Electronic Supplementary Material (ESI) for ChemComm.

Supporting Information

One-Pot and selective Intermolecular Aryl- and Heteroaryltrifluoromethylation of Alkenes by Photoredox Catalysis

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I- General information

All reactions were carried out under argon atmosphere in oven dried glassware with magnetic stirring. Reagents were obtained from commercial suppliers and used without further purification.

Analytical thin layer chromatography (TLC) was purchased from Merck KGaA (silica gel 60 F254). Visualization was accomplished by irradiation with a UV light at 254 nm. Flash column chromatography was carried out using kieselgel 35-70 µm particle sized silica gel (200-400 mesh).

Chromatography was performed using silica gel 60 (0.040-0.063 mm) from Merck.

Proton chemical shifts are reported in ppm (δ) relative to tetramethylsilane (TMS) with the solvent resonance employed as the internal standard ($CDCl_3$, δ 7.26 ppm). Data are reported as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet), coupling constants (Hz) and integration. ^{13}C chemical shifts are reported in ppm from tetramethylsilane (TMS) with the solvent resonance as the internal standard ($CDCl_3$, δ 77.0 ppm).

For compounds **5q-5v**, NMR experiments were performed in Acetone d^6. ^{19}F chemical shifts are reported using hexafluoroacetone as the reference standard ($(CD_3)_2CO$, δ-84.6 ppm).

Mass spectra were determined on a Waters XevoQTof spectrometer using an electrospray ionization coupled with a time of flight analyser (ESI-TOF).

Infrared spectra were recorded on an IR spectrometer (Perkin Elmer BX FT-IR), and absorption frequencies were reported in reciprocal centimeters (cm^{-1})

Melting points were recorded on a Reichert apparatus and were uncorrected.

$Ru(bpy)_3(PF_6)_2$ was synthesized according to literature procedure.[1]

Visible light irradiations were performed with a Flexled INSPIRE LED lamp (3.6 W; λ = 465 nm).

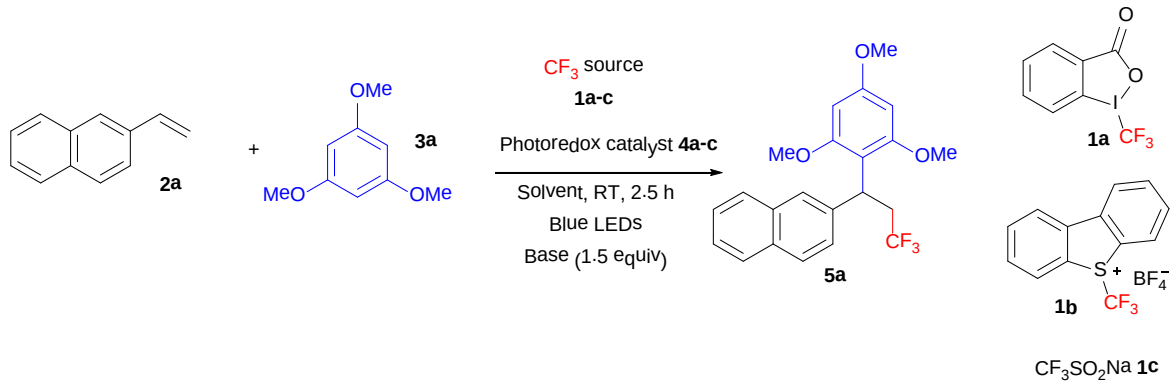
[1] Baghurst, D. R.; Mingos, D. M. P. *J. Chem. Soc., Dalton Trans.* **1992**, 1151.

II- General procedure

Typical procedure for aryl- and heteroaryltrifluoromethylation of alkenes.

A test tube was charged with the corresponding styrene **2** (0.1 mmol), Umemoto's reagent **1b** (51.0 mg, 0.15 mmol, 1.5 equiv), $Ru(bpy)_3(PF_6)_2$ **4a** (4.4 mg, 0.005 mmol, 0.05 equiv).Then, it was dissolved in 2 mL of DCM and the corresponding arene or heteroarene **3** (0.3 mmol, 3 equiv) was added. The solution was then irradiated with blue LEDs at RT for 2.5 h. The solvent was removed *in vacuo*. The residue was purified by flash chromatography on silica gel (Hept/AcOEt) to afford the corresponding pure trifluoromethylated product.

III- Optimisation of reaction conditions

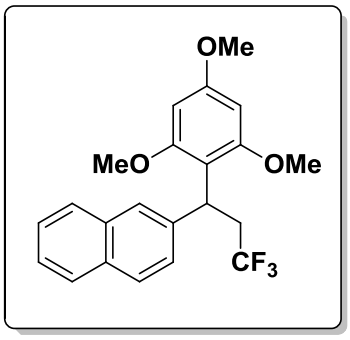


Entry	**1**	Solvent	Base	Photoredox catalyst **4**	Yield (%)[b]
1	**1b**	CH_2Cl_2	-	$Ru(bpy)_3(PF_6)_2$ **4a**	61
2	**1a**	CH_2Cl_2	-	**4a**	-
3	**1c**	CH_2Cl_2	-	**4a**	-
4	**1b**	Acetone	-	**4a**	27
5	**1b**	MeCN	-	**4a**	50
6	**1b**	$CHCl_3$	-	**4a**	19
7	**1b**	DCE	-	**4a**	49
8	**1b**	CH_2Cl_2	-	$Ru(bpy)_3Cl_2{\cdot}6H_2O$ **4b**	30
9	**1b**	CH_2Cl_2	-	$Ir(ppy)_2(dtbbpy)(PF_6)$ **4c**	44
10[c]	**1b**	CH_2Cl_2	-	**4a**	46
11[d]	**1b**	CH_2Cl_2	-	**4a**	44
12[e]	**1b**	CH_2Cl_2	-	**4a**	69
13	**1b**	CH_2Cl_2	Na_2HPO_4	**4a**	65
14	**1b**	CH_2Cl_2	K_2CO_3	**4a**	69

[a] General conditions: **2a** (0.10 mmol), CF_3 source **1** (1.2 equiv), **3a** (3 equiv), **4** (0.05 equiv) irradiated at RT for 2.5 h. [b] Yields referred to chromatographically pure product. [c] Reaction performed with 1 mol% of **4a**. [d] Reaction performed with 1.5 equiv of **3a**. [e] Reaction performed with 1.5 equiv of **1b**.

IV- Experimental data of compounds 5a-5w

2-(3,3,3-trifluoro-1-(2,4,6-trimethoxyphenyl)propyl)naphthalene 5a



m = 27.0 mg, 69 % yield, colourless oil.

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.82-7.68 (m, 4H), 7.51-7.38 (m, 3H), 6.16 (s, 2H), 5.18 (dd, 8.2 and 5.5 Hz, 1H), 3.72-3.68 (m, 9H), 3.36-3.21 (m, 1H), 3.18-3.03 (m, 1H).

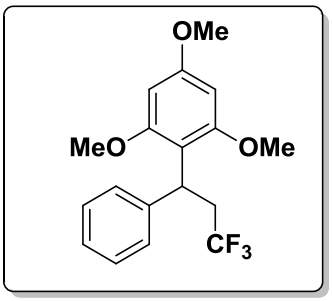
^{13}C NMR (125 MHz, $CDCl_3$) δ (ppm): 160.1 (2XC), 158.9, 140.9, 133.3, 132.0, 127.8, 127.4, 126.7, 125.7, 125.5, 125.3 (q, *J* = 278.5 Hz), 125.2, 111.8, 91.3 (2xC), 55.8 (2xC), 55.2, 36.4 (q, *J* = 27.4 Hz), 33.4.

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -64.63 (t, *J* = 10.3 Hz)

IR (neat) ν (cm^{-1}): 2970, 2840, 1590, 1456, 1366, 1255, 1204, 1114, 1087, 951, 813, 736.

EI-HRMS (positive ion) $C_{22}H_{22}F_3O_3$ $[M+H]^+$: requires 391.1516**;** found 391.1526.

1,3,5-trimethoxy-2-(3,3,3-trifluoro-1-phenylpropyl)benzene 5b



m = 23.8 mg, 70% yield, white solid.

m.p. 56-58°C.

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm): 7.34 (d, *J* = 7.6 Hz, 2H), 7.25 (dd, *J* = 7.6 Hz and 7.6 Hz, 2H), 7.16 (t, *J* = 7.6 Hz, 1H), 6.14 (s, 2H), 5.01 (dd, *J* = 8.5 Hz and 5.8 Hz, 1H), 3.81 (s, 3H), 3.80 (s, 6H), 3.22-3.15 (m, 1H), 3.00-2.94 (m, 1H).

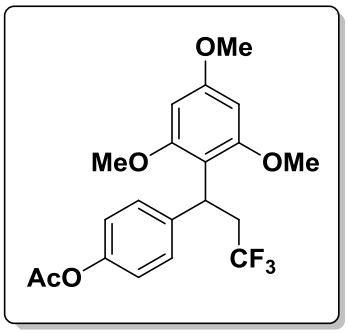
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): 160.0 (2XC), 158.7, 143.5, 127.9 (2XC), 127.5 (2XC), 127.3 (q, *J* = 278.6 Hz), 125.8, 111.9, 91.2 (2XC), 55.7 (2XC), 55.2, 36.5 (q, *J* = 26.9 Hz), 33.2 (q, *J* = 3.5 Hz).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -64.77 (t, *J* = 10.3 Hz).

IR (neat) ν (cm^{-1}): 2967, 2841, 1591, 1454, 1204, 1117, 1063, 811, 699.

EI-HRMS (positive ion) $C_{18}H_{20}F_3O_3$ $[M+H]^+$: requires 341.1365; found 341.1373.

4-(3,3,3-trifluoro-1-(2,4,6-trimethoxyphenyl)propyl)phenyl acetate 5c



m = 24.6 mg, 62 % yield, colourless oil.

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.34 (d, *J* = 8.7 Hz, 2H), 6.96 (d, *J* = 8.7 Hz, 2H), 6.13 (s, 2H), 4.99 (dd, *J* = 8.6 and 5.7 Hz, 1H), 3.80 (s, 3H), 3.79 (s, 6H), 3.26-3.06 (m, 1H), 3.02-2.82 (m, 1H), 2.28 (s, 3H).

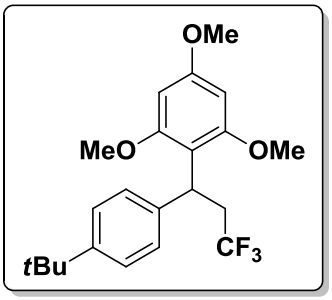
^{13}C NMR (125 MHz, $CDCl_3$) δ (ppm): 169.6, 160.1 (2XC), 158.7, 148.7, 141.0, 128.6 (2XC), 127.2 (q, *J* = 277.7 Hz), 120.8 (2XC), 111.5, 91.2 (2XC), 55.7 (2XC), 55.2, 36.6 (q, *J* = 27.4 Hz), 36.6, 32.8, 21.1.

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -64.80 (t, *J* = 10.3 Hz).

IR (neat) ν (cm^{-1}): 2945, 1591, 1370, 1257, 1201, 1085, 910, 813.

EI-HRMS (positive ion) $C_{20}H_{22}F_3O_5$ $[M+H]^+$: requires 399.1414**;** found 399.1406.

2-(1-(4-(tert-butyl)phenyl)-3,3,3-trifluoropropyl)-1,3,5-trimethoxybenzene 5d



m = 20.3 mg, 51% yield, colourless oil.

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.27-7.24 (m, 4H), 6.14 (s, 2H), 4.98 (dd, *J* = 9.2 and 5.5 Hz, 1H), 3.80 (s, 3H), 3.79 (s, 6H), 3.34-3.11 (m, 1H), 3.00-2.78 (m, 1H), 1.30 (s, 9H).

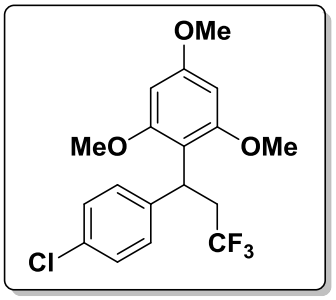
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): 159.9 (2XC), 158.8, 148.5, 140.4, 127.4 (q, *J* = 276.8 Hz), 127.2 (2XC), 124.9 (2XC), 111.9, 91.2 (2XC), 55.7 (2XC), 55.2, 36.7 (q, *J* = 26.6 Hz), 34.3, 32.9, 31.4 (3XC).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -64.82 (t, *J* = 10.3 Hz).

IR (neat) ν (cm^{-1}): 2970, 2839, 1591, 1456, 1365, 1225, 1204, 1117, 1087, 908, 813, 731.

EI-HRMS (positive ion) $C_{22}H_{28}F_3O_3$ $[M+H]^+$: requires 397.1985; found 397.1982.

2-(1-(4-chlorophenyl)-3,3,3-trifluoropropyl)-1,3,5-trimethoxybenzene 5e



m = 20.6 mg, 55% yield, colourless oil.

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm): 7.27 (d, *J* = 8.5 Hz, 2H), 7.21 (d, *J* = 8.5 Hz, 2H), 6.13 (s, 2H), 4.96 (t, *J* = 7.0 Hz, 1H), 3.80 (s, 3H), 3.80 (s, 6H), 3.14-3.05 (m, 1H), 3.01-2.92 (m, 1H).

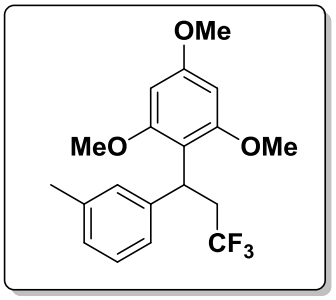
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): 160.2 (2XC), 159.1, 142.0, 131.5, 128.9 (2XC), 128.0 (2XC), 127.5 (q, *J* = 278.6 Hz), 111.4, 91.2 (2XC), 55.7 (2XC), 55.2, 36.4 (q, *J* = 26.9 Hz), 32.7 (q, *J* = 3.5 Hz).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -64.79 (t, *J* = 10.3 Hz).

IR (neat) ν (cm^{-1}): 2941, 2840, 1590, 1456, 1204, 1150, 1117, 1086, 812.

EI-HRMS (positive ion) $C_{18}H_{19}F_3ClO_3$ $[M+H]^+$: requires 375.0975; found 375.0972.

1,3,5-trimethoxy-2-(3,3,3-trifluoro-1-(m-tolyl)propyl)benzene 5f



m = 21.6 mg, 61% yield, white solid.

m.p. 46-48°C.

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm): 7.15-7.13 (m, 3H), 6.98-6.93 (m, 1H), 6.14 (s, 2H), 4.97 (dd, *J* = 8.9 Hz and 5.5 Hz, 1H), 3.81 (s, 3H), 3.80 (s, 6H), 3.23-3.16 (m, 1H), 2.97-2.90 (m, 1H), 2.31 (s, 3H).

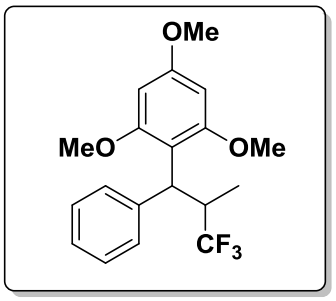
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): 159.9 (2XC), 158.8, 143.4, 137.3, 128.4, 127.8, 127.3 (q, *J* = 278.6 Hz), 126.6, 124.5, 111.9, 91.3 (2XC), 55.7 (2XC), 55.2, 36.5 (q, *J* = 26.9 Hz), 33.1 (q, *J* = 2.8 Hz), 21.6.

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -64.79 (t, *J* = 10.3 Hz).

IR (neat) ν (cm^{-1}): 2970, 2901, 1590, 1455, 1222, 1115, 1084, 1064, 812, 699.

EI-HRMS (positive ion) $C_{19}H_{22}F_3O_3$ $[M+H]^+$: requires 355.1521; found 355.1523.

1-3-5-trimethoxy-2-(3,3,3-trifluoro-2-methyl-1-phenylpropyl)benzene 5g



m = 23.8 mg, 67% yield, orange oil, mixture of 2 diastereomers, dr = 70:30

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.50-7.40 (m, 2H), 7.27-7.07 (m, 3H), 6.09 (s, 2H), 4.73 (d, *J* = 11.5 Hz, 1H, dia 1), 4.66 (d, *J*= 11.5 Hz, 1H, dia 2), 3.86-3.82 (m, 6H), 3.77 (s, 3H, dia 1), 3.76 (s, 3H, dia 2), 3.75-3.55 (m, 1H), 1.04 (d, J=6.8 Hz, 3H, dia 2), 0.98 (d, *J* = 6.8 Hz, 3H, dia 1).

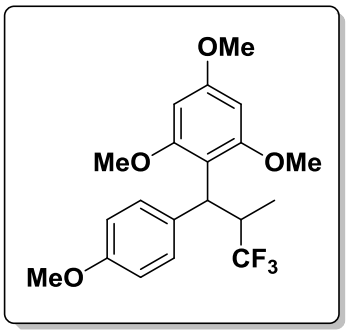
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): 159.8 (2XC), 159.6, 143.7 (dia 1), 142.6 (dia 2), 128.7 (dia 2, 2XC), 128.1 (dia 1, 2XC), 128.0 (dia 2, 2XC), 127.7 (dia 1, 2XC), 125.9 (dia 2), 125.8 (dia 1), 112.2 (dia 2), 111.6 (dia 1), 91.2 (dia 2, 2XC), 91.0 (dia 1, 2XC), 55.7 (dia 1, 2XC), 55.3 (dia 2, 2XC), 55.2 (dia 1), 55.1 (dia 2), 41.3 (dia 2), 40.8 (dia 1), 39.0 (q, *J* = 24.2 Hz, dia 1), 38.0 (q, *J* = 24.2 Hz, dia 2), 13.8 (dia 2), 12.9 (dia 1).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -69.07 (d, *J* = 8.2 Hz, dia 1), -70.13 (d, *J* = 8.2 Hz, dia 2).

IR (neat) ν (cm^{-1}): 2942, 2841, 1591, 1455, 1224, 1151, 1109, 1068, 813, 734, 698.

EI-HRMS (positive ion) $C_{19}H_{22}F_3O_3$ $[M+H]^+$: requires 355.1516; found 355. 1517.

1,3,5-trimethoxy-2-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzene 5h



m = 29.7 mg, 77 % yield, colourless oil, mixture of 2 diastereomers, dr = 90:10

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.40 (d, *J* = 8.8 Hz, 2H, dia 1), 7.36 (d, *J* = 8.7 Hz, 2H, dia 2), 6.76 (d, *J* = 8.7 Hz, 2H), 6.11 (s, 2H), 4.69 (d, *J* = 11.5 Hz, 1H, dia 1), 4.62 (d, *J* = 11.0 Hz, 1H, dia 2), 3.87-3.83 (m, 6H), 3.80-3.75 (m, 6H), 3.72-3.59 (m, 1H), 1.04 (d, *J* = 6.9 Hz, 3H, dia 2), 0.98 (d, *J* = 6.8 Hz, 3H, dia 1).

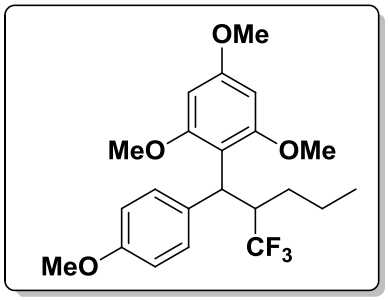
^{13}C NMR (125 MHz, $CDCl_3$) δ (ppm): 159.7 (2XC), 157.6 (2XC), 136.0, 129.6 (dia 2, 2XC), 129.0 (dia 1, 2XC), 128.9 (q, *J* = 281.4 Hz), 113.4 (dia 2, 2XC), 113.1 (dia 1, 2XC), 112.0, 91.3 (dia 2, 2XC), 91.1 (dia 1, 2XC), 55.2 (2XC), 55.1 (2XC), 40.5 (dia 2), 40.1 (dia 1), 39.3 (q, *J* = 23.8 Hz), 13.0.

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -68.95 (d, *J* = 8.2 Hz, dia 1), -70.16 (d, *J* = 8.2 Hz, dia 2).

IR (neat) ν (cm^{-1}): 2945, 1512, 1218, 1111, 1035, 843, 778.

EI-HRMS (positive ion) $C_{20}H_{24}F_3O_4$ $[M+H]^+$: requires 385.1621**;** found 385.1624.

1,3,5-trimethoxy-2-(1-(4-methoxyphenyl)-2-(trifluoromethyl)pentyl)benzene 5i



m = 28.7 mg, 70% yield, orange oil, mixture of 2 diastereomers, dr = 50:50.

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm): 7.32 (d, *J* = 8.9 Hz, 2H, dia 2), 7.25 (d, *J* = 8.9 Hz, 2H, dia 1), 6.69 (d, *J* = 9.0 Hz, 2H, dia 1), 6.66 (d, *J* = 9.0 Hz, 2H, dia 2), 6.01 (s, 2H, dia 2), 6.00 (s, 2H, dia 1), 4.65 (d, *J* = 11.9 Hz, 1H, dia 2), 4.64 (d, *J* = 11.7 Hz, 1H, dia 1), 3.76 (s, 6H, dia 1), 3.74 (s, 6H, dia 2), 3.68 (s, 3H, dia 2, 3.68 (s, 3H, dia 1), 3.67 (s, 3H, dia 1), 3.66 (s, 3H, dia 2), 3.60-3.40 (m, 1H), 1.43-1.20 (m, 4H), 0.73-0.61 (m, 3H).

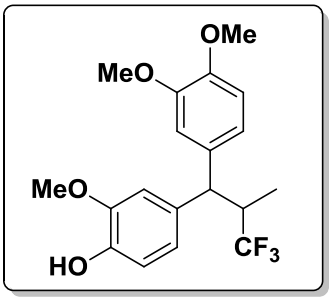
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): 159.9, 159.5, 157.6 (2XC), 135.2 (dia 2), 134.8 (dia 1), 129. (dia 1, 2XC), 129.2 (dia 2, 2XC), 129.0 (q, *J* = 282.1 Hz, dia 2), 128.9 (q, *J* = 282.1 Hz, dia 1), 113.3 (dia 1, 2XC), 113.1 (dia 2, 2XC), 112.5 (dia 2), 111.9 (dia 1), 91.2 (dia 1, 2XC), 91.0 (dia 2, 2XC), 55.7 (dia 1, 2XC), 55.2 (dia 2, 2XC), 55.1 (dia 1, 2XC), 55.0 (dia 1, 2XC), 43.7 (q, *J* = 22.0 Hz, dia 1), 42.7 (q, *J* = 23.1 Hz, dia 2), 39.0 (dia 2), 38.9 (dia 1), 30.5 (dia 2), 30.2 (dia 1), 20.5 (dia 1), 19.5 (dia 2), 14.5 (dia 2), 14.3 (dia 1).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -64.68 (d, *J* = 8.2 Hz, dia 1), -66.98 (d, *J* = 8.2 Hz, dia 2).

IR (neat) ν (cm^{-1}): 2970, 2838, 1738, 1591, 1510, 1366, 1218, 1204, 1112, 908, 813, 730.

EI-HRMS (positive ion) $C_{22}H_{28}F_3O_4$ $[M+H]^+$: requires 413.1934; found 413.1937.

4-(1-(3,4-dimethoxyphenyl)-3,3,3-trifluoro-2-methylpropyl)-2-methoxyphenol 5j



m = 24.0 mg, 65% yield, colourless oil, mixture of 2 diastereomers, dr = 65:35.

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 6.88-6.85 (m, 2H), 6.82-6.72 (m, 4H), 5.51 (s, 1H, dia 1), 5.49 (s, 1H, dia 2), 3.94 (d, *J* = 9.8 Hz, 1H), 3.88-3.84 (m, 9H), 3.12-3.04 (m, 1H), 1.09 (d, *J* = 7.0 Hz, 3H, dia 1), 1.08 (d, *J* = 7.0 Hz, 3H, dia 2).

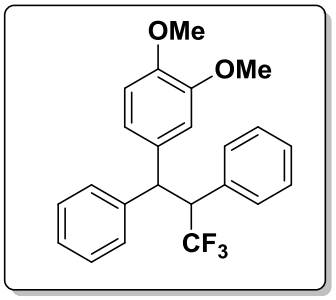
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): 159.5, 148.8 (dia 1, 2XC), 147.7 (dia 2, 2XC), 146.5 (dia 1), 143.4 (dia 2), 135.6 (dia 1), 134.9 (dia 2), 134.8 (dia 2), 134.1 (dia 1), 120.7 (dia 1), 120.1 (dia 2), 120.0 (dia 2), 119.5 (dia 1), 114.5 (dia 1), 114.3 (dia 2), 111.8 (dia 2), 111.5 (dia 1), 111.4 (dia 2), 111.1 (dia 1), 111.0 (dia 1), 110.6 (dia 2), 55.9 (2XC), 55.8, 51.6, 42.0 (q, *J* = 24.2 Hz), 13.0 (q, *J* = 3.0 Hz).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -68.56 (d, *J* = 8.2 Hz).

IR (neat) ν (cm^{-1}): 3453, 2970, 1591, 1515, 1373, 1225, 1108, 1035, 953, 813, 730.

EI-HRMS (positive ion) $C_{19}H_{22}F_3O_4$ $[M+H]^+$: requires 371.1465; found 371.1468.

(1-(3,4-dimethoxyphenyl)-3,3,3-trifluoropropane)-1,2-diyl)dibenzene 5k



m = 18.5 mg, 48% yield, colourless oil, mixture of 2 diastereomers, dr = 60:40.

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.49-6.55 (m, 13H), 4.61 (d, *J* = 11.0 Hz, 1H, dia 1), 4.60 (d, *J* = 11.0 Hz, 1H, dia 2), 4.28-4.18 (m, 1H), 3.92 (s, 3H, dia 1), 3.87 (s, 3H, dia 1), 3.74 (s, 6H, dia 2).

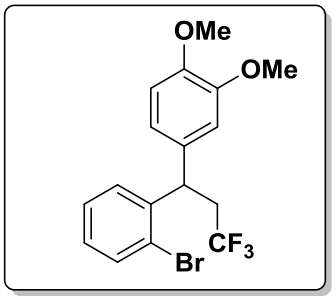
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): 148.9 (dia 1), 148.4 (dia 2), 147.9 (dia 1), 147.3 (dia 2), 142.5 (dia 2), 141.6 (dia 1), 134.8 (dia 1), 134.7 (dia 2), 134.6 (dia 2), 134.0 (dia 1), 129.6 (2XC), 128.6 (2XC), 128.3 (dia 1, 2XC), 128.3 (dia 2, 2XC), 128.1 (2XC), 127.8 (dia 1), 127.8 (dia 2), 126.8 (dia 2), 126.7 (q, *J* = 281.4 Hz, dia 2), 126.6 (q, *J* = 281.4 Hz, dia 1), 126.2 (dia 1), 120.5 (dia 2), 120.1 (dia 1), 111.9 (dia 2), 111.5 (dia 1), 111.2 (dia 1), 110.9 (dia 2), 56.0 (dia 2), 55.8 (dia 1), 55.8 (dia 1), 55.7 (dia 2), 54.5 (q, *J* = 24.7 Hz, dia 2), 54.4 (q, *J* = 24.7 Hz, dia 1), 52.2 (dia 1), 52.0 (dia 2).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -64.00 (d, *J* = 8.2 Hz, dia 2), -64.02 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 2970, 2837, 1593, 1516, 1455, 1365, 1239, 1143, 1105, 1026, 908, 698.

EI-HRMS (positive ion) $C_{23}H_{22}F_3O_2$ $[M+H]^+$: requires 387.1568; found 387.1566.

4-(1-(2-bromophenyl)-3,3,3-trifluoropropyl)-1,2-dimethoxybenzene 5l



m = 15.6 mg, 40% yield, colourless oil.

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.60-7.56 (m, 1H), 7.32-7.25 (m, 2H), 7.12-7.05 (m, 1H), 6.87-6.79 (m, 3H), 4.89 (t, *J* = 7.6 Hz, 1H), 3.86 (s, 6H), 2.92-2.82 (m, 2H).

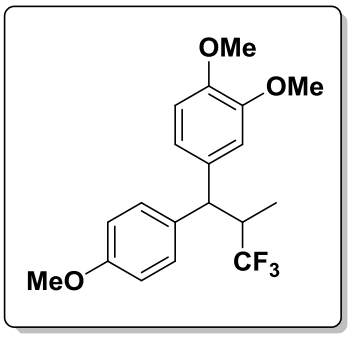
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): 149.0, 148.1, 141.9, 133.7, 133.5, 128.3 (2XC), 127.7, 126.2 (q, *J* = 278.6 Hz), 124.5, 119.6, 111.6, 111.2, 55.9, 55.9, 42.9, 39.2 (q, *J* = 27.5 Hz).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -63.74 (t, *J* = 10.3 Hz).

IR (neat) ν (cm^{-1}): 2970, 1517, 1366, 1229, 1217, 1093, 1027, 748.

EI-HRMS (positive ion) $C_{17}H_{17}BrF_3O_2$ $[M+H]^+$: requires 389.0359; found 389.0367.

1,2-dimethoxy-4-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzene 5m



m= 21.6 mg, 61 % yield, colourless oil, mixture of 2 diastereomers, dr = 60:40

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.23 (d, *J* = 8.7 Hz, 2H, dia 2), 7.18 (d, *J* = 8.8 Hz, 2H, dia 1), 6.89-6.72 (m, 5H), 3.98 (d, *J* = 9.5 Hz, 1H, dia 1), 3.96 (d, *J* = 9.5 Hz, 1H, dia 2), 3.88 (s, 3H, dia 2), 3.86 (s, 3H, dia 1), 3.86 (s, 3H, dia 2), 3.85 (s, 3H, dia 1), 3.79 (s, 3H, dia 1), 3.79 (s, 3H, dia 2), 3.16-3.02 (m, 1H), 1.10 (d, *J* = 7.4 Hz, 3H, dia 2), 1.10 (d, *J* = 7.3 Hz, 3H, dia 1).

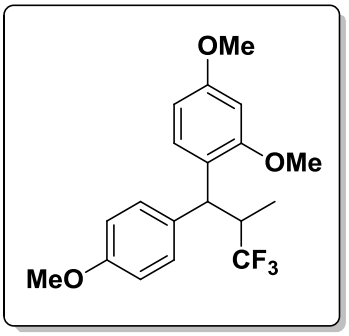
^{13}C NMR (125 MHz, $CDCl_3$) δ (ppm): 158.3 (dia 1), 158.2 (dia 2), 149.0 (dia 2), 148.8 (dia 1), 147.8 (dia 2), 147.7 (dia 1), 135.7 (dia 1), 135.1 (dia 2), 135.0 (dia 2), 134.3 (dia 1), 129.2 (dia 1, 2XC), 128.5 (dia 2, 2XC), 128.1 (q, *J* = 281.4 Hz), 120.1 (dia 2), 119.5 (dia 1), 114.1 (dia 1, 2XC), 113.9 (dia 2, 2XC), 111.8 (dia 2), 111.4 (dia 1), 111.1, 55.9, 55.9 (dia 2), 55.8 (dia 1), 55.2 (dia 1), 55.2 (dia 2), 51.3 (dia 2), 51.1 (dia 1), 42.0 (q, *J* = 24.7 Hz), 13.0 (dia 1), 13.0 (dia 2).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -68.46 (d, *J* = 8.2 Hz, dia 2), -68.60 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 2940, 1510, 1243, 1112, 1027, 836, 806.

EI-HRMS (positive ion) $C_{19}H_{22}F_3O_3$ $[M+H]^+$: requires 355.1516**;** found 355.1508.

2,4-dimethoxy-1-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzene 5n



m = 19.7 mg, 56 % yield, colourless oil, mixture of 2 diastereomers, dr = 55:45

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.29-7.13 (m, 3H), 6.82 (d, *J* = 9.0 Hz, 2H, dia 1), 6.80 (d, *J* = 9.1 Hz, 2H, dia 2), 6.48-6.41 (m, 2H), 4.39 (d, *J* = 11.0 Hz, 1H, dia 2), 4.34 (d, *J* = 10.4 Hz, 1H, dia 1), 3.83 (s, 3H, dia 2), 3.81 (s, 3H, dia 1), 3.79 (s, 3H, dia 1), 3.78 (s, 3H), 3.77 (s, 3H, dia 2), 3.32-3.19 (m, 1H), 1.06 (d, *J* = 6.6 Hz, 3H, dia 2), 1.05 (d, *J* = 6.8 Hz, 3H, dia 1).

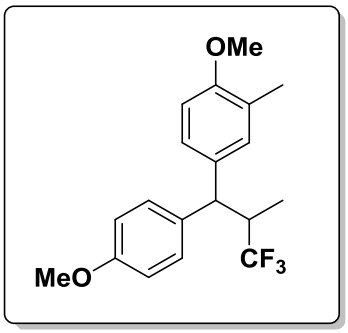
^{13}C NMR (125 MHz, $CDCl_3$) δ (ppm): 159.4 (dia 2), 159.3 (dia 1), 158.0 (dia 1), 157.9 (dia 2), 157.8 (dia 1), 157.6 (dia 2), 135.3 (dia 2), 134.4 (dia 1), 129.5 (dia 1), 128.9 (dia 2), 128.8 (dia 2, 2XC), 128.6 (dia 1, 2XC), 128.4 (q, *J* = 281.4 Hz, dia 2), 128.3 (q, *J* = 281.4 Hz, dia 1), 124.2 (dia 1), 123.6 (dia 2), 113.7 (dia 1, 2XC), 113.5 (dia 2, 2XC), 104.6 (dia 2), 104.2 (dia 1), 99.0 (dia 1), 99.0 (dia 2), 55.5 (dia 1), 55.4 (dia 2), 55.3 (dia 2), 55.2 (dia 1), 55.2 (dia 1), 55.1 (dia 2), 44.8 (dia 1), 44.5 (dia 2), 41.1 (q, *J* = 23.8 Hz, dia 2), 40.4 (q, *J* = 23.8 Hz, dia 1), 13.3 (dia 1), 13.0 (dia 2).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -68.48 (d, *J* = 8.2 Hz, dia 2), -68.27 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 2942, 1506, 1246, 1161, 1111, 1033, 838, 796.

EI-HRMS (positive ion) $C_{19}H_{22}F_3O_3$ $[M+H]^+$: requires 355.1516**;** found 355.1512.

1-methoxy-2-methyl-4-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzene 5o



m = 19.6 mg, 58 % yield, colourless oil, mixture of 2 diastereomers, dr = 60:40

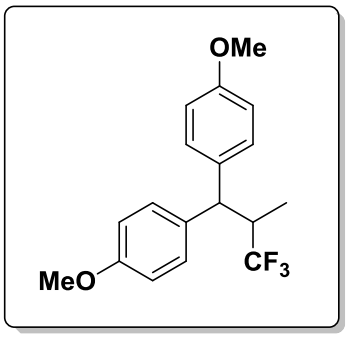
^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.22 (d, *J* = 8.7 Hz, 2H, dia 2), 7.17 (d, *J* = 8.7 Hz, 2H, dia 1), 7.11-6.99 (m, 2H), 6.84 (d, *J* = 8.8 Hz, 2H, dia 1), 6.82 (d, *J* = 8.8 Hz, 2H, dia 2), 6.75 (d, *J* = 7.4 Hz, 1H, dia 2), 6.74 (d, *J* = 8.0 Hz, 1H, dia 1), 3.96 (d, *J* = 9.8 Hz, 1H, dia 1), 3.93 (d, *J* = 10.1 Hz, 1H, dia 2), 3.80 (s, 3H, dia 2), 3.79 (s, 3H, dia 1), 3.78 (s, 3H, dia 1), 3.78 (s, 3H, dia 2), 3.16-3.04 (m, 1H), 2.20 (s, 3H, dia 2), 2.19 (s, 3H, dia 1), 1.08 (d, *J* = 6.8 Hz, 3H, dia 2), 1.07 (d, *J* = 6.9 Hz, 3H, dia 1).

^{13}C NMR (125 MHz, $CDCl_3$) δ (ppm): 158.2 (dia 1), 158.1 (dia 2), 156.4 (dia 2), 156.3 (dia 1), 135.5 (dia 2), 134.8 (dia 1), 134.7 (dia 1), 134.1 (dia 2), 130.4 (dia 2), 130.0 (dia 1), 129.2 (dia 1, 2XC), 128.5 (dia 2, 2XC), 128.1 (q, *J* = 281.4 Hz), 126.8 (dia 2), 126.5 (dia 1), 125.6 (dia 2), 124.8 (dia 1), 114.1 (dia 1, 2XC), 113.8 (dia 2, 2XC), 110.0 (dia 2), 109.8 (dia 1), 55.3 (dia 2), 55.2 (dia 1), 55.2 (dia 1), 55.2 (dia 2), 51.0 (dia 2), 50.8 (dia 1), 42.0 (q, *J* = 23.8 Hz, dia 2), 41.9 (q, *J* = 23.8 Hz, dia 1), 16.4, 13.2 (dia 2), 13.0 (dia 1).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -68.45 (d, *J* = 8.2 Hz, dia 2), -68.62 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 2950, 2837, 1507, 1243, 1167, 1111, 1033, 833, 806.

4,4'-(3,3,3-trifluoro-2-methylpropane-1,1-diyl)bis(methoxybenzene) 5p



m = 14.4 mg, 44 % yield, colourless oil.

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.22 (d, *J* = 8.7 Hz, 2H), 7.17 (d, *J* = 8.7 Hz, 2H), 6.85 (d , *J* = 8.8 Hz, 2H), 6.83 (d, *J* = 8.8 Hz, 2H), 3.99 (d, *J* = 9.9 Hz, 1H), 3.79 (s, 3H), 3.78 (s, 3H), 3.17-3.05 (m, 1H), 1.08 (d, *J* = 6.9 Hz, 3H).

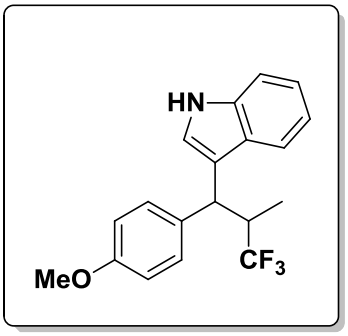
^{13}C NMR (125 MHz, $CDCl_3$) δ (ppm): 158.2, 158.1, 135.3, 134.5, 129.5 (2XC), 128.5 (2XC), 128.1 (q, *J* = 281.4 Hz), 114.1 (2XC), 113.8 (2XC), 55.2, 55.2, 50.8, 41.9 (q, *J* = 24.7 Hz), 13.0.

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -68.51 (d, *J* = 8.2 Hz).

IR (neat) ν (cm^{-1}): 2947, 1506, 1242, 1111, 1031, 838, 799.

EI-HRMS (positive ion) $C_{18}H_{20}F_3O_2$ $[M+H]^+$: requires 325.1410**;** found 325.1413.

3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5q



m = 20.7 mg, **yield** 62%, orange oil, mixture of 2 diastereomers, dr = 60:40

^{1}H NMR (500 MHz, $(CD_3)_2CO$) δ (ppm): 10.17 (s, NH, dia 2), 10.10 (s, NH, dia 1), 7.46-7.26 (m, 5H), 7.11-6.89 (m, 2H), 6.85-6.75 (m, 2H), 4.55 (d, *J* = 7.5 Hz, 1H, dia 1), 4.45 (d, *J* = 9.8 Hz, 1H, dia 2), 3.74 (s, 3H, dia 1), 3.72 (s, 3H, dia 2), 3.48-3.29 (m, 1H), 1.21 (d, *J* = 7.0 Hz, 3H, dia 2), 1.10 (d, *J* = 7.2 Hz, 3H, dia 1).

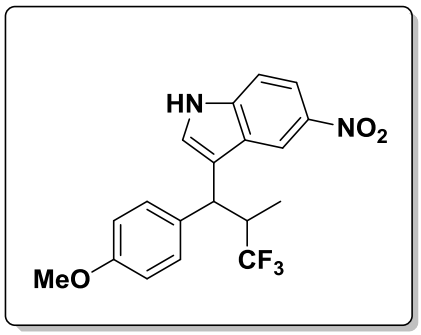
^{13}C NMR (125 MHz, $(CD_3)_2CO$) δ (ppm): 159.3 (dia 2), 159.0 (dia 1), 137.7 (dia 1), 137.5 (dia 2), 136.6 (dia 2), 134.9 (dia 1), 130.9 (dia 2, 2XC), 129.9 (dia 1, 2XC), 129.6 (q, *J* = 280.4 Hz, dia 1), 129.5 (q, *J* = 280.4 Hz, dia 2), 128.0 (dia 2), 127.8 (dia 1), 123.0 (dia 2), 122.6 (dia 1), 122.3 (dia 2), 122.2 (dia 1), 119.7 (dia 1), 119.7 (dia 2), 119.6 (dia 2), 119.5 (dia 1), 118.2 (dia 1), 117.5 (dia 2), 114.3 (dia 1, 2XC), 114.3 (dia 2, 2XC), 112.2 (dia 2), 112.1 (dia 1), 55.4 (dia 1), 55.3 (dia 2), 43.8 (dia 2), 43.4 (q, *J* = 23.1 Hz, dia 2), 42.6 (dia 1), 42.5 (q, *J* = 24.2 Hz, dia 1), 13.4 (dia 2), 12.5 (dia 1).

^{19}F NMR (282 MHz, $(CD_3)_2CO$) δ (ppm): -70.26 (d, *J* = 8.2 Hz, dia 2), -71.11 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 3379, 2949, 1698, 1512, 1245, 1168, 1112, 1032, 742.

EI-HRMS (positive ion) $C_{19}H_{17}F_3NO$ $[M-H]^+$: requires 332.1268**;** found 332.1270.

5-nitro-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5r



m = 19.8 mg, **yield** 52%, yellow oil, mixture of 2 diastereomers, dr = 60:40

^{1}H NMR (500 MHz, $(CD_3)_2CO$) δ (ppm): 10.92 (s, NH, dia 2), 10.84 (s, NH, dia 1), 8.61 (d, *J* = 2.1 Hz, 1H, dia 2), 8.47 (d, *J* = 2.1 Hz, 1H, dia 1), 8.04-7.97 (m, 1H), 7.80-7.76 (m, 1H), 7.59-7.40 (m, 1H), 6.90-6.81 (m, 2H), 4.65 (d, *J* = 8.3 Hz, 1H, dia 1), 4.64 (d, *J* = 9.6 Hz, 1H, dia 2), 3.75 (s, 3H, dia 1), 3.73 (s, 3H, dia 2), 3.52-3.34 (m, 1H), 1.24 (d, *J* = 7.0 Hz, 3H, dia 2), 1.12 (d, *J* = 7.0 Hz, 3H, dia 1).

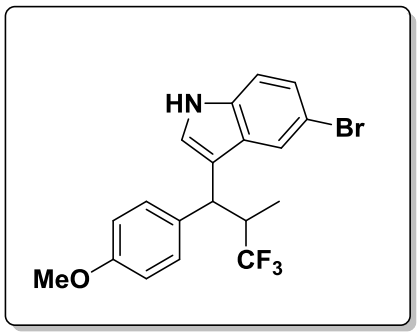
^{13}C NMR (125 MHz, $(CD_3)_2CO$) δ (ppm): CF_3 was not assigned; 158.6 (dia 1), 158.4 (dia 2), 134.7 (dia 2), 133.6 (dia 1), 129.8 (dia 1, 2XC), 129.1 (dia 2, 2XC), 126.9 (dia 1), 126.6 (dia 2), 125.9 (dia 2), 125.6 (dia 1), 125.4 (dia 2), 124.6 (dia 1), 122.8 (dia 1), 121.7 (dia 2), 120.3 (dia 1), 119.4 (dia 2), 116.8 (dia 2), 116.7 (dia 1), 115.9 (dia 1), 115.7 (dia 2), 113.7 (dia 1, 2XC), 113.6 (dia 2, 2XC), 111.7 (dia 2), 111.6 (dia 1), 42.4 (q, *J* = 24.3 Hz, dia 2), 42.3 (dia 2), 41.6 (q, *J* = 24.3 Hz, dia 1), 41.4 (dia 1), 12.4 (dia 2), 12.0 (dia 1).

^{19}F NMR (282 MHz, $(CD_3)_2CO$) δ (ppm): -70.23 (d, *J* = 8.2 Hz, dia 2), -70.91 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 3323, 2954, 1511, 1463, 1325, 1248, 1109, 1084, 810, 737.

EI-HRMS (positive ion) $C_{19}H_{18}F_3N_2O_3$ $[M+H]^+$: requires 379.1264**;** found 379.1270.

5-bromo-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5s



m = 23.4 mg, **yield** 57%, yellow oil, mixture of 2 diastereomers, dr = 65:35

^{1}H NMR (500 MHz, $(CD_3)_2CO$) δ (ppm): 10.41 (s, NH, dia 2), 10.34 (s, NH, dia 1), 7.80 (d, *J* = 1.9 Hz, 1H, dia 2), 7.62 (d, *J* = 1.9 Hz, 1H, dia 1), 7.55 (d, *J* = 2.4 Hz), 7.44-7.30 (m, 3H), 7.18 (td, *J* = 10.2 and 1.9 Hz), 6.89-6.79 (m, 2H), 4.52 (d, *J* = 7.9 Hz, 1H, dia 1), 4.45 (d, *J* = 9.8 Hz, 1H, dia 2), 3.74 (s, 3H, dia 1), 3.72 (s, 3H, dia 2), 3.49-3.30 (m, 1H), 1.21 (d, *J* = 7.0 Hz, 3H, dia 2), 1.09 (d, *J* = 7.0 Hz, 3H, dia 1).

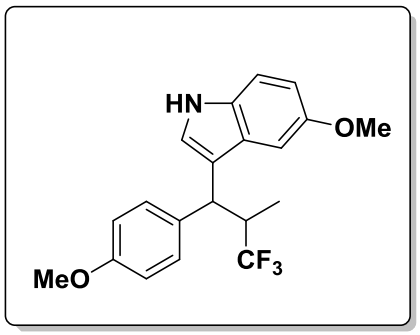
^{13}C NMR (125 MHz, $(CD_3)_2CO$) δ (ppm): 158.4 (dia 1), 158.2 (dia 2), 135.3 (dia 1), 135.2 (dia 2), 135.1 (dia 2), 133.8 (dia 1), 129.9 (dia 1, 2XC), 129.1 (dia 2, 2XC), 129.0 (dia 2), 128.7 (dia 1), 128.7 (q, *J* = 280.4 Hz, dia 1), 128.5 (q, *J* = 280.4 Hz, dia 2), 124.1 (dia 2), 124.0 (dia 1), 123.8 (dia 2), 123.5 (dia 1), 121.2 (dia 1), 121.1 (dia 2), 117.3 (dia 1), 116.5 (dia 2), 113.6 (dia 1, 2XC), 113.4 (dia 2, 2XC), 113.2 (dia 2), 113.1 (dia 1), 111.8 (dia 2), 111.6 (dia 1), 54.5 (dia 1), 54.5 (dia 2), 42.6 (dia 2), 42.4 (q, *J* = 23.8 Hz, dia 2), 41.5 (q, *J* = 23.8 Hz, dia 1), 41.5 (dia 1), 12.5 (dia 2), 11.9 (dia 1).

^{19}F NMR (282 MHz, $(CD_3)_2CO$) δ (ppm): -70.22 (d, *J* = 8.2 Hz, dia 2), -71.00 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 3423, 2999, 1697, 1510, 1459, 1245, 1167, 1112, 1034, 796.

EI-HRMS (positive ion) $C_{19}H_{16}BrF_3NO$ $[M-H]^+$: requires 410.0373**;** found 410.0371.

5-methoxy-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5t



m = 29.6 mg, **yield** 66%, orange oil, mixture of 2 diastereomers, dr = 55:45

^{1}H NMR (500 MHz, $(CD_3)_2CO$) δ (ppm): 10.04 (s, NH, dia 1), 9.97 (s, NH, dia 2), 7.46-7.40 (m, 2H), 7.35 (d, *J* = 8.9 Hz, 2H, dia 1), 7.26 (d, *J* = 9.2 Hz, 1H, dia 2), 7.24 (d, *J* = 8.9 Hz, 1H, dia 1), 7.14 (d, *J* = 2.4 Hz, 1H, dia 2), 6.89 (d, *J* = 2.4 Hz, 1H, dia 1), 6.85 (d, *J* = 8.9 Hz, 2H, dia 1), 6.80 (d, *J* = 8.5 Hz, 2H, dia 2), 6.75 (dd, *J* = 8.9 and 2.4 Hz, 1H, dia 2), 6.72 (dd, *J* = 8.9 and 2.4 Hz, 1H, dia 1), 4.52 (d, *J* = 7.3 Hz, 1H, dia 1), 4.40 (d, *J* = 9.8 Hz, 1H, dia 2), 3.80 (s, 3H, dia 2), 3.76 (s, 3H, dia 1), 3.73 (s, 3H, dia 2), 3.71 (s, 3H, dia 1), 3.45-3.33 (m, 1H), 1.22 (d, *J* = 7.0 Hz, 3H, dia 2), 1.11 (d, *J* = 7.0 Hz, 3H, dia 1).

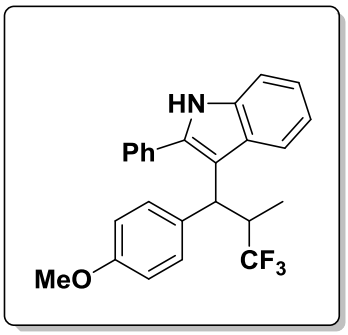
^{13}C NMR (125 MHz, $(CD_3)_2CO$) δ (ppm): 159.2 (dia 1), 159.0 (dia 2), 154.8 (dia 1), 154.6 (dia 2), 136.6 (dia 1), 134.8 (dia 2), 132.8 (dia 2), 132.6 (dia 1), 131.0 (dia 1, 2XC), 129.9 (dia 2, 2XC), 129.6 (q, *J* =280.5 Hz, dia 2), 129.5 (q, *J* = 280.5 Hz, dia 1), 127.8 (dia 1), 127.7 (dia 2), 123.6 (dia 1), 123.3 (dia 2), 117.9 (dia 2), 117.3 (dia 1), 114.3 (dia 2, 2XC), 114.2 (dia 1, 2XC), 112.8 (dia 1), 112.7 (dia 2), 112.4 (dia 1), 112.2 (dia 2), 101.9 (dia 1), 101.6 (dia), 55.9 (dia 1), 55.8 (dia 2), 55.4 (dia 1), 55.4 (dia 2), 43.8 (dia 1), 43.3 (q, *J* = 23.6 Hz, dia 1), 42.5 (dia 2), 42.3 (q, *J* = 24.2 Hz, dia 2), 13.4 (q, *J* = 3.3 Hz, dia 2), 12.5 (q, *J* = 3.3 Hz, dia 1).

^{19}F NMR (282 MHz, $(CD_3)_2CO$) δ (ppm): -70.21 (d, *J* = 8.2 Hz, dia 2), -71.08 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 3408, 3059, 1511, 1455, 1243, 1167, 1109, 1008, 740, 698.

EI-HRMS (positive ion) $C_{20}H_{21}F_3NO_2$ $[M+H]^+$: requires 364.1513**;** found 364.1519.

2-phenyl-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5u



m = 33.5 mg, **yield** 82%, orange oil, mixture of 2 diastereomers, dr = 50:50

^{1}H NMR (500 MHz, $(CD_3)_2CO$) δ (ppm): 10.36 (s, NH, dia 1), 10.27 (s, NH, dia 2), 8.05 (d, *J* = 7.9 Hz, 1H, dia 1), 8.01 (d, *J* = 7.9 Hz, 1H, dia 2), 7.62-7.33 (m, 8H), 7.20-7.08 (m, 2H), 6.83 (d, *J* = 8.9 Hz, 2H, dia 1), 6.77 (d, *J* = 8.9 Hz, 2H, dia 2), 4.49 (d, *J* = 12.1 Hz, 1H, dia 2), 4.45 (d, *J* = 11.3 Hz, 1H, dia 1), 3.90-3.74 (m, 1H), 3.74 (s, 3H, dia 1), 3.72 (s, 3H, dia 2), 1.11 (d, *J* = 7.0 Hz, 3H, dia 1), 1.06 (d, *J* = 7.0 Hz, 3H, dia 2).

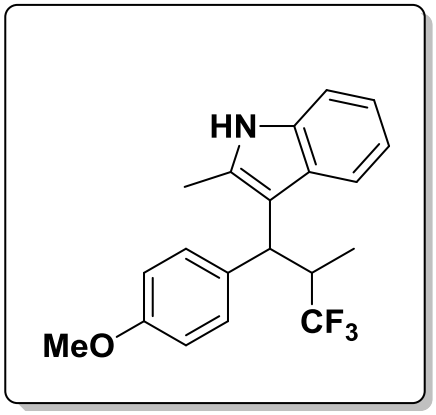
^{13}C NMR (125 MHz, $(CD_3)_2CO$) δ (ppm): CF_3 was not assigned; 159.1 (dia 1 or dia 2), 158.9 (dia 1 or dia 2), 137.7 (dia 1 or dia 2), 137.2 (dia 1 or dia 2), 136.7 (dia 1 or dia 2), 136.0 (dia 1 or dia 2), 134.4 (dia 1 or dia 2), 134.2 (dia 1 or dia 2), 130.2 (dia 1 or dia 2, 2XC), 130.1 (dia 1 or dia 2, 2XC), 130.0 (dia 1 or dia 2, 2XC), 129.7 (dia 1 or dia 2, 2XC), 129.6 (dia 1 or dia, 2 2XC), 129.4 (dia 1 or dia 2, 2XC), 129.0 (dia 1 or dia 2), 128.8 (dia 1 or dia 2), 127.7 (dia 1 or dia 2), 127.4 (dia 1 or dia 2), 122.6 (dia 1 or dia 2), 122.2 (dia 1 or dia 2), 122.0 (dia 1 or dia 2), 121.8 (dia 1 or dia 2), 121.6 (dia 1 or dia 2), 121.3 (dia 1 or dia 2), 120.4 (dia 1 or dia 2), 120.0 (dia 1 or dia 2), 114.9 (dia 1 or dia 2), 114.6 (dia 1 or dia 2), 114.3 (dia 1 or dia 2, 2XC), 114.1 (dia 1 or dia 2, 2XC), 112.5 (dia 1 or dia 2), 112.3 (dia 1 or dia 2), 55.4 (dia 1 or dia 2), 55.3 (dia 1 or dia 2), 44.0, 41.6 (q, *J* = 24.2 Hz, dia 1 or dia 2), 41.0 (q, *J* = 24.2 Hz, dia 1 or dia 2), 14.2 (q, *J* = 2.7 Hz, dia 1 or dia 2), 13.7 (q, *J* = 3.0 Hz, dia 1 or dia 2).

^{19}F NMR (282 MHz, $(CD_3)_2CO$) δ (ppm): -70.53 (d, *J* = 8.2 Hz, dia 1), -71.53 (d, *J* = 8.2 Hz, dia 2).

IR (neat) ν (cm^{-1}): 3408, 3059, 1511, 1456, 1243, 1167, 1109, 1008, 740, 699.

EI-HRMS (positive ion) $C_{25}H_{23}F_3NO$ $[M+H]^+$: requires 410.1726**;** found 410.1731.

2-methyl-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5v



m = 34.2 mg, **yield** 99%, orange oil, mixture of 2 diastereomers, dr = 55:45

^{1}H NMR (500 MHz, $(CD_3)_2CO$) δ (ppm): 9.95 (s, NH, dia 1), 9.83 (s, NH, dia 2), 7.81 (d, J= 8.5 Hz, 1H, dia 1), 7.77 (d, *J* = 8.5 Hz, 1H, dia 2), 7.47 (d, *J* = 8.9 Hz, 2H, dia 1), 7.45 (d, *J* = 8.9 Hz, 2H, dia 2), 7.28 (d, *J* = 8.5 Hz, 1H, dia 1), 7.23 (d, *J* = 9.2 Hz, 1H, dia 2), 7.06-6.92 (m, 2H), 6.84 (d, *J* = 8.7 Hz, 2H, dia 1), 6.80 (d, *J* = 8.8 Hz, 2H, dia 2), 4.35 (d, *J* = 10.6 Hz, 1H, dia 2), 4.31 (d, *J* = 11.2 Hz, 1H, dia 1), 3.81-3.68 (m, 1H), 3.73 (s, 3H, dia 1), 3.72 (s, 3H, dia 2), 2.50 (s, 3H), 1.16 (d, *J* = 6.8 Hz, 3H, dia 1), 1.10 (d, *J* = 6.9 Hz, 3H, dia 2).

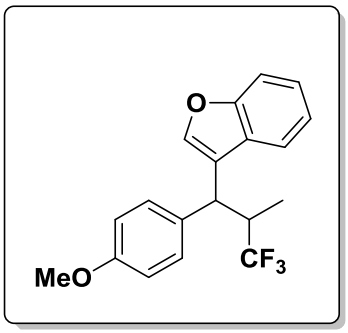
^{13}C NMR (125 MHz, $(CD_3)_2CO$) δ (ppm): 159.9 (dia 1), 158.8 (dia 2), 136.8 (dia 1), 136.0 (dia 2), 133.0 (dia 1), 131.9 (dia 2), 130.0 (dia 1, 2XC), 129.8 (q, *J* = 281.0 Hz, dia 1), 129.6 (q, *J* = 281.0 Hz, dia 2), 129.4 (dia 2, 2XC), 128.2 (dia 2), 127.8 (dia 1), 122.9 (dia 1), 121.6 (dia 2), 121.2 (dia 2), 120.9 (dia 1), 120.0 (dia 1), 119.8 (dia 2), 119.8 (dia 2), 119.3 (dia 1), 114.5 (dia 1, 2XC), 114.3 (dia 2, 2XC), 113.8 (dia 1), 112.9 (dia 2), 111.6 (dia 2), 111.4 (dia 1), 55.4 (dia 1), 55.3 (dia 2), 44.2 (dia 1), 43.9 (dia 2), 41.3 (q, *J* = 24.2 Hz, dia 2), 40.6 (q, *J* = 23.6 Hz, dia 1), 14.3 (q, *J* = 3.3 Hz, dia 2), 13.4 (q, *J* = 3.3 Hz, dia 1), 12.1 (dia 2), 12.1 (dia 1).

^{19}F NMR (282 MHz, $(CD_3)_2CO$) δ (ppm): -70.68 (d, *J* = 8.2 Hz, dia 2), -71.49 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 3401, 2948, 1697, 1511, 1459, 1244, 1111, 1010, 831, 740.

EI-HRMS (positive ion) $C_{20}H_{21}F_3NO$ $[M+H]^+$: requires 348.1571**;** found 348.1570.

3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzofuran 5w



m = 16.7 mg, **yield** 50 %, colourless oil, mixture of 2 diastereomers, dr = 70:30

^{1}H NMR (500 MHz, $CDCl_3$) δ (ppm): 7.53-7.30 (m, 4H), 7.26-7.15 (m, 2H), 6.92-6.84 (m, 2H), 6.55 (s, 1H, dia 2), 6.51 (s, 1H, dia 1), 4.30 (d, *J* = 8.2 Hz, 1H, dia 1), 4.26 (d, *J* = 8.2 Hz, 1H, dia 2), 3.81 (s, 3H, dia 1), 3.79 (s, 3H, dia 2), 3.37-3.05 (m, 1H), 1.20 (d, *J* = 7.0 Hz, 3H, dia 2), 1.07 (d, *J* = 7.2 Hz, 3H, dia 1).

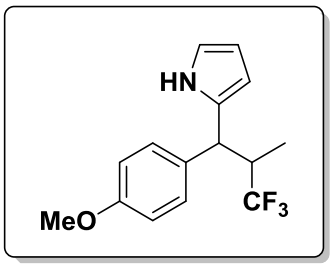
^{13}C NMR (125 MHz, $CDCl_3$) δ (ppm): CF_3 was not assigned; 158.9, 154.8, 130.0 (dia 2, 2XC), 130.0 (dia 1, 2XC), 129.2, 128.4, 123.8 (dia 2), 123.7 (dia 1), 122.8 (dia 2), 122.6 (dia 1), 120.7 (dia 2), 120.6 (dia 1), 114.0 (dia 1, 2XC), 114.0 (dia 2, 2XC), 111.1 (dia 2), 111.0 (dia 1), 110.2, 104.2 (dia 2), 103.3 (dia 1), 55.2, 45.6 (dia 2), 44.9 (dia 1), 41.1 (q, *J* = 25.2 Hz), 12.3 (dia 2), 11.7 (dia 1).

^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -69.15 (d, *J* = 8.2 Hz, dia 2), -70.24 (d, *J* = 8.2 Hz, dia 1).

IR (neat) ν (cm^{-1}): 2940, 1512, 1217, 1111, 1030, 837, 777.

EI-HRMS (positive ion) $C_{19}H_{18}F_3O_2$ $[M+H]^+$: requires 335.1253**;** found 335.1257.

2-(3,3,3-trifluoro-1-(4-methoxyphenylpropyl)-2-methylpropyl)-1H-pyrrole 5x



m = 8.7 mg, 31% yield, colourless oil, mixture of 2 diastereomers, dr = 55:45

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm): 7.88 (s, NH, dia 1), 7.76 (s, NH, dia 2), 7.20 (d, J= 8.6 Hz, 2H, dia 1), 7.13 (d, *J* = 8.6 Hz, 2H, dia 2), 6.88 (d, *J* = 8.7 Hz, 2H, dia 1), 6.85 (d, *J* = 8.7 Hz, 2H, dia 2), 6.70-6.64 (m, 1H), 6.21-6.14 (m, 1H), 6.14-6.05 (m, 1H), 4.38 (d, *J* = 4.8 Hz, 1H, dia 2), 4.18 (d, *J* = 7.3 Hz, 1H, dia 1), 3.82 (s, 2H, dia 2), 3.80 (s, 2H, dia 1), 3.18-3.01 (m, 1H, dia 2), 3.01-2.85 (m, 1H, dia 1), 1.20 (d, *J* = 6.8 Hz, 3H, dia 1), 1.13 (d, *J* = 6.9 Hz, 3H, dia 2).

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm): CF_3 was not assigned; 158.8 (dia 1), 158.4 (dia 2), 133.4, 130.9, 130.7 (dia 2), 128.9 (dia 1), 117.1 (dia 2), 117.0 (dia 1), 114.0 (dia 1), 113.8 (dia 2), 108.5 (dia 1), 108.2 (dia 2), 106.9 (dia 1), 105.5 (dia 2), 55.3, 44.3 (dia 2), 43.0 (dia 1), 42.8 (q, *J* = 24.2 Hz, dia 2), 41.4 (q, *J* = 24.2 Hz, dia 1), 12.1 (dia 1), 10.6 (dia 2).

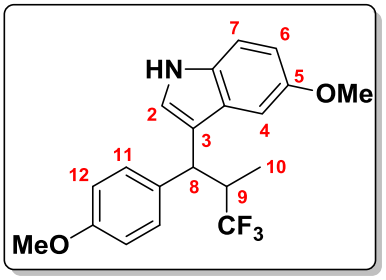
^{19}F NMR (282 MHz, $CDCl_3$) δ (ppm): -69.13 (d, *J* = 8.2 Hz, dia 1), -69.64 (d, *J* = 8.2 Hz, dia 2).

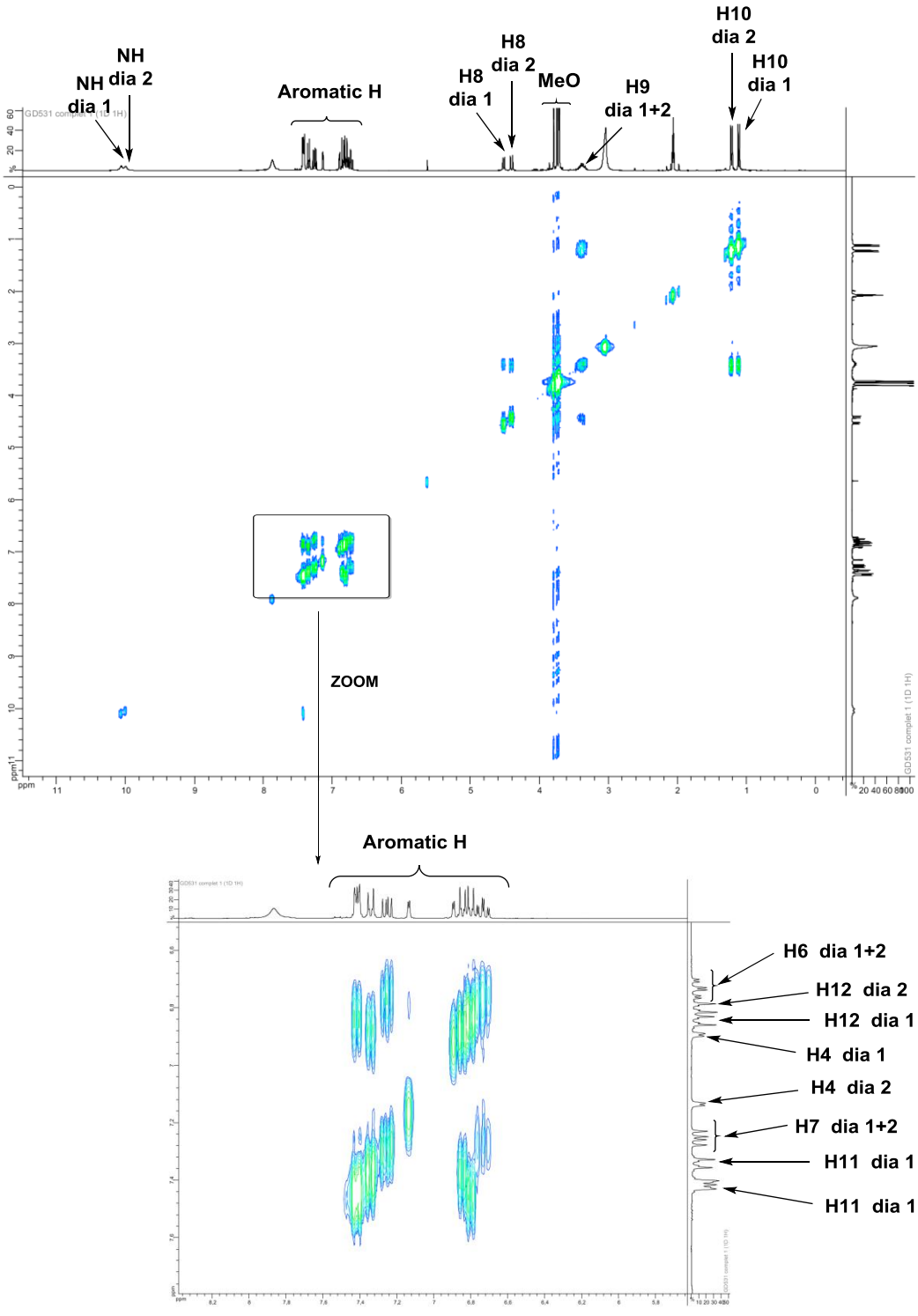
IR (neat) ν (cm^{-1}): 3386, 2937, 1611, 1512, 1463, 1247, 1167, 1115, 1092, 1031, 834, 718.

EI-HRMS (positive ion) $C_{15}H_{17}F_3NO$ $[M+H]^+$: requires 284.1268; found 284.1262.

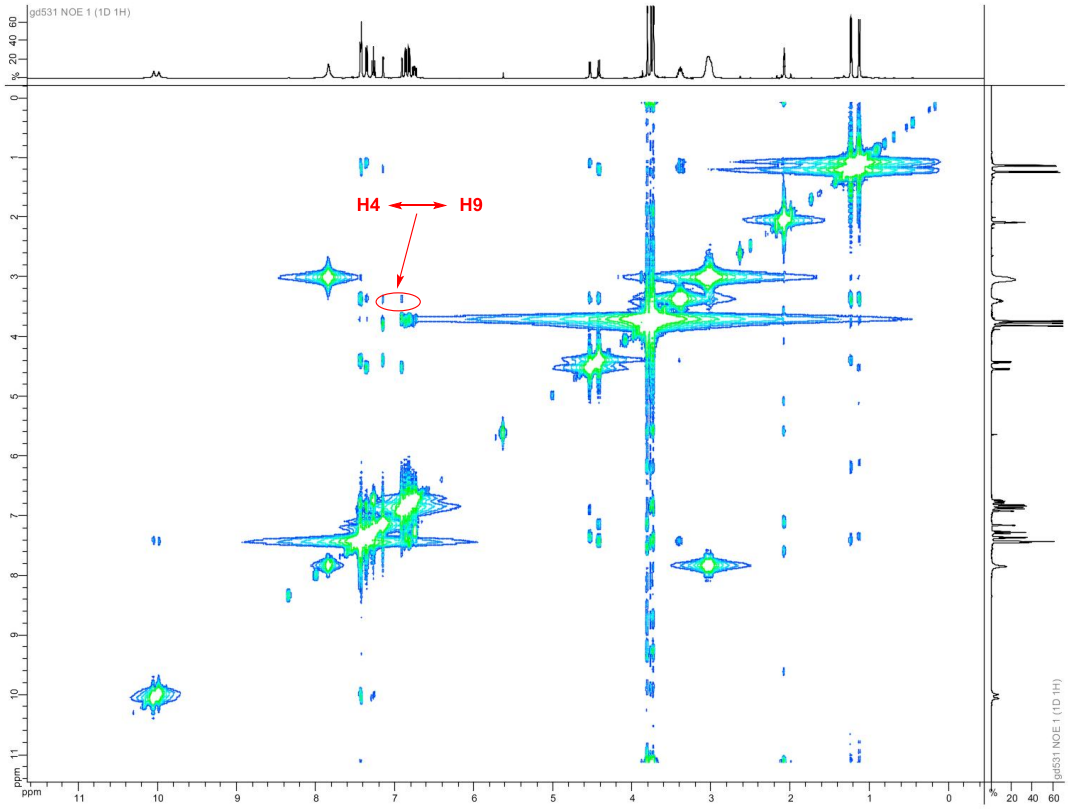
V- Determination of regioselectivity

COSY spectrum of compound 5t:





NOESY spectrum of compound 5t:

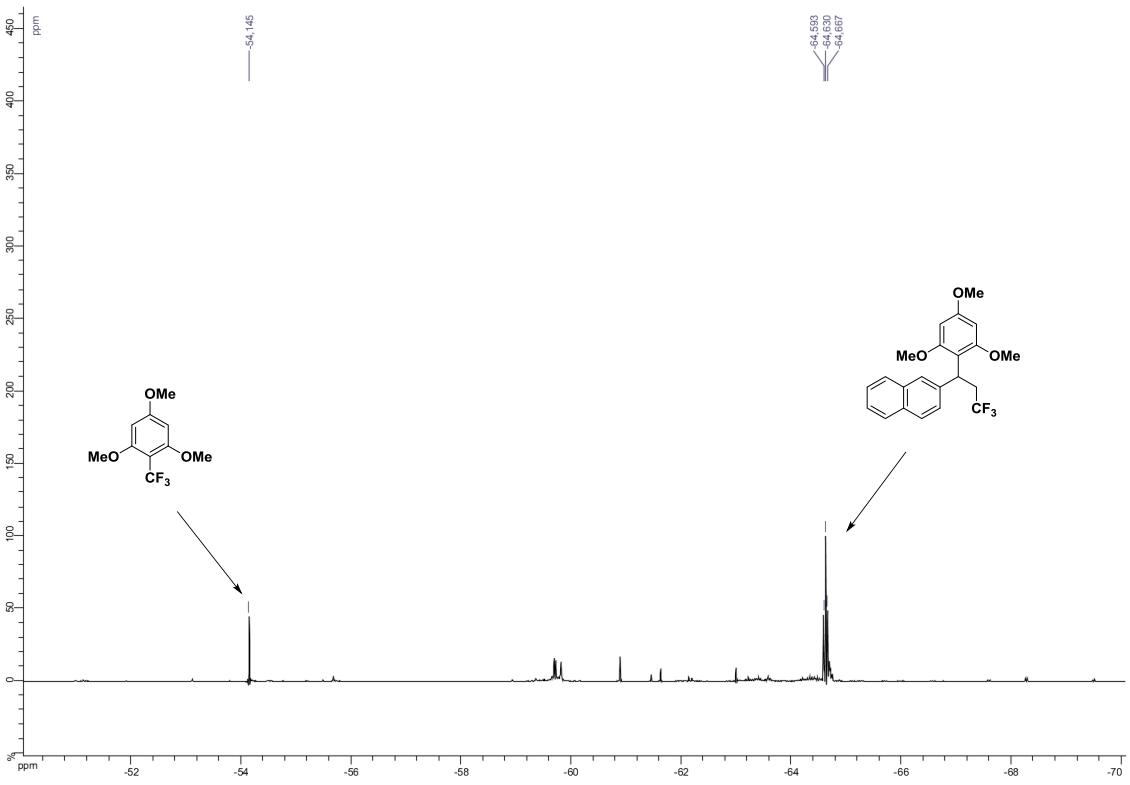


Regioisomer with C3 alkylation of 5t **Regioisomer with C2 alkylation of 5t**

NOESY experiments for compound **5t** were performed in order to determine unambiguously the regioselectivity of the addition of indole derivatives. A signal was found between H4 and H9 for both diastereomers (see red circle on NOESY spectrum), and no signal was detected between H8 and NH. These results are in accordance with an alkylation of indoles in C3 position, as described in this supporting information.

VI- Chemoselectivity

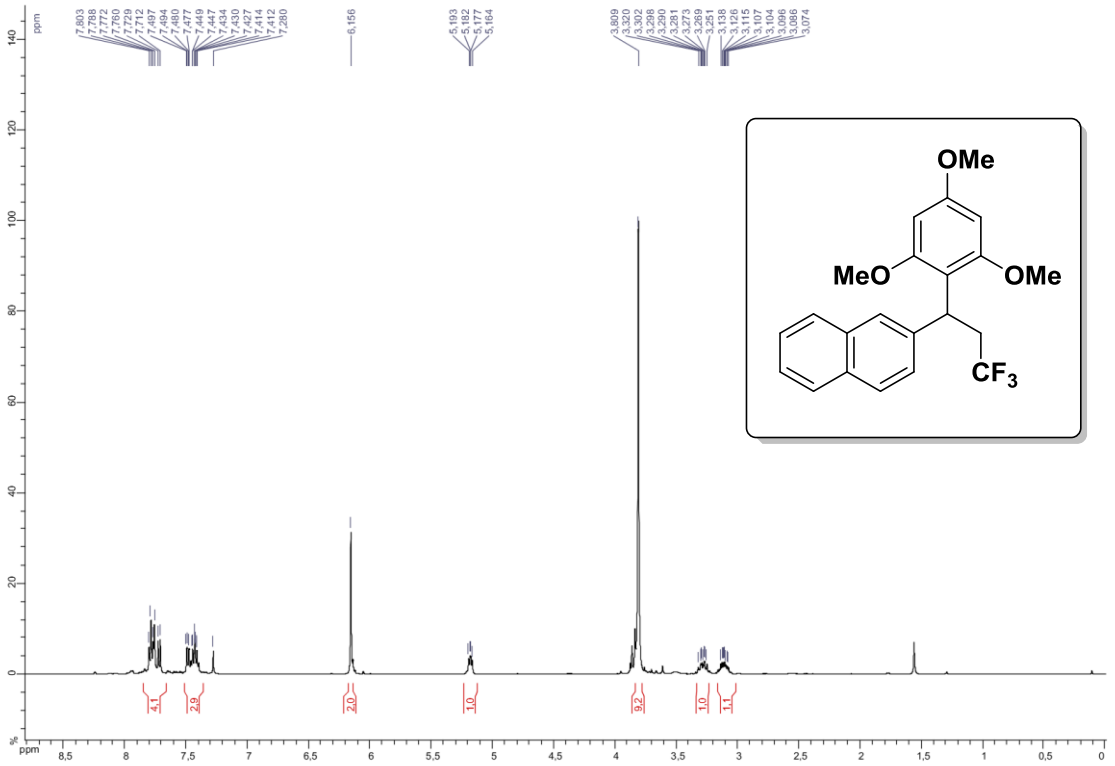
^{19}F spectrum of crude compound 5a:

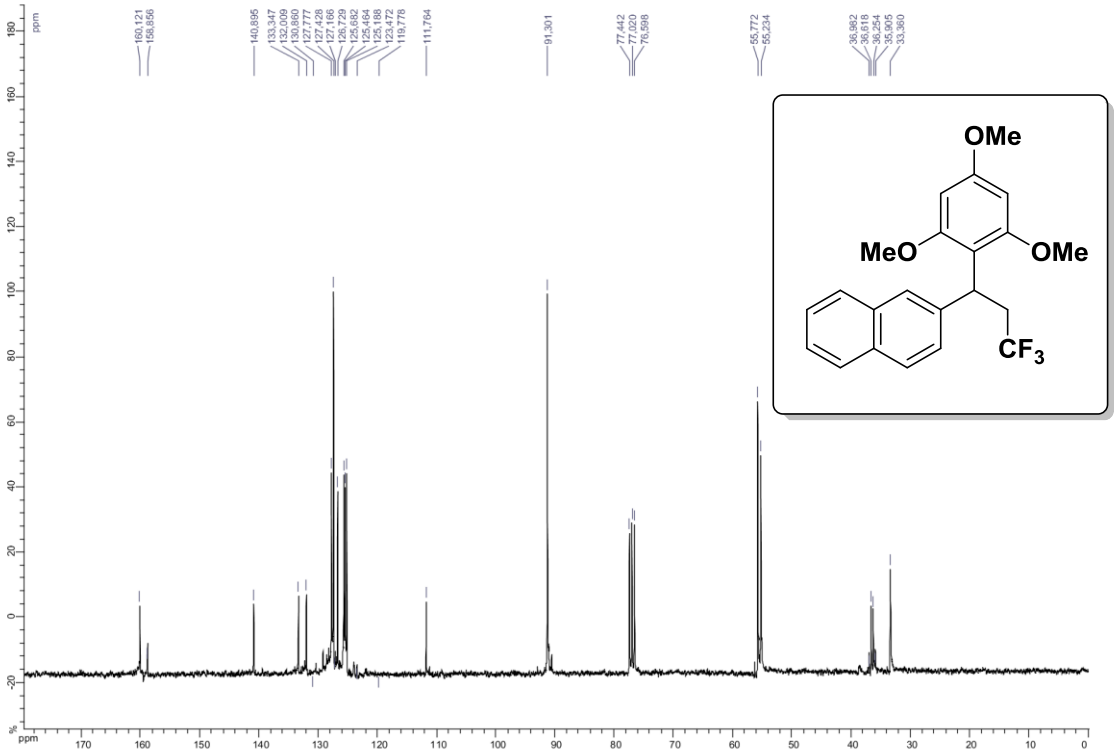


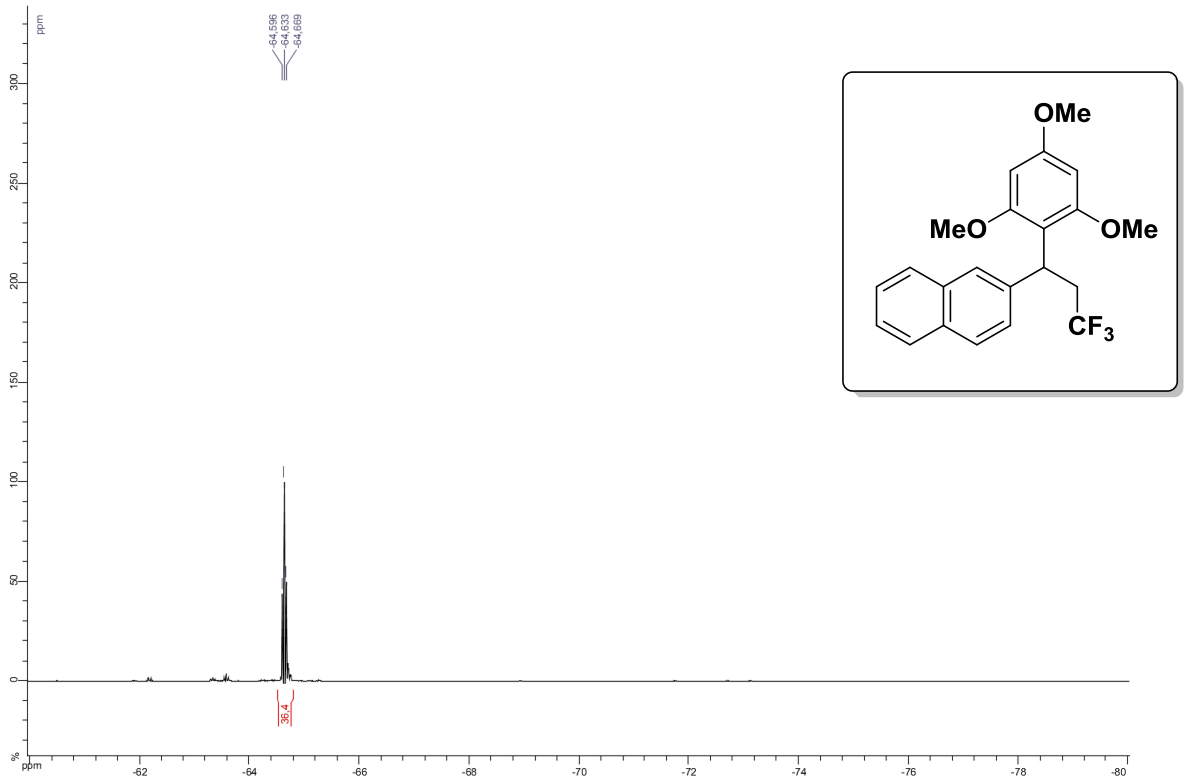
Traces of trifluoromethylated TMB were observed (14% NMR yield, see 19F NMR spectrum above).

VI- NMR Spectra of new compounds

2-(3,3,3-trifluoro-1-(2,4,6-trimethoxyphenyl)propyl)naphthalene 5a



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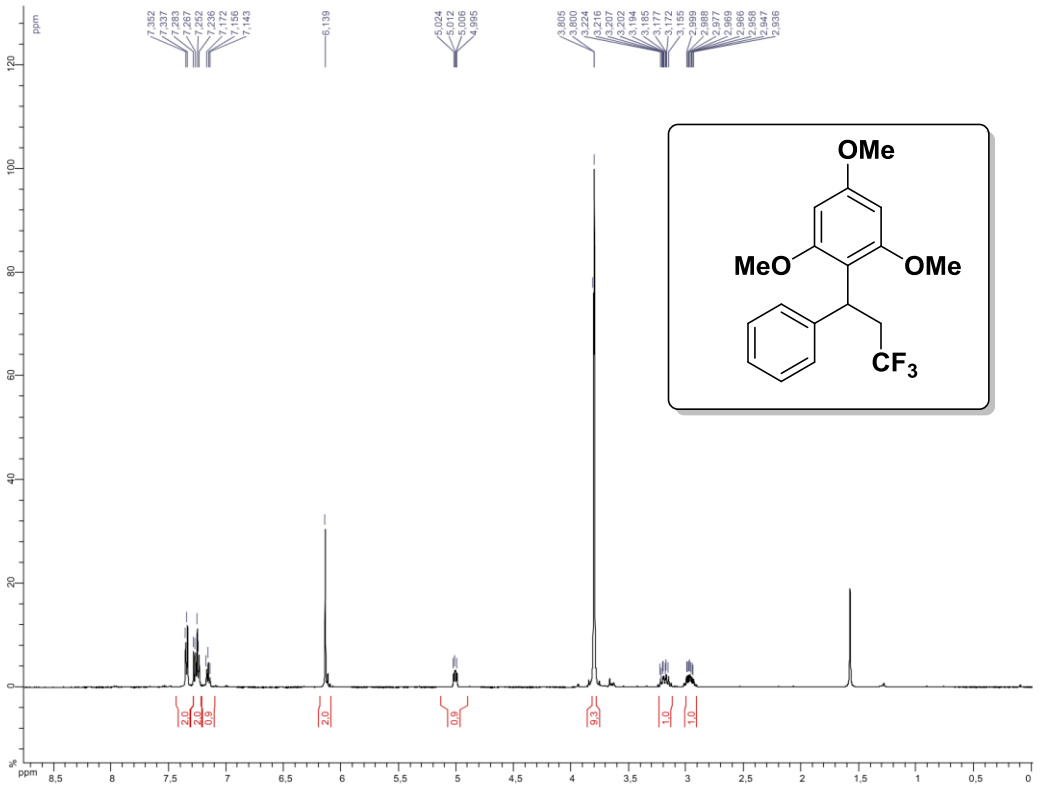
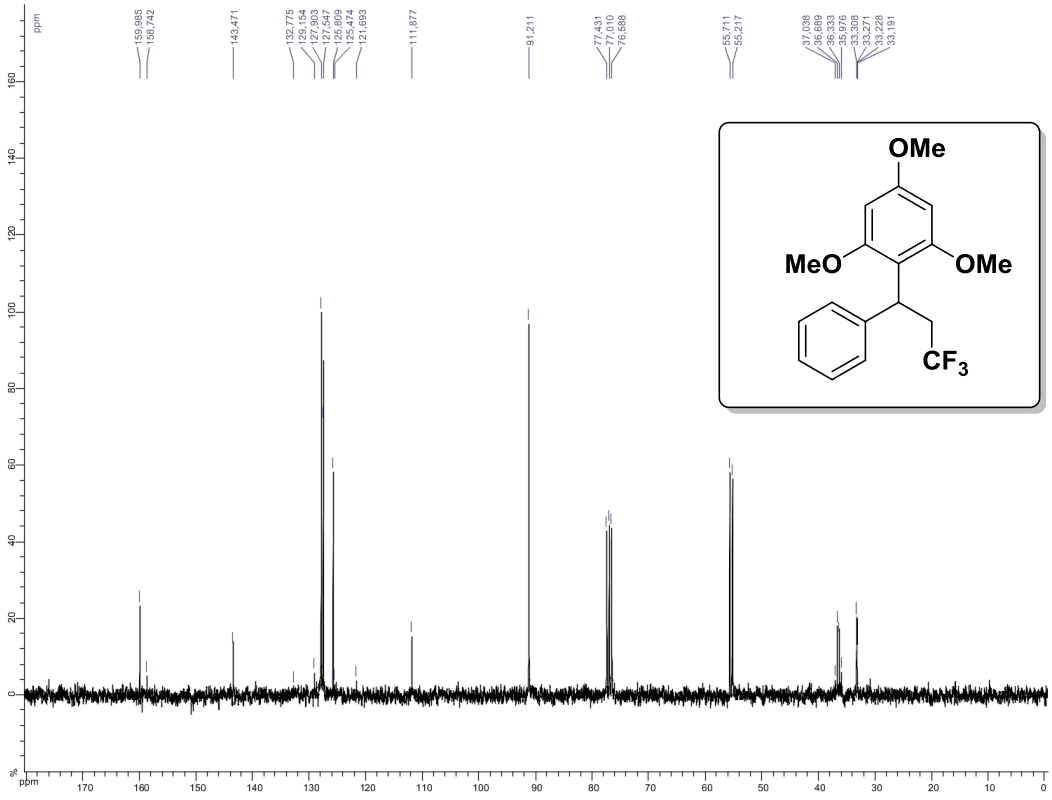
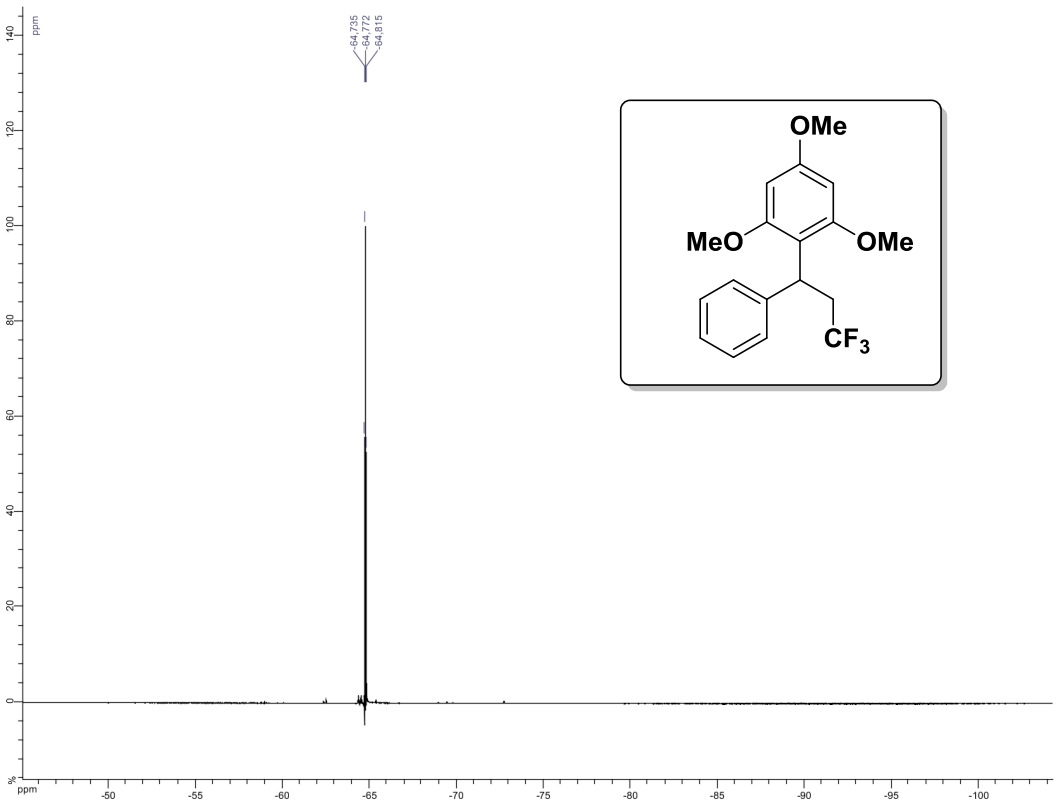
OMe
MeO
OMe
CF3

1,3,5-trimethoxy-2-(3,3,3-trifluoro-1-phenylpropyl)benzene 5b



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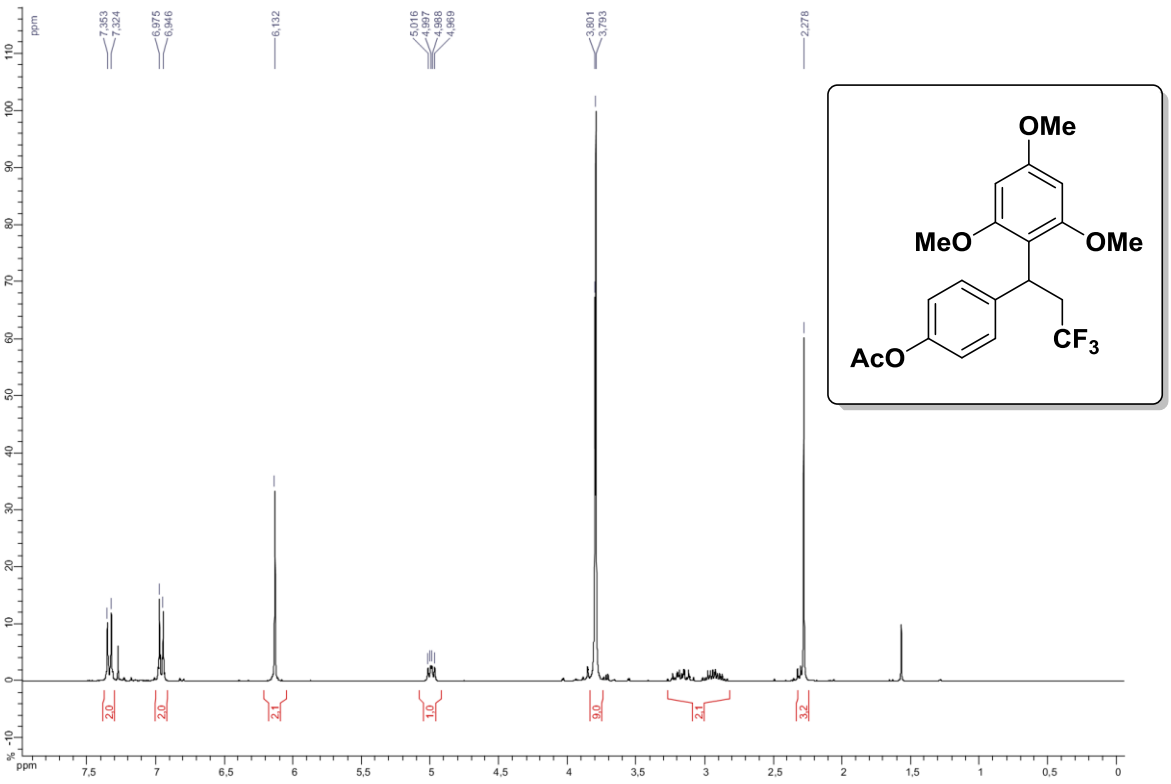
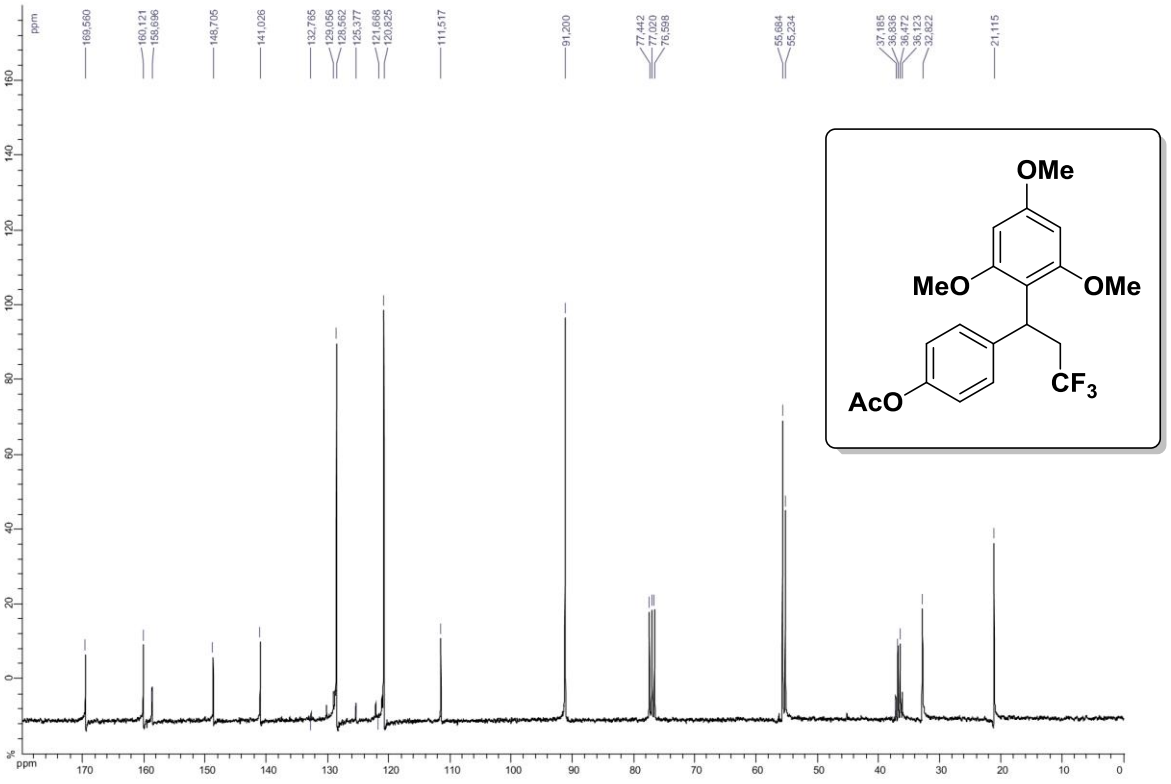
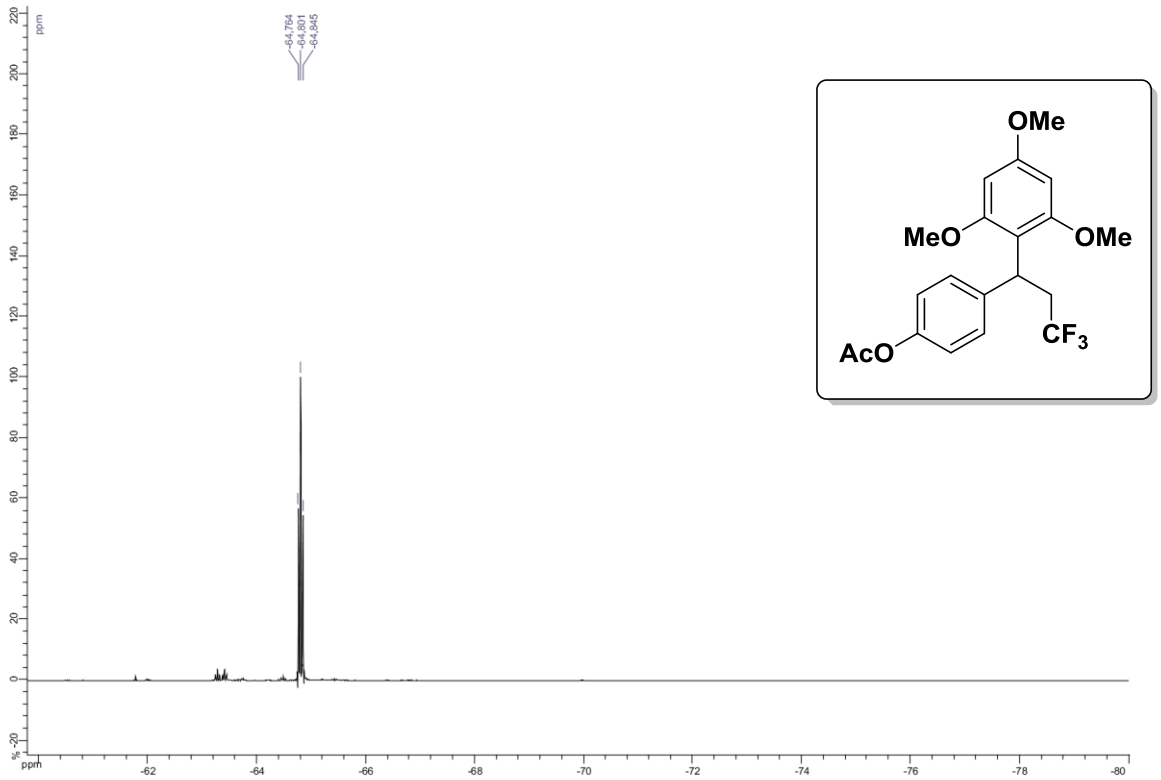
OMe
CF3

4-(3,3,3-trifluoro-1-(2,4,6-trimethoxyphenyl)propyl)phenyl acetate 5c



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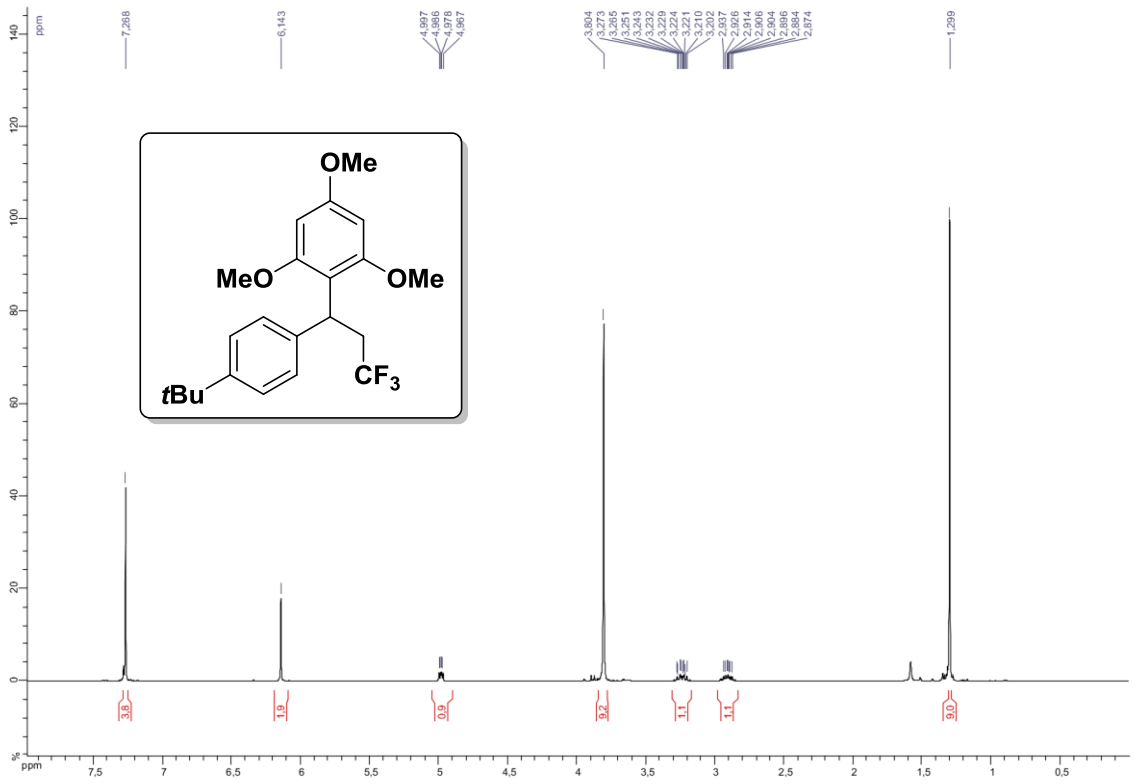
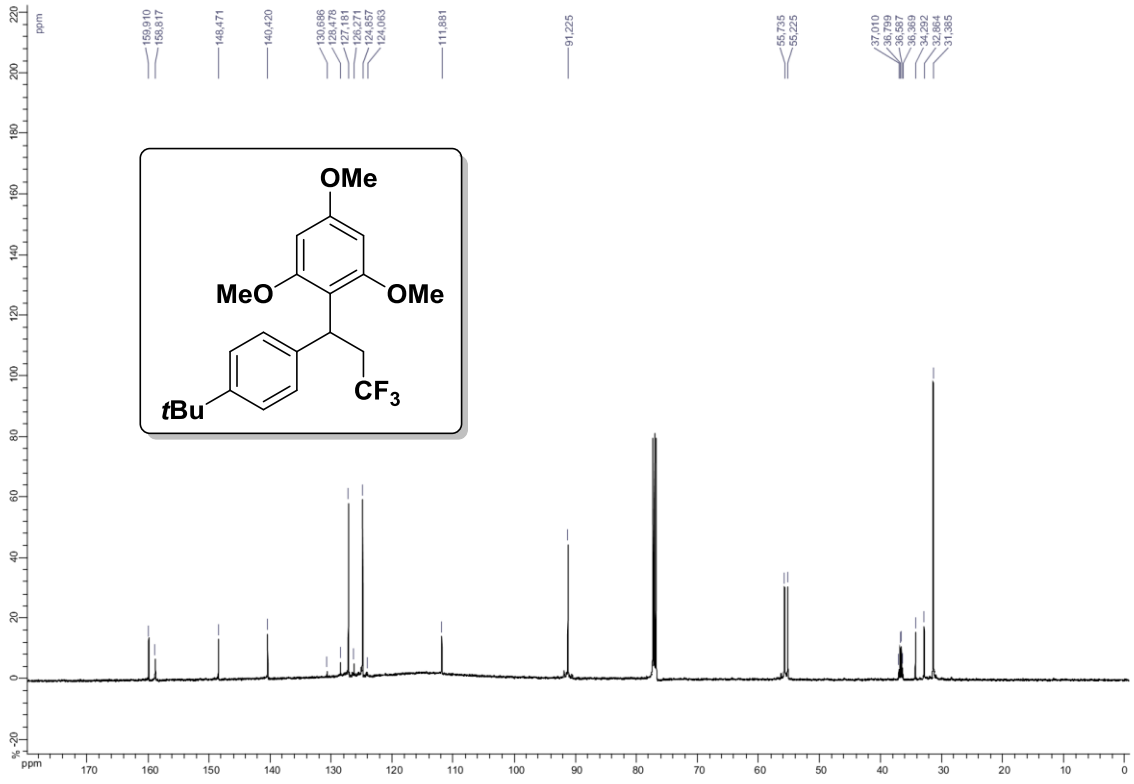
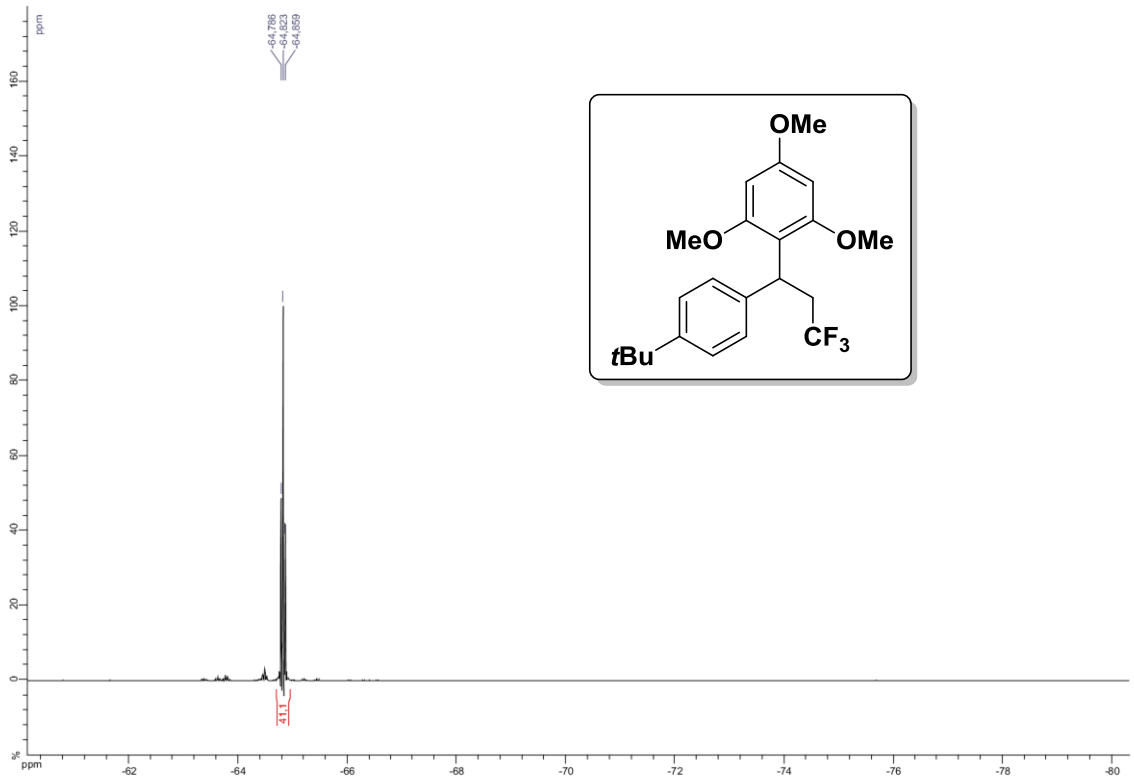
AcO
CF3

2-(1-(4-(tert-butyl)phenyl)-3,3,3-trifluoropropyl)-1,3,5-trimethoxybenzene 5d



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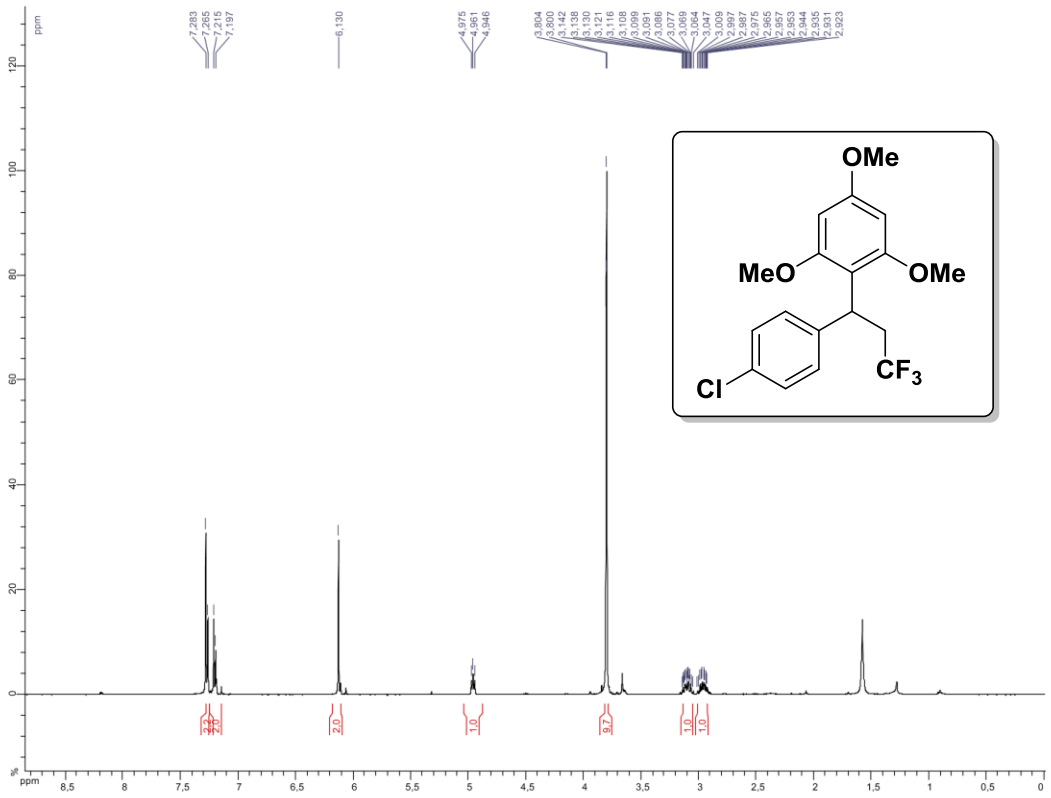
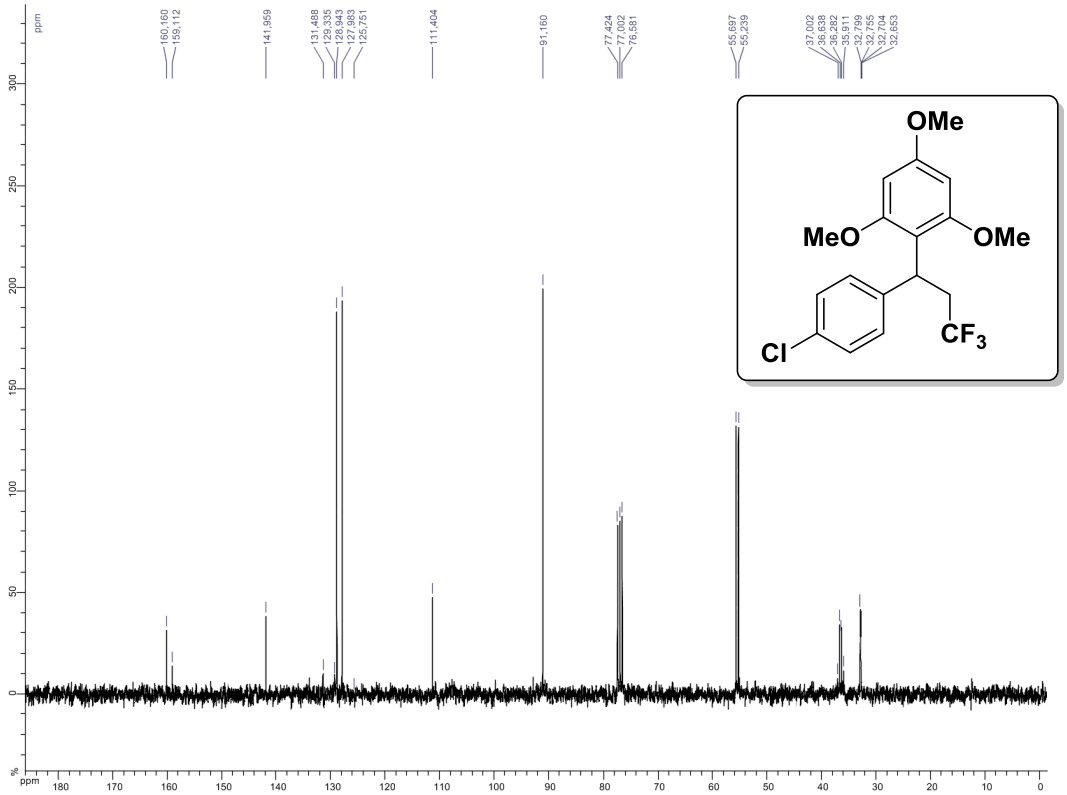
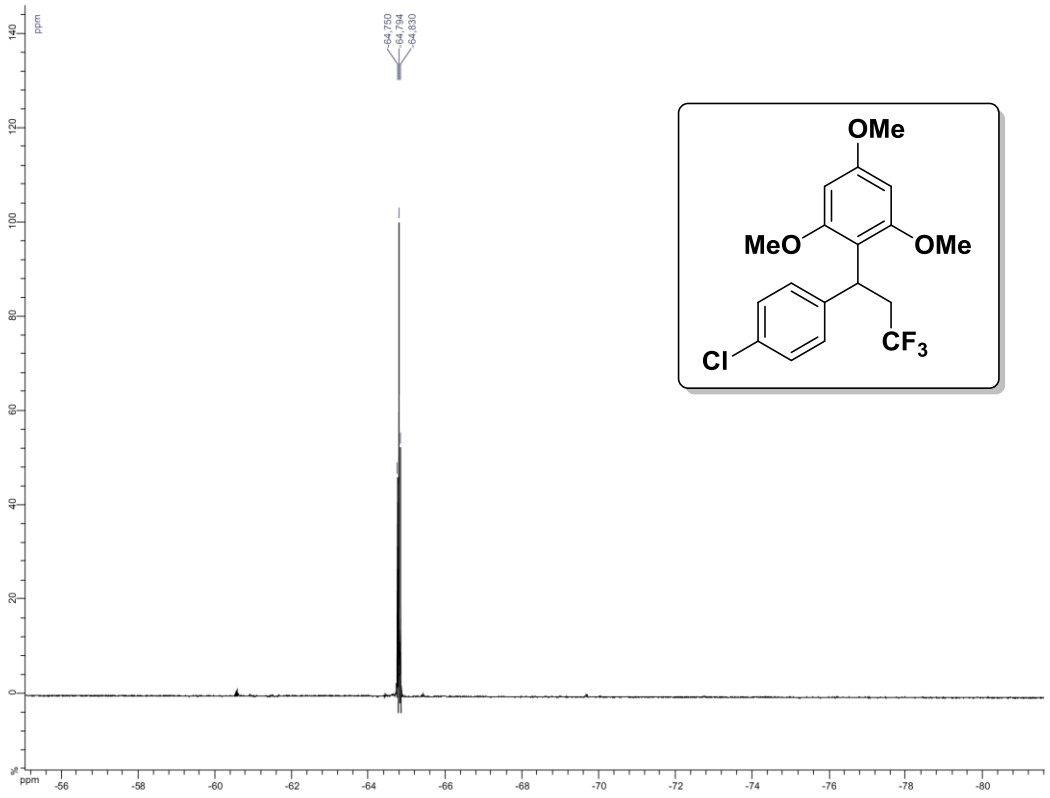
tBu
CF3

2-(1-(4-chlorophenyl)-3,3,3-trifluoropropyl)-1,3,5-trimethoxybenzene 5e



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-66
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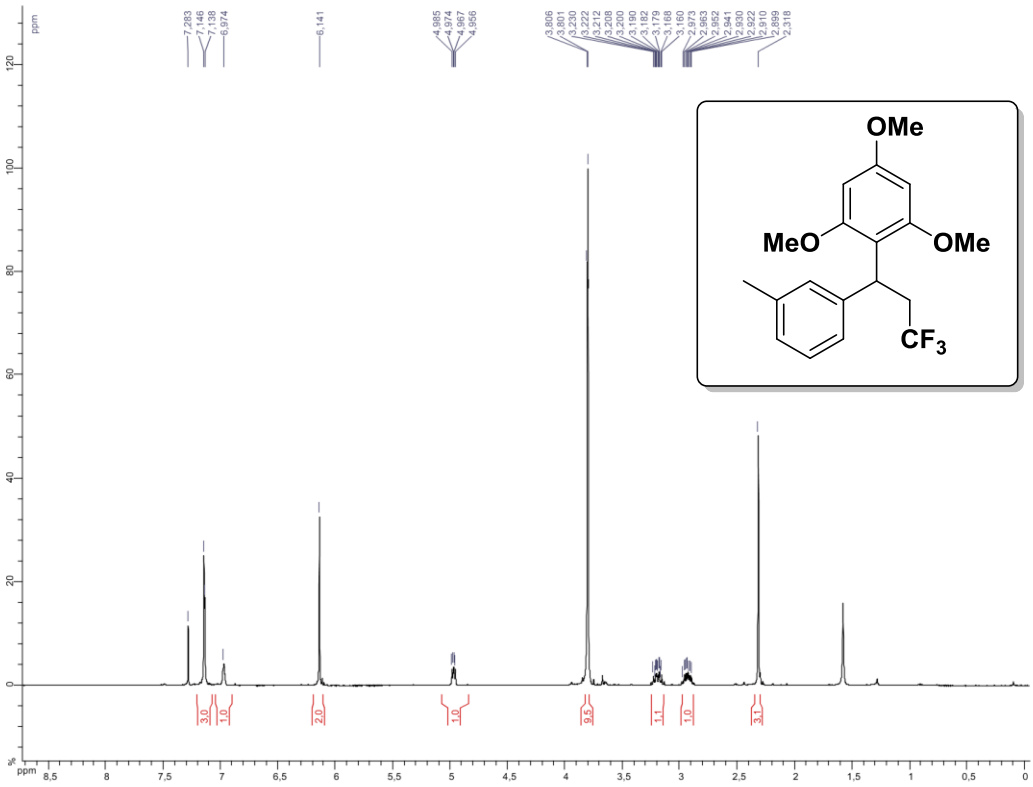
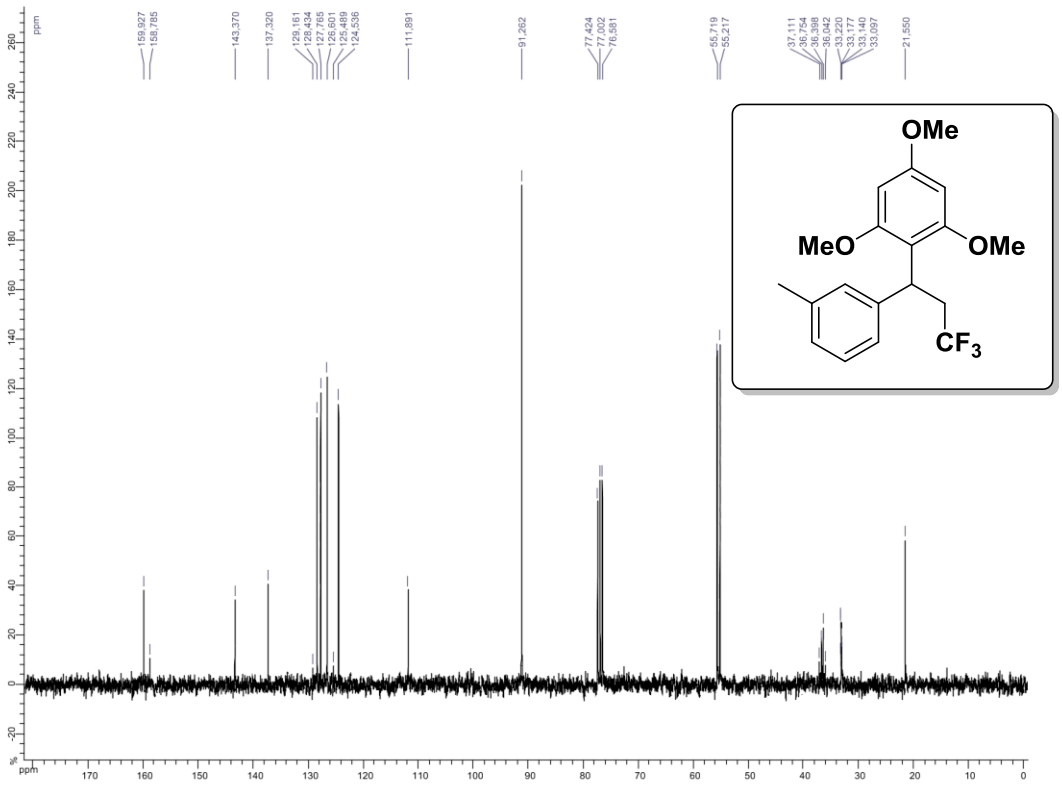
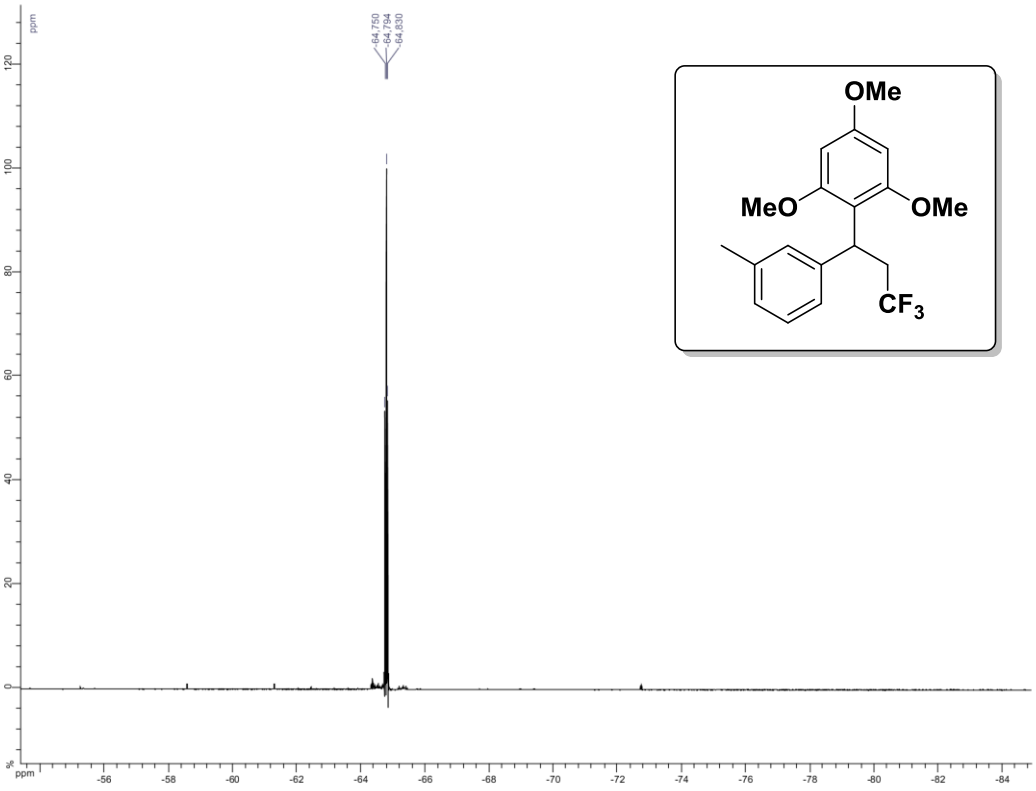
-74
-76
-78
-80
OMe
MeO
OMe
Cl
CF3

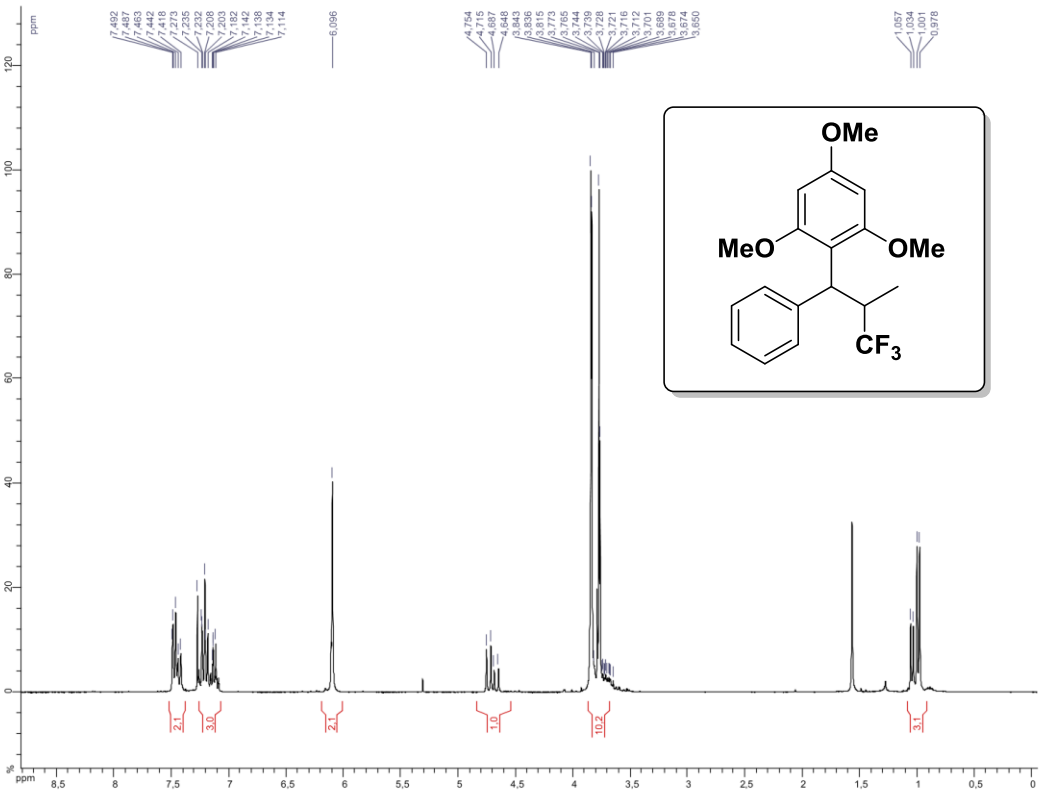
1,3,5-trimethoxy-2-(3,3,3-trifluoro-1-(m-tolyl)propyl)benzene 5f

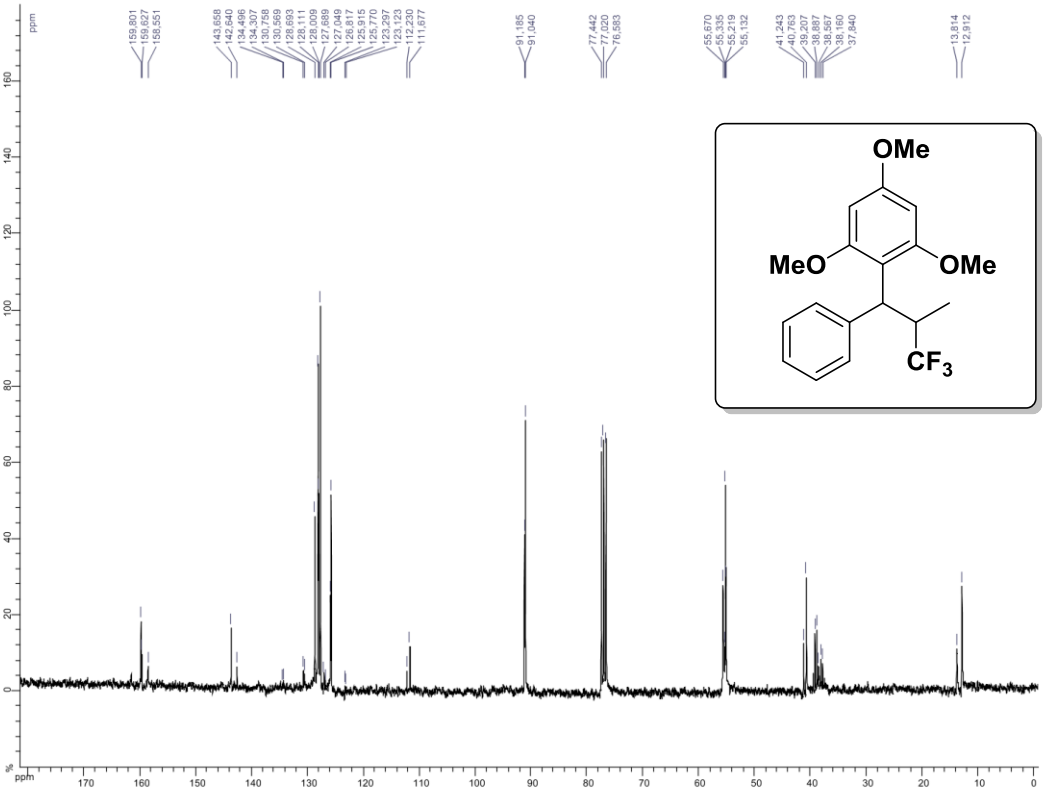


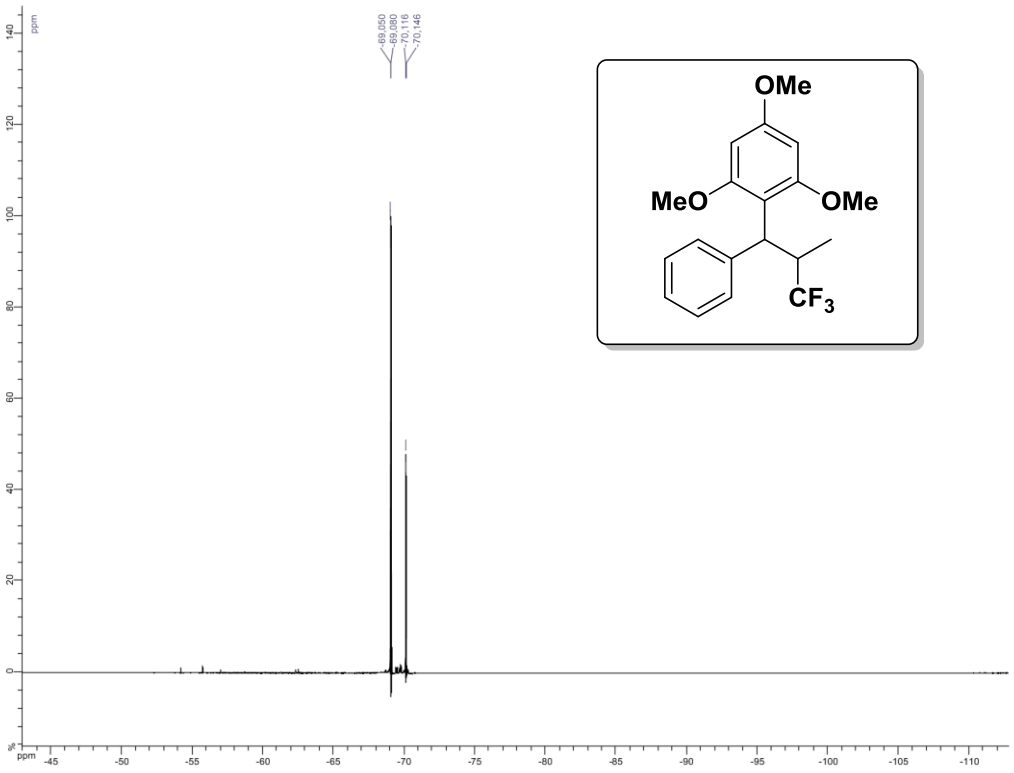



-64.750
-64.794
-64.830
OMe
MeO
OMe
CF3
ppm
-56
-58
-60
-62
-64
-66
-68
-70
-72
-74
-76
-78
-80
-82
-84

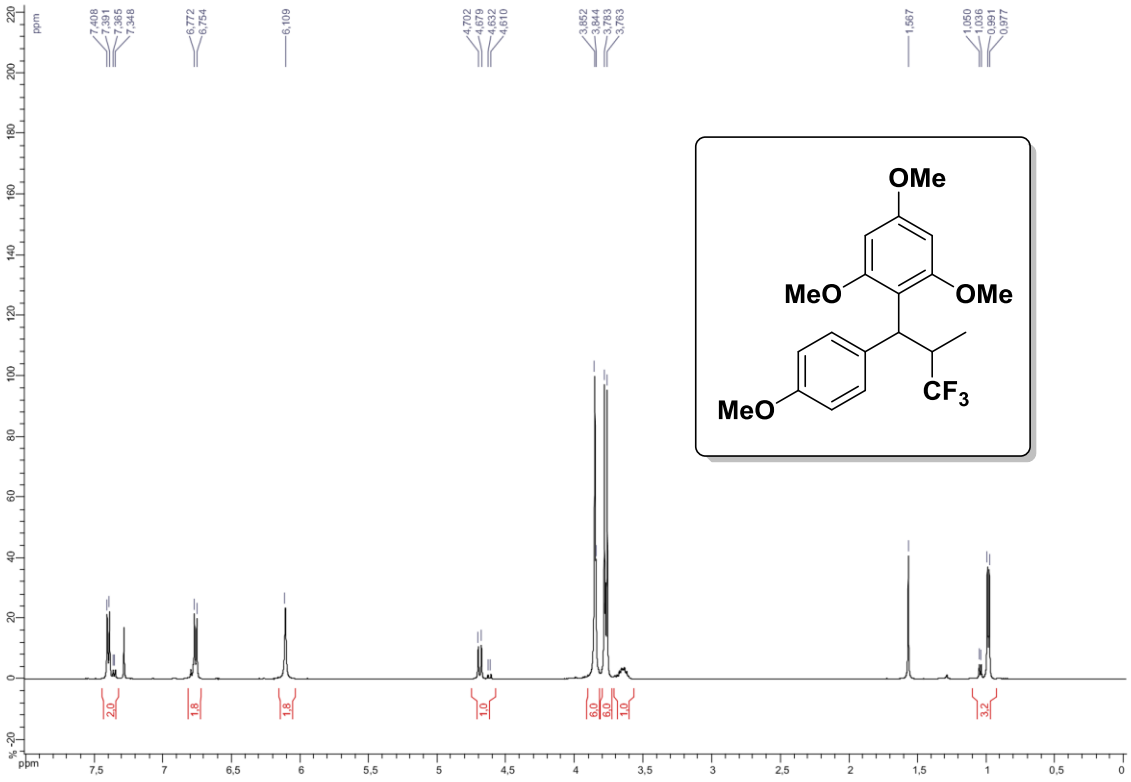
1-3-5-trimethoxy-2-(3,3,3-trifluoro-2-methyl-1-phenylpropyl)benzene 5g

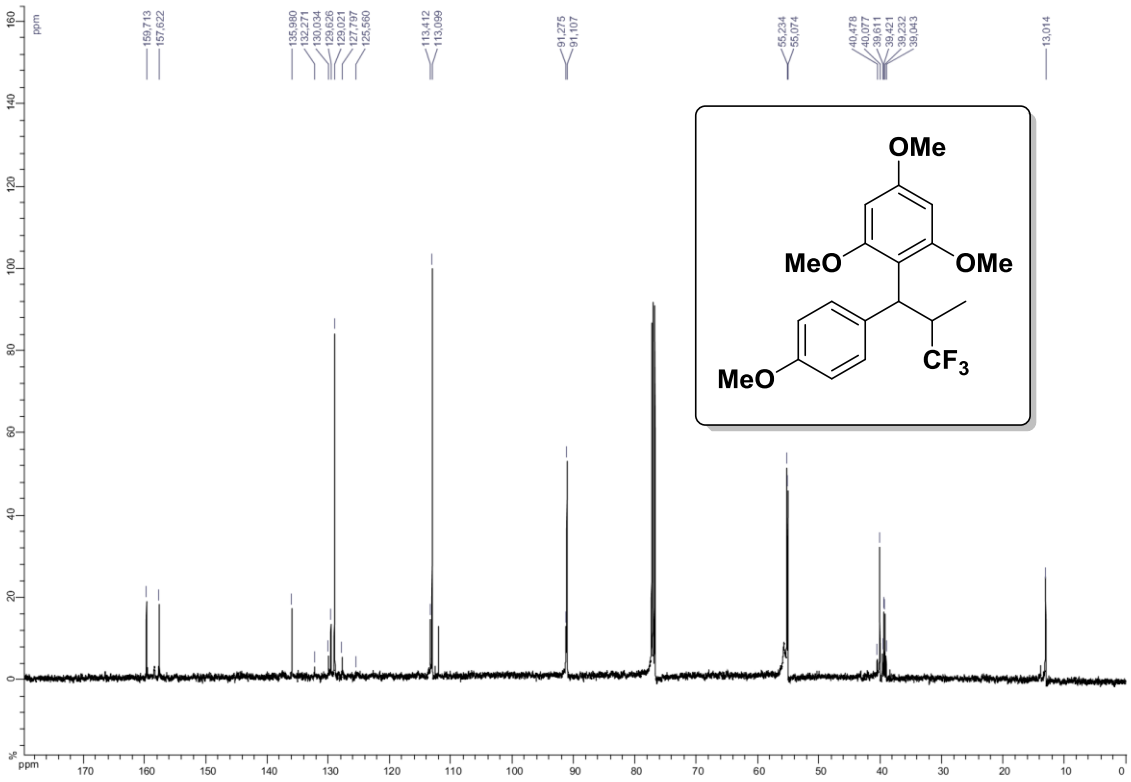


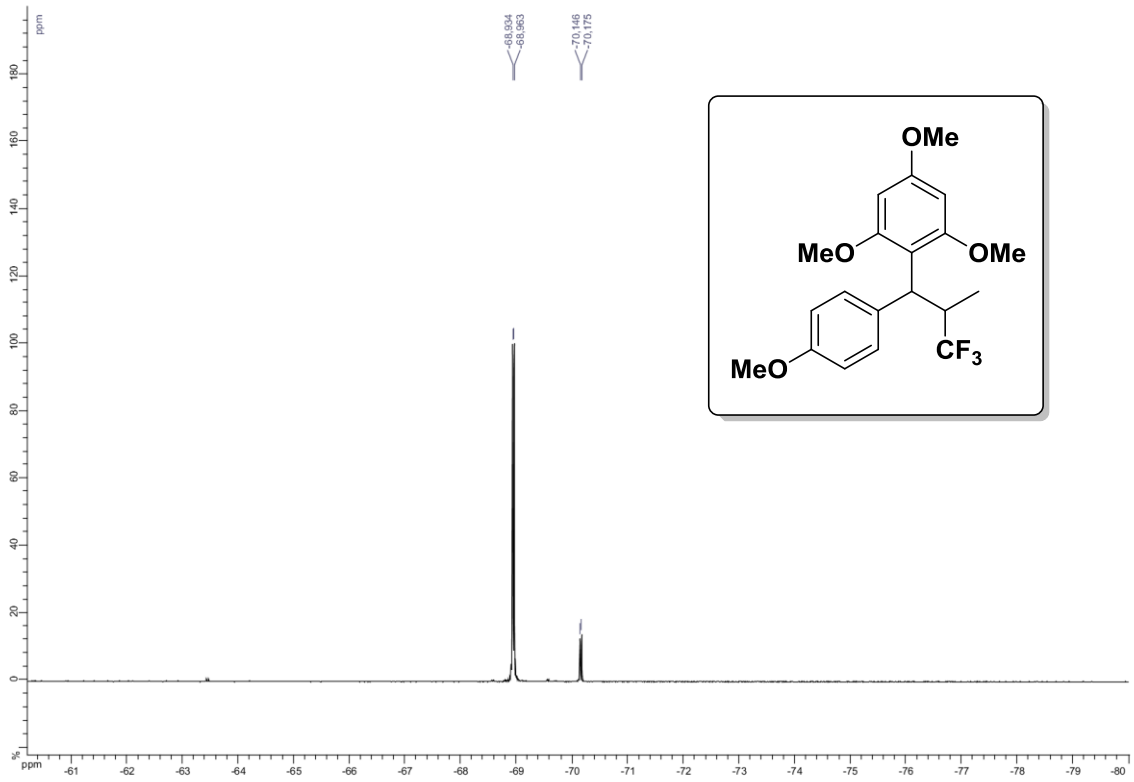



69.050
69.080
70.116
70.146
ppm
140
120
100
80
60
40
20
0
%
ppm
-45
-50
-55
-60
-65
-70
-75
-80
-85
-90
-95
-100
-105
-110
OMe
MeO
OMe
CF3

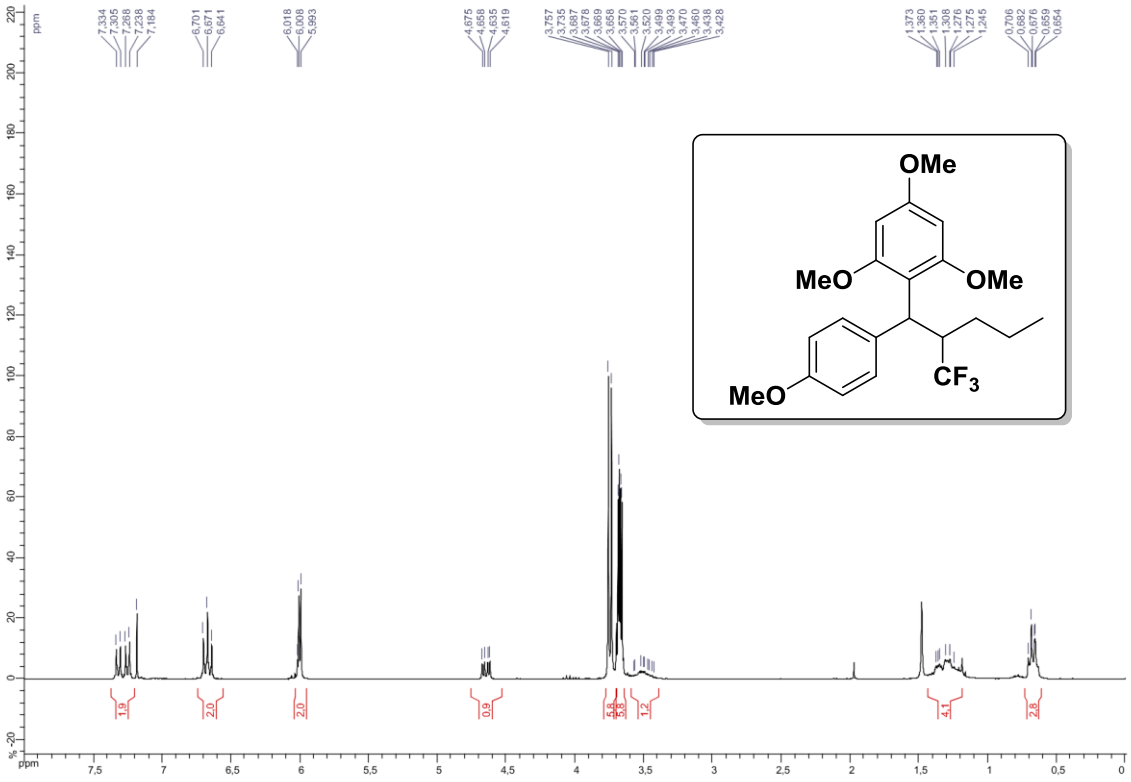
1,3,5-trimethoxy-2-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzene) 5h

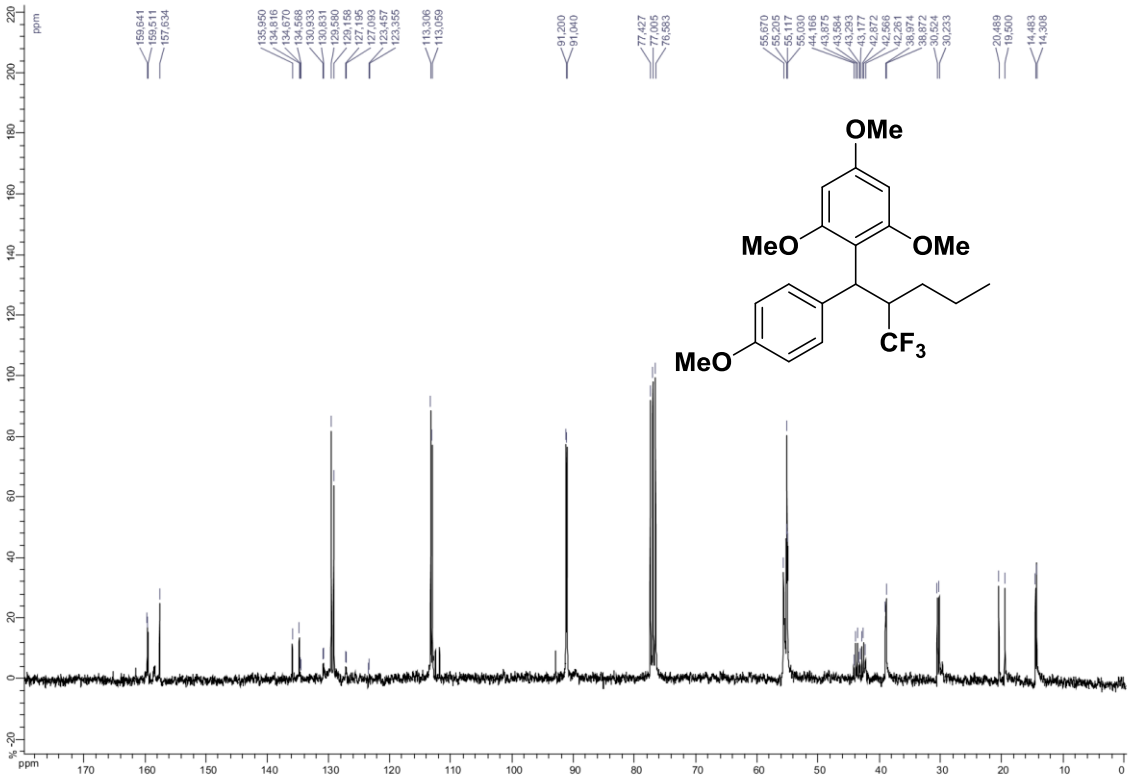




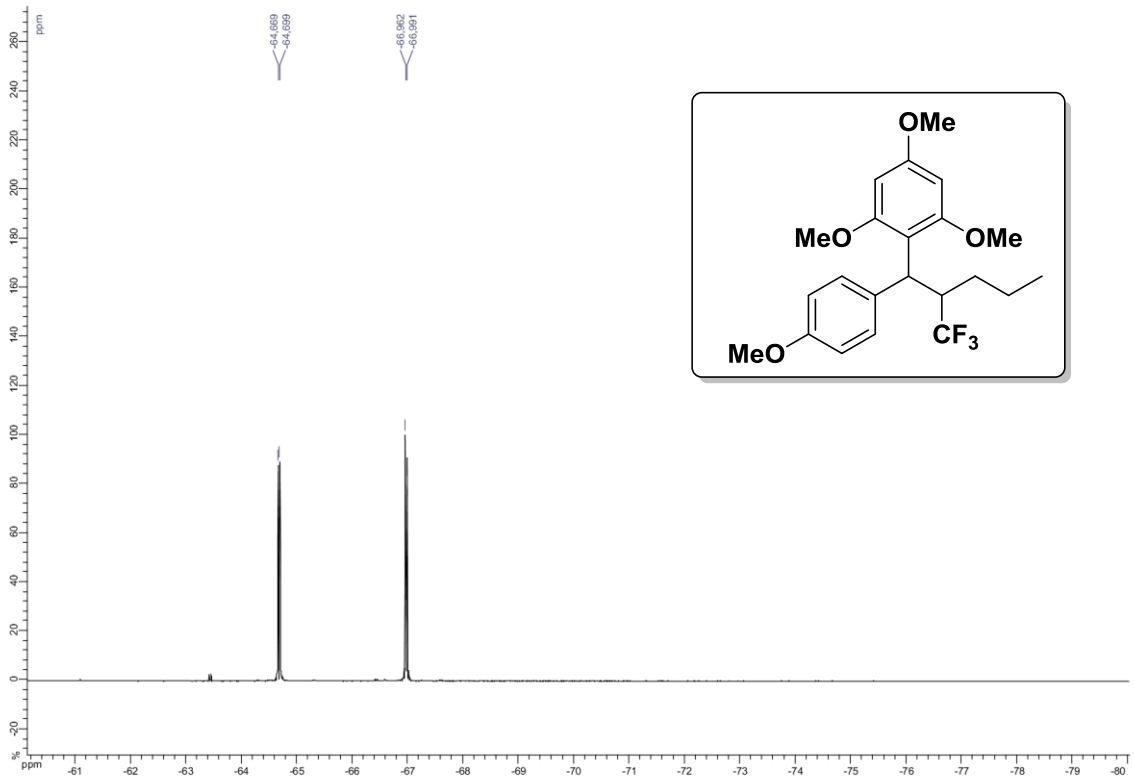

ppm
-68.934
-68.953
-70.146
-70.175
OMe
MeO
OMe
MeO
CF3
ppm
-61
-62
-63
-64
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
-76
-77
-78
-79
-80

1,3,5-trimethoxy-2-(1-(4-methoxyphenyl)-2-(trifluoromethyl)pentyl)benzene 5i

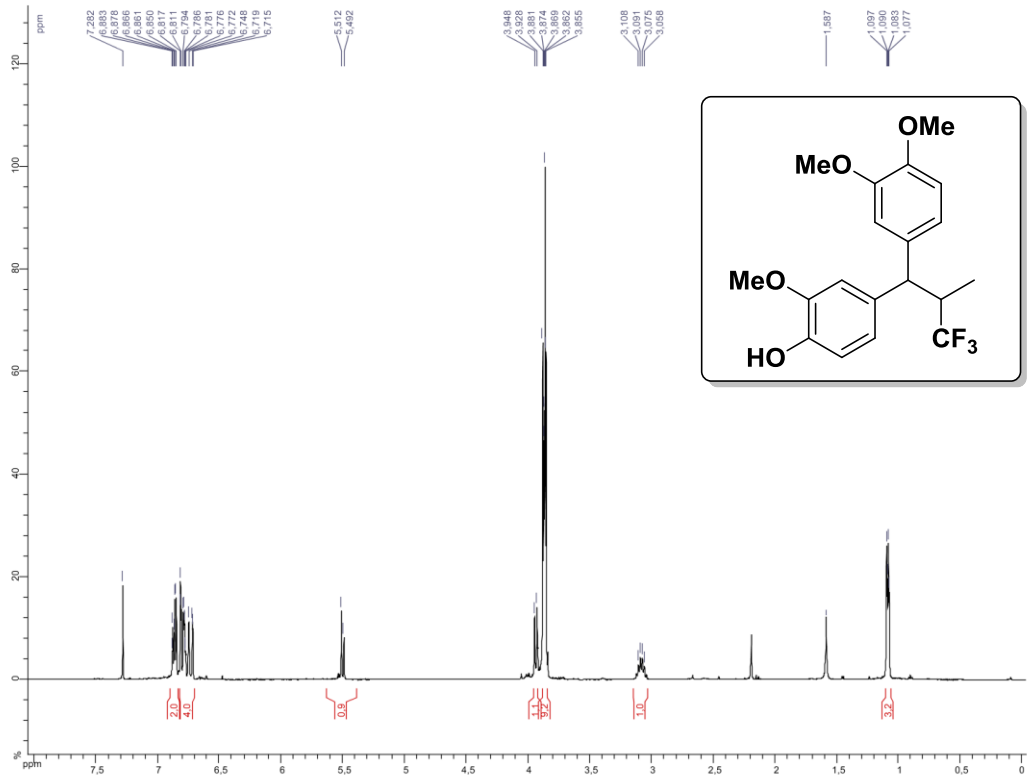


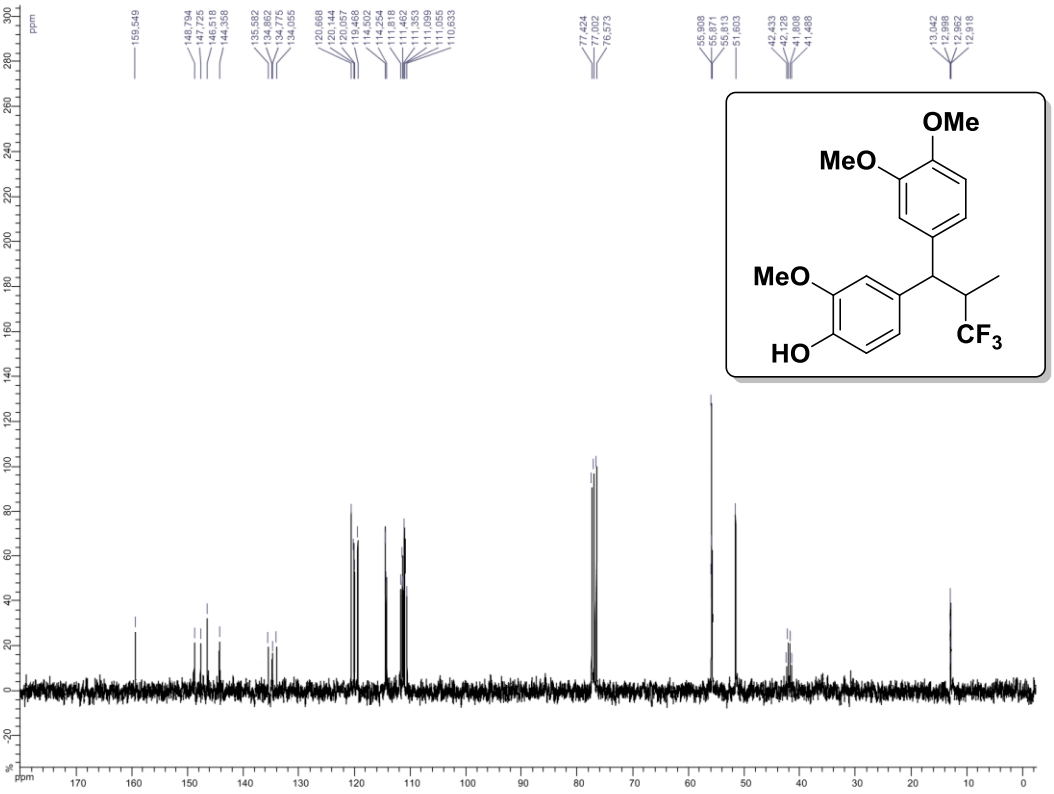


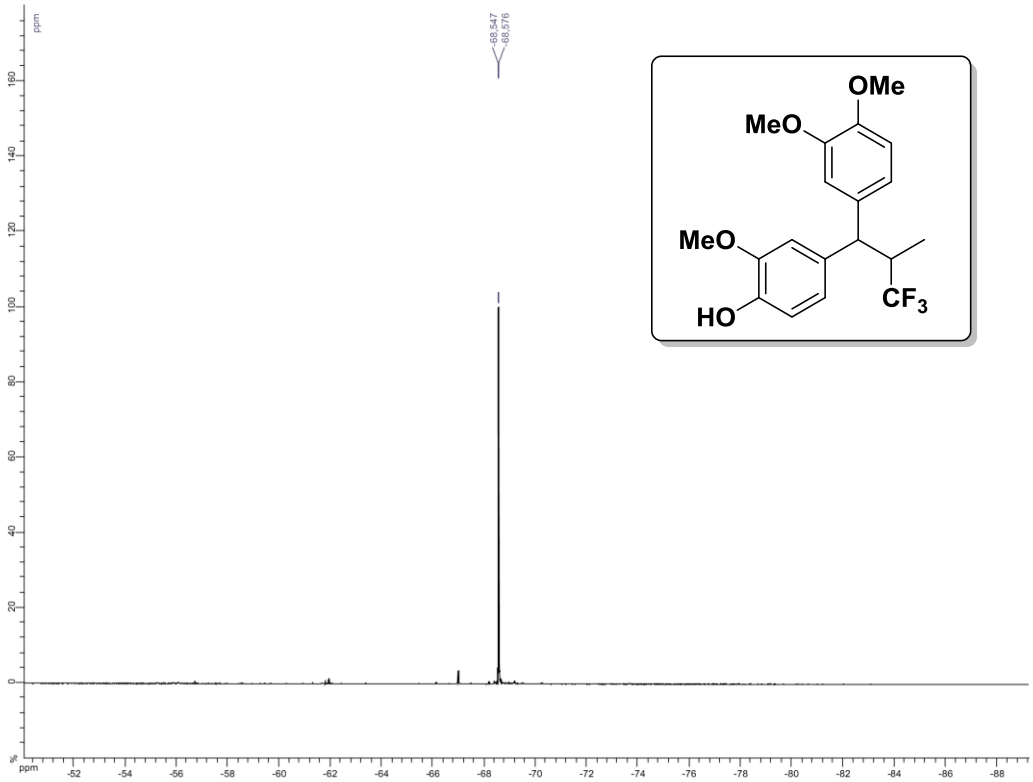
Me


-64.689
-64.699
-66.982
-66.991
ppm
OMe
MeO
OMe
CF3
MeO

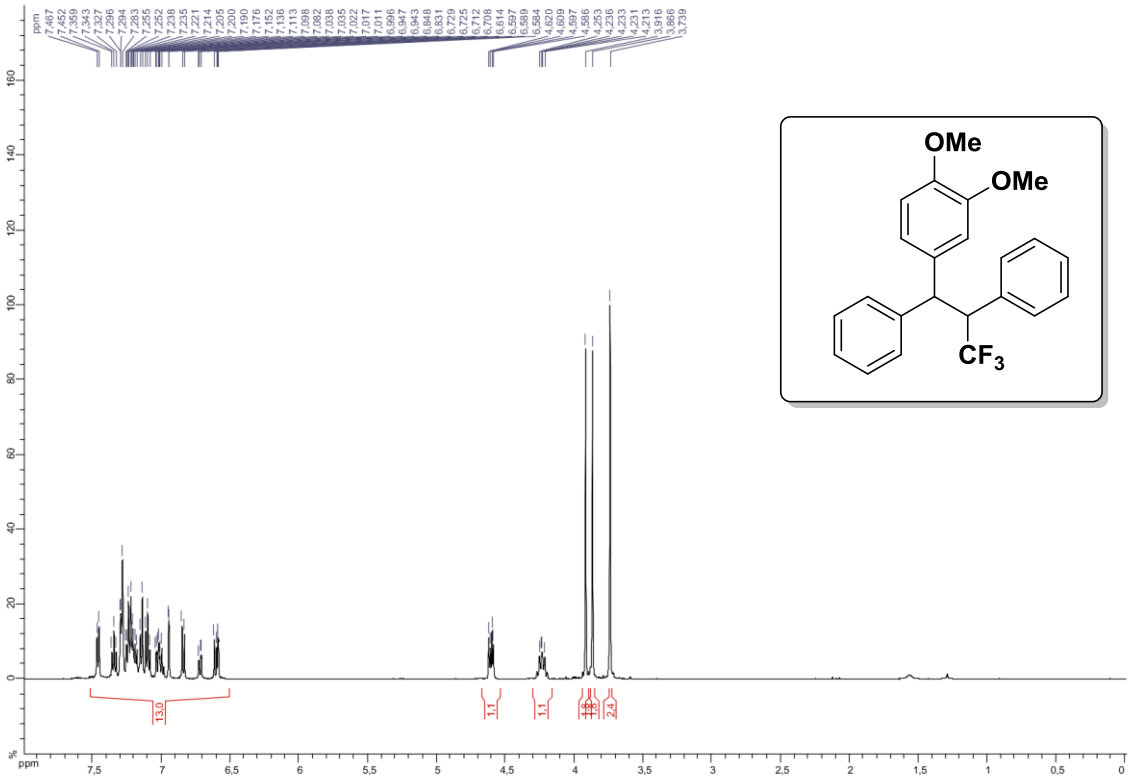
4-(1-(3,4-dimethoxyphenyl)-3,3,3-trifluoro-2-methylpropyl)-2-methoxyphenol 5j

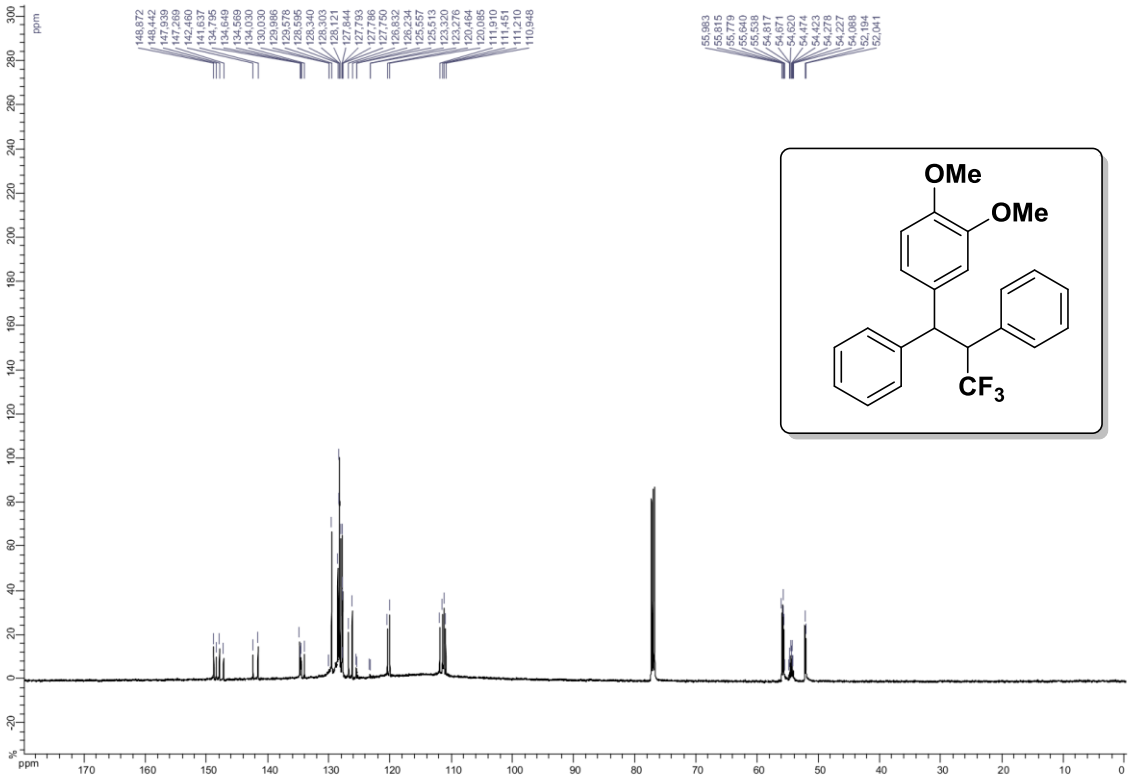


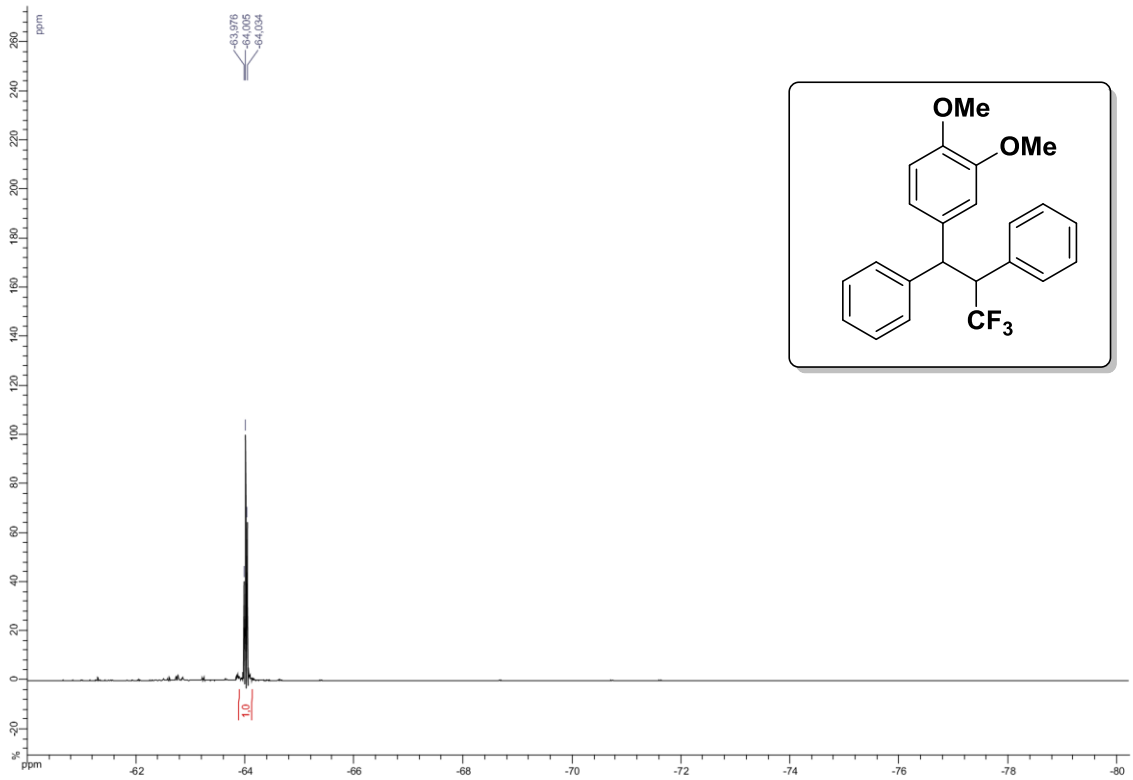



ppm
-68.547
-68.576
160
140
120
100
80
60
40
20
0
%
ppm
-52
-54
-56
-58
-60
-62
-64
-66
-68
-70
-72
-74
-76
-78
-80
-82
-84
-86
-88
OMe
MeO
MeO
HO
CF3

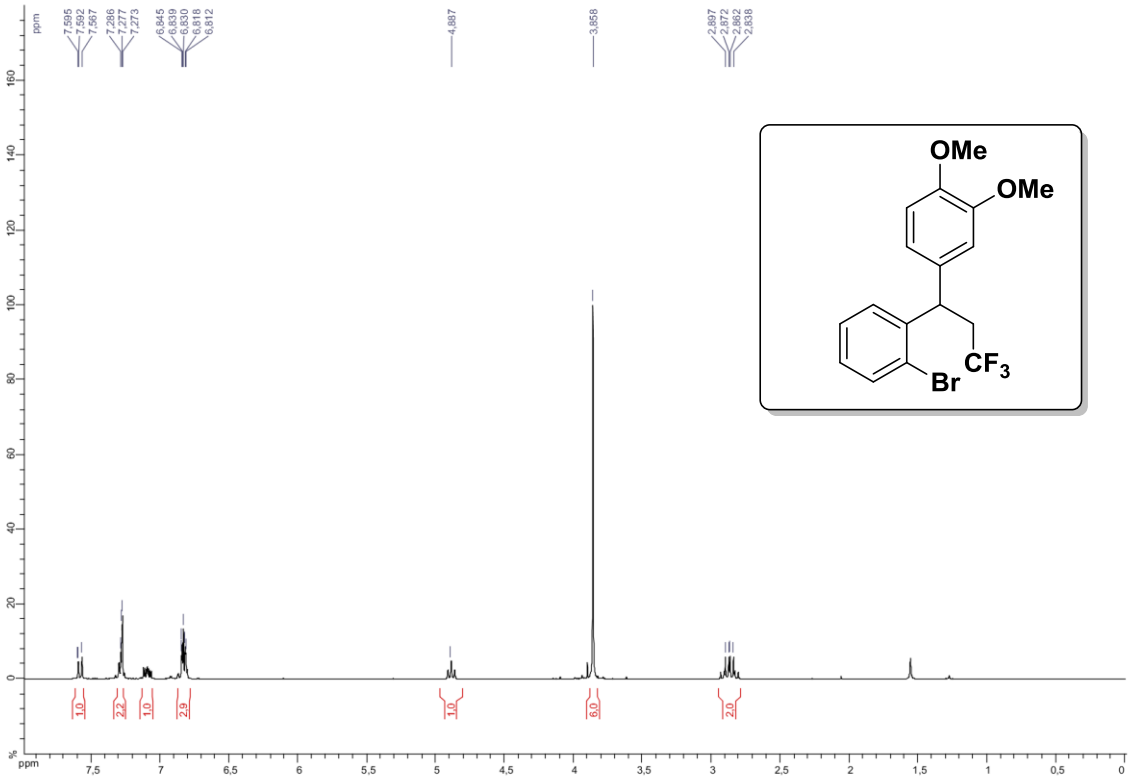
(1-(3,4-dimethoxyphenyl)-3,3,3-trifluoropropane)-1,2-diyl)dibenzene 5k

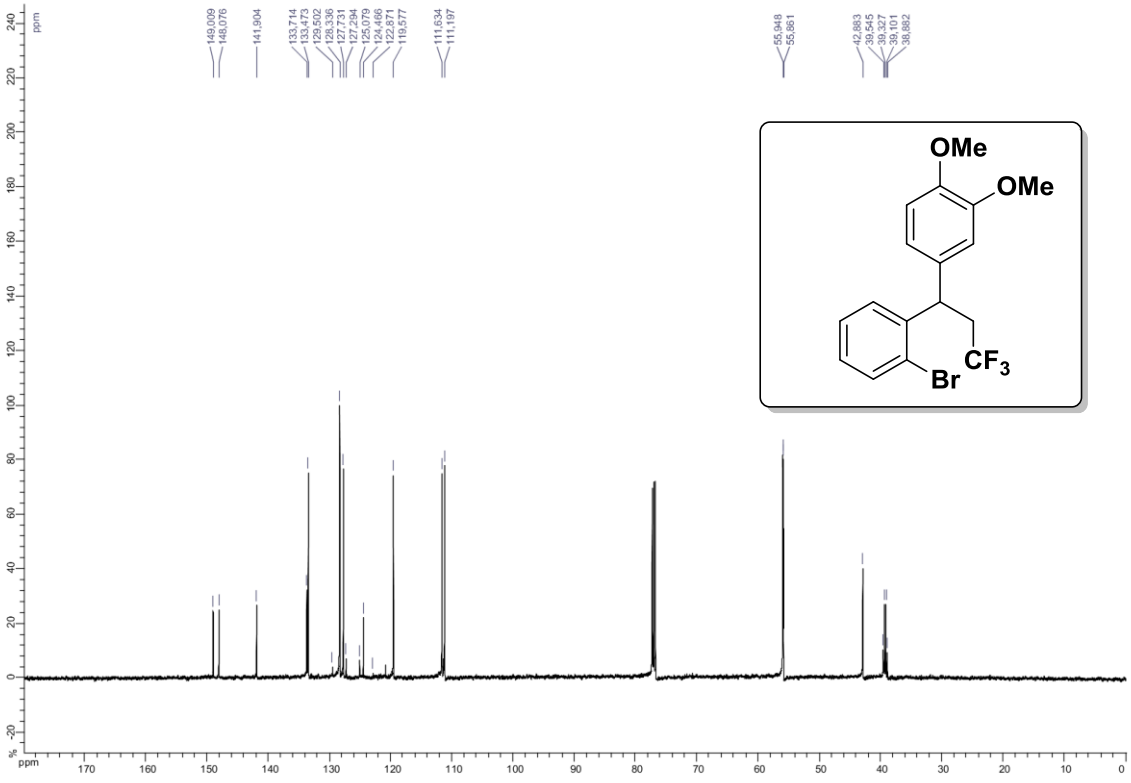


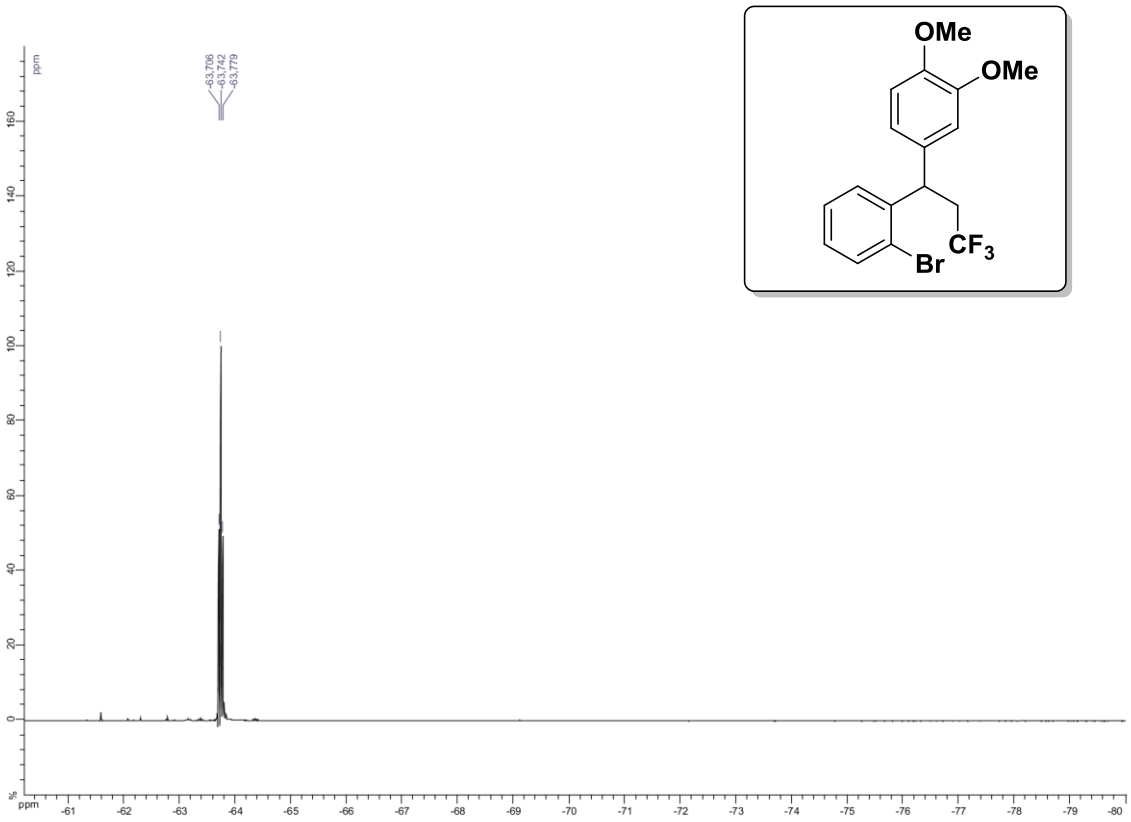



-63.976
-64.005
-64.034
1.0
ppm
-62
-64
-66
-68
-70
-72
-74
-76
-78
-80
OMe
OMe
CF3

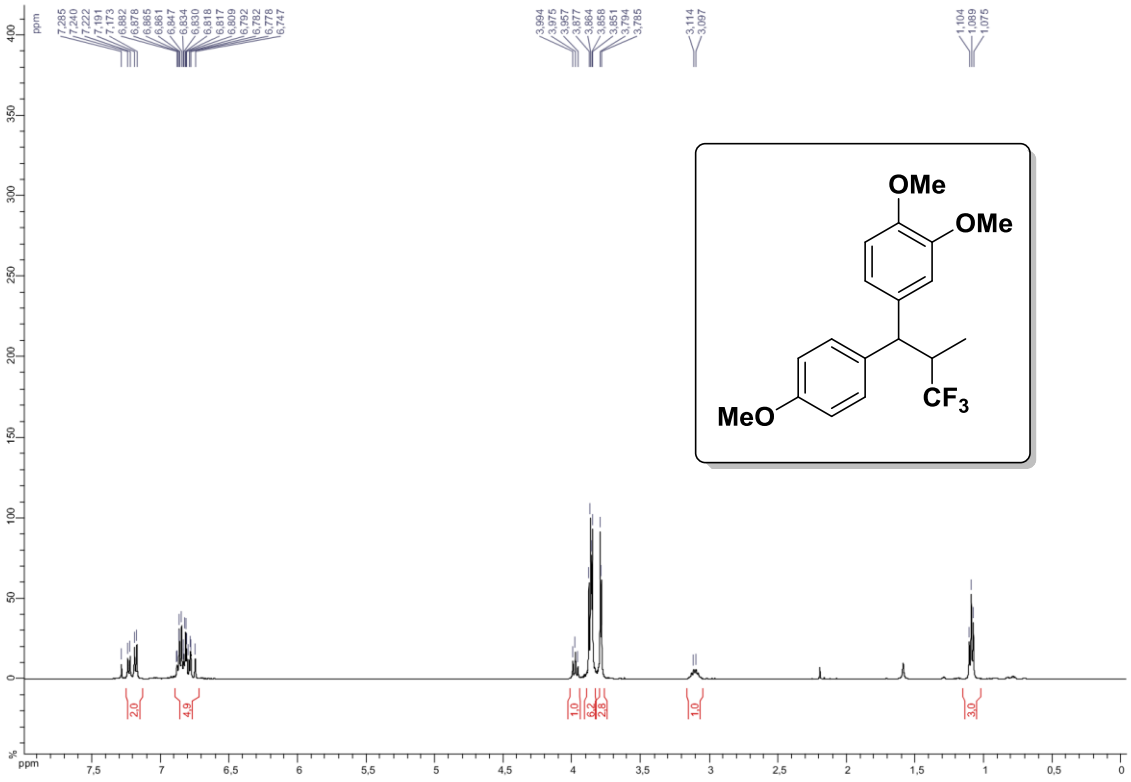
4-(1-(2-bromophenyl)-3,3,3-trifluoropropyl)-1,2-dimethoxybenzene 5l

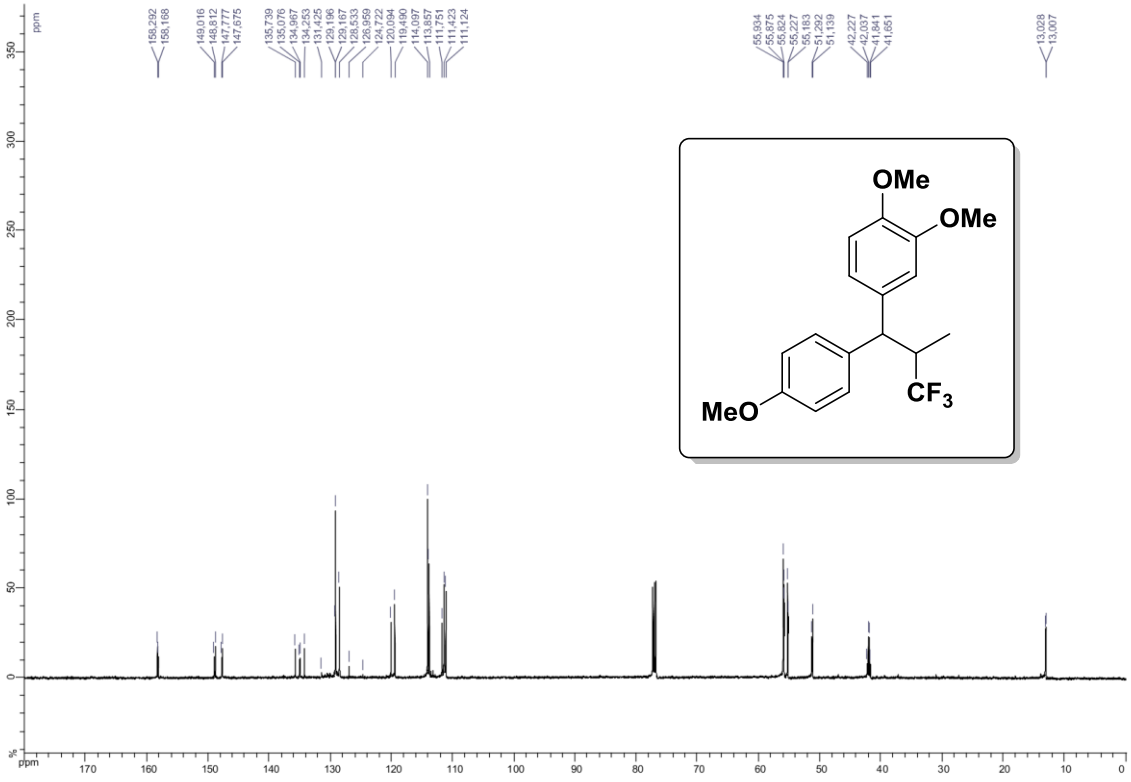


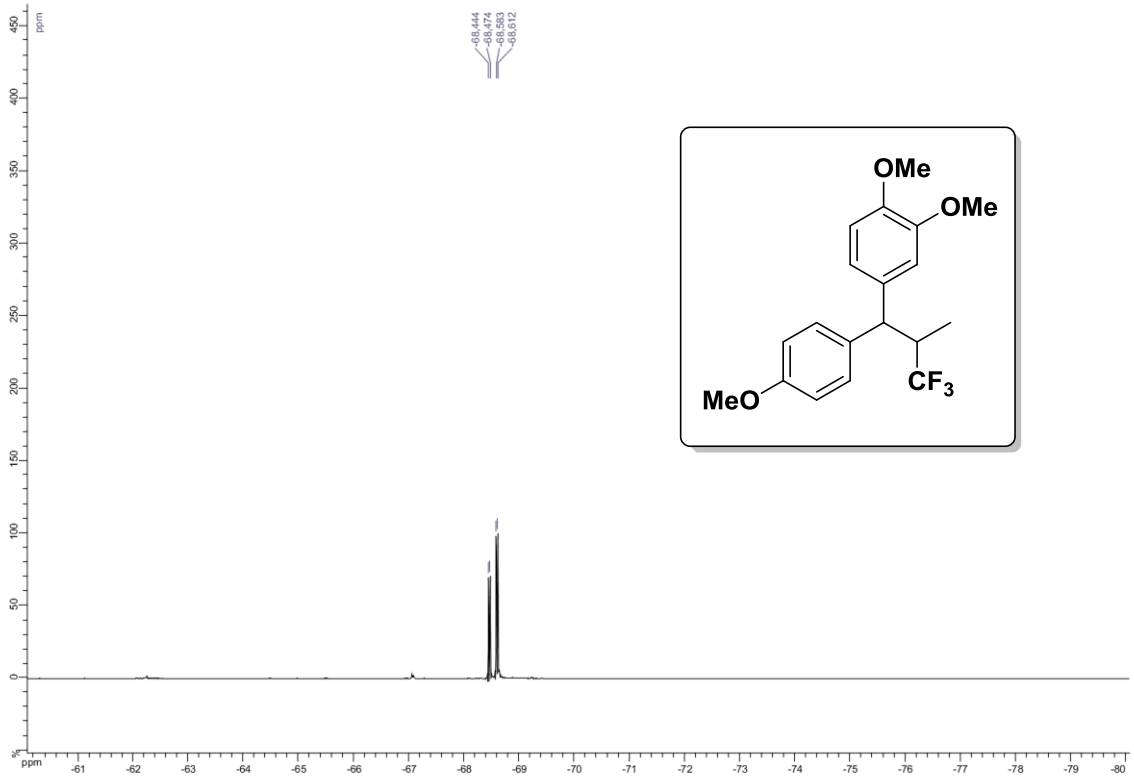



OMe
OMe
CF3
Br
-63.706
-63.742
-63.779
ppm
160
140
120
100
80
60
40
20
0
-61
-62
-63
-64
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
-76
-77
-78
-79
-80

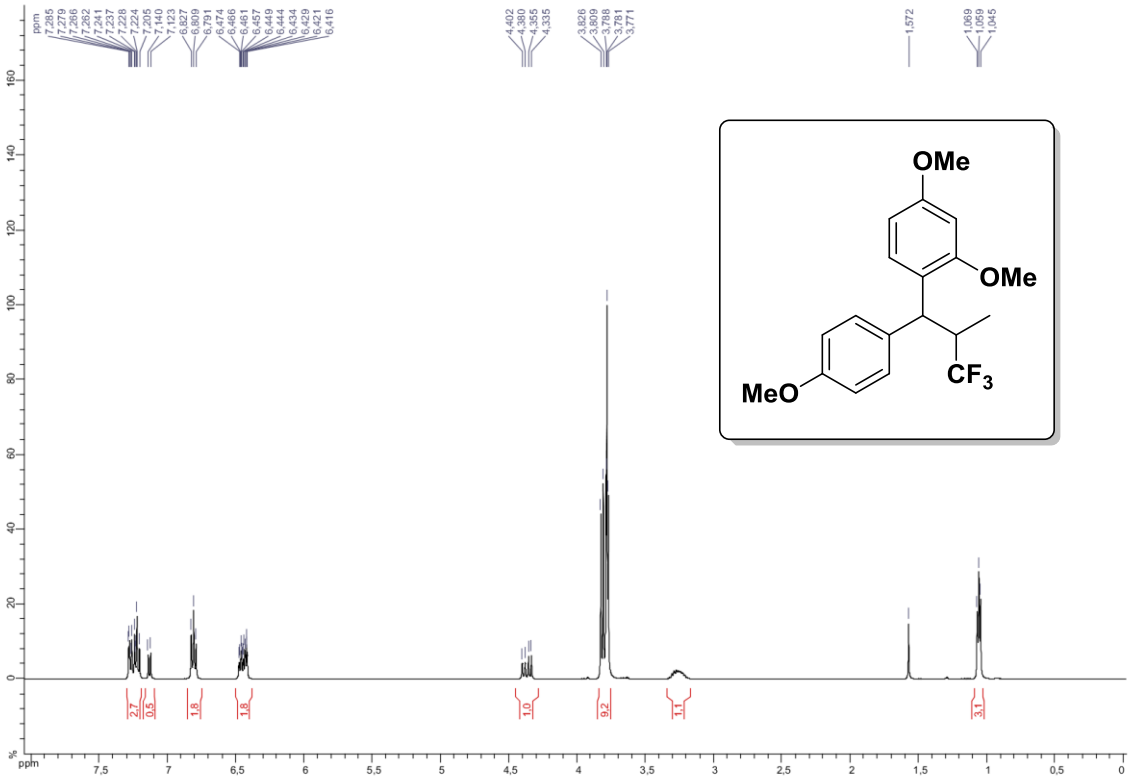
1,2-dimethoxy-4-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzene) 5m

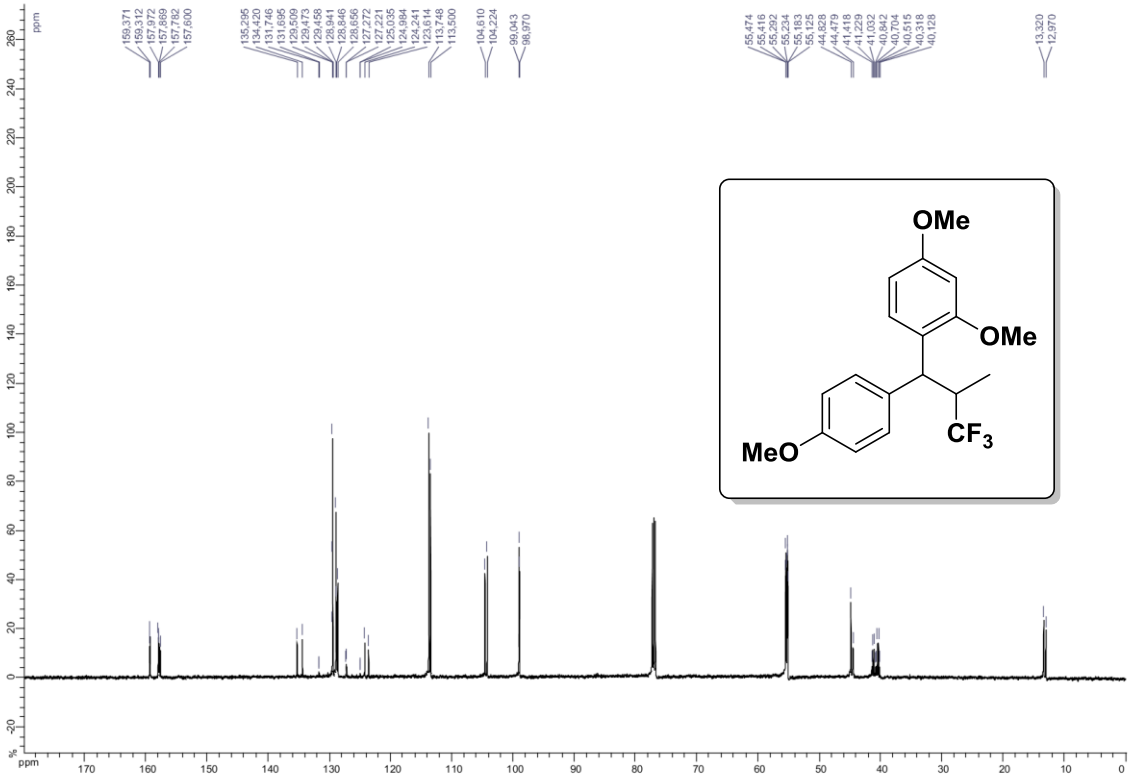


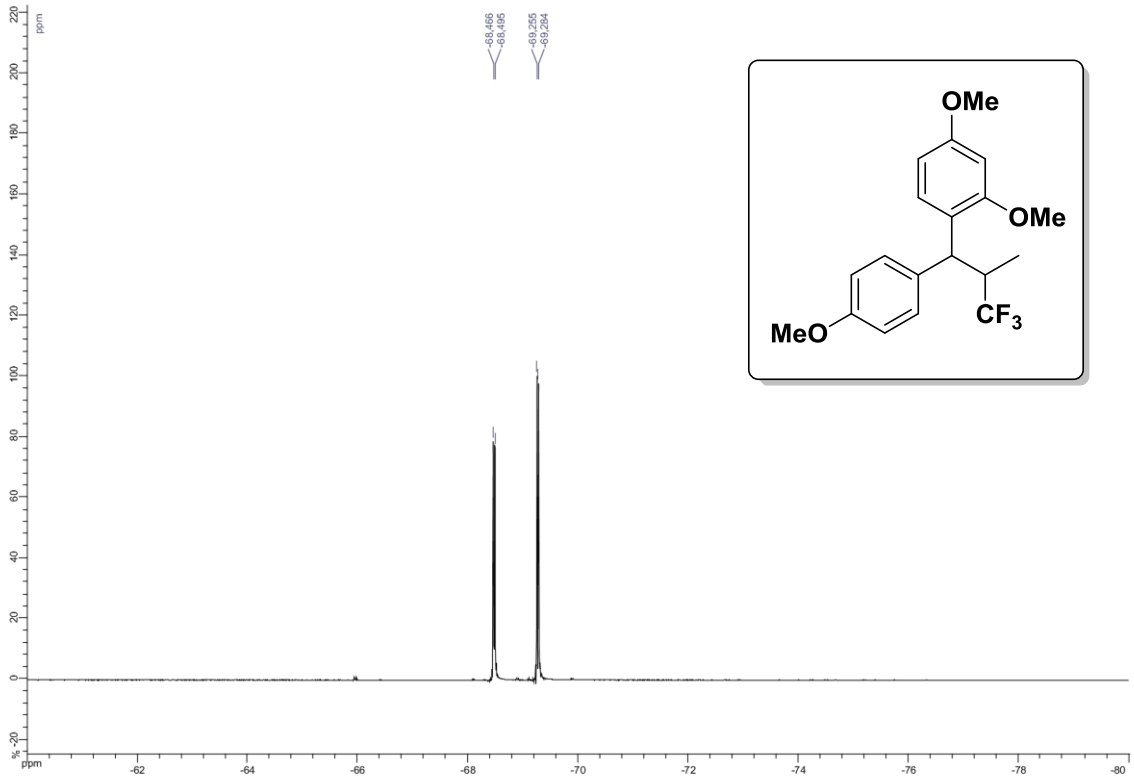



-68.444
-68.474
-68.583
-68.612
OMe
OMe
MeO
CF3
ppm

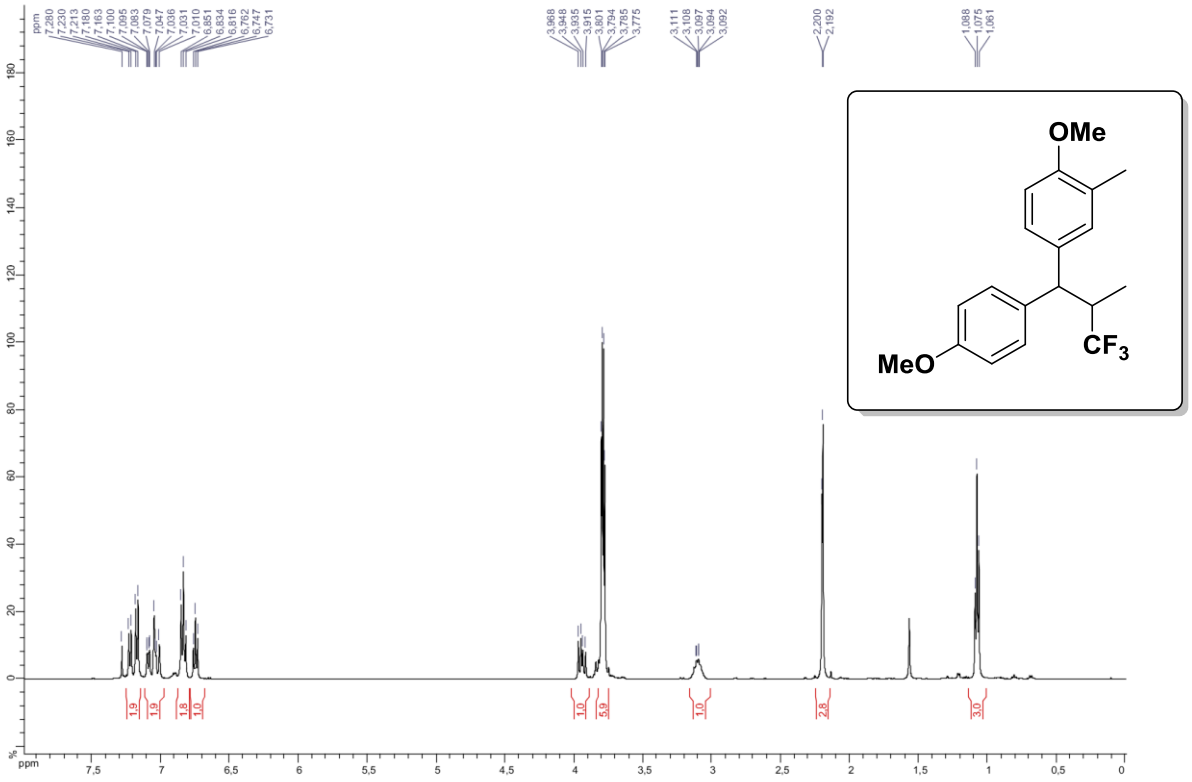
2,4-dimethoxy-1-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzene) 5n

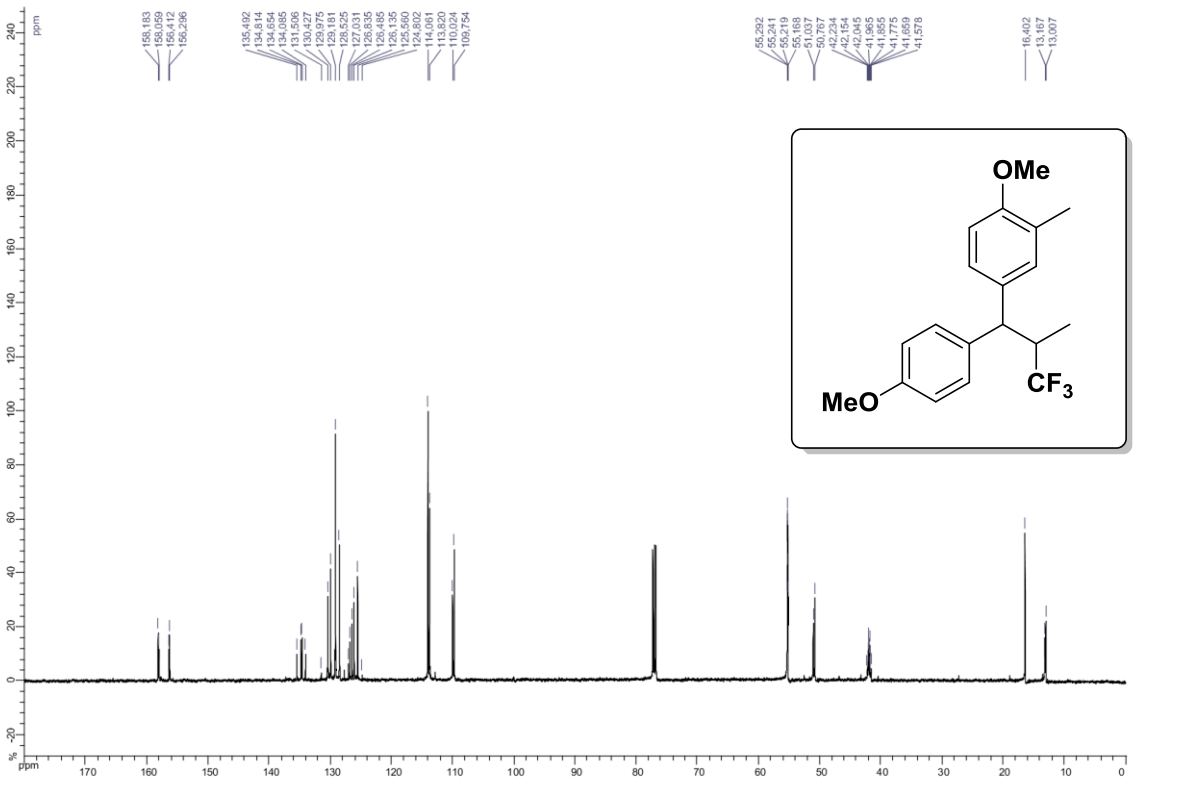


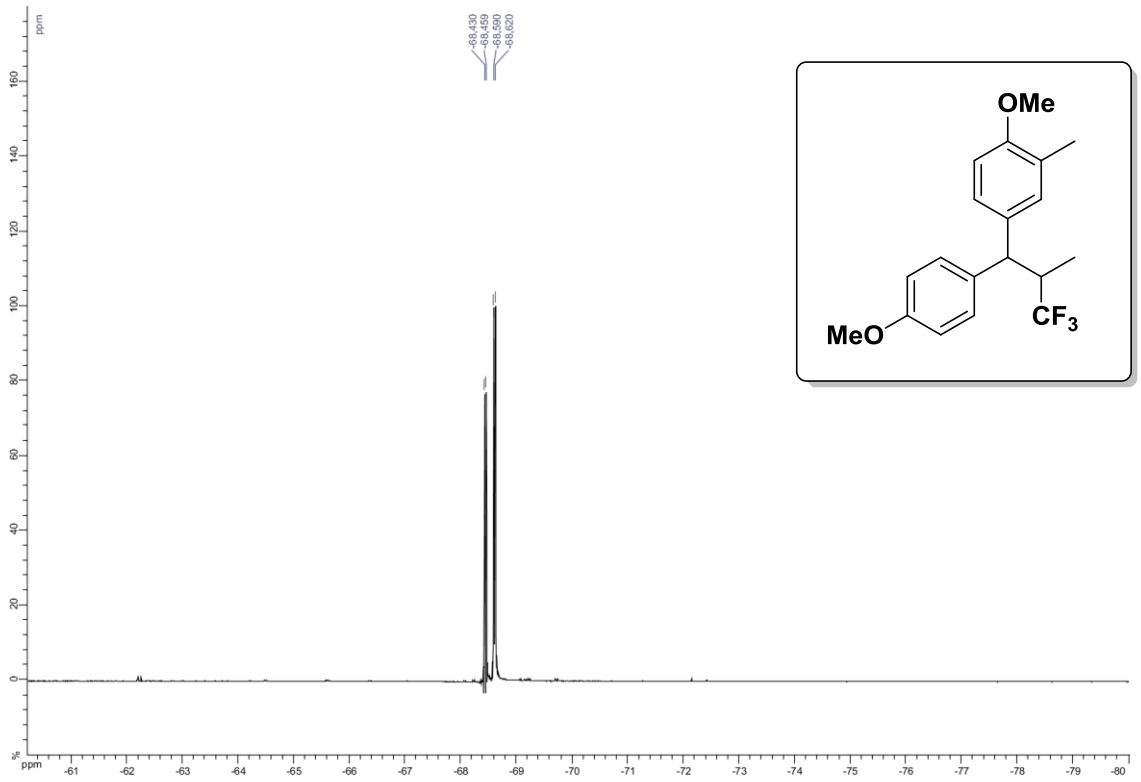



-68.466
-68.495
-69.255
-69.284
OMe
OMe
MeO
CF3
ppm
-62
-64
-66
-68
-70
-72
-74
-76
-78
-80

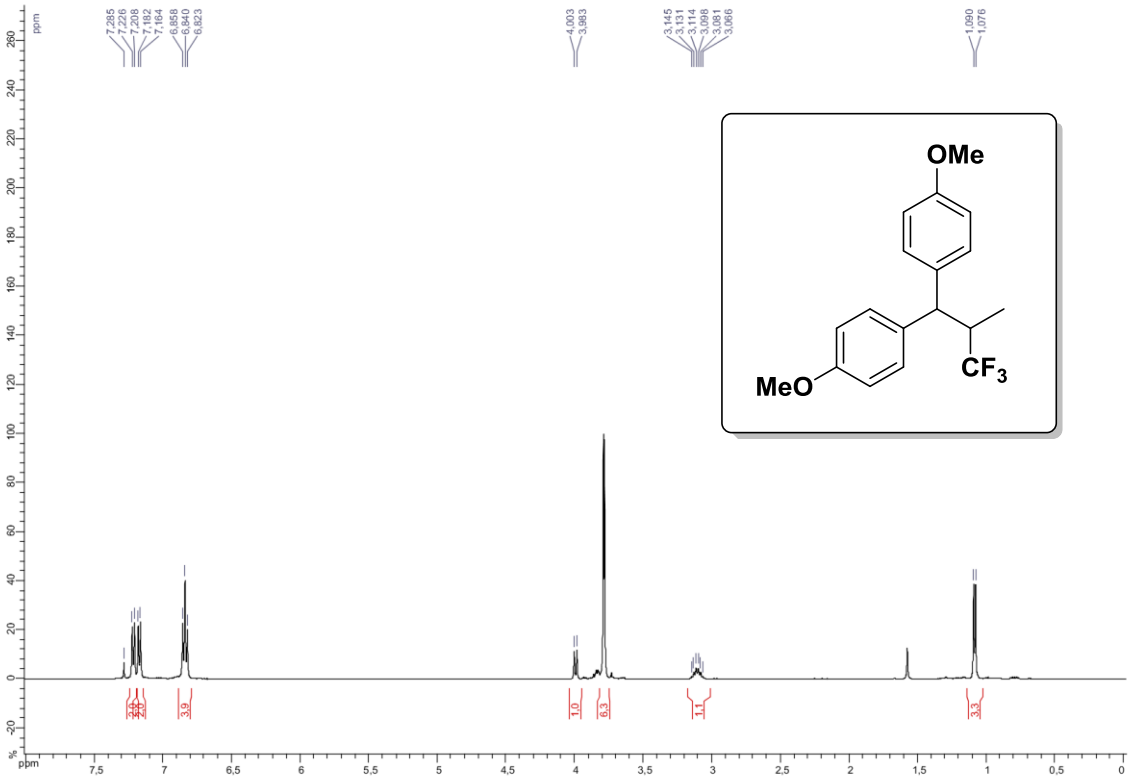
1-methoxy-2-methyl-4-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzene) 5o

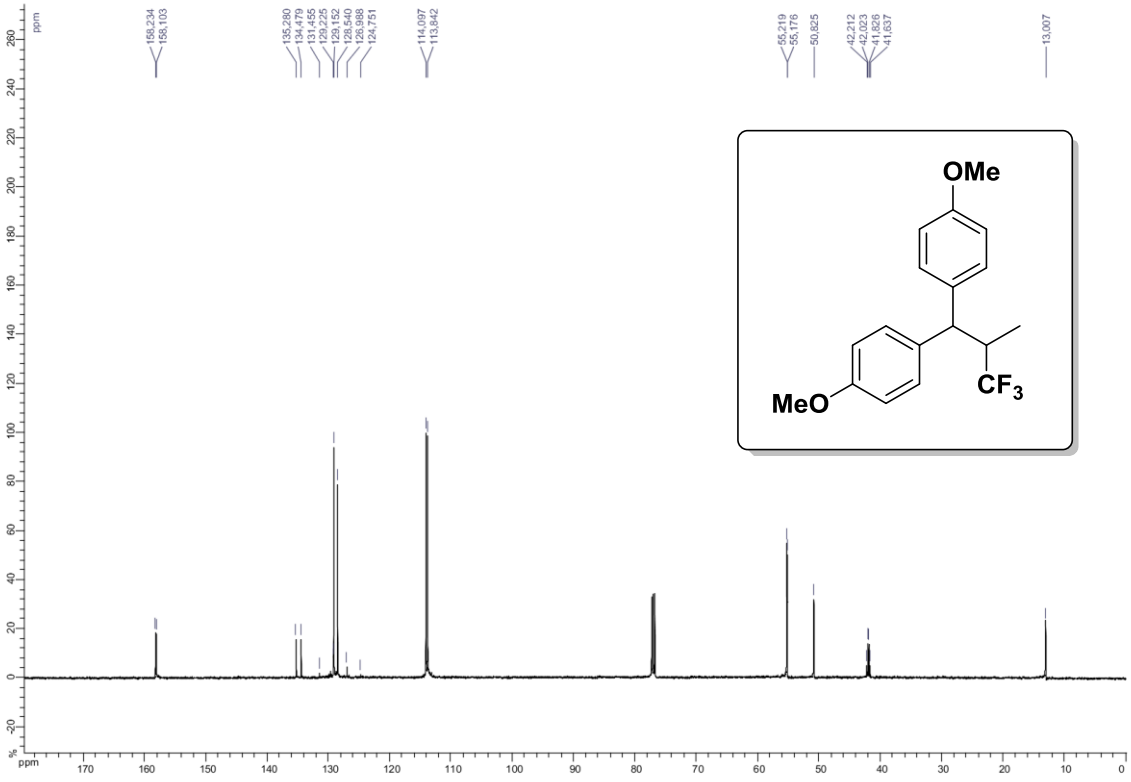


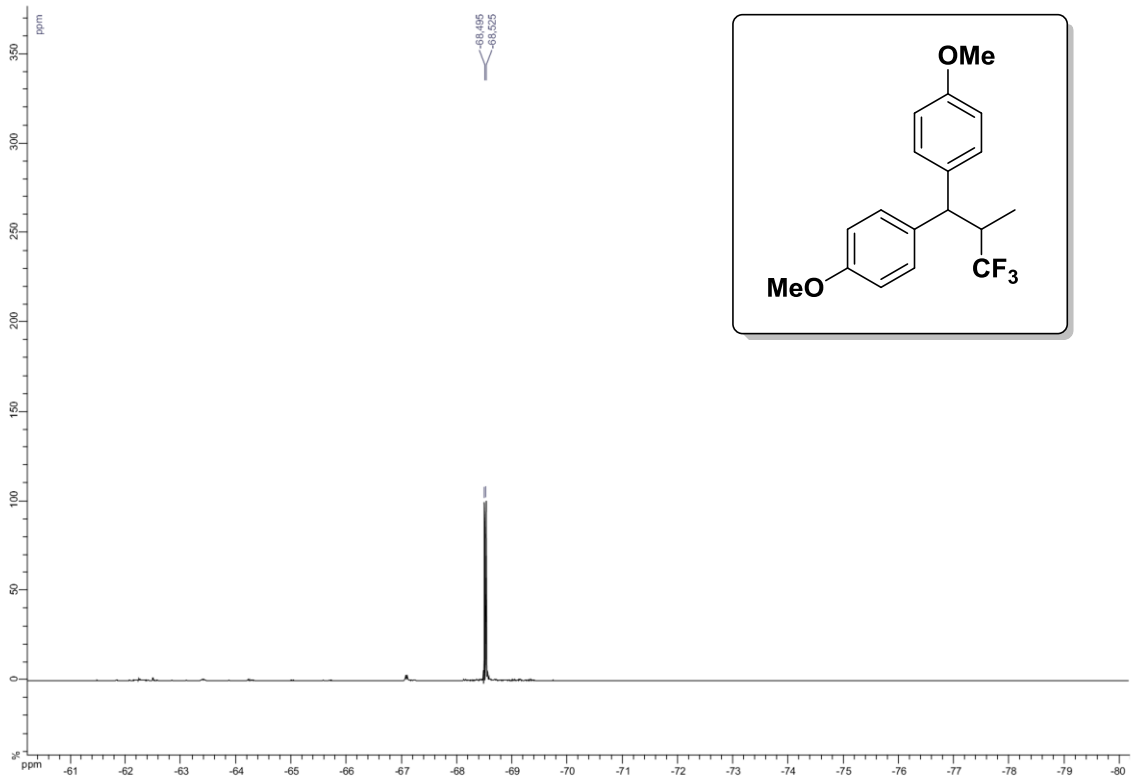



-68,430
-68,459
-68,590
-68,620
ppm
160
140
120
100
80
60
40
20
0
-61
-62
-63
-64
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
-76
-77
-78
-79
-80
OMe
MeO
CF3

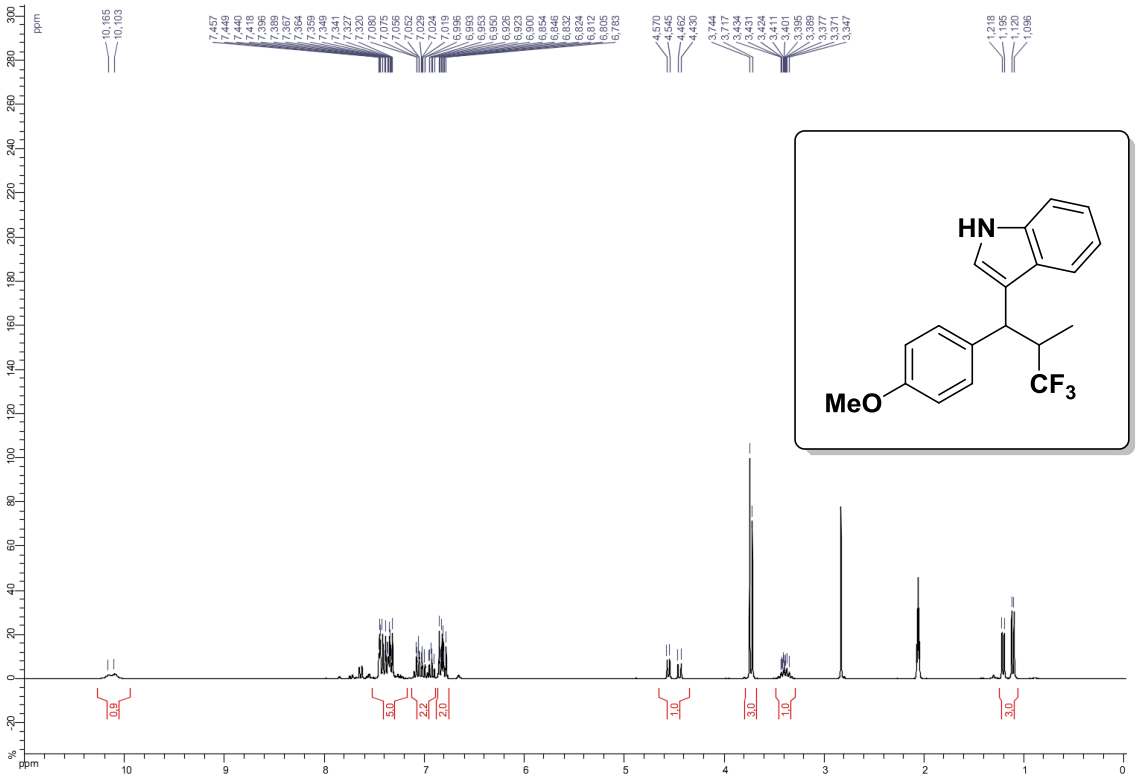
4,4’-(3,3,3-trifluoro-2-methylpropane-1,1-diyl)bis(methoxybenzene) 5p

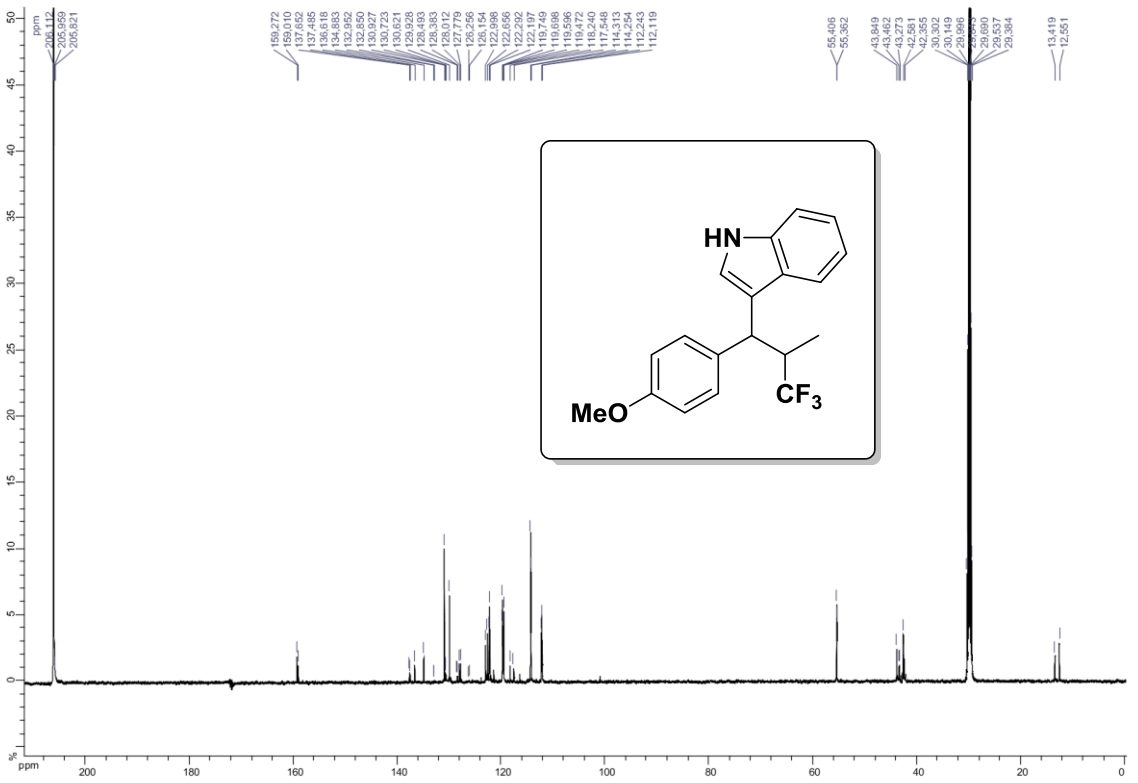


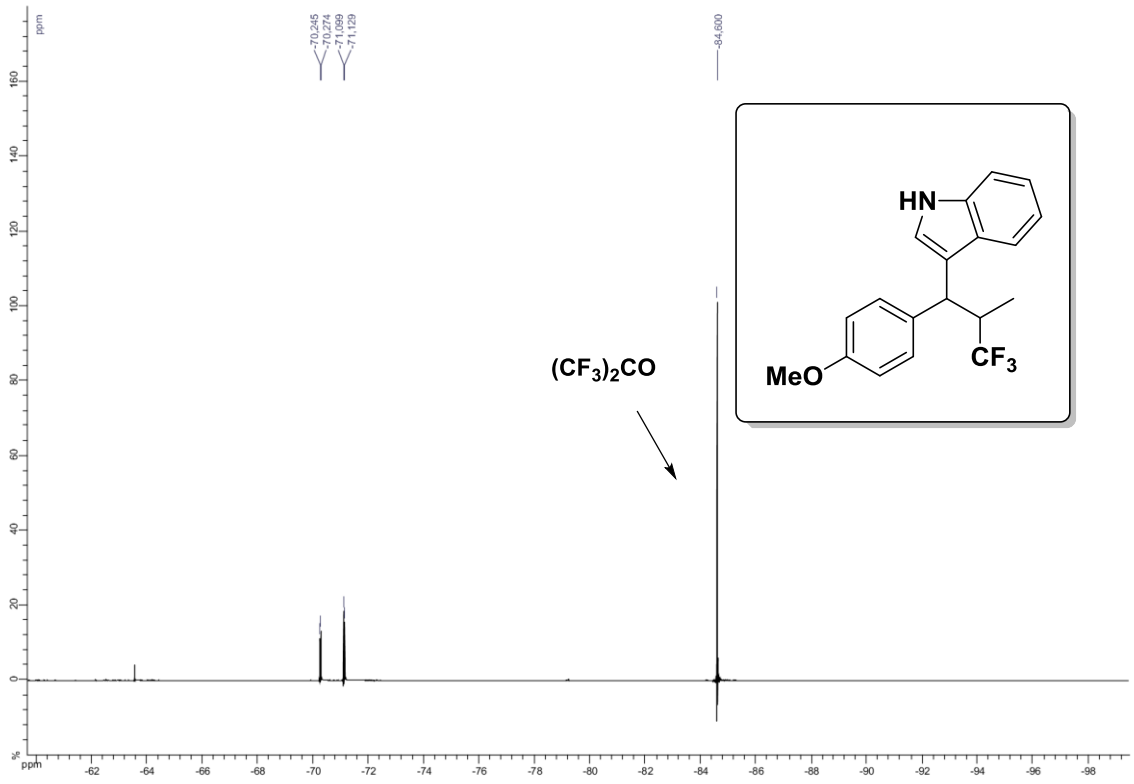



ppm
-68.495
-68.525
350
300
250
200
150
100
50
0
ppm
-61
-62
-63
-64
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
-76
-77
-78
-79
-80
OMe
MeO
CF3

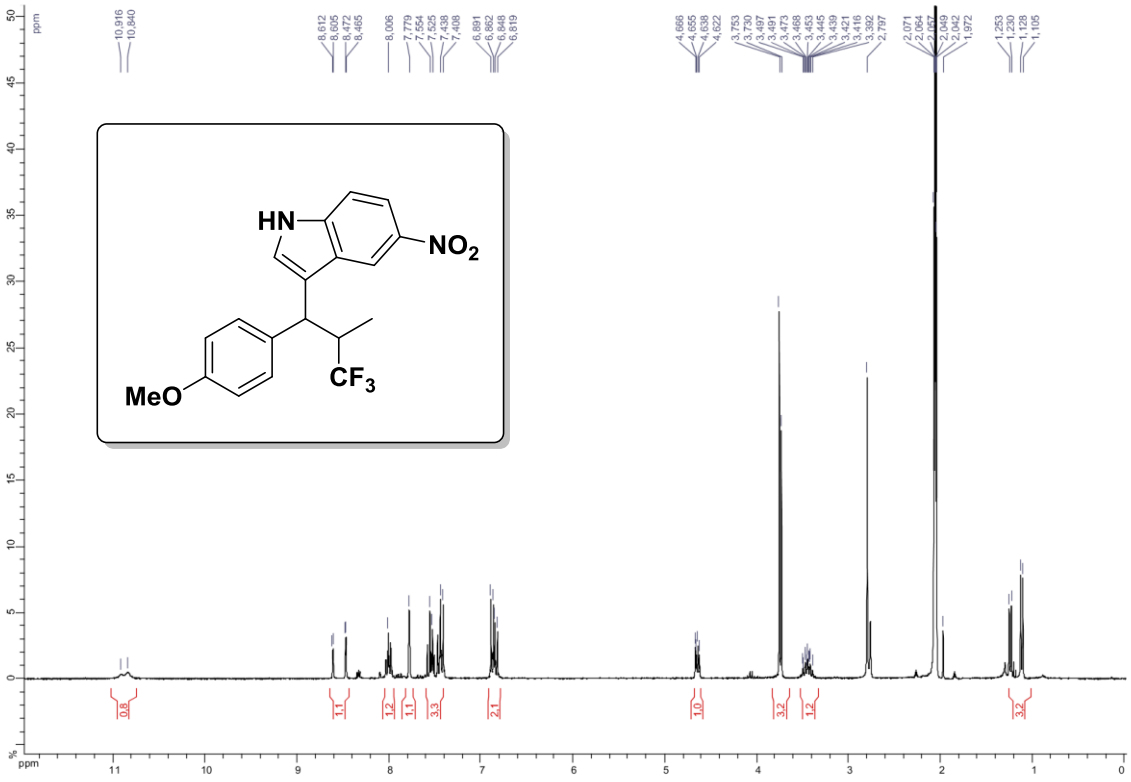
3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5q

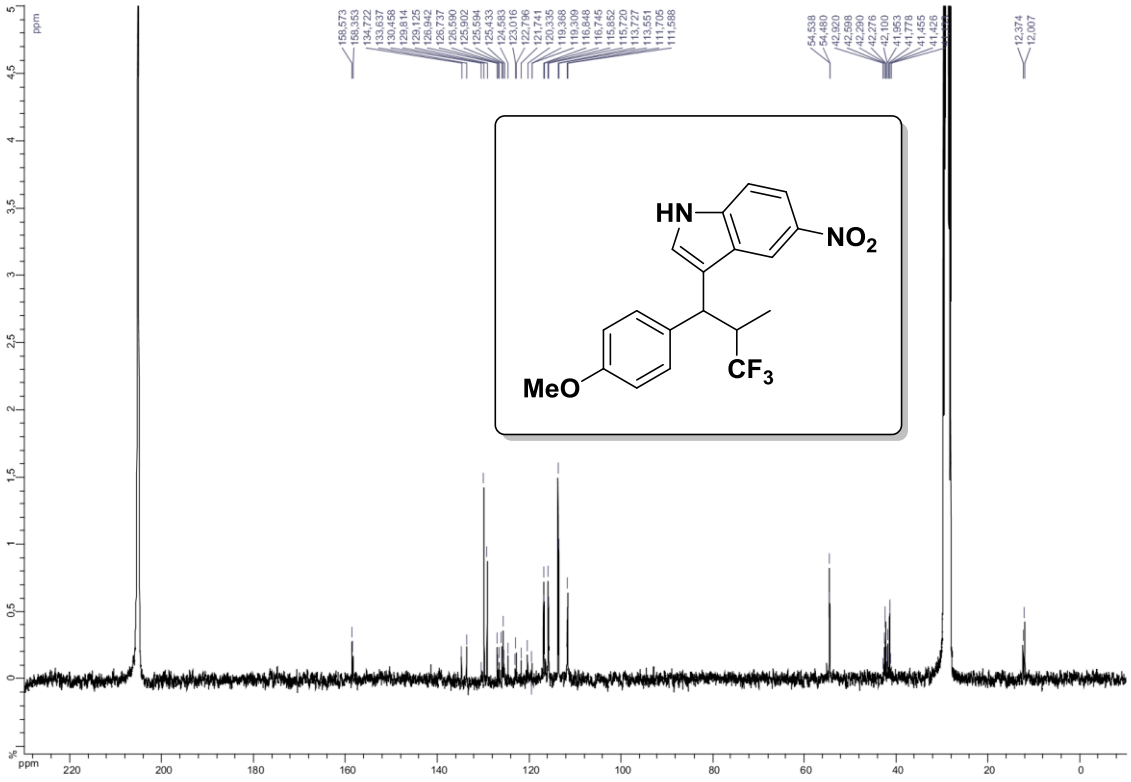


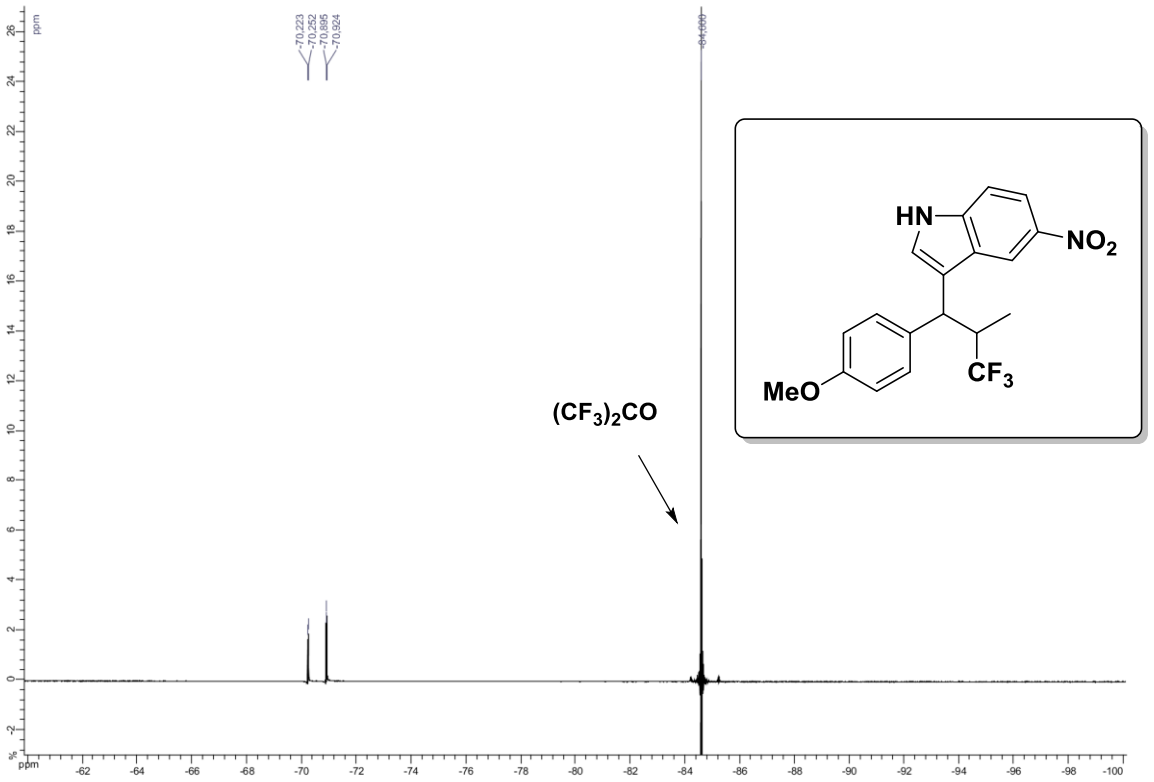



-70,245
-70,274
-71,099
-71,129
-84,600
HN
MeO
CF3
(CF3)2CO
ppm

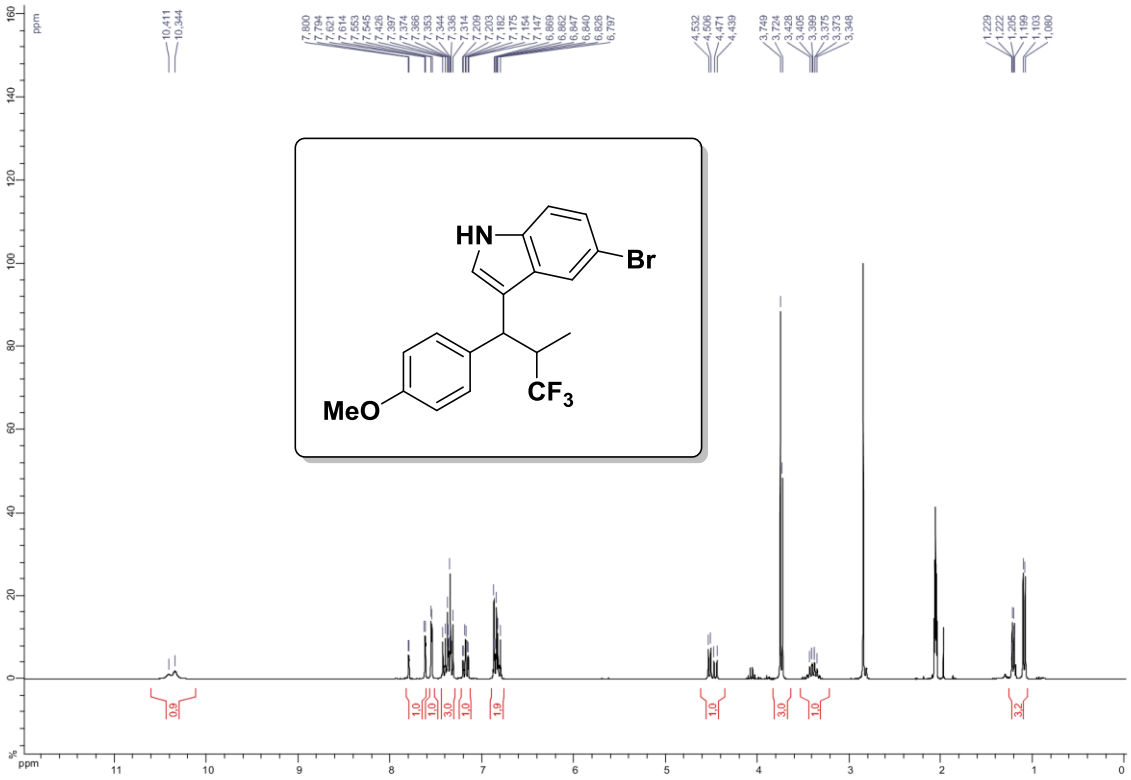
5-nitro-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5r

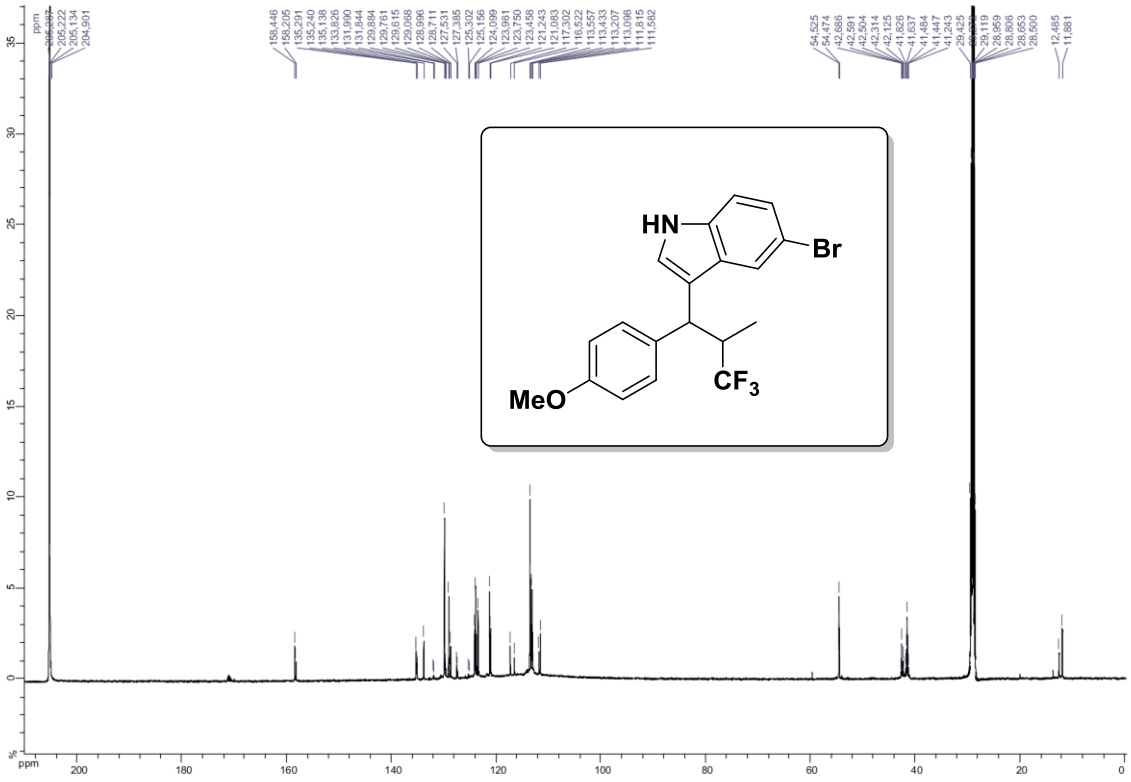


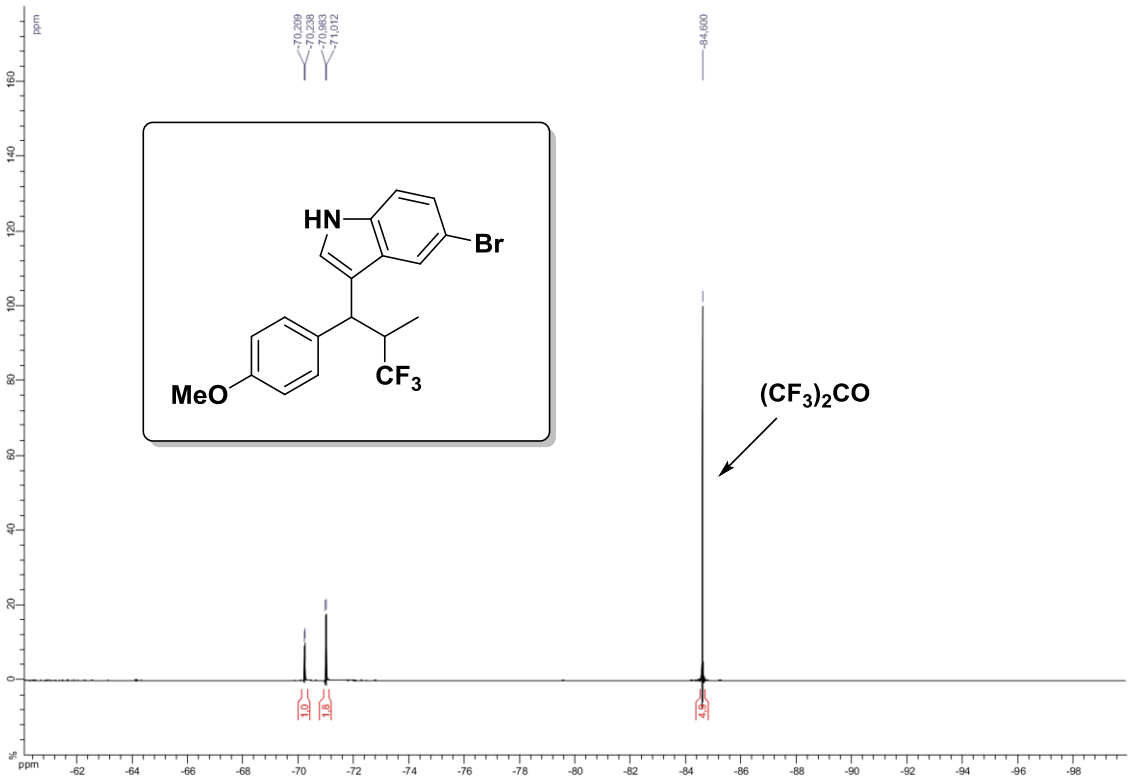



-70.223
-70.252
-70.895
-70.924
-84.000
HN
NO2
MeO
CF3
(CF3)2CO
ppm

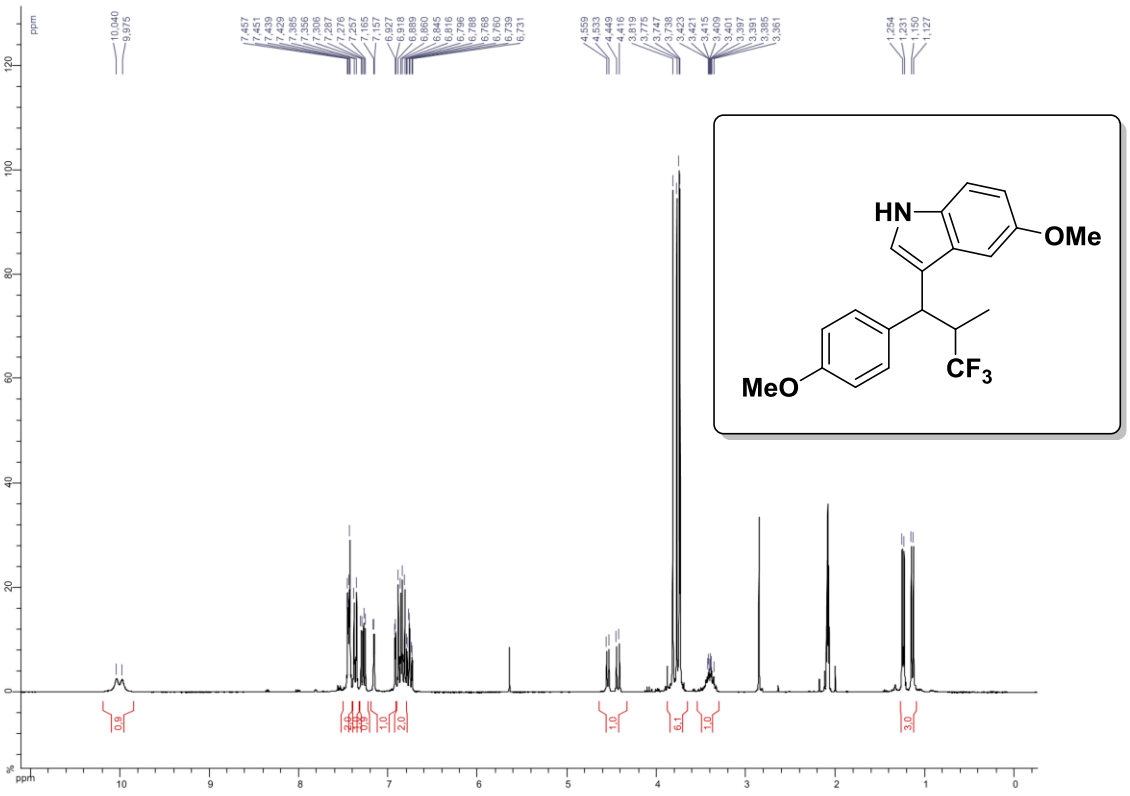
5-bromo-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5s

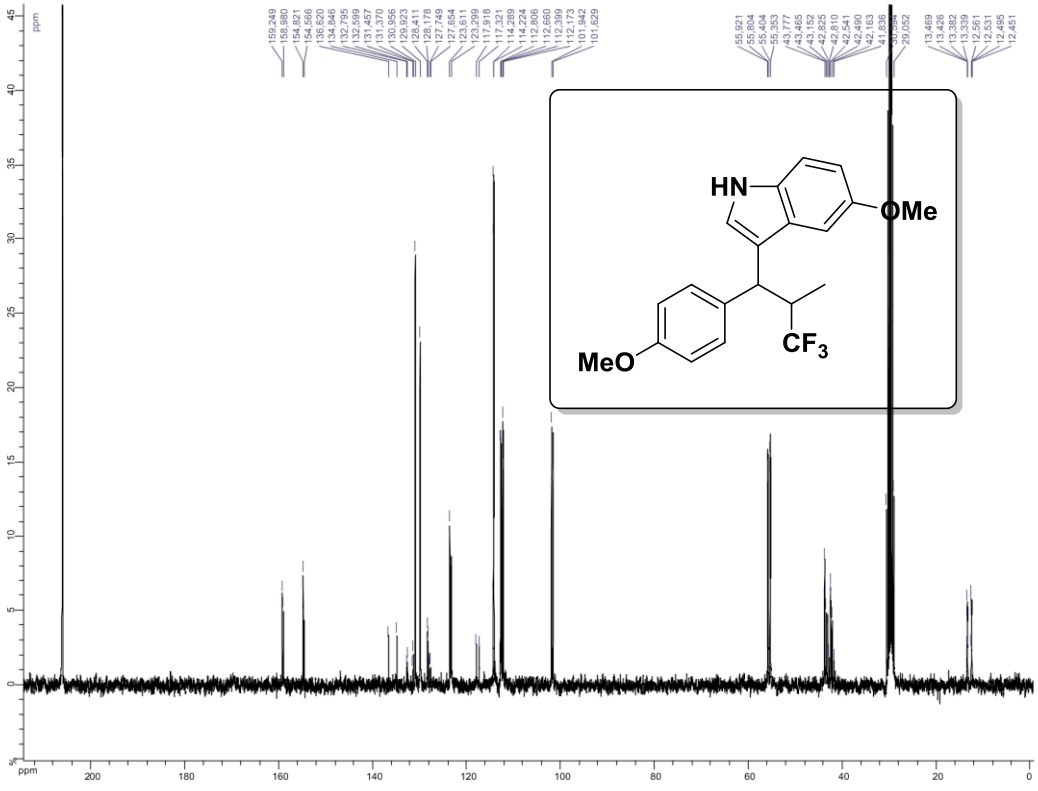


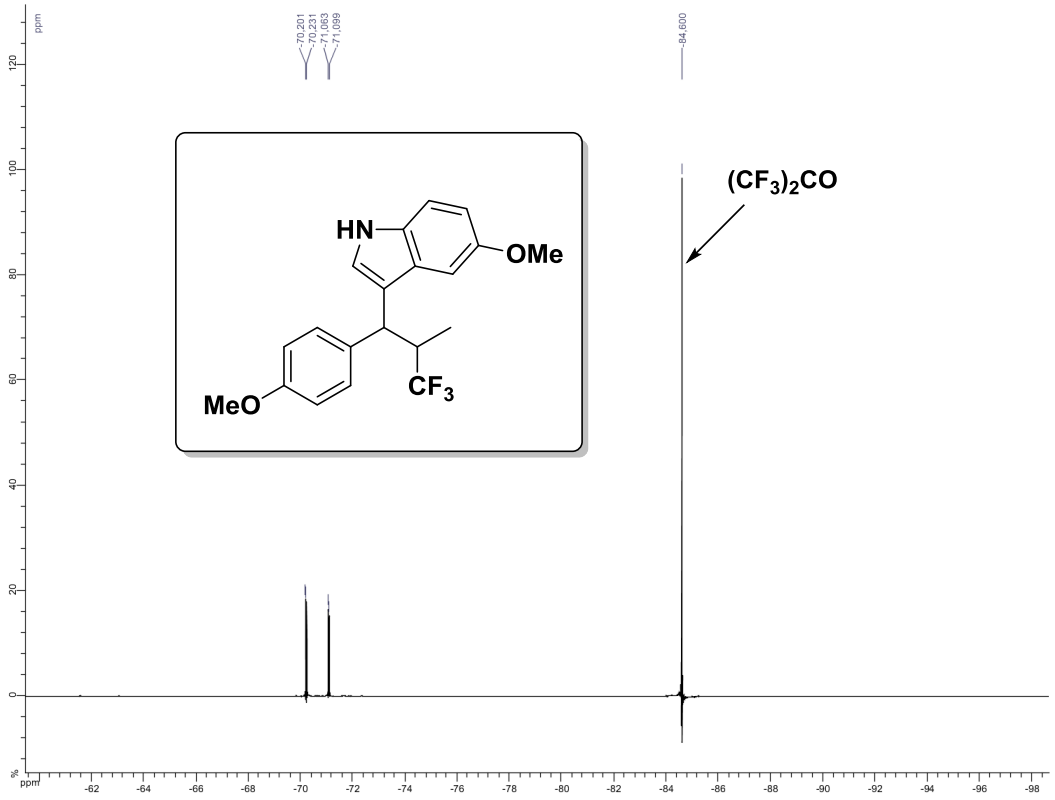



ppm
-70,209
-70,238
-70,883
-71,012
-84,600
HN
Br
MeO
CF3
(CF3)2CO
1.0
1.8
4.9
ppm

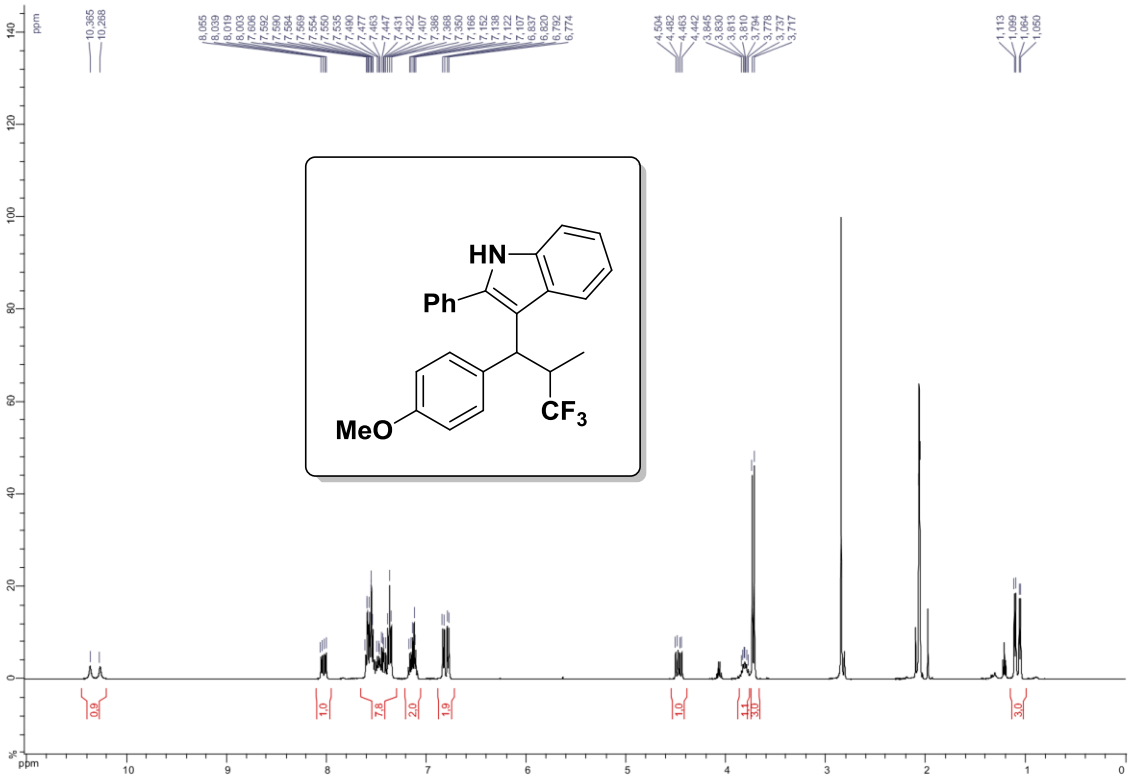
5-methoxy-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5t

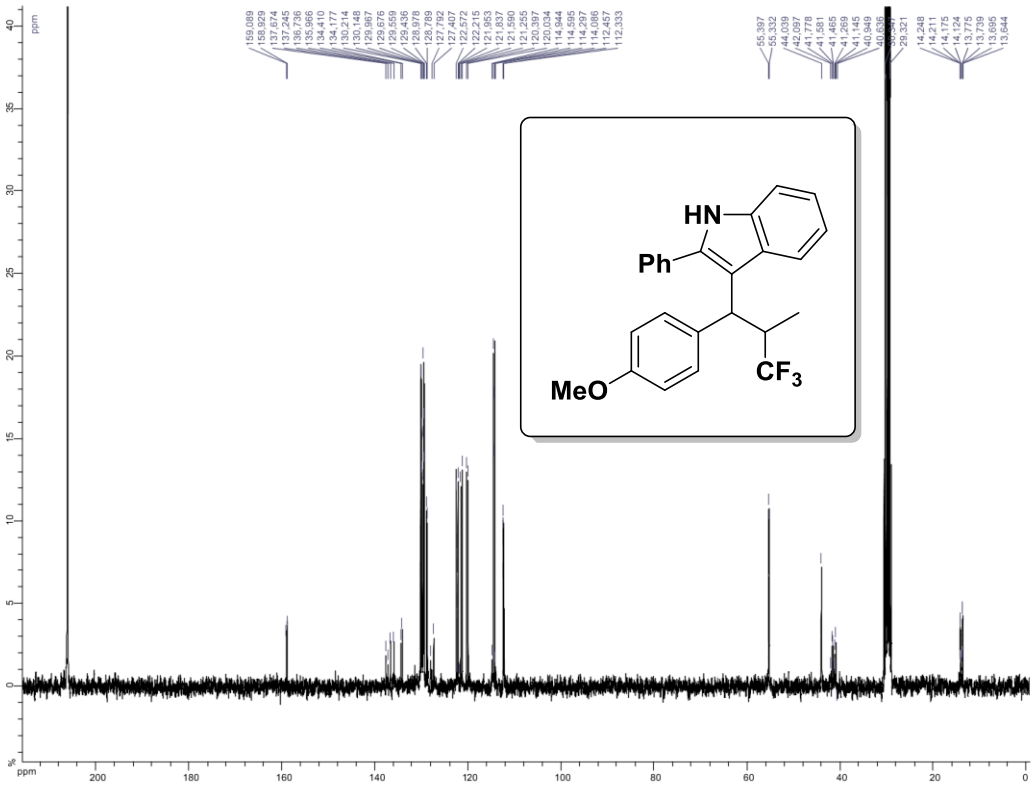


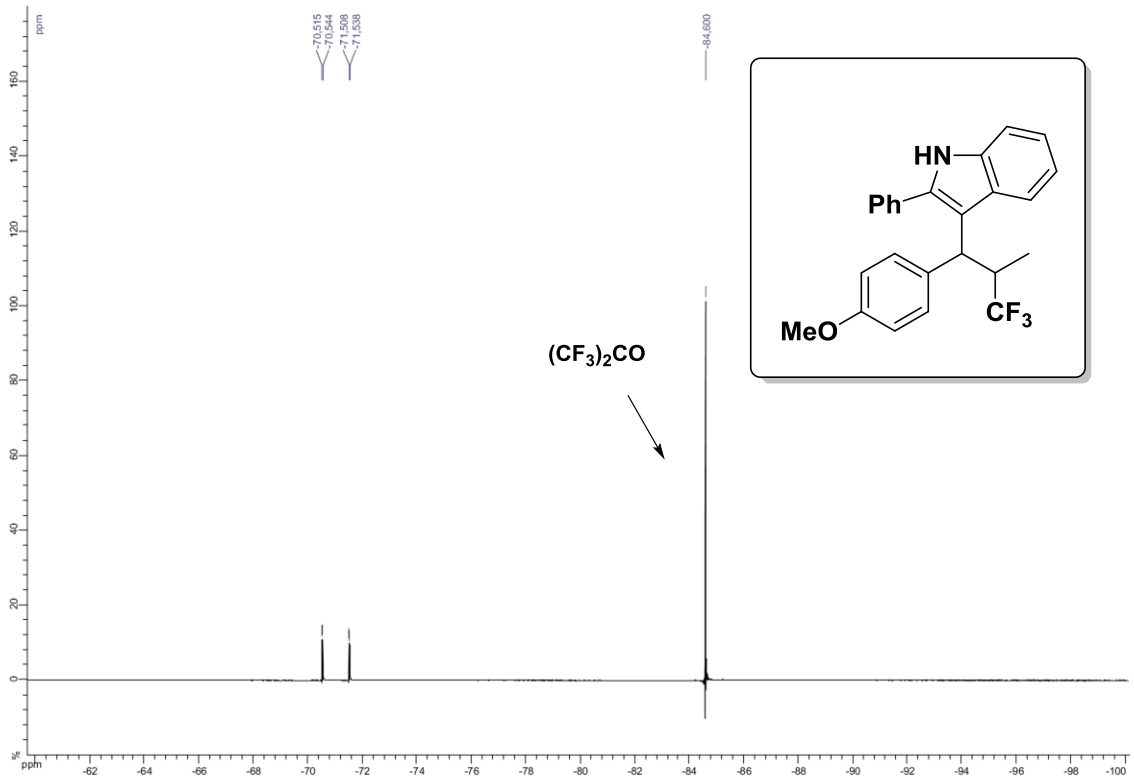



ppm
-70.201
-70.231
-71.063
-71.099
-84.600
HN
OMe
MeO
CF3
(CF3)2CO
120
100
80
60
40
20
0
%
ppm
-62
-64
-66
-68
-70
-72
-74
-76
-78
-80
-82
-84
-86
-88
-90
-92
-94
-96
-98

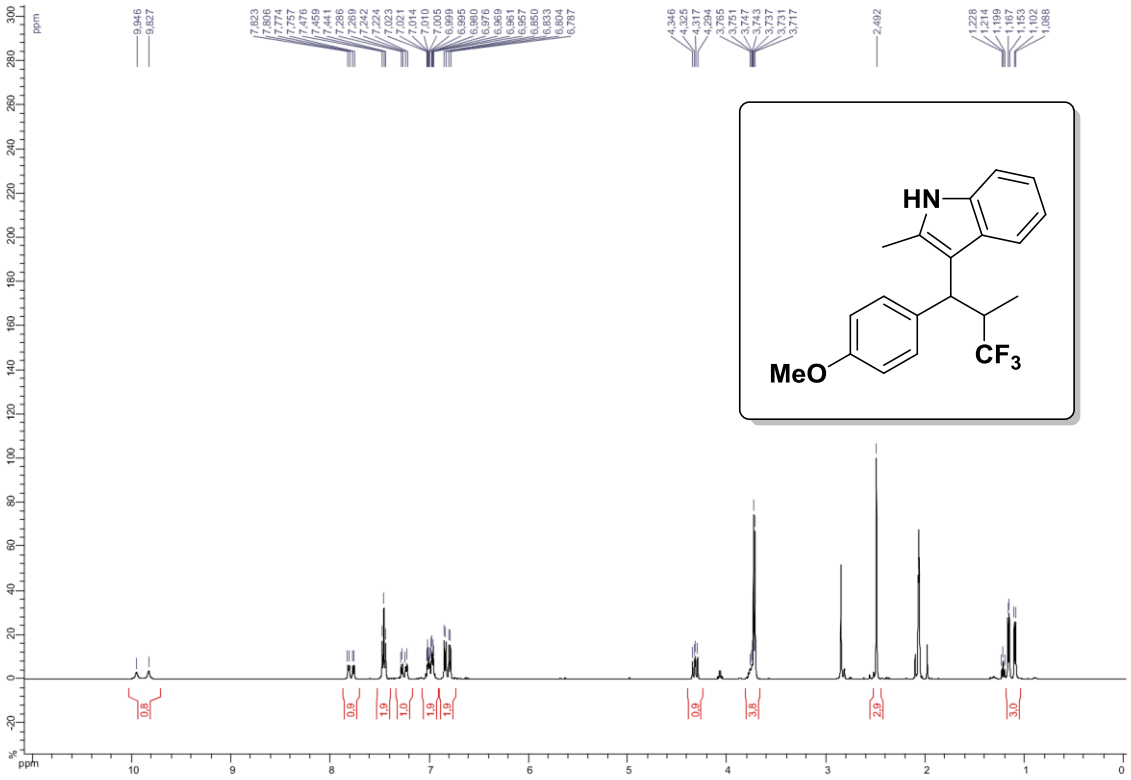
2-phenyl-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5u

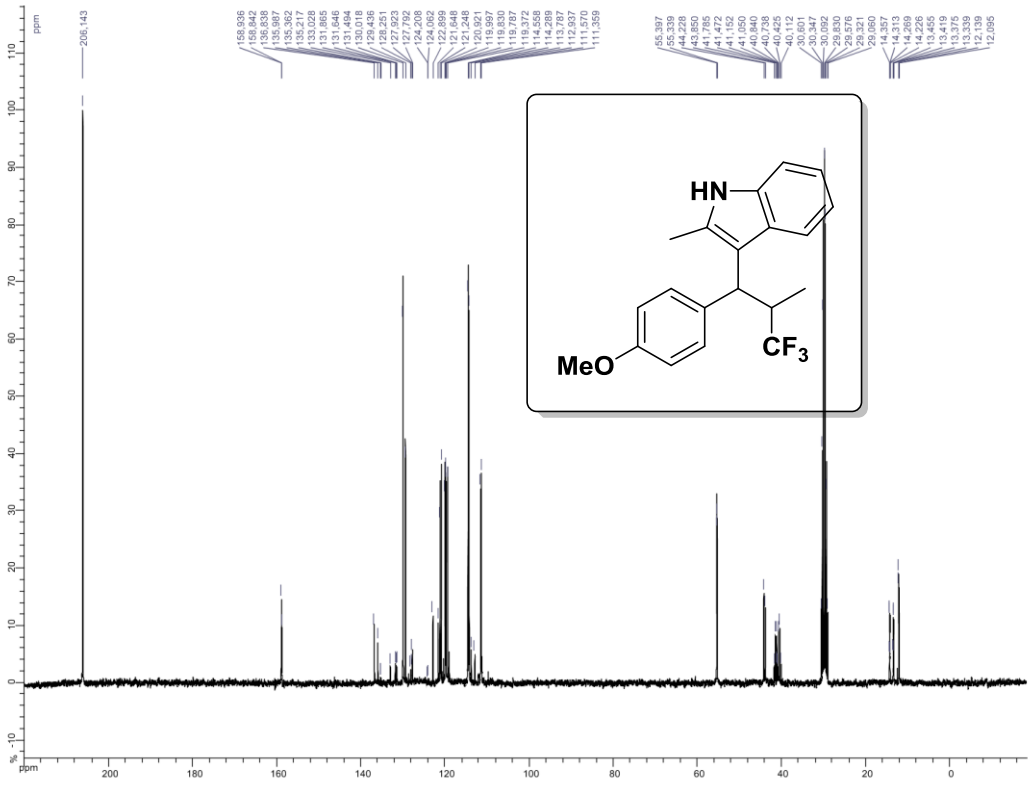


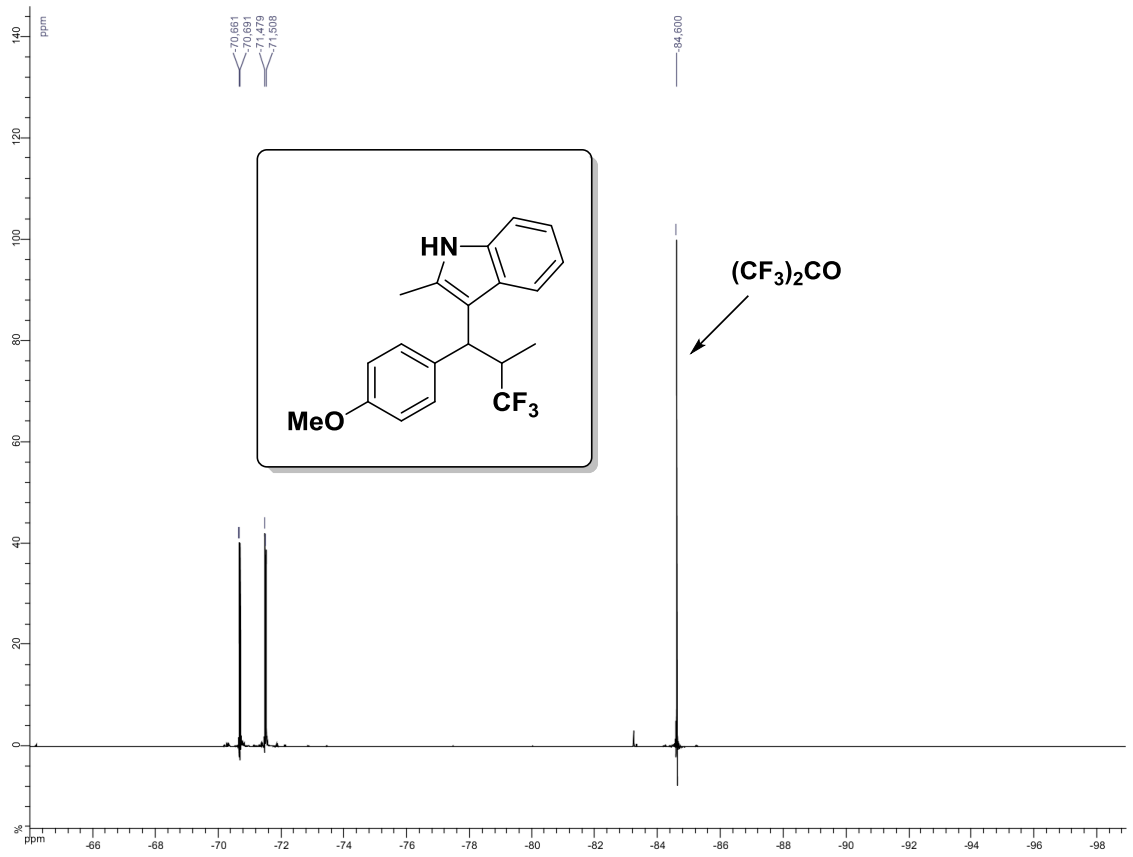



ppm
-70,515
-70,544
-71,508
-71,538
-84,600
HN
Ph
MeO
CF3
(CF3)2CO
160
140
120
100
80
60
40
20
0
ppm
-62
-64
-66
-68
-70
-72
-74
-76
-78
-80
-82
-84
-86
-88
-90
-92
-94
-96
-98
-100

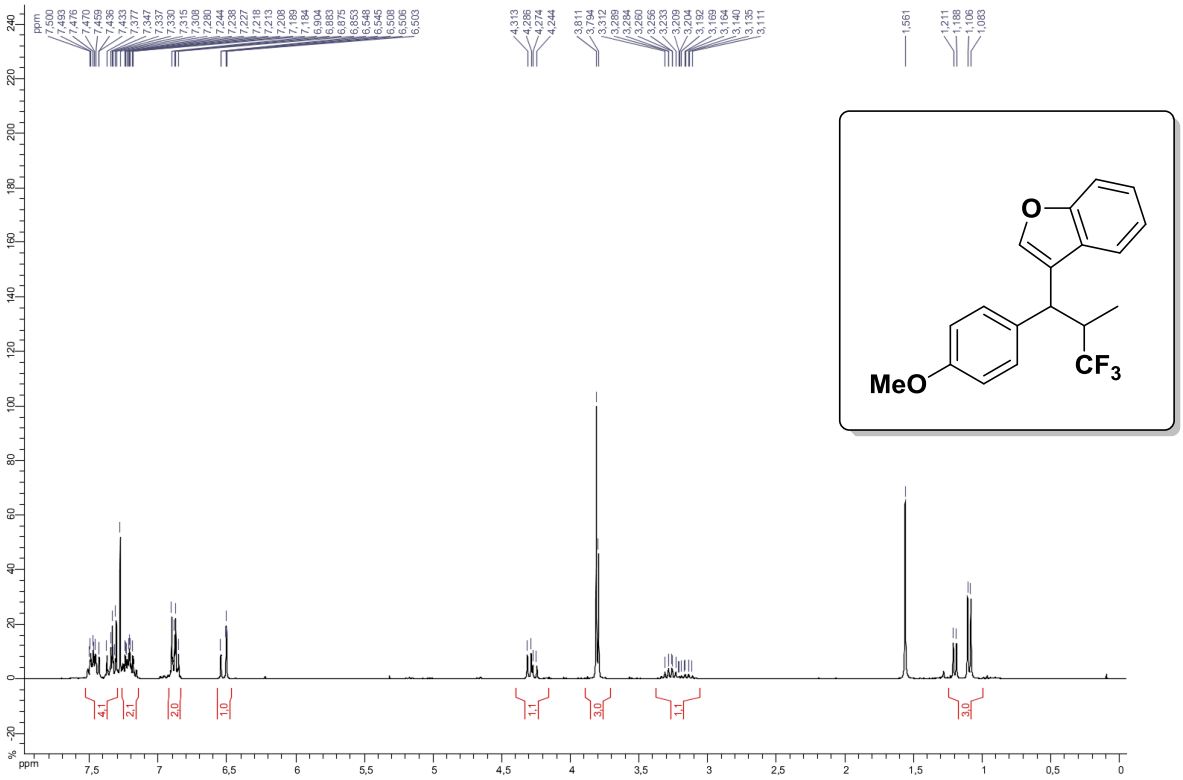
2-methyl-3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)-1*H*-indole 5v

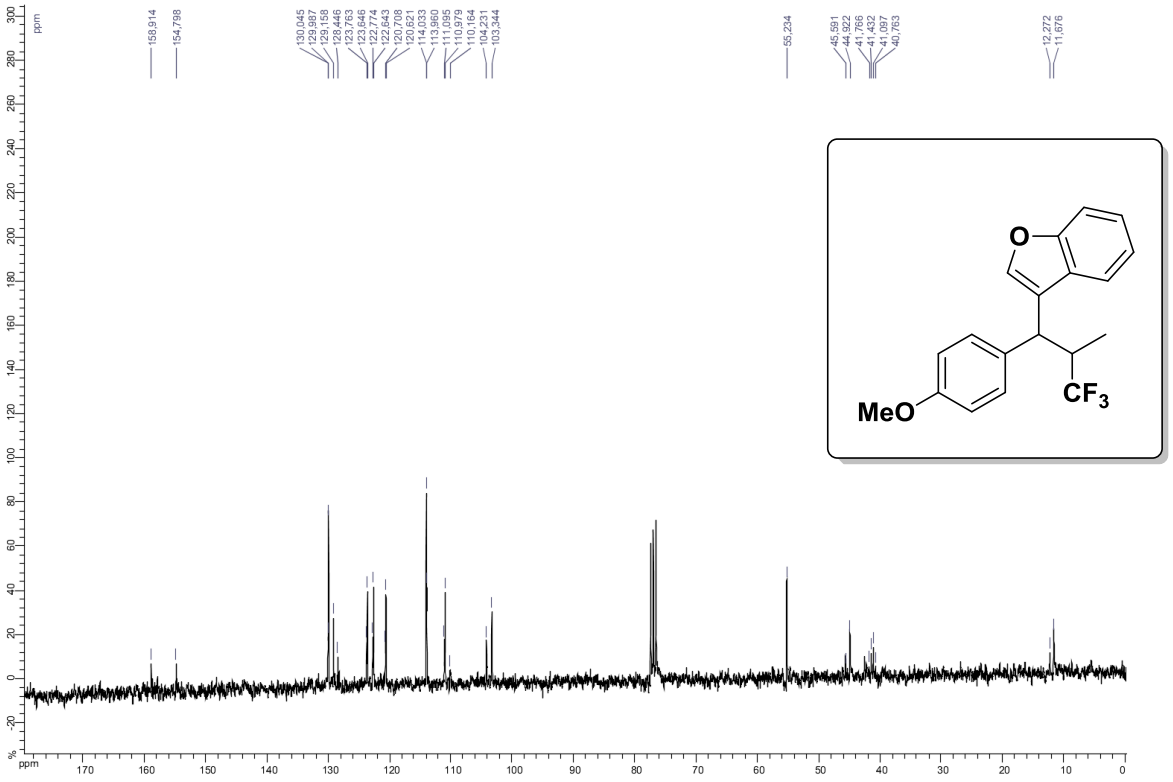


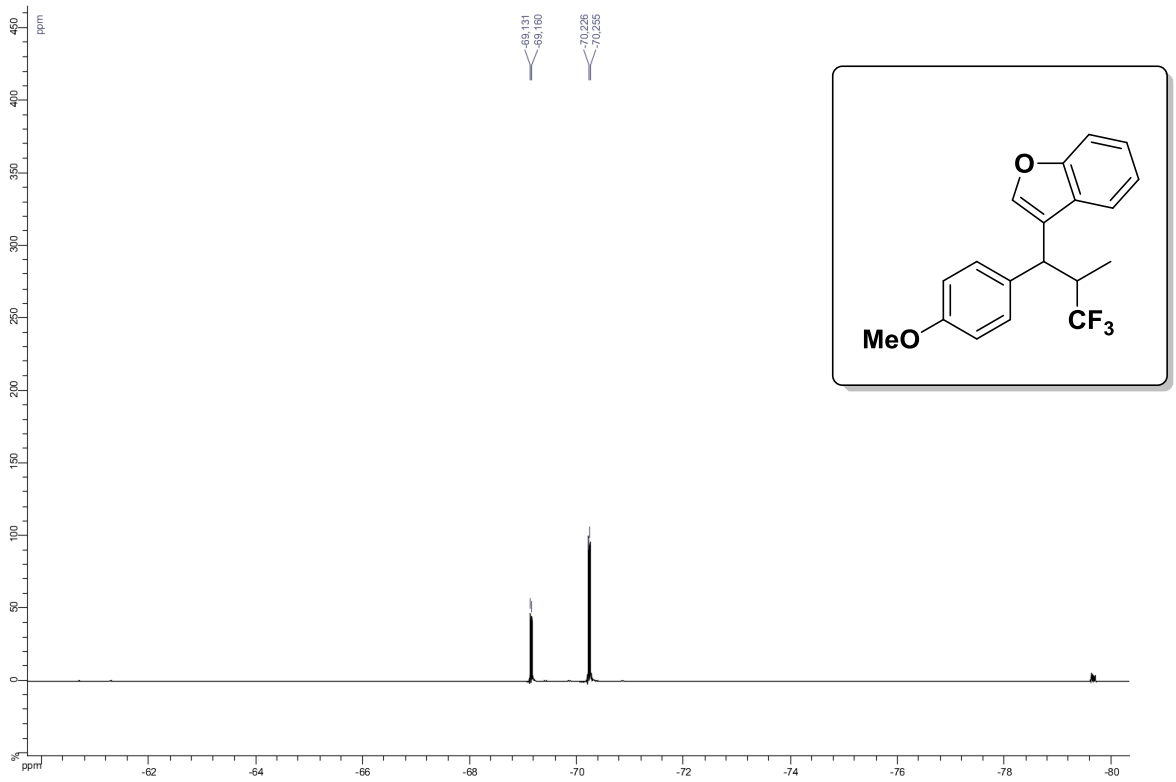



-70,661
-70,691
-71,479
-71,508
-84,600
HN
MeO
CF3
(CF3)2CO
ppm
140
120
100
80
60
40
20
0
%
-66
-68
-70
-72
-74
-76
-78
-80
-82
-84
-86
-88
-90
-92
-94
-96
-98

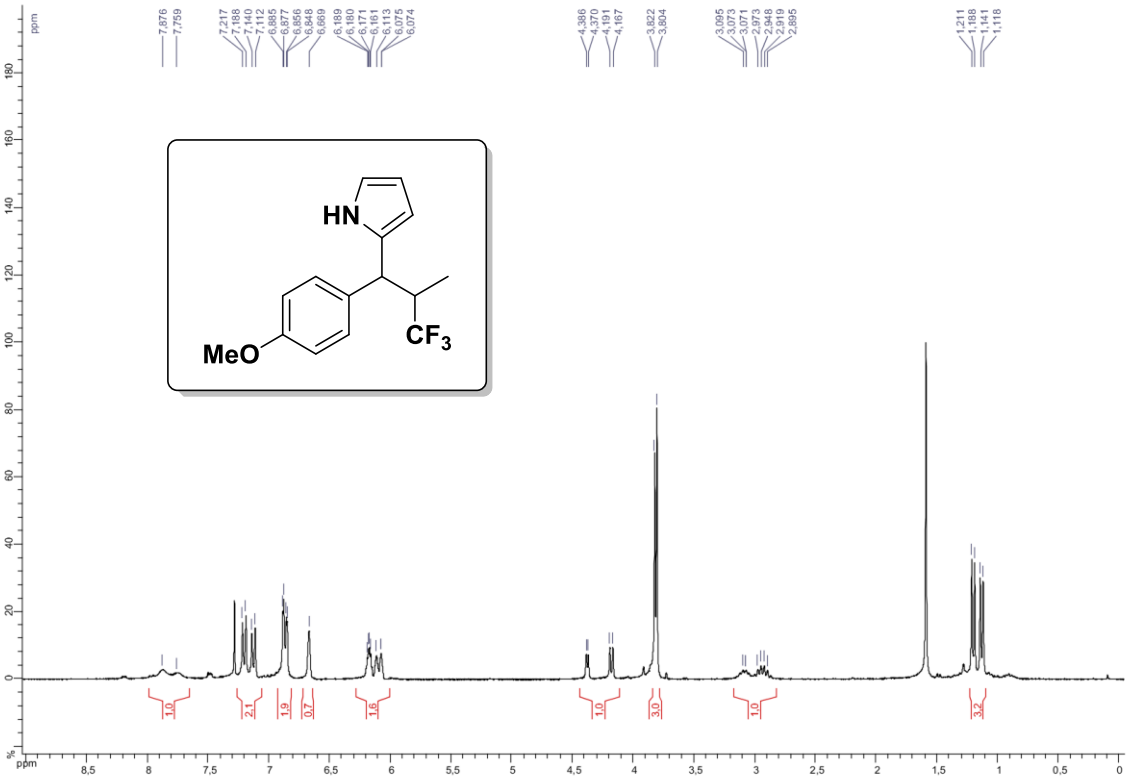
3-(3,3,3-trifluoro-1-(4-methoxyphenyl)-2-methylpropyl)benzofuran 5w

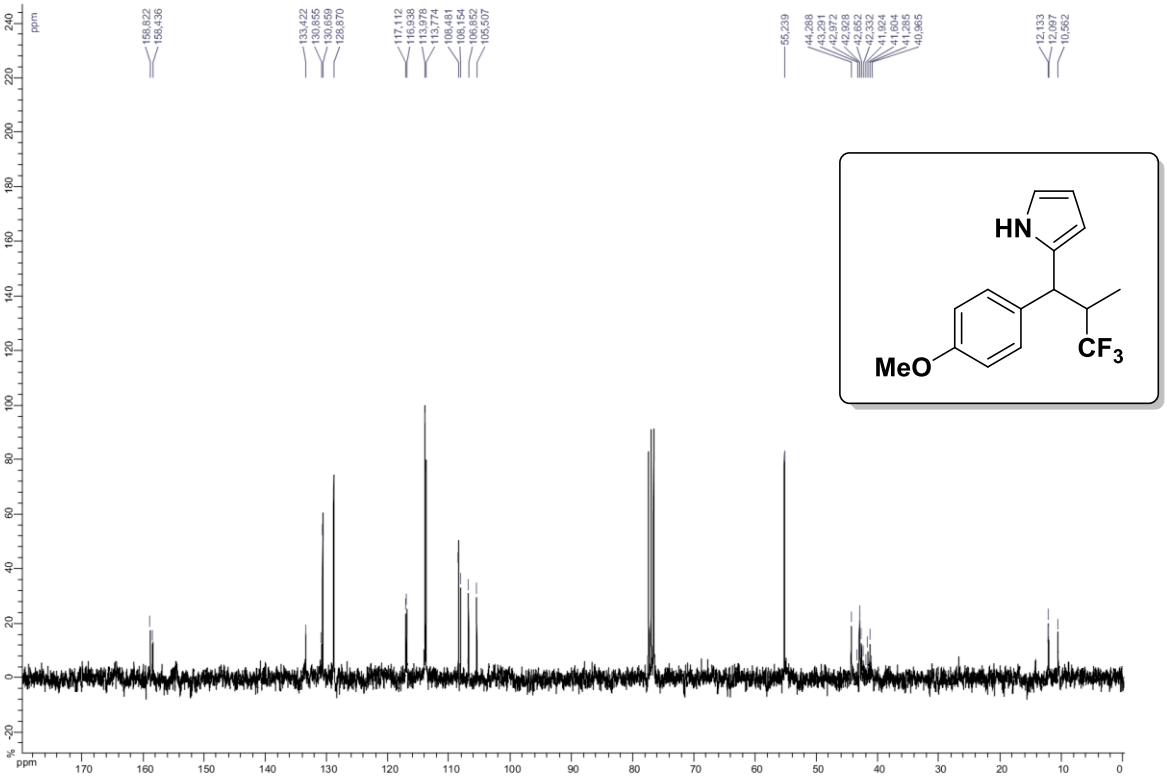


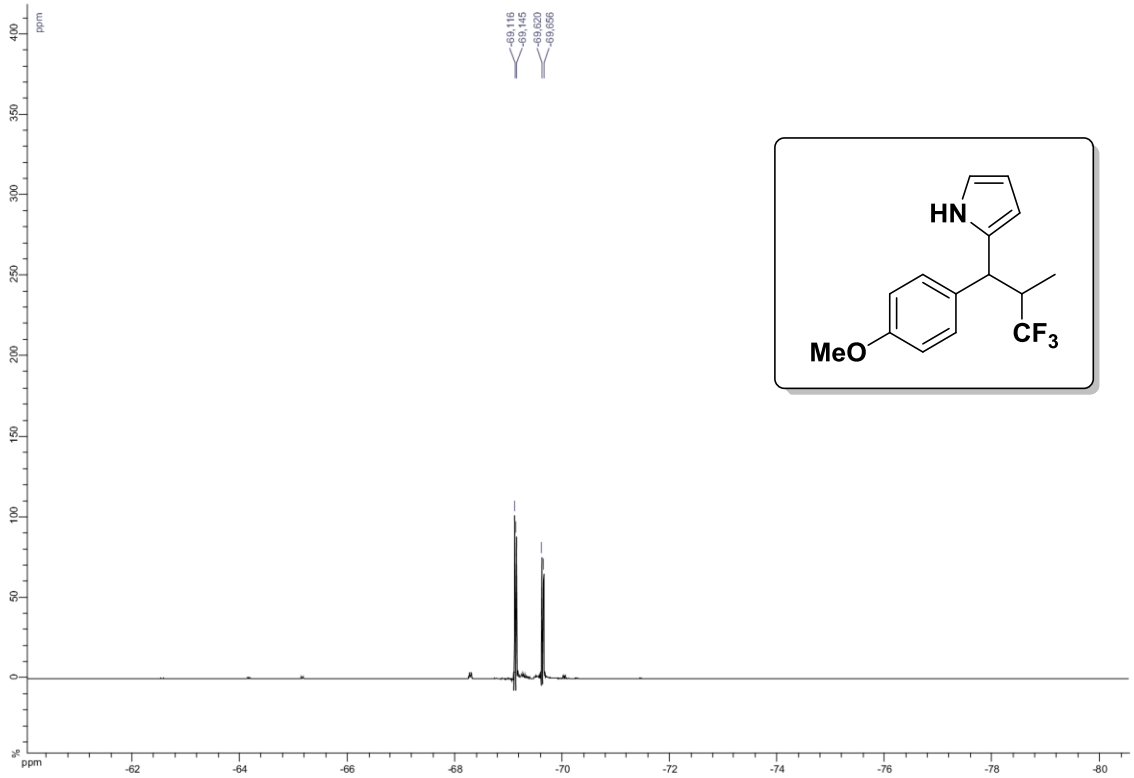



-69.131
-69.160
-70.226
-70.255
O
MeO
CF3
ppm
-62
-64
-66
-68
-70
-72
-74
-76
-78
-80

2-(3,3,3-trifluoro-1-(4-methoxyphenylpropyl)-2-methylpropyl)-1H-pyrrole 5x






-69.116
-69.145
-69.620
-69.656
HN
MeO
CF3
ppm
-62
-64
-66
-68
-70
-72
-74
-76
-78
-80