

Supporting Information

Photoinduced Fluoroalkylation-Peroxidation of Alkenes Enabled by Ligand-to-Iron Charge Transfer Mediated Decarboxylation

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1. General information

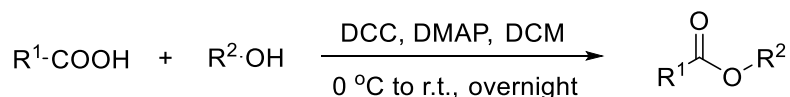
^1H NMR spectra were recorded on Bruker 400 MHz spectrometer and the chemical shifts were reported in parts per million (δ) relative to internal standard TMS (0 ppm) for CDCl_3 . The peak patterns are indicated as follows: s, singlet; d, doublet; dd, doublet of doublet; t, triplet; m, multiplet; q, quartet. The coupling constants, J , are reported in Hertz (Hz). ^{13}C NMR spectra were obtained at Bruker 100 MHz and referenced to the internal solvent signals (central peak is 77.0 ppm in CDCl_3). ^{19}F NMR spectra were obtained at Bruker 376 MHz and referenced to CFCl_3 ($\delta = 0$ ppm). CDCl_3 was used as the NMR solvent. High-resolution mass spectra (HRMS) were acquired on Thermo Q-Exactive instrument (quadrupole mass analyzer) using electrospray ionization mode (ESI). Flash column chromatography was performed over silica gel 200-300. All reagents were weighed and handled in air at room temperature. All chemical reagents were purchased from Alfa, Acros, Aldrich, TCI, J&K and used without further purification. Unless otherwise stated, all reactions were carried out under a positive atmosphere of nitrogen in oven-dried or flame-dried glassware. Prior to the reaction set-up, glassware was evacuated and backfilled with nitrogen three times. Experiments upon light irradiation were carried out with a 10 W Kessil® PR160L-390nm (max 40 W) with average intensity of 300 mW/cm^2 (for light spectrum and other details, see: https://kessil.com/products/science_PR160L.php). The material of the irradiation vessel was Schlenk tube made of borosilicate glass. Irradiation to each tube at a distance of 3.0 cm without any filters (Figure S1). The alkene substrates were synthesized according to the reported literature.



Figure S1 Experimental set-up featuring with a Kessil® PR160L-390 nm lamp

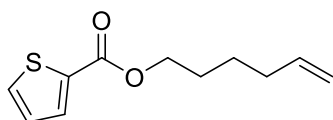
2. Synthesis of starting materials

2.1. Method A¹

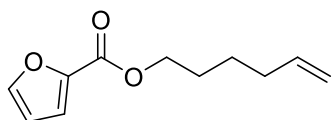


To a Schlenk tube was added alcohol (4.0 mmol), carboxylic acid (2.0 mmol), 4-dimethylamino pyridine (0.2 mmol, 10 mol%), and a stir bar. The Schlenk tube was then evacuated and backfilled with nitrogen gas three times. Dry dichloromethane (0.2 M) was added via syringe to the Schlenk tube. The Schlenk tube was then placed in an ice bath positioned on top of a stirring plate. Dicyclohexyl carbodiimide (4.0 mmol) was added to the mixture via syringe dropwise over a period of 5 min. The ice bath was then removed, allowing the reaction to return to room temperature. The reaction was left to stir overnight. After the reaction was finished, the mixture was concentrated through rotary

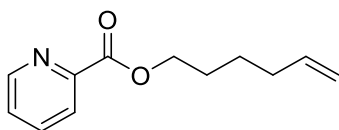
evaporation. Purification by column chromatography afforded the desired alkenes.



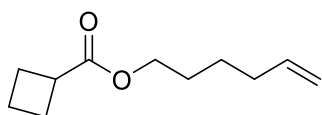
Hex-5-en-1-yl thiophene-2-carboxylate (1i) Colorless oil, 400 mg, 95% yield. ^1H NMR (400 MHz, CDCl_3) δ 7.71 (d, $J = 3.7$ Hz, 1H), 7.46 (d, $J = 4.9$ Hz, 1H), 7.01 (t, $J = 4.4$ Hz, 1H), 5.73 (ddt, $J = 16.9, 10.2, 6.7$ Hz, 1H), 5.00-4.86 (m, 2H), 4.22 (t, $J = 6.6$ Hz, 2H), 2.09-1.99 (m, 2H), 1.74-1.63 (m, 2H), 1.52-1.39 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 162.2, 138.3, 134.0, 133.2, 132.1, 127.6, 114.8, 65.0, 33.2, 28.1, 25.2.



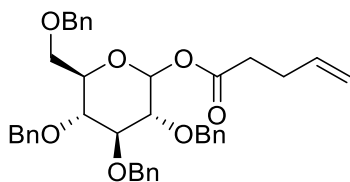
Hex-5-en-1-yl furan-2-carboxylate (1j) Colorless oil, 354 mg, 91% yield. ^1H NMR (400 MHz, CDCl_3) δ 7.58 (s, 1H), 7.17, (d, $J = 3.4$ Hz, 1H), 6.50 (dd, $J = 3.0, 1.3$ Hz, 1H), 5.81 (ddt, $J = 16.9, 10.2, 6.7$ Hz, 1H), 5.07-4.94 (m, 2H), 4.31 (t, $J = 6.7$ Hz, 2H), 2.17-2.07 (m, 2H), 1.82-1.72 (m, 2H), 1.58-1.47 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 158.7, 146.1, 144.8, 138.2, 117.6, 114.8, 111.7, 64.8, 33.2, 28.0, 25.1.



Hex-5-en-1-yl picolinate (1k) Colorless oil, 405 mg, 99% yield. ^1H NMR (400 MHz, CDCl_3) δ 8.78-8.76 (m, 1H), 8.13 (d, $J = 7.7$ Hz, 1H), 7.85 (td, $J = 7.7, 1.6$ Hz, 1H), 7.50-7.45 (m, 1H), 5.81 (ddt, $J = 16.9, 10.2, 6.7$ Hz, 1H), 5.07-4.94 (m, 2H), 4.43 (t, $J = 6.9$ Hz, 2H), 2.16-2.09 (m, 2H), 1.89-1.81 (m, 2H), 1.59-1.50 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 165.2, 149.8, 148.2, 138.2, 136.9, 126.7, 125.0, 114.8, 65.8, 33.2, 28.1, 25.1.

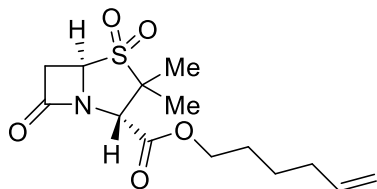


Hex-5-en-1-yl cyclobutanecarboxylate (1l) Colorless oil, 353 mg, 97% yield. ^1H NMR (400 MHz, CDCl_3) δ 7.58 (s, 1H), 7.17, (d, $J = 3.4$ Hz, 1H), 6.50 (dd, $J = 3.0, 1.3$ Hz, 1H), 5.81 (ddt, $J = 16.9, 10.2, 6.7$ Hz, 1H), 5.07-4.94 (m, 2H), 4.31 (t, $J = 6.7$ Hz, 2H), 2.17-2.07 (m, 2H), 1.82-1.72 (m, 2H), 1.58-1.47 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 158.7, 146.1, 144.8, 138.2, 117.6, 114.8, 111.7, 64.8, 33.2, 28.0, 25.1.

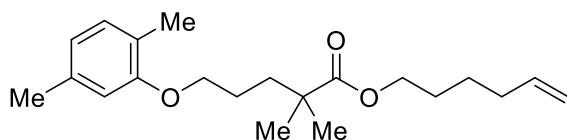


2,3,4,6-Tetra-O-benzyl-D-glucopyranosyl pent-4-enoate (5a) Colorless oil, 1240 mg, 99% yield. **5a** was obtained as a mixture of α and β configuration product. ^1H NMR (400 MHz, CDCl_3) δ 7.39-7.23 (m, 36H), 7.17-7.11 (m, 4H),

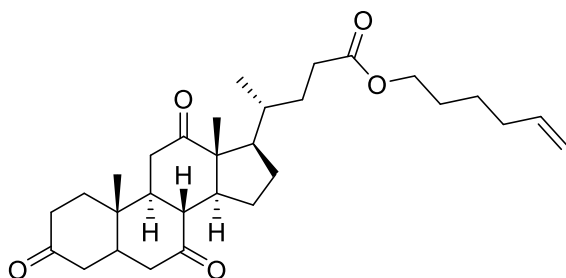
6.39 (d, $J = 3.6$ Hz, 1H, α configuration), 5.88-5.74 (m, 2H), 5.63 (d, $J = 8.0$ Hz, 1H, β configuration), 5.10-4.44 (m, 20H), 3.97-3.53 (m, 12H), 2.56-2.30 (m, 8H); ^{13}C NMR (100 MHz, CDCl_3) δ 171.4, 171.3, 138.3, 138.0, 137.9, 137.6, 136.3, 135.2, 128.4, 128.3, 128.1, 128.0, 127.9, 127.8, 127.6, 115.7, 115.6, 94.0, 89.9, 84.8, 81.6, 81.0, 78.9, 76.9, 75.7, 75.6, 75.5, 75.3, 75.0, 73.5, 73.4, 73.1, 72.8, 68.1, 68.0, 33.5, 33.4, 28.7, 28.3.



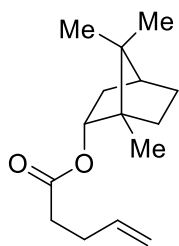
Hex-5-en-1-yl (2*S*,5*R*)-3,3-dimethyl-7-oxo-4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylate 4,4-dioxide (5c) Colorless solid, 491 mg, 78% yield. ^1H NMR (400 MHz, CDCl_3) δ 5.86-5.71 (m, 1H), 5.08-4.95 (m, 2H), 4.61 (s, 1H), 4.38 (s, 1H), 4.21 (t, $J = 6.6$ Hz, 2H), 3.54-3.40 (m, 2H), 2.15-2.06 (m, 2H), 1.76-1.65 (m, 2H), 1.62 (s, 3H), 1.52-1.44 (m, 2H), 1.42 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 170.7, 167.0, 137.8, 115.2, 66.4, 63.3, 62.6, 61.1, 38.3, 33.0, 27.8, 25.0, 20.3, 18.6.



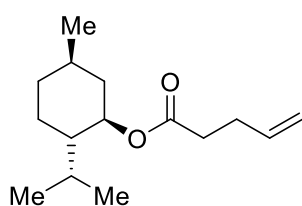
Hex-5-en-1-yl 5-(2,5-dimethylphenoxy)-2,2-dimethylpentanoate (5d) Colorless oil, 658 mg, 99% yield. ^1H NMR (400 MHz, CDCl_3) δ 7.00 (d, $J = 7.4$ Hz, 1H), 6.65 (d, $J = 7.5$ Hz, 1H), 6.60 (s, 1H), 5.79 (ddt, $J = 17.0, 10.2, 6.7$ Hz, 1H), 5.06-4.84 (m, 2H), 4.06 (t, $J = 6.6$ Hz, 2H), 3.91 (t, $J = 5.4$ Hz, 2H), 2.30 (s, 3H), 2.17 (s, 3H), 2.12-2.03 (m, 2H), 1.79-1.68 (m, 4H), 1.68-1.59 (m, 2H), 1.52-1.39 (m, 2H), 1.21 (s, 6H); ^{13}C NMR (100 MHz, CDCl_3) δ 177.8, 156.9, 138.3, 136.4, 130.3, 123.6, 120.7, 114.8, 111.9, 67.9, 64.3, 42.1, 37.1, 33.2, 28.1, 25.3, 25.2, 21.4, 15.7.



Hex-5-en-1-yl (5*β*)-3,7,12-trioxocholan-24-oate (5e) White solid, 902 mg, 93% yield. ^1H NMR (400 MHz, CDCl_3) δ 5.80 (ddt, $J = 16.9, 10.3, 6.7$ Hz, 1H), 5.07-4.90 (m, 2H), 4.07 (t, $J = 6.6$ Hz, 2H), 3.00-2.82 (m, 3H), 2.44-2.21 (m, 8H), 2.18-1.97 (m, 8H), 1.89-1.81 (m, 2H), 1.67-1.60 (m, 3H), 1.50-1.42 (m, 2H), 1.40 (s, 3H), 1.36-1.23 (m, 4H), 1.07 (s, 3H), 0.85 (d, $J = 6.5$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 211.8, 208.9, 208.6, 174.1, 138.3, 114.8, 64.1, 56.8, 51.7, 49.0, 48.9, 46.8, 45.6, 45.5, 44.9, 42.7, 38.6, 36.4, 36.0, 35.5, 35.2, 33.9, 33.2, 31.5, 30.4, 28.0, 27.6, 25.6, 25.2, 25.1, 24.9, 21.8, 18.6, 11.8.

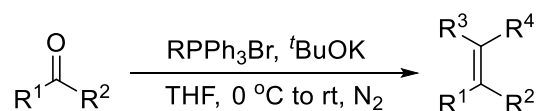


(1S,2R,4S)-1,7,7-Trimethylbicyclo[2.2.1]heptan-2-yl pent-4-enoate (5f) Colorless oil, 468 mg, 99% yield. ^1H NMR (400 MHz, CDCl_3) δ 5.83 (ddt, $J = 16.5, 11.5, 6.0$ Hz, 1H), 5.12-4.96 (m, 2H), 4.93-4.85 (m, 1H), 2.47-2.30 (m, 5H), 1.99-1.89 (m, 1H), 1.78-1.70 (m, 1H), 1.69-1.64 (m, 1H), 1.36-1.17 (m, 2H), 0.99-0.92 (m, 1H), 0.90 (s, 3H), 0.87 (s, 3H), 0.83 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 173.3, 136.8, 115.4, 79.8, 48.7, 47.7, 44.9, 36.8, 33.9, 29.0, 28.0, 27.1, 19.7, 18.8, 13.4.

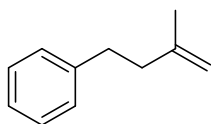


(1R,2S,5R)-2-Isopropyl-5-methylcyclohexyl pent-4-enoate (5g) Colorless oil, 475 mg, 99% yield. ^1H NMR (400 MHz, CDCl_3) δ 5.89-5.75 (m, 1H), 5.10-4.97 (m, 2H), 4.69 (td, $J = 10.9, 4.4$ Hz, 1H), 2.41-2.35 (m, 4H), 2.01-1.94 (m, 1H), 1.92-1.80 (m, 1H), 1.73-1.62 (m, 2H), 1.54-1.42 (m, 1H), 1.37 (tt, $J = 12.0, 3.1$ Hz, 1H), 1.11-1.00 (m, 1H), 1.00-0.92 (m, 1H), 0.89 (dd, $J = 6.5, 3.2$ Hz, 6H), 0.88-0.80 (m, 1H), 0.75 (d, $J = 7.0$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 172.6, 136.7, 115.4, 74.1, 47.0, 40.9, 34.3, 33.9, 31.4, 29.0, 26.2, 23.4, 22.0, 20.7, 16.3; HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{15}\text{H}_{26}\text{O}_2\text{Na}$ 261.1825; Found: 261.1816.

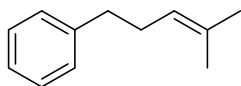
2.2 Method B



Alkyltriphenylphosphonium bromide (13 mmol) and potassium *tert*-butoxide (13 mmol) were stirred in THF (20.0 mL) at 0 °C for 1h. A solution of related ketone (10 mmol) in THF (10.0 mL) was then added drop-wise. The reaction mixture was stirred until the completion of the reaction. Then, saturated aqueous NH_4Cl was added and the aqueous layer was extracted with EtOAc. The combined organic layers were washed with saturated brine, dried over Na_2SO_4 , and concentrated in vacuum. Purification by column chromatography afforded the desired alkenes

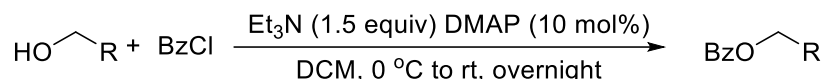


(3-methylbut-3-en-1-yl)benzene (1x) Colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.27 (t, $J = 7.5$ Hz, 2H), 7.19 (d, $J = 7.9$ Hz, 3H), 4.72 (d, $J = 11.0$ Hz, 2H), 2.82-2.66 (m, 2H), 2.39-2.24 (m, 2H), 1.77 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 145.3, 142.2, 128.3, 128.3, 125.7, 110.2, 39.6, 34.3, 22.6.

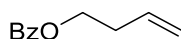


(4-Methylpent-3-en-1-yl)benzene (1ae) Colorless oil. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.30-7.23 (m, 2H), 7.21-7.13 (m, 3H), 5.17 (t, $J = 7.2$ Hz, 1H), 2.62 (t, $J = 7.7$ Hz, 2H), 2.33-2.24 (m, 2H), 1.68 (s, 3H), 1.56 (s, 3H). Spectral data match those previously reported.²

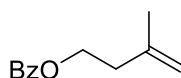
2.3 Method C³



To a solution of alcohol (2.0 mmol, 1.0 equiv), DMAP (0.2 mmol, 10 mol%), and triethylamine (3.0 mmol, 1.5 equiv) in anhydrous CH_2Cl_2 was added benzoyl chloride (3.6 mmol, 1.3 equiv) dropwise at 0°C . The resulting mixture was stirred at 0°C for 0.5 hour, and then at room temperature overnight. After completion, the reaction was quenched with water and extracted with CH_2Cl_2 . The combined organic layers were dried with Na_2SO_4 , filtered, and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate) to afford the corresponding pure product.

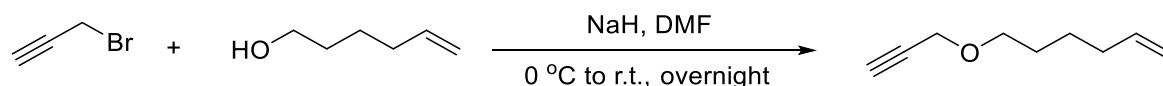


But-3-en-1-yl benzoate (1b) Colorless oil, 352 mg, 100% yield. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.98-7.92 (m, 2H), 7.50-7.41 (m, 1H), 7.39-7.29 (m, 2H), 5.86-5.71 (m, 1H), 5.12-4.97 (m, 2H), 4.29 (t, $J = 6.7$ Hz, 2H), 2.51-2.34 (m, 2H). Spectral data match those previously reported.⁴



3-methylbut-3-en-1-yl benzoate (1t) Colorless oil, 380 mg, 100% yield. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 8.07 – 8.00 (m, 2H), 7.59 – 7.50 (m, 1H), 7.47 – 7.39 (m, 2H), 4.83 (d, $J = 10.8$ Hz, 2H), 4.44 (t, $J = 6.8$ Hz, 2H), 2.48 (t, $J = 6.8$, 2H), 1.81 (t, $J = 1.2$ Hz, 3H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 166.5, 141.7, 132.8, 130.4, 129.5, 128.3, 112.4, 63.1, 36.8, 22.5.

2.4 Method D⁵

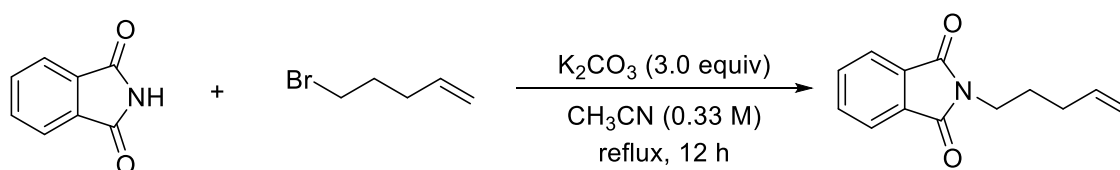


To a suspension of NaH in dry DMF, the alcohol solution of dry DMF was added dropwise at 0°C . After 2 h, propargyl bromide (80% in toluene) was added at 0°C and the resulting mixture was stirred at room temperature for 12 h. The reaction was quenched by water and then extracted with diethyl ether. The combined organic layers were washed with water and brine, dried over Na_2SO_4 and filtered. The resulting residue was purified by silica gel flash chromatography.

6-(Prop-2-ynyloxy)hex-1-ene (1f) yellow oil, 262 mg, 95% yield. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 5.87-5.73 (m, 1H), 5.06-4.90 (m, 2H), 4.13 (d, $J = 2.3$ Hz, 2H), 3.52 (t, $J = 6.5$ Hz, 2H), 2.42 (t, $J = 2.2$ Hz, 1H), 2.12-2.03 (m, 2H),

1.66-1.56 (m, 2H), 1.52-1.41 (m, 2H). Spectral data match those previously reported.⁵

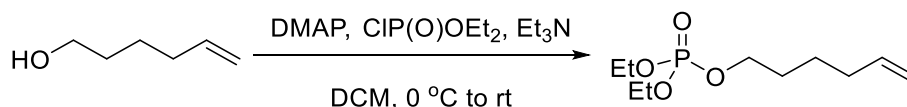
2.5 Method E⁶



To a solution of phthalimide (5 mmol, 1.0 equiv) and K_2CO_3 (15 mmol, 3.0 equiv) in CH_3CN (15 mL) was added 5-bromo-1-pentene (7.5 mmol, 1.5 equiv), and the mixture was refluxed for 12 h. The reaction mixture was concentrated, and the residue was partitioned between CH_2Cl_2 and water. The aqueous layer was extracted with CH_2Cl_2 . The combined organic extracts were washed with water, dried over anhydrous Na_2SO_4 , and concentrated in vacuo. The resulting residue was purified by silica gel flash chromatography.

2-(But-3-en-1-yl)isoindoline-1,3-dione (1g) colorless oil, 1076 mg, 99% yield. 1H NMR (400 MHz, $CDCl_3$) δ 7.87-7.81 (m, 2H), 7.74-7.68 (m, 2H), 5.89-5.75 (m, 1H), 5.10-4.94 (m, 2H), 3.70 (t, $J = 7.4$ Hz, 2H), 2.17-2.08 (m, 2H), 1.85-1.74 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.4, 137.3, 133.8, 132.1, 115.3, 37.6, 30.9, 27.6. Spectral data match those previously reported.⁶

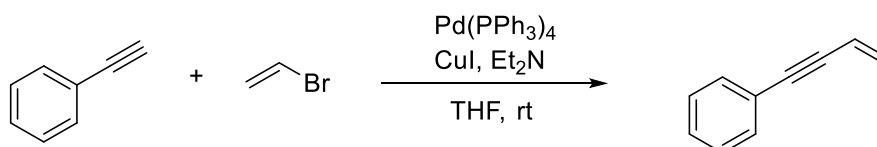
2.6 Method F



Diethyl chlorophosphate (2.0 mmol) was added dropwise to a solution of hex-5-en-1-ol (2.4 mmol), 4-dimethylaminopyridine (0.4 mmol, 20 mol%), and triethylamine (3.0 mmol) in dichloromethane (10 mL) at 0 °C. The reaction mixture was warmed up over 2 h to rt and the reaction mixture was stirred overnight at rt. The product mixture was filtered through a pad of silica gel. The filtrates were combined and the combined filtrates were concentrated to dryness. The residue obtained was purified by flash-column chromatography.

Hex-5-en-1-yl phosphate (1k) colorless oil, 1.13 g, 93% yield. 1H NMR (400 MHz, $CDCl_3$) δ 5.85-5.70 (m, 1H), 5.07-4.88 (m, 2H), 4.17-4.07 (m, 4H), 4.06-4.00 (m, 2H), 2.13-2.05 (m, 2H), 1.77-1.63 (m, 2H), 1.57-1.41 (m, 2H), 1.38-1.29 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 138.2, 138.1, 114.9, 114.8, 67.7 (d, $J_{C-P} = 6.0$ Hz), 63.6 (d, $J_{C-P} = 5.9$ Hz), 33.1, 29.6 (d, $J_{C-P} = 6.9$ Hz), 24.6, 16.1 (d, $J_{C-P} = 6.7$ Hz); ^{31}P NMR (162 MHz, $CDCl_3$) δ -0.9.

2.7 Method G⁷

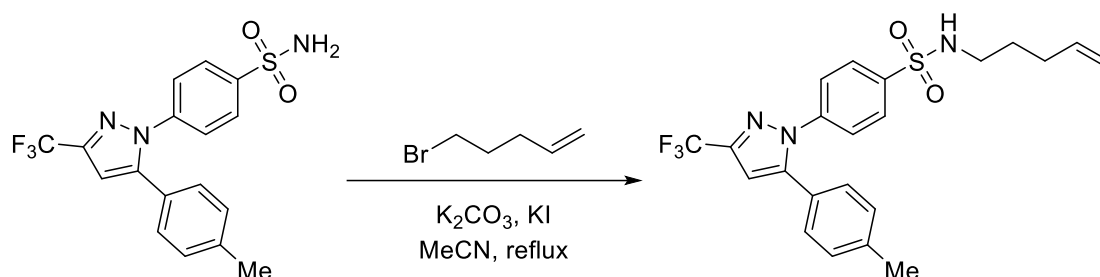


To an oven-dried 50-mL round-bottom flask equipped with a magnetic stirring bar was added $Pd(PPh_3)_4$ (2.00 mol%) and CuI (10.0 mol%) in glovebox. The flask was sealed with a rubber septum and removed from the glovebox. Vinyl bromide (1.0 M in THF , 2.50 equiv) was added followed by freshly distilled and degassed Et_2NH (5.0 equiv).

The mixture was allowed to stir at ambient temperature for ca. 5 min and subsequently phenylacetylene (5.0 mmol) was added as a solution in THF (2.0 mL) dropwise. The mixture was then allowed to stir at ambient temperature overnight. The reaction contents were then filtered through a pad of celite, eluting with Et₂O. The solution was then concentrated in vacuo. The residue obtained was purified by flash-column chromatography.

But-3-en-1-yn-1-ylbenzene (1q) colorless oil .640 mg, 99% yield. ¹H NMR (400 MHz, CDCl₃) δ 7.48-7.41 (m, 2H), 7.34-7.26 (m, 3H), 6.01 (dd, *J* = 17.6, 11.1, 1H), 5.73 (dd, *J* = 17.6, 2.0 Hz, 1H), 5.54 (dd, *J* = 11.1, 2.0 Hz, 1H). Spectral data match those previously reported.⁷

2.8 Method H⁸

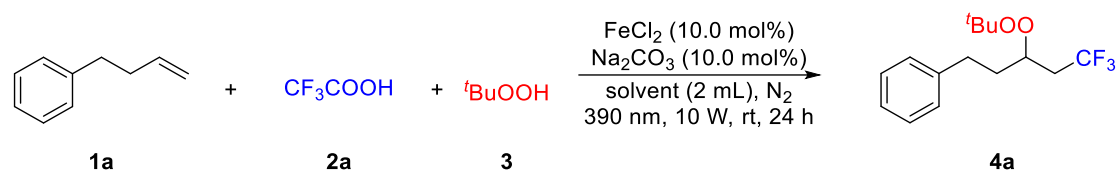


To a suspension of celecoxib (2.0 mmol, 1.0 equiv), K₂CO₃ (4 mmol, 2.0 equiv), KI (0.2 mmol, 10 mol%) in MeCN (6 mL) was added 6-bromopent-1-ene (2.4 mmol, 1.2 equiv). After being stirred at reflux for 12 h, the mixture was cooled to RT. The solvent was removed under reduced pressure. The residue was diluted with H₂O and CH₂Cl₂. The aqueous layer was extracted 3 times with CH₂Cl₂. The combined organic phase was dried over anhydrous MgSO₄, filtered, and concentrated under reduced pressure. The resulting residue was purified by column chromatography.

***N*-(pent-5-en-1-yl)-4-(5-(*p*-tolyl)-3-(trifluoromethyl)-1*H*-pyrazol-1-yl)benzenesulfonamide (5b)** white solid, 668 mg, 74% yield. ¹H NMR (400 MHz, CDCl₃) δ 7.85 (d, *J* = 7.7 Hz, 2H), 7.47 (d, *J* = 7.7 Hz, 2H), 7.23-7.05 (m, 4H), 6.75 (s, 1H), 5.78-5.61 (m, 1H), 5.08-4.88 (m, 3H), 3.03-2.87 (m, 2H), 2.37 (s, 3H), 2.09-1.97 (m, 2H), 1.64-1.50 (m, 2H). ¹³C NMR (100 MHz, CDCl₃) δ 145.2, 144.0 (q, *J*_{C-F} = 38.9 Hz), 142.4, 139.7, 139.4, 137.0, 129.7, 128.6, 128.0, 125.6, 125.5, 121.0 (q, *J*_{C-F} = 268.6 Hz), 115.7, 106.2, 42.6, 30.5, 28.5, 21.2; ¹⁹F NMR (376 MHz, CDCl₃) δ -62.4 (s, 3F).

3. Additional optimization studies

Table S1 Additional optimization studies



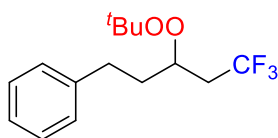
entry	solvent	yield of 4a
1	Acetone	51
2	Ph-Cl	0
3	Ph-CF ₃	0
4 ^c	MeCN	33
5 ^d	MeCN	0

^aReaction conditions: **1a** (0.2 mmol), **2a** (0.6 mmol), ^tBuOOH **3** (0.8 mmol, 5–6 M in decane), catalyst (10.0 mol%), base (10.0 mol%), solvent (2.0 mL), 390 nm (10 W), r.t., 24 h in a Schlenk tube under N₂ unless otherwise noted.

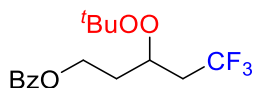
^bNMR yields are based on **1a** and determined by ¹H NMR using mesitylene as an internal standard. ^c1.0 Equiv of Na₂CO₃. ^dAir instead of N₂

4. Experimental procedures and characterization data of products

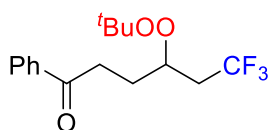
To a mixture of alkene **1** (0.2 mmol), acid **2** (0.6 mmol), Na₂CO₃ (0.02 mmol) and FeCl₂ (2.5 mg, 0.02 mmol), MeCN (2.0 mL) was added under nitrogen at room temperature. Then *tert*-butyl hydroperoxide (TBHP, 0.8 mmol, 5–6 M in decane) was added into the mixture under nitrogen at room temperature. The resulting mixture was stirred under rt, 390 nm, 10 W for 24 h. The resulting reaction solution was directly filtered through a pad of silica by chloroform. The solvent was evaporated in vacuo to give the crude products. NMR yields are determined by ¹H NMR using mesitylene as an internal standard. Solvent was evaporated and the residues were purified by flash column chromatography on silica gel with an eluent to afford the pure products.



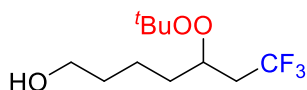
(3-(*tert*-Butylperoxy)-5,5,5-trifluoropentyl)benzene (4a) (44.7 mg, 77%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:5, R_f = 0.5). The title compound was obtained as colorless oil. ¹H NMR (400 MHz, CDCl₃) δ 7.32–7.26 (m, 2H), 7.23–7.16 (m, 3H), 4.25–4.18 (m, 1H), 2.87–2.76 (m, 1H), 2.75–2.63 (m, 2H), 2.31–2.15 (m, 1H), 2.06–1.88 (m, 2H), 1.25 (s, 9H); ¹³C NMR (100 MHz, CDCl₃) δ 141.4, 128.4, 128.3, 126.1 (q, J_{C-F} = 276.9 Hz), 126.0, 80.2, 76.7 (q, J_{C-F} = 2.7 Hz), 36.9 (q, J_{C-F} = 27.6 Hz), 34.5, 31.5, 26.4; ¹⁹F NMR (376 MHz, CDCl₃) δ -63.1 (s, 3F). HRMS (ESI) *m/z*: [M+Na]⁺ Calcd for C₁₅H₂₁F₃O₂Na 313.1386; Found: 313.1383.



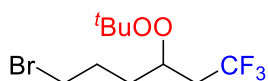
3-(tert-Butylperoxy)-5,5,5-trifluoropentyl benzoate (4b) (58.8 mg, 88%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:10, R_f = 0.6). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 8.03 (d, J = 7.7 Hz, 2H), 7.57 (t, J = 7.4 Hz, 1H), 7.45 (t, J = 7.6 Hz, 2H), 4.47 (t, J = 6.1 Hz, 2H), 4.45-4.38 (m, 1H), 2.85-2.68 (m, 1H), 2.40-2.25 (m, 1H), 2.20-2.06 (m, 2H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 166.4, 133.0, 130.1, 129.5, 128.4, 125.9 (q, $J_{\text{C-F}}$ = 276.5 Hz) 80.5, 74.5 (q, $J_{\text{C-F}}$ = 2.9 Hz), 61.2, 37.1 (q, $J_{\text{C-F}}$ = 27.6 Hz), 32.1, 26.3; ^{19}F NMR (376 MHz, CDCl_3) δ -63.2 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{16}\text{H}_{21}\text{F}_3\text{O}_4\text{Na}$ 357.1284; Found: 357.1276.



4-(tert-Butylperoxy)-6,6,6-trifluoro-1-phenylhexan-1-one (4c) (38.8 mg, 61%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:20, R_f = 0.3). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 8.01-7.93 (m, 2H), 7.59-7.53 (m, 1H), 7.49-7.41 (m, 2H), 4.36-4.25 (m, 1H), 3.19-3.08 (m, 2H), 2.80-2.56 (m, 1H), 2.36-2.12 (m, 2H), 2.10-1.95 (m, 1H), 1.22 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 199.2, 136.9, 133.1, 128.6, 128.0, 126.1 (q, $J_{\text{C-F}}$ = 277.2 Hz), 80.3, 76.4 (q, $J_{\text{C-F}}$ = 3.1 Hz), 37.2 (q, $J_{\text{C-F}}$ = 28.2 Hz), 34.1, 27.4, 26.4; ^{19}F NMR (376 MHz, CDCl_3) δ -63.2 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{16}\text{H}_{21}\text{F}_3\text{O}_3\text{Na}$ 341.1335; Found: 341.1317.

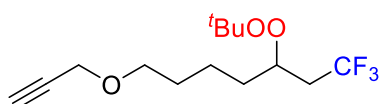


5-(tert-Butylperoxy)-7,7,7-trifluoroheptan-1-ol (4d) (21.2 mg, 41%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:3, R_f = 0.5). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 4.22-4.14 (m, 1H), 3.66 (t, J = 6.6 Hz, 2H), 2.75-2.58 (m, 1H), 2.29-2.11 (m, 1H), 1.71-1.64 (m, 2H), 1.63-1.56 (m, 2H), 1.54-1.40 (m, 3H), 1.24 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 126.0 (q, $J_{\text{C-F}}$ = 276.9 Hz), 80.3, 77.3 (q, $J_{\text{C-F}}$ = 2.7 Hz), 62.6, 36.9 (q, $J_{\text{C-F}}$ = 27.2 Hz), 32.5, 26.4, 21.4; ^{19}F NMR (376 MHz, CDCl_3) δ -63.1 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{11}\text{H}_{21}\text{F}_3\text{O}_3\text{Na}$ 281.1335; Found: 281.1329.

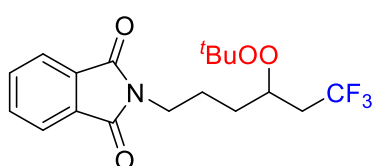


6-Bromo-3-(tert-butylperoxy)-1,1,1-trifluorohexane (4e) (33.8 mg, 55%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:5, R_f = 0.5). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 4.24-4.15 (m, 1H), 3.44 (t, J = 6.6 Hz, 2H), 2.78-2.62 (m, 1H), 2.28-2.13 (m, 1H), 2.12-1.90 (m, 2H), 1.89-1.71 (m, 2H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 125.9 (q, $J_{\text{C-F}}$ = 277.0 Hz), 80.3, 76.6 (q, $J_{\text{C-F}}$ = 2.6 Hz), 37.0 (q, $J_{\text{C-F}}$ = 27.5 Hz), 33.3, 31.5, 28.5, 26.4; ^{19}F NMR (376 MHz, CDCl_3) δ -63.2 (s, 3F);

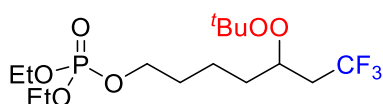
HRMS (ESI) m/z : $[M+Na]^+$ Calcd for $C_{10}H_{18}BrF_3O_2Na$ 329.0334; Found: 329.0325.



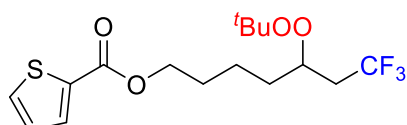
3-(*tert*-Butylperoxy)-1,1,1-trifluoro-7-(prop-2-yn-1-yloxy)heptane (4f) (36.1 mg, 61%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:1, R_f = 0.4). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 4.21-4.15 (m, 1H), 4.13 (d, J = 2.4 Hz, 2H), 3.53 (t, J = 6.3 Hz, 2H), 2.71-2.59 (m, 1H), 2.41 (t, J = 2.3 Hz, 1H), 2.25-2.14 (m, 1H), 1.73-1.59 (m, 4H), 1.56-1.42 (m, 2H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 126.1 (q, J_{C-F} = 277.1 Hz), 80.3, 79.9, 77.4 (q, J_{C-F} = 2.4 Hz), 74.1, 69.8, 58.0, 36.9 (q, J_{C-F} = 27.6 Hz), 32.5, 29.3, 26.4, 21.8; ^{19}F NMR (376 MHz, $CDCl_3$) δ -63.1 (s, 3F); HRMS (ESI) m/z : $[M+Na]^+$ Calcd for $C_{14}H_{23}F_3O_3Na$ 319.1492; Found: 319.1486.



2-(4-(*tert*-Butylperoxy)-6,6,6-trifluorohexyl)isoindoline-1,3-dione (4g) (56.0 mg, 75%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:10, R_f = 0.3). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 7.86-7.83 (m, 2H), 7.74-7.70 (m, 2H), 4.25-4.16 (m, 1H), 3.72 (t, J = 6.9 Hz, 2H), 2.72-2.57 (m, 1H), 2.27-2.12 (m, 1H), 1.93-1.83 (m, 1H), 1.83-1.76 (m, 1H), 1.75-1.67 (m, 2H), 1.21 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.3, 133.9, 132.1, 125.9 (q, J_{C-F} = 277.0 Hz), 123.2, 80.3, 76.7 (q, J_{C-F} = 2.6 Hz), 37.7, 36.8 (q, J_{C-F} = 27.5 Hz), 30.1, 26.3, 24.3; ^{19}F NMR (376 MHz, $CDCl_3$) δ -63.2 (s, 3F); HRMS (ESI) m/z : $[M+Na]^+$ Calcd for $C_{18}H_{22}F_3NO_4Na$ 396.1393; Found: 396.1383.

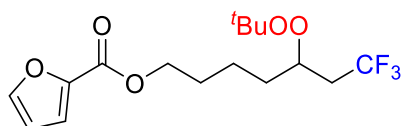


5-(*tert*-Butylperoxy)-7,7,7-trifluoroheptyl diethyl phosphate (4h) (53.6 mg, 68%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:1, R_f = 0.3). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 4.20-4.15 (m, 1H), 4.15-4.07 (m, 4H), 4.07-4.00 (m, 2H), 2.76-2.58 (m, 1H), 2.28-2.06 (m, 1H), 1.76-1.63 (m, 4H), 1.61-1.44 (m, 2H), 1.34 (t, J = 7.1 Hz, 6H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 126.1 (q, J_{C-F} = 276.4 Hz), 80.3, 77.2 (q, J_{C-F} = 2.5 Hz), 67.2 (d, J_{C-P} = 5.9 Hz), 63.6 (d, J_{C-P} = 5.9 Hz), 36.9 (q, J_{C-F} = 27.6 Hz), 32.3, 30.1 (d, J_{C-P} = 6.7 Hz), 26.3, 21.2, 16.1 (d, J_{C-P} = 6.9 Hz); ^{19}F NMR (376 MHz, $CDCl_3$) δ -63.1 (s, 3F); HRMS (ESI) m/z : $[M+Na]^+$ Calcd for $C_{15}H_{30}F_3PO_6Na$ 417.1624; Found: 417.1612.

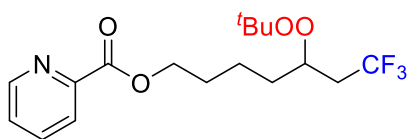


5-(*tert*-Butylperoxy)-7,7,7-trifluoroheptyl thiophene-2-carboxylate (4i) (67.1 mg, 91%). Isolated by flash column

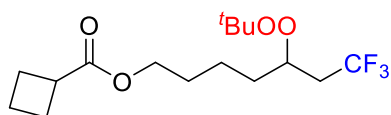
chromatography (ethyl acetate/petroleum ether = 1:20, R_f = 0.4). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.79 (d, J = 3.8 Hz, 1H), 7.55 (d, J = 5.0 Hz, 1H), 7.10 (dd, J = 5.0, 3.7 Hz, 1H), 4.31 (t, J = 6.5 Hz, 2H), 4.23-4.14 (m, 1H), 2.77-2.59 (m, 1H), 2.29-2.13 (m, 1H), 1.86-1.75 (m, 2H), 1.73-1.63 (m, 2H), 1.64-1.58 (m, 1H), 1.58-1.47 (m, 1H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 162.2, 134.0, 133.3, 132.2, 127.7, 126.1 (q, $J_{\text{C-F}}$ = 276.6 Hz), 80.2, 77.1 (q, $J_{\text{C-F}}$ = 3.0 Hz), 64.8, 36.9 (q, $J_{\text{C-F}}$ = 27.3 Hz), 32.4, 28.6, 26.4, 21.7; ^{19}F NMR (376 MHz, CDCl_3) δ -63.1 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{16}\text{H}_{23}\text{F}_3\text{O}_4\text{SNa}$ 391.1161; Found: 391.1142.



5-(tert-Butylperoxy)-7,7,7-trifluoroheptyl furan-2-carboxylate (4j) (53.0 mg, 75%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:10, R_f = 0.4). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.60-7.56 (m, 1H), 7.18-7.16 (m, 1H), 6.52-6.50, 4.32 (t, J = 6.6 Hz), 4.22-4.15 (m, 1H), 2.76-2.60 (m, 1H), 2.27-2.15 (m, 1H), 1.86-1.75 (m, 2H), 1.74-1.66 (m, 2H), 1.63-1.47 (m, 2H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 158.7, 146.2, 144.7, 126.0 (q, $J_{\text{C-F}}$ = 277.0 Hz), 117.7, 111.8, 80.2, 77.1 (q, $J_{\text{C-F}}$ = 2.8 Hz), 64.6, 36.9 (q, $J_{\text{C-F}}$ = 27.7 Hz), 32.4, 28.5, 26.3, 21.7; ^{19}F NMR (376 MHz, CDCl_3) δ -63.1 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{16}\text{H}_{23}\text{F}_3\text{O}_5\text{Na}$ 375.1390; Found: 375.1380.

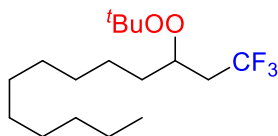


5-(tert-Butylperoxy)-7,7,7-trifluoroheptyl picolinate (4k) (10.9 mg, 15%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:2, R_f = 0.4). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 8.83-8.72 (m, 1H), 8.13 (d, J = 7.8 Hz, 1H), 7.85 (td, J = 7.7, 1.6 Hz, 1H), 7.53-7.41 (m, 1H), 4.44 (t, J = 6.8 Hz, 2H), 4.22-4.14 (m, 1H), 2.77-2.57 (m, 1H), 2.28-2.11 (m, 1H), 1.93-1.79 (m, 2H), 1.75-1.68 (m, 2H), 1.61-1.46 (m, 2H), 1.22 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 165.2, 149.9, 148.2, 137.0, 126.8, 126.1 (q, $J_{\text{C-F}}$ = 277.3 Hz), 125.1, 80.3, 77.1 (q, $J_{\text{C-F}}$ = 3.0 Hz), 65.7, 38.2, 36.9 (q, $J_{\text{C-F}}$ = 27.5 Hz), 32.5, 28.6, 26.4, 21.8; ^{19}F NMR (376 MHz, CDCl_3) δ -63.1 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{17}\text{H}_{24}\text{F}_3\text{NO}_4\text{Na}$ 386.1550; Found: 386.1534.

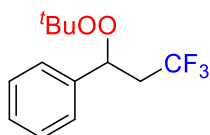


5-(tert-Butylperoxy)-7,7,7-trifluoroheptyl cyclobutanecarboxylate (4l) (59.9 mg, 88%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:20, R_f = 0.3). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 4.21-4.12 (m, 1H), 4.08 (t, J = 6.5 Hz, 2H), 3.18-3.06 (m, 1H), 2.74-2.60 (m, 1H), 2.34-2.21 (m, 3H), 2.20-2.13 (m, 2H), 2.04-1.87 (m, 2H), 1.72-1.61 (m, 4H), 1.59-1.50 (m, 1H), 1.48-1.38 (m, 1H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.5, 126.1 (q, $J_{\text{C-F}}$ = 276.7 Hz), 80.2, 77.2 (q, $J_{\text{C-F}}$ = 2.8 Hz), 64.0,

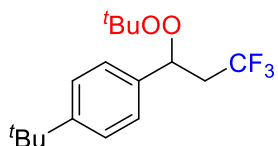
38.2, 36.9 (q, $J_{C-F} = 27.4$ Hz), 32.4, 28.6, 26.4, 25.2, 21.7, 18.4; ^{19}F NMR (376 MHz, CDCl_3) δ -63.2 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{16}\text{H}_{27}\text{F}_3\text{O}_4\text{Na}$ 363.1754; Found: 363.1737.



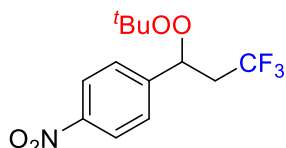
3-(tert-Butylperoxy)-1,1,1-trifluorotridecane (4m) (44.4 mg, 68%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:10, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 4.20-4.12 (m, 1H), 2.73-2.57 (m, 1H), 2.27-2.10 (m, 1H), 1.68-1.57 (m, 2H), 1.27 (s, 16H), 1.23 (s, 9H), 0.88 (t, $J = 7.0$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 126.2 (q, $J_{C-F} = 277.0$ Hz), 80.2, 77.5 (q, $J_{C-F} = 2.9$ Hz), 36.9 (q, $J_{C-F} = 27.6$ Hz), 32.9, 31.9, 29.6, 29.5, 29.4, 29.3, 26.4, 25.2, 22.7, 14.1; ^{19}F NMR (376 MHz, CDCl_3) δ -63.1 (s, 3F).



1-(tert-Butylperoxy)-3,3,3-trifluoropropylbenzene (4n) (38.8 mg, 74%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:10, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.40-7.30 (m, 5H), 5.15 (dd, $J = 7.2, 5.8$ Hz, 1H), 2.90-2.75 (m, 1H), 2.55-2.39 (m, 1H), 1.22 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 139.1, 128.6, 128.5, 126.9, 125.5 (q, $J_{C-F} = 277.1$ Hz), 80.8, 79.8 (q, $J_{C-F} = 2.9$ Hz), 39.2 (q, 28.2 Hz), 26.3; ^{19}F NMR (376 MHz, CDCl_3) δ -63.3 (s, 3F).

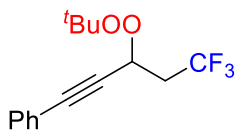


1-(tert-Butyl)-4-(1-(tert-butylperoxy)-3,3,3-trifluoropropyl)benzene (4o) (43.3 mg, 68%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:10, $R_f = 0.6$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.38 (d, $J = 7.8$ Hz, 2H), 7.26 (d, $J = 7.8$ Hz, 2H), 5.14 (t, $J = 6.1$ Hz, 1H), 2.93-2.75 (m, 1H), 2.56-2.39 (m, 1H), 1.32 (s, 9H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 151.4, 135.9, 127.0, 125.6 (q, $J_{C-F} = 276.6$ Hz), 125.4, 80.8, 79.6 (q, $J_{C-F} = 3.2$ Hz), 39.1 (q, 27.8 Hz), 34.6, 31.3, 26.3; ^{19}F NMR (376 MHz, CDCl_3) δ -63.3 (s, 3F).

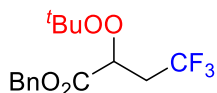


3-(tert-Butylperoxy)-5,5,5-trifluoropent-1-yn-1-ylbenzene (4p) (28.9 mg, 47%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:5, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 8.25 (d, $J = 8.4$ Hz, 2H), 7.54 (d, $J = 8.3$ Hz, 2H), 5.27 (dd, $J = 8.1, 5.1$ Hz, 1H), 2.82-2.66 (m, 1H), 2.51-2.35 (m, 1H), 1.22 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 147.9, 146.6, 127.5, 125.1 (q, J_{C-F}

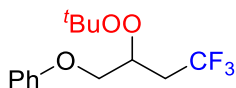
$F = 277.5$ Hz), 123.8, 81.3, 78.7 (q, $J_{C-F} = 3.1$ Hz), 39.2 (q, $J_{C-F} = 28.9$ Hz), 26.2; ^{19}F NMR (376 MHz, $CDCl_3$) δ -63.3 (s, 3F); HRMS (ESI) m/z : $[M+Na]^+$ Calcd for $C_{13}H_{16}F_3NO_4Na$ 330.0924; Found: 330.0919.



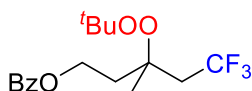
(3-(*tert*-Butylperoxy)-5,5,5-trifluoropent-1-yn-1-yl)benzene (4q) (14.3 mg, 25%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:5, $R_f = 0.5$). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 7.48-7.42 (m, 2H), 7.36-7.28 (m, 3H), 5.07 (t, $J = 6.4$ Hz, 1H), 2.90-2.75 (m, 1H), 2.72-2.57 (m, 1H), 1.29 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 131.8, 128.8, 128.3, 125.1 (q, $J_{C-F} = 276.9$ Hz), 122.1, 86.5, 85.0, 68.2 (q, $J_{C-F} = 3.9$ Hz), 38.3 (q, $J_{C-F} = 28.5$ Hz), 29.7, 26.4; ^{19}F NMR (376 MHz, $CDCl_3$) δ -63.6 (s, 3F); HRMS (ESI) m/z : $[M+Na]^+$ Calcd for $C_{15}H_{17}F_3O_2Na$ 309.1073; Found: 309.1068. 7.40 – 7.27 (m, 5H), 5.37 – 5.05 (m, 2H), 3.08 – 2.60 (m, 2H), 1.55 (s, 3H), 1.16 (d, $J = 1.4$ Hz, 9H).



Benzyl 2-(*tert*-butylperoxy)-4,4,4-trifluorobutanoate (4r) (21.1 mg, 33%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:10, $R_f = 0.5$). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 7.39-7.33 (m, 5H), 5.30-5.19 (m, 2H), 4.73 (dd, $J = 7.3, 5.5$ Hz, 1H), 2.67-2.54 (m, 2H), 1.22 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.2, 135.2, 128.6, 128.5, 128.3, 125.2 (q, $J_{C-F} = 277.2$ Hz), 81.6, 76.4 (q, $J_{C-F} = 3.0$ Hz), 67.3, 34.4 (q, $J_{C-F} = 30.0$ Hz), 26.1; ^{19}F NMR (376 MHz, $CDCl_3$) δ -63.9 (s, 3F).

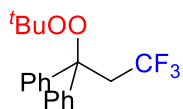


(2-(*tert*-Butylperoxy)-4,4,4-trifluorobutoxy)benzene (4s) (15.8 mg, 27%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:4, $R_f = 0.4$). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 7.32-7.26 (m, 2H), 6.97 (t, $J = 7.5$ Hz, 1H), 6.93 (d, $J = 7.9$ Hz, 2H), 4.57-4.50 (m, 1H), 4.19 (dd, $J = 10.0, 4.1$ Hz, 1H), 4.14 (dd, $J = 10.0, 5.2$ Hz, 1H), 2.65-2.50 (m, 2H), 1.25 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 158.4, 129.5, 126.0 (q, $J_{C-F} = 276.8$ Hz), 121.2, 114.6, 81.0, 76.1 (q, $J_{C-F} = 3.0$ Hz), 66.7, 34.3 (q, $J_{C-F} = 29.5$ Hz), 26.2; ^{19}F NMR (376 MHz, $CDCl_3$) δ -63.5 (s, 3F).

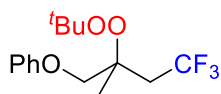


3-(*tert*-Butylperoxy)-5,5,5-trifluoro-3-methylpentyl benzoate (4t) (53.6 mg, 77%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:20, $R_f = 0.4$). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 8.04 (d, $J = 7.6$ Hz, 2H), 7.56 (t, $J = 7.0$ Hz, 1H), 7.44 (t, $J = 7.4$ Hz, 2H), 4.48 (t, $J = 7.0$ Hz, 2H), 2.67-2.52 (m, 2H), 2.35-2.22 (m, 1H), 2.16-2.06 (m, 1H), 1.41 (s, 3H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.5, 132.9, 130.3, 129.5, 128.3, 126.0 (q, $J_{C-F} = 278.2$ Hz), 79.3, 78.2 (q, $J_{C-F} = 2.2$ Hz), 60.8, 41.2

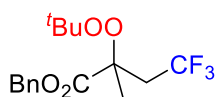
(q, $J_{C-F} = 27.0$ Hz), 36.2, 26.5, 22.2 (q, $J_{C-F} = 1.6$ Hz); ^{19}F NMR (376 MHz, CDCl_3) δ -59.9 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{17}\text{H}_{23}\text{F}_3\text{O}_4\text{Na}$ 371.1441; Found: 371.1435.



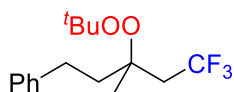
(1-(*tert*-Butylperoxy)-3,3,3-trifluoropropane-1,1-diyl)dibenzene (4u) (26.4 mg, 39%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:10, $R_f = 0.3$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.31-7.26 (m, 8H), 7.25-7.20 (m, 2H), 3.40 (q, $J = 10.4$ Hz, 2H), 1.14 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 143.1, 127.7, 127.3, 126.8, 125.7 (q, $J_{C-F} = 278.5$ Hz), 83.0 (q, $J_{C-F} = 2.0$ Hz), 79.9, 39.4 (q, $J_{C-F} = 27.0$ Hz), 26.5; ^{19}F NMR (376 MHz, CDCl_3) δ -58.9 (s, 3F).



(2-(*tert*-Butylperoxy)-4,4,4-trifluoro-2-methylbutoxy)benzene (4v) (20.8 mg, 34%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:4, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.28 (t, $J = 7.6$ Hz, 2H), 6.96 (t, $J = 7.4$ Hz, 1H), 6.91 (d, $J = 8.1$ Hz, 2H), 4.07 (d, $J = 9.4$ Hz, 1H), 3.97 (d, $J = 9.5$ Hz, 1H), 4.16-4.11 (m, 1H), 2.77-2.56 (m, 2H), 1.46 (s, 3H), 1.21 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 158.7, 129.4, 126.0 (q, $J_{C-F} = 277.6$ Hz), 121.0, 114.7, 79.6, 79.0 (q, $J_{C-F} = 1.6$ Hz), 70.8, 37.7 (q, $J_{C-F} = 27.6$ Hz), 26.4, 19.7 (q, $J_{C-F} = 1.6$ Hz); ^{19}F NMR (376 MHz, CDCl_3) δ -59.9 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{15}\text{H}_{21}\text{F}_3\text{O}_3\text{Na}$ 329.1335; Found: 329.1327.

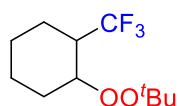


(2-(*tert*-Butylperoxy)-4,4,4-trifluoro-2-methylbutoxy)benzene (4w) (20.8 mg, 34%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:20, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.40-7.27 (m, 5H), 5.37-5.05 (m, 2H), 3.08-2.60 (m, 2H), 1.55 (s, 3H), 1.16 (d, $J = 1.4$ Hz, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 171.2, 135.5, 128.5, 128.3, 128.2, 125.6 (q, $J_{C-F} = 277.4$ Hz), 80.6 (q, $J_{C-F} = 2.2$ Hz), 80.4, 67.1, 37.6 (q, $J_{C-F} = 28.5$ Hz), 26.3, 19.8 (q, $J_{C-F} = 1.6$ Hz); ^{19}F NMR (376 MHz, CDCl_3) δ -60.0 (s, 3F).

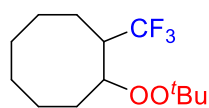


(3-(*tert*-Butylperoxy)-5,5,5-trifluoro-3-methylpentyl)benzene/(3-((*tert*-butylperoxy)methyl)-4,4,4-trifluoro-3-methylbutyl)benzene (4x) (32.3 mg, 53%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:5, $R_f = 0.7$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.31-7.24 (m, 2H), 7.22-7.14 (m, 3H), 2.79-2.41 (m, 4H), 2.03 (td, $J = 13.0, 4.9$ Hz, 1H), 1.88 (td, $J = 13.2, 5.4$ Hz, 1H), 1.36 (s, 3H), 1.25 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 142.4, 128.4, 128.3, 126.2 (q, $J_{C-F} = 278.2$ Hz), 125.8, 79.1, 79.0 (q, $J_{C-F} = 2.1$ Hz), 40.7 (q, $J_{C-F} = 27.0$ Hz), 29.5, 26.6, 22.0 (q, $J_{C-F} = 1.7$ Hz); ^{19}F NMR (376 MHz, CDCl_3) δ -60.0

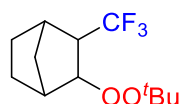
(s, 3F); HRMS (ESI) m/z : $[M+Na]^+$ Calcd for $C_{16}H_{23}F_3O_2Na$ 327.1542; Found: 327.1538.



1-(tert-Butylperoxy)-2-(trifluoromethyl)cyclohexane (4y) (38.8 mg, 61%, d.r. = 2.1:1). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:20, R_f = 0.4). The title compound was obtained as colorless oil. Major: 1H NMR (400 MHz, $CDCl_3$) 4.01 (td, J = 9.3, 4.0 Hz, 1H), 2.46-2.32 (m, 1H), 2.28-2.13 (m, 1H), 2.06-1.94 (m, 1H), 1.79-1.66 (m, 2H), 1.42-1.28 (m, 4H), 1.24 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 126.9 (q, J_{C-F} = 280.4 Hz), 80.3, 79.5 (q, J_{C-F} = 1.8 Hz), 44.1 (q, J_{C-F} = 25.5 Hz), 30.2, 26.3, 24.2 (q, J_{C-F} = 3.1 Hz), 23.9, 23.0; ^{19}F NMR (376 MHz, $CDCl_3$) δ -68.2 (s, 3F); HRMS (ESI) m/z : $[M+Na]^+$ Calcd for $C_{11}H_{19}F_3O_2Na$ 263.1229; Found: 263.1226.

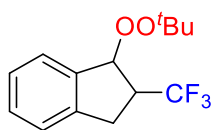


1-(tert-Butylperoxy)-2-(trifluoromethyl)cyclooctane (4z) (35.4 mg, 66%, d.r. = 1.7:1). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:10, R_f = 0.5). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 4.43-4.36 (m, 0.38H), 4.34-4.26 (m, 0.62H), 2.53-2.17 (m, 1H), 2.15-1.98 (m, 1H), 1.94-1.82 (m, 2H), 1.80-1.35 (m, 9H), 1.23 (s, 5.7H), 1.22 (s, 3.3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 128.0 (q, J_{C-F} = 280.2 Hz), 127.9 (q, J_{C-F} = 280.2 Hz), 80.7 (q, J_{C-F} = 1.8 Hz), 80.1, 80.0, 78.0 (q, J_{C-F} = 2.6 Hz), 44.5 (q, 24.6 Hz), 44.3 (q, J_{C-F} = 24.6 Hz), 28.6, 27.8, 27.4, 27.2, 26.4, 26.3, 26.0, 25.5, 25.2, 24.3, 22.4 (q, J_{C-F} = 2.9 Hz), 21.0, 20.9 (q, J_{C-F} = 2.0 Hz); ^{19}F NMR (376 MHz, $CDCl_3$) δ -68.2 (s, 1.89F), -69.2 (s, 1.11F); HRMS (ESI) m/z : $[M+H]^+$ Calcd for $C_{13}H_{24}F_3O_2$ 269.1723; Found: 269.1723.

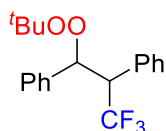


2-(tert-Butylperoxy)-3-(trifluoromethyl)bicyclo[2.2.1]heptane (4aa) (20.7 mg, 41%, d.r. = 1.5:1). **Major:** Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:10, R_f = 0.7). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 4.44-4.34 (m, 1H), 2.58 (s, 1H), 2.40 (d, J = 4.3 Hz, 1H), 1.91-1.72 (m, 2H), 1.69-1.55 (m, 2H), 1.46-1.38 (m, 1H), 1.35-1.26 (m, 2H), 1.24 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 127.1 (q, J_{C-F} = 277.7 Hz), 84.0 (q, J_{C-F} = 1.9 Hz), 80.4, 50.5 (q, J_{C-F} = 27.6 Hz), 39.4, 37.6 (q, J_{C-F} = 1.7 Hz), 35.2 (q, J_{C-F} = 1.1 Hz), 29.9, 26.3, 19.6; ^{19}F NMR (376 MHz, $CDCl_3$) δ -69.3 (s, 3F); HRMS (ESI) m/z : $[M+Na]^+$ Calcd for $C_{12}H_{19}F_3O_2Na$ 275.1229; Found: 275.1218. **Minor:** Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:10, R_f = 0.6). The title compound was obtained as colorless oil. 1H NMR (400 MHz, $CDCl_3$) δ 4.18 (d, J = 7.7 Hz, 1H), 2.66 (d, J = 4.9 Hz, 1H), 2.43 (s, 1H), 2.37-2.22 (m, 1H), 1.86 (d, J = 10.6 Hz, 1H), 1.67-1.59 (m, 1H), 1.57-1.47 (m, 1H), 1.24 (s, 9H), 1.19-1.03 (m, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 126.0 (q, J_{C-F} = 279.0 Hz), 85.3 (q, J_{C-F} = 1.4 Hz), 80.5, 50.8 (q, J_{C-F} = 26.4 Hz), 39.8, 37.0 (q, J_{C-F} = 2.0 Hz), 33.7 (q, J_{C-F} = 1.3 Hz), 29.6, 26.3, 23.0; ^{19}F NMR (376 MHz, $CDCl_3$) δ -62.1 (s, 3F); HRMS (ESI) m/z : $[M+Na]^+$ Calcd

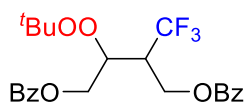
for C₁₂H₁₉F₃O₂Na 275.1229; Found: 275.1218.



1-(tert-Butylperoxy)-2-(trifluoromethyl)-2,3-dihydro-1H-indene (4ab) (10.4 mg, 19%, d.r. = 12.9:1). Isolated by flash column chromatography (dichloromethane/petroleum ether, R_f = 0.4). The title compound was obtained as colorless oil. ¹H NMR (400 MHz, CDCl₃) δ 7.51 (d, *J* = 7.5 Hz, 1H), 7.35-7.29 (m, 1H), 7.28-7.22 (m, 2H), 5.62 (d, *J* = 2.4 Hz, 0.93H), 5.46 (d, *J* = 6.0 Hz, 0.07H), 3.40-3.25 (m, 2H), 3.11-3.00 (m, 1H), 1.27 (s, 8.35H), 1.20 (s, 0.65H); ¹³C NMR (100 MHz, CDCl₃) δ 141.7, 138.5, 129.6, 127.4 (q, *J*_{C-F} = 278.4 Hz), 127.1, 126.3, 124.7, 86.9 (q, *J*_{C-F} = 2.8 Hz), 80.7, 47.0 (q, *J*_{C-F} = 26.9 Hz), 31.0 (q, *J*_{C-F} = 2.8 Hz), 26.4, 26.2; ¹⁹F NMR (376 MHz, CDCl₃) δ -65.4 (s, 0.22F), -70.6 (s, 2.78F).

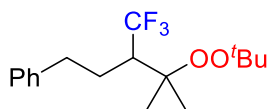


(1-(tert-Butylperoxy)-3,3,3-trifluoropropane-1,2-diyl)dibenzene (4ac) (30.5 mg, 45%, d.r. = 1.4:1). **Major:** Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:5, R_f = 0.4). The title compound was obtained as colorless oil. ¹H NMR (400 MHz, CDCl₃) δ 7.30-7.18 (m, 8H), 7.13-7.08 (m, 2H), 5.52 (d, *J* = 4.6 Hz, 1H), 3.51 (qd, *J* = 9.8, 4.7 Hz, 1H), 1.16 (s, 9H); ¹³C NMR (100 MHz, CDCl₃) δ 138.7, 130.7 (q, *J*_{C-F} = 1.3 Hz), 130.6, 128.2, 128.0, 127.9, 127.8, 126.8, 125.7 (q, *J*_{C-F} = 280.0 Hz), 82.4, (q, *J*_{C-F} = 2.3 Hz), 80.7, 50.4 (q, *J*_{C-F} = 23.4 Hz), 26.3; ¹⁹F NMR (376 MHz, CDCl₃) δ -65.2 (s, 3F); HRMS (ESI) *m/z*: [M+Na]⁺ Calcd for C₁₉H₂₁F₃O₂Na 361.1386; Found: 361.1375. **Minor:** Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:5, R_f = 0.4). The title compound was obtained as colorless oil. ¹H NMR (400 MHz, CDCl₃) δ 7.20-7.09 (m, 6H), 7.04-6.97 (m, 4H), 5.36 (d, *J* = 8.8 Hz, 1H), 3.82-3.70 (m, 1H), 1.23 (s, 9H); ¹³C NMR (100 MHz, CDCl₃) δ 137.8, 132.0 (q, *J*_{C-F} = 1.9 Hz), 139.6, 128.2, 128.0, 127.8, 127.7, 127.6, 126.1 (q, *J*_{C-F} = 280.0 Hz), 84.5, (q, *J*_{C-F} = 1.9 Hz), 80.8, 54.3 (q, *J*_{C-F} = 26.3 Hz), 26.4; ¹⁹F NMR (376 MHz, CDCl₃) δ -63.4 (s, 3F); HRMS (ESI) *m/z*: [M+Na]⁺ Calcd for C₁₉H₂₁F₃O₂Na 361.1386; Found: 361.1375.

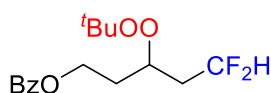


2-(tert-Butylperoxy)-3-(trifluoromethyl)butane-1,4-diyl dibenzoate (4ad) (41.8 mg, 46%, d.r. = 1:1). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:10, R_f = 0.4). The title compound was obtained as colorless oil. ¹H NMR (400 MHz, CDCl₃) δ 8.04 (d, *J* = 9.1 Hz, 4H), 7.60-7.54 (m, 2H), 7.47-7.41 (m, 4H), 4.78-4.68 (m, 4H), 4.67-4.63 (m, 0.50H), 4.55-4.48 (m, 0.50H), 3.40-3.29 (m, 0.50H), 3.21-3.08 (m, 0.50H), 1.25 (s, 4.50H), 1.22 (s, 4.50H); ¹³C NMR (100 MHz, CDCl₃) δ 166.1, 166.0, 165.9, 165.8, 133.3-133.2, 129.7-129.6, 129.5, 129.4, 128.5, 129.4, 126.0 (q, *J*_{C-F} = 280.1 Hz), 125.8 (q, *J*_{C-F} = 281.0 Hz), 81.3, 81.0, 77.9 (q, *J*_{C-F} = 2.2 Hz), 76.5 (q, *J*_{C-F} = 2.2 Hz), 62.6 (q, *J*_{C-F} = 1.3 Hz), 62.3 (q, *J*_{C-F} = 1.5 Hz), 58.9 (q, *J*_{C-F} = 2.9 Hz), 58.8 (q, *J*_{C-F} = 2.8 Hz), 43.9

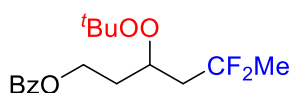
(q, $J_{C-F} = 26.3$ Hz), 43.5 (q, $J_{C-F} = 25.5$ Hz), 26.2; ^{19}F NMR (376 MHz, CDCl_3) δ -65.1 (s, 1.5F), -65.8 (s, 1.5F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{23}\text{H}_{25}\text{F}_3\text{O}_6\text{Na}$ 477.1495; Found: 477.1478.



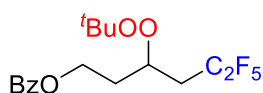
(3-(*tert*-Butylperoxy)-5,5,5-trifluoro-4,4-dimethylpentyl)benzene (4ae) (15.9 mg, 25%). Isolated by flash column chromatography (petroleum ether, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.31-7.26 (m, 2H), 7.23-7.18 (m, 3H), 2.90-2.81 (m, 1H), 2.78-2.68 (m, 2H), 2.15-2.05 (m, 1H), 1.82-1.70 (m, 1H), 1.42-1.38 (m, 3H), 1.22 (s, 9H), 1.30-1.11 (m, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 142.1, 128.5, 128.4, 128.2 (q, $J_{C-F} = 281.6$ Hz), 125.9, 80.0 (q, $J_{C-F} = 1.6$ Hz), 78.8, 48.5 (q, $J_{C-F} = 23.3$ Hz), 35.7 (q, $J_{C-F} = 1.5$ Hz), 27.0 (q, $J_{C-F} = 2.3$ Hz), 26.6, 25.4 (q, $J_{C-F} = 2.9$ Hz), 21.1 (q, $J_{C-F} = 1.7$ Hz); ^{19}F NMR (376 MHz, CDCl_3) δ -63.2 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{17}\text{H}_{25}\text{F}_3\text{O}_2\text{Na}$ 341.1699; Found: 341.1693.



3-(*tert*-Butylperoxy)-5,5-difluorohexyl benzoate (4af) (34.8 mg, 55%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:10, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 8.06-8.01 (m, 2H), 7.59-7.53 (m, 1H), 7.48-7.41 (m, 2H), 6.10 (tdd, $J = 56.9, 6.4, 3.3$ Hz, 1H), 4.48-4.42 (m, 2H), 4.39-4.31 (m, 1H), 2.37-2.19 (m, 1H), 2.18-1.99 (m, 3H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 166.4, 133.0, 130.1, 129.5, 128.4, 115.8 (t, $J_{C-F} = 238.1$ Hz), 80.4, 75.2 (dd, $J_{C-F} = 8.6, 4.4$ Hz), 61.4, 38.5 (t, $J_{C-F} = 21.2$ Hz), 32.3, 26.4; ^{19}F NMR (376 MHz, CDCl_3) δ -114.1 (d, $J = 285.9$, 1F), -117.4 (d, $J = 285.0$, 1F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{16}\text{H}_{22}\text{F}_2\text{O}_4\text{Na}$ 339.1378; Found: 339.1370.

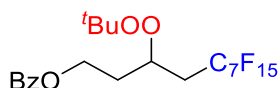


3-(*tert*-Butylperoxy)-5,5-difluorohexyl benzoate (4ag) (40.3 mg, 61%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:10, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 8.07-8.00 (m, 2H), 7.59-7.53 (m, 1H), 7.48-7.41 (m, 2H), 4.47 (t, $J = 6.5$ Hz, 2H), 4.42-4.35 (m, 1H), 2.50-2.34 (m, 1H), 2.22-2.03 (m, 3H), 1.68 (t, $J = 18.9$ Hz, 3H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 166.5, 132.9, 130.2, 129.5, 128.4, 123.3 (t, $J_{C-F} = 240.1$ Hz), 80.1, 75.6 (dd, $J_{C-F} = 5.5, 3.8$ Hz), 61.7, 40.8 (t, $J_{C-F} = 24.7$ Hz), 32.7, 26.5, 24.1 (t, $J_{C-F} = 27.6$ Hz); ^{19}F NMR (376 MHz, CDCl_3) δ -85.6 (d, $J = 242.8$, 1F), -89.9 (d, $J = 242.7$, 1F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{17}\text{H}_{24}\text{F}_2\text{O}_4\text{Na}$ 353.1535; Found: 353.1527.

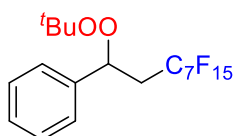


3-(*tert*-Butylperoxy)-5,5,6,6,6-pentafluorohexyl benzoate (4ah) (53.0 mg, 72%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:20, $R_f = 0.4$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 8.05-8.00 (m, 2H), 7.59-7.54 (m, 1H), 7.47-7.41 (m, 2H), 4.57-4.50 (m, 1H), 4.50-

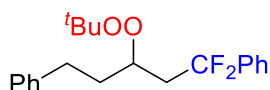
4.44 (m, 2H), 2.82-2.65 (m, 1H), 2.32-2.21 (m, 1H), 2.21-2.11 (m, 2H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 166.4, 133.0, 130.1, 129.5, 128.4, 120.1-111.3 (m, C_2F_5), 80.5, 73.7 (t, $J_{\text{C-F}} = 2.3$ Hz), 61.2, 33.7 (t, $J_{\text{C-F}} = 21.3$ Hz), 32.6, 26.3; ^{19}F NMR (376 MHz, CDCl_3) δ -85.7 (s, 3F), -115.4 to -117.1 (m, 2F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{17}\text{H}_{21}\text{F}_5\text{O}_4\text{Na}$ 407.1252; Found: 407.1241.



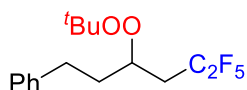
3-(*tert*-Butylperoxy)-5,5,6,6,7,7,8,8,9,9,10,10,11,11,11-pentadecafluoroundecyl benzoate (4ai) (91.4 mg, 72%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:20, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 8.05-8.01 (m, 2H), 7.59-7.54 (m, 1H), 7.47-7.41 (m, 2H), 4.60-4.52 (m, 1H), 4.52-4.45 (m, 2H), 2.87-2.68 (m, 1H), 2.36-2.09 (m, 3H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 166.4, 133.0, 130.1, 129.5, 128.4, 121.6-104.3 (m, C_7F_{15}), 80.5, 73.8 (t, $J_{\text{C-F}} = 2.6$ Hz), 61.2, 34.0 (t, $J_{\text{C-F}} = 21.1$ Hz), 32.7, 26.3; ^{19}F NMR (376 MHz, CDCl_3) δ -80.8 (t, $J = 9.8$ Hz, 3F), -111.4 to -113.5 (m, 2F), -121.4 to -123.7 (m, 8F), -126.0 to -126.2 (m, 2F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{22}\text{H}_{21}\text{F}_{15}\text{O}_4\text{Na}$ 657.1093; Found: 657.1079.



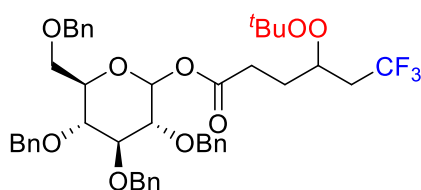
(1-(*tert*-Butylperoxy)-3,3,4,4,5,5,6,6,7,7,8,8,9,9,9-pentadecafluorononyl)benzene (4aj) (48.4 mg, 43%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:10, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.41-7.31 (m, 5H), 5.27 (dd, $J = 6.9, 5.5$ Hz, 1H), 2.89-2.71 (m, 1H), 2.54-2.36 (m, 1H), 1.22 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 139.4, 128.6, 128.5, 126.9, 121.6-104.3 (m, C_7F_{15}), 80.8, 78.9, 36.0 (t, $J_{\text{C-F}} = 21.1$ Hz), 26.3; ^{19}F NMR (376 MHz, CDCl_3) δ -80.8 (t, $J = 10.1$ Hz, 3F), -111.2 to -113.1 (m, 2F), -121.4 to -123.8 (m, 8F), -126.1 to -126.3 (m, 2F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{19}\text{H}_{17}\text{F}_{15}\text{O}_2\text{Na}$ 585.0881; Found: 585.0878.



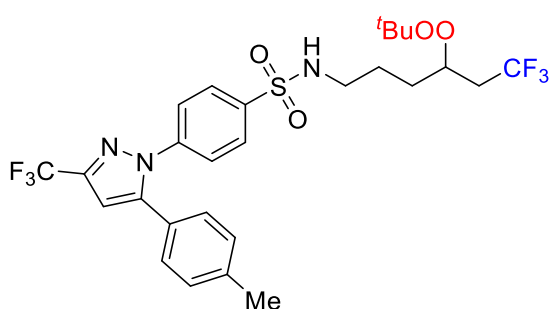
(3-(*tert*-Butylperoxy)-1,1-difluoropentane-1,5-diyl)dibenzene (4ak) (20.2 mg, 29%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:5, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.48-7.41 (m, 2H), 7.42-7.38 (m, 3H), 7.30-7.24 (m, 2H), 7.20-7.14 (m, 3H), 4.20-4.12 (m, 1H), 2.85-2.60 (m, 3H), 2.35-2.19 (m, 1H), 2.00-1.90 (m, 2H), 1.17 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 141.9, 137.3 (t, $J_{\text{C-F}} = 26.3$ Hz), 129.7 (t, $J_{\text{C-F}} = 1.8$ Hz), 128.4, 128.3 (t, $J_{\text{C-F}} = 2.6$ Hz), 125.8, 125.0 (t, $J_{\text{C-F}} = 6.2$ Hz), 122.1 (t, $J_{\text{C-F}} = 243.1$ Hz), 80.4, 75.2 (dd, $J_{\text{C-F}} = 8.6, 4.4$ Hz), 61.4, 38.5 (t, $J_{\text{C-F}} = 21.2$ Hz), 32.3, 26.4; ^{19}F NMR (376 MHz, CDCl_3) δ -89.9 (d, $J = 247.4$, 1F), -96.0 (d, $J = 247.4$, 1F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{21}\text{H}_{26}\text{F}_2\text{O}_2\text{Na}$ 371.1793; Found: 371.1791.



(3-(*tert*-Butylperoxy)-5,5,6,6,6-pentafluorohexyl)benzene (4a1) (53.8 mg, 79%). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:10, R_f = 0.5). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.32-7.26 (m, 2H), 7.22-7.16 (m, 3H), 4.36-4.28 (m, 1H), 2.87-2.77 (m, 2H), 2.75-2.57 (m, 2H), 2.21-1.91 (m, 3H), 1.25 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 141.4, 128.4, 128.3, 126.0, 120.8-112.1 (m, C_2F_5), 80.2, 76.0 (t, $J_{\text{C-F}}$ = 2.2 Hz), 35.2, 33.6 (t, $J_{\text{C-F}}$ = 21.0 Hz), 31.5, 26.4; ^{19}F NMR (376 MHz, CDCl_3) δ -85.9 (s, 3F), -115.3 to -117.6 (m, 2F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{16}\text{H}_{21}\text{F}_5\text{O}_2\text{Na}$ 363.1354; Found: 363.1345.

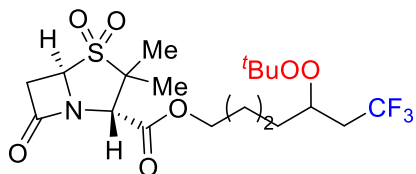


2,3,4,6-Tetra-*O*-benzyl-*D*-glucopyranosyl 4-(*tert*-butylperoxy)-6,6,6-trifluorohexanoate (6a) (110.9 mg, 71%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:5, R_f = 0.5). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.38-7.22 (m, 18H), 7.18-7.07 (m, 2H), 6.40 (s, 0.5H), 5.67-5.60 (m, 0.5H), 5.00-4.43 (m, 8H), 4.25-4.19 (m, 1H), 3.78-3.50 (m, 6H), 2.72-1.89 (m, 6H), 1.26-1.20 (m, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 171.6-171.2 (m), 138.7-137.7 (m), 128.6-127.5 (m), 125.9 (q, $J_{\text{C-F}}$ = 277.4 Hz), 94.1, 94.0, 90.1, 90.0, 84.8, 84.6, 81.6, 81.1, 81.0, 80.3, 75.9, 75.6, 75.2, 74.9, 73.5-73.0 (m), 68.1, 61.4, 36.9 (q, $J_{\text{C-F}}$ = 28.3 Hz), 36.8 (q, $J_{\text{C-F}}$ = 27.8 Hz), 33.8-33.1 (m), 30.0 29.9, 29.8, 27.9, 27.6, 26.4, 26.3, 2.3-21.2 (m); ^{19}F NMR (376 MHz, CDCl_3) δ -62.9 to -63.2 (m), -66.1 to -66.4 (m); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{44}\text{H}_{51}\text{F}_3\text{O}_9\text{Na}$ 803.3377; Found: 803.3369.

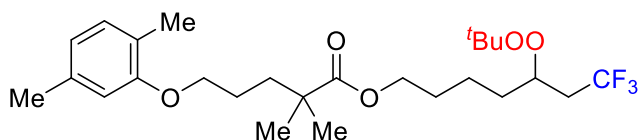


***N*-(4-(*tert*-Butylperoxy)-6,6,6-trifluorohexyl)-4-(5-(*p*-tolyl)-3-(trifluoromethyl)-1*H*-pyrazol-1-yl)benzenesulfonamide (6b)** (96.0 mg, 79%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:3, R_f = 0.5). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.84 (d, J = 8.2 Hz, 2H), 7.47 (d, J = 8.2 Hz, 2H), 7.17 (d, J = 7.7 Hz, 2H), 7.11 (d, J = 7.6 Hz, 2H), 6.74 (s, 1H), 4.89 (t, J = 6.2 Hz, 1H), 4.21-4.07 (m, 1H), 3.06-2.91 (m, 2H), 2.71-2.51 (m, 1H), 2.38 (s, 3H), 2.25-2.06 (m, 1H), 1.75-1.65 (m, 2H), 1.63-1.53 (m, 2H), 1.21 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 145.2, 144.1 (q, $J_{\text{C-F}}$ = 38.8 Hz), 142.5, 139.8, 139.6, 129.7, 128.7, 128.0, 125.9 (q, $J_{\text{C-F}}$ = 276.9 Hz), 125.7, 125.5, 121.0 (q, $J_{\text{C-F}}$ = 269.0 Hz), 106.2, 80.6, 76.8 (q,

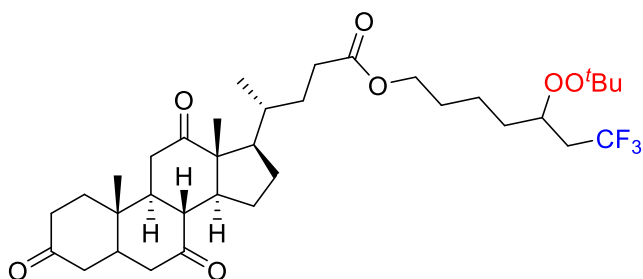
$J_{C-F} = 2.9$ Hz), 43.0, 36.8 (q, $J_{C-F} = 27.7$ Hz), 29.5, 26.3, 25.2, 21.2; ^{19}F NMR (376 MHz, CDCl_3) δ -62.5 (s, 3F), -63.2 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{27}\text{H}_{31}\text{F}_6\text{N}_3\text{O}_4\text{SNa}$ 630.1832; Found: 630.1812.



5-(*tert*-Butylperoxy)-7,7,7-trifluoroheptyl (2*S*,5*R*)-3,3-dimethyl-7-oxo-4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylate 4,4-dioxide (6c) (67.2 mg, 71%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:3, $R_f = 0.3$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 4.61 (dd, $J = 4.1, 2.3$ Hz, 1H), 4.38 (s, 1H), 4.22 (t, $J = 6.7$ Hz, 2H), 4.20-4.13 (m, 1H), 3.55-3.38 (m, 2H), 2.78-2.60 (m, 1H), 2.28-2.11 (m, 1H), 1.78-1.65 (m, 4H), 1.61 (s, 3H), 1.59-1.44 (m, 2H), 1.42 (s, 3H), 1.23 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 170.7, 167.0, 126.0 (q, $J_{C-F} = 277.0$ Hz), 80.3, 77.0 (q, $J_{C-F} = 1.6$ Hz), 66.2, 63.3, 62.6, 61.1, 38.3, 36.9 (q, $J_{C-F} = 27.4$ Hz), 32.3, 28.3, 26.4, 21.6, 21.6, 20.3, 18.6; ^{19}F NMR (376 MHz, CDCl_3) δ -63.1 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{19}\text{H}_{30}\text{F}_3\text{NO}_7\text{SNa}$ 496.1587; Found: 496.1582.

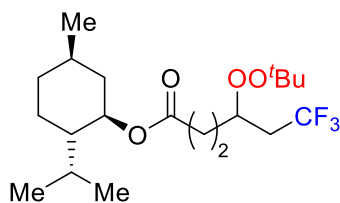


5-(*tert*-Butylperoxy)-7,7,7-trifluoroheptyl 5-(2,5-dimethylphenoxy)-2,2-dimethylpentanoate (6d) (63.8 mg, 65%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:20, $R_f = 0.3$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 6.99 (d, $J = 7.4$ Hz, 1H), 6.65 (d, $J = 7.5$ Hz, 1H), 6.60 (s, 1H), 4.20-4.11 (m, 1H), 4.10-4.03 (m, 2H), 3.94-3.88 (m, 2H), 2.73-2.57 (m, 1H), 2.30 (s, 3H), 2.17 (s, 3H), 1.74-1.70 (m, 4H), 1.70-1.61 (m, 4H), 1.46-1.36 (m, 2H), 1.22 (s, 9H), 1.21 (s, 6H); ^{13}C NMR (100 MHz, CDCl_3) δ 177.8, 157.0, 136.4, 130.3, 126.1 (q, $J_{C-F} = 276.5$ Hz), 123.6, 120.7, 112.0, 80.2, 77.2 (q, $J_{C-F} = 2.7$ Hz), 68.0, 64.1, 42.1, 37.1, 37.0 (q, $J_{C-F} = 27.6$ Hz), 32.5, 28.6, 26.4, 25.2, 25.1, 21.8, 21.4, 15.7; ^{19}F NMR (376 MHz, CDCl_3) δ -63.1 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{26}\text{H}_{41}\text{F}_3\text{O}_5\text{Na}$ 513.2798; Found: 513.2775.

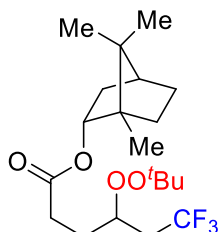


5-(*tert*-Butylperoxy)-7,7,7-trifluoroheptyl (5 β)-3,7,12-trioxocholan-24-oate (6e) (65.6 mg, 51%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:1, $R_f = 0.6$). The title compound was obtained as white solid. ^1H NMR (400 MHz, CDCl_3) δ 4.21-4.12 (m, 1H), 4.07 (t, $J = 6.7$ Hz, 2H), 2.97-2.80 (m, 3H), 2.75-2.58 (m, 1H), 2.46-2.05 (m, 12H), 2.06-1.91 (m, 4H), 1.90-1.78 (m, 2H), 1.72-1.59 (m, 5H), 1.57-1.44 (m, 2H), 1.40 (s, 3H), 1.35-1.25 (m, 3H), 1.23 (s, 9H), 1.07 (s, 3H), 0.85 (d, $J = 6.6$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 211.8, 208.9,

208.5, 174.0, 126.1 (q, $J_{C-F} = 276.8$ Hz), 80.2, 77.1 (q, $J_{C-F} = 3.0$ Hz), 64.0, 56.9, 51.8, 49.0, 46.8, 45.7, 45.5, 44.9, 42.8, 38.6, 36.9 (q, $J_{C-F} = 27.5$ Hz), 36.4, 36.0, 35.5, 35.3, 32.4, 31.5, 30.5, 28.5, 27.6, 26.4, 25.1, 21.9, 21.7, 18.6, 11.8; ^{19}F NMR (376 MHz, CDCl_3) δ -63.1 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{35}\text{H}_{53}\text{F}_3\text{O}_7\text{Na}$ 665.3636; Found: 665.3610.



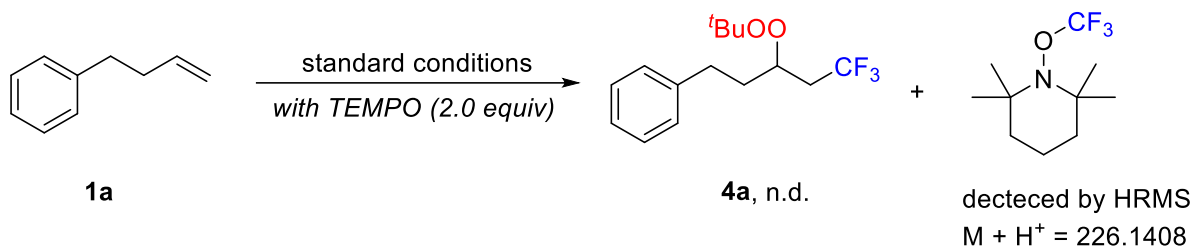
(1R,2S,5R)-2-Isopropyl-5-methylcyclohexyl 4-(*tert*-butylperoxy)-6,6,6-trifluorohexanoate (6f) (60.3 mg, 76%, d.r. = 1:1). Isolated by flash column chromatography (dichloromethane/petroleum ether = 1:2, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 4.70 (tdd, $J = 10.8, 4.4, 1.5$ Hz, 1H), 4.27-4.18 (m, 1H), 2.78-2.60 (m, 1H), 2.46 (t, $J = 7.6$ Hz, 2H), 2.28-2.13 (m, 1H), 2.08-1.95 (m, 2H), 1.94-1.79 (m, 2H), 1.72-1.63 (m, 2H), 1.55-1.43 (m, 1H), 1.37 (tt, $J = 11.9, 3.0$ Hz), 1.23 (s, 9H), 1.12-1.00 (m, 1H), 0.96 (q, $J = 11.5$ Hz, 1H), 0.91 (d, $J = 3.0$ Hz, 3H), 0.89 (d, $J = 3.5$ Hz, 3H), 0.87-0.80 (m, 1H), 0.76 (d, $J = 7.0$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 172.5, 125.9 (q, $J_{C-F} = 276.2$ Hz), 76.3 (q, $J_{C-F} = 3.0$ Hz), 74.4, 74.3, 47.0, 40.9, 40.8, 37.0 (q, $J_{C-F} = 27.6$ Hz), 36.9 (q, $J_{C-F} = 27.6$ Hz), 34.2, 30.3, 30.2, 28.2, 26.4, 26.3, 23.4, 22.0, 20.7, 16.3, 16.2; ^{19}F NMR (376 MHz, CDCl_3) δ -63.2 (s, 1.5F), -63.3 (s, 1.5F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{20}\text{H}_{35}\text{F}_3\text{O}_4\text{Na}$ 419.2380; Found: 419.2362.



(1S,2R,4S)-1,7,7-Trimethylbicyclo[2.2.1]heptan-2-yl 4-(*tert*-butylperoxy)-6,6,6-trifluorohexanoate (6g) (53.6 mg, 68%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:20, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 4.91 (d, $J = 9.8$ Hz, 1H), 4.30-4.18 (m, 1H), 2.77-2.61 (m, 1H), 2.49 (t, $J = 7.5$ Hz, 2H), 2.41-2.31 (m, 1H), 2.28-2.14 (m, 1H), 2.10-1.99 (m, 1H), 1.98-1.87 (m, 2H), 1.77-1.67 (m, 2H), 1.31-1.26 (m, 2H), 1.23 (s, 9H), 1.00-0.94 (m, 1H), 0.91 (s, 3H), 0.88 (s, 3H), 0.83 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 173.1, 126.0 (q, $J_{C-F} = 276.8$ Hz), 80.3, 80.1, 80.0, 76.3 (q, $J_{C-F} = 3.0$ Hz), 48.8, 47.8, 44.9, 37.0 (q, $J_{C-F} = 28.1$ Hz), 36.8, 36.7, 30.3, 28.2, 28.0, 27.1, 26.4, 19.7, 18.8, 13.4; ^{19}F NMR (376 MHz, CDCl_3) δ -63.3 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{20}\text{H}_{33}\text{F}_3\text{O}_4\text{Na}$ 417.2223; Found: 417.2203.

5. Mechanistic experiments

5.1 Radical inhibition experiment



The operation followed the general procedure for the synthesis of product, when 2,2,6,6-tetramethyl piperidin-1-oxyl (TEMPO) (0.4 mmol) was added. ^1H NMR analysis revealed that **4a** was not detected. Besides, the adduct was also detected by HRMS (Figure S2)

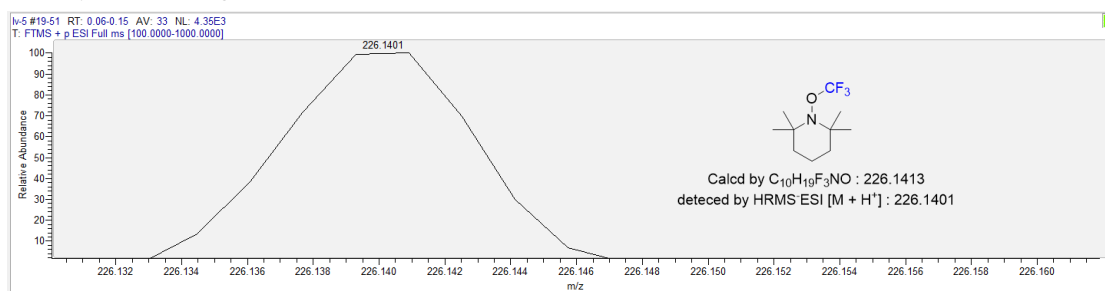
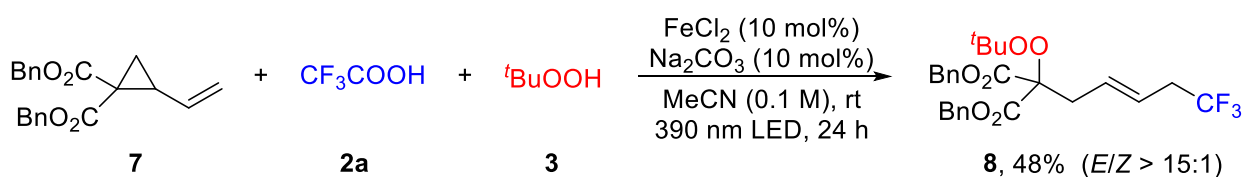
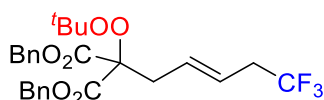


Figure S2 HRMS data for radical inhibition experiment

5.2 Radical clock experiment



To a mixture of alkene **7** (0.2 mmol), acid **2a** (0.6 mmol), Na_2CO_3 (0.02 mmol) and FeCl_2 (2.5 mg, 0.02 mmol), MeCN (2.0 mL) was added under nitrogen at room temperature. Then tert-butyl hydroperoxide (TBHP, 0.8 mmol, 5-6 M in decane) was added into the mixture under nitrogen at room temperature. The resulting mixture was stirred under rt, 390 nm, 10 W for 24 h. The resulting reaction solution was directly filtered through a pad of silica by chloroform. The solvent was evaporated in vacuo to give the crude products. NMR yields are determined by ^1H NMR using mesitylene as an internal standard. Solvent was evaporated and the residues were purified by flash column chromatography on silica gel with an eluent to afford the pure products



Dibenzyl 2-(tert-butylperoxy)-2-(5,5,5-trifluoropent-2-en-1-yl)malonate (8) (47.4 mg, 48%). Isolated by flash column chromatography (ethyl acetate/petroleum ether = 1:10, $R_f = 0.5$). The title compound was obtained as colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.34-7.26 (m, 10H), 5.65-5.55 (m, 1H), 5.41-5.31 (m, 1H), 5.20-5.11 (m, 4H), 2.96 (d, $J = 7.4$ Hz, 2H), 2.70-2.57 (m, 2H), 1.18 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 166.4, 135.1, 130.2, 128.4, 128.3, 125.7 (q, $J_{\text{C-F}} = 276.0$ Hz), 122.5 (q, $J_{\text{C-F}} = 3.4$ Hz), 87.0, 81.0, 67.3, 37.3 (q, $J_{\text{C-F}} = 29.6$ Hz), 35.4, 26.3;

^{19}F NMR (376 MHz, CDCl_3) δ -66.5 (s, 3F); HRMS (ESI) m/z : $[\text{M}+\text{Na}]^+$ Calcd for $\text{C}_{26}\text{H}_{29}\text{F}_3\text{O}_6\text{Na}$ 517.1808; Found: 517.1790.

5.3 Light on/off experiment

Light on/off experiment was performed with the model reaction with a Kessil® PR160L-390 nm lamp (10 W). The reaction was placed in light and dark in every alternative 2 h. The yield of the product **4a** was determined by ^1H NMR using mesitylene as internal standard. The results show that the reaction proceeds when the light is on, while it is stopped when the light is off.

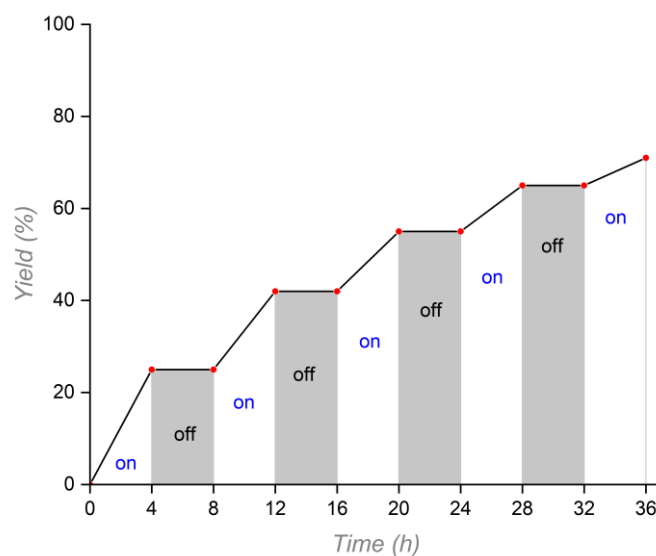


Figure S3 Light on/off experiment

5.4 Quantum yield measurement

5.4.1 Determination of the photon flux

The photon flux of the spectrophotometer was determined by standard ferrioxalate actinometry.⁹ Following a literature procedure. For this purpose, the following two solutions were prepared:

Solution A:

Potassium ferrioxalate hydrate (737 mg, 1.50 mmol) was dissolved in aq. H_2SO_4 (0.05 M, 10 mL) to afford a 0.15 M ferrioxalate solution.

Solution B:

1,10-Phenanthroline monohydrate (20 mg, 0.10 mmol), NaOAc (2.71 g, 41.3 mmol) were dissolved in aq. H_2SO_4 (0.5 M, 20 mL).

Notice: Solution A was prepared in the dark and both solutions were stored in the dark to avoid external irradiation prior to the actinometry. The following procedure was performed in a darkened lab.

First, the photon flux of the 390 nm LED was determined. For this, solution A (1.0 mL) was filled in a 10 mL

Schlenk tube and irradiated for 60 s, at $\lambda_{\max} = 390$ nm. After irradiation, solution B (175 μ L) was added to the Schlenk tube and the mixture was stirred in the dark for 1 h to ensure coordination of Fe(II)- ions by phenantroline. The solution was poured into a quartz cuvette and the absorption of the solution was measured at 510 nm. Sample preparation and measurement were repeated two more times. In a similar way a non-irradiated control sample was prepared, measured for absorbance at 510 nm, which was repeated twice. The average of the absorption of the both irradiated and radiated samples were calculated and were used to calculate the conversion factor n applying eq. 1.

$$n(Fe^{2+}) = \frac{V \cdot \Delta A(510 \text{ nm})}{l \cdot \varepsilon} \quad (1)$$

V refers to the total volume (0.001175 L) of the solution (after addition of solution B), ΔA is the average difference in absorption of irradiated and non-irradiated samples between at 510 nm ($\Delta A = 1.86$), l is the path length (1.0 cm) of the cuvette, and ε is the molar extinction coefficient of the ferrioxalate actinometer at 510 nm (11100 L mol⁻¹ cm⁻¹).¹⁰ The photon flux (Φ_q) is calculated using eq. 2.

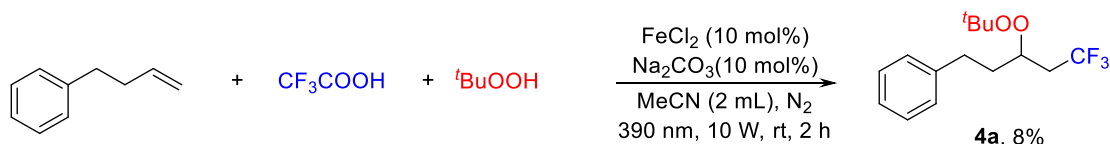
$$\Phi_q = \frac{n(Fe^{2+})}{\Phi_F \cdot t \cdot f} \quad (2)$$

Φ_F refers to the quantum yield for the ferrioxalate actinometer (1.13 at $\lambda_{\max} = 390$ nm),¹¹ t is the irradiation time for solution A (60 s), and f is the fraction of light absorbed at $\lambda_{\max} = 390$ nm by the ferrioxalate actinometer. This value is calculated using eq. 3, where A (390 nm) is the absorption of the ferrioxalate solution at 390 nm. A measured absorbance value of >8 at 390 nm indicates the fraction of absorbed light (f) to be >0.999 .

$$f = 1 - 10^{-A(390 \text{ nm})} \quad (3)$$

Thus, the average photon flux was calculated to be 2.90×10^{-9} einsteins s⁻¹

5.4.2 Determination of the quantum yield of trifluoromethylation-peroxidation



First, a stock solution was prepared: To two oven-dried 25 mL Schlenk tube were added 4-Phenyl-1-butene (30.0 μ L, 0.2 mmol, 1.0 equiv.), trifluoroacetic acid (44.8 μ L, 0.6 mmol, 3.0 equiv.), *tert*-butyl hydroperoxide (145 μ L, 0.8 mmol, 4.0 equiv.), FeCl₂ (2.5 mg, 0.02 mmol, 10mol%), Na₂CO₃(2.1 mg, 0.02 mmol, 10mol%) and MeCN (2 mL) under nitrogen. Upon homogenization, two 25 mL Schlenk tubes each equipped with Teflon coated stir bars under nitrogen. Both reaction tubes were carefully degassed by two freeze/pump/thaw cycles and irradiated with the single blue LED (10 W, $\lambda_{\max} = 390$ nm) for 2 h. Followed by an addition of 1 mL 0.1 M mesitylene internal standard in CDCl₃ and yield determination by ¹H NMR. Thus, the average yield was calculated to be 8%.

The quantum yield (Φ) of the reaction was determined using eq. 4, where the photon flux (Φ_q) is 2.90×10^{-9} einsteins s⁻¹ (see above), t is the reaction time (2 h = 7200 s) and f_R is the fraction of light absorbed by the reaction mixture (indicated in eq. 3; A_{Rct} (390 nm) = 4.3, thus $f_R > (0.999)$) determined using eq. 4.

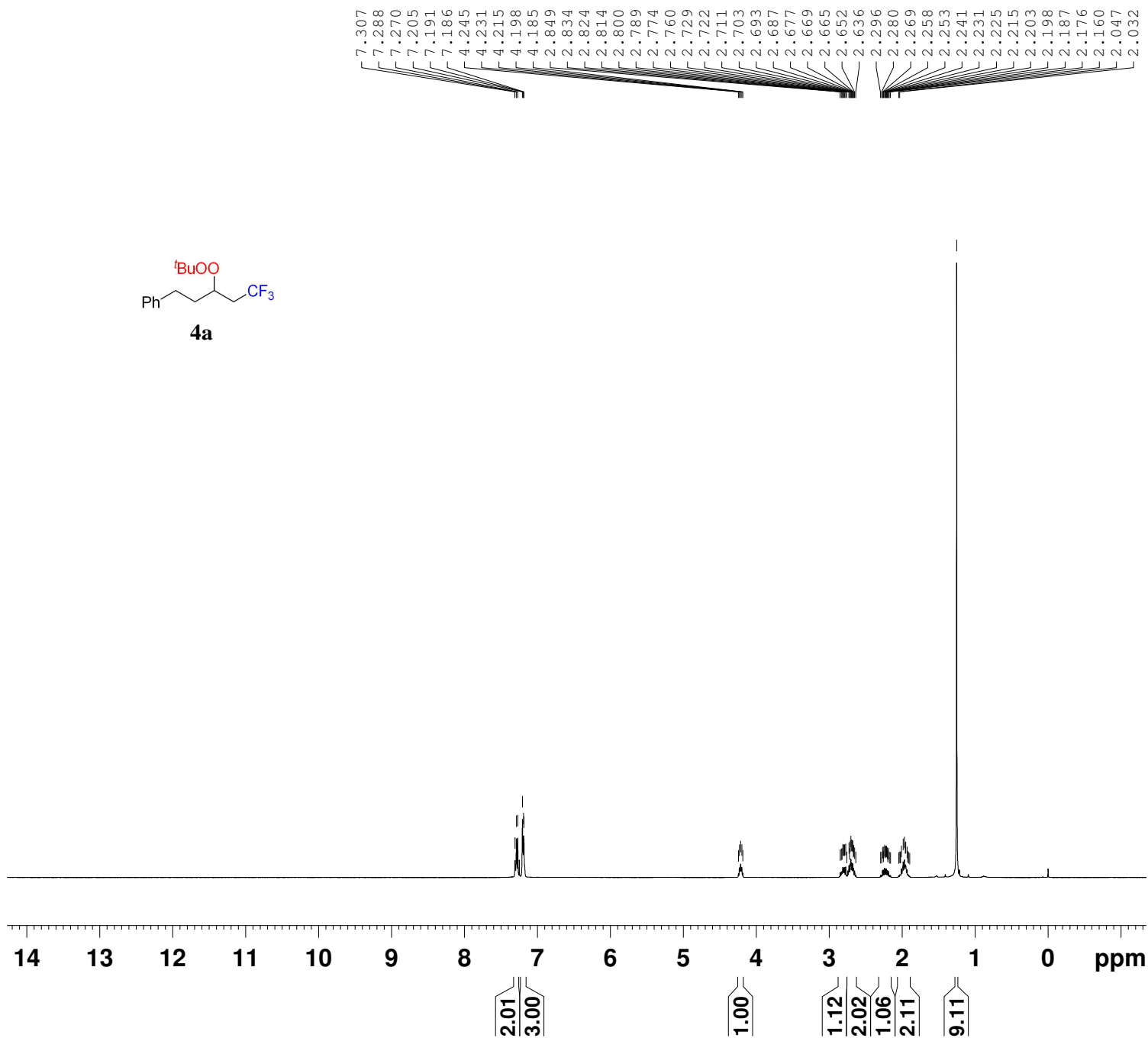
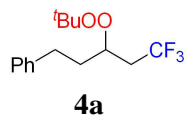
$$\Phi = \frac{n(\text{product})}{\Phi_q \cdot t \cdot f_R} \quad (4)$$

Thus, the quantum yield (Φ) of the trifluoromethylation-peroxidation was determined to be: $\Phi = 0.79$.

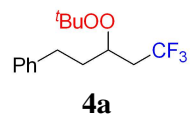
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7. Copies of ^1H NMR, ^{13}C NMR and ^{19}F NMR spectra for products



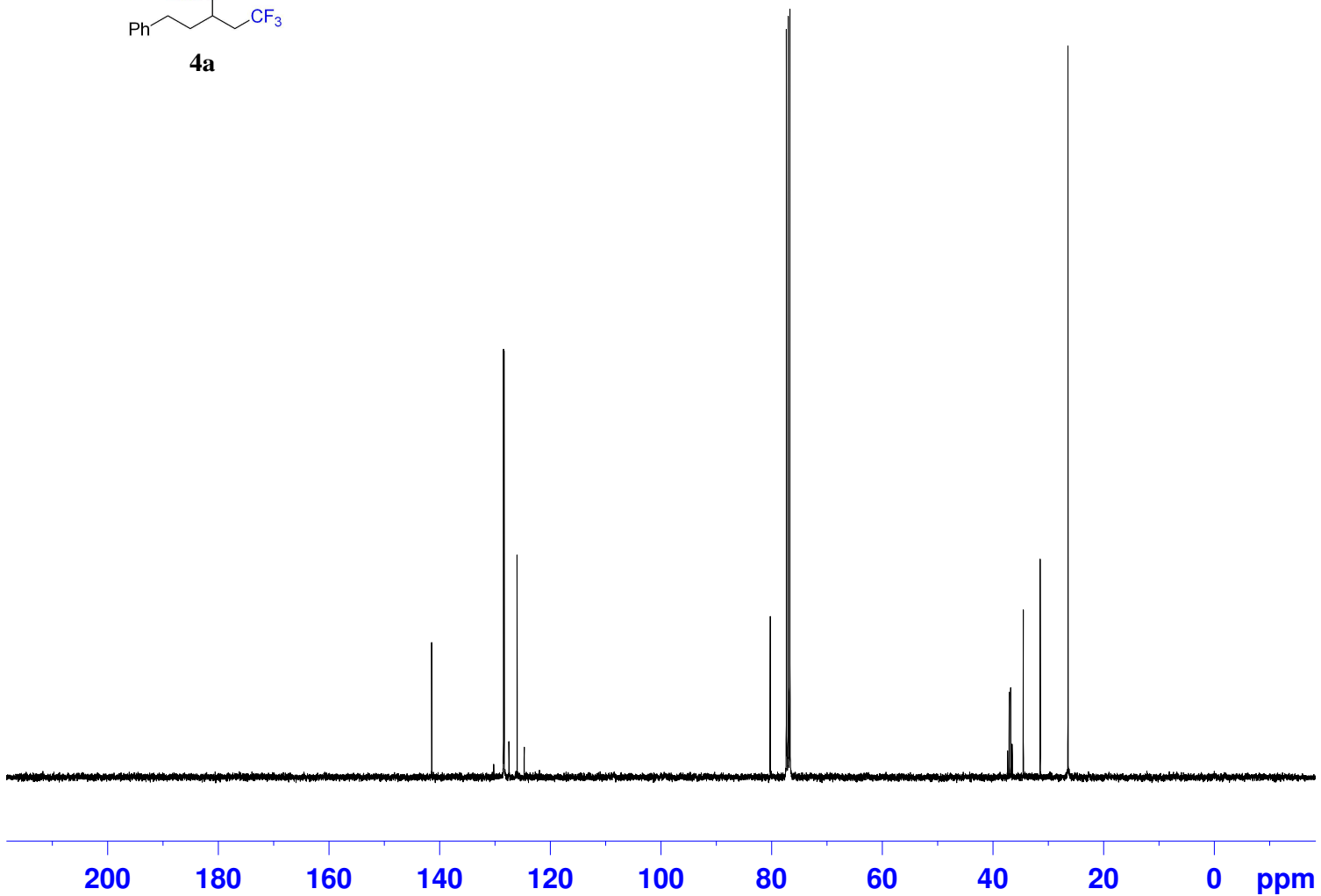
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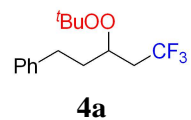
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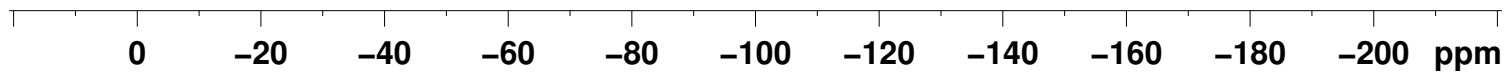
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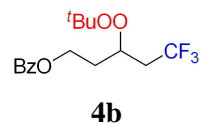


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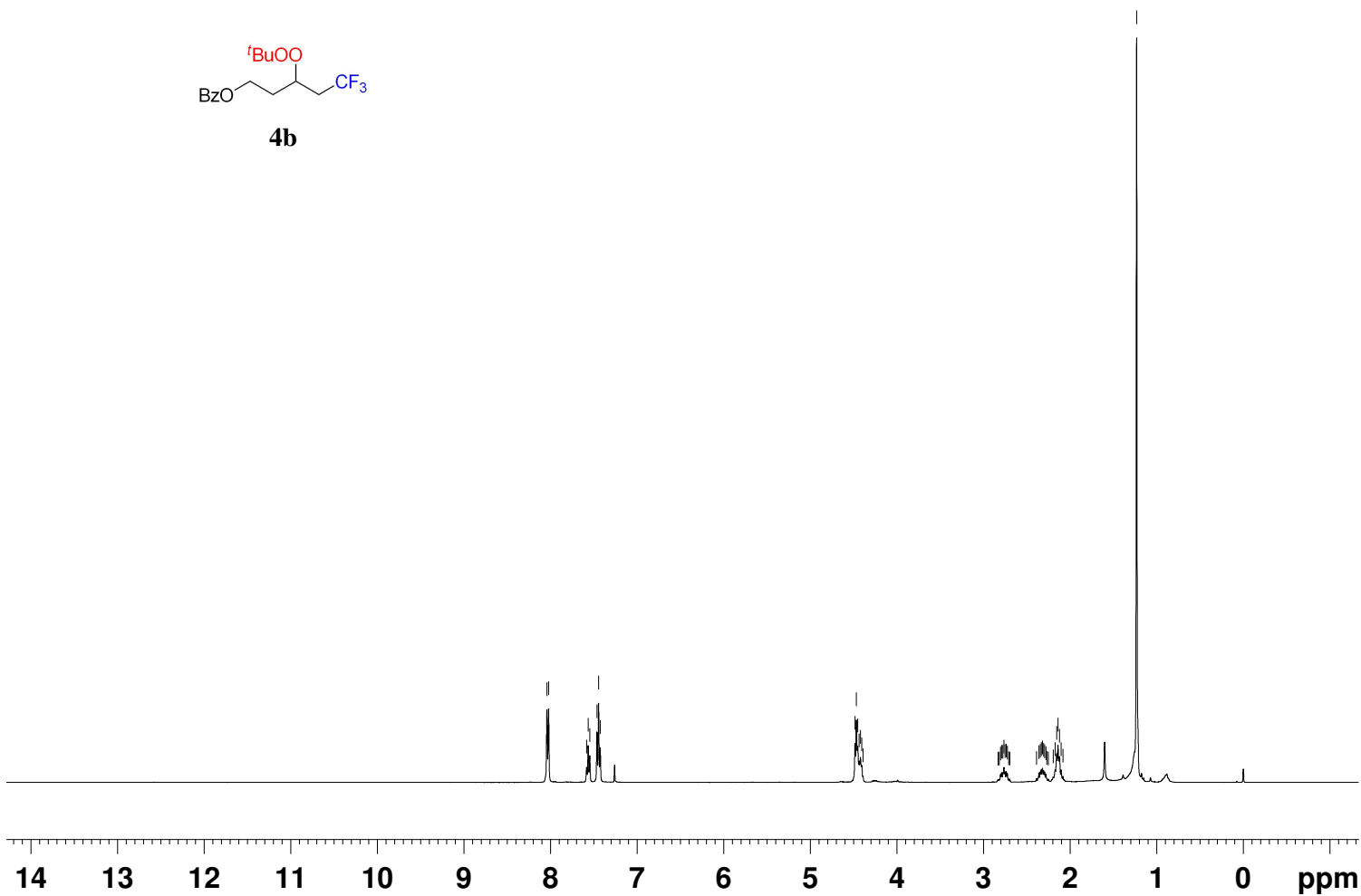
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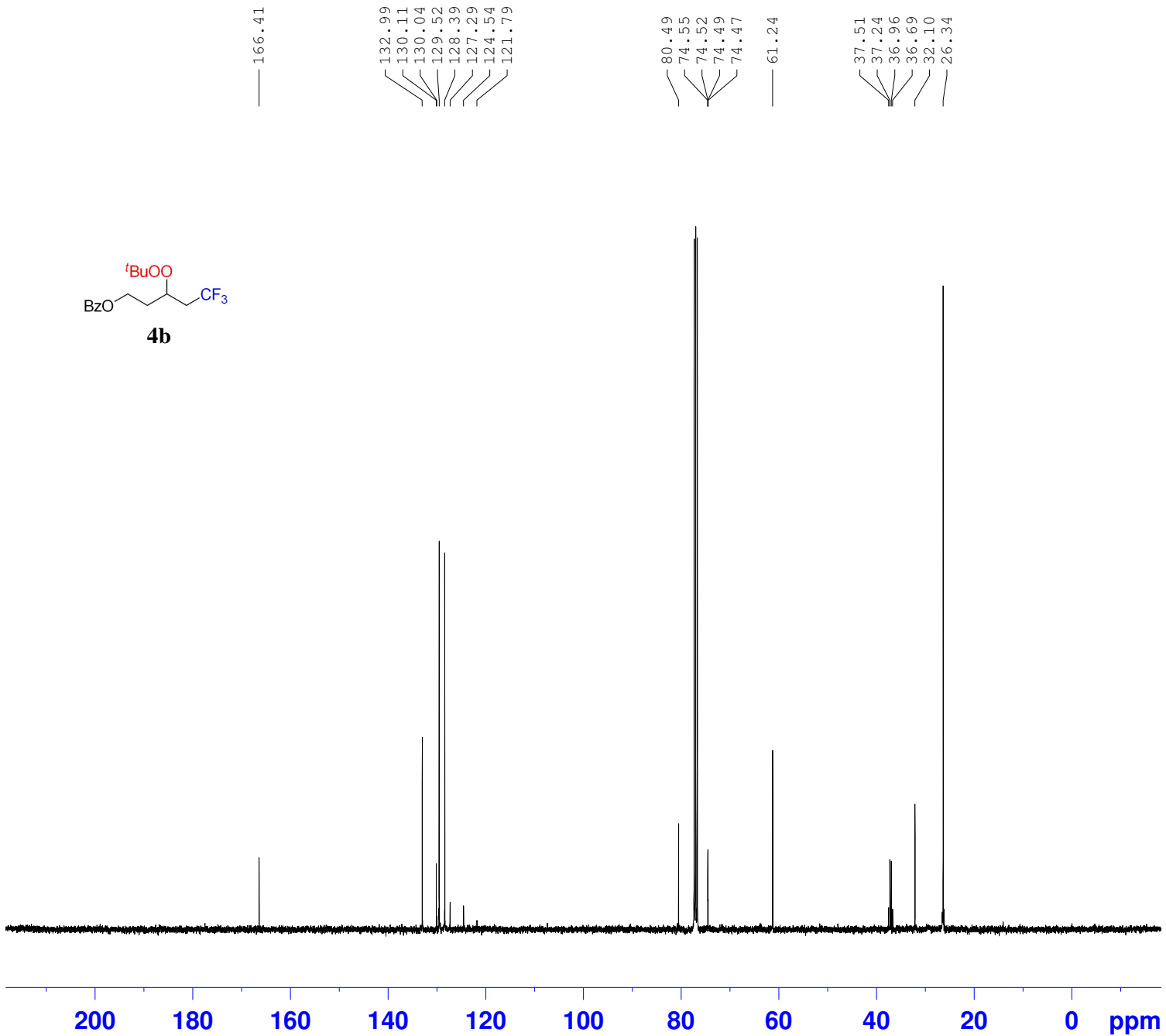
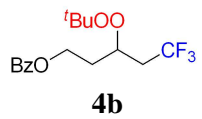
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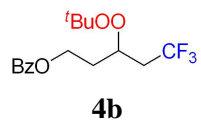
NAME LV-HQW-668P-20240608
 EXPNO 10
 PROCNO 1
 Date_ 20240608
 Time 13.41 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 90.5
 DW 80.000 usec
 DE 8.64 usec
 TE 300.4 K
 D1 1.00000000 sec
 TD0 1
 SFO1 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300106 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



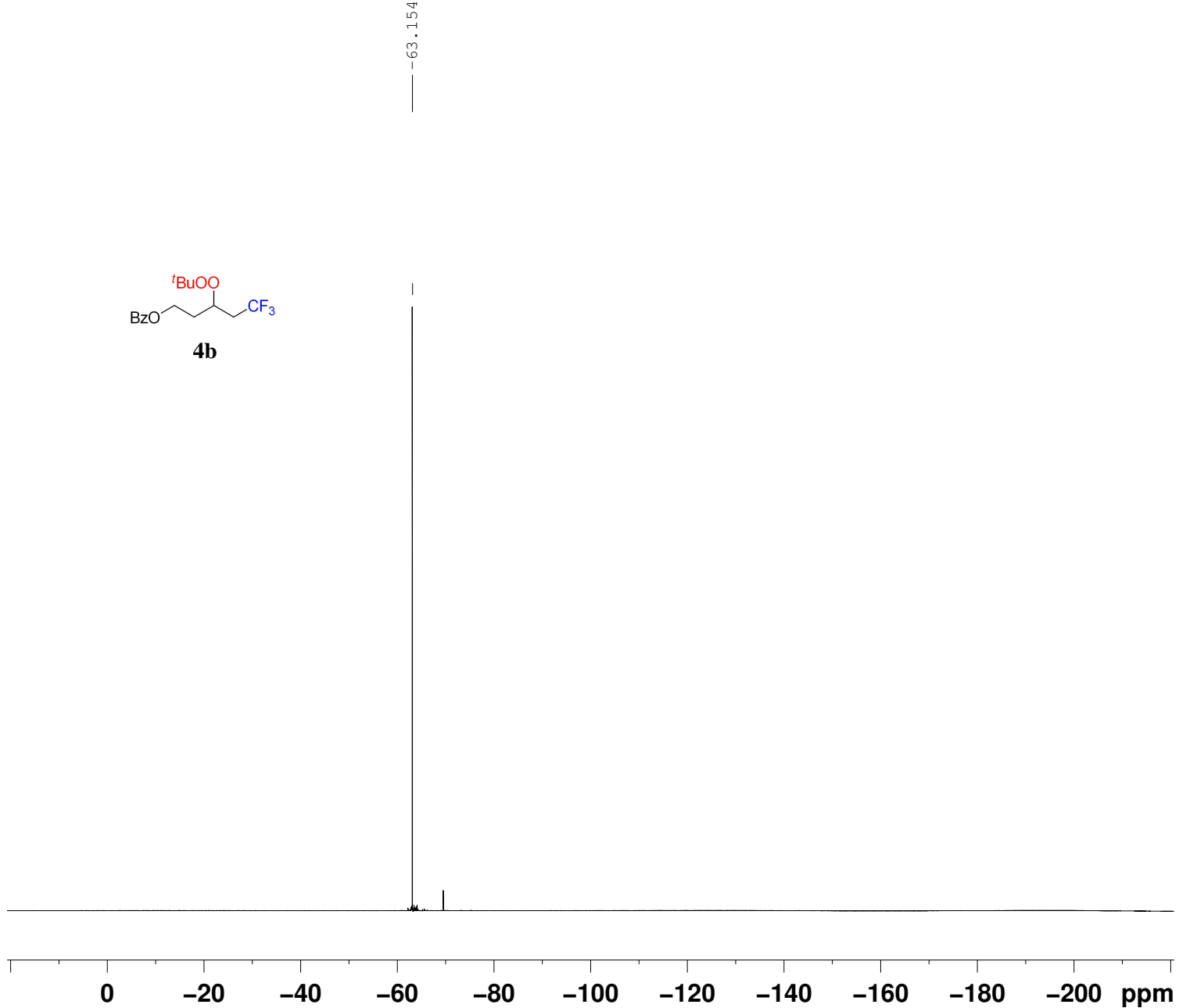


```

NAME      LV-HQW-668P-20240608
EXPNO     13
PROCNO    1
Date_     20240608
Time      14.50 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD        65536
SOLVENT   CDC13
NS        600
DS        4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG        101
DW        21.000 usec
DE        6.50 usec
TE        300.9 K
D1        2.0000000 sec
D11       0.0300000 sec
TD0       1
SFO1      100.6228298 MHz
NUC1      13C
P0        2.67 usec
P1        8.00 usec
SI        32768
SF        100.6127702 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
  
```



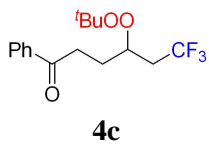
-63.154



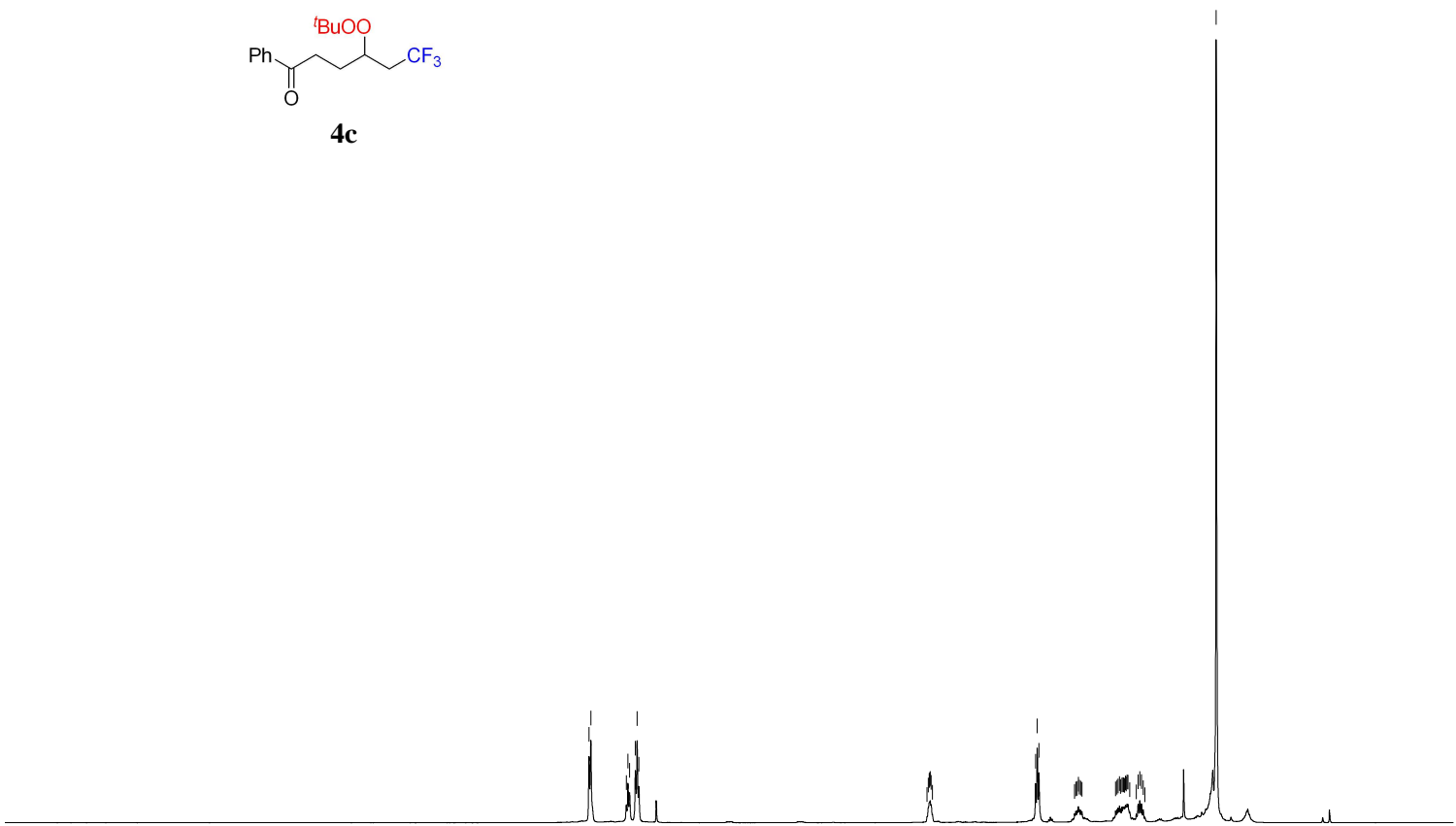
```

NAME      LV-HQW-668P-20240608
EXPNO     11
PROCNO    1
Date_     20240608
Time      13.43 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        300.6 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

```

7.982
 7.961
 7.579
 7.563
 7.545
 7.482
 7.463
 7.445
 4.338
 4.324
 4.314
 4.309
 4.303
 4.294
 4.280
 4.167
 3.151
 3.132
 2.748
 2.734
 2.720
 2.706
 2.696
 2.682
 2.668
 2.306
 2.291
 2.278
 2.263
 2.252
 2.236
 2.225
 2.219
 2.208
 2.199
 2.182
 2.172
 2.153
 2.082
 2.062
 2.044
 2.026



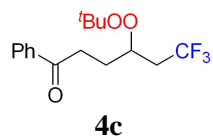
```

NAME      LV-HQW-706P-20240627
EXPNO     10
PROCNO    1
Date_     20240627
Time      20.39 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDCl3
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        101
DW        80.000 usec
DE        8.64 usec
TE        305.7 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300129 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

2.10
 1.14
 2.19
 1.00
 2.12
 1.17
 2.34
 1.18
 9.34

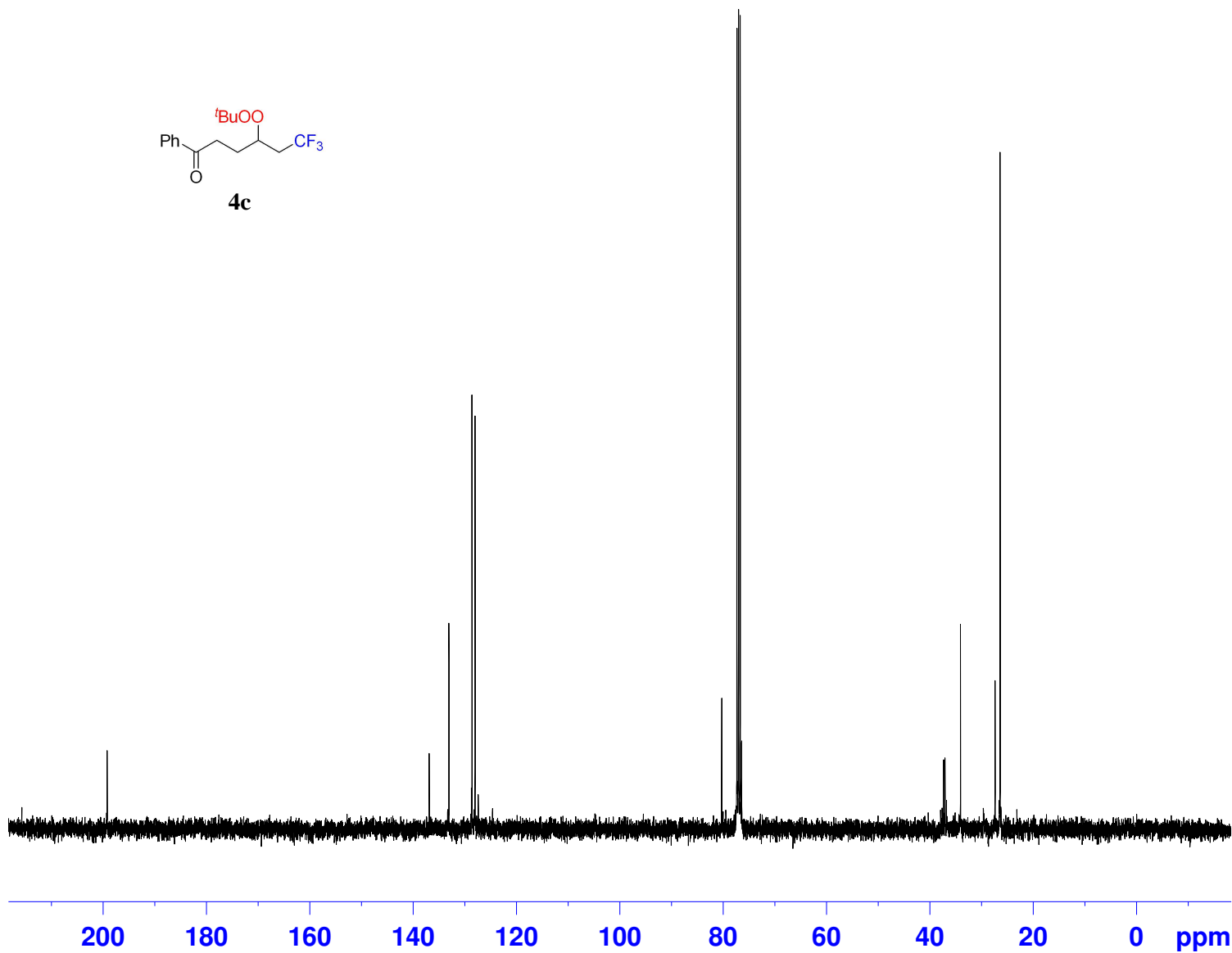
199.22



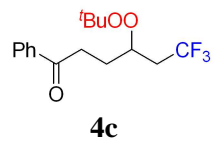
136.88
133.06
130.15
128.60
128.01
127.38
124.63
121.89

80.27
76.48
76.45
76.42
76.39

37.61
37.33
37.05
36.77
34.07
27.37
26.39



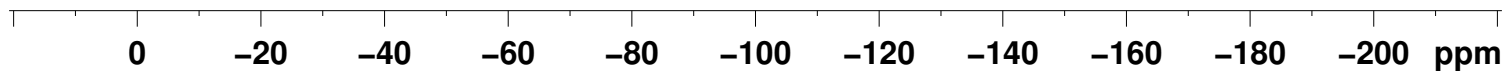
NAME LV-HQW-706P-20240627
EXPNO 12
PROCNO 1
Date_ 20240627
Time 20.52 h
INSTRUM Avance
PROBHD Z163739_0744 (
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 168
DS 4
SWH 23809.523 Hz
FIDRES 0.726609 Hz
AQ 1.3763061 sec
RG 101
DW 21.000 usec
DE 6.50 usec
TE 306.1 K
D1 2.0000000 sec
D11 0.0300000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P0 2.67 usec
P1 8.00 usec
SI 32768
SF 100.6127687 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



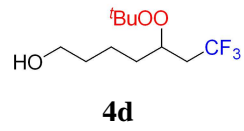
-63.214

```

NAME      LV-HQW-706P-20240627
EXPNO     11
PROCNO    1
Date_     20240627
Time      20.40 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        305.9 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

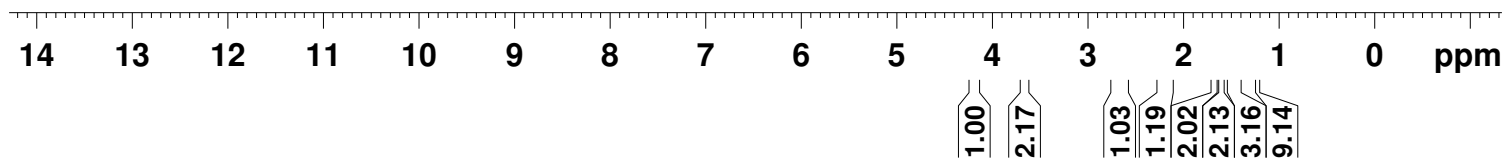
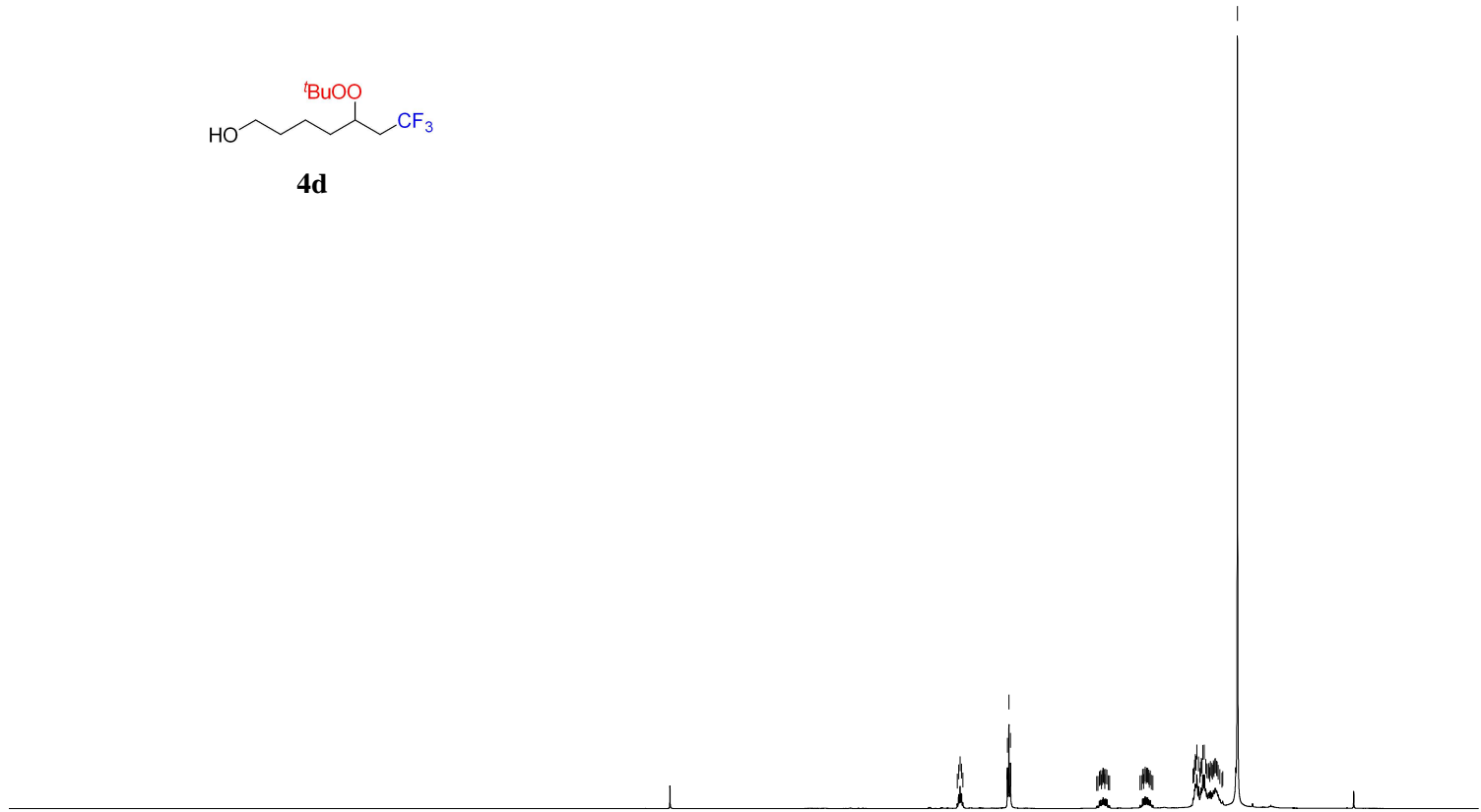


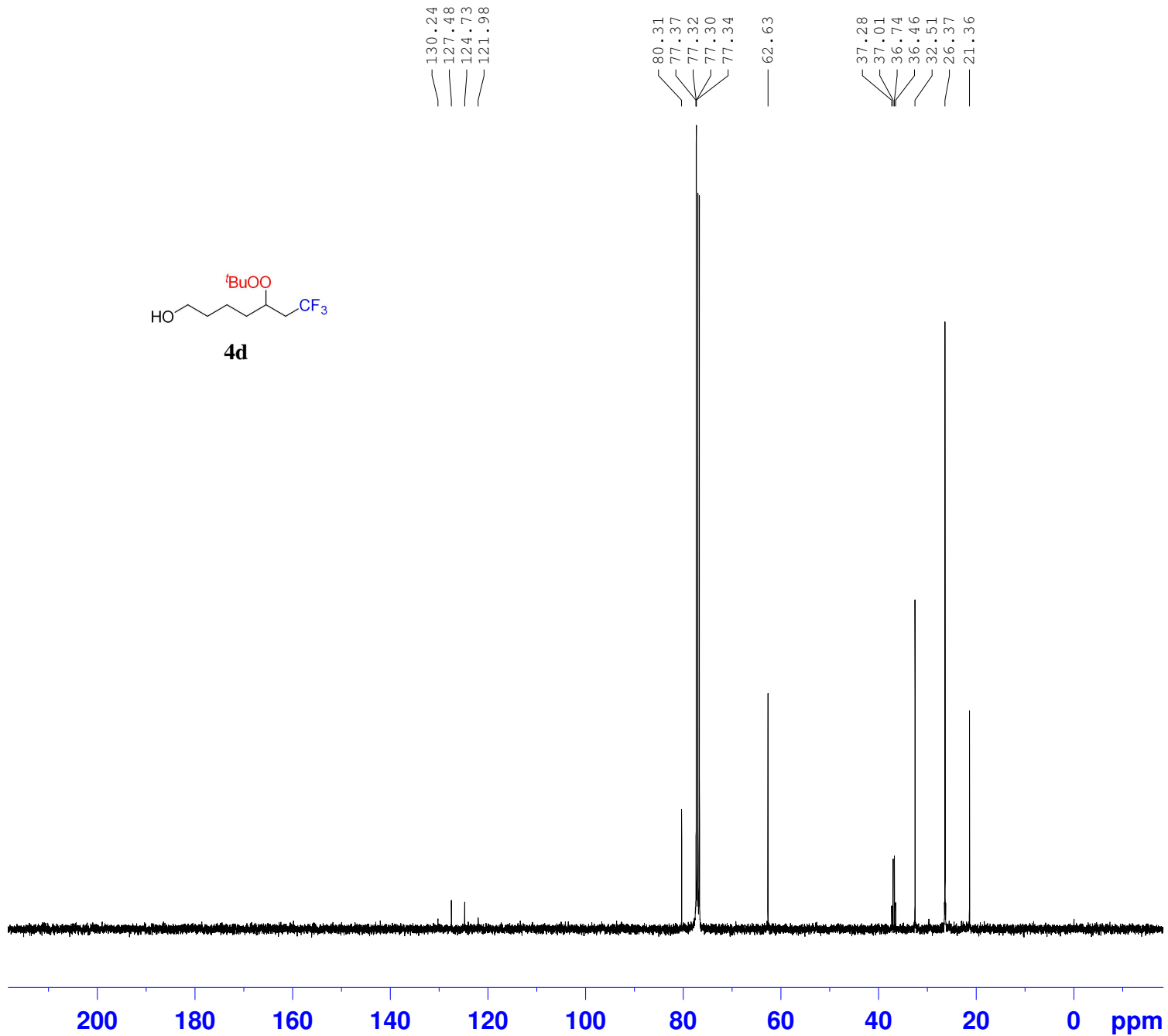
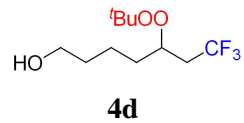
4.212
4.197
4.182
4.168
4.153
3.679
3.663
3.647
2.702
2.689
2.680
2.673
2.664
2.661
2.651
2.645
2.635
2.623
2.607
2.594
2.270
2.254
2.243
2.232
2.227
2.215
2.205
2.199
2.188
2.177
2.172
2.161
2.150
2.134
1.707
1.699
1.691
1.683
1.676
1.667
1.650
1.634
1.627
1.619
1.612
1.603
1.588
1.572
1.559
1.544
1.538
1.529
1.522
1.507
1.501
1.490
1.485
1.474
1.471
1.456
1.451
1.440
1.422
1.400
1.391
1.235



```

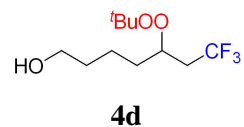
NAME      LV-HQW-636P-20240516
EXPNO     10
PROCNO    1
Date_     20240516
Time      19.56 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG         90.5
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SFO1      400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300083 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



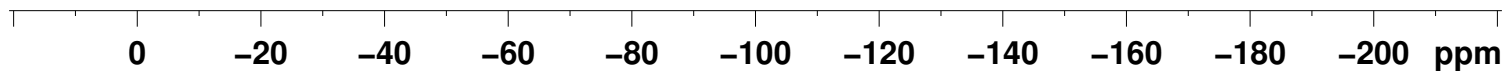


```

NAME      LV-HQW-636P-20240516
EXPNO     12
PROCNO    1
Date_     20240516
Time      20.35 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         600
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.2 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127709 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

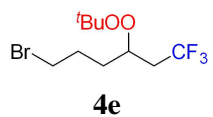


—63.114



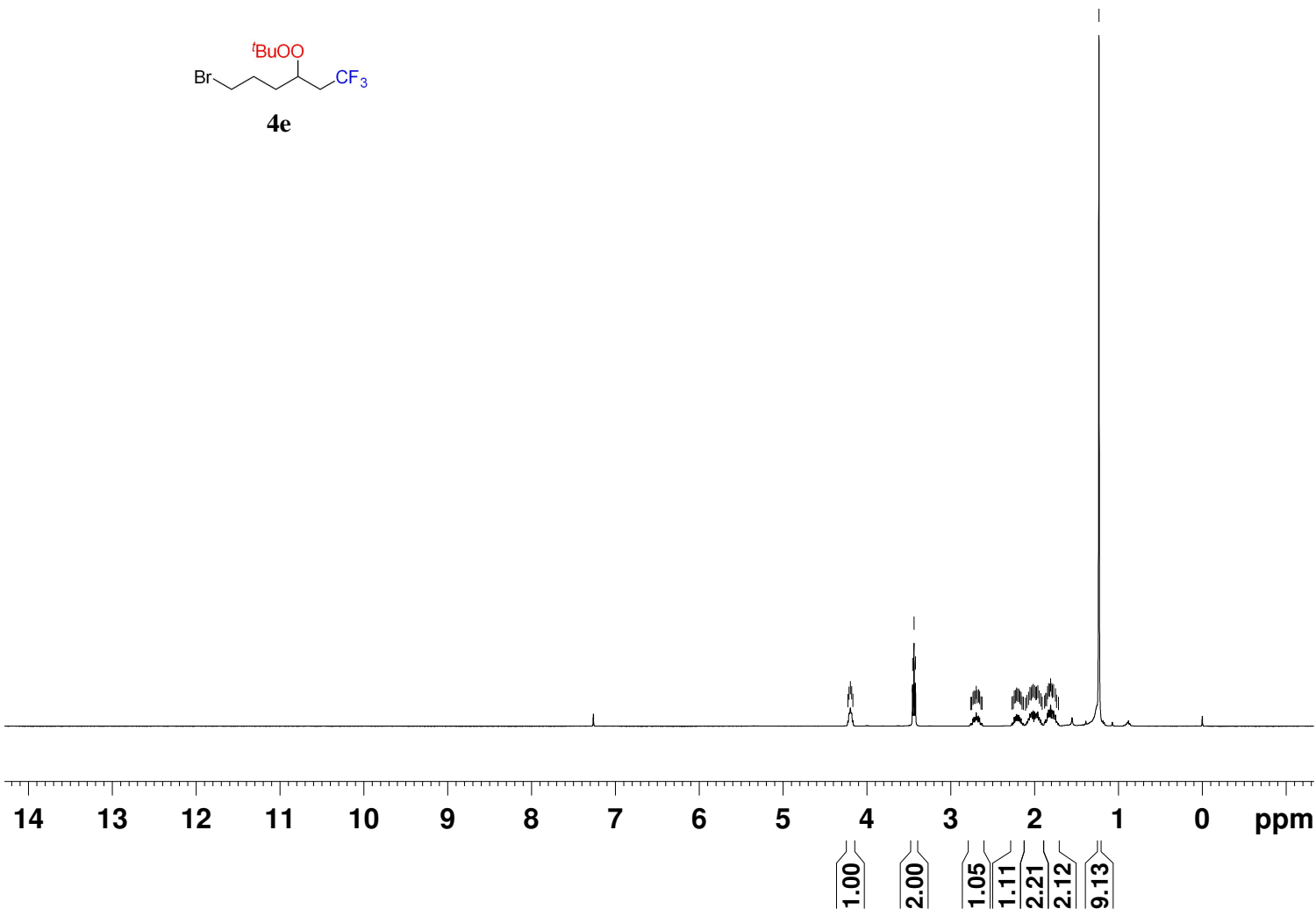
```

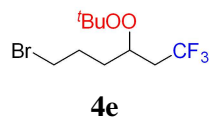
NAME      LV-HQW-636P-20240516
EXPNO     11
PROCNO    1
Date_     20240516
Time      19.58 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDC13
NS         16
DS         4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         298.1 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1      376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



4.227
 4.214
 4.198
 4.182
 4.168
 3.455
 3.438
 3.422
 2.764
 2.751
 2.735
 2.723
 2.707
 2.696
 2.684
 2.668
 2.656
 2.640
 2.627
 2.270
 2.253
 2.243
 2.227
 2.216
 2.203
 2.188
 2.177
 2.161
 2.150
 2.134
 2.108
 2.093
 2.073
 2.056
 2.041
 2.034
 2.017
 2.001
 1.985
 1.977
 1.962
 1.944

NAME LV-HQW-635P-20240516
 EXPNO 10
 PROCNO 1
 Date_ 20240516
 Time 15.38 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 90.5
 DW 80.000 usec
 DE 8.64 usec
 TE 298.0 K
 D1 1.00000000 sec
 TD0 1
 SFO1 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300095 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

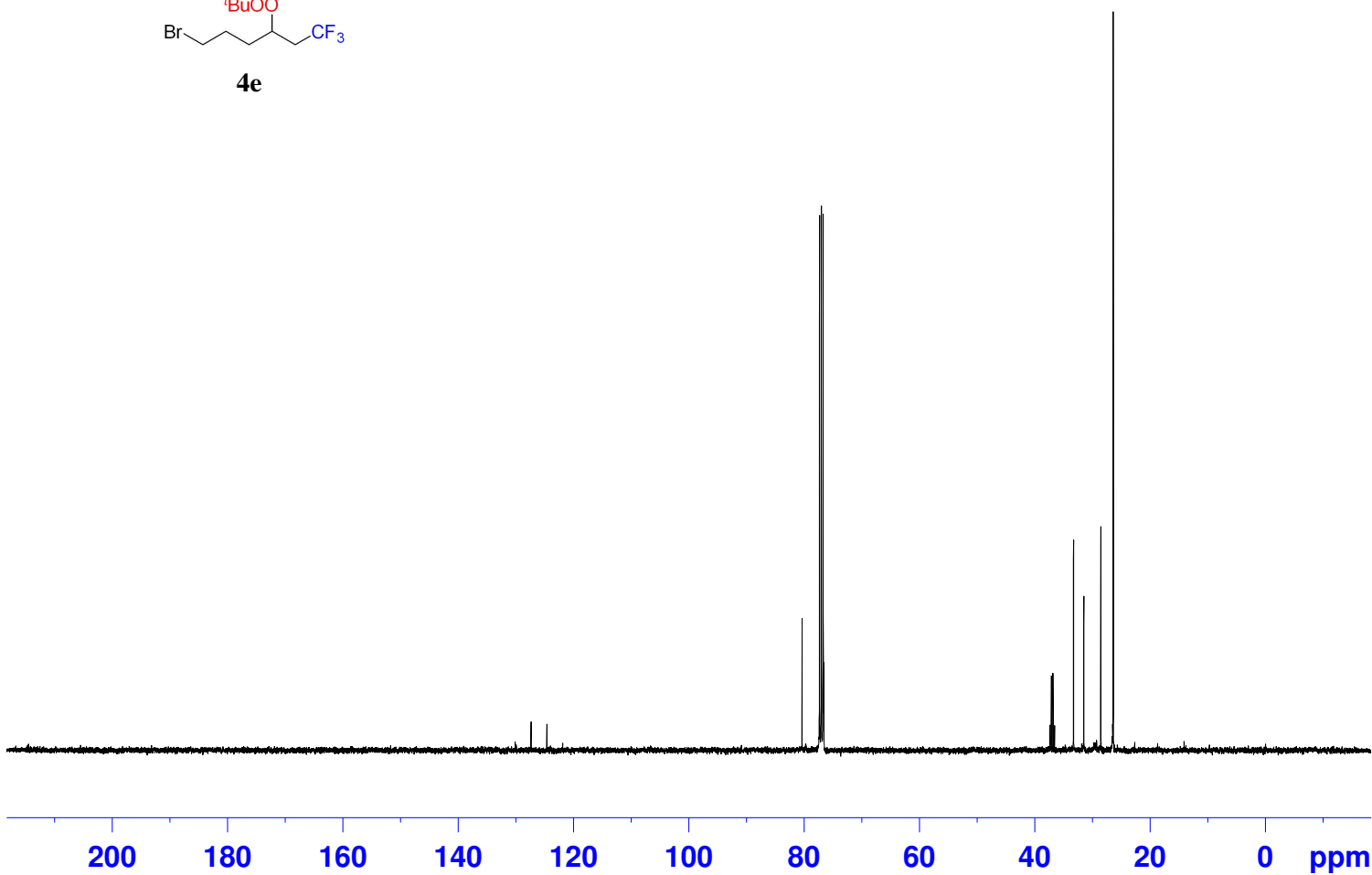




130.12
 127.36
 124.61
 121.86

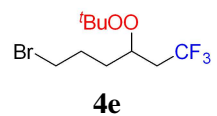
80.34
 76.61
 76.59
 76.56
 76.53

37.38
 37.10
 36.83
 36.55
 33.26
 31.48
 28.53
 26.37

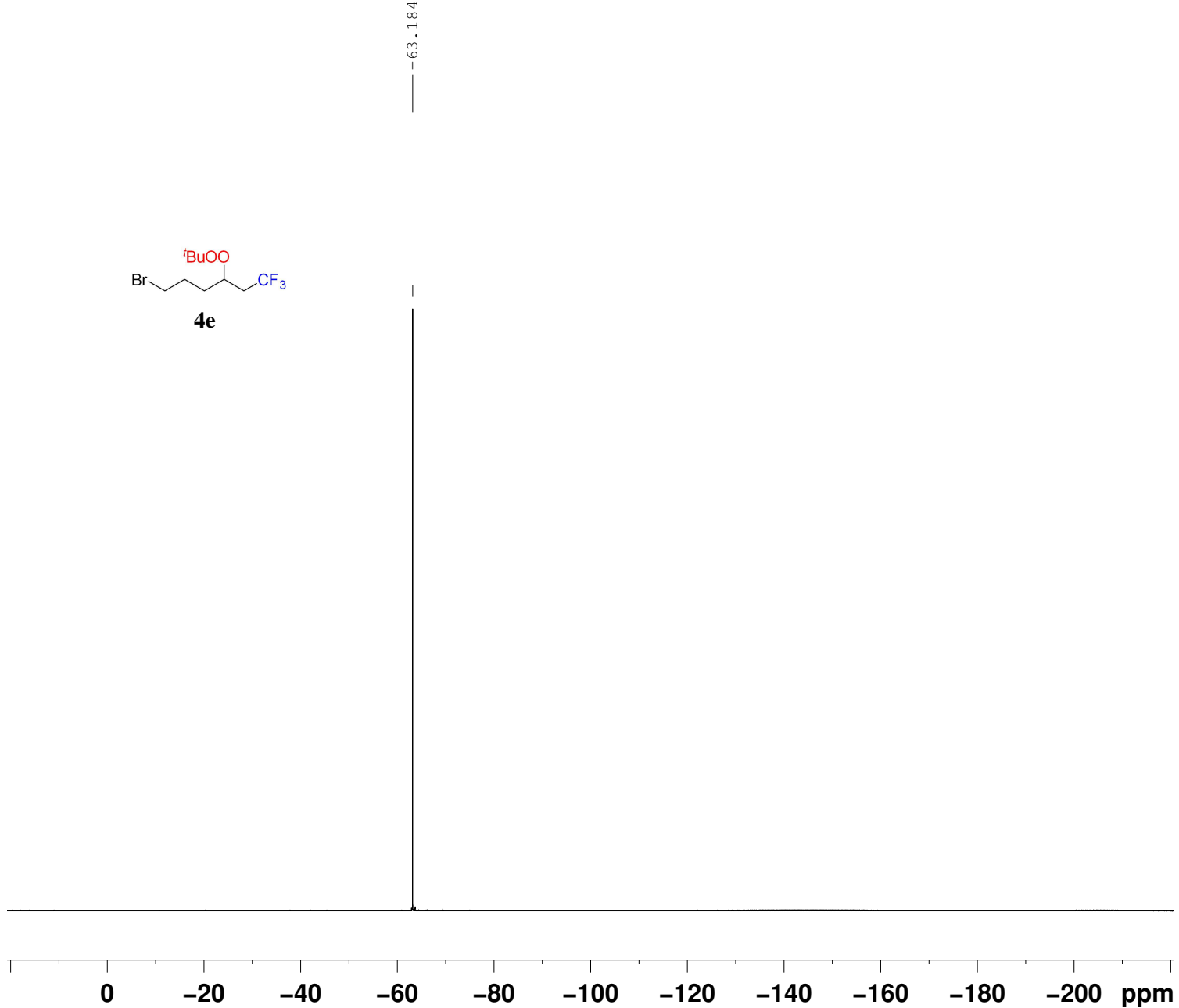


```

NAME      LV-HQW-635P-20240516
EXPNO     12
PROCNO    1
Date_     20240516
Time      16.15 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         600
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.0 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1       100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127702 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

--63.184

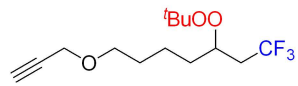


```

NAME      LV-HQW-635P-20240516
EXPNO     11
PROCNO    1
Date_     20240516
Time      15.39 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

```

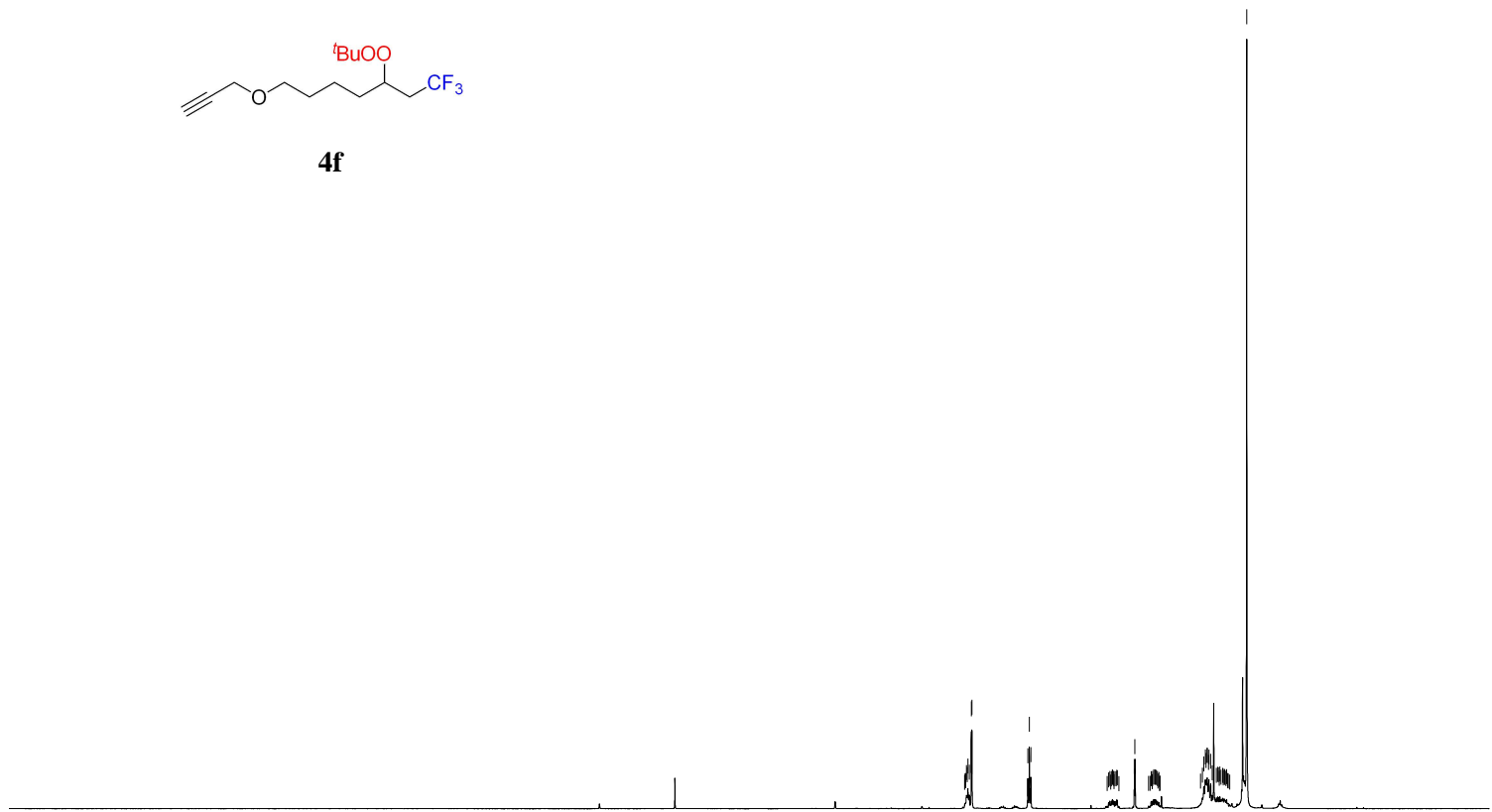
4.208
4.202
4.197
4.189
4.181
4.173
4.159
4.137
4.131
3.541
3.525
3.509
2.689
2.676
2.667
2.660
2.651
2.647
2.638
2.632
2.622
2.609
2.602
2.597
2.418
2.413
2.407
2.240
2.229
2.224
2.213
2.202
2.196
2.186
2.174
2.169
2.159
2.147
1.720
1.685
1.668
1.662
1.651
1.648
1.635
1.631
1.613
1.596
1.553
1.537
1.532
1.522
1.516
1.504
1.486
1.480
1.471
1.467
1.462
1.451
1.445
1.433
1.428
1.412
1.232



4f

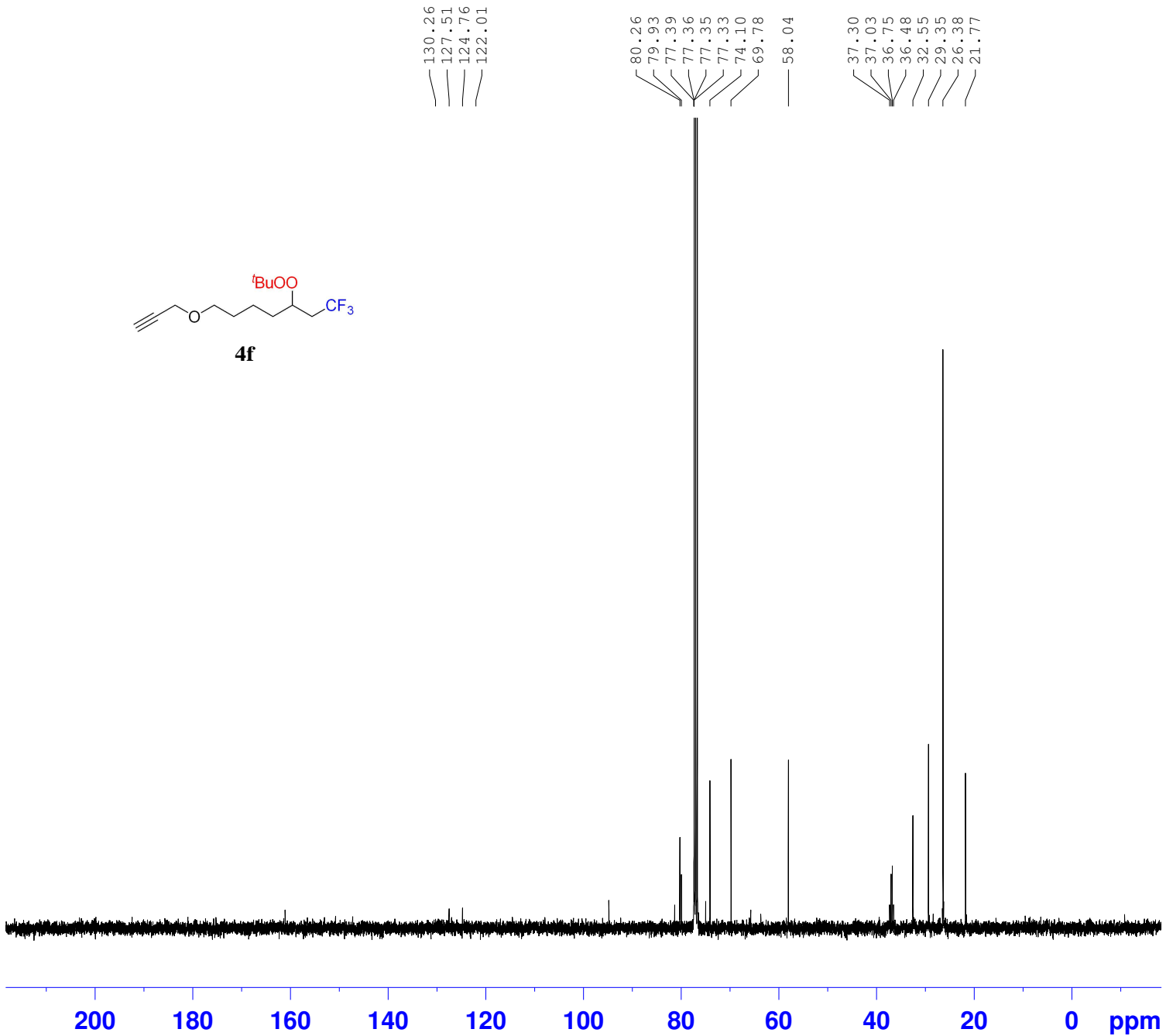
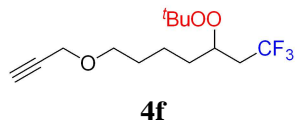
```

NAME      LV-HQW-659P-20240613
EXPNO     10
PROCNO    1
Date_     20240613
Time      22.32 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH        6250.000 Hz
FIDRES     0.190735 Hz
AQ         5.2429299 sec
RG         101
DW         80.000 usec
DE         8.64 usec
TE         300.4 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300091 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



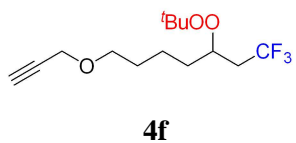
14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

1.05
2.01
2.00
1.18
0.99
1.13
4.13
2.13
9.22

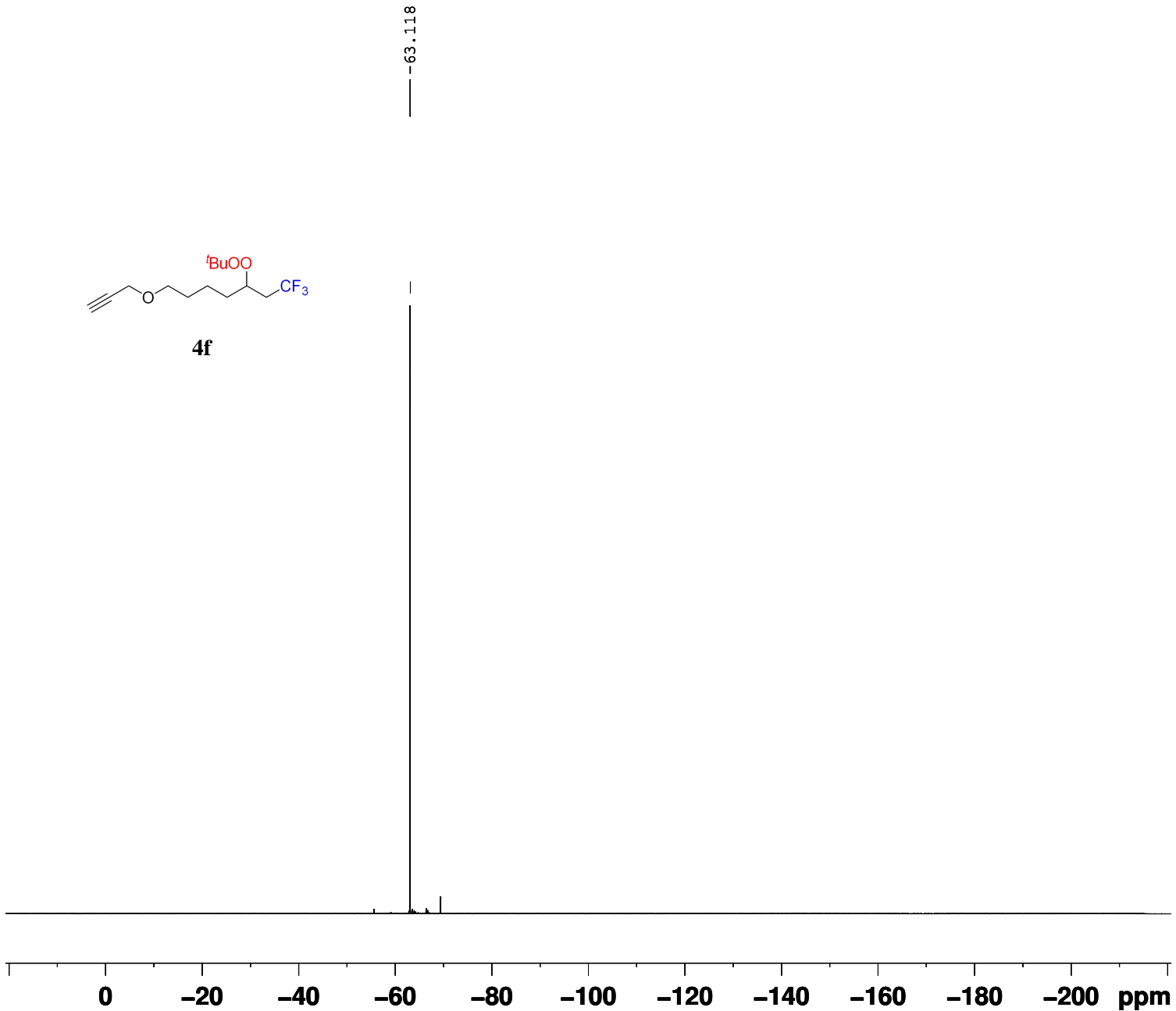


```

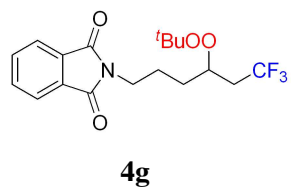
NAME      LV-HQW-659P-20240613
EXPNO     12
PROCNO    1
Date_     20240613
Time      22.53 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         296
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         300.8 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1       100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127694 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```



--63.118



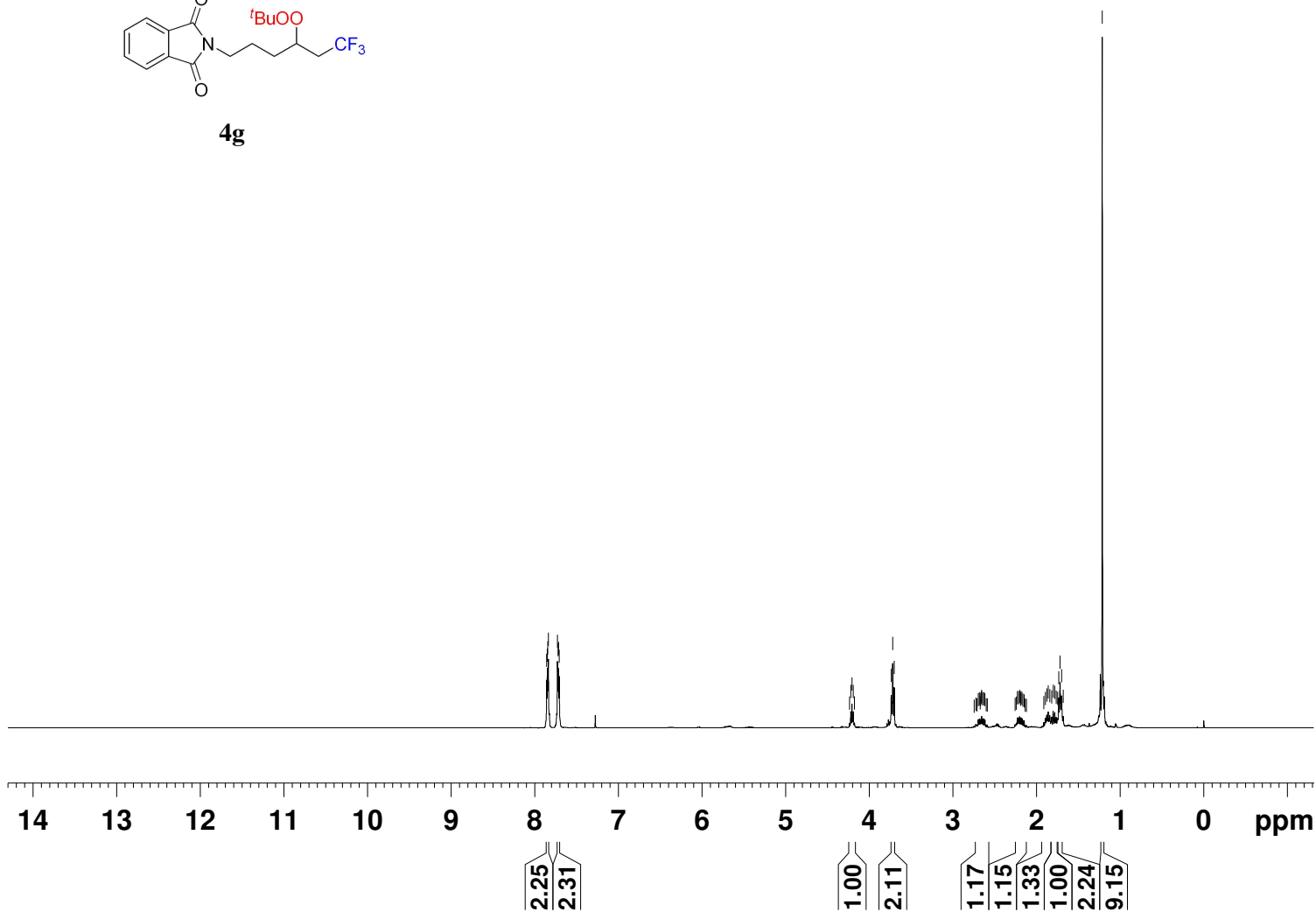
NAME	LV-HQW-659P-20240613
EXPNO	11
PROCNO	1
Date_	20240613
Time	22.34 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	300.6 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

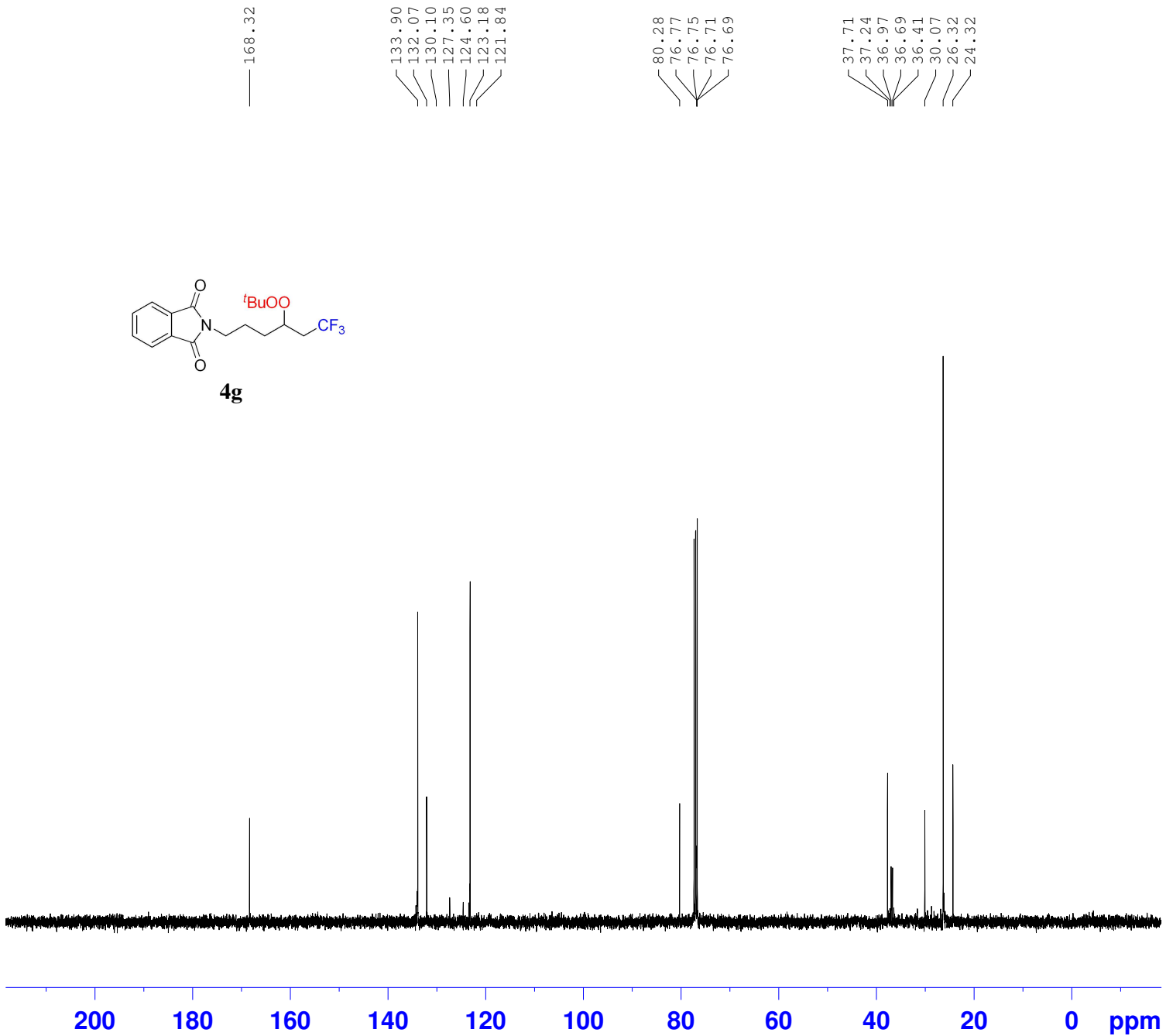
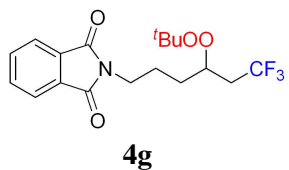


7.859
7.851
7.845
7.837
7.729
7.721
7.716
7.708
4.236
4.221
4.207
4.192
4.178
3.737
3.720
3.702
2.746
2.725
2.712
2.697
2.684
2.674
2.668
2.658
2.656
2.645
2.630
2.617
2.602
2.588
2.566
2.241
2.229
2.213
2.202
2.191
2.186
2.175
2.164
2.148
2.136
2.120
1.913
1.894
1.876
1.860

```

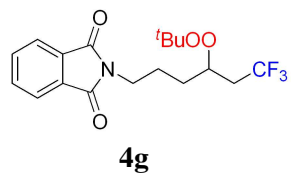
NAME      LV-HQW-660P-20240530
EXPNO     10
PROCNO    1
Date_     20240530
Time      14.02 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH        6250.000 Hz
FIDRES     0.190735 Hz
AQ         5.2429299 sec
RG         45.2
DW         80.000 usec
DE         8.64 usec
TE         298.8 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300040 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```





```

NAME      LV-HQW-660P-20240530
EXPNO     12
PROCNO    1
Date_     20240530
Time      14.08 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         48
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         299.1 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1       100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127720 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

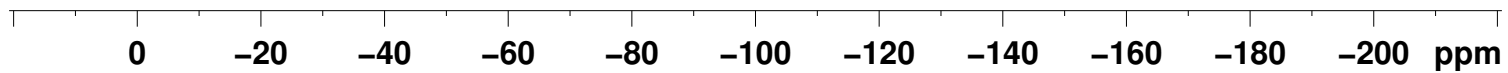


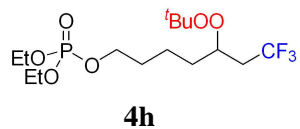
--63.195

```

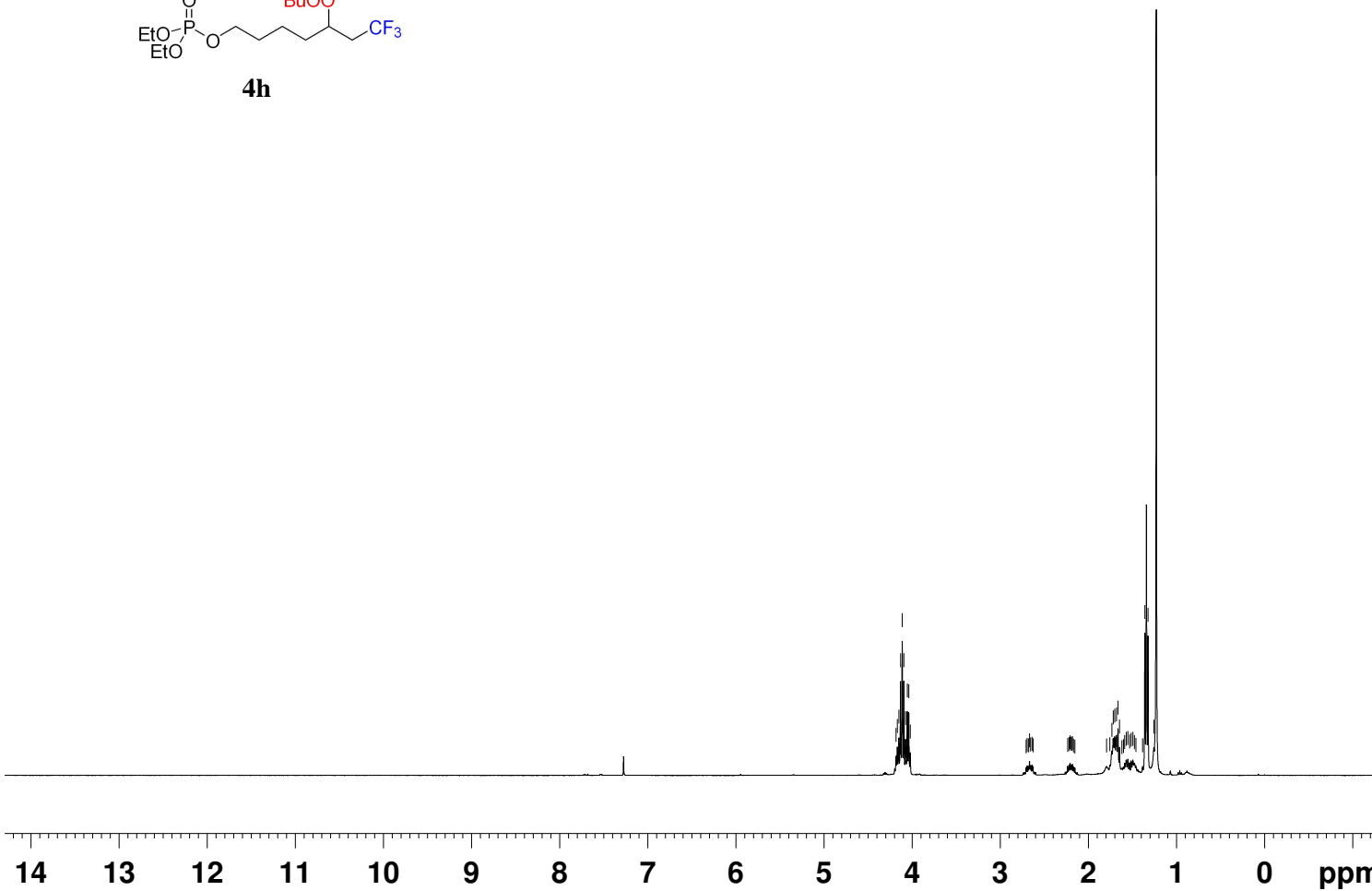
NAME      LV-HQW-660P-20240530
EXPNO     11
PROCNO    1
Date_     20240530
Time      14.04 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDCl3
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         298.9 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

```



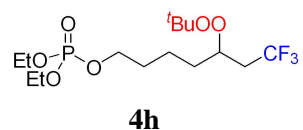


4.183
4.168
4.151
4.131
4.113
4.095
4.075
4.055
4.038
4.022
2.707
2.695
2.678
2.668
2.657
2.640
2.628
2.235
2.219
2.208
2.196
2.192
2.181
2.170
2.154
1.794
1.757
1.734
1.718
1.702
1.681
1.664
1.647
1.620
1.602
1.589
1.571



```

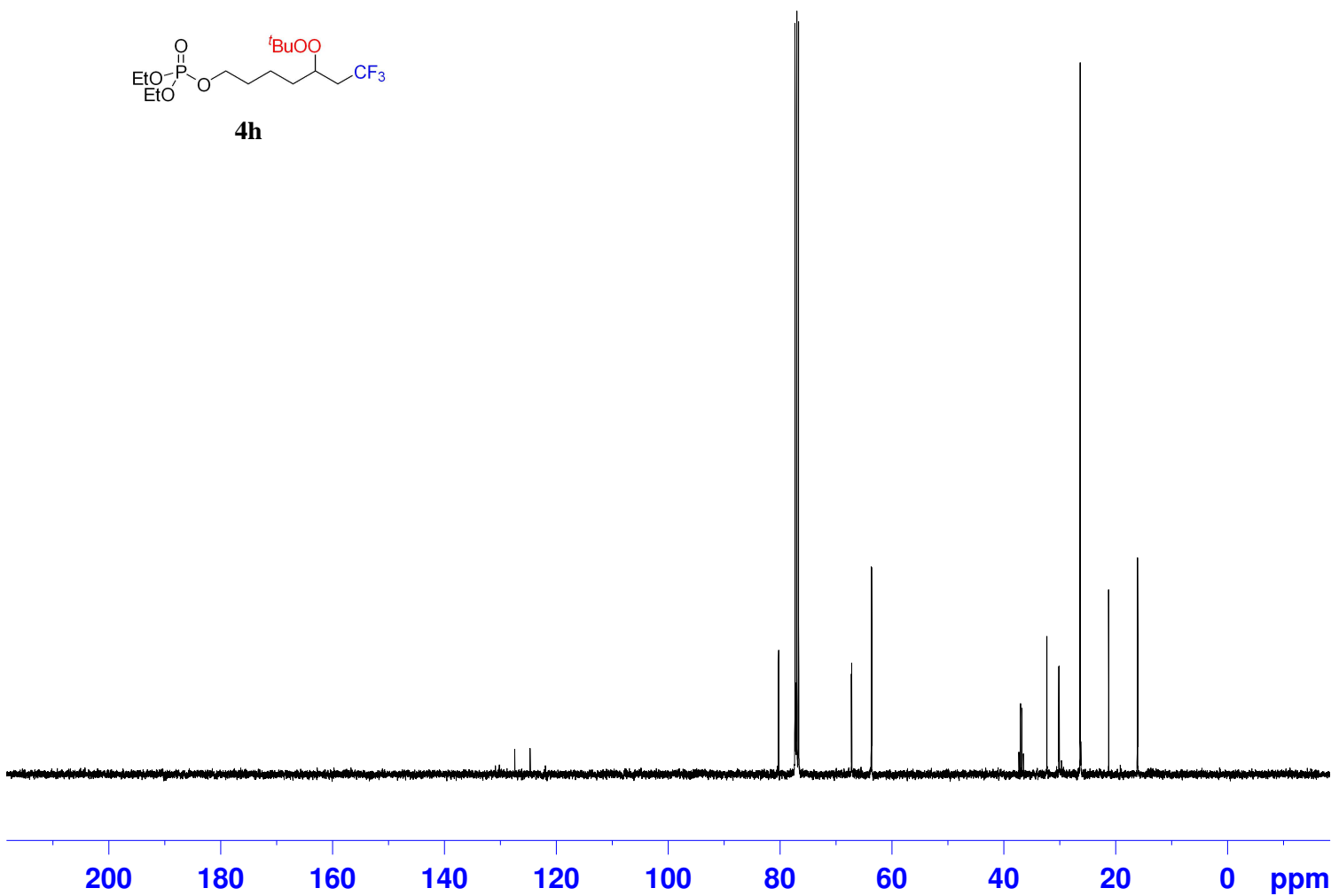
NAME      LV-HQW-685P-20240614
EXPNO     10
PROCNO    1
Date_     20240614
Time      22.07 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH        6250.000 Hz
FIDRES     0.190735 Hz
AQ         5.2429299 sec
RG         57
DW         80.000 usec
DE         8.64 usec
TE         299.4 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300047 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

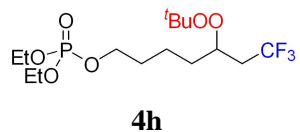
130.18
127.43
124.69
121.93

80.25
77.20
77.18
77.15
77.12
67.23
67.17
63.68
63.62

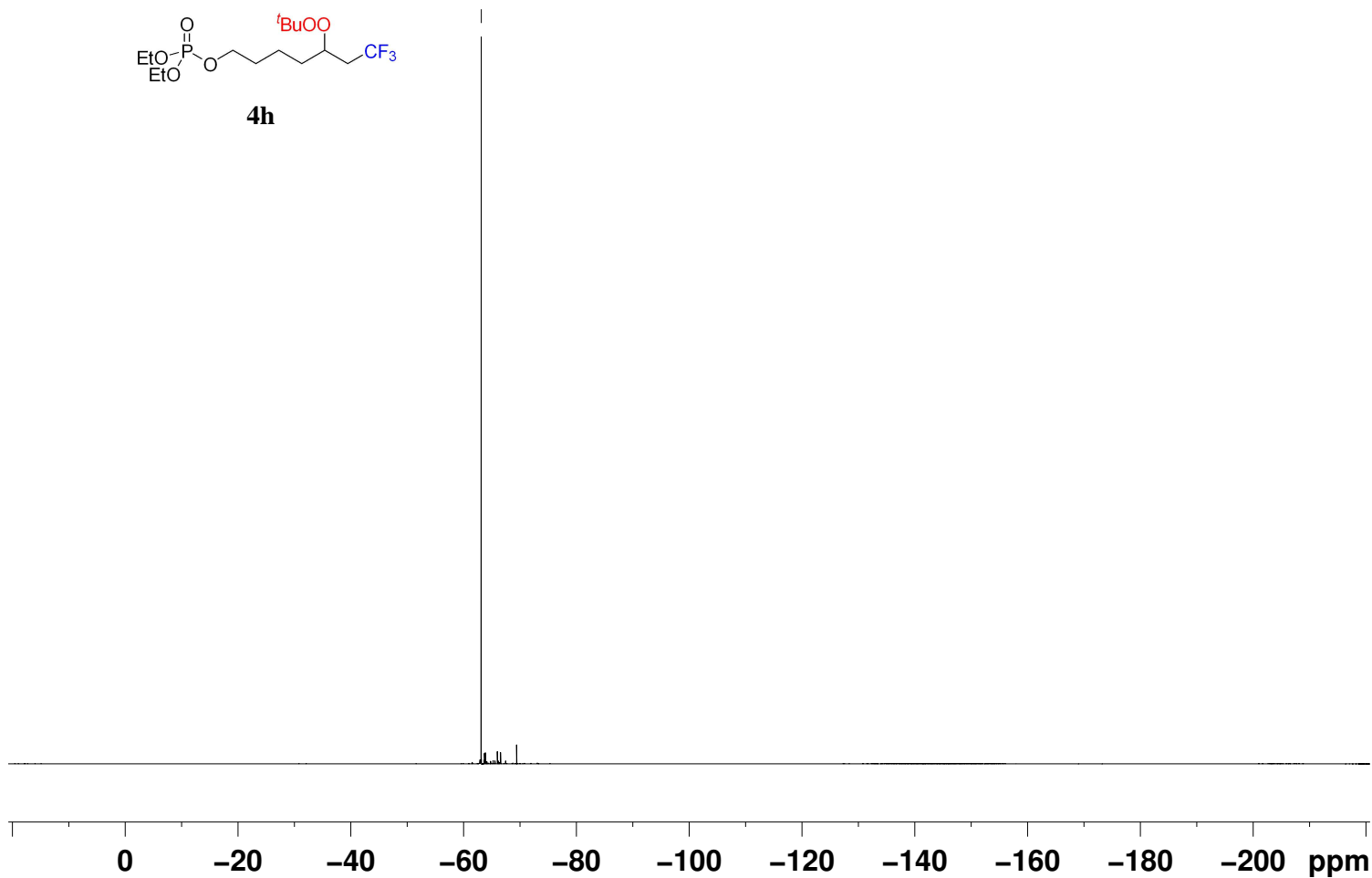
37.29
37.01
37.01
36.74
36.47
32.29
30.15
30.09
26.35
21.24
16.13
16.06



NAME	LV-HQW-685P-20240614
EXPNO	13
PROCNO	1
Date_	20240614
Time	22.41 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDC13
NS	500
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	300.5 K
D1	2.0000000 sec
D11	0.0300000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127709 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

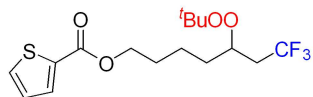


--63.139



NAME	LV-HQW-685P-20240614
EXPNO	11
PROCNO	1
Date_	20240614
Time	22.08 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	299.6 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

7.798
7.791
7.550
7.540
7.107
7.097
7.095
7.085
4.324
4.308
4.292
4.218
4.203
4.188
4.174
4.158
2.717
2.705
2.689
2.679
2.677
2.667
2.651
2.638
2.253
2.243
2.226
2.215
2.205
2.199
2.188
2.177
2.161
1.853
1.829
1.812
1.807
1.799
1.795
1.790
1.784
1.778
1.763
1.745
1.738
1.727
1.721
1.704
1.687
1.667
1.654
1.647
1.637
1.618
1.600
1.583
1.579
1.562
1.556
1.546
1.540
1.524
1.518
1.508
1.502
1.225

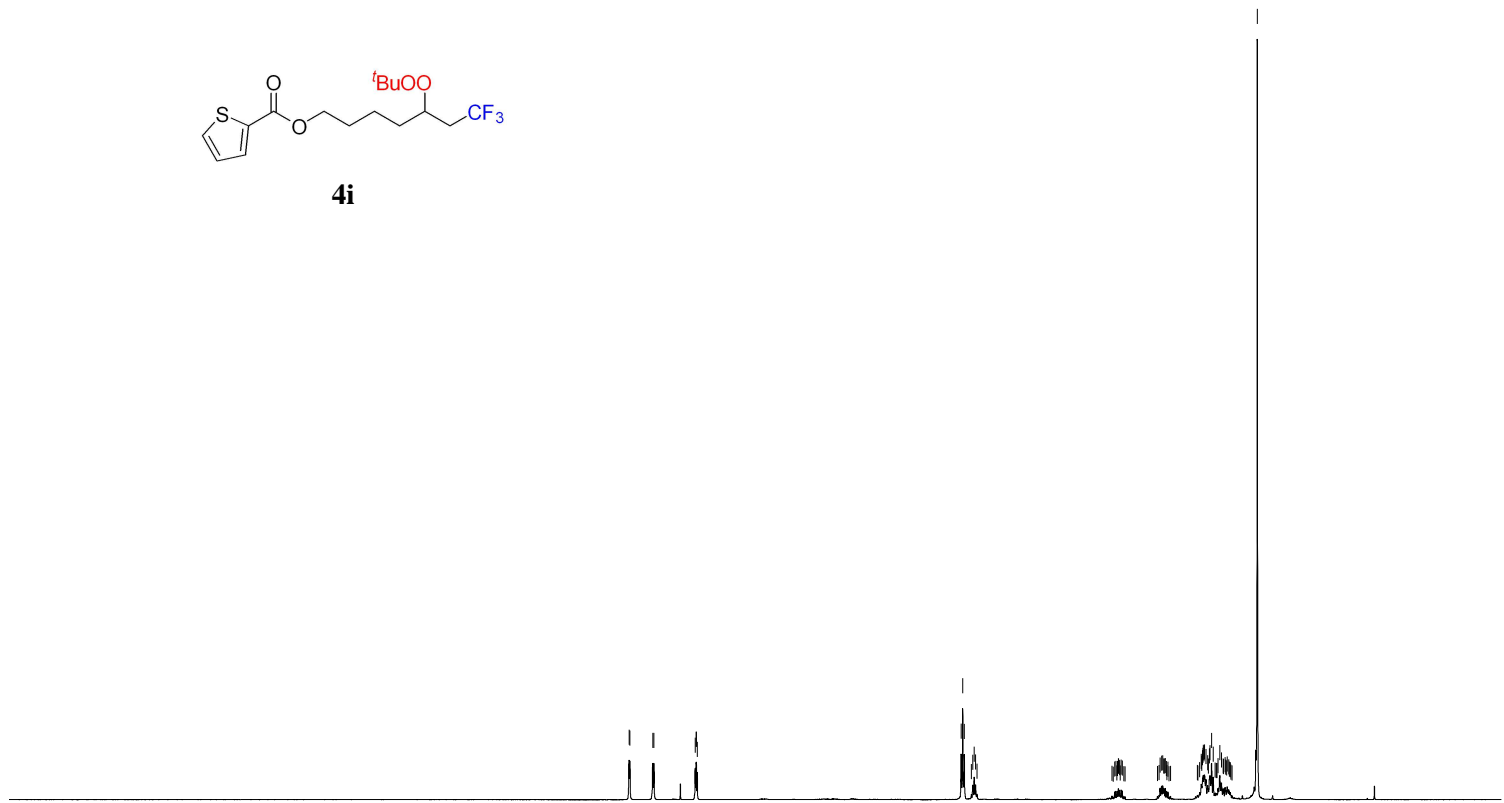


4i

```

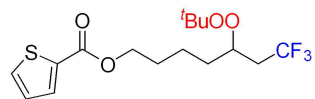
NAME      LV-HQW-697P-20240623
EXPNO     10
PROCNO    1
Date_     20240623
Time      23.00 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        57
DW        80.000 usec
DE        8.64 usec
TE        302.1 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300095 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

```



14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

1.14
1.14
1.15
2.27
1.00
1.04
1.18
1.99
2.01
1.24
1.09
9.04



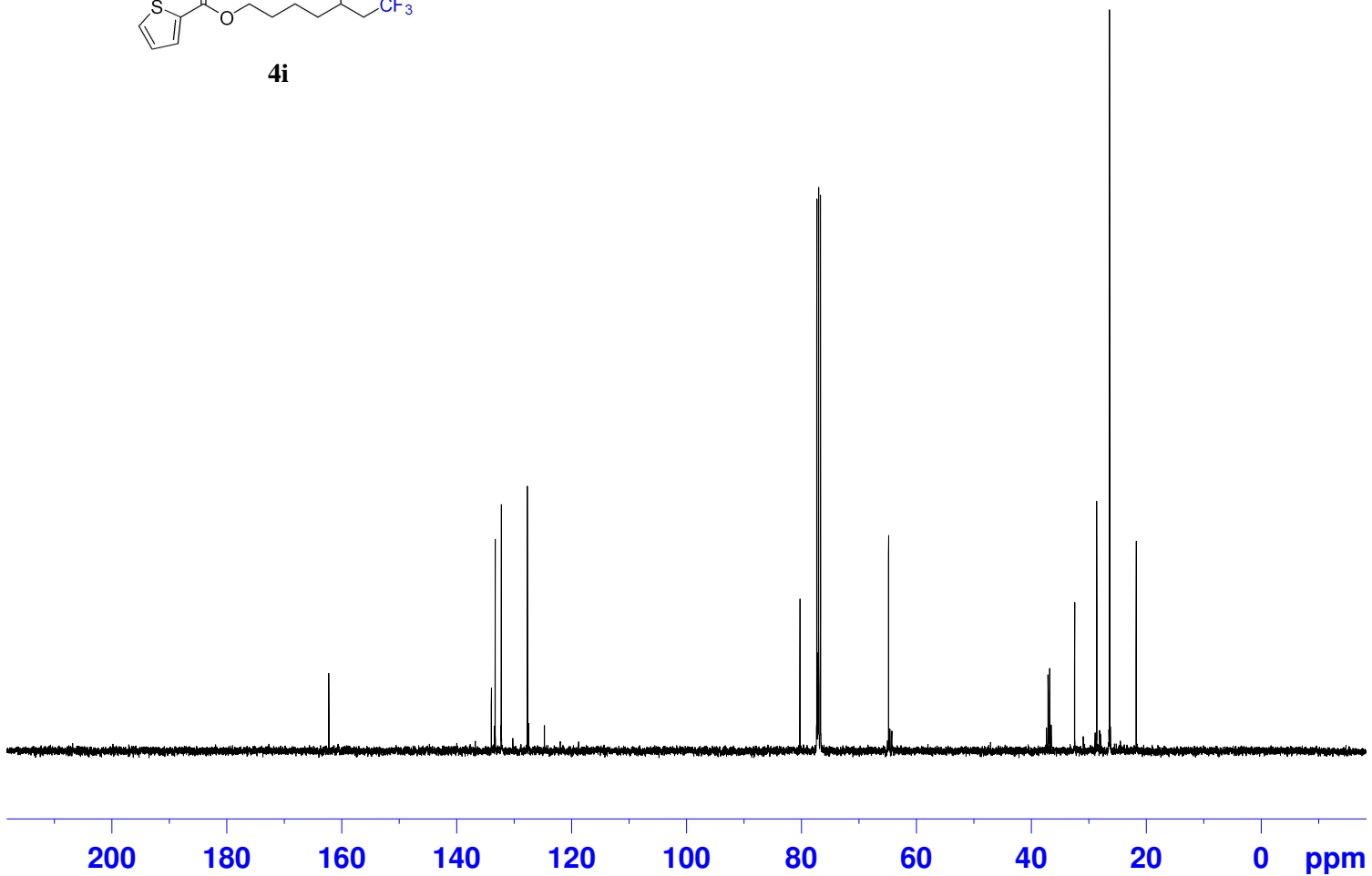
4i

162.23

133.95
133.27
132.21
130.22
127.68
127.47
124.72
121.97

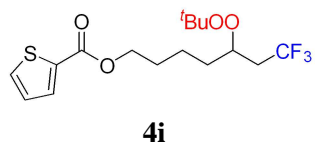
80.24
77.19
77.16
77.13
77.10
64.83

37.35
37.08
36.80
36.53
32.44
28.60
26.37
21.74

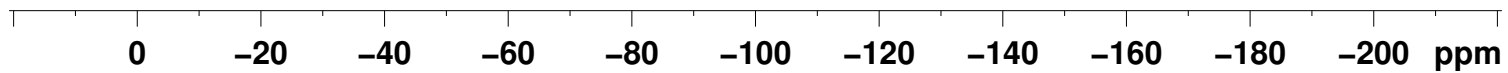


```

NAME      LV-HQW-697P-20240623
EXPNO     12
PROCNO    1
Date_     20240623
Time      23.18 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         248
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         303.0 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127702 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```



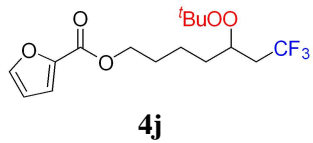
--63.105



```

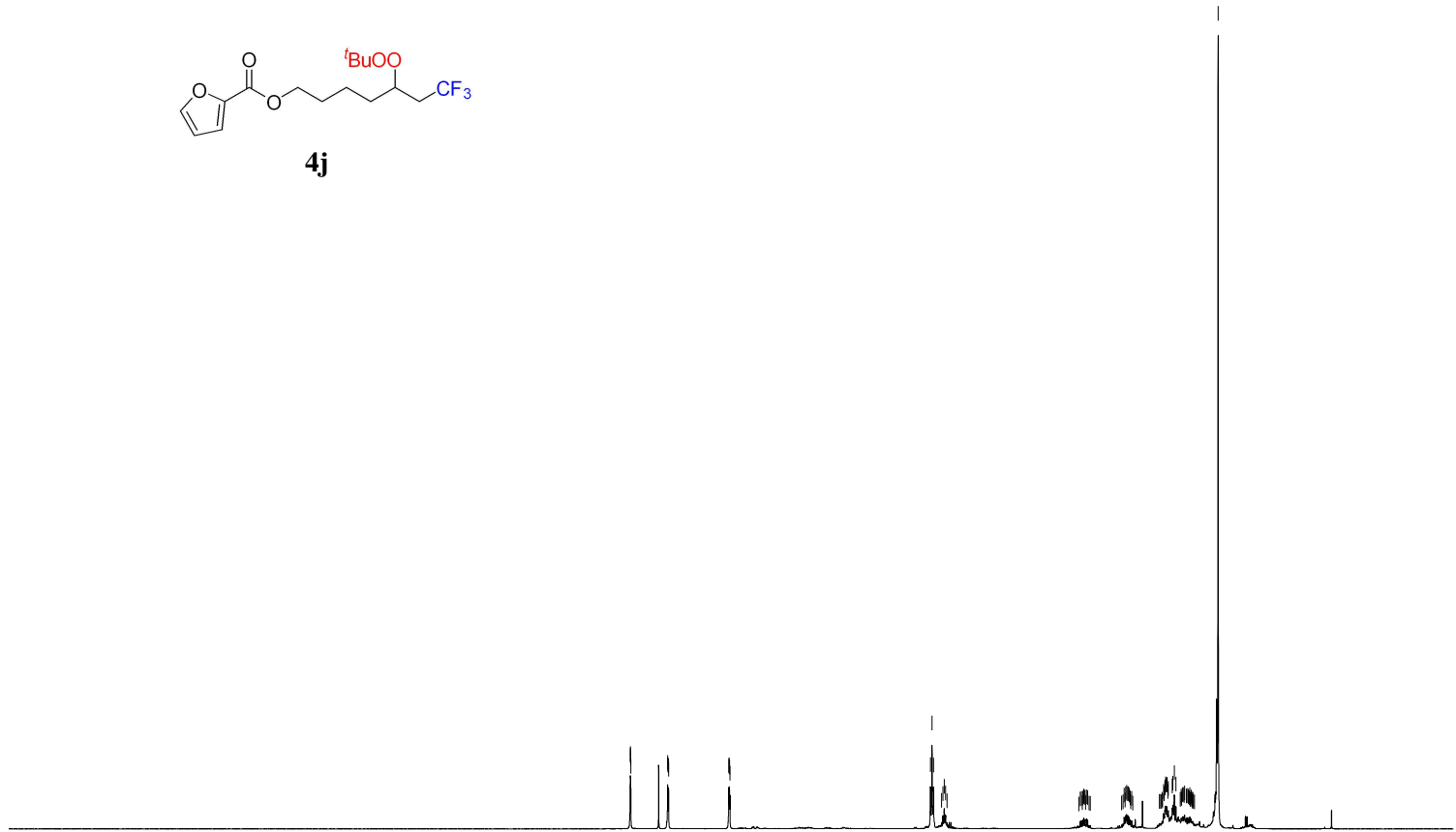
NAME      LV-HQW-697P-20240623
EXPNO     11
PROCNO    1
Date_     20240623
Time      23.02 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDCl3
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         302.2 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

7.580
7.578
7.576
7.574
7.176
7.174
7.167
7.165
6.515
6.511
6.507
6.502
4.335
4.319
4.302
4.200
4.186
4.172
2.716
2.703
2.688
2.678
2.675
2.666
2.650
2.637
2.242
2.225
2.215
2.204
2.198
2.188
2.176
2.160
1.815
1.810
1.802
1.798
1.793
1.786
1.779
1.777
1.770
1.765
1.722
1.716
1.699
1.682
1.636
1.626
1.621
1.610
1.604
1.594
1.589
1.570
1.555
1.549
1.538
1.533
1.526
1.523
1.516
1.510
1.499
1.226



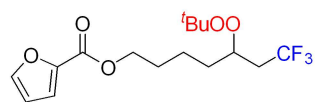
```

NAME      LV-HQW-637P-20240517
EXPNO     10
PROCNO    1
Date_     20240518
Time      0.29 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        45.2
DW        80.000 usec
DE        8.64 usec
TE        298.0 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300052 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



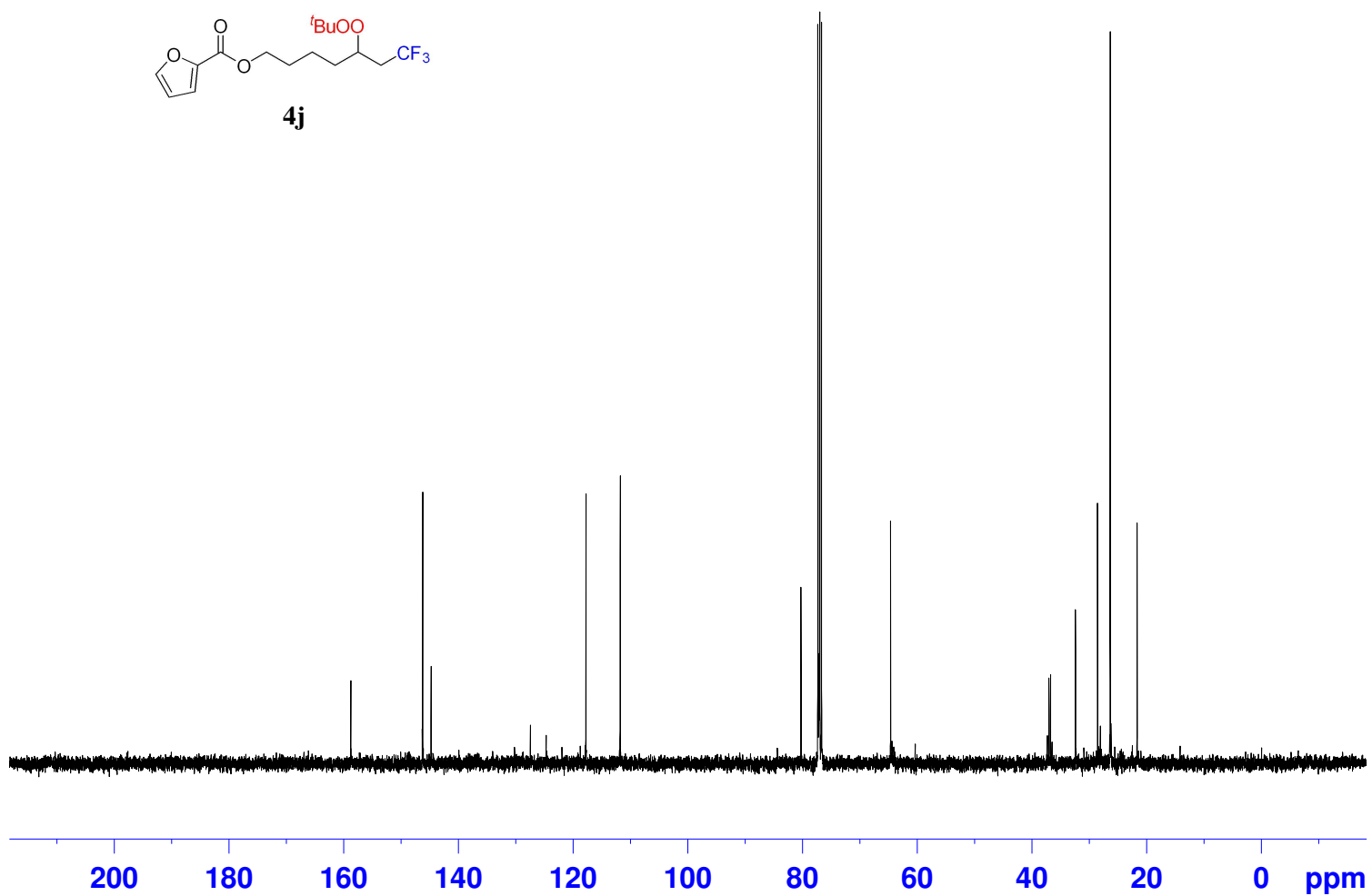
14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

1.00 1.02 1.01 2.15 1.02 1.03 1.15 2.19 2.03 2.08 9.06

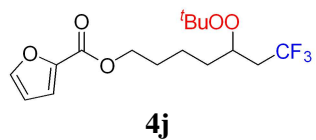


4j

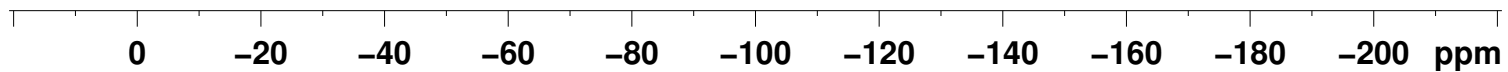
158.75
 146.21
 144.75
 130.19
 127.44
 124.69
 121.94
 117.75
 111.76
 80.25
 77.15
 77.12
 77.09
 77.06
 64.64
 37.30
 37.03
 36.75
 36.48
 32.39
 28.54
 26.34
 21.66



NAME LV-HQW-637P-20240517
 EXPNO 12
 PROCNO 1
 Date_ 20240518
 Time 0.39 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 104
 DS 4
 SWH 23809.523 Hz
 FIDRES 0.726609 Hz
 AQ 1.3763061 sec
 RG 101
 DW 21.000 usec
 DE 6.50 usec
 TE 298.0 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 100.6228298 MHz
 NUC1 13C
 P0 2.67 usec
 P1 8.00 usec
 SI 32768
 SF 100.6127716 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



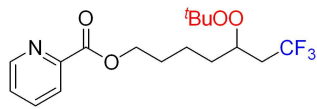
--63.118



```

NAME      LV-HQW-637P-20240517
EXPNO     11
PROCNO    1
Date_     20240518
Time      0.31 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDCl3
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         298.1 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

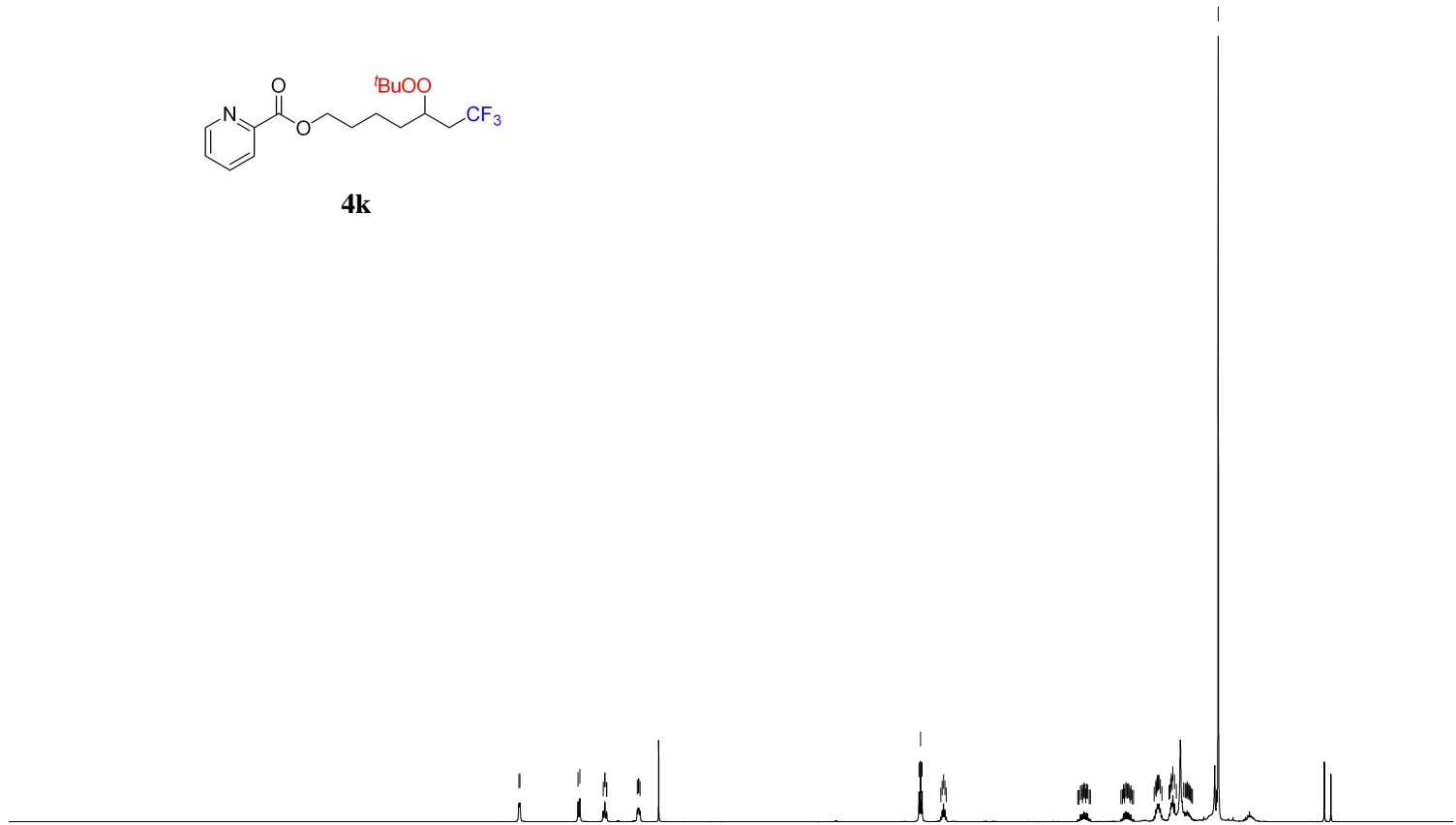

8.776
8.766
8.137
8.118
7.865
7.849
7.846
7.830
7.827
7.497
7.485
7.480
7.467
4.452
4.435
4.418
4.216
4.202
4.186
4.172
4.157
2.708
2.695
2.679
2.670
2.666
2.657
2.641
2.628
2.242
2.226
2.215
2.204
2.199
2.188
2.177
2.161
1.910
1.893
1.889
1.881
1.876
1.872
1.865
1.858
1.843
1.826
1.750
1.741
1.733
1.726
1.717
1.709
1.691
1.671
1.591
1.575
1.568
1.559
1.552
1.545
1.536
1.529
1.520
1.513
1.218



4k

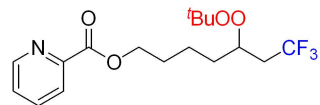
```

NAME      LV-HQW-762P-20240721
EXPNO     10
PROCNO    1
Date_     20240721
Time      23.17 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH        6250.000 Hz
FIDRES     0.190735 Hz
AQ         5.2429299 sec
RG         101
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300080 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

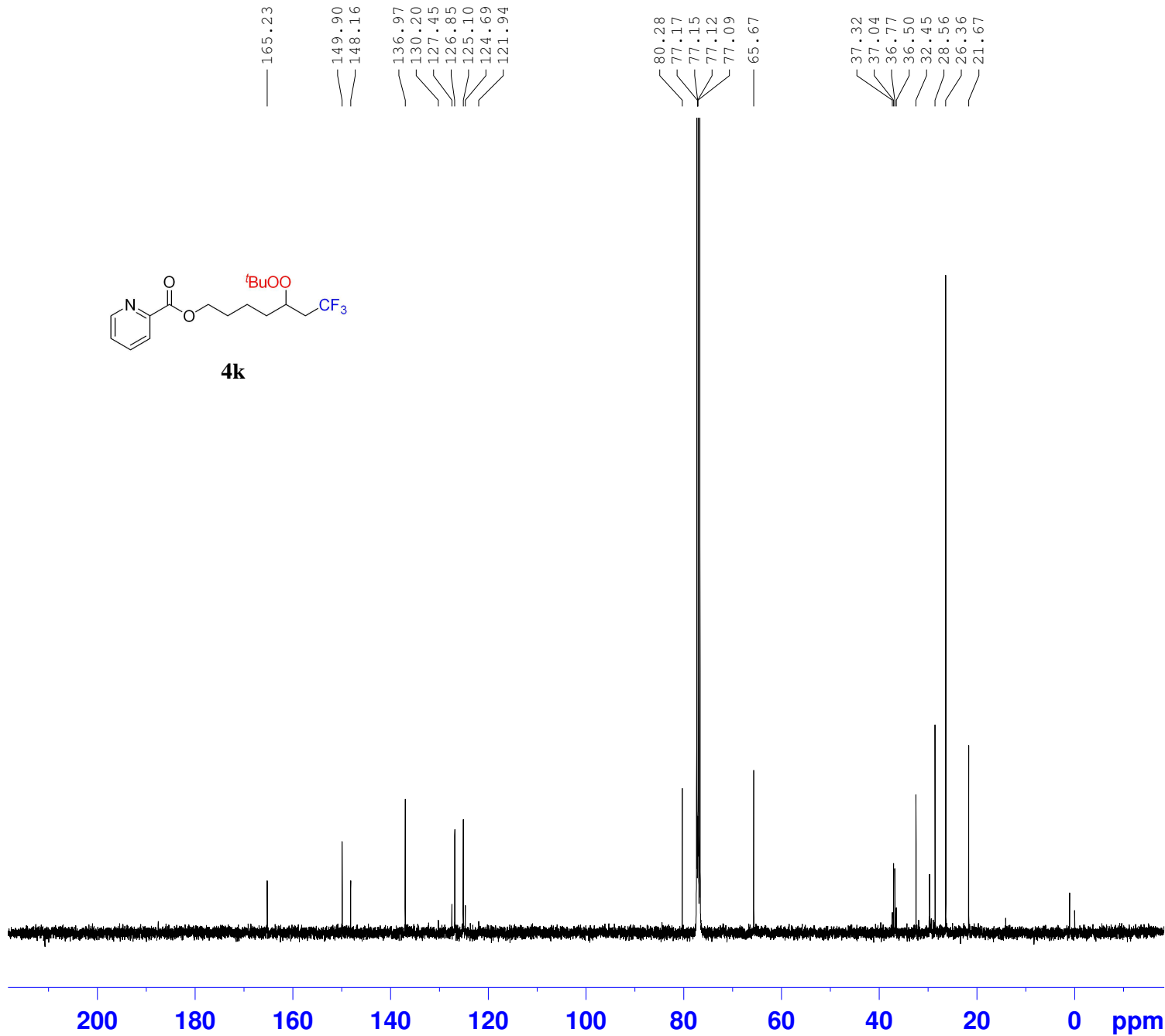


14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

1.00 1.00 1.02 1.01 2.05 1.02 1.02 1.08 2.14 2.11 2.03 9.04



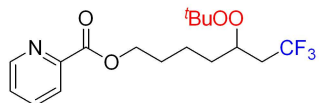
4k



```

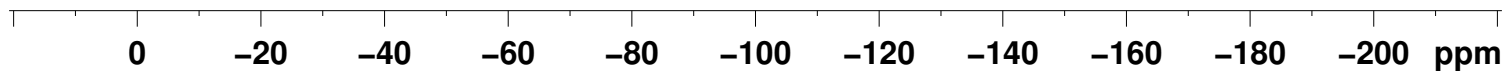
NAME      LV-HQW-762P-20240721
EXPNO     12
PROCNO    1
Date_     20240722
Time      1.15 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD        65536
SOLVENT   CDC13
NS        2000
DS        4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG        101
DW        21.000 usec
DE        6.50 usec
TE        298.0 K
D1        2.0000000 sec
D11       0.0300000 sec
TD0       1
SFO1      100.6228298 MHz
NUC1      13C
P0        2.67 usec
P1        8.00 usec
SI        32768
SF        100.6127709 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

```



4k

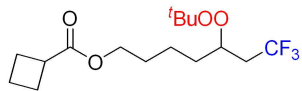
--63.103



```

NAME      LV-HQW-762P-20240721
EXPNO     11
PROCNO    1
Date_     20240721
Time      23.19 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDCl3
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         298.1 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

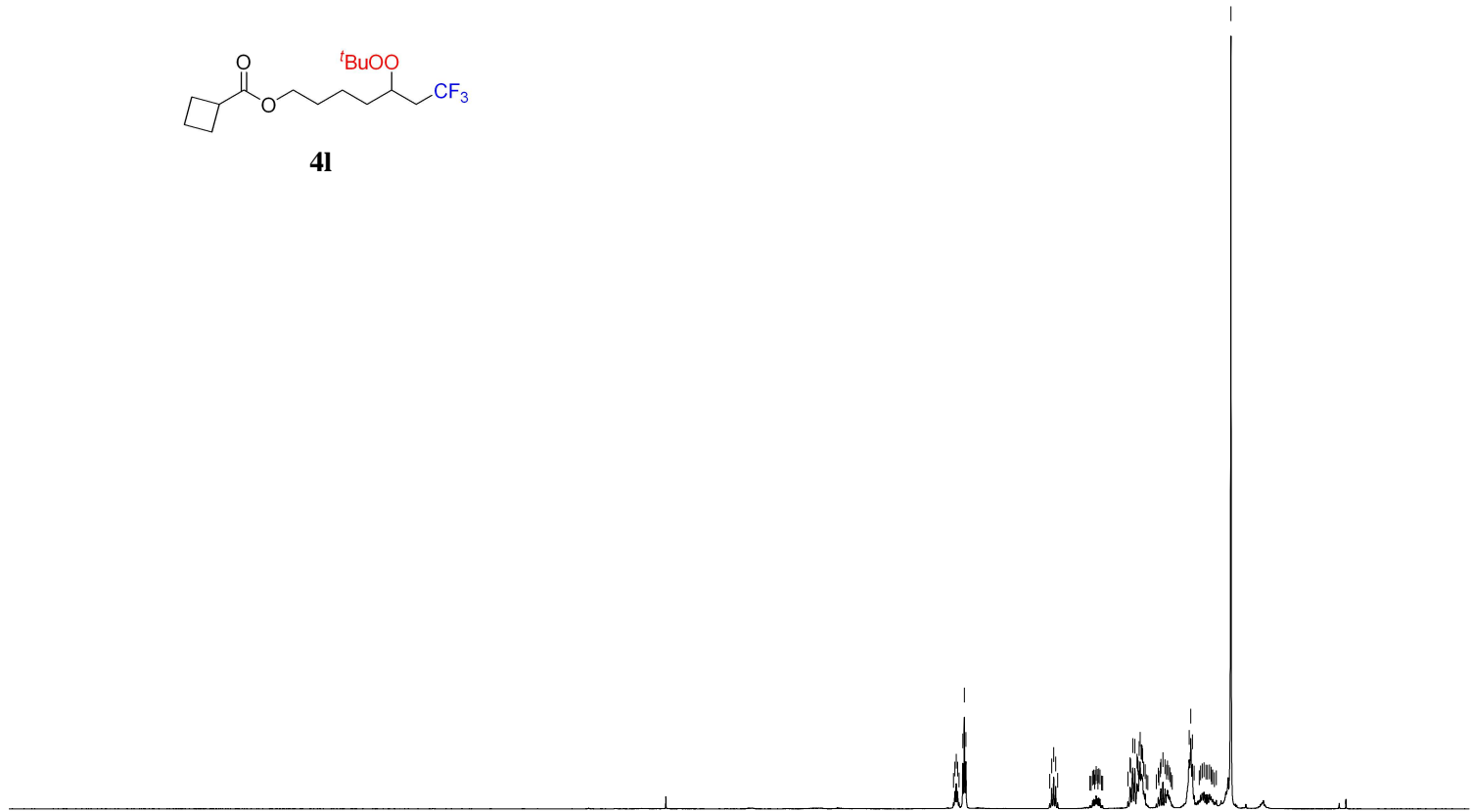
4.196
4.181
4.167
4.152
4.137
4.096
4.080
4.064
3.167
3.146
3.125
3.103
3.082
2.709
2.696
2.680
2.671
2.659
2.642
2.630
2.331
2.308
2.304
2.279
2.257
2.234
2.227
2.221
2.211
2.200
2.189
2.184
2.180
2.174
2.162
2.147
2.135
2.028
2.006
2.001
1.984
1.979
1.957
1.935
1.918
1.908
1.896
1.883
1.872
1.676
1.660
1.642
1.623
1.569
1.554
1.537
1.518
1.497
1.480
1.459
1.442
1.436
1.425
1.407
1.386
1.230



41

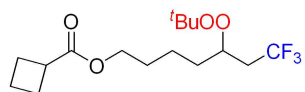
```

NAME      LV-HQW-699P-20240624
EXPNO     10
PROCNO    1
Date_     20240625
Time      0.01 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        45.2
DW        80.000 usec
DE        8.64 usec
TE        303.2 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300061 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

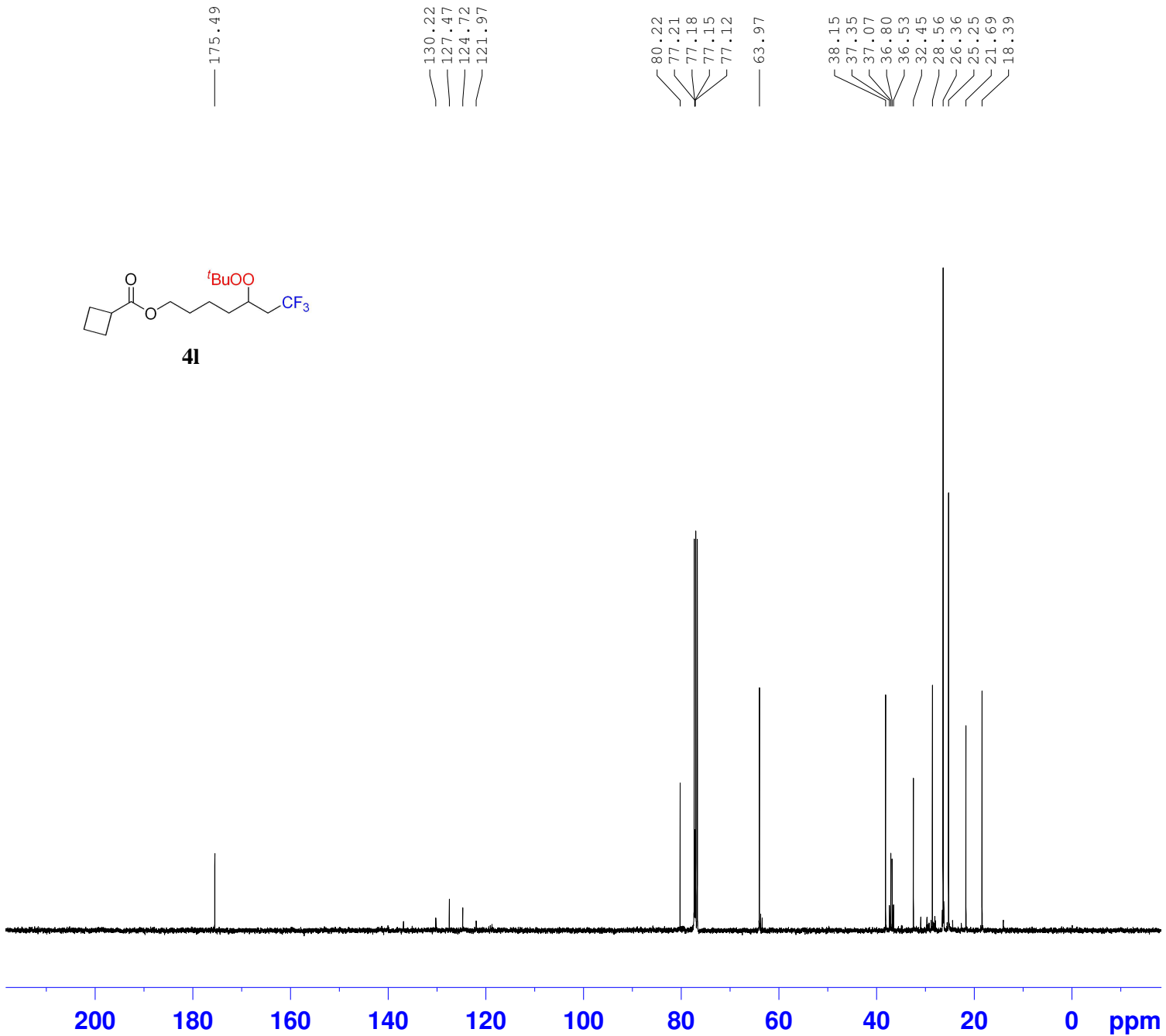


14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

1.00
2.16
1.11
0.99
3.15
2.13
2.25
4.16
1.15
1.25
9.16

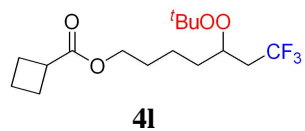


4I



```

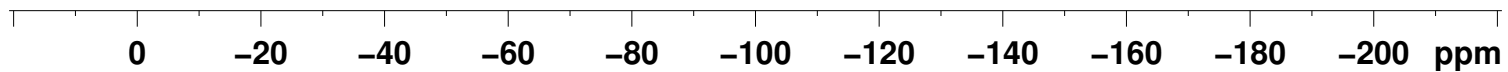
NAME      LV-HQW-699P-20240624
EXPNO     11
PROCNO    1
Date_     20240625
Time      0.25 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         400
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         303.7 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1       100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127685 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

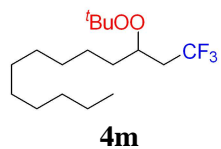


—63.162

```

NAME      LV-HQW-699P-20240624
EXPNO     12
PROCNO    1
Date_     20240625
Time      0.27 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDCl3
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         303.3 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

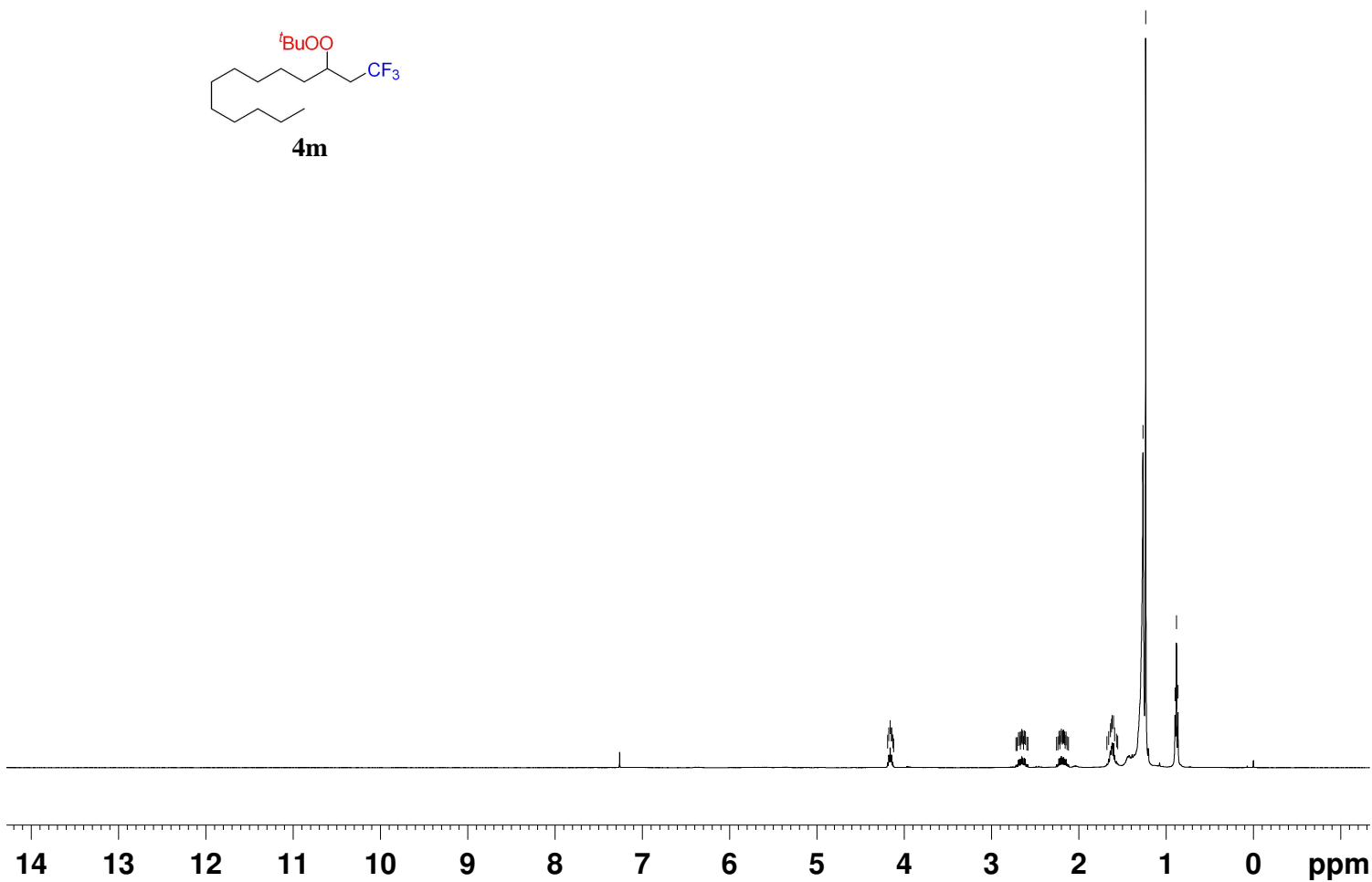


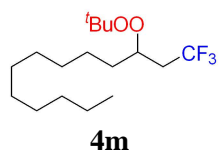


4.191
4.177
4.161
4.148
4.144
4.131
4.122
2.720
2.708
2.692
2.679
2.670
2.663
2.654
2.650
2.641
2.634
2.625
2.612
2.596
2.583
2.256
2.240
2.228
2.218
2.212
2.200
2.190
2.184
2.174
2.163
2.157
2.146
2.135
2.119
1.679
1.658
1.626

```

NAME      LI-HQW-584-06-20240424
EXPNO     10
PROCNO    1
Date_     20240424
Time      14.09 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        45.2
DW        80.000 usec
DE        8.64 usec
TE        298.0 K
D1        1.0000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300104 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

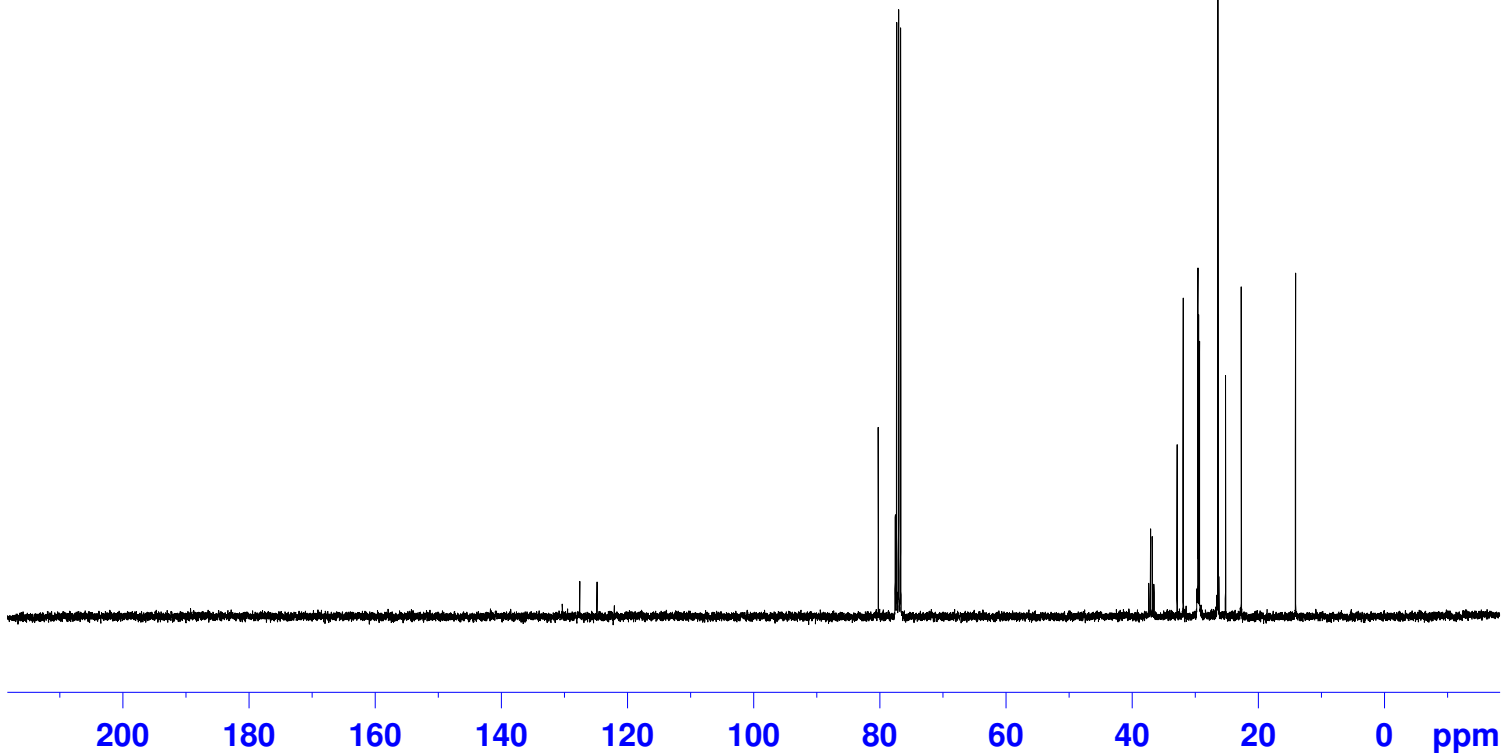




130.32
 127.57
 124.82
 122.06

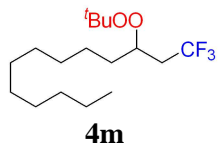
80.23
 77.58
 77.56
 77.53
 77.50

37.35
 37.08
 36.81
 36.54
 32.86
 31.91
 29.59
 29.56
 29.52
 29.47
 29.32
 26.38
 25.19
 22.68
 14.10

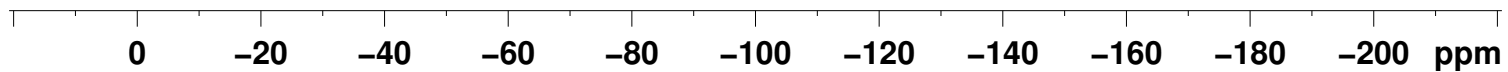


```

NAME      LI-HQW-584-06-20240424
EXPNO     12
PROCNO    1
Date_     20240424
Time      14.24 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         200
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.2 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
SF01       100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127687 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

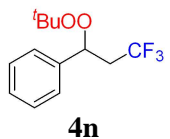



--63.110

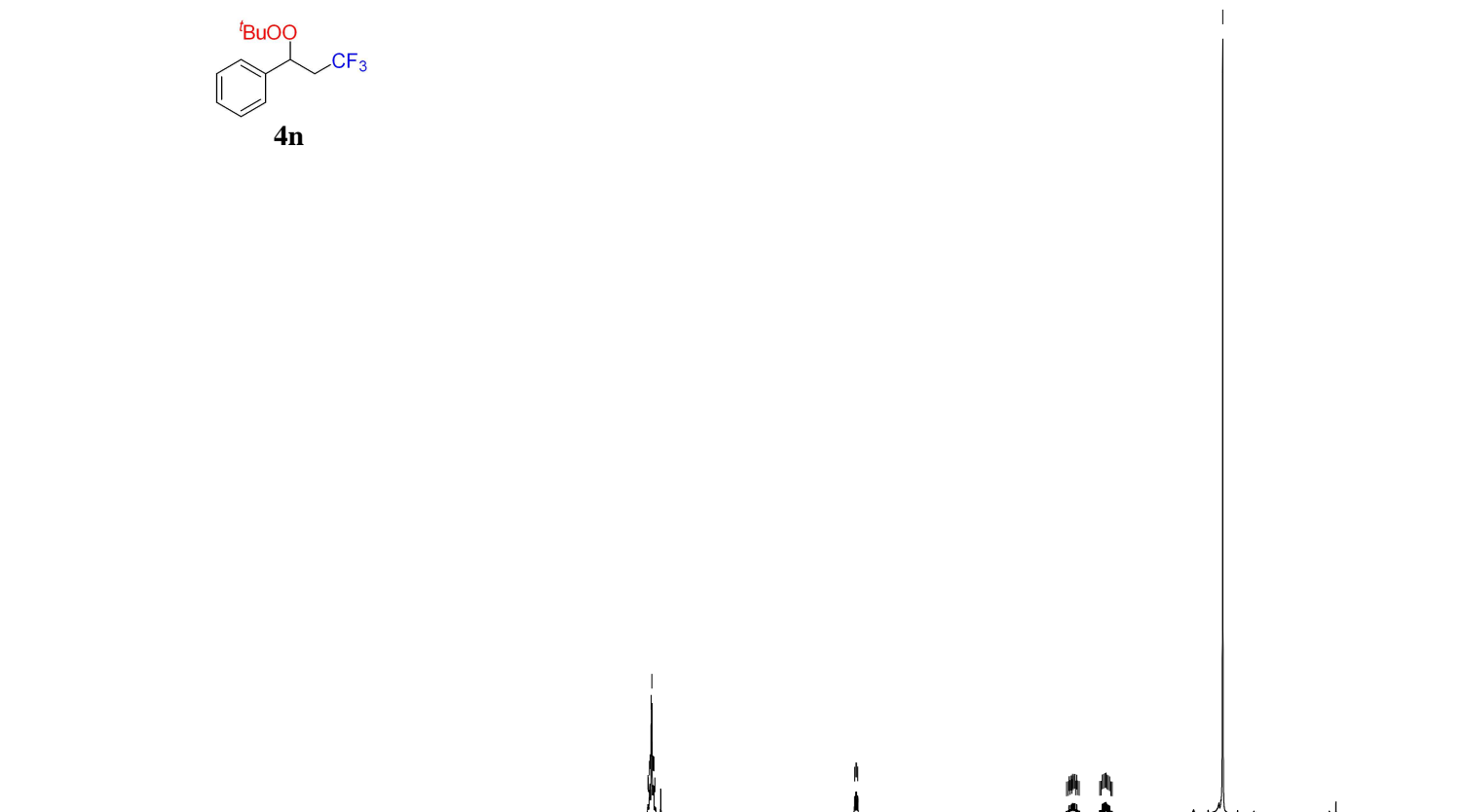


```

NAME      LI-HQW-584-06-20240424
EXPNO     11
PROCNO    1
Date_     20240424
Time      14.11 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



7.391
7.387
7.375
7.368
7.356
7.349
7.337
7.334
7.326
7.316
5.169
5.155
5.151
5.137
2.894
2.875
2.867
2.855
2.849
2.841
2.837
2.829
2.822
2.811
2.803
2.796
2.784
2.777
2.758
2.537
2.523
2.510
2.496
2.483
2.472
2.469
2.458
2.445
2.431
2.418
2.404
1.216



14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

5.02

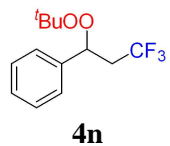
1.00

1.05

1.05

9.15

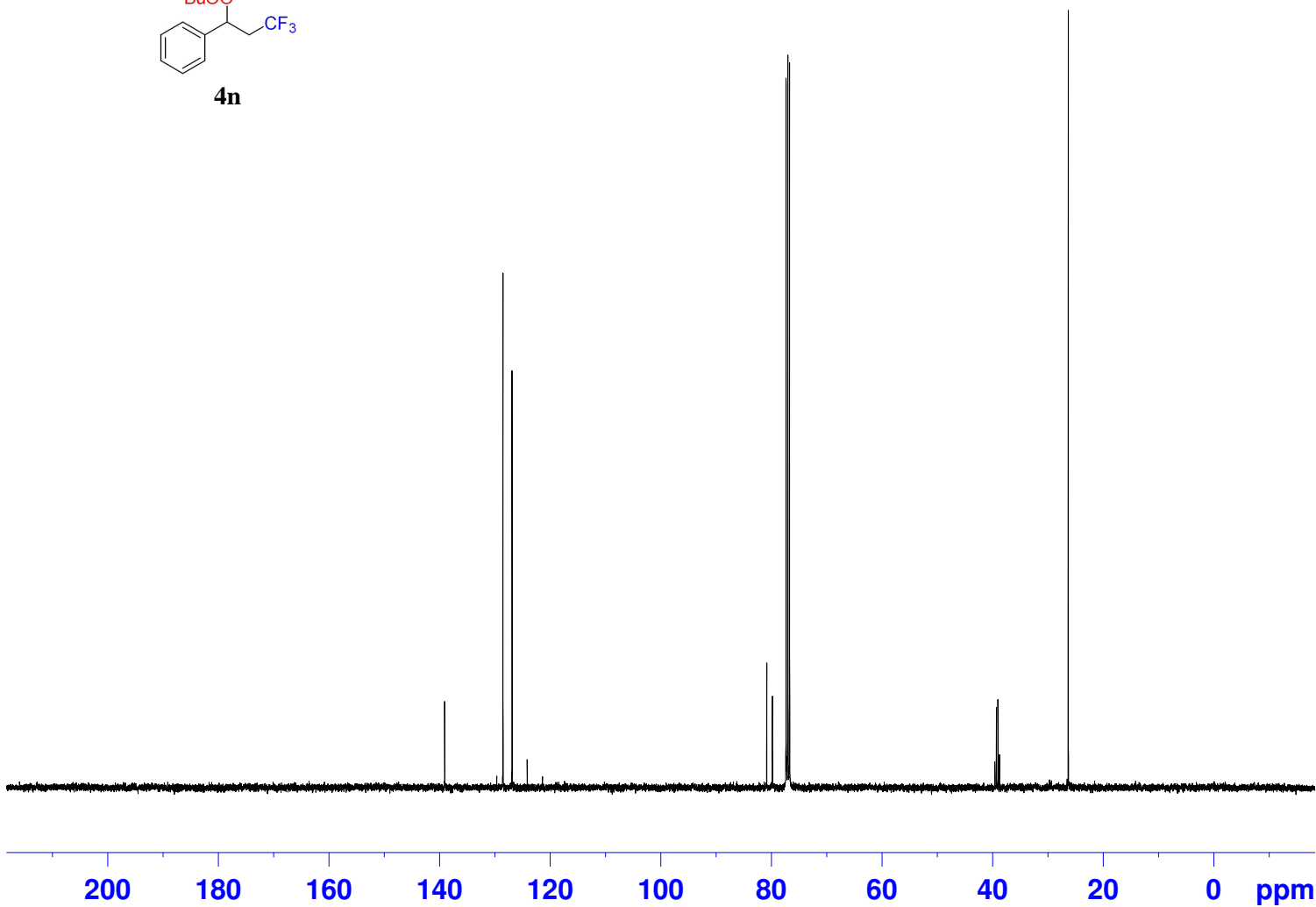
NAME HQW-502P-20240312
EXPNO 10
PROCNO 1
Date_ 20240312
Time 19.22 h
INSTRUM Avance
PROBHD Z163739_0744 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 8
DS 0
SWH 6250.000 Hz
FIDRES 0.190735 Hz
AQ 5.2429299 sec
RG 101
DW 80.000 usec
DE 8.64 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
SFO1 400.1326008 MHz
NUC1 1H
P0 2.67 usec
P1 8.00 usec
SI 65536
SF 400.1300131 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



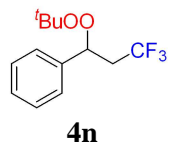
139.07
 129.65
 128.54
 128.50
 126.88
 124.14
 121.39

80.84
 79.85
 79.82
 79.79
 79.76

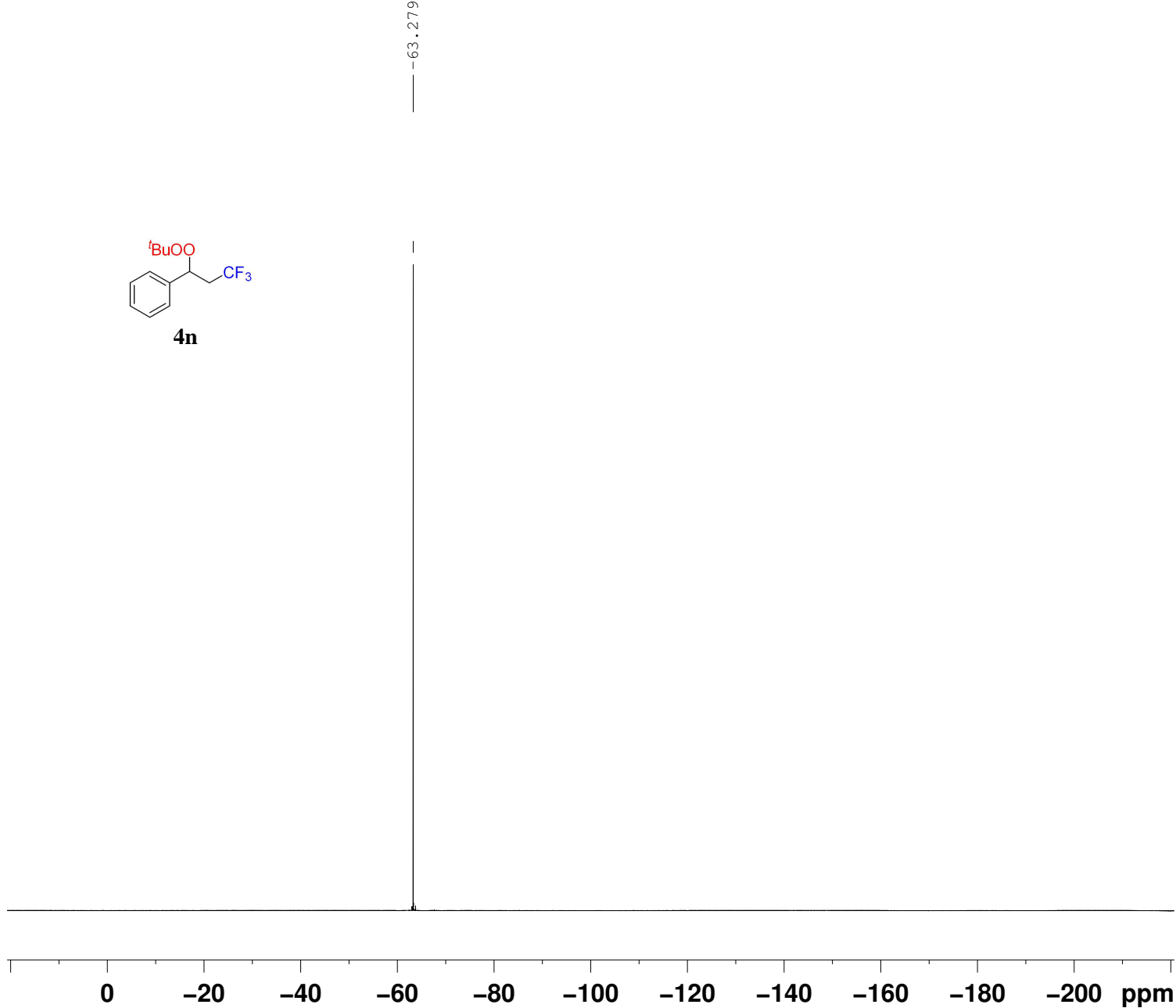
39.58
 39.30
 39.02
 38.74
 26.31



NAME	HQW-502P-20240312
EXPNO	20
PROCNO	1
Date_	20240312
Time	23.23 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	500
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	298.0 K
D1	2.0000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127685 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

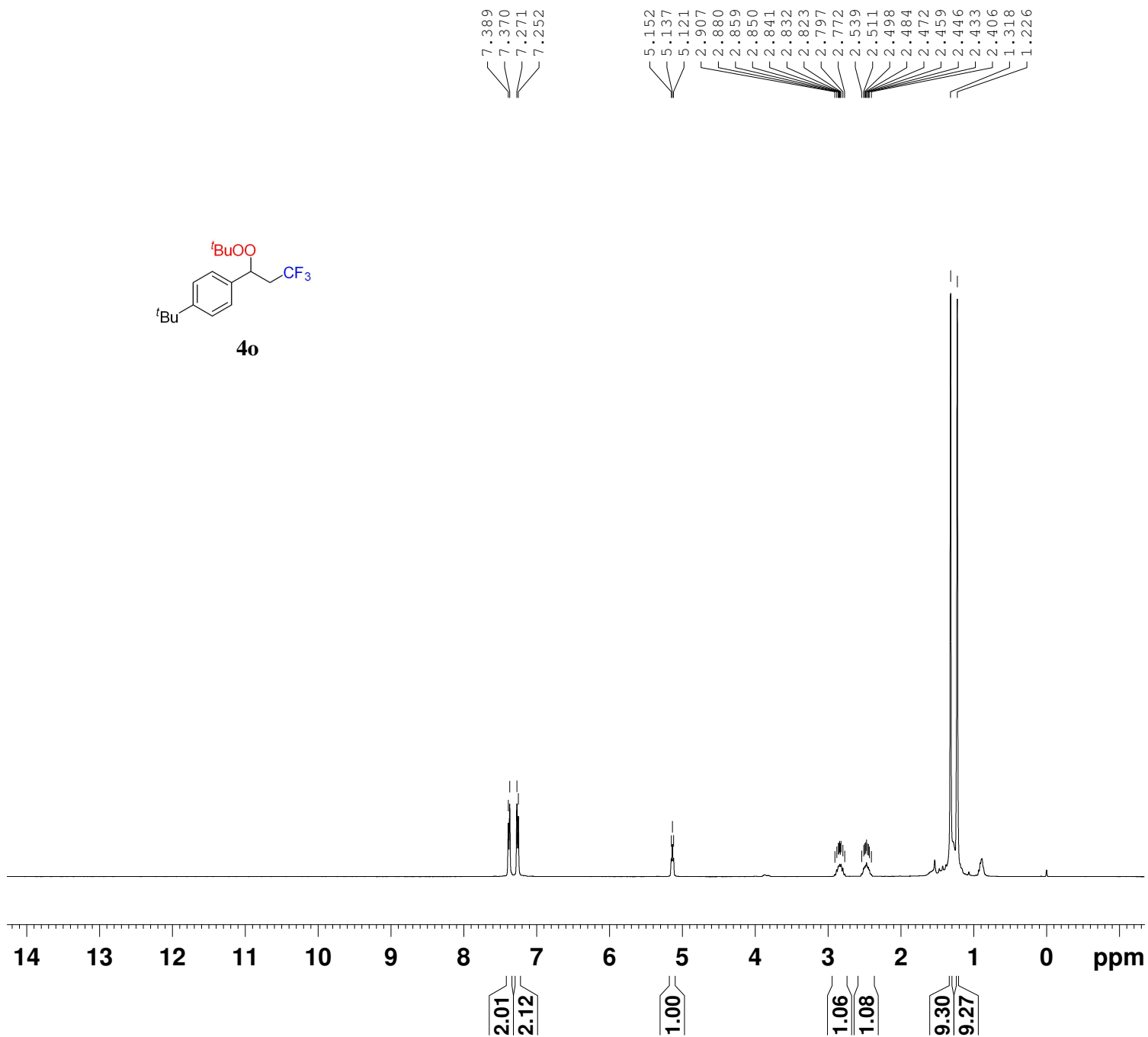
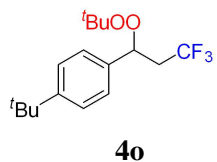


-63.279



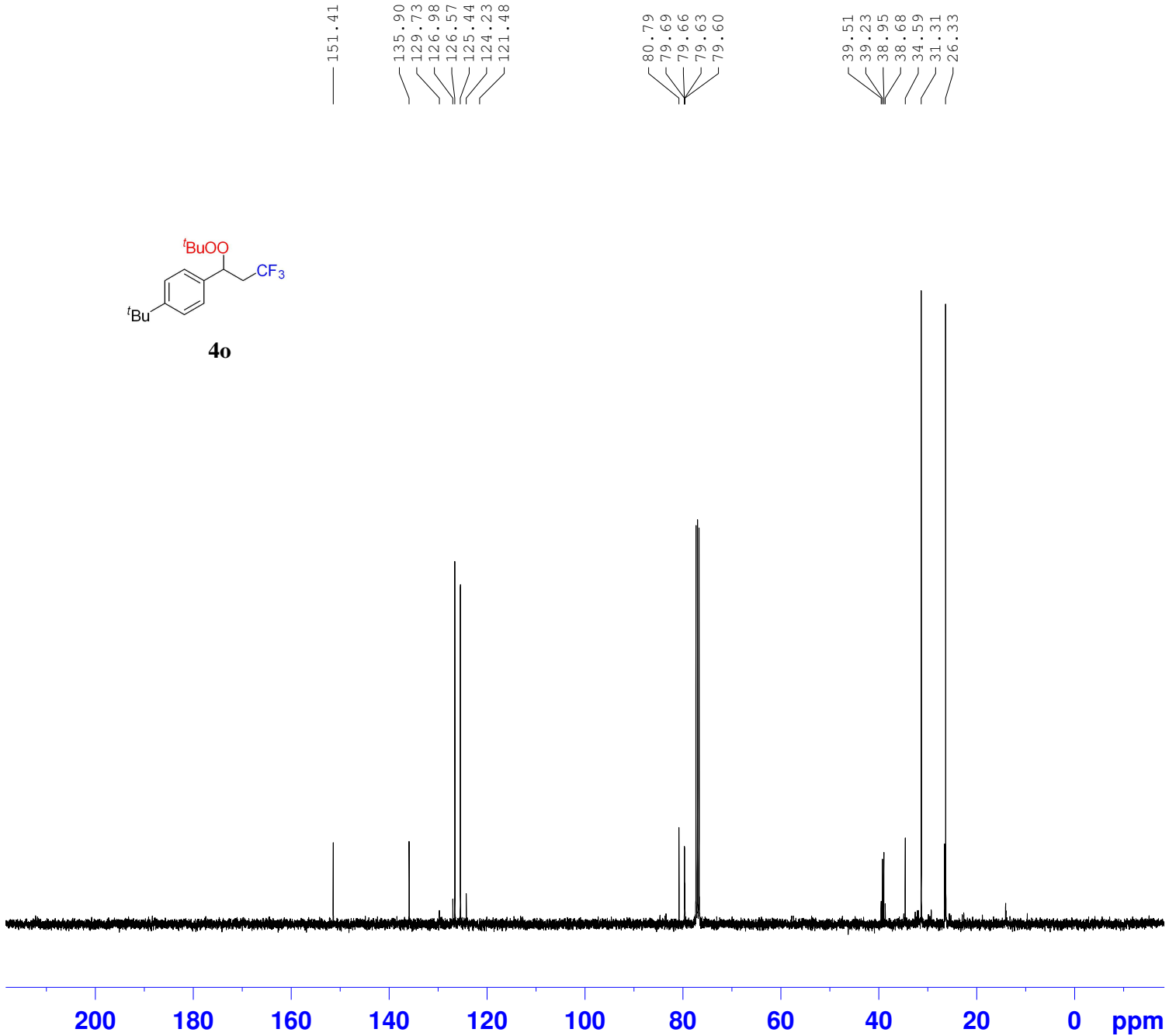
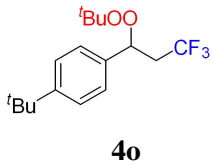
```

NAME      HQW-502P-20240312
EXPNO     12
PROCNO    1
Date_     20240312
Time      19.37 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.0000000 sec
D11       0.0300000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



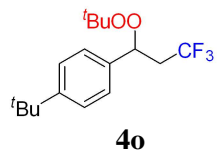
```

NAME      LV-HQW-638P-20240518
EXPNO     10
PROCNO    1
Date_     20240518
Time      14.47 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDCl3
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG         45.2
DW         80.000 usec
DE         8.64 usec
TE         298.4 K
D1         1.00000000 sec
TD0        1
SFO1      400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300152 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

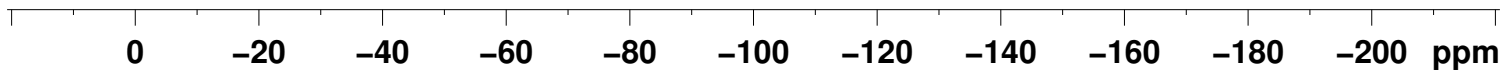


```

NAME      LV-HQW-638P-20240518
EXPNO     12
PROCNO    1
Date_     20240518
Time      15.00 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD        65536
SOLVENT   CDC13
NS        160
DS        4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG        101
DW        21.000 usec
DE        6.50 usec
TE        299.7 K
D1        2.0000000 sec
D11       0.0300000 sec
TD0       1
SFO1      100.6228298 MHz
NUC1      13C
P0        2.67 usec
P1        8.00 usec
SI        32768
SF        100.6127695 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
  
```

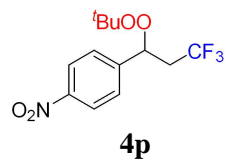


— 63.260



```

NAME      LV-HQW-638P-20240518
EXPNO     11
PROCNO    1
Date_     20240518
Time      14.49 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        299.1 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

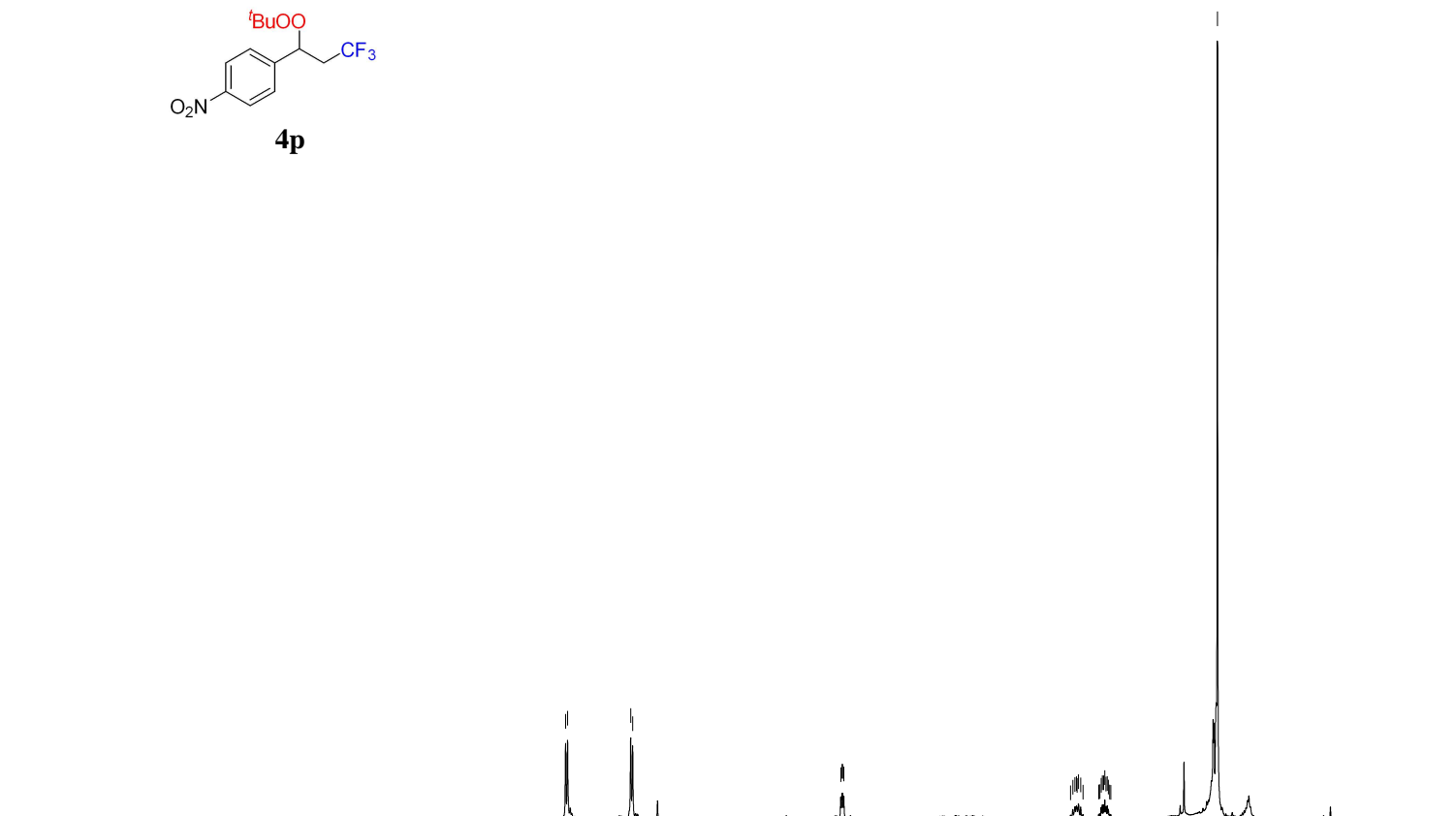


8.256
8.235
7.553
7.532

5.286
5.272
5.266
5.253
2.806
2.781
2.759
2.742
2.735
2.720
2.696
2.671
2.501
2.489
2.475
2.463
2.449
2.436
2.424
2.410
2.398
2.384
2.372
1.220

```

NAME      LV-HQW-675P-20240611
EXPNO     10
PROCNO    1
Date_     20240611
Time      13.38 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        64
DW        80.000 usec
DE        8.64 usec
TE        299.3 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300091 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

2.14

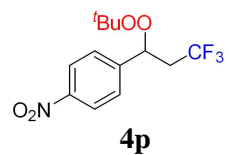
2.17

1.00

1.07

1.13

9.12



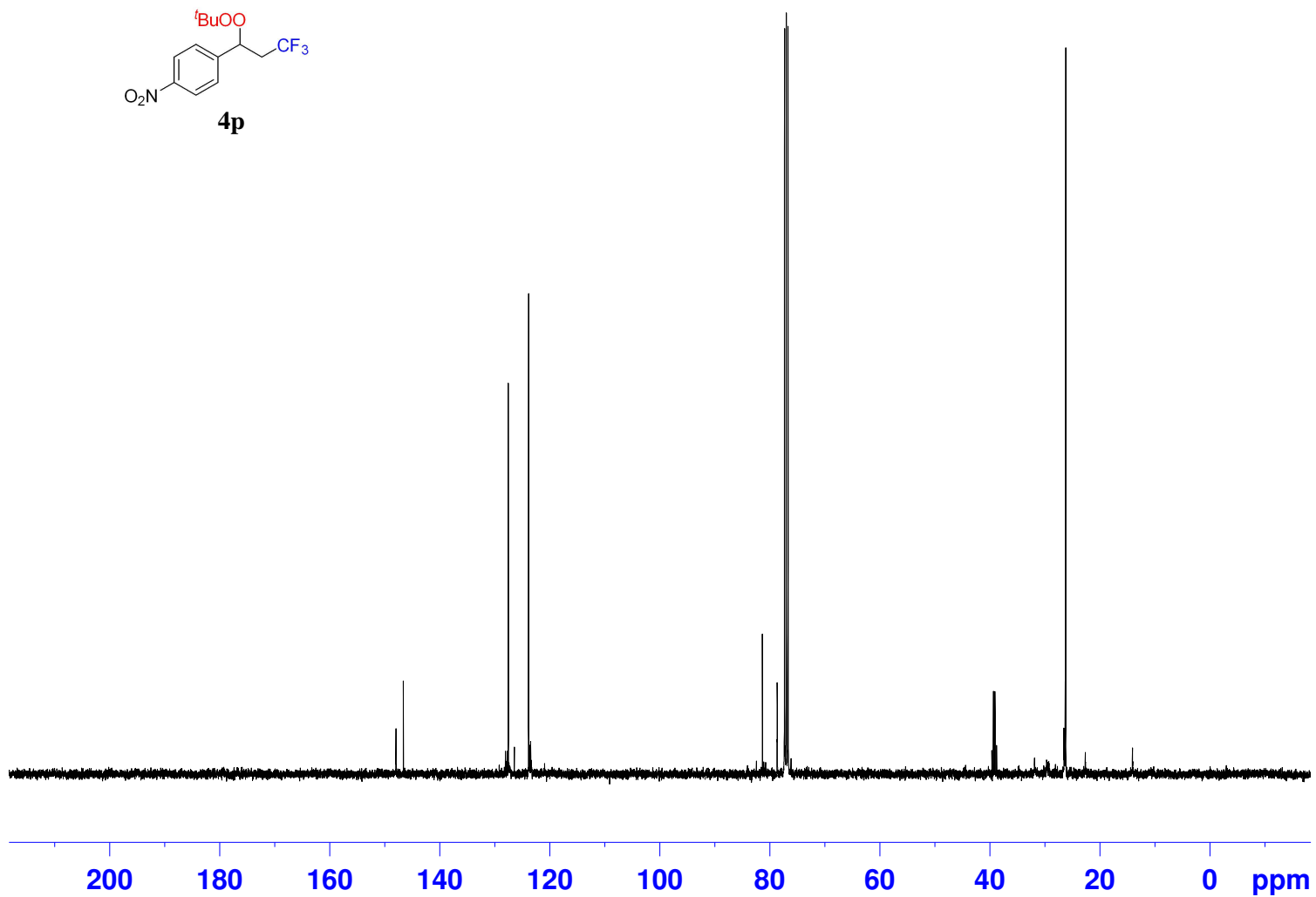
147.95
146.61

129.18
127.53
126.43
123.84
123.68
120.92

81.34
78.70
78.67
78.64
78.61

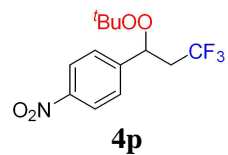
39.63
39.35
39.06
38.77

26.20

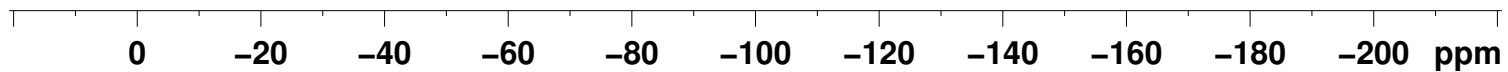


```

NAME      LV-HQW-675P-20240611
EXPNO     12
PROCNO    1
Date_     20240611
Time      14.05 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         416
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         300.6 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127702 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

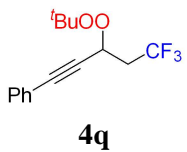


— 63.316



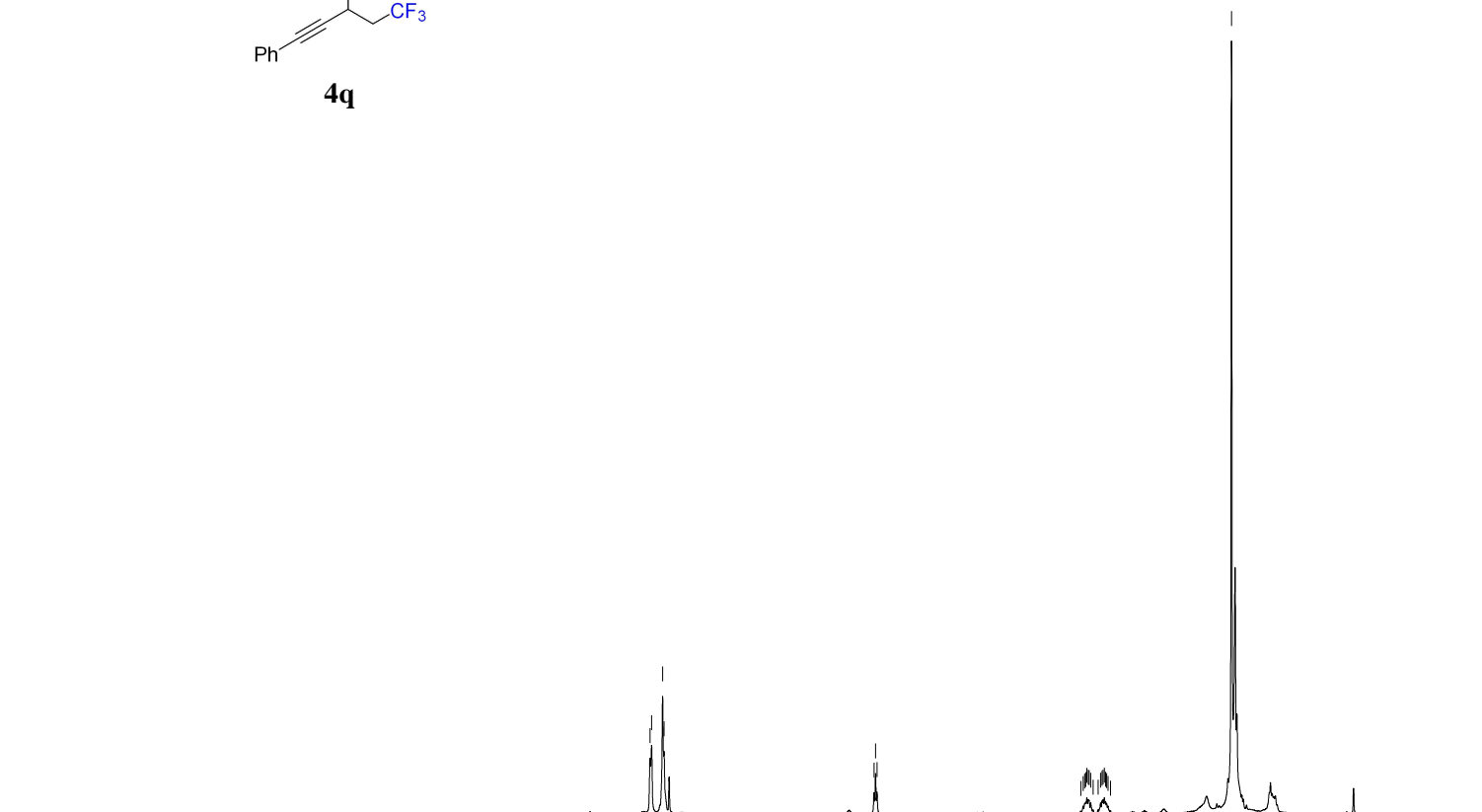
```

NAME      LV-HQW-675P-20240611
EXPNO     11
PROCNO    1
Date_     20240611
Time      13.40 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        299.6 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



7.461
7.445
7.328
7.313

5.085
5.070
5.054
2.893
2.868
2.852
2.841
2.829
2.814
2.805
2.788
2.763
2.709
2.684
2.668
2.657
2.644
2.631
2.619
2.604
2.578
1.295



14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

2.02
3.08

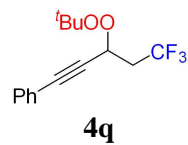
1.00

1.08
1.09

9.18

```

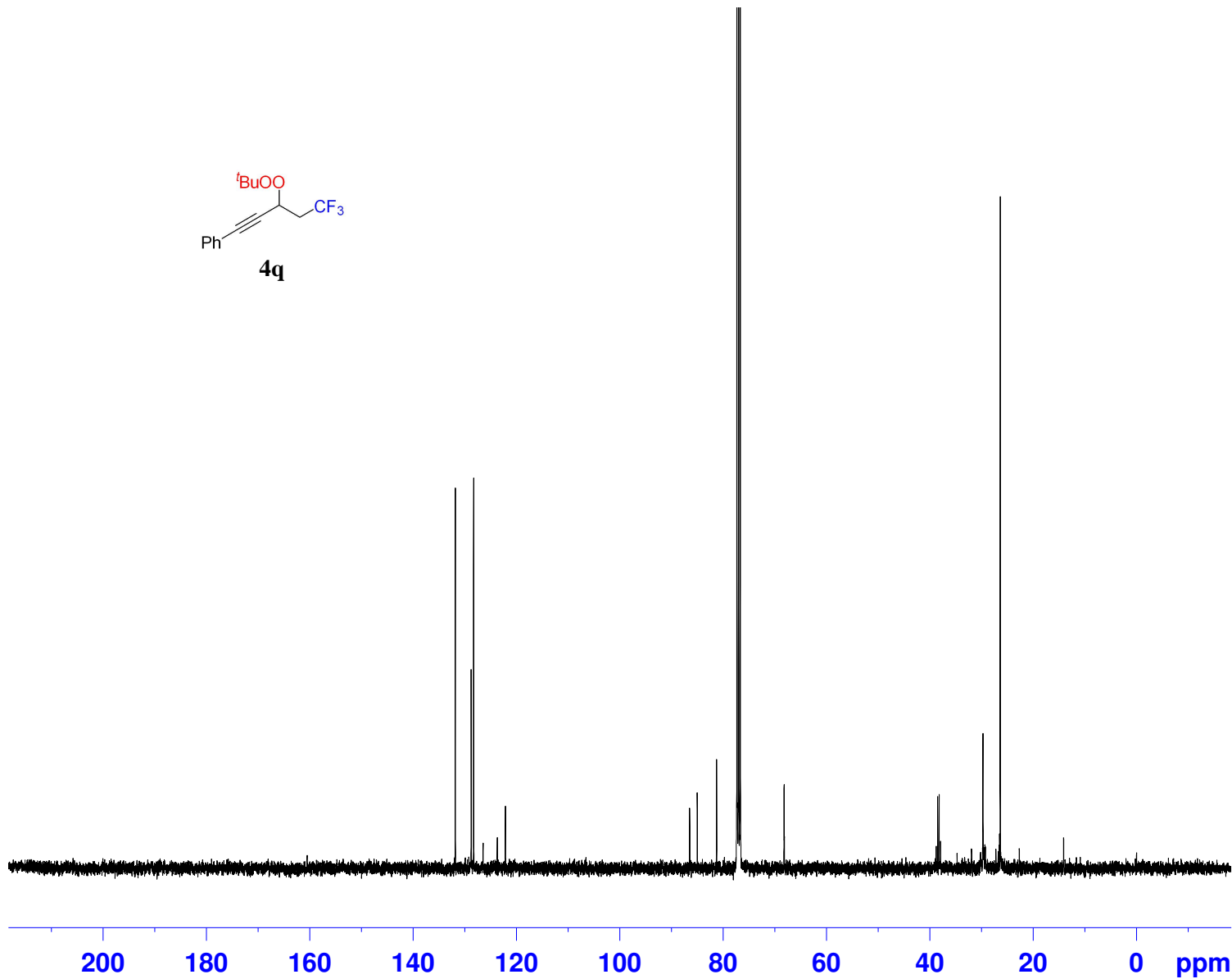
NAME      LV-HQW-670P-rrr-20240609
EXPNO     10
PROCNO    1
Date_     20240609
Time      17.20 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDCl3
NS         8
DS         0
SWH        6250.000 Hz
FIDRES     0.190735 Hz
AQ         5.2429299 sec
RG         101
DW         80.000 usec
DE         8.64 usec
TE         299.1 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300118 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



131.82
129.21
128.76
128.27
126.45
123.70
122.12
120.95

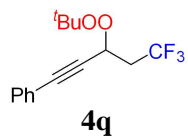
86.47
84.99
81.26
68.24
68.20
68.17
68.13

38.76
38.47
38.19
37.90
29.70
26.35

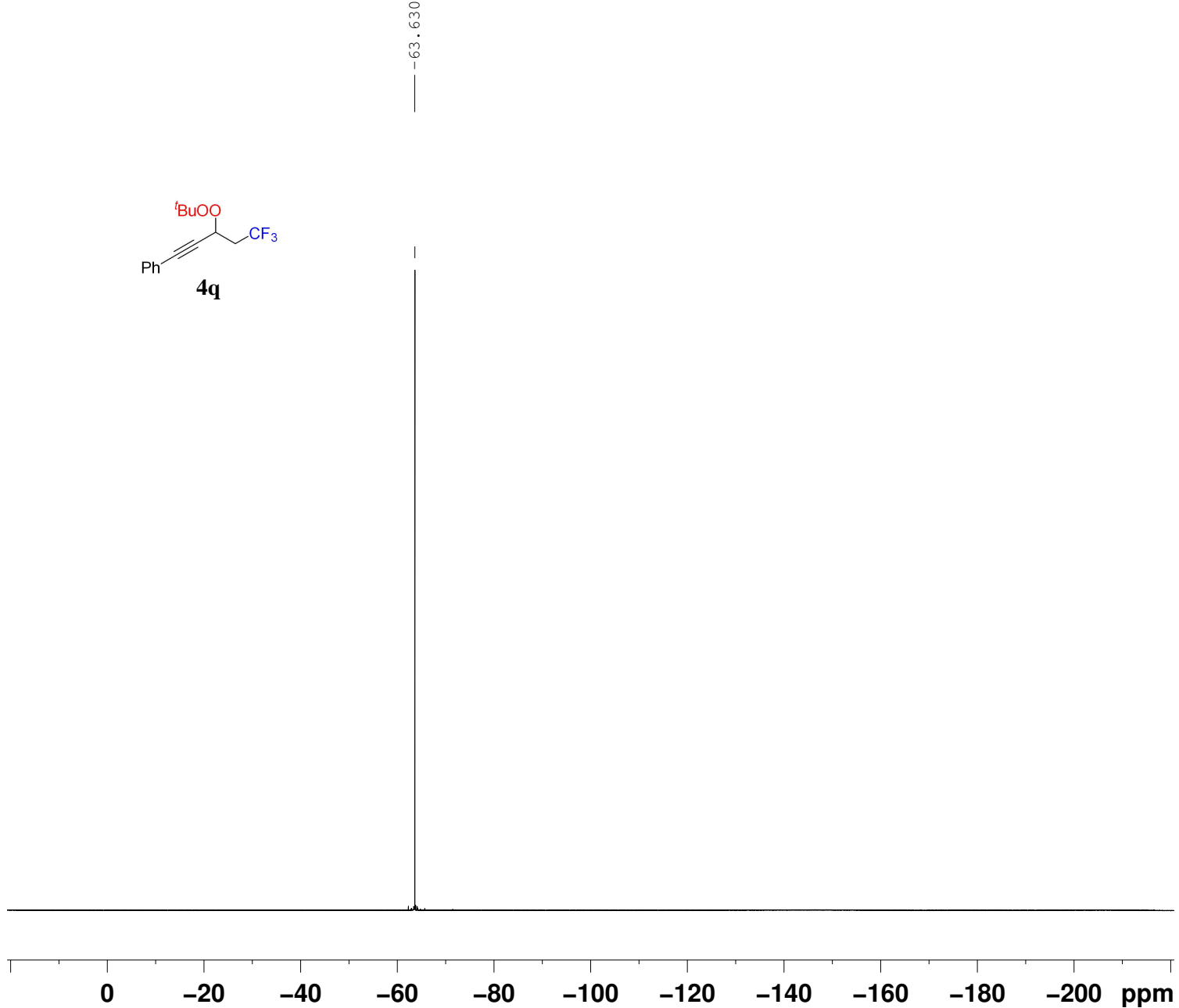


```

NAME      LV-HQW-670P-rrr-20240609
EXPNO     12
PROCNO    1
Date_     20240609
Time      18.22 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD        65536
SOLVENT   CDCl3
NS        1024
DS        4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG        101
DW        21.000 usec
DE        6.50 usec
TE        299.8 K
D1        2.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      100.6228298 MHz
NUC1      13C
P0        2.67 usec
P1        8.00 usec
SI        32768
SF        100.6127695 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
  
```



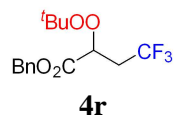
---63.630



```

NAME      LV-HQW-670P-rrr-20240609
EXPNO     11
PROCNO    1
Date_     20240609
Time      17.21 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDC13
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         299.5 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

```



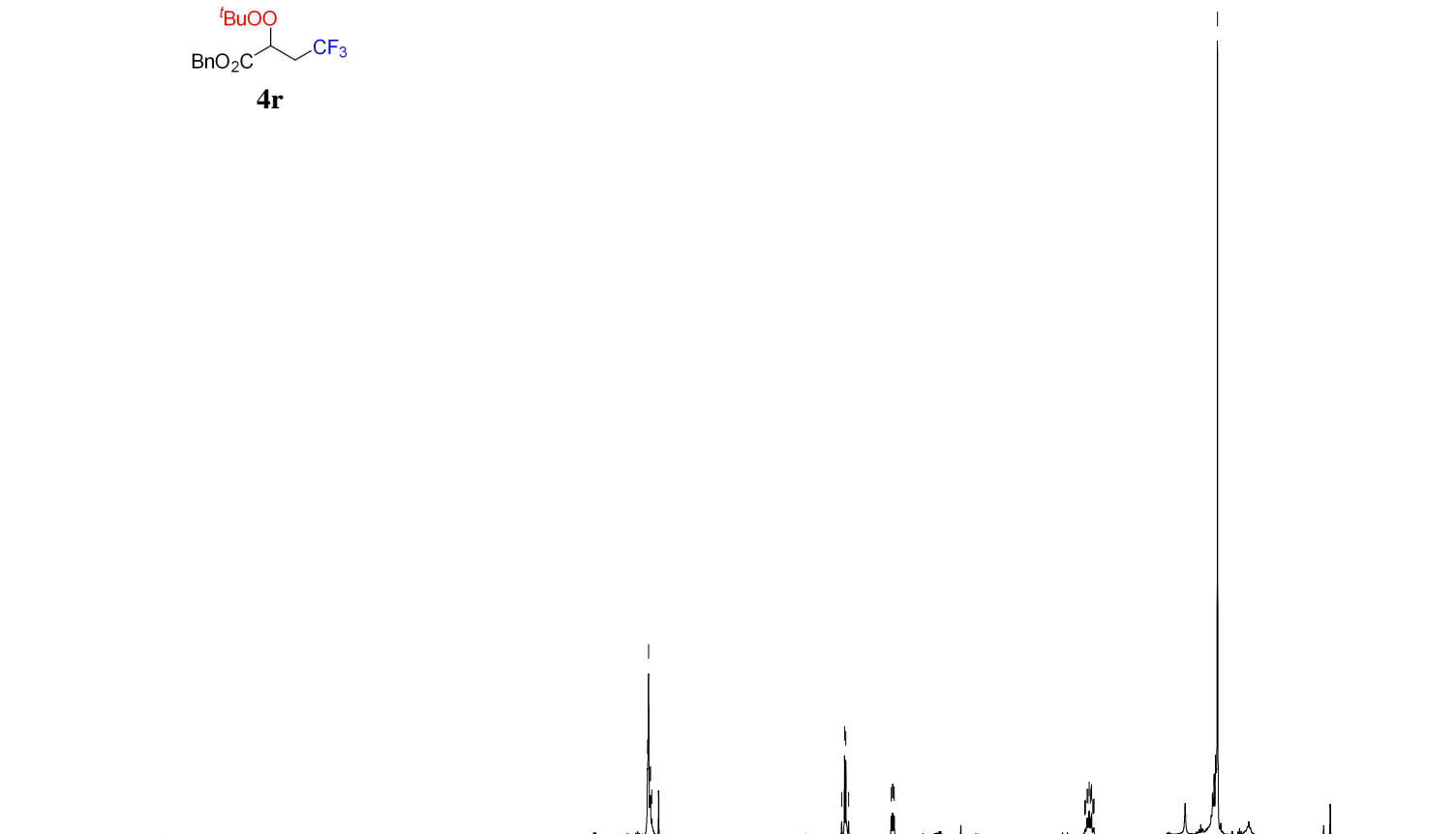
7.378
7.367
7.354
7.346
7.333

5.280
5.249
5.236
5.205

4.745
4.731
4.726
4.713

2.653
2.645
2.628
2.619
2.606
2.592
2.583
2.579
2.566
2.558
2.553

1.218



14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

5.26

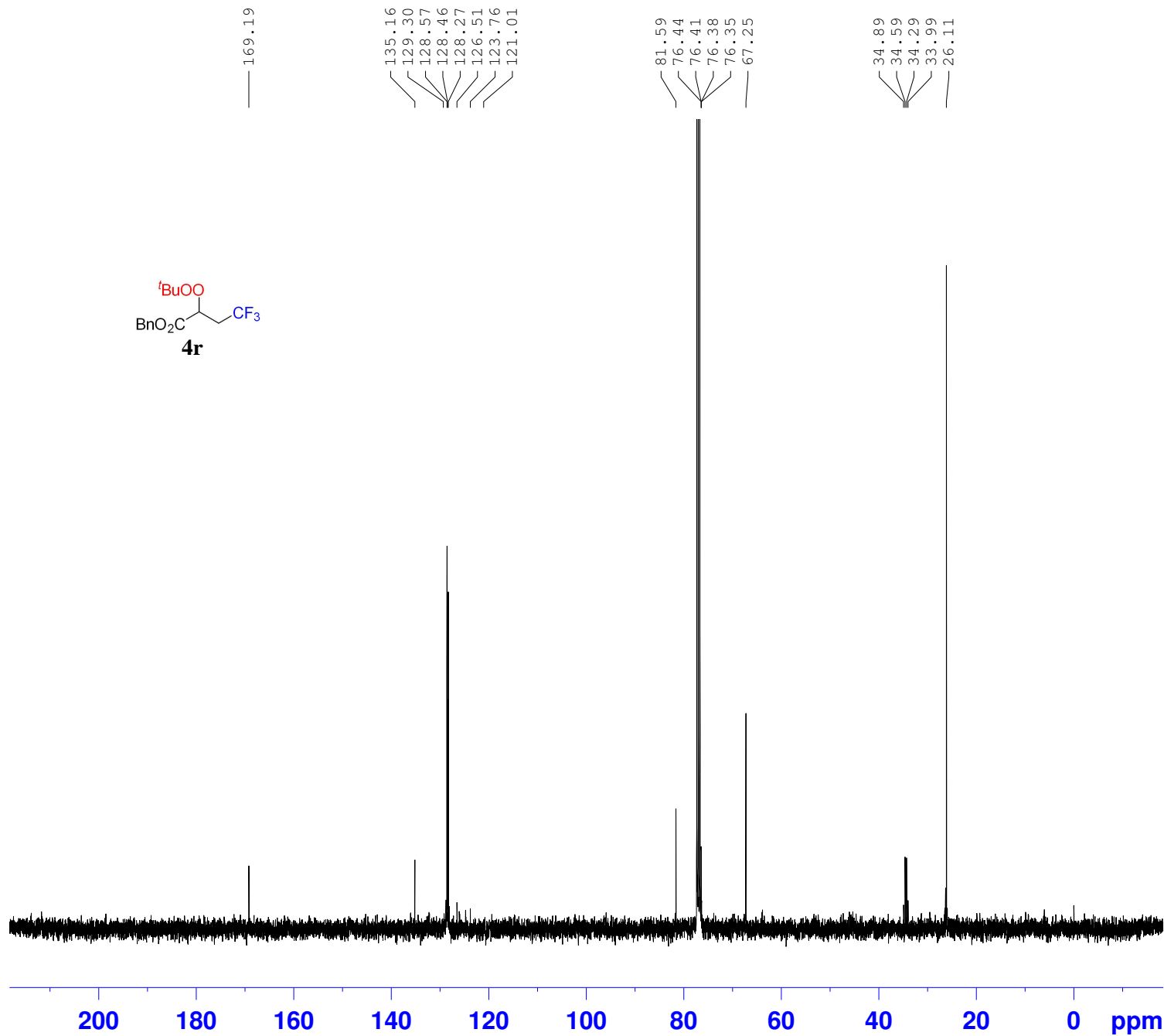
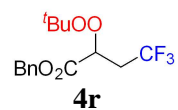
2.18

1.00

2.03

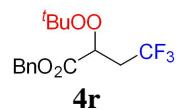
9.27

NAME	LV-HQW-647P-20240530
EXPNO	10
PROCNO	1
Date_	20240530
Time	13.36 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zg30
TD	65536
SOLVENT	CDC13
NS	8
DS	0
SWH	6250.000 Hz
FIDRES	0.190735 Hz
AQ	5.2429299 sec
RG	101
DW	80.000 usec
DE	8.64 usec
TE	298.7 K
D1	1.00000000 sec
TD0	1
SFO1	400.1326008 MHz
NUC1	1H
P0	2.67 usec
P1	8.00 usec
SI	65536
SF	400.1300110 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

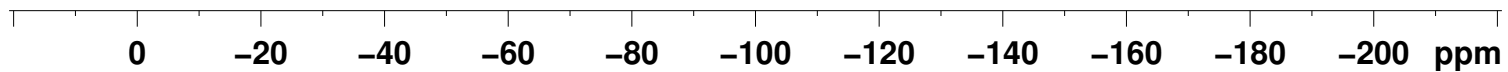


```

NAME      LV-HQW-647P-20240530
EXPNO     12
PROCNO    1
Date_     20240530
Time      13.57 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         312
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         299.0 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1       100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127709 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

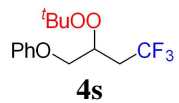


—63.870



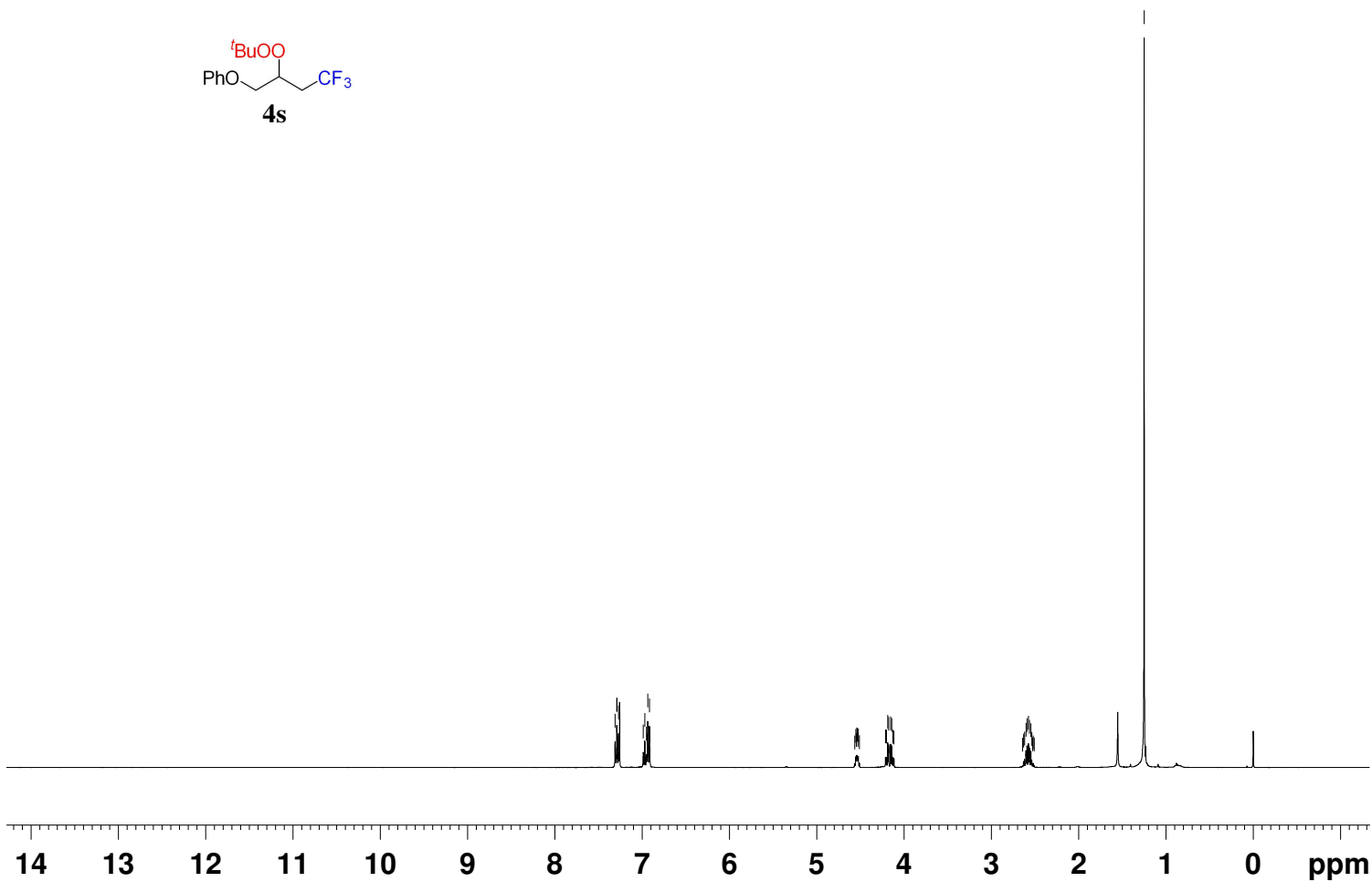
```

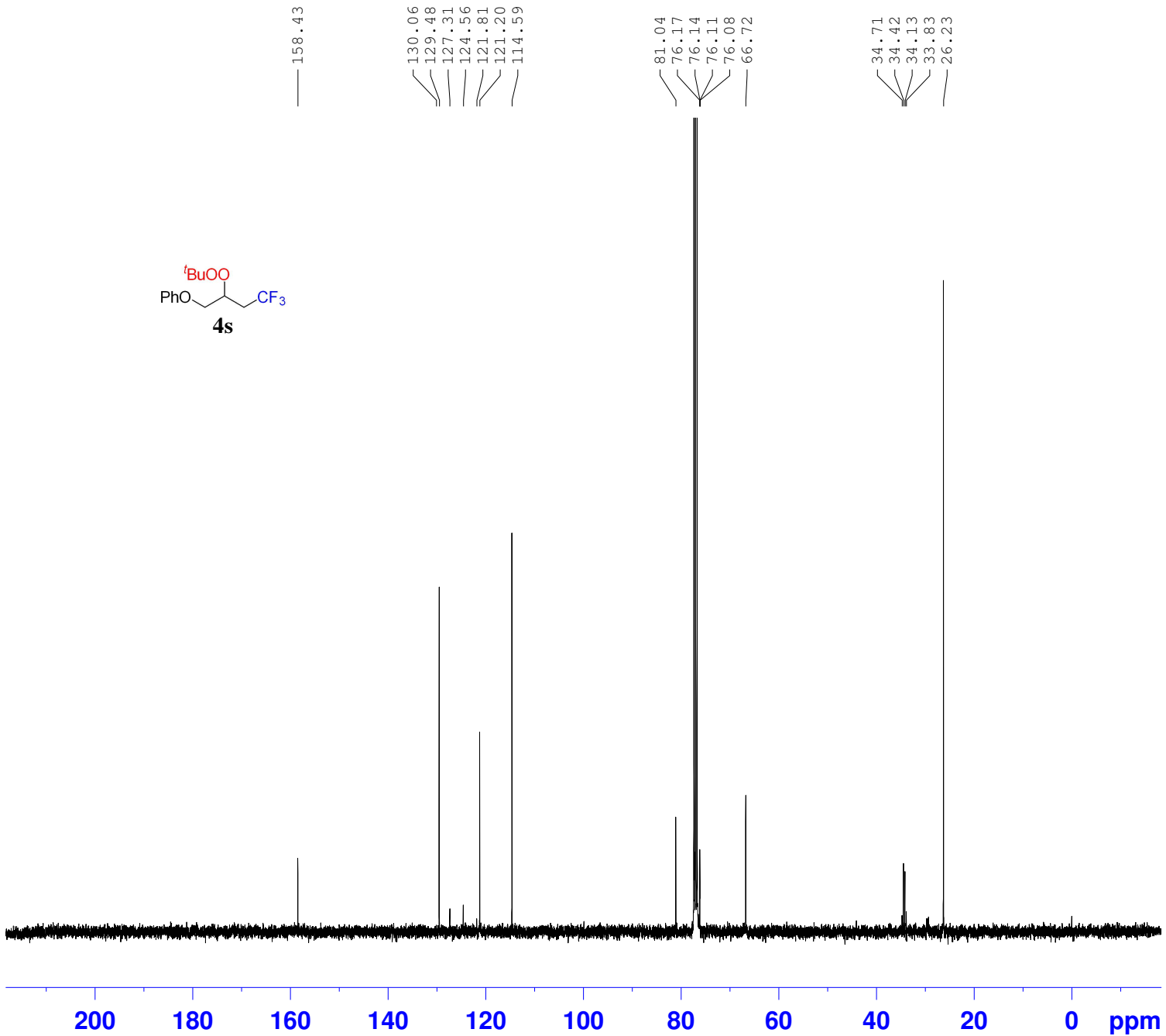
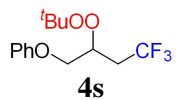
NAME      LV-HQW-647P-20240530
EXPNO     11
PROCNO    1
Date_     20240530
Time      13.38 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.9 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
    
```

7.311
 7.292
 7.289
 7.271
 6.988
 6.970
 6.952
 6.936
 6.917
 4.565
 4.553
 4.548
 4.542
 4.536
 4.530
 4.524
 4.512
 4.212
 4.202
 4.187
 4.177
 4.154
 4.141
 4.129
 4.116
 2.642
 2.631
 2.619
 2.603
 2.592
 2.575
 2.564
 2.548
 2.536
 2.527
 2.521
 2.509
 1.250

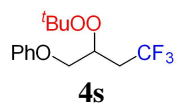
NAME LV-HQW-657P-20240531
 EXPNO 10
 PROCNO 1
 Date_ 20240531
 Time 8.37 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 101
 DW 80.000 usec
 DE 8.64 usec
 TE 298.3 K
 D1 1.00000000 sec
 TD0 1
 SFO1 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300111 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



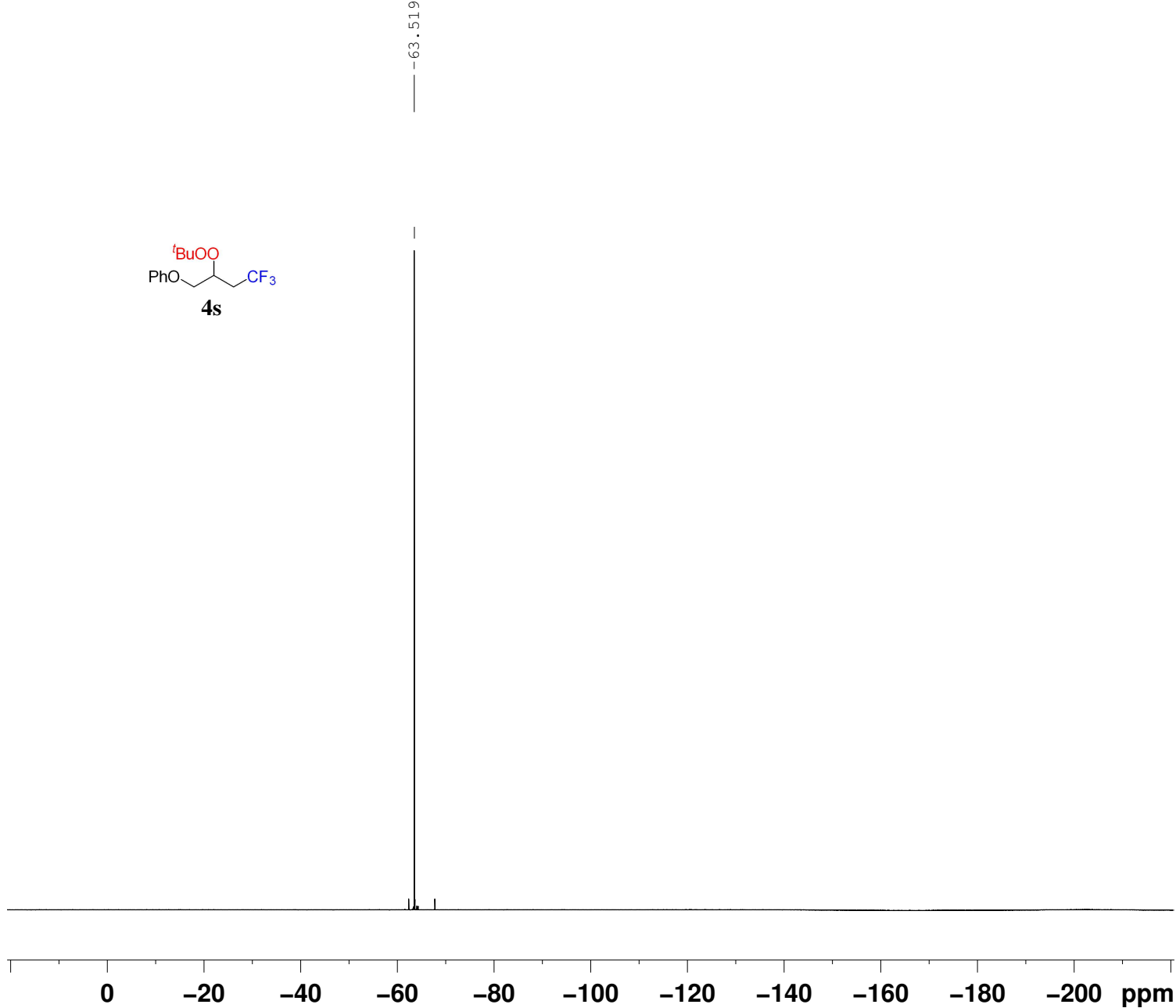


```

NAME      LV-HQW-657P-20240607
EXPNO     11
PROCNO    1
Date_     20240607
Time      18.13 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD        65536
SOLVENT   CDC13
NS        1024
DS        4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG        101
DW        21.000 usec
DE        6.50 usec
TE        300.0 K
D1        2.0000000 sec
D11       0.03000000 sec
TD0       1
SFO1      100.6228298 MHz
NUC1      13C
P0        2.67 usec
P1        8.00 usec
SI        32768
SF        100.6127702 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
  
```

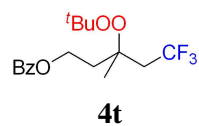


--63.519



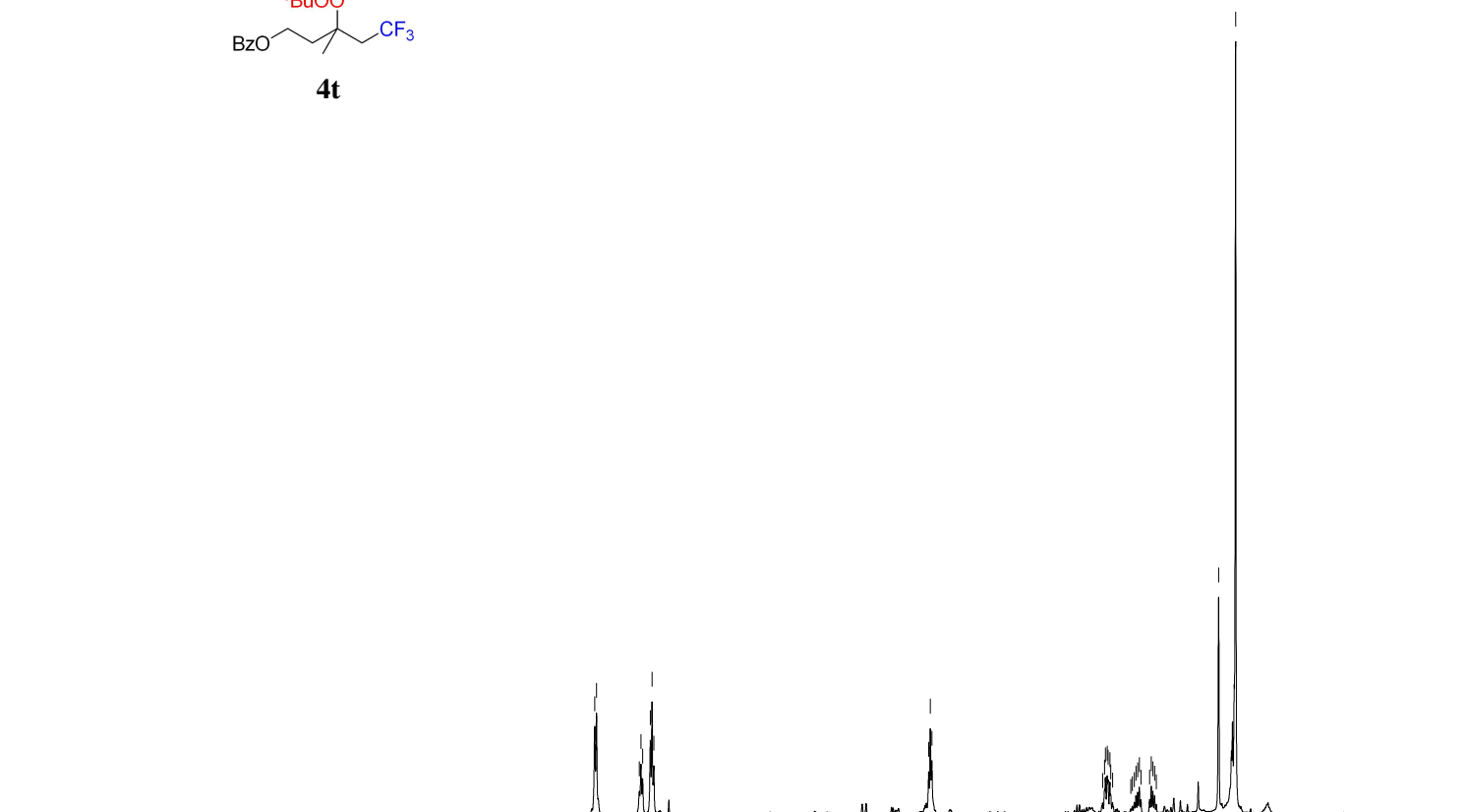
```

NAME      LV-HQW-657P-20240607
EXPNO     10
PROCNO    1
Date_     20240607
Time      17.13 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        299.2 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



8.048
8.029
7.574
7.556
7.538
7.456
7.438
7.419

4.494
4.477
4.460
2.643
2.623
2.613
2.594
2.585
2.565
2.557
2.537
2.343
2.326
2.305
2.288
2.269
2.252
2.235
2.143
2.125
2.107
2.089
2.072
1.408
1.227



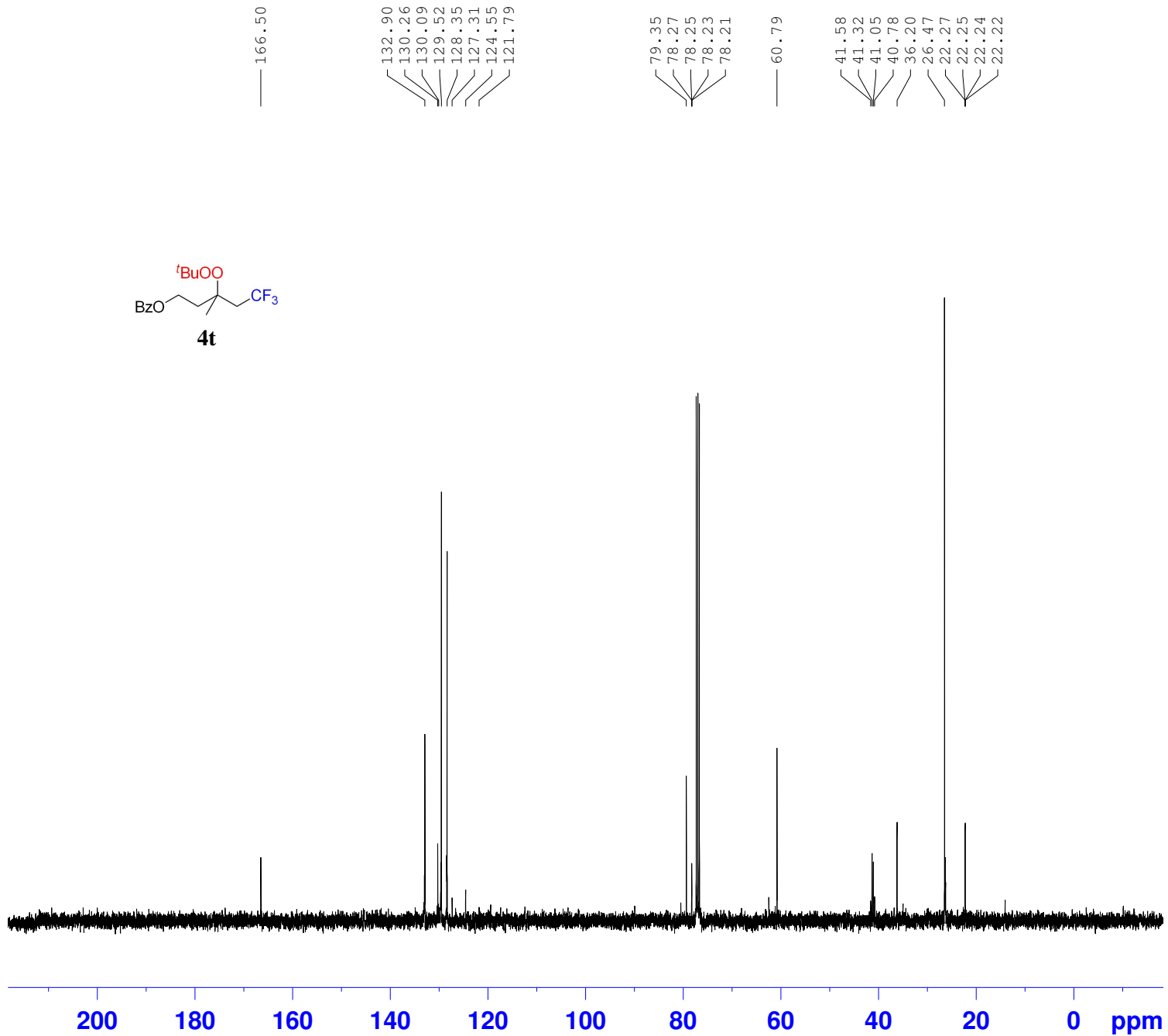
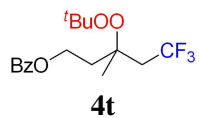
2.33
1.14
2.34

2.00

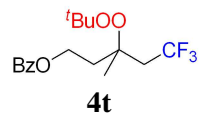
2.13
1.12
0.99
2.90
9.12

```

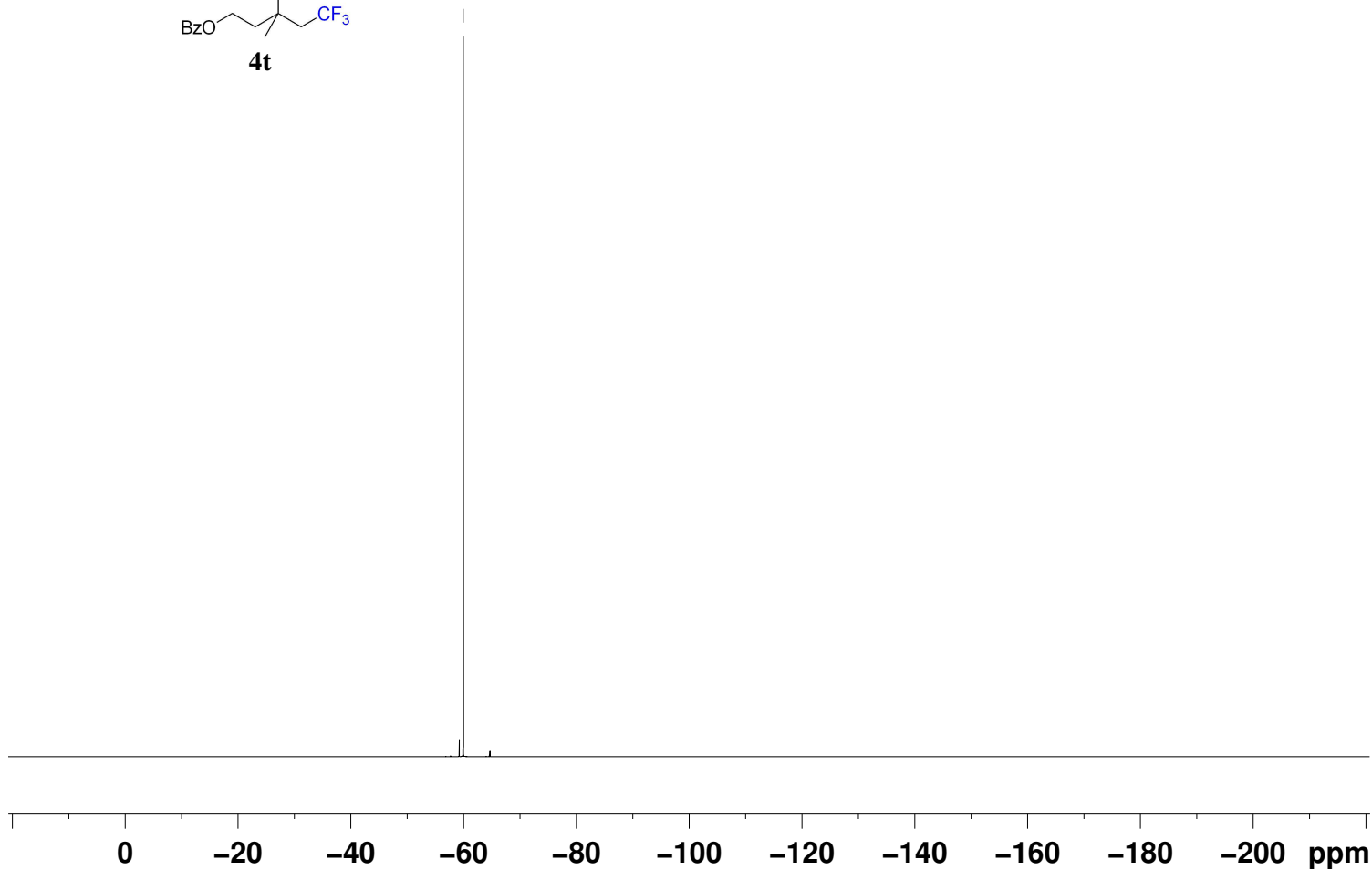
NAME      LV-HQW-679P-20240614
EXPNO     10
PROCNO    1
Date_     20240614
Time      15.21 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH        6250.000 Hz
FIDRES     0.190735 Hz
AQ         5.2429299 sec
RG         45.2
DW         80.000 usec
DE         8.64 usec
TE         300.5 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300113 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



NAME LV-HQW-679P-20240614
 EXPNO 12
 PROCNO 1
 Date_ 20240614
 Time 15.28 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 56
 DS 4
 SWH 23809.523 Hz
 FIDRES 0.726609 Hz
 AQ 1.3763061 sec
 RG 101
 DW 21.000 usec
 DE 6.50 usec
 TE 301.1 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 100.6228298 MHz
 NUC1 13C
 P0 2.67 usec
 P1 8.00 usec
 SI 32768
 SF 100.6127709 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

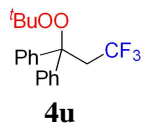


--59.926



```

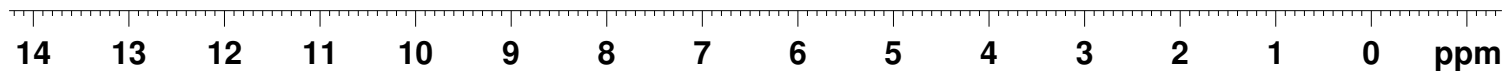
NAME      LV-HQW-679P-20240614
EXPNO     11
PROCNO    1
Date_     20240614
Time      15.23 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDCl3
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         300.7 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



7.286
7.275
7.260
7.250
7.240
7.234
7.229
7.222
7.218
7.214
7.207

3.435
3.409
3.383
3.358

1.145

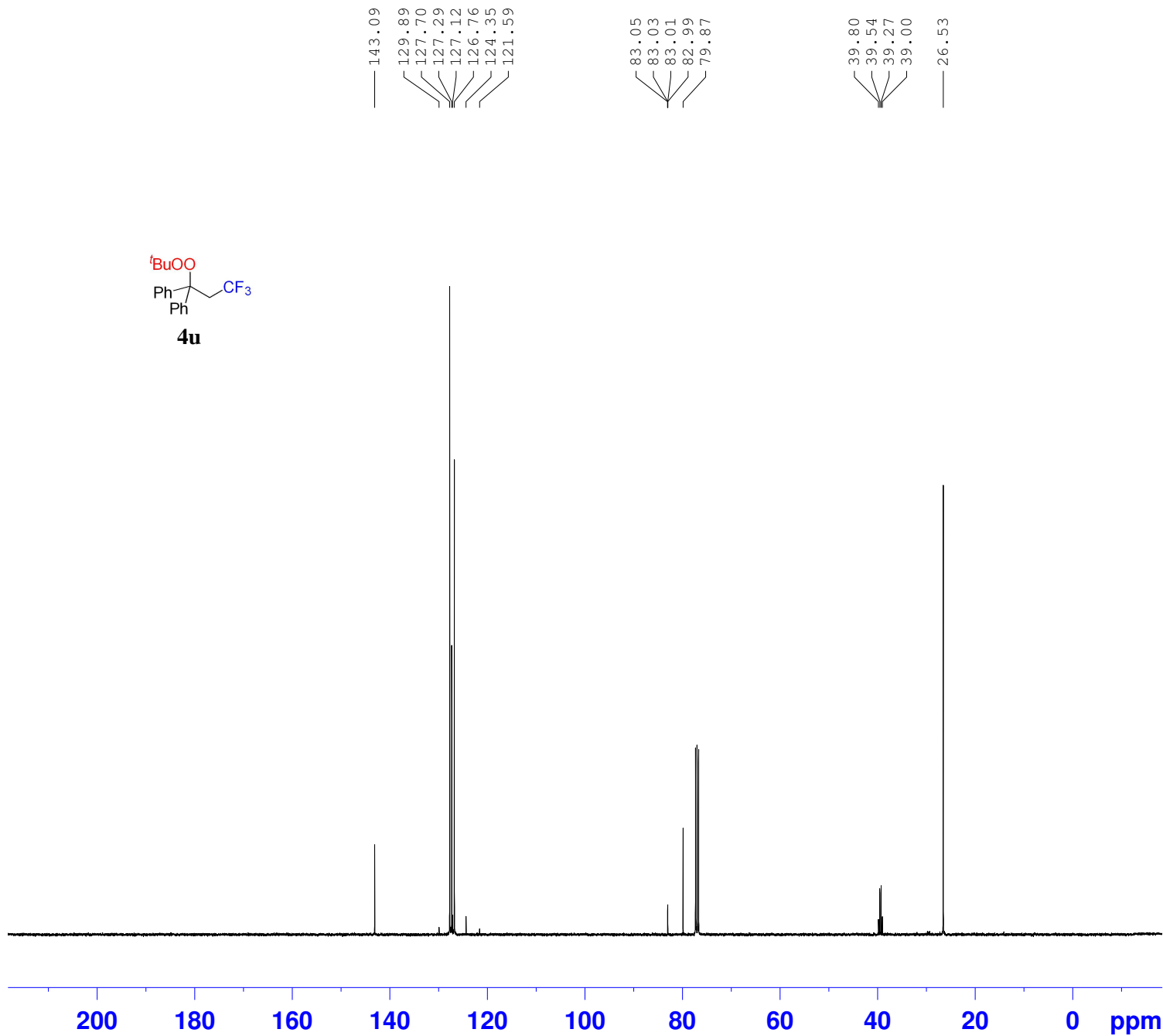
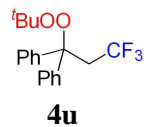


8.07
2.11

2.00

9.04

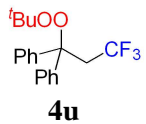
NAME	LV-HQW-664P-20240702
EXPNO	10
PROCNO	1
Date_	20240703
Time	10.33 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zg30
TD	65536
SOLVENT	CDC13
NS	8
DS	0
SWH	6250.000 Hz
FIDRES	0.190735 Hz
AQ	5.2429299 sec
RG	45.2
DW	80.000 usec
DE	8.64 usec
TE	298.0 K
D1	1.00000000 sec
TD0	1
SFO1	400.1326008 MHz
NUC1	1H
P0	2.67 usec
P1	8.00 usec
SI	65536
SF	400.1300226 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



```

NAME      LV-HQW-664P-20240702
EXPNO     11
PROCNO    1
Date_     20240703
Time      10.58 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD        65536
SOLVENT   CDC13
NS        400
DS        4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG        101
DW        21.000 usec
DE        6.50 usec
TE        298.0 K
D1        2.0000000 sec
D11       0.0300000 sec
TD0       1
SFO1      100.6228298 MHz
NUC1      13C
P0        2.67 usec
P1        8.00 usec
SI        32768
SF        100.6127724 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

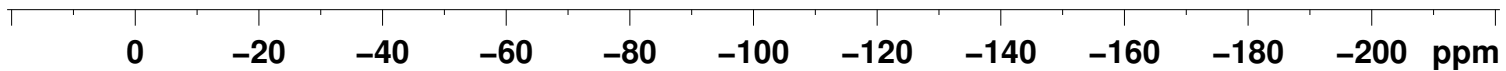
```

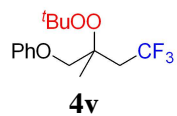



—58.891

```

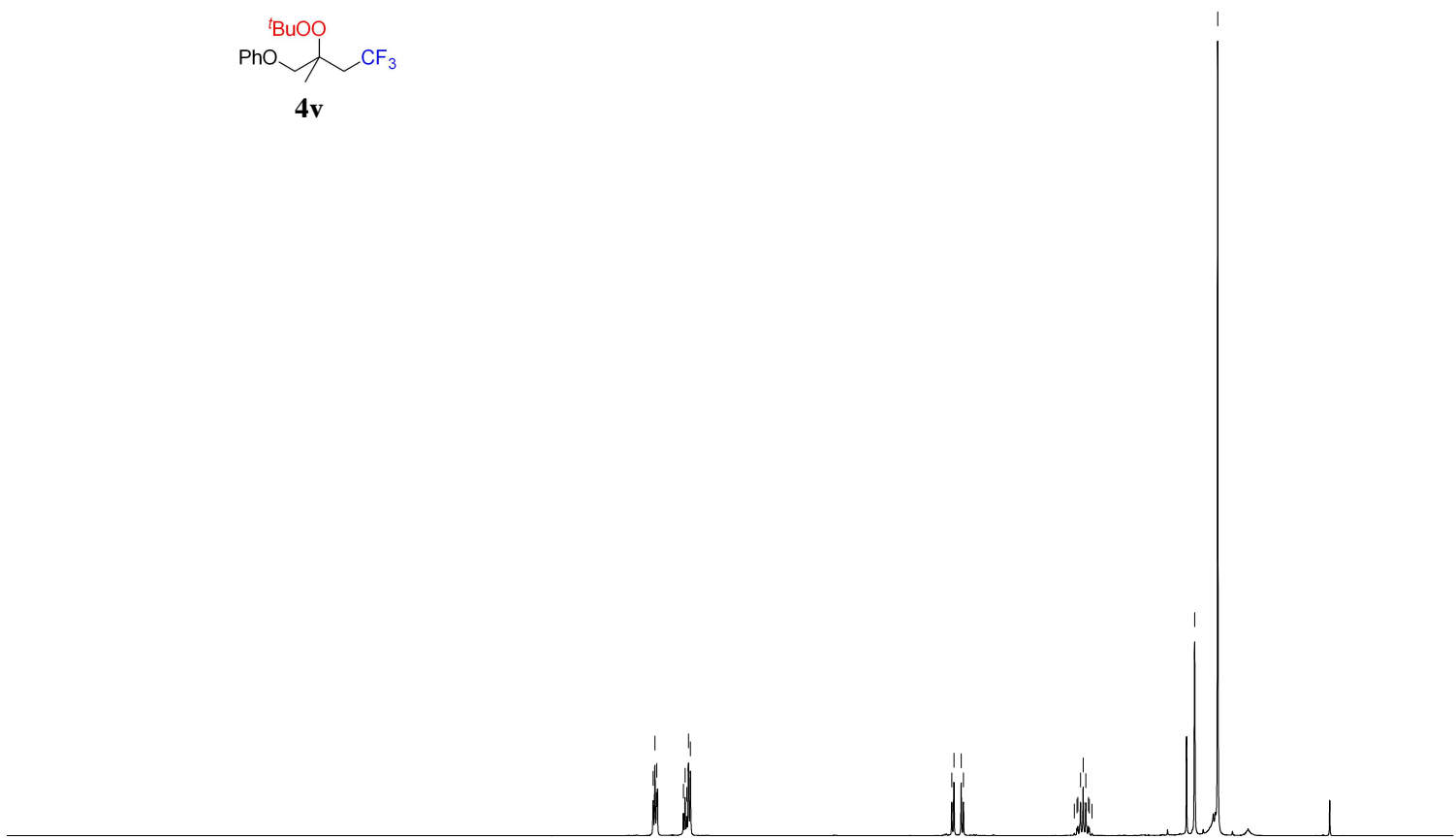
NAME      LV-HQW-664P-20240702
EXPNO     12
PROCNO    1
Date_     20240703
Time      11.00 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
    
```





7.304
7.284
7.265
6.977
6.958
6.940
6.922
6.901

4.080
4.056
3.978
3.954
2.757
2.728
2.719
2.690
2.662
2.633
2.605
2.595
2.566
1.458
1.209



```

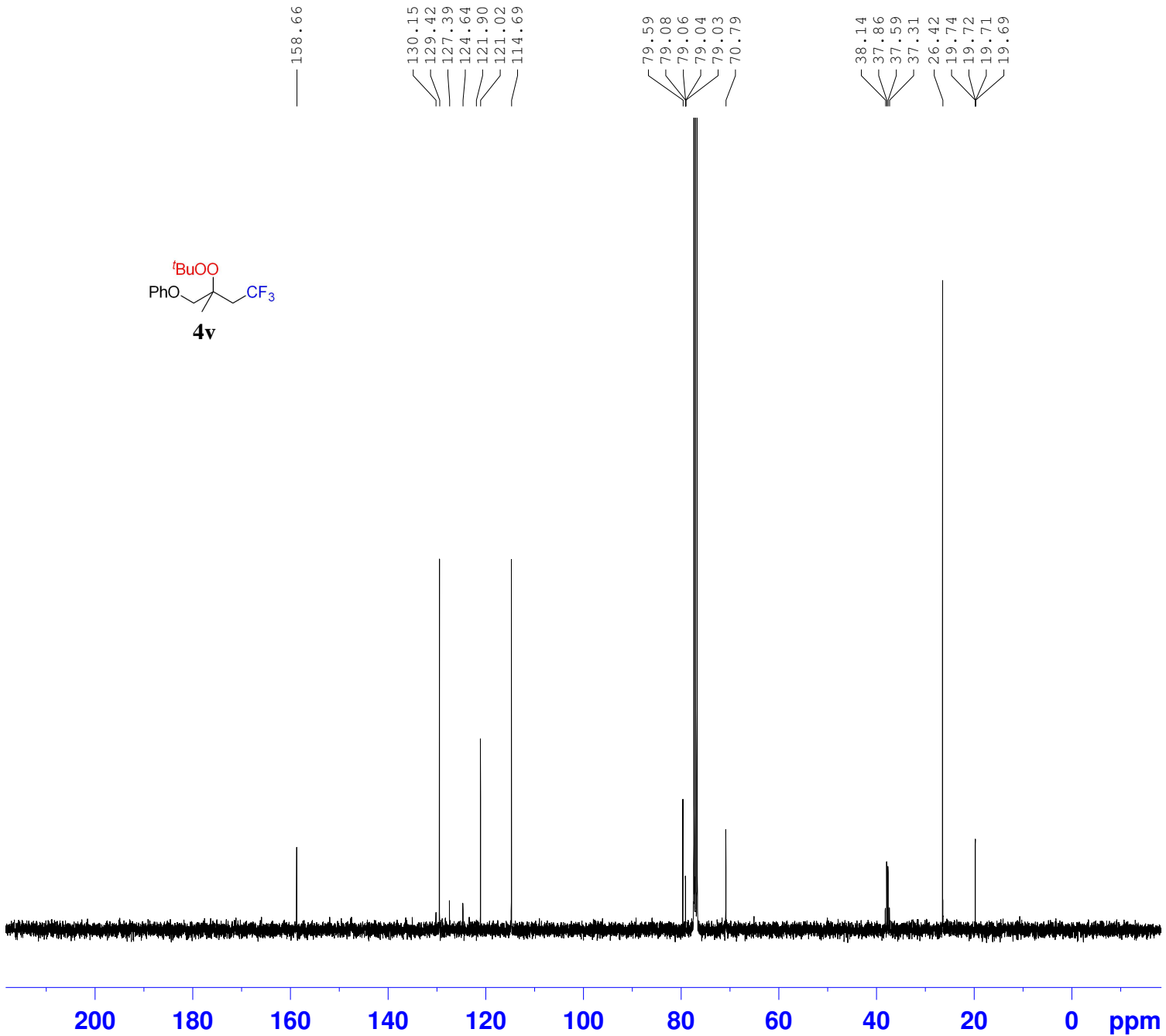
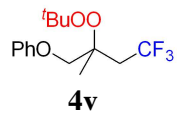
NAME      LV-HQW-658P-20240529
EXPNO     10
PROCNO    1
Date_     20240530
Time      0.37 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        101
DW        80.000 usec
DE        8.64 usec
TE        298.7 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300122 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

2.01
1.06
2.00

1.01
1.00

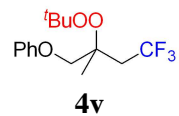
2.08

3.12
9.05

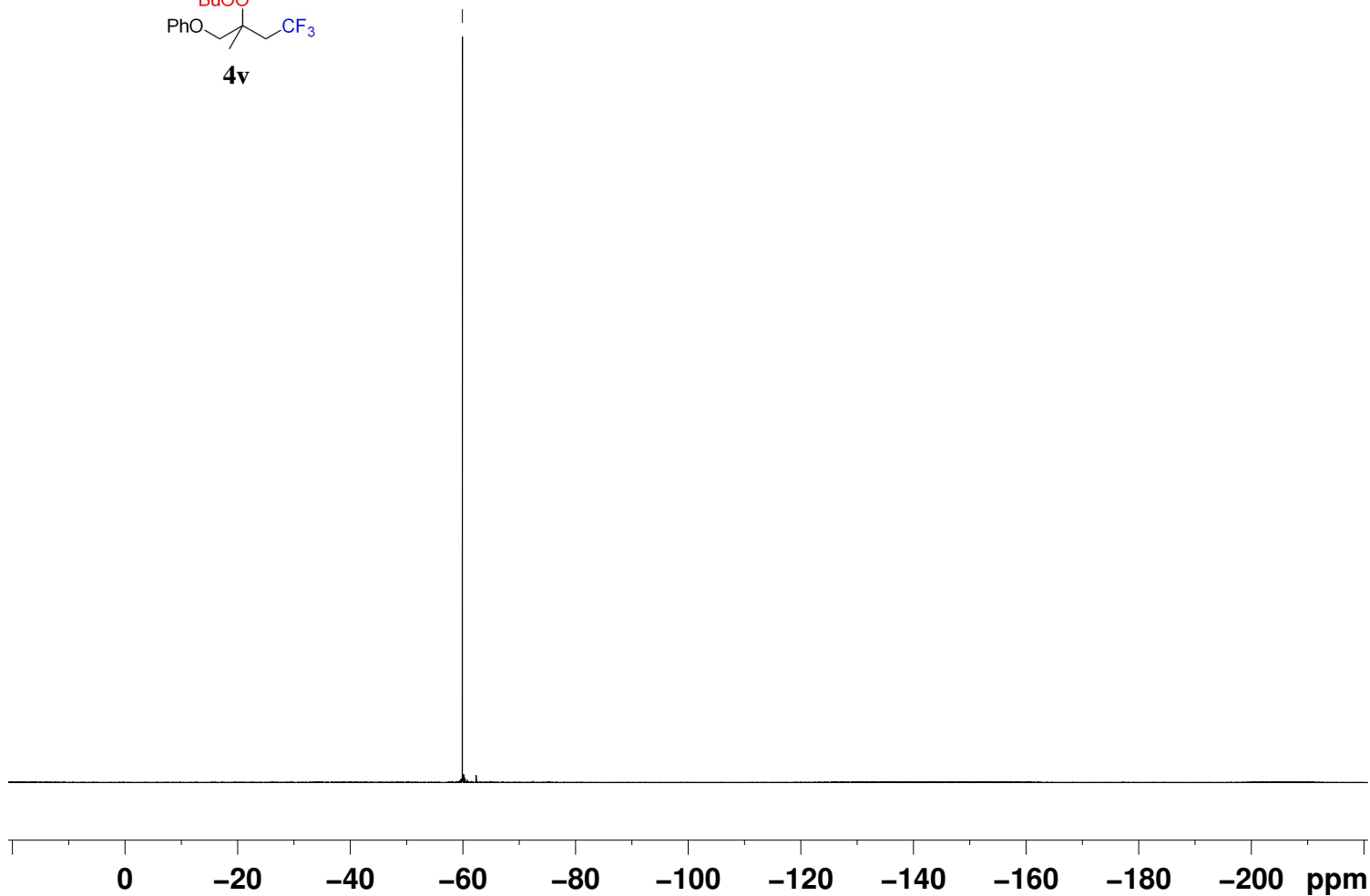


```

NAME      LV-HQW-658P-20240529
EXPNO     12
PROCNO    1
Date_     20240530
Time      1.09 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         512
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         299.9 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127702 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

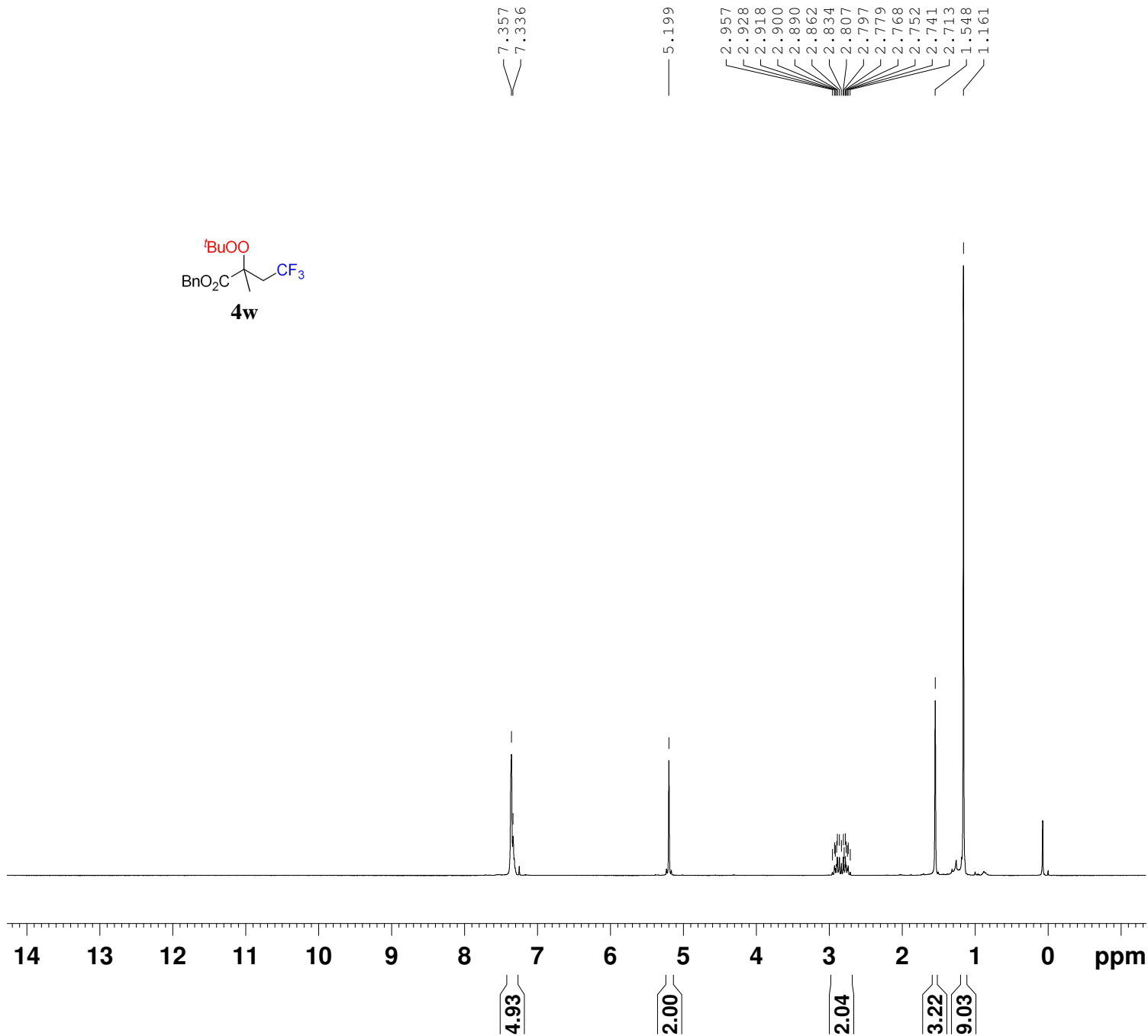
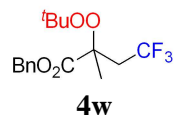


—59.909

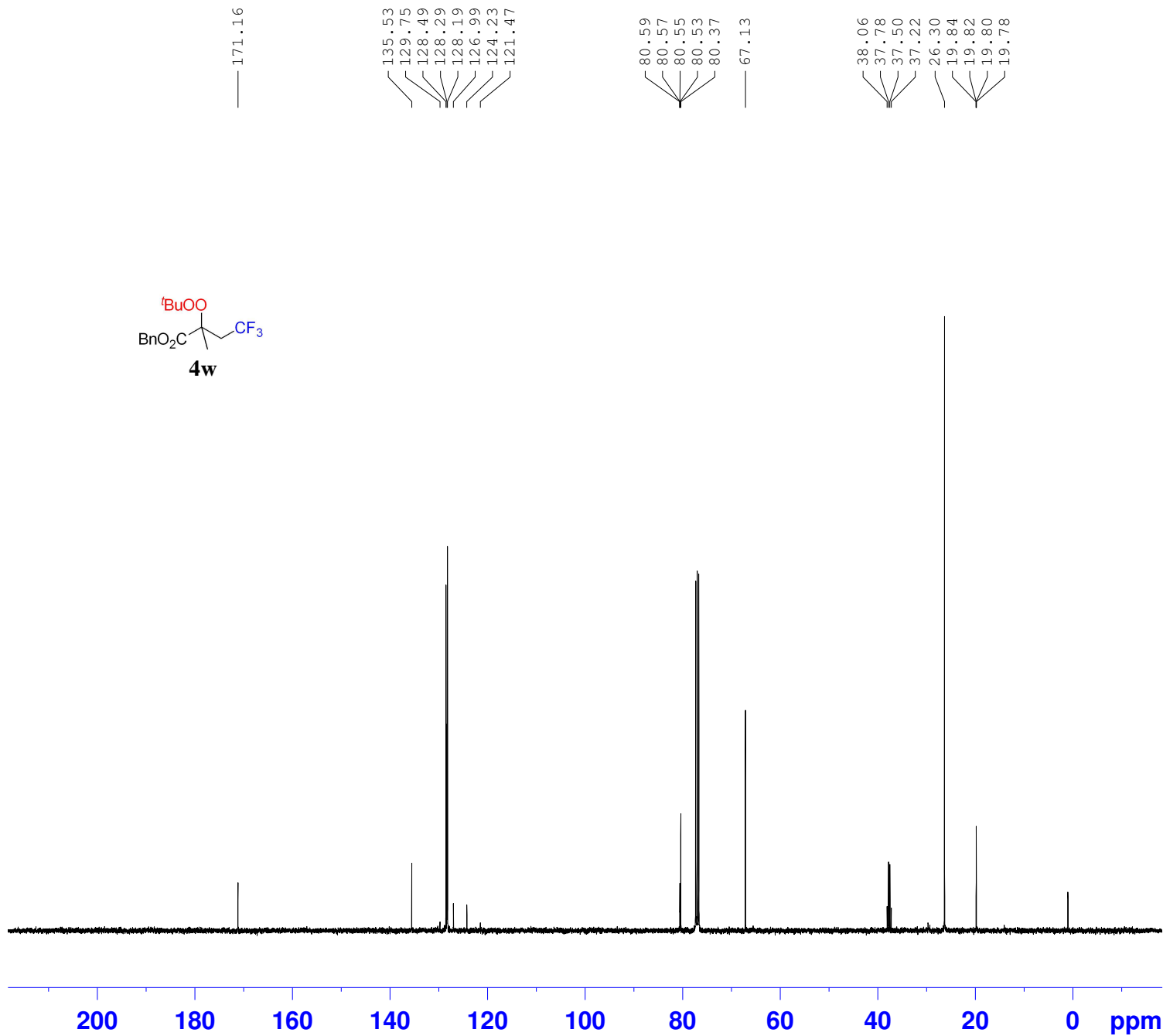
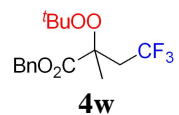


```

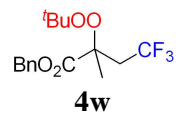
NAME      LV-HQW-658P-20240529
EXPNO     11
PROCNO    1
Date_     20240530
Time      0.38 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.9 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



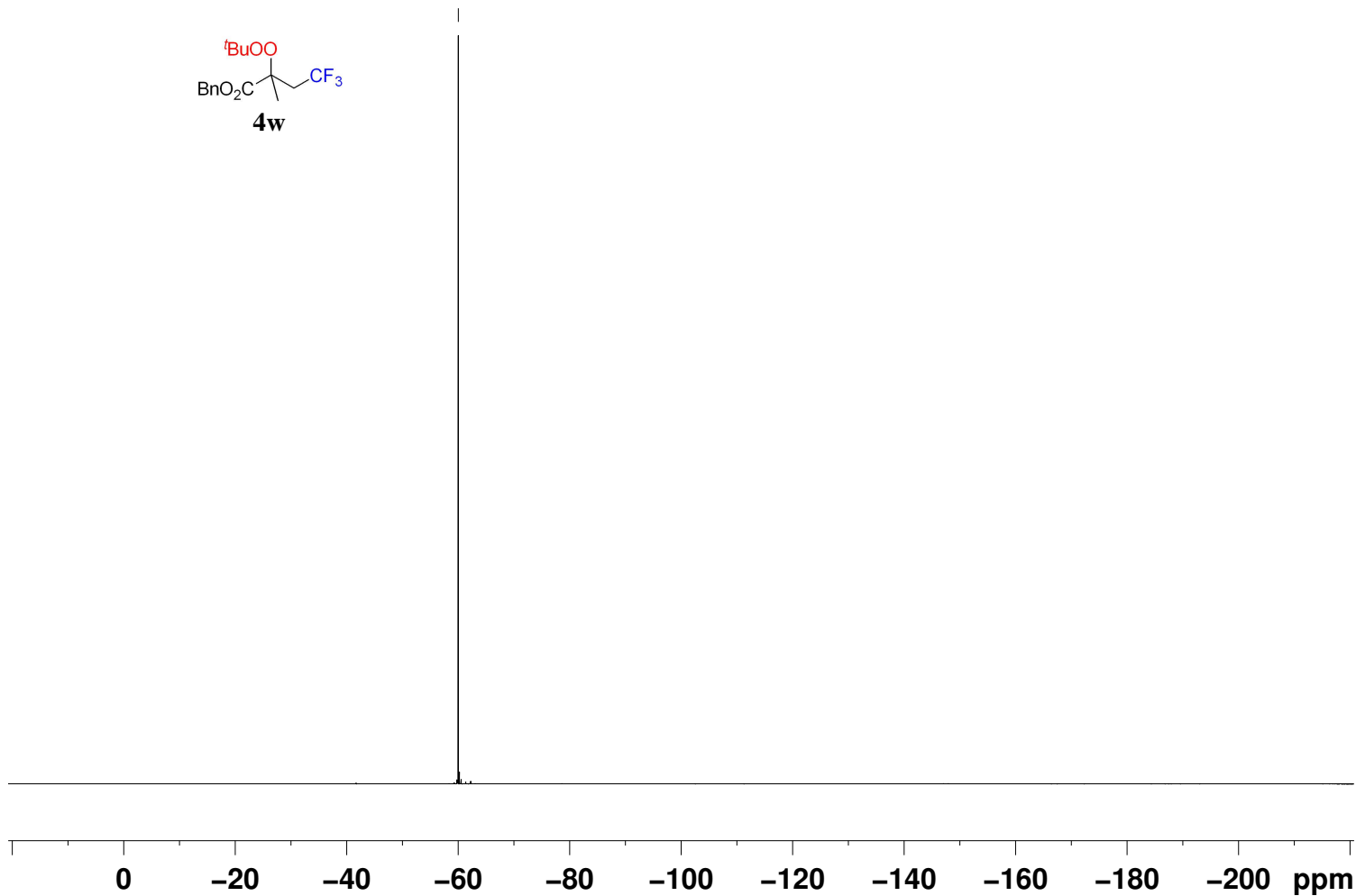
NAME LV-HQW-4w-20240627
 EXPNO 10
 PROCNO 1
 Date_ 20240627
 Time 17.35 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 57
 DW 80.000 usec
 DE 8.64 usec
 TE 305.9 K
 D1 1.00000000 sec
 TD0 1
 SFO1 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300146 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



NAME LV-HQW-4w-20240627
 EXPNO 11
 PROCNO 1
 Date_ 20240627
 Time 18.00 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 400
 DS 4
 SWH 23809.523 Hz
 FIDRES 0.726609 Hz
 AQ 1.3763061 sec
 RG 101
 DW 21.000 usec
 DE 6.50 usec
 TE 306.3 K
 D1 2.0000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 100.6228298 MHz
 NUC1 13C
 P0 2.67 usec
 P1 8.00 usec
 SI 32768
 SF 100.6127687 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

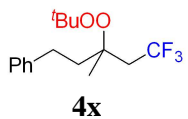


--- 60.023



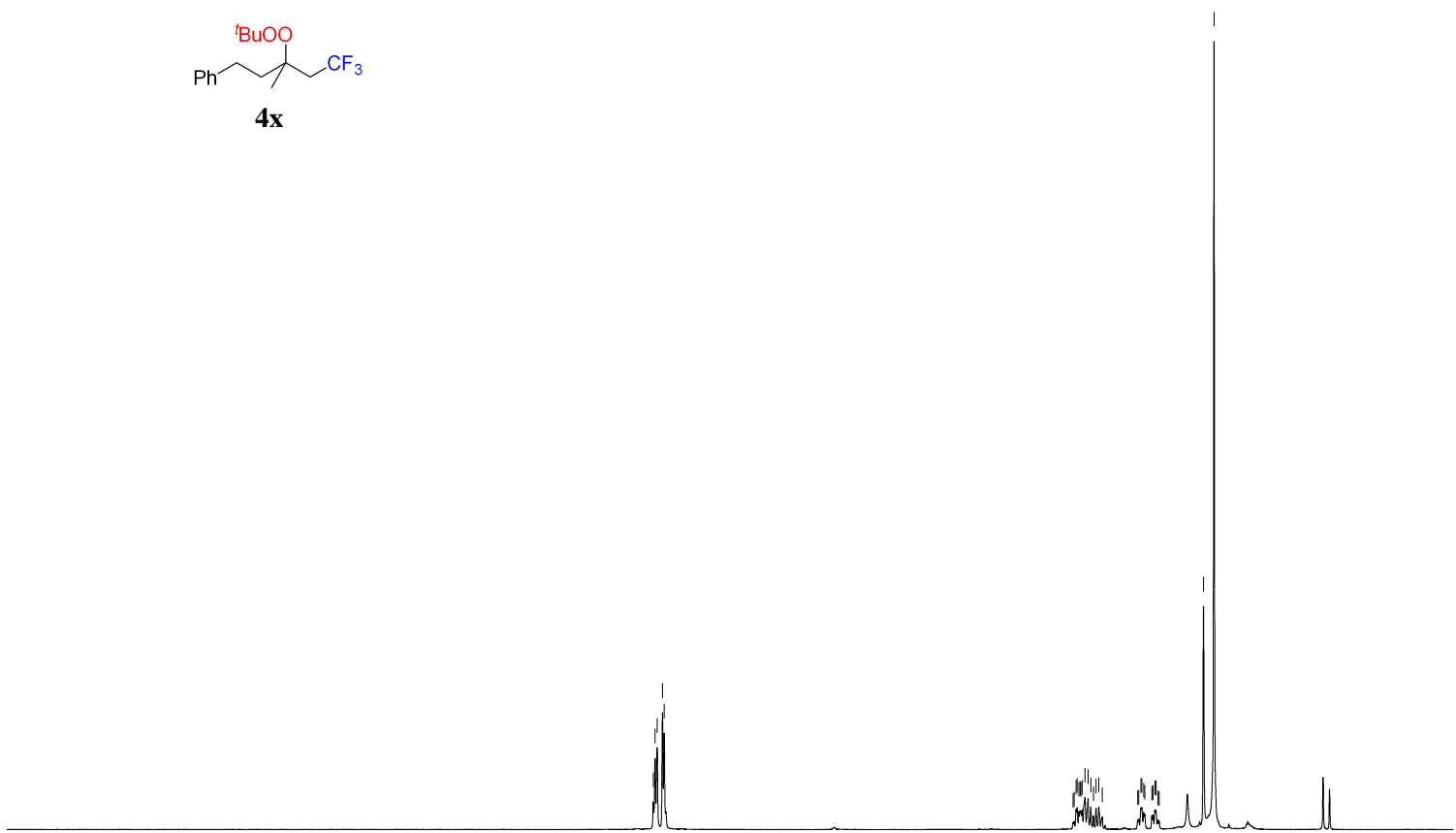
```

NAME      LV-HQW-4w-20240627
EXPNO     12
PROCNO    1
Date_     20240627
Time      18.02 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDC13
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        305.9 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



7.299
7.280
7.258
7.200
7.182

2.768
2.757
2.736
2.725
2.705
2.692
2.684
2.670
2.640
2.606
2.576
2.548
2.520
2.491
2.454
2.071
2.059
2.036
2.026
2.006
1.994
1.918
1.905
1.885
1.873
1.852
1.839
1.360
1.246



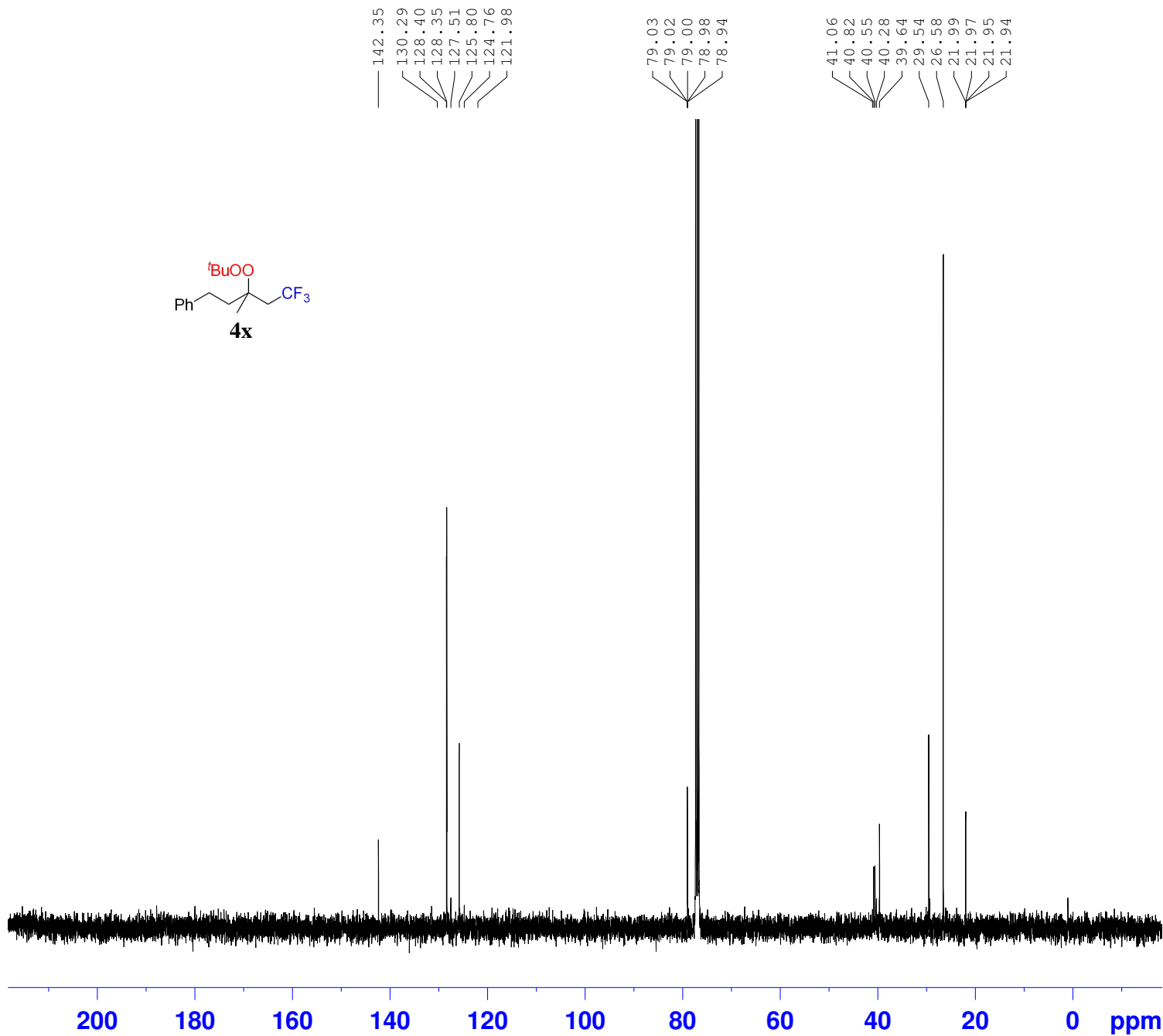
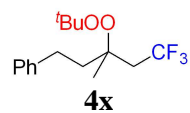
```

NAME      LV-HQW-684P-20240617
EXPNO     10
PROCNO    1
Date_     20240617
Time      19.01 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ         5.2429299 sec
RG         101
DW         80.000 usec
DE         8.64 usec
TE         301.8 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300132 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

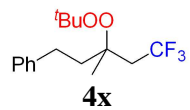
2.06
3.04

4.08
1.12
1.00
3.15
9.06

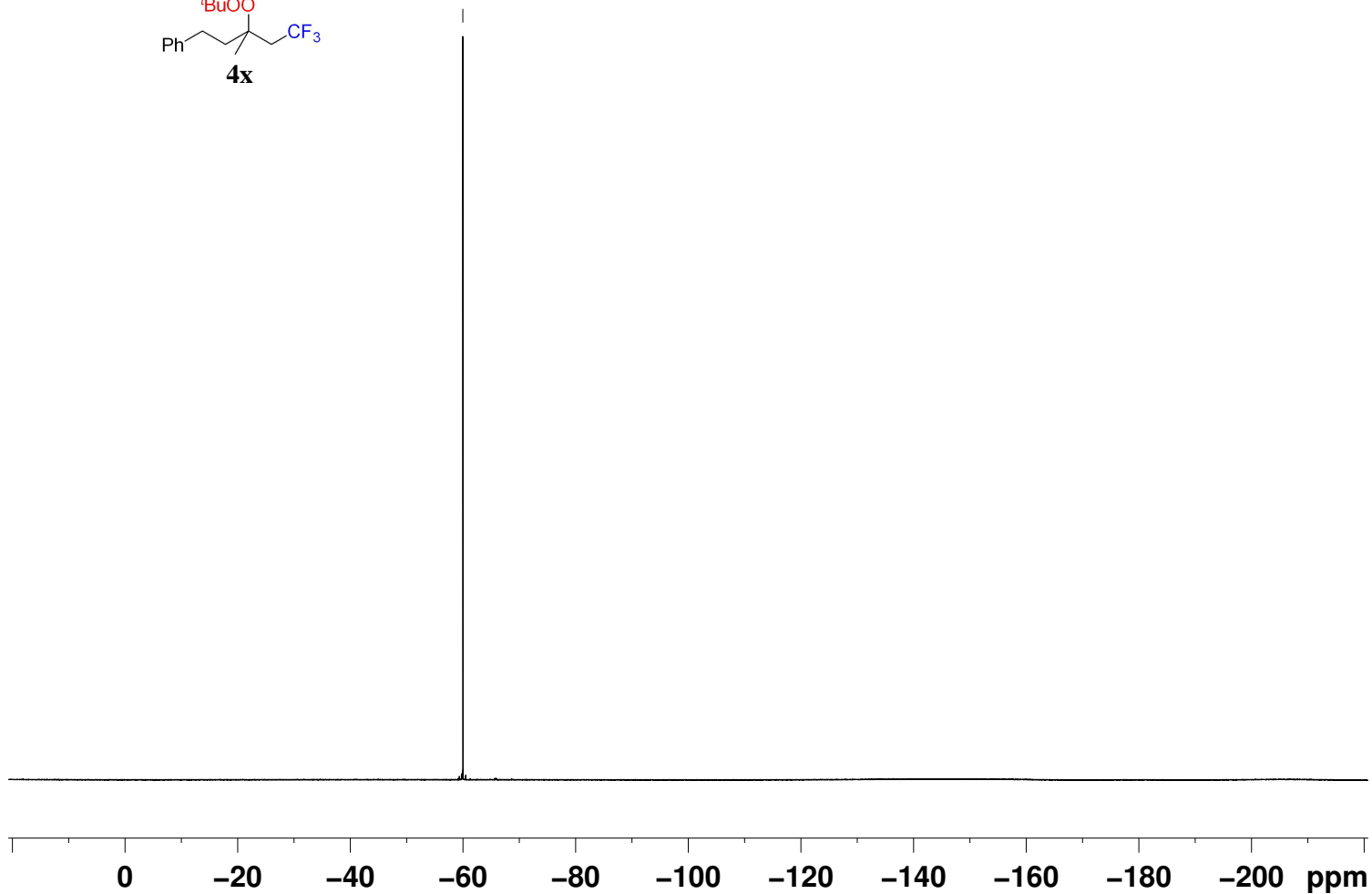


```

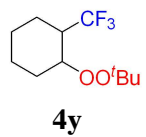
NAME      LV-HQW-684P-20240617
EXPNO     12
PROCNO    1
Date_     20240617
Time      19.39 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         600
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         302.8 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127688 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```



— -59.971



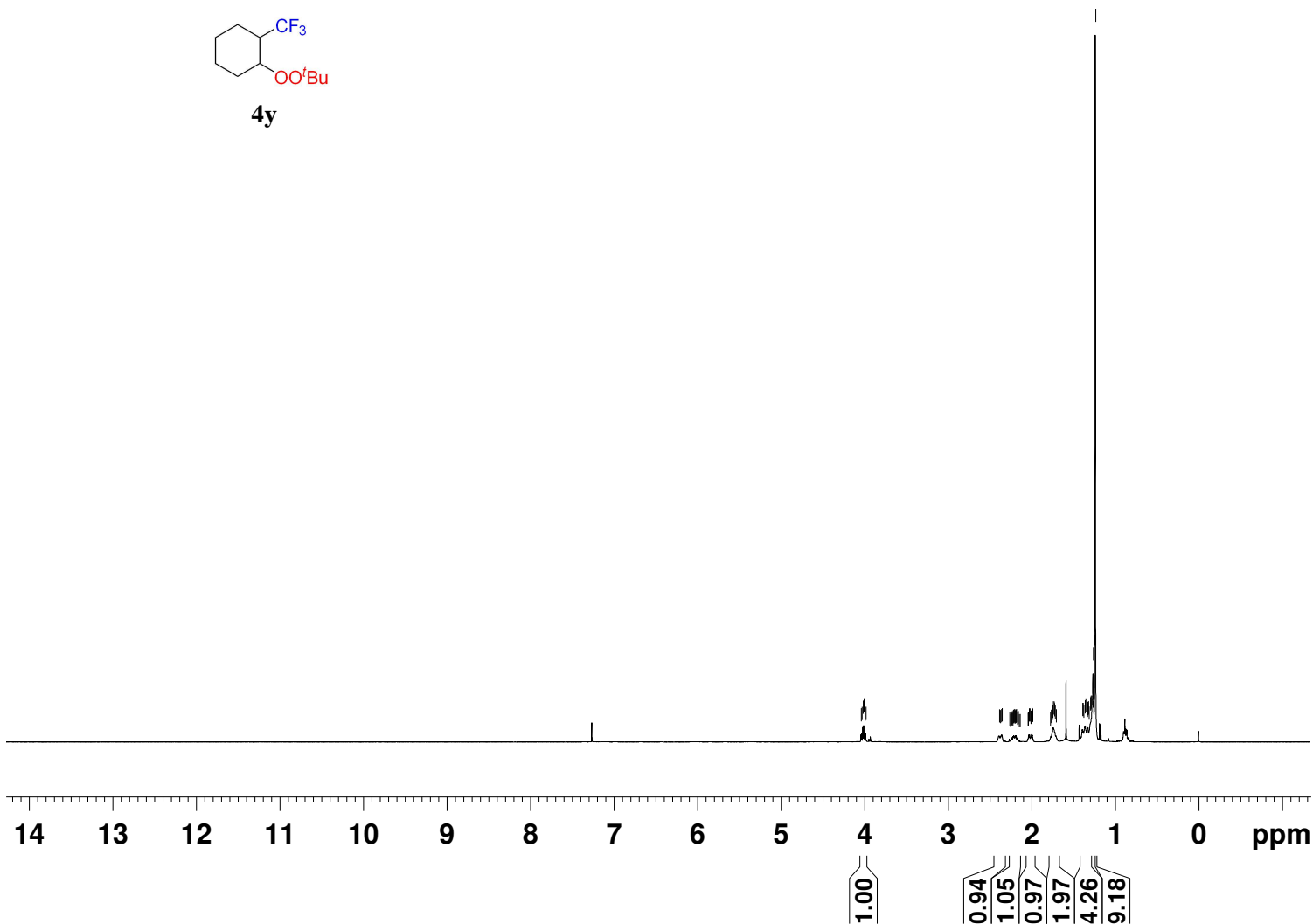
NAME	LV-HQW-684P-20240617
EXPNO	11
PROCNO	1
Date_	20240617
Time	19.03 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	302.2 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	13C
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

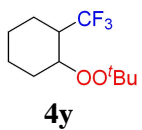


4.042
 4.032
 4.018
 4.008
 3.995
 3.985
 2.387
 2.375
 2.363
 2.355
 2.264
 2.254
 2.243
 2.237
 2.233
 2.227
 2.221
 2.216
 2.211
 2.205
 2.199
 2.194
 2.189
 2.184
 2.172
 2.168
 2.161
 2.151
 2.140
 2.045
 2.041
 2.031
 2.022
 2.011
 2.008
 1.997
 1.993
 1.989
 1.777
 1.767
 1.762
 1.755
 1.748

```

NAME      LV-HQW-740P-20240713
EXPNO     10
PROCNO    1
Date_     20240713
Time      23.11 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ         5.2429299 sec
RG         71.8
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SFO1      400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300089 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

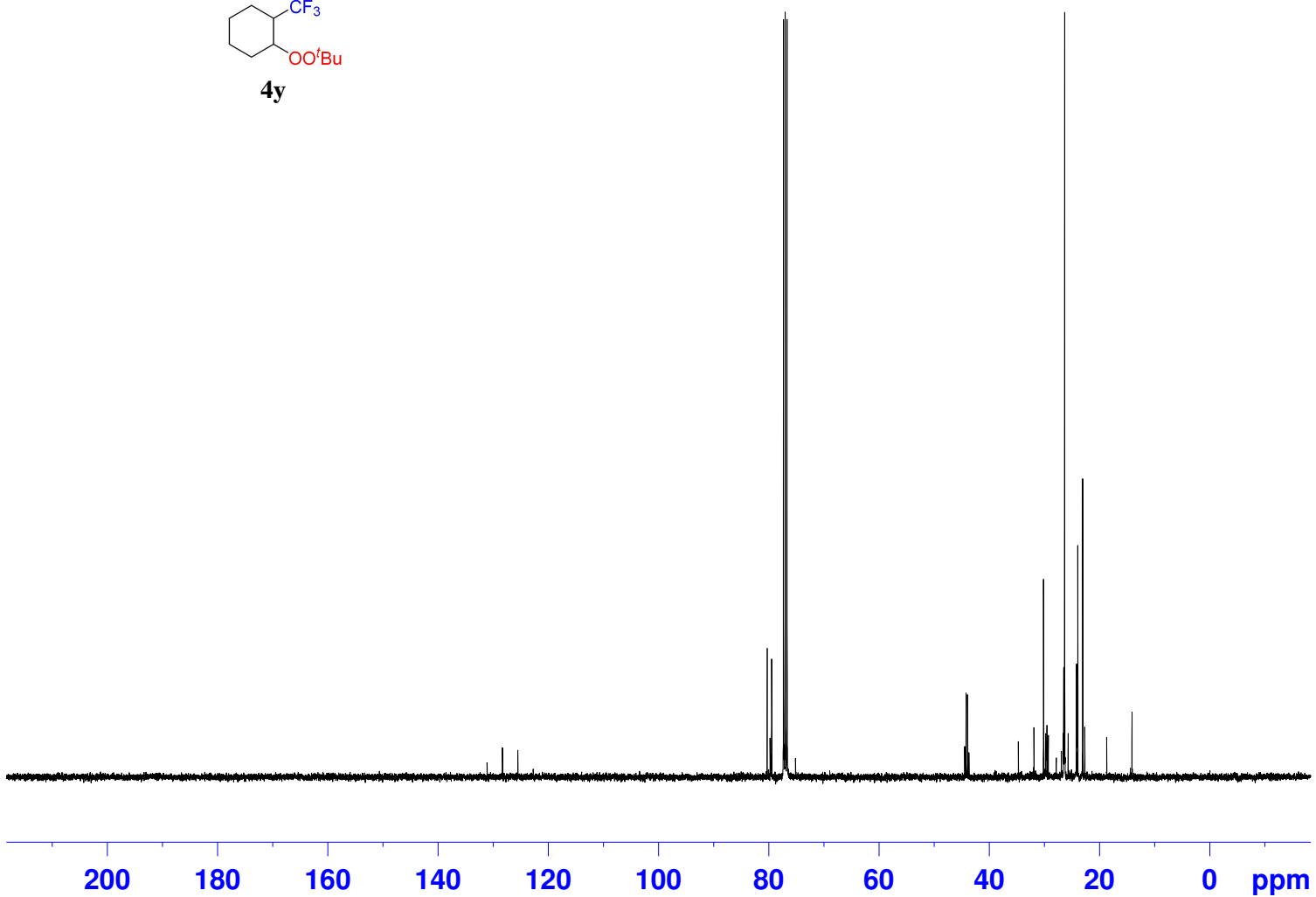




131.10
 128.31
 125.52
 122.74

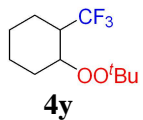
80.29
 79.49
 79.48
 79.46
 79.44

44.45
 44.20
 43.95
 43.69
 30.15
 26.30
 24.22
 24.19
 24.16
 24.13
 23.92
 23.05

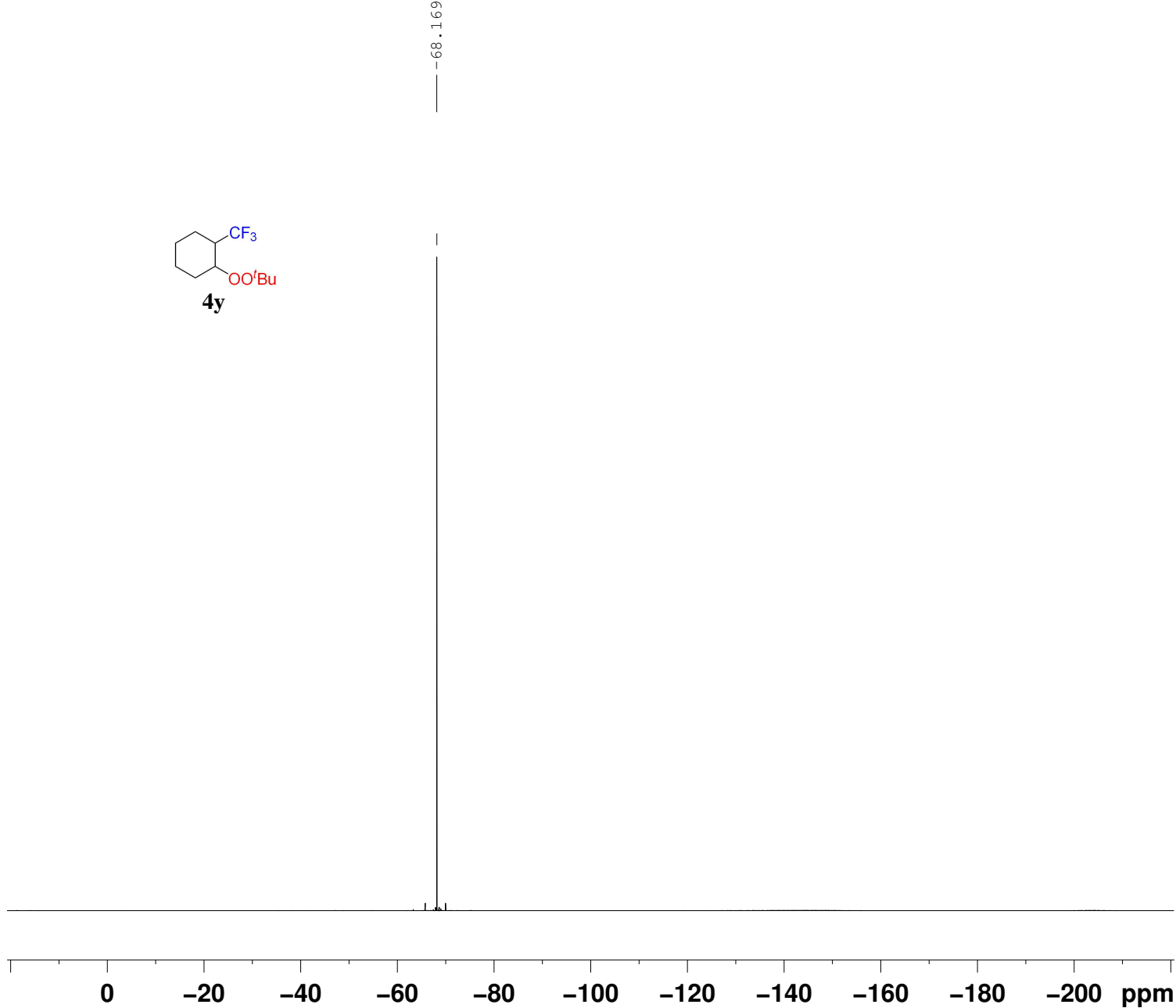


```

NAME      LV-HQW-740P-20240713
EXPNO     12
PROCNO    1
Date_     20240714
Time      0.49 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         600
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.0 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127695 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```



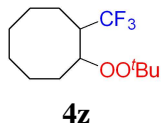
--68.169



```

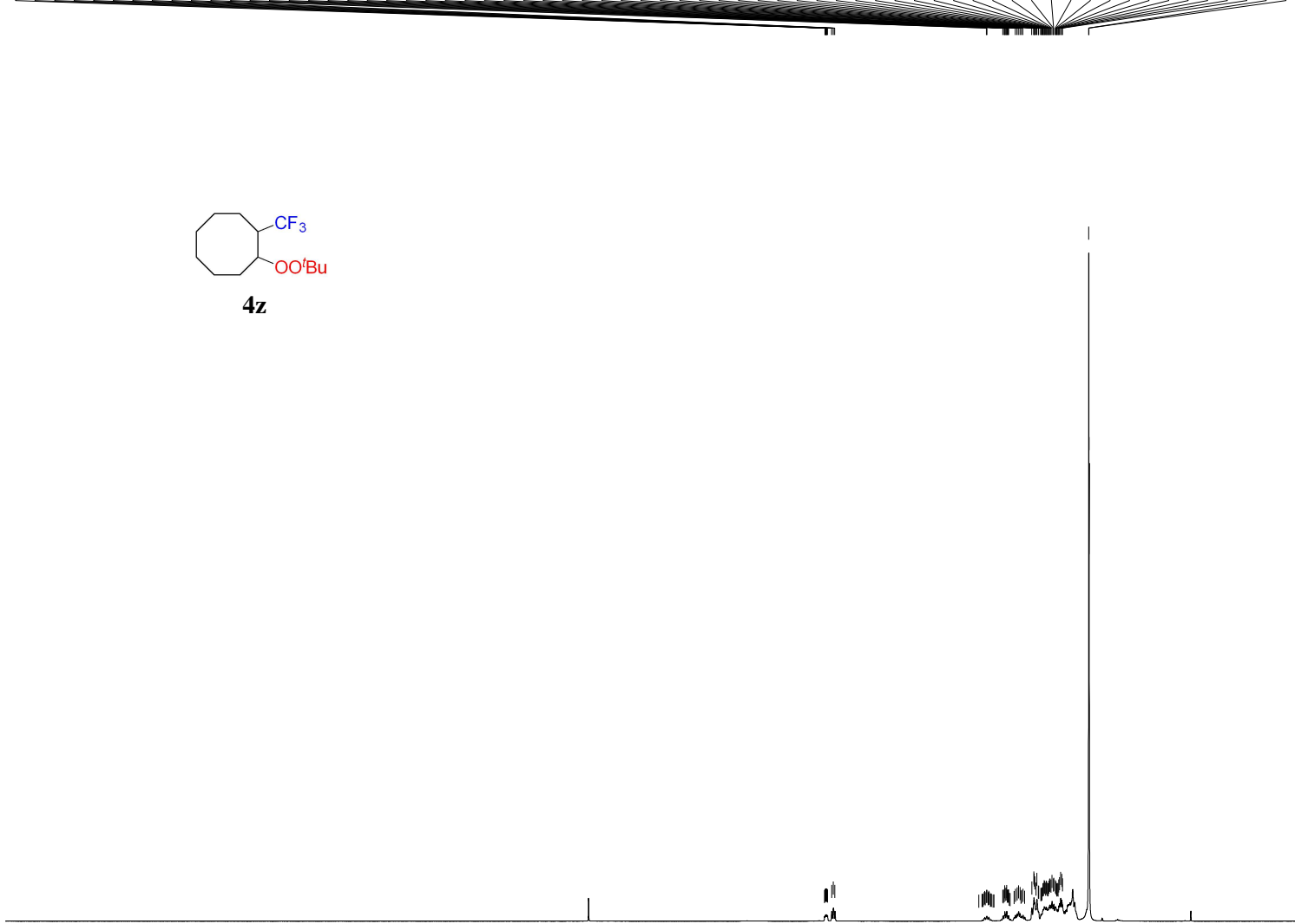
NAME      LV-HQW-740P-20240713
EXPNO     11
PROCNO    1
Date_     20240713
Time      23.13 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

4.409
4.405
4.398
4.395
4.388
4.384
4.378
4.328
4.309
4.291
2.462
2.457
2.266
2.249
2.242
2.236
2.225
2.219
2.212
2.201
2.195
2.113
2.092
2.076
2.057
2.040
2.022
1.915
1.892
1.888
1.880
1.865
1.855
1.837
1.833
1.807
1.800
1.793
1.782
1.775
1.767
1.761
1.750
1.742
1.735
1.726
1.719
1.711
1.702
1.696
1.685
1.673
1.655
1.651
1.632
1.624
1.616
1.607
1.599
1.591
1.581
1.569
1.554
1.546
1.230
1.226



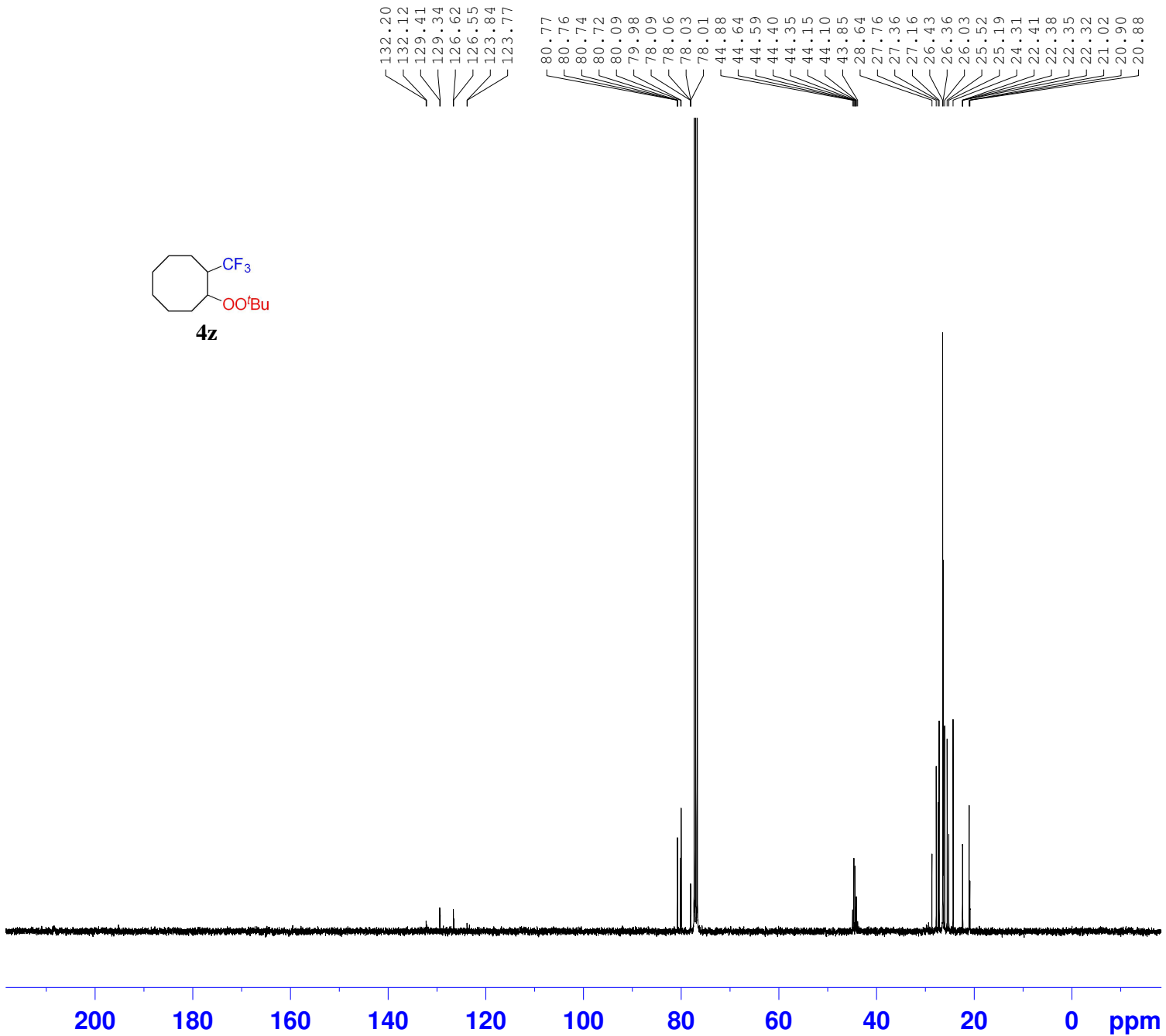
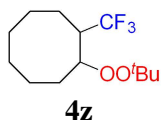
```

NAME      HQW-513P1-20240316
EXPNO     10
PROCNO    1
Date_     20240316
Time      16.25 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG         57
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300102 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

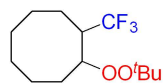


14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

0.38 0.62 1.17 1.15 2.11 9.23 9.18

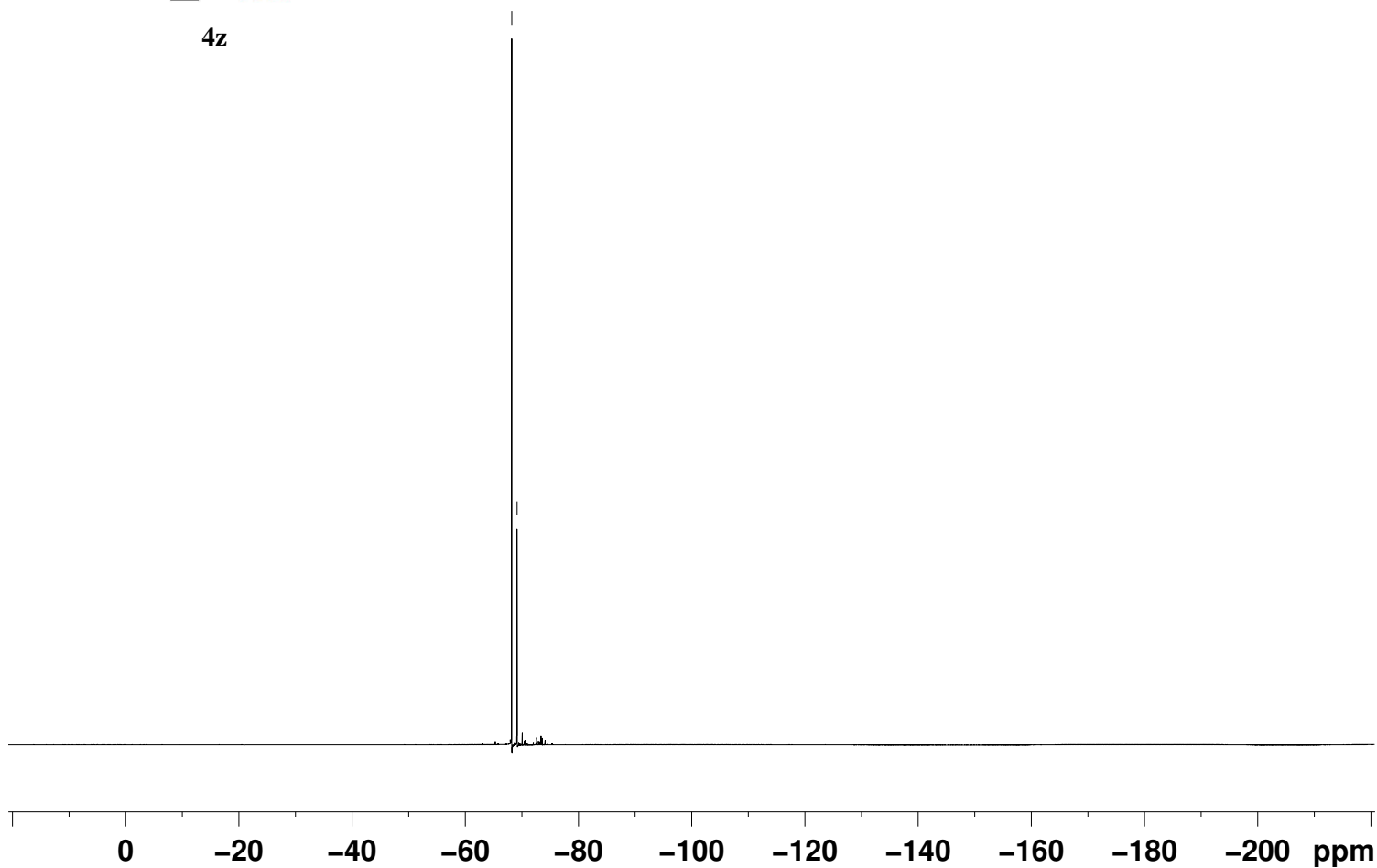


NAME	HQW-513P1-20240316
EXPNO	12
PROCNO	1
Date_	20240316
Time	17.16 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	800
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	298.0 K
D1	2.0000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127695 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



4z

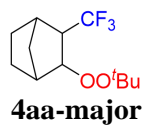
-68.213
-69.152



```

NAME      HQW-513P1-20240316
EXPNO     11
PROCNO    1
Date_     20240316
Time      16.28 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDC13
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.0000000 sec
D11       0.0300000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

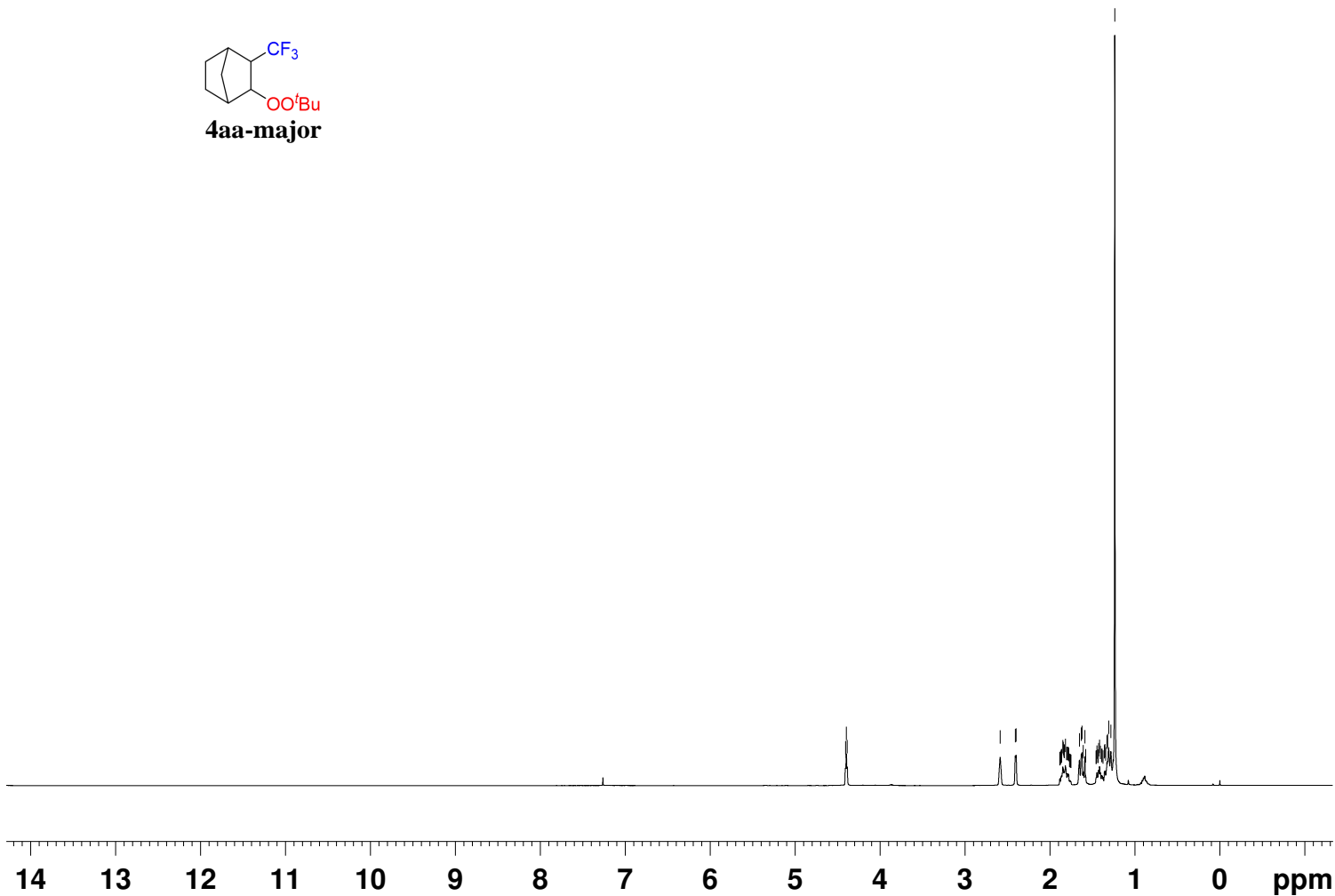
```

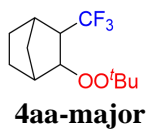
4.407
4.398
4.388
2.587
2.408
2.399
1.885
1.881
1.871
1.866
1.863
1.849
1.843
1.836
1.831
1.818
1.805
1.796
1.791
1.784
1.779
1.771
1.765
1.758
1.753
1.653
1.632
1.623
1.609
1.589
1.580
1.458
1.454
1.448
1.438
1.434

```

NAME      LV-HQW-775P1-20240728
EXPNO     10
PROCNO    1
Date_     20240729
Time      2.27 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ         5.2429299 sec
RG         36
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SF01      400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300092 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



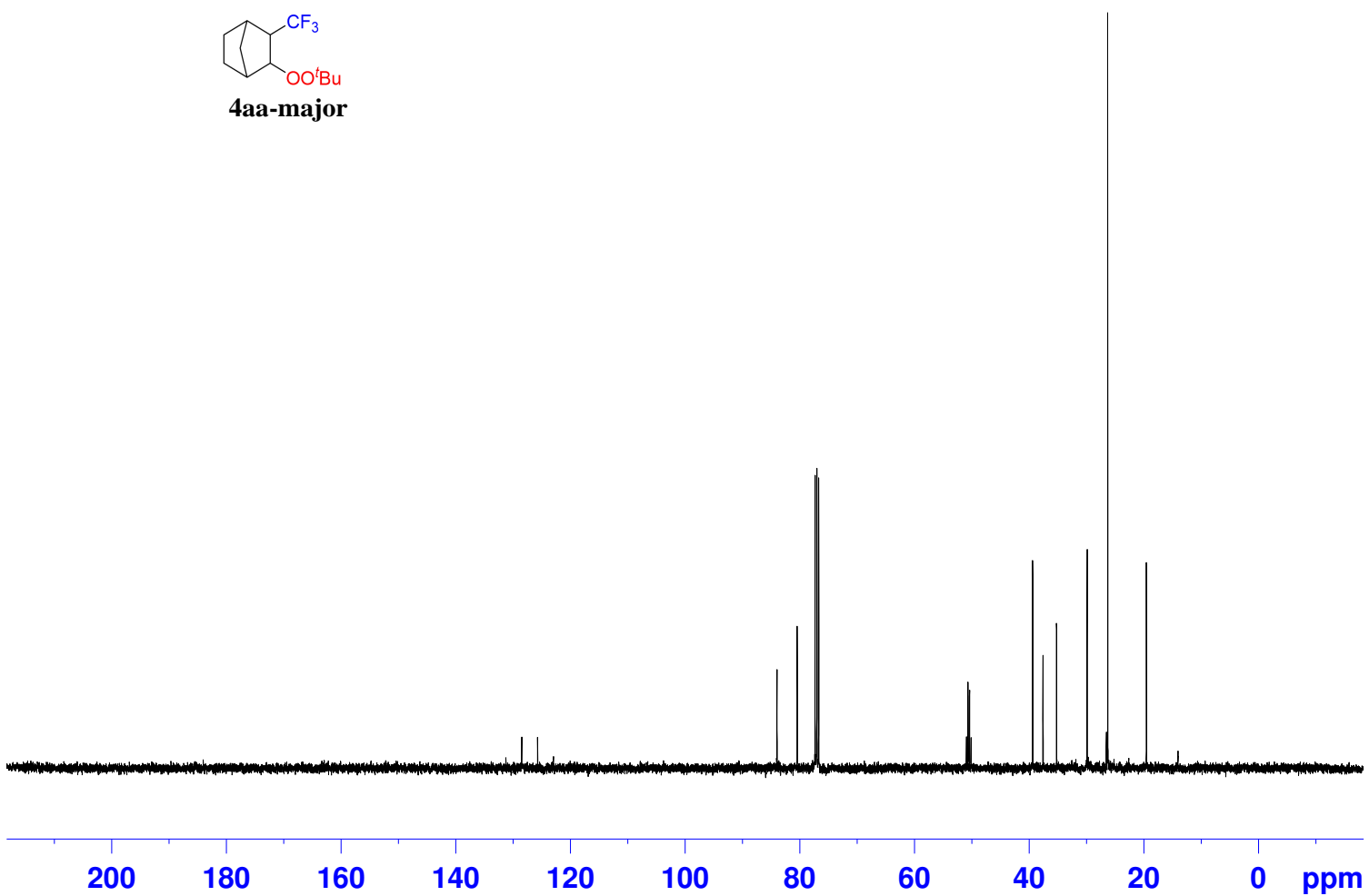
1.00
1.01
1.01
2.12
2.24
1.16
2.03
9.36



131.24
128.47
125.71
122.95

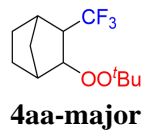
84.00
83.97
83.95
83.93
80.43

50.92
50.66
50.38
50.11
39.37
37.60
37.58
37.57
37.55
35.23
35.22
35.21
35.20
29.89
26.28
19.57

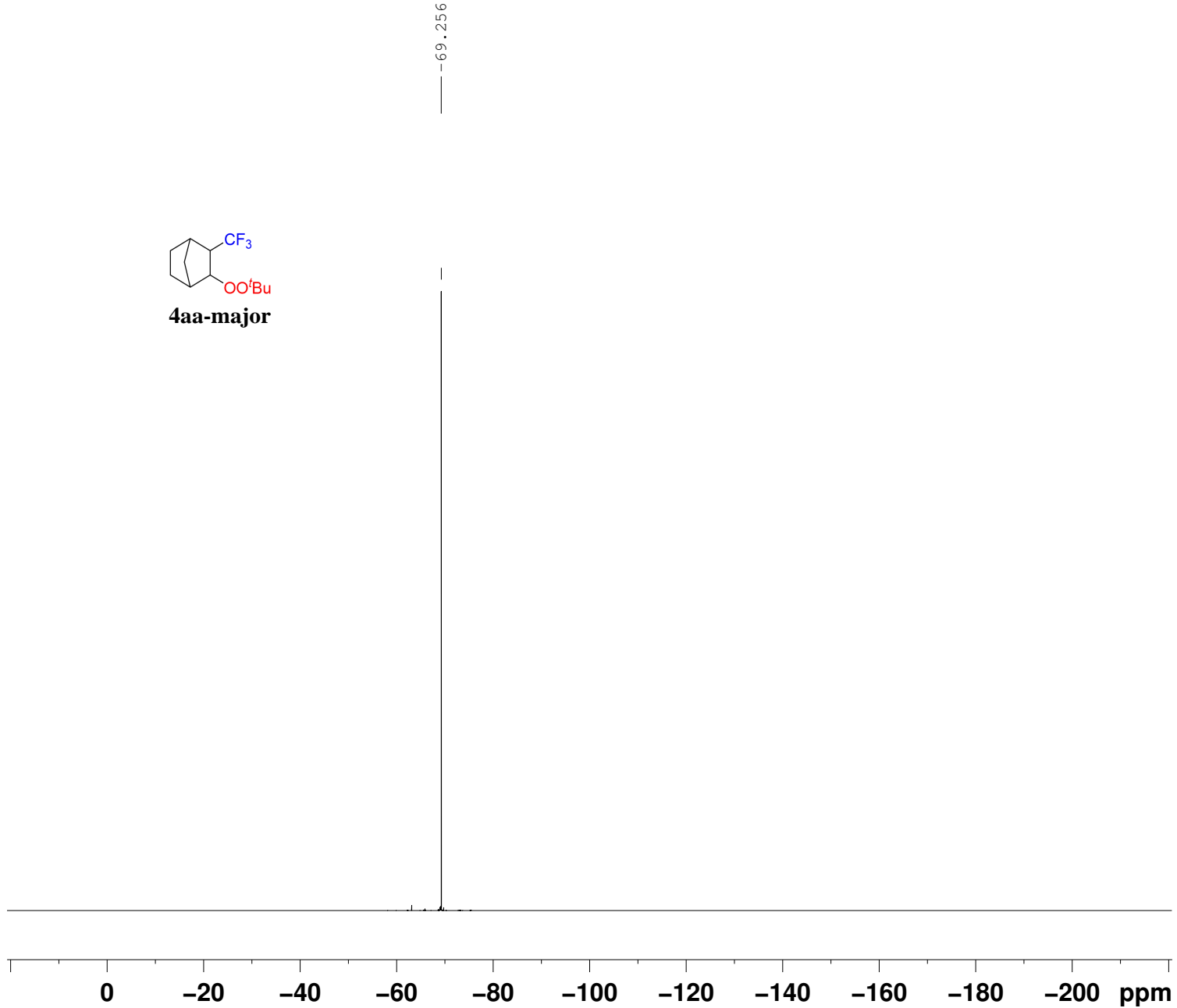


```

NAME      LV-HQW-775P1-20240728
EXPNO     12
PROCNO    1
Date_     20240729
Time      2.37 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD        65536
SOLVENT   CDC13
NS        50
DS        4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG        101
DW        21.000 usec
DE        6.50 usec
TE        298.0 K
D1        2.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      100.6228298 MHz
NUC1      13C
P0        2.67 usec
P1        8.00 usec
SI        32768
SF        100.6127687 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
  
```

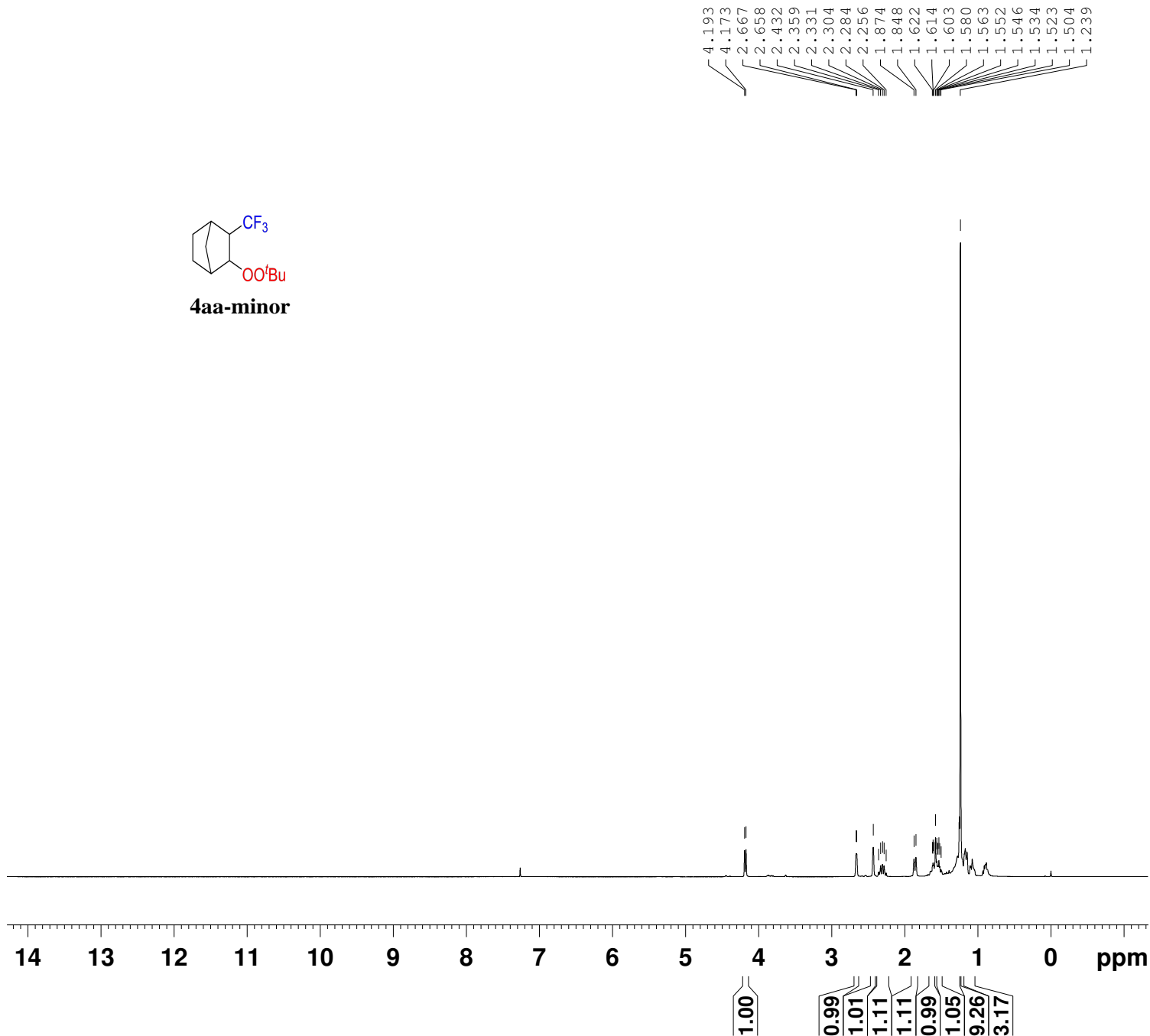
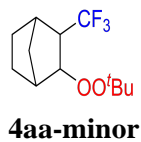


— -69.256



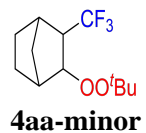
```

NAME      LV-HQW-775P1-20240728
EXPNO     11
PROCNO    1
Date_     20240729
Time      2.32 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDC13
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         298.1 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



```

NAME      LV-HQW-768P2-20240726
EXPNO     10
PROCNO    1
Date_     20240727
Time      13.50 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ         5.2429299 sec
RG         64
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SF01      400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300091 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



130.26
127.49
124.72
121.92

85.35
85.33
85.32
85.31
80.55

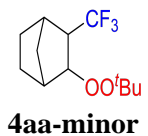
51.18
50.92
50.65
50.39
39.80
37.02
37.00
36.98
36.96
33.68
33.67
33.65
33.64
29.63
26.26
22.99



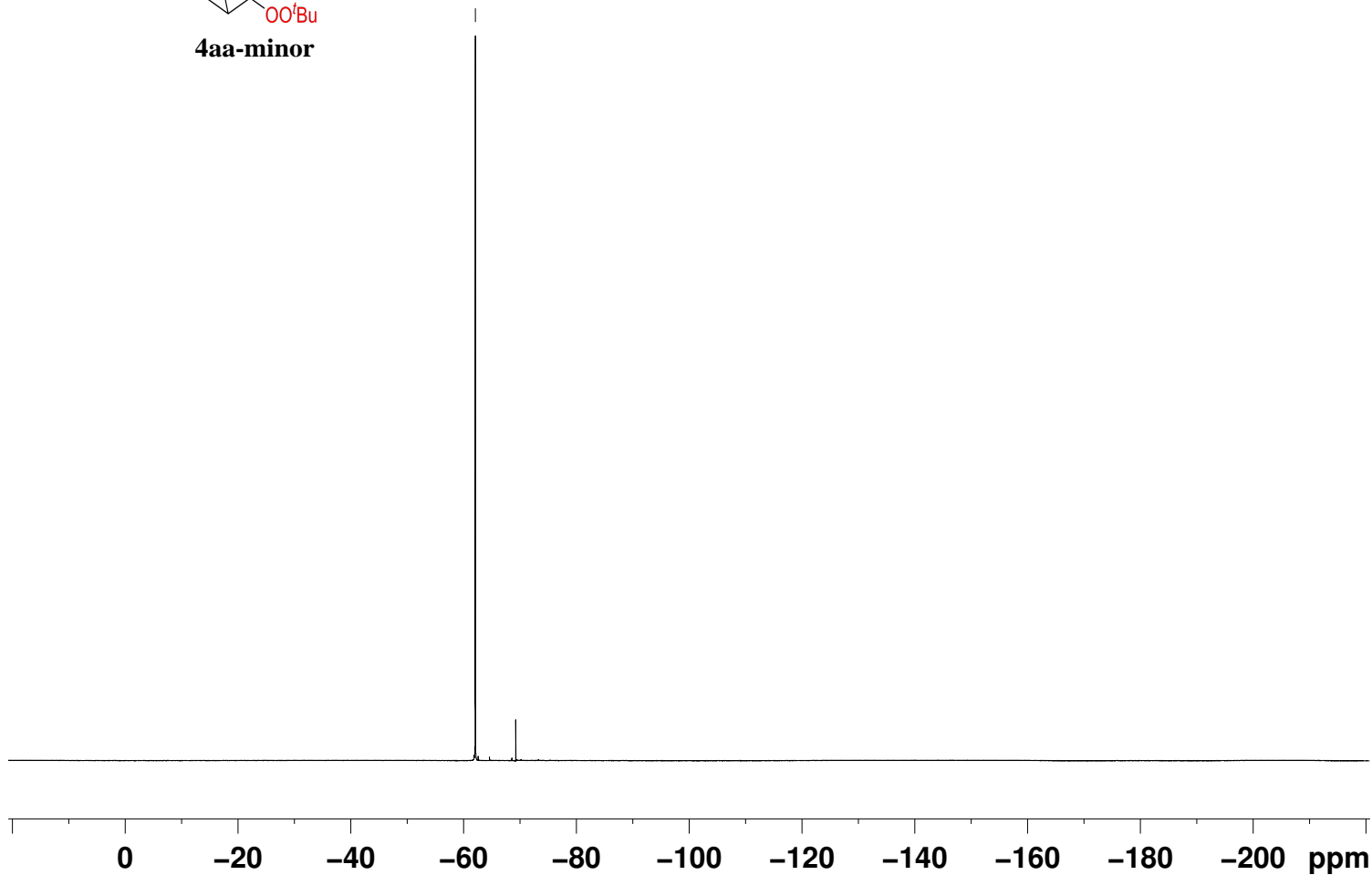
200 180 160 140 120 100 80 60 40 20 0 ppm

```

NAME      LV-HQW-768P2-20240726
EXPNO     12
PROCNO    1
Date_     20240727
Time      13.59 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD        65536
SOLVENT   CDC13
NS        100
DS        4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG        101
DW        21.000 usec
DE        6.50 usec
TE        298.2 K
D1        2.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      100.6228298 MHz
NUC1      13C
P0        2.67 usec
P1        8.00 usec
SI        32768
SF        100.6127695 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
  
```

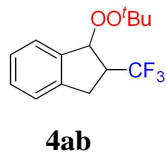


— -62.089

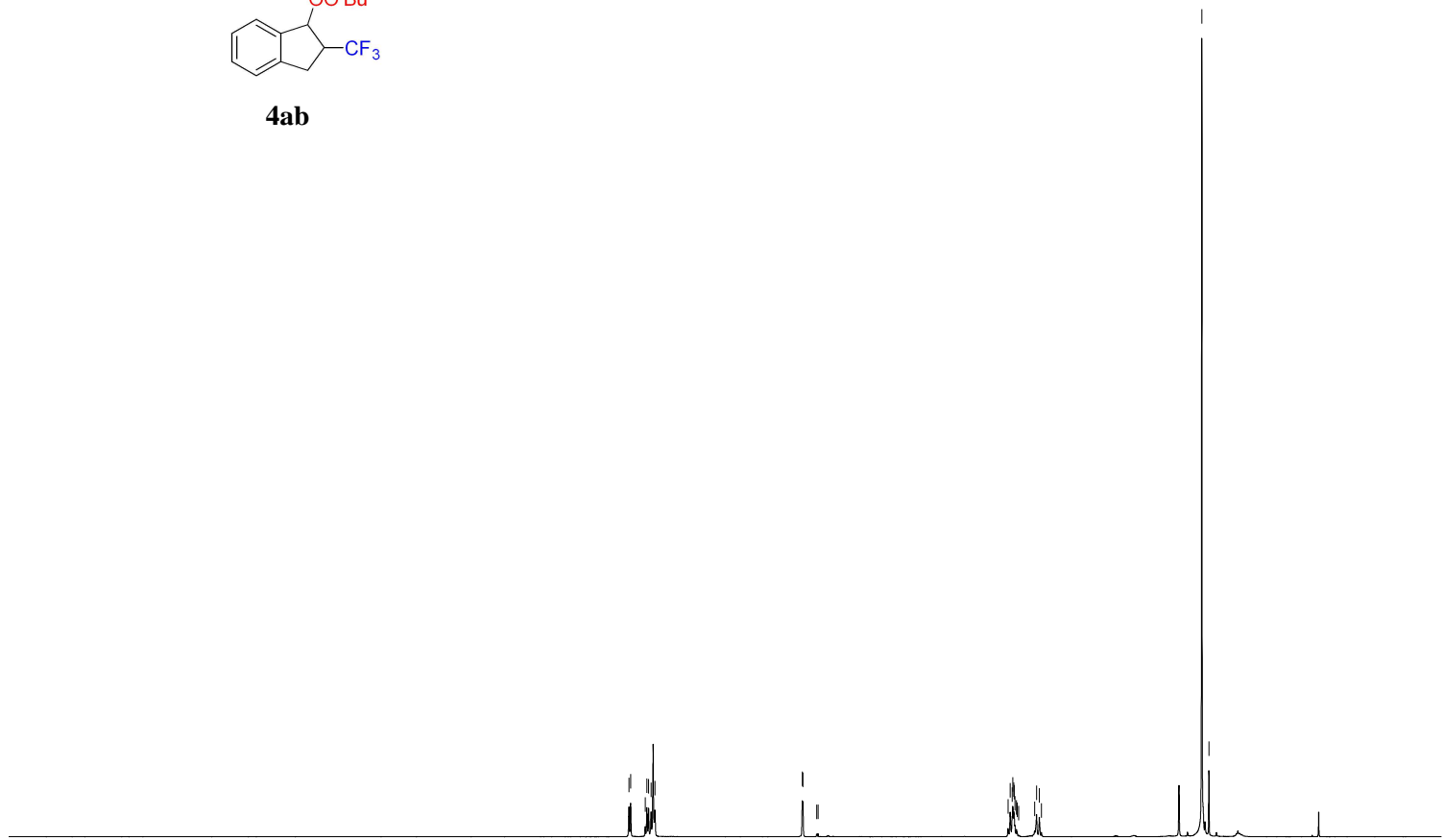


```

NAME      LV-HQW-768P2-20240726
EXPNO     11
PROCNO    1
Date_     20240727
Time      13.51 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDC13
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.0000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

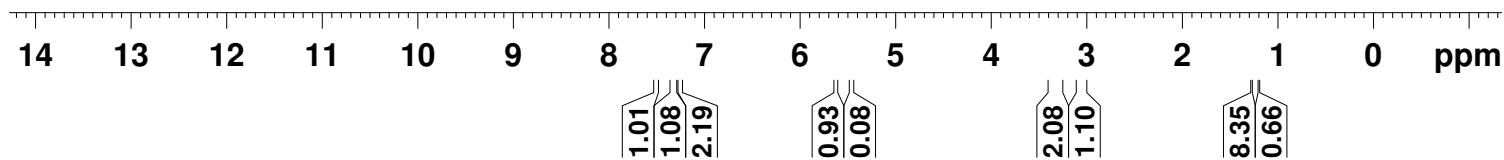


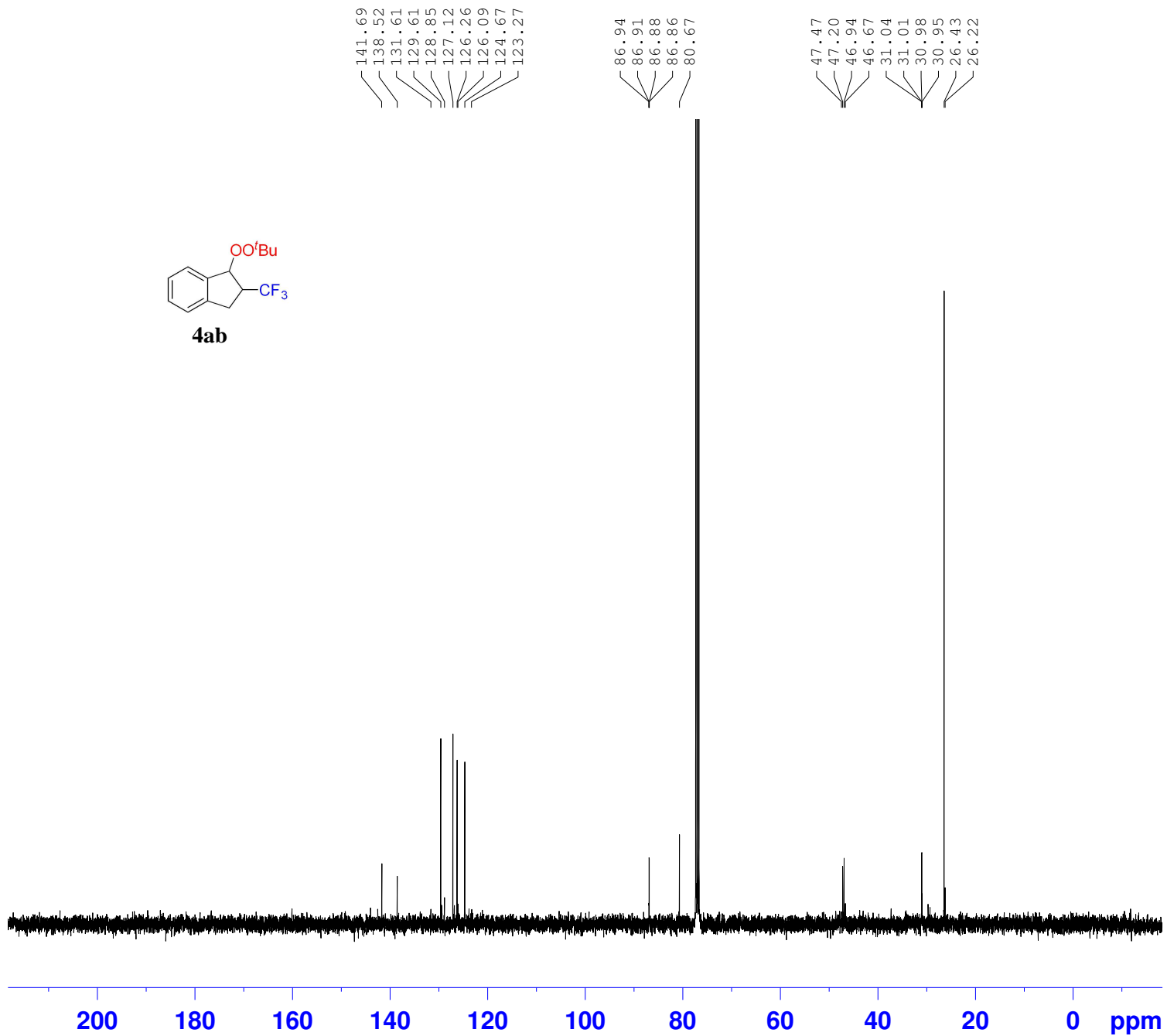
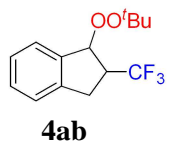
7.517
 7.498
 7.339
 7.322
 7.303
 7.276
 7.234
 5.628
 5.622
 5.471
 5.456
 3.385
 3.363
 3.341
 3.334
 3.324
 3.319
 3.310
 3.294
 3.286
 3.270
 3.096
 3.075
 3.045
 3.022
 1.274
 1.196



```

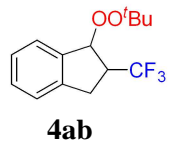
NAME      LV-HQW-648P-20240628
EXPNO     10
PROCNO    1
Date_     20240629
Time      2.24 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        101
DW        80.000 usec
DE        8.64 usec
TE        305.7 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300133 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



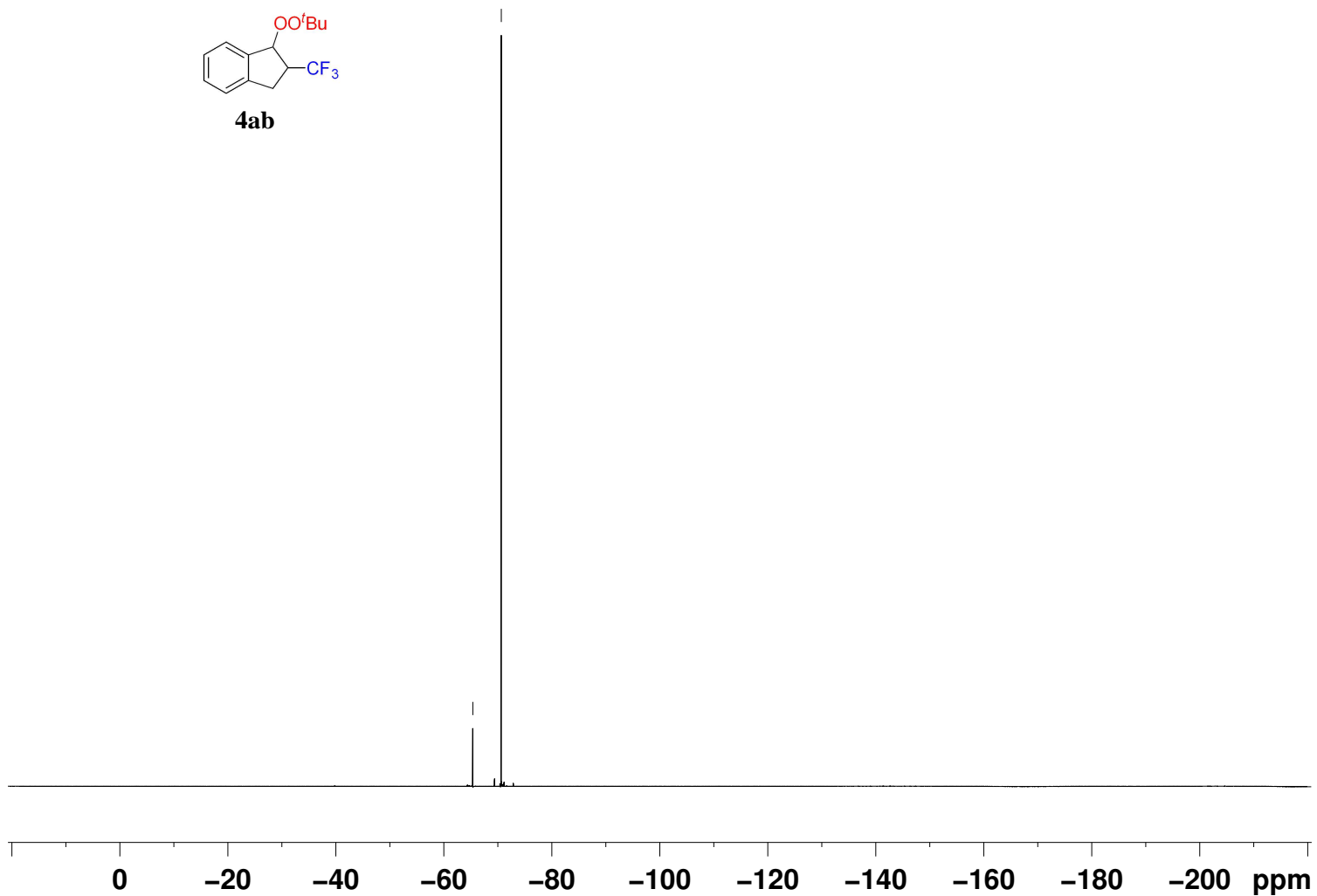


```

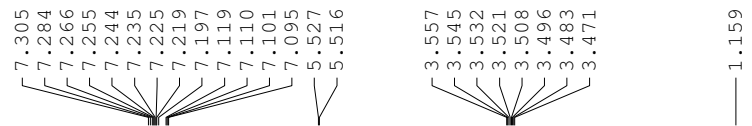
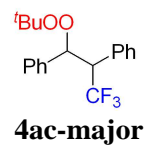
NAME      LV-HQW-648P-20240628
EXPNO     11
PROCNO    1
Date_     20240629
Time      2.37 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         200
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         305.7 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127680 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

— -65.372
— -70.641

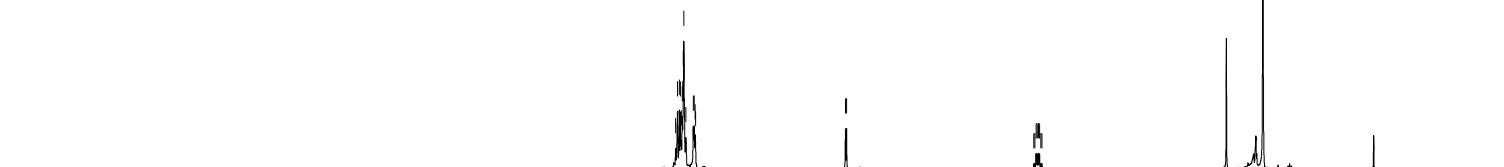


NAME	LV-HQW-648P-20240628
EXPNO	12
PROCNO	1
Date_	20240629
Time	2.39 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	305.4 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



```

NAME      LV-HQW-646P1-20240525
EXPNO     10
PROCNO    1
Date_     20240525
Time      15.25 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH        6250.000 Hz
FIDRES     0.190735 Hz
AQ         5.2429299 sec
RG         101
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SF01       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300126 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



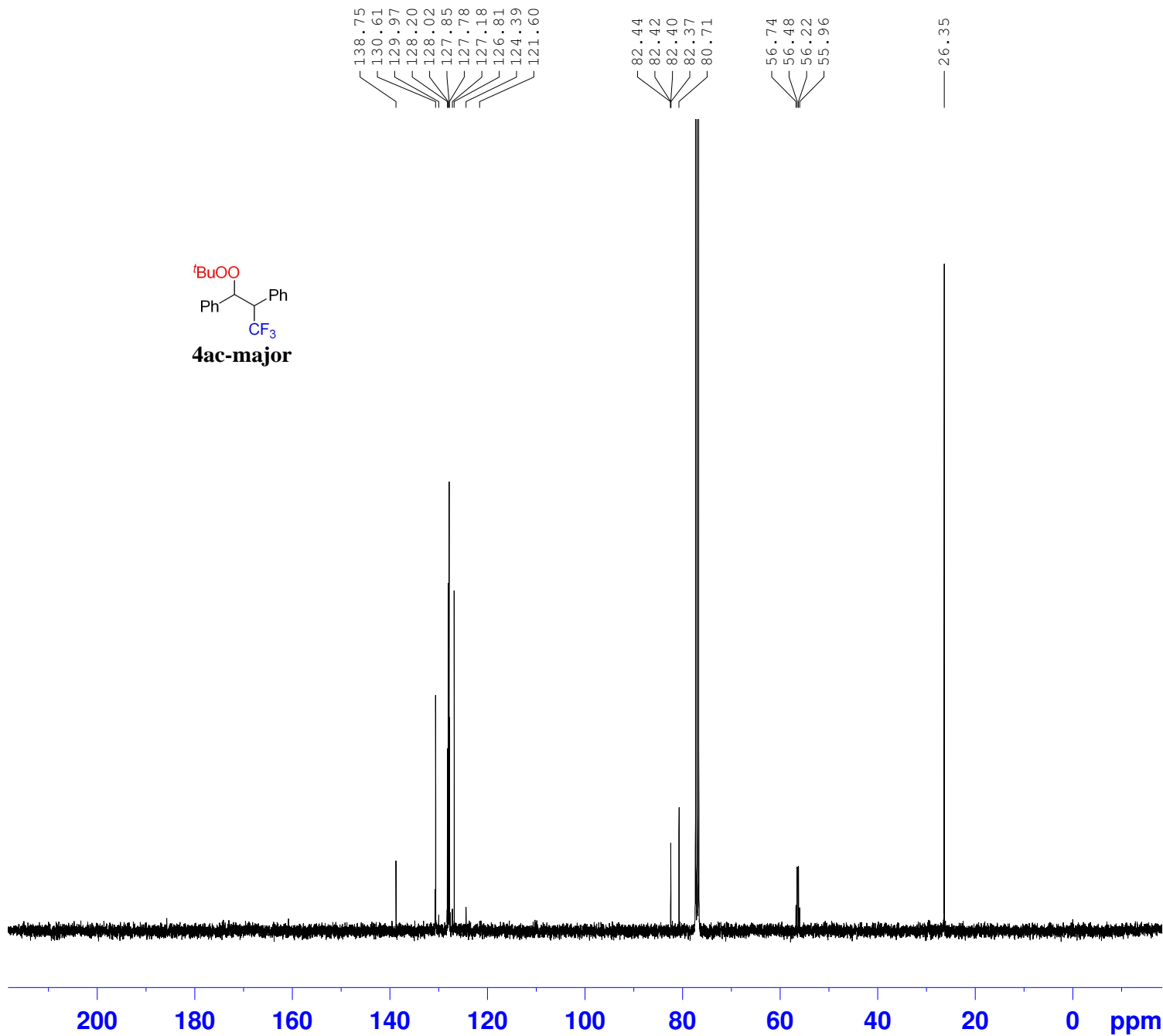
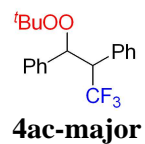
14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

8.19
2.02

1.00

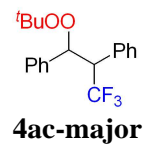
1.01

9.12



```

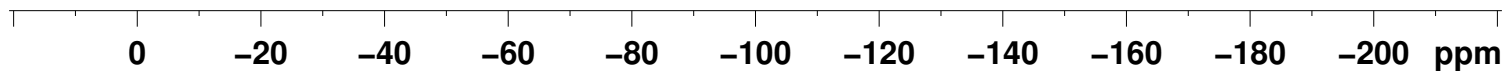
NAME      LV-HQW-646P1-20240525
EXPNO     12
PROCNO    1
Date_     20240525
Time      16.02 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         584
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.0 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127709 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

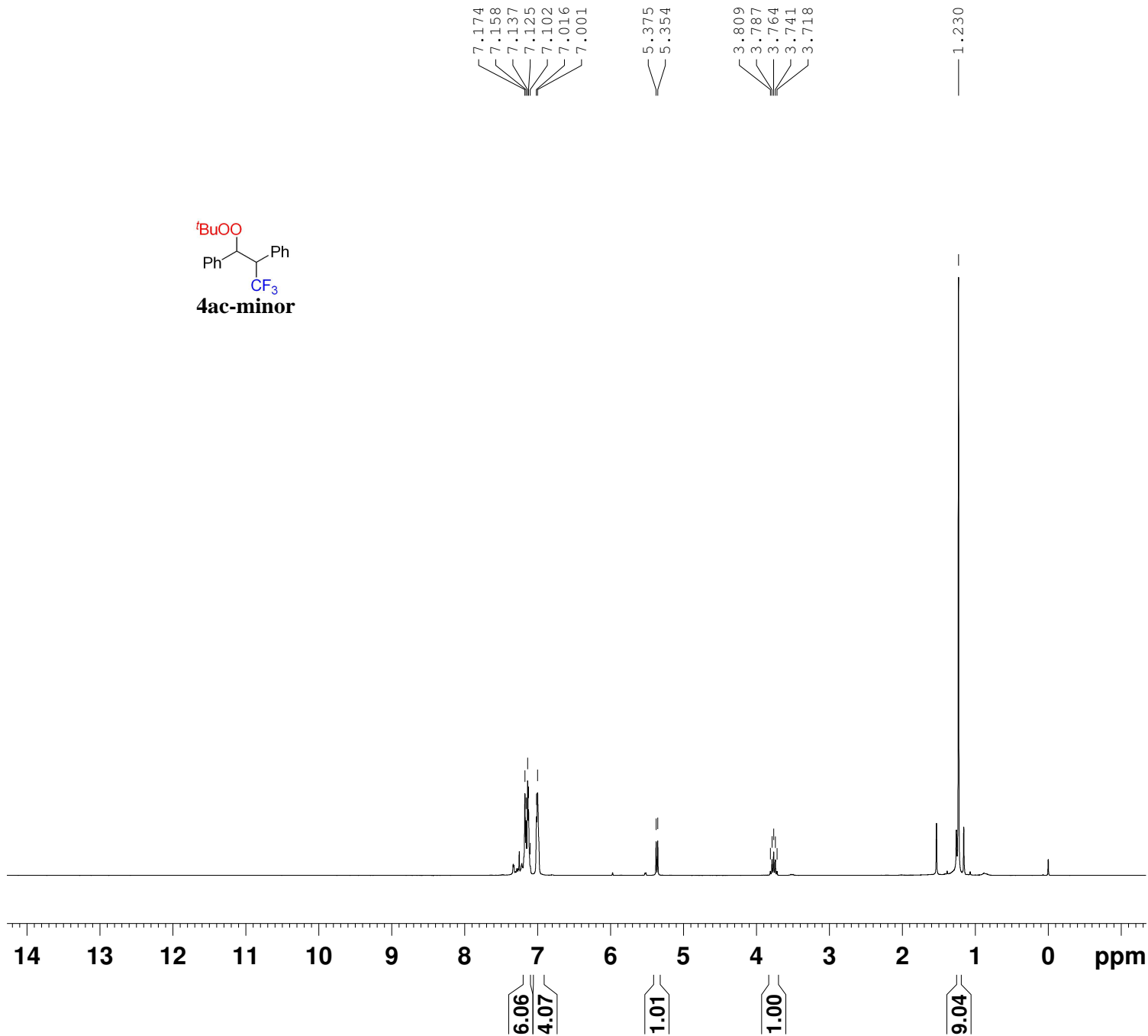
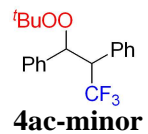


--65.1165

```

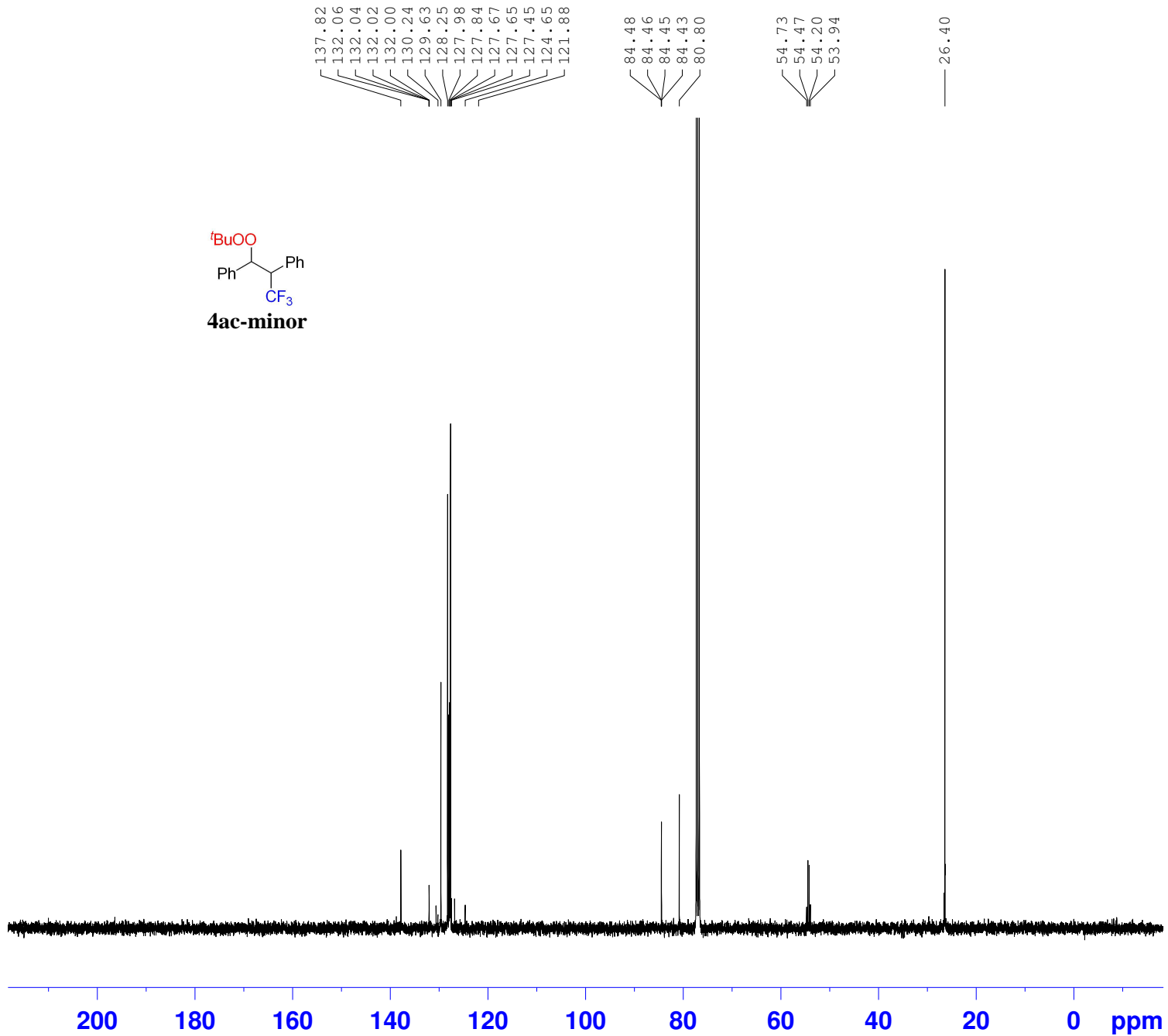
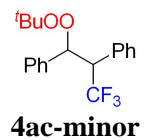
NAME      LV-HQW-646P1-20240525
EXPNO     11
PROCNO    1
Date_     20240525
Time      15.27 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDC13
NS         16
DS         4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         298.1 K
D1         1.0000000 sec
D11        0.03000000 sec
TD0        1
SFO1      376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```





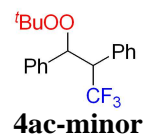
```

NAME      LV-HQW-646P2-202040525
EXPNO     10
PROCNO    1
Date_     20240525
Time      16.09 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDCl3
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        101
DW        80.000 usec
DE        8.64 usec
TE        298.0 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300139 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

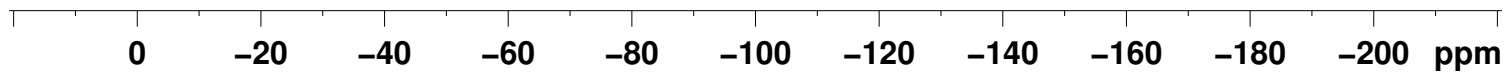


```

NAME      LV-HQW-646P2-202040525
EXPNO     12
PROCNO    1
Date_     20240525
Time      16.39 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         464
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         299.1 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
SF01      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127709 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

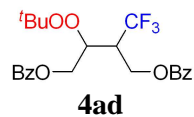


— 63.411

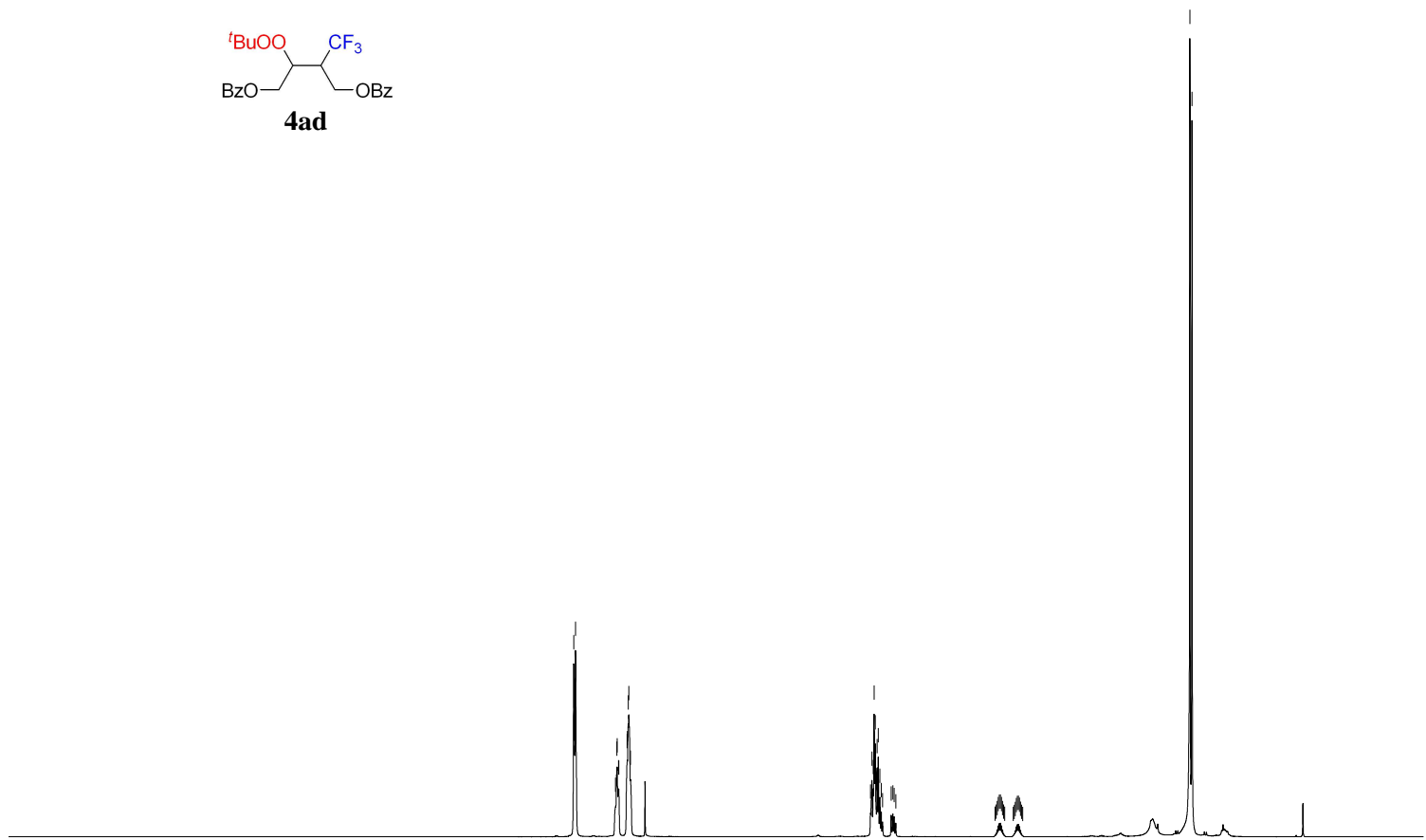


```

NAME      LV-HQW-646P2-202040525
EXPNO     11
PROCNO    1
Date_     20240525
Time      16.11 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

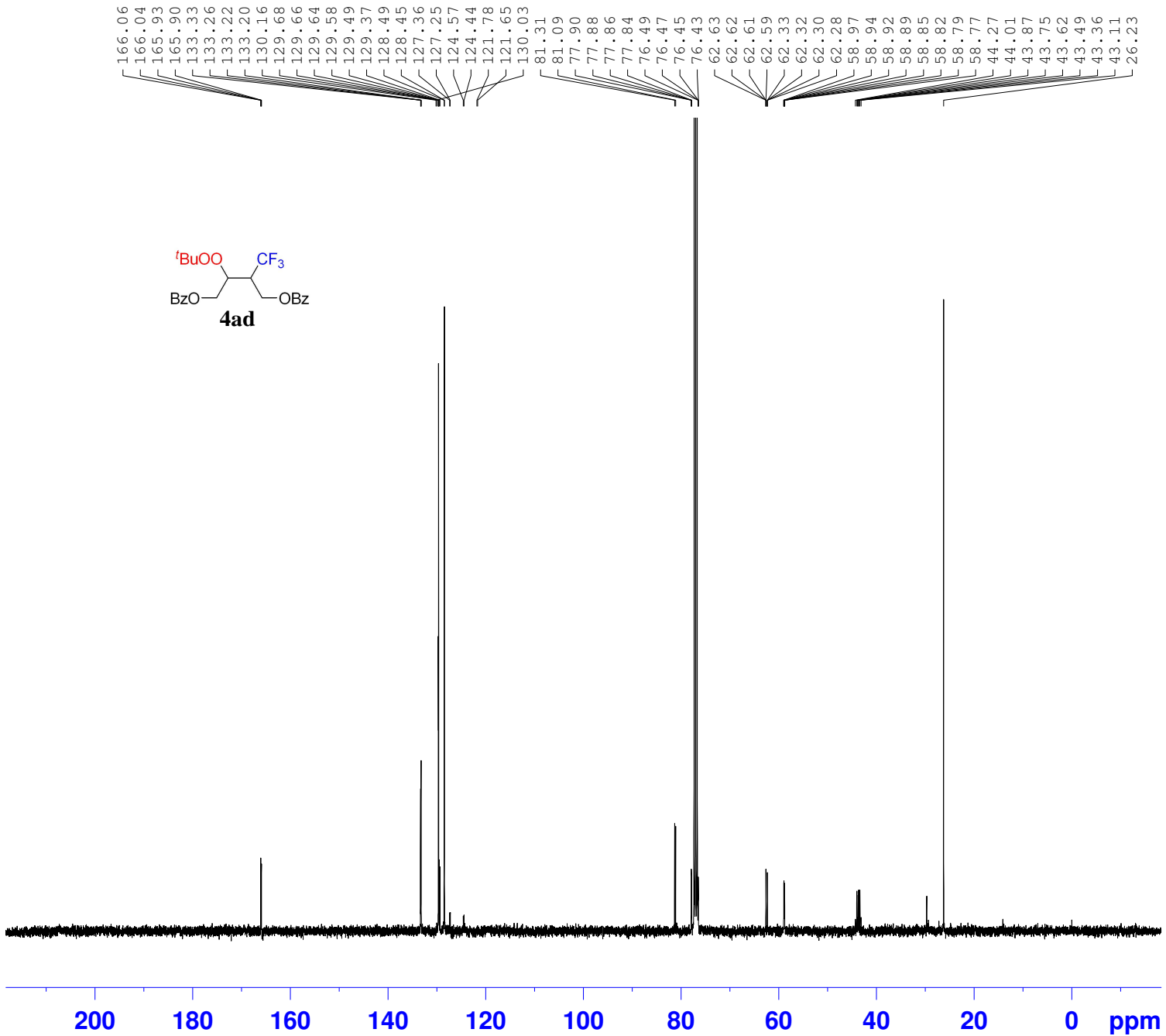


8.047
 8.028
 7.587
 7.571
 7.568
 7.553
 7.550
 7.458
 7.455
 7.446
 7.439
 7.421
 4.772
 4.756
 4.742
 4.732
 4.719
 4.699
 4.686
 4.669
 4.654
 4.639
 4.544
 4.525
 4.511
 4.493
 3.398
 3.386
 3.374
 3.363
 3.350
 3.339
 3.327
 3.315
 3.304
 3.291
 3.197
 3.186
 3.175
 3.163
 3.152
 3.140
 3.128
 3.117
 3.105
 3.093
 1.247
 1.224



NAME LV-HQW-764P-20240726
 EXPNO 10
 PROCNO 1
 Date_ 20240726
 Time 16.15 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 101
 DW 80.000 usec
 DE 8.64 usec
 TE 298.0 K
 D1 1.00000000 sec
 TD0 1
 SFO1 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300105 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

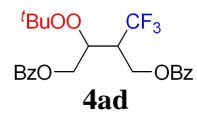
14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm
 4.11 2.05 4.01
 4.03 0.54 0.51
 0.54 0.50
 4.51 4.42



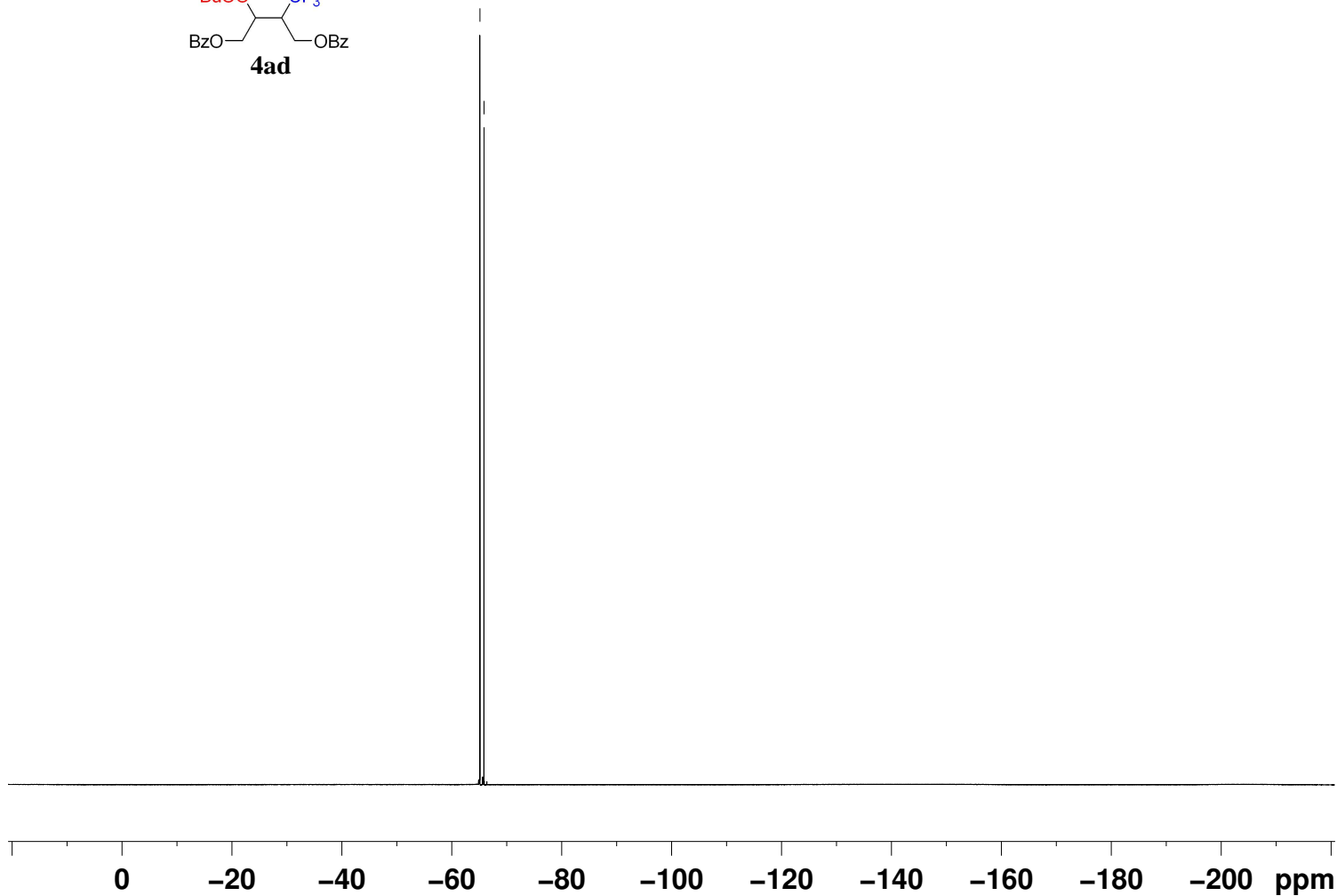
```

NAME      LV-HQW-764P-20240726
EXPNO     12
PROCNO    1
Date_     20240726
Time      17.04 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         800
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.0 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127716 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40

```

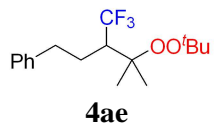


--65.125
--65.870



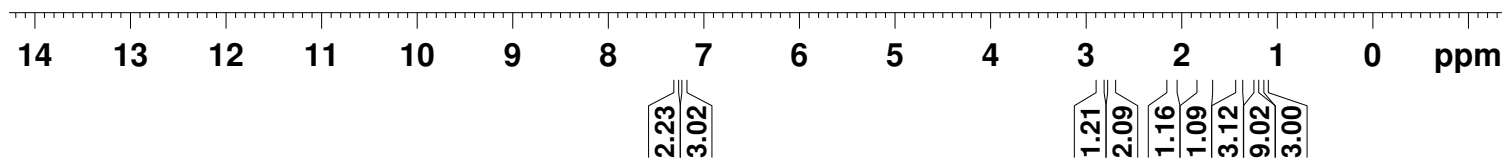
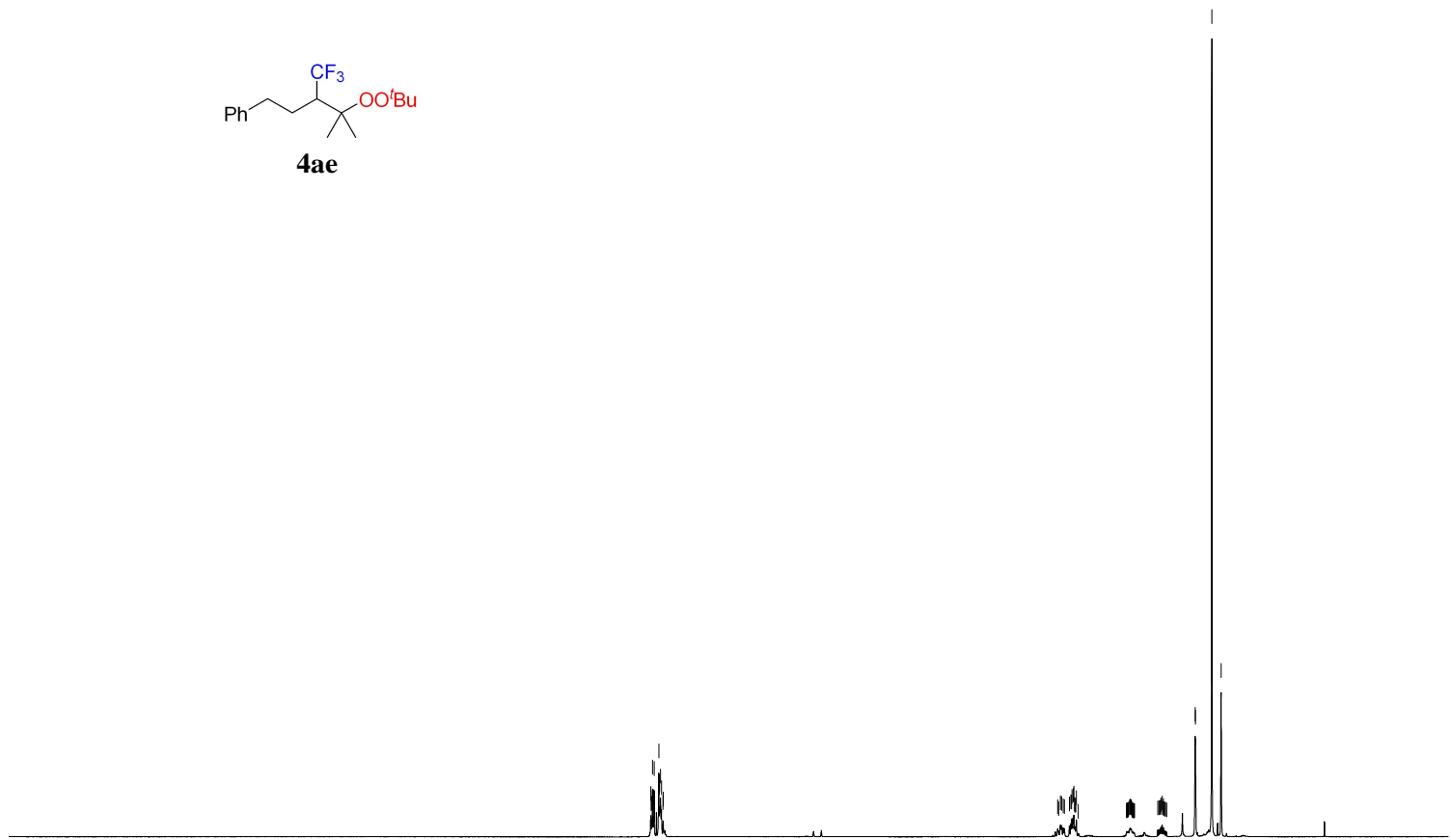
NAME	LV-HQW-764P-20240726
EXPNO	11
PROCNO	1
Date_	20240726
Time	16.17 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	298.1 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	13C
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

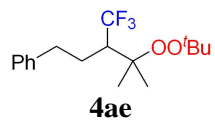
7.306
7.303
7.298
7.288
7.279
7.275
7.270
7.219
7.211
7.201
7.190
7.175
7.172
2.894
2.884
2.864
2.851
2.834
2.821
2.766
2.751
2.744
2.739
2.724
2.718
2.712
2.706
2.697
2.691
2.144
2.141
2.138
2.132
2.129
2.126
2.114
2.111
2.108
2.106
2.102
2.097
2.094
2.091
2.087
2.083
2.079
2.076
2.064
2.061
1.808
1.795
1.788
1.781
1.774
1.768
1.760
1.752
1.747
1.739
1.732
1.724
1.711
1.403
1.399
1.222
1.121



```

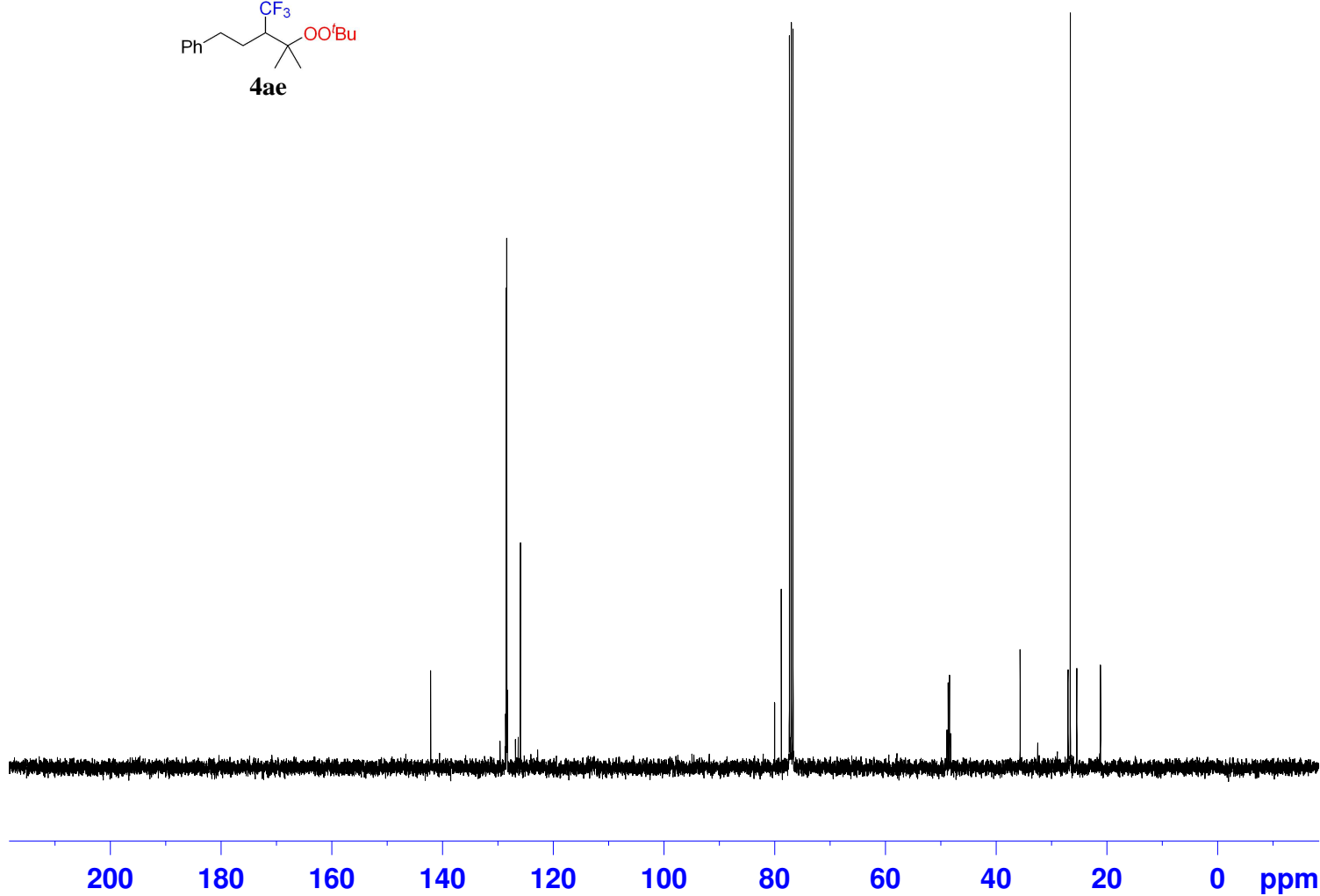
NAME      LV-HQW-776Pr-20240728
EXPNO     10
PROCNO    1
Date_     20240729
Time      7.32 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ         5.2429299 sec
RG         57
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SF01      400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300160 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```





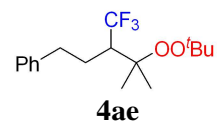
142.14
132.40
129.61
128.47
128.38
126.81
125.92
124.02

80.03
80.01
79.99
79.97
78.80
48.88
48.65
48.42
48.19
35.68
35.66
35.65
35.63
27.04
27.02
27.00
26.98
26.59
25.46
25.44
25.41
25.38
21.17
21.15
21.13
21.11



```

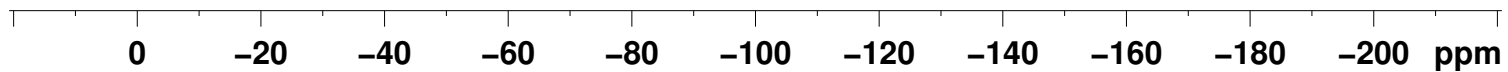
NAME      LV-HQW-776Pr-20240728
EXPNO     12
PROCNO    1
Date_     20240729
Time      7.40 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         82
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.2 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127709 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```



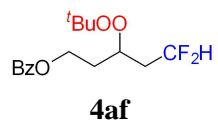
-63.215

```

NAME      LV-HQW-776Pr-20240728
EXPNO     11
PROCNO    1
Date_     20240729
Time      7.33 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDC13
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.0000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

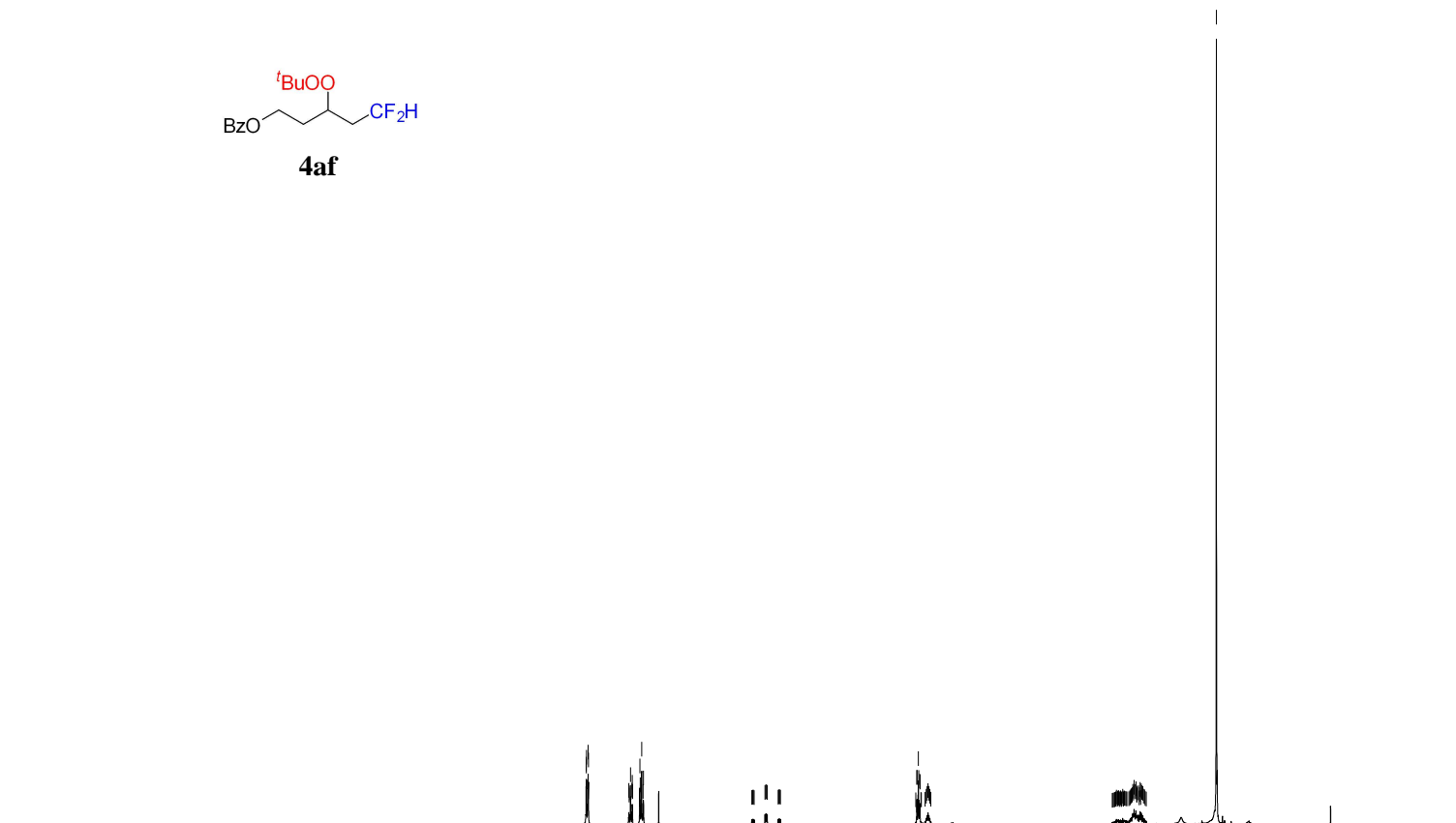


8.046
8.044
8.043
8.025
8.021
7.585
7.582
7.571
7.566
7.562
7.551
7.548
7.545
7.465
7.462
7.446
7.431
7.427
6.255
6.247
6.239
6.113
6.105
6.097
6.089
5.971
5.963
5.955
5.947
4.472
4.471
4.456
4.452
4.441
4.437
4.371
4.361
4.352
4.341
4.332
2.315
2.247
2.247
2.159
2.154
2.145
2.144
2.138
2.130
2.124
2.117
2.106
2.103
2.096
2.093
2.089
2.077
2.069
2.065
2.059
2.053
2.047
2.041
2.029
2.022
2.010
1.234



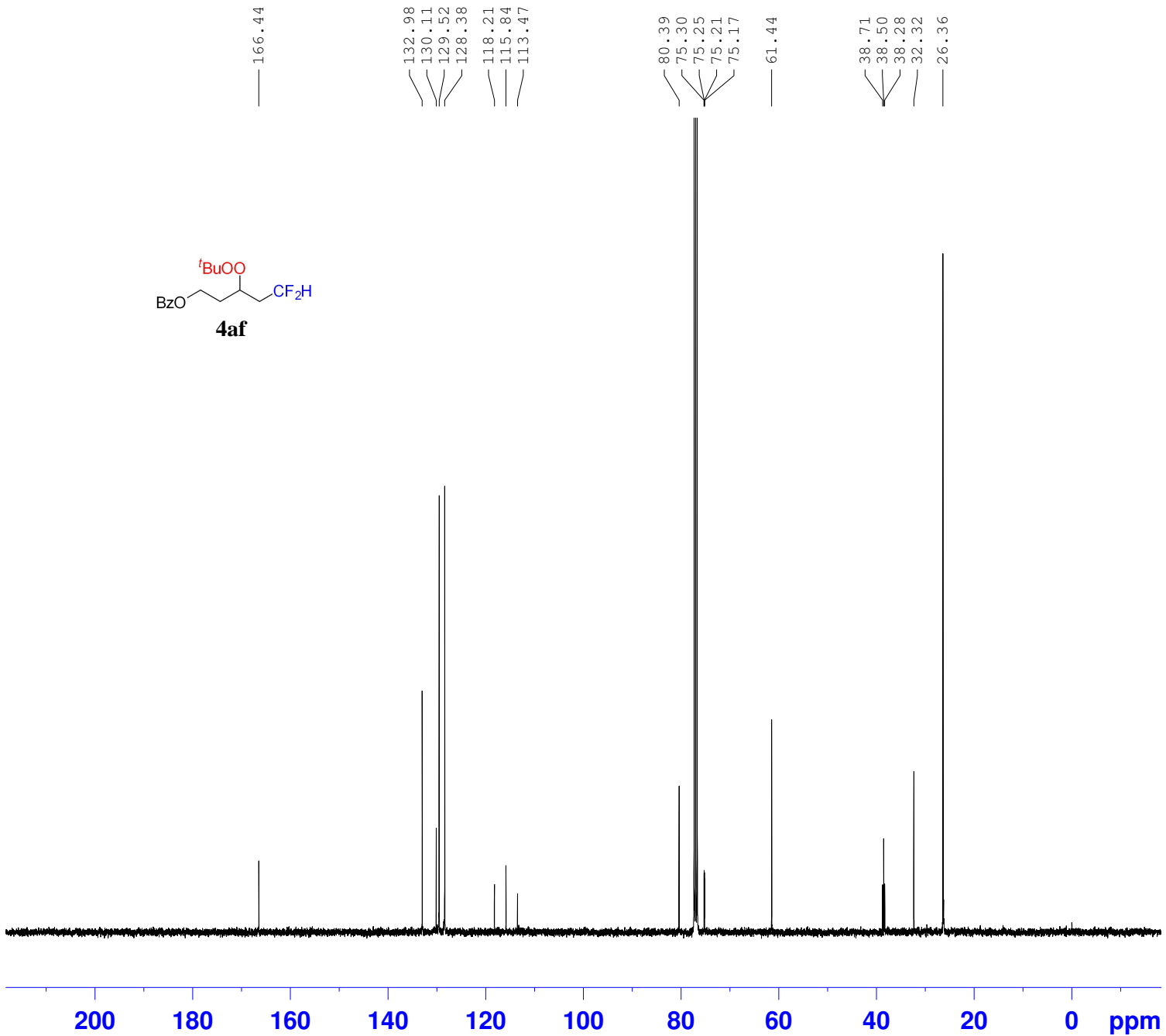
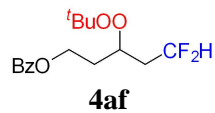
```

NAME      LV-HQW-728P-20240708
EXPNO     10
PROCNO    1
Date_     20240709
Time      0.19 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        90.5
DW        80.000 usec
DE        8.64 usec
TE        298.0 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300094 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



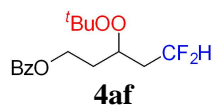
14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

2.00
1.04
2.04
1.03
1.90
0.93
1.10
3.01
9.17

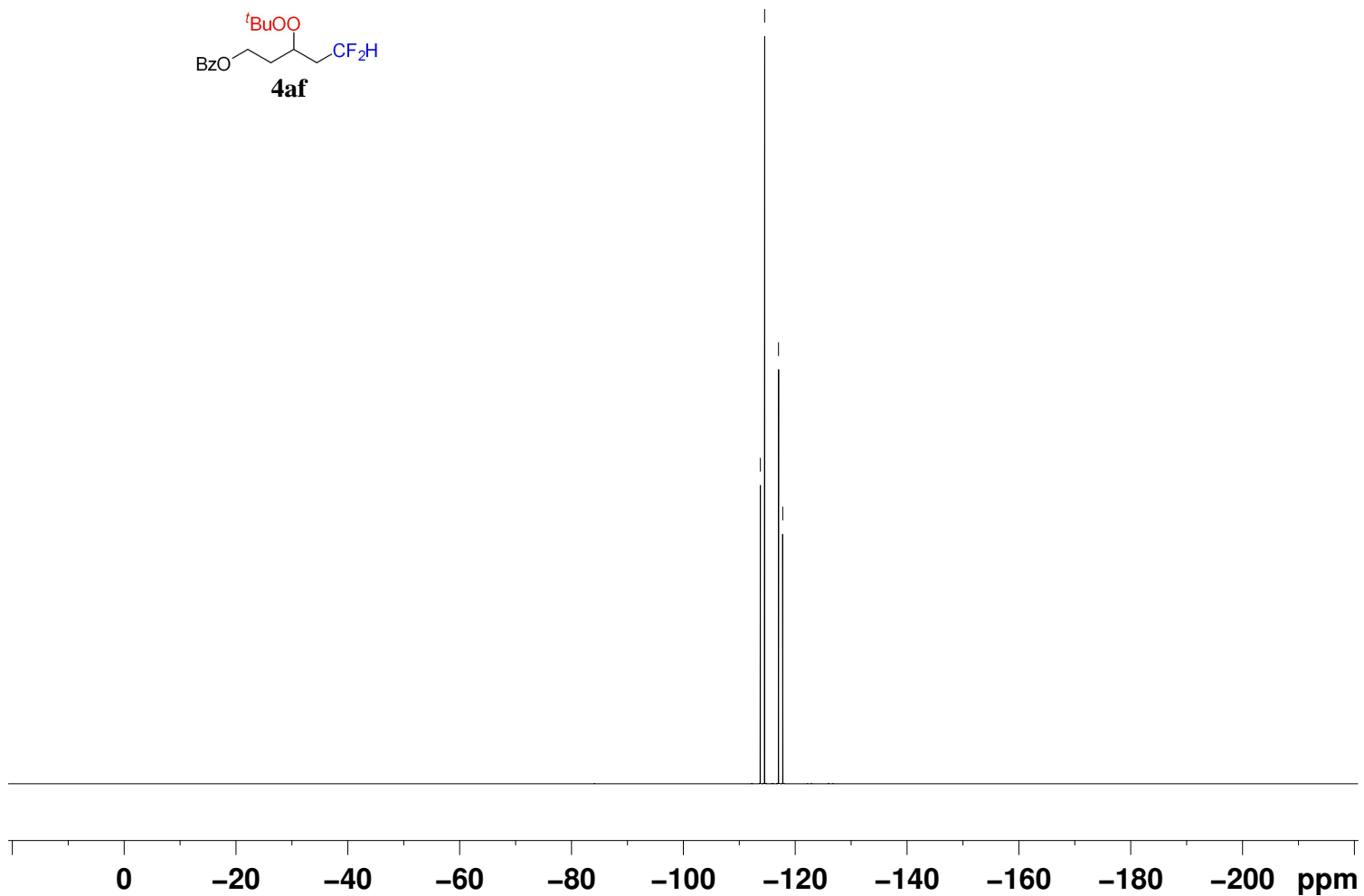


```

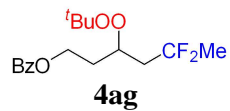
NAME      LV-HQW-728P-20240708
EXPNO     12
PROCNO    1
Date_     20240709
Time      1.09 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         800
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.0 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127716 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```



-113.770
 -114.529
 -117.014
 -117.772

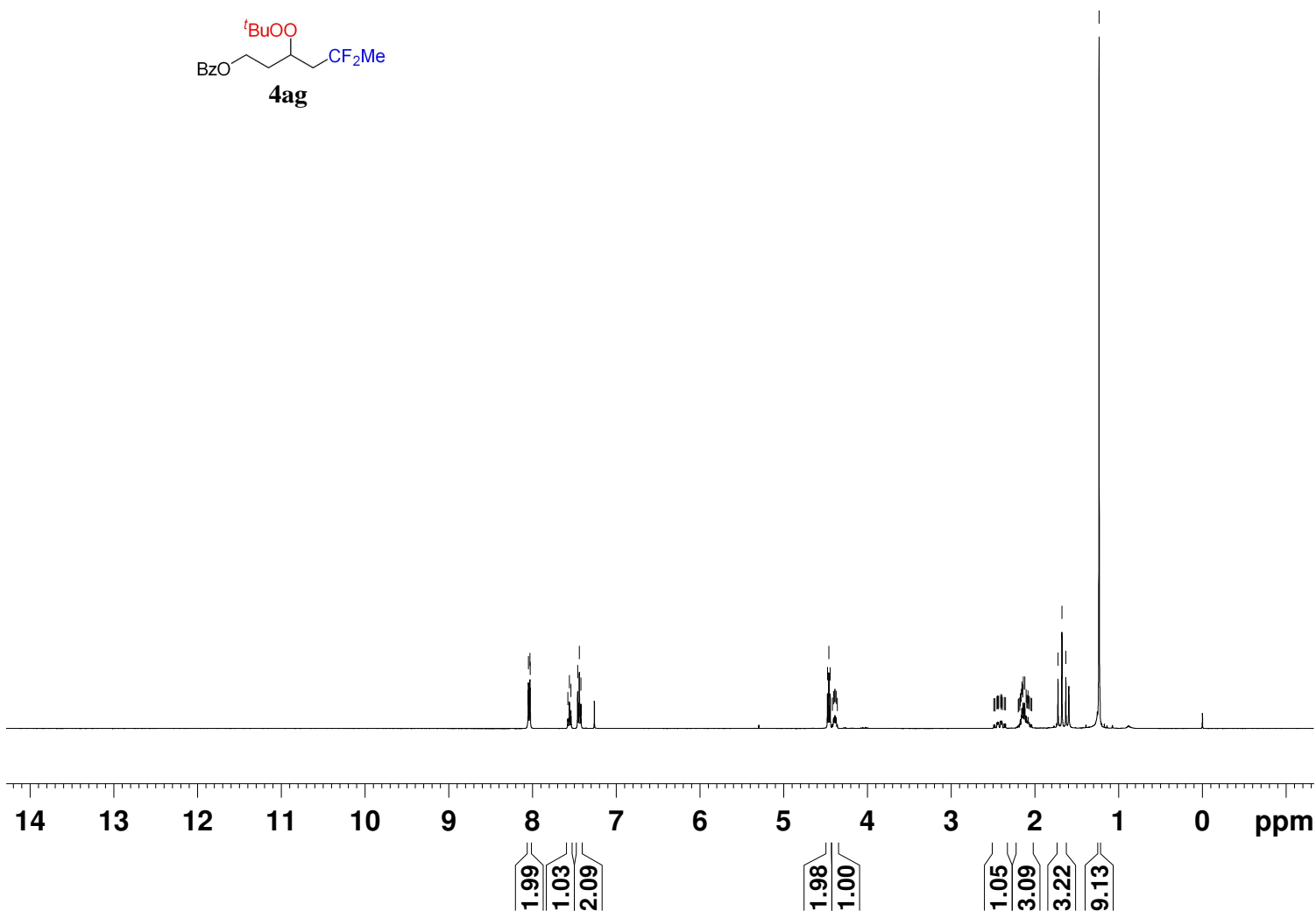


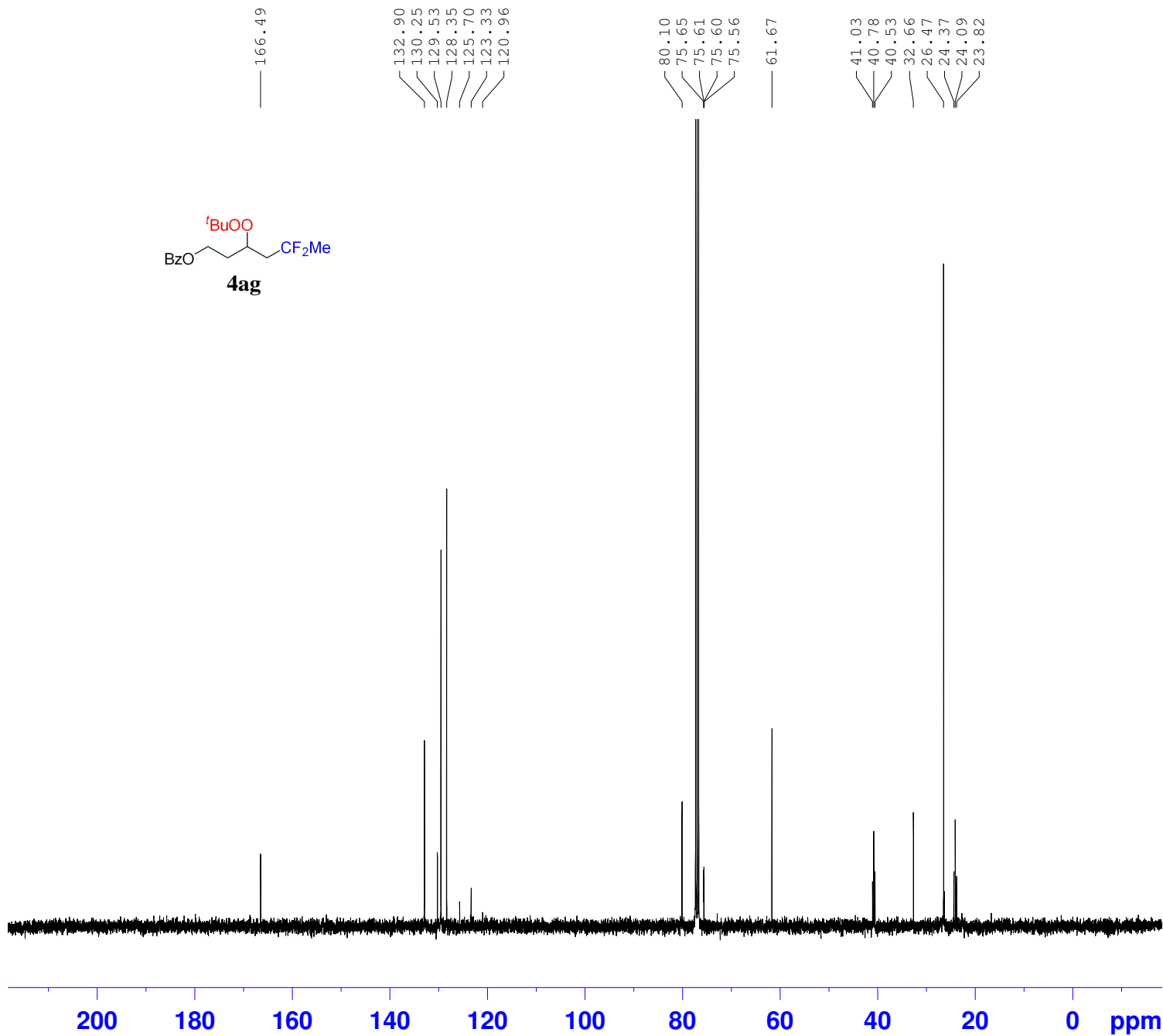
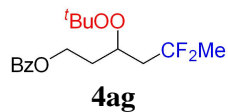
NAME	LV-HQW-728P-20240708
EXPNO	11
PROCNO	1
Date_	20240709
Time	0.21 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	298.1 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	13C
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



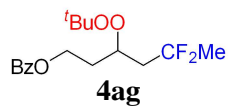
8.049
 8.031
 8.028
 7.578
 7.560
 7.541
 7.460
 7.441
 7.422
 4.477
 4.461
 4.445
 4.419
 4.405
 4.391
 4.388
 4.374
 4.360
 2.491
 2.477
 2.454
 2.448
 2.439
 2.434
 2.410
 2.404
 2.395
 2.390
 2.366
 2.351
 2.199
 2.193
 2.181
 2.174
 2.163
 2.156
 2.145
 2.139
 2.120
 2.105
 2.098
 2.090
 2.083
 2.076
 2.069

NAME LV-HQW-727P-20240708
 EXPNO 10
 PROCNO 1
 Date_ 20240708
 Time 18.20 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 90.5
 DW 80.000 usec
 DE 8.64 usec
 TE 298.0 K
 D1 1.00000000 sec
 TD0 1
 SFO1 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300098 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

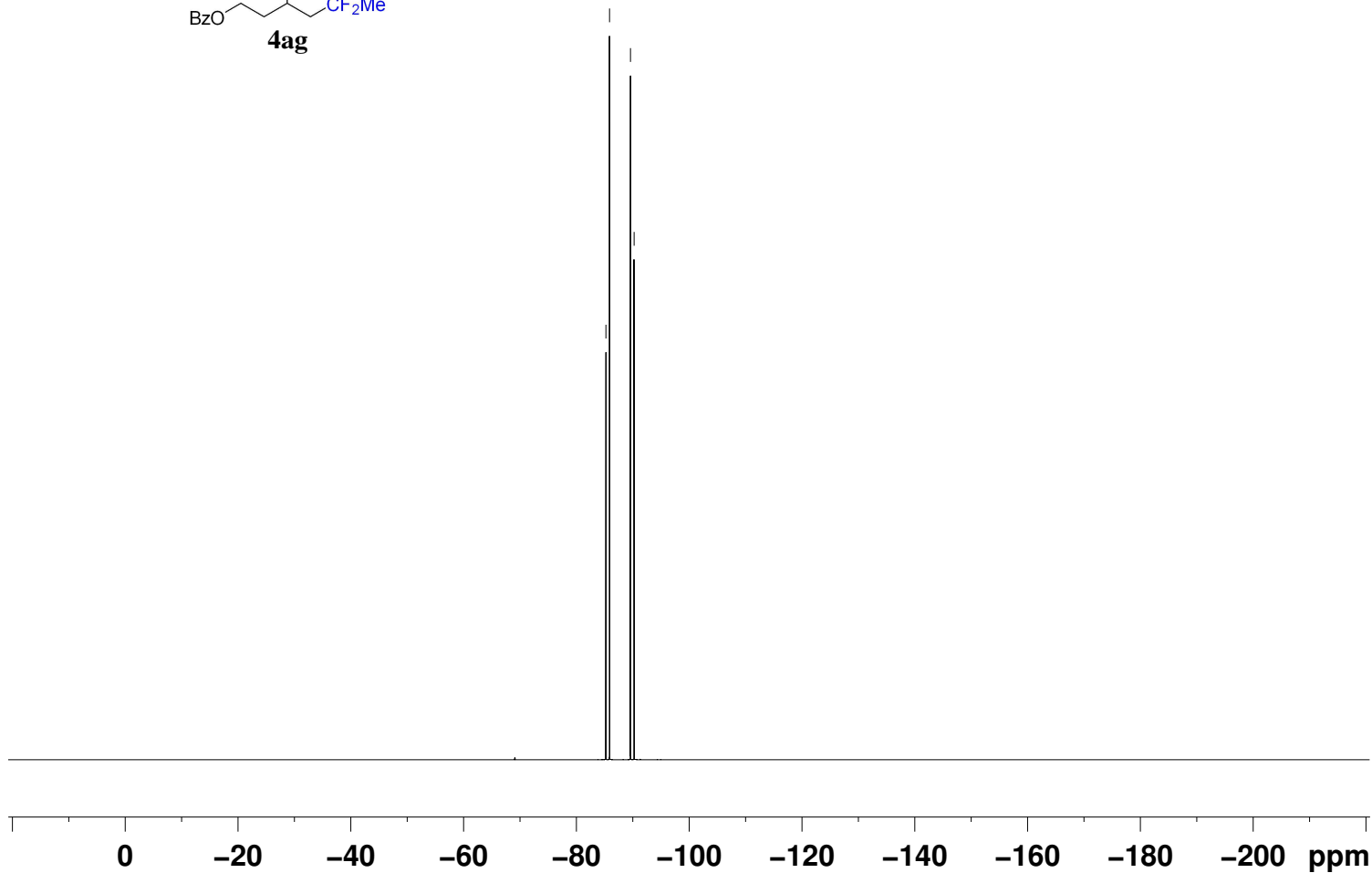




NAME	LV-HQW-727P-20240708
EXPNO	12
PROCNO	1
Date_	20240708
Time	18.36 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDC13
NS	216
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	298.0 K
D1	2.0000000 sec
D11	0.0300000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127710 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

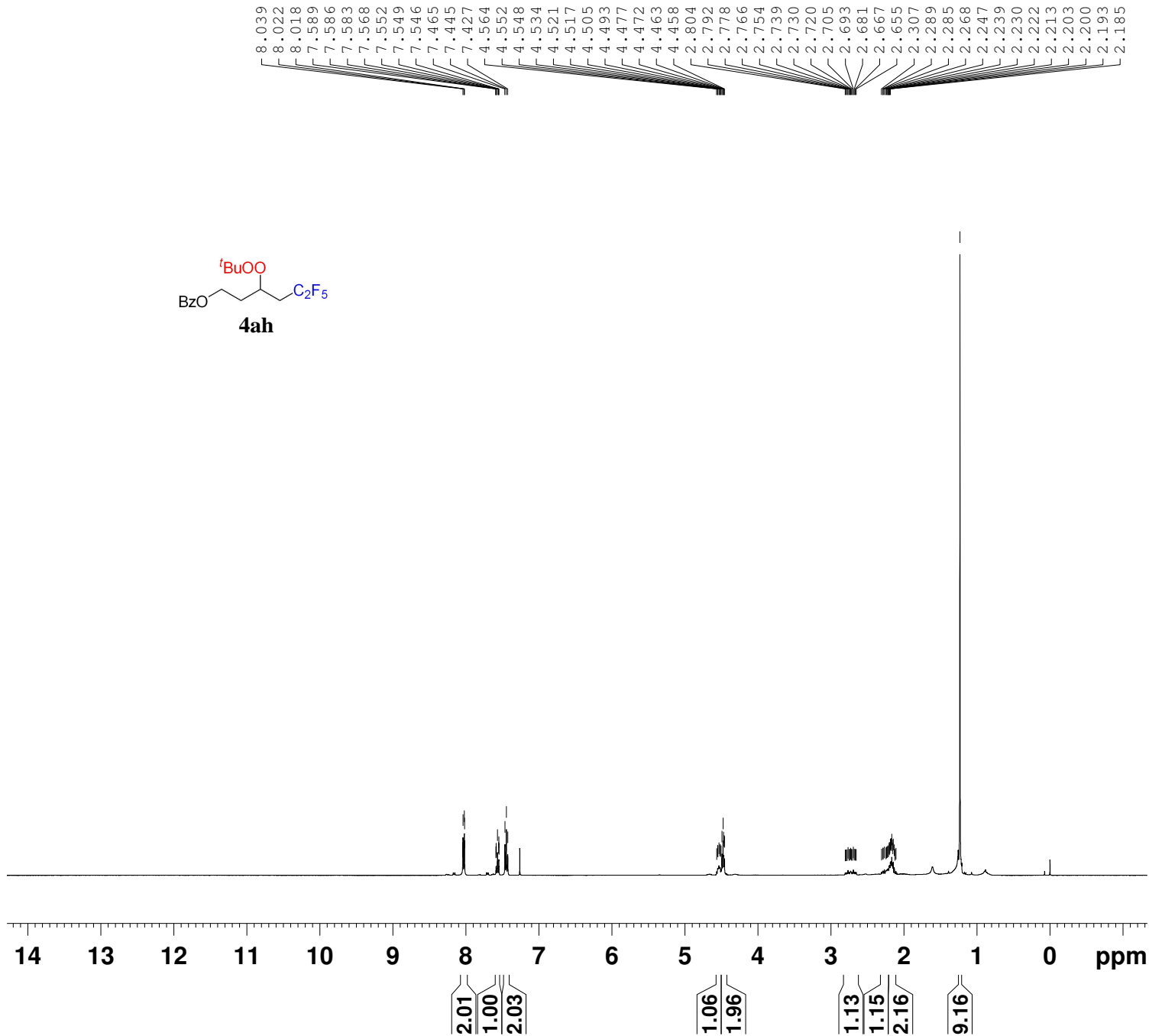
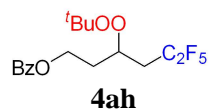


-85.234
 -85.877
 -89.590
 -90.235

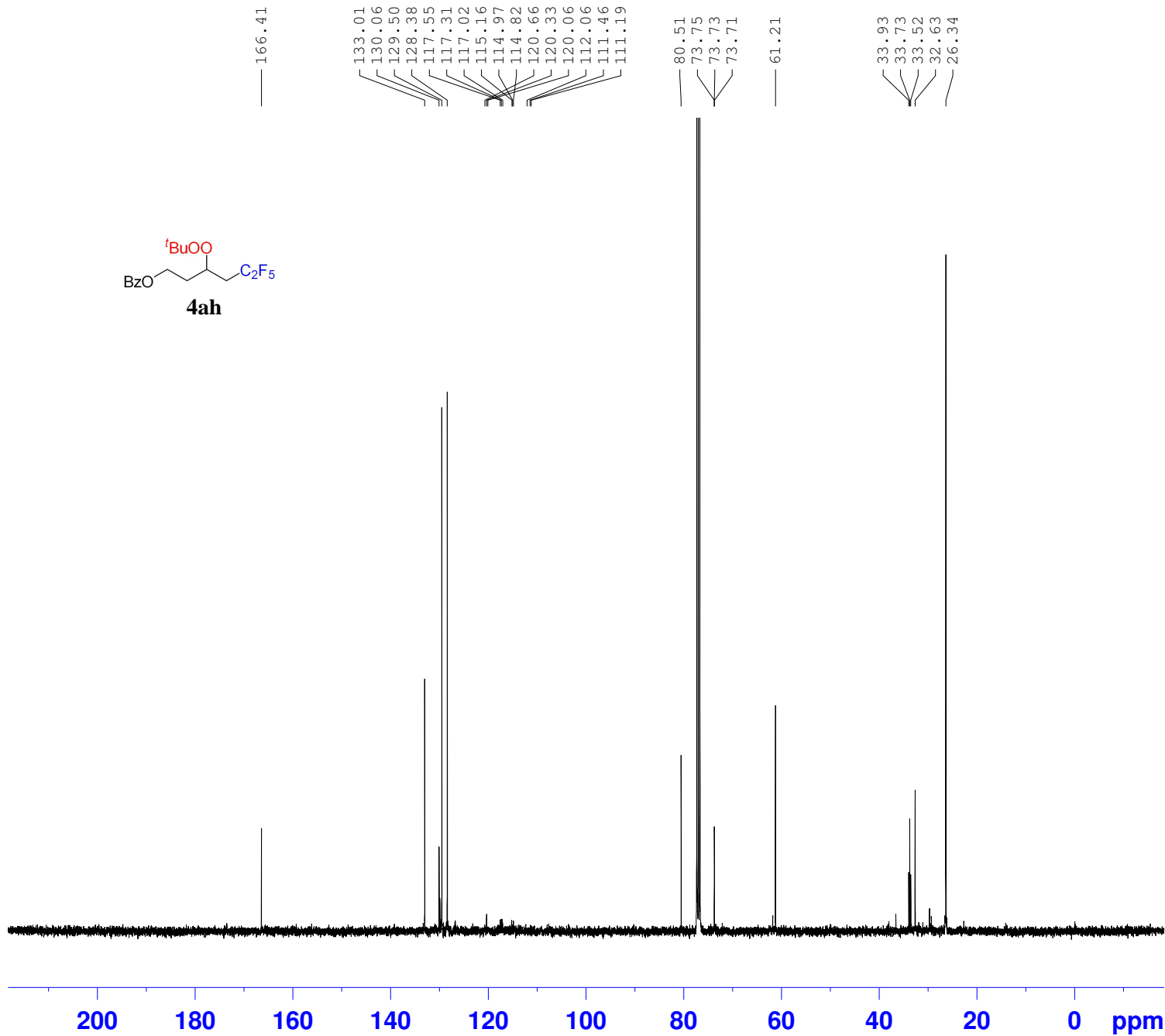
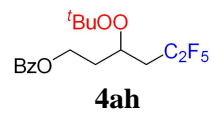


```

NAME      LV-HQW-727P-20240708
EXPNO     11
PROCNO    1
Date_     20240708
Time      18.22 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDC13
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

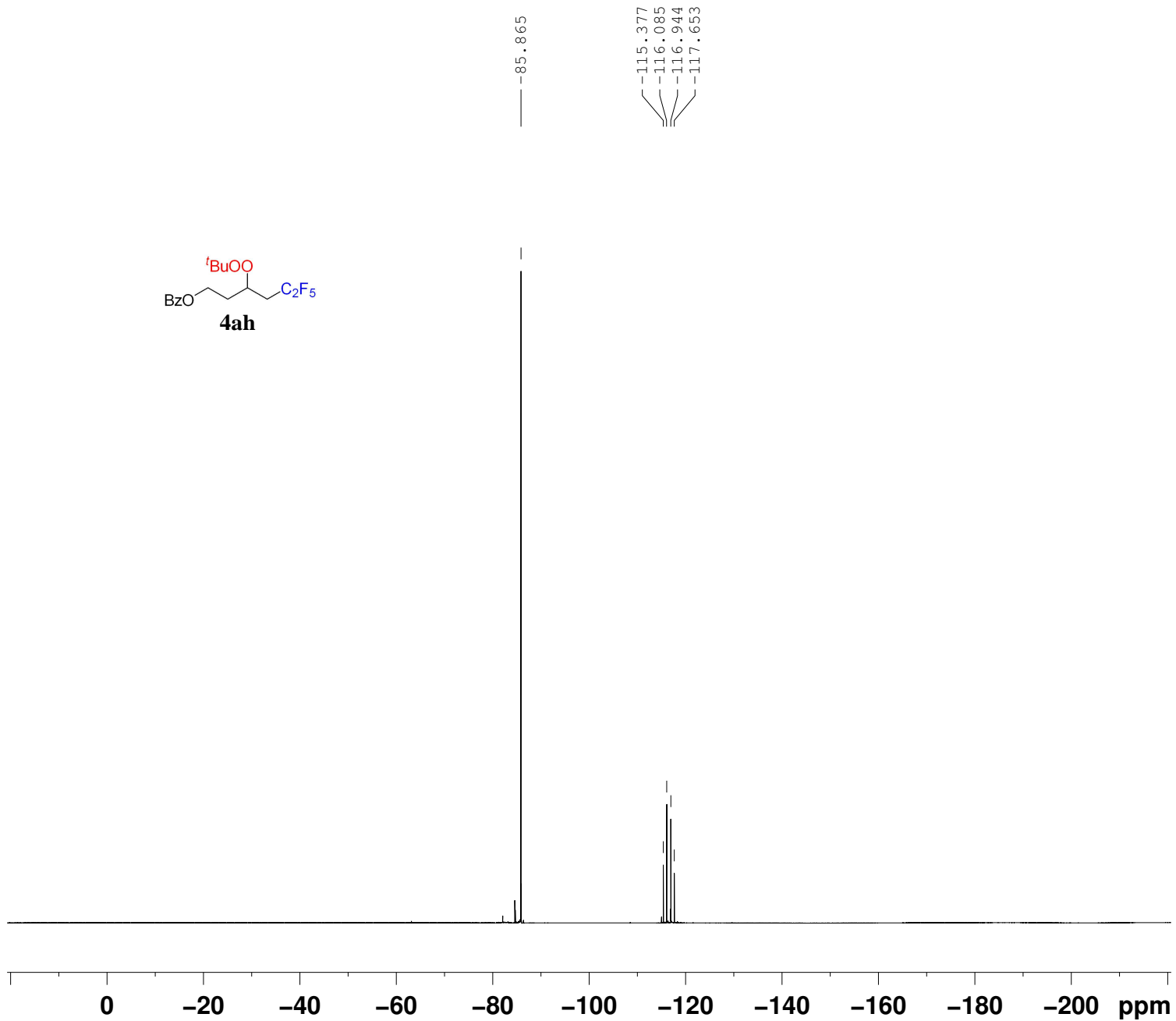
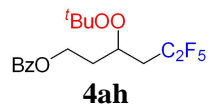


NAME LV-HQW-732Pr-20240710
 EXPNO 10
 PROCNO 1
 Date_ 20240710
 Time 23.39 h
 INSTRUM Avance
 PROBHD z163739_0744 ()
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 90.5
 DW 80.000 usec
 DE 8.64 usec
 TE 298.0 K
 D1 1.00000000 sec
 TD0 1
 SF01 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300096 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



```

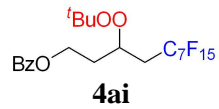
NAME      LV-HQW-732Pr-20240710
EXPNO     12
PROCNO    1
Date_     20240711
Time      0.28 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDCl3
NS         800
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.0 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127709 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```



```

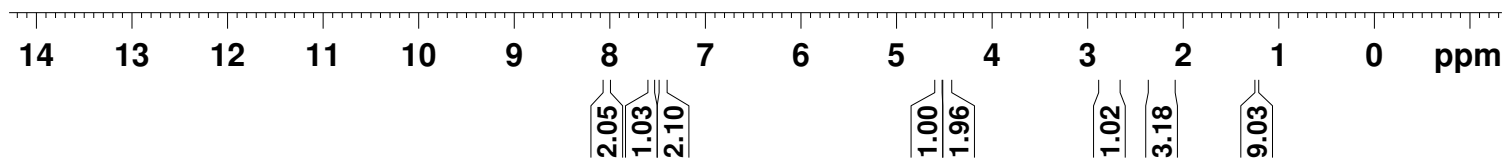
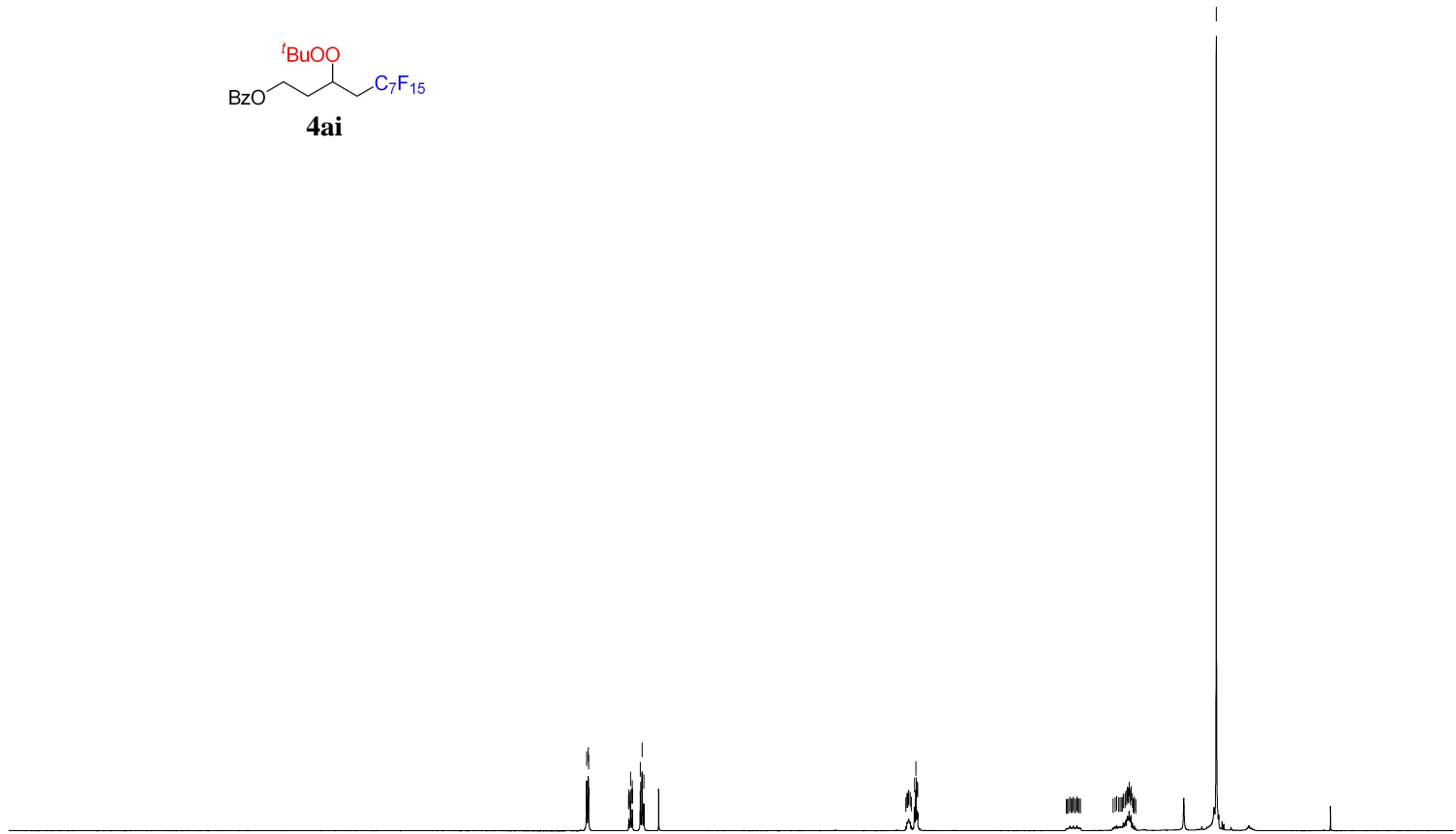
NAME      LV-HQW-732Pr-20240710
EXPNO     11
PROCNO    1
Date_     20240710
Time      23.41 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDC13
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.0000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

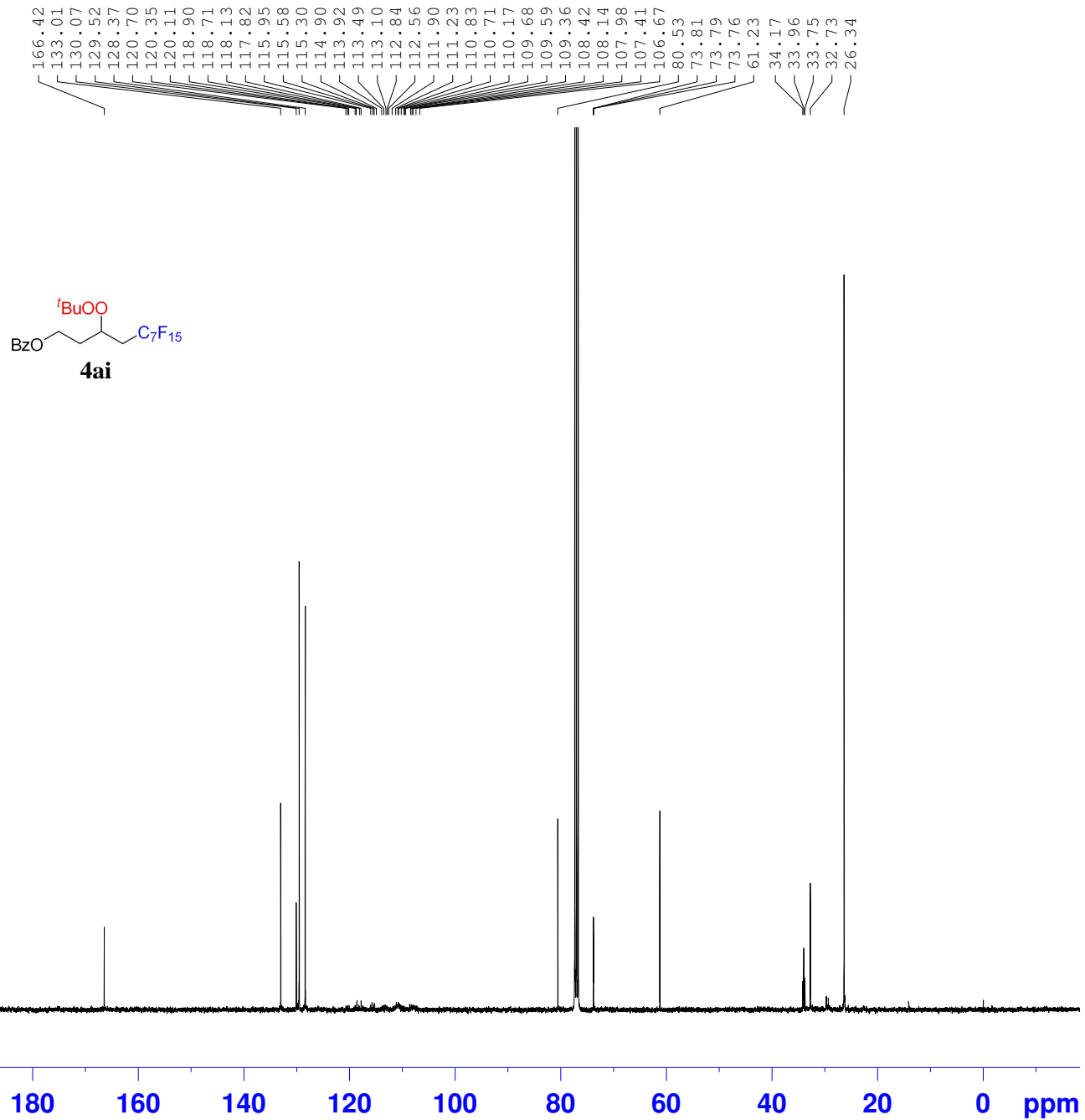
8.040
8.027
8.022
8.019
7.588
7.584
7.581
7.570
7.566
7.561
7.550
7.547
7.544
7.460
7.457
7.441
7.422
4.590
4.578
4.575
4.570
4.562
4.559
4.543
4.531
4.496
4.481
4.477
4.468
4.462
2.843
2.830
2.817
2.805
2.791
2.779
2.768
2.754
2.742
2.729
2.716
2.703
2.350
2.328
2.311
2.289
2.274
2.256
2.251
2.240
2.221
2.213
2.202
2.195
2.189
2.185
2.176
2.169
2.162
2.156
2.141
2.132
2.124
2.118
2.104
1.235



```

NAME      LV-HQW-721P-20240706
EXPNO     10
PROCNO    1
Date_     20240706
Time      19.53 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH        6250.000 Hz
FIDRES    0.190735 Hz
AQ         5.2429299 sec
RG         101
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SFO1      400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300097 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

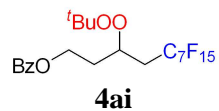




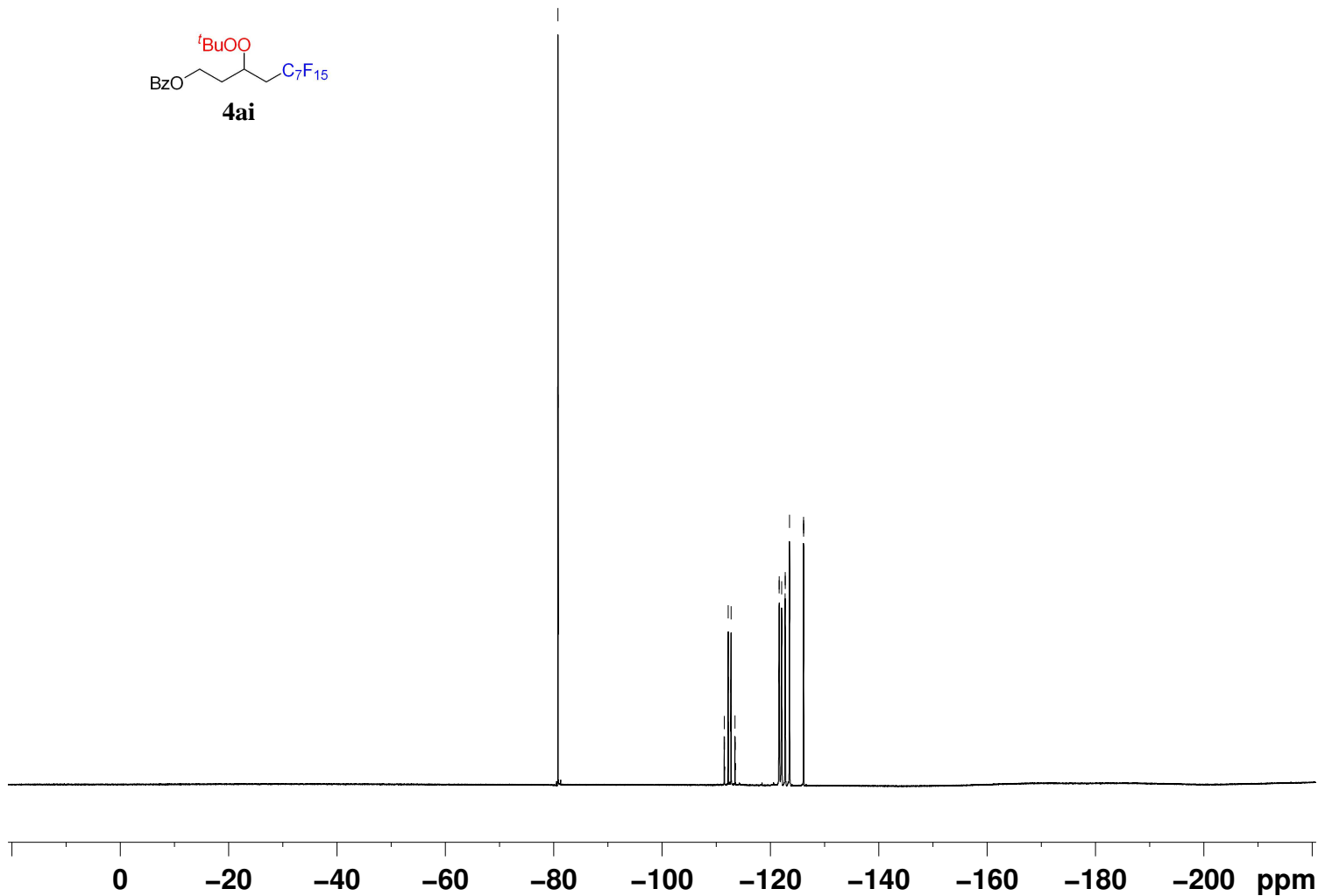
```

NAME      LV-HQW-721P-20240706
EXPNO     8
PROCNO    1
Date_     20240707
Time      13.16 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         3000
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.0 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1       100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127695 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40

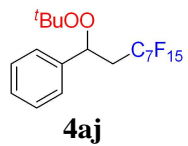
```

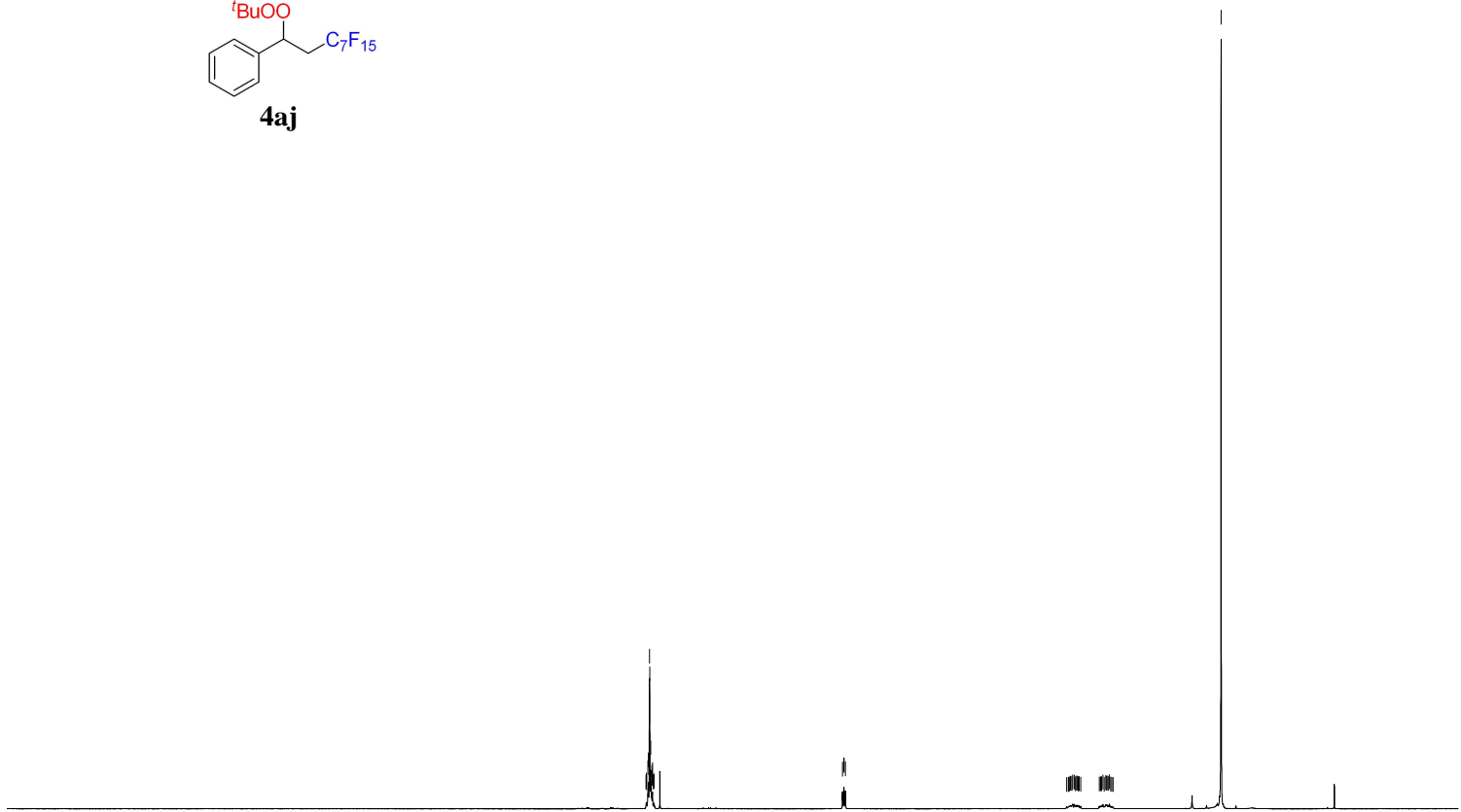
-80.755
 -80.781
 -80.808
 -111.446
 -111.483
 -111.521
 -112.165
 -112.204
 -112.241
 -112.705
 -112.742
 -112.779
 -113.424
 -113.462
 -113.499
 -121.611
 -121.622
 -122.074
 -122.710
 -122.733
 -122.742
 -123.523
 -126.077
 -126.094
 -126.117
 -126.124
 -126.132
 -126.153
 -126.164
 -126.171



NAME LV-HQW-721P-20240706
 EXPNO 11
 PROCNO 1
 Date_ 20240706
 Time 19.55 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zgig
 TD 131072
 SOLVENT CDCl3
 NS 16
 DS 4
 SWH 90909.094 Hz
 FIDRES 1.387163 Hz
 AQ 0.7209460 sec
 RG 101
 DW 5.500 usec
 DE 6.50 usec
 TE 298.1 K
 D1 1.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 376.4607164 MHz
 NUC1 19F
 P1 12.00 usec
 SI 65536
 SF 376.4983662 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



7.405
 7.401
 7.397
 7.385
 7.379
 7.367
 7.364
 7.354
 7.343
 7.339
 7.334
 7.325
 7.324
 7.319
 5.291
 5.277
 5.274
 5.260
 2.880
 2.862
 2.857
 2.852
 2.840
 2.835
 2.823
 2.814
 2.796
 2.785
 2.772
 2.768
 2.755
 2.750
 2.746
 2.728
 2.528
 2.515
 2.504
 2.490
 2.476
 2.458
 2.454
 2.445
 2.433
 2.420
 2.406
 2.394
 2.381



14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

5.03

1.00

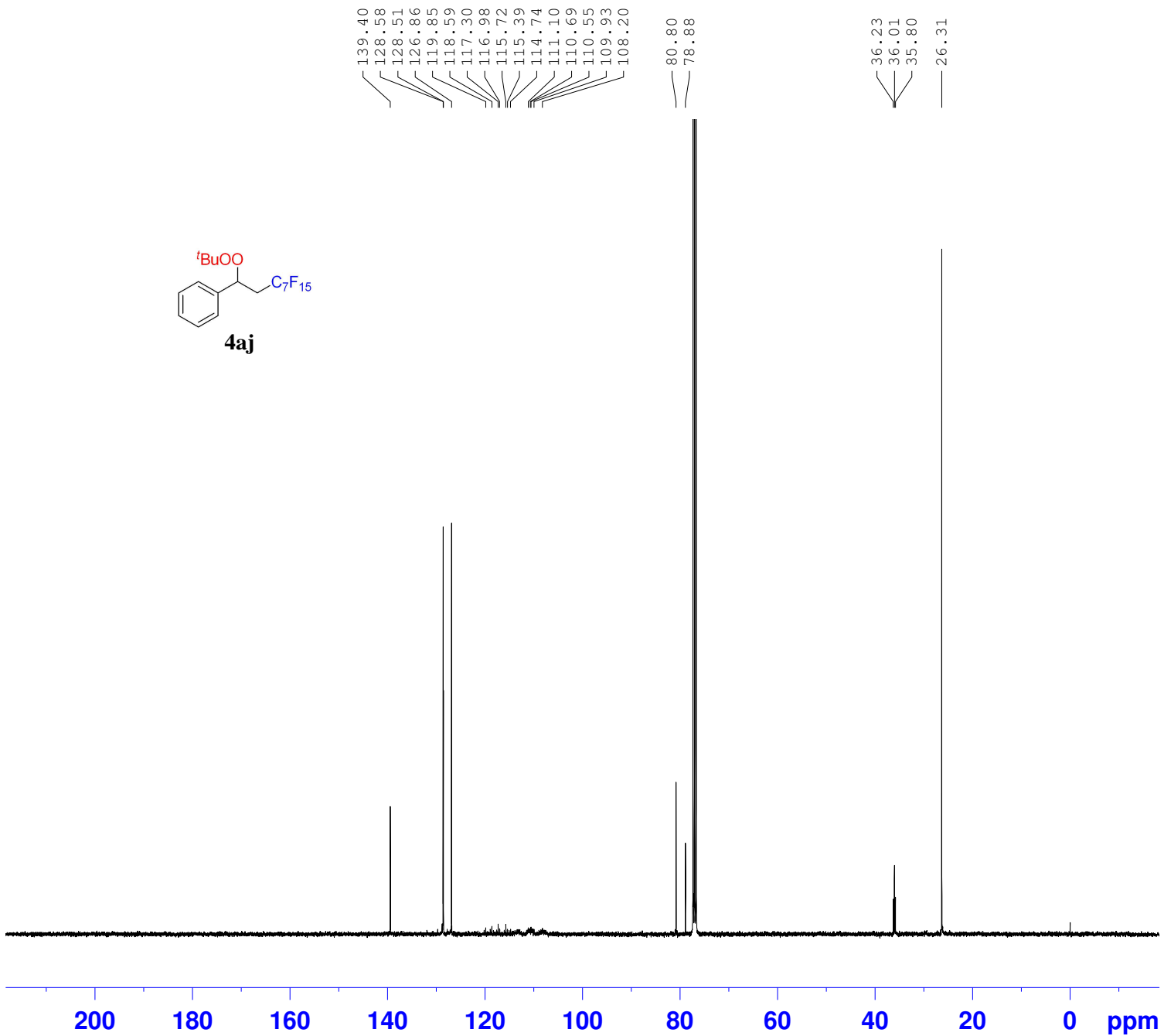
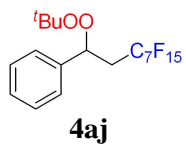
1.03

1.04

9.02

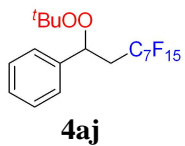
```

NAME      HQW-508P-20240314
EXPNO     10
PROCNO    1
Date_     20240314
Time      18.34 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH        6250.000 Hz
FIDRES     0.190735 Hz
AQ         5.2429299 sec
RG         101
DW         80.000 usec
DE         8.64 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300121 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

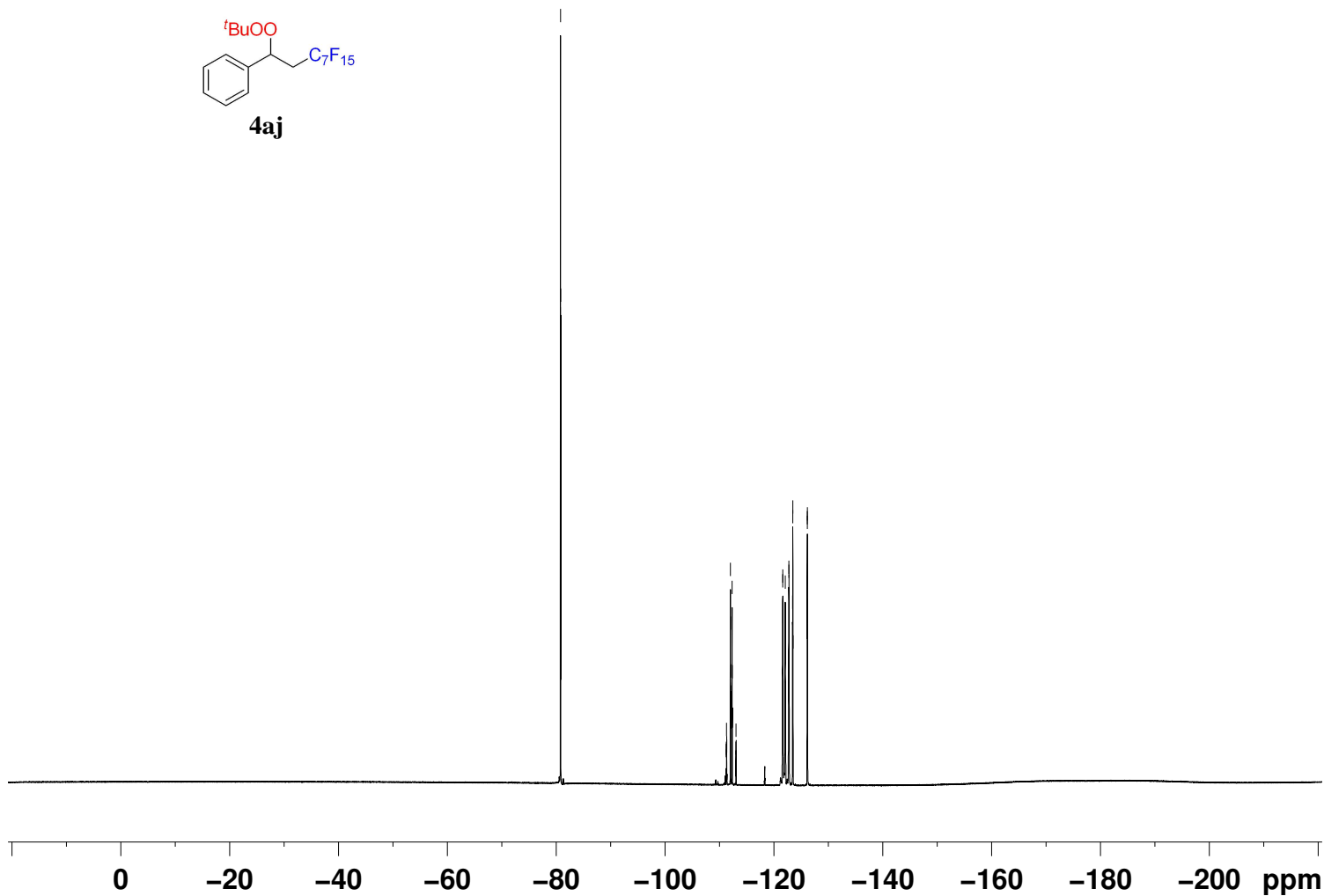


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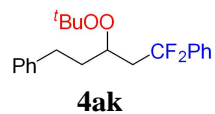
NAME      HQW-508P-20240315
EXPNO     10
PROCNO    1
Date_     20240316
Time      8.48 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD        65536
SOLVENT   CDCl3
NS        3000
DS        4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ        1.3763061 sec
RG        101
DW        21.000 usec
DE        6.50 usec
TE        298.0 K
D1        2.0000000 sec
D11       0.0300000 sec
TD0       1
SFO1      100.6228298 MHz
NUC1      13C
P0        2.67 usec
P1        8.00 usec
SI        32768
SF        100.6127687 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
  
```



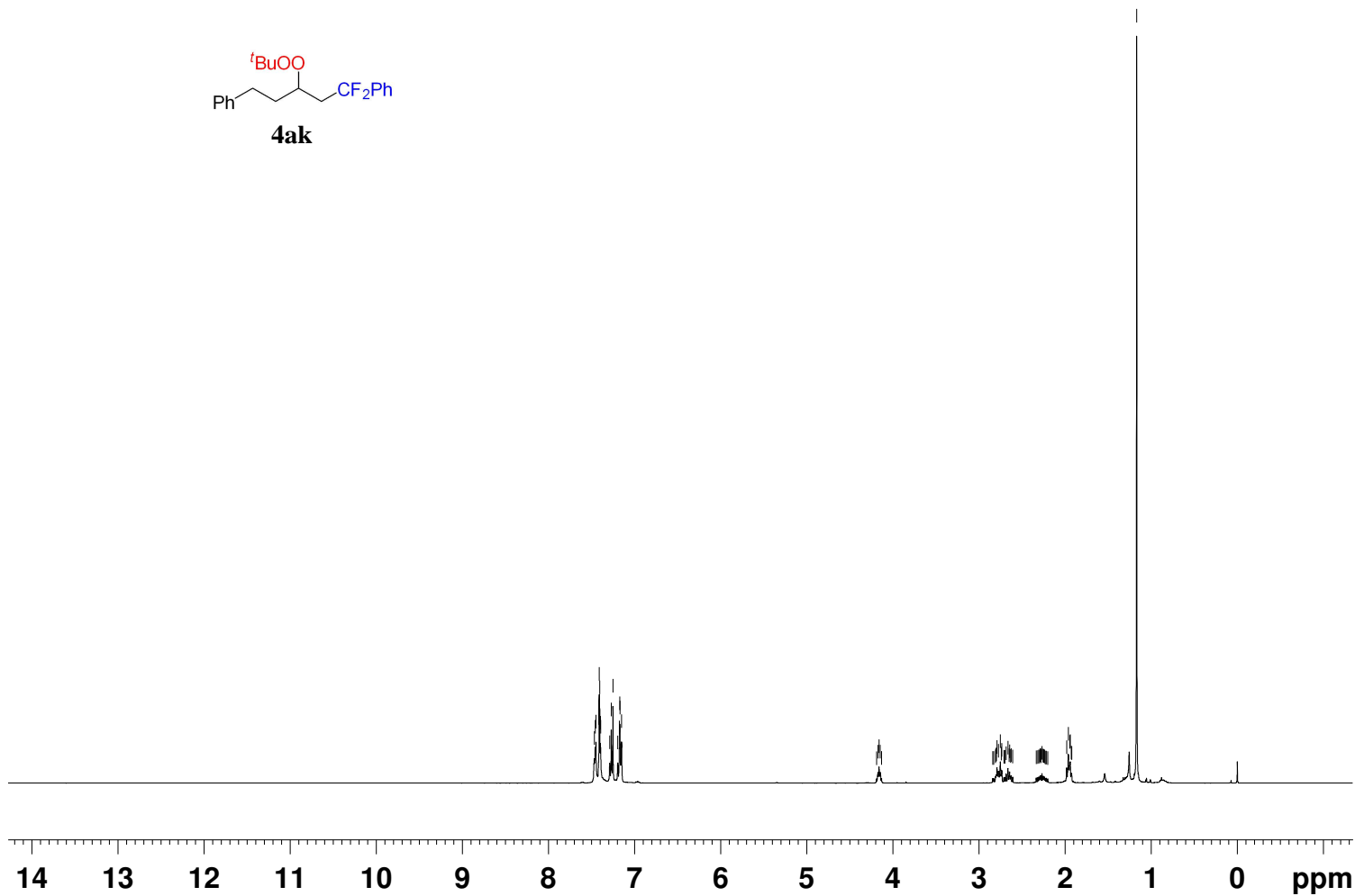
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 -111.257
 -111.270
 -111.287
 -111.304
 -111.325
 -111.334
 -111.969
 -111.976
 -111.989
 -112.006
 -112.015
 -112.045
 -112.052
 -112.275
 -112.275
 -112.314
 -112.351
 -112.996
 -113.033
 -113.070
 -121.615
 -121.623
 -121.658
 -122.084
 -122.743
 -122.756
 -122.767
 -123.432
 -123.465
 -123.472
 -123.521
 -126.091
 -126.099
 -126.108
 -126.129
 -126.139
 -126.146
 -126.168
 -126.178
 -126.186



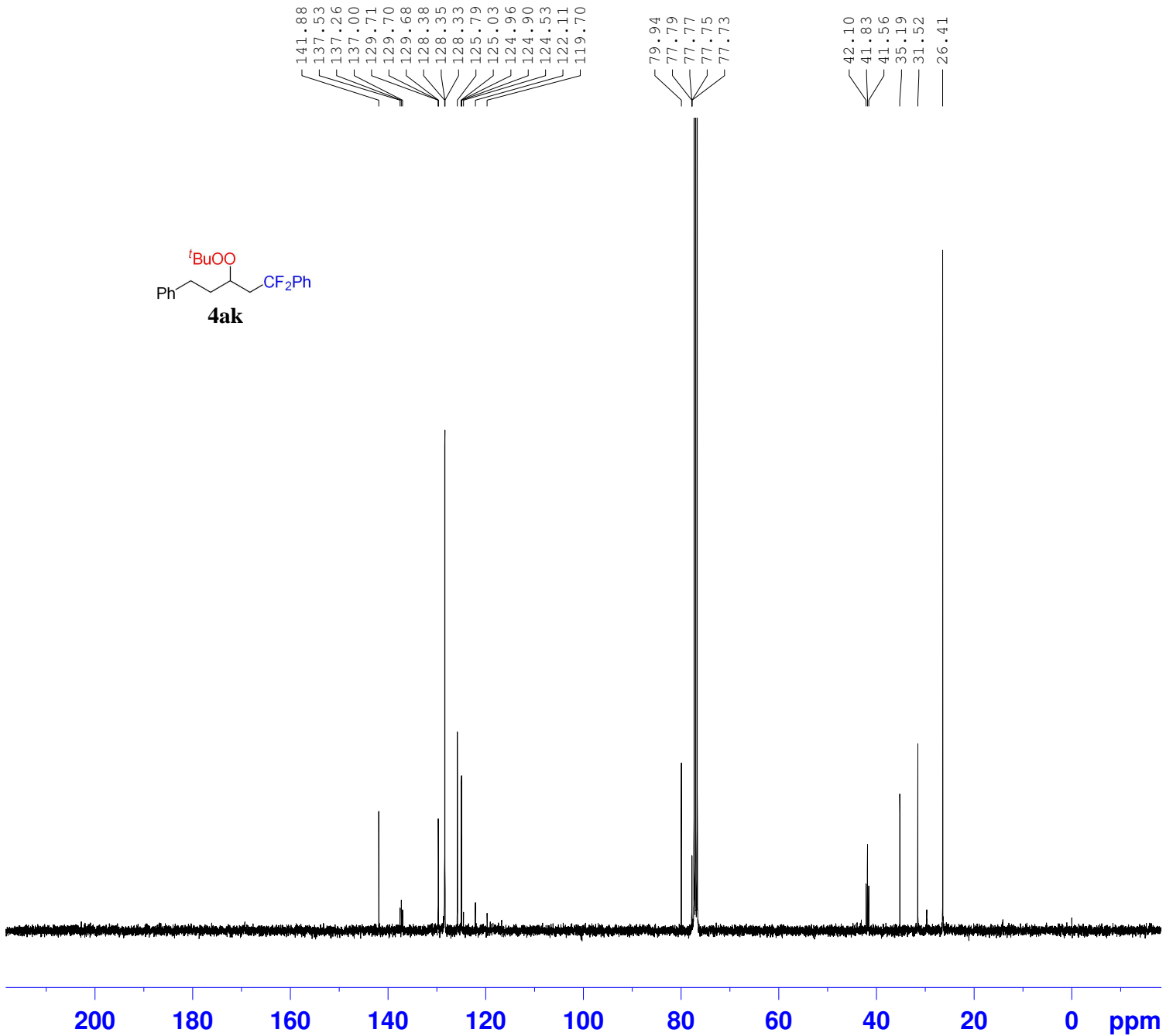
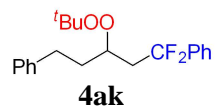
NAME	HQW-508P-20240314
EXPNO	11
PROCNO	1
Date_	20240314
Time	18.36 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDC13
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	298.1 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



7.467
 7.457
 7.449
 7.411
 7.405
 7.397
 7.394
 7.289
 7.271
 7.251
 7.196
 7.177
 7.172
 7.170
 7.152
 4.189
 4.173
 4.161
 4.148
 4.132
 2.840
 2.829
 2.809
 2.803
 2.798
 2.791
 2.774
 2.752
 2.741
 2.736
 2.710
 2.700
 2.685
 2.663
 2.650
 2.644
 2.633
 2.627
 2.609
 2.335
 2.318
 2.306
 2.297
 2.289
 2.285
 2.281
 2.268
 2.256
 2.252
 2.248
 2.239

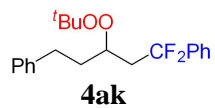


NAME HQW-550P2-20240331
 EXPNO 10
 PROCNO 1
 Date_ 20240331
 Time 21.24 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 101
 DW 80.000 usec
 DE 8.64 usec
 TE 298.0 K
 D1 1.00000000 sec
 TD0 1
 SFO1 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300139 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

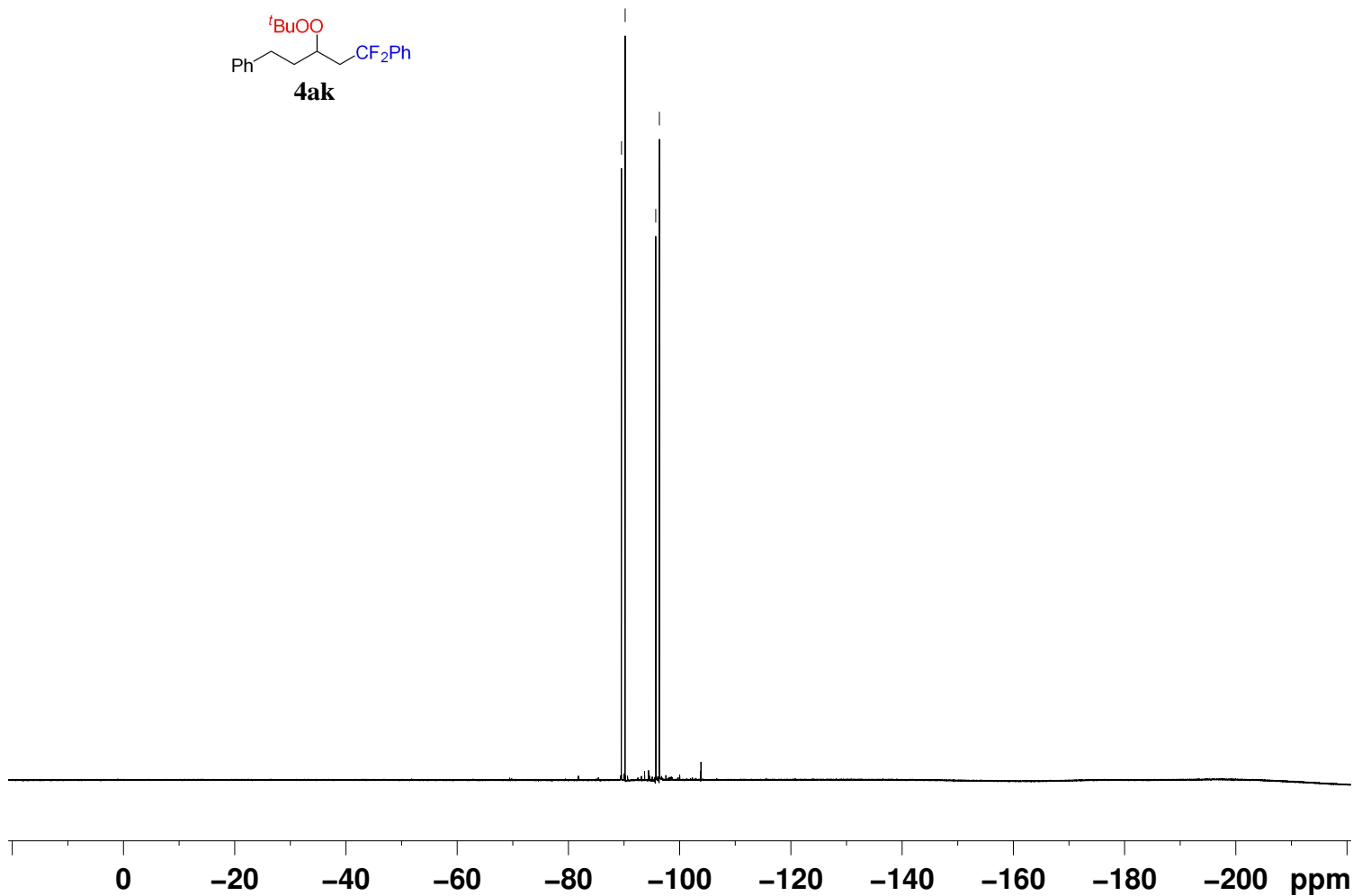


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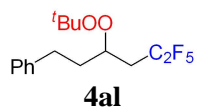
NAME      HQW-550P2-20240331
EXPNO     12
PROCNO    1
Date_     20240331
Time      22.10 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDCl3
NS         744
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         298.1 K
D1         2.0000000 sec
D11        0.03000000 sec
TD0        1
SFO1       100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127717 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```



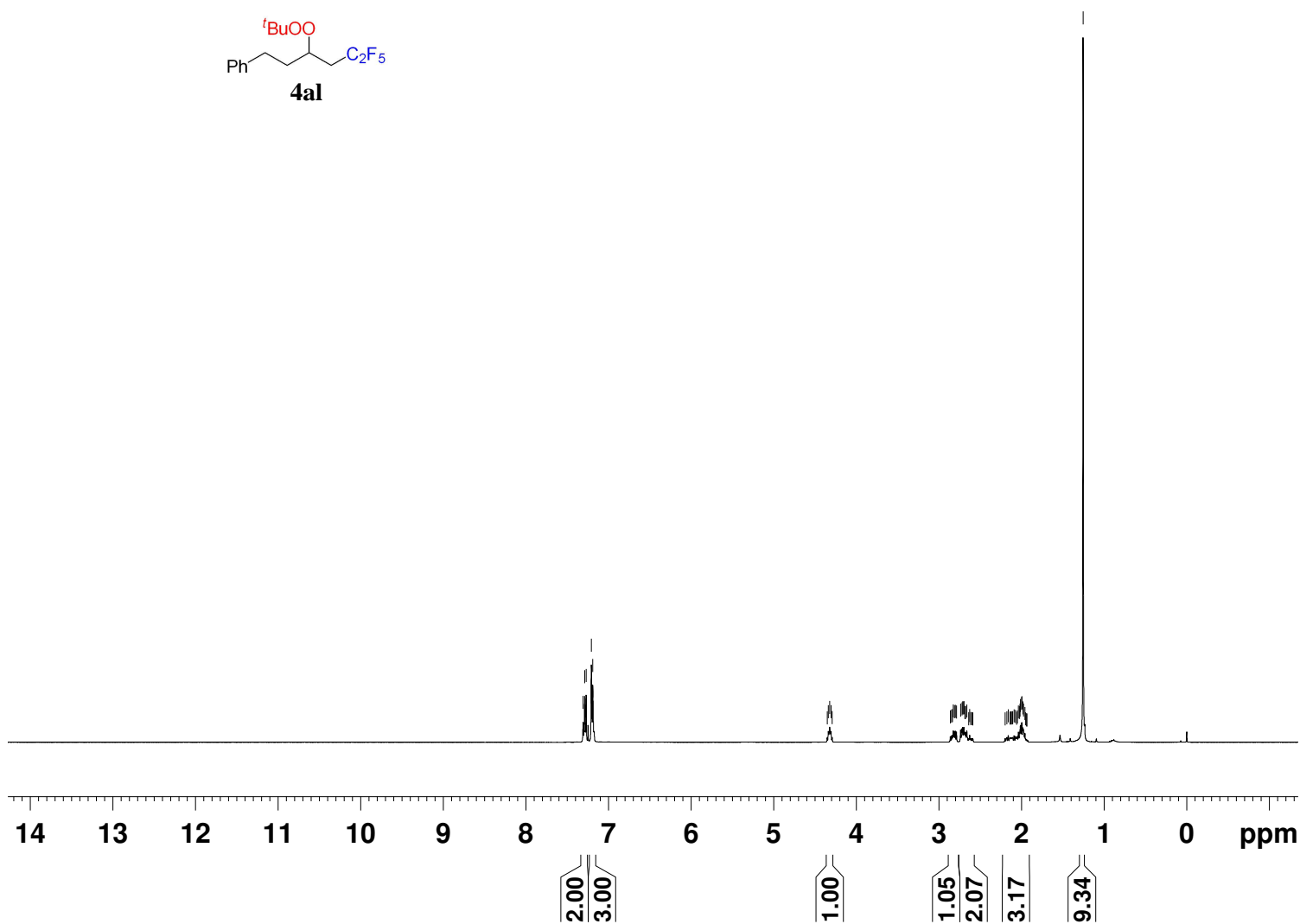
-89.545
 -90.201
 -95.701
 -96.358



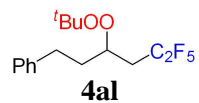
NAME	HQW-550P2-20240331
EXPNO	11
PROCNO	1
Date_	20240331
Time	21.26 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDC13
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	298.1 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



7.308
 7.289
 7.279
 7.271
 7.208
 7.191
 4.352
 4.340
 4.323
 4.305
 4.293
 2.862
 2.847
 2.837
 2.827
 2.813
 2.802
 2.787
 2.738
 2.721
 2.713
 2.702
 2.697
 2.686
 2.678
 2.662
 2.640
 2.628
 2.616
 2.602
 2.590
 2.199
 2.178
 2.161
 2.139
 2.127
 2.124
 2.111
 2.107
 2.090
 2.074
 2.060
 2.050
 2.039
 2.024



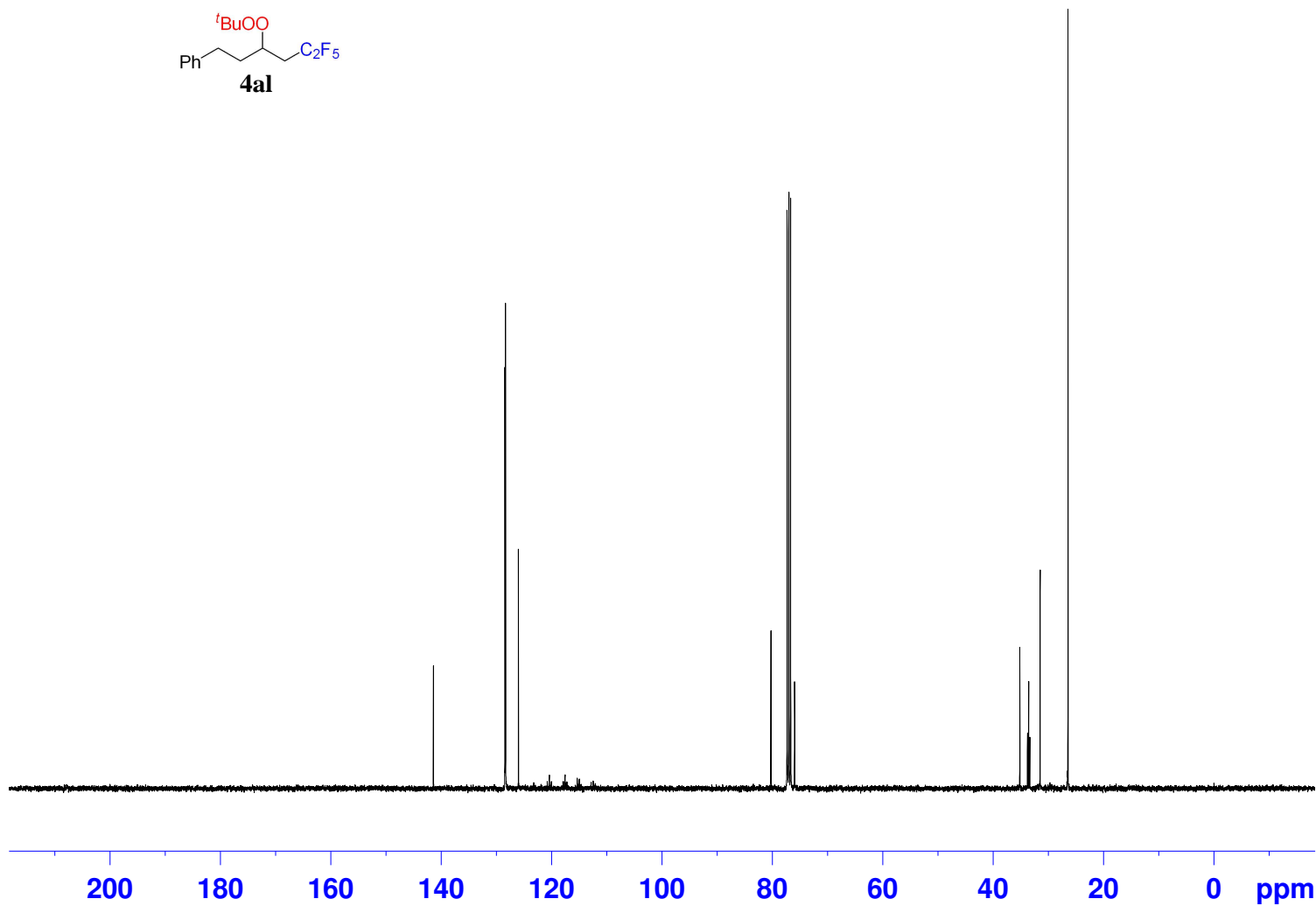
NAME HQW-558P-20240409
 EXPNO 10
 PROCNO 1
 Date_ 20240409
 Time 21.40 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 71.8
 DW 80.000 usec
 DE 8.64 usec
 TE 298.0 K
 D1 1.00000000 sec
 TD0 1
 SFO1 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300154 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



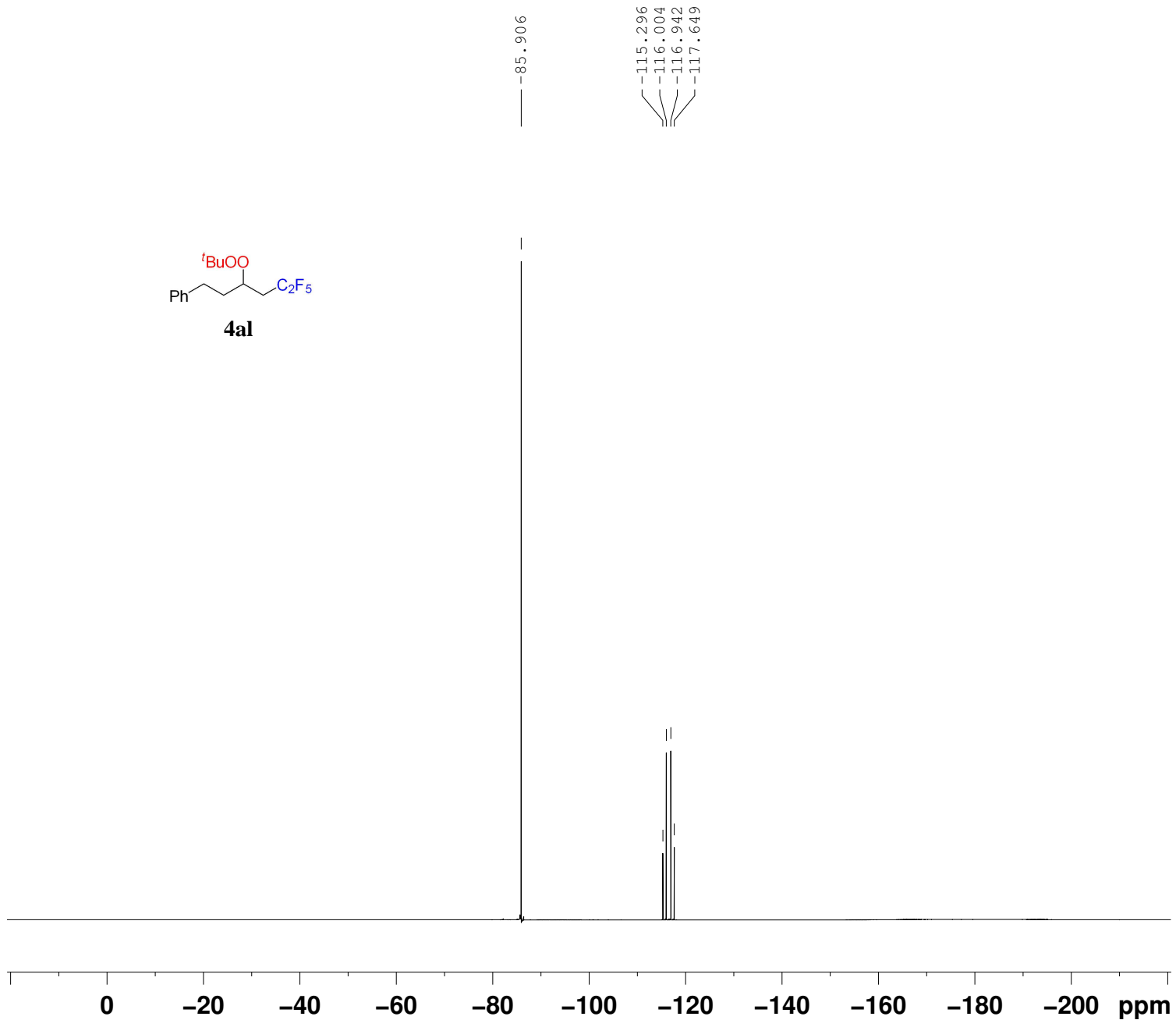
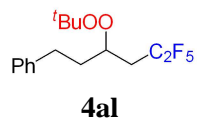
141.39
 128.44
 128.33
 125.99
 120.79
 120.43
 120.04
 117.88
 117.55
 117.20
 115.36
 114.96
 114.57
 112.83
 112.43
 112.14

80.24
 75.98
 75.96
 75.94

35.15
 33.76
 33.55
 33.35
 31.48
 26.43

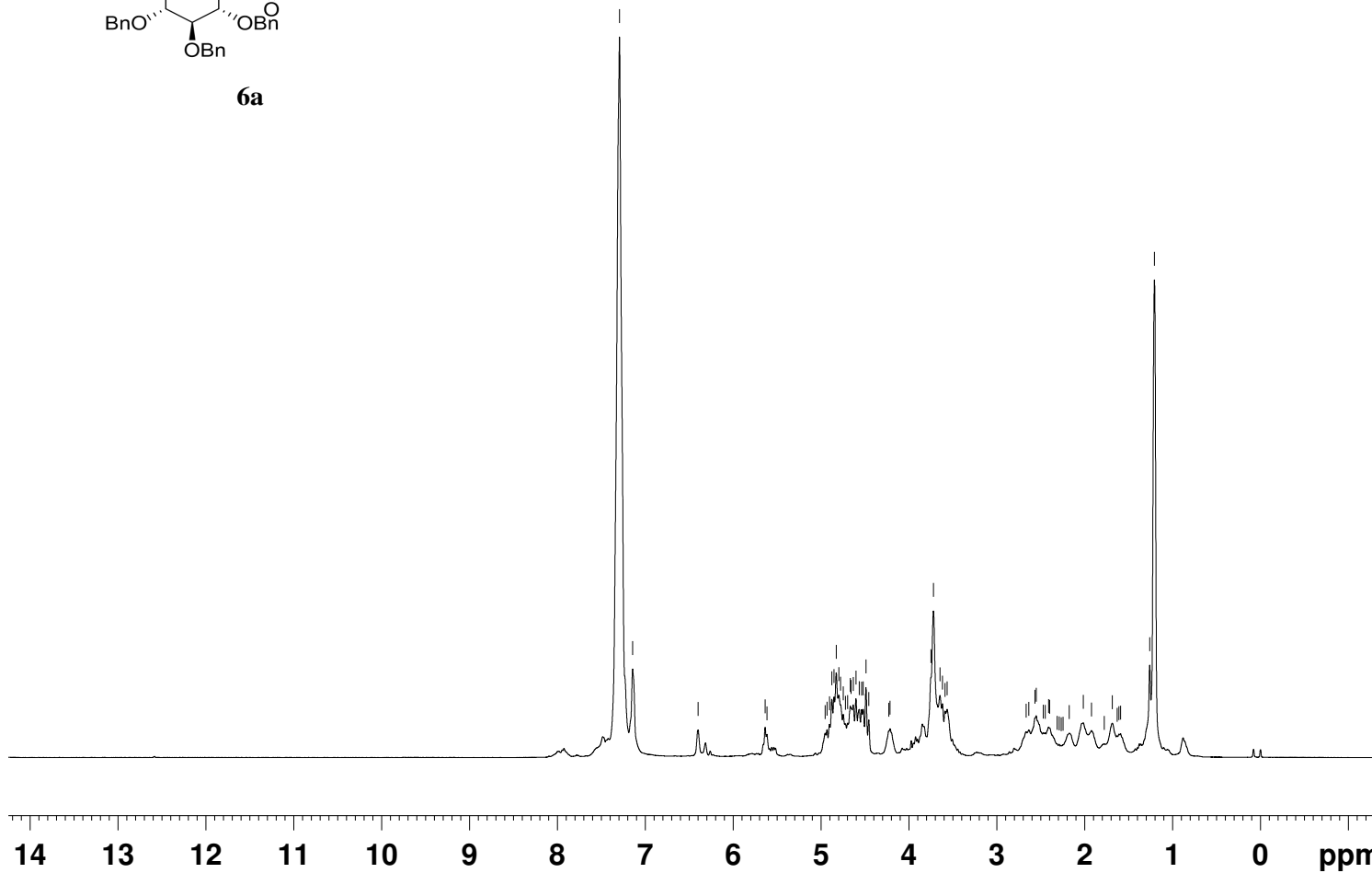
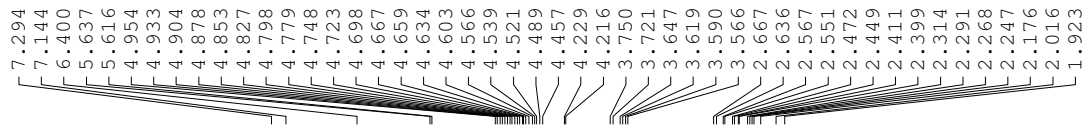
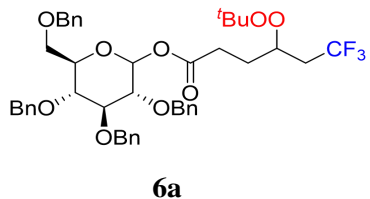


NAME	HQW-558P-20240409
EXPNO	13
PROCNO	1
Date_	20240409
Time	22.18 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDC13
NS	600
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	298.0 K
D1	2.0000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127709 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



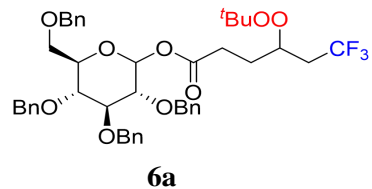
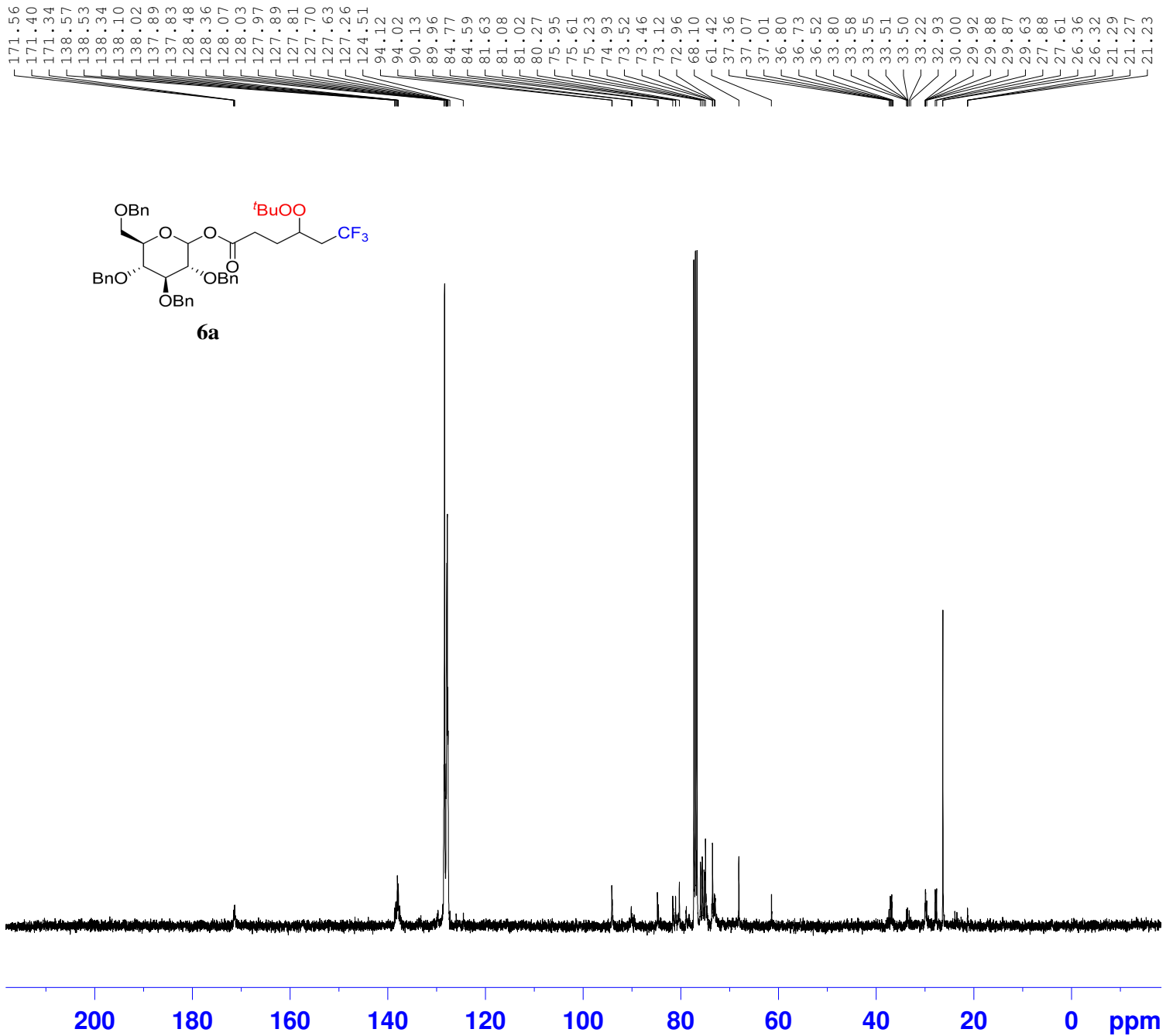
```

NAME      HQW-558P-20240409
EXPNO     12
PROCNO    1
Date_     20240409
Time      21.41 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDC13
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        298.1 K
D1        1.0000000 sec
D11       0.0300000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```



```

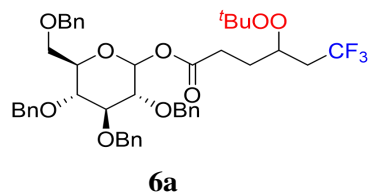
NAME      LV-HQW-678P2-20240612
EXPNO     10
PROCNO    1
Date_     20240612
Time      15.24 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ         5.2429299 sec
RG         32
DW         80.000 usec
DE         8.64 usec
TE         300.1 K
D1         1.00000000 sec
TD0        1
SF01       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300249 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



```

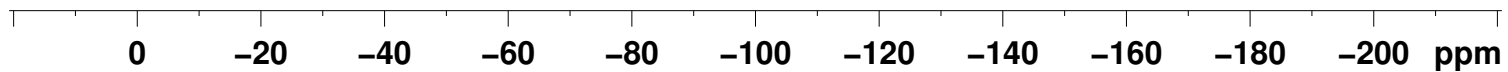
NAME      LV-HQW-678P2-20240612
EXPNO     12
PROCNO    1
Date_     20240612
Time      16.03 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         600
DS         4
SWH       23809.523 Hz
FIDRES    0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         302.3 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127770 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
  
```

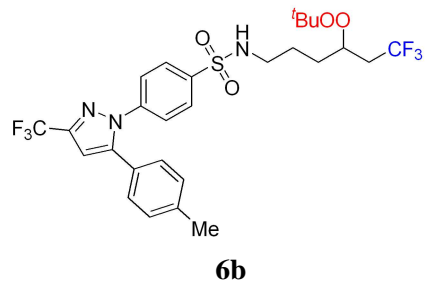
-63.028
 -63.069
 -63.079
 -63.148
 -66.214
 -66.253
 -66.330



```

NAME      LV-HQW-678P2-20240612
EXPNO     11
PROCNO    1
Date_     20240612
Time      15.27 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDC13
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         300.8 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

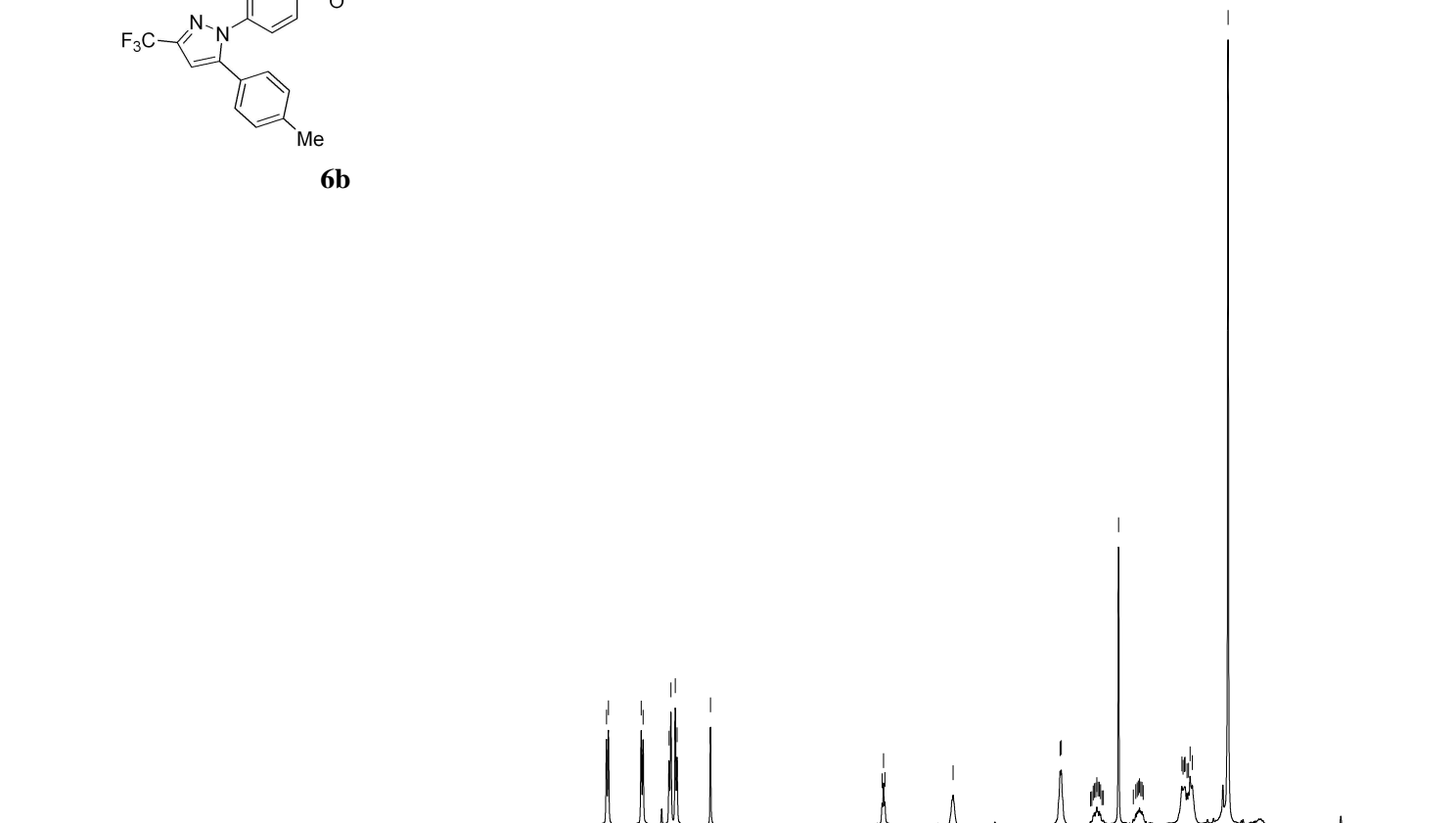




7.853
7.832
7.482
7.462
7.184
7.164
7.118
7.098
6.741
4.906
4.891
4.876
4.147
3.002
2.990
2.677
2.663
2.648
2.636
2.621
2.610
2.597
2.582
2.570
2.555
2.540
2.377
2.220
2.193
2.178
2.166
2.154
2.140
2.127
2.114
1.700
1.688
1.673
1.666
1.645
1.629
1.612

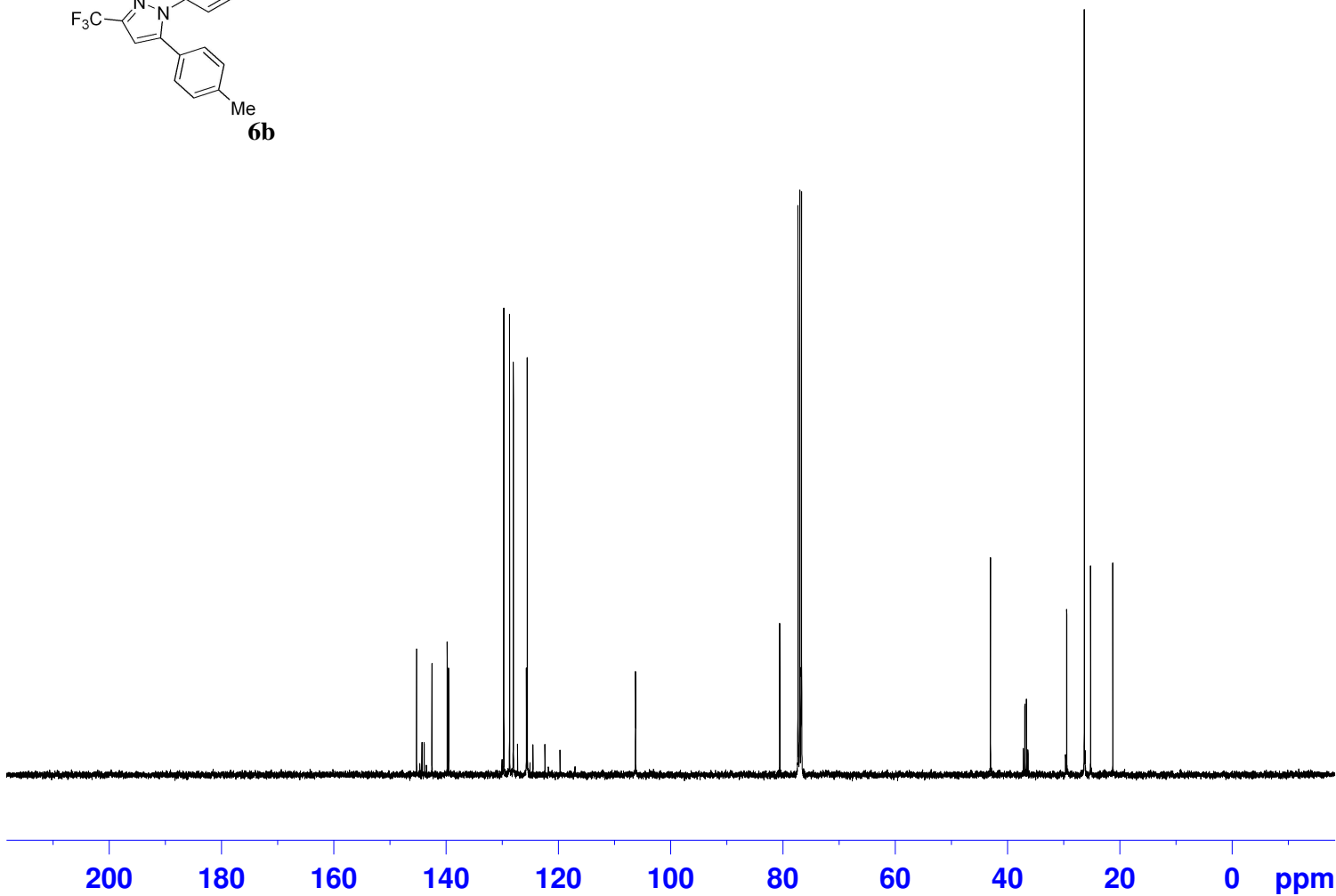
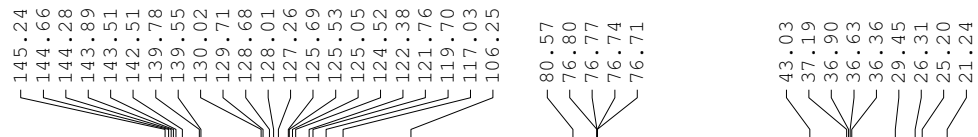
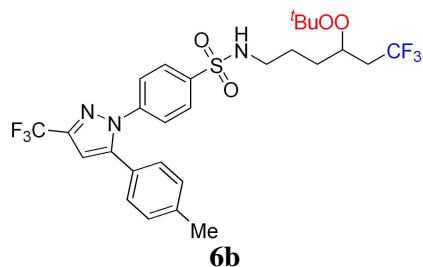
```

NAME      LV-HQW-691P-20240619
EXPNO     10
PROCNO    1
Date_     20240620
Time      0.05 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        45.2
DW        80.000 usec
DE        8.64 usec
TE        302.1 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300098 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

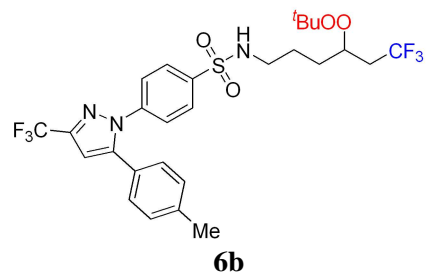


14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

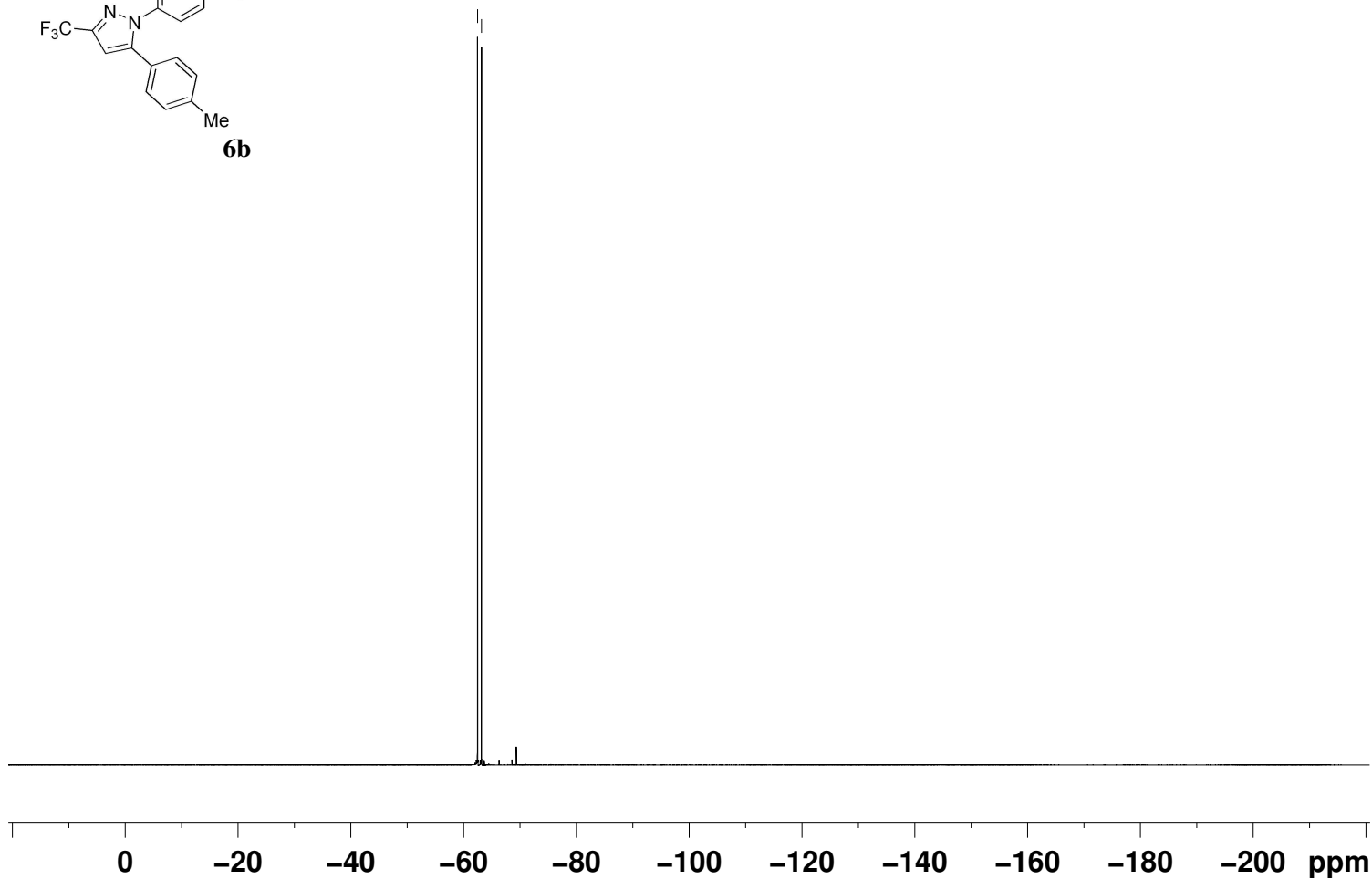
2.08
2.17
2.05
2.08
1.00
0.94
1.00
2.04
1.06
3.11
1.09
2.18
2.23
9.25



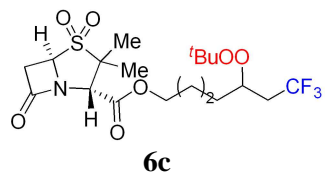
NAME	LV-HQW-691P-20240619
EXPNO	12
PROCNO	1
Date_	20240620
Time	0.43 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDC13
NS	600
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	302.8 K
D1	2.0000000 sec
D11	0.0300000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127716 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



--62.477
--63.176



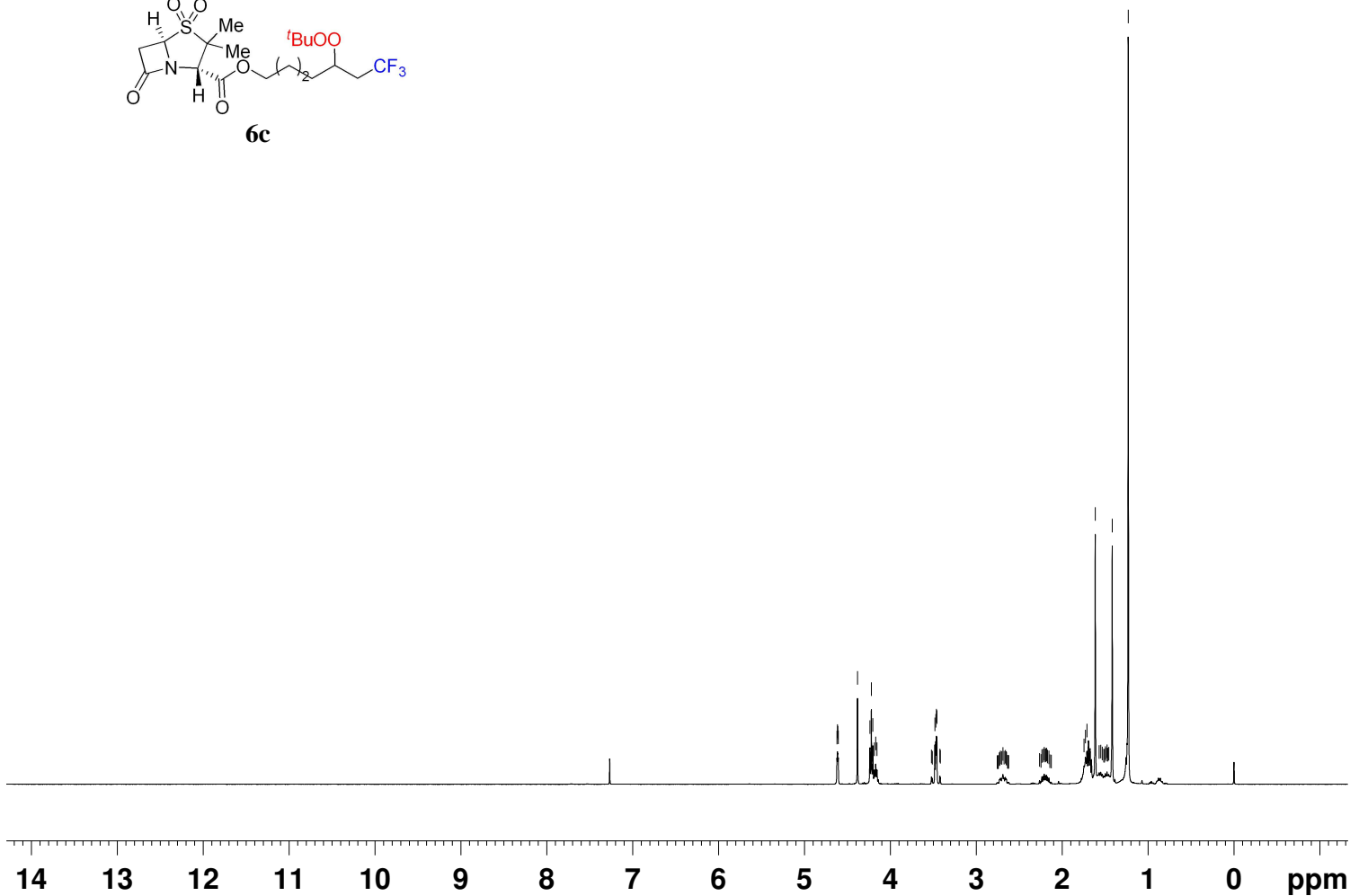
NAME	LV-HQW-691P-20240619
EXPNO	11
PROCNO	1
Date_	20240620
Time	0.07 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	302.5 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



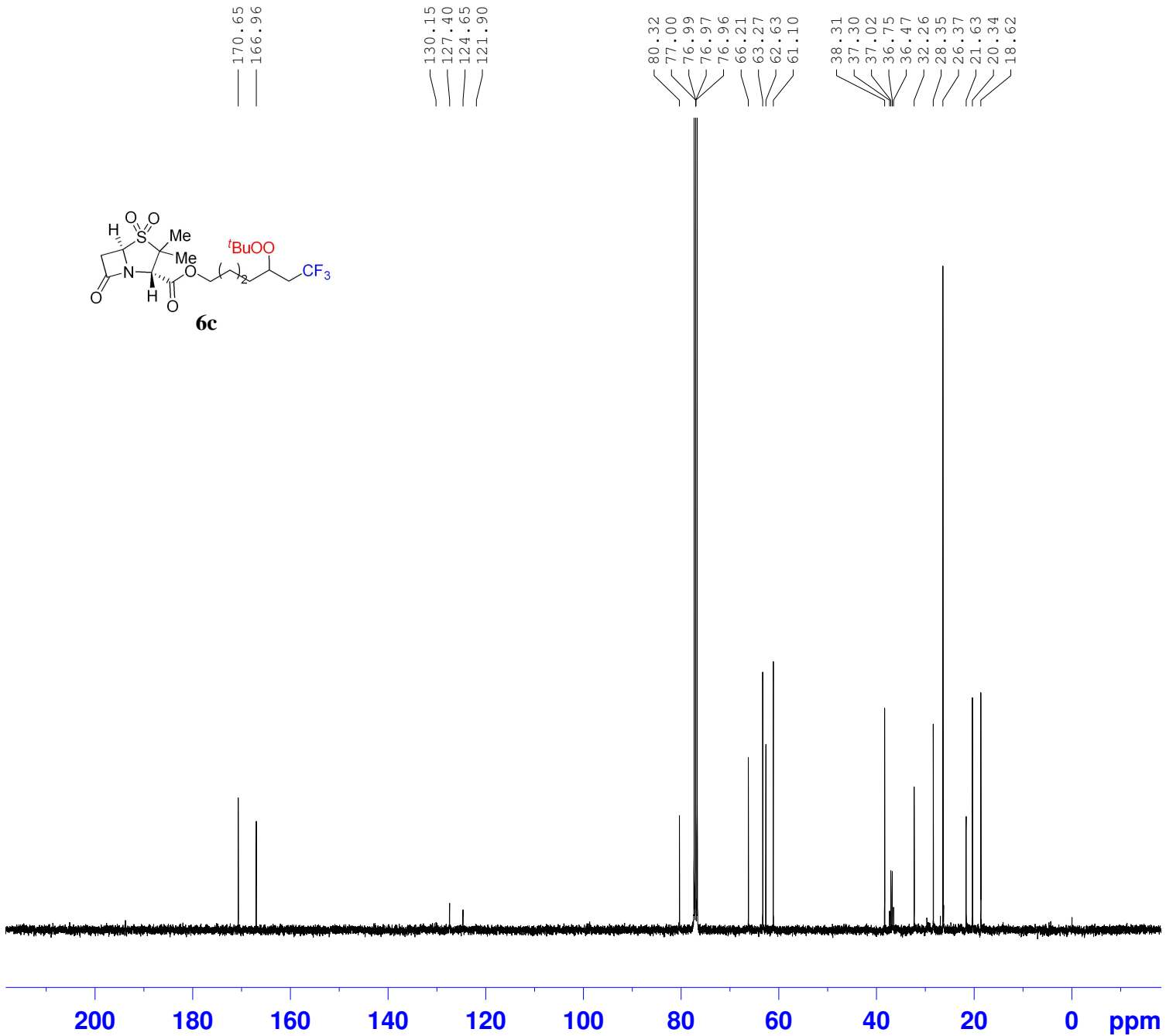
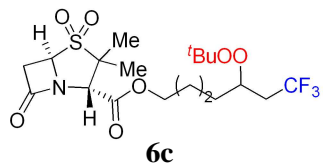
4.622
4.616
4.612
4.607
4.383
4.238
4.222
4.205
4.186
4.171
4.157
3.522
3.512
3.482
3.472
3.465
3.459
3.424
3.419
2.756
2.748
2.744
2.731
2.727
2.719
2.703
2.690
2.677
2.661
2.653
2.648
2.636
2.632
2.624
2.264
2.247
2.236
2.220
2.209
2.198
2.193
2.182
2.171
2.155
2.144

```

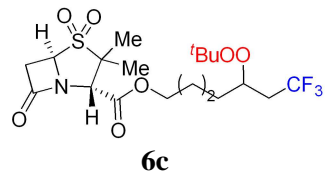
NAME      LV-HQW-688P-20240616
EXPNO     10
PROCNO    1
Date_     20240617
Time      0.33 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG         90.5
DW         80.000 usec
DE         8.64 usec
TE         300.7 K
D1         1.00000000 sec
TD0        1
SFO1      400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300073 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



1.00
1.00
2.06
1.04
2.09
0.97
1.02
4.09
3.23
2.08
3.17
9.05



NAME	LV-HQW-688P-20240616
EXPNO	12
PROCNO	1
Date_	20240617
Time	1.17 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDC13
NS	600
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	301.3 K
D1	2.0000000 sec
D11	0.0300000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127709 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

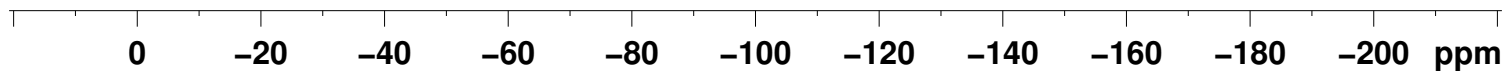


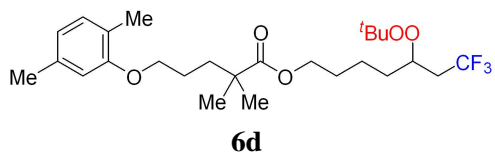
--63.063

```

NAME      LV-HQW-688P-20240616
EXPNO     11
PROCNO    1
Date_     20240617
Time      0.41 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDCl3
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         300.9 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

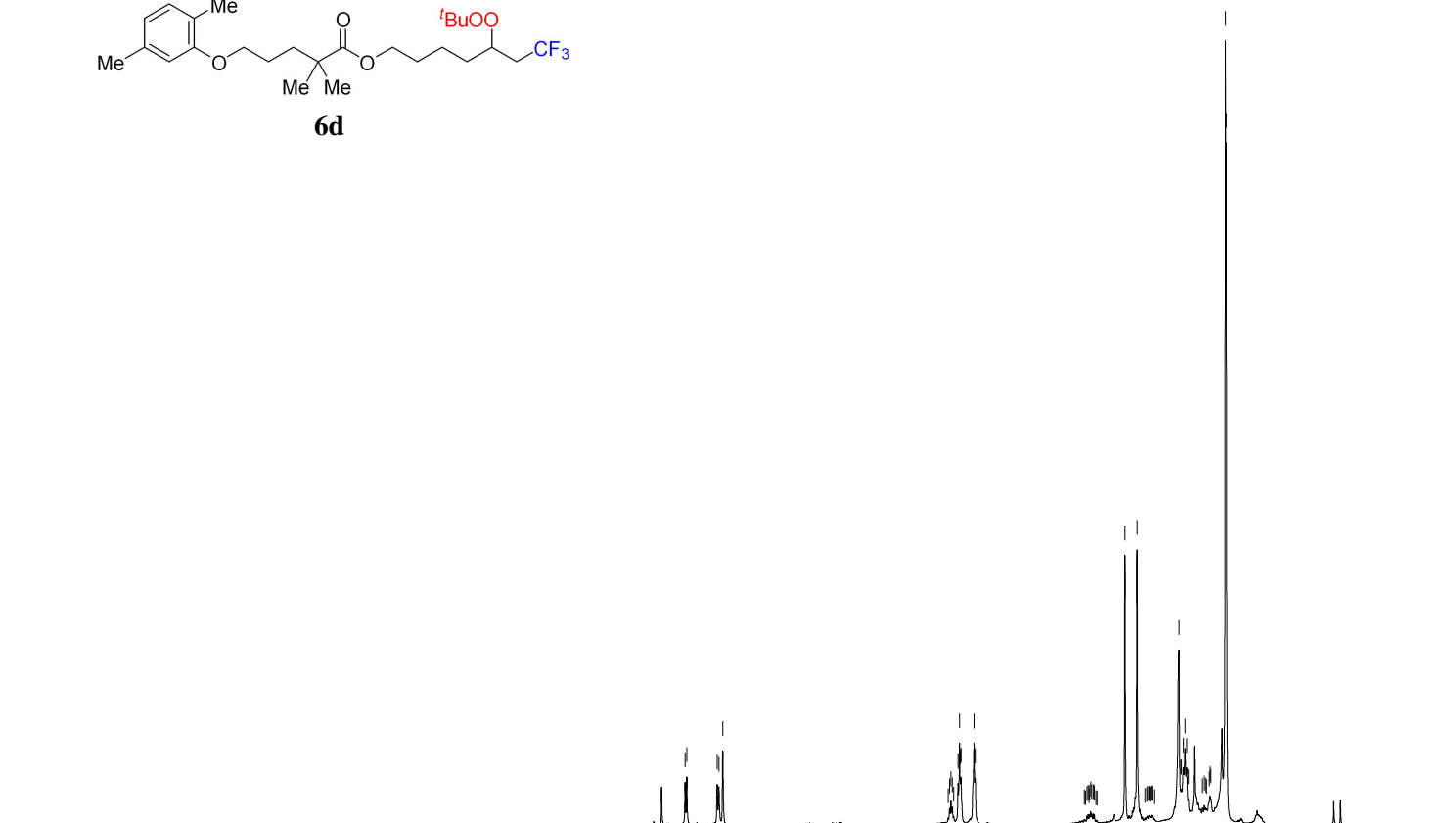
```





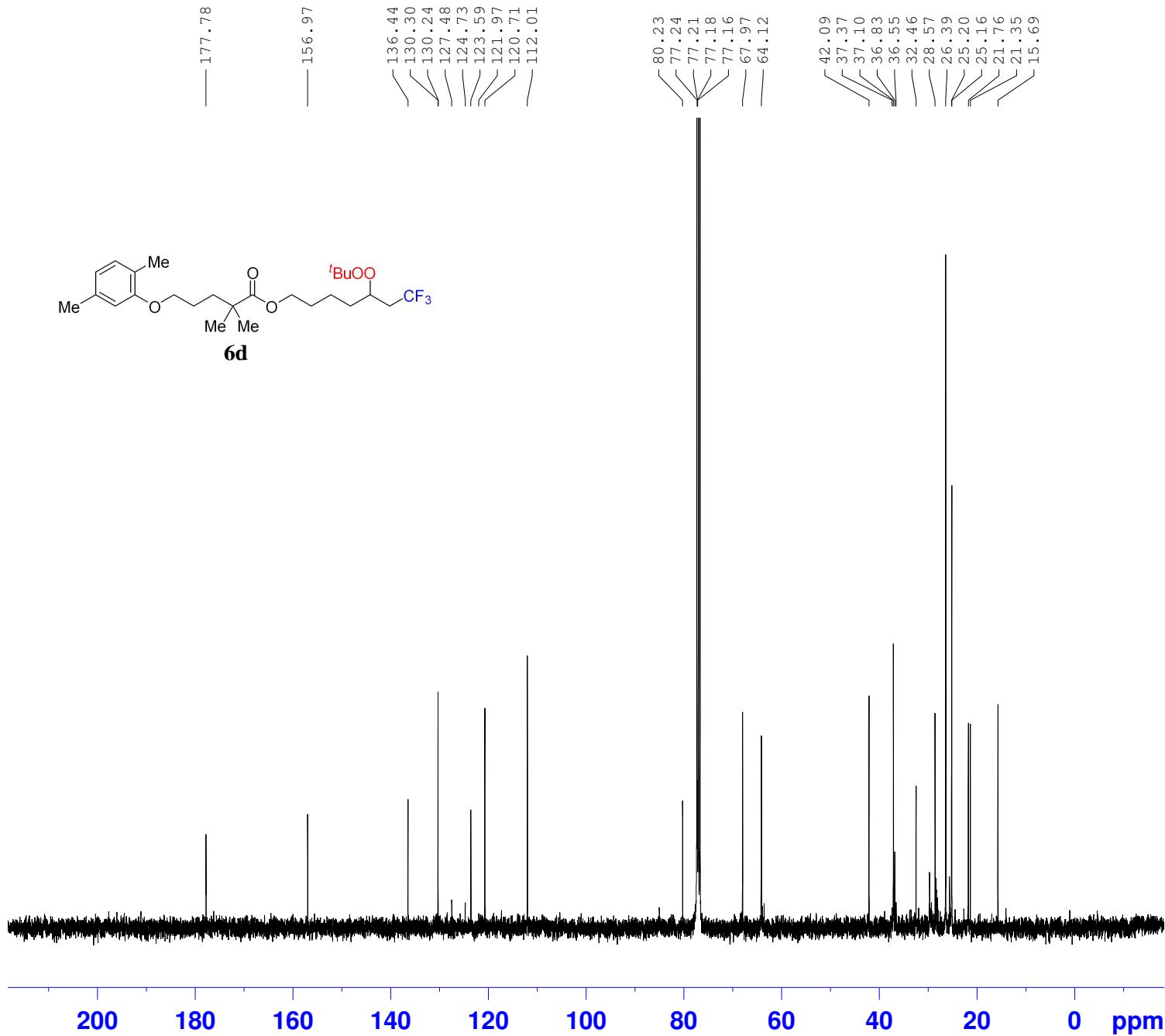
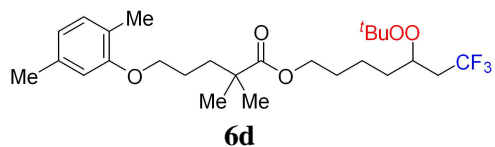
7.001
6.983
6.658
6.640
6.598
4.188
4.173
4.159
4.144
4.129
4.082
4.066
4.058
4.050
3.912
3.899
2.732
2.719
2.703
2.691
2.681
2.674
2.663
2.653
2.636
2.624
2.608
2.595
2.297
2.168
2.083
2.063
2.056
2.042
2.037
2.029
2.016
2.008
1.989
1.718
1.700
1.692
1.671

NAME LV-HQW-707P2r-20240628
EXPNO 10
PROCNO 1
Date_ 20240628
Time 14.24 h
INSTRUM Avance
PROBHD Z163739_0744 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 6250.000 Hz
FIDRES 0.190735 Hz
AQ 5.2429299 sec
RG 90.5
DW 80.000 usec
DE 8.64 usec
TE 305.2 K
D1 1.0000000 sec
TD0 1
SFO1 400.1326008 MHz
NUC1 1H
P0 2.67 usec
P1 8.00 usec
SI 65536
SF 400.1300141 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

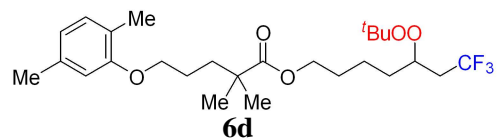


14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

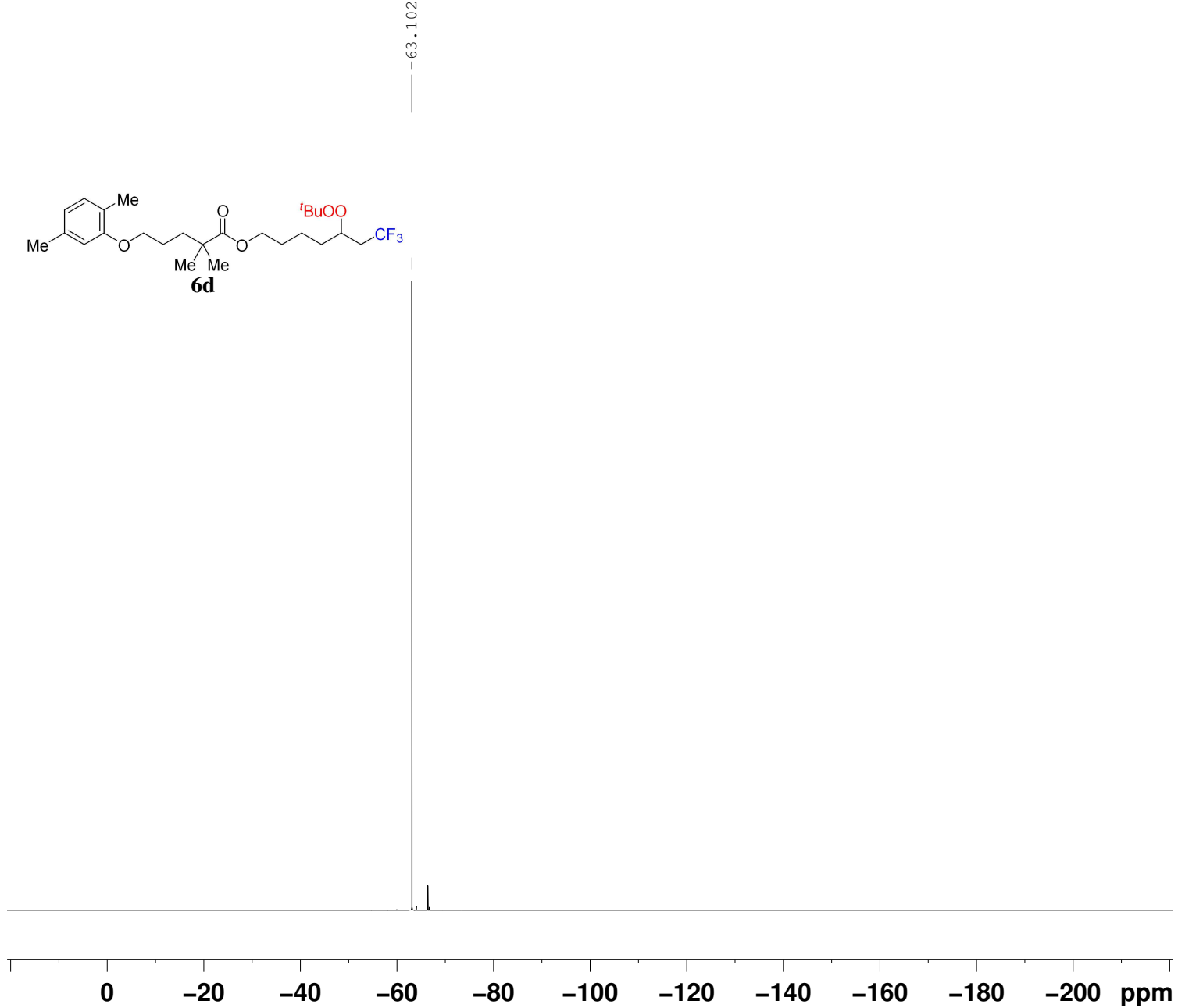
1.17
1.19
1.14
1.00
2.17
2.14
1.10
3.47
3.06
1.17
4.50
4.26
2.29
9.22
6.33



NAME	LV-HQW-707P2r-20240628
EXPNO	12
PROCNO	1
Date_	20240628
Time	15.01 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDC13
NS	600
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	305.7 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127687 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

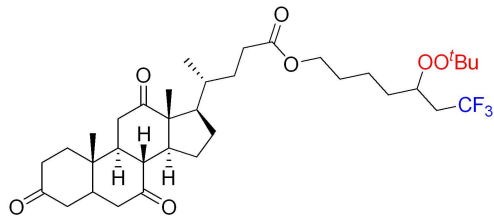


63.102



```

NAME      LV-HQW-707P2r-20240628
EXPNO     11
PROCNO    1
Date_     20240628
Time      14.25 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDC13
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         305.5 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

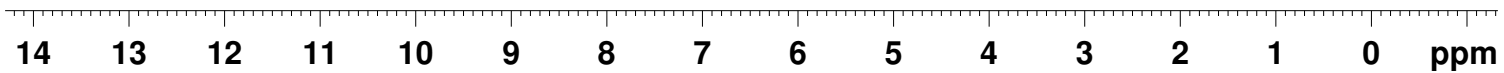


6e

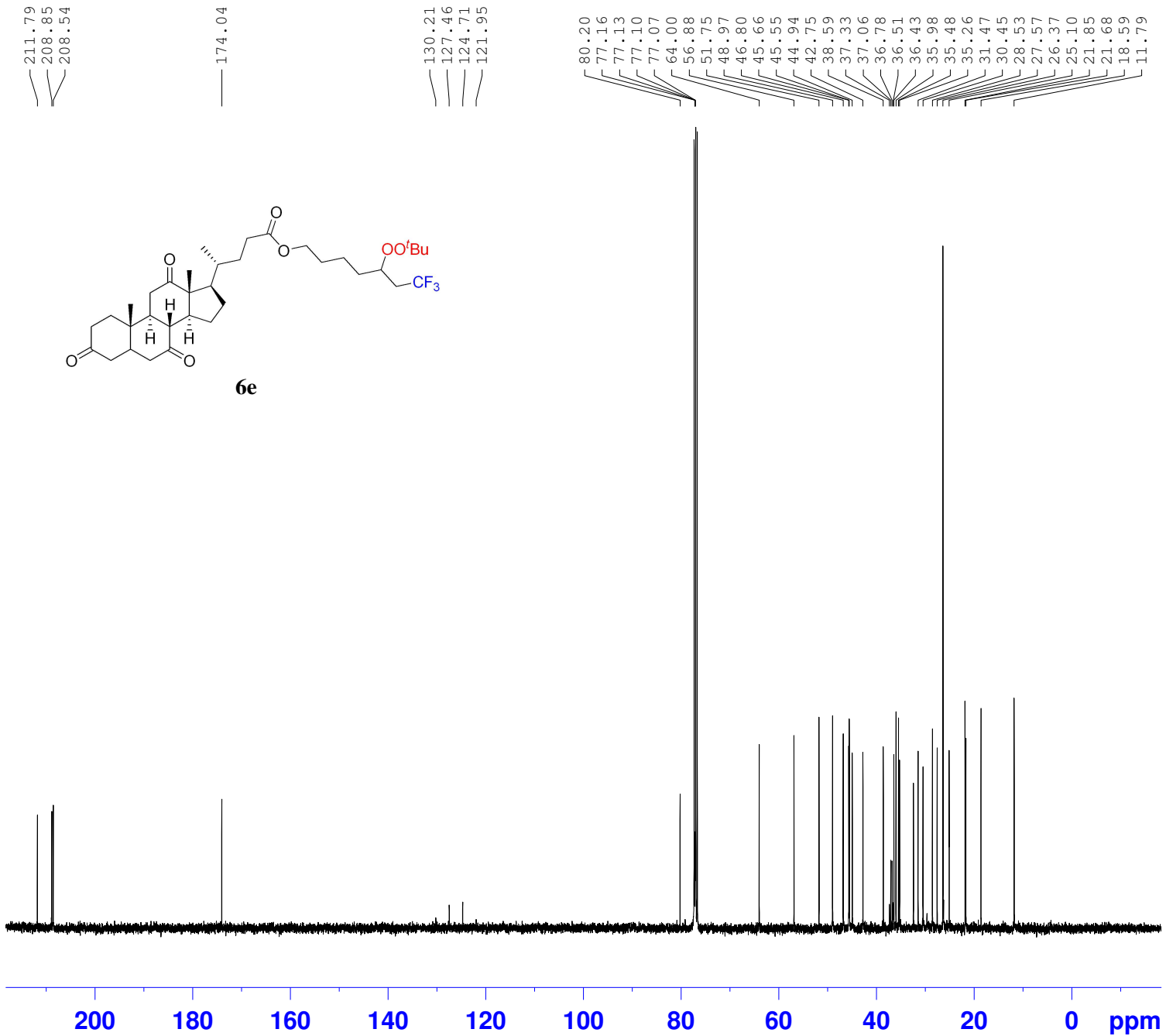
4.181
4.167
4.154
4.087
4.071
4.056
2.940
2.923
2.908
2.891
2.861
2.845
2.813
2.695
2.667
2.639
2.380
2.363
2.345
2.332
2.318
2.299
2.271
2.248
2.205
2.162
2.127
2.044
2.015
1.858
1.839
1.662
1.622
1.400
1.335
1.306

```

NAME      LV-HQW-700P-20240627
EXPNO     10
PROCNO    1
Date_     20240627
Time      12.17 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH        6250.000 Hz
FIDRES     0.190735 Hz
AQ         5.2429299 sec
RG         64
DW         80.000 usec
DE         8.64 usec
TE         306.1 K
D1         1.00000000 sec
TD0        1
SFO1       400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300054 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



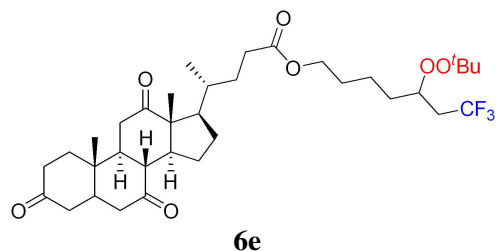
1.00
2.03
3.13
1.07
1.96
4.15
2.17
5.28
2.30
3.47
2.99
9.36
3.02
3.02



```

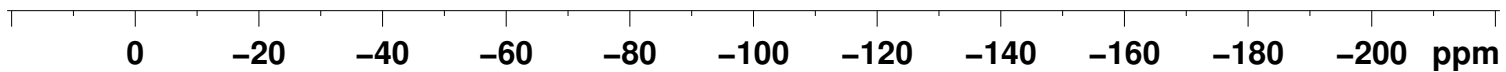
NAME      LV-HQW-700P-20240627
EXPNO     12
PROCNO    1
Date_     20240627
Time      12.55 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         600
DS         4
SWH        23809.523 Hz
FIDRES     0.726609 Hz
AQ         1.3763061 sec
RG         101
DW         21.000 usec
DE         6.50 usec
TE         307.5 K
D1         2.0000000 sec
D11        0.0300000 sec
TD0        1
SFO1      100.6228298 MHz
NUC1       13C
P0         2.67 usec
P1         8.00 usec
SI         32768
SF         100.6127709 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40

```

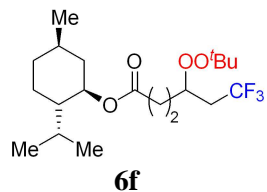
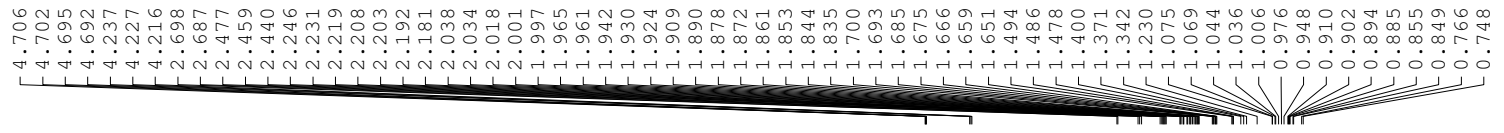
6e

63.095



```

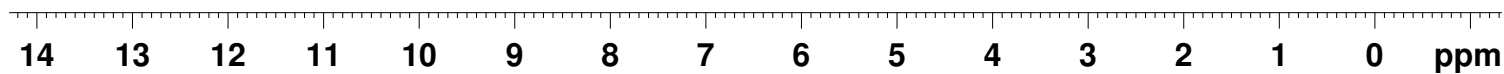
NAME      LV-HQW-700P-20240627
EXPNO     11
PROCNO    1
Date_     20240627
Time      12.19 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDCl3
NS         16
DS         4
SWH        90909.094 Hz
FIDRES     1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         306.3 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



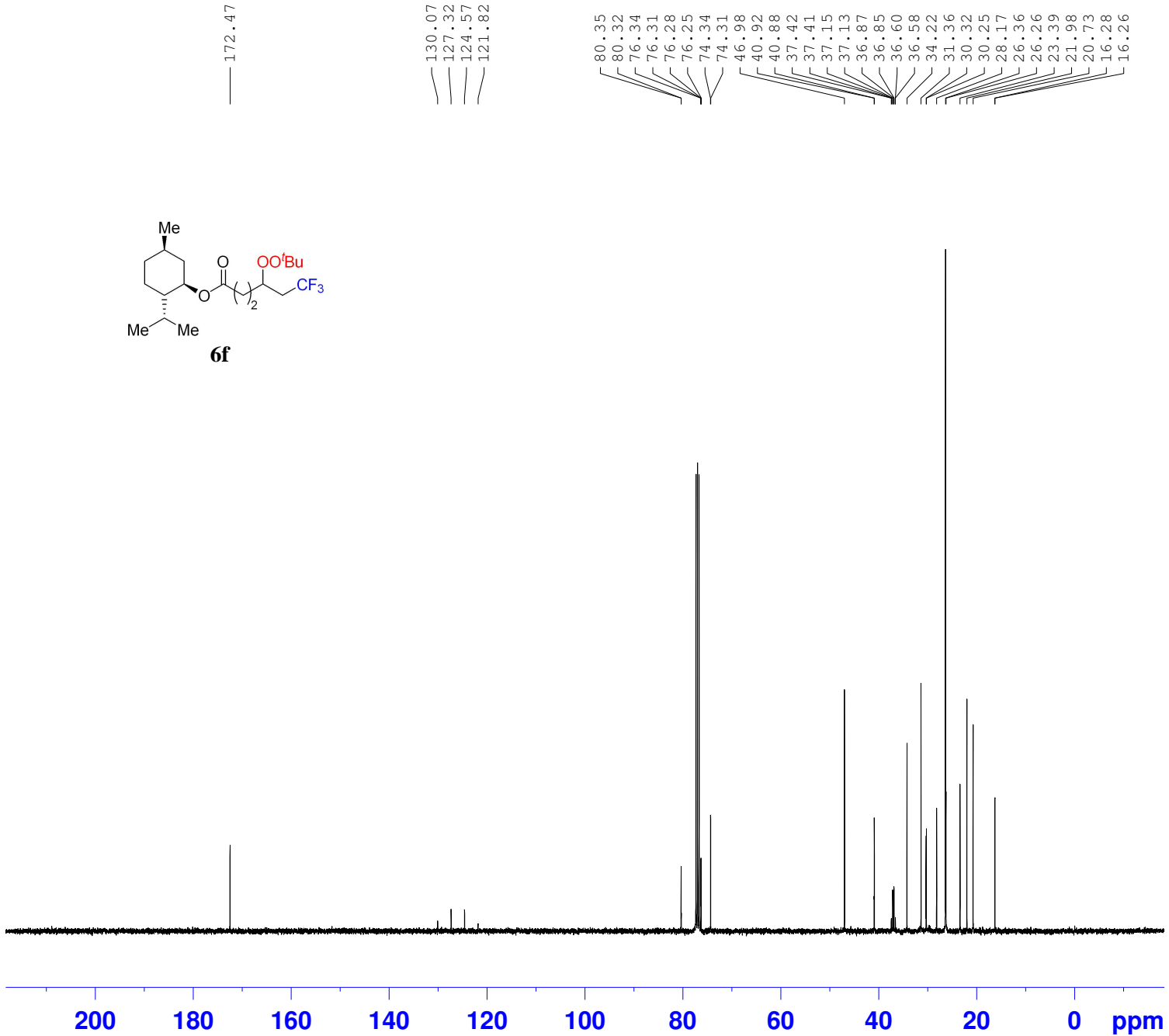
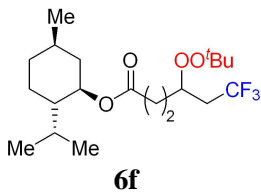
```

NAME      LV-HQW-655P-20240528
EXPNO     10
PROCNO    1
Date_     20240528
Time      13.16 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD        65536
SOLVENT   CDC13
NS        8
DS        0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ        5.2429299 sec
RG        45.2
DW        80.000 usec
DE        8.64 usec
TE        298.6 K
D1        1.00000000 sec
TD0       1
SFO1      400.1326008 MHz
NUC1      1H
P0        2.67 usec
P1        8.00 usec
SI        65536
SF        400.1300077 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

```



1.01
 1.00
 1.00
 2.00
 1.02
 2.14
 2.05
 2.08
 1.14
 1.18
 9.27
 1.21
 1.18
 3.06
 3.10
 1.12
 3.08

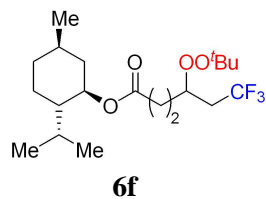


— 172.47

130.07
127.32
124.57
121.82

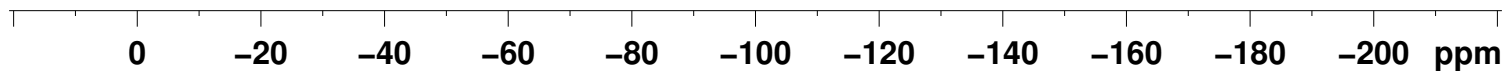
80.35
80.32
76.34
76.31
76.28
76.25
74.34
74.31
46.98
40.92
40.88
37.42
37.41
37.15
37.13
36.87
36.85
36.60
36.58
34.22
31.36
30.32
30.25
28.17
26.36
26.26
23.39
21.98
20.73
16.28
16.26

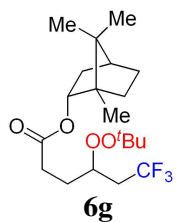
NAME	LV-HQW-655P-20240528
EXPNO	12
PROCNO	1
Date_	20240528
Time	13.53 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDC13
NS	400
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	298.0 K
D1	2.0000000 sec
D11	0.0300000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127702 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



-63.217
-63.231

NAME	LV-HQW-655P-20240528
EXPNO	11
PROCNO	1
Date_	20240528
Time	13.18 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgig
TD	131072
SOLVENT	CDCl3
NS	16
DS	4
SWH	90909.094 Hz
FIDRES	1.387163 Hz
AQ	0.7209460 sec
RG	101
DW	5.500 usec
DE	6.50 usec
TE	298.5 K
D1	1.00000000 sec
D11	0.03000000 sec
TD0	1
SFO1	376.4607164 MHz
NUC1	19F
P1	12.00 usec
SI	65536
SF	376.4983662 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

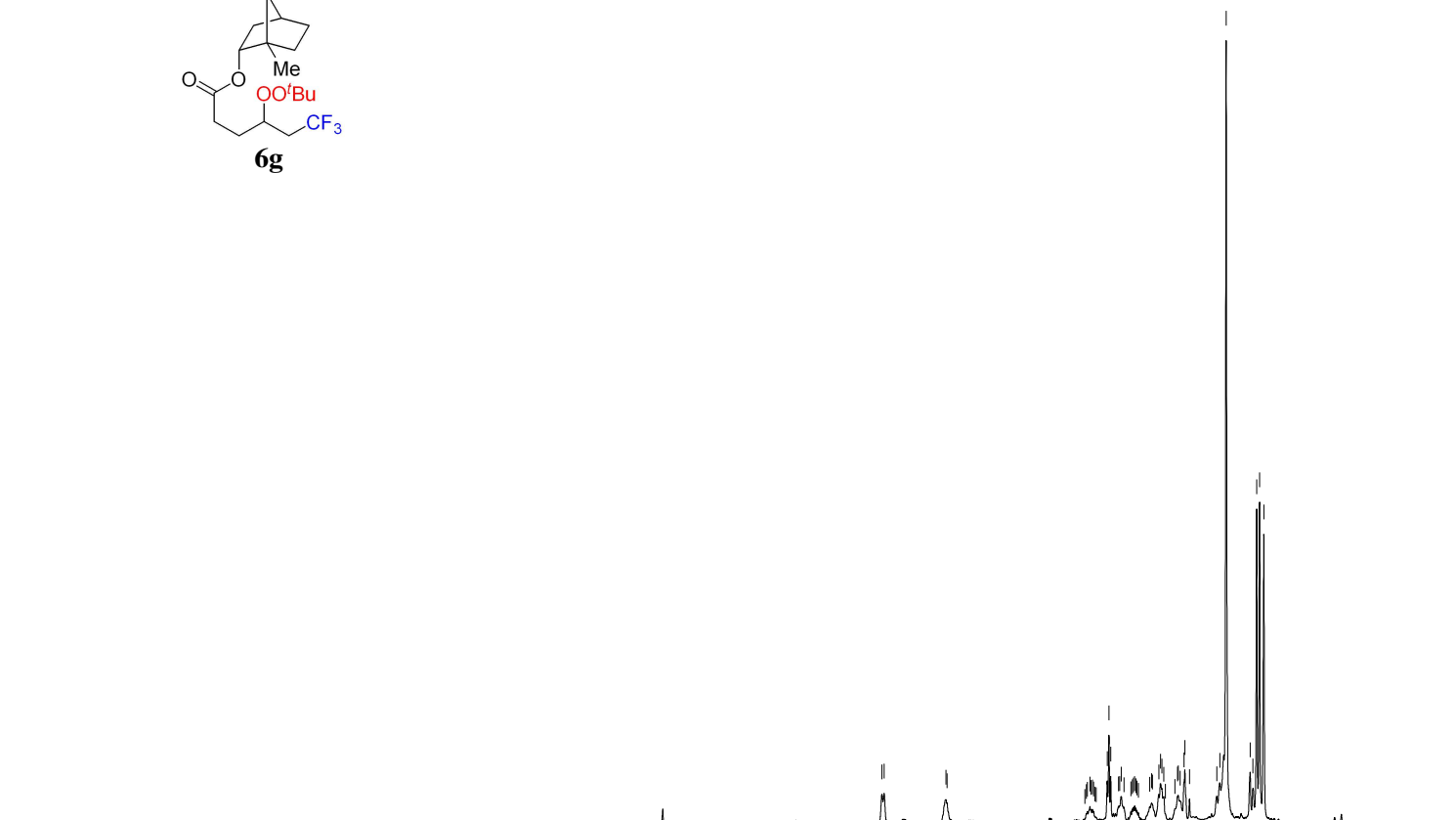




4.922
4.897
4.235
4.223
2.748
2.732
2.721
2.693
2.683
2.666
2.655
2.641
2.626
2.507
2.490
2.471
2.387
2.375
2.358
2.329
2.255
2.239
2.228
2.215
2.201
2.189
2.174
2.053
2.034
2.024
1.955
1.938
1.923
1.903
1.886
1.784
1.756
1.747

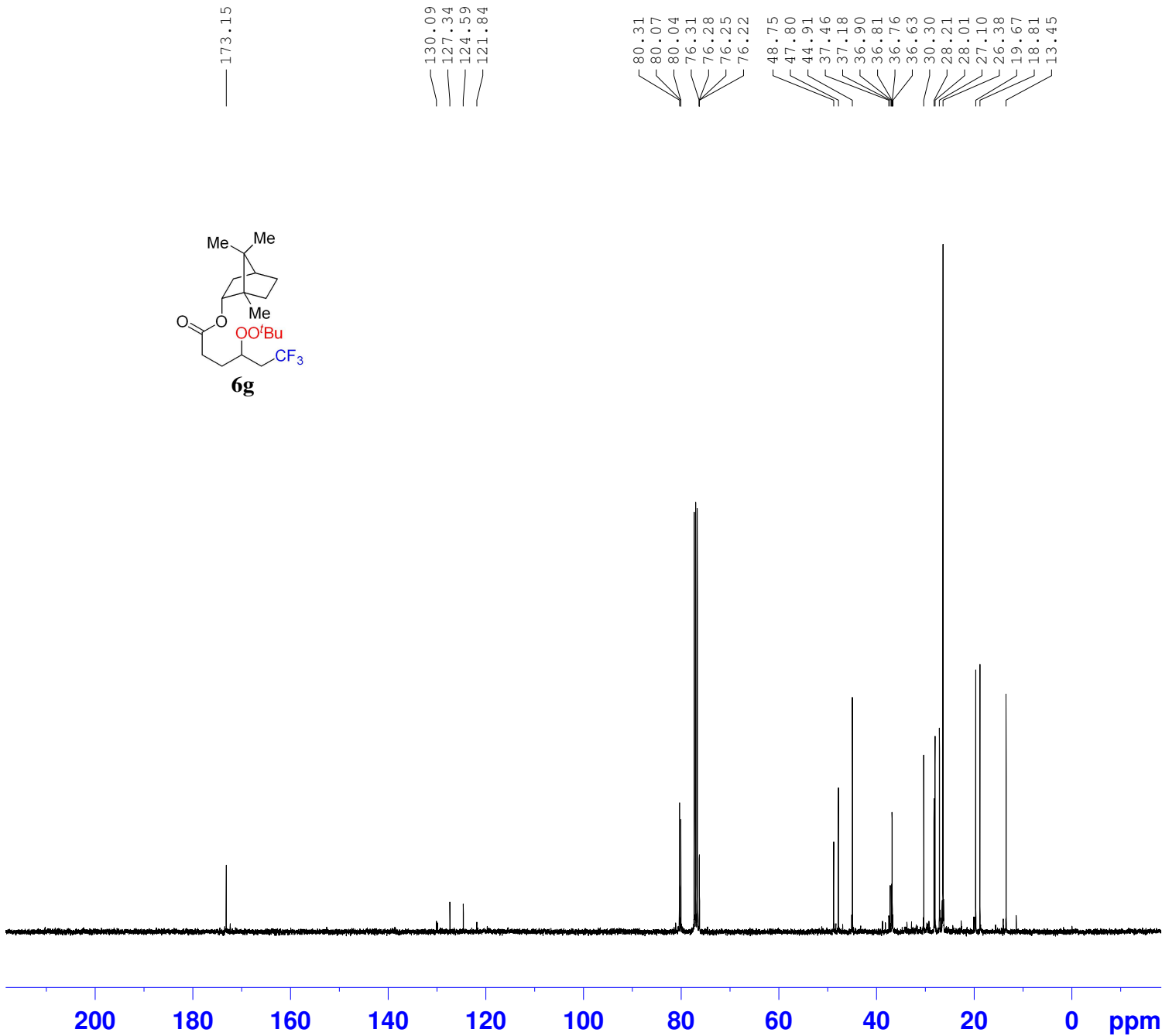
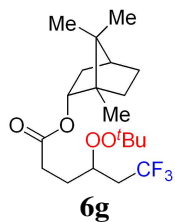
```

NAME      LV-HQW-703P-20240626
EXPNO     10
PROCNO    1
Date_     20240626
Time      22.34 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         8
DS         0
SWH       6250.000 Hz
FIDRES    0.190735 Hz
AQ         5.2429299 sec
RG         32
DW         80.000 usec
DE         8.64 usec
TE         304.7 K
D1         1.00000000 sec
TD0        1
SFO1      400.1326008 MHz
NUC1       1H
P0         2.67 usec
P1         8.00 usec
SI         65536
SF         400.1300080 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```

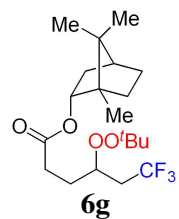


14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

1.05
1.00
0.99
2.03
1.26
1.01
0.96
2.17
2.23
2.34
9.08
1.29
3.22
3.26
3.36



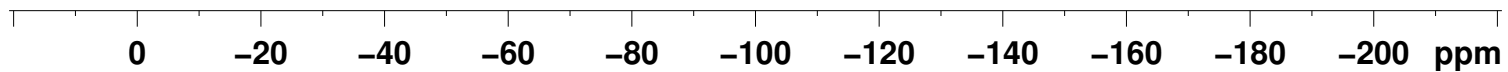
NAME	LV-HQW-703P-20240626
EXPNO	12
PROCNO	1
Date_	20240626
Time	23.06 h
INSTRUM	Avance
PROBHD	Z163739_0744 (
PULPROG	zgpg30
TD	65536
SOLVENT	CDC13
NS	464
DS	4
SWH	23809.523 Hz
FIDRES	0.726609 Hz
AQ	1.3763061 sec
RG	101
DW	21.000 usec
DE	6.50 usec
TE	306.5 K
D1	2.0000000 sec
D11	0.0300000 sec
TD0	1
SFO1	100.6228298 MHz
NUC1	13C
P0	2.67 usec
P1	8.00 usec
SI	32768
SF	100.6127680 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

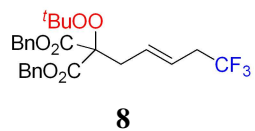


— 63.204

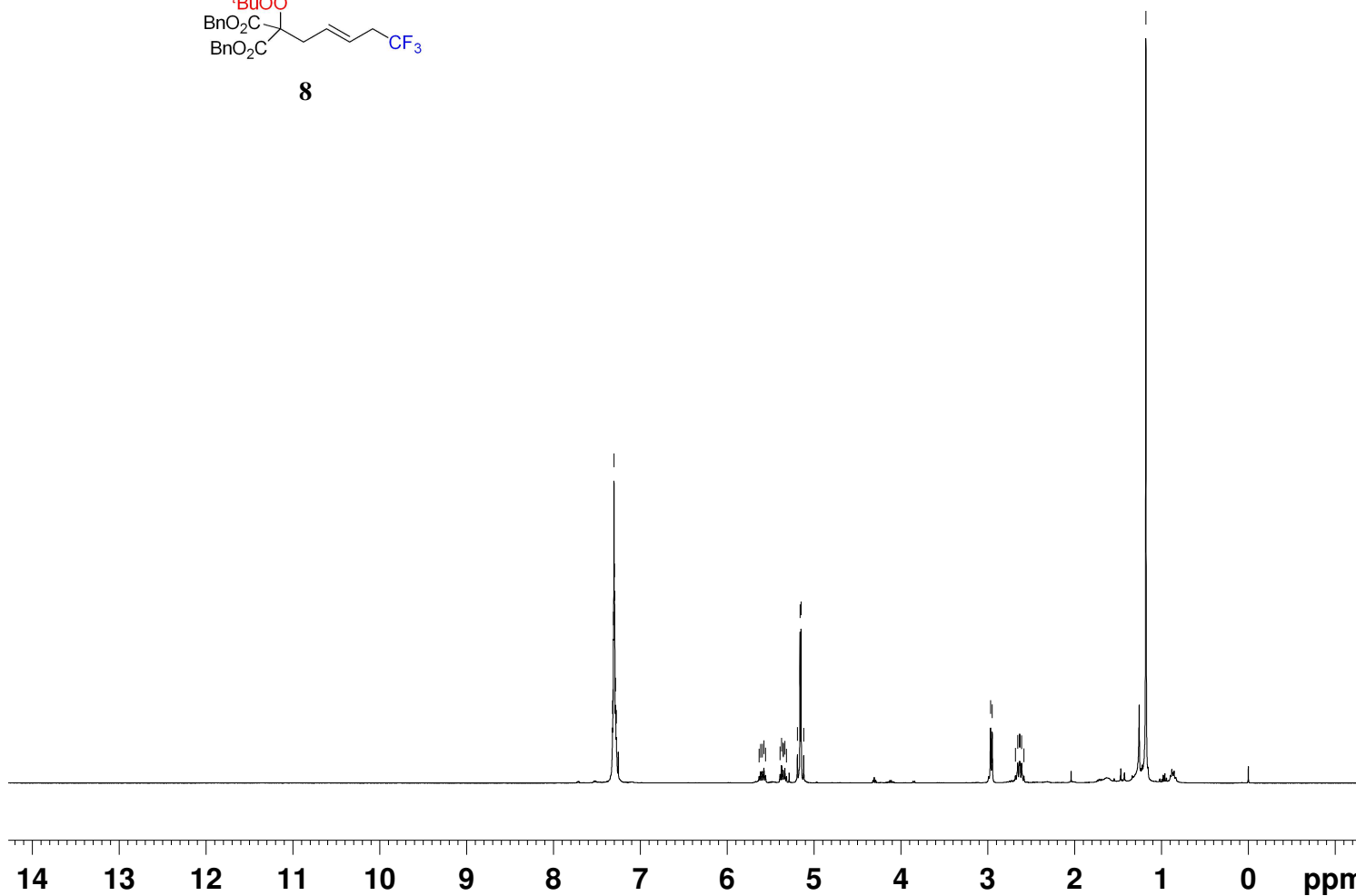
```

NAME      LV-HQW-703P-20240626
EXPNO     11
PROCNO    1
Date_     20240626
Time      22.37 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD        131072
SOLVENT   CDCl3
NS        16
DS        4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ        0.7209460 sec
RG        101
DW        5.500 usec
DE        6.50 usec
TE        305.3 K
D1        1.00000000 sec
D11       0.03000000 sec
TD0       1
SFO1      376.4607164 MHz
NUC1      19F
P1        12.00 usec
SI        65536
SF        376.4983662 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

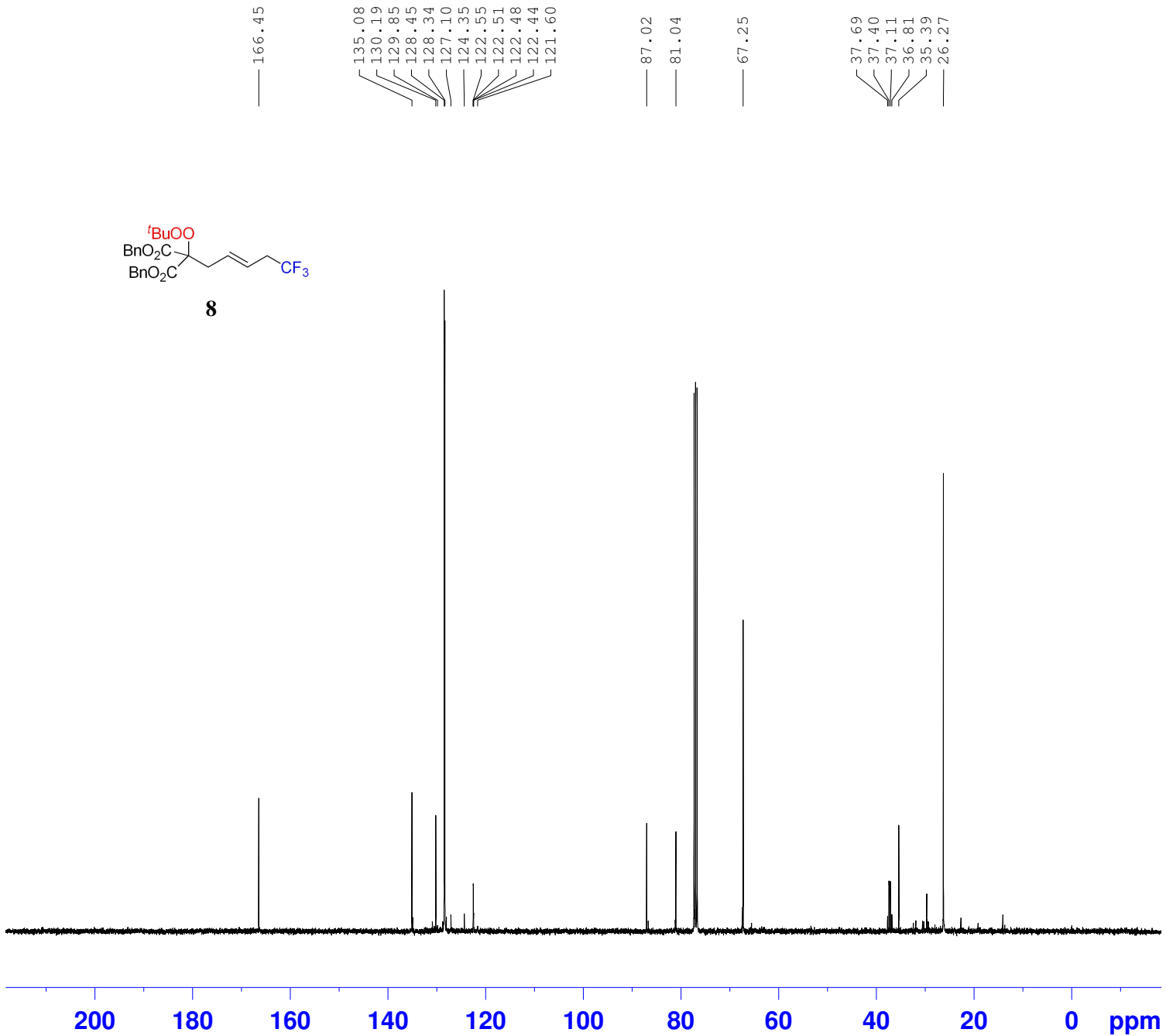
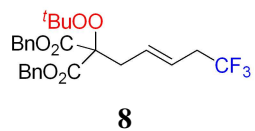




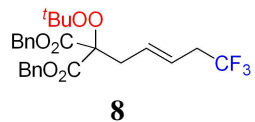
7.320
 7.316
 7.310
 7.303
 7.298
 7.286
 7.276
 5.633
 5.615
 5.596
 5.577
 5.559
 5.392
 5.374
 5.356
 5.354
 5.336
 5.318
 5.192
 5.161
 5.149
 5.119
 2.968
 2.950
 2.682
 2.655
 2.637
 2.629
 2.611
 2.584
 — 1.180



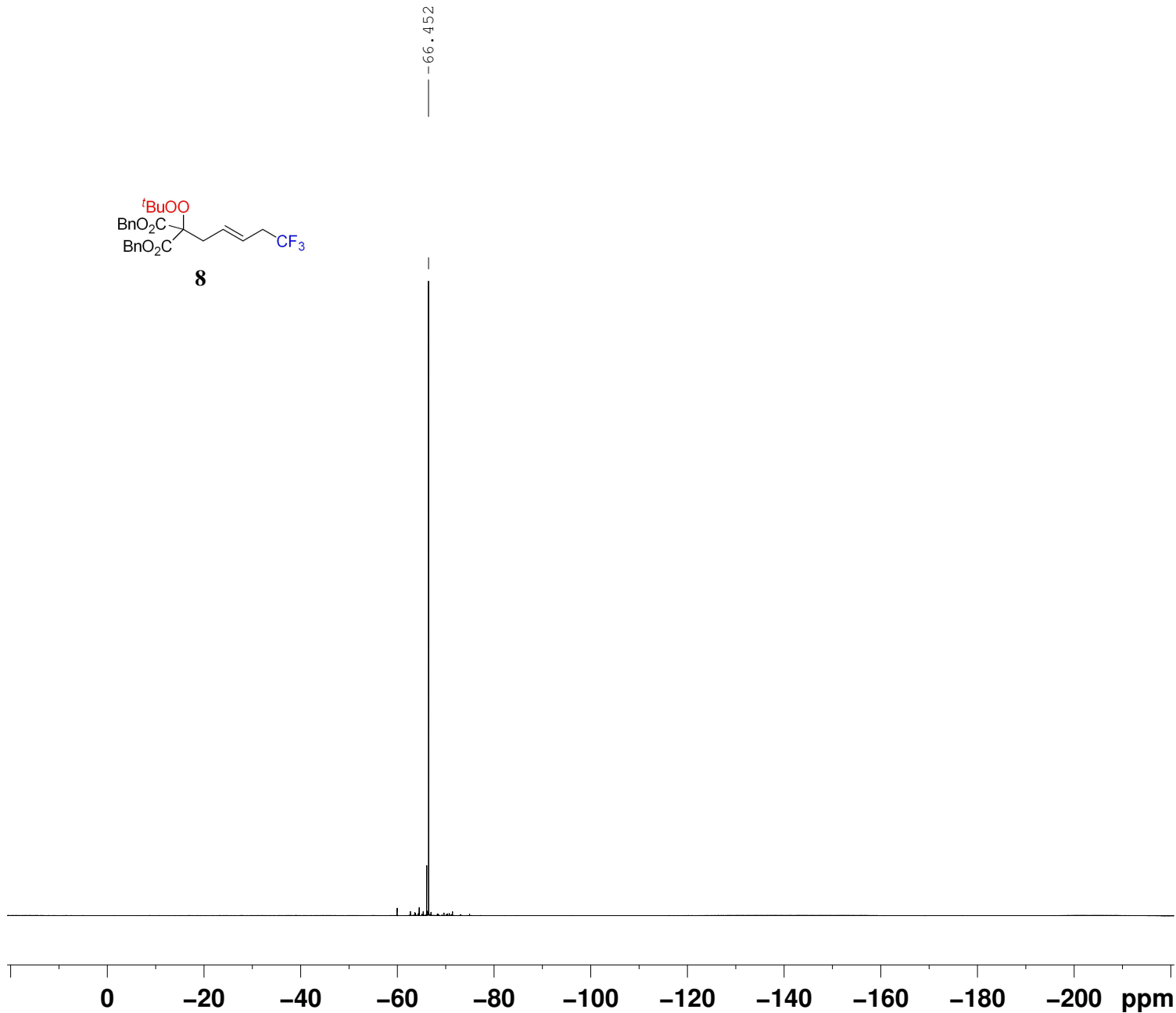
NAME LV-HQW-781P-20240830
 EXPNO 10
 PROCNO 1
 Date_ 20240830
 Time 20.18 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 8
 DS 0
 SWH 6250.000 Hz
 FIDRES 0.190735 Hz
 AQ 5.2429299 sec
 RG 57
 DW 80.000 usec
 DE 8.64 usec
 TE 298.0 K
 D1 1.00000000 sec
 TD0 1
 SFO1 400.1326008 MHz
 NUC1 1H
 P0 2.67 usec
 P1 8.00 usec
 SI 65536
 SF 400.1300131 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



NAME LV-HQW-781P-20240830
 EXPNO 12
 PROCNO 1
 Date_ 20240830
 Time 20.56 h
 INSTRUM Avance
 PROBHD Z163739_0744 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 600
 DS 4
 SWH 23809.523 Hz
 FIDRES 0.726609 Hz
 AQ 1.3763061 sec
 RG 101
 DW 21.000 usec
 DE 6.50 usec
 TE 298.0 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 100.6228298 MHz
 NUC1 13C
 P0 2.67 usec
 P1 8.00 usec
 SI 32768
 SF 100.6127731 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



-66.452



```

NAME      LV-HQW-781P-20240830
EXPNO     11
PROCNO    1
Date_     20240830
Time      20.20 h
INSTRUM   Avance
PROBHD    Z163739_0744 (
PULPROG   zgig
TD         131072
SOLVENT   CDCl3
NS         16
DS         4
SWH       90909.094 Hz
FIDRES    1.387163 Hz
AQ         0.7209460 sec
RG         101
DW         5.500 usec
DE         6.50 usec
TE         298.1 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       376.4607164 MHz
NUC1       19F
P1         12.00 usec
SI         65536
SF         376.4983662 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```