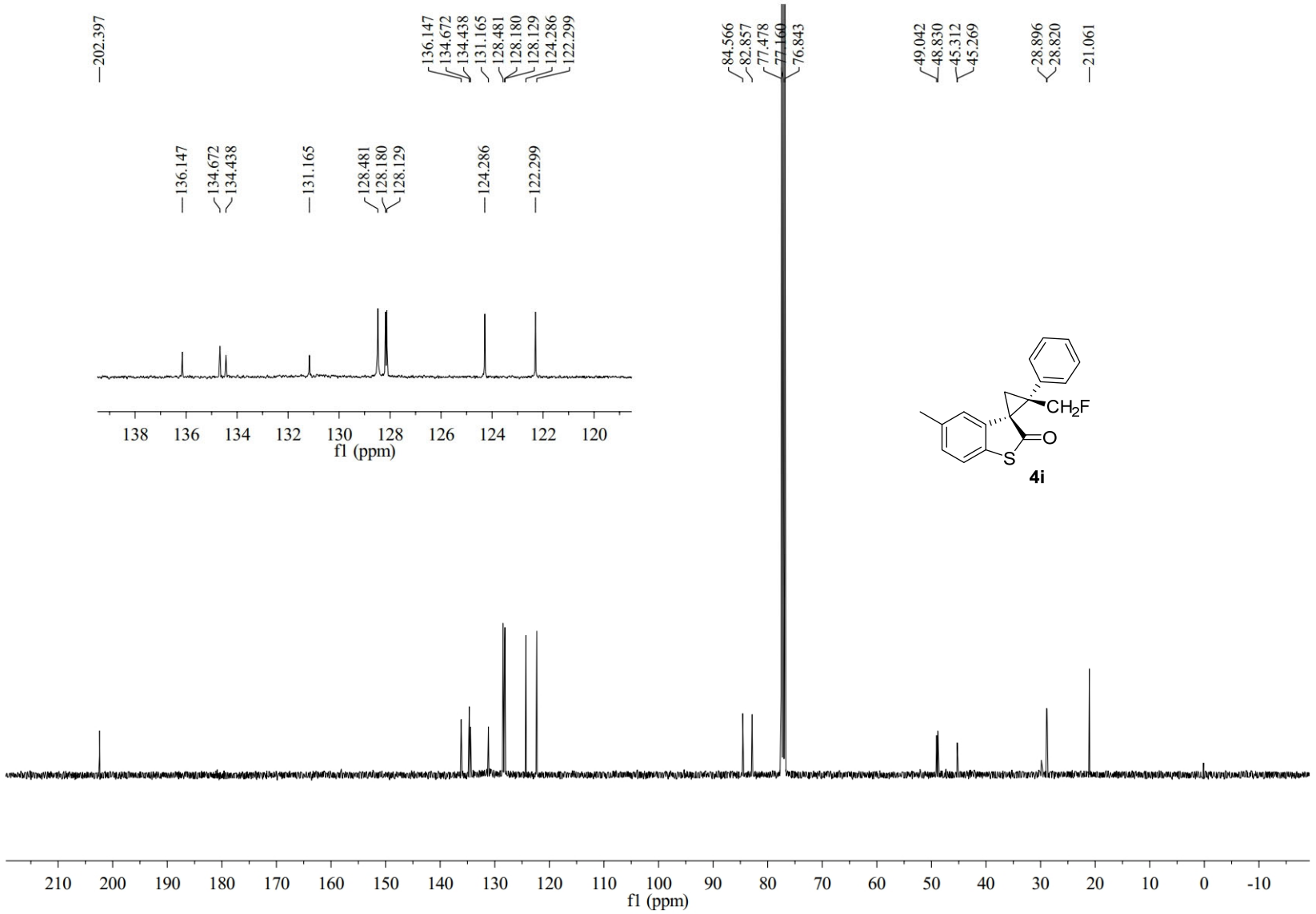
134.613
134.432
131.366
131.224
130.644
129.269
128.250
128.191
121.815
77.477
77.160
76.843
50.597
49.905
37.773
32.347
20.943
20.535
142 140 138 136 134 132 130 128 126 124 122 120 118
f1 (ppm)
CH2Br
O
S
4h
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


7.289
7.272
7.256
7.229
7.219
7.199
6.946
6.944
6.941
6.926
6.921
5.427
5.423
5.142
5.118
5.025
5.001
4.926
4.902
4.808
4.783
2.470
2.466
2.457
2.453
2.182
2.169
2.155
1.890
-0.000
5.96
1.05
0.99
1.09
1.02
0.96
1.01
3.00
f1 (ppm)
CH2F
O
S
4i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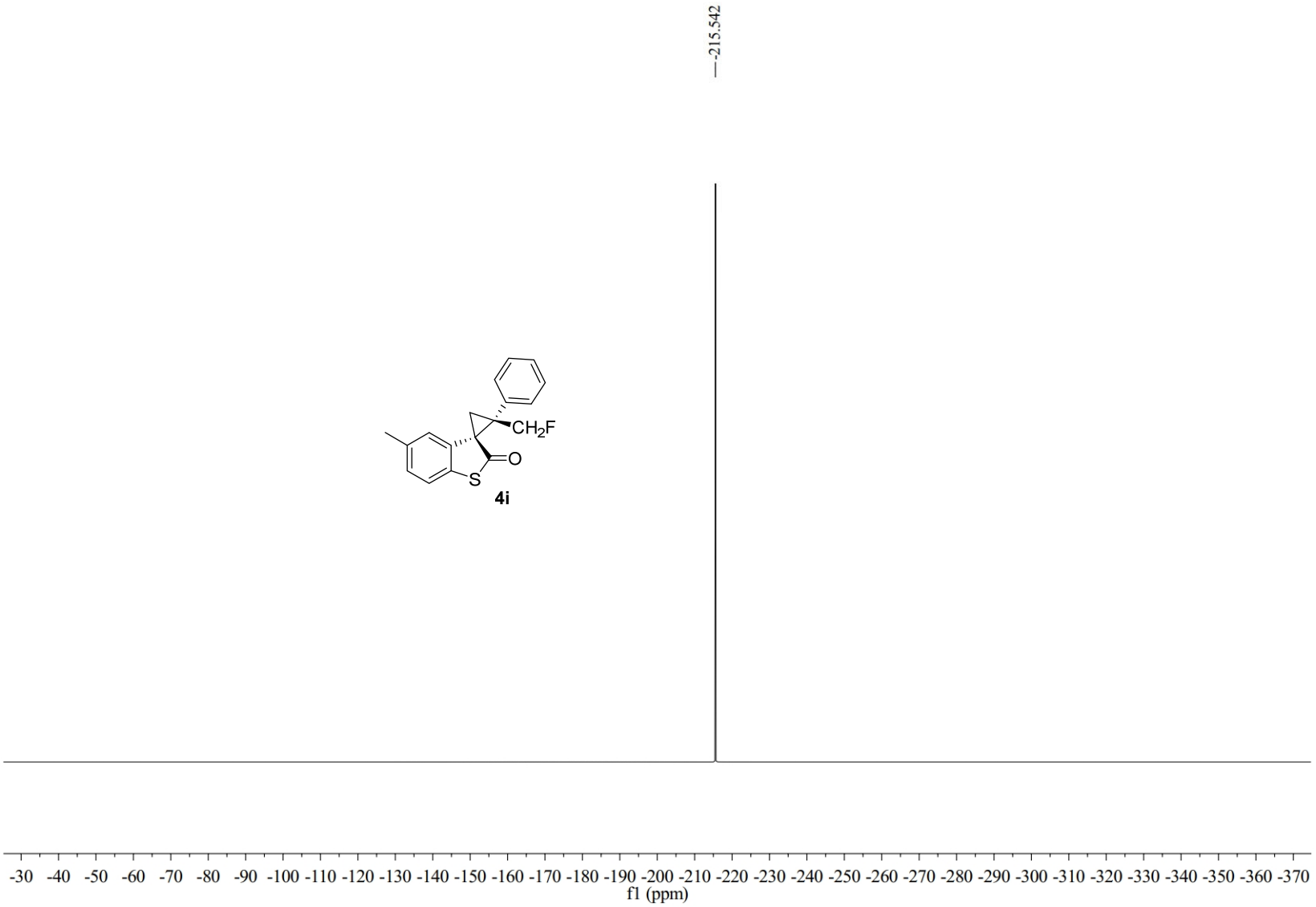
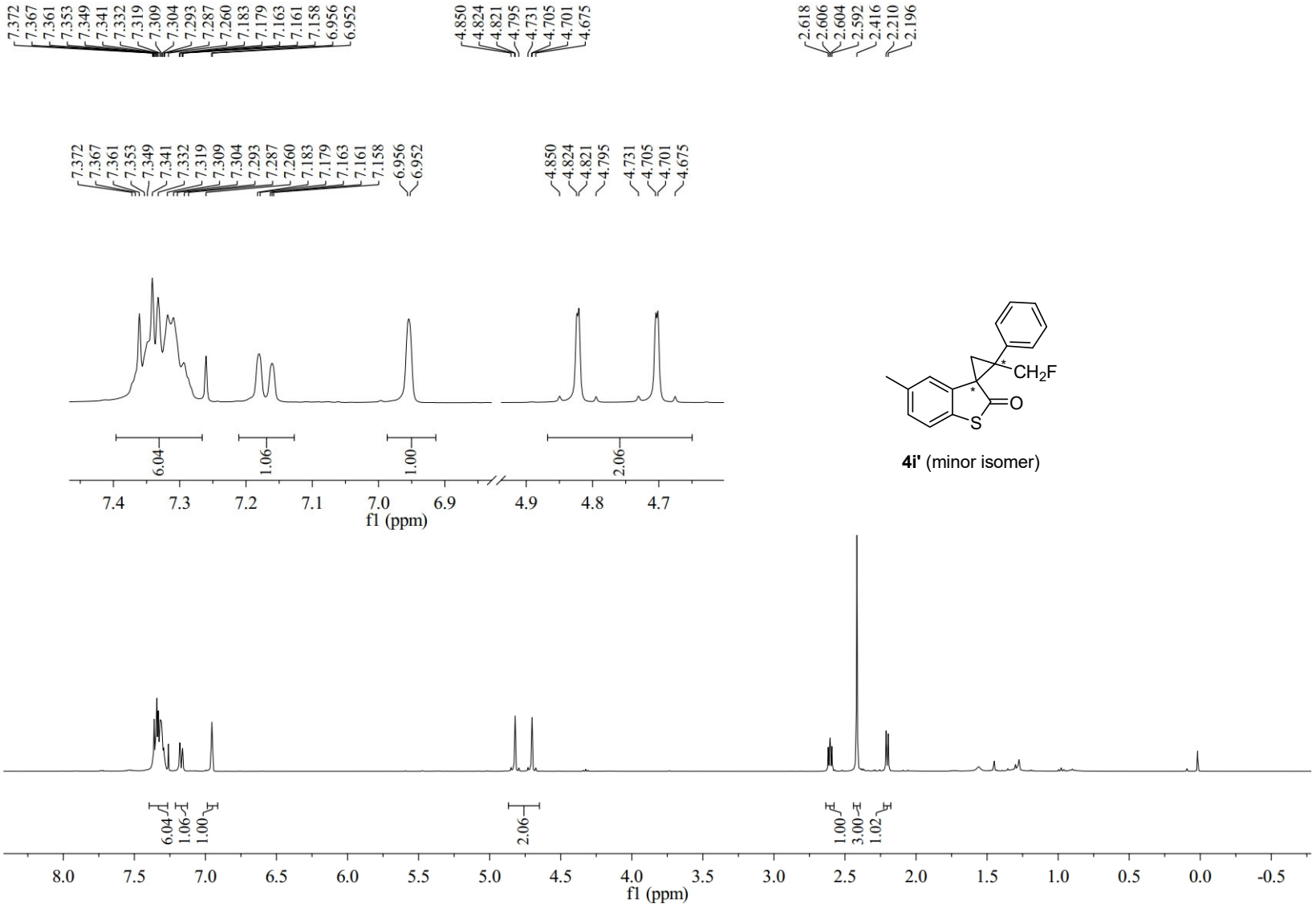
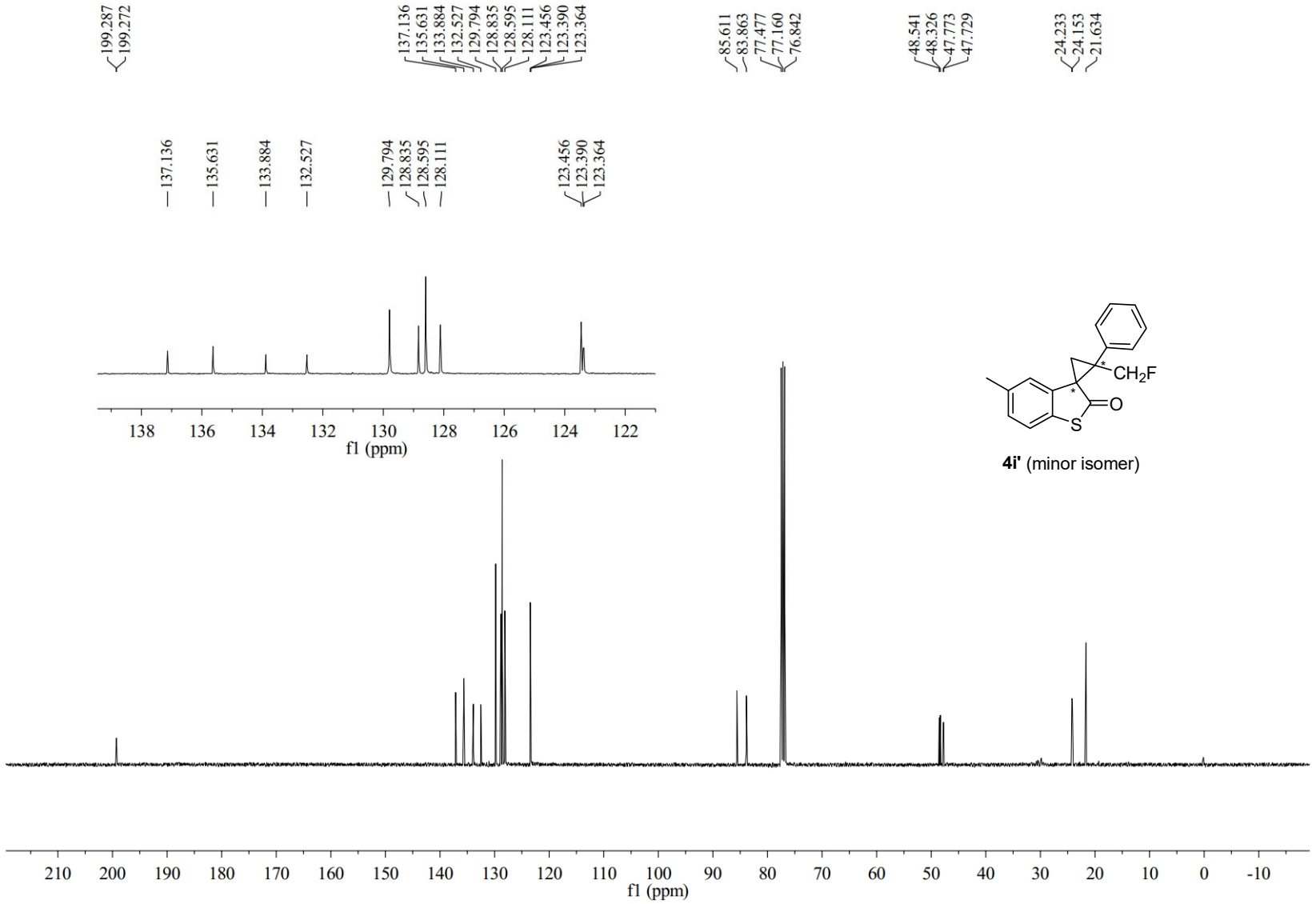
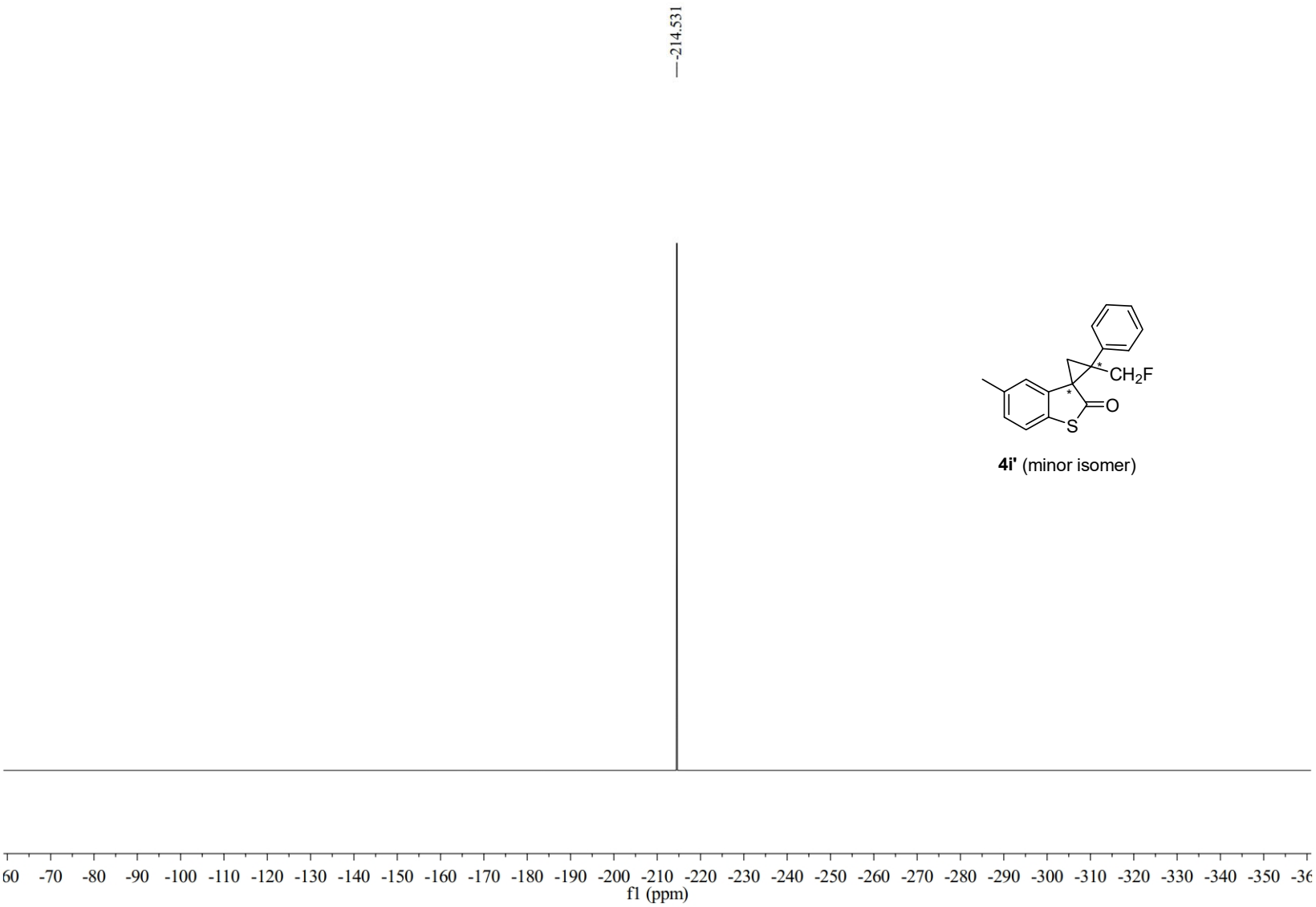
134.672
134.438
131.165
128.481
128.180
128.129
124.286
122.299
84.566
82.857
77.478
77.160
76.843
49.042
48.830
45.312
45.269
28.896
28.820
21.061
CH2F
O
S
4i
f1 (ppm)


-215.542
CH2F
O
S
4i
-30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260 -270 -280 -290 -300 -310 -320 -330 -340 -350 -360 -370
f1 (ppm)

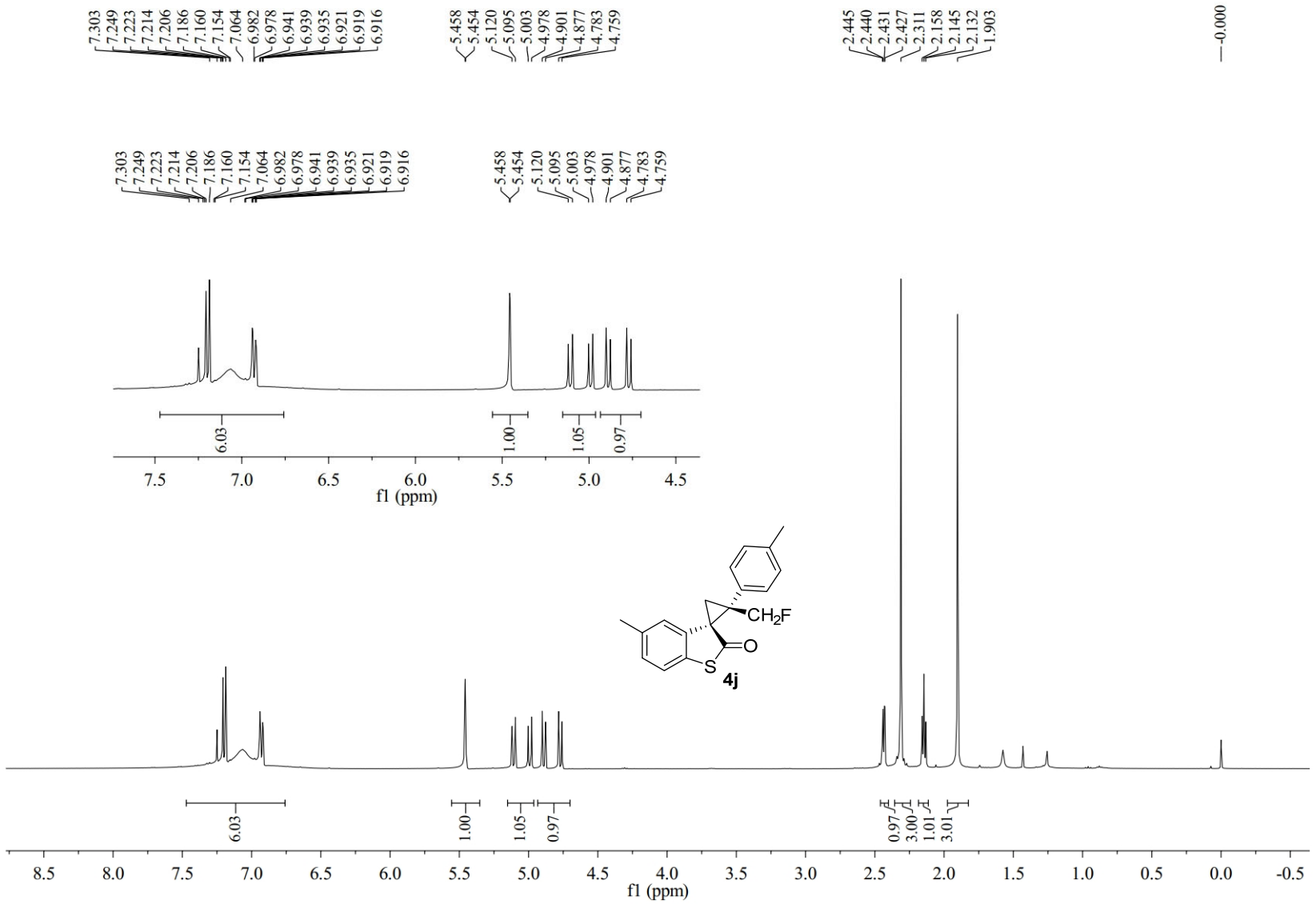

7.372
7.367
7.361
7.353
7.349
7.341
7.332
7.319
7.309
7.304
7.293
7.287
7.260
7.183
7.179
7.163
7.161
7.158
6.956
6.952
4.850
4.824
4.821
4.795
4.731
4.705
4.701
4.675
2.618
2.606
2.604
2.592
2.416
2.210
2.196
6.04
1.06
1.00
2.06
f1 (ppm)
CH2F
O
S
4i' (minor isomer)
1.00
3.00
1.02

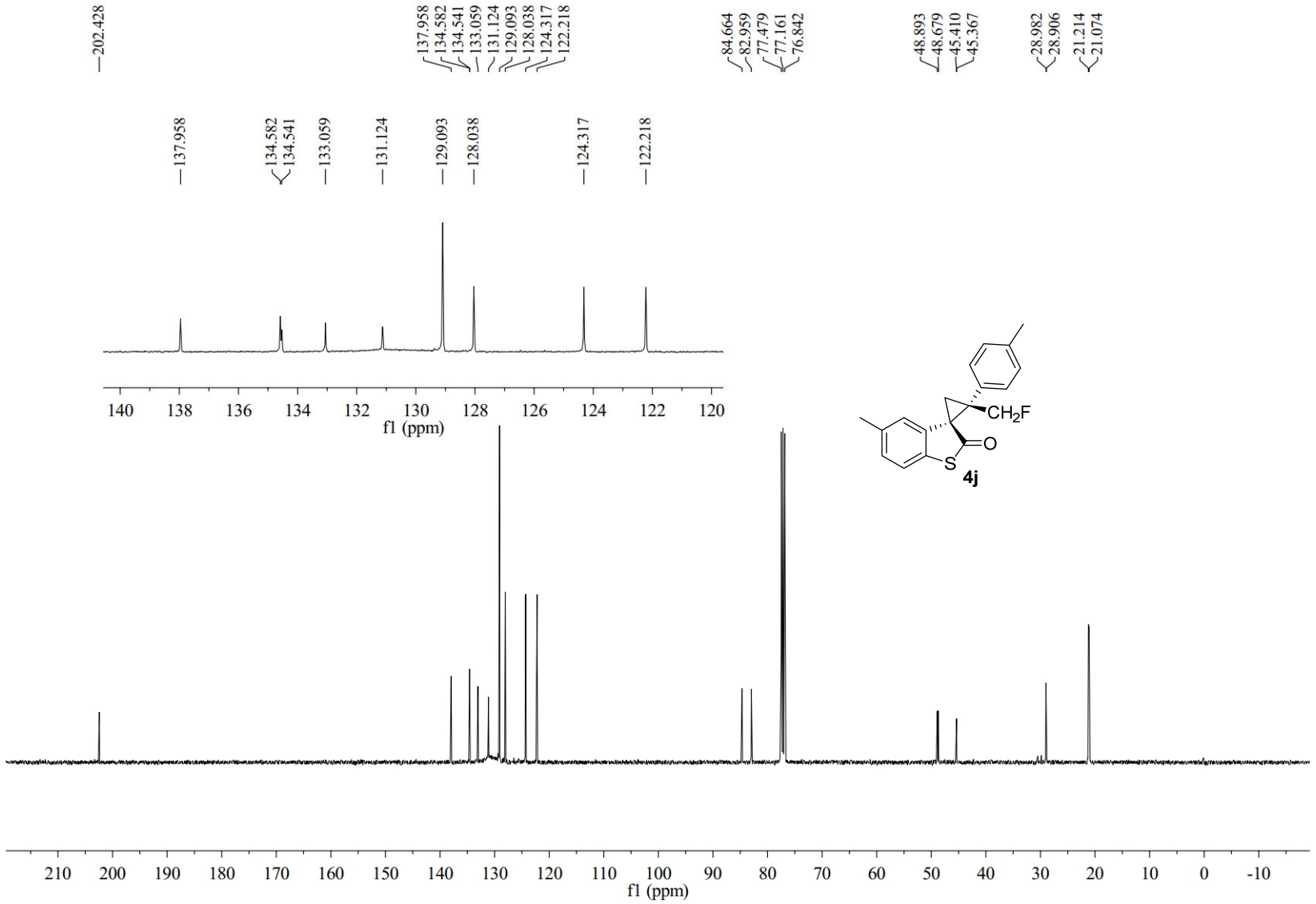


4i' (minor isomer)



4i' (minor isomer)


7.303
7.249
7.223
7.214
7.206
7.186
7.160
7.154
7.064
6.982
6.978
6.941
6.939
6.935
6.921
6.919
6.916
5.458
5.454
5.120
5.095
5.003
4.978
4.901
4.877
4.783
4.759
2.445
2.440
2.431
2.427
2.311
2.158
2.145
2.132
1.903
-0.000
6.03
1.00
1.05
0.97
f1 (ppm)
CH2F
O
S
4j
0.97
3.00
1.01
3.01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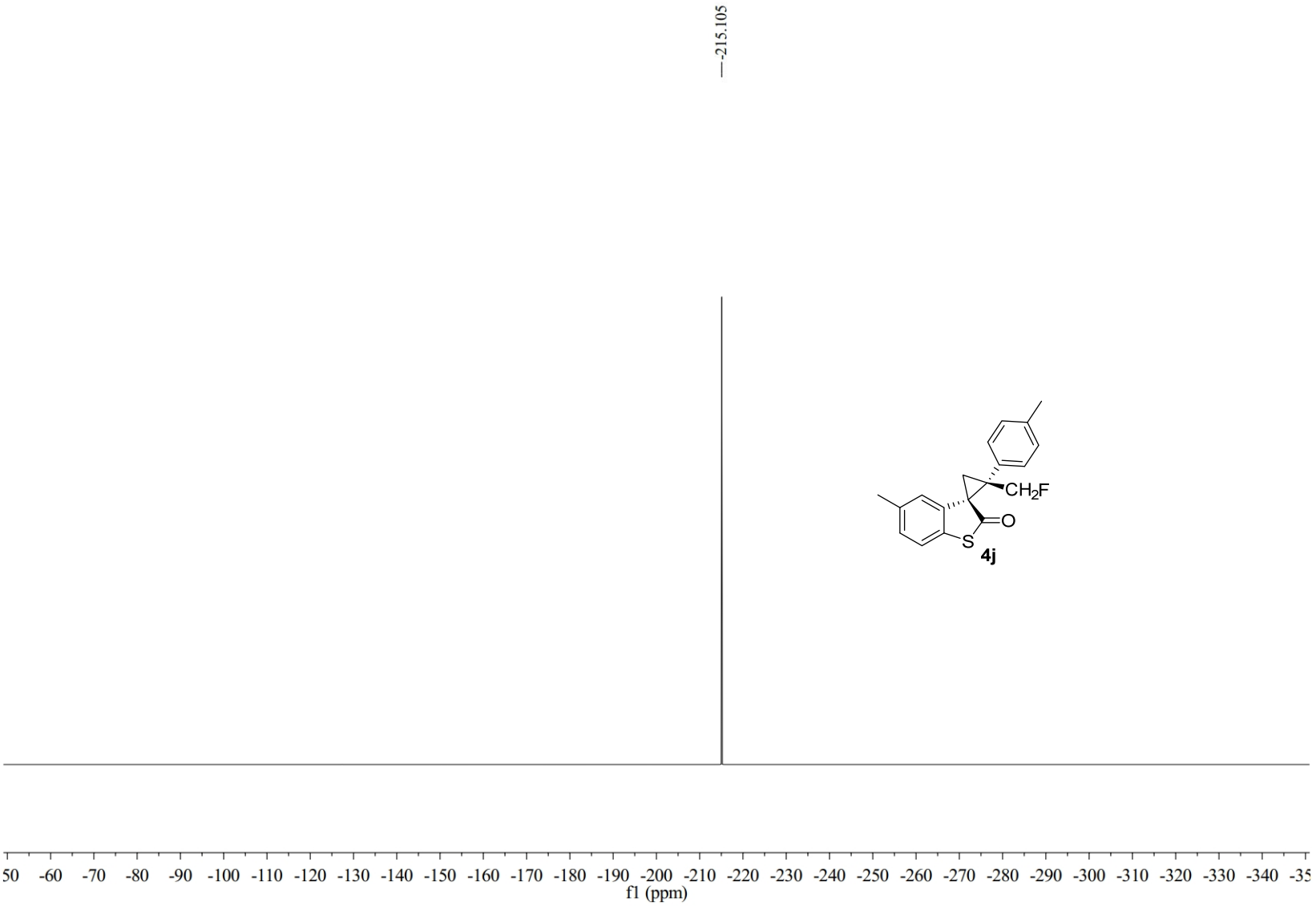
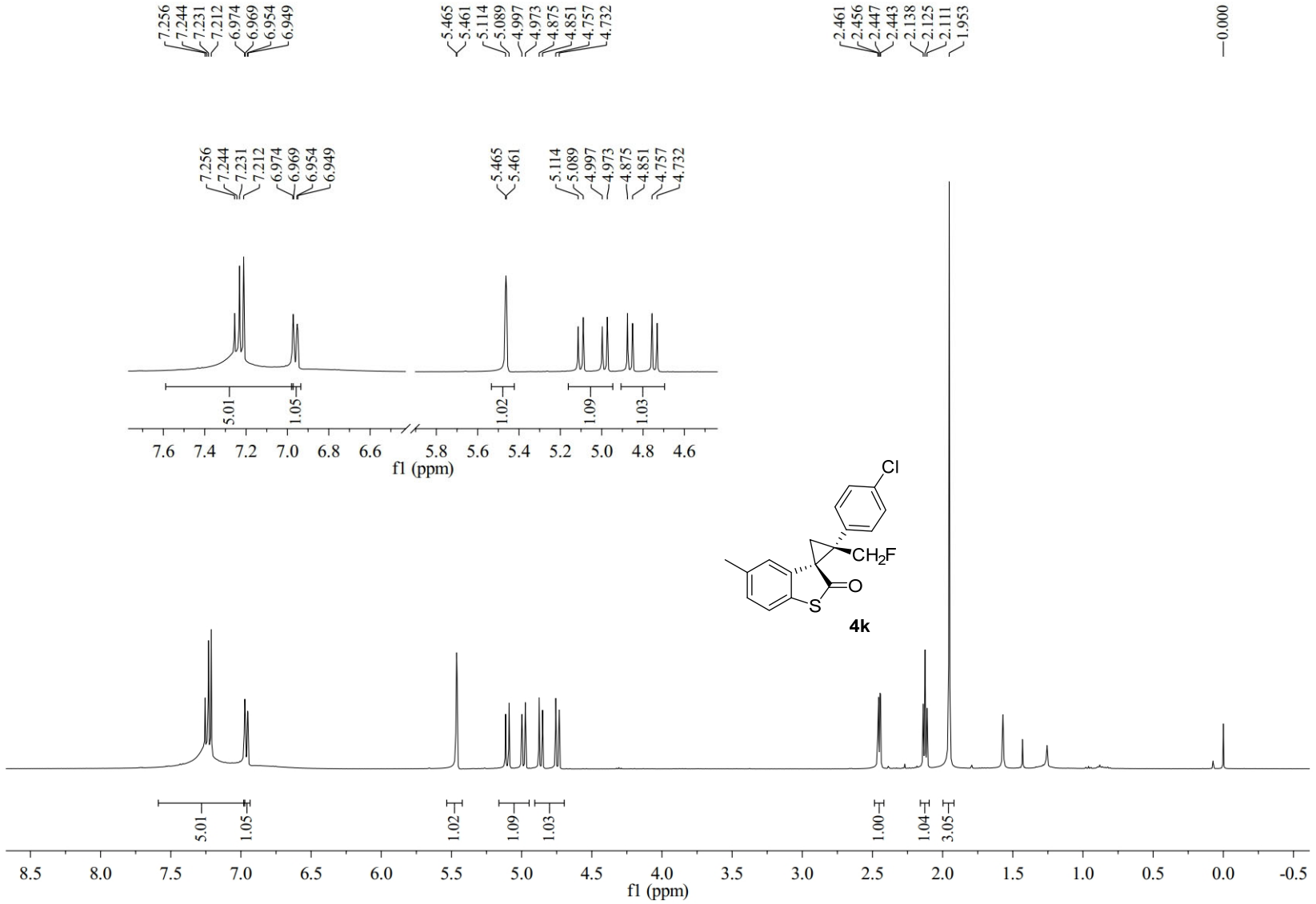
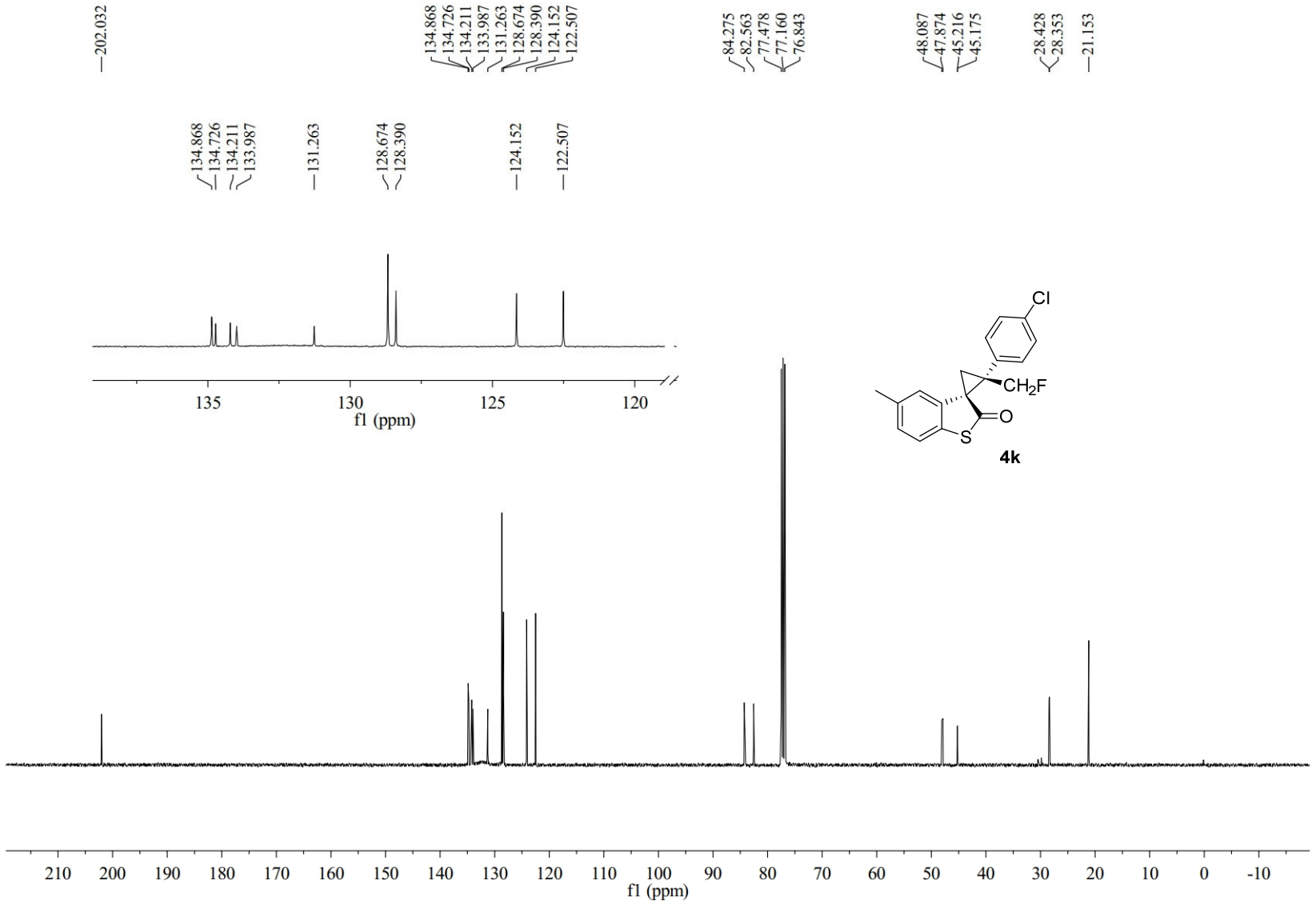
134.582
134.541
133.059
131.124
129.093
128.038
124.317
122.218
84.664
82.959
77.479
77.161
76.842
48.893
48.679
45.410
45.367
28.982
28.906
21.214
21.074
f1 (ppm)
CH2F
O
S
4j


-215.105
CH2F
O
S
4j
50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260 -270 -280 -290 -300 -310 -320 -330 -340 -35
f1 (ppm)


7.256
7.244
7.231
7.212
6.974
6.969
6.954
6.949
5.465
5.461
5.114
5.089
4.997
4.973
4.875
4.851
4.757
4.732
2.461
2.456
2.447
2.443
2.138
2.125
2.111
1.953
0.000
5.01
1.05
1.02
1.09
1.03
1.00
1.04
3.05
f1 (ppm)
Cl
CH2F
O
S
4k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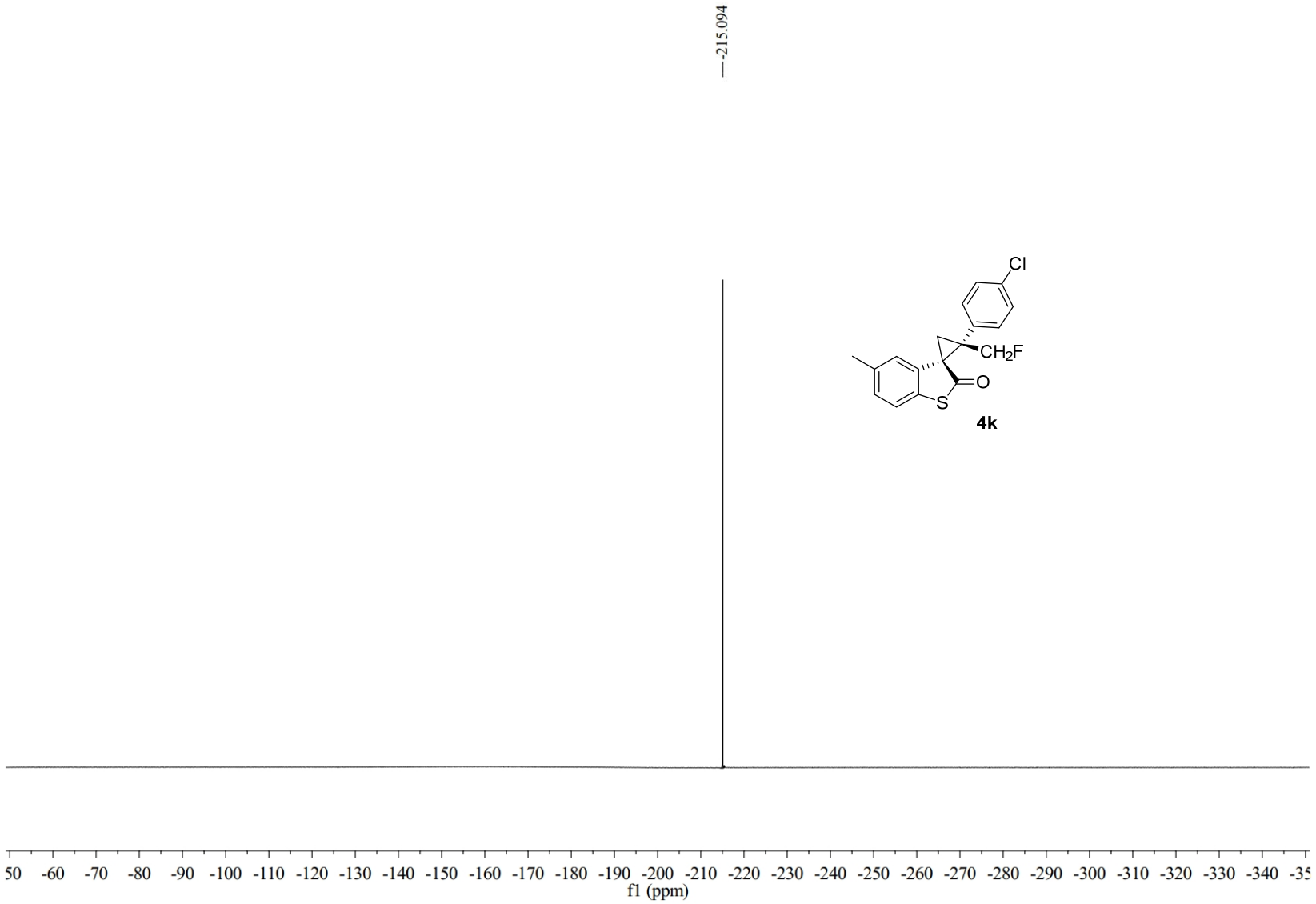
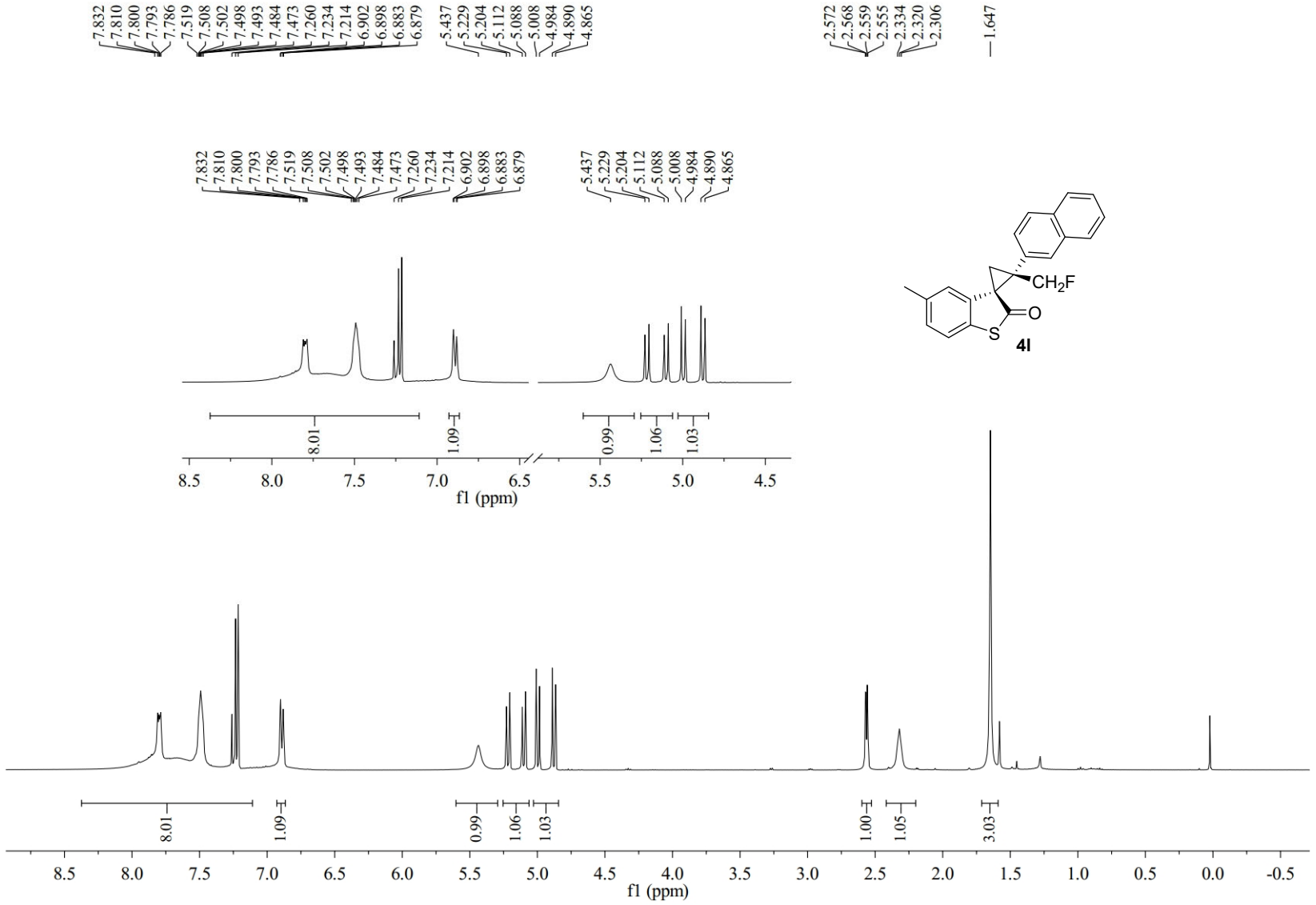
134.868
134.726
134.211
133.987
131.263
128.674
128.390
124.152
122.507
84.275
82.563
77.478
77.160
76.843
48.087
47.874
45.216
45.175
28.428
28.353
21.153
Cl
CH2F
O
S
4k
f1 (ppm)


-215.094
Cl
CH2F
O
S
4k
50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260 -270 -280 -290 -300 -310 -320 -330 -340 -35
f1 (ppm)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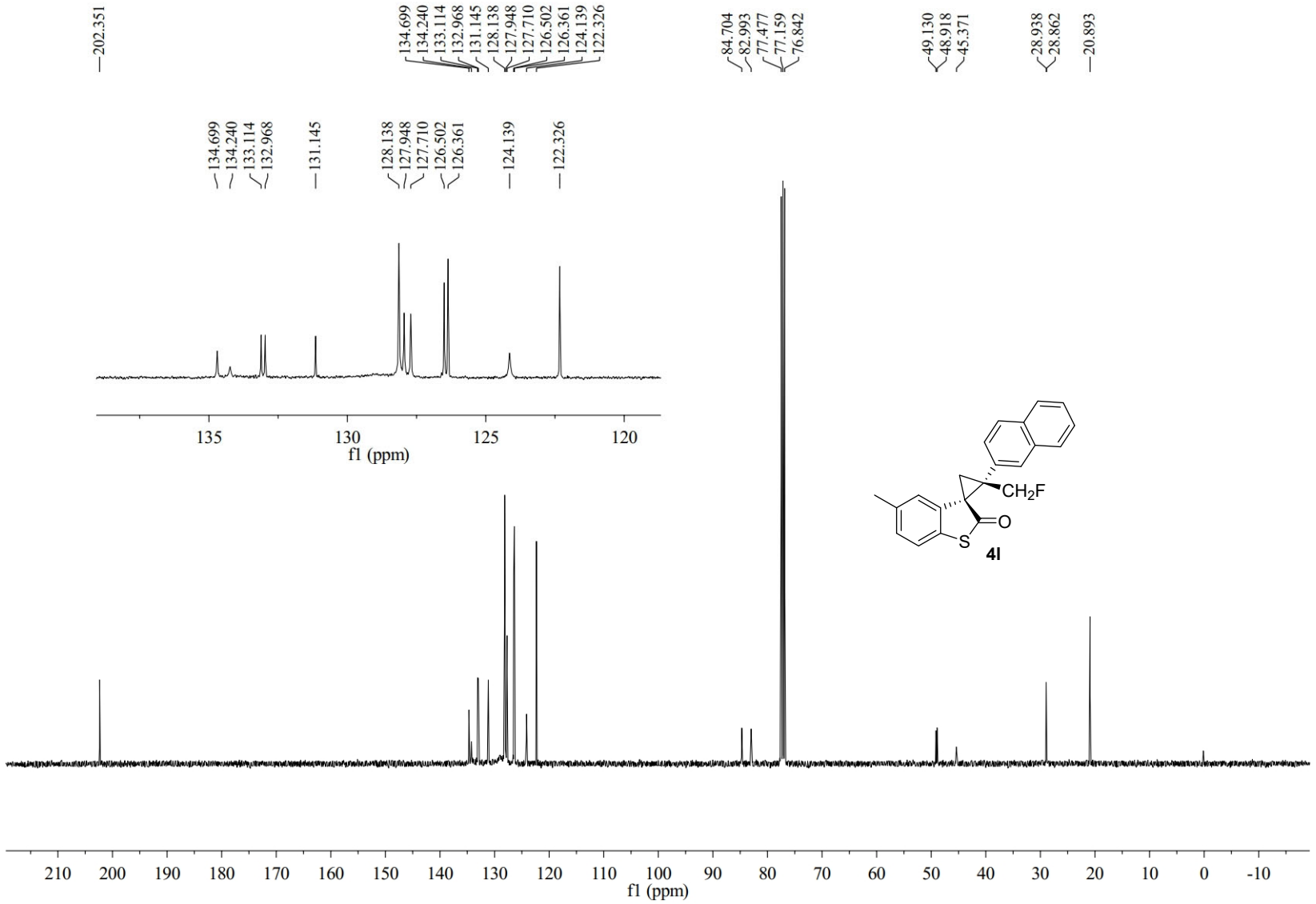
7.810
7.800
7.793
7.786
7.519
7.508
7.502
7.498
7.493
7.484
7.473
7.260
7.234
7.214
6.902
6.898
6.883
6.879
5.437
5.229
5.204
5.112
5.088
5.008
4.984
4.890
4.865
2.572
2.568
2.559
2.555
2.334
2.320
2.306
1.647
CH2F
O
S
4l
8.01
1.09
0.99
1.06
1.03
1.00
1.05
3.03
f1 (ppm)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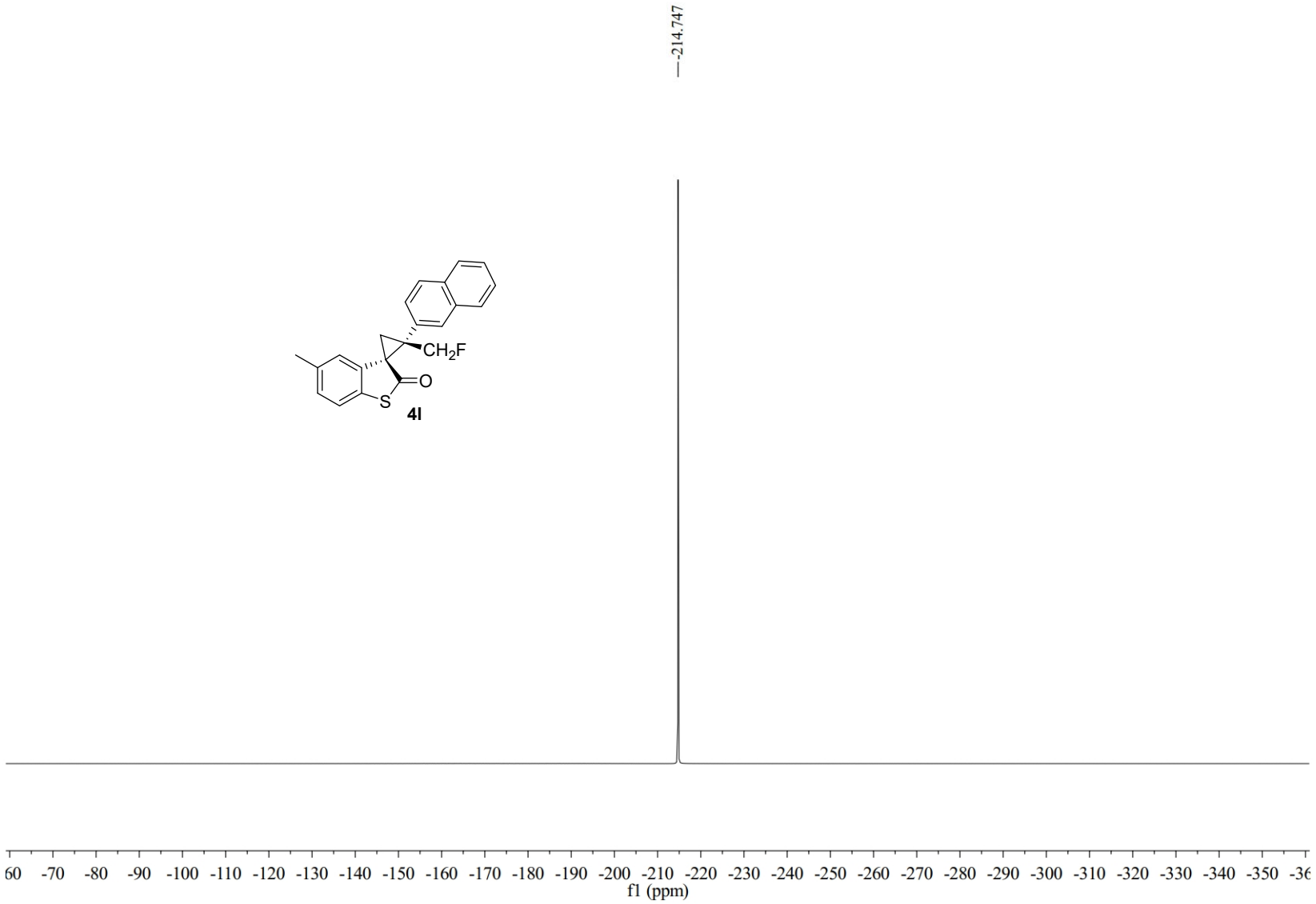
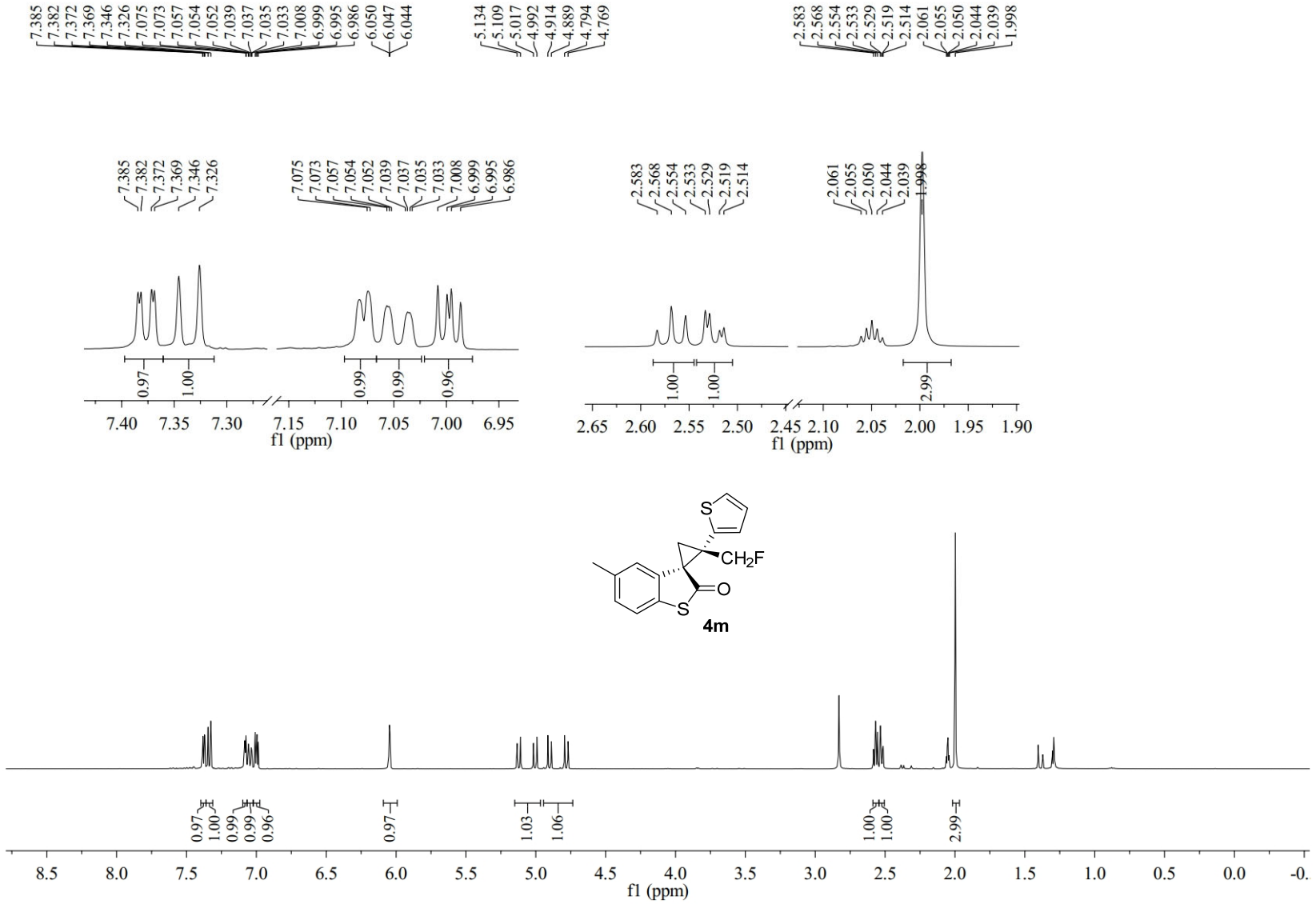
132.968
131.145
128.138
127.948
127.710
126.502
126.361
124.139
122.326
84.704
82.993
77.477
77.159
76.842
49.130
48.918
45.371
28.938
28.862
20.893
f1 (ppm)
CH2F
O
S
4l


-214.747
CH2F
O
S
4l
60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260 -270 -280 -290 -300 -310 -320 -330 -340 -350 -36
f1 (ppm)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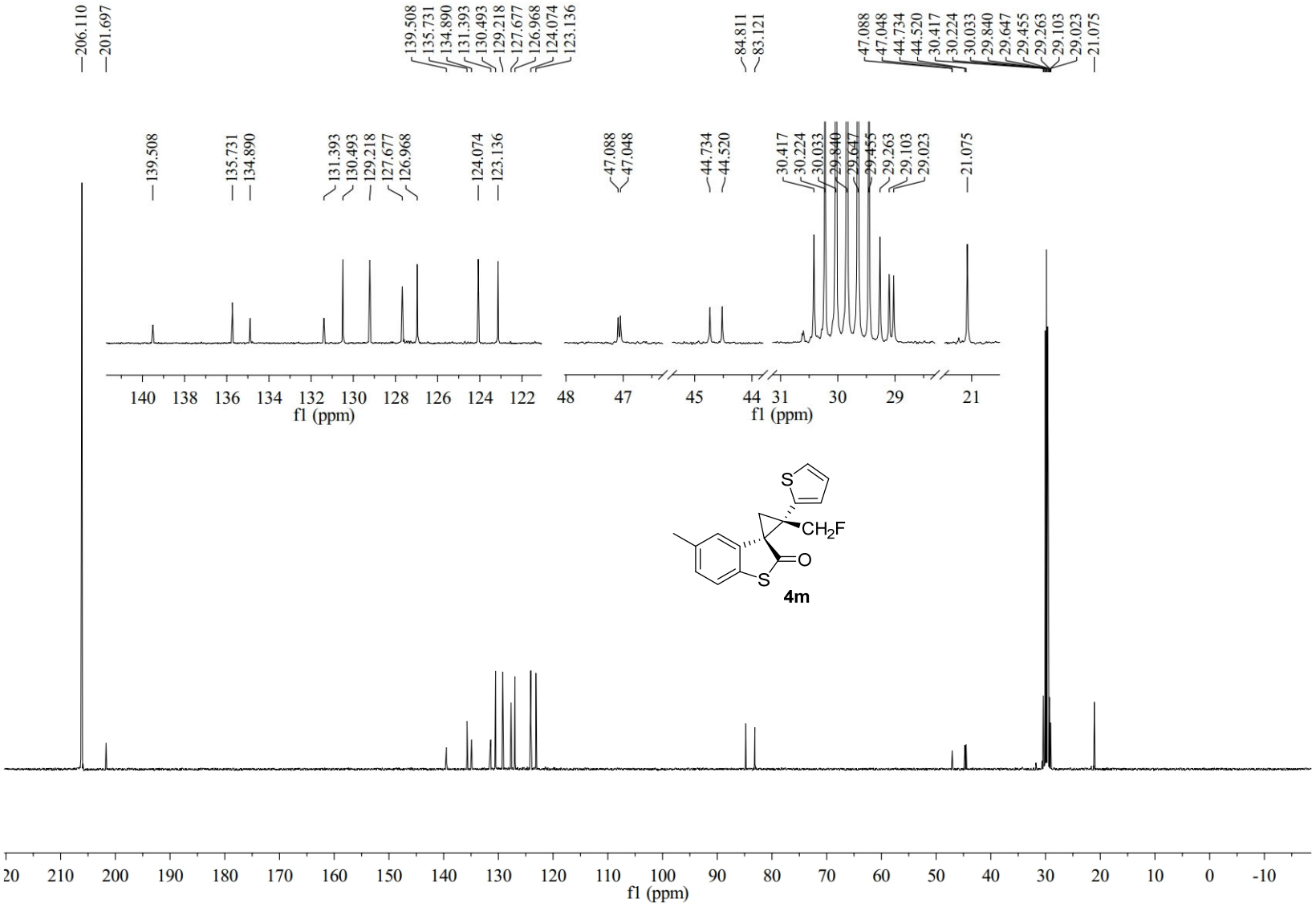
7.382
7.372
7.369
7.346
7.326
7.075
7.073
7.057
7.054
7.052
7.039
7.037
7.035
7.033
7.008
6.999
6.995
6.986
6.050
6.047
6.044
5.134
5.109
5.017
4.992
4.914
4.889
4.794
4.769
2.583
2.568
2.554
2.533
2.529
2.519
2.514
2.061
2.055
2.050
2.044
2.039
1.998
0.97
1.00
0.99
0.99
0.96
1.00
1.00
2.99
f1 (ppm)
S
CH2F
O
S
4m
0.97
1.00
0.99
0.99
0.96
0.97
1.03
1.06
1.00
1.00
2.99
f1 (ppm)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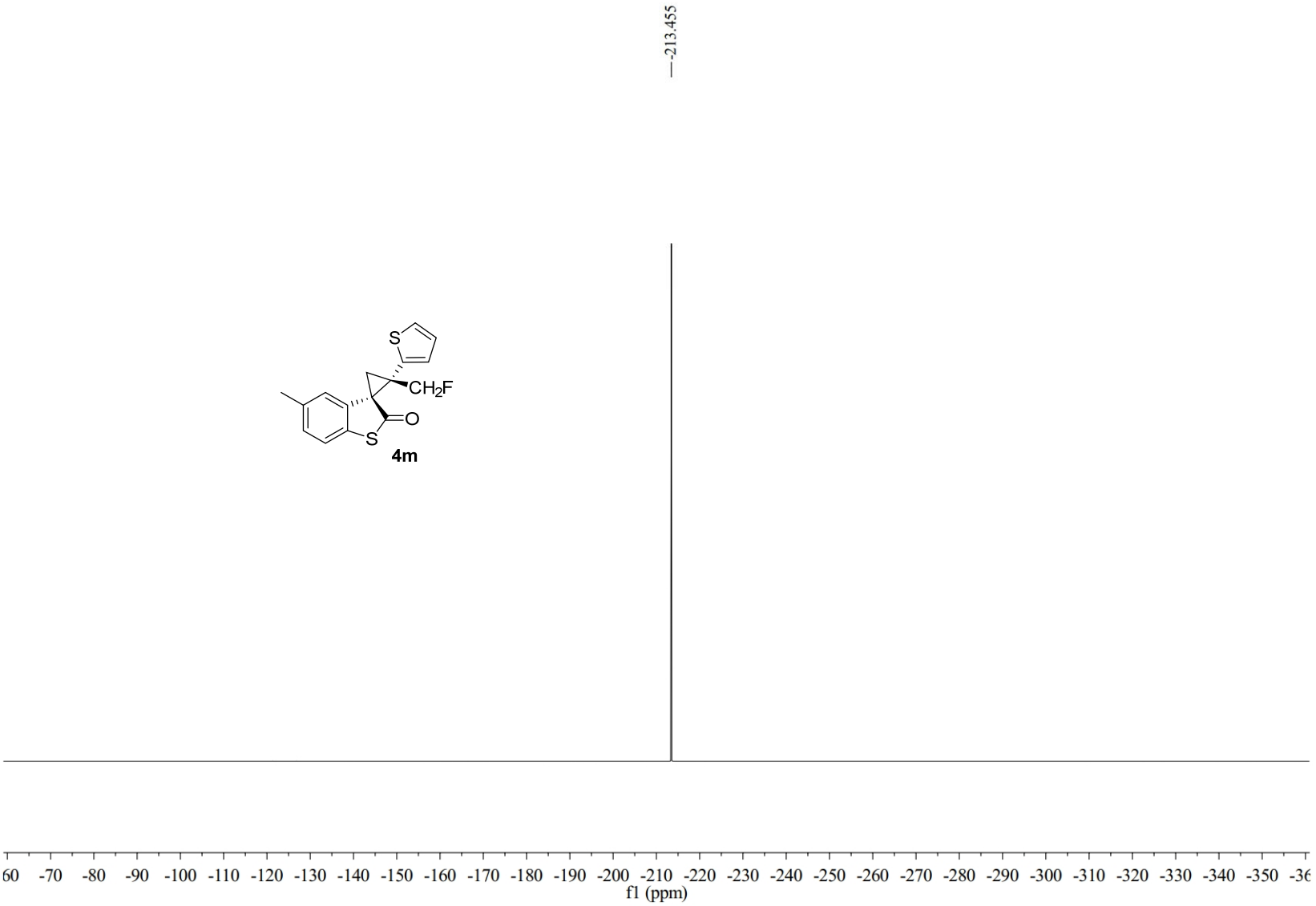
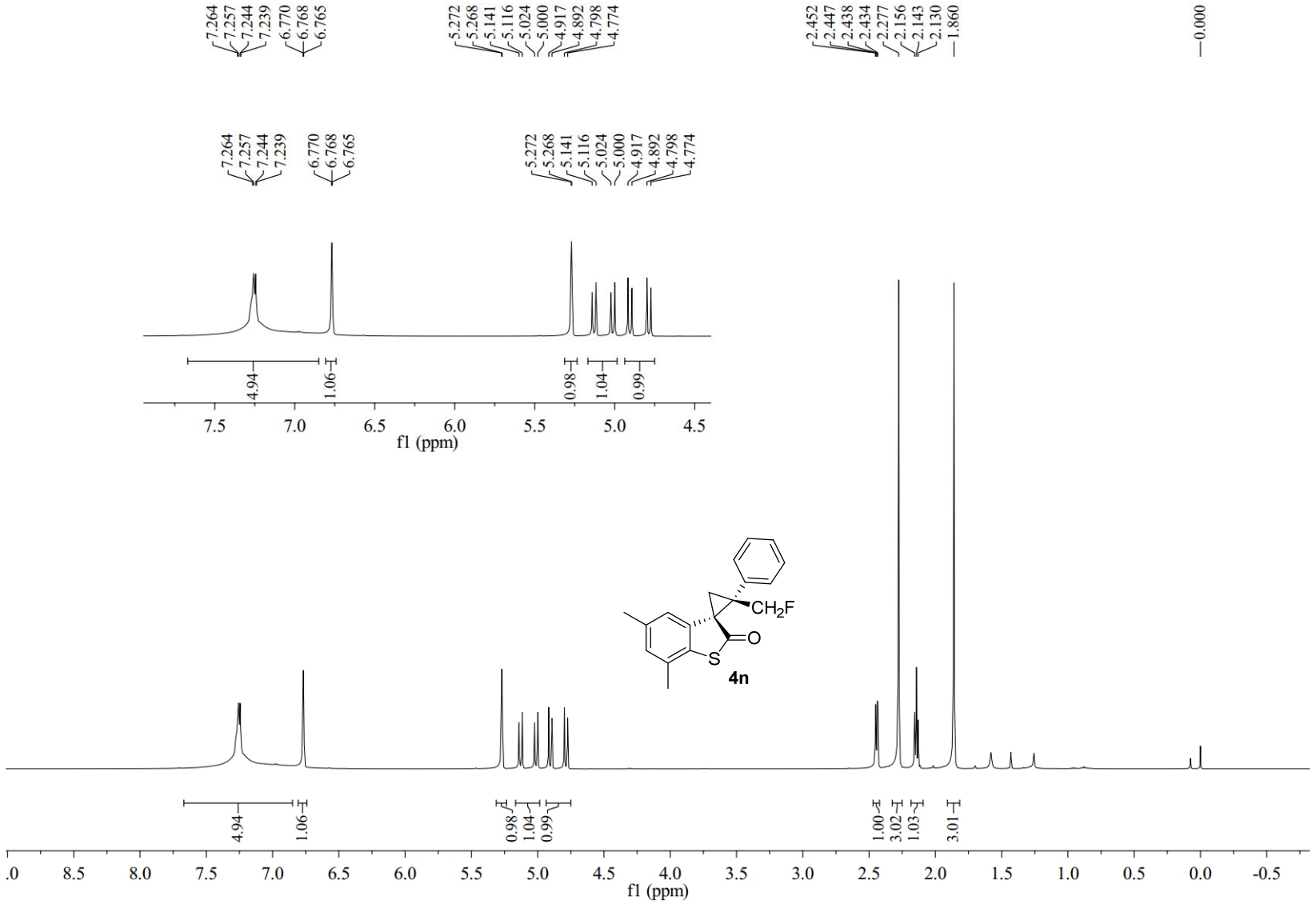
201.697
139.508
135.731
134.890
131.393
130.493
129.218
127.677
126.968
124.074
123.136
84.811
83.121
47.088
47.048
44.734
44.520
30.417
30.224
30.033
29.840
29.647
29.455
29.263
29.103
29.023
21.075
f1 (ppm)
S
CH2F
O
S
4m


-213.455
S
CH2F
O
S
4m
60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260 -270 -280 -290 -300 -310 -320 -330 -340 -350 -36
f1 (ppm)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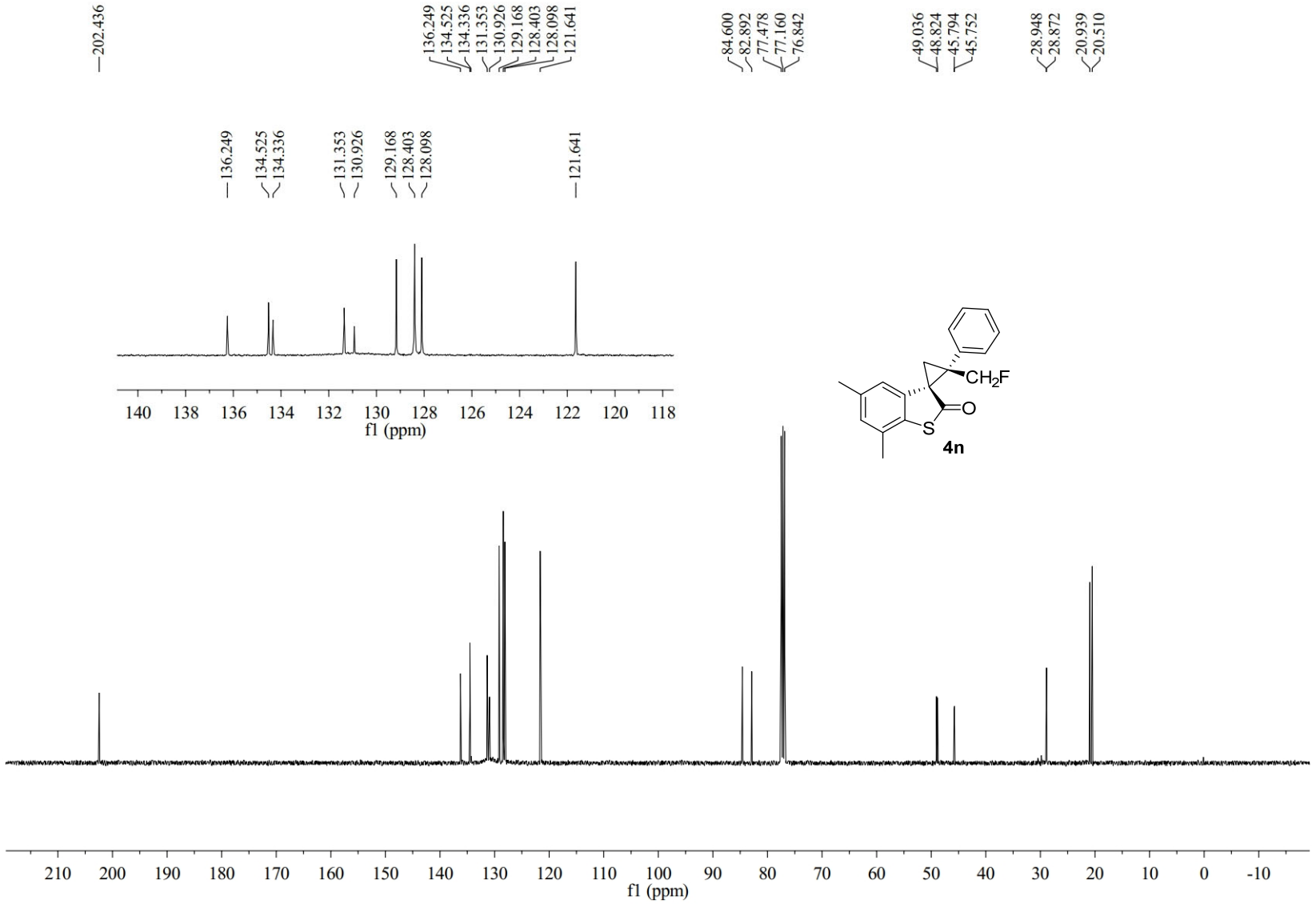
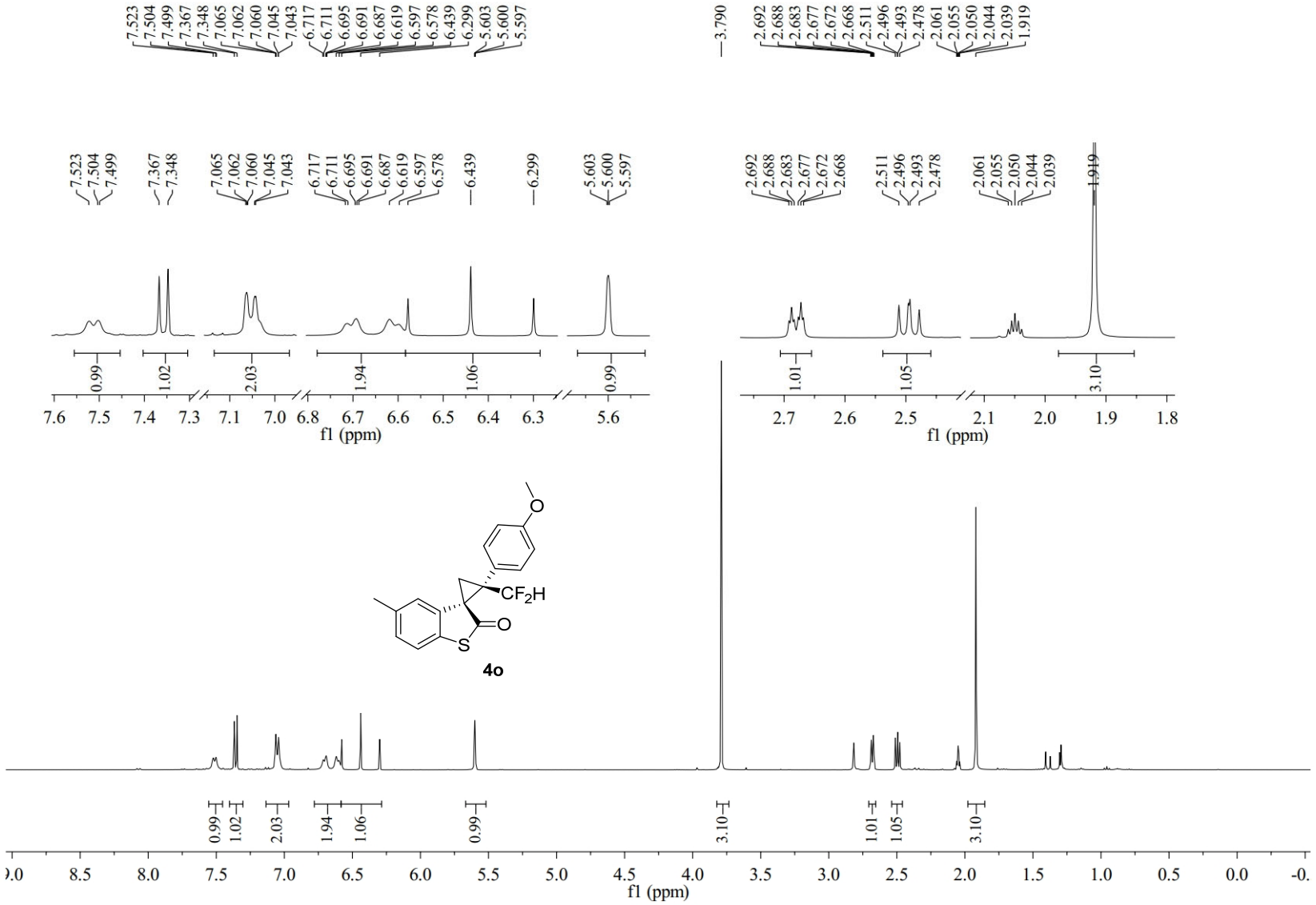
5.268
5.141
5.116
5.024
5.000
4.917
4.892
4.798
4.774
2.452
2.447
2.438
2.434
2.277
2.156
2.143
2.130
1.860
0.000
4.94
1.06
0.98
1.04
0.99
1.00
3.02
1.03
3.01
f1 (ppm)
CH2F
O
S
4n


202.436
136.249
134.525
134.336
131.353
130.926
129.168
128.403
128.098
121.641
84.600
82.892
77.478
77.160
76.842
49.036
48.824
45.794
45.752
28.948
28.872
20.939
20.510
CH2F
O
S
4n
fl (ppm)


-215.010
CH2F
O
S
4n
-90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260 -270 -280 -290 -300 -310
f1 (ppm)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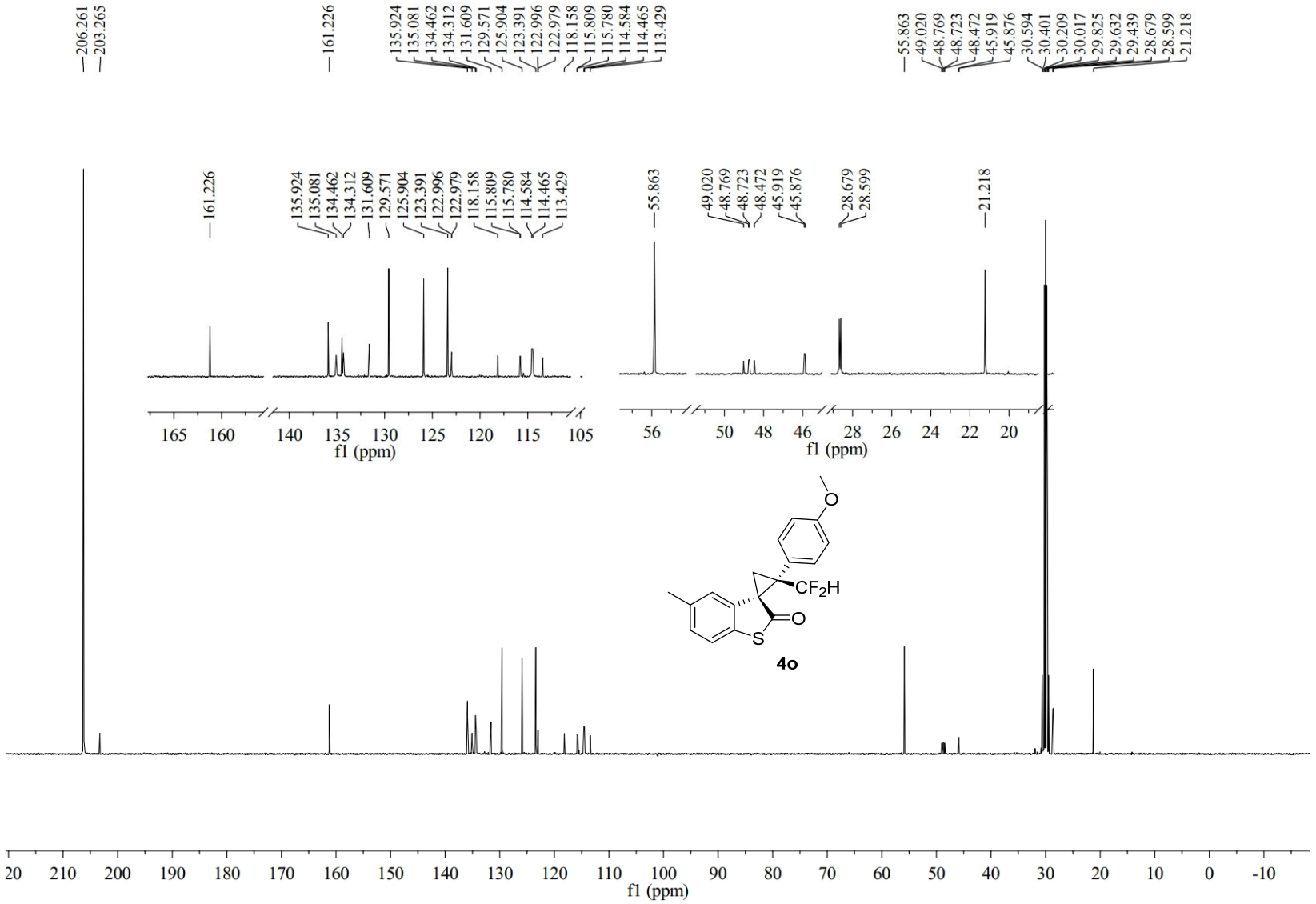
7.062
7.060
7.045
7.043
6.717
6.711
6.695
6.691
6.687
6.619
6.597
6.578
6.439
6.299
5.603
5.600
5.597
3.790
2.692
2.688
2.683
2.677
2.672
2.668
2.511
2.496
2.493
2.478
2.061
2.055
2.050
2.044
2.039
1.919
0.99
1.02
2.03
1.94
1.06
0.99
1.01
1.05
3.10
fl (ppm)
O
CF2H
O
S
4o


206.261
203.265
161.226
135.924
135.081
134.462
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131.609
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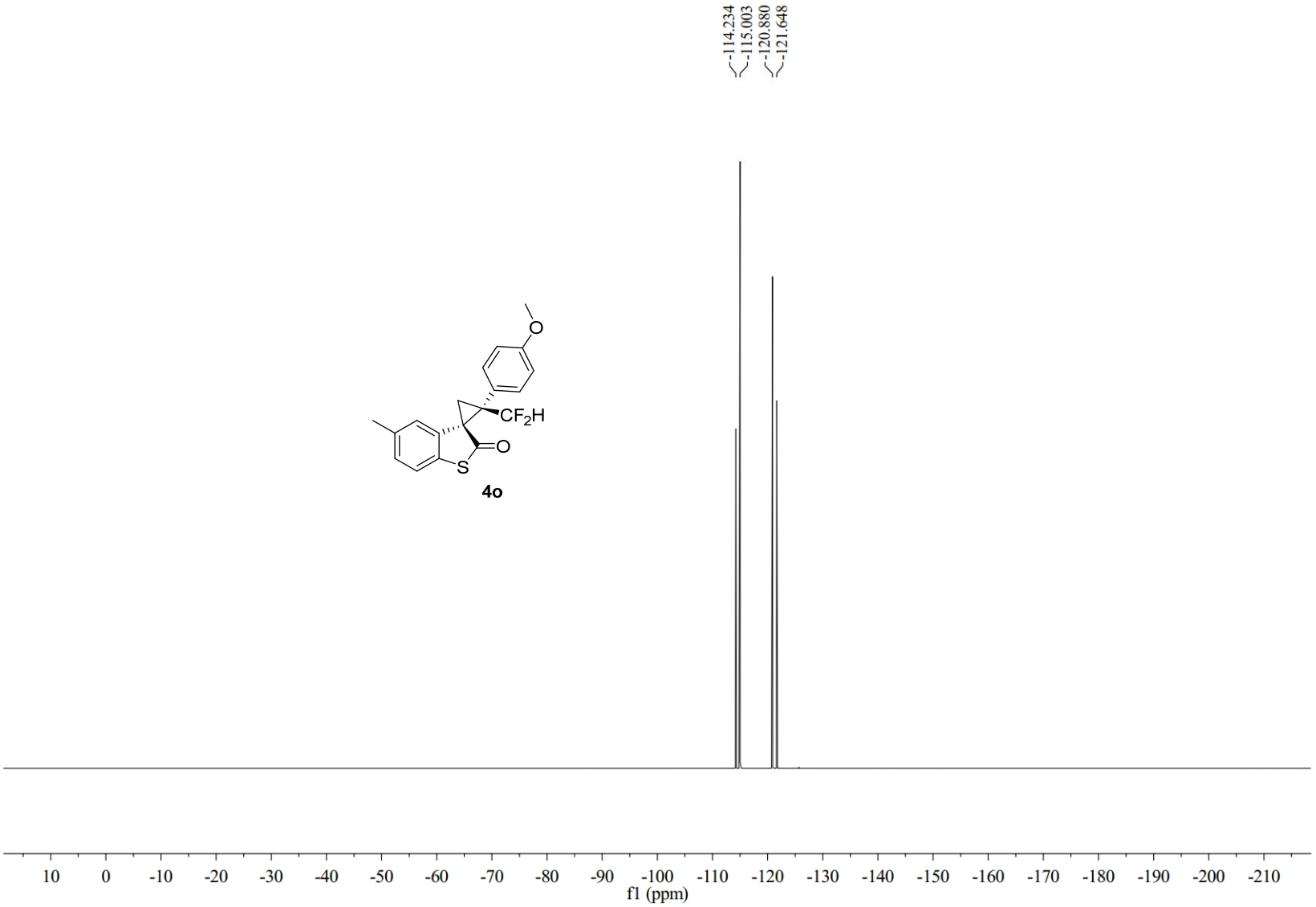
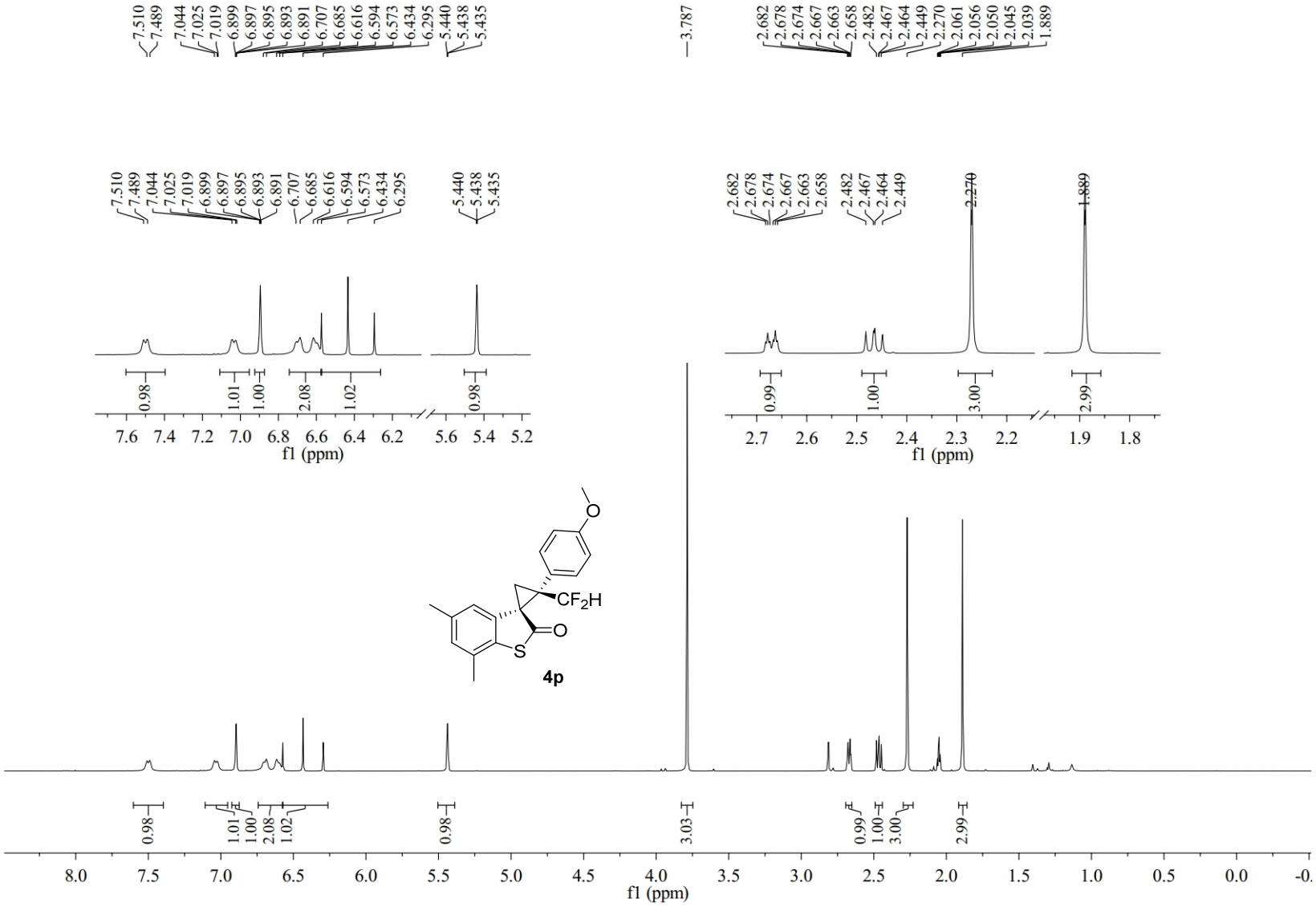
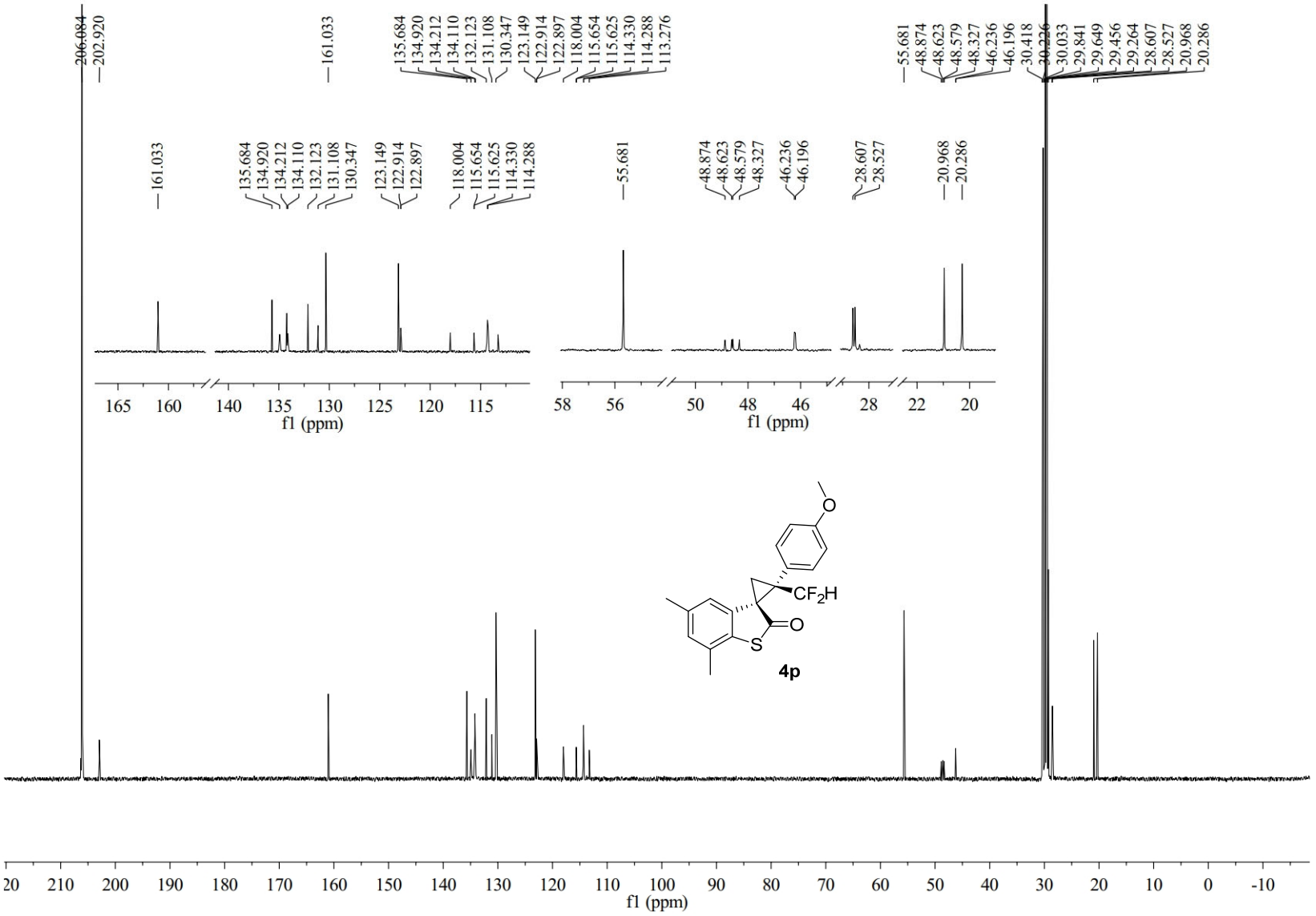
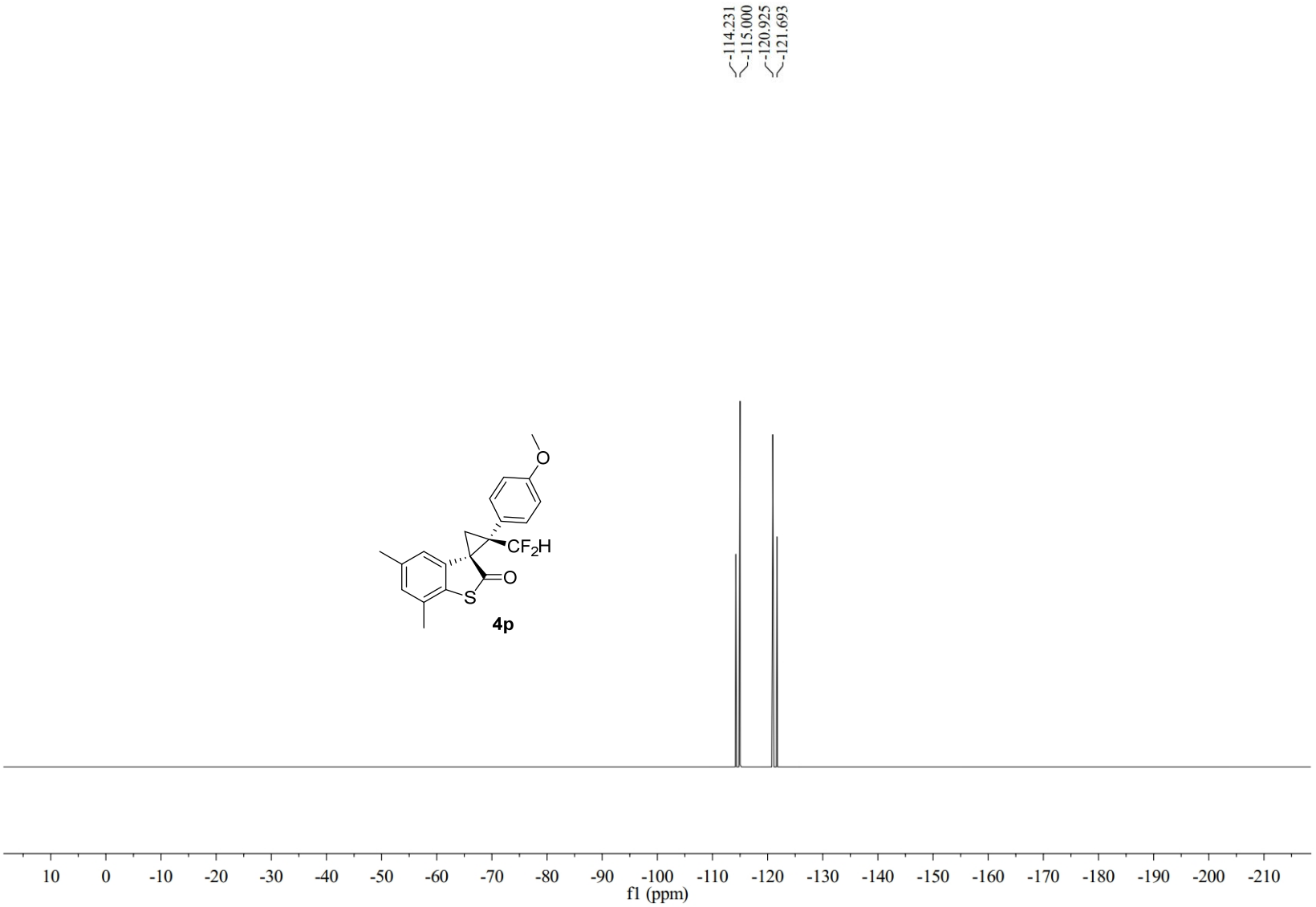
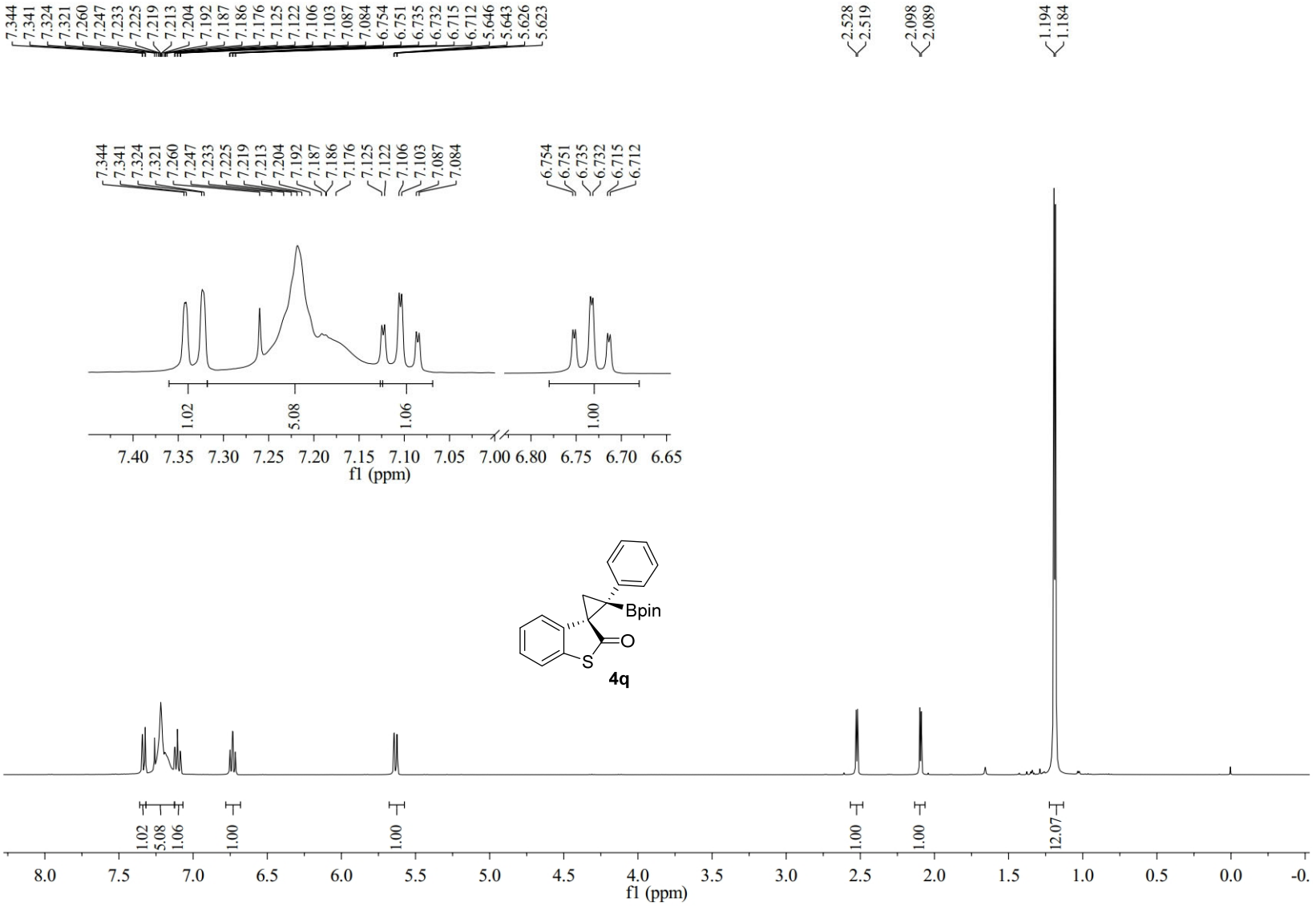
125.904
123.391
122.996
122.979
118.158
115.809
115.780
114.584
114.465
113.429
55.863
49.020
48.769
48.723
48.472
45.919
45.876
30.594
30.401
30.209
30.017
29.825
29.632
29.439
28.679
28.599
21.218
f1 (ppm)
O
CF2H
O
S
4o

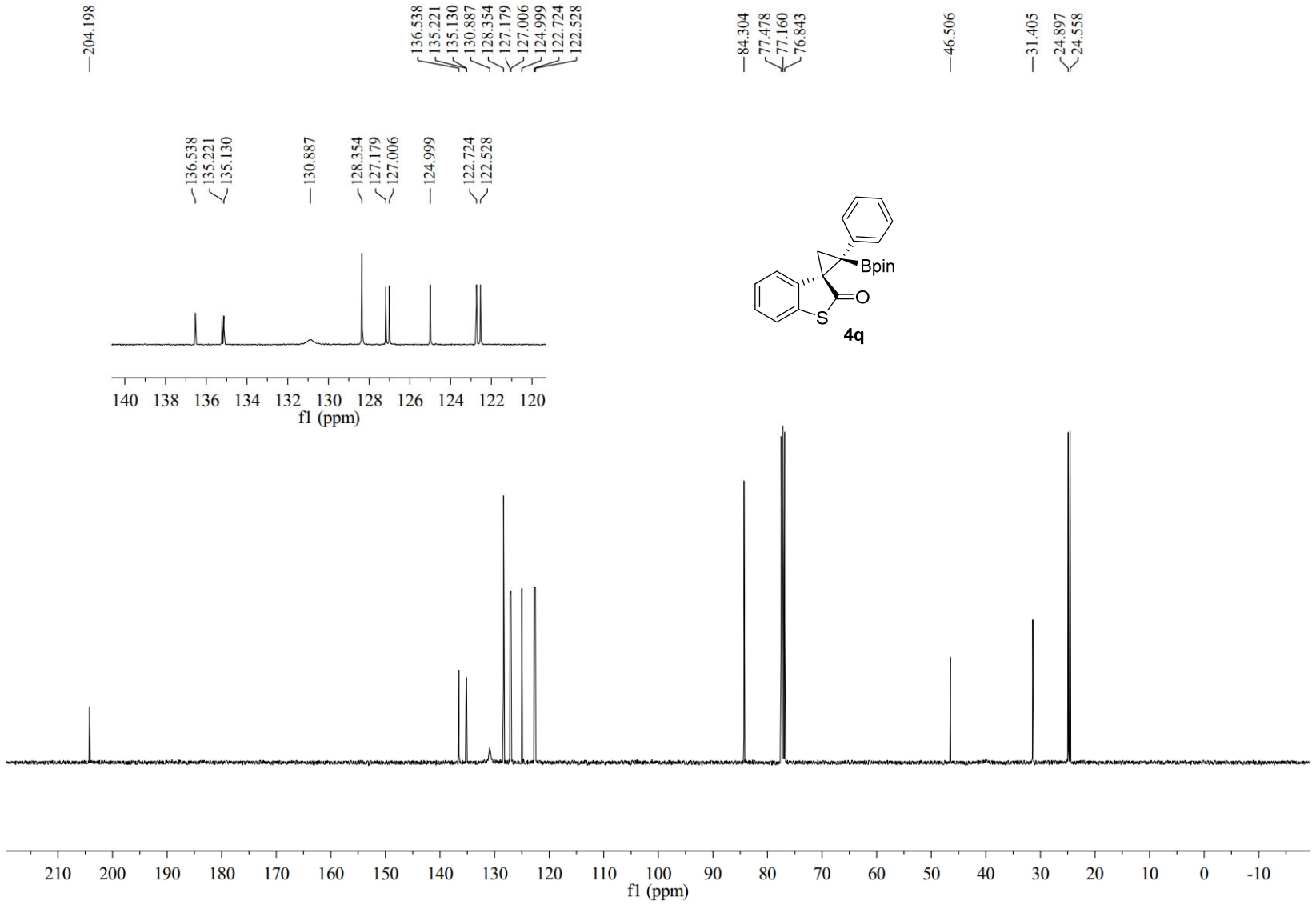

-114.234
-115.003
-120.880
-121.648
O
CF2H
O
S
4o
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

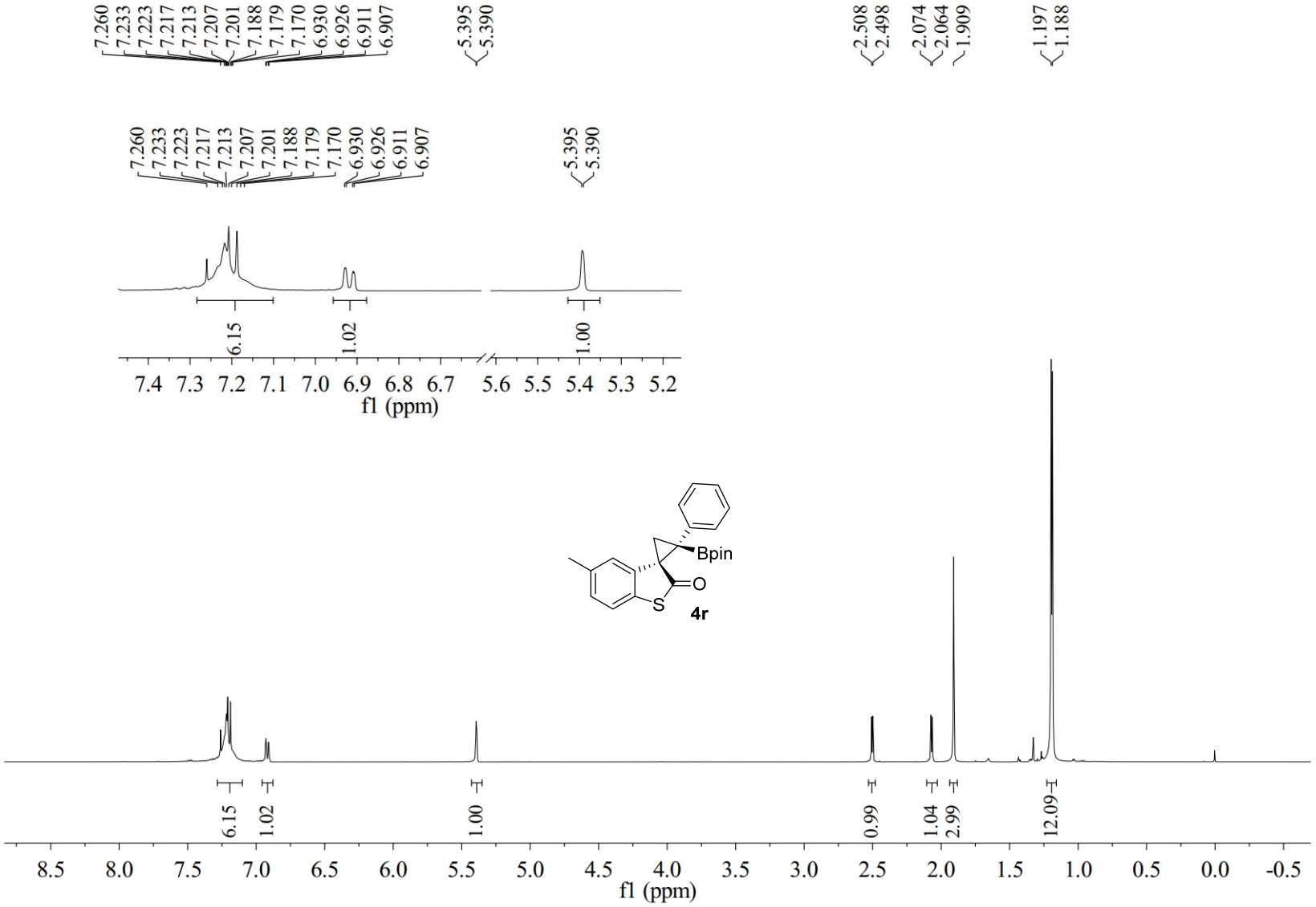

7.510
7.489
7.044
7.025
7.019
6.899
6.897
6.895
6.893
6.891
6.707
6.685
6.616
6.594
6.573
6.434
6.295
5.440
5.438
5.435
3.787
2.682
2.678
2.674
2.667
2.663
2.658
2.482
2.467
2.464
2.449
2.270
2.061
2.056
2.050
2.045
2.039
1.889
0.98
1.01
1.00
2.08
1.02
0.98
3.03
0.99
1.00
3.00
2.99
f1 (ppm)
CF2H
O
S
4p

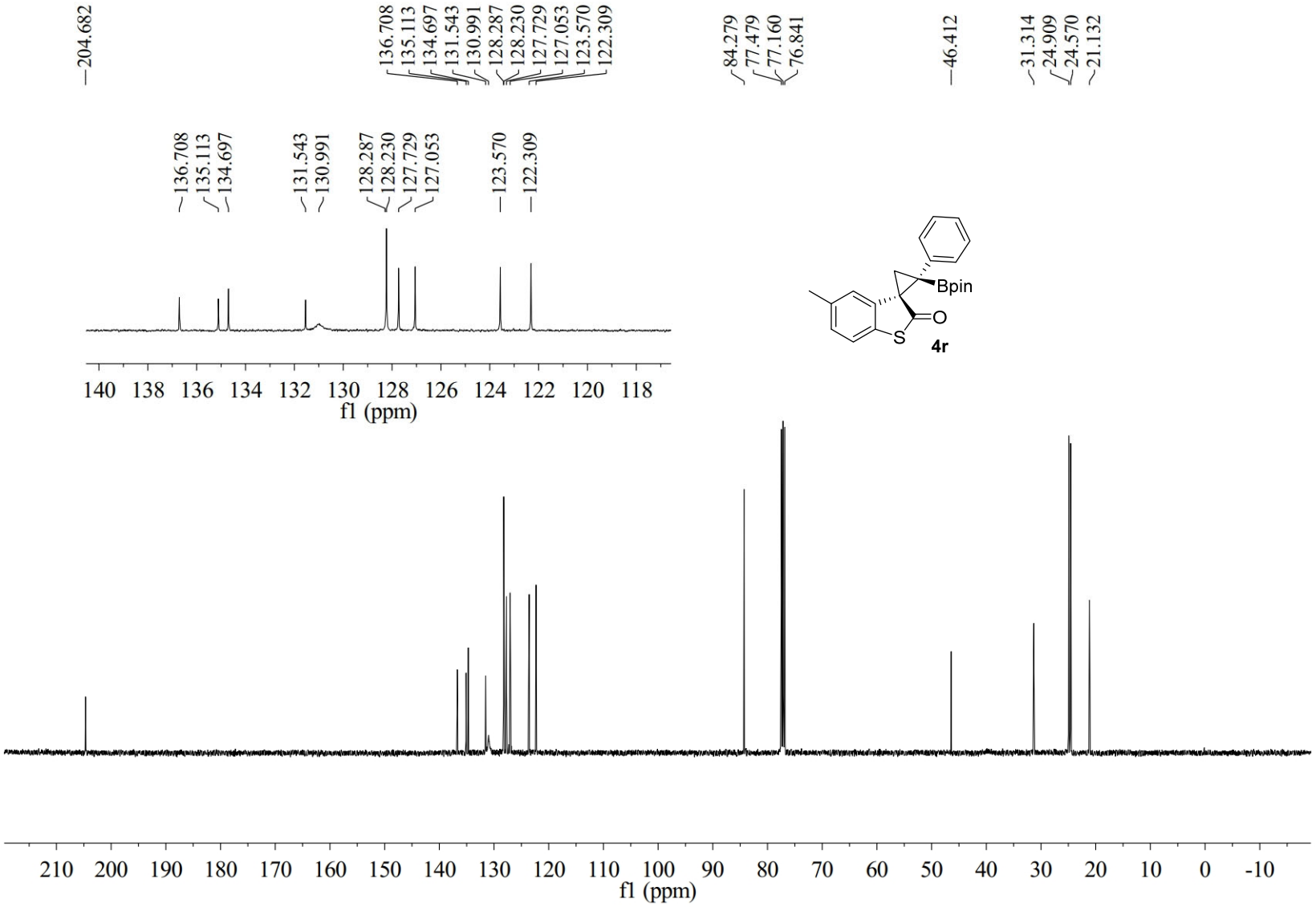

206.084
202.920
161.033
135.684
134.920
134.212
134.110
132.123
131.108
130.347
123.149
122.914
122.897
118.004
115.654
115.625
114.330
114.288
113.276
55.681
48.874
48.623
48.579
48.327
46.236
46.196
30.418
30.226
30.033
29.841
29.649
29.456
29.264
28.607
28.527
20.968
20.286
f1 (ppm)
O
CF2H
O
S
4p


-114.231
-115.000
-120.925
-121.693
O
CF2H
O
S
4p
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


7.344
7.341
7.324
7.321
7.260
7.247
7.233
7.225
7.219
7.213
7.204
7.192
7.187
7.186
7.176
7.125
7.122
7.106
7.103
7.087
7.084
6.754
6.751
6.735
6.732
6.715
6.712
5.646
5.643
5.626
5.623
2.528
2.519
2.098
2.089
1.194
1.184
1.02
5.08
1.06
1.00
7.40 7.35 7.30 7.25 7.20 7.15 7.10 7.05 7.00 6.80 6.75 6.70 6.65
f1 (ppm)
Bpin
O
S
4q
1.02
5.08
1.06
1.00
1.00
1.00
1.00
12.07
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.
f1 (ppm)


204.198
136.538
135.221
135.130
130.887
128.354
127.179
127.006
124.999
122.724
122.528
84.304
77.478
77.160
76.843
46.506
31.405
24.897
24.558
Bpin
O
S
4q
fl (ppm)
fl (ppm)


7.260
7.233
7.223
7.217
7.213
7.207
7.201
7.188
7.179
7.170
6.930
6.926
6.911
6.907
5.395
5.390
2.508
2.498
2.074
2.064
1.909
1.197
1.188
6.15
1.02
1.00
7.4 7.3 7.2 7.1 7.0 6.9 6.8 6.7 5.6 5.5 5.4 5.3 5.2
f1 (ppm)
Bpin
O
S
4r
6.15
1.02
1.00
0.99
1.04
2.99
12.09
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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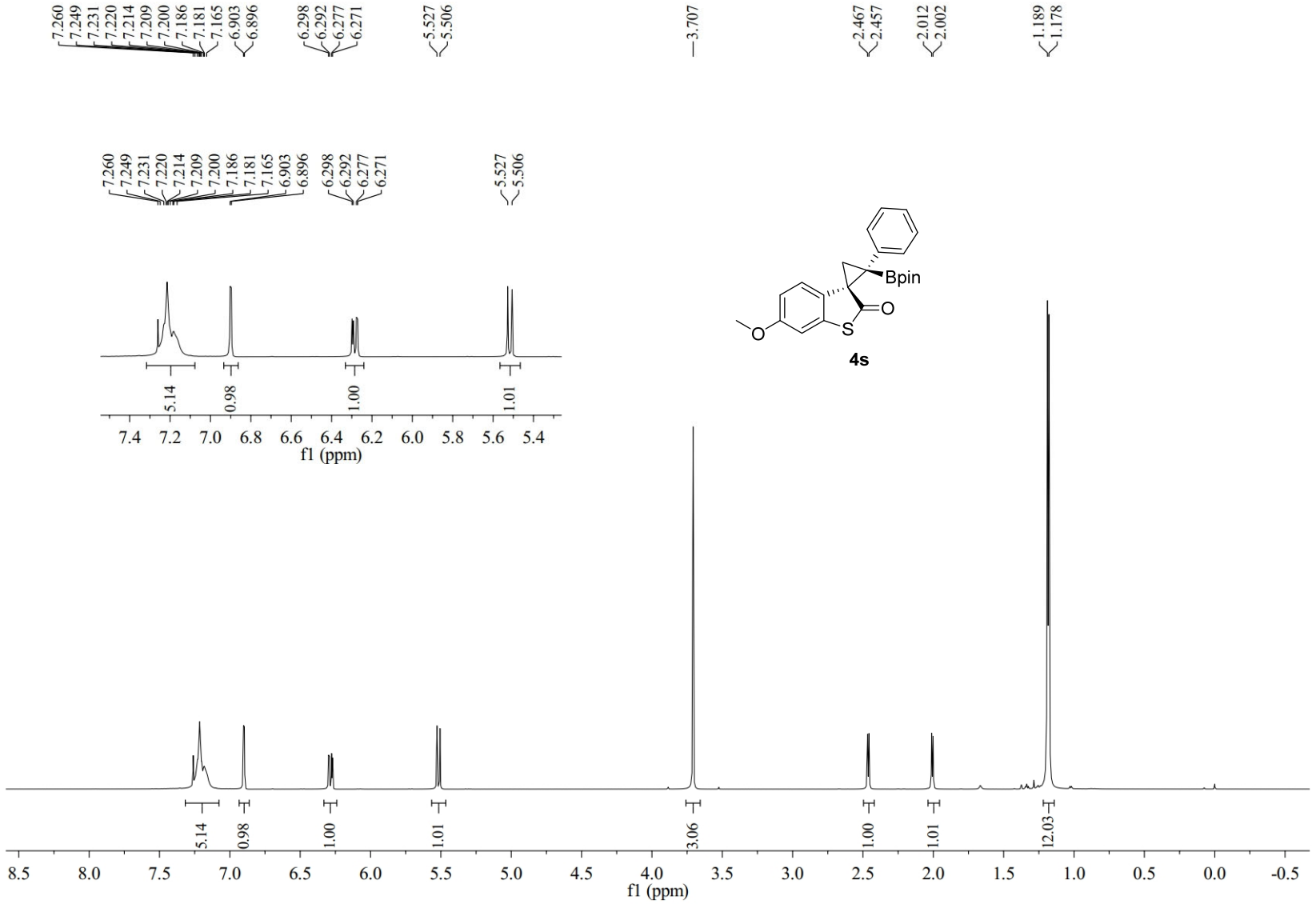
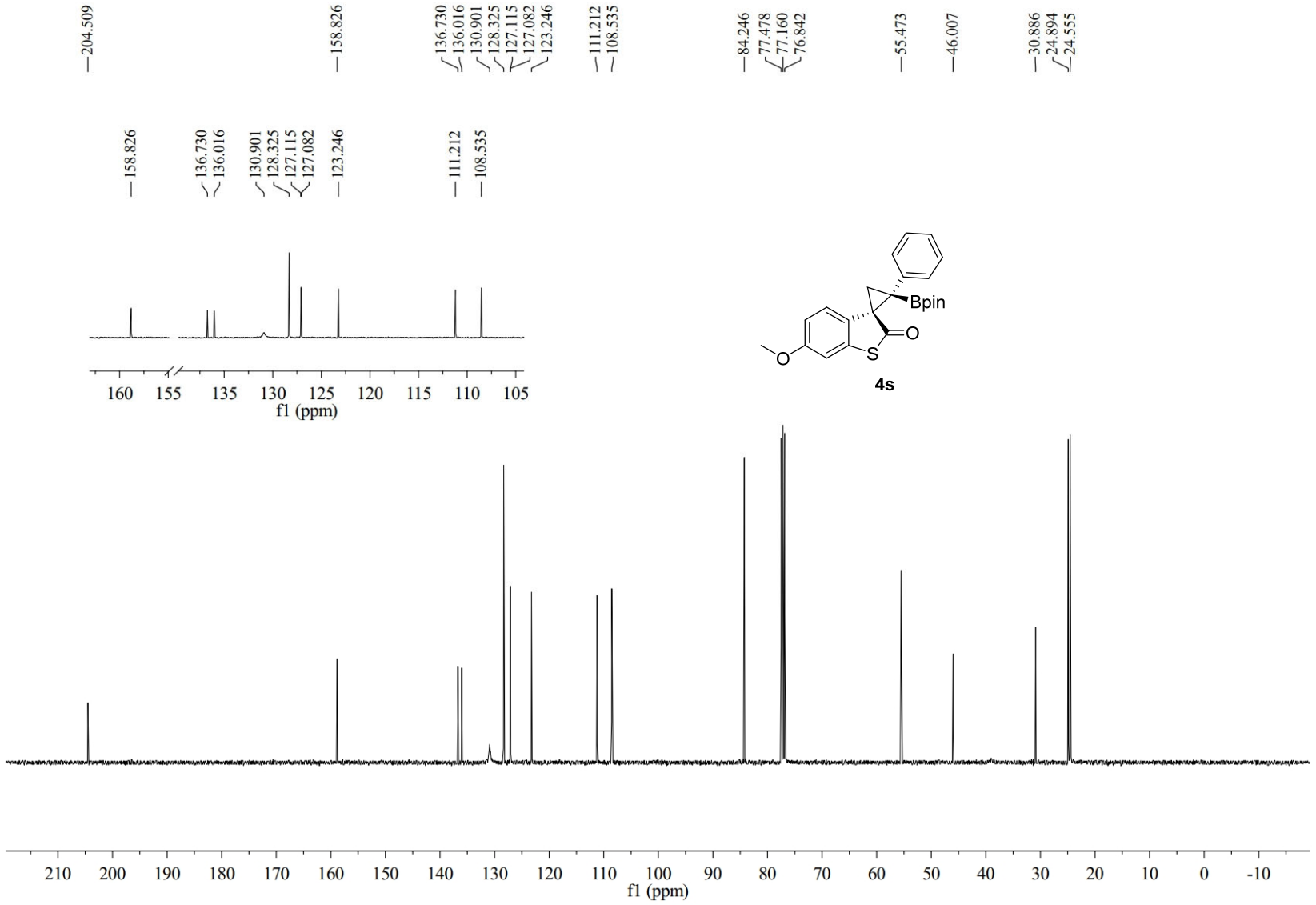
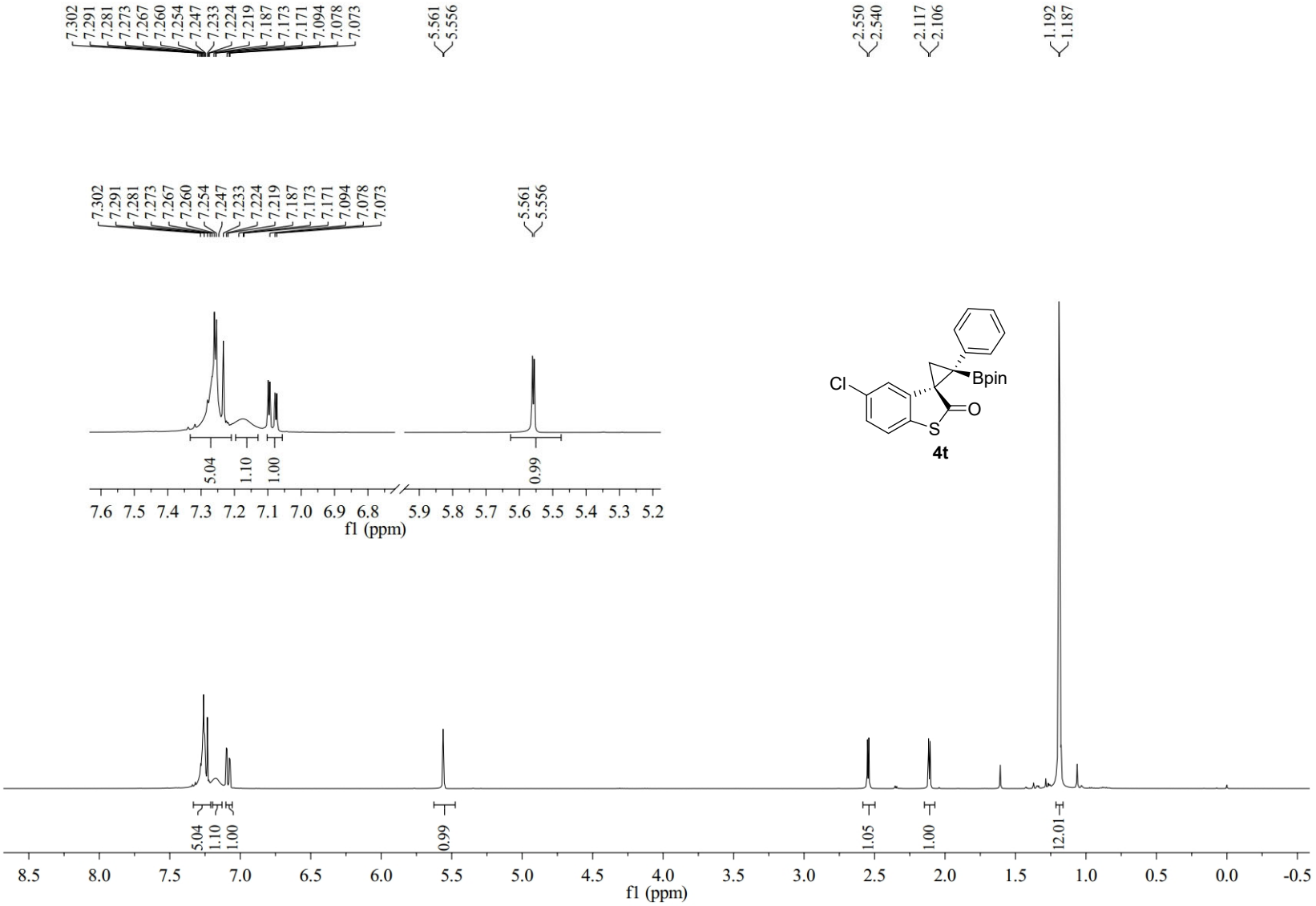
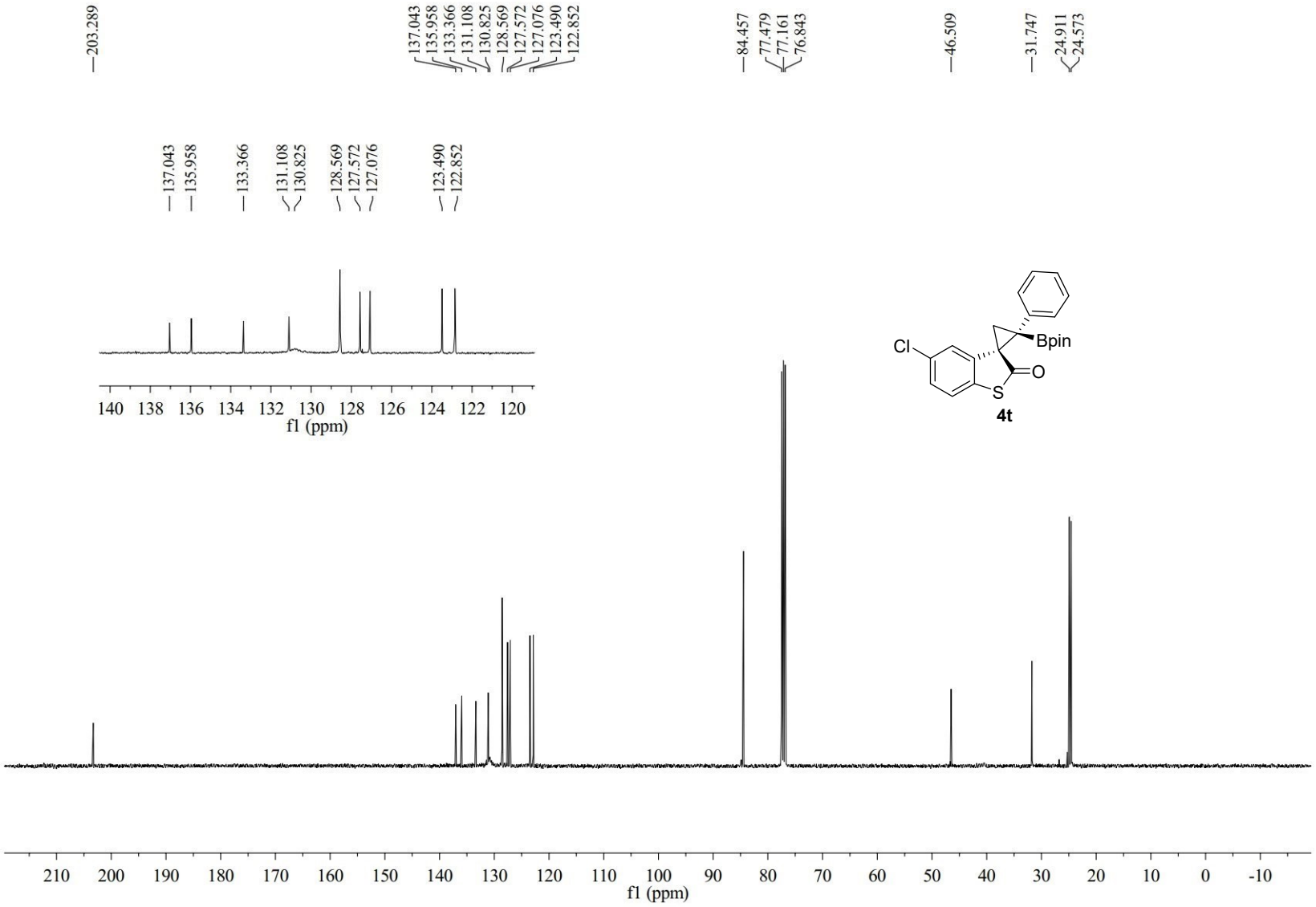
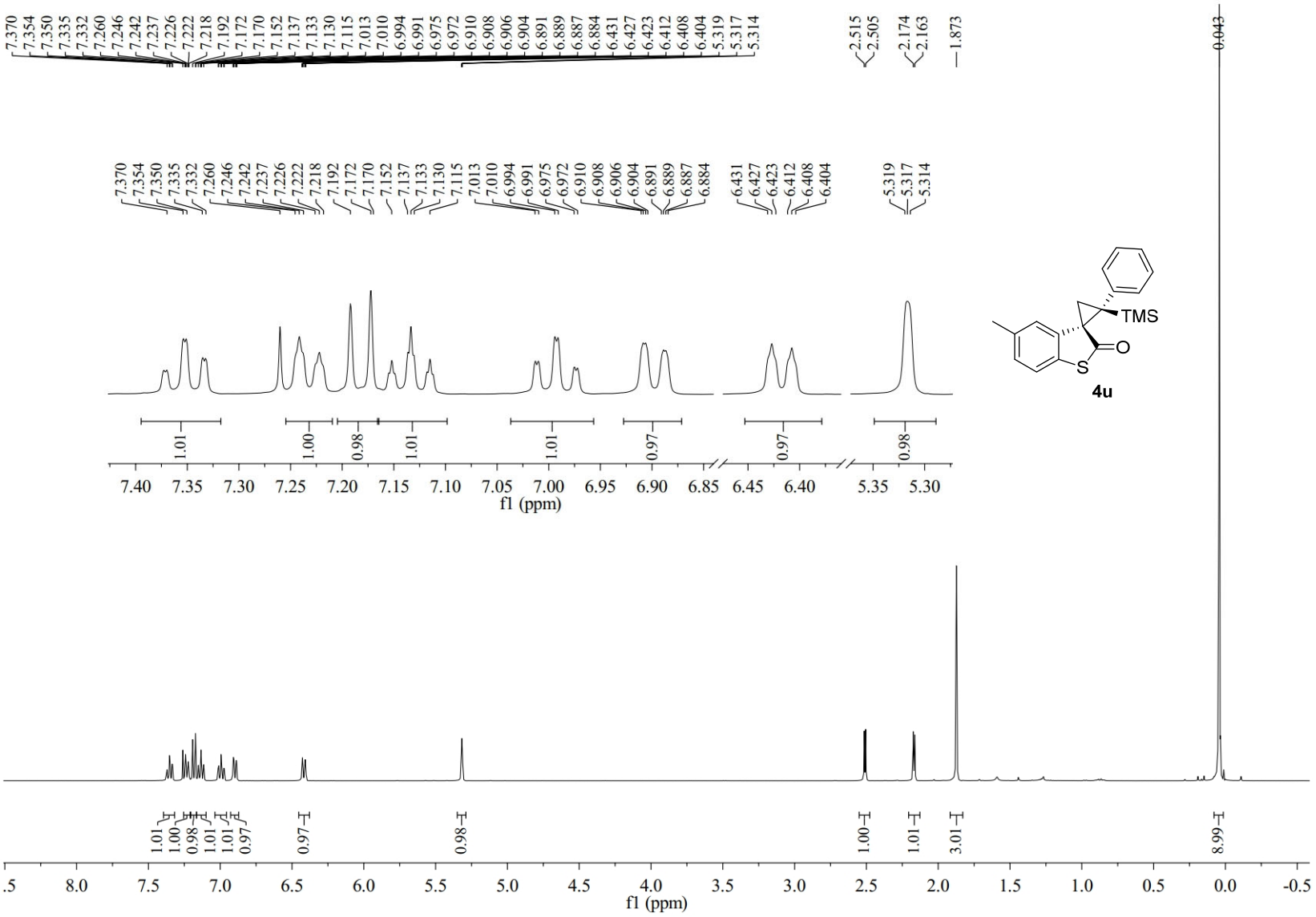
136.708
135.113
134.697
131.543
130.991
128.287
128.230
127.729
127.053
123.570
122.309
84.279
77.479
77.160
76.841
46.412
31.314
24.909
24.570
21.132
Bpin
O
S
4r
fl (ppm)
fl (ppm)

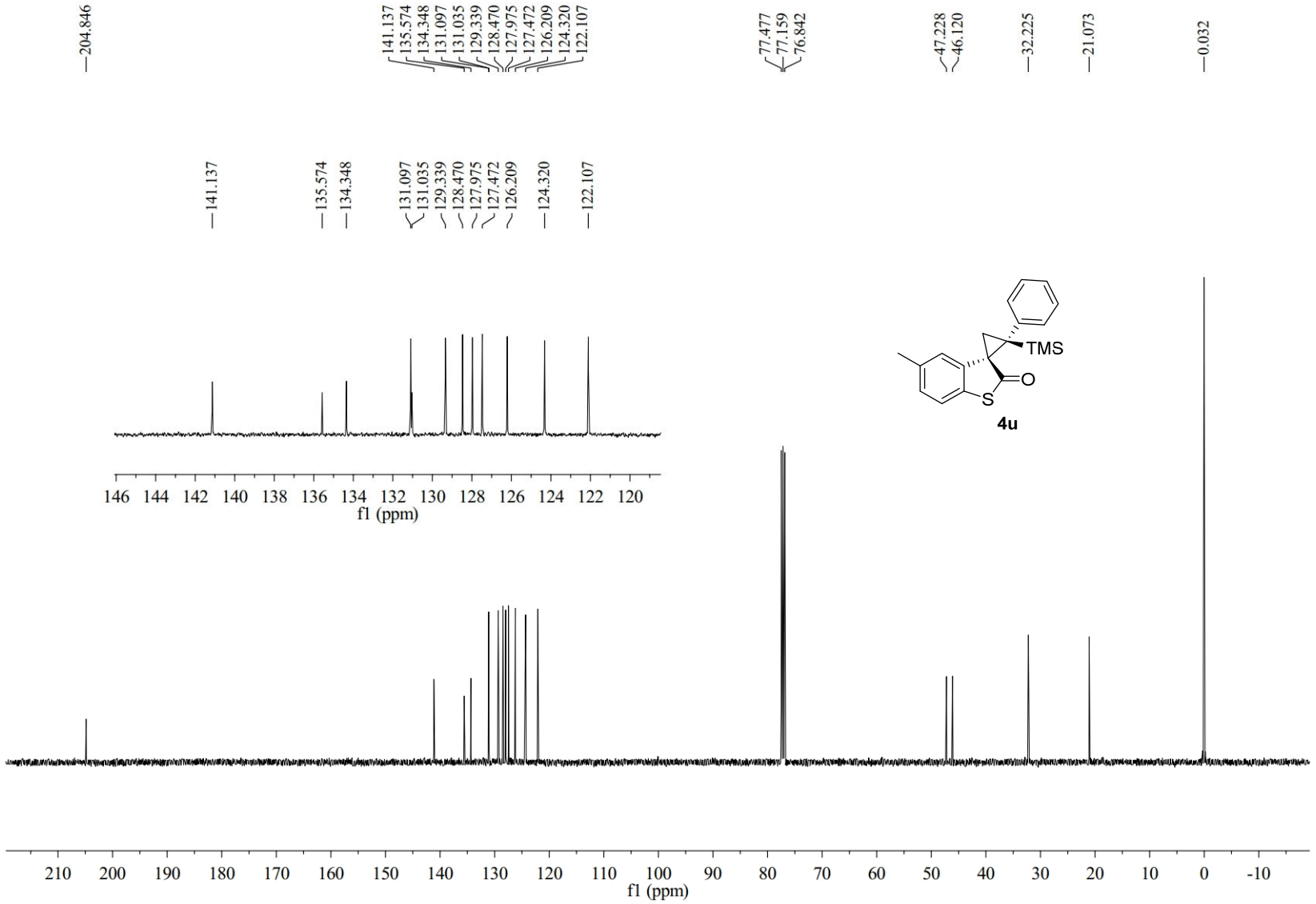

7.260
7.249
7.231
7.220
7.214
7.209
7.200
7.186
7.181
7.165
6.903
6.896
6.298
6.292
6.277
6.271
5.527
5.506
3.707
2.467
2.457
2.012
2.002
1.189
1.178
Bpin
O
S
O
4s
5.14
0.98
1.00
1.01
3.06
1.00
1.01
12.03
f1 (ppm)


204.509
158.826
136.730
136.016
130.901
128.325
127.115
127.082
123.246
111.212
108.535
84.246
77.478
77.160
76.842
55.473
46.007
30.886
24.894
24.555
Bpin
O
S
O
4s
f1 (ppm)
f1 (ppm)


7.302
7.291
7.281
7.273
7.267
7.260
7.254
7.247
7.233
7.224
7.219
7.187
7.173
7.171
7.094
7.078
7.073
5.561
5.556
2.550
2.540
2.117
2.106
1.192
1.187
5.04
1.10
1.00
0.99
1.05
1.00
12.01
f1 (ppm)
Cl
Bpin
O
S
4t


203.289
137.043
135.958
133.366
131.108
130.825
128.569
127.572
127.076
123.490
122.852
84.457
77.479
77.161
76.843
46.509
31.747
24.911
24.573
Cl
Bpin
O
S
4t
140 138 136 134 132 130 128 126 124 122 120
f1 (ppm)
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


7.370
7.354
7.350
7.335
7.332
7.260
7.246
7.242
7.237
7.226
7.222
7.218
7.192
7.172
7.170
7.152
7.137
7.133
7.130
7.115
7.013
7.010
6.994
6.991
6.975
6.972
6.910
6.908
6.906
6.904
6.891
6.889
6.887
6.884
6.431
6.427
6.423
6.412
6.408
6.404
5.319
5.317
5.314
2.515
2.505
2.174
2.163
1.873
0.043
TMS
O
S
4u
1.01
1.00
0.98
1.01
1.01
0.97
0.97
0.98
1.00
1.01
3.01
8.99
f1 (ppm)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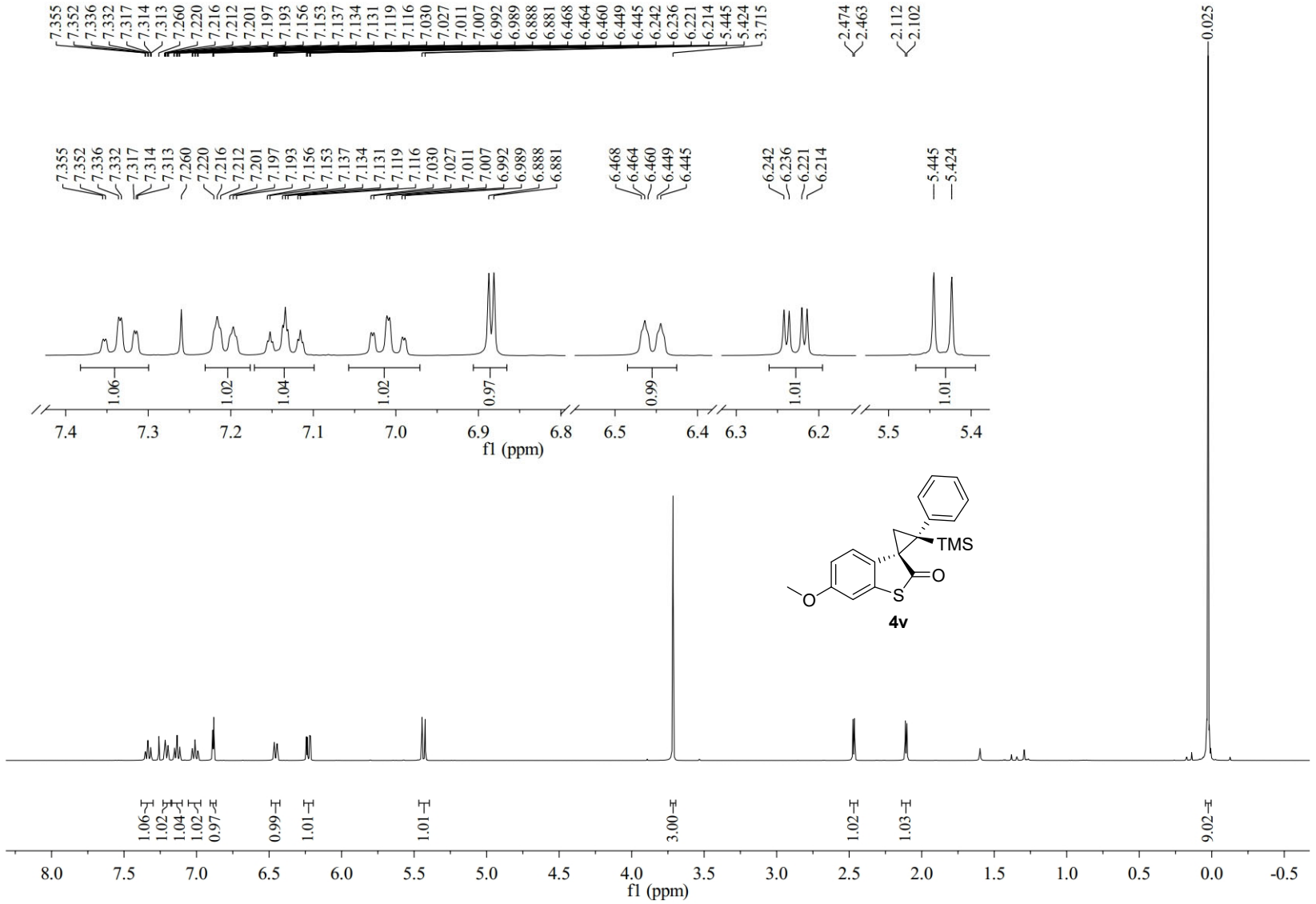
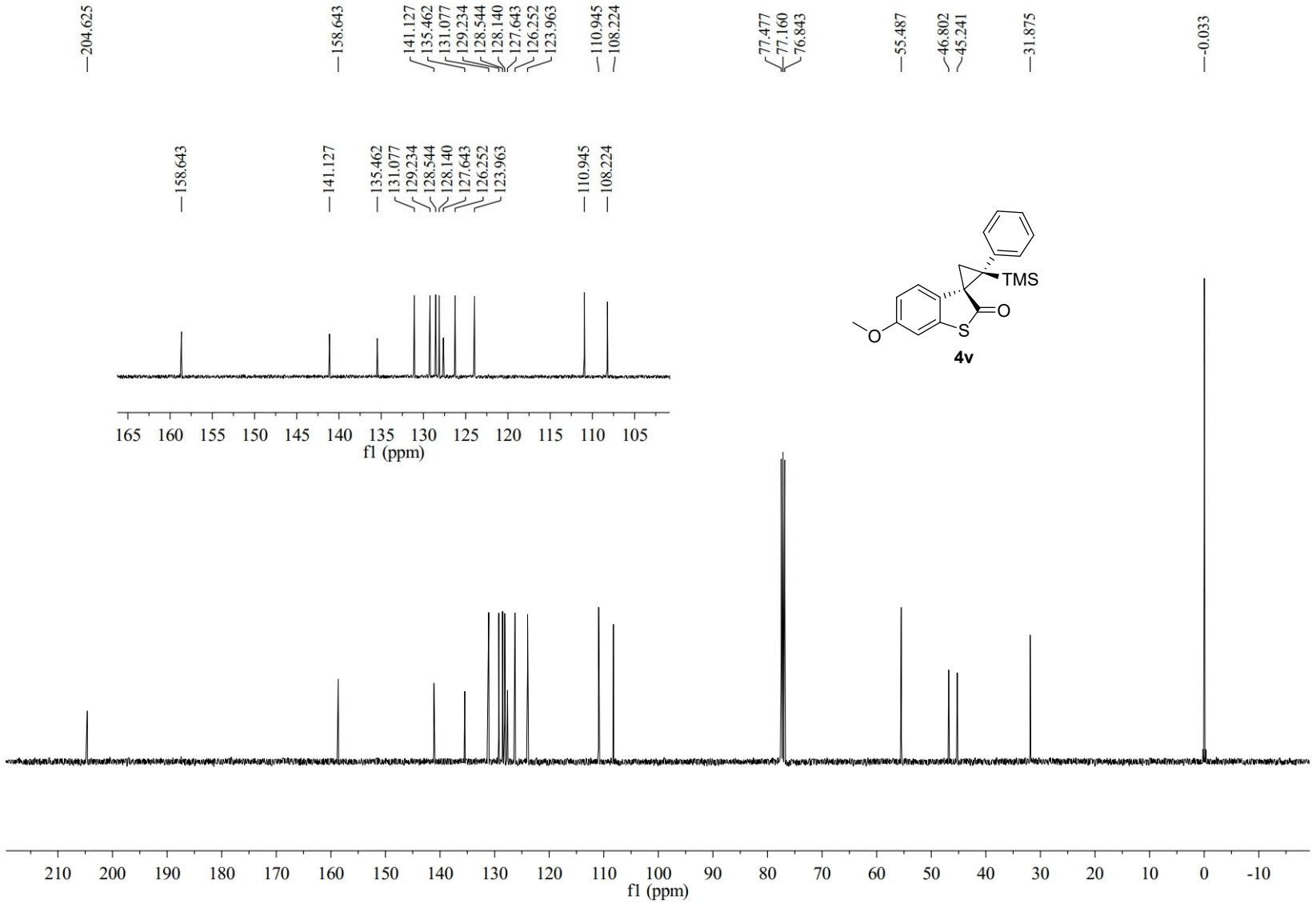
135.574
134.348
131.097
131.035
129.339
128.470
127.975
127.472
126.209
124.320
122.107
77.477
77.159
76.842
47.228
46.120
32.225
21.073
0.032
TMS
O
S
4u
146 144 142 140 138 136 134 132 130 128 126 124 122 120
f1 (ppm)
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


7.355
7.352
7.336
7.332
7.317
7.314
7.313
7.260
7.220
7.216
7.212
7.201
7.197
7.193
7.156
7.153
7.137
7.134
7.131
7.119
7.116
7.030
7.027
7.011
7.007
6.992
6.989
6.888
6.881
6.468
6.464
6.460
6.449
6.445
6.242
6.236
6.221
6.214
5.445
5.424
3.715
2.474
2.463
2.112
2.102
0.025
1.06
1.02
1.04
1.02
0.97
0.99
1.01
1.01
3.00
1.02
1.03
9.02
f1 (ppm)
TMS
O
S
O
4v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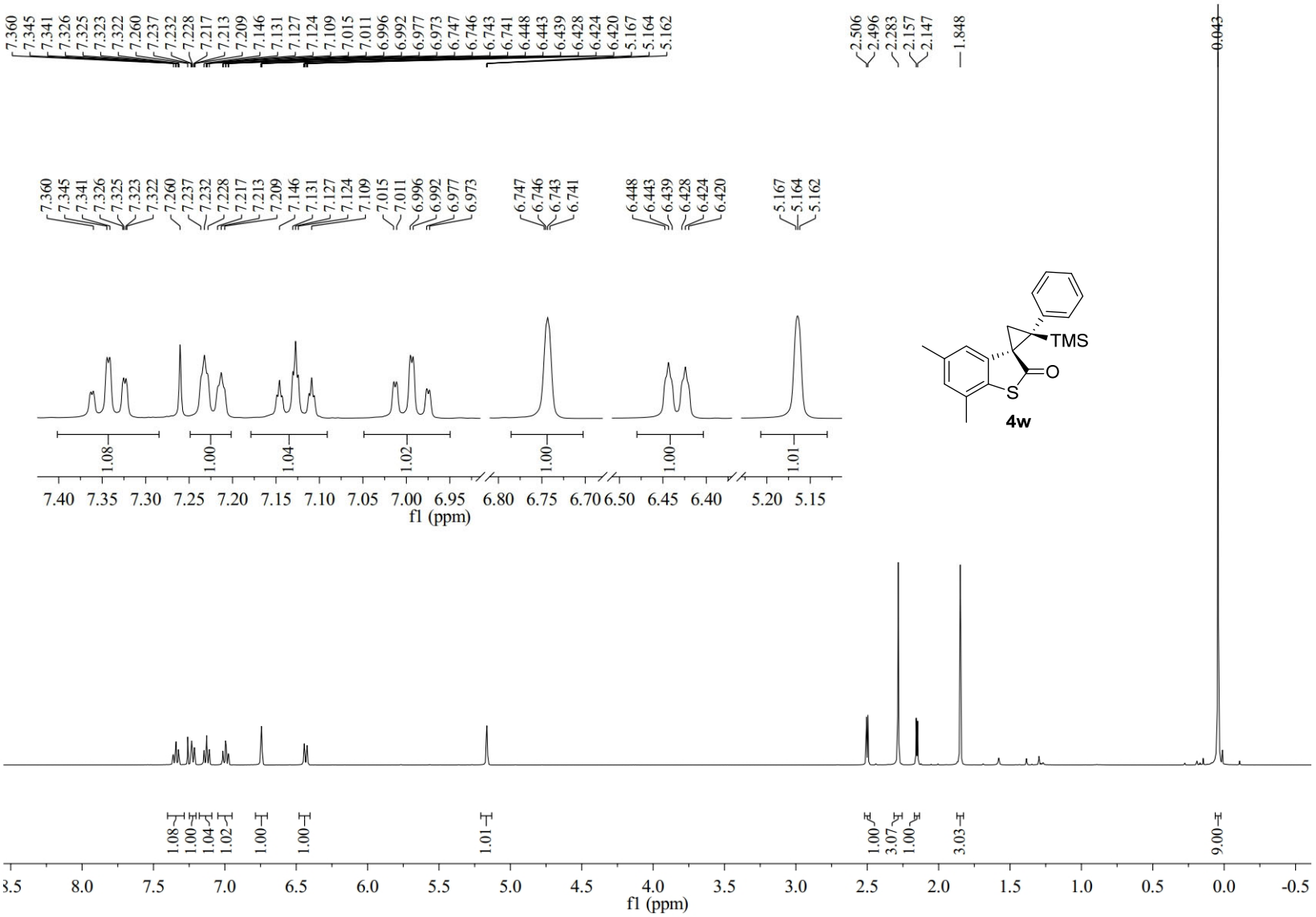
158.643
141.127
135.462
131.077
129.234
128.544
128.140
127.643
126.252
123.963
110.945
108.224
77.477
77.160
76.843
55.487
46.802
45.241
31.875
-0.033
TMS
O
S
O
4v
165 160 155 150 145 140 135 130 125 120 115 110 105
f1 (ppm)
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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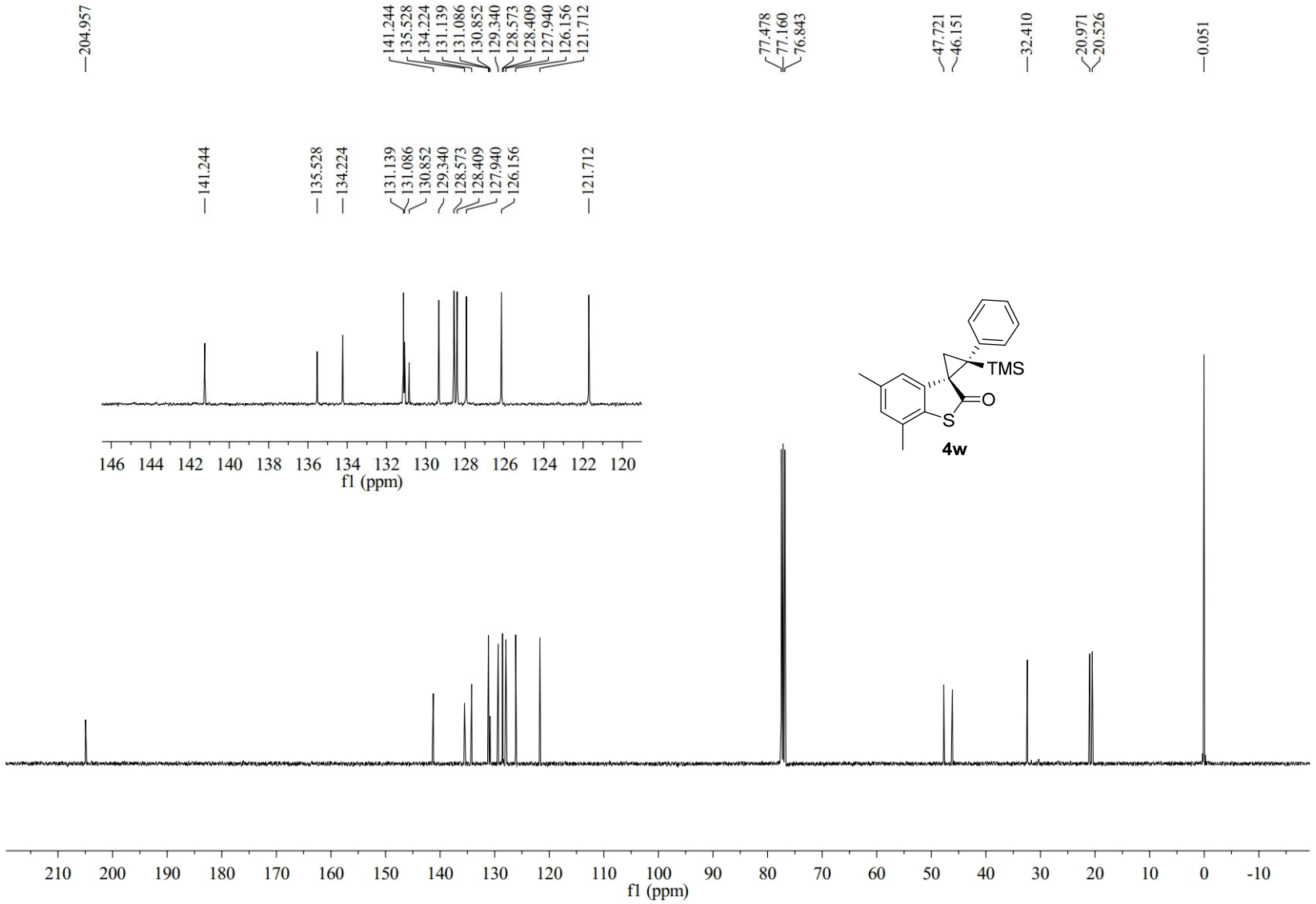
7.345
7.341
7.326
7.325
7.323
7.322
7.260
7.237
7.232
7.228
7.217
7.213
7.209
7.146
7.131
7.127
7.124
7.109
7.015
7.011
6.996
6.992
6.977
6.973
6.747
6.746
6.743
6.741
6.448
6.443
6.439
6.428
6.424
6.420
5.167
5.164
5.162
2.506
2.496
2.283
2.157
2.147
1.848
0.043
TMS
O
S
4w
1.08
1.00
1.04
1.02
1.00
1.00
1.01
1.00
3.07
1.00
3.03
9.00
fl (ppm)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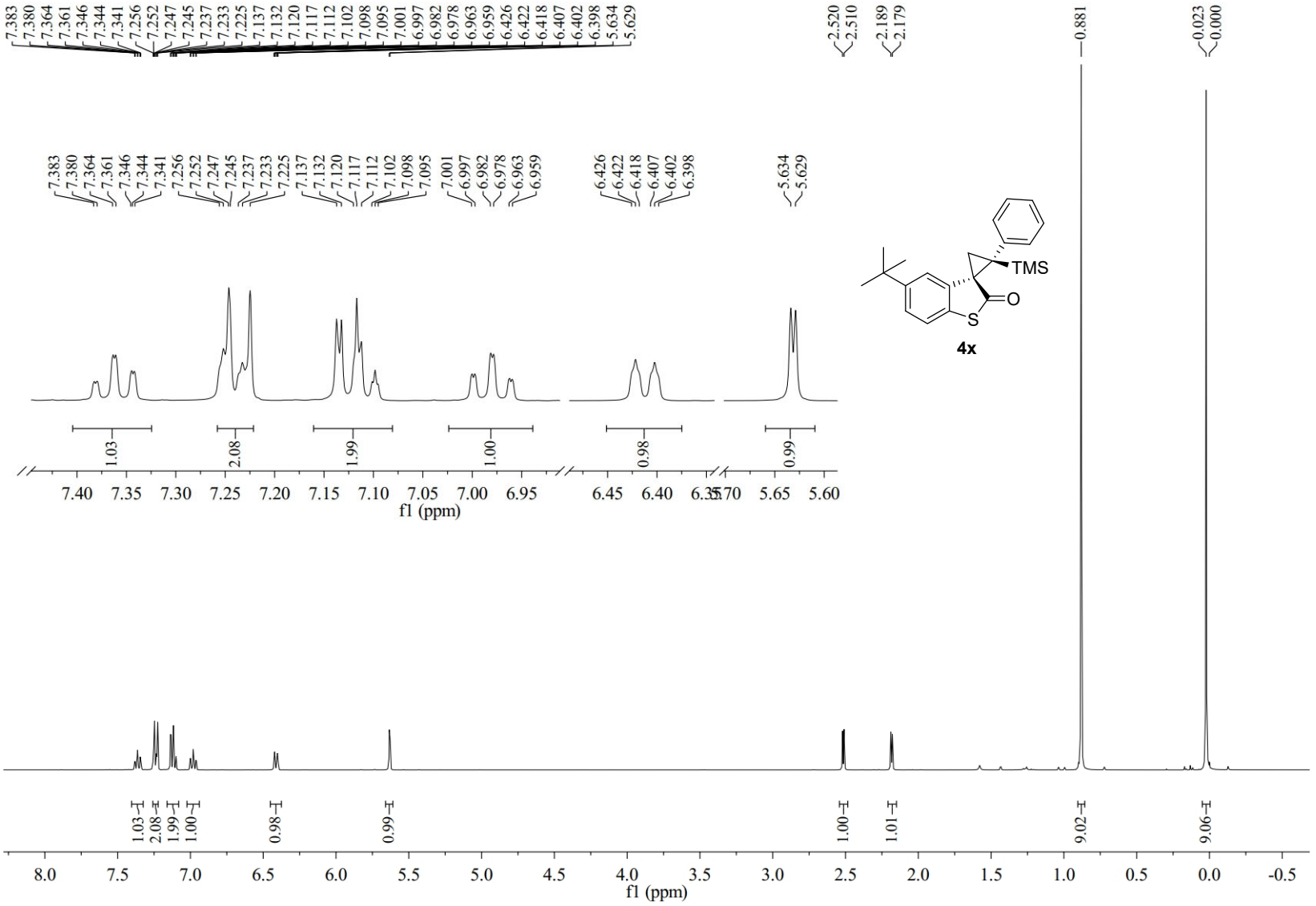
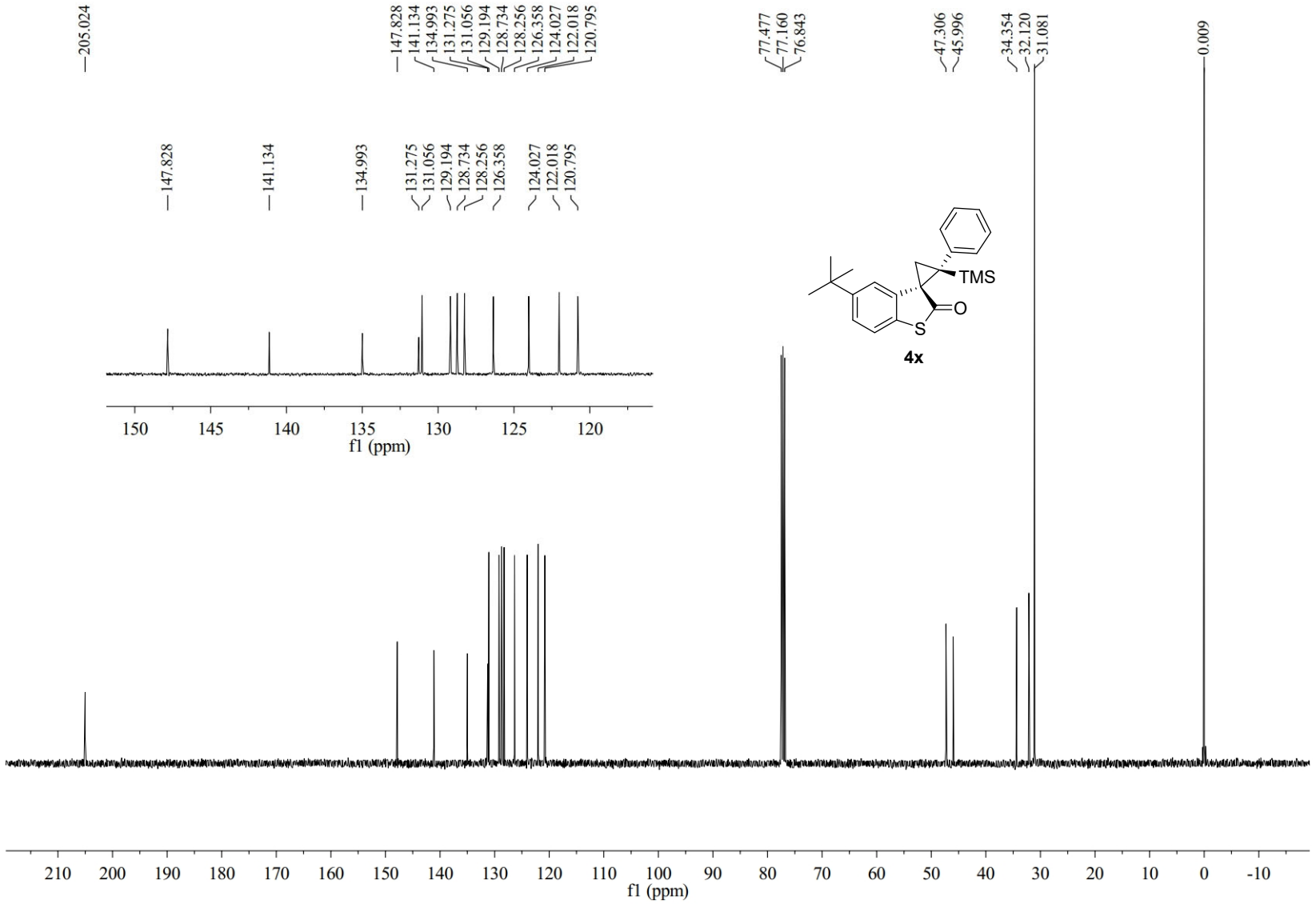
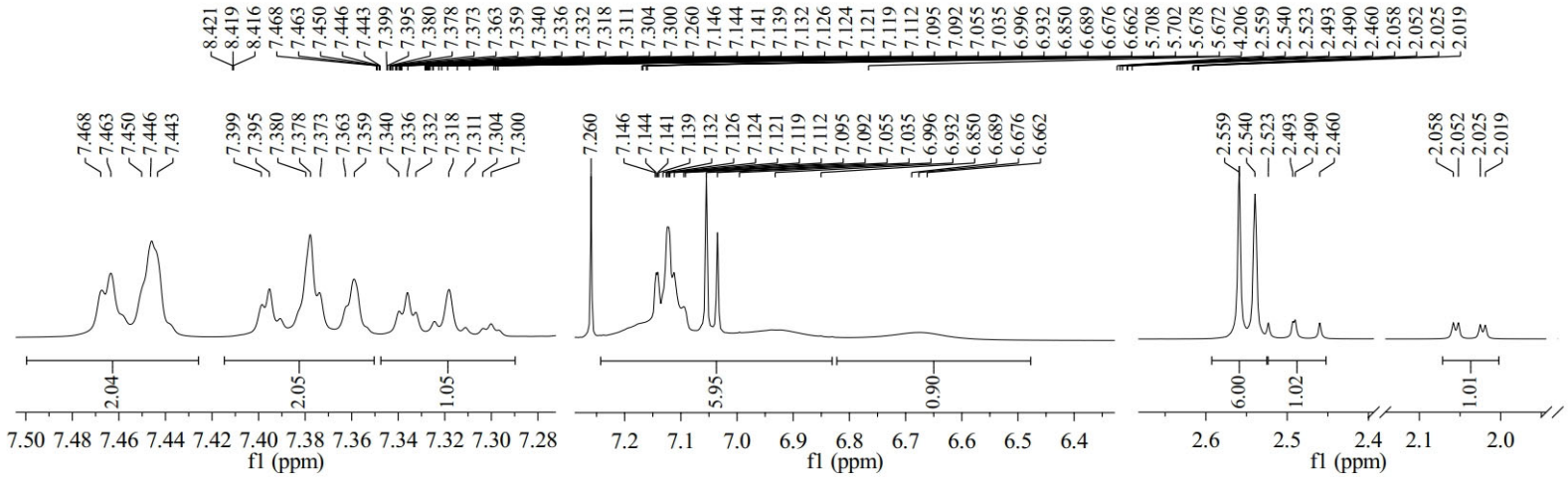
134.224
131.139
131.086
130.852
129.340
128.573
128.409
127.940
126.156
121.712
77.478
77.160
76.843
47.721
46.151
32.410
20.971
20.526
0.051
TMS
O
S
4w
f1 (ppm)

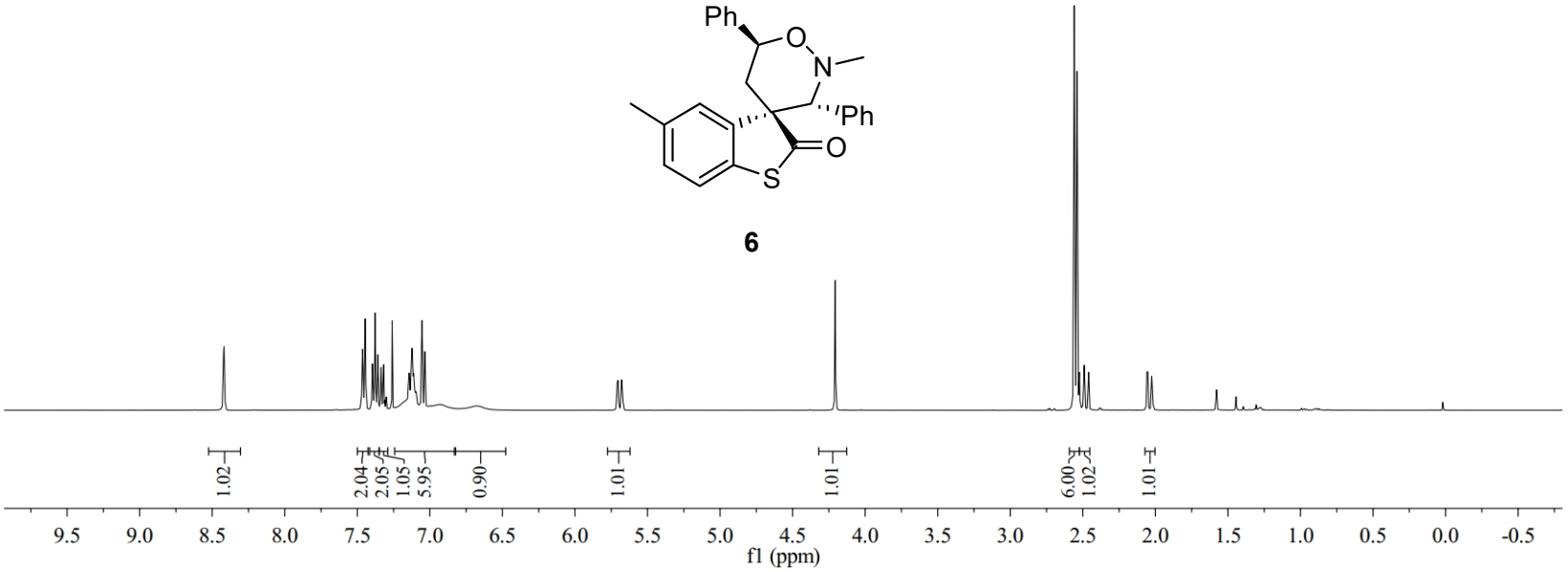

7.383
7.380
7.364
7.361
7.346
7.344
7.341
7.256
7.252
7.247
7.245
7.237
7.233
7.225
7.137
7.132
7.120
7.117
7.112
7.102
7.098
7.095
7.001
6.997
6.982
6.978
6.963
6.959
6.426
6.422
6.418
6.407
6.402
6.398
5.634
5.629
2.520
2.510
2.189
2.179
0.881
0.023
0.000
TMS
O
S
4x
1.03
2.08
1.99
1.00
0.98
0.99
f1 (ppm)
1.00
1.01
9.02
9.06

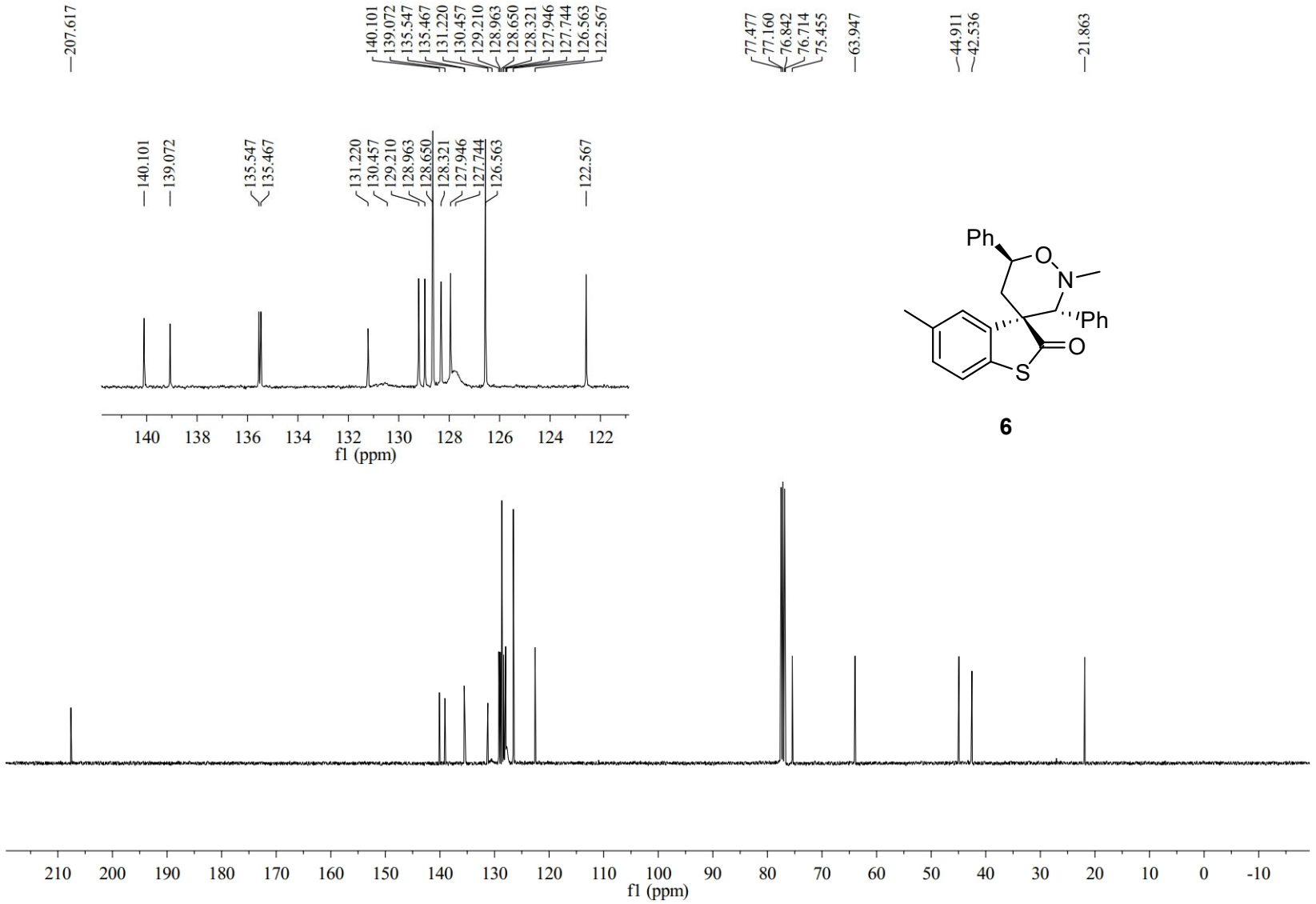

205.024
147.828
141.134
134.993
131.275
131.056
129.194
128.734
128.256
126.358
124.027
122.018
120.795
77.477
77.160
76.843
47.306
45.996
34.354
32.120
31.081
0.009
TMS
O
S
4x
f1 (ppm)
f1 (ppm)


8.421 8.419 8.416 7.468 7.463 7.450 7.446 7.443 7.399 7.395 7.380 7.378 7.373 7.363 7.359 7.340 7.336 7.332 7.318 7.311 7.304 7.300 7.260 7.146 7.144 7.141 7.139 7.132 7.126 7.124 7.121 7.119 7.112 7.095 7.092 7.055 7.035 6.996 6.932 6.850 6.689 6.676 6.662 5.708 5.702 5.678 5.672 4.206 2.559 2.540 2.523 2.493 2.490 2.460 2.058 2.052 2.025 2.019
2.04 2.05 1.05
7.50 7.48 7.46 7.44 7.42 7.40 7.38 7.36 7.34 7.32 7.30 7.28
f1 (ppm)
5.95 0.90
7.2 7.1 7.0 6.9 6.8 6.7 6.6 6.5 6.4
f1 (ppm)
6.00 1.02 1.01
2.6 2.5 2.4 2.1 2.0
f1 (ppm)

Ph
O
N
Ph
O
S

6


1.02 2.04 2.05 1.05 5.95 0.90 1.01 1.01 6.00 1.02 1.01
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


207.617
140.101
139.072
135.547
135.467
131.220
130.457
129.210
128.963
128.650
128.321
127.946
127.744
126.563
122.567
77.477
77.160
76.842
76.714
75.455
63.947
44.911
42.536
21.863
Ph
O
N
Ph
O
S
6
fl (ppm)
fl (ppm)

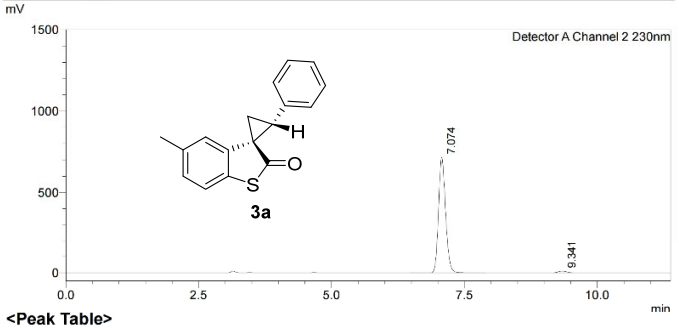
7. HPLC spectra

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-79-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-79-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/28 10:09:19	Acquired by	: System Administrator
Date Processed	: 2020/8/28 10:24:32	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

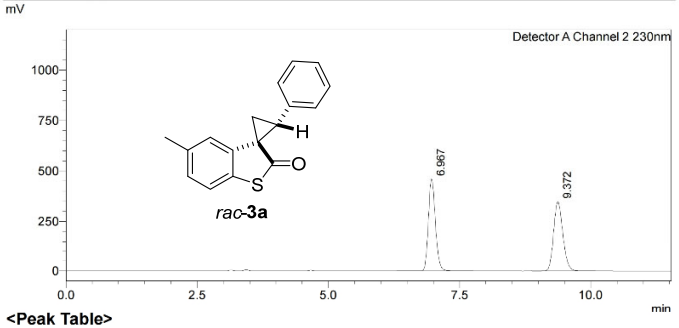
Peak#	Ret. Time	Area	Height	Conc.
1	7.074	6671339	716535	98.411
2	9.341	107744	10138	1.589
Total		6779083	726673	

Analysis Report

<Sample Information>

Sample Name	: pbw-pb-142-2-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pb-142-2-rac-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/10 20:54:51	Acquired by	: System Administrator
Date Processed	: 2020/9/10 21:07:42	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

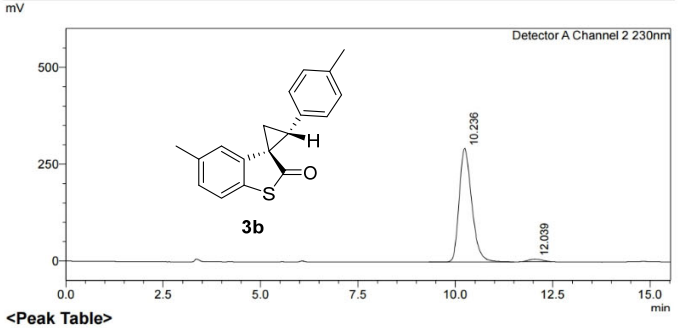
Peak#	Ret. Time	Area	Height	Conc.
1	6.967	4294000	461567	50.016
2	9.372	4291234	348494	49.984
Total		8585234	810061	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-56-1-asy-ojh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-56-1-asy-ojh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 14:22:01	Acquired by	: System Administrator
Date Processed	: 2020/8/31 14:48:13	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	10.236	6577362	292807	97.895
2	12.039	141437	6237	2.105
Total		6718799	299045	

Analysis Report

<Sample Information>

Sample Name	: pbw-pb-148-1-rac-ojh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pb-148-1-rac-ojh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/19 14:36:06	Acquired by	: System Administrator
Date Processed	: 2020/8/31 14:58:12	Processed by	: System Administrator

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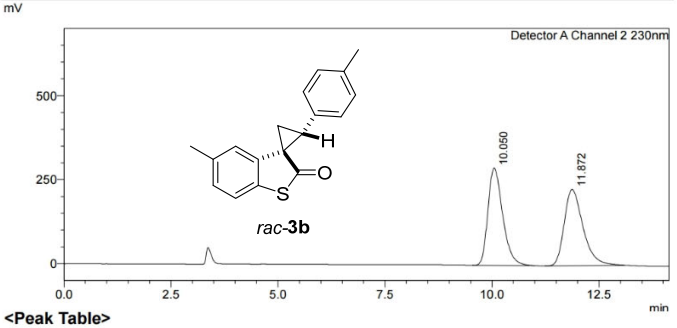


<Peak Table>

Detector A Channel 2 230nm

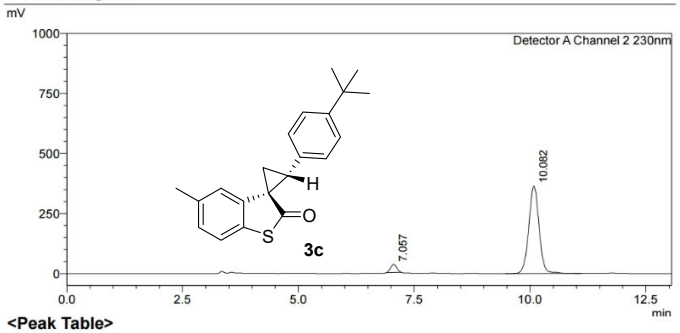
Peak#	Ret. Time	Area	Height	Conc.
1	10.050	6973961	290110	50.089
2	11.872	6949276	227272	49.911
Total		13923237	517382	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-58-1-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-58-1-asy-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 9:37:48	Acquired by	: System Administrator
Date Processed	: 2020/8/31 10:11:56	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	7.057	305185	33360	5.133
2	10.082	5639981	365414	94.867
Total		5945166	398774	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-7-7-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-7-7-rac-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/20 20:48:35	Acquired by	: System Administrator
Date Processed	: 2020/8/31 10:21:42	Processed by	: System Administrator

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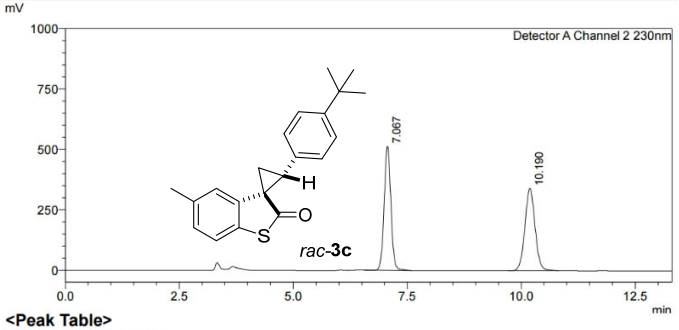


<Peak Table>

Detector A Channel 2 230nm

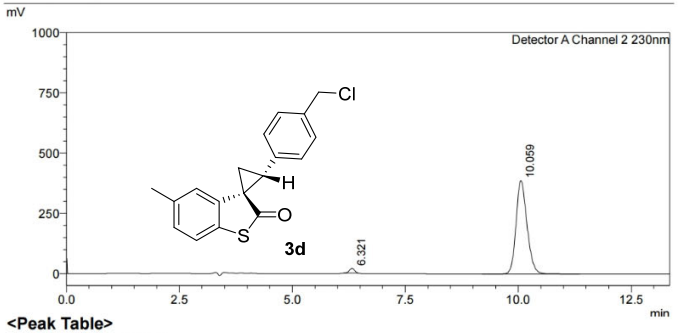
Peak#	Ret. Time	Area	Height	Conc.
1	7.067	5265521	513327	49.903
2	10.190	5285901	340909	50.097
Total		10551422	854236	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-56-5-asy-ozh-85-15-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-56-5-asy-ozh-85-15-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 20:52:17	Acquired by	: System Administrator
Date Processed	: 2020/8/31 21:09:55	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

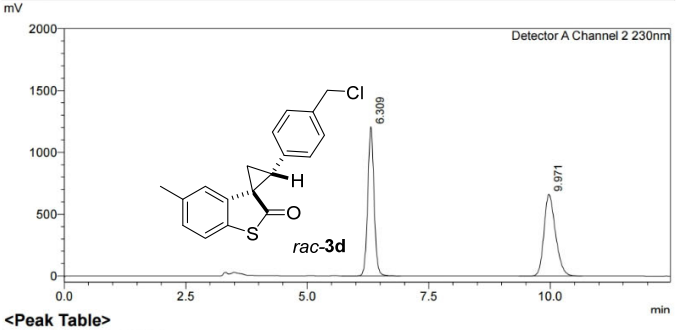
Peak#	Ret. Time	Area	Height	Conc.
1	6.321	157584	19656	2.349
2	10.059	6551991	388154	97.651
Total		6709575	407809	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-8-4-rac-ozh-85-15-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-8-4-rac-ozh-85-15-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/21 20:24:34	Acquired by	: System Administrator
Date Processed	: 2020/8/31 21:13:01	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	6.309	10920056	1205824	50.023
2	9.971	10910206	659827	49.977
Total		21830262	1865651	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-56-4-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-56-4-asy-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 10:07:47	Acquired by	: System Administrator
Date Processed	: 2020/8/31 10:40:56	Processed by	: System Administrator

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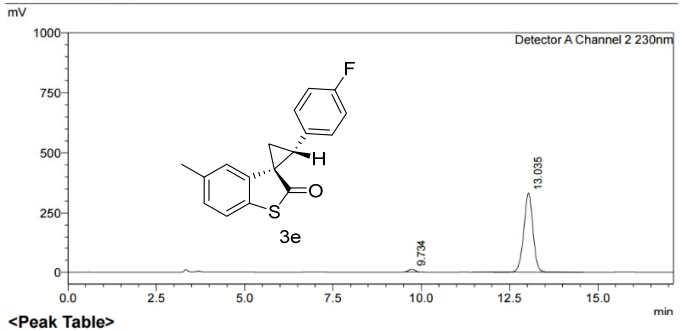

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	9.734	122973	10265	1.996
2	13.035	6036547	332918	98.004
Total		6159520	343184	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-7-8-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-7-8-rac-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/20 21:03:06	Acquired by	: System Administrator
Date Processed	: 2020/8/21 9:51:51	Processed by	: System Administrator

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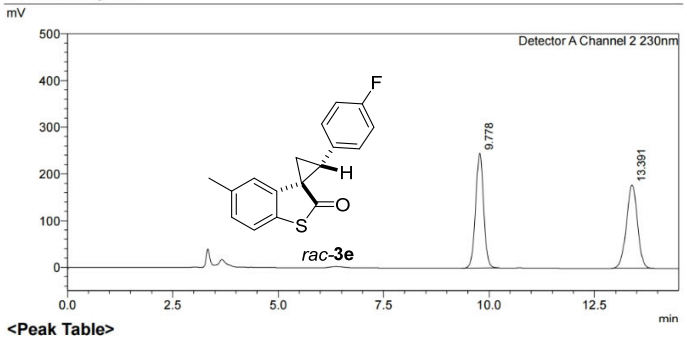

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	9.778	3258068	246244	50.071
2	13.391	3248775	177952	49.929
Total		6506843	424196	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-56-3-asy-ozh-97-3-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-56-3-asy-ozh-97-3-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 17:15:59	Acquired by	: System Administrator
Date Processed	: 2020/8/31 17:38:02	Processed by	: System Administrator

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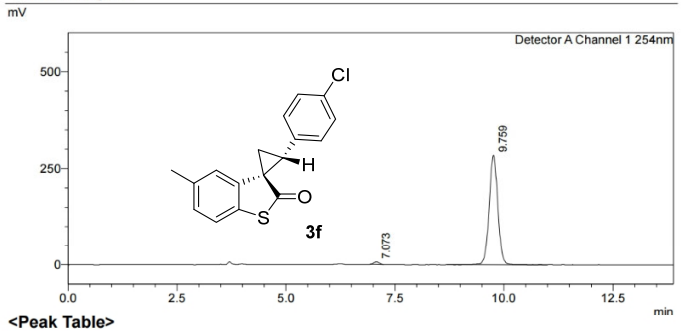


<Peak Table>

Detector A Channel 1 254nm

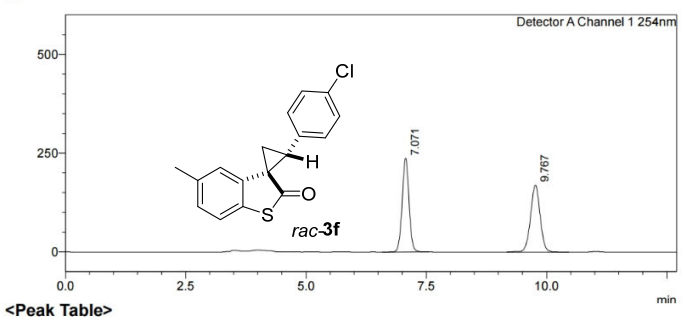
Peak#	Ret. Time	Area	Height	Conc.
1	7.073	58483	6838	1.458
2	9.759	3951631	284851	98.542
Total		4010114	291689	

Analysis Report

<Sample Information>

Sample Name	: pbw-pb-148-4-rac-ozh-97-3-1.0ml		
Sample ID	:		
Data Filename	: pbw-pb-148-4-rac-ozh-97-3-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 17:45:01	Acquired by	: System Administrator
Date Processed	: 2020/8/31 18:04:47	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

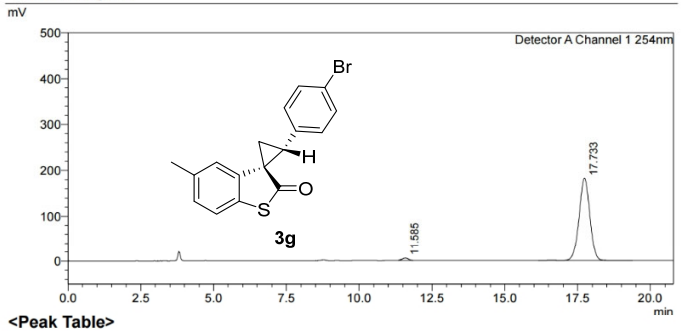
Peak#	Ret. Time	Area	Height	Conc.
1	7.071	2349178	236673	49.937
2	9.767	2355146	169640	50.063
Total		4704324	406313	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-56-2-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-56-2-asy-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 10:49:06	Acquired by	: System Administrator
Date Processed	: 2020/8/31 11:17:18	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

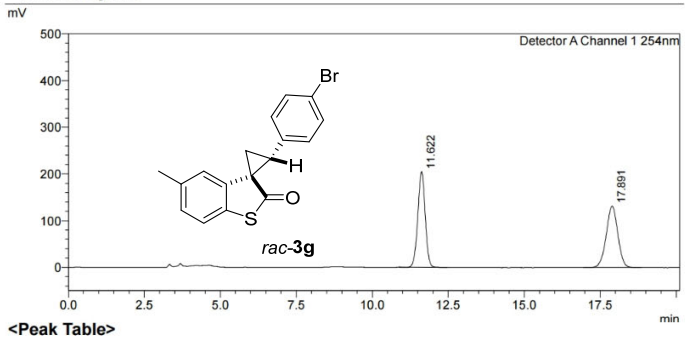
Peak#	Ret. Time	Area	Height	Conc.
1	11.585	77932	5300	1.628
2	17.733	4709467	181359	98.372
Total		4787400	186659	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-148-3-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-148-3-rac-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 11:30:29	Acquired by	: System Administrator
Date Processed	: 2020/8/31 12:01:41	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	11.622	3461924	204312	49.964
2	17.891	3466854	131210	50.036
Total		6928779	335522	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-128-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-128-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/14 16:13:28	Acquired by	: System Administrator
Date Processed	: 2020/10/14 16:31:13	Processed by	: System Administrator

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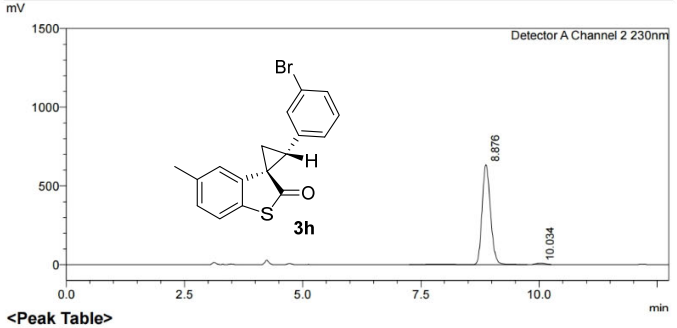


<Peak Table>

Detector A Channel 2 230nm

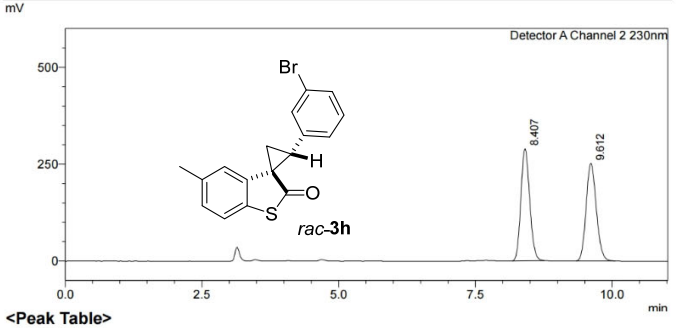
Peak#	Ret. Time	Area	Height	Conc.
1	8.876	7989373	634054	98.796
2	10.034	97387	8275	1.204
Total		8086760	642329	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-8-2-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-8-2-rac-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/15 17:03:43	Acquired by	: System Administrator
Date Processed	: 2020/8/21 16:26:36	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

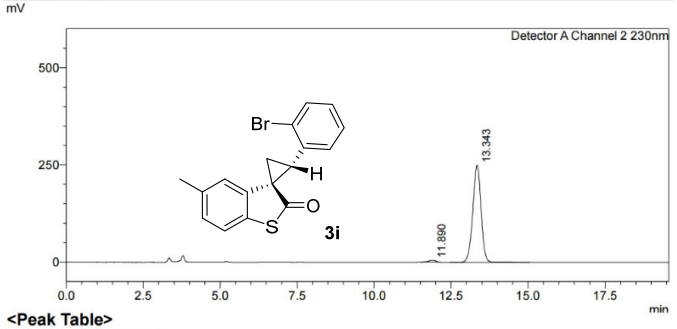
Peak#	Ret. Time	Area	Height	Conc.
1	8.407	3251723	289076	49.881
2	9.612	3267291	251270	50.119
Total		6519014	540345	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-60-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-60-asy-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 10:27:28	Acquired by	: System Administrator
Date Processed	: 2020/8/31 11:35:33	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	11.890	78175	4817	1.642
2	13.343	4682397	249306	98.358
Total		4760571	254124	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-8-1-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-8-1-rac-ozh-99-1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 11:12:19	Acquired by	: System Administrator
Date Processed	: 2020/8/31 11:42:46	Processed by	: System Administrator

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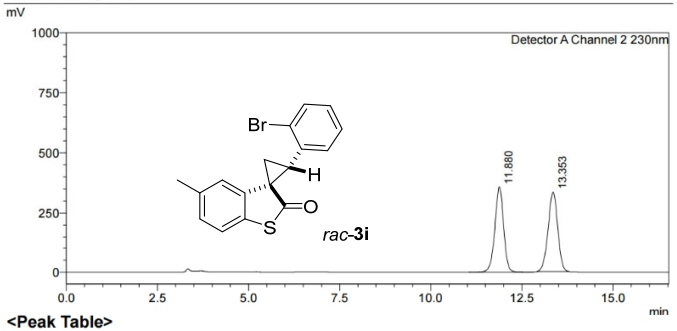

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	11.880	6002300	359098	49.272
2	13.353	6179586	335332	50.728
Total		12181886	694430	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-58-2-asy-ozh-97-3-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-58-2-asy-ozh-97-3-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 16:41:56	Acquired by	: System Administrator
Date Processed	: 2020/8/31 17:09:22	Processed by	: System Administrator

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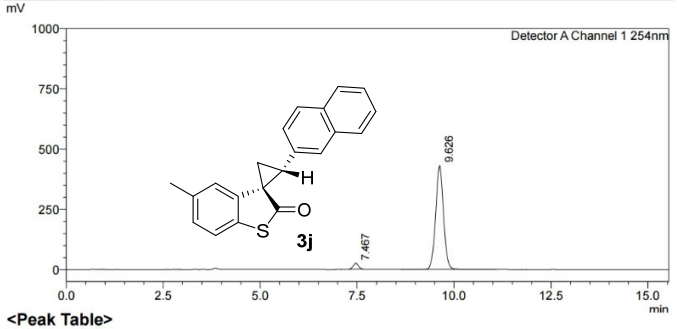


<Peak Table>

Detector A Channel 1 254nm

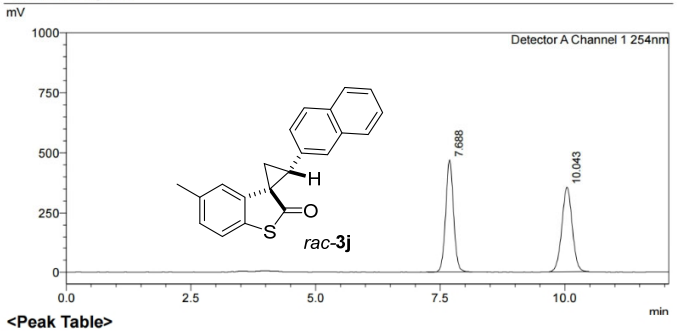
Peak#	Ret. Time	Area	Height	Conc.
1	7.467	233639	24016	3.677
2	9.626	6120202	431013	96.323
Total		6353841	455029	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-7-3-rac-ozh-97-3-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-7-3-rac-ozh-97-3-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 17:31:02	Acquired by	: System Administrator
Date Processed	: 2020/8/31 17:50:18	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	7.688	5164227	469778	50.045
2	10.043	5154894	355087	49.955
Total		10319121	824865	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-58-3-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-58-3-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/1 9:01:37	Acquired by	: System Administrator
Date Processed	: 2020/9/1 9:57:09	Processed by	: System Administrator

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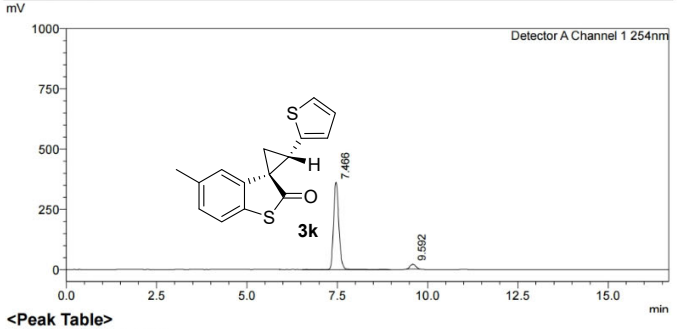


<Peak Table>

Detector A Channel 1 254nm

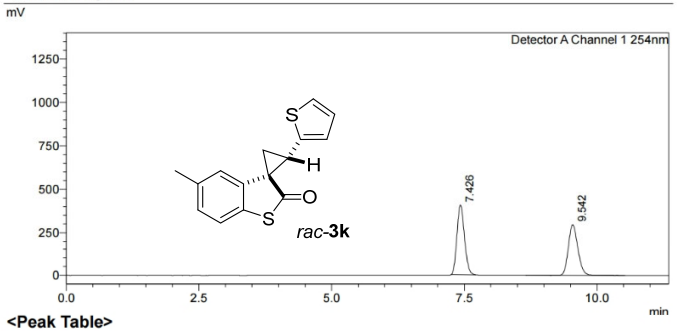
Peak#	Ret. Time	Area	Height	Conc.
1	7.466	3666182	362797	94.306
2	9.592	221375	20271	5.694
Total		3887557	383068	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-45-1-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-45-1-rac-odh-99-1-1.0ml4.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/1 10:34:34	Acquired by	: System Administrator
Date Processed	: 2020/9/1 11:13:50	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

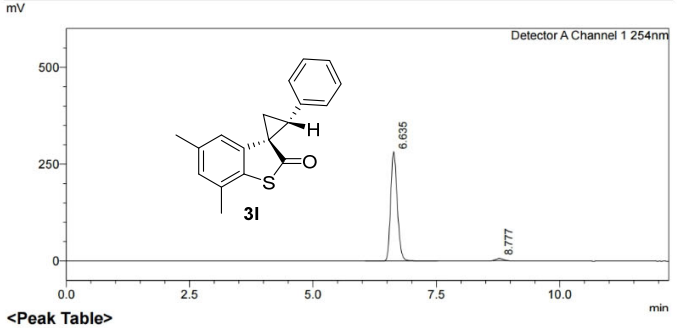
Peak#	Ret. Time	Area	Height	Conc.
1	7.426	3992149	407129	51.975
2	9.542	3688721	296585	48.025
Total		7680871	703713	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-74-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-74-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/9 10:22:33	Acquired by	: System Administrator
Date Processed	: 2020/9/9 10:39:14	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	6.635	2634410	281619	97.934
2	8.777	55585	5640	2.066
Total		2689996	287259	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-69-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-69-rac-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/9 10:08:44	Acquired by	: System Administrator
Date Processed	: 2020/9/9 10:36:05	Processed by	: System Administrator

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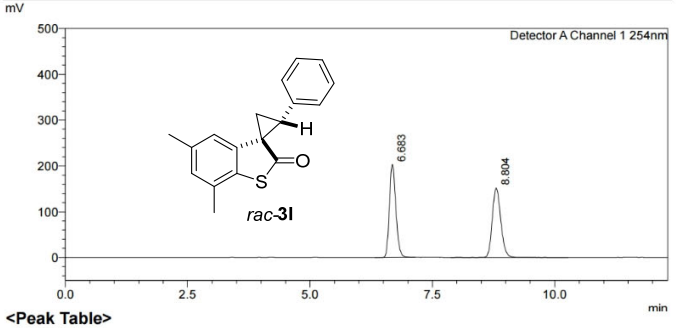


<Peak Table>

Detector A Channel 1 254nm

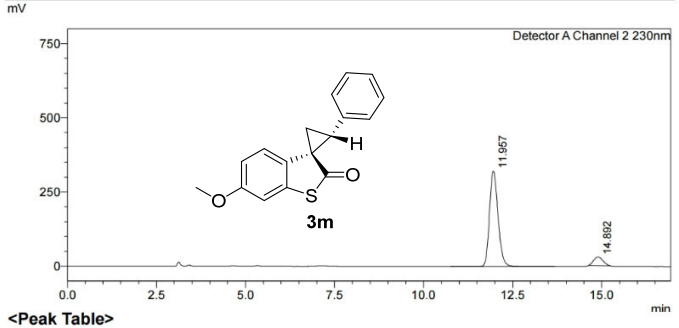
Peak#	Ret. Time	Area	Height	Conc.
1	6.683	1870086	203090	50.449
2	8.804	1836831	151585	49.551
Total		3706917	354675	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-82-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-82-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/15 10:56:17	Acquired by	: System Administrator
Date Processed	: 2020/9/15 11:24:24	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

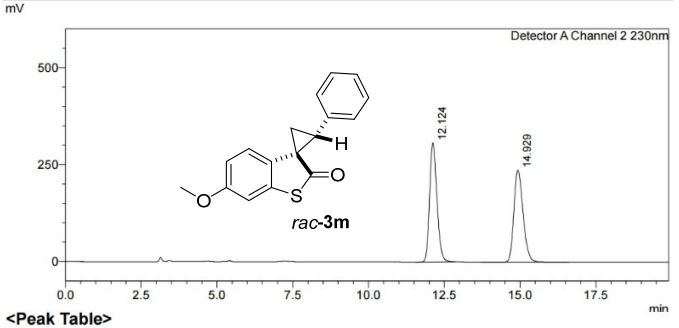
Peak#	Ret. Time	Area	Height	Conc.
1	11.957	5371595	321369	90.888
2	14.892	538552	29338	9.112
Total		5910147	350707	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-81-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-81-rac-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/15 10:34:50	Acquired by	: System Administrator
Date Processed	: 2020/9/15 11:19:59	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

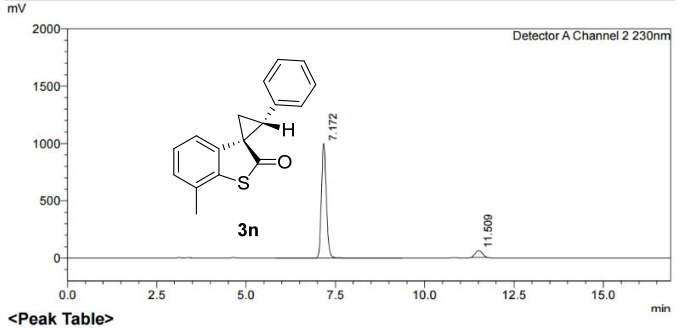
Peak#	Ret. Time	Area	Height	Conc.
1	12.124	5177085	306477	50.812
2	14.929	5011551	236906	49.188
Total		10188636	543384	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-103-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-103-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/25 10:28:38	Acquired by	: System Administrator
Date Processed	: 2020/9/25 10:52:32	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

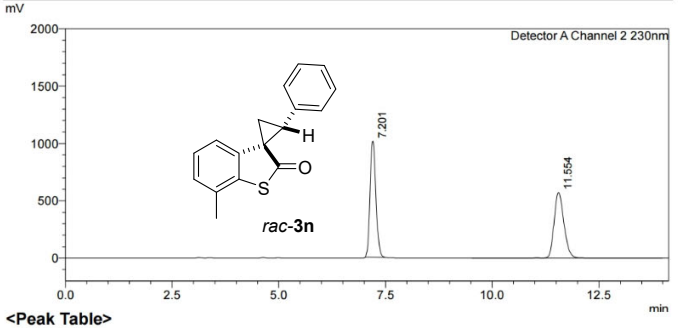
Peak#	Ret. Time	Area	Height	Conc.
1	7.172	9595667	1000371	92.221
2	11.509	809462	59334	7.779
Total		10405129	1059704	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-102-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-102-rac-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/25 9:20:58	Acquired by	: System Administrator
Date Processed	: 2020/9/25 11:01:18	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

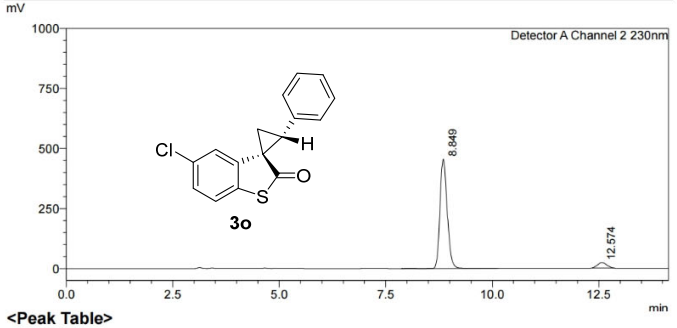
Peak#	Ret. Time	Area	Height	Conc.
1	7.201	9611064	1013443	51.157
2	11.554	9176405	570698	48.843
Total		18787469	1584140	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-72-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-72-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/9 9:53:27	Acquired by	: System Administrator
Date Processed	: 2020/9/9 10:19:21	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

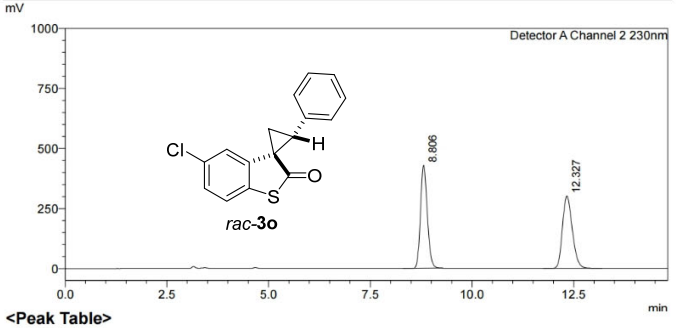
Peak#	Ret. Time	Area	Height	Conc.
1	8.849	5417426	455955	94.183
2	12.574	334625	22287	5.817
Total		5752051	478242	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-61-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-61-rac-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/8 10:09:26	Acquired by	: System Administrator
Date Processed	: 2020/9/8 15:03:48	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	8.806	5050769	429698	50.112
2	12.327	5028171	301135	49.888
Total		10078940	730834	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-58-5-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-58-5-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/1 8:47:11	Acquired by	: System Administrator
Date Processed	: 2020/9/1 9:10:42	Processed by	: System Administrator

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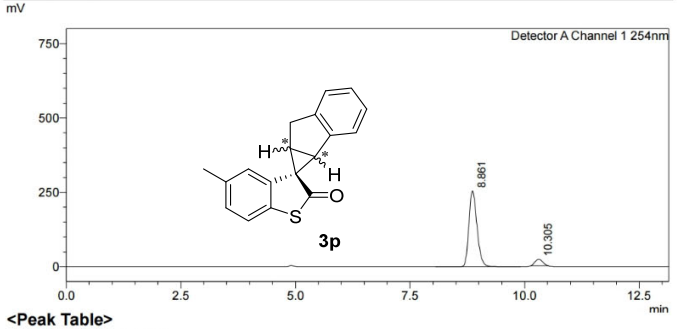

<Peak Table>

Detector A Channel 1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	8.861	3147385	254840	92.376
2	10.305	259778	21824	7.624
Total		3407163	276664	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-7-1-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-7-1-rac-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/17 9:59:30	Acquired by	: System Administrator
Date Processed	: 2020/9/1 9:21:18	Processed by	: System Administrator

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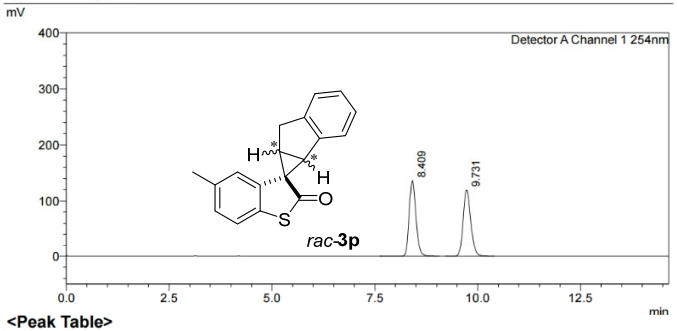


<Peak Table>

Detector A Channel 1 254nm

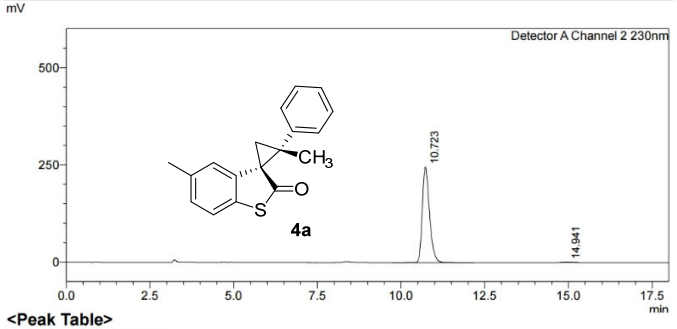
Peak#	Ret. Time	Area	Height	Conc.
1	8.409	1563634	136458	49.921
2	9.731	1568610	119571	50.079
Total		3132244	256029	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-58-4-asy-adh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-58-4-asy-adh-99-1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 16:10:52	Acquired by	: System Administrator
Date Processed	: 2020/8/31 16:48:06	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	10.723	3724287	246009	99.472
2	14.941	19779	1080	0.528
Total		3744066	247089	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-7-2-2-rac-adh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-7-2-2-rac-adh-99-1-1.0ml3.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/8/31 15:50:16	Acquired by	: System Administrator
Date Processed	: 2020/8/31 16:14:45	Processed by	: System Administrator

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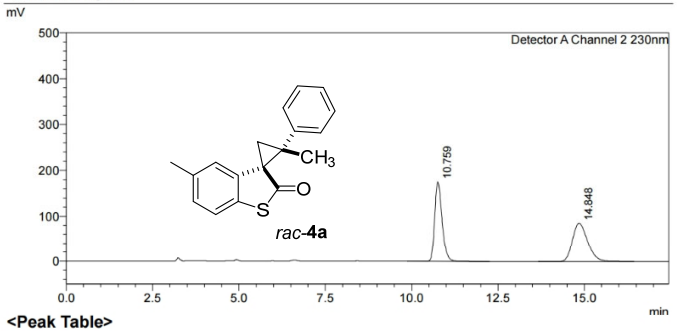

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	10.759	2638454	175311	50.198
2	14.848	2617591	85368	49.802
Total		5256045	260679	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-94-1B-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-94-1B-asy-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 14:44:50	Acquired by	: System Administrator
Date Processed	: 2020/9/23 15:56:23	Processed by	: System Administrator

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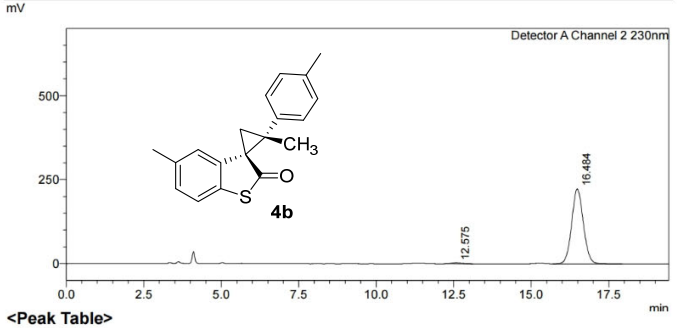

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	12.575	69970	3077	1.180
2	16.484	5860672	222906	98.820
Total		5930642	225983	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-92-1B-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-92-1B-rac-ozh-99-1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 15:27:08	Acquired by	: System Administrator
Date Processed	: 2020/9/23 16:03:44	Processed by	: System Administrator

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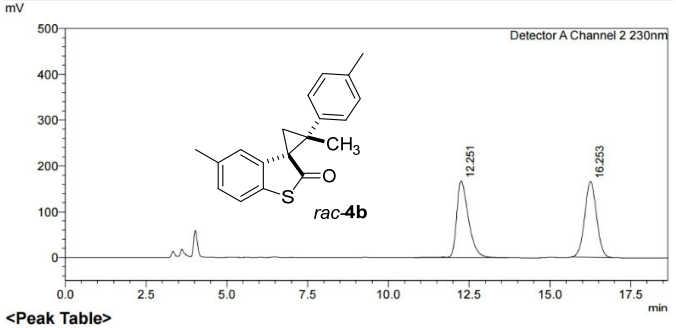

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	12.251	4265057	167657	50.314
2	16.253	4211741	165569	49.686
Total		8476798	333226	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-94-2B-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-94-2B-asy-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 15:05:24	Acquired by	: System Administrator
Date Processed	: 2020/9/23 16:30:36	Processed by	: System Administrator

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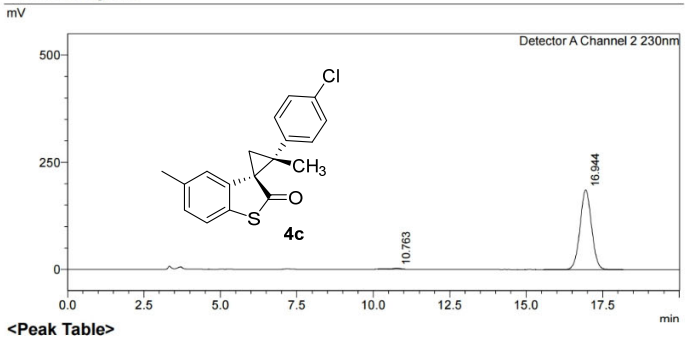


<Peak Table>

Detector A Channel 2 230nm

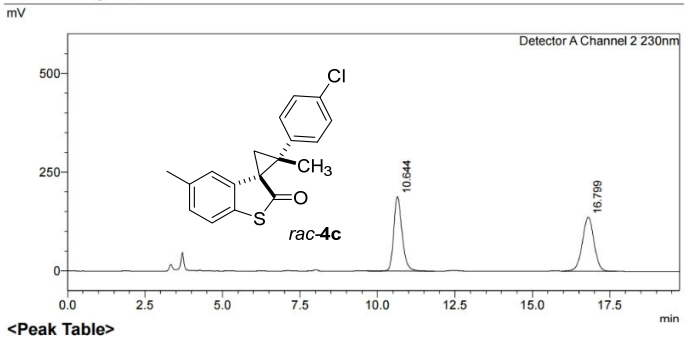
Peak#	Ret. Time	Area	Height	Conc.
1	10.763	59630	2821	1.202
2	16.944	4902022	186088	98.798
Total		4961652	188909	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-92-2B-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-92-2B-rac-ozh-99-1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 15:46:48	Acquired by	: System Administrator
Date Processed	: 2020/9/23 16:21:26	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	10.644	3519845	188393	49.560
2	16.799	3582360	137070	50.440
Total		7102205	325464	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-124-1-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-124-1-asy-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/7 17:42:16	Acquired by	: System Administrator
Date Processed	: 2020/10/7 21:00:21	Processed by	: System Administrator

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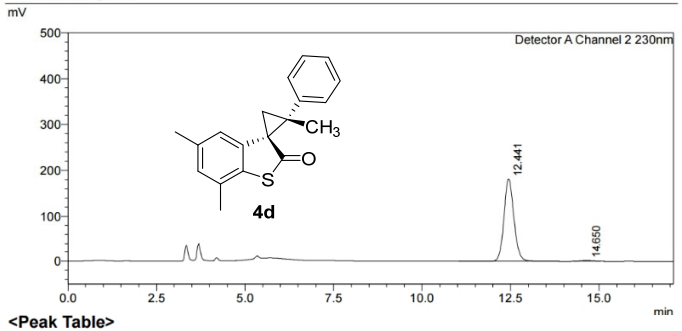

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	12.441	3552457	181614	98.931
2	14.650	38398	1639	1.069
Total		3590855	183253	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-118-1-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-118-1-rac-ozh-99-1-1.0ml4.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/7 20:37:34	Acquired by	: System Administrator
Date Processed	: 2020/10/7 21:02:34	Processed by	: System Administrator

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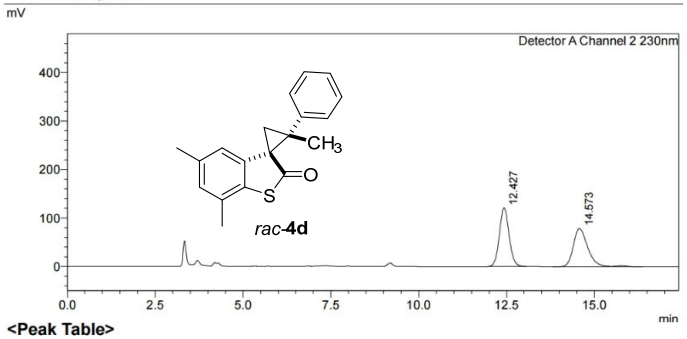

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	12.427	2322492	121166	50.501
2	14.573	2276405	78827	49.499
Total		4598898	199993	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-94-5-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-94-5-asy-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 17:37:26	Acquired by	: System Administrator
Date Processed	: 2020/9/23 20:02:07	Processed by	: System Administrator

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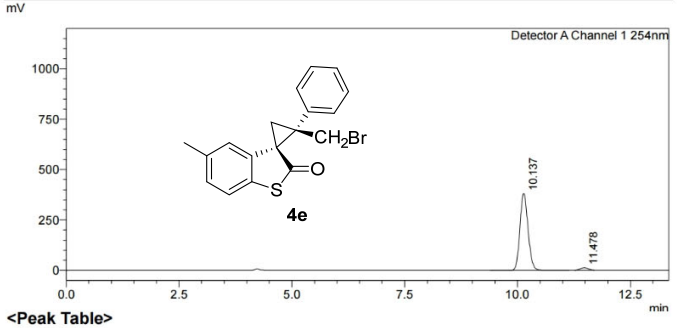


<Peak Table>

Detector A Channel 1 254nm

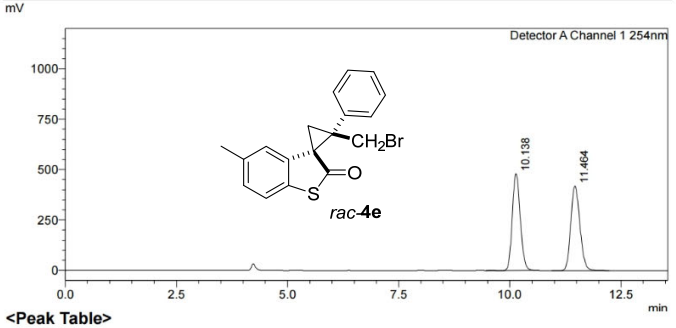
Peak#	Ret. Time	Area	Height	Conc.
1	10.137	4779252	381566	96.833
2	11.478	156321	12378	3.167
Total		4935573	393944	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-92-5-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-92-5-rac-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 16:58:47	Acquired by	: System Administrator
Date Processed	: 2020/9/23 20:03:55	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

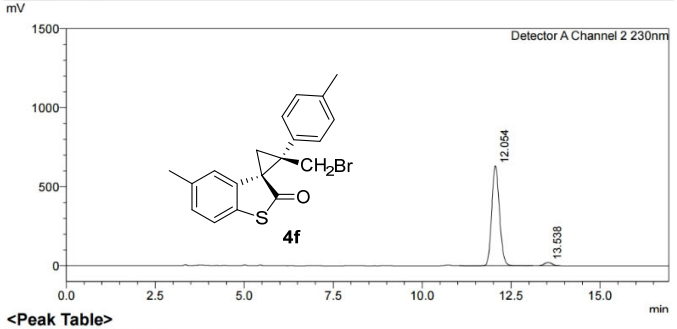
Peak#	Ret. Time	Area	Height	Conc.
1	10.138	6003866	479733	49.989
2	11.464	6006438	418840	50.011
Total		12010304	898573	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-122-5-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-122-5-asy-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/7 14:55:55	Acquired by	: System Administrator
Date Processed	: 2020/10/7 15:39:16	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

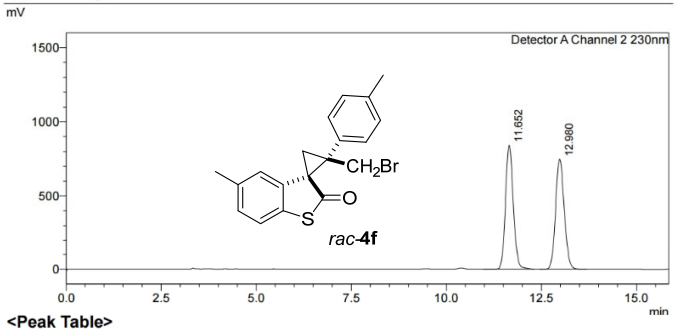
Peak#	Ret. Time	Area	Height	Conc.
1	12.054	9597110	632769	96.839
2	13.538	313219	20417	3.161
Total		9910329	653185	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-113-5-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-113-5-rac-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/6 16:41:14	Acquired by	: System Administrator
Date Processed	: 2020/10/7 15:39:43	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

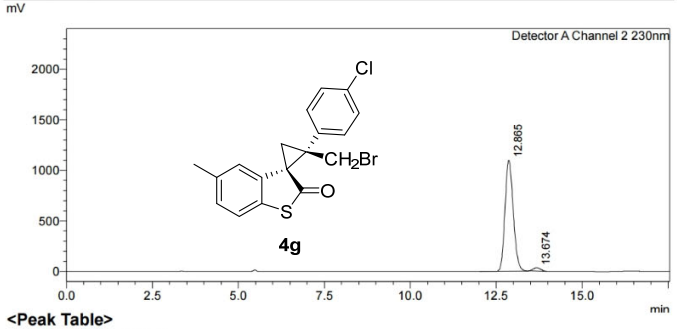
Peak#	Ret. Time	Area	Height	Conc.
1	11.652	12132553	841938	50.384
2	12.980	11947650	748561	49.616
Total		24080204	1590498	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-122-6-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-122-6-asy-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/7 15:13:57	Acquired by	: System Administrator
Date Processed	: 2020/10/7 15:48:02	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

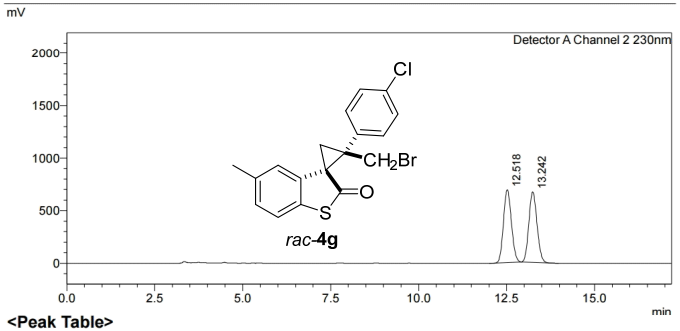
Peak#	Ret. Time	Area	Height	Conc.
1	12.865	18297446	1096722	97.350
2	13.674	498050	33443	2.650
Total		18795496	1130165	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-113-6-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-113-6-rac-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/6 16:58:04	Acquired by	: System Administrator
Date Processed	: 2020/10/7 15:48:43	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

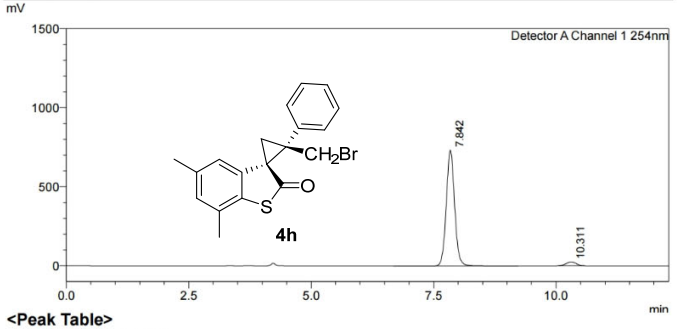
Peak#	Ret. Time	Area	Height	Conc.
1	12.518	10868733	692620	50.088
2	13.242	10830755	670194	49.912
Total		21699488	1362814	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-124-2-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-124-2-asy-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/7 17:09:28	Acquired by	: System Administrator
Date Processed	: 2020/10/7 17:30:02	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

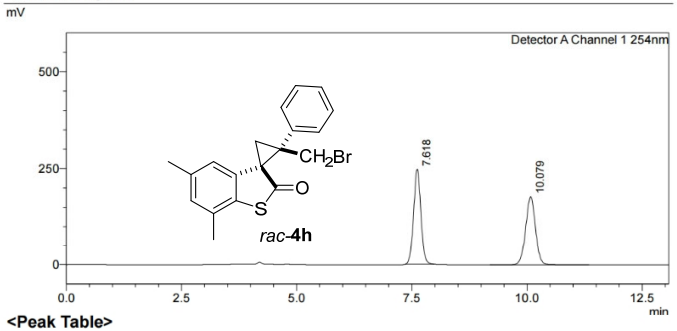
Peak#	Ret. Time	Area	Height	Conc.
1	7.842	8726826	732452	96.134
2	10.311	350935	24786	3.866
Total		9077761	757238	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-118-2-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-118-2-rac-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/6 15:13:55	Acquired by	: System Administrator
Date Processed	: 2020/10/7 17:33:49	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

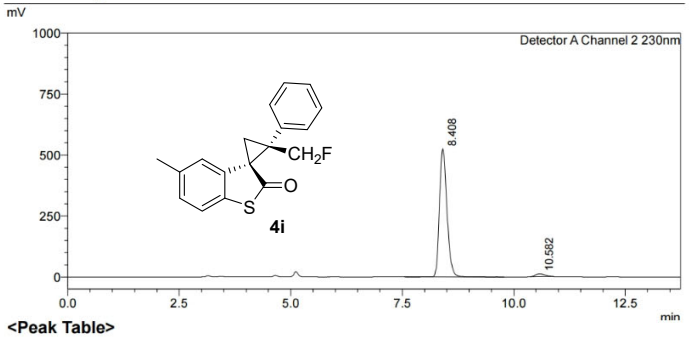
Peak#	Ret. Time	Area	Height	Conc.
1	7.618	2733158	247308	50.807
2	10.079	2646293	177690	49.193
Total		5379451	424998	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-73-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-73-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/8 11:08:11	Acquired by	: System Administrator
Date Processed	: 2020/9/8 11:34:27	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

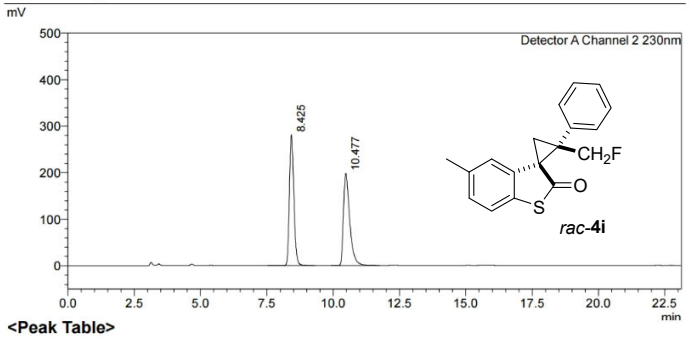
Peak#	Ret. Time	Area	Height	Conc.
1	8.408	6145489	524495	97.362
2	10.582	166520	10934	2.638
Total		6312010	535428	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-62-1-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-62-1-rac-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/8 10:25:26	Acquired by	: System Administrator
Date Processed	: 2020/9/8 11:35:42	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

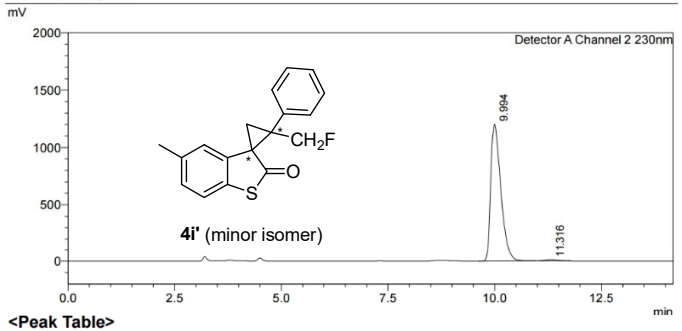
Peak#	Ret. Time	Area	Height	Conc.
1	8.425	3282611	280787	50.140
2	10.477	3264229	198067	49.860
Total		6546841	478854	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-73B-asy-adh-98-2-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-73B-asy-adh-98-2-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/24 15:48:57	Acquired by	: System Administrator
Date Processed	: 2020/10/24 16:06:40	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	9.994	19926325	1202841	98.964
2	11.316	208631	9638	1.036
Total		20134956	1212479	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-62-2-rac-adh-98-2-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-62-2-rac-adh-98-2-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/24 15:33:18	Acquired by	: System Administrator
Date Processed	: 2020/10/24 15:58:02	Processed by	: System Administrator

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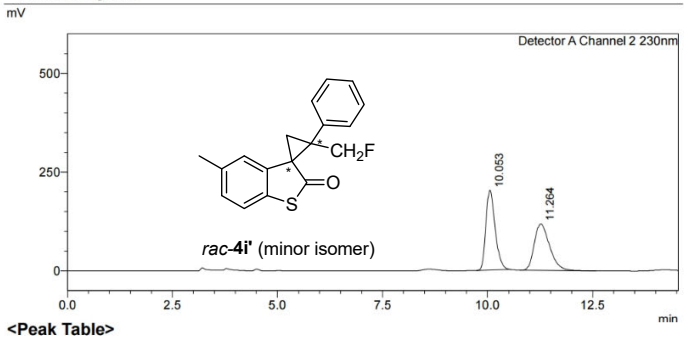

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	10.053	3108683	202288	50.973
2	11.264	2989966	117605	49.027
Total		6098649	319893	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-94-3-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-94-3-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 21:12:10	Acquired by	: System Administrator
Date Processed	: 2020/9/23 21:31:57	Processed by	: System Administrator

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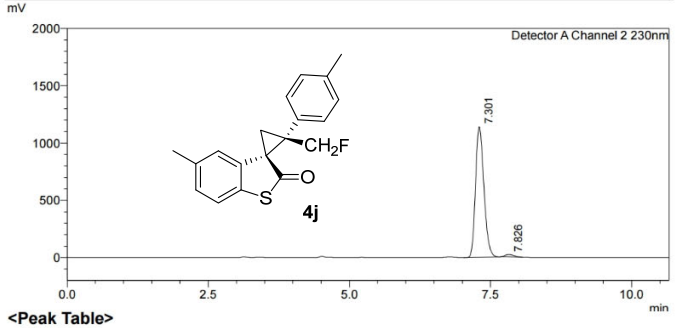

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	7.301	11756251	1139439	98.080
2	7.826	230095	21251	1.920
Total		11986346	1160691	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-92-3-rac-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-92-3-rac-odh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 9:06:47	Acquired by	: System Administrator
Date Processed	: 2020/9/23 21:25:16	Processed by	: System Administrator

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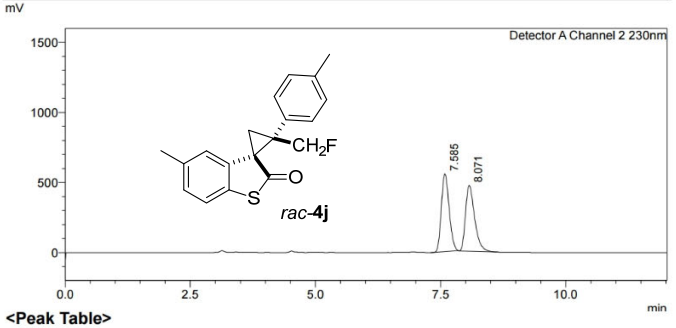

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	7.585	6004508	554433	50.152
2	8.071	5968122	468263	49.848
Total		11972630	1022696	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-94-4-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-94-4-asy-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 17:14:03	Acquired by	: System Administrator
Date Processed	: 2020/9/23 17:46:09	Processed by	: System Administrator

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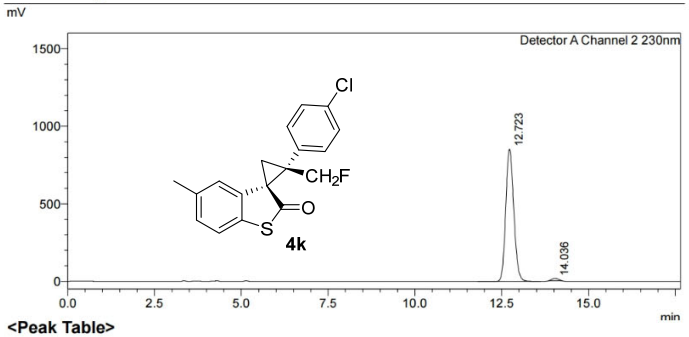

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	12.723	13705552	851833	98.537
2	14.036	203458	15315	1.463
Total		13909010	867148	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-92-4-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-92-4-rac-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/23 16:36:00	Acquired by	: System Administrator
Date Processed	: 2020/9/23 16:57:18	Processed by	: System Administrator

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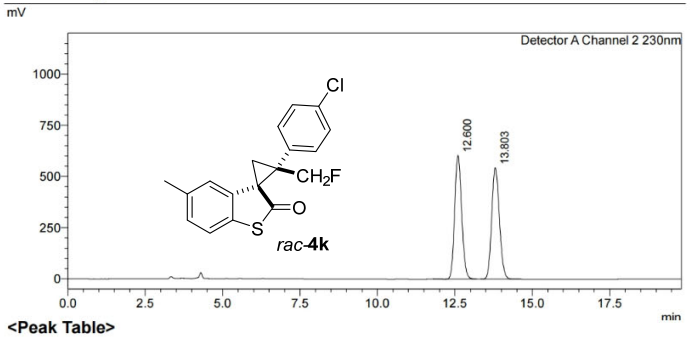

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	12.600	9508280	604345	50.038
2	13.803	9493960	545729	49.962
Total		19002240	1150074	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-122-4-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-122-4-asy-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/7 14:26:51	Acquired by	: System Administrator
Date Processed	: 2020/10/7 15:11:34	Processed by	: System Administrator

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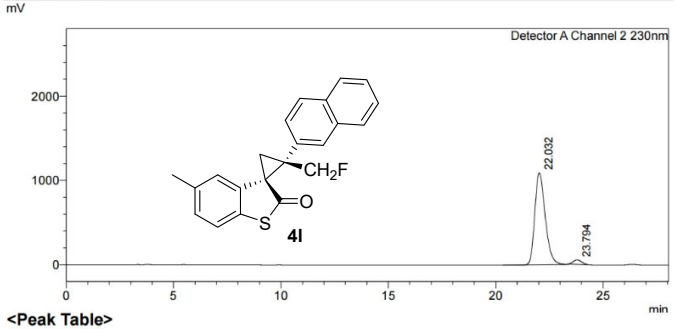

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	22.032	36504545	1087529	96.348
2	23.794	1383852	51214	3.652
Total		37888397	1138743	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-113-4-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-113-4-rac-oxh-99-1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/7 15:32:38	Acquired by	: System Administrator
Date Processed	: 2020/10/7 16:07:02	Processed by	: System Administrator

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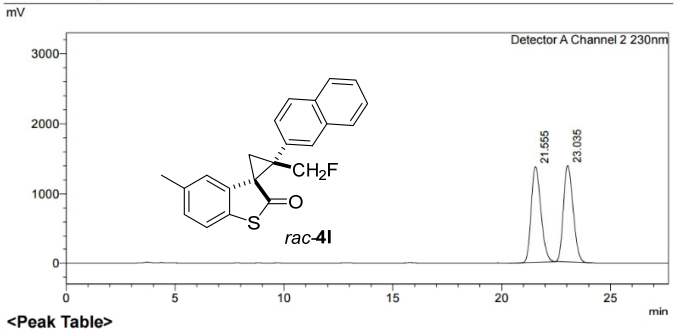

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	21.555	42884768	1377457	49.803
2	23.035	43223391	1389941	50.197
Total		86108159	2767398	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-122-3-asy-odh-98-2-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-122-3-asy-odh-98-2-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/7 11:20:22	Acquired by	: System Administrator
Date Processed	: 2020/10/7 14:34:21	Processed by	: System Administrator

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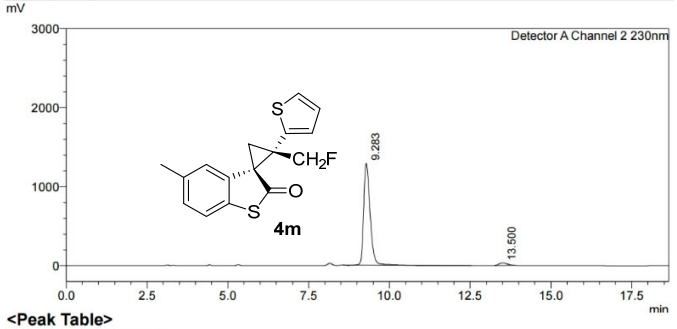

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	9.283	17722233	1288439	96.683
2	13.500	608016	32303	3.317
Total		18330249	1320743	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-113-3b-rac-odh-98-2-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-113-3b-rac-odh-98-2-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/7 11:50:30	Acquired by	: System Administrator
Date Processed	: 2020/10/7 14:20:04	Processed by	: System Administrator

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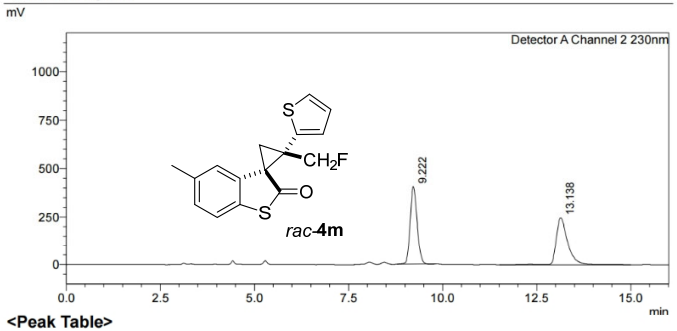

<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	9.222	5182608	404324	49.993
2	13.138	5184052	246070	50.007
Total		10366659	650394	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-86-3-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-86-3-asy-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/17 15:50:34	Acquired by	: System Administrator
Date Processed	: 2020/9/17 16:10:34	Processed by	: System Administrator

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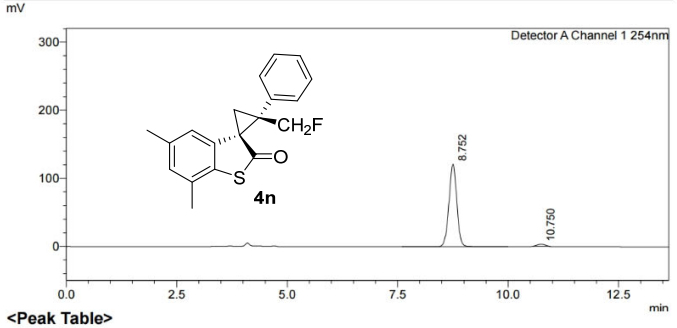

<Peak Table>

Detector A Channel 1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	8.752	1506673	121087	97.491
2	10.750	38770	3097	2.509
Total		1545443	124184	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-84-3-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-84-3-rac-ozh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/9/17 15:20:53	Acquired by	: System Administrator
Date Processed	: 2020/9/17 15:53:05	Processed by	: System Administrator

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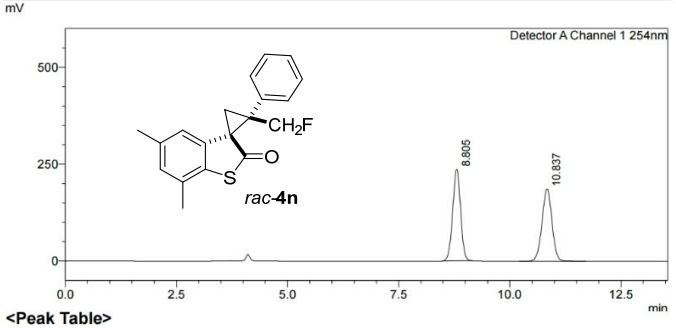


<Peak Table>

Detector A Channel 1 254nm

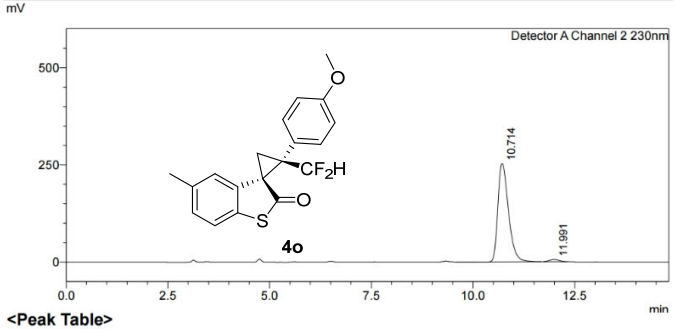
Peak#	Ret. Time	Area	Height	Conc.
1	8.805	2933417	235568	50.165
2	10.837	2914112	186057	49.835
Total		5847529	421625	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-133-asy-odh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-133-asy-odh-99-1-1.0ml1.lcd		
Method Filename	: 278-254nm.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/16 18:39:12	Acquired by	: System Administrator
Date Processed	: 2020/10/17 9:29:47	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

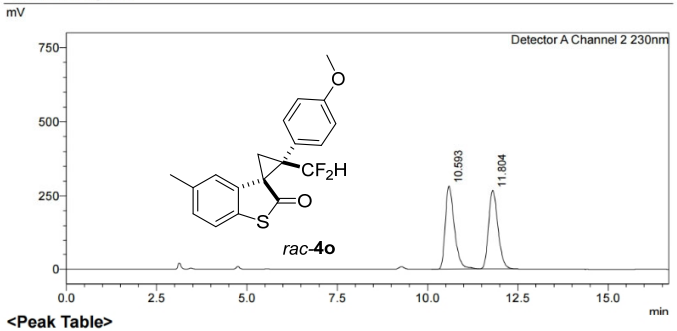
Peak#	Ret. Time	Area	Height	Conc.
1	10.714	4513976	252938	97.968
2	11.991	93603	5650	2.032
Total		4607580	258587	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-120A-rac-odh-99-1-1.0ml-2		
Sample ID	:		
Data Filename	: pbw-pc-120A-rac-odh-99-1-1.0ml-3.lcd		
Method Filename	: 278-254nm.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/16 19:26:45	Acquired by	: System Administrator
Date Processed	: 2020/10/17 9:37:13	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

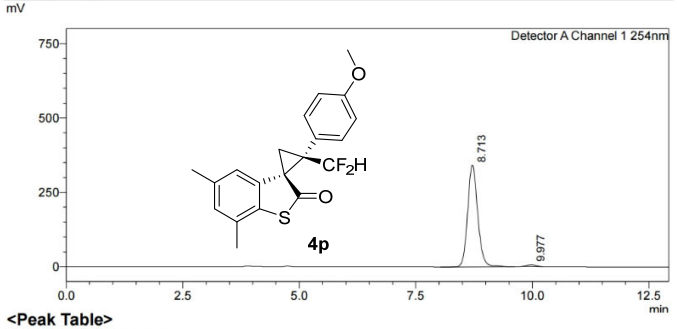
Peak#	Ret. Time	Area	Height	Conc.
1	10.593	4964864	283206	50.618
2	11.804	4843710	268133	49.382
Total		9808574	551338	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-140-5-asy-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-140-5-asy-ozh-99-1-1.0ml.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/31 10:30:20	Acquired by	: System Administrator
Date Processed	: 2020/10/31 10:58:08	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	8.713	5165255	342067	98.487
2	9.977	79354	5896	1.513
Total		5244608	347962	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-135-5-rac-ozh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-135-5-rac-ozh-99-1-1.0ml001.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/31 10:46:08	Acquired by	: System Administrator
Date Processed	: 2020/10/31 11:03:59	Processed by	: System Administrator

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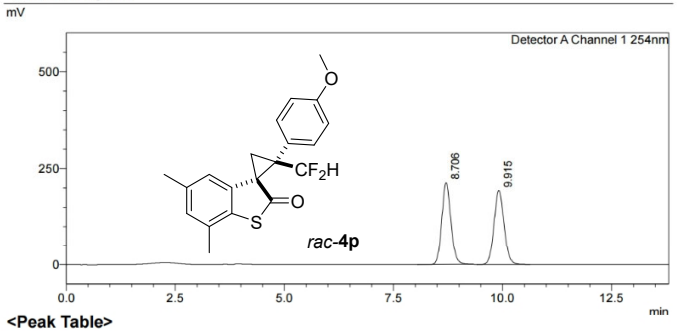


<Peak Table>

Detector A Channel 1 254nm

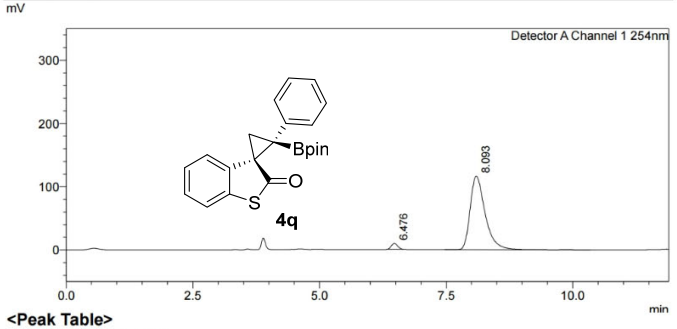
Peak#	Ret. Time	Area	Height	Conc.
1	8.706	3134051	213020	50.021
2	9.915	3131394	192956	49.979
Total		6265445	405976	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-11-1-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-11-1-asy-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/3 10:19:50	Acquired by	: System Administrator
Date Processed	: 2020/11/3 10:41:11	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

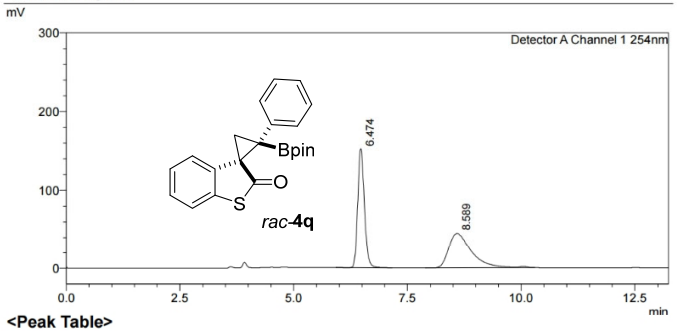
Peak#	Ret. Time	Area	Height	Conc.
1	6.476	79105	9278	3.195
2	8.093	2396525	116438	96.805
Total		2475630	125716	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-142-1-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-142-1-rac-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/3 9:07:30	Acquired by	: System Administrator
Date Processed	: 2020/11/3 9:24:22	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

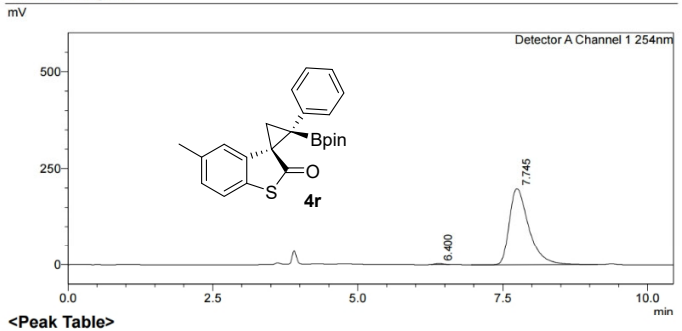
Peak#	Ret. Time	Area	Height	Conc.
1	6.474	1556214	151987	50.064
2	8.589	1552258	44650	49.936
Total		3108472	196637	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-141-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-141-asy-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/31 15:41:12	Acquired by	: System Administrator
Date Processed	: 2020/10/31 16:03:13	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

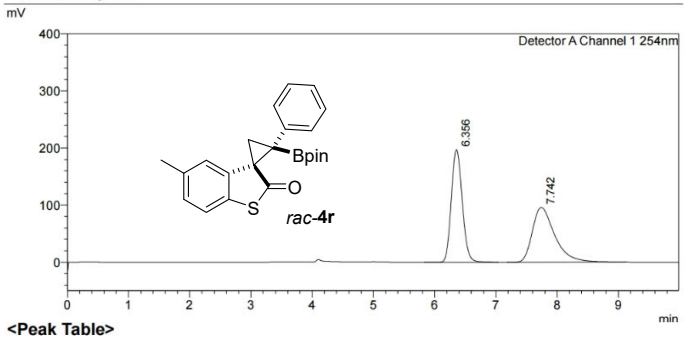
Peak#	Ret. Time	Area	Height	Conc.
1	6.400	27446	2916	0.583
2	7.745	4677918	198877	99.417
Total		4705364	201793	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-136-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-136-rac-oxh-99-1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/10/31 15:30:16	Acquired by	: System Administrator
Date Processed	: 2020/10/31 15:46:11	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	6.356	2468710	197262	50.238
2	7.742	2445326	95798	49.762
Total		4914036	293060	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-11-2-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-11-2-asy-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/3 10:32:40	Acquired by	: System Administrator
Date Processed	: 2020/11/3 11:40:11	Processed by	: System Administrator

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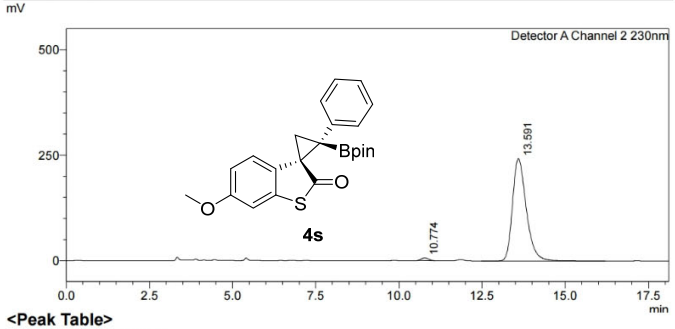


<Peak Table>

Detector A Channel 2 230nm

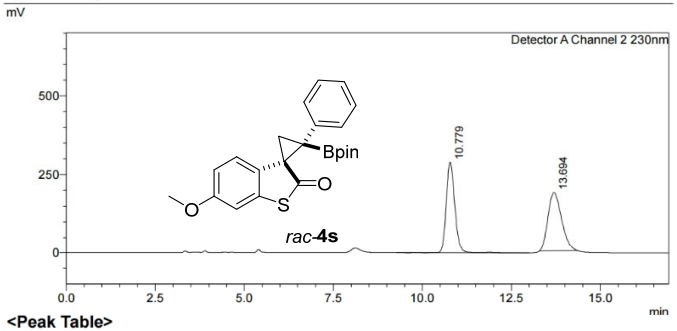
Peak#	Ret. Time	Area	Height	Conc.
1	10.774	87782	6038	1.239
2	13.591	6994752	242788	98.761
Total		7082534	248826	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-142-3-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-142-3-rac-oxh-99-1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/3 11:04:37	Acquired by	: System Administrator
Date Processed	: 2020/11/3 11:37:33	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

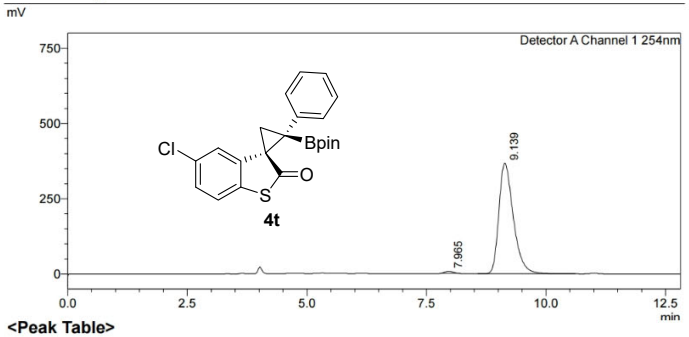
Peak#	Ret. Time	Area	Height	Conc.
1	10.779	4866096	289933	49.042
2	13.694	5056172	187585	50.958
Total		9922269	477518	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-11-3-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-11-3-asy-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/10 15:09:49	Acquired by	: System Administrator
Date Processed	: 2020/11/10 15:24:49	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

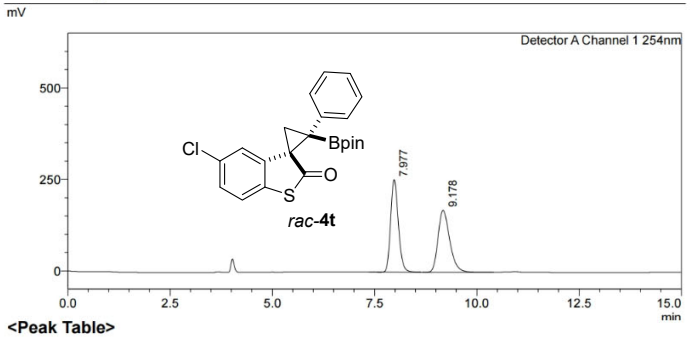
Peak#	Ret. Time	Area	Height	Conc.
1	7.965	89401	7546	1.142
2	9.139	7739553	367159	98.858
Total		7828954	374704	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-142-2-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-142-2-rac-oxh-99-1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/10 14:39:59	Acquired by	: System Administrator
Date Processed	: 2020/11/10 15:18:23	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	7.977	3354674	252916	49.937
2	9.178	3363071	169393	50.063
Total		6717745	422309	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-17-4-asy-oxh-99.9-0.1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-17-4-asy-oxh-99.9-0.1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/7 10:38:49	Acquired by	: System Administrator
Date Processed	: 2020/11/7 11:05:30	Processed by	: System Administrator

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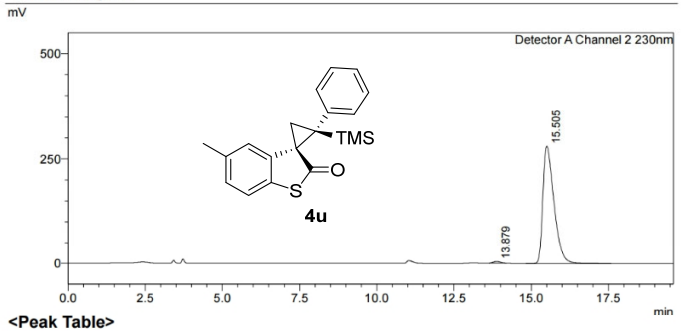


<Peak Table>

Detector A Channel 2 230nm

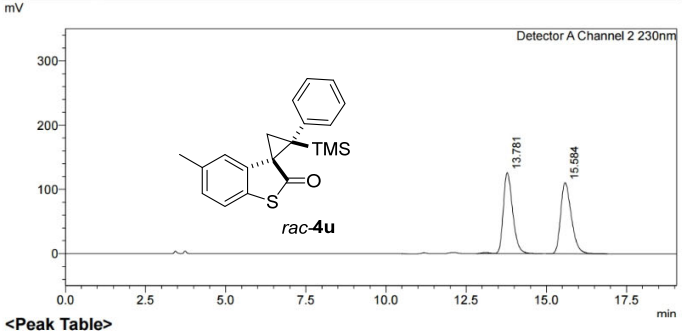
Peak#	Ret. Time	Area	Height	Conc.
1	13.879	67856	4000	0.952
2	15.505	7061792	280844	99.048
Total		7129649	284843	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-7-rac-oxh-99.9-0.1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-7-rac-oxh-99.9-0.1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/7 10:18:19	Acquired by	: System Administrator
Date Processed	: 2020/11/7 10:59:43	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	13.781	2593140	126047	50.089
2	15.584	2583885	110675	49.911
Total		5177026	236722	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-17-1-asy-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-17-1-asy-oxh-99-1-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/16 11:36:05	Acquired by	: System Administrator
Date Processed	: 2020/11/16 15:00:32	Processed by	: System Administrator

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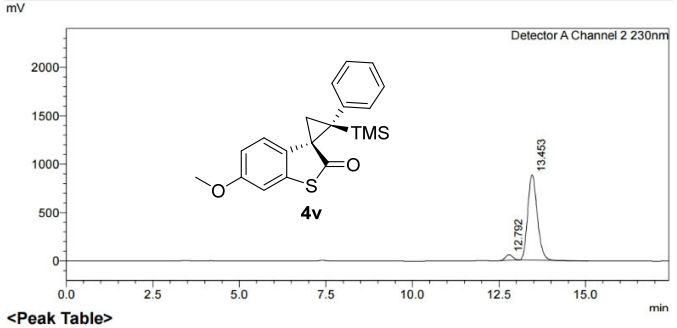


<Peak Table>

Detector A Channel 2 230nm

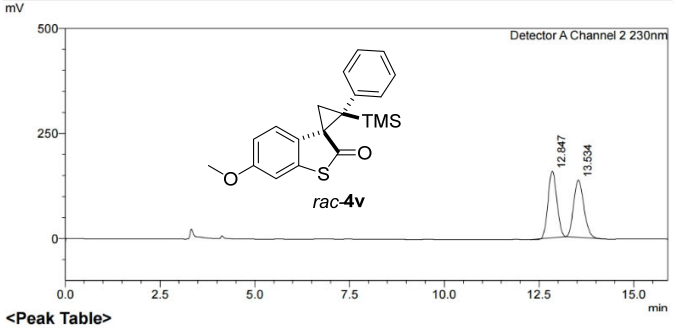
Peak#	Ret. Time	Area	Height	Conc.
1	12.792	854293	56991	4.783
2	13.453	17007807	881818	95.217
Total		17862100	938810	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-15-1-rac-oxh-99-1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-15-1-rac-oxh-99-1-1.0ml4.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/17 8:43:46	Acquired by	: System Administrator
Date Processed	: 2020/11/17 9:02:31	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

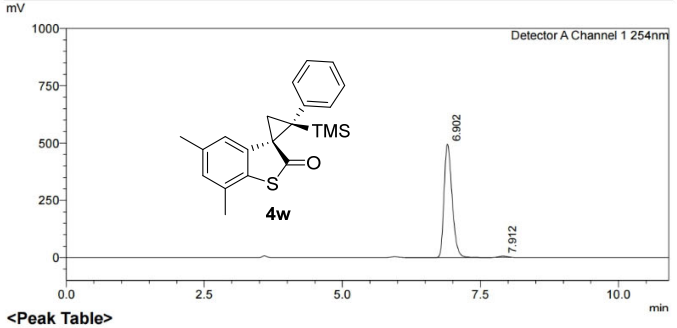
Peak#	Ret. Time	Area	Height	Conc.
1	12.847	2562508	158531	50.067
2	13.534	2555654	136119	49.933
Total		5118162	294650	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-17-3-asy-oxh-99.5-0.5-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-17-3-asy-oxh-99.5-0.5-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/12 22:54:28	Acquired by	: System Administrator
Date Processed	: 2020/11/12 23:11:40	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

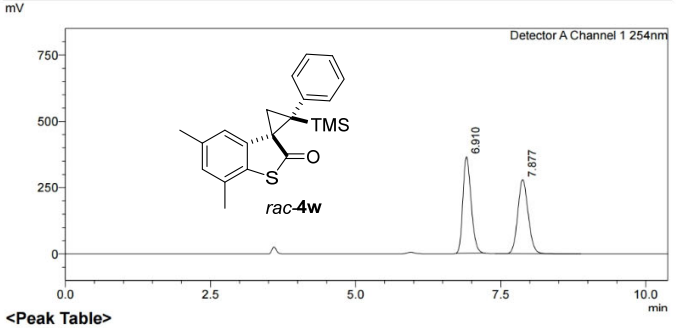
Peak#	Ret. Time	Area	Height	Conc.
1	6.902	5020900	495420	99.021
2	7.912	49620	5383	0.979
Total		5070520	500804	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-15-3-rac-oxh-99.5-0.5-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-15-3-rac-oxh-99.5-0.5-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/12 22:43:01	Acquired by	: System Administrator
Date Processed	: 2020/11/12 22:56:17	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

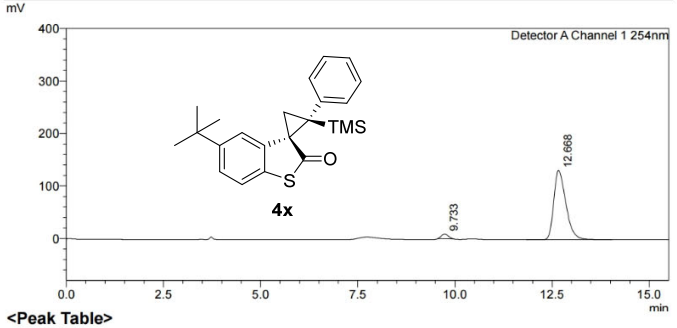
Peak#	Ret. Time	Area	Height	Conc.
1	6.910	3574227	363012	50.519
2	7.877	3500751	278944	49.481
Total		7074977	641956	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-17-6-asy-oxh-99.9-0.1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-17-6-asy-oxh-99.9-0.1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/16 10:27:21	Acquired by	: System Administrator
Date Processed	: 2020/11/16 10:58:23	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	9.733	117537	9368	3.952
2	12.668	2856206	131950	96.048
Total		2973743	141318	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-15-6-rac-oxh-99.9-0.1-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-15-6-rac-oxh-99.9-0.1-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
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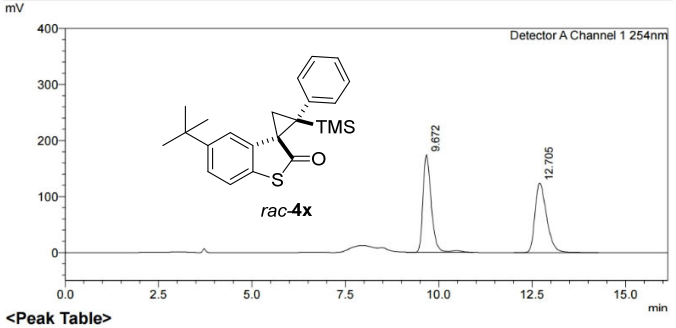


<Peak Table>

Detector A Channel 1 254nm

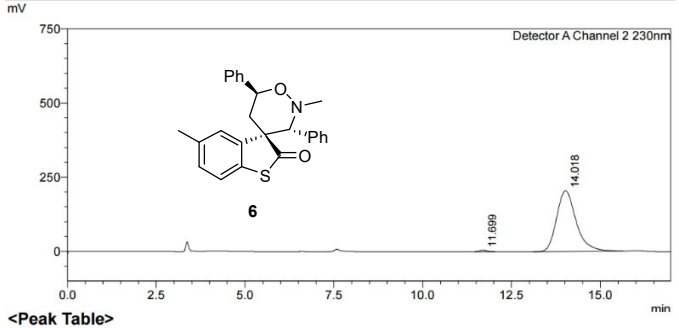
Peak#	Ret. Time	Area	Height	Conc.
1	9.672	2704895	173693	50.164
2	12.705	2687179	124075	49.836
Total		5392074	297767	

Analysis Report

<Sample Information>

Sample Name	: pbw-pd-12A-asy-oxh-99.5-0.5-1.0ml		
Sample ID	:		
Data Filename	: pbw-pd-12A-asy-oxh-99.5-0.5-1.0ml1.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/3 16:34:06	Acquired by	: System Administrator
Date Processed	: 2020/11/3 17:01:26	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

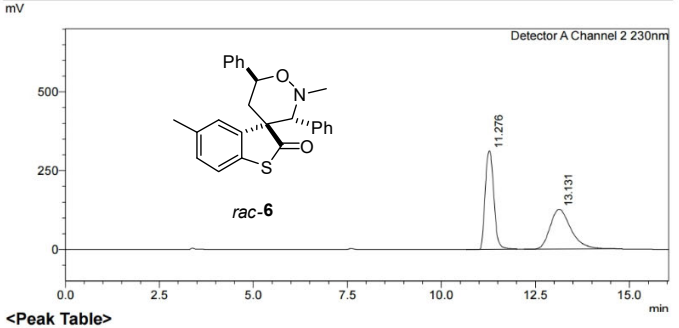
Peak#	Ret. Time	Area	Height	Conc.
1	11.699	76484	5782	0.962
2	14.018	7870605	205034	99.038
Total		7947089	210816	

Analysis Report

<Sample Information>

Sample Name	: pbw-pc-144-1A-rac-oxh-99.5-0.5-1.0ml		
Sample ID	:		
Data Filename	: pbw-pc-144-1A-rac-oxh-99.5-0.5-1.0ml2.lcd		
Method Filename	: 1.0ml-254-230.lcm		
Batch Filename	:		
Vial #	: 1-1	Sample Type	: Unknown
Injection Volume	: 20 uL		
Date Acquired	: 2020/11/3 16:52:32	Acquired by	: System Administrator
Date Processed	: 2020/11/3 17:09:51	Processed by	: System Administrator

<Chromatogram>



<Peak Table>

Detector A Channel 2 230nm

Peak#	Ret. Time	Area	Height	Conc.
1	11.276	4970596	312476	50.407
2	13.131	4890352	126288	49.593
Total		9860948	438764	