Supplementary Information

Fenton-like Chemistry Enables Catalytic Oxidative Desulfurization of Thioacetals and Thioketals with Hydrogen Peroxide

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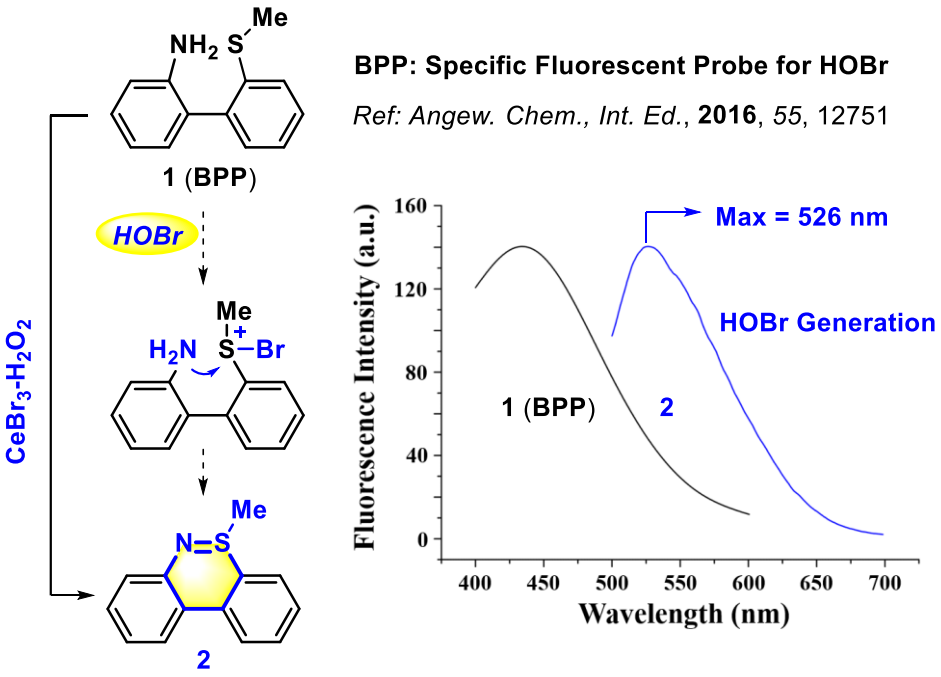
1. General Information

Reactions were carried out in a round-bottom flask with vigorous stirring at room temperature with open-air condition, unless otherwise noted. Anhydrous ethanol (EtOH), acetonitrile (MeCN), tetrahydrofuran (THF), dichloromethane (DCM), dimethyl sulfoxide (DMSO), *N,N*-dimethylformamide (DMF), 1-butanol (*n*-BuOH) and pyridine were used as received without further purification unless otherwise noted. Anhydrous $CeBr_3$, $FeBr_2$ and $FeBr_3$ were purchased from Sigma-Aldrich and dried under vacuum before use. Solvents were used as received from commercial suppliers without prior purification for workup, extraction and column chromatography. Reactions were monitored by thin-layer chromatography (TLC, 0.25 mm) on pre-coated silica gel plates. Flash chromatography was performed with silica gel 60 (particle size 0.040-0.062 mm). ^{1}H- and ^{13}C-NMR spectra were recorded on a 400 MHz spectrometer (400 MHz for ^{1}H, 100 MHz for ^{13}C). Chemical shifts are reported in parts per million (ppm) as values relative to the internal chloroform (7.26 ppm for ^{1}H and 77.16 ppm for ^{13}C) or DMSO (2.50 ppm for ^{1}H and 39.52 ppm for ^{13}C). Abbreviations for signal coupling are as follows: s, singlet; d, doublet; t, triplet; q, quartet; m, multiplet. Mass spectra were detected by ESI-TOF (Agilent 6520 or G6125B) or GC-MS (Agilent 7890A/5975C). Infrared spectrometry was recorded on Nicolet iS10 FT-IR (Thermo). Fluorescence emission spectra were recorded on LS-45 fluorescence spectrophotometer (PerkinElmer). Optical rotations were measured on Autopol I polarimeter (Rudolph Research Analytical) with $[\alpha]_D$ values reported in degrees. Melting points were determined on MP70 instrument (Mettler Toledo) without correction.

2. [Br^+] from $CeBr_3$-H_2O_2 system was confirmed to be HOBr.

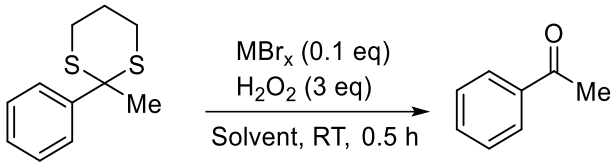


To a stirred solution of fluorescent probe **BPP**[1] (compound **1**, 108 mg, 0.5 mmol) in MeCN/H_2O (3/1, 10 mL) were added $CeBr_3$ (56.9 mg, 0.15 mmol) and H_2O_2 (30%, 150 μL, 1.5 mmol). After completion of the addition, the reaction mixture was stirred at room temperature (rt) for 1.5 h. The reaction was quenched by aqueous $Na_2S_2O_3$ solution (0.1 M, 50 mL) and ethyl acetate (50 mL). The organic fractions were collected, and the aqueous phase was extracted with ethyl acetate (2 × 20 mL). The combined organic fractions were washed with H_2O, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. Compound **2**[1] was purified by flash column chromatography (ethyl acetate/hexane = 1:1 to 3:1) as a gray solid (85.3 mg, 80%). M.P. 142–144 ℃. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.95 (d, *J* = 8.1 Hz, 1H), 7.89 (d, *J* = 8.0 Hz, 1H), 7.63–7.57 (m, 1H), 7.42 (d, *J* = 4.6 Hz, 2H), 7.34–7.27 (m, 1H), 7.22 (d, *J* = 8.2 Hz, 1H), 6.97 (t, *J* = 7.5 Hz, 1H), 2.35 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 148.7, 132.6, 131.9, 130.5, 127.6, 125.8, 124.8, 124.6, 124.3, 123.6, 120.8, 119.8, 32.1. IR 2971.9, 2895.4, 1590.2, 1563.1, 1465.4, 1413.1, 1280.4, 1218.5, 1148.6, 1109.4, 1037.1, 738.3 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{13}H_{12}NS$ $[M+H]^+$ 214.0685; found 214.0683.

Notably, no product **2** was furnished after the combination of Br_2 (38.4 μL, 0.75 mmol) or H_2O_2 (30%, 150 μL, 1.5 mmol) with fluorescent probe **BPP** (108 mg, 0.5 mmol) following the above protocol (1.5 h at rt in MeCN/H_2O 3/1), further indicating the specificity of fluorescent probe **BPP** for HOBr[1] detection.

The emission spectra of fluorescent probe **BPP 1** (0.9 mM in MeCN, black) and **2** (7.5 mM in MeCN, blue) were got under the excitation wavelength of 375 nm and 480 nm respectively, and the emission wavelength collected were 400-600 nm (for **BBP**) and 500-700 nm (for compound **2**), which were reported in the literature[1].

3. Optimization of the 1,3-dithiane deprotection.



3a **4a**

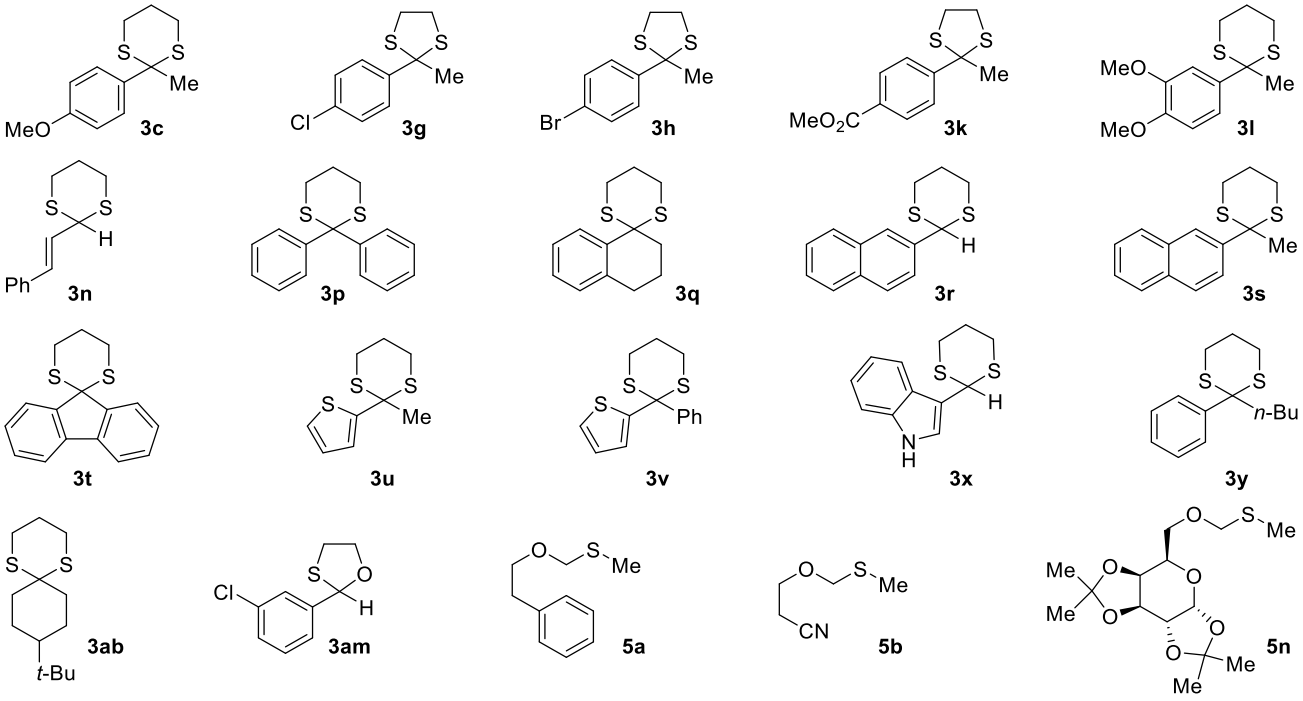
General Procedure: To a stirred solution of compound **3a** (21.0 mg, 0.1 mmol) in solvent (1 mL) were added MBr_x (0.01 mmol) and H_2O_2 (30 wt%, 30 μL, 0.3 mmol). After completion of the addition, the reaction mixture was allowed to stir at room temperature (rt) for 1.5 h. The reaction was quenched by dilute aqueous $Na_2S_2O_3$ solution (0.1 M, 10 mL) and ethyl acetate (10 mL). The organic fractions were collected, and the aqueous phase was extracted with ethyl acetate (2 × 10 mL). The combined organic fractions were washed with H_2O, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. Yield was determined by ^{1}H-NMR of the crude reaction mixture using CH_2Br_2 as the internal reference.

entry[a]	*MBr$_x$ (0.1 eq)*	*Solvent*	*Yield*[c] *(%)*
1	$CeBr_3$	DCM/H_2O (10/1)	<5
2	$CeBr_3$	DMSO/H_2O (10/1)	<5
3	$CeBr_3$	DMF/H_2O (10/1)	<5
4	$CeBr_3$	THF/H_2O (10/1)	13
5	$CeBr_3$	*n*-BuOH/H_2O (10/1)	32
6	$CeBr_3$	MeCN/H_2O (10/1)	70
7	$CeBr_3$	EtOH/H_2O (10/1)	75
8	**$CeBr_3$**	**EtOH**	**77**
9	$FeBr_2$	EtOH	69
10	$FeBr_3$	EtOH	73
11[b]	**$CeBr_3$**	**EtOH**	**86**

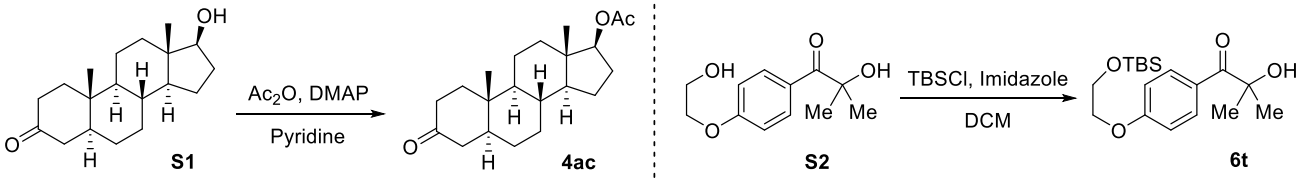
[a]Reaction was carried out at rt: **3a** (0.1 mmol) was dissolved in solvent (1 mL), then $CeBr_3$, $FeBr_2$ or $FeBr_3$ (0.01 mmol), and H_2O_2 (30%, 30 μL, 0.3 mmol) were added and stirred at rt for 1.5 h. [b]0.005 mmol $CeBr_3$ and 0.2 mmol H_2O_2 were added, and the reaction was stirred at 40°C for 15 min. [c]Yield was determined by ^{1}H-NMR of the crude reaction mixture using CH_2Br_2 as the internal reference.

4. Preparation of thioacetals, thioketals and methylthiomethyl ether.

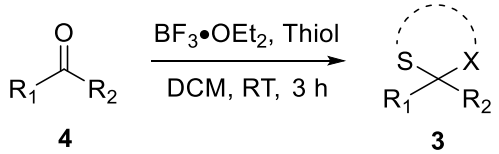
4.1. Substrates **3c**[2], **3g**[3], **3h**[4], **3k**[5], **3l**[6], **3n**[7], **3p-t**[8], **3u**[9], **3v**[10], **3x**[11], **3y**[12], **3ab**[7], **3am**[13], **5a**[14], **5b**[15] and **5n**[16] were prepared according to the published procedure.



4.2. Synthesis of 4ac and 6t: To a stirred solution of compound **S1** or **S2** (20 mmol) in anhydrous pyridine (40 mL) or dichloromethane (DCM: 100 mL) were added acetic anhydride (Ac_2O: 9.4 mL, 100 mmol) and 4-dimethylaminopyridine (DMAP: 244 mg, 2 mmol) or *tert*-butyldimethylsilyl chloride (TBSCl: 3.01 g, 20 mmol) and imidazole (2.04 g, 30 mmol). After completion of the addition, the reaction mixture was allowed to stir at rt for 1 h. Then the mixture was quenched by cooled aqueous HCl or $NaHCO_3$ solution and DCM (200 mL). The organic fractions were collected, and the aqueous phase was extracted with DCM (2 × 100 mL). The combined organic fractions were washed with brine, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. The resulting residue was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) to give **4ac** (4.72 g, 71%) or **6t** (5.42 g, 80%). The detail spectra data was described in detail below (Part 5).



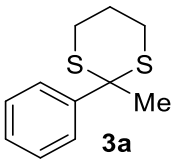
4.3. Others were synthesized according to "**General Procedure I or II**" as below:



General Procedure I: To a stirred solution of compound **4** (8 mmol) in DCM (40 mL) were added thiol (1,3-propanedithiol, 1,2-ethanedithiol, 2-mercaptoethanol, 3-mercaptopropanol, 2-mercaptophenol, 2-aminothiophenol or L-cysteine ethyl ester hydrochloride: 8 mmol; 4-methylbenzenethiol or benzyl

mercaptan: 16 mmol) and BF_3•OEt_2 (1.97 mL, 16 mmol) at rt. After completion of the addition, the reaction mixture was allowed to stir at rt for 3 h. Then the mixture was quenched by saturated aqueous $NaHCO_3$ solution (100 mL) and CH_2Cl_2 (100 mL). The organic fractions were collected, and the aqueous phase was extracted with CH_2Cl_2 (3 × 50 mL). The combined organic fractions were washed with brine, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. The resulting residue was purified by flash column chromatography to give compound **3**.

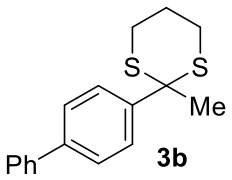
2-Methyl-2-phenyl-1,3-dithiane (3a)



3a

3a[17] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.26 g, 75%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.96–7.91 (m, 2H), 7.38–7.33 (m, 2H), 7.26–7.21 (m, 1H), 2.76–2.64 (m, 4H), 1.95–1.89 (m, 2H), 1.78 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 143.8, 128.5, 127.7, 127.0, 53.9, 32.8, 28.1, 24.6. IR 3055.6, 2907.4, 1593.1, 1485.7, 1440.9, 1368.0, 1275.1, 1179.9, 1062.5, 906.6, 866.5, 760.5 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{11}H_{15}S_2$ $[M+H]^+$ 211.0610; found 211.0610.

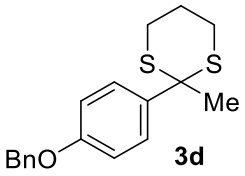
2-Methyl-2-(4-phenylphenyl)-1,3-dithiane (3b)



3b

3b was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a white solid (1.83 g, 80%). M.P. 135–137 ℃. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.03–7.99 (m, 2H), 7.65–7.60 (m, 4H), 7.48–7.43 (m, 2H), 7.39–7.34 (m, 1H), 2.81–2.75 (m, 4H), 2.02–1.95 (m, 2H), 1.85 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 143.1, 140.7, 140.0, 128.9, 128.4, 127.5, 127.4, 127.2, 53.9, 32.9, 28.3, 24.8. IR 2878.7, 1591.8, 1478.2, 1390.6, 1275.8, 1175.3, 1069.9, 999.6, 845.7, 761.6 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{17}H_{19}S_2$ $[M+H]^+$ 287.0923; found 287.0922.

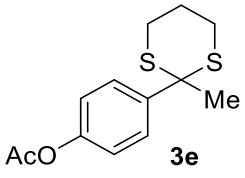
2-Methyl-2-(4-benzyloxyphenyl)-1,3-dithiane (3d)



3d

3d was purified by flash column chromatography (dichloromethane/hexane = 1:1 to 2:1) as a white solid (1.77 g, 70%). M.P. 98–100 ℃. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.87–7.82 (m, 2H), 7.49–7.36 (m, 5H), 7.00–6.95 (m, 2H), 5.08 (s, 2H), 2.81–2.69 (m, 4H), 1.99–1.93 (m, 2H), 1.81 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 158.0, 137.1, 136.2, 129.3, 128.7, 128.1, 127.7, 114.8, 70.2, 53.6, 32.3, 28.3, 24.9. IR 3030.9, 2906.3, 1600.2, 1573.8, 1498.1, 1453.7, 1383.7, 1287.4, 1236.1, 1169.8, 1070.4, 1007.1, 835.9, 736.5 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{18}H_{21}OS_2$ $[M+H]^+$ 317.1028; found 317.1028.

2-Methyl-2-(4-acetoxyphenyl)-1,3-dithiane (3e)

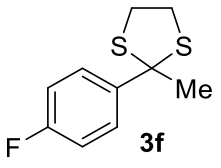


3e

3e[18] was purified by flash column chromatography (dichloromethane/hexane = 1:1 to 2:1) as a light-yellow oil (1.70 g, 79%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.96–7.92 (m, 2H), 7.10–7.05 (m, 2H), 2.75–2.69 (m, 4H), 2.30 (s, 3H), 1.99–1.88 (m, 2H), 1.77 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 169.5, 149.7, 141.5, 129.2, 121.6,

53.7, 33.1, 28.2, 24.7, 21.3. IR 2900.7, 1763.3, 1591.2, 1494.0, 1415.5, 1363.6, 1277.8, 1189.2, 1067.1, 1011.1, 903.9, 846.3 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{13}H_{17}O_2S_2$ $[M+H]^+$ 269.0664; found 269.0666.

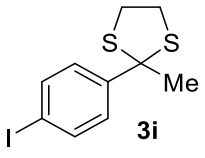
2-Methyl-2-(4-fluorophenyl)-1,3-dithiolane (3f)



3f

3f was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.37 g, 80%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.76–7.69 (m, 2H), 7.01–6.94 (m, 2H), 3.52–3.43 (m, 2H), 3.42–3.34 (m, 2H), 2.13 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 160.7 (d, J = 245 Hz), 141.9 (d, J = 3.2 Hz), 128.8 (d, J = 8 Hz), 114.7 (d, J = 21.3 Hz), 68.1, 40.6, 34.0. IR 2922.4, 1599.3, 1501.2, 1445.3, 1372.8, 1273.8, 1224.2, 1106.3, 1067.1, 1013.2, 833.6 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{10}H_{12}FS_2$ $[M+H]^+$ 215.0359; found 215.0357.

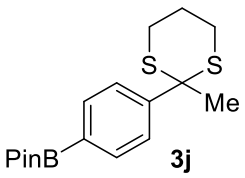
2-Methyl-2-(4-iodophenyl)-1,3-dithiolane (3i)



3i

3i was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.86 g, 72%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.65–7.58 (m, 2H), 7.53–7.46 (m, 2H), 3.49–3.39 (m, 2H), 3.38–3.28 (m, 2H), 2.11 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 146.0, 137.0, 129.0, 92.9, 68.1, 40.5, 33.5. IR 2916.4, 1568.7, 1465.3, 1435.9, 1374.9, 1263.5, 1172.4, 1102.9, 1066.4, 817.3 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{10}H_{12}IS_2$ $[M+H]^+$ 322.9420; found 322.9412.

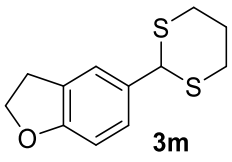
2-Methyl-2-[4-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl]-1,3-dithiane (3j)



3j

3j was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a white solid (1.78 g, 66%). M.P. 153–155 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.98–7.93 (m, 2H), 7.84–7.81 (m, 2H), 2.73–2.67 (m, 4H), 1.96–1.90 (m, 2H), 1.76 (s, 3H), 1.35 (s, 12H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 147.2, 135.3, 127.3, 84.0, 54.4, 33.0, 28.2, 25.0, 24.7. IR 2972.6, 2906.4, 1600.9, 1391.9, 1356.7, 1324.0, 1265.7, 1209.9, 1138.7, 1066.6, 1013.9, 849.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{17}H_{26}BO_2S_2$ $[M+H]^+$ 337.1462; found 337.1468.

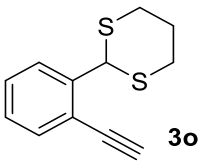
2-(2,3-dihydrobenzofuran-5-yl)-1,3-dithiane (3m)



3m

3m was purified by flash column chromatography (dichloromethane/hexane = 1:1 to 2:1) as a white solid (1.33 g, 70%). M.P. 167–169 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.32 (s, 1H), 7.18 (dd, J = 8.2, 2.0 Hz, 1H), 6.71 (d, J = 8.2 Hz, 1H), 5.11 (s, 1H), 4.52 (t, J = 8.7 Hz, 2H), 3.15 (t, J = 8.7 Hz, 2H), 3.08–2.99 (m, 2H), 2.91–2.84 (m, 2H), 2.18–2.11 (m, 1H), 1.95–1.83 (m, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 160.3, 131.3, 127.8, 127.6, 124.4, 109.3, 71.5, 51.1, 32.3, 29.6, 25.1. IR 2926.3, 2891.1, 1602.5, 1483.4, 1417.2, 1319.8, 1275.6, 1237.0, 1174.2, 1099.0, 898.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{12}H_{15}OS_2$ $[M+H]^+$ 239.0559; found 239.0550.

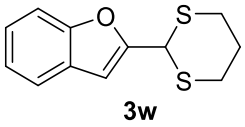
2-(2-ethynylphenyl)-1,3-dithiane (3o)



3o

THF (40 mL) was used as the reaction solvent instead of DCM, and **3o** was purified by flash column chromatography (dichloromethane/hexane = 1:1 to 2:1) as a white solid (1.15 g, 65%). M.P. 102–104 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.65 (dd, *J* = 7.9, 1.2 Hz, 1H), 7.47 (dd, *J* = 7.7, 1.4 Hz, 1H), 7.34 (td, *J* = 7.6, 1.4 Hz, 1H), 7.22 (td, *J* = 7.6, 1.4 Hz, 1H), 5.73 (s, 1H), 3.37 (s, 1H), 3.14–3.05 (m, 2H), 2.87 (dt, *J* = 14.4, 4.2 Hz, 2H), 2.20–2.10 (m, 1H), 1.99–1.86 (m, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 141.0, 133.1, 129.6, 128.14, 128.09, 120.7, 82.2, 80.9, 48.9, 32.3, 25.2. IR 3236.8, 3048.4, 2945.9, 2891.1, 2103.2, 1475.4, 1443.1, 1271.2, 1243.2, 1191.3, 756.9 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{13}S_2$ $[M+H]^+$ 221.0453; found 221.0452.

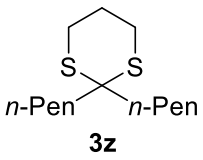
2-(benzofuran-2-yl)-1,3-dithiane (3w)



3w

3w was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.40 g, 74%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.50 (d, *J* = 7.5 Hz, 1H), 7.45 (d, *J* = 8.1 Hz, 1H), 7.28–7.22 (m, 1H), 7.22–7.16 (m, 1H), 6.77 (s, 1H), 5.26 (s, 1H), 3.02–2.94 (m, 2H), 2.93–2.85 (m, 2H), 2.14–2.04 (m, 1H), 2.04–1.92 (m, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 154.7, 154.6, 128.0, 124.5, 122.9, 121.0, 111.3, 104.7, 41.9, 29.8, 25.2. IR 3087.7, 2901.8, 1583.8, 1446.1, 1419.2, 1341.4, 1273.4, 1244.7, 1199.0, 1159.7, 1124.6, 1005.2, 748.4 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{13}OS_2$ $[M+H]^+$ 237.0402; found 237.0399.

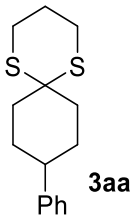
2,2-Dipentyl-1,3-dithiane (3z)



3z

3z[19] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.50 g, 72%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 2.77–2.74 (m, 4H), 1.92–1.88 (m, 2H), 1.82–1.79 (m, 4H), 1.40–1.35 (m, 4H), 1.32–1.27 (m, 4H), 1.27–1.22 (m, 4H), 0.85 (t, *J* = 4.0 Hz, 6H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 52.4, 37.1, 31.0, 25.0, 24.7, 22.7, 21.6, 13.1. IR 2930.2, 2860.7, 1458.2, 1421.8, 1376.4, 1272.9, 1239.0, 1120.4, 907.5, 734.5 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{14}H_{29}S_2$ $[M+H]^+$ 261.1705; found 261.1704.

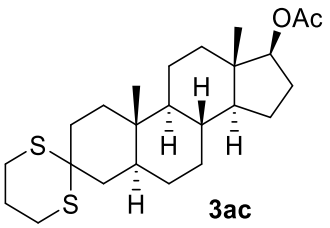
9-Phenyl-1,5-dithiaspiro[5.5]undecane (3aa)



3aa

3aa[20] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a white solid (1.44 g, 68%). M.P. 110–112 °C; ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.31–7.26 (m, 2H), 7.25–7.21 (m, 2H), 7.21–7.16 (m, 1H), 2.93–2.89 (m, 2H), 2.80–2.75 (m, 2H), 2.50 (tt, *J* = 12.1, 3.7 Hz, 1H), 2.50–2.44 (m, 2H), 2.05–1.94 (m, 4H), 1.87–1.78 (m, 2H), 1.76–1.69 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 146.7, 128.5, 127.0, 126.3, 49.8, 44.3, 38.2, 29.7, 26.4, 25.9. IR 3018.4, 2918.7, 1596.0, 1487.4, 1417.4, 1268.8, 1232.2, 1099.8, 1066.0, 993.0, 831.9, 755.2 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{15}H_{21}S_2$ $[M+H]^+$ 265.1079; found 265.1076.

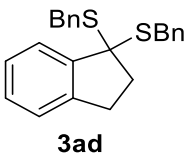
(5*S*)-17-Acetyl-4,5-dihydrotestosterone Cyclic 1,3-Propanediyl Dithioacetal (3ac)



3ac

3ac was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a white solid (2.03 g, 60%). M.P. 213–215 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.57 (t, *J* = 8.5 Hz, 1H), 2.90–2.84 (m, 2H), 2.76–2.71 (m, 2H), 2.23–2.08 (m, 2H), 2.02 (s, 3H), 2.00–1.93 (m, 2H), 1.92–1.78 (m, 2H), 1.73–1.53 (m, 6H), 1.52–1.38 (m, 4H), 1.33–1.19 (m, 4H), 1.18–0.88 (m, 4H), 0.80 (s, 3H), 0.76 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 171.3, 83.0, 54.1, 50.9, 50.6, 42.8, 41.5, 40.6, 37.0, 36.6, 35.4, 34.6, 34.0, 31.5, 28.1, 27.7, 26.41, 26.35, 26.1, 23.6, 21.3, 20.6, 12.2, 12.0. IR 2920.5, 2851.3, 1722.8, 1439.0, 1378.6, 1246.6, 1028.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{24}H_{39}O_2S_2$ [M+H]$^+$ 423.2386; found 423.2388. $[\alpha]_D^{25}$ = +21 (*c* 1, $CHCl_3$).

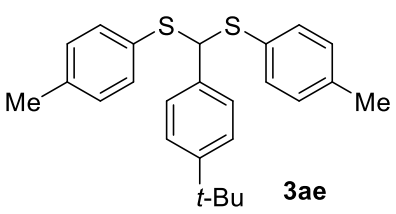
1-(Bisbenzylthio)indane (3ad)



3ad

$InCl_3$ (177 mg, 0.8 mmol) was used as the reaction solvent instead of BF_3•OEt_2, and **3ad** was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.45 g, 50%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.28–7.16 (m, 14H), 3.89 (d, *J* = 12.0 Hz, 2H), 3.71 (d, *J* = 12.0 Hz, 2H), 2.96 (t, *J* = 6.9 Hz, 2H), 2.44 (t, *J* = 6.9 Hz, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 144.0, 142.8, 137.4, 129.3, 128.6, 128.4, 127.1, 126.5, 125.5, 123.9, 67.7, 43.1, 36.0, 30.6. IR 2936.2, 2879.2, 1616.9, 1407.2, 1321.9, 1162.9, 1117.5, 1013.0, 758.9, 710.6 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{23}H_{23}S_2$ [M+H]$^+$ 363.1236; found 363.1223.

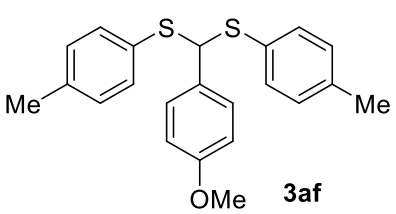
1-[Bis(4-tolylthio)methyl]-4-*tert*-butylbenzene (3ae)



3ae

3ae was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a white solid (2.39 g, 76%). M.P. 84–86 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.28–7.20 (m, 8H), 7.03 (d, *J* = 7.8 Hz, 4H), 5.31 (s, 1H), 2.30 (s, 6H), 1.29 (s, 9H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 151.0, 138.0, 137.0, 133.1, 131.4, 129.7, 127.6, 125.5, 61.3, 34.7, 31.5, 21.3. IR 2959.1, 2864.1, 1600.8, 1487.9, 1401.0, 1360.7, 1265.9, 1213.2, 1084.3, 1015.4, 800.4 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{25}H_{28}NaS_2$ [M+Na]$^+$ 415.1525; found 415.1534.

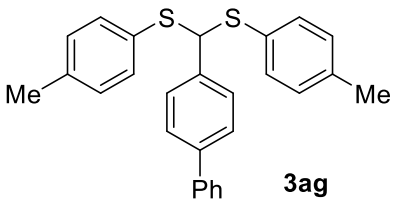
1-[Bis(4-tolylthio)methyl]-4-methoxybenzene (3af)



3af

3af[21] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (2.11 g, 72%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.31–7.24 (m, 6H), 7.05 (d, *J* = 7.9 Hz, 4H), 6.78–6.83 (m, 2H), 5.33 (s, 1H), 3.80 (s, 3H), 2.32 (s, 6H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 159.3, 138.0, 133.1, 132.1, 131.2, 129.7, 129.2, 113.8, 60.7, 55.4, 21.3. IR 2919.6, 1605.7, 1501.7, 1452.4, 1301.2, 1247.4, 1098.2, 1028.6, 835.9 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{22}H_{22}NaOS_2$ [M+Na]$^+$ 389.1004; found 389.0998.

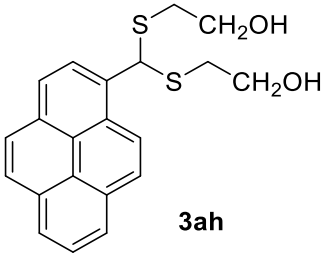
1-[Bis(4-tolylthio)methyl]-4-phenylbenzene (3ag)



3ag

3ag was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a white solid (2.48 g, 75%). M.P. 113–115 ℃. ^{1}H-NMR (400 MHz, DMSO) δ: 7.67–7.58 (m, 4H), 7.56–7.51 (m, 2H), 7.43 (t, *J* = 7.4 Hz, 2H), 7.38–7.33 (m, 1H), 7.29 (d, *J* = 8.0 Hz, 4H), 7.10 (d, *J* = 8.0 Hz, 4H), 6.00 (s, 1H), 2.25 (s, 6H). ^{13}C-NMR (100 MHz, DMSO) δ: 139.6, 139.4, 138.5, 137.2, 131.5, 130.5, 129.6, 128.9, 128.4, 127.6, 126.6, 57.1, 20.6. IR 3023.1, 2918.1, 1599.7, 1482.0, 1444.8, 1399.8, 1176.5, 1106.3, 1008.9, 838.2, 758.3 cm^{-1}; HRMS (ESI^{+}) (m/z) calcd. for $C_{27}H_{24}NaS_2$ [M+Na]$^{+}$ 435.1212; found 435.1208.

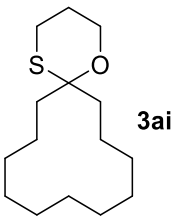
1-[Bis(2-Hydroxyethyl)thio]pyrene (3ah)



3ah

TsOH (800 mg, 4.64 mmol) was used instead of BF_3•OEt_2, and the mixture was refluxed with 2-mercaptoethanol (1.69 mL, 24 mmol) in EtOH for 24 h under nitrogen atmosphere. **3ah**[22] was purified by flash column chromatography (ethyl acetate/hexane =1:5 to 2:1) as a yellow solid (2.21 g, 75%). M.P. 132–134 ℃. ^{1}H-NMR (400 MHz, DMSO) δ: 8.65 (d, *J* = 9.4 Hz, 1H), 8.40–8.24 (m, 5H), 8.21–8.14 (m, 2H), 8.06 (t, *J* = 7.6 Hz, 1H), 6.43 (s, 1H), 4.80 (t, *J* = 5.4 Hz, 2H), 3.60–3.49 (m, 4H), 2.85–2.76 (m, 2H), 2.70–2.62 (m, 2H). ^{13}C-NMR (100 MHz, DMSO) δ: 134.4, 130.8, 130.3, 130.2, 127.54, 127.46, 127.3, 126.4, 126.0, 125.5, 125.3, 124.9, 124.1, 123.9, 60.8, 35.0. IR 3221.3, 2912.0, 1592.9, 1394.2, 1284.6, 1231.6, 1161.3, 1004.6, 823.2 cm^{-1}; HRMS (ESI^{+}) (m/z) calcd. for $C_{21}H_{20}NaO_2S_2$ [M+Na]$^{+}$ 391.0797; found 391.0789.

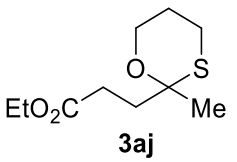
1-Oxa-5-thiaspiro[5.11]heptadecane (3ai)



3ai

THF (40 mL) was used as the reaction solvent instead of DCM, and **3ai** was purified by flash column chromatography (ethyl acetate/hexane = 1:20 to 1:5) as a light-yellow oil (1.23 g, 60%). M.P. 59–61 ℃. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 3.81 (t, *J* = 5.4 Hz, 2H), 2.86–2.82 (m, 2H), 2.17–2.08 (m, 2H), 1.83–1.68 (m, 4H), 1.34 (m, 18H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 85.5, 61.9, 33.3, 26.3, 26.2, 25.7, 24.1, 22.5, 22.1, 19.3. IR 2909.4, 2853.6, 1468.0, 1439.6, 1211.9, 1074.0, 1021.3, 722.1 cm^{-1}; HRMS (ESI^{+}) (m/z) calcd. for $C_{15}H_{29}OS$ [M+H]$^{+}$ 257.1934; found 257.1929.

2-[2-(Ethoxycarbonyl)ethyl]-2-methyl-1,3-oxathiane (3aj)

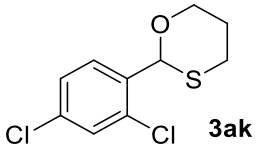


3aj

THF (40 mL) was used as the reaction solvent instead of DCM, and **3aj** was purified by flash column chromatography (ethyl acetate/petroleum ether = 1:20 to 1:5) as a light-yellow oil (1.36 g, 78%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.03 (q, *J* = 7.1 Hz, 2H), 3.83–3.72 (m, 2H), 2.82–2.76 (m, 2H), 2.46–2.32 (m, 2H), 2.23–2.03 (m, 2H), 1.74–1.67 (m, 2H), 1.48 (s, 3H), 1.17 (t, *J* = 7.2 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 173.5, 80.7, 61.9,

60.4, 35.4, 29.1, 26.1, 25.1, 24.3, 14.2. IR 2939.4, 2873.1, 1729.8, 1438.2, 1373.7, 1171.7, 1094.4, 1015.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{10}H_{19}O_3S$ $[M+H]^+$ 219.1049; found 219.1039.

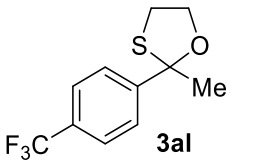
2-(2,4-Dichlorophenyl)-1,3-oxathiane (3ak)



3ak

THF (40 mL) was used as the reaction solvent instead of DCM, and **3ak** was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a white solid (1.46 g, 73%). M.P. 60–62 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.62 (d, *J* = 8.4 Hz, 1H), 7.34 (d, *J* = 2.1 Hz, 1H), 7.27 (dd, *J* = 8.4, 2.2 Hz, 1H), 6.03 (s, 1H), 4.36–4.29 (m, 1H), 3.79 (td, *J* = 12.5, 2.2 Hz, 1H), 3.21 (td, *J* = 13.2, 2.8 Hz, 1H), 2.86–2.79 (m, 1H), 2.18–2.05 (m, 1H), 1.82–1.74 (m, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 135.9, 134.8, 132.0, 129.7, 129.2, 127.7, 80.7, 70.9, 29.3, 25.7. IR 2912.8, 2865.5, 1585.1, 1465.8, 1376.8, 1342.9, 1227.9, 1072.8, 852.5, 752.1 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{10}H_{11}Cl_2OS$ $[M+H]^+$ 248.9902; found 248.9896.

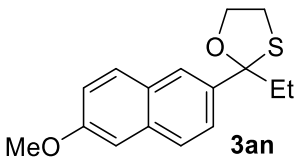
2-Methyl-2-(4-trifluoromethylphenyl)-1,3-oxathiolane (3al)



3al

THF (40 mL) was used as the reaction solvent instead of DCM, and **3al** was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.41 g, 71%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.63 (d, *J* = 4.7 Hz, 2H), 7.59 (d, *J* = 5.1 Hz, 2H), 4.38–4.34 (m, 1H), 4.04–4.00 (m, 1H), 3.25–3.21 (m, 1H), 3.09–3.05 (m, 1H), 1.92 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 151.1, 129.2 (q, *J* = 18.4 Hz), 125.4, 125.2 (q, *J* = 2.1 Hz), 121.9 (q, *J* = 155 Hz), 95.0, 71.0, 34.6, 32.2. IR 2980.1, 2879.2, 1616.9, 1407.2, 1321.9, 1162.8, 1117.6, 1067.9, 1013.0, 840.4 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{11}H_{12}F_3OS$ $[M+H]^+$ 249.0555; found 249.0567.

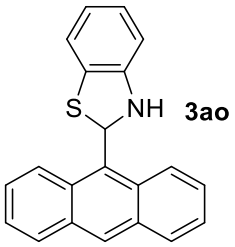
2-Ethyl-2-(6-methoxynaphthalen-2-yl)-1,3-oxathiolane (3an)



3an

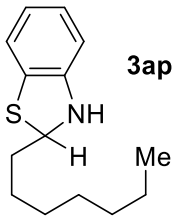
THF (40 mL) was used as the reaction solvent instead of DCM, and **3an** was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.54 g, 70%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.93 (d, *J* = 1.2 Hz, 1H), 7.78 (d, *J* = 5.2 Hz, 1H), 7.74 (d, *J* = 4.9 Hz, 1H), 7.54 (dd, *J* = 4.9, 1.1 Hz, 1H), 7.20 (dd, *J* = 5.1, 1.5 Hz, 1H), 7.16 (d, *J* = 1.6 Hz, 1H), 4.42–4.39 (m, 1H), 4.04–4.00 (m, 1H), 3.92 (s, 3H), 3.21–3.16 (m, 1H), 3.08–3.04 (m, 1H), 2.26 (q, *J* = 4.1 Hz, 2H), 0.97 (t, *J* = 4.2 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 157.8, 140.4, 133.7, 129.7, 128.3, 126.8, 124.8, 123.8, 118.9, 105.5, 100.0, 70.7, 55.2, 37.4, 34.0, 9.8. IR 3055.1, 2927.4, 2871.1, 1599.1, 1473.2, 1378.9, 1335.2, 1220.3, 1122.3, 1024.7, 884.9 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{16}H_{19}O_2S$ $[M+H]^+$ 275.1100; found 275.1096.

2-(Anthracen-9-yl)benzothiazoline (3ao)



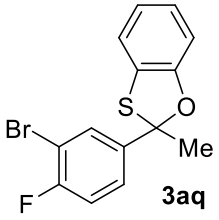
EtOH (40 mL) was used as the reaction solvent instead of DCM, and no BF_3•OEt_2 was needed. **3ao** was purified by flash column chromatography (dichloromethane/hexane = 1:5 to 1:2) as a yellow solid (1.63 g, 65%). M.P. 126–128 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.75 (d, *J* = 8.1 Hz, 2H), 8.48 (s, 1H), 8.12 (s, 1H), 8.05–7.99 (m, 2H), 7.53–7.45 (m, 4H), 7.18 (dd, *J* = 7.6, 1.2 Hz, 1H), 7.01 (td, *J* = 7.6, 1.3 Hz, 1H), 6.85 (td, *J* = 7.6, 1.2 Hz, 1H), 6.67 (dd, *J* = 7.8, 1.2 Hz, 1H), 4.42 (s, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 146.7, 131.7, 130.7, 130.1, 129.6, 128.0, 127.9, 126.2, 125.9, 125.1, 124.4, 122.1, 121.0, 110.5, 65.7. IR 3337.9, 3040.1, 1576.7, 1447.7, 1366.9, 1072.6, 1015.9, 844.1, 731.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{21}H_{16}NS$ $[M+H]^+$ 314.0998; found 314.1012.

2-(*n*-Heptyl)benzothiazoline (3ap)



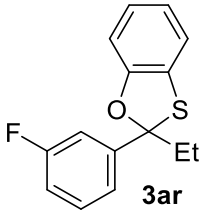
EtOH (40 mL) was used as the reaction solvent instead of DCM, and no BF_3•OEt_2 was needed. **3ap**[23] was purified by flash column chromatography (dichloromethane/hexane = 1:5 to 1:2) as a light-yellow oil (1.32 g, 70%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.06 (dd, *J* = 7.6, 1.3 Hz, 1H), 6.89 (td, *J* = 7.6, 1.4 Hz, 1H), 6.72 (td, *J* = 7.5, 1.2 Hz, 1H), 6.63 (dd, *J* = 7.8, 1.2 Hz, 1H), 5.25 (t, *J* = 6.6 Hz, 1H), 3.99 (s, 1H), 1.91–1.85 (m, 2H), 1.43–1.29 (m, 10H), 0.89 (t, *J* = 7.0 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 146.7, 127.6, 125.2, 122.0, 120.8, 110.9, 69.0, 38.7, 31.8, 29.33, 29.25, 26.2, 22.7, 14.2. IR 3298.3, 2920.6, 2850.9, 1583.0, 1462.7, 1400.6, 1366.5, 1211.3, 1118.0, 1019.5, 736.5 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{14}H_{22}NS$ $[M+H]^+$ 236.1467; found 236.1472.

2-(3-Bromo-4-fluorophenyl)-2-methyl-1,3-benzoxathiole (3aq)



$CHCl_3$ (40 mL) was used as the reaction solvent instead of DCM, and the mixture was refluxed under nitrogen for 3 h. **3aq** was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.56 g, 60%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.81 (dd, *J* = 6.4, 2.4 Hz, 1H), 7.49 (ddd, *J* = 8.6, 4.5, 2.4 Hz, 1H), 7.13–7.04 (m, 3H), 6.98–6.89 (m, 2H), 2.14 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 157.5 (d, *J* = 247 Hz), 154.6, 142.2 (d, *J* = 3.7 Hz), 130.4, 126.3, 125.9, 125.8 (d, *J* = 7.5 Hz), 122.9, 122.2, 116.2 (d, *J* = 22.5 Hz), 111.0, 109.0 (d, *J* = 21.1 Hz), 98.3, 31.1. IR 1579.4, 1491.9, 1456.9, 1384.7, 1228.9, 1083.4, 1045.5, 1017.0, 852.7, 739.7 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{14}H_{11}BrFOS$ $[M+H]^+$ 324.9693; found 324.9690.

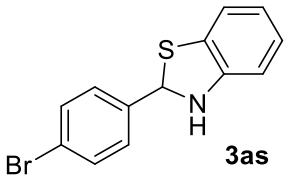
2-Ethyl-2-(3-fluorophenyl)-1,3-benzoxathiole (3ar)



$CHCl_3$ (40 mL) was used as the reaction solvent instead of DCM, and the mixture was refluxed under nitrogen for 3 h. **3ar** was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.35 g, 65%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.30–7.19 (m, 3H), 7.04 (dd, *J* = 7.6, 1.4 Hz, 1H), 7.02–6.90 (m, 3H), 6.82 (td, *J* = 7.5, 1.3 Hz, 1H), 2.44–2.24 (m, 2H), 0.96 (t, *J* = 7.3 Hz, 3H). ^{13}C-NMR

(100 MHz, $CDCl_3$) δ: 161.5 (d, *J* = 245 Hz), 155.2, 146.7 (d, *J* = 6.6 Hz), 129.9 (d, *J* = 8.1 Hz), 126.0, 125.8, 122.6, 122.1, 120.8 (d, *J* = 2.9 Hz), 114.8 (d, *J* = 21.1 Hz), 112.4 (d, *J* = 23.2 Hz), 110.6, 102.7 (d, *J* = 1.9 Hz), 36.7, 9.3. IR 2935.2, 1585.8, 1458.3, 1229.1, 1119.9, 862.9, 781.6, 739.4 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{15}H_{14}FOS$ $[M+H]^+$ 261.0744; found 261.0757.

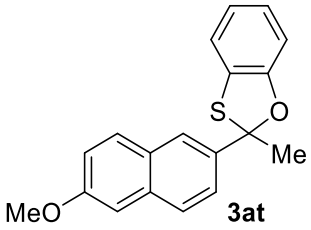
2-(4-Bromophenyl)benzothiazoline (3as)



3as

EtOH (40 mL) was used as the reaction solvent instead of DCM, and no BF_3•OEt_2 was needed. **3as** was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a yellow solid (1.64 g, 70%). M.P. 81–83 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.50–7.46 (m, 2H), 7.42–7.38 (m, 2H), 7.04 (dd, *J* = 7.6, 1.3 Hz, 1H), 6.96 (td, *J* = 7.7, 1.3 Hz, 1H), 6.77 (td, *J* = 7.5, 1.2 Hz, 1H), 6.65 (dd, *J* = 7.7, 1.2 Hz, 1H), 6.30 (s, 1H), 4.03 (s, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 146.1, 140.9, 131.9, 128.3, 126.3, 125.7, 122.7, 121.7, 120.9, 110.0, 69.3. IR 3342.5, 1576.4, 1461.9, 1391.1, 1250.2, 1064.1, 826.1, 746.6 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{13}H_{11}BrNS$ $[M+H]^+$ 291.9790; found 291.9789.

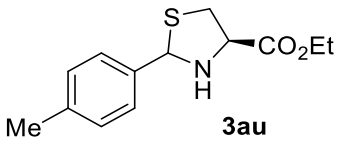
2-Methyl-2-(6-methoxynaphthalen-2-yl)-1,3-benzoxathiole (3at)



3at

THF (40 mL) was used as the reaction solvent instead of DCM, and **3at** was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a white solid (1.83 g, 74%). M.P. 122–124 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.99 (d, *J* = 2.0 Hz, 1H), 7.76 (d, *J* = 8.7 Hz, 2H), 7.68 (dd, *J* = 8.6, 2.0 Hz, 1H), 7.18 (dd, *J* = 8.9, 2.5 Hz, 1H), 7.16–7.13 (m, 2H), 7.11–7.06 (m, 1H), 7.02 (dd, *J* = 8.0, 1.4 Hz, 1H), 6.90 (td, *J* = 7.4, 1.4 Hz, 1H), 3.93 (s, 3H), 2.29 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 158.3, 155.1, 139.3, 134.3, 130.0, 128.2, 127.3, 126.6, 126.0, 124.0, 123.3, 122.5, 122.1, 119.3, 110.9, 105.8, 99.8, 55.4, 31.0. IR 2963.1, 1600.9, 1454.0, 1368.9, 1268.9, 1232.1, 1198.7, 1089.4, 1027.8, 841.8, 742.2 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{19}H_{17}O_2S$ $[M+H]^+$ 309.0944; found 309.0941.

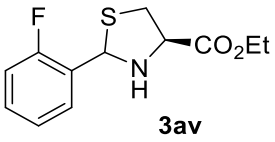
(2*RS*,4*R*) Ethyl-2-(4-methylphenyl)thiazolidine-4-carboxylate (3au)



3au

EtOH (40 mL) was used as the reaction solvent instead of DCM, and Et_3N (1.11 mL, 8 mmol) was added. **3au**[24] was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 1:2) as a light-yellow oil (1.51 g, 75%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.44–7.35 (m, 2H), 7.19–7.11 (m, 2H), 5.81–5.52 (m, 1H), 4.30–4.21 (m, 2H), 4.21–3.93 (m, 1H), 3.48–3.35 (m, 1H), 3.22–3.07 (m, 1H), 2.69 (s, 1H), 2.36–2.32 (m, 3H), 1.33–1.27 (m, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 171.8, 171.2, 138.6, 138.3, 137.6, 135.2, 129.4, 129.1, 127.4, 126.9, 72.6, 70.8, 65.7, 64.4, 61.7, 61.6, 39.3, 38.2, 21.2, 21.1, 14.2. IR 3312.5, 2926.5, 1734.2, 1512.8, 1449.1, 1374.1, 1266.3, 1190.4, 1094.2, 1025.5, 763.0 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{13}H_{18}NO_2S$ $[M+H]^+$ 252.1053; found 252.1061.

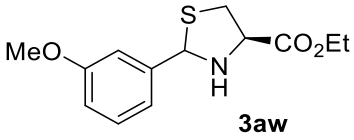
(2*RS*,4*R*) Ethyl-2-(2-fluorophenyl)thiazolidine-4-carboxylate (3av)



3av

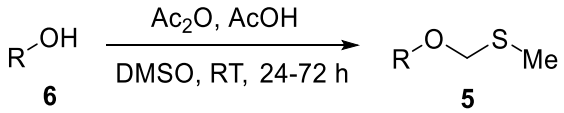
EtOH (40 mL) was used as the reaction solvent instead of DCM, and Et_3N (1.11 mL, 8 mmol) was added. **3av** was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 1:2) as a light-yellow oil (0.92 g, 45%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.64–7.49 (m, 1H), 7.35–7.21 (m, 1H), 7.19–7.00 (m, 2H), 6.04–5.78 (m, 1H), 4.30–4.24 (m, 2H), 4.24–3.93 (m, 1H), 3.50–3.37 (m, 1H), 3.17–3.08 (m, 1H), 2.82 (s, 1H), 1.34–1.29 (m, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 171.6, 171.1, 159.5 (d, *J* = 247 Hz), 159.2 (d, *J* = 246 Hz), 130.3 (d, *J* = 8.5 Hz), 129.4 (d, *J* = 12.3 Hz), 129.3 (d, *J* = 8.1 Hz), 128.6 (d, *J* = 3.3 Hz), 127.2 (d, *J* = 3.6 Hz), 125.3 (d, *J* = 12.5 Hz), 124.6 (d, *J* = 3.5 Hz), 124.1 (d, *J* = 3.5 Hz), 115.8 (d, *J* = 21.7 Hz), 115.5 (d, *J* = 21.1 Hz), 65.8, 65.7 (d, *J* = 3.7 Hz), 64.8, 64.3 (d, *J* = 2.2 Hz), 61.82, 61.79, 39.2, 38.0, 14.2. IR 3319.3, 2981.4, 1732.5, 1585.7, 1487.0, 1454.9, 1374.6, 1265.0, 1192.1, 1090.0, 1025.9, 753.6 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{15}FNO_2S$ $[M+H]^+$ 256.0802; found 256.0811.

(2*RS*,4*R*) Ethyl-2-(3-methoxyphenyl)thiazolidine-4-carboxylate (3aw)



3aw

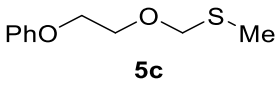
EtOH (40 mL) was used as the reaction solvent instead of DCM, and Et_3N (1.11 mL, 8 mmol) was added. **3aw** was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 1:2) as a light-yellow oil (1.07 g, 50%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.30–7.21 (m, 1H), 7.13–7.04 (m, 2H), 6.89–6.78 (m, 1H), 5.82–5.52 (m, 1H), 4.29–4.21 (m, 2H), 4.19–3.93 (m, 1H), 3.82–3.79 (m, 3H), 3.48–3.35 (m, 1H), 3.19–3.07 (m, 1H), 2.67 (s, 1H), 1.34–1.28 (m, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 171.8, 171.2, 159.9, 159.7, 143.2, 139.8, 129.8, 129.5, 119.8, 119.3, 114.4, 113.4, 113.0, 112.5, 72.6, 70.8, 65.8, 64.5, 61.8, 61.7, 55.4, 55.3, 39.3, 38.3, 14.2. IR 3313.8, 2934.5, 1733.3, 1595.0, 1458.4, 1373.2, 1255.3, 1154.5, 1039.1, 758.1 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{13}H_{18}NO_3S$ $[M+H]^+$ 268.1002; found 268.1012.



6 **5**

General Procedure II: To a solution of compound **6** (6.5 mmol) in dimethyl sulfoxide (20 mL) was added a mixture of acetic anhydride (14 mL) and acetic acid (2.5 mL) at rt. After completion of the addition, the mixture was allowed to stand for 24-72 h (primary alcohol: 24 h; secondary alcohol: 48 h; tertiary alcohol: 72 h). Then the mixture was quenched by saturated aqueous $NaHCO_3$ solution (200 mL) and ethyl acetate (100 mL). The organic fractions were collected, and the aqueous phase was extracted with ethyl acetate (3 × 50 mL). The combined organic fractions were washed with brine, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. The resulting residue was purified by flash column chromatography to give compound **5**.

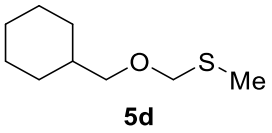
Methylthiomethyl 2-phenoxyethyl ether (5c)



5c

5c was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (0.97 g, 75%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.28–7.23 (m, 2H), 6.95–6.90 (m, 3H), 4.72 (s, 2H), 4.12 (t, *J* = 4.6 Hz, 2H), 3.88 (t, *J* = 4.8 Hz, 2H), 2.15 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 158.8, 129.5, 121.0, 114.7, 75.6, 67.1, 66.3, 13.9. IR 2922.2, 1742.0, 1594.6, 1493.0, 1430.0, 1369.6, 1299.1, 1241.8, 1212.4, 1174.3, 1085.1, 1022.9, 959.4, 922.2, 840.6, 752.9, 607.8, 509.7, 464.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{10}H_{15}O_2S$ $[M+H]^+$ 199.0787; found 199.0786.

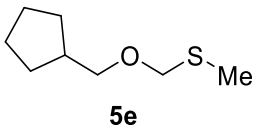
Cyclohexylmethyl methylthiomethyl ether (5d)



5d

5d was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (0.76 g, 67%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.61 (s, 2H), 3.30 (d, *J* = 7.8 Hz, 2H), 2.13 (s, 3H), 1.77–1.67 (m, 5H), 1.60–1.54 (m, 1H), 1.26–1.16 (m, 3H), 0.99–0.89 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 75.4, 74.0, 37.9, 30.2, 26.7, 26.0, 13.9. IR 2919.9, 2850.1, 1445.0, 1299.1, 1260.0, 1068.3, 956.6, 882.2, 728.9, 678.9 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_9H_{19}OS$ $[M+H]^+$ 175.1151; found 175.1154.

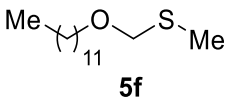
Cyclopentylmethyl methylthiomethyl ether (5e)



5e

5e was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (0.89 g, 85%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.60 (s, 2H), 3.36 (d, *J* = 7.0 Hz, 2H), 2.14–2.08 (m, 4H), 1.76–1.68 (m, 2H), 1.60–1.47 (m, 4H), 1.24–1.19 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 75.4, 72.8, 39.3, 29.8, 25.6, 13.9. IR 2948.4, 2863.9, 1434.8, 1299.5, 1256.9, 1070.2, 960.0, 923.7, 728.7, 678.7 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_8H_{20}NOS$ $[M+NH_4]^+$ 178.1260; found 178.1253.

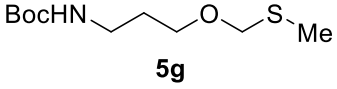
Methylthiomethyl *n*-undecanyl ether (5f)



5f

5f was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.35 g, 84%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.63 (s, 2H), 3.52 (t, *J* = 6.5 Hz, 2H), 2.15 (s, 3H), 1.62–1.55 (m, 2H), 1.32–1.26 (m, 18H), 0.89 (t, *J* = 6.5 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 75.3, 68.3, 32.0, 29.78, 29.75, 29.72, 29.56, 29.52, 29.47, 26.4, 22.8, 14.2, 14.0. IR 2921.6, 2853.3, 1461.8, 1381.1, 1299.4, 1081.6, 952.9, 726.3, 679.7 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{14}H_{31}OS$ $[M+H]^+$ 247.2090; found 247.2096.

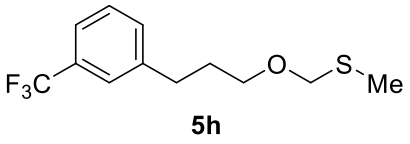
3-[(*tert*-Butyloxycarbonyl)amino]propanyl methylthiomethyl ether (5g)



5g

5g was purified by flash column chromatography (ethyl acetate/hexane = 1:20 to 1:5) as a light-yellow oil (1.16 g, 76%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.81 (s, 1H), 4.59 (s, 2H), 3.54 (t, *J* = 6.0 Hz, 2H), 3.23–3.18 (m, 2H), 2.12 (s, 3H), 1.78–1.72 (m, 2H), 1.41 (s, 9H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 156.1, 79.1, 75.5, 66.3, 38.5, 29.6, 28.5, 14.1. IR 3357.9, 2925.7, 1693.2, 1511.7, 1447.5, 1391.5, 1364.8, 1246.3, 1166.8, 1072.9, 859.7, 779.1, 728.6, 678.5 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{10}H_{22}NO_3S$ $[M+H]^+$ 236.1315; found 236.1313.

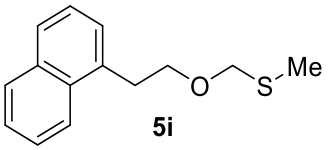
3-(3-Trifluoromethylphenyl)propanyl methylthiomethyl ether (5h)



5h

5h was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.53 g, 89%) as colorless oil. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.46–7.38 (m, 4H), 4.64 (s, 2H), 3.53 (t, *J* = 6.1 Hz, 2H), 2.76 (t, *J* = 7.7 Hz, 2H), 2.17 (s, 3H), 1.90 (p, *J* = 6.7 Hz, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 142.9, 132.0, 130.3 (q, *J* = 32.0 Hz), 128.9, 125.3 (q, *J* = 4.0 Hz), 122.8 (q, *J* = 4.0 Hz), 120.3 (q, *J* = 270.0 Hz), 75.5, 67.2, 32.4, 31.0, 14.2. IR 2924.4, 1744.4, 1442.0, 1326.4, 1210.6, 1162.4, 1121.3, 1068.2, 1017.9, 959.7, 907.4, 800.3, 732.7, 701.1, 458.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{12}H_{16}F_3OS$ $[M+H]^+$ 265.0868; found 265.0876.

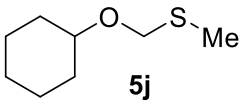
2-(Naphthalen-1-yl)ethyl methylthiomethyl ether (5i)



5i

5i was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.22 g, 81%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.09 (d, *J* = 8.3 Hz, 1H), 7.87 (d, *J* = 8.0 Hz, 1H), 7.75 (d, *J* = 9.4 Hz, 1H), 7.57–7.49 (m, 2H), 7.46–7.41 (m, 2H), 4.67 (s, 2H), 3.90 (t, *J* = 7.2 Hz, 2H), 3.40 (t, *J* = 7.2 Hz, 2H), 2.11 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 134.8, 133.9, 132.2, 128.9, 127.2, 126.9, 126.1, 125.61, 125.59, 123.8, 75.4, 68.3, 33.1, 14.0. IR 3046.2, 2916.7, 1727.2, 1594.8, 1510.1, 1431.4, 1392.6, 1299.2, 1258.9, 1163.6, 1062.2, 955.8, 862.1, 775.0, 728.8, 678.0, 596.5, 520.6, 478.0, 422.3 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{14}H_{16}NaOS$ $[M+Na]^+$ 255.0814; found 255.0810.

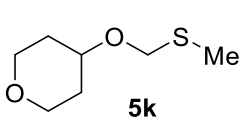
Cyclohexyl methylthiomethyl ether (5j)



5j

5j[25] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (0.78 g, 75%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.63 (s, 2H), 3.61–3.56 (m, 1H), 2.14 (s, 3H), 1.88–1.83 (m, 2H), 1.73–1.69 (m, 2H), 1.54–1.50 (m, 1H), 1.25 (t, *J* = 9.7 Hz, 5H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 74.5, 72.0, 32.1, 25.9, 24.3, 13.9. IR 2927.1, 2855.1, 1444.5, 1298.0, 1263.2, 1060.9, 931.2, 890.3, 792.7, 728.5, 677.5 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_8H_{17}OS$ $[M+H]^+$ 161.0995; found 161.0993.

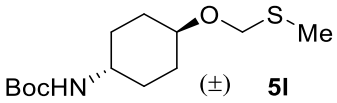
Tetrahydropyran-4-yl methylthiomethyl ether (5k)



5k

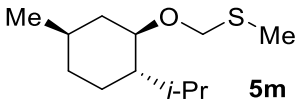
5k was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (0.97 g, 92%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.63 (s, 2H), 3.87 (dt, *J* = 11.7, 4.4 Hz, 2H), 3.85–3.81 (m, 1H), 3.45–3.39 (m, 2H), 2.12 (s, 3H), 1.86–1.81 (m, 2H), 1.60–1.51 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 71.8, 70.7, 65.7, 32.2, 13.8. IR 2922.6, 2846.8, 1743.6, 1435.3, 1366.7, 1296.9, 1155.5, 1067.9, 1004.2, 947.1, 858.9, 818.5, 728.7, 678.0, 599.6, 515.6 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_7H_{15}O_2S$ $[M+H]^+$ 163.0787; found 163.0784.

***trans*-1-[(*tert*-Butyloxycarbonyl)amino]-4-methylthiomethyloxy cyclohexane (5l)**



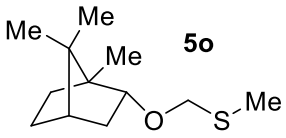
5l was purified by flash column chromatography (ethyl acetate/hexane = 1:20 to 1:5) as a light-yellow oil (1.32 g, 74%) as white solid. M.P. 92–94 °C; ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.64 (s, 2H), 4.44 (s, 1H), 3.61–3.55 (m, 1H), 3.44 (s, 1H), 2.15 (s, 3H), 2.05–1.97 (m, 4H), 1.44 (s, 9H), 1.39–1.35 (m, 2H), 1.21–1.15 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 155.3, 79.3, 73.7, 72.3, 49.0, 31.2, 30.4, 28.5, 13.8. IR 3320.8, 2976.9, 2931.6, 2860.4, 1676.0, 1522.4, 1445.2, 1365.5, 1310.0, 1271.2, 1229.5, 1164.3, 1076.5, 1038.5, 962.2, 926.7, 896.2, 856.6, 785.9, 735.4, 677.4, 646.4, 463.0 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{13}H_{26}NO_3S$ $[M+H]^+$ 276.1628; found 276.1624.

(1*R*,2*S*,5*R*) 2-Isopropyl-5-methyl-1-methylthiomethyloxy cyclohexane (5m)



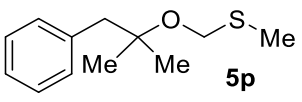
5m[26] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.01 g, 72%) as colorless oil. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.62 (dd, *J* = 15.4, 11.4 Hz, 2H), 3.36 (td, *J* = 10.5, 4.2 Hz, 1H), 2.21–2.15 (m, 1H), 2.14 (s, 3H), 2.10–2.05 (m, 1H), 1.65–1.61 (m, 2H), 1.36–1.33 (m, 1H), 1.23–1.20 (m, 1H), 1.00–0.88 (m, 8H), 0.86–0.84 (m, 1H), 0.79 (d, *J* = 7.0 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 75.9, 72.4, 48.4, 40.0, 34.6, 31.6, 25.4, 23.2, 22.4, 21.3, 15.9, 14.2. IR 2951.9, 2919.6, 2868.8, 1452.7, 1374.2, 1297.2, 1179.6, 1051.4, 1005.0, 959.3, 918.0, 839.5, 729.3, 678.5, 512.7 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{25}OS$ $[M+H]^+$ 217.1621; found 217.1613. $[\alpha]_D^{25}$ = -228 (*c* 0.1, EtOH).

(1*S*,2*R*)-1,7,7-Trimethylbicyclo[2.2.1]heptan-2-yl methylthiomethyl ether (5o)



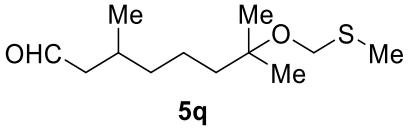
5o was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (0.53 g, 38%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.69–4.51 (m, 2H), 3.92 (ddd, *J* = 9.5, 3.2, 1.8 Hz, 1H), 2.14–2.10 (m, 4H), 1.97–1.90 (m, 1H), 1.74–1.68 (m, 1H), 1.62 (t, *J* = 4.6 Hz, 1H), 1.24–1.19 (m, 2H), 0.98 (dd, *J* = 13.0, 3.4 Hz, 1H), 0.86–0.83 (m, 9H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 81.6, 74.0, 49.0, 47.9, 45.2, 35.9, 28.3, 27.0, 19.8, 19.0, 13.9, 13.7. IR 2947.3, 1450.2, 1368.8, 1301.0, 1261.9, 1112.7, 1062.9, 818.6, 728.7, 678.4, 473.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{22}NaOS$ $[M+Na]^+$ 237.1284; found 237.1282. $[\alpha]_D^{25}$ = -160 (*c* 0.1, EtOH).

1,1-Dimethyl-2-phenylethyl methylthiomethyl ether (5p)



5p was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (0.74 g, 54%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.26–7.20 (m, 5H), 4.56 (s, 2H), 2.81 (s, 2H), 2.16 (s, 3H), 1.19 (s, 6H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 138.1, 130.7, 127.9, 126.3, 77.1, 66.9, 47.9, 25.2, 14.4. IR 3028.1, 2973.1, 2919.5, 1494.2, 1449.7, 1372.8, 1302.7, 1219.8, 1130.7, 1040.6, 856.3, 763.6, 698.8, 610.6, 514.6, 468.5 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{19}OS$ $[M+H]^+$ 211.1151; found 211.1149.

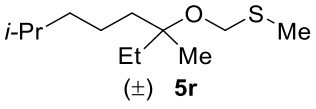
3,7,7-Trimethyl-7-methylthiomethyloxy heptaldehyde (5q)



5q

5q was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (0.91 g, 60%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.74 (t, *J* = 2.3 Hz, 1H), 4.48 (s, 2H), 2.36 (ddd, *J* = 16.1, 5.7, 2.0 Hz, 1H), 2.24 (td, *J* = 8.1, 2.5 Hz, 1H), 2.18 (s, 3H), 2.10–2.02 (m, 1H), 1.48–1.29 (m, 6H), 1.19 (s, 6H), 0.95 (d, *J* = 6.7 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 203.1, 76.6, 66.8, 51.2, 41.0, 37.4, 28.3, 25.73, 25.71, 21.4, 20.1, 14.6. IR 2926.4, 2716.2, 1723.0, 1462.3, 1371.9, 1304.9, 1213.1, 1151.5, 1045.1, 961.7, 733.9, 683.4 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{24}NaO_2S$ $[M+Na]^+$ 255.1389; found 255.1389.

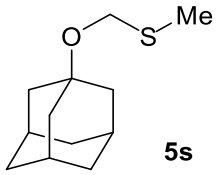
1-Ethyl-1,5-dimethylhexyl methylthiomethyl ether (5r)



(±) **5r**

5r was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (0.75 g, 53%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.44 (s, 2H), 2.18 (s, 3H), 1.55–1.50 (m, 3H), 1.45–1.41 (m, 2H), 1.30–1.28 (m, 2H), 1.16–1.14 (m, 5H), 0.87–0.85 (m, 9H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 78.9, 66.2, 39.7, 38.1, 30.8, 28.0, 22.8, 22.75, 22.73, 21.4, 14.6, 8.1. IR 2949.1, 1462.0, 1374.5, 1300.5, 1154.3, 1042.0, 872.3, 733.2, 683.2 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{27}OS$ $[M+H]^+$ 219.1777; found 219.1775.

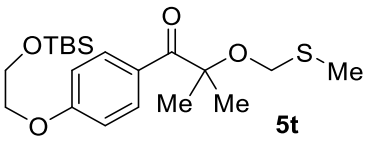
1-Adamantyl methylthiomethyl ether (5s)



5s

5s[27] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (1.02 g, 74%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.58 (s, 2H), 2.17 (s, 3H), 2.14 (s, 3H), 1.79 (d, *J* = 2.8 Hz, 6H), 1.62–1.60 (m, 6H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 74.1, 65.7, 41.9, 36.4, 30.6, 14.4. IR 2906.3, 2850.6, 1446.8, 1353.4, 1298.5, 1104.9, 1073.4, 1035.9, 905.6, 875.8, 813.9, 777.6, 679.3, 548.9, 464.9 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{21}OS$ $[M+H]^+$ 213.1308; found 213.1301.

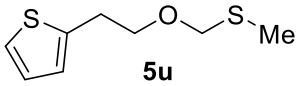
1-[4-[2-(*tert*-Butyldimethylsilyloxy)ethoxy]phenyl]-2-methyl-2-methylthiomethyloxypropan-1-one (5t)



5t

5t was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:10) as a light-yellow oil (2.31 g, 89%) as colorless oil. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.28 (d, *J* = 5.2 Hz, 2H), 6.92 (d, *J* = 5.1 Hz, 2H), 4.45 (s, 2H), 4.10 (d, *J* = 3.0 Hz, 2H), 3.99–3.98 (m, 2H), 2.06 (s, 3H), 1.57 (s, 6H), 0.90 (s, 9H), 0.10 (s, 6H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 201.0, 162.8, 132.6, 127.5, 114.1, 83.8, 69.9, 69.6, 62.0, 26.0, 25.6, 18.5, 15.3, -5.1. IR 2929.3, 1742.6, 1670.7, 1598.3, 1506.0, 1427.0, 1371.0, 1254.7, 1211.6, 1159.7, 1129.4, 1014.4, 958.7, 912.1, 834.5, 775.6, 697.5, 599.3, 560.5, 516.5, 463.1 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{20}H_{35}O_4SSi$ $[M+H]^+$ 399.2020; found 399.2008.

2-(Thiophen-2-yl)ethyl methylthiomethyl ether (5u)

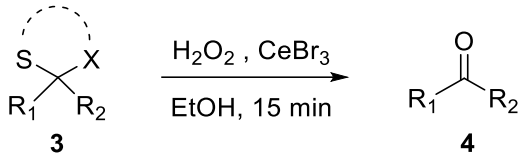


5u

5u was purified by flash column chromatography (dichloromethane/hexane = 1:2 to 1:1) as a light-yellow oil (0.43 g, 35%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ:

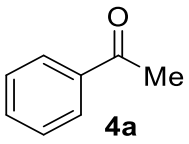
7.14 (dd, *J* = 5.1, 1.2 Hz, 1H), 6.93 (dd, *J* = 5.1, 3.4 Hz, 1H), 6.88–6.86 (m, 1H), 4.66 (s, 2H), 3.77 (t, *J* = 6.6 Hz, 2H), 3.11 (t, *J* = 7.3 Hz, 2H), 2.12 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 141.3, 126.8, 125.3, 123.8, 75.4, 68.6, 30.3, 14.1. IR 3071.5, 2856.1, 1761.7, 1431.4, 1300.7, 1201.8, 1083.0, 1050.1, 985.7, 954.2, 825.3, 688.3, 476.6 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_8H_{13}OS_2$ $[M+H]^+$ 189.0402; found 189.0404.

5. Deprotections of thioacetals, thioketals and methylthiomethyl ether.



General Procedure III: To a stirred solution of compound **3** (1 mmol) in ethanol (EtOH: 10 mL) were added $CeBr_3$ (19.0 mg, 0.05 mmol) and 30% H_2O_2 (200 μL, 2 mmol) at rt. After completion of the addition, the resulting mixture was allowed to stir at 40 ℃ for 15 min. Then the mixture was quenched by aqueous $Na_2S_2O_3$ (0.1 M, 40 mL) and ethyl acetate (50 mL). The organic fractions were collected, and the aqueous phase was extracted with ethyl acetate (3 × 20 mL). The combined organic fractions were washed with brine, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified by flash column chromatography to give compound **4**.

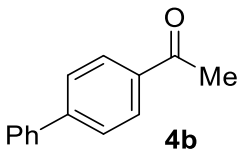
Acetophenone (4a)



4a

4a[28] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (103 mg, 86%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.98–7.93 (m, 2H), 7.59–7.53 (m, 1H), 7.44 (t, *J* = 7.9 Hz, 2H), 2.60 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 198.3, 137.3, 133.2, 128.7, 128.4, 26.7. IR 3062.1, 1680.2, 1593.2, 1445.1, 1357.9, 1179.6, 758.2 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for C_8H_9O $[M+H]^+$ 121.0648; found 121.0649.

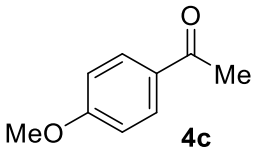
4'-Phenylacetophenone (4b)



4b

4b[28] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a white solid (165 mg, 84%). M.P. 118–120 ℃. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.06–8.02 (m, 2H), 7.71–7.67 (m, 2H), 7.65–7.61 (m, 2H), 7.50–7.45 (m, 2H), 7.43–7.38 (m, 1H), 2.64 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 197.9, 145.9, 140.0, 136.0, 129.10, 129.06, 128.4, 127.42, 127.38, 26.8. IR 1672.5, 1592.6, 1479.6, 1398.6, 1356.5, 1202.2, 1122.2, 835.3, 759.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{14}H_{13}O$ $[M+H]^+$ 197.0961; found 197.0957.

4'-Methoxyacetophenone (4c)

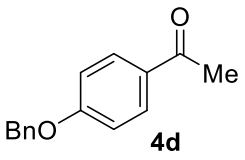


4c

4c[28] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (138 mg, 92%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.96–7.91 (m, 2H), 6.95–6.91 (m, 2H), 3.87 (s, 3H), 2.55 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 196.9, 163.6, 130.7, 130.5, 113.8, 55.6, 26.5. IR 1667.0, 1597.7, 1505.8,

1416.7, 1356.4, 1248.1, 1171.5, 1018.7, 829.4 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_9H_{11}O_2$ $[M+H]^+$ 151.0754; found 151.0755.

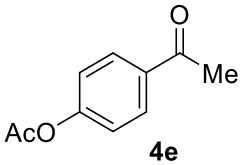
4'-Benzyloxyacetophenone (4d)



4d

4d[29] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a white solid (186 mg, 82%). M.P. 93–95 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.96–7.92 (m, 2H), 7.45–7.30 (m, 5H), 7.04–6.99 (m, 2H), 5.13 (s, 2H), 2.55 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 196.8, 162.7, 136.3, 130.7, 130.6, 128.8, 128.3, 127.6, 114.6, 70.2, 26.4. IR 3060.5, 2939.3, 2881.9, 1674.3, 1593.3, 1506.3, 1451.6, 1422.6, 1356.3, 1243.1, 1006.0, 826.9, 757.5 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{15}H_{15}O_2$ $[M+H]^+$ 227.1067; found 227.1066.

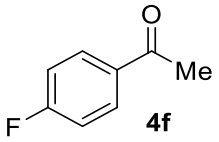
4'-Acetyloxyacetophenone (4e)



4e

4e[30] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (142.55 mg, 80%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.00–7.95 (m, 2H), 7.20–7.15 (m, 2H), 2.58 (s, 3H), 2.31 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 196.9, 168.9, 154.4, 134.8, 130.0, 121.9, 26.7, 21.2. IR 3071.8, 1749.0, 1670.8, 1591.3, 1503.6, 1418.0, 1265.5, 1161.4, 1007.5, 850.3 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{10}H_{11}O_3$ $[M+H]^+$ 179.0703; found 179.0700.

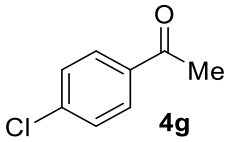
4'-Fluoroacetophenone (4f)



4f

4f[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (117 mg, 85%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.01–7.94 (m, 2H), 7.15–7.08 (m, 2H), 2.58 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 196.6, 164.6 (d, J = 253 Hz), 133.7 (d, J = 2.9 Hz), 131.0 (d, J = 9.2 Hz), 115.7 (d, J = 21.6 Hz), 26.6. IR 3073.3, 1682.2, 1594.3, 1504.5, 1408.4, 1357.5, 1227.6, 1155.1, 835.0 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for C_8H_8FO $[M+H]^+$ 139.0554; found 139.0549.

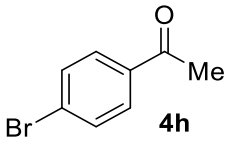
4'-Chloroacetophenone (4g)



4g

4g[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (139 mg, 90%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.89–7.84 (m, 2H), 7.43–7.38 (m, 2H), 2.56 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 196.9, 139.6, 135.5, 129.8, 129.0, 26.6. IR 3066.7, 1682.3, 1585.2, 1485.8, 1395.4, 1356.5, 1255.6, 1092.3, 1011.7, 823.6, 758.7 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for C_8H_8ClO $[M+H]^+$ 155.0258; found 155.0254.

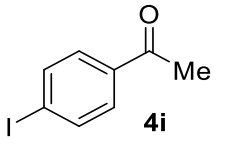
4'-Bromoacetophenone (4h)



4h

4h[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (175 mg, 88%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.83–7.78 (m, 2H), 7.61–7.57 (m, 2H), 2.57 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 197.1, 135.9, 132.0, 130.0, 128.4, 26.6. IR 1666.1, 1576.2, 1390.4, 1258.7, 1171.7, 1068.0, 818.4 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for C_8H_8BrO $[M+H]^+$ 198.9753; found 198.9747.

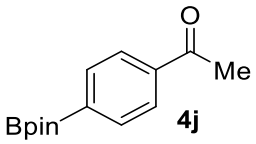
4'-Iodoacetophenone (4i)



4i

4i[28] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a brown solid (224 mg, 91%). M.P. 80–82 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.84–7.80 (m, 2H), 7.67–7.63 (m, 2H), 2.56 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 197.4, 138.0, 136.5, 129.8, 101.2, 26.6. IR 1668.1, 1573.4, 1417.8, 1386.4, 1354.0, 1171.5, 813.5 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for C_8H_8IO $[M+H]^+$ 246.9614; found 246.9611.

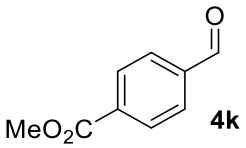
4'-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)acetophenone (4j)



4j

4j[32] was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 2:1) as a light-yellow oil (172 mg, 70%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.88 (q, *J* = 8.0 Hz, 4H), 2.61 (s, 3H), 1.35 (s, 12H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 198.6, 139.1, 135.0, 127.4, 84.3, 26.9, 25.0. IR 1678.1, 1506.6, 1393.8, 1353.7, 1261.5, 1140.3, 1090.4, 854.8 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{14}H_{20}BO_3$ $[M+H]^+$ 247.1500; found 247.1498.

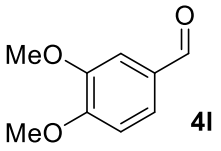
4-Methoxycarbonylbenzaldehyde (4k)



4k

MeCN (10 mL) was used as the solvent instead of EtOH. **4k**[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (148 mg, 90%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 10.10 (s, 1H), 8.21–8.17 (m, 2H), 7.97–7.93 (m, 2H), 3.96 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 191.8, 166.2, 139.3, 135.2, 130.3, 129.7, 52.7. IR 1720.7, 1682.2, 1572.2, 1500.4, 1432.6, 1387.8, 1193.9, 1102.3, 1007.8, 849.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_9H_9O_3$ $[M+H]^+$ 165.0546; found 165.0542.

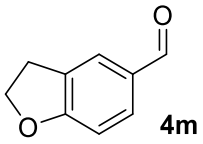
3,4-Dimethoxybenzaldehyde (4l)



4l

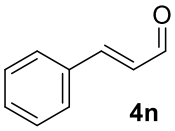
MeCN (10 mL) was used as the solvent instead of EtOH. **4l**[33] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (143 mg, 86%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.81 (s, 1H), 7.41 (dd, *J* = 8.2, 1.9 Hz, 1H), 7.37 (d, *J* = 1.9 Hz, 1H), 6.93 (d, *J* = 8.2 Hz, 1H), 3.93 (s, 3H), 3.90 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 191.0, 154.5, 149.6, 130.1, 126.9, 110.4, 108.9, 56.2, 56.0. IR 3072.97, 2943.76, 2839.54, 2764.68, 1675.23, 1583.70, 1505.70, 1463.02, 1419.78, 1129.93, 1011.43, 869.50 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_9H_{11}O_3$ $[M+H]^+$ 167.0703; found 167.0700.

2,3-Dihydrobenzofuran-5-carboxaldehdye (4m)



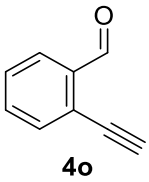
MeCN (10 mL) was used as the solvent instead of EtOH. **4m**[34] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (120 mg, 81%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.80 (s, 1H), 7.73–7.70 (m, 1H), 7.66–7.62 (m, 1H), 6.84 (d, *J* = 8.2 Hz, 1H), 4.64 (t, *J* = 8.8 Hz, 2H), 3.22 (t, *J* = 9.2 Hz, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 190.7, 165.7, 133.1, 130.5, 128.5, 126.0, 109.7, 72.5, 28.8. IR 2906.3, 2833.3, 2742.8, 1677.6, 1596.9, 1486.1, 1441.2, 1327.5, 1239.7, 1091.9, 816.4 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_9H_9O_2$ $[M+H]^+$ 149.0597; found 149.0592.

trans-Cinnamaldehyde (4n)



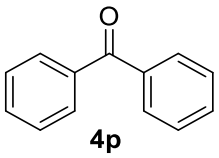
MeCN (10 mL) was used as the solvent instead of EtOH. **4n**[33] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (104 mg, 79%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.69 (d, *J* = 7.7 Hz, 1H), 7.58–7.52 (m, 2H), 7.49–7.40 (m, 4H), 6.68 (dd, *J* = 16.0, 7.7 Hz, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 193.7, 152.8, 134.1, 131.3, 129.2, 128.64, 128.55. IR 3057.9, 2813.5, 2741.8, 1668.6, 1621.7, 1448.8, 1296.4, 1247.8, 1118.7, 744.8 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for C_9H_9O $[M+H]^+$ 133.0648; found 133.0647.

2-Ethynylbenzaldehyde (4o)



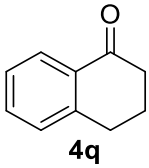
MeCN (10 mL) was used as the solvent instead of EtOH. **4o**[35] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (107 mg, 82%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 10.53 (s, 1H), 7.91 (dd, *J* = 7.7, 1.4 Hz, 1H), 7.60 (dd, *J* = 7.8, 1.5 Hz, 1H), 7.54 (td, *J* = 7.3, 1.5 Hz, 1H), 7.50–7.44 (m, 1H), 3.46 (s, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 191.5, 136.7, 134.0, 133.8, 129.3, 127.4, 125.6, 84.4, 79.3. IR 3345.2, 2847.6, 2753.7, 2091.9, 1681.6, 1584.3, 1445.5, 1388.2, 1342.0, 1264.4, 1195.3, 726.5 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for C_9H_7O $[M+H]^+$ 131.0491; found 131.0490 .

Benzophenone (4p)



4p[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (175 mg, 96%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.83–7.78 (m, 4H), 7.62–7.56 (m, 2H), 7.51–7.45 (m, 4H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 196.8, 137.7, 132.5, 130.2, 128.4. IR 3056.8, 1653.2, 1594.7, 1444.4, 1361.8, 1273.0, 756.5 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{13}H_{11}O$ $[M+H]^+$ 183.0804; found 183.0797.

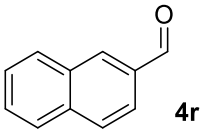
3,4-Dihydronaphthalen-1(2*H*)-one (4q)



4q[36] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (118 mg, 81%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.02 (dd, *J* = 7.8, 1.5 Hz, 1H), 7.44 (td, *J* = 7.4, 1.5 Hz, 1H), 7.33–7.22 (m, 2H), 2.95 (t, *J* = 6.1 Hz, 2H), 2.64 (t, *J* = 6.3 Hz, 2H), 2.11 (p, *J* = 6.6 Hz, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 198.5, 144.6, 133.5, 132.7, 128.9, 127.3, 126.7, 39.3, 29.8, 23.4. IR 3025.1, 2941.2, 2871.7, 1678.7, 1599.1,

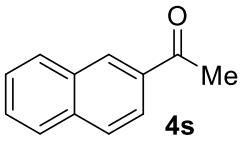
1452.1, 1323.3, 1186.2, 1024.3, 762.9 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{10}H_{11}O$ $[M+H]^+$ 147.0804; found 147.0797.

2-Naphthaldehyde (4r)



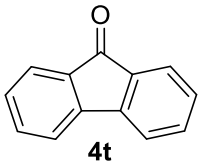
MeCN (10 mL) was used as the solvent instead of EtOH. **4r**[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (131 mg, 84%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 10.13 (s, 1H), 8.28 (s, 1H), 7.99–7.84 (m, 4H), 7.65–7.53 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 192.2, 136.5, 134.6, 134.1, 132.7, 129.6, 129.14, 129.10, 128.1, 127.1, 122.8. IR 2825.3, 1683.0, 1458.0, 1339.6, 1158.4, 870.0, 745.2 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{11}H_9O$ $[M+H]^+$ 157.0648; found 157.0646.

2-Acetonaphthone (4s)



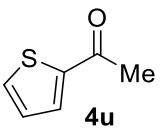
4s[28] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (141 mg, 83%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.46 (s, 1H), 8.02 (dd, *J* = 8.6, 1.8 Hz, 1H), 7.95 (d, *J* = 8.2 Hz, 1H), 7.91–7.85 (m, 2H), 7.63–7.52 (m, 2H), 2.72 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 198.2, 135.7, 134.6, 132.6, 130.3, 129.7, 128.6, 128.5, 127.9, 126.9, 124.0, 26.8. IR 3057.5, 1668.7, 1460.1, 1425.8, 1360.4, 1274.9, 1186.0, 1123.0, 867.0, 751.0 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{12}H_{11}O$ $[M+H]^+$ 171.0804; found 171.0800.

Fluorenone (4t)



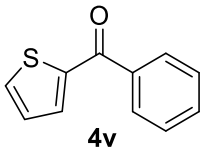
4t[37] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a yellow solid (175 mg, 97%). M.P. 81–83 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.64 (d, *J* = 7.4 Hz, 2H), 7.53–7.44 (m, 4H), 7.32–7.24 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 194.0, 144.6, 134.8, 134.3, 129.2, 124.4, 120.4. IR 3054.2, 1706.1, 1596.8, 1443.0, 1291.6, 1185.2, 1088.9, 726.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{13}H_9O$ $[M+H]^+$ 181.0648; found 181.0641.

2-Acetylthiophene (4u)



4u[38] was purified by flash column chromatography (dichloromethane/hexane = 1:1 to 3:1) as a light-yellow oil (105 mg, 83%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.69 (dd, *J* = 3.8, 1.2 Hz, 1H), 7.63 (dd, *J* = 4.9, 1.1 Hz, 1H), 7.12 (dd, *J* = 5.0, 3.8 Hz, 1H), 2.57 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 190.9, 144.7, 133.9, 132.6, 128.2, 27.1. IR 3094.1, 1655.9, 1516.1, 1410.9, 1355.6, 1267.9, 1028.9, 852.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for C_6H_7OS $[M+H]^+$ 127.0212; found 127.0211.

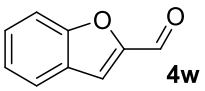
2-Benzoylthiophene (4v)



4v

4v[39] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (166 mg, 88%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.88–7.84 (m, 2H), 7.70 (dd, *J* = 4.9, 1.2 Hz, 1H), 7.63 (dd, *J* = 3.8, 1.2 Hz, 1H), 7.61–7.55 (m, 1H), 7.52–7.46 (m, 2H), 7.14 (dd, *J* = 5.0, 3.8 Hz, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 188.3, 143.7, 138.2, 134.9, 134.3, 132.4, 129.2, 128.5, 128.1. IR 3099.1, 1623.7, 1588.8, 1511.9, 1447.3, 1409.2, 1049.4, 708.0 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{11}H_9OS$ $[M+H]^+$ 189.0369; found 189.0368.

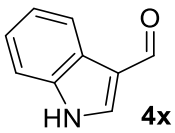
Benzofuran-2-carboxaldehyde (4w)



4w

MeCN (10 mL) was used as the solvent instead of EtOH. **4w**[40] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (120 mg, 82%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.84 (s, 1H), 7.71 (dt, *J* = 7.9, 1.0 Hz, 1H), 7.60–7.53 (m, 2H), 7.52–7.46 (m, 1H), 7.34–7.29 (m, 1H).^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.8, 156.3, 152.8, 129.3, 126.7, 124.3, 123.7, 117.9, 112.7. IR 3089.8, 2835.9, 2726.2, 1675.7, 1609.3, 1552.3, 1476.2, 1445.9, 1323.6, 1286.7, 1117.9, 735.3 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_9H_7O_2$ $[M+H]^+$ 147.0441; found 147.0445.

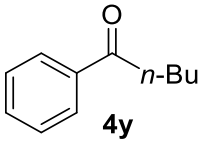
Indole-3-carboxaldehyde (4x)



4x

MeCN (10 mL) was used as the solvent instead of EtOH. **4x**[40] was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 1:1) as a brown solid (123 mg, 85%). M.P. 196–198 ℃. ^{1}H-NMR (400 MHz, DMSO) δ: 12.13 (s, 1H), 9.93 (s, 1H), 8.30–8.25 (m, 1H), 8.08 (d, *J* = 8.0 Hz, 1H), 7.50 (d, *J* = 6.9 Hz, 1H), 7.29–7.18 (m, 2H). ^{13}C-NMR (100 MHz, DMSO) δ: 184.9, 138.4, 137.0, 124.1, 123.4, 122.1, 120.8, 118.1, 112.4. IR 3103.9, 3041.4, 2815.6, 2737.4, 1627.1, 1571.4, 1518.6, 1436.7, 1385.6, 1237.8, 1122.7, 1078.5, 756.0 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for C_9H_8NO $[M+H]^+$ 146.0600; found 146.0600.

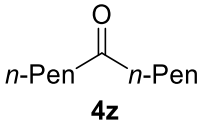
1-Phenylpentan-1-one (4y)



4y

4y[39] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (140 mg, 86%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.98–7.94 (m, 2H), 7.57–7.52 (m, 1H), 7.48–7.42 (m, 2H), 2.94 (t, *J* = 7.4 Hz, 2H), 1.69 (p, *J* = 7.3 Hz, 2H), 1.37 (h, *J* = 7.4 Hz, 2H), 0.93 (t, *J* = 7.4 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 200.7, 137.2, 133.0, 128.7, 128.2, 38.4, 26.6, 22.6, 14.1. IR 3061.9, 2932.3, 2868.8, 1682.4, 1593.2, 1450.3, 1353.1, 1263.4, 1207.6, 1010.6, 747.4 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{11}H_{15}O$ $[M+H]^+$ 163.1117; found 163.1114.

Undecan-6-one (4z)

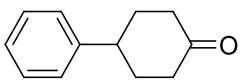


4z

4z[41] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (160 mg, 94%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 2.35 (t, *J* = 7.4 Hz, 4H), 1.52 (p, *J* = 7.5 Hz, 4H), 1.36–1.19 (m, 8H), 0.86 (t, *J* = 6.9 Hz, 6H). ^{13}C-NMR

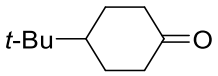
(100 MHz, $CDCl_3$) δ: 211.8, 42.9, 31.6, 23.7, 22.6, 14.0. IR 2928.7, 2863.7, 1712.4, 1460.6, 1411.1, 1371.7, 1131.7, 729.1 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{11}H_{23}O$ $[M+H]^+$ 171.1743; found 171.1737.

4-Phenylcyclohexanone (4aa)


4aa

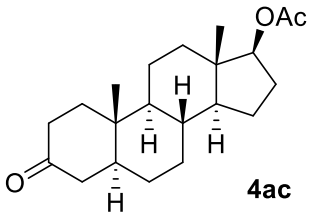
4aa[42] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (129 mg, 74%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.35–7.29 (m, 2H), 7.27–7.19 (m, 3H), 2.98 (tt, *J* = 12.1, 3.5 Hz, 1H), 2.57–2.46 (m, 4H), 2.26–2.17 (m, 2H), 2.01–1.87 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 211.2, 144.9, 128.7, 126.8, 126.7, 42.8, 41.5, 34.1. IR 3026.3, 2937.1, 2866.9, 1698.4, 1599.6, 1489.8, 1450.2, 1416.9, 1163.6, 755.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{12}H_{15}O$ $[M+H]^+$ 175.1117; found 175.1114.

4-*tert*-Butylcyclohexanone (4ab)


4ab

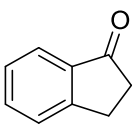
4ab[36] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (119 mg, 77%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 2.41–2.23 (m, 4H), 2.10–2.02 (m, 2H), 1.51–1.36 (m, 3H), 0.89 (s, 9H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 212.6, 46.8, 41.4, 32.6, 27.7. IR 2945.7, 2868.3, 1719.2, 1460.4, 1420.3, 1362.1, 1218.3, 1160.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{10}H_{19}O$ $[M+H]^+$ 155.1430; found 155.1432.

(5*S*)-17-Acetyl-4,5-dihydrotestosterone (4ac)


4ac

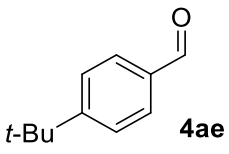
MeCN/AcOH (50/1, 10 mL) was used as the solvent instead of EtOH, and additional $CeBr_3$ (19 mg, 0.05 mmol) and H_2O_2 (204 μL, 2 mmol) were needed. **4ac**[43] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a white solid (206 mg, 62%). M.P. 159–161 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.62–4.56 (m, 1H), 2.42–2.09 (m, 5H), 2.03 (s, 3H), 1.77–1.24 (m, 14H), 1.20–1.12 (m, 1H), 1.01 (s, 3H), 0.96–0.85 (m, 1H), 0.80 (s, 3H), 0.78–0.71 (m, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 212.0, 171.3, 82.9, 53.9, 50.7, 46.7, 44.8, 42.8, 38.6, 38.2, 37.0, 35.9, 35.3, 31.4, 28.9, 27.7, 23.7, 21.3, 21.0, 12.3, 11.6. IR 2929.7, 2848.3, 1730.7, 1710.5, 1436.6, 1371.2, 1241.9, 1029.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{21}H_{33}O_3$ $[M+H]^+$ 333.2424; found 333.2416. $[\alpha]_D^{25}$ = +29 (*c* 1, $CHCl_3$).

1-Indanone (4ad)


4ad

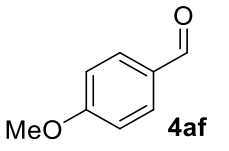
4ad[38] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (83.3 mg, 63%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.74 (d, *J* = 7.7 Hz, 1H), 7.60–7.55 (m, 1H), 7.46 (d, *J* = 7.7 Hz, 1H), 7.34 (t, *J* = 7.4 Hz, 1H), 3.12 (t, *J* = 5.8 Hz, 2H), 2.71–2.66 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 207.2, 155.3, 137.2, 134.7, 127.4, 126.8, 123.8, 36.3, 25.9. IR 3049.6, 2943.9, 2893.5, 1704.0, 1601.8, 1471.1, 1439.6, 1274.8, 1195.5, 1033.3, 756.1 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for C_9H_9O $[M+H]^+$ 133.0648; found 133.0644.

4-*tert*-Butylbenzaldehyde (4ae)



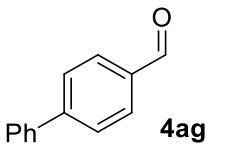
MeCN (10 mL) was used as the solvent instead of EtOH. **4ae**[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (146 mg, 90%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.98 (s, 1H), 7.81 (d, *J* = 8.3 Hz, 2H), 7.54 (d, *J* = 8.2 Hz, 2H), 1.36 (s, 9H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 192.2, 158.6, 134.2, 129.8, 126.1, 35.5, 31.2. IR 2906.5, 2870.8, 2823.3, 2726.9, 1697.1, 1604.4,1467.6, 1414.1, 1368.9, 1217.2, 1105.6, 825.9 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{11}H_{15}O$ $[M+H]^+$ 163.1117; found 163.1112.

4-Methoxybenzaldehyde (4af)



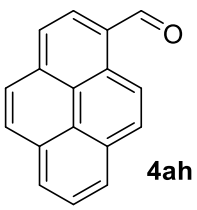
MeCN (10 mL) was used as the solvent instead of EtOH. **4af**[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (128 mg, 94%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.88 (s, 1H), 7.82 (d, *J* = 8.4 Hz, 2H), 6.99 (d, *J* = 8.4 Hz, 2H), 3.88 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 190.9, 164.7, 132.1, 130.1, 114.4, 55.7. IR 3009.5, 2837.6, 2738.7, 1681.7, 1596.0, 1508.3, 1460.3, 1253.1, 1213.5, 1154.8, 1021.2, 827.1 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_8H_9O_2$ $[M+H]^+$ 137.0597; found 137.0597.

4-Phenylbenzaldehyde (4ag)



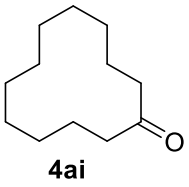
MeCN (10 mL) was used as the solvent instead of EtOH. **4ag**[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (162 mg, 89%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 10.06 (s, 1H), 7.98–7.93 (m, 2H), 7.78–7.74 (m, 2H), 7.66–7.62 (m, 2H), 7.52–7.46 (m, 2H), 7.45–7.40 (m, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 192.0, 147.3, 139.8, 135.3, 130.4, 129.1, 128.6, 127.8, 127.5. IR 3025.1, 2833.8, 2742.7, 1687.7, 1598.2, 1560.8, 1382.7, 1213.0, 1166.7, 830.3, 758.2 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{13}H_{11}O$ $[M+H]^+$ 183.0804; found 183.0810.

1-Pyrenecarboxaldehyde (4ah)



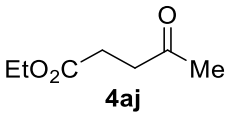
MeCN (10 mL) was used as the solvent instead of EtOH. **4ah**[44] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a yellow solid (200 mg, 87%). M.P. 124–126 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 10.77 (s, 1H), 9.39 (d, *J* = 5.3 Hz, 1H), 8.41 (d, *J* = 4.5 Hz, 1H), 8.31–8.27 (m, 3H), 8.20 (dd, *J* = 7.7, 4.5 Hz, 2H), 8.10–8.06 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 193.2, 135.7, 131.5, 131.2, 131.1, 131.0, 130.8, 130.5, 127.5, 127.3, 127.2, 127.0, 126.7, 124.8, 124.7, 124.2, 123.1. IR 2705.2, 1675.1, 1577.8, 1498.3, 1370.5, 1174.1, 1051.6, 778.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{17}H_{11}O$ $[M+H]^+$ 231.0804; found 231.0797.

Cyclododecanone (4ai)



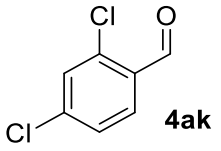
4ai[37] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:5) as a light-yellow oil (168 mg, 92%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 2.47–2.42 (m, 4H), 1.74–1.65 (m, 4H), 1.35–1.20 (m, 14H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 212.7, 40.4, 24.8, 24.6, 24.2, 22.6, 22.4. IR 2926.0, 2856.4, 1702.1, 1468.0, 1435.4, 1362.4, 1129.8, 1019.2, 722.3 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{12}H_{23}O$ $[M+H]^+$ 183.1743; found 183.1741.

Ethyl levulinate (4aj)



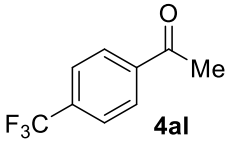
4aj[45] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (123 mg, 85%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.06 (q, *J* = 7.1 Hz, 2H), 2.69 (t, *J* = 6.5 Hz, 2H), 2.51 (t, *J* = 6.7 Hz, 2H), 2.15 (s, 3H), 1.19 (t, *J* = 7.2 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 206.8, 172.8, 60.7, 38.0, 29.9, 28.1, 14.2. IR 2934.7, 1717.1, 1363.6, 1204.9, 1185.2, 1155.2, 1029.3 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_7H_{13}O_3$ $[M+H]^+$ 145.0859; found 145.0854.

2,4-Dichlorobenzaldehyde (4ak)



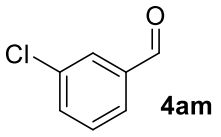
MeCN (10 mL) was used as the solvent instead of EtOH. **4ak**[46] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (154 mg, 88%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 10.38 (s, 1H), 7.83 (d, *J* = 8.4 Hz, 1H), 7.44 (s, 1H), 7.33 (d, *J* = 8.4 Hz, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 188.5, 141.2, 138.6, 131.0, 130.5, 130.4, 128.0. IR 3081.5, 2884.8, 2639.7, 1683.1, 1576.9, 1461.3, 1412.3, 1248.9, 1043.4, 820.6 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_7H_5Cl_2O$ $[M+H]^+$ 174.9712; found 174.9719.

4'-Trifluoromethylacetophenone (4al)



MeCN (10 mL) was used as the solvent instead of EtOH. **4al**[38] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (175 mg, 93%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.02 (d, *J* = 5.0 Hz, 2H), 7.69 (d, *J* = 4.8 Hz, 2H), 2.62 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 197.0, 139.8, 134.2 (q, *J* = 18.5 Hz), 128.7, 125.7 (q, *J* = 2.2 Hz), 121.4 (q, *J* = 155 Hz), 26.8. IR 3010.9, 1690.9, 1409.6, 1320.2, 1258.6, 1165.8, 1116.9, 1058.8, 1013.0, 837.1 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_9H_8F_3O$ $[M+H]^+$ 189.0522; found 189.0516.

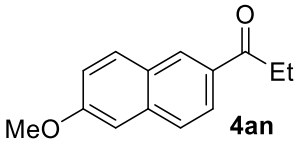
3-Chlorobenzaldehyde (4am)



MeCN (10 mL) was used as the solvent instead of EtOH. **4am**[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (128 mg, 91%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.97 (s, 1H), 7.84 (t, *J* = 1.1 Hz, 1H), 7.75 (dt, *J* = 4.3, 0.7 Hz, 1H), 7.58 (ddd, *J* = 4.6, 1.3, 0.6 Hz, 1H), 7.47 (t, *J* = 4.4 Hz, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 191.0, 137.9, 135.6, 134.5, 130.5, 129.4, 128.1. IR 3070.5, 2830.1, 2729.5,

1695.6, 1572.4, 1470.1, 1432.1, 1191.0, 1070.9, 785.5 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for C_7H_6ClO $[M+H]^+$ 141.0102; found 141.0099.

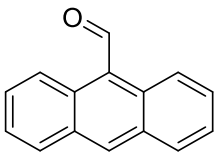
1-(6-methoxynaphthalen-2-yl)-propan-1-one (4an)



4an

4an[47] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a brown solid (201 mg, 94%). M.P. 110–112 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.38 (s, 1H), 7.99 (dd, *J* = 4.9, 1.0 Hz, 1H), 7.81 (d, *J* = 5.1 Hz, 1H), 7.73 (d, *J* = 4.9 Hz, 1H), 7.17 (dd, *J* = 5.1, 1.5 Hz, 1H), 7.12 (d, *J* = 1.5 Hz, 1H), 3.92 (s, 3H), 3.07 (q, *J* = 4.1 Hz, 2H), 1.26 (t, *J* = 4.1 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 200.6, 159.7, 137.2, 132.4, 131.2, 129.5, 127.9, 127.1, 124.7, 119.7, 105.8, 55.5, 31.7, 8.6. IR 3059.5, 1674.9, 1618.2, 1474.8, 1383.1, 1344.9, 1185.4, 1017.3, 860.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{14}H_{15}O_2$ $[M+H]^+$ 215.1067; found 215.1060.

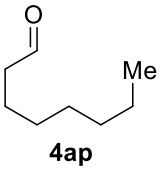
Anthracene-9-carbaldehyde (4ao)



4ao

MeCN (10 mL) was used as the solvent instead of EtOH. **4ao**[33] was purified by flash column chromatography (ethyl acetate/hexane = 1:20 to 1:5) as a light-yellow solid (134 mg, 65%). M.P. 103–105 °C; ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 11.53 (s, 1H), 8.98 (dd, *J* = 9.0, 1.0 Hz, 2H), 8.70 (s, 1H), 8.06 (d, *J* = 8.4 Hz, 2H), 7.71–7.66 (m, 2H), 7.58–7.53 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 193.2, 135.4, 132.3, 131.2, 129.4, 129.3, 125.8, 124.9, 123.7. IR 1659.8, 1547.3, 1515.4, 1437.8, 1242.5, 1155.0, 1041.6, 843.8, 723.7 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{15}H_{11}O$ $[M+H]^+$ 207.0804; found 207.0808.

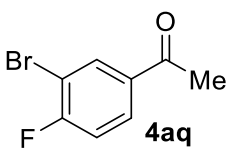
Octanal (4ap)



4ap

MeCN (10 mL) was used as the solvent instead of EtOH. **4ap**[48] was purified by flash column chromatography (ethyl acetate/hexane = 1:20 to 1:5) as a light-yellow oil (64.1 mg, 50%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.76 (t, *J* = 1.9 Hz, 1H), 2.39 (td, *J* = 7.4, 1.9 Hz, 2H), 1.67–1.59 (m, 2H), 1.34–1.24 (m, 8H), 0.86 (t, *J* = 7.0 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 203.2, 44.1, 31.8, 29.3, 29.2, 22.7, 22.2, 14.2. IR 2925.5, 2857.5, 2715.6, 1725.1, 1461.0, 1383.9, 1140.4, 724.2 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_8H_{17}O$ $[M+H]^+$ 129.1274; found 129.1275.

3'-Bromo-4'-fluoroacetophenone (4aq)

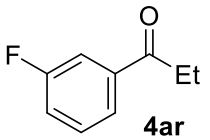


4aq

MeCN (10 mL) was used as the solvent instead of EtOH. **4aq** was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (176 mg, 81%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.15 (dd, *J* = 6.6, 2.2 Hz, 1H), 7.88 (ddd, *J* = 8.6, 4.6, 2.2 Hz, 1H), 7.17 (t, *J* = 8.3 Hz, 1H), 2.58 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 195.4, 160.9 (d, *J* = 254 Hz), 134.7 (d, *J* = 3.4 Hz), 134.3 (d, *J* = 1.8 Hz), 129.6 (d, *J* = 8.5

Hz), 116.7 (d, *J* = 22.8 Hz), 109.7 (d, *J* = 21.5 Hz), 26.6. IR 3088.9, 1677.3, 1583.0, 1484.9, 1391.0, 1351.1, 1248.8, 1040.3, 899.6 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for C_8H_7BrFO $[M+H]^+$ 216.9659; found 216.9668.

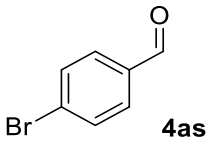
1-(3-Fluorophenyl)-propan-1-one (4ar)



4ar

MeCN (10 mL) was used as the solvent instead of EtOH. **4ar**[49] was purified by flash column chromatography (ethyl acetate/hexane = 1:20 to 1:5) as a light-yellow oil (126 mg, 83%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.73 (d, *J* = 7.8 Hz, 1H), 7.67–7.62 (m, 1H), 7.48–7.41 (m, 1H), 7.29–7.22 (m, 1H), 2.96 (q, *J* = 7.2 Hz, 2H), 1.21 (t, *J* = 7.4 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 199.6 (d, *J* = 2.1 Hz), 161.8 (d, *J* = 246 Hz), 139.1 (d, *J* = 6.0 Hz), 130.3 (d, *J* = 7.6 Hz), 123.8 (d, *J* = 3.0 Hz), 119.9 (d, *J* = 21.3 Hz), 114.8 (d, *J* = 21.9 Hz), 32.1, 8.2. IR 2940.6, 1687.8, 1586.4, 1439.3, 1350.4, 1244.9, 1165.4, 780.7 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_9H_{10}FO$ $[M+H]^+$ 153.0710; found 153.0713.

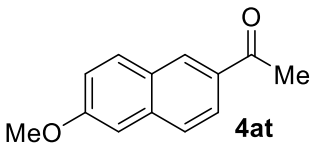
4-Bromobenzaldehyde (4as)



4as

MeCN (10 mL) was used as the solvent instead of EtOH. **4as**[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:20 to 1:5) as a light-yellow oil (124 mg, 67%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.97 (s, 1H), 7.76–7.71 (m, 2H), 7.70–7.65 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 191.2, 135.2, 132.6, 131.1, 129.9. IR 1685.5, 1576.3, 1473.0, 1379.3, 1198.1, 1147.2, 1058.3, 806.8 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for C_7H_6BrO $[M+H]^+$ 184.9597; found 184.9590.

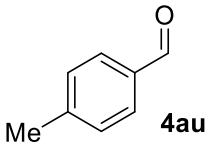
2-Acetyl-6-methoxy naphthalene (4at)



4at

4at[50] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a white solid (170 mg, 85%). M.P. 109–111 °C. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.38 (s, 1H), 7.98 (dd, *J* = 8.6, 1.8 Hz, 1H), 7.83 (d, *J* = 8.9 Hz, 1H), 7.74 (d, *J* = 8.6 Hz, 1H), 7.18 (dd, *J* = 8.9, 2.5 Hz, 1H), 7.14 (d, *J* = 2.5 Hz, 1H), 3.94 (s, 3H), 2.69 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 197.9, 159.9, 137.4, 132.8, 131.2, 130.2, 128.0, 127.2, 124.8, 119.8, 105.9, 55.5, 26.6. IR 1669.45, 1614.38, 1468.06, 1355.57, 1267.16, 1194.54, 1014.38, 857.77 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for $C_{13}H_{13}O_2$ $[M+H]^+$ 201.0910; found 201.0904.

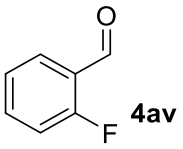
4-Methylbenzaldehyde (4au)



4au

MeCN (10 mL) was used as the solvent instead of EtOH. **4au**[33] was purified by flash column chromatography (ethyl acetate/hexane = 1:20 to 1:5) as a light-yellow oil (76.9 mg, 64%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.95 (s, 1H), 7.75 (d, *J* = 8.1 Hz, 2H), 7.31 (d, *J* = 7.8 Hz, 2H), 2.43 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 192.1, 145.6, 134.3, 129.9, 129.8, 22.0. IR 2824.6, 2733.2, 1691.5, 1602.8, 1386.5, 1301.7, 1208.8, 1109.2, 1040.0, 844.9 cm^{-1}; HRMS (ESI^+) (m/z) calcd. for C_8H_9O $[M+H]^+$ 121.0648; found 121.0654.

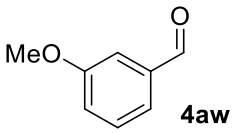
2-Fluorobenzaldehyde (4av)



4av

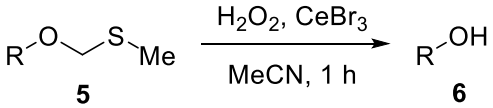
MeCN (10 mL) was used as the solvent instead of EtOH. **4av**[31] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (62.1 mg, 50%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 10.33 (s, 1H), 7.82 (td, *J* = 7.4, 2.0 Hz, 1H), 7.64–7.57 (m, 1H), 7.29–7.23 (m, 1H), 7.19–7.12 (m, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 186.8 (d, *J* = 6.6 Hz), 163.2 (d, *J* = 257 Hz), 136.2 (d, *J* = 9.1 Hz), 128.5 (d, *J* = 1.9 Hz), 124.5 (d, *J* = 3.8 Hz), 124.0 (d, *J* = 7.8 Hz), 116.2 (d, *J* = 20.3 Hz). IR 1693.7, 1609.6, 1583.1, 1481.5, 1457.5, 1400.5, 1273.1, 1188.0, 1095.9, 758.7 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for C_7H_6FO $[M+H]^+$ 125.0397; found 125.0398.

3-Methoxybenzaldehyde (4aw)



4aw

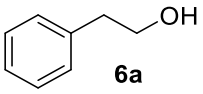
MeCN (10 mL) was used as the solvent instead of EtOH. **4aw**[51] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:5) as a light-yellow oil (84.4 mg, 62%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.97 (s, 1H), 7.47–7.43 (m, 2H), 7.40–7.38 (m, 1H), 7.19–7.15 (m, 1H), 3.86 (s, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 192.3, 160.3, 137.9, 130.2, 123.7, 121.7, 112.2, 55.6. IR 2837.8, 2730.0, 1697.0, 1589.8, 1482.7, 1459.9, 1389.1, 1146.2, 1038.2, 778.5 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_8H_9O_2$ $[M+H]^+$ 137.0597; found 137.0601.



5 **6**

General Procedure IV: To a stirred solution of compound **5** (1 mmol) in MeCN (5 mL) were added $CeBr_3$ (19.0 mg, 0.05 mmol) and 30% H_2O_2 (100 μL, 1 mmol) at rt. After completion of the addition, the resulting mixture was allowed to stir at room temperature for 1 h. Then the mixture was quenched by aqueous $Na_2S_2O_3$ (0.1 M, 20 mL) and ethyl acetate (20 mL). The organic fractions were collected, and the aqueous phase was extracted with ethyl acetate (3 × 20 mL). The combined organic fractions were washed with brine, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified by flash column chromatography to give compound **6**.

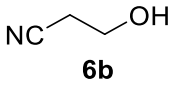
2-Phenylethanol (6a)



6a

6a[52] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (85.5 mg, 70%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.35–7.31 (m, 2H), 7.27–7.23 (m, 3H), 3.81 (t, *J* = 6.7 Hz, 2H), 2.85 (t, *J* = 6.6 Hz, 2H), 1.98 (brs, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 138.6, 129.1, 128.6, 126.5, 63.7, 39.2. IR 3323.1, 3027.4, 2939.0, 2872.9, 1601.6, 1494.2, 1450.5, 1174.6, 1042.0, 907.3, 854.1, 742.1, 695.5, 570.2, 491.9 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_8H_{11}O$ $[M+H]^+$ 123.0804; found 123.0809.

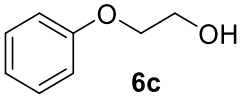
2-Cyanoethanol (6b)



6b

Solid $Na_2S_2O_3$ (316 mg, 2 mmol) was used to quench the reaction instead of an aqueous solution, and the resulting mixture was evaporated directly. **6b**[53] was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 2:1) as a light-yellow oil (59.7 mg, 84%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 3.84 (t, *J* = 6.0 Hz, 2H), 3.18 (s, 1H), 2.59 (t, *J* = 6.0 Hz, 2H). ^{13}C-NMR (101 MHz, $CDCl_3$) δ: 118.5, 57.7, 21.5. IR 3417.4, 2899.2, 2254.3, 1723.4, 1638.2, 1414.3, 1326.5, 1171.0, 1119.1, 1051.1, 852.1, 576.1 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for C_3H_6NO $[M+H]^+$ 72.0444; found 72.0447.

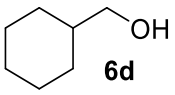
2-Phenoxyethanol (6c)



6c

6c[54] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (98.1 mg, 71%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.28 (t, *J* = 7.4 Hz, 2H), 7.00-6.92 (m, 3H), 4.06 (t, *J* = 4.2 Hz, 2H), 3.94 (t, *J* = 4.2 Hz, 2H), 2.53 (s, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 158.7, 129.6, 121.2, 114.6, 69.2, 61.5. IR 3385.3, 2930.7, 1721.9, 1594.2, 1492.3, 1455.4, 1327.8, 1298.3, 1239.6, 1169.0, 1128.0, 1078.0, 1042.7, 957.2, 913.3, 791.7, 751.0, 690.3, 604.3, 554.6, 509.1, 482.1 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_8H_{11}O_2$ $[M+H]^+$ 139.0754; found 139.0751.

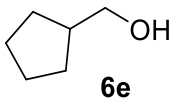
Cyclohexylmethanol (6d)



6d

Solid $Na_2S_2O_3$ (316 mg, 2 mmol) was used to quench the reaction instead of an aqueous solution, and the resulting mixture was evaporated directly. **6d**[55] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (74.2 mg, 65%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 3.37 (d, *J* = 6.4 Hz, 2H), 2.26 (s, 1H), 1.73–1.61 (m, 5H), 1.47–1.39 (m, 1H), 1.26–1.11 (m, 3H), 0.93–0.83 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 69.0, 40.7, 29.7, 26.7, 26.0. IR 3334.1, 2922.1, 2851.7, 1718.9, 1448.9, 1338.8, 1171.1, 1089.1, 1019.2, 973.0, 943.1, 891.7, 835.9, 778.5, 744.9, 554.1, 524.5, 486.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_7H_{15}O$ $[M+H]^+$ 115.1117; found 115.1121.

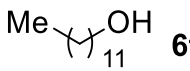
Cyclopentylmethanol (6e)



6e

Solid $Na_2S_2O_3$ (316 mg, 2 mmol) was used to quench the reaction instead of an aqueous solution, and the resulting mixture was evaporated directly. **6e**[56] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (73.1 mg, 73%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 3.50–3.48 (m, 2H), 2.11–2.04 (m, 1H), 1.77–1.70 (m, 2H), 1.60–1.51 (m, 4H), 1.24–1.19 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 67.5, 42.2, 29.2, 25.6. IR 3318.8, 2946.4, 2864.3, 1449.4, 1157.9, 1030.7, 934.7, 624.7 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_6H_{16}NO$ $[M+NH_4]^+$ 118.1226; found 118.1224.

1-Undecanol (6f)

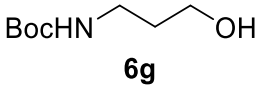


6f

6f[57] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (123 mg, 66%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 3.61 (t, *J* = 6.6 Hz,

2H), 1.56–1.51 (m, 2H), 1.27–1.23 (m, 18H), 0.84 (t, *J* = 6.3 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 63.3, 32.7, 32.1, 29.8, 29.77, 29.74, 29.6, 29.5, 25.9, 22.8, 14.2. IR 3353.3, 2921.8, 2853.4, 1461.6, 1350.9, 1173.6, 1046.6, 720.5, 528.6 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{27}O$ [M+H]$^+$ 187.2056; found 187.2065.

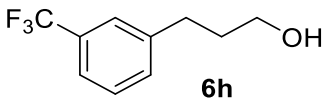
3-[(*tert*-Butyloxycarbonyl)amino]propanol (6g)



6g

Solid $Na_2S_2O_3$ (316 mg, 2 mmol) was used to quench the reaction instead of an aqueous solution, and the resulting mixture was evaporated directly. **6g**[58] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:2) as a light-yellow oil (123 mg, 70%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.91 (s, 1H), 3.61 (t, *J* = 5.3 Hz, 2H), 3.29–3.24 (m, 2H), 1.67–1.64 (m, 2H), 1.41 (s, 9H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 157.2, 79.6, 59.3, 37.1, 32.9, 28.5. IR 3348.7, 2974.1, 1682.7, 1519.6, 1452.0, 1393.9, 1365.4, 1163.9, 1046.1, 866.8, 777.9, 596.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_8H_{18}NO_3$[M+H]$^+$ 176.1281; found 176.1283.

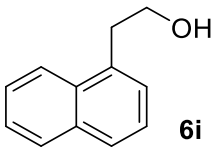
3-(3-Trifluoromethylphenyl)propanol (6h)



6h

6h[59] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (167 mg, 82%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.45–7.38 (m, 4H), 3.67 (t, *J* = 6.3 Hz, 2H), 2.76 (t, *J* = 7.8 Hz, 2H), 1.94–1.87 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 142.9, 132.0, 130.7 (q, *J* = 32.0 Hz), 128.9, 125.2 (q, *J* = 4.0 Hz), 122.8 (q, *J* = 4.0 Hz), 120.3 (q, *J* = 271.0 Hz), 62.0, 34.1, 32.0. IR 3325.8, 2941.1, 1448.4, 1325.3, 1160.5, 1118.6, 1067.8, 903.7, 798.8, 740.0, 700.5, 658.7, 516.0 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{10}H_{12}F_3O$ [M+H]$^+$ 205.0835; found 205.0839.

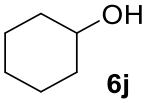
2-Naphthaleneethanol (6i)



6i

6i[60] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (127 mg, 74%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.05 (d, *J* = 8.2 Hz, 1H), 7.87 (d, *J* = 7.8 Hz, 1H), 7.76 (d, *J* = 8.0 Hz, 1H), 7.56–7.48 (m, 2H), 7.45–7.38 (m, 2H), 3.98 (t, *J* = 6.6 Hz, 2H), 3.34 (t, *J* = 6.6 Hz, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 134.5, 134.1, 132.2, 129.0, 127.5, 127.3, 126.2, 125.8, 125.6, 123.8, 63.2, 36.3. IR 3327.4, 3046.4, 2943.2, 2875.6, 1716.1, 1593.9, 1509.5, 1391.4, 1164.1, 1034.7, 865.7, 772.7, 732.7, 597.7, 551.5, 422.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{12}NaO$ [M+Na]$^+$ 195.0780; found 195.0781.

Cyclohexanol (6j)

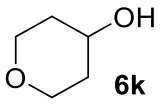


6j

Solid $Na_2S_2O_3$ (316 mg, 2 mmol) was used to quench the reaction instead of an aqueous solution, and the resulting mixture was evaporated directly. **6j**[61] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (90.1 mg, 90%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 3.62–3.59 (m, 1H), 1.92–1.87 (m, 1H), 1.77–1.70 (m, 2H), 1.57–1.45

(m, 3H), 1.31–1.14 (m, 5H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 70.3, 35.6, 25.5, 24.1. IR 3341.3, 2997.5, 2855.4, 1715.5, 1449.6, 1367.0, 1174.8, 1059.1, 964.0, 889.9, 841.5, 781.7 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_6H_{13}O$ $[M+H]^+$ 101.0961; found 101.0956.

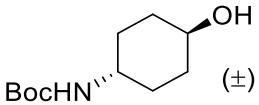
Tetrahydro-4-pyranol (6k)



6k

Solid $Na_2S_2O_3$ (316 mg, 2 mmol) was used to quench the reaction instead of an aqueous solution, and the resulting mixture was evaporated directly. **6k**[62] was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 2:1) as a light-yellow oil (87.8 mg, 86%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 3.92 (dt, *J* = 11.7, 4.4 Hz, 2H), 3.88–3.81 (m, 1H), 3.46–3.40 (m, 2H), 1.91–1.87 (m, 2H), 1.74 (s, 1H), 1.60–1.51 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 67.1, 65.8, 35.6. IR 3382.2, 2945.2, 2854.8, 1652.8, 1450.3, 1368.0, 1285.3, 1227.1, 1133.0, 1077.0, 1032.7, 1004.5, 984.6, 857.2, 813.7, 611.6, 517.5 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_5H_{11}O_2$ $[M+H]^+$ 103.0754; found 103.0756.

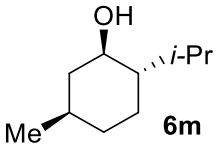
***trans*-4-[(*tert*-Butyloxycarbonyl)amino]cyclohexan-1-ol (6l)**



6l

Solid $Na_2S_2O_3$ (316 mg, 2 mmol) was used to quench the reaction instead of an aqueous solution, and the resulting mixture was evaporated directly. **6l**[63] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:2) as a white solid (129 mg, 60%). M.P. 172–174 ºC. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.38 (s, 1H), 3.60–3.55 (m, 1H), 3.40 (s, 1H), 2.00–1.94 (m, 4H), 1.77 (s, 1H), 1.42 (s, 9H), 1.37–1.34 (m, 2H), 1.16–1.12 (m, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 155.4, 79.4, 69.9, 49.0, 34.1, 31.3, 28.5. IR 3340.1, 2978.6, 2933.5, 2858.7, 2280.5, 2114.4, 1678.5, 1523.4, 1451.4, 1363.5, 1312.0, 1263.3, 1228.1, 1063.7, 948.5, 895.1, 782.9, 740.2, 619.0, 521.6, 461.4, 427.1 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{11}H_{22}NO_3$ $[M+H]^+$ 216.1594; found 216.1592.

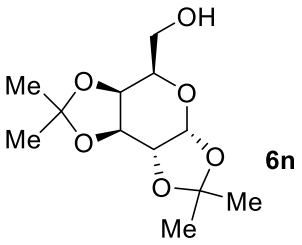
(1*R*,2*S*,5*R*) (-)-Menthol (6m)



6m

6m[64] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (127 mg, 81%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 3.37 (td, *J* = 10.4, 4.3 Hz, 1H), 2.19–2.14 (m, 1H), 1.98–1.93 (m, 1H), 1.68–1.58 (m, 2H), 1.43–1.41 (m, 1H), 1.13–1.07 (m, 1H), 0.96–0.90 (m, 8H), 0.87–0.82 (m, 1H), 0.80 (d, *J* = 1.5 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 71.7, 50.3, 45.2, 34.7, 31.8, 26.0, 23.3, 22.4, 21.2, 16.2. IR 3359.0, 2952.5, 2921.3, 2867.8, 1723.4, 1454.6, 1368.9, 1176.1, 1099.4, 1027.0, 985.3, 914.5, 874.4, 842.6, 771.2, 545.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{10}H_{20}NaO$ $[M+Na]^+$ 179.1406; found 179.1407. $[\alpha]_D^{25}$ = -51 (*c* 0.1, EtOH)

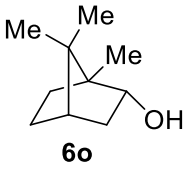
1,2:3,4-Di-*O*-isopropylidene-α-D-galactopyranose (6n)



6n

6n[65] was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 2:1) as a light-yellow oil (195 mg, 75%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 5.56 (d, *J* = 5.0 Hz, 1H), 4.60 (d, *J* = 7.9 Hz, 1H), 4.34–4.26 (m, 2H), 3.87–3.83 (m, 2H), 3.77–3.73 (m, 1H), 1.53 (s, 3H), 1.46 (s, 3H), 1.33 (s, 6H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 109.6, 108.8, 96.4, 71.8, 70.9, 70.7, 68.2, 62.5, 26.2, 26.1, 25.1, 24.4. IR 3493.7, 2986.0, 2932.9, 1723.5, 1457.1, 1377.8, 1253.2, 1209.7, 1168.7, 1063.3, 997.7, 890.8, 858.7, 802.4, 769.0, 644.2, 552.8, 509.7 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{12}H_{21}O_6$ $[M+H]^+$ 261.1333; found 261.1335. $[\alpha]_D^{25}$ = -59 (*c* 0.1, $CHCl_3$)

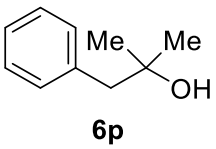
(-)-Borneol (6o)



6o

6o[66] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a white solid (128 mg, 83%). M.P. 207–210 ºC. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 4.01 (ddd, *J* = 10.0, 3.3, 1.6 Hz, 1H), 2.30–2.23 (m, 1H), 1.91–1.84 (m, 1H), 1.75–1.69 (m, 1H), 1.60 (t, *J* = 4.6 Hz, 1H), 1.27–1.20 (m, 2H), 0.91 (dd, *J* = 13.4, 3.4 Hz, 1H), 0.86–0.84 (m, 9H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 77.5, 49.6, 48.2, 45.2, 39.2, 28.4, 26.0, 20.3, 18.8, 13.5. IR 3299.0, 2945.2, 2874.9, 1451.8, 1380.2, 1303.0, 1232.1, 1139.3, 1107.5, 1053.4, 1023.0, 941.3, 828.4, 656.6. 528.1, 461.2 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{10}H_{18}KO$ $[M+K]^+$ 193.0989; found 193.0980. $[\alpha]_D^{25}$ = -34 (*c* 0.1, EtOH).

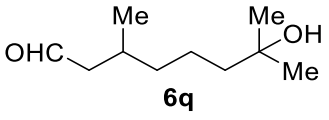
2-Methyl-1-phenylpropan-2-ol (6p)



6p

6p[64] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (116 mg, 77%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.32–7.20 (m, 5H), 2.76 (s, 2H), 1.22 (s, 6H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 137.9, 130.6, 128.3, 126.6, 70.9, 49.9, 29.3. IR 3389.7, 3028.6, 2971.0, 2927.6, 1709.0, 1493.1, 1455.1, 1373.1, 1306.5, 1207.1, 1146.6, 1031.3, 974.3. 900.0, 777.7, 725.4, 698.2, 608.2, 516.3, 466.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{10}H_{14}NaO$ $[M+Na]^+$ 173.0937; found 173.0938.

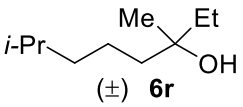
7-Hydroxy-3,7-dimethyloctanal (6q)



6q

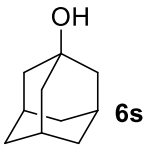
6q[67] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:2) as a light-yellow oil (141 mg, 82%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 9.69 (t, *J* = 2.3 Hz, 1H), 2.36–2.32 (m, 1H), 2.22–2.15 (m, 1H), 2.04–1.99 (m, 1H), 1.45–1.30 (m, 6H), 1.19–1.15 (m, 6H), 0.90 (d, *J* = 6.7 Hz, 3H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 203.2, 71.1, 51.1, 43.9, 37.4, 29.34, 29.25, 28.2, 21.7, 20.0. IR 3382.7, 2935.4, 1718.7, 1462.9, 1372.5, 1134.7, 937.1, 905.9, 761.9, 553.6, 482.7 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{10}H_{20}NaO_2$ $[M+Na]^+$ 195.1356; found 195.1352.

3,7-Dimethyloctan-3-ol (6r)



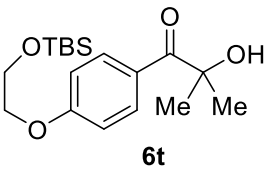
6r[68] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (125 mg, 79%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 1.58–1.51 (m, 1H), 1.50–1.35 (m, 5H), 1.34–1.26 (m, 2H), 1.20–1.15 (m, 2H), 1.14 (s, 3H), 0.90–0.86 (m, 9H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 73.1, 41.7, 39.7, 34.4, 28.1, 26.5, 22.8, 21.7, 8.3. IR 3382.6, 2956.4, 1461.9, 1373.7, 1152.8, 1081.9, 972.8, 899.2, 840.1, 738.7, 612.3 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{10}H_{22}KO$ $[M+K]^+$ 197.1302; found 197.1301.

1-Adamantanol (6s)



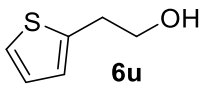
6s[64] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a white solid (129 mg, 85%). M.P. 246–249 ºC. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 2.13 (s, 3H), 1.70 (d, *J* = 2.6 Hz, 6H), 1.64–1.56 (m, 6H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 68.4, 45.5, 36.2, 30.8. IR 3272.9, 2891.8, 2843.9, 1722.7, 1446.5, 1345.8, 1299.3, 1223.7, 1174.7, 1109.6, 1081.5, 976.6, 923.2, 809.3, 651.4, 548.4, 464.6, 432.5 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{10}H_{16}NaO$ $[M+Na]^+$ 175.1093; found 175.1090.

1-[4-[2-(*tert*-Butyldimethylsilyloxy)ethoxy]phenyl]-2-hydroxy-2-methylpropan-1-one (6t)



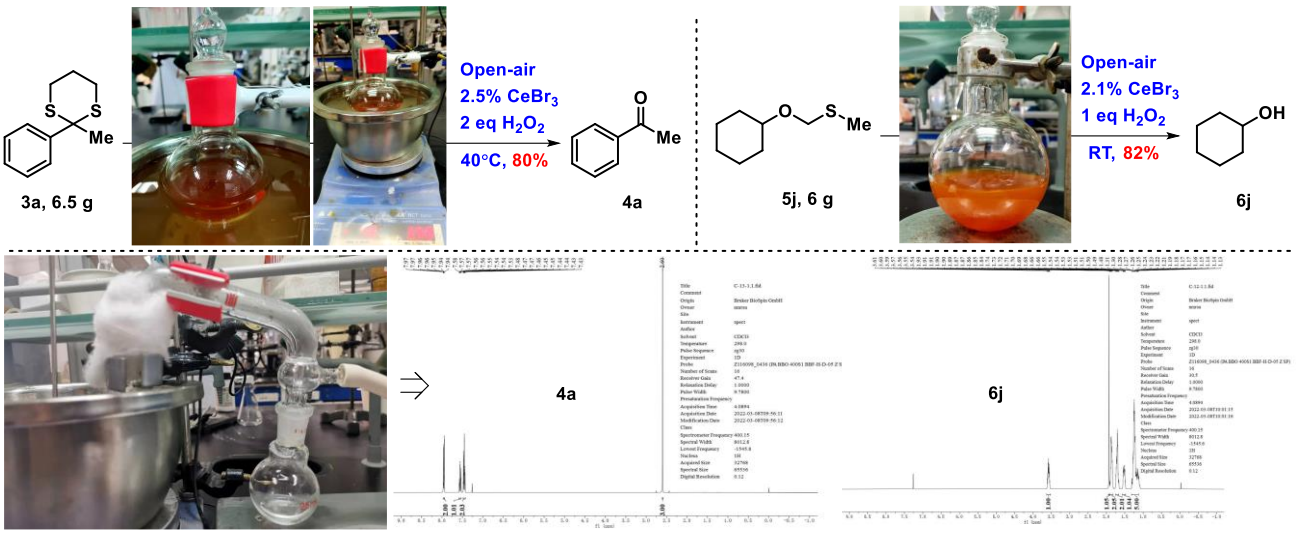
THF (5 mL) was used as the solvent instead of MeCN. **6t** was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (244 mg, 72%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 8.03 (d, *J* = 8.5 Hz, 2H), 6.93 (d, *J* = 8.5 Hz, 2H), 4.30 (s, 1H), 4.10 (t, *J* = 4.8 Hz, 2H), 3.97 (t, *J* = 4.8 Hz, 2H), 1.62 (s, 6H), 0.90 (s, 9H), 0.09 (s, 6H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 202.7, 163.0, 132.5, 126.0, 114.3, 75.9, 69.7, 61.9, 28.8, 26.0, 18.5, -5.1. IR 3454.2, 2931.6, 2858.5, 1736.9, 1663.6, 1598.3, 1571.8, 1507.4, 1463.8, 1416.8, 1368.4, 1306.8, 1252.4, 1161.5, 1128.4, 1053.9, 954.9, 832.0, 773.1, 728.5, 667.1, 586.8, 565.7, 510.9, 426.1 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for $C_{18}H_{31}O_4Si$ $[M+H]^+$ 339.1986; found 339.1998.

Thiophen-2-ylethanol (6u)



6u[69] was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) as a light-yellow oil (103 mg, 80%). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.16 (dd, *J* = 5.1, 1.2 Hz, 1H), 6.95 (dd, *J* = 5.1, 3.4 Hz, 1H), 6.88–6.87 (m, 1H), 3.83 (t, *J* = 6.3 Hz, 2H), 3.06 (t, *J* = 6.4 Hz, 2H), 1.89 (s, 1H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 140.9, 127.1, 125.7, 124.1, 63.6, 33.4. IR 3327.40, 2936.70, 1433.76, 1239.20, 1132.01, 1041.30, 845.97, 821.23, 690.27, 494.72 cm^{-1}; HRMS (ESI$^+$) (m/z) calcd. for C_6H_9OS $[M+H]^+$ 129.0369; found 129.0370.

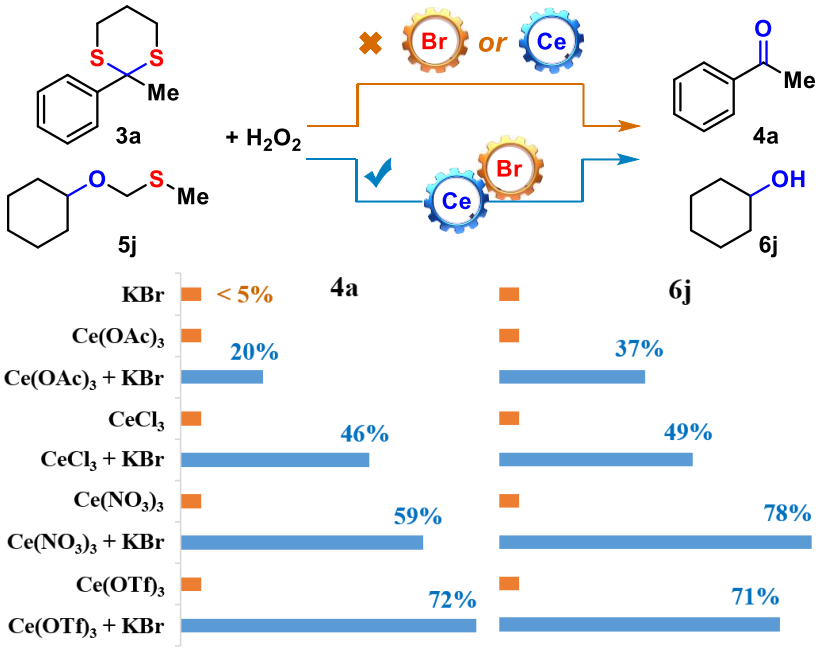
6. Gram-scale dethioacetalization of 3a and 5j under open-air condition



Gram-scale synthesis of 4a: To a stirred solution of compound **3a** (6.5 g, 30.9 mmol) in EtOH (150 mL) were added $CeBr_3$ (285 mg, 0.75 mmol) and H_2O_2 (30%, 6.2 mL, 60 mmol). After completion of the addition, the resulting mixture was allowed to stir at 40 ℃ for additional 1 h. Then the reaction was quenched by solid $Na_2S_2O_3$ (9.5 g, 60 mmol), and stirred for 30 min followed by filtration. The resulting filtrate was evaporated and purified by vacuum distillation (131-139 ℃/~80 Torr) to give compound **4a** (2.97 g, 80%).

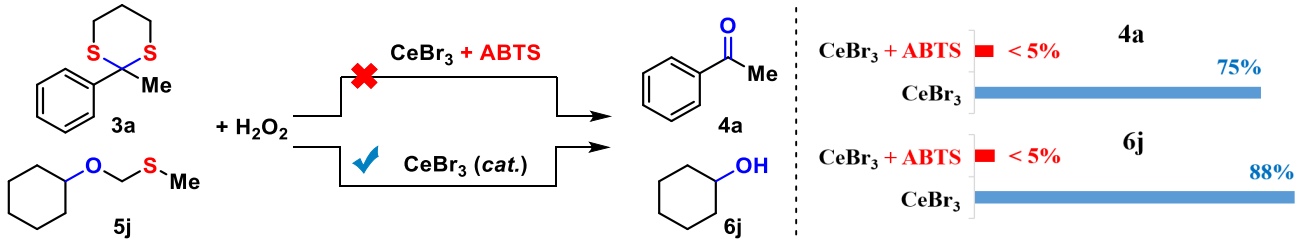
Gram-scale synthesis of 6j: To a stirred solution of compound **5j** (6.0 g, 37.4 mmol) in MeCN (90 mL) were added $CeBr_3$ (300 mg, 0.79 mmol) and H_2O_2 (30%, 3.9 mL, 37.4 mmol). After completion of the addition, the resulting mixture was allowed to stir at rt for additional 1 h. Then the reaction was quenched by solid $Na_2S_2O_3$ (5.9 g, 37.4 mmol), and stirred for 30 min followed by filtration. The resulting filtrate was evaporated and purified by vacuum distillation (107-113 ℃/~80 Torr) to give compound **6j** (3.07 g, 82%).

7. Controlled experiments of bromide and cerium catalysts for dethioacetalization.



To a stirred solution of compound **3a** (21.0 mg, 0.1 mmol) in EtOH (1 mL) or **5j** (16.0 mg, 0.1 mmol) in MeCN (1 mL) were added KBr (with or without, 3.6 mg, 0.03 mmol), metal catalyst (0.01 mmol) and H_2O_2 (30%, 20 μL, 0.2 mmol for **3a**; 10 μL, 0.1 mmol for **5j**). After completion of the addition, the reaction mixture was allowed to stir at rt for 1.5 h. The reaction was quenched by dilute aqueous $Na_2S_2O_3$ solution (0.1 M, 4 mL) and ethyl acetate (10 mL). The organic fractions were collected, and the aqueous phase was extracted with ethyl acetate (2 × 10 mL). The combined organic fractions were washed with H_2O, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. Yield was determined by ^{1}H-NMR of the crude reaction mixture using CH_2Br_2 as the internal reference. For compound **6j**, solid $Na_2S_2O_3$ (63.2 mg, 0.4 mmol) was added directly to quench the reaction instead of an aqueous solution, and the resulting mixture was evaporated directly.

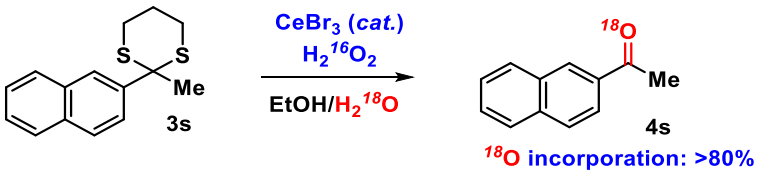
8. Radical trapping (ABTS) experiments.



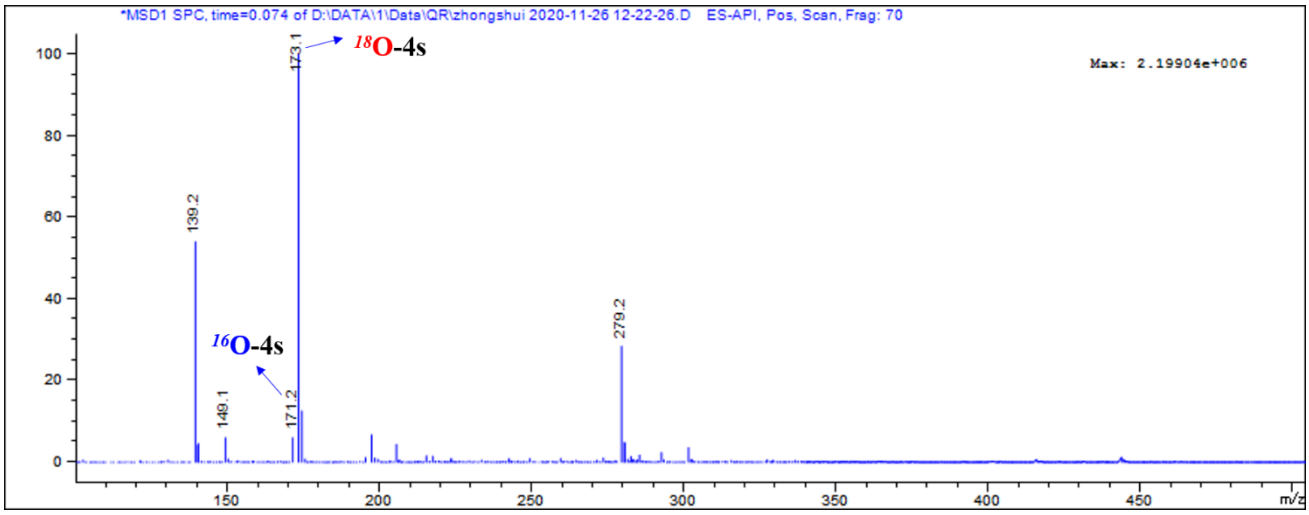
To a stirred solution of compound **3a** (21.0 mg, 0.1 mmol) in EtOH/H_2O (10/1, 1.1 mL) or compound **5j** (16.0 mg, 0.1 mmol) in MeCN/H_2O (10/1, 1.1 mL) were added ABTS (with or without, 110 mg, 0.2 mmol), and the mixture was stirred for 5 min. Then H_2O_2 (30%, 20 μL, 0.2 mmol for **3a**; 10 μL, 0.1 mmol for **5j**) and $CeBr_3$ (3.8 mg, 0.01 mmol) were added, and the resulting solution was stirred at rt for 1.5 h. The reaction was quenched by dilute aqueous $Na_2S_2O_3$ solution (0.1 M, 4 mL) and ethyl acetate (10 mL). The organic fractions

were collected, and the aqueous phase was extracted with ethyl acetate (2 × 4 mL). The combined organic fractions were washed with H_2O, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. Yield was determined by ^{1}H-NMR of the crude reaction mixture using CH_2Br_2 as the internal reference. For compound **6j**, solid $Na_2S_2O_3$ (63.2 mg, 0.4 mmol) was added to quench the reaction instead of an aqueous solution, and the resulting mixture was evaporated directly.

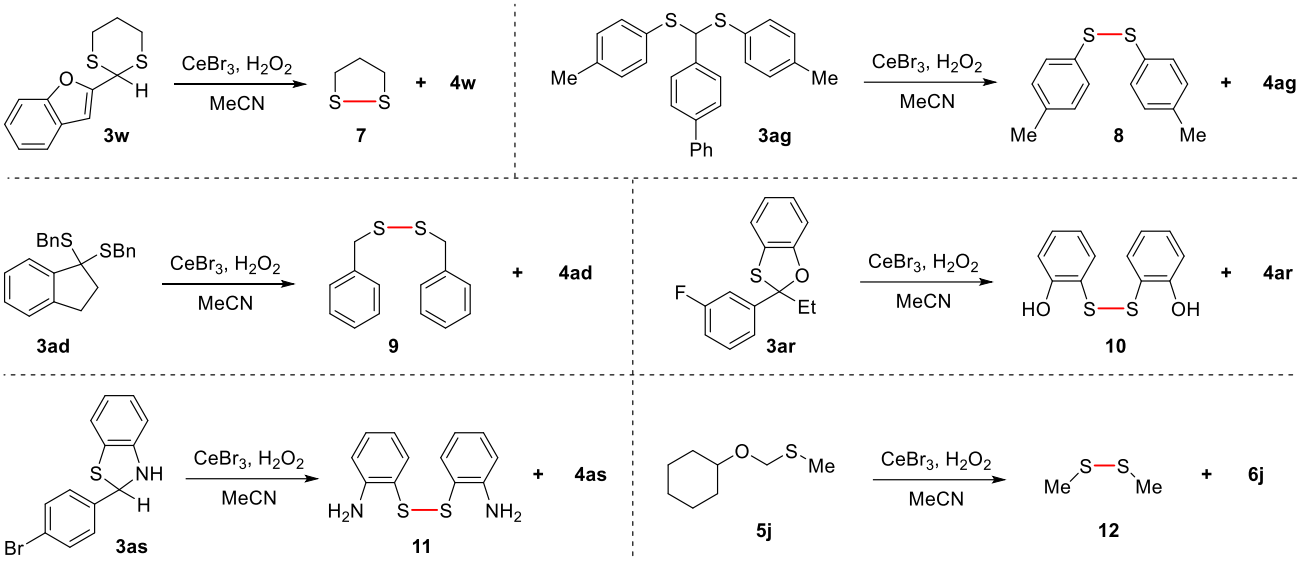
9. Isotopic labeling experiment.



To a stirred solution of compound **3s** (13.0 mg, 0.05 mmol) in ethanol (1 mL) and $H_2{}^{18}O$ (0.2 mL) were added $CeBr_3$ (1.9 mg, 0.005 mmol) and 30% H_2O_2 (10 μL, 0.1 mmol). After completion of the addition, the resulting mixture was allowed to stir at rt for 1.5 h. Then the mixture was quenched by aqueous $Na_2S_2O_3$ solution (0.1 M, 10 mL) and ethyl acetate (10 mL). The organic fractions were collected, and the aqueous phase was extracted with ethyl acetate (3 × 10 mL). The combined organic fractions were washed with brine, dried over Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified by flash column chromatography (ethyl acetate/hexane = 1:10 to 1:3) to give compound **4s** (6.0 mg, 70%). MS = 173.1 for ^{18}**O-4s**, while MS = 171.2 for ^{16}**O-4s**.



10. The isolation and confirmation of related side products.

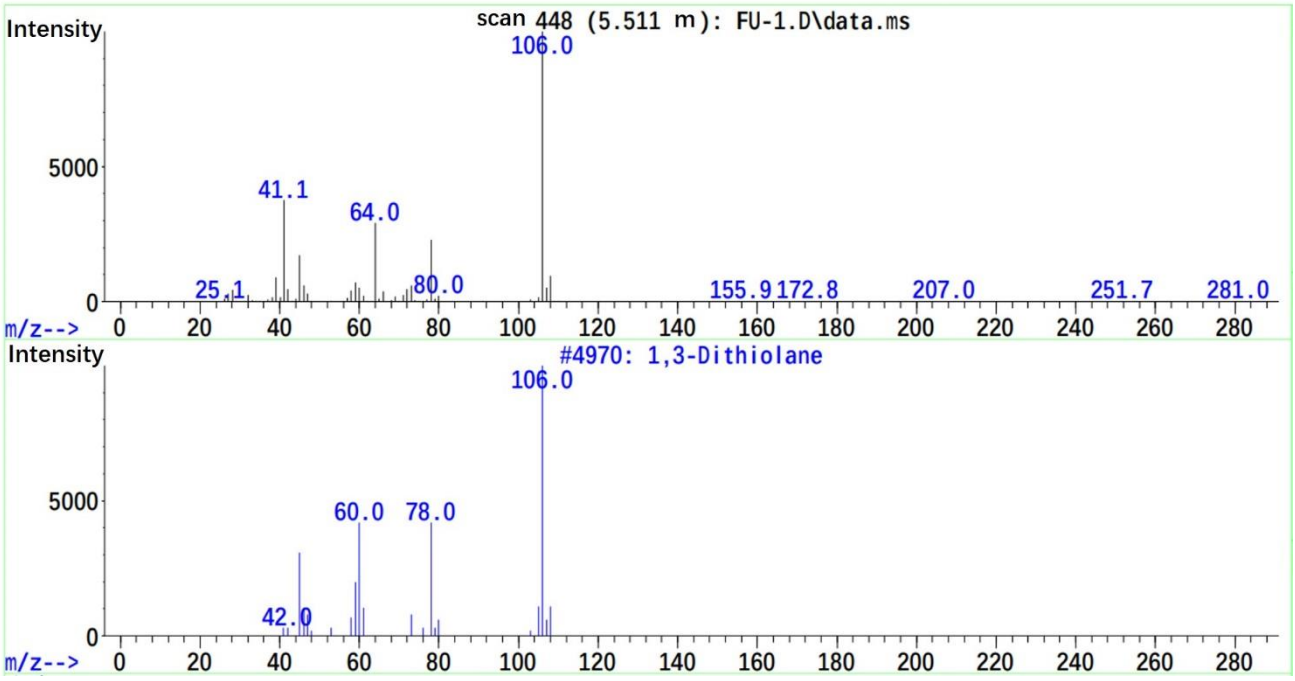


Disulfide **7-12** were isolated by flash column chromatography following the above **General Procedure III-IV** and confirmed by GC-MS, HRMS and NMR (^{1}H and ^{13}C).

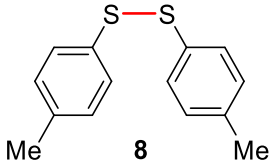
1,2-Dithiolane (7)

7

The purification of compound **7** always led to polymeric material[70], so the reaction mixture of **3w** was passed through millipore filter (0.45 μm) directly after 5 min at rt and analyzed by GC-MS directly. Mass spectrum and retrieval results were listed below respectively, and compound **7** (m/z = 106.0) was identified as 1,3-dithiolane.



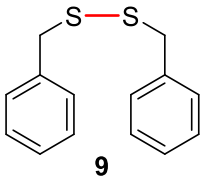
Bis(4-methylphenyl) disulfide (8)



8

8[71] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:20) as a light-yellow oil (207 mg, 84%) following the deprotection of **3ag** (1 mmol). ^{1}H-NMR (400 MHz, DMSO) δ: 7.37 (d, *J* = 8.3 Hz, 4H), 7.16 (d, *J* = 8.0 Hz, 4H), 2.27 (s, 6H). ^{13}C-NMR (100 MHz, DMSO) δ: 137.4, 132.6, 130.0, 128.1, 20.5. IR 1591.2, 1481.9, 1397.8, 1301.6, 1177.9, 1112.6, 1072.8, 1010.0, 794.3, 478.8 cm^{-1}; HRMS (ESI^{+}) (m/z) calcd. for $C_{14}H_{15}S_2$ [M+H]$^{+}$ 247.0610; found 247.0609.

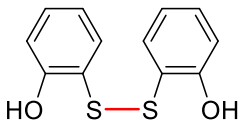
Dibenzyl disulfide (9)



9

9[71] was purified by flash column chromatography (ethyl acetate/hexane = 1:40 to 1:20) as a light-yellow oil (123 mg, 50%) following the deprotection of **3ad** (1 mmol). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.24–7.11 (m, 10H), 3.49 (s, 4H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 137.5, 129.5, 128.6, 127.5, 43.3. IR 3024.6, 2918.8, 1594.9, 1488.0, 1449.7, 1407.6, 1222.8, 1192.7, 1066.2, 1023.4, 758.7, 465.1 cm^{-1}; HRMS (ESI^{+}) (m/z) calcd. for $C_{14}H_{15}S_2$ [M+H]$^{+}$ 247.0610; found 247.0604.

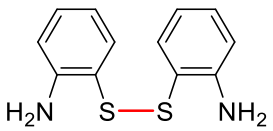
Bis(2-hydroxyphenyl) disulfide (10)



10

10[72] was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 1:1) as a light-yellow oil (173 mg, 69%) following the deprotection of **3ar** (1 mmol). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.37–7.32 (m, 2H), 7.22 (dd, *J* = 7.8, 1.7 Hz, 2H), 7.00 (dd, *J* = 8.2, 1.3 Hz, 2H), 6.81 (td, *J* = 7.6, 1.3 Hz, 2H), 6.29 (s, 2H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 157.0, 136.3, 133.3, 121.2, 120.1, 115.9. IR 3449.7, 3399.5, 1566.5, 1459.4, 1331.8, 1291.5, 1236.4, 1174.4, 1021.1, 829.1, 749.4, 496.4, 428.1 cm^{-1}; HRMS (ESI^{+}) (m/z) calcd. for $C_{12}H_{11}O_2S_2$ [M+H]$^{+}$ 251.0195; found 251.0189.

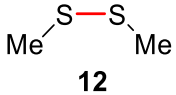
Bis(2-aminophenyl) disulfide (11)



11

11[71] was purified by flash column chromatography (ethyl acetate/hexane = 1:5 to 1:1) as a light-yellow oil (109 mg, 44%) following the deprotection of **3as** (1 mmol). ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.18–7.13 (m, 4H), 6.70 (dd, *J* = 8.4, 1.2 Hz, 2H), 6.57 (td, *J* = 7.4, 1.3 Hz, 2H), 4.22 (s, 4H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 148.8, 137.0, 131.7, 118.9, 118.4, 115.4. IR 3375.1, 3061.7, 1611.8, 1580.3, 1468.2, 1441.1, 1299.5, 1242.9, 1151.1, 1020.8, 856.4, 745.5, 451.8 cm^{-1}; HRMS (ESI^{+}) (m/z) calcd. for $C_{12}H_{13}N_2S_2$ [M+H]$^{+}$ 249.0515; found 249.0525.

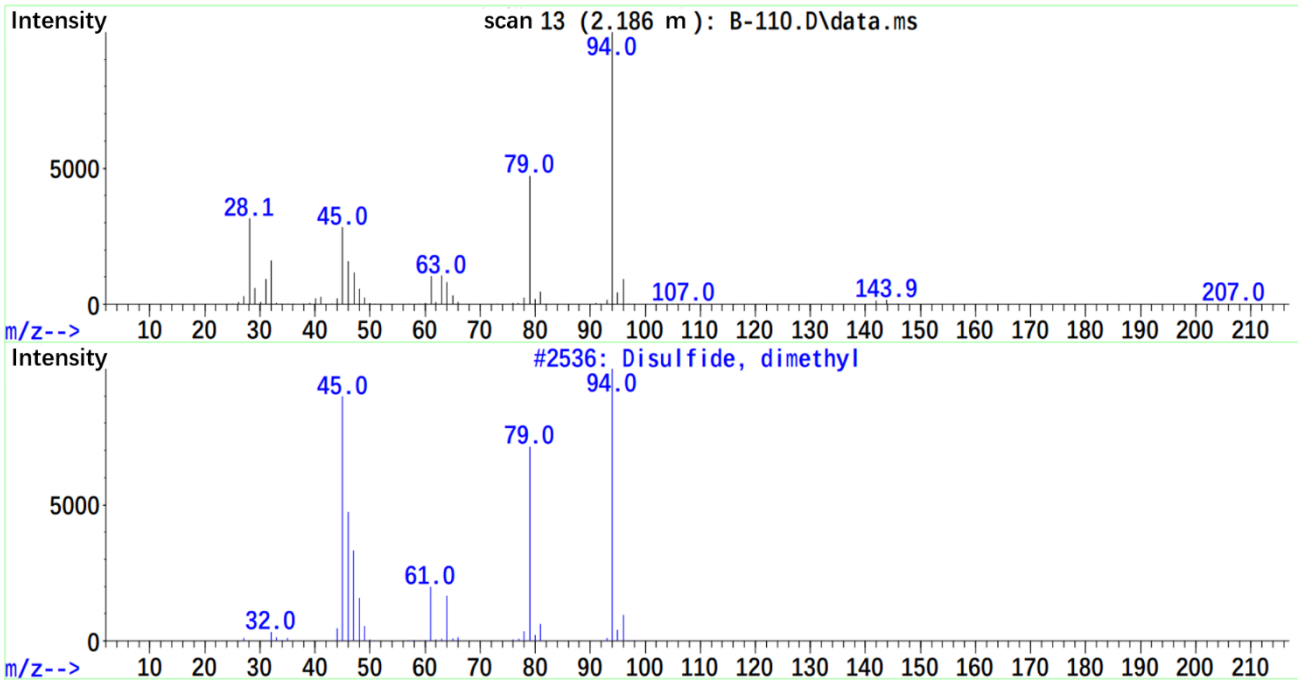
Dimethyl disulfide (12)



12

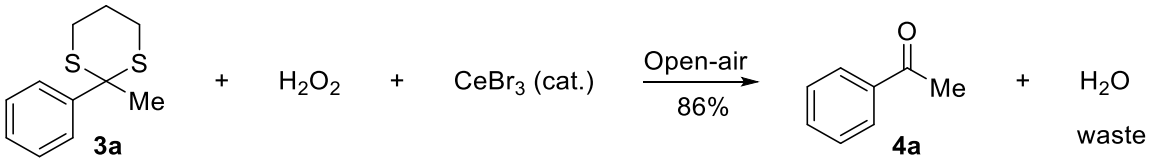
Compound **12** was too volatile to be isolated, so the reaction mixture of **5j** was passed through millipore filter (0.45 μm) directly after 10 min and analyzed by GC-MS directly.

Mass spectrum and retrieval results were listed below respectively, and compound **12** (m/z = 94.0) was identified as dimethyl disulfide.



11. Green chemistry metrics analysis.

E-Factor for 3a and 3p using H_2O_2/$CeBr_3$:



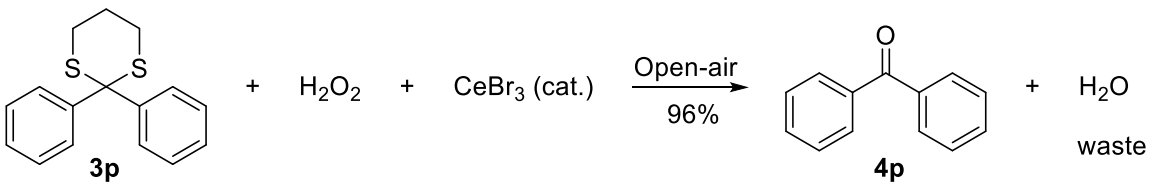
210 mg 68 mg 19 mg 103 mg

Total amount of reactants: 210 mg + 68 mg + 19 mg = 297 mg

Amount of final product: 103 mg

Amount of waste: 297 mg – 103 mg = 194 mg

E-Factor = Amount of waste/Amount of product = 194/103 = 1.88



272 mg 68 mg 19 mg 175 mg

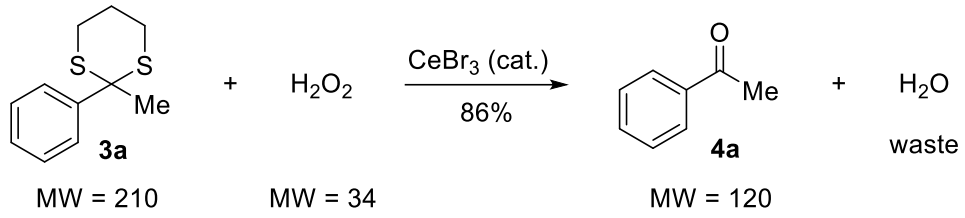
Total amount of reactants: 272 mg + 68 mg + 19 mg = 359 mg

Amount of final product: 175 mg

Amount of waste: 359 mg – 175 mg = 184 mg

E-Factor = Amount of waste/Amount of product = 184/175 = 1.05

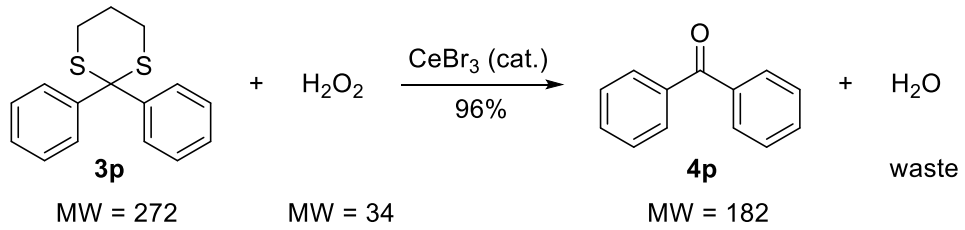
AE for 3a and 3p using H_2O_2/$CeBr_3$:



Molecular weight of product: 120

Sum of molecular weight of reagent: 210 + 34 = 244

Atom economy = Molecular weight of product/Sum of molecular weight of reagent = 120/244 = 49.2%

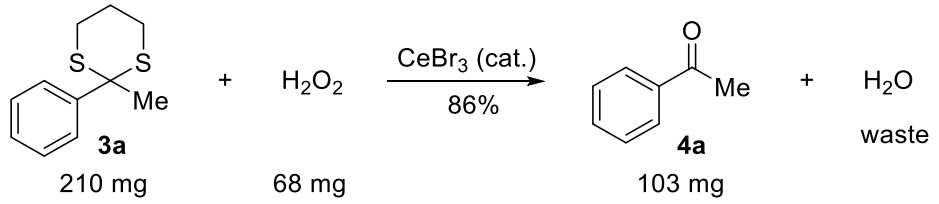


Molecular weight of product: 182

Sum of molecular weight of reagent: 272 + 34 = 306

Atom economy = Molecular weight of product/Sum of molecular weight of reagent = 182/306 = 59.5%

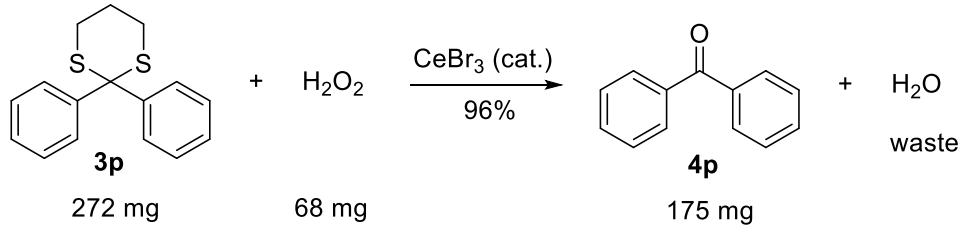
RME for 3a and 3p using H_2O_2/$CeBr_3$:



Mass of product: 103 mg

Total mass of reagent: 210 mg + 68 mg = 278 mg

RME = Mass of product/Total mass of reagent = 103/278 = 37.1%

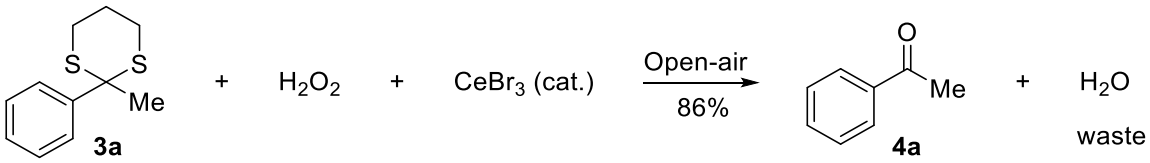


Mass of product: 175 mg

Total mass of reagent: 272 mg + 68 mg = 340 mg

RME = Mass of product/Total mass of reagent = 175/340 = 51.5%

PMI for 3a and 3p using H_2O_2/$CeBr_3$:

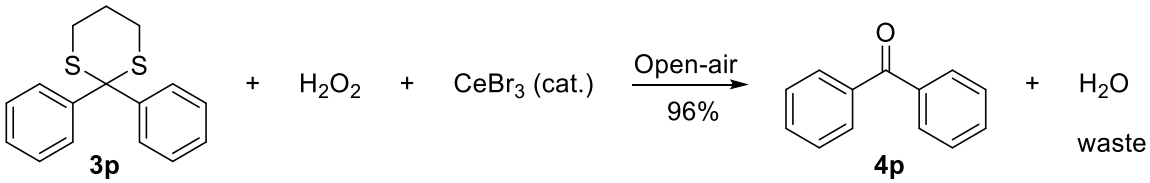


210 mg 68 mg 19 mg 103 mg

Total mass in process: 210 mg + 68 mg + 19 mg = 297 mg

Mass of product: 103 mg

PMI = Total mass in process/Mass of product = 297/103 = 2.88



272 mg 68 mg 19 mg 175 mg

Total mass in process: 272 mg + 68 mg + 19 mg = 359 mg

Mass of product: 175 mg

PMI = Total mass in process/Mass of product = 359/175 = 2.05

Green chemistry metrics for **3a** and **3p** using other protocols (SDS-I_2/H_2O_2[73], TBHP[74], NBS[75], IBX[76], DDQ[77] and Oxone[78]) were calculated according to the published literatures, and the results were listed below:

Average

Reagent	$CeBr_3$	IBX	DDQ	TBHP	NBS	Oxone	SDS, I_2/H_2O_2
E-Factor	1.47	3.90	4.11	2.16	2.65	14.2	2.05
AE	54.4%	28.8%	32.0%	45.2%	35.7%	23.2%	54.4%
RME	44.3%	21.0%	20.4%	32.4%	28.2%	6.6%	39.7%
PMI	2.47	4.90	5.11	3.16	3.65	15.2	3.05

3p

$CeBr_3$	IBX	DDQ	TBHP	NBS	SDS, I_2/H_2O_2
1.05	3.09	3.11	1.70	2.07	1.63
59.5%	33.0%	36.5%	50.3%	40.5%	59.5%
51.5%	24.5%	24.4%	37.0%	32.6%	44.6%
2.05	4.09	4.11	2.70	3.07	2.63

3a

Reagent	$CeBr_3$	IBX	DDQ	TBHP	NBS	Oxone	SDS, I_2/H_2O_2
E-Factor	1.88	4.70	5.11	2.61	3.22	14.2	2.47
AE	49.2%	24.5%	27.5%	40.0%	30.9%	23.2%	49.2%
RME	37.1%	17.5%	16.4%	27.7%	23.7%	6.6%	34.70%
PMI	2.88	5.70	6.11	3.61	4.22	15.2	3.47

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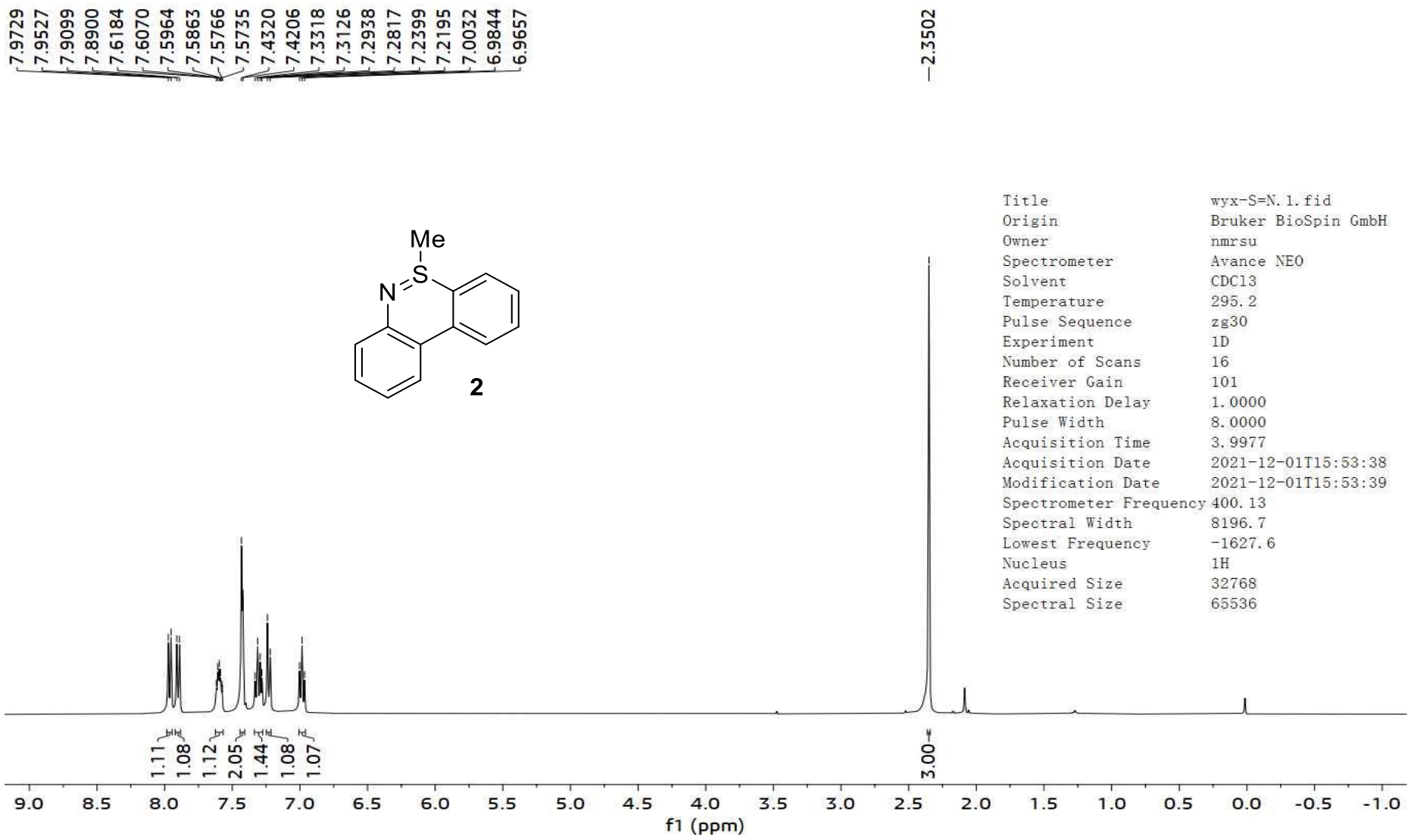
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7.5964
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7.4320
7.4206
7.3318
7.3126
7.2938
7.2817
7.2399
7.2195
7.0032
6.9844
6.9657
2.3502
Me
S
N
2
Title wyx-S=N.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer Avance NEO
Solvent CDCl3
Temperature 295.2
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 101
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-12-01T15:53:38
Modification Date 2021-12-01T15:53:39
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1627.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
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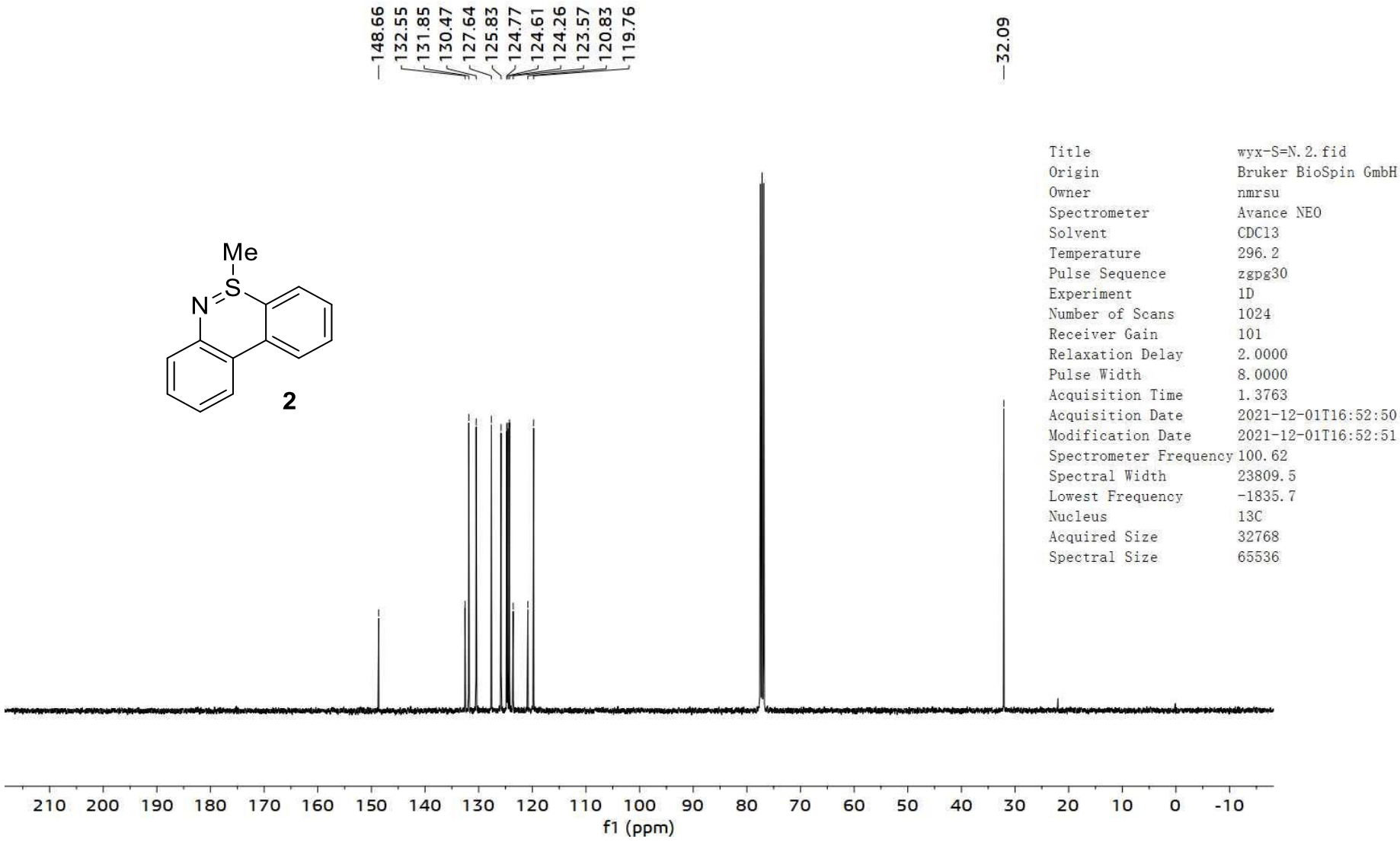
1.08
1.12
2.05
1.44
1.08
1.07
3.00
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)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132.55
131.85
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120.83
119.76
32.09
Me
S
N
2
Title wyx-S=N.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer Avance NEO
Solvent CDCl3
Temperature 296.2
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-12-01T16:52:50
Modification Date 2021-12-01T16:52:51
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Spectral Width 23809.5
Lowest Frequency -1835.7
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Acquired Size 32768
Spectral Size 65536
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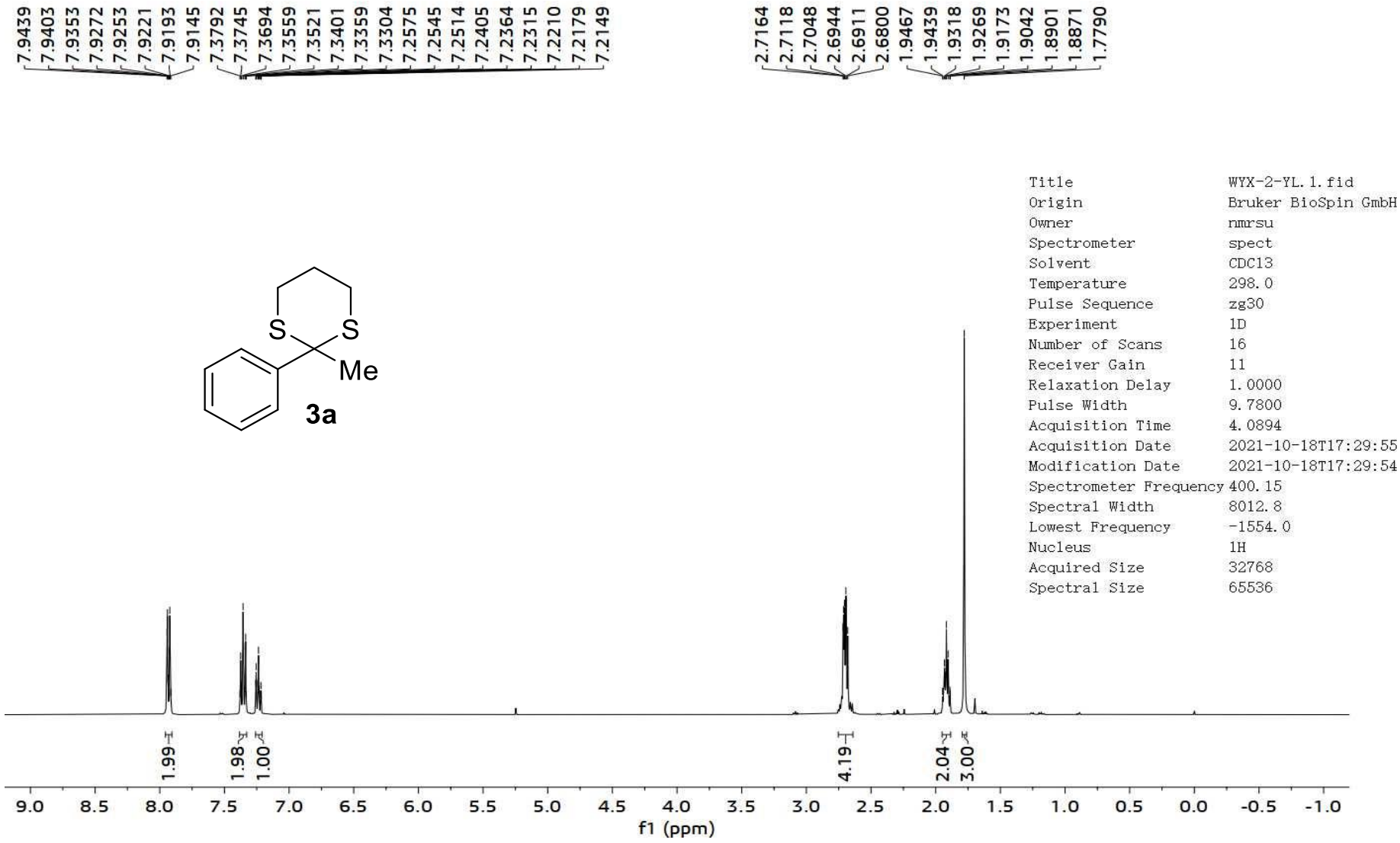
f1 (ppm)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7.9253
7.9221
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7.3792
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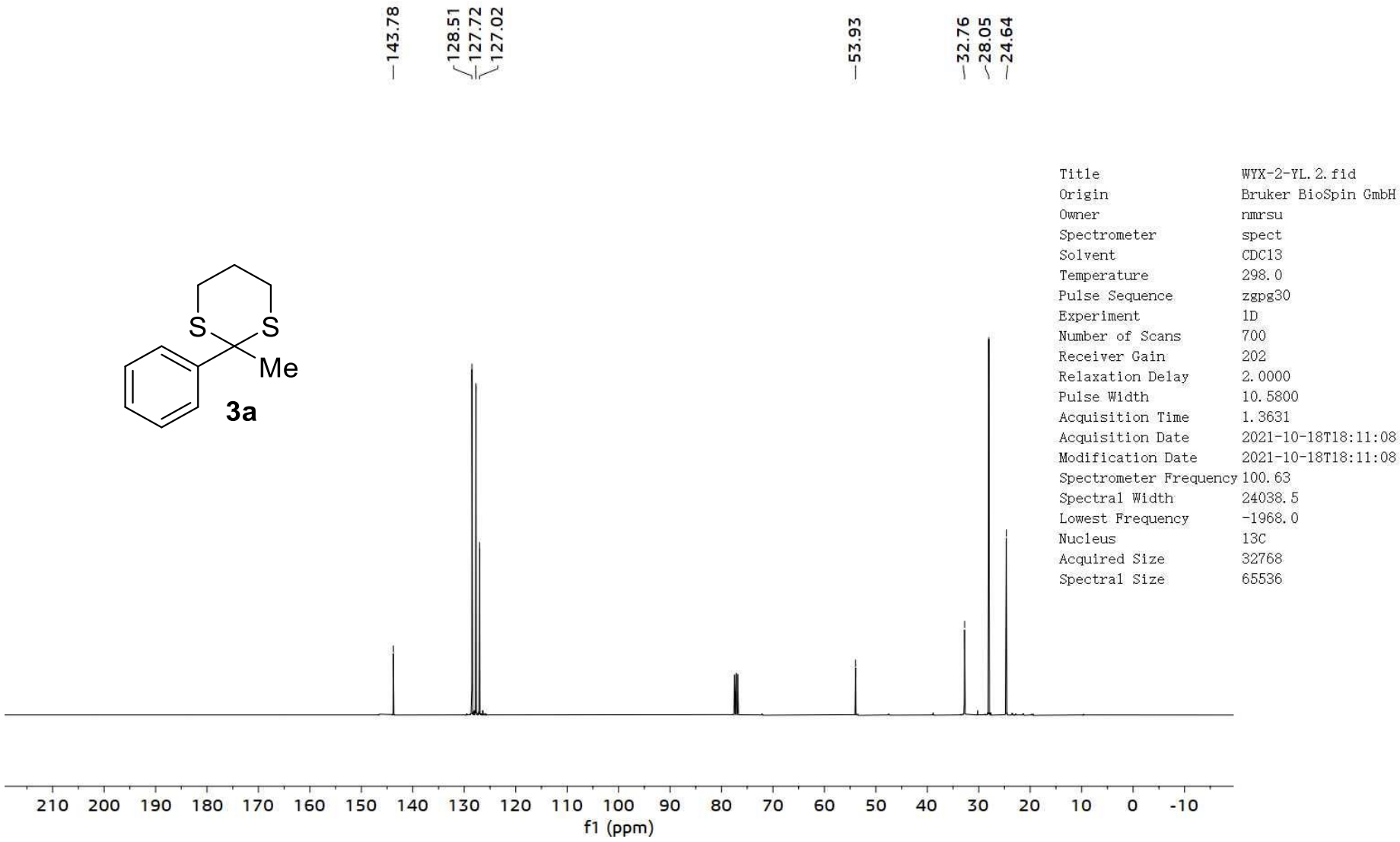
7.3694
7.3559
7.3521
7.3401
7.3359
7.3304
7.2575
7.2545
7.2514
7.2405
7.2364
7.2315
7.2210
7.2179
7.2149
2.7164
2.7118
2.7048
2.6944
2.6911
2.6800
1.9467
1.9439
1.9318
1.9269
1.9173
1.9042
1.8901
1.8871
1.7790
S
S
Me
3a
Title WYX-2-YL.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 11
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-18T17:29:55
Modification Date 2021-10-18T17:29:54
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1554.0
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.99
1.98
1.00
4.19
2.04
3.00
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 -1.0
f1 (ppm)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128.51
127.72
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53.93
32.76
28.05
24.64
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S
Me
3a
Title WYX-2-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-18T18:11:08
Modification Date 2021-10-18T18:11:08
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1968.0
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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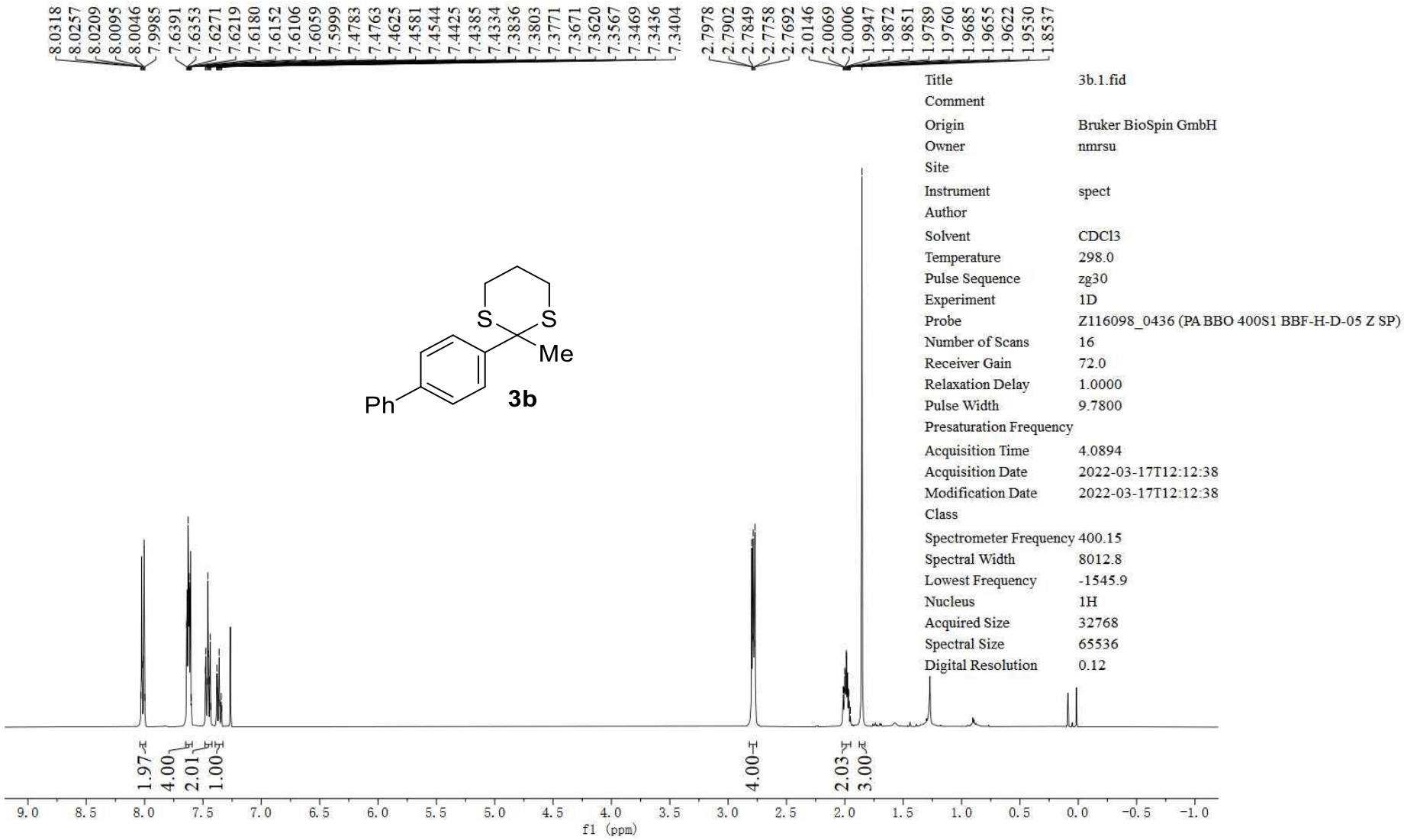
f1 (ppm)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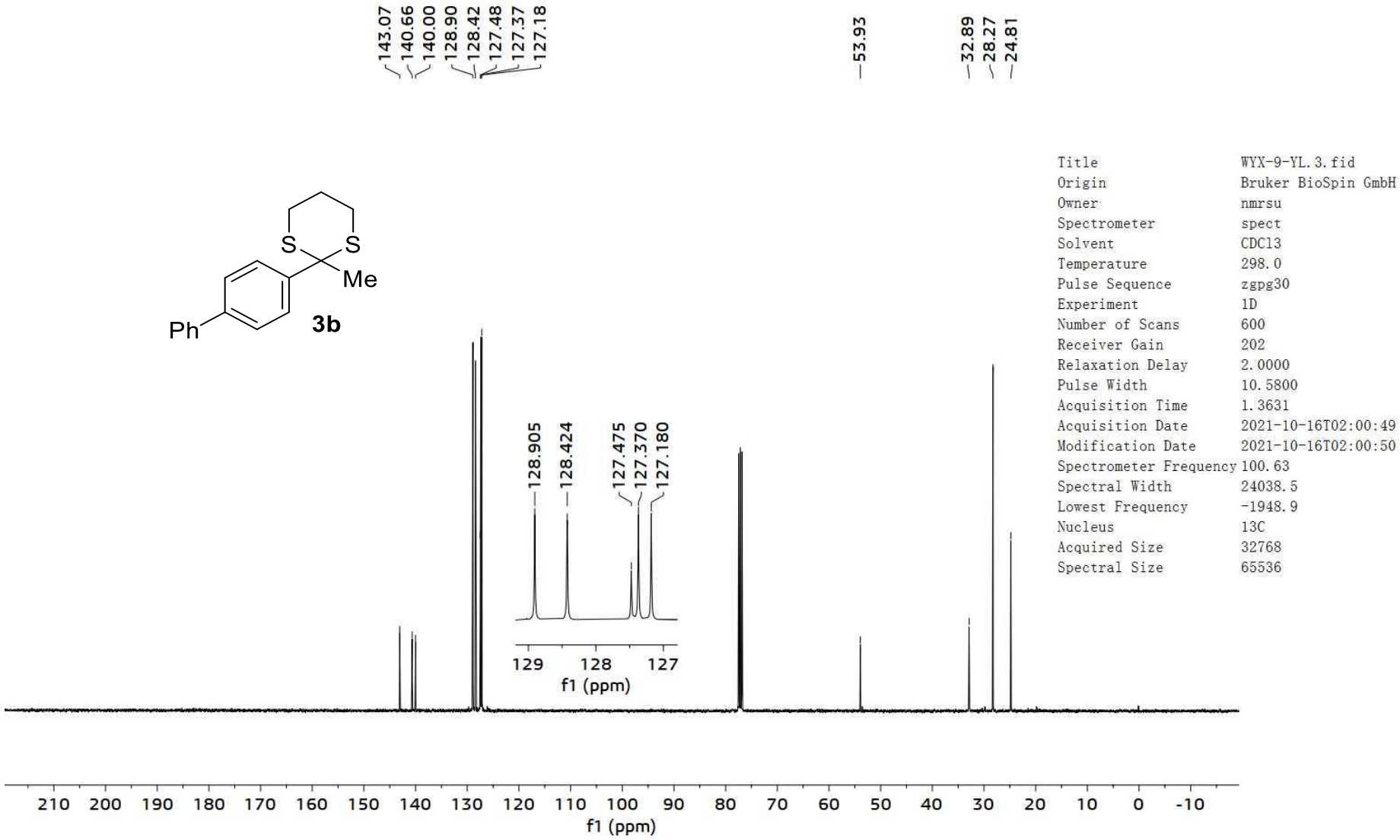
7.6180
7.6152
7.6106
7.6059
7.5999
7.4783
7.4763
7.4625
7.4581
7.4544
7.4425
7.4385
7.4334
7.3836
7.3803
7.3771
7.3671
7.3620
7.3567
7.3469
7.3436
7.3404
2.7978
2.7902
2.7849
2.7758
2.7692
2.0146
2.0069
2.0006
1.9947
1.9872
1.9851
1.9789
1.9760
1.9685
1.9655
1.9622
1.9530
1.8537
S
S
Me
Ph
3b
Title 3b.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 72.0
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2022-03-17T12:12:38
Modification Date 2022-03-17T12:12:38
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.9
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
1.97
4.00
2.01
1.00
4.00
2.03
3.00
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 -1.0
f1 (ppm)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S
S
Me
Ph
3b
128.905
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127.180
129
128
127
f1 (ppm)
Title WYX-9-YL.3.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-16T02:00:49
Modification Date 2021-10-16T02:00:50
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1948.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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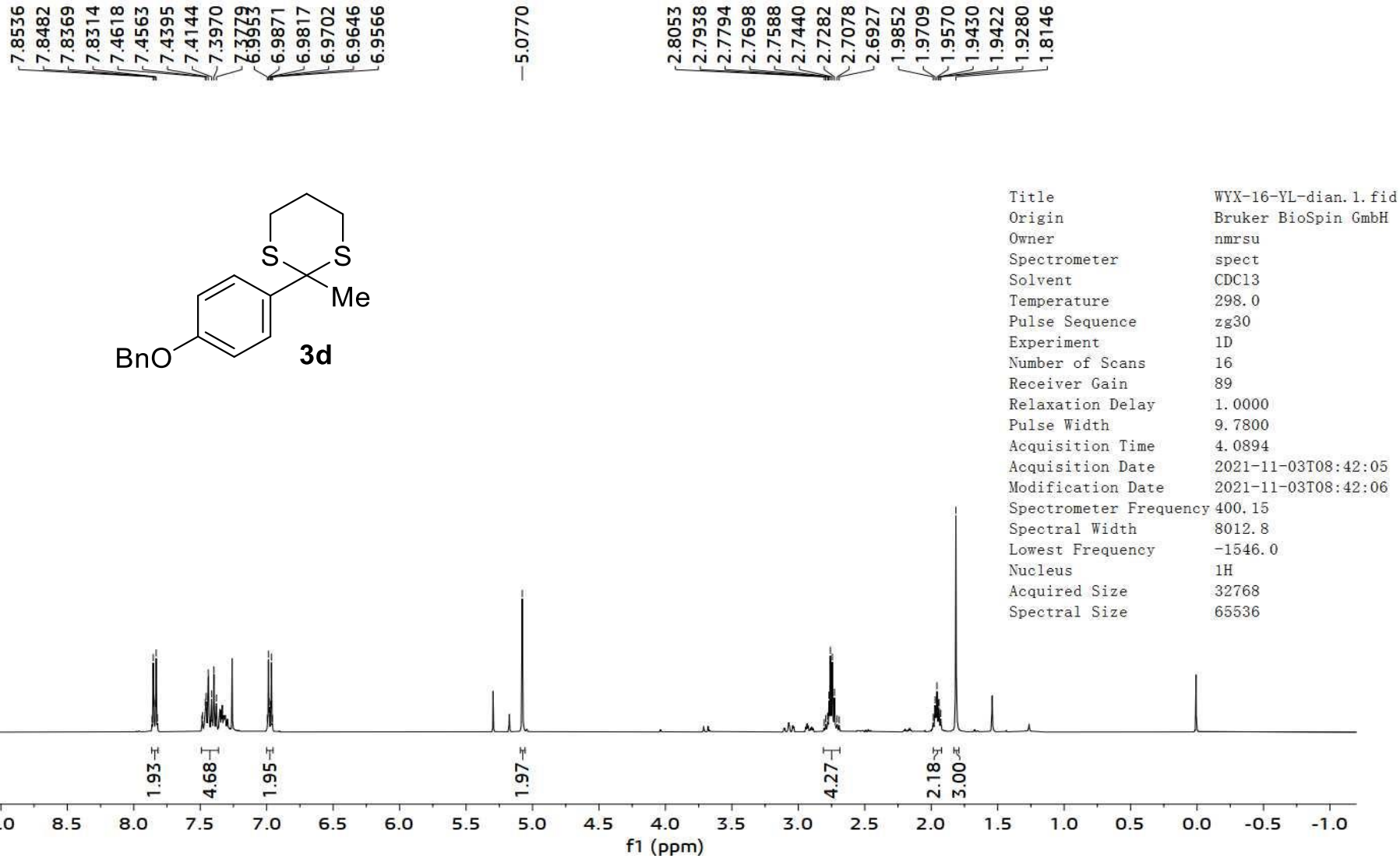
f1 (ppm)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6.9871
6.9817
6.9702
6.9646
6.9566
5.0770
2.8053
2.7938
2.7794
2.7698
2.7588
2.7440
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2.7078
2.6927
1.9852
1.9709
1.9570
1.9430
1.9422
1.9280
1.8146
S
S
Me
BnO
3d
Title WYX-16-YL-dian.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 89
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-11-03T08:42:05
Modification Date 2021-11-03T08:42:06
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1546.0
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
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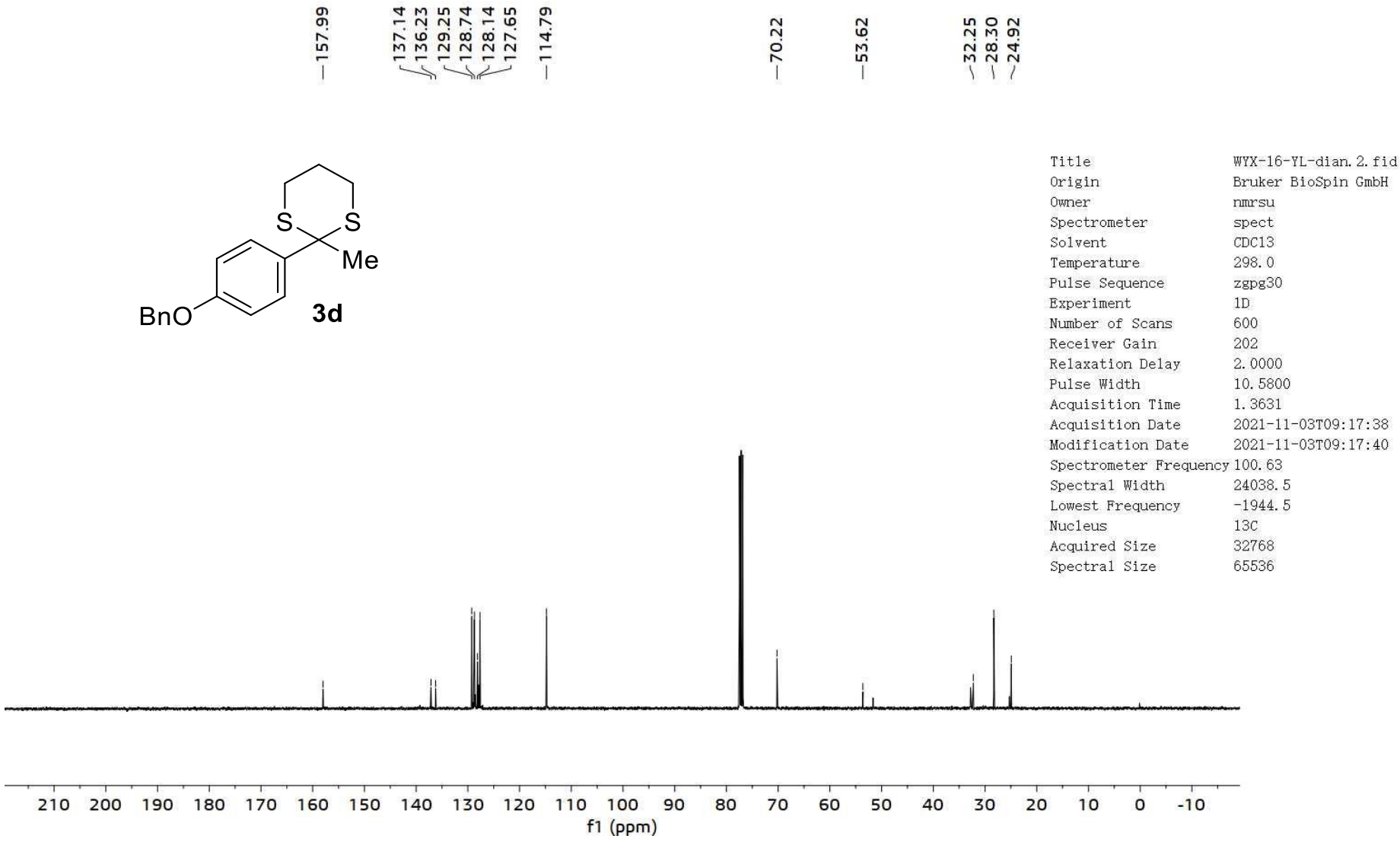
4.68
1.95
1.97
4.27
2.18
3.00
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
f1 (ppm)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53.62
32.25
28.30
24.92
S
S
Me
BnO
3d
Title WYX-16-YL-dian.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-11-03T09:17:38
Modification Date 2021-11-03T09:17:40
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1944.5
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Acquired Size 32768
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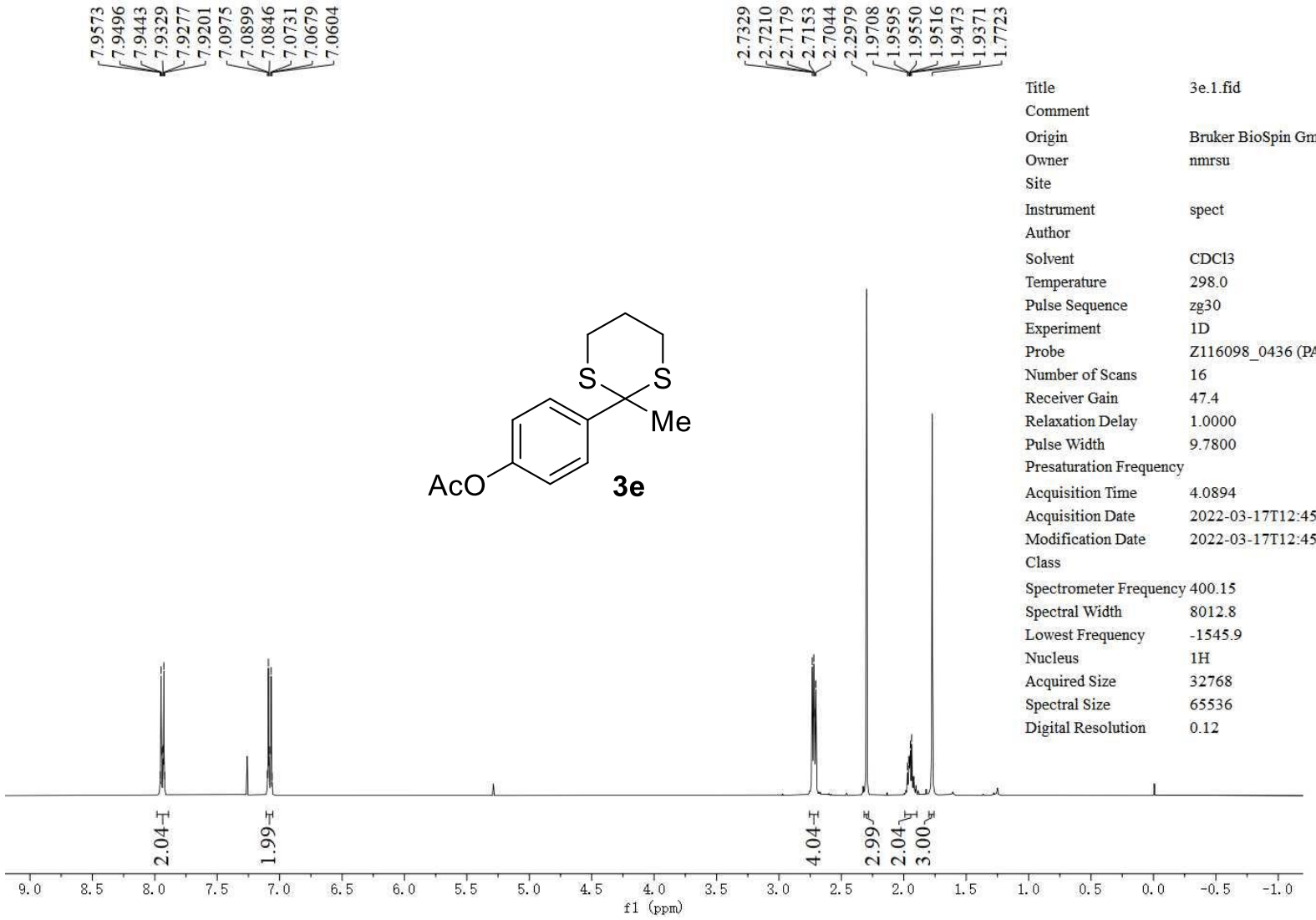
f1 (ppm)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7.0604
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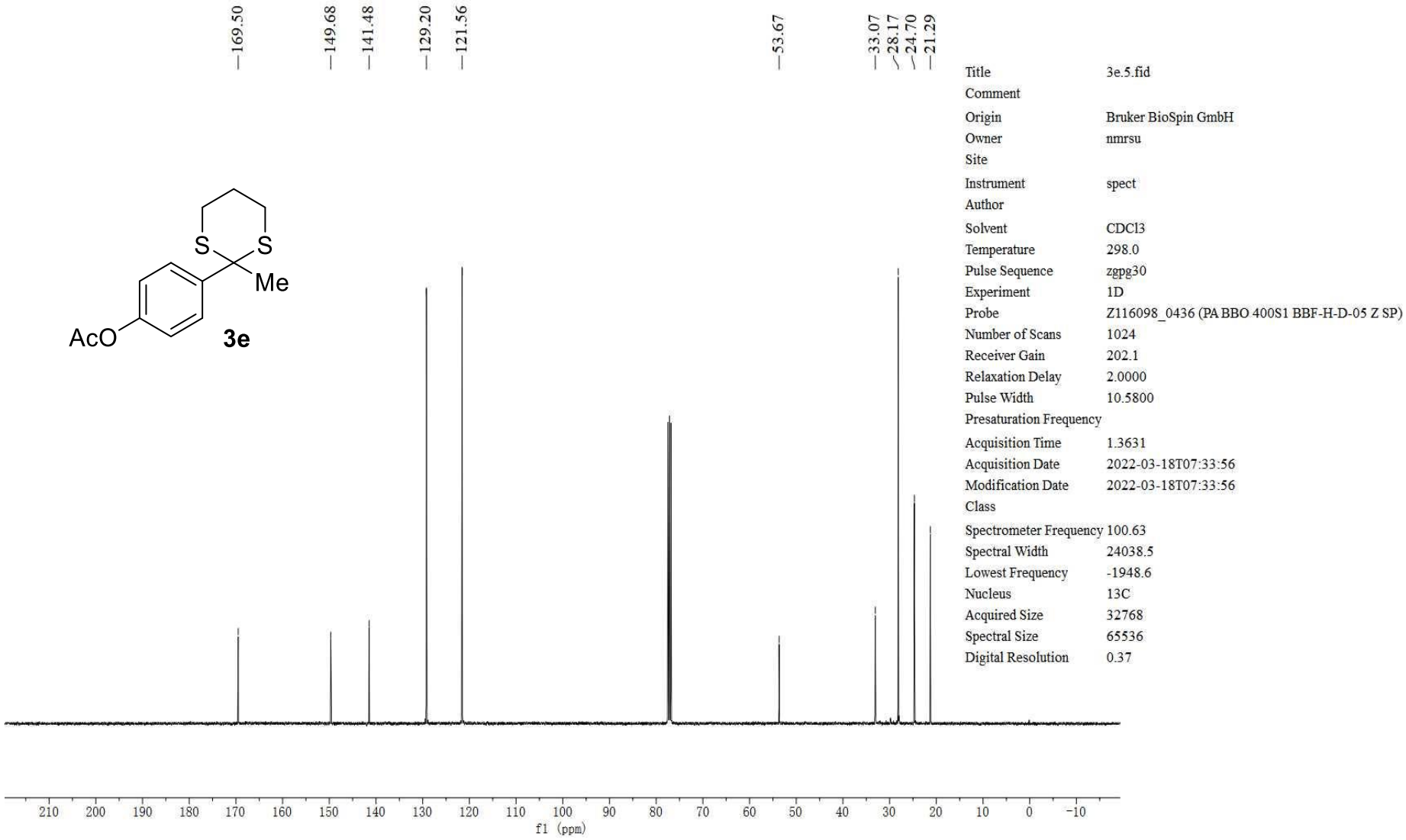
2.7210
2.7179
2.7153
2.7044
2.2979
1.9708
1.9595
1.9550
1.9516
1.9473
1.9371
1.7723
S
S
Me
AcO
3e
Title 3e.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 47.4
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2022-03-17T12:45:47
Modification Date 2022-03-17T12:45:46
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.9
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
2.04
1.99
4.04
2.99
2.04
3.00
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 -1.0
f1 (ppm)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141.48
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33.07
28.17
24.70
21.29
S
S
Me
AcO
3e
Title 3e.5.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 1024
Receiver Gain 202.1
Relaxation Delay 2.0000
Pulse Width 10.5800
Presaturation Frequency
Acquisition Time 1.3631
Acquisition Date 2022-03-18T07:33:56
Modification Date 2022-03-18T07:33:56
Class
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1948.6
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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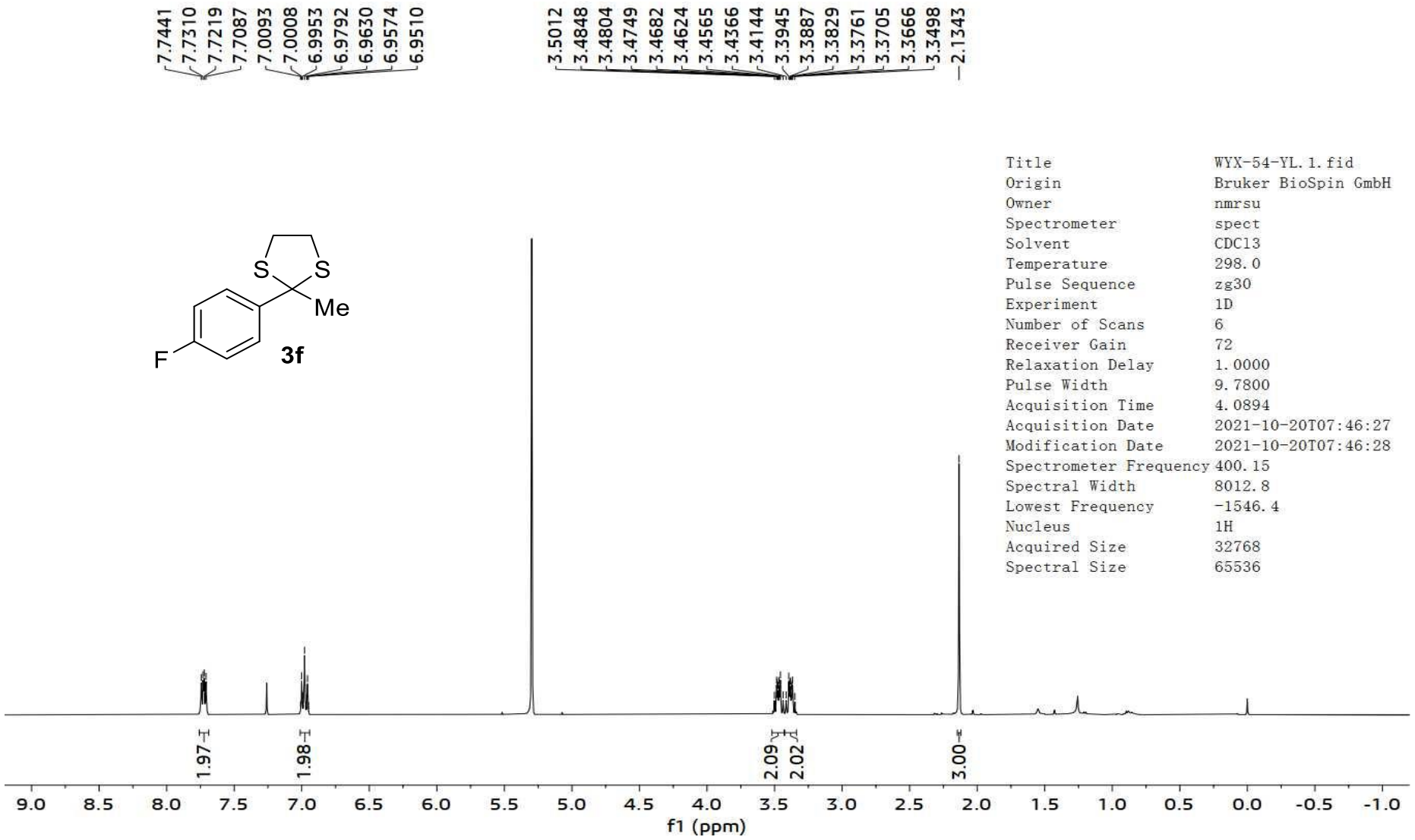
f1 (ppm)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6.9510
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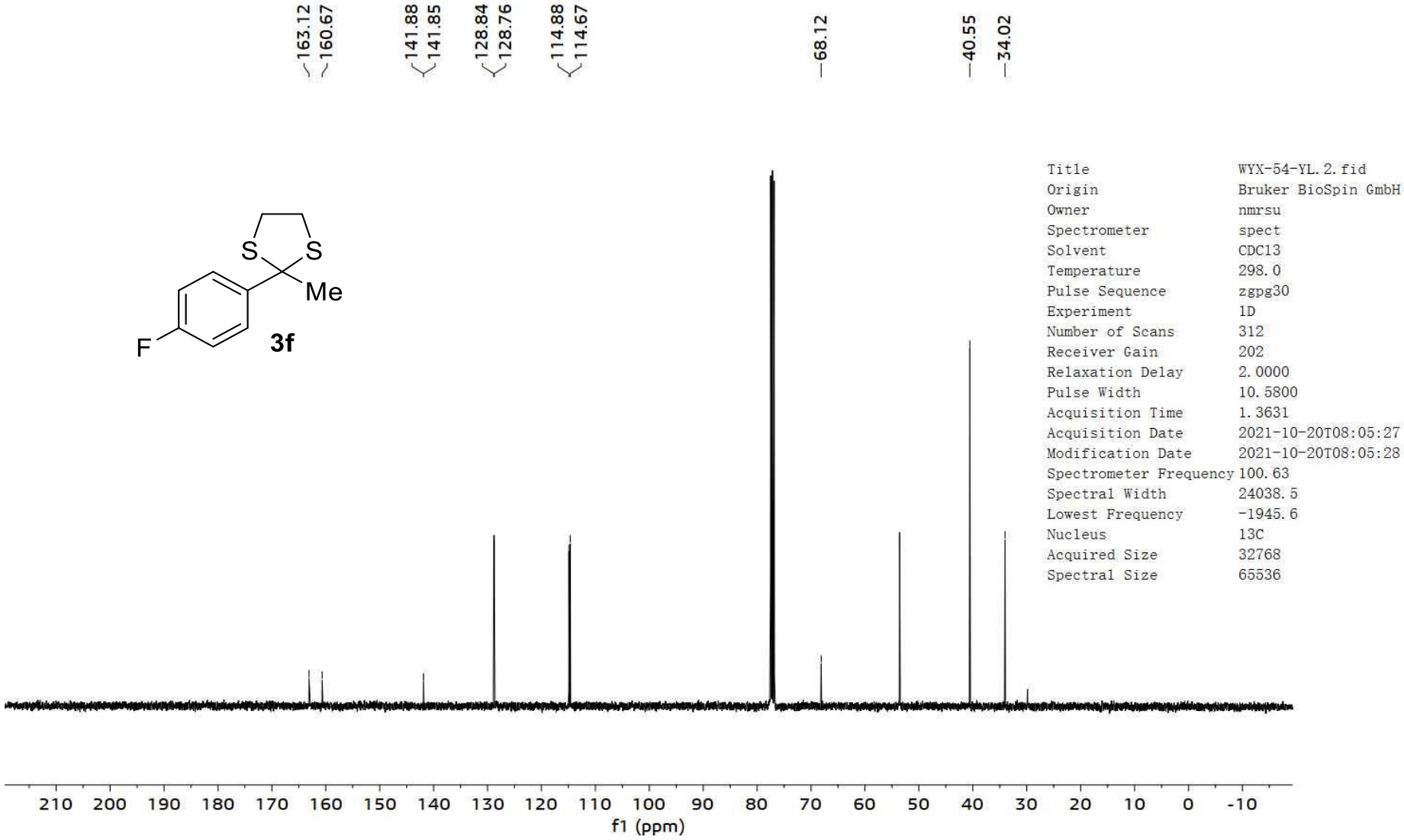
3.4848
3.4804
3.4749
3.4682
3.4624
3.4565
3.4366
3.4144
3.3945
3.3887
3.3829
3.3761
3.3705
3.3666
3.3498
2.1343
S
S
Me
F
3f
Title WYX-54-YL.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 72
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-20T07:46:27
Modification Date 2021-10-20T07:46:28
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1546.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.97
1.98
2.09
2.02
3.00
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
-1.0
f1 (ppm)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160.67
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128.84
128.76
114.88
114.67
68.12
40.55
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S
S
Me
F
3f
Title WYX-54-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 312
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-20T08:05:27
Modification Date 2021-10-20T08:05:28
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1945.6
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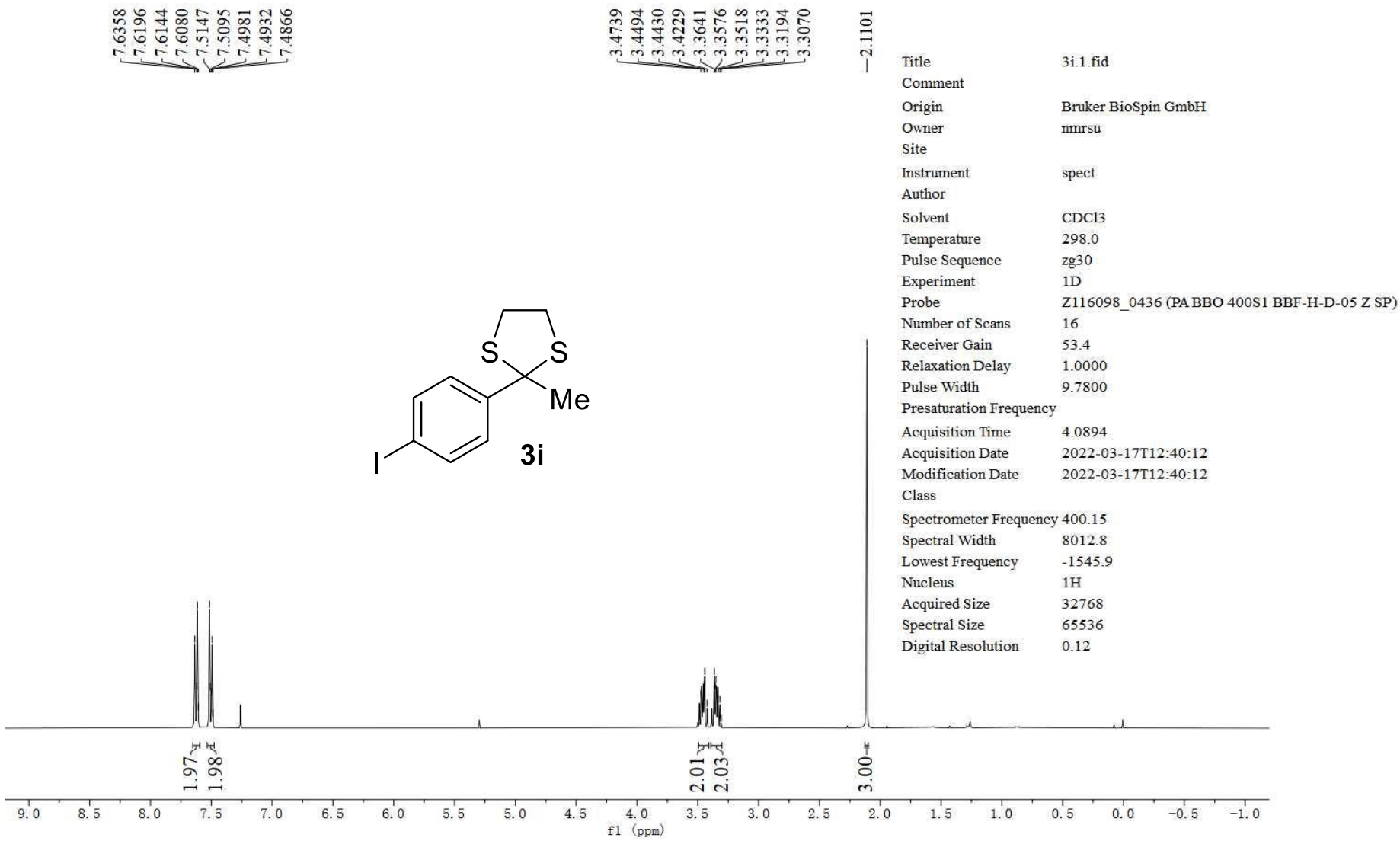
f1 (ppm)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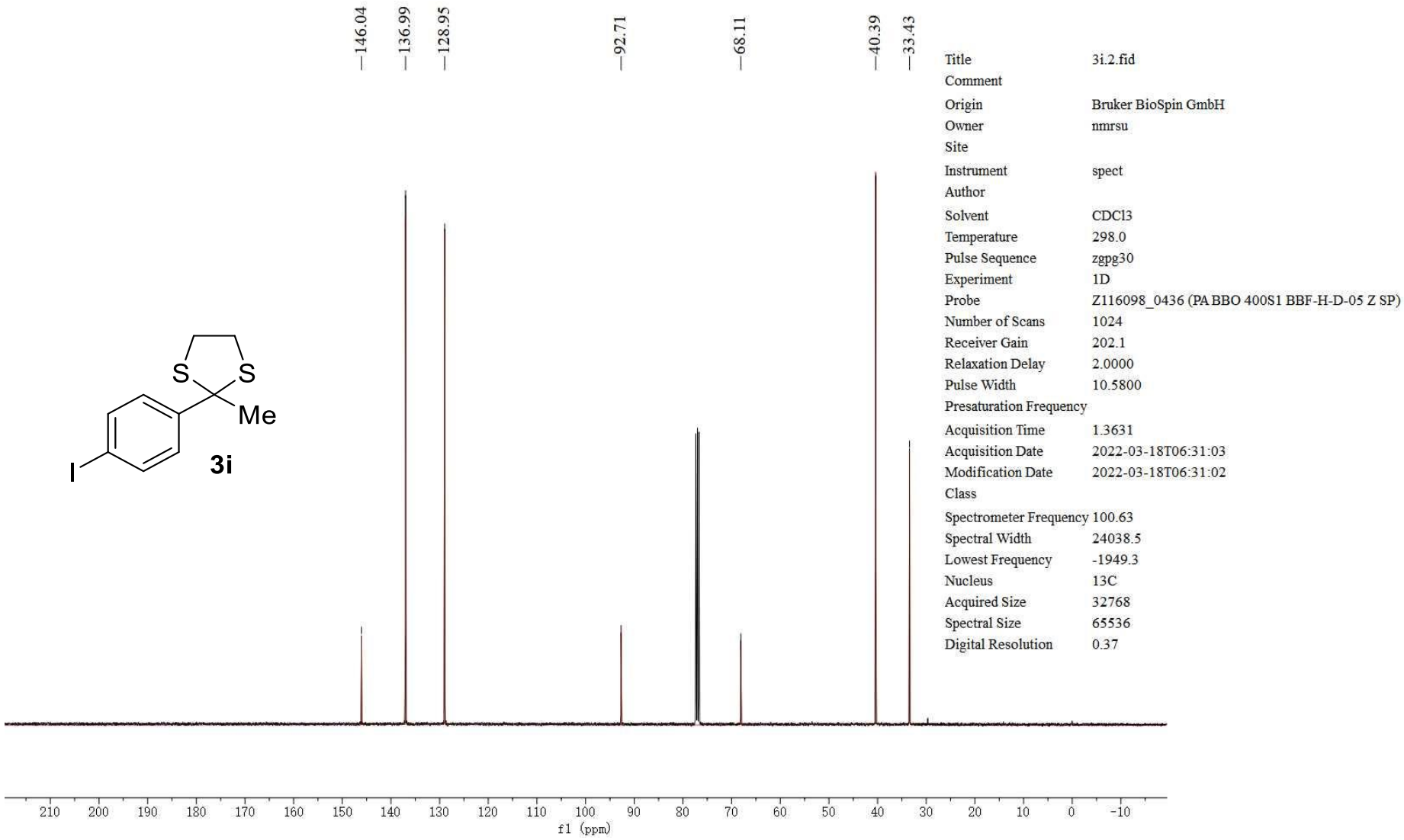
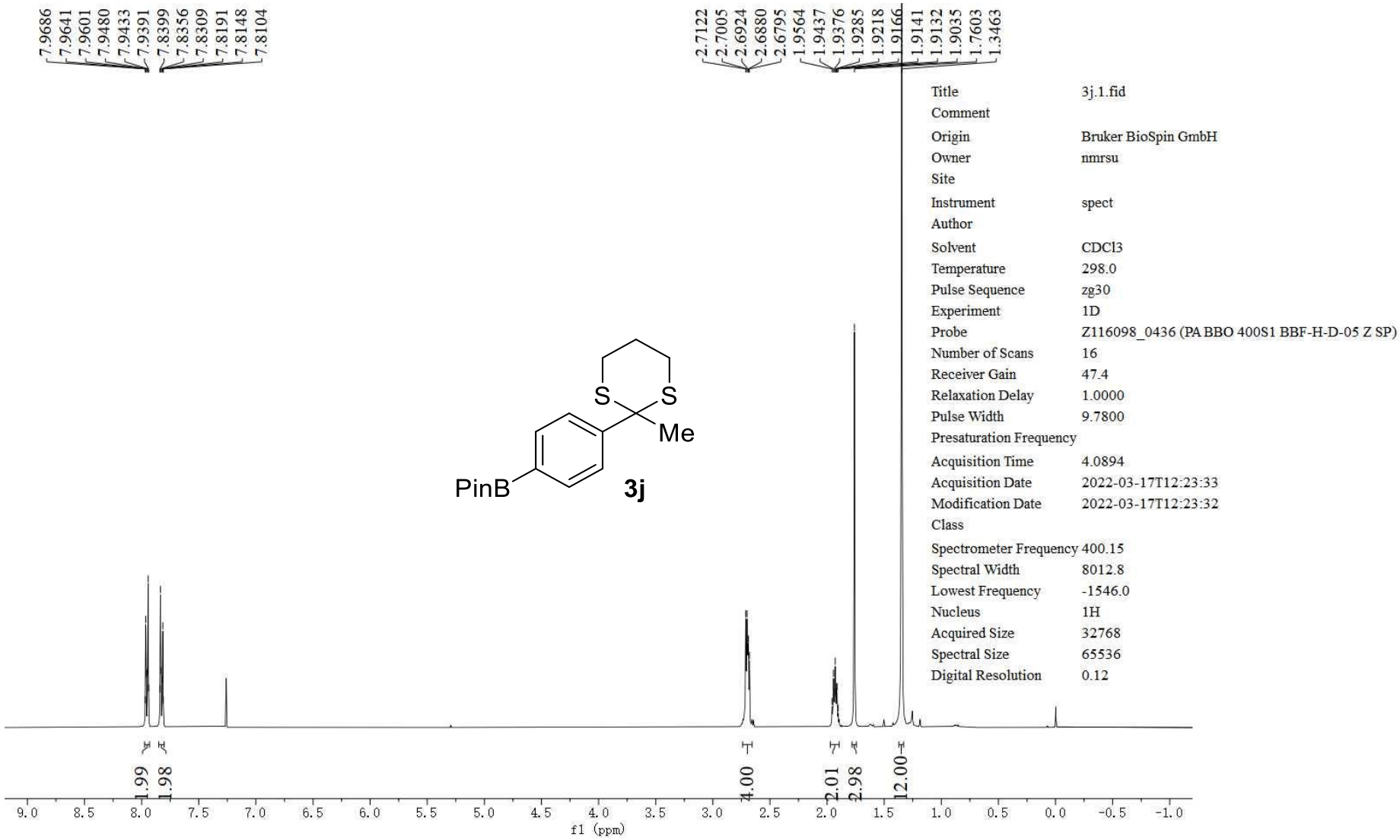
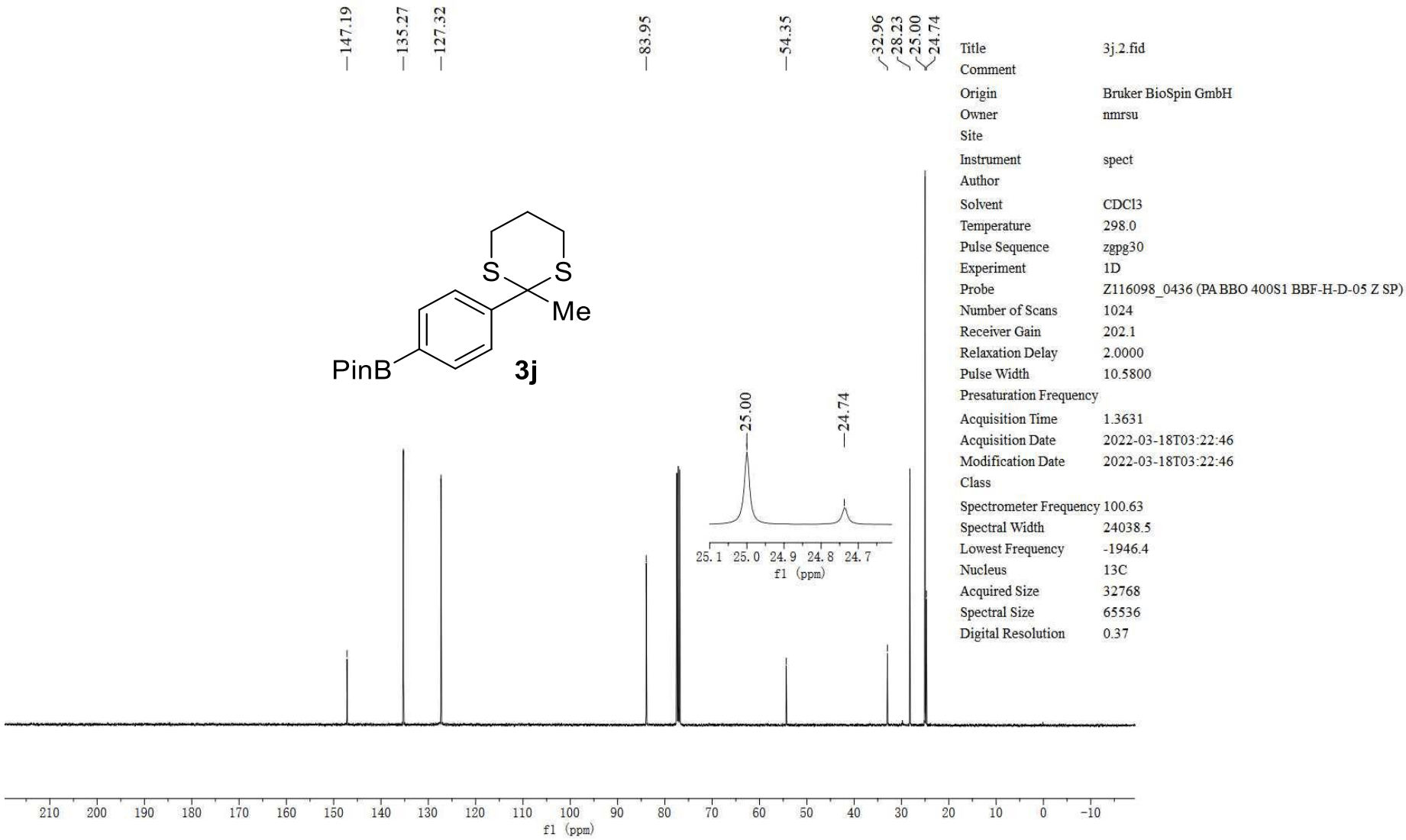
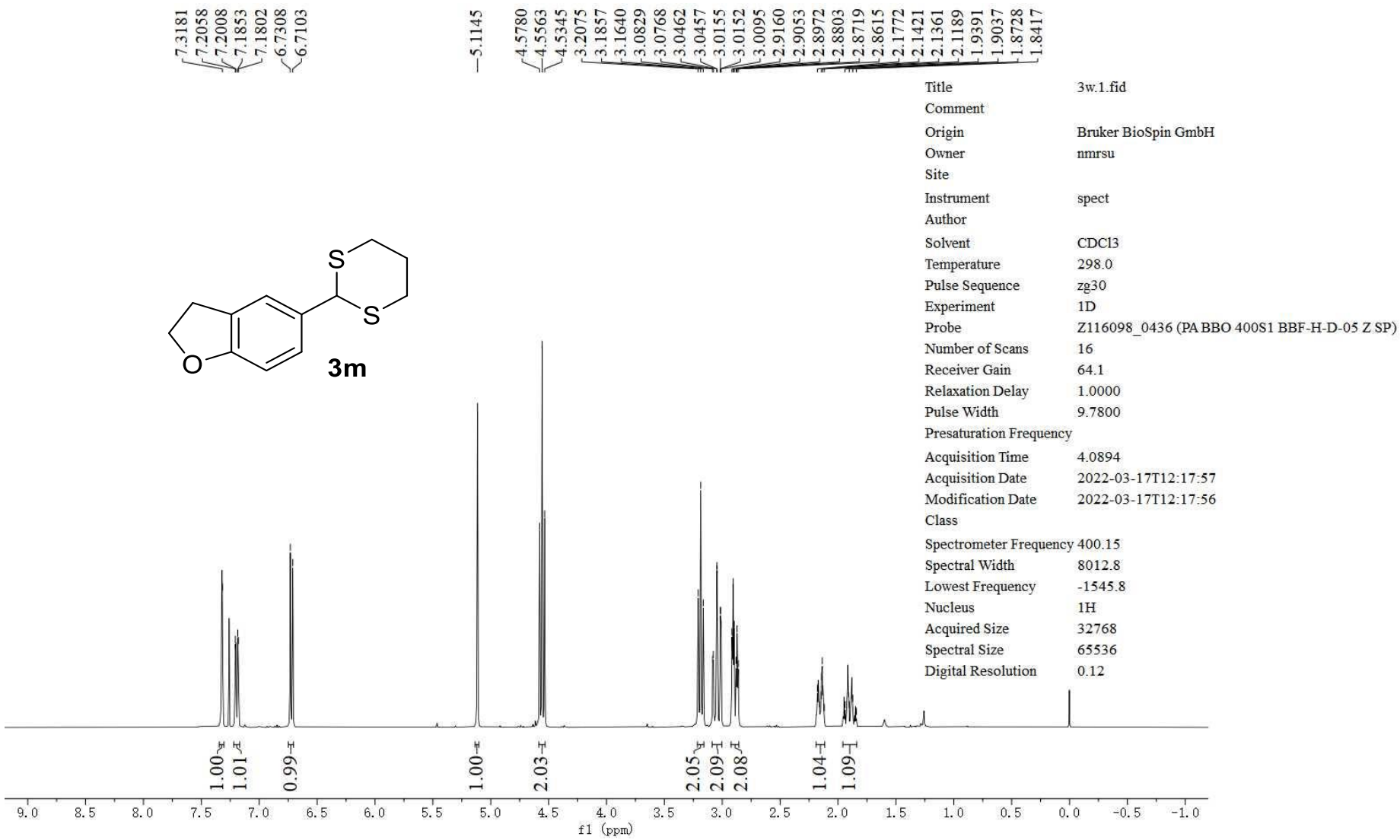
3.4430
3.4229
3.3641
3.3576
3.3518
3.3333
3.3194
3.3070
2.1101
S
S
Me
I
3i
Title 3i.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 53.4
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2022-03-17T12:40:12
Modification Date 2022-03-17T12:40:12
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.9
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
1.97
1.98
2.01
2.03
3.00
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 -1.0
f1 (ppm)

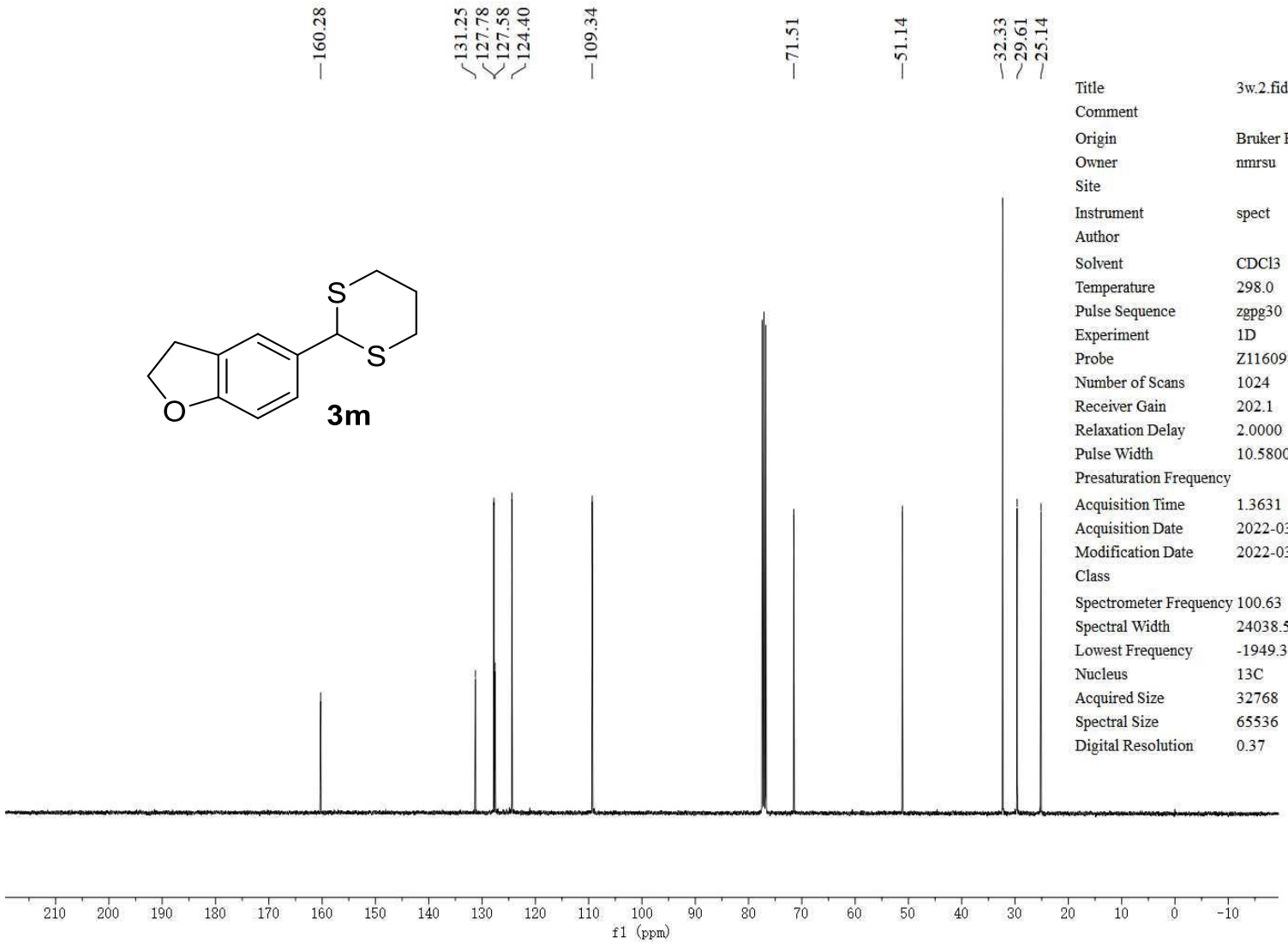

146.04
136.99
128.95
92.71
68.11
40.39
33.43
S
S
Me
I
3i
Title 3i.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 1024
Receiver Gain 202.1
Relaxation Delay 2.0000
Pulse Width 10.5800
Presaturation Frequency
Acquisition Time 1.3631
Acquisition Date 2022-03-18T06:31:03
Modification Date 2022-03-18T06:31:02
Class
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1949.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.37
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)

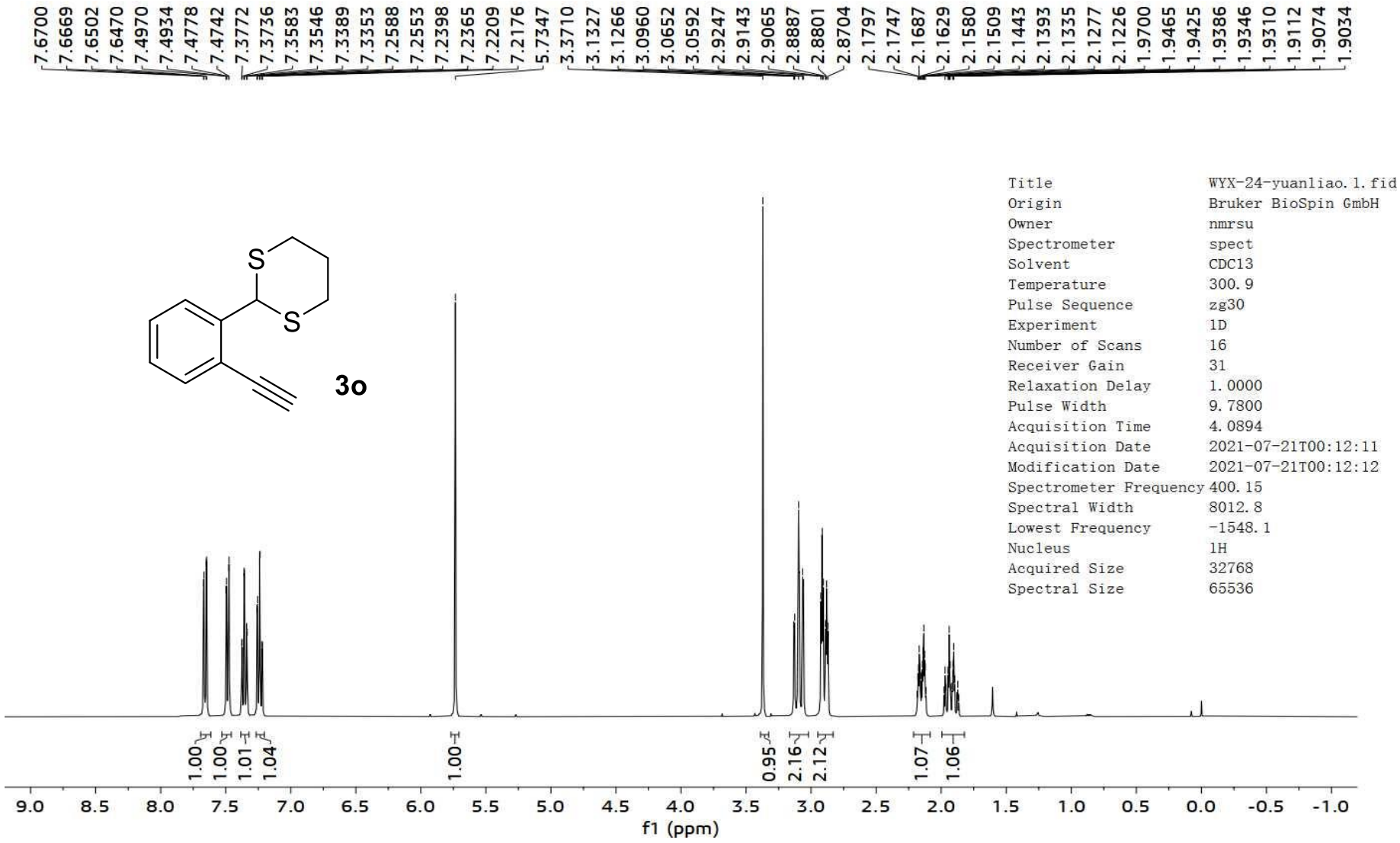

7.9686
7.9641
7.9601
7.9480
7.9433
7.9391
7.8399
7.8356
7.8309
7.8191
7.8148
7.8104
2.7122
2.7005
2.6924
2.6880
2.6795
1.9564
1.9437
1.9376
1.9285
1.9218
1.9166
1.9141
1.9132
1.9035
1.7603
1.3463
S
S
Me
PinB
3j
Title 3j.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 47.4
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2022-03-17T12:23:33
Modification Date 2022-03-17T12:23:32
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1546.0
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
1.99
1.98
4.00
2.01
2.98
12.00
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 -1.0
f1 (ppm)

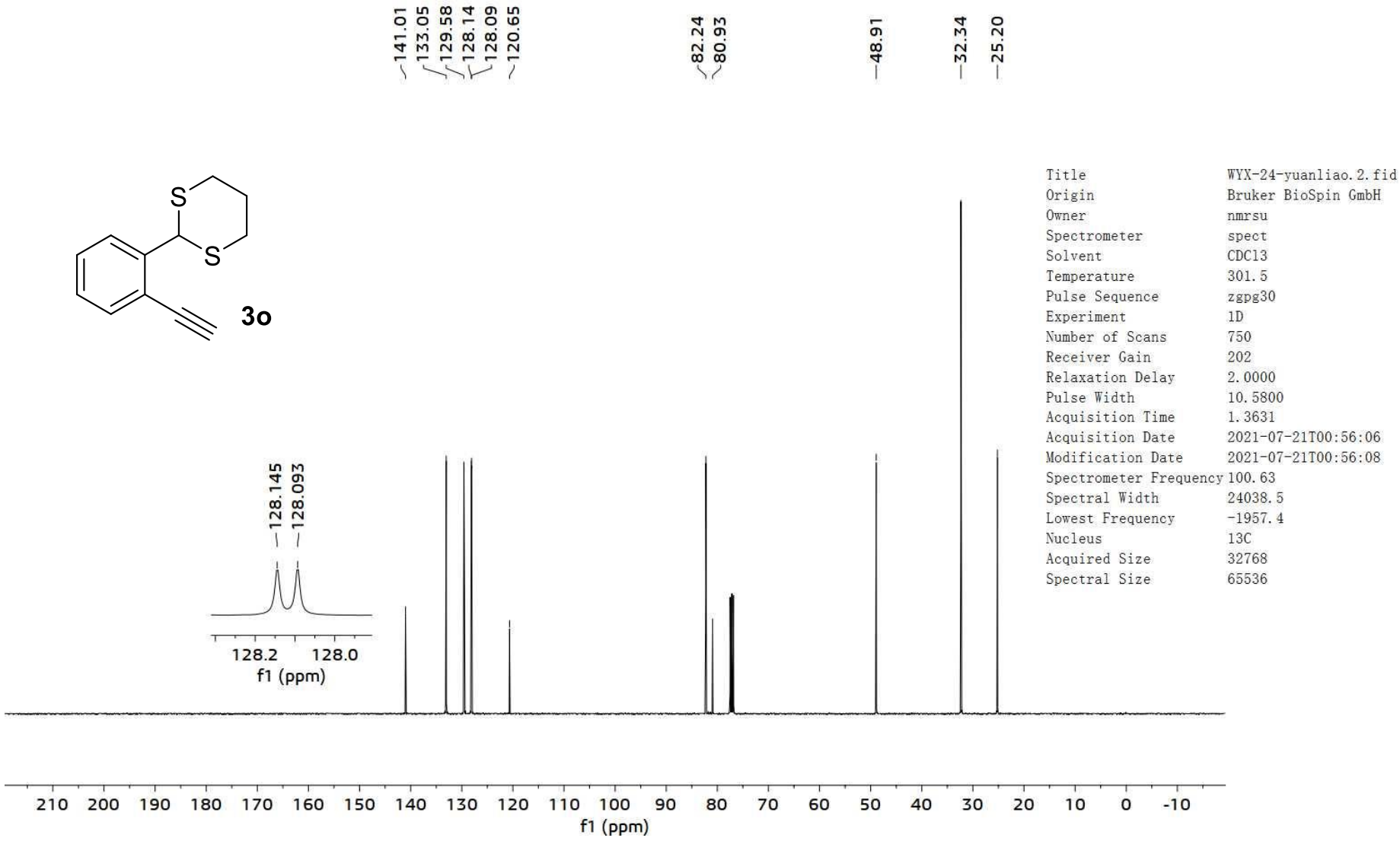


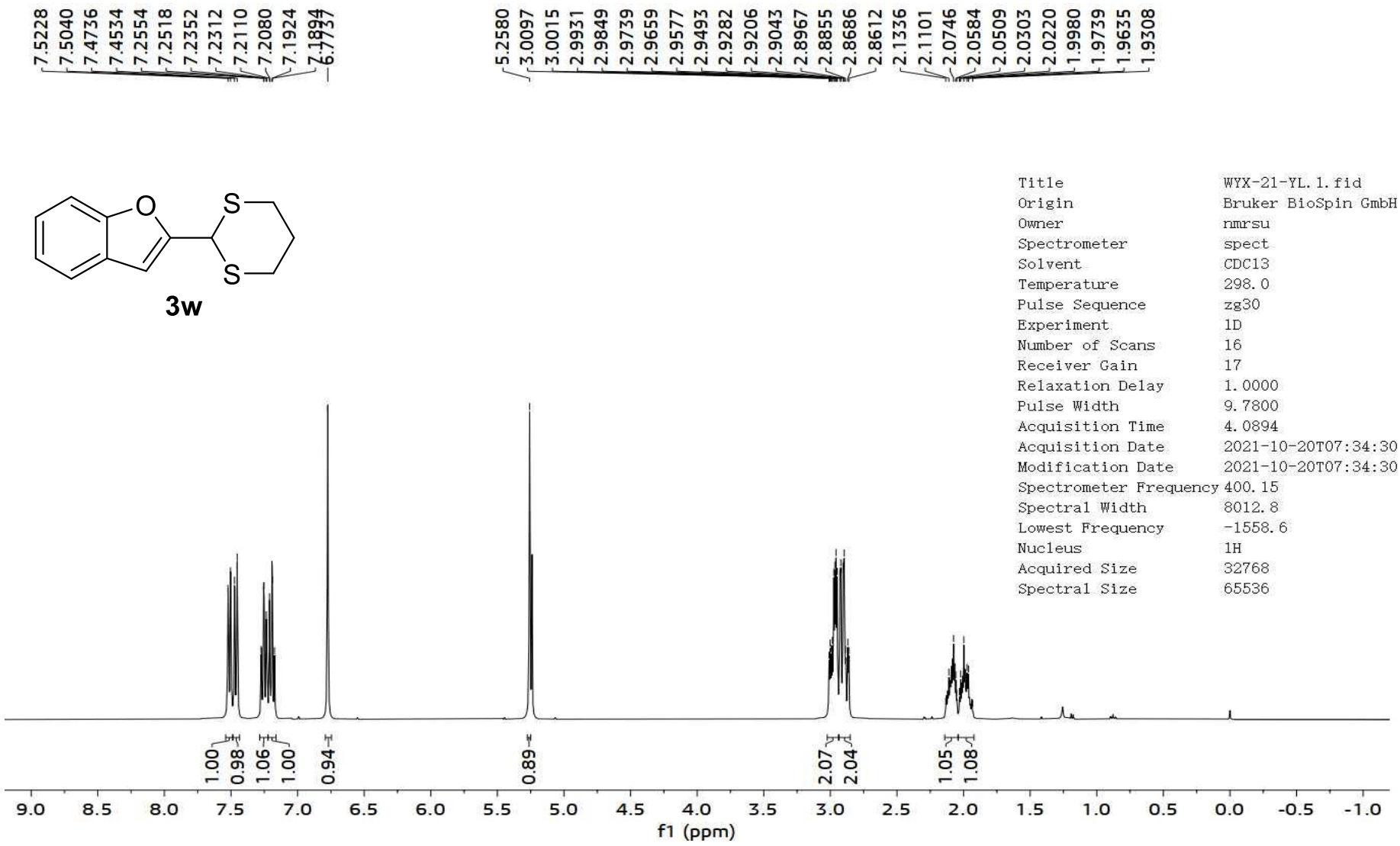
Title	3j.2.fid
Comment	
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Site	
Instrument	spect
Author	
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zgpg30
Experiment	1D
Probe	Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans	1024
Receiver Gain	202.1
Relaxation Delay	2.0000
Pulse Width	10.5800
Presaturation Frequency	
Acquisition Time	1.3631
Acquisition Date	2022-03-18T03:22:46
Modification Date	2022-03-18T03:22:46
Class	
Spectrometer Frequency	100.63
Spectral Width	24038.5
Lowest Frequency	-1946.4
Nucleus	13C
Acquired Size	32768
Spectral Size	65536
Digital Resolution	0.37

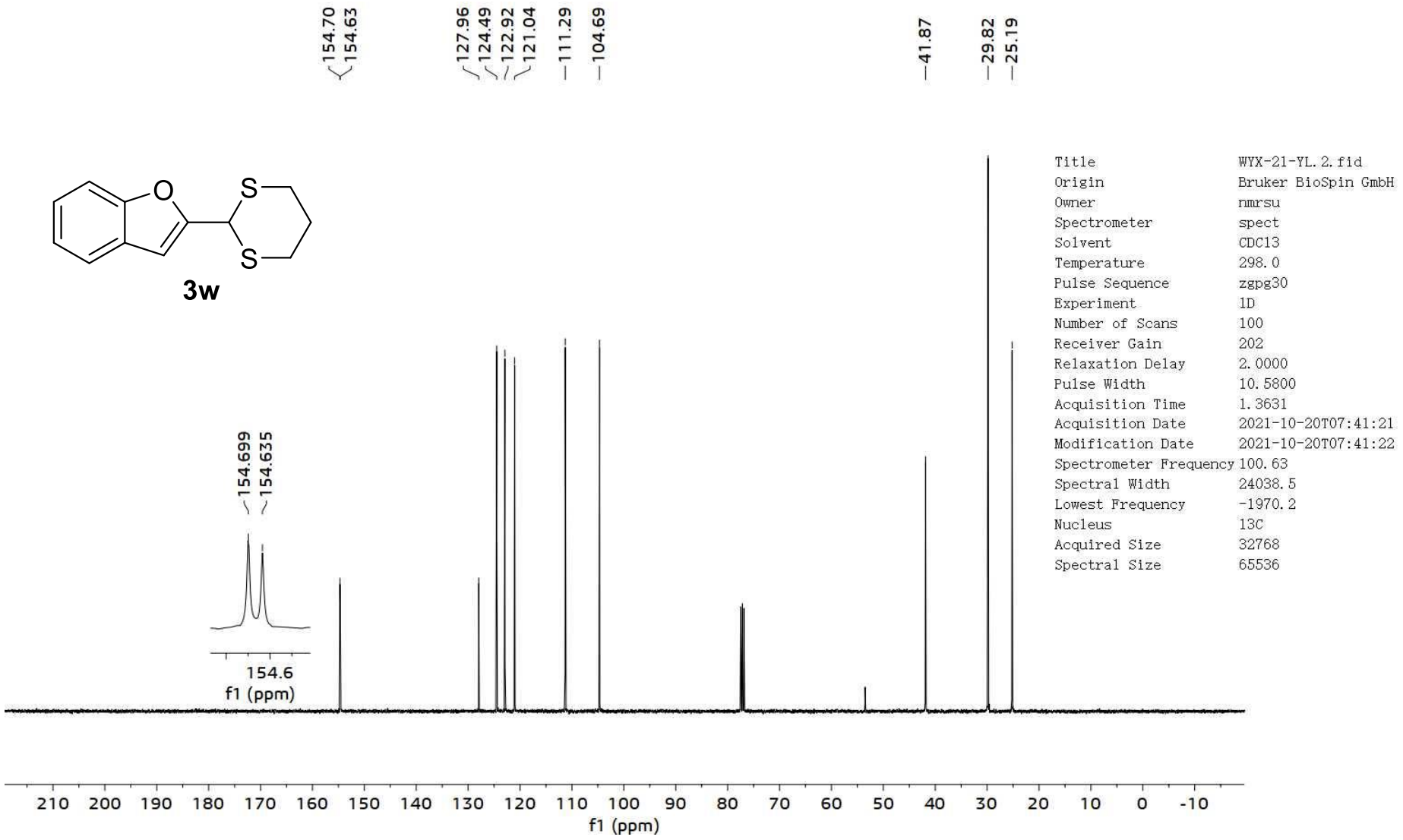

7.3181
7.2058
7.2008
7.1853
7.1802
6.7308
6.7103
5.1145
4.5780
4.5563
4.5345
3.2075
3.1857
3.1640
3.0829
3.0768
3.0462
3.0457
3.0155
3.0152
3.0095
2.9160
2.9053
2.8972
2.8803
2.8719
2.8615
2.1772
2.1421
2.1361
2.1189
1.9391
1.9037
1.8728
1.8417
S
S
O
3m
Title 3w.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 64.1
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2022-03-17T12:17:57
Modification Date 2022-03-17T12:17:56
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
1.00
1.01
0.99
1.00
2.03
2.05
2.09
2.08
1.04
1.09
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 -1.0
f1 (ppm)

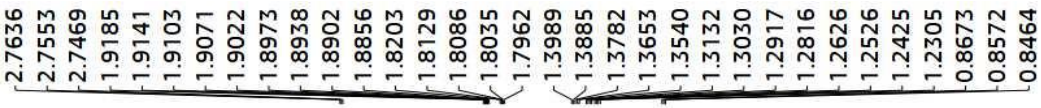

160.28
131.25
127.78
127.58
124.40
109.34
71.51
51.14
32.33
29.61
25.14
S
S
O
3m
Title 3w.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 1024
Receiver Gain 202.1
Relaxation Delay 2.0000
Pulse Width 10.5800
Presaturation Frequency
Acquisition Time 1.3631
Acquisition Date 2022-03-18T02:19:51
Modification Date 2022-03-18T02:19:50
Class
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1949.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.37
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)

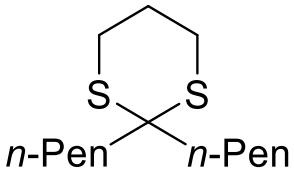

7.6700
7.6669
7.6502
7.6470
7.4970
7.4934
7.4778
7.4742
7.3772
7.3736
7.3583
7.3546
7.3389
7.3353
7.2588
7.2553
7.2398
7.2365
7.2209
7.2176
5.7347
3.3710
3.1327
3.1266
3.0960
3.0652
3.0592
2.9247
2.9143
2.9065
2.8887
2.8801
2.8704
2.1797
2.1747
2.1687
2.1629
2.1580
2.1509
2.1443
2.1393
2.1335
2.1277
2.1226
1.9700
1.9465
1.9425
1.9386
1.9346
1.9310
1.9112
1.9074
1.9034
S
S
3o
Title WYX-24-yuanliao.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 300.9
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-21T00:12:11
Modification Date 2021-07-21T00:12:12
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1548.1
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.00
1.01
1.04
1.00
0.95
2.16
2.12
1.07
1.06
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
-1.0
f1 (ppm)


141.01
133.05
129.58
128.14
128.09
120.65
82.24
80.93
48.91
32.34
25.20
S
S
3o
128.145
128.093
128.2
128.0
f1 (ppm)
Title WYX-24-yuanliao.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 301.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-21T00:56:06
Modification Date 2021-07-21T00:56:08
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1957.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)


7.5228
7.5040
7.4736
7.4534
7.2554
7.2518
7.2352
7.2312
7.2110
7.2080
7.1924
6.7737
5.2580
3.0097
3.0015
2.9931
2.9849
2.9739
2.9659
2.9577
2.9493
2.9282
2.9206
2.9043
2.8967
2.8855
2.8686
2.8612
2.1336
2.1101
2.0746
2.0584
2.0509
2.0303
2.0220
1.9980
1.9739
1.9635
1.9308
O
S
S
3w
Title WYX-21-YL.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 17
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-20T07:34:30
Modification Date 2021-10-20T07:34:30
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1558.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
0.98
1.06
1.00
0.94
0.89
2.07
2.04
1.05
1.08
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
-1.0
f1 (ppm)

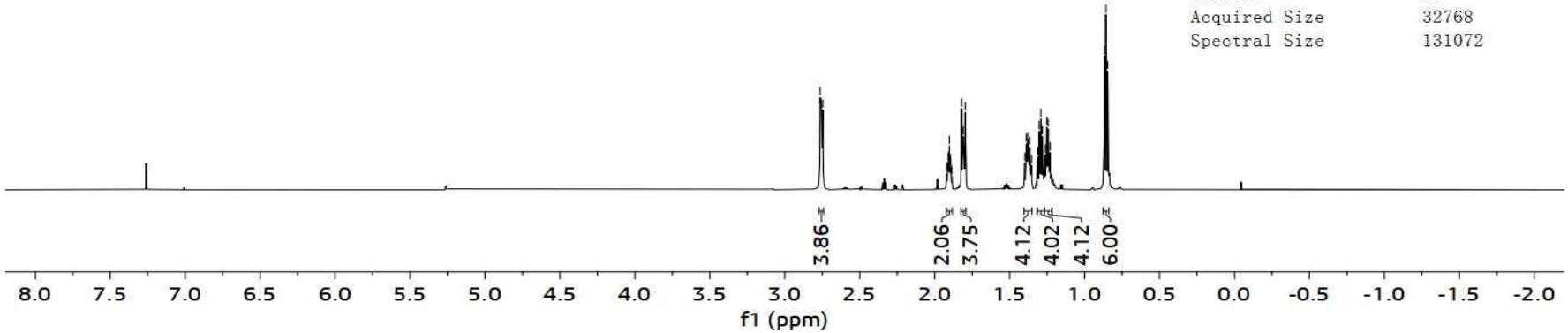

154.70
154.63
127.96
124.49
122.92
121.04
111.29
104.69
41.87
29.82
25.19
O
S
S
3w
154.699
154.635
154.6
f1 (ppm)
Title WYX-21-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 100
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-20T07:41:21
Modification Date 2021-10-20T07:41:22
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1970.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)





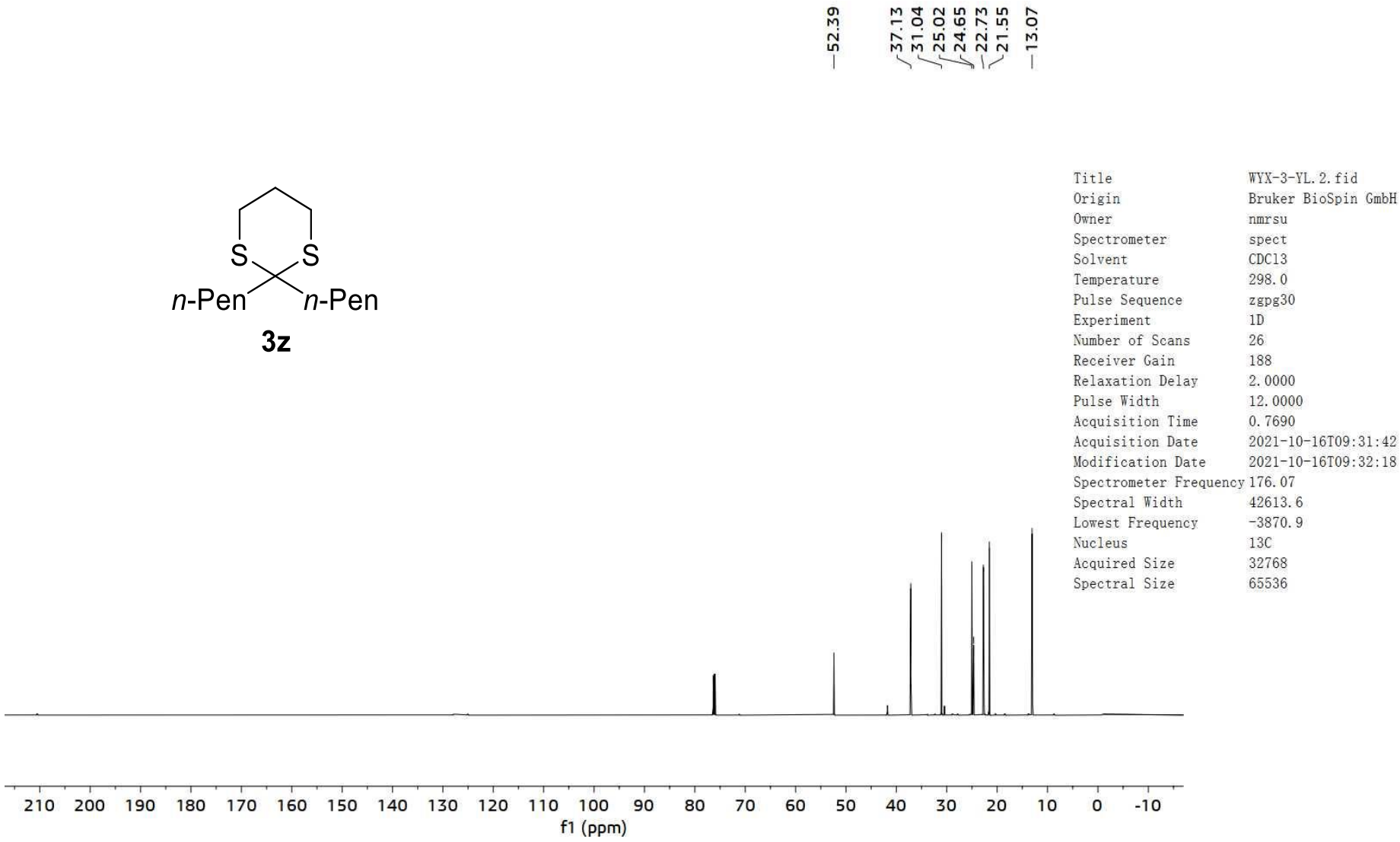
3z

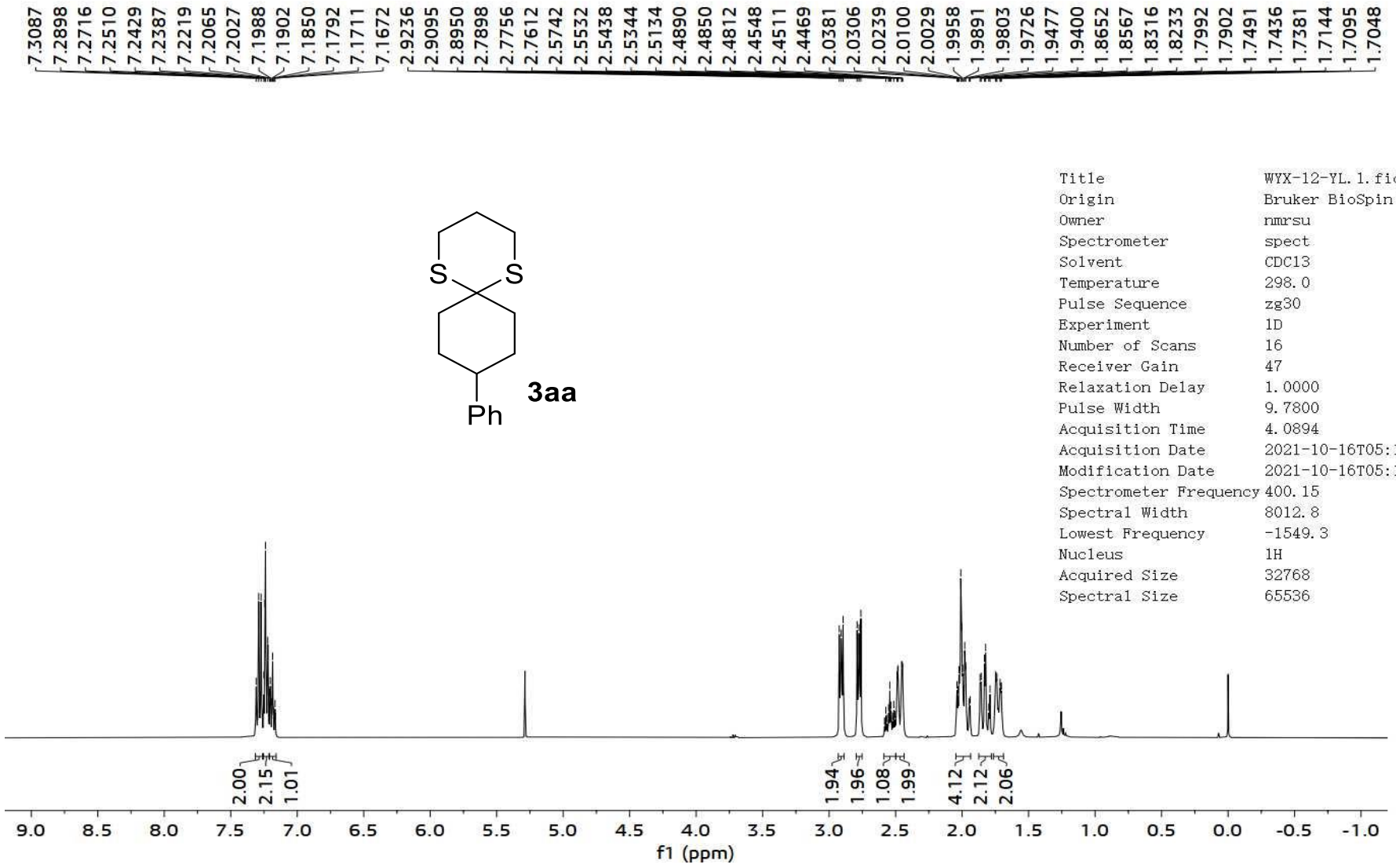
Title	WYX-3-YL.1.fid
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zg30
Experiment	1D
Number of Scans	3
Receiver Gain	1
Relaxation Delay	1.0000
Pulse Width	12.0000
Acquisition Time	2.3243
Acquisition Date	2021-10-16T09:30:42
Modification Date	2021-10-16T09:30:44
Spectrometer Frequency	700.15
Spectral Width	14097.7
Lowest Frequency	-2741.8
Nucleus	1H
Acquired Size	32768
Spectral Size	131072

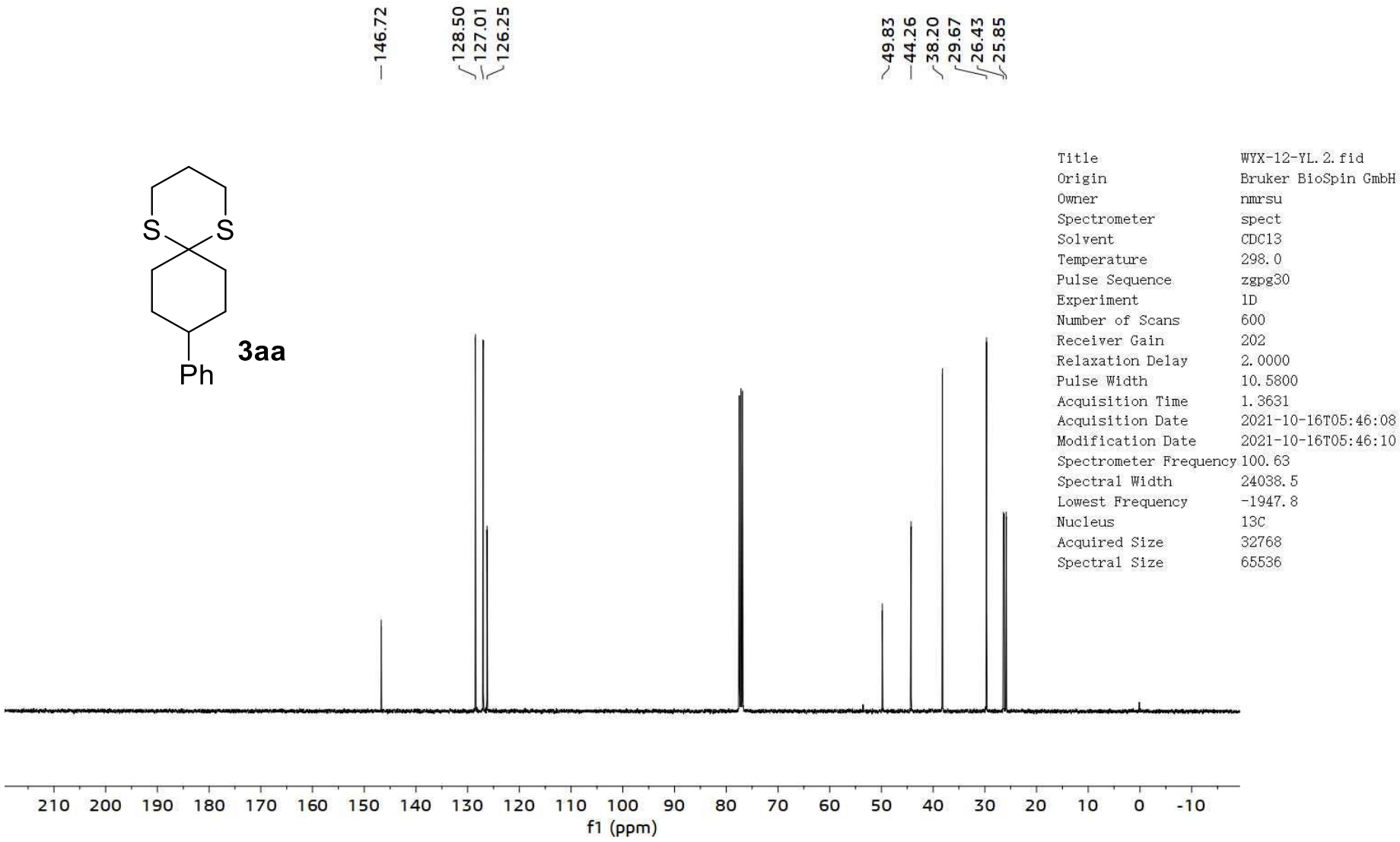


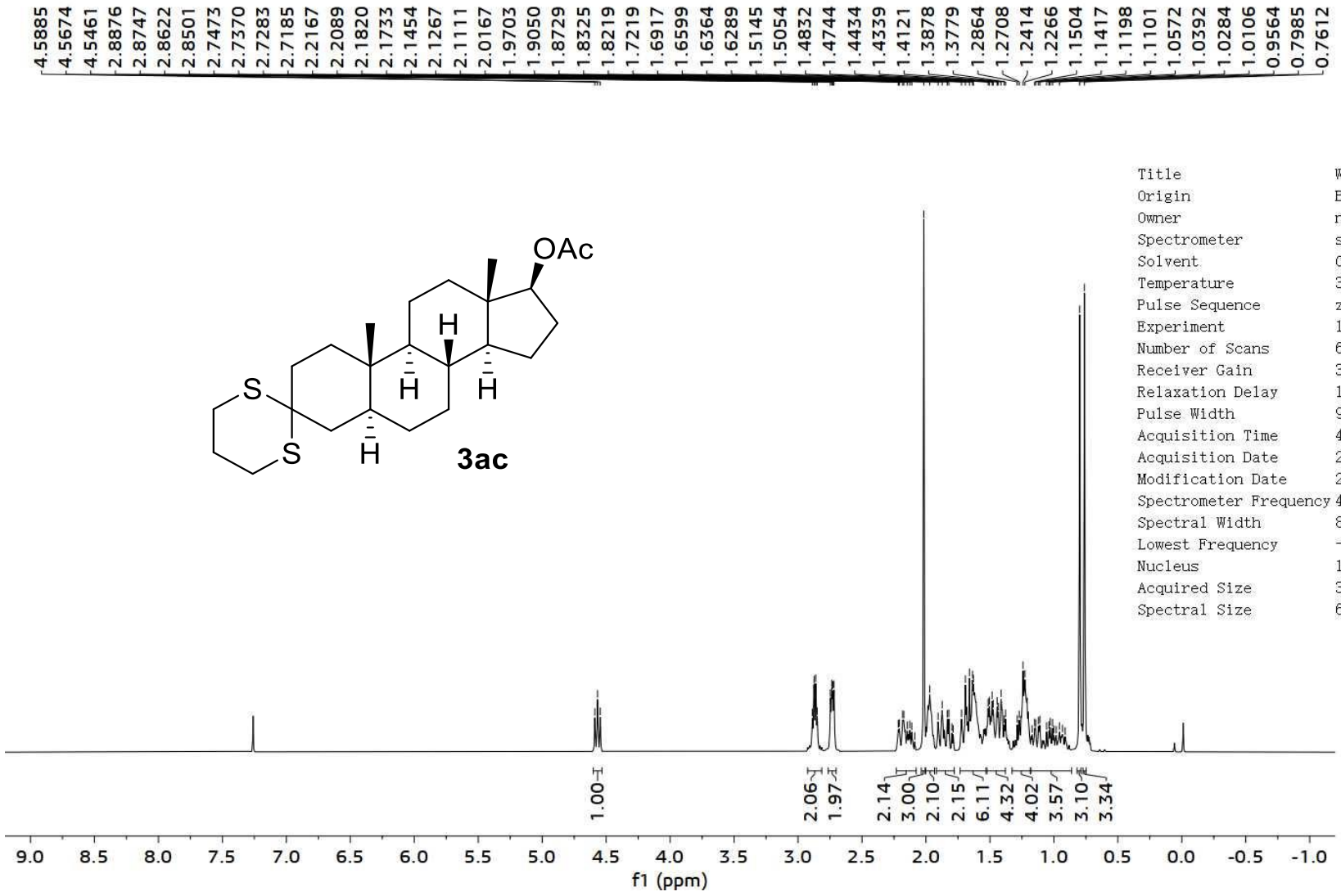
S
S
n-Pen
n-Pen

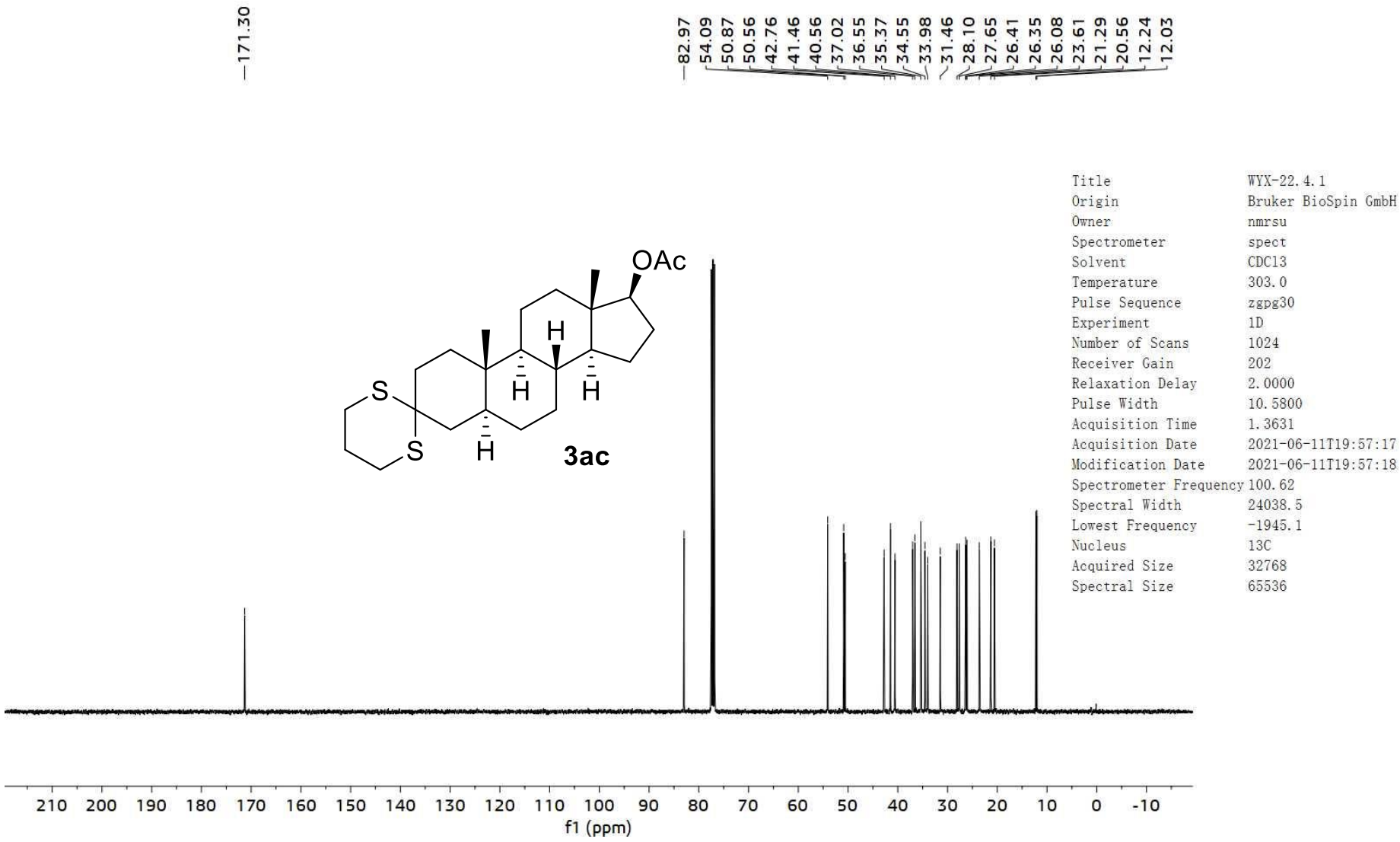
3z

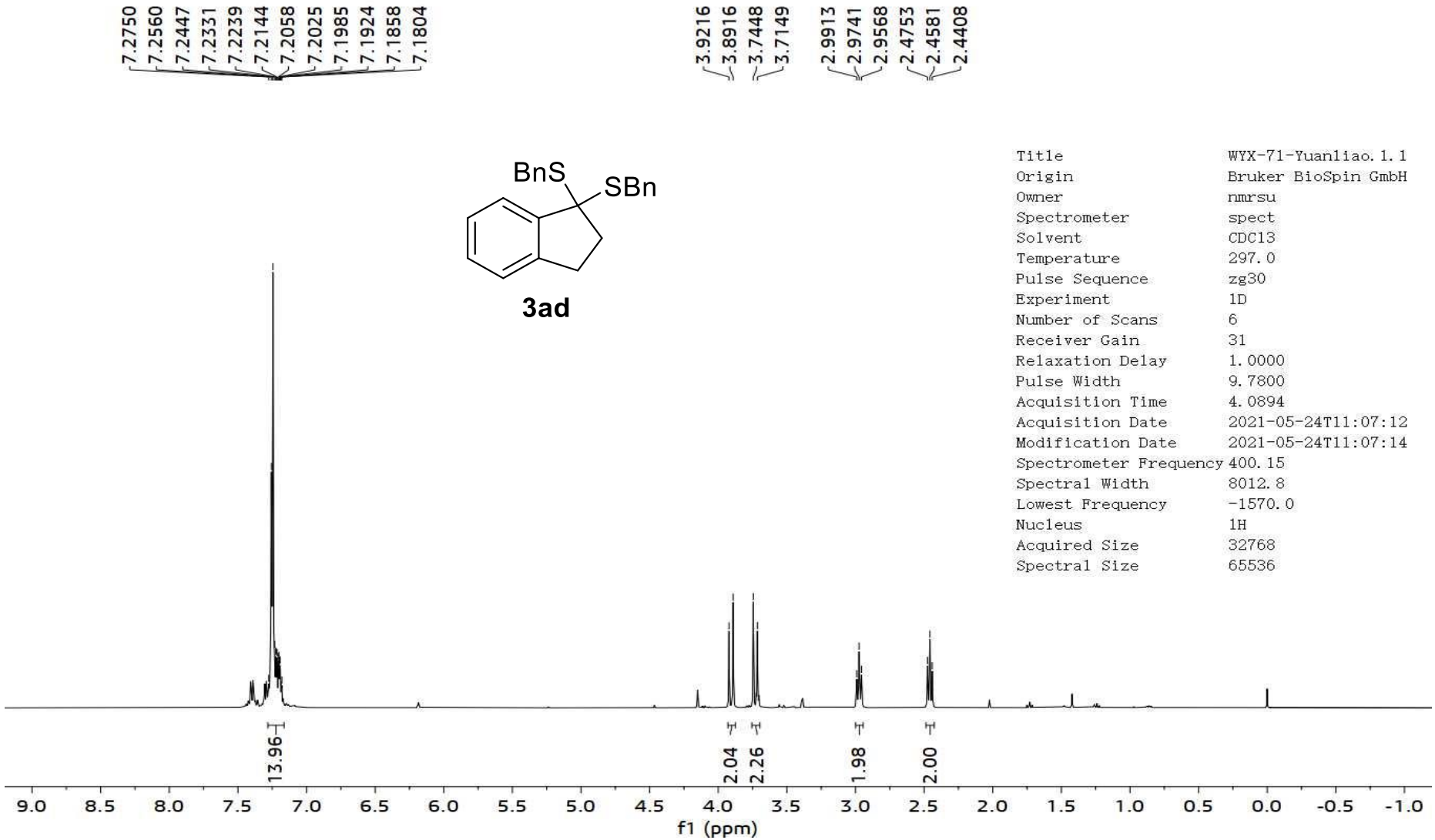

52.39
37.13
31.04
25.02
24.65
22.73
21.55
13.07
Title WYX-3-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 26
Receiver Gain 188
Relaxation Delay 2.0000
Pulse Width 12.0000
Acquisition Time 0.7690
Acquisition Date 2021-10-16T09:31:42
Modification Date 2021-10-16T09:32:18
Spectrometer Frequency 176.07
Spectral Width 42613.6
Lowest Frequency -3870.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

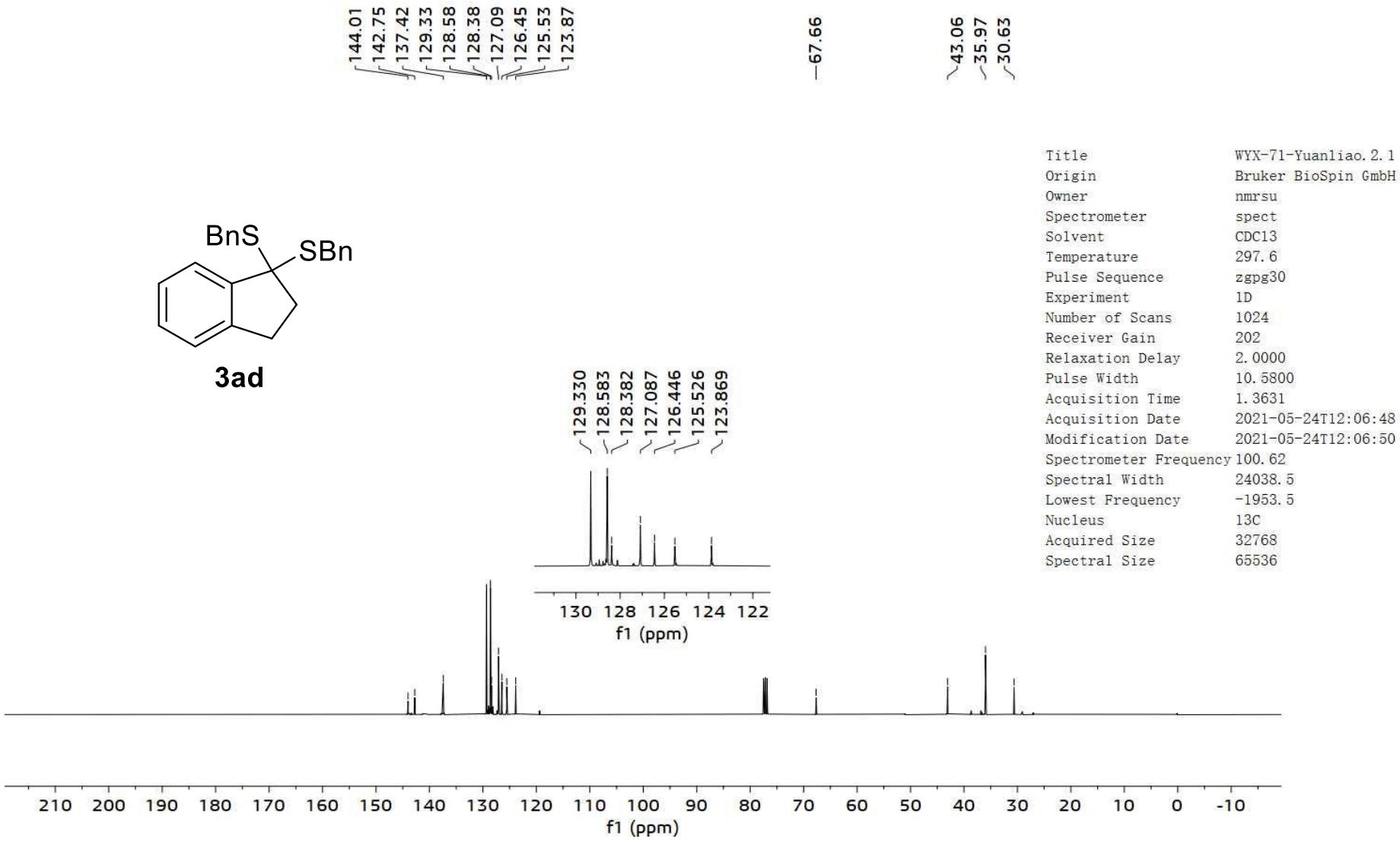

7.3087
7.2898
7.2716
7.2510
7.2429
7.2387
7.2219
7.2065
7.2027
7.1988
7.1902
7.1850
7.1792
7.1711
7.1672
2.9236
2.9095
2.8950
2.7898
2.7756
2.7612
2.5742
2.5532
2.5438
2.5344
2.5134
2.4890
2.4850
2.4812
2.4548
2.4511
2.4469
2.0381
2.0306
2.0239
2.0100
2.0029
1.9958
1.9891
1.9803
1.9726
1.9477
1.9400
1.8652
1.8567
1.8316
1.8233
1.7992
1.7902
1.7491
1.7436
1.7381
1.7144
1.7095
1.7048
S
S
Ph
3aa
Title WYX-12-YL.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 47
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-16T05:10:43
Modification Date 2021-10-16T05:10:44
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1549.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
2.15
1.01
1.94
1.96
1.08
1.99
4.12
2.12
2.06
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
-1.0
f1 (ppm)


146.72
128.50
127.01
126.25
49.83
44.26
38.20
29.67
26.43
25.85
S
S
Ph
3aa
Title WYX-12-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-16T05:46:08
Modification Date 2021-10-16T05:46:10
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1947.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

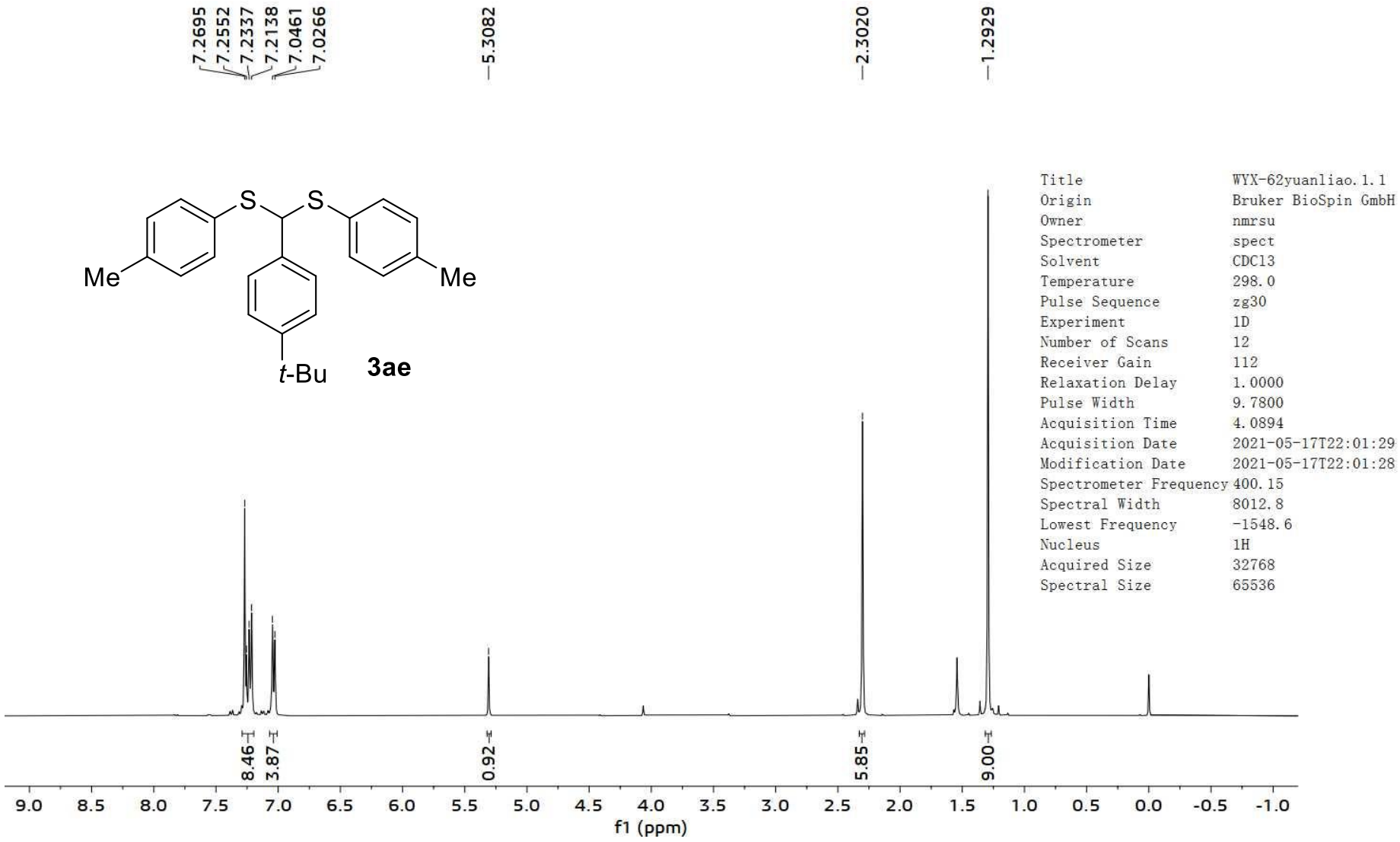

4.5885 4.5674 4.5461 2.8876 2.8747 2.8622 2.8501 2.7473 2.7370 2.7283 2.7185 2.2167 2.2089 2.1820 2.1733 2.1454 2.1267 2.1111 2.0167 1.9703 1.9050 1.8729 1.8325 1.8219 1.7219 1.6917 1.6599 1.6364 1.6289 1.5145 1.5054 1.4832 1.4744 1.4434 1.4339 1.4121 1.3878 1.3779 1.2864 1.2708 1.2414 1.2266 1.1504 1.1417 1.1198 1.1101 1.0572 1.0392 1.0284 1.0106 0.9564 0.7985 0.7612
OAc
H
S
H
H
S
H
3ac
Title WYX-22.3.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 303.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-06-11T18:57:43
Modification Date 2021-06-11T18:57:44
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.5
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00 2.06 1.97 2.14 3.00 2.10 2.15 6.11 4.32 4.02 3.57 3.10 3.34
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 -1.0
f1 (ppm)

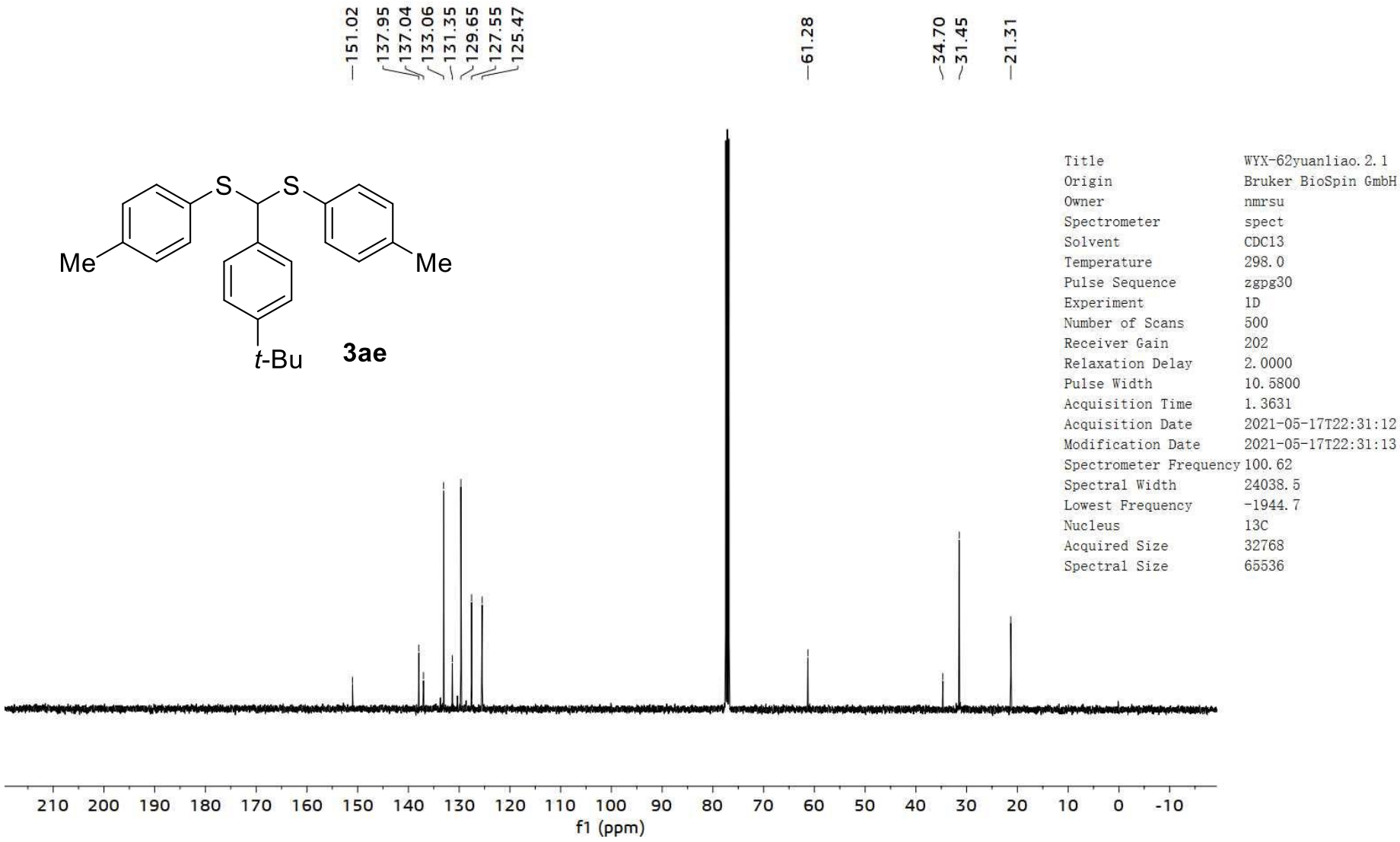

171.30
82.97
54.09
50.87
50.56
42.76
41.46
40.56
37.02
36.55
35.37
34.55
33.98
31.46
28.10
27.65
26.41
26.35
26.08
23.61
21.29
20.56
12.24
12.03
OAc
H
H
H
S
S
H
3ac
Title WYX-22.4.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 303.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-06-11T19:57:17
Modification Date 2021-06-11T19:57:18
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1945.1
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

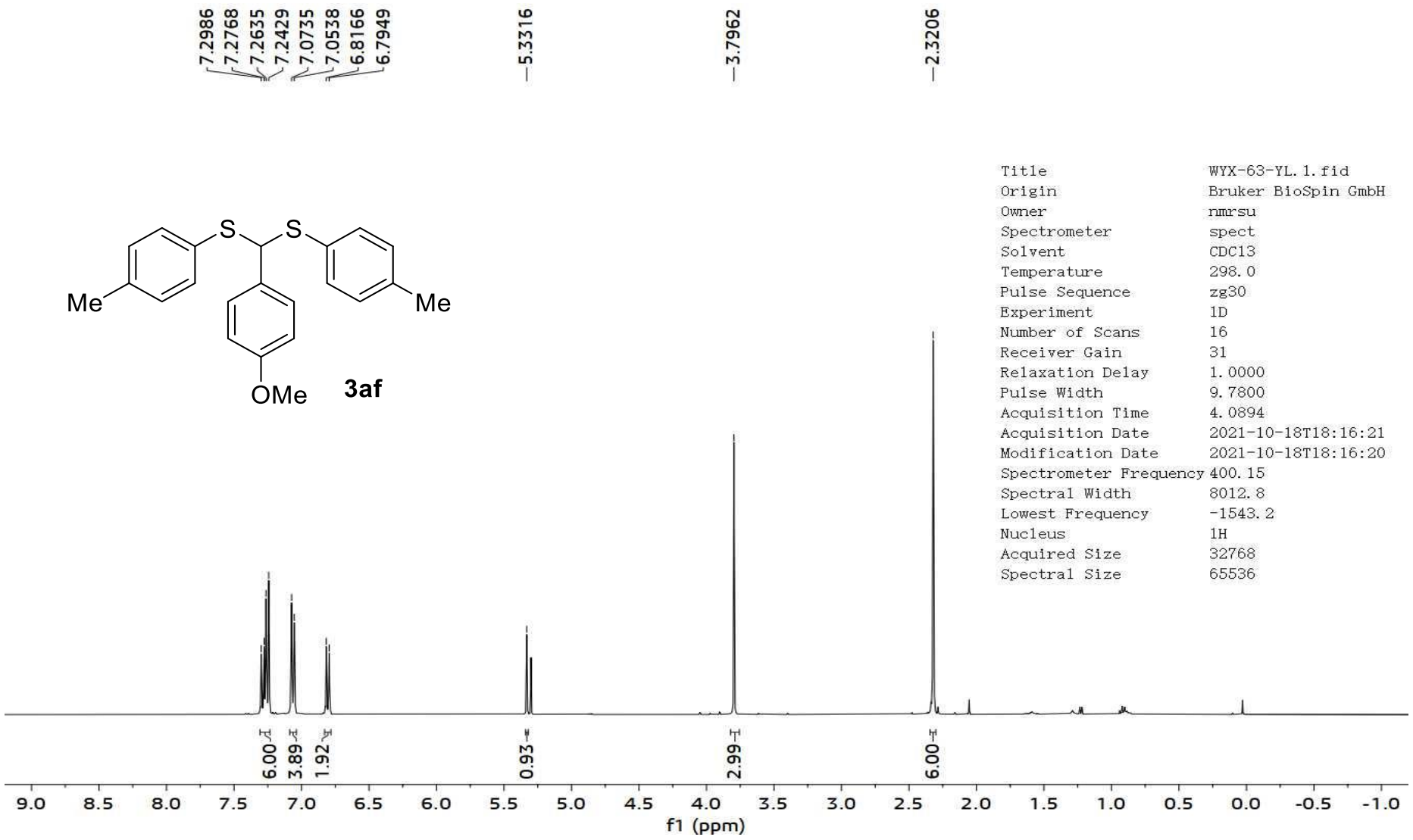

7.2750
7.2560
7.2447
7.2331
7.2239
7.2144
7.2058
7.2025
7.1985
7.1924
7.1858
7.1804
3.9216
3.8916
3.7448
3.7149
2.9913
2.9741
2.9568
2.4753
2.4581
2.4408
BnS
SBn
3ad
Title WYX-71-Yuanliao.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 297.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-24T11:07:12
Modification Date 2021-05-24T11:07:14
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1570.0
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
13.96
2.04
2.26
1.98
2.00
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 -1.0
f1 (ppm)

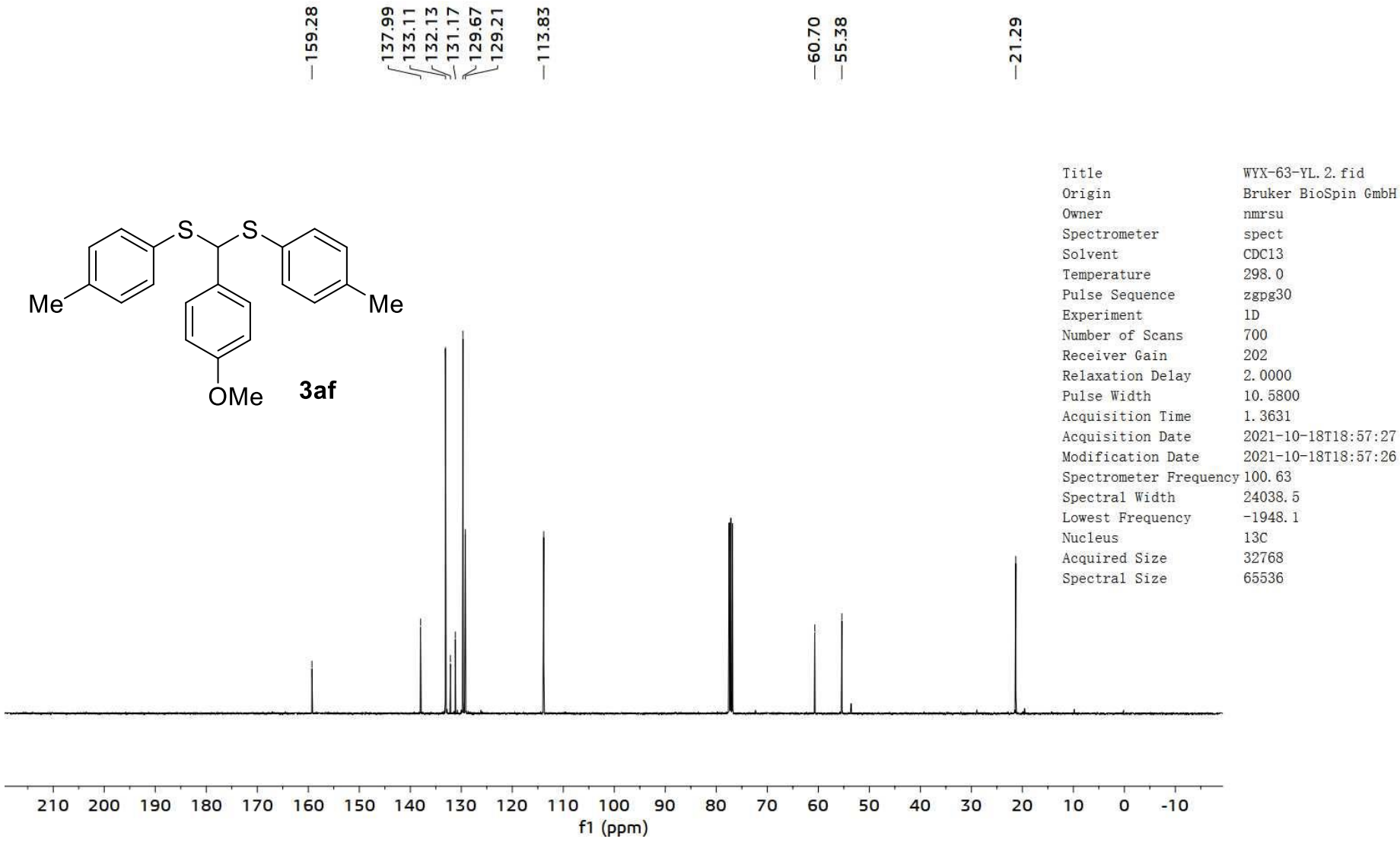


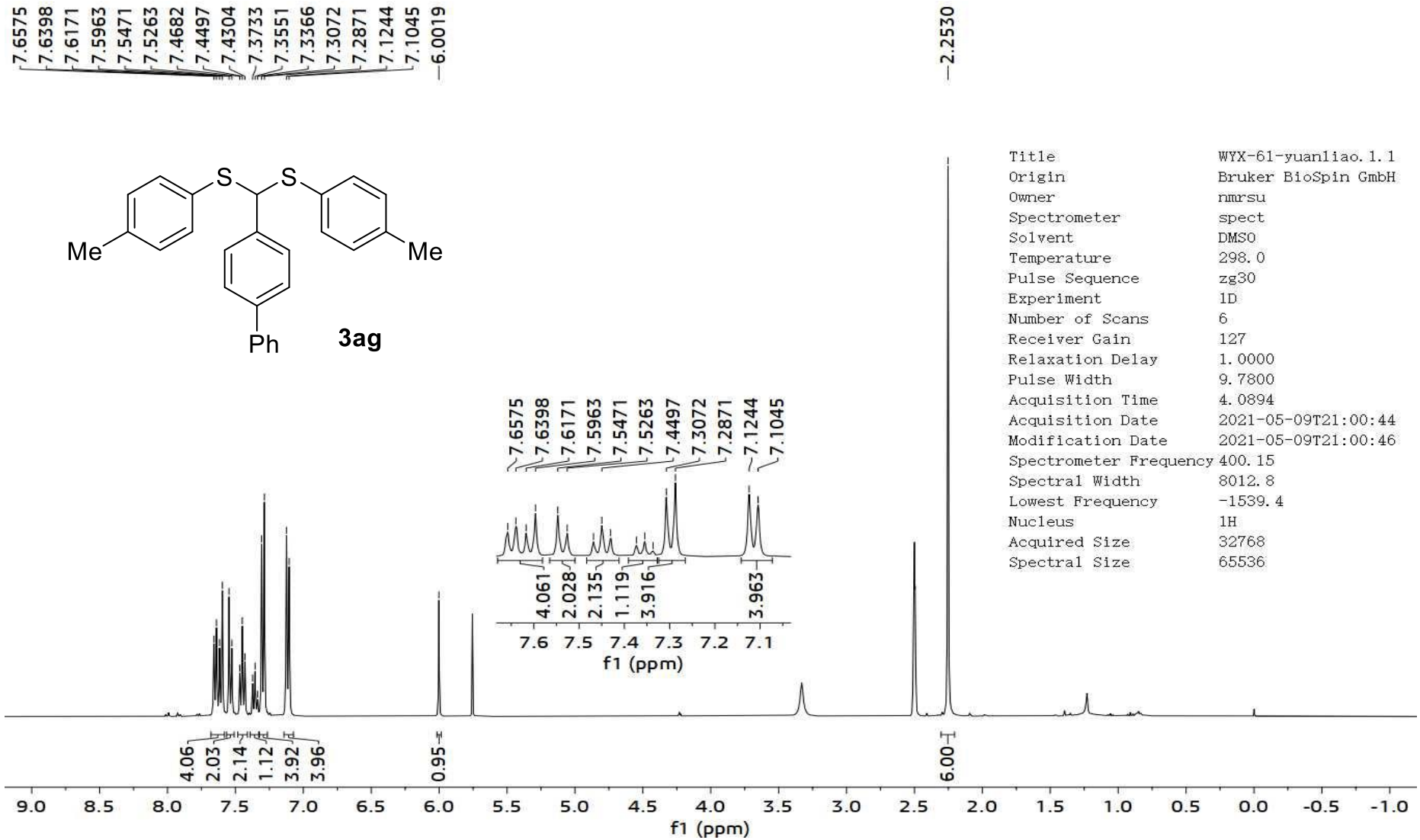
Title	WYX-71-Yuanliao.2.1
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	297.6
Pulse Sequence	zgpg30
Experiment	1D
Number of Scans	1024
Receiver Gain	202
Relaxation Delay	2.0000
Pulse Width	10.5800
Acquisition Time	1.3631
Acquisition Date	2021-05-24T12:06:48
Modification Date	2021-05-24T12:06:50
Spectrometer Frequency	100.62
Spectral Width	24038.5
Lowest Frequency	-1953.5
Nucleus	13C
Acquired Size	32768
Spectral Size	65536

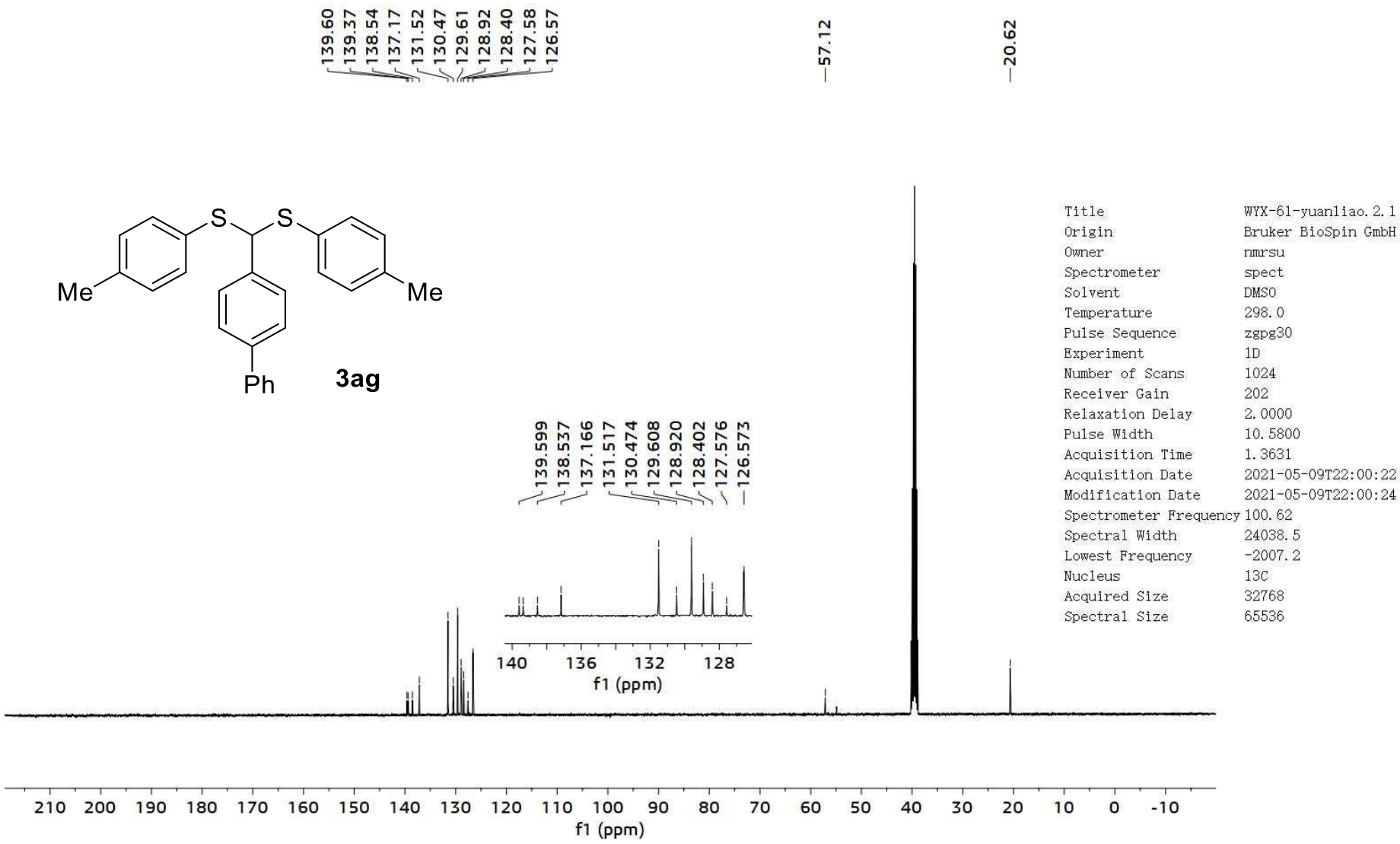

7.2695
7.2552
7.2337
7.2138
7.0461
7.0266
5.3082
2.3020
1.2929
S
S
Me
Me
t-Bu
3ae
Title WYX-62yuanliao.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 12
Receiver Gain 112
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-17T22:01:29
Modification Date 2021-05-17T22:01:28
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1548.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
8.46
3.87
0.92
5.85
9.00
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 -1.0
f1 (ppm)

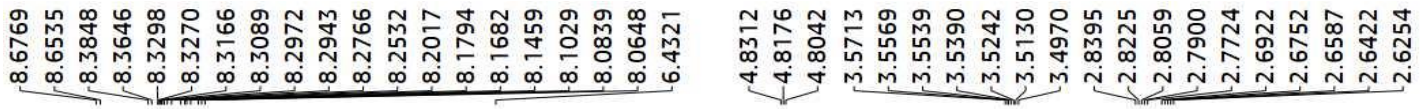

151.02
137.95
137.04
133.06
131.35
129.65
127.55
125.47
61.28
34.70
31.45
21.31
S
S
Me
Me
t-Bu
3ae
Title WYX-62yuanliao.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 500
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-17T22:31:12
Modification Date 2021-05-17T22:31:13
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1944.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

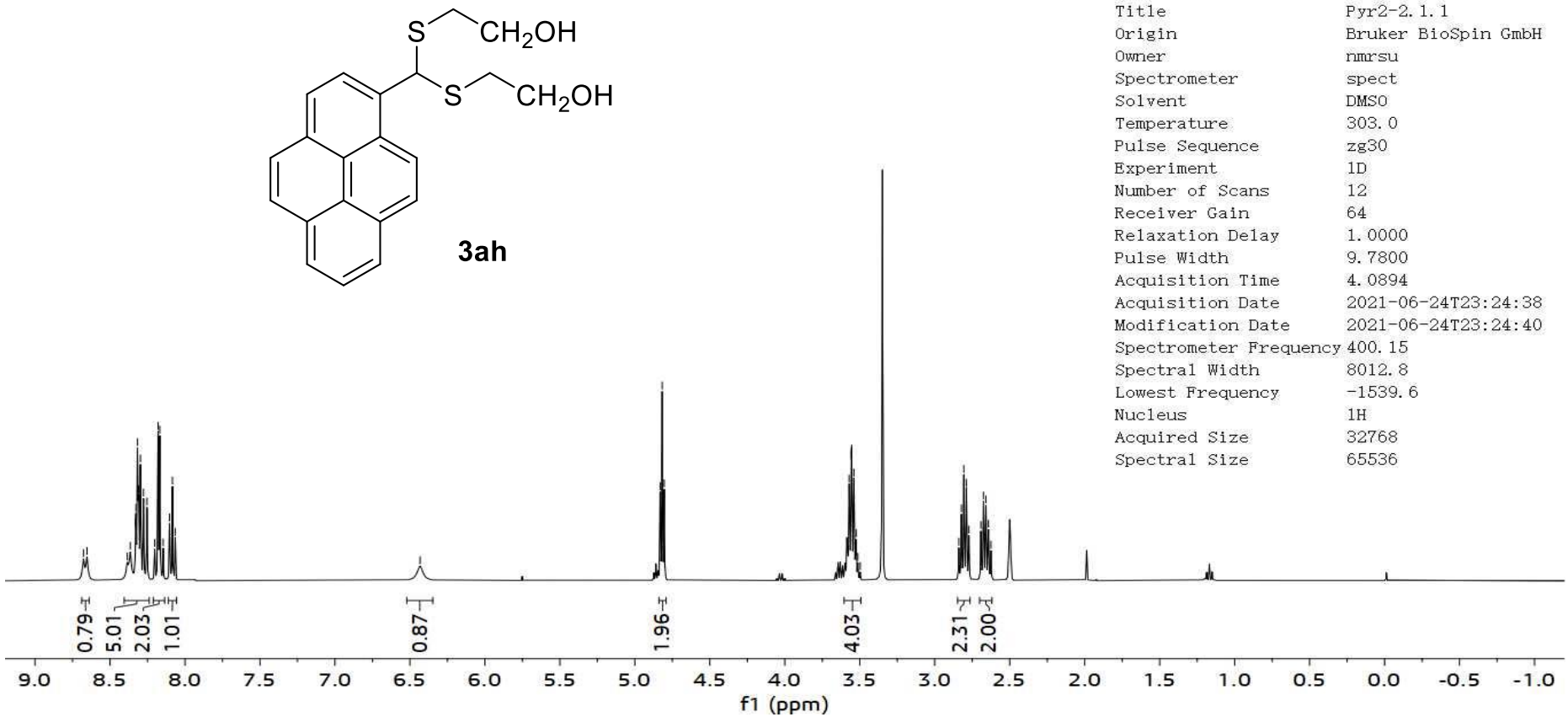

7.2986
7.2768
7.2635
7.2429
7.0735
7.0538
6.8166
6.7949
5.3316
3.7962
2.3206
Me
S
S
Me
OMe
3af
Title WYX-63-YL.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-18T18:16:21
Modification Date 2021-10-18T18:16:20
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1543.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
6.00
3.89
1.92
0.93
2.99
6.00
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 -1.0
f1 (ppm)

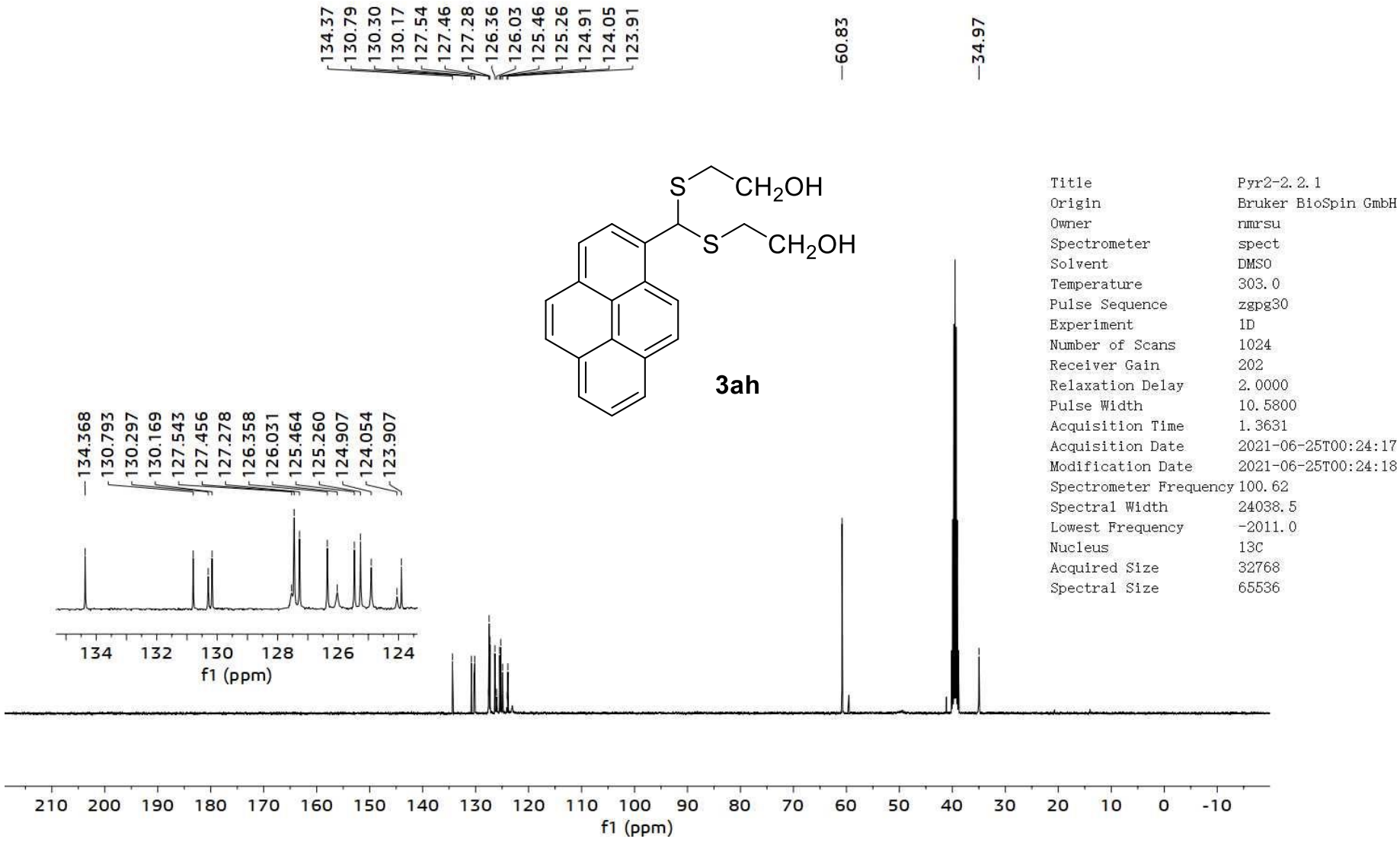

159.28
137.99
133.11
132.13
131.17
129.67
129.21
113.83
60.70
55.38
21.29
Me
S
S
Me
OMe
3af
Title WYX-63-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-18T18:57:27
Modification Date 2021-10-18T18:57:26
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1948.1
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

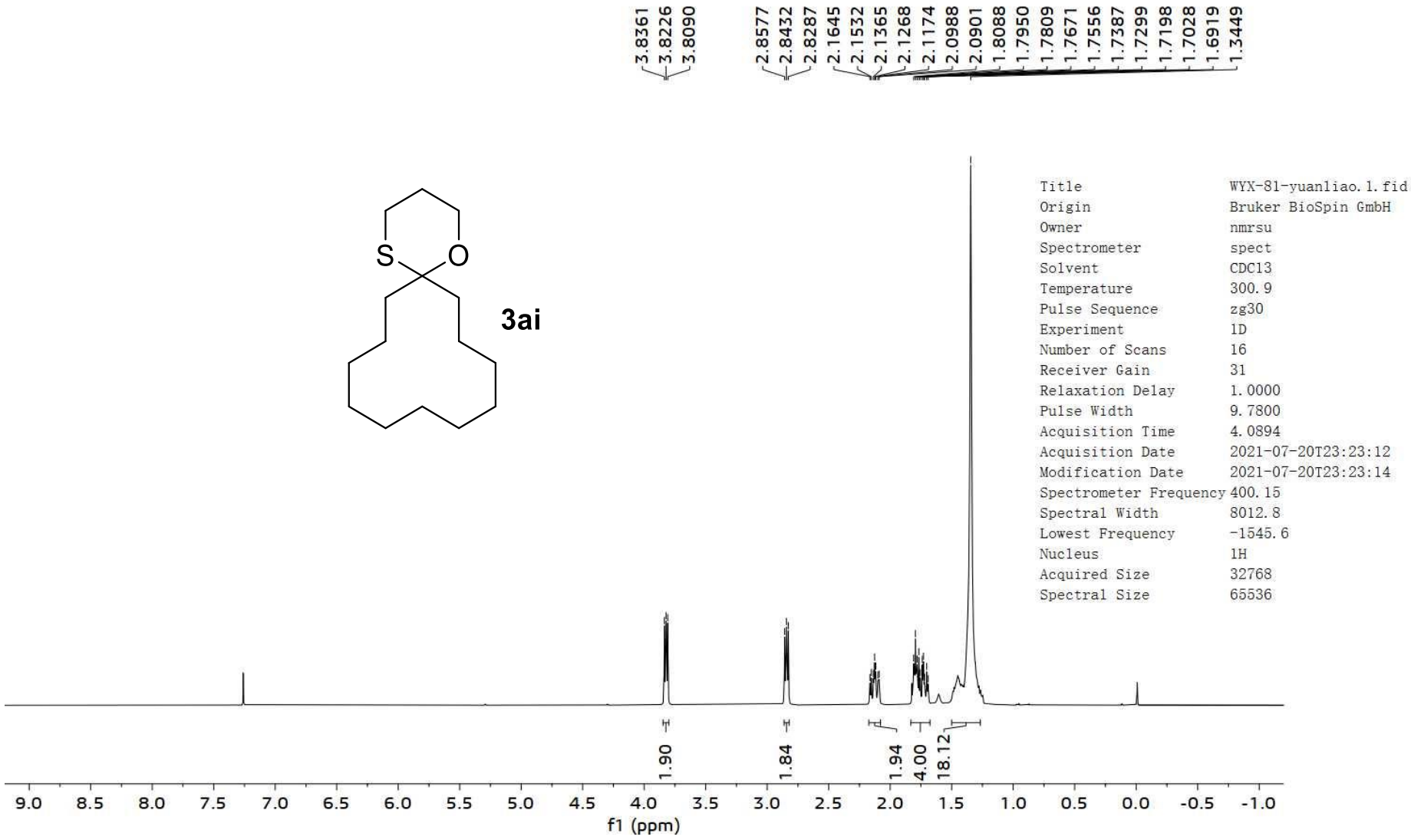

7.6575
7.6398
7.6171
7.5963
7.5471
7.5263
7.4682
7.4497
7.4304
7.3733
7.3551
7.3366
7.3072
7.2871
7.1244
7.1045
6.0019
2.2530
Me
Me
Ph
3ag
Title WYX-61-yuanliao.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent DMSO
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 127
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-09T21:00:44
Modification Date 2021-05-09T21:00:46
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1539.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
4.061
2.028
2.135
1.119
3.916
3.963
7.6 7.5 7.4 7.3 7.2 7.1
f1 (ppm)
4.06
2.03
2.14
1.12
3.92
3.96
0.95
6.00
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 -1.0
f1 (ppm)

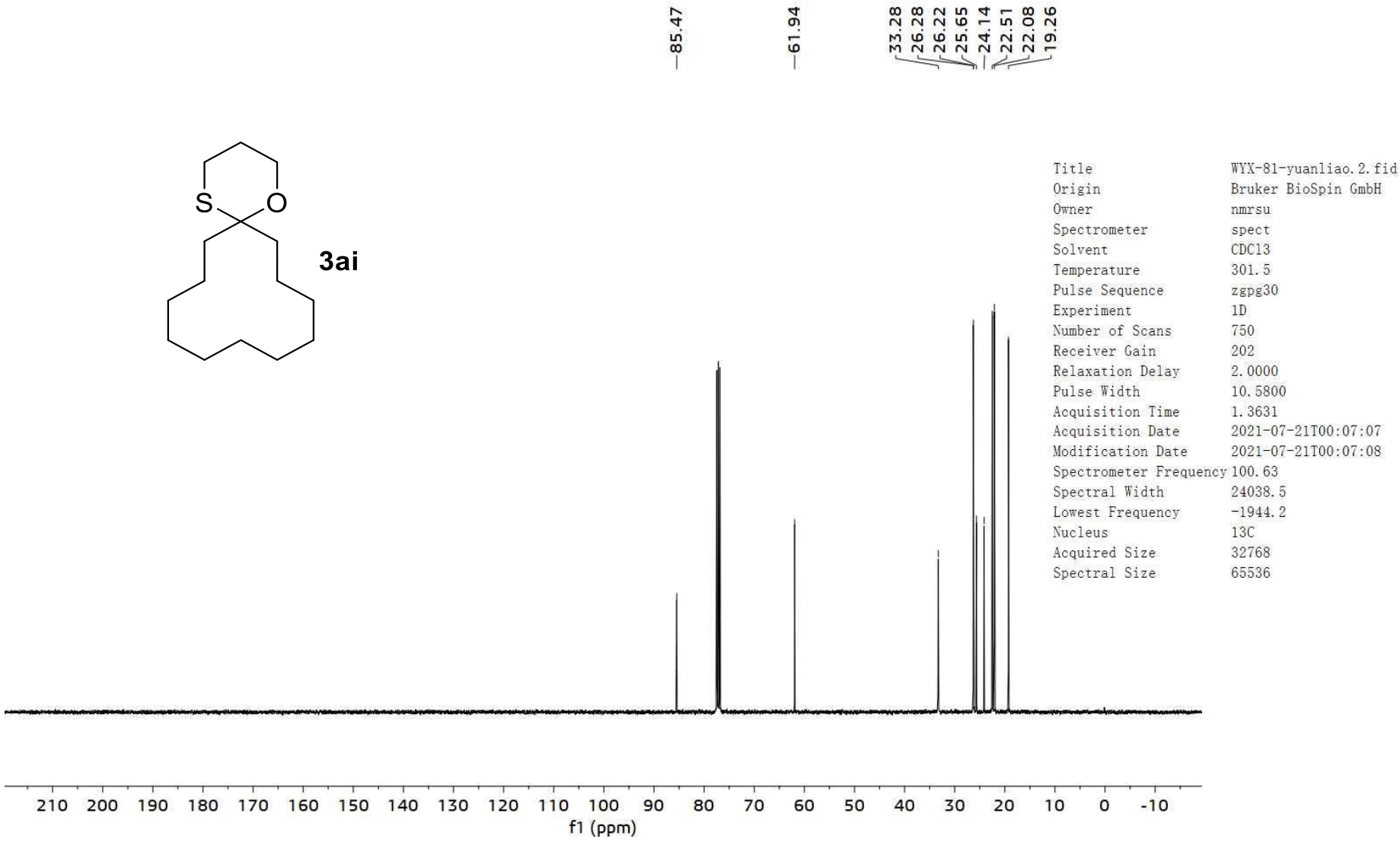

139.60
139.37
138.54
137.17
131.52
130.47
129.61
128.92
128.40
127.58
126.57
57.12
20.62
Me
S
S
Me
Ph
3ag
139.599
138.537
137.166
131.517
130.474
129.608
128.920
128.402
127.576
126.573
140
136
132
128
f1 (ppm)
Title WYX-61-yuanliao.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent DMSO
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-09T22:00:22
Modification Date 2021-05-09T22:00:24
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -2007.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

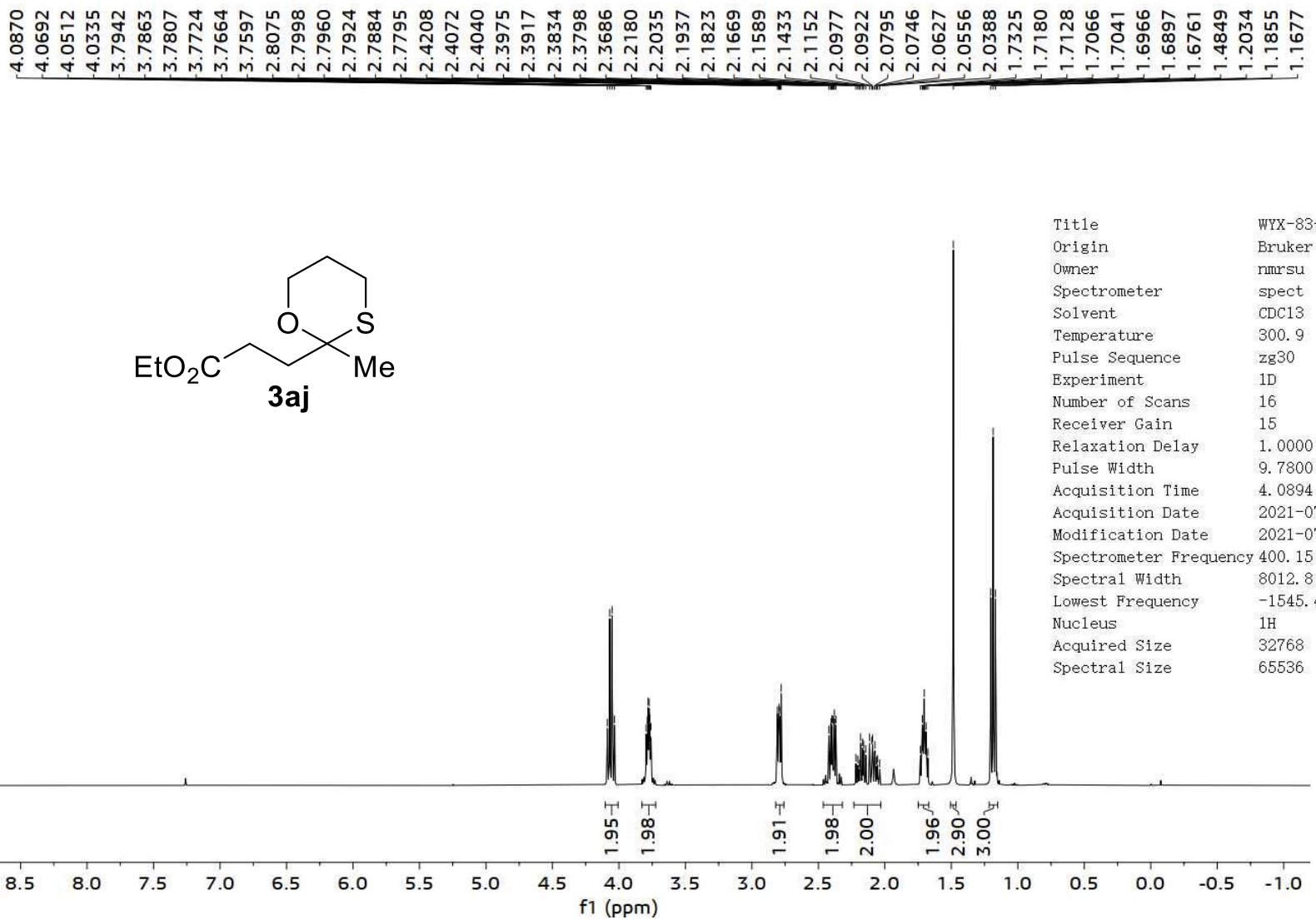

8.6769
8.6535
8.3848
8.3646
8.3298
8.3270
8.3166
8.3089
8.2972
8.2943
8.2766
8.2532
8.2017
8.1794
8.1682
8.1459
8.1029
8.0839
8.0648
6.4321
4.8312
4.8176
4.8042
3.5713
3.5569
3.5539
3.5390
3.5242
3.5130
3.4970
2.8395
2.8225
2.8059
2.7900
2.7724
2.6922
2.6752
2.6587
2.6422
2.6254

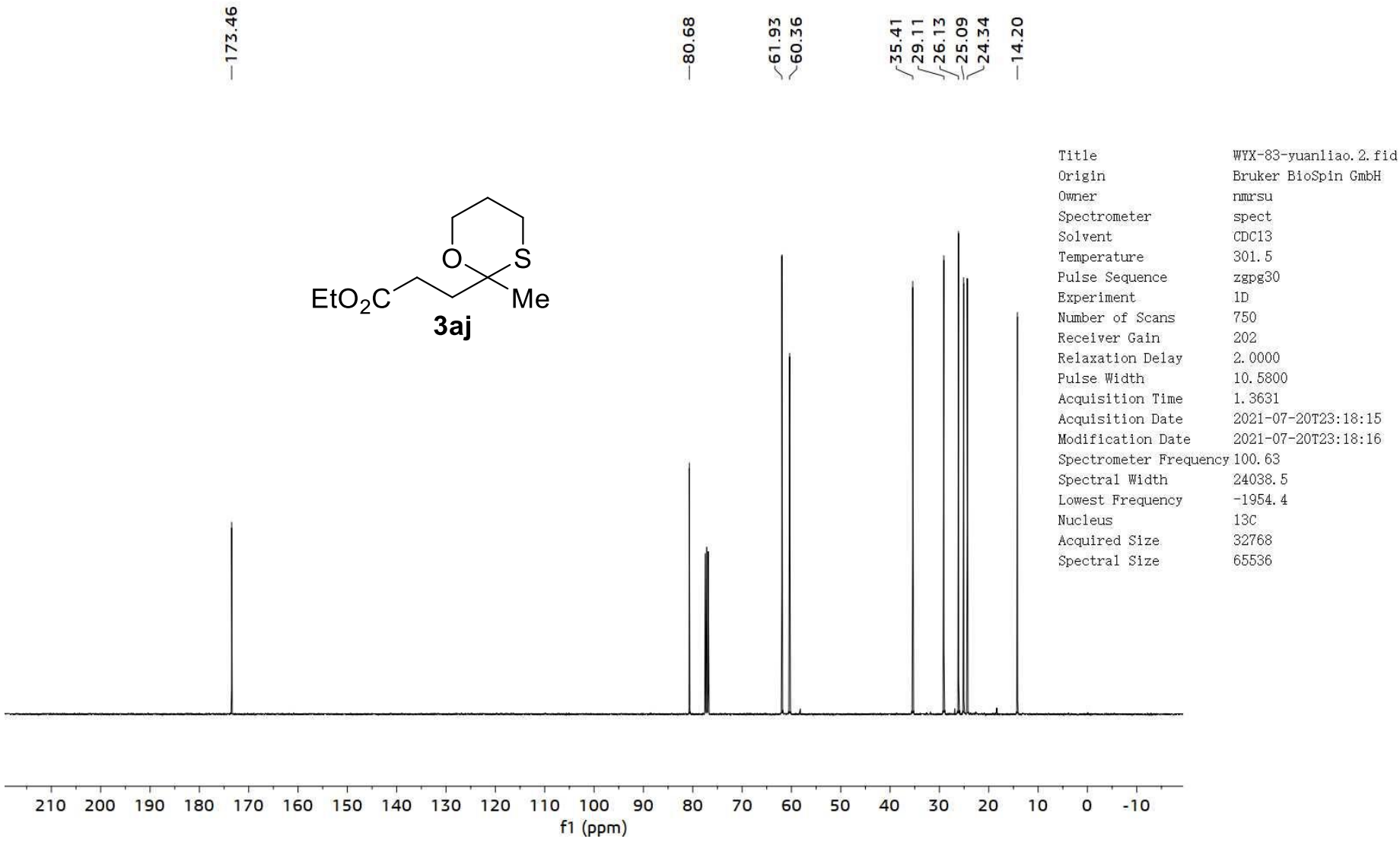

S
CH2OH
S
CH2OH
3ah
Title Pyr2-2.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent DMSO
Temperature 303.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 12
Receiver Gain 64
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-06-24T23:24:38
Modification Date 2021-06-24T23:24:40
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1539.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.79
5.01
2.03
1.01
0.87
1.96
4.03
2.31
2.00
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
-1.0
f1 (ppm)

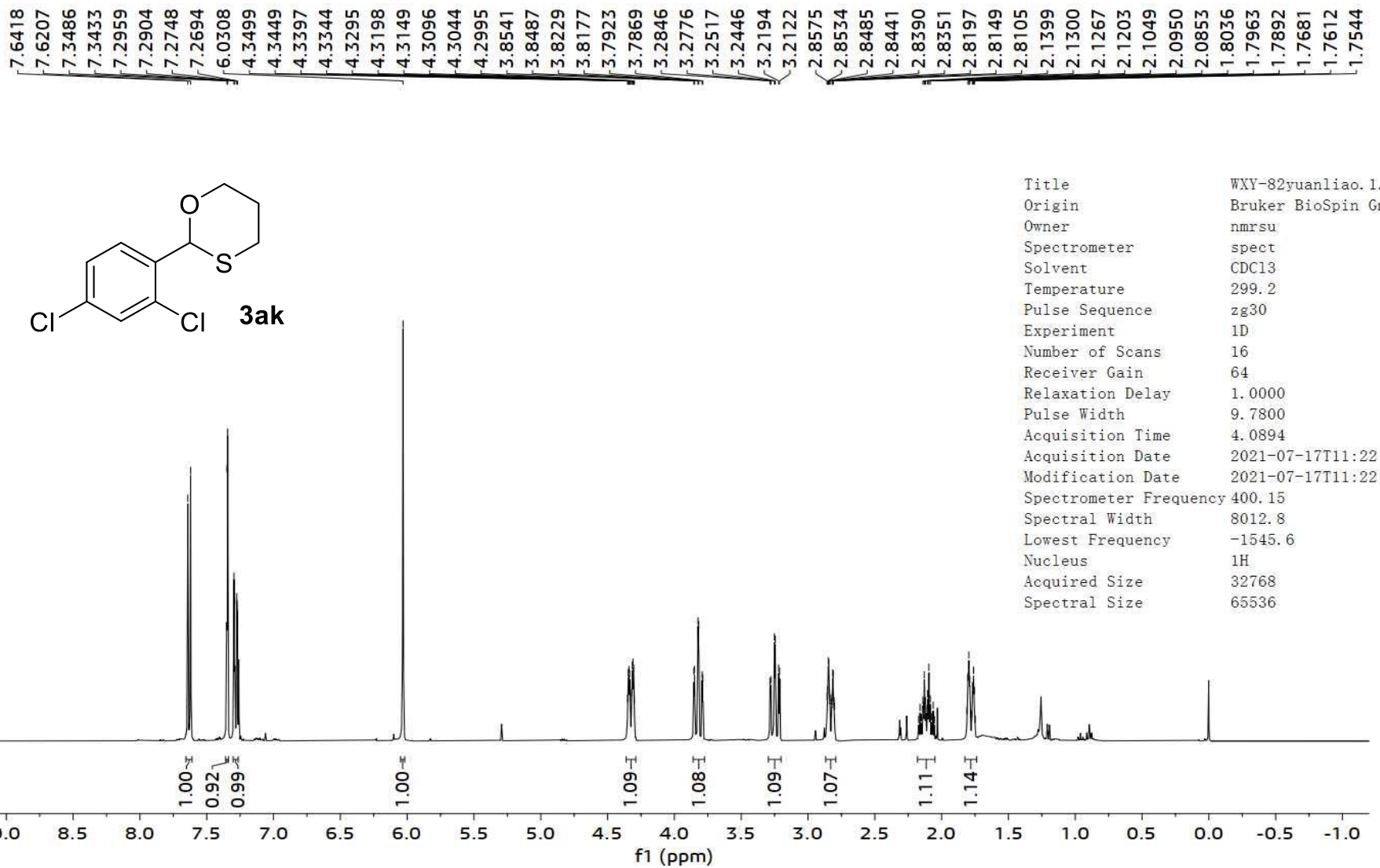

134.37
130.79
130.30
130.17
127.54
127.46
127.28
126.36
126.03
125.46
125.26
124.91
124.05
123.91
60.83
34.97
S
CH2OH
S
CH2OH
3ah
Title Pyr2-2.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent DMSO
Temperature 303.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-06-25T00:24:17
Modification Date 2021-06-25T00:24:18
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -2011.0
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
134.368
130.793
130.297
130.169
127.543
127.456
127.278
126.358
126.031
125.464
125.260
124.907
124.054
123.907
134 132 130 128 126 124
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)

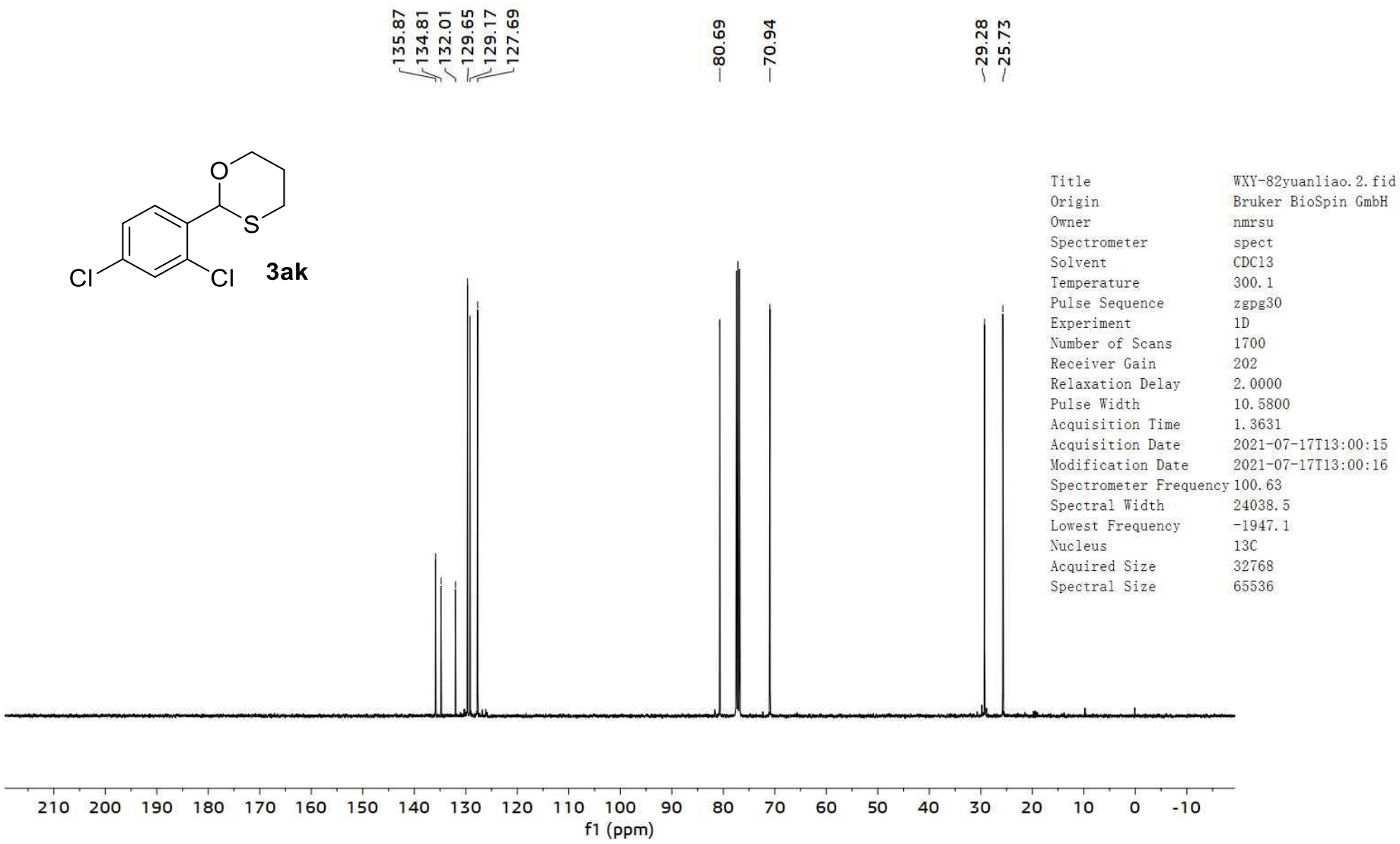

3.8361
3.8226
3.8090
2.8577
2.8432
2.8287
2.1645
2.1532
2.1365
2.1268
2.1174
2.0988
2.0901
2.0088
1.7950
1.7809
1.7671
1.7556
1.7387
1.7299
1.7198
1.7028
1.6919
1.3449
S
O
3ai
Title WYX-81-yuanliao.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 300.9
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-20T23:23:12
Modification Date 2021-07-20T23:23:14
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.90
1.84
1.94
4.00
18.12
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 -1.0
f1 (ppm)

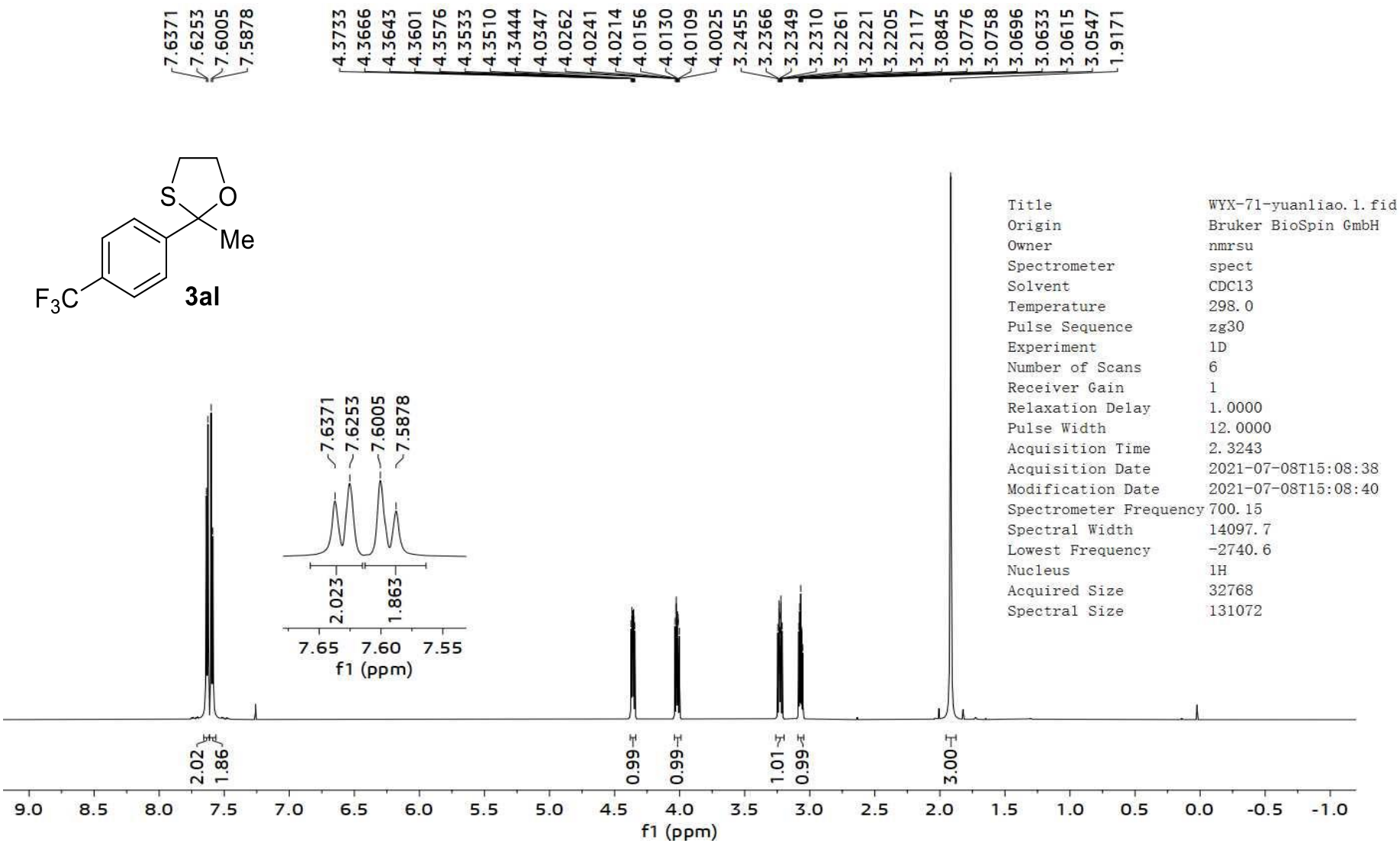

85.47
61.94
33.28
26.28
26.22
25.65
24.14
22.51
22.08
19.26
S
O
3ai
Title WYX-81-yuanliao.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 301.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-21T00:07:07
Modification Date 2021-07-21T00:07:08
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1944.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

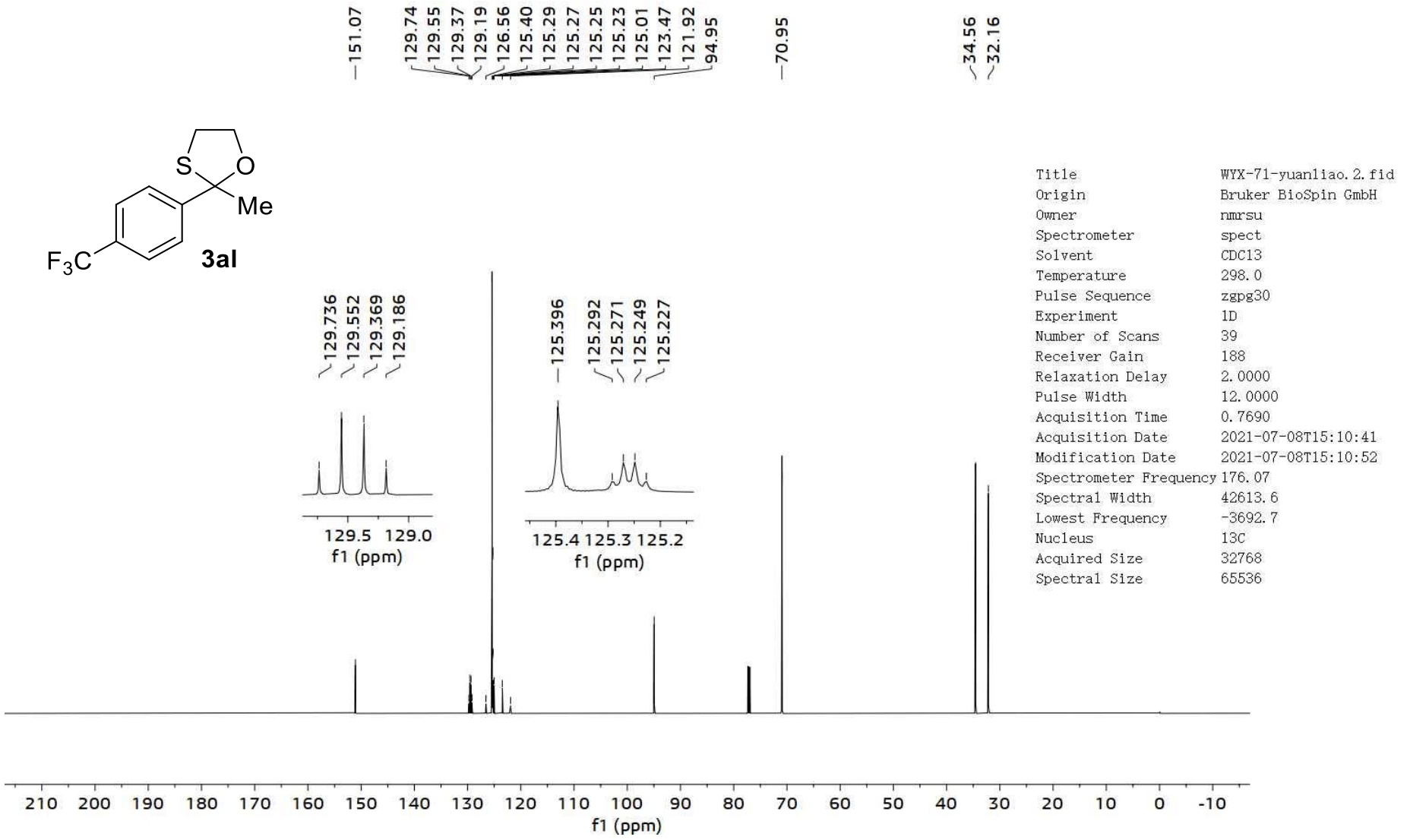

4.0870 4.0692 4.0512 4.0335 3.7942 3.7863 3.7807 3.7724 3.7664 3.7597 2.8075 2.7998 2.7960 2.7924 2.7884 2.7795 2.4208 2.4072 2.4040 2.3975 2.3917 2.3834 2.3798 2.3686 2.2180 2.2035 2.1937 2.1823 2.1669 2.1589 2.1433 2.1152 2.0977 2.0922 2.0795 2.0746 2.0627 2.0556 2.0388 1.7325 1.7180 1.7128 1.7066 1.7041 1.6966 1.6897 1.6761 1.4849 1.2034 1.1855 1.1677
O
S
EtO2C
Me
3aj
Title WYX-83-yuanliao.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 300.9
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 15
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-20T22:34:21
Modification Date 2021-07-20T22:34:22
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.95
1.98
1.91
1.98
2.00
1.96
2.90
3.00
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 -1.0
f1 (ppm)

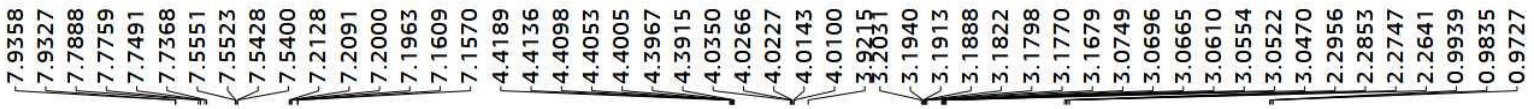

173.46
80.68
61.93
60.36
35.41
29.11
26.13
25.09
24.34
14.20
O
S
EtO2C
Me
3aj
Title WYX-83-yuanliao.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 301.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-20T23:18:15
Modification Date 2021-07-20T23:18:16
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1954.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

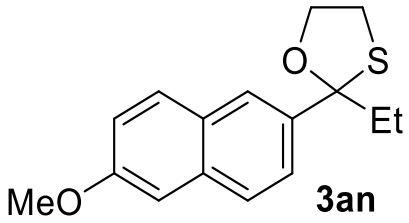

7.6418
7.6207
7.3486
7.3433
7.2959
7.2904
7.2748
7.2694
6.0308
4.3499
4.3449
4.3397
4.3344
4.3295
4.3198
4.3149
4.3096
4.3044
4.2995
3.8541
3.8487
3.8229
3.8177
3.7923
3.7869
3.2846
3.2776
3.2517
3.2446
3.2194
3.2122
2.8575
2.8534
2.8485
2.8441
2.8390
2.8351
2.8197
2.8149
2.8105
2.1399
2.1300
2.1267
2.1203
2.1049
2.0950
2.0853
1.8036
1.7963
1.7892
1.7681
1.7612
1.7544
O
S
Cl
Cl
3ak
Title WXY-82yuanliao.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 299.2
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 64
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-17T11:22:05
Modification Date 2021-07-17T11:22:06
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
0.92
0.99
1.00
1.09
1.08
1.09
1.07
1.11
1.14
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 -1.0
f1 (ppm)


135.87
134.81
132.01
129.65
129.17
127.69
80.69
70.94
29.28
25.73
O
S
Cl
Cl
3ak
Title WXY-82yuanliao.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 300.1
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-17T13:00:15
Modification Date 2021-07-17T13:00:16
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1947.1
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)


7.6371
7.6253
7.6005
7.5878
4.3733
4.3666
4.3643
4.3601
4.3576
4.3533
4.3510
4.3444
4.0347
4.0262
4.0241
4.0214
4.0156
4.0130
4.0109
4.0025
3.2455
3.2366
3.2349
3.2310
3.2261
3.2221
3.2205
3.2117
3.0845
3.0776
3.0758
3.0696
3.0633
3.0615
3.0547
1.9171
S
O
Me
F3C
3al
Title WYX-71-yuanliao.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 1
Relaxation Delay 1.0000
Pulse Width 12.0000
Acquisition Time 2.3243
Acquisition Date 2021-07-08T15:08:38
Modification Date 2021-07-08T15:08:40
Spectrometer Frequency 700.15
Spectral Width 14097.7
Lowest Frequency -2740.6
Nucleus 1H
Acquired Size 32768
Spectral Size 131072
2.023
1.863
7.65 7.60 7.55
f1 (ppm)
2.02
1.86
0.99
0.99
1.01
0.99
3.00
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 -1.0
f1 (ppm)

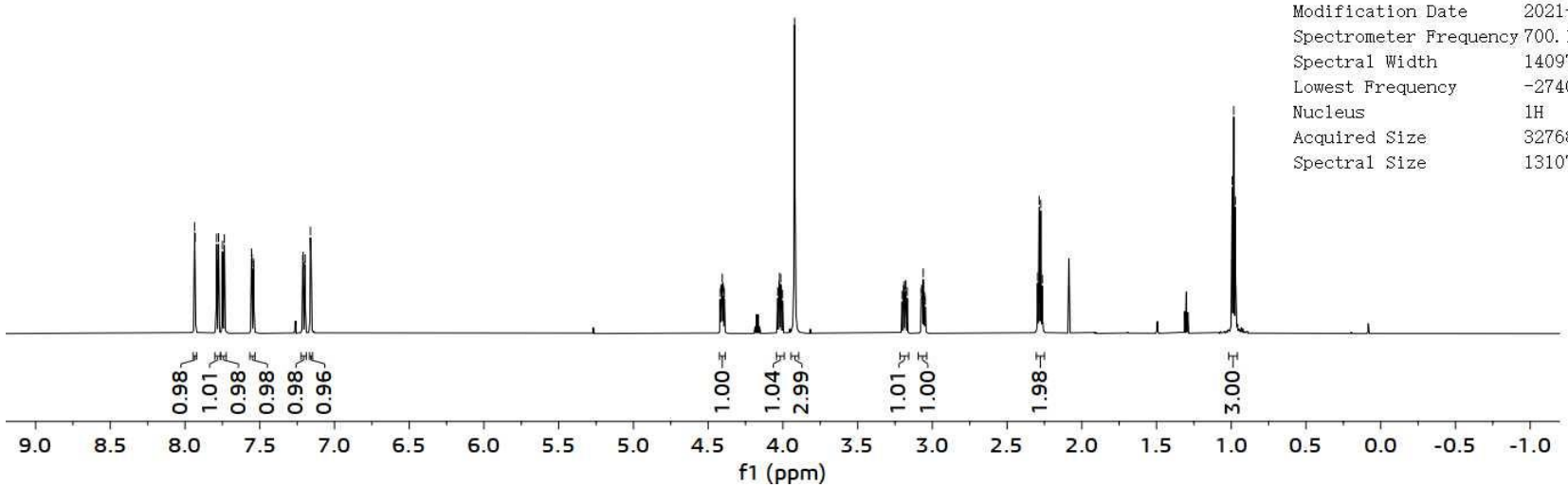

151.07
129.74
129.55
129.37
129.19
126.56
125.40
125.29
125.27
125.25
125.23
125.01
123.47
121.92
94.95
70.95
34.56
32.16
S
O
Me
F3C
3aI
129.736
129.552
129.369
129.186
129.5 129.0
f1 (ppm)
125.396
125.292
125.271
125.249
125.227
125.4 125.3 125.2
f1 (ppm)
Title WYX-71-yuanliao.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 39
Receiver Gain 188
Relaxation Delay 2.0000
Pulse Width 12.0000
Acquisition Time 0.7690
Acquisition Date 2021-07-08T15:10:41
Modification Date 2021-07-08T15:10:52
Spectrometer Frequency 176.07
Spectral Width 42613.6
Lowest Frequency -3692.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

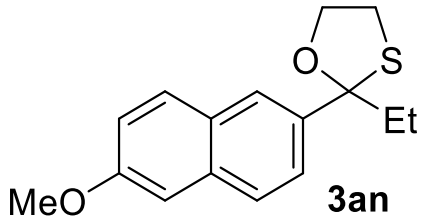




3an

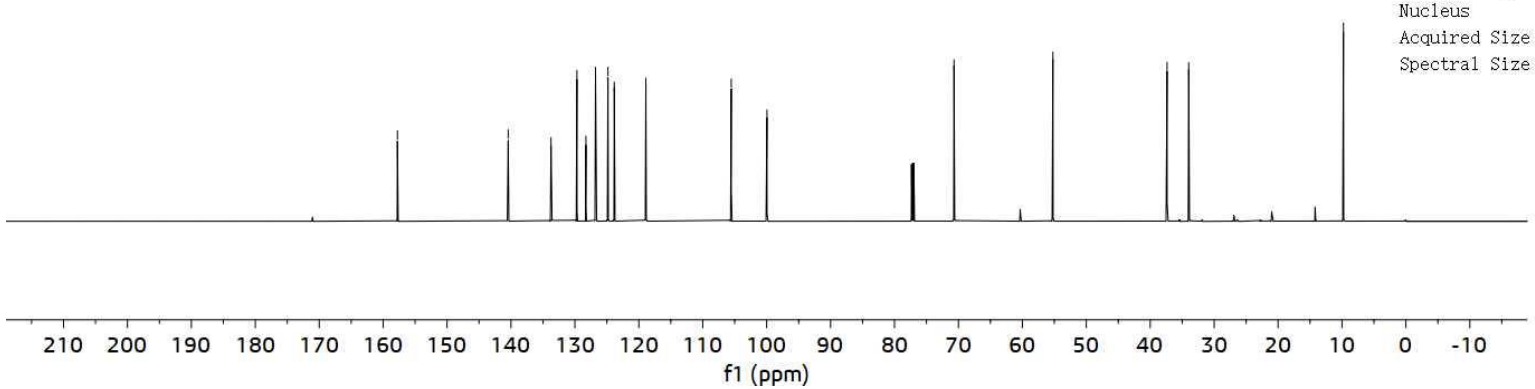
Title	WYX-72-yuanliao.1.fid
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zg30
Experiment	1D
Number of Scans	6
Receiver Gain	1
Relaxation Delay	1.0000
Pulse Width	12.0000
Acquisition Time	2.3243
Acquisition Date	2021-07-08T15:14:46
Modification Date	2021-07-08T15:14:50
Spectrometer Frequency	700.15
Spectral Width	14097.7
Lowest Frequency	-2740.1
Nucleus	1H
Acquired Size	32768
Spectral Size	131072

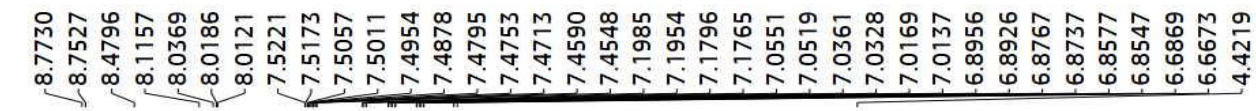


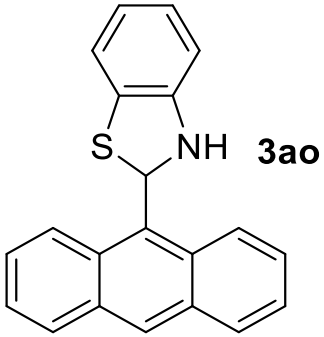


3an

Title	WYX-72-yuanliao.2.fid
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zgpg30
Experiment	1D
Number of Scans	65
Receiver Gain	188
Relaxation Delay	2.0000
Pulse Width	12.0000
Acquisition Time	0.7690
Acquisition Date	2021-07-08T15:18:06
Modification Date	2021-07-08T15:18:14
Spectrometer Frequency	176.07
Spectral Width	42613.6
Lowest Frequency	-3718.7
Nucleus	13C
Acquired Size	32768
Spectral Size	65536

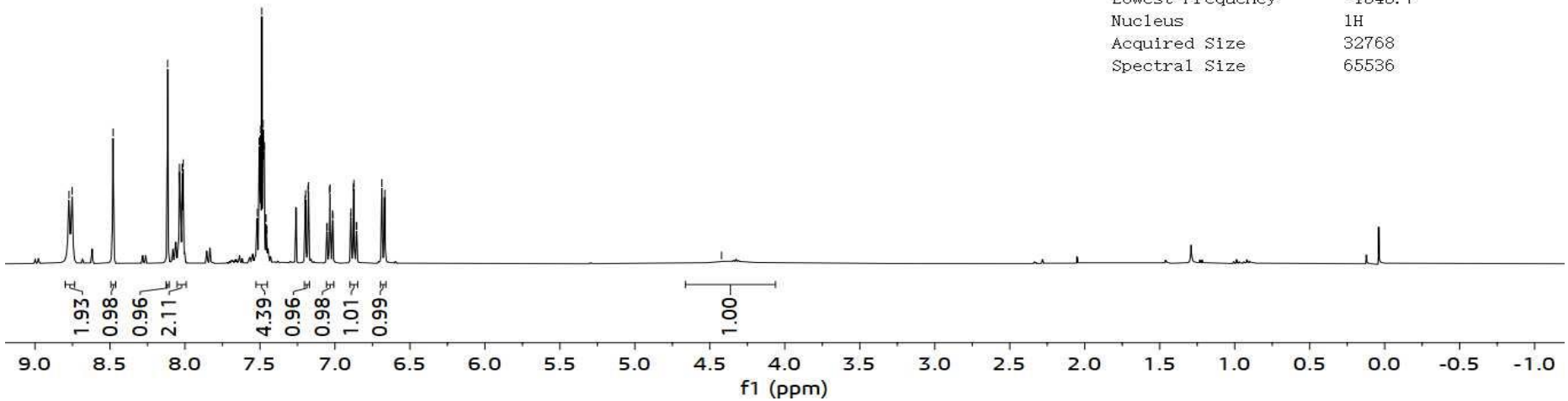


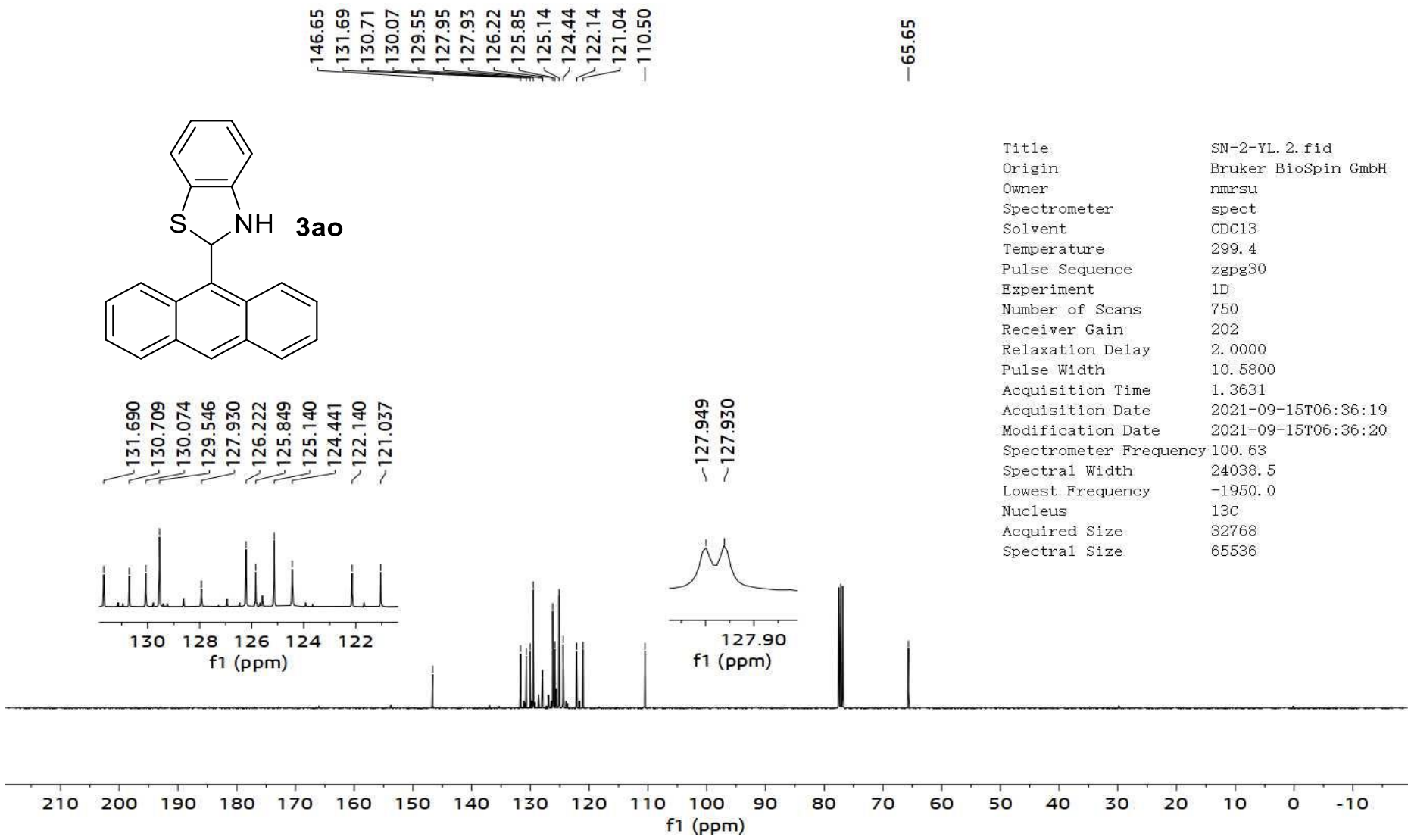


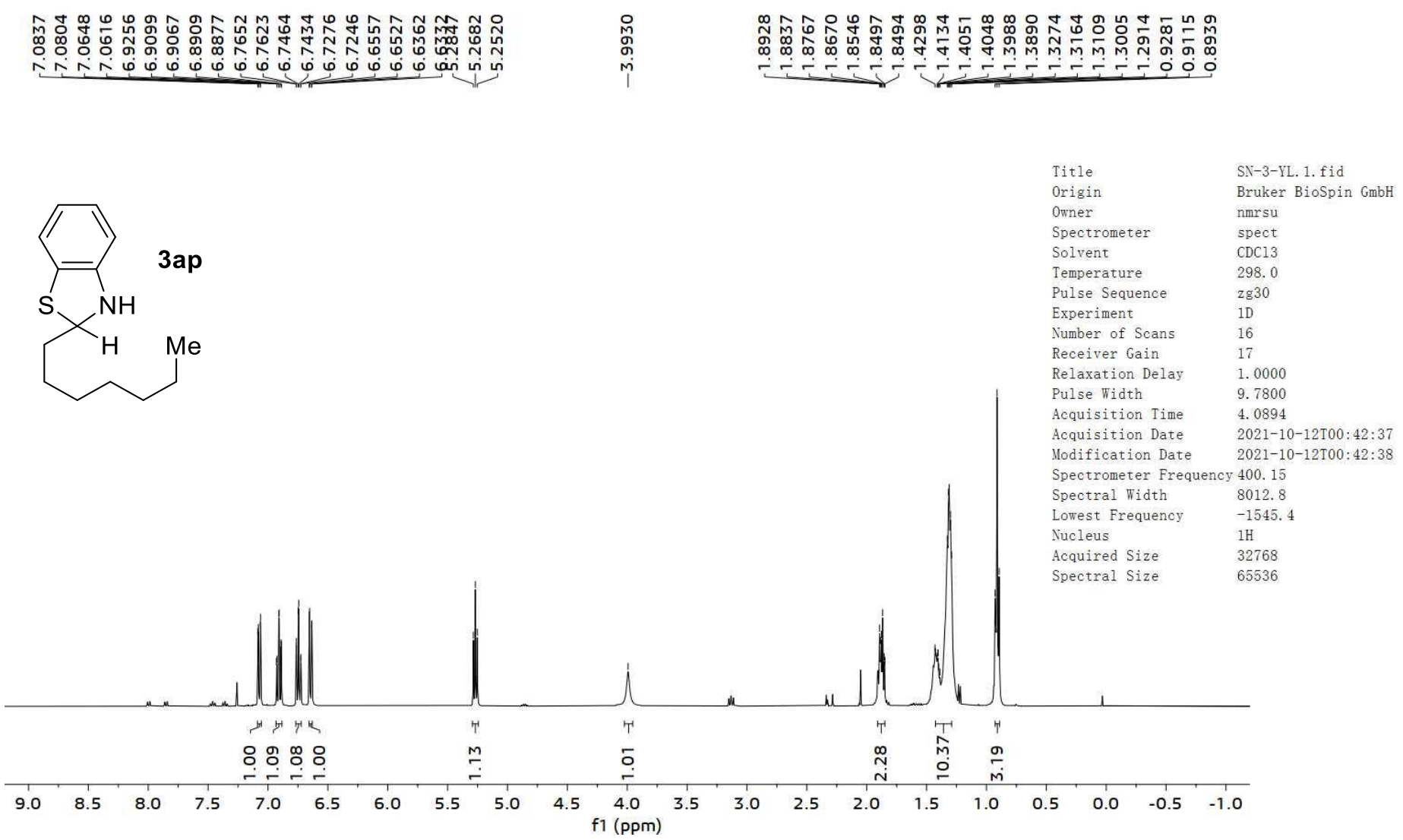


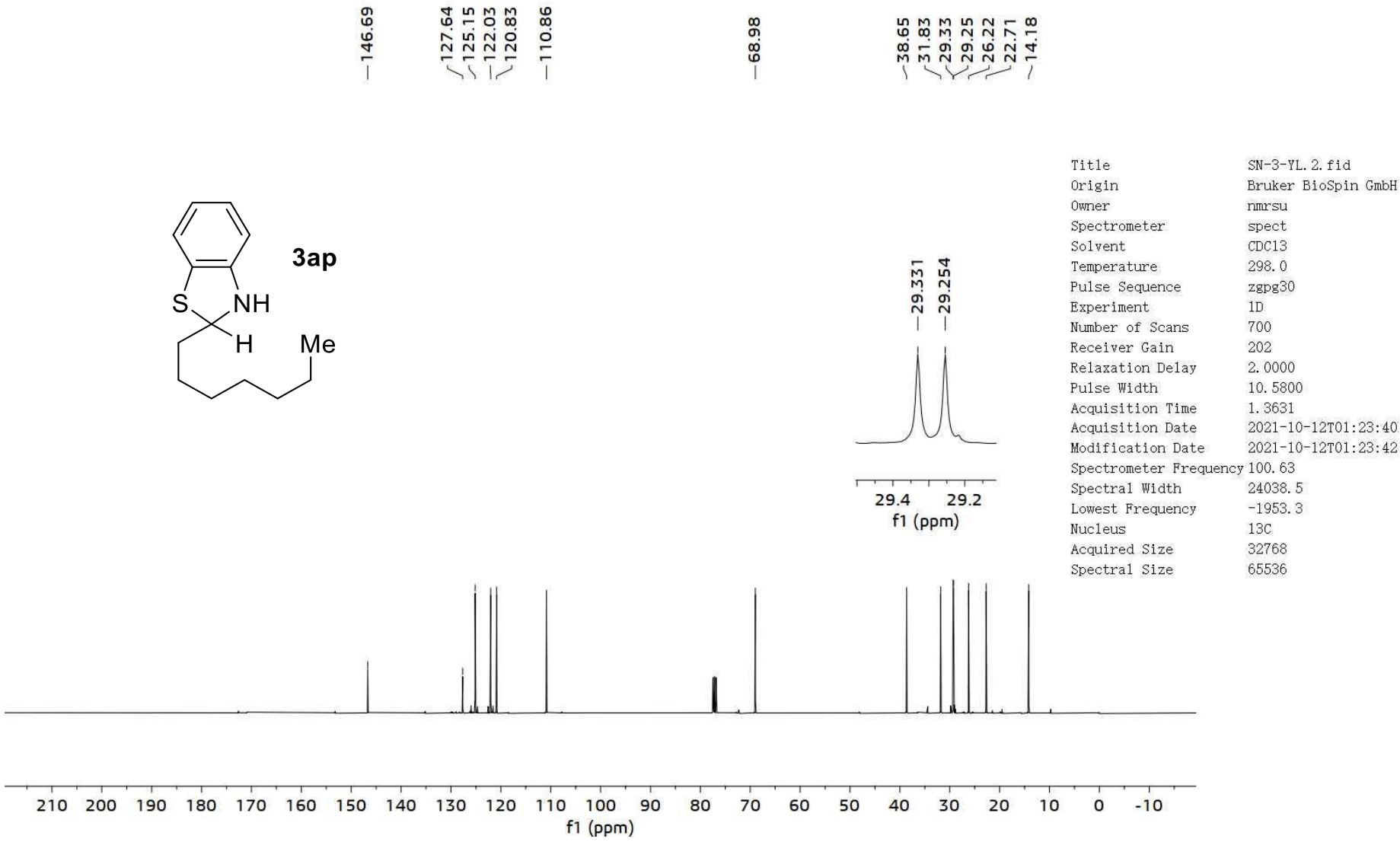
3ao

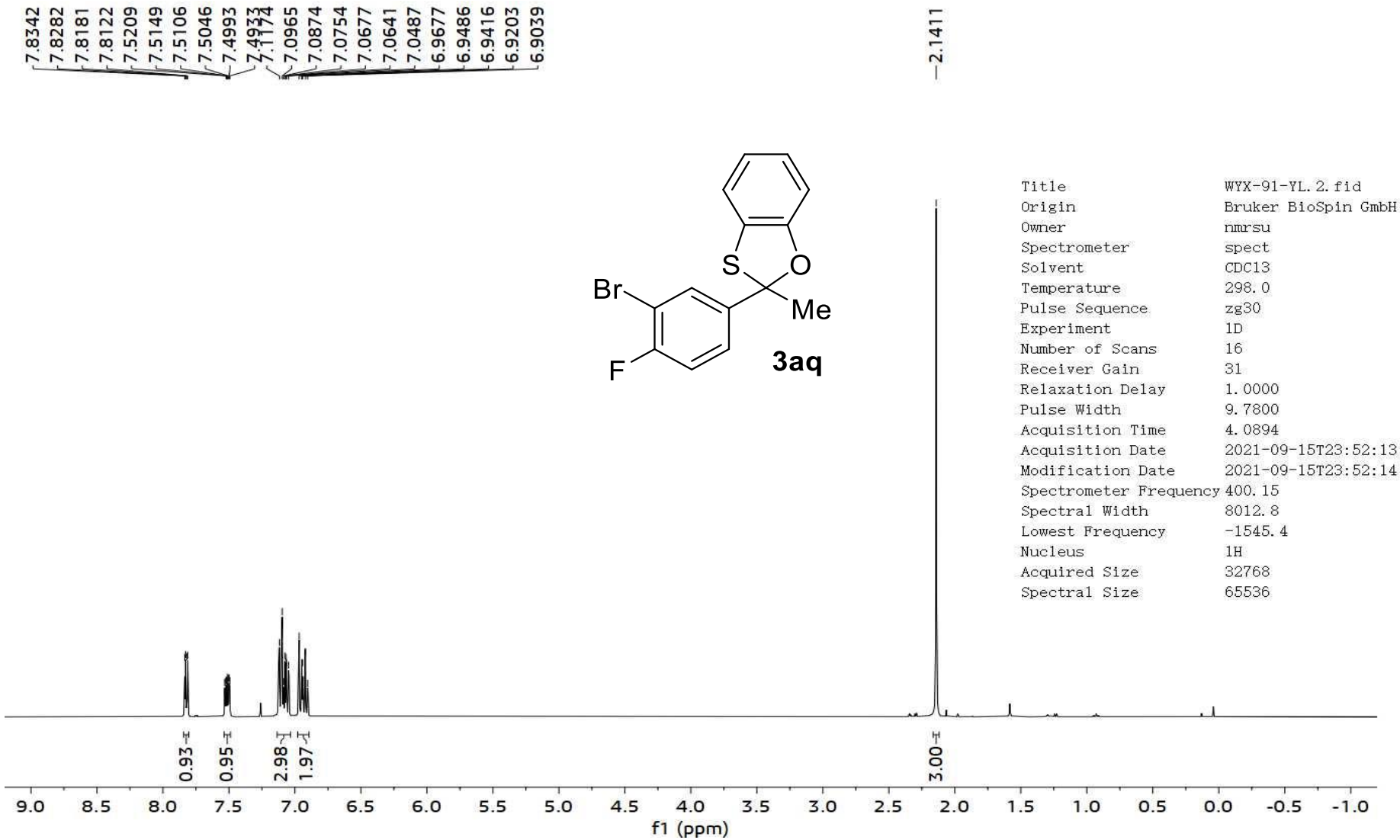
Title	SN-2-YL.1.fid
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDC13
Temperature	298.9
Pulse Sequence	zg30
Experiment	1D
Number of Scans	16
Receiver Gain	64
Relaxation Delay	1.0000
Pulse Width	9.7800
Acquisition Time	4.0894
Acquisition Date	2021-09-15T05:52:19
Modification Date	2021-09-15T05:52:20
Spectrometer Frequency	400.15
Spectral Width	8012.8
Lowest Frequency	-1545.7
Nucleus	1H
Acquired Size	32768
Spectral Size	65536

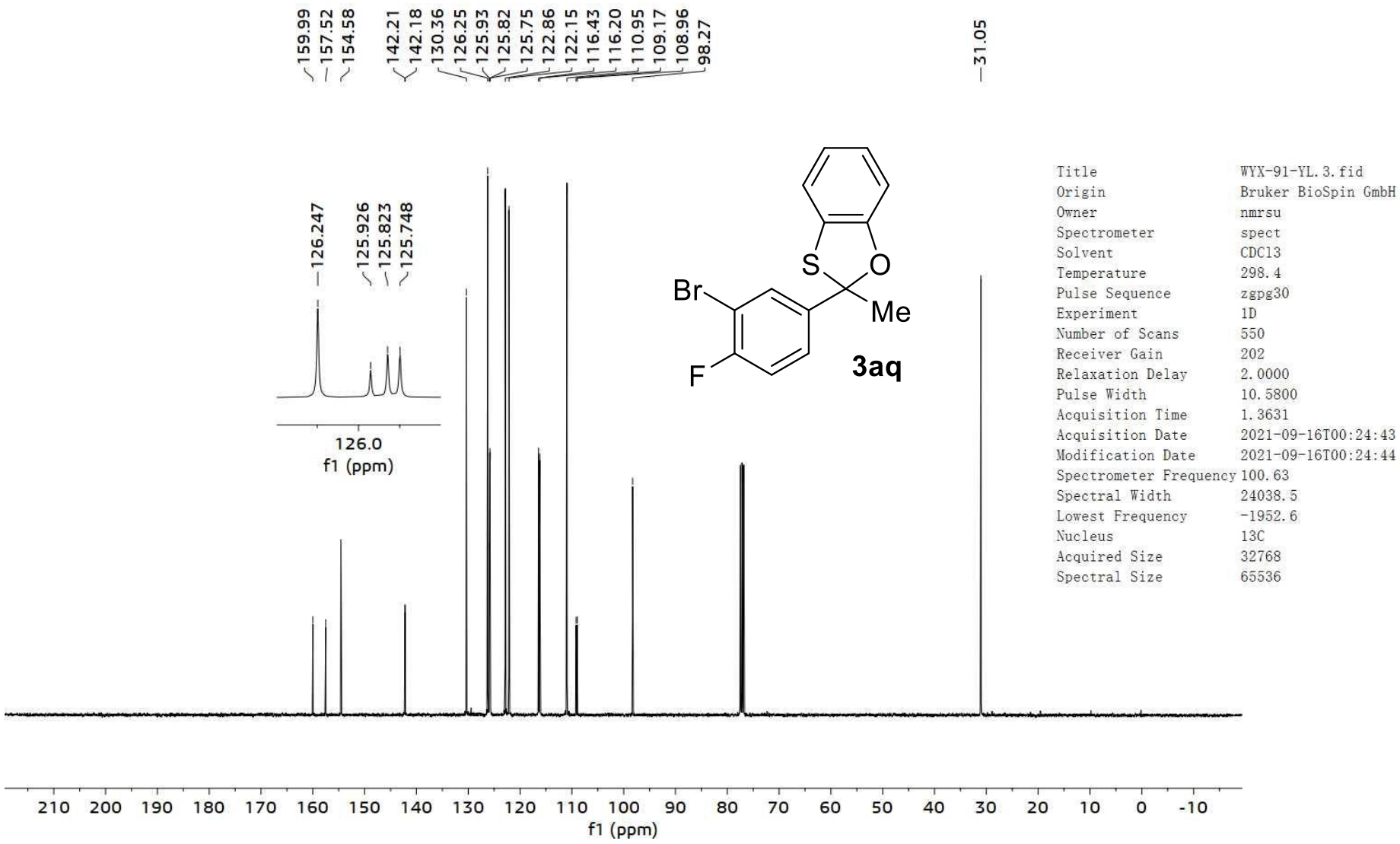


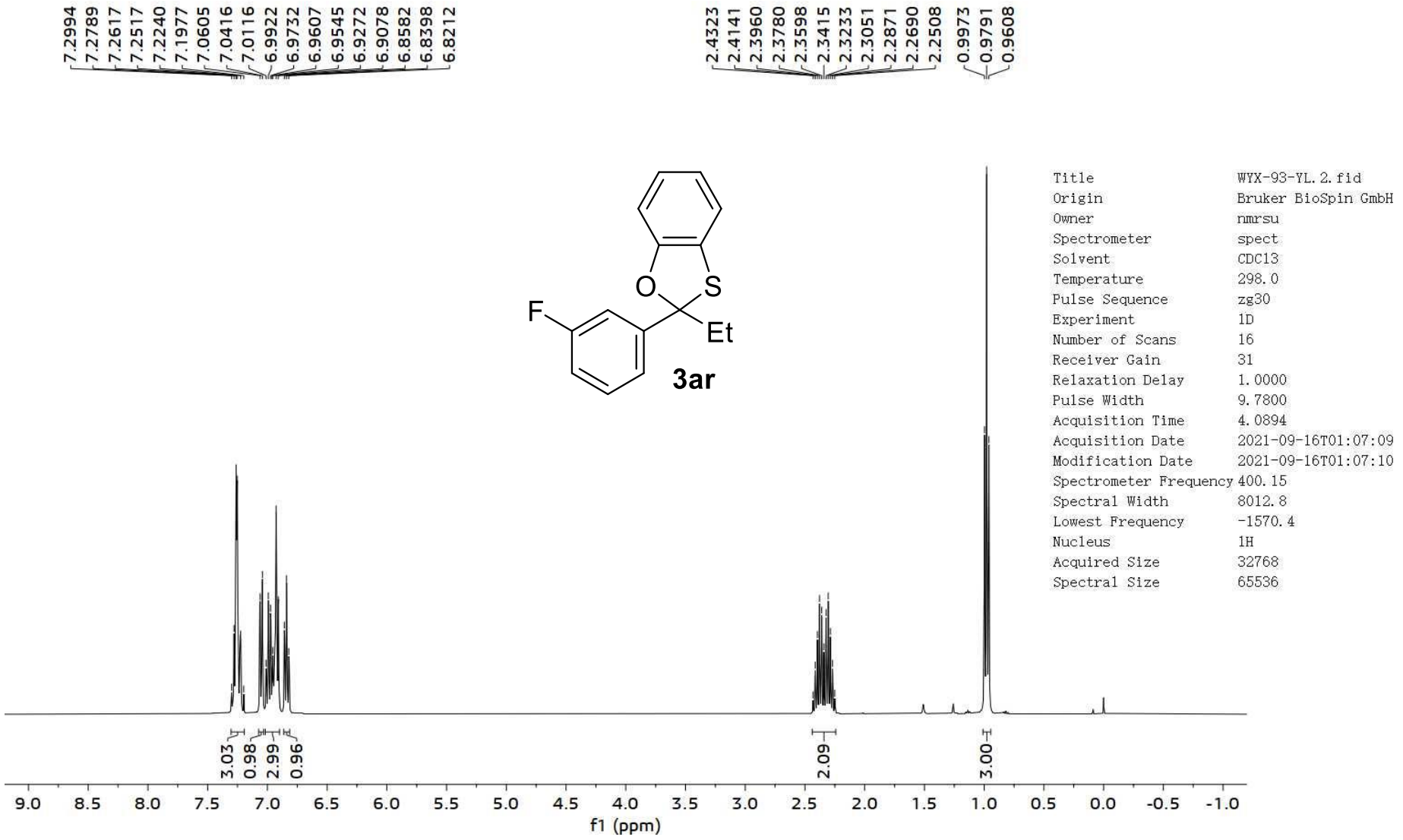

146.65
131.69
130.71
130.07
129.55
127.95
127.93
126.22
125.85
125.14
124.44
122.14
121.04
110.50
65.65
S
NH
3ao
131.690
130.709
130.074
129.546
127.930
126.222
125.849
125.140
124.441
122.140
121.037
130 128 126 124 122
f1 (ppm)
127.949
127.930
127.90
f1 (ppm)
Title SN-2-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 299.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-15T06:36:19
Modification Date 2021-09-15T06:36:20
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1950.0
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

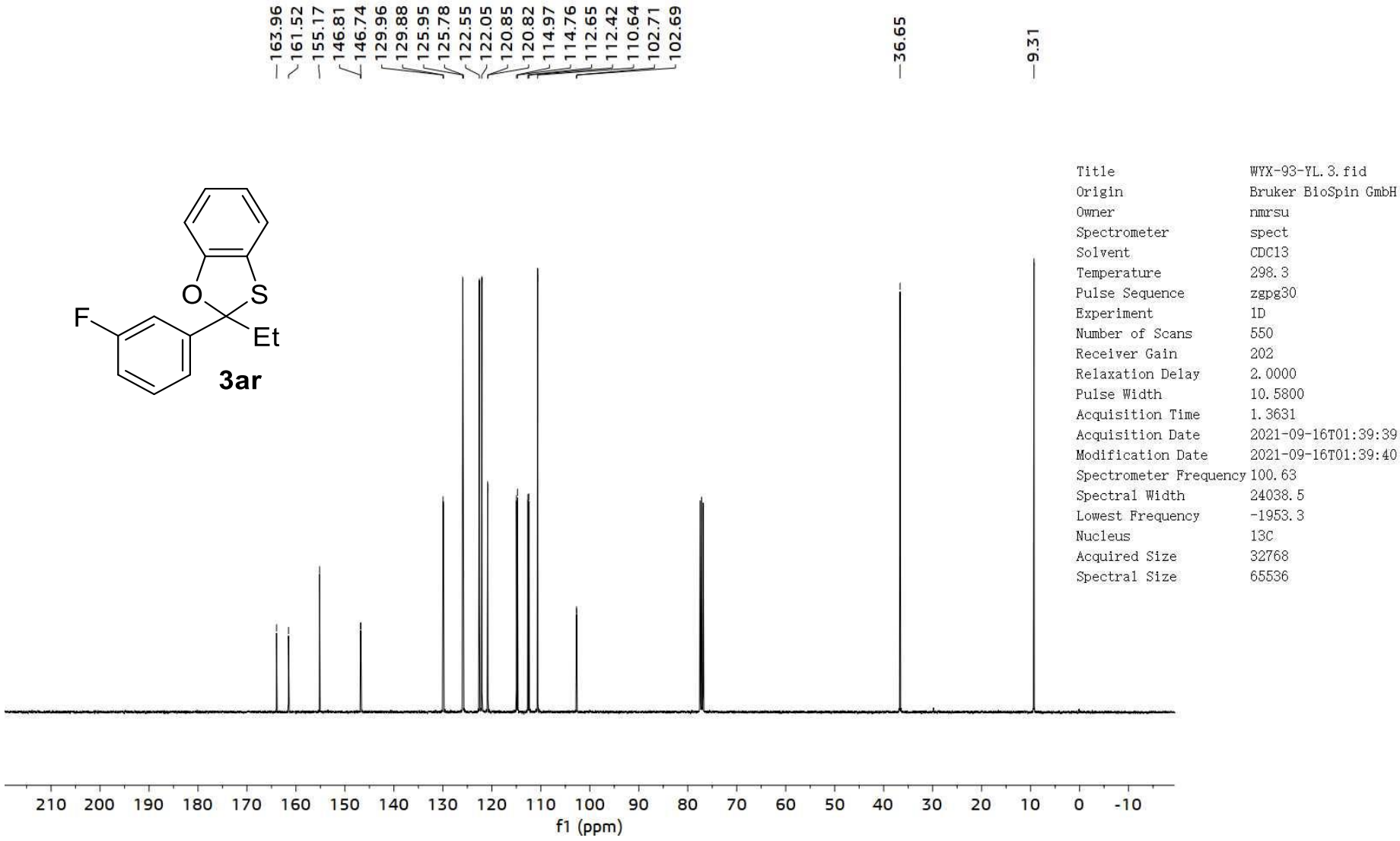

7.0837
7.0804
7.0648
7.0616
6.9256
6.9099
6.9067
6.8909
6.8877
6.7652
6.7623
6.7464
6.7434
6.7276
6.7246
6.6557
6.6527
6.6362
5.2682
5.2520
3.9930
1.8928
1.8837
1.8767
1.8670
1.8546
1.8497
1.8494
1.4298
1.4134
1.4051
1.4048
1.3988
1.3890
1.3274
1.3164
1.3109
1.3005
1.2914
0.9281
0.9115
0.8939
3ap
S
NH
H
Me
Title SN-3-YL.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 17
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-12T00:42:37
Modification Date 2021-10-12T00:42:38
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.09
1.08
1.00
1.13
1.01
2.28
10.37
3.19
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 -1.0
f1 (ppm)

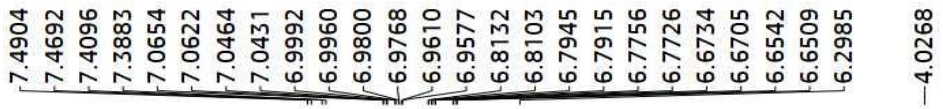

146.69
127.64
125.15
122.03
120.83
110.86
68.98
38.65
31.83
29.33
29.25
26.22
22.71
14.18
3ap
S
NH
H
Me
29.331
29.254
29.4
29.2
f1 (ppm)
Title SN-3-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-12T01:23:40
Modification Date 2021-10-12T01:23:42
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1953.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

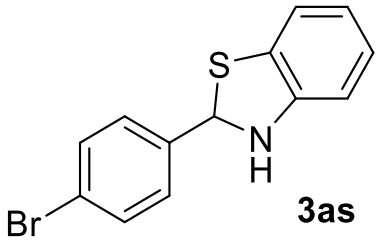

7.8342
7.8282
7.8181
7.8122
7.5209
7.5149
7.5106
7.5046
7.4993
7.4933
7.1174
7.0965
7.0874
7.0754
7.0677
7.0641
7.0487
6.9677
6.9486
6.9416
6.9203
6.9039
2.1411
Br
S
O
Me
F
3aq
Title WYX-91-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-15T23:52:13
Modification Date 2021-09-15T23:52:14
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.93
0.95
2.98
1.97
3.00
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 -1.0
f1 (ppm)


159.99
157.52
154.58
142.21
142.18
130.36
126.25
125.93
125.82
125.75
122.86
122.15
116.43
116.20
110.95
109.17
108.96
98.27
31.05
126.247
125.926
125.823
125.748
126.0
f1 (ppm)
Br
F
S
O
Me
3aq
Title WYX-91-YL.3.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 550
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-16T00:24:43
Modification Date 2021-09-16T00:24:44
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1952.6
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)


7.2994
7.2789
7.2617
7.2517
7.2240
7.1977
7.0605
7.0416
7.0116
6.9922
6.9732
6.9607
6.9545
6.9272
6.9078
6.8582
6.8398
6.8212
2.4323
2.4141
2.3960
2.3780
2.3598
2.3415
2.3233
2.3051
2.2871
2.2690
2.2508
0.9973
0.9791
0.9608
O
S
F
Et
3ar
Title WYX-93-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-16T01:07:09
Modification Date 2021-09-16T01:07:10
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1570.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
3.03
0.98
2.99
0.96
2.09
3.00
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 -1.0
f1 (ppm)

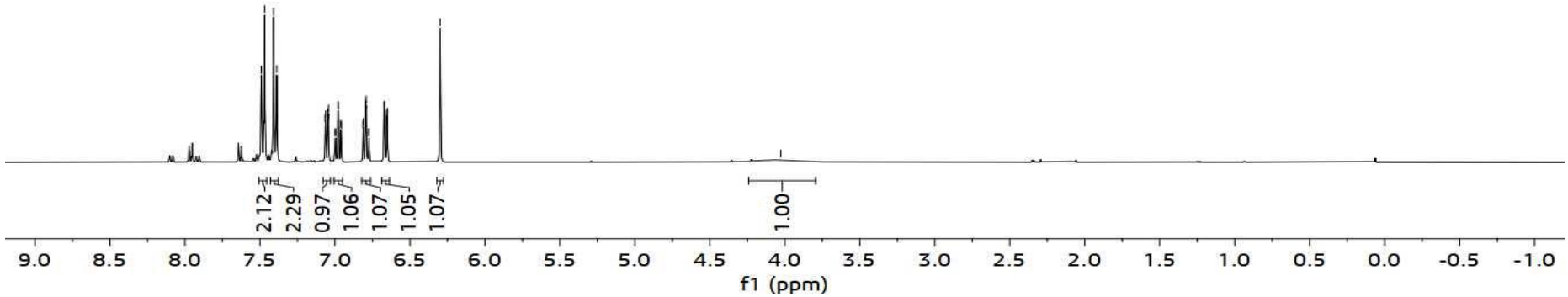

163.96
161.52
155.17
146.81
146.74
129.96
129.88
125.95
125.78
122.55
122.05
120.85
120.82
114.97
114.76
112.65
112.42
110.64
102.71
102.69
36.65
9.31
O
S
F
Et
3ar
Title WYX-93-YL.3.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.3
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 550
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-16T01:39:39
Modification Date 2021-09-16T01:39:40
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1953.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

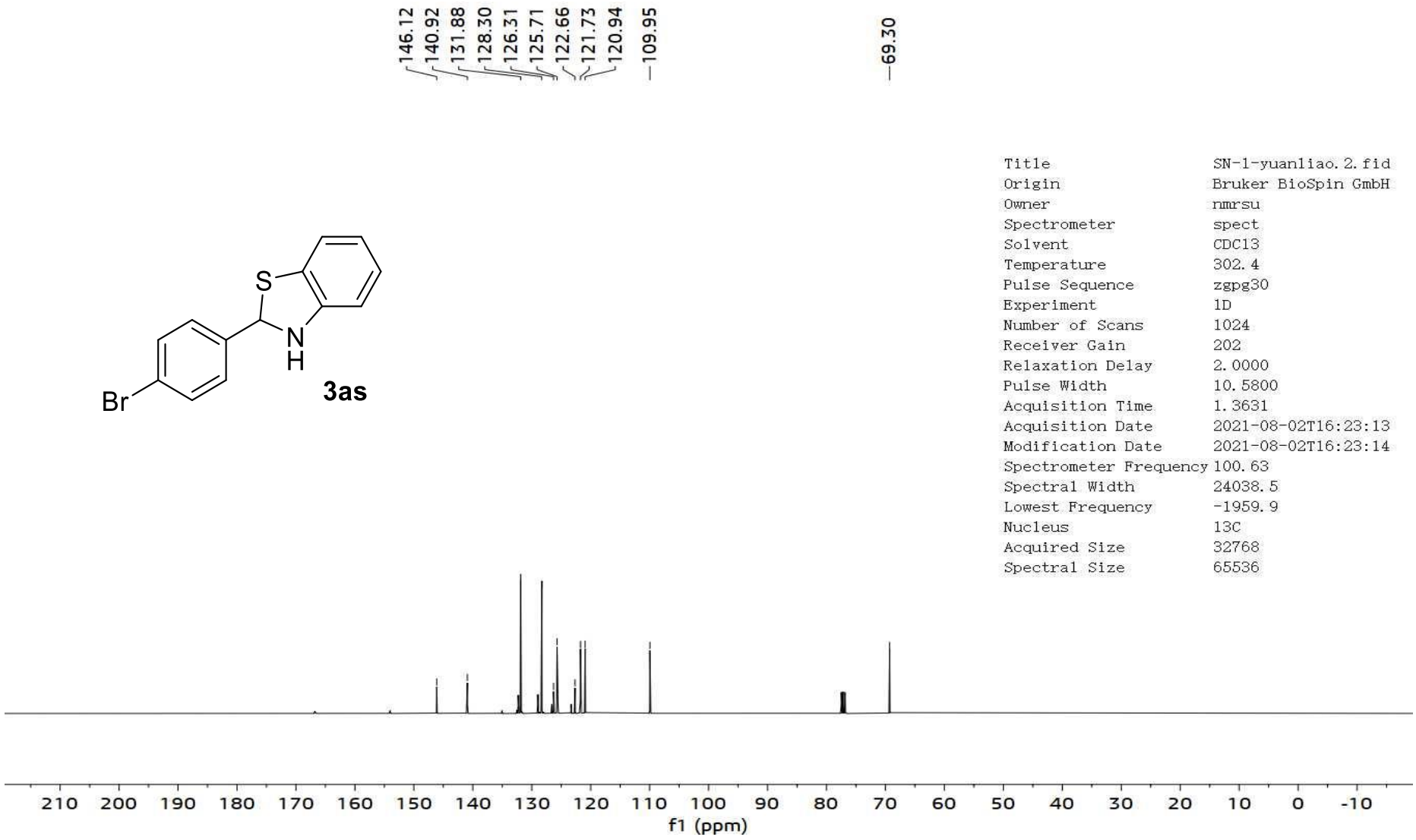


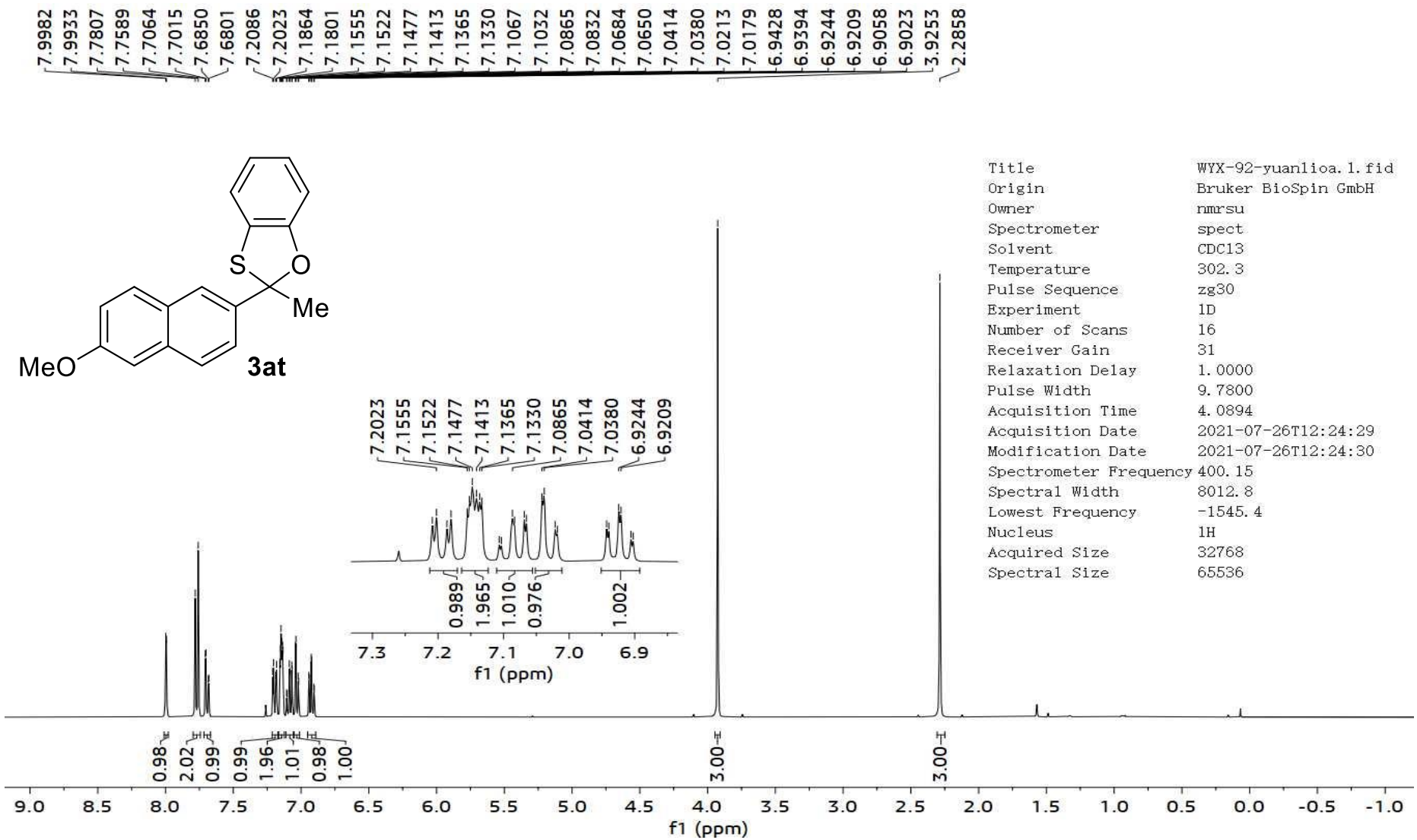


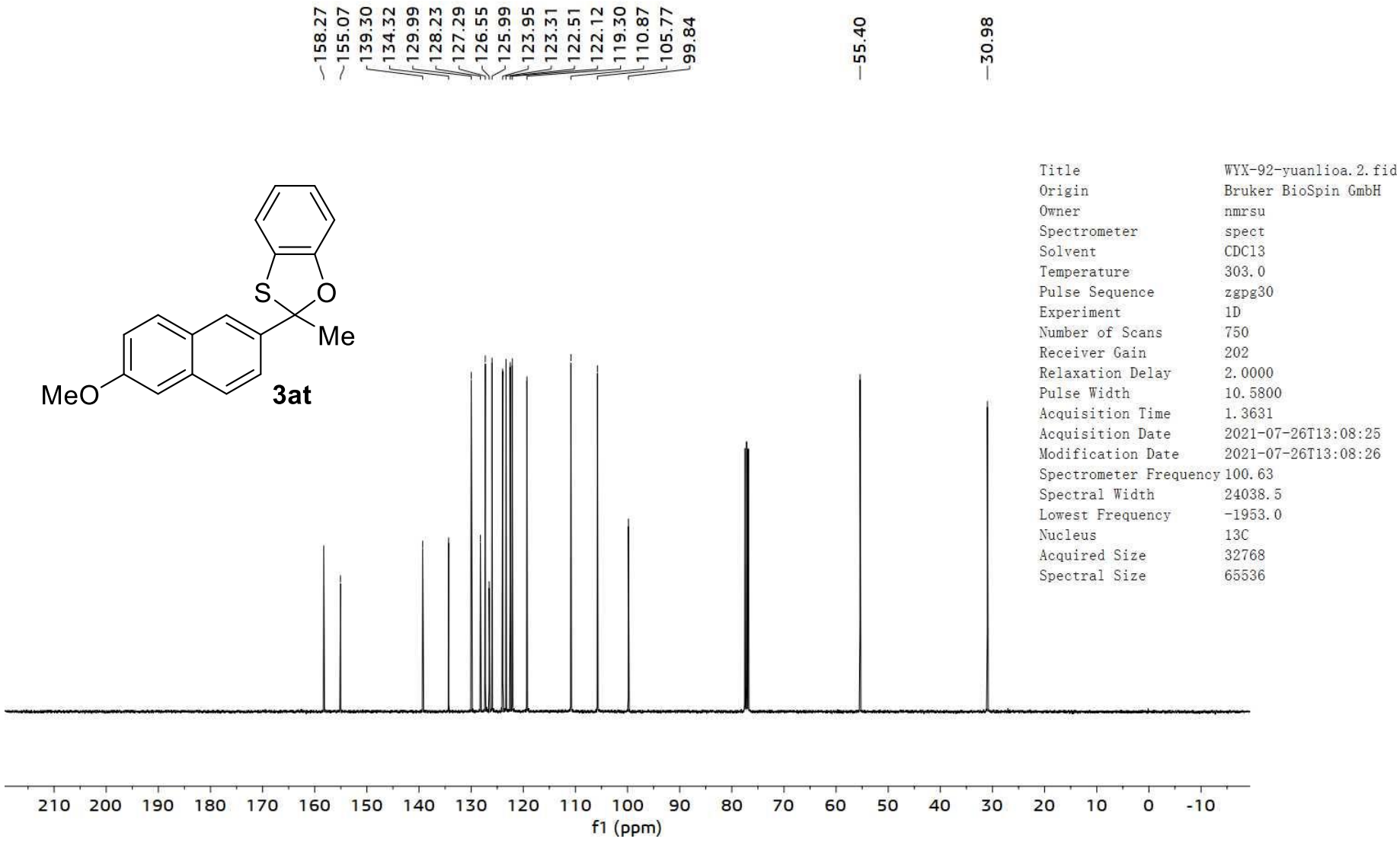
3as

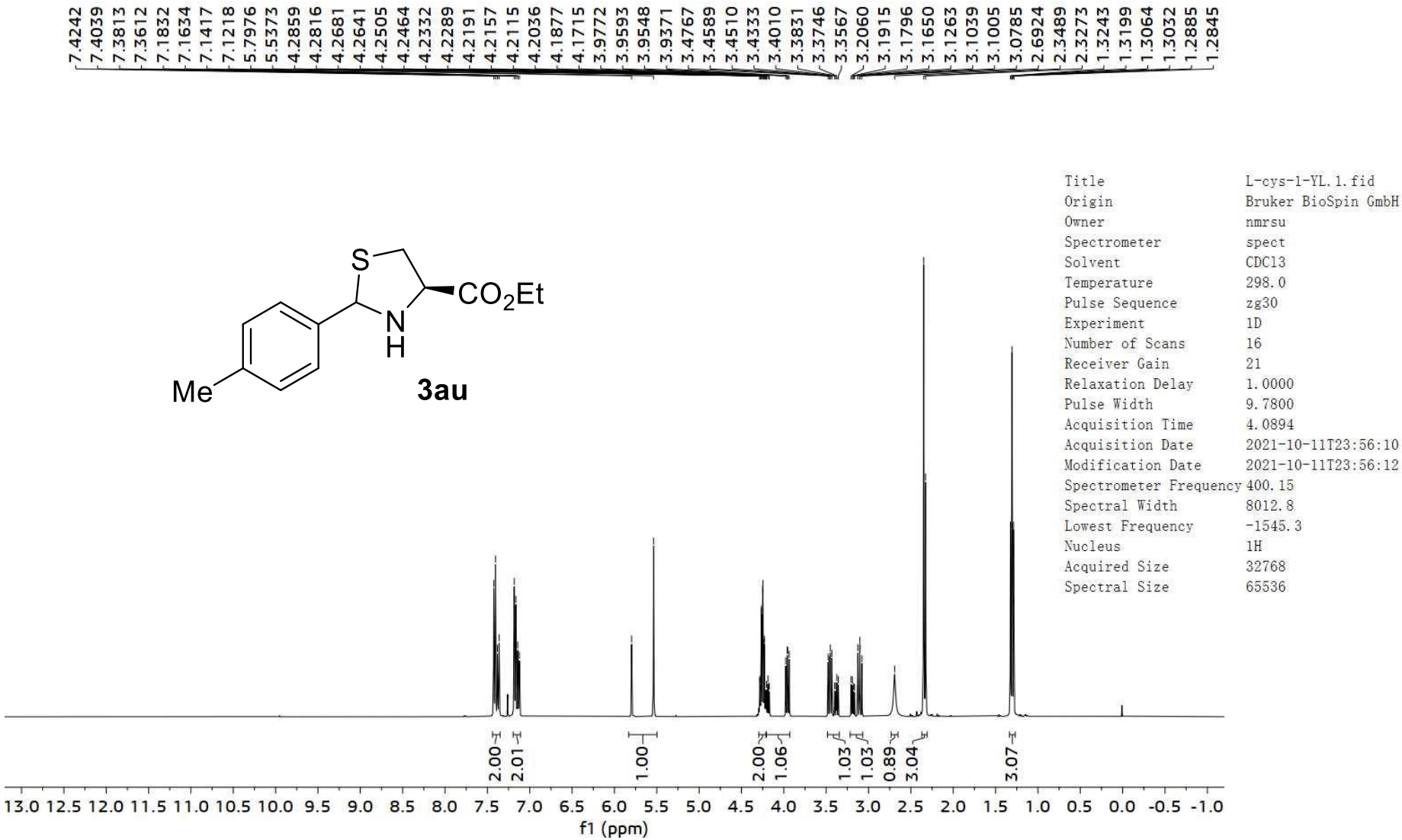
Title	SN-1-yuanliao.1.fid
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	301.7
Pulse Sequence	zg30
Experiment	1D
Number of Scans	16
Receiver Gain	31
Relaxation Delay	1.0000
Pulse Width	9.7800
Acquisition Time	4.0894
Acquisition Date	2021-08-02T15:23:39
Modification Date	2021-08-02T15:23:40
Spectrometer Frequency	400.15
Spectral Width	8012.8
Lowest Frequency	-1545.7
Nucleus	1H
Acquired Size	32768
Spectral Size	65536

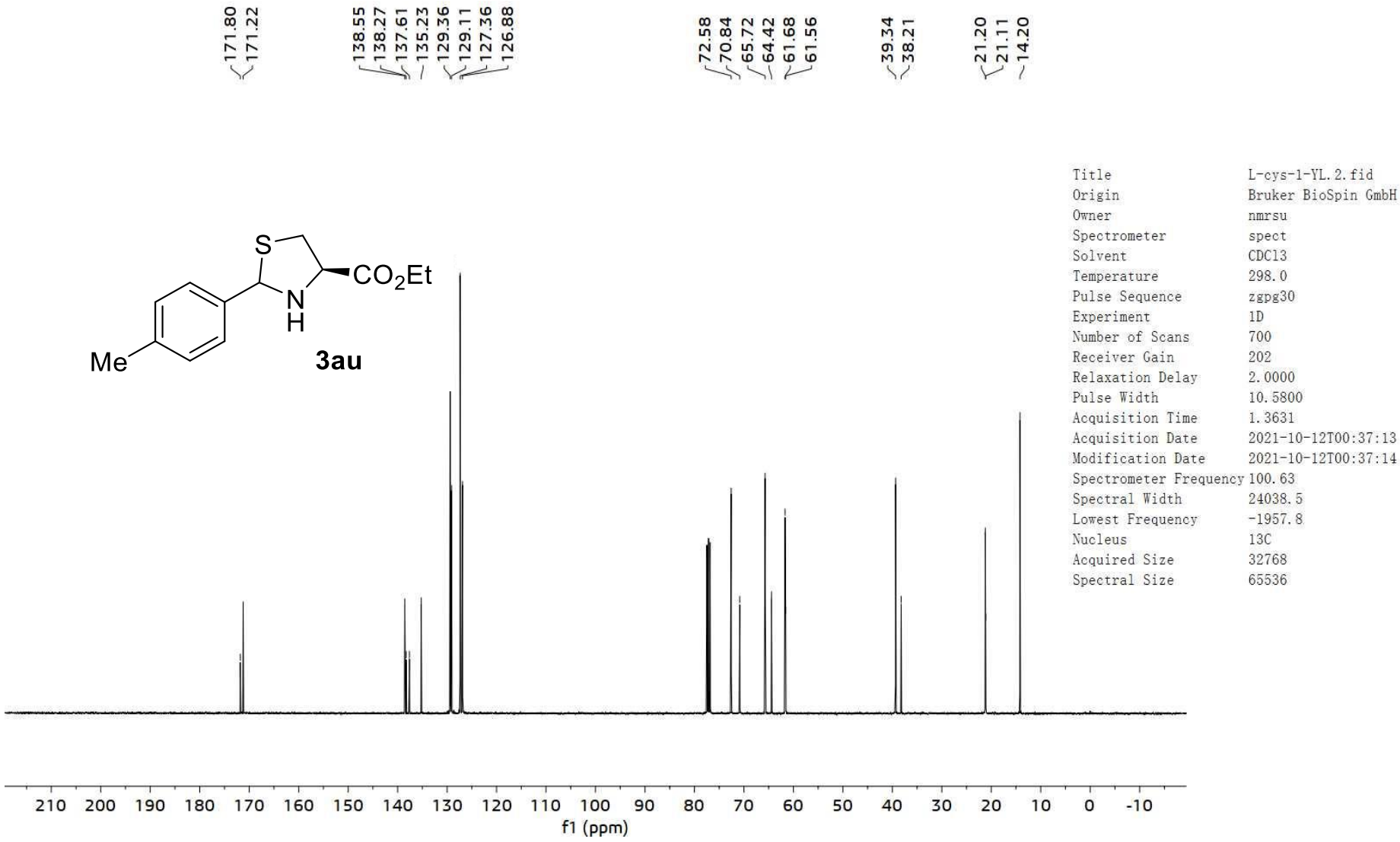


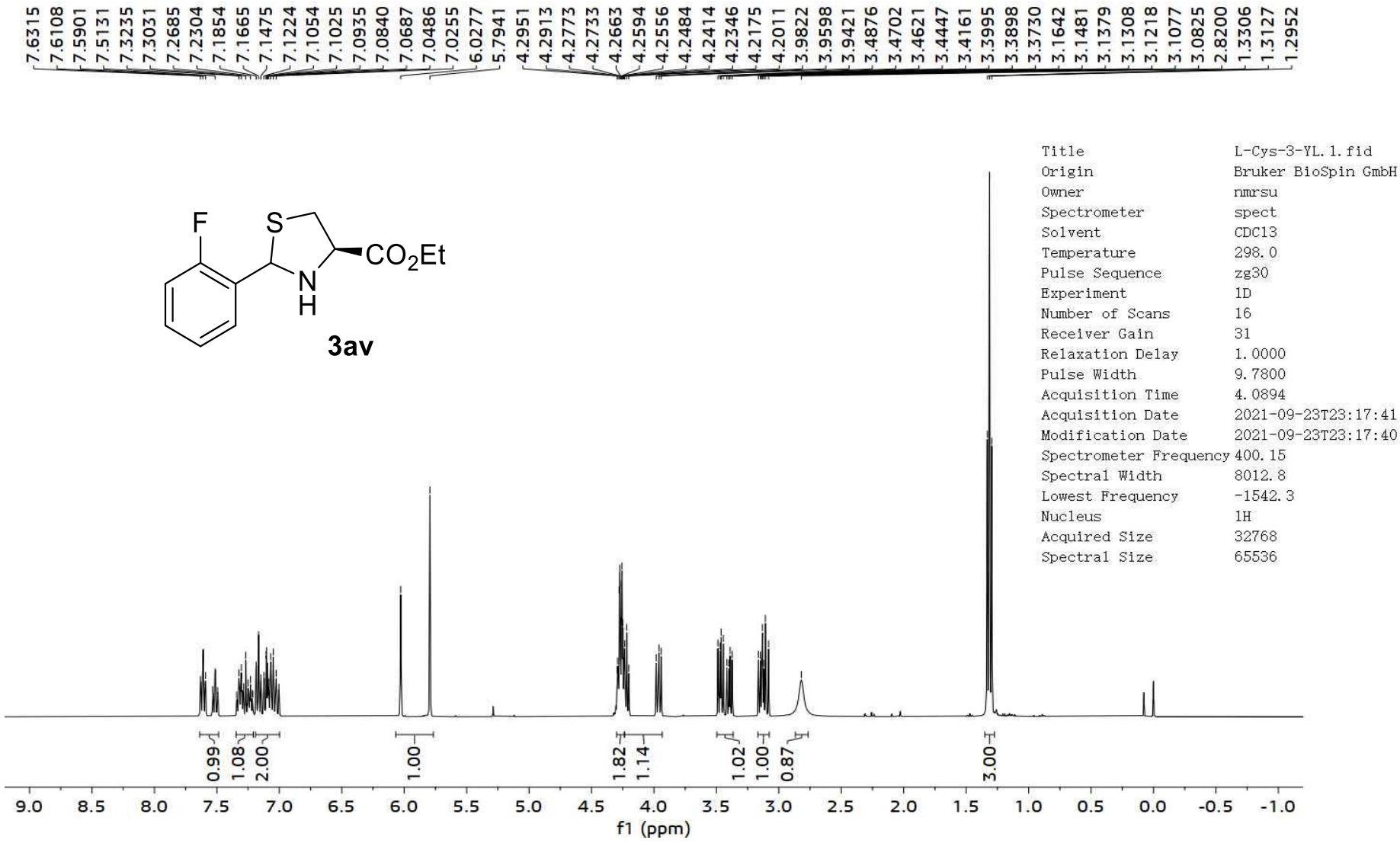

146.12
140.92
131.88
128.30
126.31
125.71
122.66
121.73
120.94
109.95
69.30
S
N
H
Br
3as
Title SN-1-yuanliao.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 302.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-08-02T16:23:13
Modification Date 2021-08-02T16:23:14
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1959.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

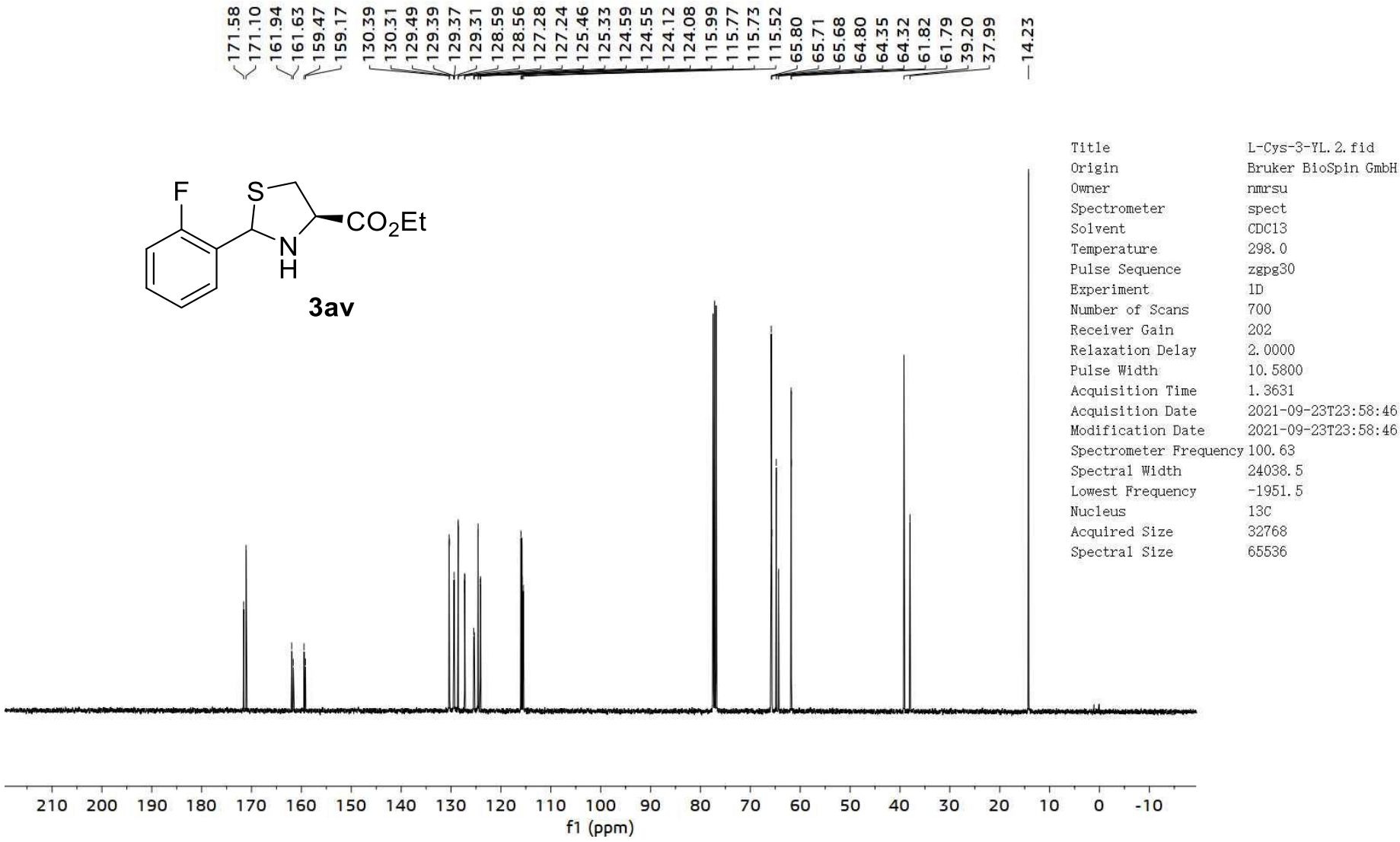

7.9982
7.9933
7.7807
7.7589
7.7064
7.7015
7.6850
7.6801
7.2086
7.2023
7.1864
7.1801
7.1555
7.1522
7.1477
7.1413
7.1365
7.1330
7.1067
7.1032
7.0865
7.0832
7.0684
7.0650
7.0414
7.0380
7.0213
7.0179
6.9428
6.9394
6.9244
6.9209
6.9058
6.9023
3.9253
2.2858
S
O
Me
MeO
3at
Title WYX-92-yuanlioa.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 302.3
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-26T12:24:29
Modification Date 2021-07-26T12:24:30
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.989
1.965
1.010
0.976
1.002
f1 (ppm)
0.98
2.02
0.99
0.99
1.96
1.01
0.98
1.00
3.00
3.00
f1 (ppm)

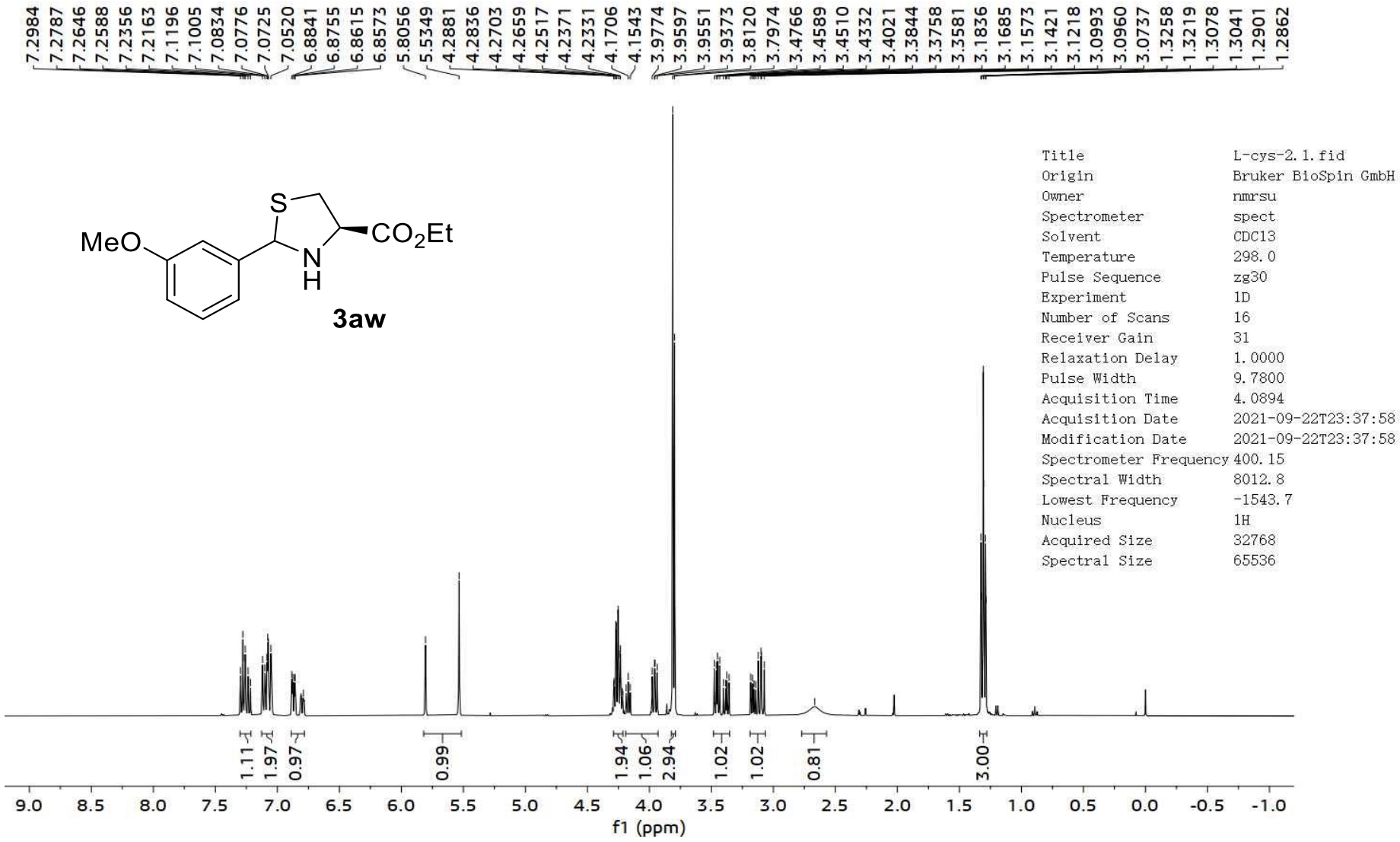

158.27
155.07
139.30
134.32
129.99
128.23
127.29
126.55
125.99
123.95
123.31
122.51
122.12
119.30
110.87
105.77
99.84
55.40
30.98
S
O
Me
MeO
3at
Title WYX-92-yuanlioa.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 303.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-26T13:08:25
Modification Date 2021-07-26T13:08:26
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1953.0
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

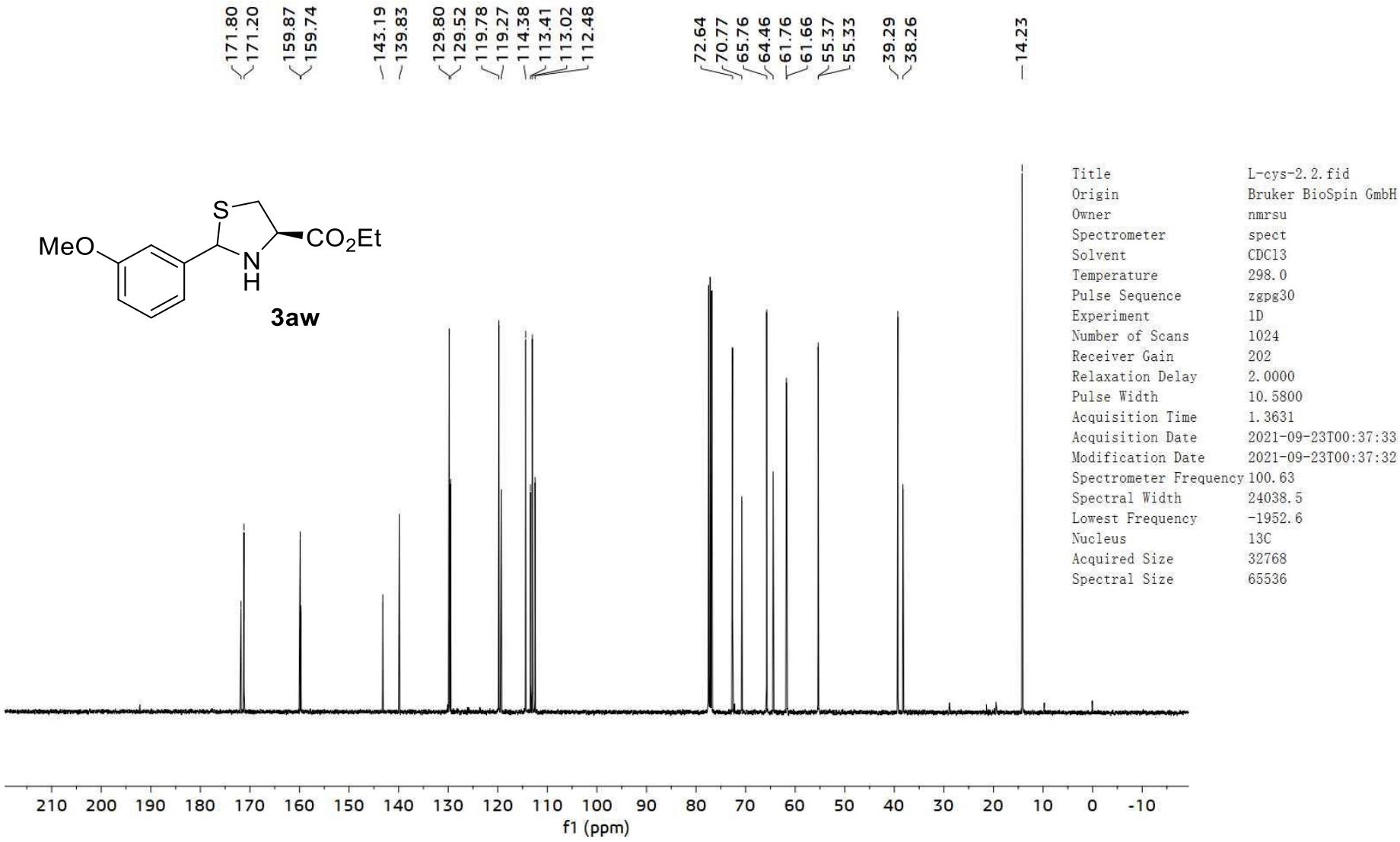

7.4242
7.4039
7.3813
7.3612
7.1832
7.1634
7.1417
7.1218
5.7976
5.5373
4.2859
4.2816
4.2681
4.2641
4.2505
4.2464
4.2332
4.2289
4.2191
4.2157
4.2115
4.2036
4.1877
4.1715
3.9772
3.9593
3.9548
3.9371
3.4767
3.4589
3.4510
3.4333
3.4010
3.3831
3.3746
3.3567
3.2060
3.1915
3.1796
3.1650
3.1263
3.1039
3.1005
3.0785
2.6924
2.3489
2.3273
1.3243
1.3199
1.3064
1.3032
1.2885
1.2845
S
CO2Et
N
H
Me
3au
Title L-cys-1-YL.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 21
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-11T23:56:10
Modification Date 2021-10-11T23:56:12
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
2.01
1.00
2.00
1.06
1.03
1.03
0.89
3.04
3.07
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

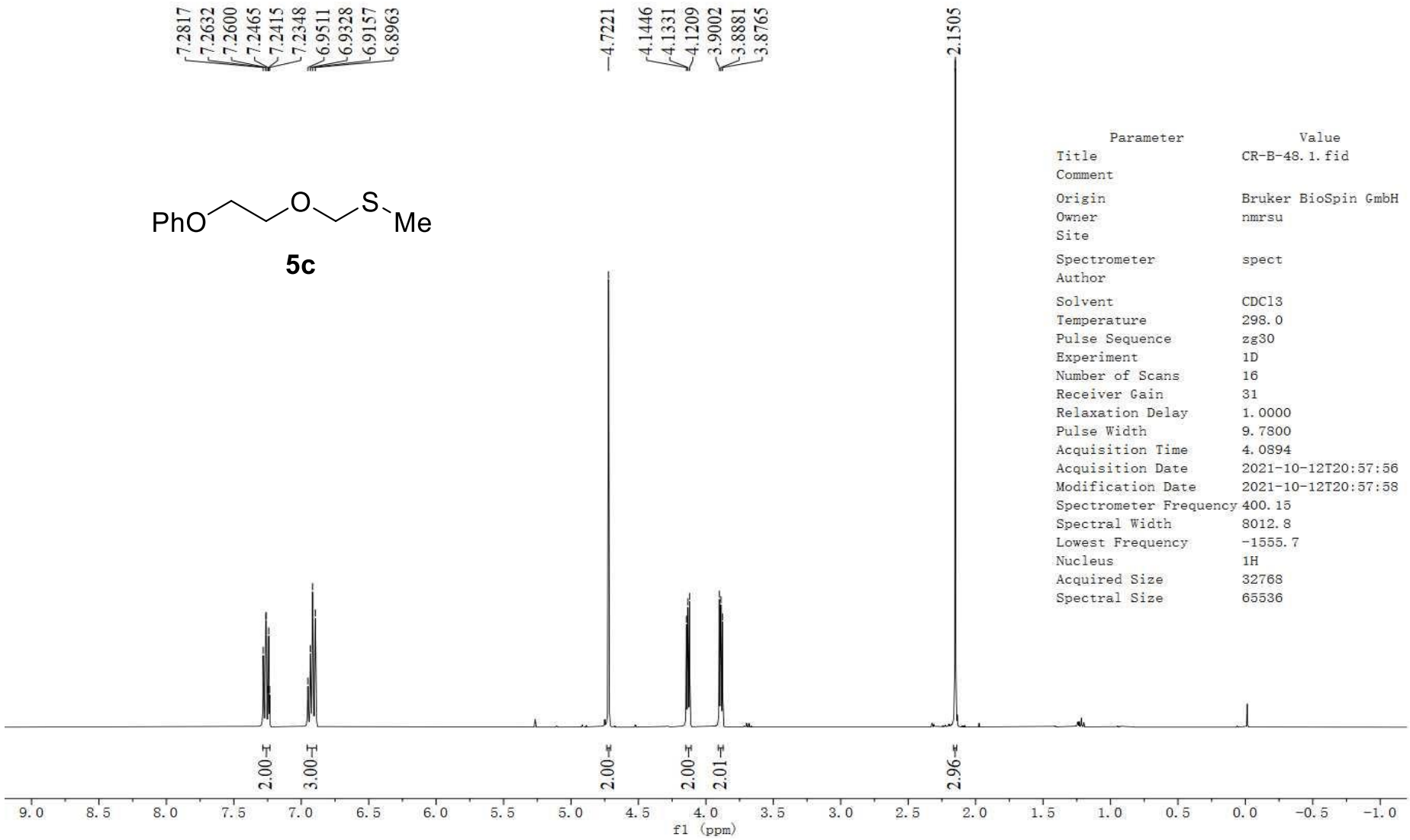

171.80
171.22
138.55
138.27
137.61
135.23
129.36
129.11
127.36
126.88
72.58
70.84
65.72
64.42
61.68
61.56
39.34
38.21
21.20
21.11
14.20
S
CO2Et
N
H
Me
3au
Title L-cys-1-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-12T00:37:13
Modification Date 2021-10-12T00:37:14
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1957.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

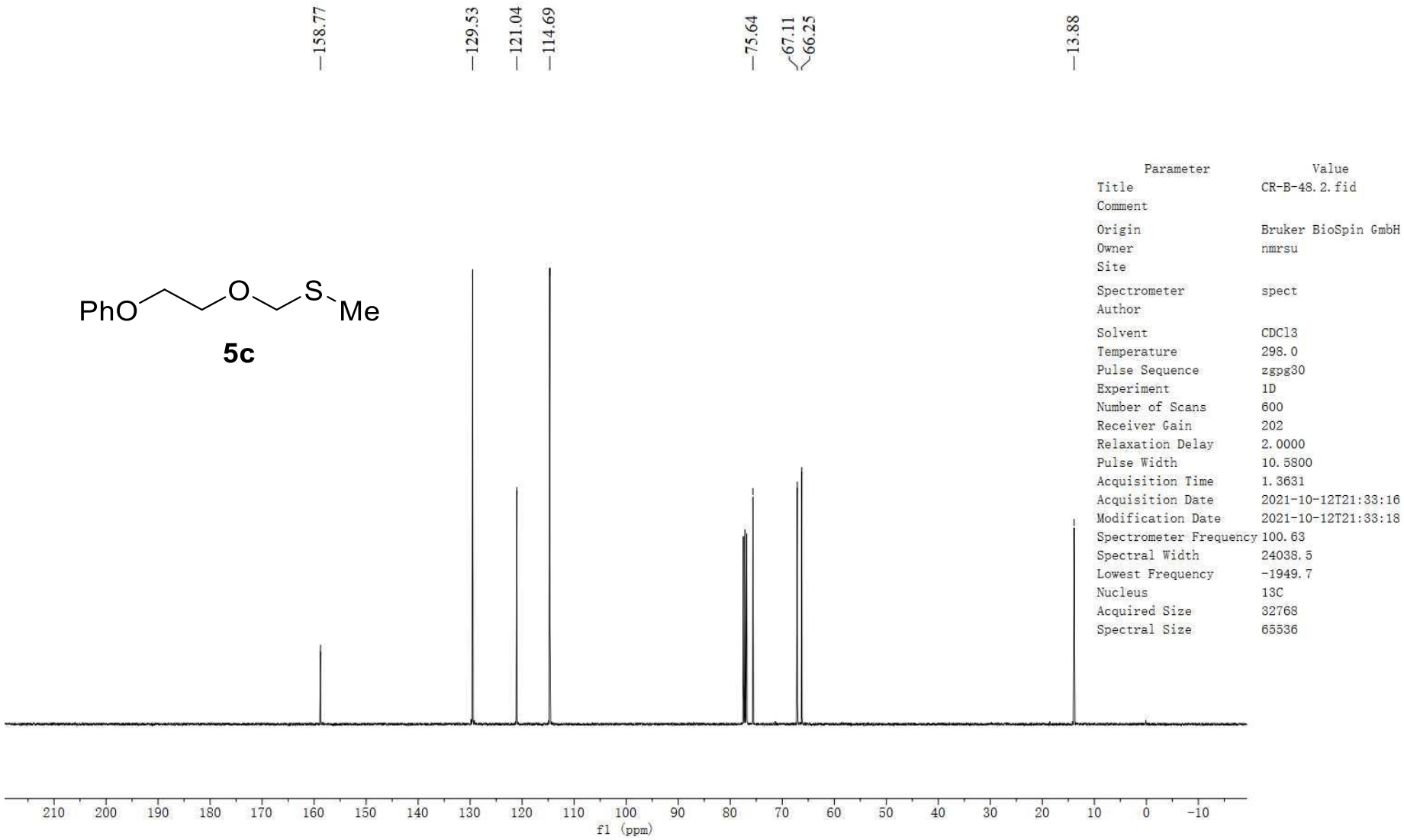

7.6315
7.6108
7.5901
7.5131
7.3235
7.3031
7.2685
7.2304
7.1854
7.1665
7.1475
7.1224
7.1054
7.1025
7.0935
7.0840
7.0687
7.0486
7.0255
6.0277
5.7941
4.2951
4.2913
4.2773
4.2733
4.2663
4.2594
4.2556
4.2484
4.2414
4.2346
4.2175
4.2011
3.9822
3.9598
3.9421
3.4876
3.4702
3.4621
3.4447
3.4161
3.3995
3.3898
3.3730
3.1642
3.1481
3.1379
3.1308
3.1218
3.1077
3.0825
2.8200
1.3306
1.3127
1.2952
F
S
CO2Et
N
H
3av
Title L-Cys-3-YL.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-23T23:17:41
Modification Date 2021-09-23T23:17:40
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1542.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.99
1.08
2.00
1.00
1.82
1.14
1.02
1.00
0.87
3.00
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 -1.0
f1 (ppm)

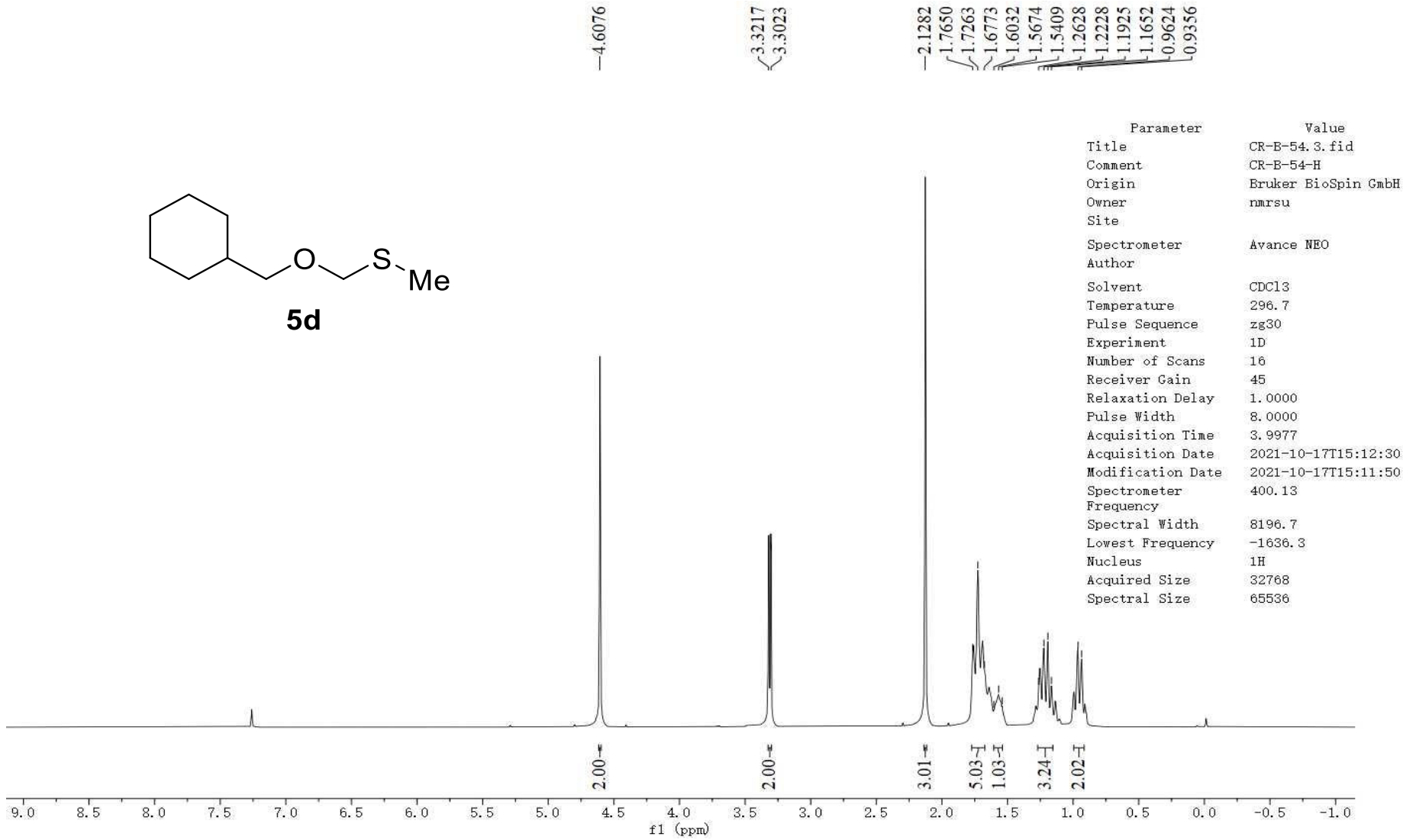

171.58
171.10
161.94
161.63
159.47
159.17
130.39
130.31
129.49
129.39
129.37
129.31
128.59
128.56
127.28
127.24
125.46
125.33
124.59
124.55
124.12
124.08
115.99
115.77
115.73
115.52
65.80
65.71
65.68
64.80
64.35
64.32
61.82
61.79
39.20
37.99
14.23
F
S
CO2Et
N
H
3av
Title L-Cys-3-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-23T23:58:46
Modification Date 2021-09-23T23:58:46
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1951.5
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

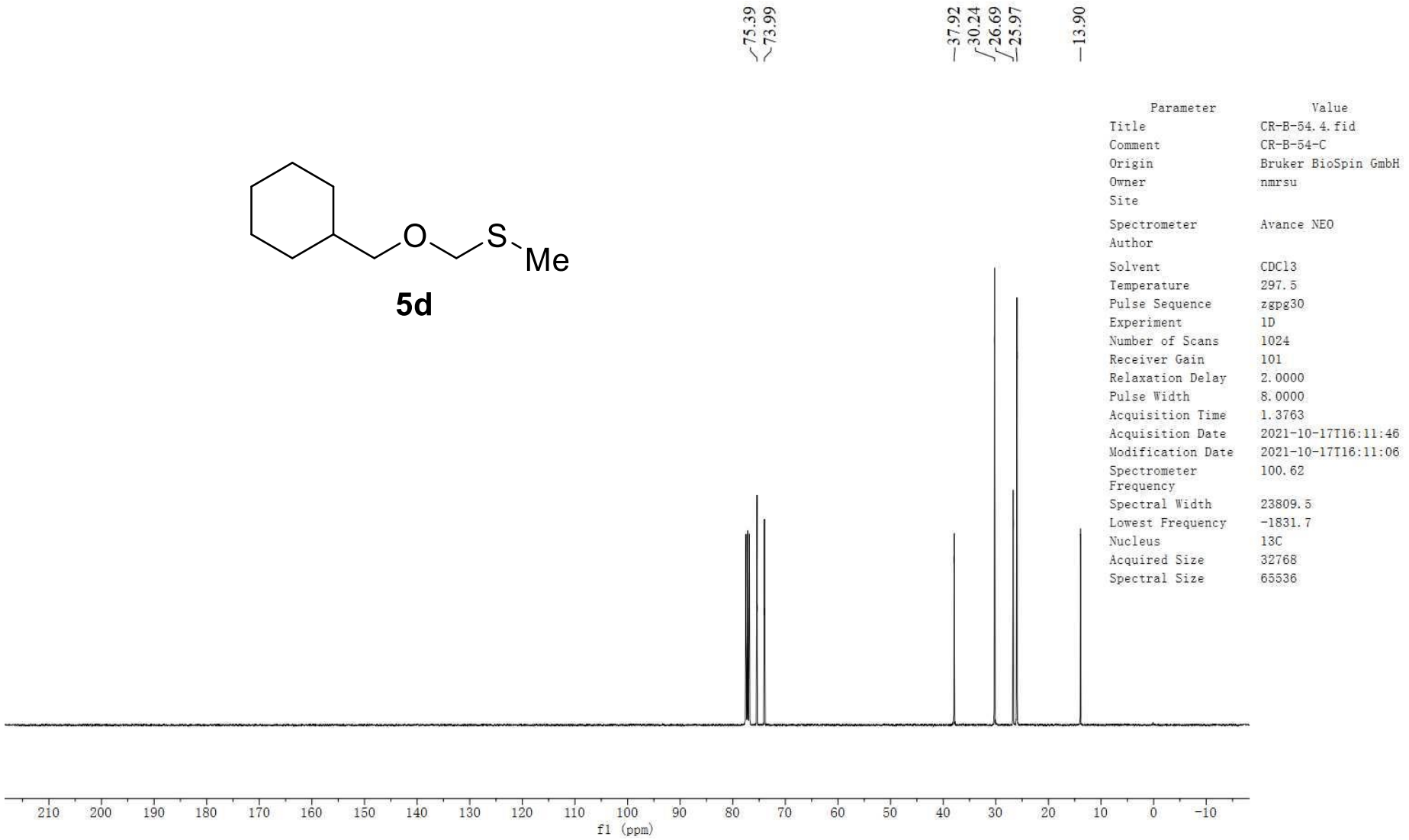

7.2984
7.2787
7.2646
7.2588
7.2356
7.2163
7.1196
7.1005
7.0834
7.0776
7.0725
7.0520
6.8841
6.8755
6.8615
6.8573
5.8056
5.5349
4.2881
4.2836
4.2703
4.2659
4.2517
4.2371
4.2331
4.1706
4.1543
3.9774
3.9597
3.9551
3.9373
3.8120
3.7974
3.4766
3.4589
3.4510
3.4332
3.4021
3.3844
3.3758
3.3581
3.1836
3.1685
3.1573
3.1421
3.1218
3.0993
3.0960
3.0737
1.3258
1.3219
1.3078
1.3041
1.2901
1.2862
MeO
S
N
H
CO2Et
3aw
Title L-cys-2.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-22T23:37:58
Modification Date 2021-09-22T23:37:58
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1543.7
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.11
1.97
0.97
0.99
1.94
1.06
2.94
1.02
1.02
0.81
3.00
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 -1.0
f1 (ppm)


171.80
171.20
159.87
159.74
143.19
139.83
129.80
129.52
119.78
119.27
114.38
113.41
113.02
112.48
72.64
70.77
65.76
64.46
61.76
61.66
55.37
55.33
39.29
38.26
14.23
MeO
S
N
H
CO2Et
3aw
Title L-cys-2.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-23T00:37:33
Modification Date 2021-09-23T00:37:32
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1952.6
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

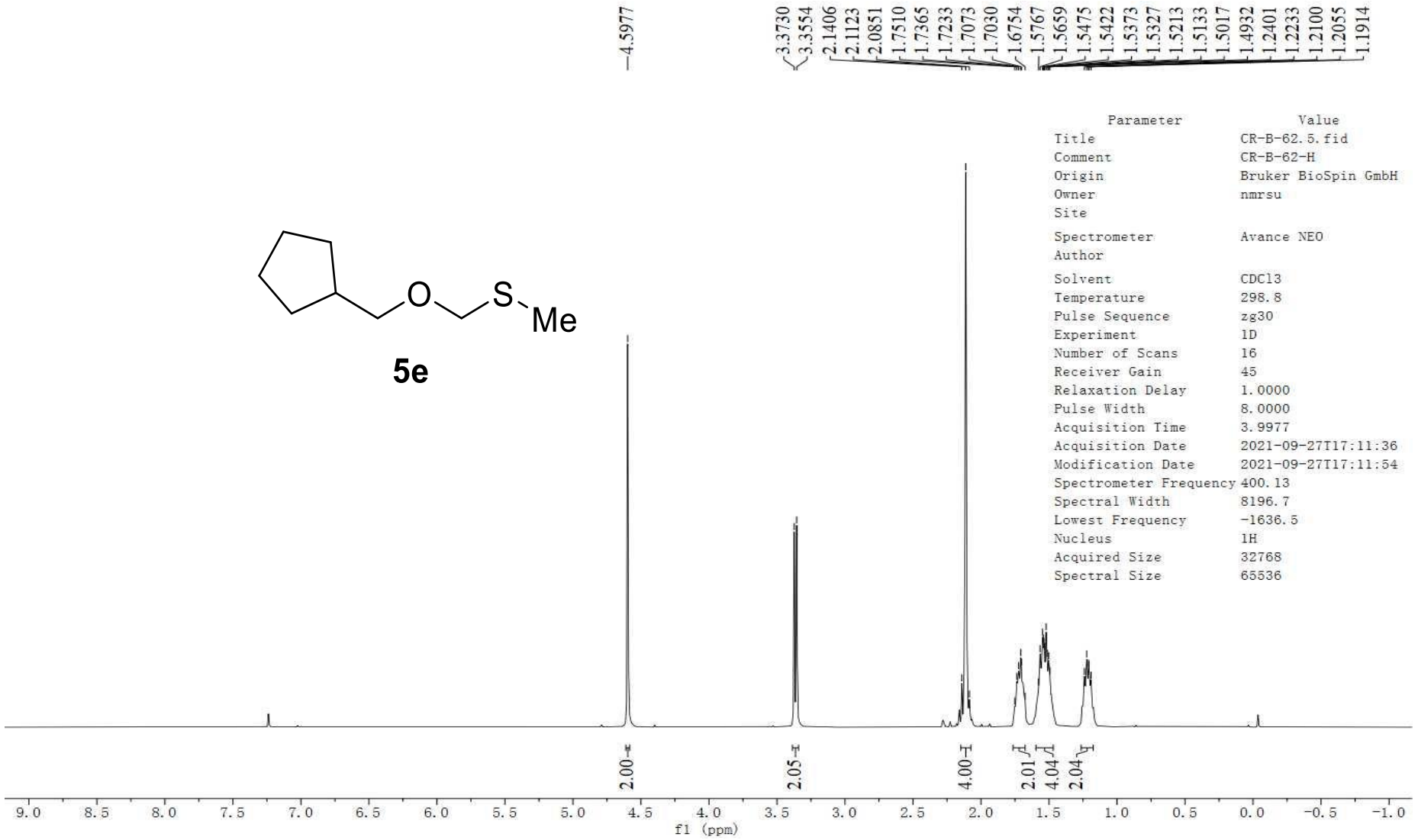

7.2817
7.2632
7.2600
7.2465
7.2415
7.2348
6.9511
6.9328
6.9157
6.8963
4.7221
4.1446
4.1331
4.1209
3.9002
3.8881
3.8765
2.1505
PhO
O
S
Me
5c
Parameter Value
Title CR-B-48.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-12T20:57:56
Modification Date 2021-10-12T20:57:58
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1555.7
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
3.00
2.00
2.00
2.01
2.96
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 -1.0
f1 (ppm)

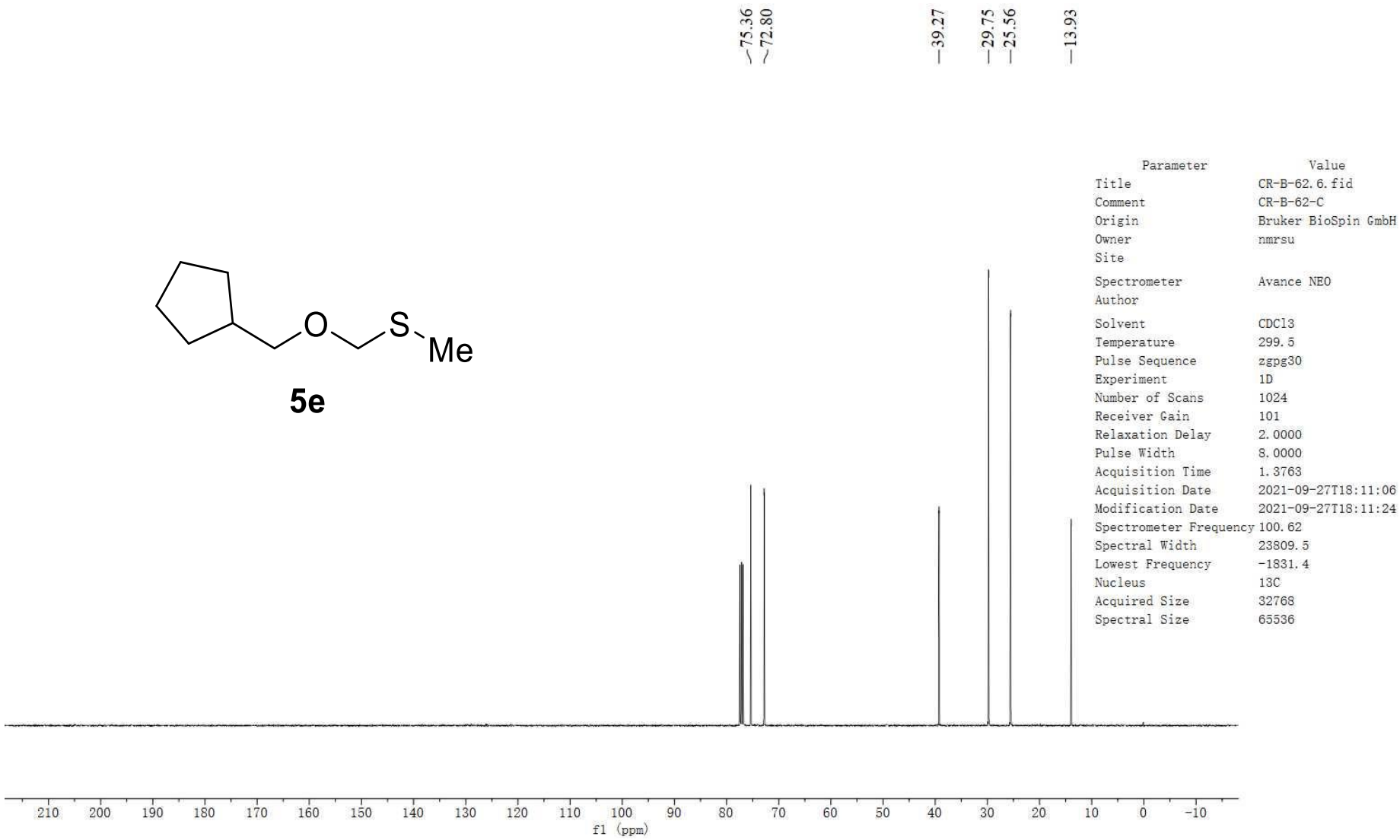

158.77
129.53
121.04
114.69
75.64
67.11
66.25
13.88
PhO
O
S
Me
5c
Parameter Value
Title CR-B-48.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-12T21:33:16
Modification Date 2021-10-12T21:33:18
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1949.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

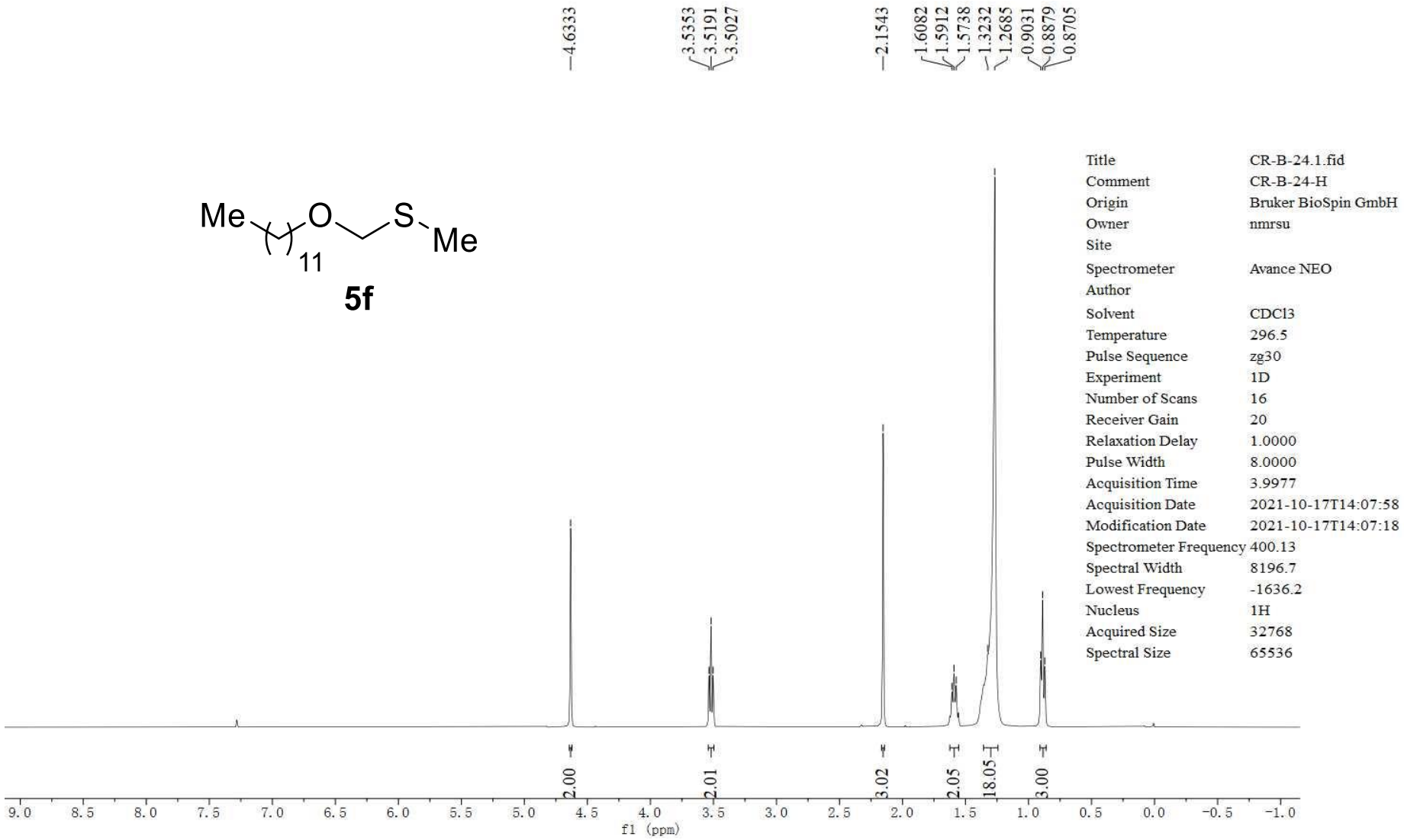

4.6076
3.3217
3.3023
2.1282
1.7650
1.7263
1.6773
1.6032
1.5674
1.5409
1.2628
1.2228
1.1925
1.1652
0.9624
0.9356
O
S
Me
5d
Parameter Value
Title CR-B-54.3.fid
Comment CR-B-54-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 296.7
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 45
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-10-17T15:12:30
Modification Date 2021-10-17T15:11:50
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
2.00
3.01
5.03
1.03
3.24
2.02
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 -1.0
f1 (ppm)



Parameter	Value
Title	CR-B-54.4.fid
Comment	CR-B-54-C
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Site	
Spectrometer	Avance NEO
Author	
Solvent	CDCl3
Temperature	297.5
Pulse Sequence	zgpg30
Experiment	1D
Number of Scans	1024
Receiver Gain	101
Relaxation Delay	2.0000
Pulse Width	8.0000
Acquisition Time	1.3763
Acquisition Date	2021-10-17T16:11:46
Modification Date	2021-10-17T16:11:06
Spectrometer Frequency	100.62
Spectral Width	23809.5
Lowest Frequency	-1831.7
Nucleus	13C
Acquired Size	32768
Spectral Size	65536

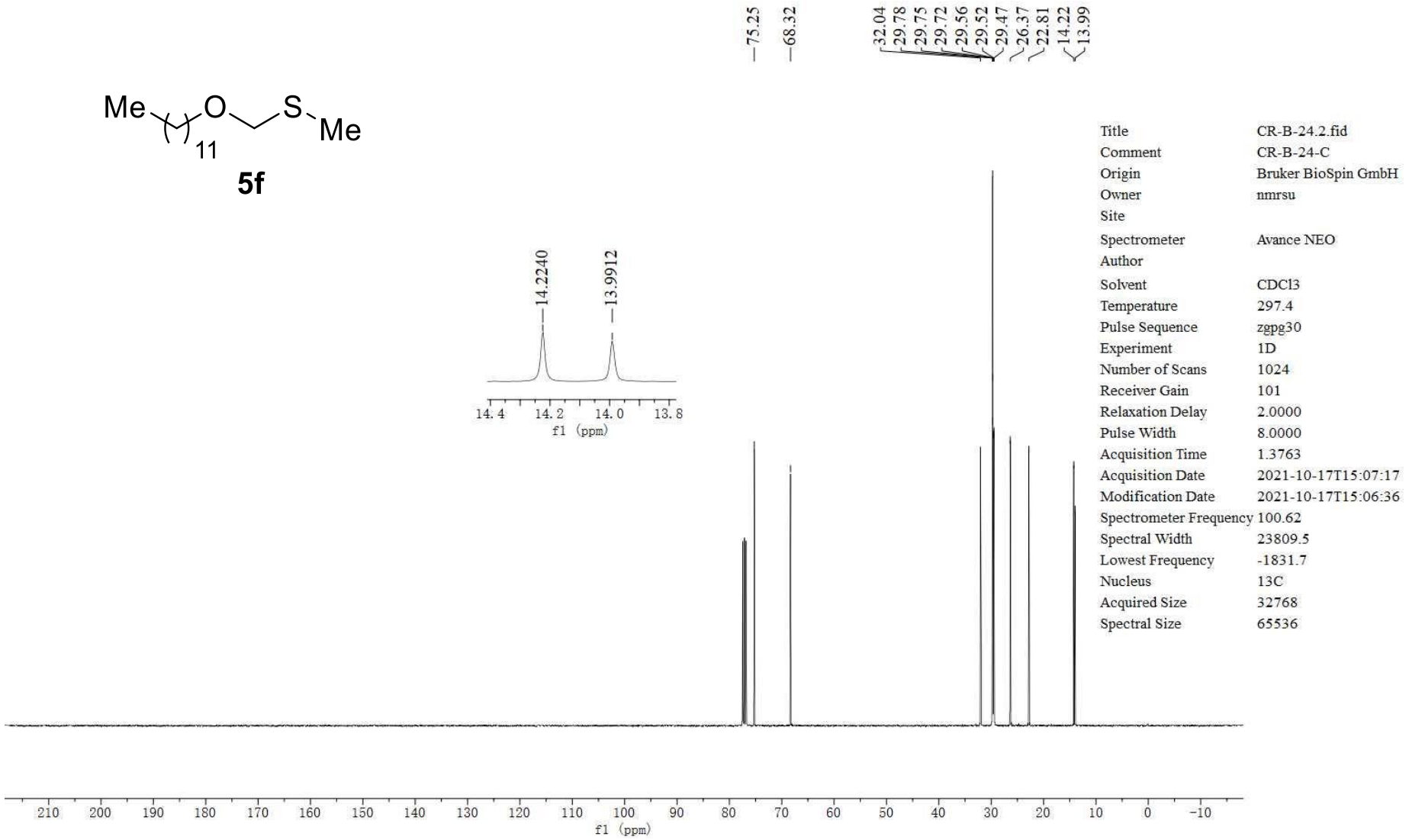

4.5977
3.3730
3.3554
2.1406
2.1123
2.0851
1.7510
1.7365
1.7233
1.7073
1.7030
1.6754
1.5767
1.5659
1.5475
1.5422
1.5373
1.5327
1.5213
1.5133
1.5017
1.4932
1.2401
1.2233
1.2100
1.2055
1.1914
O
S
Me
5e
Parameter Value
Title CR-B-62.5.fid
Comment CR-B-62-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 298.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 45
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-09-27T17:11:36
Modification Date 2021-09-27T17:11:54
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.5
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
2.05
4.00
2.01
4.04
2.04
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 -1.0
f1 (ppm)

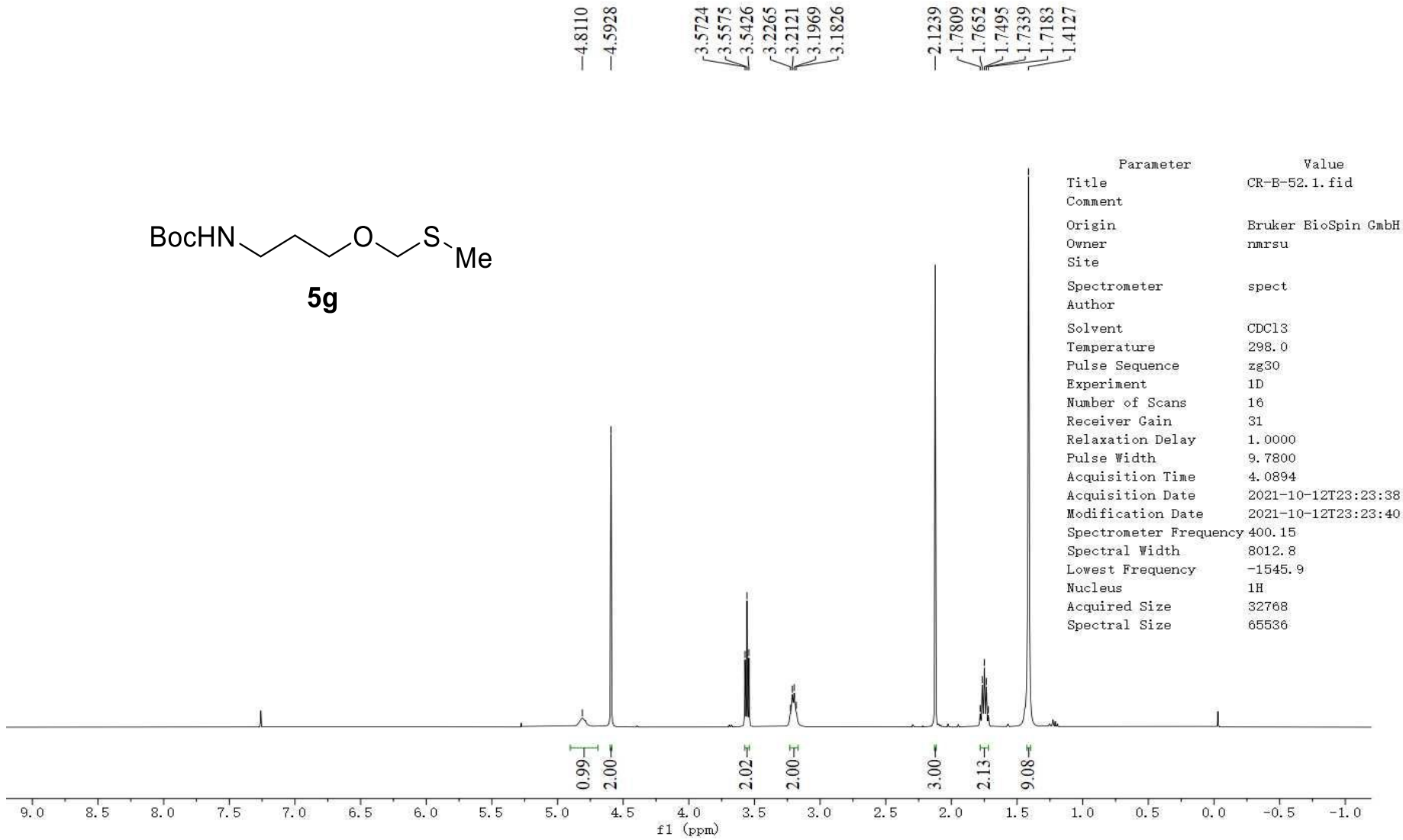

75.36
72.80
39.27
29.75
25.56
13.93
O
S
Me
5e
Parameter Value
Title CR-B-62.6.fid
Comment CR-B-62-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 299.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-09-27T18:11:06
Modification Date 2021-09-27T18:11:24
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1831.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

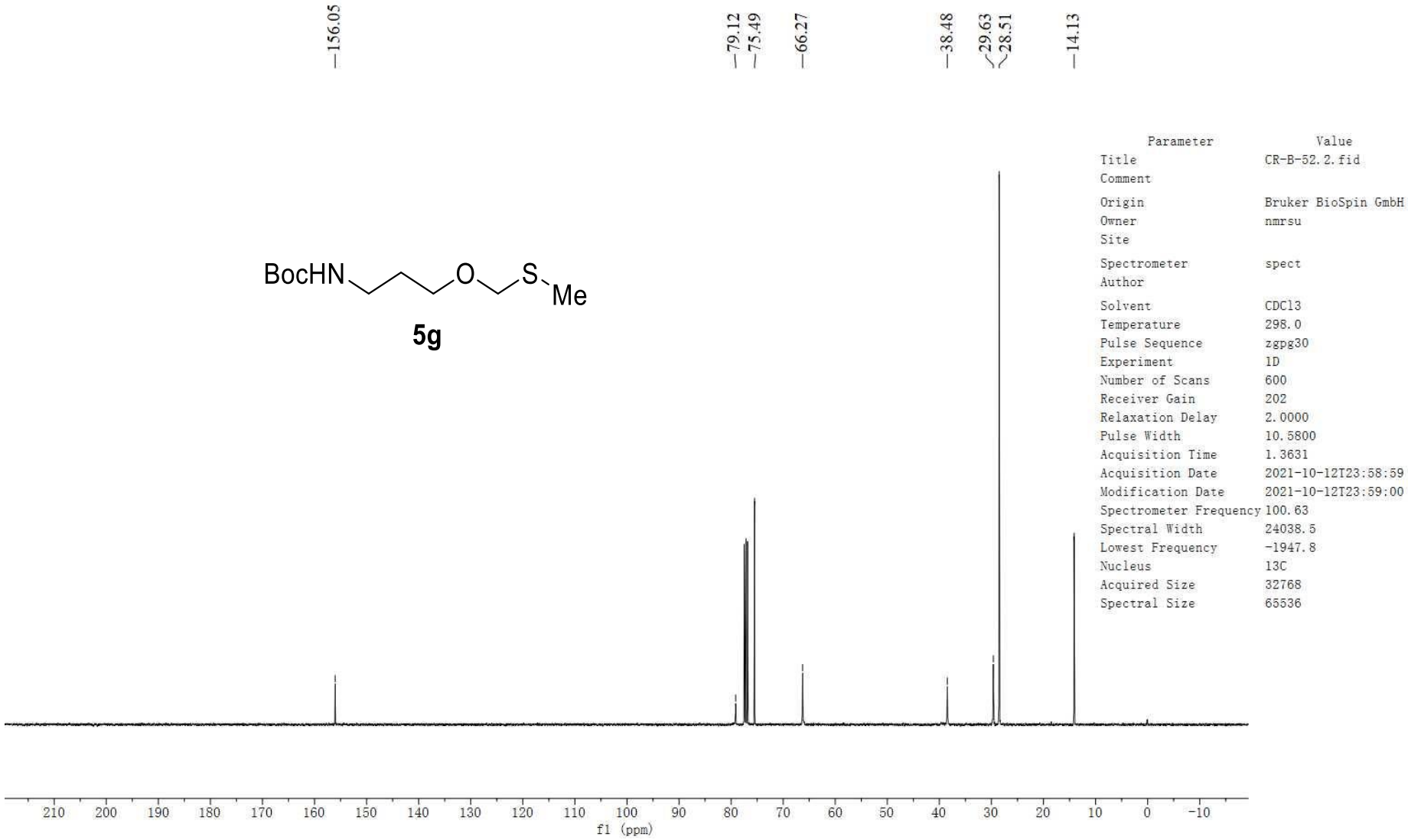

4.6333
3.5353
3.5191
3.5027
2.1543
1.6082
1.5912
1.5738
1.3232
1.2685
0.9031
0.8879
0.8705
Me
O
S
Me
11
5f
Title CR-B-24.1.fid
Comment CR-B-24-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 296.5
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 20
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-10-17T14:07:58
Modification Date 2021-10-17T14:07:18
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
2.01
3.02
2.05
18.05
3.00
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 -1.0
f1 (ppm)

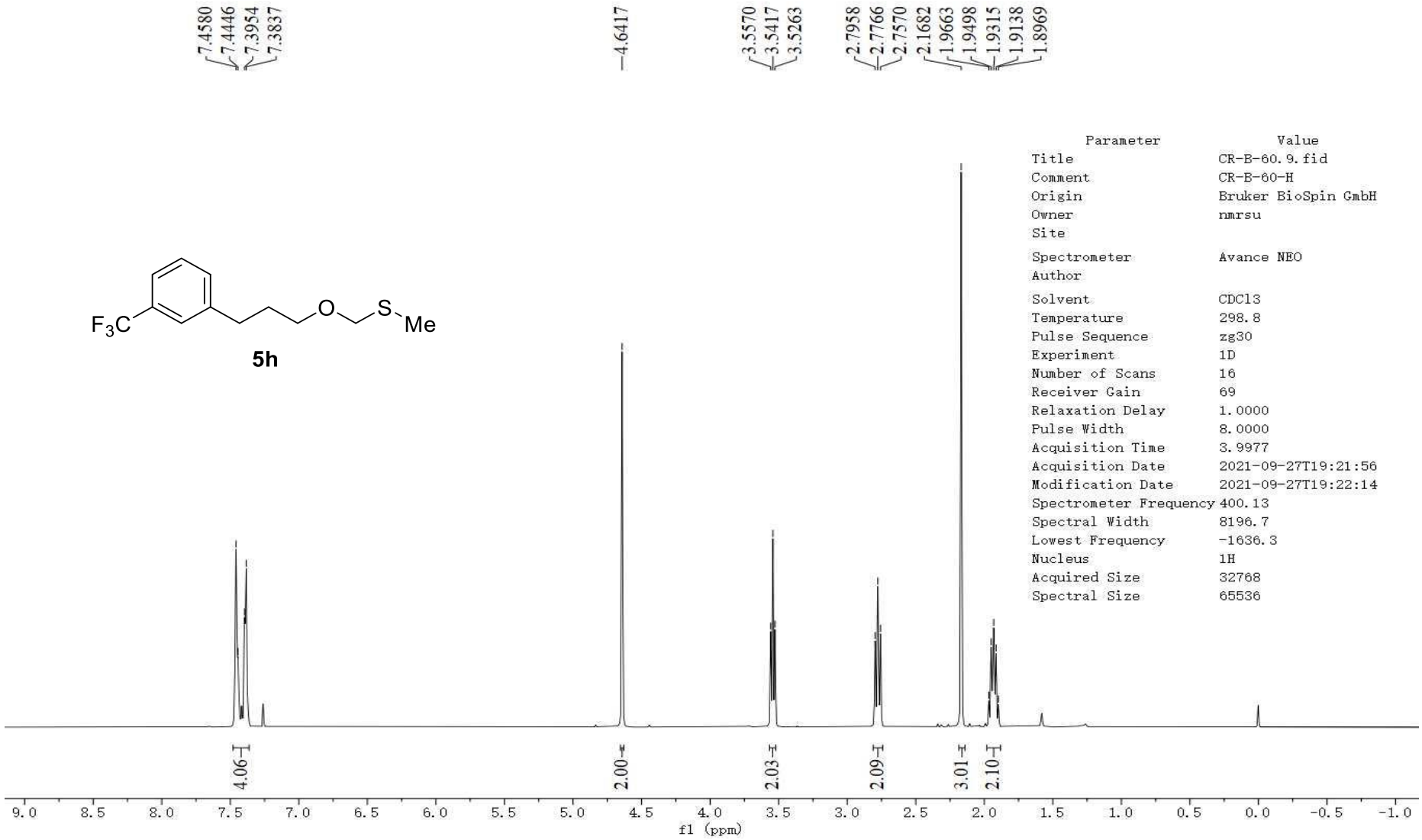
Me
O
S
Me
11

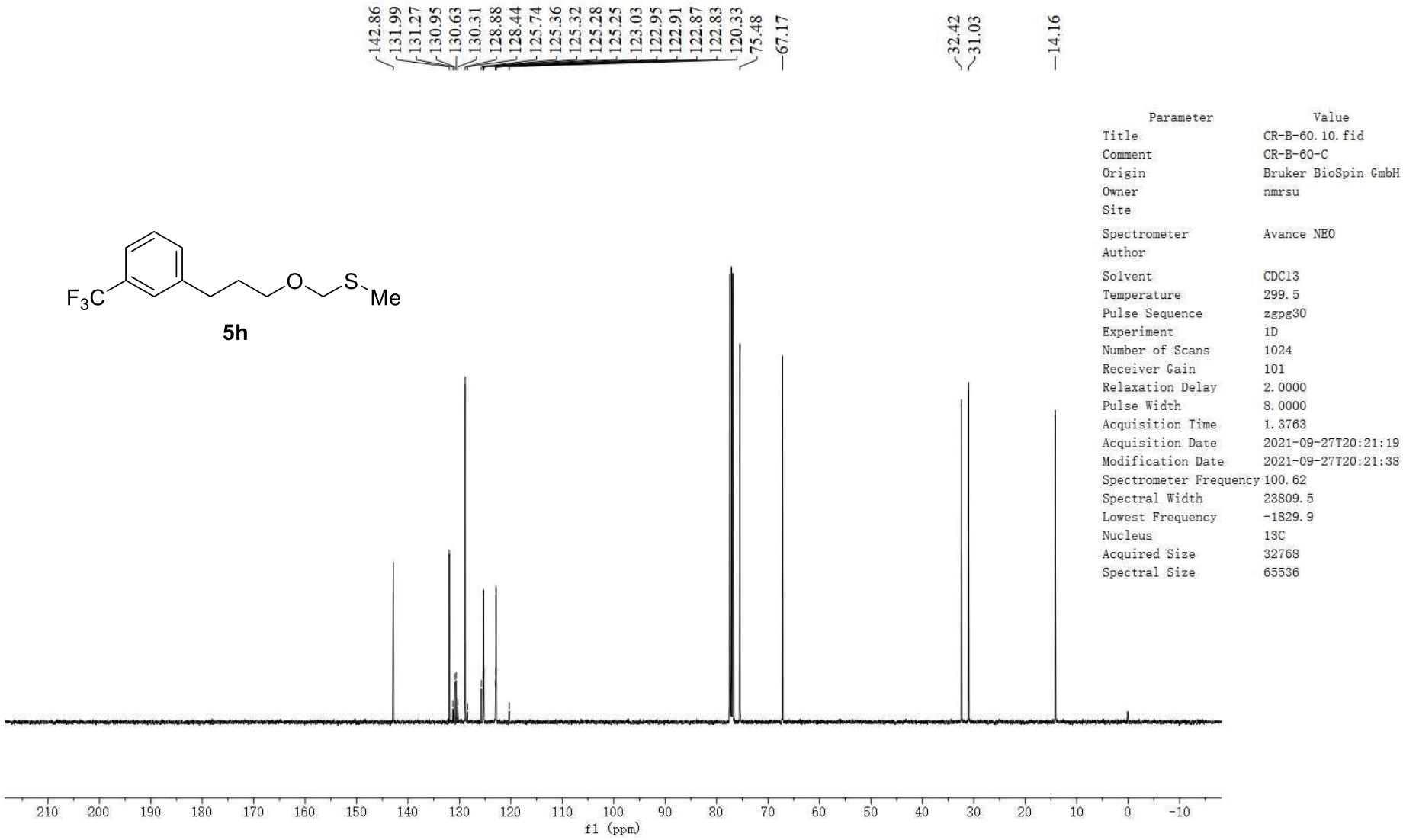
5f

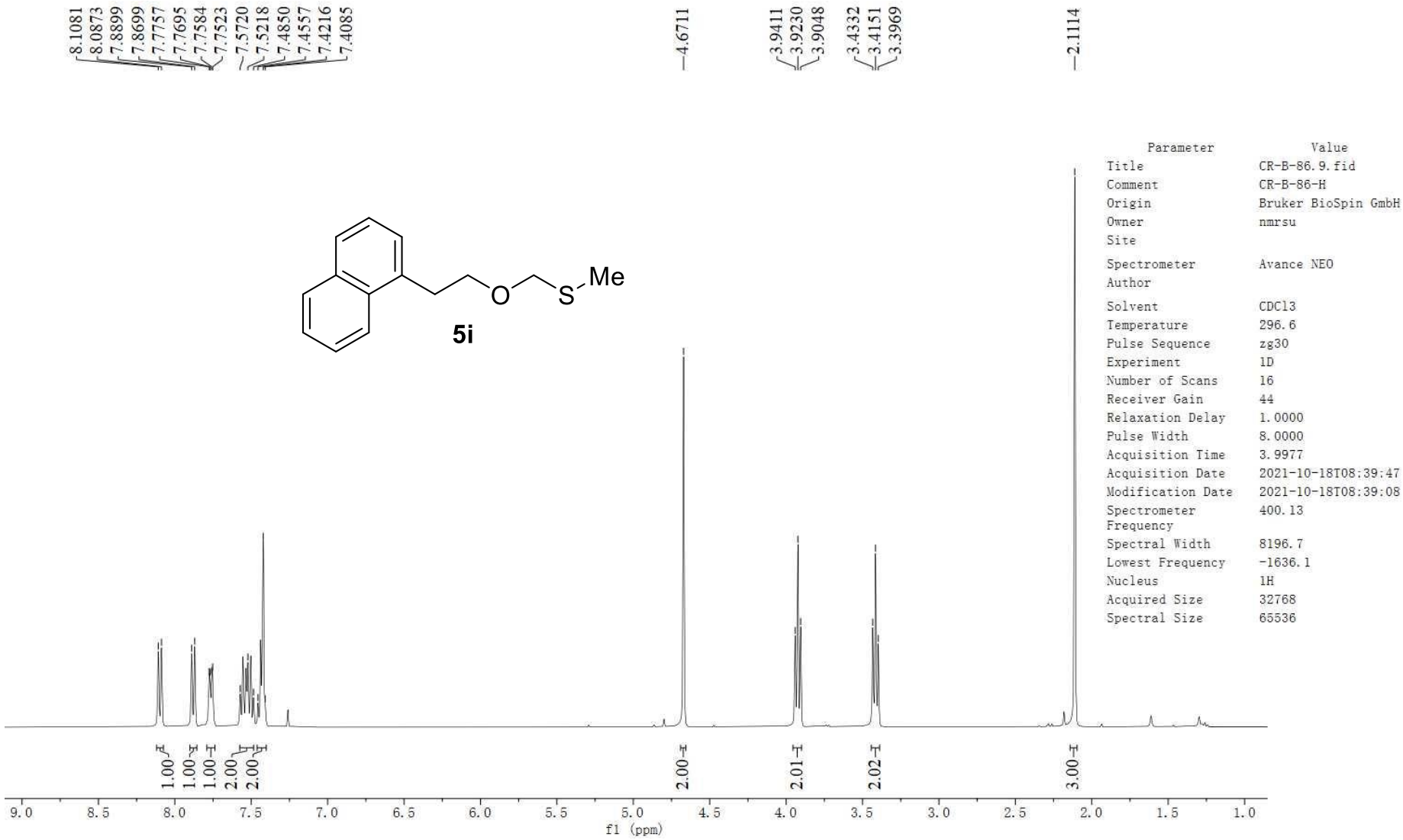

75.25
68.32
32.04
29.78
29.75
29.72
29.56
29.52
29.47
26.37
22.81
14.22
13.99
14.2240
13.9912
14.4
14.2
14.0
13.8
f1 (ppm)
Title CR-B-24.2.fid
Comment CR-B-24-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 297.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-10-17T15:07:17
Modification Date 2021-10-17T15:06:36
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1831.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

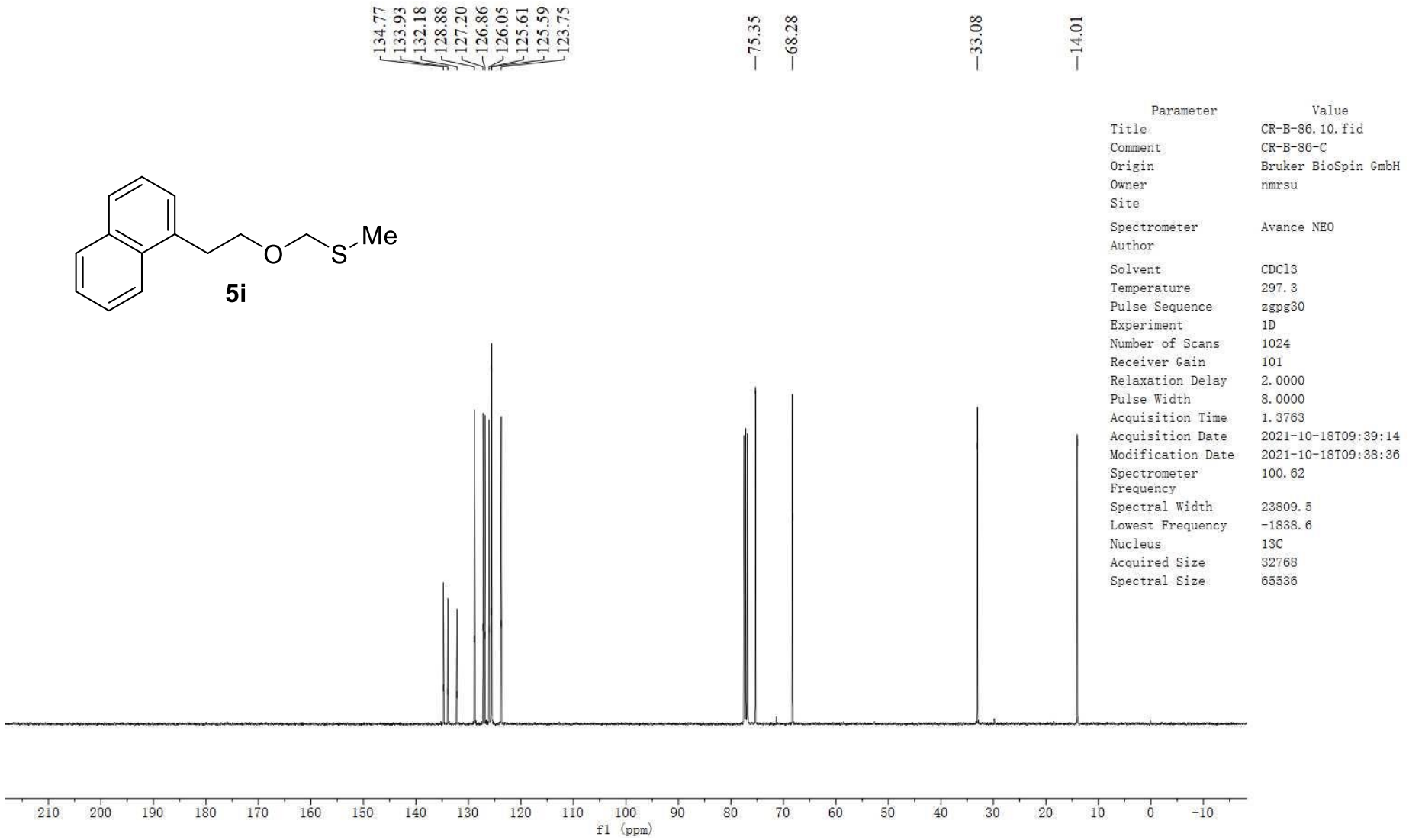

4.8110
4.5928
3.5724
3.5575
3.5426
3.2265
3.2121
3.1969
3.1826
2.1239
1.7809
1.7652
1.7495
1.7339
1.7183
1.4127
BocHN
O
S
Me
5g
Parameter Value
Title CR-B-52.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-12T23:23:38
Modification Date 2021-10-12T23:23:40
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.9
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.99
2.00
2.02
2.00
3.00
2.13
9.08
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 -1.0
f1 (ppm)


156.05
79.12
75.49
66.27
38.48
29.63
28.51
14.13
BocHN
O
S
Me
5g
Parameter Value
Title CR-B-52.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-12T23:58:59
Modification Date 2021-10-12T23:59:00
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1947.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

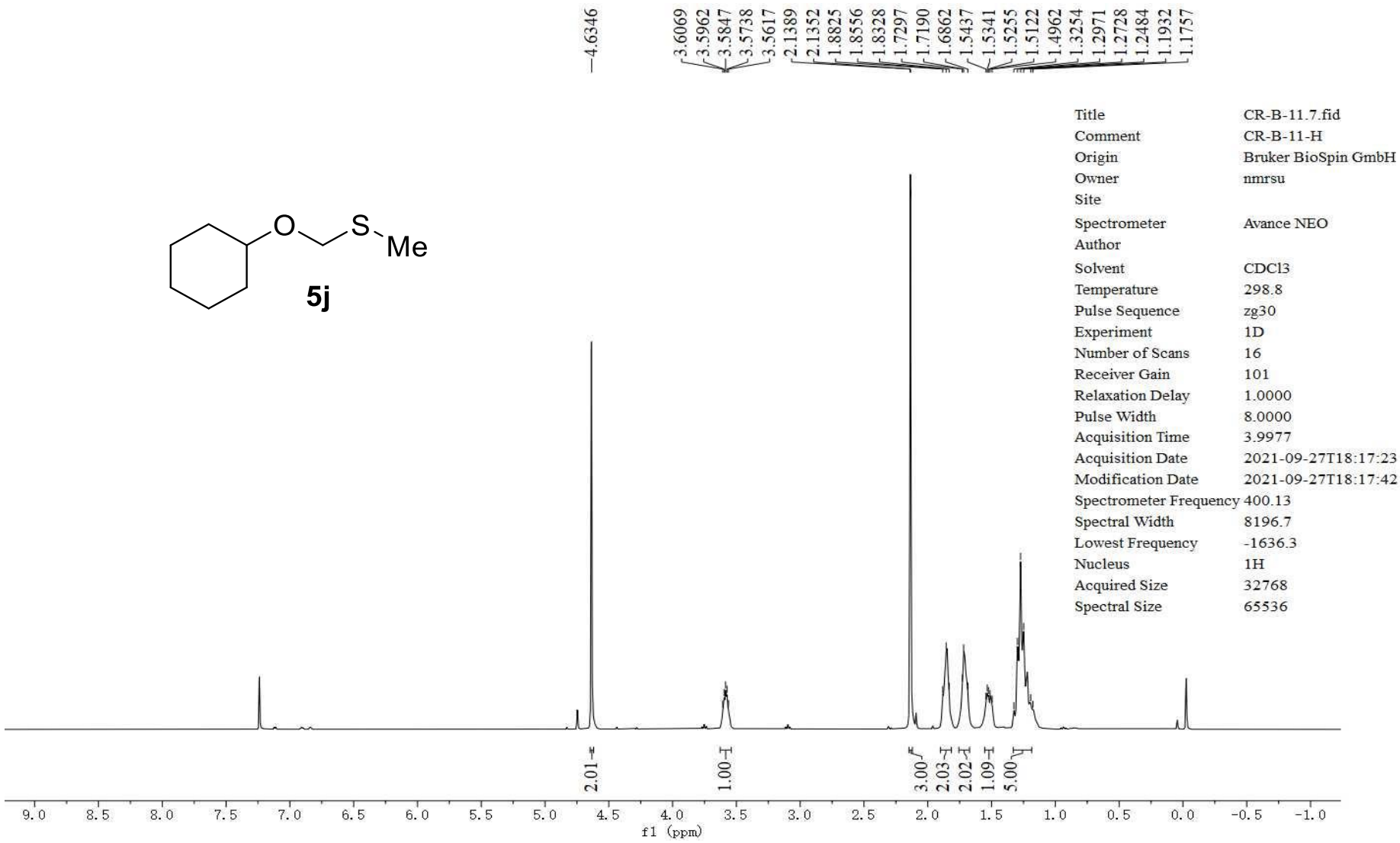

7.4580
7.4446
7.3954
7.3837
4.6417
3.5570
3.5417
3.5263
2.7958
2.7766
2.7570
2.1682
1.9663
1.9498
1.9315
1.9138
1.8969
F3C
O
S
Me
5h
Parameter Value
Title CR-B-60.9.fid
Comment CR-B-60-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 298.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 69
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-09-27T19:21:56
Modification Date 2021-09-27T19:22:14
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
4.06
2.00
2.03
2.09
3.01
2.10
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 -1.0
f1 (ppm)

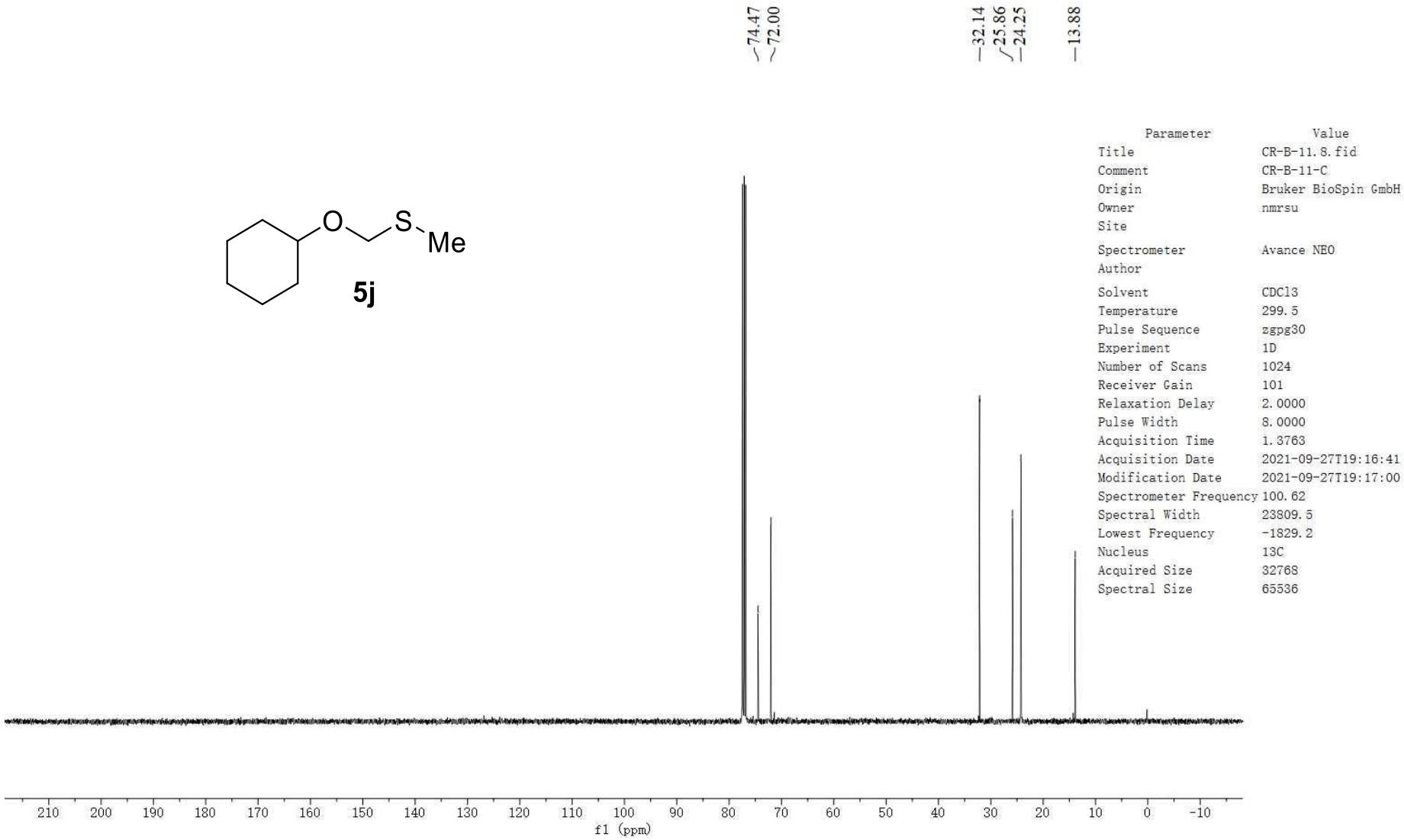

142.86
131.99
131.27
130.95
130.63
130.31
128.88
128.44
125.74
125.36
125.32
125.28
125.25
123.03
122.95
122.91
122.87
122.83
120.33
75.48
67.17
32.42
31.03
14.16
F3C
O
S
Me
5h
Parameter Value
Title CR-B-60.10.fid
Comment CR-B-60-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 299.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-09-27T20:21:19
Modification Date 2021-09-27T20:21:38
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1829.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

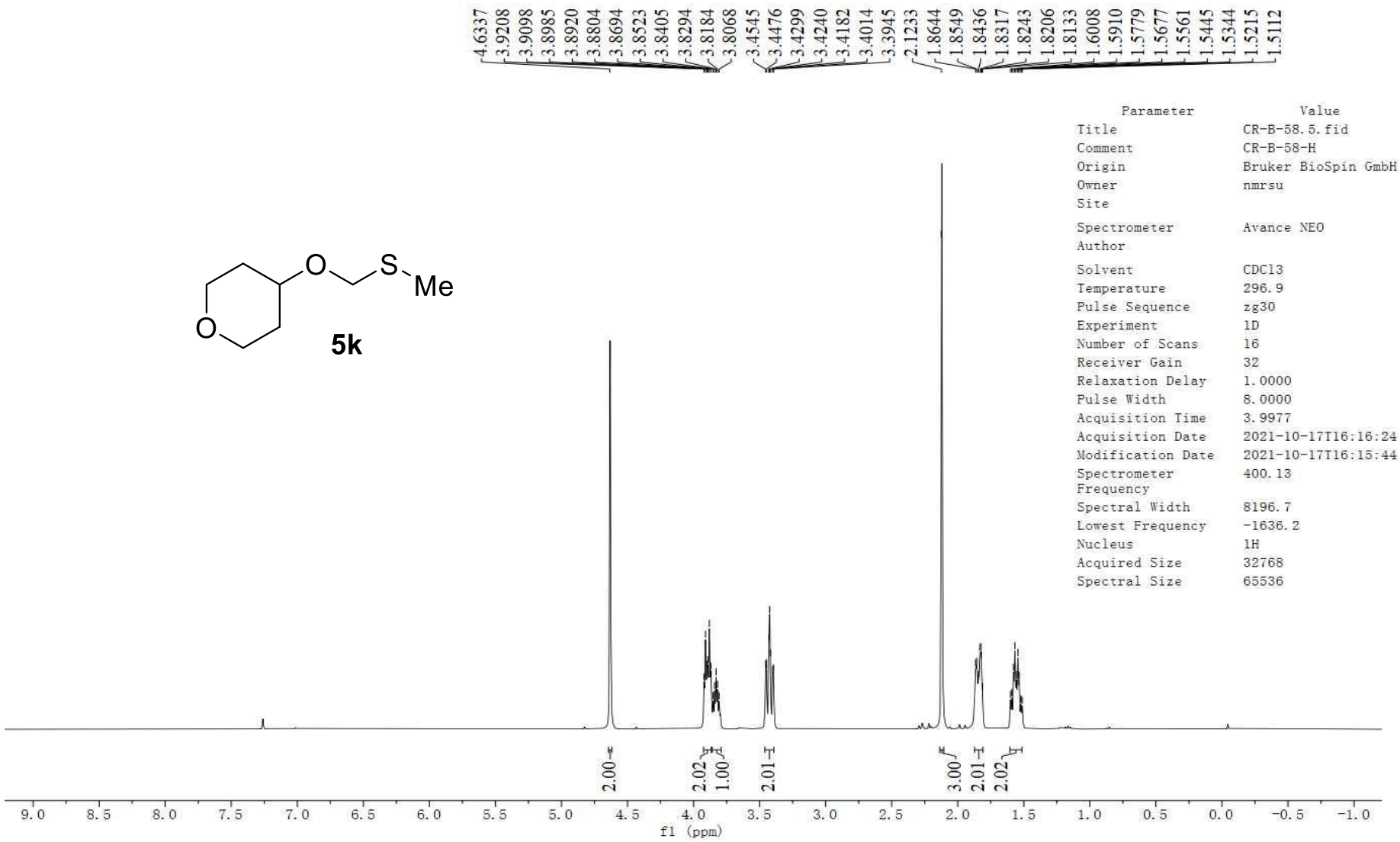

8.1081
8.0873
7.8899
7.8699
7.7757
7.7695
7.7584
7.7523
7.5720
7.5218
7.4850
7.4557
7.4216
7.4085
4.6711
3.9411
3.9230
3.9048
3.4332
3.4151
3.3969
2.1114
O
S
Me
5i
Parameter Value
Title CR-B-86.9.fid
Comment CR-B-86-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 296.6
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 44
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-10-18T08:39:47
Modification Date 2021-10-18T08:39:08
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.1
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.00
1.00
2.00
2.00
2.00
2.01
2.02
3.00
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
f1 (ppm)



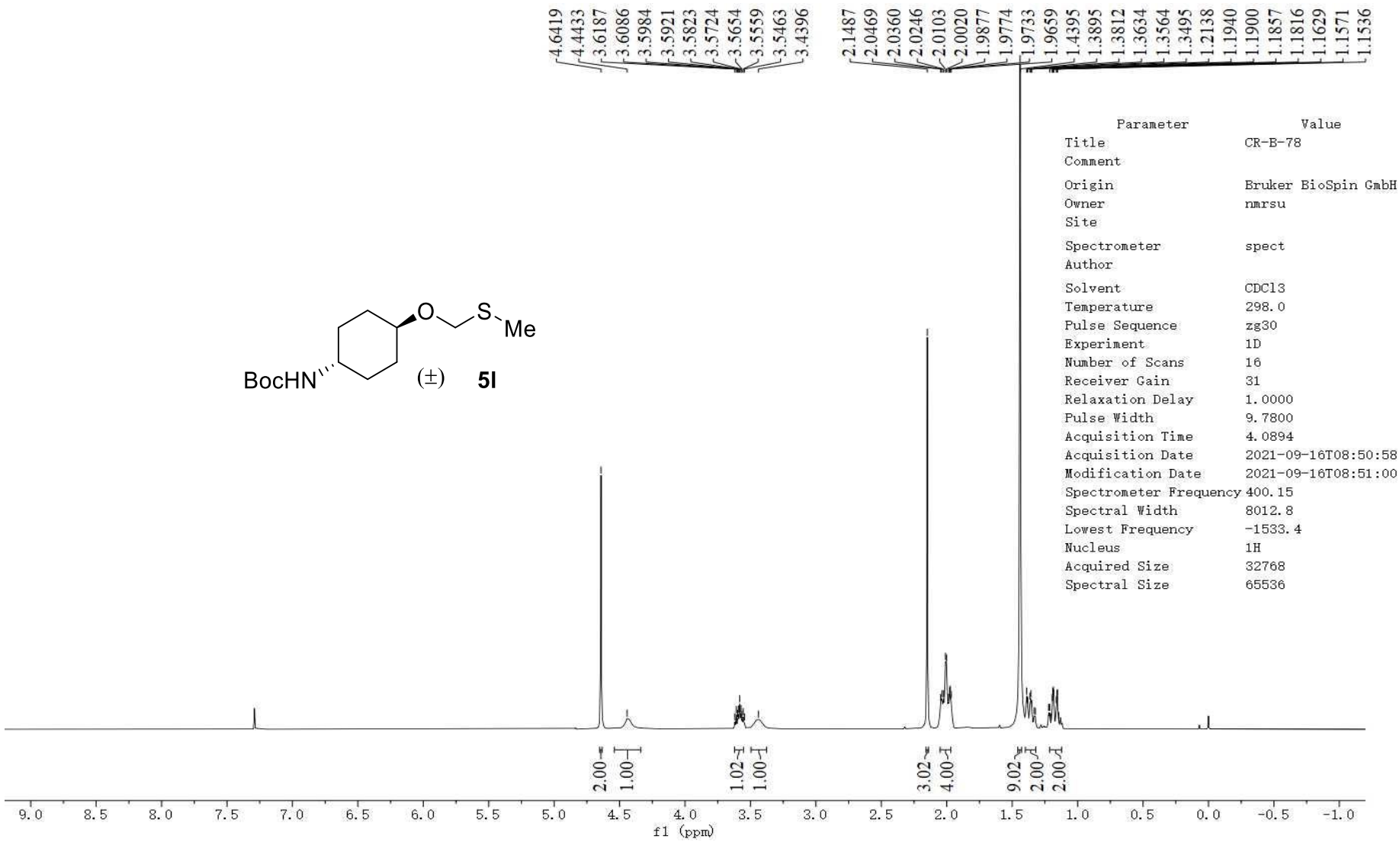
Parameter	Value
Title	CR-B-86.10.fid
Comment	CR-B-86-C
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Site	
Spectrometer	Avance NEO
Author	
Solvent	CDCl3
Temperature	297.3
Pulse Sequence	zgpg30
Experiment	1D
Number of Scans	1024
Receiver Gain	101
Relaxation Delay	2.0000
Pulse Width	8.0000
Acquisition Time	1.3763
Acquisition Date	2021-10-18T09:39:14
Modification Date	2021-10-18T09:38:36
Spectrometer Frequency	100.62
Spectral Width	23809.5
Lowest Frequency	-1838.6
Nucleus	13C
Acquired Size	32768
Spectral Size	65536

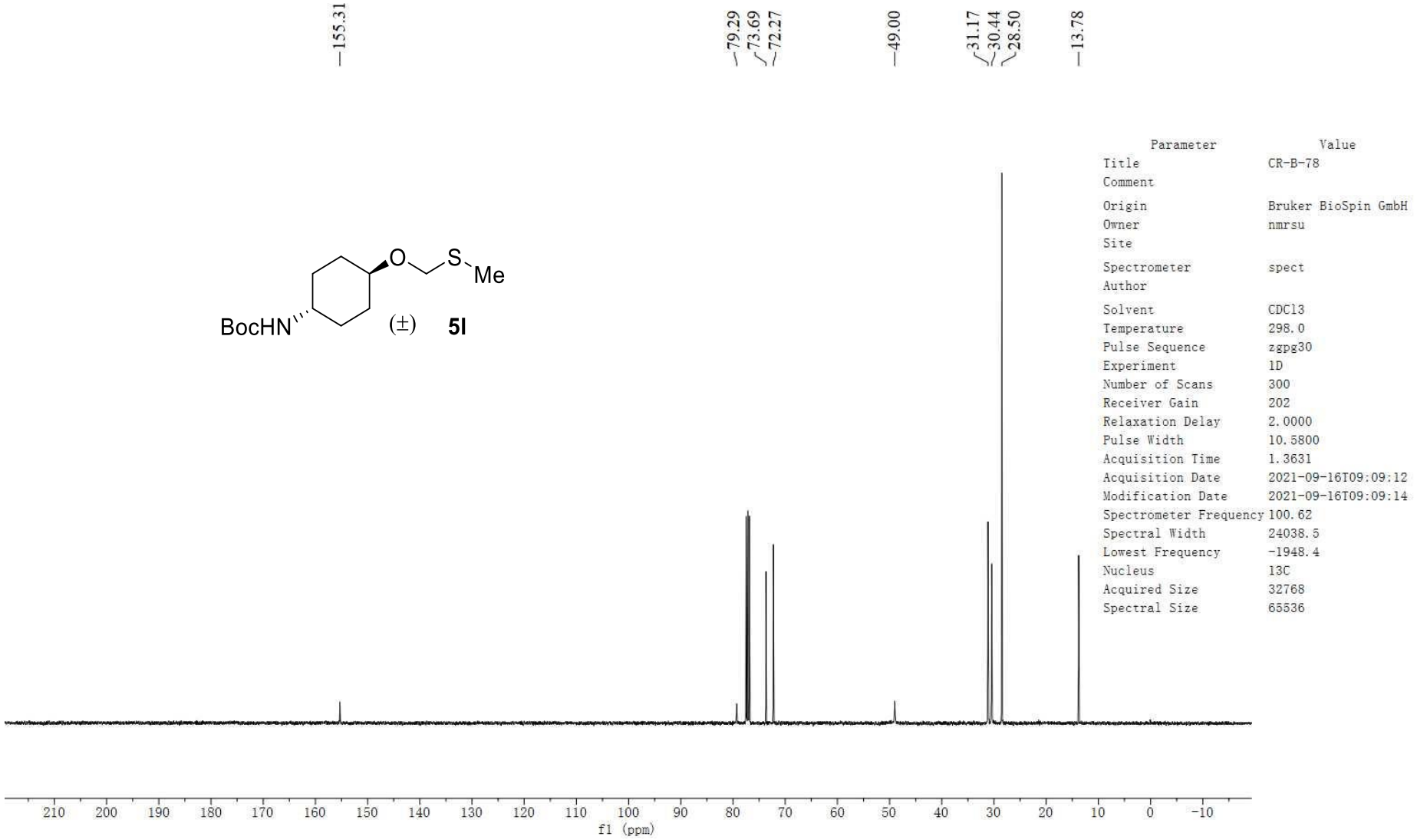

4.6346
3.6069
3.5962
3.5847
3.5738
3.5617
2.1389
2.1352
1.8825
1.8556
1.8328
1.7297
1.7190
1.6862
1.5437
1.5341
1.5255
1.5122
1.4962
1.3254
1.2971
1.2728
1.2484
1.1932
1.1757
O
S
Me
5j
Title CR-B-11.7.fid
Comment CR-B-11-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 298.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 101
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-09-27T18:17:23
Modification Date 2021-09-27T18:17:42
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.01
1.00
3.00
2.03
2.02
1.09
5.00
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 -1.0
f1 (ppm)

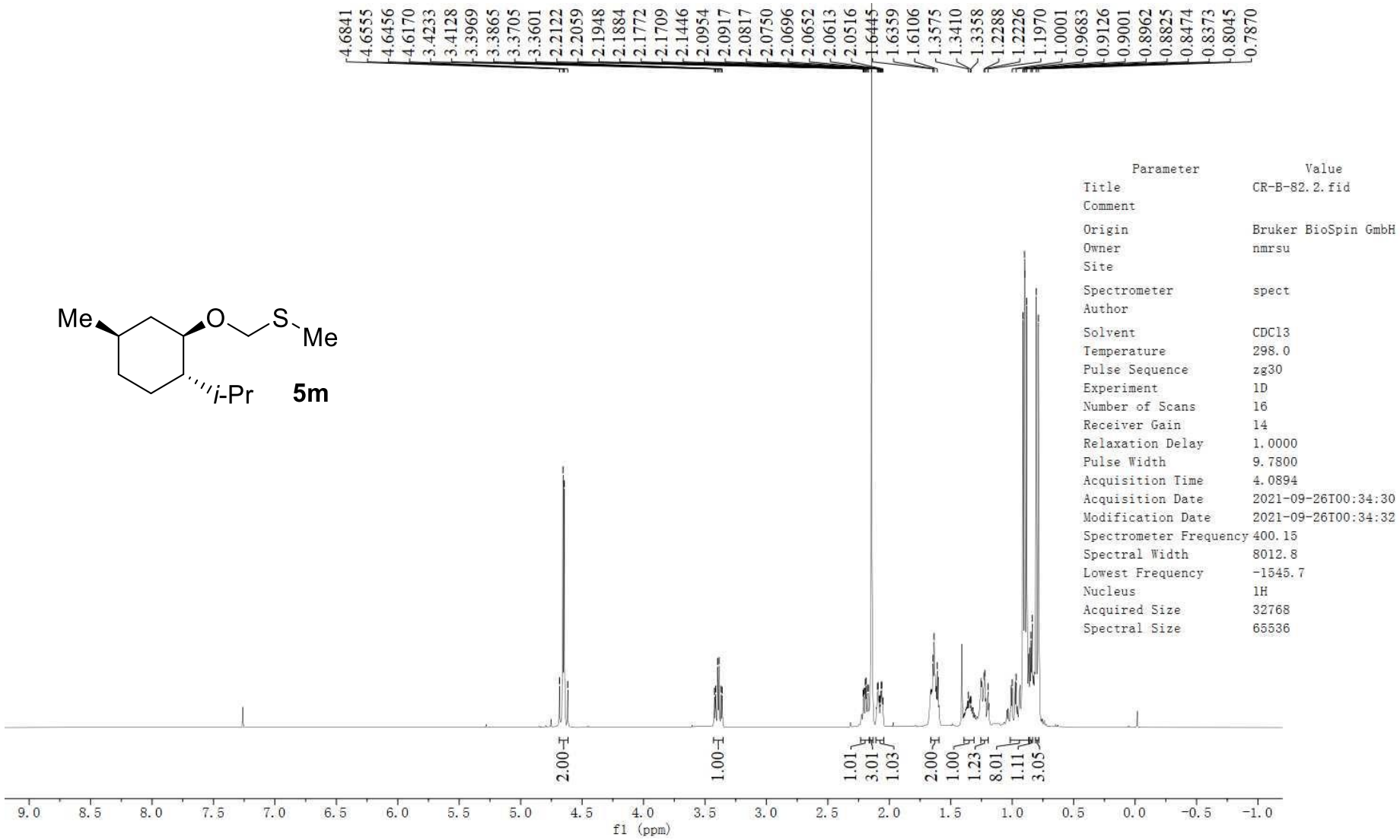

74.47
72.00
32.14
25.86
24.25
13.88
O
S
Me
5j
Parameter Value
Title CR-B-11.8.fid
Comment CR-B-11-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 299.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-09-27T19:16:41
Modification Date 2021-09-27T19:17:00
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1829.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

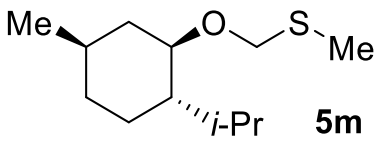

4.6337
3.9208
3.9098
3.8985
3.8920
3.8804
3.8694
3.8523
3.8405
3.8294
3.8184
3.8068
3.4545
3.4476
3.4299
3.4240
3.4182
3.4014
3.3945
2.1233
1.8644
1.8549
1.8436
1.8317
1.8243
1.8206
1.8133
1.6008
1.5910
1.5779
1.5677
1.5561
1.5445
1.5344
1.5215
1.5112
O
O
S
Me
5k
Parameter Value
Title CR-B-58.5.fid
Comment CR-B-58-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 296.9
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 32
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-10-17T16:16:24
Modification Date 2021-10-17T16:15:44
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
2.02
1.00
2.01
3.00
2.01
2.02
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 -1.0
f1 (ppm)


71.78
70.73
65.72
32.21
13.78
O
S
Me
O
5k
Parameter Value
Title CR-B-58.6.fid
Comment CR-B-58-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 297.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-10-17T17:16:24
Modification Date 2021-10-17T17:15:44
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1838.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)


4.6419
4.4433
3.6187
3.6086
3.5984
3.5921
3.5823
3.5724
3.5654
3.5559
3.5463
3.4396
2.1487
2.0469
2.0360
2.0246
2.0103
2.0020
1.9877
1.9774
1.9733
1.9659
1.4395
1.3895
1.3812
1.3634
1.3564
1.3495
1.2138
1.1940
1.1900
1.1857
1.1816
1.1629
1.1571
1.1536
O
S
Me
BocHN
(±)
5l
Parameter Value
Title CR-B-78
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-16T08:50:58
Modification Date 2021-09-16T08:51:00
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1533.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
1.00
1.02
1.00
3.02
4.00
9.02
2.00
2.00
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 -1.0
f1 (ppm)


155.31
79.29
73.69
72.27
49.00
31.17
30.44
28.50
13.78
O
S
Me
BocHN
(±)
5l
Parameter Value
Title CR-B-78
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 300
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-16T09:09:12
Modification Date 2021-09-16T09:09:14
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1948.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

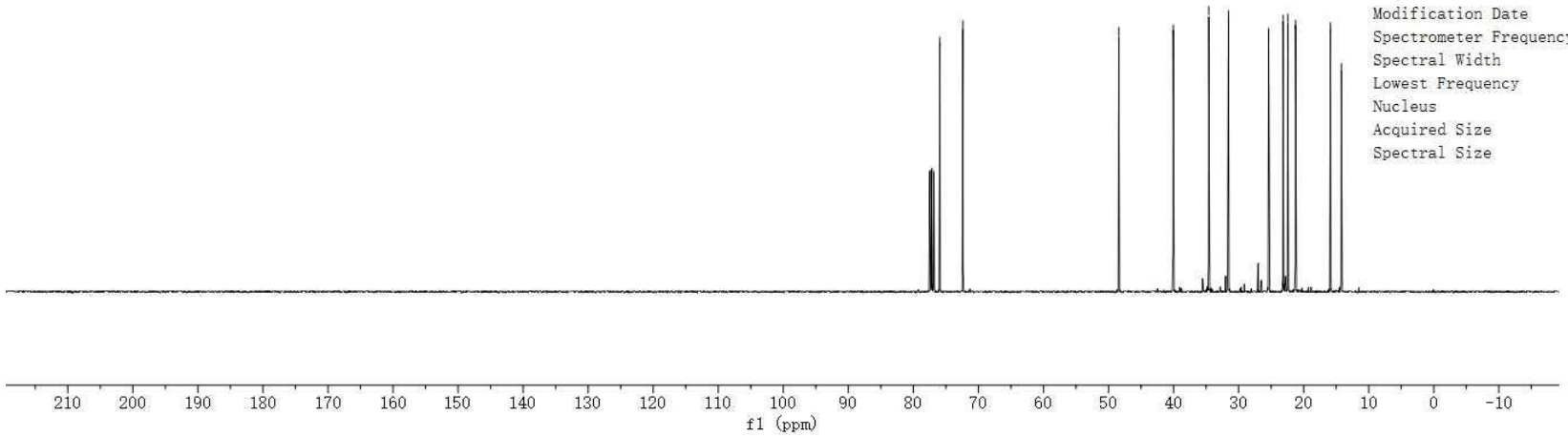

4.6841
4.6555
4.6456
4.6170
3.4233
3.4128
3.3969
3.3865
3.3705
3.3601
2.2122
2.2059
2.1948
2.1884
2.1772
2.1709
2.1446
2.0954
2.0917
2.0817
2.0750
2.0696
2.0652
2.0613
2.0516
1.6445
1.6359
1.6106
1.3575
1.3410
1.3358
1.2288
1.2226
1.1970
1.0001
0.9683
0.9126
0.9001
0.8962
0.8825
0.8474
0.8373
0.8045
0.7870
Me
O
S
Me
i-Pr
5m
Parameter Value
Title CR-B-82.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 14
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-26T00:34:30
Modification Date 2021-09-26T00:34:32
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.7
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
1.00
1.01
3.01
1.03
2.00
1.00
1.23
8.01
1.11
3.05
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
-1.0
f1 (ppm)

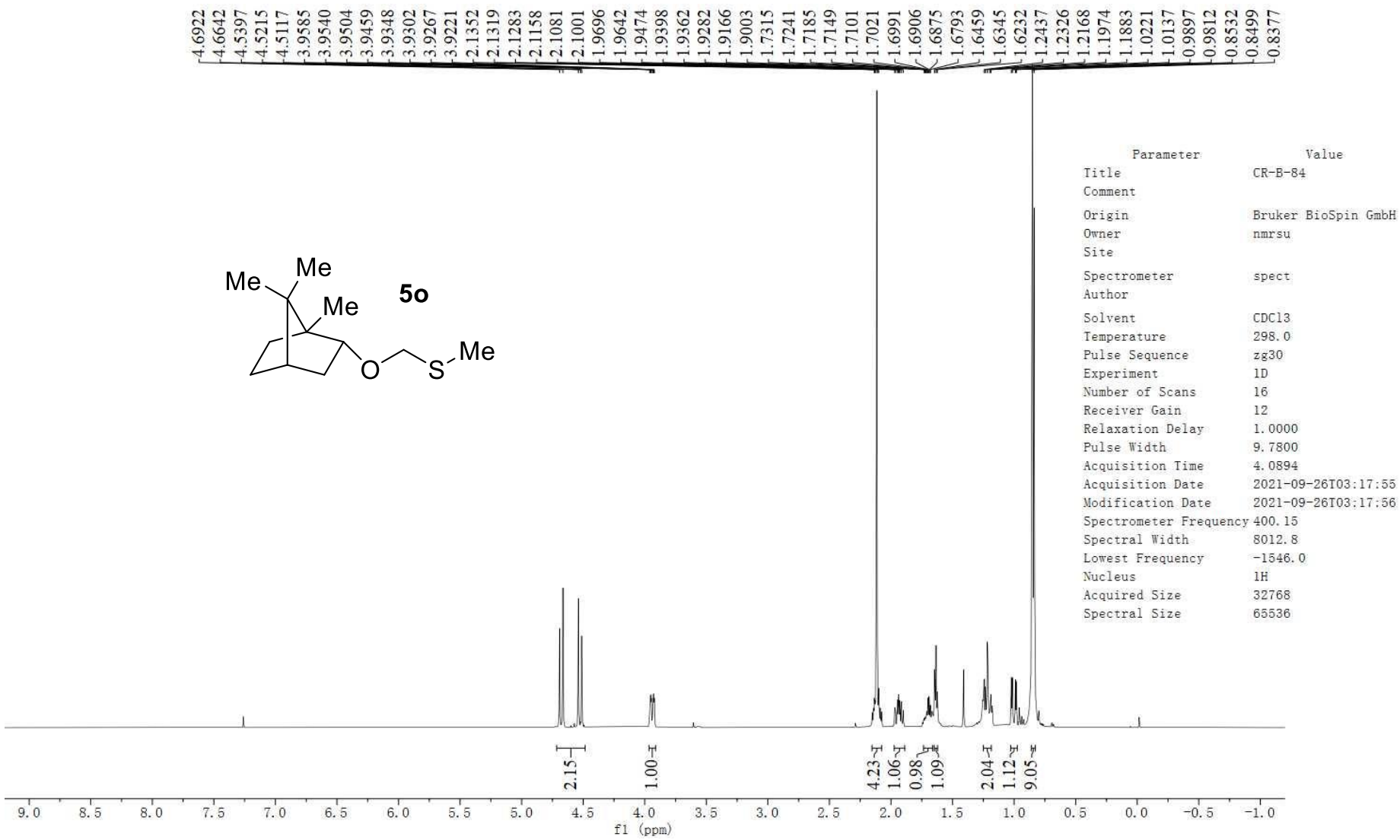


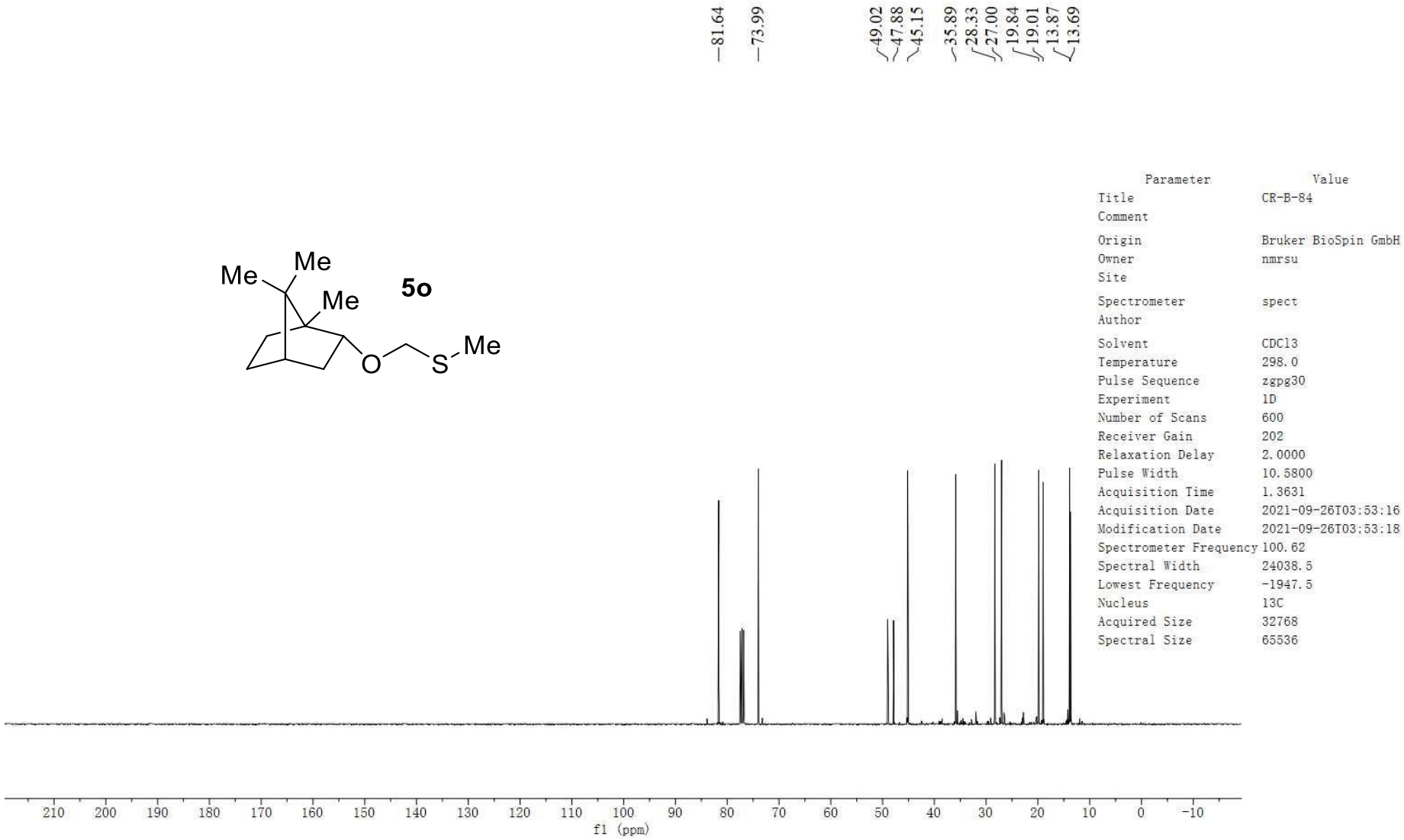
5m

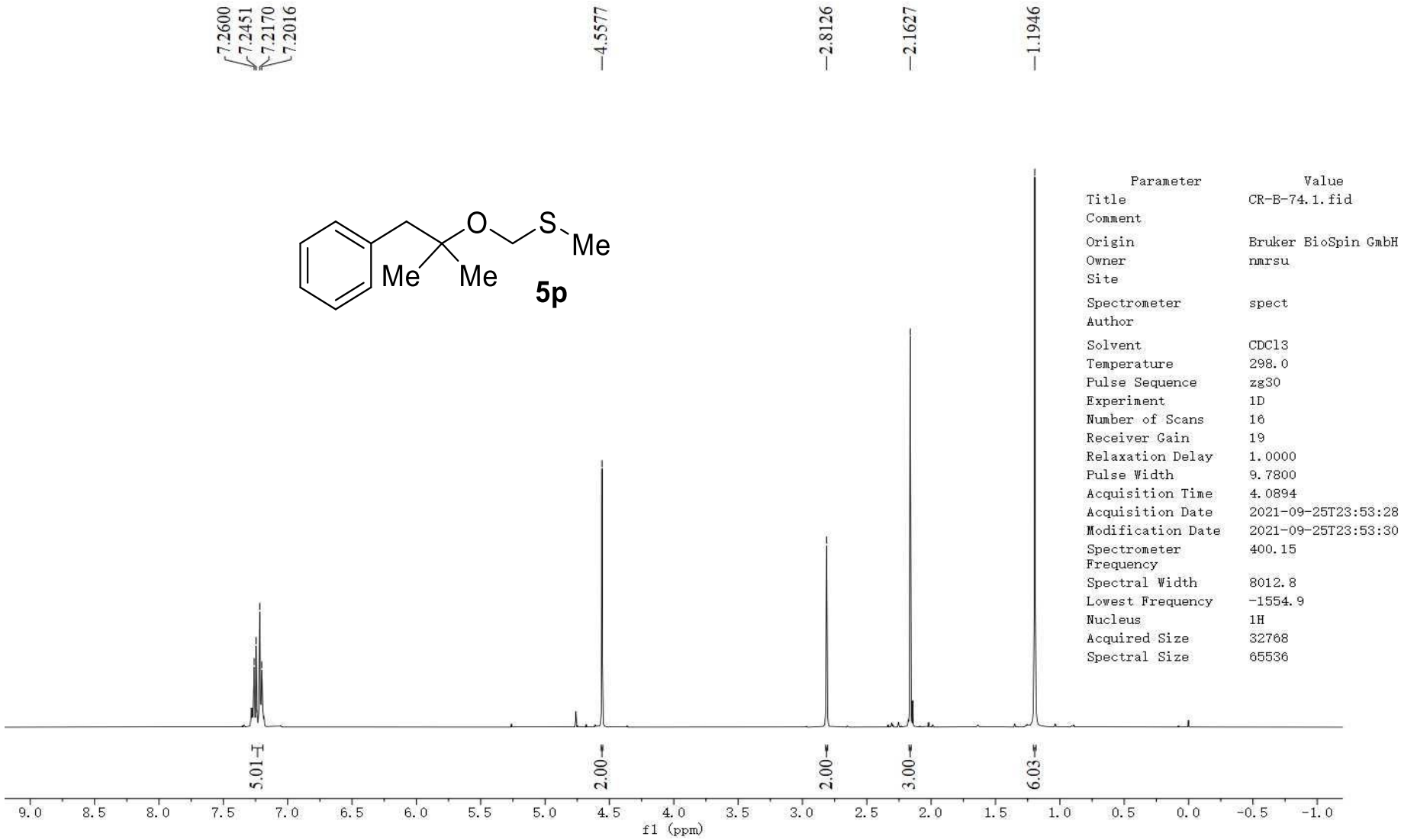
75.94
72.39
48.43
40.04
34.59
31.56
25.39
23.17
22.44
21.25
15.88
14.20

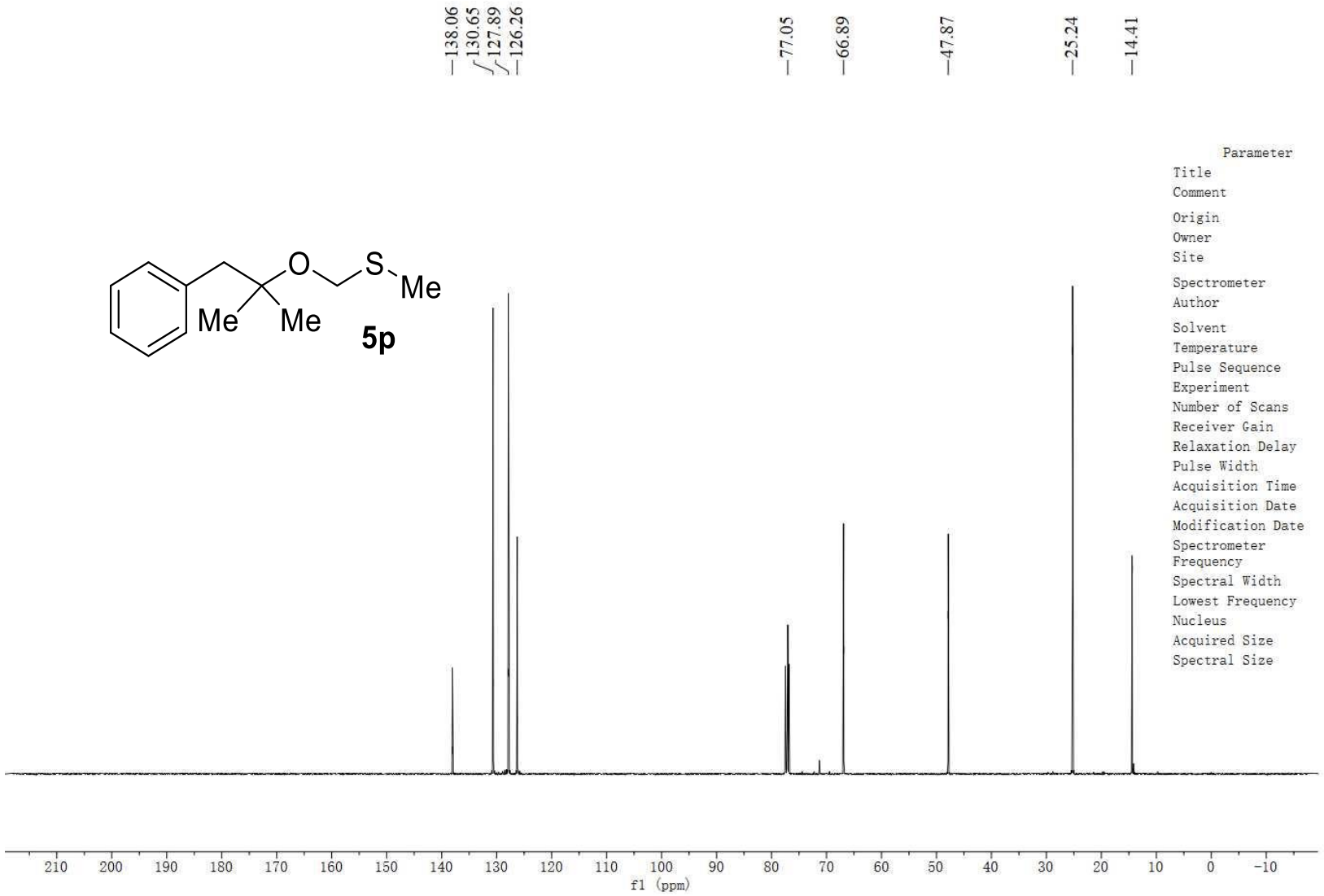
Parameter	Value
Title	CR-B-82.3.fid
Comment	
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Site	
Spectrometer	spect
Author	
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zgpg30
Experiment	1D
Number of Scans	600
Receiver Gain	202
Relaxation Delay	2.0000
Pulse Width	10.5800
Acquisition Time	1.3631
Acquisition Date	2021-09-26T01:09:52
Modification Date	2021-09-26T01:09:54
Spectrometer Frequency	100.63
Spectral Width	24038.5
Lowest Frequency	-1946.4
Nucleus	13C
Acquired Size	32768
Spectral Size	65536

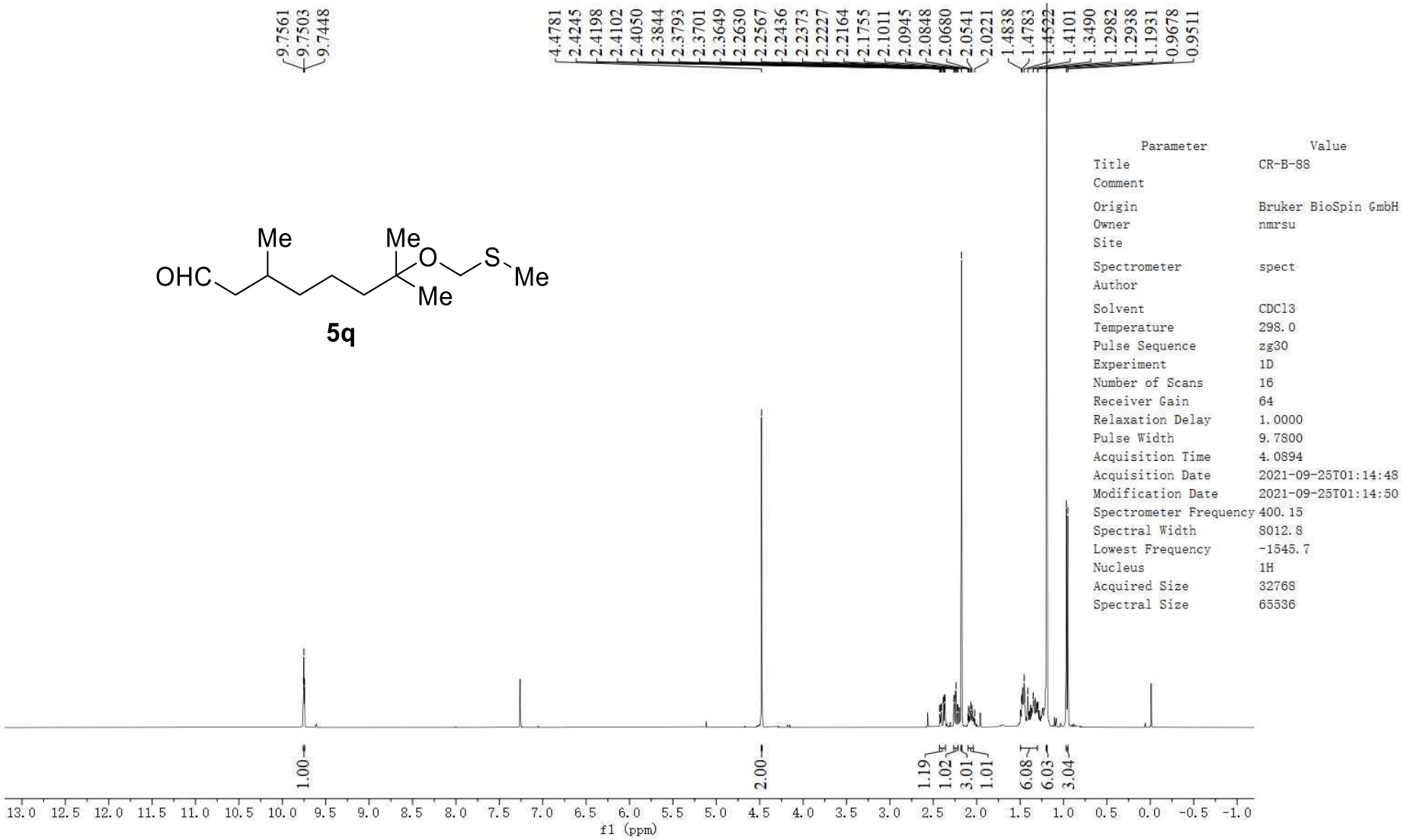


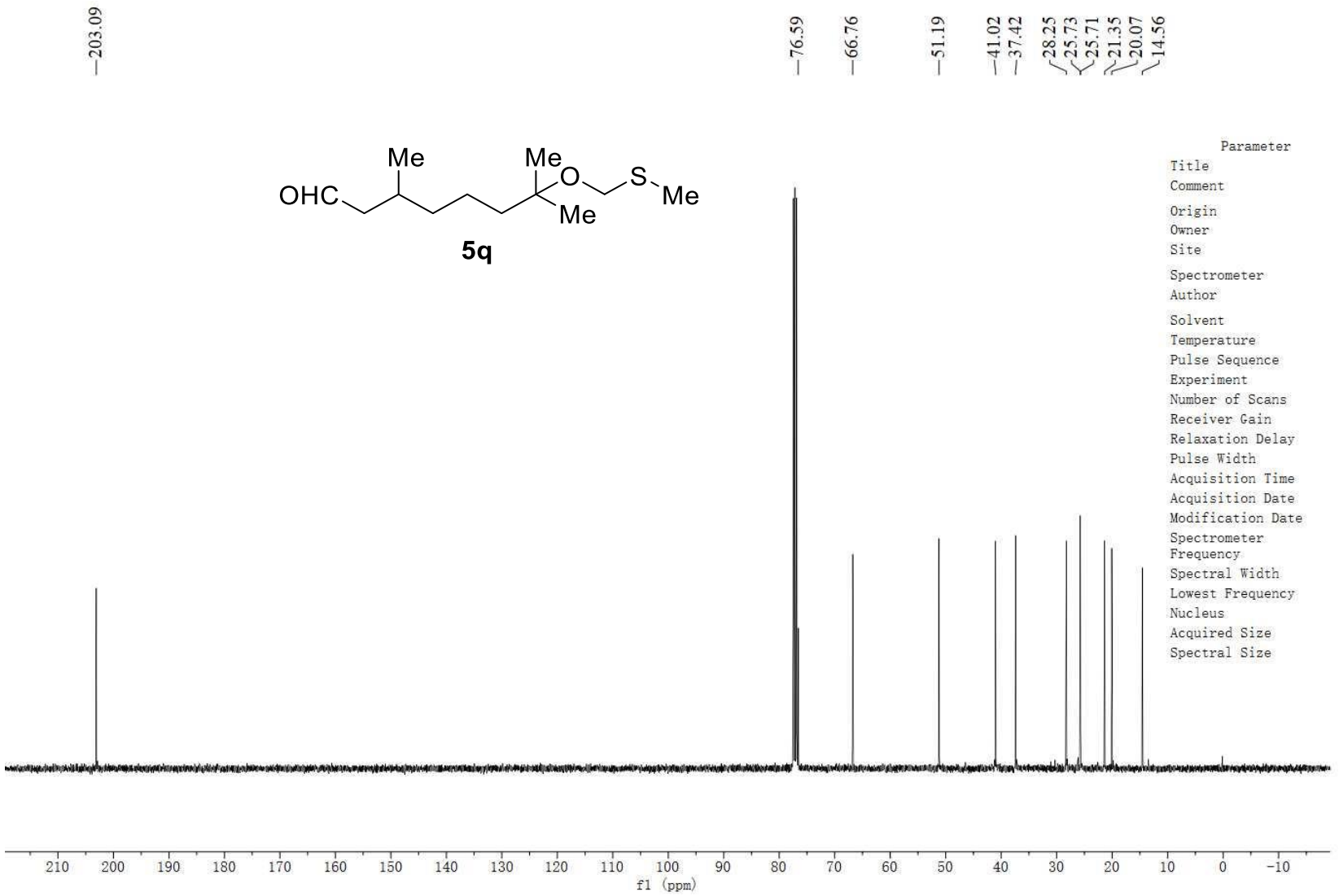

4.6922
4.6642
4.5397
4.5215
4.5117
3.9585
3.9540
3.9504
3.9459
3.9348
3.9302
3.9267
3.9221
2.1352
2.1319
2.1283
2.1158
2.1081
2.1001
1.9696
1.9642
1.9474
1.9398
1.9362
1.9282
1.9166
1.9003
1.7315
1.7241
1.7185
1.7149
1.7101
1.7021
1.6991
1.6906
1.6875
1.6793
1.6459
1.6345
1.6232
1.2437
1.2326
1.2168
1.1974
1.1883
1.0221
1.0137
0.9897
0.9812
0.8532
0.8499
0.8377
Me
Me
Me
5o
O
S
Me
Parameter Value
Title CR-B-84
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 12
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-26T03:17:55
Modification Date 2021-09-26T03:17:56
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1546.0
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.15
1.00
4.23
1.06
0.98
1.09
2.04
1.12
9.05
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 -1.0
f1 (ppm)

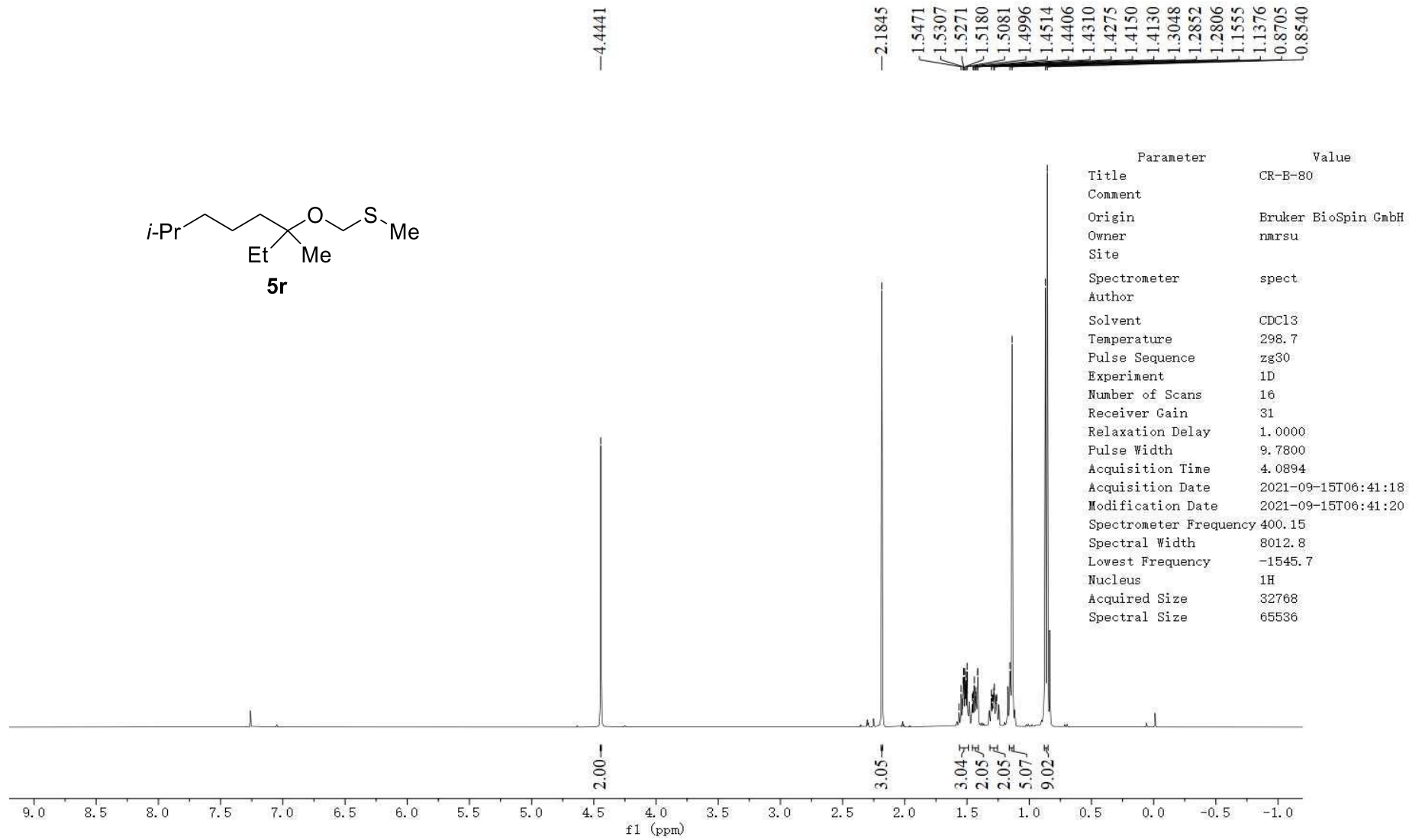

81.64
73.99
49.02
47.88
45.15
35.89
28.33
27.00
19.84
19.01
13.87
13.69
Me
Me
Me
5o
O
S
Me
Parameter Value
Title CR-B-84
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-26T03:53:16
Modification Date 2021-09-26T03:53:18
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1947.5
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

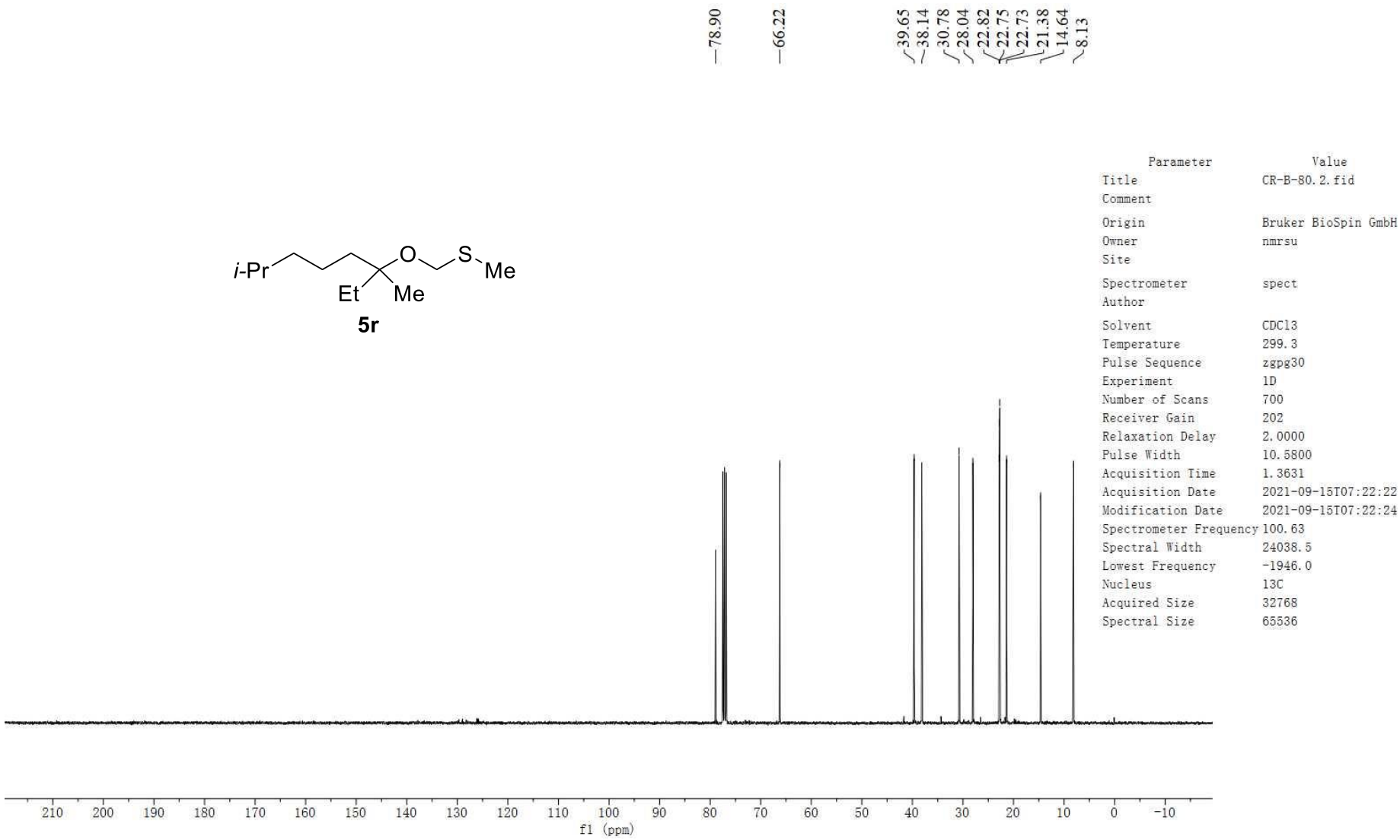

7.2600
7.2451
7.2170
7.2016
4.5577
2.8126
2.1627
1.1946
O
S
Me
Me
Me
5p
Parameter Value
Title CR-B-74.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 19
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-25T23:53:28
Modification Date 2021-09-25T23:53:30
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1554.9
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
5.01
2.00
2.00
3.00
6.03
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 -1.0
f1 (ppm)

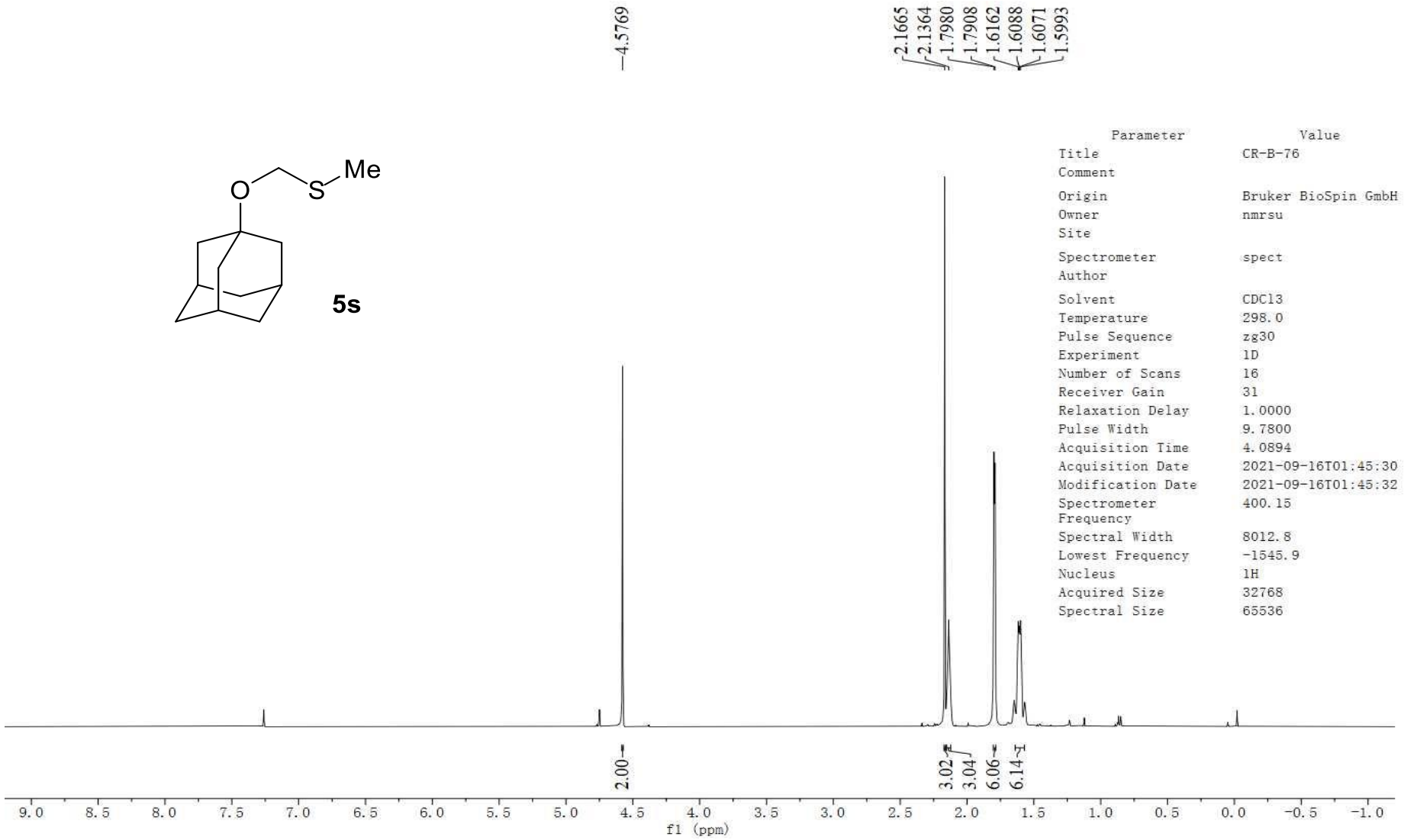

138.06
130.65
127.89
126.26
77.05
66.89
47.87
25.24
14.41
O
S
Me
Me
Me
5p
Parameter Value
Title CR-B-74.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-26T00:28:49
Modification Date 2021-09-26T00:28:50
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1955.5
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

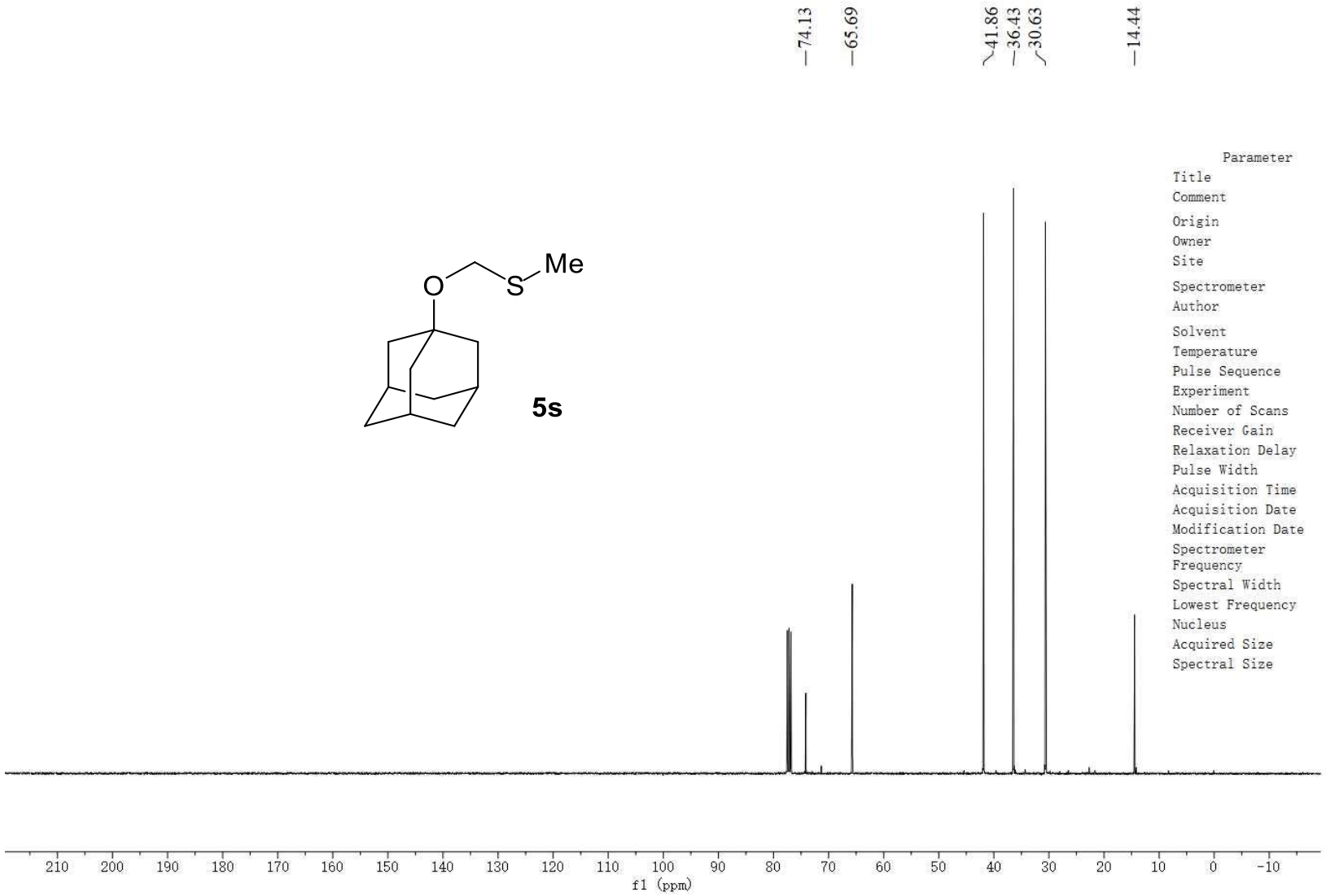

9.7561
9.7503
9.7448
4.4781
2.4245
2.4198
2.4102
2.4050
2.3844
2.3793
2.3701
2.3649
2.2630
2.2567
2.2436
2.2373
2.2227
2.2164
2.1755
2.1011
2.0945
2.0848
2.0680
2.0541
2.0221
1.4838
1.4783
1.4522
1.4101
1.3490
1.2982
1.2938
1.1931
0.9678
0.9511
OHC
Me
Me
O
S
Me
Me
5q
Parameter Value
Title CR-B-88
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 64
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-25T01:14:48
Modification Date 2021-09-25T01:14:50
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.7
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
2.00
1.19
1.02
3.01
1.01
6.08
6.03
3.04
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

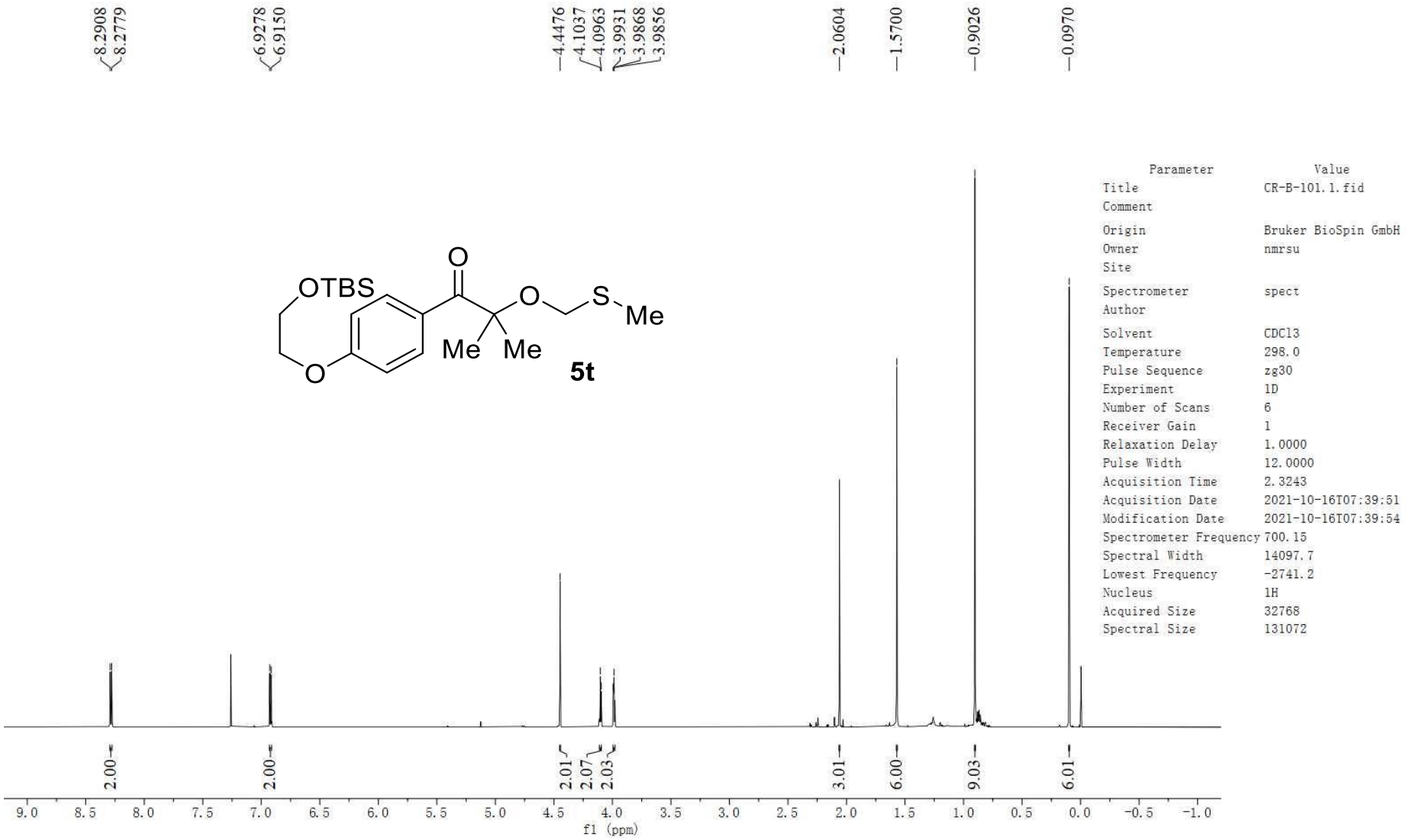

203.09
76.59
66.76
51.19
41.02
37.42
28.25
25.73
25.71
21.35
20.07
14.56
OHC
Me
Me
O
S
Me
Me
5q
Parameter Value
Title CR-B-88
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-25T01:50:09
Modification Date 2021-09-25T01:50:10
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1945.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

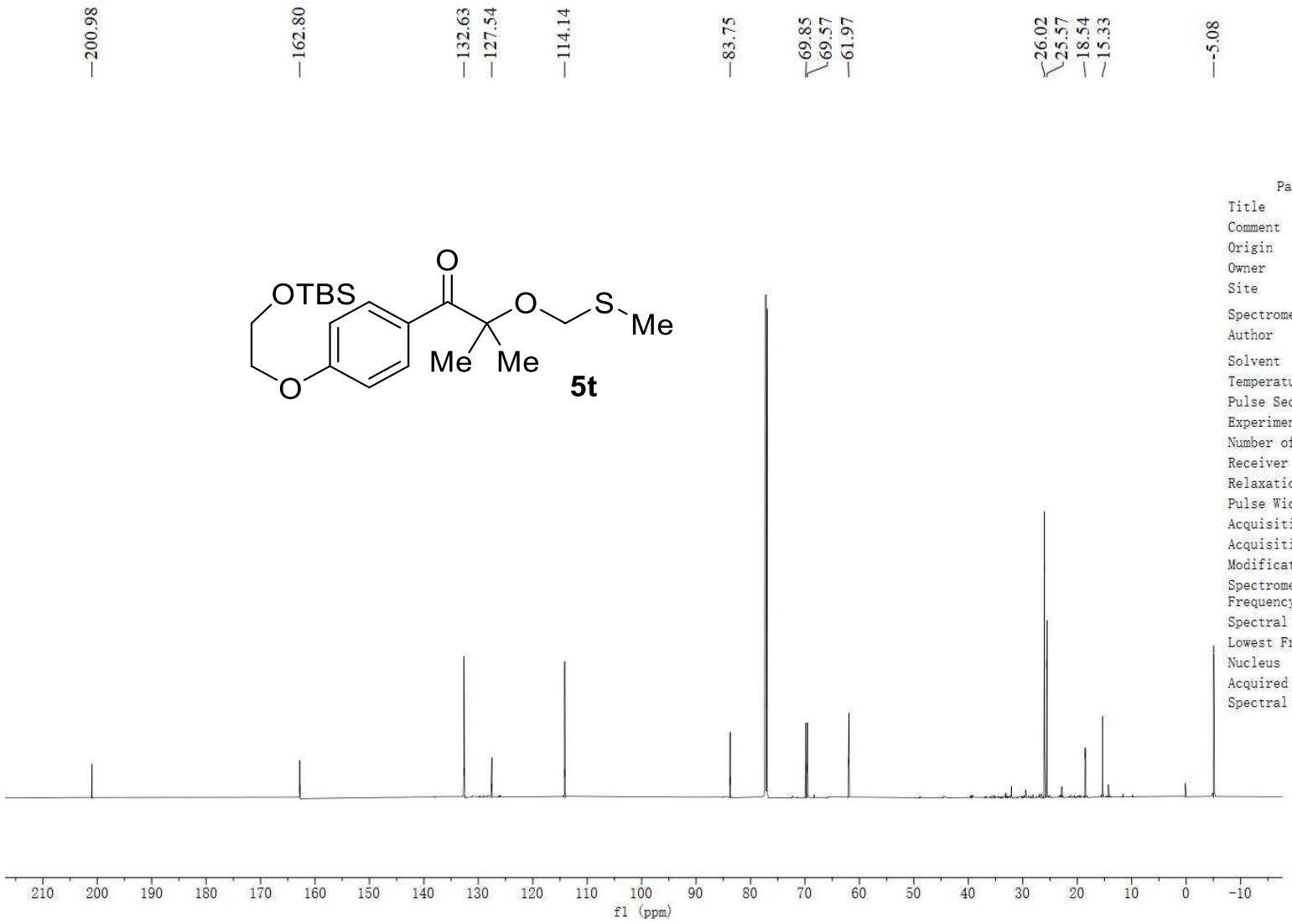

4.4441
2.1845
1.5471
1.5307
1.5271
1.5180
1.5081
1.4996
1.4514
1.4406
1.4310
1.4275
1.4150
1.4130
1.3048
1.2852
1.2806
1.1555
1.1376
0.8705
0.8540
i-Pr
O
S
Me
Et
Me
5r
Parameter Value
Title CR-B-80
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.7
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-15T06:41:18
Modification Date 2021-09-15T06:41:20
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.7
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
3.05
3.04
2.05
2.05
5.07
9.02
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 -1.0
f1 (ppm)


78.90
66.22
39.65
38.14
30.78
28.04
22.82
22.75
22.73
21.38
14.64
8.13
i-Pr
O
S
Me
Et
Me
5r
Parameter Value
Title CR-B-80.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 299.3
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-15T07:22:22
Modification Date 2021-09-15T07:22:24
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1946.0
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

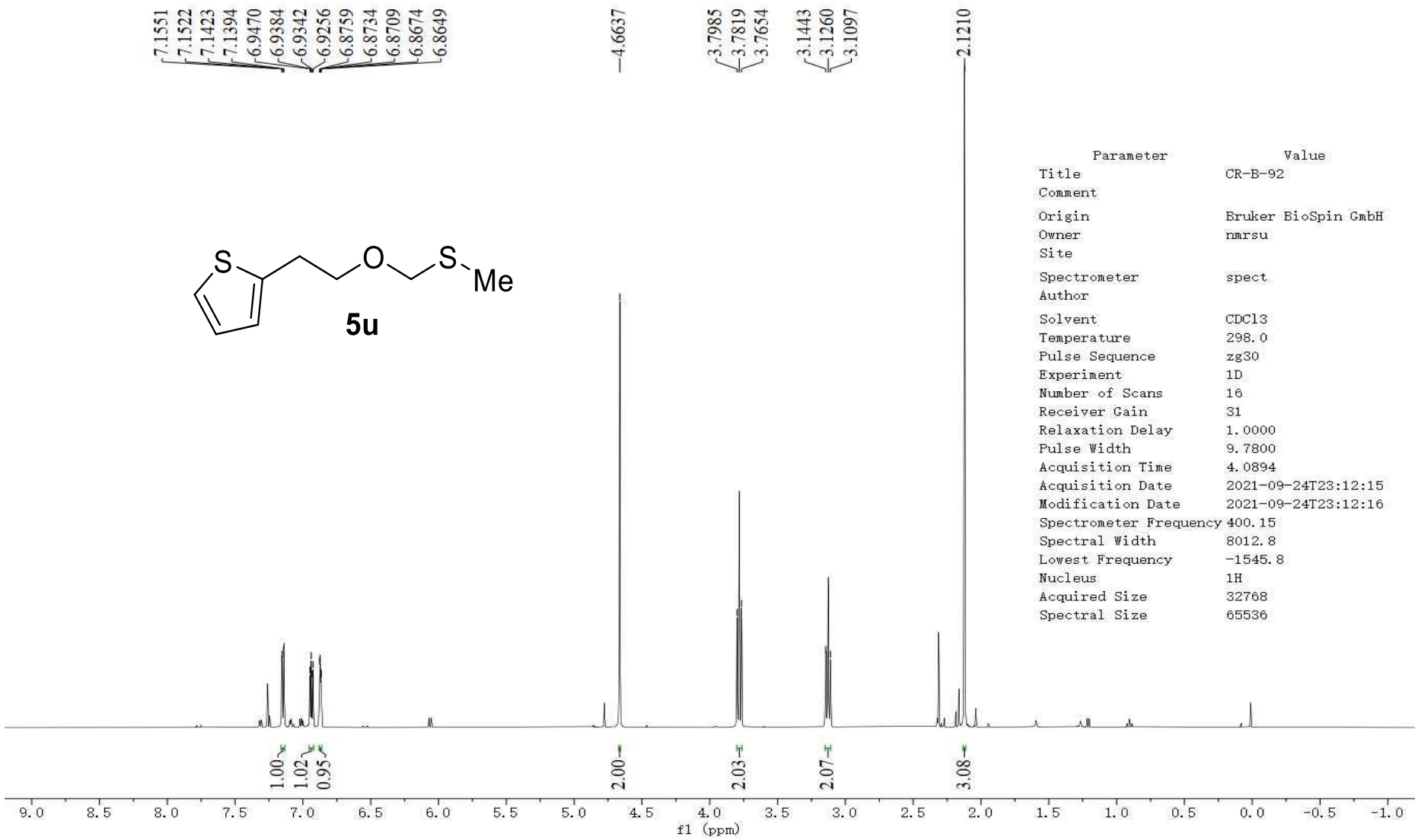

4.5769
2.1665
2.1364
1.7980
1.7908
1.6162
1.6088
1.6071
1.5993
O
S
Me
5s
Parameter Value
Title CR-B-76
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-16T01:45:30
Modification Date 2021-09-16T01:45:32
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.9
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
3.02
3.04
6.06
6.14
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 -1.0
f1 (ppm)

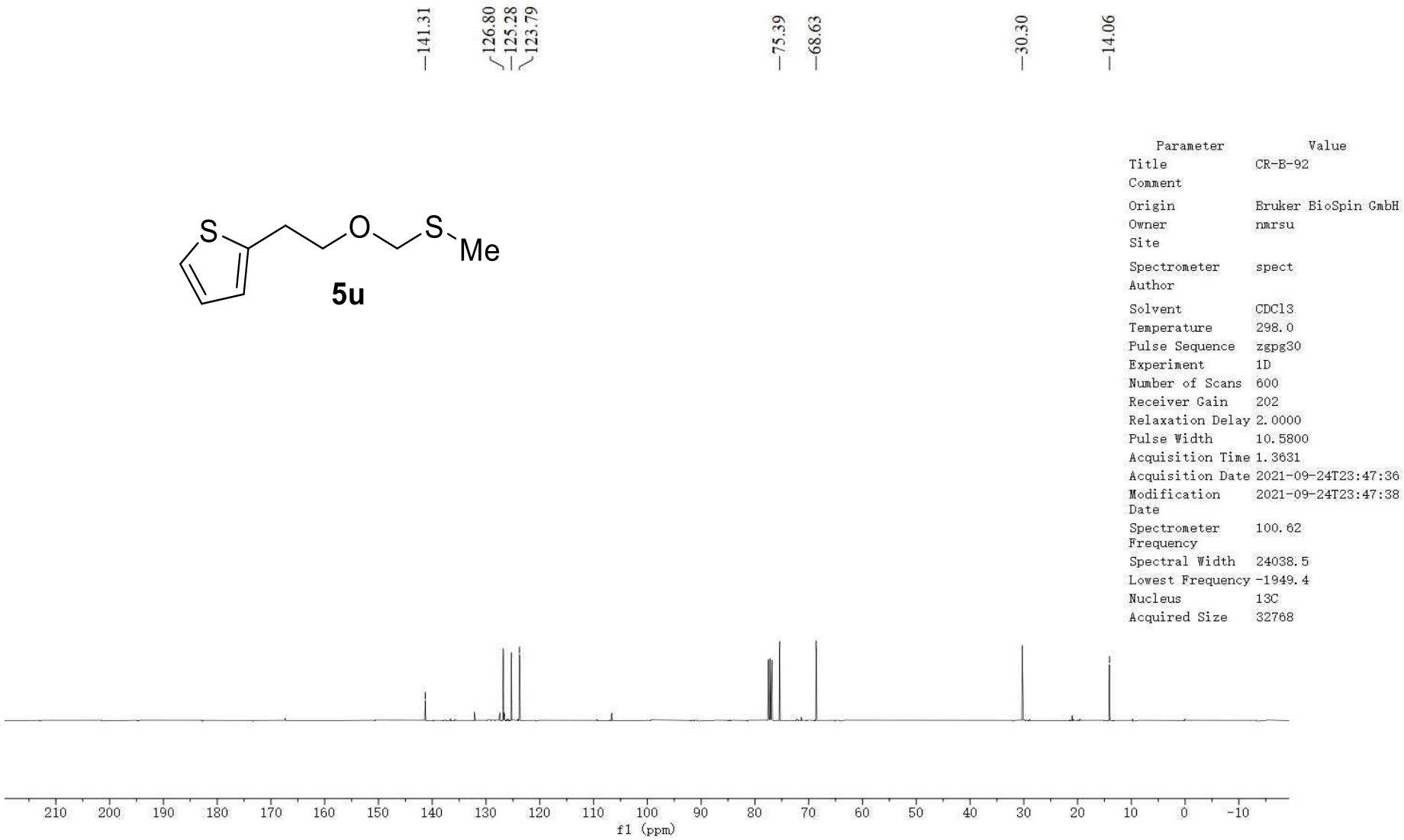

74.13
65.69
41.86
36.43
30.63
14.44
O
S
Me
5s
Parameter Value
Title CR-B-76
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.3
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 500
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-16T02:15:09
Modification Date 2021-09-16T02:15:10
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1949.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

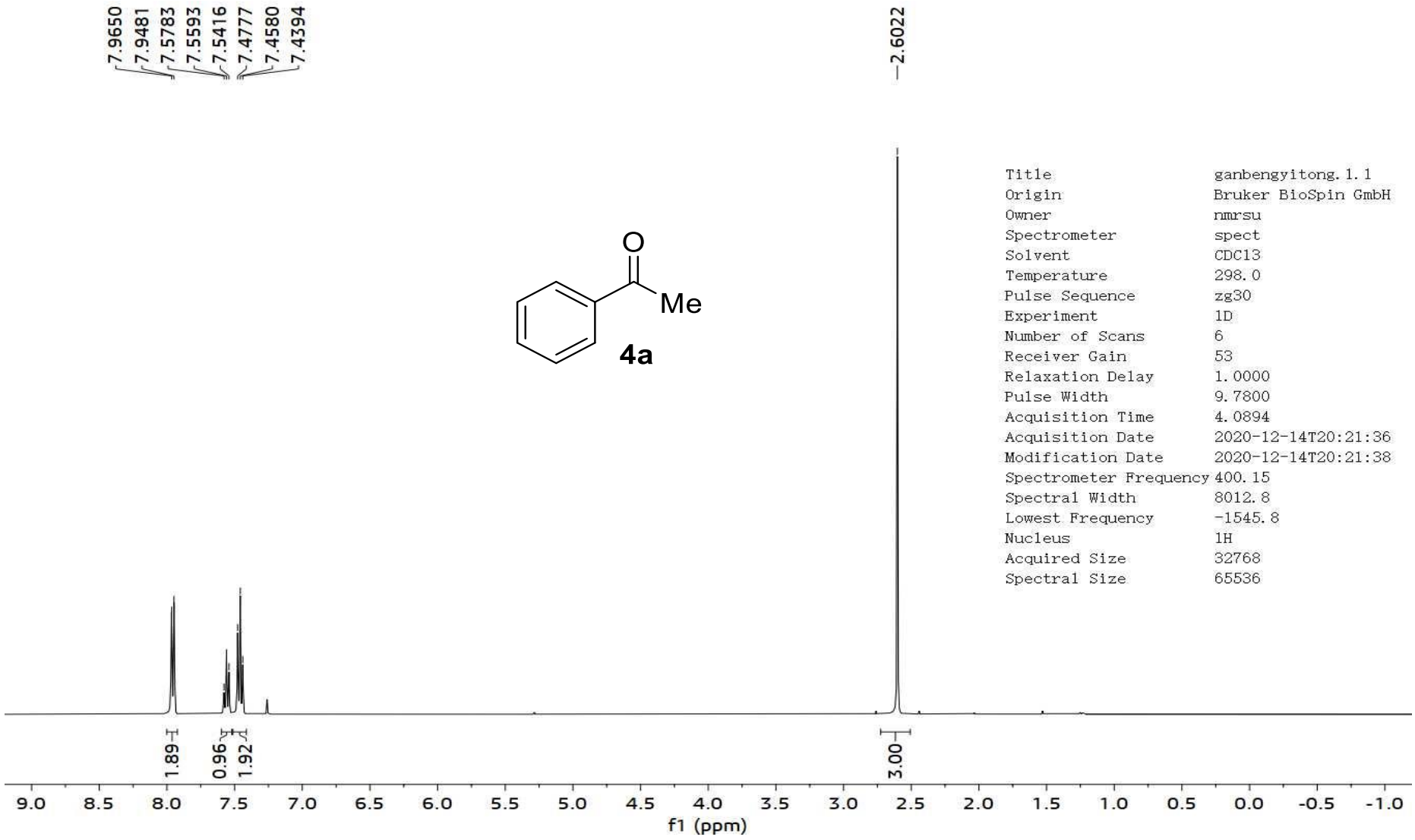

8.2908
8.2779
6.9278
6.9150
4.4476
4.1037
4.0963
3.9931
3.9868
3.9856
2.0604
1.5700
0.9026
0.0970
OTBS
O
O
S
Me
Me
Me
O
5t
Parameter Value
Title CR-B-101.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 1
Relaxation Delay 1.0000
Pulse Width 12.0000
Acquisition Time 2.3243
Acquisition Date 2021-10-16T07:39:51
Modification Date 2021-10-16T07:39:54
Spectrometer Frequency 700.15
Spectral Width 14097.7
Lowest Frequency -2741.2
Nucleus 1H
Acquired Size 32768
Spectral Size 131072
2.00
2.00
2.01
2.07
2.03
3.01
6.00
9.03
6.01
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 -1.0
f1 (ppm)

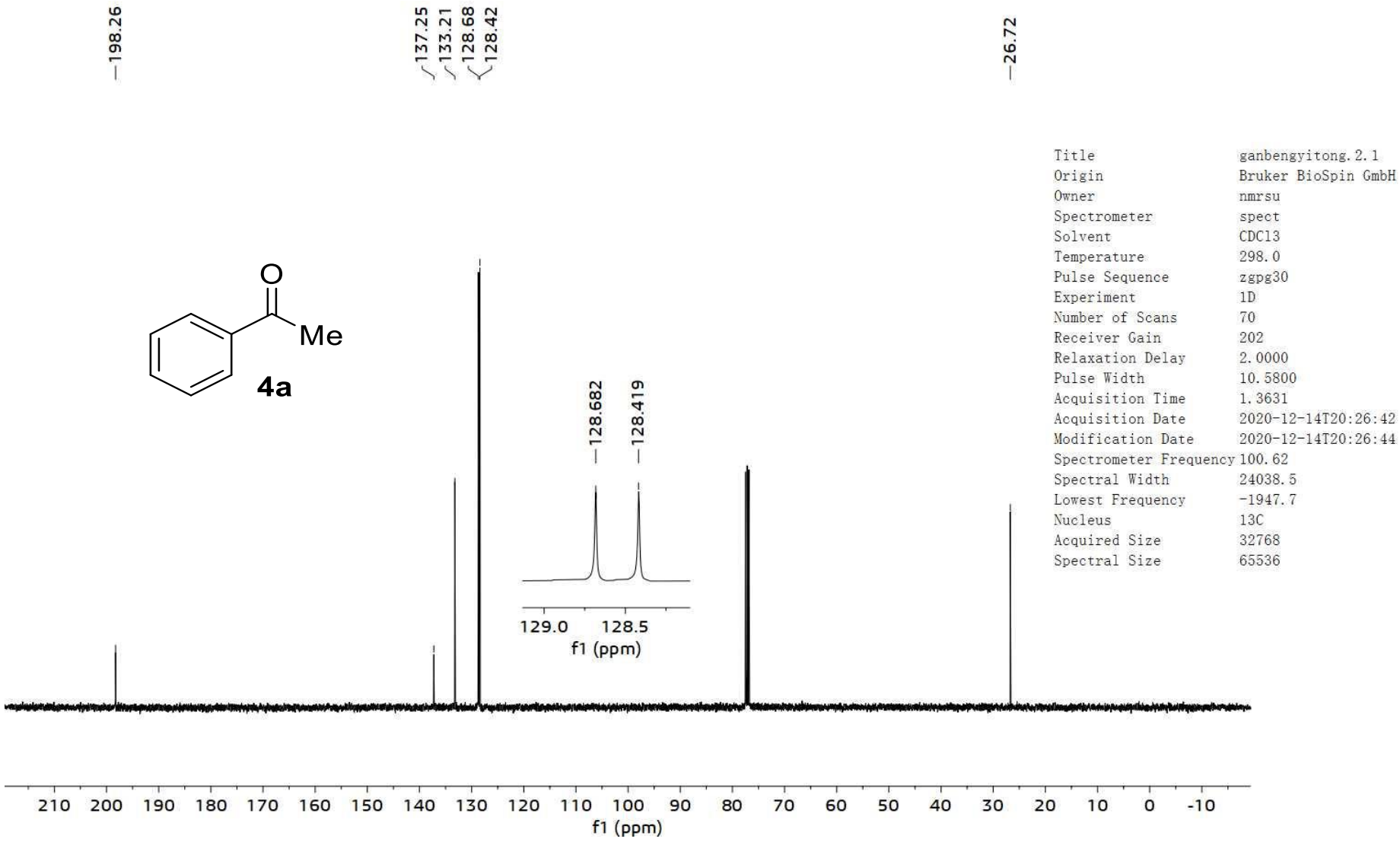


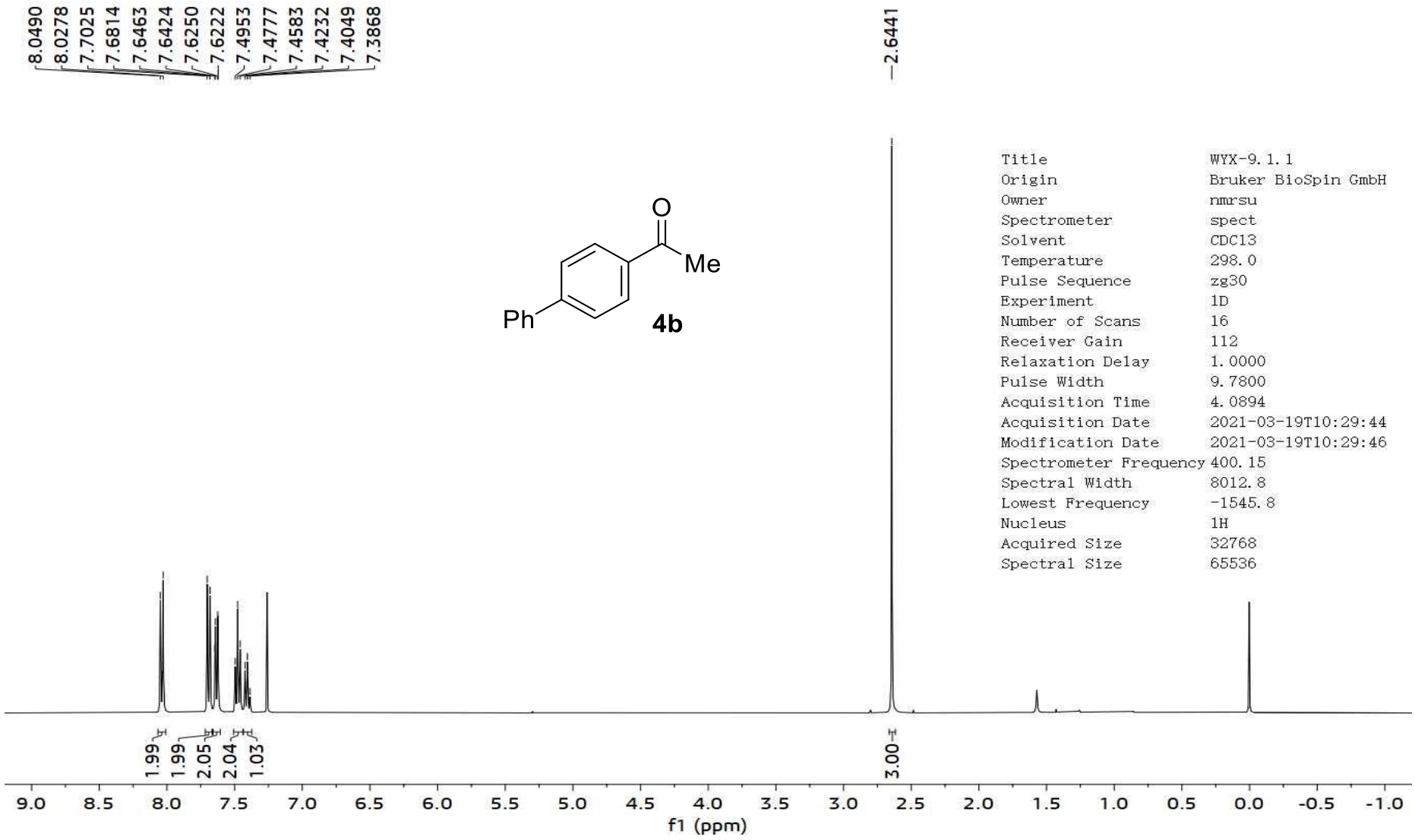
Parameter	Value
Title	CR-B-101.2.fid
Comment	13C
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Site	
Spectrometer	spect
Author	
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zgpg30
Experiment	1D
Number of Scans	500
Receiver Gain	188
Relaxation Delay	2.0000
Pulse Width	12.0000
Acquisition Time	0.7690
Acquisition Date	2021-10-16T08:03:47
Modification Date	2021-10-16T08:03:50
Spectrometer Frequency	176.07
Spectral Width	42613.6
Lowest Frequency	-3678.4
Nucleus	13C
Acquired Size	32768
Spectral Size	65536

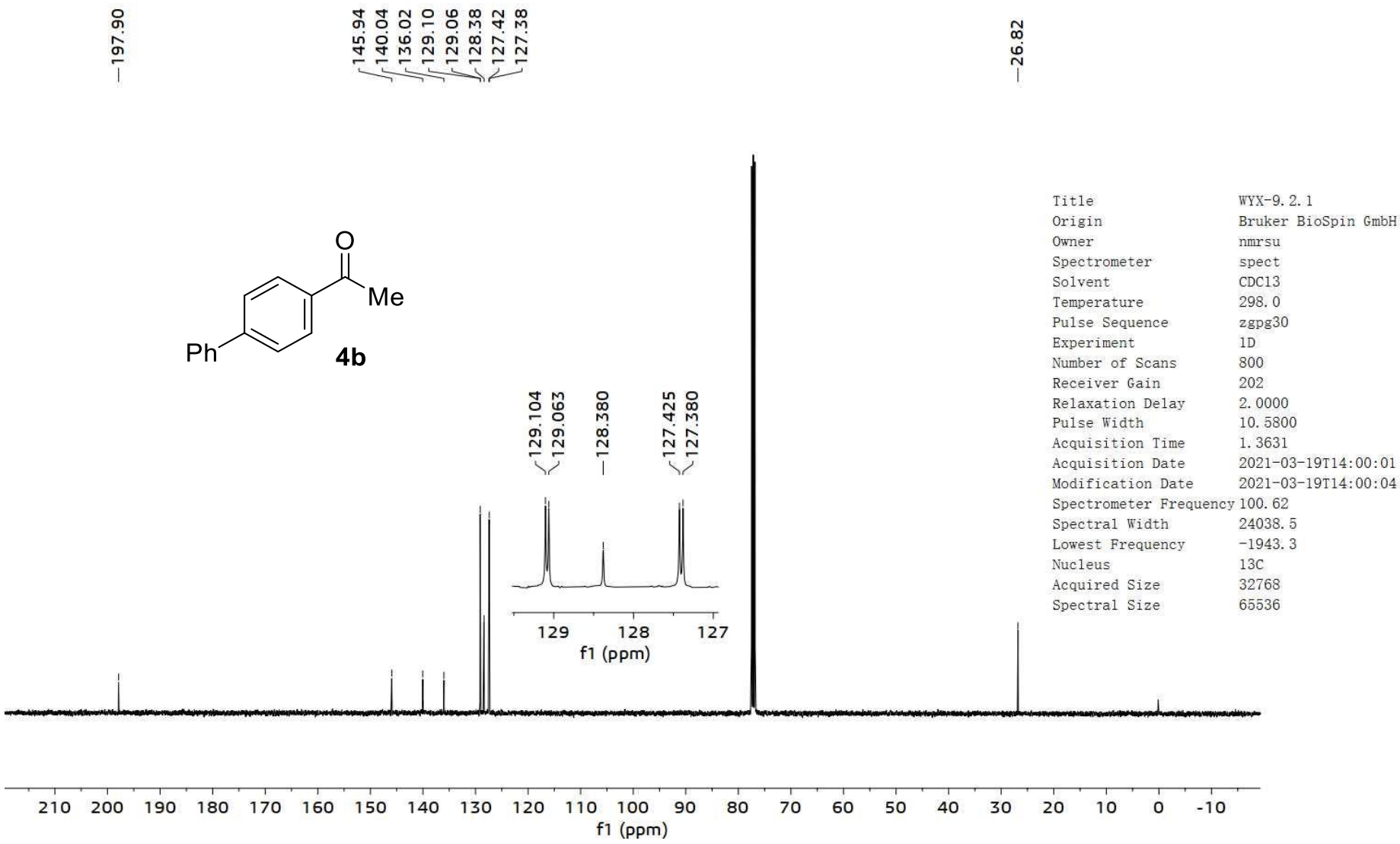

7.1551
7.1522
7.1423
7.1394
6.9470
6.9384
6.9342
6.9256
6.8759
6.8734
6.8709
6.8674
6.8649
4.6637
3.7985
3.7819
3.7654
3.1443
3.1260
3.1097
2.1210
S
O
S
Me
5u
Parameter Value
Title CR-B-92
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-24T23:12:15
Modification Date 2021-09-24T23:12:16
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.02
0.95
2.00
2.03
2.07
3.08
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 -1.0
f1 (ppm)

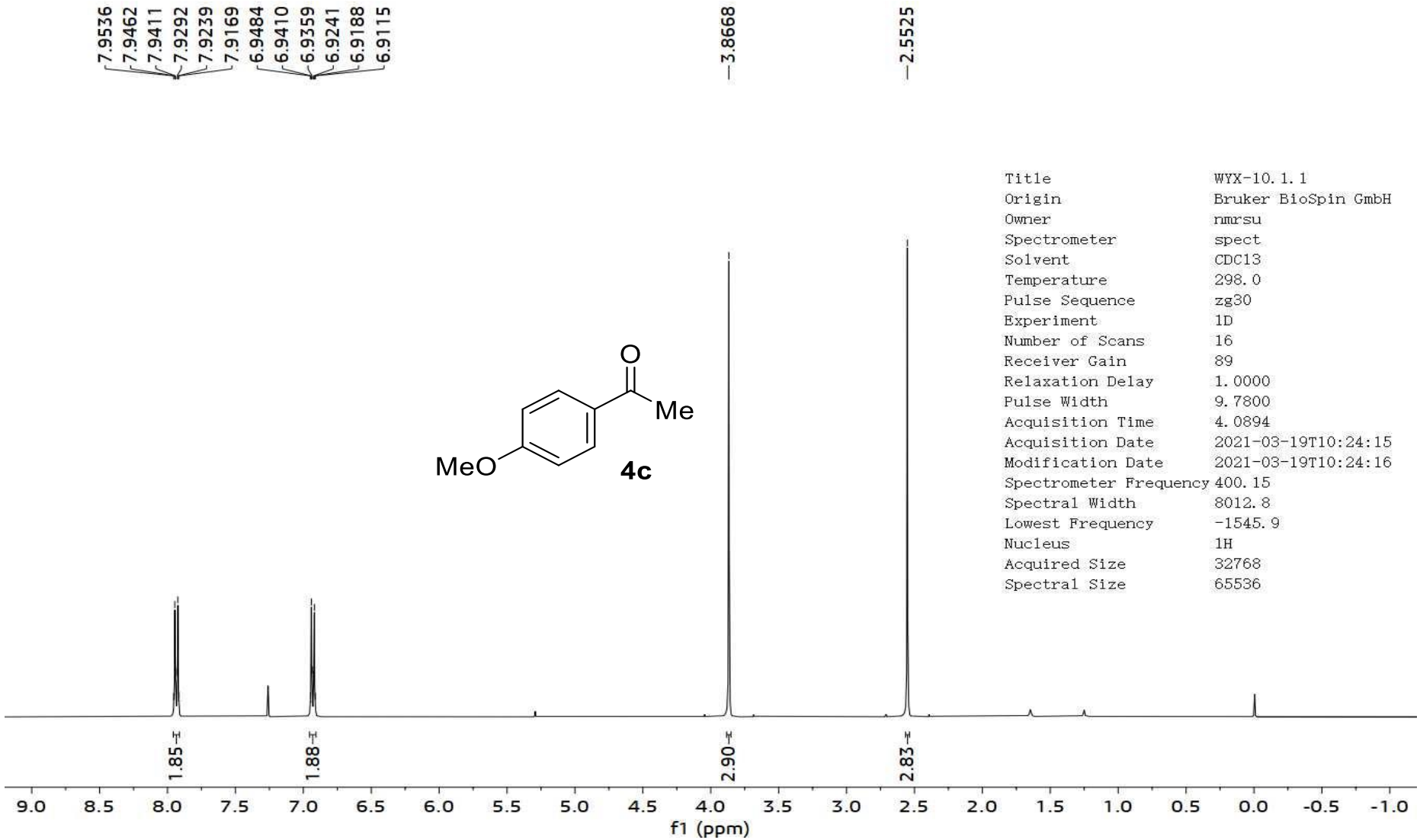

141.31
126.80
125.28
123.79
75.39
68.63
30.30
14.06
S
O
S
Me
5u
Parameter Value
Title CR-B-92
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-24T23:47:36
Modification Date 2021-09-24T23:47:38
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1949.4
Nucleus 13C
Acquired Size 32768
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)

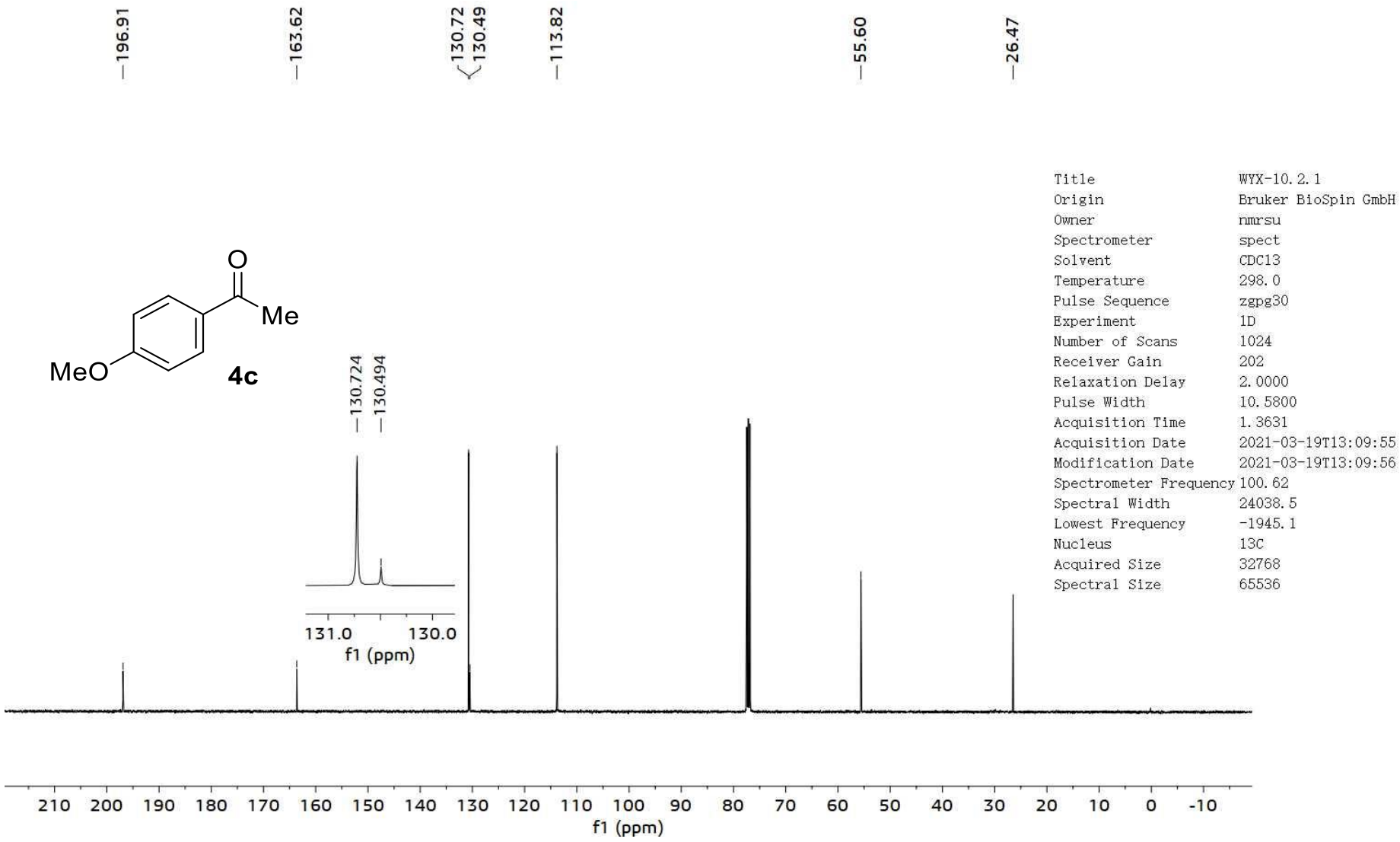

7.9650
7.9481
7.5783
7.5593
7.5416
7.4777
7.4580
7.4394
2.6022
O
Me
4a
Title ganbengyitong.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 53
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2020-12-14T20:21:36
Modification Date 2020-12-14T20:21:38
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.89
0.96
1.92
3.00
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 -1.0
f1 (ppm)

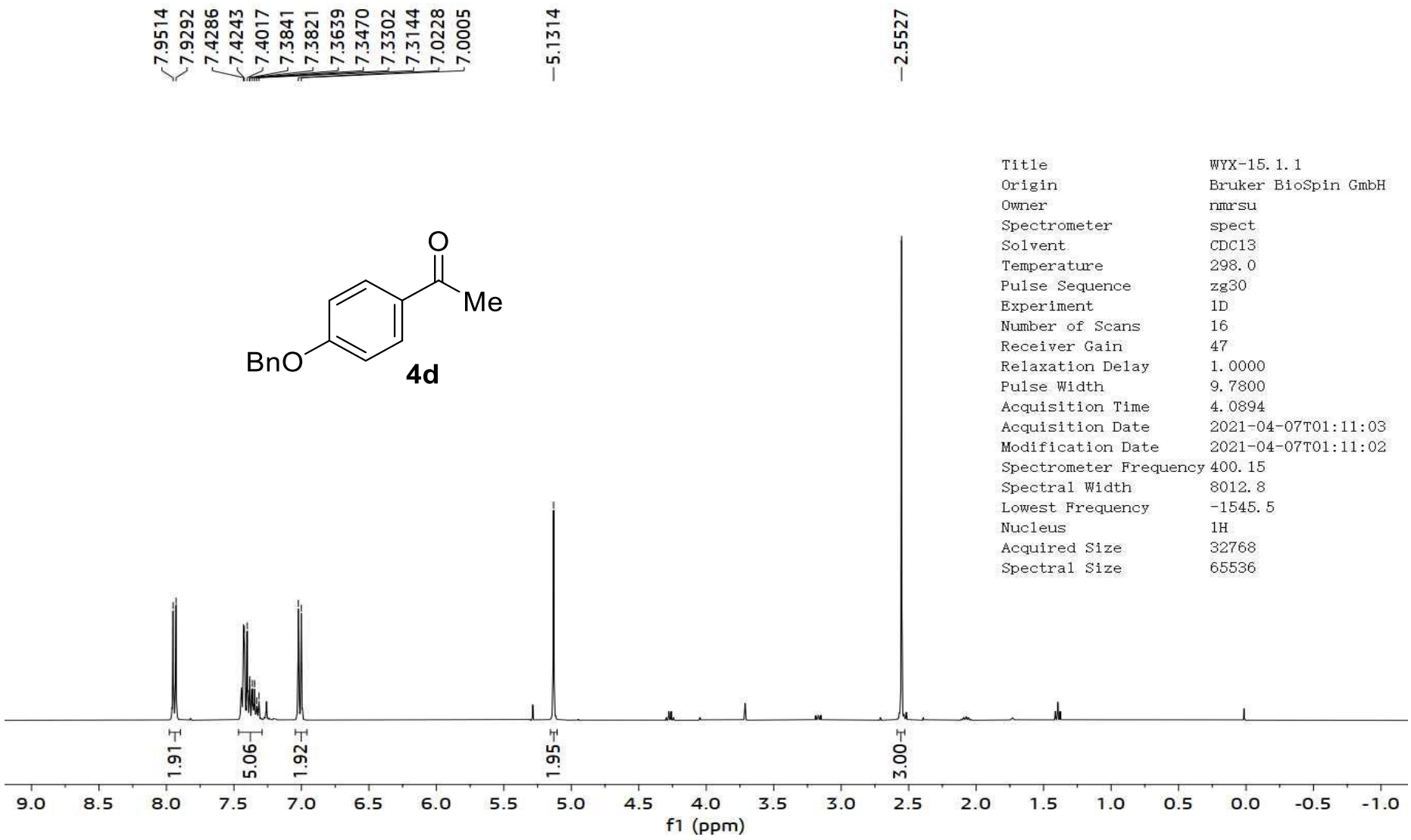

198.26
137.25
133.21
128.68
128.42
26.72
O
Me
4a
128.682
128.419
129.0
128.5
f1 (ppm)
Title ganbengyitong.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 70
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2020-12-14T20:26:42
Modification Date 2020-12-14T20:26:44
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1947.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

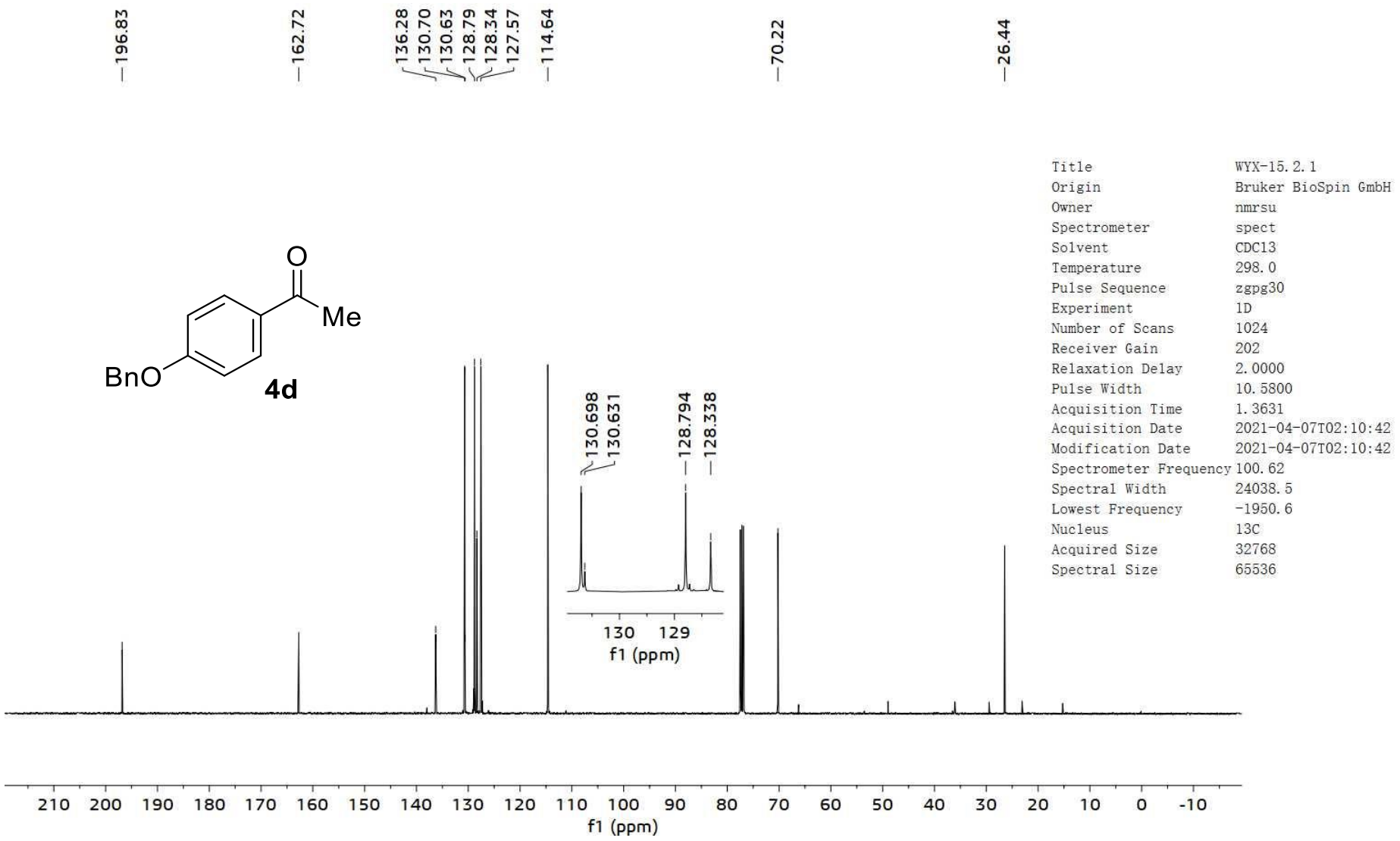

8.0490
8.0278
7.7025
7.6814
7.6463
7.6424
7.6250
7.6222
7.4953
7.4777
7.4583
7.4232
7.4049
7.3868
2.6441
O
Me
Ph
4b
Title WYX-9.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 112
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-03-19T10:29:44
Modification Date 2021-03-19T10:29:46
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.99
1.99
2.05
2.04
1.03
3.00
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 -1.0
f1 (ppm)


197.90
145.94
140.04
136.02
129.10
129.06
128.38
127.42
127.38
26.82
O
Me
Ph
4b
129.104
129.063
128.380
127.425
127.380
129
128
127
f1 (ppm)
Title WYX-9.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 800
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-03-19T14:00:01
Modification Date 2021-03-19T14:00:04
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1943.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

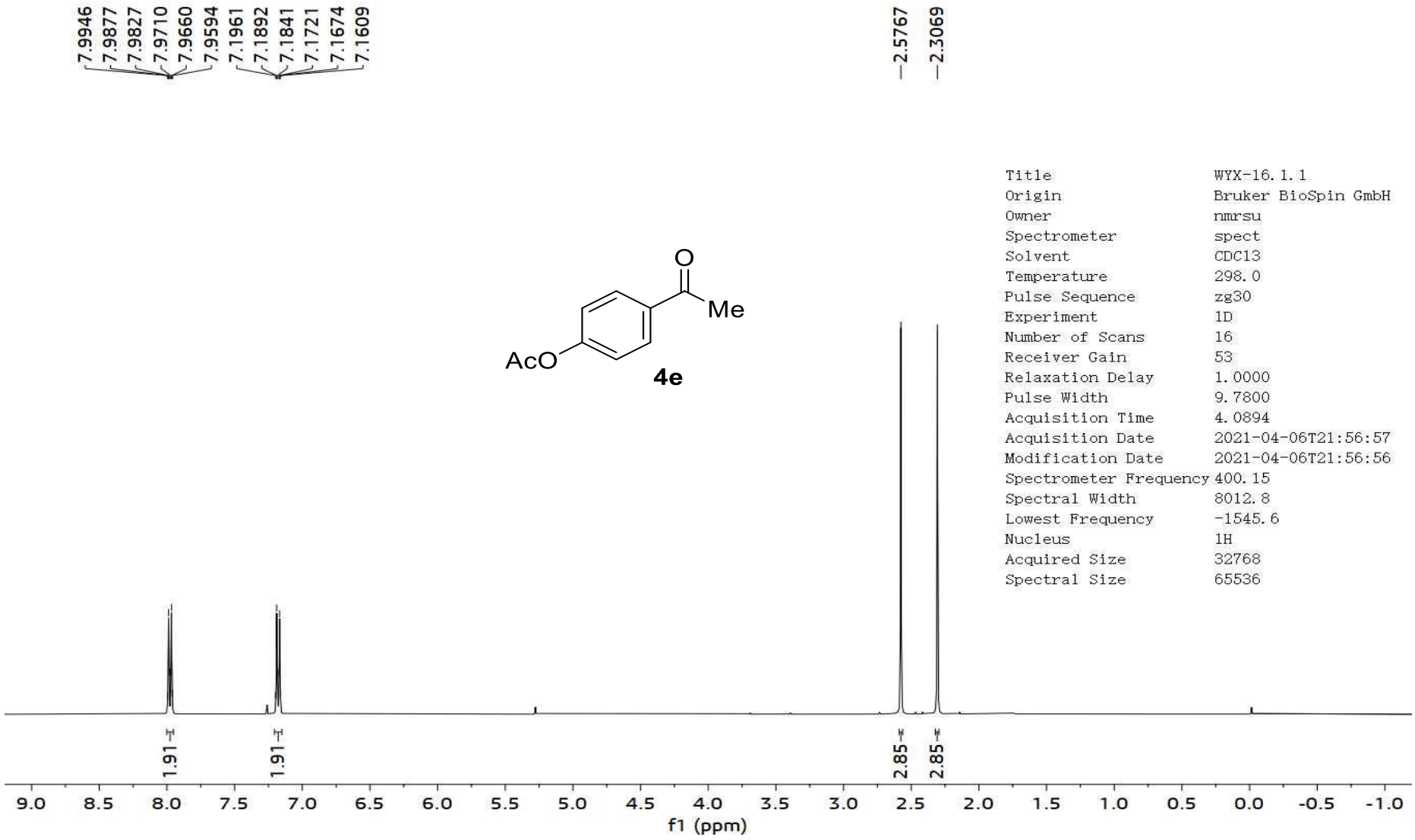

7.9536
7.9462
7.9411
7.9292
7.9239
7.9169
6.9484
6.9410
6.9359
6.9241
6.9188
6.9115
3.8668
2.5525
O
Me
MeO
4c
Title WYX-10.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 89
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-03-19T10:24:15
Modification Date 2021-03-19T10:24:16
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.9
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.85
1.88
2.90
2.83
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 -1.0
f1 (ppm)

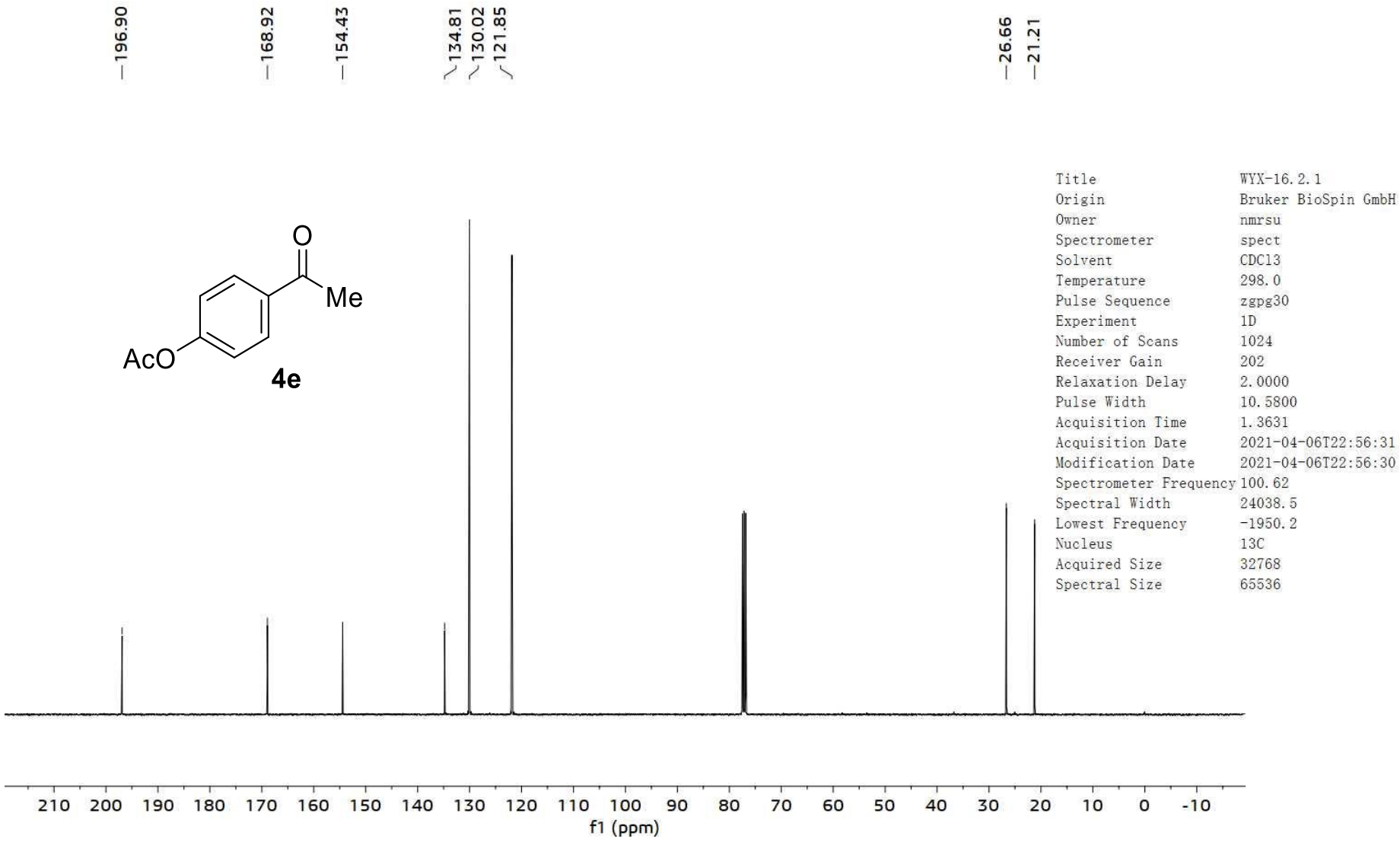

196.91
163.62
130.72
130.49
113.82
55.60
26.47
O
Me
MeO
4c
130.724
130.494
131.0
130.0
f1 (ppm)
Title WYX-10.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-03-19T13:09:55
Modification Date 2021-03-19T13:09:56
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1945.1
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

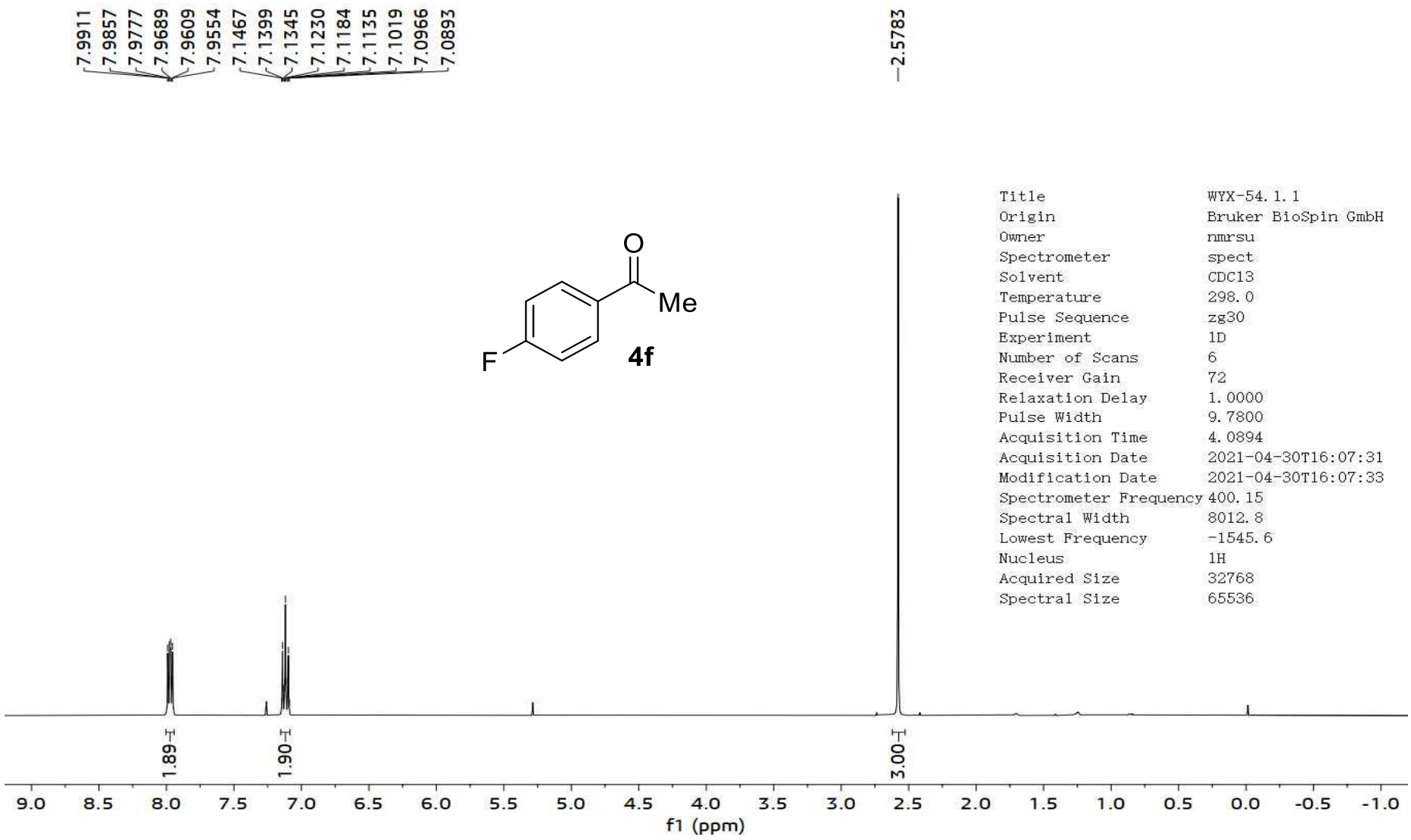

7.9514
7.9292
7.4286
7.4243
7.4017
7.3841
7.3821
7.3639
7.3470
7.3302
7.3144
7.0228
7.0005
5.1314
2.5527
O
Me
BnO
4d
Title WYX-15.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 47
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-07T01:11:03
Modification Date 2021-04-07T01:11:02
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.5
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.91
5.06
1.92
1.95
3.00
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 -1.0
f1 (ppm)

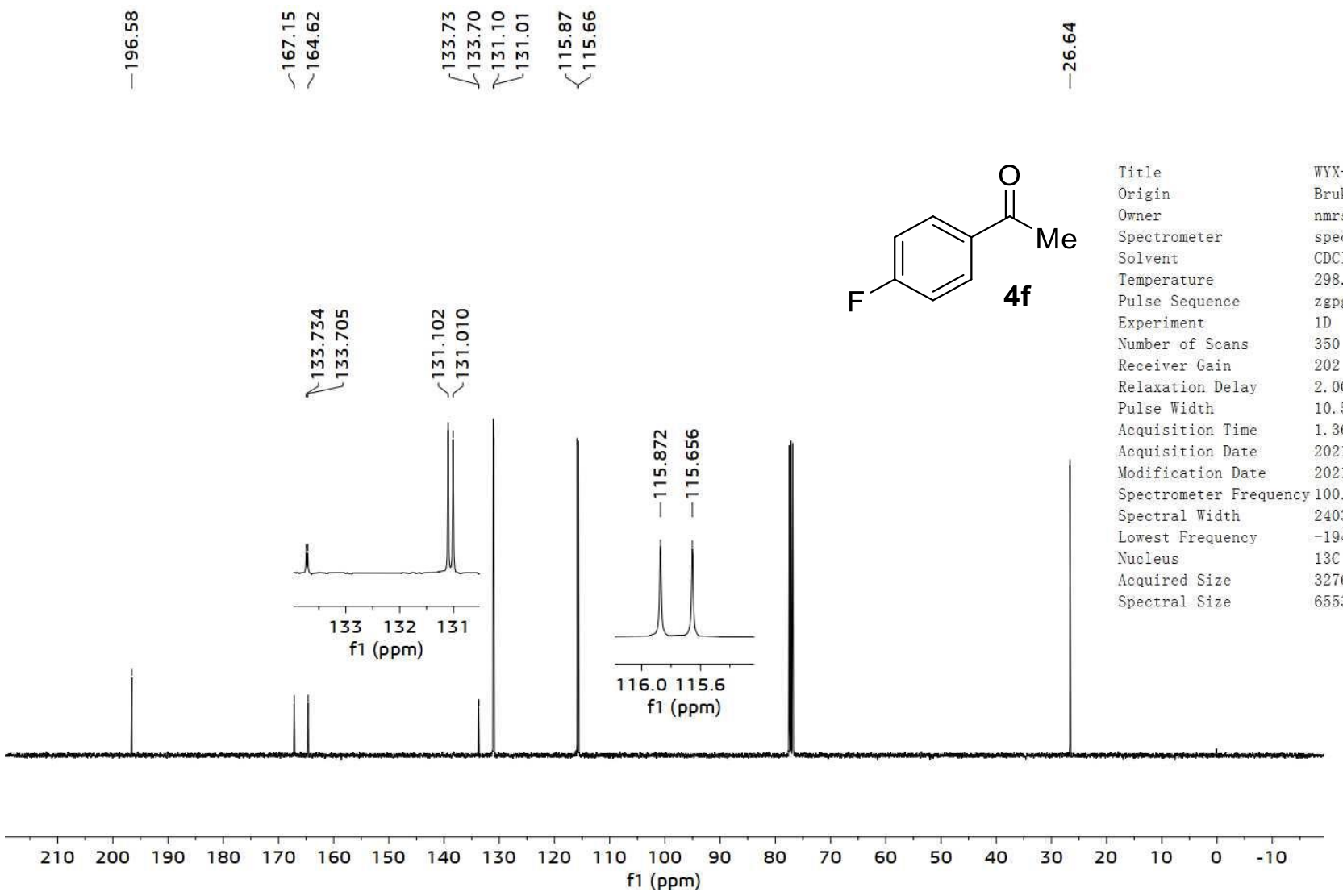


Title	WYX-15.2.1
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDC13
Temperature	298.0
Pulse Sequence	zgpg30
Experiment	1D
Number of Scans	1024
Receiver Gain	202
Relaxation Delay	2.0000
Pulse Width	10.5800
Acquisition Time	1.3631
Acquisition Date	2021-04-07T02:10:42
Modification Date	2021-04-07T02:10:42
Spectrometer Frequency	100.62
Spectral Width	24038.5
Lowest Frequency	-1950.6
Nucleus	13C
Acquired Size	32768
Spectral Size	65536

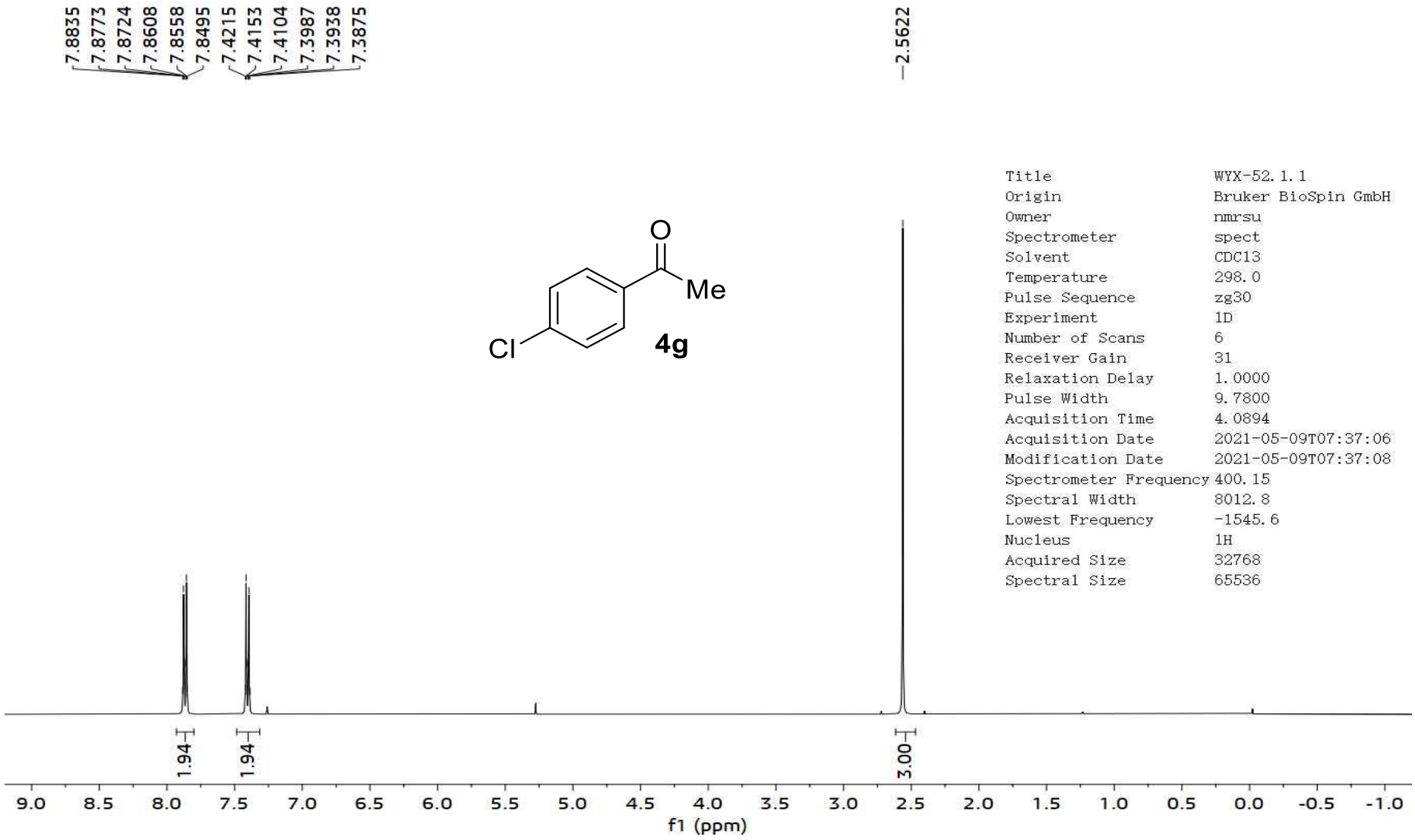

7.9946
7.9877
7.9827
7.9710
7.9660
7.9594
7.1961
7.1892
7.1841
7.1721
7.1674
7.1609
2.5767
2.3069
O
Me
AcO
4e
Title WYX-16.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 53
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-06T21:56:57
Modification Date 2021-04-06T21:56:56
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.91
1.91
2.85
2.85
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 -1.0
f1 (ppm)

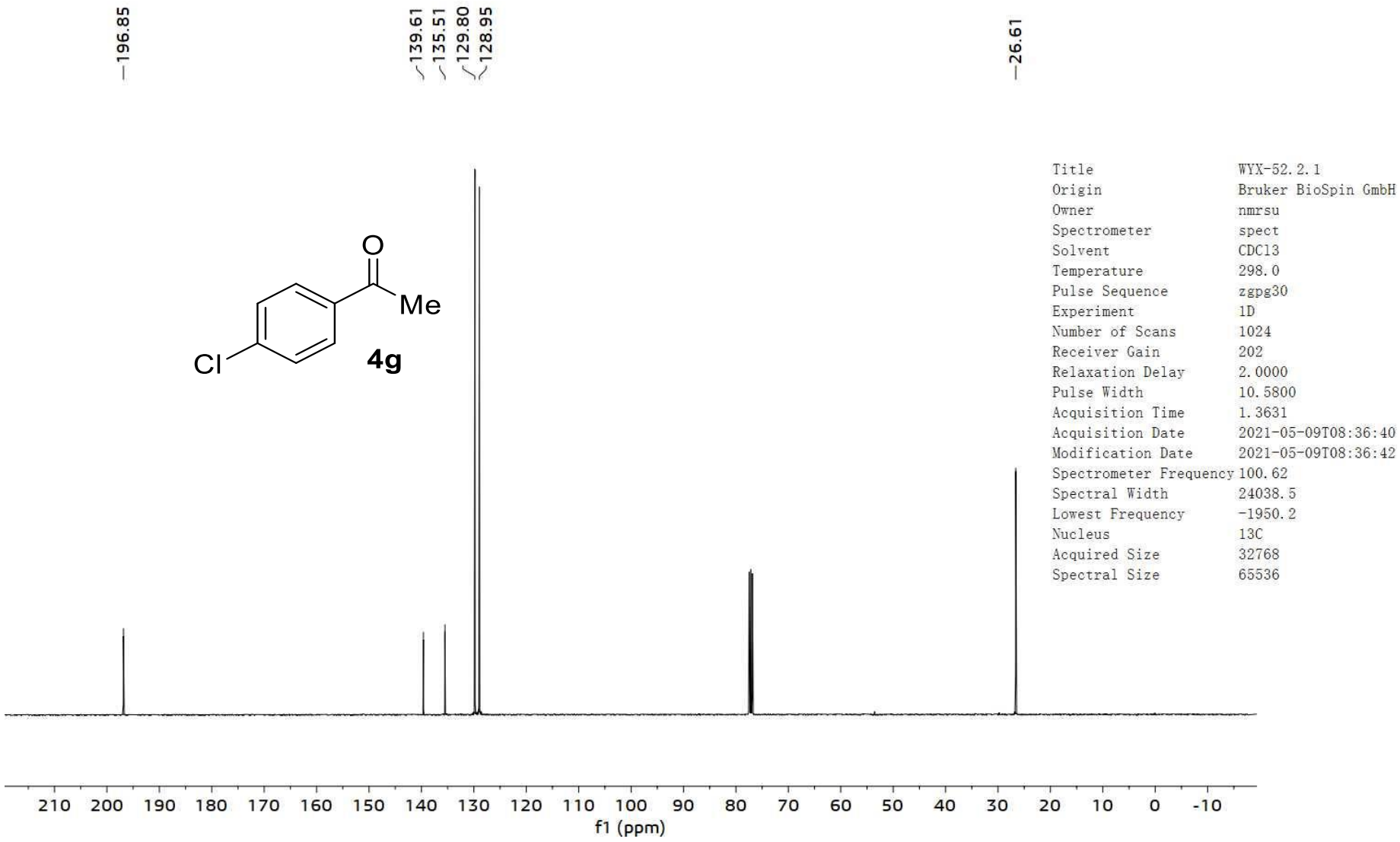

196.90
168.92
154.43
134.81
130.02
121.85
26.66
21.21
O
Me
AcO
4e
Title WYX-16.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-06T22:56:31
Modification Date 2021-04-06T22:56:30
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1950.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

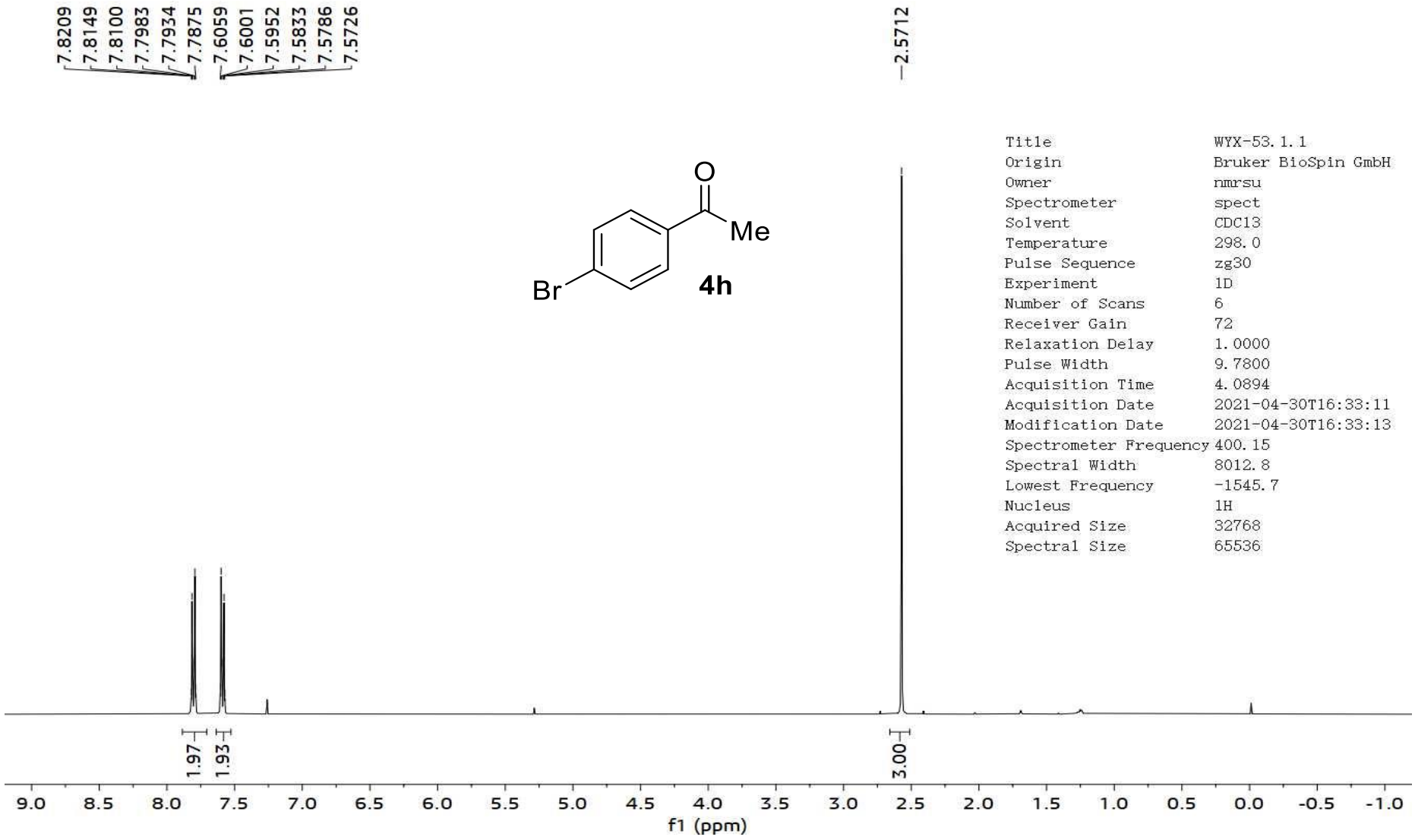

7.9911
7.9857
7.9777
7.9689
7.9609
7.9554
7.1467
7.1399
7.1345
7.1230
7.1184
7.1135
7.1019
7.0966
7.0893
2.5783
O
Me
F
4f
Title WYX-54.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 72
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-30T16:07:31
Modification Date 2021-04-30T16:07:33
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.89
1.90
3.00
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 -1.0
f1 (ppm)

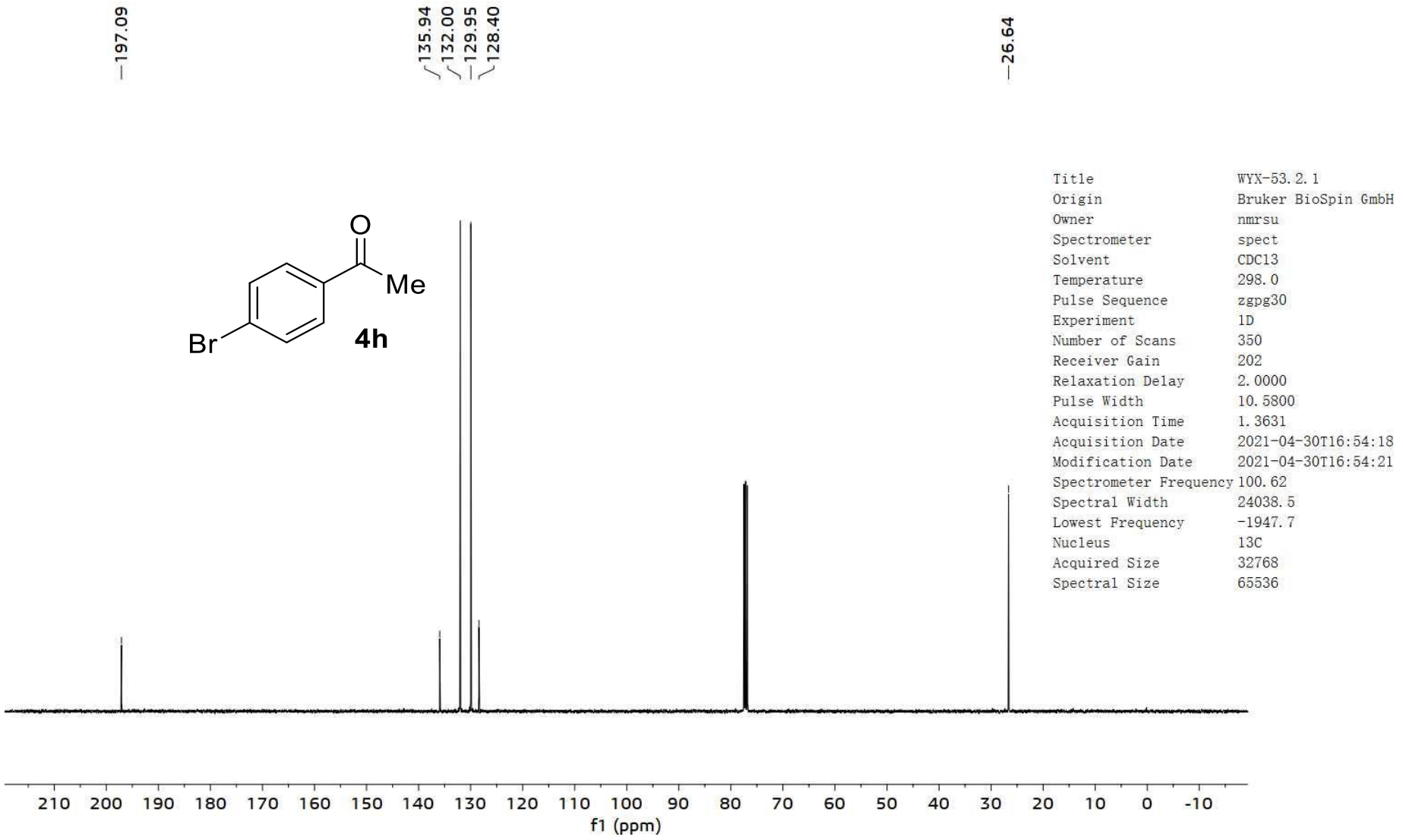


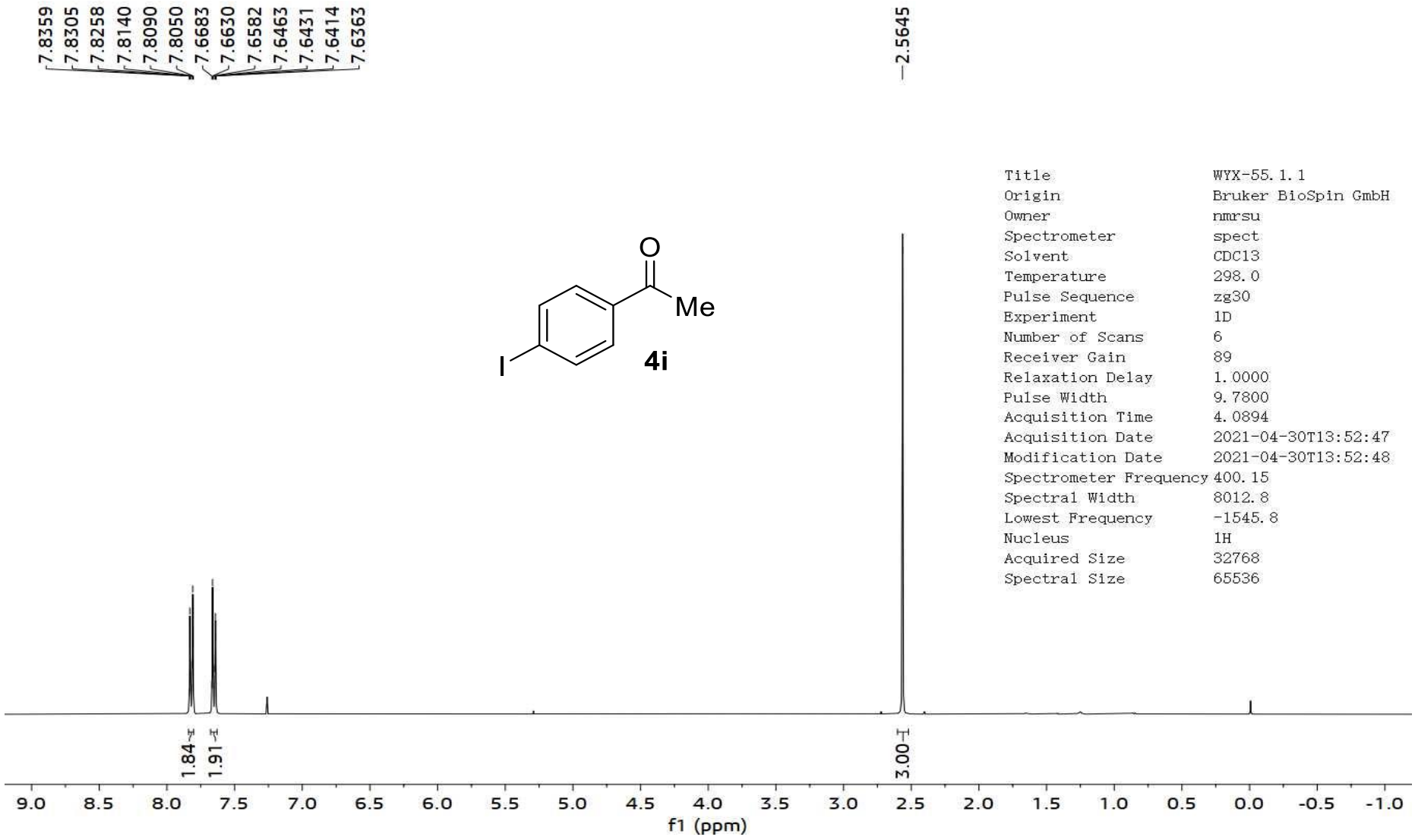
Title	WYX-54.2.1
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zgpg30
Experiment	1D
Number of Scans	350
Receiver Gain	202
Relaxation Delay	2.0000
Pulse Width	10.5800
Acquisition Time	1.3631
Acquisition Date	2021-04-30T16:28:38
Modification Date	2021-04-30T16:28:41
Spectrometer Frequency	100.62
Spectral Width	24038.5
Lowest Frequency	-1946.2
Nucleus	13C
Acquired Size	32768
Spectral Size	65536

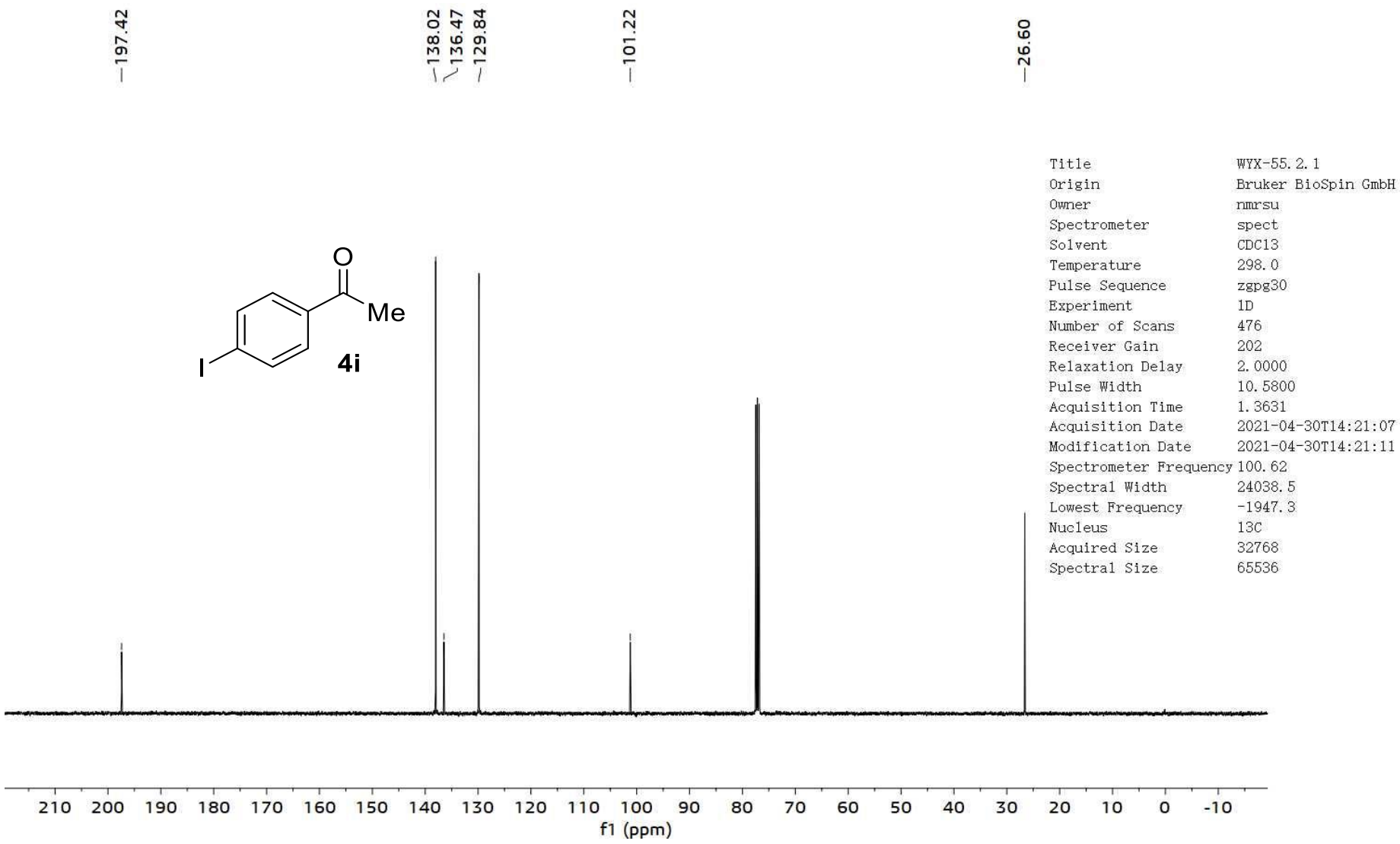

7.8835
7.8773
7.8724
7.8608
7.8558
7.8495
7.4215
7.4153
7.4104
7.3987
7.3938
7.3875
2.5622
O
Me
Cl
4g
Title WYX-52.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-09T07:37:06
Modification Date 2021-05-09T07:37:08
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.94
1.94
3.00
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 -1.0
f1 (ppm)

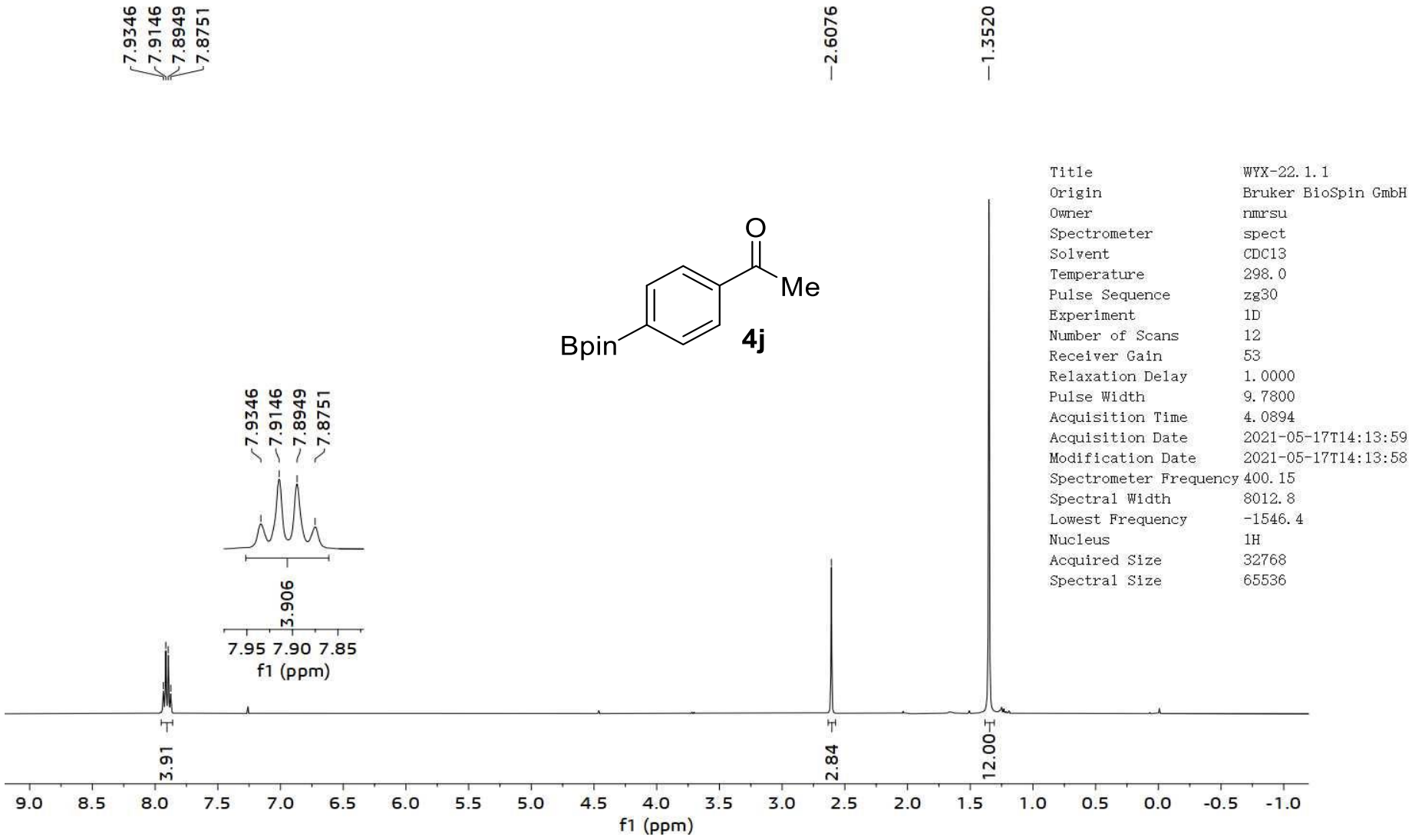

196.85
139.61
135.51
129.80
128.95
26.61
O
Me
Cl
4g
Title WYX-52.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-09T08:36:40
Modification Date 2021-05-09T08:36:42
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1950.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

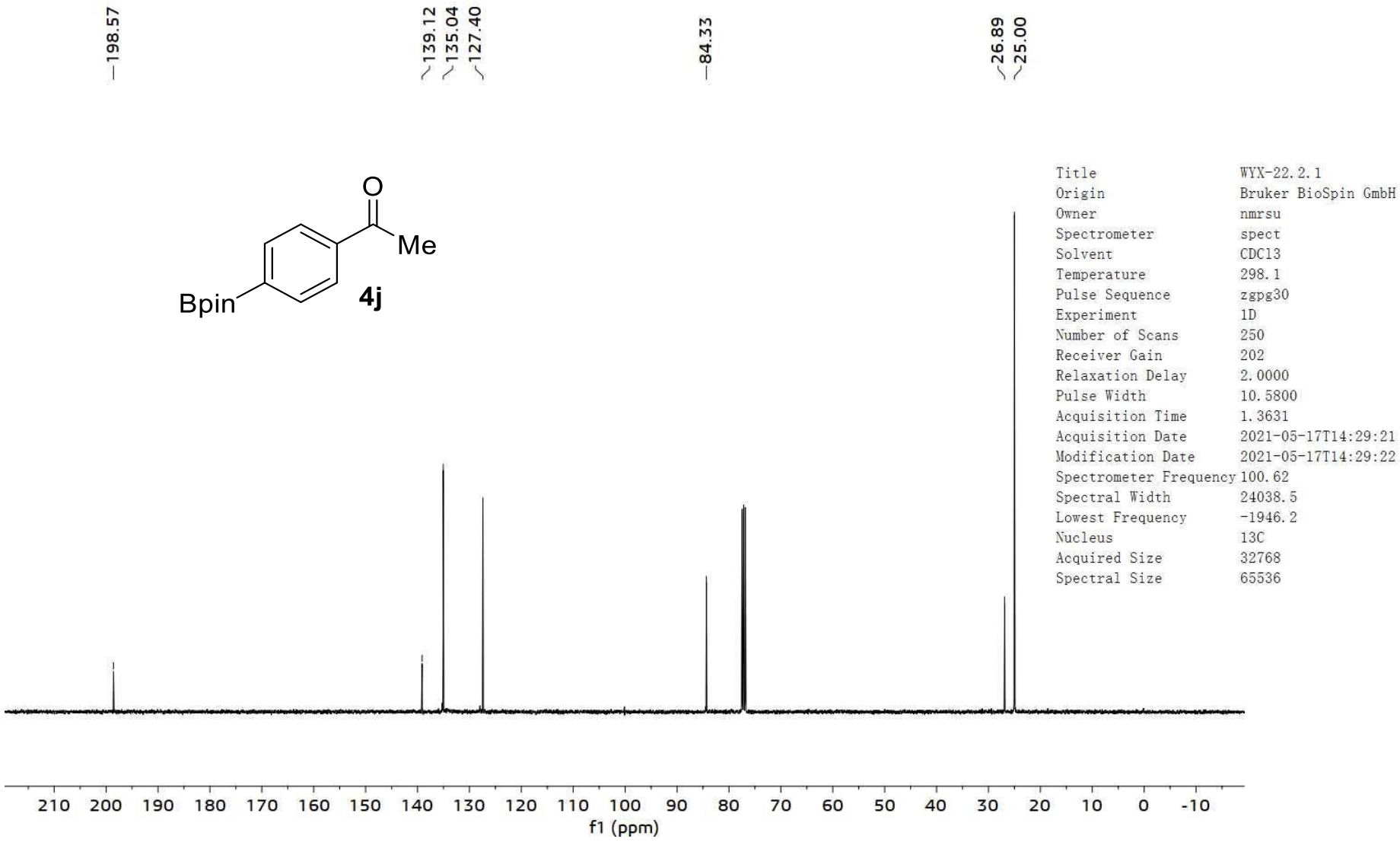

7.8209
7.8149
7.8100
7.7983
7.7934
7.7875
7.6059
7.6001
7.5952
7.5833
7.5786
7.5726
2.5712
O
Me
Br
4h
Title WYX-53.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 72
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-30T16:33:11
Modification Date 2021-04-30T16:33:13
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.7
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.97
1.93
3.00
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 -1.0
f1 (ppm)

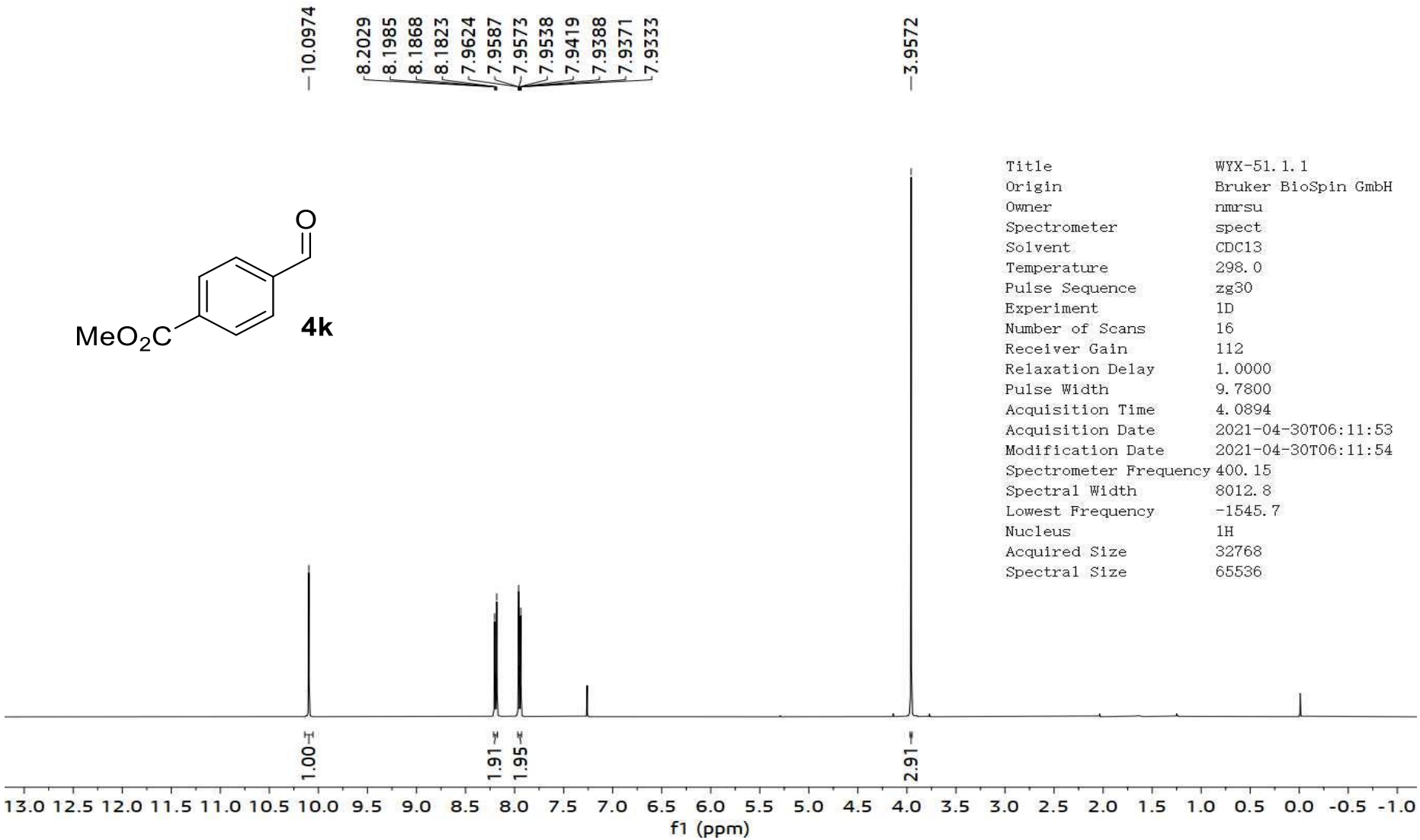

197.09
135.94
132.00
129.95
128.40
26.64
O
Me
Br
4h
Title WYX-53.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 350
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-30T16:54:18
Modification Date 2021-04-30T16:54:21
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1947.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

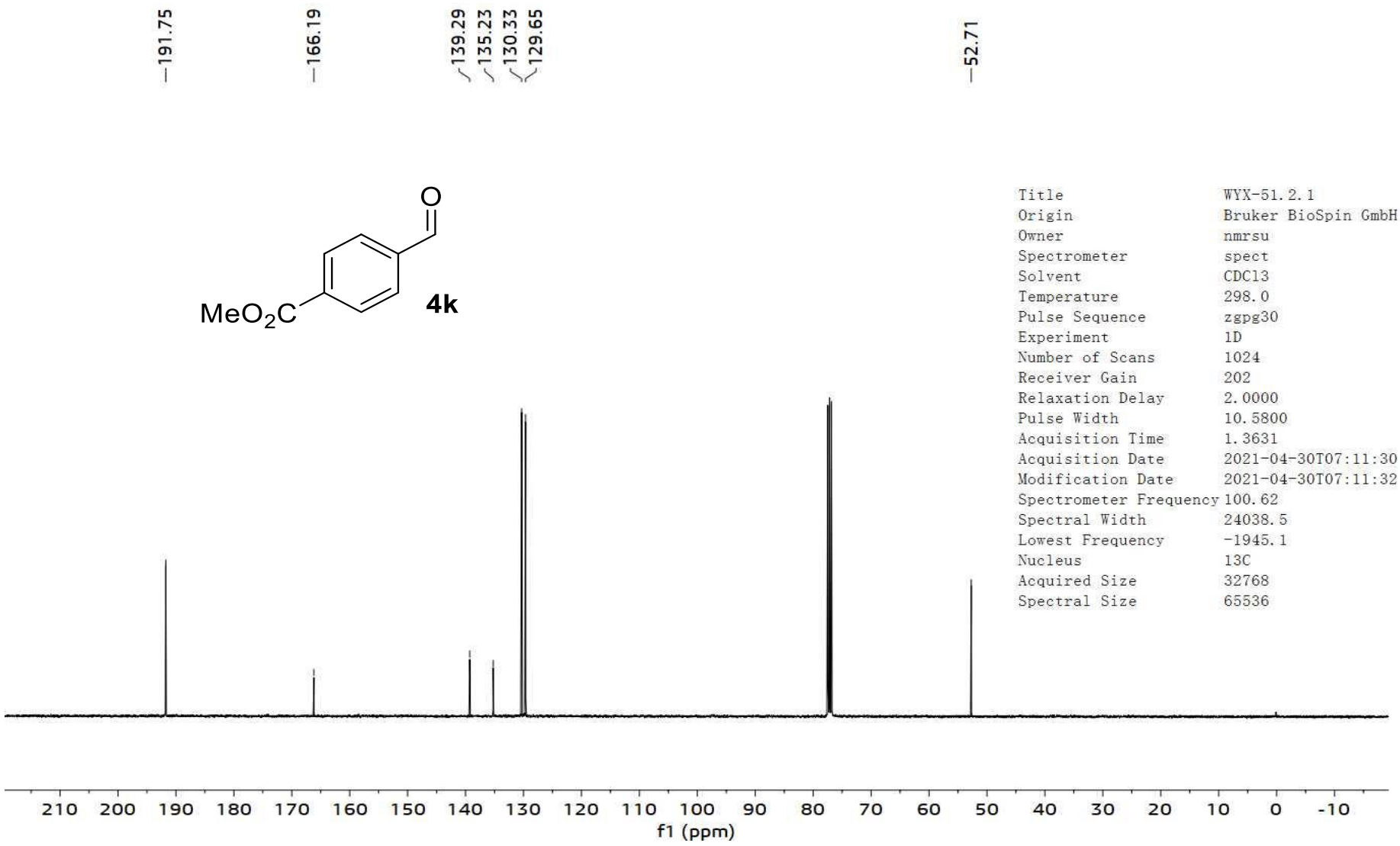

7.8359
7.8305
7.8258
7.8140
7.8090
7.8050
7.6683
7.6630
7.6582
7.6463
7.6431
7.6414
7.6363
2.5645
O
Me
I
4i
Title WYX-55.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 89
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-30T13:52:47
Modification Date 2021-04-30T13:52:48
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.84
1.91
3.00
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 -1.0
f1 (ppm)

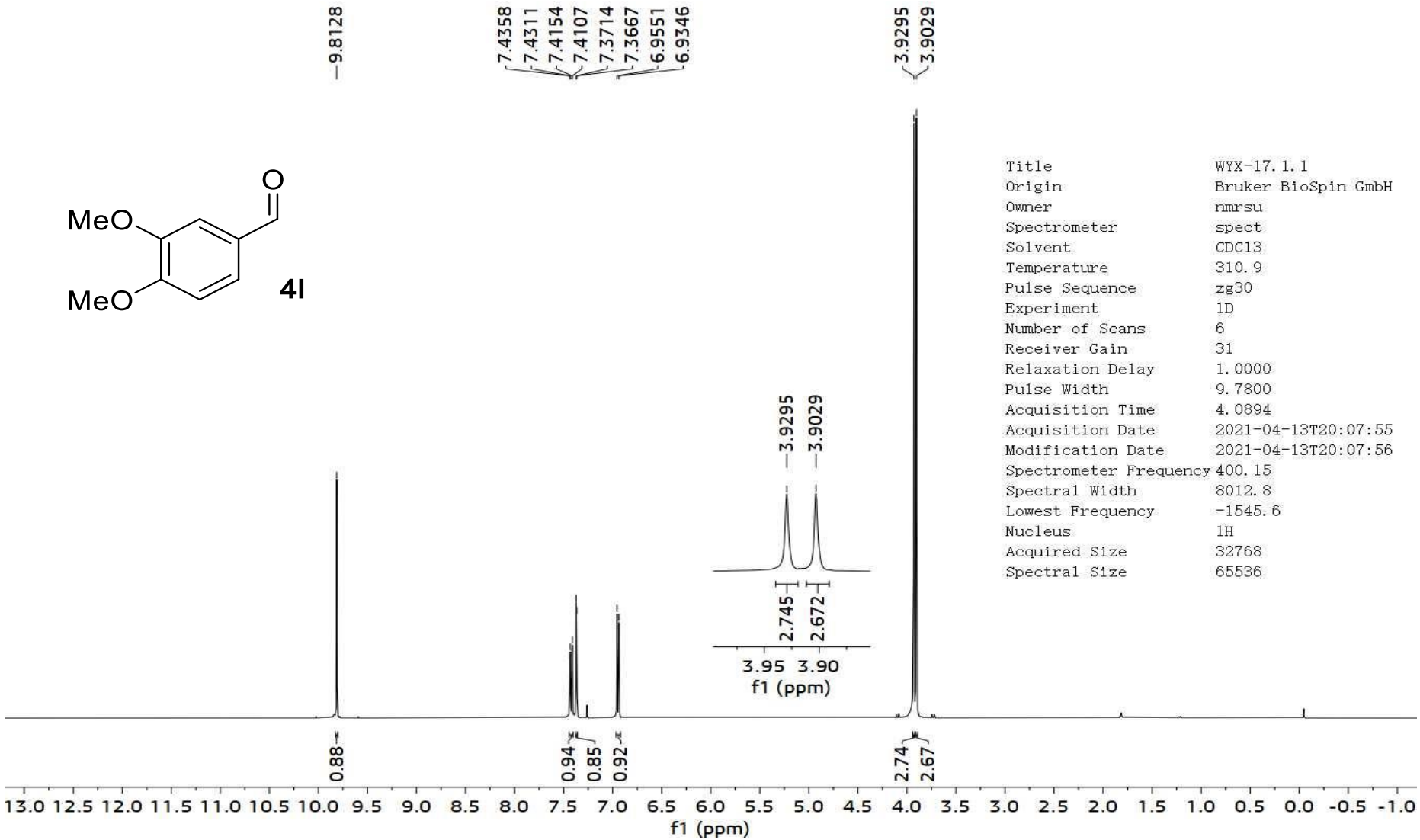

197.42
138.02
136.47
129.84
101.22
26.60
O
Me
I
4i
Title WYX-55.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 476
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-30T14:21:07
Modification Date 2021-04-30T14:21:11
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1947.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

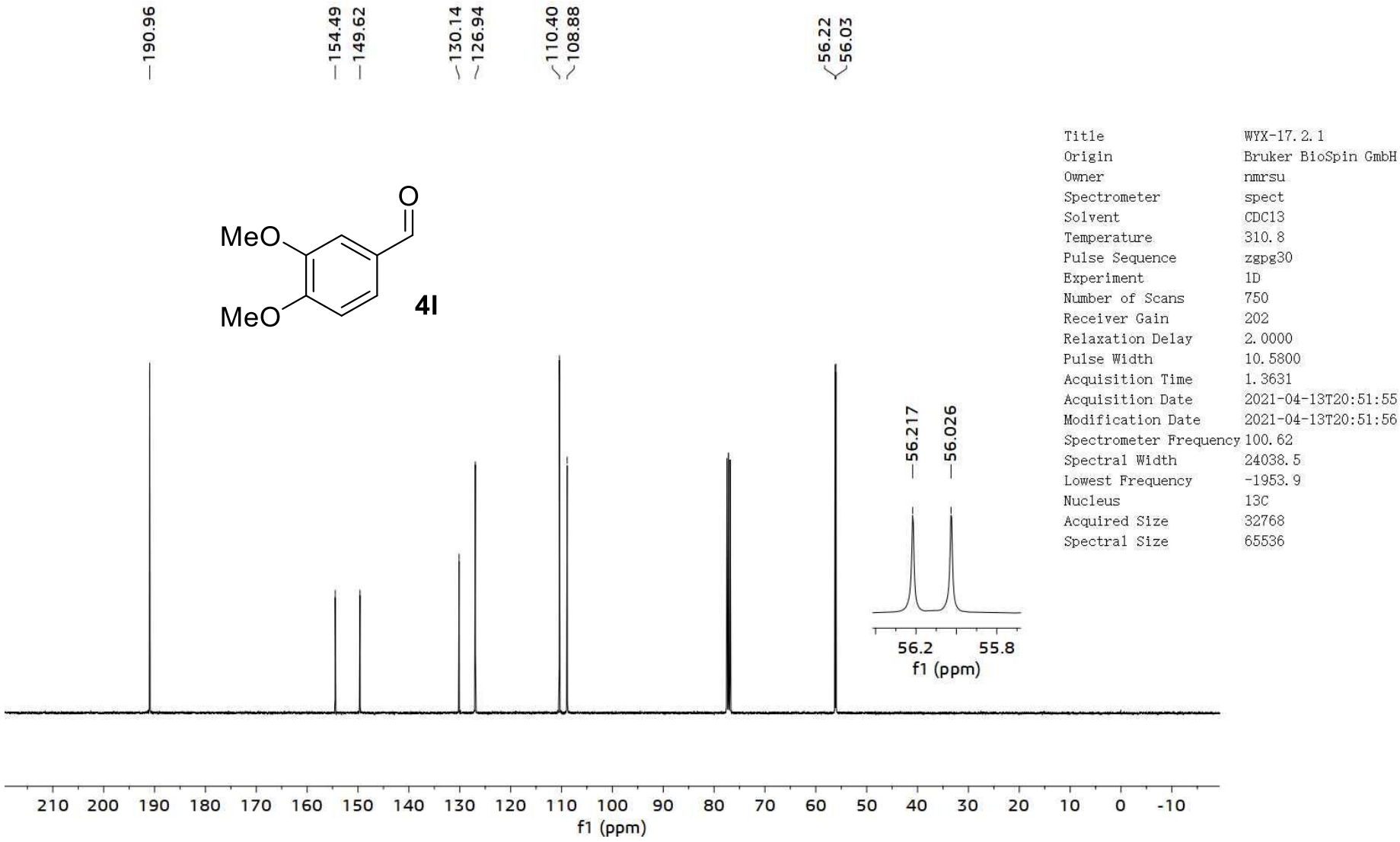

7.9346
7.9146
7.8949
7.8751
2.6076
1.3520
O
Me
Bpin
4j
Title WYX-22.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 12
Receiver Gain 53
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-17T14:13:59
Modification Date 2021-05-17T14:13:58
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1546.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
3.906
7.95 7.90 7.85
f1 (ppm)
3.91
2.84
12.00
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 -1.0
f1 (ppm)

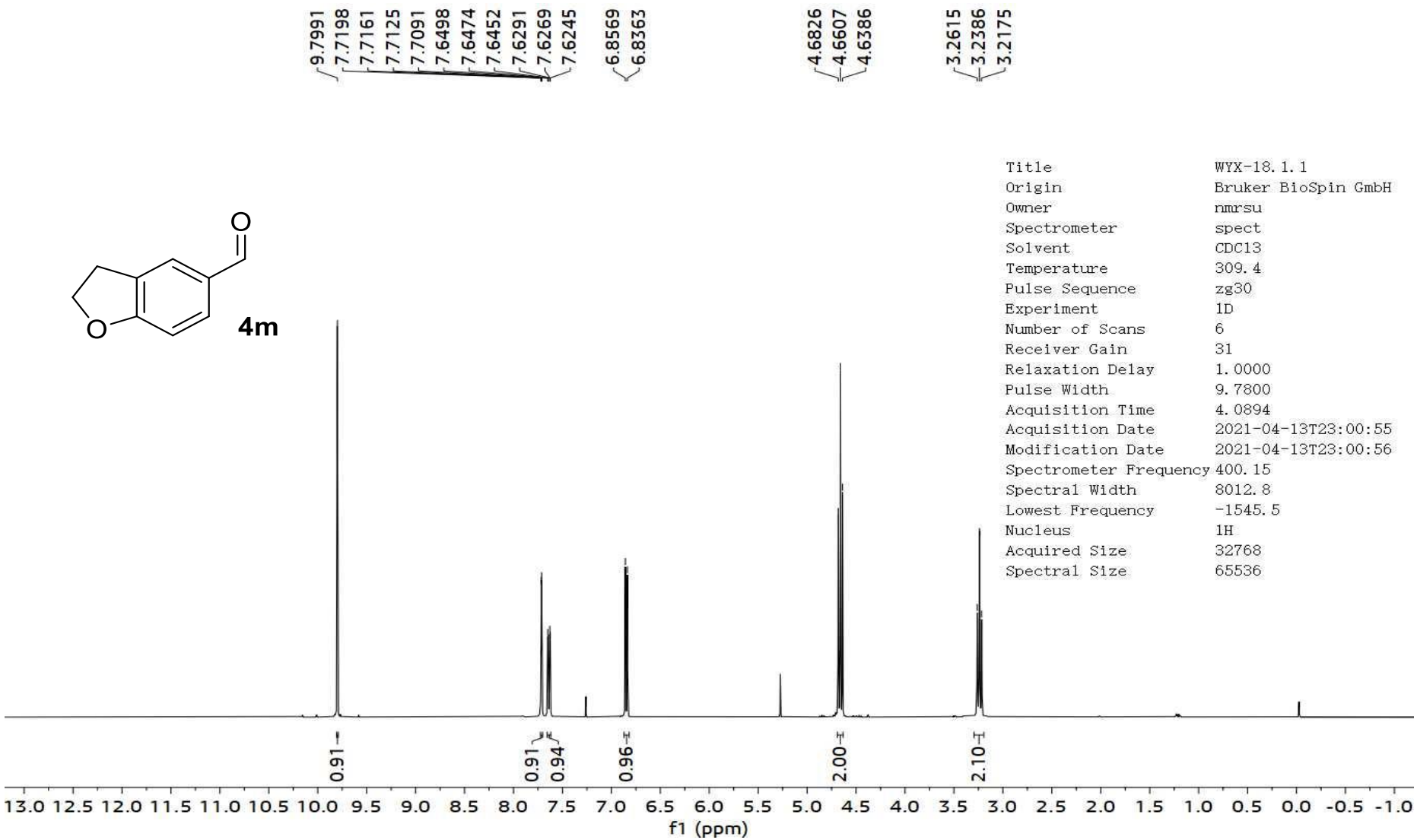

198.57
139.12
135.04
127.40
84.33
26.89
25.00
O
Me
Bpin
4j
Title WYX-22.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.1
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 250
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-17T14:29:21
Modification Date 2021-05-17T14:29:22
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1946.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

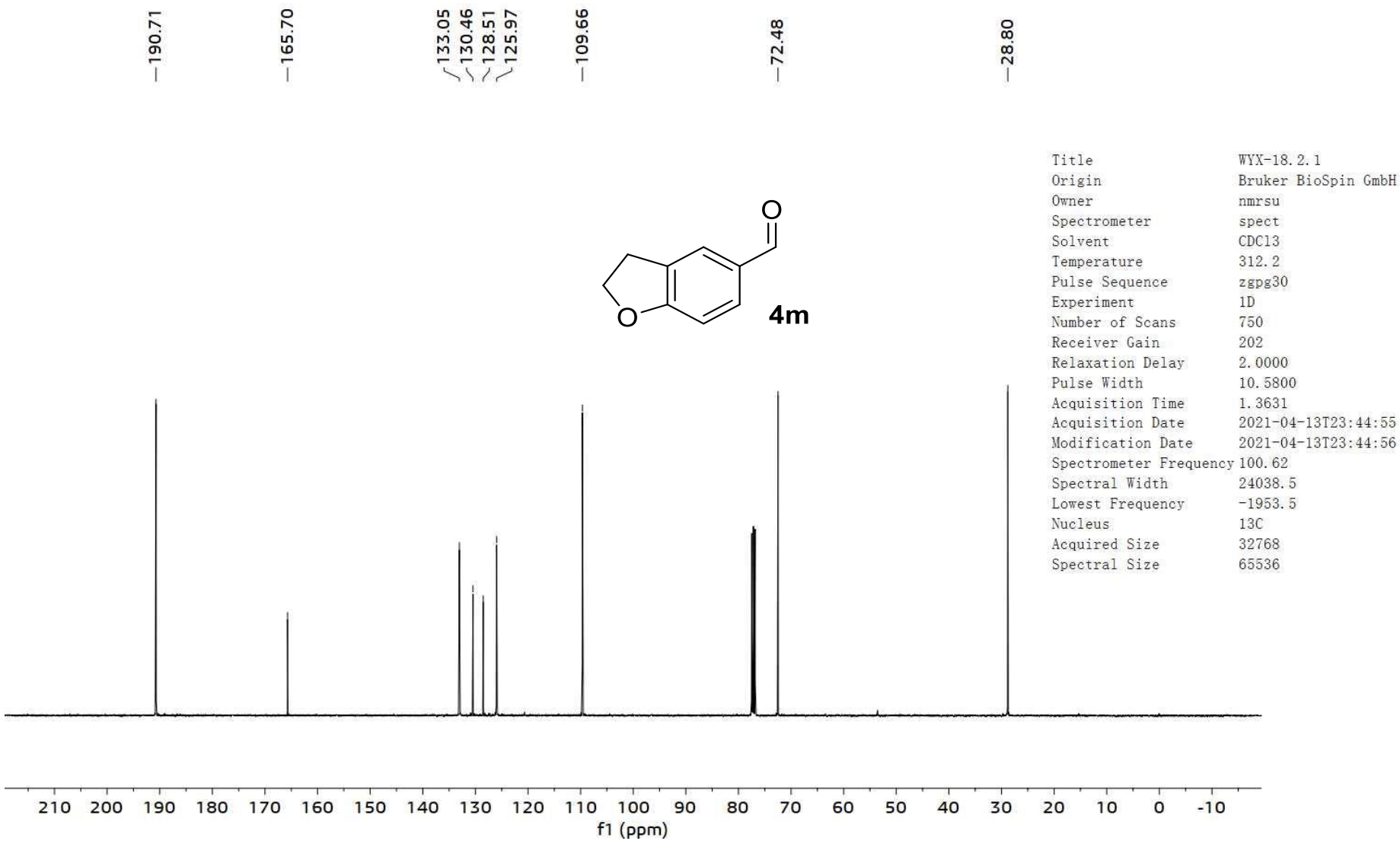

10.0974
8.2029
8.1985
8.1868
8.1823
7.9624
7.9587
7.9573
7.9538
7.9419
7.9388
7.9371
7.9333
3.9572
O
MeO2C
4k
Title WYX-51.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 112
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-30T06:11:53
Modification Date 2021-04-30T06:11:54
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.7
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.91
1.95
2.91
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

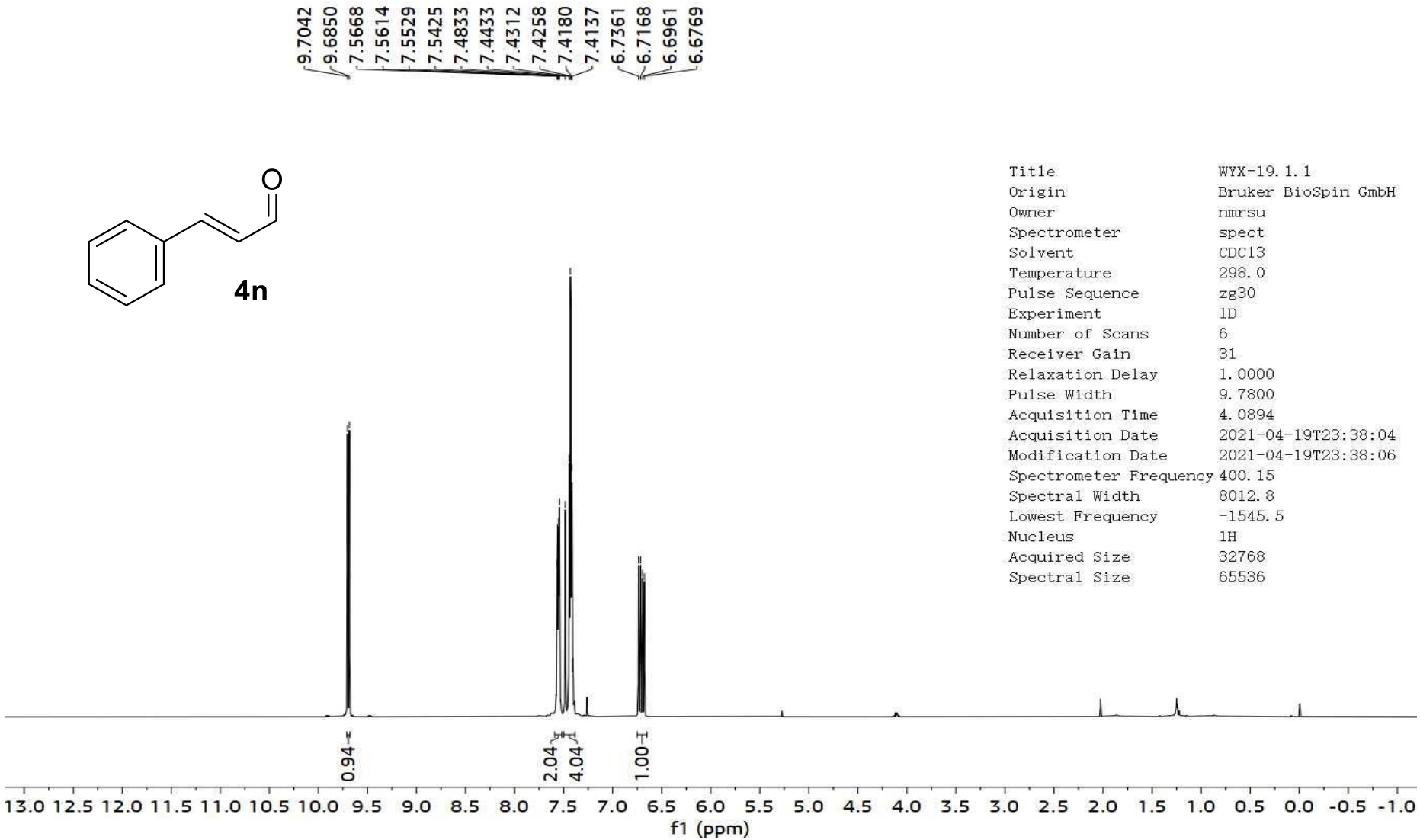

191.75
166.19
139.29
135.23
130.33
129.65
52.71
O
MeO2C
4k
Title WYX-51.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-30T07:11:30
Modification Date 2021-04-30T07:11:32
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1945.1
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

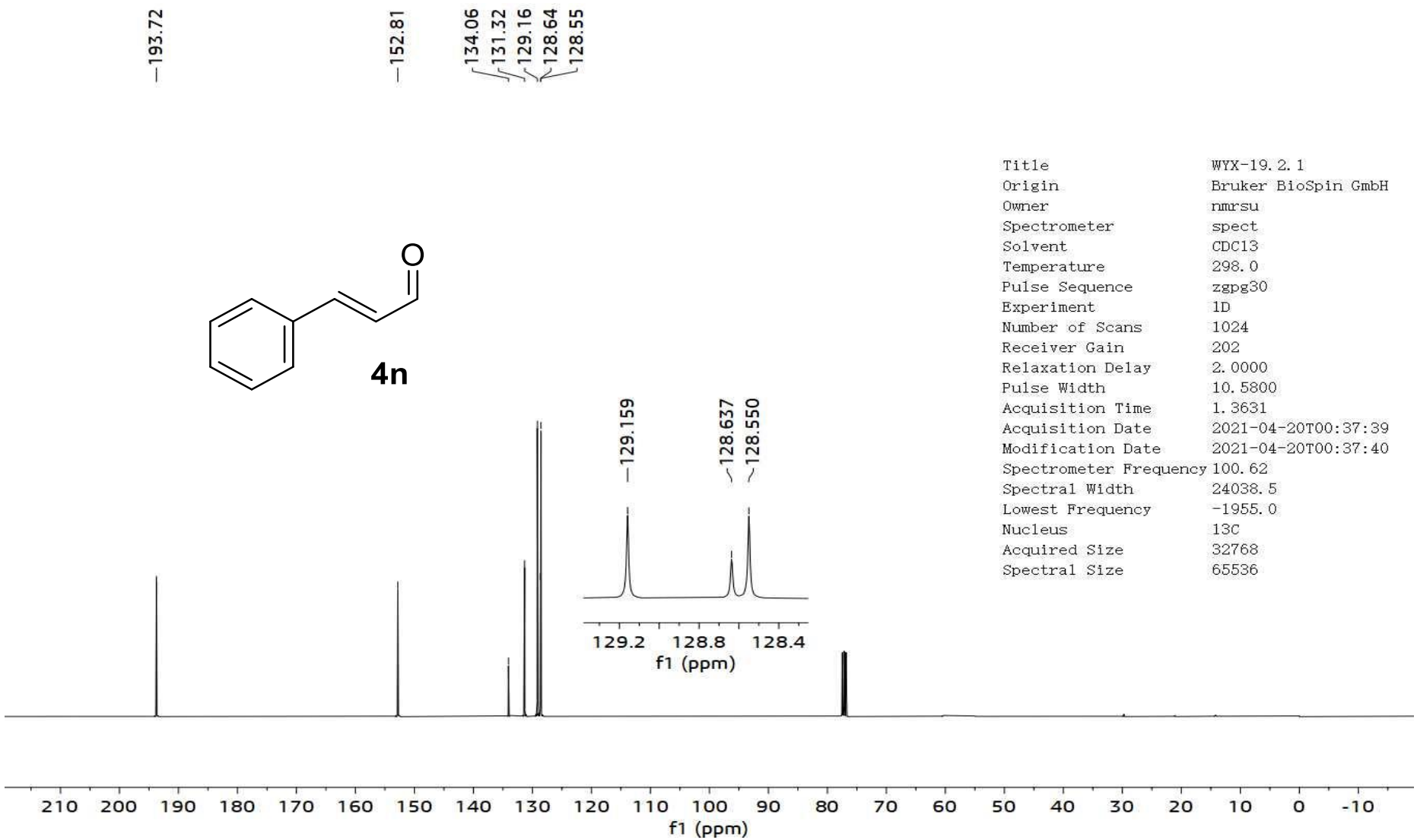

9.8128
7.4358
7.4311
7.4154
7.4107
7.3714
7.3667
6.9551
6.9346
3.9295
3.9029
MeO
MeO
O
4l
Title WYX-17.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 310.9
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-13T20:07:55
Modification Date 2021-04-13T20:07:56
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.745
2.672
3.95 3.90
f1 (ppm)
0.88
0.94
0.85
0.92
2.74
2.67
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

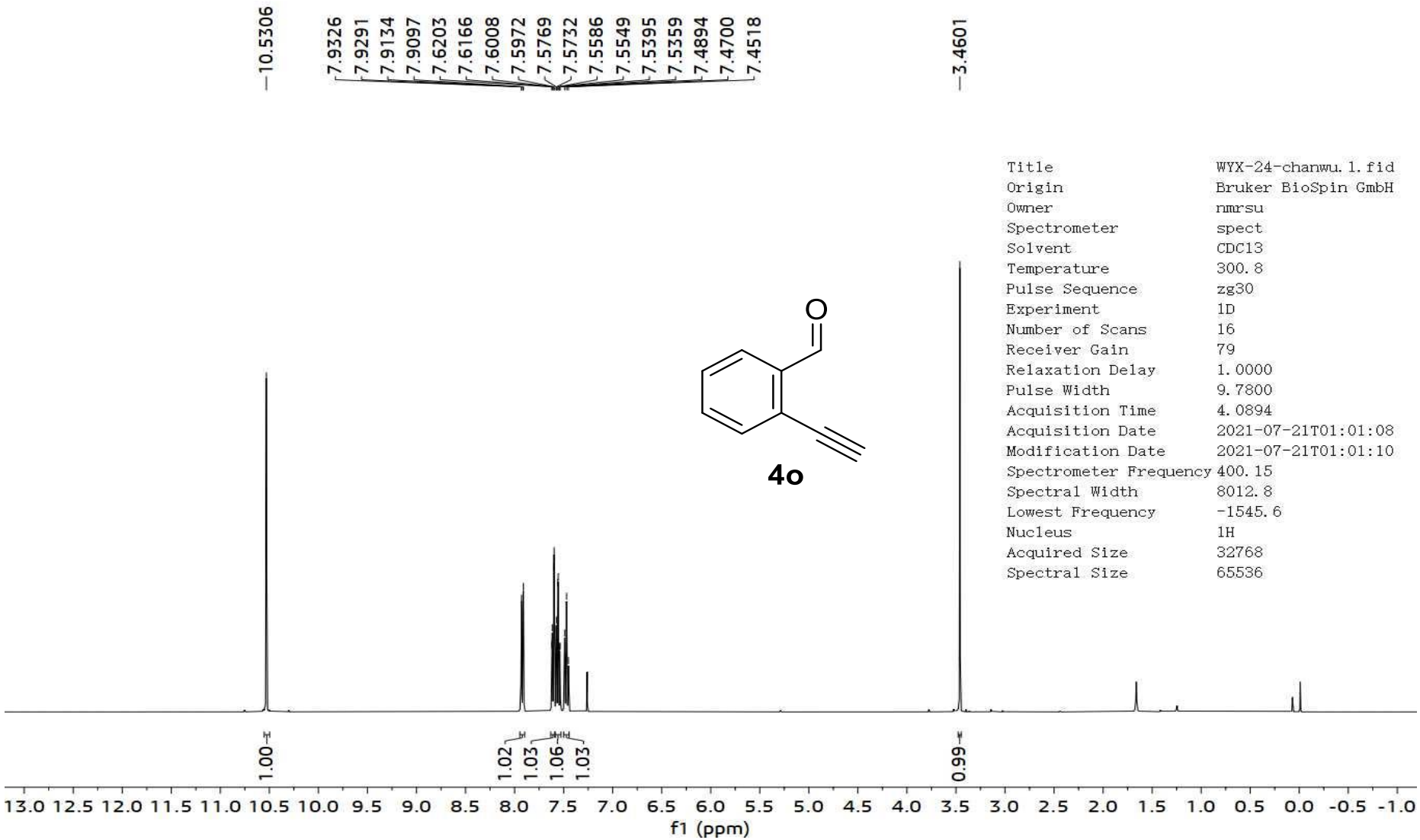

190.96
154.49
149.62
130.14
126.94
110.40
108.88
56.22
56.03
MeO
MeO
O
4l
56.217
56.026
56.2
55.8
f1 (ppm)
Title WYX-17.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 310.8
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-13T20:51:55
Modification Date 2021-04-13T20:51:56
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1953.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

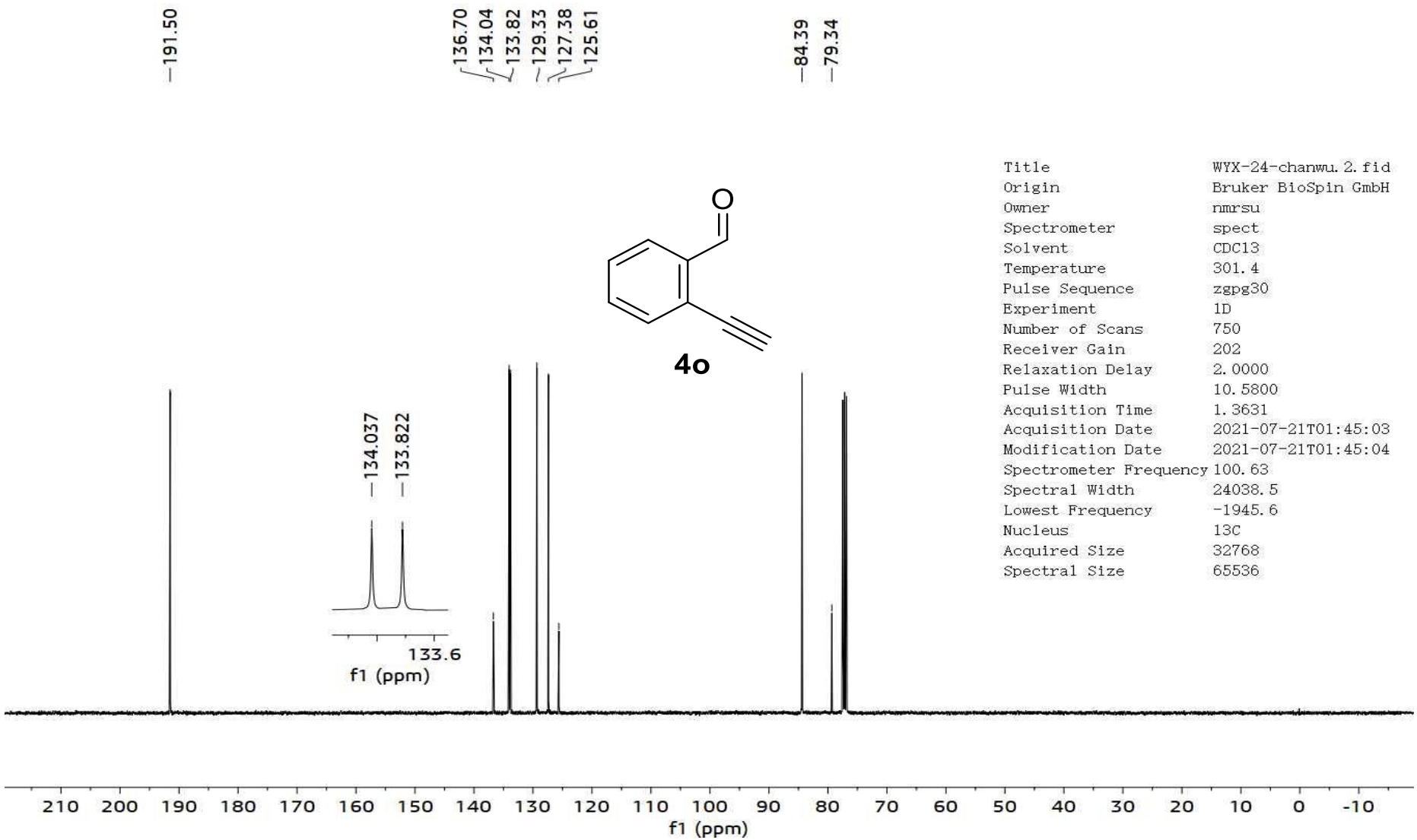

9.7991
7.7198
7.7161
7.7125
7.7091
7.6498
7.6474
7.6452
7.6291
7.6269
7.6245
6.8569
6.8363
4.6826
4.6607
4.6386
3.2615
3.2386
3.2175
O
O
4m
Title WYX-18.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 309.4
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-13T23:00:55
Modification Date 2021-04-13T23:00:56
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.5
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.91
0.91
0.94
0.96
2.00
2.10
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

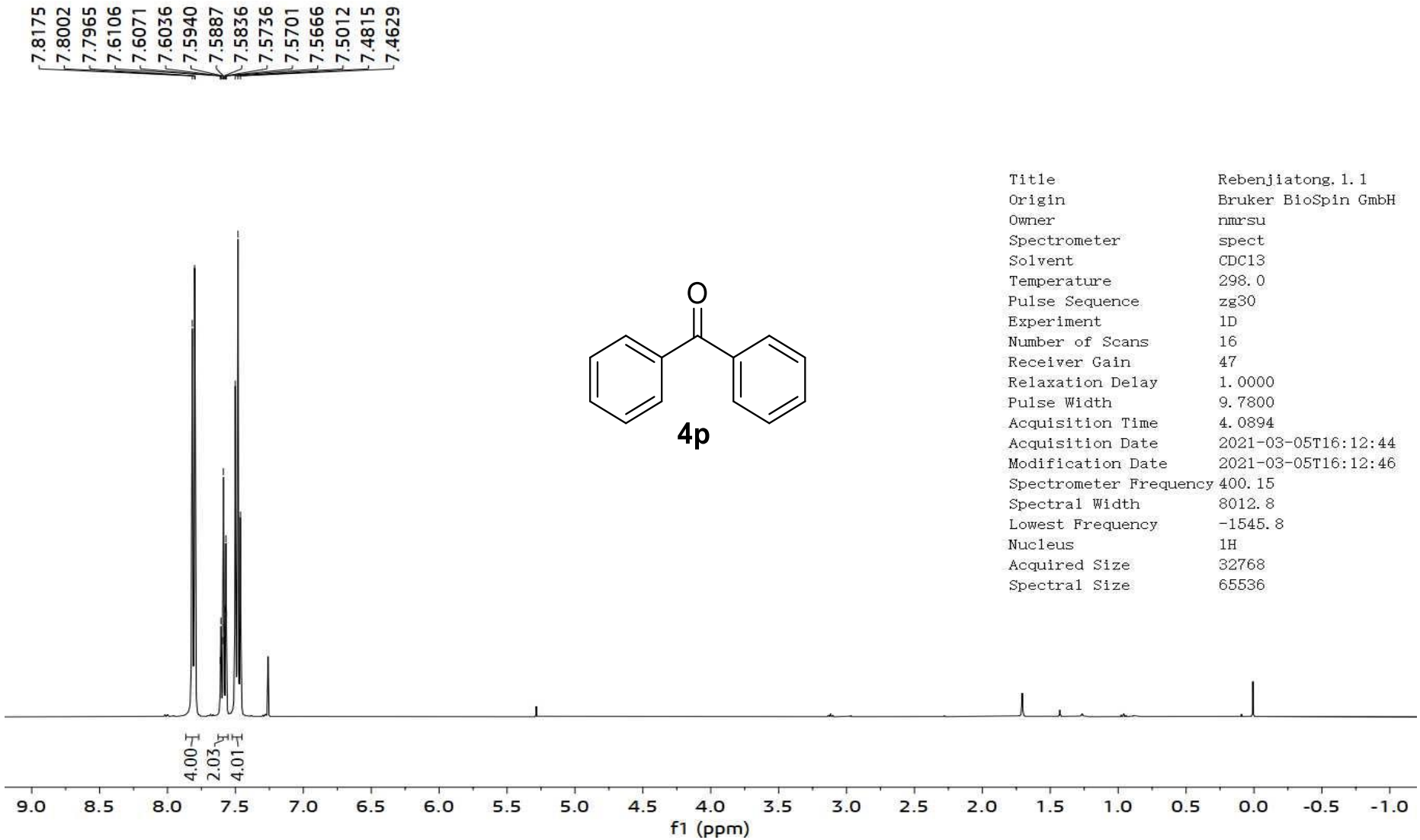

190.71
165.70
133.05
130.46
128.51
125.97
109.66
72.48
28.80
O
O
4m
Title WYX-18.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 312.2
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-13T23:44:55
Modification Date 2021-04-13T23:44:56
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1953.5
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

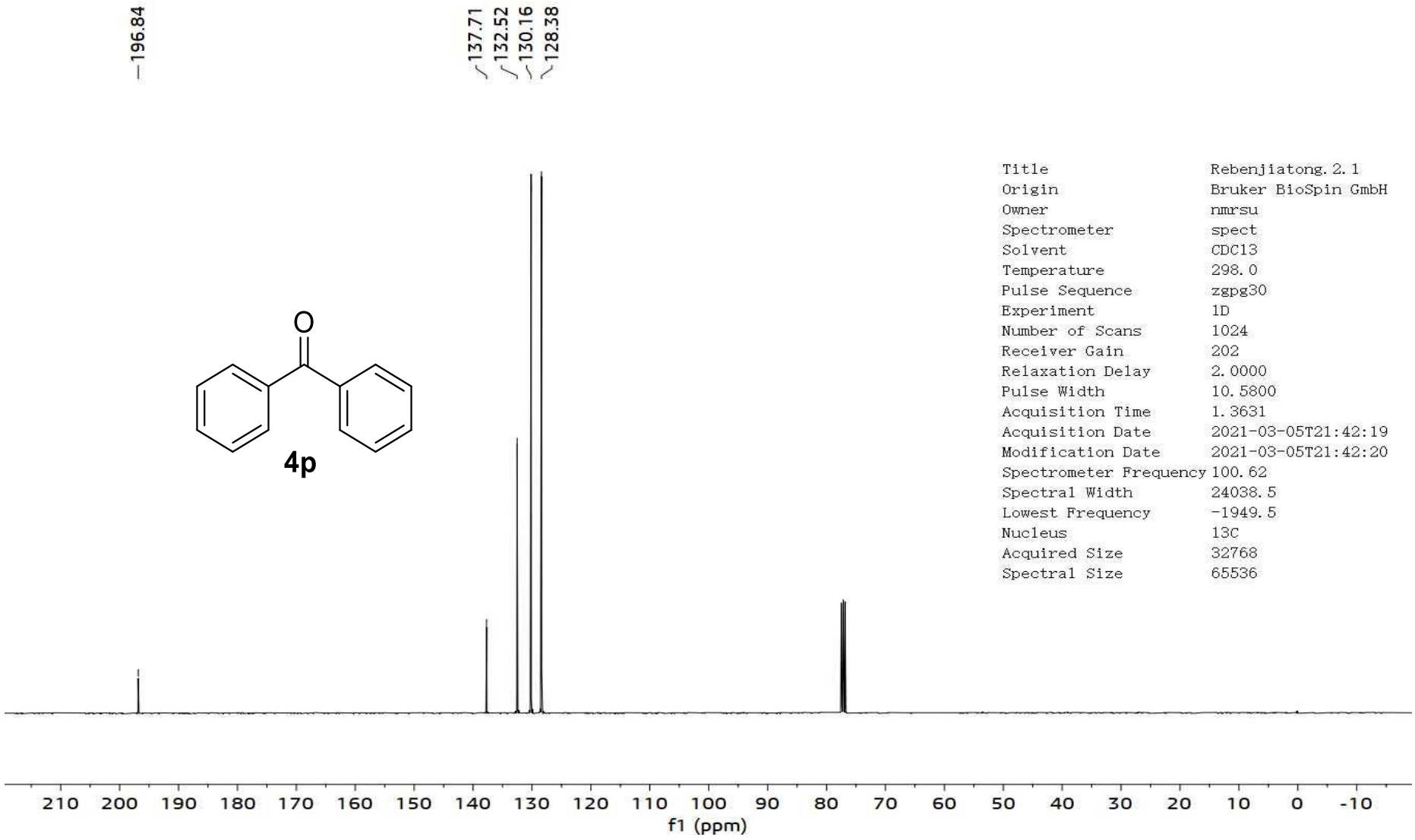

9.7042
9.6850
7.5668
7.5614
7.5529
7.5425
7.4833
7.4433
7.4312
7.4258
7.4180
7.4137
6.7361
6.7168
6.6961
6.6769
O
4n
Title WYX-19.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-19T23:38:04
Modification Date 2021-04-19T23:38:06
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.5
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.94
2.04
4.04
1.00
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

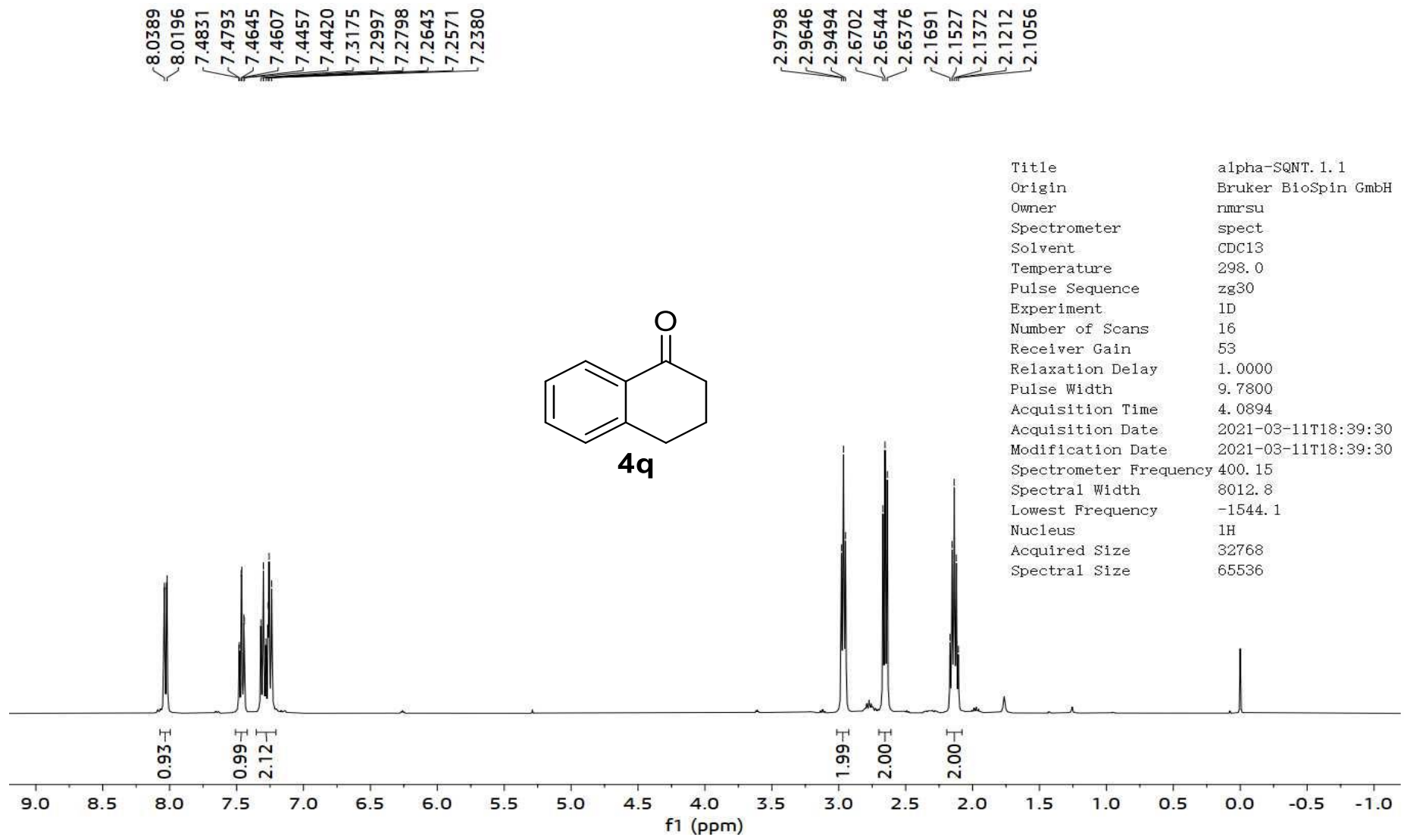

193.72
152.81
134.06
131.32
129.16
128.64
128.55
O
4n
129.159
128.637
128.550
129.2
128.8
128.4
f1 (ppm)
Title WYX-19.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-20T00:37:39
Modification Date 2021-04-20T00:37:40
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1955.0
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

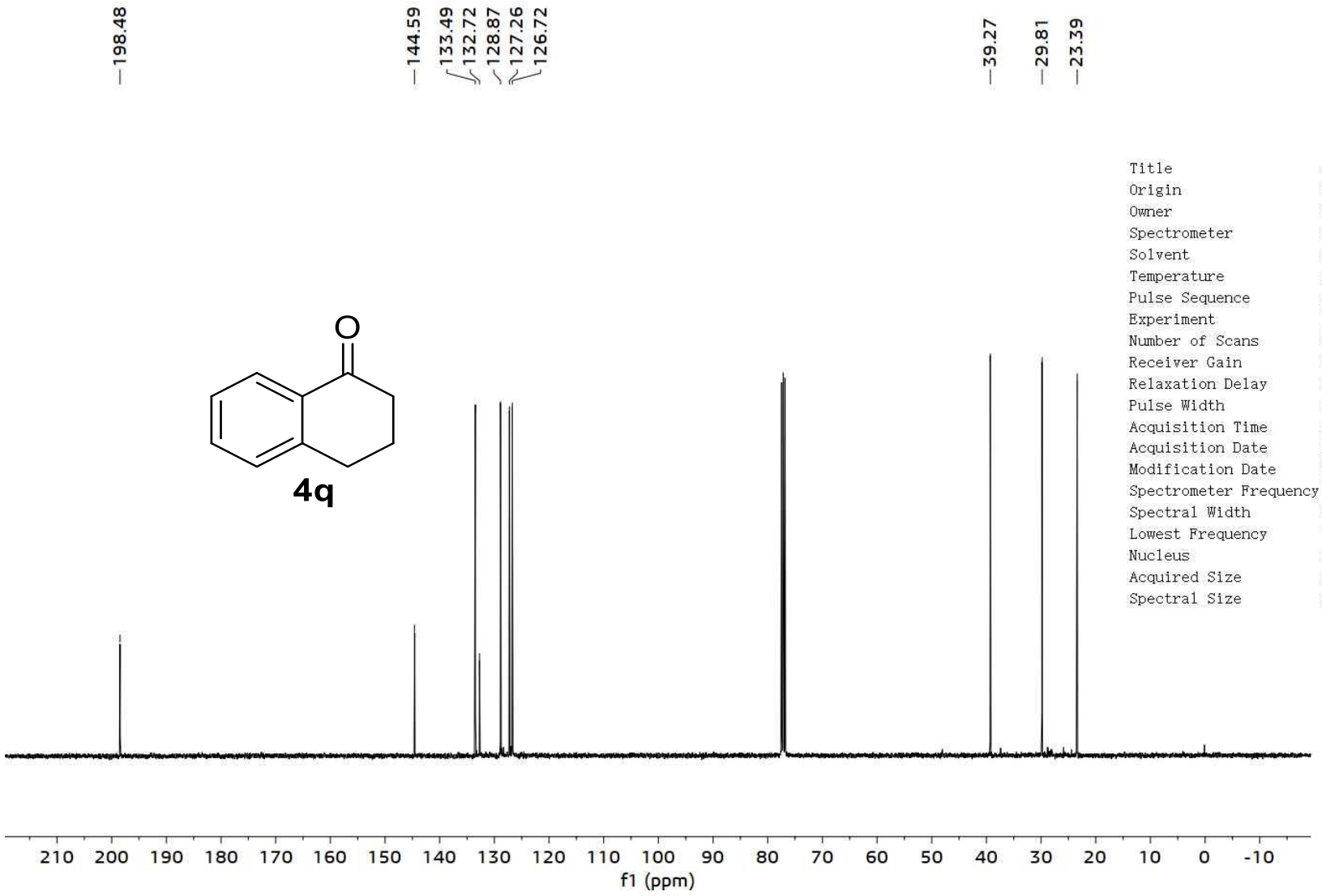

10.5306
7.9326
7.9291
7.9134
7.9097
7.6203
7.6166
7.6008
7.5972
7.5769
7.5732
7.5586
7.5549
7.5395
7.5359
7.4894
7.4700
7.4518
3.4601
O
4o
Title WYX-24-chanwu.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 300.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 79
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-21T01:01:08
Modification Date 2021-07-21T01:01:10
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.02
1.03
1.06
1.03
0.99
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

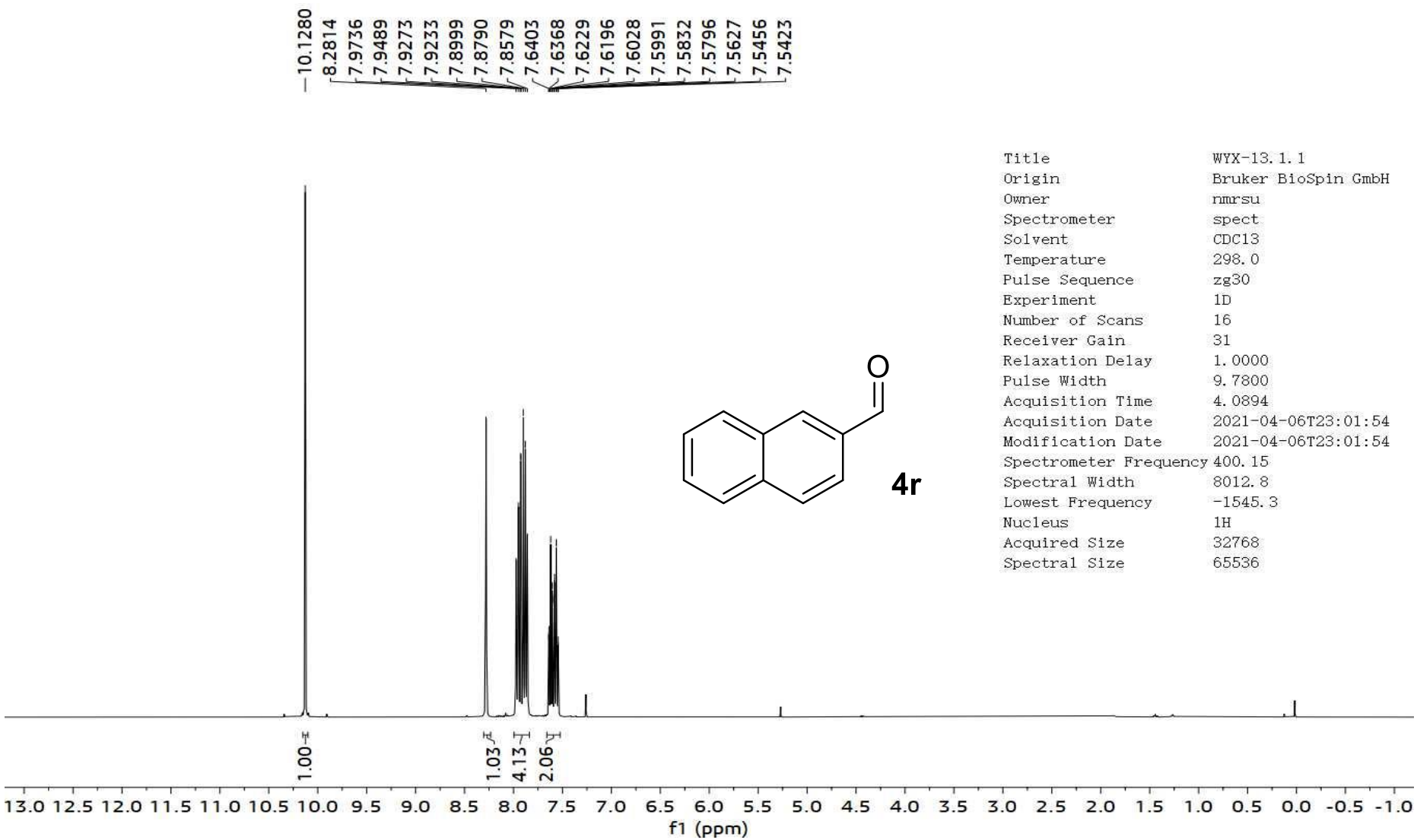

191.50
136.70
134.04
133.82
129.33
127.38
125.61
84.39
79.34
O
4o
134.037
133.822
133.6
f1 (ppm)
Title WYX-24-chanwu.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 301.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-21T01:45:03
Modification Date 2021-07-21T01:45:04
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1945.6
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

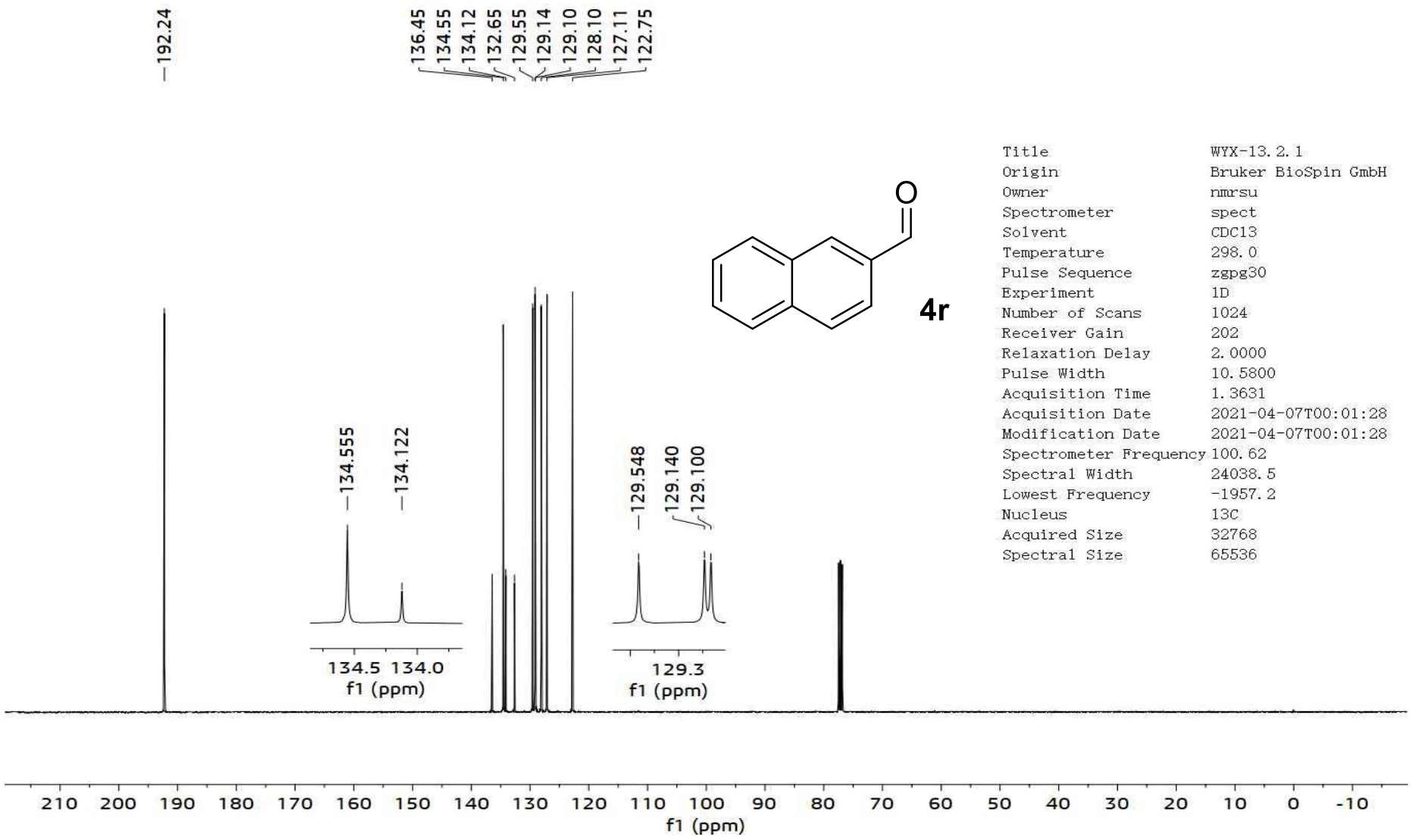

7.8175
7.8002
7.7965
7.6106
7.6071
7.6036
7.5940
7.5887
7.5836
7.5736
7.5701
7.5666
7.5012
7.4815
7.4629
O
4p
Title Rebenjiatong.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 47
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-03-05T16:12:44
Modification Date 2021-03-05T16:12:46
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
4.00
2.03
4.01
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 -1.0
f1 (ppm)

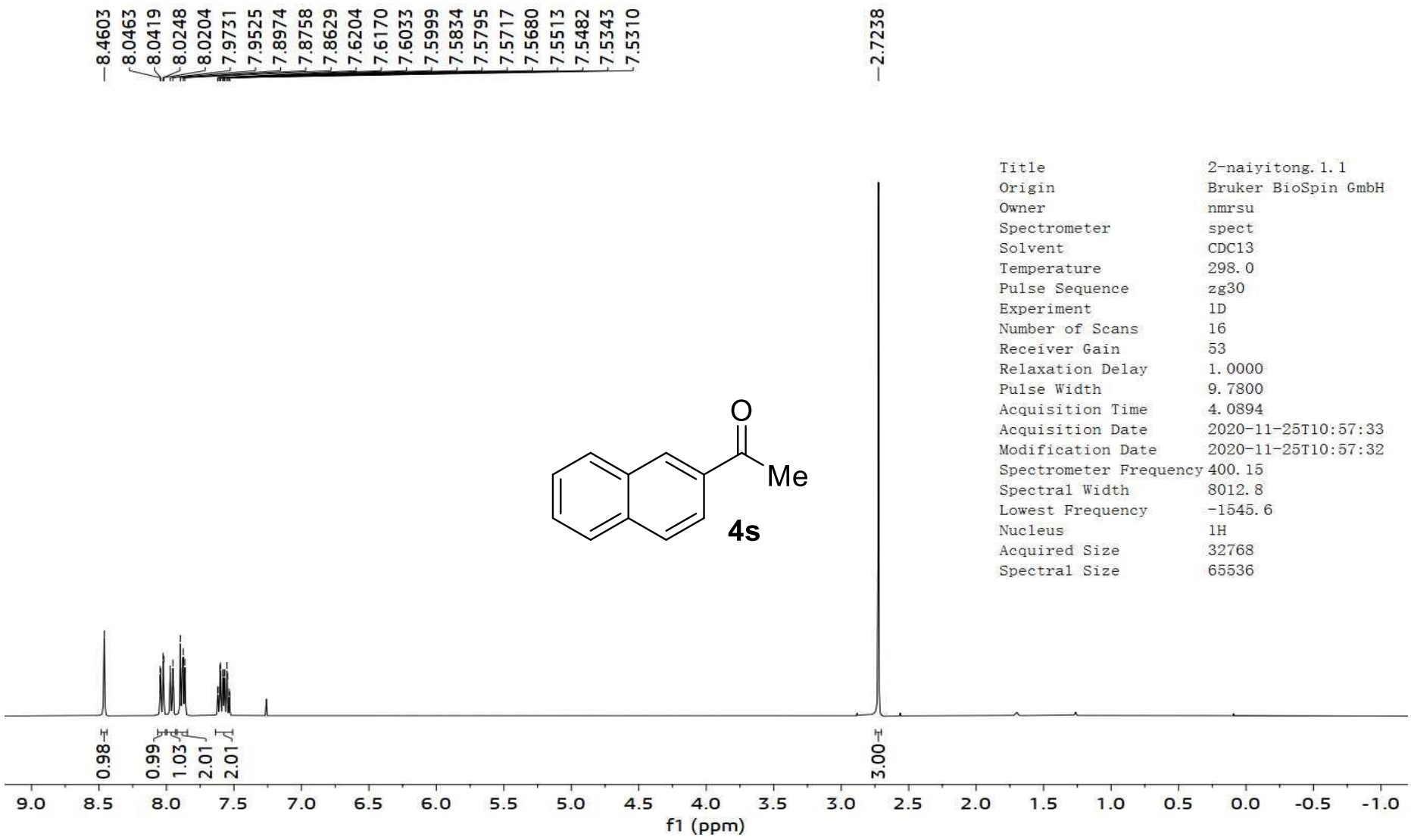

196.84
137.71
132.52
130.16
128.38
O
4p
Title Rebenjiatong.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-03-05T21:42:19
Modification Date 2021-03-05T21:42:20
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1949.5
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

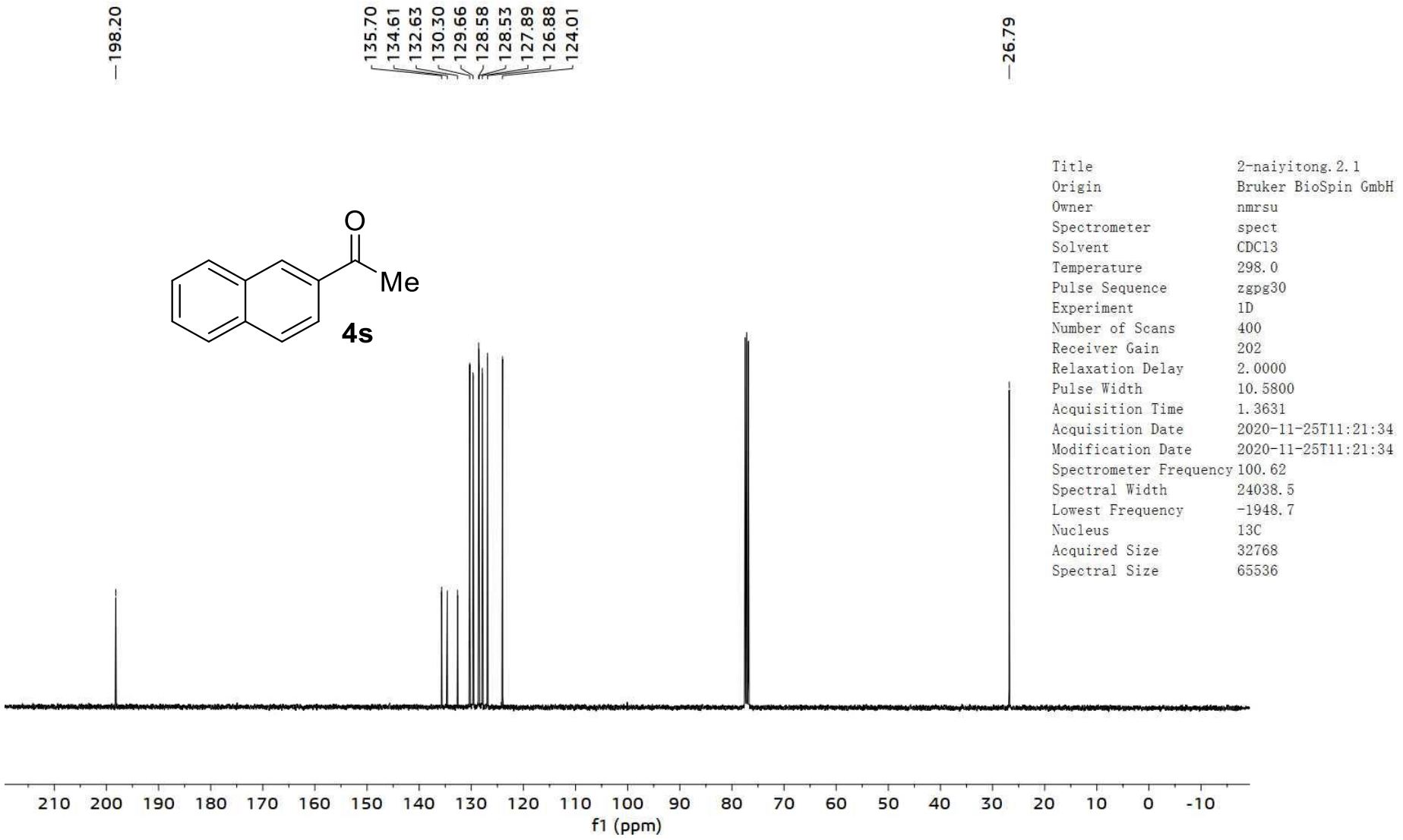

8.0389
8.0196
7.4831
7.4793
7.4645
7.4607
7.4457
7.4420
7.3175
7.2997
7.2798
7.2643
7.2571
7.2380
2.9798
2.9646
2.9494
2.6702
2.6544
2.6376
2.1691
2.1527
2.1372
2.1212
2.1056
O
4q
Title alpha-SQNT.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 53
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-03-11T18:39:30
Modification Date 2021-03-11T18:39:30
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1544.1
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.93
0.99
2.12
1.99
2.00
2.00
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 -1.0
f1 (ppm)

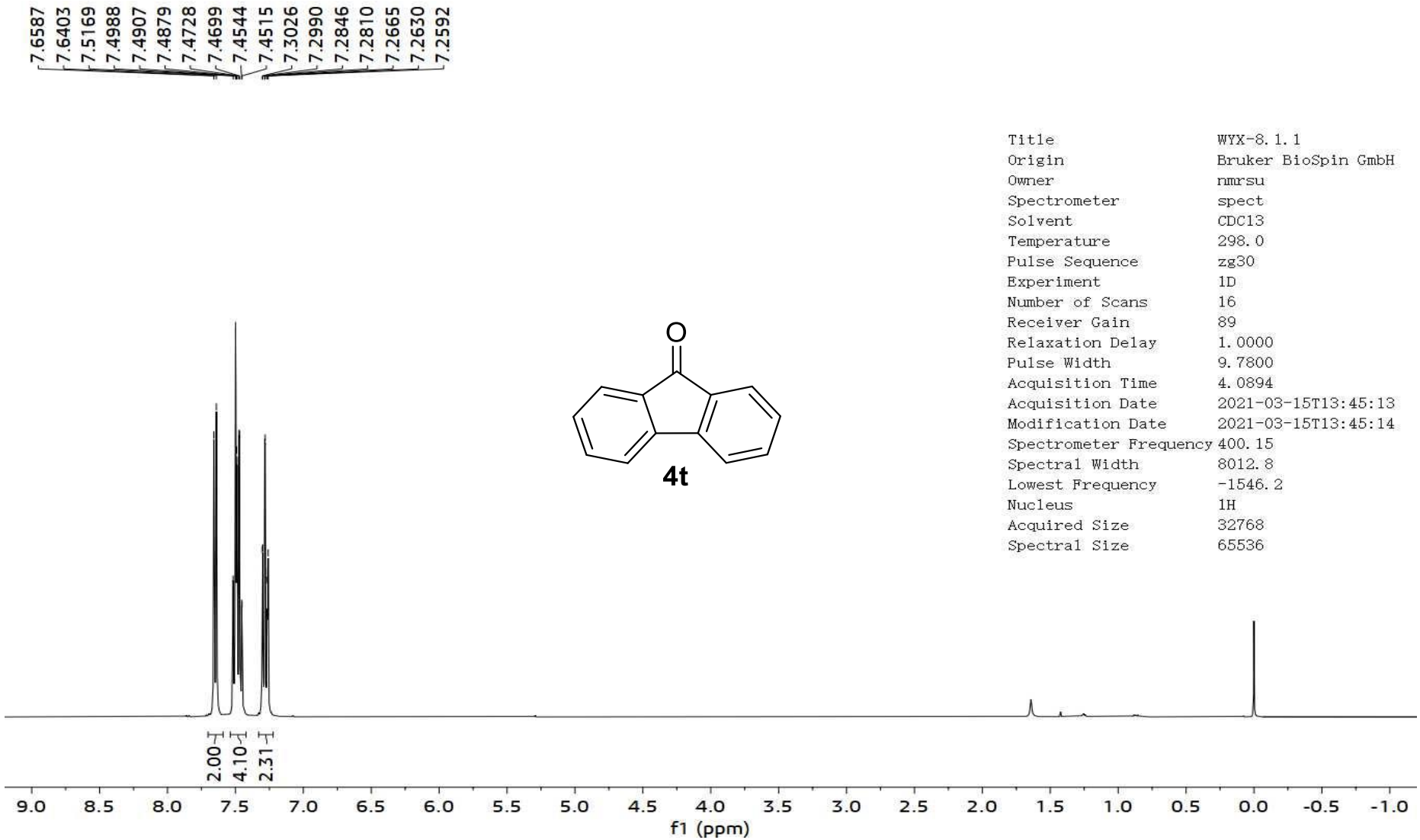

198.48
144.59
133.49
132.72
128.87
127.26
126.72
39.27
29.81
23.39
O
4q
Title alpha-SQNT.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 512
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-03-11T19:09:57
Modification Date 2021-03-11T19:09:57
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1948.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

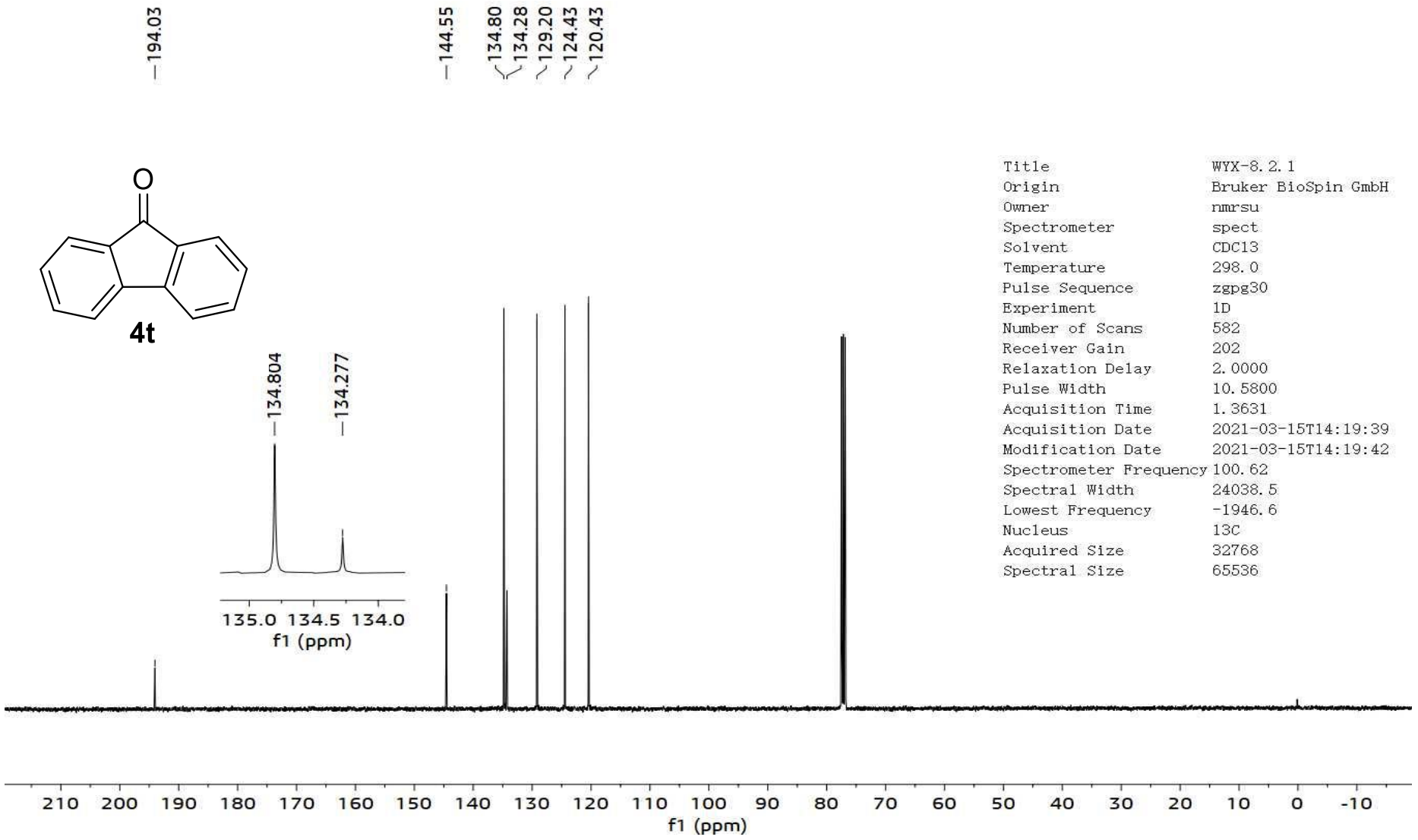

10.1280
8.2814
7.9736
7.9489
7.9273
7.9233
7.8999
7.8790
7.8579
7.6403
7.6368
7.6229
7.6196
7.6028
7.5991
7.5832
7.5796
7.5627
7.5456
7.5423
O
4r
Title WYX-13.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-06T23:01:54
Modification Date 2021-04-06T23:01:54
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.03
4.13
2.06
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

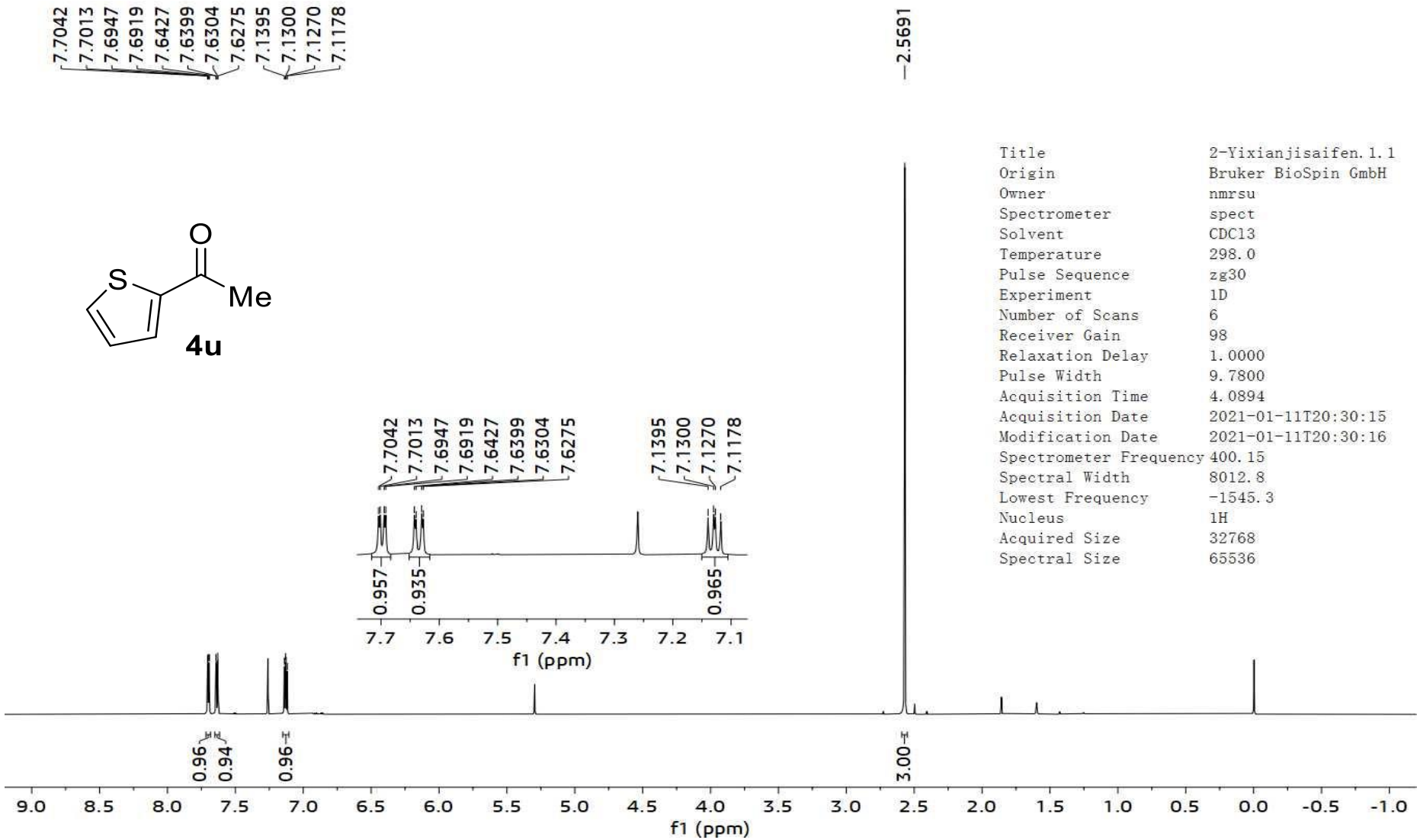

192.24
136.45
134.55
134.12
132.65
129.55
129.14
129.10
128.10
127.11
122.75
O
4r
134.555
134.122
129.548
129.140
129.100
134.5 134.0
f1 (ppm)
129.3
f1 (ppm)
Title WYX-13.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-07T00:01:28
Modification Date 2021-04-07T00:01:28
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1957.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

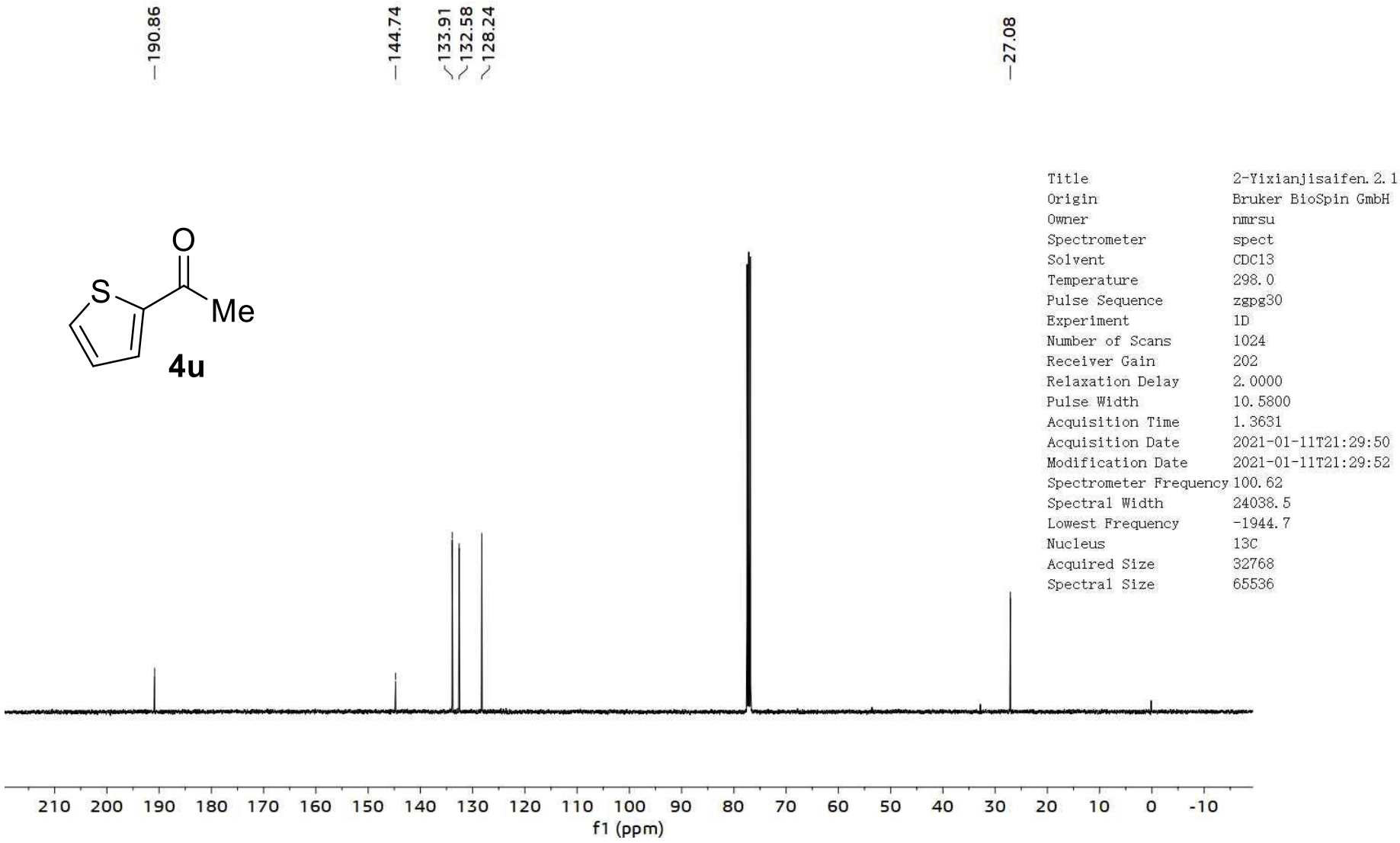

8.4603
8.0463
8.0419
8.0248
8.0204
7.9731
7.9525
7.8974
7.8758
7.8629
7.6204
7.6170
7.6033
7.5999
7.5834
7.5795
7.5717
7.5680
7.5513
7.5482
7.5343
7.5310
2.7238
O
Me
4s
Title 2-naiyitong.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 53
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2020-11-25T10:57:33
Modification Date 2020-11-25T10:57:32
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.98
0.99
1.03
2.01
2.01
3.00
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 -1.0
f1 (ppm)

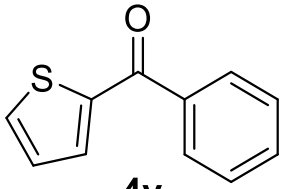

198.20
135.70
134.61
132.63
130.30
129.66
128.58
128.53
127.89
126.88
124.01
26.79
O
Me
4s
Title 2-naiyitong.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 400
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2020-11-25T11:21:34
Modification Date 2020-11-25T11:21:34
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1948.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)


7.6587
7.6403
7.5169
7.4988
7.4907
7.4879
7.4728
7.4699
7.4544
7.4515
7.3026
7.2990
7.2846
7.2810
7.2665
7.2630
7.2592
O
4t
Title WYX-8.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 89
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-03-15T13:45:13
Modification Date 2021-03-15T13:45:14
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1546.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
4.10
2.31
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 -1.0
f1 (ppm)


194.03
144.55
134.80
134.28
129.20
124.43
120.43
O
4t
134.804
134.277
135.0 134.5 134.0
f1 (ppm)
Title WYX-8.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 582
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-03-15T14:19:39
Modification Date 2021-03-15T14:19:42
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1946.6
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

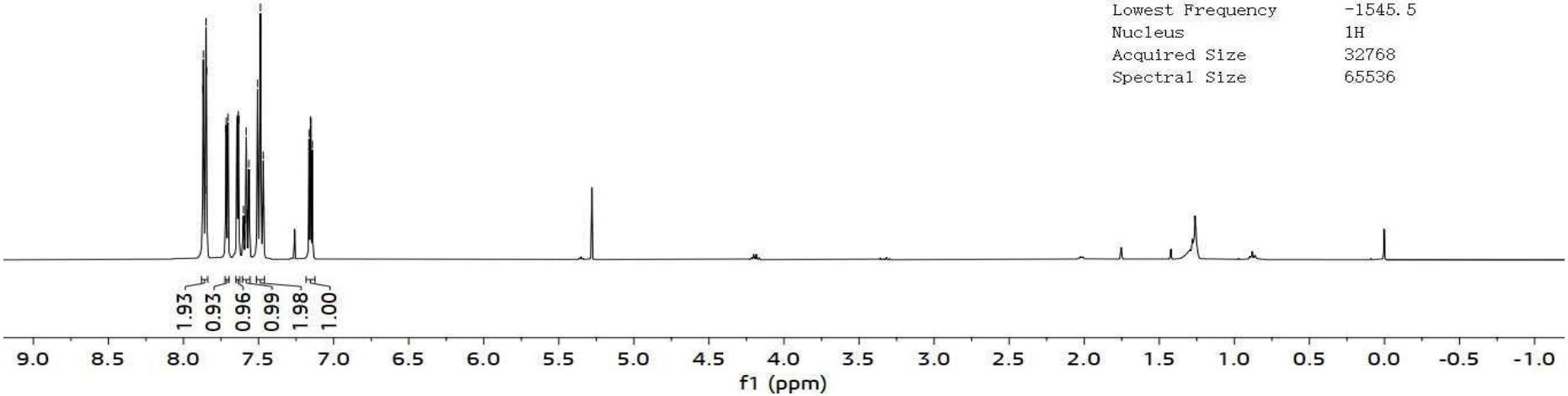

7.7042
7.7013
7.6947
7.6919
7.6427
7.6399
7.6304
7.6275
7.1395
7.1300
7.1270
7.1178
2.5691
O
S
Me
4u
Title 2-Yixianjisaifen.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 98
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-01-11T20:30:15
Modification Date 2021-01-11T20:30:16
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.957
0.935
0.965
f1 (ppm)
0.96
0.94
0.96
3.00
f1 (ppm)

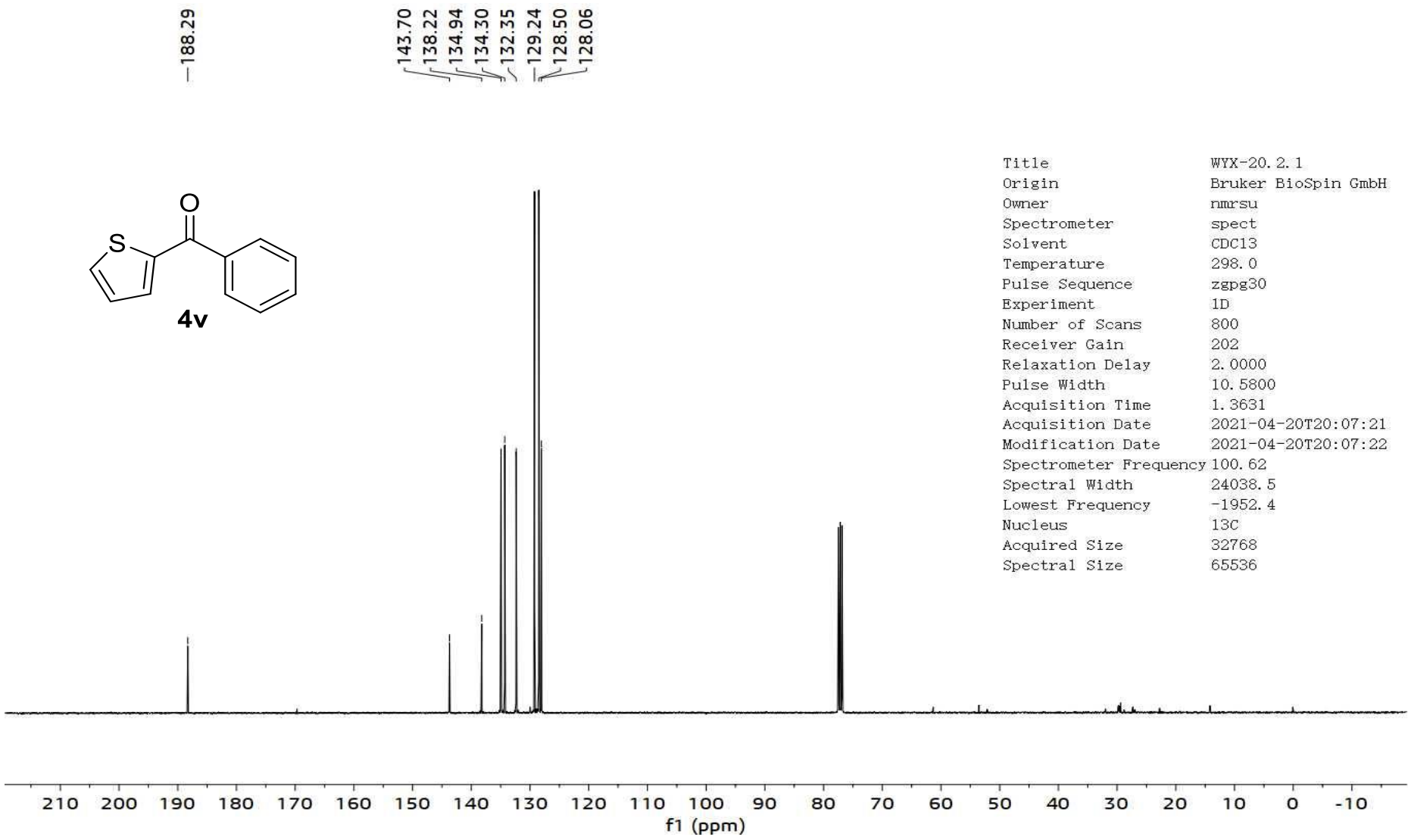

190.86
144.74
133.91
132.58
128.24
27.08
O
S
Me
4u
Title 2-Yixianjisaifen.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-01-11T21:29:50
Modification Date 2021-01-11T21:29:52
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1944.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

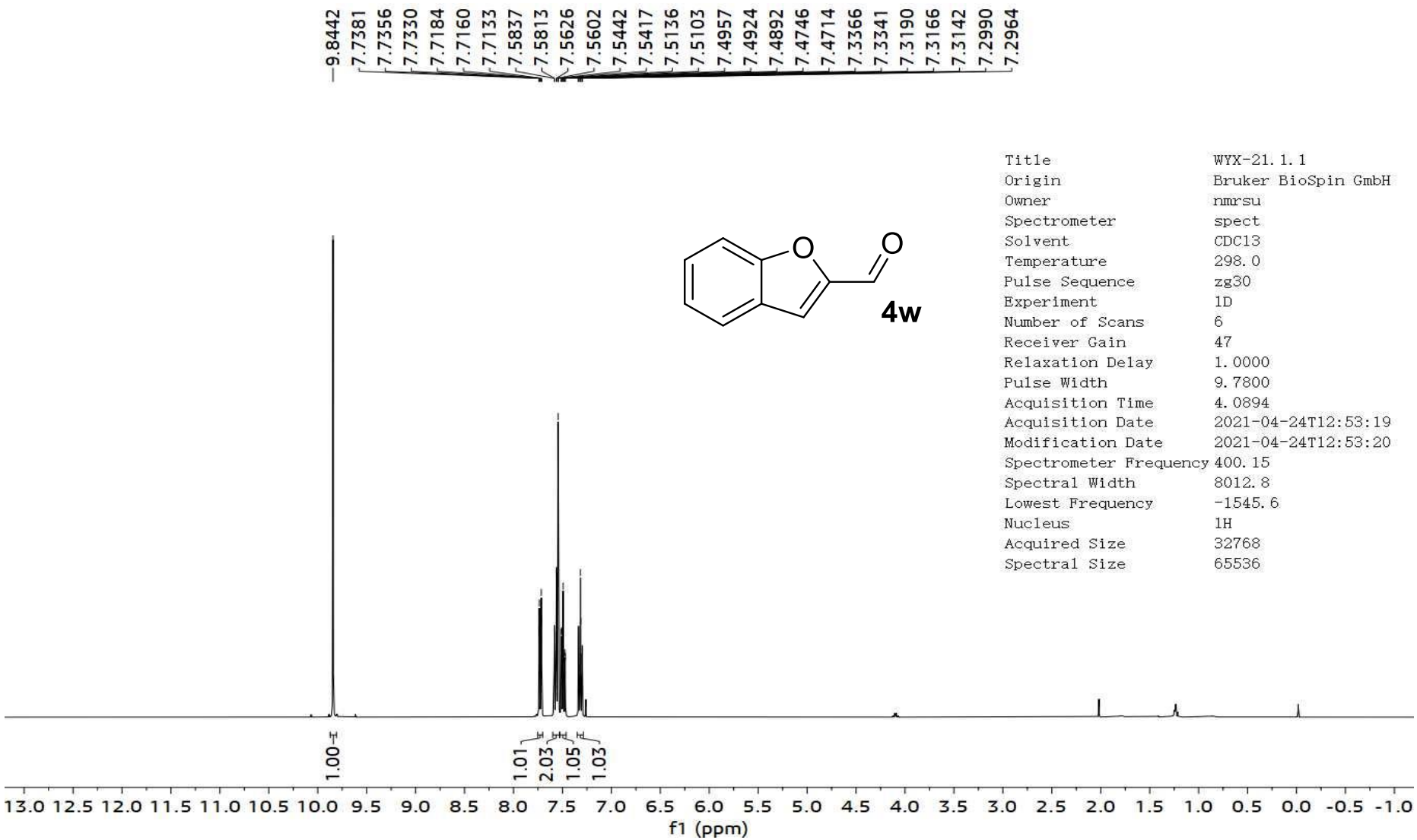


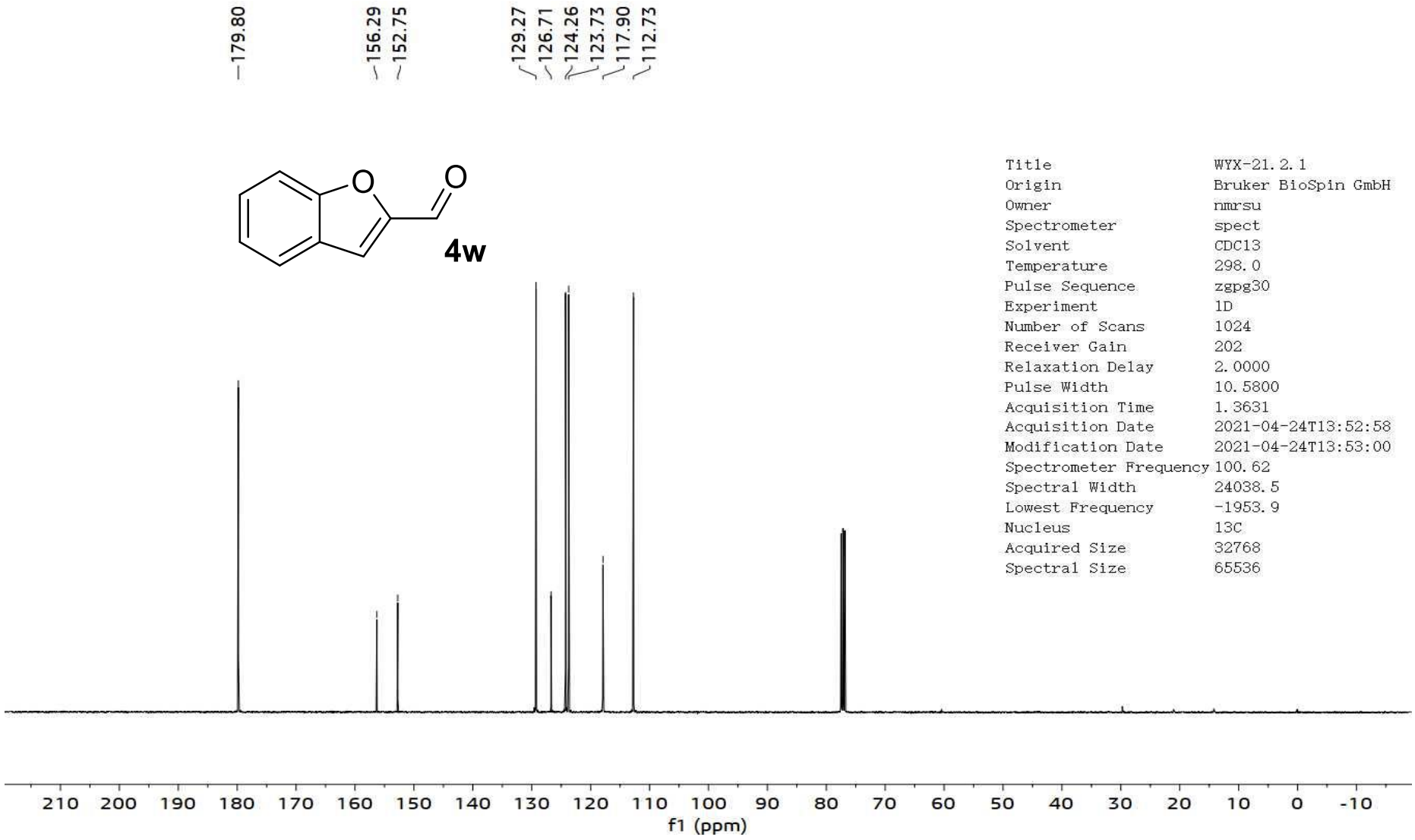
4v

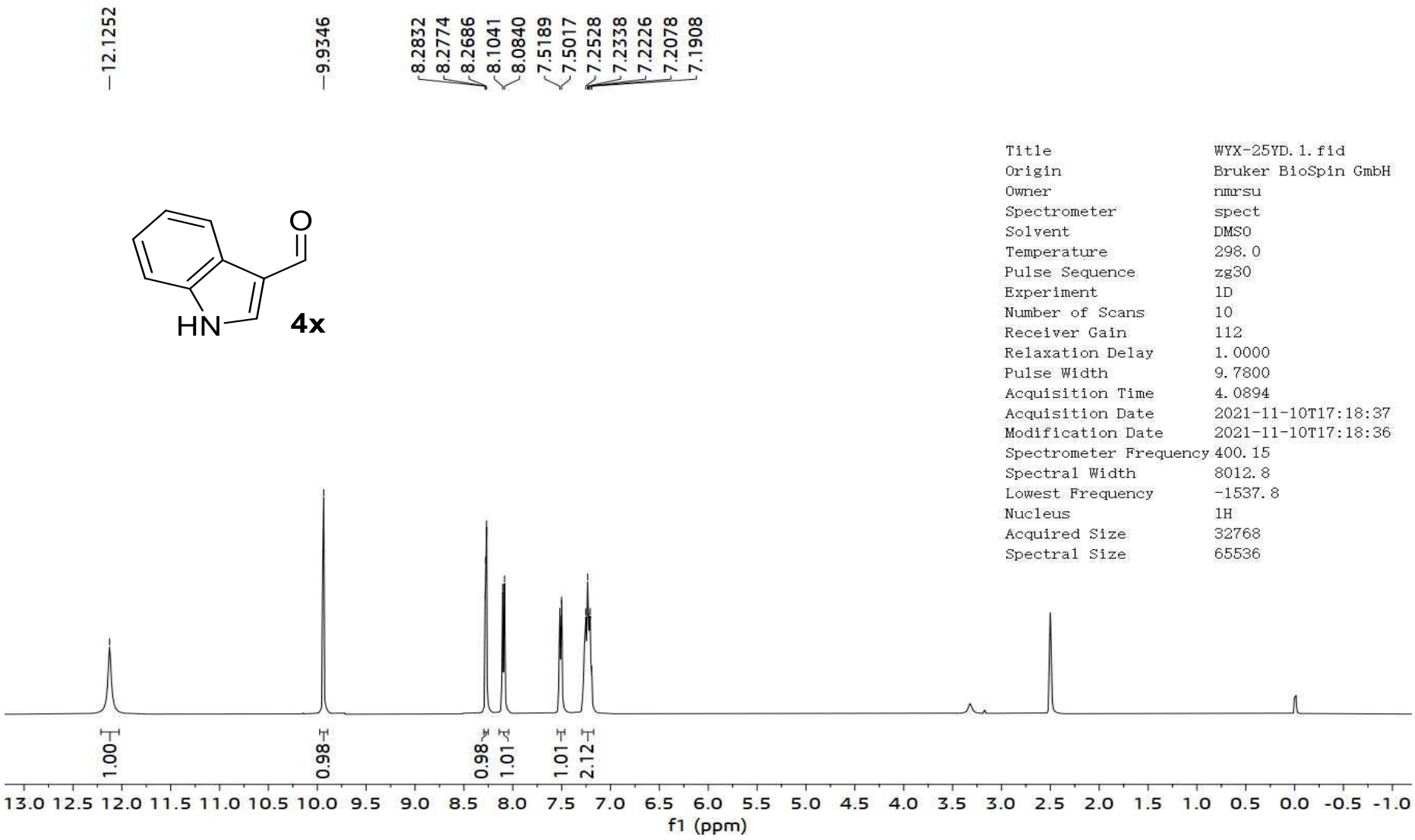
Title	WYX-20.1.1
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zg30
Experiment	1D
Number of Scans	6
Receiver Gain	31
Relaxation Delay	1.0000
Pulse Width	9.7800
Acquisition Time	4.0894
Acquisition Date	2021-04-20T19:20:30
Modification Date	2021-04-20T19:20:32
Spectrometer Frequency	400.15
Spectral Width	8012.8
Lowest Frequency	-1545.5
Nucleus	1H
Acquired Size	32768
Spectral Size	65536

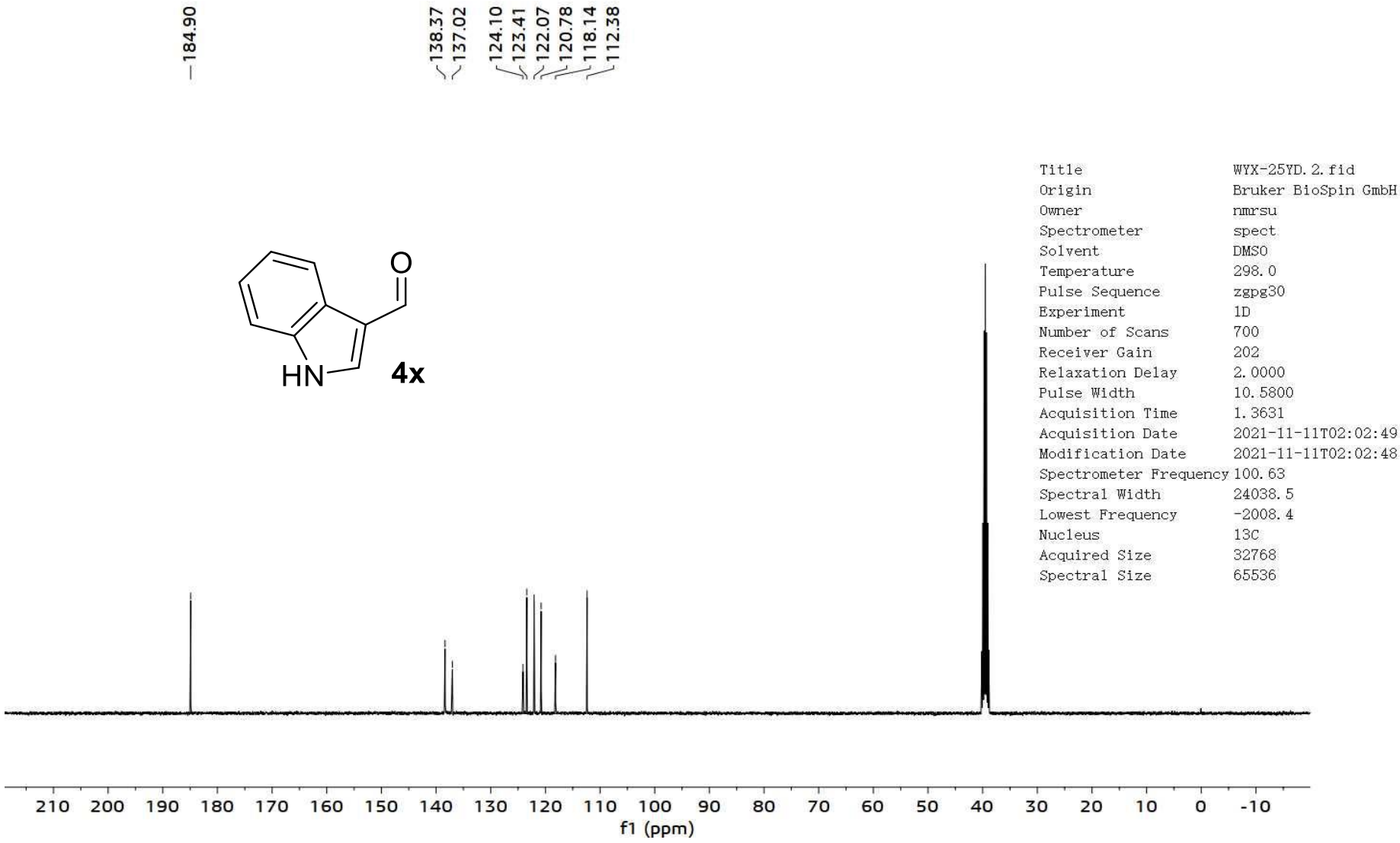


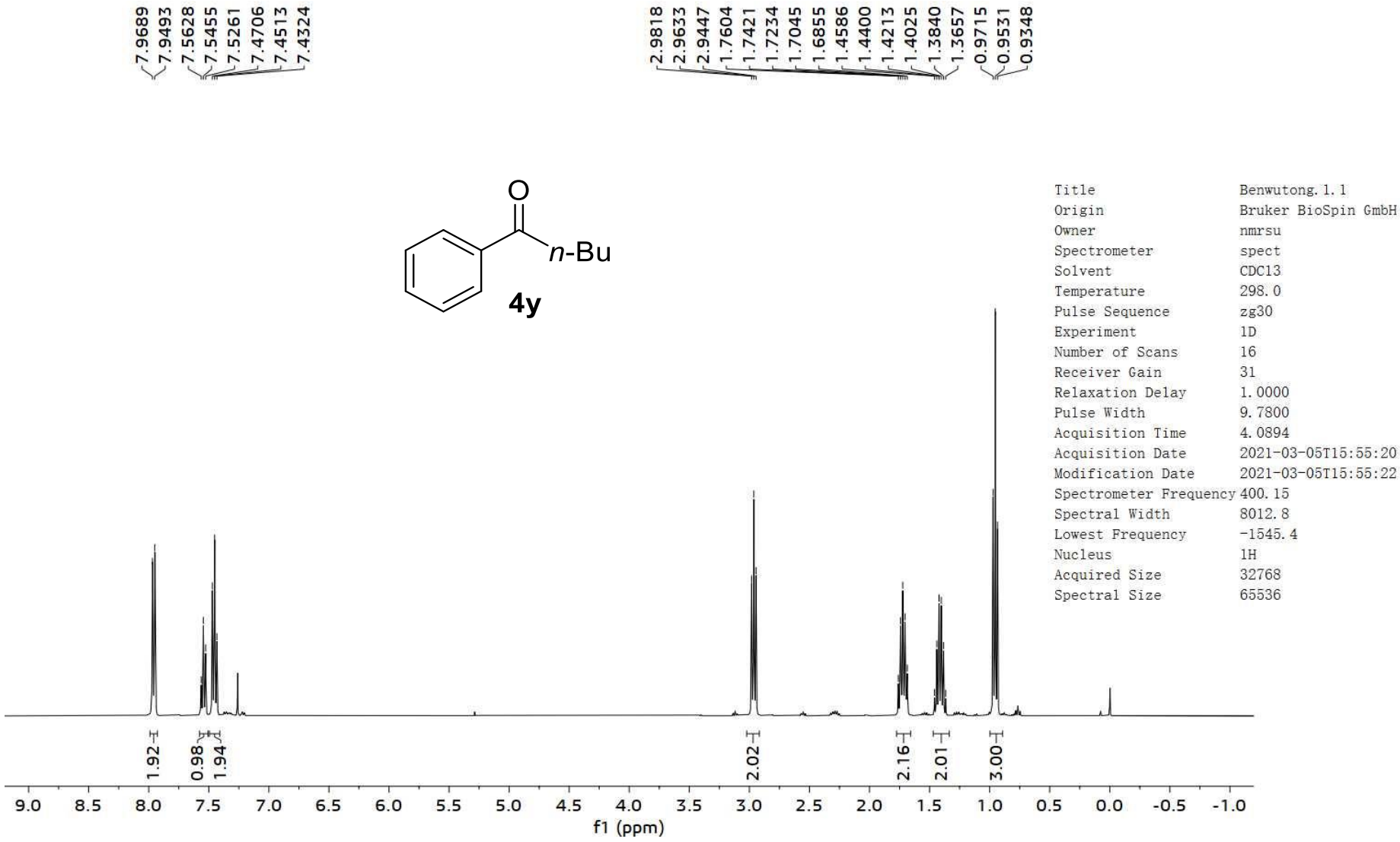

188.29
143.70
138.22
134.94
134.30
132.35
129.24
128.50
128.06
O
S
4v
Title WYX-20.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 800
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-20T20:07:21
Modification Date 2021-04-20T20:07:22
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1952.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

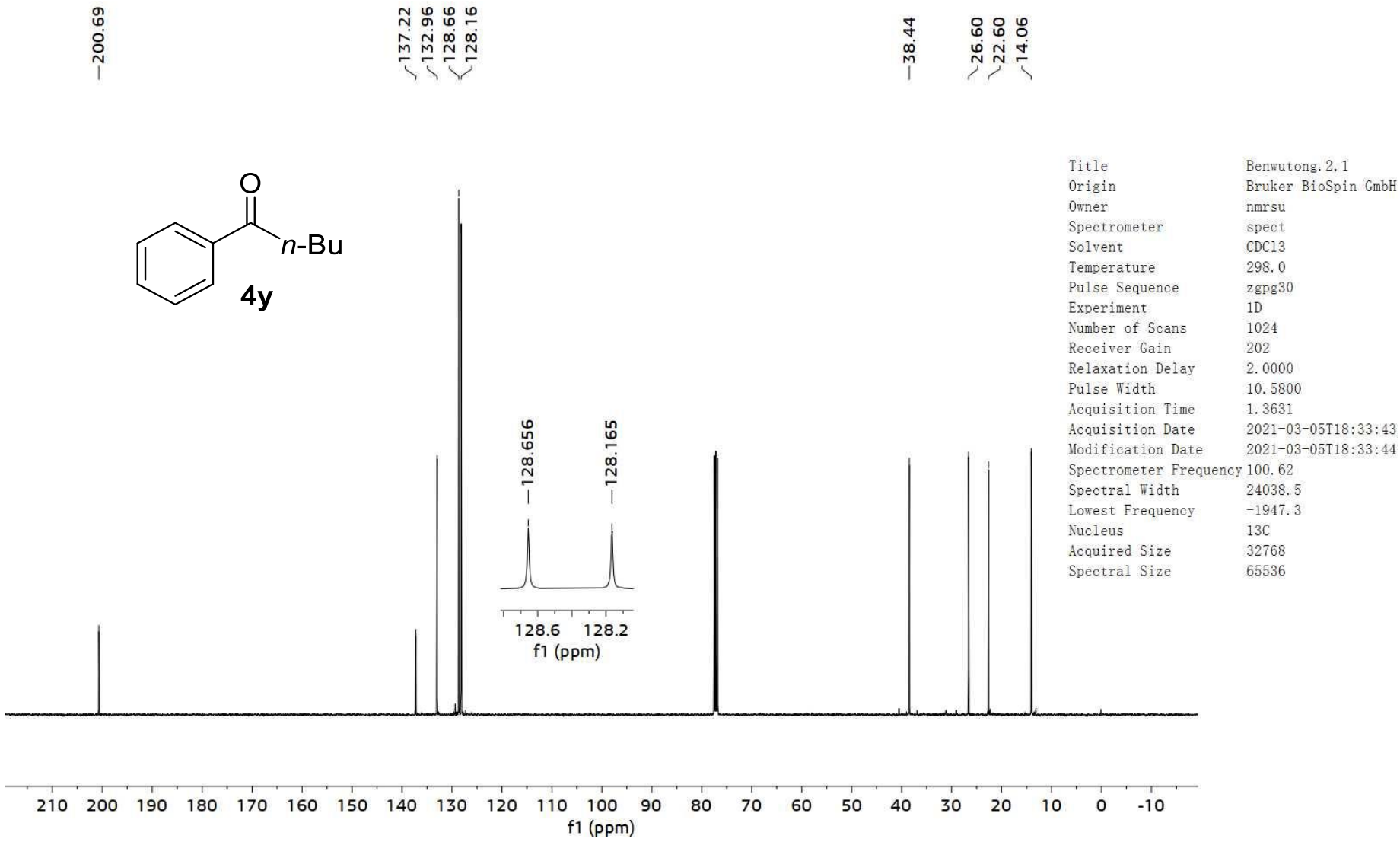

9.8442
7.7381
7.7356
7.7330
7.7184
7.7160
7.7133
7.5837
7.5813
7.5626
7.5602
7.5442
7.5417
7.5136
7.5103
7.4957
7.4924
7.4892
7.4746
7.4714
7.3366
7.3341
7.3190
7.3166
7.3142
7.2990
7.2964
O
O
4w
Title WYX-21.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 47
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-04-24T12:53:19
Modification Date 2021-04-24T12:53:20
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.01
2.03
1.05
1.03
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

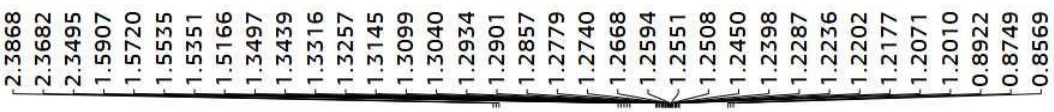

179.80
156.29
152.75
129.27
126.71
124.26
123.73
117.90
112.73
O
O
4w
Title WYX-21.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-04-24T13:52:58
Modification Date 2021-04-24T13:53:00
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1953.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

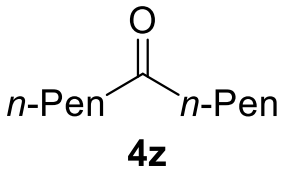

12.1252
9.9346
8.2832
8.2774
8.2686
8.1041
8.0840
7.5189
7.5017
7.2528
7.2338
7.2226
7.2078
7.1908
HN
O
4x
Title WYX-25YD.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent DMSO
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 10
Receiver Gain 112
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-11-10T17:18:37
Modification Date 2021-11-10T17:18:36
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1537.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
0.98
0.98
1.01
1.01
2.12
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)


184.90
138.37
137.02
124.10
123.41
122.07
120.78
118.14
112.38
O
HN
4x
Title WYX-25YD.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent DMSO
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-11-11T02:02:49
Modification Date 2021-11-11T02:02:48
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -2008.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)


7.9689
7.9493
7.5628
7.5455
7.5261
7.4706
7.4513
7.4324
2.9818
2.9633
2.9447
1.7604
1.7421
1.7234
1.7045
1.6855
1.4586
1.4400
1.4213
1.4025
1.3840
1.3657
0.9715
0.9531
0.9348
O
n-Bu
4y
Title Benwutong.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-03-05T15:55:20
Modification Date 2021-03-05T15:55:22
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.92
0.98
1.94
2.02
2.16
2.01
3.00
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 -1.0
f1 (ppm)

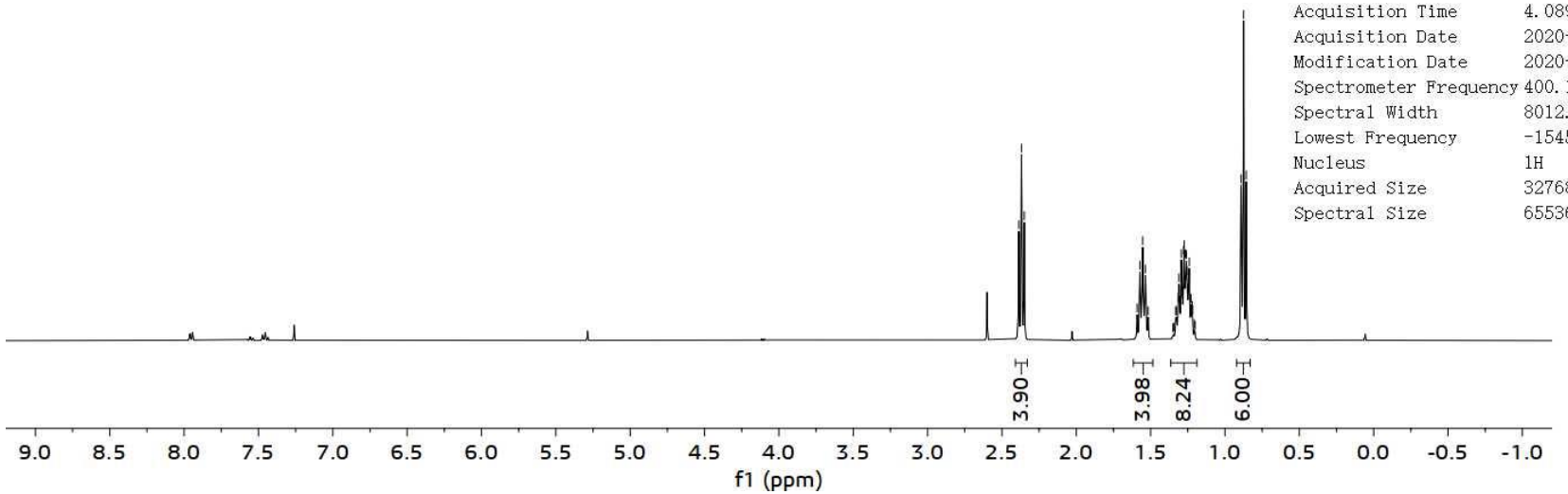

200.69
137.22
132.96
128.66
128.16
38.44
26.60
22.60
14.06
O
n-Bu
4y
128.656
128.165
128.6
128.2
f1 (ppm)
Title Benwutong.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-03-05T18:33:43
Modification Date 2021-03-05T18:33:44
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1947.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

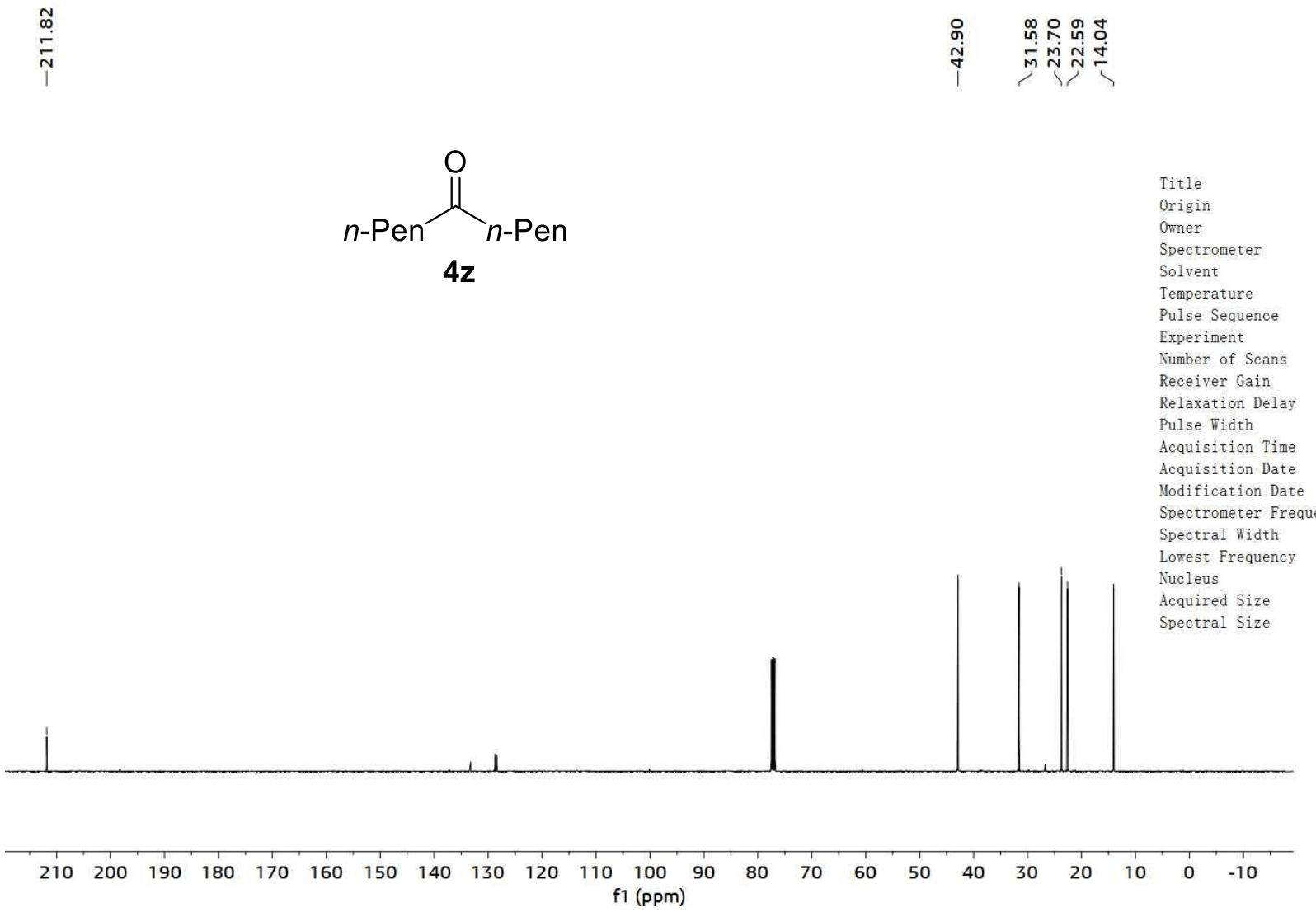


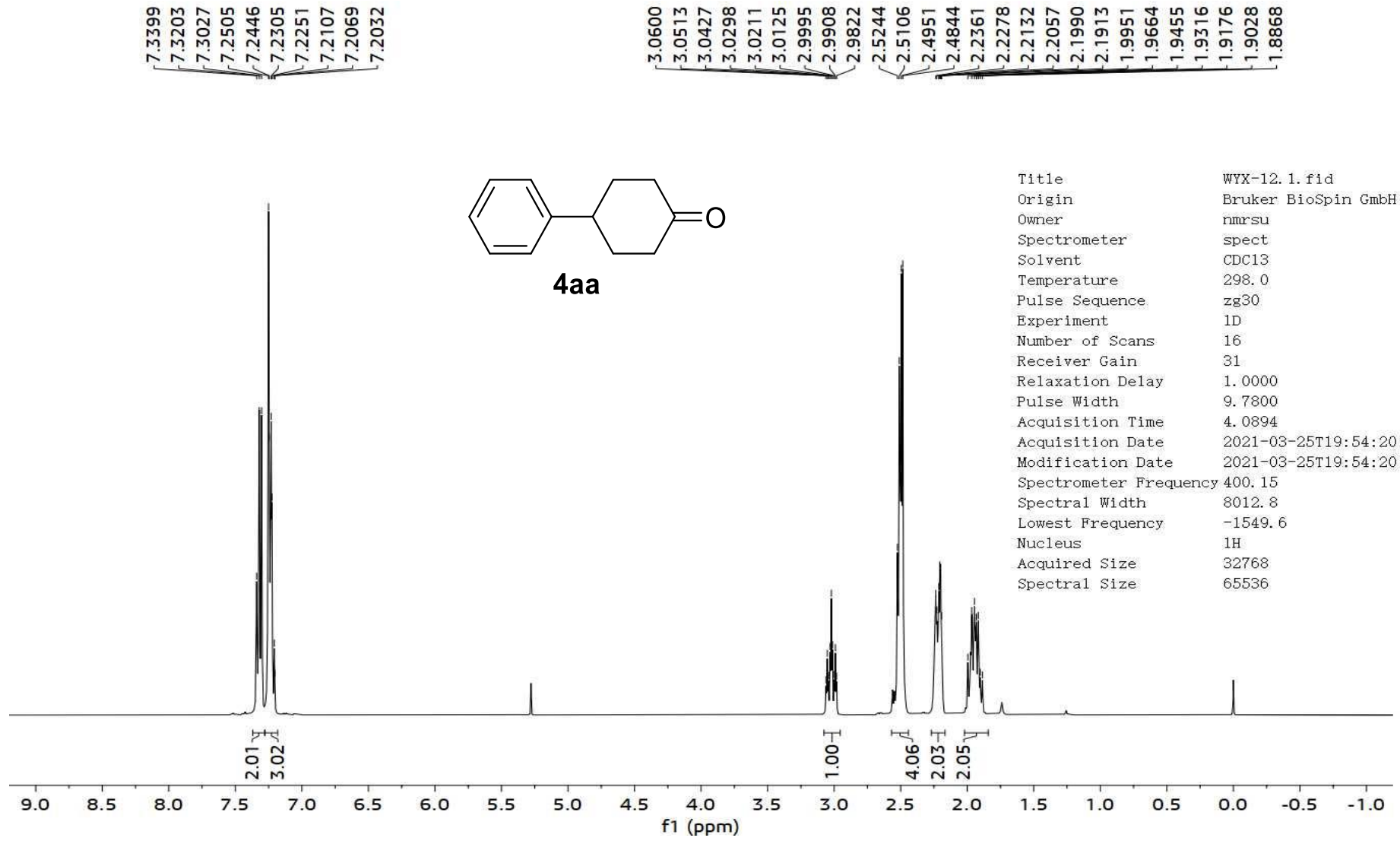


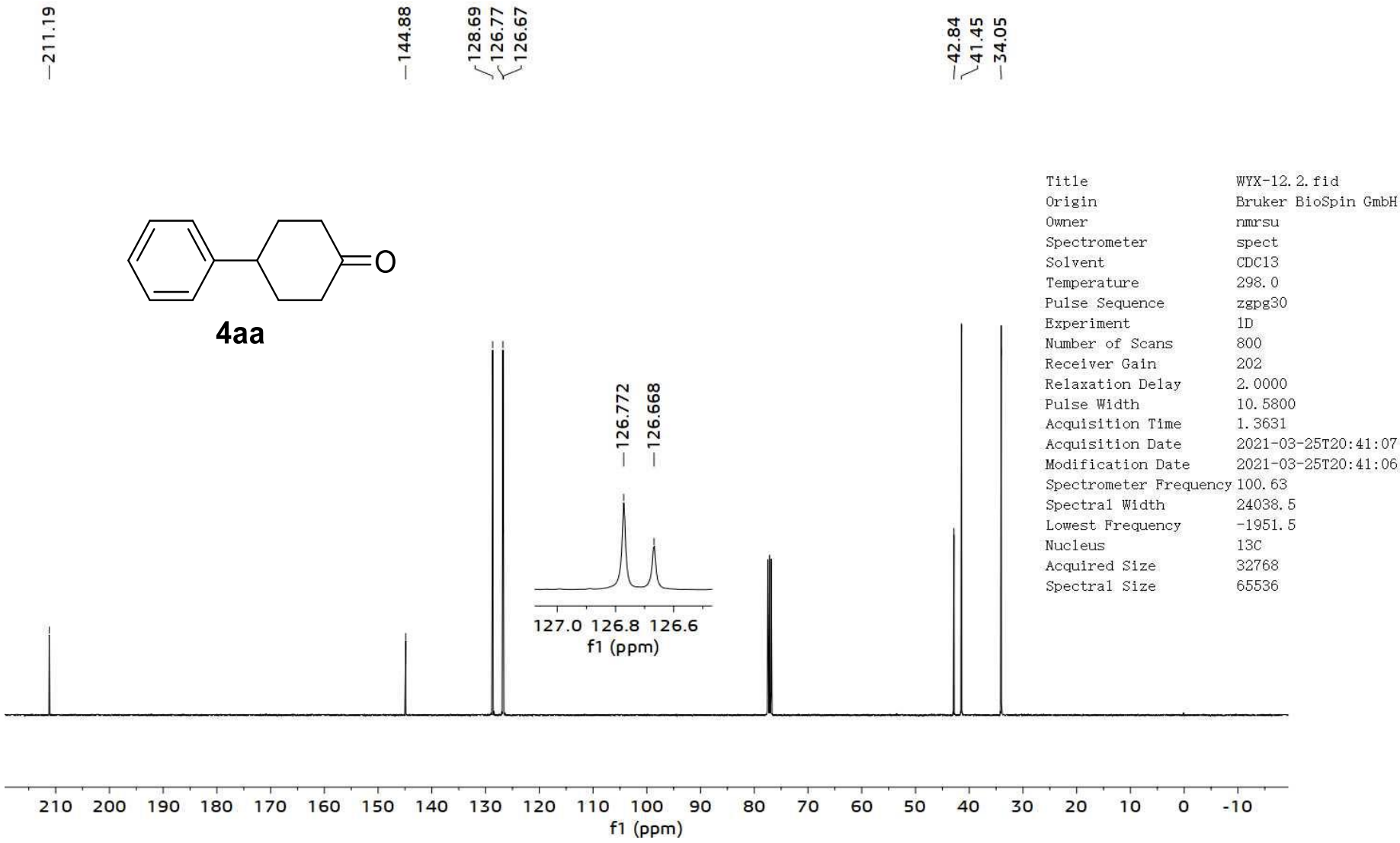
4z

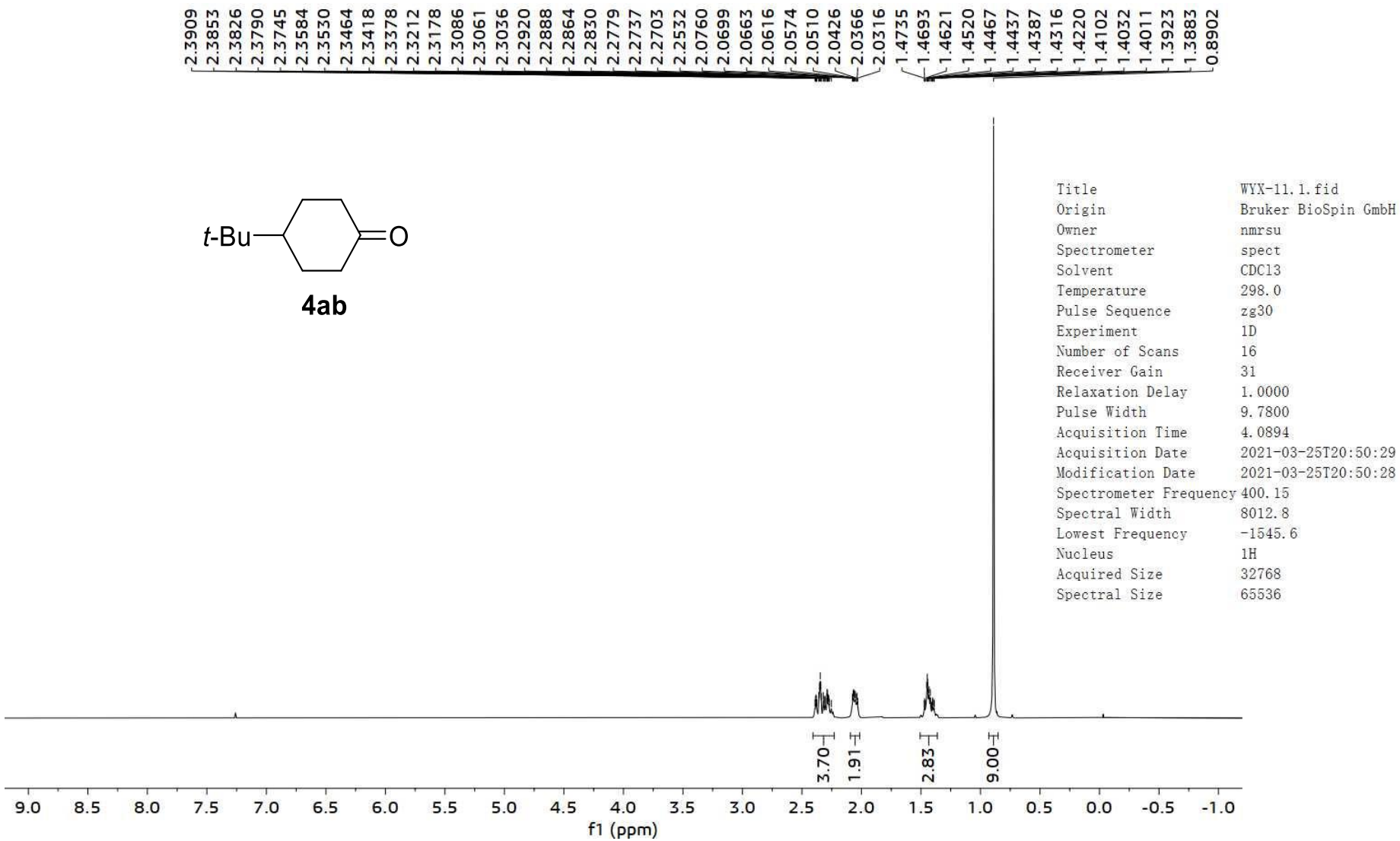
Title	Eezhengwujitong.1.fid
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zg30
Experiment	1D
Number of Scans	6
Receiver Gain	31
Relaxation Delay	1.0000
Pulse Width	9.7800
Acquisition Time	4.0894
Acquisition Date	2020-12-14T19:47:26
Modification Date	2020-12-14T19:47:28
Spectrometer Frequency	400.15
Spectral Width	8012.8
Lowest Frequency	-1545.4
Nucleus	1H
Acquired Size	32768
Spectral Size	65536

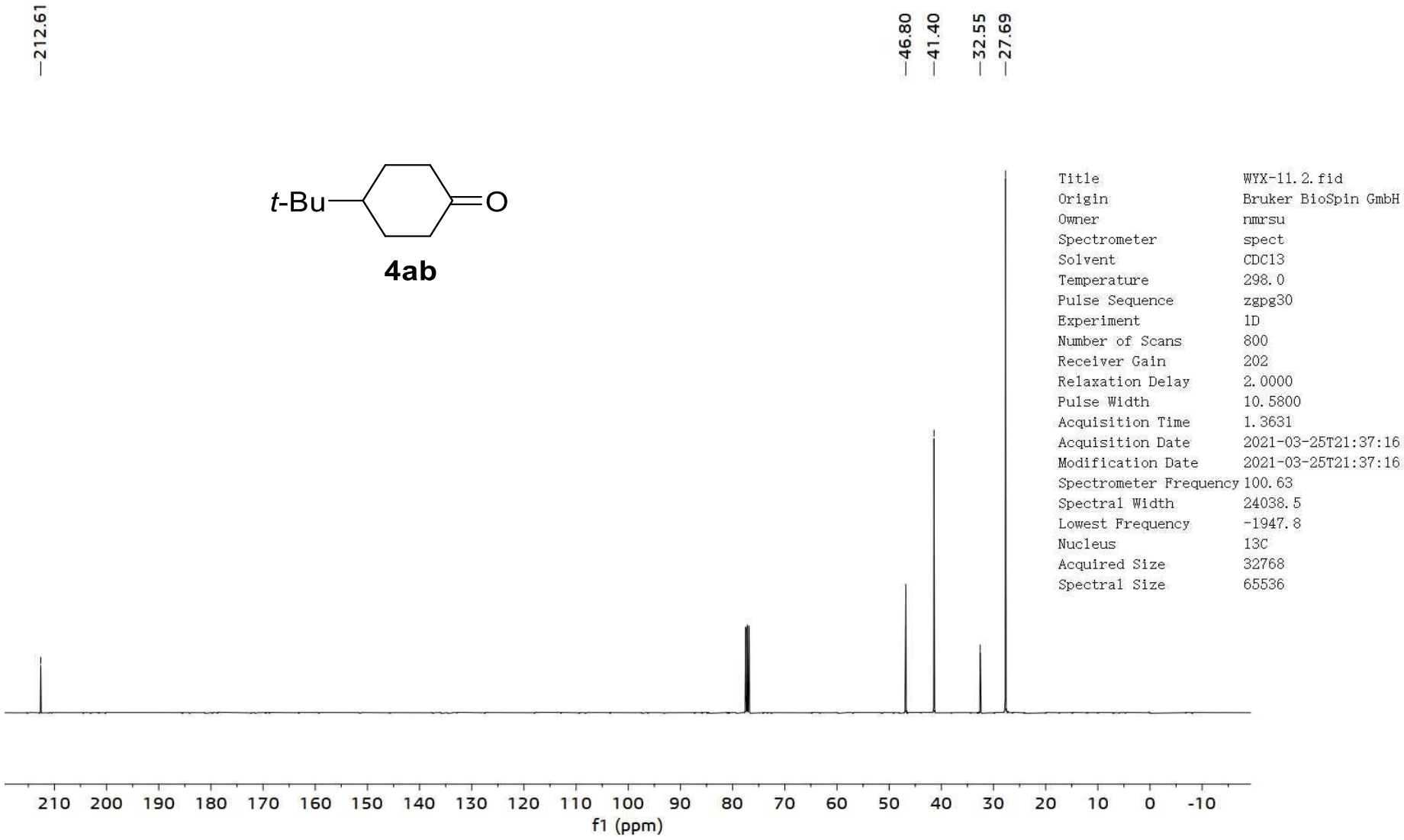


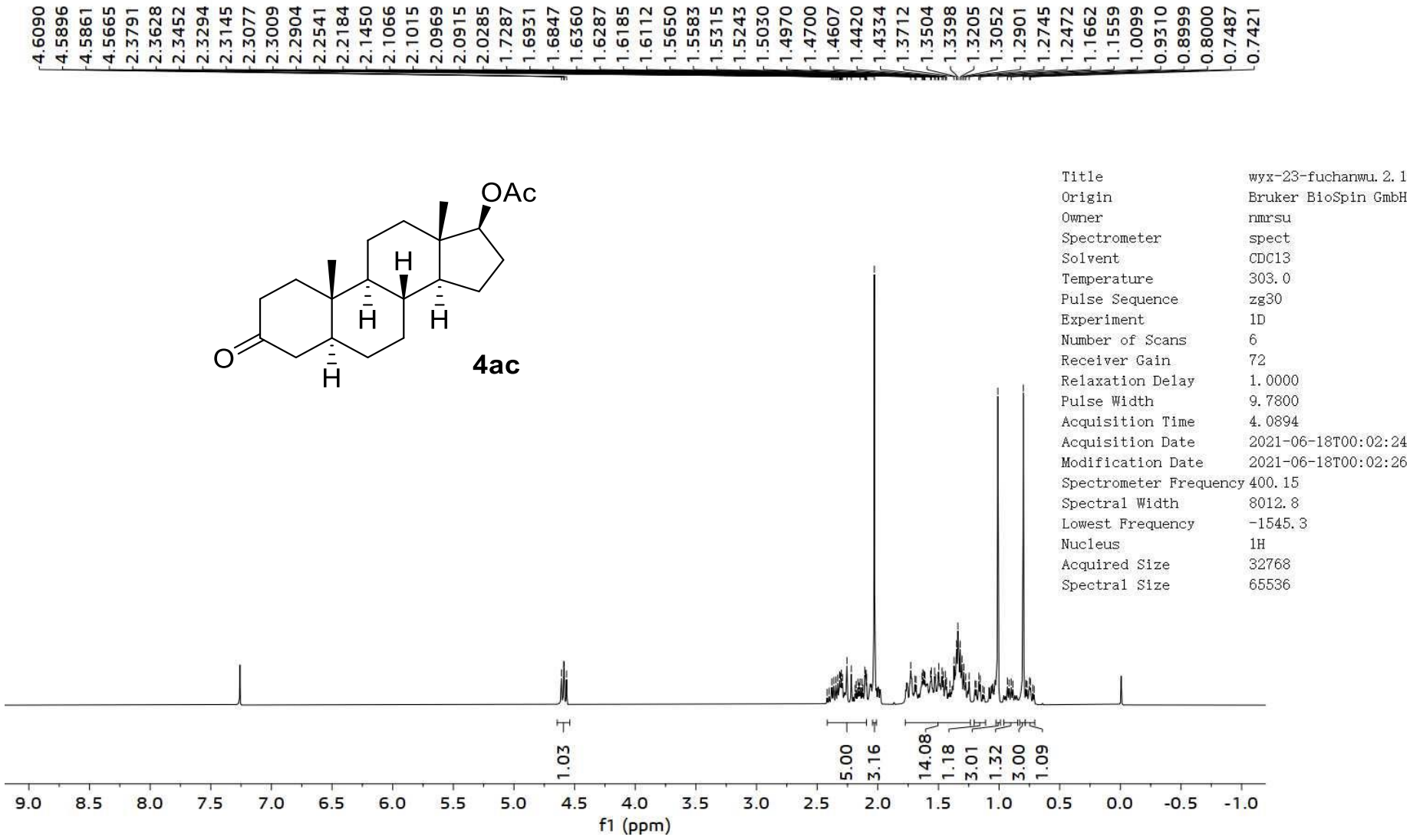

211.82
42.90
31.58
23.70
22.59
14.04
O
n-Pen
n-Pen
4z
Title Eezhengwujitong.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 500
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2020-12-14T20:17:09
Modification Date 2020-12-14T20:17:12
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1944.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

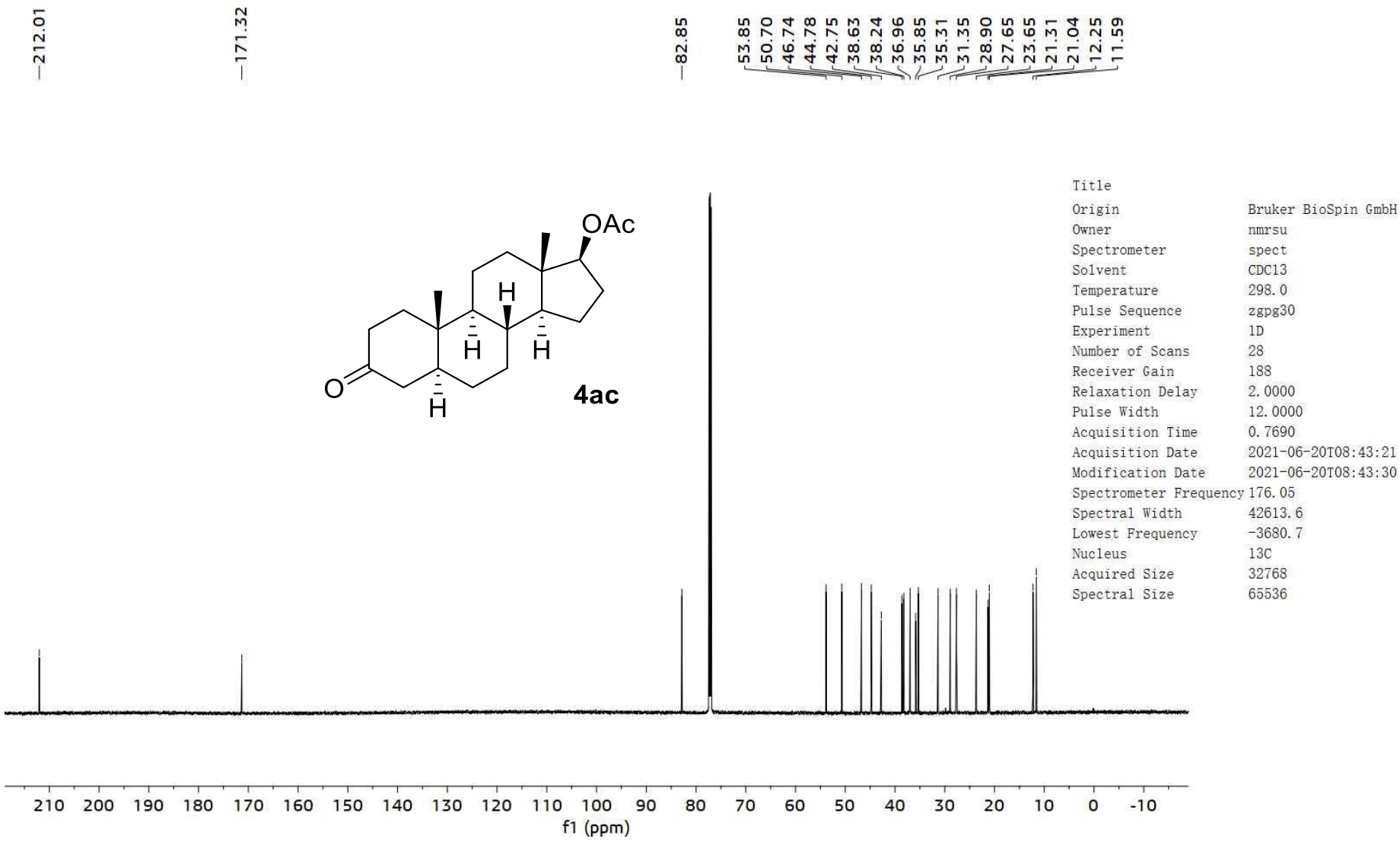

7.3399
7.3203
7.3027
7.2505
7.2446
7.2305
7.2251
7.2107
7.2069
7.2032
3.0600
3.0513
3.0427
3.0298
3.0211
3.0125
2.9995
2.9908
2.9822
2.5244
2.5106
2.4951
2.4844
2.2361
2.2278
2.2132
2.2057
2.1990
2.1913
1.9951
1.9664
1.9455
1.9316
1.9176
1.9028
1.8868
O
4aa
Title WYX-12.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-03-25T19:54:20
Modification Date 2021-03-25T19:54:20
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1549.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.01
3.02
1.00
4.06
2.03
2.05
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 -1.0
f1 (ppm)

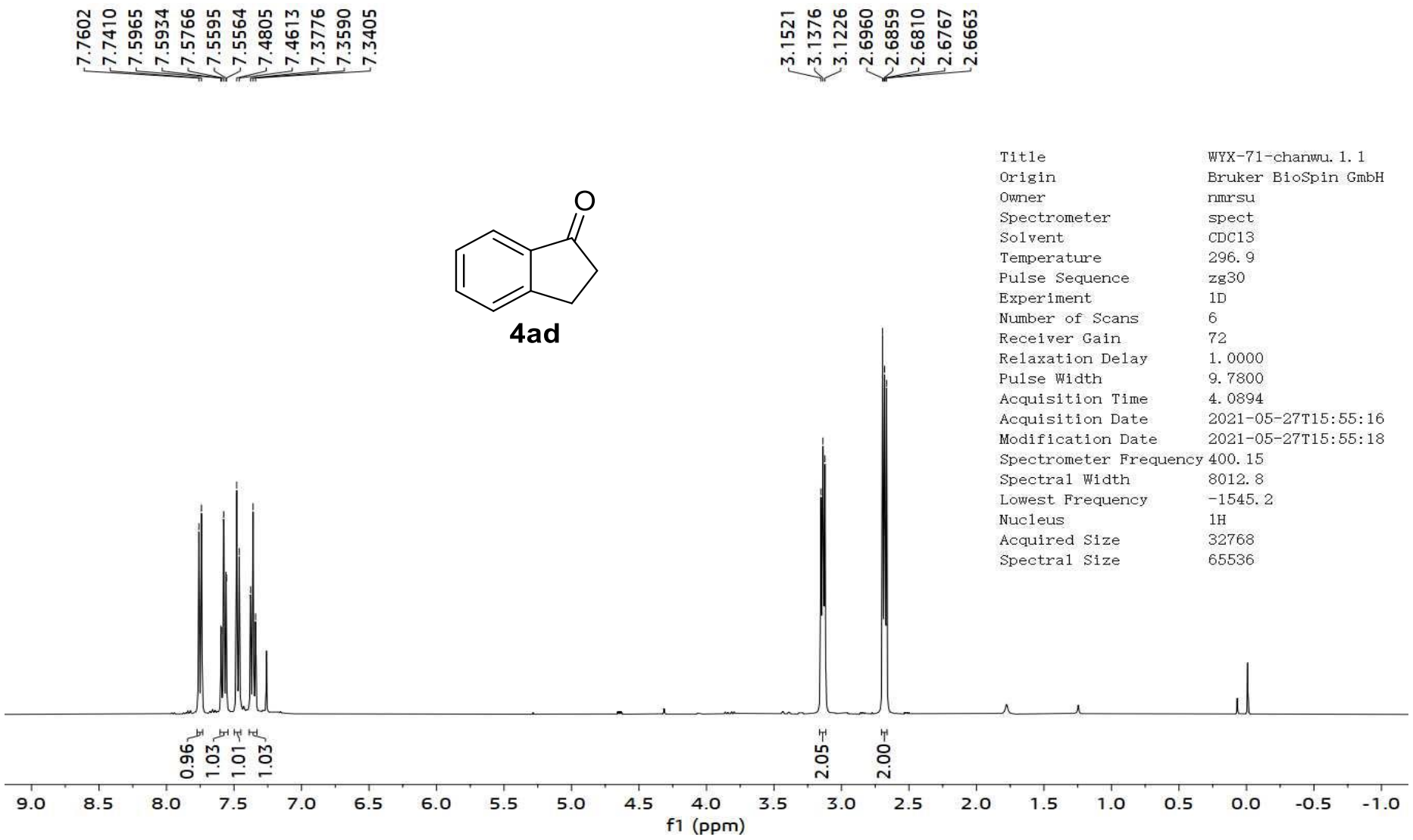

211.19
144.88
128.69
126.77
126.67
42.84
41.45
34.05
O
4aa
126.772
126.668
127.0 126.8 126.6
f1 (ppm)
Title WYX-12.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 800
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-03-25T20:41:07
Modification Date 2021-03-25T20:41:06
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1951.5
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

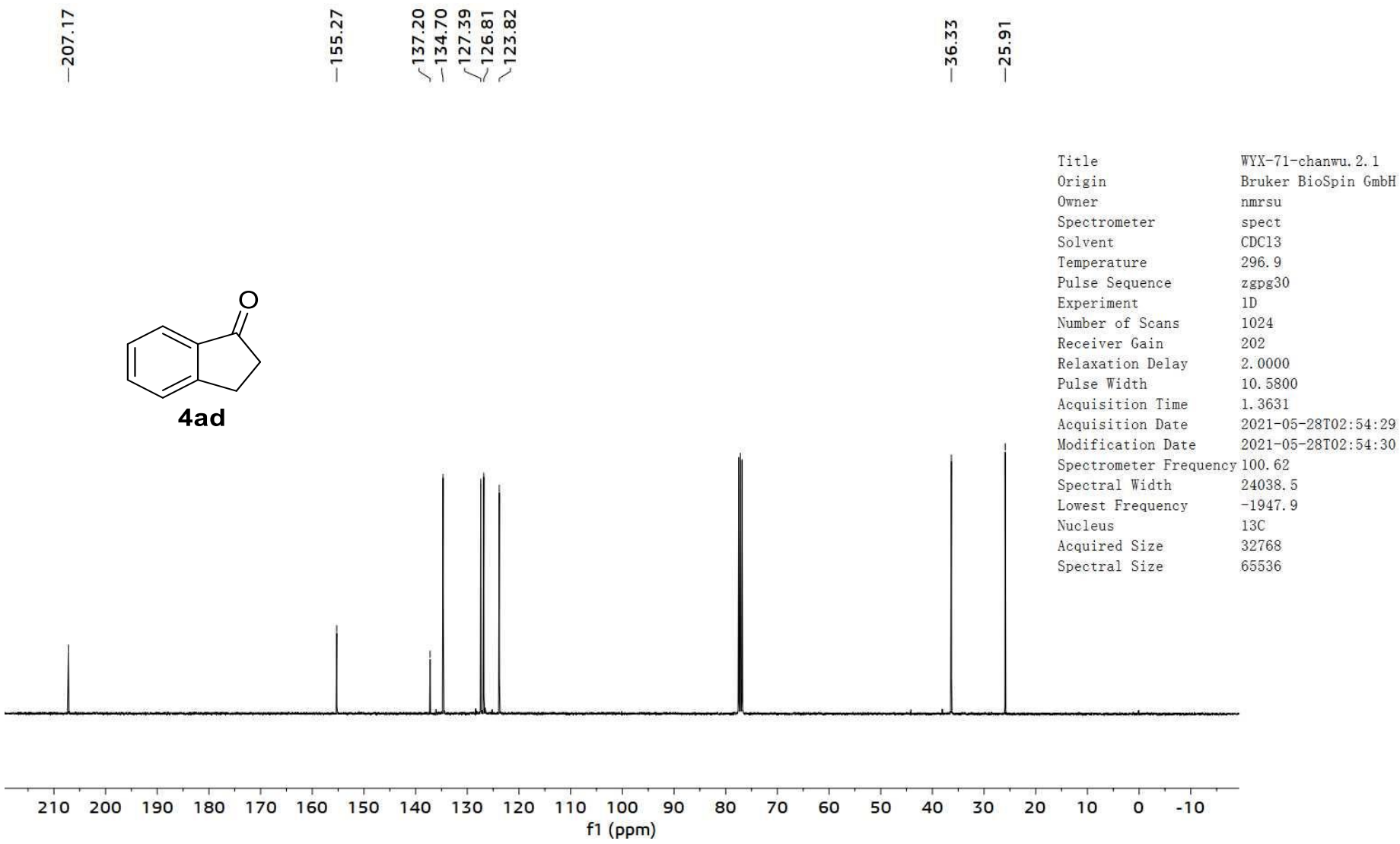

2.3909
2.3853
2.3826
2.3790
2.3745
2.3584
2.3530
2.3464
2.3418
2.3378
2.3212
2.3178
2.3086
2.3061
2.3036
2.2920
2.2888
2.2864
2.2830
2.2779
2.2737
2.2703
2.2532
2.0760
2.0699
2.0663
2.0616
2.0574
2.0510
2.0426
2.0366
2.0316
1.4735
1.4693
1.4621
1.4520
1.4467
1.4437
1.4387
1.4316
1.4220
1.4102
1.4032
1.4011
1.3923
1.3883
0.8902
t-Bu
O
4ab
Title WYX-11.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-03-25T20:50:29
Modification Date 2021-03-25T20:50:28
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
3.70
1.91
2.83
9.00
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 -1.0
f1 (ppm)

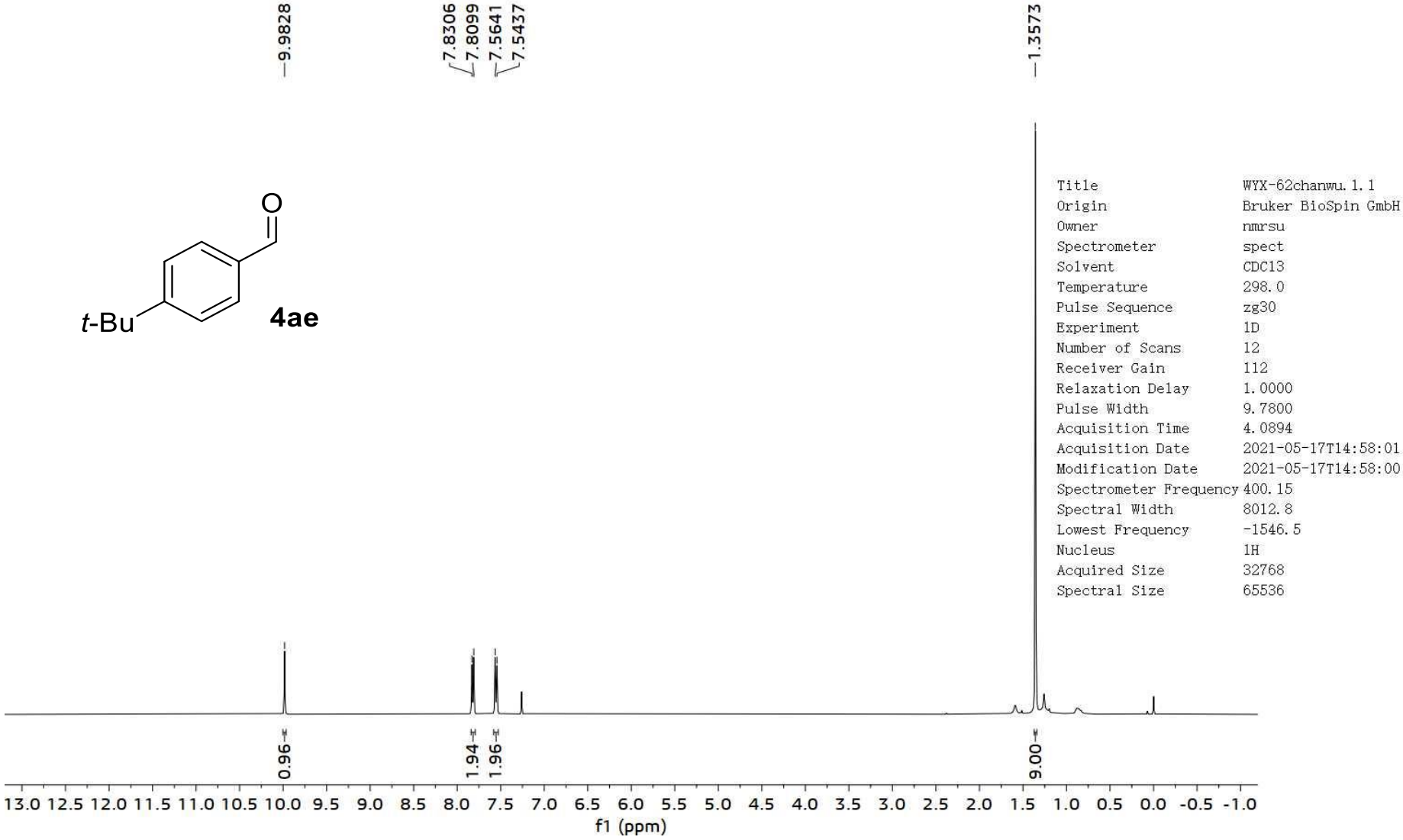

212.61
46.80
41.40
32.55
27.69
t-Bu
O
4ab
Title WYX-11.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 800
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-03-25T21:37:16
Modification Date 2021-03-25T21:37:16
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1947.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

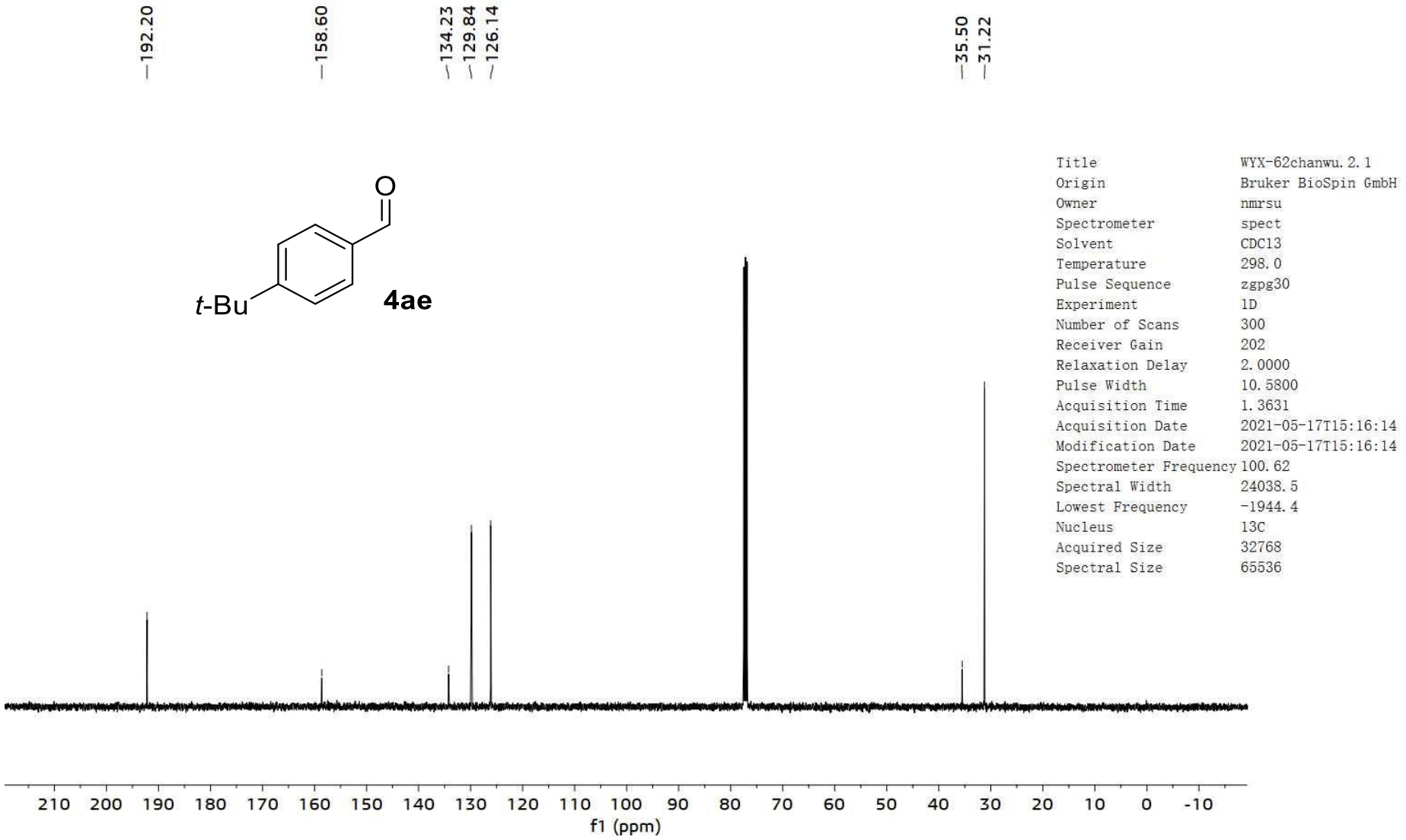

4.6090 4.5896 4.5861 4.5665 2.3791 2.3628 2.3452 2.3294 2.3145 2.3077 2.3009 2.2904 2.2541 2.2184 2.1450 2.1066 2.1015 2.0969 2.0915 2.0285 1.7287 1.6931 1.6847 1.6360 1.6287 1.6185 1.6112 1.5650 1.5583 1.5315 1.5243 1.5030 1.4970 1.4700 1.4607 1.4420 1.4334 1.3712 1.3504 1.3398 1.3205 1.3052 1.2901 1.2745 1.2472 1.1662 1.1559 1.0099 0.9310 0.8999 0.8000 0.7487 0.7421
OAc
H
H
H
O
H
4ac
Title wyx-23-fuchanwu.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 303.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 72
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-06-18T00:02:24
Modification Date 2021-06-18T00:02:26
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.03
5.00
3.16
14.08
1.18
3.01
1.32
3.00
1.09
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 -1.0
f1 (ppm)

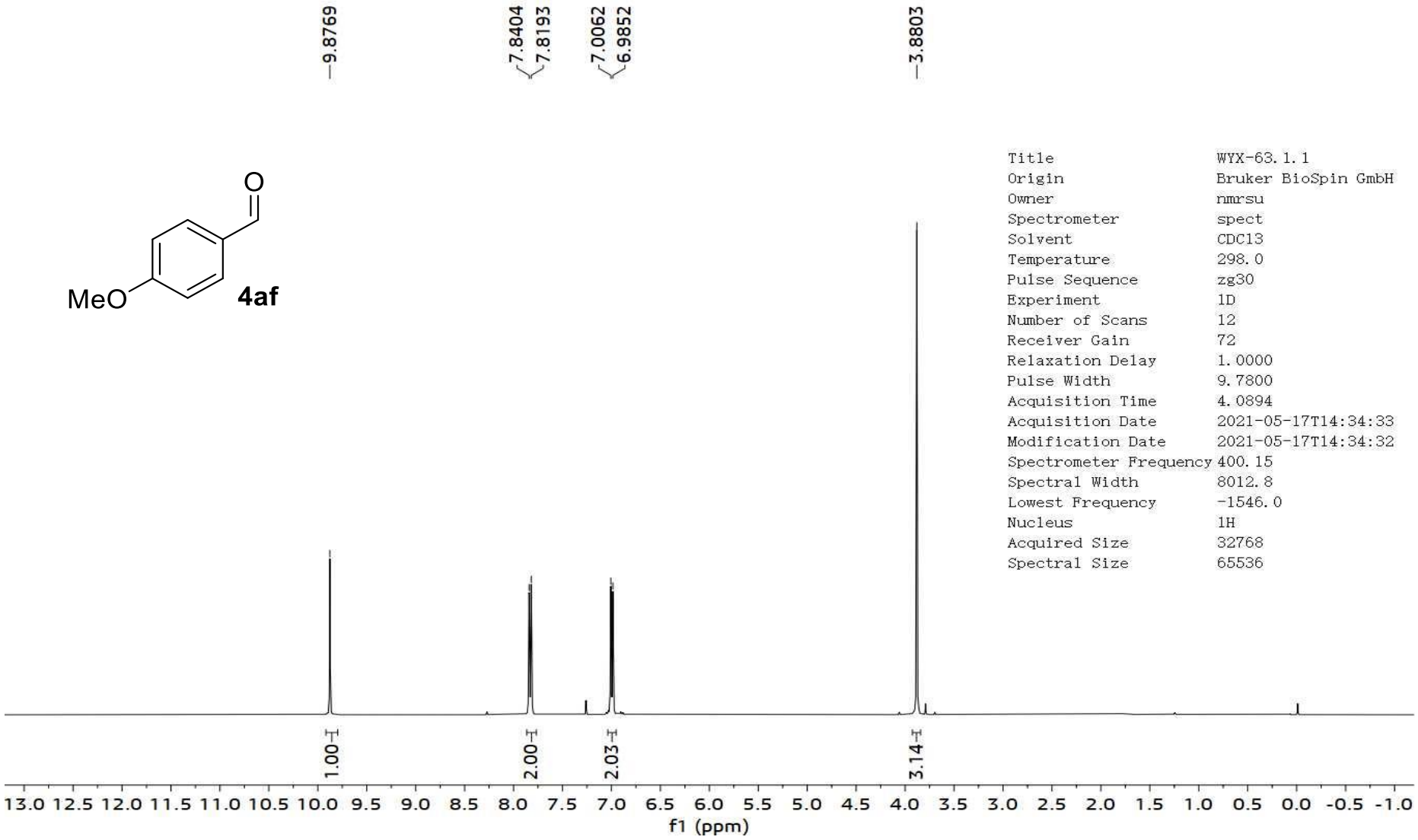

212.01
171.32
82.85
53.85
50.70
46.74
44.78
42.75
38.63
38.24
36.96
35.85
35.31
31.35
28.90
27.65
23.65
21.31
21.04
12.25
11.59
OAc
H
H
H
O
H
4ac
Title
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 28
Receiver Gain 188
Relaxation Delay 2.0000
Pulse Width 12.0000
Acquisition Time 0.7690
Acquisition Date 2021-06-20T08:43:21
Modification Date 2021-06-20T08:43:30
Spectrometer Frequency 176.05
Spectral Width 42613.6
Lowest Frequency -3680.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

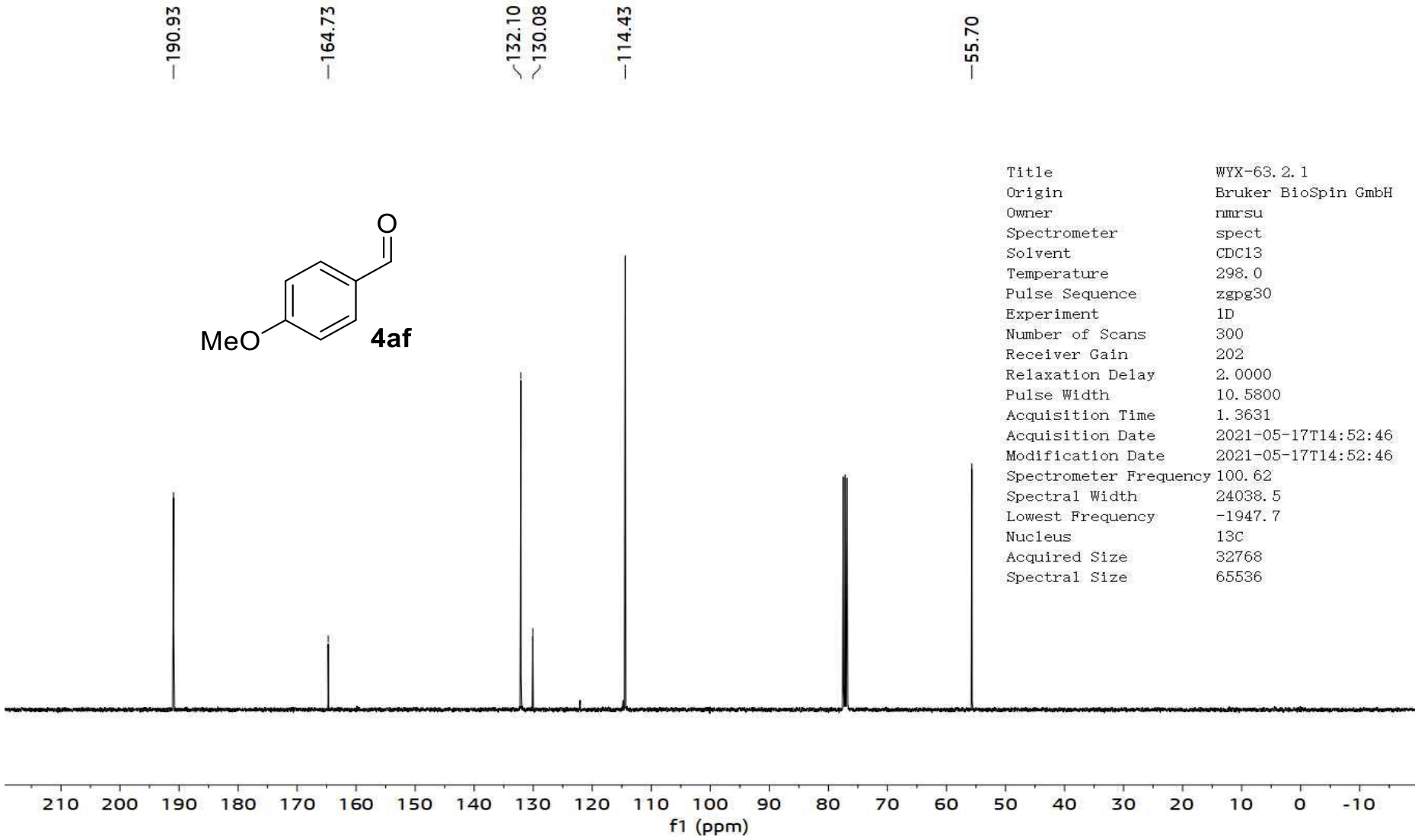

7.7602
7.7410
7.5965
7.5934
7.5766
7.5595
7.5564
7.4805
7.4613
7.3776
7.3590
7.3405
3.1521
3.1376
3.1226
2.6960
2.6859
2.6810
2.6767
2.6663
O
4ad
Title WYX-71-chanwu.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 296.9
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 72
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-27T15:55:16
Modification Date 2021-05-27T15:55:18
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.96
1.03
1.01
1.03
2.05
2.00
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 -1.0
f1 (ppm)

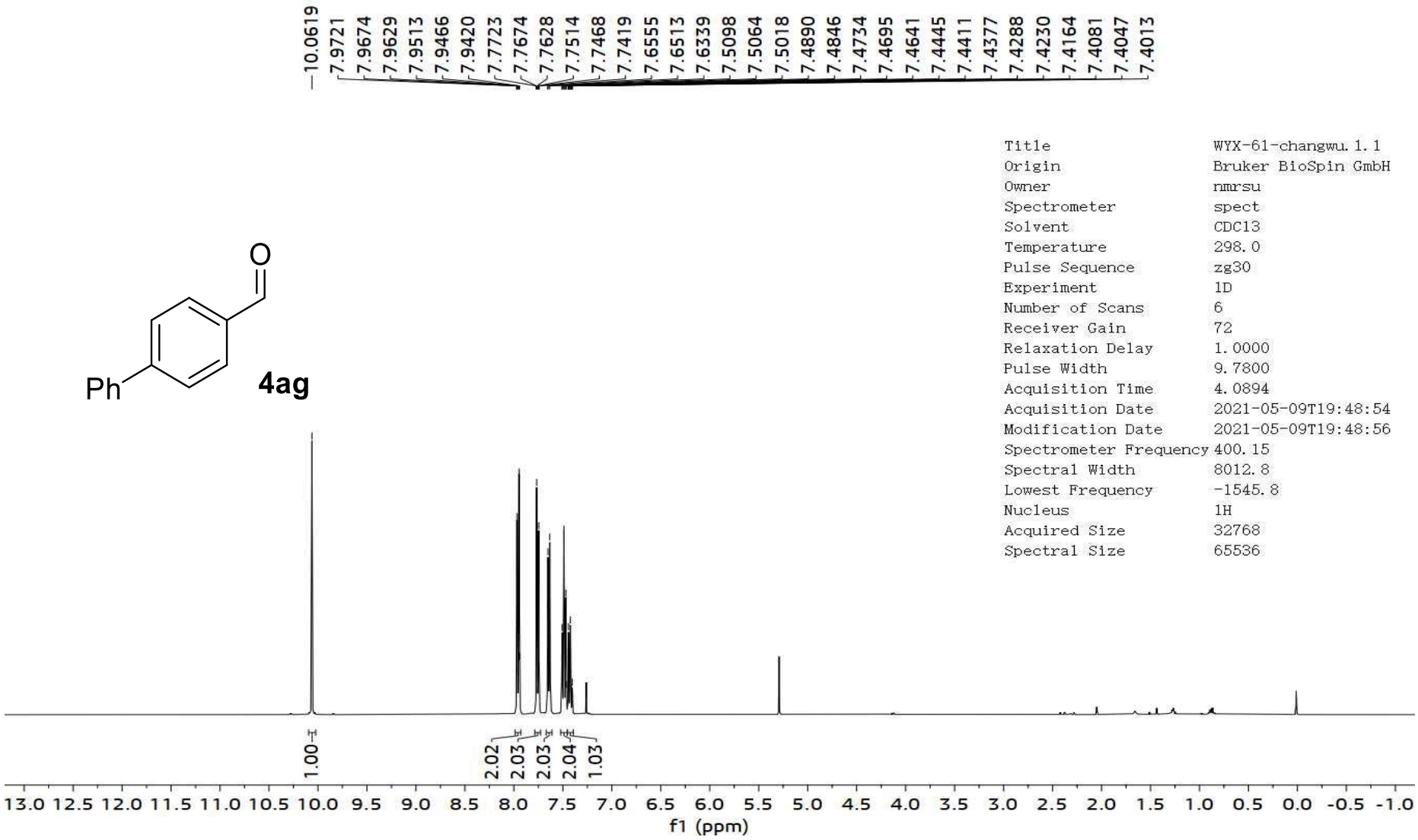

207.17
155.27
137.20
134.70
127.39
126.81
123.82
36.33
25.91
O
4ad
Title WYX-71-chanwu.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 296.9
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-28T02:54:29
Modification Date 2021-05-28T02:54:30
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1947.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

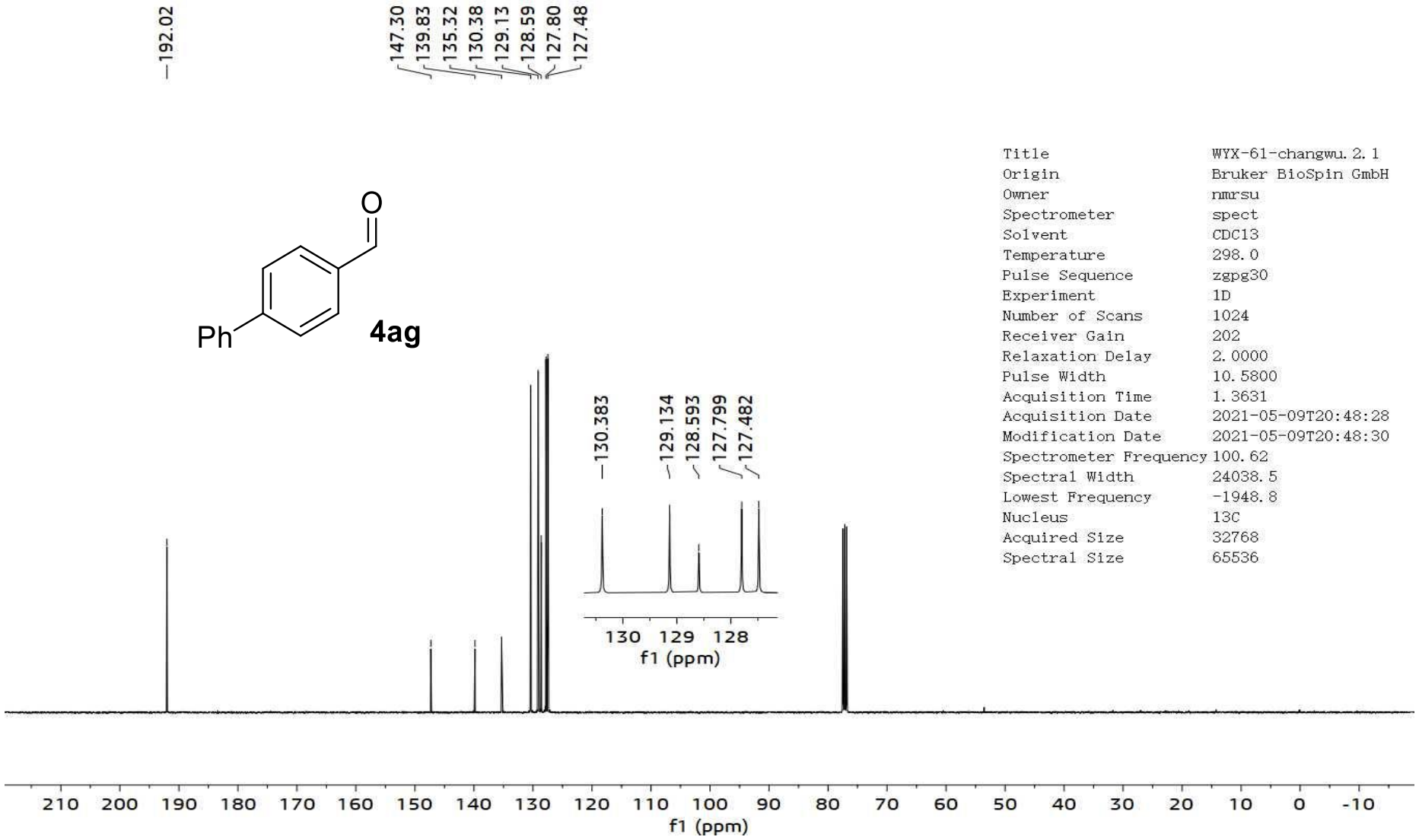

9.9828
7.8306
7.8099
7.5641
7.5437
1.3573
O
t-Bu
4ae
Title WYX-62chanwu.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 12
Receiver Gain 112
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-17T14:58:01
Modification Date 2021-05-17T14:58:00
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1546.5
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.96
1.94
1.96
9.00
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

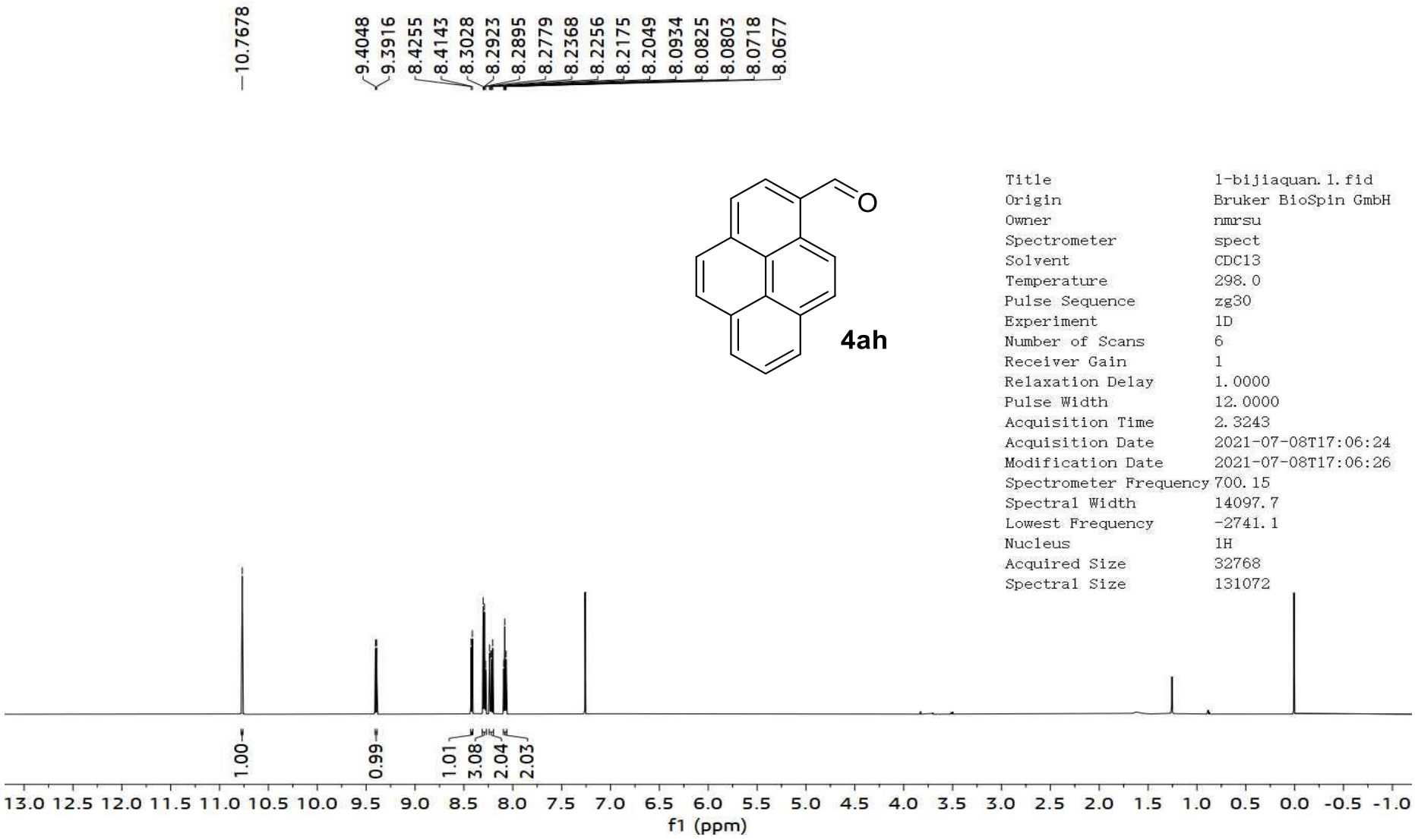

192.20
158.60
134.23
129.84
126.14
35.50
31.22
O
t-Bu
4ae
Title WYX-62chanwu.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 300
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-17T15:16:14
Modification Date 2021-05-17T15:16:14
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1944.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

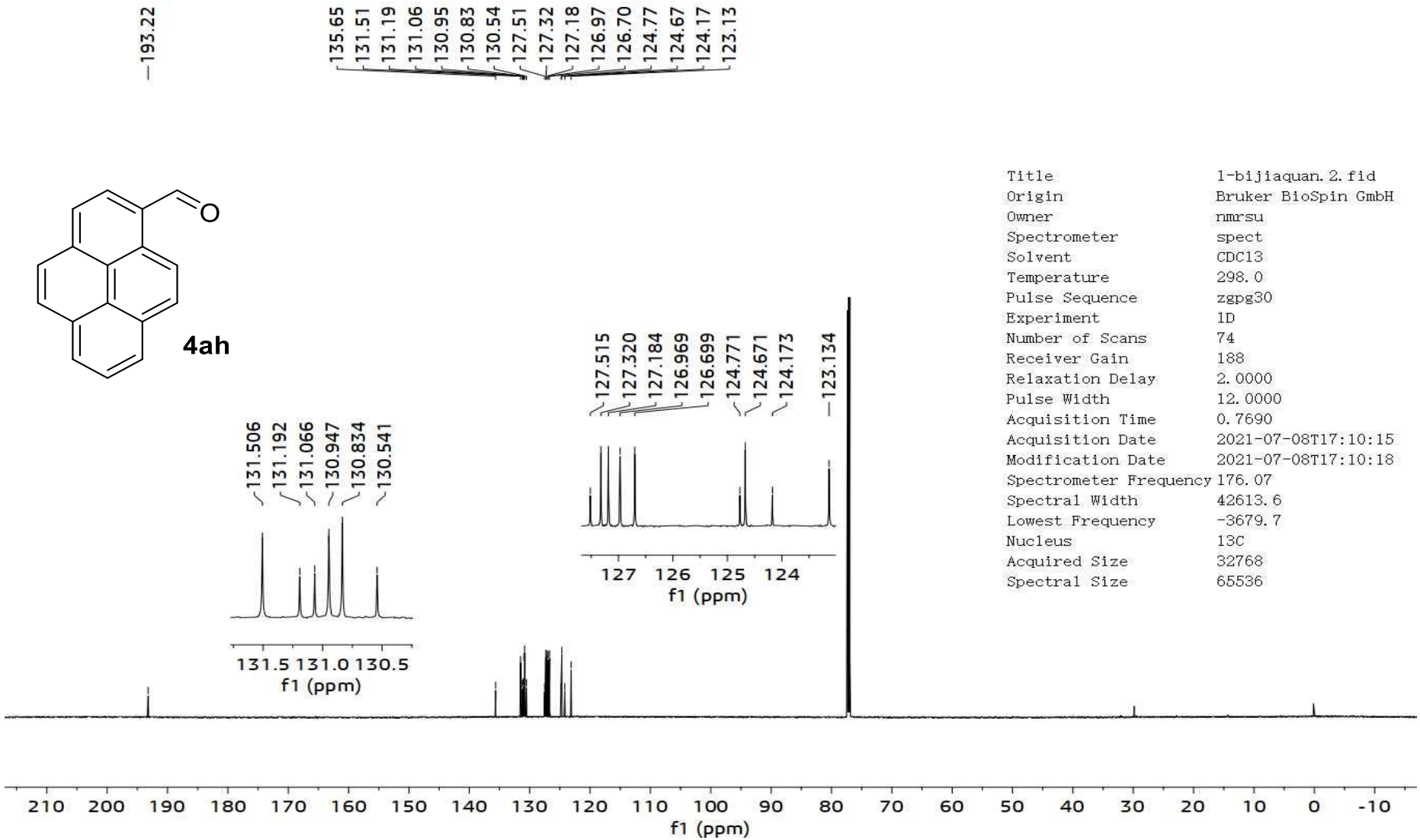

9.8769
7.8404
7.8193
7.0062
6.9852
3.8803
O
MeO
4af
Title WYX-63.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 12
Receiver Gain 72
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-17T14:34:33
Modification Date 2021-05-17T14:34:32
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1546.0
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
2.00
2.03
3.14
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

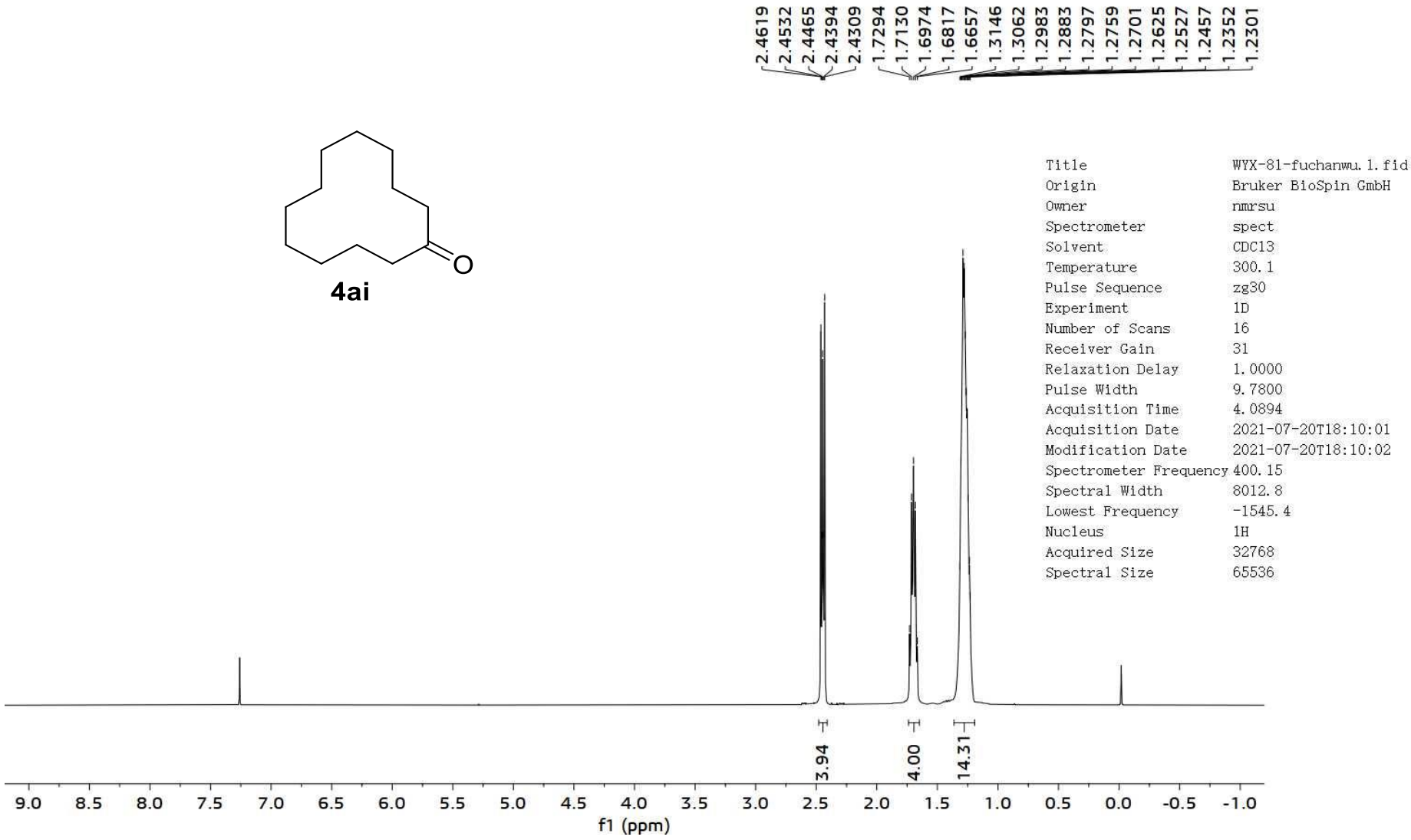

190.93
164.73
132.10
130.08
114.43
55.70
O
MeO
4af
Title WYX-63.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 300
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-17T14:52:46
Modification Date 2021-05-17T14:52:46
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1947.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

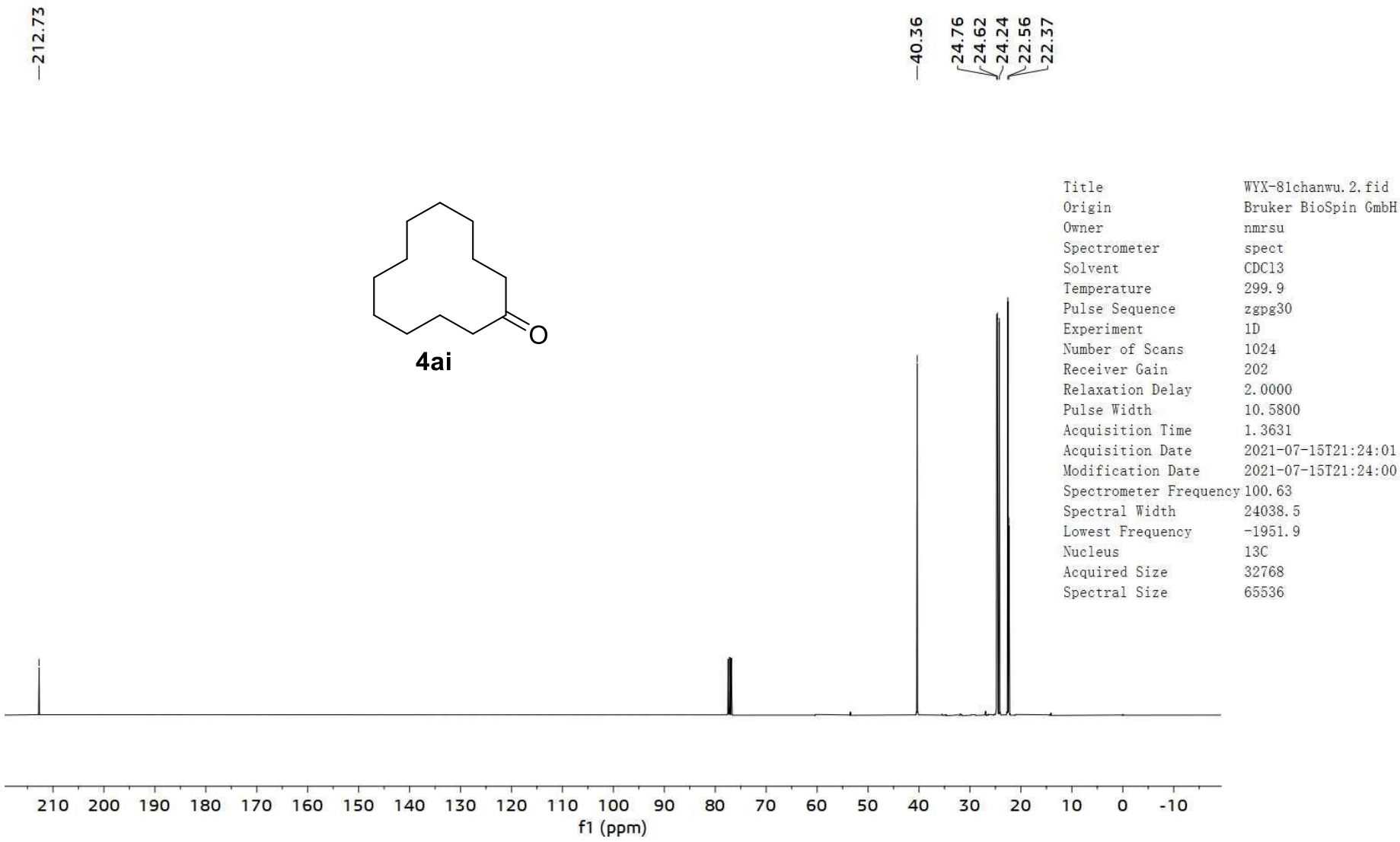

10.0619
7.9721
7.9674
7.9629
7.9513
7.9466
7.9420
7.7723
7.7674
7.7628
7.7514
7.7468
7.7419
7.6555
7.6513
7.6339
7.5098
7.5064
7.5018
7.4890
7.4846
7.4734
7.4695
7.4641
7.4445
7.4411
7.4377
7.4288
7.4230
7.4164
7.4081
7.4047
7.4013
O
Ph
4ag
Title WYX-61-changwu.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 72
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-09T19:48:54
Modification Date 2021-05-09T19:48:56
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
2.02
2.03
2.03
2.04
1.03
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

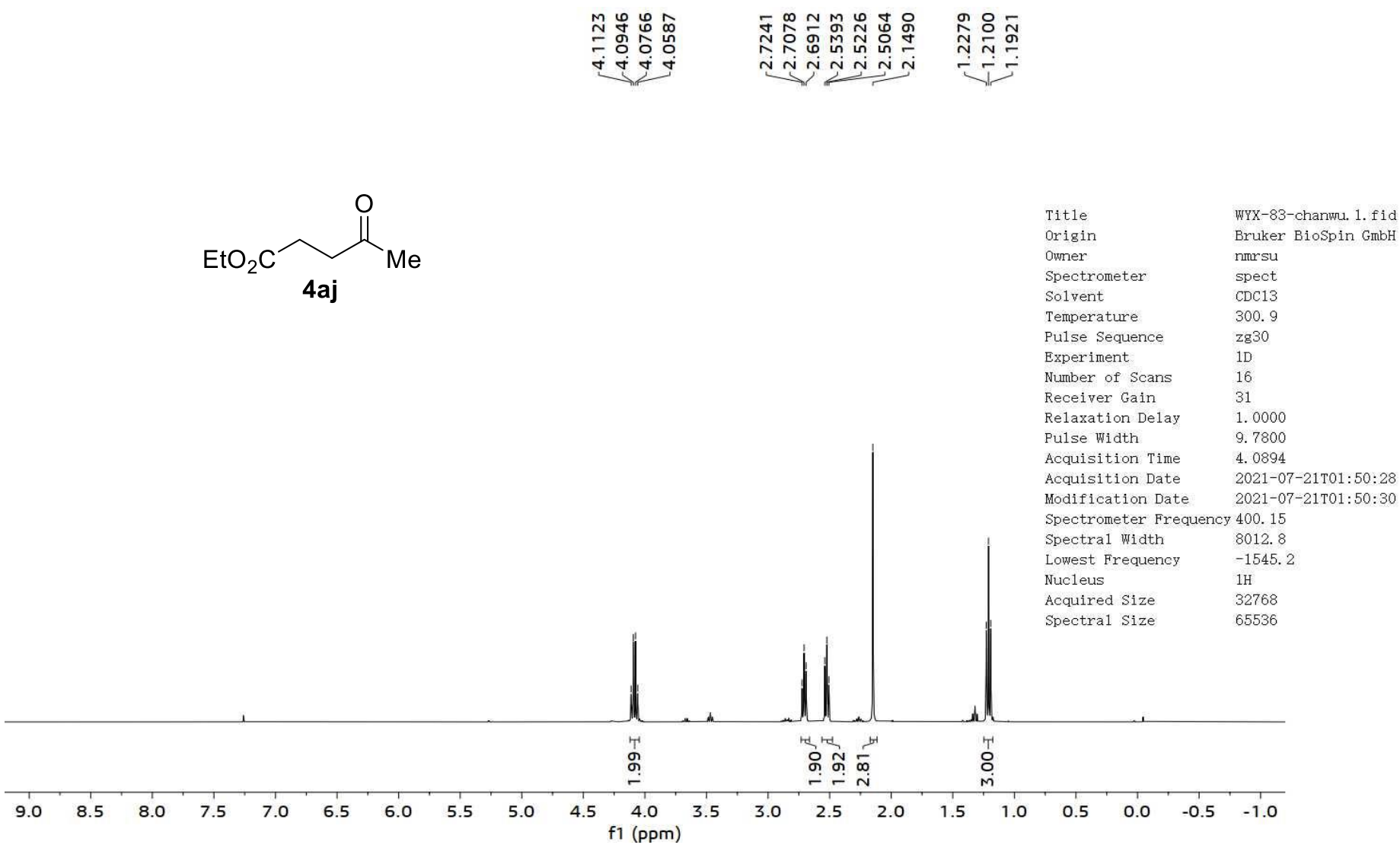

192.02
147.30
139.83
135.32
130.38
129.13
128.59
127.80
127.48
O
Ph
4ag
130.383
129.134
128.593
127.799
127.482
130 129 128
f1 (ppm)
Title WYX-61-changwu.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-09T20:48:28
Modification Date 2021-05-09T20:48:30
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1948.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

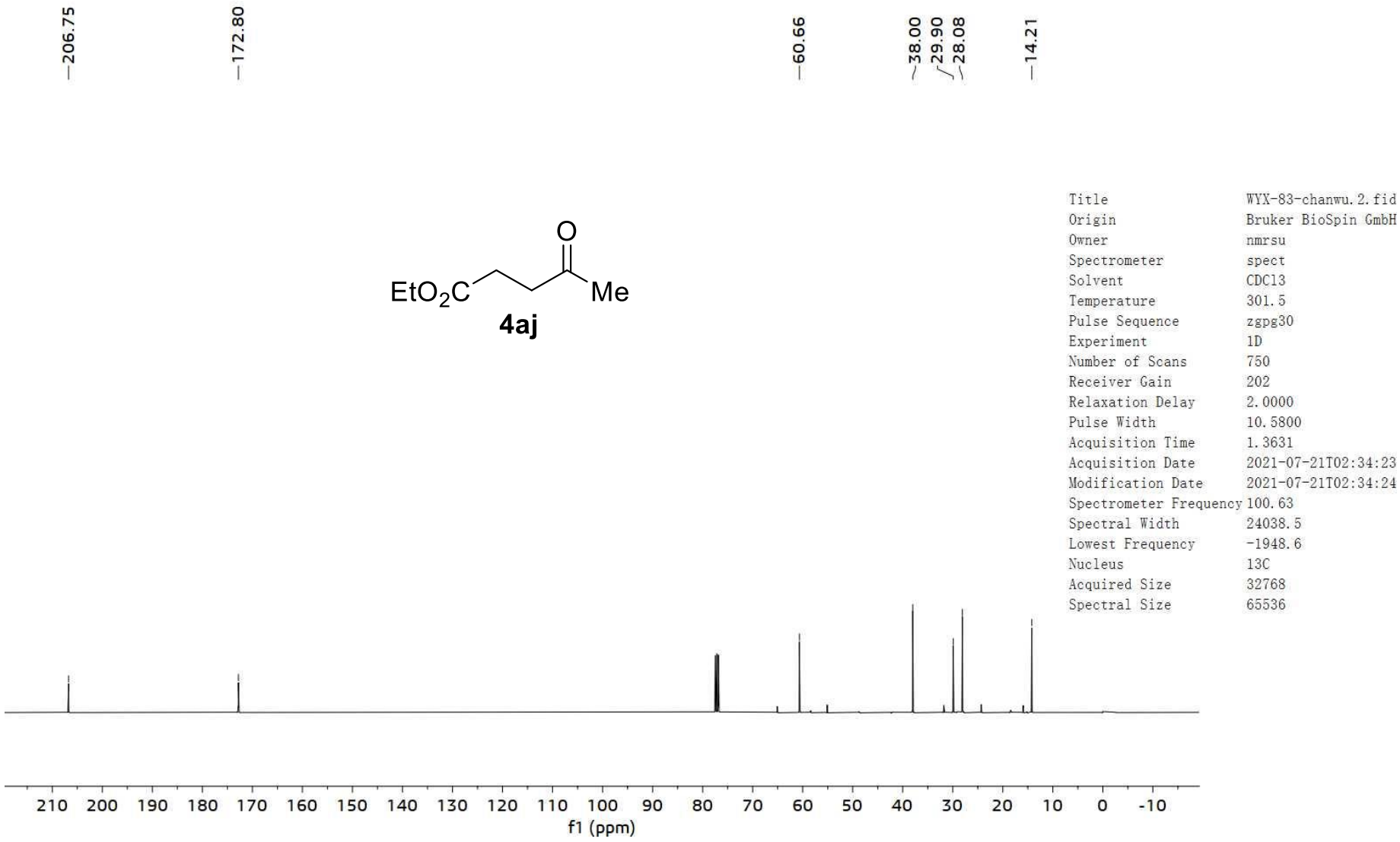

10.7678
9.4048
9.3916
8.4255
8.4143
8.3028
8.2923
8.2895
8.2779
8.2368
8.2256
8.2175
8.2049
8.0934
8.0825
8.0803
8.0718
8.0677
O
4ah
Title 1-bijiaquan.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 1
Relaxation Delay 1.0000
Pulse Width 12.0000
Acquisition Time 2.3243
Acquisition Date 2021-07-08T17:06:24
Modification Date 2021-07-08T17:06:26
Spectrometer Frequency 700.15
Spectral Width 14097.7
Lowest Frequency -2741.1
Nucleus 1H
Acquired Size 32768
Spectral Size 131072
1.00
0.99
1.01
3.08
2.04
2.03
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

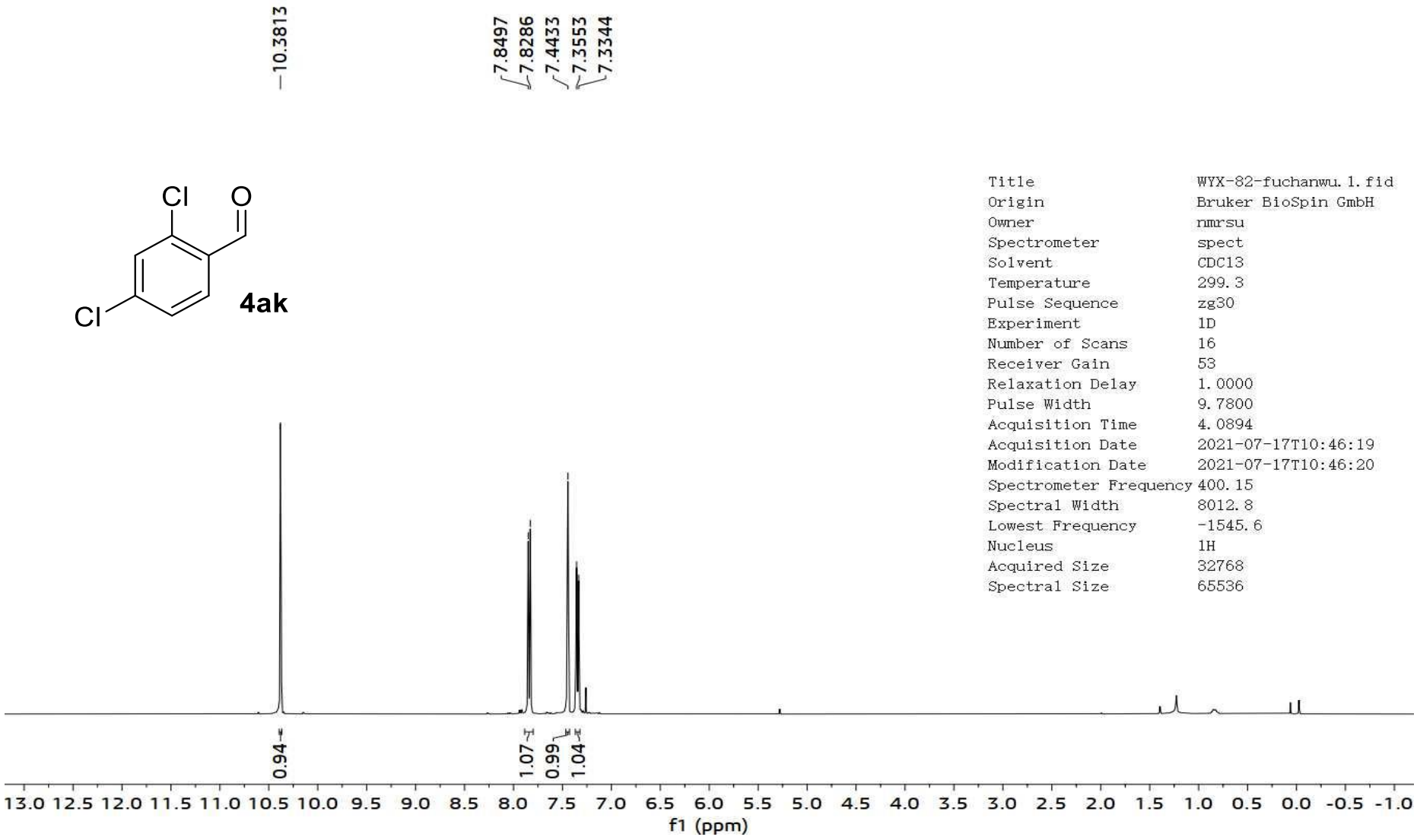

193.22
135.65
131.51
131.19
131.06
130.95
130.83
130.54
127.51
127.32
127.18
126.97
126.70
124.77
124.67
124.17
123.13
O
4ah
131.506
131.192
131.066
130.947
130.834
130.541
131.5 131.0 130.5
f1 (ppm)
127.515
127.320
127.184
126.969
126.699
124.771
124.671
124.173
123.134
127 126 125 124
f1 (ppm)
Title 1-bijiaquan.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 74
Receiver Gain 188
Relaxation Delay 2.0000
Pulse Width 12.0000
Acquisition Time 0.7690
Acquisition Date 2021-07-08T17:10:15
Modification Date 2021-07-08T17:10:18
Spectrometer Frequency 176.07
Spectral Width 42613.6
Lowest Frequency -3679.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

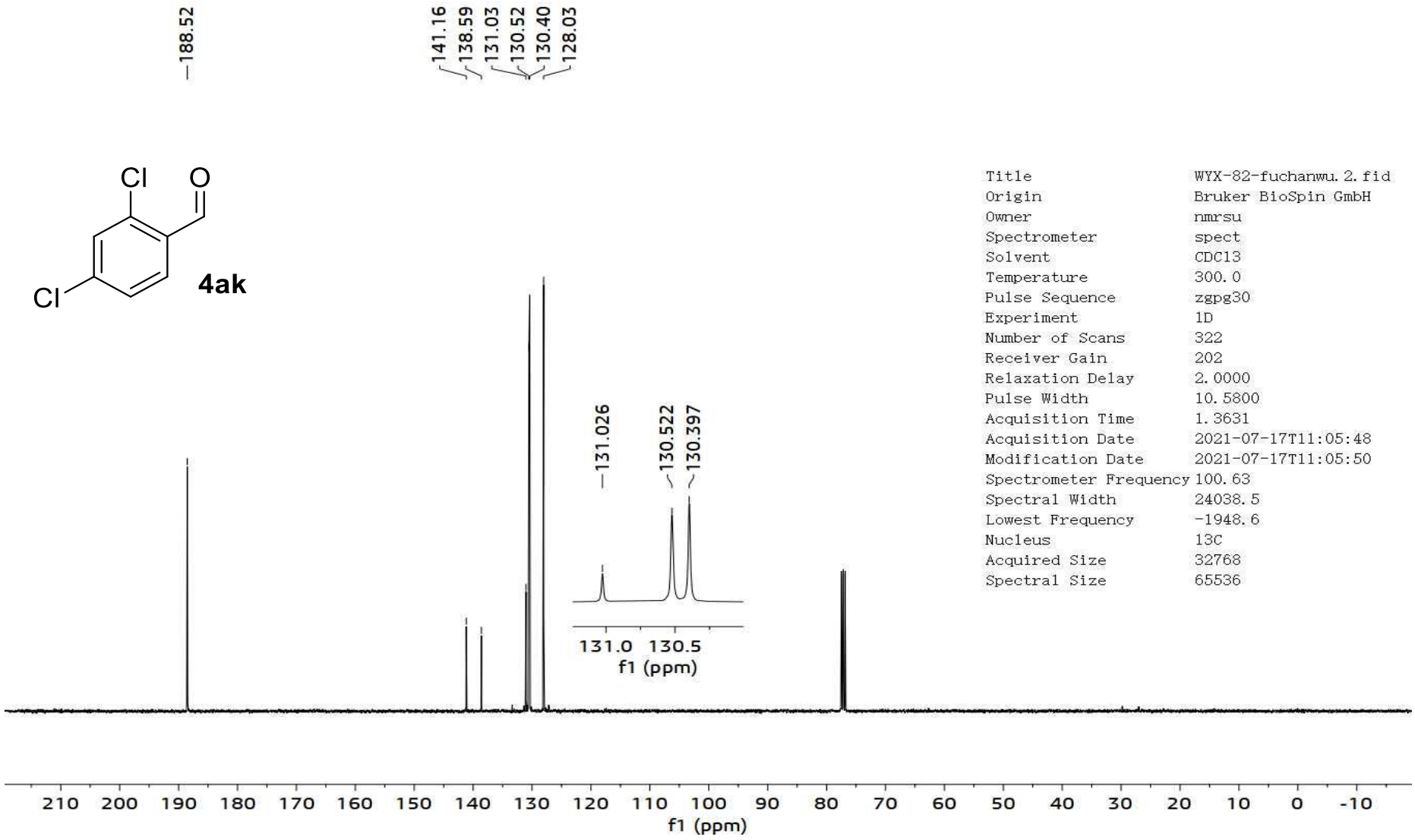

2.4619
2.4532
2.4465
2.4394
2.4309
1.7294
1.7130
1.6974
1.6817
1.6657
1.3146
1.3062
1.2983
1.2883
1.2797
1.2759
1.2701
1.2625
1.2527
1.2457
1.2352
1.2301
O
4ai
Title WYX-81-fuchanwu.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 300.1
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-20T18:10:01
Modification Date 2021-07-20T18:10:02
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
3.94
4.00
14.31
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 -1.0
f1 (ppm)

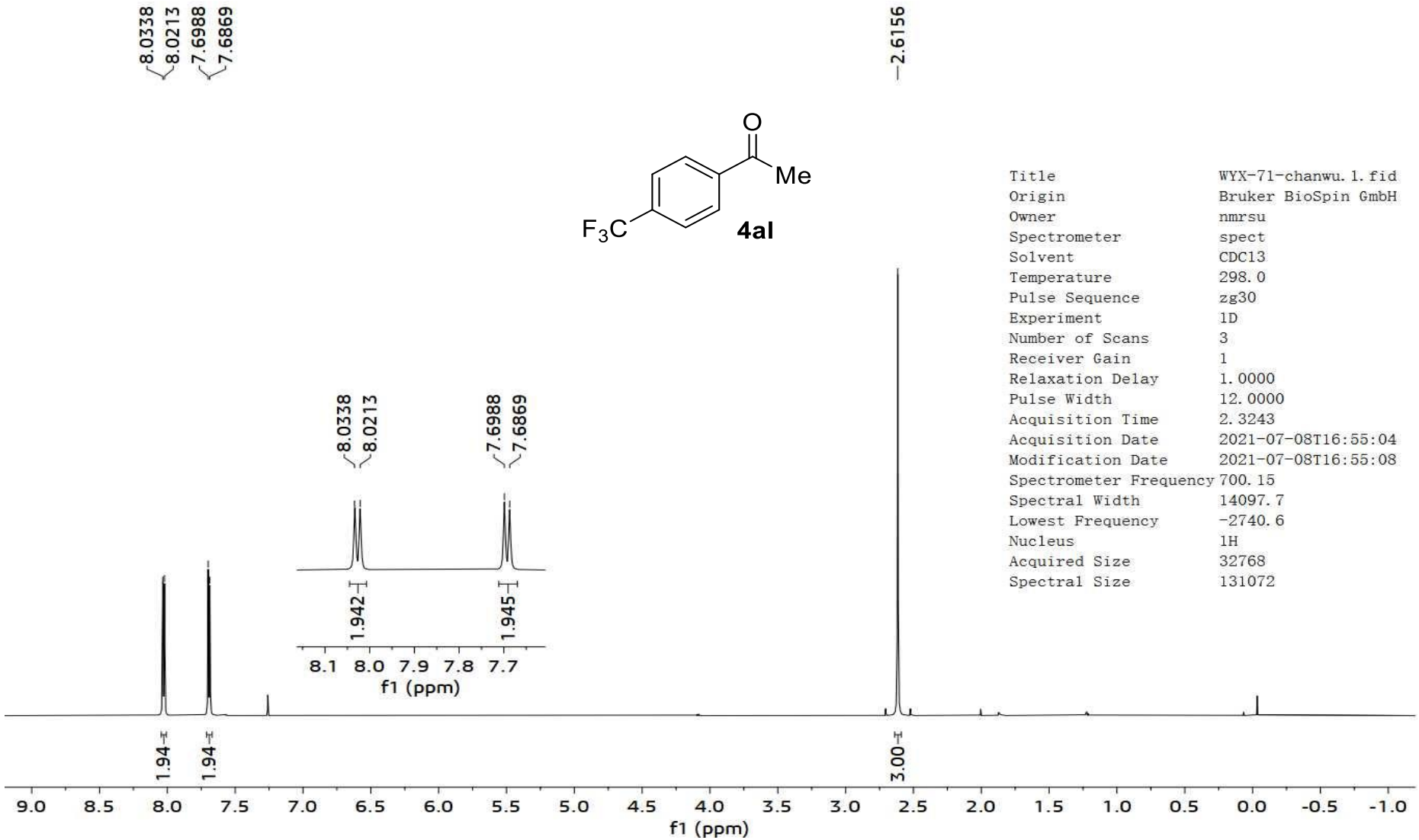

212.73
40.36
24.76
24.62
24.24
22.56
22.37
O
4ai
Title WYX-81chanwu.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 299.9
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-15T21:24:01
Modification Date 2021-07-15T21:24:00
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1951.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

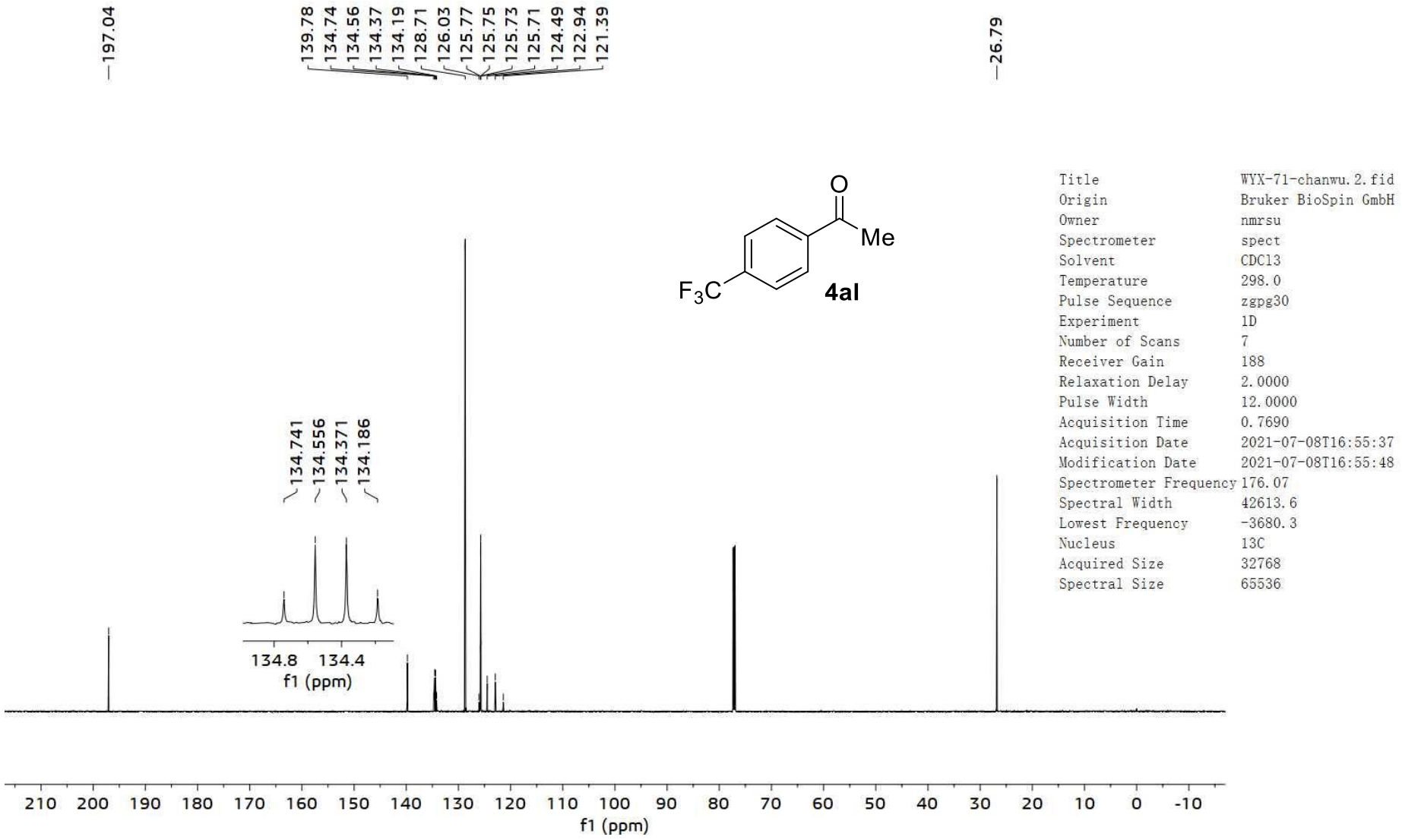

4.1123
4.0946
4.0766
4.0587
2.7241
2.7078
2.6912
2.5393
2.5226
2.5064
2.1490
1.2279
1.2100
1.1921
O
EtO2C
Me
4aj
Title WYX-83-chanwu.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 300.9
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-21T01:50:28
Modification Date 2021-07-21T01:50:30
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.99
1.90
1.92
2.81
3.00
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 -1.0
f1 (ppm)

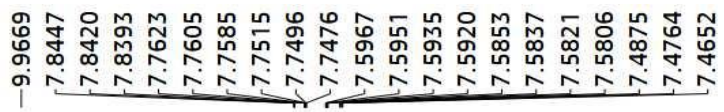

206.75
172.80
60.66
38.00
29.90
28.08
14.21
O
EtO2C
Me
4aj
Title WYX-83-chanwu.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 301.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-21T02:34:23
Modification Date 2021-07-21T02:34:24
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1948.6
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

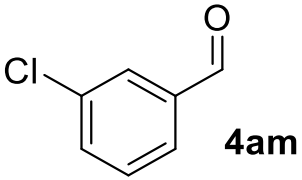

10.3813
7.8497
7.8286
7.4433
7.3553
7.3344
Cl
O
Cl
4ak
Title WYX-82-fuchanwu.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 299.3
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 53
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-17T10:46:19
Modification Date 2021-07-17T10:46:20
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.94
1.07
0.99
1.04
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)


188.52
141.16
138.59
131.03
130.52
130.40
128.03
Cl
O
Cl
4ak
131.026
130.522
130.397
131.0
130.5
f1 (ppm)
Title WYX-82-fuchanwu.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 300.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 322
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-17T11:05:48
Modification Date 2021-07-17T11:05:50
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1948.6
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)


8.0338
8.0213
7.6988
7.6869
2.6156
O
Me
F3C
4al
Title WYX-71-chanwu.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 3
Receiver Gain 1
Relaxation Delay 1.0000
Pulse Width 12.0000
Acquisition Time 2.3243
Acquisition Date 2021-07-08T16:55:04
Modification Date 2021-07-08T16:55:08
Spectrometer Frequency 700.15
Spectral Width 14097.7
Lowest Frequency -2740.6
Nucleus 1H
Acquired Size 32768
Spectral Size 131072
1.942
1.945
8.1 8.0 7.9 7.8 7.7
f1 (ppm)
1.94
1.94
3.00
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 -1.0
f1 (ppm)

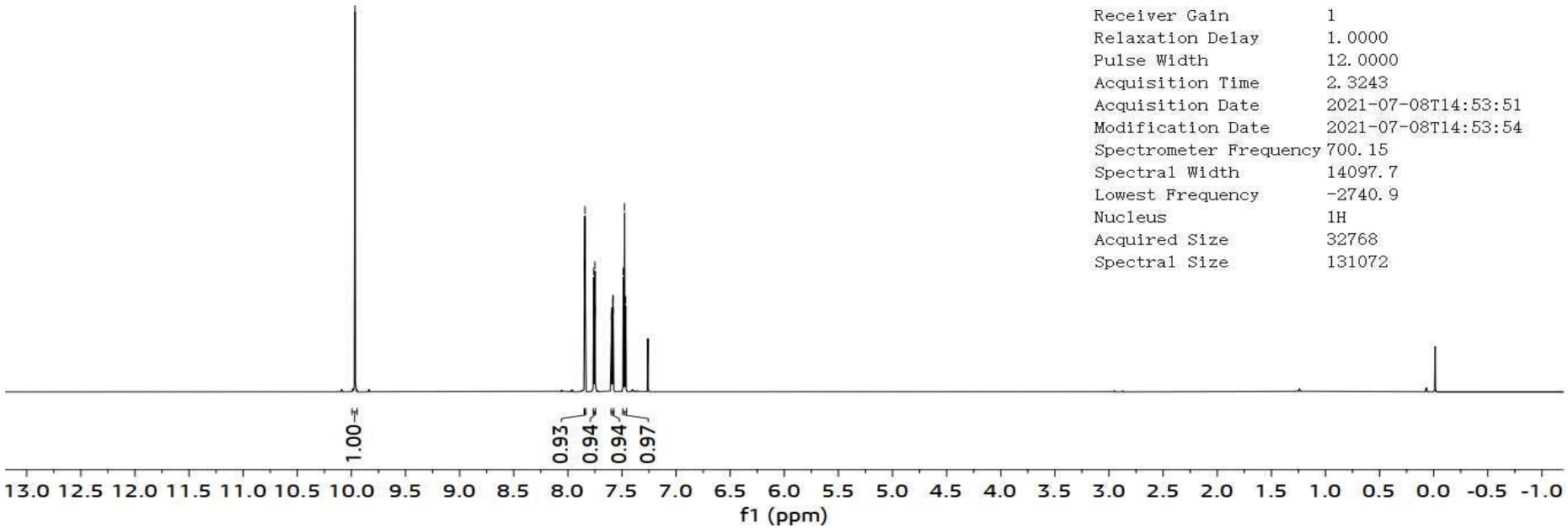

197.04
139.78
134.74
134.56
134.37
134.19
128.71
126.03
125.77
125.75
125.73
125.71
124.49
122.94
121.39
26.79
O
Me
F3C
4al
134.741
134.556
134.371
134.186
134.8
134.4
f1 (ppm)
Title WYX-71-chanwu.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 7
Receiver Gain 188
Relaxation Delay 2.0000
Pulse Width 12.0000
Acquisition Time 0.7690
Acquisition Date 2021-07-08T16:55:37
Modification Date 2021-07-08T16:55:48
Spectrometer Frequency 176.07
Spectral Width 42613.6
Lowest Frequency -3680.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

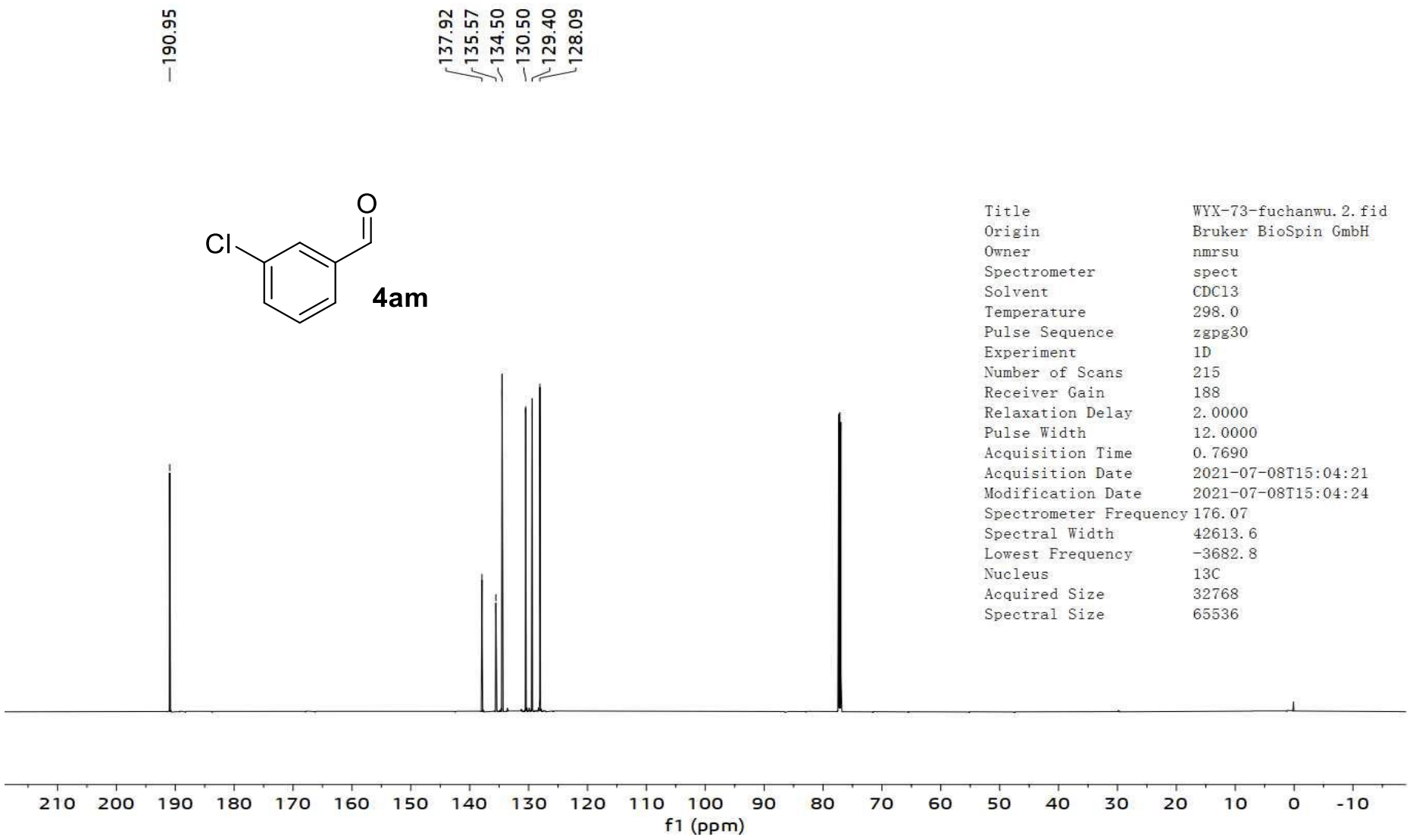


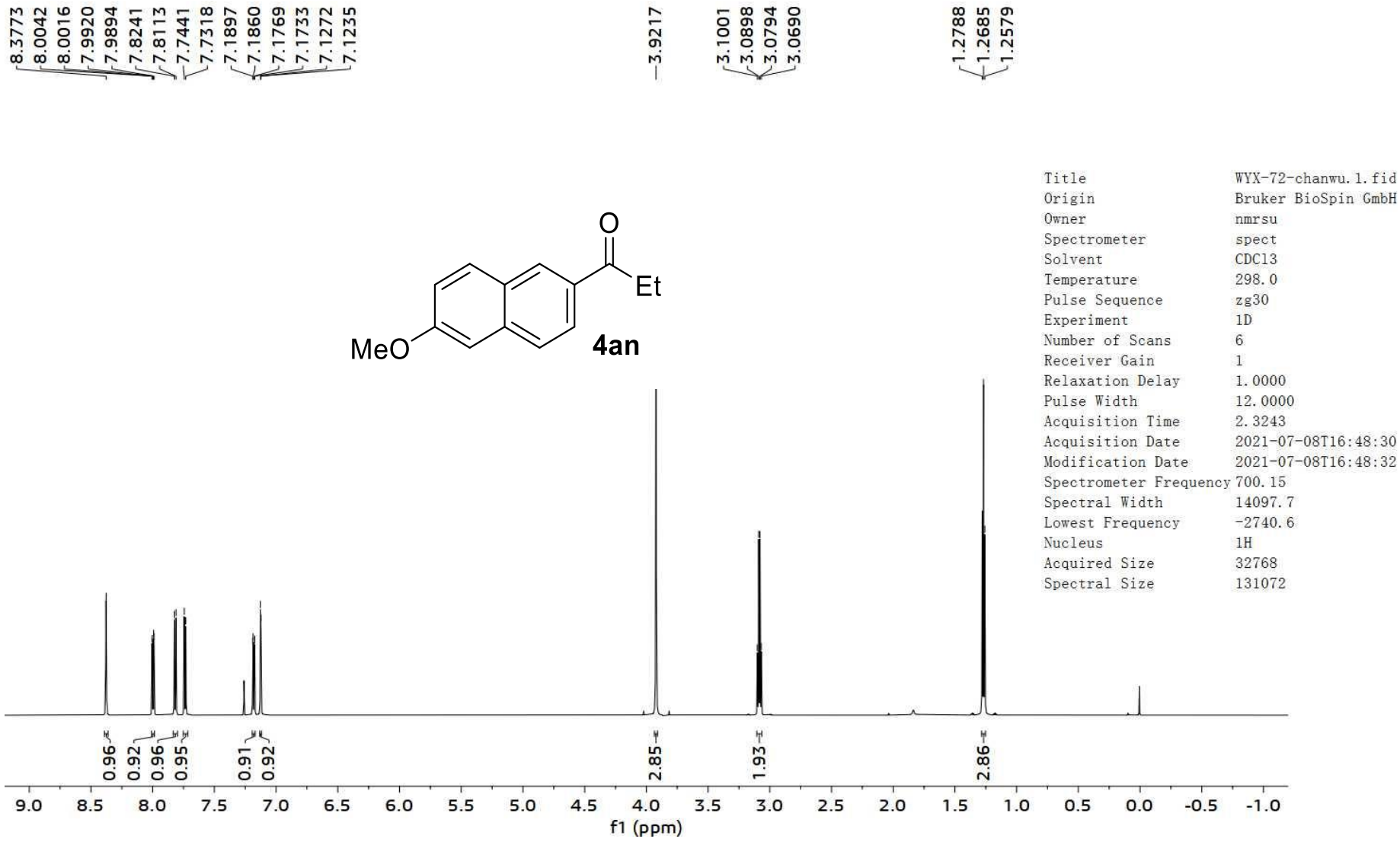


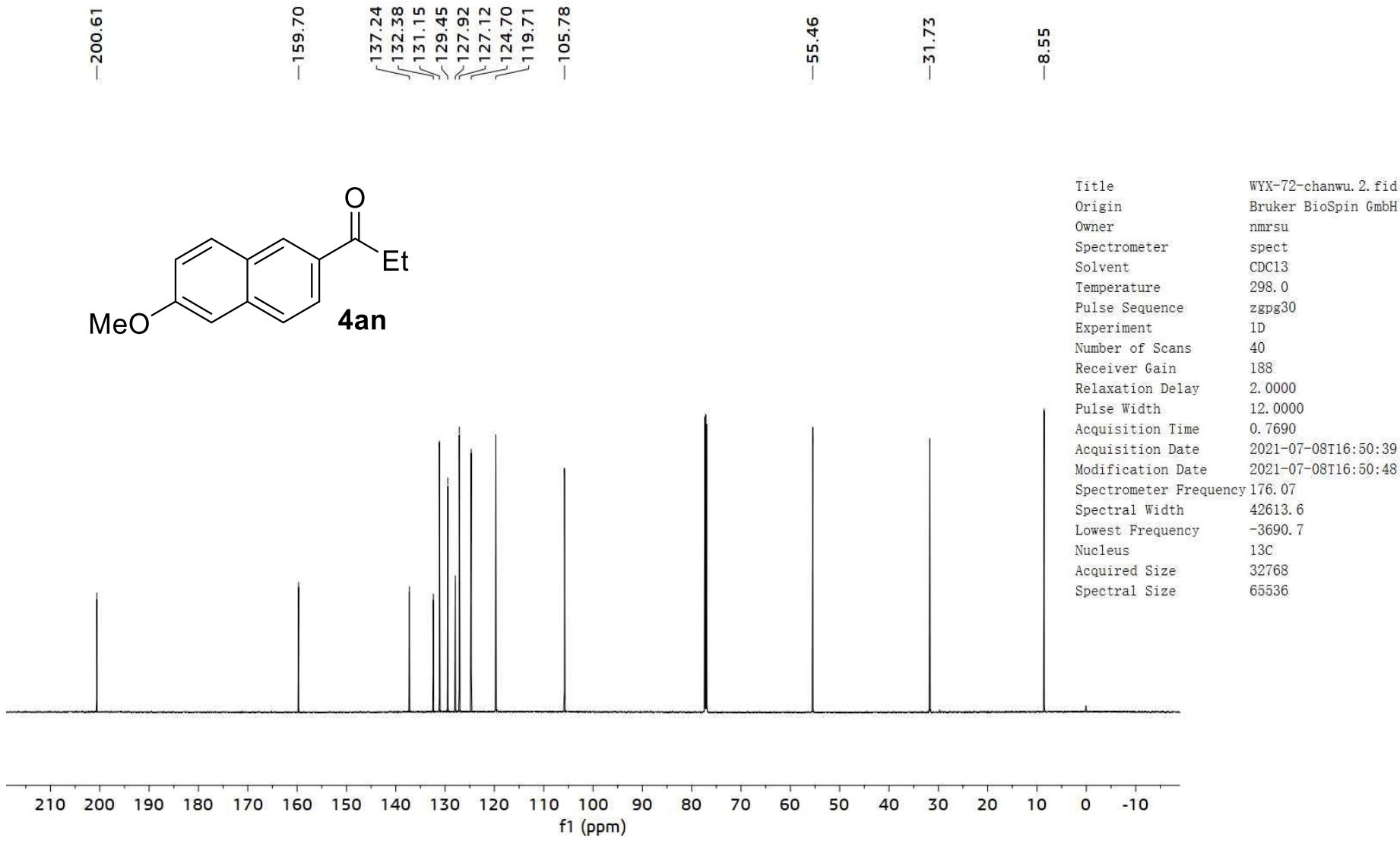
4am

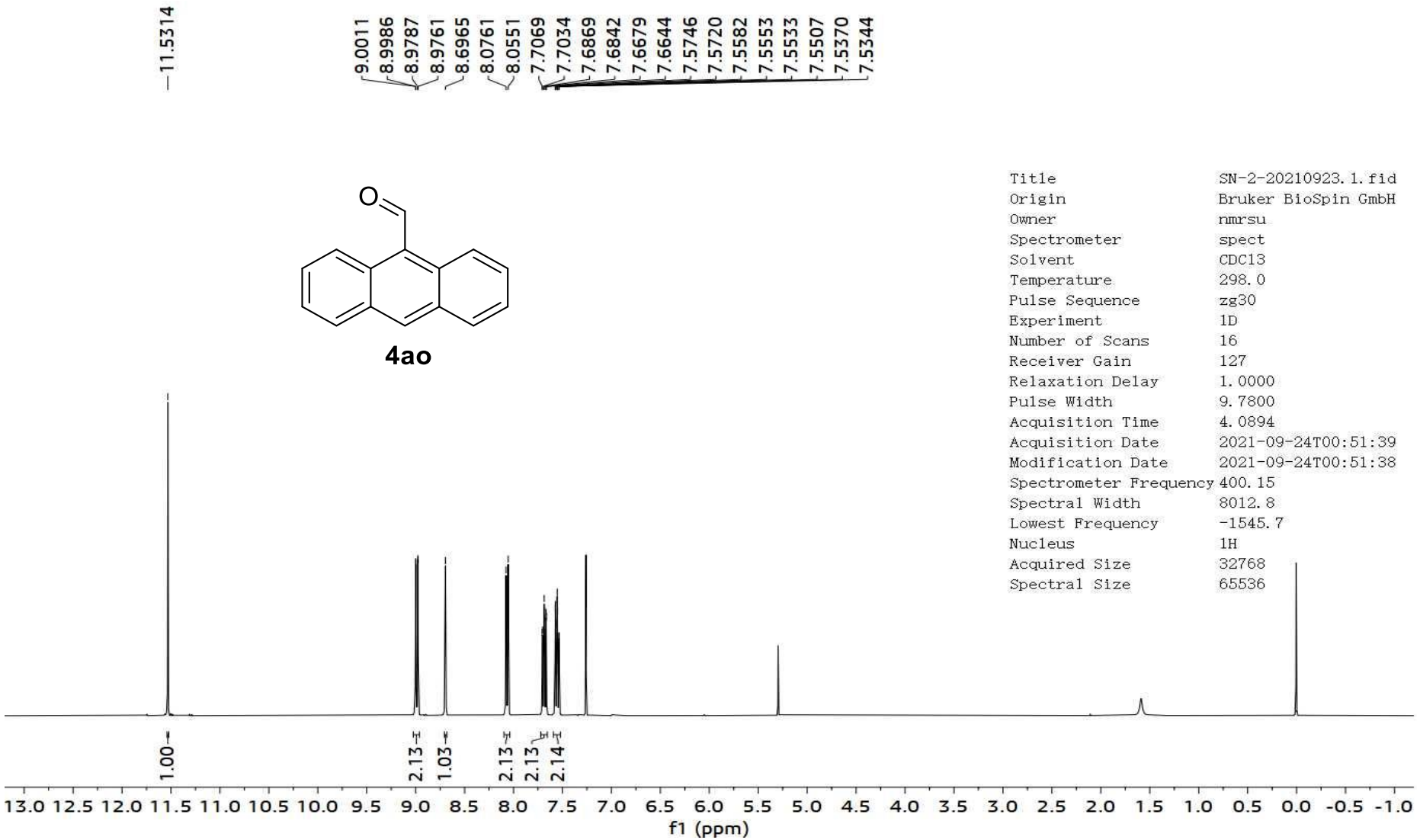
Title	WYX-73-fuchanwu.1.fid
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDC13
Temperature	298.0
Pulse Sequence	zg30
Experiment	1D
Number of Scans	6
Receiver Gain	1
Relaxation Delay	1.0000
Pulse Width	12.0000
Acquisition Time	2.3243
Acquisition Date	2021-07-08T14:53:51
Modification Date	2021-07-08T14:53:54
Spectrometer Frequency	700.15
Spectral Width	14097.7
Lowest Frequency	-2740.9
Nucleus	1H
Acquired Size	32768
Spectral Size	131072

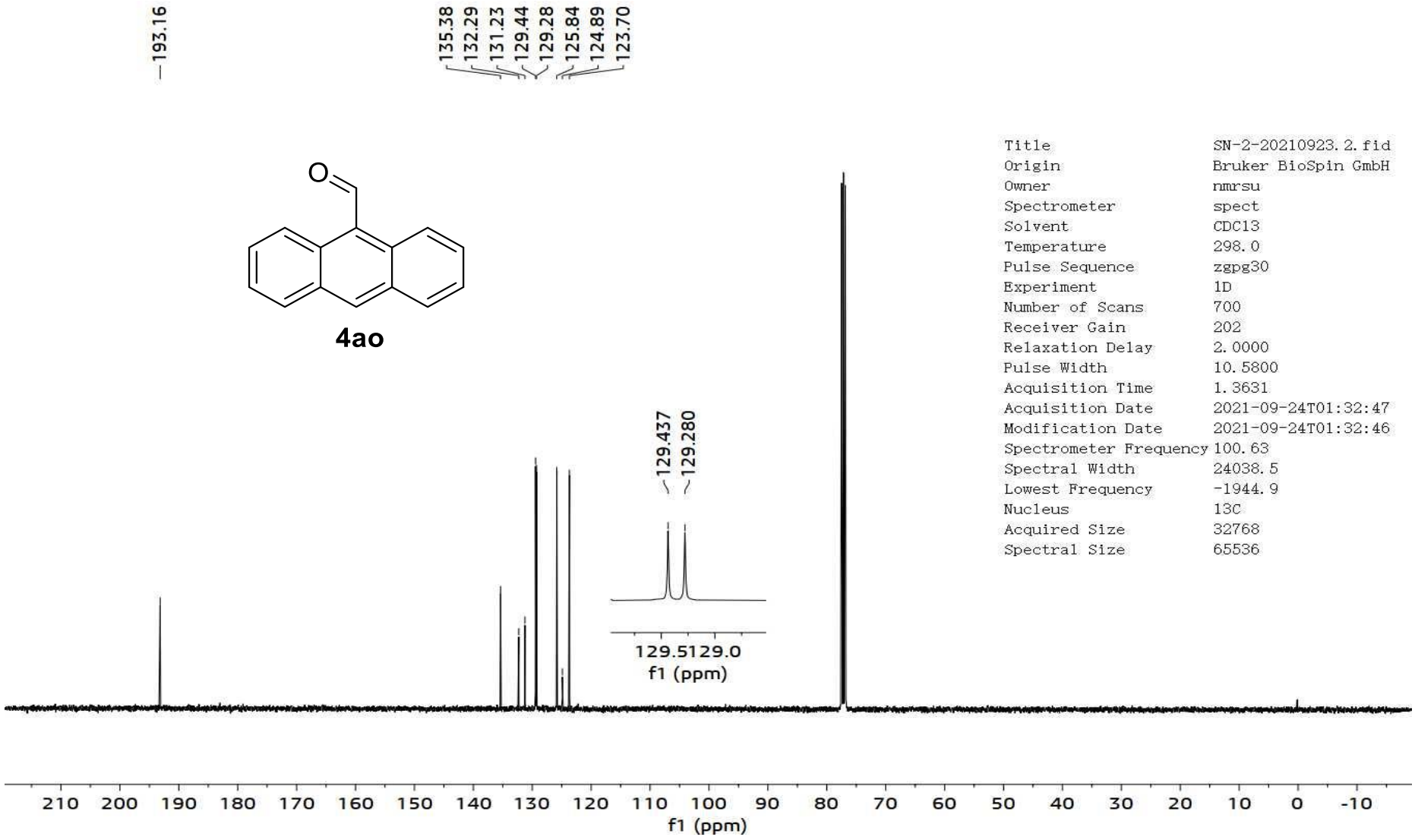


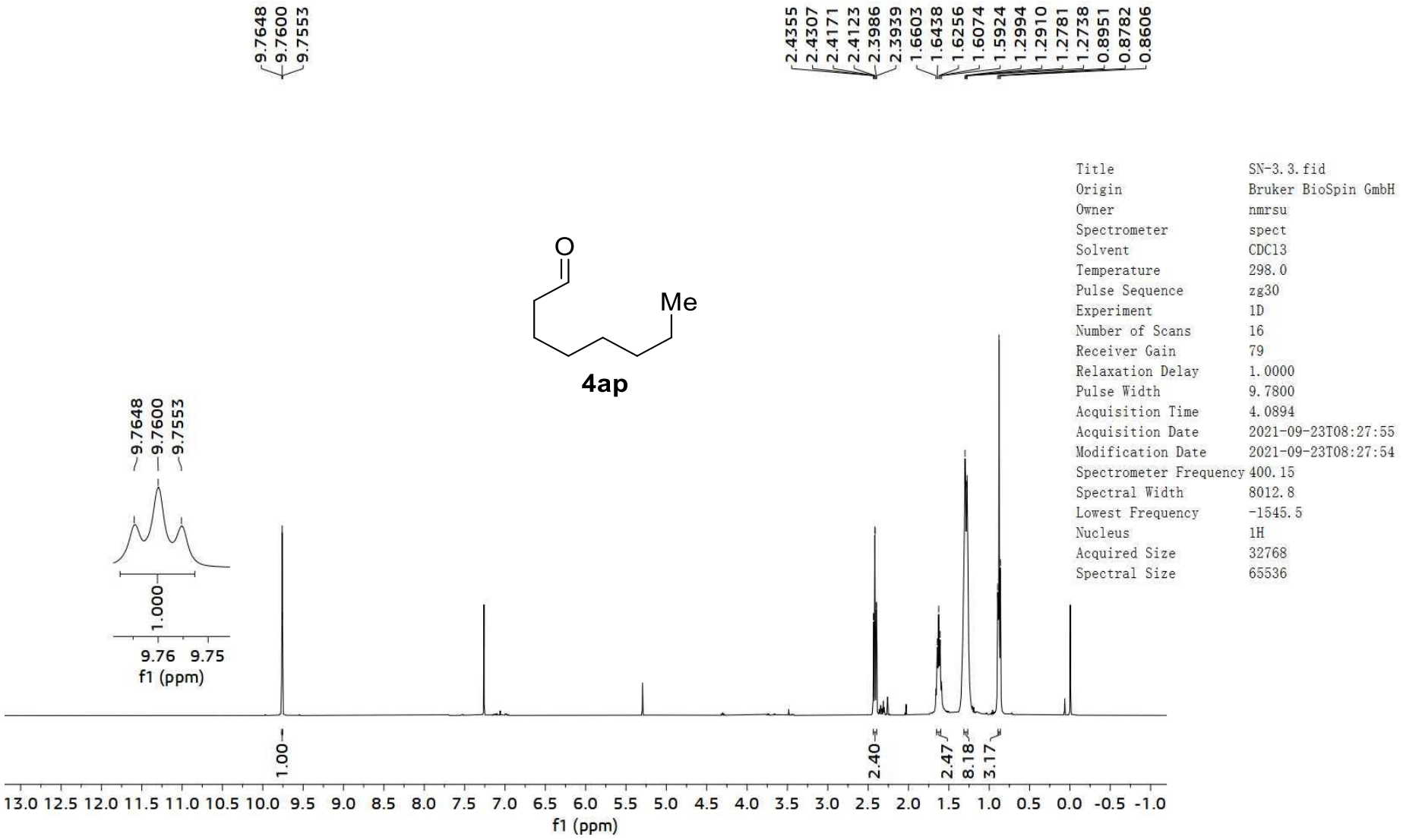

190.95
137.92
135.57
134.50
130.50
129.40
128.09
Cl
O
4am
Title WYX-73-fuchanwu.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 215
Receiver Gain 188
Relaxation Delay 2.0000
Pulse Width 12.0000
Acquisition Time 0.7690
Acquisition Date 2021-07-08T15:04:21
Modification Date 2021-07-08T15:04:24
Spectrometer Frequency 176.07
Spectral Width 42613.6
Lowest Frequency -3682.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

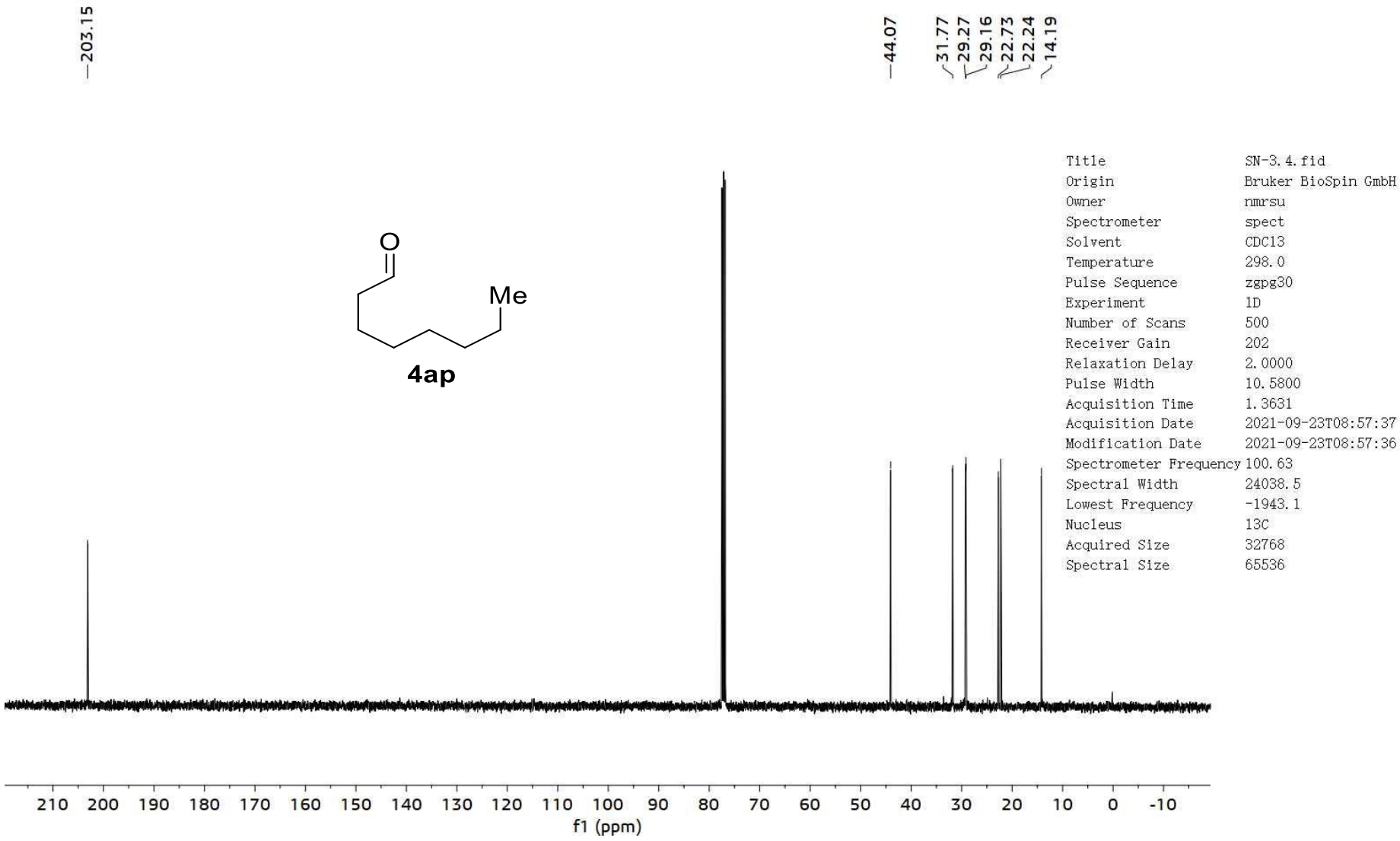

8.3773
8.0042
8.0016
7.9920
7.9894
7.8241
7.8113
7.7441
7.7318
7.1897
7.1860
7.1769
7.1733
7.1272
7.1235
3.9217
3.1001
3.0898
3.0794
3.0690
1.2788
1.2685
1.2579
O
Et
MeO
4an
Title WYX-72-chanwu.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 1
Relaxation Delay 1.0000
Pulse Width 12.0000
Acquisition Time 2.3243
Acquisition Date 2021-07-08T16:48:30
Modification Date 2021-07-08T16:48:32
Spectrometer Frequency 700.15
Spectral Width 14097.7
Lowest Frequency -2740.6
Nucleus 1H
Acquired Size 32768
Spectral Size 131072
0.96
0.92
0.96
0.95
0.91
0.92
2.85
1.93
2.86
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 -1.0
f1 (ppm)

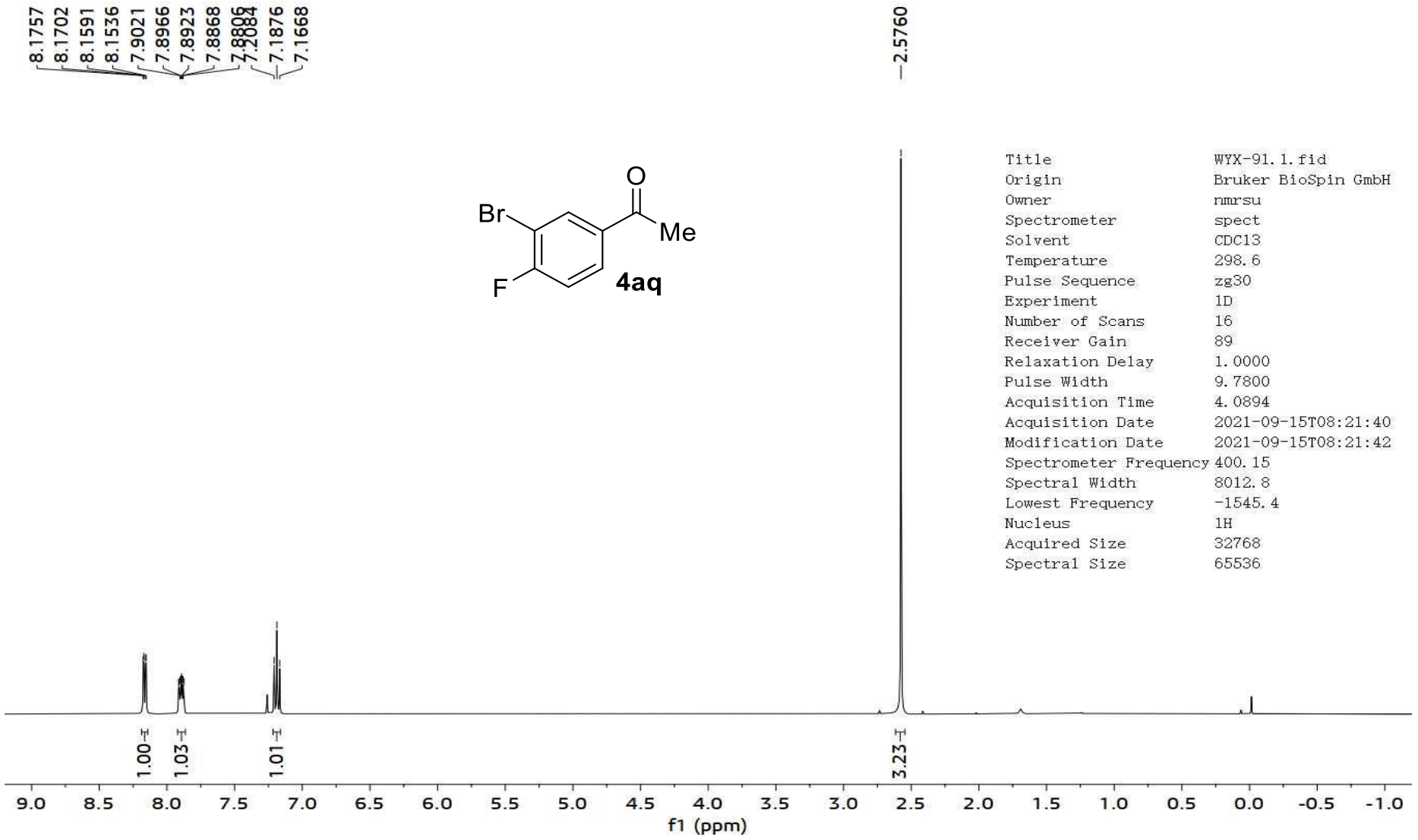

200.61
159.70
137.24
132.38
131.15
129.45
127.92
127.12
124.70
119.71
105.78
55.46
31.73
8.55
O
Et
MeO
4an
Title WYX-72-chanwu.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 40
Receiver Gain 188
Relaxation Delay 2.0000
Pulse Width 12.0000
Acquisition Time 0.7690
Acquisition Date 2021-07-08T16:50:39
Modification Date 2021-07-08T16:50:48
Spectrometer Frequency 176.07
Spectral Width 42613.6
Lowest Frequency -3690.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

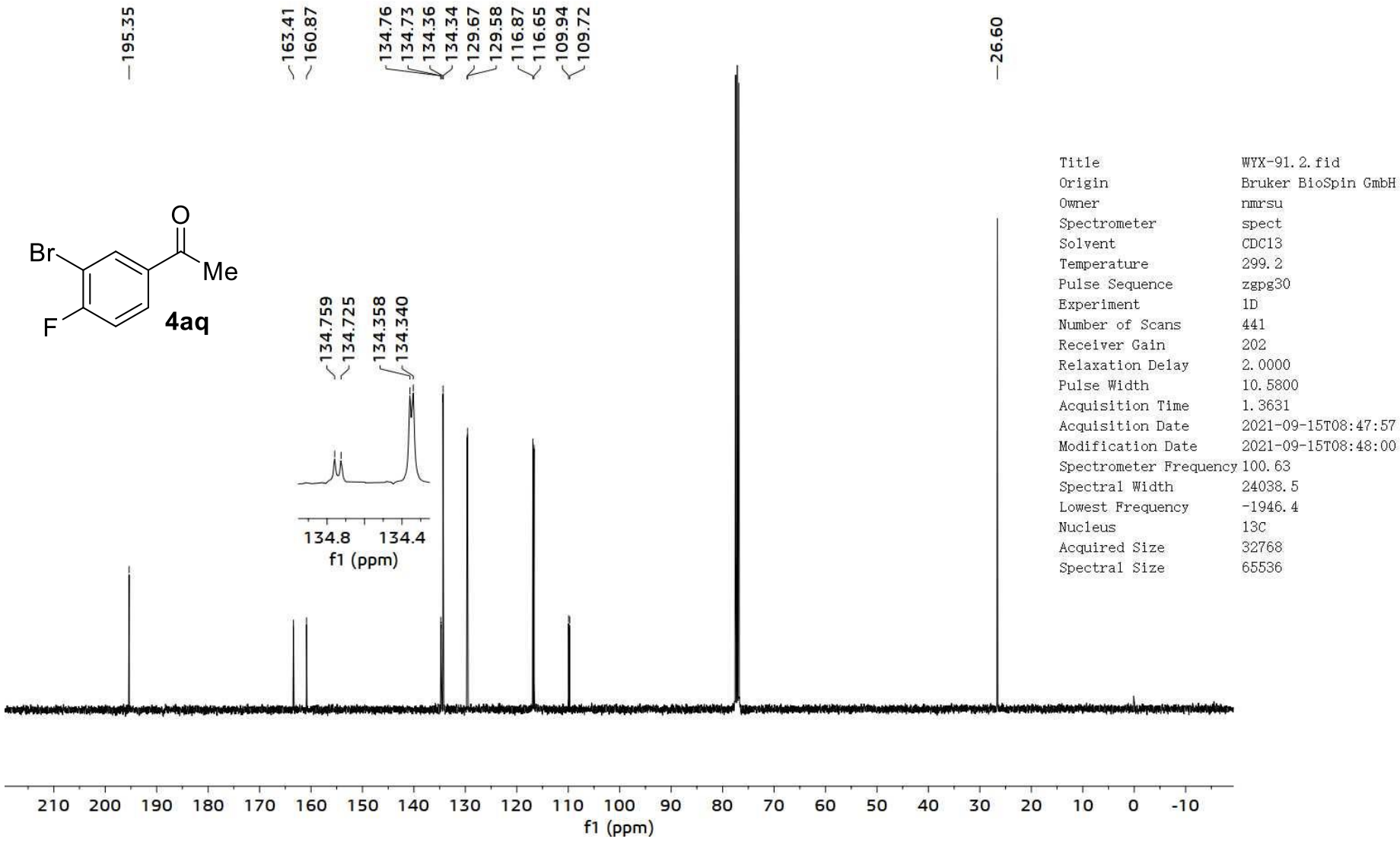

11.5314
9.0011
8.9986
8.9787
8.9761
8.6965
8.0761
8.0551
7.7069
7.7034
7.6869
7.6842
7.6679
7.6644
7.5746
7.5720
7.5582
7.5553
7.5533
7.5507
7.5370
7.5344
O
4ao
Title SN-2-20210923.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 127
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-24T00:51:39
Modification Date 2021-09-24T00:51:38
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.7
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
2.13
1.03
2.13
2.13
2.14
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

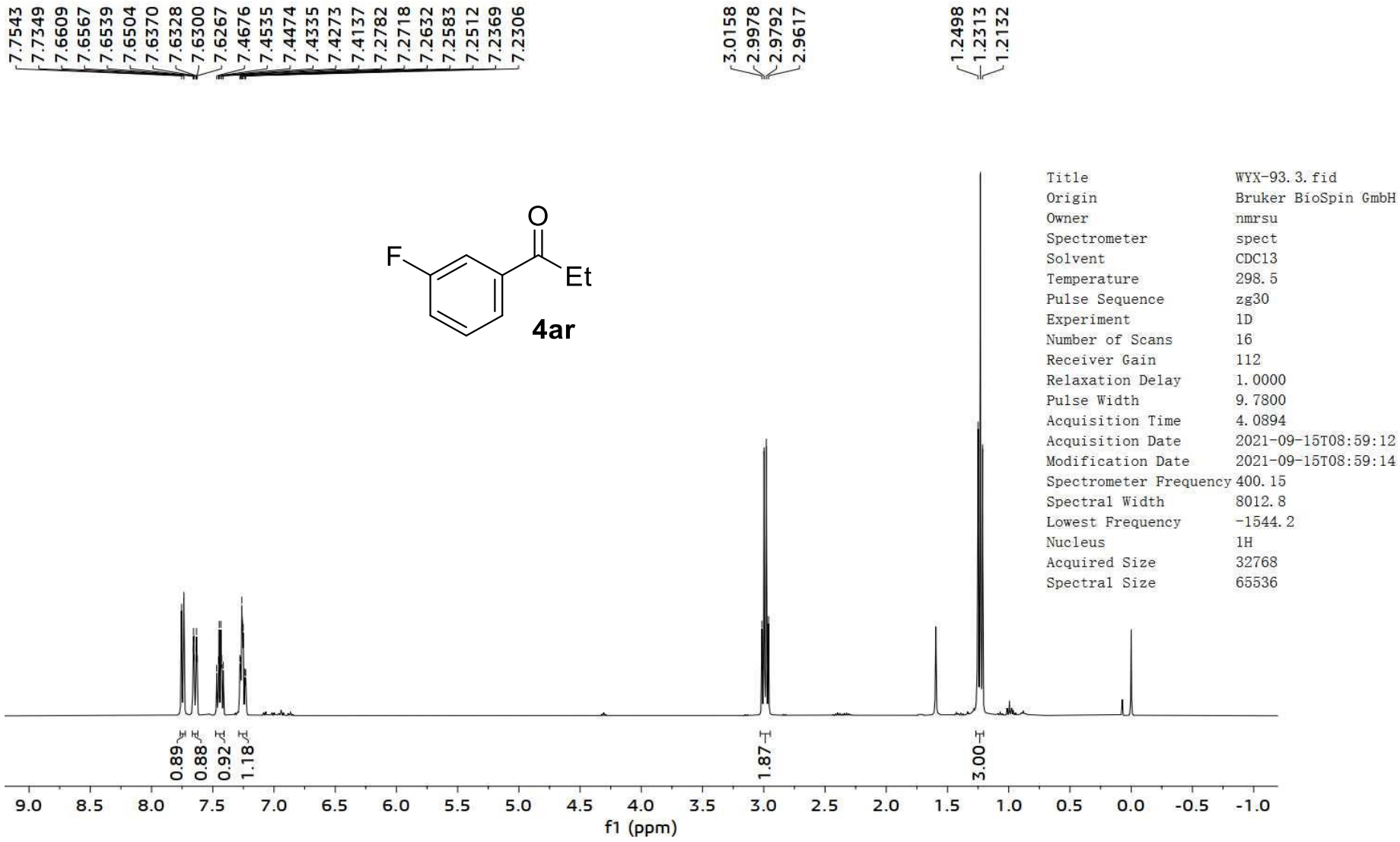

193.16
135.38
132.29
131.23
129.44
129.28
125.84
124.89
123.70
O
4ao
129.437
129.280
129.5129.0
f1 (ppm)
Title SN-2-20210923.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-24T01:32:47
Modification Date 2021-09-24T01:32:46
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1944.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

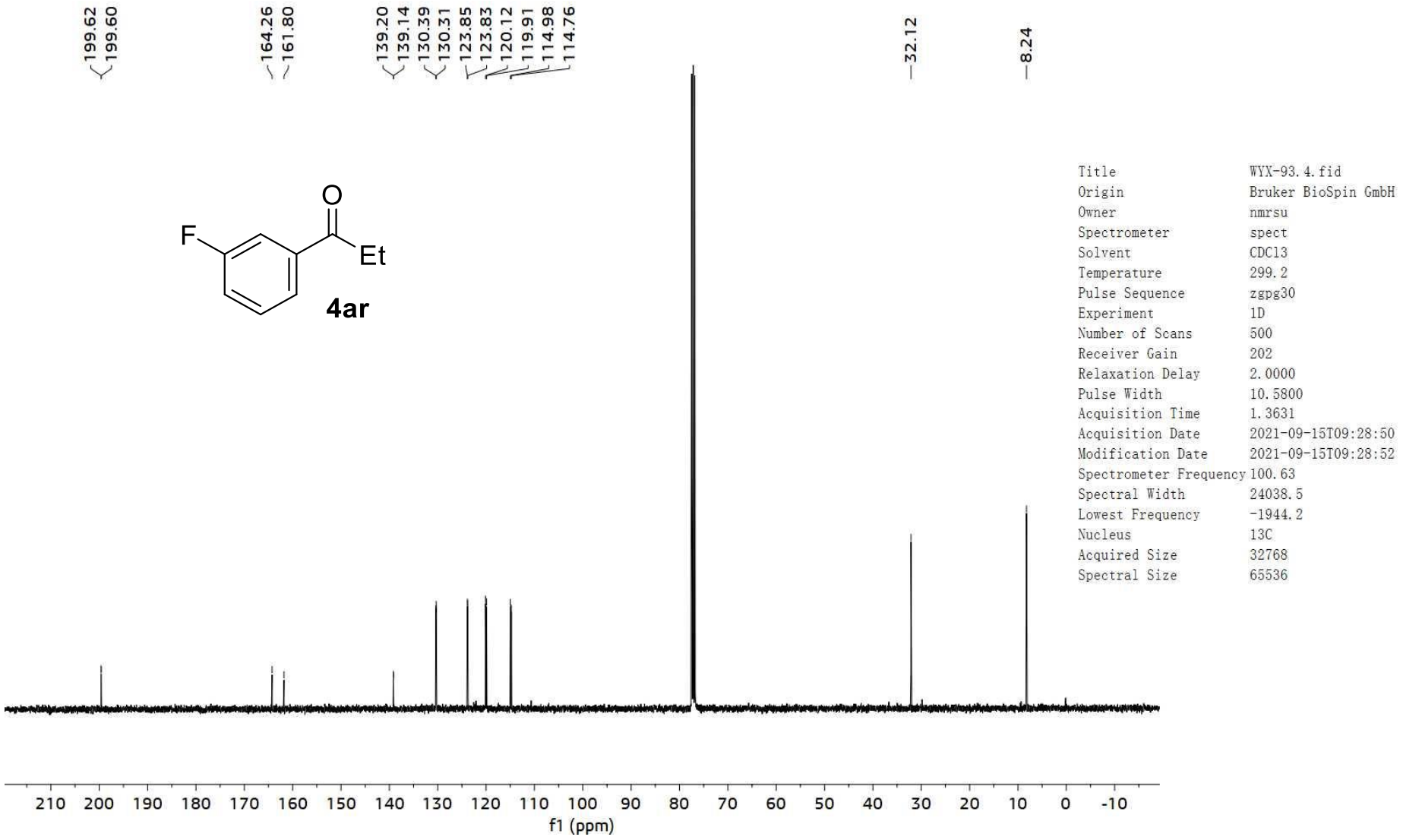

9.7648
9.7600
9.7553
2.4355
2.4307
2.4171
2.4123
2.3986
2.3939
1.6603
1.6438
1.6256
1.6074
1.5924
1.2994
1.2910
1.2781
1.2738
0.8951
0.8782
0.8606
O
Me
4ap
Title SN-3.3.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 79
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-23T08:27:55
Modification Date 2021-09-23T08:27:54
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.5
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.000
9.76 9.75
f1 (ppm)
1.00
2.40
2.47
8.18
3.17
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

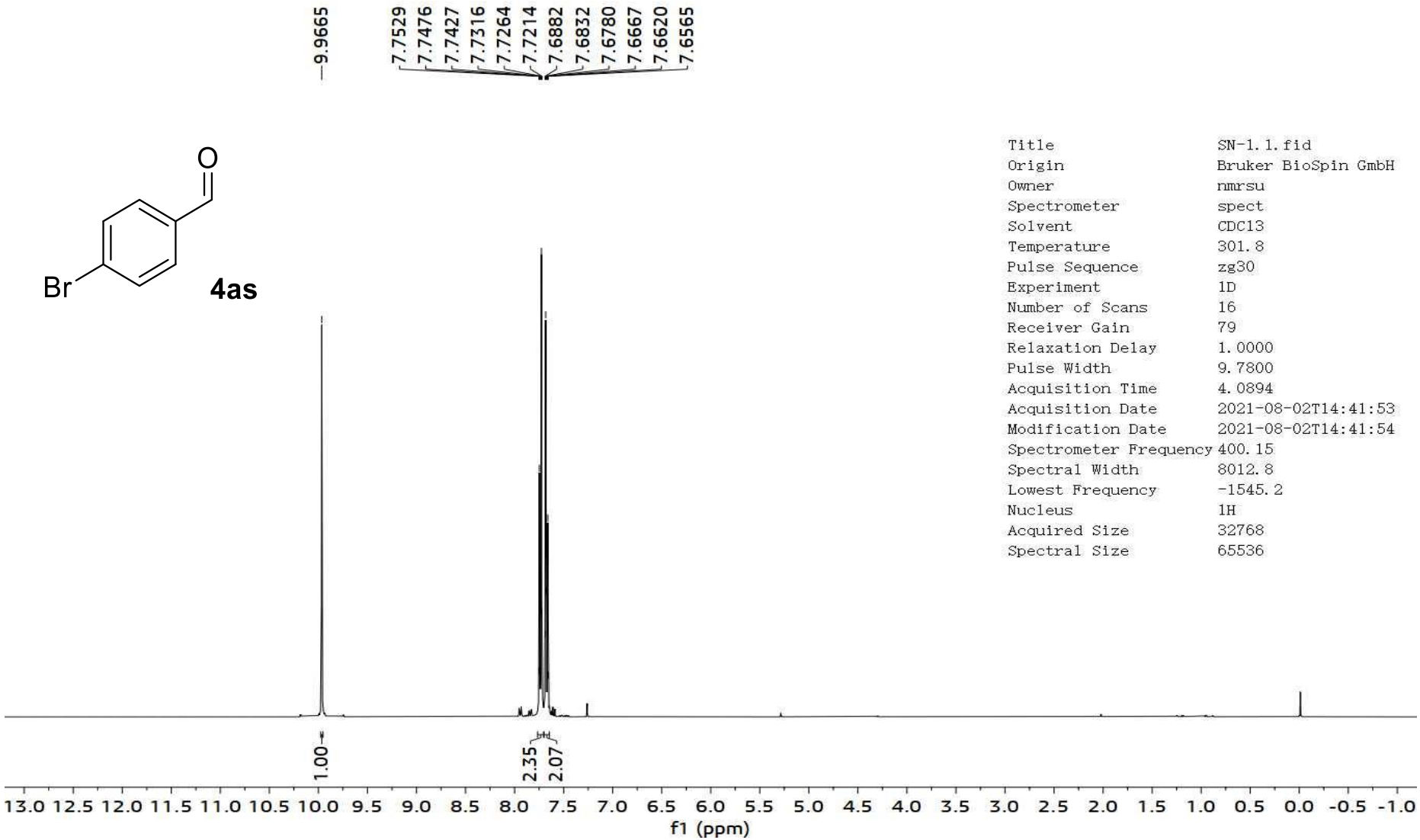

203.15
44.07
31.77
29.27
29.16
22.73
22.24
14.19
O
Me
4ap
Title SN-3.4.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 500
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-23T08:57:37
Modification Date 2021-09-23T08:57:36
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1943.1
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

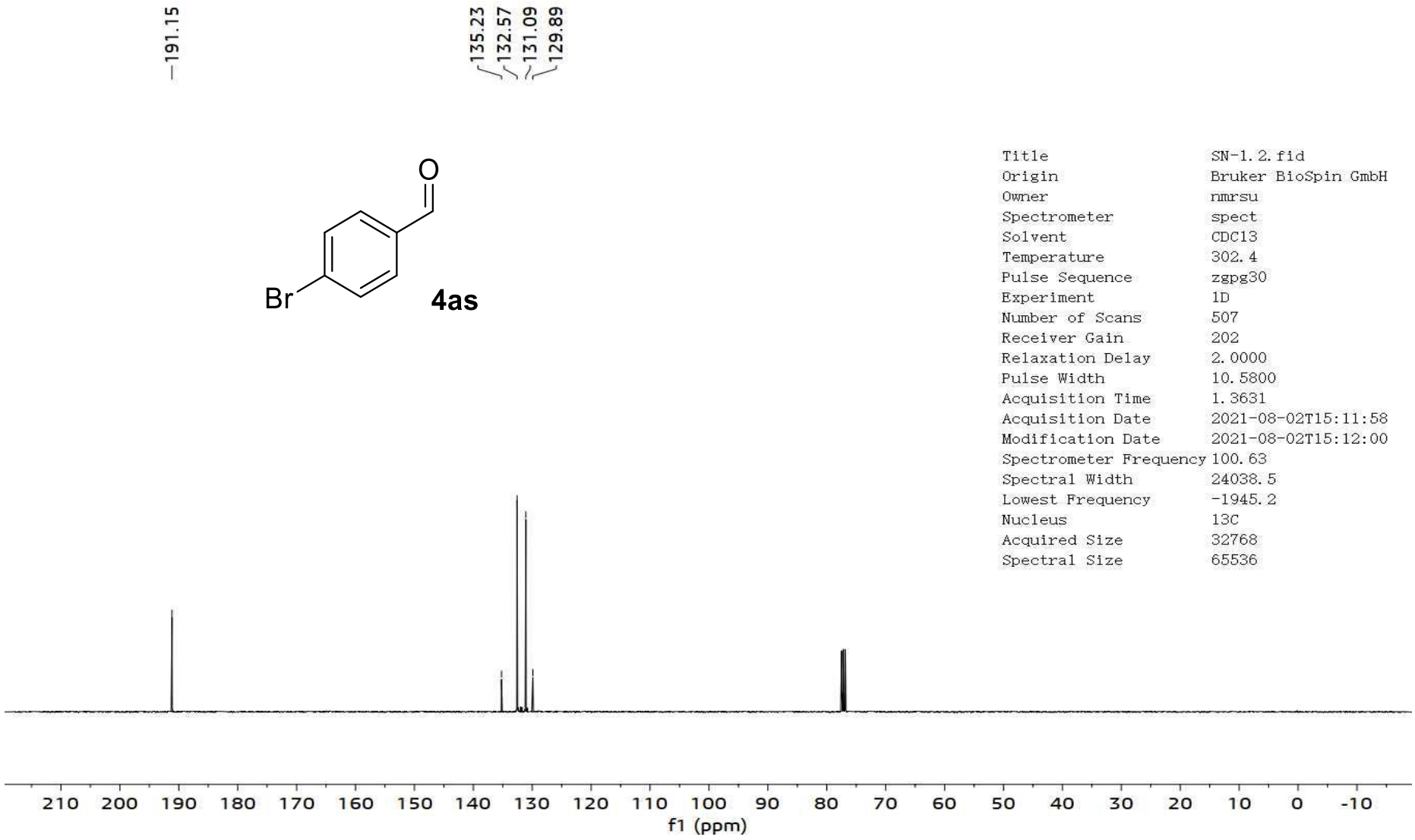

8.1757
8.1702
8.1591
8.1536
7.9021
7.8966
7.8923
7.8868
7.2084
7.1876
7.1668
2.5760
Br
O
Me
F
4aq
Title WYX-91.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.6
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 89
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-15T08:21:40
Modification Date 2021-09-15T08:21:42
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.03
1.01
3.23
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 -1.0
f1 (ppm)

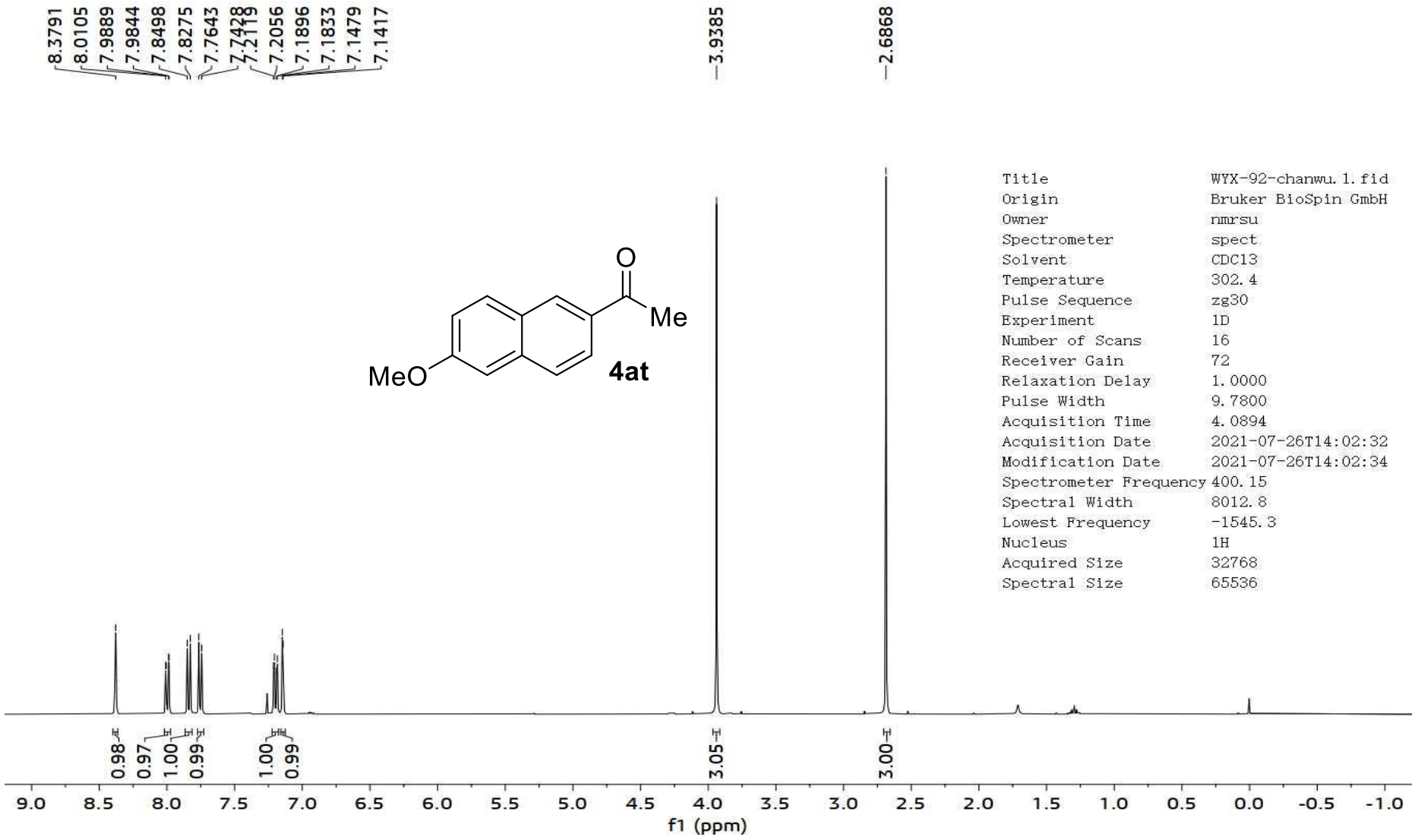

195.35
163.41
160.87
134.76
134.73
134.36
134.34
129.67
129.58
116.87
116.65
109.94
109.72
26.60
Br
O
Me
F
4aq
134.759
134.725
134.358
134.340
134.8
134.4
f1 (ppm)
Title WYX-91.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 299.2
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 441
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-15T08:47:57
Modification Date 2021-09-15T08:48:00
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1946.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

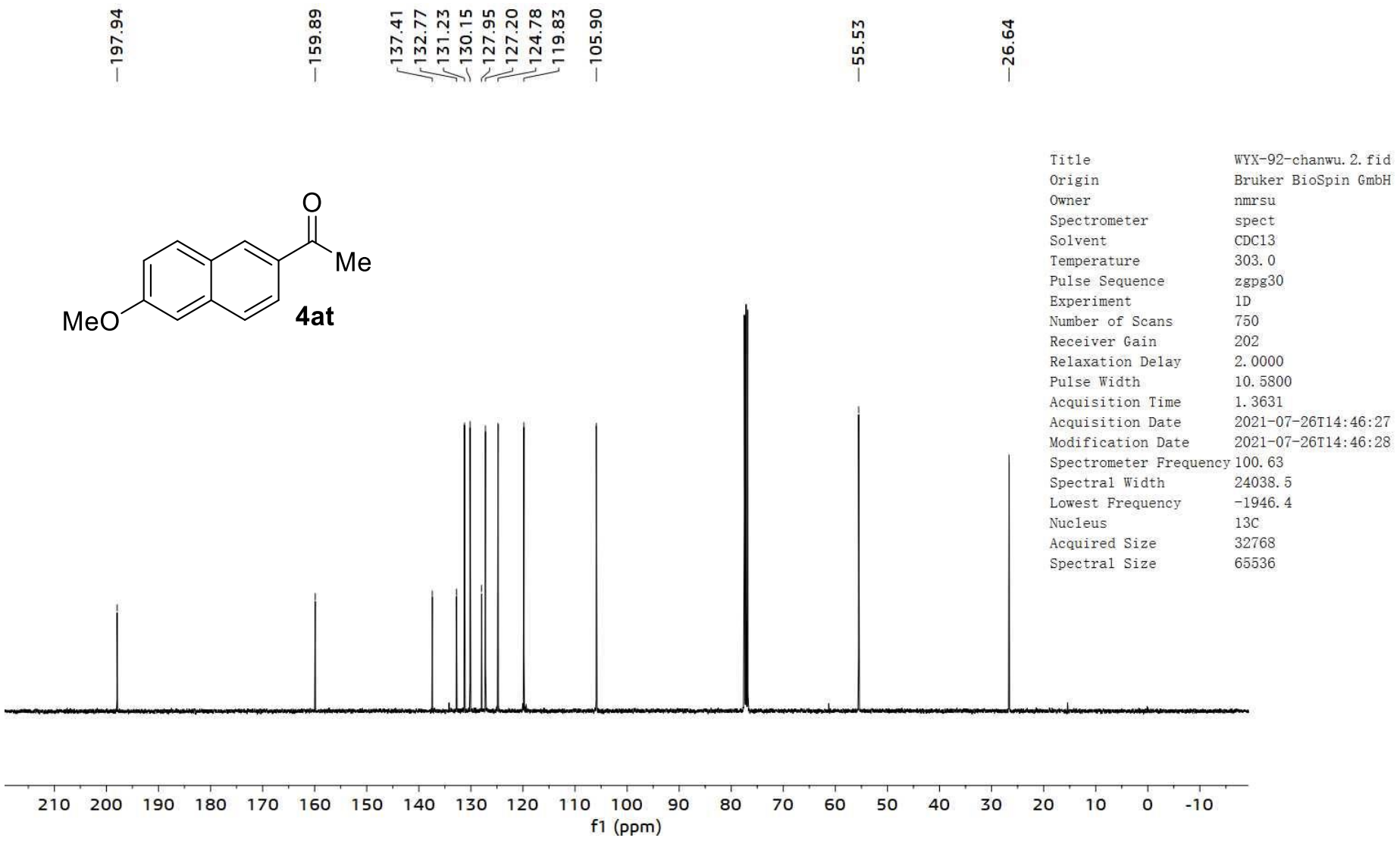

7.7543
7.7349
7.6609
7.6567
7.6539
7.6504
7.6370
7.6328
7.6300
7.6267
7.4676
7.4535
7.4474
7.4335
7.4273
7.4137
7.2782
7.2718
7.2632
7.2583
7.2512
7.2369
7.2306
3.0158
2.9978
2.9792
2.9617
1.2498
1.2313
1.2132
F
O
Et
4ar
Title WYX-93.3.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.5
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 112
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-15T08:59:12
Modification Date 2021-09-15T08:59:14
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1544.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.89
0.88
0.92
1.18
1.87
3.00
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 -1.0
f1 (ppm)

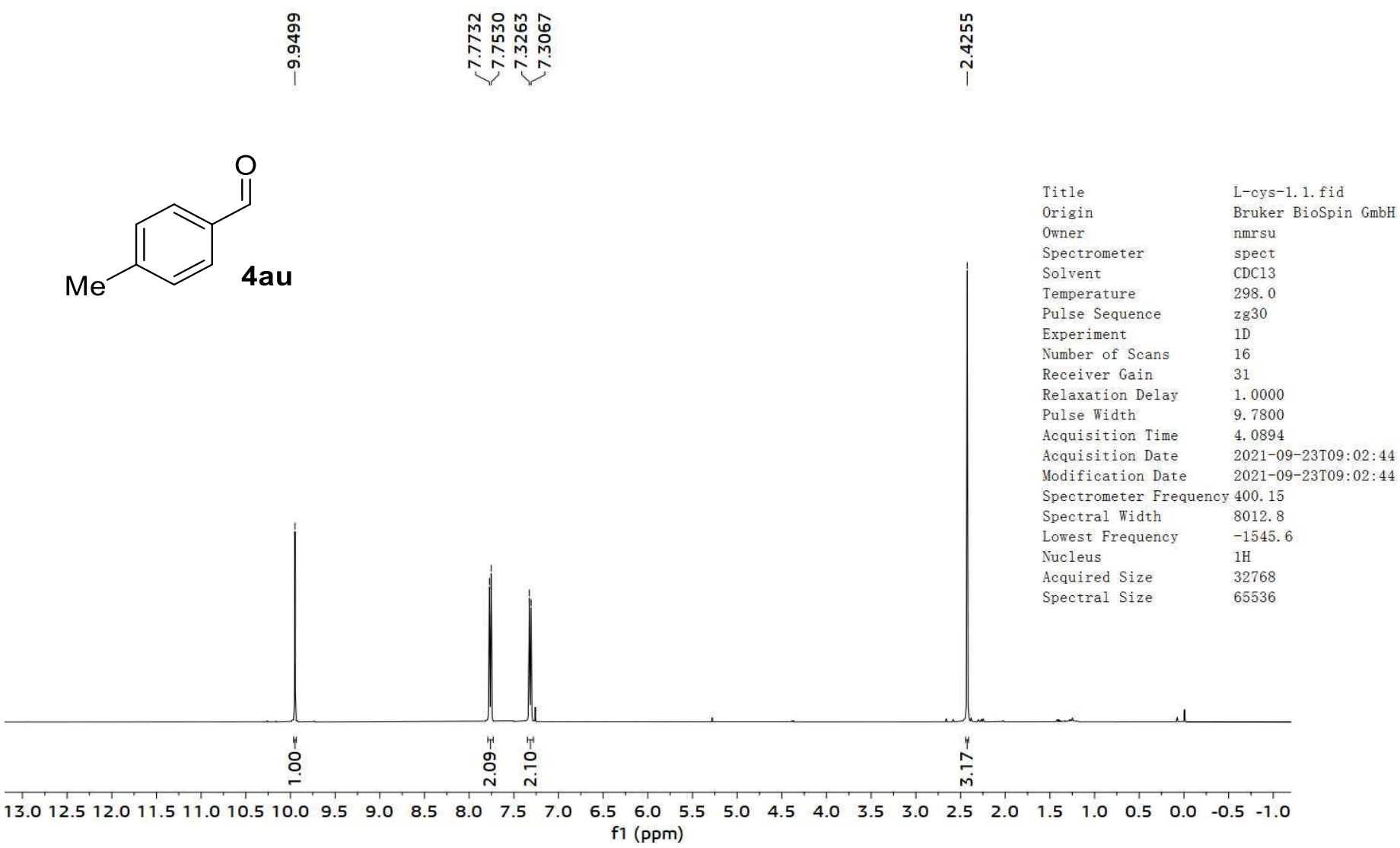

199.62
199.60
164.26
161.80
139.20
139.14
130.39
130.31
123.85
123.83
120.12
119.91
114.98
114.76
32.12
8.24
O
F
Et
4ar
Title WYX-93.4.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 299.2
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 500
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-15T09:28:50
Modification Date 2021-09-15T09:28:52
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1944.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

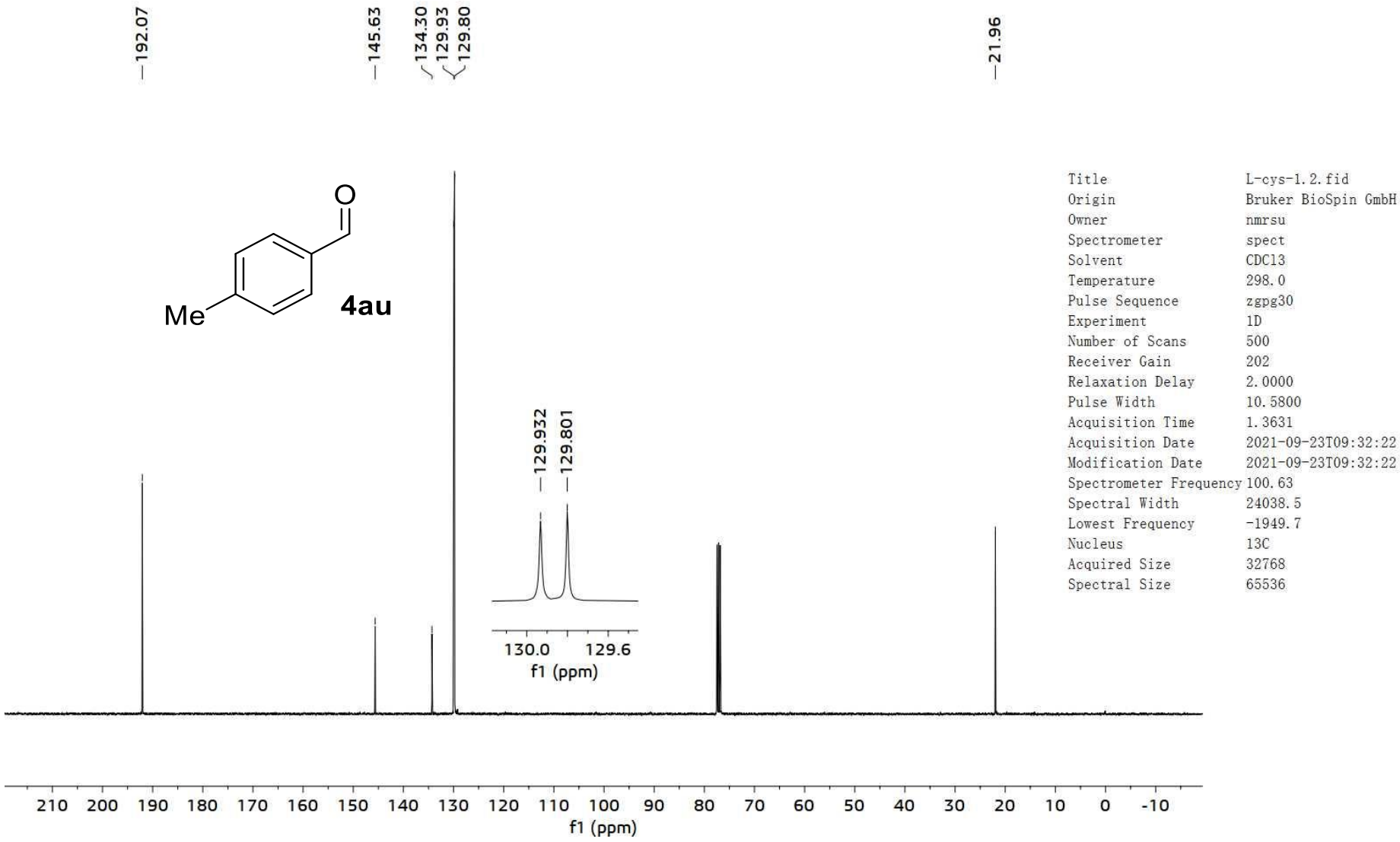

9.9665
7.7529
7.7476
7.7427
7.7316
7.7264
7.7214
7.6882
7.6832
7.6780
7.6667
7.6620
7.6565
O
Br
4as
Title SN-1.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 301.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 79
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-08-02T14:41:53
Modification Date 2021-08-02T14:41:54
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
2.35
2.07
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

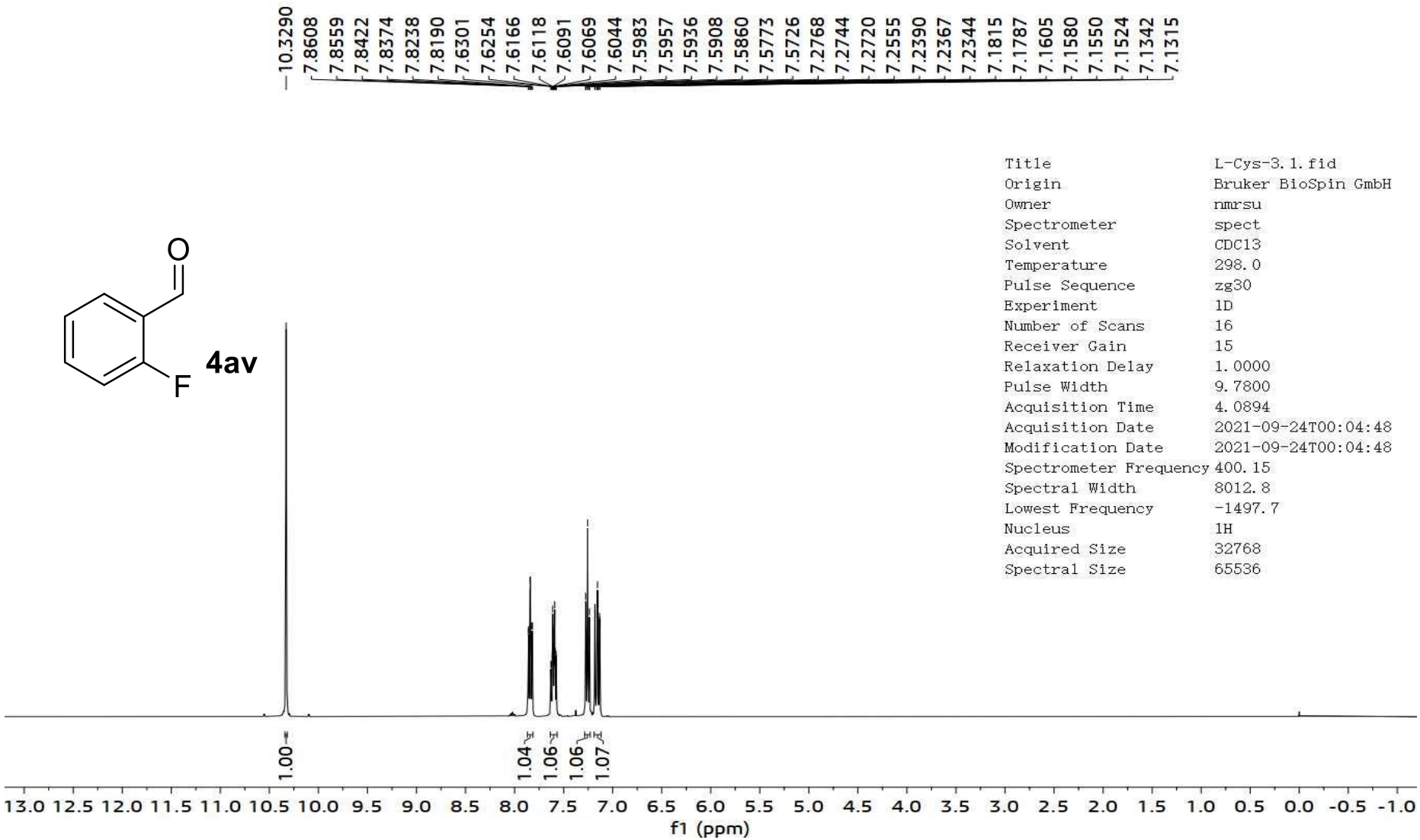

191.15
135.23
132.57
131.09
129.89
O
Br
4as
Title SN-1.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 302.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 507
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-08-02T15:11:58
Modification Date 2021-08-02T15:12:00
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1945.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

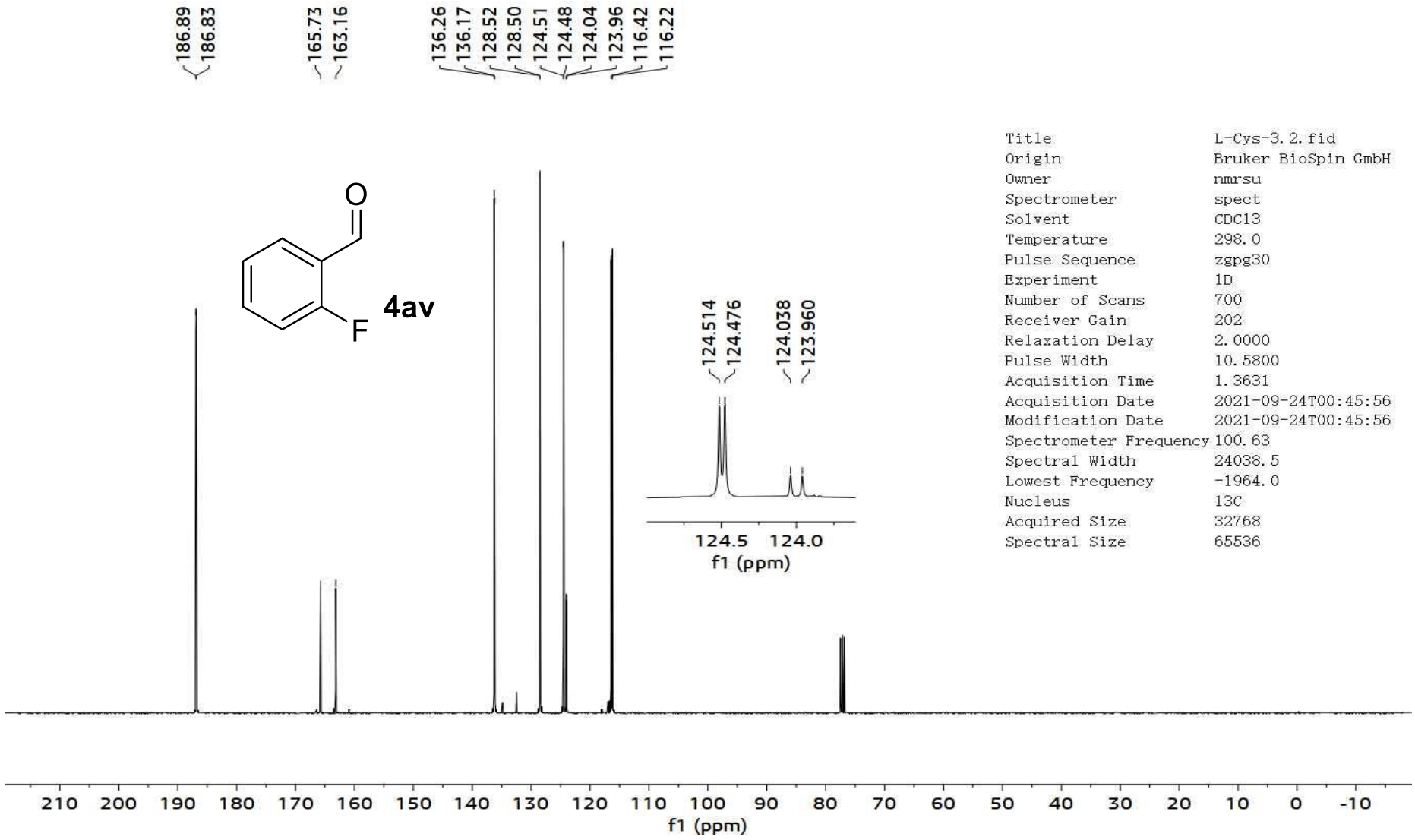

8.3791
8.0105
7.9889
7.9844
7.8498
7.8275
7.7643
7.7428
7.7119
7.2056
7.1896
7.1833
7.1479
7.1417
3.9385
2.6868
O
Me
MeO
4at
Title WYX-92-chanwu.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 302.4
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 72
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-07-26T14:02:32
Modification Date 2021-07-26T14:02:34
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
0.98
0.97
1.00
0.99
1.00
0.99
3.05
3.00
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 -1.0
f1 (ppm)

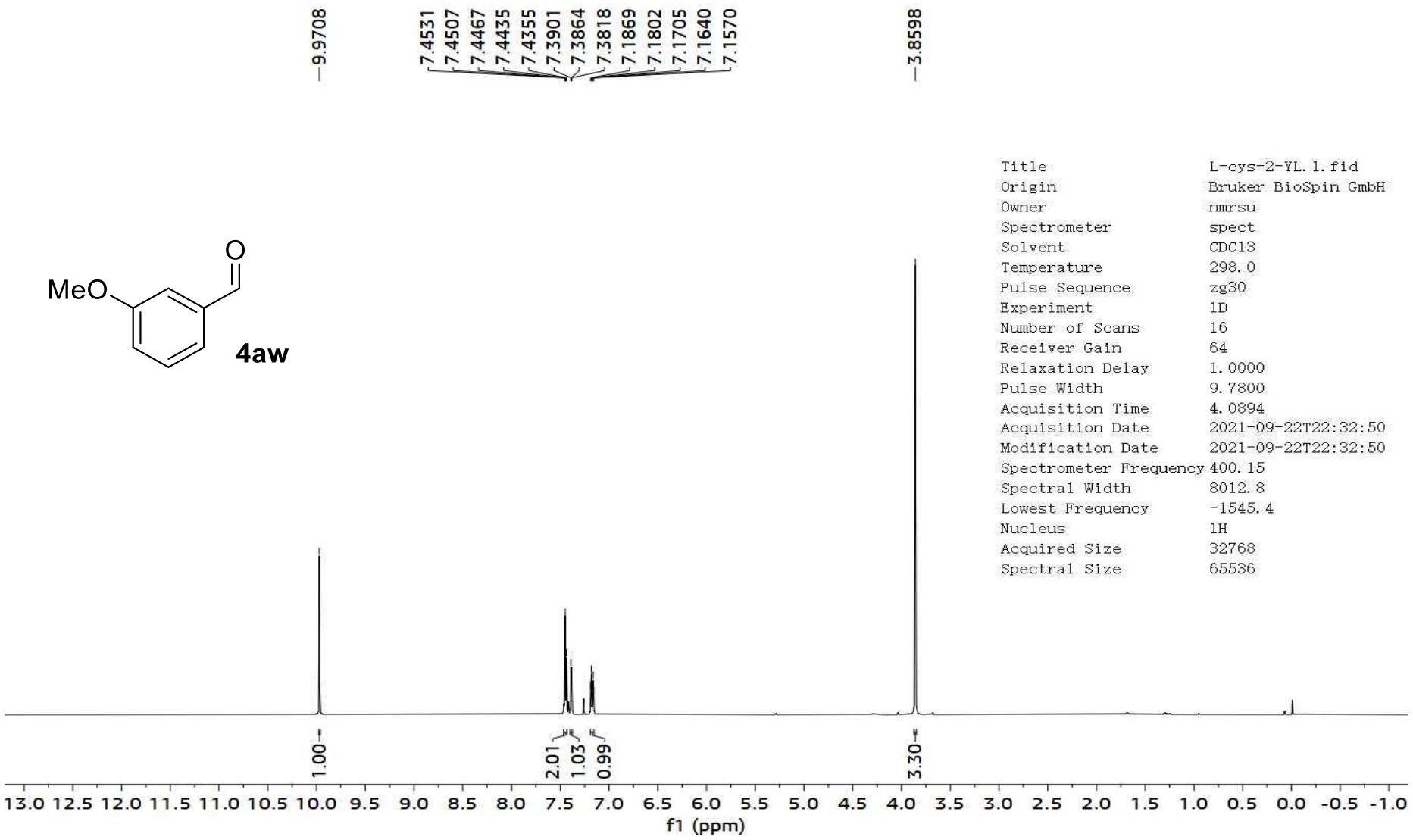

197.94
159.89
137.41
132.77
131.23
130.15
127.95
127.20
124.78
119.83
105.90
55.53
26.64
O
Me
MeO
4at
Title WYX-92-chanwu.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 303.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 750
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-07-26T14:46:27
Modification Date 2021-07-26T14:46:28
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1946.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

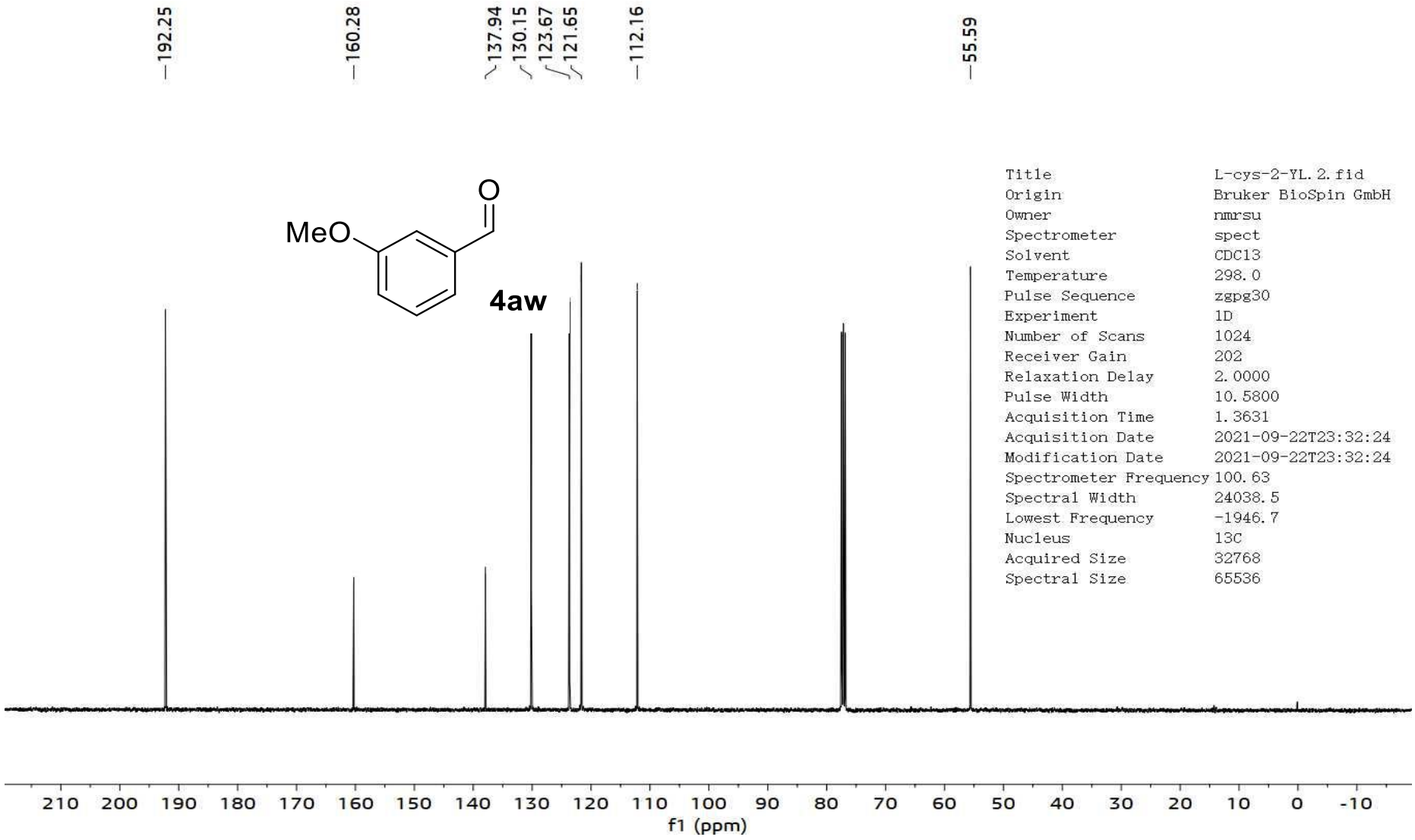

9.9499
7.7732
7.7530
7.3263
7.3067
2.4255
O
Me
4au
Title L-cys-1.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-23T09:02:44
Modification Date 2021-09-23T09:02:44
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
2.09
2.10
3.17
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

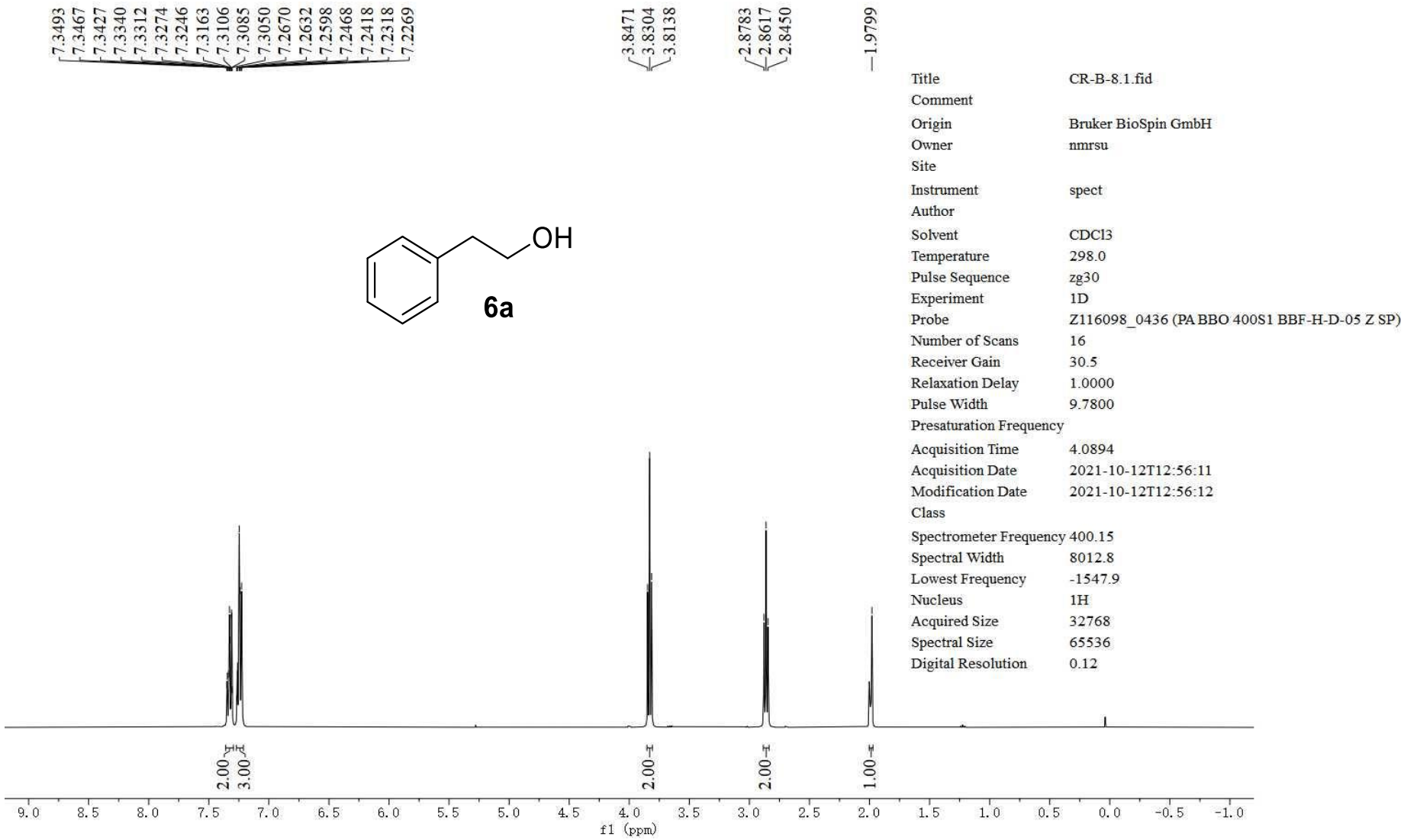

192.07
145.63
134.30
129.93
129.80
21.96
O
Me
4au
129.932
129.801
130.0
129.6
f1 (ppm)
Title L-cys-1.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 500
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-23T09:32:22
Modification Date 2021-09-23T09:32:22
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1949.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

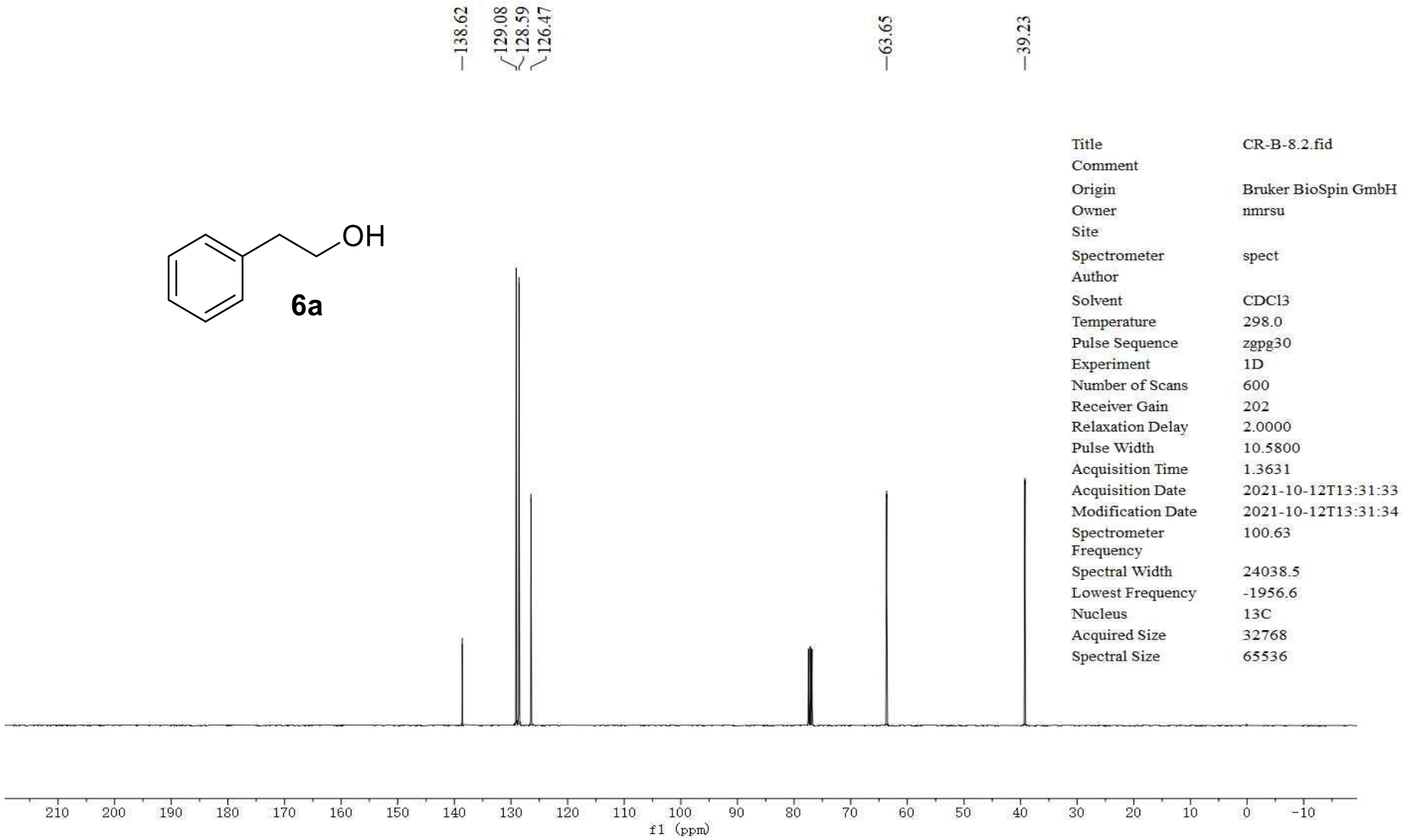

10.3290
7.8608
7.8559
7.8422
7.8374
7.8238
7.8190
7.6301
7.6254
7.6166
7.6118
7.6091
7.6069
7.6044
7.5983
7.5957
7.5936
7.5908
7.5860
7.5773
7.5726
7.2768
7.2744
7.2720
7.2555
7.2390
7.2367
7.2344
7.1815
7.1787
7.1605
7.1580
7.1550
7.1524
7.1342
7.1315
O
F
4av
Title L-Cys-3.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 15
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-24T00:04:48
Modification Date 2021-09-24T00:04:48
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1497.7
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.04
1.06
1.06
1.07
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

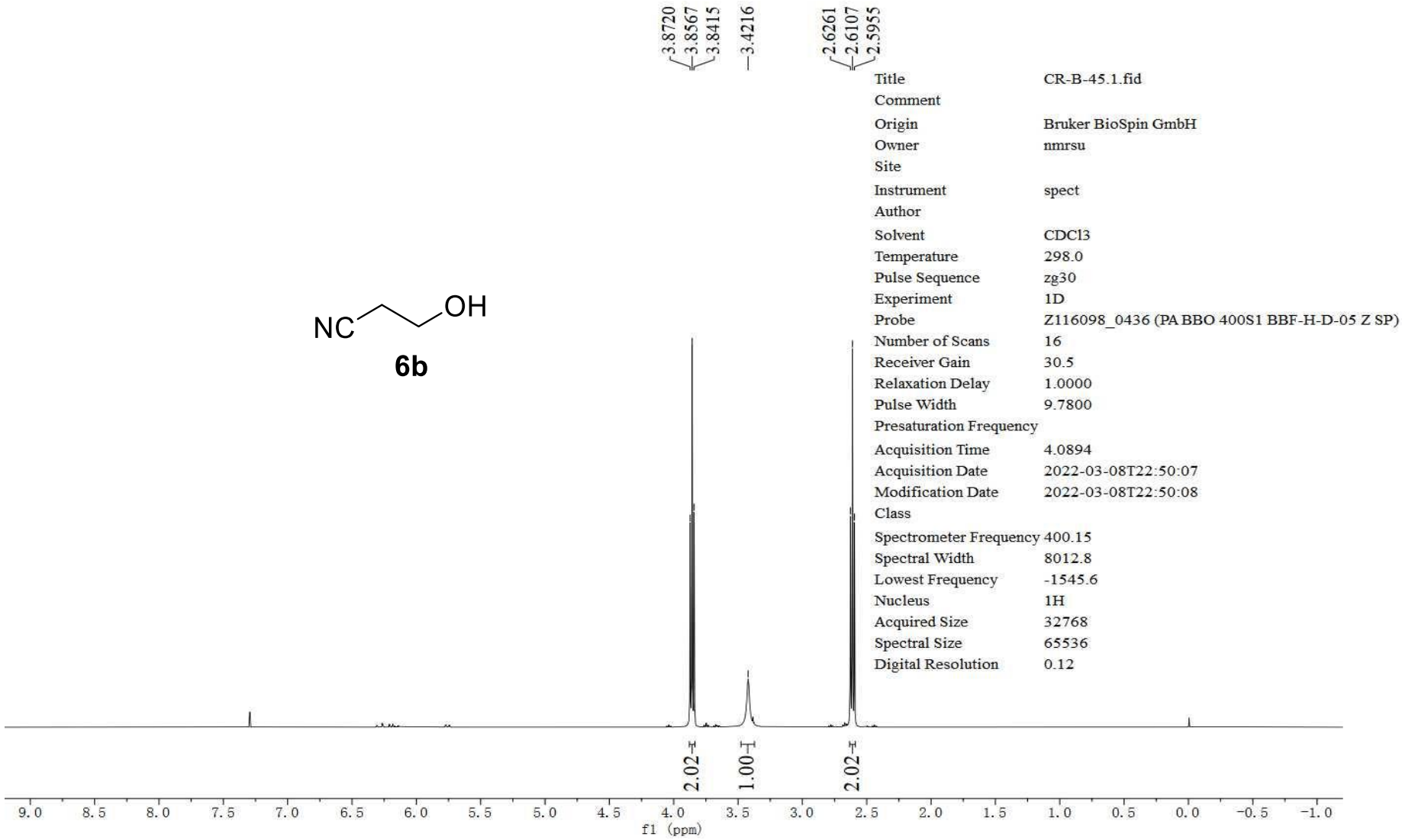

186.89
186.83
165.73
163.16
136.26
136.17
128.52
128.50
124.51
124.48
124.04
123.96
116.42
116.22
O
F
4av
124.514
124.476
124.038
123.960
124.5
124.0
f1 (ppm)
Title L-Cys-3.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-24T00:45:56
Modification Date 2021-09-24T00:45:56
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1964.0
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

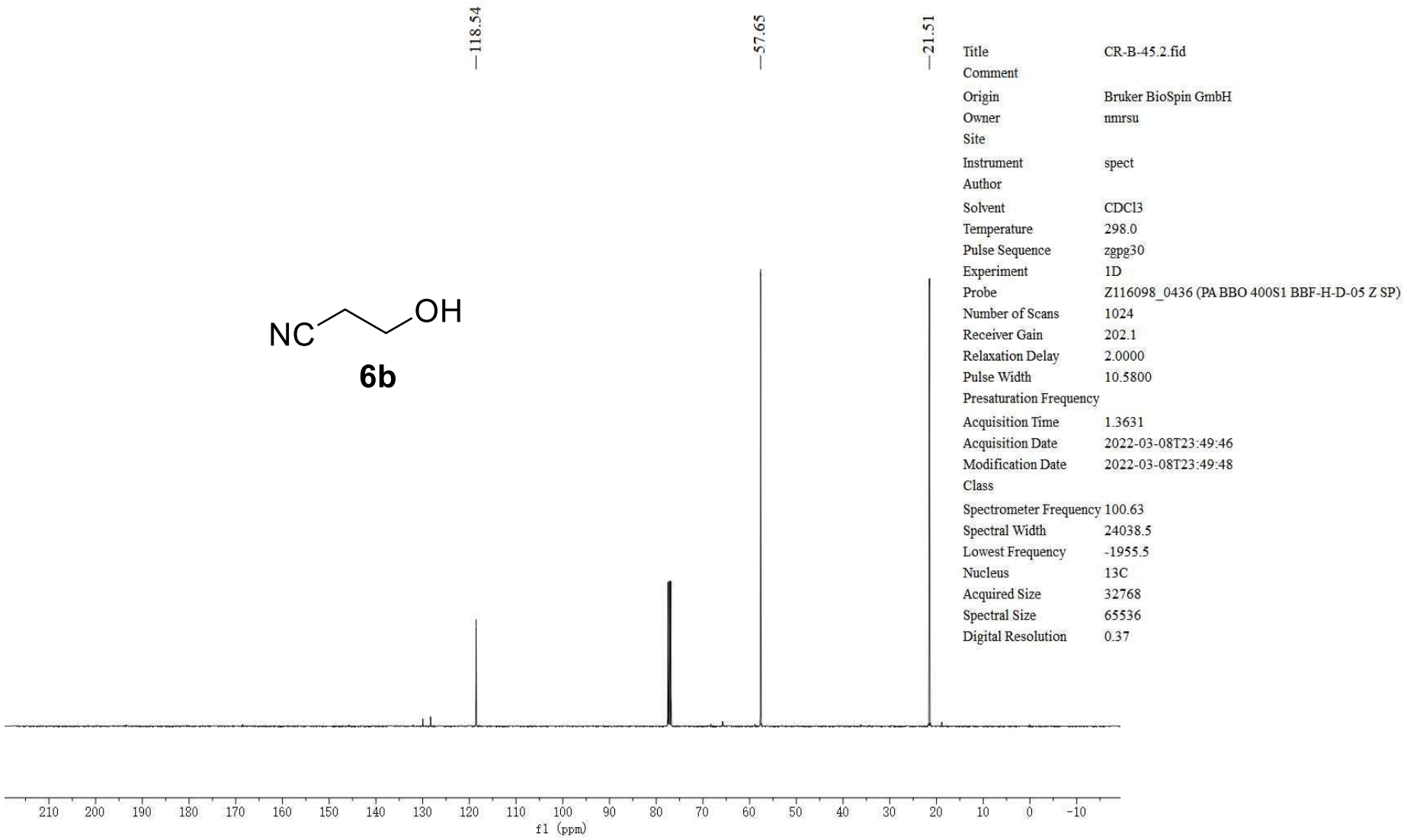

9.9708
7.4531
7.4507
7.4467
7.4435
7.4355
7.3901
7.3864
7.3818
7.1869
7.1802
7.1705
7.1640
7.1570
3.8598
MeO
O
4aw
Title L-cys-2-YL.1.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 64
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-22T22:32:50
Modification Date 2021-09-22T22:32:50
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.4
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
2.01
1.03
0.99
3.30
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

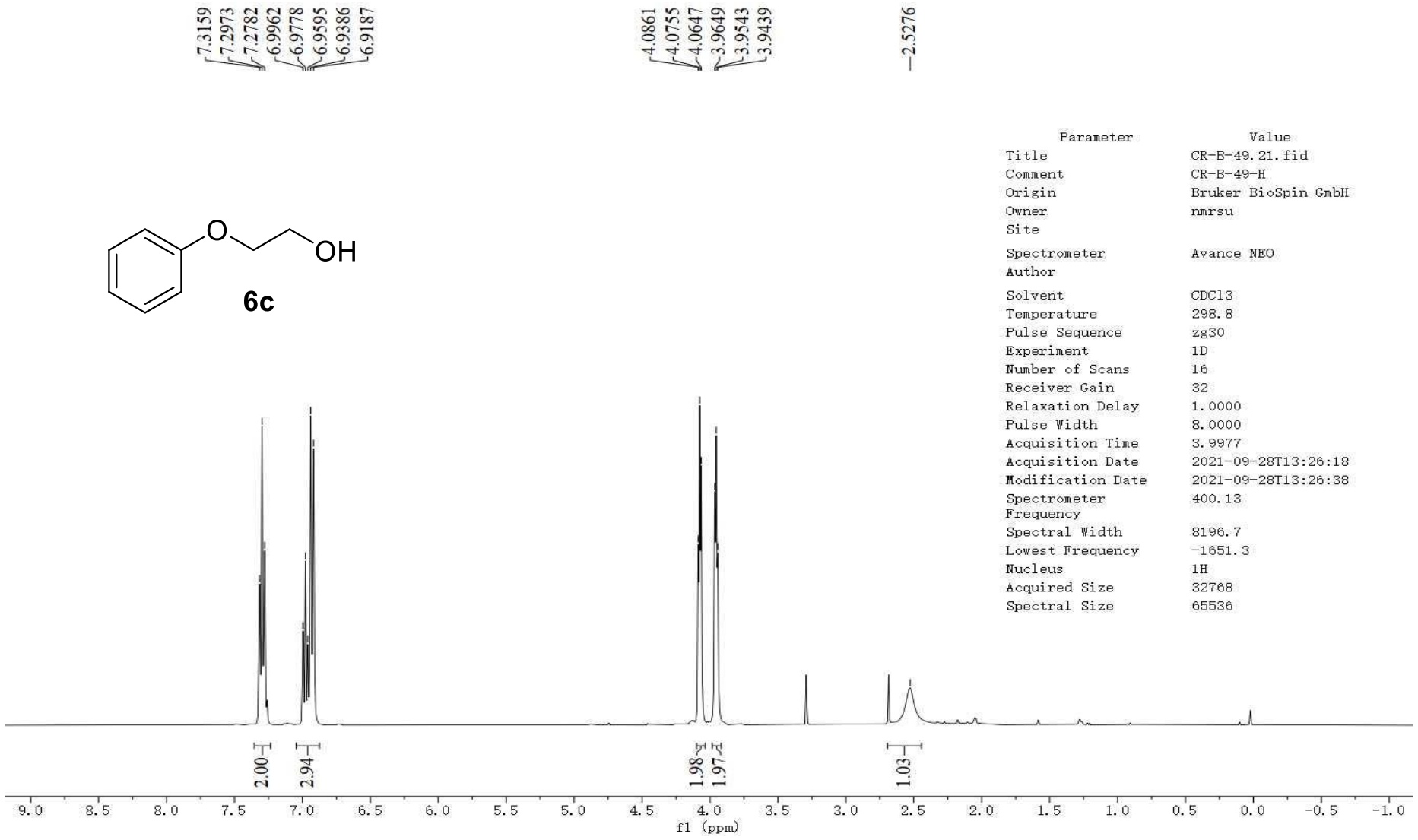

192.25
160.28
137.94
130.15
123.67
121.65
112.16
55.59
MeO
O
4aw
Title L-cys-2-YL.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-22T23:32:24
Modification Date 2021-09-22T23:32:24
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1946.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

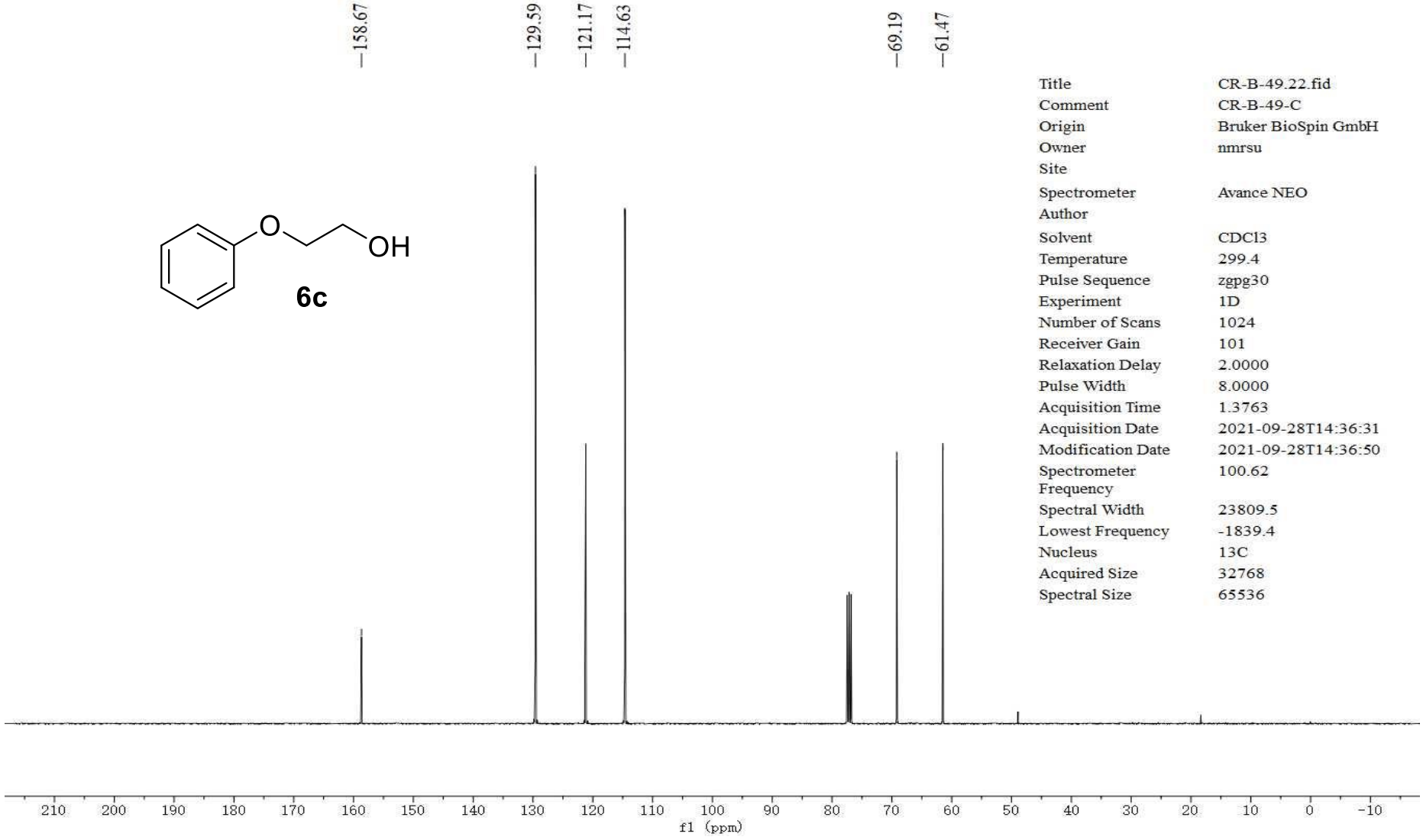

7.3493
7.3467
7.3427
7.3340
7.3312
7.3274
7.3246
7.3163
7.3106
7.3085
7.3050
7.2670
7.2632
7.2598
7.2468
7.2418
7.2318
7.2269
3.8471
3.8304
3.8138
2.8783
2.8617
2.8450
1.9799
OH
6a
Title CR-B-8.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 30.5
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2021-10-12T12:56:11
Modification Date 2021-10-12T12:56:12
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1547.9
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
2.00
3.00
2.00
2.00
1.00
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 -1.0
f1 (ppm)

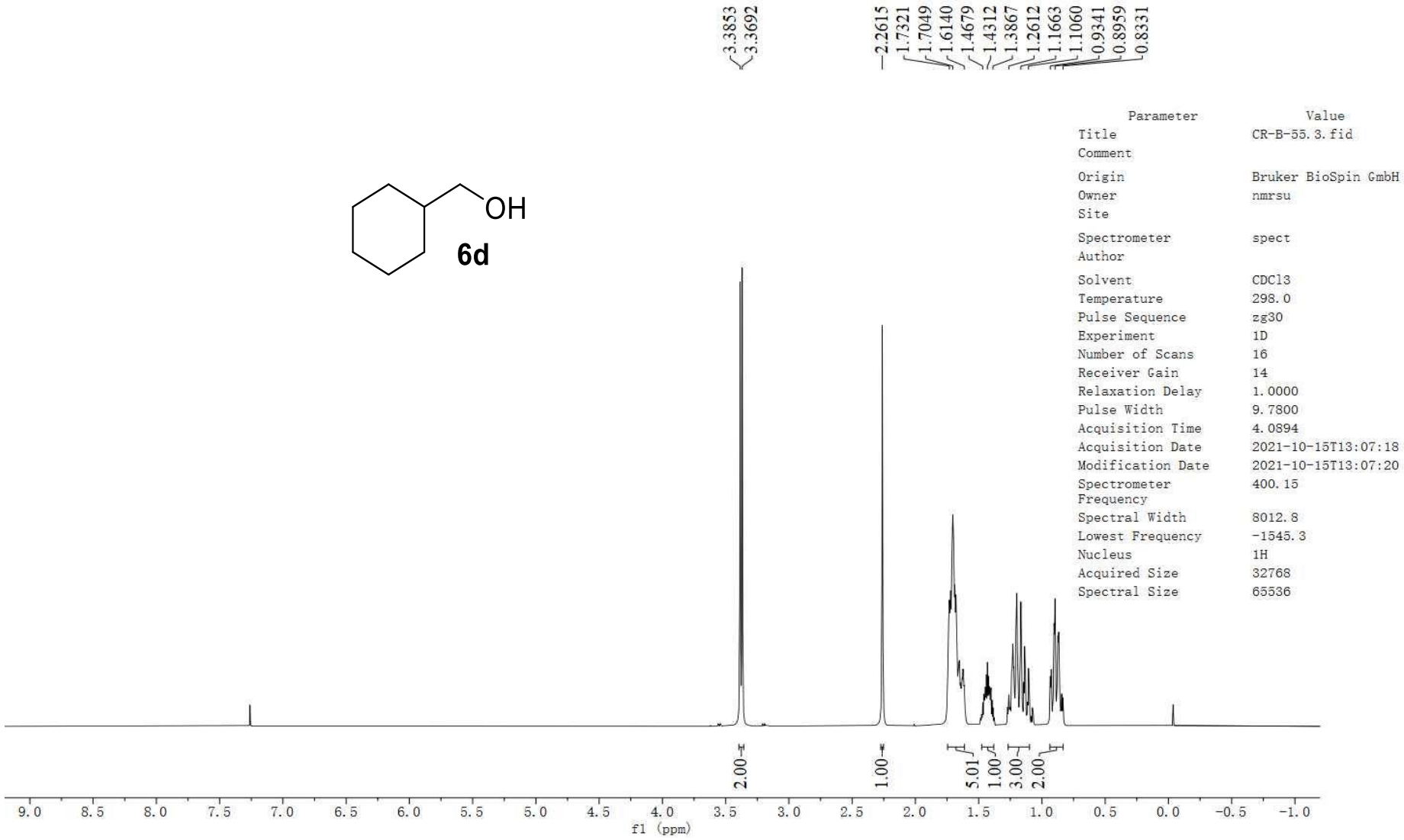

138.62
129.08
128.59
126.47
63.65
39.23
OH
6a
Title CR-B-8.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-12T13:31:33
Modification Date 2021-10-12T13:31:34
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1956.6
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

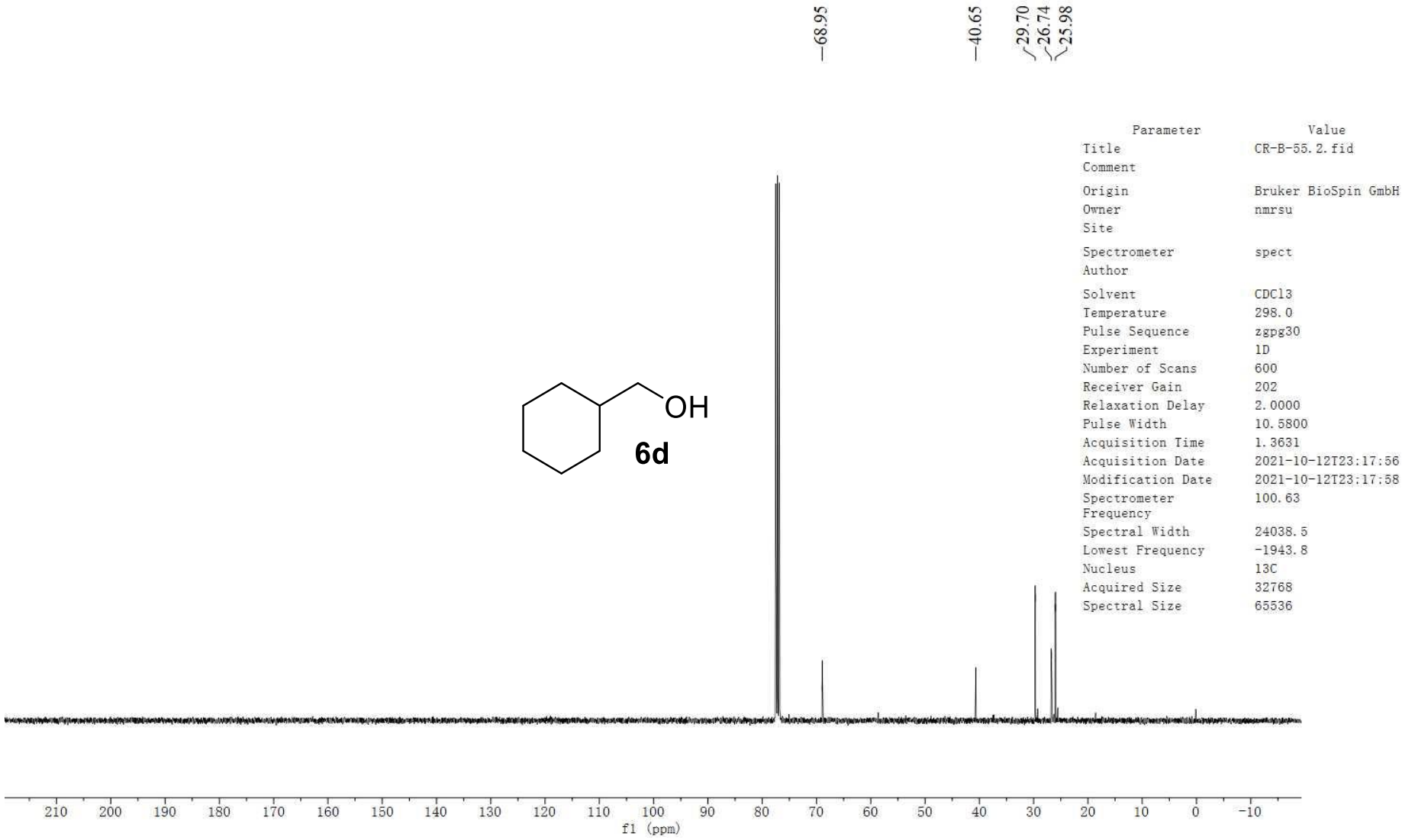

3.8720
3.8567
3.8415
3.4216
2.6261
2.6107
2.5955
NC
OH
6b
Title CR-B-45.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 30.5
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2022-03-08T22:50:07
Modification Date 2022-03-08T22:50:08
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
2.02
1.00
2.02
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 -1.0
f1 (ppm)

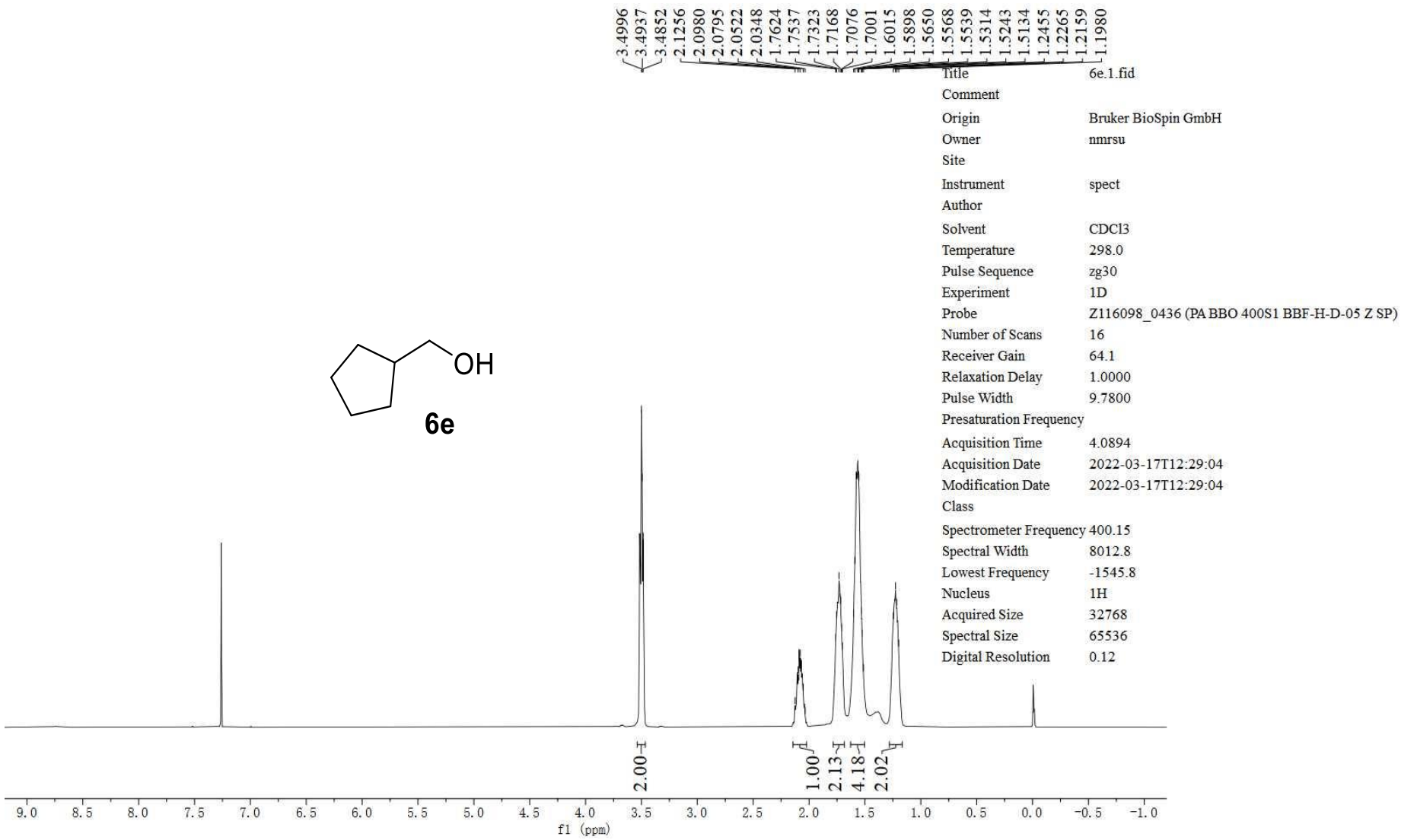

118.54
57.65
21.51
NC
OH
6b
Title CR-B-45.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 1024
Receiver Gain 202.1
Relaxation Delay 2.0000
Pulse Width 10.5800
Presaturation Frequency
Acquisition Time 1.3631
Acquisition Date 2022-03-08T23:49:46
Modification Date 2022-03-08T23:49:48
Class
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1955.5
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.37
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)

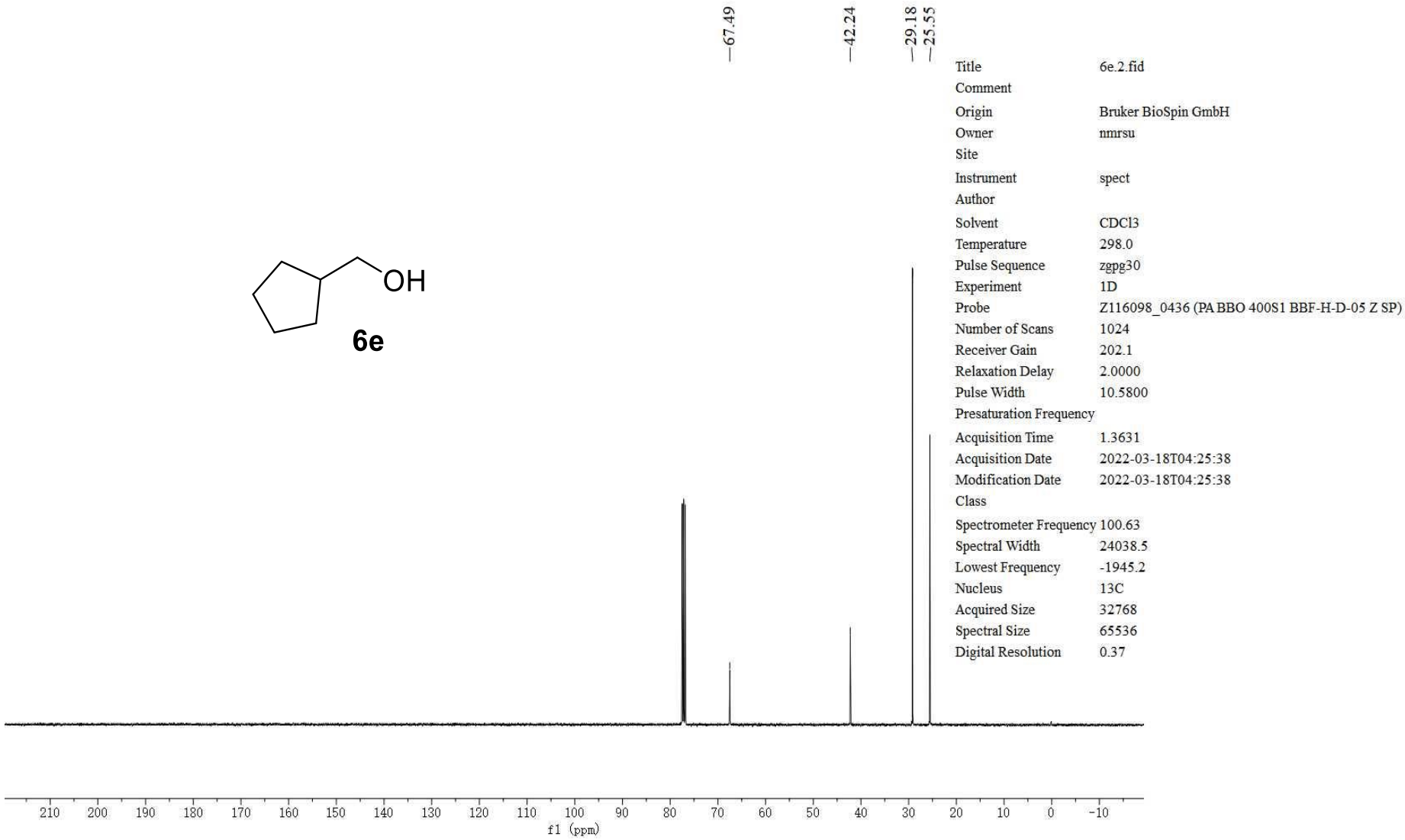

7.3159
7.2973
7.2782
6.9962
6.9778
6.9595
6.9386
6.9187
4.0861
4.0755
4.0647
3.9649
3.9543
3.9439
2.5276
O
OH
6c
Parameter Value
Title CR-B-49.21.fid
Comment CR-B-49-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 298.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 32
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-09-28T13:26:18
Modification Date 2021-09-28T13:26:38
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1651.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
2.94
1.98
1.97
1.03
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 -1.0
f1 (ppm)

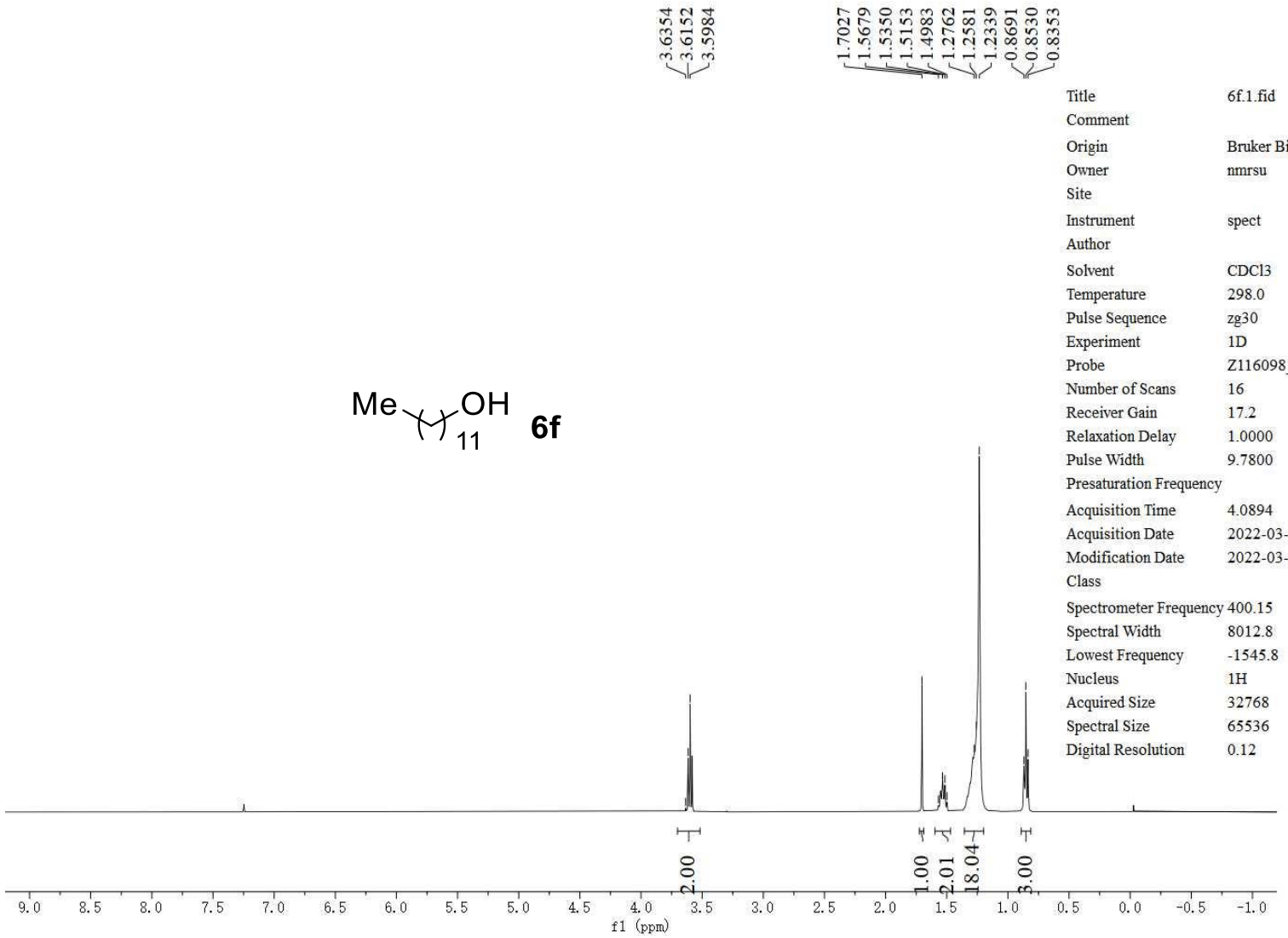

158.67
129.59
121.17
114.63
69.19
61.47
O
OH
6c
Title CR-B-49.22.fid
Comment CR-B-49-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 299.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-09-28T14:36:31
Modification Date 2021-09-28T14:36:50
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1839.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

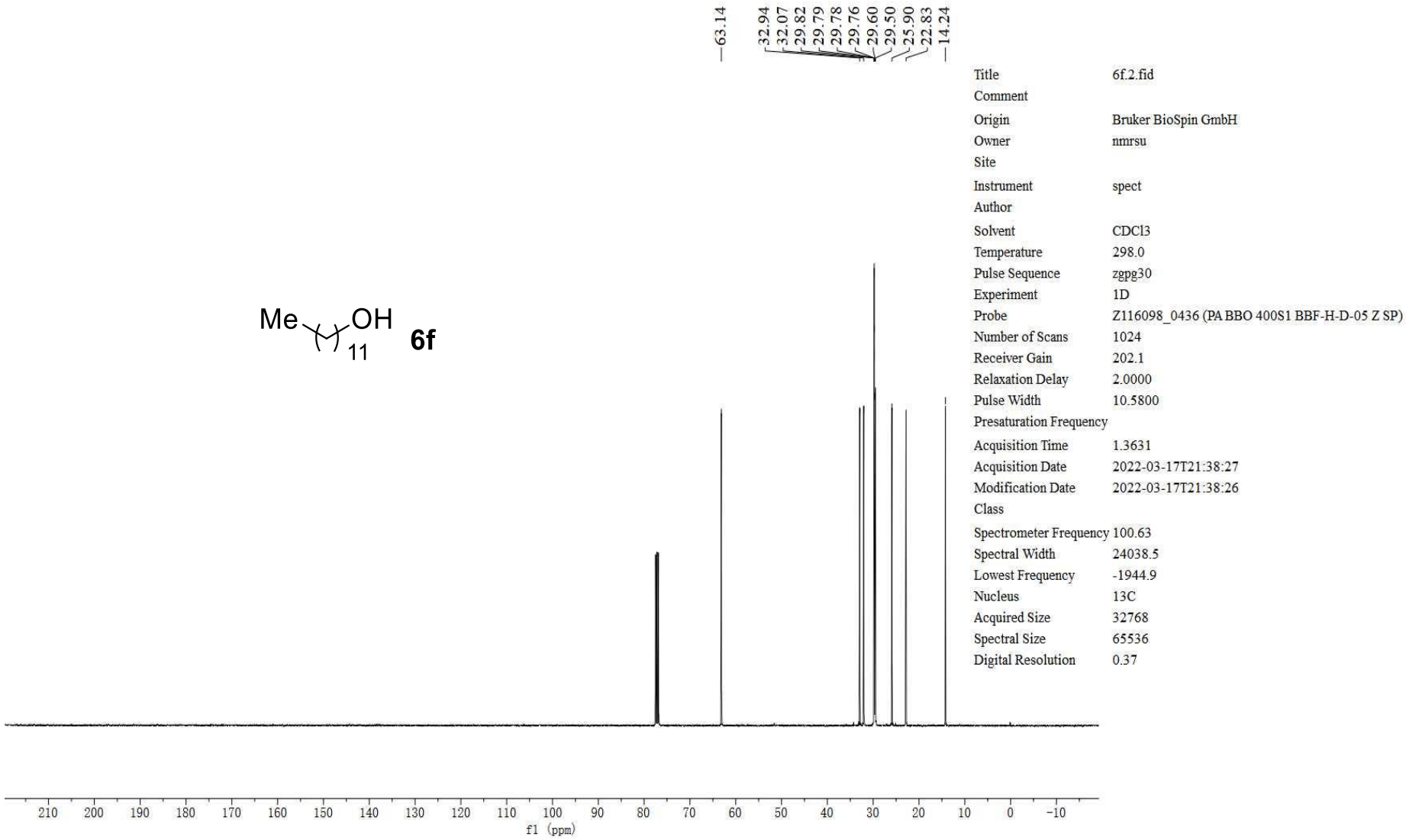

3.3853
3.3692
2.2615
1.7321
1.7049
1.6140
1.4679
1.4312
1.3867
1.2612
1.1663
1.1060
0.9341
0.8959
0.8331
OH
6d
Parameter Value
Title CR-B-55.3.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 14
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-10-15T13:07:18
Modification Date 2021-10-15T13:07:20
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
1.00
5.01
1.00
3.00
2.00
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 -1.0
f1 (ppm)

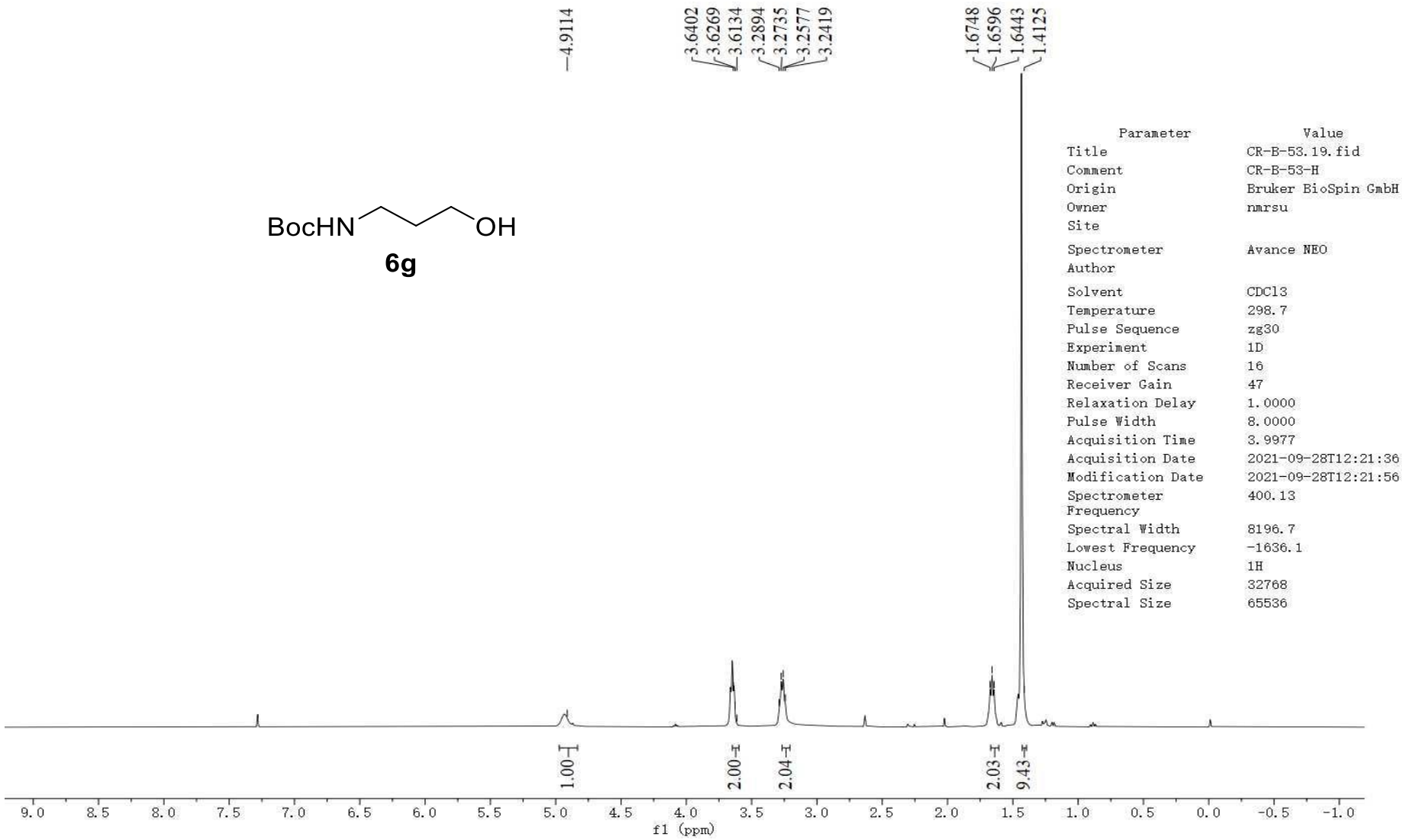

68.95
40.65
29.70
26.74
25.98
OH
6d
Parameter Value
Title CR-B-55.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-12T23:17:56
Modification Date 2021-10-12T23:17:58
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1943.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

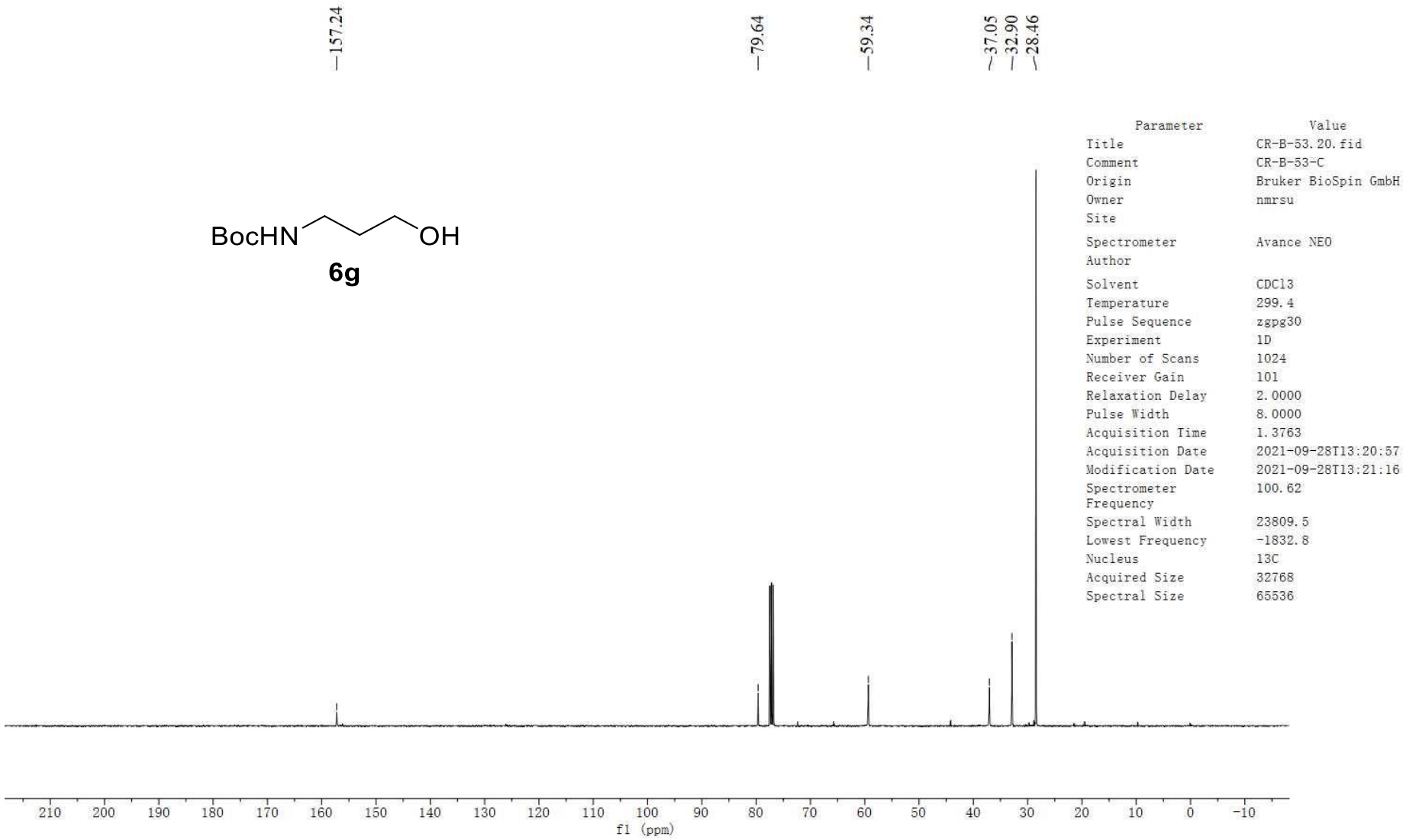

3.4996
3.4937
3.4852
2.1256
2.0980
2.0795
2.0522
2.0348
1.7624
1.7537
1.7323
1.7168
1.7076
1.7001
1.6015
1.5898
1.5650
1.5568
1.5539
1.5314
1.5243
1.5134
1.2455
1.2265
1.2159
1.1980
OH
6e
Title 6e.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 64.1
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2022-03-17T12:29:04
Modification Date 2022-03-17T12:29:04
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
2.00
1.00
2.13
4.18
2.02
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 -1.0
f1 (ppm)

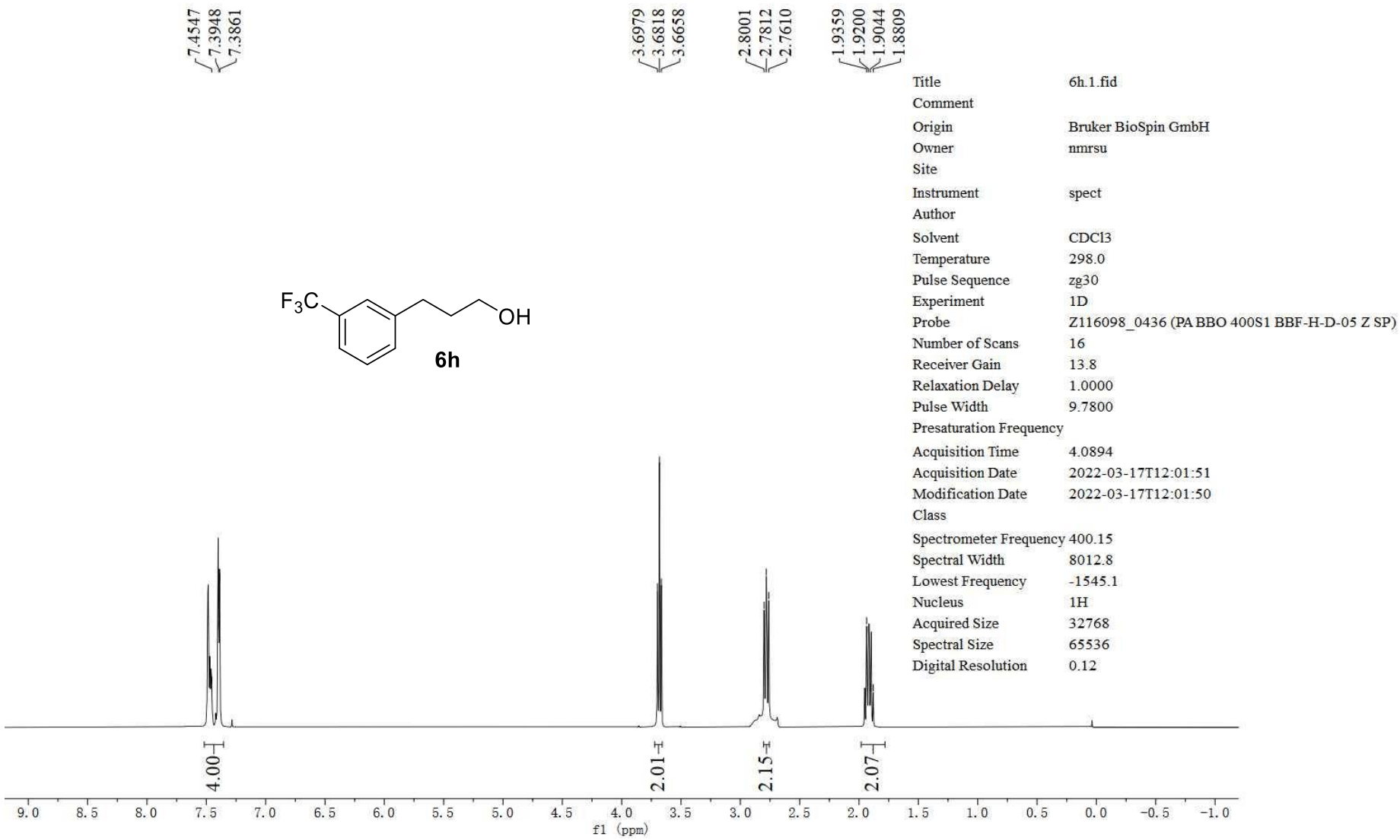

67.49
42.24
29.18
25.55
OH
6e
Title 6e.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 1024
Receiver Gain 202.1
Relaxation Delay 2.0000
Pulse Width 10.5800
Presaturation Frequency
Acquisition Time 1.3631
Acquisition Date 2022-03-18T04:25:38
Modification Date 2022-03-18T04:25:38
Class
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1945.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.37
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)

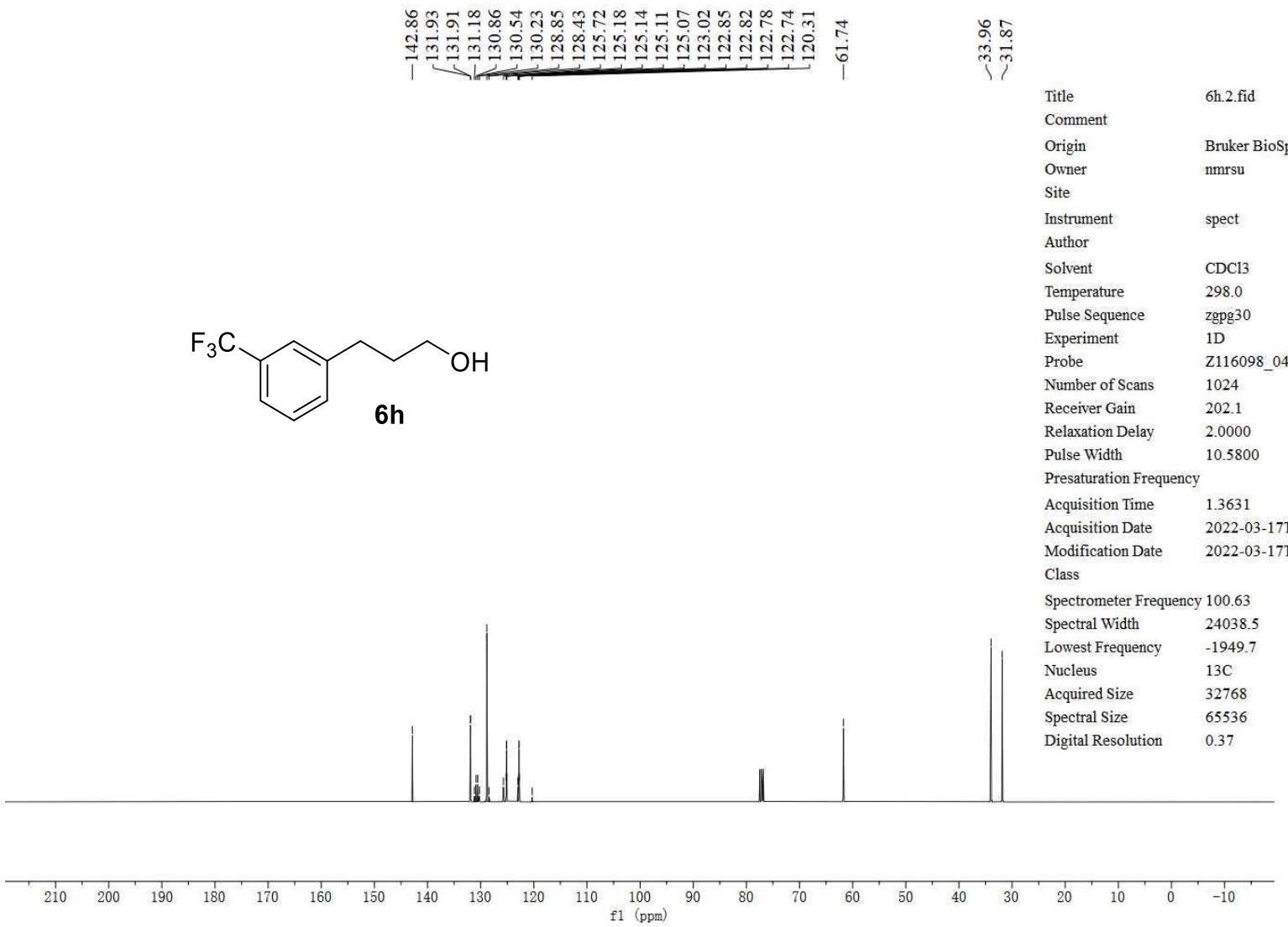

3.6354
3.6152
3.5984
1.7027
1.5679
1.5350
1.5153
1.4983
1.2762
1.2581
1.2339
0.8691
0.8530
0.8353
Me
OH
11
6f
Title 6f.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 17.2
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2022-03-17T11:56:31
Modification Date 2022-03-17T11:56:30
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
2.00
1.00
2.01
18.04
3.00
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 -1.0
f1 (ppm)

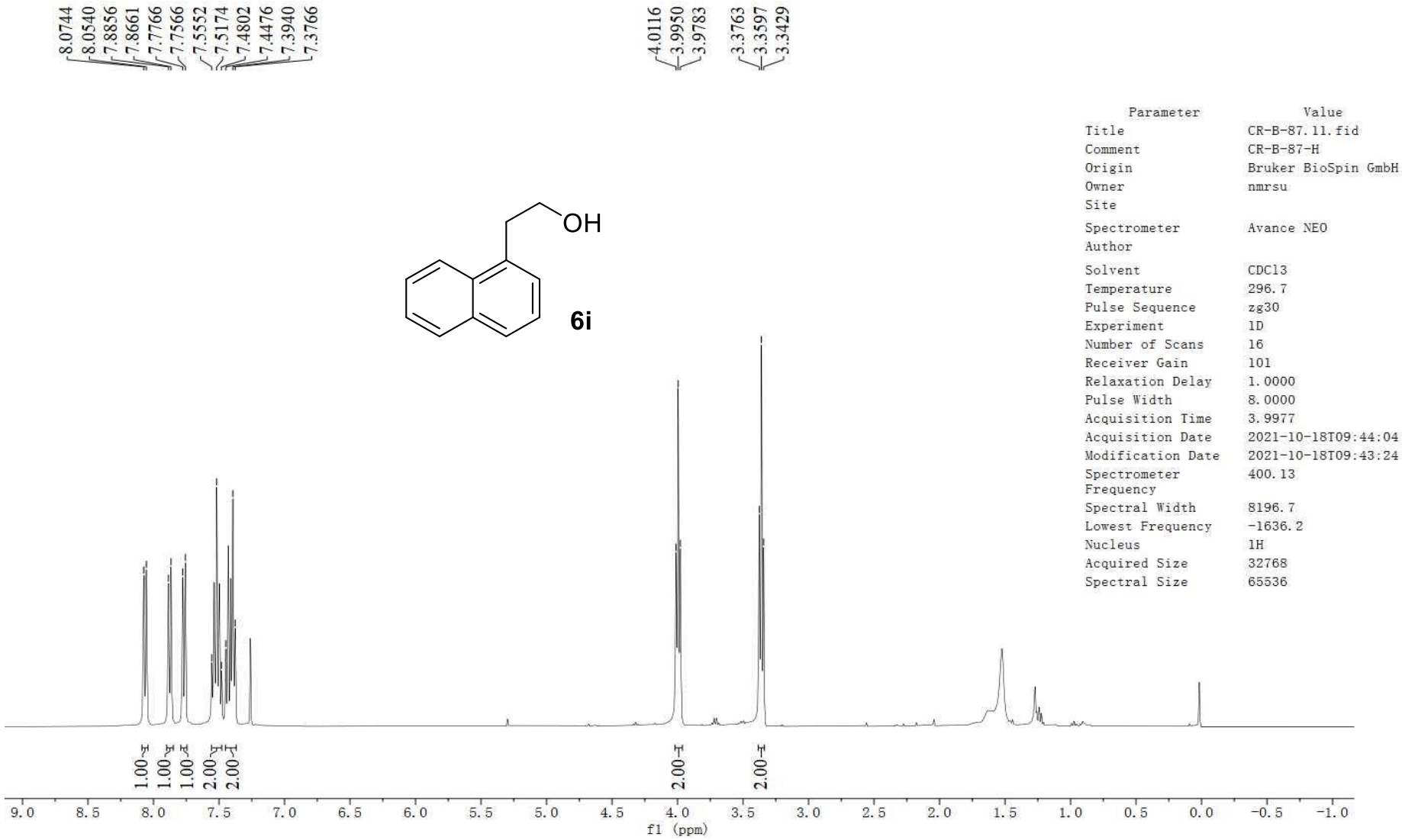

63.14
32.94
32.07
29.82
29.79
29.78
29.76
29.60
29.50
25.90
22.83
14.24
Me
OH
11
6f
Title 6f.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 1024
Receiver Gain 202.1
Relaxation Delay 2.0000
Pulse Width 10.5800
Presaturation Frequency
Acquisition Time 1.3631
Acquisition Date 2022-03-17T21:38:27
Modification Date 2022-03-17T21:38:26
Class
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1944.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.37
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)

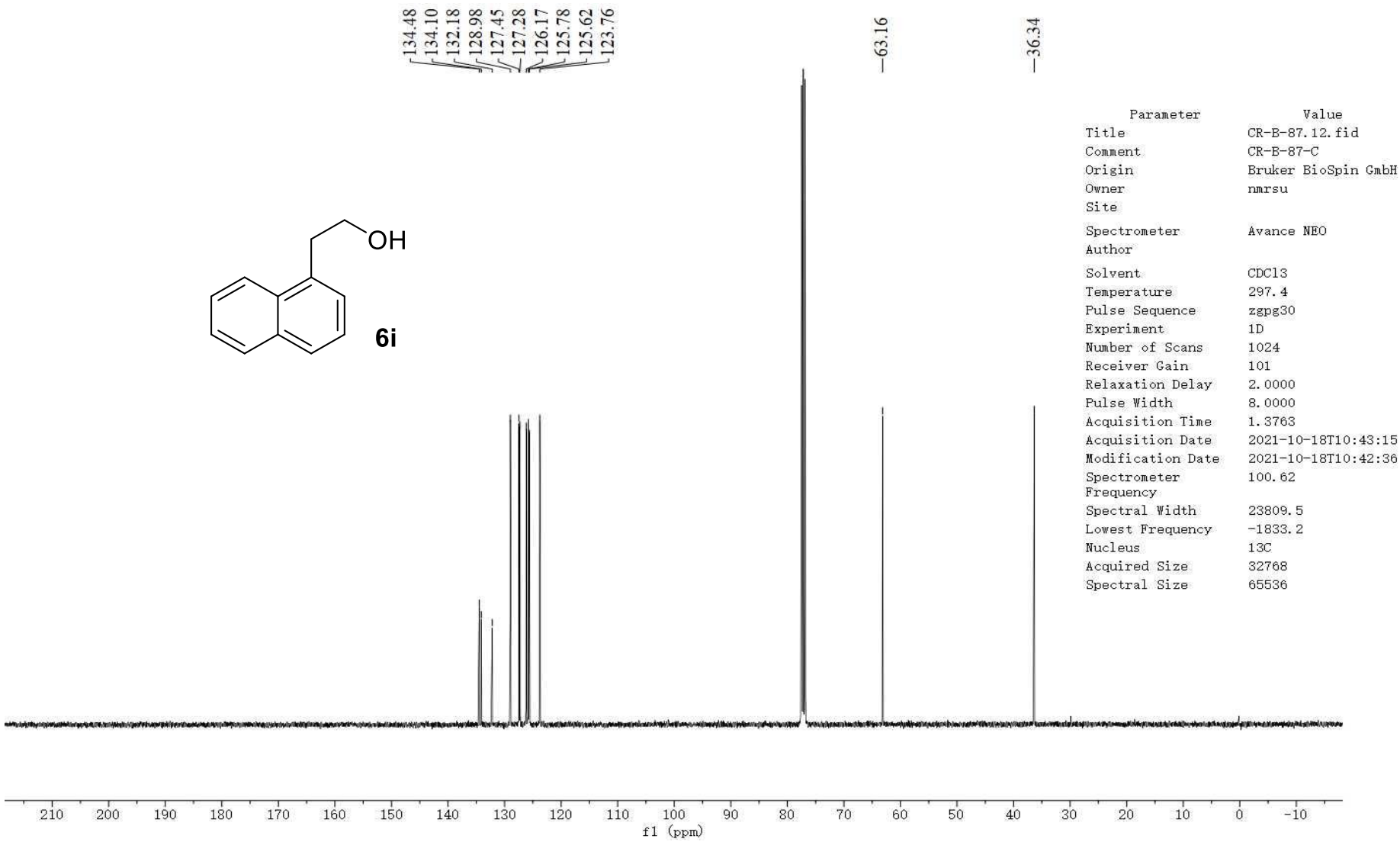

4.9114
3.6402
3.6269
3.6134
3.2894
3.2735
3.2577
3.2419
1.6748
1.6596
1.6443
1.4125
BocHN
OH
6g
Parameter Value
Title CR-B-53.19.fid
Comment CR-B-53-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 298.7
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 47
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-09-28T12:21:36
Modification Date 2021-09-28T12:21:56
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.1
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
2.00
2.04
2.03
9.43
f1 (ppm)

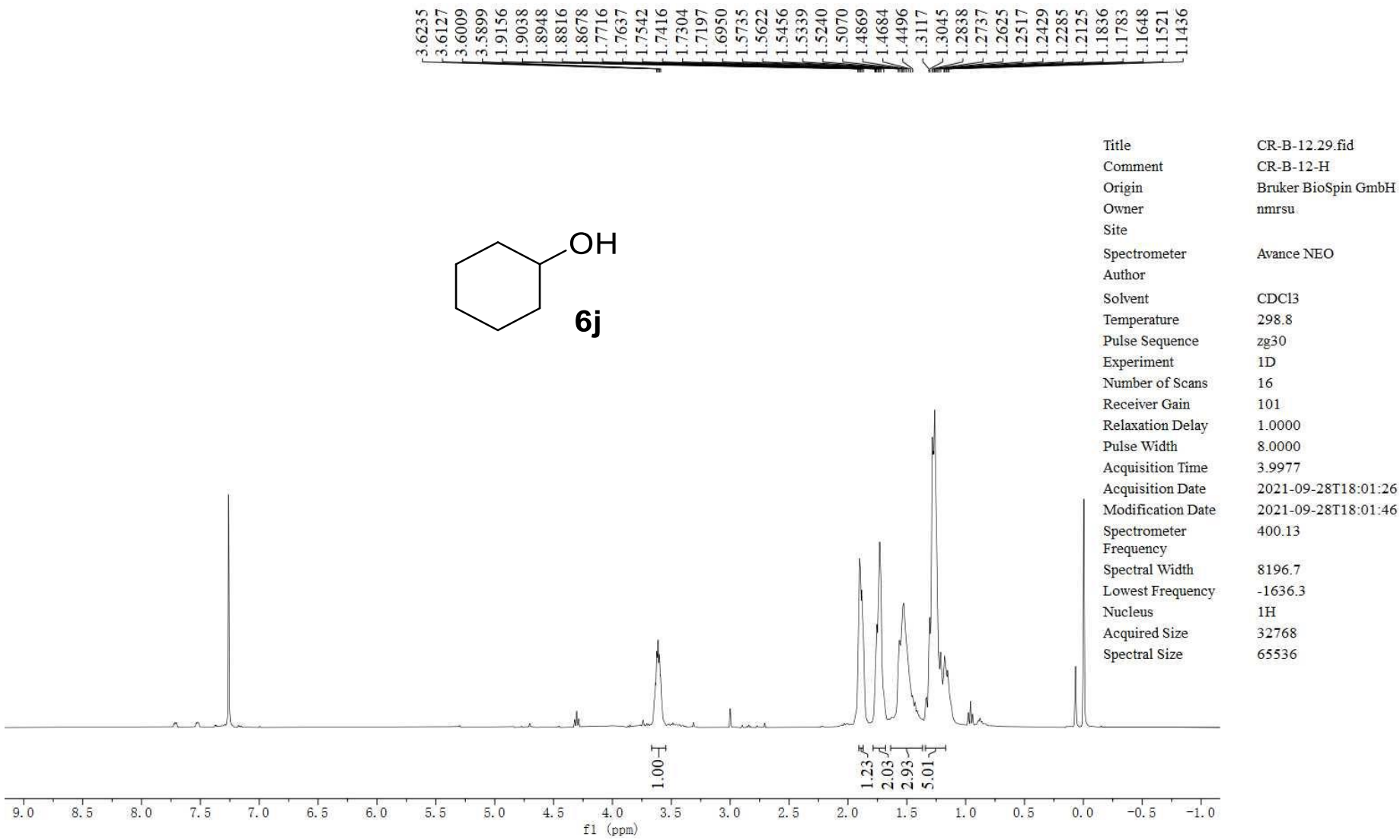

157.24
79.64
59.34
37.05
32.90
28.46
BocHN
OH
6g
Parameter Value
Title CR-B-53.20.fid
Comment CR-B-53-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 299.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-09-28T13:20:57
Modification Date 2021-09-28T13:21:16
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1832.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

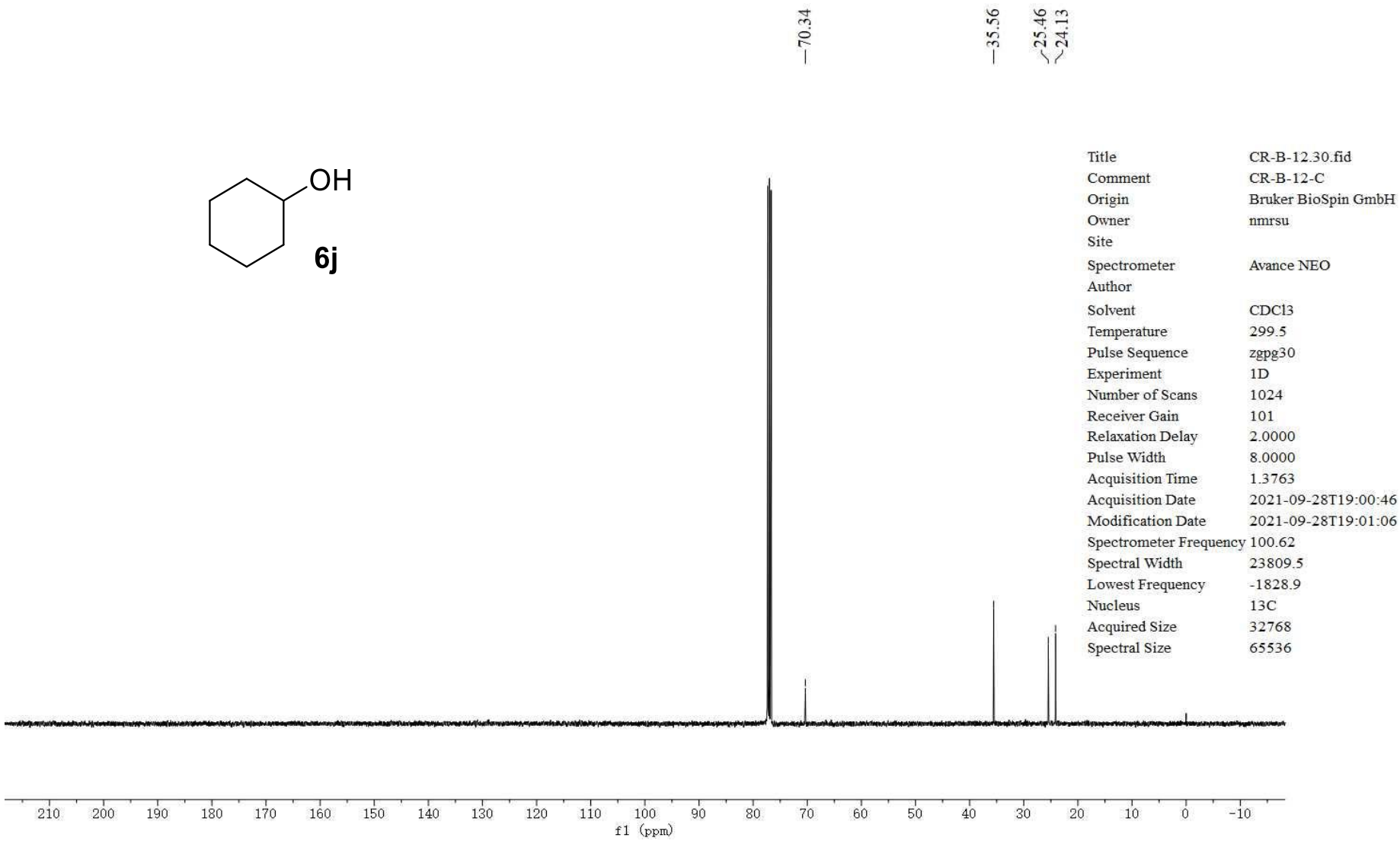

7.4547
7.3948
7.3861
3.6979
3.6818
3.6658
2.8001
2.7812
2.7610
1.9359
1.9200
1.9044
1.8809
F3C
OH
6h
Title 6h.1.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 16
Receiver Gain 13.8
Relaxation Delay 1.0000
Pulse Width 9.7800
Presaturation Frequency
Acquisition Time 4.0894
Acquisition Date 2022-03-17T12:01:51
Modification Date 2022-03-17T12:01:50
Class
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.1
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.12
4.00
2.01
2.15
2.07
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 -1.0
f1 (ppm)

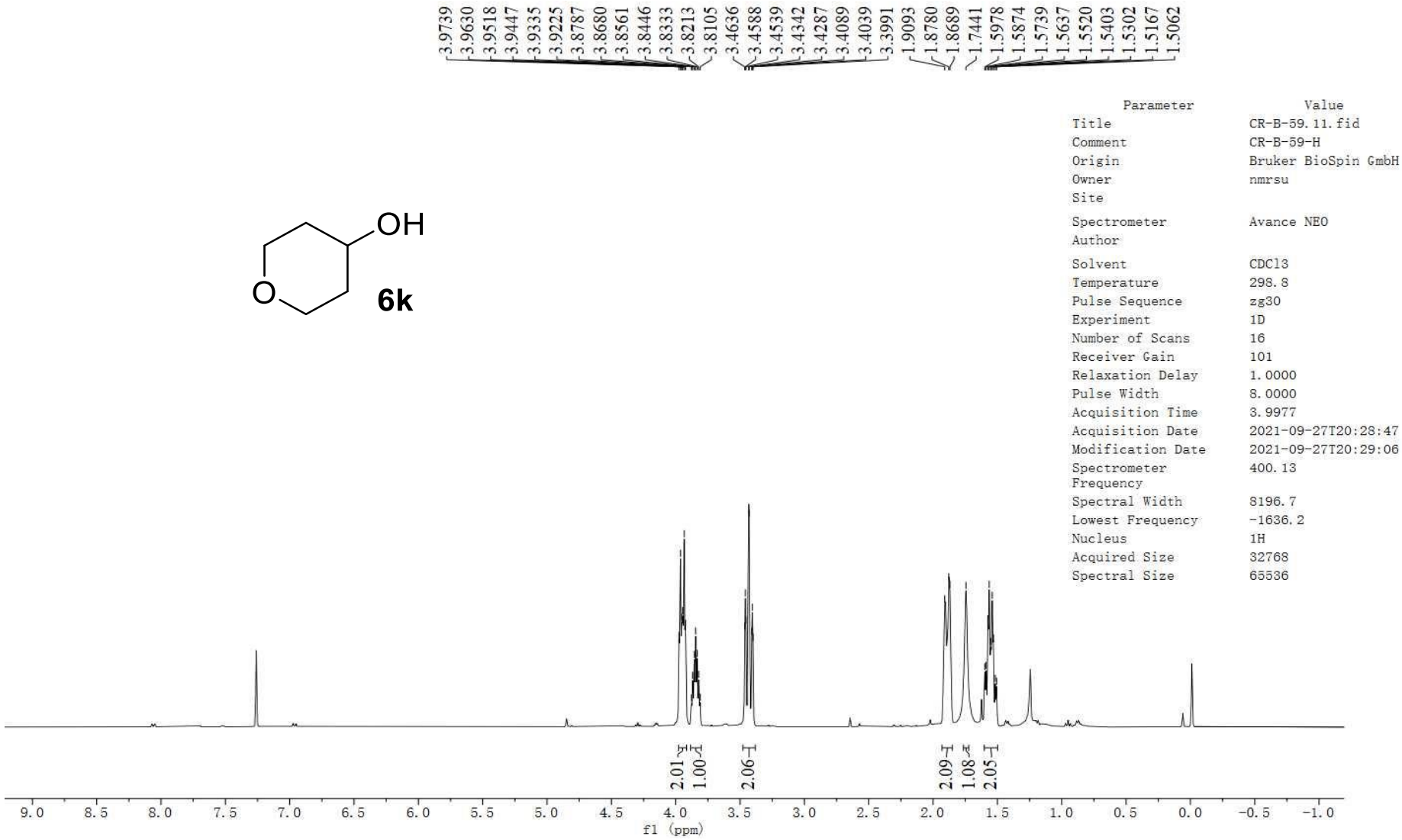

142.86
131.93
131.91
131.18
130.86
130.54
130.23
128.85
128.43
125.72
125.18
125.14
125.11
125.07
123.02
122.85
122.82
122.78
122.74
120.31
61.74
33.96
31.87
F3C
OH
6h
Title 6h.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Instrument spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Probe Z116098_0436 (PA BBO 400S1 BBF-H-D-05 Z SP)
Number of Scans 1024
Receiver Gain 202.1
Relaxation Delay 2.0000
Pulse Width 10.5800
Presaturation Frequency
Acquisition Time 1.3631
Acquisition Date 2022-03-17T22:59:55
Modification Date 2022-03-17T22:59:54
Class
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1949.7
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
Digital Resolution 0.37
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)

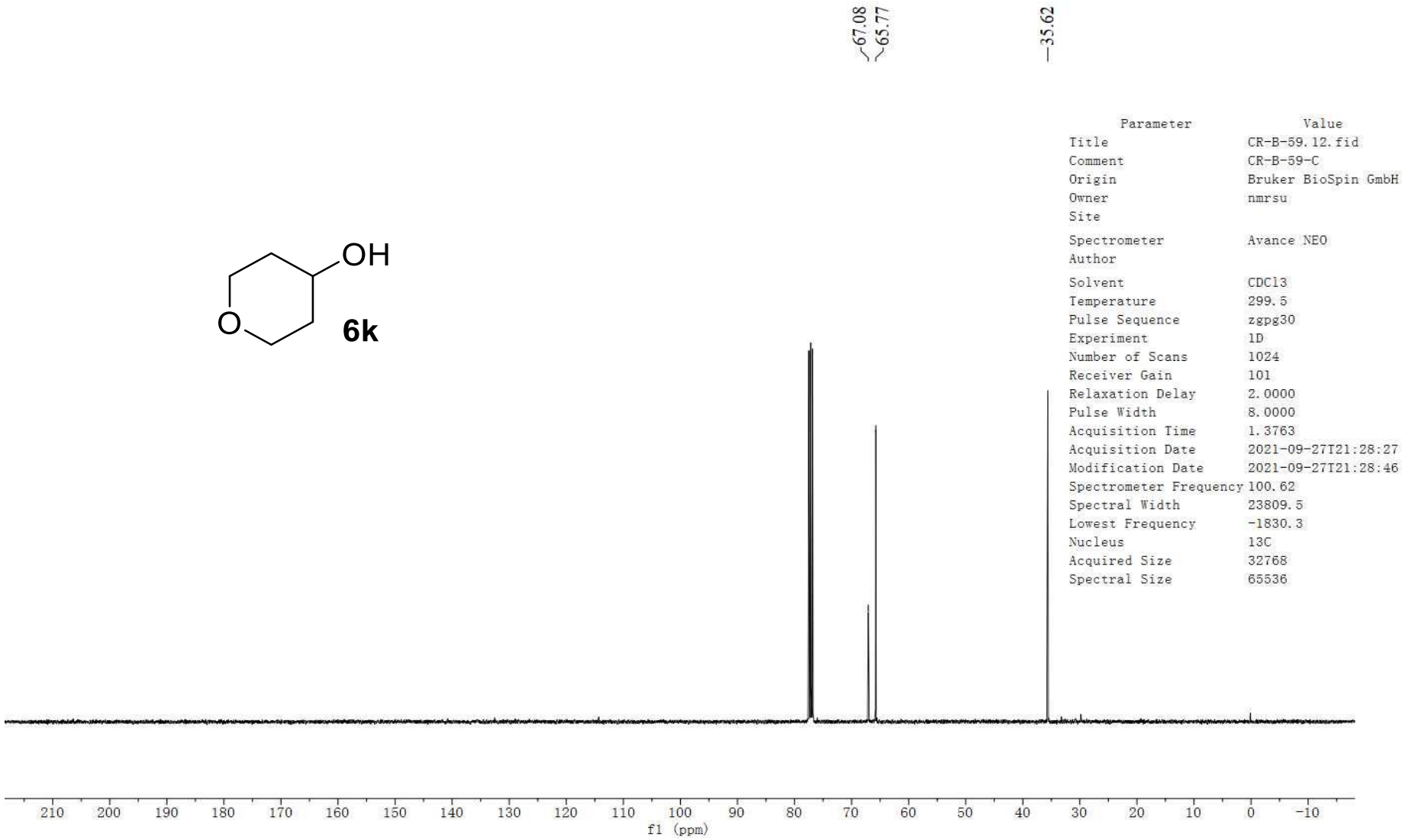

8.0744
8.0540
7.8856
7.8661
7.7766
7.7566
7.5552
7.5174
7.4802
7.4476
7.3940
7.3766
4.0116
3.9950
3.9783
3.3763
3.3597
3.3429
OH
6i
Parameter Value
Title CR-B-87.11.fid
Comment CR-B-87-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 296.7
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 101
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-10-18T09:44:04
Modification Date 2021-10-18T09:43:24
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.00
1.00
2.00
2.00
2.00
2.00
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 -1.0
f1 (ppm)

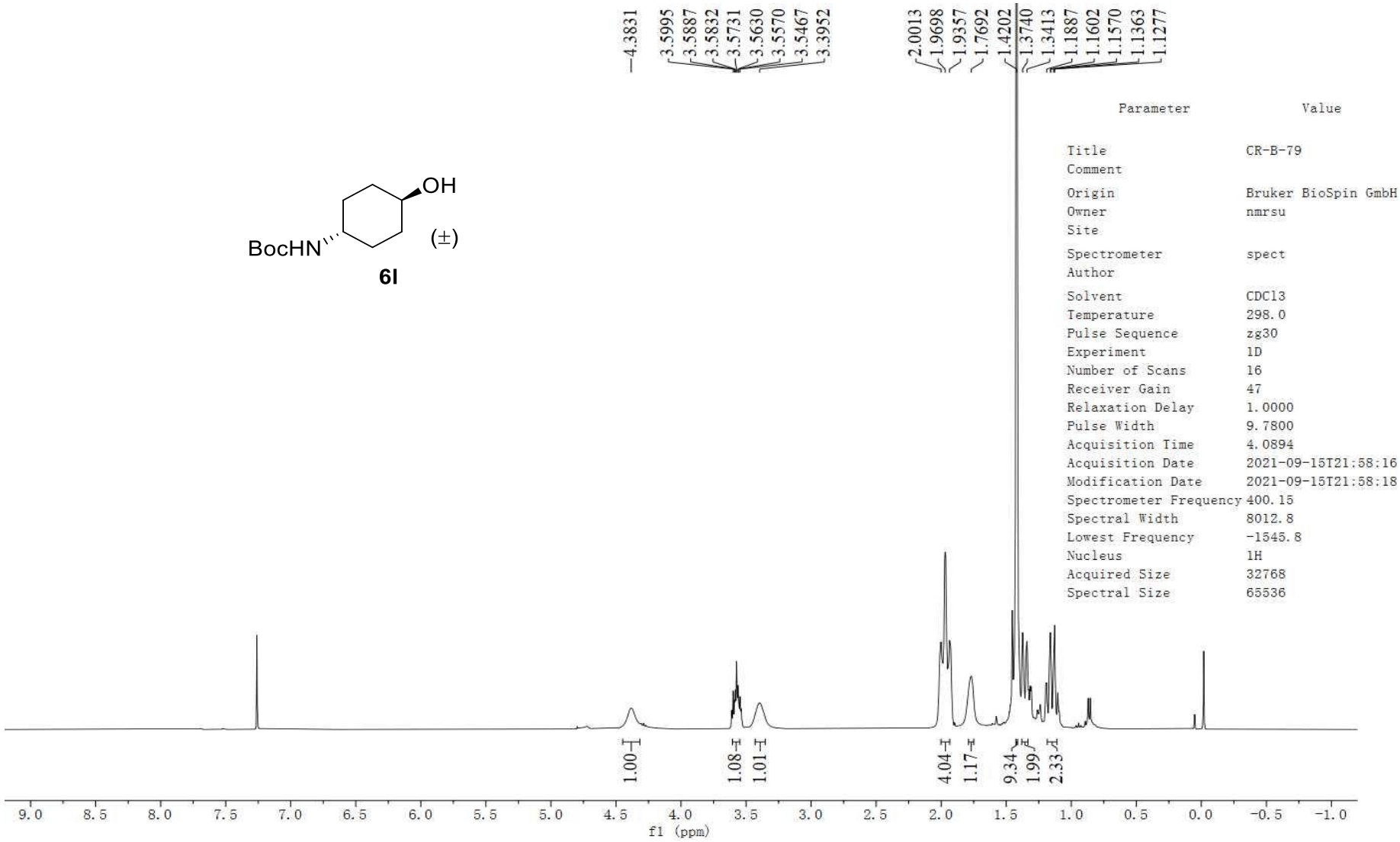

134.48
134.10
132.18
128.98
127.45
127.28
126.17
125.78
125.62
123.76
63.16
36.34
OH
6i
Parameter Value
Title CR-B-87.12.fid
Comment CR-B-87-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 297.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-10-18T10:43:15
Modification Date 2021-10-18T10:42:36
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1833.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

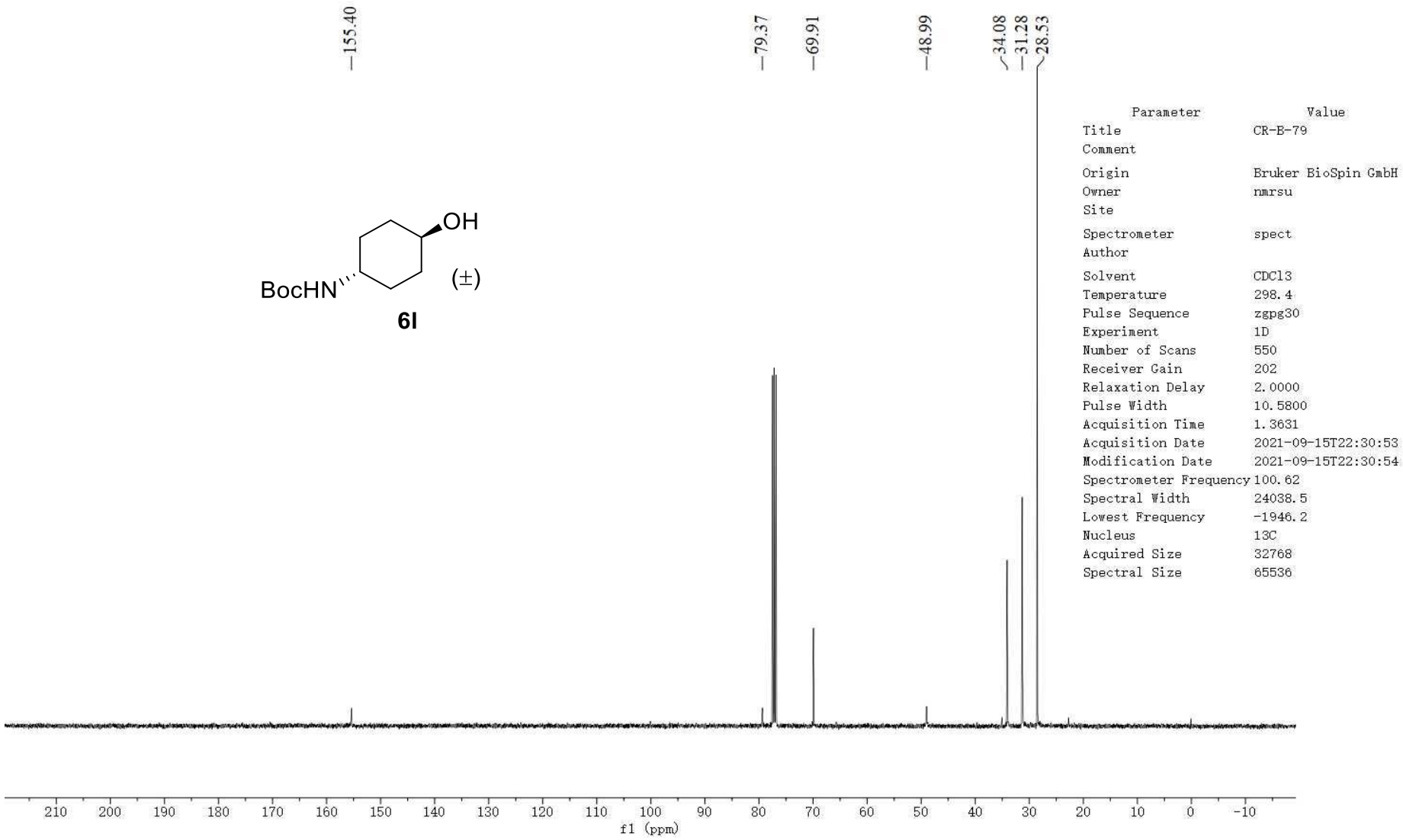

3.6235
3.6127
3.6009
3.5899
1.9156
1.9038
1.8948
1.8816
1.8678
1.7716
1.7637
1.7542
1.7416
1.7304
1.7197
1.6950
1.5735
1.5622
1.5456
1.5339
1.5240
1.5070
1.4869
1.4684
1.4496
1.3117
1.3045
1.2838
1.2737
1.2625
1.2517
1.2429
1.2285
1.2125
1.1836
1.1783
1.1648
1.1521
1.1436
OH
6j
Title CR-B-12.29.fid
Comment CR-B-12-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 298.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 101
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-09-28T18:01:26
Modification Date 2021-09-28T18:01:46
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.23
2.03
2.93
5.01
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 -1.0
f1 (ppm)

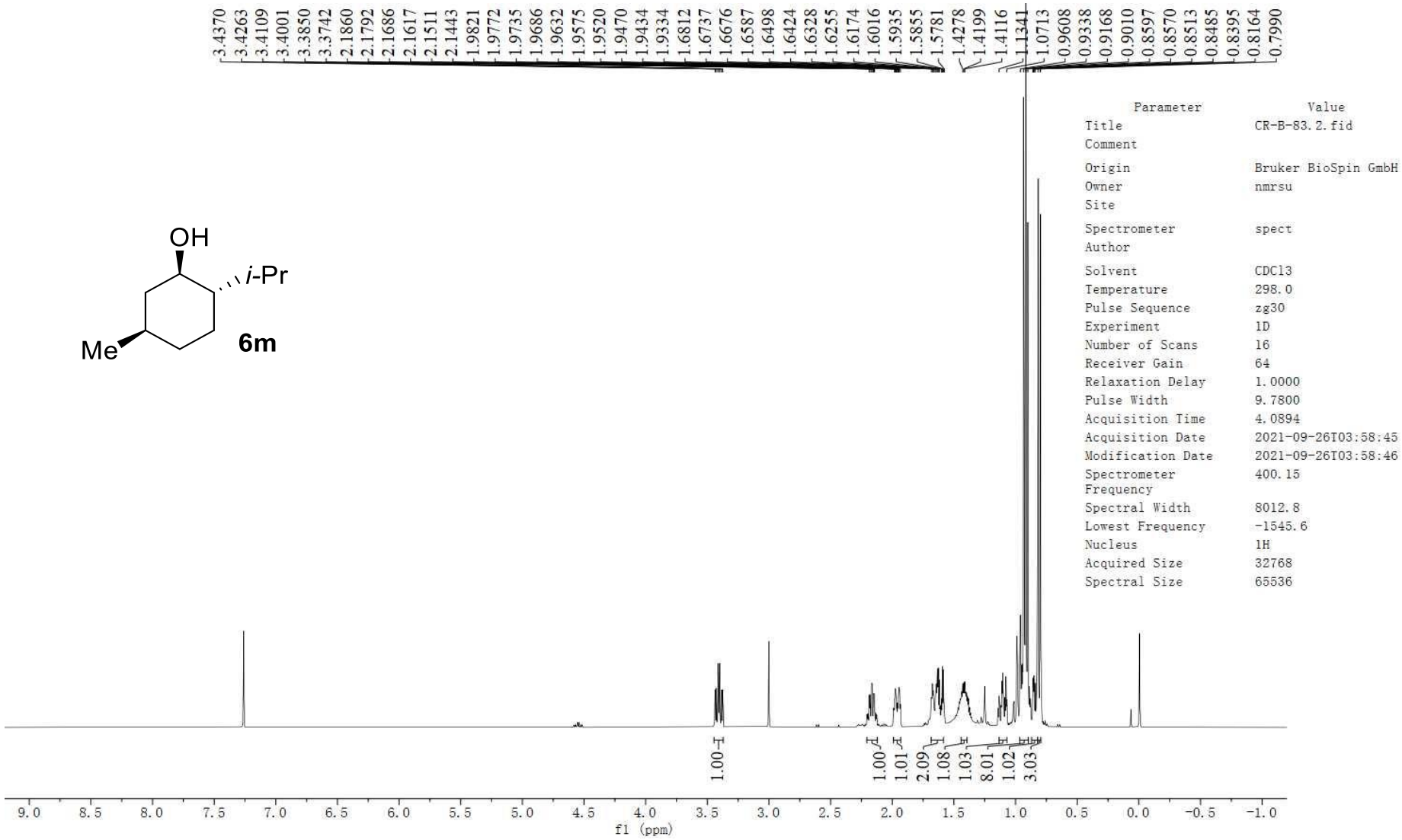

OH
6j
70.34
35.56
25.46
24.13
Title CR-B-12.30.fid
Comment CR-B-12-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 299.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-09-28T19:00:46
Modification Date 2021-09-28T19:01:06
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1828.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

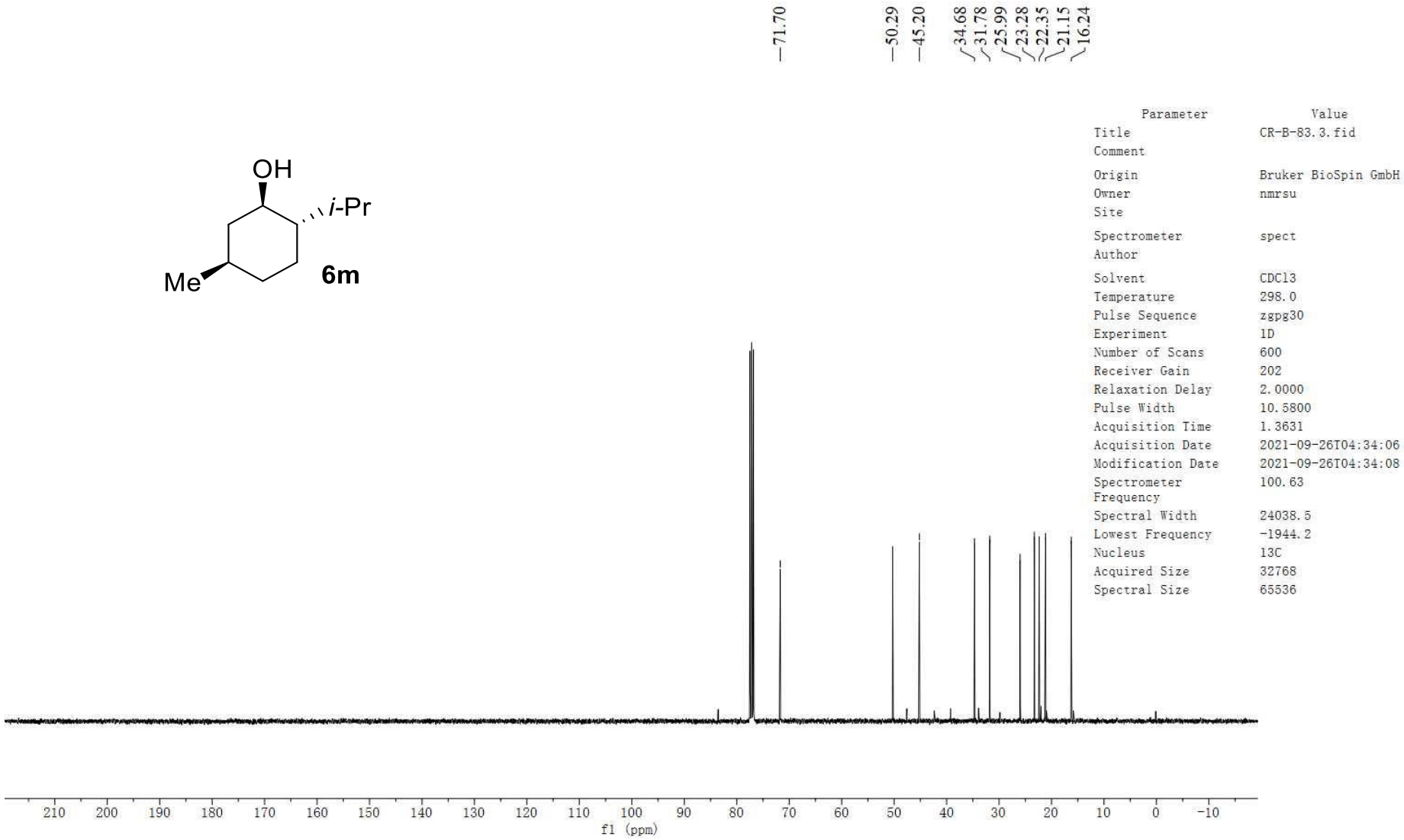

3.9739
3.9630
3.9518
3.9447
3.9335
3.9225
3.8787
3.8680
3.8561
3.8446
3.8333
3.8213
3.8105
3.4636
3.4588
3.4539
3.4342
3.4287
3.4089
3.4039
3.3991
1.9093
1.8780
1.8689
1.7441
1.5978
1.5874
1.5739
1.5637
1.5520
1.5403
1.5302
1.5167
1.5062
OH
O
6k
Parameter Value
Title CR-B-59.11.fid
Comment CR-B-59-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 298.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 101
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-09-27T20:28:47
Modification Date 2021-09-27T20:29:06
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.01
1.00
2.06
2.09
1.08
2.05
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 -1.0
f1 (ppm)

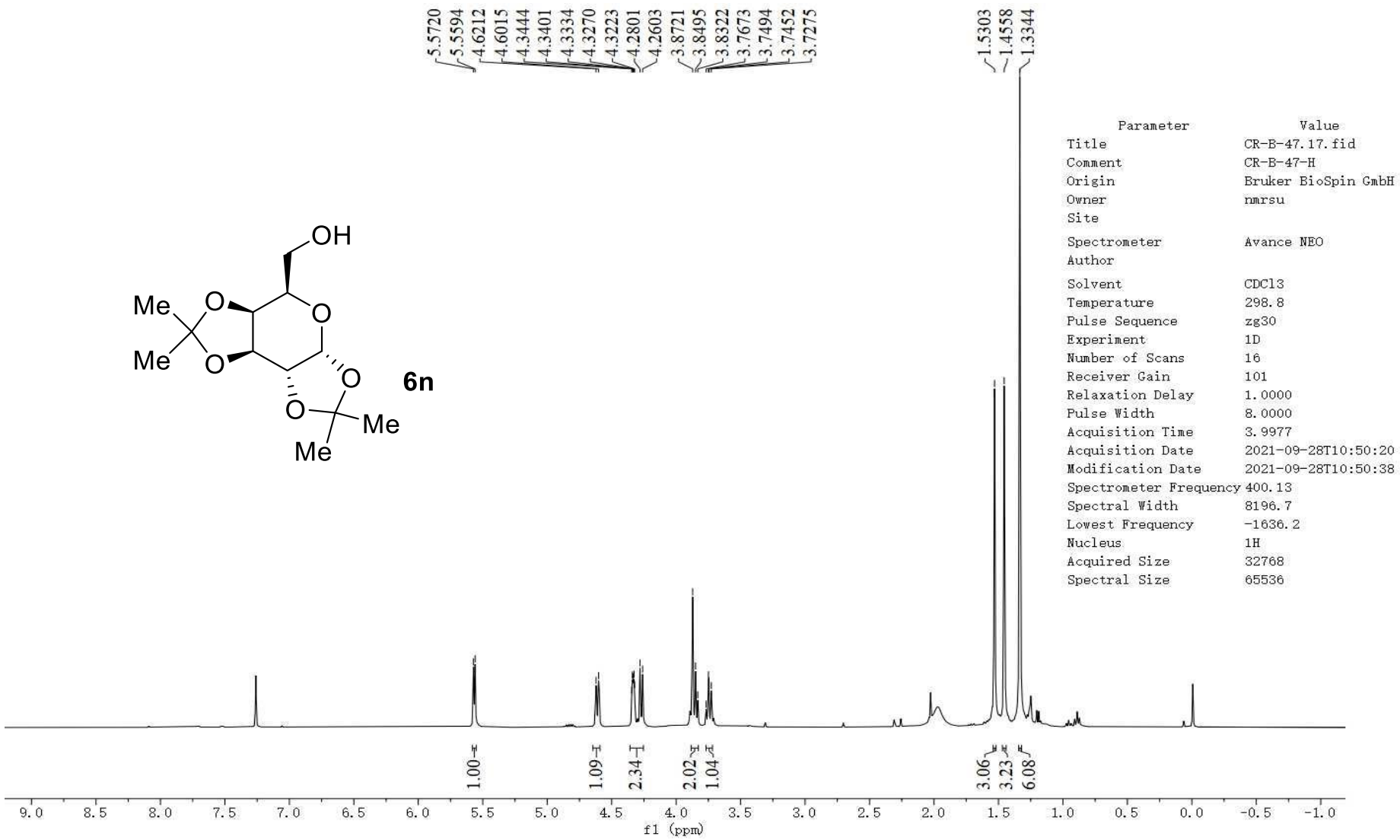

67.08
65.77
35.62
OH
O
6k
Parameter Value
Title CR-B-59.12.fid
Comment CR-B-59-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 299.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-09-27T21:28:27
Modification Date 2021-09-27T21:28:46
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1830.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

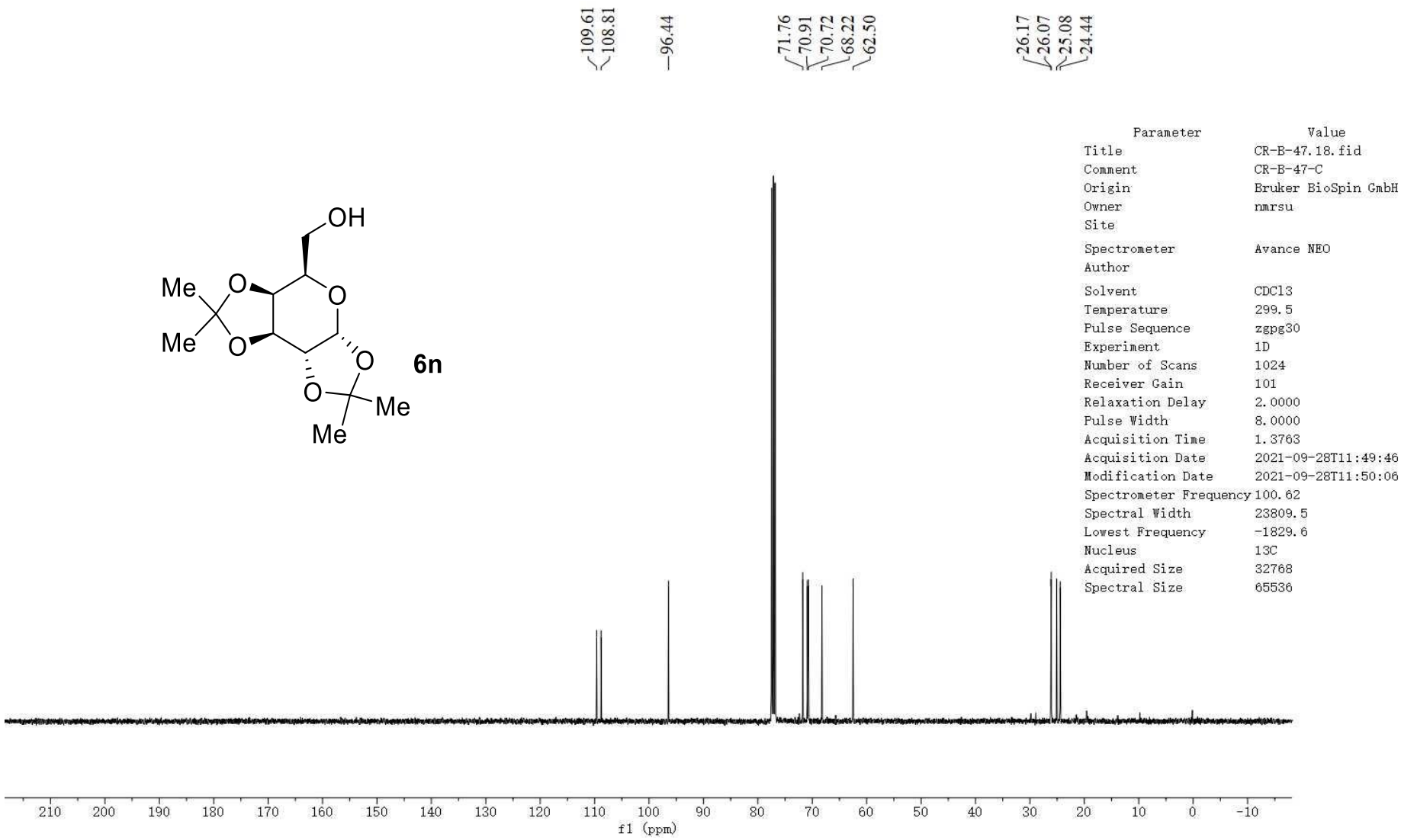

OH
BocHN
(±)
6l
4.3831
3.5995
3.5887
3.5832
3.5731
3.5630
3.5570
3.5467
3.3952
2.0013
1.9698
1.9357
1.7692
1.4202
1.3740
1.3413
1.1887
1.1602
1.1570
1.1363
1.1277
Parameter Value
Title CR-B-79
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 47
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-15T21:58:16
Modification Date 2021-09-15T21:58:18
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.08
1.01
4.04
1.17
9.34
1.99
2.33
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 -1.0
f1 (ppm)

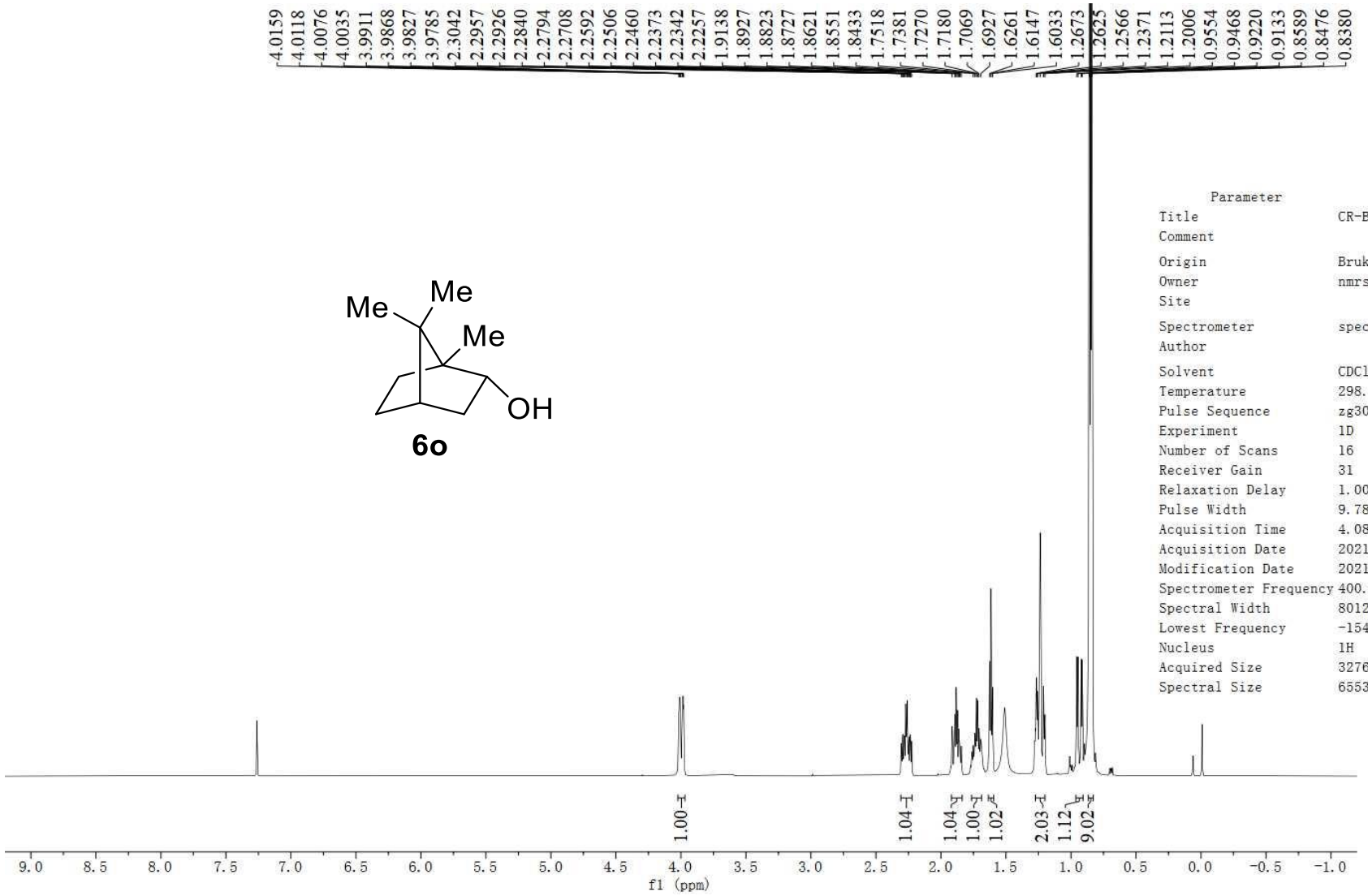

155.40
79.37
69.91
48.99
34.08
31.28
28.53
OH
BocHN
(±)
6l
Parameter Value
Title CR-B-79
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 550
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-15T22:30:53
Modification Date 2021-09-15T22:30:54
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1946.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

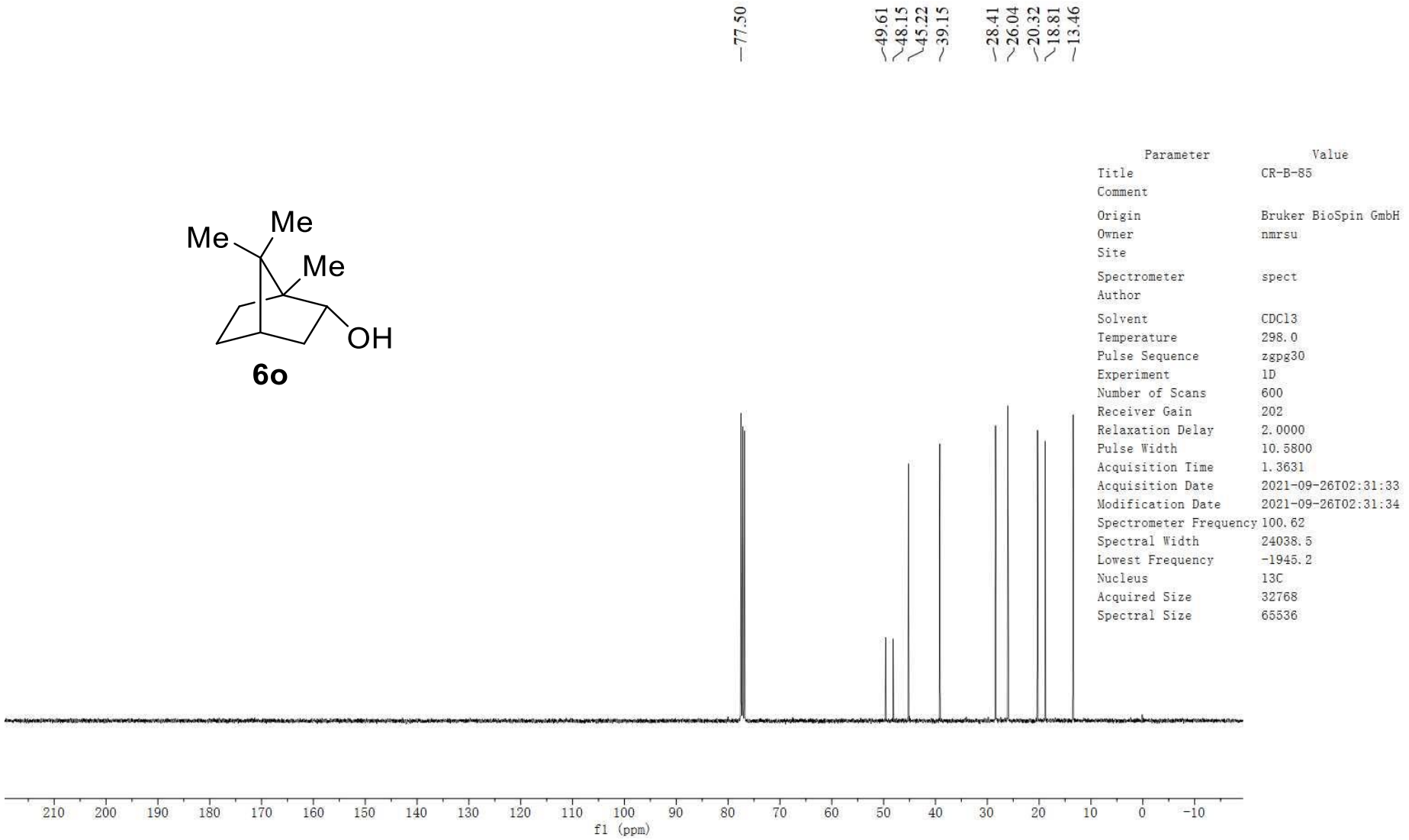

3.4370
3.4263
3.4109
3.4001
3.3850
3.3742
2.1860
2.1792
2.1686
2.1617
2.1511
2.1443
1.9821
1.9772
1.9735
1.9686
1.9632
1.9575
1.9520
1.9470
1.9434
1.9334
1.6812
1.6737
1.6676
1.6587
1.6498
1.6424
1.6328
1.6255
1.6174
1.6016
1.5935
1.5855
1.5781
1.4278
1.4199
1.4116
1.1341
1.0713
1.0608
0.9338
0.9168
0.9010
0.8597
0.8570
0.8513
0.8485
0.8395
0.8164
0.7990
OH
i-Pr
Me
6m
Parameter
Value
Title
CR-B-83.2.fid
Comment
Origin
Bruker BioSpin GmbH
Owner
nmrsu
Site
Spectrometer
spect
Author
Solvent
CDCl3
Temperature
298.0
Pulse Sequence
zg30
Experiment
1D
Number of Scans
16
Receiver Gain
64
Relaxation Delay
1.0000
Pulse Width
9.7800
Acquisition Time
4.0894
Acquisition Date
2021-09-26T03:58:45
Modification Date
2021-09-26T03:58:46
Spectrometer Frequency
400.15
Spectral Width
8012.8
Lowest Frequency
-1545.6
Nucleus
1H
Acquired Size
32768
Spectral Size
65536
1.00
1.00
1.01
2.09
1.08
1.03
8.01
1.02
3.03
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
-1.0
f1 (ppm)

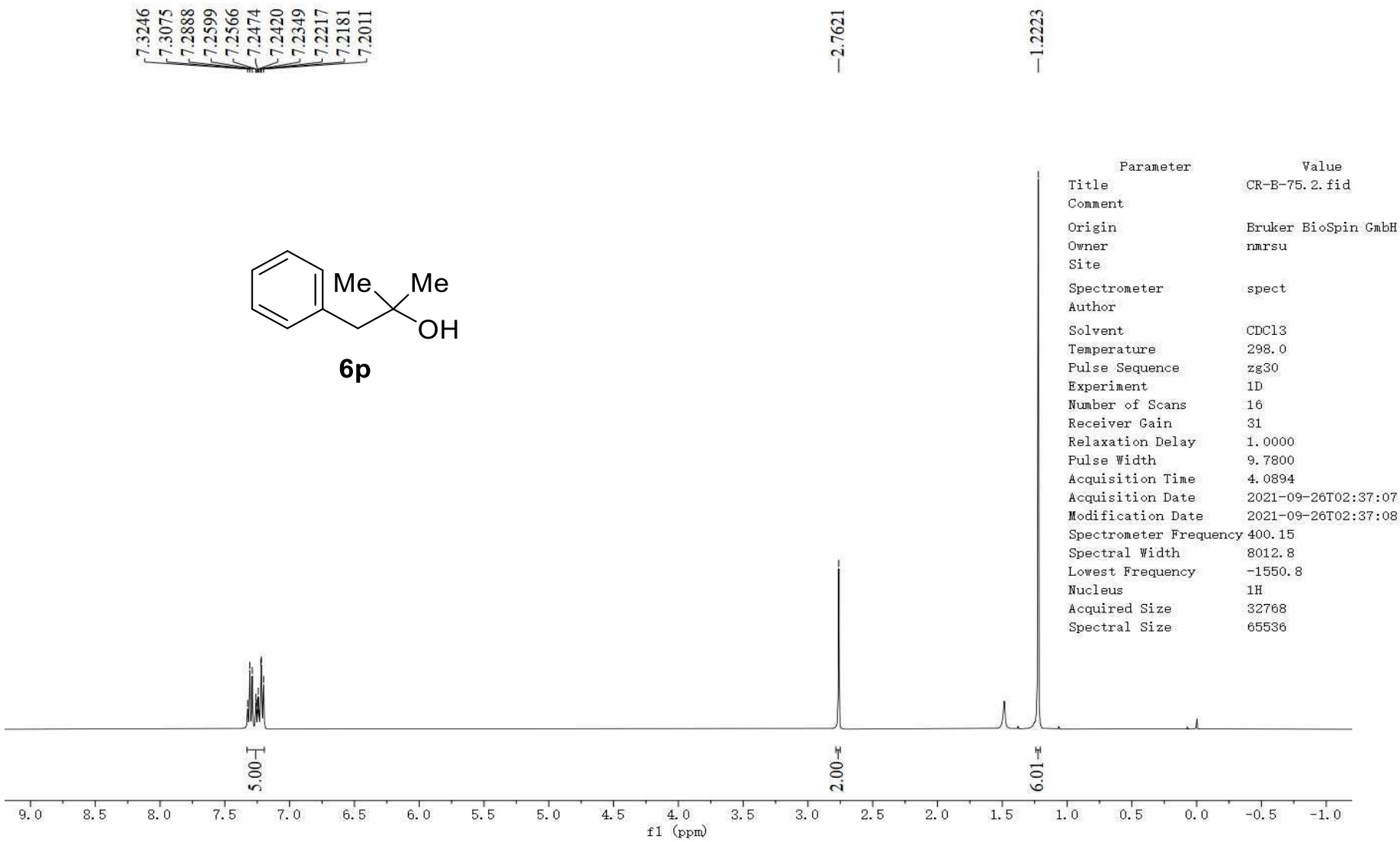

OH
i-Pr
Me
6m
71.70
50.29
45.20
34.68
31.78
25.99
23.28
22.35
21.15
16.24
Parameter Value
Title CR-B-83.3.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-26T04:34:06
Modification Date 2021-09-26T04:34:08
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1944.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

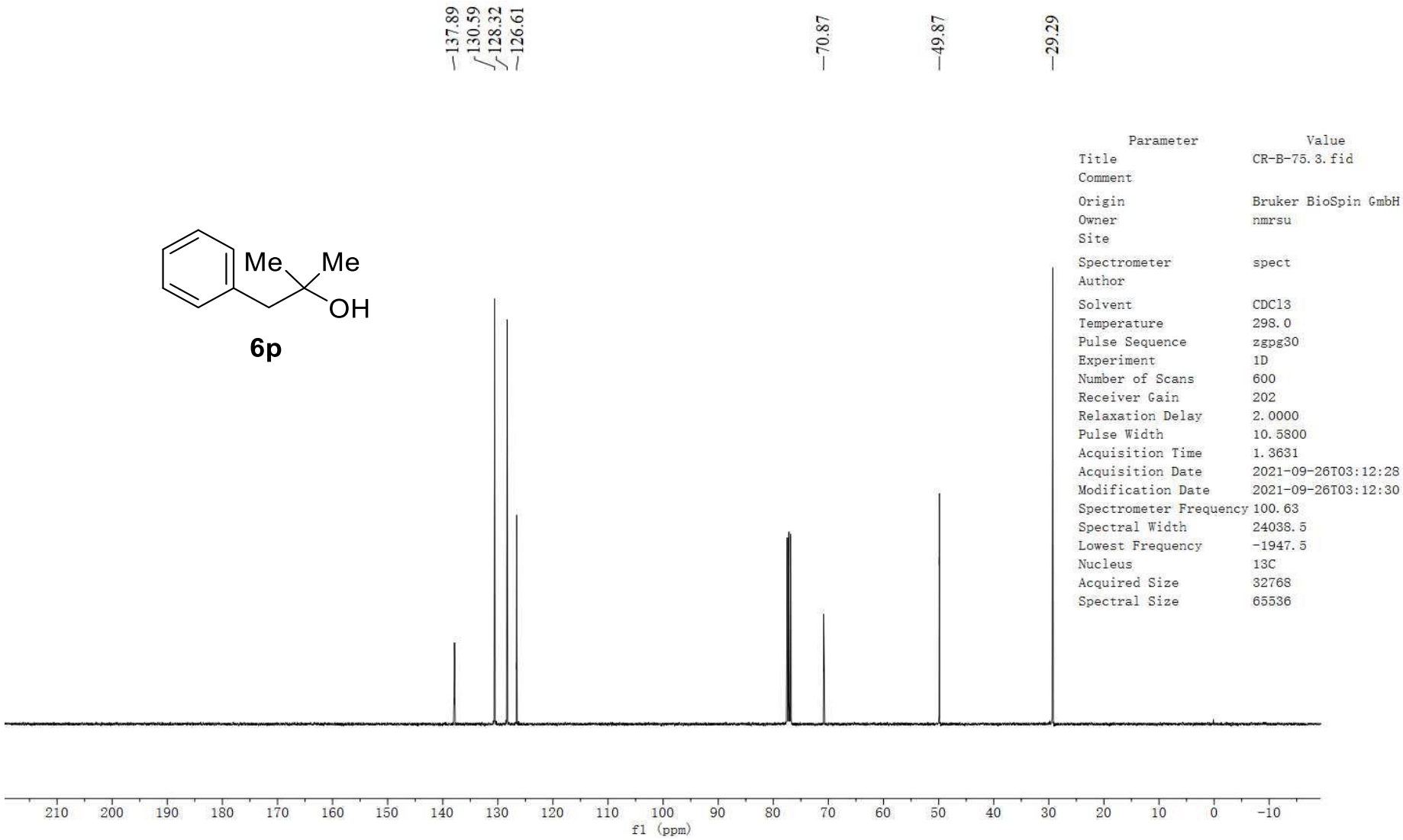

5.5720
5.5594
4.6212
4.6015
4.3444
4.3401
4.3334
4.3270
4.3223
4.2801
4.2603
3.8721
3.8495
3.8322
3.7673
3.7494
3.7452
3.7275
1.5303
1.4558
1.3344
OH
Me
Me
O
O
O
O
O
Me
Me
6n
Parameter Value
Title CR-B-47.17.fid
Comment CR-B-47-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 298.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 101
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-09-28T10:50:20
Modification Date 2021-09-28T10:50:38
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.2
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.09
2.34
2.02
1.04
3.06
3.23
6.08
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 -1.0
f1 (ppm)

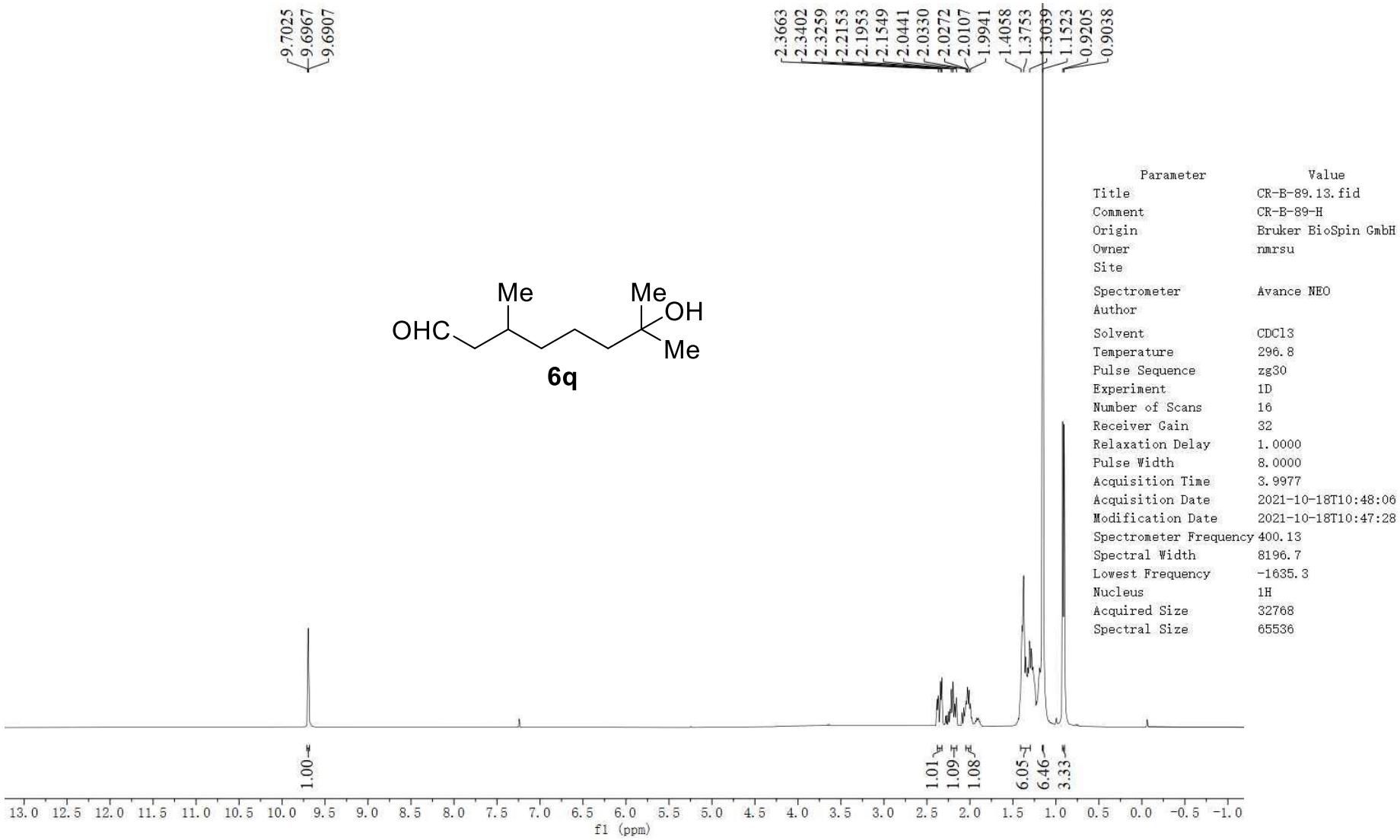

109.61
108.81
96.44
71.76
70.91
70.72
68.22
62.50
26.17
26.07
25.08
24.44
OH
Me
Me
Me
Me
O
O
O
O
O
6n
Parameter Value
Title CR-B-47.18.fid
Comment CR-B-47-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 299.5
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-09-28T11:49:46
Modification Date 2021-09-28T11:50:06
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1829.6
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

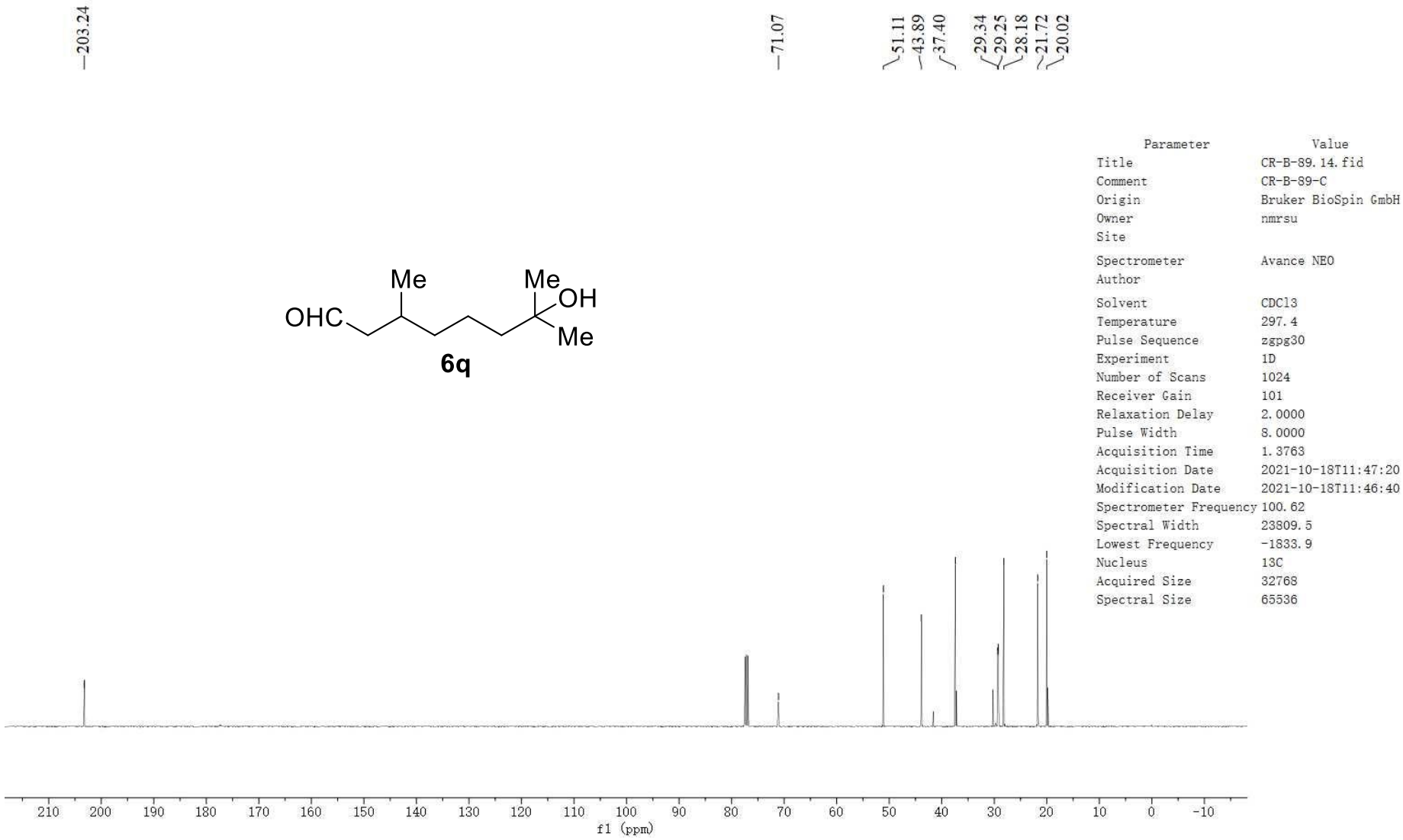

4.0159
4.0118
4.0076
4.0035
3.9911
3.9868
3.9827
3.9785
2.3042
2.2957
2.2926
2.2840
2.2794
2.2708
2.2592
2.2506
2.2460
2.2373
2.2342
2.2257
1.9138
1.8927
1.8823
1.8727
1.8621
1.8551
1.8433
1.7518
1.7381
1.7270
1.7180
1.7069
1.6927
1.6261
1.6147
1.6033
1.2673
1.2625
1.2566
1.2371
1.2113
1.2006
0.9554
0.9468
0.9220
0.9133
0.8589
0.8476
0.8380
Me
Me
Me
OH
6o
Parameter Value
Title CR-B-85
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-26T01:56:12
Modification Date 2021-09-26T01:56:14
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.04
1.04
1.00
1.02
2.03
1.12
9.02
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 -1.0
f1 (ppm)

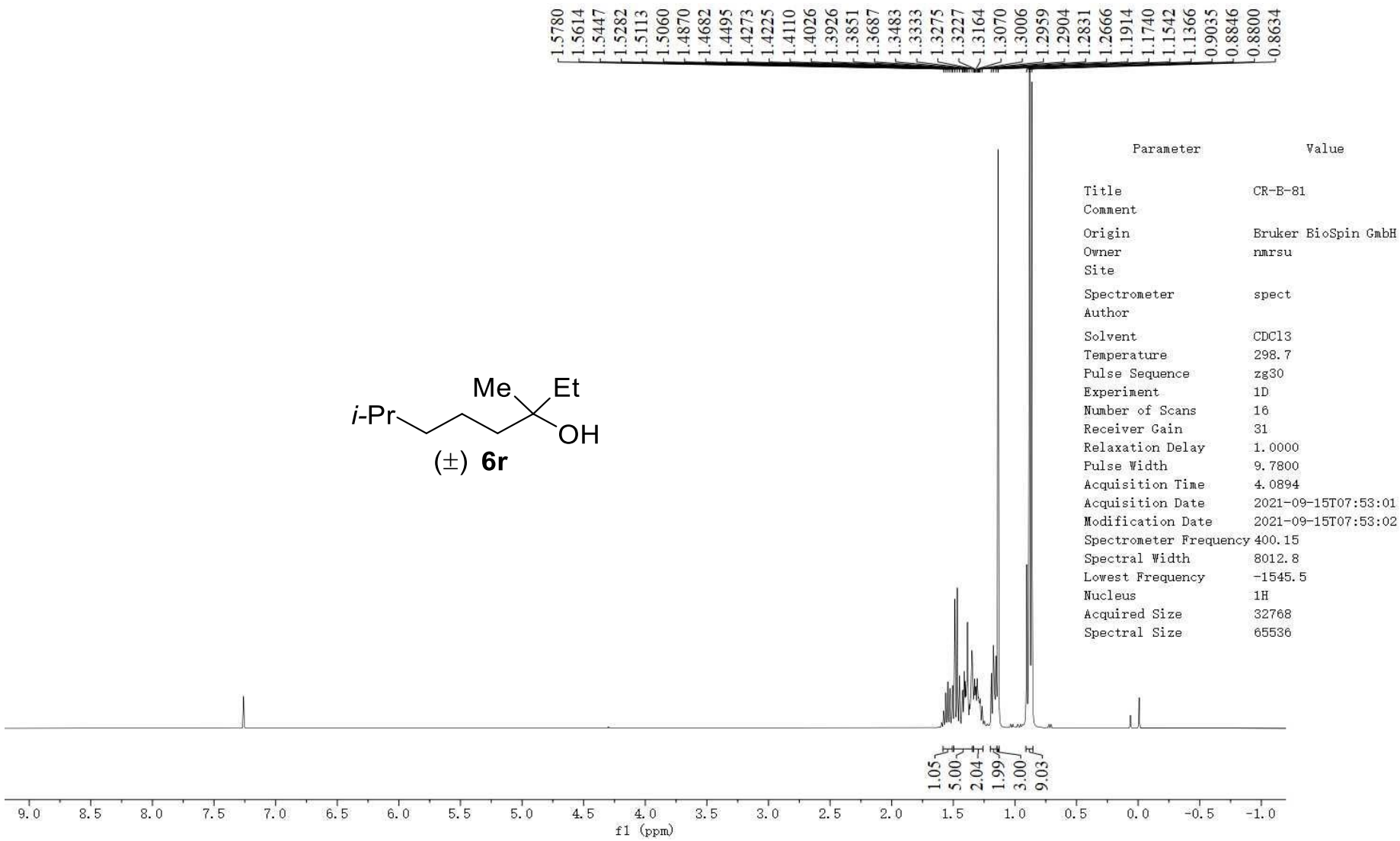

77.50
49.61
48.15
45.22
39.15
28.41
26.04
20.32
18.81
13.46
Me
Me
Me
OH
6o
Parameter Value
Title CR-B-85
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-26T02:31:33
Modification Date 2021-09-26T02:31:34
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1945.2
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

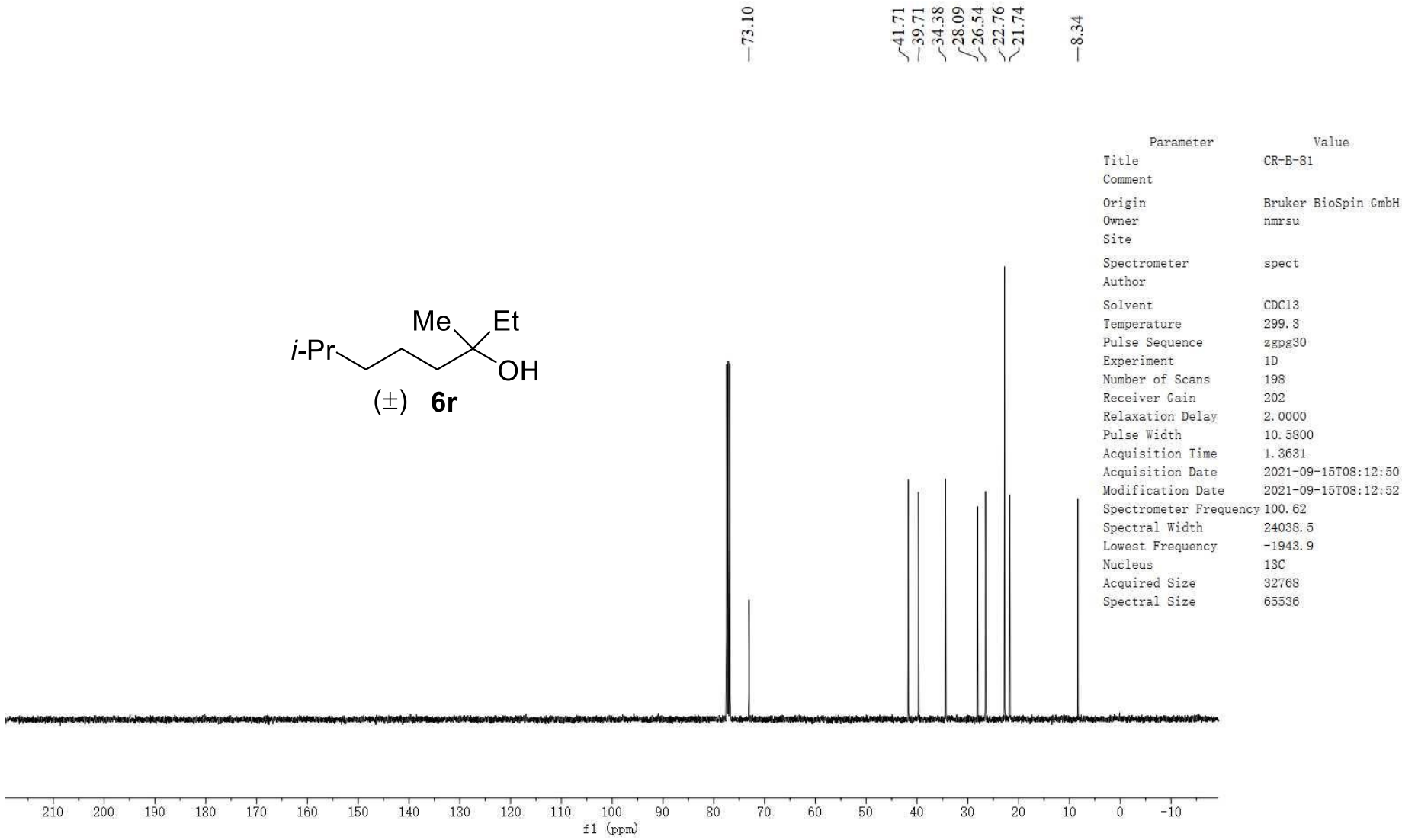

7.3246
7.3075
7.2888
7.2599
7.2566
7.2474
7.2420
7.2349
7.2217
7.2181
7.2011
2.7621
1.2223
Me
Me
OH
6p
Parameter Value
Title CR-B-75.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-26T02:37:07
Modification Date 2021-09-26T02:37:08
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1550.8
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
5.00
2.00
6.01
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 -1.0
f1 (ppm)

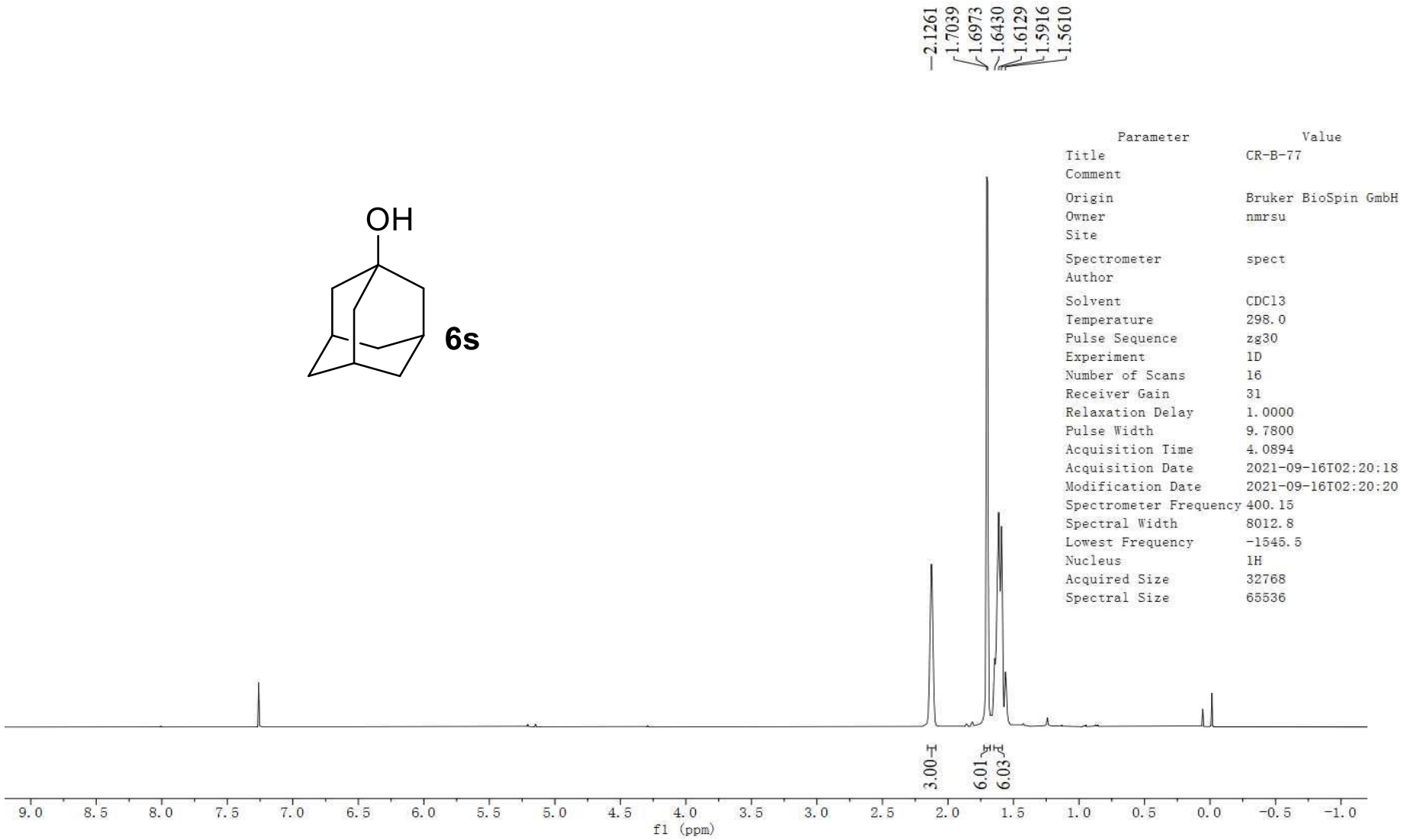

137.89
130.59
128.32
126.61
70.87
49.87
29.29
Me
Me
OH
6p
Parameter Value
Title CR-B-75.3.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 600
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-26T03:12:28
Modification Date 2021-09-26T03:12:30
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1947.5
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

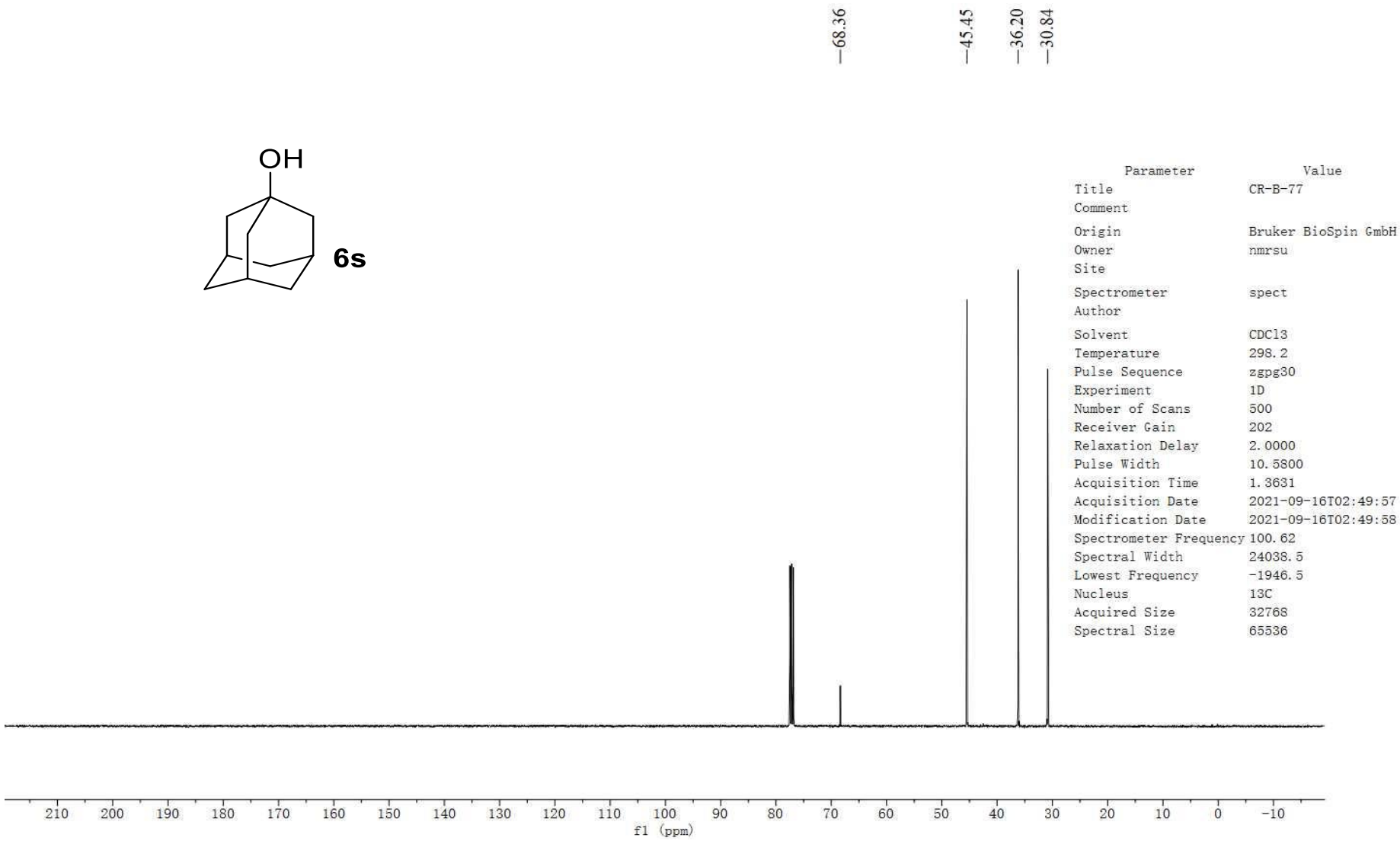

9.7025
9.6967
9.6907
2.3663
2.3402
2.3259
2.2153
2.1953
2.1549
2.0441
2.0330
2.0272
2.0107
1.9941
1.4058
1.3753
1.3039
1.1523
0.9205
0.9038
Me
Me
OH
OHC
Me
6q
Parameter Value
Title CR-B-89.13.fid
Comment CR-B-89-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 296.8
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 32
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-10-18T10:48:06
Modification Date 2021-10-18T10:47:28
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1635.3
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.01
1.09
1.08
6.05
6.46
3.33
13.0 12.5 12.0 11.5 11.0 10.5 10.0 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 -1.0
f1 (ppm)

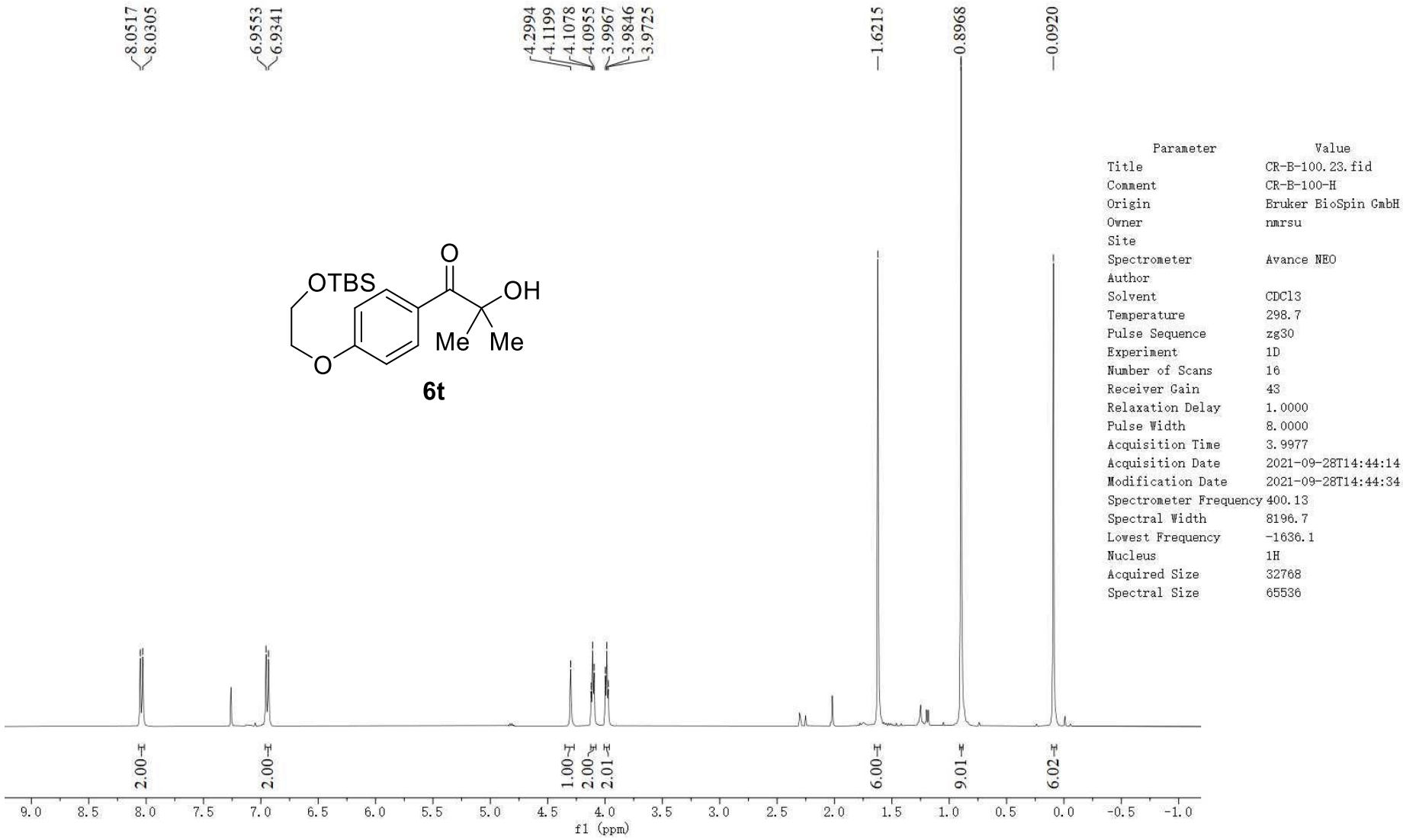

203.24
71.07
51.11
43.89
37.40
29.34
29.25
28.18
21.72
20.02
Me
Me
OH
OHC
Me
6q
Parameter Value
Title CR-B-89.14.fid
Comment CR-B-89-C
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 297.4
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 101
Relaxation Delay 2.0000
Pulse Width 8.0000
Acquisition Time 1.3763
Acquisition Date 2021-10-18T11:47:20
Modification Date 2021-10-18T11:46:40
Spectrometer Frequency 100.62
Spectral Width 23809.5
Lowest Frequency -1833.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

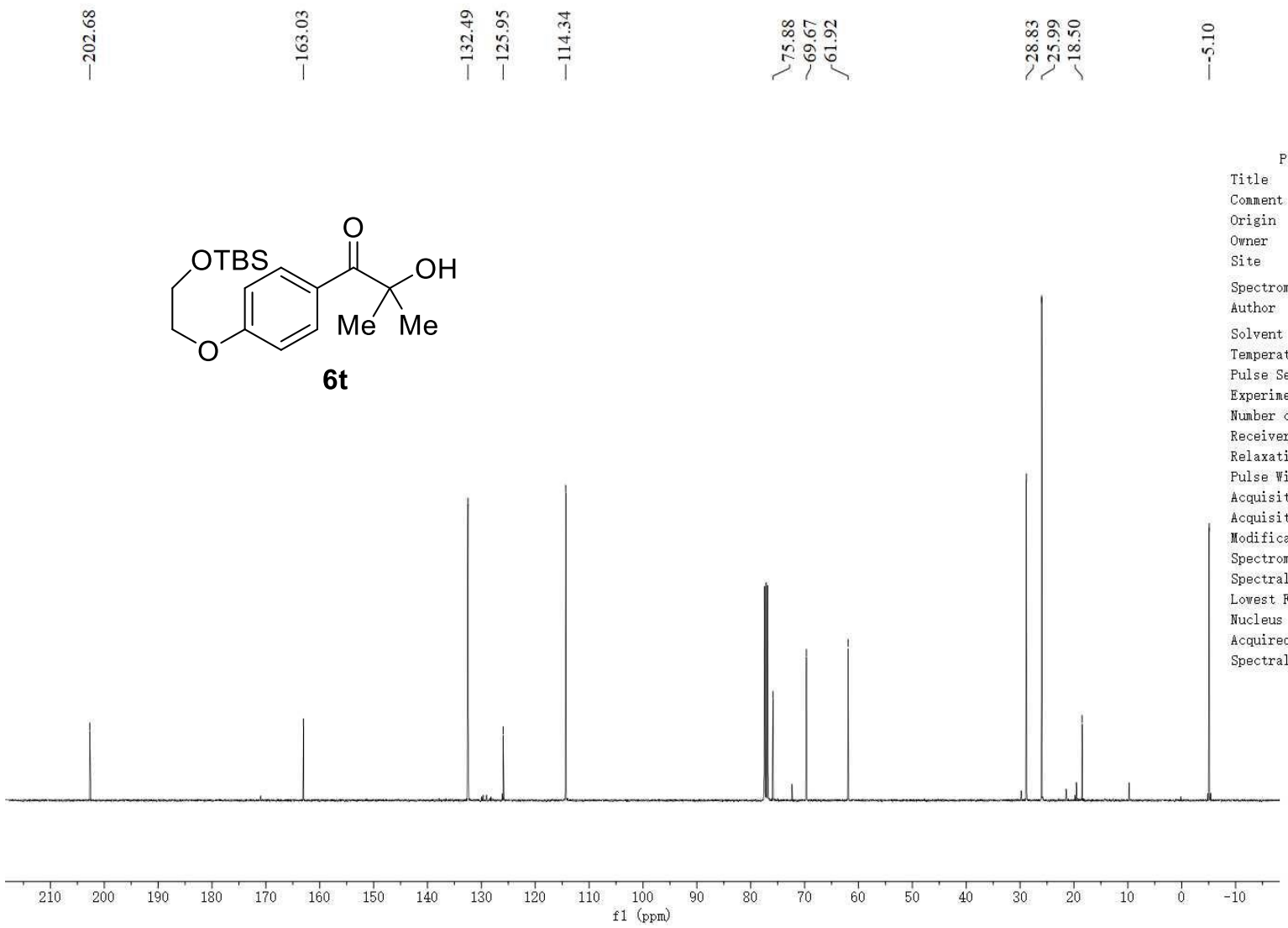

1.5780
1.5614
1.5447
1.5282
1.5113
1.5060
1.4870
1.4682
1.4495
1.4273
1.4225
1.4110
1.4026
1.3926
1.3851
1.3687
1.3483
1.3333
1.3275
1.3227
1.3164
1.3070
1.3006
1.2959
1.2904
1.2831
1.2666
1.1914
1.1740
1.1542
1.1366
0.9035
0.8846
0.8800
0.8634
Me
Et
i-Pr
OH
(±) 6r
Parameter
Value
Title
CR-B-81
Comment
Origin
Bruker BioSpin GmbH
Owner
nmrsu
Site
Spectrometer
spect
Author
Solvent
CDCl3
Temperature
298.7
Pulse Sequence
zg30
Experiment
1D
Number of Scans
16
Receiver Gain
31
Relaxation Delay
1.0000
Pulse Width
9.7800
Acquisition Time
4.0894
Acquisition Date
2021-09-15T07:53:01
Modification Date
2021-09-15T07:53:02
Spectrometer Frequency
400.15
Spectral Width
8012.8
Lowest Frequency
-1545.5
Nucleus
1H
Acquired Size
32768
Spectral Size
65536
1.05
5.00
2.04
1.99
3.00
9.03
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
-1.0
f1 (ppm)


73.10
41.71
39.71
34.38
28.09
26.54
22.76
21.74
8.34
Me
Et
i-Pr
OH
(±) 6r
Parameter Value
Title CR-B-81
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 299.3
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 198
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-15T08:12:50
Modification Date 2021-09-15T08:12:52
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1943.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

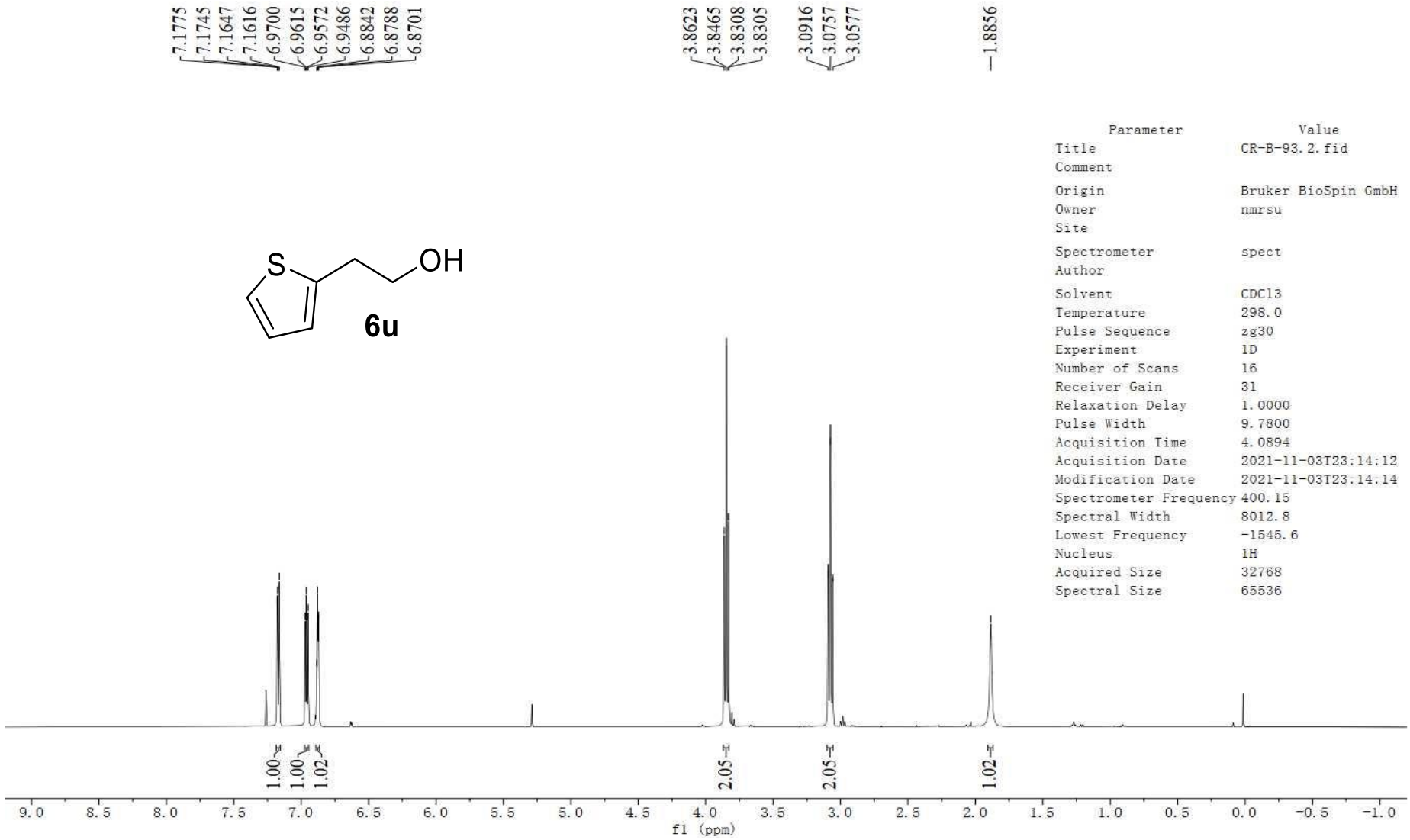

2.1261
1.7039
1.6973
1.6430
1.6129
1.5916
1.5610
OH
6s
Parameter Value
Title CR-B-77
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-09-16T02:20:18
Modification Date 2021-09-16T02:20:20
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.5
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
3.00
6.01
6.03
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 -1.0
f1 (ppm)

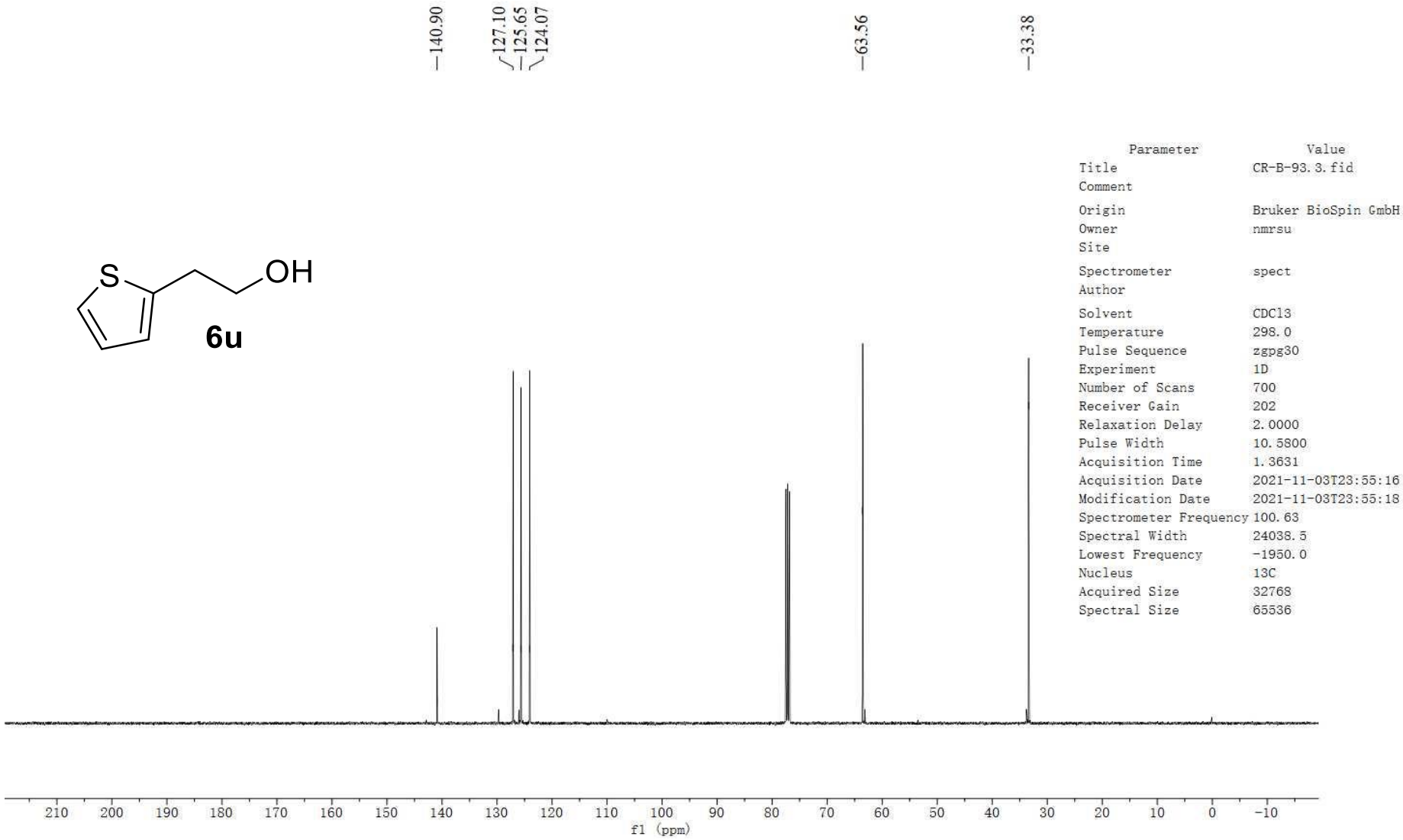

OH
6s
68.36
45.45
36.20
30.84
Parameter Value
Title CR-B-77
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.2
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 500
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-09-16T02:49:57
Modification Date 2021-09-16T02:49:58
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1946.5
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

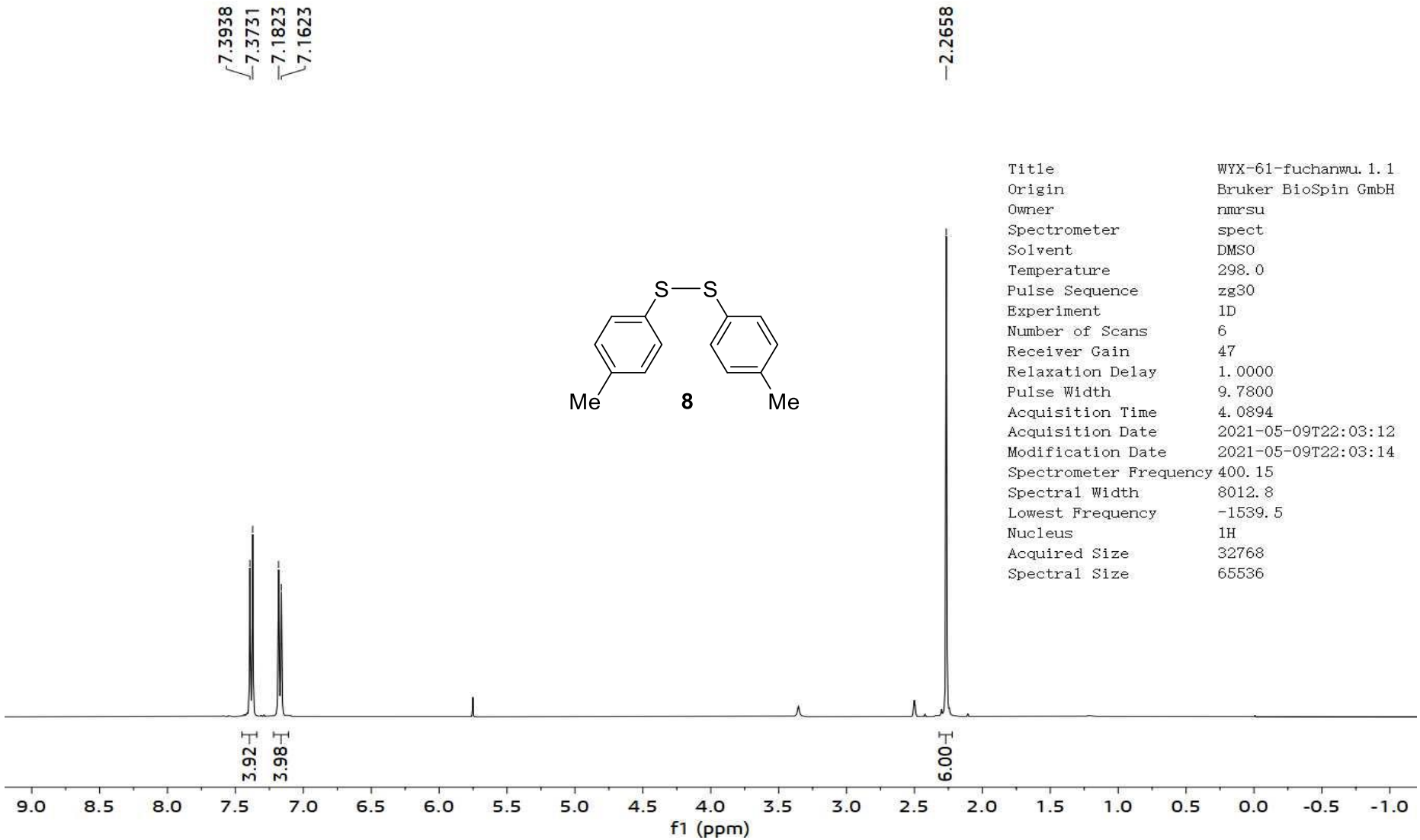

8.0517
8.0305
6.9553
6.9341
4.2994
4.1199
4.1078
4.0955
3.9967
3.9846
3.9725
1.6215
0.8968
0.0920
OTBS
O
OH
Me
Me
O
6t
Parameter Value
Title CR-B-100.23.fid
Comment CR-B-100-H
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer Avance NEO
Author
Solvent CDCl3
Temperature 298.7
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 43
Relaxation Delay 1.0000
Pulse Width 8.0000
Acquisition Time 3.9977
Acquisition Date 2021-09-28T14:44:14
Modification Date 2021-09-28T14:44:34
Spectrometer Frequency 400.13
Spectral Width 8196.7
Lowest Frequency -1636.1
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
2.00
2.00
1.00
2.00
2.01
6.00
9.01
6.02
f1 (ppm)

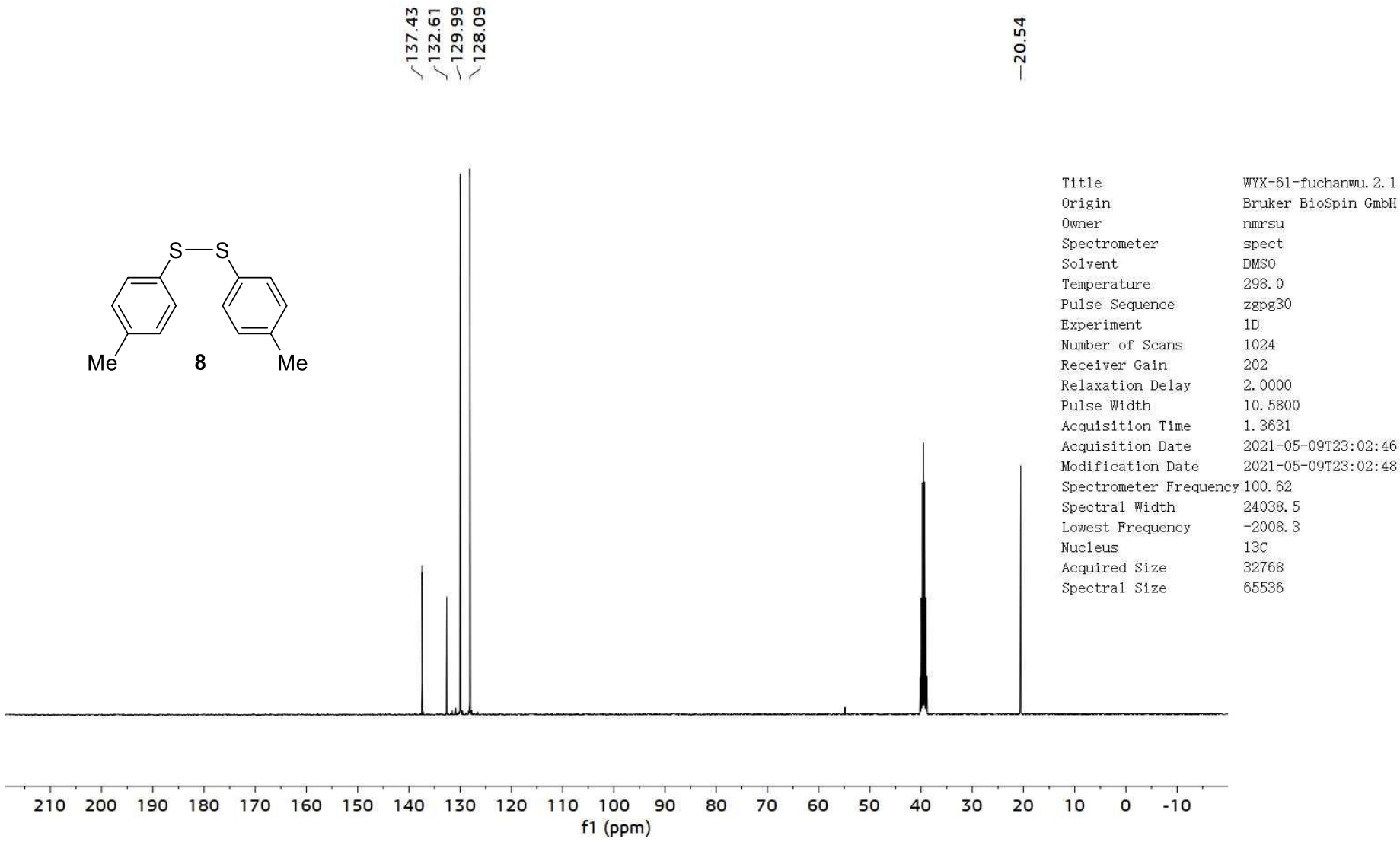


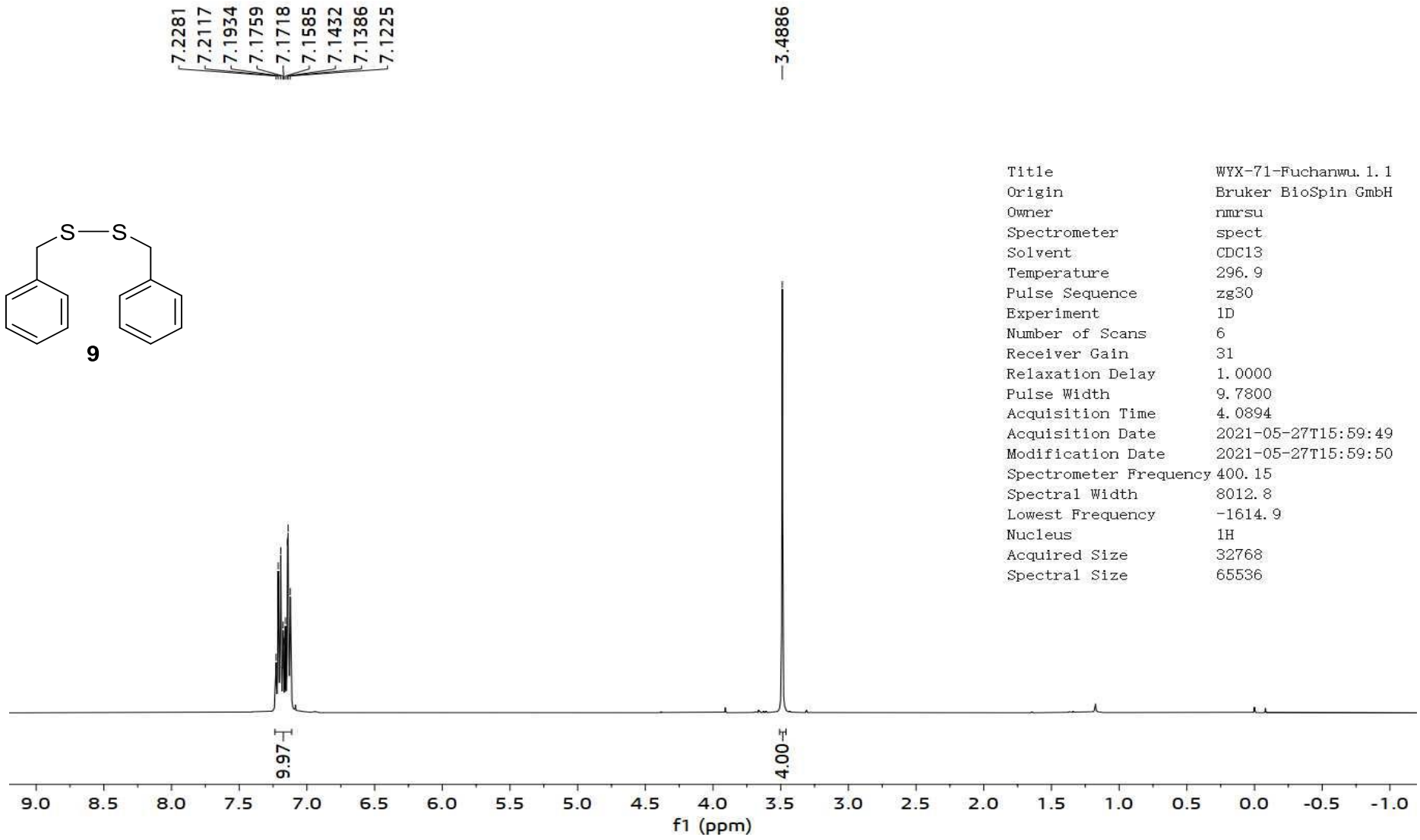
Parameter	Value
Title	CR-B-100.24.fid
Comment	CR-B-100-C
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Site	
Spectrometer	Avance NEO
Author	
Solvent	CDCl3
Temperature	299.4
Pulse Sequence	zgpg30
Experiment	1D
Number of Scans	1024
Receiver Gain	101
Relaxation Delay	2.0000
Pulse Width	8.0000
Acquisition Time	1.3763
Acquisition Date	2021-09-28T15:45:51
Modification Date	2021-09-28T15:46:10
Spectrometer Frequency	100.62
Spectral Width	23809.5
Lowest Frequency	-1831.4
Nucleus	13C
Acquired Size	32768
Spectral Size	65536

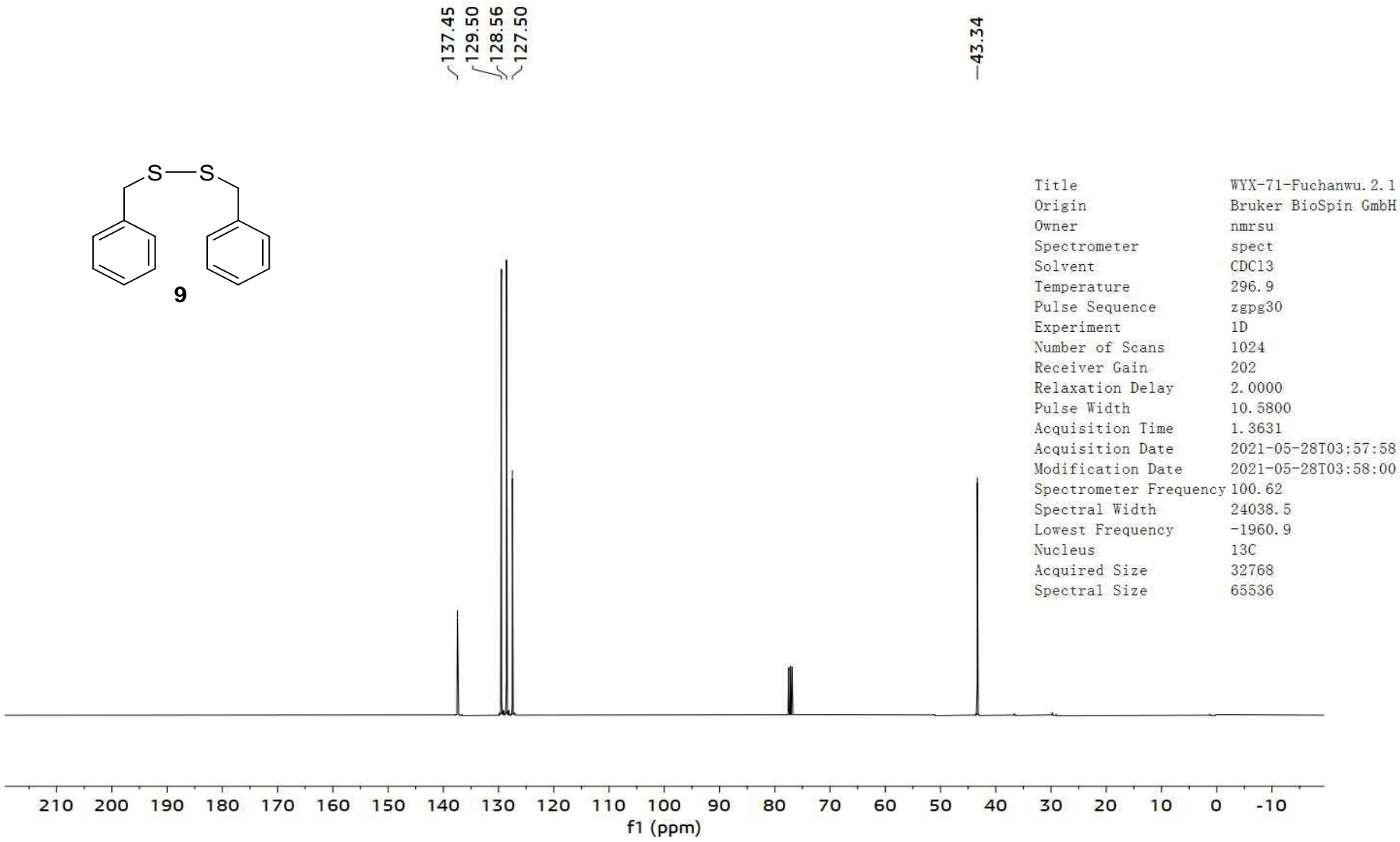

7.1775
7.1745
7.1647
7.1616
6.9700
6.9615
6.9572
6.9486
6.8842
6.8788
6.8701
3.8623
3.8465
3.8308
3.8305
3.0916
3.0757
3.0577
1.8856
S
OH
6u
Parameter Value
Title CR-B-93.2.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 16
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-11-03T23:14:12
Modification Date 2021-11-03T23:14:14
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1545.6
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
1.00
1.00
1.02
2.05
2.05
1.02
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 -1.0
f1 (ppm)

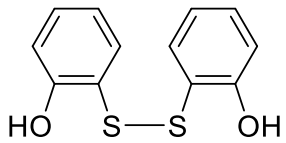

140.90
127.10
125.65
124.07
63.56
33.38
S
OH
6u
Parameter Value
Title CR-B-93.3.fid
Comment
Origin Bruker BioSpin GmbH
Owner nmrsu
Site
Spectrometer spect
Author
Solvent CDCl3
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-11-03T23:55:16
Modification Date 2021-11-03T23:55:18
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1950.0
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)


7.3938
7.3731
7.1823
7.1623
2.2658
S—S
Me
8
Me
Title WYX-61-fuchanwu.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent DMSO
Temperature 298.0
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 47
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-09T22:03:12
Modification Date 2021-05-09T22:03:14
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1539.5
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
3.92
3.98
6.00
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 -1.0
f1 (ppm)


137.43
132.61
129.99
128.09
20.54
S—S
Me
8
Me
Title WYX-61-fuchanwu.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent DMSO
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-09T23:02:46
Modification Date 2021-05-09T23:02:48
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -2008.3
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

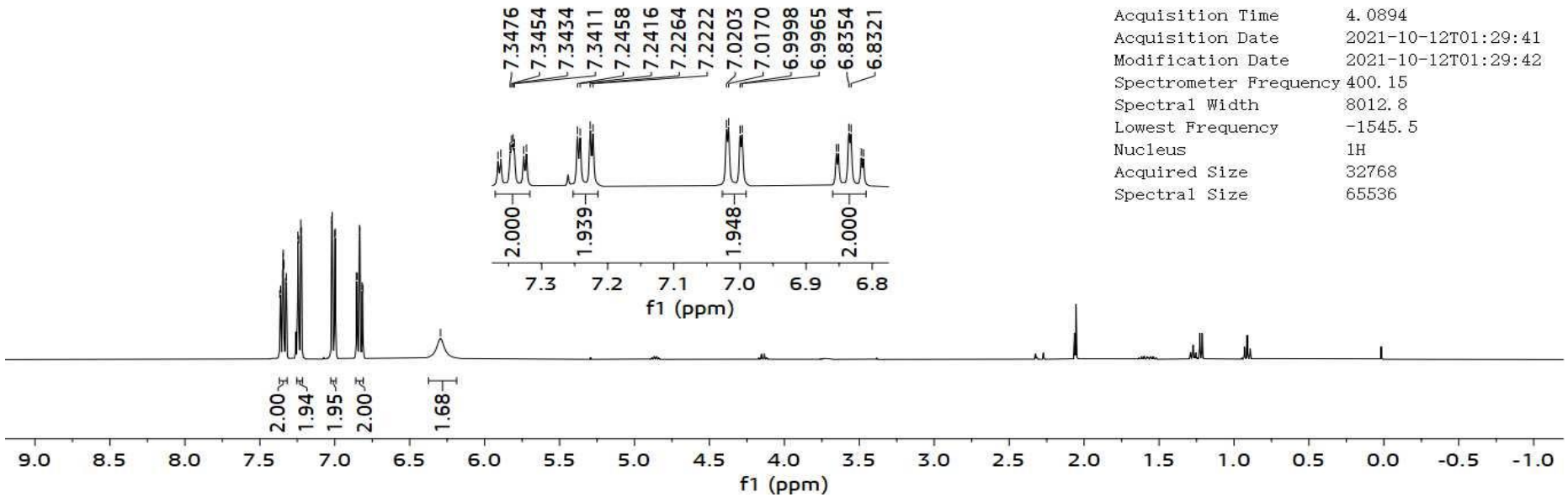

7.2281
7.2117
7.1934
7.1759
7.1718
7.1585
7.1432
7.1386
7.1225
3.4886
S—S
9
Title WYX-71-Fuchanwu.1.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 296.9
Pulse Sequence zg30
Experiment 1D
Number of Scans 6
Receiver Gain 31
Relaxation Delay 1.0000
Pulse Width 9.7800
Acquisition Time 4.0894
Acquisition Date 2021-05-27T15:59:49
Modification Date 2021-05-27T15:59:50
Spectrometer Frequency 400.15
Spectral Width 8012.8
Lowest Frequency -1614.9
Nucleus 1H
Acquired Size 32768
Spectral Size 65536
9.97
4.00
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 -1.0
f1 (ppm)

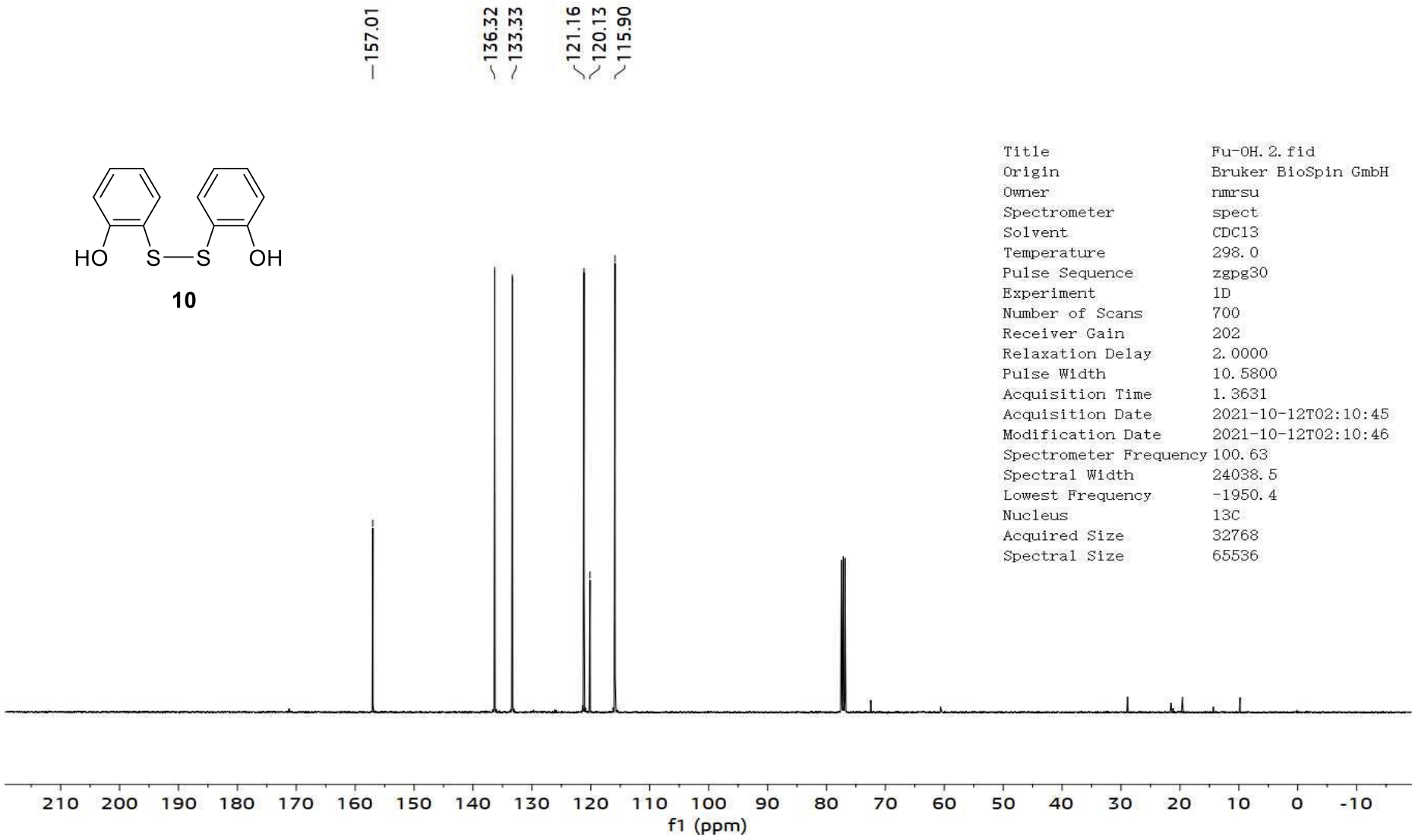

137.45
129.50
128.56
127.50
43.34
S
S
9
Title WYX-71-Fuchanwu.2.1
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDCl3
Temperature 296.9
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 1024
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-05-28T03:57:58
Modification Date 2021-05-28T03:58:00
Spectrometer Frequency 100.62
Spectral Width 24038.5
Lowest Frequency -1960.9
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

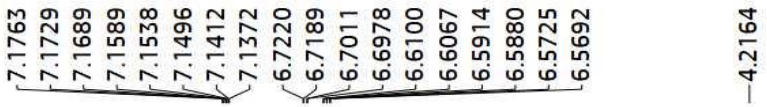


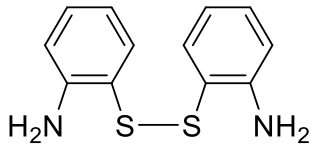
10

Title	Fu-OH.1.fid
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zg30
Experiment	1D
Number of Scans	16
Receiver Gain	31
Relaxation Delay	1.0000
Pulse Width	9.7800
Acquisition Time	4.0894
Acquisition Date	2021-10-12T01:29:41
Modification Date	2021-10-12T01:29:42
Spectrometer Frequency	400.15
Spectral Width	8012.8
Lowest Frequency	-1545.5
Nucleus	1H
Acquired Size	32768
Spectral Size	65536



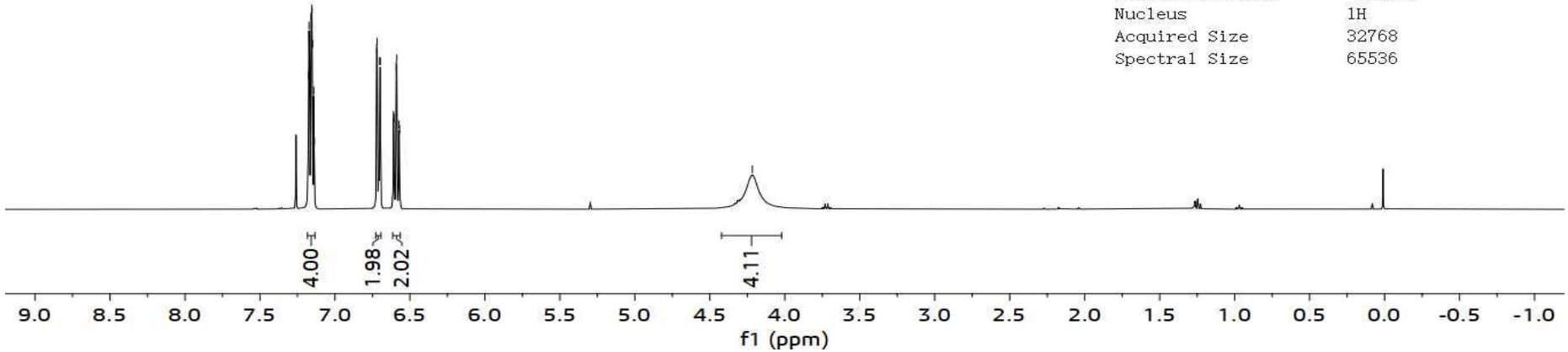

157.01
136.32
133.33
121.16
120.13
115.90
HO
S—S
OH
10
Title Fu-OH.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-12T02:10:45
Modification Date 2021-10-12T02:10:46
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1950.4
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
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)

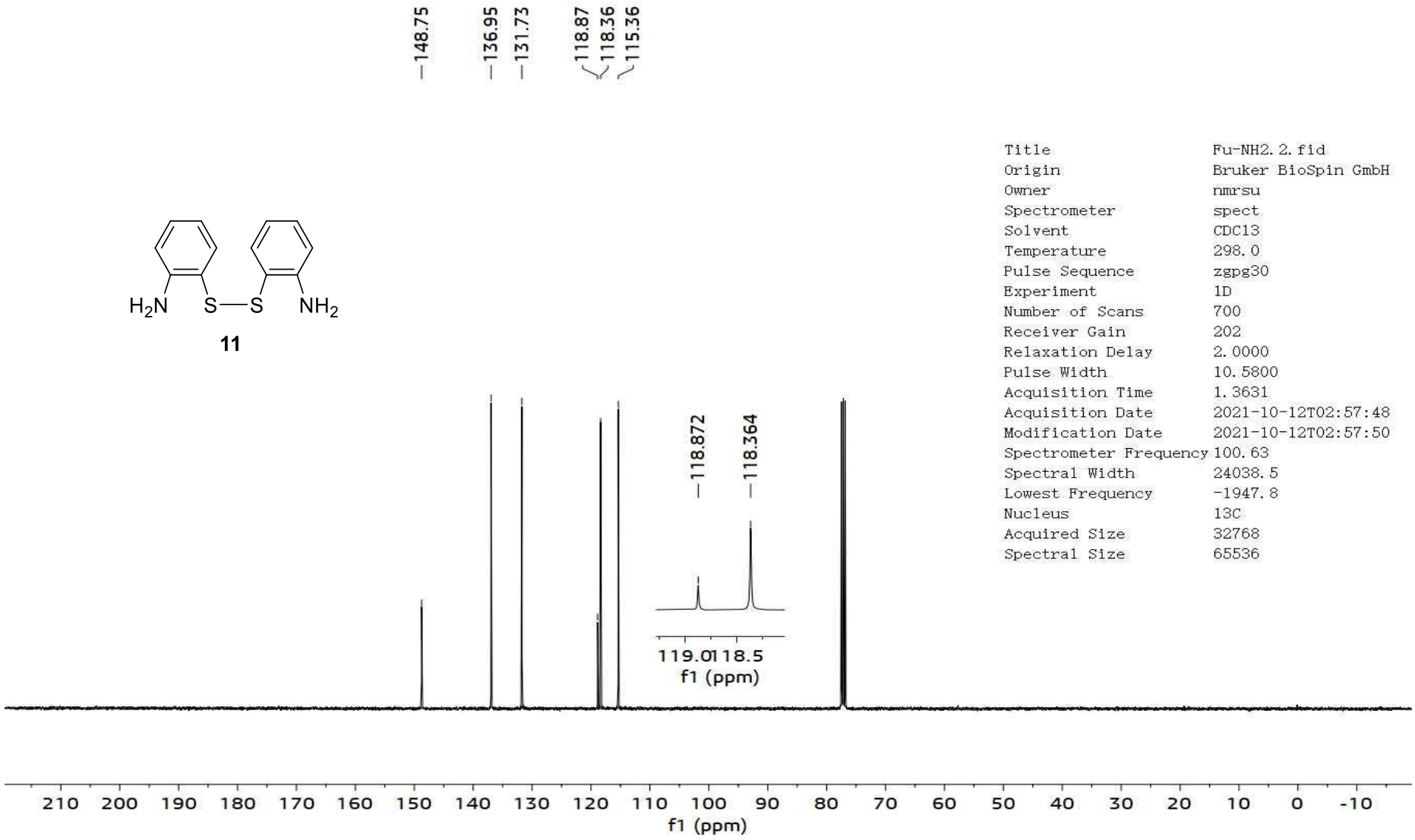




11

Title	Fu-NH2.1.fid
Origin	Bruker BioSpin GmbH
Owner	nmrsu
Spectrometer	spect
Solvent	CDCl3
Temperature	298.0
Pulse Sequence	zg30
Experiment	1D
Number of Scans	16
Receiver Gain	79
Relaxation Delay	1.0000
Pulse Width	9.7800
Acquisition Time	4.0894
Acquisition Date	2021-10-12T02:16:44
Modification Date	2021-10-12T02:16:46
Spectrometer Frequency	400.15
Spectral Width	8012.8
Lowest Frequency	-1545.5
Nucleus	1H
Acquired Size	32768
Spectral Size	65536




148.75
136.95
131.73
118.87
118.36
115.36
H2N
S—S
NH2
11
Title Fu-NH2.2.fid
Origin Bruker BioSpin GmbH
Owner nmrsu
Spectrometer spect
Solvent CDC13
Temperature 298.0
Pulse Sequence zgpg30
Experiment 1D
Number of Scans 700
Receiver Gain 202
Relaxation Delay 2.0000
Pulse Width 10.5800
Acquisition Time 1.3631
Acquisition Date 2021-10-12T02:57:48
Modification Date 2021-10-12T02:57:50
Spectrometer Frequency 100.63
Spectral Width 24038.5
Lowest Frequency -1947.8
Nucleus 13C
Acquired Size 32768
Spectral Size 65536
118.872
118.364
119.0 118.5
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)