# Rapid incorporation of difluoroacetate radical into *para*-quinone methides via radical 1,6-conjugate addition

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## Supporting Information

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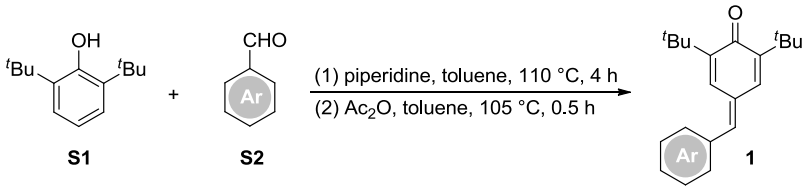
## I. General Information

All air or moisture sensitive reactions were conducted in oven-dried glassware under nitrogen atmosphere using dry solvents. Anhydrous THF were freshly distilled from sodium. Unless otherwise stated, chemicals and reagents were used as received. Flash column chromatography was performed over silica gel (200-300 mesh) purchased from *Qindao Bangkai Co., China.* $^{1}H$ and $^{13}C$ NMR spectra were recorded on a Bruker AV 500 MHz NMR spectrometer using residue solvent peaks as an internal standard ($^{1}H$ NMR: $CHCl_3$ at 7.26 ppm, $^{13}C$ NMR: $CDCl_3$ at 77.0 ppm). HRMS were recorded on an Agilent 6545 Q-TOF LC/MS instrument with electrospray ionization (ESI) technique.

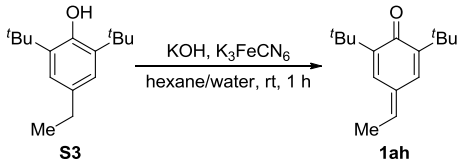
## II. Preparation of Materials

### 2.1. Synthesis of *p*-Quinone Methide Substrates



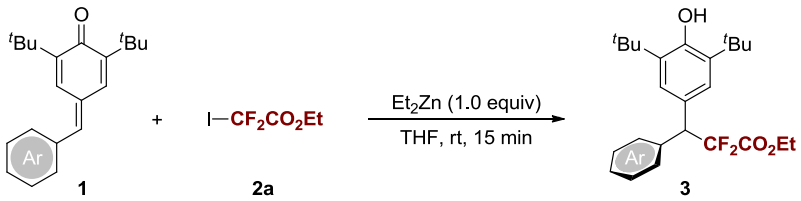

*p*-Quinone methide substrates **1a-1ag**, **1ai, 1aj** were synthesized according to the literature reported procedure.[1] They are known compounds.

### 2.2. Synthesis of *p*-Quinone Methide 1ah




*p*-Quinone methide **1ah** was synthesized according to the literature reported procedure, and it is a known compound.[2]

## III. Radical 1,6-Conjugate Addition of *p*-Quinone Methides




An oven-dried Schlenk tube was charged with *p*-quinone methide substrates (0.1 mmol) and a stir bar. The tube was degased and refilled with nitrogen, and then a solution of ethyl iododifluoroacetate (0.1 mmol, 1.0 equiv) in anhydrous THF (1 mL) was injected to the tube via a syringe, followed by the addition of a solution of diethylzinc (1.0 mol/L in hexane, 0.1 mL, 1.0 equiv). After stirring at room temperature for 15 minutes, the reaction was quenched with saturated $NH_4Cl$ and the aqueous layer was extracted with ethyl acetate (3 × 20 mL). The combined organic layers were dried with $Na_2SO_4$, filtered, and concentrated under reduced pressure. The residue was purified by flash silica gel column chromatography (petroleum ether/ethyl acetate) to afford the pure product.

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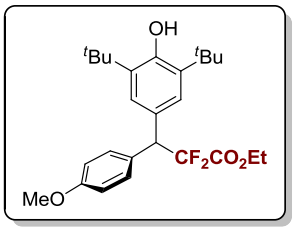
[1] D. Richter, N. Hampel, T. Singer, A. R. Ofial, H. Mayr, *Eur. J. Org. Chem*. **2009,** *19*, 3203.

[2] Z.-Q. Liu, P.-S. You, L.-D. Zhang, D.-Q. Liu, S.-S. Liu, X.-Y. Guan, *Molecules* **2020**, *25*, 539.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(4-methoxyphenyl)-propanoate (3a)**



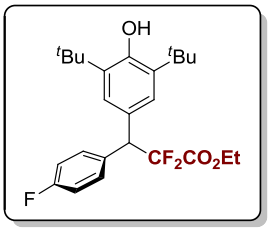

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.37 (d, *J* = 8.7 Hz, 2H), 7.20 (s, 2H), 6.89 (d, *J* = 8.7 Hz, 2H), 5.19 (s, 1H), 4.62 (t, *J* = 18.5 Hz, 1H), 4.14 (qd, *J* = 7.2, 5.3 Hz, 2H), 3.81 (s, 3H), 1.43 (s, 18H), 1.07 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.6 Hz), 159.0, 153.2, 135.7, 130.7, 128.16, 128.14, 126.2, 116.2 (t, *J* = 255.5 Hz), 113.8, 62.5, 55.2, 54.7 (t, *J* = 21.8 Hz), 34.3, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -106.17 (d, *J* = 254.6 Hz), -107.09 (d, *J* = 254.6 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{26}H_{34}F_2O_4Na$: 471.2317, found: 471.2325.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(4-fluorophenyl)propanoate (3b)**



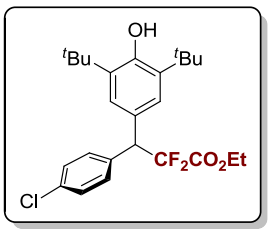

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.42 (dd, *J* = 8.5, 5.4 Hz, 2H), 7.17 (s, 2H), 7.05 (t, *J* = 8.7 Hz, 1H), 5.22 (s, 1H), 4.66 (t, *J* = 18.2 Hz, 1H), 4.19 – 4.10 (m, 2H), 1.43 (s, 18H), 1.08 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.9 (t, *J* = 32.5 Hz), 162.2 (d, *J* = 246.3 Hz), 153.4, 135.9, 131.9, 131.2 (d, *J* = 8.1 Hz), 126.1, 125.7 (d, *J* = 4.8 Hz), 116.0 (t, *J* = 256.1 Hz), 115.3 (d, *J* = 21.3 Hz), 62.6, 54.6 (t, *J* = 21.9 Hz), 34.3, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.52 (d, *J* = 256.0 Hz), -107.67 (d, *J* = 256.0 Hz), -114.96.

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{25}H_{31}F_3O_3Na$: 459.2118, found: 459.2117.

**Ethyl 3-(4-chlorophenyl)-3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoropropanoate (3c)**



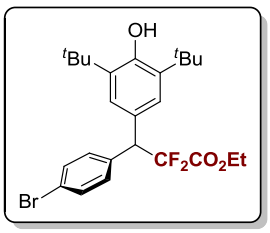

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.38 (d, *J* = 8.6 Hz, 2H), 7.33 (d, *J* = 8.6 Hz, 2H), 7.16 (s, 2H), 5.22 (s, 1H), 4.65 (dd, *J* = 19.1, 17.3 Hz, 1H), 4.23 – 4.08 (m, 2H), 1.43 (s, 18H), 1.08 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.8 (t, *J* = 32.5 Hz), 153.5, 135.9, 134.71, 134.68, 133.6, 130.9, 128.6, 126.1, 125.42, 125.38, 115.9 (t, *J* = 255.3 Hz), 62.7, 54.8 (t, *J* = 21.9 Hz), 34.3, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.06 (d, *J* = 256.4 Hz), -107.88 (d, *J* = 256.4 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{25}H_{31}ClF_2O_3Na$: 475.1822, found: 475.1826.

**Ethyl 3-(4-bromophenyl)-3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoropropanoate (3d)**



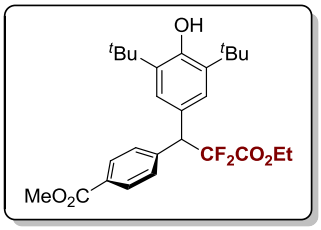

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.48 (d, *J* = 8.4 Hz, 2H), 7.32 (d, *J* = 8.4 Hz, 2H), 7.16 (s, 2H), 5.22 (s, 1H), 4.64 (dd, *J* = 19.2, 17.1 Hz, 1H), 4.21 – 4.09 (m, 2H), 1.43 (s, 18H), 1.08 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.8 (t, *J* = 32.4 Hz), 153.5, 136.0, 135.26, 135.23, 131.6, 131.3, 126.1, 125.4, 125.3, 121.75, 115.8 (t, *J* = 256.4 Hz), 62.7, 54.8 (t, *J* = 22.0 Hz), 34.3, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -104.90 (d, *J* = 256.5 Hz), -107.98 (d, *J* = 256.5 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{25}H_{31}BrF_2O_3Na$: 475.1822, found: 475.1826.

**Methyl 4-(1-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-3-ethoxy-2,2-difluoro-3-oxopropyl)-benzoate (3e)**



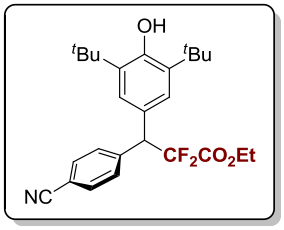

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 8.03 (d, *J* = 8.2 Hz, 2H), 7.53 (d, *J* = 8.2 Hz, 2H), 7.16 (s, 2H), 5.23 (s, 1H), 4.74 (t, *J* = 18.1 Hz, 1H), 4.14 (qt, *J* = 7.1, 3.6 Hz, 2H), 3.93 (s, 3H), 1.42 (s, 18H), 1.07 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 166.8, 163.8 (t, *J* = 32.8 Hz), 153.5, 141.34, 141.31, 135.9, 129.7, 129.6, 129.3, 126.2, 125.13, 125.09, 115.8 (t, *J* = 255.9 Hz), 62.7, 55.3 (t, *J* = 21.8 Hz), 52.1, 34.3, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.14 (d, *J* = 256.9 Hz), -107.39 (d, *J* = 256.9 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{27}H_{34}F_2O_5Na$: 499.2267, found: 499.2270.

**Ethyl 3-(4-cyanophenyl)-3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoropropanoate (3f)**



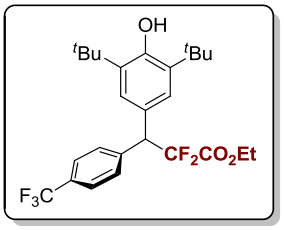

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.65 (d, *J* = 8.2 Hz, 2H), 7.55 (d, *J* = 8.2 Hz, 2H), 7.13 (s, 2H), 5.26 (s, 1H), 4.73 (dd, *J* = 20.6, 15.0 Hz, 1H), 4.22 – 4.09 (m, 2H), 1.42 (s, 18H), 1.08 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.5 (t, *J* = 32.3 Hz), 153.7, 141.63, 141.60, 136.2, 132.2, 130.4, 126.1, 124.61, 124.56, 118.6, 115.6 (dd, *J* = 255.4, 255.0 Hz), 111.6, 62.8, 55.3 (t, *J* = 21.9 Hz), 34.4, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -103.22 (d, *J* = 258.2 Hz), -109.00 (d, *J* = 258.2 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{26}H_{31}F_2NO_3Na$: 466.2164, found: 466.2165.

**Ethyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(4-(trifluoromethyl)phenyl)-propanoate (3g)**



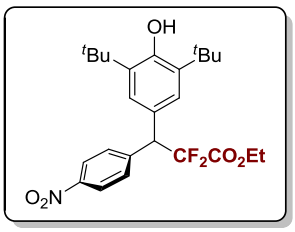

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.62 (d, *J* = 8.3 Hz, 2H), 7.58 (d, *J* = 8.3 Hz, 2H), 7.18 (s, 2H), 5.25 (s, 1H), 4.74 (dd, *J* = 20.2, 15.9 Hz, 1H), 4.26 – 4.06 (m, 2H), 1.43 (s, 18H), 1.07 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.7 (t, *J* = 32.3 Hz), 153.6, 140.3, 140.2, 136.1, 129.9, 129.8 (q, *J* = 32.7 Hz), 126.2, 125.4 (q, *J* = 3.8 Hz), 125.04, 125.00, 124.0 (q, *J* = 272.2 Hz), 115.8 (t, *J* = 255.9 Hz), 62.7, 55.2 (t, *J* = 21.9 Hz), 34.4, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -62.64, -103.99 (d, *J* = 257.2 Hz), -108.56 (d, *J* = 257.2 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{26}H_{31}F_5O_3Na$: 509.2086, found: 509.2093.

**Ethyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(4-nitrophenyl)propanoate (3h)**



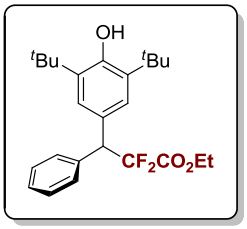

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 8.22 (d, *J* = 8.8 Hz, 2H), 7.62 (d, *J* = 8.8 Hz, 2H), 7.14 (s, 2H), 5.27 (s, 1H), 4.80 (dd, *J* = 20.9, 14.6 Hz, 1H), 4.25 – 4.10 (m, 2H), 1.43 (s, 18H), 1.09 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.4 (t, *J* = 32.2 Hz), 153.8, 147.3, 143.64, 143.61, 136.3, 130.5, 126.1, 124.54, 124.49, 123.6, 115.6 (t, *J* = 255.1 Hz), 62.9, 55.1 (t, *J* = 21.9 Hz), 34.4, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -102.93 (d, *J* = 258.3 Hz), -109.18 (d, *J* = 258.3 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{25}H_{31}F_2NO_5Na$: 486.2063, found: 486.2064.

**Ethyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-3-phenylpropanoate (3i)**




**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.46 (d, *J* = 7.5 Hz, 2H), 7.38 – 7.33 (m, 2H), 7.33 – 7.29 (m, 1H), 7.22 (s, 2H), 5.20 (s, 1H), 4.67 (t, *J* = 18.5 Hz,

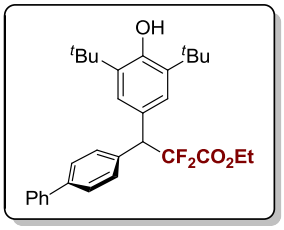
1H), 4.24 – 4.07 (m, 2H), 1.44 (s, 18H), 1.06 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.9 Hz), 153.3, 136.21, 136.18, 135.8, 129.6, 128.5, 127.5, 126.3, 126.0, 125.9, 116.2 (t, *J* = 255.9 Hz), 62.5, 55.5 (t, *J* = 21.8 Hz), 34.3, 30.3, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.80 (d, *J* = 255.4 Hz), -107.03 (d, *J* = 255.4 Hz).

**HRMS:** ($ESI^+$) $[M+H]^+$ calcd for $C_{25}H_{33}F_2O_3$: 419.2389, found: 419.2392.

**Ethyl 3-([1,1'-biphenyl]-4-yl)-3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-propanoate (3j)**



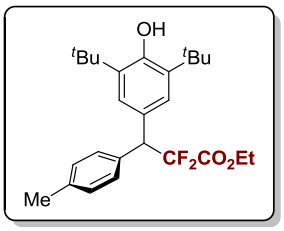

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.65 – 7.57 (m, 4H), 7.53 (d, *J* = 8.2 Hz, 2H), 7.45 (dd, *J* = 8.2, 7.0 Hz, 2H), 7.40 – 7.34 (m, 1H), 7.28 (s, 2H), 5.21 (s, 1H), 4.71 (t, *J* = 18.4 Hz, 1H), 4.24 – 4.10 (m, 2H), 1.45 (s, 18H), 1.08 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.4 Hz), 153.4, 140.6, 140.4, 135.9, 135.23, 135.20, 130.0, 128.8, 127.3, 127.2, 127.0, 126.3, 125.89, 125.86, 116.2 (t, *J* = 255.7 Hz), 62.6, 55.2 (t, *J* = 21.8 Hz), 34.4, 30.3, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.43 (d, *J* = 255.3 Hz), -107.36 (d, *J* = 255.3 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{31}H_{36}F_2O_3Na$: 495.2705, found: 495.2713.

**Ethyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(p-tolyl)propanoate (3k)**



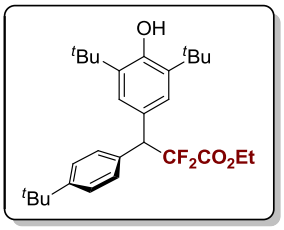

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.34 (d, *J* = 7.9 Hz, 2H), 7.21 (s, 2H), 7.16 (d, *J* = 7.9 Hz, 2H), 5.18 (s, 1H), 4.62 (t, *J* = 18.5 Hz, 1H), 4.19 – 4.06 (m, 2H), 2.34 (s, 3H), 1.43 (s, 18H), 1.07 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.6 Hz), 153.3, 137.2, 135.7, 133.11, 133.08, 129.4, 129.2, 126.2, 126.12, 126.09, 116.2 (t, *J* = 255.6 Hz), 62.5, 55.1 (t, *J* = 21.8 Hz), 34.3, 30.2, 21.0, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.76 (d, *J* = 254.6 Hz), -107.23 (d, *J* = 254.6 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{26}H_{34}F_2O_3Na$: 455.2368, found: 455.2370.

**Ethyl 3-(4-(*tert*-butyl)phenyl)-3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-propanoate (3l)**



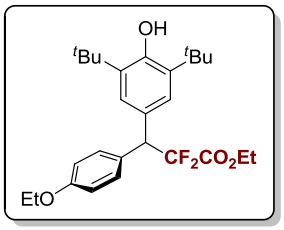

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.43 – 7.33 (m, 4H), 7.23 (s, 2H), 5.18 (s, 1H), 4.61 (t, *J* = 18.6 Hz, 1H), 4.18 – 4.06 (m, 2H), 1.43 (s, 18H), 1.31 (s, 9H), 1.02 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.2 (t, *J* = 32.3 Hz), 153.3, 150.4, 135.7, 133.02, 132.99, 129.2, 126.3, 126.13, 126.09, 125.4, 116.3 (t, *J* = 255.8 Hz), 62.4, 55.2 (t, *J* = 21.8 Hz), 34.4, 34.3, 31.3, 30.3, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.56 (d, *J* = 253.5 Hz), -107.76 (d, *J* = 253.5 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{29}H_{40}F_2O_3Na$: 497.2838, found: 497.2846.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-3-(4-ethoxyphenyl)-2,2-difluoropropanoate (3m)**




**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.35 (d, *J* = 8.7 Hz, 2H), 7.19 (s, 2H), 6.87 (d, *J* = 8.7 Hz, 2H), 5.18 (s, 1H), 4.60 (t, *J* = 18.5 Hz, 1H), 4.13 (qd, *J* = 7.2, 4.6 Hz, 2H), 4.03 (q, *J* = 7.0 Hz, 2H), 1.43 (s, 18H), 1.42 (t, *J* = 7.0 Hz, 3H), 1.07 (t, *J* = 7.1 Hz, 3H).

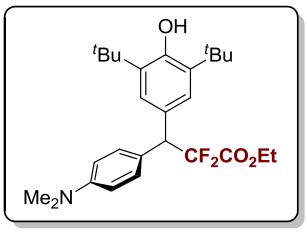
**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.2 (t, *J* = 32.8 Hz), 158.4, 153.3, 135.7, 130.7, 127.99, 126.2, 116.2 (t, *J* = 256.4 Hz), 114.4, 63.4, 62.5,

54.7 (t, *J* = 22.0 Hz), 34.3, 30.3, 14.8, 13.7.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -106.36 (d, *J* = 254.3 Hz), -106.94 (d, *J* = 254.3 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{27}H_{36}F_2O_4Na$: 485.2474, found: 485.2479.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-3-(4-(dimethylamino)phenyl)-2,2-difluoro-propanoate (3n)**



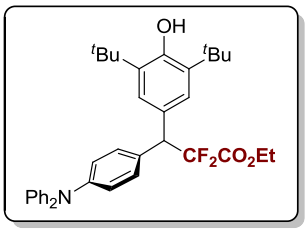

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.31 (d, *J* = 8.7 Hz, 2H), 7.23 (s, 2H), 6.71 (d, *J* = 8.7 Hz, 2H), 5.16 (s, 1H), 4.56 (t, *J* = 18.8 Hz, 1H), 4.19 – 4.09 (m, 2H), 2.95 (s, 6H), 1.44 (s, 18H), 1.08 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$)) δ 164.3 (t, *J* = 32.8 Hz), 153.1, 149.9, 135.6, 130.3, 126.6, 126.2, 123.6, 116.4 (t, *J* = 255.4 Hz), 112.4, 62.3, 54.7 (t, *J* = 21.8 Hz), 40.5, 34.3, 30.3, 13.7.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -106.26 (d, *J* = 253.5 Hz), -107.05 (d, *J* = 253.5 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{27}H_{37}F_2NO_3Na$: 484.2634, found: 484.2640.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-3-(4-(diphenylamino)phenyl)-2,2-difluoro-propanoate (3o)**



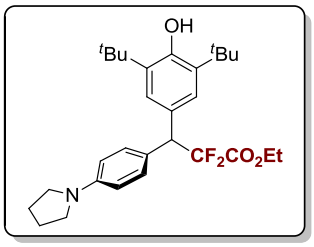

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.34 – 7.29 (m, 2H), 7.28 – 7.24 (m, 4H), 7.22 (s, 2H), 7.12 – 7.07 (m, 4H), 7.06 – 7.01 (m, 4H), 5.21 (s, 1H), 4.60 (t, *J* = 18.5 Hz, 1H), 4.23 – 4.10 (m, 2H), 1.44 (s, 18H), 1.09 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.2 (t, *J* = 32.6 Hz), 153.3, 147.6, 147.2, 135.8, 130.4, 129.71, 129.68, 129.2, 126.3, 126.09, 126.06, 124.5, 123.3, 122.9, 116.2 (t, *J* = 255.8 Hz), 62.5, 54.9 (t, *J* = 21.8 Hz), 34.4, 30.3, 13.7.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.95 (d, *J* = 254.1 Hz), -107.43 (d, *J* = 254.1 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{37}H_{41}F_2NO_3Na$: 608.2947, found: 608.2950.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(4-(pyrrolidin-1-yl)phenyl)-propanoate (3p)**



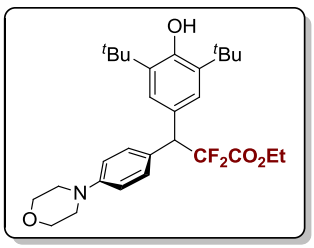

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.29 (d, *J* = 8.7 Hz, 2H), 7.23 (s, 2H), 6.54 (d, *J* = 8.7 Hz, 2H), 5.15 (s, 1H), 4.55 (t, *J* = 18.8 Hz, 1H), 4.22 – 4.05 (m, 2H), 3.34 – 3.21 (m, 4H), 2.11 – 1.91 (m, 4H), 1.44 (s, 18H), 1.09 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.4 (t, *J* = 32.8 Hz), 153.0, 147.3, 135.5, 130.3, 126.8, 126.2, 122.4, 116.5 (t, *J* = 255.1 Hz), 111.5, 62.3, 54.7 (t, *J* = 21.7 Hz), 47.5, 34.3, 30.3, 25.4, 13.7.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -106.26 (d, *J* = 254.3 Hz), -106.93 (d, *J* = 254.3 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{29}H_{39}F_2NO_4Na$: 510.2790, found: 510.2794.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(4-morpholinophenyl)-propanoate (3q)**




**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.35 (d, *J* = 8.8 Hz, 2H), 7.20 (s, 2H), 6.89 (d, *J* = 8.8 Hz, 2H), 5.17 (s, 1H), 4.58 (t, *J* = 18.6 Hz, 1H), 4.20 – 4.08 (m, 2H), 3.97 – 3.80 (m, 4H), 3.23 – 3.10 (m, 4H), 1.43 (s, 18H), 1.07 (t, *J* = 7.1 Hz, 3H).

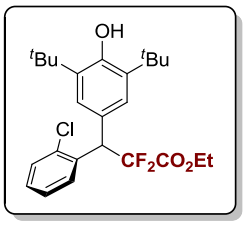
**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.2 (t, *J* = 32.8 Hz), 153.2, 150.5, 135.7, 130.4, 127.29, 127.28, 126.32, 126.30, 126.2, 116.3 (t,

*J* = 257.1 Hz), 115.4, 66.9, 62.4, 54.7 (t, *J* = 21.5 Hz), 49.1, 34.3, 30.3, 13.7.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -106.00 (d, *J* = 254.2 Hz), -107.26 (d, *J* = 254.2 Hz).

**HRMS:** (ESI$^+$) $[M+Na]^+$ calcd for $C_{29}H_{39}F_2NO_4Na$: 526.2739, found: 526.2742.

**Ethyl 3-(2-chlorophenyl)-3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoropropanoate (3r)**



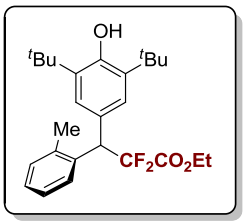

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.75 (dd, *J* = 7.9, 1.5 Hz, 1H), 7.40 (dd, *J* = 7.9, 1.5 Hz, 1H), 7.31 (td, *J* = 7.7, 1.5 Hz, 1H), 7.24 (dd, *J* = 7.7, 1.7 Hz, 1H), 7.21 (s, 2H), 5.36 (dd, *J* = 19.4, 17.6 Hz, 1H), 5.21 (s, 1H), 4.17 (q, *J* = 7.1 Hz, 2H), 1.42 (s, 18H), 1.09 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.7 (t, *J* = 32.5 Hz), 153.4, 135.7, 134.8, 134.37, 134.33, 129.9, 129.7, 128.7, 126.9, 126.6, 124.62, 124.58, 116.0 (t, *J* = 256.2 Hz), 62.7, 50.5 (t, *J* = 22.1 Hz), 34.3, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -103.78 (d, *J* = 257.0 Hz), -107.27 (d, *J* = 257.0 Hz).

**HRMS:** (ESI$^+$) $[M+Na]^+$ calcd for $C_{28}H_{31}ClF_2O_3Na$: 475.1822, found: 475.1823.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(o-tolyl)propanoate (3s)**



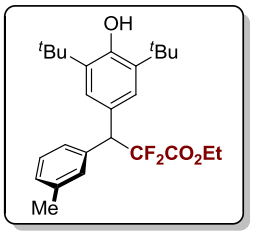

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.64 (d, *J* = 7.7 Hz, 1H), 7.24 (td, *J* = 7.4, 2.1 Hz, 1H), 7.21 – 7.14 (m, 2H), 7.17 (s, 2H), 5.17 (s, 1H), 4.91 (dd, *J* = 20.7, 16.8 Hz, 1H), 4.13 (q, *J* = 7.1 Hz, 2H), 2.37 (s, 3H), 1.41 (s, 18H), 1.05 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.2 (t, *J* = 32.6 Hz), 153.3, 136.8, 135.6, 134.90, 134.85, 130.7, 128.0, 127.4, 126.8, 126.1, 125.10, 125.07, 116.3 (t, *J* = 257.6 Hz), 62.5, 50.5 (t, *J* = 22.1 Hz), 34.3, 30.3, 20.2, 13.5.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -101.76 (d, *J* = 256.6 Hz), -108.33 (d, *J* = 256.6 Hz).

**HRMS:** (ESI$^+$) $[M+Na]^+$ calcd for $C_{26}H_{34}F_2O_3Na$: 455.2368, found: 455.2369.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(m-tolyl)propanoate (3t)**



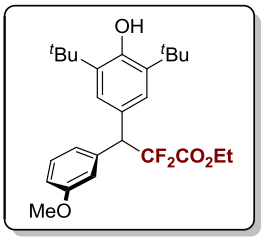

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.64 (d, *J* = 7.7 Hz, 1H), 7.24 (td, *J* = 7.4, 2.1 Hz, 1H), 7.20 – 7.14 (m, 2H), 7.17 (s, 2H), 5.17 (s, 1H), 4.92 (dd, *J* = 20.6, 16.8 Hz, 1H), 4.13 (q, *J* = 7.1 Hz, 2H), 2.37 (s, 3H), 1.42 (s, 18H), 1.05 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.2 (t, *J* = 32.6 Hz), 153.3, 136.8, 135.6, 134.90, 134.85, 130.7, 128.03, 128.00, 127.4, 126.7, 126.1, 125.1, 116.33 (d, *J* = 255.1 Hz), 62.5, 50.5 (t, *J* = 21.9 Hz), 34.3, 30.3, 20.2, 13.5.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -101.80 (d, *J* = 255.9 Hz), -108.30 (d, *J* = 255.9 Hz).

**HRMS:** (ESI$^+$) $[M+H]^+$ calcd for $C_{26}H_{35}F_2O_3$: 433.2549, found: 433.2540.

**Ethyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(3-methoxyphenyl)-propanoate (3u)**



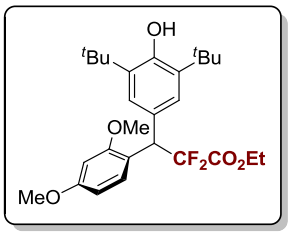

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.31 – 7.24 (m, 1H), 7.22 (s, 2H), 7.06 (d, *J* = 7.6 Hz, 1H), 7.00 (t, *J* = 2.1 Hz, 1H), 6.85 (dd, *J* = 8.2, 2.5 Hz, 1H), 5.20 (s, 1H), 4.64 (t, *J* = 18.3 Hz, 1H), 4.15 (qd, *J* = 7.1, 5.3 Hz, 2H), 3.82 (s, 3H), 1.44 (s, 18H), 1.07 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.0 (t, *J* = 32.6 Hz), 159.5, 153.4, 137.58, 137.55, 135.8, 129.4, 126.3, 125.78, 125.75, 121.9, 116.1 (t, *J* = 256.0 Hz), 115.5, 113.0, 62.5, 55.4 (t, *J* = 21.8 Hz), 55.1, 34.3, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.59 (d, *J* = 255.3 Hz), -107.10 (d, *J* = 255.3 Hz).

**HRMS:** (ESI$^+$) [M+Na]$^+$ calcd for $C_{26}H_{34}F_2O_4Na$: 471.2317, found: 471.2313.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-3-(2,4-dimethoxyphenyl)-2,2-difluoropropanoate (3v)**



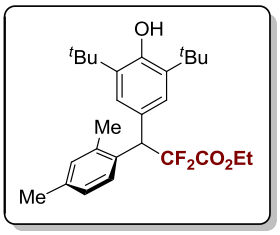

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.54 (d, *J* = 8.6 Hz, 1H), 7.23 (s, 2H), 6.53 (dd, *J* = 8.6, 2.5 Hz, 1H), 6.45 (d, *J* = 2.4 Hz, 1H), 5.24 (dd, *J* = 21.1, 17.7 Hz, 1H), 5.15 (s, 1H), 4.14 (q, *J* = 7.1 Hz, 2H), 3.81 (s, 3H), 3.81 (s, 3H), 1.43 (s, 18H), 1.08 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.3 (t, *J* = 32.8 Hz), 160.1, 158.1, 153.1, 135.4, 130.0, 126.5, 126.25, 126.22, 117.39, 117.35, 116.6 (t, *J* = 254.7 Hz), 104.3, 98.7, 62.3, 55.7, 55.2, 45.7 (t, *J* = 22.0 Hz), 34.3, 30.3, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -103.43 (d, *J* = 252.9 Hz), -107.79 (d, *J* = 252.9 Hz).

**HRMS:** (ESI$^+$) [M+Na]$^+$ calcd for $C_{27}H_{36}F_2O_5Na$: 501.2423, found: 501.2419.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-3-(2,4-dimethylphenyl)-2,2-difluoropropanoate (3w)**



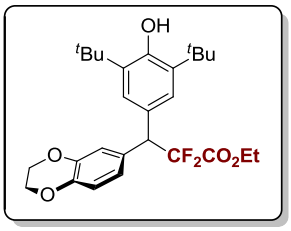

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.52 (d, *J* = 7.7 Hz, 1H), 7.17 (s, 2H), 7.10 – 7.01 (m, 1H), 6.98 (d, *J* = 1.8 Hz, 1H), 5.16 (s, 1H), 4.87 (dd, *J* = 20.6, 17.1 Hz, 1H), 4.13 (qd, *J* = 7.1, 1.6 Hz, 2H), 2.33 (s, 3H), 2.30 (s, 3H), 1.42 (s, 18H), 1.07 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.2 (t, *J* = 32.7 Hz), 153.2, 136.9, 136.5, 135.5, 131.81, 131.77, 131.5, 128.0, 126.8, 126.7, 125.42, 125.39, 116.4 (dd, *J* = 257.0, 252.8 Hz), 62.5, 50.2 (t, *J* = 21.8 Hz), 34.3, 30.2, 20.9, 20.1, 13.8.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -102.10 (d, *J* = 255.8 Hz), -108.20 (d, *J* = 255.8 Hz).

**HRMS:** (ESI$^+$) [M+Na]$^+$ calcd for $C_{27}H_{36}F_2O_3Na$: 469.2525, found: 469.2529.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-3-(2,3-dihydrobenzo[*b*][1,4]dioxin-7-yl)-2,2-difluoropropanoate (3x)**



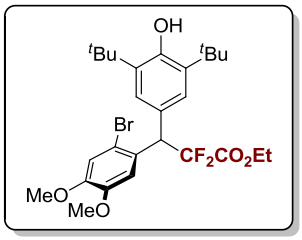

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.19 (s, 2H), 6.98 – 6.89 (m, 2H), 6.84 (d, *J* = 8.3 Hz, 1H), 5.19 (s, 1H), 4.55 (t, *J* = 18.4 Hz, 1H), 4.25 (s, 4H), 4.14 (qt, *J* = 10.1, 6.9 Hz, 2H), 1.44 (s, 18H), 1.08 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.7 Hz), 153.3, 143.3, 143.0, 135.8, 129.28, 129.25, 128.08, 128.07, 126.1, 122.6, 118.6, 117.1, 116.1 (t, *J* = 255.6 Hz), 64.31, 64.27, 62.5, 54.8 (t, *J* = 21.8 Hz), 34.3, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.37 (d, *J* = 254.9 Hz), -107.83 (d, *J* = 254.8 Hz).

**HRMS:** (ESI$^+$) [M+Na]$^+$ calcd for $C_{27}H_{34}F_2O_5Na$: 499.2267, found: 499.2262.

**Ethyl 3-(2-bromo-4,5-dimethoxyphenyl)-3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoropropanoate (3y)**



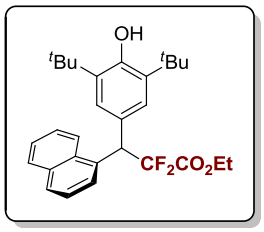

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.27 (s, 1H), 7.24 (s, 2H), 7.04 (s, 1H), 5.30 – 5.18 (m, 2H), 5.20 (s, 1H), 4.18 (q, *J* = 7.1 Hz, 2H), 3.91 (s, 3H), 3.86 (s, 3H), 1.43 (s, 18H), 1.13 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.7 (t, *J* = 32.6 Hz), 153.4, 148.8, 148.3, 135.7, 127.79, 127.74, 126.4, 124.96, 124.93, 116.1 (t, *J* = 255.3 Hz), 115.8, 115.6, 112.3, 62.3, 56.0, 55.9, 53.0 (t, *J* = 22.0 Hz), 34.3, 30.2, 13.7.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -103.43 (d, *J* = 256.2 Hz), -107.85 (d, *J* = 256.2 Hz).

**HRMS:** (ESI$^+$) [M+Na]$^+$ calcd for $C_{27}H_{35}BrF_2O_5Na$: 579.1528, found: 579.1533.

**Ethyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(naphthalen-1-yl)propanoate (3z)**



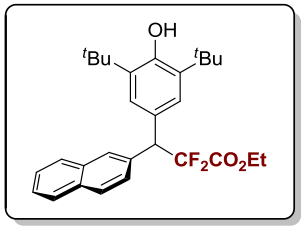

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 8.15 (d, *J* = 8.5 Hz, 1H), 7.90 – 7.78 (m, 3H), 7.57 – 7.46 (m, 3H), 7.27 (s, 2H), 5.58 (dd, *J* = 20.0, 16.6 Hz, 1H), 5.17 (s, 1H), 4.06 (q, *J* = 7.1 Hz, 2H), 1.40 (s, 18H), 0.90 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.6 Hz), 153.4, 135.6, 134.1, 132.26, 132.21, 131.9, 128.9, 128.3, 126.6, 126.4, 126.23, 126.19, 125.5, 125.4, 125.2, 123.3, 116.3 (dd, *J* = 257.0, 252.0 Hz), 62.6, 49.7 (t, *J* = 21.8 Hz), 34.3, 30.2, 13.5.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -101.26 (d, *J* = 256.9 Hz), -107.67 (d, *J* = 256.9 Hz).

**HRMS:** (ESI$^+$) [M+Na]$^+$ calcd for $C_{29}H_{34}F_2O_3Na$: 491.2368, found: 491.2374.

**Ethyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(naphthalen-2-yl)propanoate (3aa)**



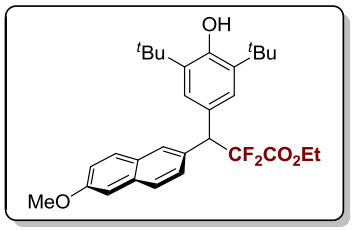

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.92 (d, *J* = 1.8 Hz, 1H), 7.88 – 7.79 (m, 3H), 7.57 (dd, *J* = 8.6, 1.7 Hz, 1H), 7.54 – 7.46 (m, 2H), 7.27 (s, 2H), 5.20 (s, 1H), 4.85 (t, *J* = 18.3 Hz, 1H), 4.18 – 4.09 (m, 2H), 1.43 (s, 18H), 1.04 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.5 Hz), 153.4, 135.8, 133.71, 133.68, 133.3, 132.6, 128.6, 128.1, 128.0, 127.5, 127.4, 126.4, 126.11, 126.07, 125.90, 125.88, 116.2 (t, *J* = 256.0 Hz), 62.6, 55.5 (t, *J* = 21.8 Hz), 34.4, 30.3, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.72 (d, *J* = 255.9 Hz), -106.50 (d, *J* = 255.9 Hz).

**HRMS:** (ESI$^+$) [M+Na]$^+$ calcd for $C_{29}H_{34}F_2O_3Na$: 491.2368, found: 491.2372.

**Ethyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(6-methoxynaphthalen-2-yl)-propanoate (3ab)**



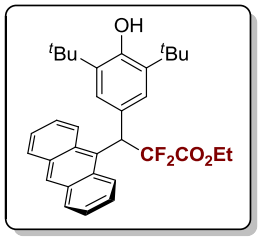

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.87 – 7.80 (m, 1H), 7.73 (dd, *J* = 11.1, 8.8 Hz, 2H), 7.52 (dd, *J* = 8.5, 1.8 Hz, 1H), 7.26 (s, 2H), 7.16 (dd, *J* = 8.9, 2.5 Hz, 1H), 7.12 (d, *J* = 2.5 Hz, 1H), 5.19 (s, 1H), 4.81 (t, *J* = 18.4 Hz, 1H), 4.12 (qd, *J* = 7.1, 5.2 Hz, 2H), 3.94 (s, 3H), 1.43 (s, 18H), 1.04 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.8 Hz), 157.9, 153.3, 135.8, 133.8, 131.3, 129.5, 128.7, 128.4, 127.9, 127.0, 126.4, 126.1, 119.0, 116.3 (t, *J* = 256.4 Hz), 105.5, 62.5, 55.4 (t, *J* = 21.9 Hz), 55.3, 34.3, 30.3, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -103.51 (d, *J* = 257.1 Hz), -109.00 (d, *J* = 257.1 Hz).

**HRMS:** (ESI$^+$) [M+Na]$^+$ calcd for $C_{30}H_{36}F_2O_4Na$: 521.2474, found: 521.2479.

**Ethyl 3-(anthracen-9-yl)-3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoropropanoate (3ac)**



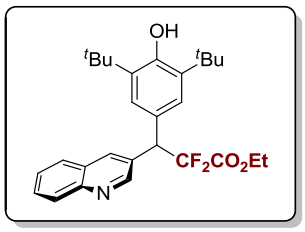

**$^1$H NMR** (500 MHz, $CDCl_3$) δ 7.82 (dd, *J* = 8.1, 1.3 Hz, 1H), 7.46 – 7.37 (m, 4H), 7.31 – 7.27 (m, 1H), 7.24 (s, 2H), 7.21 (td, *J* = 7.6, 1.3 Hz, 1H), 7.09 (td, *J* = 7.6, 1.3 Hz, 1H), 7.06 (s, 1H), 5.24 (s, 1H), 4.74 (dd, *J* = 17.3, 14.0 Hz, 1H), 4.29 – 4.14 (m, 2H), 1.37 (s, 18H), 1.23 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.1 Hz), 153.2, 140.9, 137.0, 135.5, 133.5, 131.24, 131.21, 129.63, 129.56, 129.2, 128.94, 128.92, 128.3, 128.2, 128.0, 126.8, 126.7, 126.6, 126.3, 123.6, 116.3 (t, *J* = 258.9 Hz), 62.8, 51.2 (t, *J* = 23.6 Hz), 34.2, 30.2, 13.8.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -106.98 (d, *J* = 245.3 Hz), -109.52 (d, *J* = 245.3 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{33}H_{36}F_2O_3Na$: 541.2525, found: 541.2529.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(quinoline-2-yl)propanoate (3ad)**



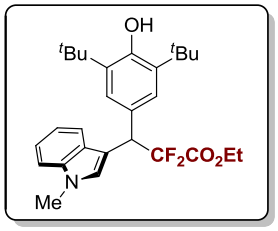

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 8.94 (d, *J* = 2.1 Hz, 1H), 8.26 (d, *J* = 2.1 Hz, 1H), 8.10 (d, *J* = 8.4 Hz, 1H), 7.86 (dd, *J* = 8.2, 1.5 Hz, 1H), 7.73 (ddd, *J* = 8.3, 6.8, 1.4 Hz, 1H), 7.58 (ddd, *J* = 8.0, 6.8, 1.1 Hz, 1H), 7.24 (s, 2H), 5.26 (s, 1H), 4.90 (dd, *J* = 20.3, 15.7 Hz, 1H), 4.21 – 4.12 (m, 2H), 1.43 (s, 18H), 1.07 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.6 (t, *J* = 32.3 Hz), 153.7, 151.8, 147.3, 136.3, 136.1, 129.65, 129.32, 129.29, 129.1, 128.0, 127.6, 126.9, 126.2, 124.80, 124.75, 115.9 (t, *J* = 256.1 Hz), 62.8, 53.3 (t, *J* = 22.2 Hz), 34.4, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -103.39 (d, *J* = 257.6 Hz), -108.54 (d, *J* = 257.6 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{28}H_{33}F_2NO_3Na$: 492.2321, found: 492.2319.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(1-methyl-1H-indol-3-yl)-propanoate (3ae)**



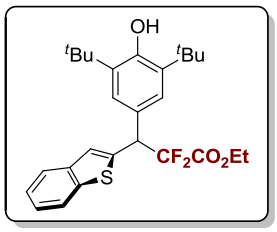

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.62 (d, *J* = 8.0 Hz, 1H), 7.31 (dt, *J* = 8.2, 1.0 Hz, 1H), 7.28 (s, 2H), 7.26 – 7.21 (m, 2H), 7.13 (ddd, *J* = 7.9, 7.0, 1.1 Hz, 1H), 5.15 (s, 1H), 4.99 (dd, *J* = 20.4, 16.1 Hz, 1H), 4.08 (qd, *J* = 7.1, 5.3 Hz, 2H), 3.81 (s, 3H), 1.43 (s, 18H), 1.01 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.3 (t, *J* = 32.8 Hz), 153.2, 136.6, 135.6, 128.0, 127.7, 126.3, 126.23, 126.20, 121.8, 119.2, 119.1, 116.4 (t, *J* = 255.1 Hz), 109.32, 109.27, 109.2, 62.4, 46.9 (t, *J* = 22.8 Hz), 34.3, 32.9, 30.3, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -106.05 (d, *J* = 250.9 Hz), -109.13 (d, *J* = 250.9 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{28}H_{35}F_2NO_3Na$: 494.2477, found: 494.2486.

**Ethyl 3-(benzo[*b*]thiophen-2-yl)-3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluoro-propanoate (3af)**



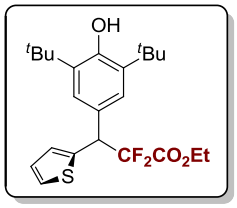

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.88 (dd, *J* = 7.1, 1.5 Hz, 1H), 7.77 (dd, *J* = 7.4, 1.6 Hz, 1H), 7.69 (d, *J* = 1.4 Hz, 1H), 7.42 – 7.33 (m, 2H), 7.24 (s, 2H), 5.20 (s, 1H), 5.14 (dd, *J* = 19.7, 15.4 Hz, 1H), 4.13 (qd, *J* = 7.1, 2.1 Hz, 2H), 1.42 (s, 18H), 1.02 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.0 (t, *J* = 32.5 Hz), 153.6, 139.8, 138.6, 135.7, 130.18, 130.14, 126.4, 124.4, 124.18, 124.15, 124.1, 122.7, 121.7, 117.9, 115.9 (t, *J* = 255.5 Hz), 62.7, 48.8 (t, *J* = 22.7 Hz), 34.3, 30.2, 13.6.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -104.66 (d, *J* = 255.0 Hz), -109.15 (d, *J* = 255.0 Hz).

**HRMS:** ($ESI^+$) $[M+Na]^+$ calcd for $C_{27}H_{32}F_2O_3SNa$: 497.1932, found: 497.1935.

**Ethyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl)-2,2-difluoro-3-(thiophen-2-yl)propanoate (3ag)**




**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.31 – 7.27 (m, 1H), 7.26 (s, 2H), 7.12 (d, *J* = 3.5 Hz, 1H), 7.00 (dd, *J* = 5.1, 3.5 Hz, 1H), 5.24 (s, 1H), 4.92 (t, *J*

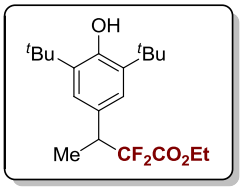
= 17.4 Hz, 1H), 4.15 (qd, *J* = 7.1, 2.6 Hz, 2H), 1.44 (s, 18H), 1.10 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 163.8 (t, *J* = 32.3 Hz), 153.7, 138.01, 137.97, 135.9, 127.6, 126.7, 126.3, 125.6, 125.28, 125.24, 115.4 (t, *J* = 257.2 Hz), 62.6, 51.1 (t, *J* = 22.8 Hz), 34.4, 30.2, 13.7.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -106.54 (d, *J* = 251.3 Hz), -109.76 (d, *J* = 251.3 Hz).

**HRMS:** (ESI$^+$) $[M+Na]^+$ calcd for $C_{23}H_{30}F_2O_3SNa$: 447.1776, found: 447.1779.

**Ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)-2,2-difluorobutanoate (3ah)**



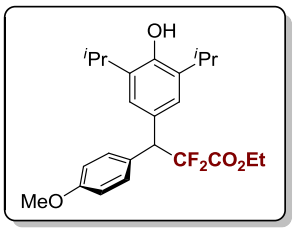

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.07 (s, 2H), 5.20 (s, 1H), 4.21 – 4.11 (m, 2H), 3.43 (ddq, *J* = 20.5, 14.3, 7.2 Hz, 1H), 1.47 (d, *J* = 9.6 Hz, 3H), 1.45 (s, 18H), 1.15 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.3 (t, *J* = 32.9 Hz), 153.3, 135.7, 127.3, 125.4, 116.9 (dd, *J* = 257.0, 253.4 Hz), 62.3, 44.2 (t, *J* = 22.5 Hz), 34.3, 30.3, 13.79 (t, *J* = 2.5 Hz), 13.76.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -108.55 (d, *J* = 248.6 Hz), -115.40 (d, *J* = 248.6 Hz).

**HRMS:** (ESI$^+$) $[M+Na]^+$ calcd for $C_{20}H_{30}F_2O_3Na$: 379.2055, found: 379.2054.

**Ethyl 2,2-difluoro-3-(4-hydroxy-3,5-diisopropylphenyl)-3-(4-methoxyphenyl)-propanoate (3ai)**



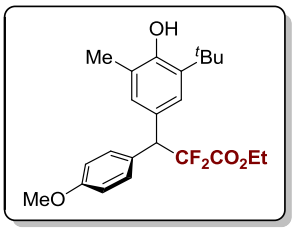

**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.34 (d, *J* = 8.7 Hz, 2H), 7.07 (s, 2H), 6.88 (d, *J* = 8.7 Hz, 2H), 4.78 (s, 1H), 4.64 (t, *J* = 18.4 Hz, 1H), 4.14 (qd, *J* = 7.1, 4.4 Hz, 2H), 3.81 (s, 3H), 3.13 (p, *J* = 6.9 Hz, 2H), 1.26 (d, *J* = 6.9 Hz, 12H), 1.10 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.8 Hz), 159.0, 149.5, 133.60, 130.7, 128.1, 128.0, 127.52, 127.49 124.7, 116.1 (t, *J* = 255.8 Hz), 113.8, 62.5, 55.2, 54.5 (t, *J* = 21.8 Hz), 27.2, 22.7, 22.6, 13.7.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -105.62 (d, *J* = 255.5 Hz), -107.44 (d, *J* = 255.5 Hz).

**HRMS:** (ESI$^+$) $[M+Na]^+$ calcd for $C_{24}H_{30}F_2O_4Na$: 443.2004, found: 443.2009.

**Ethyl 3-(3-(tert-butyl)-4-hydroxy-5-methylphenyl)-2,2-difluoro-3-(4-methoxyphenyl)-propanoate (3aj)**




**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ 7.35 (d, *J* = 8.7 Hz, 2H), 7.16 (d, *J* = 2.2 Hz, 1H), 7.04 (d, *J* = 2.1 Hz, 1H), 6.88 (d, *J* = 8.8 Hz, 2H), 4.77 (s, 1H), 4.61 (t, *J* = 18.5 Hz, 1H), 4.16 (qd, *J* = 7.1, 1.8 Hz, 2H), 3.81 (s, 3H), 2.23 (s, 3H), 1.40 (s, 9H), 1.12 (t, *J* = 7.1 Hz, 3H).

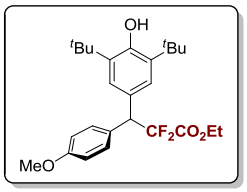
**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ 164.1 (t, *J* = 32.8 Hz), 159.0, 152.2, 135.5, 130.6, 129.4, 128.2, 126.9, 126.5, 123.1, 116.1 (t, *J* = 255.4 Hz), 113.9, 62.6, 55.2, 54.3 (t, *J* = 21.9 Hz), 34.5, 29.7, 16.1, 13.7.

**$^{19}$F NMR** (471 MHz, $CDCl_3$) δ -106.08 (d, *J* = 255.8 Hz), -107.11 (d, *J* = 255.8 Hz).

**HRMS:** (ESI$^+$) $[M+Na]^+$ calcd for $C_{23}H_{28}F_2O_4Na$: 429.1848, found: 429.1847.

## IV. NMR Spectra

Please refer to next pages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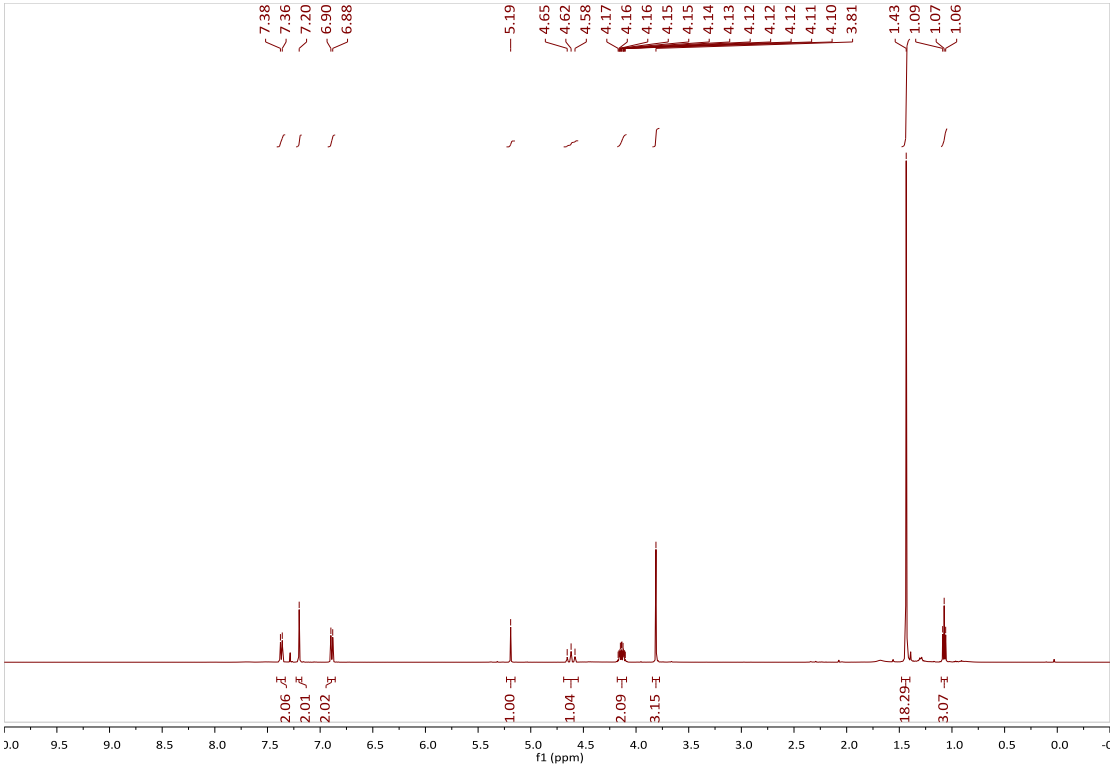
MeO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6.88
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4.58
4.17
4.16
4.16
4.15
4.15
4.14
4.13
4.12
4.12
4.12
4.11
4.10
3.81
1.43
1.09
1.07
1.06
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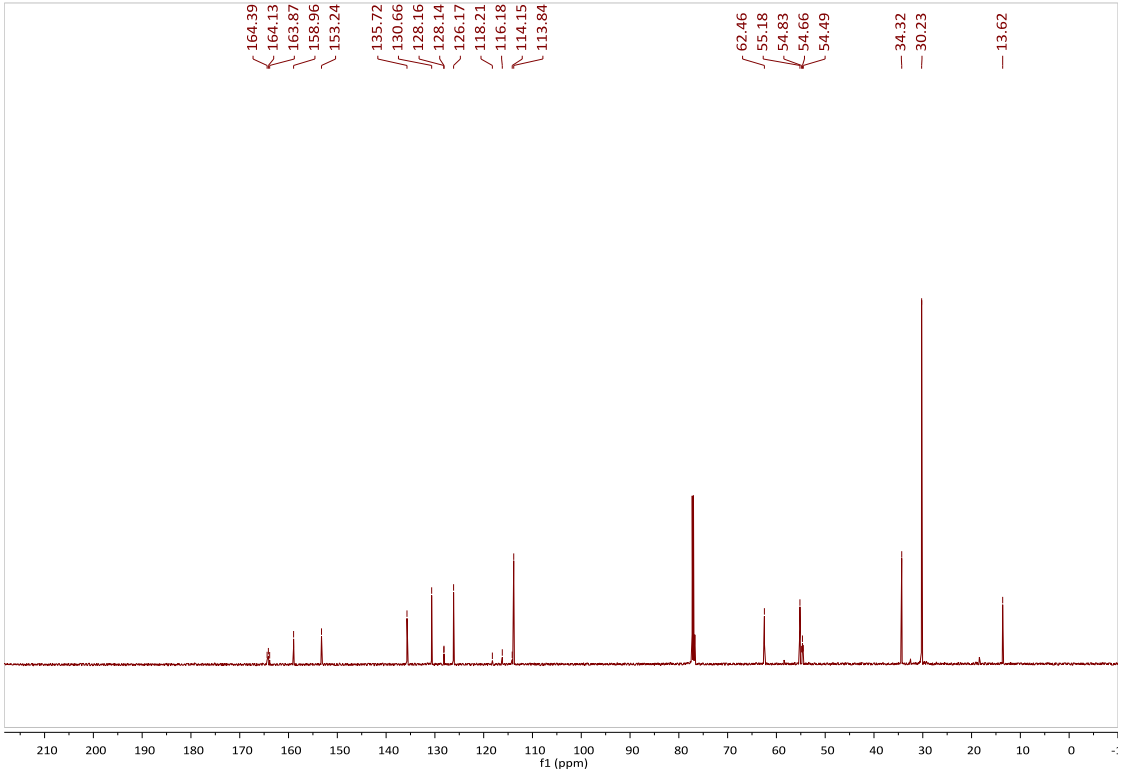
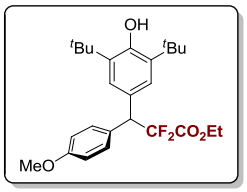
2.01
2.02
1.00
1.04
2.09
3.15
18.29
3.07
f1 (ppm)


164.39
164.13
163.87
158.96
153.24
135.72
130.66
128.16
128.14
126.17
118.21
116.18
114.15
113.84
62.46
55.18
54.83
54.66
54.49
34.32
30.23
13.62
f1 (ppm)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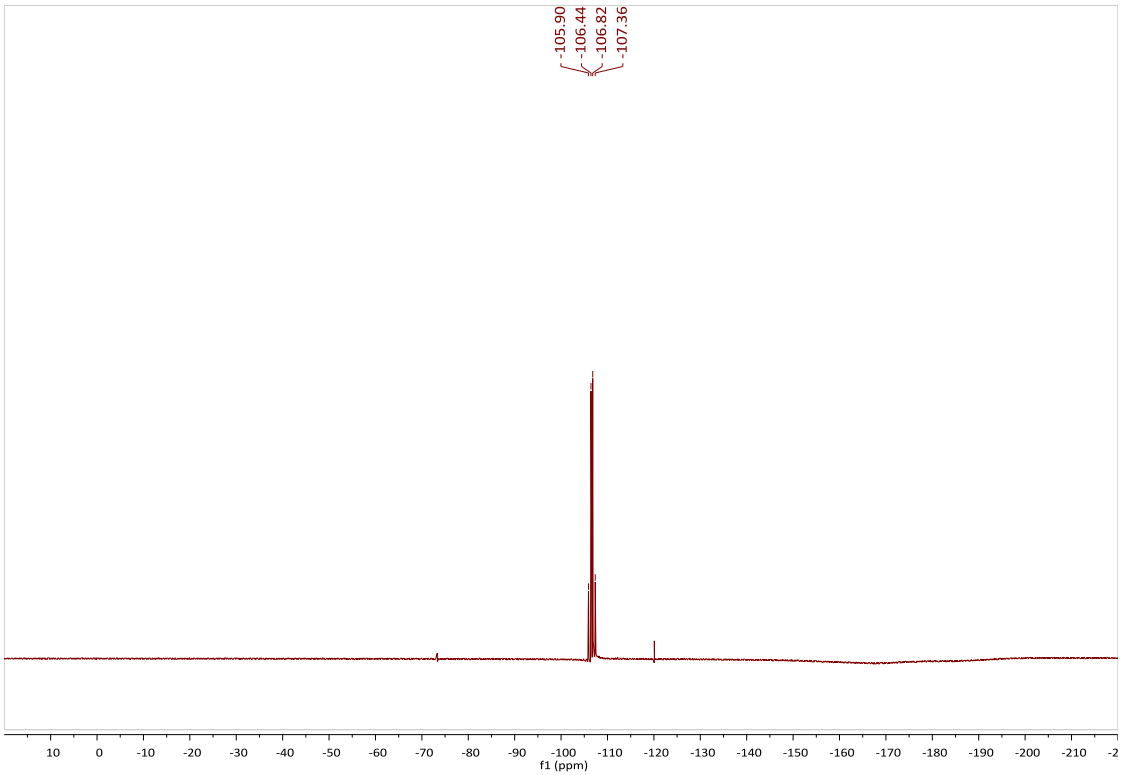
tBu
tBu
CF2CO2Et
MeO


-105.90
-106.44
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-107.36
10
0
-10
-20
-30
-40
-50
-60
-70
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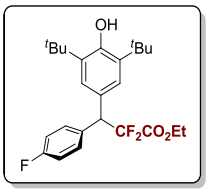
-170
-180
-190
-200
-210
f1 (ppm)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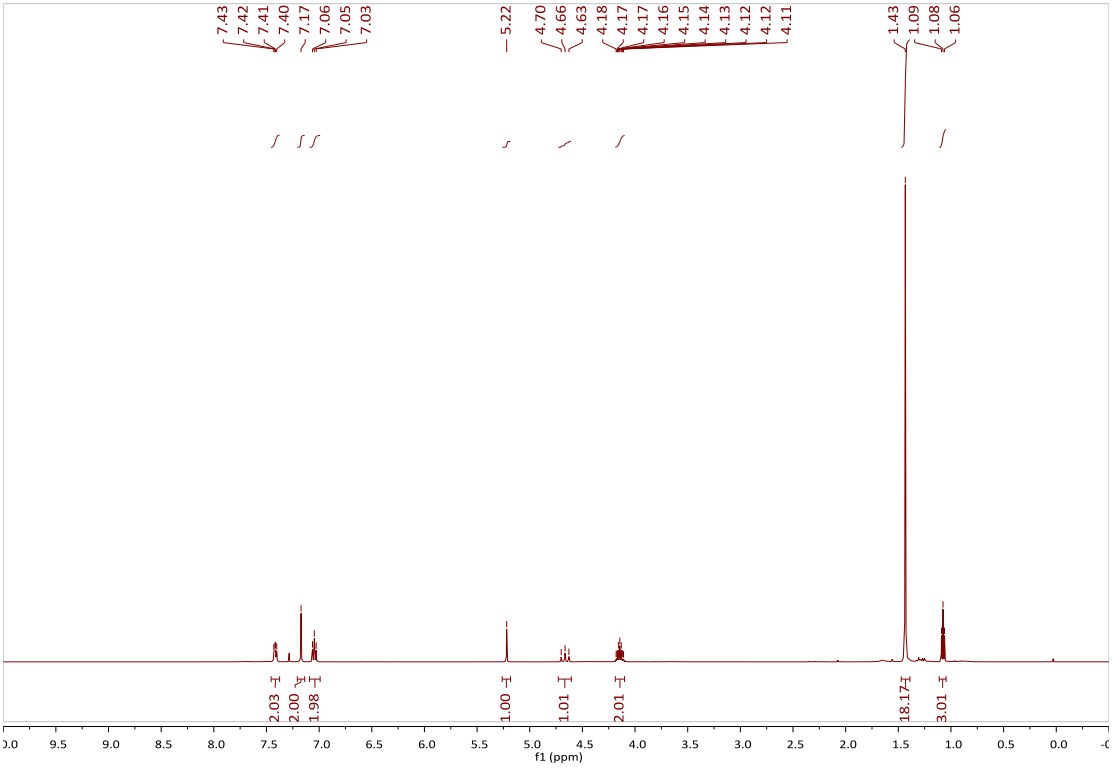
CF2CO2Et
F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4.17
4.17
4.16
4.15
4.14
4.13
4.12
4.12
4.11
1.43
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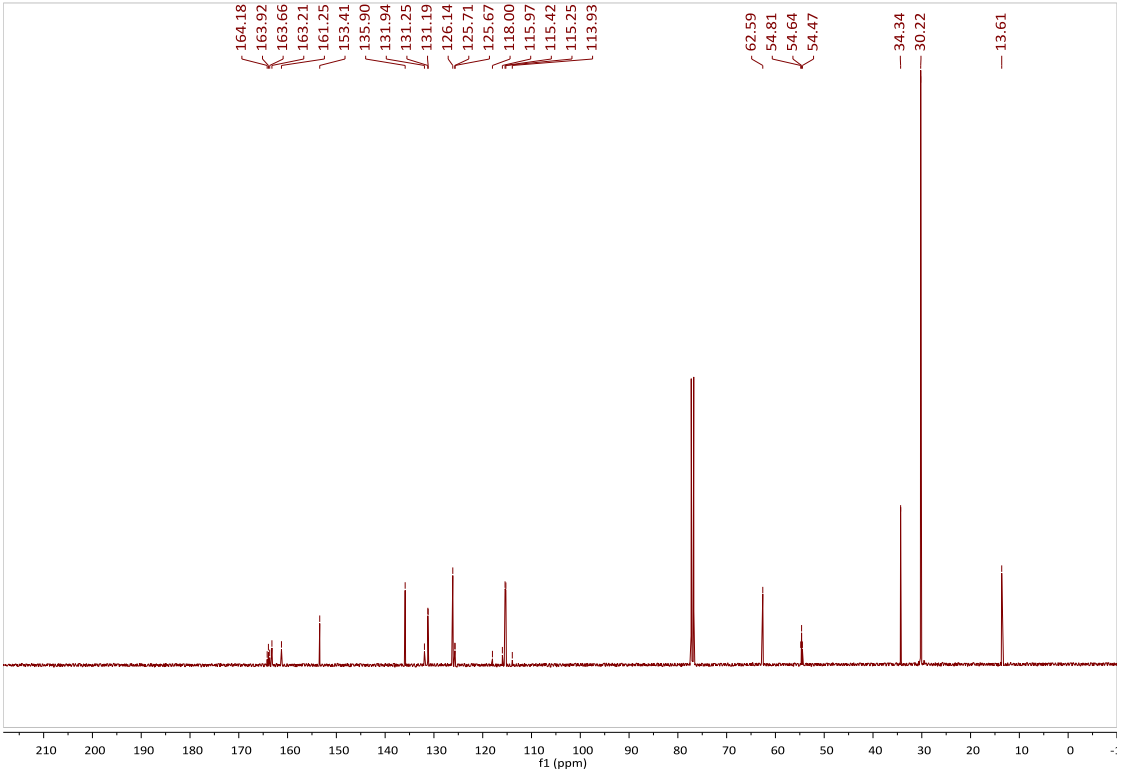
1.01
2.01
18.17
3.01
f1 (ppm)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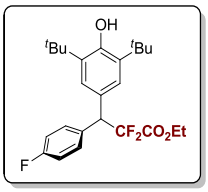
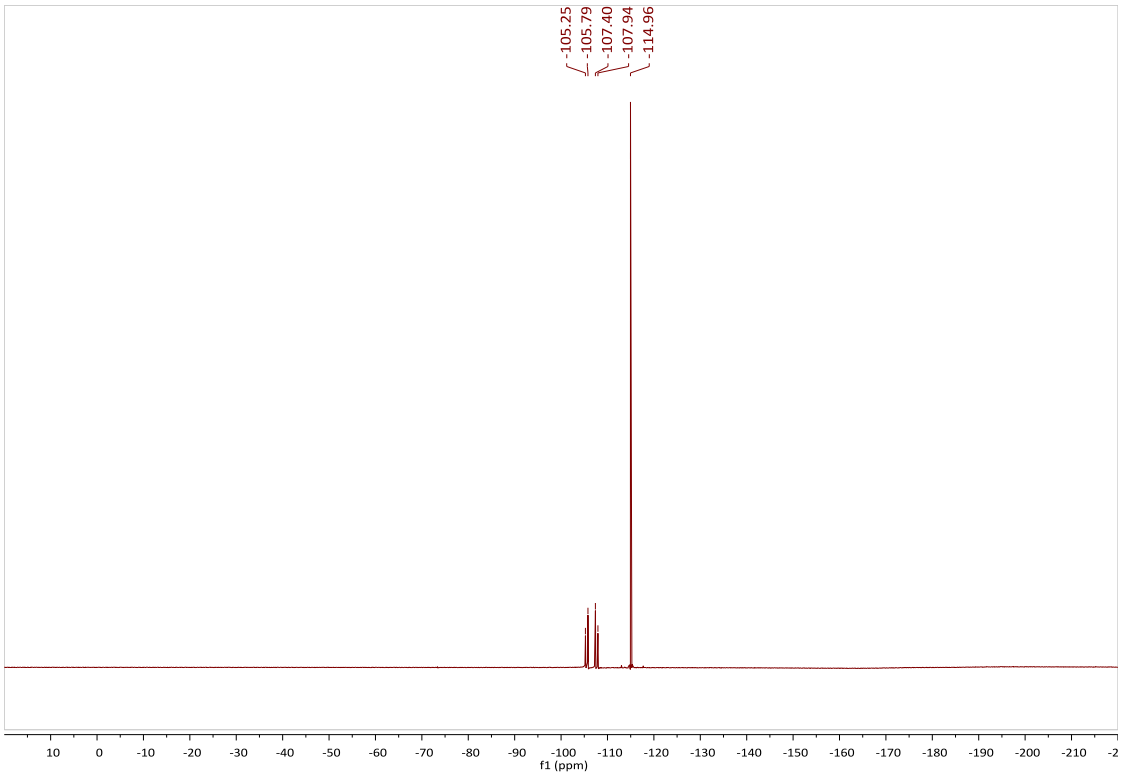
163.66
163.21
161.25
153.41
135.90
131.94
131.25
131.19
126.14
125.71
125.67
118.00
115.97
115.42
115.25
113.93
62.59
54.81
54.64
54.47
34.34
30.22
13.61
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
F


-105.25
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-107.40
-107.94
-114.96
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0
-10
-20
-30
-40
-50
-60
-70
-80
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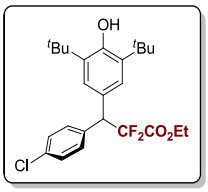
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)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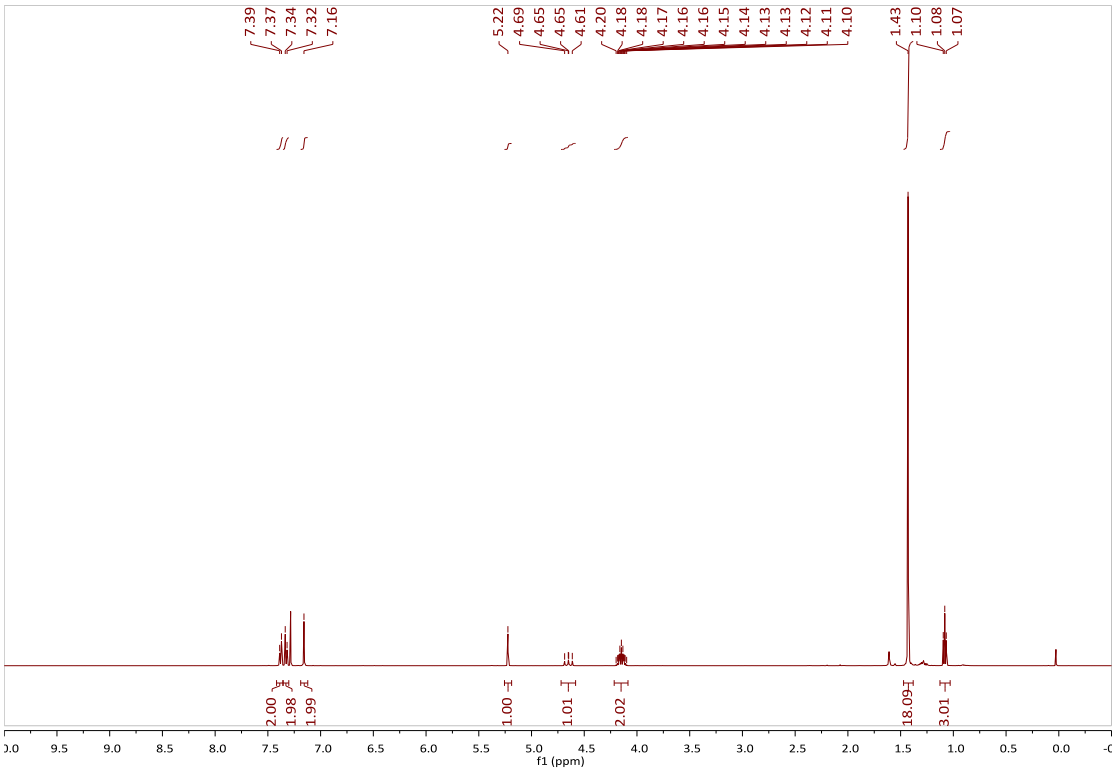
Cl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4.16
4.16
4.15
4.14
4.13
4.13
4.12
4.11
4.10
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1.99
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2.02
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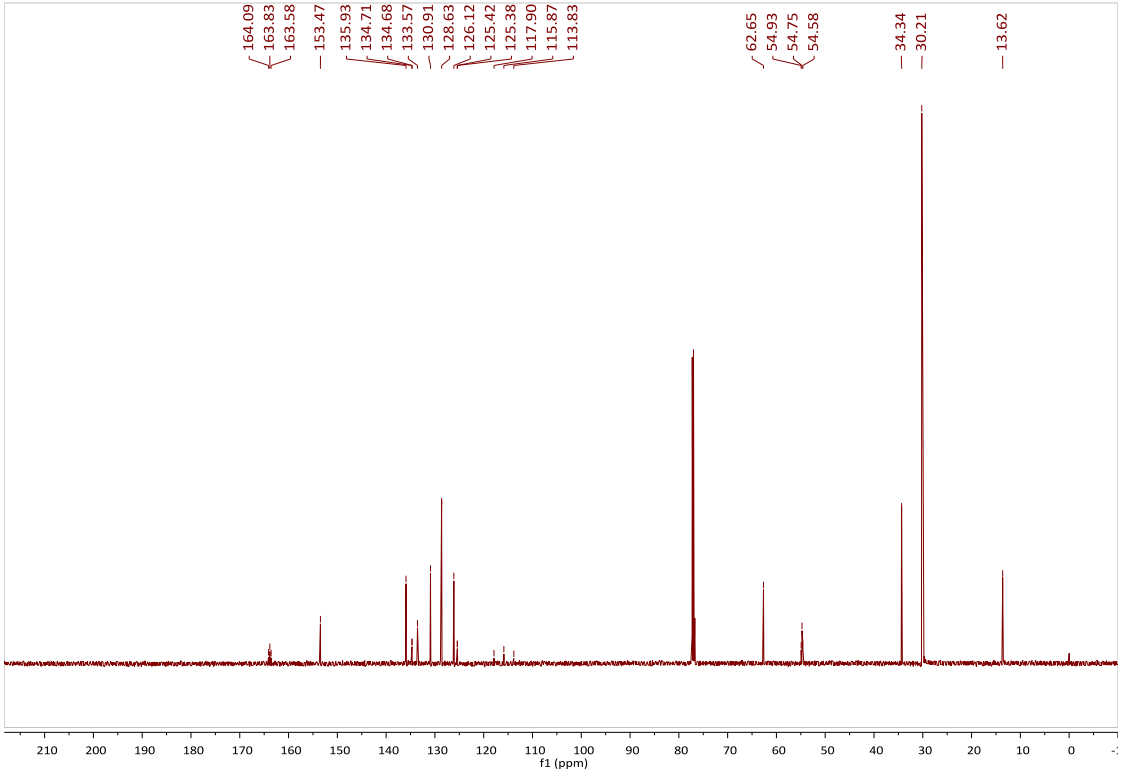
3.01
f1 (ppm)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133.57
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126.12
125.42
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113.83
62.65
54.93
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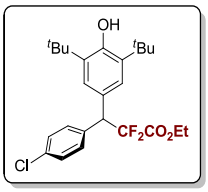
54.58
34.34
30.21
13.62
f1 (ppm)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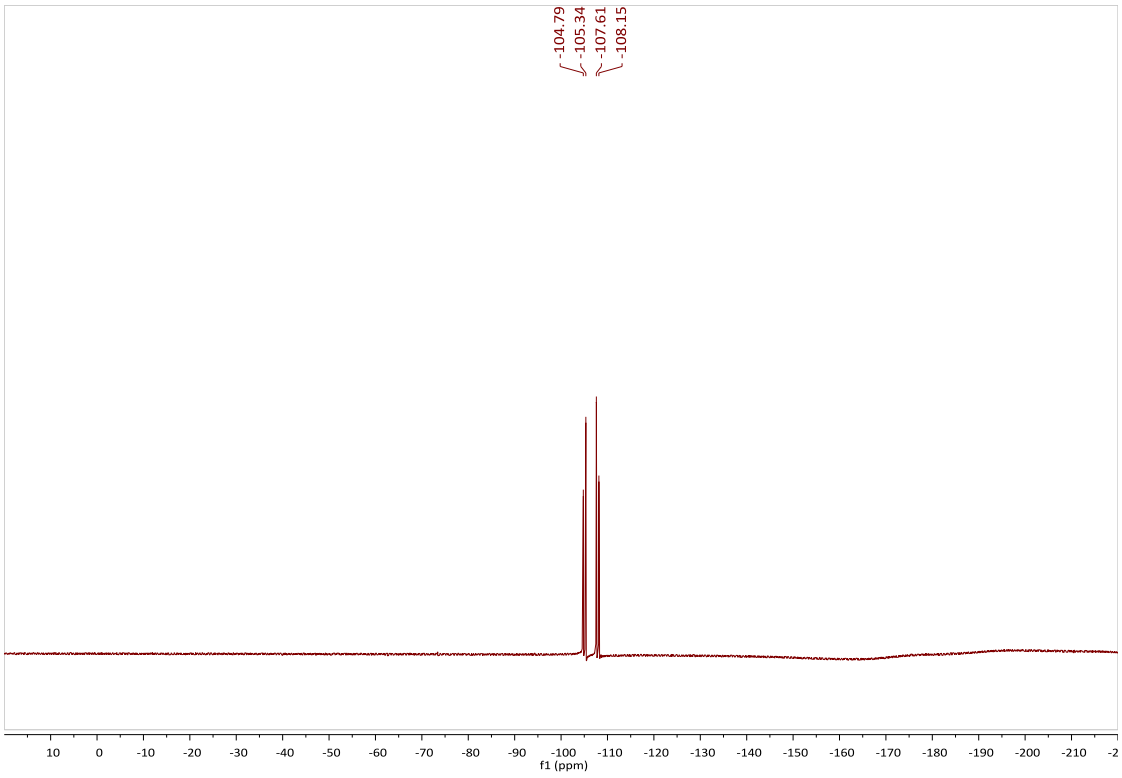
tBu
CF2CO2Et
Cl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-110
-120
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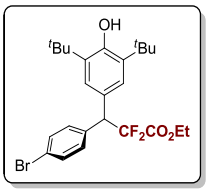
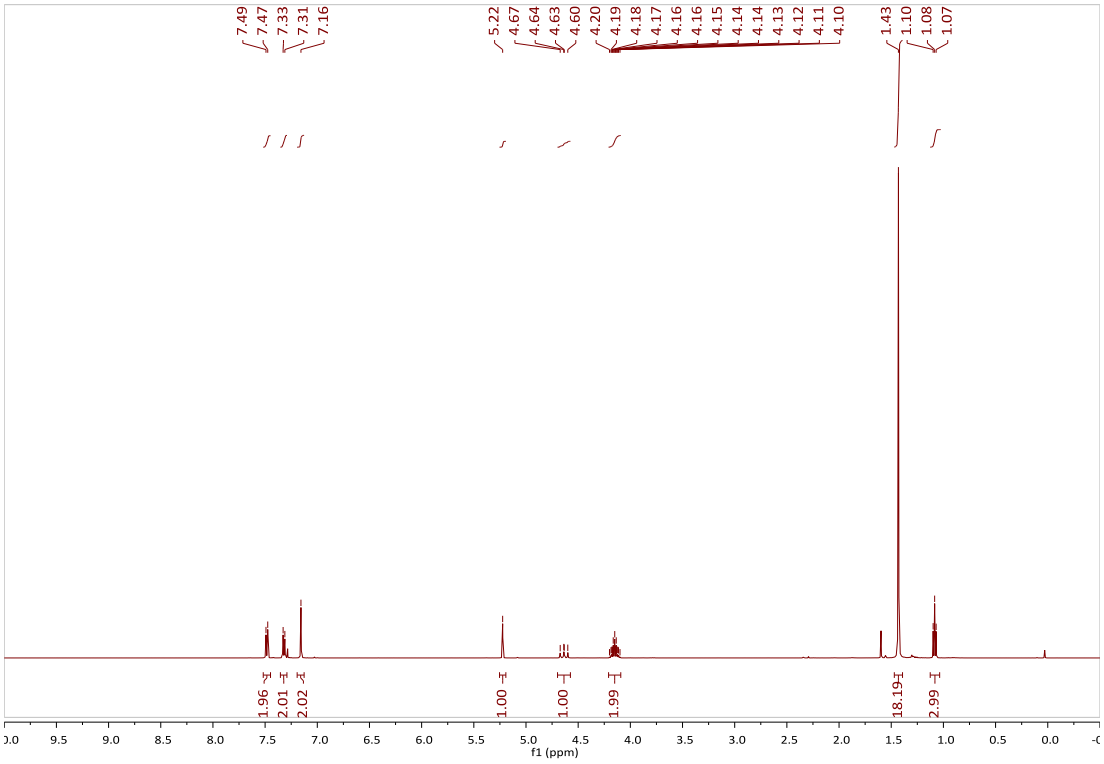
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
Br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4.20
4.19
4.18
4.17
4.16
4.16
4.15
4.14
4.14
4.13
4.12
4.11
4.10
1.43
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1.08
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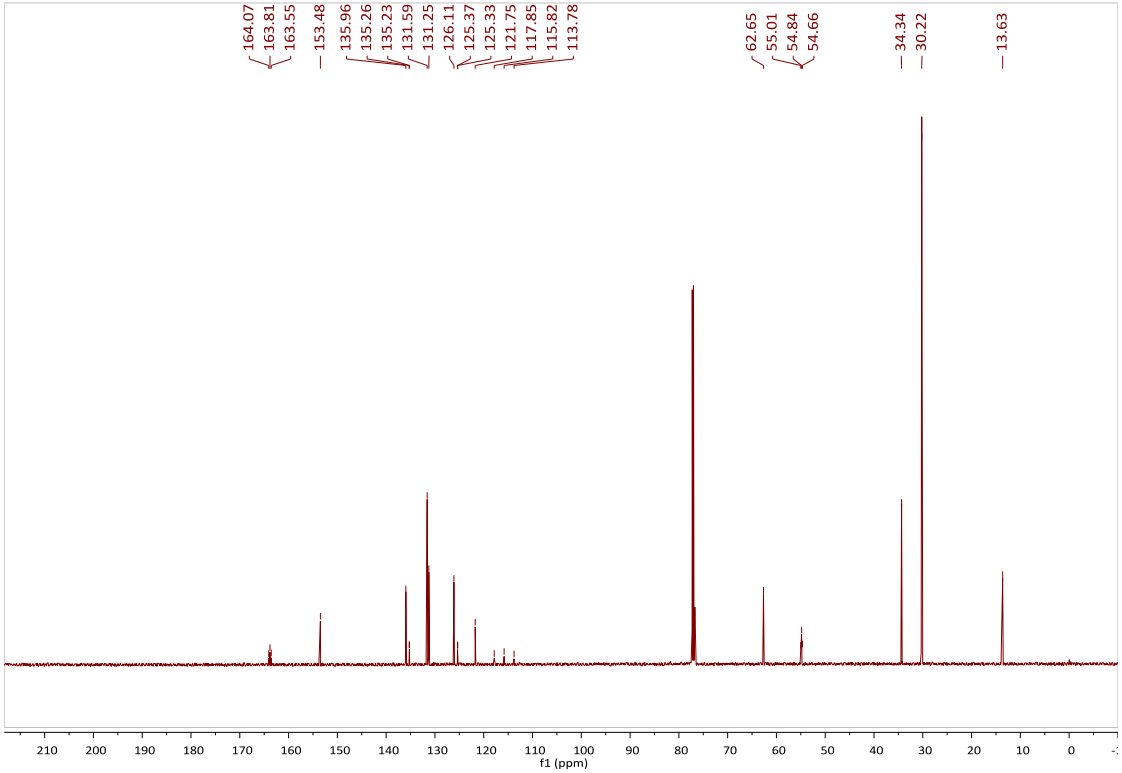
1.00
1.99
18.19
2.99
f1 (ppm)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125.33
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113.78
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55.01
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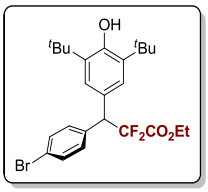
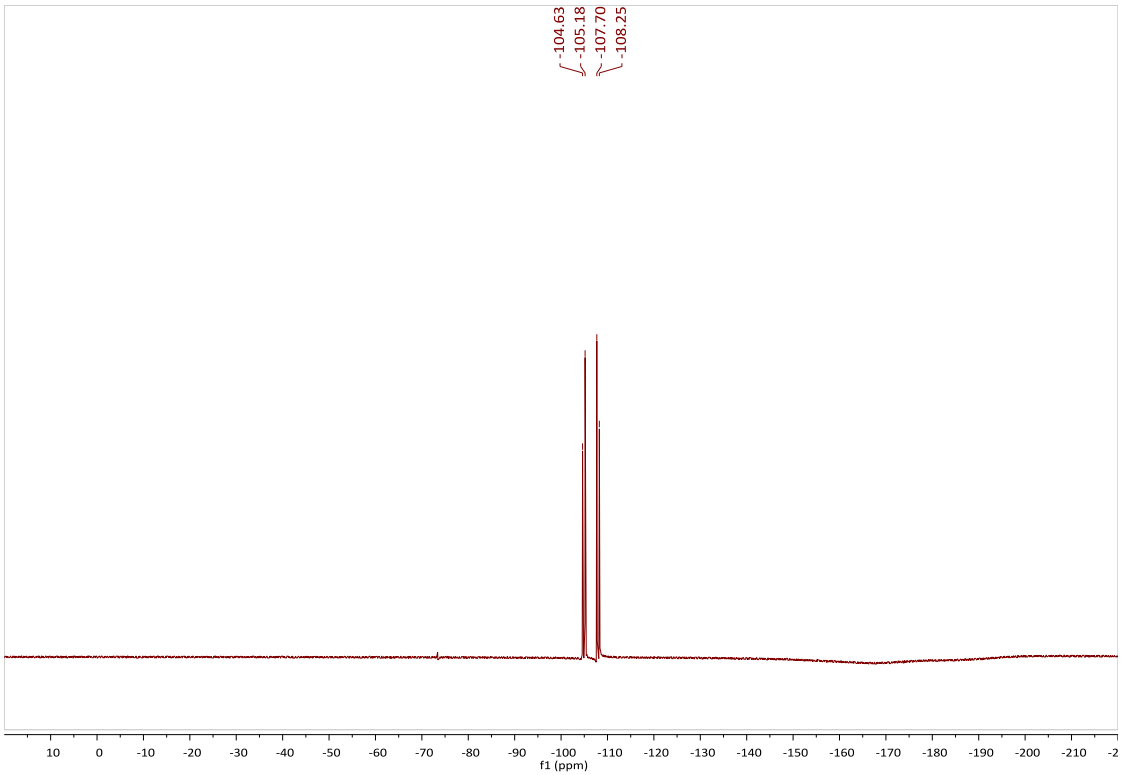
54.66
34.34
30.22
13.63
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
Br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-70
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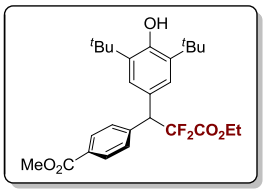
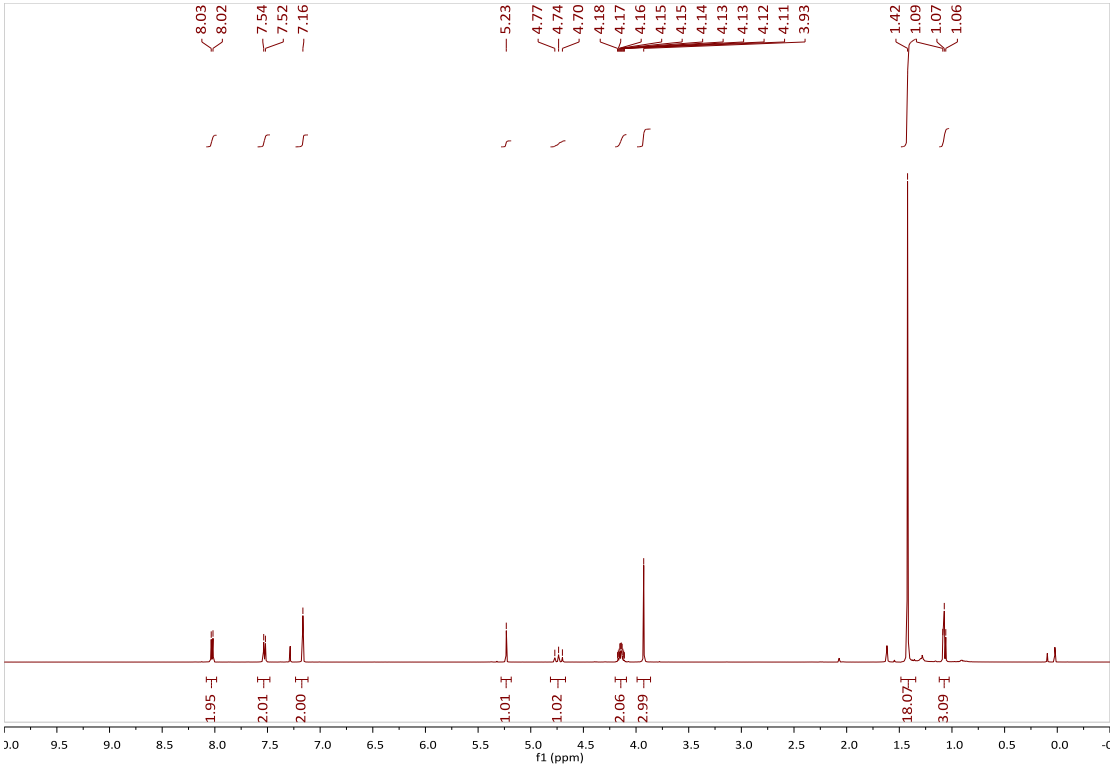
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
MeO2C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4.74
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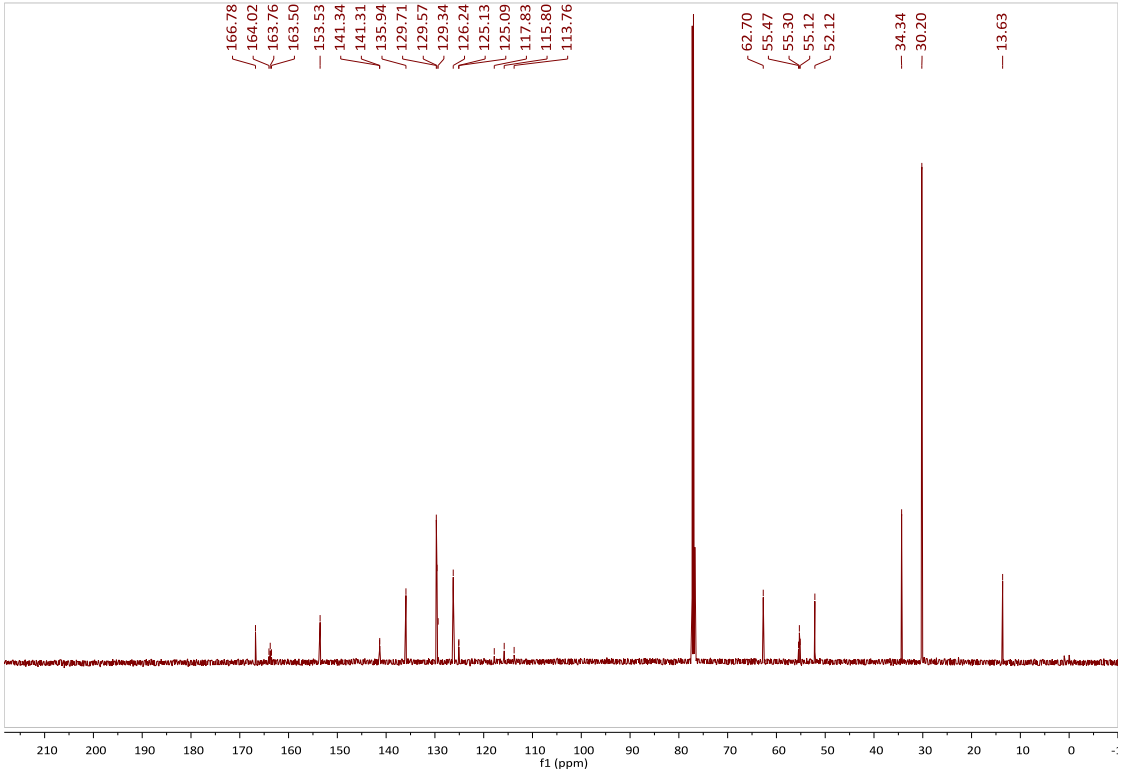
4.17
4.16
4.15
4.15
4.14
4.13
4.13
4.12
4.11
3.93
1.42
1.09
1.07
1.06
1.95
2.01
2.00
1.01
1.02
2.06
2.99
18.07
3.09
f1 (ppm)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129.34
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125.13
125.09
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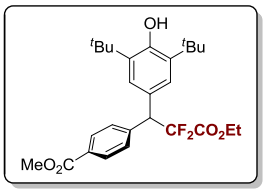
55.30
55.12
52.12
34.34
30.20
13.63
f1 (ppm)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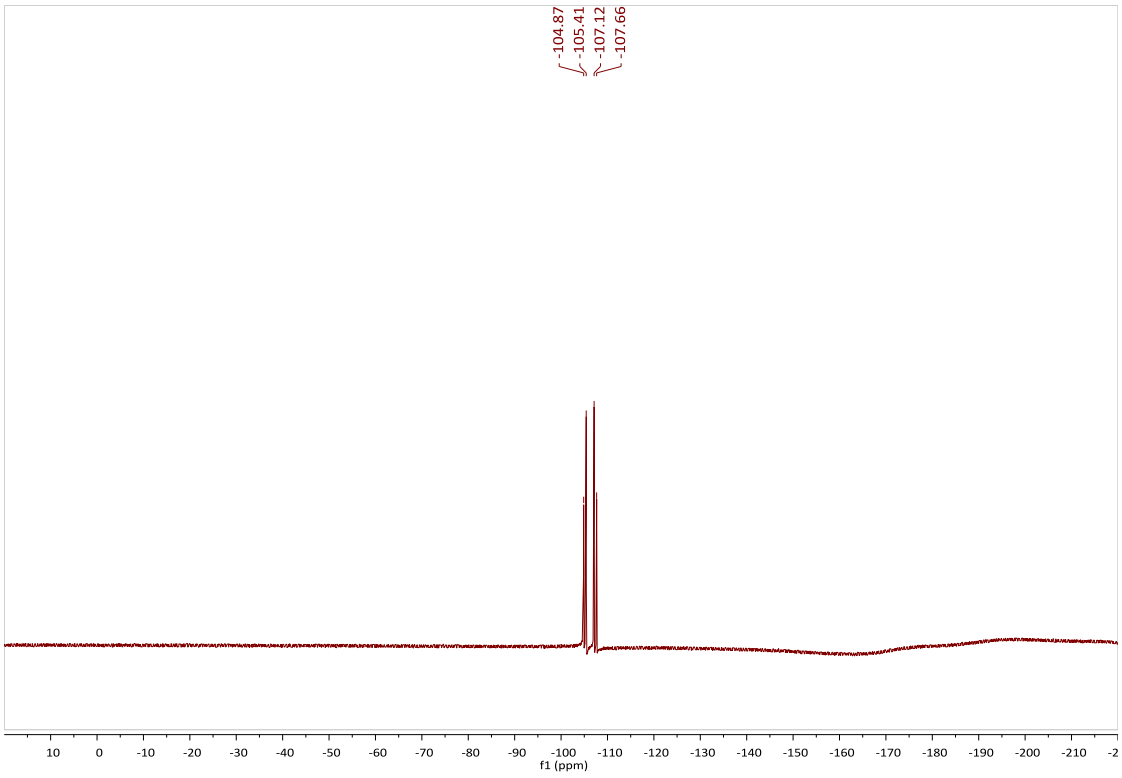
tBu
tBu
CF2CO2Et
MeO2C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-60
-70
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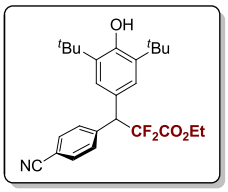
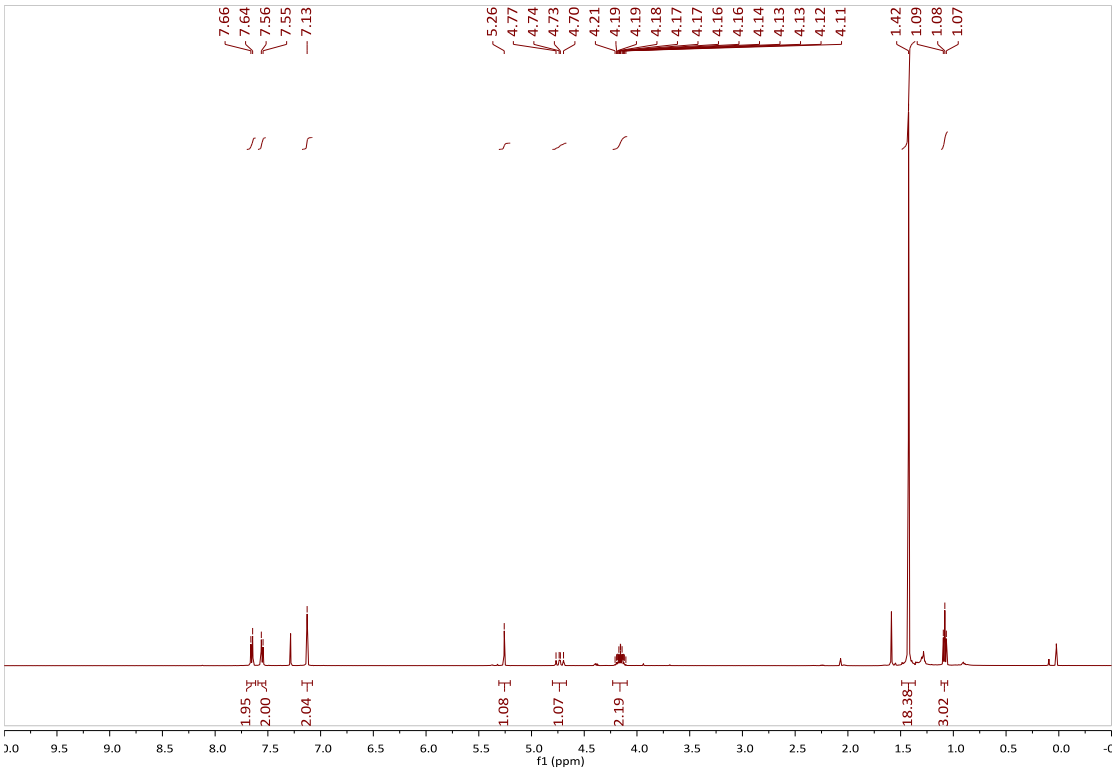
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
NC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4.19
4.18
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4.17
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4.14
4.13
4.12
4.11
1.42
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1.08
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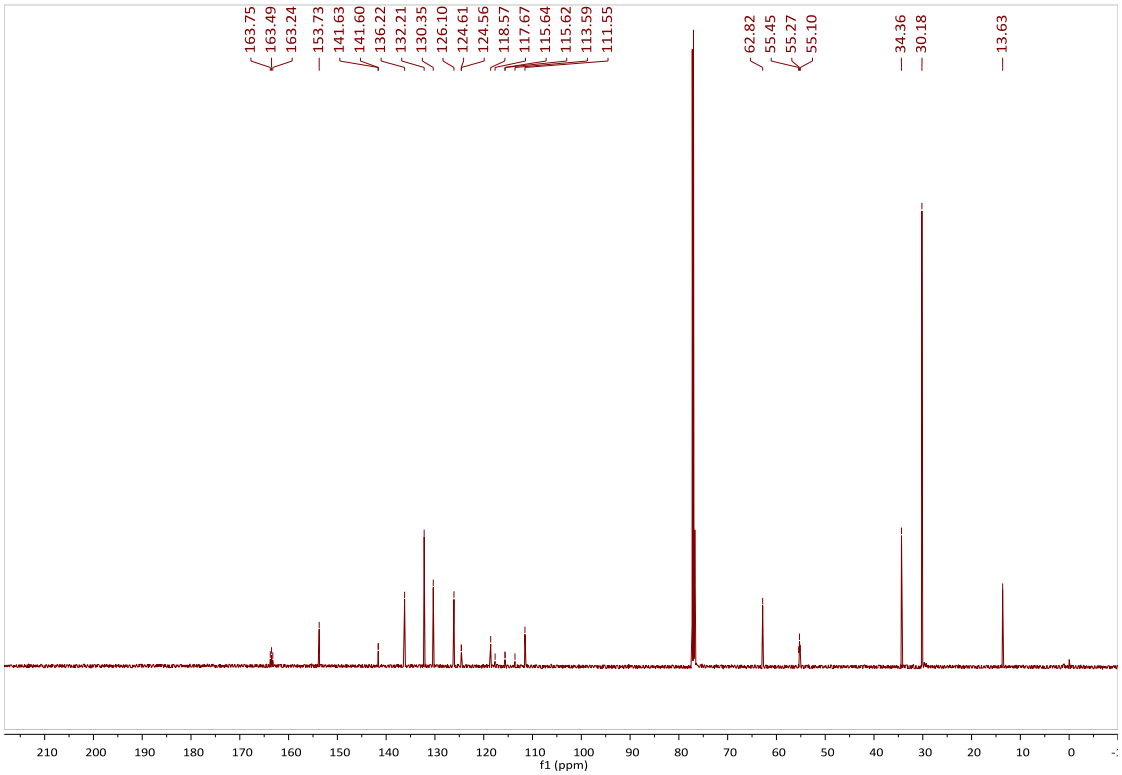
2.04
1.08
1.07
2.19
18.38
3.02
f1 (ppm)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126.10
124.61
124.56
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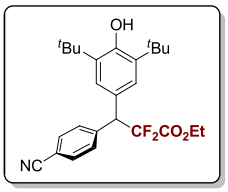
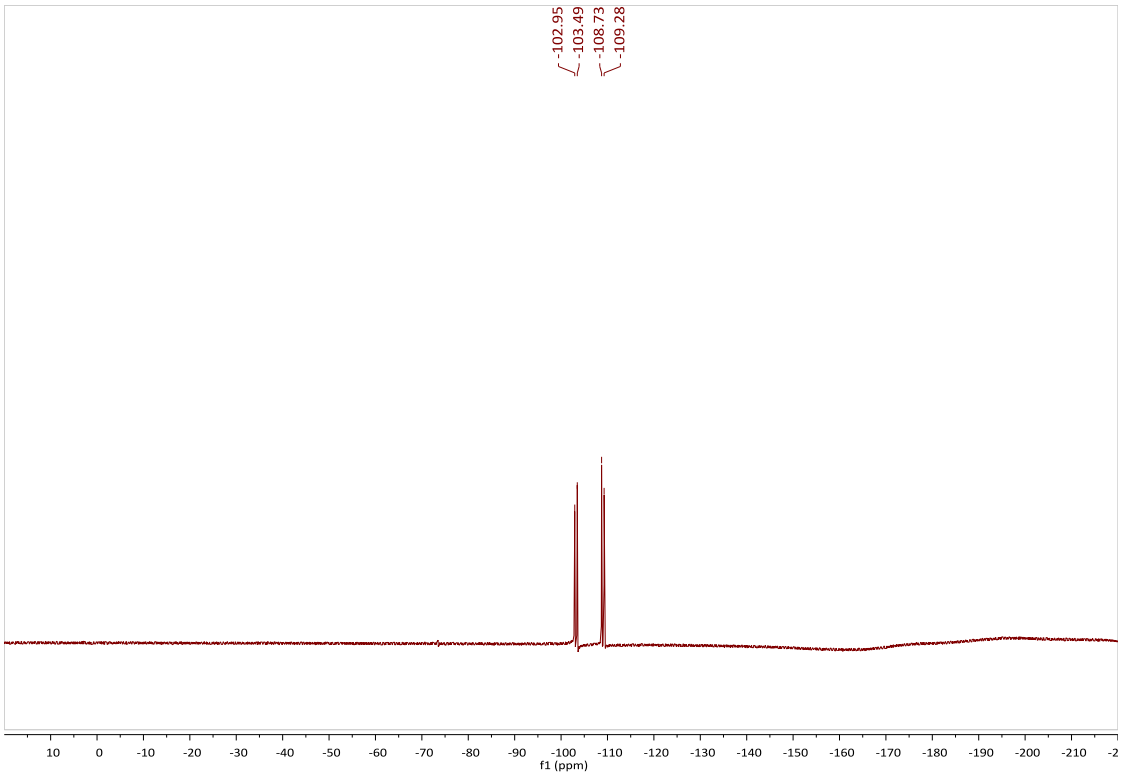
55.10
34.36
30.18
13.63
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
NC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-70
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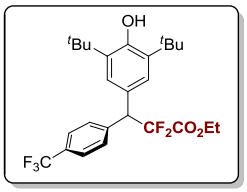
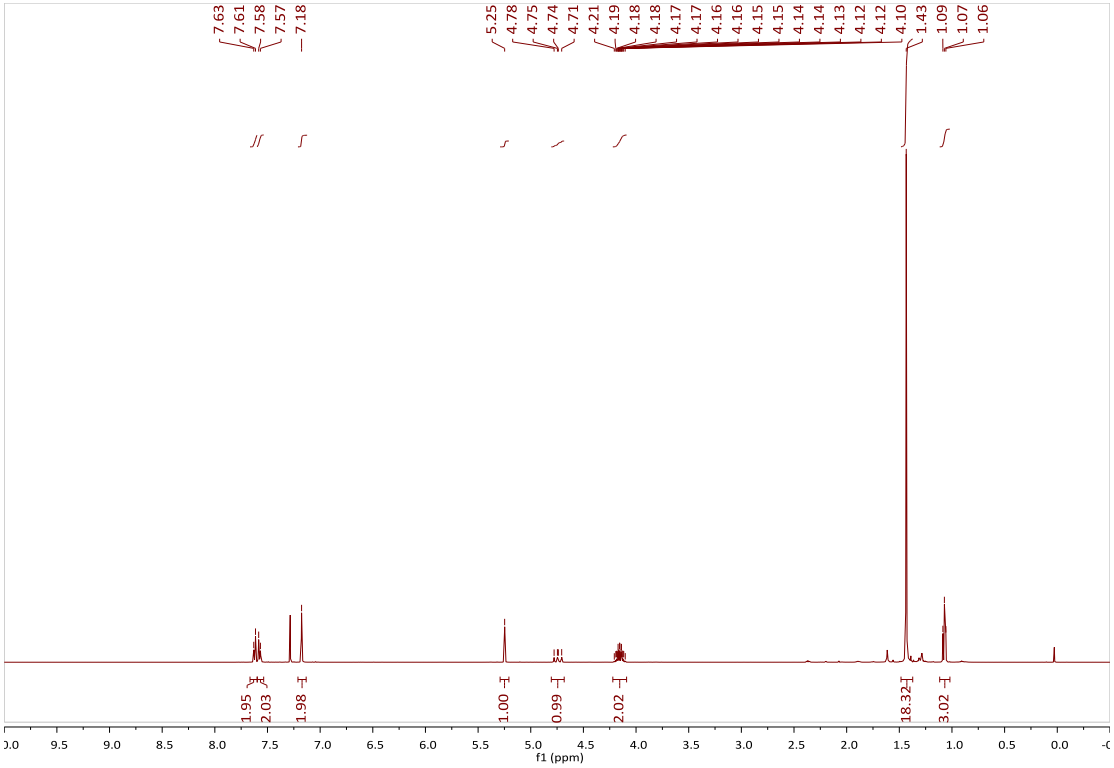
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
F3C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4.71
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4.18
4.18
4.17
4.17
4.16
4.16
4.15
4.15
4.14
4.14
4.13
4.12
4.12
4.10
1.43
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1.98
1.00
0.99
2.02
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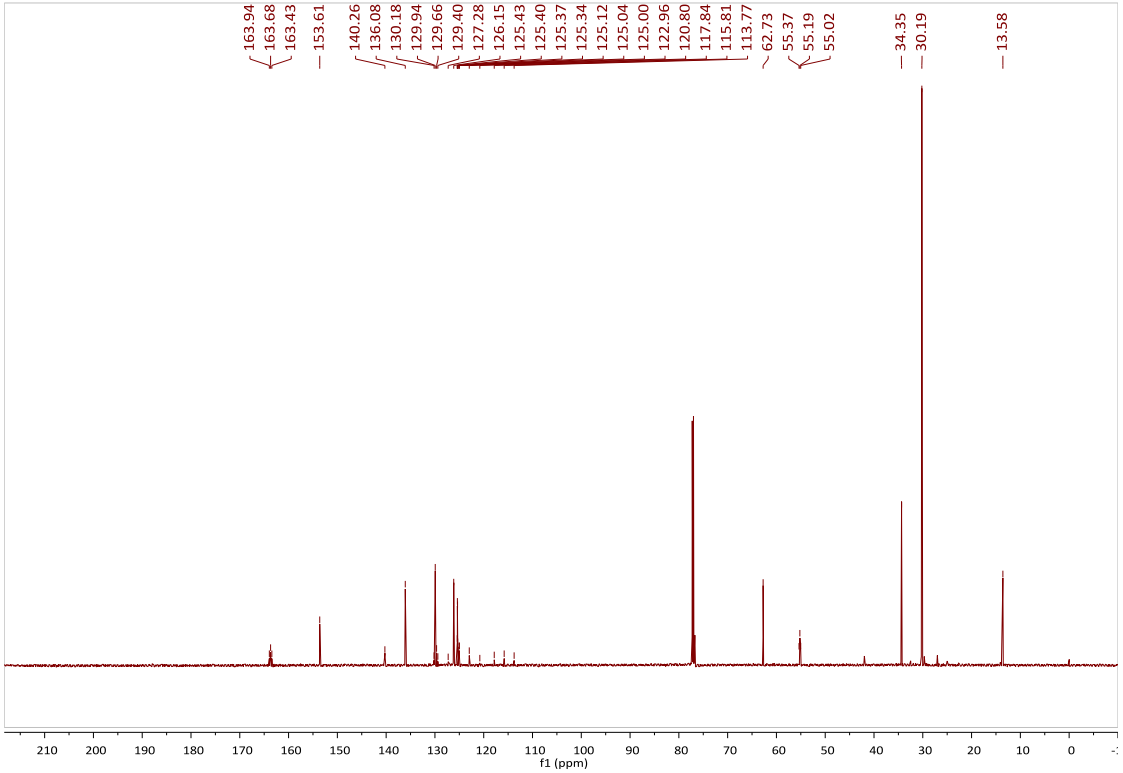
3.02
f1 (ppm)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125.40
125.37
125.34
125.12
125.04
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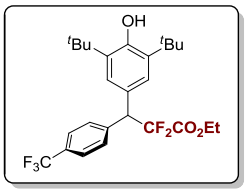
55.19
55.02
34.35
30.19
13.58
f1 (ppm)


OH
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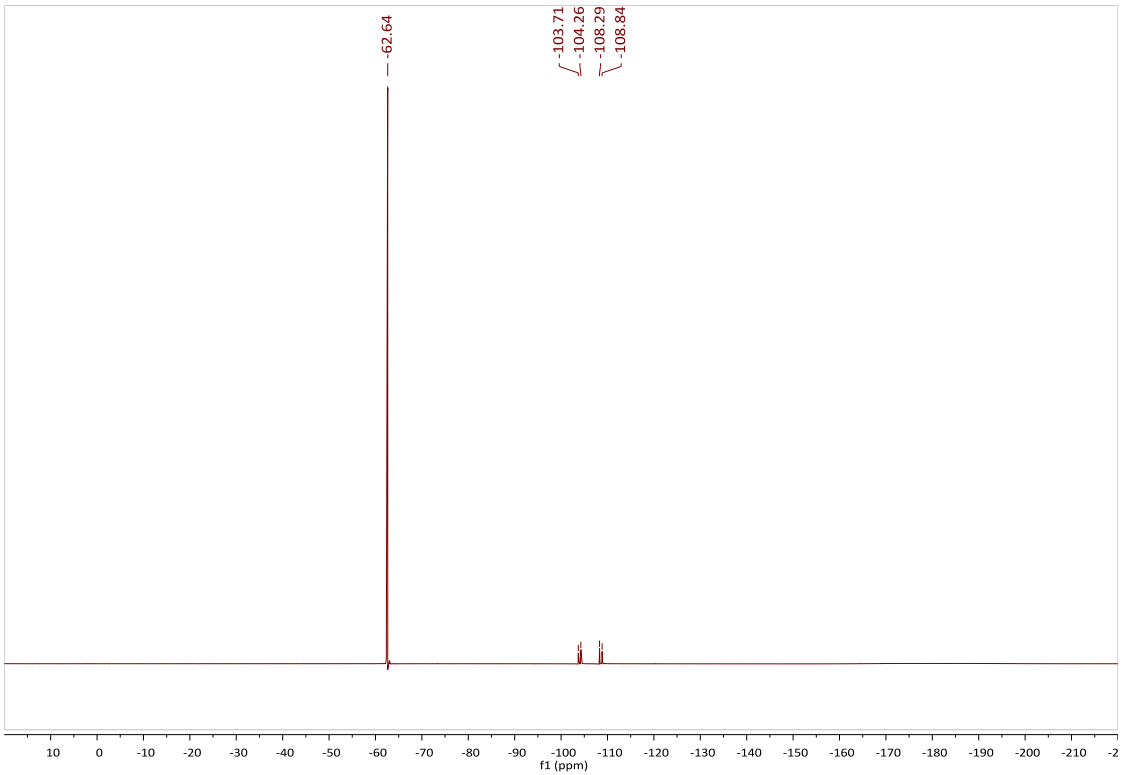
CF2CO2Et
F3C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10
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-20
-30
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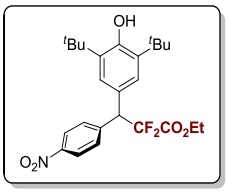
-170
-180
-190
-200
-210
f1 (ppm)


OH
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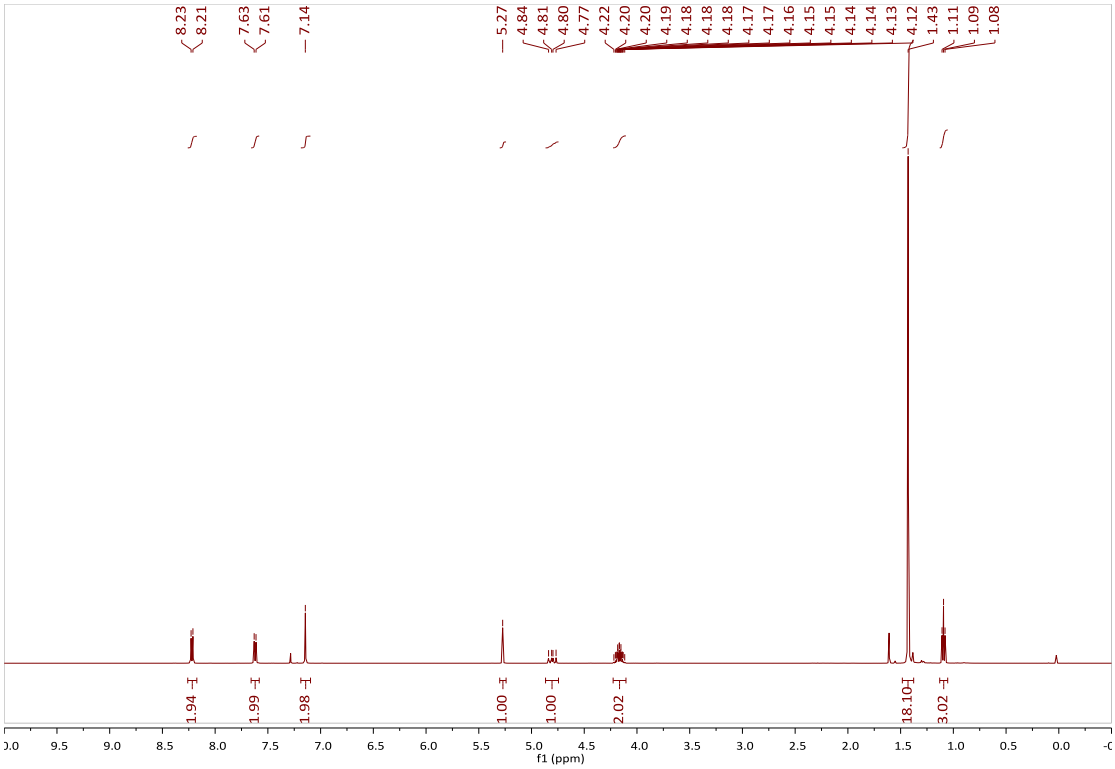
tBu
CF2CO2Et
O2N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4.18
4.18
4.18
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4.17
4.16
4.15
4.15
4.14
4.14
4.13
4.12
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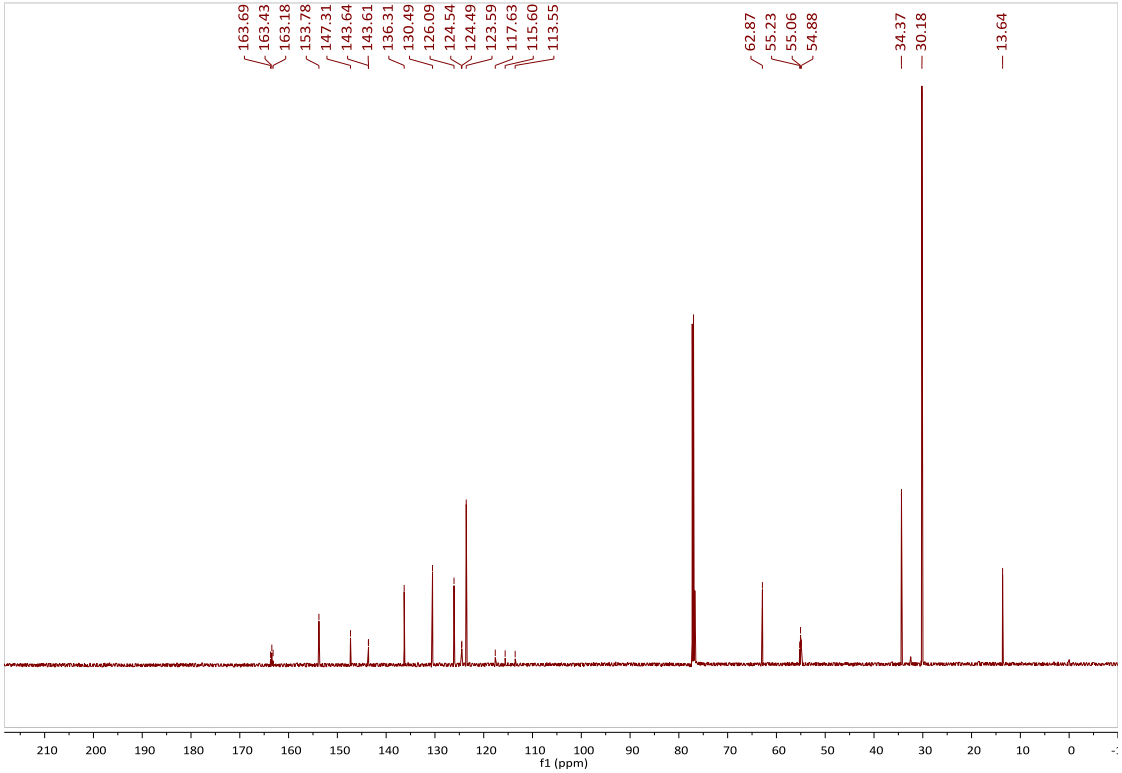
2.02
18.10
3.02
f1 (ppm)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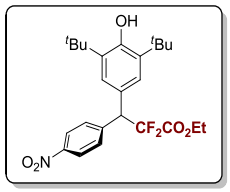
55.06
54.88
34.37
30.18
13.64
f1 (ppm)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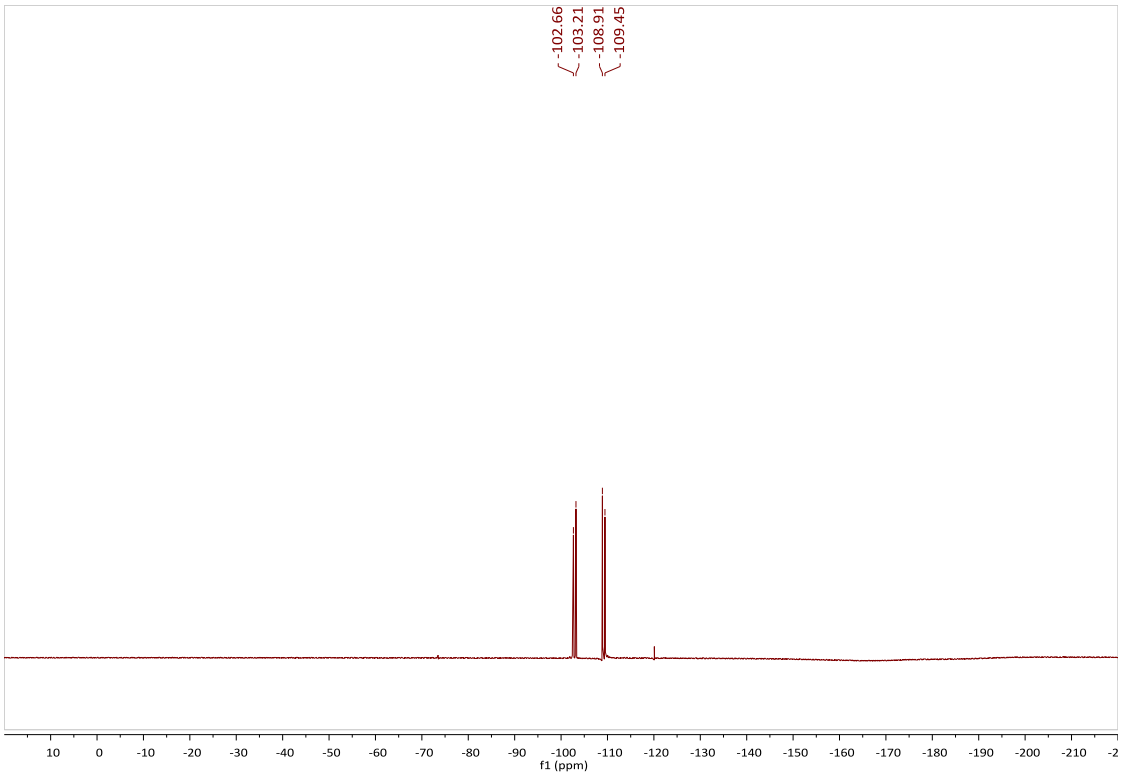
tBu
CF2CO2Et
O2N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-20
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-60
-70
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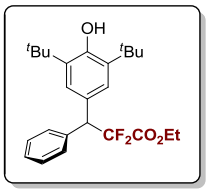
-170
-180
-190
-200
-210
f1 (ppm)


OH
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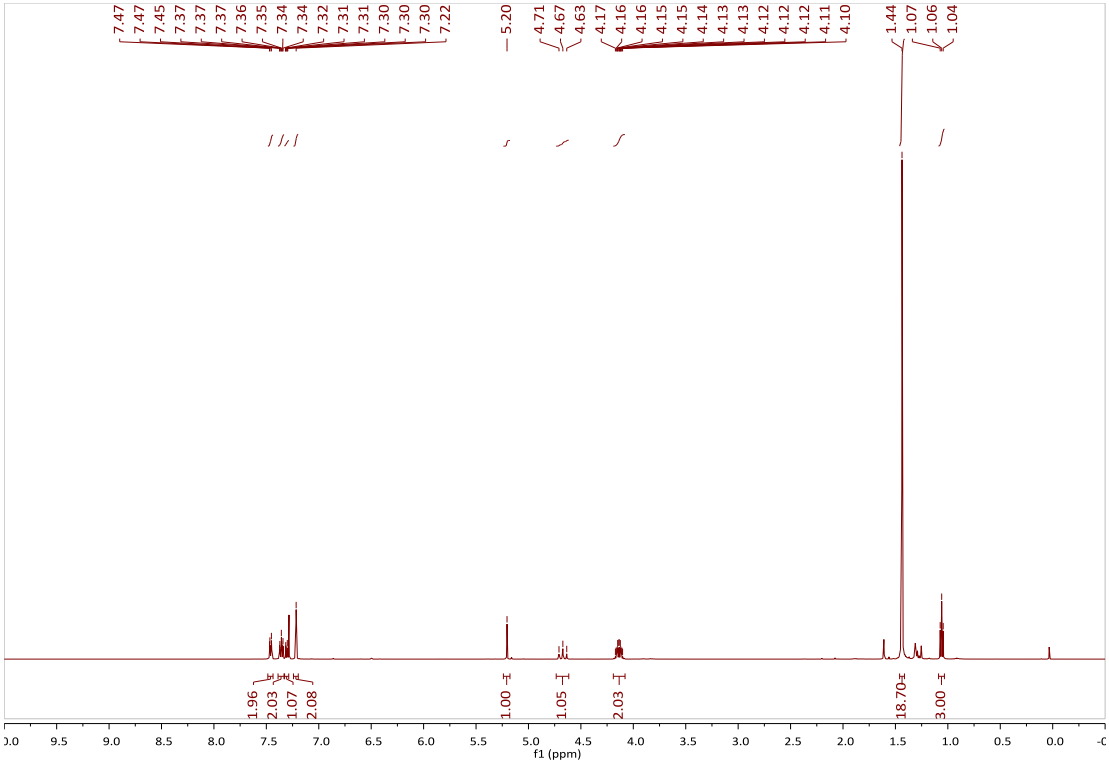
CF2CO2Et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7.30
7.30
7.22
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4.71
4.67
4.63
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4.16
4.16
4.15
4.15
4.14
4.13
4.12
4.12
4.12
4.11
4.10
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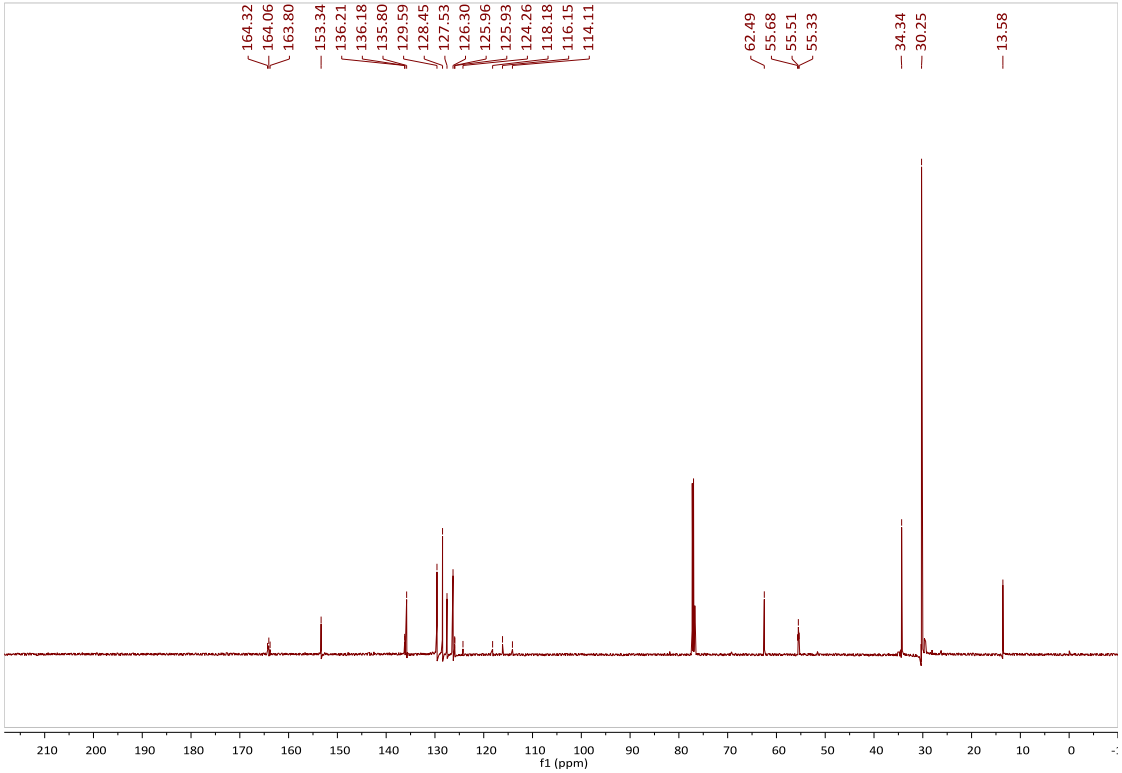
2.03
18.70
3.00
f1 (ppm)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127.53
126.30
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125.93
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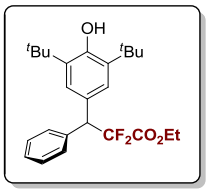
55.33
34.34
30.25
13.58
f1 (ppm)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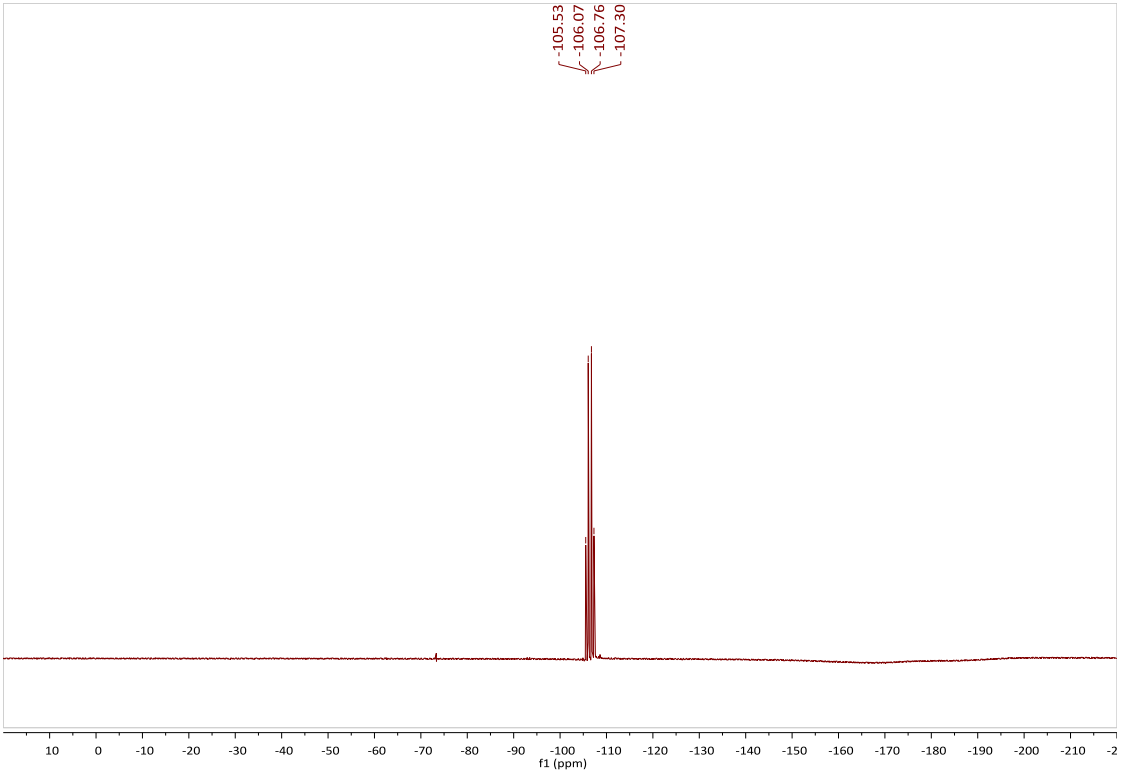
tBu
CF2CO2Et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-120
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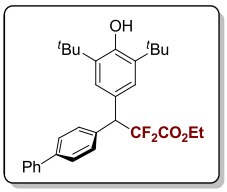
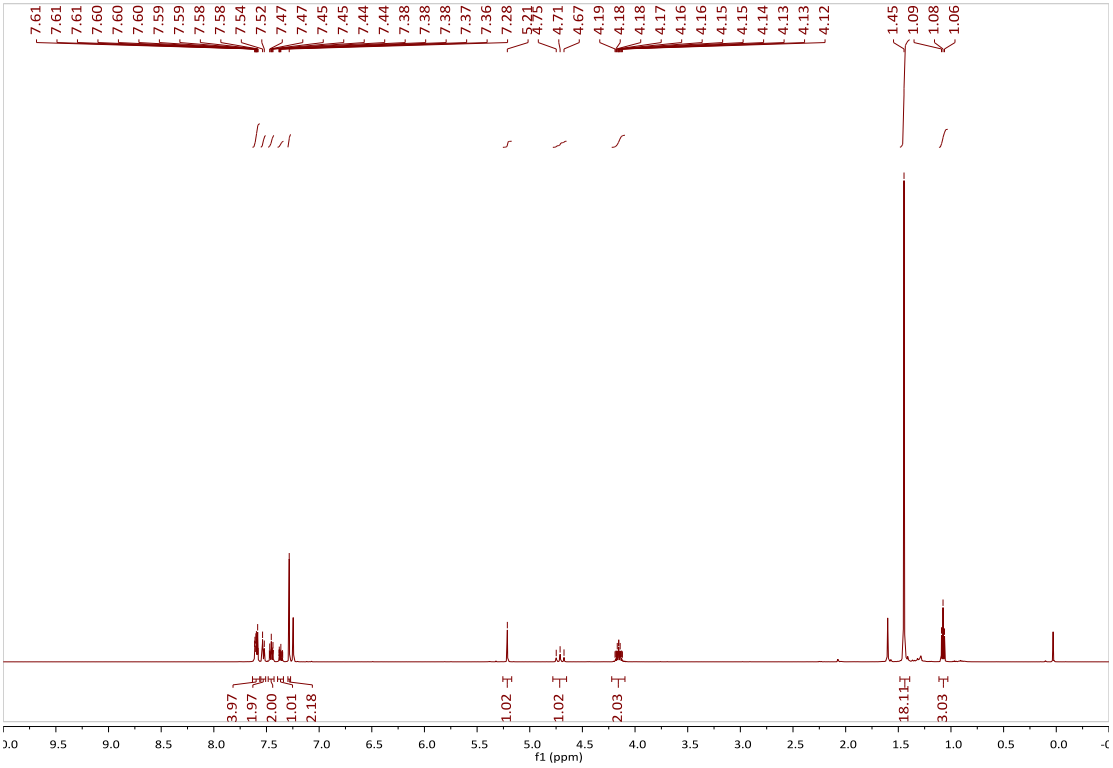
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
Ph


7.61 7.61 7.61 7.60 7.60 7.60 7.59 7.59 7.58 7.58 7.54 7.52 7.47 7.47 7.45 7.45 7.44 7.44 7.38 7.38 7.38 7.37 7.36 7.28 5.21 4.75 4.71 4.67 4.19 4.18 4.18 4.17 4.16 4.16 4.15 4.15 4.14 4.13 4.13 4.12
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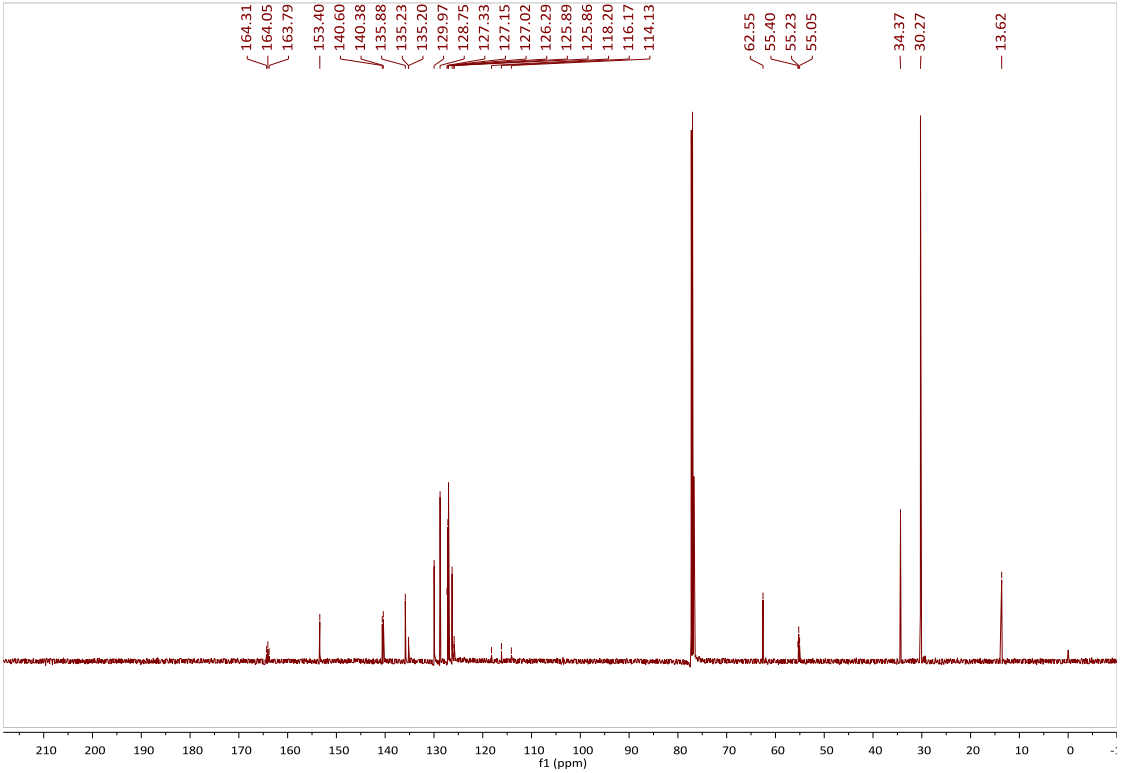
3.97 1.97 2.00 1.01 2.18 1.02 1.02 2.03 18.11 3.03
f1 (ppm)


164.31 164.05 163.79 153.40 140.60 140.38 135.88 135.23 135.20 129.97 128.75 127.33 127.15 127.02 126.29 125.89 125.86 118.20 116.17 114.13
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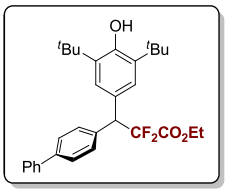
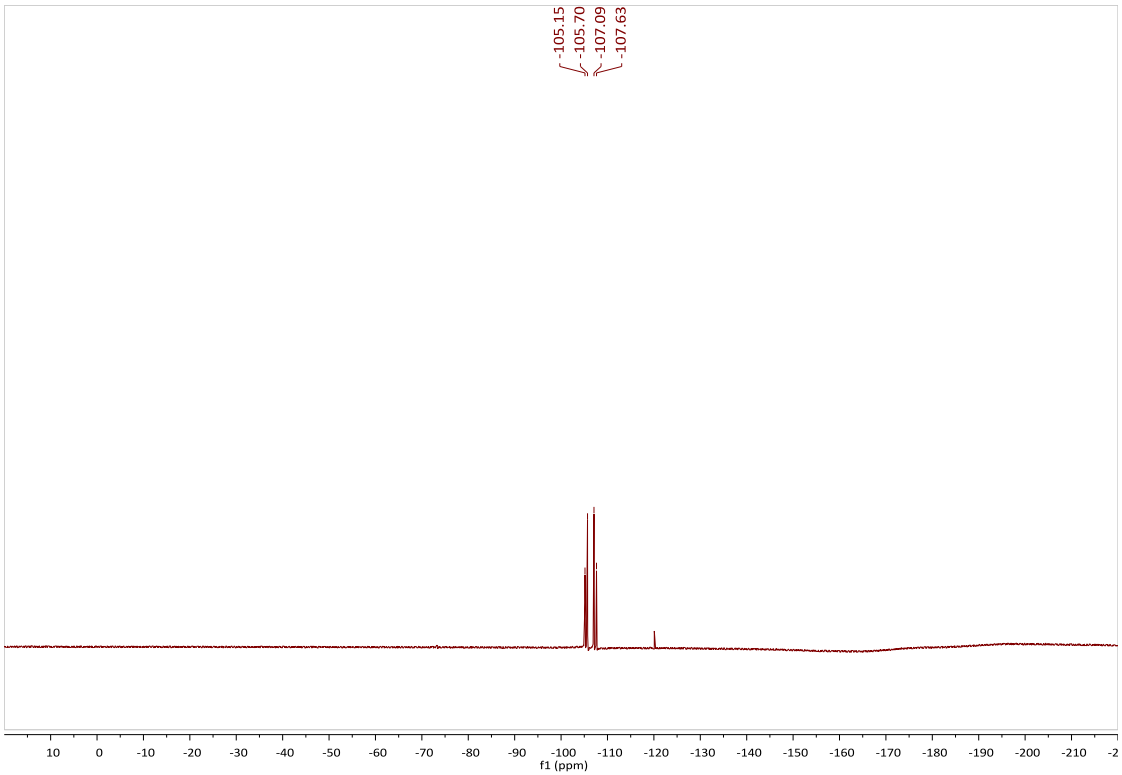
34.37 30.27
13.62
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
Ph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-107.09
-107.63
10
0
-10
-20
-30
-40
-50
-60
-70
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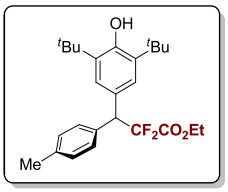
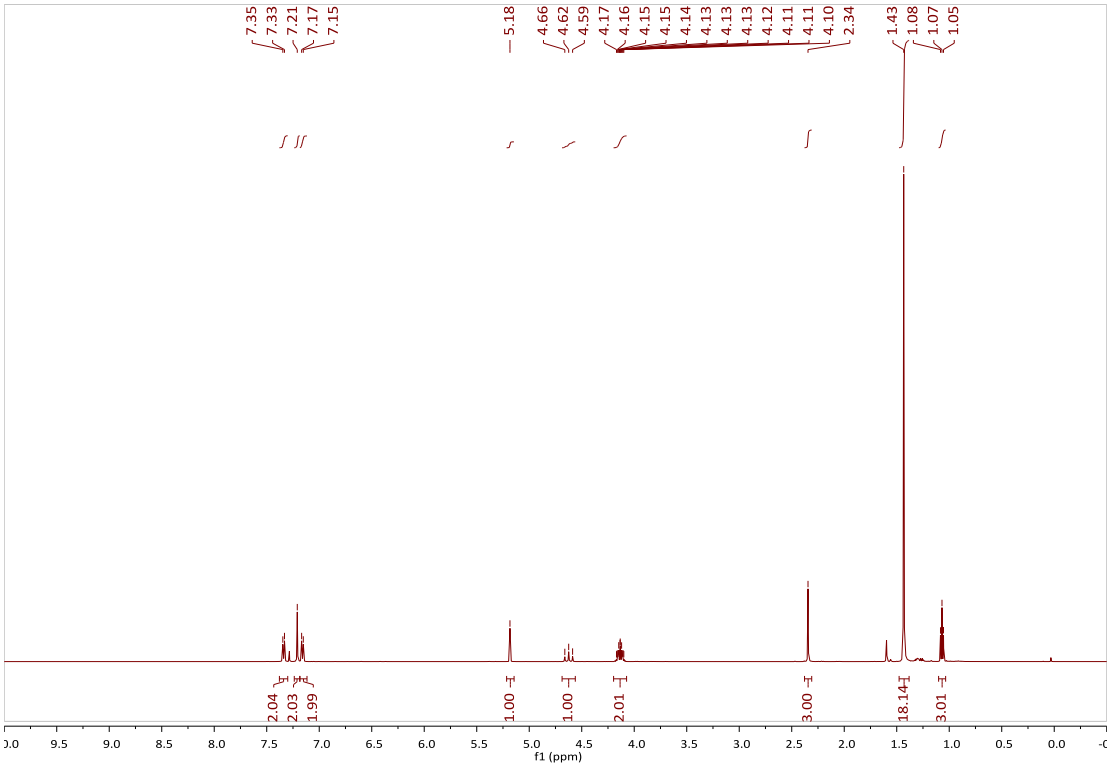
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
Me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7.33
7.21
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4.62
4.59
4.17
4.16
4.15
4.14
4.13
4.13
4.12
4.11
4.11
4.10
2.34
1.43
1.08
1.07
1.05
2.04
2.03
1.99
1.00
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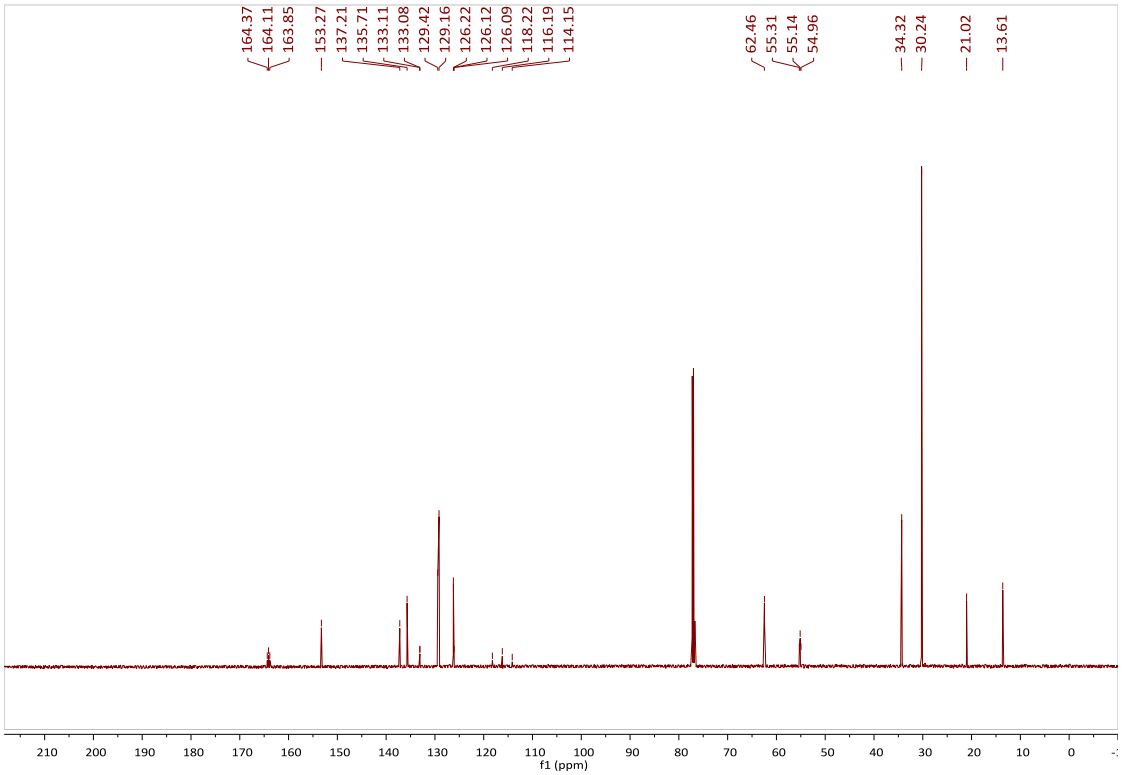
2.01
3.00
18.14
3.01
f1 (ppm)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164.11
163.85
153.27
137.21
135.71
133.11
133.08
129.42
129.16
126.22
126.12
126.09
118.22
116.19
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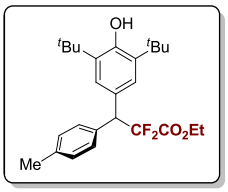
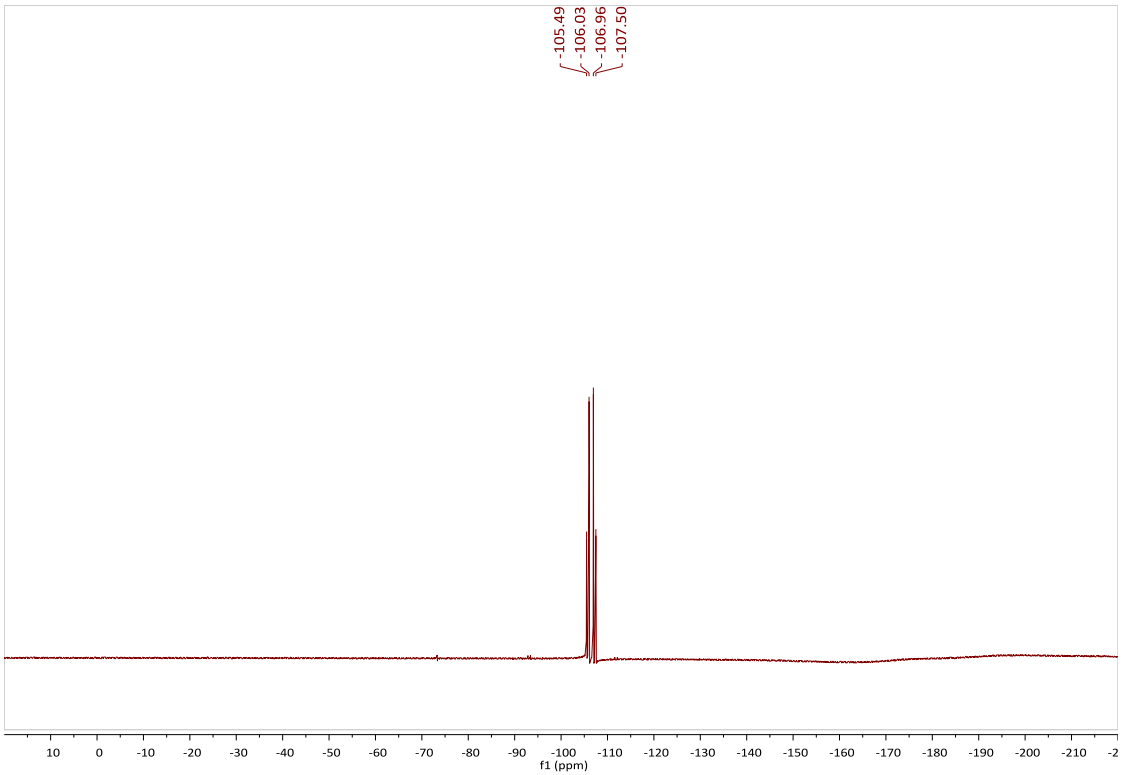
62.46
55.31
55.14
54.96
34.32
30.24
21.02
13.61
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
Me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-20
-30
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-50
-60
-70
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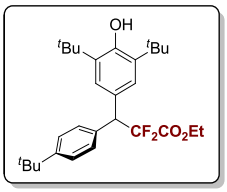
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)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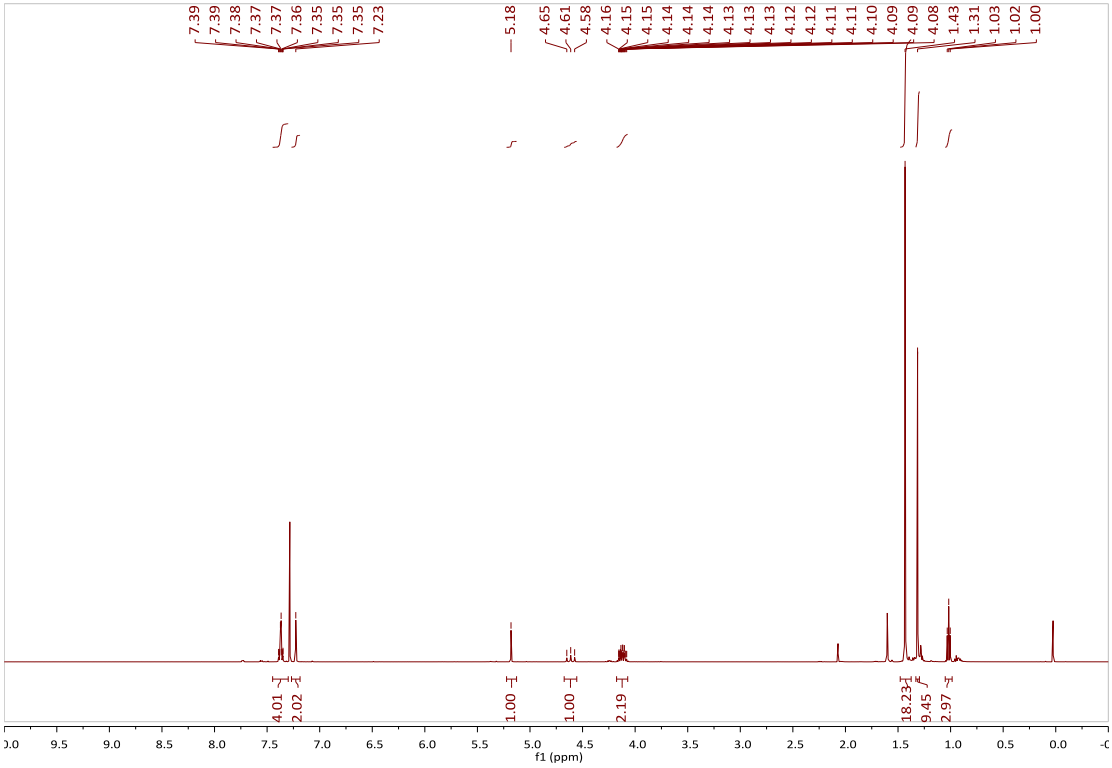
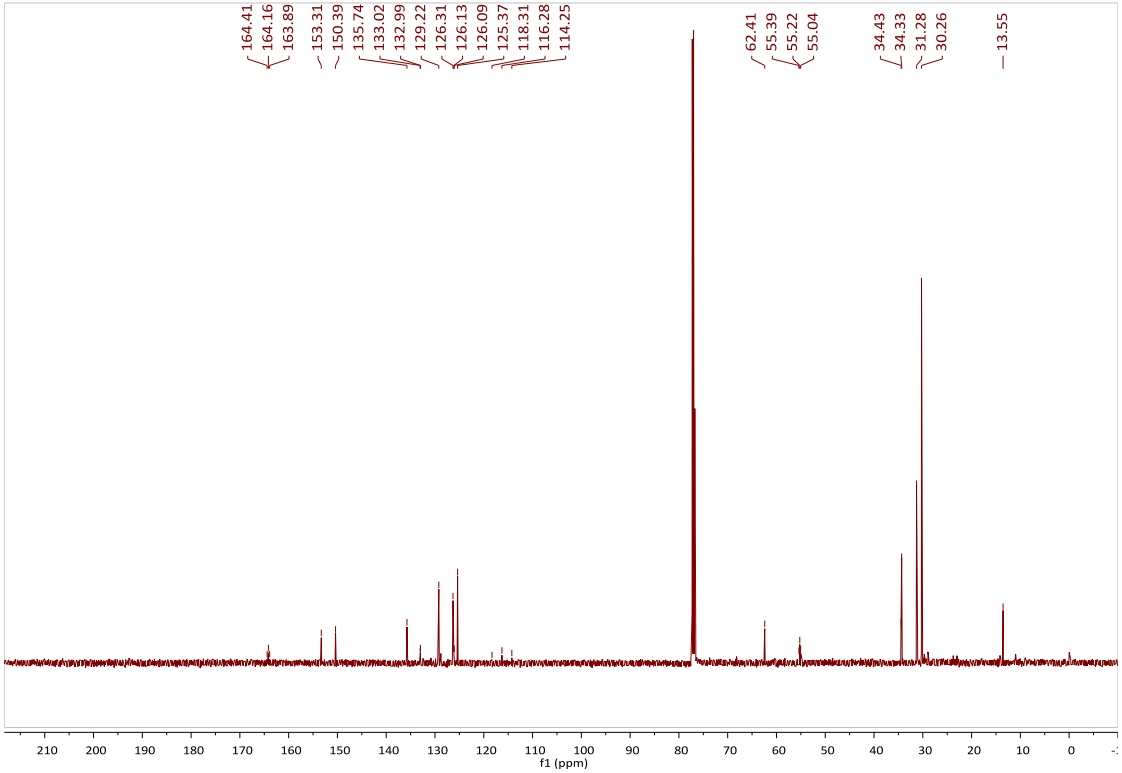
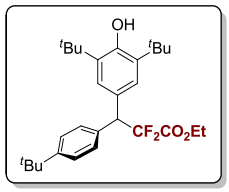
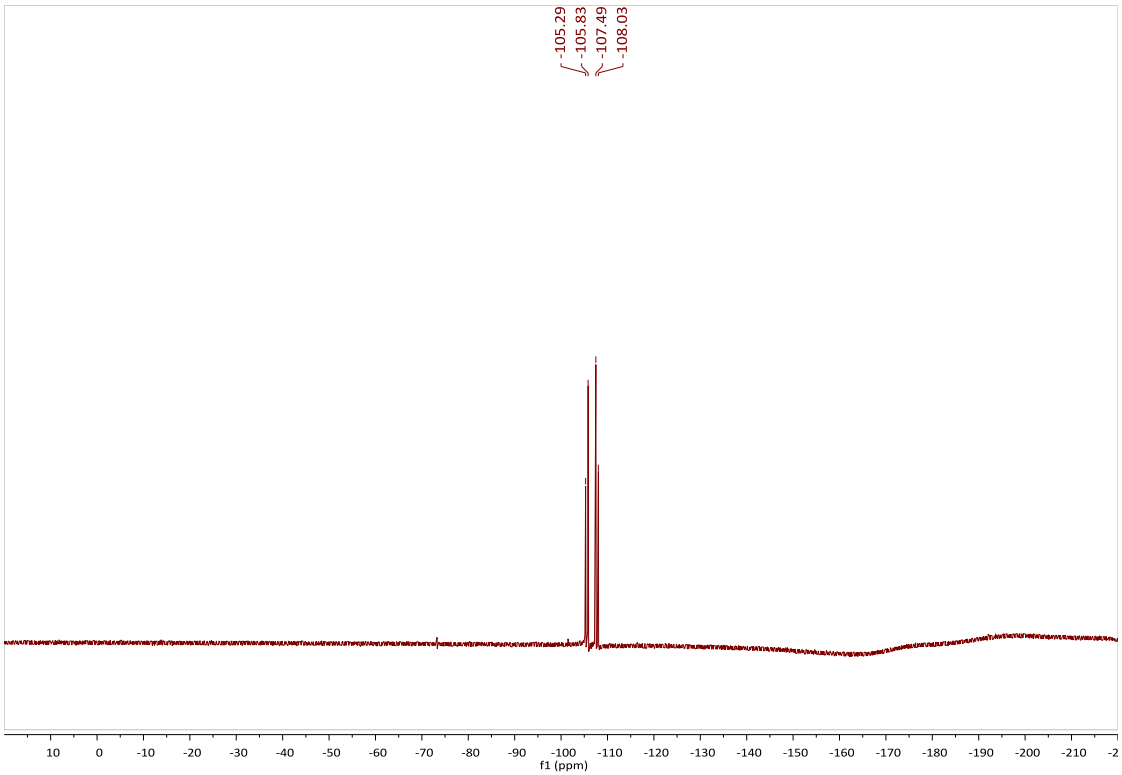
tBu
tBu
CF2CO2Et
tBu


7.39 7.39 7.38 7.37 7.37 7.36 7.35 7.35 7.35 7.23
5.18
4.65 4.61 4.58 4.16 4.15 4.15 4.14 4.14 4.14 4.13 4.13 4.13 4.12 4.12 4.11 4.11 4.10 4.09 4.09 4.08
1.43 1.31 1.03 1.02 1.00
4.01 2.02 1.00 1.00 2.19 18.23 9.45 2.97
f1 (ppm)


164.41 164.16 163.89
153.31 150.39
135.74 133.02 132.99 129.22 126.31 126.13 126.09 125.37 118.31 116.28 114.25
62.41 55.39 55.22 55.04
34.43 34.33 31.28 30.26
13.55
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
tBu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-107.49
-108.03
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-10
-20
-30
-40
-50
-60
-70
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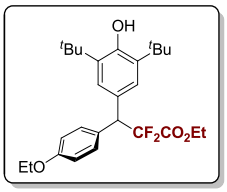
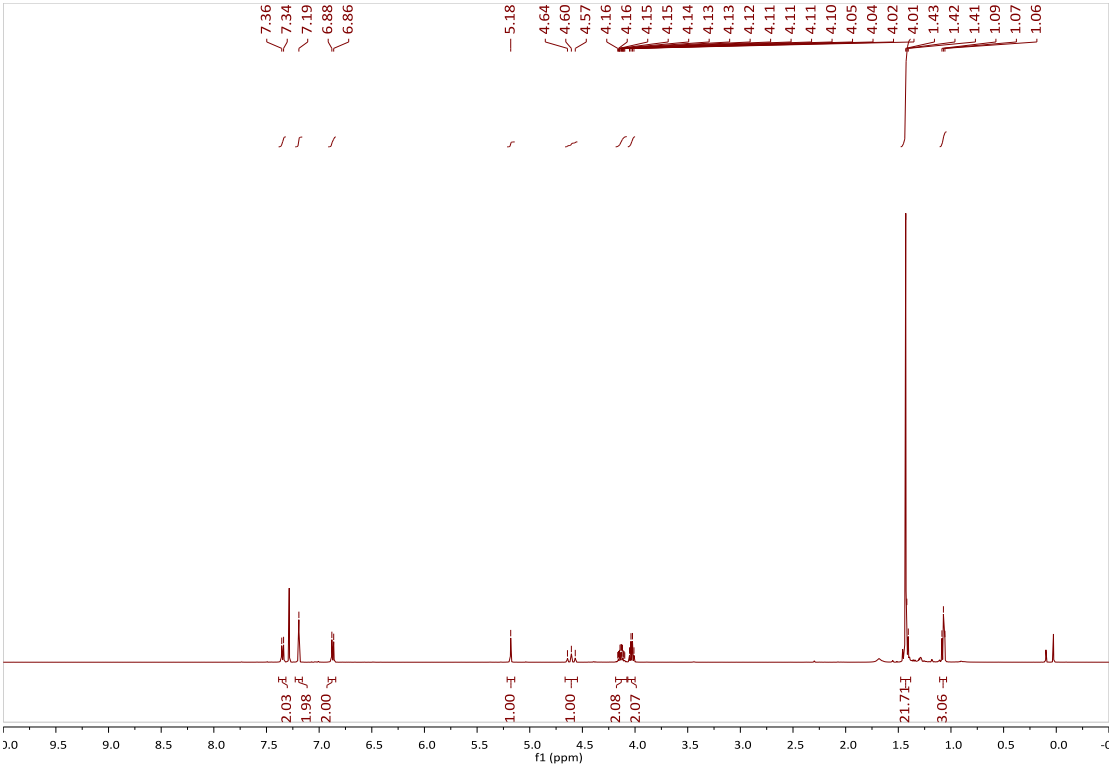
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
EtO


7.36
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6.86
5.18
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4.60
4.57
4.16
4.16
4.15
4.15
4.14
4.13
4.13
4.12
4.11
4.11
4.11
4.10
4.05
4.04
4.02
4.01
1.43
1.42
1.41
1.09
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1.06
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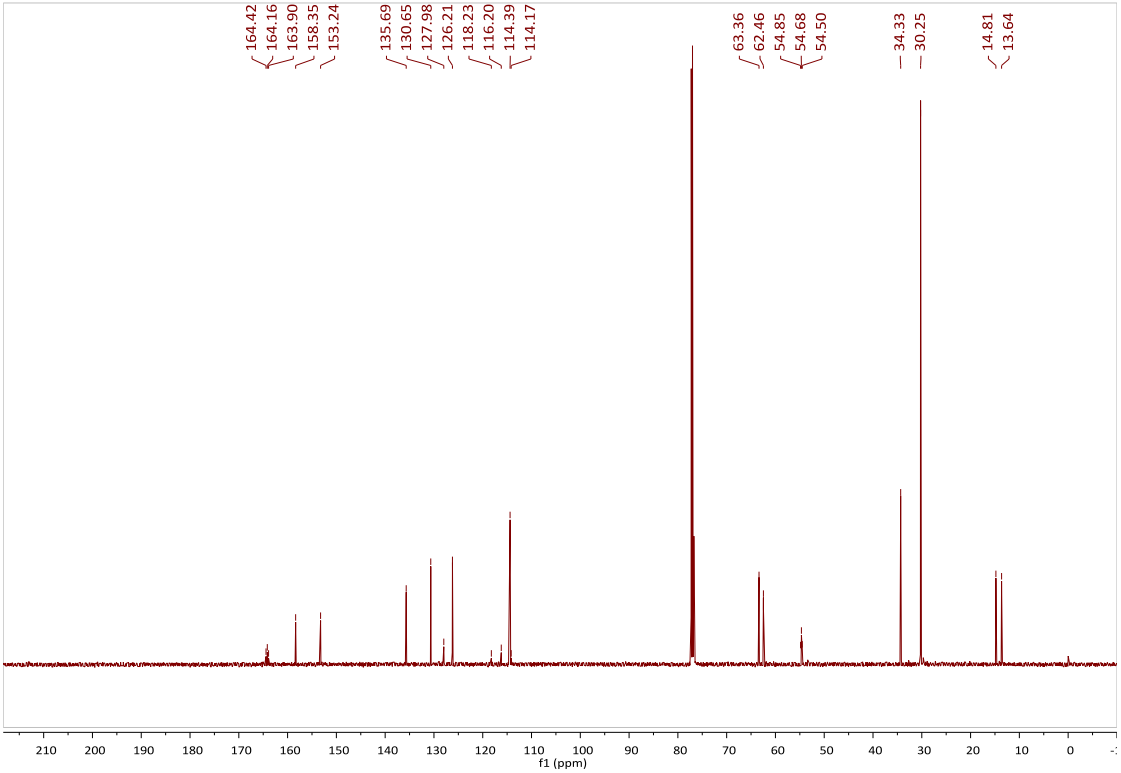
1.00
1.00
2.08
2.07
21.71
3.06
f1 (ppm)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164.16
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158.35
153.24
135.69
130.65
127.98
126.21
118.23
116.20
114.39
114.17
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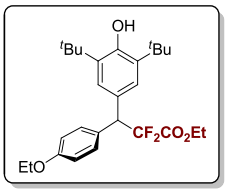
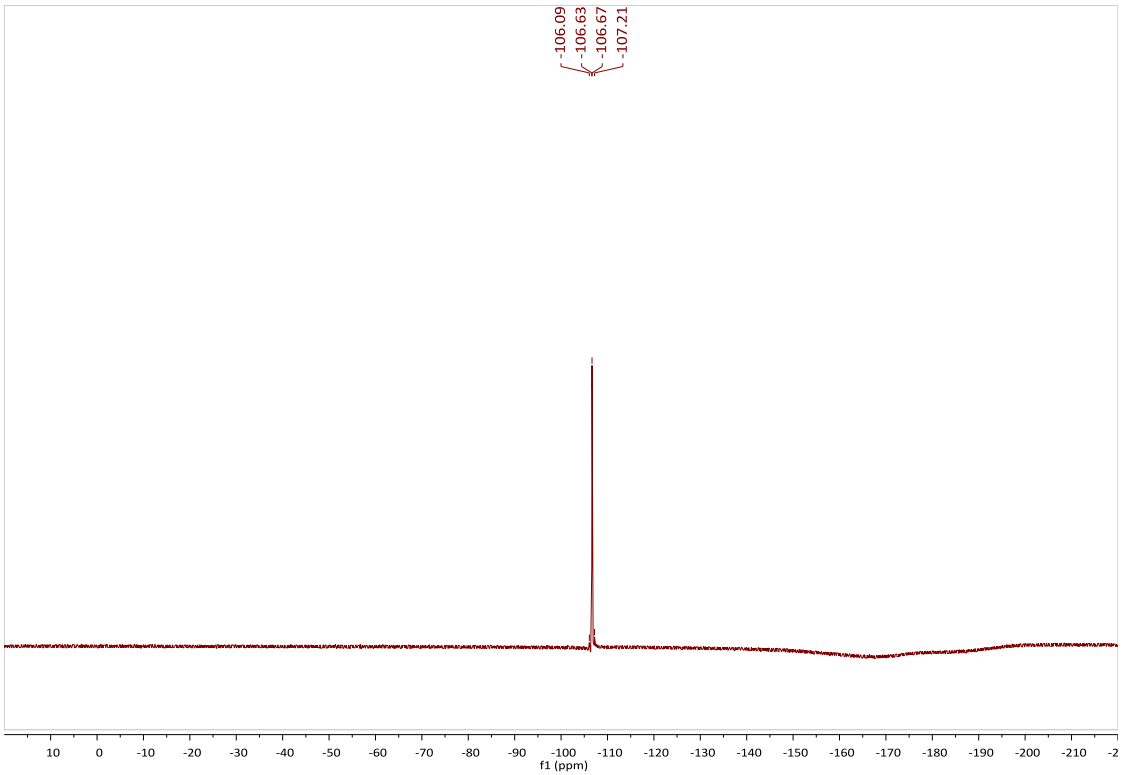
62.46
54.85
54.68
54.50
34.33
30.25
14.81
13.64
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
EtO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-106.63
-106.67
-107.21
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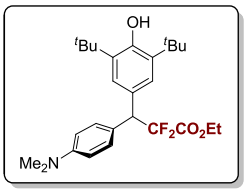
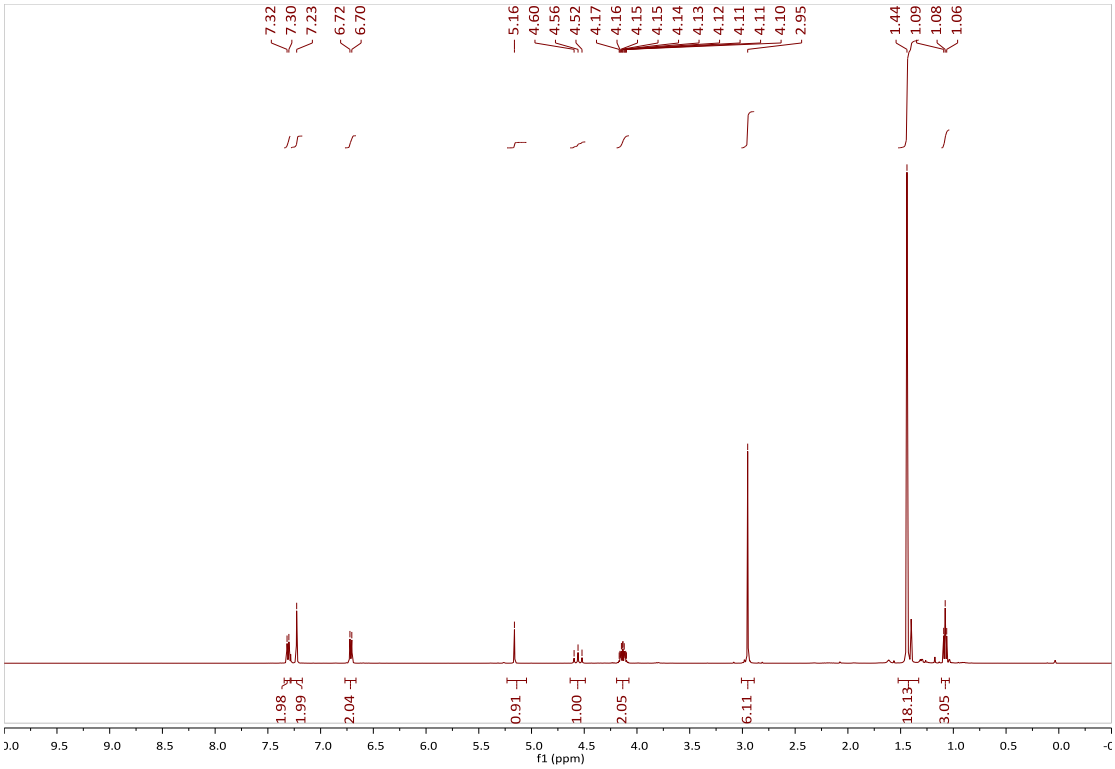
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
Me2N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4.52
4.17
4.16
4.15
4.15
4.14
4.13
4.12
4.11
4.11
4.10
2.95
1.44
1.09
1.08
1.06
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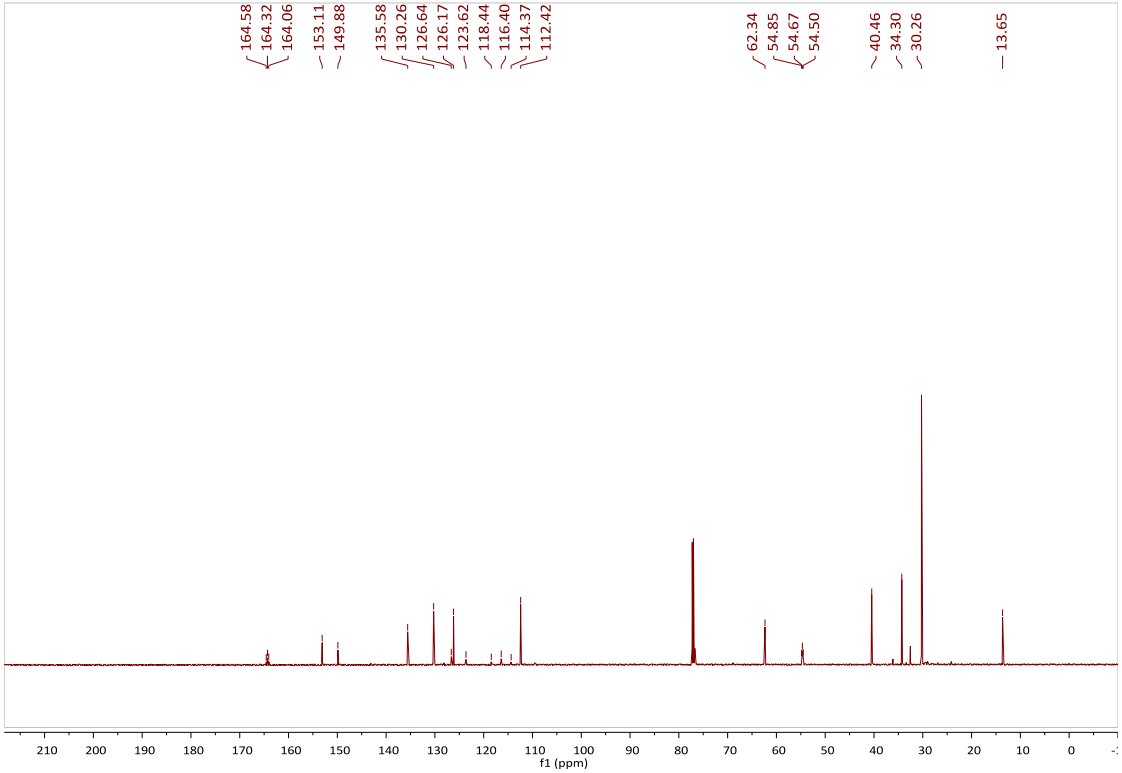
1.99
2.04
0.91
1.00
2.05
6.11
18.13
3.05
f1 (ppm)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126.64
126.17
123.62
118.44
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62.34
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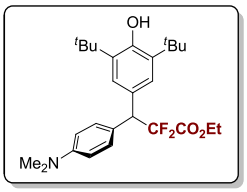
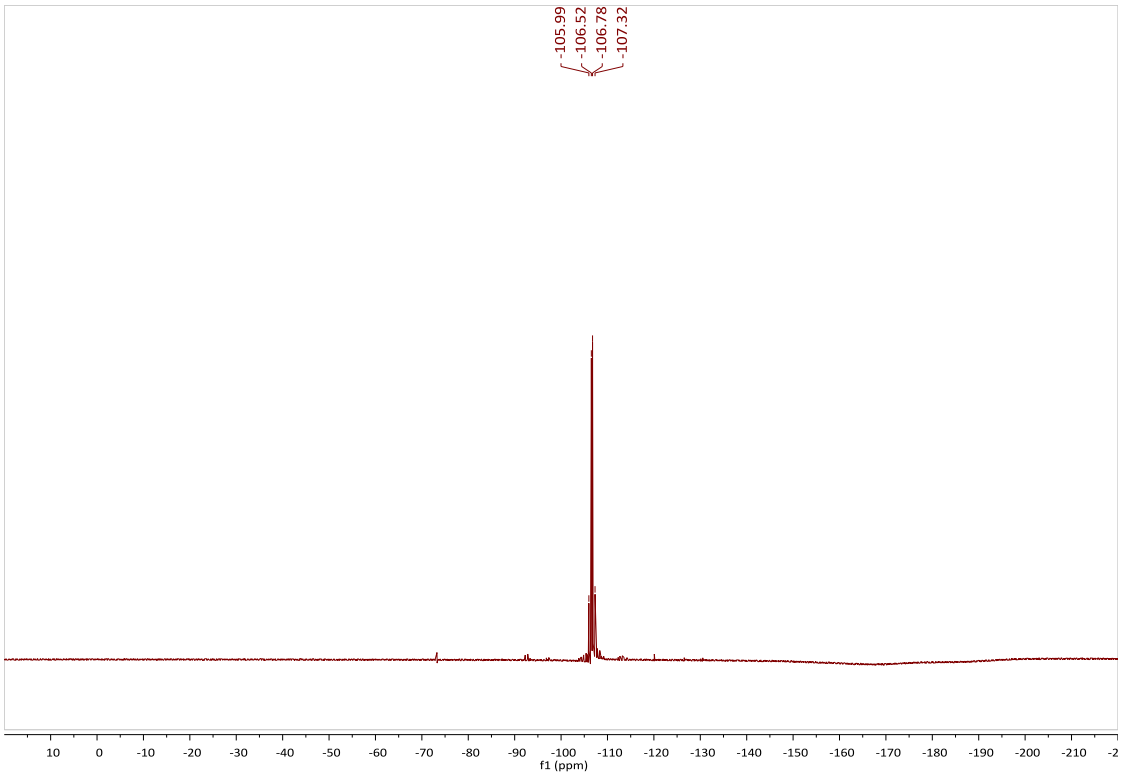
54.67
54.50
40.46
34.30
30.26
13.65
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
Me2N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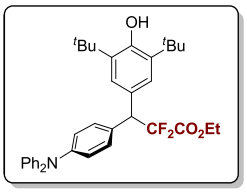
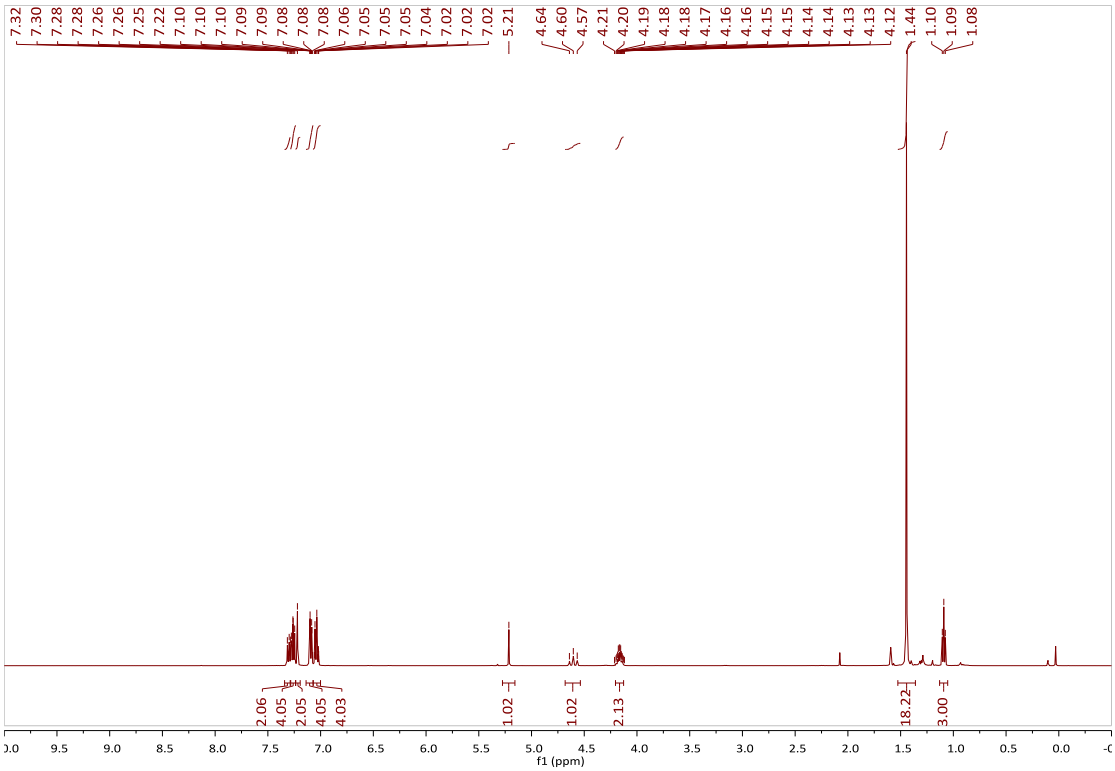
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
Ph2N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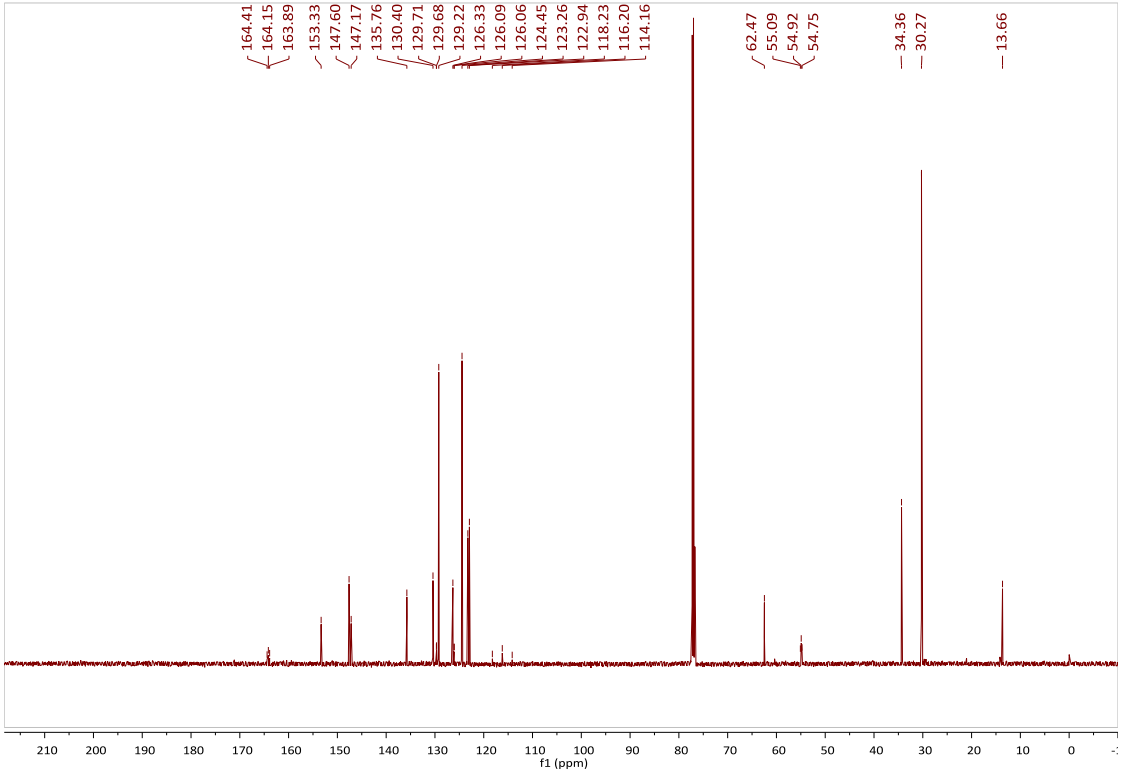
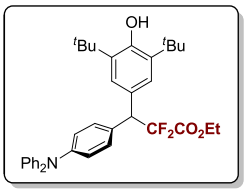
2.06 4.05 2.05 4.05 4.03 1.02 1.02 2.13 18.22 3.00
f1 (ppm)


164.41 164.15 163.89 153.33 147.60 147.17 135.76 130.40 129.71 129.68 129.22 126.33 126.09 126.06 124.45 123.26 122.94 118.23 116.20 114.16
62.47 55.09 54.92 54.75 34.36 30.27 13.66
f1 (ppm)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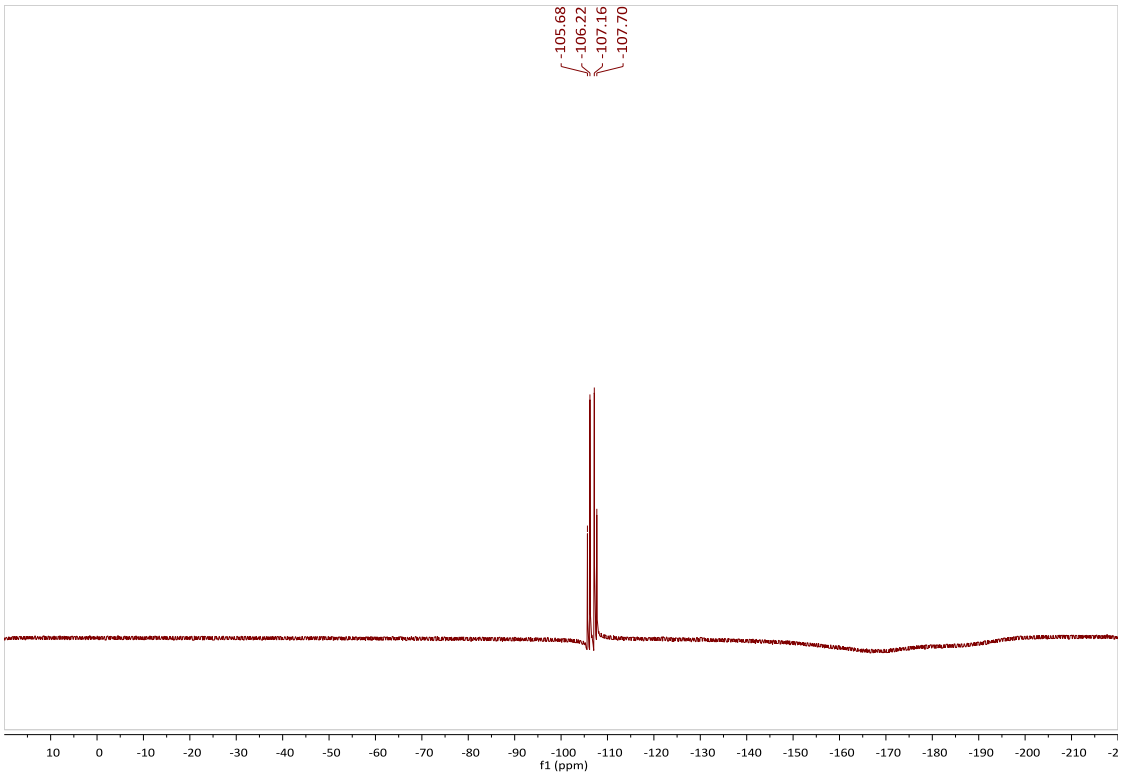
tBu
CF2CO2Et
Ph2N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-70
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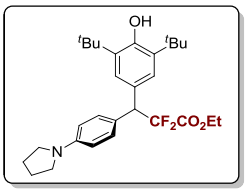
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


OH
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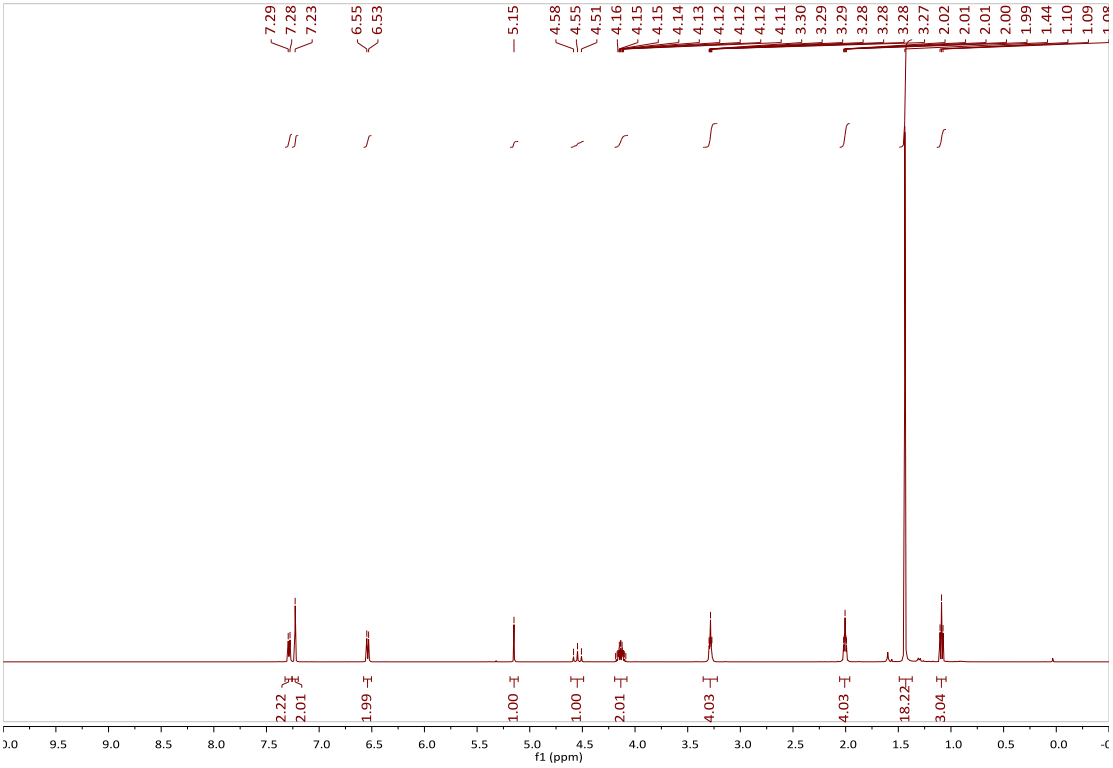
tBu
CF2CO2Et
N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4.55
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4.15
4.14
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4.12
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4.12
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3.29
3.28
3.28
3.28
3.27
2.02
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2.01
2.00
1.99
1.44
1.10
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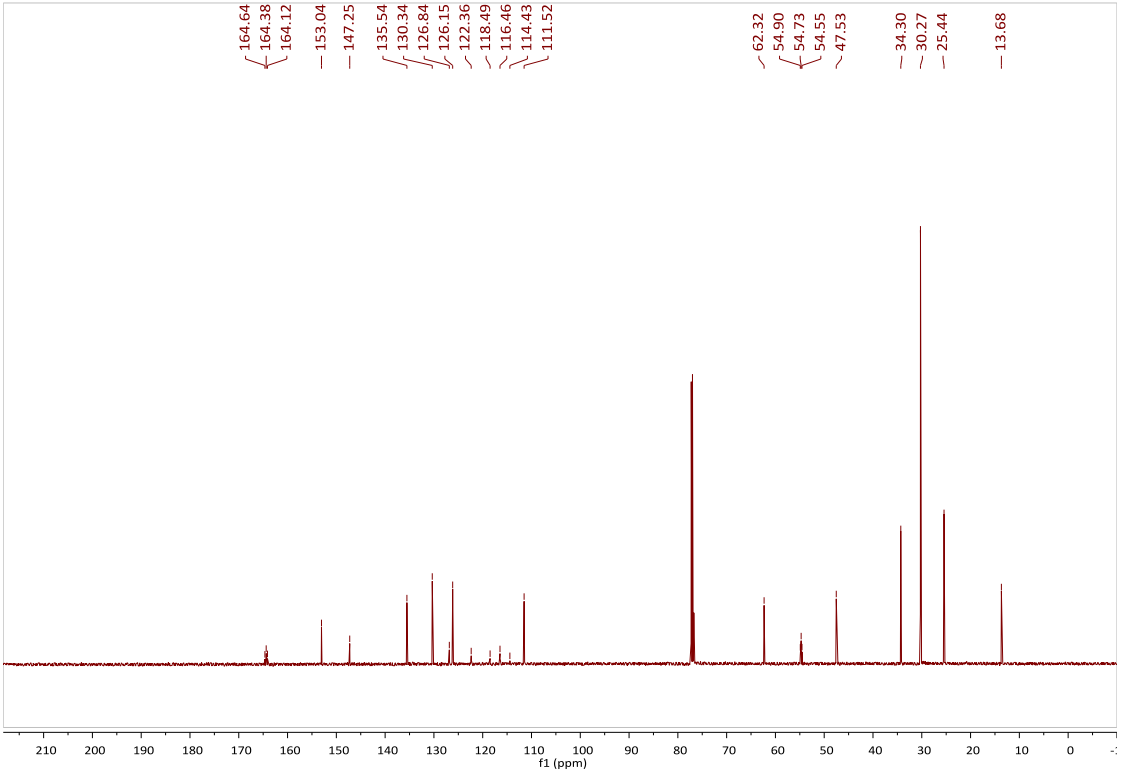
1.99
1.00
1.00
2.01
4.03
4.03
18.22
3.04
f1 (ppm)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135.54
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122.36
118.49
116.46
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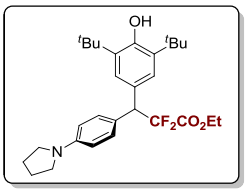
34.30
30.27
25.44
13.68
f1 (ppm)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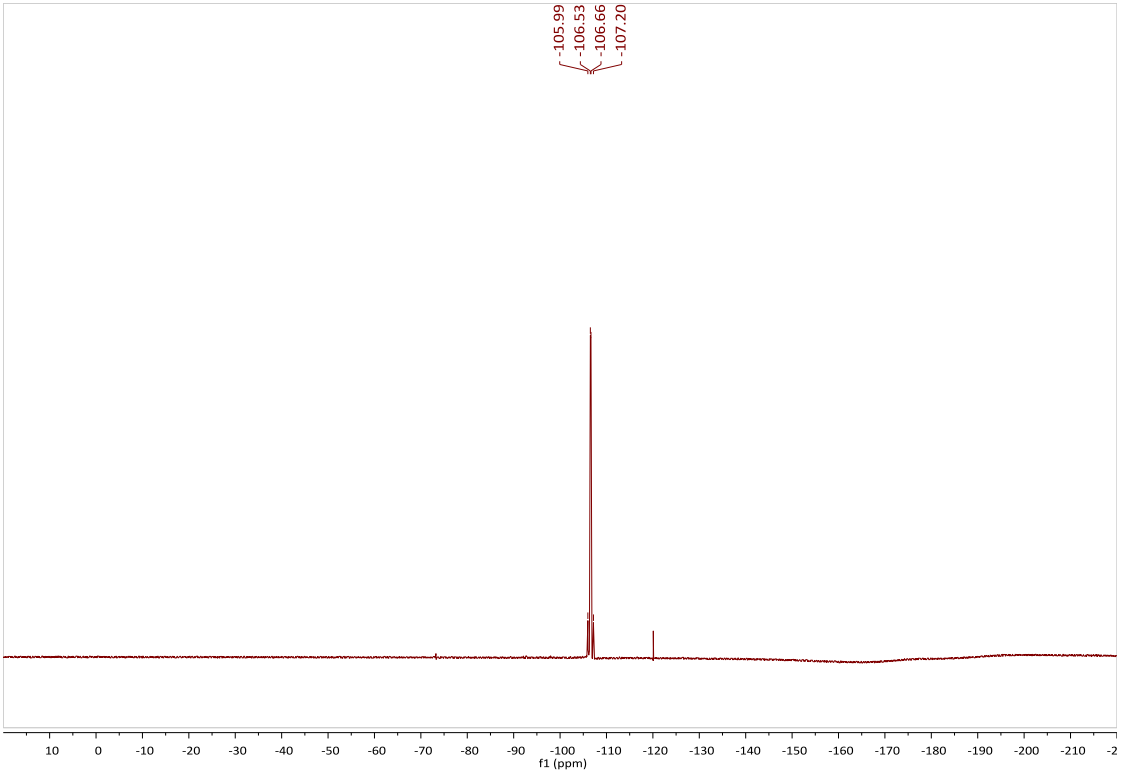
CF2CO2Et
N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-20
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-50
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-70
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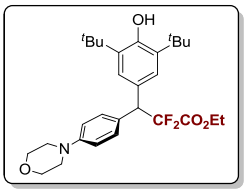
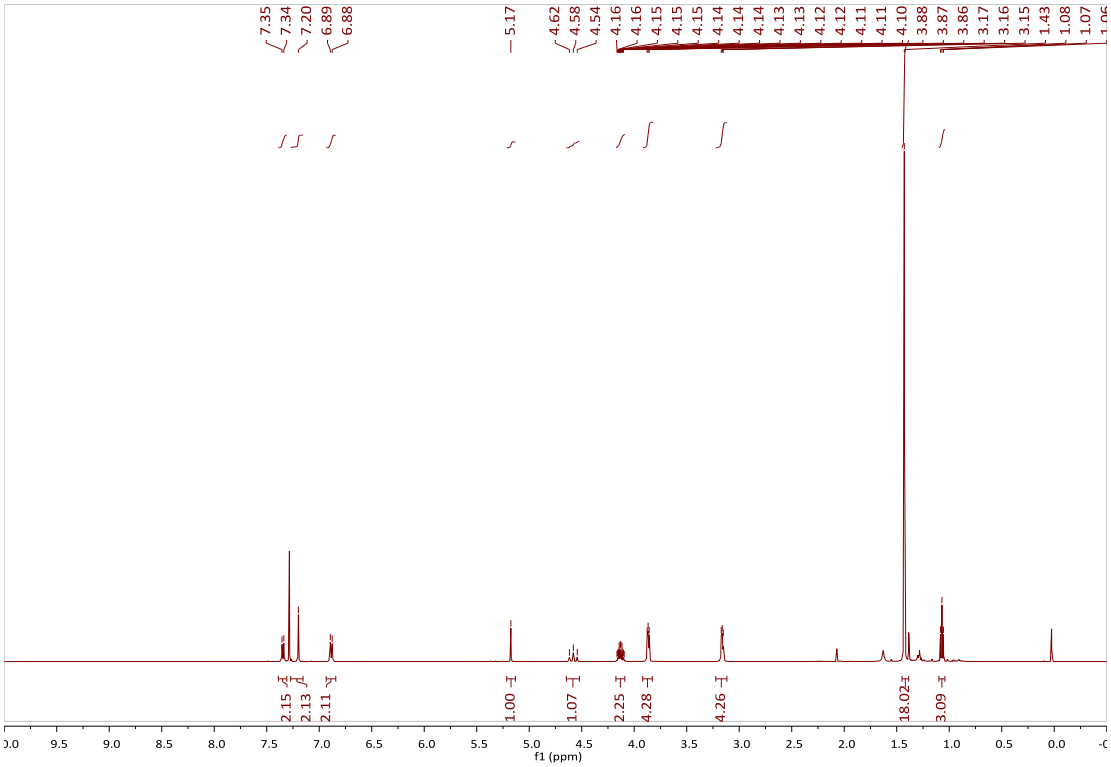
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
N
O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7.34
7.20
6.89
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4.62
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4.54
4.16
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4.15
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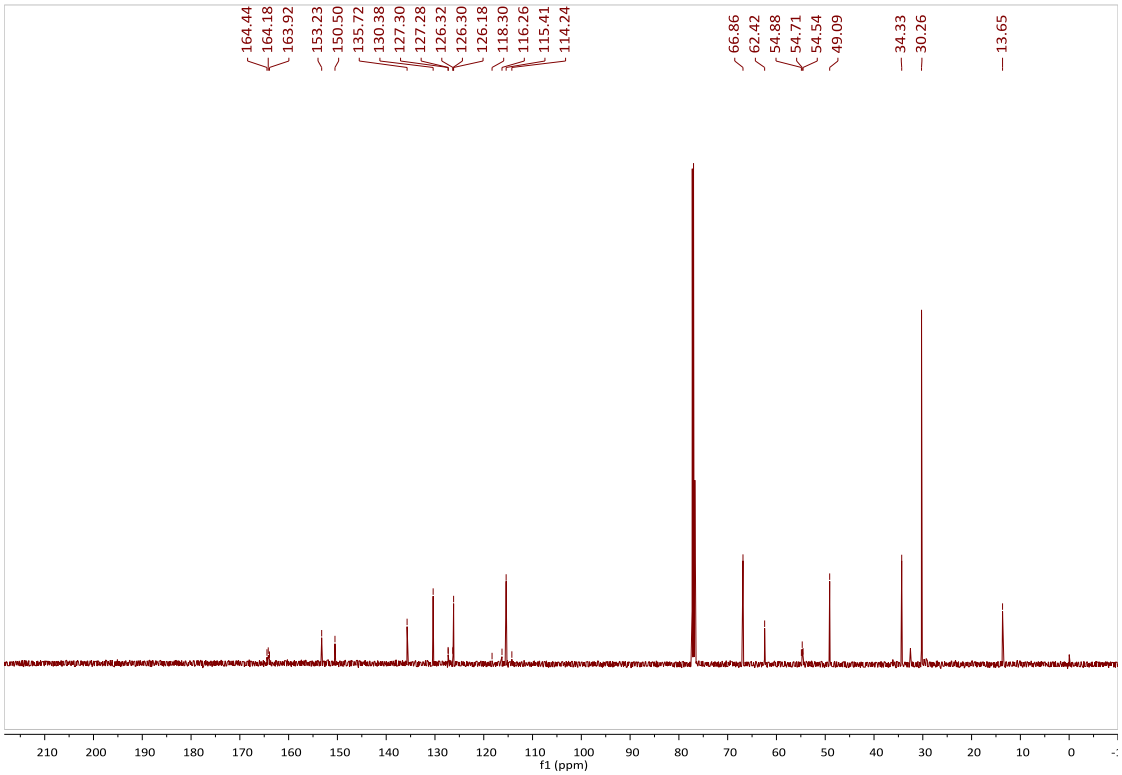
4.13
4.12
4.12
4.11
4.11
4.10
3.88
3.87
3.86
3.17
3.16
3.15
1.43
1.08
1.07
2.15
2.13
2.11
1.00
1.07
2.25
4.28
4.26
18.02
3.09
f1 (ppm)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135.72
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127.30
127.28
126.32
126.30
126.18
118.30
116.26
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114.24
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62.42
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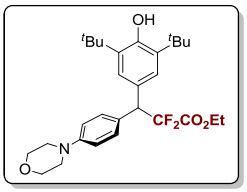
54.71
54.54
49.09
34.33
30.26
13.65
f1 (ppm)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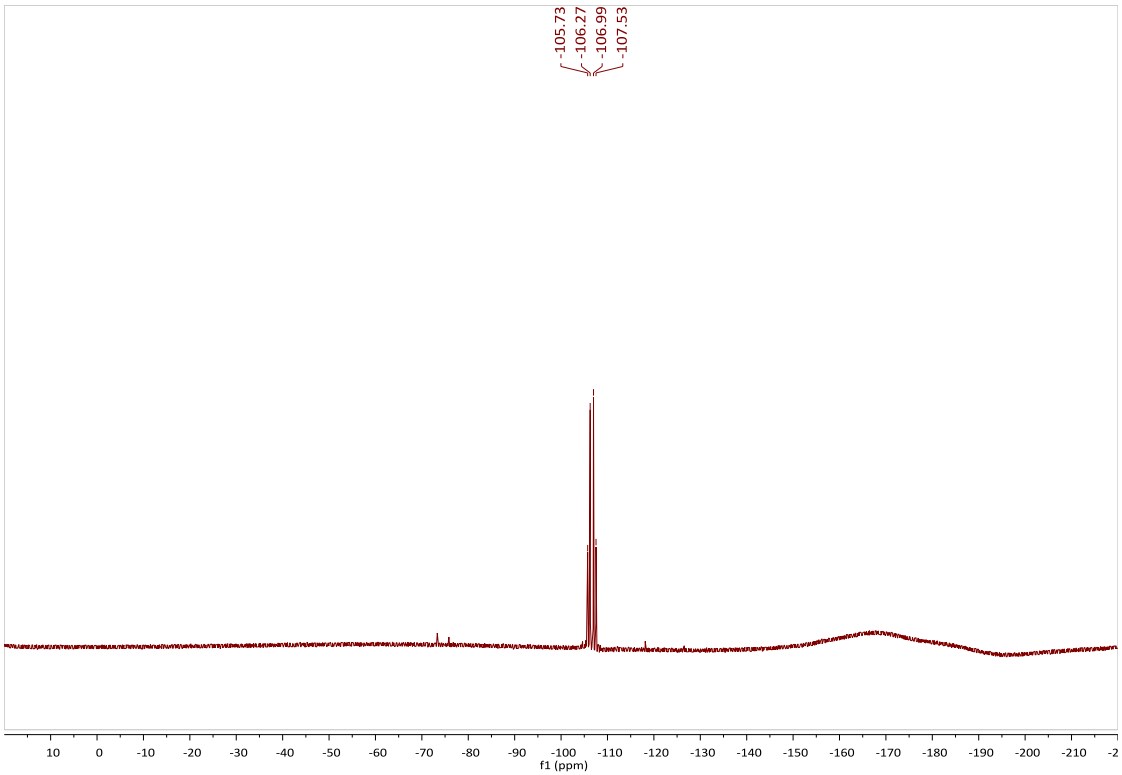
tBu
CF2CO2Et
N
O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-10
-20
-30
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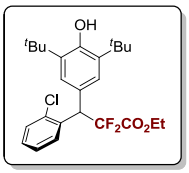
-170
-180
-190
-200
-210
f1 (ppm)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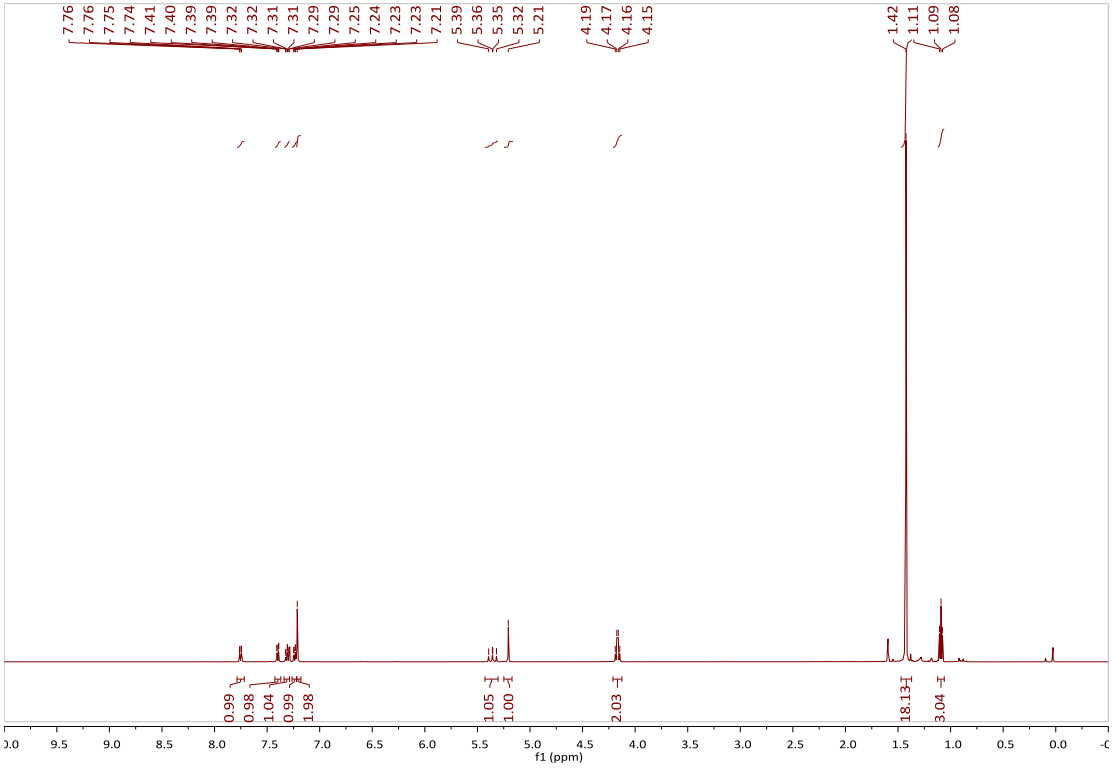
Cl
CF2CO2Et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7.31
7.29
7.29
7.25
7.24
7.23
7.23
7.21
5.39
5.36
5.35
5.32
5.21
4.19
4.17
4.16
4.15
1.42
1.11
1.09
1.08
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1.04
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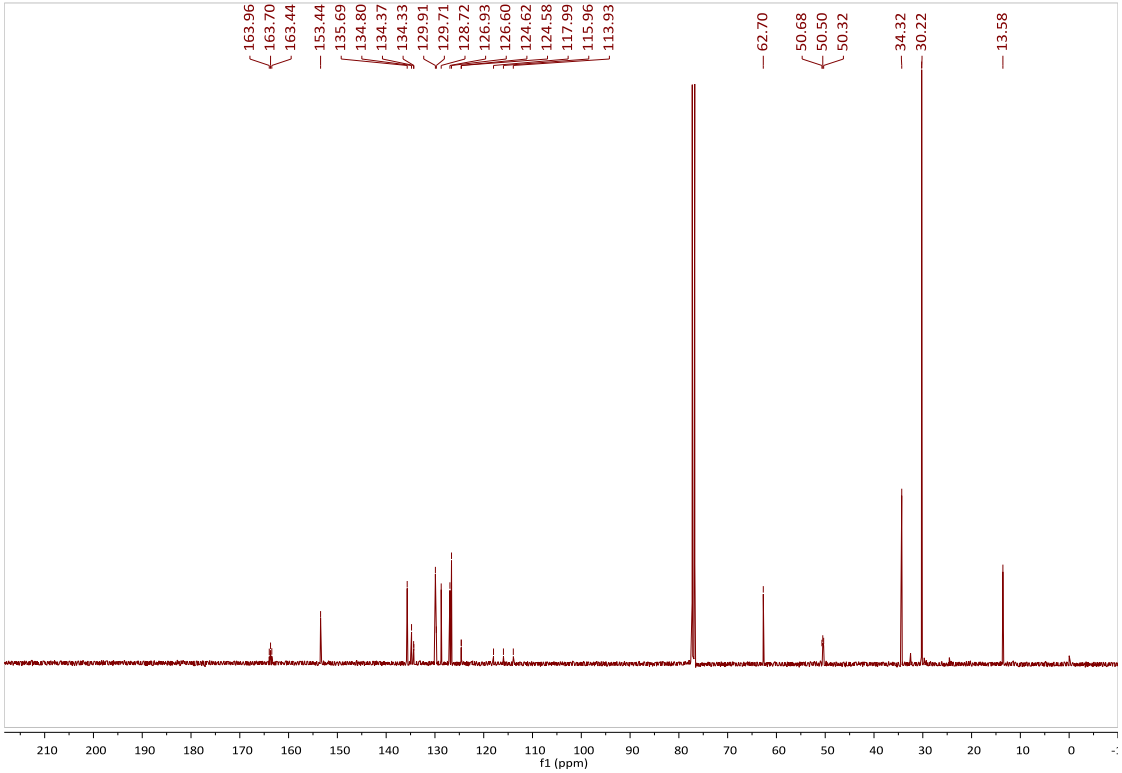
3.04
f1 (ppm)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134.33
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126.93
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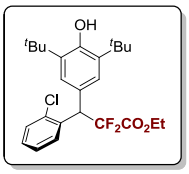
50.32
34.32
30.22
13.58
f1 (ppm)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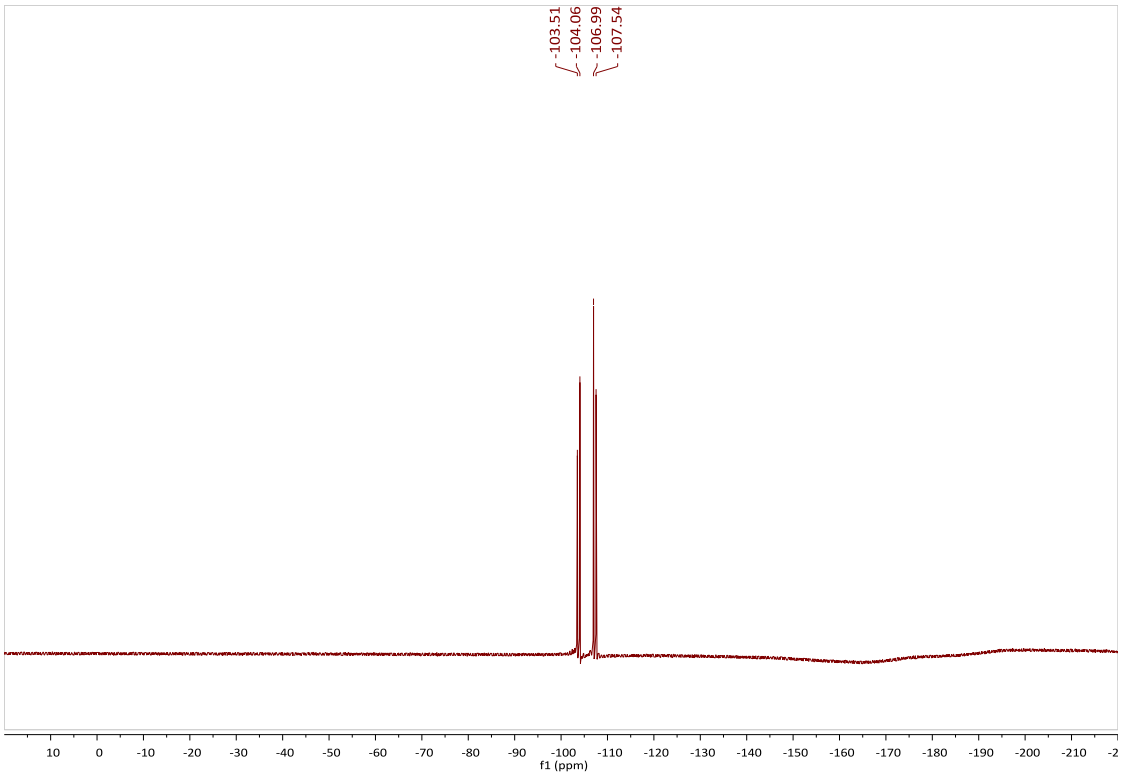
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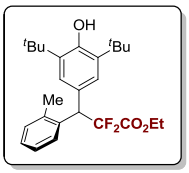
-190
-200
-210
f1 (ppm)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Me
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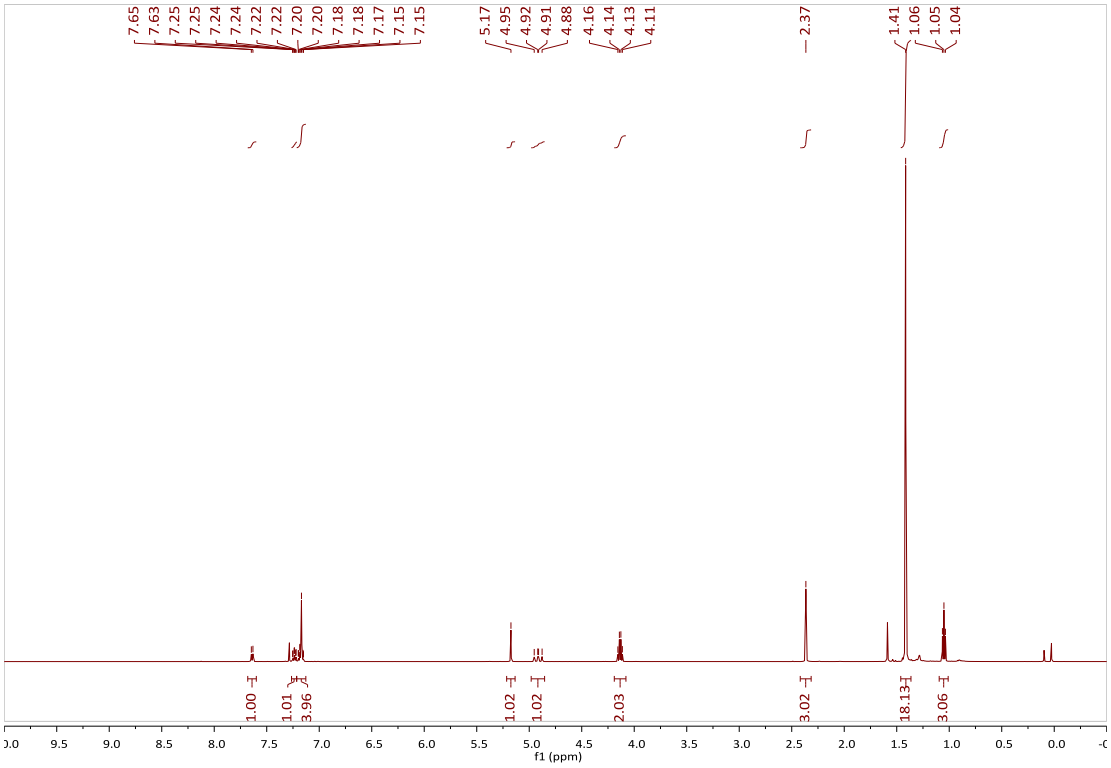
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7.17
7.15
7.15
5.17
4.95
4.92
4.91
4.88
4.16
4.14
4.13
4.11
2.37
1.41
1.06
1.05
1.04
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1.01
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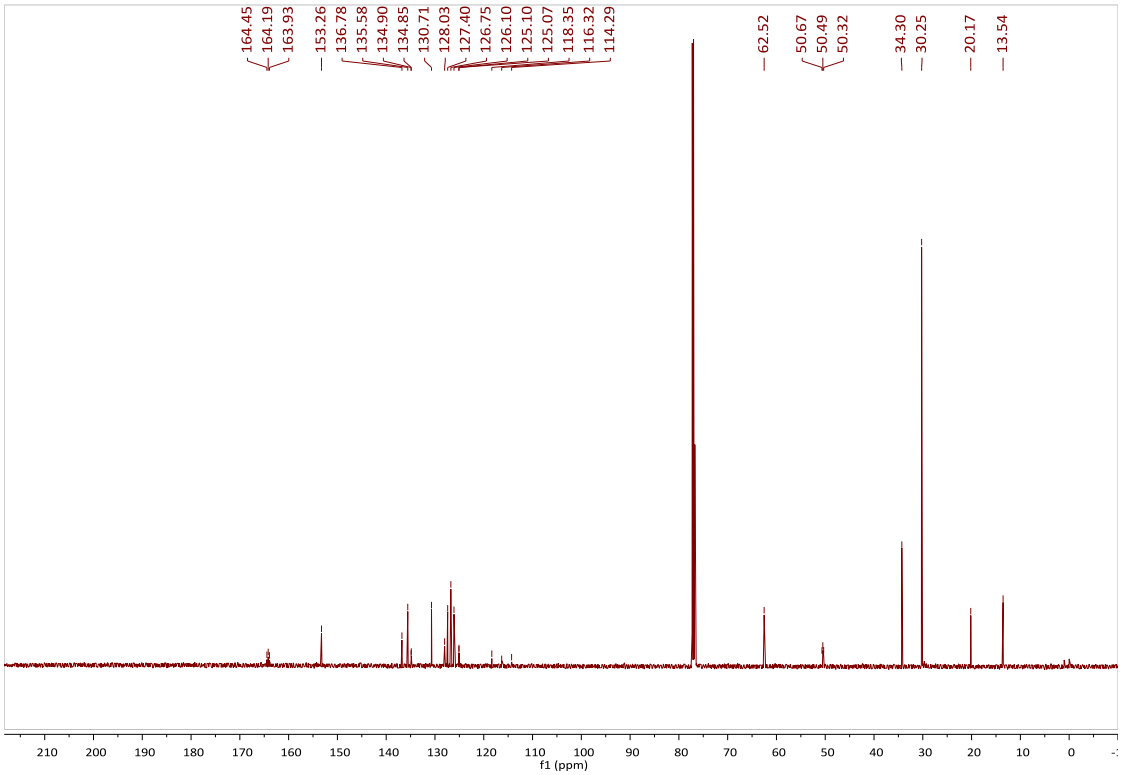
1.02
1.02
2.03
3.02
18.13
3.06
f1 (ppm)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126.75
126.10
125.10
125.07
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116.32
114.29
62.52
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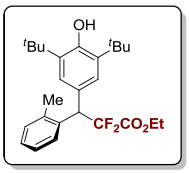
50.49
50.32
34.30
30.25
20.17
13.54
f1 (ppm)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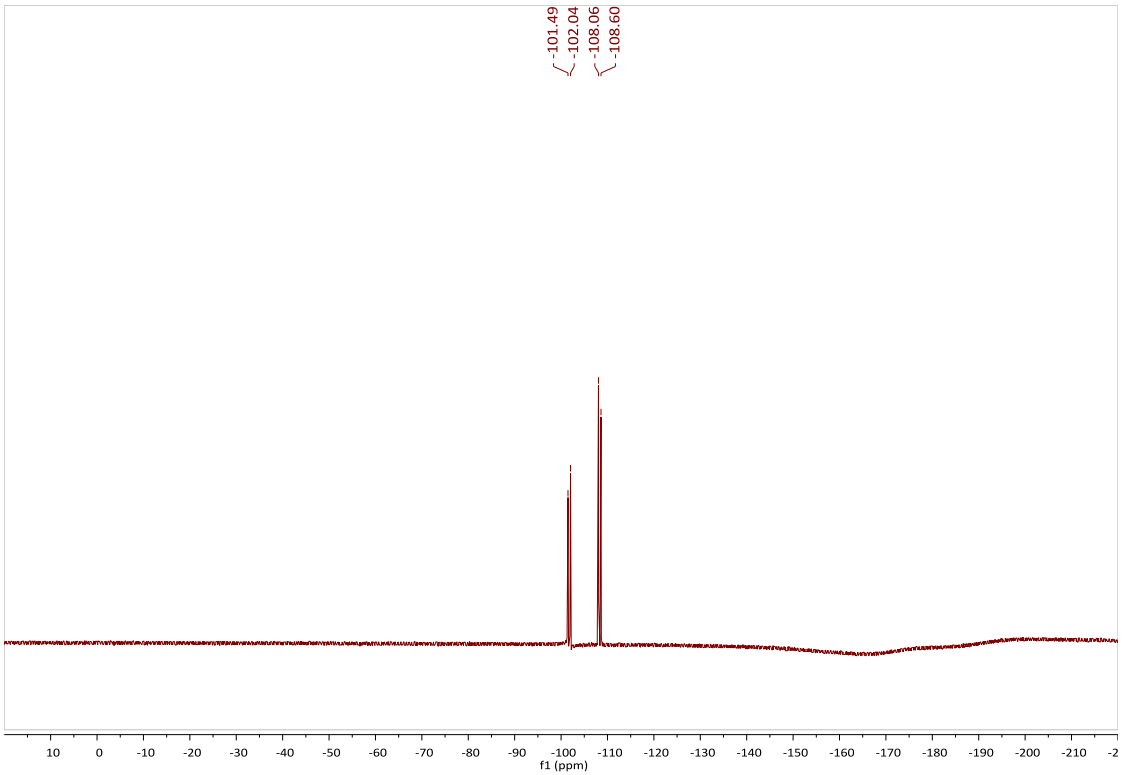
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-70
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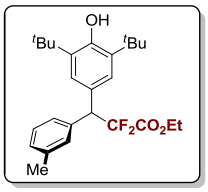
-170
-180
-190
-200
-210
f1 (ppm)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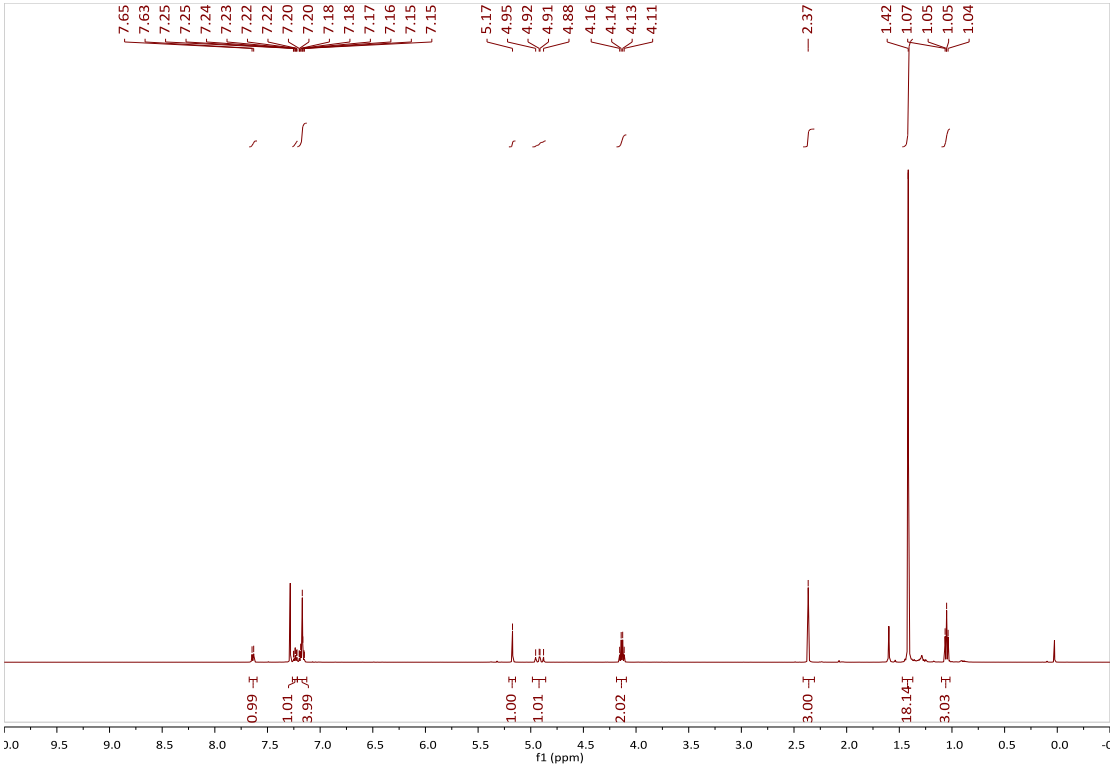
Me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4.91
4.88
4.16
4.14
4.13
4.11
2.37
1.42
1.07
1.05
1.05
1.04
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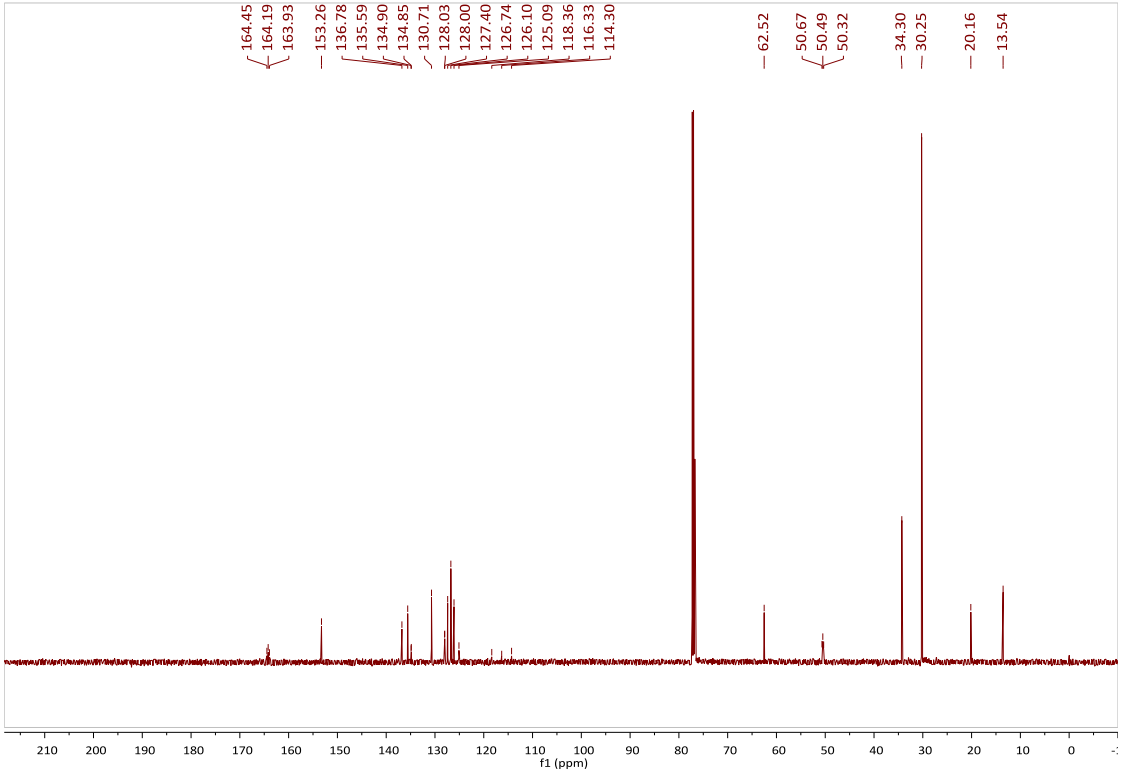
1.01
3.99
1.00
1.01
2.02
3.00
18.14
3.03
f1 (ppm)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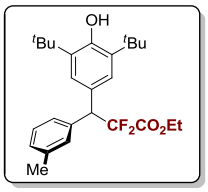
34.30
30.25
20.16
13.54
f1 (ppm)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tBu
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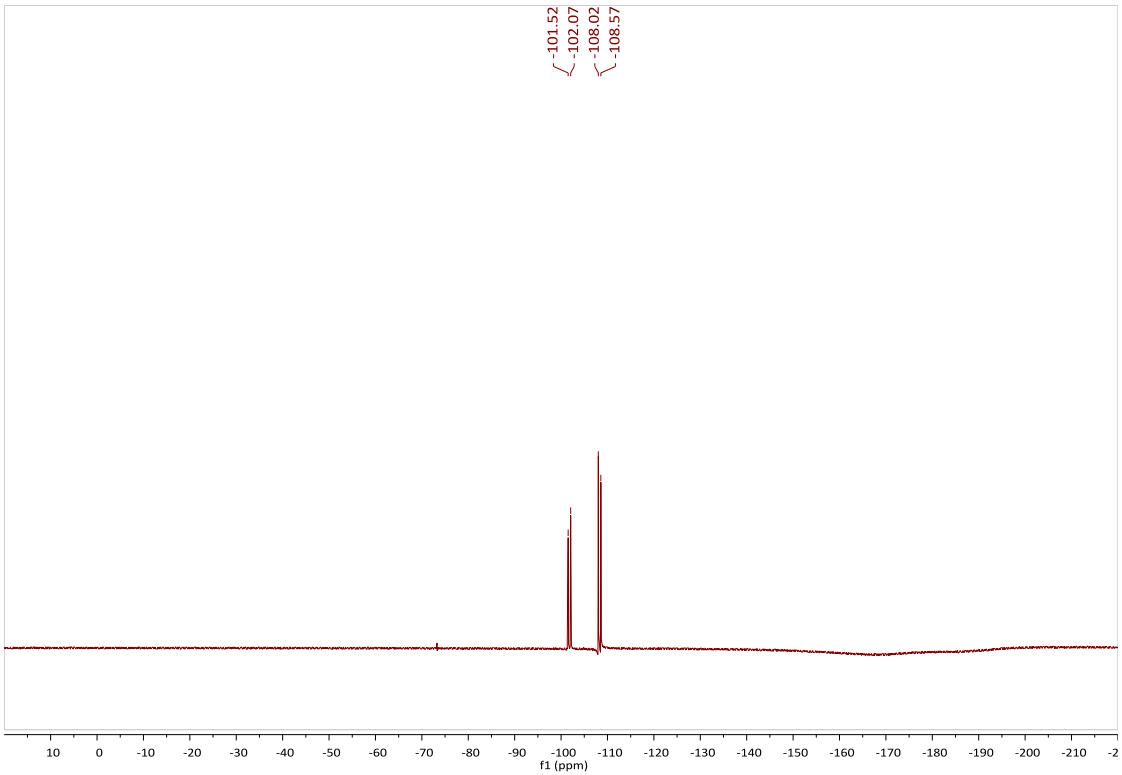
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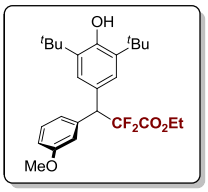
-102.07
-108.02
-108.57
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -2
f1 (ppm)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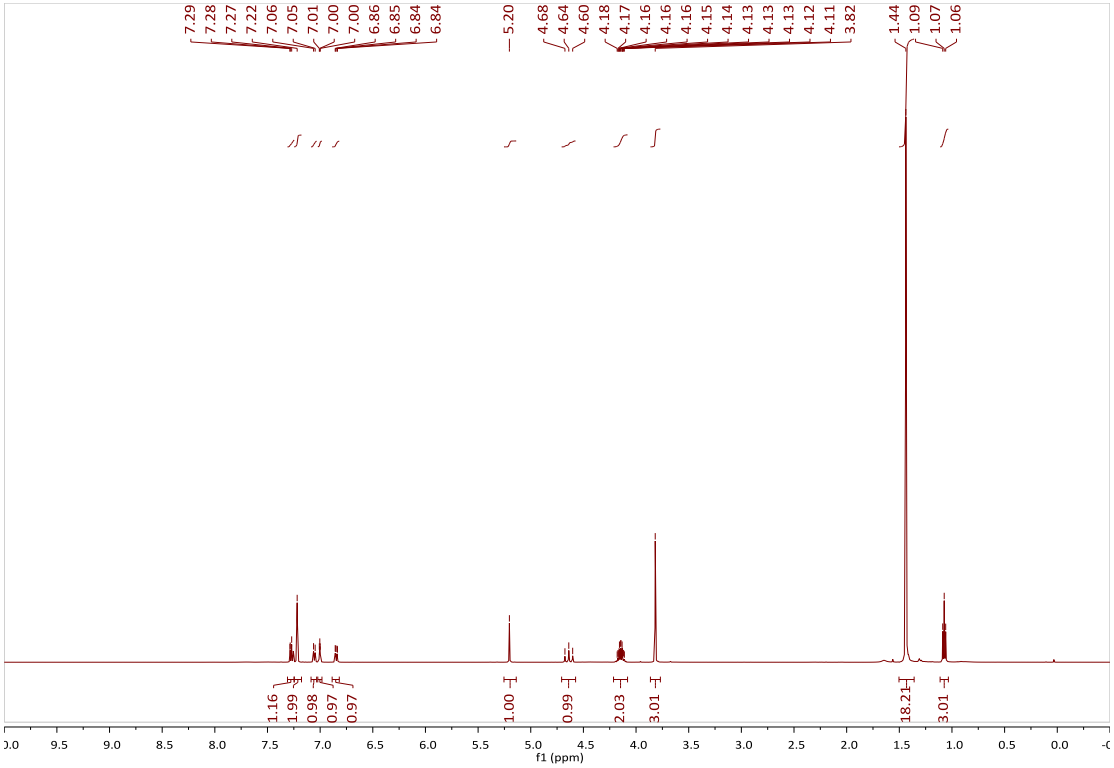
MeO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4.64
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4.18
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4.16
4.16
4.15
4.14
4.13
4.13
4.13
4.12
4.11
3.82
1.44
1.09
1.07
1.06
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0.97
0.97
1.00
0.99
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3.01
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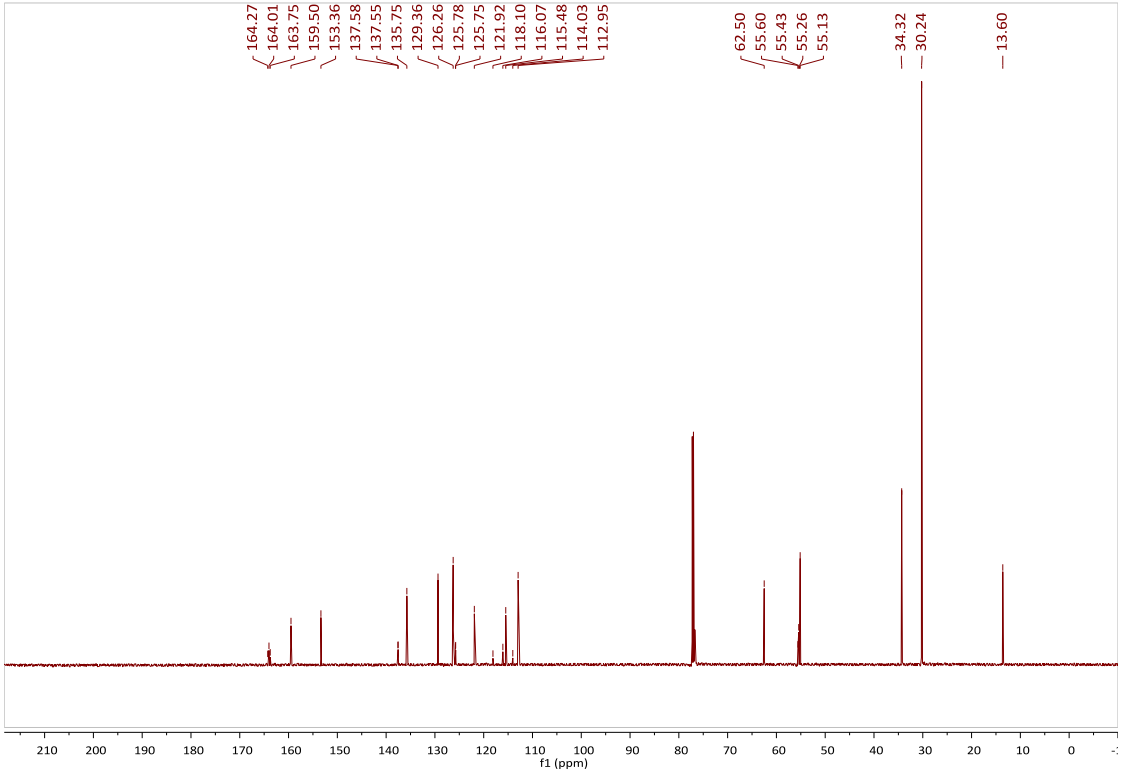
3.01
f1 (ppm)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125.75
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118.10
116.07
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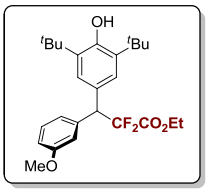
55.43
55.26
55.13
34.32
30.24
13.60
f1 (ppm)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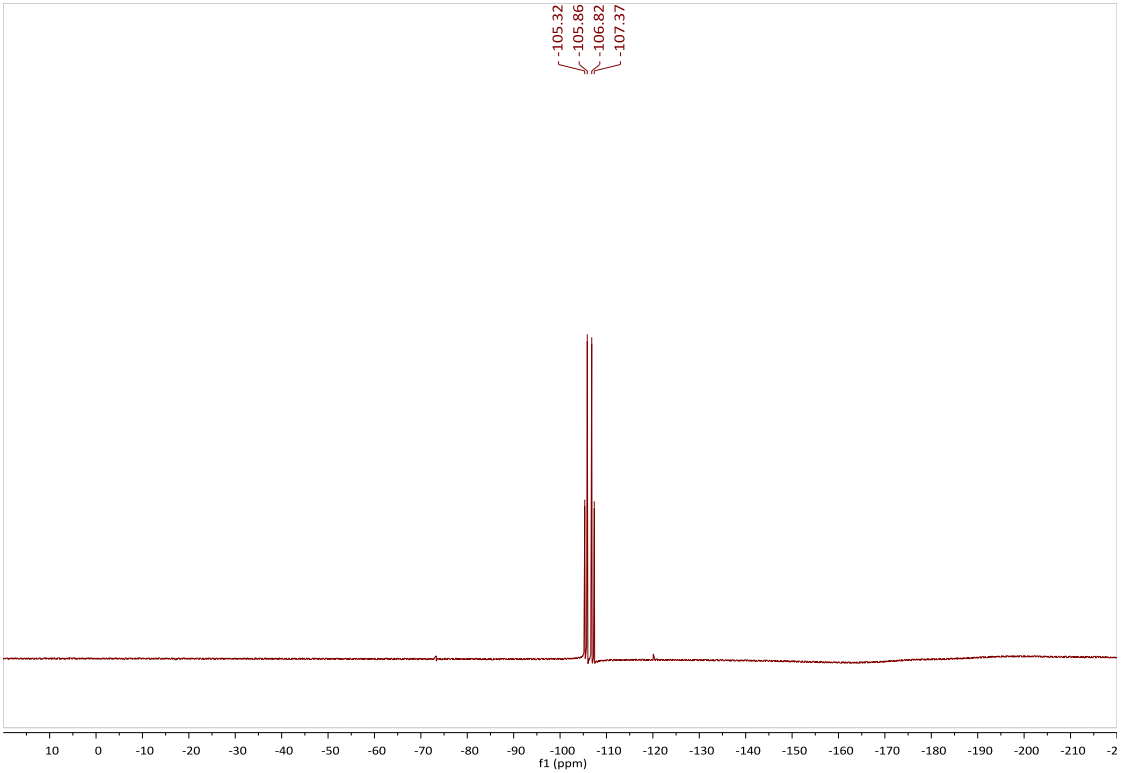
CF2CO2Et
MeO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-20
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-50
-60
-70
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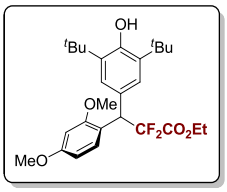
-170
-180
-190
-200
-210
f1 (ppm)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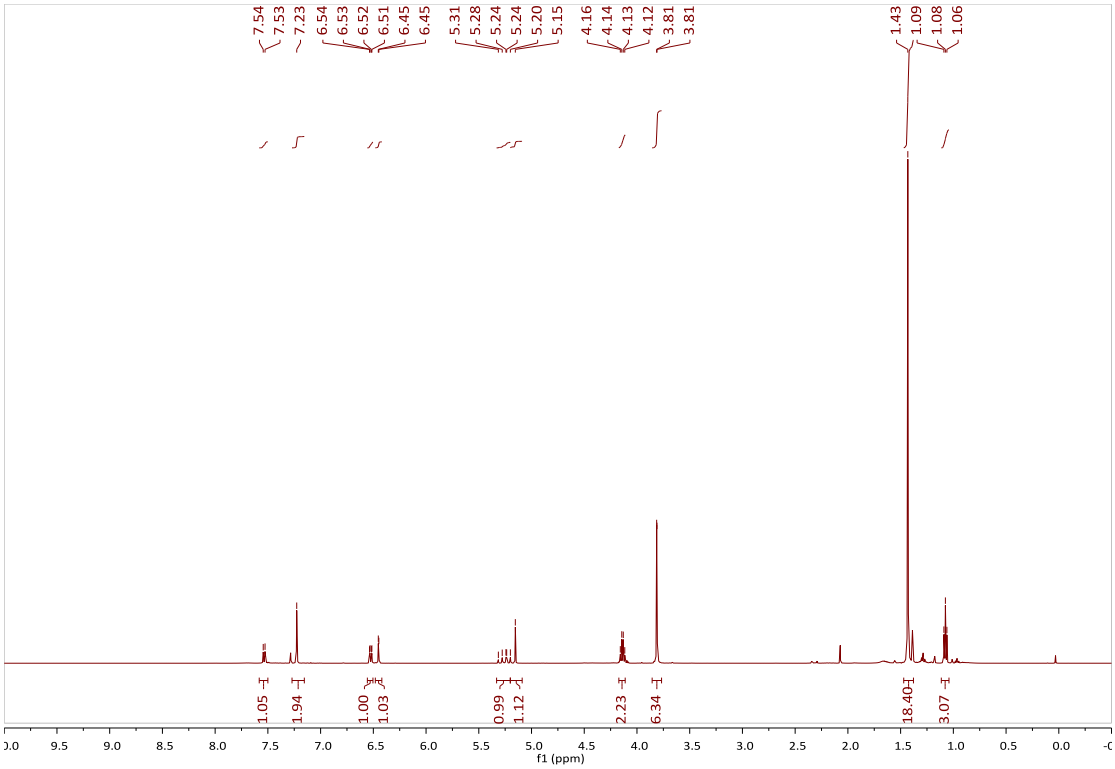
CF2CO2Et
MeO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5.24
5.24
5.20
5.15
4.16
4.14
4.13
4.12
3.81
3.81
1.43
1.09
1.08
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0.99
1.12
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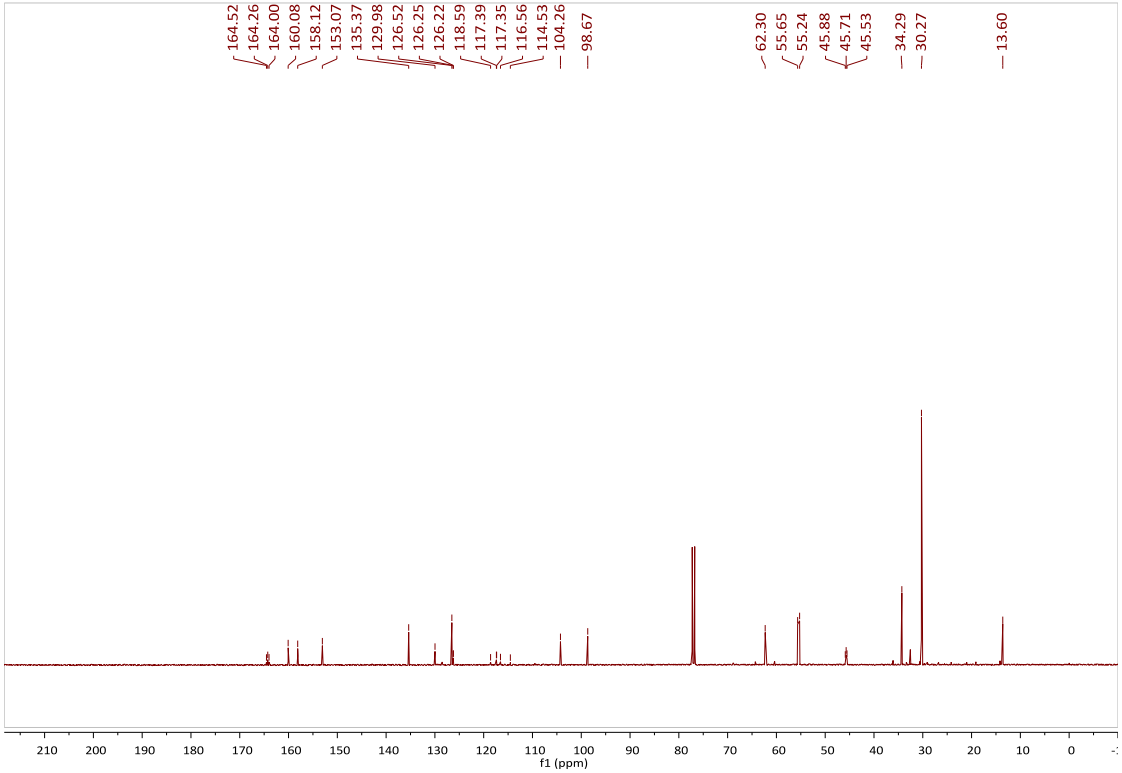
6.34
18.40
3.07
f1 (ppm)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117.35
116.56
114.53
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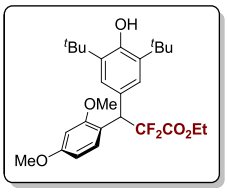
55.24
45.88
45.71
45.53
34.29
30.27
13.60
f1 (ppm)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CF2CO2Et
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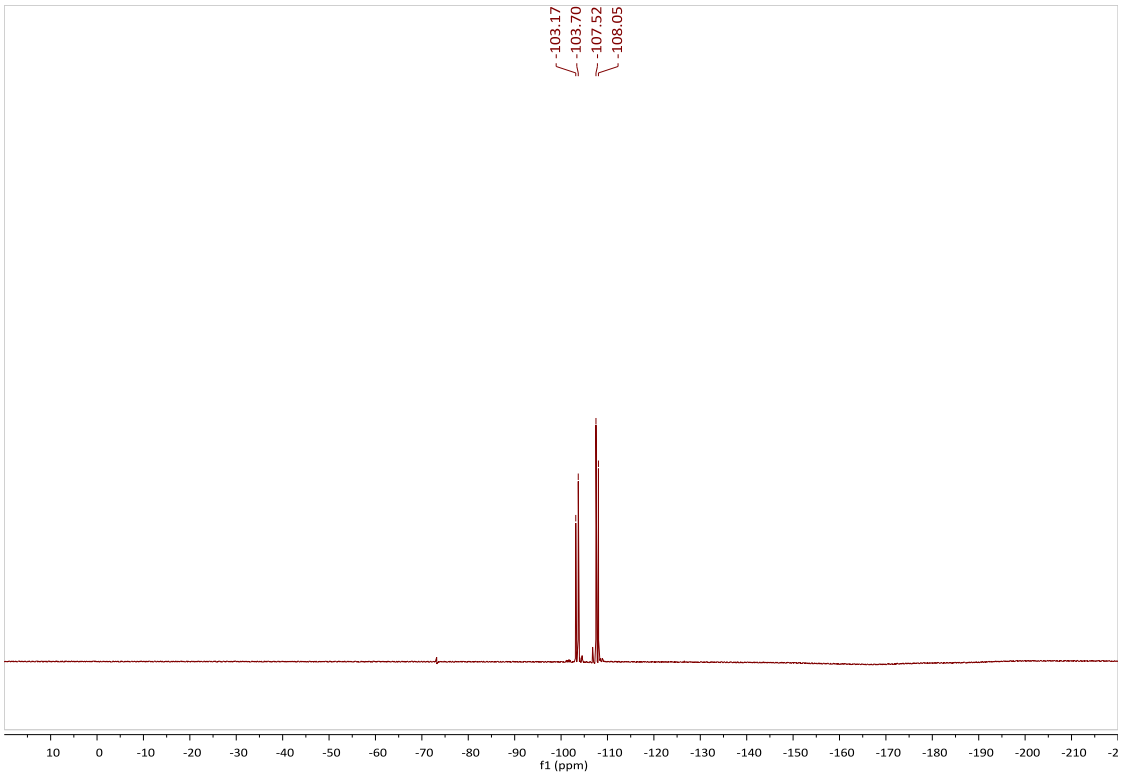
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-108.05
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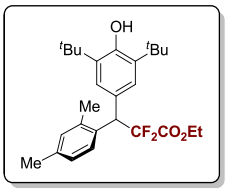
f1 (ppm)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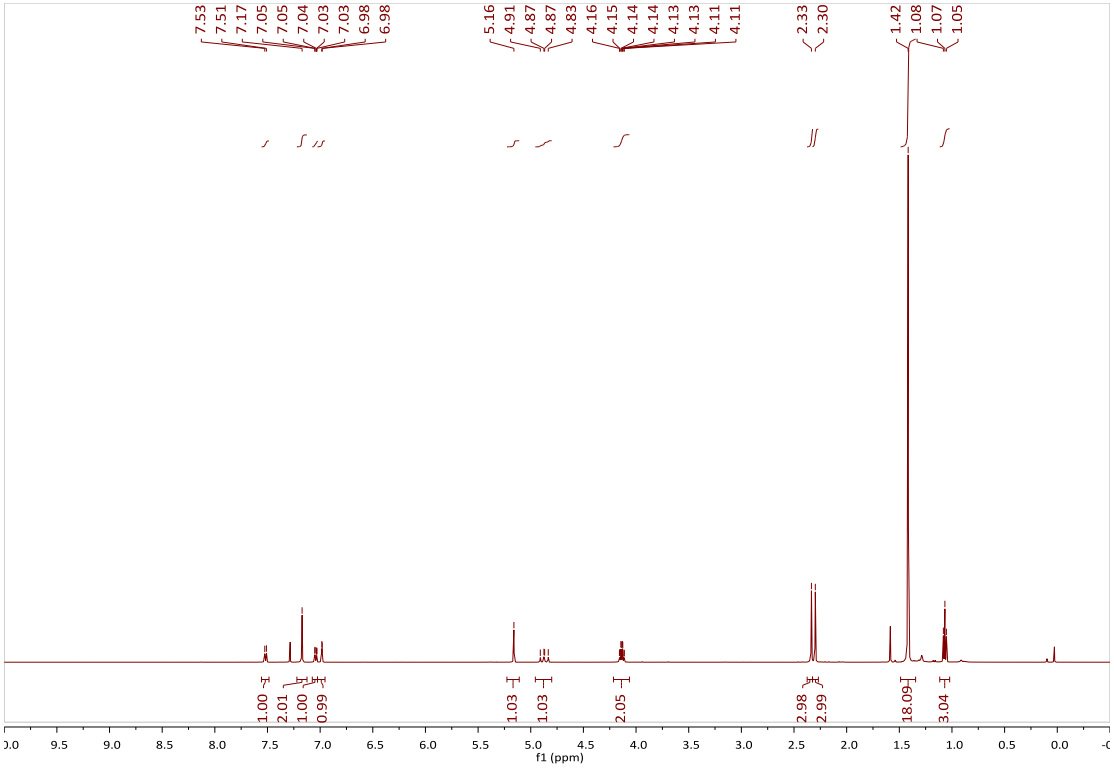
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4.14
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4.13
4.11
4.11
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1.08
1.07
1.05
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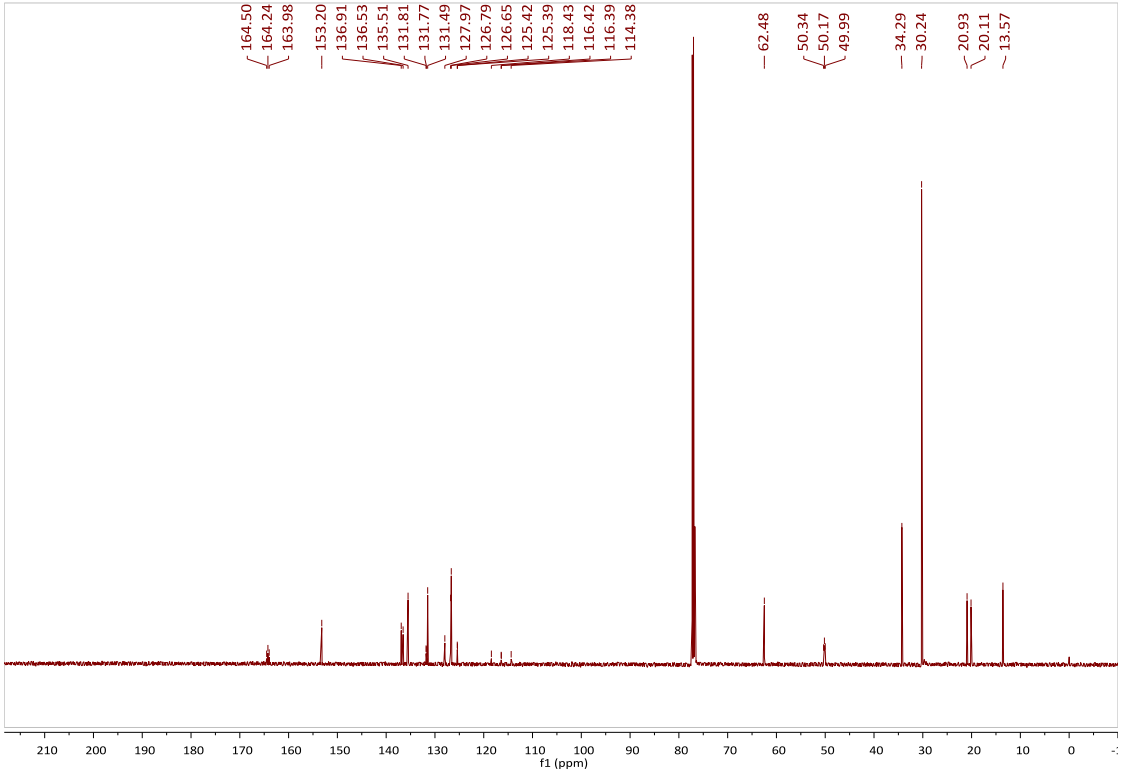
1.03
1.03
2.05
2.98
2.99
18.09
3.04
f1 (ppm)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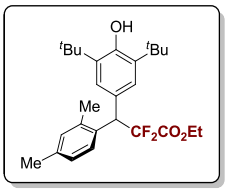
49.99
34.29
30.24
20.93
20.11
13.57
f1 (ppm)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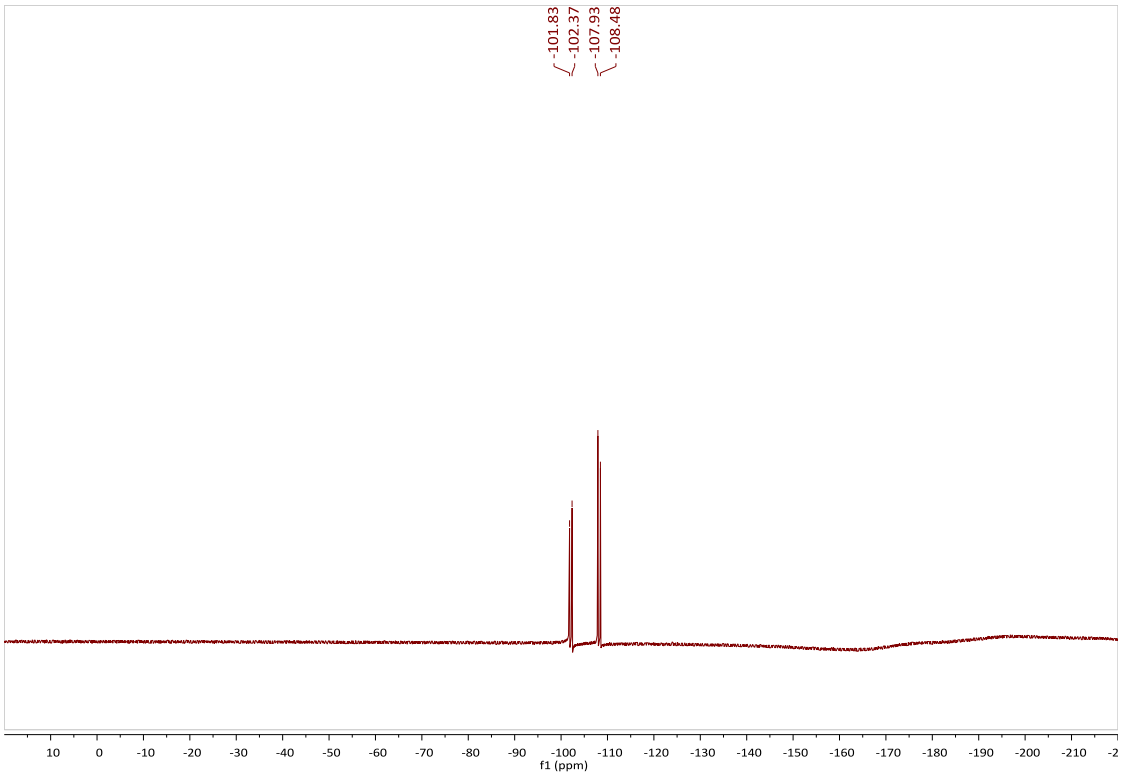
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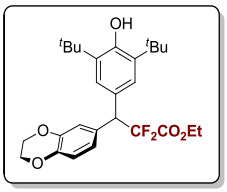
-170
-180
-190
-200
-210
f1 (ppm)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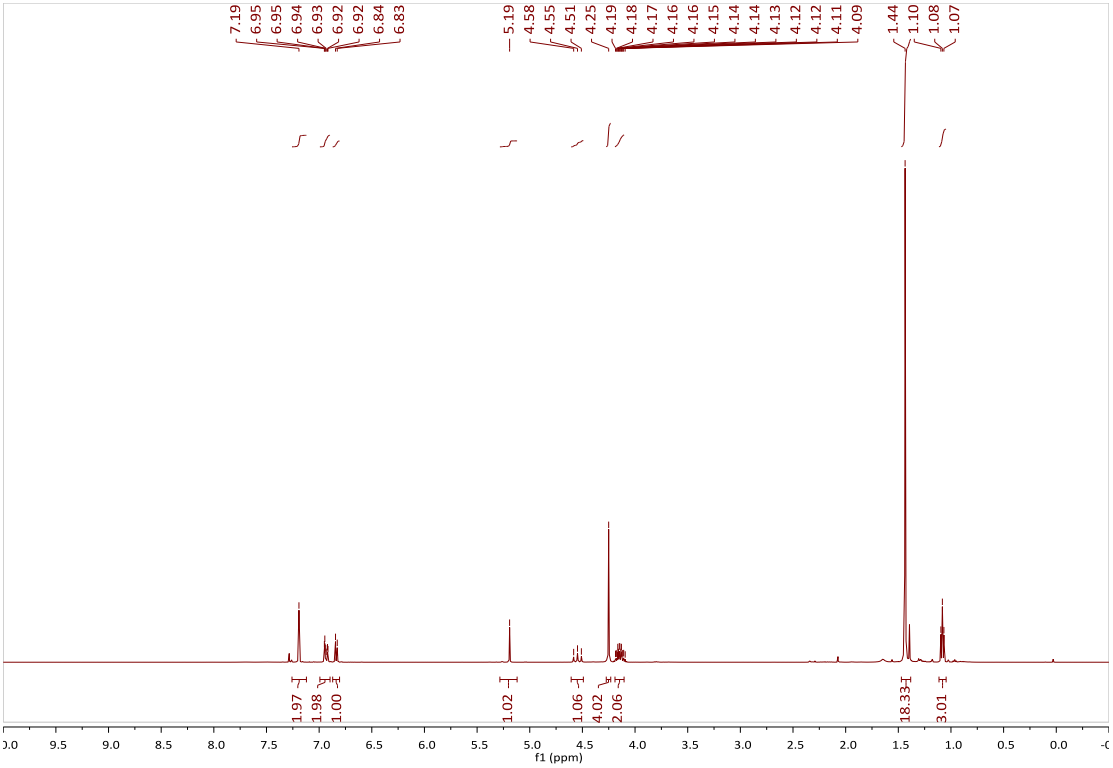
CF2CO2Et
O
O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2.06
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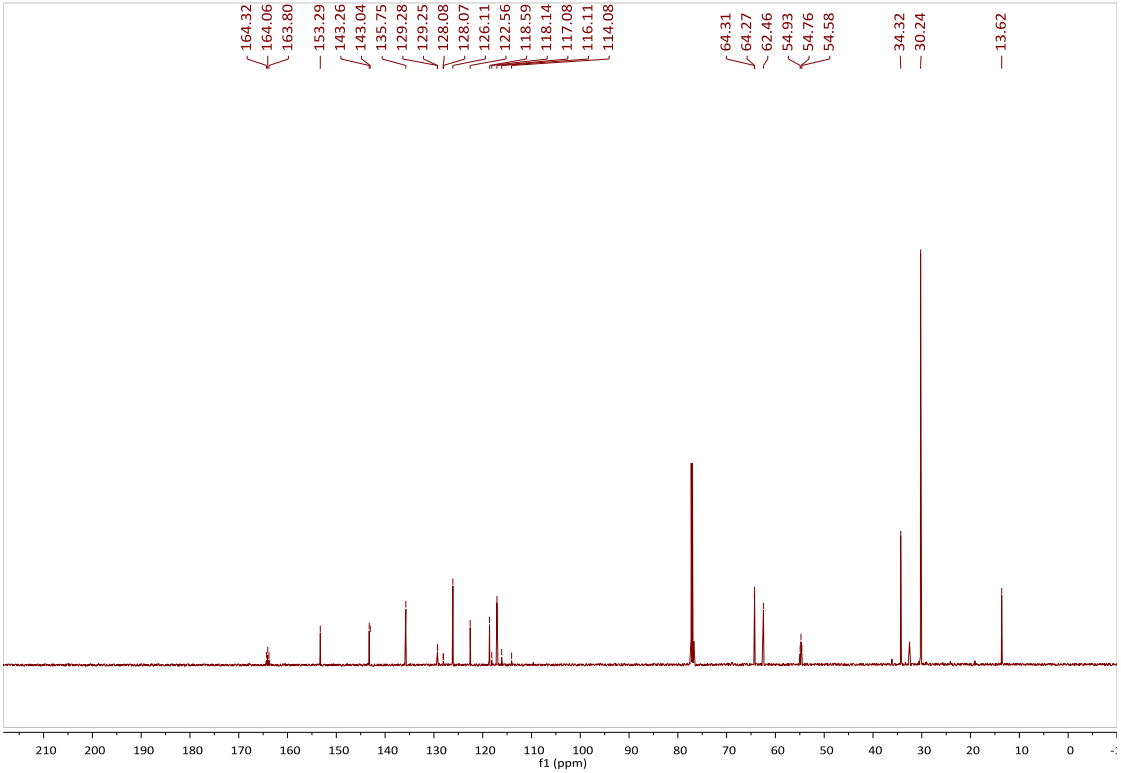
3.01
f1 (ppm)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153.29
143.26
143.04
135.75
129.28
129.25
128.08
128.07
126.11
122.56
118.59
118.14
117.08
116.11
114.08
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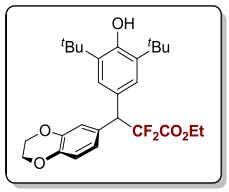
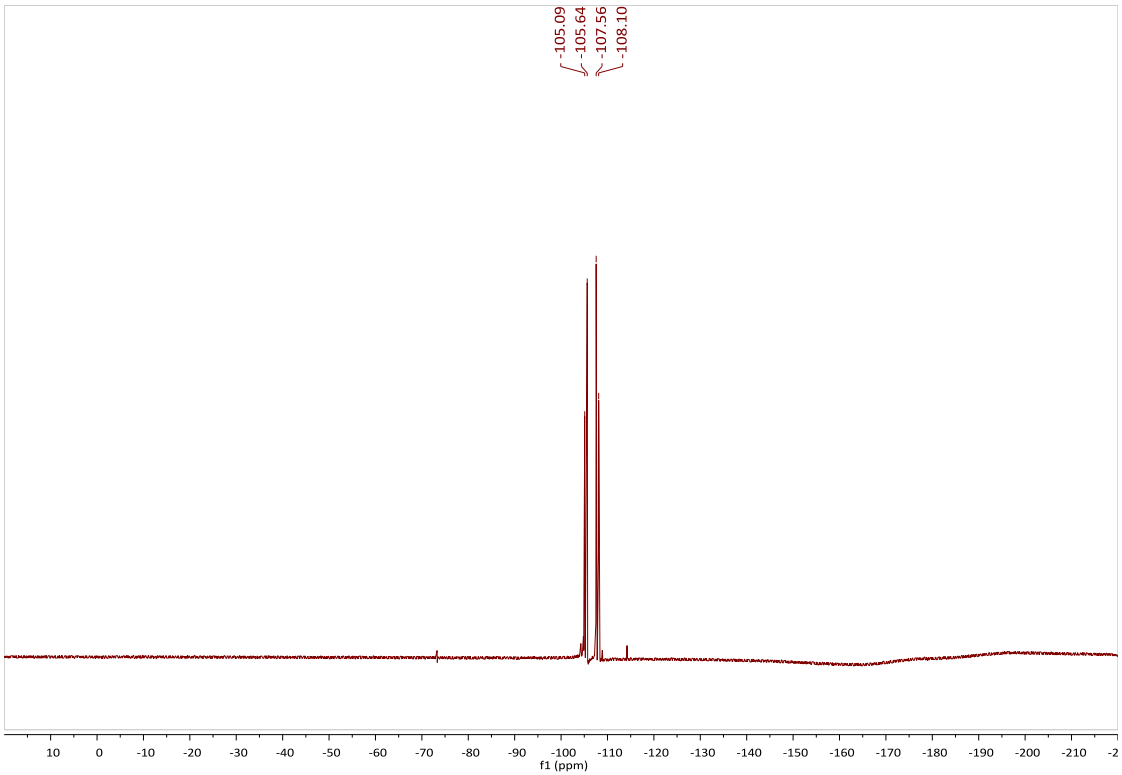
64.27
62.46
54.93
54.76
54.58
34.32
30.24
13.62
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
O
O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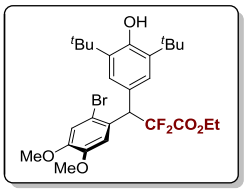
-105.64
-107.56
-108.10
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)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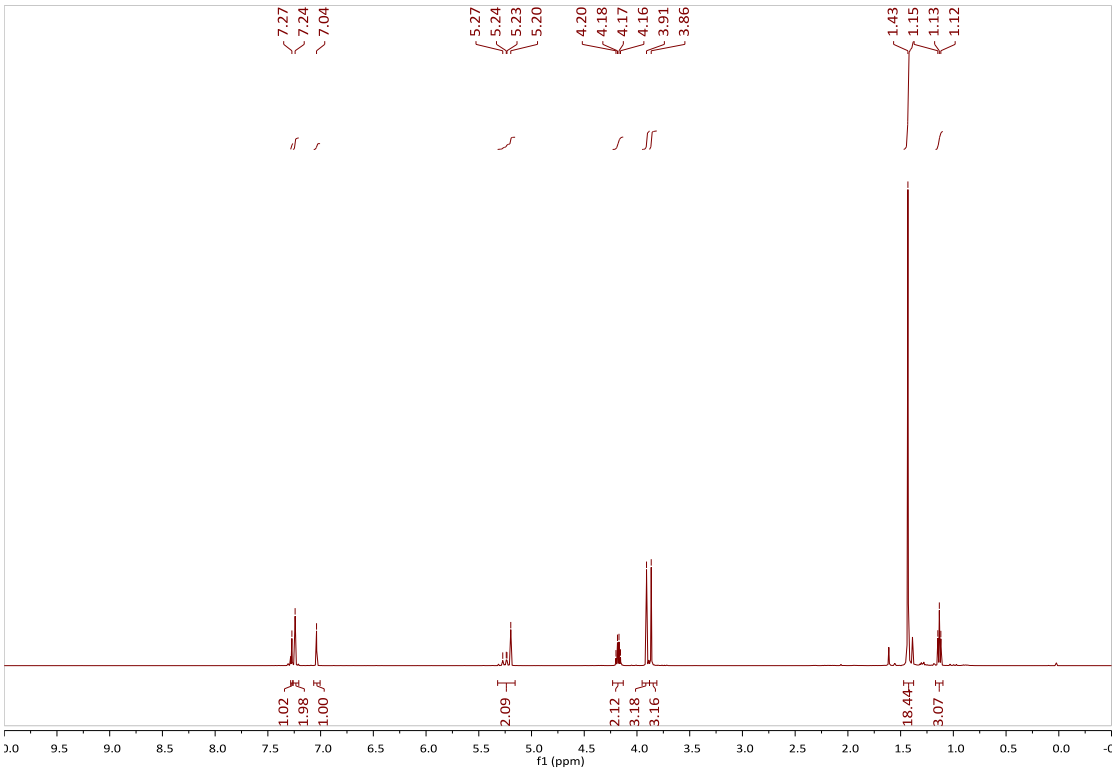
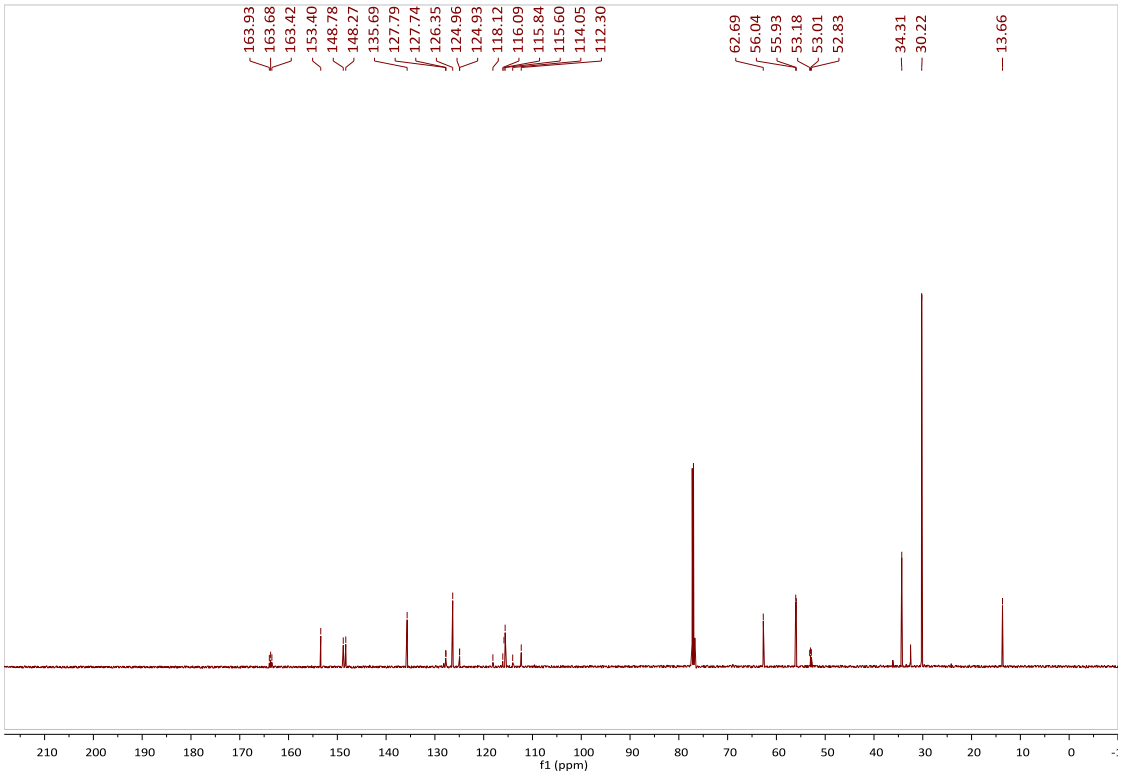
tBu
tBu
Br
CF2CO2Et
MeO
MeO


7.27
7.24
7.04
5.27
5.24
5.23
5.20
4.20
4.18
4.17
4.16
3.91
3.86
1.43
1.15
1.13
1.12
1.02
1.98
1.00
2.09
2.12
3.18
3.16
18.44
3.07
f1 (ppm)


163.93
163.68
163.42
153.40
148.78
148.27
135.69
127.79
127.74
126.35
124.96
124.93
118.12
116.09
115.84
115.60
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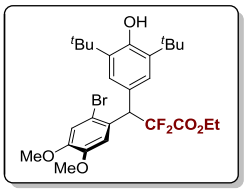
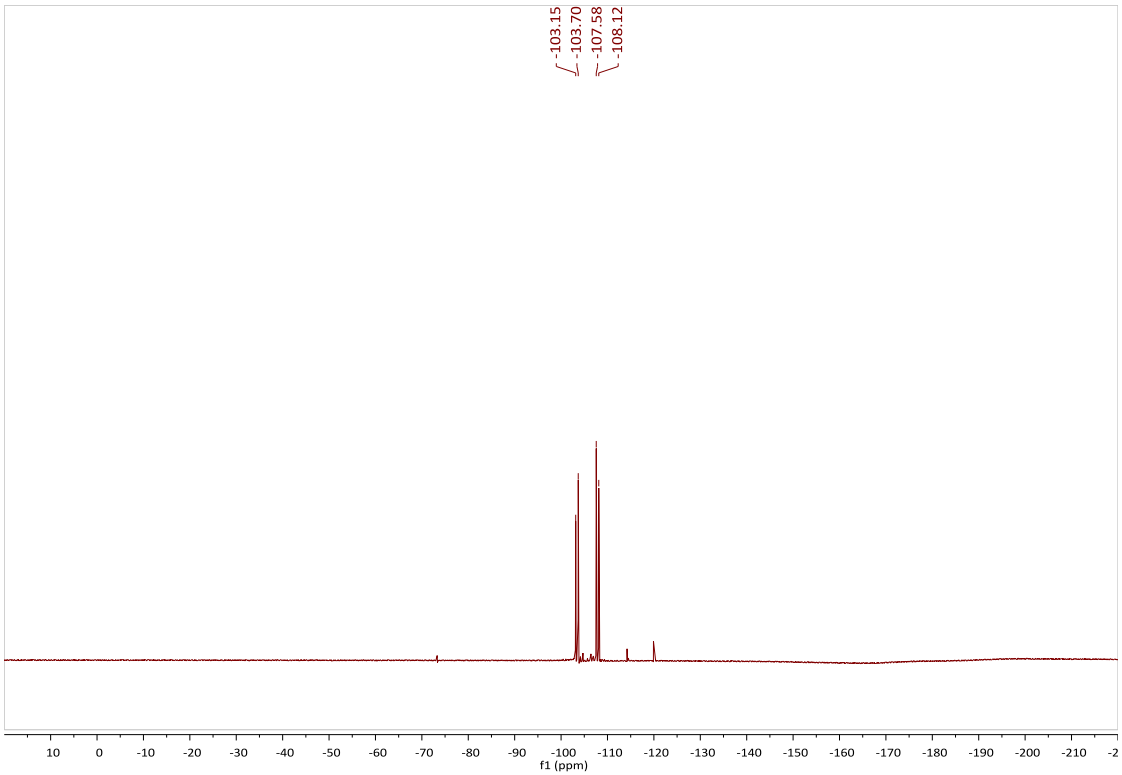
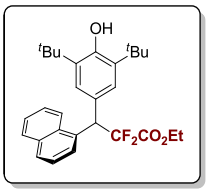
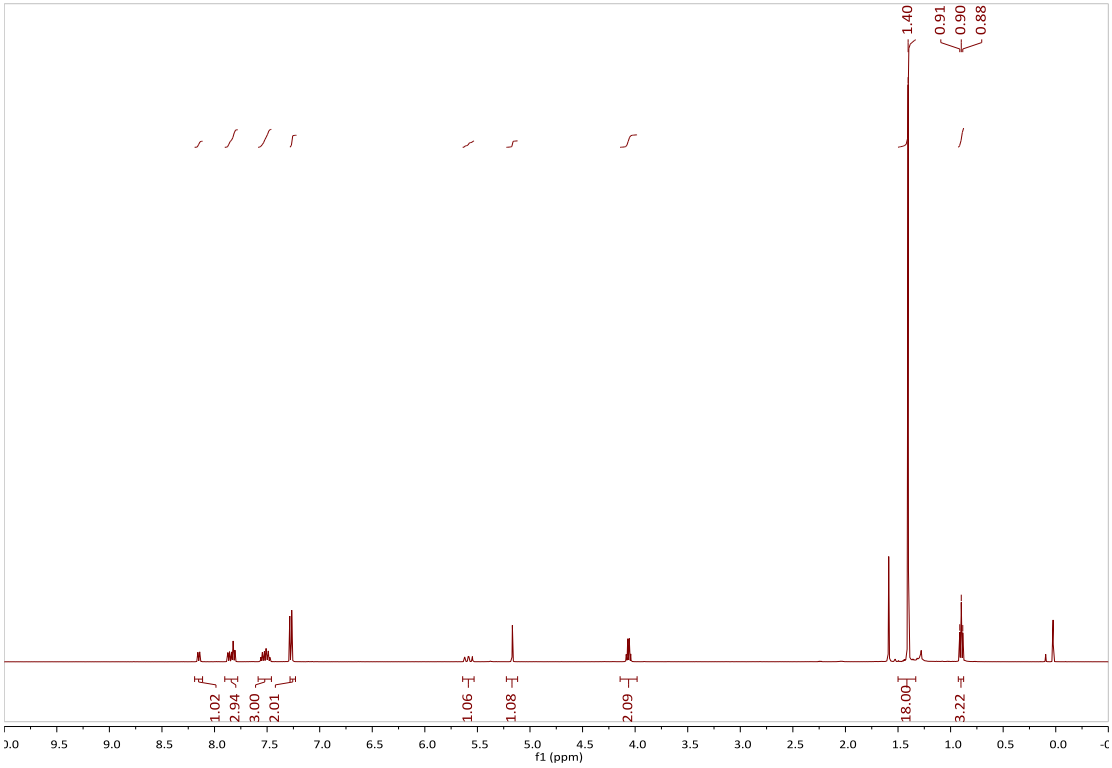
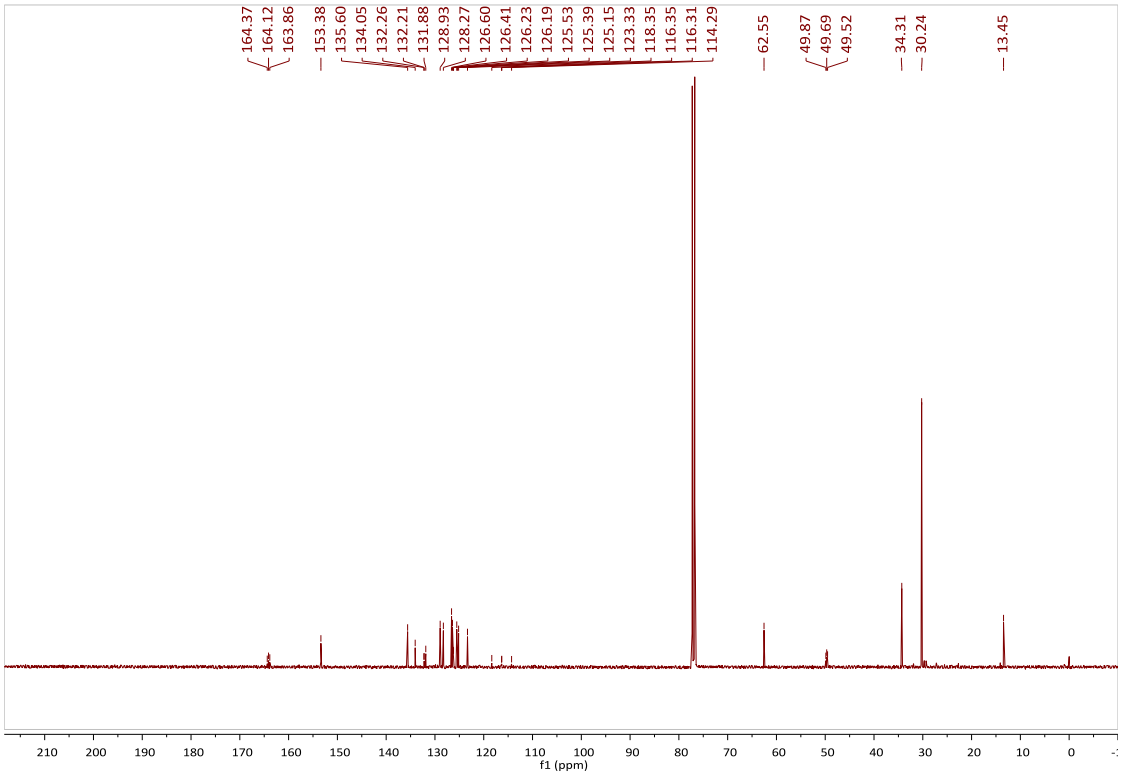
52.83
34.31
30.22
13.66
f1 (ppm)

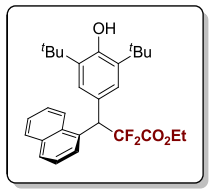

OH
tBu
tBu
Br
CF2CO2Et
MeO
MeO

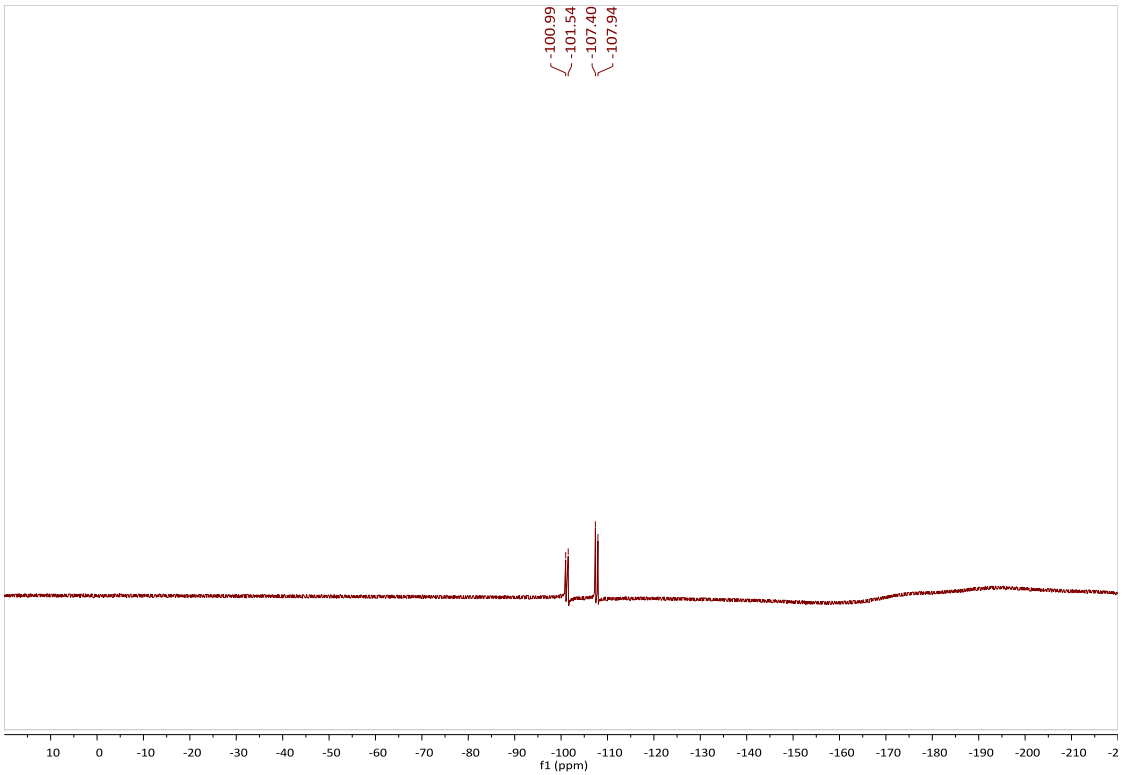

-103.15
-103.70
-107.58
-108.12
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -2
f1 (ppm)


OH
tBu
tBu
CF2CO2Et


1.40
0.91
0.90
0.88
1.02
2.94
3.00
2.01
1.06
1.08
2.09
18.00
3.22
f1 (ppm)


164.37
164.12
163.86
153.38
135.60
134.05
132.26
132.21
131.88
128.93
128.27
126.60
126.41
126.23
126.19
125.53
125.39
125.15
123.33
118.35
116.35
116.31
114.29
62.55
49.87
49.69
49.52
34.31
30.24
13.45
f1 (ppm)


OH
tBu
tBu
CF2CO2Et


-100.99
-101.54
-107.40
-107.94
10
0
-10
-20
-30
-40
-50
-60
-70
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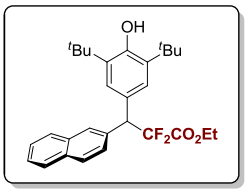
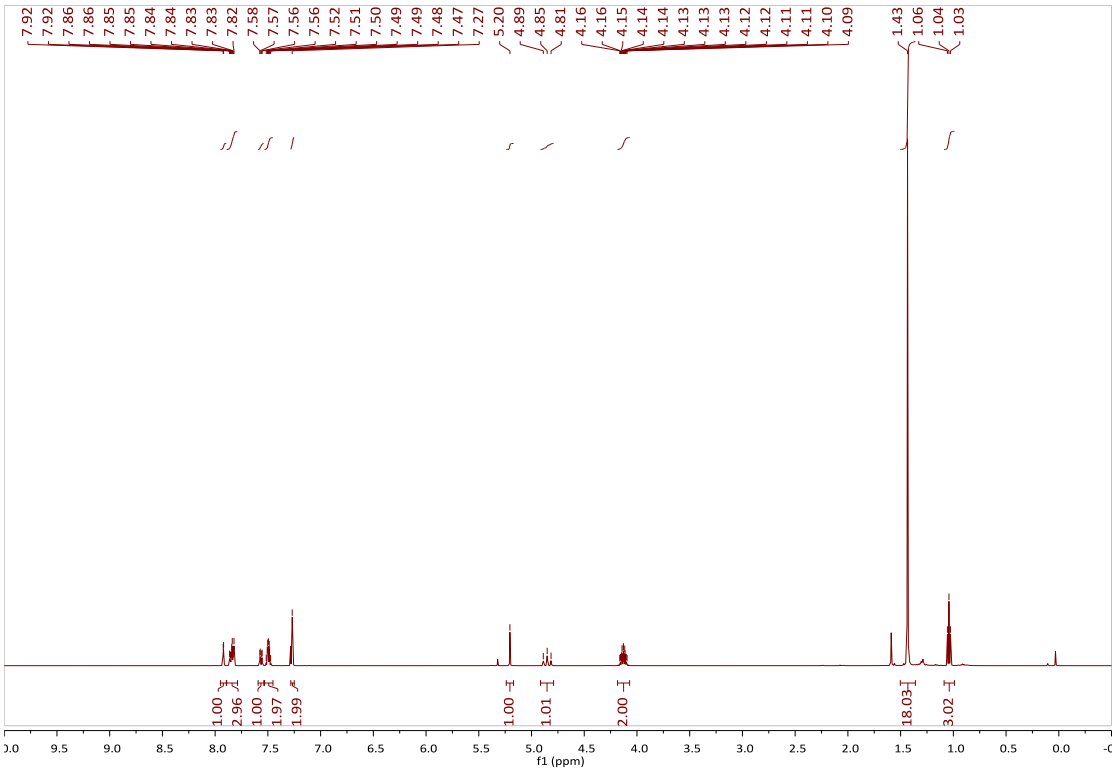
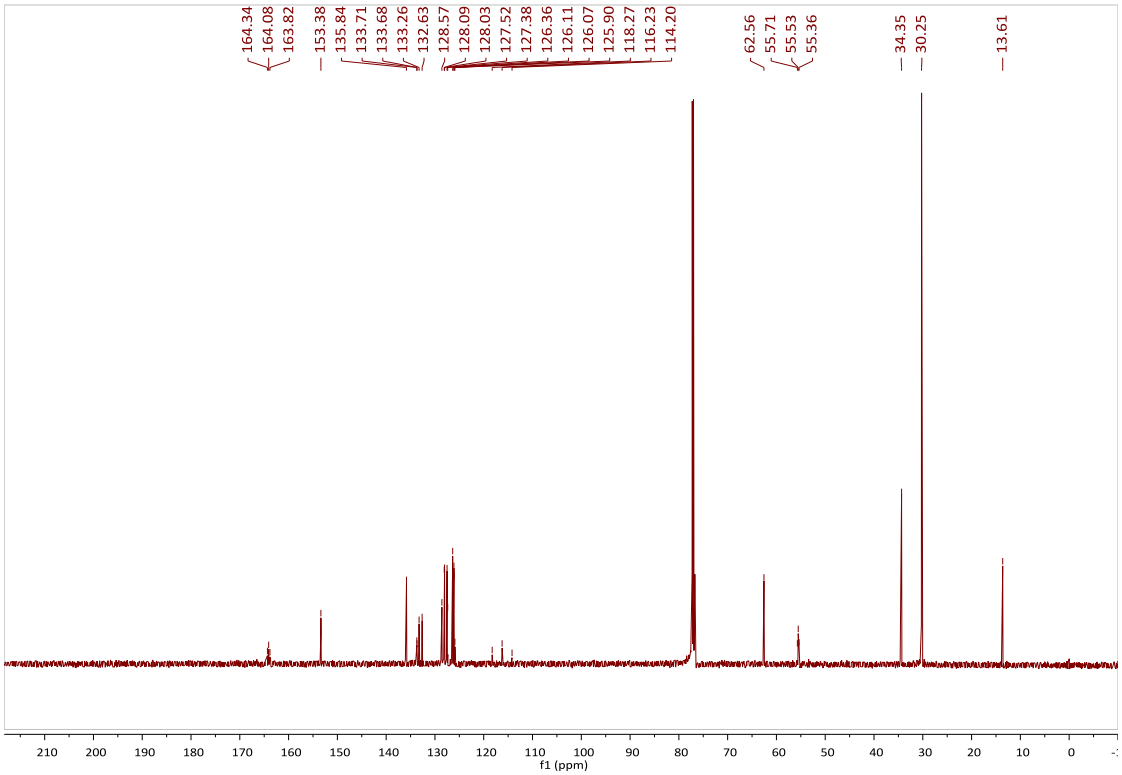
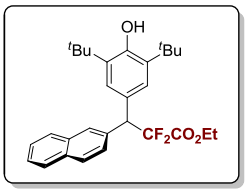
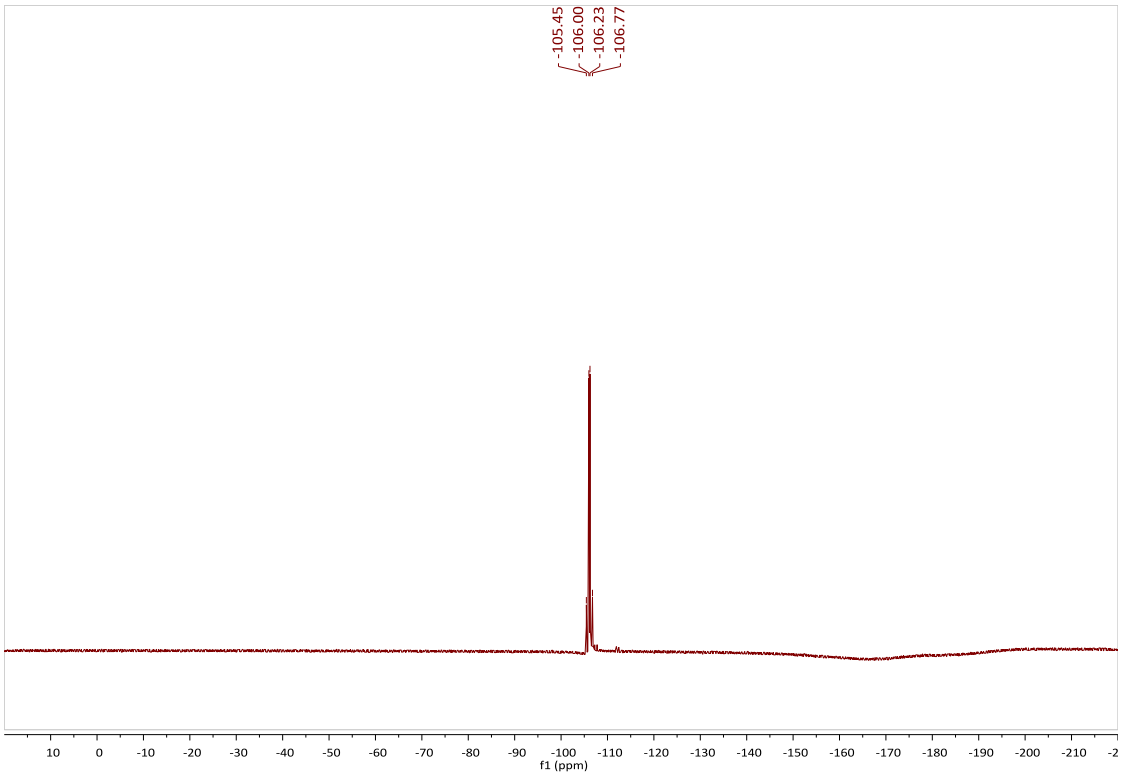
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et


7.92 7.92 7.86 7.86 7.85 7.85 7.84 7.84 7.83 7.83 7.82 7.58 7.57 7.56 7.56 7.52 7.51 7.50 7.49 7.49 7.48 7.47 7.27 5.20 4.89 4.85 4.81 4.16 4.16 4.15 4.14 4.14 4.13 4.13 4.12 4.12 4.11 4.11 4.10 4.09 1.43 1.06 1.04 1.03
1.00 2.96 1.00 1.97 1.99 1.00 1.01 2.00 18.03 3.02
f1 (ppm)


164.34 164.08 163.82 153.38 135.84 133.71 133.68 133.26 132.63 128.57 128.09 128.03 127.52 127.38 126.36 126.11 126.07 125.90 118.27 116.23 114.20 62.56 55.71 55.53 55.36 34.35 30.25 13.61
f1 (ppm)


OH
tBu
tBu
CF2CO2Et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-106.00
-106.23
-106.77
10
0
-10
-20
-30
-40
-50
-60
-70
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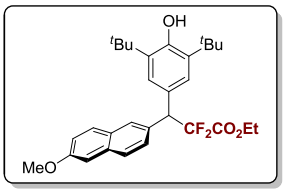
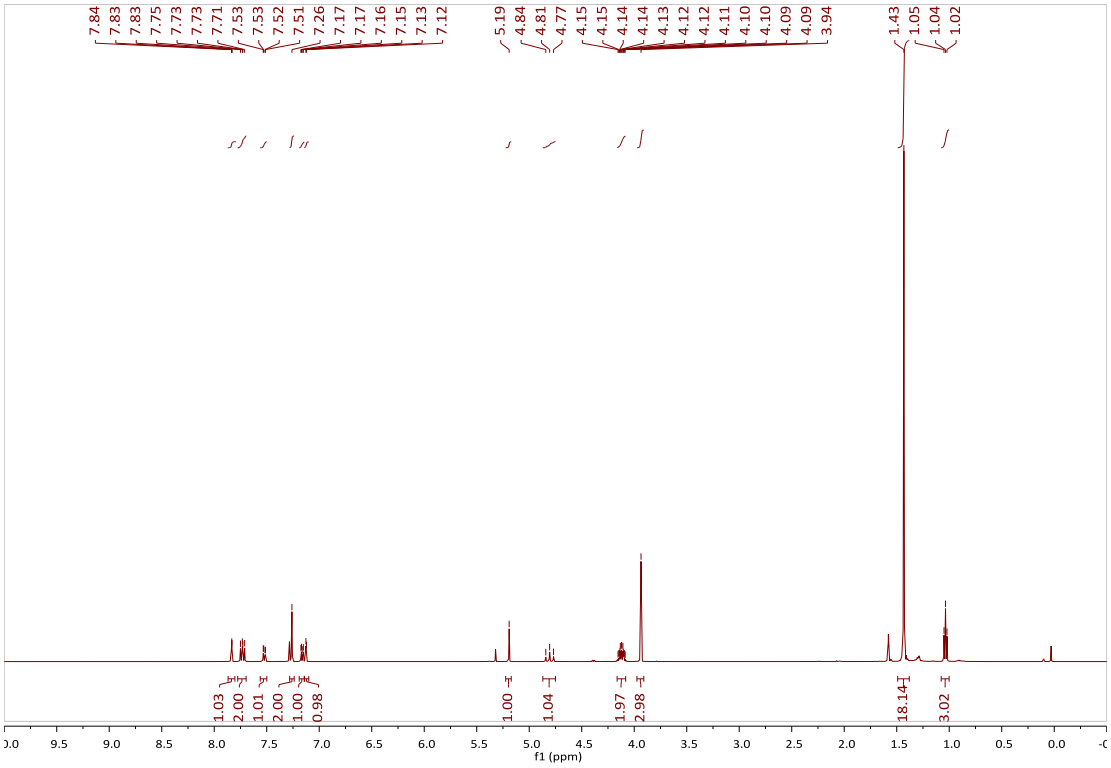
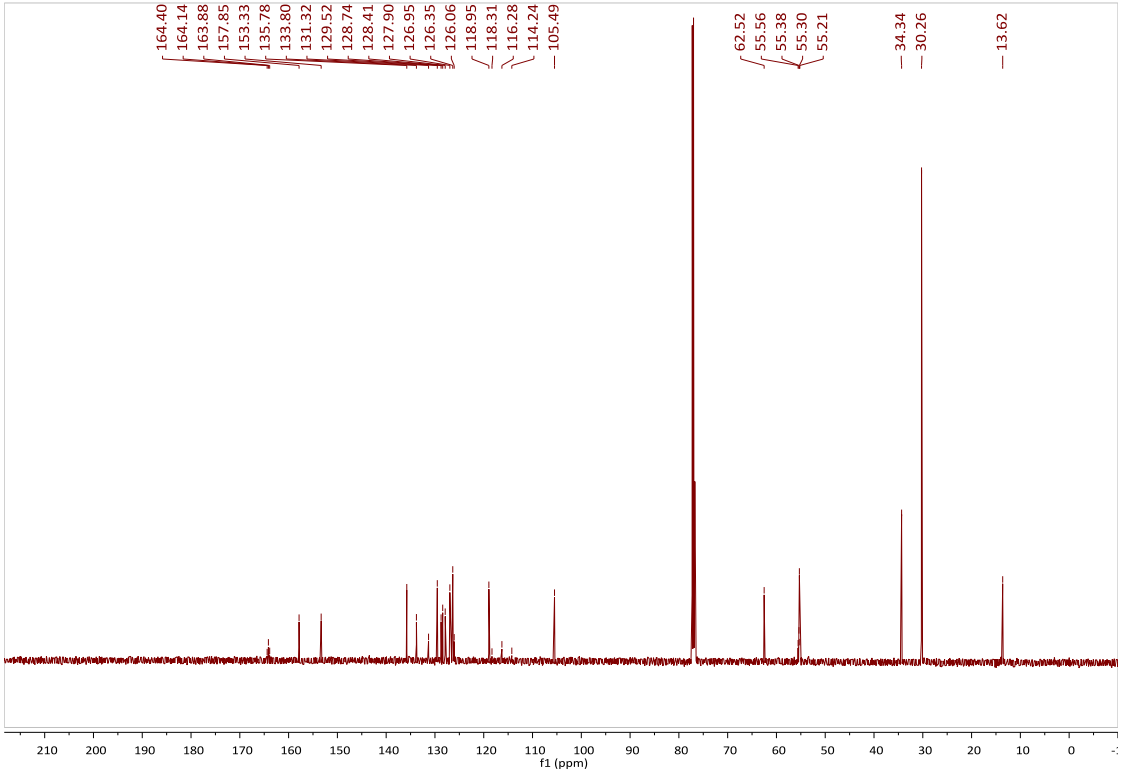
-160
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
MeO


7.84
7.83
7.83
7.75
7.73
7.73
7.71
7.53
7.53
7.52
7.51
7.26
7.17
7.17
7.16
7.15
7.13
7.12
5.19
4.84
4.81
4.77
4.15
4.15
4.14
4.14
4.13
4.12
4.12
4.11
4.10
4.10
4.09
4.09
3.94
1.43
1.05
1.04
1.02
1.03
2.00
1.01
2.00
1.00
0.98
1.00
1.04
1.97
2.98
18.14
3.02
f1 (ppm)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164.14
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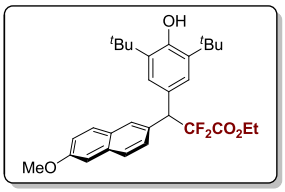
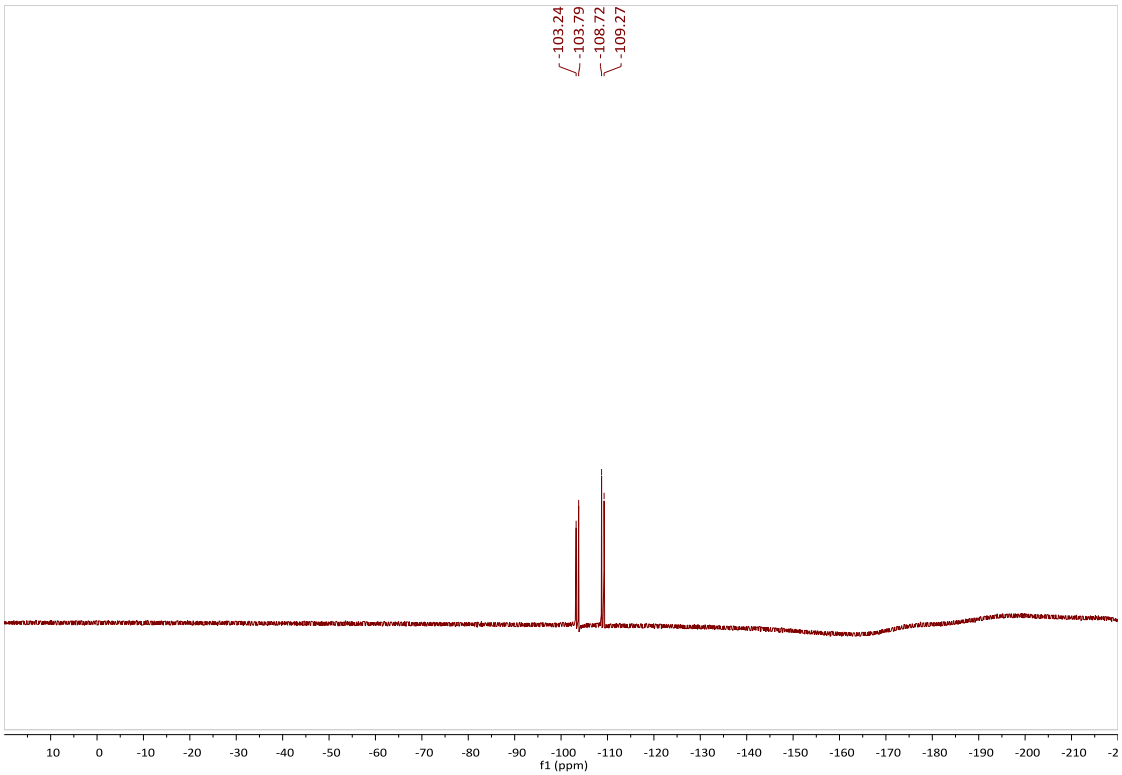
153.33
135.78
133.80
131.32
129.52
128.74
128.41
127.90
126.95
126.35
126.06
118.95
118.31
116.28
114.24
105.49
62.52
55.56
55.38
55.30
55.21
34.34
30.26
13.62
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
MeO


-103.24
-103.79
-108.72
-109.27
10
0
-10
-20
-30
-40
-50
-60
-70
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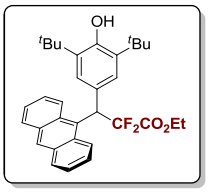
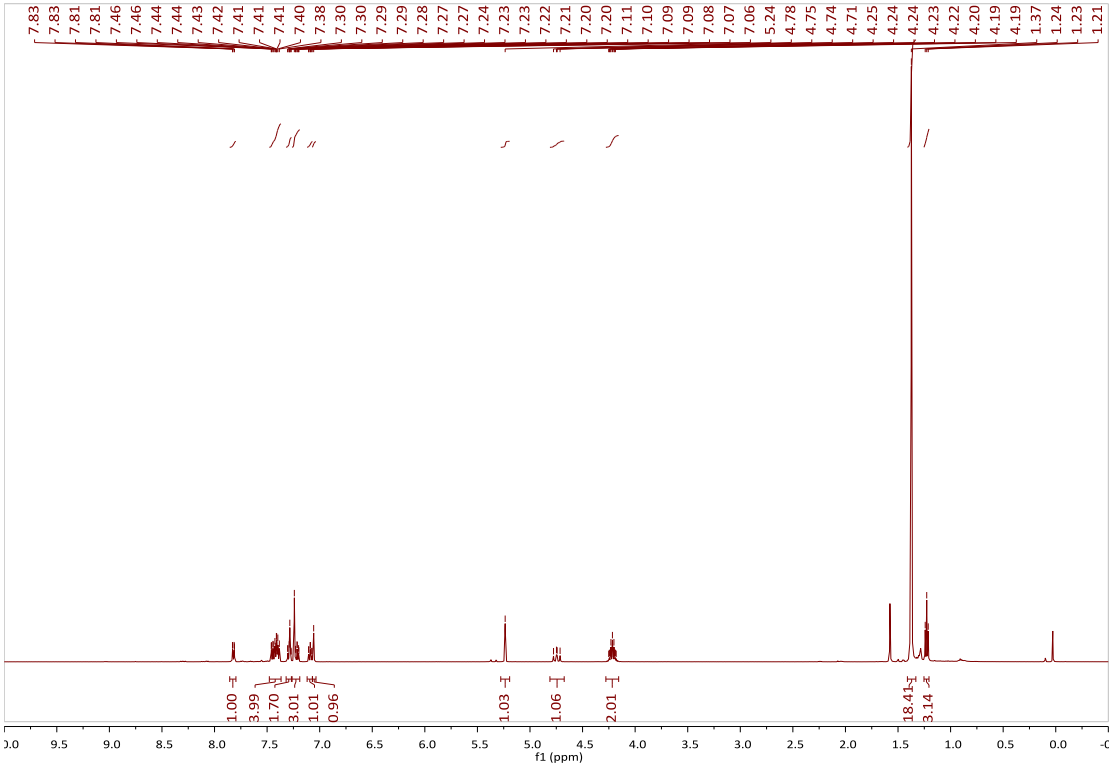
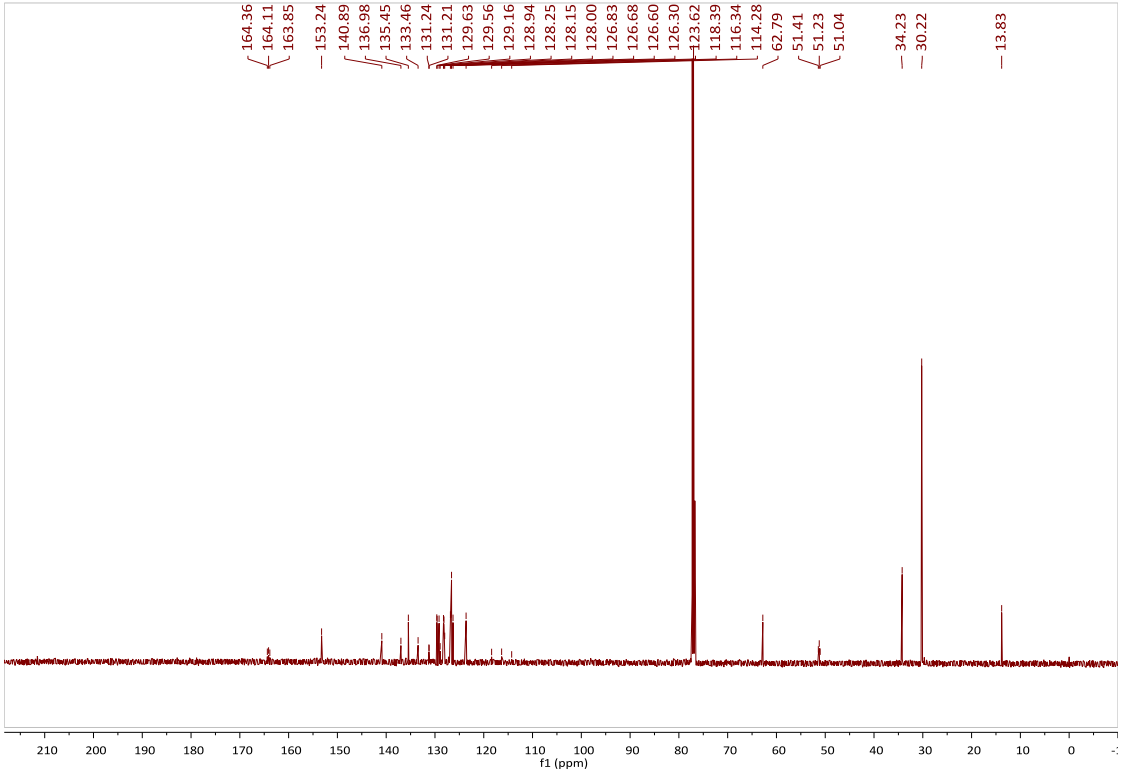
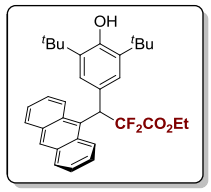
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et


7.83 7.83 7.81 7.81 7.46 7.44 7.44 7.43 7.42 7.41 7.41 7.41 7.40 7.38 7.30 7.30 7.29 7.29 7.28 7.27 7.27 7.24 7.23 7.23 7.22 7.21 7.20 7.20 7.11 7.10 7.09 7.09 7.08 7.07 7.06 5.24 4.78 4.75 4.74 4.71 4.25 4.24 4.24 4.23 4.22 4.20 4.19 4.19 1.37 1.24 1.23 1.21
1.00 3.99 1.70 3.01 1.01 0.96 1.03 1.06 2.01 18.41 3.14
f1 (ppm)


164.36 164.11 163.85 153.24 140.89 136.98 135.45 133.46 131.24 131.21 129.63 129.56 129.16 128.94 128.25 128.15 128.00 126.83 126.68 126.60 126.30 123.62 118.39 116.34 114.28 62.79 51.41 51.23 51.04 34.23 30.22 13.83
f1 (ppm)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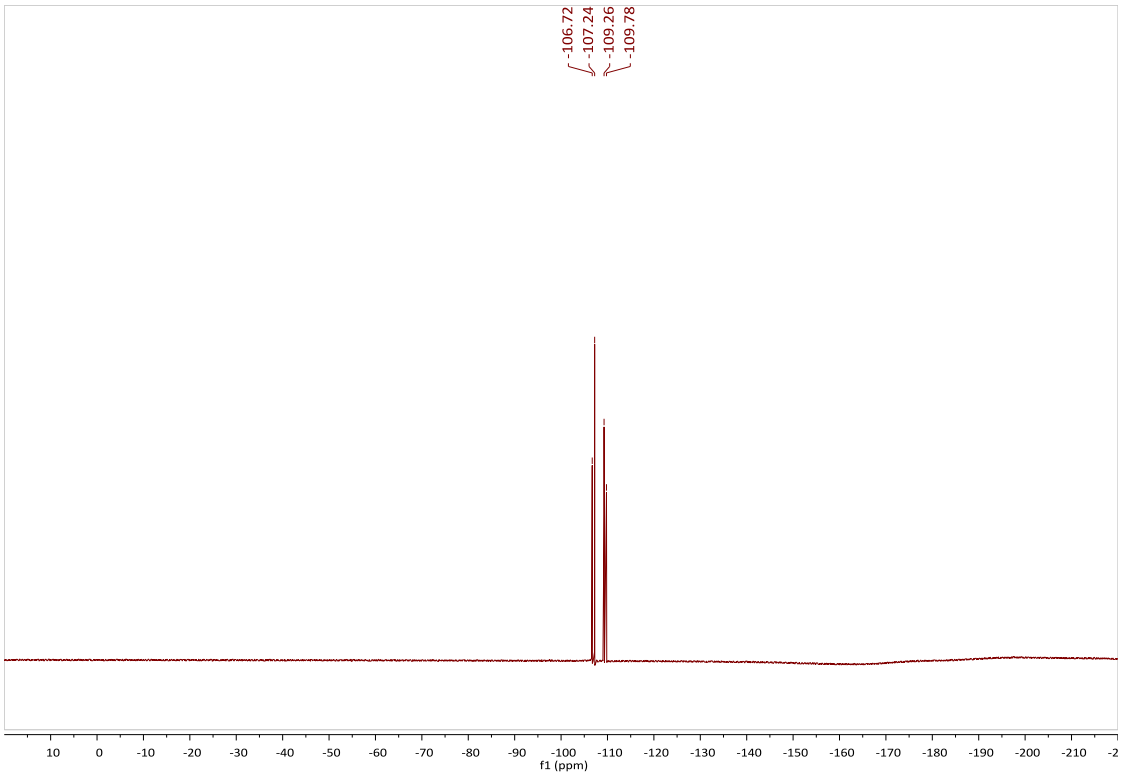
tBu
tBu
CF2CO2Et


-106.72
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-109.78
10
0
-10
-20
-30
-40
-50
-60
-70
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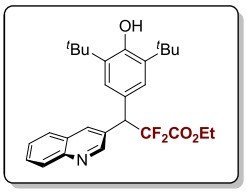
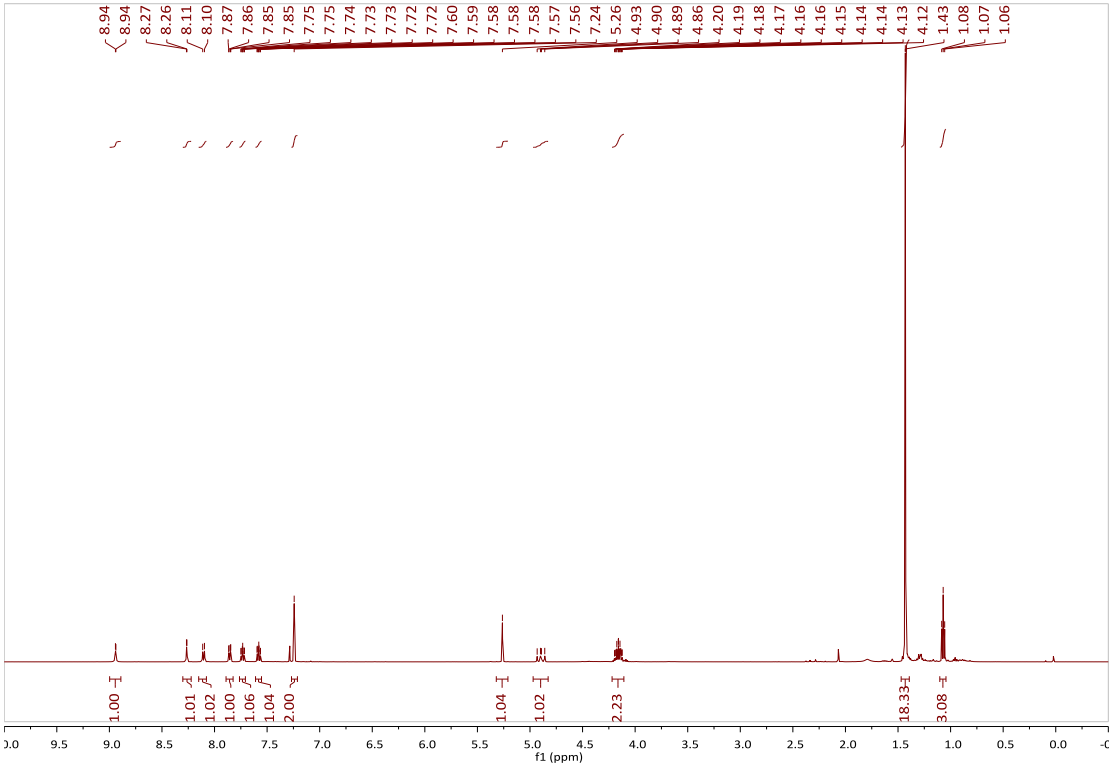
-160
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
N


8.94
8.94
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8.26
8.11
8.10
7.87
7.86
7.85
7.85
7.75
7.75
7.74
7.73
7.73
7.72
7.72
7.60
7.59
7.58
7.58
7.58
7.57
7.56
7.24
5.26
4.93
4.90
4.89
4.86
4.20
4.19
4.18
4.17
4.16
4.16
4.15
4.14
4.14
4.13
4.12
1.43
1.08
1.07
1.06
1.00
1.01
1.02
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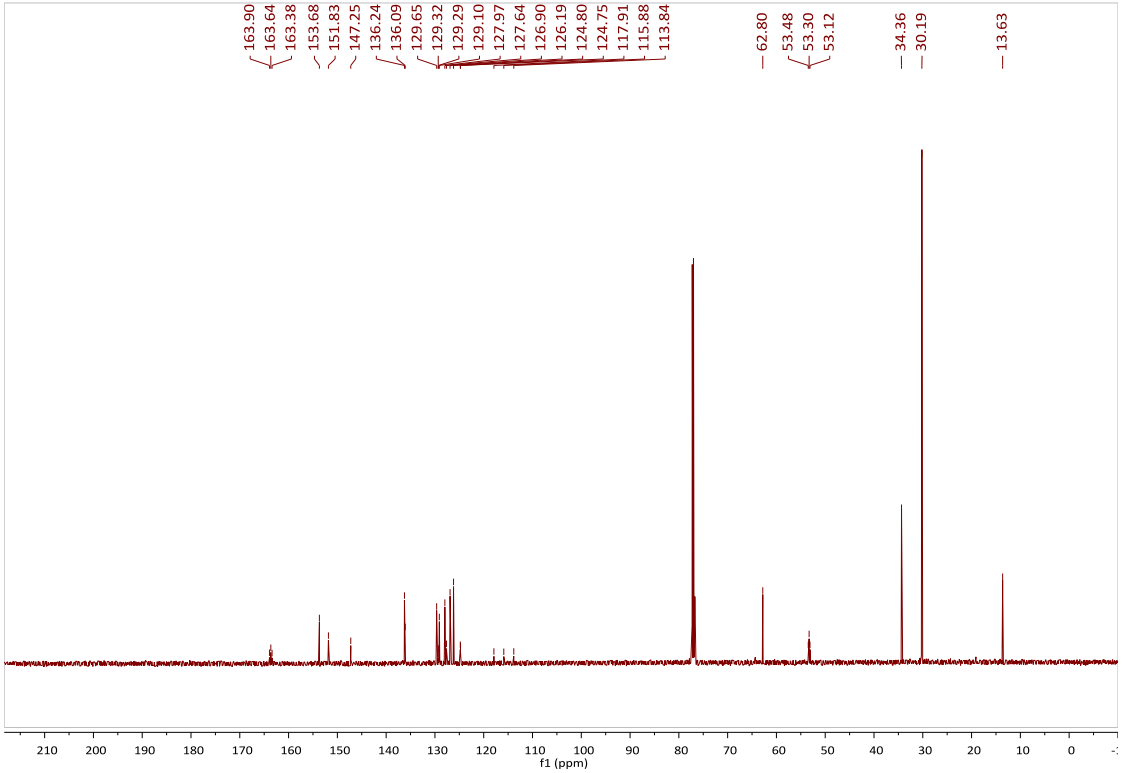
1.06
1.04
2.00
1.04
1.02
2.23
18.33
3.08
f1 (ppm)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151.83
147.25
136.24
136.09
129.65
129.32
129.29
129.10
127.97
127.64
126.90
126.19
124.80
124.75
117.91
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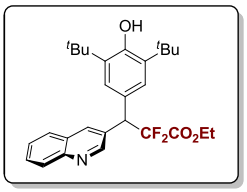
113.84
62.80
53.48
53.30
53.12
34.36
30.19
13.63
f1 (ppm)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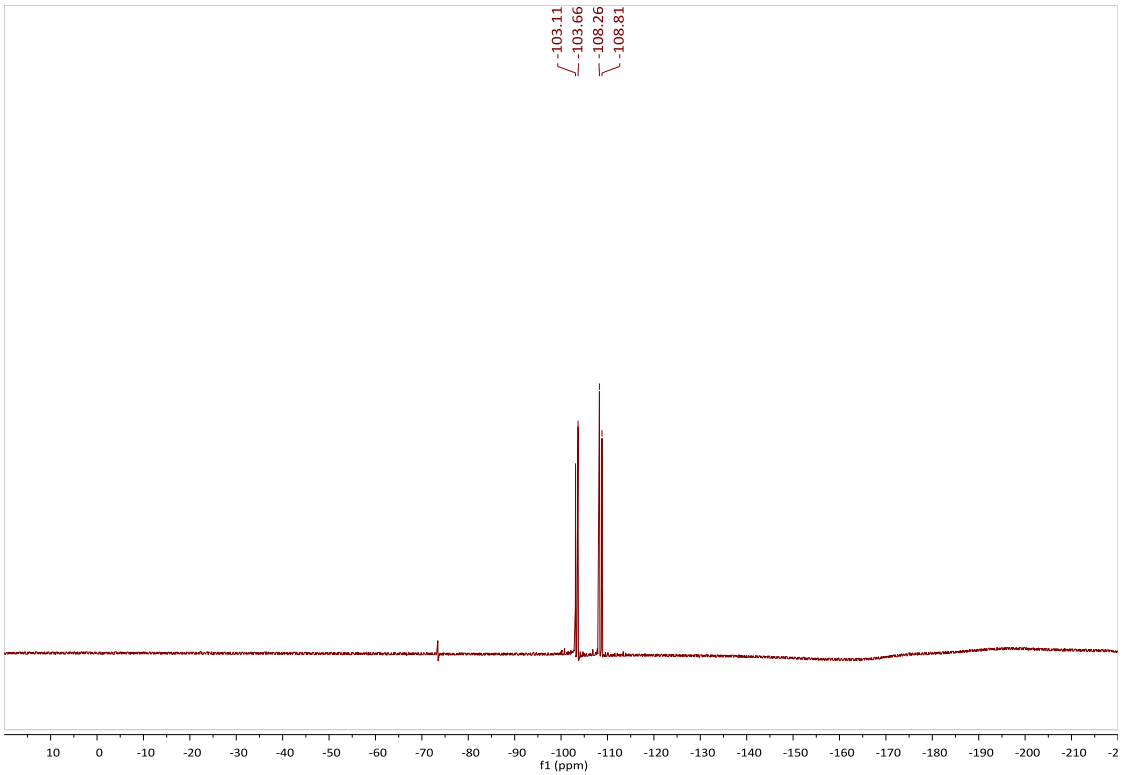
tBu
CF2CO2Et
N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-103.66
-108.26
-108.81
10
0
-10
-20
-30
-40
-50
-60
-70
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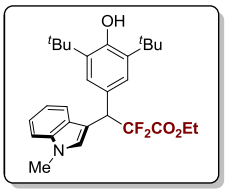
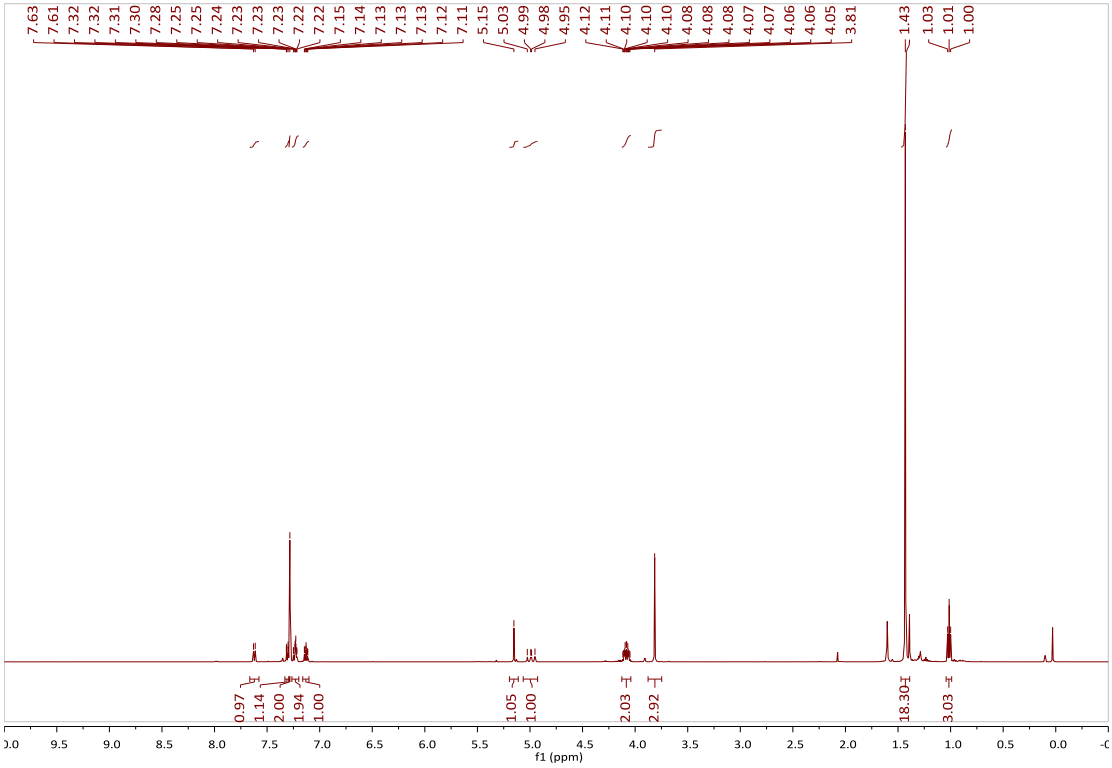
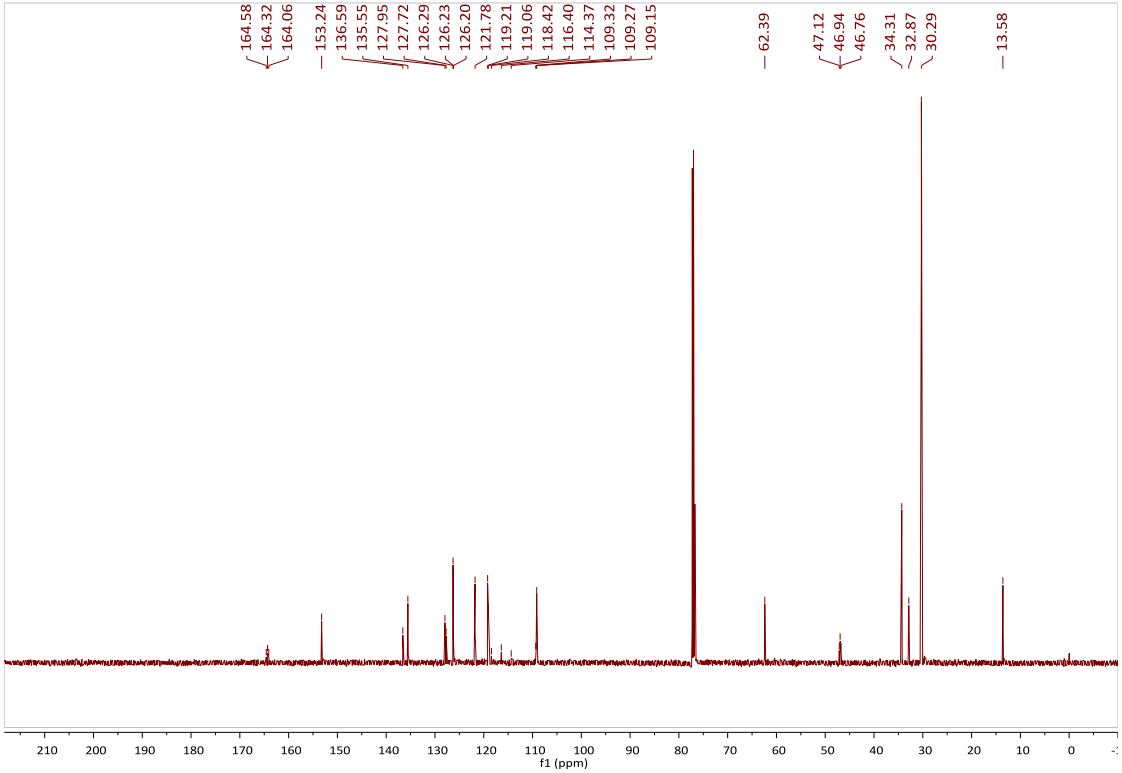
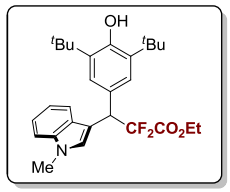
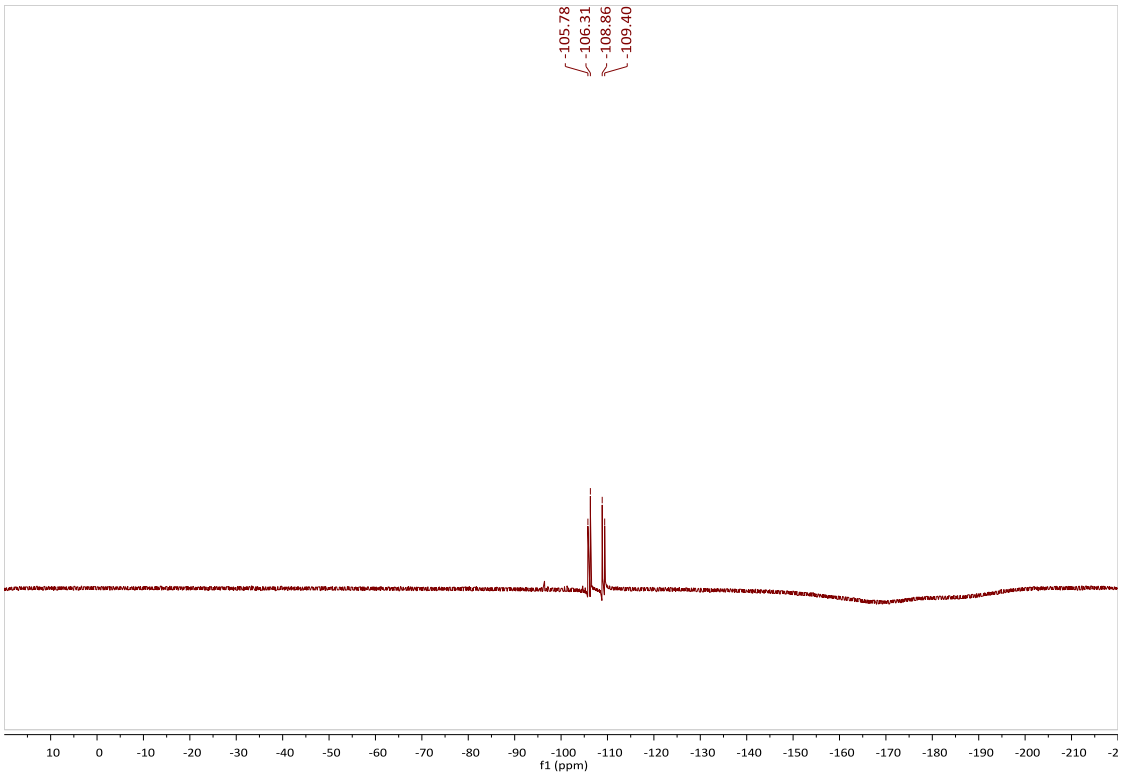
-170
-180
-190
-200
-210
f1 (ppm)

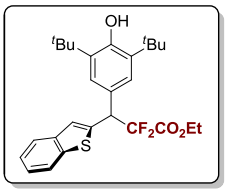

OH
tBu
tBu
CF2CO2Et
N
Me

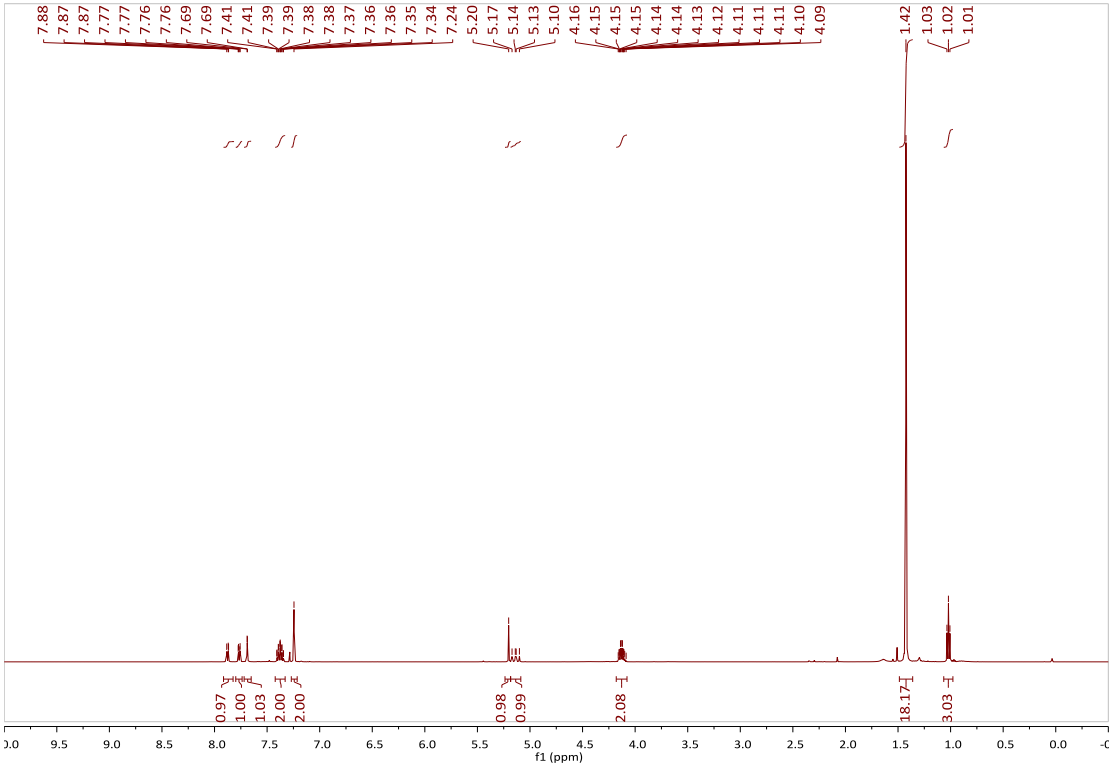

7.63 7.61 7.32 7.32 7.31 7.30 7.28 7.25 7.25 7.24 7.23 7.23 7.23 7.22 7.22 7.15 7.14 7.13 7.13 7.12 7.11
5.15 5.03 4.99 4.98 4.95
4.12 4.11 4.10 4.10 4.10 4.08 4.08 4.08 4.07 4.07 4.06 4.06 4.05 3.81
1.43 1.03 1.01 1.00
0.97 1.14 2.00 1.94 1.00 1.05 1.00 2.03 2.92 18.30 3.03
f1 (ppm)

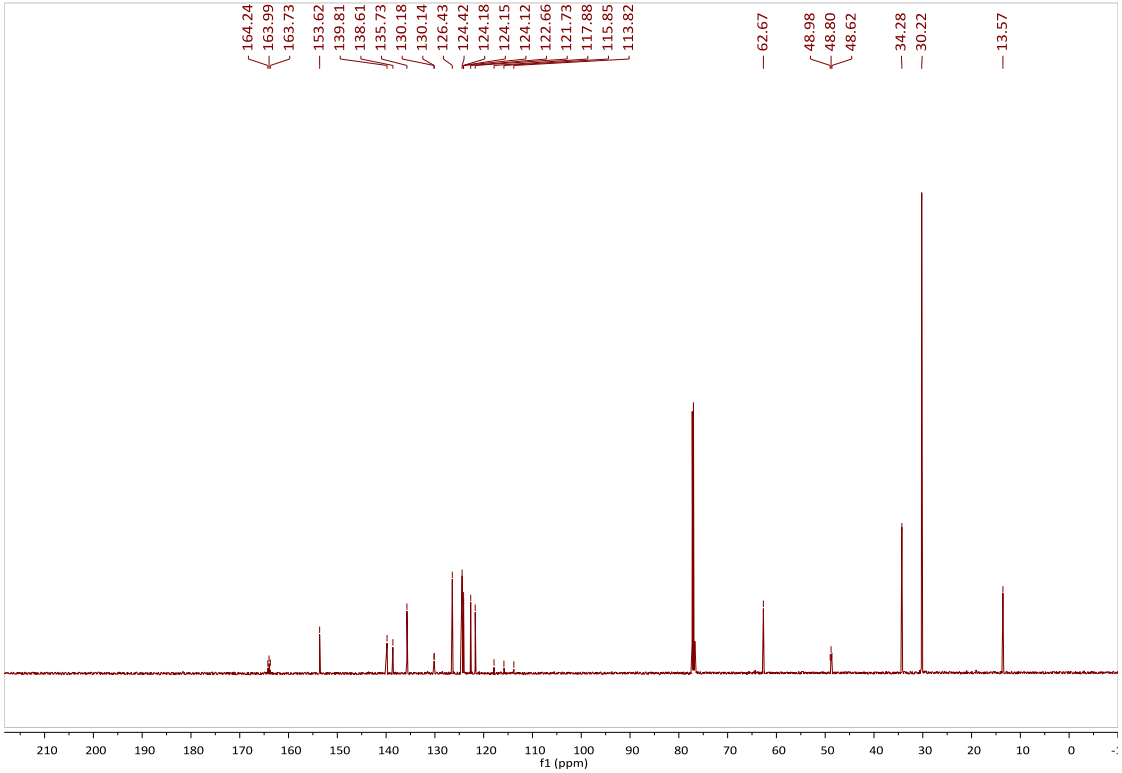

164.58 164.32 164.06 153.24 136.59 135.55 127.95 127.72 126.29 126.23 126.20 121.78 119.21 119.06 118.42 116.40 114.37 109.32 109.27 109.15
62.39
47.12 46.94 46.76 34.31 32.87 30.29
13.58
f1 (ppm)

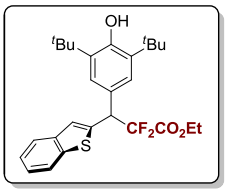

OH
tBu
tBu
CF2CO2Et
N
Me

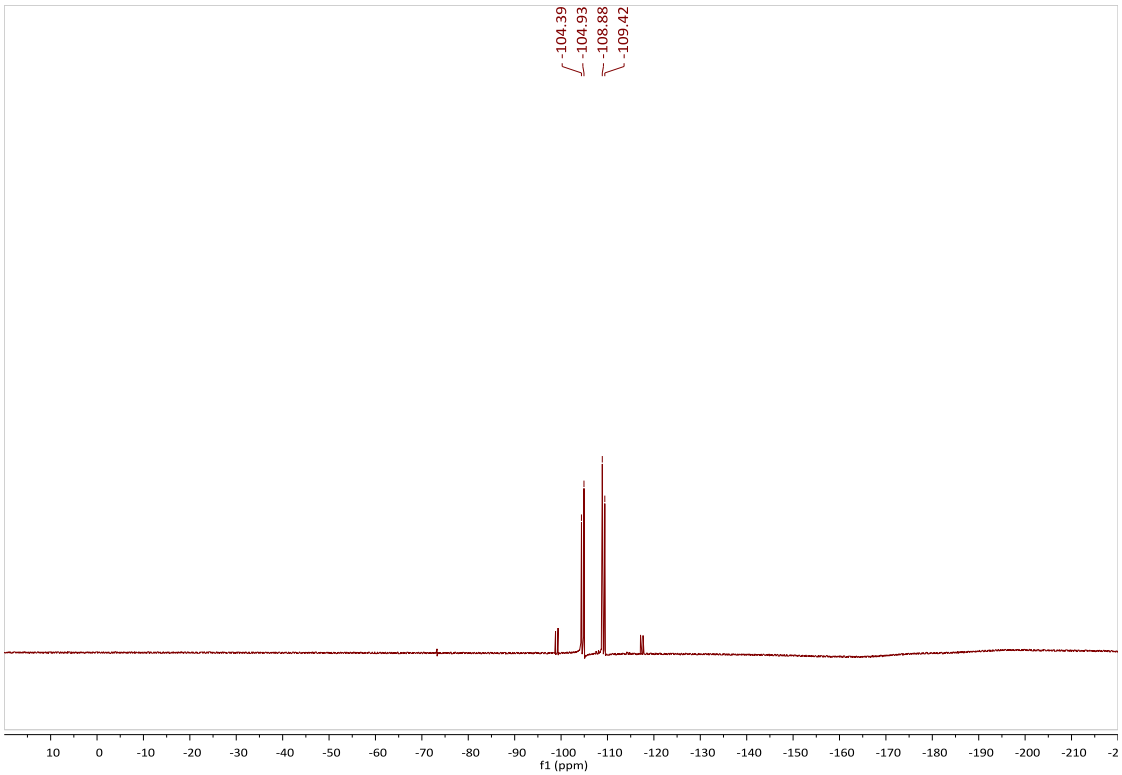

-105.78
-106.31
-108.86
-109.40
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
S


7.88 7.87 7.87 7.77 7.77 7.76 7.76 7.69 7.69 7.41 7.41 7.39 7.39 7.38 7.38 7.37 7.36 7.36 7.35 7.34 7.24 5.20 5.17 5.14 5.13 5.10 4.16 4.15 4.15 4.15 4.14 4.14 4.13 4.12 4.11 4.11 4.11 4.10 4.09 1.42 1.03 1.02 1.01
0.97 1.00 1.03 2.00 2.00 0.98 0.99 2.08 18.17 3.03
f1 (ppm)


164.24 163.99 163.73 153.62 139.81 138.61 135.73 130.18 130.14 126.43 124.42 124.18 124.15 124.12 122.66 121.73 117.88 115.85 113.82 62.67 48.98 48.80 48.62 34.28 30.22 13.57
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
S


-104.39
-104.93
-108.88
-109.42
10
0
-10
-20
-30
-40
-50
-60
-70
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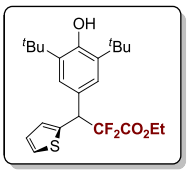
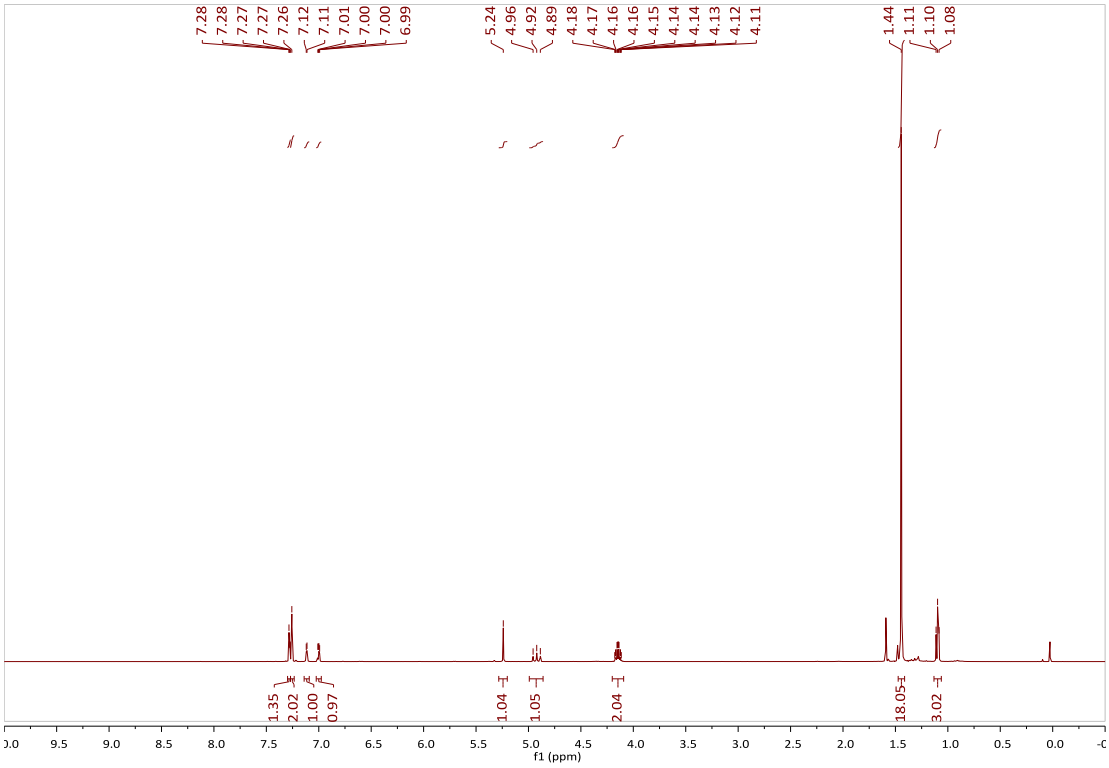
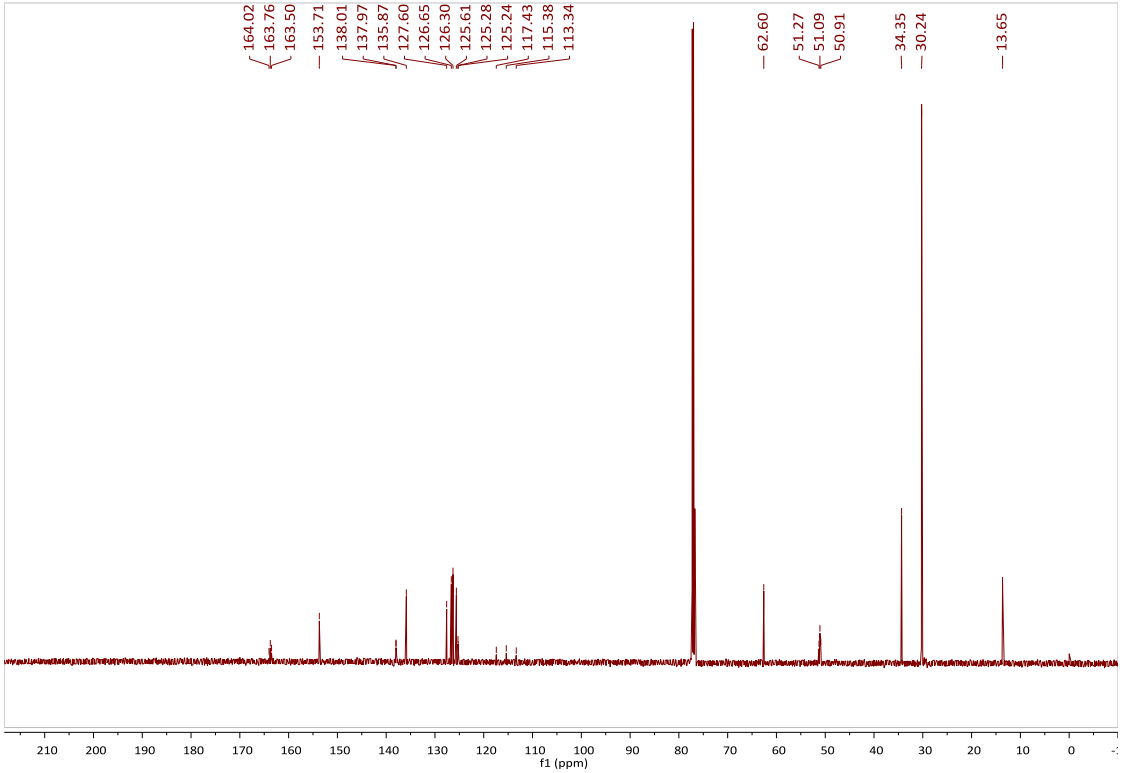
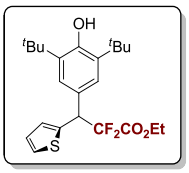
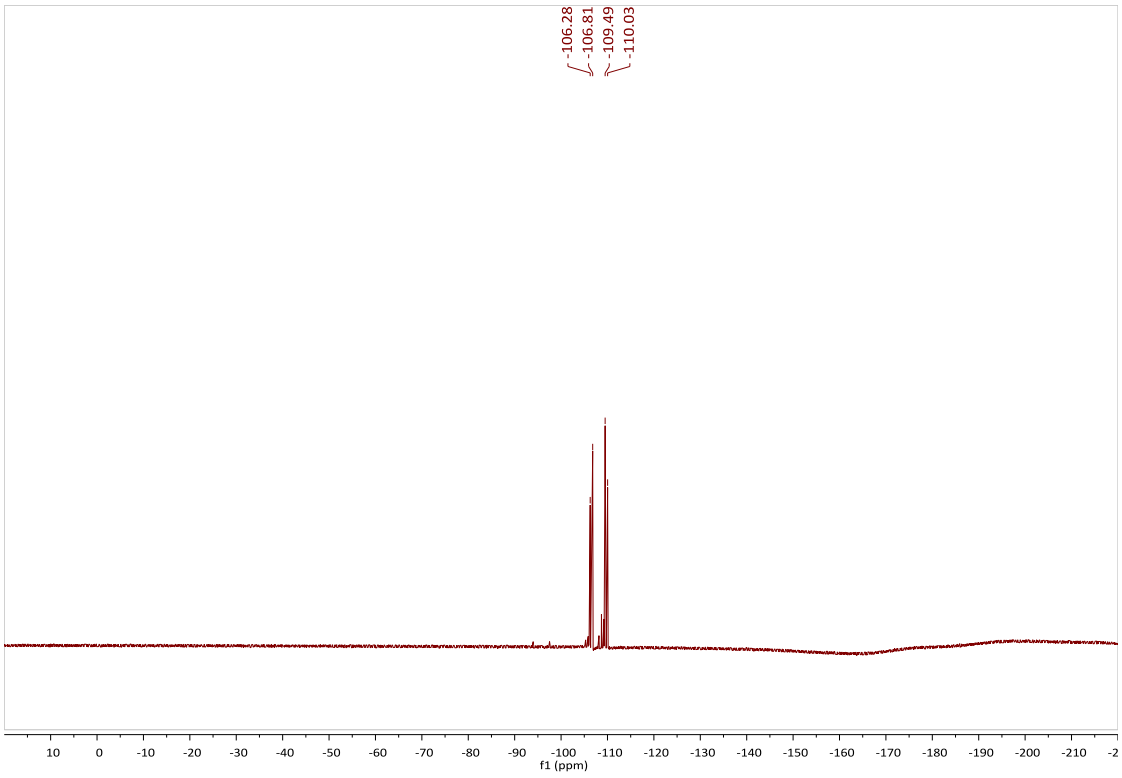
-170
-180
-190
-200
-210
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
S


7.28
7.28
7.27
7.27
7.26
7.12
7.11
7.01
7.00
7.00
6.99
5.24
4.96
4.92
4.89
4.18
4.17
4.16
4.16
4.15
4.14
4.14
4.13
4.12
4.11
1.44
1.11
1.10
1.08
1.35
2.02
1.00
0.97
1.04
1.05
2.04
18.05
3.02
f1 (ppm)


164.02
163.76
163.50
153.71
138.01
137.97
135.87
127.60
126.65
126.30
125.61
125.28
125.24
117.43
115.38
113.34
62.60
51.27
51.09
50.91
34.35
30.24
13.65
f1 (ppm)


OH
tBu
tBu
CF2CO2Et
S


-106.28
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-109.49
-110.03
10
0
-10
-20
-30
-40
-50
-60
-70
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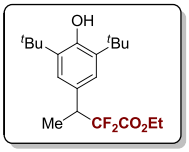
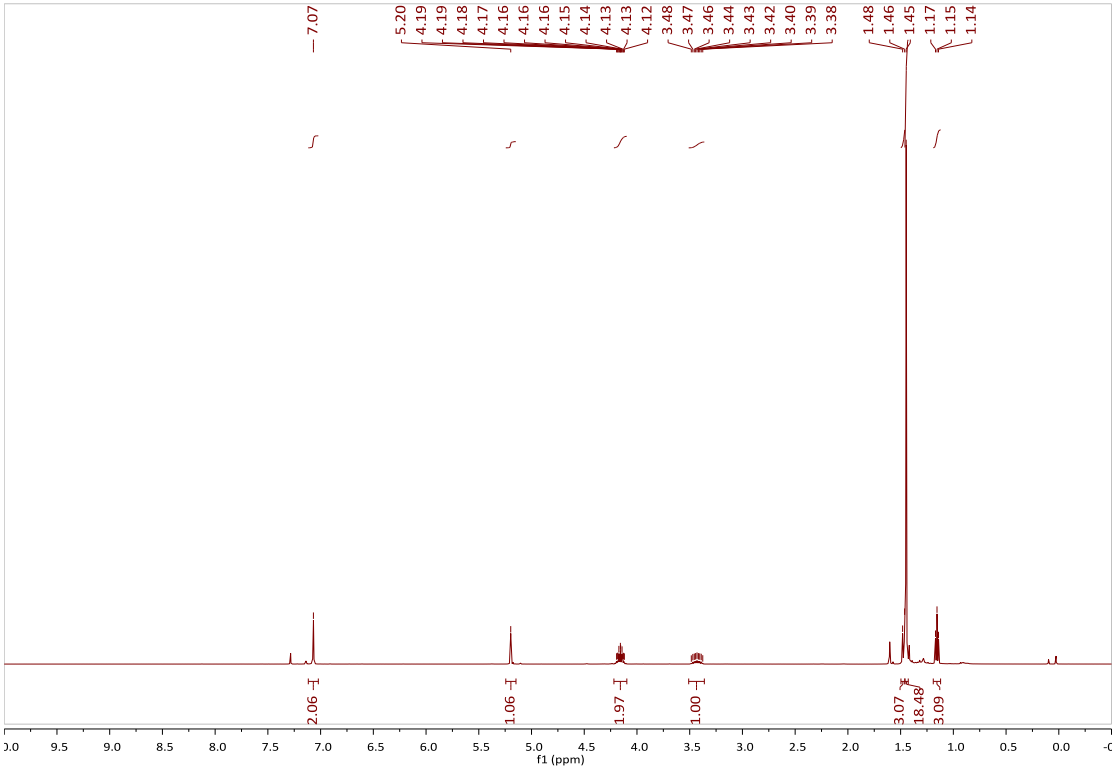
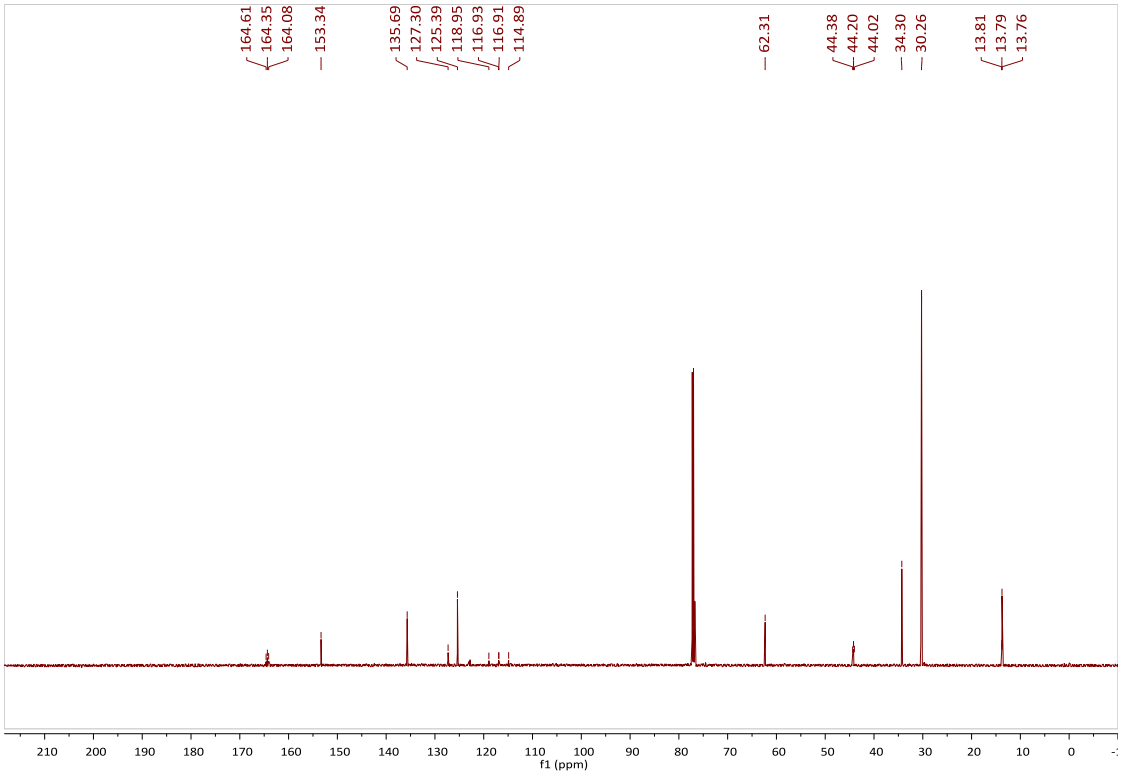
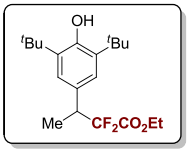
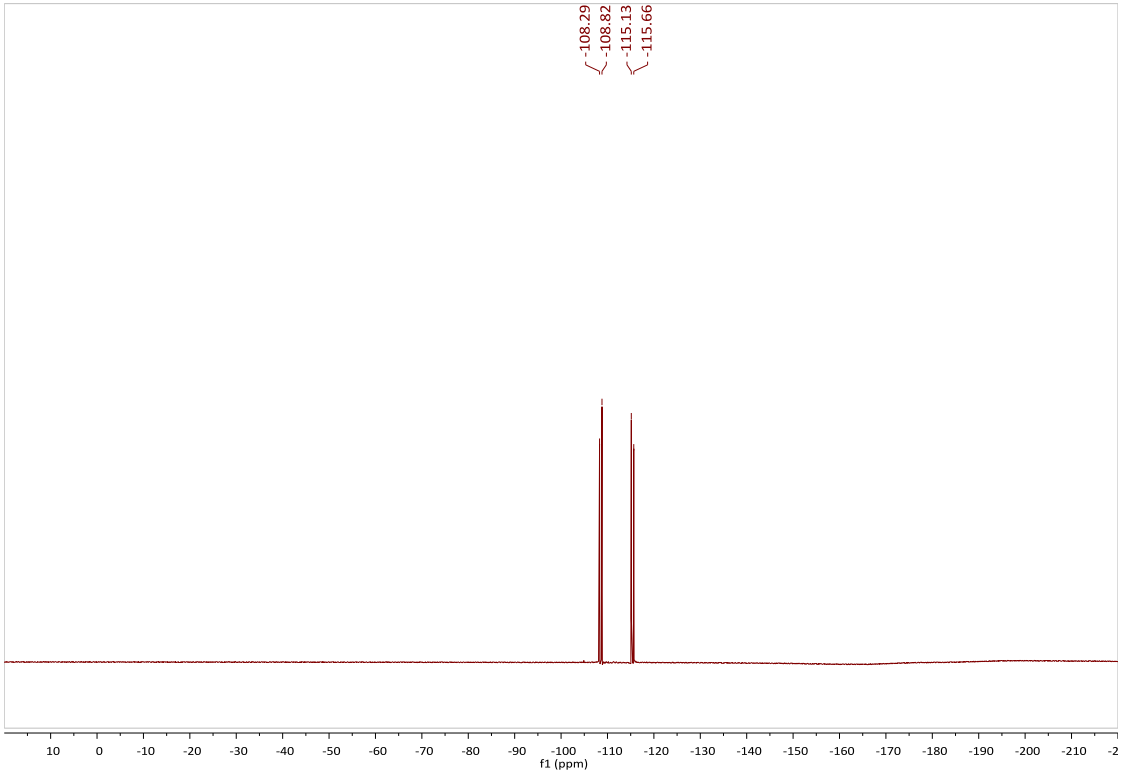
-170
-180
-190
-200
-210
f1 (ppm)

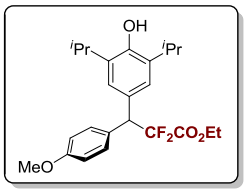

OH
tBu
tBu
Me
CF2CO2Et

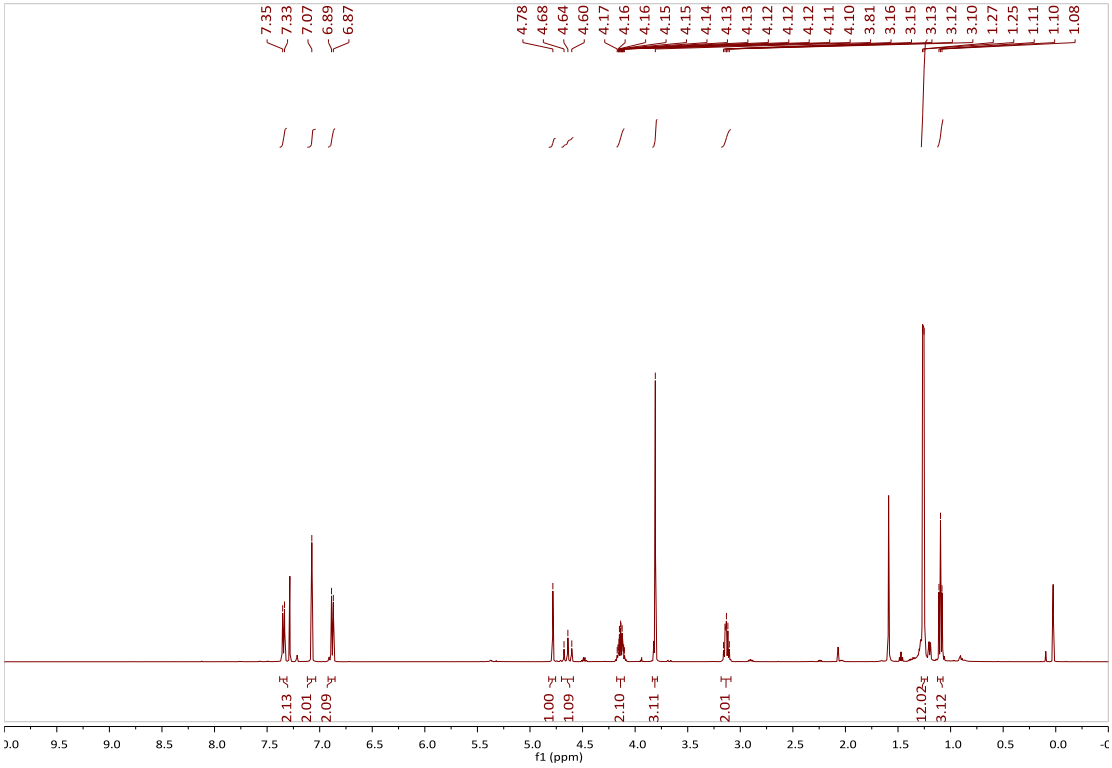

7.07
5.20
4.19
4.19
4.18
4.17
4.16
4.16
4.16
4.15
4.14
4.13
4.13
4.12
3.48
3.47
3.46
3.44
3.43
3.42
3.40
3.39
3.38
1.48
1.46
1.45
1.17
1.15
1.14
2.06
1.06
1.97
1.00
3.07
18.48
3.09
f1 (ppm)


164.61
164.35
164.08
153.34
135.69
127.30
125.39
118.95
116.93
116.91
114.89
62.31
44.38
44.20
44.02
34.30
30.26
13.81
13.79
13.76
f1 (ppm)


OH
tBu
tBu
Me
CF2CO2Et


-108.29
-108.82
-115.13
-115.66
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


OH
iPr
iPr
CF2CO2Et
MeO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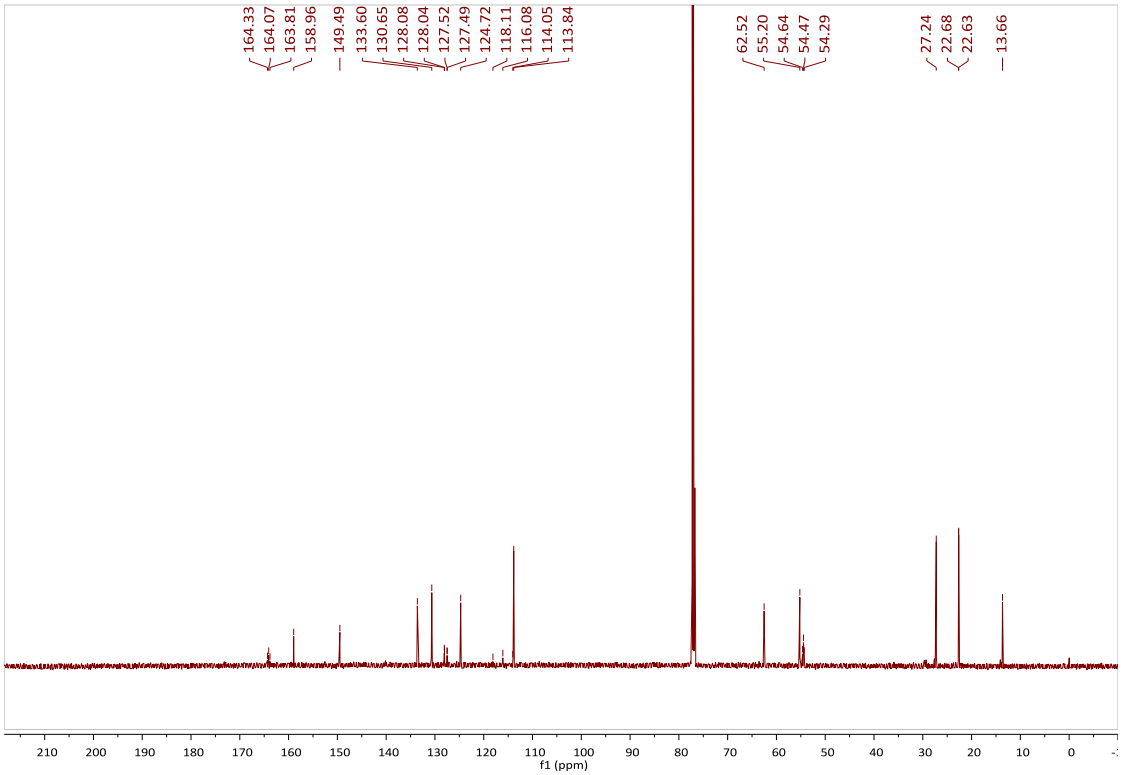
7.33
7.07
6.89
6.87
4.78
4.68
4.64
4.60
4.17
4.16
4.16
4.15
4.15
4.14
4.13
4.13
4.12
4.12
4.12
4.11
4.10
3.81
3.16
3.15
3.13
3.12
3.10
1.27
1.25
1.11
1.10
1.08
2.13
2.01
2.09
1.00
1.09
2.10
3.11
2.01
12.02
3.12
f1 (ppm)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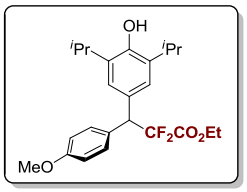
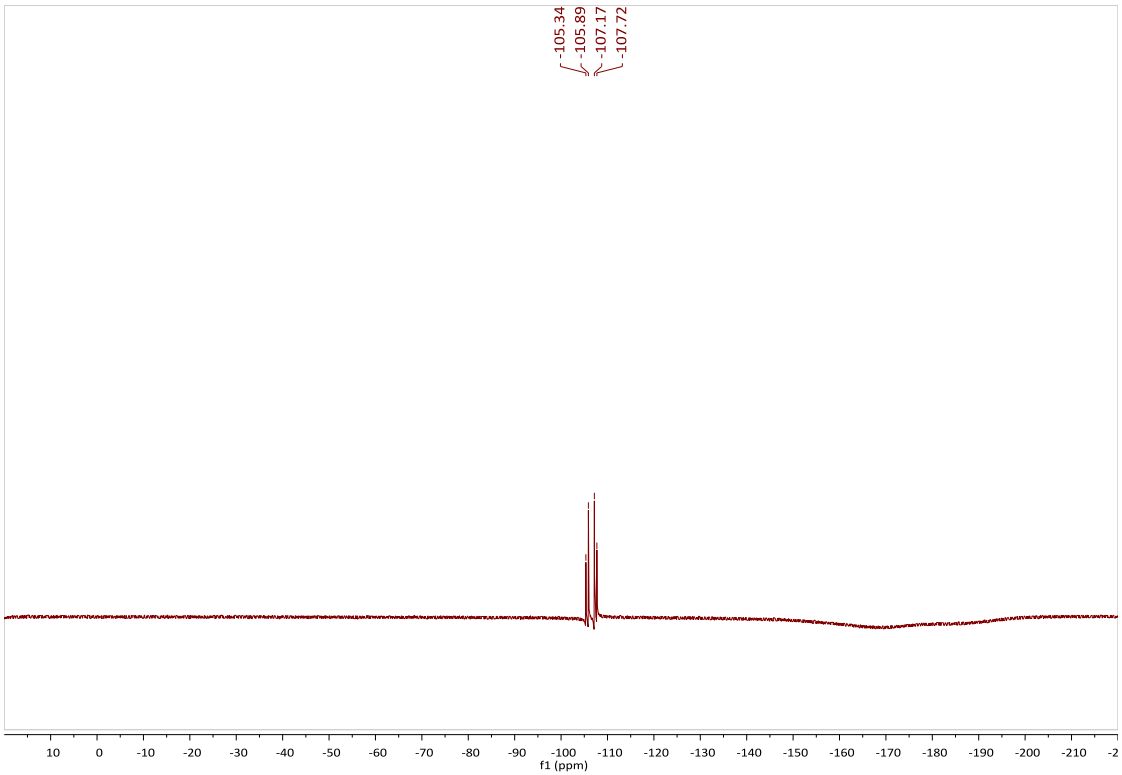
164.07
163.81
158.96
149.49
133.60
130.65
128.08
128.04
127.52
127.49
124.72
118.11
116.08
114.05
113.84
62.52
55.20
54.64
54.47
54.29
27.24
22.68
22.63
13.66
f1 (ppm)


OH
iPr
iPr
CF2CO2Et
MeO


-105.34
-105.89
-107.17
-107.72
10
0
-10
-20
-30
-40
-50
-60
-70
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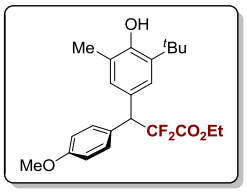
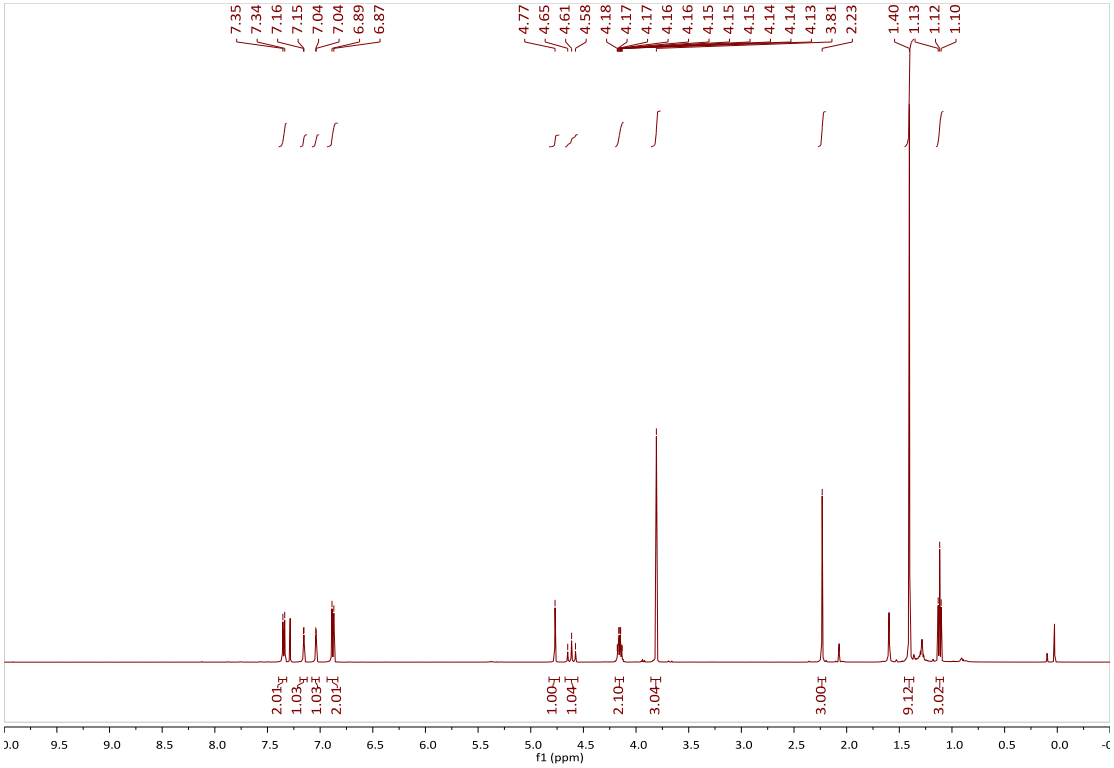
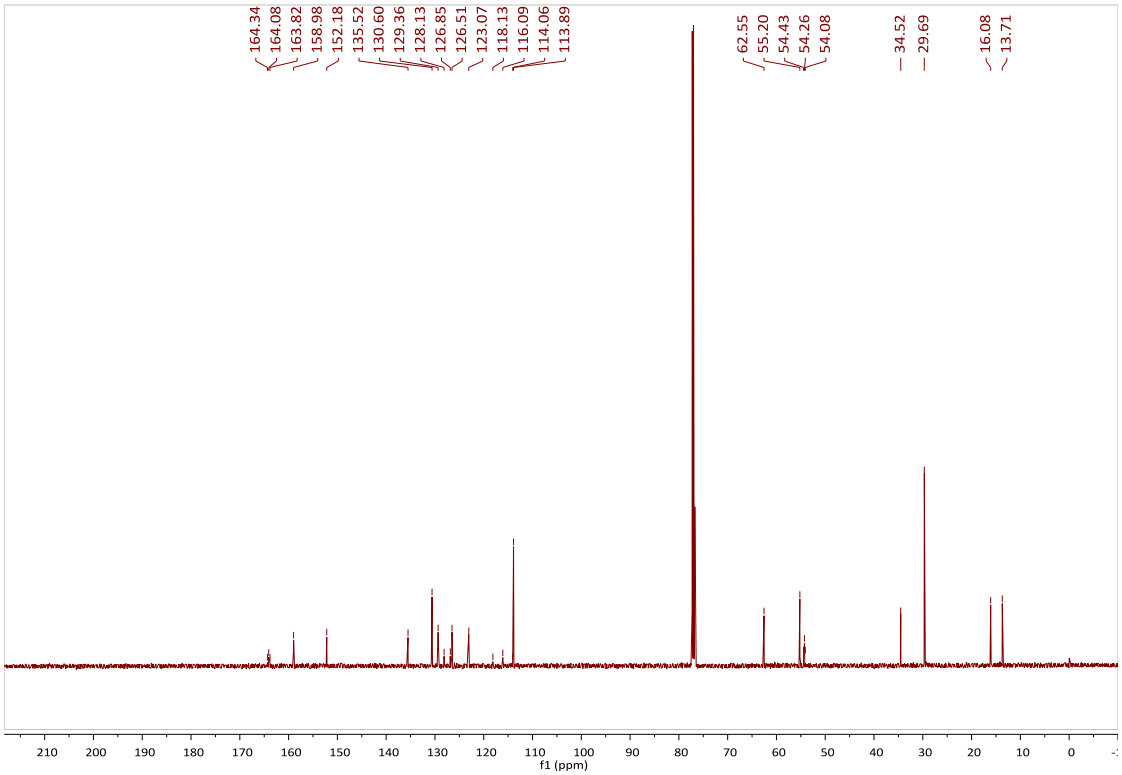
-170
-180
-190
-200
-210
f1 (ppm)


OH
Me
tBu
CF2CO2Et
MeO


7.35
7.34
7.16
7.15
7.04
7.04
6.89
6.87
4.77
4.65
4.61
4.58
4.18
4.17
4.17
4.16
4.16
4.15
4.15
4.15
4.14
4.14
4.13
3.81
2.23
1.40
1.13
1.12
1.10
2.01
1.03
1.03
2.01
1.00
1.04
2.10
3.04
3.00
9.12
3.02
f1 (ppm)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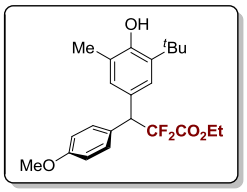
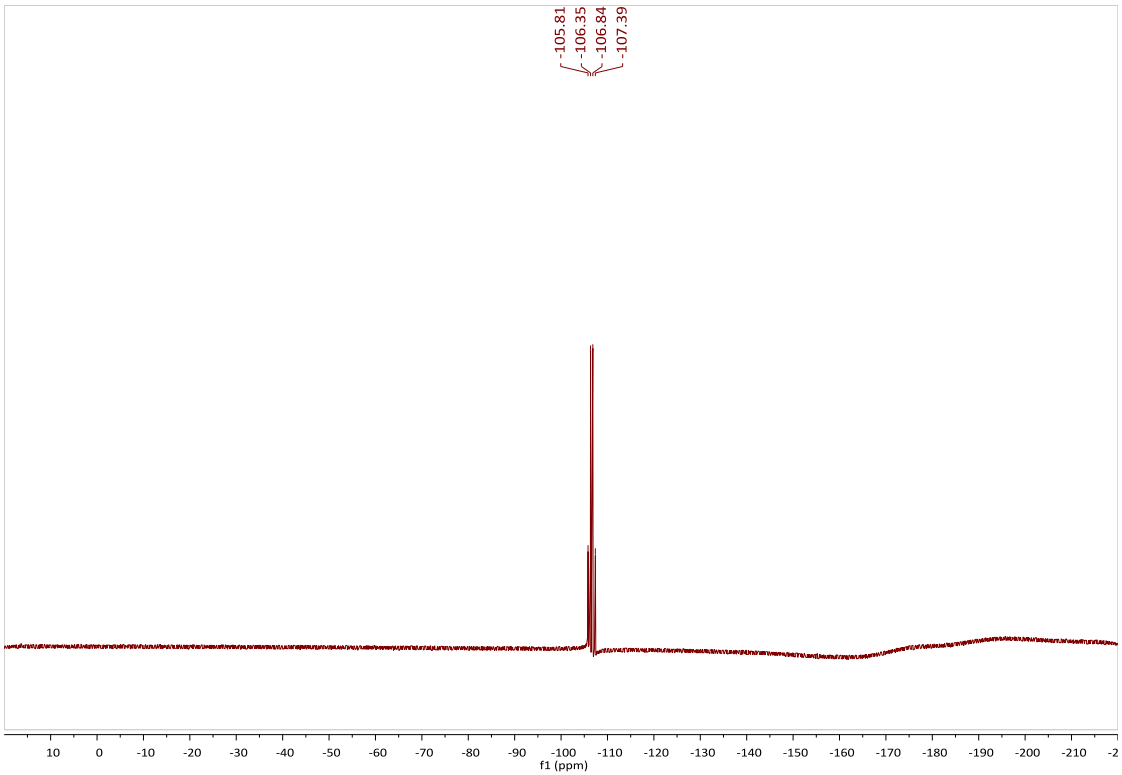
164.08
163.82
158.98
152.18
135.52
130.60
129.36
128.13
126.85
126.51
123.07
118.13
116.09
114.06
113.89
62.55
55.20
54.43
54.26
54.08
34.52
29.69
16.08
13.71
f1 (ppm)


OH
Me
tBu
CF2CO2Et
MeO


-105.81
-106.35
-106.84
-107.39
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)