Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.

Supporting Information

Rh-catalyzed C-C/C-N bond formation via C-H activation: Synthesis of 2H-indazol-2-yl-benzo[a]carbazoles

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General Information. $Cu(OAc)_2 \cdot H_2O$ (>98%), CsOAc (≥99.99%), $[Cp^*RhCl_2]_2$, $AgSbF_6$ (98%), AgOAc (99.99%), Ag_2CO_3 (99%), Ag_2O (99%), $Cu(OTf)_2$ (98%), Pd/C (10%) and $PhI(OAc)_2$ were purchased from Aldrich and used as received. Silica gel-G plates (Merck) were used for TLC analysis with a mixture of hexane and ethyl acetate as the eluent. Melting point was measured on Büchi melting point apparatus, MPB-540. Open capillary tubes were used for the measurements and are uncorrected. NMR spectra were recorded on Bruker 400 MHz spectrometer using TMS as an internal standard and $CDCl_3$ as a solvent. Mestrenova software was used throughout the spectral analysis. Chemical shifts are given in parts per million (δ-scale) and the coupling constants are given in Hertz. Q-Tof ESI-MS instrument (model HAB273) was used for recording HRMS. Infrared spectra were recorded on Perkin Elmer FT-IR instrument. Single crystal X-ray data were collected on a Bruker SMART APEX equipped with a CCD area detector using Mo/Kα radiation and the structure was solved by direct method using SHELXL-16 (Göttingen, Germany).

Preparation of $[Cp^*Rh(CH_3CN)_3](SbF_6)_2$.[1] $[Cp^*RhCl_2]_2$ (0.16 mmol, 100 mg) and $AgSbF_6$ (0.65 mmol, 225 mg) were stirred in CH_3CN (5 mL) for 30 min under nitrogen. The prcipitated salt was filtered over a short pad of celite using CH_3CN (5 mL). Evaporation of the solvent gave a residue that was dissolved in a 1:1 mixture of CH_3CN and CH_2Cl_2 (10 mL) and filtered through silica gel using a 1:1 mixture of CH_3CN an CH_2Cl_2 (25 mL). The resultant solution was concentrated to minimal volume and diethyl ether was added. The target complex was precipitated as a light yellow solid in 85% (243 mg) yield. ^1H NMR (400 MHz, DMSO-d_6) δ 2.07 (s, 9H), 1.54 (s, 15H).

Synthesis of 7-Azabenzonorbornadienes. 7-Azabenzonorbornadienes were synthesized as per the reported procedure.[2,3] Compounds **1b**, **1c**, **1e**, **1f**, **1k**, **1n**, **1q** and **1r** are new, while **1a**, **1d**, **1h**, **1i**, **1n** and **1p** are known, however, their characterization data were not given. On the other hand,

the compounds **1g**, **1j**, **1l**, **1m** and **1o** are known with their characterization data, which were in agreement with our data.

Step-1. ***tert*-Butyl 1,4-dihydro-1,4-epiminonaphthalene-9-carboxylate (1o).** To a solution of *N*-(*tert*-butoxycarbonyl)pyrrole (6 mmol, 1g) in dimethoxymethane (DME) (2 mL) at 60 °C in a three-neck flask fitted with a reflux condenser and 2 addition funnels, was simultaneously and dropwise added a solution of anthranilic acid (6 mmol, 822 mg) in DME (2 mL) and a solution of isoamylnitrite (7.2 mmol, 1 mL) in DME (2 mL) separately. After stirring the resultant mixture at 60 °C for 2 h, the reaction mixture was concenrated and the residue was dissolved in ethyl acetate (20 mL) and washed with saturated K_2CO_3 (5 mL). Drying (Na_2SO_4) and evaporation of the solvent gave a residue, which was purified by column chromatography using a 1:20 mixture of ethyl acetate and hexane to afford **1o** as a colorless solid in 62% (903 mg) yield. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.18 (s, 2H), 6.90-6.86 (m, 4H), 5.41 (s, 2H), 1.30 (s, 9H).

Step-2. **1,4-Dihydro-1,4-epiminonaphthalene**. To a stirred solution acetyl chloride (6 mmol, 85 µL) in MeOH (10 mL) at 0 °C was added *tert*-butyl 1,4-dihydro-1,4-epiminonaphthalene-9-carboxylate **1o** (2 mmol, 500 mg). The reaction mixutre was allowed to warm up to room temperature and the stirring was continued for an additional 2 h. The reaction mixture was then quenched with saturated K_2CO_3 and adjusted to pH ~ 10. The aqueous solution was extracted using ethyl acetate (25 mL) and dried over Na_2SO_4. Evaporation of the solvent gave the bicyclic amine, which was directly utilized for the next step.

Step-3. **9-Aryl/alkylsulfonyl-1,4-dihydro-1,4-epiminonaphthalene.** To a stirred solution of the amine prepared from step-2, 1,4-dihydro-1,4-epiminonaphthalene (1 mmol) in CH_2Cl_2 (10 mL), was added aryl/alkyl sulfonyl chloride (1.1 mmol), 4-(dimethylamino)pyridine (10 mol %) and triethylamine (5 mmol) at room temperature and the resultant mixture was stirred for an additional

24 h. The progress of the reaction was monitered by TLC using ethyl acetate and hexane. The reaction mixture was diluted with CH_2Cl_2 (25 mL) and washed successivly with brine (5 mL) and water (5 mL). Dyring (Na_2SO_4) and evaporation of the solvent gave a residue that was purified on silica gel column chromatography using a 1:4 mixture of ethyl acetate and hexane to produce the *N*-protected 7-azabenzonorbornadienes **1**.

The data for the new compounds and the compounds that are reported without data follow:

9-Phenylsulfonyl-1,4-dihydro-1,4-epiminonaphthalene (1a).[3a] Brown solid; yield 70% (198 mg); R_f = 0.16 (1:6 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.51-7.48 (m, 2H), 7.34-7.30 (m, 1H), 7.23-7.18 (m, 2H), 6.94 (dd, *J* = 5.1, 3.0 Hz, 2H), 6.72 (t, *J* = 1.6 Hz, 2H), 6.68 (dd, *J* = 5.2, 3.0 Hz, 2H), 5.39 (t, *J* = 1.6 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 147.2, 142.5, 138.2, 132.5, 128.8, 128.3, 125.2, 121.3, 67.8; FT-IR (KBr) 2927, 2853, 2478, 1911, 1637, 1445, 1400, 1336, 1264, 1161, 1085, 10113, 748 cm^{-1}; HRMS (ESI) calcd for $[C_{16}H_{13}NO_2S+H]^+$ 284.0740, found 284.0749.

9-(m-Tolylsulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1b). Colorless solid; yield 72% (214 mg); mp 129-130 °C; R_f = 0.26 (1:6 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.41 (td, *J* = 4.8, 4.2, 2.0 Hz, 1H), 7.30-7.29 (m, 1H), 7.10-7.17 (m, 2H), 7.00 (dd, *J* = 5.1, 3.0 Hz, 2H), 6.83 (t, *J* = 1.6 Hz, 2H), 6.75 (dd, *J* = 5.2, 3.0 Hz, 2H), 5.45 (t, *J* = 1.6 Hz, 2H), 2.28 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 147.2, 142.6, 138.9, 137.8, 133.3, 128.8, 128.7, 125.5, 125.1, 121.3, 67.8, 21.2; FT-IR (KBr) 2306, 1958, 1910, 1801, 1635, 1449, 1401, 1335, 1220, 1156, 1090, 1012, 752 cm^{-1}; HRMS (ESI) calcd for $[C_{17}H_{15}NO_2S+H]^+$ 298.0896, found 298.0909.

9-((3-(Trifluoromethyl)phenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1c). Colorless solid; yield 76% (267 mg); mp 115-116 °C; R_f = 0.24 (1:6 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.72-7.71 (m, 2H), 7.60 (d, *J* = 7.8 Hz, 1H), 7.39 (t, *J* = 8.1 Hz, 1H), 6.97-6.93

(m, 4H), 6.69 (dd, J = 5.2, 3.0 Hz, 2H), 5.47 (t, J = 1.6 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 146.7, 143.1, 139.0, 131.9, 131.69, 131.68, 131.5, 131.2, 129.6, 129.1 (q, J = 3.5 Hz), 125.6 (q, J = 4.04 Hz), 125.58, 124.7, 122.0, 121.7, 67.9; ^{19}F NMR (377 MHz, $CDCl_3$) δ -62.9; FT-IR (KBr) 2855, 1916, 1637, 1401, 1326, 1272, 1163, 1131, 1071, 1019, 750 cm^{-1}; HRMS (ESI) calcd for $[C_{17}H_{12}F_3NO_2S+H]^+$ 352.0614, found 352.0628.

9-((4-Bromophenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1d).[3b] Colorless solid; yield 80% (289 mg); mp 157-158 °C; R_f = 0.32 (1:6 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.40 (m, 4H), 7.01 (dd, J = 5.2, 3.0 Hz, 2H), 6.86 (t, J = 1.6 Hz, 2H), 6.80 (dd, J = 5.2, 3.0 Hz, 2H), 5.44 (t, J = 1.6 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 147.0, 142.7, 137.1, 132.0, 129.8, 127.6, 125.3, 121.5, 67.8; FT-IR (KBr) 1916, 1644, 1572, 1399, 1345, 1275, 1158, 1071, 1012, 742 cm^{-1}; HRMS (ESI) calcd for $[C_{16}H_{12}BrNO_2S+H]^+$ 361.9845, found 361.9860.

9-((4-Chlorophenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1e). Colorless solid; yield 84% (266 mg); mp 148-149 °C; R_f = 0.18 (1:6 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.48-7.45 (m, 2H), 7.25-7.22 (m, 2H), 7.01 (dd, J = 5.2, 3.0 Hz, 2H), 6.85 (t, J = 1.6 Hz, 2H), 6.79 (dd, J = 5.2, 3.0 Hz, 2H), 5.45 (t, J = 1.6 Hz, 2H);^{13}C NMR (101 MHz, $CDCl_3$) δ 147.0, 142.7, 139.1, 136.5, 129.7, 129.0, 125.3, 121.5, 67.8; FT-IR (KBr) 2684, 2563, 2307, 1914, 1636, 1584, 1400, 1274, 1163, 1089, 1016, 750 cm^{-1}; HRMS (ESI) calcd for $[C_{16}H_{12}ClNO_2S+H]^+$ 318.0350, found 318.0367.

9-((4-Iodophenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1f). Brown solid; yield 77% (314 mg); mp 168-169 °C; R_f = 0.32 (1:6 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.55-7.53 (m, 2H), 7.19-7.16 (m, 2H), 6.93 (dd, J = 5.2, 3.0 Hz, 2H), 6.78 (t, J = 1.6 Hz, 2H), 6.72 (dd, J = 5.2, 3.0 Hz, 2H), 5.36 (t, J = 1.6 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 147.0, 142.7,

137.9, 129.7, 125.3, 121.5, 100.1, 67.8; FT-IR (KBr) 1932, 1639, 1567, 1400, 1337, 1270, 1163, 1088, 1019, 735 cm^{-1}; HRMS (ESI) calcd for $[C_{16}H_{12}INO_2S+H]^+$ 409.9706, found 409.9722.

9-Tosyl-1,4-dihydro-1,4-epiminonaphthalene (1g).[3c] Colorless solid; yield 73% (217 mg); ^1H NMR (400 MHz, $CDCl_3$) δ 7.46 (d, *J* = 8.3 Hz, 2H), 7.09 (d, *J* = 8.1 Hz, 2H), 7.03 (dd, *J* = 5.1, 3.0 Hz, 2H), 6.79-6.77 (m, 4H), 5.44 (t, *J* = 1.6 Hz, 2H), 2.34 (s, 3H).

9-((4-Methoxyphenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1h).[3c] Colorless solid; yield 61% (191 mg); mp 127-128 °C; R_f = 0.22 (1:4 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 7.49 (d, *J* = 8.9 Hz, 2H), 7.03 (dd, *J* = 5.1, 3.0 Hz, 2H), 6.80-6.75 (m, 6H), 5.43 (t, *J* = 1.6 Hz, 2H), 3.81 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 162.9, 147.3, 142.4, 130.4, 129.8, 125.2, 121.3, 114.0, 67.8, 55.7; FT-IR (KBr) 3021, 2847, 2567, 2400, 2304, 2054, 1593, 1496, 1450, 1401, 1339, 1261, 1156, 1093, 1019, 742 cm^{-1}; HRMS (ESI) calcd for $[C_{17}H_{15}NO_3S+H]^+$ 314.0845, found 314.0862.

9-((4-Nitrophenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1i).[3c] Colorless solid; yield 90% (295 mg); ^1H NMR (400 MHz, $CDCl_3$) δ 8.07 (d, *J* = 8.8 Hz, 2H), 7.69 (d, *J* = 8.8 Hz, 2H), 7.00 (dd, *J* = 5.2, 3.0 Hz, 2H), 6.93 (s, 2H), 6.73 (dd, *J* = 5.2, 3.0 Hz, 2H), 5.49 (d, *J* = 1.7 Hz, 2H).

9-((4-(*tert*-Butyl)phenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1j).[3g] Colorless solid; yield 68% (230 mg); mp 158-159 °C; R_f = 0.27 (1:6 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 7.47-7.45 (m, 2H), 7.28-7.26 (m, 2H), 6.99 (dd, *J* = 5.1, 3.0 Hz, 2H), 6.90 (t, *J* = 1.6 Hz, 2H), 6.73 (dd, *J* = 5.2, 3.0 Hz, 2H), 5.45 (t, *J* = 1.7 Hz, 2H), 1.29 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 156.2, 147.1, 142.9, 134.7, 128.2, 125.7, 125.1, 121.4, 67.8, 35.1, 31.1; FT-IR (KBr)

2870, 2685, 1920, 1798, 1631, 1594, 1400, 1341, 1267, 1163, 1088, 1016, 744 cm^{-1}; HRMS (ESI) calcd for $[C_{20}H_{21}NO_2S+H]^+$ 340.1366, found 340.1381.

9-(Naphthalen-2-ylsulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1k). Brown solid; yield 65% (216 mg); mp 173-174 °C; R_f = 0.24 (1:6 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 8.16-8.15 (m, 1H), 7.84 (ddd, *J* = 13.3, 8.1, 1.5 Hz, 2H), 7.74 (d, *J* = 8.7 Hz, 1H), 7.62-7.54 (m, 3H), 6.98 (dd, *J* = 5.2, 3.0 Hz, 2H), 6.77 (t, *J* = 1.6 Hz, 2H), 6.60 (dd, *J* = 5.2, 3.0 Hz, 2H), 5.53 (t, *J* = 1.6 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 147.2, 142.5, 135.2, 134.7, 132.2, 129.8, 129.2, 128.9, 128.8, 128.0, 127.4, 125.0, 123.5, 121.2, 67.9; FT-IR (KBr) 1636, 1401, 1336, 1264, 1160, 1086, 1013, 747 cm^{-1}; HRMS (ESI) calcd for $[C_{20}H_{15}NO_2S+H]^+$ 334.0896, found 334.0901.

9-(Thiophen-2-ylsulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1l).[3d] Brown solid; yield 77% (222 mg); mp 173-174 °C; R_f = 0.18 (1:6 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 7.45 (dd, *J* = 5.0, 1.3 Hz, 1H), 7.22 (dd, *J* = 3.8, 1.3 Hz, 1H), 7.09 (dd, *J* = 5.1, 3.0 Hz, 2H), 6.88 (dd, *J* = 5.0, 3.8 Hz, 1H), 6.84 (dd, *J* = 5.2, 3.0 Hz, 2H), 6.76 (t, *J* = 1.6 Hz, 2H), 5.48 (t, *J* = 1.6 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 146.9, 141.5, 138.5, 133.5, 133.0, 127.9, 125.3, 121.4, 68.0; FT-IR (KBr) 3015, 2859, 2761, 1639, 1400, 1345, 1268, 1228, 1157, 1019, 736 cm^{-1}; HRMS (ESI) calcd for $[C_{14}H_{11}NO_2S_2+H]^+$ 290.0304, found 290.0326.

9-(Pyridin-2-ylsulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1m).[3d] Brown solid; yield 74% (210 mg); ^1H NMR (400 MHz, $CDCl_3$) δ 8.47 (dt, *J* = 4.7, 1.3 Hz, 1H), 7.62-7.61 (m, 1H), 7.24-7.20 (m, 1H), 6.97 (dd, *J* = 5.2, 3.0 Hz, 1H), 6.72 (t, *J* = 1.6 Hz, 1H), 6.68 (dd, *J* = 5.2, 3.0 Hz, 1H), 5.54 (t, *J* = 1.6 Hz, 1H).

9-(Methylsulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1n).[3e] Colorless solid; yield 63% (139 mg); mp 101-102 °C; R_f = 0.16 (1:4 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ

7.30 (dd, J = 5.1, 3.0 Hz, 2H), 7.07 (t, J = 1.6 Hz, 2H), 7.02 (dd, J = 5.2, 3.0 Hz, 2H), 5.47 (t, J = 1.6 Hz, 2H), 2.35 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 147.5, 143.1, 125.9, 121.7, 67.7, 39.2; FT-IR (KBr) 3017, 2933, 2859, 2470, 2294, 1915, 1632, 1449, 1401, 1334, 1273, 1153, 1020, 747 cm^{-1}; HRMS (ESI) calcd for $[C_{11}H_{11}NO_2S+H]^+$ 222.0583, found 222.0561.

Benzyl-1,4-dihydro-1,4-epiminonaphthalene-9-carboxylate (1p).[3f] Colorless solid; yield 52% (144 mg); mp 84-85 °C; R_f = 0.55 (1:10 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.27-7.16 (m, 7H), 6.95 (brs, 1H), 6.90 (dd, J = 5.2, 3.0 Hz, 3H), 5.52 (s, 2H), 4.99 (s, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 155.4, 148.2, 143.6, 142.8, 136.4, 128.6, 128.2, 127.9, 125.2, 121.2, 67.3, 66.4; FT-IR (KBr) 3028, 2956, 2922, 2852, 2065, 1708, 1638, 1451, 1387, 1325, 1244, 1072, 743 cm^{-1}; HRMS (ESI) calcd for $[C_{18}H_{15}NO_2+H]^+$ 278.1176, found 278.1178.

6,7-Difluoro-9-(phenylsulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1q). Brown solid; yield 76% (242 mg); mp 178-179 °C; R_f = 0.20 (1:6 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.59-7.56 (m, 2H), 7.48-7.44 (m, 1H), 7.35 (dd, J = 8.4, 7.2 Hz, 2H), 6.87-6.82 (m, 4H), 5.43 (t, J = 1.7 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) 147.3 (dd, J = 249.3, 14.9 Hz), 143.6 (t, J = 4.9 Hz), 142.8, 137.8, 132.9, 128.86, 128.44, 112.0 (tt, J = 21.6, 9.2), 67.4; ^{19}F NMR (377 MHz, $CDCl_3$) δ -142.0; FT-IR (KBr) 2963, 2927, 2857, 1626, 1462, 1401, 1261, 1160, 1089, 757 cm^{-1}; HRMS (ESI) calcd for $[C_{16}H_{11}F_2NO_2S+H]^+$ 320.0551, found 320.0559.

6,7-Dimethoxy-9-(phenylsulfonyl)-1,4-dihydro-1,4-epiminonaphthalene (1r). Colorless solid; yield 58% (199 mg); mp 126-127 °C; R_f = 0.42 (2:3 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) 7.49-7.47 (m, 2H), 7.33 (t, J = 7.4 Hz, 1H), 7.22 (dd, J = 8.4, 7.1 Hz, 2H), 6.82 (t, J = 1.7 Hz, 2H), 6.61 (s, 2H), 5.34 (t, J = 1.6 Hz, 2H), 3.66 (s, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 145.9, 143.0, 140.1, 138.2, 132.4, 128.6, 107.8, 68.1, 56.5; FT-IR (KBr) 3010, 2842, 2043, 1608, 1479,

1446, 1401, 1333, 1266, 1074, 1009, 734 cm^{-1}; HRMS (ESI) calcd for $[C_{18}H_{17}NO_4S+H]^+$ 344.0951, found 344.0956.

7-(*tert*-Butyl) 2,3-diethyl 7-azabicyclo[2.2.1]hepta-2,5-diene-2,3,7-tricarboxylate (1s).[3h] A mixture of N-Boc-pyrrole (1 mmol) and diethyl acetylenedicarboxylate (0.5 mmol) were stireed at 100 °C for 2 h. The resulting mixture was cooled to room temperature and purified directly on silica gel column chromatography using a 1:20 ethyl acetate and hexane. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.07 (s, 2H), 5.37 (s, 2H), 4.21-4.18 (m, 4H), 1.34 (s, 9H), 1.25-1.23 (m, 6H).

Preparation of 2-Aryl-2*H*-indazoles 2. 2-Aryl-2*H*-indazoles were prepared as per the literature and the spectroscopic data were in agreement with literature values.[4] 2-Bromobenzaldehyde (1 mmol), amine (1.1 mmol), NaN_3 (1.2 mmol), CuI (15 mol %) and TMEDA (15 mol %) were stirred in DMSO (10 ml) at 120 °C for 12 h. Progress of the reaction was monitored by TLC using ethyl acetate and hexane as the eluent. The reaction mixture was then cooled to room temperature and poured in ice cold water. The mixture was extracted using EtOAc (3 x 40 mL) and dried over Na_2SO_4. The solution was passed through a short pad of cellite and evaporated to produce a residue that was purified on silica gel column chromatography using a 1:20 ethyl acetate and hexane to give aryl-2*H*-indazoles **2**.

Compounds **2c**, **2k, 2s** and **2t** are new compounds, which have been synthesized using the following procedure: 2-azidobenzaldehyde (0.5 mmol) and amine (0.5 mmol) were stirred at 110 °C as neat for 3 h. The resultant mixture was directly loaded on the silica gel column chromatography and purified using ethyl acteate and hexane (1:19) as the eluent.

2-Phenyl-2*H*-indazole (2a).[4b] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.41 (d, J = 1.0 Hz, 1H), 7.92 -7.89 (m, 2H), 7.81 (dd, J = 8.8, 1.1 Hz, 1H), 7.72 (dt, J = 8.5, 1.1 Hz, 1H), 7.53 (dd, J = 8.6, 7.2 Hz, 2H), 7.43-7.38 (m, 1H), 7.33 (ddd, J = 8.8, 6.6, 1.1 Hz, 1H), 7.12 (ddd, J = 8.5, 6.6, 0.9 Hz, 1H).

2-(2-Methoxyphenyl)-2*H*-indazole (2b).[4c] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.52 (d, *J* = 1.0 Hz, 1H), 7.87 (dd, *J* = 7.9, 1.7 Hz, 1H), 7.79 (dd, *J* = 8.8, 1.0 Hz, 1H), 7.73 (dt, *J* = 8.5, 1.1 Hz, 1H), 7.42-7.38 (m, 1H), 7.32 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.15-7.08 (m, 3H), 3.90 (s, 3H).

2-(2-(Difluoromethoxy)phenyl)-2*H*-indazole (2c). Brown liquid; 105 mg, yield 81%; R_f = 0.58 (1:9 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.43 (d, *J* = 1.0 Hz, 1H), 7.91 (dd, *J* = 7.7, 2.0 Hz, 1H), 7.79 (dd, *J* = 8.8, 1.1 Hz, 1H), 7.74 (dt, *J* = 8.5, 1.1 Hz, 1H), 7.47-7.32 (m, 4H), 7.13 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H), 6.47 (t, $J_{H,F}$ = 73.3 Hz, 1H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 149.4, 143.63, 143.60, 133.0, 129.6, 127.5, 127.1, 126.6, 125.3, 122.5, 122.4, 121.2, 120.7, 116.0 (t, $J_{C,F}$ = 263.5); ^{19}F NMR (377 MHz, $CDCl_3$) δ -81.02. FT-IR (Neat) 2234, 1925, 1807, 1630, 1602, 1521, 1398, 1229, 1128, 1053, 756 cm^{-1}; HRMS (ESI) calcd for $[C_{14}H_{10}F_2N_2O+H]^+$ 261.0834, found 261.0837.

1-(3-(2*H*-Indazol-2-yl)phenyl)ethan-1-one (2d).[4d] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.50-8.48 (m, 2H), 8.17 (ddd, *J* = 8.1, 2.3, 1.1 Hz, 1H), 7.98 (dt, *J* = 7.9, 1.2 Hz, 1H), 7.79 (dd, *J* = 8.8, 1.1 Hz, 1H), 7.72 (dt, *J* = 8.4, 1.1 Hz, 1H), 7.64 (t, *J* = 7.9 Hz, 1H), 7.34 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.13 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H), 2.70 (s, 3H).

2-(3-Chlorophenyl)-2*H*-indazole (2e).[4c] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.40 (d, *J* = 1.1 Hz, 1H), 7.98 (t, *J* = 2.1 Hz, 1H), 7.81-7.76 (m, 2H), 7.70 (dt, *J* = 8.5, 1.1 Hz, 1H), 7.45 (t, *J* = 8.0 Hz, 1H), 7.38-7.31 (m, 2H), 7.13 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H).

2-(3-Fluorophenyl)-2*H*-indazole (2f).[4c] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.40 (d, *J* = 1.0 Hz, 1H), 7.78 (dd, *J* = 8.8, 1.0 Hz, 1H), 7.72-7.67 (m, 3H), 7.48 (td, *J* = 8.4, 6.0 Hz, 1H), 7.34 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.14-7.08 (m, 2H).

2-(*m*-Tolyl)-2*H*-indazole (2g).[4c] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.41 (d, *J* = 1.0 Hz, 1H), 7.81-7.77 (m, 2H), 7.72-7.70 (m, 1H), 7.66 (dd, *J* = 8.0, 2.1 Hz, 1H), 7.40 (t, *J* = 7.8 Hz, 1H), 7.33 (ddd, *J* = 8.7, 6.6, 1.1 Hz, 1H), 7.22 (d, *J* = 7.6 Hz, 1H), 7.14-7.10 (m, 1H), 2.47 (s, 3H).

2-(3-Methoxyphenyl)-2*H*-indazole (2h).[4c] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.39 (d, *J* = 1.0 Hz, 1H), 7.80 (dd, *J* = 8.8, 0.9 Hz, 1H), 7.71-7.69 (m, 1H), 7.52 (t, *J* = 2.2 Hz, 1H), 7.45-7.38 (m, 2H), 7.33 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.11 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H), 6.94 (ddd, *J* = 7.5, 2.5, 1.6 Hz, 1H), 3.90 (s, 3H).

2-(3-(Trifluoromethyl)phenyl)-2*H*-indazole (2i).[4a] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.46 (d, *J* = 1.0 Hz, 1H), 8.23-8.22 (m, 1H), 8.12-8.09 (m, 1H), 8.11 (td, *J* = 5.0, 2.5 Hz, 1H), 7.79 (dd, *J* = 8.8, 1.0 Hz, 1H), 7.72-7.70 (m, 1H), 7.66-7.65 (m, 2H), 7.35 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.14 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H).

2-(3-Nitrophenyl)-2*H*-indazole (2j).[4e] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.80 (t, *J* = 2.1 Hz, 1H), 8.53 (d, *J* = 1.0 Hz, 1H), 8.34 (ddd, *J* = 8.2, 2.2, 1.0 Hz, 1H), 8.26 (ddd, *J* = 8.2, 2.2, 1.0 Hz, 1H), 7.80-7.71 (m, 3H), 7.36 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.15 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H).

2-(2,3-Dihydro-1*H*-inden-4-yl)-2*H*-indazole (2k). Brown liquid; 82 mg, yield 70%; R_f = 0.22 (1:50 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.23 (d, *J* = 0.9 Hz, 1H), 7.80 (ddd, *J* = 8.8, 1.8, 0.9 Hz, 1H), 7.72 (dt, *J* = 8.5, 1.0 Hz, 1H), 7.51-7.47 (m, 1H), 7.33-7.30 (m, 3H), 7.12 (ddd, *J* = 8.4, 6.6, 0.8 Hz, 1H), 3.10 (t, *J* = 7.4 Hz, 2H), 3.02 (t, *J* = 7.5 Hz, 2H), 2.11 (t, *J* = 7.4 Hz, 2H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 149.4, 147.1, 137.8, 137.7, 127.5, 126.6, 124.5, 123.0, 122.3, 122.2, 122.0, 120.4, 118.0, 33.4, 32.2, 25.7; FT-IR (Neat) 3125, 3060, 2953, 2889, 2844, 1628, 1590, 1518, 1485, 1389, 1349, 1173, 1147, 1080, 845, 754 cm^{-1}; HRMS (ESI) calcd for $[C_{16}H_{14}N_2+H]^+$ 235.1235, found 235.1237.

2-(4-Fluorophenyl)-2*H*-indazole (2l).[4c] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.28 (d, *J* = 1.0 Hz, 1H), 7.81-7.78 (m, 2H), 7.70-7.69 (m, 1H), 7.63 (dt, *J* = 8.5, 1.1 Hz, 1H), 7.26 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.19-7.13 (m, 2H), 7.05 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H).

2-(4-Chlorophenyl)-2H-indazole (2m).[4b] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.38 (d, *J* = 1.0 Hz, 1H), 7.88-7.84 (m, 2H), 7.77 (dd, *J* = 8.8, 1.0 Hz, 1H), 7.70 (dt, *J* = 8.5, 1.1 Hz, 1H), 7.51-7.49 (m, 2H), 7.33 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.12 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H).

2-(*p*-Tolyl)-2*H*-indazole (2n).[4b] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.38 (d, *J* = 1.0 Hz, 1H), 7.80-7.77 (m, 3H), 7.72-7.70 (m, 1H), 7.34-7.30 (m, 3H), 7.11 (ddd, *J* = 8.4, 6.6, 0.9 Hz, 1H), 2.43 (s, 3H).

2-(Pyridin-4-yl)-2*H*-indazole (2o).[4c] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.77 (s, 2H), 8.53 (d, *J* = 1.0 Hz, 1H), 7.88 (d, *J* = 5.6 Hz, 2H), 7.76 (dd, *J* = 8.8, 1.1 Hz, 1H), 7.69 (d, *J* = 8.5 Hz, 1H), 7.35 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.13 (dd, *J* = 8.6, 6.5 Hz, 1H).

5-Fluoro-2-phenyl-2*H*-indazole (2p).[4c] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.30 (d, *J* = 1.0 Hz, 1H), 7.82-7.79 (m, 2H), 7.69 (ddt, *J* = 9.3, 4.6, 0.9 Hz, 1H), 7.46 (dd, *J* = 8.6, 7.2 Hz, 2H), 7.36-7.32 (m, 1H), 7.22-7.18 (m, 1H), 7.06 (td, *J* = 9.3, 2.4 Hz, 1H).

5-Methoxy-2-phenyl-2*H*-indazole (2q).[4c] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.27 (d, *J* = 1.0 Hz, 1H), 7.87 (dd, *J* = 8.6, 1.2 Hz, 2H), 7.69 (dt, *J* = 9.3, 0.9 Hz, 1H), 7.51 (dd, *J* = 8.6, 7.2 Hz, 2H), 7.40-7.36 (m, 1H), 7.03 (dd, *J* = 9.3, 2.4 Hz, 1H), 6.90 (d, *J* = 2.3 Hz, 1H), 3.86 (s, 3H).

2-Benzyl-2*H*-indazole (2r).[4a] ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, *J* = 1.0 Hz, 1H), 7.73 (dd, *J* = 8.7, 1.0 Hz, 1H), 7.63 (d, *J* = 8.4 Hz, 1H), 7.36-7.32 (m, 3H), 7.30-7.26 (m, 3H), 7.08 (ddd, *J* = 8.4, 6.6, 0.9 Hz, 1H), 5.61 (s, 2H).

2-(2-Methylbenzyl)-2*H*-indazole (2s). Yellow oil; 101 mg, yield 91%; R_f = 0.85 (1:9 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.77-7.50 (m, 2H), 7.64-7.61 (m, 1H), 7.33-7.28 (m, 2H), 7.26-7.22 (m, 2H), 7.15-7.07 (m, 2H), 5.64 (s, 2H), 2.31 (s, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 148.9, 137.1, 133.6, 130.9, 129.5, 128.9, 126.7, 126.1, 122.8, 122.1, 121.8, 120.3, 117.6, 55.8; FT-IR (Neat) 1628, 1607, 1515, 1495, 1462, 1401, 1310, 1183, 1153, 1052, 756 cm^{-1}; HRMS (ESI) calcd for $[C_{15}H_{14}N_2+H]^+$ 223.1230, found 223.1232.

2-(3-Chlorobenzyl)-2*H*-indazole (2t). Yellow oil. 105 mg, yield 87%; R_f = 0.77 (1:9 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.85 (d, *J* = 1.0 Hz, 1H), 7.67-7.64 (m, 1H), 7.58-7.55 (m, 1H), 7.25-7.18 (m, 4H), 7.09-7.06 (m, 1H), 7.04-7.00 (m, 1H), 5.50 (s, 2H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 149.1, 137.9, 135.0, 130.4, 128.7, 128.1, 126.4, 126.1, 123.2, 122.3, 122.2, 120.3, 117.7, 56.9; FT-IR (Neat) 1628, 1599, 1577, 1516, 1473, 1400, 1344, 1206, 1155, 1079, 757 cm^{-1}; HRMS (ESI) calcd for $[C_{14}H_{11}ClN_2+H]^+$ 243.0684, found 243.0680.

2-(2,5-dimethylphenyl)-2*H*-indazole (2u). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (s, 1H), 7.71 (d, *J* = 8.8 Hz, 1H), 7.63 (d, *J* = 8.5 Hz, 1H), 7.24 (ddd, *J* = 8.7, 6.6, 0.9 Hz, 1H), 7.17 (s, 1H), 7.14 (d, *J* = 7.6 Hz, 1H), 7.10 (d, *J* = 7.9 Hz, 1H), 7.06 -7.02 (m, 1H), 2.28 (s, 3H), 2.10 (s, 3H).

Preparation of 1-Phenyl-1*H*-pyrazole (2v).[5] Pyrazole (1.2 mmol, 82 mg), phenylboronic acid (1 mmol, 122 mg) and Cu_2O (20 mol%, 29 mg) were stirred in MeOH (2 mL) for 5 h at room temperature. The solvent was evaporated and the residue was purified on silica gel column chromatography using a 3:7 mixture of ethyl acetate and hexane to furnish **2u** as a colorless oil in 95 (137 mg) yield. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.95 (d, *J* = 2.4 Hz, 1H), 7.77-7.71 (m, 3H), 7.48 (dd, *J* = 8.5, 7.5 Hz, 2H), 7.34-7.28 (m, 1H), 6.50 (t, *J* = 2.2 Hz, 1H).

Preparation of 2-Phenylimidazo[1,2-*a*]pyridine 2w.[6] 2-Aminopyridine (583 mg, 2.5 mmol), phenacyl bromide (500 mg, 2.5 mmol) and $NaHCO_3$ (315 mg, 3.7 mmol) were stirred in EtOH (4 mL) for 12 h at room temperature. Evaporation of the solvent gave a residue, which was treated with water (10 mL) and extracted using CH_2Cl_2 (30 mL). Drying (Na_2SO_4) and evaporation of the sovlent produced a residue, which was purified on silica gel column chromatography using 20% ethyl acetate in hexane to give **2v** as a colorless solid in 87% (422 mg). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (dt, *J* = 6.8, 1.2 Hz, 1H), 7.96 (dd, *J* = 8.3, 1.3 Hz, 2H), 7.84 (s, 1H), 7.63 (dd, *J* = 9.2, 1.0 Hz, 1H), 7.43 (t, *J* = 7.6 Hz, 2H), 7.35-7.31 (m, 1H), 7.16 (ddd, *J* = 9.1, 6.8, 1.3 Hz, 1H), 6.76 (td, *J* = 6.8, 1.2 Hz, 1H).

Preparation of 1-Phenyl-1*H*-tetrazole 2x.[7] Aniline (1 mmol, 93 mg), NaN_3 (1.1 mmol, 71 mg) and triethyl orthoformate (3 mmol, 49 μL) were refluxed for 8 h in acetic acid. The reaction mixture was quenched with saturated $NaHCO_3$ (5 mL) and extraced using ethyl acetate (25 mL). Drying (Na_2SO_4) and evaporation of the solvent produced a residue, which was purified employing silica gel coloumn chromatography with 20% ethyl acetate in hexane to furnish **2w** as a colorless solid in 82% (120 mg) yield. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.02 (s, 1H), 7.73-7.69 (m, 2H), 7.61-7.51 (m, 3H).

General Procedure for the Assembly of Indazolylbenzocarbazoles 3. 7-Azabenzonorbornadiene (0.25 mmol), 2-aryl-2*H*-indazole (0.30 mmol), $Cu(OAc)_2$•H_2O (0.62 mmol), CsOAc (0.25 mmol) and $[Cp^*Rh(CH_3CN)_3](SbF_6)_2$ (5 mol %) were stirred in $(CH_2Cl)_2$ (2 ml) at 110 °C for 24 h under nitrogen. The progress of the reaction was monitored by TLC using ethyl acetate and hexane as an eluent. The reaction mixture was extracted using CH_2Cl_2 (25 mL) and was washed with water (5 mL). Drying (Na_2SO_4) and evaporation of the solvent gave a residue

that was purified on silica gel column chromatography using a 1:7 mixture of ethyl acetate in hexane as the eluent.

7-(2*H*-Indazol-2-yl)-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3a). Colorless solid; yield 61% (72 mg); mp 251-252 °C; R_f = 0.20 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (s, 1H), 7.96 (t, *J* = 8.6 Hz, 1H), 7.83 (d, *J* = 7.8 Hz, 1H), 7.72-7.64 (m, 5H), 7.49 (t, *J* = 7.8 Hz, 2H), 7.38-7.27 (m, 3H), 7.19-7.12 (m, 3H), 6.81 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.94 (d, *J* = 9.9 Hz, 1H), 5.70 (d, *J* = 10.0 Hz, 1H), 4.76 (dd, *J* = 9.9, 5.6 Hz, 1H), 3.97 (dd, *J* = 10.0, 5.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.7, 143.3, 138.1, 137.6, 133.7, 131.8, 131.7, 131.0, 129.5, 129.0, 128.9, 128.6, 128.5, 127.7, 127.1, 126.9, 126.6, 123.9, 122.9, 122.7, 122.3, 121.5, 120.5, 119.9, 118.0, 64.1, 40.2; FT-IR (KBr) 2847, 1634, 1400, 1261, 1171, 1091, 1017, 798, 751 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{21}N_3O_2S+H]^+$ 476.1427, found 476.1455.

7-(2*H*-Indazol-2-yl)-11-(*m*-tolylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3b). Colorless solid; yield 64% (78 mg); mp 259-260 °C; R_f = 0.22 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 1.0 Hz, 1H), 7.97 (d, *J* = 7.7 Hz, 1H), 7.83 (dd, *J* = 8.1, 1.0 Hz, 1H), 7.73-7.70 (m, 2H), 7.48-7.44 (m, 3H), 7.38-7.27 (m, 4H), 7.20-7.12 (m, 3H), 6.81 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.95 (dd, *J* = 9.9, 1.4 Hz, 1H), 5.67 (d, *J* = 10.0 Hz, 1H), 4.78 (dd, *J* = 9.9, 5.5 Hz, 1H), 3.99 (dd, *J* = 10.0, 5.6 Hz, 1H), 2.36 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.7, 143.4, 139.7, 137.9, 137.6, 134.5, 131.8, 131.7, 131.0, 129.4, 129.0, 128.9, 128.6, 128.5, 127.7, 127.6, 126.9, 126.6, 124.2, 123.9, 122.8, 122.7, 122.3, 121.6, 120.5, 119.9, 118.0, 64.0, 40.2, 21.5; FT-IR (KBr) 1629, 1600, 1520, 1400, 1326, 1172, 1135, 1103, 1072, 757 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{23}N_3O_2S+H]^+$ 490.1584, found 490.1612.

7-(2*H*-Indazol-2-yl)-11-((3-(trifluoromethyl)phenyl)sulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3c). Colorless solid; yield 66% (89 mg); mp 203-204 °C; R_f = 0.28 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (s, 1H), 7.91-7.85 (m, 4H), 7.81-7.79 (m, 1H), 7.70-7.72 (m, 2H), 7.59 (t, *J* = 7.8 Hz, 1H), 7.39 (td, *J* = 8.0, 0.8 Hz, 1H), 7.35-7.27 (m, 2H), 7.23 (dd, *J* = 7.9, 1.0 Hz, 1H), 7.19-7.13 (m, 2H), 6.79 (dd, *J* = 7.6, 1.3 Hz, 1H), 5.96 (dd, *J* = 9.9, 1.6 Hz, 1H), 5.69 (d, *J* = 9.6 Hz, 1H), 4.88 (dd, *J* = 9.8, 5.1 Hz, 1H), 4.12 (dd, *J* = 9.7, 4.9 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.8, 143.1, 139.6, 137.8, 132.1, 132.0, 131.7, 130.8, 130.3, 130.1 (q, *J* = 3.5 Hz),130.1, 129.73, 129.67, 129.1, 128.9, 128.4, 127.5, 127.0, 126.6, 124.5, 124.3 (q, *J* = 4.0 Hz), 123.6, 122.7, 122.6, 122.3, 122.2, 121.8, 120.5, 119.0, 118.0, 64.5, 40.4; ^{19}F NMR (377 MHz, $CDCl_3$) δ -62.82; FT-IR (KBr) 1627, 1598, 1520, 1400, 1351, 1157, 1085, 1027, 771 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{20}F_3N_3O_2S+H]^+$ 544.1301, found 544.1311.

11-((4-Bromophenyl)sulfonyl)-7-(2*H*-indazol-2-yl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3d). Colorless solid; yield 58% (80 mg); mp 223-224 °C; R_f = 0.36 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.93 (d, *J* = 7.8 Hz, 1H), 7.81 (d, *J* = 8.1 Hz, 1H), 7.73 (dd, *J* = 11.6, 8.7 Hz, 2H), 7.61 (d, *J* = 8.6 Hz, 2H), 7.52 (d, *J* = 8.6 Hz, 2H), 7.38-7.27 (m, 3H), 7.21-7.13 (m, 3H), 6.82 (d, *J* = 7.4 Hz, 1H), 5.96 (d, *J* = 9.8 Hz, 1H), 5.67 (d, *J* = 9.9 Hz, 1H), 4.82 (dd, *J* = 9.9, 5.5 Hz, 1H), 4.06 (dd, *J* = 10.0, 5.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.8, 143.1, 137.7, 137.2, 132.8, 131.8, 131.6, 130.6, 129.1, 129.0, 128.9, 128.63, 128.60, 128.58, 127.7, 127.0, 126.6, 123.9, 123.0, 122.7, 122.3, 121.6, 120.6, 119.6, 118.0, 64.2, 40.3; FT-IR (KBr) 2852, 2826, 1628, 1598, 1573, 1400, 1265, 1170, 1090, 1068, 758 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{20}BrN_3O_2S+H]^+$ 554.0532, found 554.0524.

11-((4-Chlorophenyl)sulfonyl)-7-(2*H*-indazol-2-yl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3e). Colorless solid; yield 62% (79 mg); mp 238-239 °C; R_f = 0.30 (1:7 ethyl acetate/hexane); ^{1}H

NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.94 (d, *J* = 7.8 Hz, 1H), 7.81 (d, *J* = 8.0 Hz, 1H), 7.72 (t, *J* = 9.1 Hz, 2H), 7.60 (d, *J* = 8.6 Hz, 2H), 7.45 (d, *J* = 8.6 Hz, 2H), 7.38-7.27 (m, 3H), 7.21-7.13 (m, 3H), 6.82 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.96 (d, *J* = 9.9 Hz, 1H), 5.67 (d, *J* = 9.9 Hz, 1H), 4.81 (dd, *J* = 9.9, 5.5 Hz, 1H), 4.06 (dd, *J* = 9.9, 5.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.8, 143.1, 140.4, 137.7, 136.7, 131.8, 131.6, 130.6, 129.9, 129.1, 129.0, 128.63, 128.61, 128.5, 127.7, 127.0, 126.6, 123.9, 122.9, 122.7, 121.6, 120.6, 119.6, 118.0, 64.2, 40.3; FT-IR (KBr) 1629, 1598, 1518, 1400, 1264, 1169, 1091, 1023, 759 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{20}ClN_3O_2S+H]^+$ 510.1038, found 510.1034.

7-(2*H*-Indazol-2-yl)-11-((4-iodophenyl)sulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3f). Colorless solid; yield 60% (90 mg); mp 220-221 °C; R_f = 0.36 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 (d, *J* = 1.0 Hz, 1H), 7.93 (d, *J* = 7.7 Hz, 1H), 7.84-7.79 (m, 3H), 7.73 (ddd, *J* = 13.7, 8.7, 1.1 Hz, 2H), 7.38-7.33 (m, 4H), 7.29 (td, *J* = 7.6, 1.4 Hz, 1H), 7.21-7.13 (m, 3H), 6.82 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.96 (d, *J* = 9.9 Hz, 1H), 5.66 (d, *J* = 9.9 Hz, 1H), 4.81 (dd, *J* = 9.9, 5.5 Hz, 1H), 4.04 (dd, *J* = 10.0, 5.5 Hz, 1H);^{13}C NMR (101 MHz, $CDCl_3$) δ 149.8, 143.1, 138.7, 137.8, 137.7, 131.8, 131.7, 130.6, 129.1, 129.0, 128.62, 128.60, 128.4, 127.7, 127.0, 126.6, 123.8, 123.0, 122.7, 122.3, 121.6, 120.5, 119.6, 118.0, 101.5, 64.2, 40.2; FT-IR (KBr) 1628, 1599, 1567, 1491, 1400, 1265, 1169, 1091, 1054, 758 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{20}IN_3O_2S+H]^+$ 602.0394, found 602.0394.

7-(2*H*-Indazol-2-yl)-11-tosyl-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3g). Colorless solid; yield 47% (57 mg); mp 264-265 °C; R_f = 0.24 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 0.9 Hz, 1H), 7.98 (d, *J* = 7.8 Hz, 1H), 7.82 (d, *J* = 8.0 Hz, 1H), 7.72-7.69 (m, 2H), 7.57 (d, *J* = 8.2 Hz, 2H), 7.37-7.26 (m, 5H), 7.15 (ddd, *J* = 11.2, 6.5, 3.7 Hz, 3H), 6.81 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.94 (d, *J* = 9.9 Hz, 1H), 5.68 (d, *J* = 10.1 Hz, 1H), 4.76 (dd, *J* = 9.9, 5.6

Hz, 1H), 3.99 (dd, *J* = 10.1, 5.7 Hz, 1H), 2.46 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.7, 144.7, 143.3, 137.5, 135.1, 131.9, 131.7, 131.2, 130.2, 128.9, 128.8, 128.6, 128.4, 127.7, 127.2, 126.9, 126.6, 124.0, 122.9, 122.6, 122.3, 121.5, 120.6, 119.9, 117.9, 63.9, 40.2, 21.8; FT-IR (KBr) 1647, 1632, 1598, 1493, 1400, 1265, 1167, 1091, 740 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{23}N_3O_2S+H]^+$ 490.1584, found 490.1582.

7-(2*H*-Indazol-2-yl)-11-((4-methoxyphenyl)sulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3h). Colorless solid; yield 54% (68 mg); mp 261-262 °C; R_f = 0.34 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (d, *J* = 1.0 Hz, 1H), 7.98 (d, *J* = 7.8 Hz, 1H), 7.81 (dd, *J* = 8.1, 1.0 Hz, 1H), 7.74-7.69 (m, 2H), 7.61 (d, *J* = 8.9 Hz, 2H), 7.37-7.27 (m, 3H), 7.18-7.13 (m, 3H), 6.94 (d, *J* = 8.9 Hz, 2H), 6.81 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.95 (d, *J* = 10.0 Hz, 1H), 5.66 (d, *J* = 10.1 Hz, 1H), 4.77 (dd, *J* = 9.9, 5.6 Hz, 1H), 4.00 (dd, *J* = 10.1, 5.6 Hz, 1H), 3.89 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.7, 149.7, 143.5, 137.5, 132.0, 131.7, 131.3, 129.6, 129.3, 128.9, 128.8, 128.6, 128.4, 127.7, 126.9, 126.6, 124.0, 122.9, 122.7, 122.3, 121.5, 120.6, 120.1, 117.9, 114.8, 63.9, 55.8, 40.2; FT-IR (KBr) 1630, 1594, 1520, 1495, 1158, 1090, 1021, 739 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{23}N_3O_3S+H]^+$ 506.1533 found 506.1535.

7-(2*H*-Indazol-2-yl)-11-((4-nitrophenyl)sulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3i). Colorless solid; yield 51% (66 mg); mp 208-209 °C; R_f = 0.52 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.28 (d, *J* = 8.8 Hz, 2H), 8.09 (d, *J* = 0.9 Hz, 1H), 7.90 (d, *J* = 7.7 Hz, 1H), 7.85 (dd, *J* = 8.1, 0.9 Hz, 1H), 7.81 (d, *J* = 8.8 Hz, 2H), 7.72-7.67 (m, 2H), 7.40 (td, *J* = 8.0, 0.9 Hz, 1H), 7.35-7.28 (m, 2H), 7.24 -7.12 (m, 3H), 6.80 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.95 (dd, *J* = 10.0, 1.5 Hz, 1H), 5.71 (d, *J* = 9.6 Hz, 1H), 4.87 (dd, *J* = 9.9, 5.2 Hz, 1H), 4.13 (dd, *J* = 9.6, 5.3 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 150.6, 149.8, 144.0, 142.8, 137.9, 132.0, 131.0, 129.7, 129.5, 129.2, 129.0, 128.5, 128.3, 127.6, 127.1, 126.7, 124.6, 123.7, 122.8, 122.3, 122.0, 120.5,

119.0, 117.9, 64.6, 40.4; FT-IR (KBr) 1936, 1630, 1603, 1529, 1491, 1400, 1311, 1266, 1172, 1093, 1036, 737 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{20}N_4O_4S+H]^+$ 521.1278, found 521.1289.

11-((4-(*tert*-Butyl)phenyl)sulfonyl)-7-(2*H*-indazol-2-yl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3j). Colorless solid; yield 63% (84 mg); mp 226-227 °C; R_f = 0.42 (1:7 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 1.0 Hz, 1H), 7.97 (d, *J* = 7.7 Hz, 1H), 7.81 (dd, *J* = 8.0, 1.0 Hz, 1H), 7.69 (dt, *J* = 8.4, 1.1 Hz, 1H), 7.66 (dd, *J* = 8.8, 1.0 Hz, 1H), 7.56 (d, *J* = 8.6 Hz, 2H), 7.48 (d, *J* = 8.6 Hz, 2H), 7.38-7.29 (m, 3H), 7.20-7.12 (m, 3H), 6.80 (d, *J* = 7.0 Hz, 1H), 5.94 (d, *J* = 10.2 Hz, 1H), 5.66 (d, *J* = 10.0 Hz, 1H), 4.73 (dd, *J* = 9.9, 5.6 Hz, 1H), 3.87 (dd, *J* = 10.0, 5.6 Hz, 1H), 1.39 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 157.7, 149.7, 143.5, 137.5, 134.7, 132.1, 131.7, 131.1, 129.0, 128.8, 128.6, 128.4, 127.6, 127.1, 126.9, 126.6, 126.5, 123.7, 122.8, 122.6, 122.3, 121.6, 120.5, 120.1, 117.9, 64.0, 40.1, 35.4, 31.2; FT-IR (KBr) 2970, 1930, 1629, 1599, 1489, 1451, 1400, 1267, 1169, 1089, 1021, 759 cm^{-1}; HRMS (ESI) calcd for $[C_{33}H_{29}N_3O_2S+H]^+$ 532.2053, found 532.2061.

7-(2*H*-Indazol-2-yl)-11-(naphthalen-2-ylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3k). Colorless solid; yield 65% (85 mg); mp 265-266 °C; R_f = 0.26 (1:7 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 8.33 (d, *J* = 1.8 Hz, 1H), 8.02 (d, *J* = 7.7 Hz, 1H), 7.96 (d, *J* = 9.9 Hz, 1H), 7.93-7.89 (m, 4H), 7.71-7.60 (m, 4H), 7.55 (dd, *J* = 8.7, 1.9 Hz, 1H), 7.39 (t, *J* = 8.0 Hz, 1H), 7.30 (qd, *J* = 8.6, 8.1, 1.2 Hz, 2H), 7.20-7.09 (m, 3H), 6.78 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.91 (d, *J* = 10.1 Hz, 1H), 5.75 (d, *J* = 9.9 Hz, 1H), 4.73 (dd, *J* = 9.9, 5.5 Hz, 1H), 3.95 (dd, *J* = 10.0, 5.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.6, 143.4, 137.6, 135.3, 135.2, 132.2, 131.8, 131.6, 130.9, 129.9, 129.5, 129.3, 129.1, 128.9, 128.6, 128.5, 128.2, 127.9, 127.7, 126.8, 126.6, 123.9, 122.9, 122.6, 122.2, 122.0, 121.6, 120.5, 119.7, 117.9, 64.1, 40.2; FT-IR (KBr) 1626, 1595, 1522,1491,

1400, 1350, 1263, 1164, 1131, 1089, 754 cm^{-1}; HRMS (ESI) calcd for $[C_{33}H_{23}N_3O_2S+H]^+$ 526.1584, found 526.1597.

7-(2*H*-Indazol-2-yl)-11-(thiophen-2-ylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3l). Colorless solid; yield 70% (84 mg); mp 211-212 °C; R_f = 0.16 (1:7 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 8.05 (d, *J* = 0.9 Hz, 1H), 7.94 (d, *J* = 7.8 Hz, 1H), 7.79 (dd, *J* = 8.1, 1.0 Hz, 1H), 7.73 (td, *J* = 8.4, 1.1 Hz, 2H), 7.66 (dd, *J* = 5.0, 1.3 Hz, 1H), 7.48 (dd, *J* = 3.8, 1.3 Hz, 1H), 7.39-7.27 (m, 3H), 7.23-7.11 (m, 4H), 6.84 (dd, *J* = 7.6, 1.3 Hz, 1H), 5.98 (dd, *J* = 9.9, 1.4 Hz, 1H), 5.78 (d, *J* = 10.1 Hz, 1H), 4.79 (dd, *J* = 9.9, 5.5 Hz, 1H), 4.17 (dd, *J* = 10.2, 5.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.8, 142.7, 137.6, 137.4, 133.4, 132.9, 132.1, 131.7, 131.0, 128.9, 128.9, 128.6, 128.5, 127.9, 127.7, 127.0, 126.7, 124.0, 123.3, 122.7, 122.3, 121.4, 120.6, 120.4, 118.0, 64.4, 40.2; FT-IR (KBr) 3013, 2923, 2851, 1629, 1599, 1519, 1491, 1450, 1400, 1261, 1165, 1093, 757 cm^{-1}; HRMS (ESI) calcd for $[C_{27}H_{19}N_3O_2S_2+H]^+$ 482.0991, found 482.1006.

7-(2*H*-Indazol-2-yl)-11-(methylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3n). Colorless solid; yield 62% (64 mg); mp 193-194 °C; R_f = 0.22 (1:4 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 8.11 (d, *J* = 1.0 Hz, 1H), 7.76-7.71 (m, 2H), 7.69 (dd, *J* = 8.5, 1.1 Hz, 1H), 7.58 (dd, *J* = 8.1, 0.9 Hz, 1H), 7.34-7.24 (m, 2H), 7.21-7.17 (m, 1H), 7.15-7.09 (m, 3H), 6.80 (dd, *J* = 7.5, 1.3 Hz, 1H), 6.00 (d, *J* = 9.6 Hz, 1H), 5.70 (d, *J* = 9.8 Hz, 1H), 4.95-4.78 (m, 2H), 2.84 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.9, 143.2, 137.9, 131.8, 130.7, 130.7, 129.5, 129.2, 128.7, 128.6, 127.7, 127.2, 126.6, 124.0, 122.8, 122.39, 122.37, 121.9, 120.7, 118.7, 117.9, 64.3, 40.8, 37.8; FT-IR (KBr) 2929, 1938, 1627, 1600, 1519, 1491, 1452, 1399, 1349, 1267, 1161, 1095, 762 cm^{-1}; HRMS (ESI) calcd for $[C_{24}H_{19}N_3O_2S+H]^+$ 414.1271, found 414.1295.

***tert*-Butyl 7-(2*H*-indazol-2-yl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole-11-carboxylate (3o).** Colorless solid; yield 37% (40 mg); mp 108-109 °C; R_f = 0.42 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 (d, *J* = 1.0 Hz, 1H), 7.81 (dd, *J* = 8.8, 1.1 Hz, 1H), 7.75 (dt, *J* = 8.5, 1.1 Hz, 1H), 7.69 (d, *J* = 8.1 Hz, 1H), 7.49-7.46 (m, 1H), 7.37 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.29-7.24 (m, 1H), 7.21-7.12 (m, 3H), 7.04 (dd, *J* = 7.9, 1.0 Hz, 1H), 6.85 (dd, *J* = 7.4, 1.5 Hz, 1H), 6.02 (d, *J* = 9.9 Hz, 1H), 5.95 (d, *J* = 10.2 Hz, 1H), 4.96 (dd, *J* = 9.9, 5.7 Hz, 1H), 4.74 (dd, *J* = 10.2, 5.7 Hz, 1H), 1.65 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.4, 149.6, 144.0, 137.4, 132.8, 132.1, 129.9, 128.4, 128.2, 128.1, 127.7, 127.5, 126.8, 126.7, 123.9, 122.55, 122.4, 122.3, 120.6, 120.5, 118.1, 117.7, 82.1, 61.2, 40.1, 28.6; FT-IR (KBr) 1700, 1603, 1519, 1457, 1399, 1298, 1261, 1155, 1040, 740 cm^{-1}; HRMS (ESI) calcd for $[C_{28}H_{25}N_3O_2+H]^+$ 436.2020, found 436.2037.

Benzyl 7-(2*H*-indazol-2-yl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole-11-carboxylate (3p). Colorless solid; yield 55% (64 mg); mp 219-220 °C; R_f = 0.30 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 (d, *J* = 1.0 Hz, 1H), 7.82-7.73 (m, 3H), 7.46-7.35 (m, 7H), 7.29 (dd, *J* = 8.0, 0.9 Hz, 1H), 7.19-7.11 (m, 3H), 7.08 (dd, *J* = 8.0, 0.9 Hz, 1H), 6.87-6.84 (m, 1H), 6.03 (d, *J* = 9.1 Hz, 1H), 5.99 (d, *J* = 10.0 Hz, 1H), 5.40 (d, *J* = 1.2 Hz, 2H), 5.00 (dd, *J* = 9.9, 5.5 Hz, 1H), 4.76 (dd, *J* = 10.0, 5.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.2, 149.7, 143.6, 137.5, 135.9, 132.2, 131.9, 129.6, 128.8, 128.6, 128.5, 128.3, 128.2, 127.8, 127.7, 126.8, 126.7, 123.9, 122.6, 122.6, 122.3, 120.8, 120.6, 118.1, 117.6, 68.1, 61.6, 40.2; FT-IR (KBr) 1706, 1629, 1603, 1519, 1492, 1462, 1400, 1349, 1282, 1144, 1041, 755 cm^{-1}; HRMS (ESI) calcd for $[C_{31}H_{23}N_3O_2+H]^+$ 470.1863, found 470.1876.

2,3-Difluoro-7-(2*H*-indazol-2-yl)-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3q). Colorless solid; yield 72% (92 mg); mp 164-165 °C; R_f = 0.20 (1:6 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (s, 1H), 7.85-7.80 (m, 2H), 7.71-7.65 (m, 5H),

7.52-7.48 (m, 2H), 7.40 (td, *J* = 8.0, 0.9 Hz, 1H), 7.34-7.32 (m, 1H), 7.21 (dd, *J* = 8.0, 1.0 Hz, 1H), 7.17-7.13 (m, 1H), 6.62 (dd, *J* = 10.4, 7.7 Hz, 1H), 5.83 (d, *J* = 10.5 Hz, 1H), 5.60 (d, *J* = 10.1 Hz, 1H), 4.81 (dd, *J* = 9.9, 5.6 Hz, 1H), 3.97 (dd, *J* = 10.0, 5.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 151.3 (dd, *J* = 21.4, 12.8 Hz), 149.8, 148.8 (dd, *J* = 22.0, 13.0 Hz), 143.0, 137.7 (d, *J* = 11.1 Hz), 133.9, 131.2, 129.6, 129.8, 128.7 (dd, *J* = 6.2, 3.8 Hz), 128.0 (dd, *J* = 5.4, 3.8 Hz), 127.2, 127.0, 125.8, 123.8, 123.1, 122.8, 122.5, 122.4, 122.3, 120.6, 119.9, 118.5 (d, *J* = 19.4 Hz), 117.9, 115.0 (d, *J* = 17.9 Hz), 63.3, 39.8; ^{19}F NMR (377 MHz, $CDCl_3$) δ -136.71 (d, *J* = 21.2 Hz), -138.90 (d, *J* = 21.1 Hz); FT-IR (KBr) 2327, 1936, 1599, 1512, 1399, 1211, 1170, 1094, 745 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{19}F_2N_3O_2S+H]^+$ 512.1239, found 512.1248.

7-(2*H*-Indazol-2-yl)-2,3-dimethoxy-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3r). Colorless solid; yield 66% (88 mg); mp 117-118 °C; R_f = 0.25 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 0.9 Hz, 1H), 7.84 (dd, *J* = 8.1, 1.0 Hz, 1H), 7.72-7.63 (m, 5H), 7.54 (s, 1H), 7.49 (t, *J* = 7.9 Hz, 2H), 7.39-7.31 (m, 2H), 7.20-7.12 (m, 2H), 6.32 (s, 1H), 5.84 (dd, *J* = 9.9, 1.4 Hz, 1H), 5.65 (d, *J* = 10.2 Hz, 1H), 4.64 (dd, *J* = 9.8, 5.6 Hz, 1H), 4.00 (s, 3H), 3.97-3.93 (m, 1H), 3.78 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.7, 149.0, 148.8, 143.0, 138.0, 137.6, 133.7, 132.0, 129.5, 128.8, 127.13, 127.08, 126.9, 124.7, 123.9, 123.3, 123.0, 122.6, 122.3, 120.5, 119.9, 119.7, 118.0, 112.0, 109.6, 64.1, 56.2, 56.0, 39.9; FT-IR (KBr) 1653, 1600, 1518, 1400, 1268, 1169, 1035, 1095, 738 cm^{-1}; HRMS (ESI) calcd for $[C_{31}H_{25}N_3O_4S+H]^+$ 536.1639, found 536.1647**.**

7-(2*H*-Indazol-2-yl)-8-methoxy-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3t). Colorless solid; yield 71% (90 mg); mp 222-223 °C; R_f = 0.32 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (d, *J* = 7.8 Hz, 1H), 7.89 (d, *J* = 1.0 Hz, 1H), 7.70 (d, *J* = 8.8 Hz, 1H), 7.64-7.59 (m, 5H), 7.47-7.43 (m, 2H), 7.27-7.20 (m, 2H), 7.12-7.03 (m, 2H), 6.85 (dd, *J* =

8.9, 0.9 Hz, 1H), 6.76 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.84 (d, *J* = 9.9 Hz, 1H), 5.55 (d, *J* = 10.0 Hz, 1H), 4.17 (dd, *J* = 9.8, 5.8 Hz, 1H), 3.68-3.64 (m, 4H, methoxy protons merged); ^{13}C NMR (101 MHz, $CDCl_3$) δ 152.6, 149.2, 137.9, 135.4, 135.0, 133.7, 131.7, 131.3, 129.6, 128.6, 128.6, 128.4, 127.7, 127.2, 126.8, 126.6, 126.6, 126.4, 122.2, 121.7, 121.1, 120.7, 120.6, 117.9, 111.2, 64.1, 56.5, 40.2; FT-IR (KBr) 2959, 2926, 2854, 1739, 1628, 1522, 1495, 1400, 1264, 1169, 1090, 1074, 757 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{23}N_3O_3S+H]^+$ 506.1533, found 506.1554.

8-(Difluoromethoxy)-7-(2*H*-indazol-2-yl)-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3u). Colorless solid; yield 76% (103 mg); mp 114-115 °C; R_f = 0.20 (1:6 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96-7.95 (m, 2H), 7.81 (d, *J* = 8.8 Hz, 1H), 7.73-7.67 (m, 5H), 7.53 (t, *J* = 7.8 Hz, 1H), 7.36-7.28 (m, 2H), 7.26-7.12 (m, 4H), 6.84 (dd, *J* = 7.5, 1.3 Hz, 1H), 6.27 (dd, $J_{H,F}$ = 74.0, 72.1 Hz, 1H), 5.93 (d, *J* = 9.9 Hz, 1H), 5.66 (d, *J* = 10.0 Hz, 1H), 4.26 (dd, *J* = 9.9, 5.8 Hz, 1H), 3.81 (dd, *J* = 10.0, 5.8 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.5, 139.9, 138.0, 135.6, 134.0, 131.6, 130.8, 130.0, 129.7, 128.8, 128.7, 128.6, 128.2, 127.1, 126.7, 126.5, 122.7, 121.9, 120.8, 120.7, 120.39, 120.37, 117.9, 115.7 (t, $J_{C,F}$ = 264.8 Hz), 64.4, 40.3; ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.9 (d, $J_{F,H}$ = 163.5 Hz), -81.9 (d, $J_{F,H}$ = 163.5 Hz); FT-IR (KBr) 1630, 1523, 1493, 1400, 1266, 1168, 1123, 1089, 1057, 747 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{21}F_2N_3O_3S+H]^+$ 542.1344, found 542.1362.

9-Chloro-7-(2*H*-indazol-2-yl)-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3w). Colorless solid; yield 75% (95 mg); mp 207-208 °C; R_f = 0.30 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.94 (d, *J* = 0.9 Hz, 1H), 7.85 (d, *J* = 7.7 Hz, 1H), 7.76 (d, *J* = 1.8 Hz, 1H), 7.65-7.57 (m, 5H), 7.43 (t, *J* = 7.9 Hz, 2H), 7.28-7.18 (m, 2H), 7.12-7.05 (m, 3H), 6.73 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.87 (dd, *J* = 9.9, 1.4 Hz, 1H), 5.61 (d, *J* = 9.8 Hz, 1H), 4.75 (dd, *J* = 9.9, 5.5 Hz, 1H), 3.90 (ddd, *J* = 9.8, 5.5, 1.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ δ 149.8, 144.4,

138.0, 137.9, 134.2, 133.9, 131.7, 130.4, 130.0, 129.6, 129.1, 128.7, 128.7, 127.9, 127.2, 127.1, 126.7, 123.8, 123.0, 122.7, 122.4, 121.3, 120.6, 119.7, 118.0, 64.5, 40.0; FT-IR (KBr) 2926, 2854, 1629, 1596, 1519, 1486, 1448, 1421, 1400, 1265, 1168, 1030, 756 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{20}ClN_3O_2S+H]^+$ 510.1038, found 510.1054.

9-Fluoro-7-(2*H*-indazol-2-yl)-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3x). Colorless solid; yield 72% (89 mg); mp 199-200 °C; R_f = 0.28 (1:7 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 7.95 (d, *J* = 0.9 Hz, 1H), 7.86 (d, *J* = 7.7 Hz, 1H), 7.65-7.57 (m, 5H), 7.53 (dd, *J* = 9.0, 2.3 Hz, 1H), 7.43 (t, *J* = 7.9 Hz, 2H), 7.29-7.21 (m, 2H), 7.13-7.06 (m, 2H), 6.86 (dd, *J* = 8.8, 2.3 Hz, 1H), 6.74 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.88 (d, *J* = 10.0 Hz, 1H), 5.62 (d, *J* = 9.8 Hz, 1H), 4.78 (dd, *J* = 9.9, 5.4 Hz, 1H), 3.99-3.92 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 162.2 (d, *J* = 247.3 Hz), 149.8, 144.6 (d, *J* = 12.8 Hz), 138.1, 137.8 (d, *J* = 11.6 Hz), 133.9, 131.8, 130.4, 129.6, 129.3, 128.7, 128.6, 127.8, 127.2, 127.1, 126.9 (d, *J* = 3.2 Hz), 126.6, 123.7, 123.0, 122.4, 121.7, 120.6, 118.00, 109.9 (d, *J* = 25.7 Hz), 107.4 (d, *J* = 27.0 Hz), 64.7, 39.8; ^{19}F NMR (377 MHz, $CDCl_3$) δ -110.9; FT-IR (KBr) 2926, 2857, 2312, 1921, 1610, 1519, 1492, 1445, 1397, 1362, 1170, 1093, 1038, 746 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{20}FN_3O_2S+H]^+$ 494.1333, found 494.1333.

7-(2*H*-Indazol-2-yl)-9-methyl-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3y). Colorless solid; yield 76% (93 mg); mp 221-222 °C; R_f = 0.26 (1:7 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 7.97-7.95 (m, 2H), 7.72-7.64 (m, 6H), 7.49 (t, *J* = 7.9 Hz, 2H), 7.35-7.26 (m, 2H), 7.17-7.11 (m, 2H), 7.02 (s, 1H), 6.80 (dd, *J* = 7.6, 1.3 Hz, 1H), 5.92 (d, *J* = 9.9 Hz, 1H), 5.67 (d, *J* = 9.9 Hz, 1H), 4.78 (dd, *J* = 9.9, 5.6 Hz, 1H), 3.87 (dd, *J* = 9.9, 5.6 Hz, 1H), 2.42 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.6, 143.2, 139.5, 138.1, 137.1, 133.7, 131.7, 131.1, 129.5, 128.9, 128.8, 128.6, 128.4, 127.5, 127.2, 126.8, 126.6, 123.8, 123.7, 122.6, 122.2, 121.7,

120.6, 120.5, 118.0, 64.2, 39.8, 21.5; FT-IR (KBr) 2521, 2310, 1929, 1616, 1593, 1519, 1490, 1400, 1357, 1266, 1169, 1041, 738 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{23}N_3O_2S+H]^+$ 490.1584, found 490.1591.

7-(2*H*-Indazol-2-yl)-9-methoxy-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3z). Colorless solid; yield 80% (101 mg); mp 233-234 °C; R_f = 0.42 (1:4 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 7.98 (d, *J* = 1.0 Hz, 1H), 7.96 (d, *J* = 7.8 Hz, 1H), 7.73-7.64 (m, 5H), 7.50 (t, *J* = 7.9 Hz, 2H), 7.42 (d, *J* = 2.3 Hz, 1H), 7.35-7.27 (m, 2H), 7.18-7.11 (m, 2H), 6.80 (dd, *J* = 7.5, 1.3 Hz, 1H), 6.74 (d, *J* = 2.3 Hz, 1H), 5.92 (d, *J* = 10.0 Hz, 1H), 5.68 (d, *J* = 9.8 Hz, 1H), 4.80 (dd, *J* = 9.9, 5.5 Hz, 1H), 3.91-3.87 (m, 1H), 3.86 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.2, 149.6, 144.2, 138.2, 137.7, 133.7, 131.8, 131.1, 129.5, 129.0, 128.6, 128.5, 127.4, 127.2, 126.9, 126.6, 123.8, 123.4, 122.7, 122.2, 122.0, 120.5, 118.0, 109.3, 105.8, 64.6, 56.2, 39.6; FT-IR (KBr) 2852, 1615, 1594, 1494, 1400, 1357, 1261, 1193, 1090, 1047, 757 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{23}N_3O_3S+H]^+$ 506.1533, found 506.1540.

N-(3-(2*H*-Indazol-2-yl)-2-(naphthalen-2-yl)-5-(trifluoromethyl)phenyl)benzenesulfonamide (3aa). Yellow solid; yield 43% (58 mg); mp 191-192 °C; R_f = 0.16 (1:7 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 8.22 (d, *J* = 1.7 Hz, 1H), 7.85 (d, *J* = 1.7 Hz, 1H), 7.81 (d, *J* = 7.0 Hz, 1H), 7.71 (d, *J* = 8.4 Hz, 1H), 7.66-7.60 (m, 3H), 7.57-7.52 (m, 4H), 7.44 (dd, *J* = 8.4, 7.3 Hz, 2H), 7.40 (d, *J* = 1.0 Hz, 1H), 7.27 (d, *J* = 7.2 Hz, 2H), 7.20 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 6.91 (dd, *J* = 8.5, 6.5 Hz, 1H), 6.72 (dd, *J* = 8.4, 1.8 Hz, 1H), 6.68 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.3, 140.7, 138.4, 136.6, 133.9, 133.19, 133.18, 132.3, 131.9, 131.51, 131.50, 130.3, 129.5, 128.7, 128.5, 128.3, 128.1, 127.7, 127.4, 127.3, 127.2, 125.7, 125.1, 122.5, 122.0, 120.5, 120.4, 120.4, 117.7, 117.6; ^{19}F NMR (377 MHz, $CDCl_3$) δ -62.94; FT-IR (KBr) 3333, 1629, 1584, 1516,

1473, 1401, 1330, 1268, 1172, 1133, 1103, 746 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{20}F_3N_3O_2S+H]^+$ 544.1301, found 544.1314.

N-(3-(2*H*-Indazol-2-yl)-2-(naphthalen-2-yl)-5-nitrophenyl)benzenesulfonamide (3ab). Yellow solid; yield 51% (66 mg); mp 202-203 °C; R_f = 0.74 (1:4 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 8.76 (d, *J* = 2.3 Hz, 1H), 8.43 (d, *J* = 2.3 Hz, 1H), 7.83 (d, *J* = 7.1 Hz, 1H), 7.76 (d, *J* = 8.4 Hz, 1H), 7.69-7.54 (m, 7H), 7.48 (dd, *J* = 8.5, 7.3 Hz, 2H), 7.41 (d, *J* = 1.0 Hz, 1H), 7.35-7.34 (m, 1H), 7.27 (d, *J* = 9.4 Hz, 1H), 7.22 (ddd, *J* = 8.9, 6.5, 1.1 Hz, 1H), 6.93 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H), 6.79-6.76 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.5, 148.2, 141.0, 138.4, 137.2, 134.1, 133.5, 133.3, 133.2, 130.5, 129.7, 128.7, 128.3, 128.2, 128.0, 127.6, 127.5, 127.4, 125.3, 125.0, 122.8, 122.2, 120.5, 118.2, 117.8, 114.7; FT-IR (KBr) 3468, 2782, 2261, 1636, 1530, 1401, 1352, 1268, 1167, 1091, 735 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{20}N_4O_4S+H]^+$ 521.1278, found 521.1281.

7-(2*H*-Indazol-2-yl)-12-(phenylsulfonyl)-6a,8,9,10,12,12a-hexahydrobenzo[*a*]cyclopenta[*h*]carbazole (3ac). Colorless solid; yield 61% (78 mg); mp 211-212 °C; R_f = 0.22 (1:7 ethyl acetate/hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 7.97 (d, *J* = 7.6 Hz, 1H), 7.86 (s, 1H), 7.73-7.64 (m, 5H), 7.51 (t, *J* = 7.8 Hz, 2H), 7.35-7.28 (m, 3H), 7.17-7.12 (m, 2H), 6.81 (d, *J* = 7.4 Hz, 1H), 5.90 (d, *J* = 9.9 Hz, 1H), 5.62 (d, *J* = 9.8 Hz, 1H), 4.34 (dd, *J* = 9.8, 5.8 Hz, 1H), 3.68 (dd, *J* = 9.8, 6.0 Hz, 1H), 3.05-2.93 (m, 2H), 2.82 (dt, *J* = 16.2, 8.1 Hz, 1H), 2.51 (ddd, *J* = 16.1, 8.5, 4.8 Hz, 1H), 2.12-2.02 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.3, 146.6, 141.5, 138.4, 138.3, 133.6, 131.8, 131.4, 130.7, 129.6, 129.2, 129.1, 128.6, 128.3, 127.5, 127.2, 126.7, 126.6, 124.6, 122.5, 121.9, 121.5, 120.5, 118.0, 116.6, 64.4, 39.7, 33.5, 30.5, 25.7; FT-IR (KBr) 1634, 1520, 1401, 1266, 1168, 1092, 1021, 741 cm^{-1}; HRMS (ESI) calcd for $[C_{32}H_{25}N_3O_2S+H]^+$ 516.1740, found 514. 1760.

7-(5-Fluoro-2*H*-indazol-2-yl)-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3ah). Colorless solid; yield 68% (84 mg); mp 257-258 °C; R_f = 0.26 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98-7.94 (m, 2H), 7.83 (dd, *J* = 8.1, 0.9 Hz, 1H), 7.70-7.64 (m, 4H), 7.48 (dd, *J* = 8.3, 7.4 Hz, 2H), 7.36 (td, *J* = 8.0, 0.9 Hz, 1H), 7.32-7.25 (m, 2H), 7.19-7.11 (m, 3H), 6.82 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.96 (d, *J* = 9.5 Hz, 1H), 5.69 (d, *J* = 10.0 Hz, 1H), 4.73 (dd, *J* = 9.9, 5.6 Hz, 1H), 3.93 (dd, *J* = 10.0, 5.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.8 (d, *J* = 241.0 Hz), 147.1, 143.3, 138.0, 137.4, 133.7, 131.74, 131.70, 130.9, 129.5, 129.2, 129.0, 128.98 (d, *J* = 3.9 Hz), 128.5, 127.8, 127.1, 126.6, 124.0, 122.8, 121.6, 121.5, 121.3, 120.1, 120.06, 120.0, 118.7 (d, *J* = 29.2 Hz), 102.9 (d, *J* = 24.5 Hz), 64.1, 40.1; FT-IR (KBr) 3013, 2845, 2783, 1637, 1524, 1400, 1265, 1167, 1090, 1025, 740 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{20}FN_3O_2S+H]^+$ 494.1333, found 494.1341.

7-(5-Methoxy-2*H*-indazol-2-yl)-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3ai). Colorless solid; yield 49% (62 mg); mp 191-192 °C; R_f = 0.36 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97 (d, *J* = 7.7 Hz, 1H), 7.85 (d, *J* = 1.0 Hz, 1H), 7.81 (dd, *J* = 8.1, 1.0 Hz, 1H), 7.69-7.65 (m, 2H), 7.60 (d, *J* = 9.4 Hz, 1H), 7.50-7.46 (m, 2H), 7.37-7.27 (m, 3H), 7.18-7.15 (m, 2H), 7.03 (dd, *J* = 9.4, 2.4 Hz, 1H), 6.88 (d, *J* = 2.3 Hz, 1H), 6.81 (dd, *J* = 7.7, 1.3 Hz, 1H), 5.96 (d, *J* = 9.6 Hz, 1H), 5.69 (d, *J* = 10.0 Hz, 1H), 4.81 (dd, *J* = 9.9, 5.5 Hz, 1H), 3.96 (dd, *J* = 10.1, 5.7 Hz, 1H), 3.85 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 155.7, 146.7, 143.2, 138.1, 137.7, 133.7, 131.7, 131.6, 131.0, 129.5, 129.0, 128.8, 128.6, 128.5, 127.6, 127.2, 126.6, 122.84, 122.80, 122.3, 122.1, 121.7, 119.7, 119.3, 96.3, 64.0, 55.5, 40.2; FT-IR (KBr) 1735, 1636, 1594, 1527, 1493, 1400, 1265, 1225, 1164, 1089, 733 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{23}N_3O_3S+H]^+$ 506.1533, found 506.1549.

7-((2*H*-Indazol-2-yl)methyl)-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3aj). Colorless solid; yield 65% (79 mg); mp 245-246 °C; R_f = 0.24 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (d, *J* = 7.7 Hz, 1H), 7.76 (dd, *J* = 8.1, 1.0 Hz, 1H), 7.67 (dd, *J* = 8.8, 1.1 Hz, 1H), 7.55-7.50 (m, 3H), 7.45-7.41 (m, 1H), 7.32-7.27 (m, 6H), 7.19 (tt, *J* = 7.5, 1.1 Hz, 1H), 7.10 (ddd, *J* = 8.4, 6.6, 0.9 Hz, 1H), 6.97 (dd, *J* = 7.6, 1.0 Hz, 1H), 6.91 (dd, *J* = 7.5, 1.3 Hz, 1H), 6.33 (d, *J* = 9.8 Hz, 1H), 5.99 (dd, *J* = 9.8, 6.0 Hz, 1H), 5.73 (d, *J* = 14.8 Hz, 1H), 5.56 (d, *J* = 9.5 Hz, 1H), 5.31 (d, *J* = 14.8 Hz, 1H), 3.08 (dd, *J* = 9.5, 6.0 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 148.9, 142.5, 138.0, 135.3, 133.3, 131.7, 131.6, 129.2, 128.9, 128.8, 128.5, 128.1, 126.9, 126.7, 126.2, 122.2, 122.0, 121.9, 121.7, 120.6, 120.1, 117.7, 64.0, 55.5, 40.8; FT-IR (KBr) 1628, 1604, 1587, 1400, 1348, 1226, 1164, 1091, 1044, 748 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{23}N_3O_2S+H]^+$ 490.1584, found 490.1588.

7-((2*H*-Indazol-2-yl)methyl)-8-methyl-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3ak). Colorless solid; yield 62% (78 mg); mp 218-219 °C; R_f = 0.57 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (d, *J* = 7.7 Hz, 1H), 7.70-7.65 (m, 2H), 7.59-7.56 (m, 2H), 7.52-7.48 (m, 2H), 7.47-7.27 (m, 4H), 7.22-7.17 (m, 2H), 7.09-7.04 (m, 2H), 6.88 (dd, *J* = 7.5, 1.3 Hz, 1H), 6.23 (d, *J* = 9.8 Hz, 1H), 5.91 (dd, *J* = 9.8, 6.1 Hz, 1H), 5.66 (d, *J* = 14.8 Hz, 1H), 5.56 (d, *J* = 9.3 Hz, 1H), 5.44 (d, *J* = 14.9 Hz, 1H), 3.16 (dd, *J* = 9.3, 6.0 Hz, 1H), 2.27 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 148.9, 140.6, 138.3, 136.7, 136.4, 133.3, 131.8, 131.7, 130.9, 129.3, 129.2, 128.9, 128.8, 128.5, 128.4, 127.0, 126.7, 126.2, 121.9, 121.8, 121.7, 121.6, 120.5, 120.7, 117.5, 64.2, 51.3, 41.0, 19.2; FT-IR (KBr) 1738, 1628, 1445, 1400, 1355, 1266, 1170, 1134, 1091, 1031, 756 cm^{-1}; HRMS (ESI) calcd for $[C_{31}H_{25}N_3O_2S+H]^+$ 504.1740, found 504.1731.

7-((2*H*-Indazol-2-yl)methyl)-9-chloro-11-(phenylsulfonyl)-6a,11a-dihydro-11*H*-benzo[*a*]carbazole (3al). Colorless solid; yield 58% (76 mg); mp 206-207 °C; R_f = 0.65 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.87 (d, *J* = 7.7 Hz, 1H), 7.75 (d, *J* = 1.9 Hz, 1H), 7.65 (dd, *J* = 8.8, 1.1 Hz, 1H), 7.58-7.53 (m, 3H), 7.46-7.41 (m, 2H), 7.33-7.28 (m, 4H), 7.23-7.19 (m, 1H), 7.13-7.09 (m, 1H), 6.94-6.91 (m, 2H), 6.35 (d, *J* = 9.8 Hz, 1H), 6.00 (dd, *J* = 9.8, 6.0 Hz, 1H), 5.67 (d, *J* = 15.0 Hz, 1H), 5.56 (d, *J* = 9.4 Hz, 1H), 5.27 (d, *J* = 15.0 Hz, 1H), 3.12 (dd, *J* = 9.5, 5.9 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.0, 143.8, 138.0, 134.4, 133.6, 133.5, 133.2, 131.7, 131.1, 129.3, 129.0, 128.99, 128.7, 128.6, 127.5, 126.89, 126.86, 126.4, 122.4, 122.2, 122.0, 121.4, 120.4, 120.2, 117.8, 64.5, 54.8, 40.5; FT-IR (KBr) 1628, 1513, 1400, 1265, 1178, 1166, 1149, 1134, 1034, 746 cm^{-1}; HRMS (ESI) calcd for $[C_{30}H_{22}ClN_3O_2S+H]^+$ 524.1194, found 524.1217.

Synthetic transformations of 3a.

7-(2*H*-Indazol-2-yl)-11-(phenylsulfonyl)-6,6a,11,11a-tetrahydro-5*H*-benzo[*a*]carbazole (4a). Compound **3a** (0.15 mmol, 71 mg) and 10 wt% Pd/C (15 mg) were stirred in ethyl acetate (3 mL) for 24 h at room temperature under H_2 (balloon). The resultant mixture was passed through celite and the solvent was evaporated. The residue was purified on a short pad of silica gel using ethyl acetate and hexane (1:7) to furnish **4a** as a colorless liquid; yield 95% (68 mg); R_f = 0.20 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.85 (d, *J* = 7.8 Hz, 1H), 7.56 (td, *J* = 8.3, 1.0 Hz, 3H), 7.51-7.47 (m, 1H), 7.34 (t, *J* = 7.8 Hz, 2H), 7.21-7.16 (m, 2H), 7.08-7.03 (m, 2H), 6.99 (dd, *J* = 8.0, 1.0 Hz, 1H), 6.83 (dd, *J* = 7.5, 1.3 Hz, 1H), 5.34 (d, *J* = 9.1 Hz, 1H), 3.63 (dt, *J* = 9.8, 5.4 Hz, 1H), 2.61 (t, *J* = 6.2 Hz, 2H), 2.49 (t, *J* = 6.2 Hz, 2H), 2.21-2.18 (m, 2H), 1.76-1.66 (m, 4H), 1.56-1.45 (m, 1H), 1.13-1.06 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 151.0, 143.9, 139.2, 138.2, 134.2, 133.3, 130.3, 130.1, 129.2, 128.7, 127.6, 127.5, 127.3, 126.8, 126.7, 121.7, 118.1, 117.7,

64.2, 40.2, 26.6, 24.3, 23.54, 23.51, 23.49, 20.7; FT-IR (Neat) 3059, 2927, 2854, 2083, 1636, 199, 1493, 1449, 1355, 1265, 1168, 1092, 1022, 441 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{27}N_3O_2S+H]^+$ 482.1897, found 482.1901.

8,9-Diphenyl-5-(phenylsulfonyl)-4b,15c-dihydro-5*H*-benzo[a]indazolo[2',3':1,6]pyrido[2,3-*g*]carbazole (6a). Compound **3a** (0.15 mmol, 71 mg), diphenylacetylene **5** (0.18 mmol, 32 mg), $Cu(OAc)_2•H_2O$ (0.18 mmol, 36 mg) and K_2CO_3 (0.15 mmol, 21 mg) were stirred in $(CH_2Cl)_2$ (2 mL) at 110 °C for 10 h under nitrogen. The resultant mixutre was extracted using CH_2Cl_2 (10 mL) and washed with water (5 mL). Drying (Na_2SO_4) and evaporation of the solvent gave a residue that was purified on silica gel coloumn chromatography to afford **6a** as a yellow solid; yield 73% (71 mg); mp 227-228 °C; R_f = 0.71 (1:9 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (d, *J* = 9.1 Hz, 1H), 7.81-7.76 (m, 2H), 7.53 (d, *J* = 9.1 Hz, 1H), 7.45-7.21 (m, 18H), 6.89-6.85 (m, 2H), 6.63 (d, *J* = 8.5 Hz, 1H), 6.23 (dd, *J* = 9.7, 2.4 Hz, 1H), 6.08 (dd, *J* = 9.7, 2.5 Hz, 1H), 5.89 (dt, *J* = 8.4, 2.5 Hz, 1H), 5.57 (d, *J* = 8.3 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.7, 145.1, 139.5, 136.7, 136.5, 134.2, 134.1, 133.8, 132.8, 132.7, 131.14, 131.07, 130.4, 129.7, 129.3, 128.7, 128.6, 128.52, 128.50, 128.4, 128.1, 127.9, 127.6, 127.5, 126.9, 126.8, 126.2, 125.8, 123.6, 121.8, 120.9, 120.5, 116.7, 116.7, 115.0, 65.9, 43.5; FT-IR (KBr) 3019, 2921, 2853, 1649, 1600, 1401, 1260, 1157, 742 cm^{-1}; HRMS (ESI) calcd for $[C_{43}H_{29}N_3O_2S+H]^+$ 652.2053, found 652. 2076.

N-(3-(2*H*-Indazol-2-yl)-2-(naphthalen-2-yl)phenyl)benzenesulfonamide (7a). Compound **3a** (0.20 mmol, 95 mg) and solid NaOH (0.30 mmol, 12 mg) were refluxed in 4:1 v/v mixture of MeOH:CH_2Cl_2 (3 mL) for 8 h. The resultant mixture was concentatrated on a rotrary evaportor and the residue was neutrailzed using 1 M HCl and extracted using CH_2Cl_2 (25 mL). The organic layer was washed with water (5 mL). Drying (Na_2SO_4) and evaporation of the solvent gave a residue, which was purified on silica gel coloumn chromatography using ethyl acetate and hexane

(1:4) to produce **7a** as a colorless solid; yield 75% (71 mg); mp 70-71 °C; R_f = 0.20 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (dd, *J* = 6.3, 3.2 Hz, 1H), 7.78-7.76 (m, 1H), 7.64-7.60 (m, 3H), 7.56 (dd, *J* = 6.9, 3.7 Hz, 3H), 7.52-7.49 (m, 4H), 7.42-7.37 (m, 3H), 7.28 (d, *J* = 8.5 Hz, 1H), 7.22 (s, 1H), 7.18 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 6.91-6.87 (m, 1H), 6.69 (dd, *J* = 8.4, 1.8 Hz, 1H), 6.59 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.0, 140.3, 138.9, 135.5, 133.4, 133.2, 132.9, 129.7, 129.6, 129.5, 129.3, 129.1, 128.7, 128.2, 128.0, 127.3, 127.2, 127.1, 126.7, 126.3, 125.1, 123.9, 122.1, 121.8, 120.5, 117.7; FT-IR (KBr) 3325, 2306, 1945, 1910, 1730, 1626, 1582, 1400, 1339, 1265, 1167, 1091, 751 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{21}N_3O_2S+H]^+$ 476.1427, found 476. 1433.

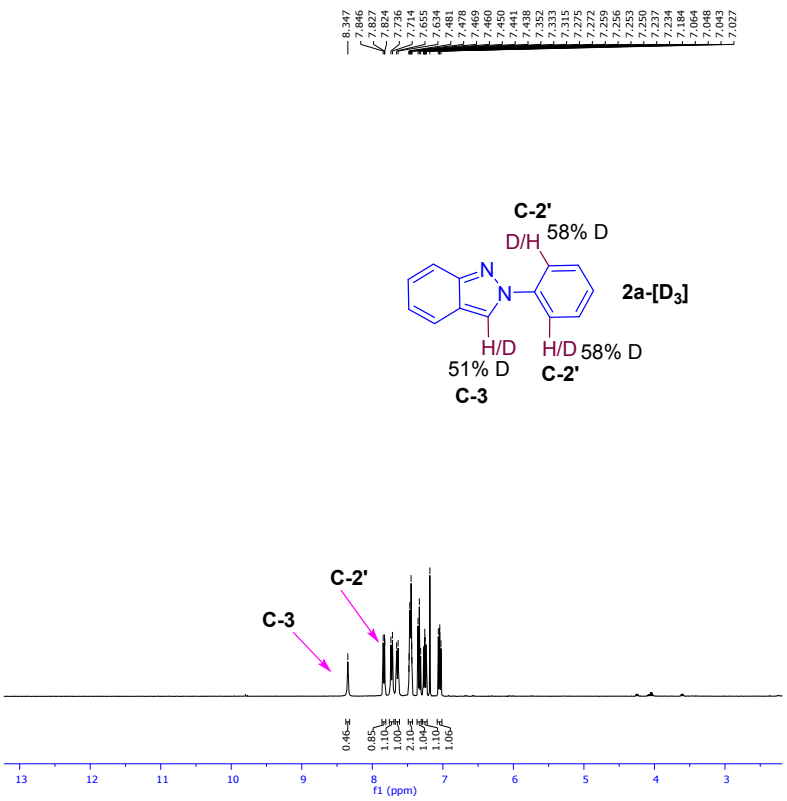
7-(2*H*-Indazol-2-yl)-11-(phenylsulfonyl)-11*H*-benzo[*a*]carbazole (8a). To a stirred solution of **7a** (0.15 mmol, 71 mg), $Cu(OTf)_2$ (5 mol %, 3 mg) and CF_3CO_2H (0.45 mmol, 34 μL) in $(CH_2Cl)_2$ (1 mL) at 80 °C, a solution of $PhI(OAc)_2$ (0.30 mmol, 97 mg) in $(CH_2Cl)_2$ (2 mL) was added, and the resultant mixture was allowed to stir at the same temperature for 20 h. The reaction mixture was then treated with CH_2Cl_2 (30 mL), and successively washed with saturated $NaHCO_3$ (5 mL) and water (5 mL). Drying (Na_2SO_4) and evaporation of the solvent gave a residue, which was purified on silica gel coloumn chromatography using ethyl acetate and hexane (1:7) to furnish **8a** as a colorless solid; yield 78% (55 mg); mp 197-198 °C; R_f = 0.35 (1:7 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.98 (d, *J* = 8.6 Hz, 1H), 8.53 (dd, *J* = 8.3, 1.0 Hz, 1H), 8.02 (d, *J* = 1.0 Hz, 1H), 7.84 (ddd, *J* = 8.8, 5.0, 1.2 Hz, 2H), 7.76 (d, *J* = 8.5 Hz, 1H), 7.67 (ddd, *J* = 8.5, 6.8, 1.4 Hz, 1H), 7.60-7.51 (m, 3H), 7.47 (dd, *J* = 7.8, 1.0 Hz, 1H), 7.41 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.35-7.31 (m, 1H), 7.21 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H), 7.05 (dd, *J* = 8.5, 7.3 Hz, 2H), 6.99 (dd, *J* = 8.5, 1.4 Hz, 2H), 6.54 (d, *J* = 8.7 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.8, 142.9, 137.6, 134.6, 134.2, 134.1, 133.8, 128.3, 128.1, 127.9, 127.4, 127.1, 127.0, 126.7, 126.6, 126.2, 125.9,

125.8, 125.1, 124.9, 124.4, 122.8, 122.4, 120.9, 120.5, 119.0, 118.3; FT-IR (KBr) 1628, 1598, 1520, 1400, 1266, 1178, 1089, 738 cm^{-1}; HRMS (ESI) calcd for $[C_{29}H_{19}N_3O_2S+H]^+$ 474. 1271, found 474. 1283.

7-(2*H*-Indazol-2-yl)-11*H*-benzo[*a*]carbazole (9a). Compound **8a** (0.10 mmol, 47 mg) and solid NaOH (0.12 mmol, 5 mg) were subjected to the reaction conditions described for **7a** to produce **9a** as a colorless solid; yield 82% (27 mg); mp 266-267 °C; R_f = 0.25 (1:4 ethyl acetate/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.44 (s, 1H), 8.32 (d, *J* = 1.0 Hz, 1H), 8.02-8.00 (m, 1H), 7.87-7.84 (m, 1H), 7.78-7.75 (m, 2H), 7.44 (dd, *J* = 5.7, 3.7 Hz, 1H), 7.40-7.33 (m, 3H), 7.26-7.20 (m, 2H), 7.17-7.13 (m, 2H), 7.02 (d, *J* = 8.7 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.7, 139.8, 135.9, 135.0, 132.6, 129.3, 129.0, 126.8, 125.9, 125.7, 124.8, 124.6, 122.49, 122.46, 121.0, 120.9, 120.8, 120.7, 119.6, 118.3, 118.0, 116.1, 112.2; FT-IR (KBr) 3346, 2863, 2792, 1910, 1626, 1519, 1400, 1323,1267, 1163, 1091, 744 cm^{-1}; HRMS (ESI) calcd for $[C_{23}H_{15}N_3+H]^+$ 334.1339, found 334.1344.

Mechanestic Investigation

Procedure for H/D Exchange in $(CH_2Cl)_2$:D_2O (Scheme 3a). 2-Aryl-2*H*-indazole **2a** (0.25 mmol, 48 mg), $Cu(OAc)_2$•H_2O (0.62 mmol, 123 mg), CsOAc (0.25 mmol, 48 mg) and $[Cp^*Rh(CH_3CN)_3](SbF_6)_2$ (5 mol %, 10 mg) were strirred in $(CH_2Cl)_2$ (2 mL) at 110 °C for 0.5 h under nitrogen. Then, D_2O (1 mmol, 2 μL) was added at the same temperature and the stirring was continued for an additional 3 h. The reaction mixture was then extracted using CH_2Cl_2 (30 mL) and was washed with water (5 mL) and dried over Na_2SO_4. Evaporation of the solvent gave a resiude that was purified on silica gel column chromatography using a 1:20 mixture of ethyl acetate and hexane. The 400 MHz ^{1}H NMR showed that deutirum (D) has incorporated in C-2′ and C-3 in 58 and 51%, respectively.



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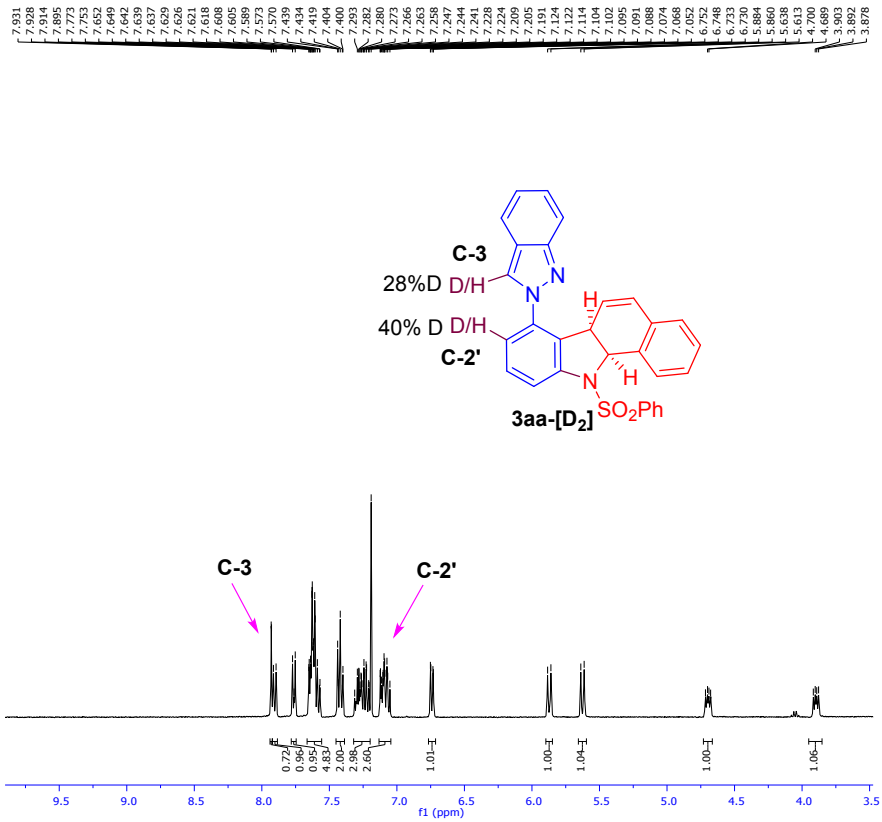
Procedure for H/D Exchange in $(CH_2Cl)_2$:D_2O with 1a (Scheme 3b). 9-(Phenylsulfonyl)-1,4-dihydro-1,4-epiminonaphthalene **1a** (0.25 mmol, 71 mg), 2-aryl-2*H*-indazole **2a** (0.30 mmol, 58 mg), $Cu(OAc)_2$•H_2O (0.62 mmol, 123 mg), CsOAc (0.25 mmol, 48 mg), $[Cp^*Rh(CH_3CN)_3](SbF_6)_2$ (5 mol %, 10 mg) and D_2O (1 mmol, 2 μL) were stirred in $(CH_2Cl)_2$ (2 mL) at 110 °C for 24 h under nitrogen. The reaction mixture was then extracted with CH_2Cl_2 (25 mL), and the organic layer was washed with water (5 mL) and dried over Na_2SO_4. Evaporation of the solvent provided a residue that was purified by column chromatography on silica gel using a 1:7 mixture of ethyl acetate and hexane. The 400 MHz ^{1}H NMR showed that deutrium (D) is incorporated in C-2′ and C-3 in 40 and 28%, respectively.



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12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
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26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072

Benzen-3-*d*-amine. To a stirred solution of 3-nitroaniline (3.6 mmol, 497 mg) and acetic acid (1 mL) in $CDCl_3$ (5 mL), was added $NaNO_2$ (5 mmol, 345 mg) in H_2O (5 mL). The resultant mixture was stirred at room temperature for 2 h. After completion, the reaction mixture was extracted with CH_2Cl_2 (25 mL) and dried over Na_2SO_4. Evaporation of the sovlent produced a residue that was purified on silica gel column chromatography using a 1:20 ethyl acetate and hexane as the eluent to give the 1-nitrobenzene-3-*d* as a yellow oil in 13% yield (60 mg). The ^{1}H NMR showed that 85% D was incorporated. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.24-8.22 (m, 2H), 7.75-7.67 (m, 1H), 7.55 (dd, J = 9.0, 7.4 Hz, 1H). It, 1-nitrobenzene-3-*d* (4 mmol, 496 mg) was then refluxed with $SnCl_2$•$2H_2O$ (12 mmol, 2.275 g) in ethyl acetate (20 mL) for 7 h under nitrogen. The resulatant mixture was passed through a short pad of celite and the solvent was evaporated to give a residue that was purified on silica gel column chromatography using 7% ethyl acetate in hexane to furnish

benzen-3-*d*-amine as a brown oil in 62% (235 mg). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.16 (dd, J = 8.7, 7.3 Hz, 1H), 6.79-6.74 (m, 1H), 6.71-6.65 (m, 2H), 3.64 (s, 2H). The ^{1}H NMR showed that 80% D was incorporated. HRMS (ESI) calcd for $[C_6H_6DN+H]^+$ 95.0714, found 95.0711.

Procedure for the Synthesis of Deuterated 2-Phenyl-2*H*-indazoles. A mixture of 2-azidobenzaldehyde (0.5 mmol) and benzen-2,4,6-d_3-amine (82% D) or benzen-2-*d*-amine (70% D) or benzen-3-*d*-amine (80% D) (0.5 mmol) was stirred at 110 °C for 3 h under solvent-free. The resultant mixture was purified on silica gel column chromatography using 5% ethyl acetae in hexane.

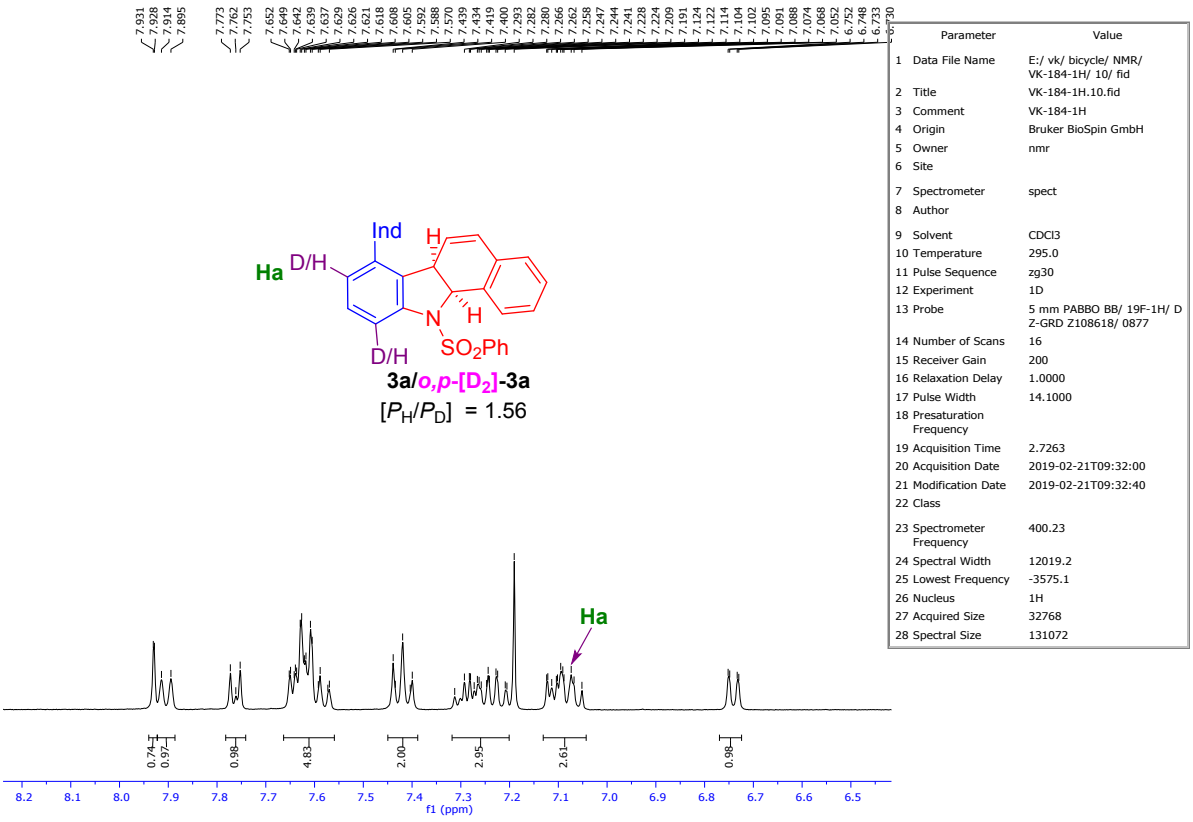
2-(Phenyl-2,6-d_2)-2*H*-indazole ([D$_3$]-2a). Colorless solid; yield 82% (81 mg); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.42 (d, *J* = 1.0 Hz, 1H), 7.80 (dd, *J* = 8.8, 1.1 Hz, 1H), 7.72 (dt, *J* = 8.5, 1.1 Hz, 1H), 7.54-7.52 (m, 2H), 7.33 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.12 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H); HRMS (ESI) calcd for $[C_{13}H_7D_3N_2+H]^+$ 198.1105, found 198.1106.

2-(Phenyl-2-*d*)-2*H*-indazole (o-[D]-2a). Colorless solid; yield 85% (83 mg); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.43 (d, *J* = 1.1 Hz, 1H), 7.93-7.90 (m, 1H), 7.80 (dd, *J* = 8.7, 1.0 Hz, 1H), 7.72 (d, *J* = 8.5 Hz, 1H), 7.56-7.52 (m, 2H), 7.41 (td, *J* = 7.5, 1.1 Hz, 1H), 7.33 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.13 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H); HRMS (ESI) calcd for $[C_{13}H_9DN_2+H]^+$ 196.0980, found 196.0983.

2-(Phenyl-3-*d*)-2*H*-indazole (m-[D]-2a). Colorless solid; yield 86% (84 mg); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.42 (d, *J* = 1.0 Hz, 1H), 7.92-7.90 (m, 2H), 7.80 (dd, *J* = 8.8, 1.0 Hz, 1H), 7.72 (d, *J* = 8.4 Hz, 1H), 7.53 (dd, *J* = 8.7, 7.4 Hz, 1H), 7.43-7.40 (m, 1H), 7.33 (ddd, *J* = 8.8, 6.6, 1.1 Hz, 1H), 7.12 (ddd, *J* = 8.5, 6.6, 0.9 Hz, 1H); HRMS (ESI) calcd for $[C_{13}H_9DN_2+H]^+$ 196.0980, found 196.1000.

Kinetic Istope Experiments

One-pot Experiment (Scheme 4a). 9-((Phenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene **1a** (0.20 mmol, 57 mg), 2-phenyl-2*H*-indazole (0.096 mmol, 19 mg) **2a**, 2-(phenyl-2,4,6-d_3)-2*H*-indazole (82% D) **[D_3]-2a** (0.15 mmol, 30 mg), $Cu(OAc)_2$•H_2O (0.62 mmol, 123 mg), CsOAc (0.25 mmol, 48 mg) and $[Cp^*Rh(CH_3CN)_3]$ $(SbF_6)_2$ (5 mol %, 10 mg) were stirred in $(CH_2Cl)_2$ (2 mL) at 110 °C for 2 h under nitrogen. The reaction mixture was diluted using CH_2Cl_2 (25 mL) and was washed with water (5 mL). Drying (Na_2SO_4) and evaporation of the solvent gave a resiude that was purified on silica gel column chromatography using 15% ethyl acetate in hexane. The 400 MHz ^{1}H NMR showed that $[P_H/P_D]$ = 1.56.



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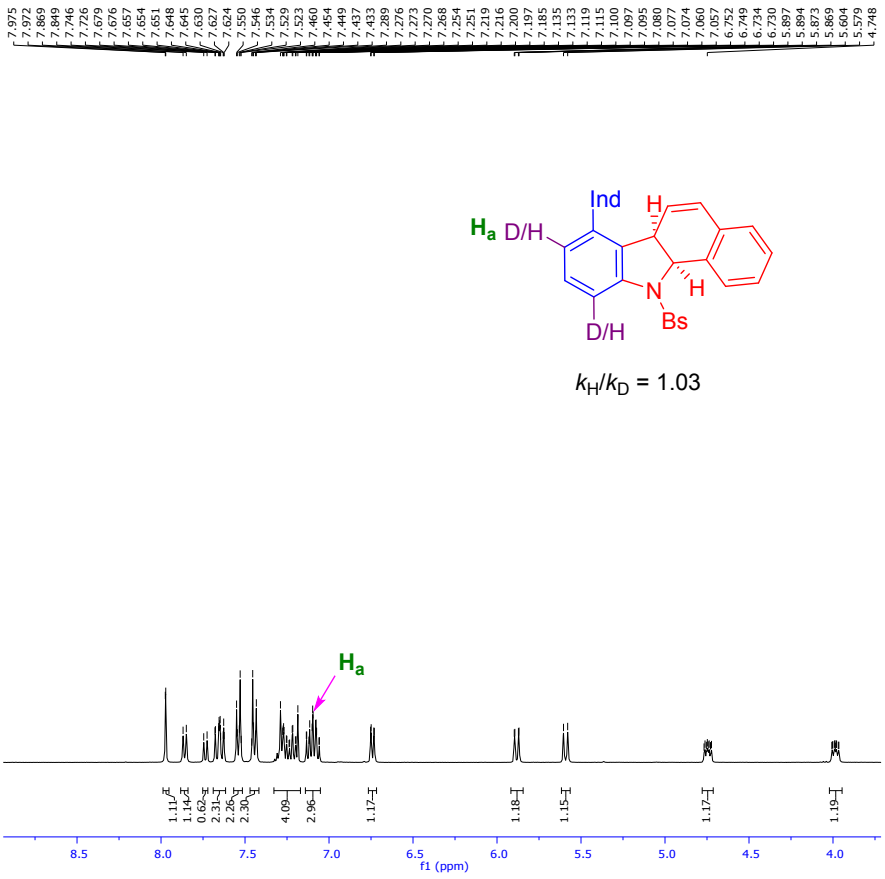
Parallel Experiments (Scheme 4b). 9-((4-Bromophenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene **1d** (0.125 mmol, 54 mg), 2-phenyl-2*H*-indazole (0.125 mmol, 24 mg) **2a**,

$Cu(OAc)_2•H_2O$ (0.31 mmol, 61 mg), CsOAc (0.125 mmol, 24 mg) and $[Cp^*Rh(CH_3CN)_3](SbF_6)_2$ (5 mol %, 5 mg) in $(CH_2Cl)_2$ (2 mL) were taken in a flask under nitrogen. In another flask, 9-((4-bromophenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene **1d** (0.125 mmol, 54 mg), 2-(phenyl-2,4,6-d_3)-2*H*-indazole (82% D) **[D$_3$]-2a** (0.125 mmol, 25 mg) $Cu(OAc)_2•H_2O$ (0.31 mmol, 61 mg), CsOAc (0.125 mmol, 24 mg) and $[Cp^*Rh(CH_3CN)_3](SbF_6)_2$ (5 mol %, 5 mg) were charged in $(CH_2Cl)_2$ (2 mL) under nitrogen. These two reaction mixtures were stirred in parallel in the same preheated oil bath at 110 °C for 2 h. Both the reaction mixture were mixed and diluted using CH_2Cl_2 (25 mL) and was washed with water (5 mL). Drying (Na_2SO_4) and evaporation of the solvent gave the residue, which was purified on silica gel column chromatography using 15% ethyl acetate in hexane. The 400 MHz ^{1}H NMR showed k_H/k_D = 1.03.



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8	Author	
9	Solvent	CDCl3
10	Temperature	296.0
11	Pulse Sequence	zg30
12	Experiment	1D
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14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-02-25T10:21:00
21	Modification Date	2019-02-25T10:21:33
22	Class	
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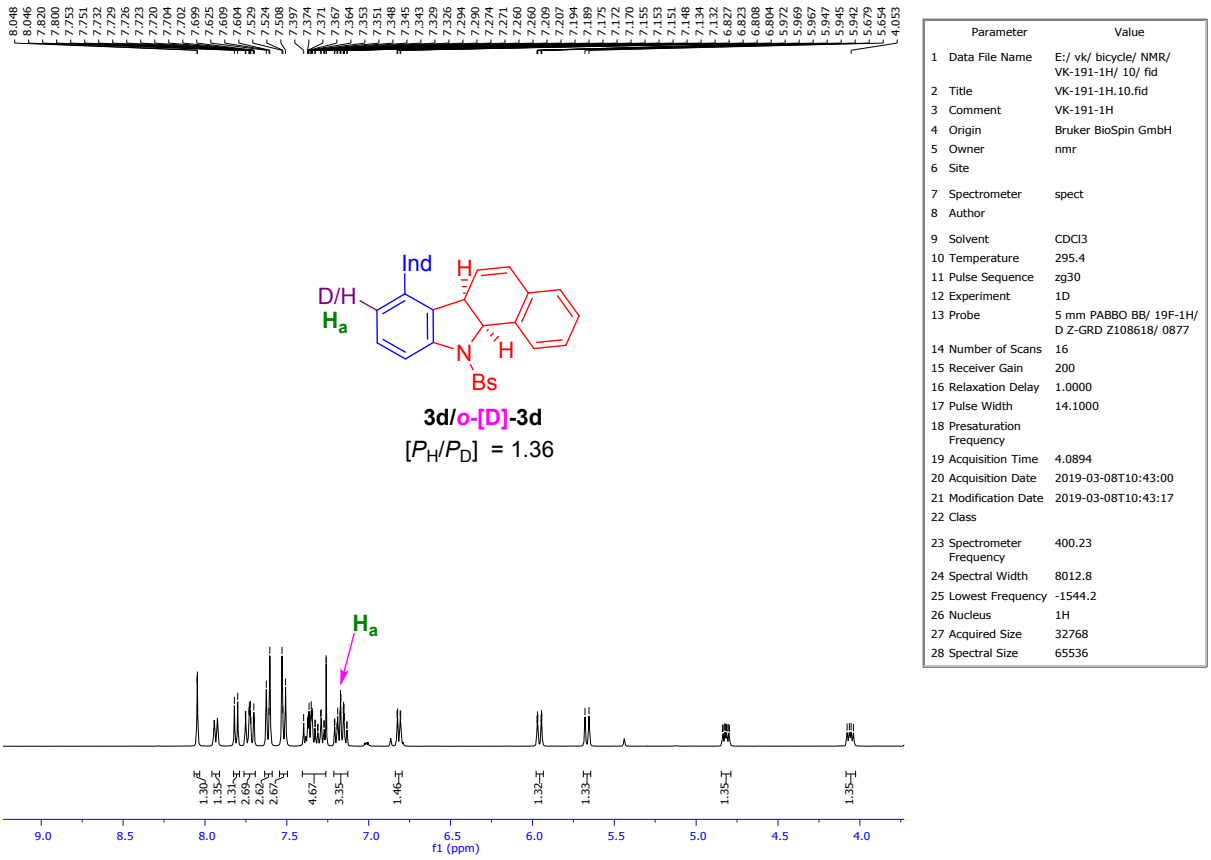
24	Spectral Width	8012.8
25	Lowest Frequency	-1573.9
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536

Intramolecular Experiment-I (Scheme 4c-i) 9-((4-Bromophenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene **1d** (0.25 mmol, 90 mg), 2-(phenyl-2-*d*)-2*H*-indazole 70% D (0.25 mmol, 49 mg) ***o*-[D]-2a**, $Cu(OAc)_2 \cdot H_2O$ (0.62 mmol, 123 mg), CsOAc (0.25 mmol, 48 mg) and $[Cp^*Rh(CH_3CN)_3]$ $(SbF_6)_2$ (5 mol %, 10 mg) were stirred in $(CH_2Cl)_2$ (2 mL) at 110 °C for 2 h under nitrogen. The reaction mixture was diluted with CH_2Cl_2 (25 mL) and washed using water (5 mL). Drying (Na_2SO_4) and evaporation of the solvent yielded a residue that was purified using silica gel column chromatography employing 15% ethyl acetate in hexane. The 400 MHz ^{1}H NMR showed $[P_H/P_D]$ = 1.36.



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6	Site	
7	Spectrometer	spect
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12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
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15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
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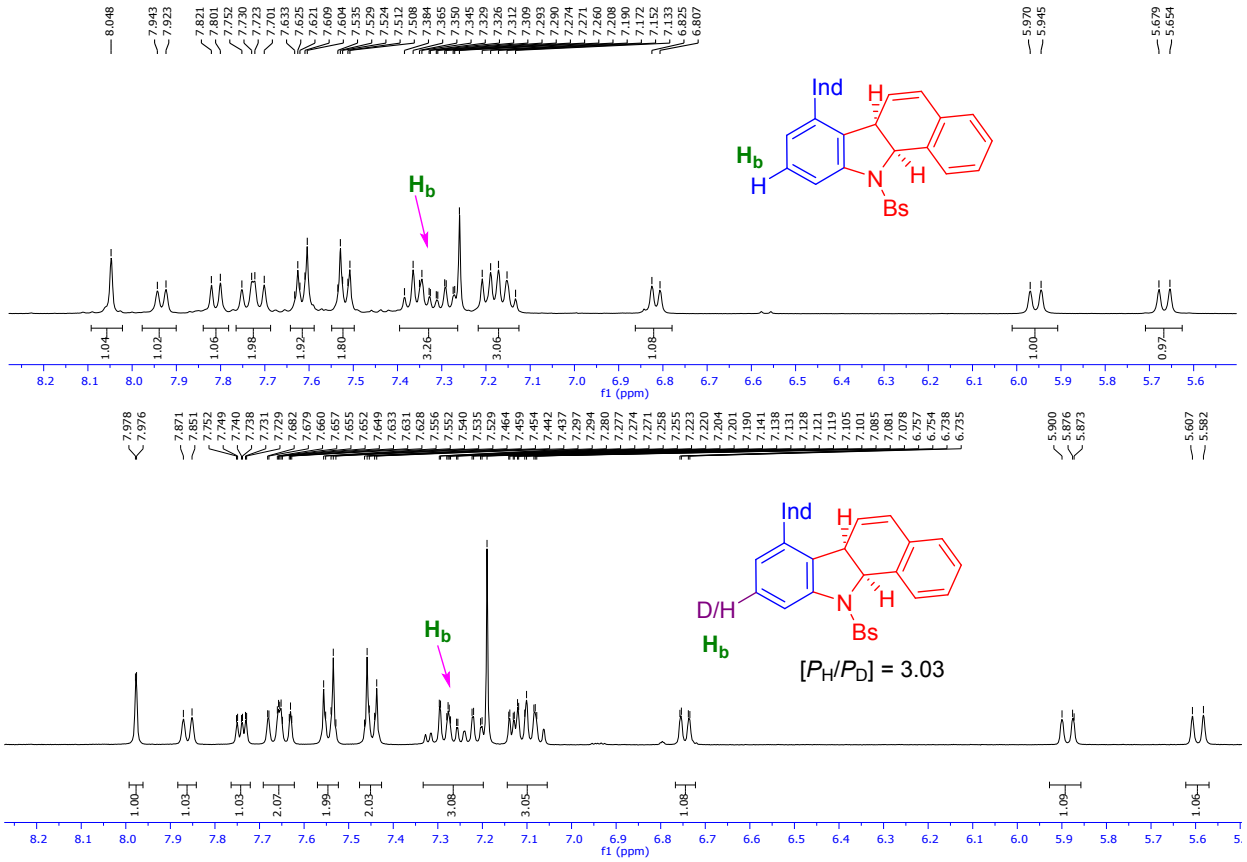
25	Lowest Frequency	-1544.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536

Intramolecular Experiment-II (Scheme 4c-ii). 9-((4-Bromophenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene **1d** (0.25 mmol, 90 mg), 2-(phenyl-3-*d*)-2*H*-indazole 80% D (0.25 mmol, 49

mg) ***m*-[D]-2a**, $Cu(OAc)_2•H_2O$ (0.62 mmol, 123 mg), CsOAc (0.25 mmol, 48 mg) and $[Cp^*Rh(CH_3CN)_3](SbF_6)_2$ (5 mol %, 10 mg) were stirred in $(CH_2Cl)_2$ (2 mL) at 110 °C for 2 h under nitrogen. The work up and purification have been carried out as described above for the intramolecular experiment-I. The 400 MHz ^{1}H NMR exhibited $[P_H/P_D] = 3.03$.



Preparation of the Rodocycle 10 (Scheme 4d-i). 2-Phenyl-2*H*-indazole (0.10 mmol, 19 mg), $[Cp^*Rh(CH_3CN)_3](SbF_6)_2$ (0.10 mmol, 83 mg) and CsOAc (0.20 mmol, 38 mg) were stirred in $(CH_2Cl)_2$ (2 mL) at 110 °C for 24 h under nitrogen. The mixture was filtered through a short pad of celite and the solvent was evaporated to produce a residue that was purified on silica gel column chromatography using a 4:1 mixture of CH_2Cl_2 and MeOH to give **10** as a red solid in yield 61% (26 mg). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.46 (d, J = 1.1 Hz, 1H), 7.90 (dd, J = 7.5, 1.3 Hz, 1H), 7.78 (dd, J = 8.8, 1.0 Hz, 1H), 7.68 (d, J = 8.5 Hz, 1H), 7.42-7.37 (m, 2H), 7.22 (td, J = 7.4, 1.3

Hz, 1H), 7.15 (ddd, J = 8.5, 6.7, 0.9 Hz, 1H), 7.08 (td, J = 7.6, 1.3 Hz, 1H), 1.68 (s, 15H); HRMS (ESI) calcd for $[C_{23}H_{24}N_2Rh]^+$ 431.0989, found 431.1019.

The Catalytic Experiment using the Rhodocycle 10 (Scheme 4d-ii). A mixture of 9-((phenyl)sulfonyl)-1,4-dihydro-1,4-epiminonaphthalene **1a** (0.125 mmol, 35 mg), 2-phenyl-2*H*-indazole (0.15 mmol, 29 mg) **2a**, $Cu(OAc)_2 \bullet H_2O$ (0.31 mmol, 61 mg), CsOAc (0.125 mmol, 24 mg) and Rh-complex **10** (5 mol %, 4 mg) was stirred in $(CH_2Cl)_2$ at 110 °C for 24 h under nitrogen. The reaction mixture was diluted using CH_2Cl_2 (25 mL) and washed with water (5 mL). Drying (Na_2SO_4) and evaporation of the solvent provided a residue that was purified by column chromatography on silica gel using 15% ethyl acetate in hexane to give **3a** in 54% (32 mg) yield.

Crystal Structure of 3g. Recrystallization **3g** in CH_3CN produced single crystal whose structure was determined using the single-crystal X-ray diffraction analysis (CCDC 1917915).

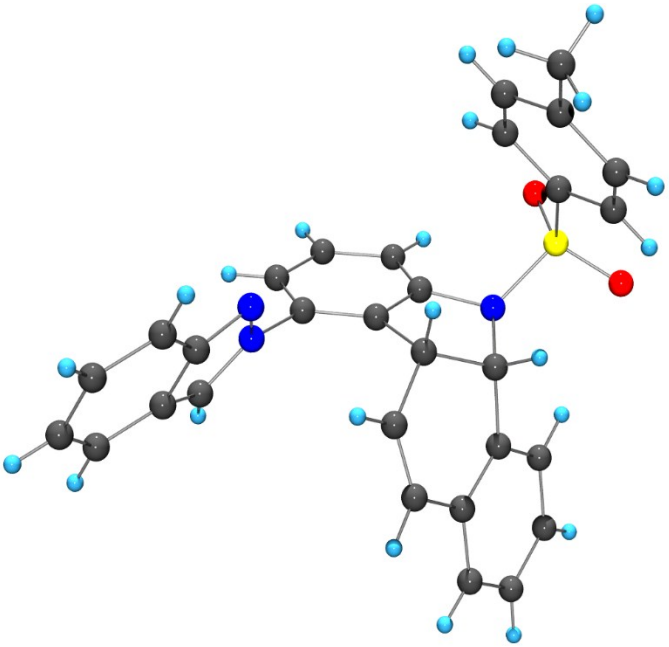


Table 1. Crystal data and structure refinement for vk141.

Identification code	VK-141	
Empirical formula	$C_{30}\ H_{23}\ N_3\ O_2\ S$	
Formula weight	489.57	
Temperature	293(2) K	
Wavelength	0.71073 Å	
Crystal system	Monoclinic	
Space group	P 21/c	
Unit cell dimensions	a = 13.650(3) Å	a= 90°.
	b = 9.7451(19) Å	b= 105.20(3)°.
	c = 19.194(4) Å	g = 90°.
Volume	2463.8(9) $Å^3$	
Z	4	
Density (calculated)	1.320 Mg/m^3	
Absorption coefficient	0.165 mm^{-1}	
F(000)	1024	

Crystal size	0.086 x 0.057 x 0.047 mm^3
Theta range for data collection	1.546 to 26.359°.
Index ranges	-16<=h<=16, -12<=k<=12, -23<=l<=23
Reflections collected	83192
Independent reflections	4995 [R(int) = 0.1070]
Completeness to theta = 25.242°	99.9 %
Absorption correction	Numerical
Max. and min. transmission	0.8778 and 0.5007
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	4995 / 0 / 368
Goodness-of-fit on F^2	1.023
Final R indices [I>2sigma(I)]	R1 = 0.0530, wR2 = 0.1282
R indices (all data)	R1 = 0.0793, wR2 = 0.1483
Extinction coefficient	n/a
Largest diff. peak and hole	0.386 and -0.429 e.$Å^{-3}$

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[2] a) L. Rocard, A. Berezin, F. D. Leo and D. Bonifazi, *Angew. Chem. Int. Ed.* 2015, **54**, 15739; b) A. H. G. P. Prenzel, N. Deppermann and W. Maison, *Org. Lett.* 2006, **8**, 1681; c) M. J. Koh, K. M. Khan, S. Torker and A. H. Hoveyda, *Angew. Chem. Int. Ed.* 2014, **53**, 1968.

[3] a) Q. Yang, P. Y. Choy, B. Fan and F. Y. Kwong, *Adv. Synth. Catal.* 2015, **357**, 2345; b) S. Fang, X. Liang, Y. Long, X. Li, D. Yang, S. Wang and C. Li, *Organometallics* 2012, **31**, 3113; c) M. Lautens, K. Fagnou and V. Zunic, *Org. Lett.* 2002, **4**, 3465; d) R. G. Arrayás, S. Cabrera and J. C. Carretero, *Org. Lett.* 2005, **7**, 219; f) L.-K. Liu, C.-H. Sun,

C.-Z. Yang, Y.-S. Wen, C.-F. Wu, S.-Y. Shlh and K.-S. Lin, *Organometallics* 1992, **11**, 972; g) E. Carlson and W. Tam, *Synthesis* 2016, **48**, 2449; h) T. Ohwada, M. Miura, H. Tanaka, S. Sakamoto, K. Yamaguchi, H. Ikeda and S. Inagaki, *J. Am. Chem. Soc.* 2001, **123**, 10164.

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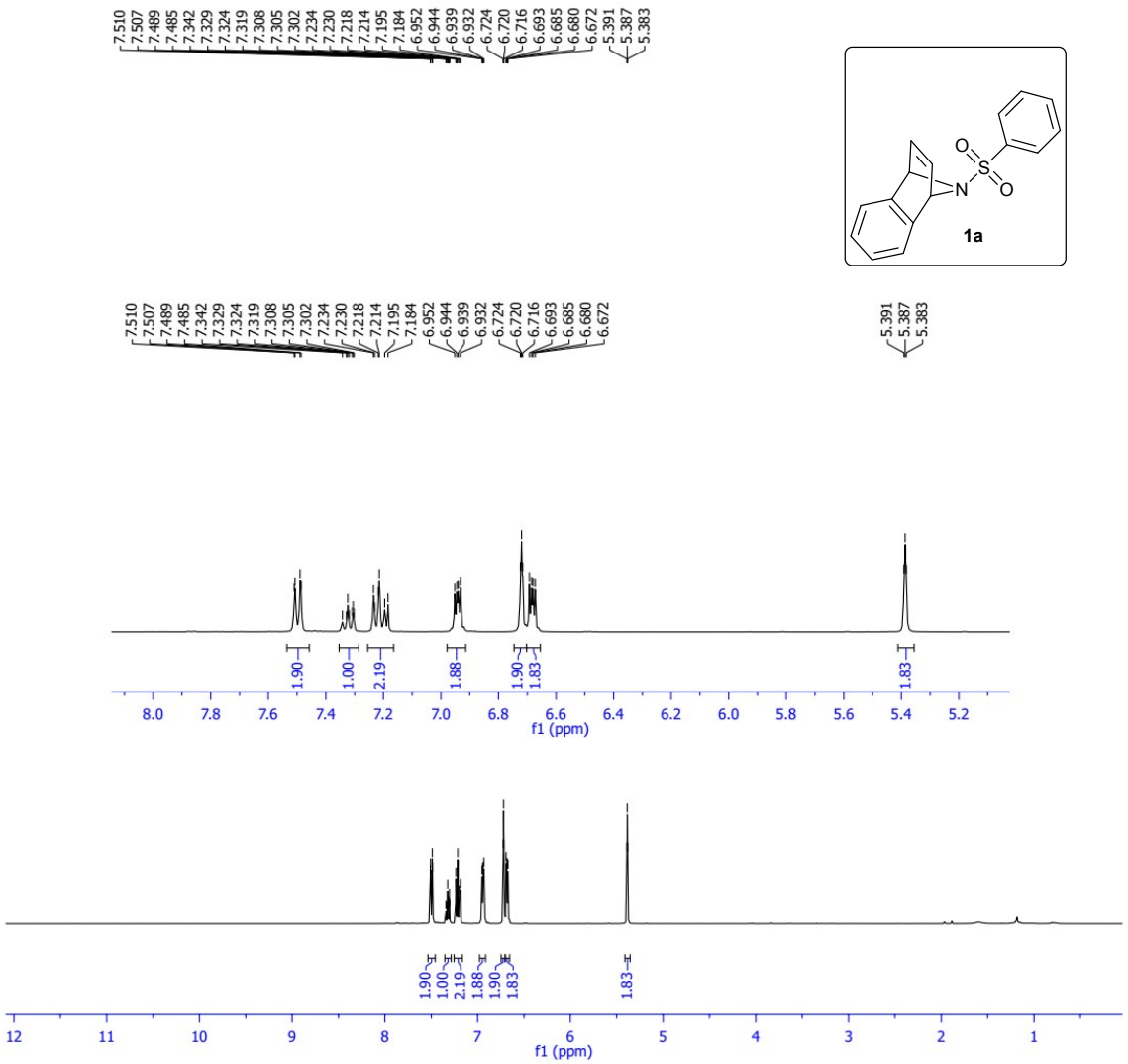
^{1}H and ^{13}C NMR spectra



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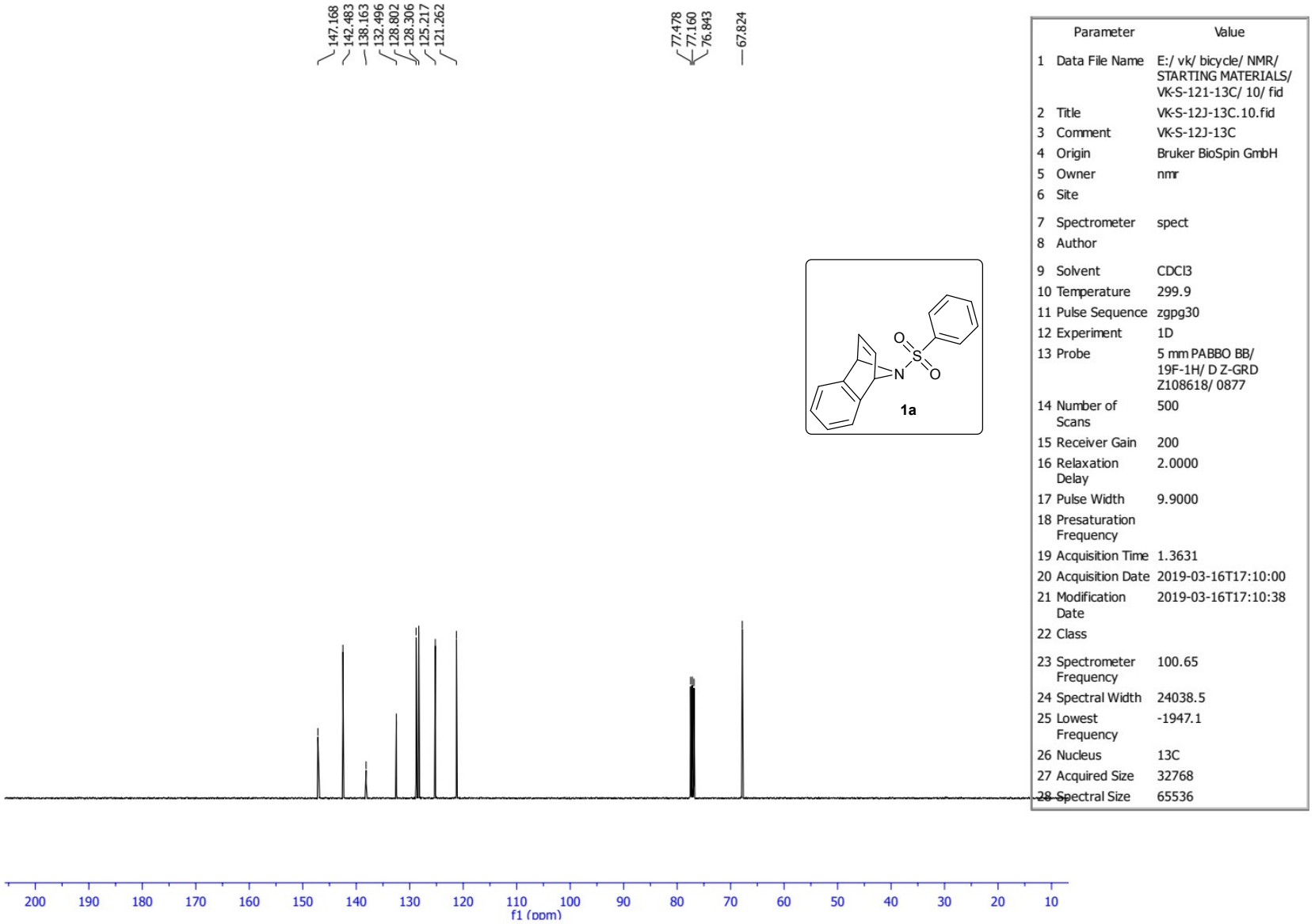

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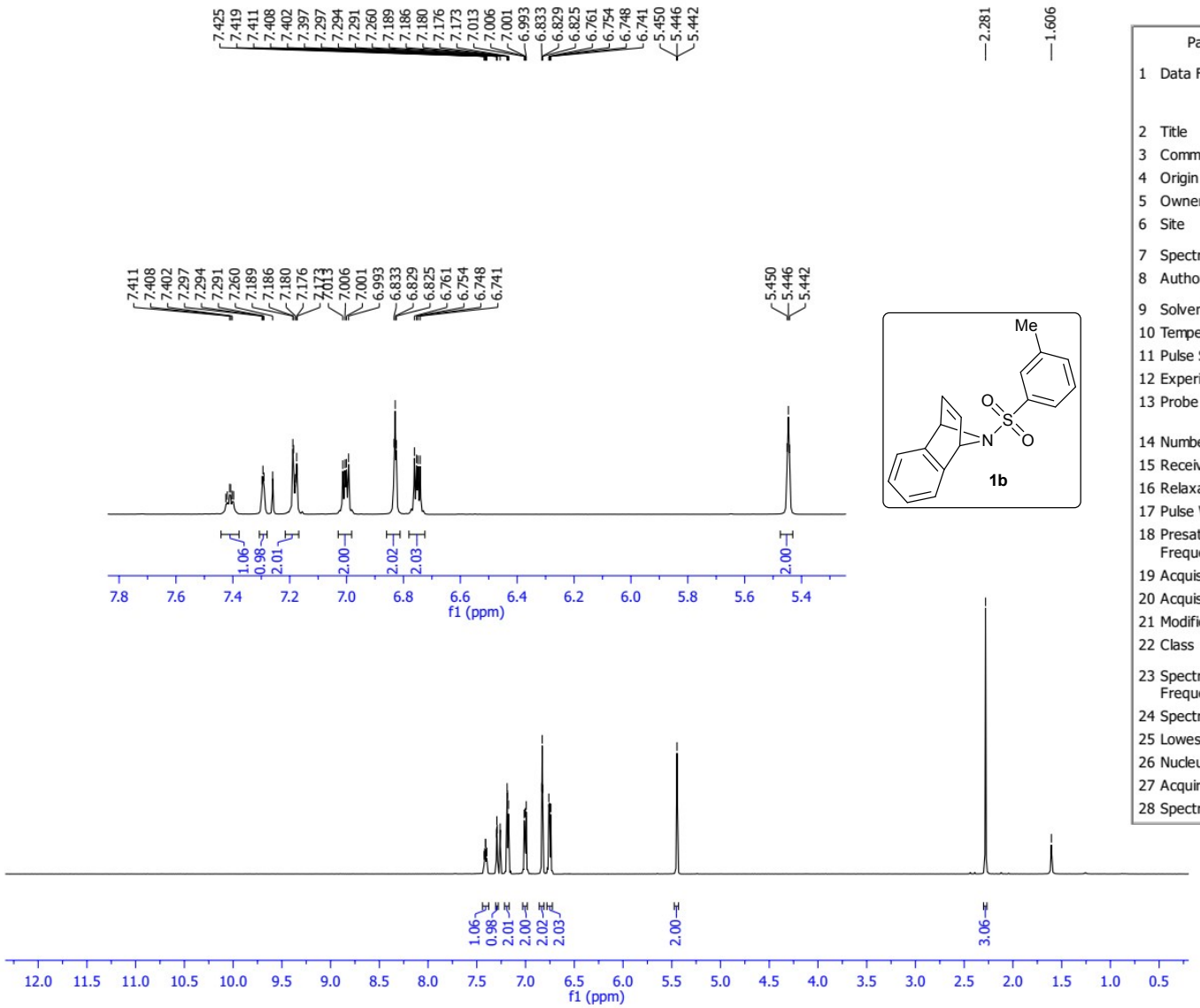

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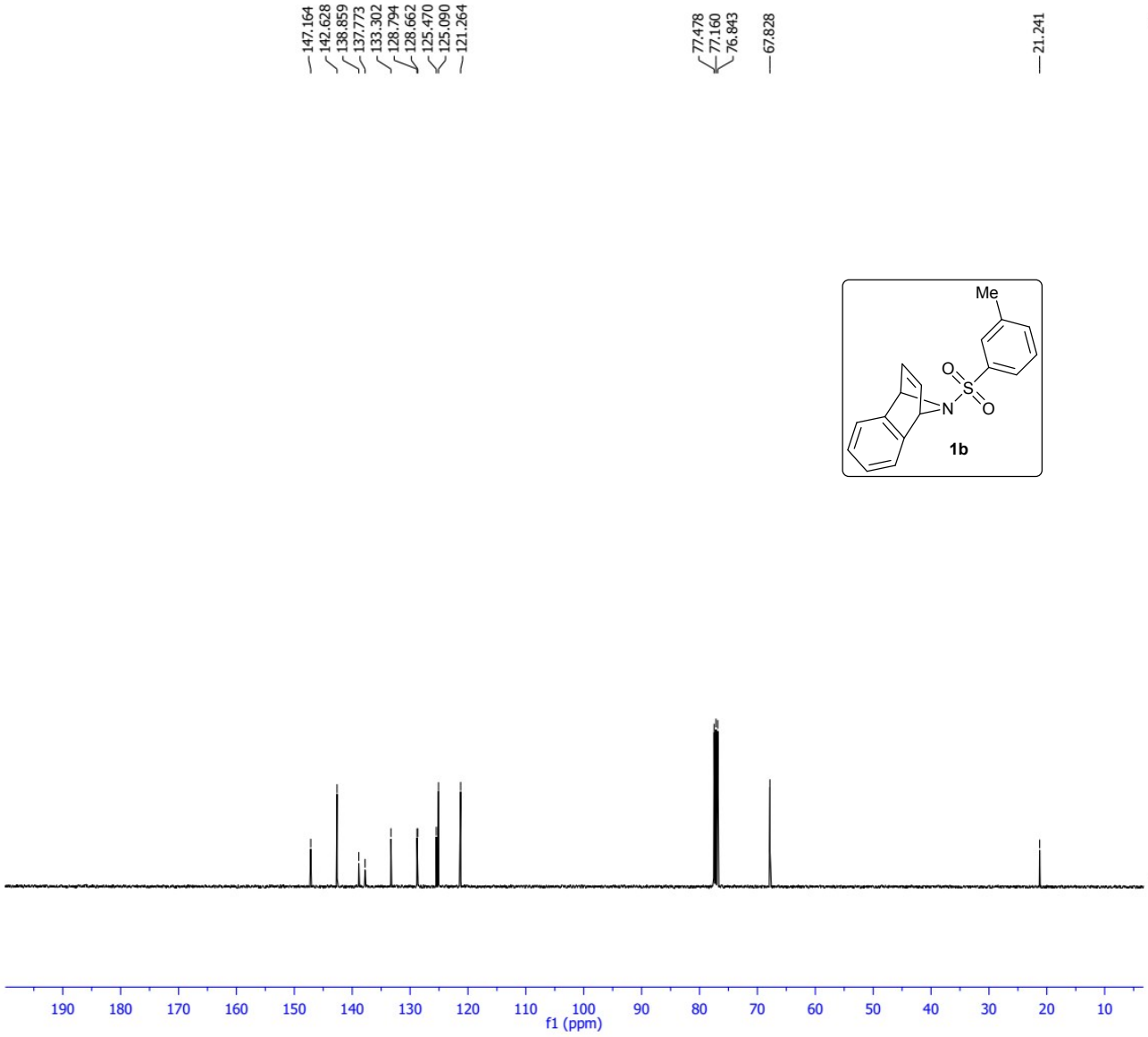

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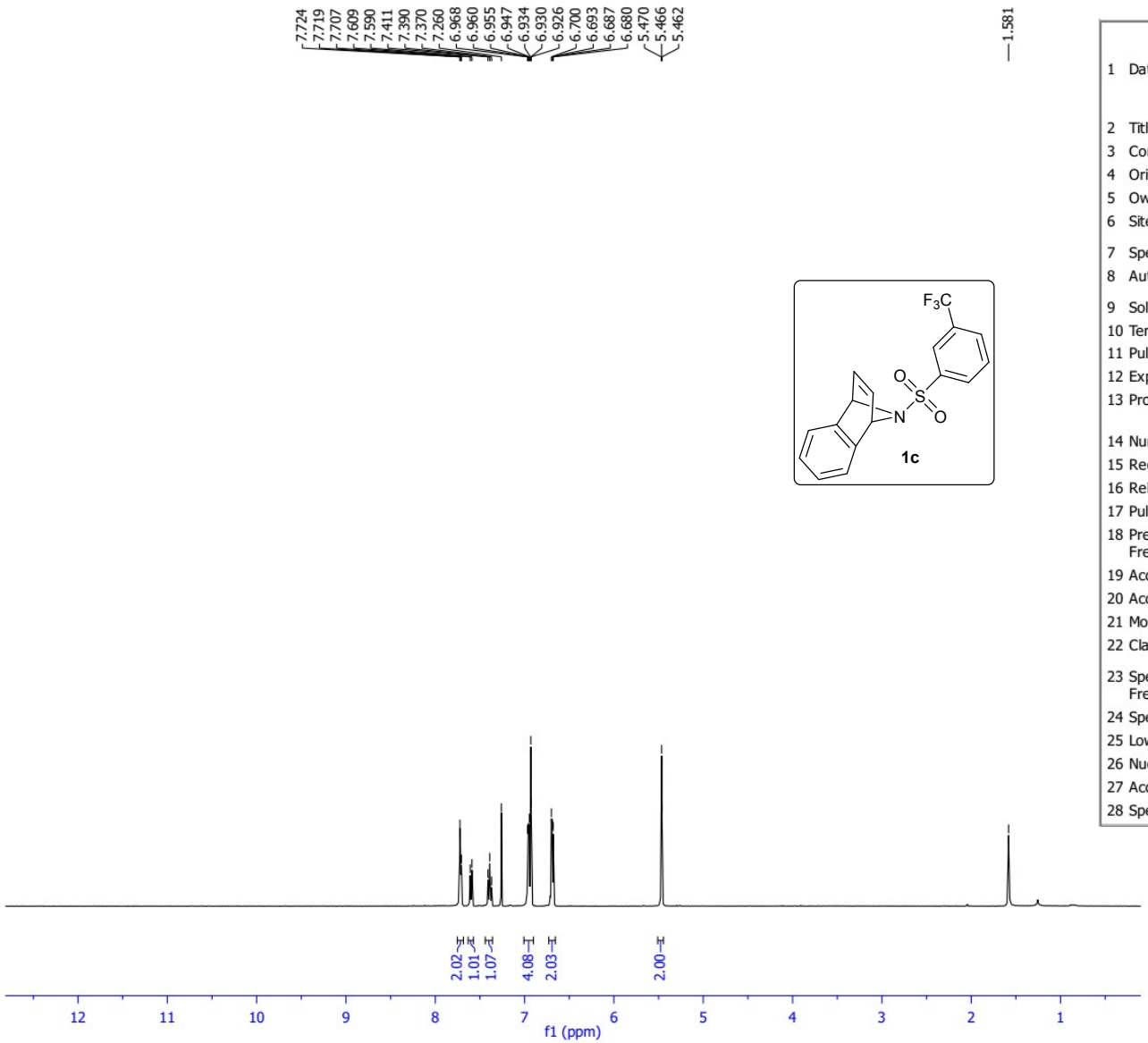

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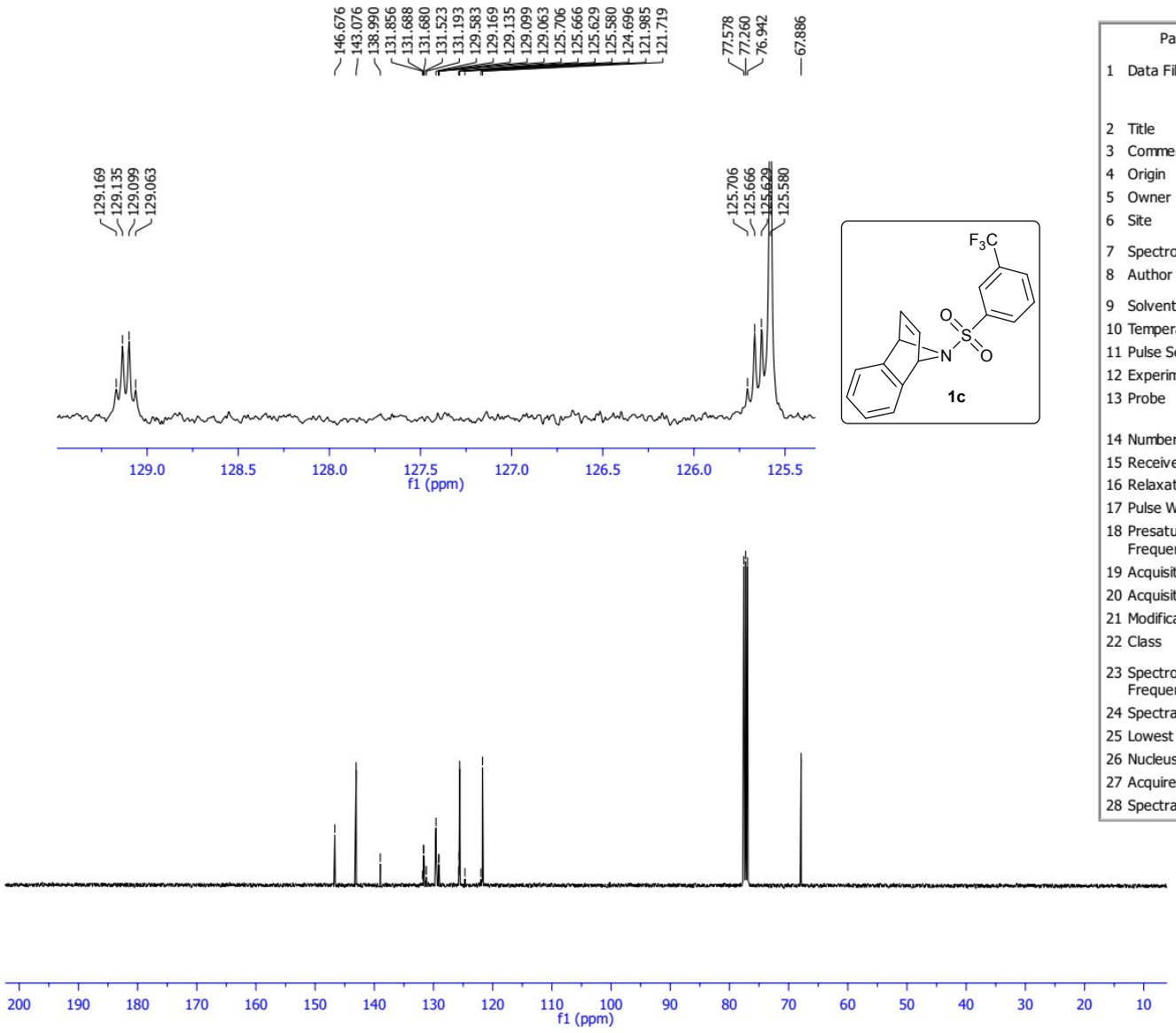

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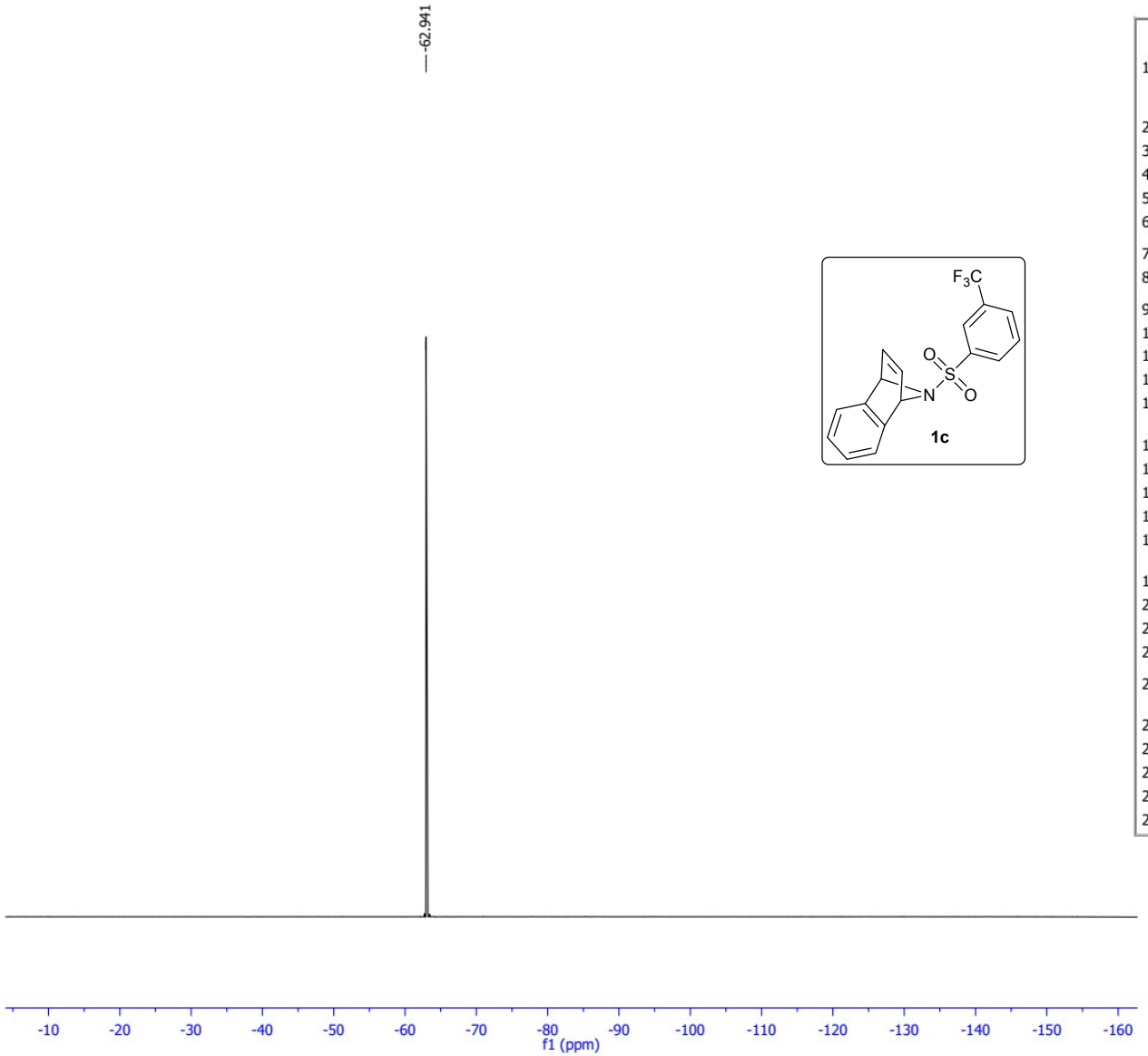

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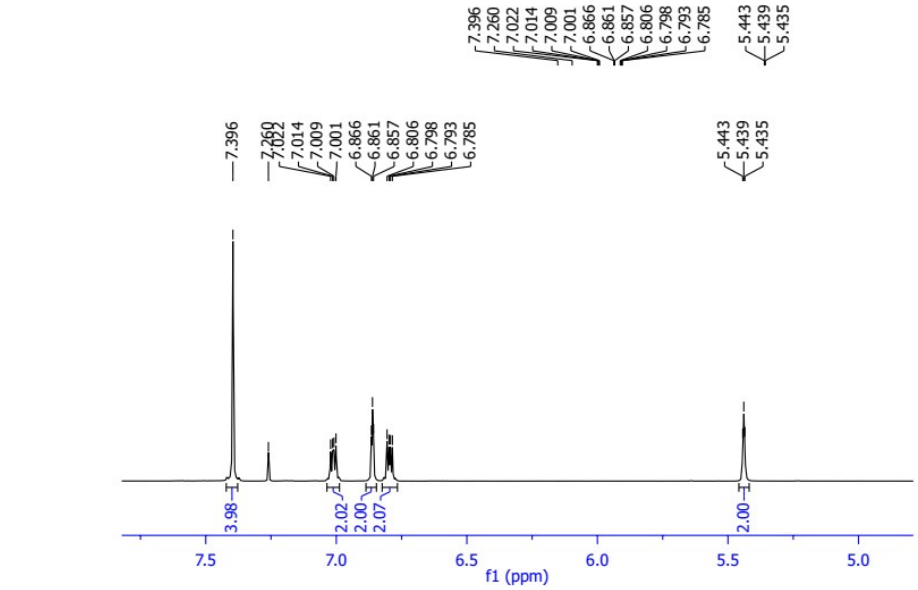

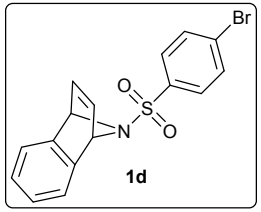

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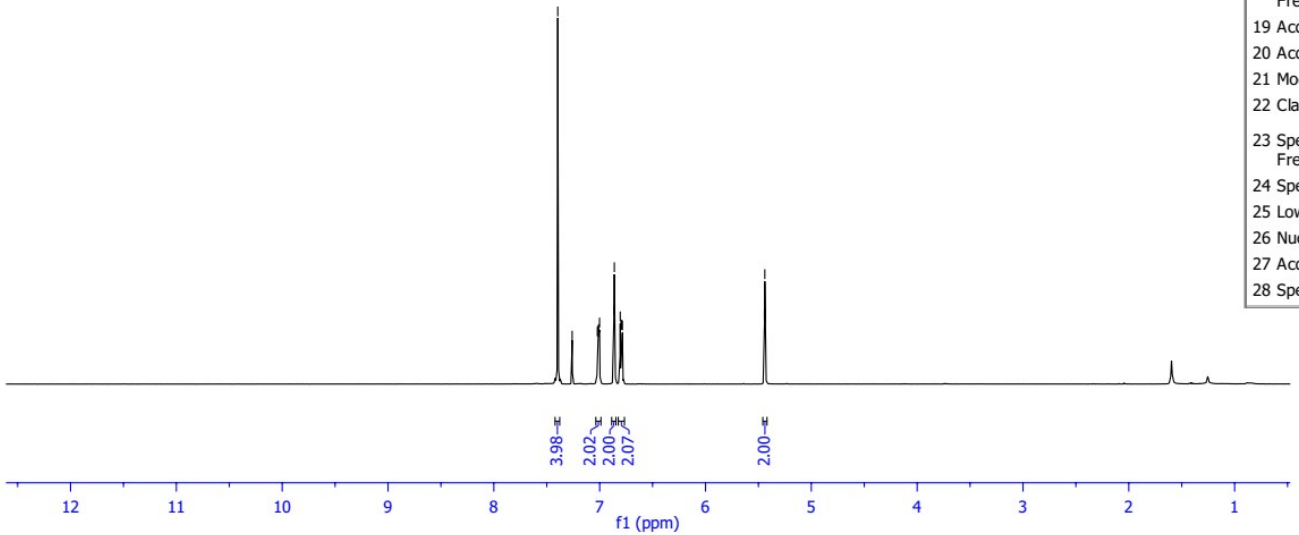

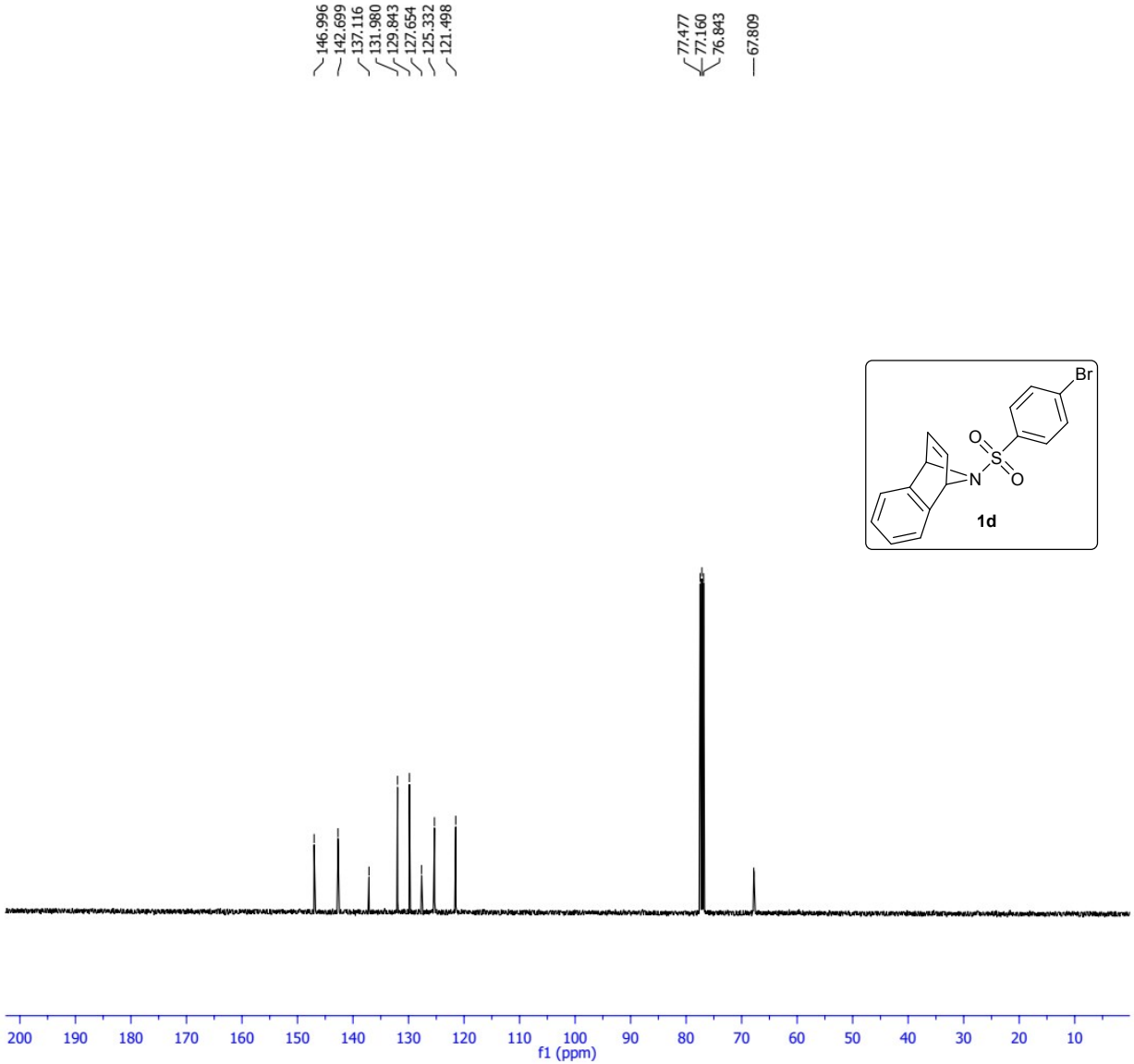

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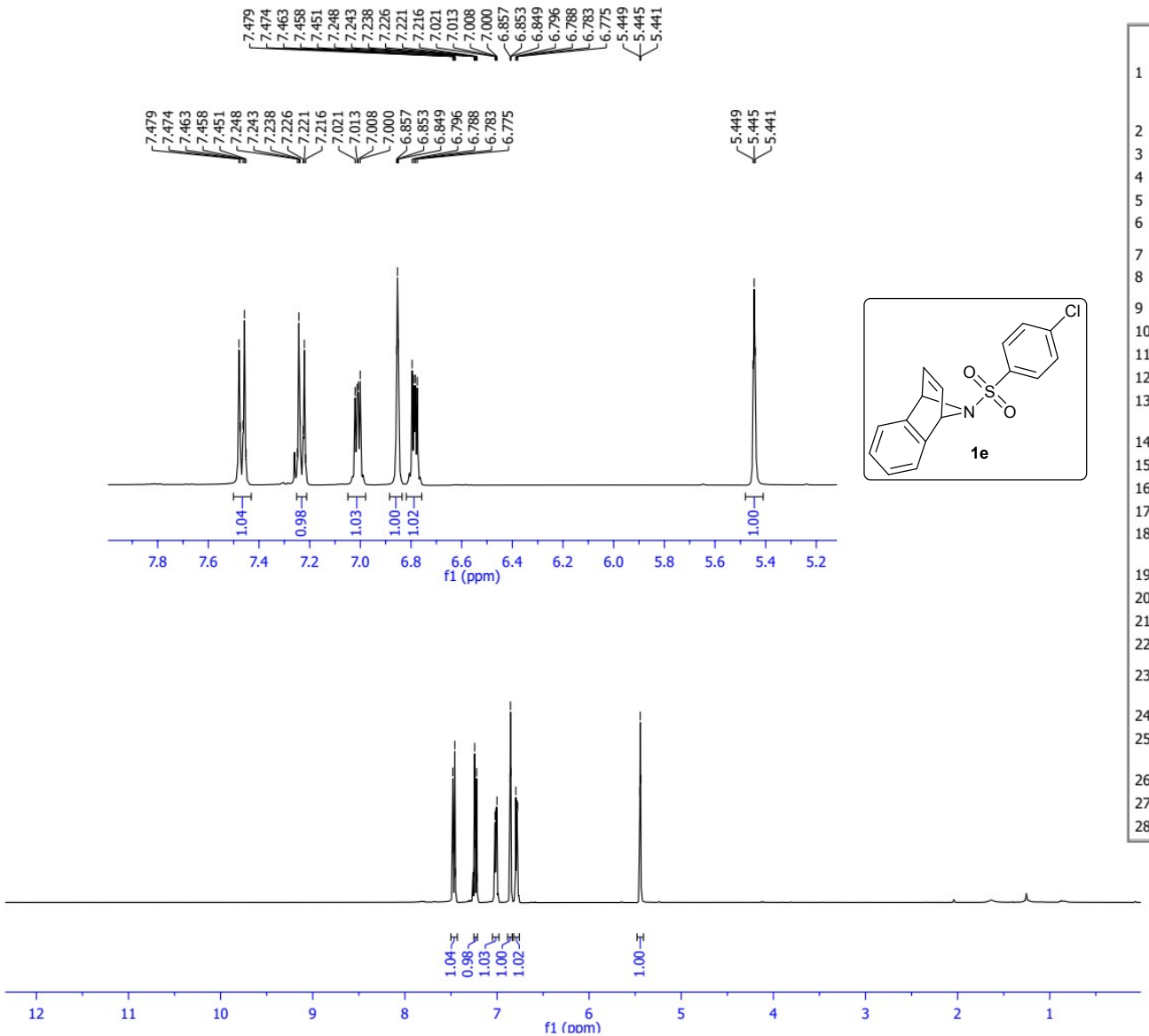
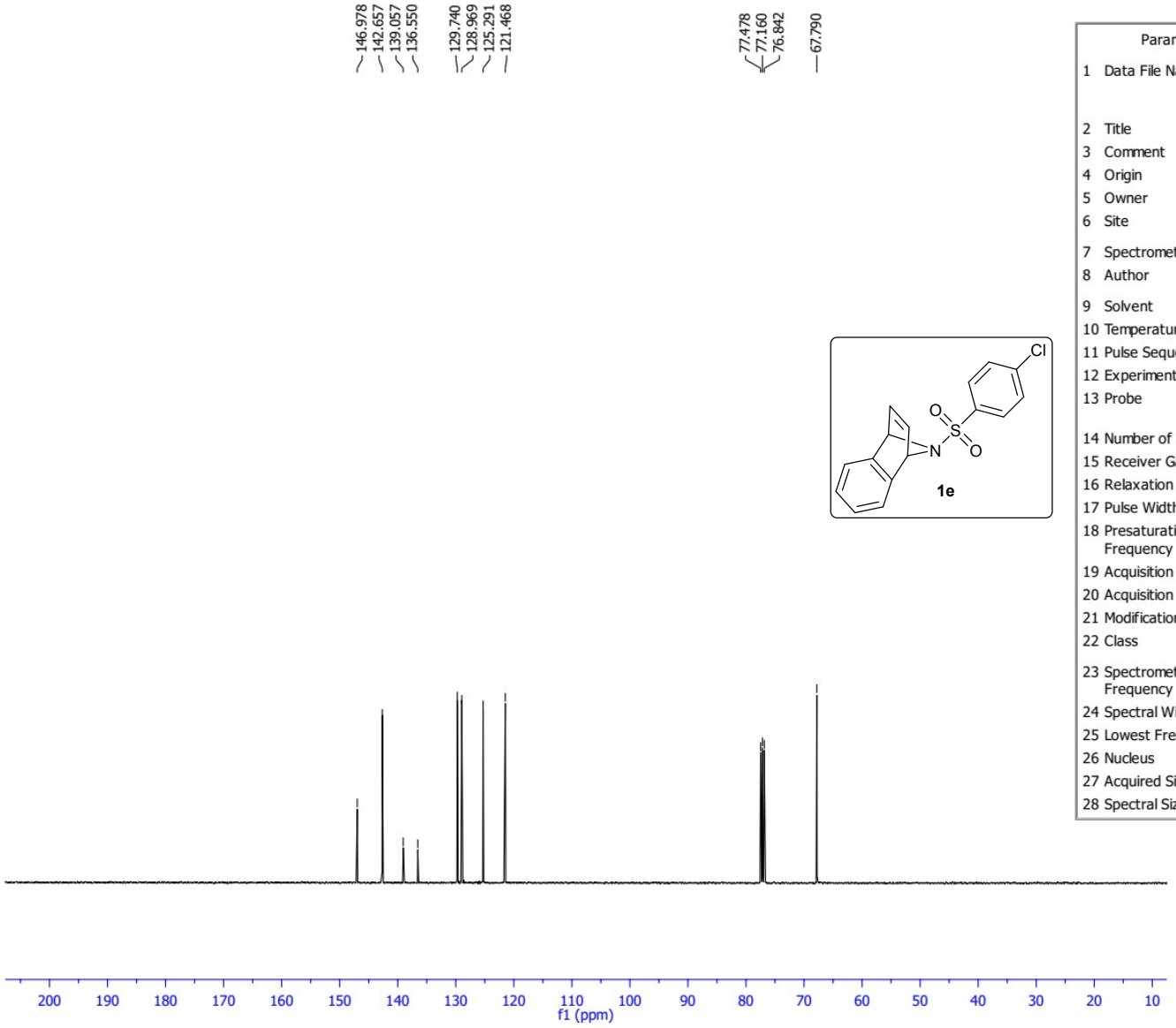
21	Modification Date	2018-12-29T03:28:31
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1944.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ SB-B-4Cl-SM-1H/ 10/ fid
2	Title	SB-B-4Cl-SM-1H.10.fid
3	Comment	SB-B-4Cl-SM-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.2
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2018-12-31T10:14:00
21	Modification Date	2018-12-31T10:14:48
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.3
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



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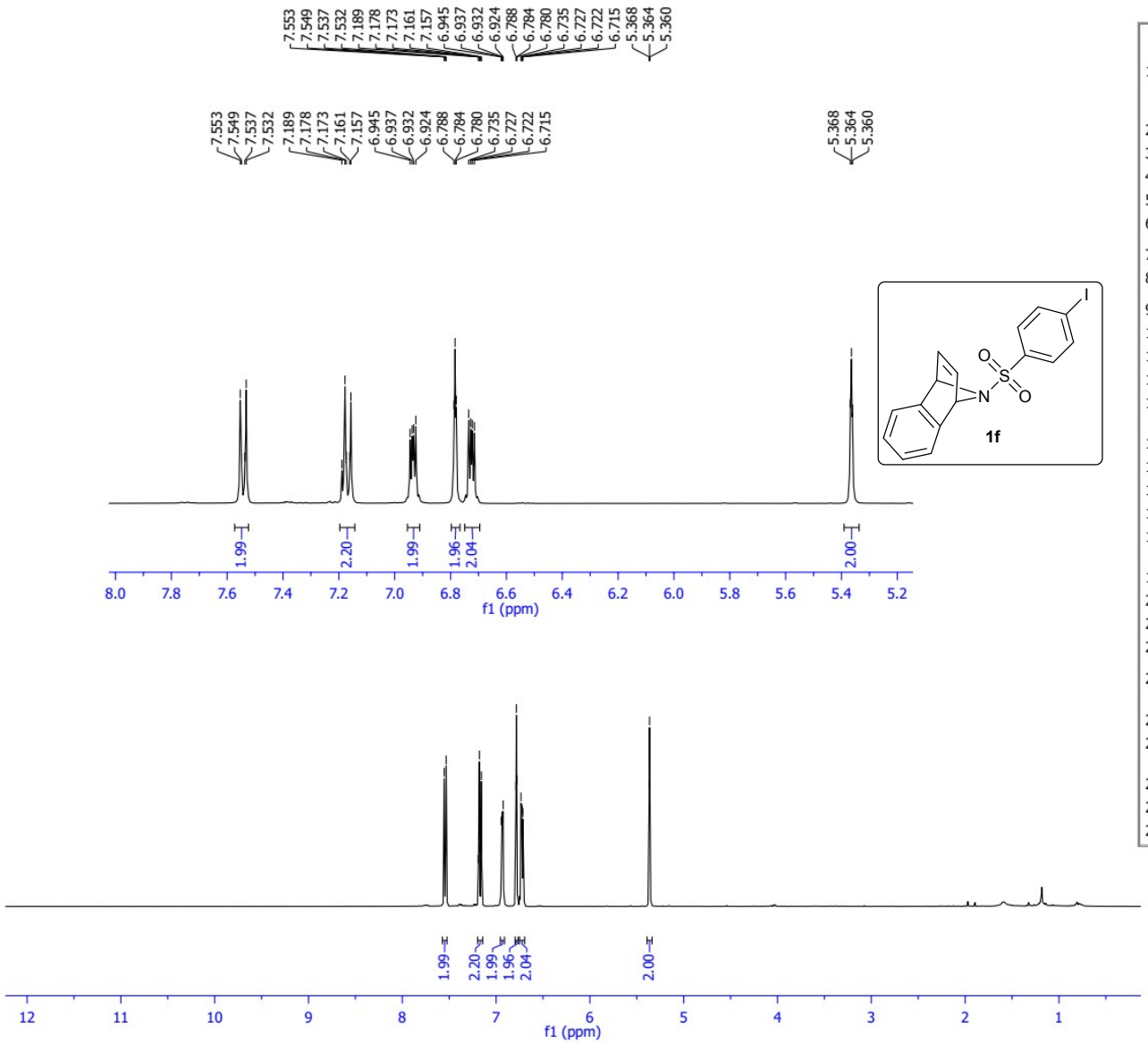
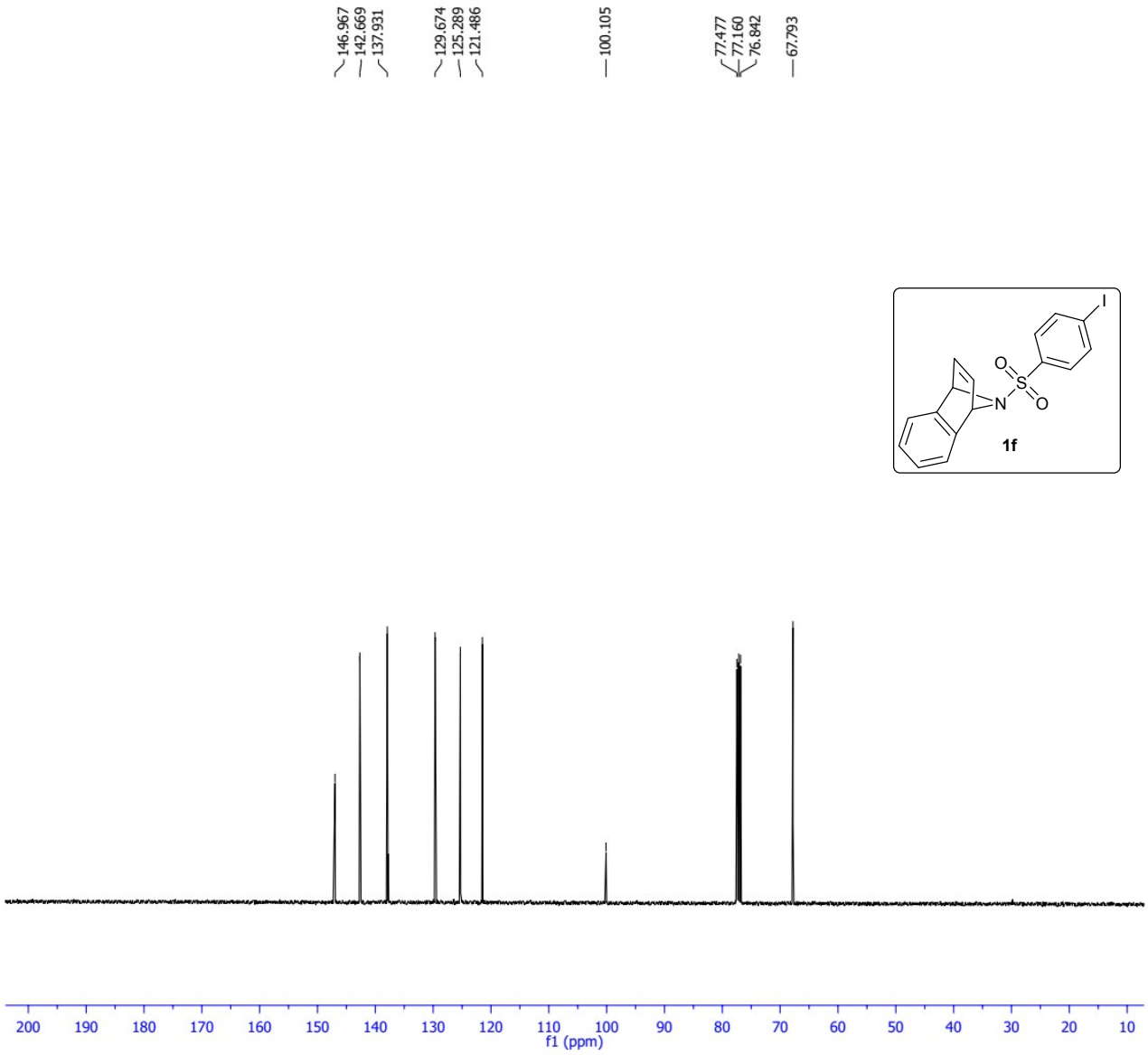
2	Title	SB-B-4CL-SM-13C.10.fid
3	Comment	SB-B-4CL-SM-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	500
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-31T22:25:00
21	Modification Date	2018-12-31T22:25:05
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1947.6
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ SB-B-SM-4I-1H/ 10/ fid
2	Title	SB-B-SM-4I-1H.10.fid
3	Comment	SB-B-SM-4I-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.7
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2018-12-28T10:45:00
21	Modification Date	2018-12-28T10:45:35
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3575.4
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



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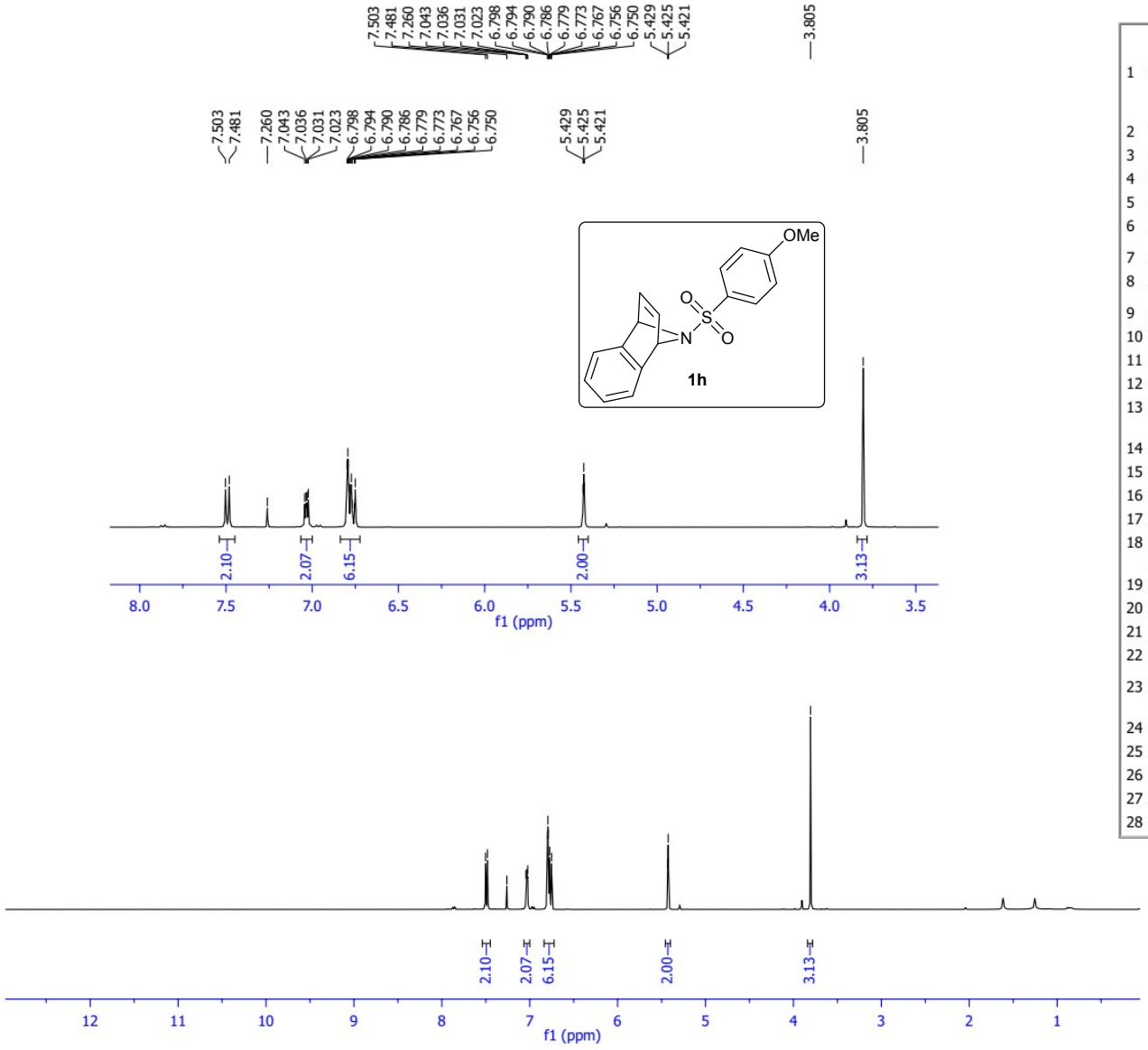
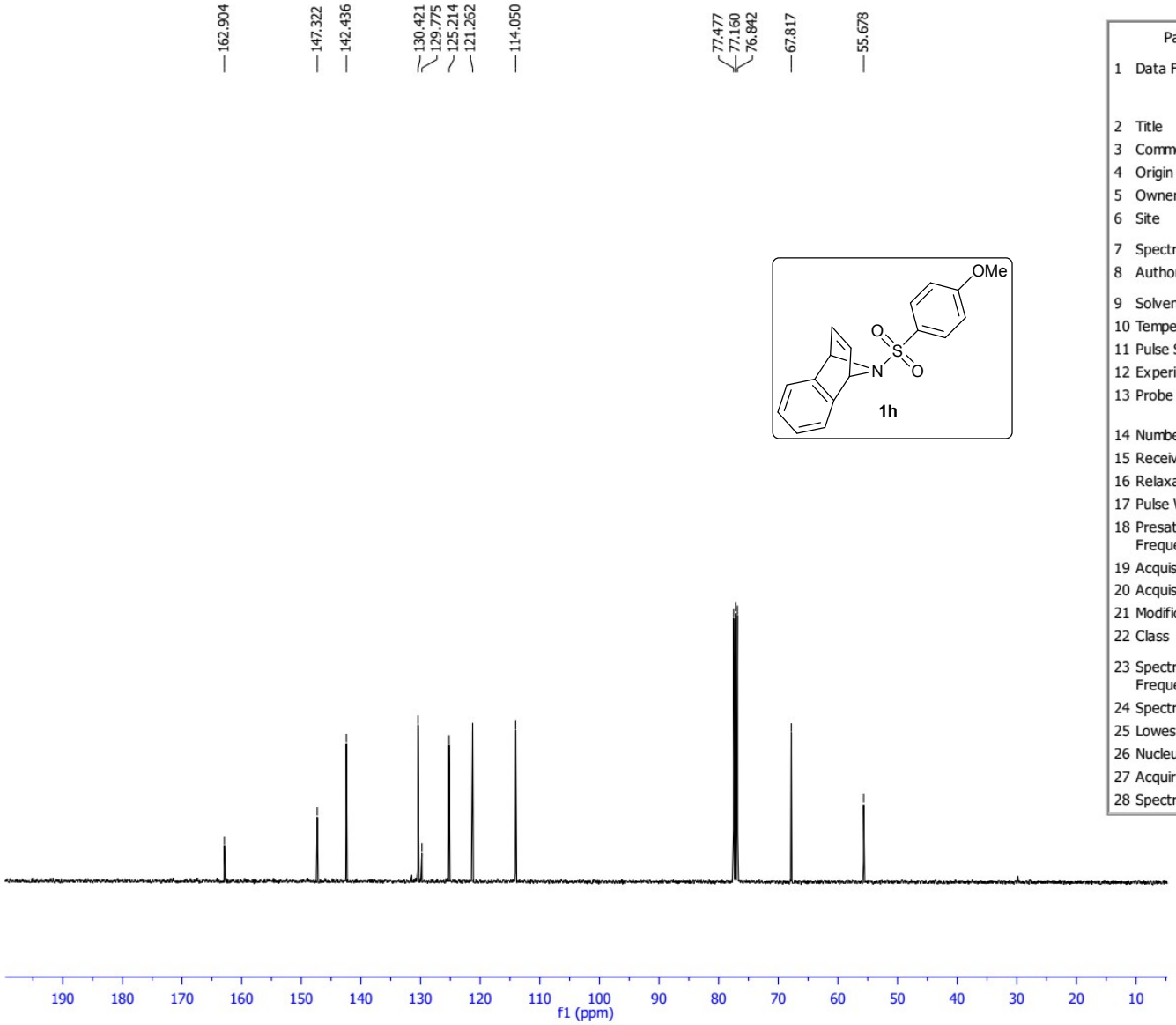
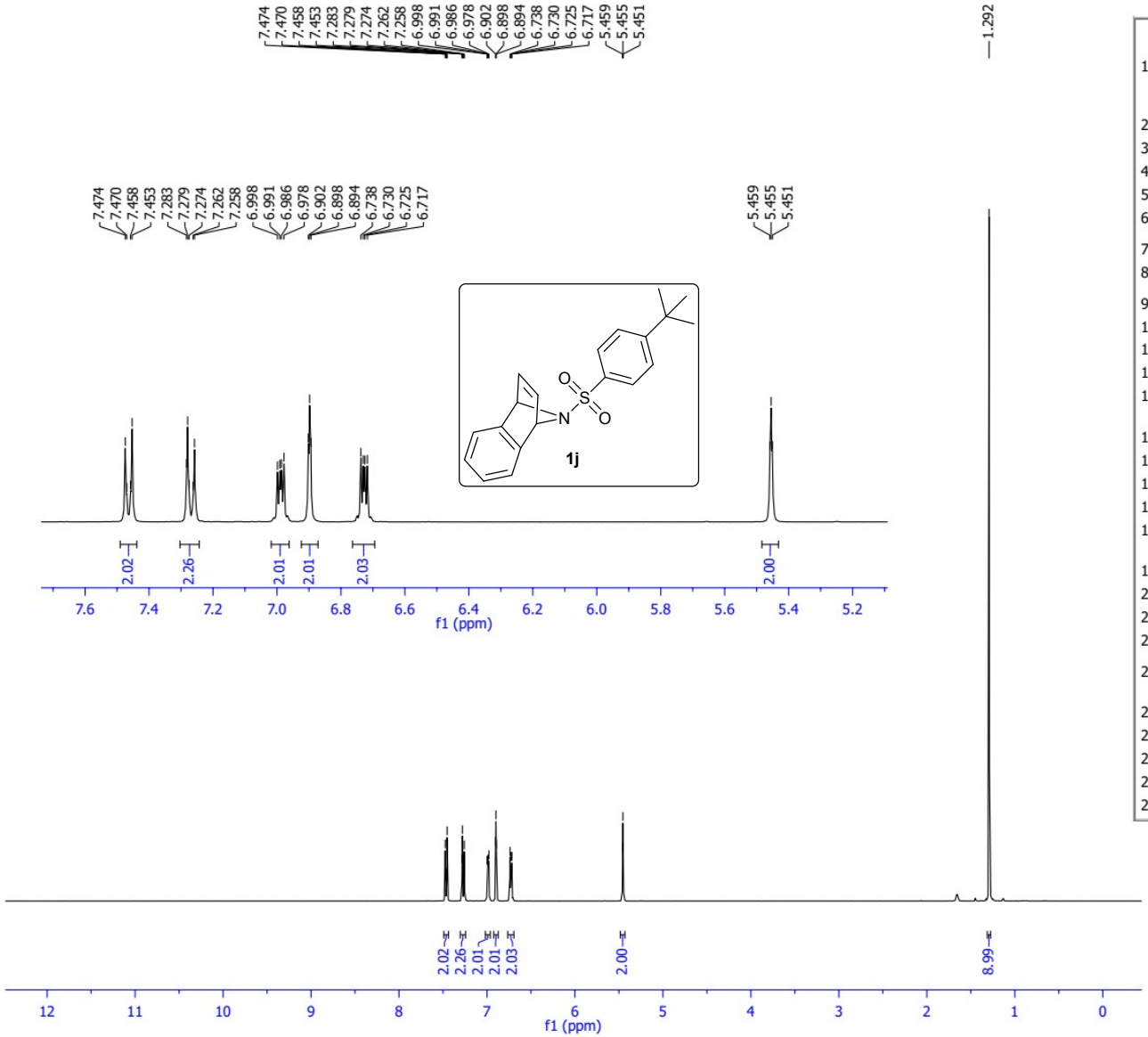
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ SB-B-SM-4I-13C/ 10/ fid
2	Title	SB-B-SM-4I-13C.10.fid
3	Comment	SB-B-SM-4I-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.5
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	400
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-28T16:30:00
21	Modification Date	2018-12-28T16:30:03
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1947.3
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



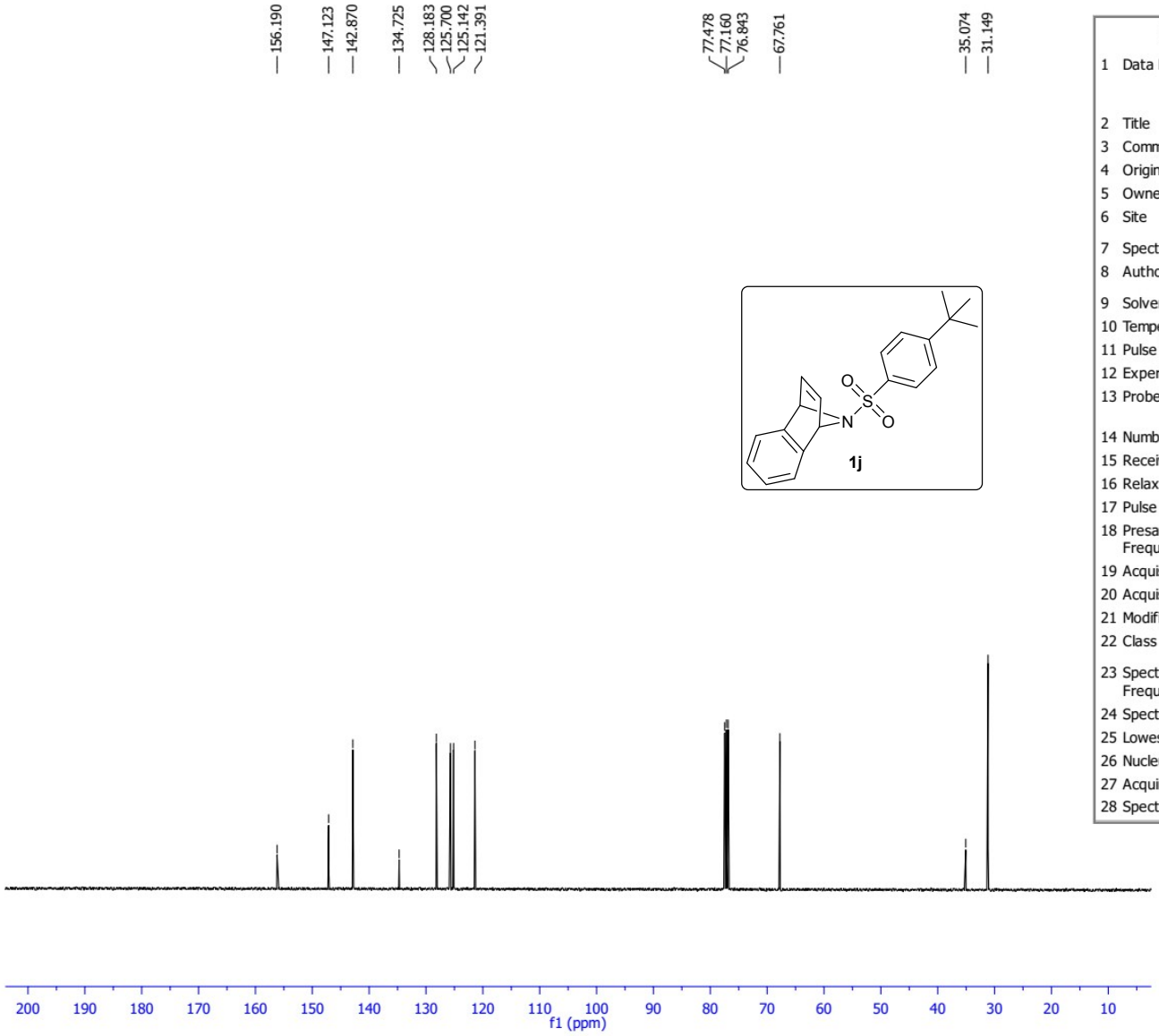
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-120-1H/ 20/ fid
2	Title	VK-S-120-1H.20.fid
3	Comment	VK-S-120-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2018-12-28T10:21:00
21	Modification Date	2018-12-28T10:21:15
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



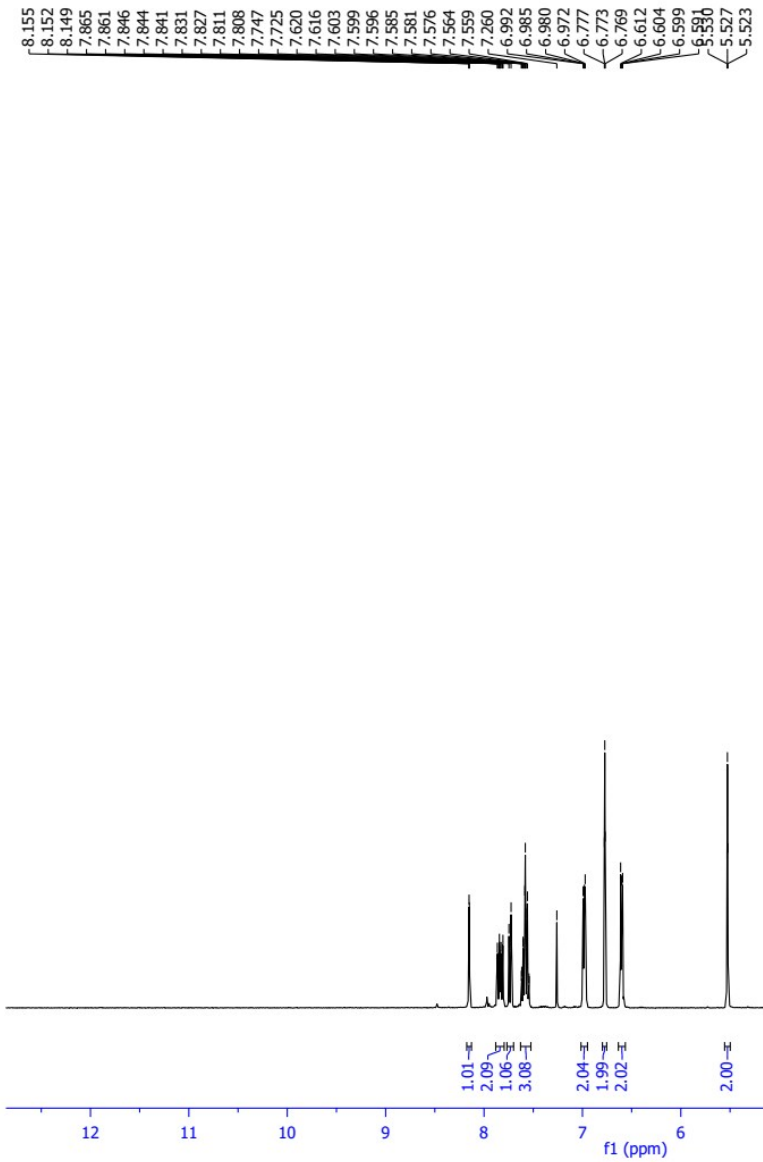
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-120-13C/ 10/ fid
2	Title	VK-S-120-13C.10.fid
3	Comment	VK-S-120-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.0
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	400
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-29T03:55:00
21	Modification Date	2018-12-29T03:55:06
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1944.4
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536

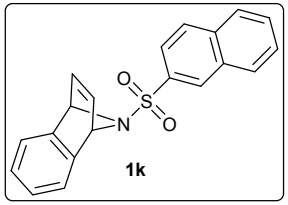


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-119-1H/ 20/ fid
2	Title	VK-S-119-1H.20.fid
3	Comment	VK-S-119-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2018-12-28T10:15:00
21	Modification Date	2018-12-28T10:15:48
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3538.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072

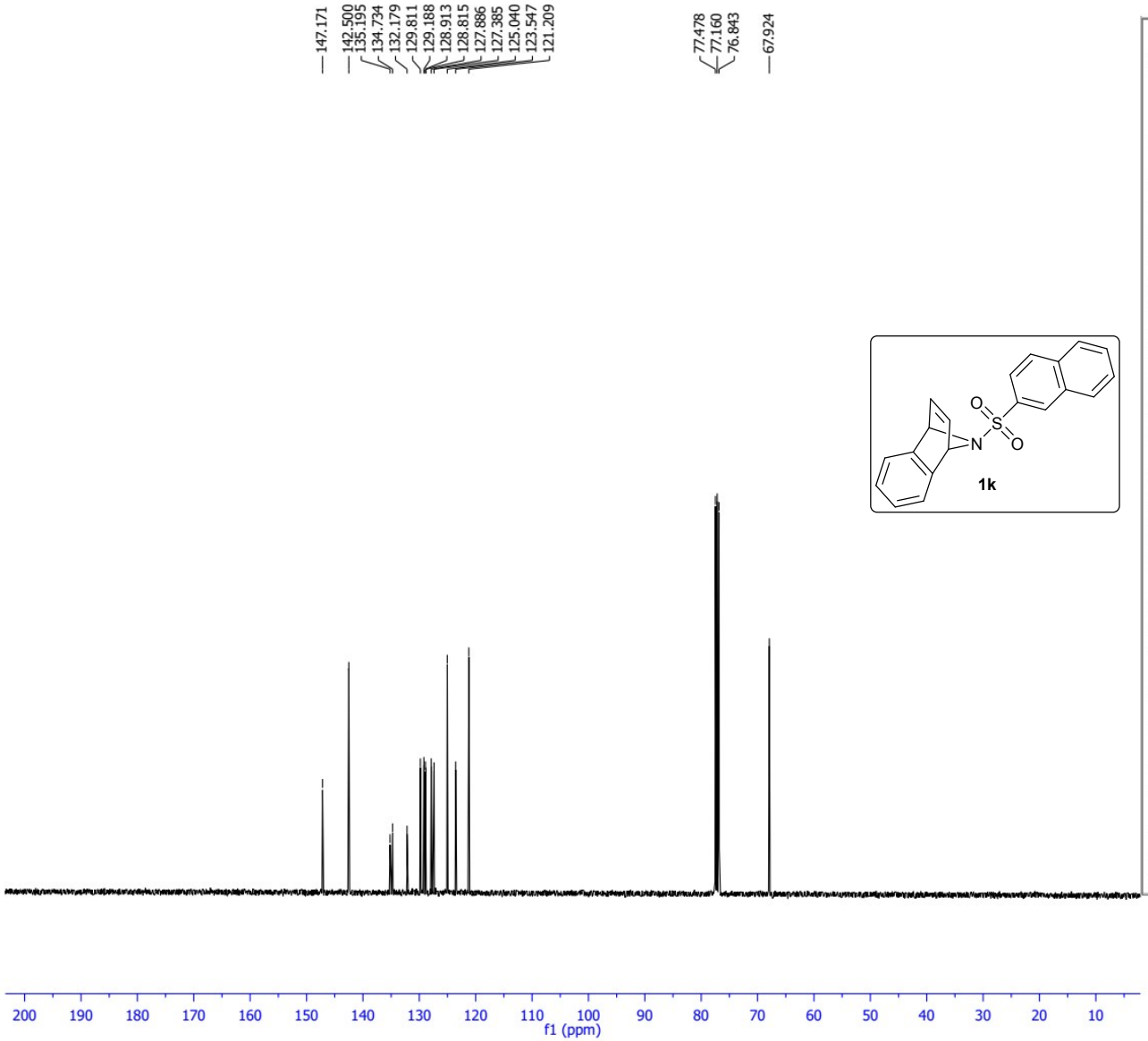


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-119-13C/ 10/ fid
2	Title	VK-S-119-13C.10.fid
3	Comment	VK-S-119-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.6
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	400
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-28T16:56:00
21	Modification Date	2018-12-28T16:56:32
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1945.4
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536

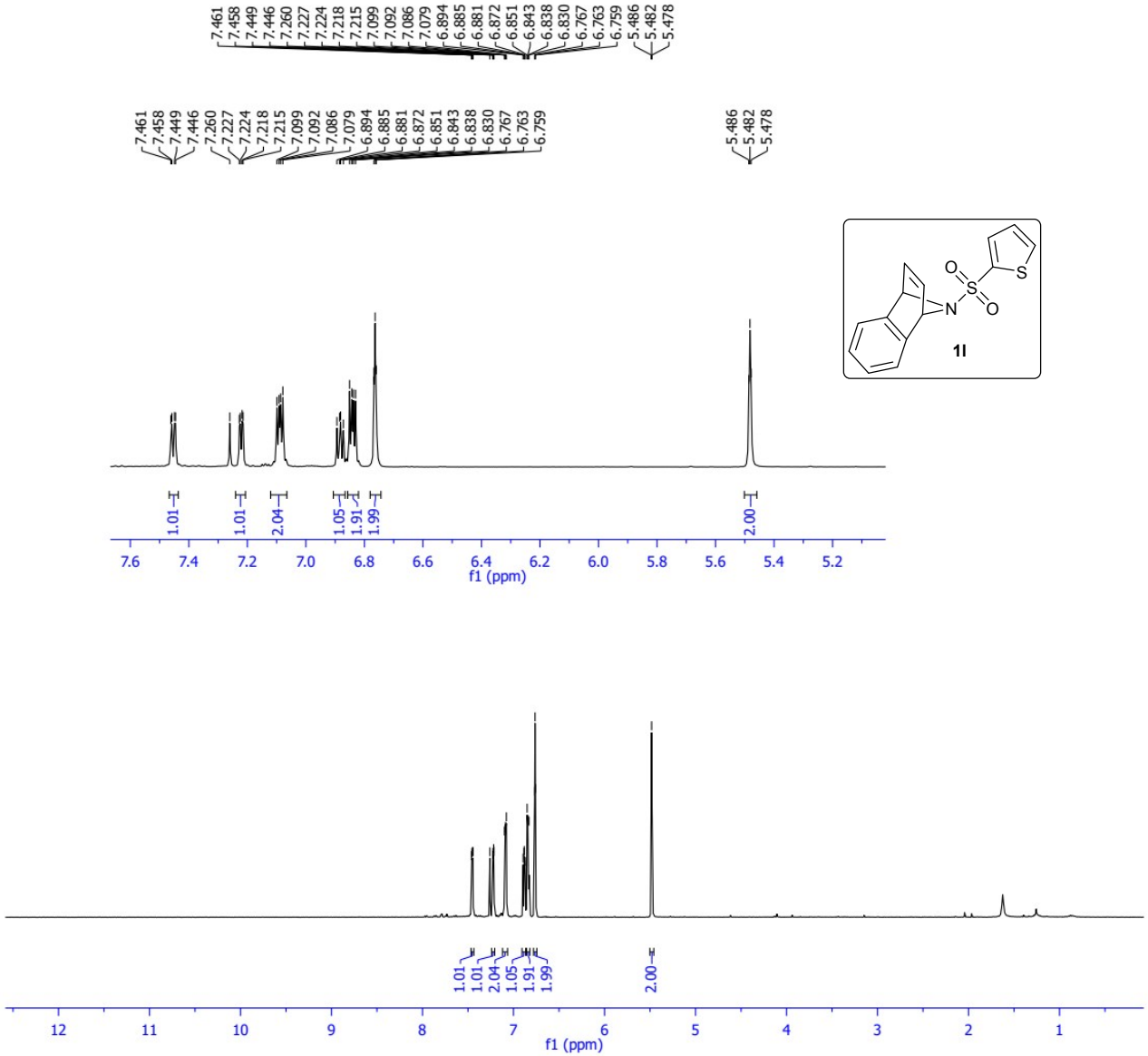




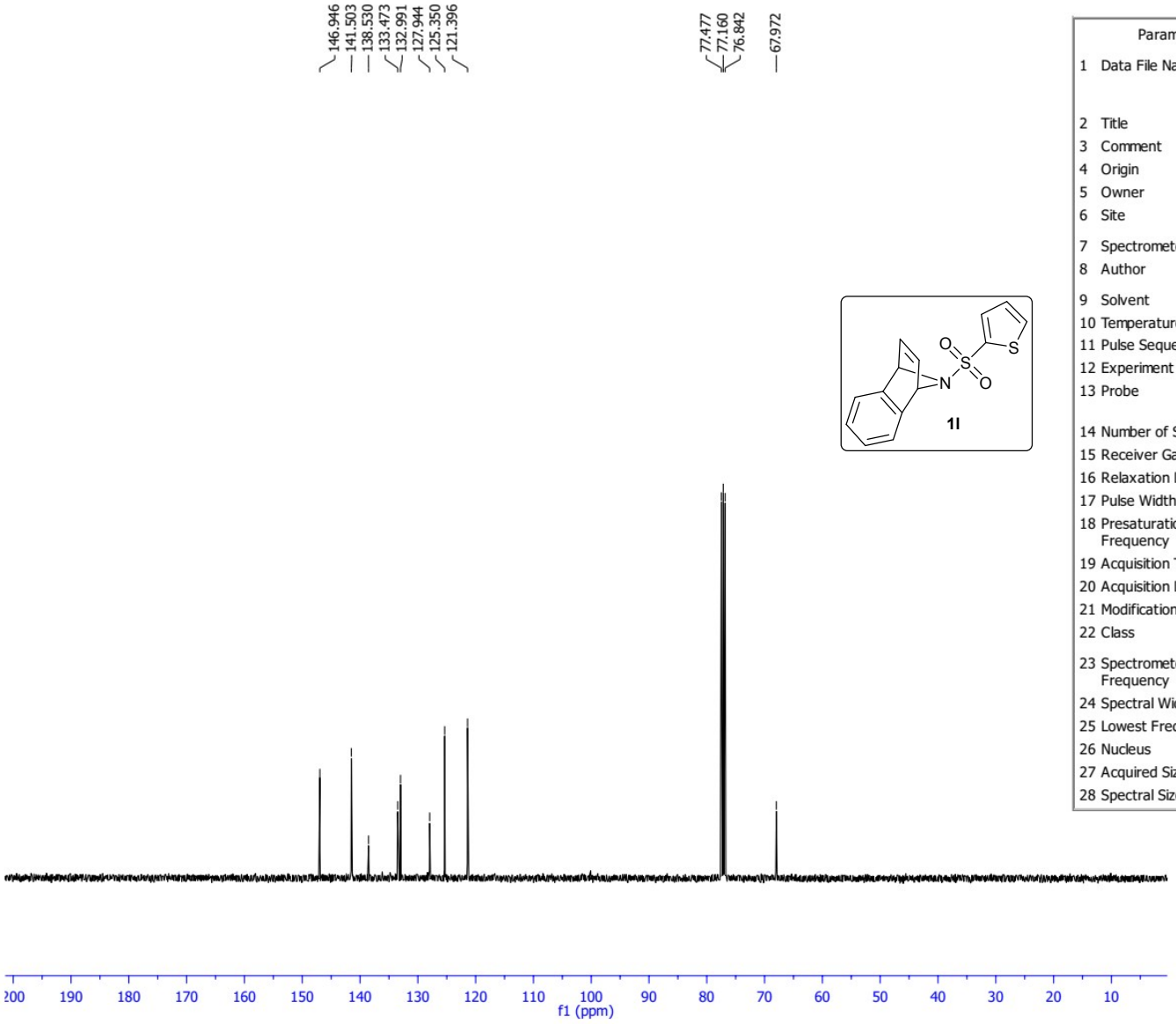
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ SB-B-SM-NAPH-1H/ 10/ fid
2	Title	SB-B-SM-NAPH-1H.10.fid
3	Comment	SB-B-SM-NAPH-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.8
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2018-12-28T10:40:00
21	Modification Date	2018-12-28T10:40:02
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



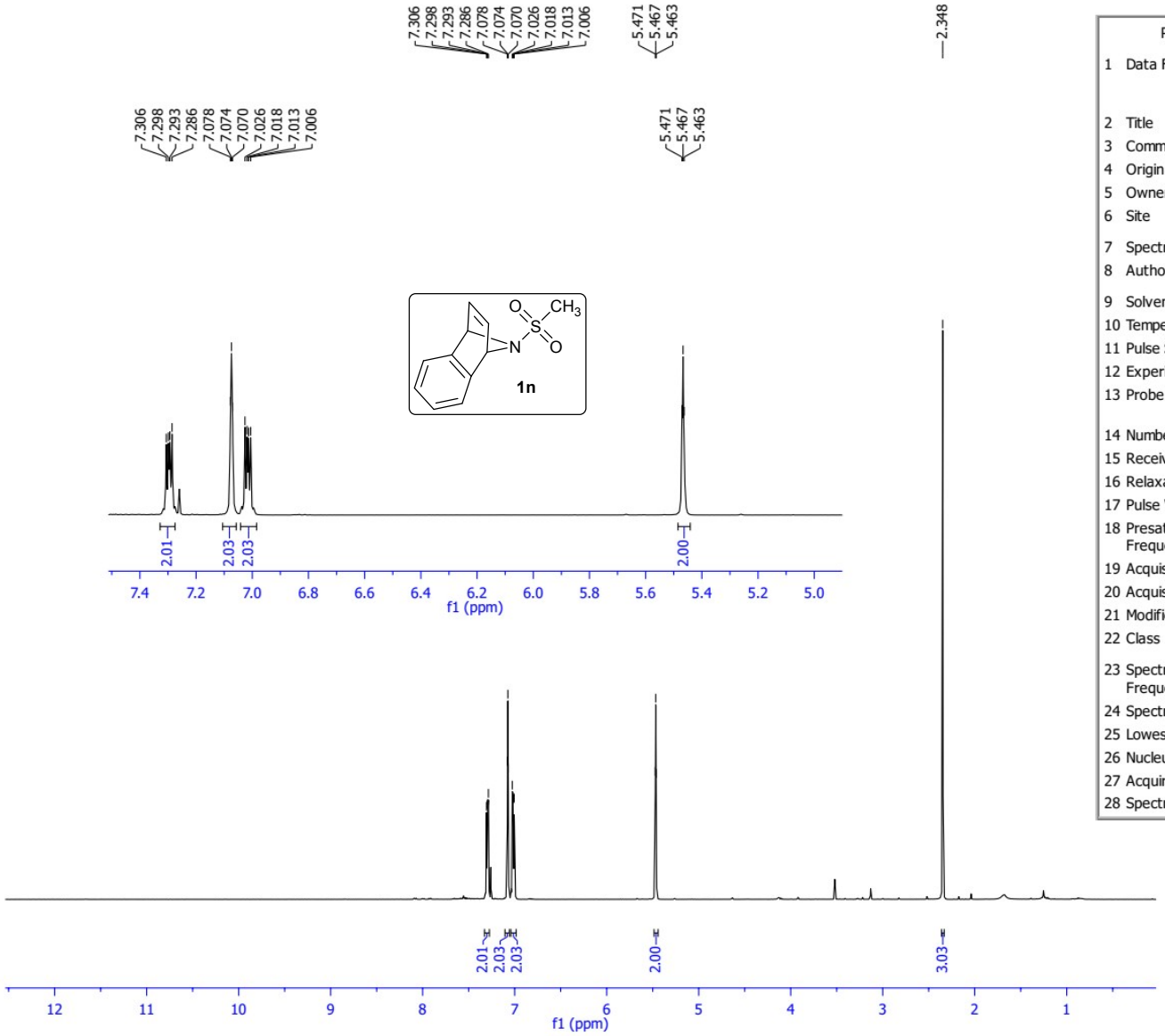
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ SB-B-SM-NAPH-13C/ 10/ fid
2	Title	SB-B-SM-NAPH-13C.10.fid
3	Comment	SB-B-SM-NAPH-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.5
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	400
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-29T02:02:00
21	Modification Date	2018-12-29T02:02:36
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1945.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



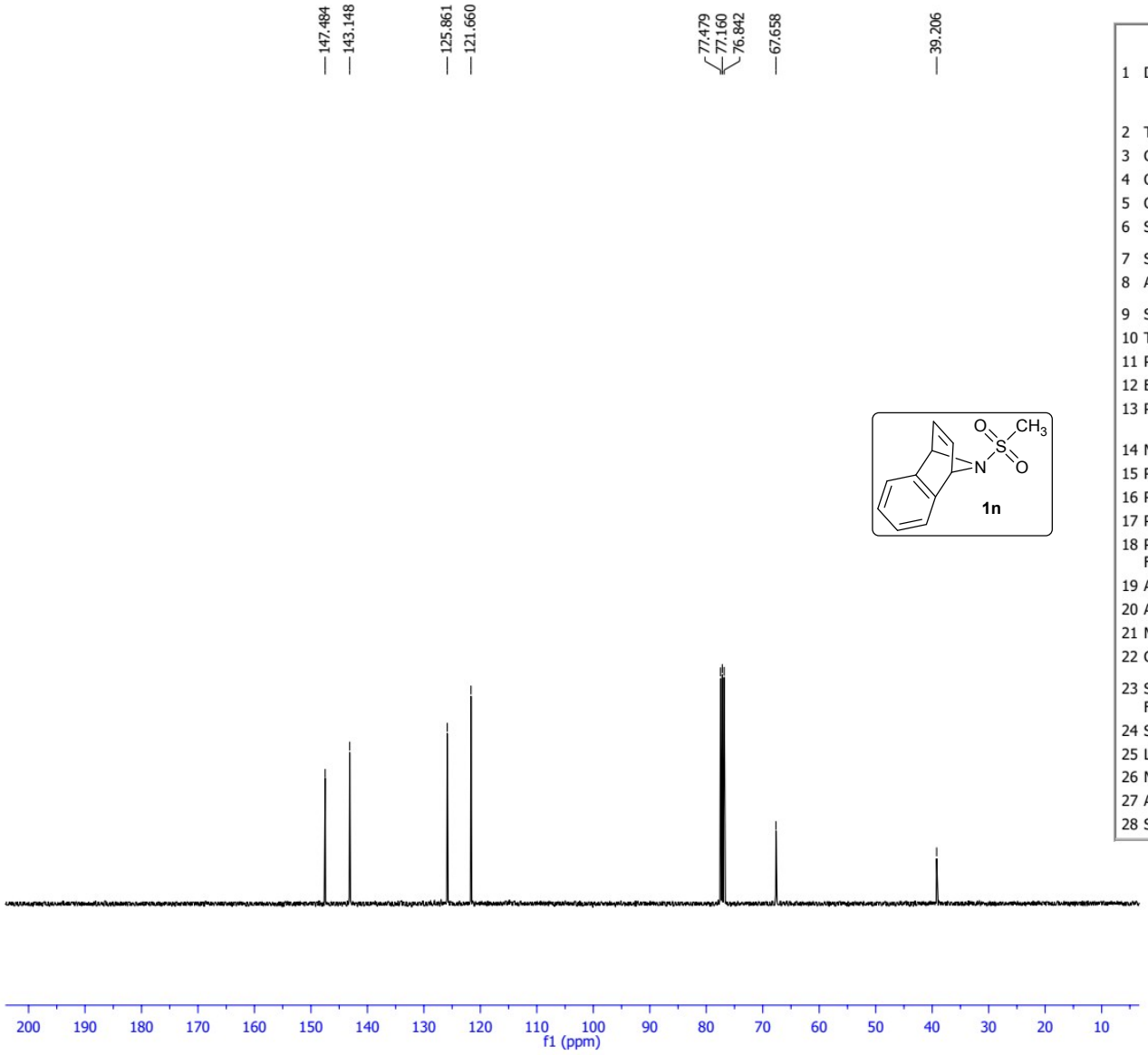
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-133-1H/ 10/ fid
2	Title	VK-S-133-1H.10.fid
3	Comment	VK-S-133-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.4
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-01-04T09:21:00
21	Modification Date	2019-01-04T09:21:51
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1544.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536



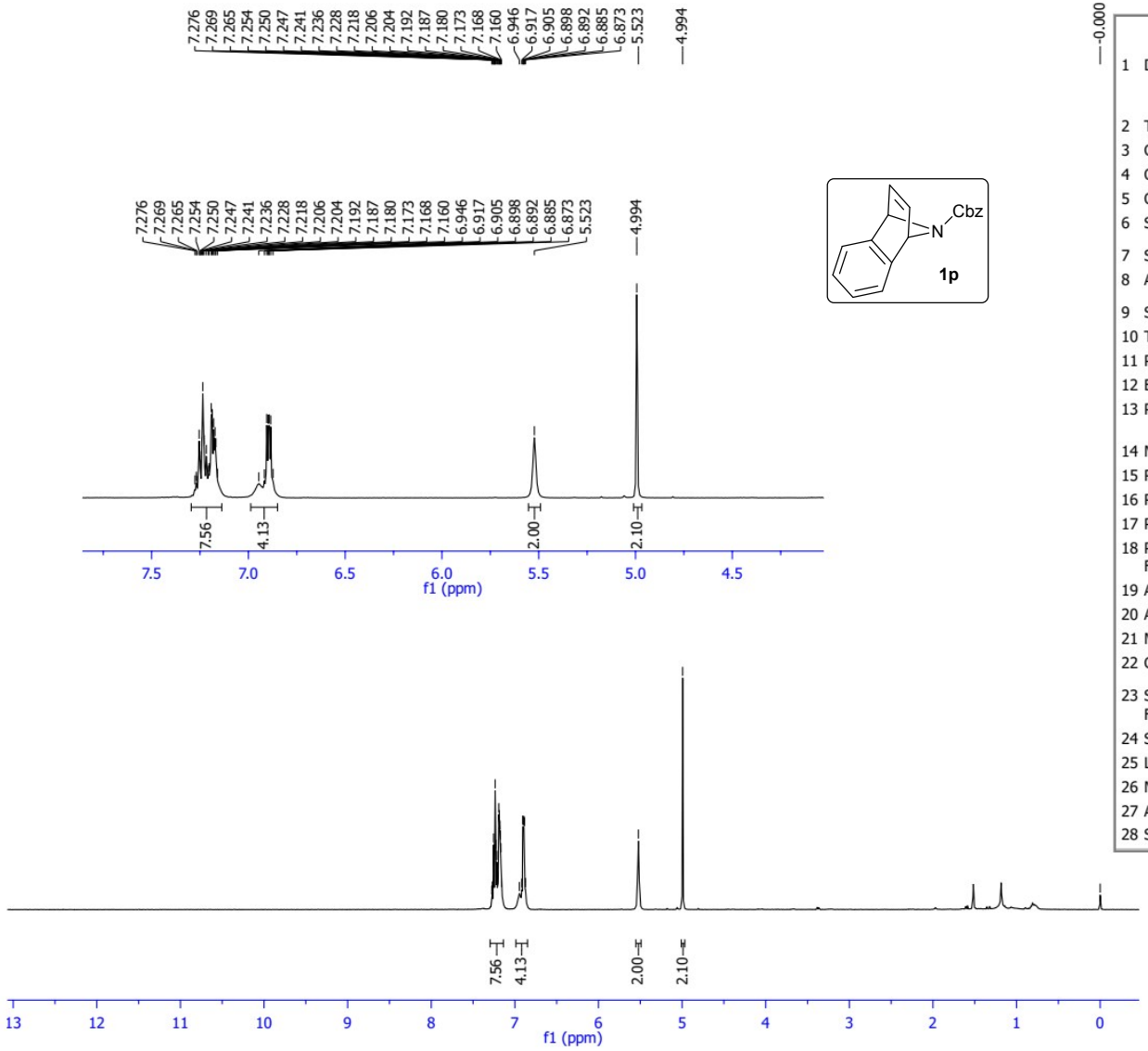
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-133-13C/ 10/ fid
2	Title	VK-S-133-13C.10.fid
3	Comment	VK-S-133-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	250
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-04T16:19:00
21	Modification Date	2019-01-04T16:19:31
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1945.6
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



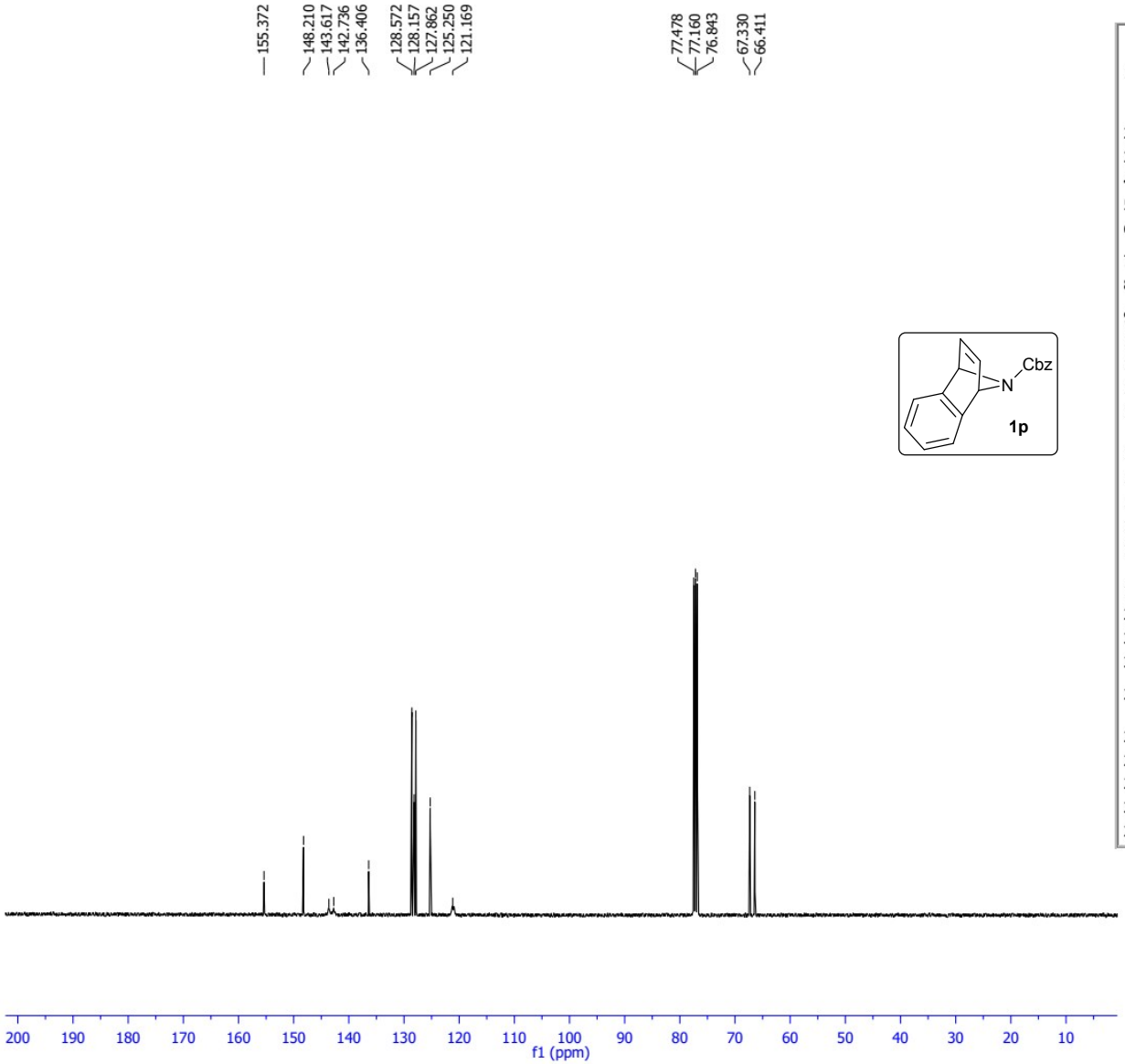
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-134-1H/ 10/ fid
2	Title	VK-S-134-1H.10.fid
3	Comment	VK-S-134-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.4
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-01-04T09:26:00
21	Modification Date	2019-01-04T09:26:22
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1544.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536



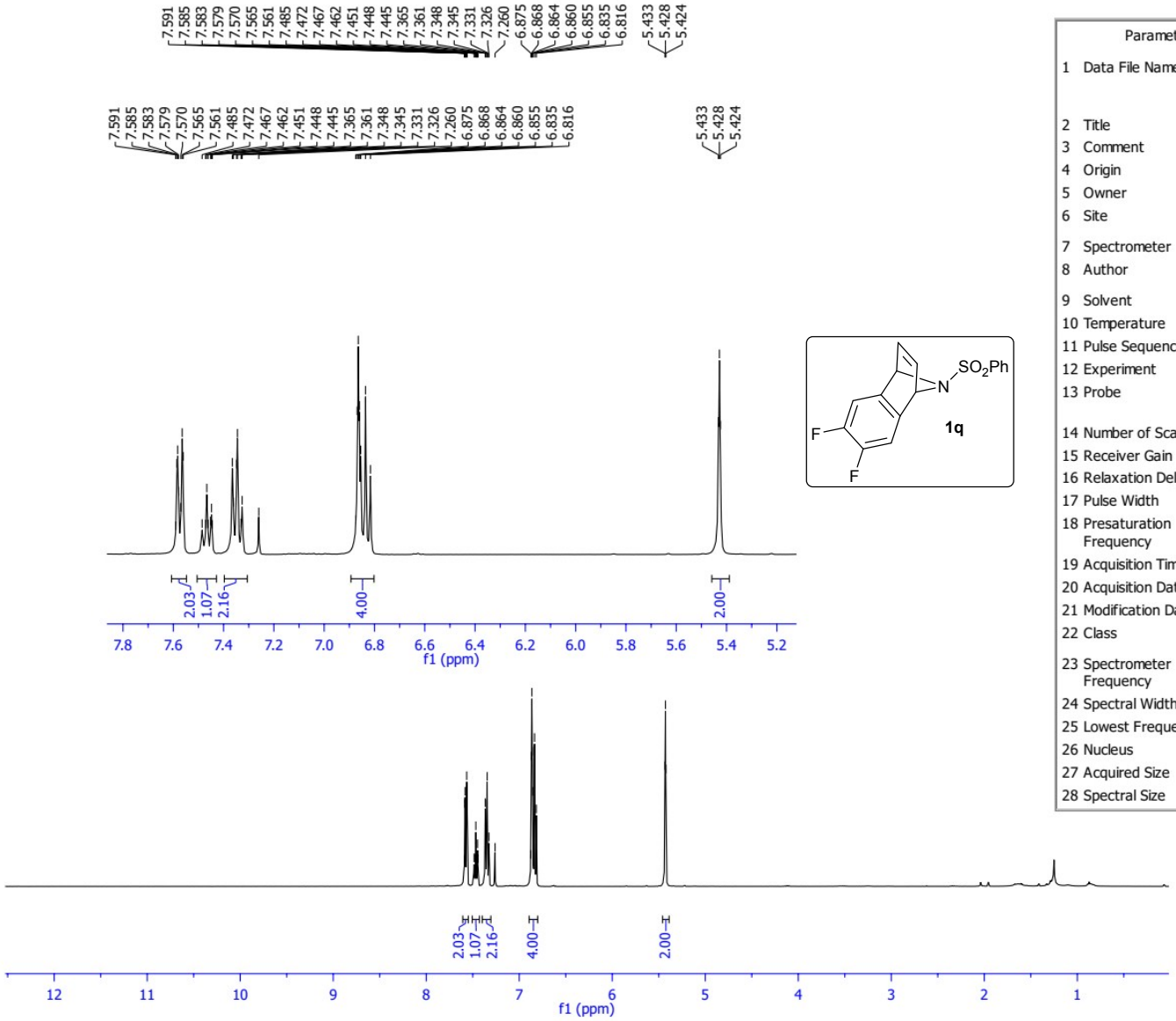
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-134-13C/ 10/ fid
2	Title	VK-S-134-13C.10.fid
3	Comment	VK-S-134-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	250
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-04T16:01:00
21	Modification Date	2019-01-04T16:01:47
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1948.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



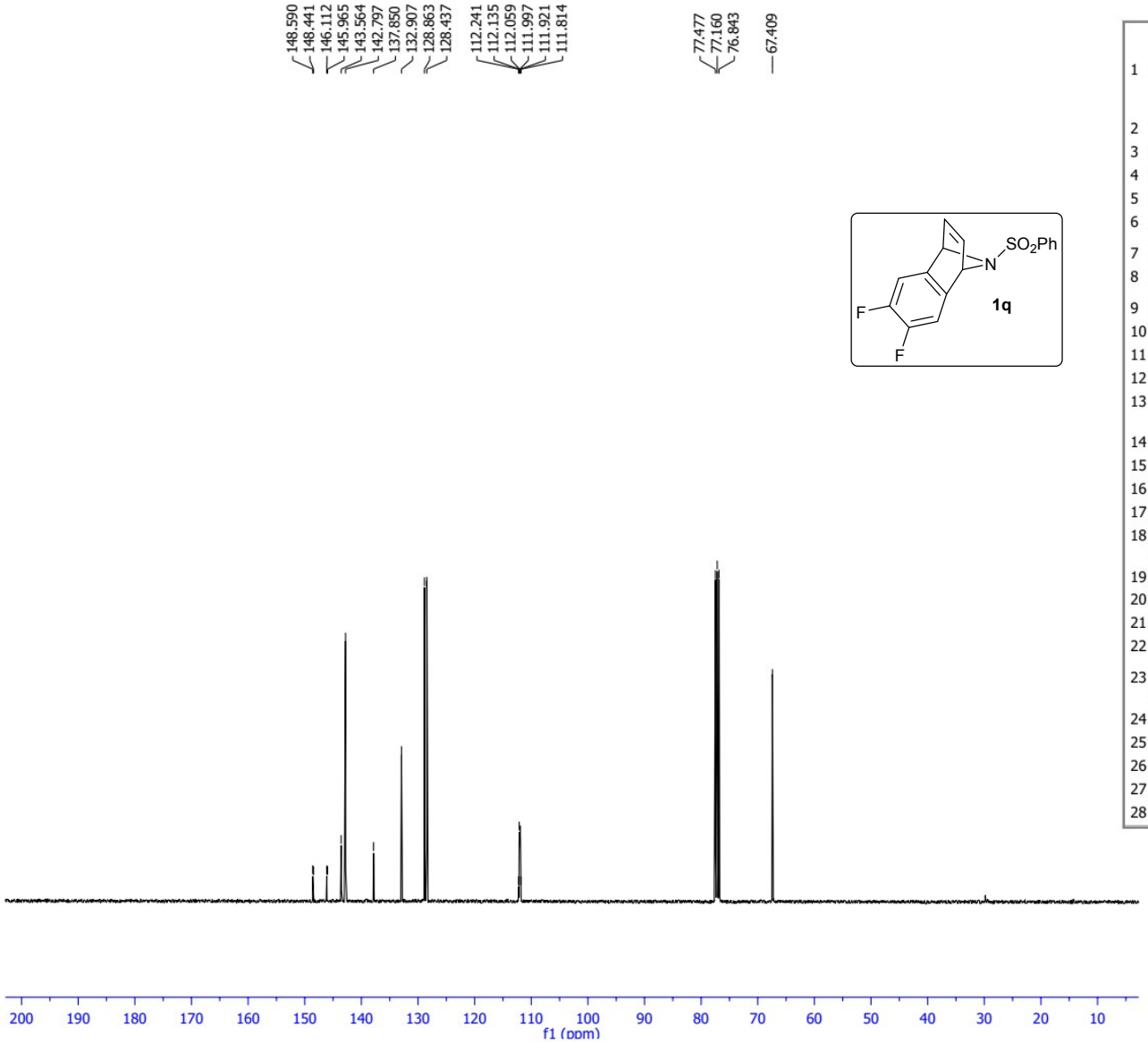
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-135-1H/ 10/ fid
2	Title	VR-S-135-1H.10.fid
3	Comment	VR-S-135-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-08T10:42:00
21	Modification Date	2019-01-08T10:42:12
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3579.4
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



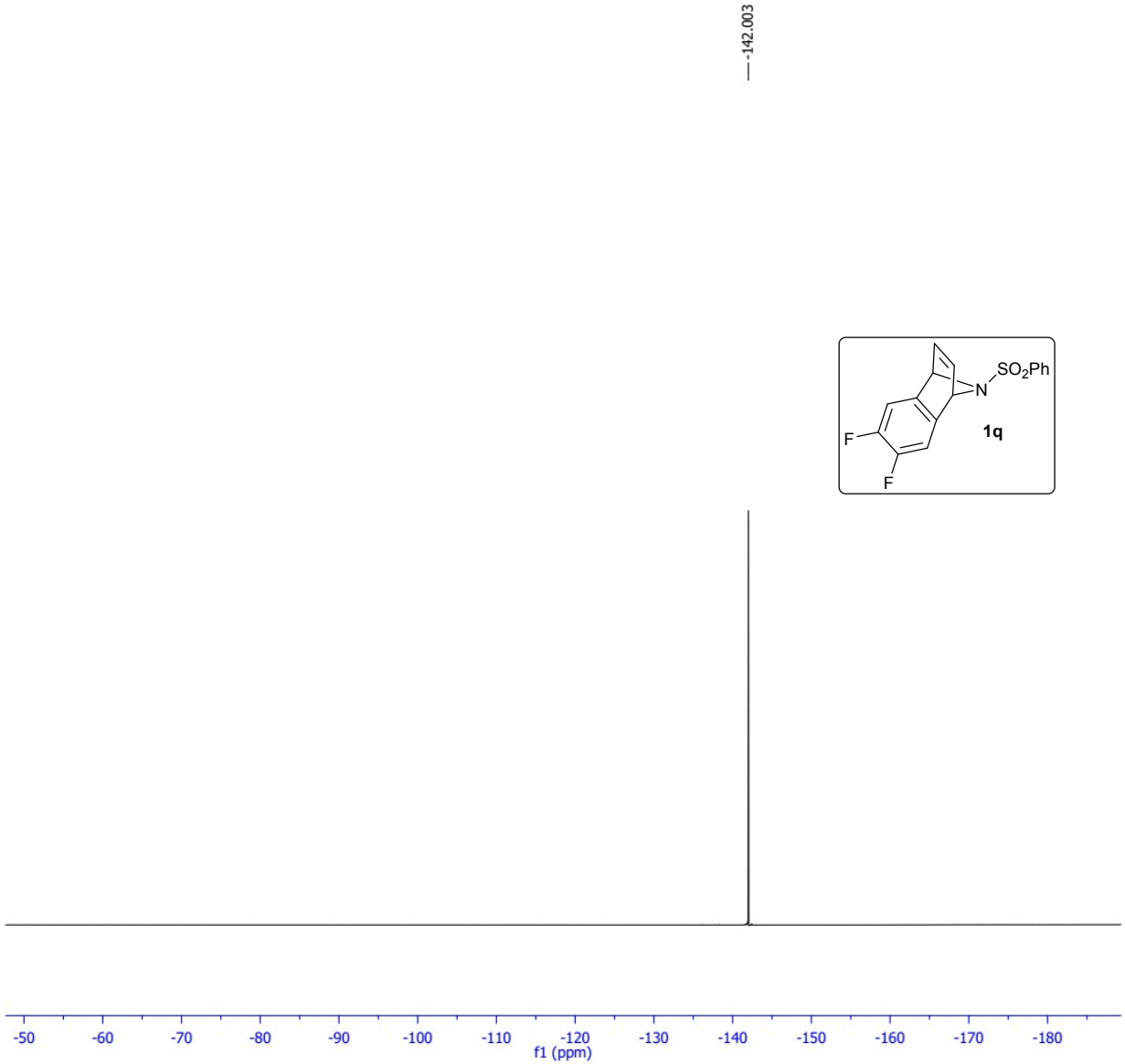
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-CBZ-13C/ 10/ fid
2	Title	VK-CBZ-13C.10.fid
3	Comment	VK-CBZ-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	299.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-05-27T21:27:00
21	Modification Date	2019-05-27T21:27:45
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



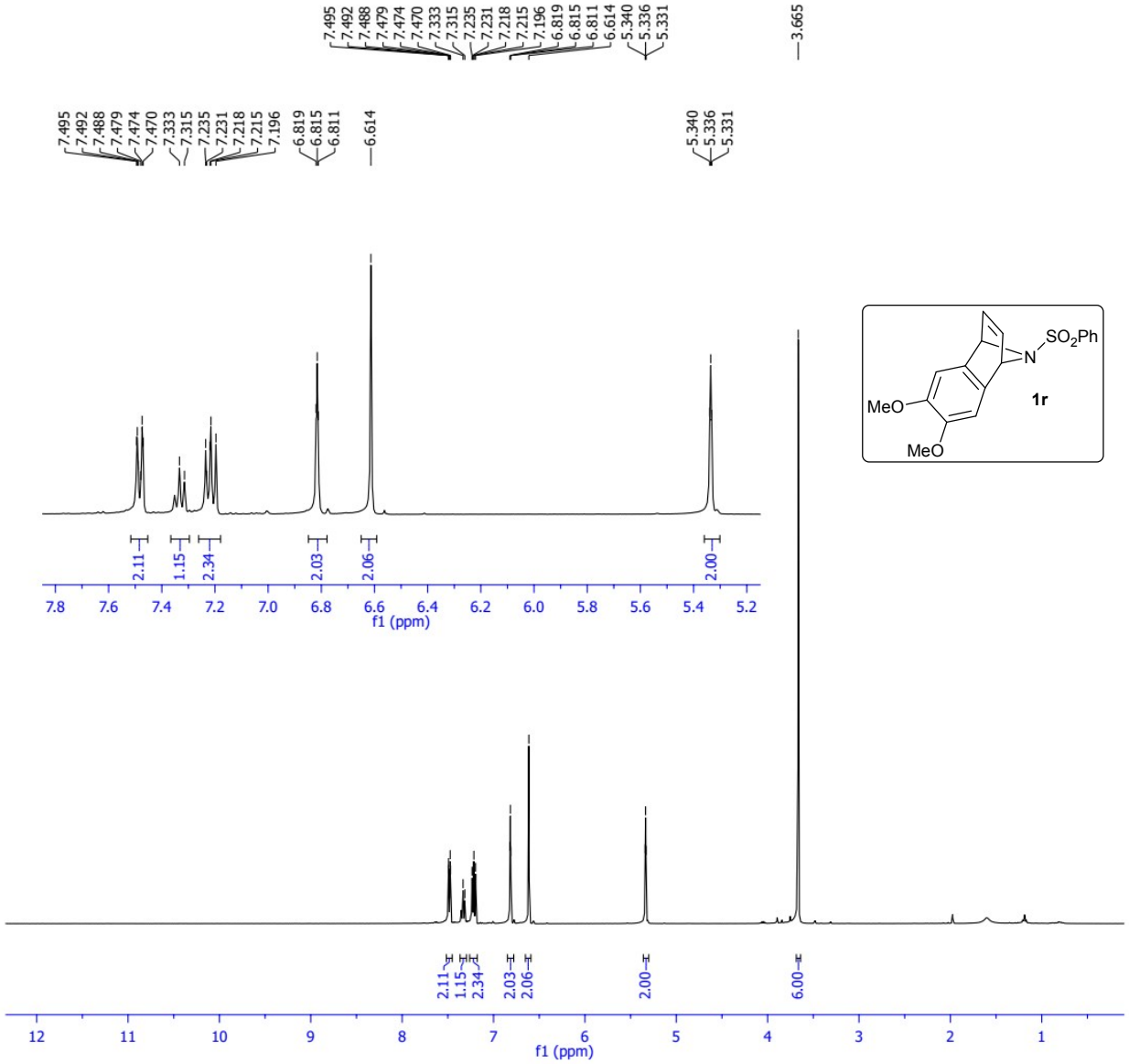
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-155-1H/ 10/ fid
2	Title	VK-S-155-1H.10.fid
3	Comment	VK-S-155-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-03-04T09:38:00
21	Modification Date	2019-03-04T09:38:27
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3545.9
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



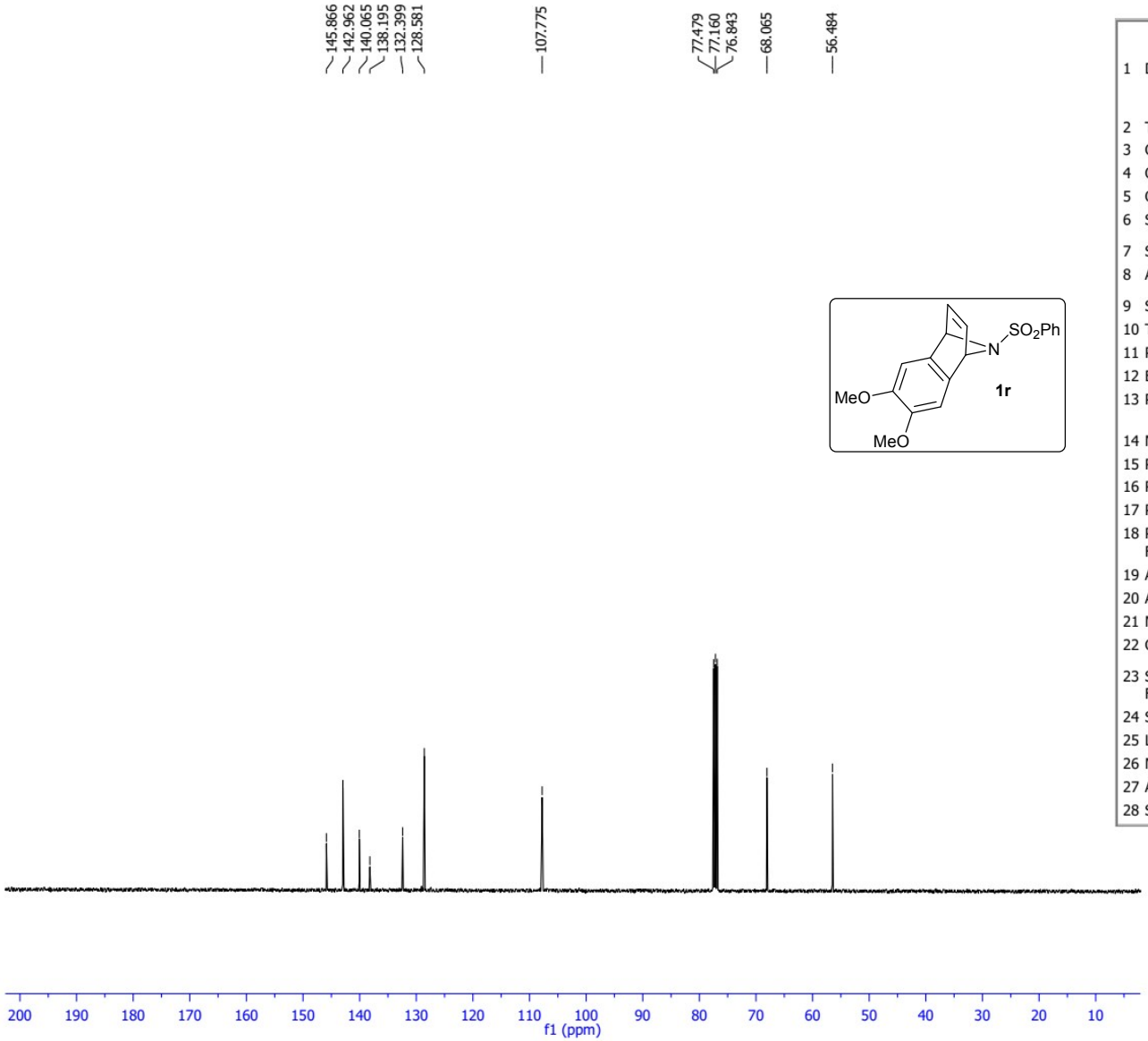
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-155-13C/ 10/ fid
2	Title	VK-155-13C.10.fid
3	Comment	VK-155-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	298.0
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-03-05T04:05:00
21	Modification Date	2019-03-05T04:05:11
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1944.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



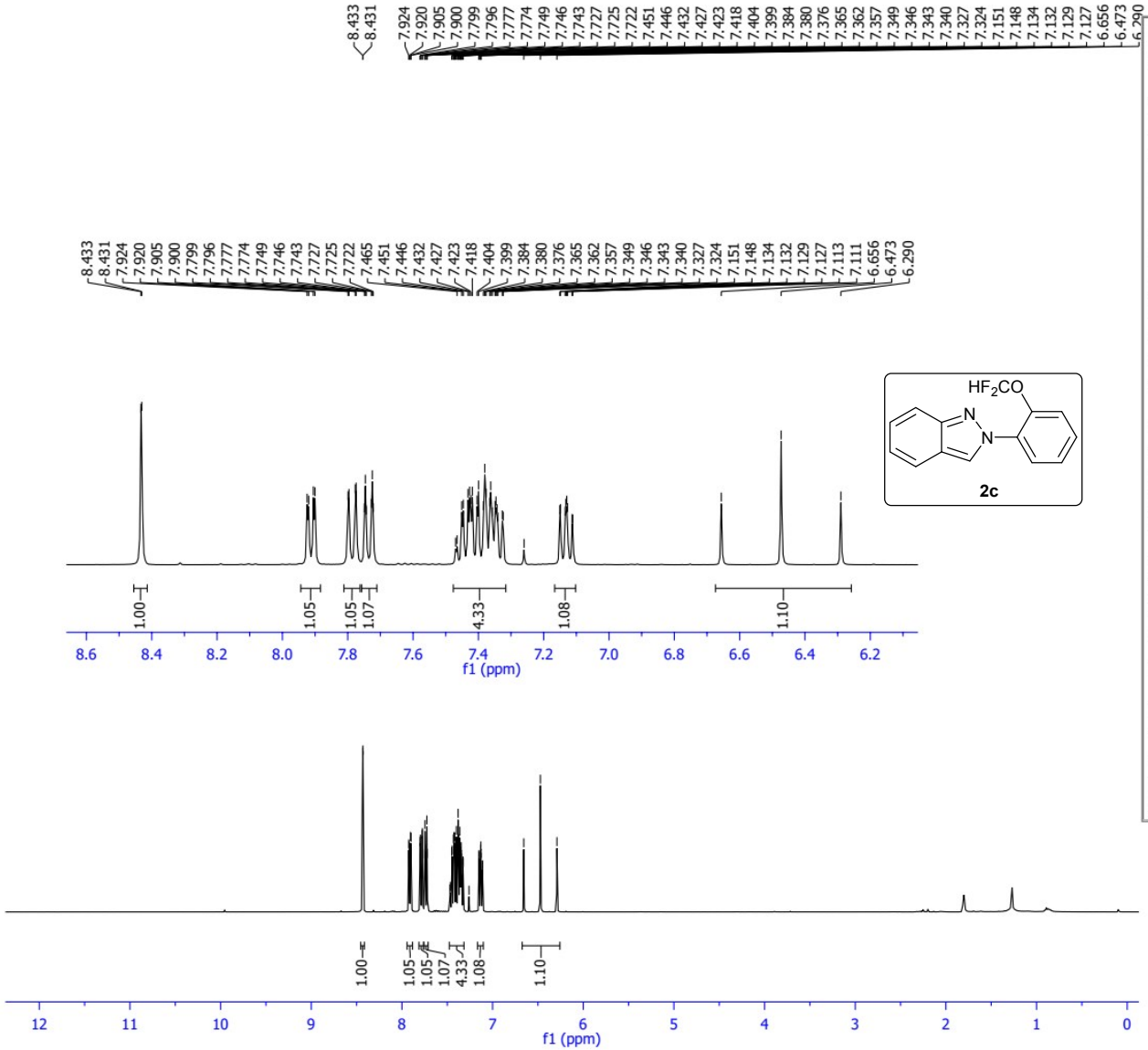
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-155-19F/ 10/ fid
2	Title	VK-S-155-19F.10.fid
3	Comment	VK-S-155-19F
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.2
11	Pulse Sequence	zgfhigqn.2
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	11.9000
18	Presaturation Frequency	
19	Acquisition Time	0.7340
20	Acquisition Date	2019-03-04T09:40:00
21	Modification Date	2019-03-04T09:40:29
22	Class	
23	Spectrometer Frequency	376.55
24	Spectral Width	89285.7
25	Lowest Frequency	-82302.1
26	Nucleus	19F
27	Acquired Size	65536
28	Spectral Size	131072



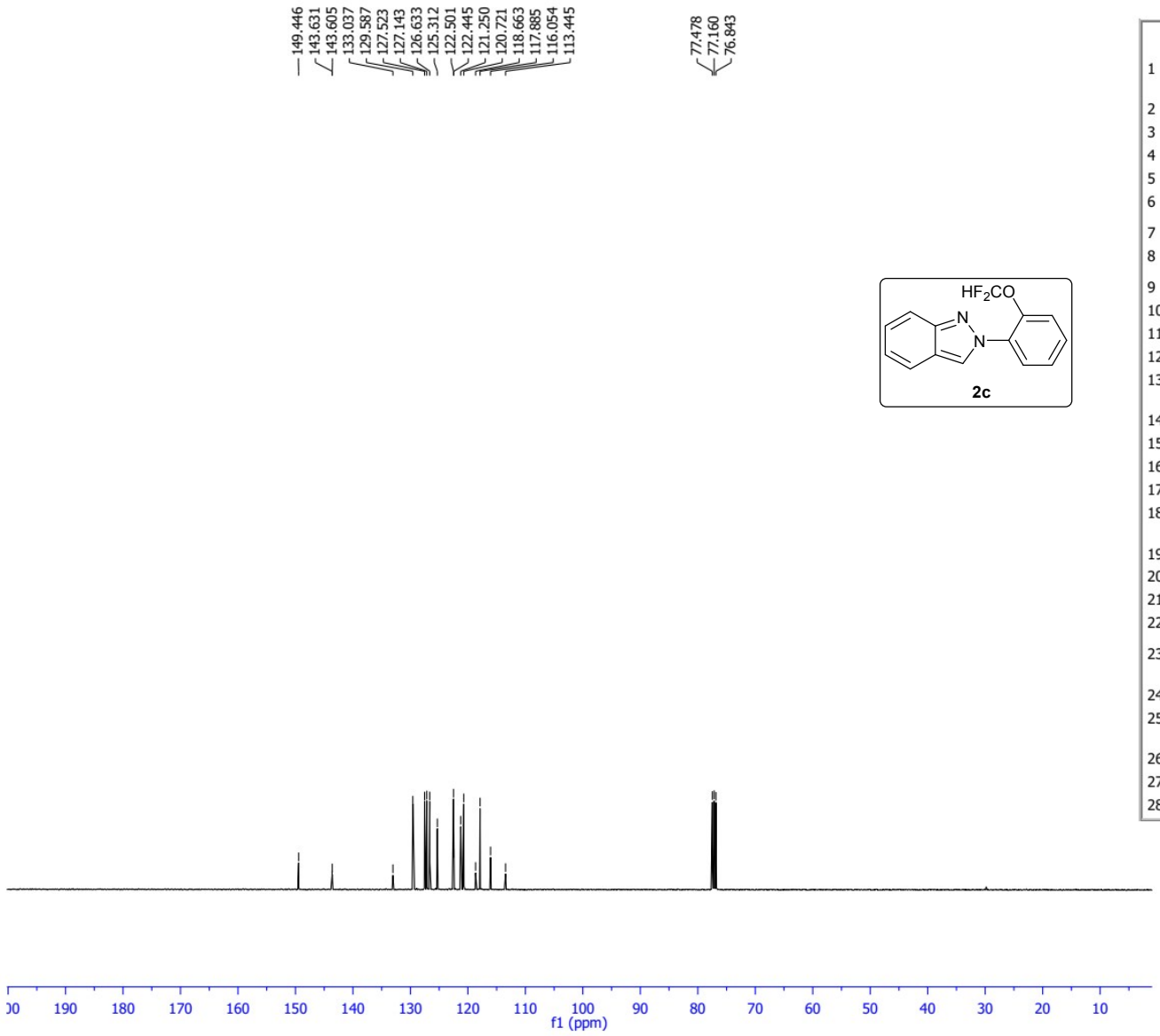
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-137-1H/ 10/ fid
2	Title	VK-S-137-1H.10.fid
3	Comment	VK-S-137-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.7
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-17T10:40:00
21	Modification Date	2019-01-17T10:40:43
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3572.6
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



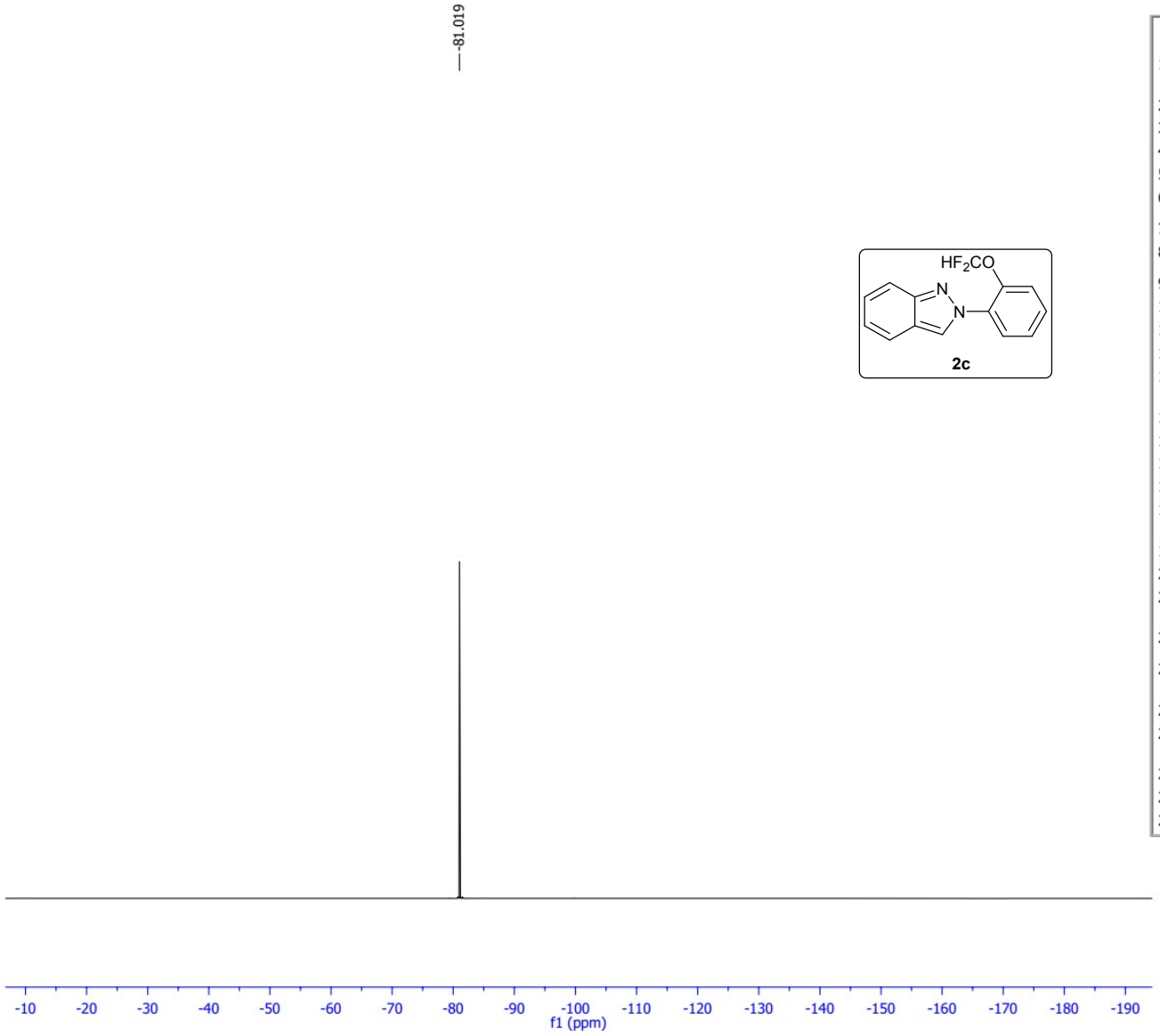
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ STARTING MATERIALS/ VK-S-137-13C/ 10/ fid
2	Title	VK-S-137-13C.10.fid
3	Comment	VK-S-137-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.6
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	500
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-17T22:25:00
21	Modification Date	2019-01-17T22:25:14
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1945.1
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



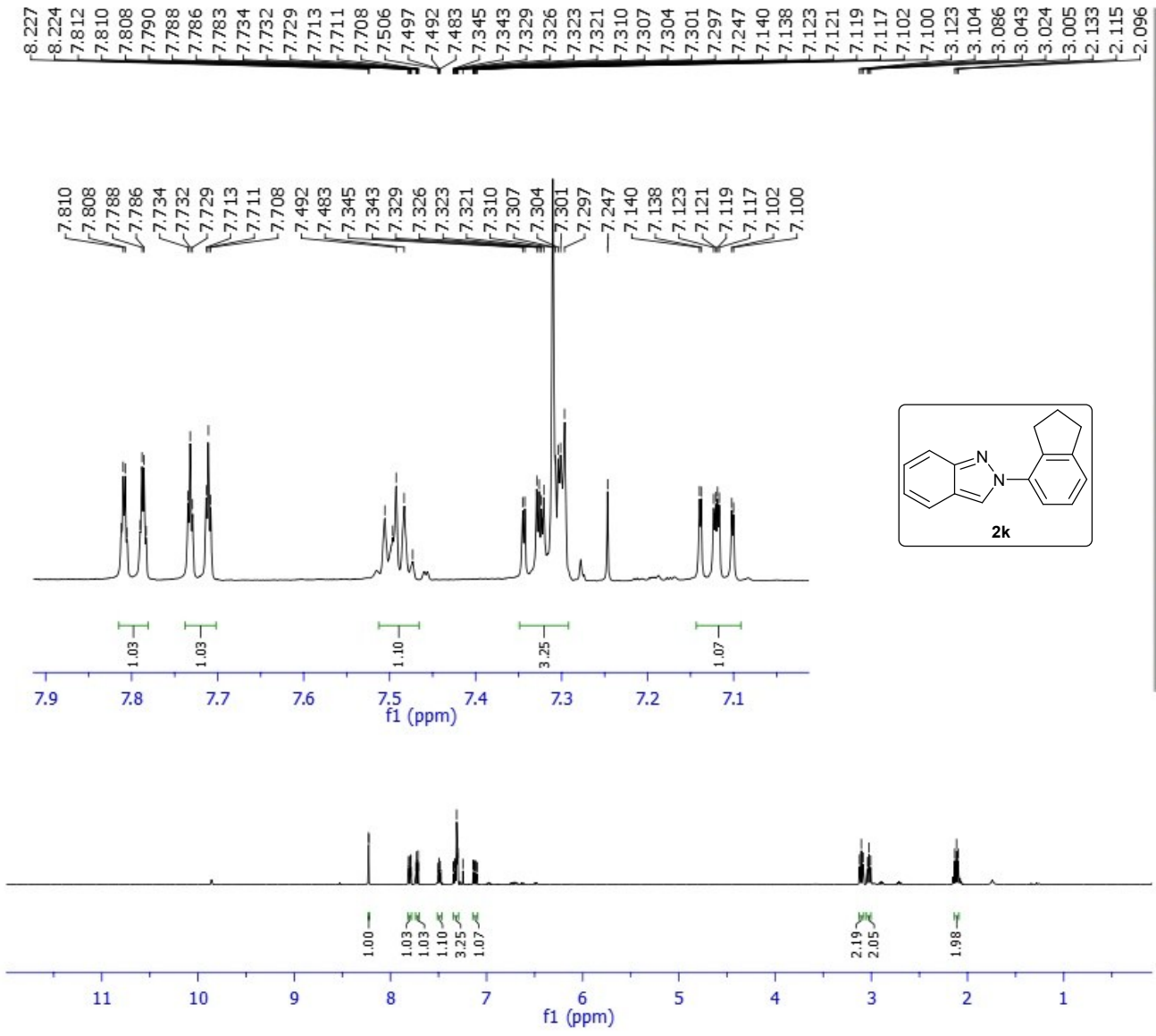
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-S-139-1H/ 10/ fid
2	Title	VK-S-139-1H.10.fid
3	Comment	VK-S-139-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.2
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-02-27T09:51:00
21	Modification Date	2019-02-27T09:51:13
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



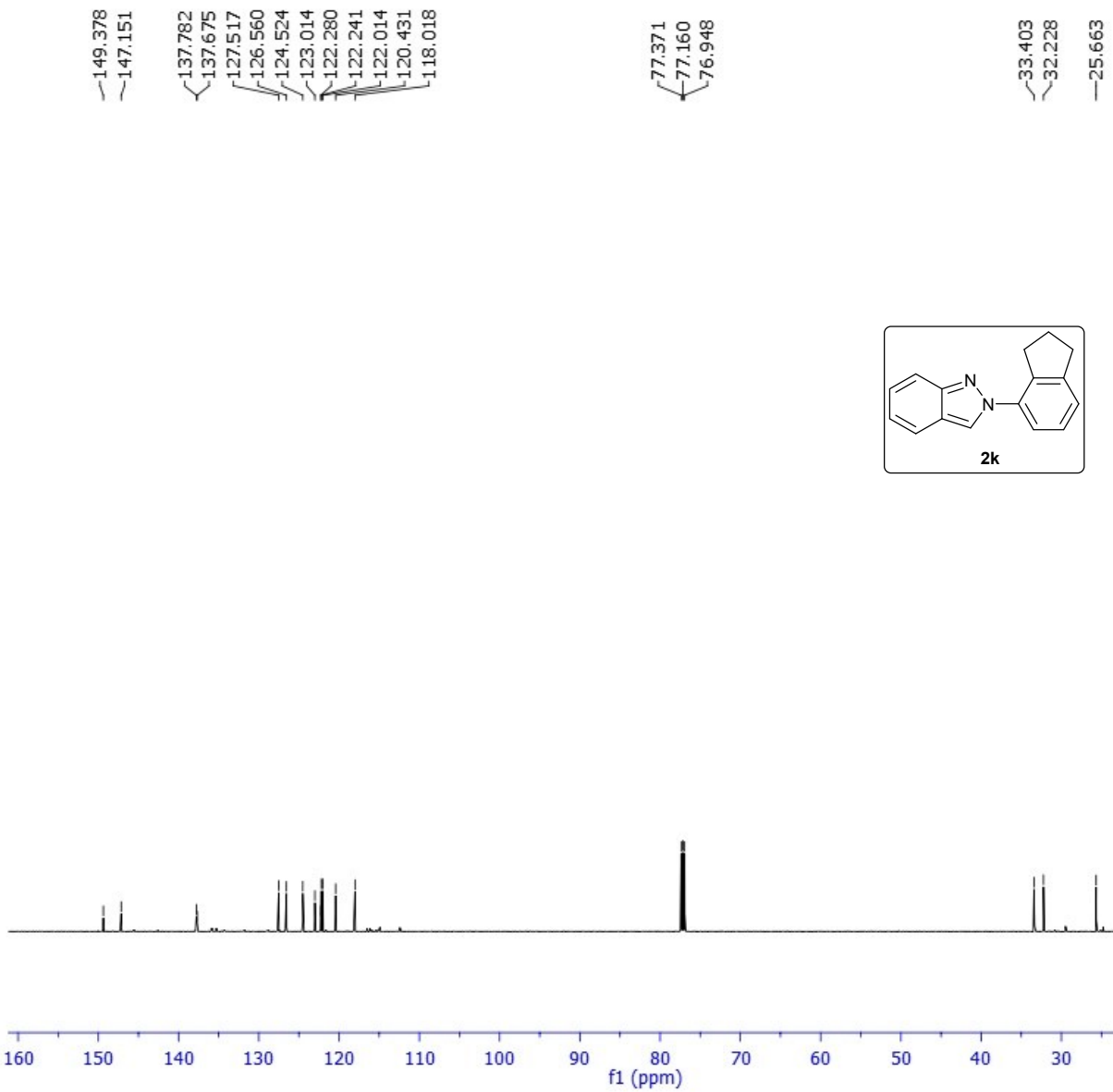
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-S-139-13C/ 10/ fid
2	Title	VK-S-139-13C. 10. fid
3	Comment	VK-S-139-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.0
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-02-27T23:49:00
21	Modification Date	2019-02-27T23:49:43
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1947.1
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-S-139-19F/ 10/ fid
2	Title	VK-S-139-19F.10.fid
3	Comment	VK-S-139-19F
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.4
11	Pulse Sequence	zgfhigqn.2
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	11.9000
18	Presaturation Frequency	
19	Acquisition Time	0.7340
20	Acquisition Date	2019-02-27T09:53:00
21	Modification Date	2019-02-27T09:53:27
22	Class	
23	Spectrometer Frequency	376.55
24	Spectral Width	89285.7
25	Lowest Frequency	-82302.1
26	Nucleus	19F
27	Acquired Size	65536
28	Spectral Size	131072



	Parameter	Value
1	Data File Name	H:/S-36-1H.fid/fid
2	Title	S-36-1H
3	Comment	S-36-1H
4	Origin	Varian
5	Owner	
6	Site	
7	Spectrometer	mercury
8	Author	
9	Solvent	cdcl3
10	Temperature	25.0
11	Pulse Sequence	s2pul
12	Number of Scans	8
13	Receiver Gain	30
14	Relaxation Delay	1.0000
15	Pulse Width	0.0000
16	Acquisition Time	2.5608
17	Acquisition Date	2017-09-18T11:27:01
18	Modification Date	2017-09-18T11:27:42
19	Spectrometer Frequency	399.85
20	Spectral Width	6398.0
21	Lowest Frequency	-804.7
22	Nucleus	1H
23	Acquired Size	16384
24	Spectral Size	32768



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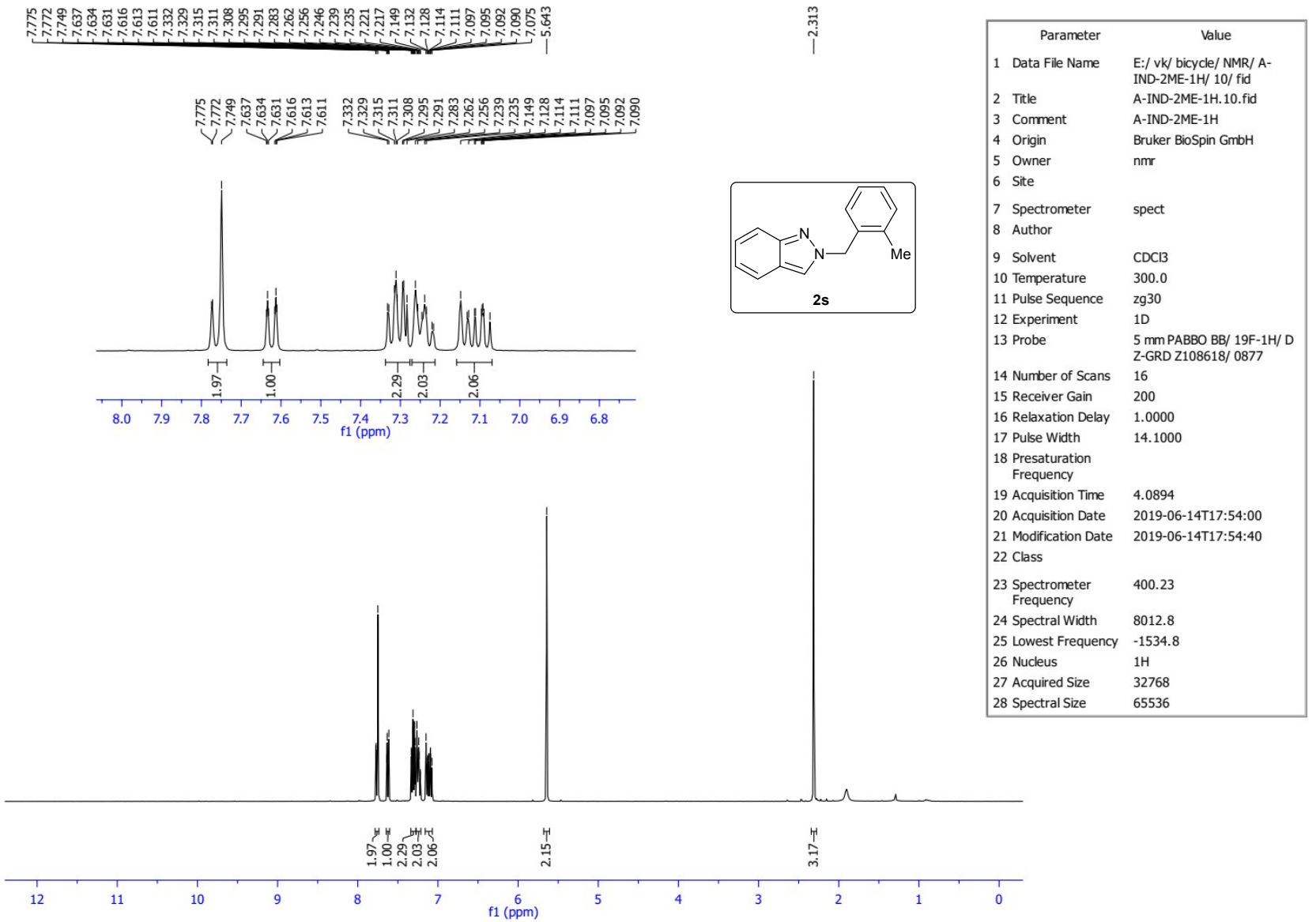
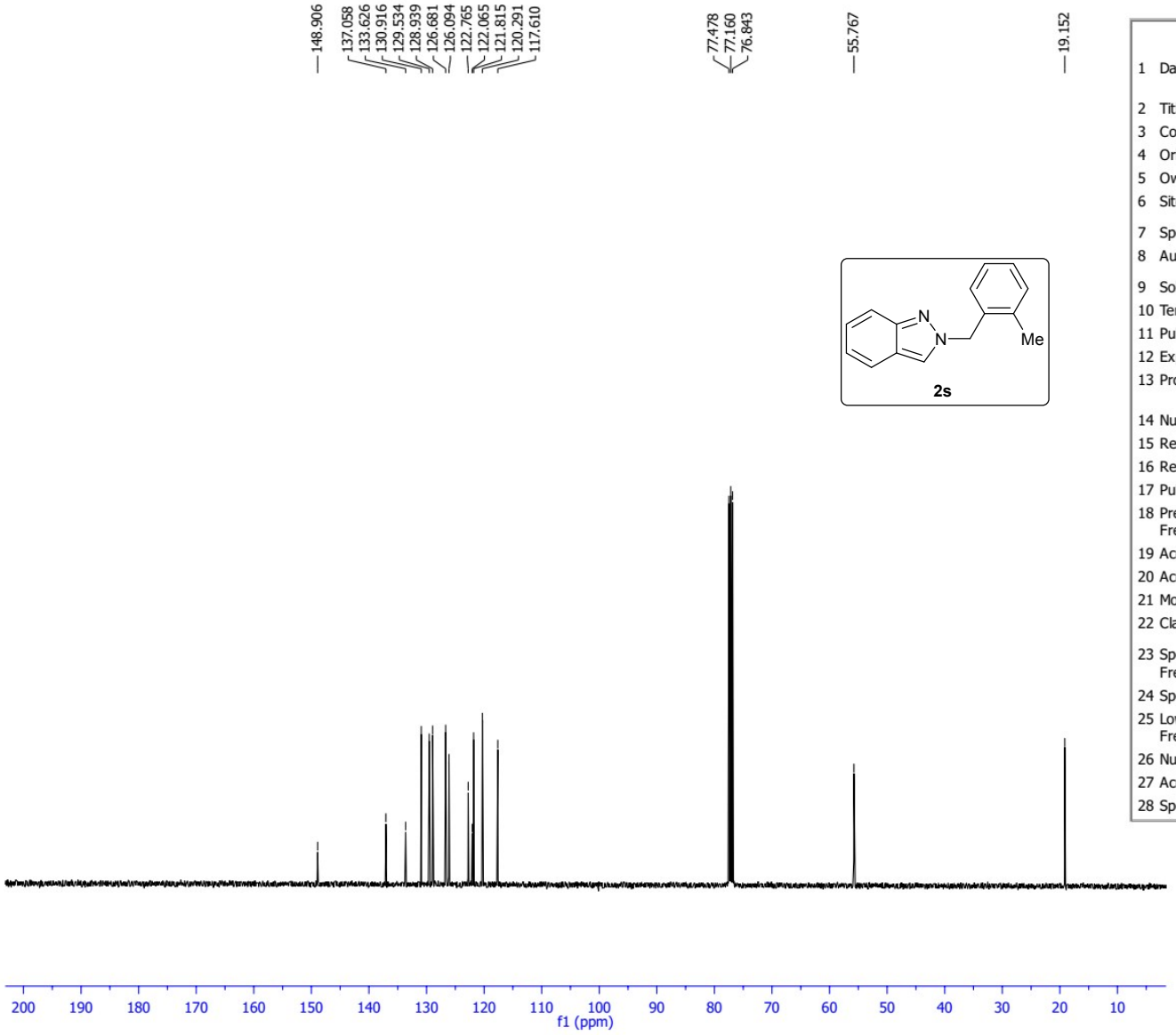
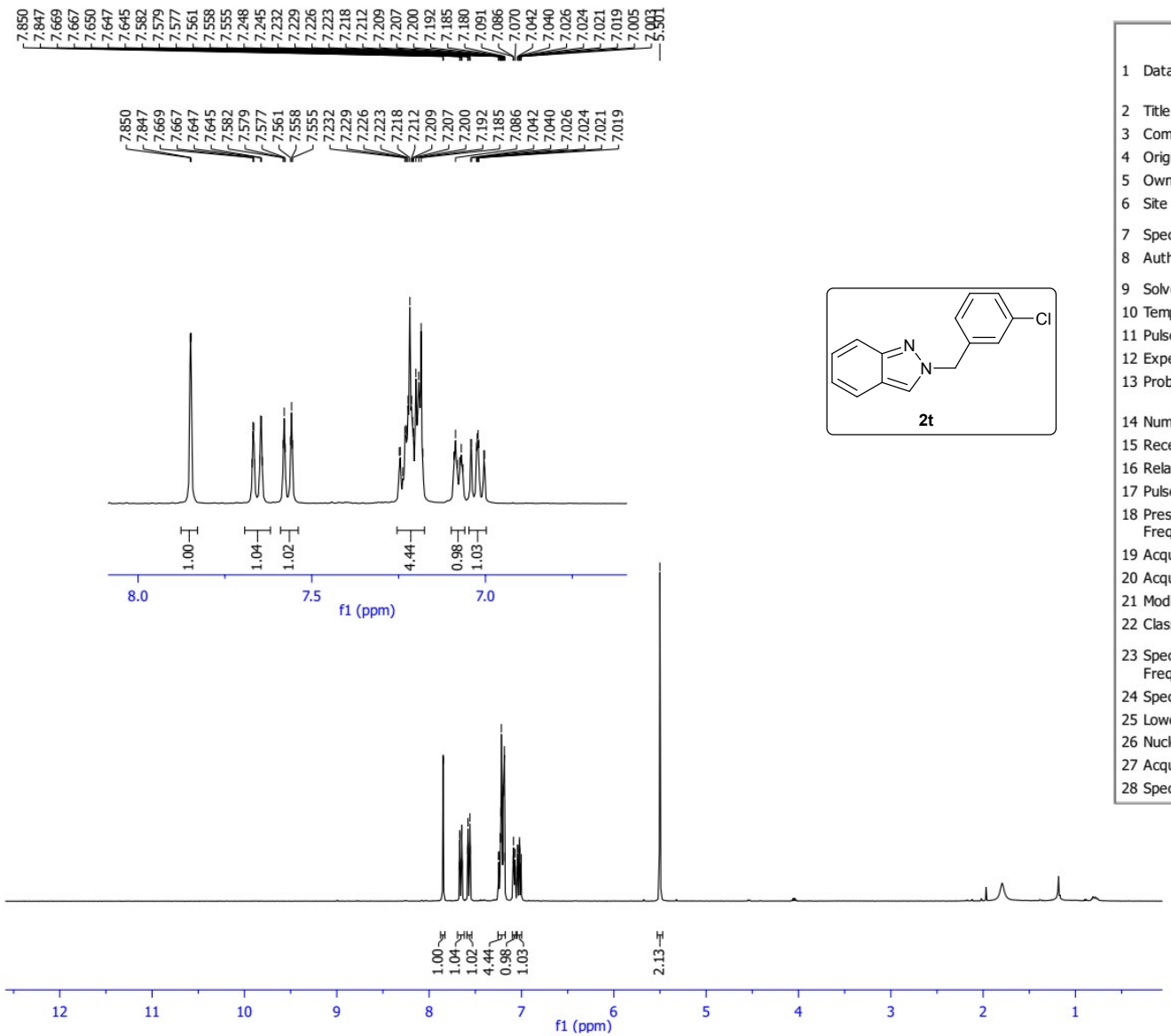
1	Data File Name	C:/Users/T Punniyamurthy/Desktop/TP-14-9-17/S-36-13C/1/fid
2	Title	S-36-13C
3	Comment	S-36-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmrsu
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.9
11	Pulse Sequence	zgpg30
12	Number of Scans	100
13	Receiver Gain	200
14	Relaxation Delay	2.0000
15	Pulse Width	12.0000
16	Acquisition Time	0.9044
17	Acquisition Date	2017-09-14T18:39:38
18	Modification Date	2017-09-14T18:39:40
19	Spectrometer Frequency	150.93
20	Spectral Width	36231.9
21	Lowest Frequency	-3010.3
22	Nucleus	13C
23	Acquired Size	32768
24	Spectral Size	65536



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ A-IND-2ME-1H/ 10/ fid
2	Title	A-IND-2ME-1H.10.fid
3	Comment	A-IND-2ME-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	300.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-06-14T17:54:00
21	Modification Date	2019-06-14T17:54:40
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1534.8
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536

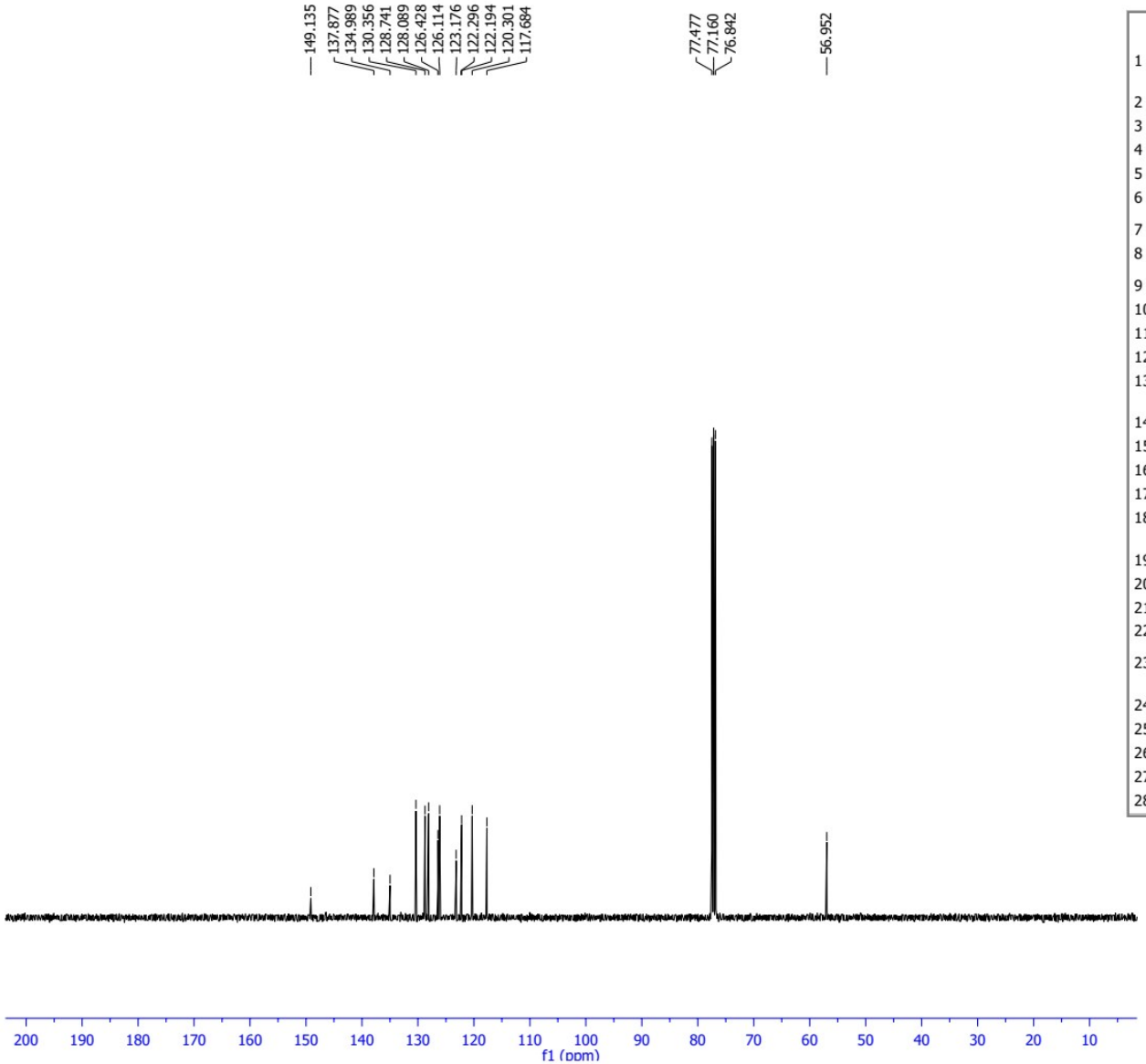


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ A-IND-2ME-13C/ 10/ fid
2	Title	A-IND-2ME-13C.10.fid
3	Comment	A-IND-2ME-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	301.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	500
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-06-14T18:24:00
21	Modification Date	2019-06-14T18:24:37
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536

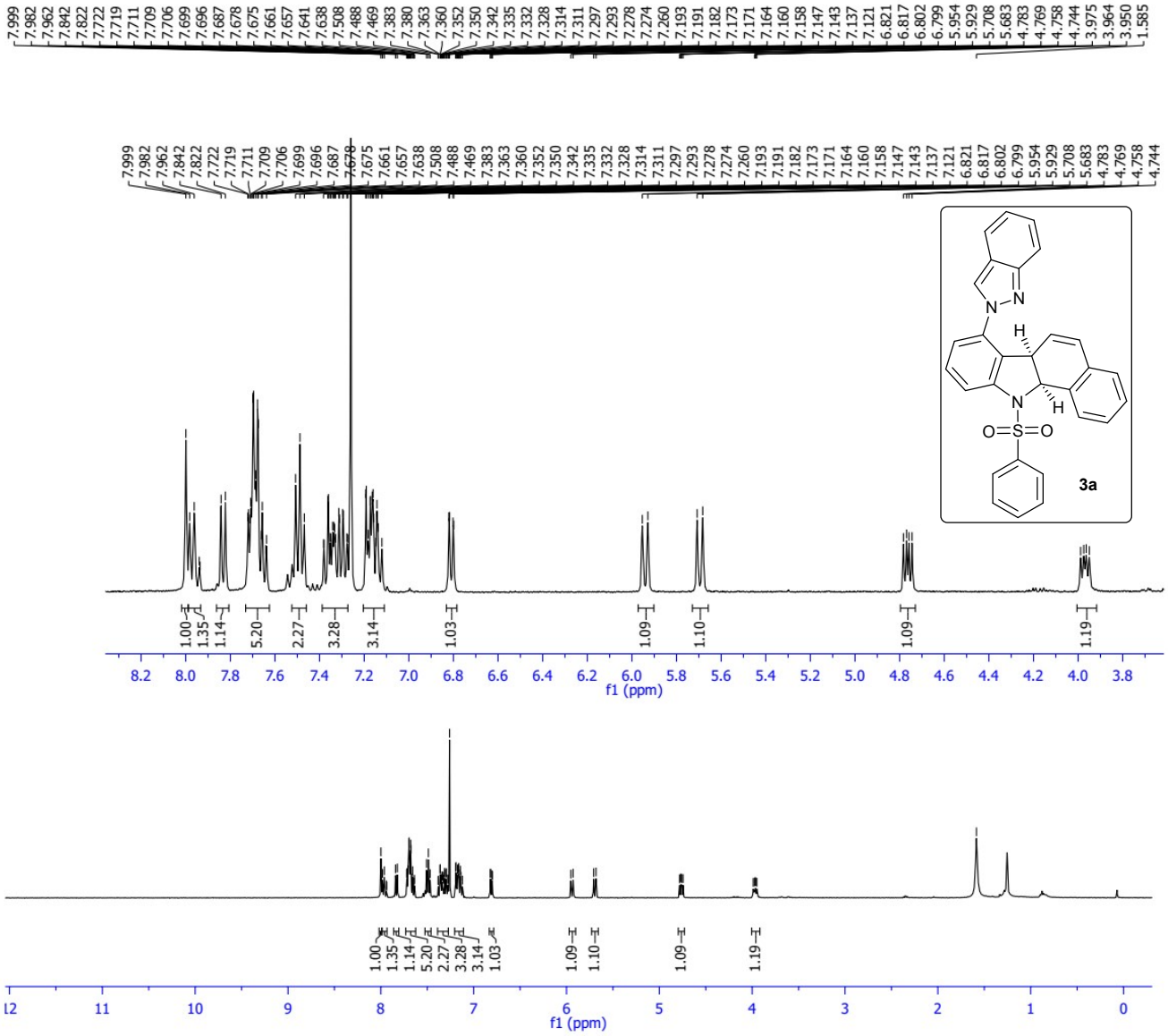


2t

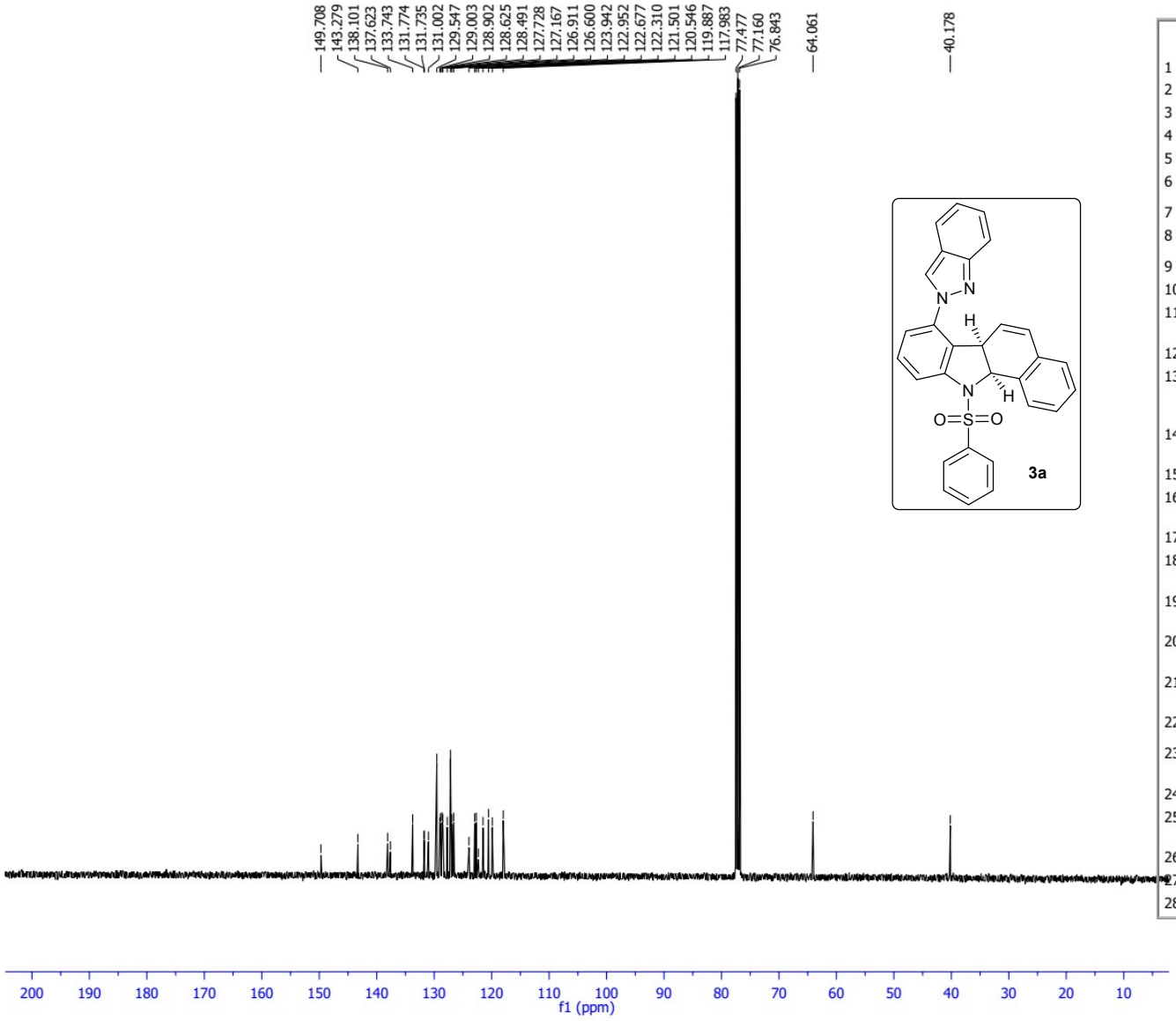
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ Vk-A-3Cl-1H/ 10/ fid
2	Title	SK-301-1H.10.fid
3	Comment	SK-301-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	300.1
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-06-14T20:44:00
21	Modification Date	2019-06-14T20:44:33
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1574.3
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536



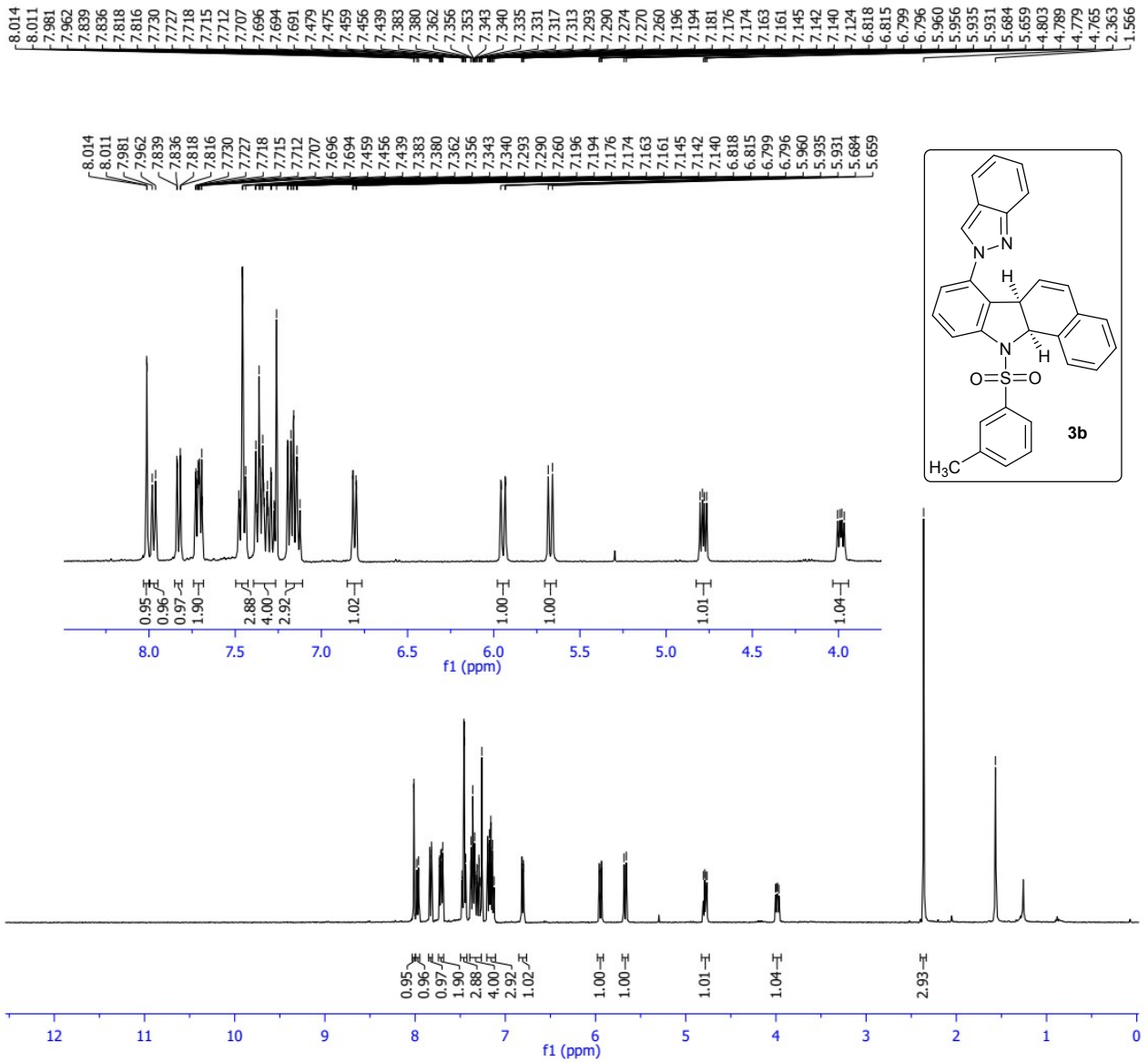
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ Vk-A-3Cl-13C/ 10/ fid
2	Title	SK-301-13C.10.fid
3	Comment	SK-301-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	301.3
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	500
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-06-14T21:14:00
21	Modification Date	2019-06-14T21:14:31
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1941.7
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



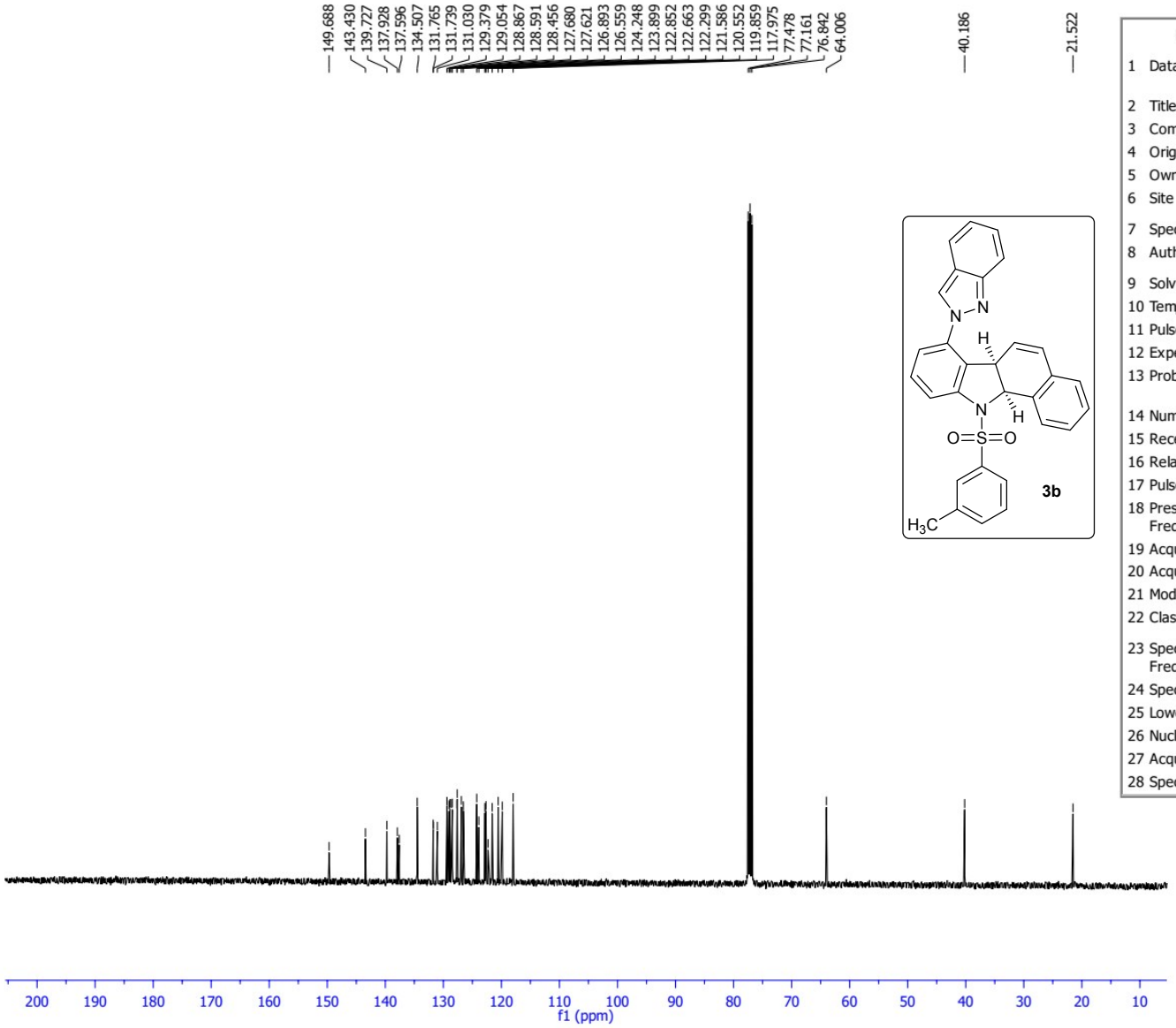
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-151R-1H/ 10/ fid
2	Title	VK-151-1H.10.fid
3	Comment	VK-151-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.8
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-02-01T09:38:00
21	Modification Date	2019-02-01T09:38:08
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3575.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



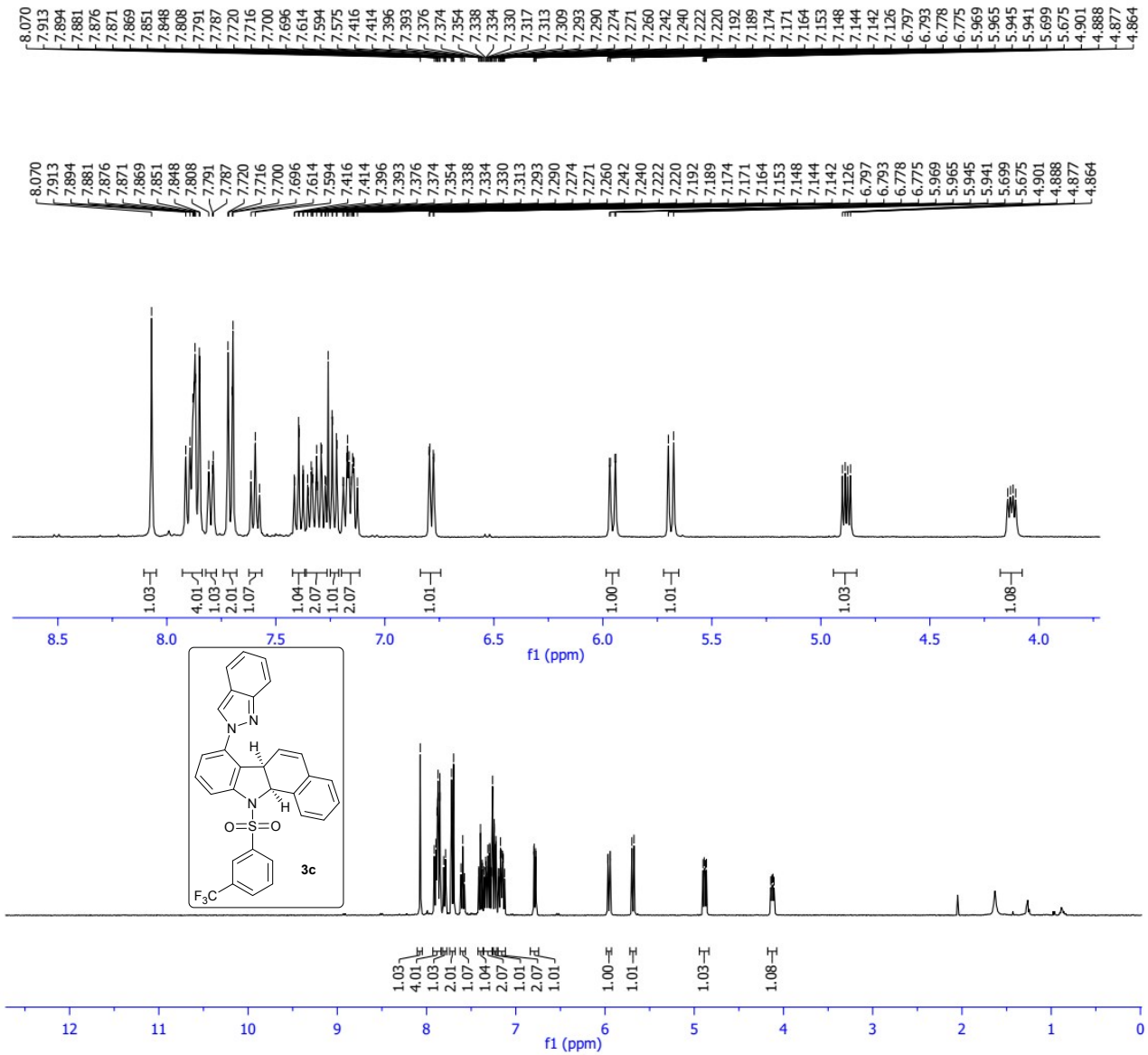
	Parameter	Value
1	Data File Name	VK-151-13C/ 10/ fid
2	Title	VK-151-13C.10.fid
3	Comment	VK-151-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.8
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-17T20:15:00
21	Modification Date	2018-12-17T20:15:50
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.4
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



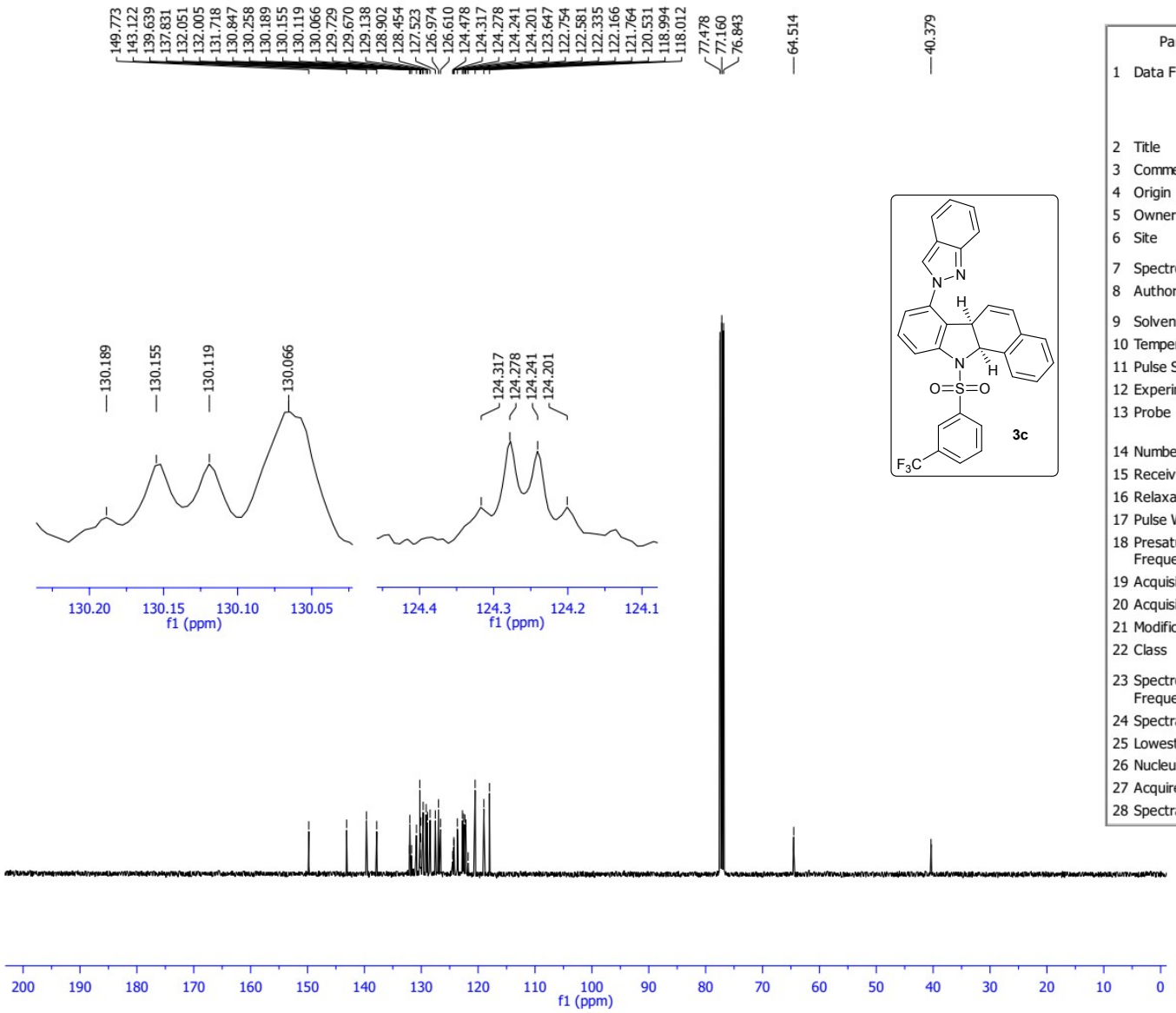
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-154R-1H/ 10/ fid
2	Title	VK-154R-1H.10.fid
3	Comment	VK-154R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	299.1
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-02-05T09:36:00
21	Modification Date	2019-02-05T09:36:25
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3576.4
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



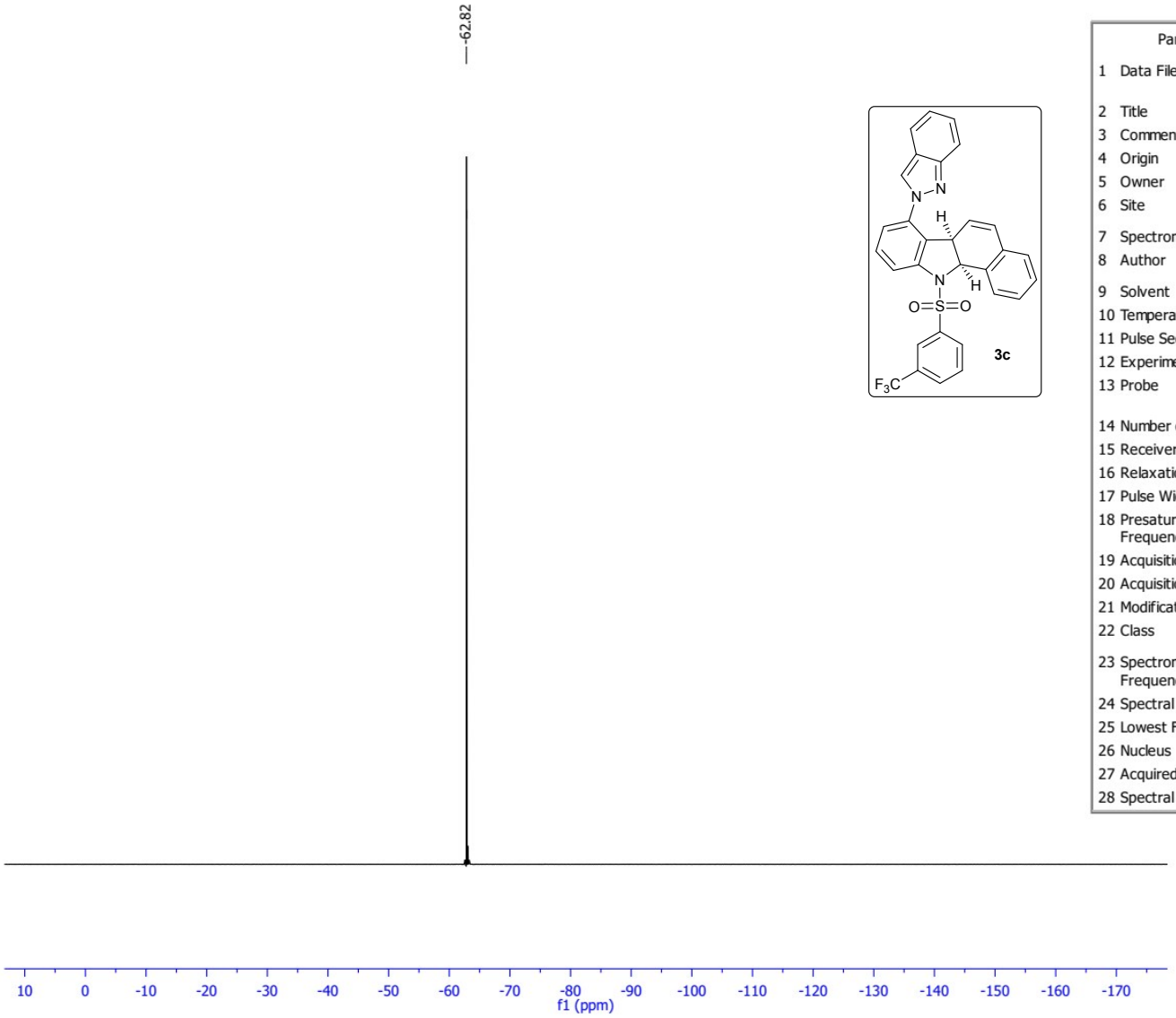
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-154-13C/ 10/ fid
2	Title	VK-154-13C.10.fid
3	Comment	VK-154-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.9
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1024
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-28T02:30:00
21	Modification Date	2018-12-28T02:30:47
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.3
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



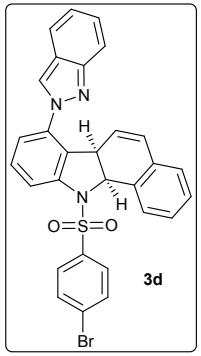
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-155-1H/ 10/ fid
2	Title	VK-155-1H.10.fid
3	Comment	VK-155-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-01T09:47:00
21	Modification Date	2019-01-01T09:47:29
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3538.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072

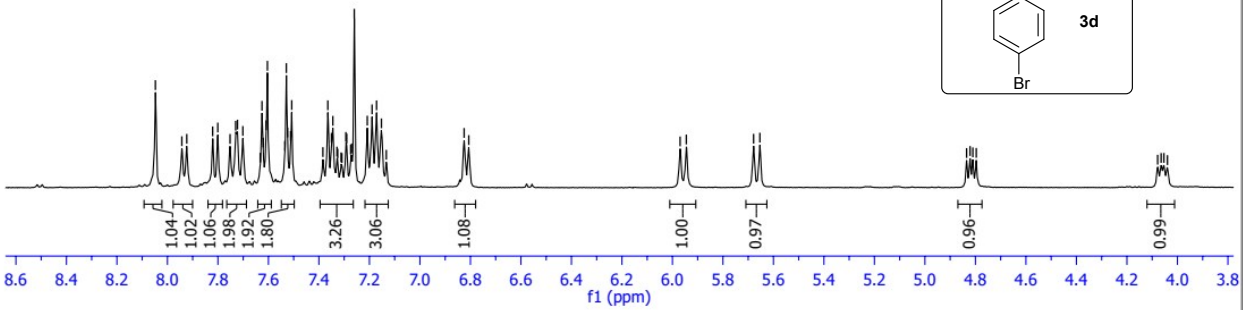


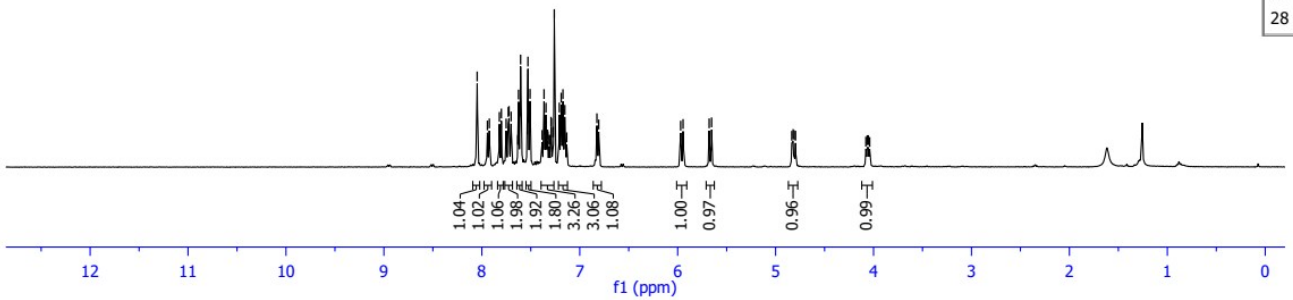
	Parameter	Value
1	Data File Name	/ / 172.16.33.138/ nmr/ NMR/ NMR/ JAN19/ TP/ 01.01.19/ data/ nmr/ nmr/ VK-155-13C/ 10/ fid
2	Title	VK-155-13C.10.fid
3	Comment	VK-155-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-01T18:01:00
21	Modification Date	2019-01-01T18:01:10
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.9
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



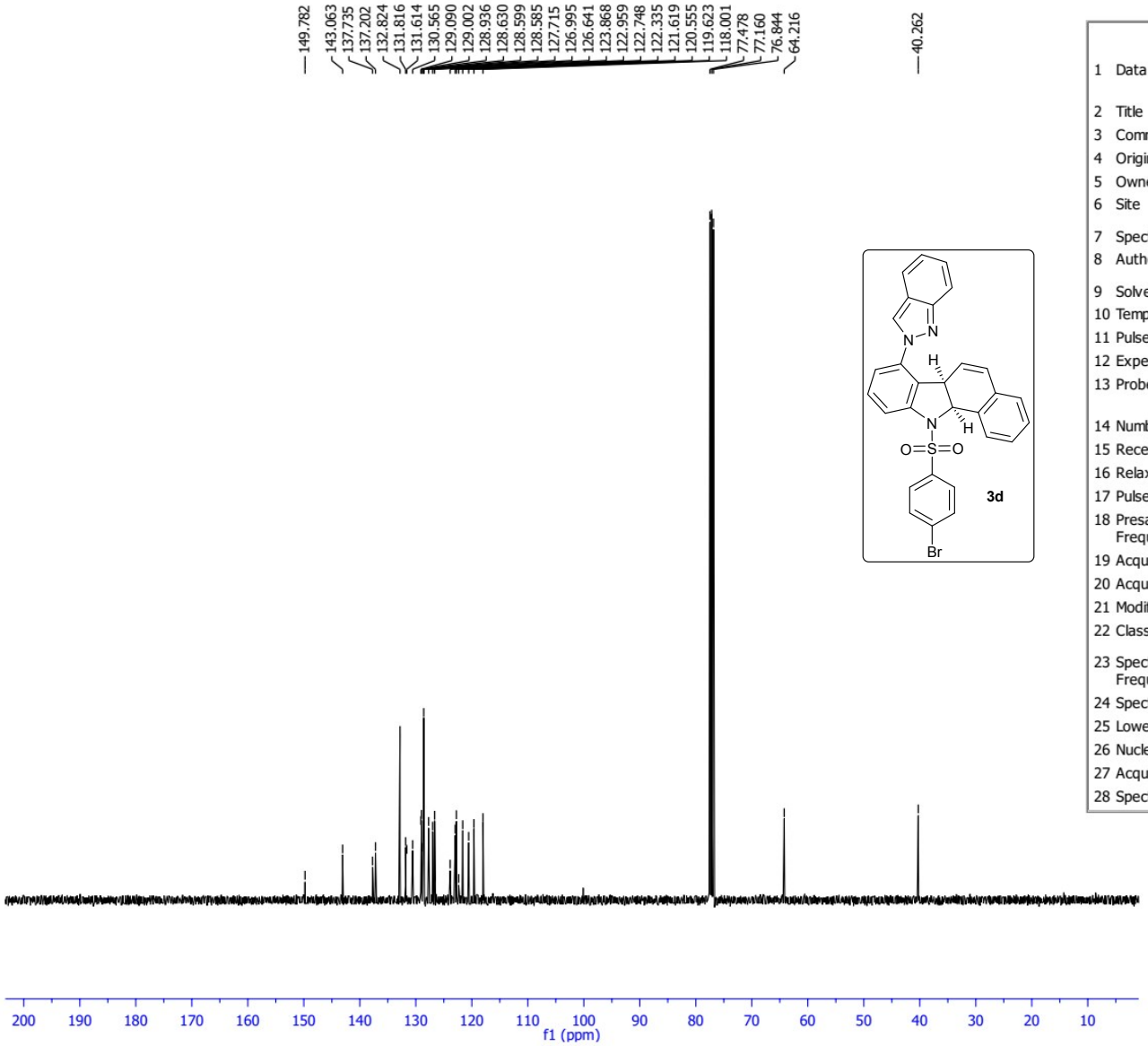
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-155-19F/ 10/ fid
2	Title	VK-155-19F.10.fid
3	Comment	VK-155-19F
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.8
11	Pulse Sequence	zgfhigqn.2
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	32
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	11.9000
18	Presaturation Frequency	
19	Acquisition Time	0.7340
20	Acquisition Date	2019-01-07T10:19:00
21	Modification Date	2019-01-07T10:19:08
22	Class	
23	Spectrometer Frequency	376.55
24	Spectral Width	89285.7
25	Lowest Frequency	-82302.1
26	Nucleus	19F
27	Acquired Size	65536
28	Spectral Size	131072



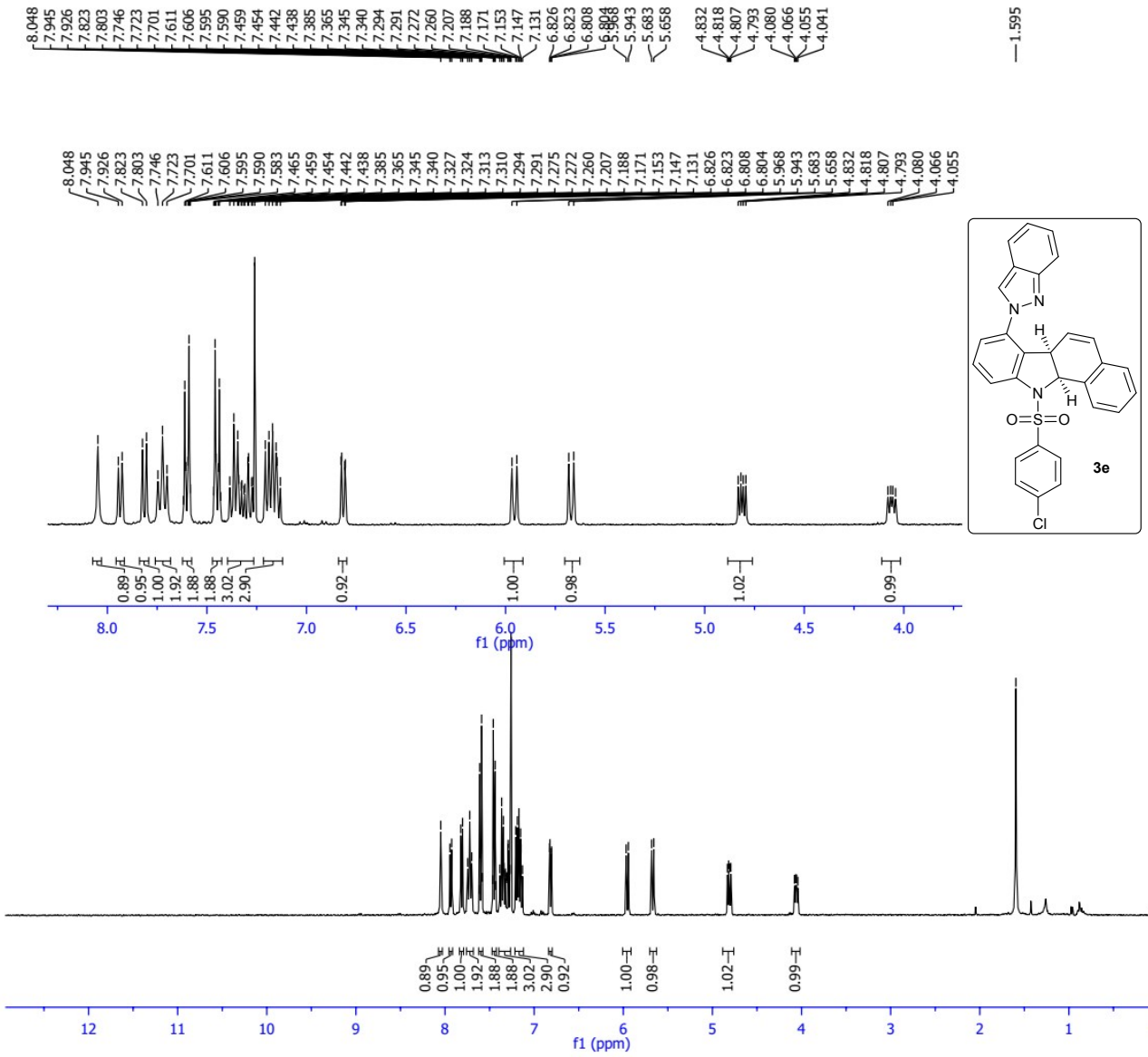




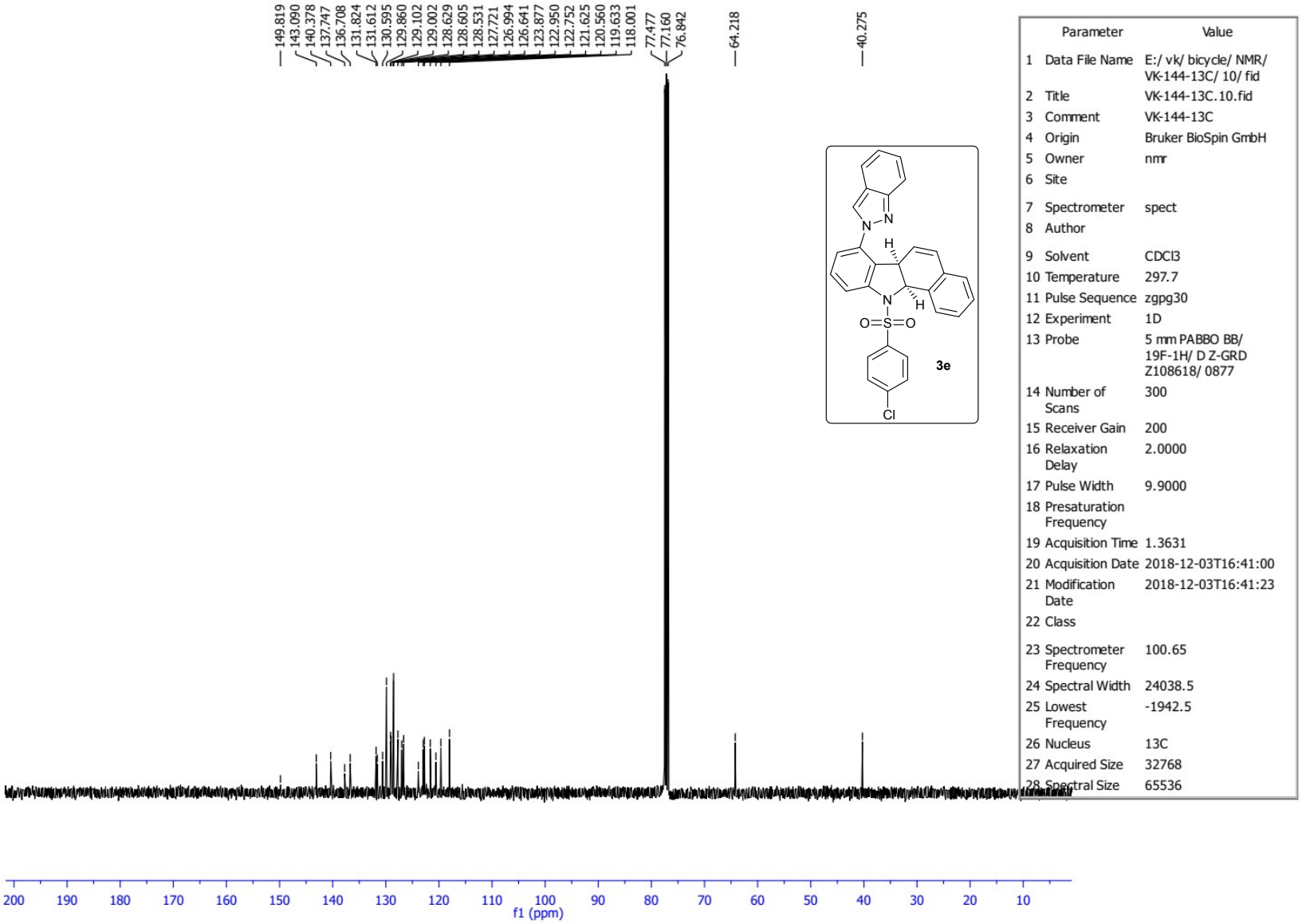
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-146R-1H/ 10/ fid
2	Title	VK-146R-1H. 10. fid
3	Comment	VK-146R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.8
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-01-28T10:30:00
21	Modification Date	2019-01-28T10:30:19
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1542.7
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536



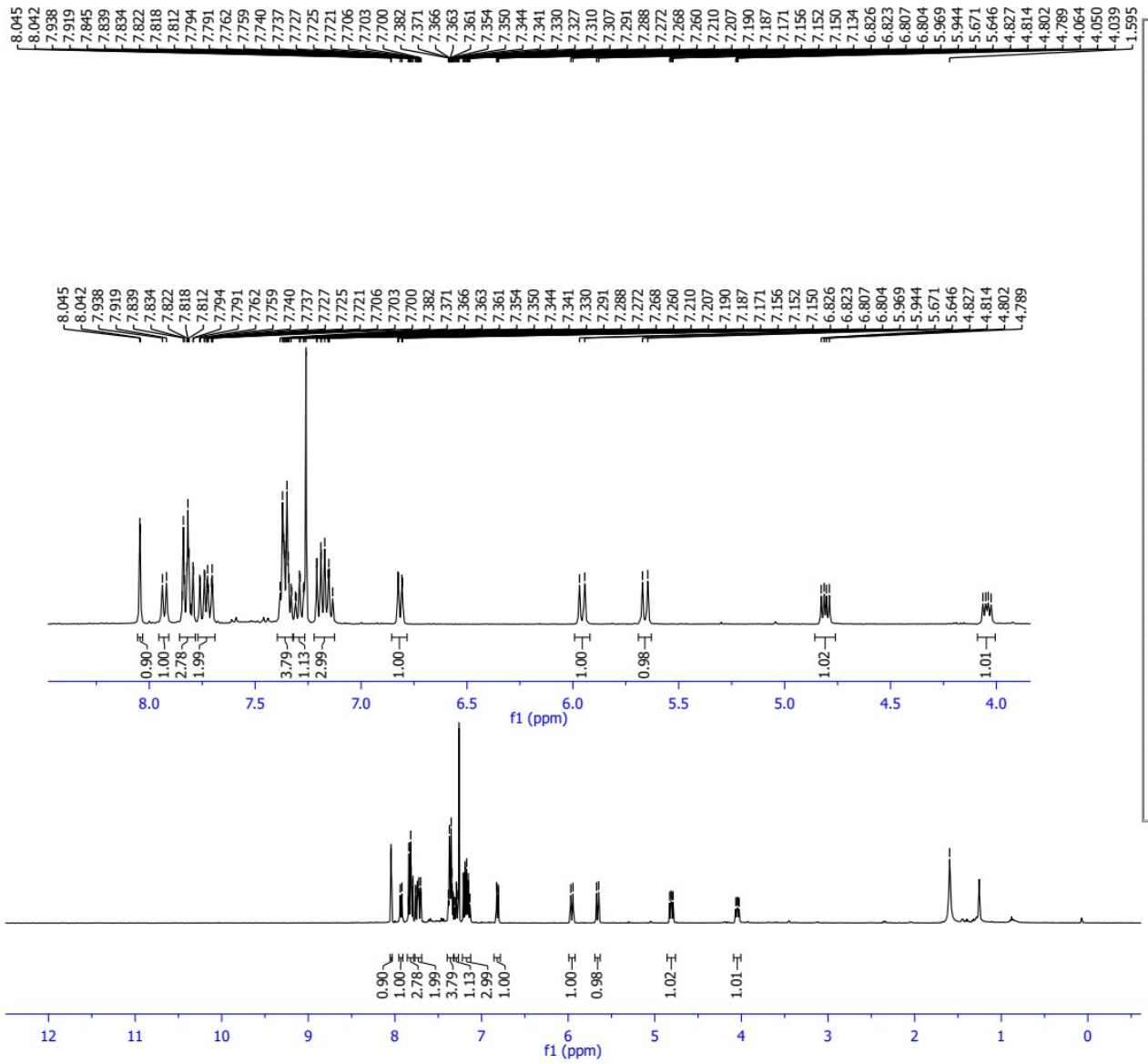
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-146R-13C/ 10/ fid
2	Title	VK-146R-13C.10.fid
3	Comment	VK-146R-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	500
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-06T16:30:00
21	Modification Date	2018-12-06T16:30:22
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.4
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



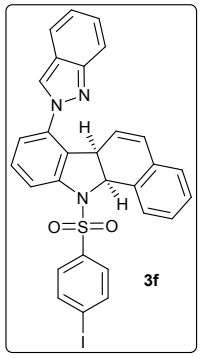
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-144-1H/ 10/ fid
2	Title	VK-144-1H.10.fid
3	Comment	VK-144-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2018-12-03T10:29:00
21	Modification Date	2018-12-03T10:29:15
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1573.1
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536

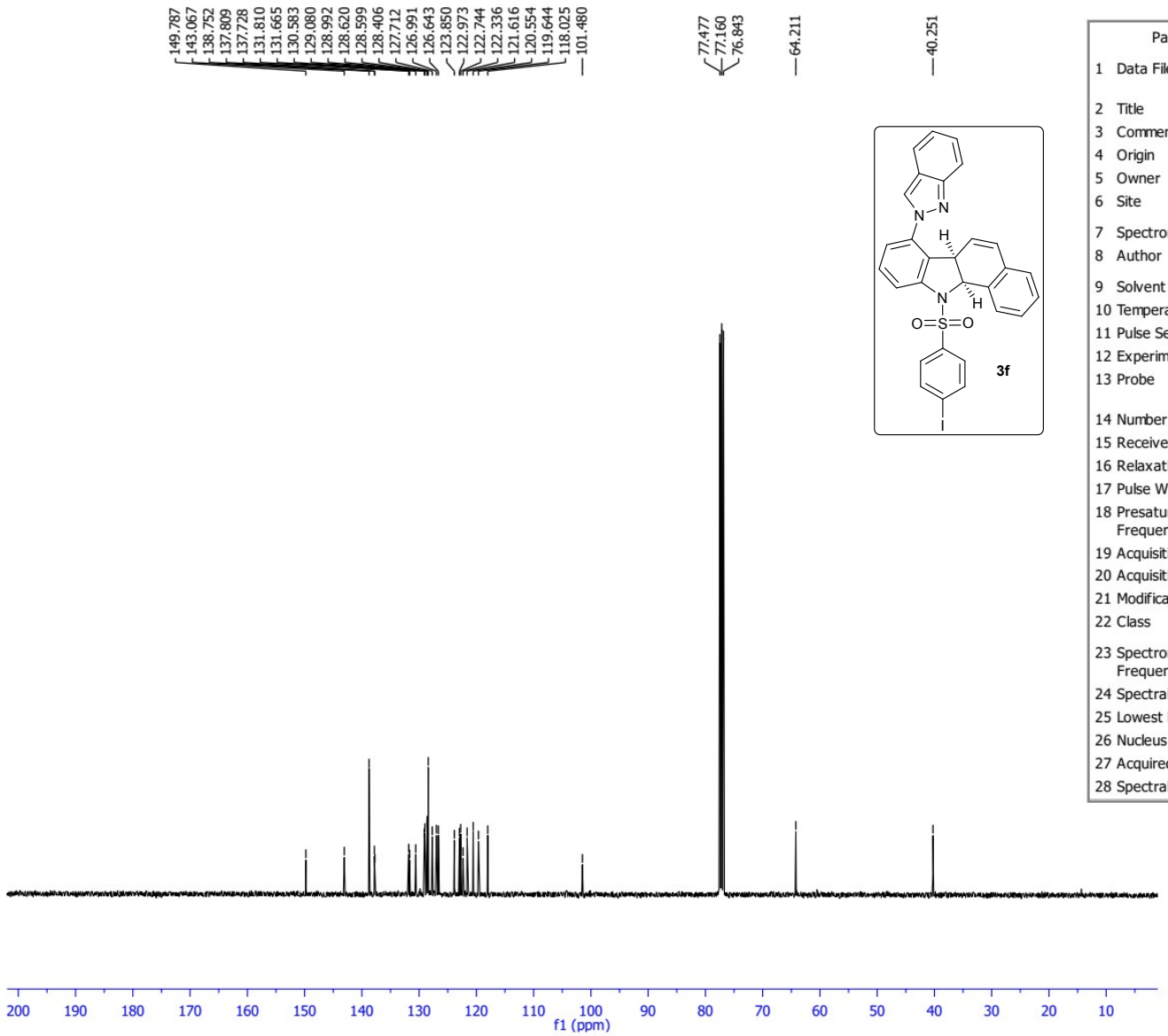


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-144-13C/ 10/ fid
2	Title	VK-144-13C.10.fid
3	Comment	VK-144-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.7
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	300
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-03T16:41:00
21	Modification Date	2018-12-03T16:41:23
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536

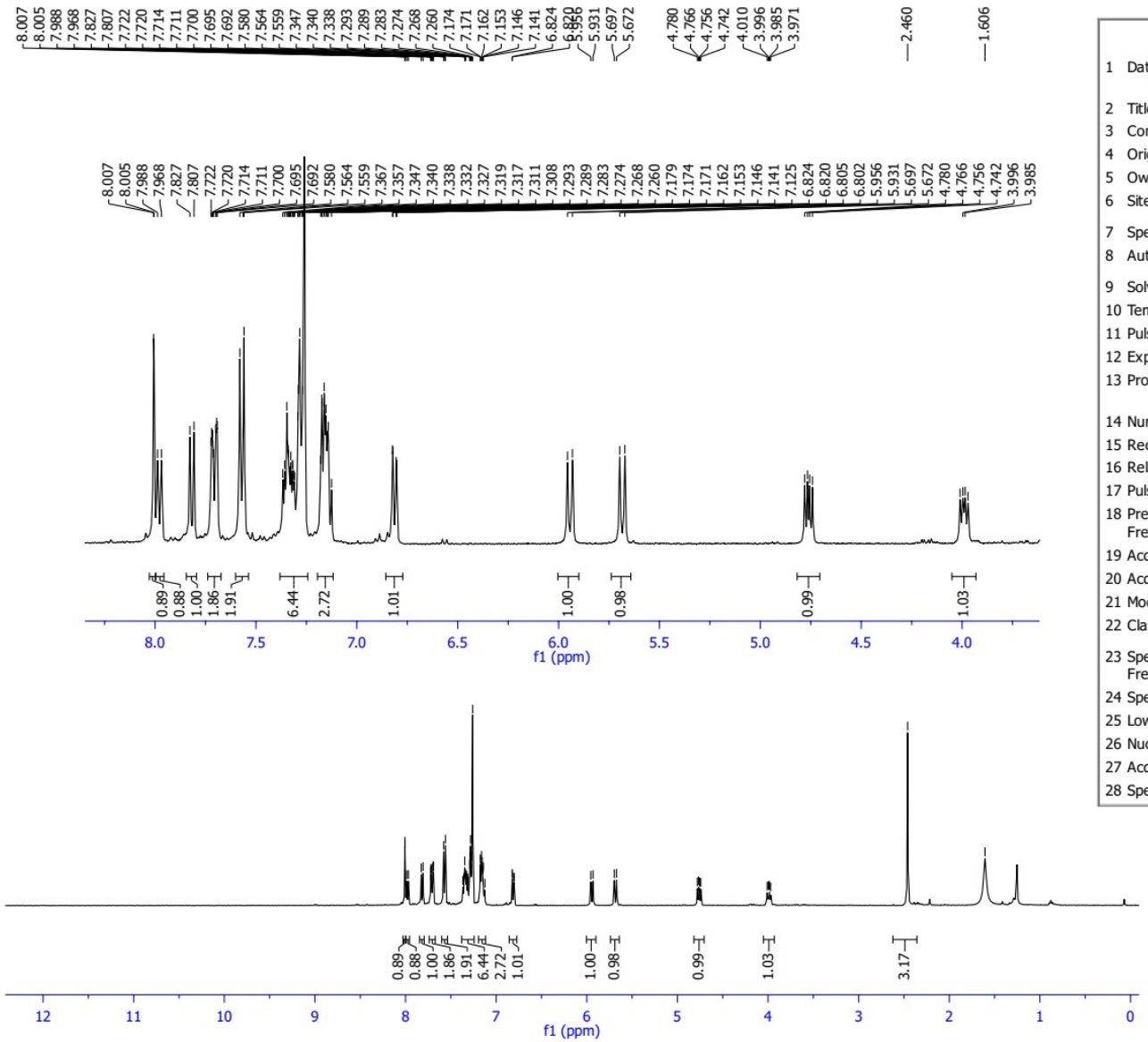


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-148R-1H/ 10/ fid
2	Title	VK-148-1H.10.fid
3	Comment	VK-148-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-29T10:51:00
21	Modification Date	2019-01-29T10:51:36
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3574.7
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072

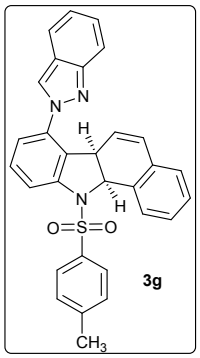


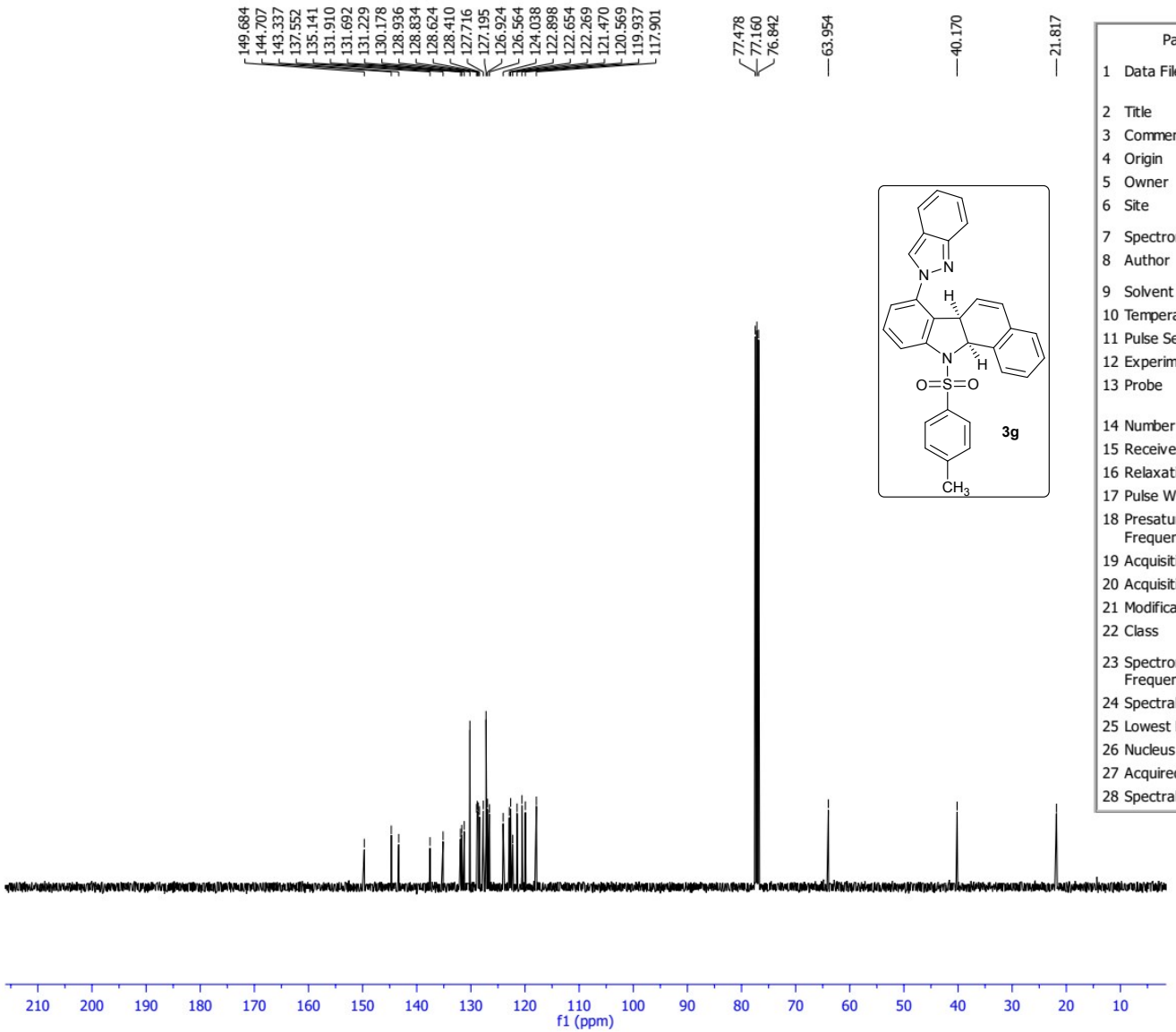


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-148-13C/ 10/ fid
2	Title	VK-148-13C.10.fid
3	Comment	VK-148-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-14T22:28:00
21	Modification Date	2018-12-14T22:28:06
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536

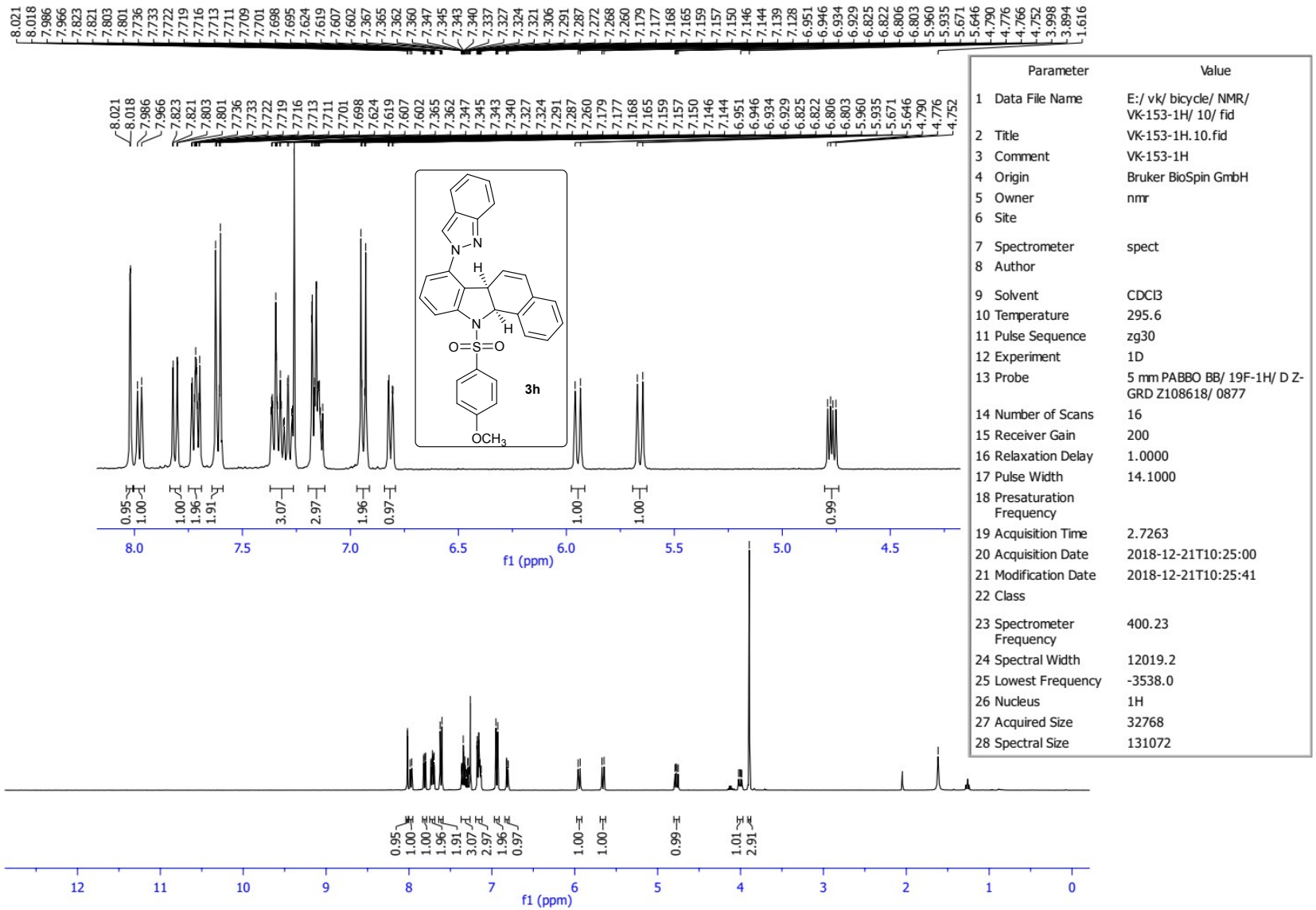


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-141R-1H/ 10/ fid
2	Title	VK-141R-1H.10.fid
3	Comment	VK-141R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.7
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-02-19T09:48:00
21	Modification Date	2019-02-19T09:48:45
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.3
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072

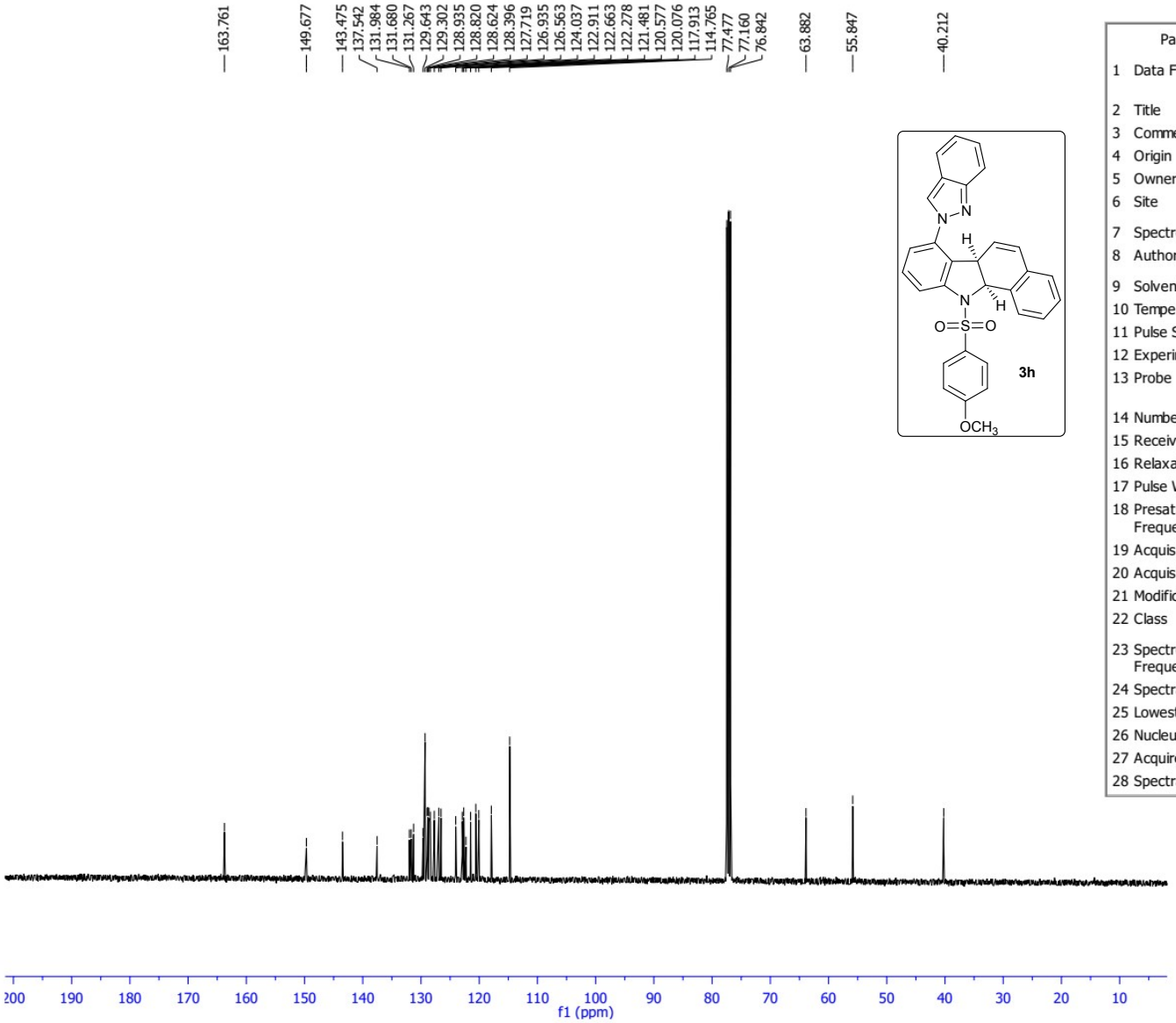




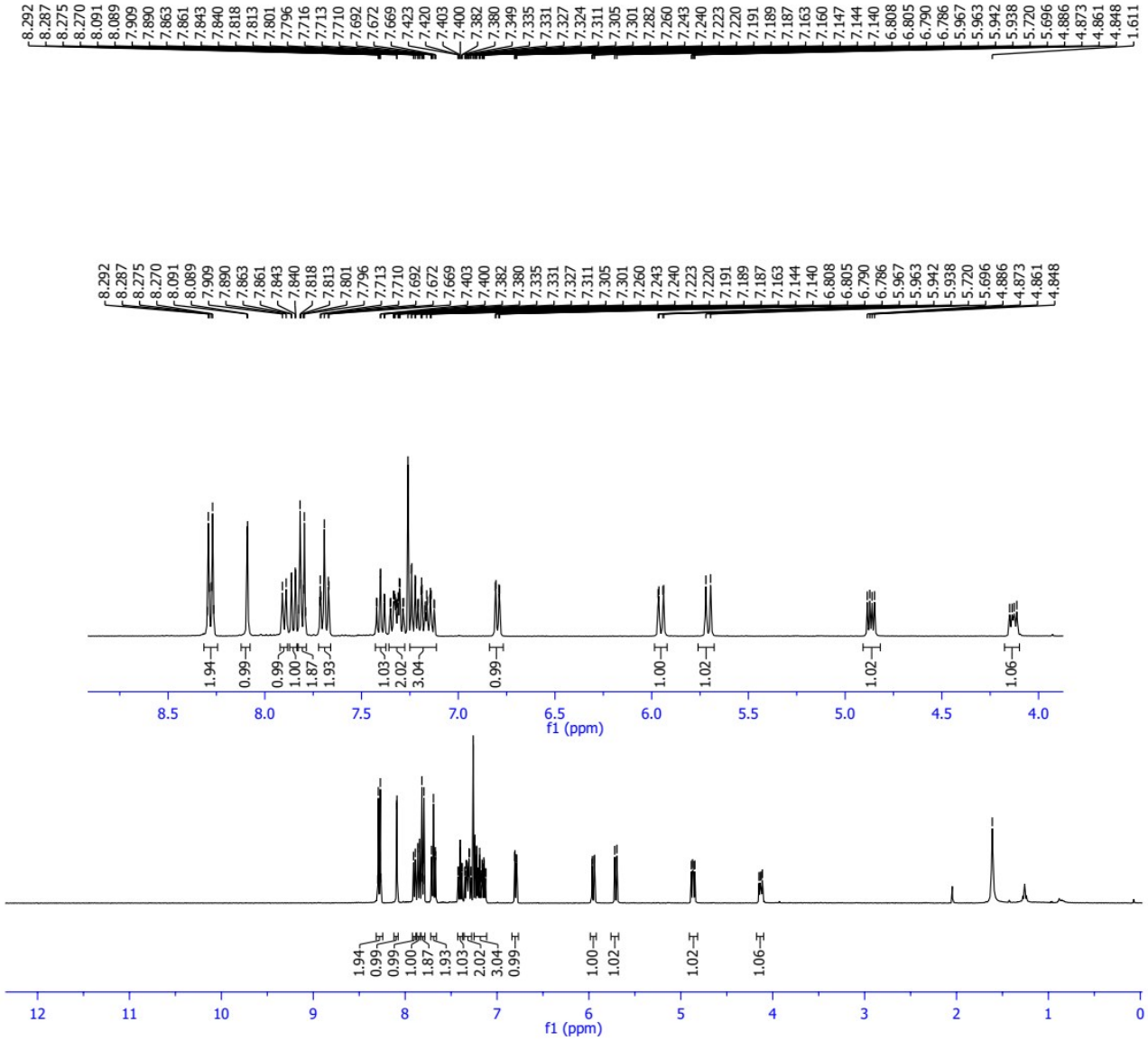
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ 141/ VK-141R-13C/ 10/ fid
2	Title	VK-141R-13C.10.fid
3	Comment	VK-141R-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.3
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	300
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-11-29T14:37:00
21	Modification Date	2018-11-29T14:37:41
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.7
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



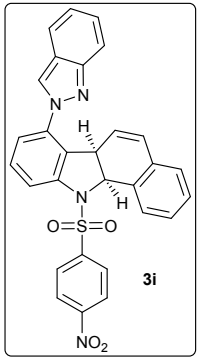
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-153-1H/ 10/ fid
2	Title	VK-153-1H. 10.fid
3	Comment	VK-153-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2018-12-21T10:25:00
21	Modification Date	2018-12-21T10:25:41
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3538.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-153-13C/ 10/ fid
2	Title	VK-153-13C.10.fid
3	Comment	VK-153-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.5
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-26T18:37:00
21	Modification Date	2018-12-26T18:37:32
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-150-1H/ 10/ fid
2	Title	VK-150-1H. 10. fid
3	Comment	VK-150-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.1
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2018-12-24T10:10:00
21	Modification Date	2018-12-24T10:10:55
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3576.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



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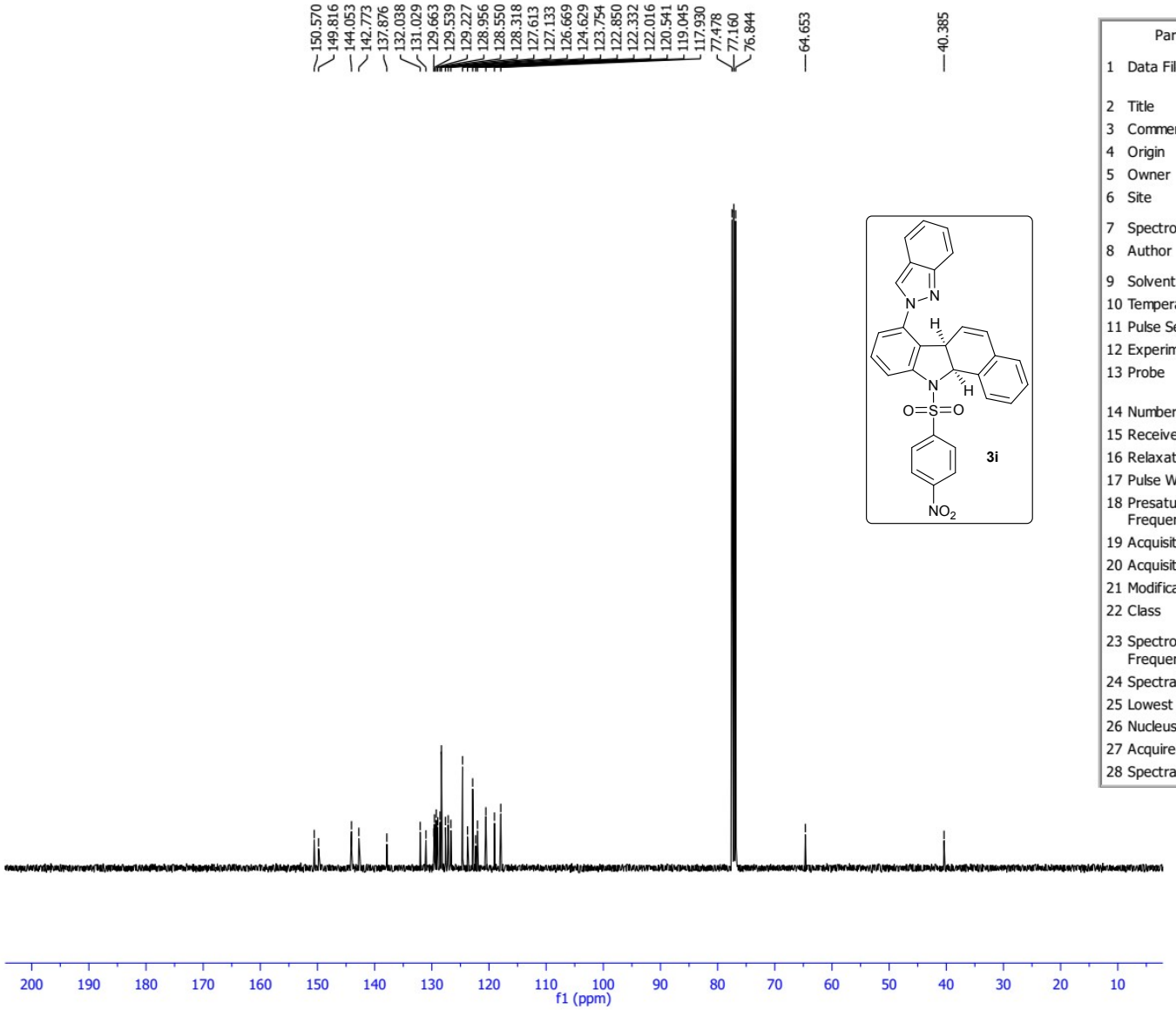
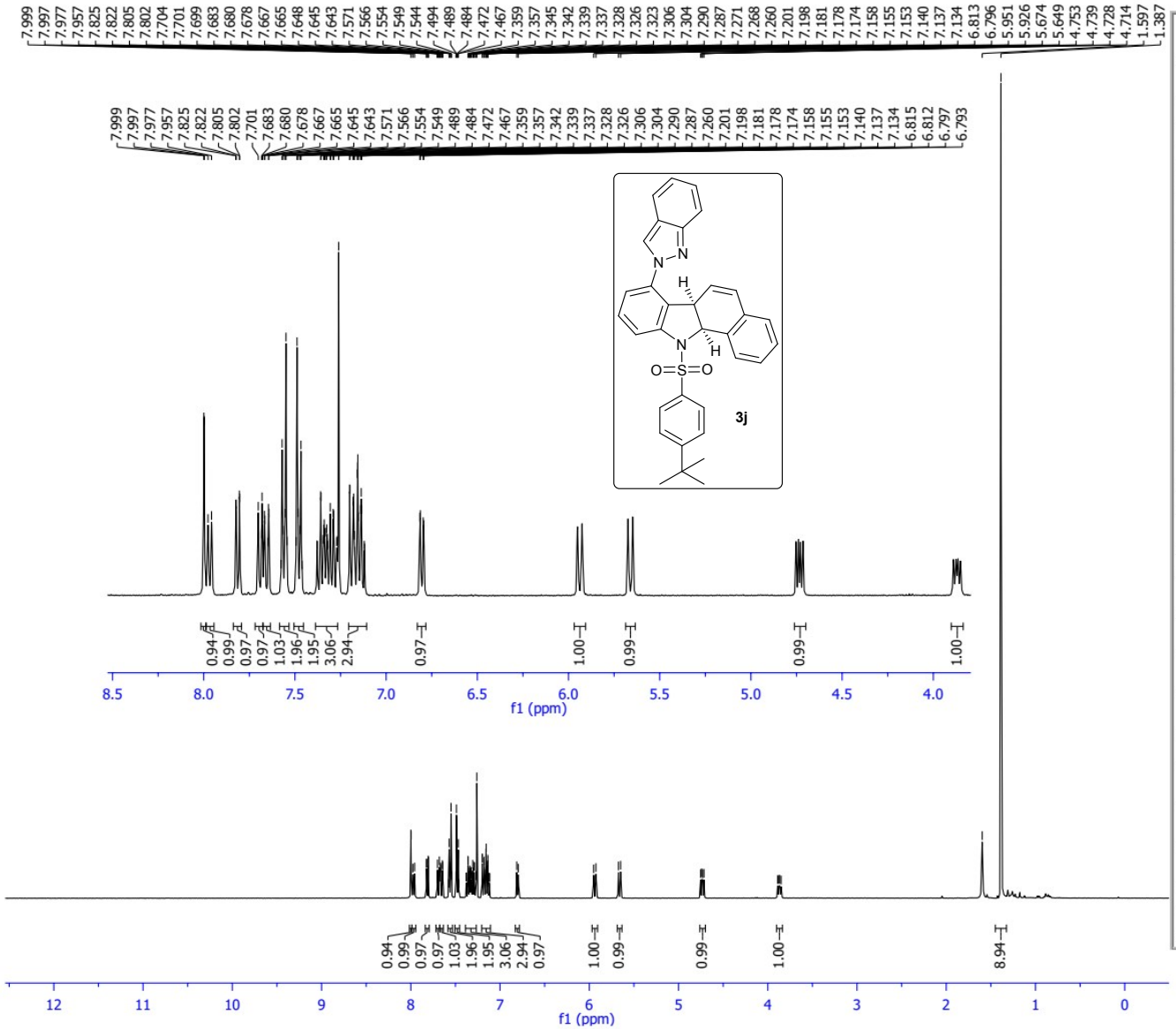
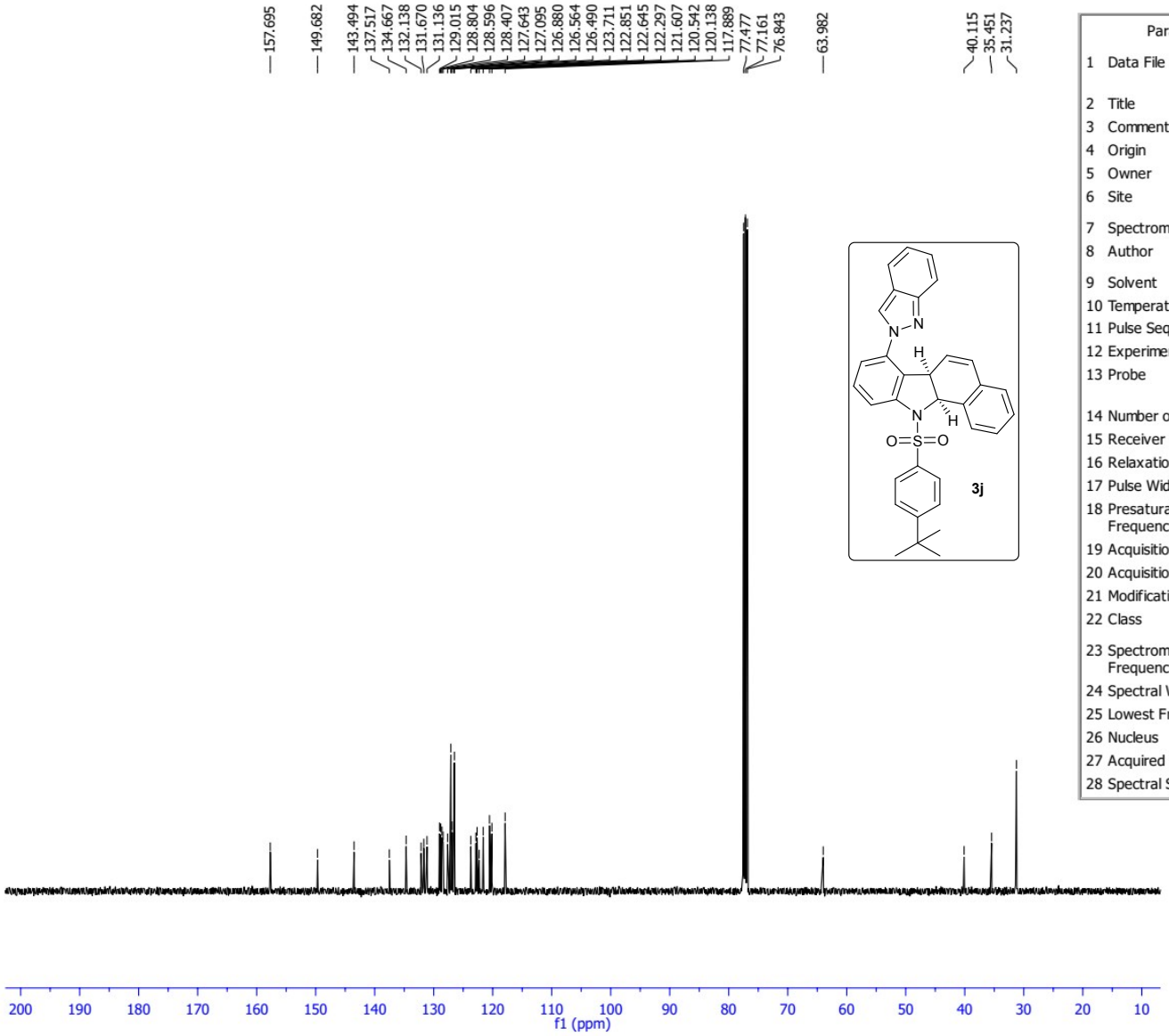


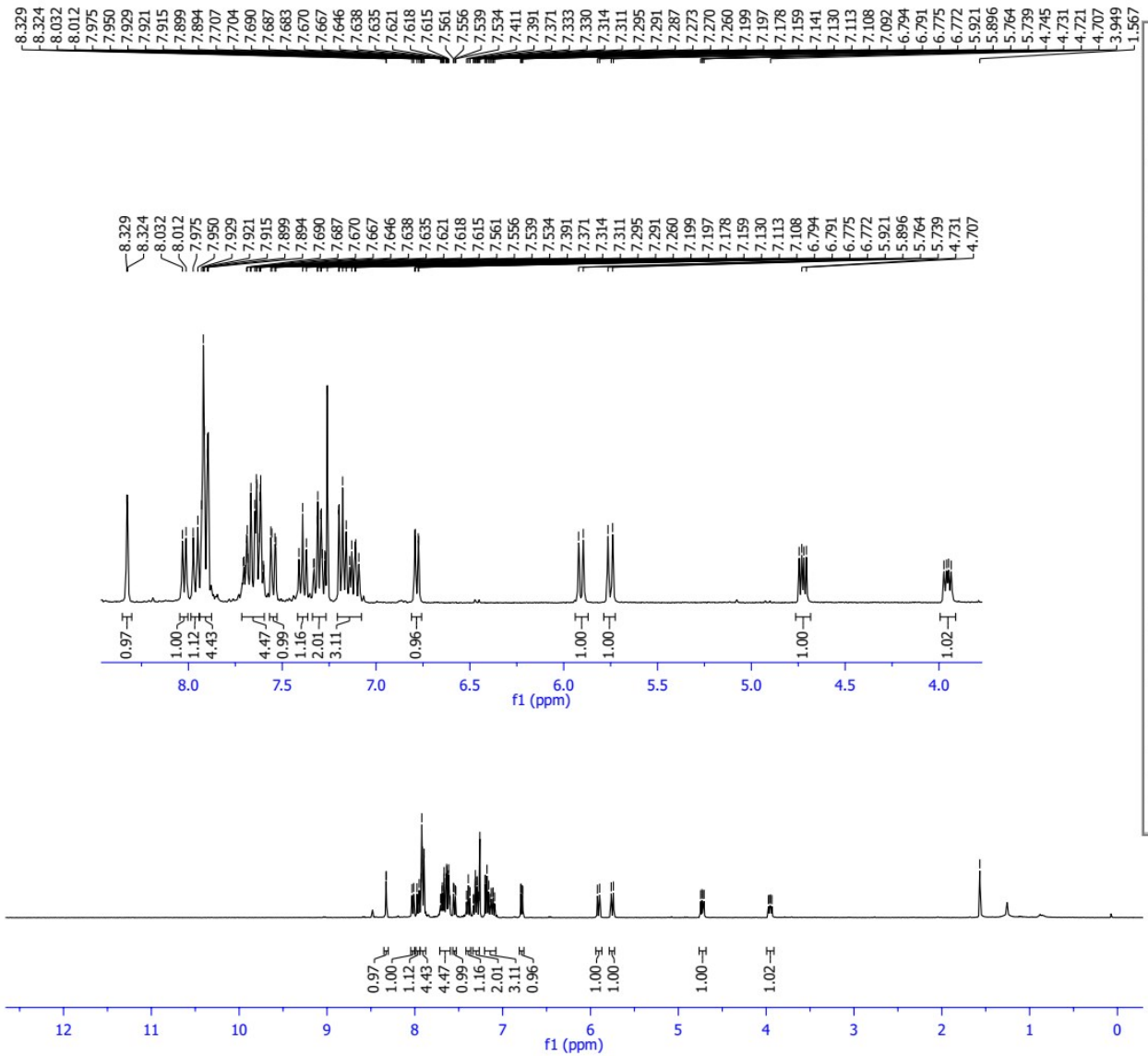
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-150-13C/ 10/ fid
2	Title	VK-150-13C.10.fid
3	Comment	VK-150-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.6
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-26T21:43:00
21	Modification Date	2018-12-26T21:43:25
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.4
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



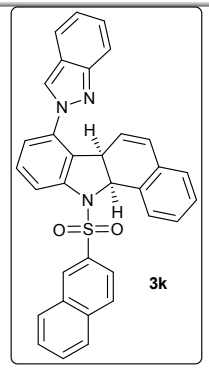
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-152-1H/ 10/ fid
2	Title	VK-152-1H.10.fid
3	Comment	VK-152-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2018-12-21T10:21:00
21	Modification Date	2018-12-21T10:21:34
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072

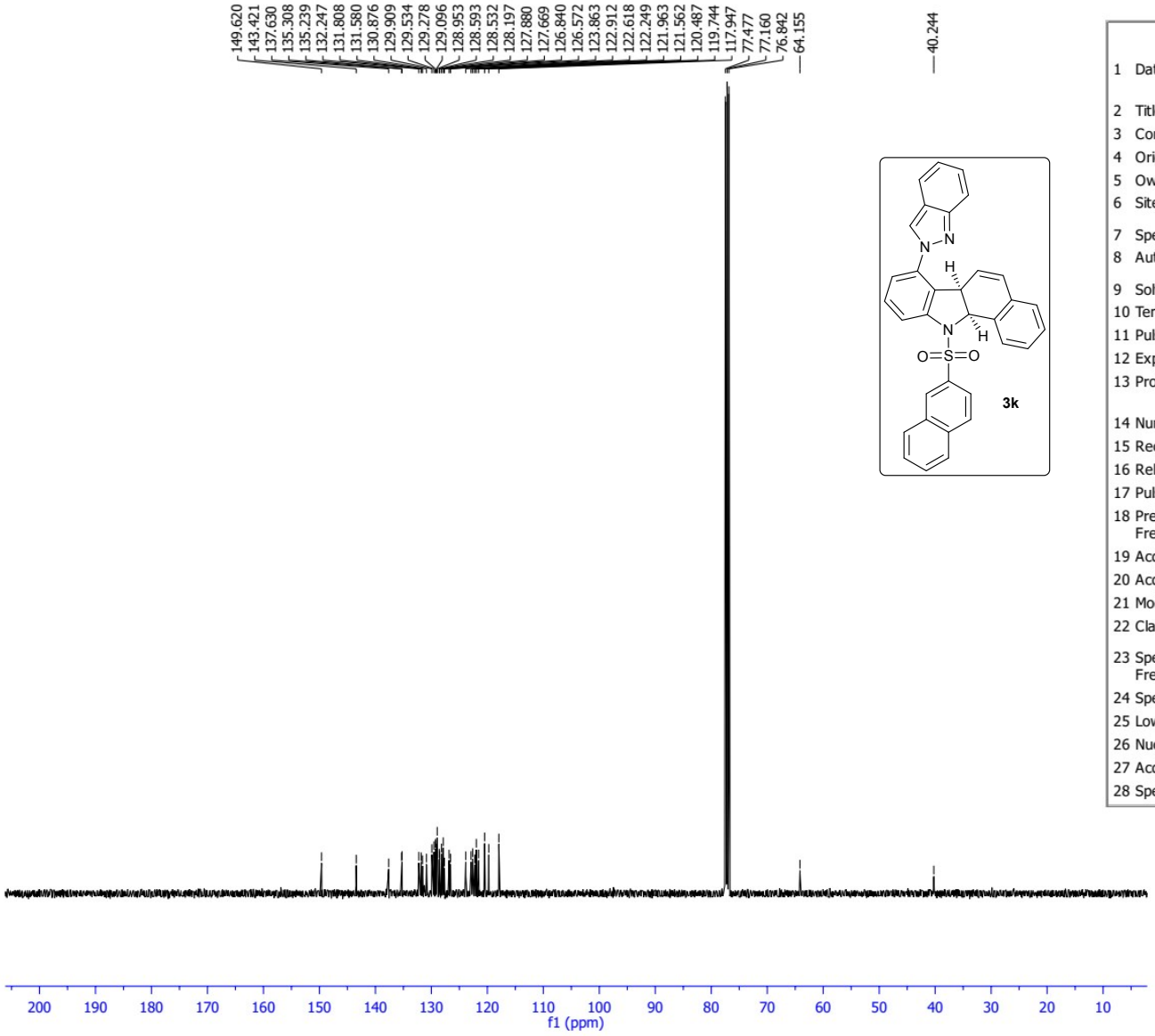


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-152-13C/ 10/ fid
2	Title	VK-152-13C.10.fid
3	Comment	VK-152-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.9
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1024
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2018-12-28T01:27:00
21	Modification Date	2018-12-28T01:27:02
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536

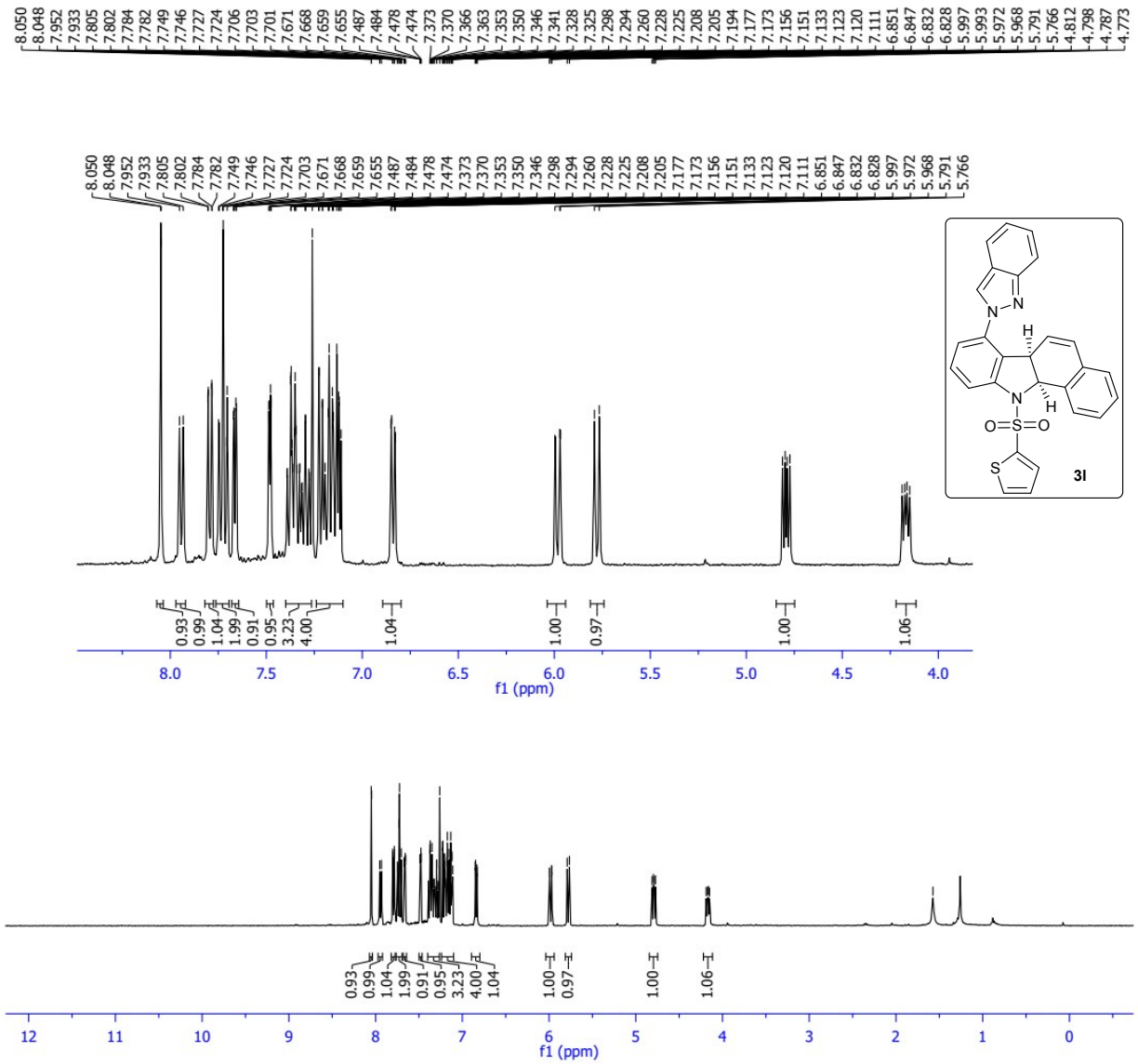


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-156-1H/ 10/ fid
2	Title	VK-156-1H.10.fid
3	Comment	VK-156-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-07T10:31:00
21	Modification Date	2019-01-07T10:31:16
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3575.7
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072

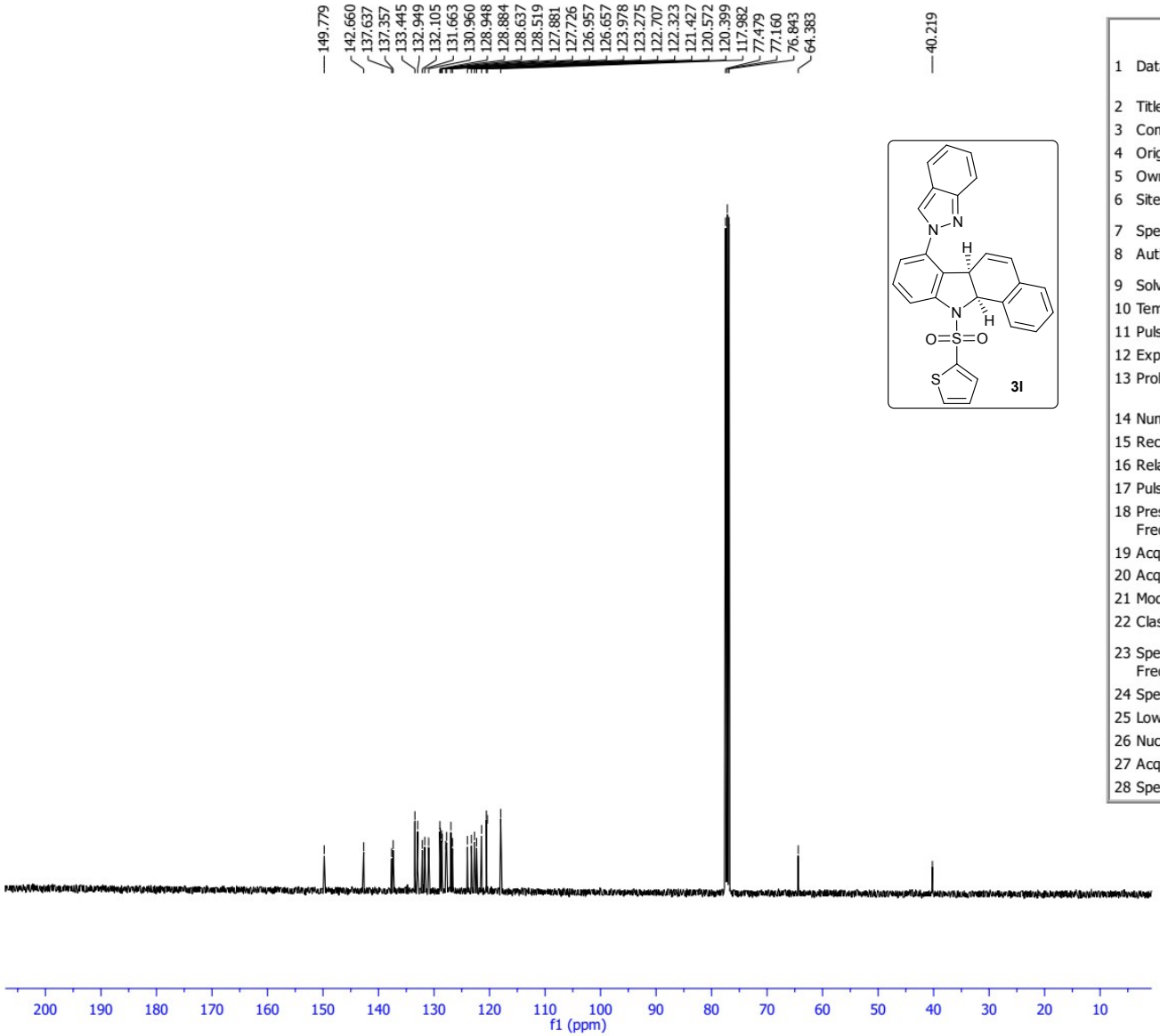




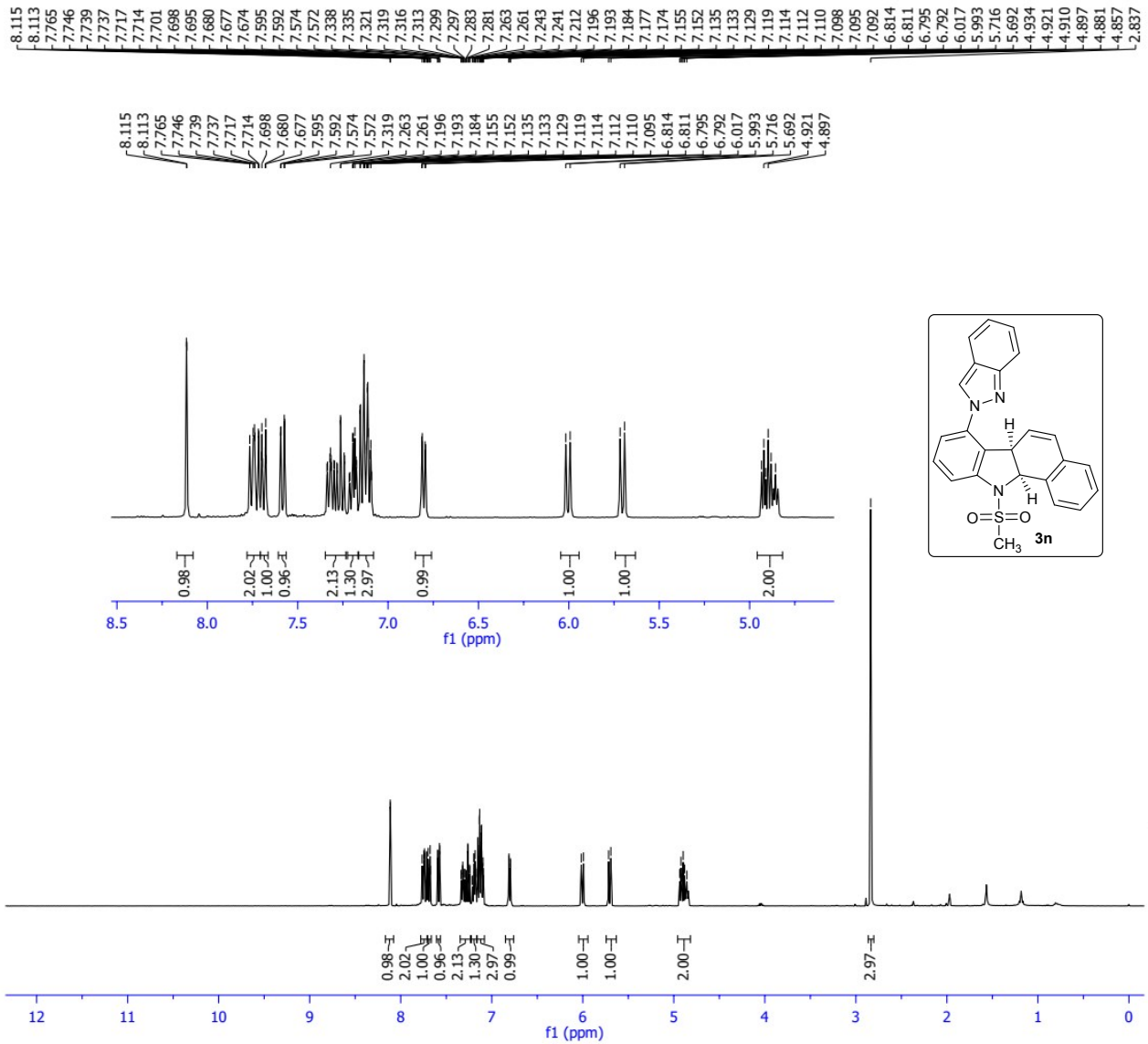
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-156-13C/ 10/ fid
2	Title	VK-156-13C.10.fid
3	Comment	VK-156-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.3
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-07T23:25:00
21	Modification Date	2019-01-07T23:25:13
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



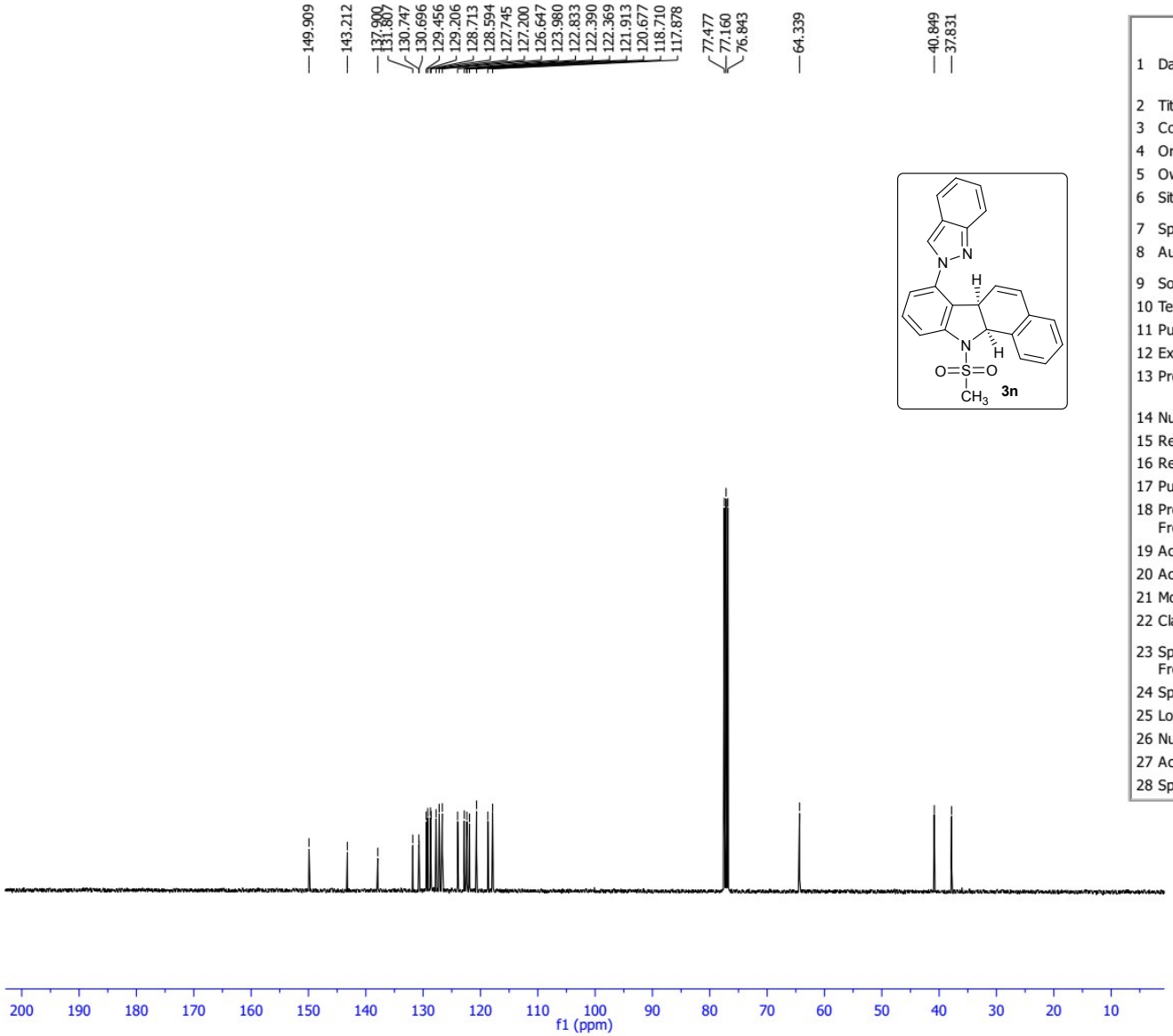
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-157R-1H/ 10/ fid
2	Title	VK-157R-1H.10.fid
3	Comment	VK-157R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	299.1
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-02-05T09:40:00
21	Modification Date	2019-02-05T09:40:34
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3577.1
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



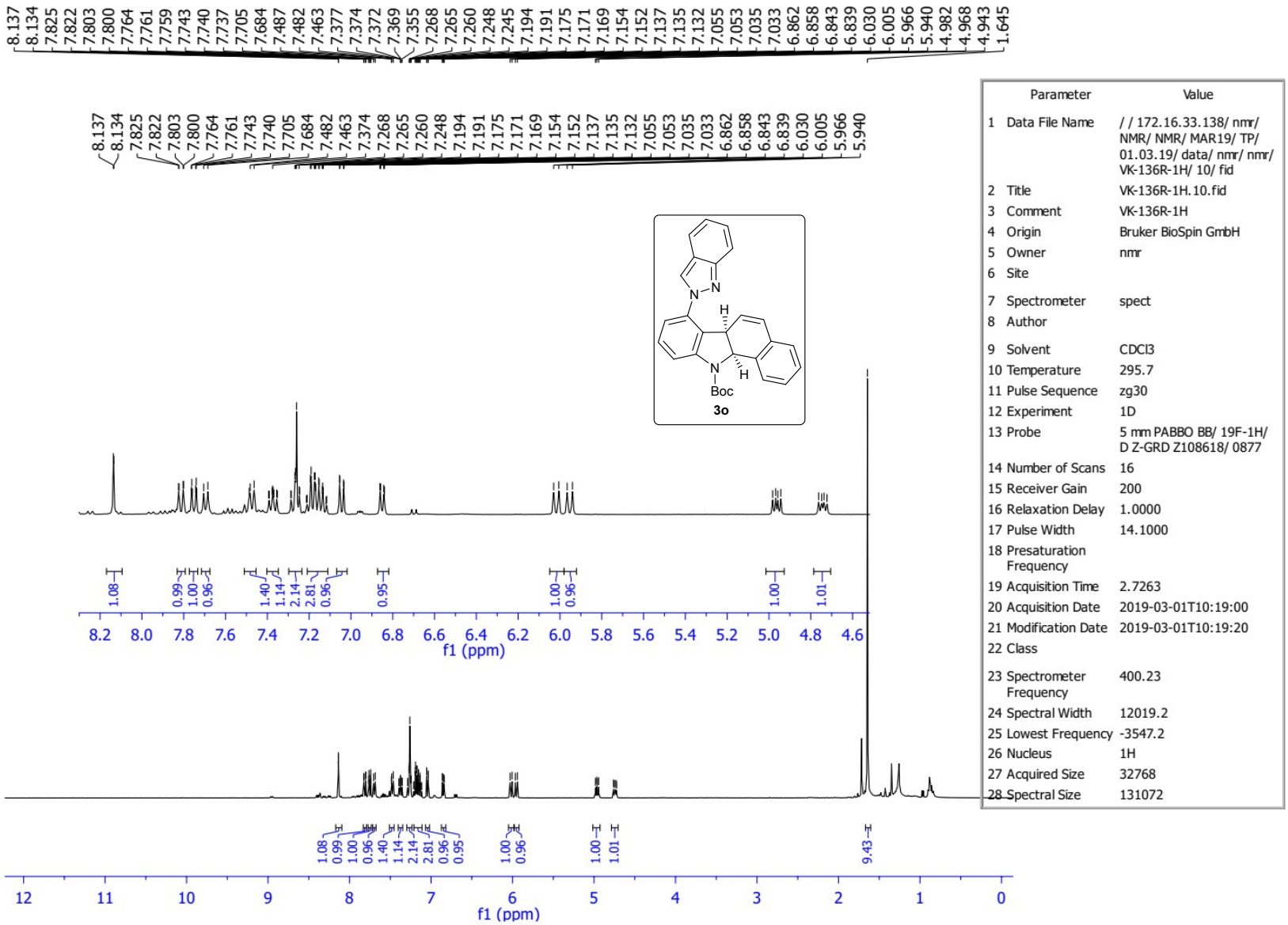
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-157-13C/ 10/ fid
2	Title	VK-157-13C.10.fid
3	Comment	VK-157-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.0
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1024
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-11T05:39:00
21	Modification Date	2019-01-11T05:39:23
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.6
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



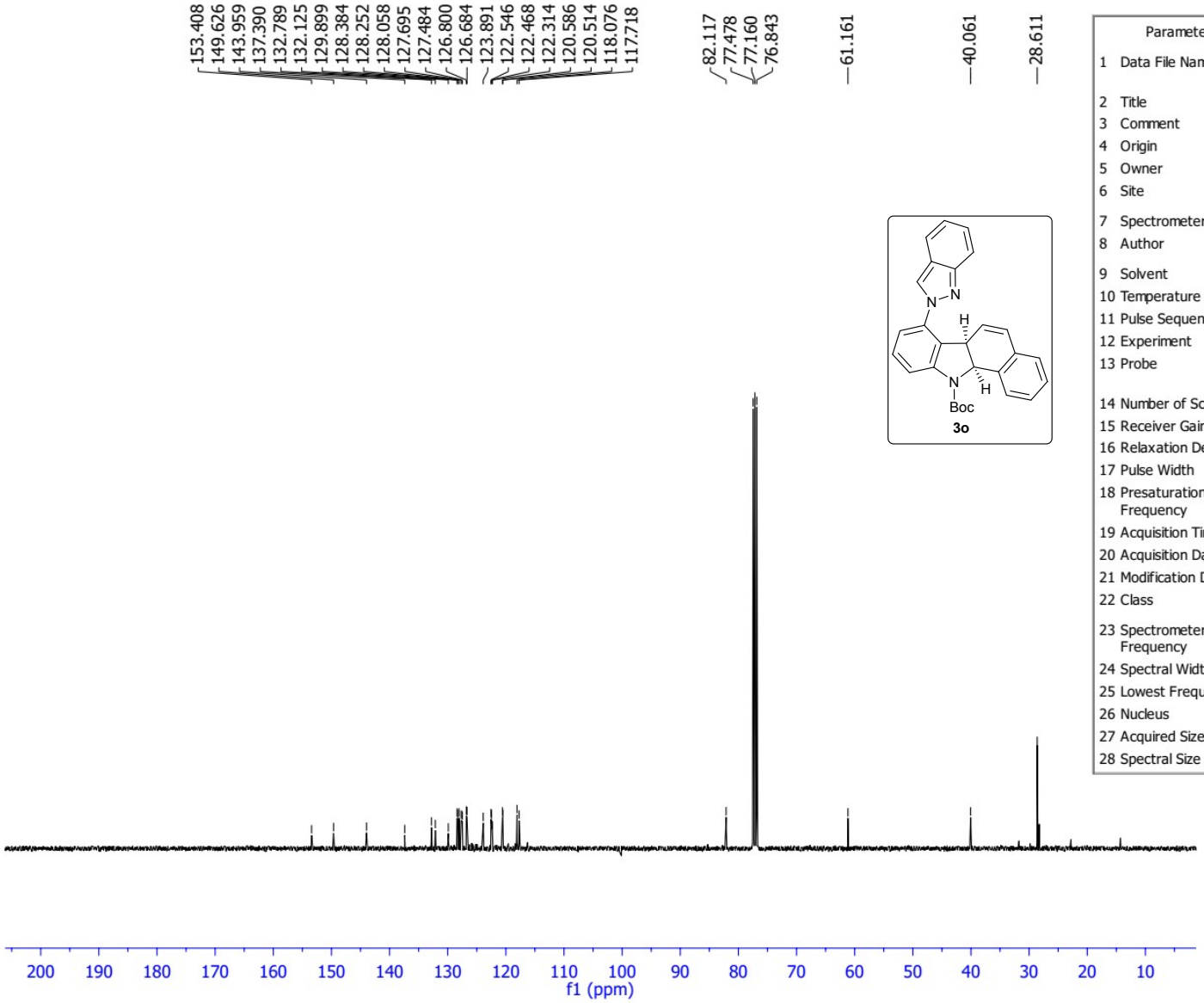
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-158-1H/ 10/ fid
2	Title	VK-158-1H.10.fid
3	Comment	VK-158-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.7
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-07T10:23:00
21	Modification Date	2019-01-07T10:23:01
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3577.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



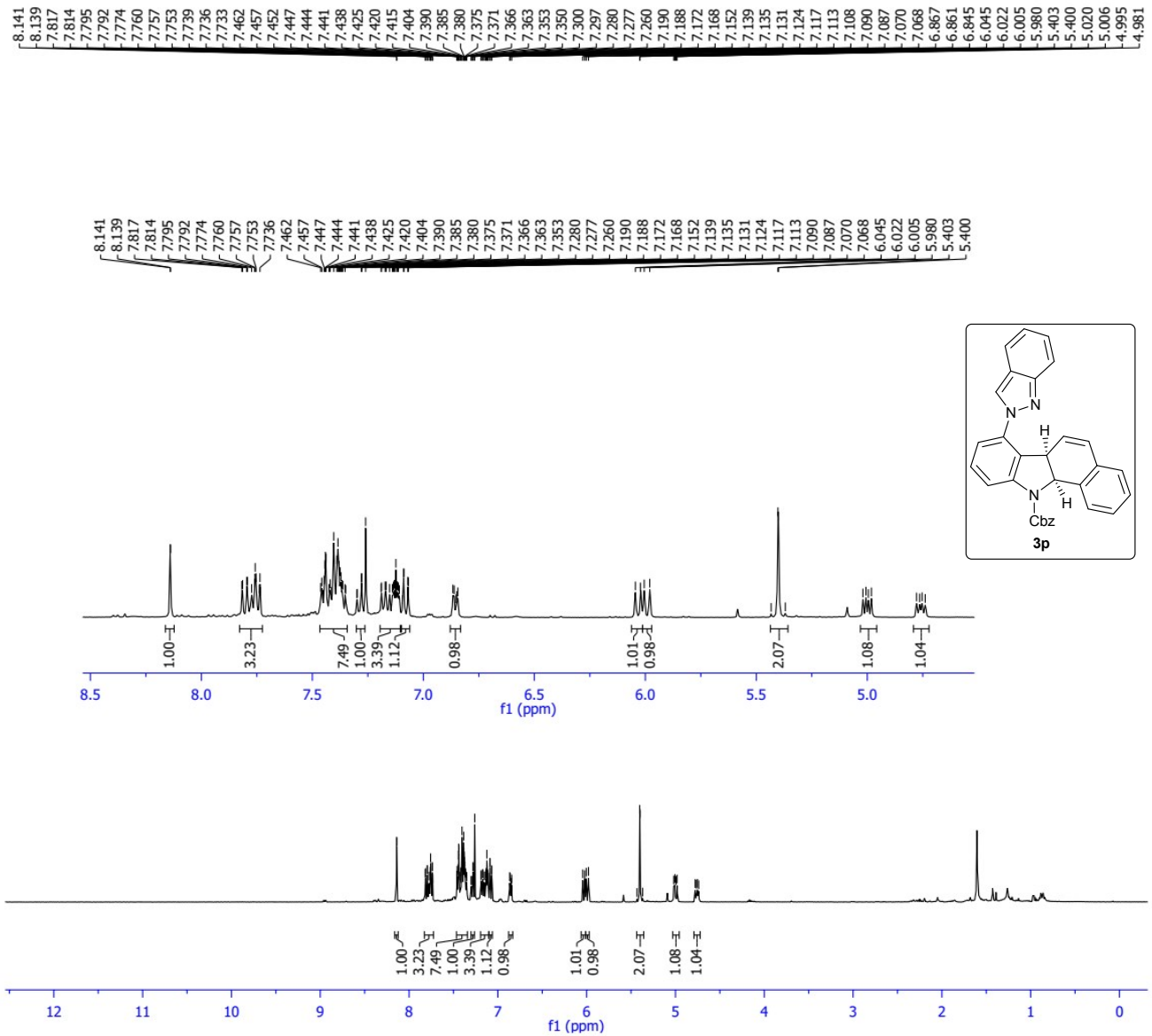
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-158-13C/ 10/ fid
2	Title	VK-158-13C.10.fid
3	Comment	VK-158-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.7
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-11T00:42:00
21	Modification Date	2019-01-11T00:42:46
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1944.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



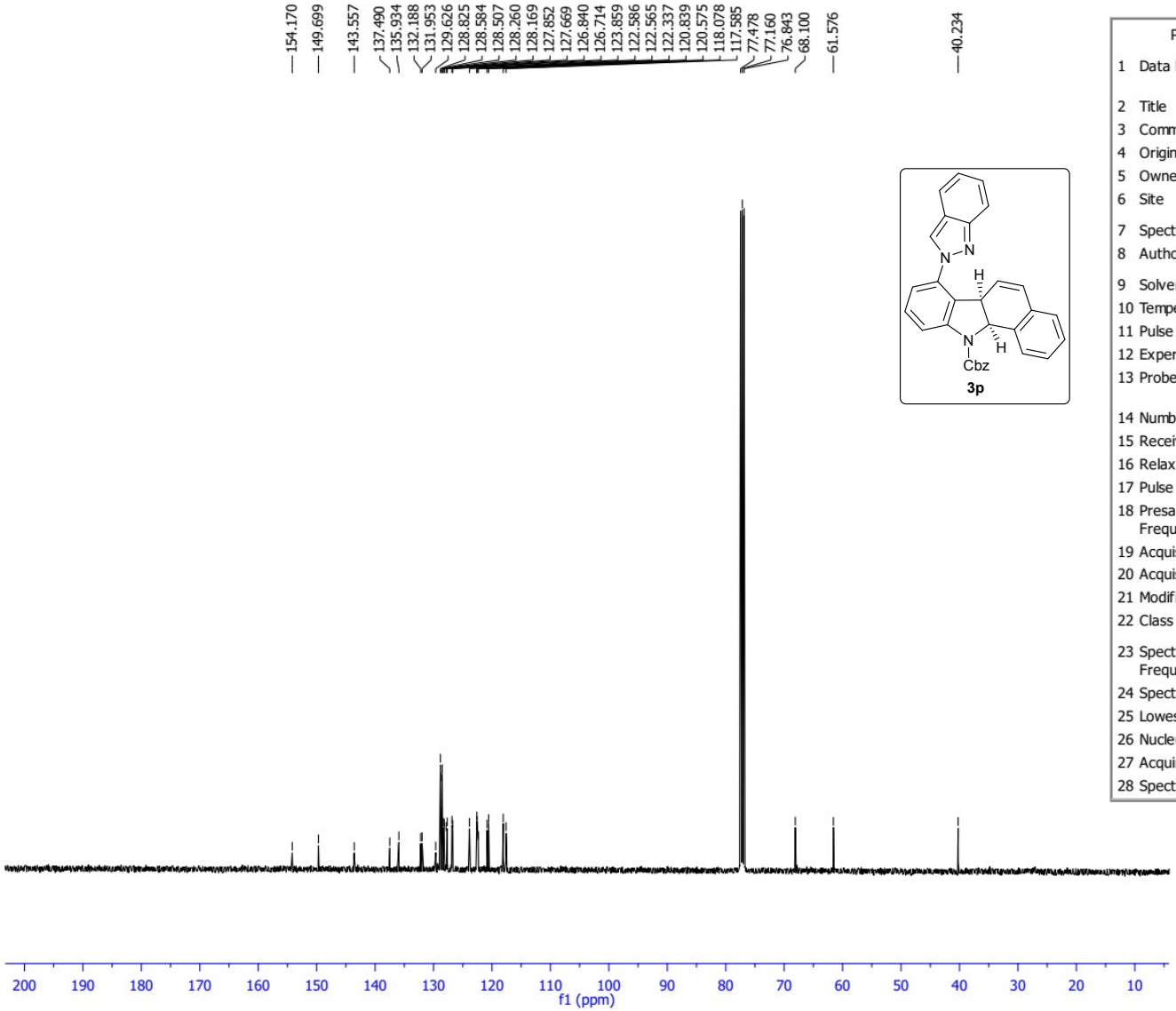
	Parameter	Value
1	Data File Name	/ / 172.16.33.138/ nmr/ NMR/ NMR/ MAR19/ TP/ 01.03.19/ data/ nmr/ nmr/ VK-136R-1H/ 10/ fid
2	Title	VK-136R-1H.10.fid
3	Comment	VK-136R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.7
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-03-01T10:19:00
21	Modification Date	2019-03-01T10:19:20
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



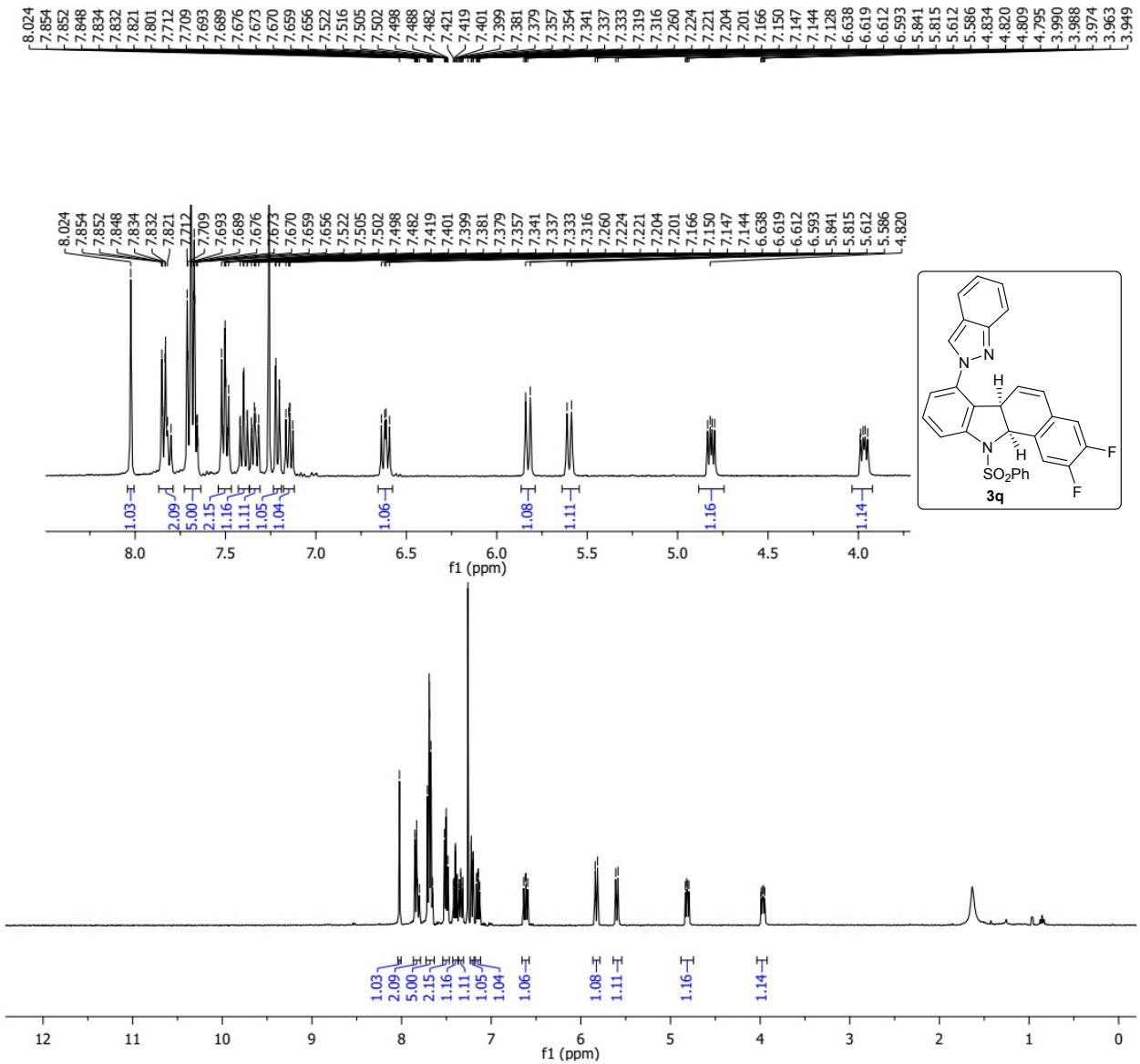
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ 136/ VK-136R-13C/ 10/ fid
2	Title	VK-136R-13C.10.fid
3	Comment	VK-136R-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	800
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-03-01T23:11:00
21	Modification Date	2019-03-01T23:11:05
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.7
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



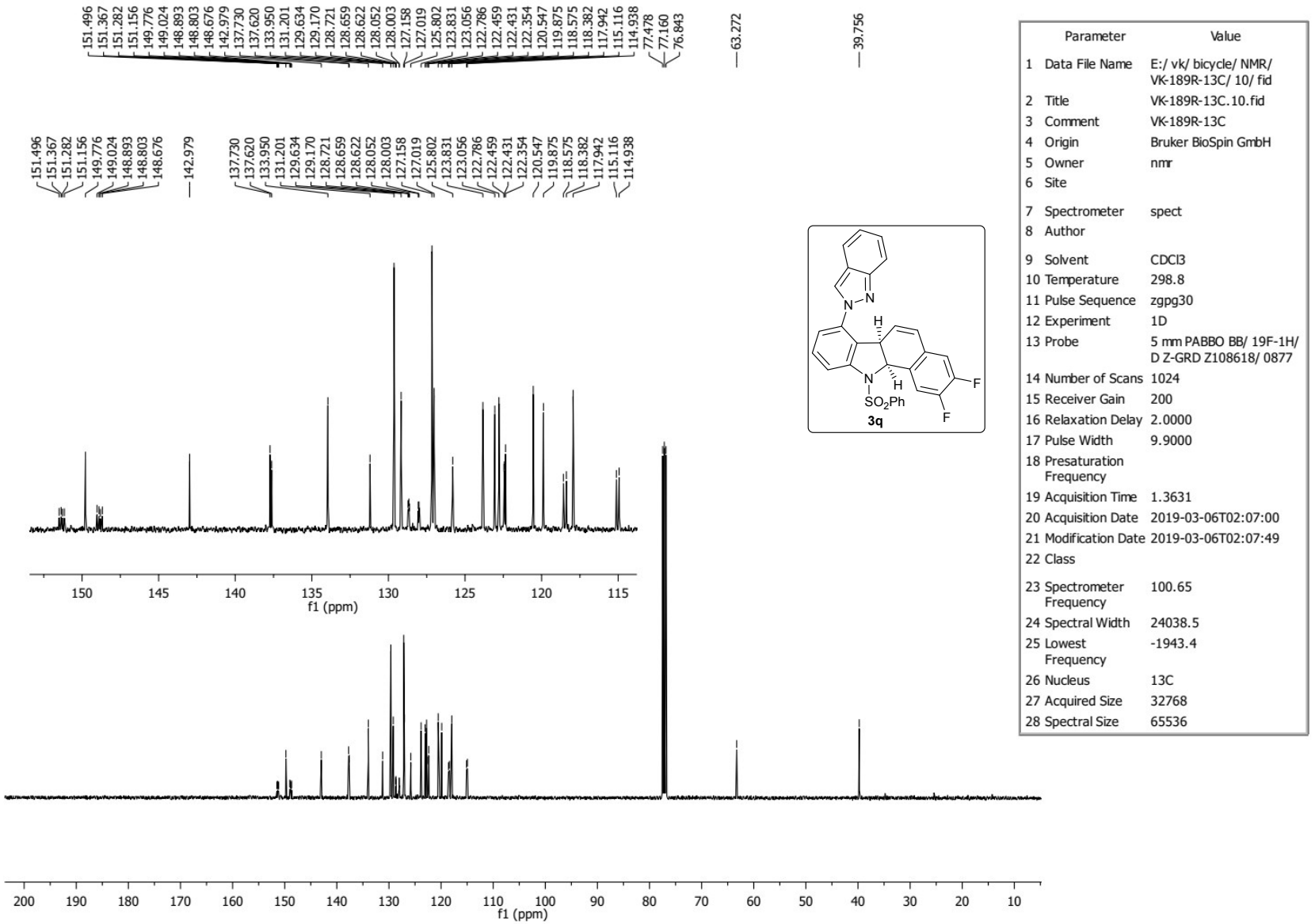
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-160-1H/ 10/ fid
2	Title	VK-160-1H.10.fid
3	Comment	VK-160-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-16T09:29:00
21	Modification Date	2019-01-16T09:29:40
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3576.5
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



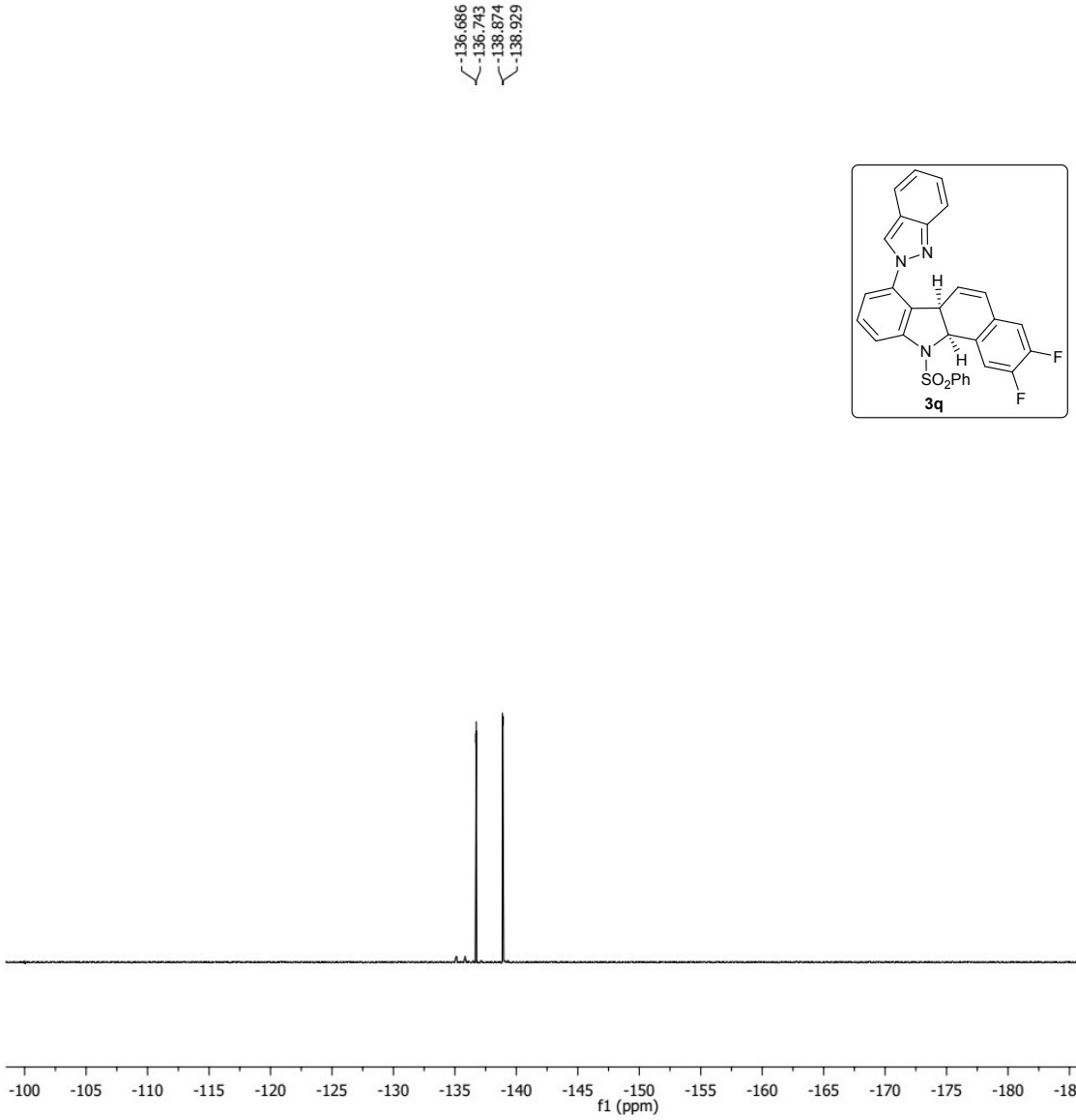
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-160-13C/ 10/ fid
2	Title	VK-160-13C.10.fid
3	Comment	VK-160-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.9
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1024
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-18T07:05:00
21	Modification Date	2019-01-18T07:05:58
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.9
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



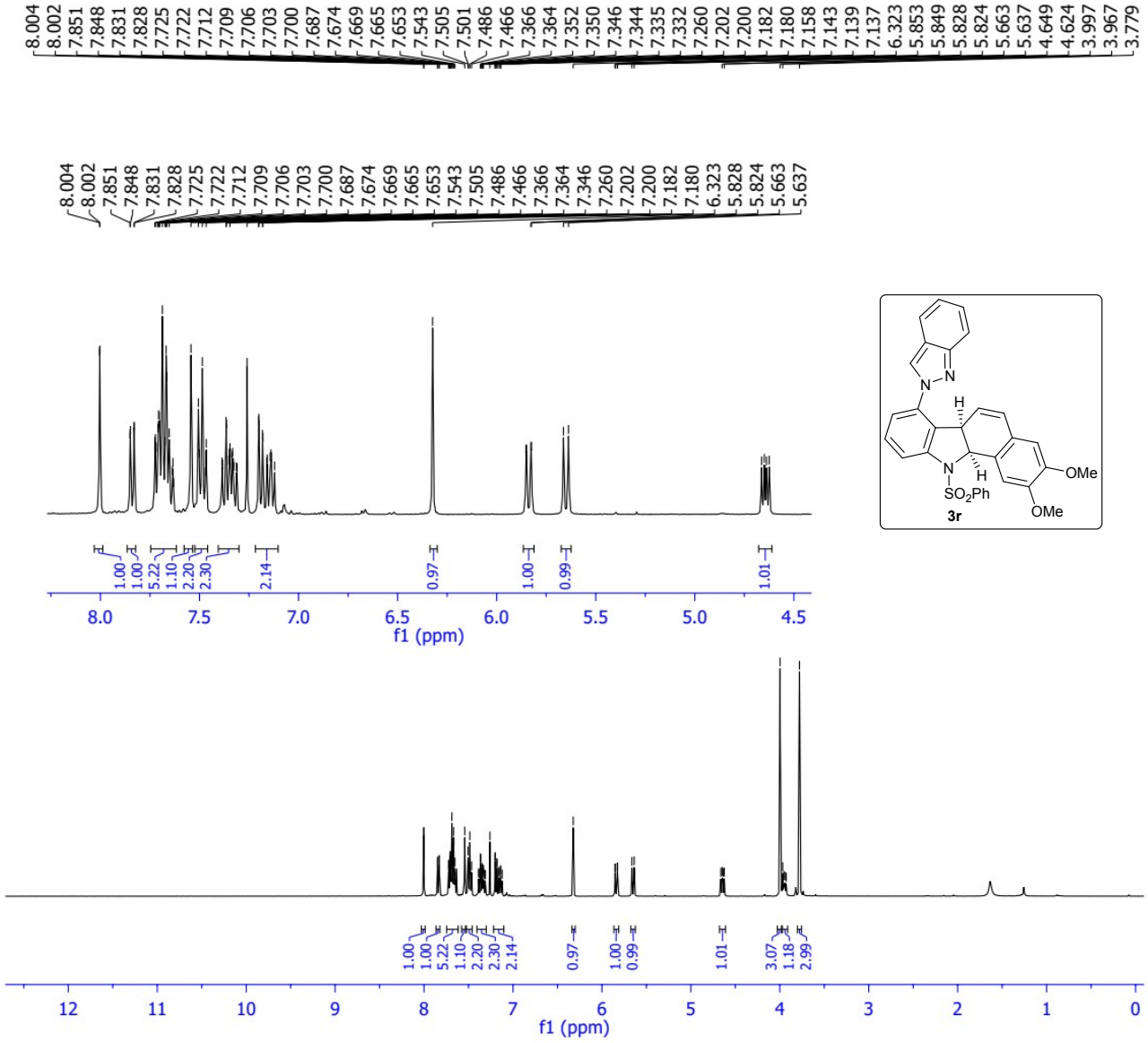
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-189-1H/ 10/ fid
2	Title	VK-189-1H.10.fid
3	Comment	VK-189-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-03-04T09:23:00
21	Modification Date	2019-03-04T09:23:16
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



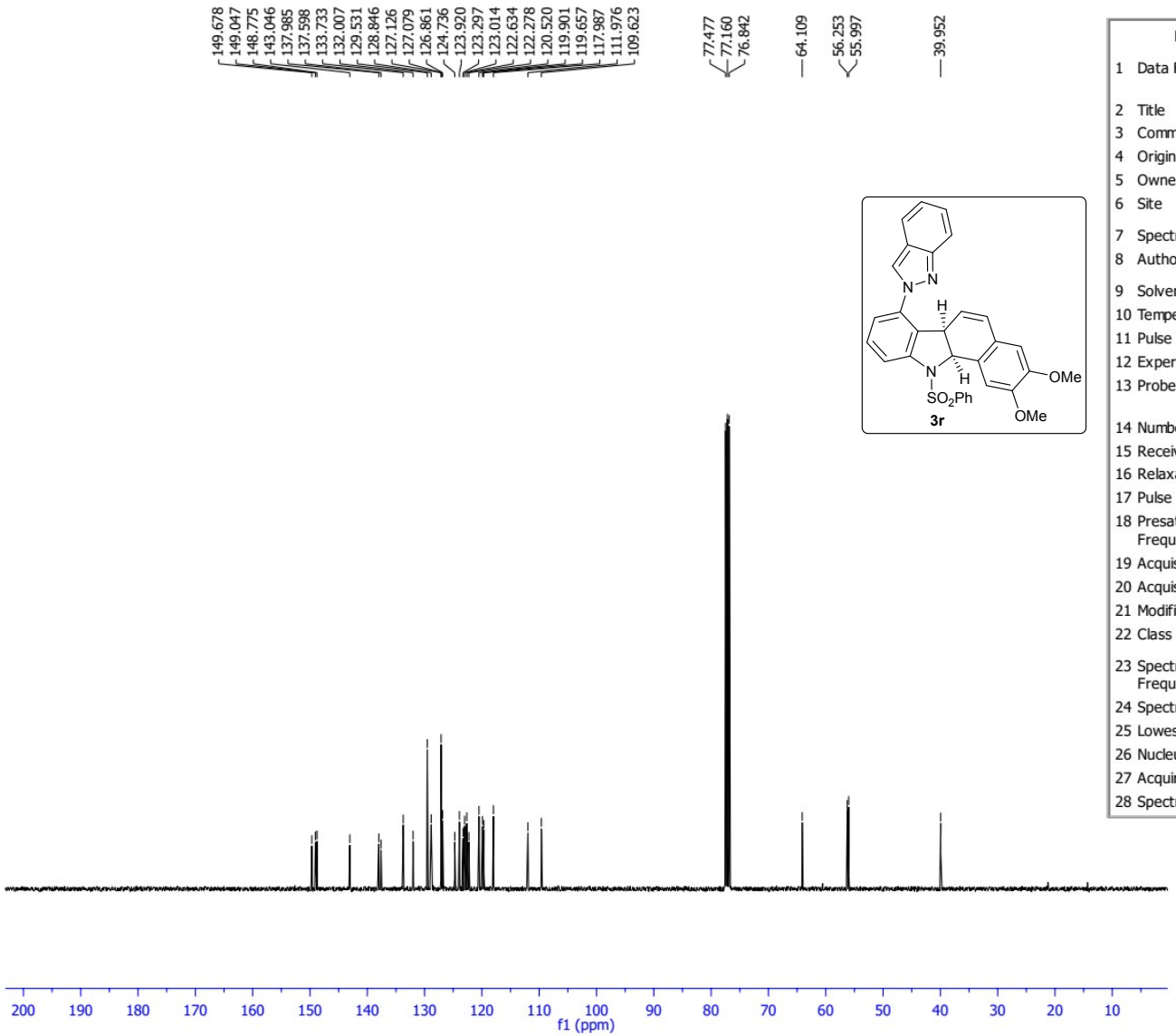
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-189R-13C/ 10/ fid
2	Title	VK-189R-13C.10.fid
3	Comment	VK-189R-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	298.8
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1024
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-03-06T02:07:00
21	Modification Date	2019-03-06T02:07:49
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.4
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



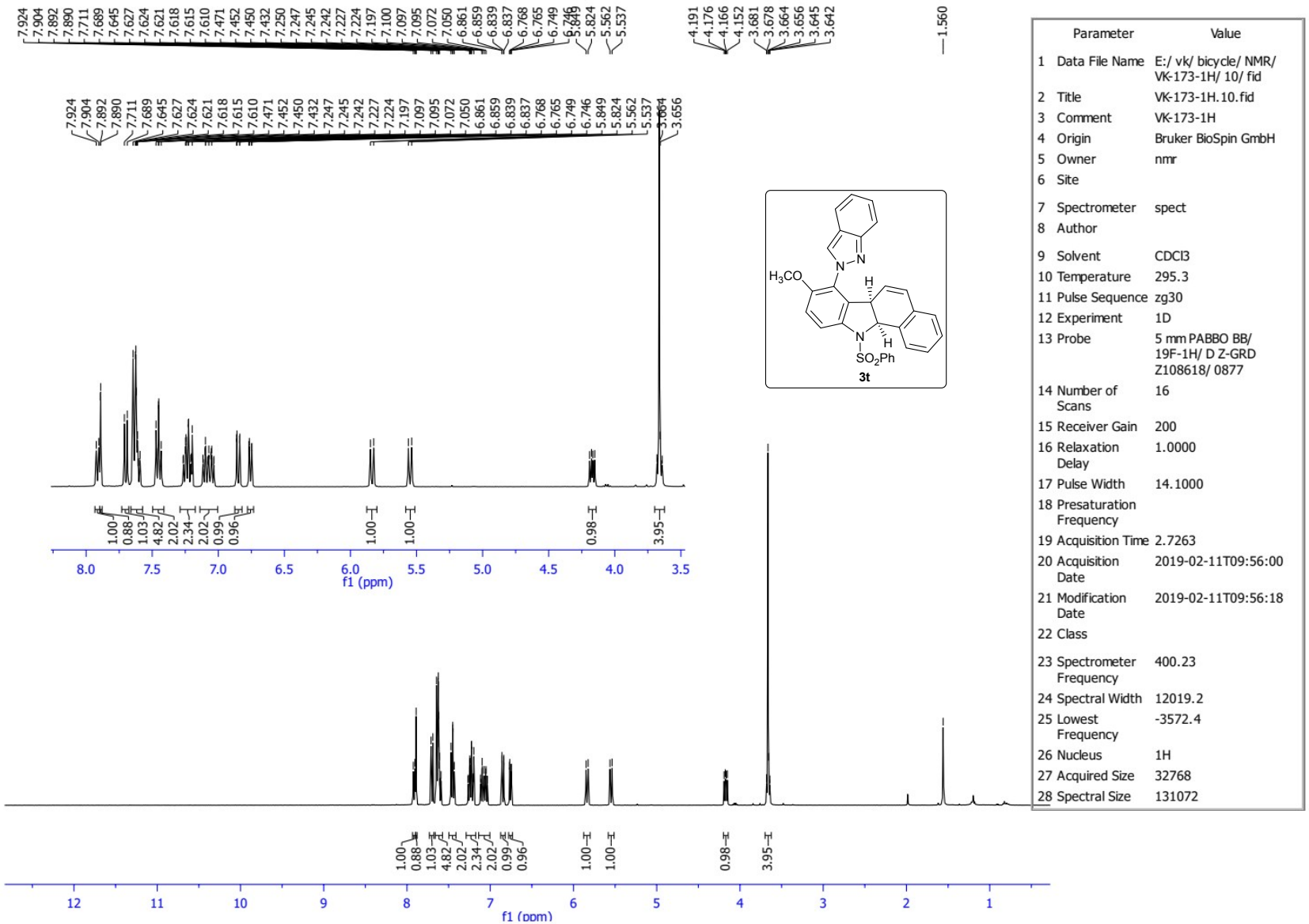
Parameter	Value
1 Data File Name	E:/ vk/ bicycle/ NMR/ VK-189-19F/ 10/ fid
2 Title	VK-189-19F.10.fid
3 Comment	VK-189-19F
4 Origin	Bruker BioSpin GmbH
5 Owner	nmr
6 Site	
7 Spectrometer	spect
8 Author	
9 Solvent	CDCl3
10 Temperature	296.3
11 Pulse Sequence	zgfhigqn.2
12 Experiment	1D
13 Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14 Number of Scans	16
15 Receiver Gain	200
16 Relaxation Delay	1.0000
17 Pulse Width	11.9000
18 Presaturation Frequency	
19 Acquisition Time	0.7340
20 Acquisition Date	2019-03-04T09:25:00
21 Modification Date	2019-03-04T09:25:42
22 Class	
23 Spectrometer Frequency	376.55
24 Spectral Width	89285.7
25 Lowest Frequency	-82302.1
26 Nucleus	19F
27 Acquired Size	65536
28 Spectral Size	131072



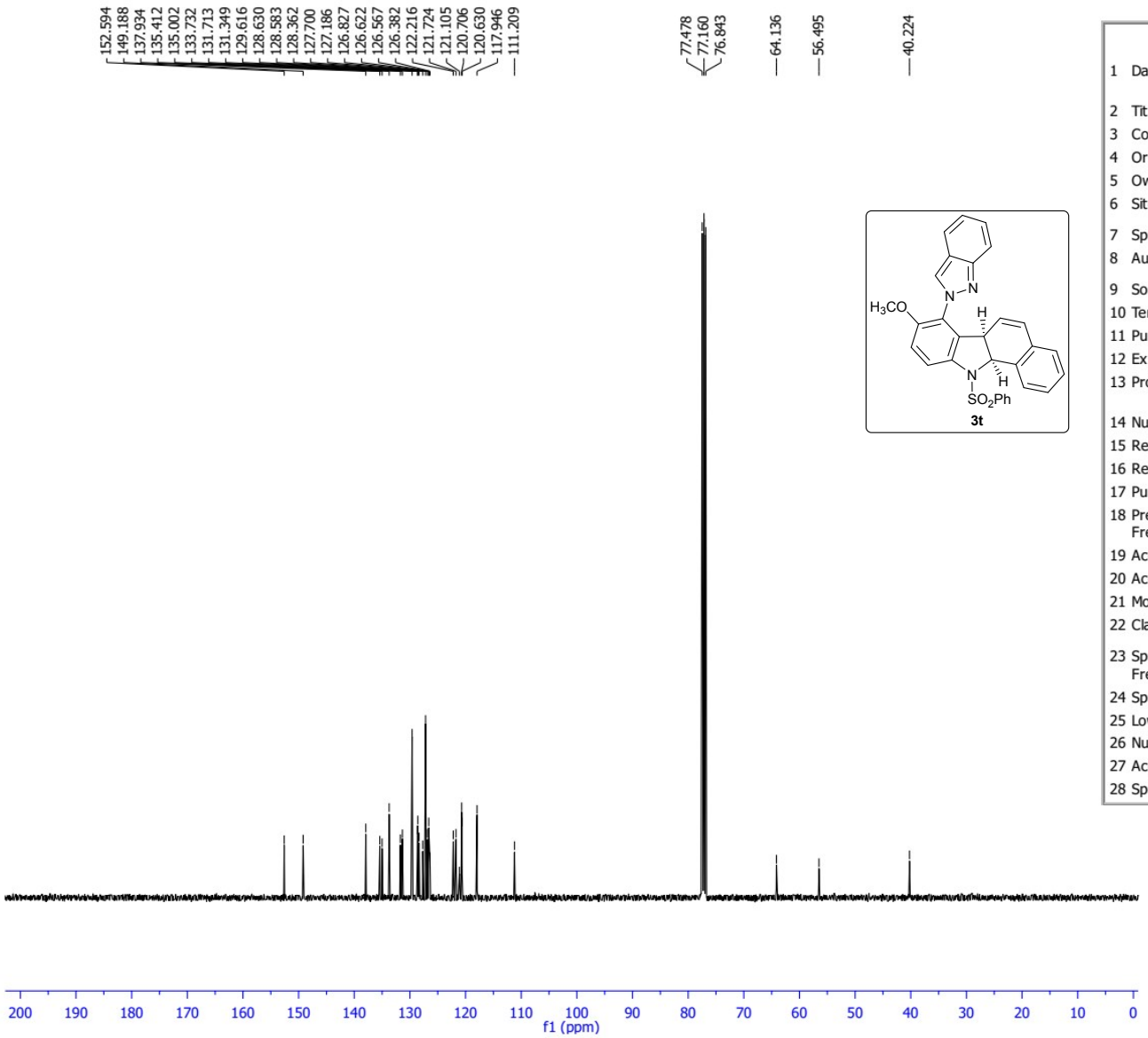
	Parameter	Value
1	Data File Name	VK-161R-1H/ 10/ fid
2	Title	VK-161R-1H. 10.fid
3	Comment	VK-161R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	298.2
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-05-02T10:13:00
21	Modification Date	2019-05-02T10:13:25
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.4
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



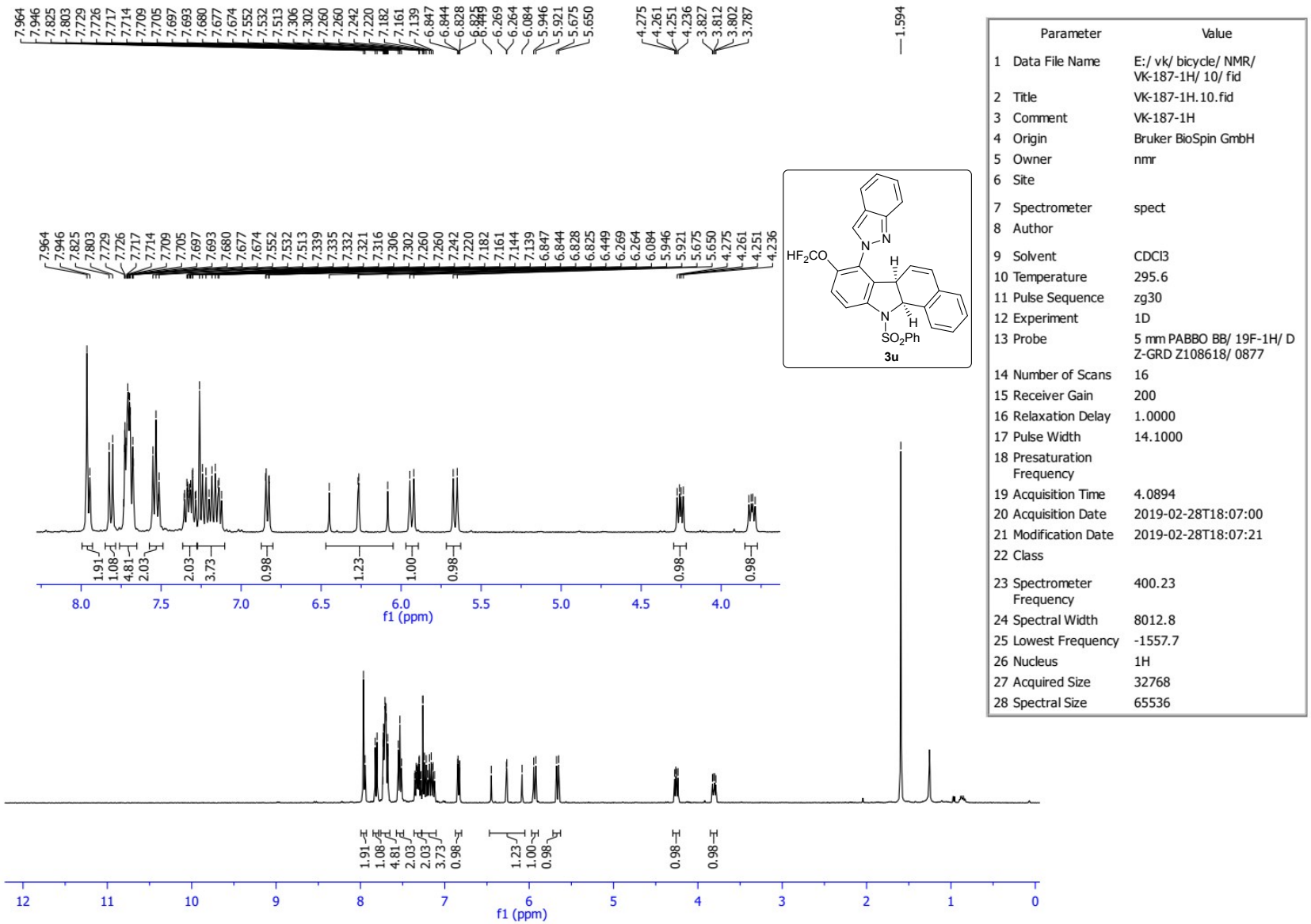
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ SB-VK-161-13C/ 10/ fid
2	Title	SB-VK-161-13C.10.fid
3	Comment	SB-VK-161-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.6
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-22T22:50:00
21	Modification Date	2019-01-22T22:50:12
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1945.0
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



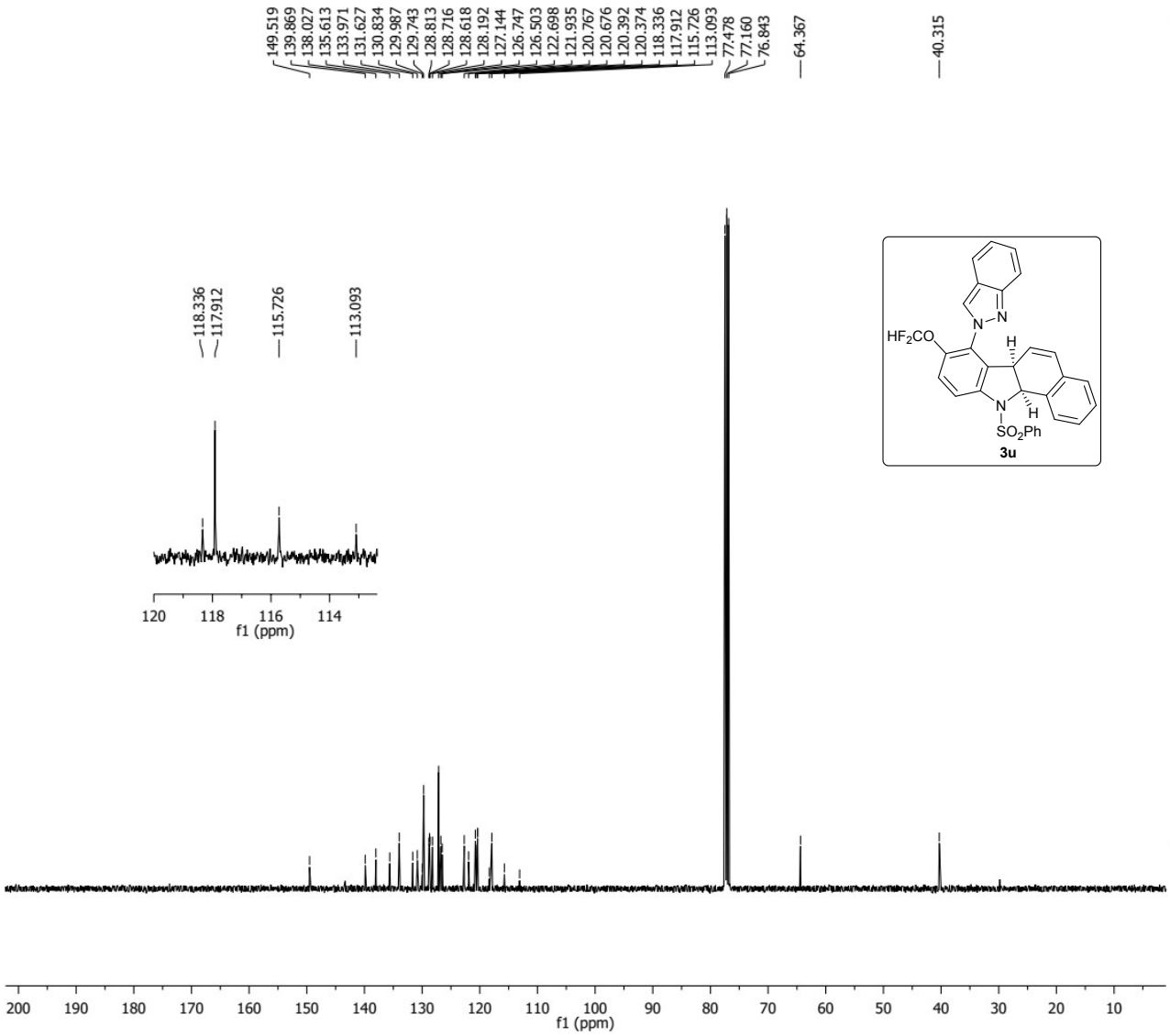
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-173-1H/ 10/ fid
2	Title	VK-173-1H.10.fid
3	Comment	VK-173-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.3
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-02-11T09:56:00
21	Modification Date	2019-02-11T09:56:18
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3572.4
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



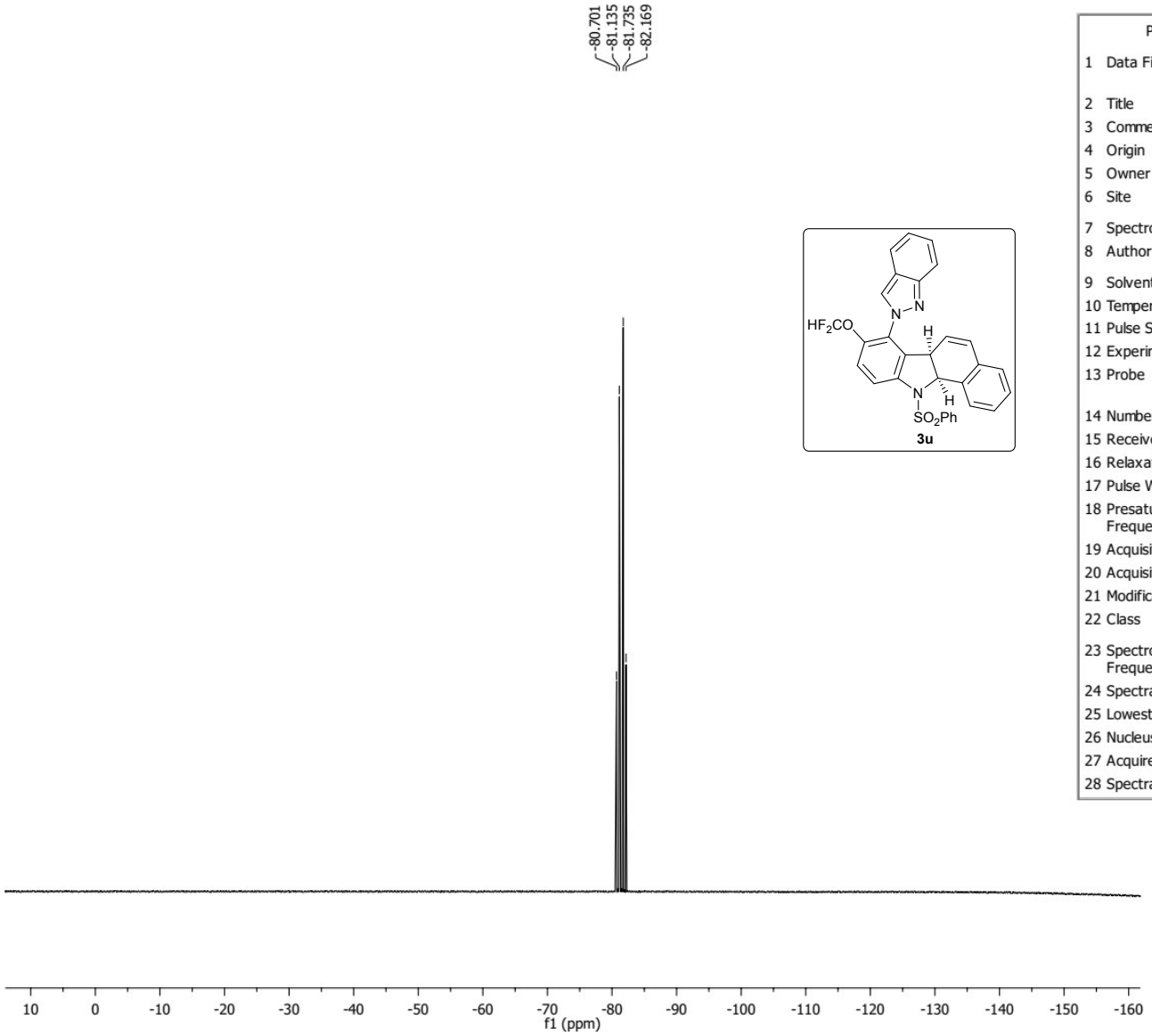
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-173-13C/ 10/ fid
2	Title	VK-173-13C.10.fid
3	Comment	VK-173-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.8
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-02-11T19:55:00
21	Modification Date	2019-02-11T19:55:23
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1944.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



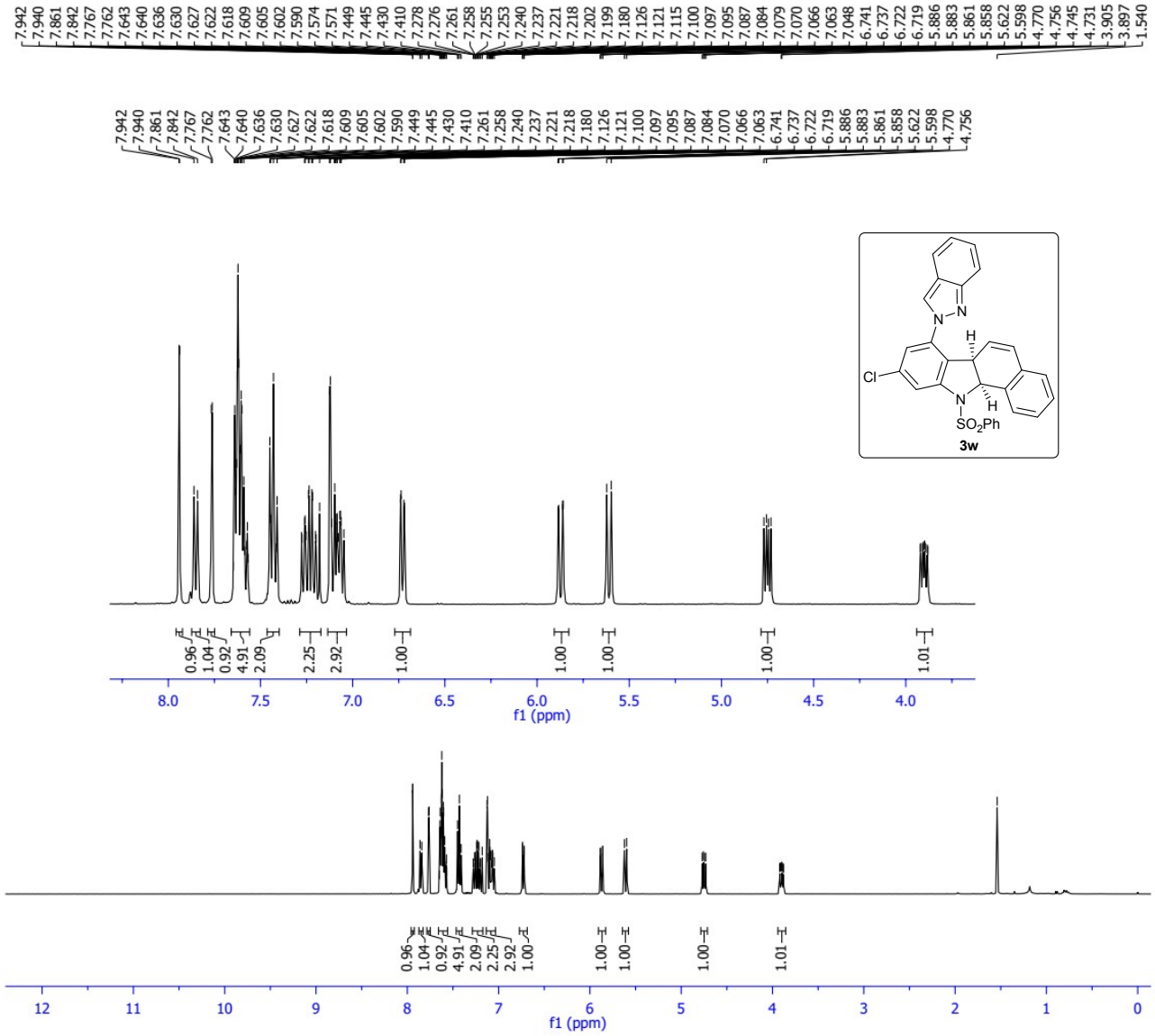
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-187-1H/ 10/ fid
2	Title	VK-187-1H.10.fid
3	Comment	VK-187-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-02-28T18:07:00
21	Modification Date	2019-02-28T18:07:21
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1557.7
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536



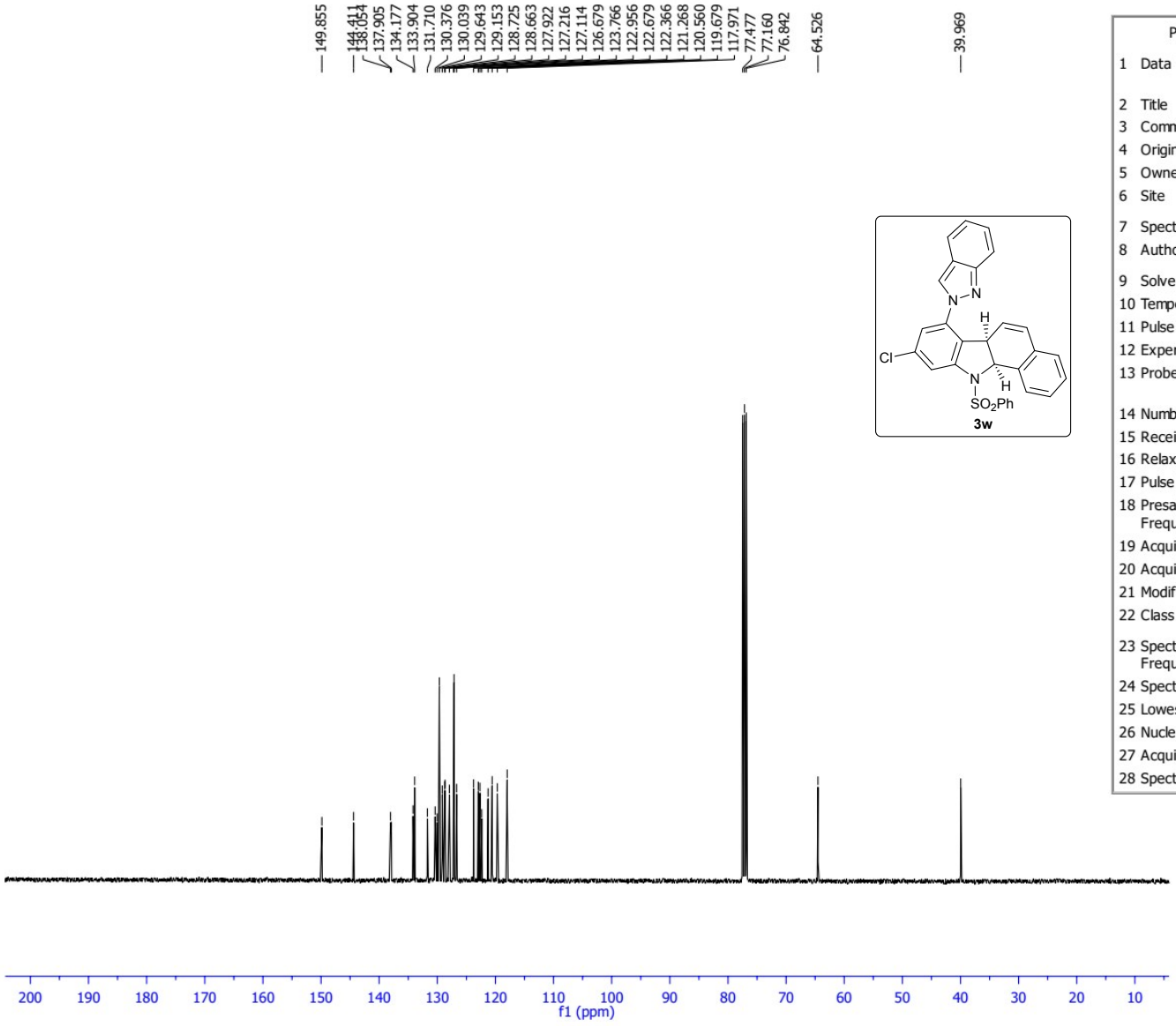
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-187-13C/ 10/ fid
2	Title	VK-187-13C.10.fid
3	Comment	VK-187-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.7
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-02-28T18:04:00
21	Modification Date	2019-02-28T18:04:43
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



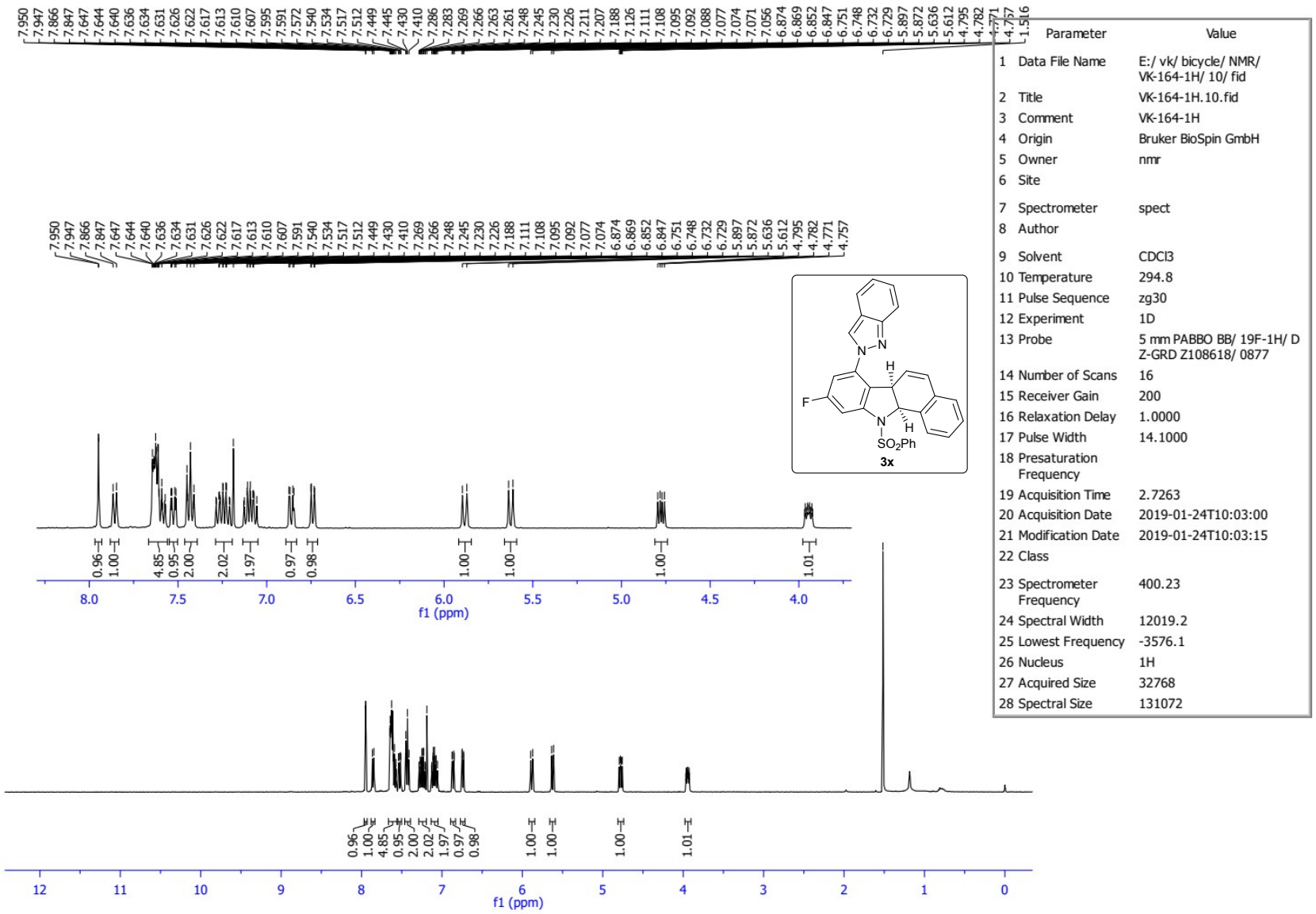
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-187-19F/ 10/ fid
2	Title	VK-187-19F.10.fid
3	Comment	VK-187-19F
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.9
11	Pulse Sequence	zgfhigqn.2
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	11.9000
18	Presaturation Frequency	
19	Acquisition Time	0.7340
20	Acquisition Date	2019-03-04T11:09:00
21	Modification Date	2019-03-04T11:09:35
22	Class	
23	Spectrometer Frequency	376.55
24	Spectral Width	89285.7
25	Lowest Frequency	-82302.1
26	Nucleus	19F
27	Acquired Size	65536
28	Spectral Size	131072



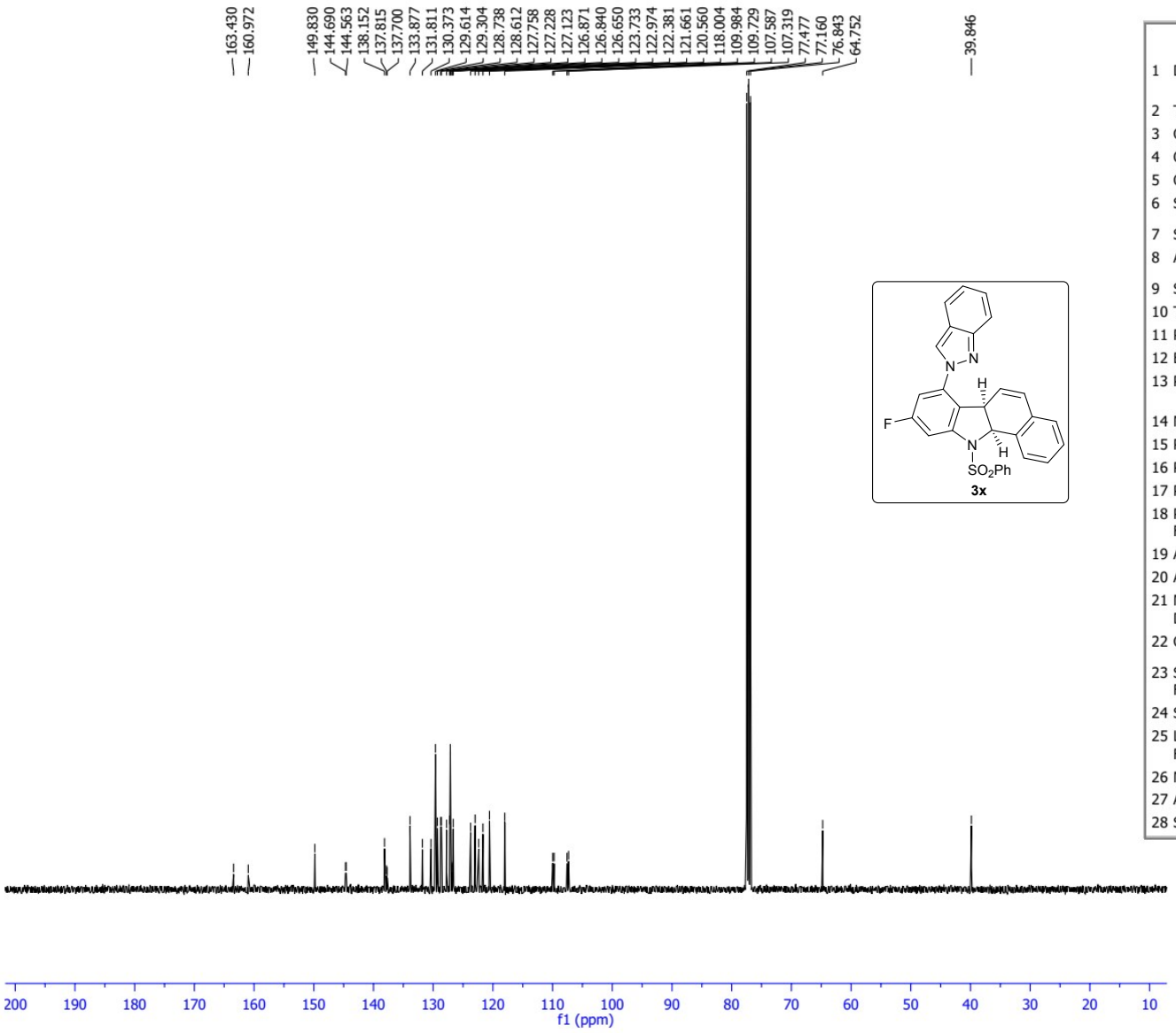
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-159-1H/ 10/ fid
2	Title	VK-159-1H.10.fid
3	Comment	VK-159-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-16T09:25:00
21	Modification Date	2019-01-16T09:25:29
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3578.5
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



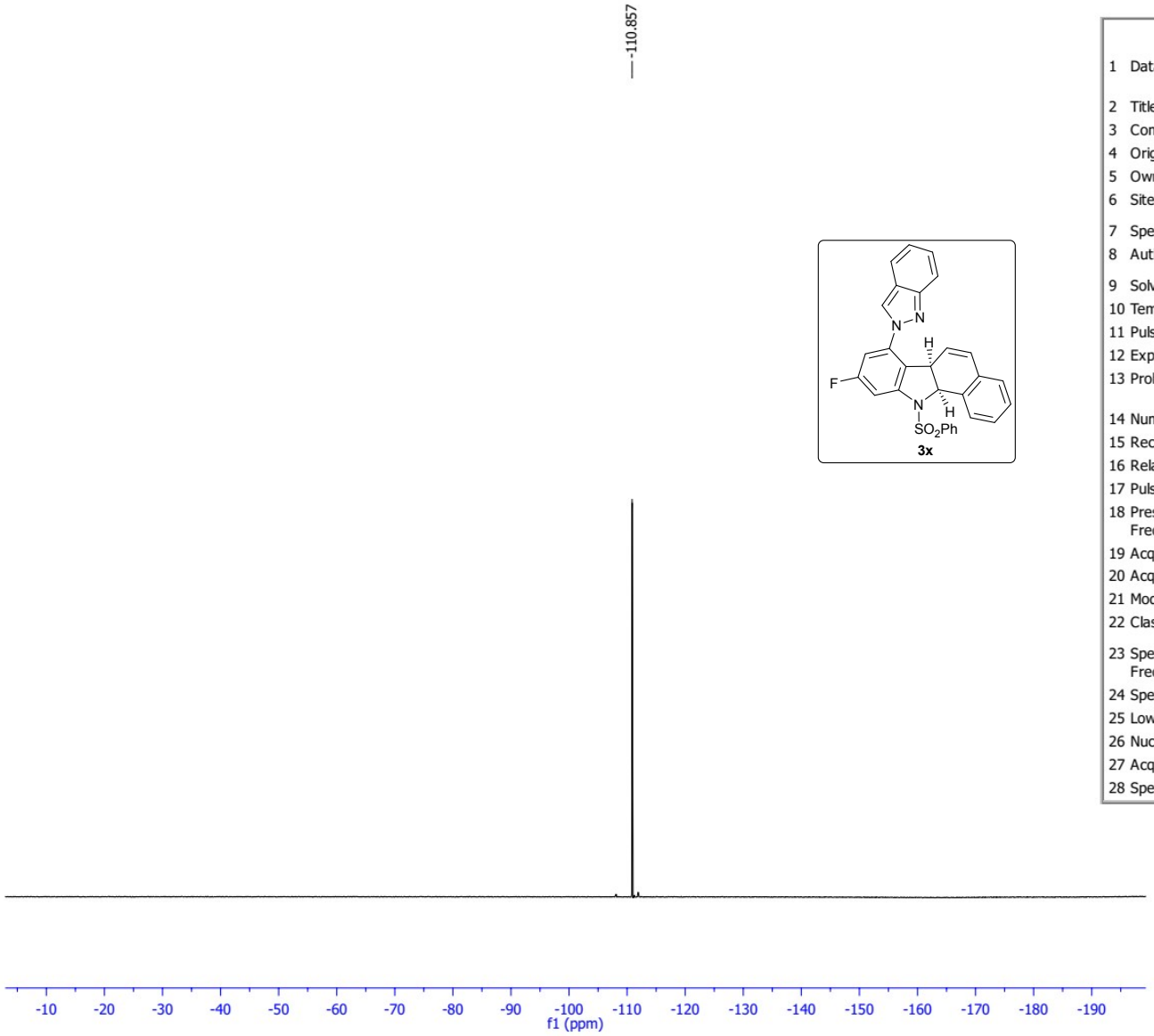
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-159-13C/ 10/ fid
2	Title	VK-159-13C.10.fid
3	Comment	VK-159-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.5
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-16T22:25:00
21	Modification Date	2019-01-16T22:25:24
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1944.8
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



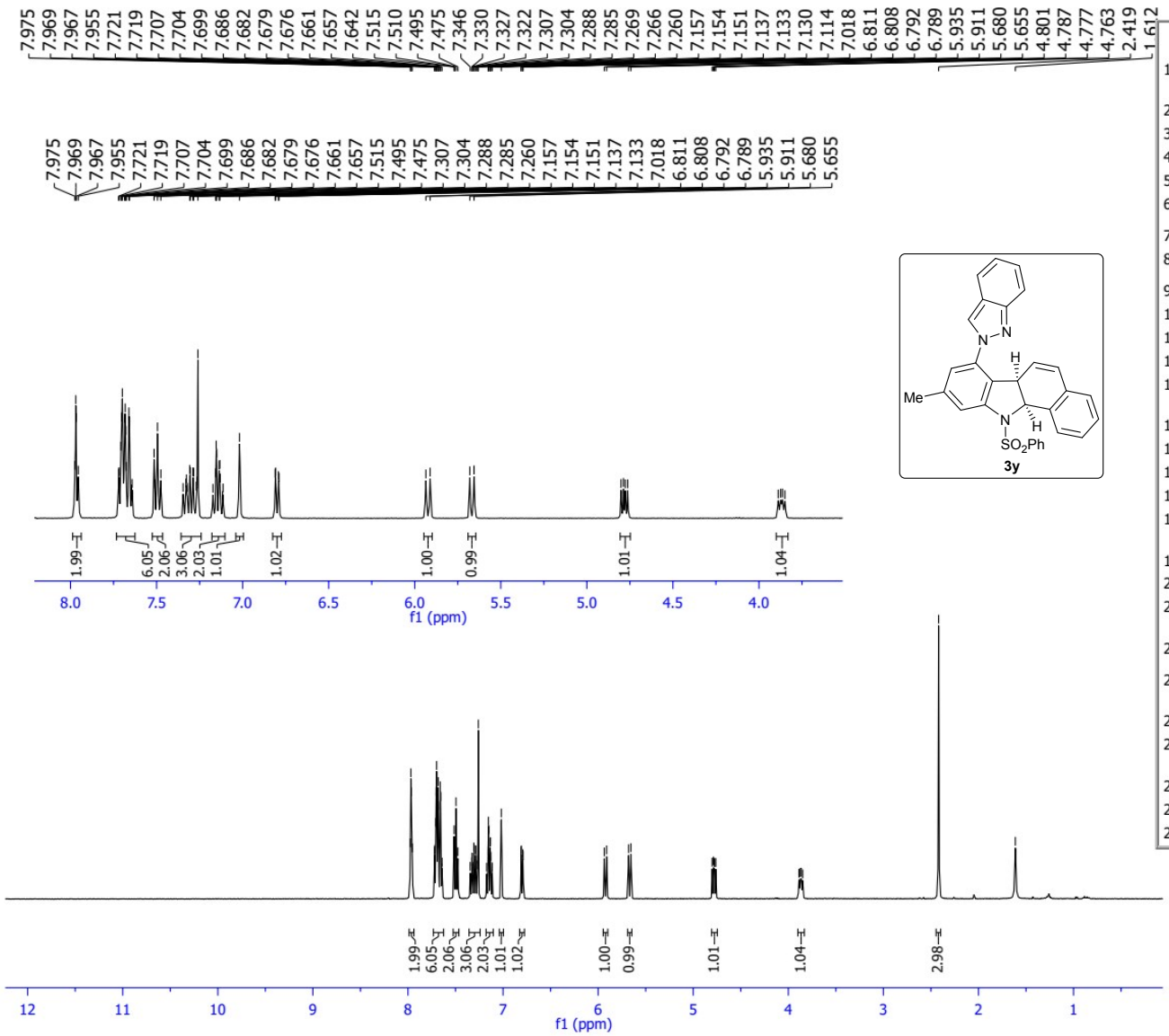
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-164-1H/ 10/ fid
2	Title	VK-164-1H.10.fid
3	Comment	VK-164-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.8
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-24T10:03:00
21	Modification Date	2019-01-24T10:03:15
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3576.1
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



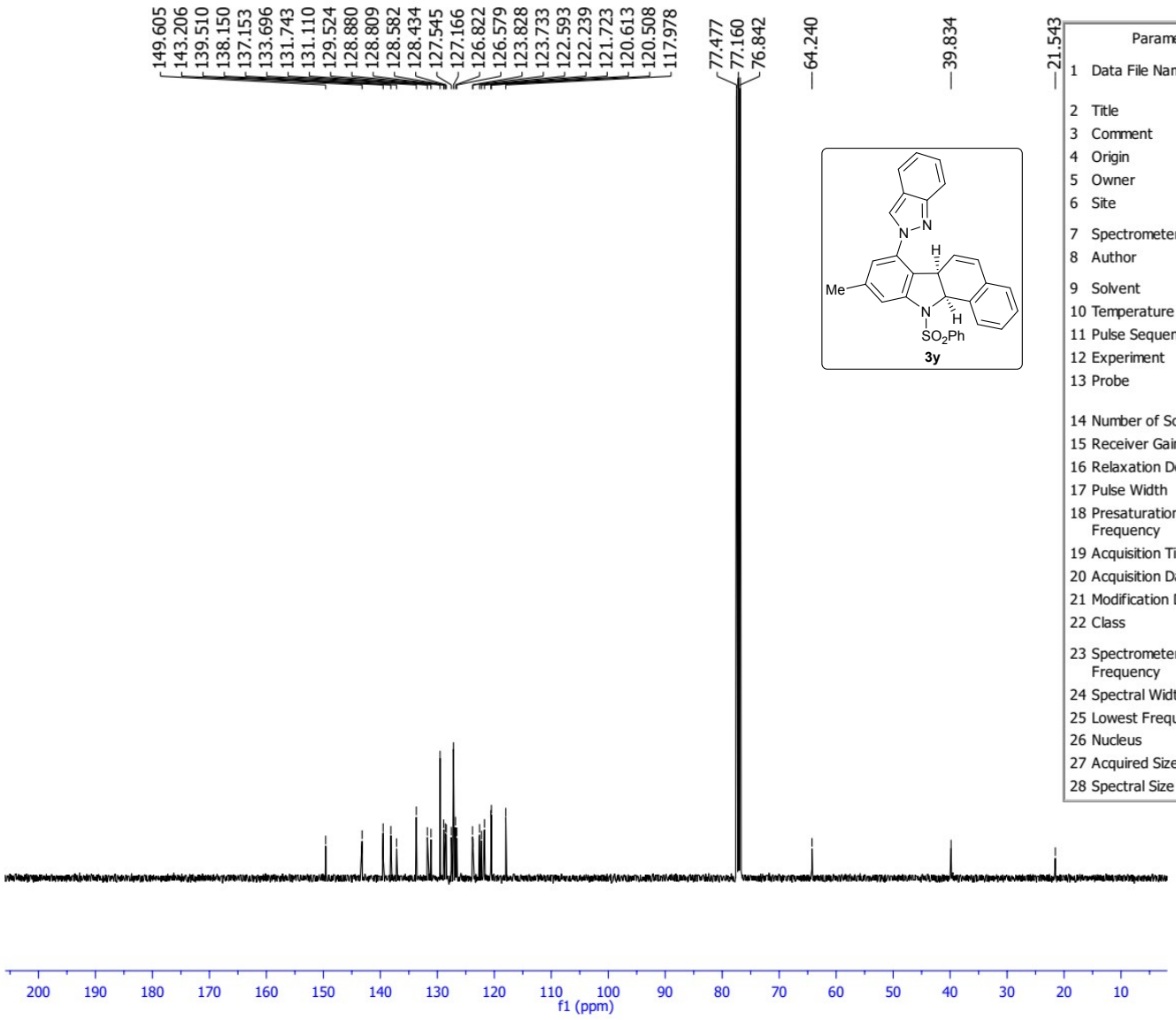
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-164-13C/ 10/ fid
2	Title	VK-164-13C.10.fid
3	Comment	VK-164-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-24T19:44:00
21	Modification Date	2019-01-24T19:44:25
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.7
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



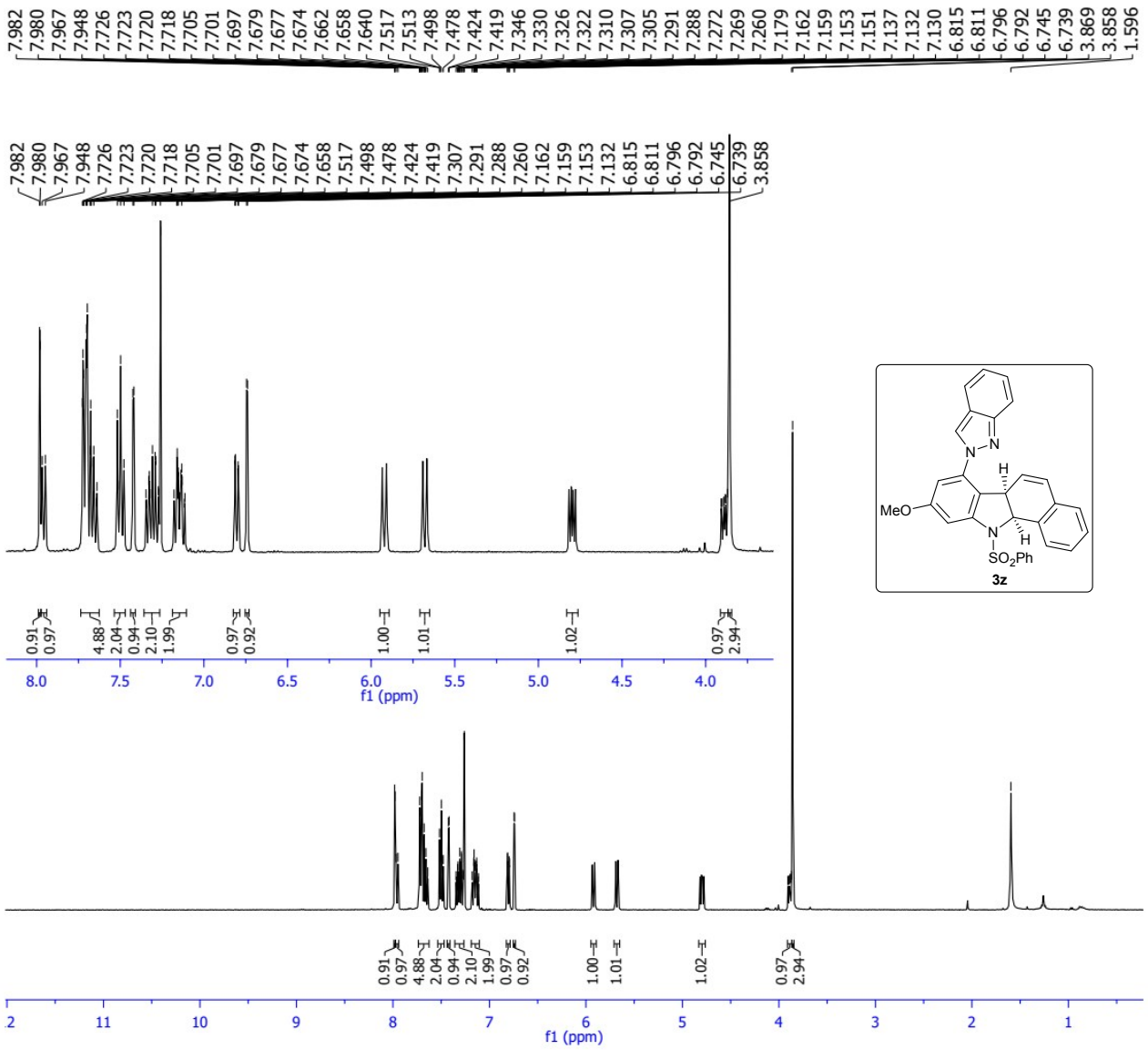
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-164-19F/ 10/ fid
2	Title	VK-164-19F.10.fid
3	Comment	VK-164-19F
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.0
11	Pulse Sequence	zgfhigqn.2
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	11.9000
18	Presaturation Frequency	
19	Acquisition Time	0.7340
20	Acquisition Date	2019-01-24T10:06:00
21	Modification Date	2019-01-24T10:06:04
22	Class	
23	Spectrometer Frequency	376.55
24	Spectral Width	89285.7
25	Lowest Frequency	-82302.1
26	Nucleus	19F
27	Acquired Size	65536
28	Spectral Size	131072



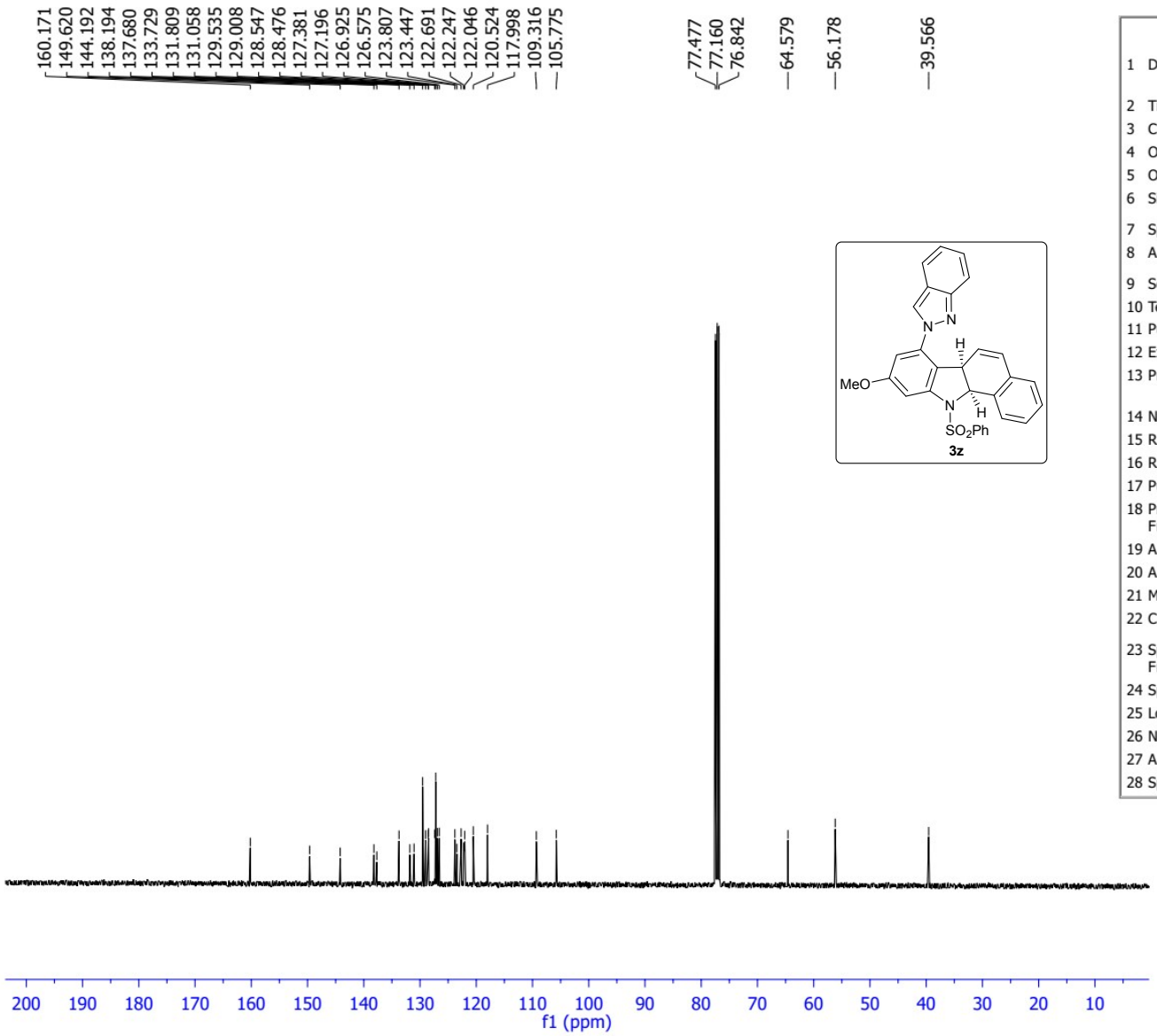
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-166-1H/ 10/ fid
2	Title	VK-166-1H.10.fid
3	Comment	VK-166-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-01-28T10:11:00
21	Modification Date	2019-01-28T10:11:44
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1544.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536



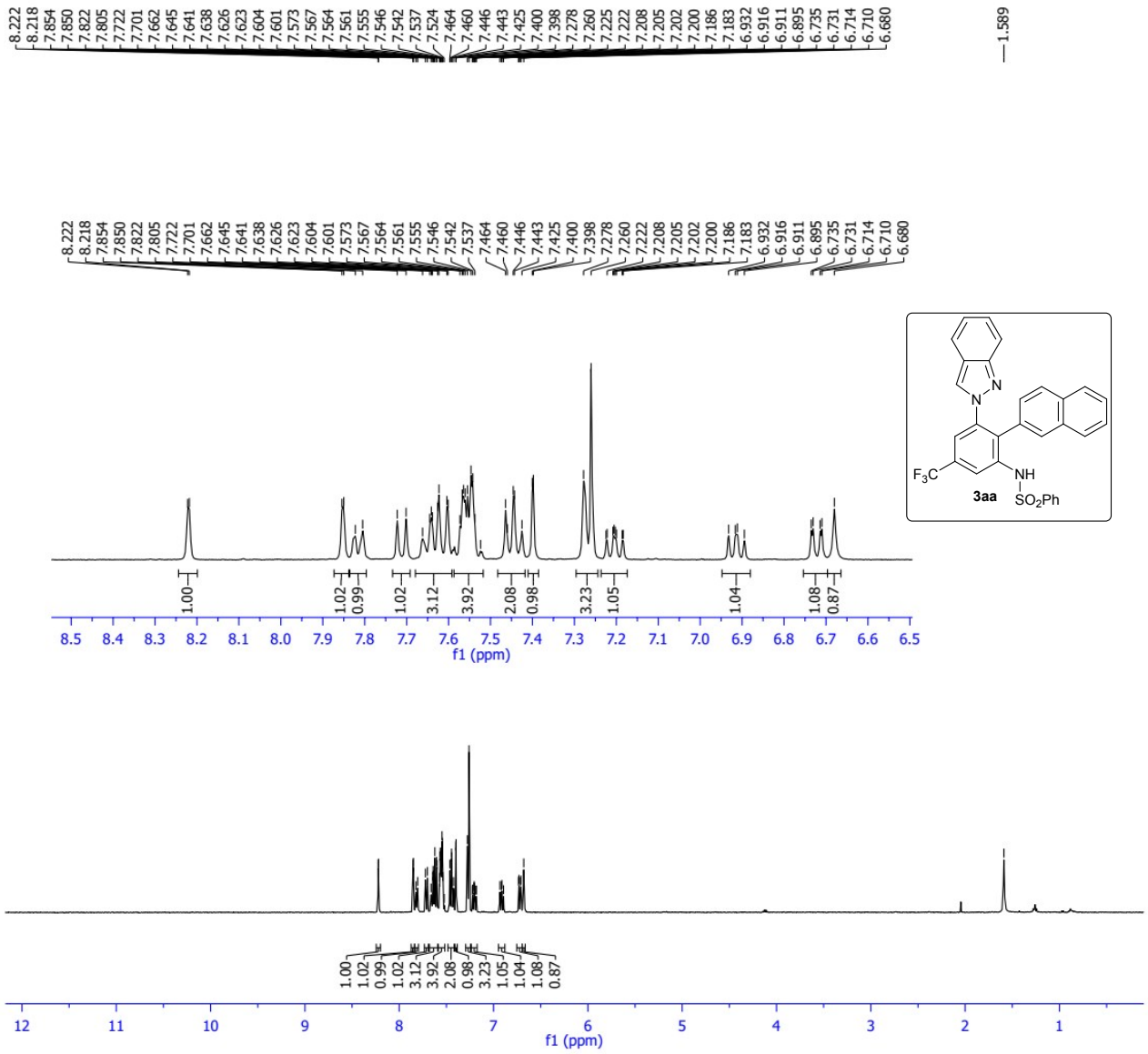
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-166-13C/ 10/ fid
2	Title	VK-166-13C.10.fid
3	Comment	VK-166-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.6
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-28T21:49:00
21	Modification Date	2019-01-28T21:49:28
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



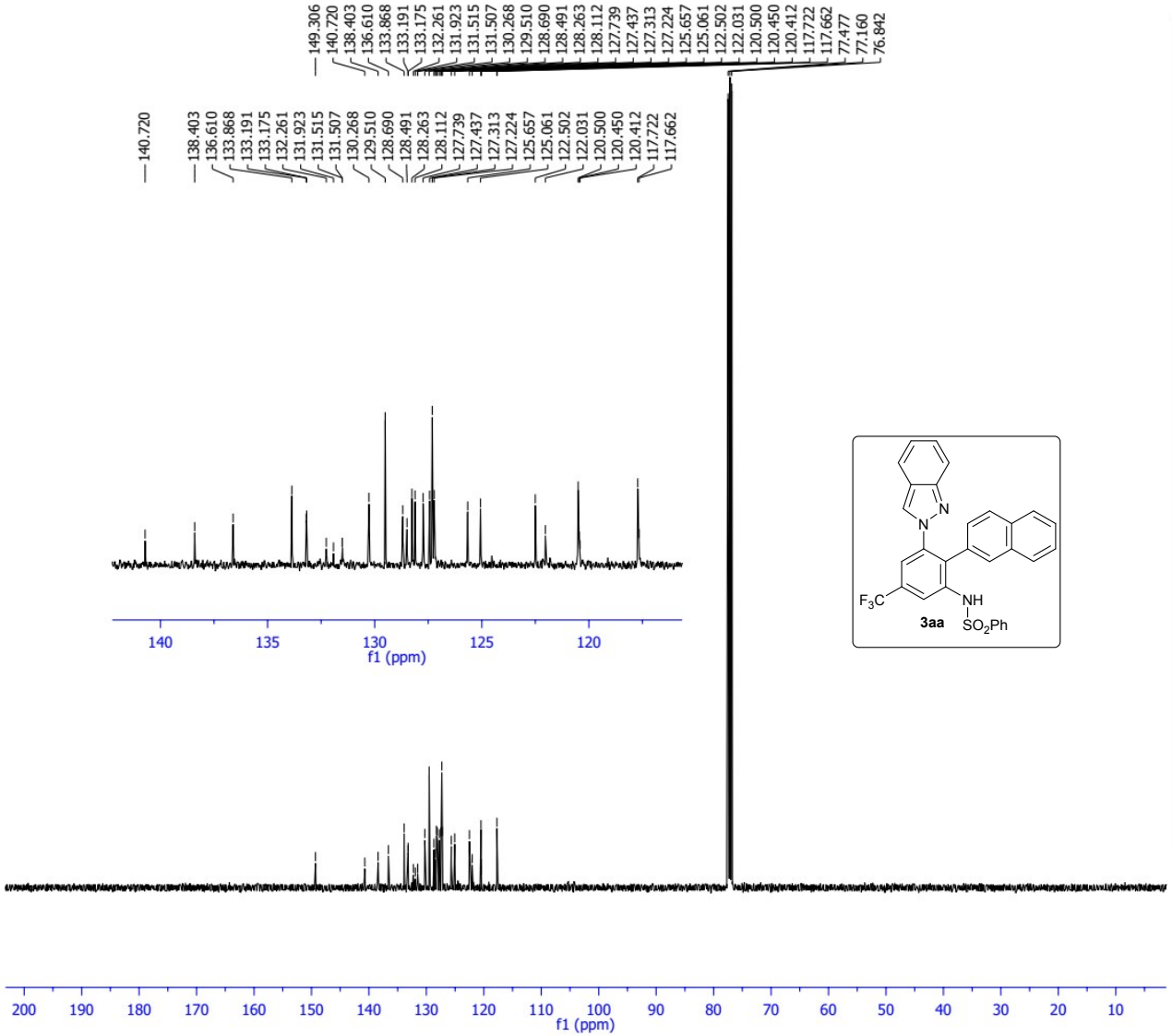
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-171-1H/ 10/ fid
2	Title	VK-171-1H. 10. fid
3	Comment	VK-171-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	299.2
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-02-04T10:22:00
21	Modification Date	2019-02-04T10:22:25
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.4
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



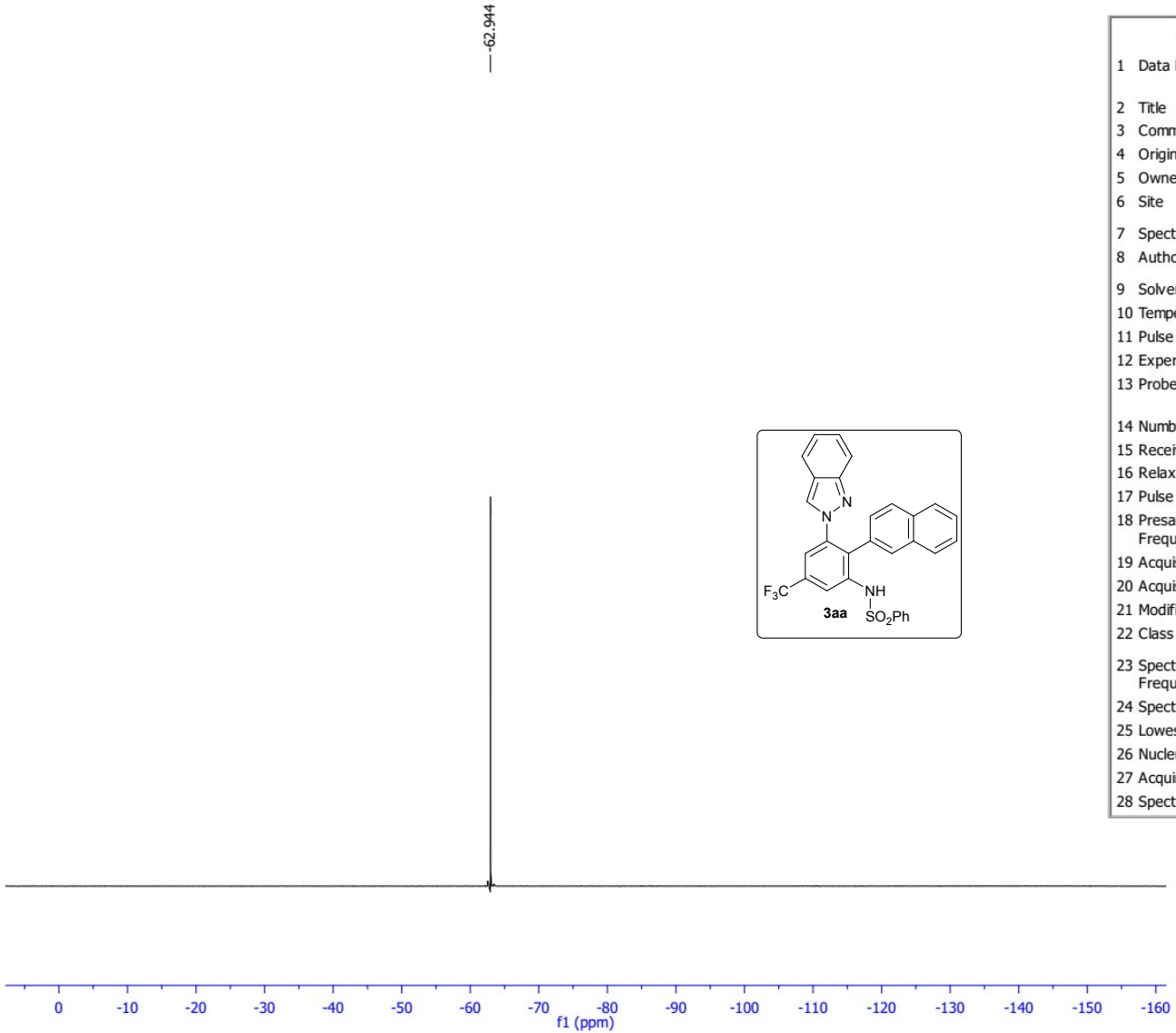
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-171R-13C/ 10/ fid
2	Title	VK-171R-13C.10.fid
3	Comment	VK-171R-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.7
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-03-12T03:29:00
21	Modification Date	2019-03-12T03:29:14
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



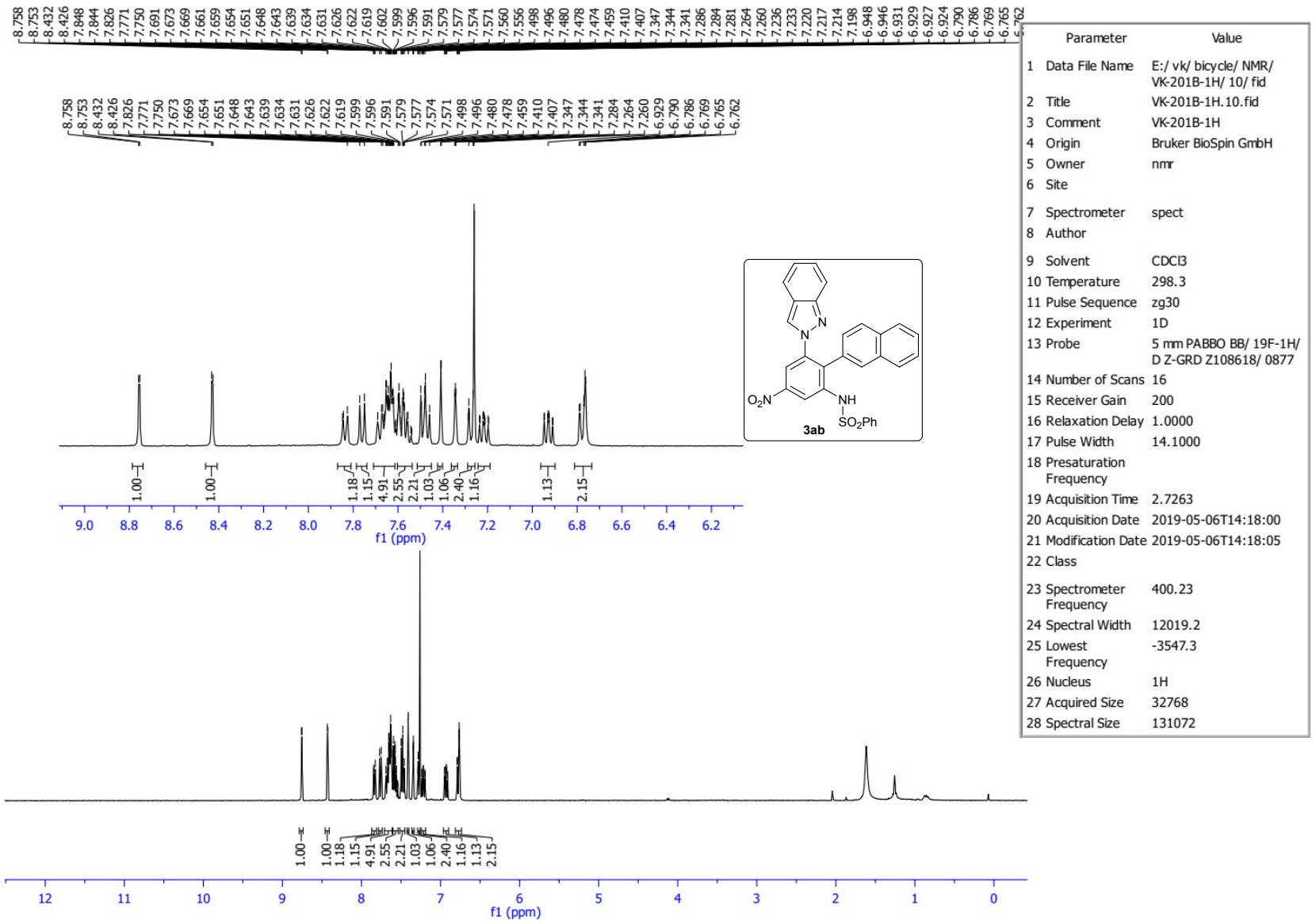
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-165-1H/ 10/ fid
2	Title	VK-165-1H.10.fid
3	Comment	VK-165-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-01-28T10:16:00
21	Modification Date	2019-01-28T10:16:32
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1544.0
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536



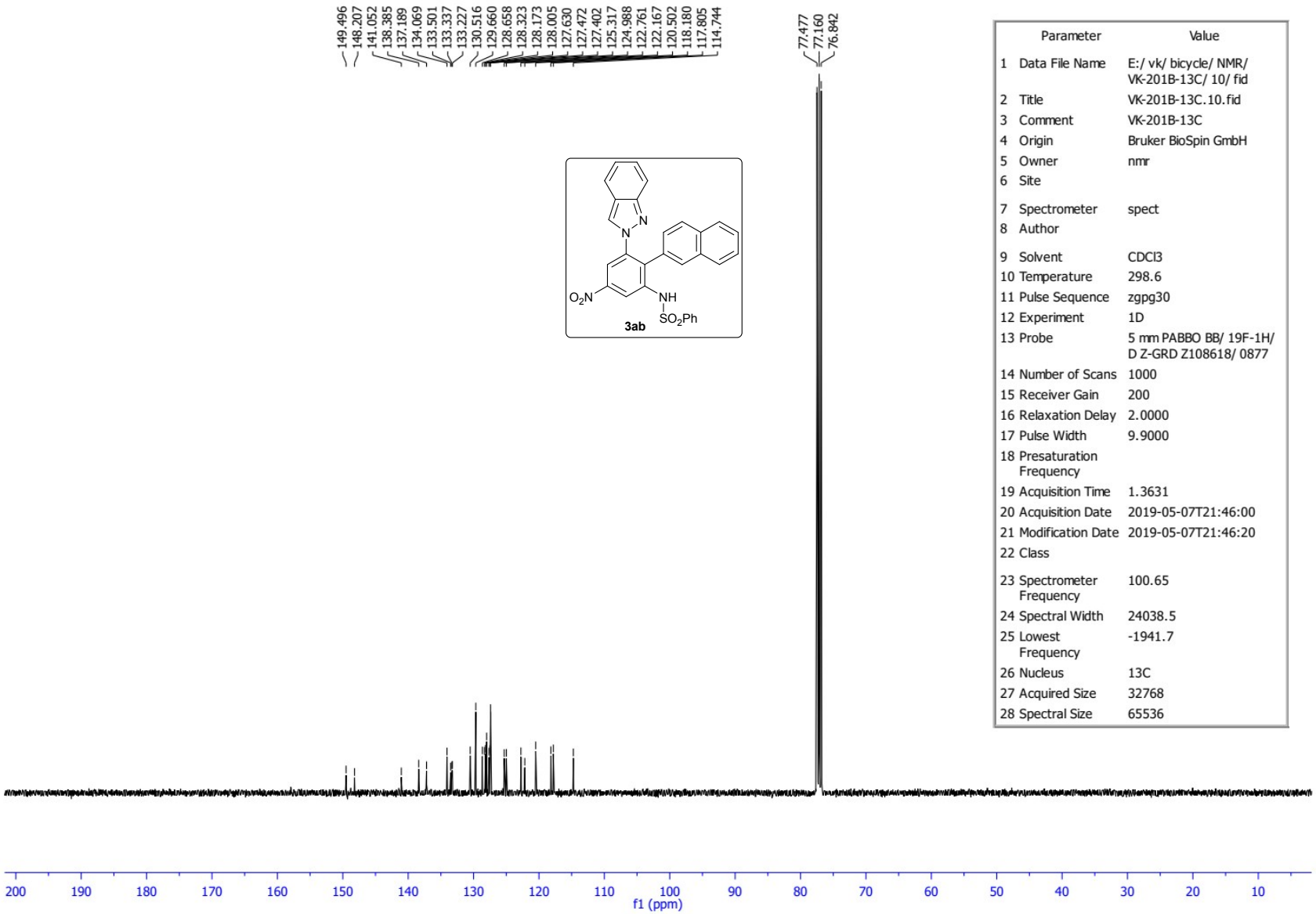
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ SB-VK-165-13C/ 10/ fid
2	Title	SB-VK-165-13C.10.fid
3	Comment	SB-VK-165-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-28T20:48:00
21	Modification Date	2019-01-28T20:48:25
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-165-19F/ 10/ fid
2	Title	VK-165-19F.10.fid
3	Comment	VK-165-19F
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.1
11	Pulse Sequence	zgfhigqn.2
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	11.9000
18	Presaturation Frequency	
19	Acquisition Time	0.7340
20	Acquisition Date	2019-01-28T10:20:00
21	Modification Date	2019-01-28T10:20:07
22	Class	
23	Spectrometer Frequency	376.55
24	Spectral Width	89285.7
25	Lowest Frequency	-82302.1
26	Nucleus	19F
27	Acquired Size	65536
28	Spectral Size	131072



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-201B-1H/ 10/ fid
2	Title	VK-201B-1H.10.fid
3	Comment	VK-201B-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	298.3
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-05-06T14:18:00
21	Modification Date	2019-05-06T14:18:05
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.3
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



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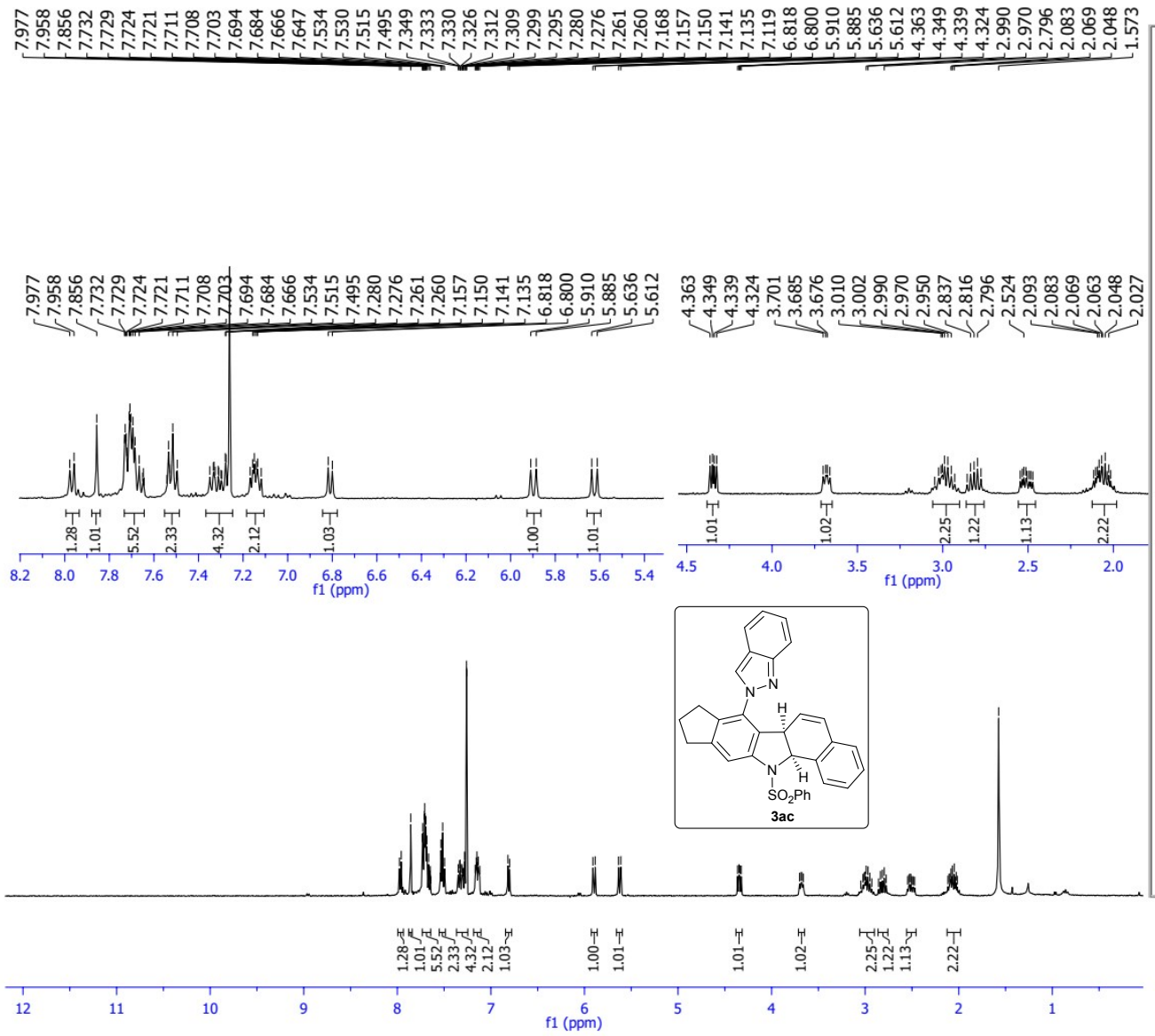
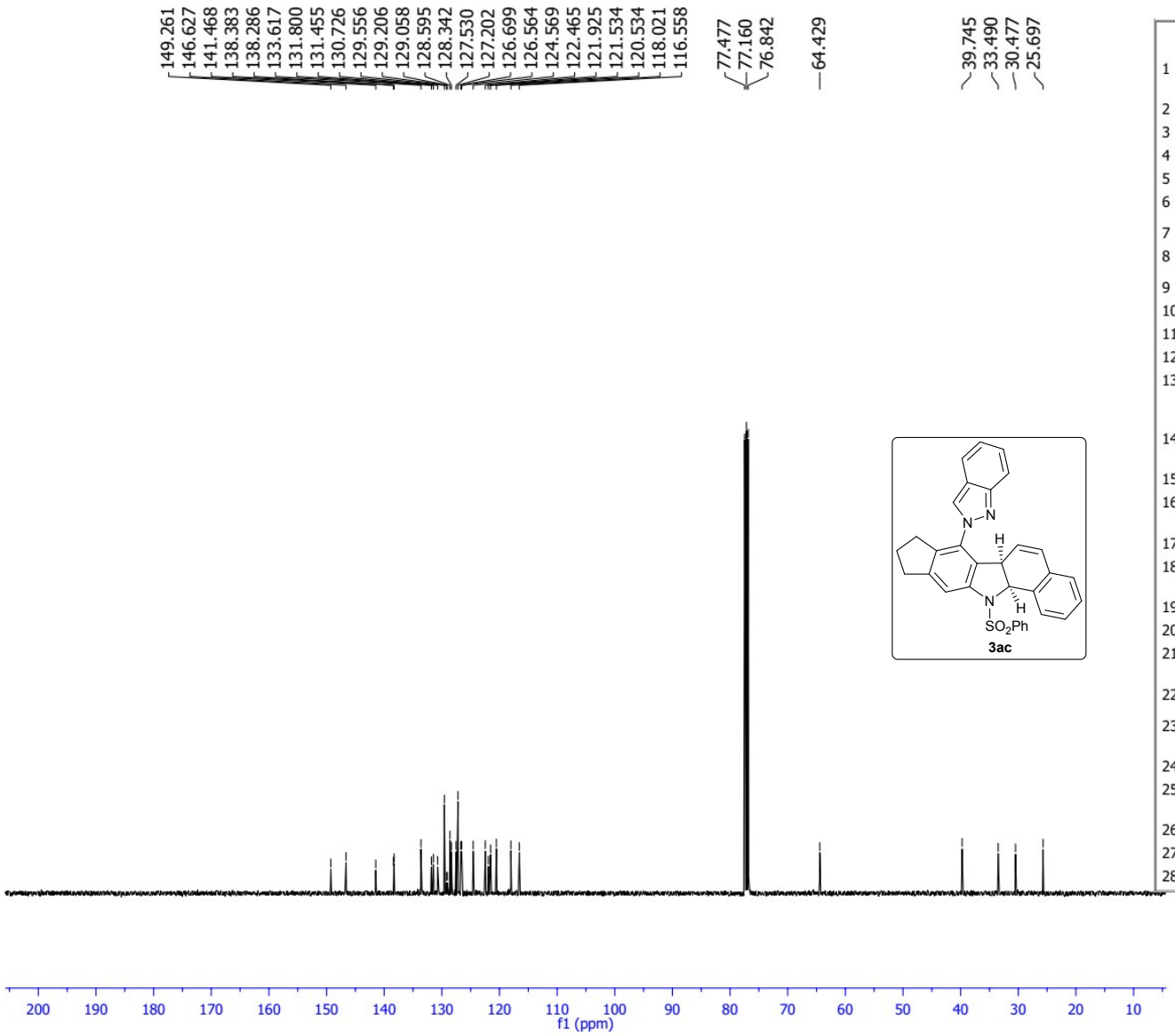
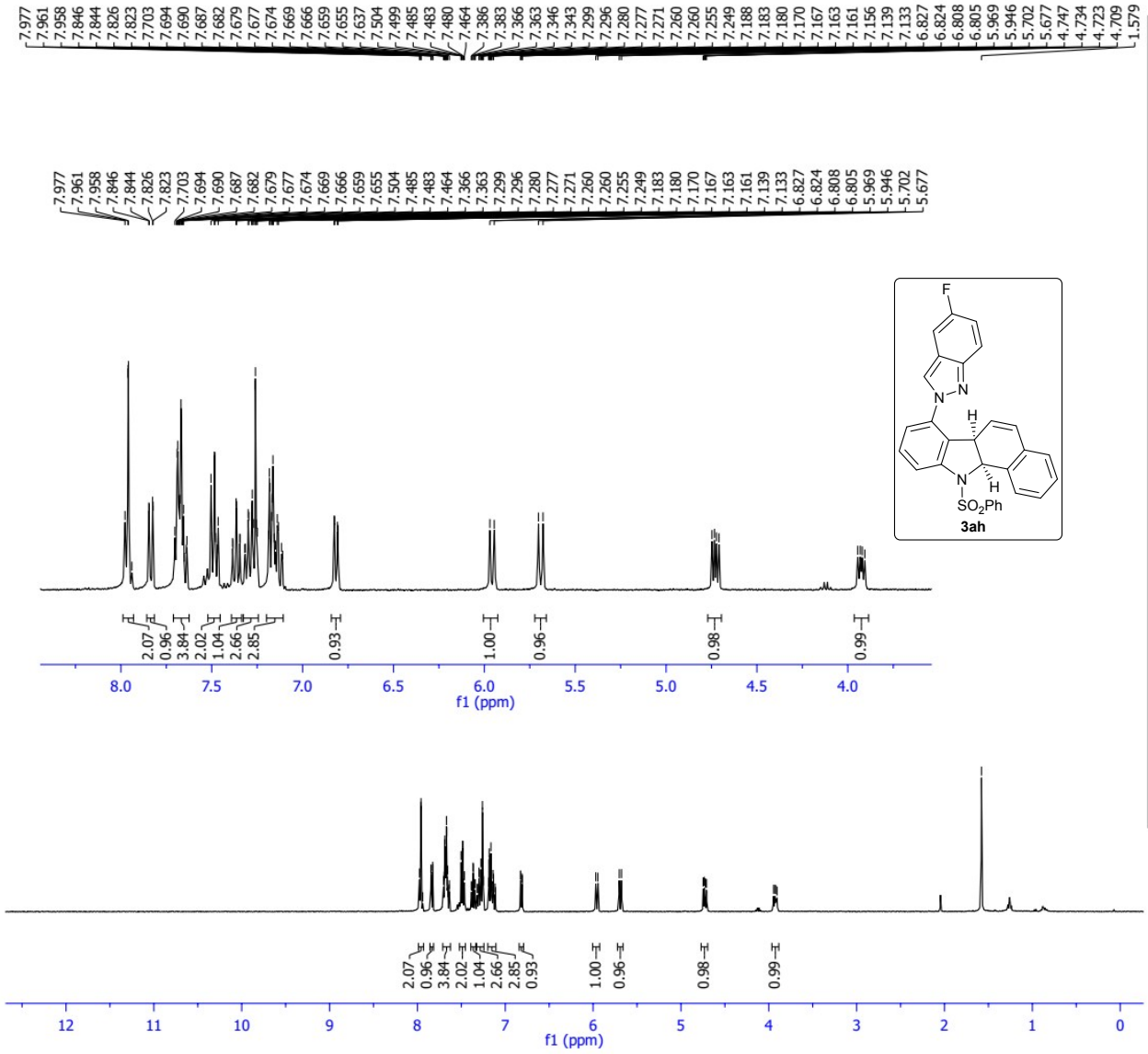
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-201B-13C/ 10/ fid
2	Title	VK-201B-13C.10.fid
3	Comment	VK-201B-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	298.6
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-05-07T21:46:00
21	Modification Date	2019-05-07T21:46:20
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1941.7
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



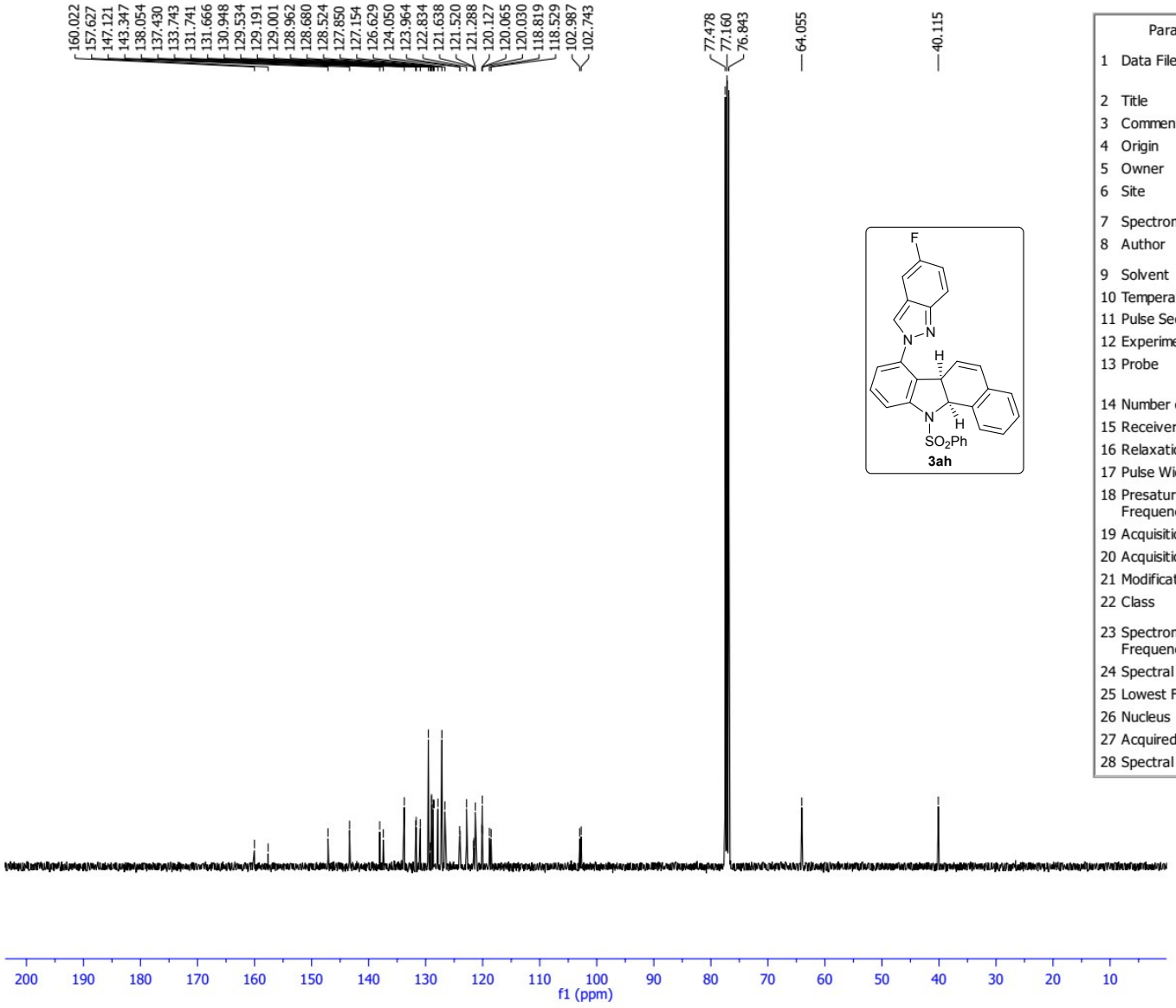
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-169-1H/ 10/ fid
2	Title	VK-169-1H.10.fid
3	Comment	VK-169-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	299.4
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-02-04T10:12:00
21	Modification Date	2019-02-04T10:12:48
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3546.8
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



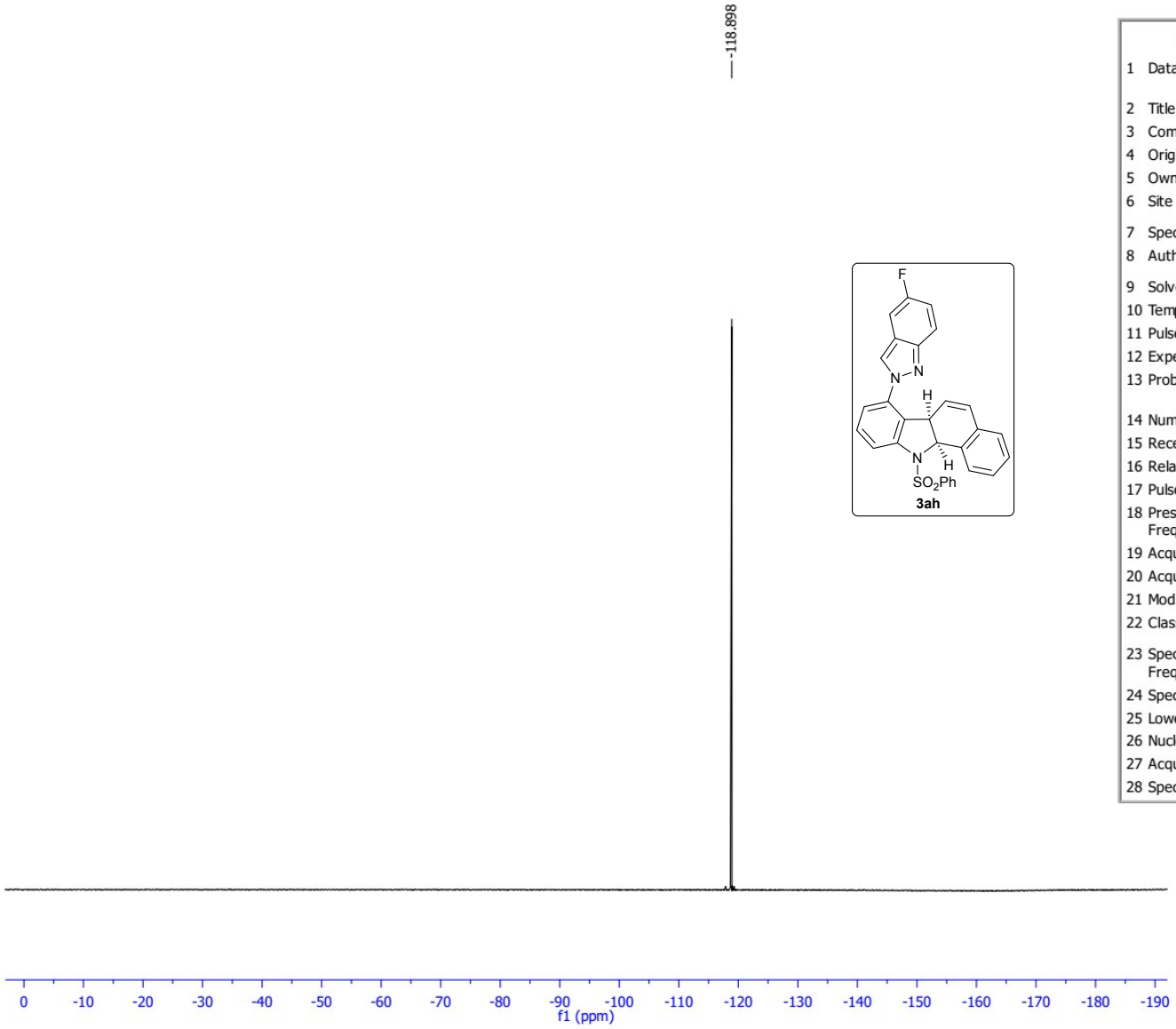
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-169-13C/ 10/ fid
2	Title	VK-169-13C.10.fid
3	Comment	VK-169-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	301.0
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-02-04T20:06:00
21	Modification Date	2019-02-04T20:06:59
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1941.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



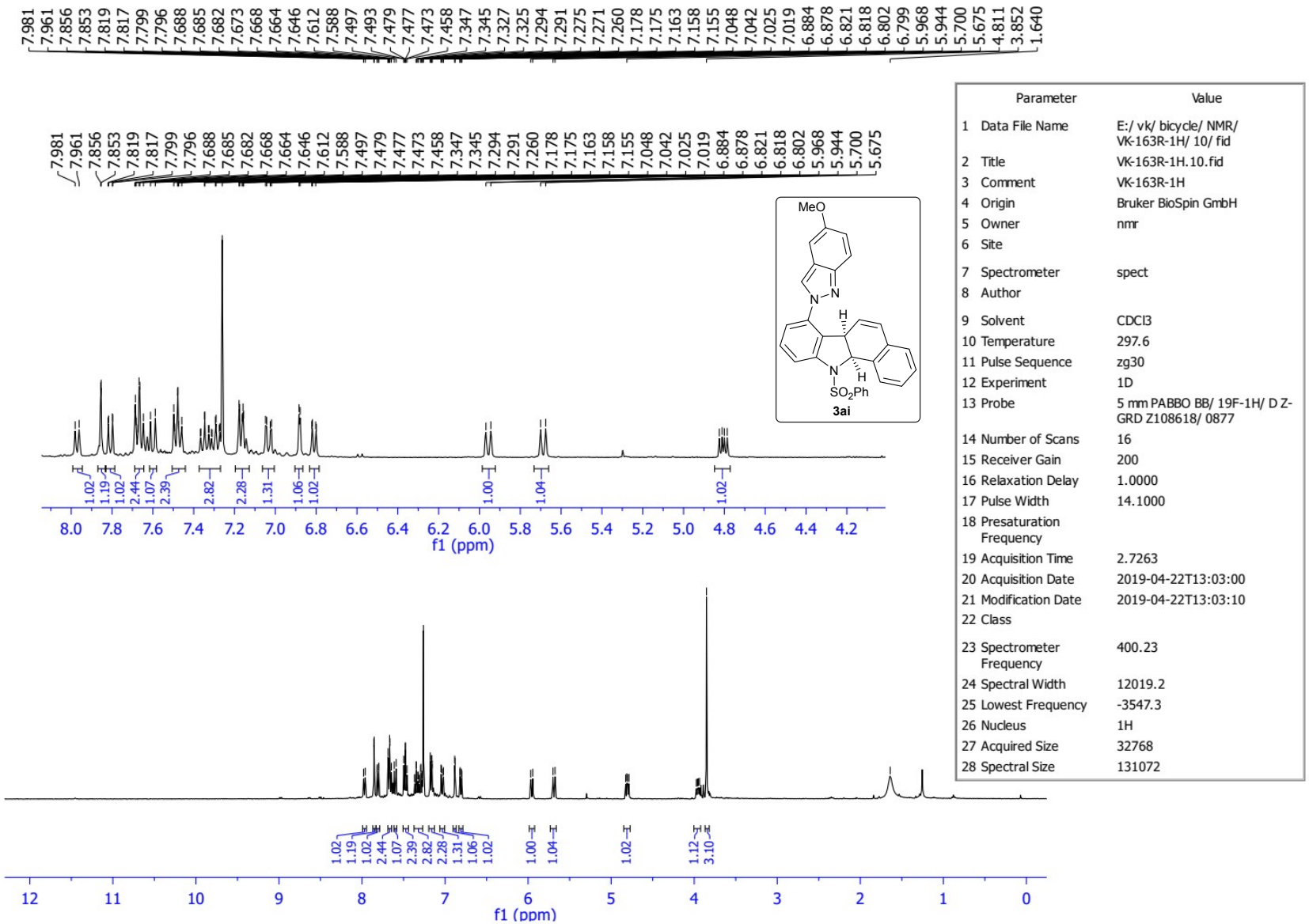
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-162-1H/ 10/ fid
2	Title	VK-162-1H. 10. fid
3	Comment	VK-162-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-01-22T10:28:00
21	Modification Date	2019-01-22T10:28:09
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3575.8
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



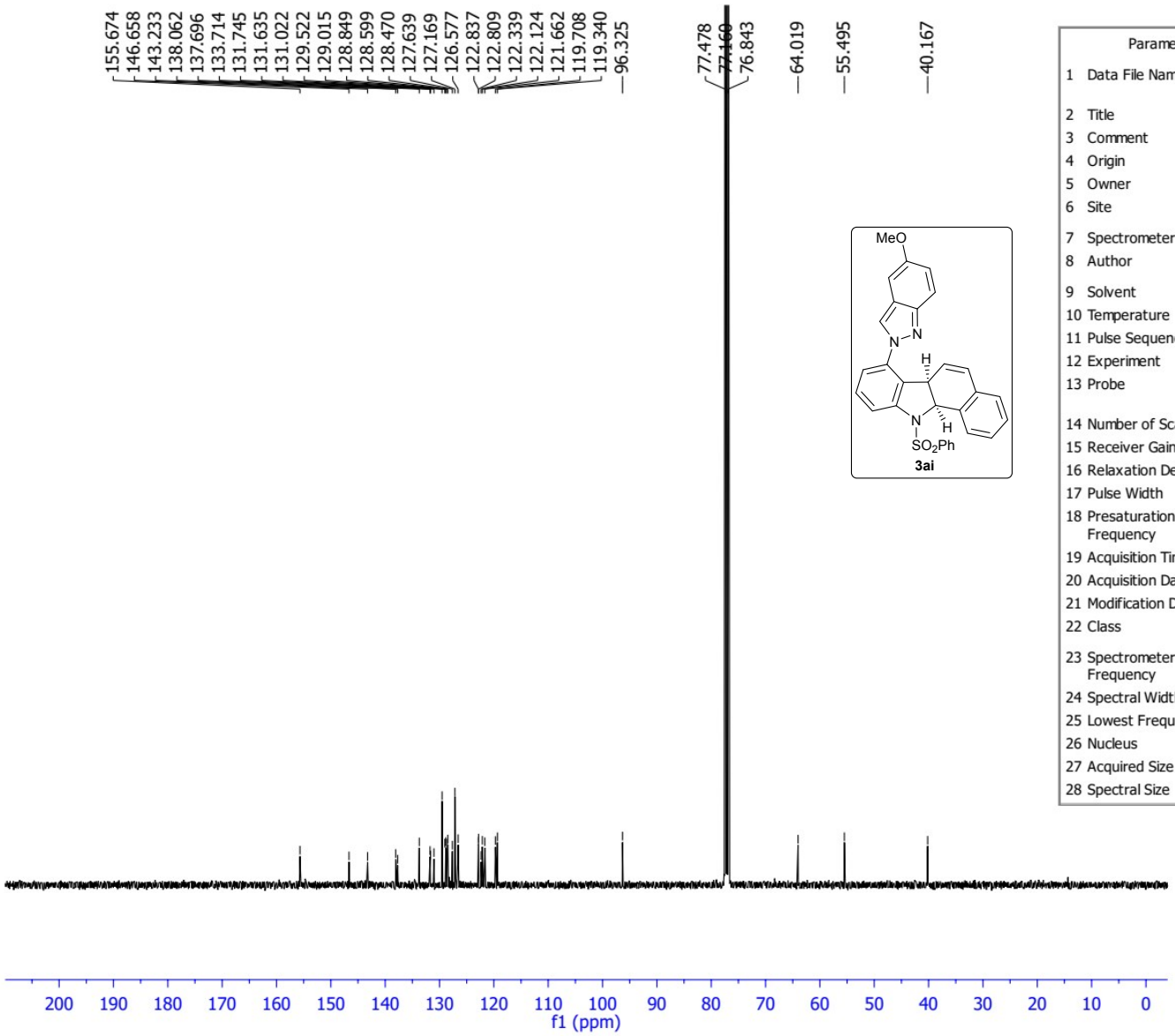
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ SB-VK-162-13C/ 10/ fid
2	Title	SB-VK-162-13C.10.fid
3	Comment	SB-VK-162-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.1
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-01-24T21:46:00
21	Modification Date	2019-01-24T21:46:56
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.7
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



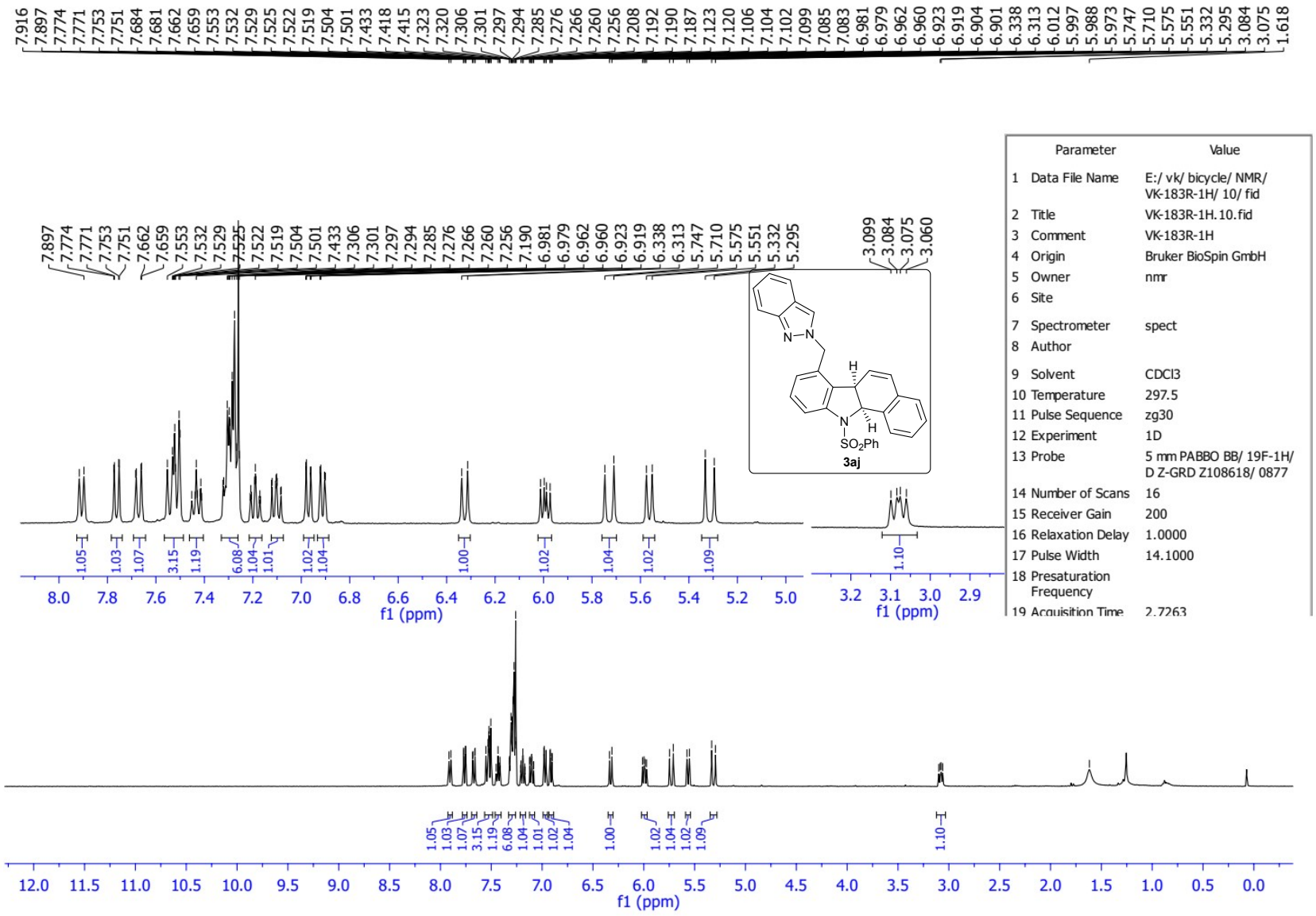
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-162-19F/ 10/ fid
2	Title	VK-162-19F.10.fid
3	Comment	VK-162-19F
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.1
11	Pulse Sequence	zgfhigqn.2
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	11.9000
18	Presaturation Frequency	
19	Acquisition Time	0.7340
20	Acquisition Date	2019-01-22T10:30:00
21	Modification Date	2019-01-22T10:30:56
22	Class	
23	Spectrometer Frequency	376.55
24	Spectral Width	89285.7
25	Lowest Frequency	-82302.1
26	Nucleus	19F
27	Acquired Size	65536
28	Spectral Size	131072

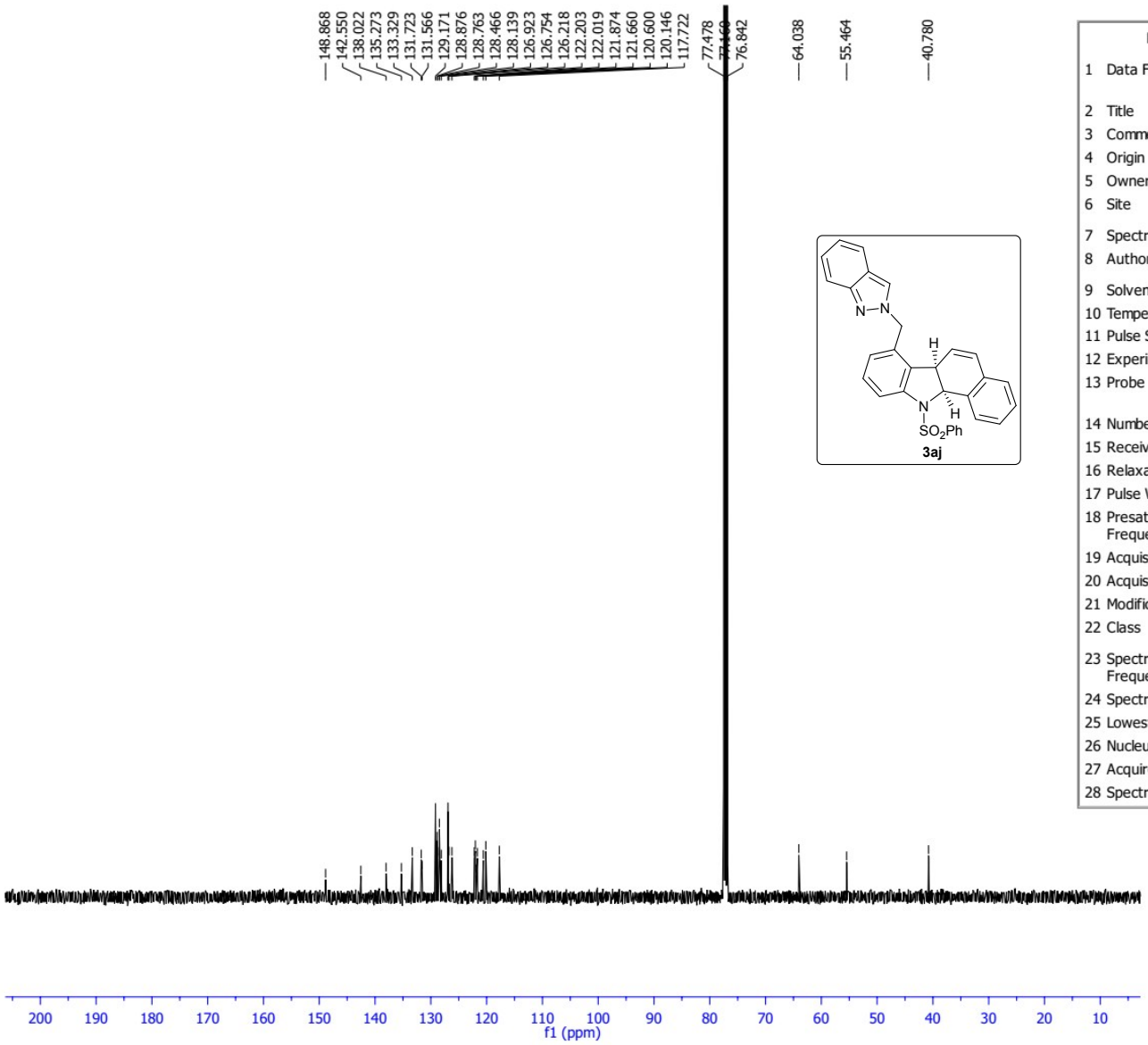


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-163R-1H/ 10/ fid
2	Title	VK-163R-1H.10.fid
3	Comment	VK-163R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-04-22T13:03:00
21	Modification Date	2019-04-22T13:03:10
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.3
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072

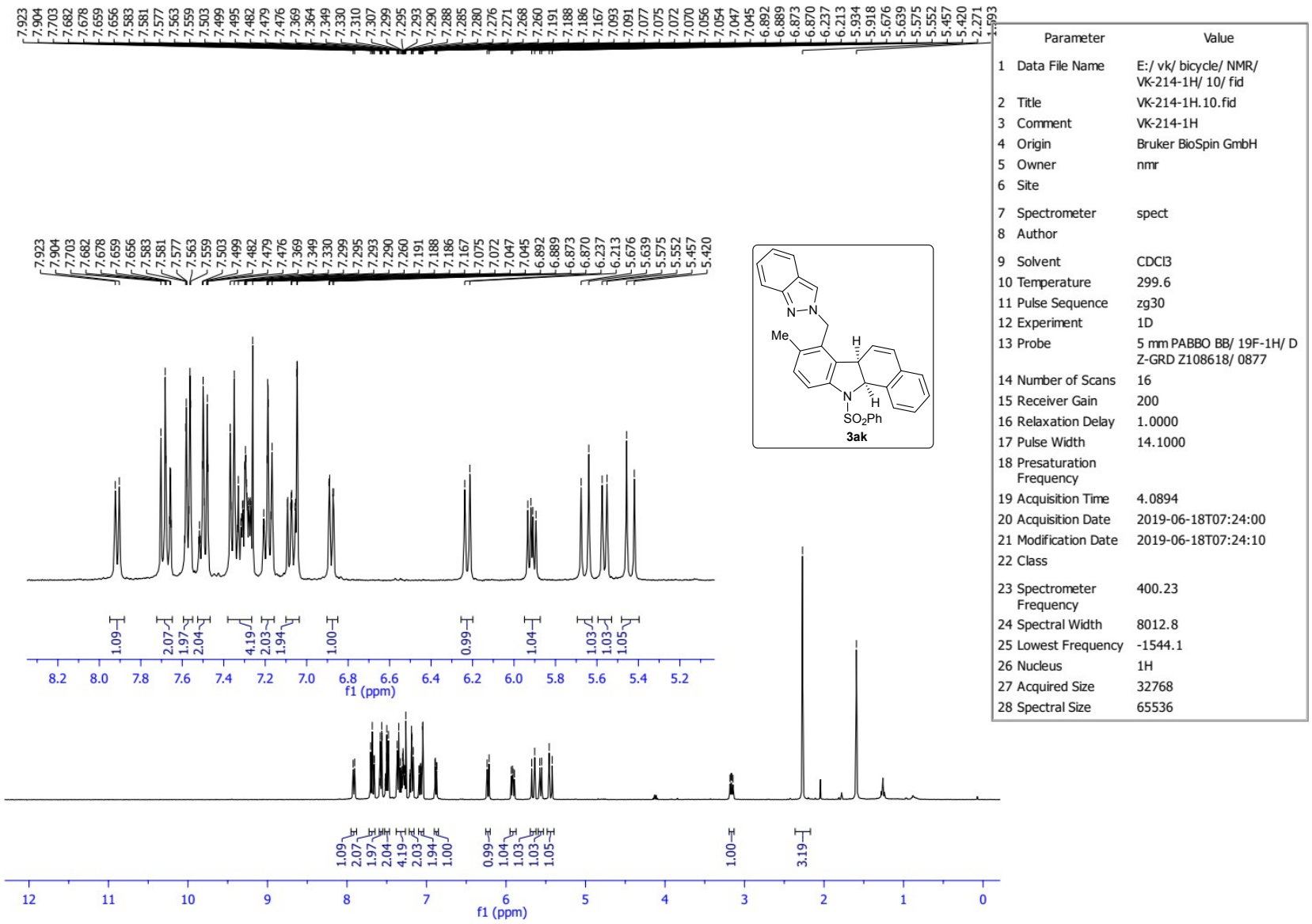


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-163-13C/ 10/ fid
2	Title	VK-163-13C.10.fid
3	Comment	VK-163-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.5
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	2000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-02-23T04:58:00
21	Modification Date	2019-02-23T04:58:10
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.4
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536

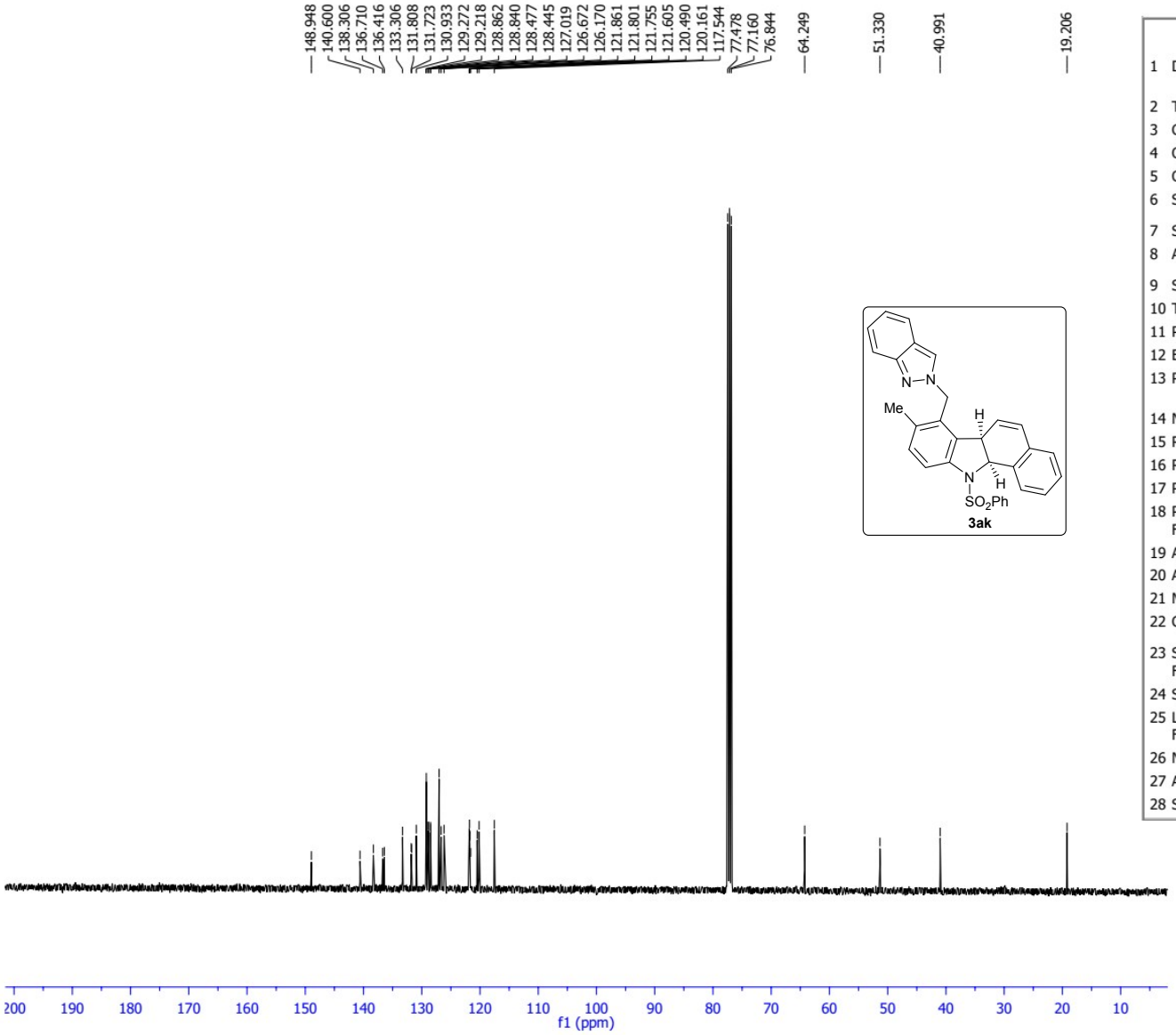

7.916 7.897 7.774 7.771 7.753 7.751 7.684 7.681 7.662 7.659 7.553 7.532 7.529 7.525 7.522 7.519 7.504 7.501 7.433 7.418 7.415 7.323 7.320 7.306 7.301 7.297 7.294 7.285 7.276 7.266 7.260 7.256 7.208 7.192 7.190 7.187 7.123 7.120 7.106 7.104 7.102 7.099 7.085 7.083 6.981 6.979 6.962 6.960 6.923 6.919 6.904 6.901 6.338 6.313 6.012 5.997 5.988 5.973 5.747 5.710 5.575 5.551 5.332 5.295 3.084 3.075 1.618
3.099 3.084 3.075 3.060
3aj
Parameter Value
1 Data File Name E:/ vk/ bicycle/ NMR/ VK-183R-1H/ 10/ fid
2 Title VK-183R-1H.10.fid
3 Comment VK-183R-1H
4 Origin Bruker BioSpin GmbH
5 Owner nmr
6 Site
7 Spectrometer spect
8 Author
9 Solvent CDCl3
10 Temperature 297.5
11 Pulse Sequence zg30
12 Experiment 1D
13 Probe 5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14 Number of Scans 16
15 Receiver Gain 200
16 Relaxation Delay 1.0000
17 Pulse Width 14.1000
18 Presaturation Frequency
19 Acquisition Time 2.7263
f1 (ppm)



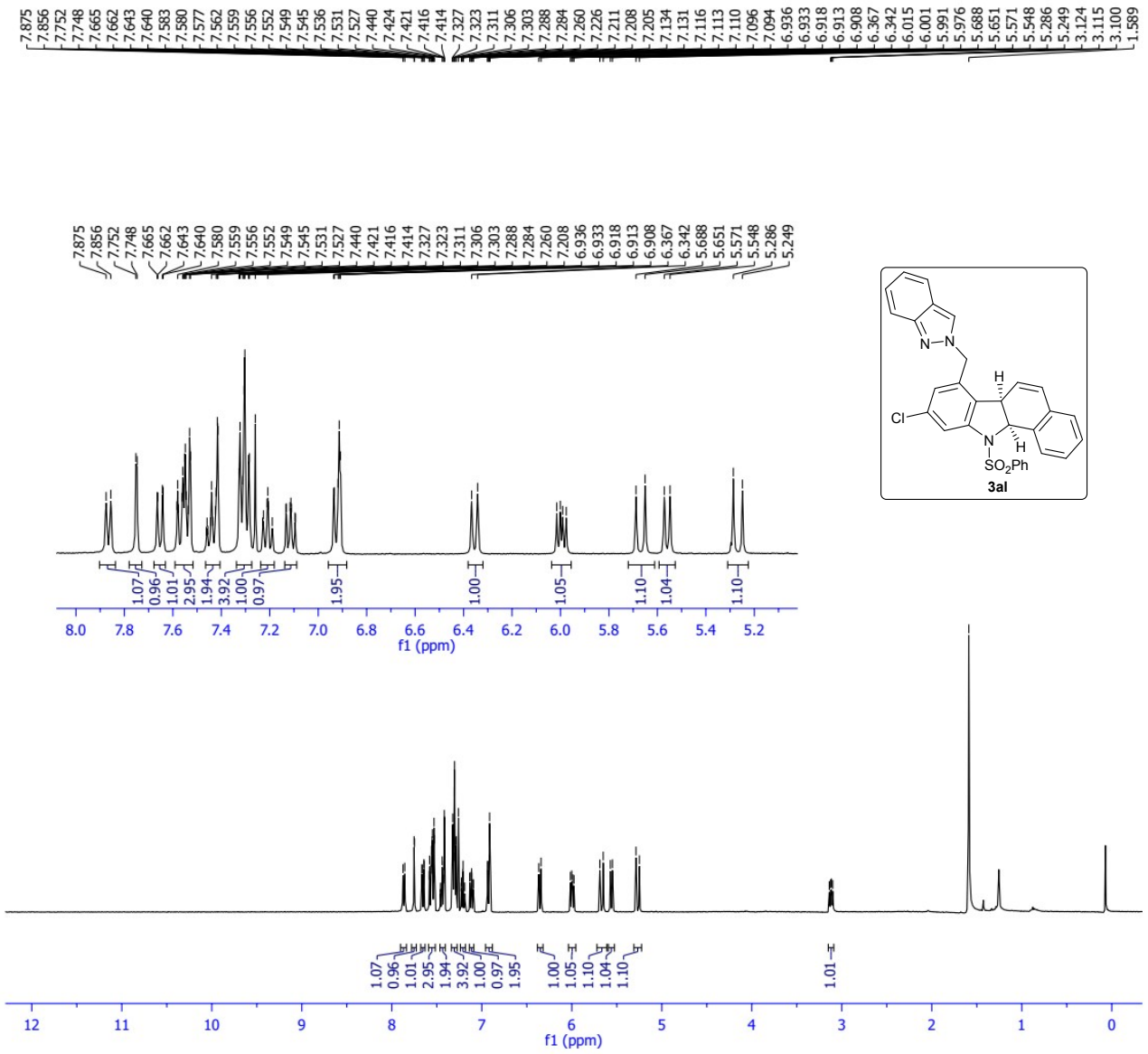
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-183-13C/ 10/ fid
2	Title	VK-183-13C.10.fid
3	Comment	VK-183-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.8
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1024
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-02-22T01:59:00
21	Modification Date	2019-02-22T01:59:08
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-214-1H/ 10/ fid
2	Title	VK-214-1H.10.fid
3	Comment	VK-214-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	299.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-06-18T07:24:00
21	Modification Date	2019-06-18T07:24:10
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1544.1
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536

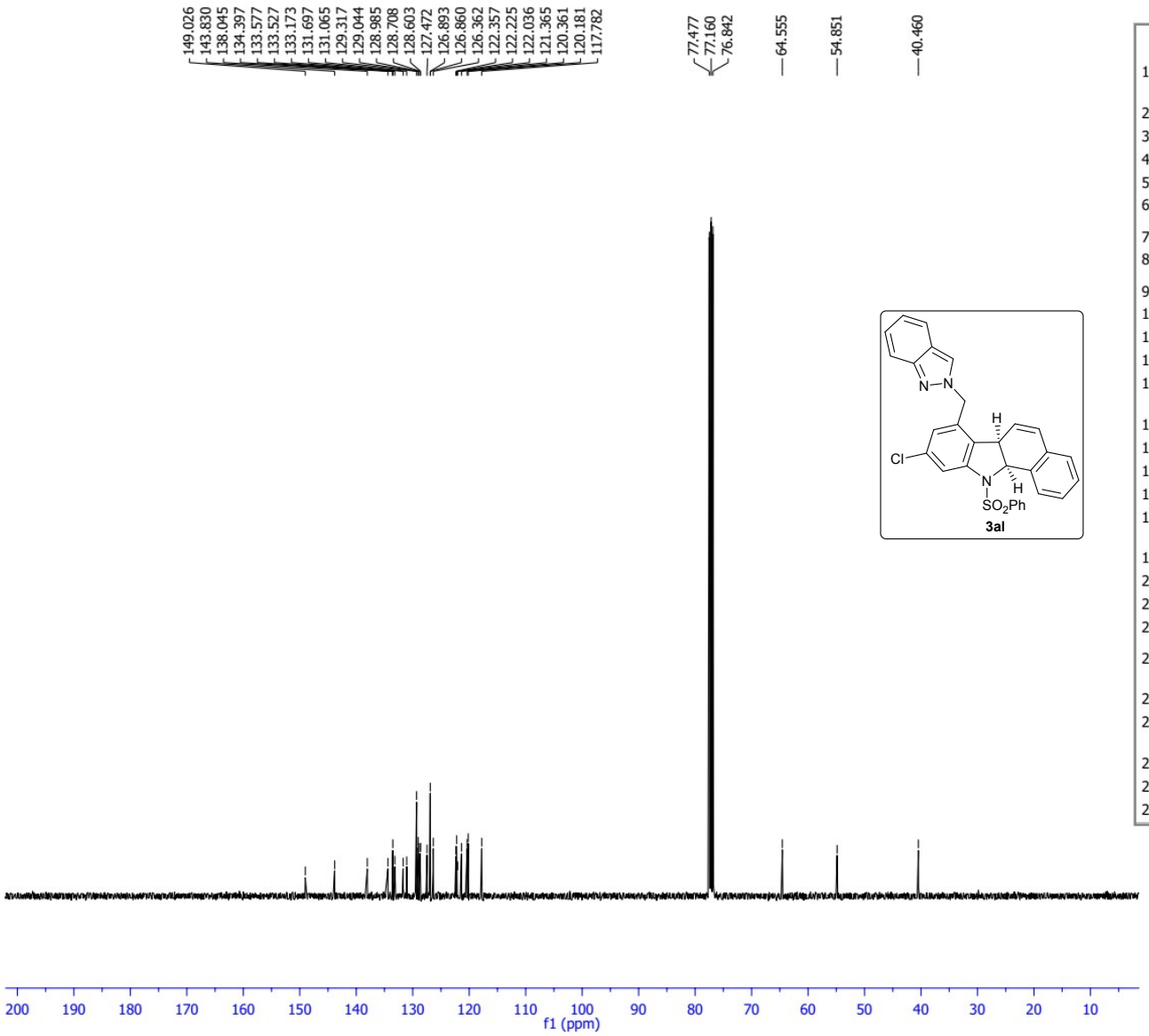


	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-214-13C/ 10/ fid
2	Title	VK-214-13C.10.fid
3	Comment	VK-214-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	300.9
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-06-18T08:22:00
21	Modification Date	2019-06-18T08:22:40
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1941.2
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536

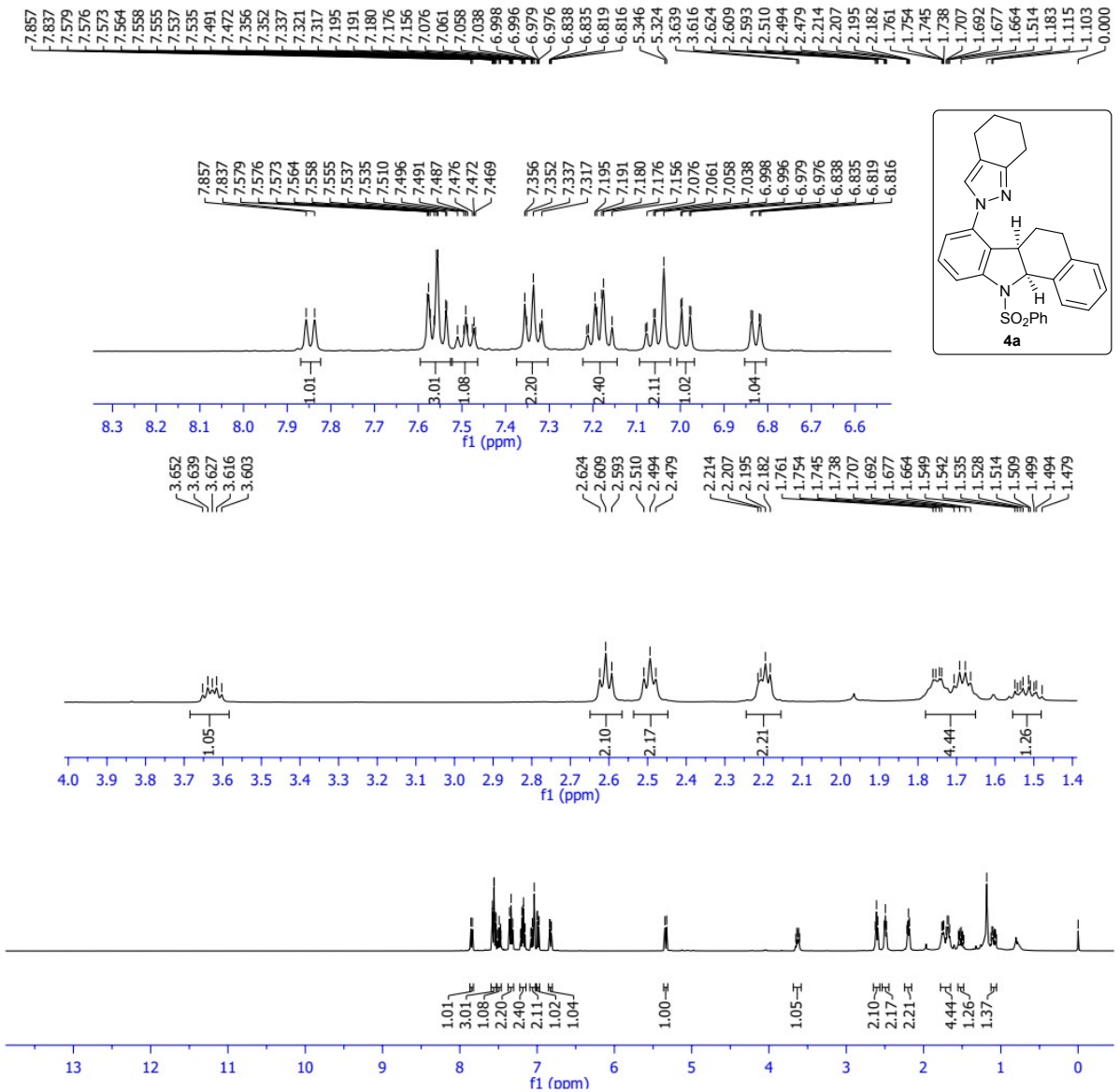


3al

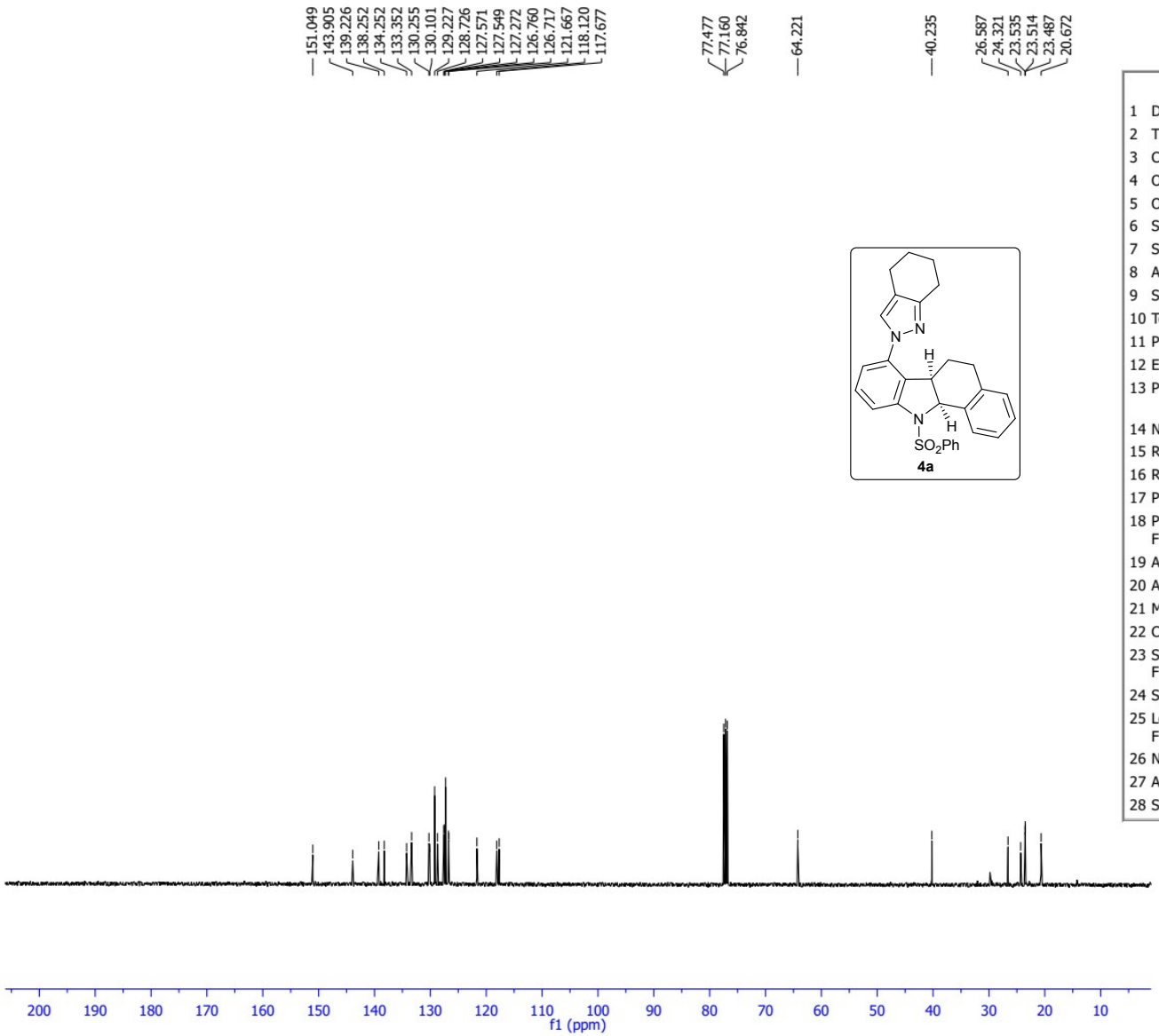
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-217R-1H/ 10/ fid
2	Title	VK-217R-1H.10.fid
3	Comment	VK-217R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	299.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.3243
20	Acquisition Date	2019-06-21T09:43:00
21	Modification Date	2019-06-21T09:43:57
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	14097.7
25	Lowest Frequency	-4586.8
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



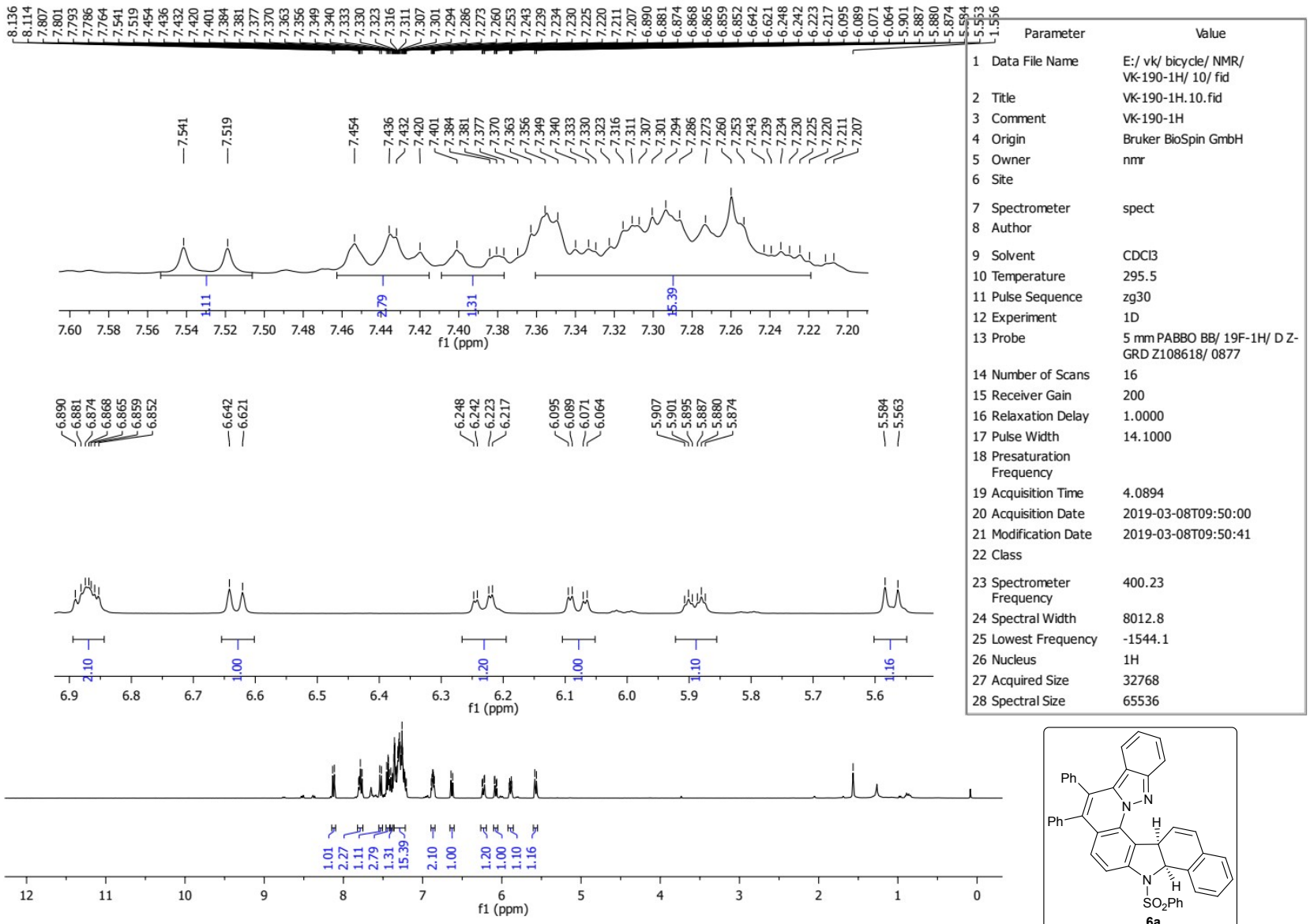
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-217-13C/ 10/ fid
2	Title	VK-217-13C.10.fid
3	Comment	VK-217-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	301.3
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-06-21T15:18:00
21	Modification Date	2019-06-21T15:18:03
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1941.0
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



	Parameter	Value
1	Data File Name	/ / 172.16.33.138/ nmr/ NMR/ NMR/ MAY19/ TP/ 17.05.19/ data/ nmr/ nmr/ VK-205R-1H/ 10/ fid
2	Title	VK-205R-1H.10.fid
3	Comment	VK-205R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	298.3
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-05-17T09:48:00
21	Modification Date	2019-05-17T09:48:28
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3579.3
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072

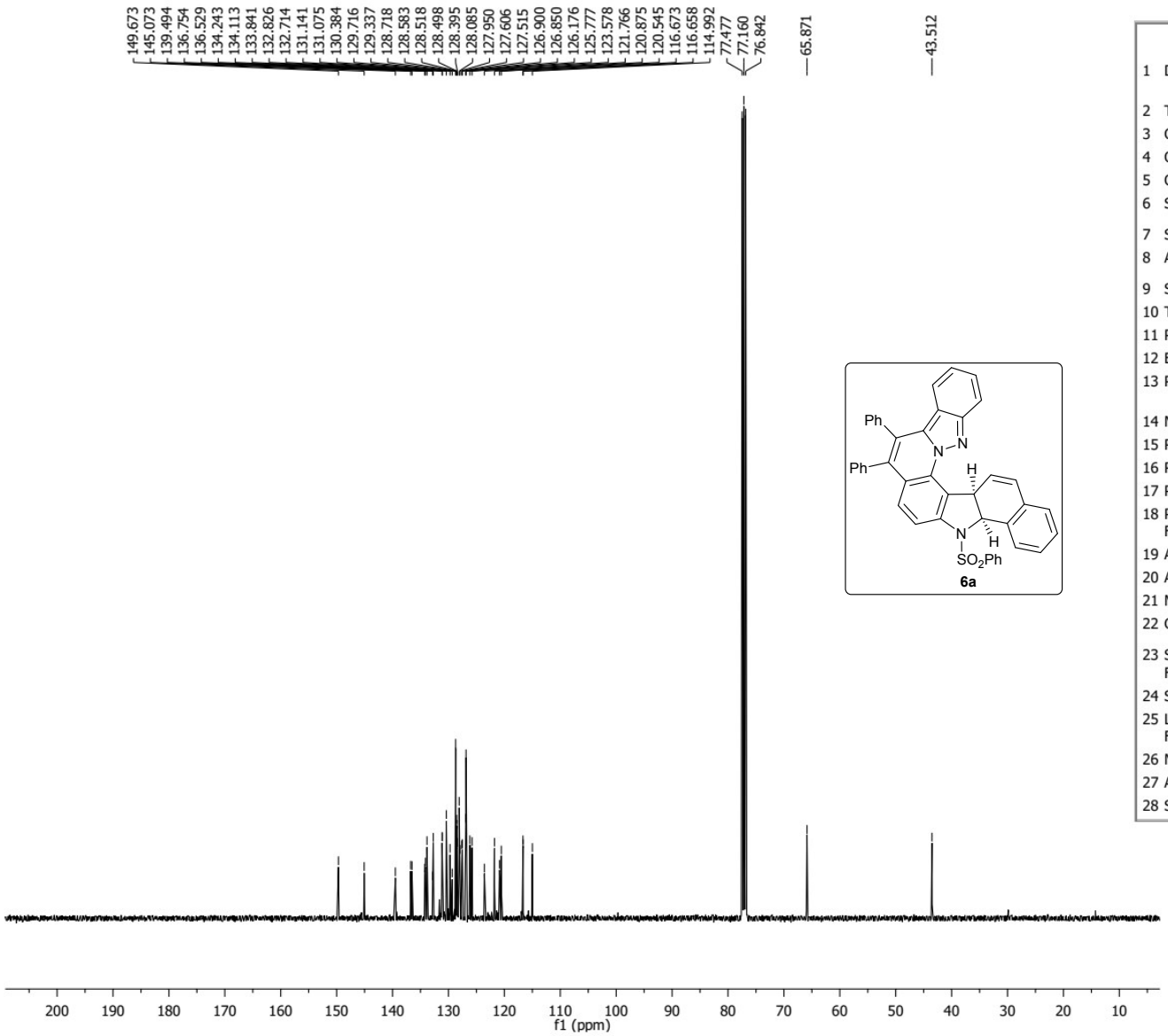


	Parameter	Value
1	Data File Name	VK-205R-13C/ 10/ fid
2	Title	VK-205R-13C.10.fid
3	Comment	VK-205R-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	299.9
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	150
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-05-20T18:20:00
21	Modification Date	2019-05-20T18:20:49
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1945.4
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



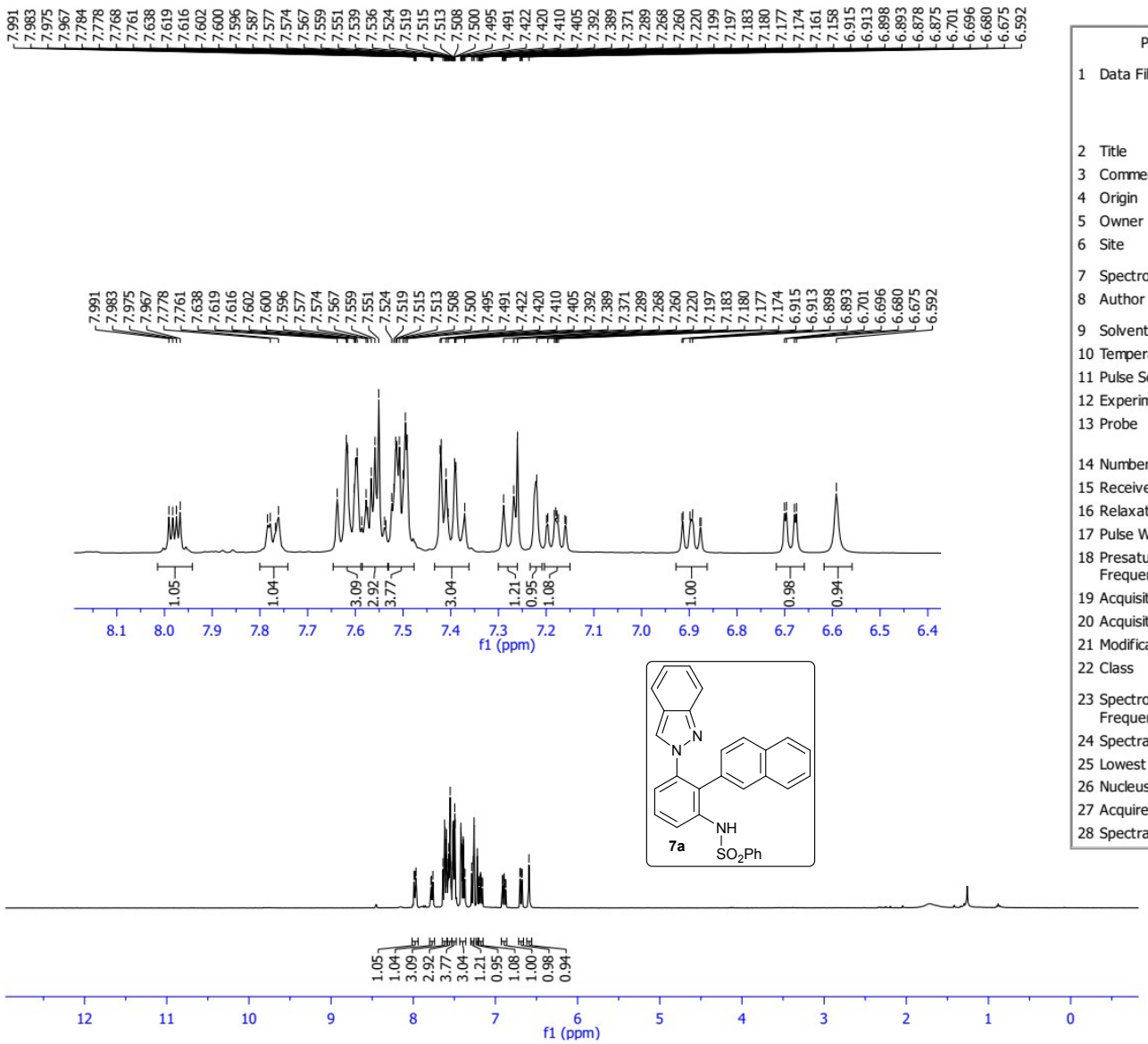
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-190-1H/ 10/ fid
2	Title	VK-190-1H.10.fid
3	Comment	VK-190-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.5
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-03-08T09:50:00
21	Modification Date	2019-03-08T09:50:41
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1544.1
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536

6a

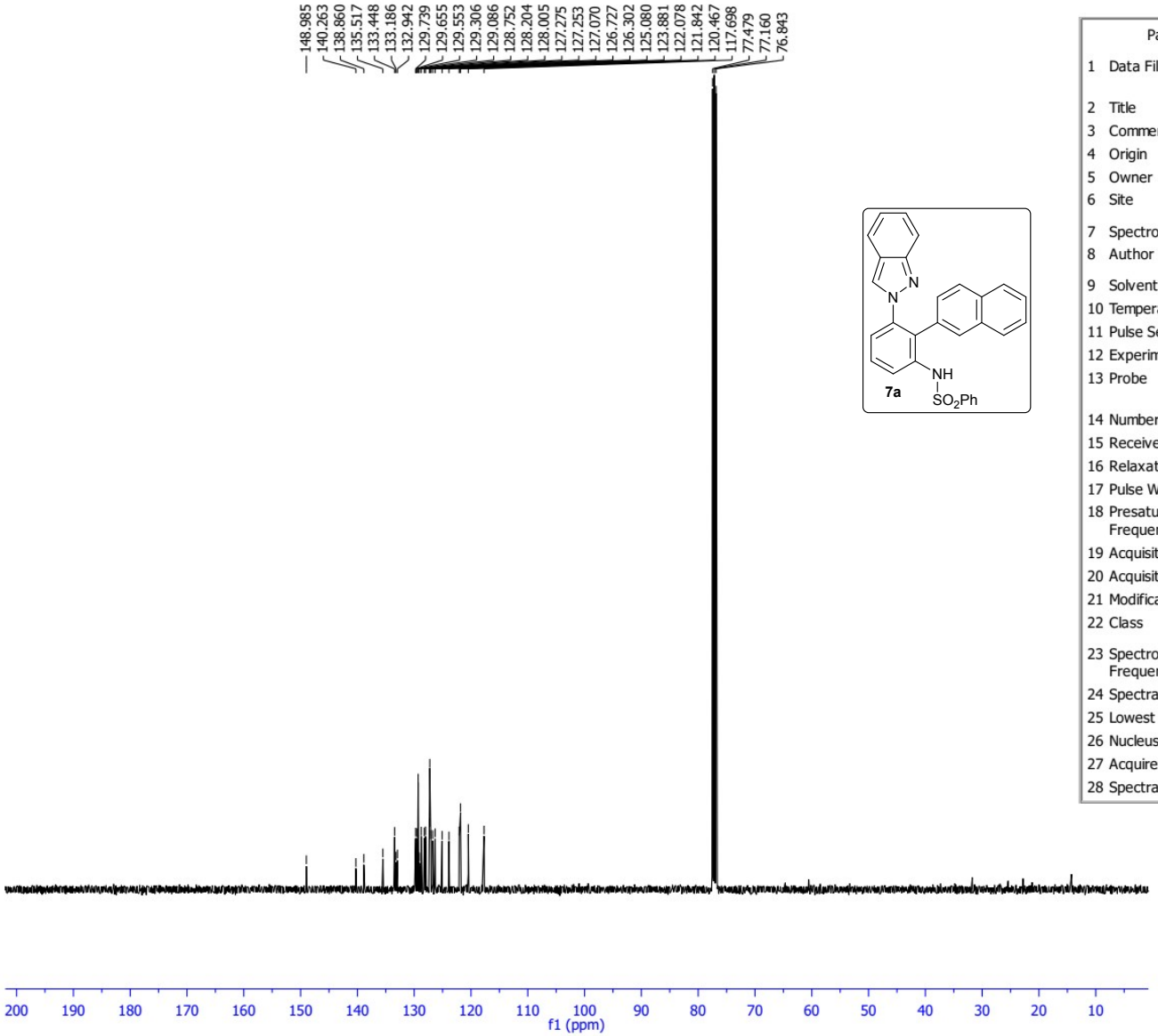


6a

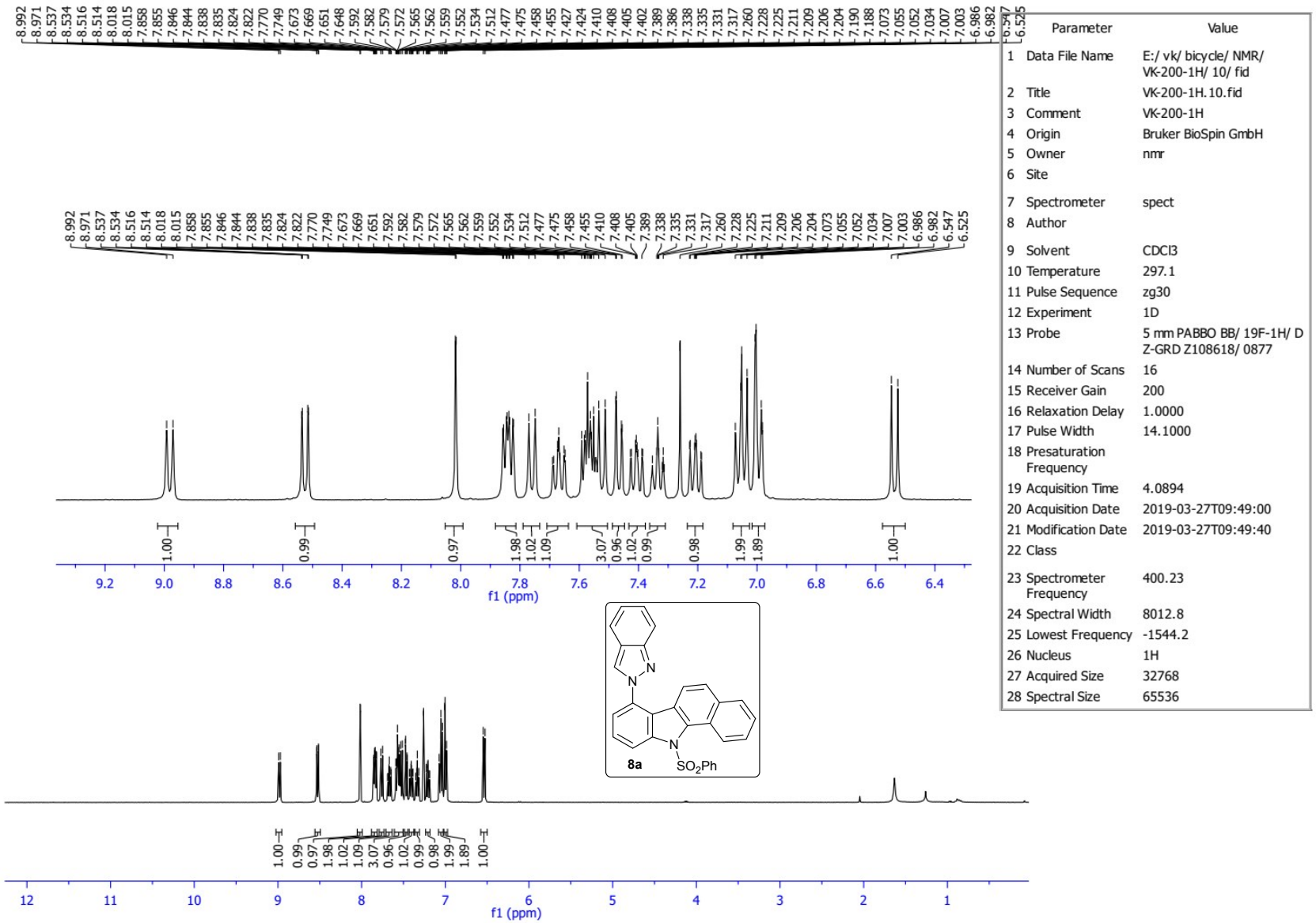
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-190-13C/ 10/ fid
2	Title	VK-190-13C.10.fid
3	Comment	VK-190-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.7
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	2000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-03-09T00:32:00
21	Modification Date	2019-03-09T00:32:31
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1943.7
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



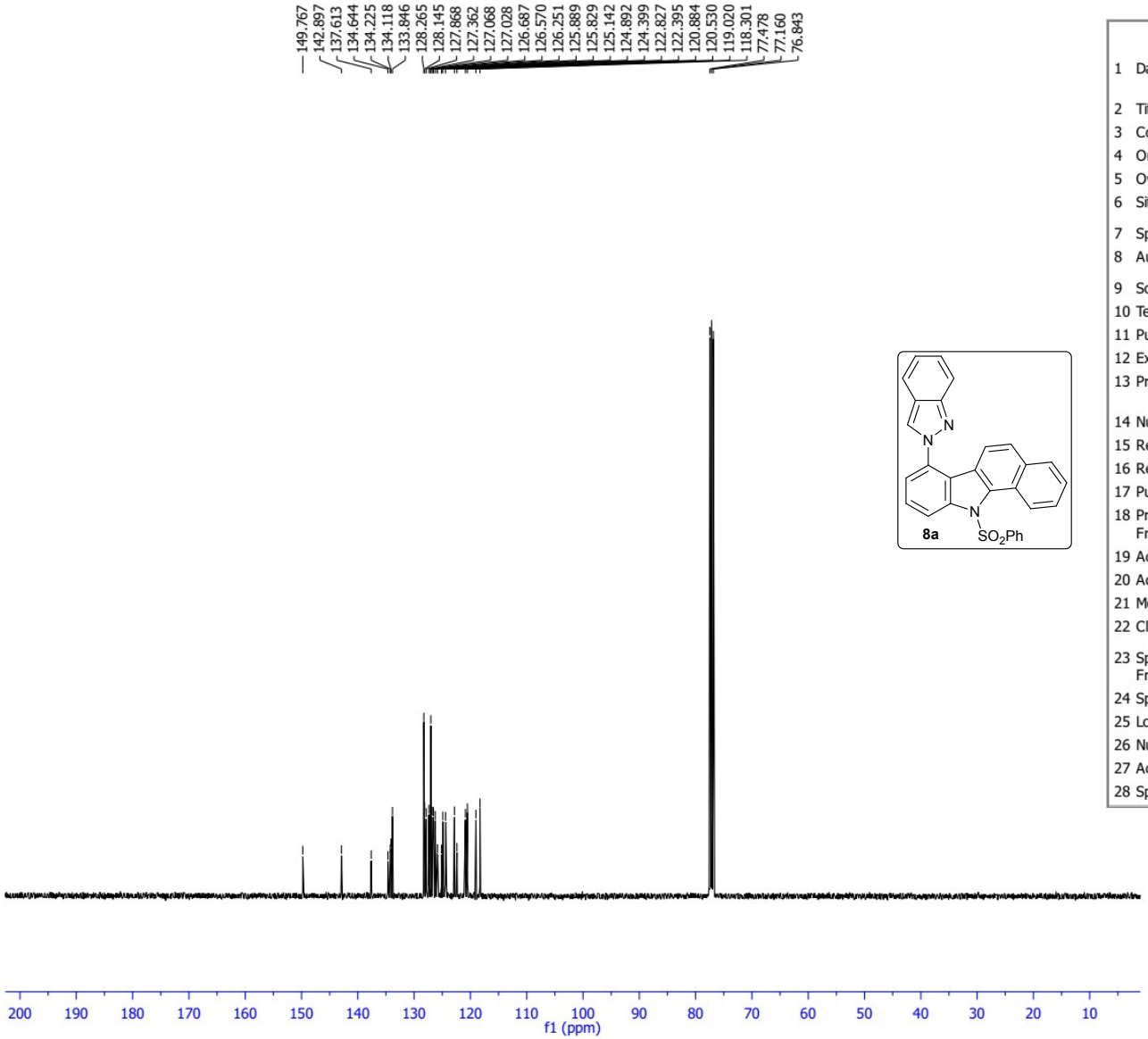
	Parameter	Value
1	Data File Name	/ / 172.16.33.138/ nmr/ NMR/ NMR/ MAY19/ TP/ 17.05.19/ data/ nmr/ nmr/ VK-196R-1H/ 10/ fid
2	Title	VK-196R-1H.10.fid
3	Comment	VK-196R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.8
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-05-17T11:05:00
21	Modification Date	2019-05-17T11:05:59
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.3
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



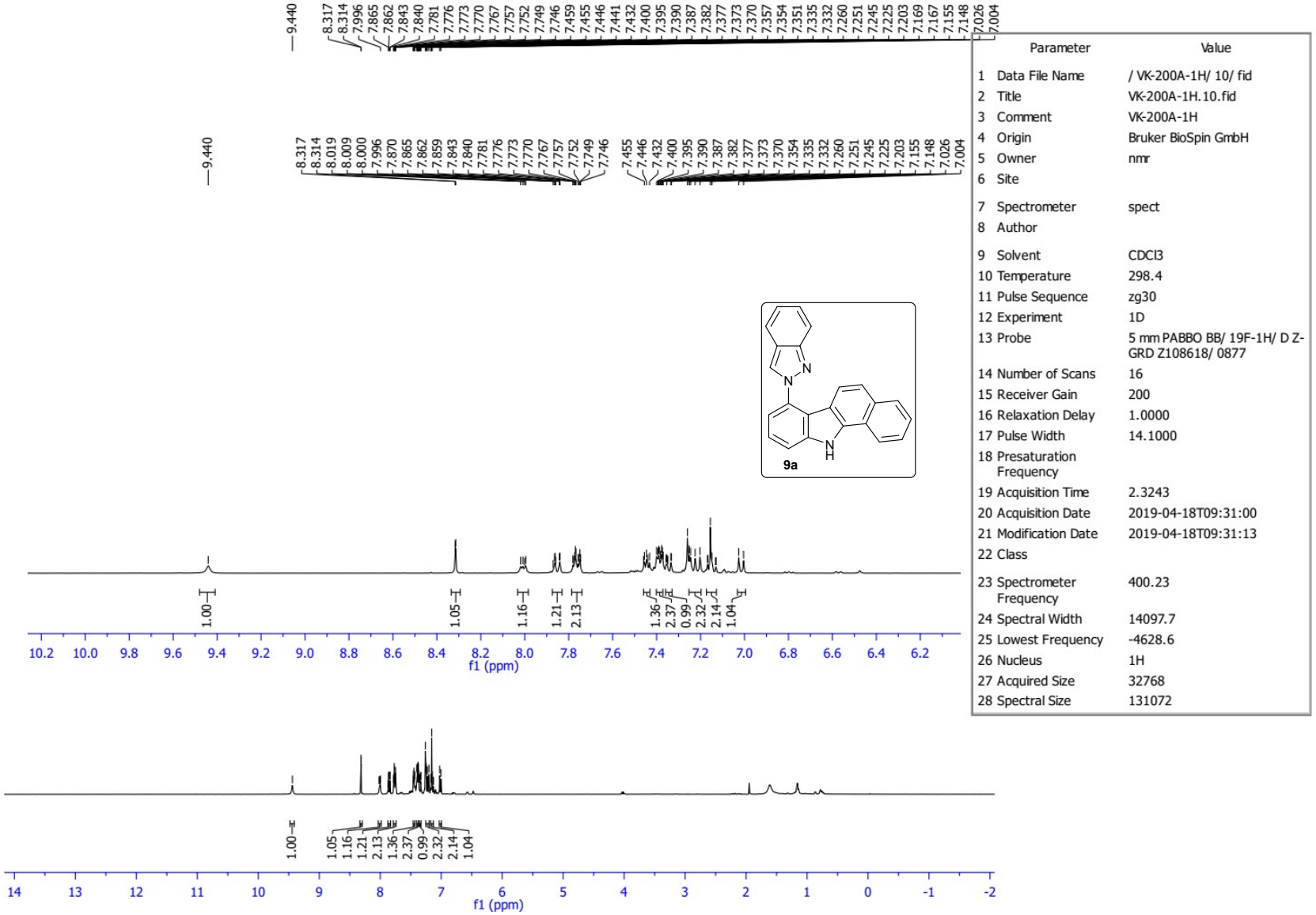
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-196R-13C/ 10/ fid
2	Title	VK-196R-13C.10.fid
3	Comment	VK-196R-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	299.1
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-03-23T08:49:00
21	Modification Date	2019-03-23T08:49:27
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1941.5
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



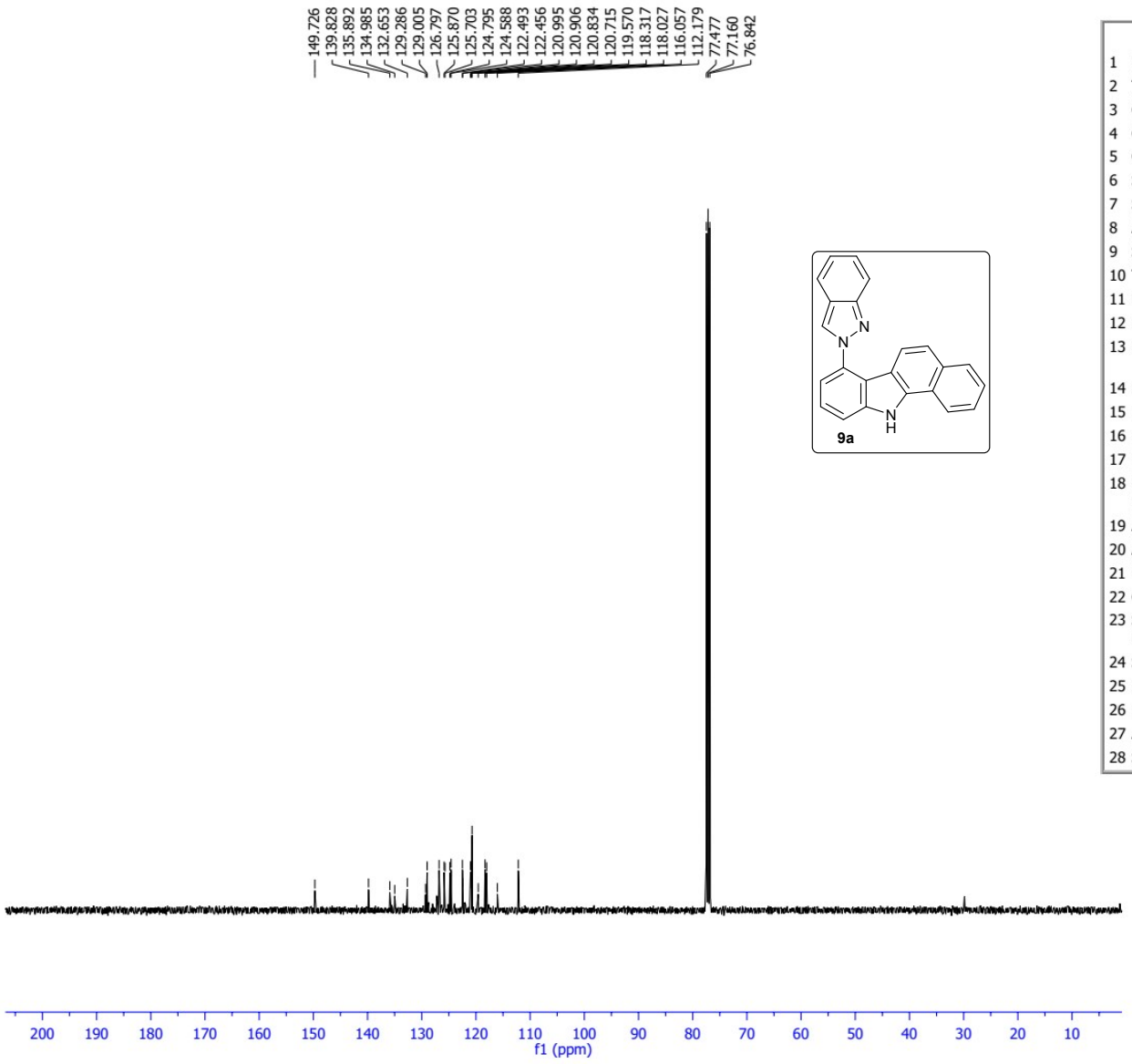
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-200-1H/ 10/ fid
2	Title	VK-200-1H.10.fid
3	Comment	VK-200-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.1
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-03-27T09:49:00
21	Modification Date	2019-03-27T09:49:40
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1544.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536



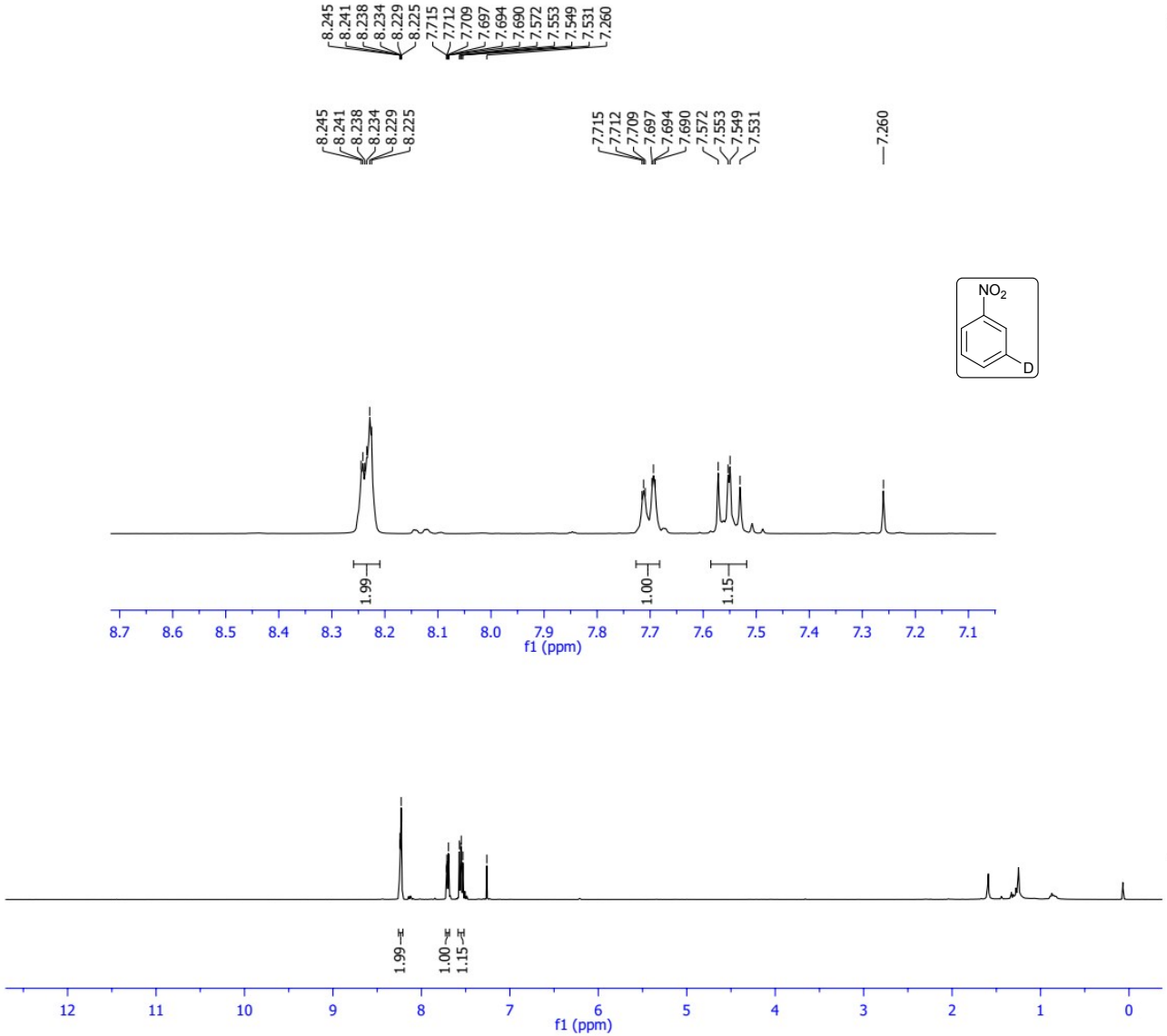
	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ VK-200-13C/ 10/ fid
2	Title	VK-200-13C.10.fid
3	Comment	VK-200-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	298.6
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-03-27T20:45:00
21	Modification Date	2019-03-27T20:45:11
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1942.7
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



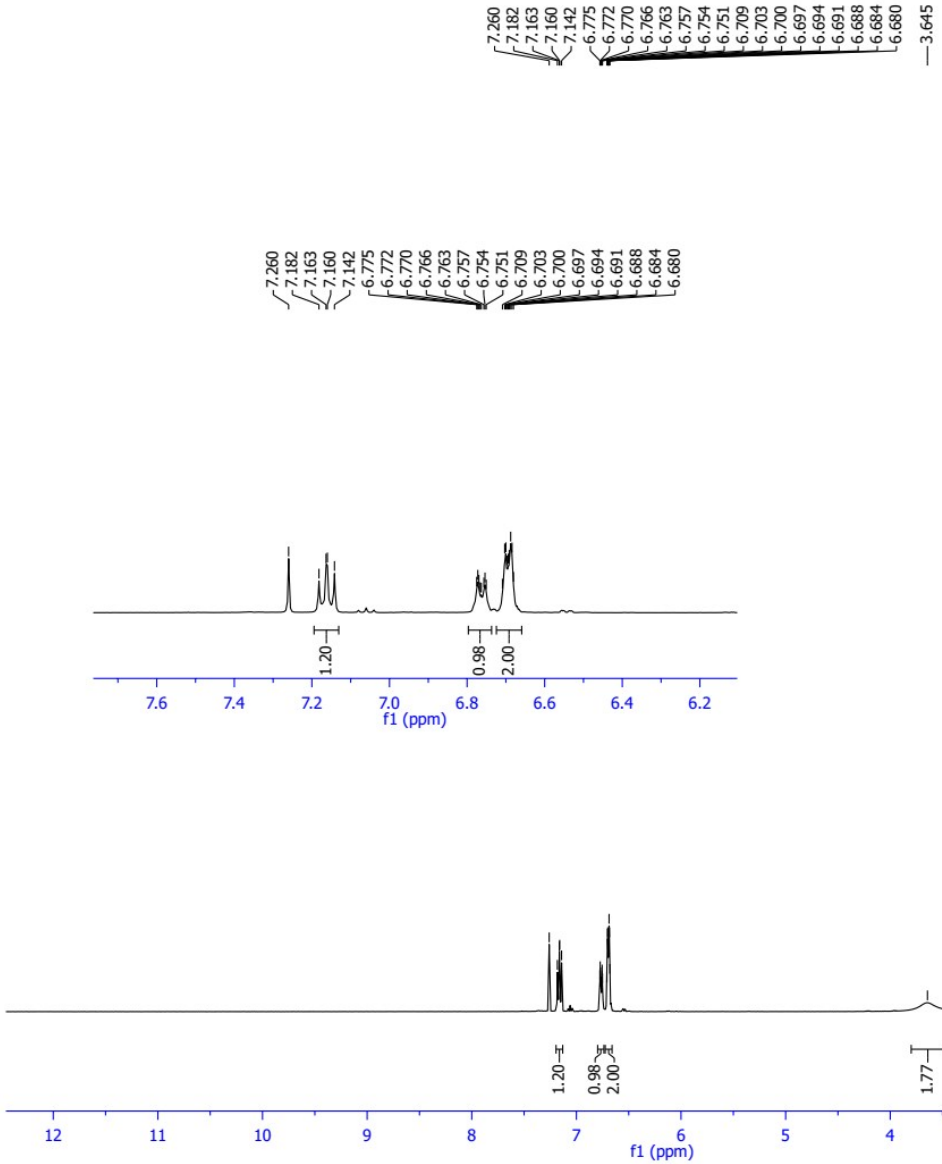
	Parameter	Value
1	Data File Name	/ VK-200A-1H/ 10/ fid
2	Title	VK-200A-1H.10.fid
3	Comment	VK-200A-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	298.4
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.3243
20	Acquisition Date	2019-04-18T09:31:00
21	Modification Date	2019-04-18T09:31:13
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	14097.7
25	Lowest Frequency	-4628.6
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



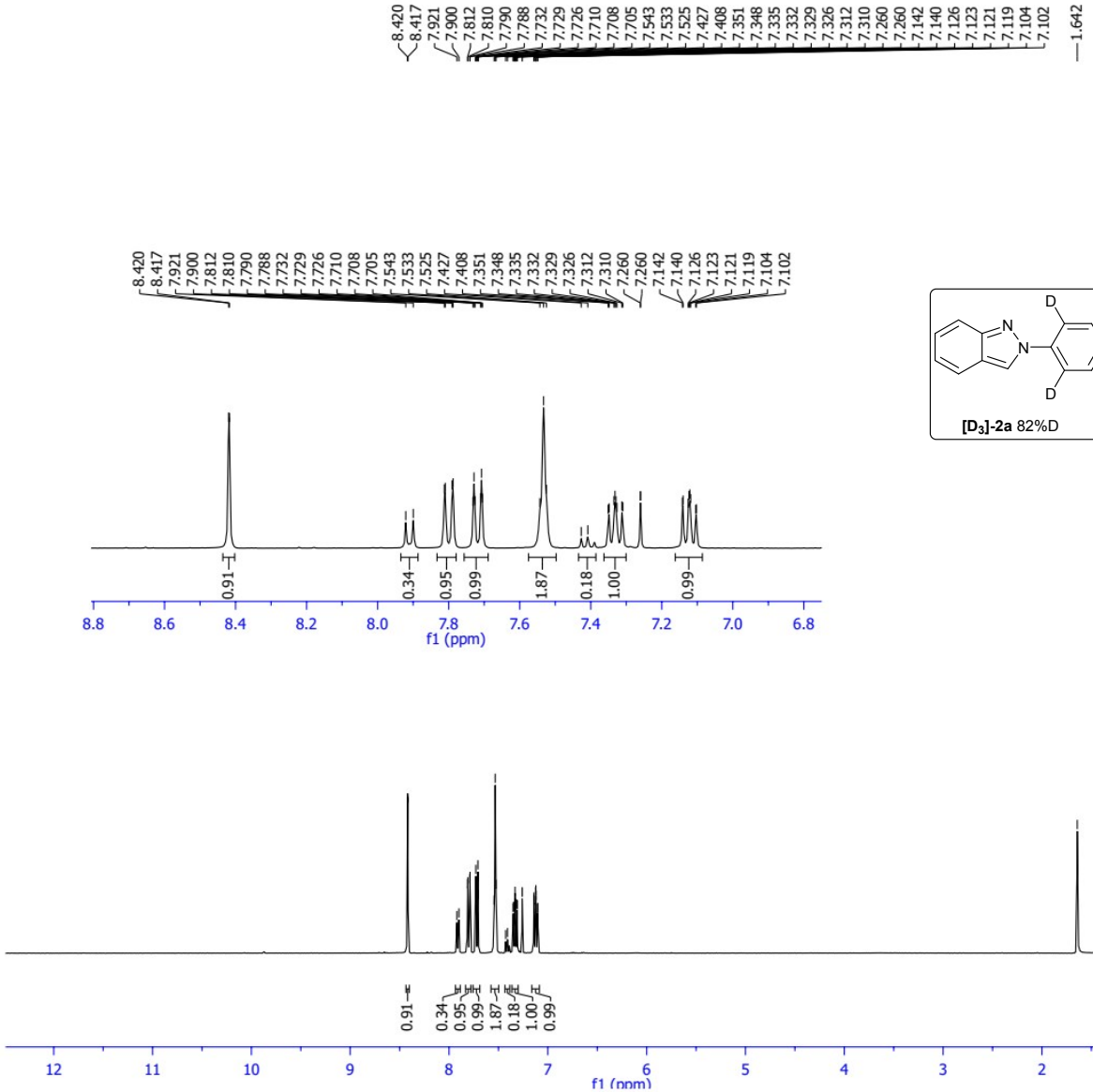
	Parameter	Value
1	Data File Name	VK-SB-F-13C/ 9/ fid
2	Title	VK-SB-F-13C.9.fid
3	Comment	VK-SB-F-13C
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	300.1
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	1000
15	Receiver Gain	200
16	Relaxation Delay	2.0000
17	Pulse Width	9.9000
18	Presaturation Frequency	
19	Acquisition Time	1.3631
20	Acquisition Date	2019-05-22T03:32:00
21	Modification Date	2019-05-22T03:32:50
22	Class	
23	Spectrometer Frequency	100.65
24	Spectral Width	24038.5
25	Lowest Frequency	-1955.9
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536



	Parameter	Value
1	Data File Name	E:/ vk/ bicycle/ NMR/ S-121-1H/ 20/ fid
2	Title	S-121-1H.20.fid
3	Comment	S-121-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2018-12-21T10:29:00
21	Modification Date	2018-12-21T10:29:59
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



	Parameter	Value
1	Data File Name	E:/ vk/ my nmr/ Mar/ VK-S-129R-1H/ 10/ fid
2	Title	VK-S-129R-1H.10.fid
3	Comment	VK-S-129R-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-03-14T09:23:00
21	Modification Date	2019-03-14T09:23:51
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.3
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



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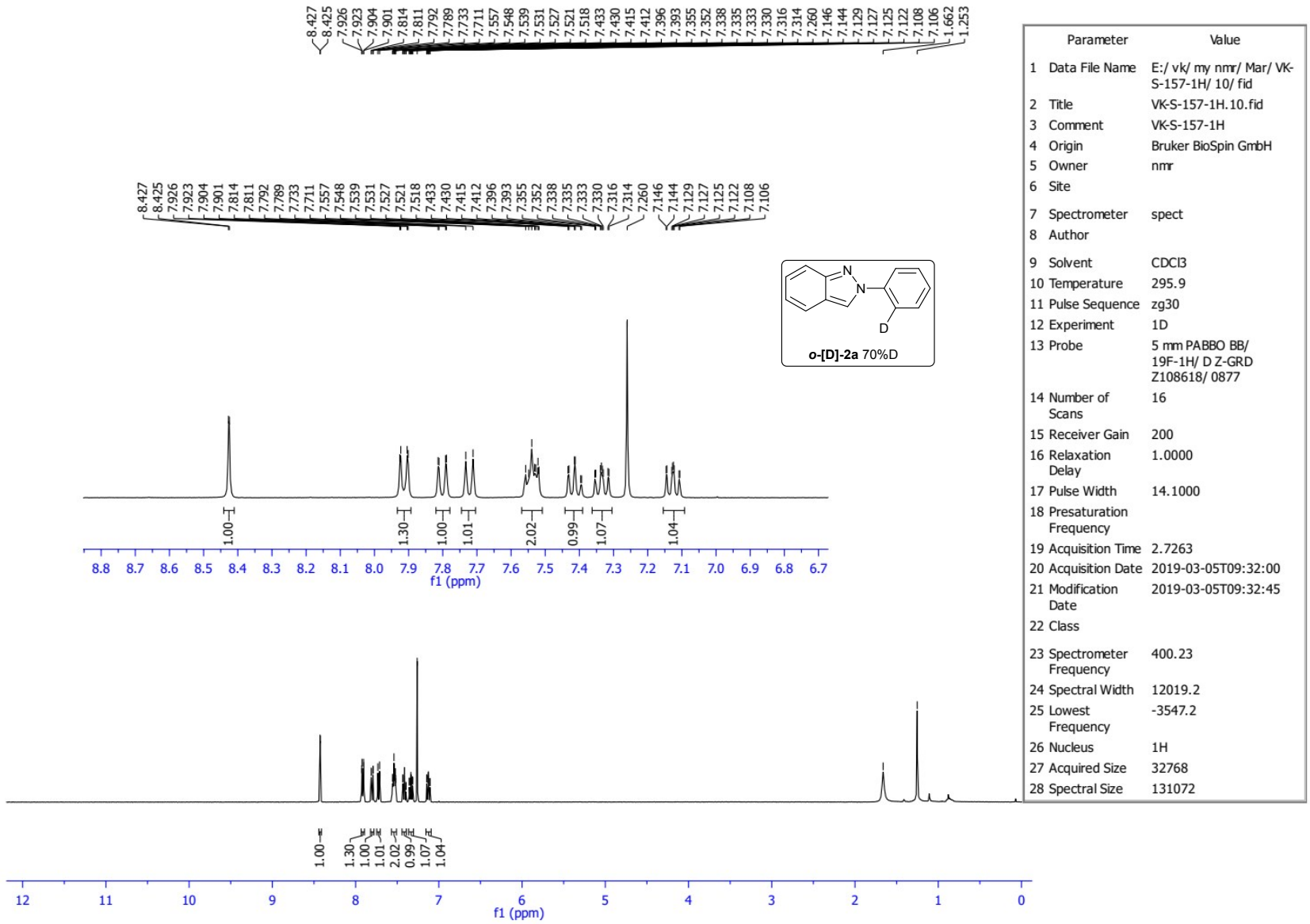
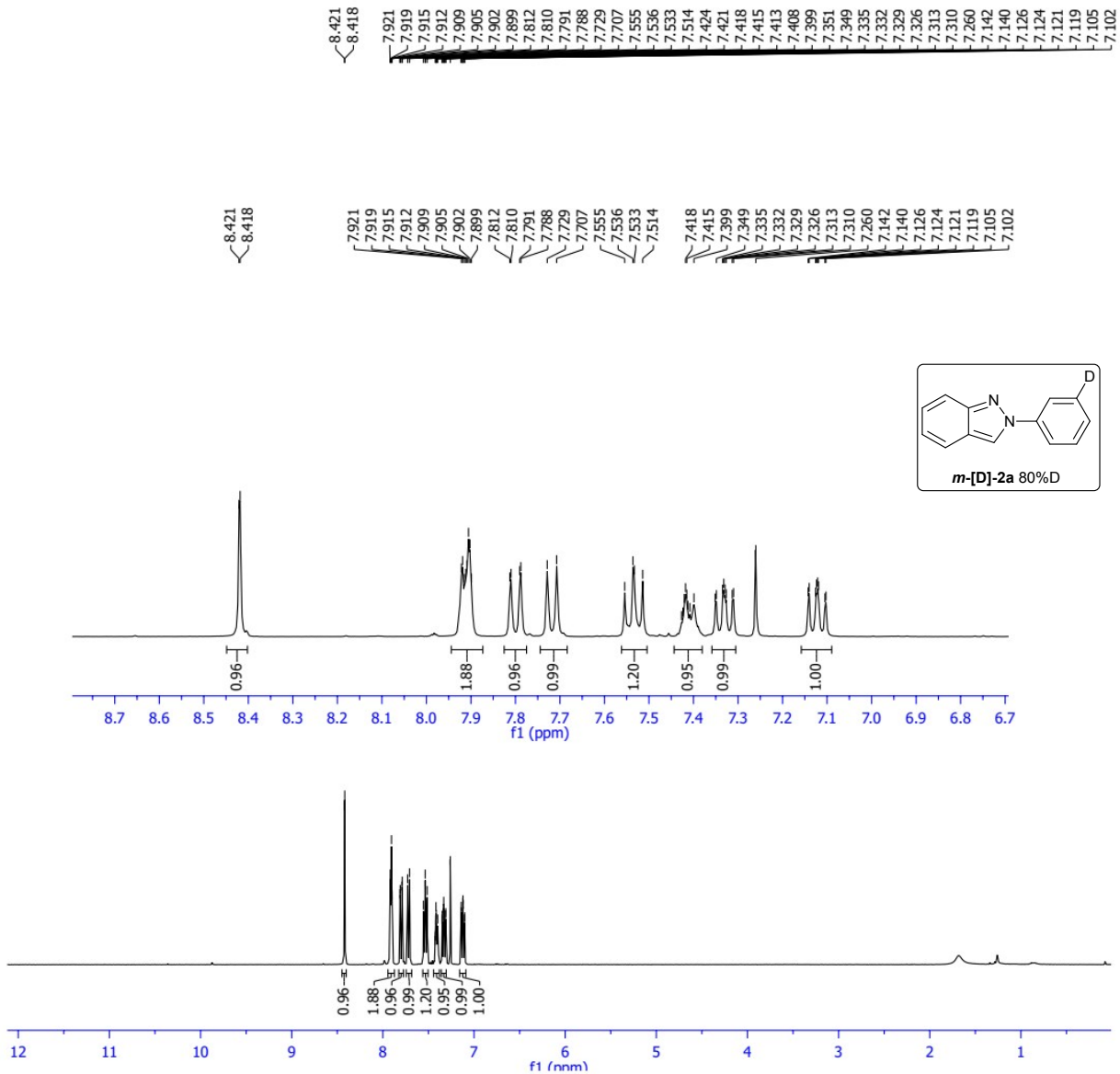
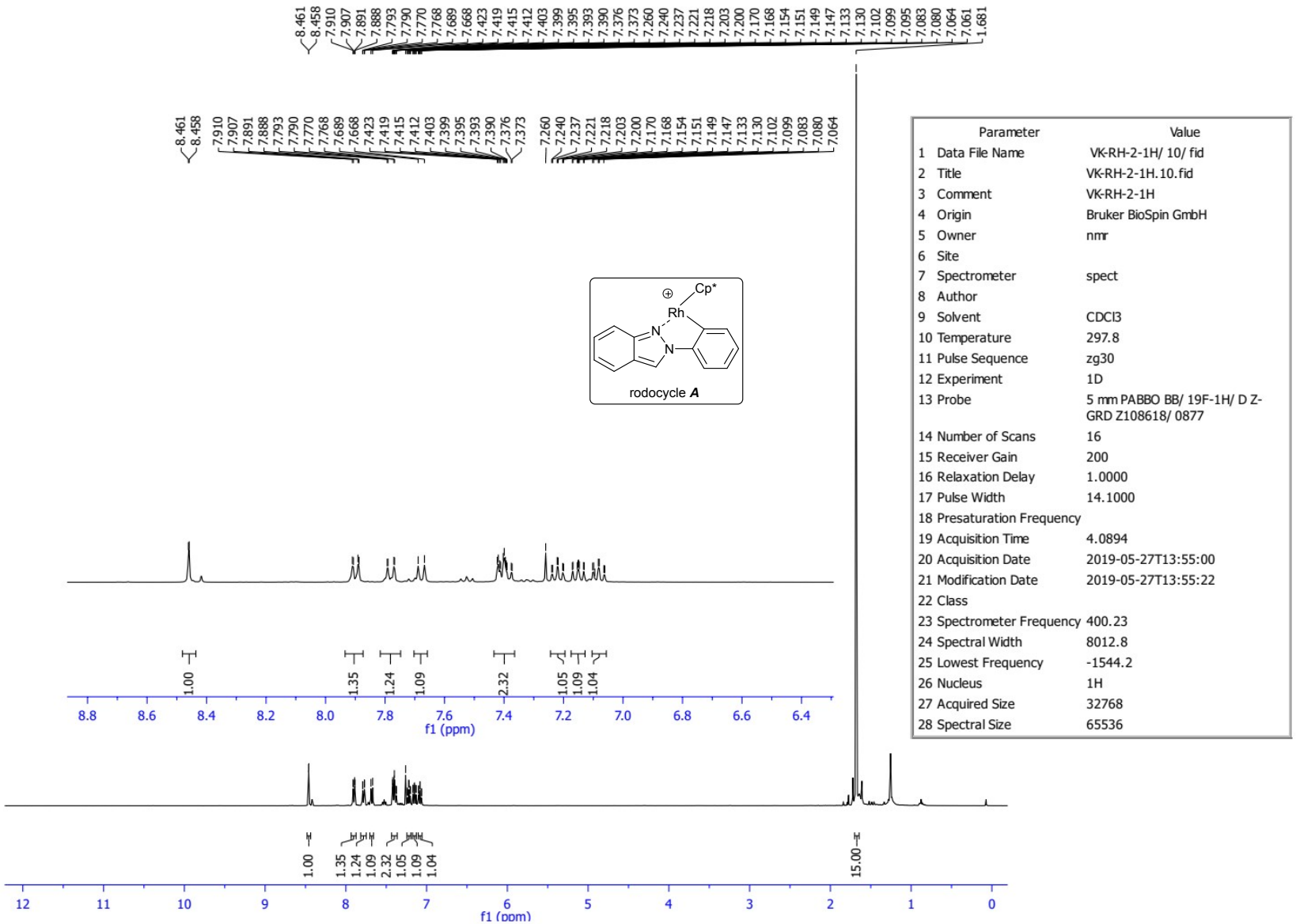
	Parameter	Value
1	Data File Name	E:/ vk/ my nmr/ Feb/ VK-S-144-1H/ 10/ fid
2	Title	VK-S-144-1H.10.fid
3	Comment	VK-S-144-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.3
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-02-11T10:00:00
21	Modification Date	2019-02-11T10:00:06
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.3
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



	Parameter	Value
1	Data File Name	E:/ vk/ my nmr/ Mar/ VK-S-157-1H/ 10/ fid
2	Title	VK-S-157-1H.10.fid
3	Comment	VK-S-157-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-03-05T09:32:00
21	Modification Date	2019-03-05T09:32:45
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



	Parameter	Value
1	Data File Name	E:/ vk/ my nmr/ Mar/ VK-S-161-1H/ 10/ fid
2	Title	VK-S-161-1H.10.fid
3	Comment	VK-S-161-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	296.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	2.7263
20	Acquisition Date	2019-03-12T10:24:00
21	Modification Date	2019-03-12T10:24:23
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	12019.2
25	Lowest Frequency	-3547.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	131072



	Parameter	Value
1	Data File Name	VK-RH-2-1H/ 10/ fid
2	Title	VK-RH-2-1H.10.fid
3	Comment	VK-RH-2-1H
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	297.8
11	Pulse Sequence	zg30
12	Experiment	1D
13	Probe	5 mm PABBO BB/ 19F-1H/ D Z-GRD Z108618/ 0877
14	Number of Scans	16
15	Receiver Gain	200
16	Relaxation Delay	1.0000
17	Pulse Width	14.1000
18	Presaturation Frequency	
19	Acquisition Time	4.0894
20	Acquisition Date	2019-05-27T13:55:00
21	Modification Date	2019-05-27T13:55:22
22	Class	
23	Spectrometer Frequency	400.23
24	Spectral Width	8012.8
25	Lowest Frequency	-1544.2
26	Nucleus	1H
27	Acquired Size	32768
28	Spectral Size	65536

Sample Name	VK-178	**Position**	P1-C7	**Instrument Name**	Instrument 1
User Name		**Inj Vol**	20	**InjPosition**	
Sample Type	Sample	**IRM Calibration Status**	Success	**Data Filename**	VK-178.d
ACQ Method	ESI ALS 200-1000.m	**Comment**		**Acquired Time**	29-04-2019 11:55:16 (UTC+05:30)